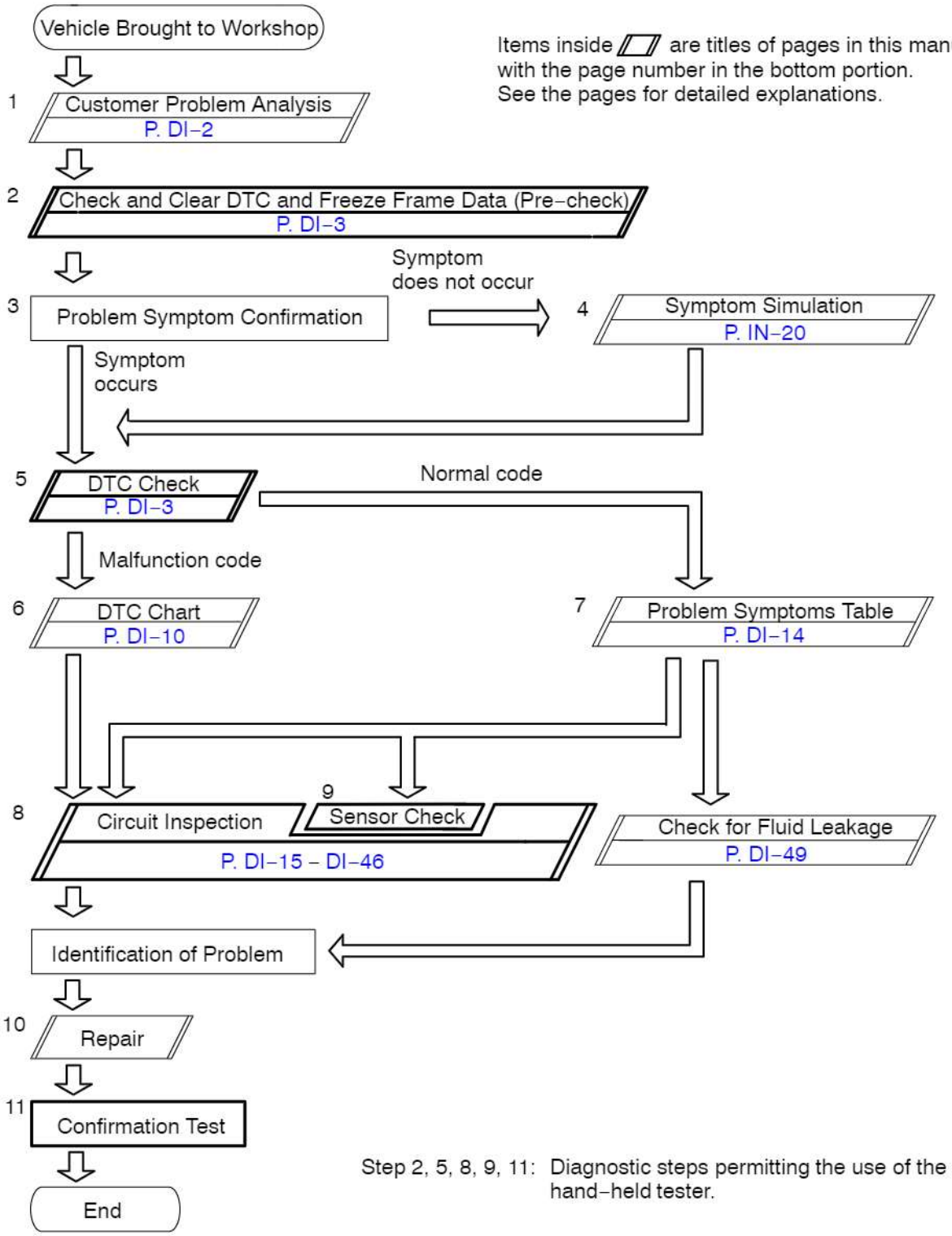
ANTI–LOCK BRAKE SYSTEM WITH ELECTRONIC BRAKE FORCE DISTRIBUTION (EBD)

HOW TO PROCEED WITH TROUBLESHOOTING

DI6M7–04

Troubleshoot in accordance with the procedure on the following pages.



Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the hand–held tester.

Fail safe function:
When a failure occurs in the ABS system, the ABS warning light comes on and the ABS operation is prohibited. In addition to this, when the failure which disables the EBD operation occurs, the brake warning light comes on as well and the EBD operation is prohibited.

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DI6M8–02

CUSTOMER PROBLEM ANALYSIS CHECK

ABS Check Sheet

Inspector's Name :

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

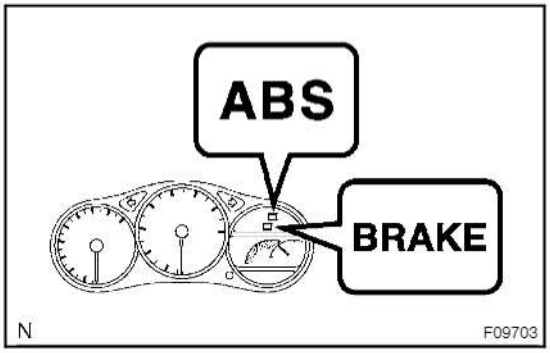
Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not comes on
	BRAKE Warning Light Abnormal	☐ Remains ON ☐ Does not come on

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

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DIAIJ–02



PRE–CHECK

1. DIAGNOSIS SYSTEM

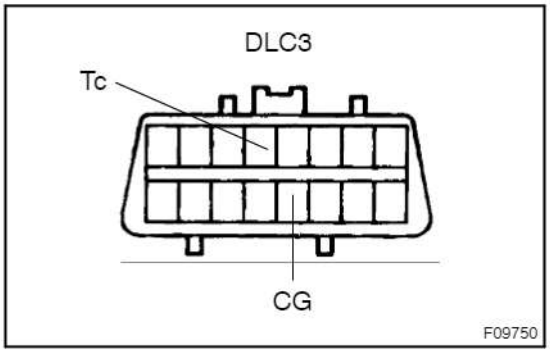
(a) Release the parking brake lever.

(b) Check the indicator.

When the ignition switch is turned ON, check that the ABS warning light and the BRAKE warning light come 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 come on.
- 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–39 or DI–42).



(c) In the case of not using hand –held tester:

Check DTC.

(1) Using SST, connect terminal Tc and CG of DLC3.

SST 09843–18040

(2) Turn the ignition switch to ON.

(3) Read DTC from the ABS warning light on the combination meter.

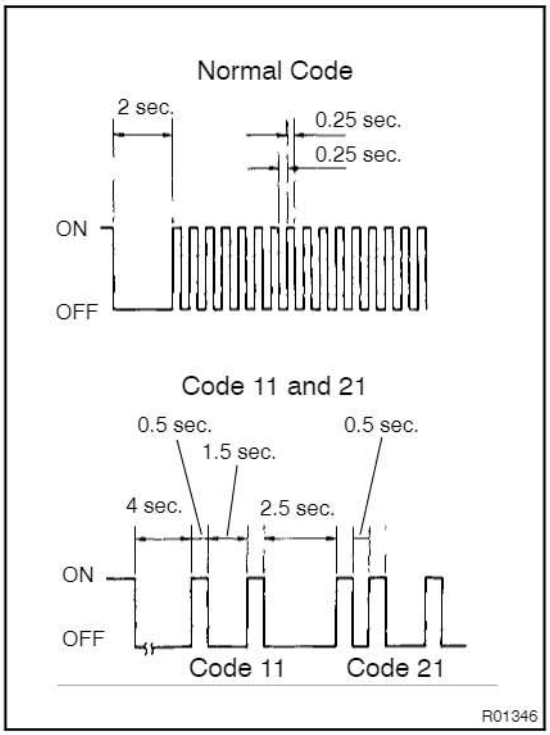
HINT:

- If no code appears, inspect the diagnostic circuit or ABS warning light circuit (See page DI–44 or DI–39).
- As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.

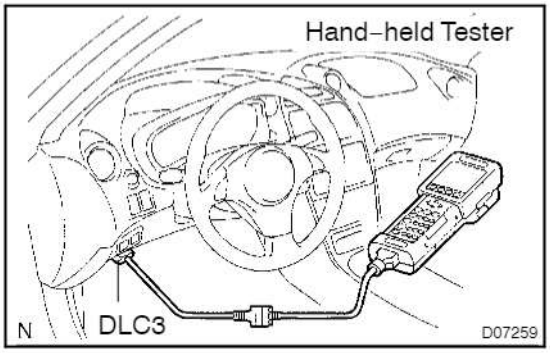
(4) Codes are explained in the code table on page DI–10.

(5) After completing the check, disconnect terminal Tc and CG, and turn off the display.

If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC will be displayed first.

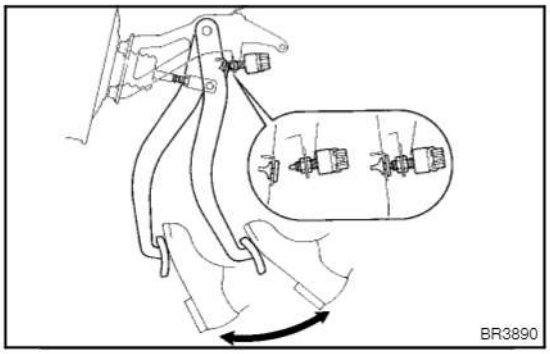


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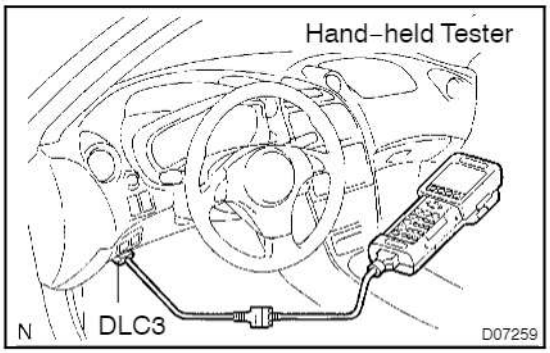


(d) In the case of using hand–held tester:
Check the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch to ON.
(3) Read DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.



(e) In case of not using hand–held tester:
Clear the DTC.
(1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(2) Turn the ignition switch to 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 DLC3.
SST 09843–18040



(f) In the case of using hand–held tester:
Clear the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch to ON.
(3) Operate the hand–held tester to erase the codes.

HINT:
Please refer to the hand–held tester operator's manual for further details.

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2. DATA LIST

HINT:

By the DATA LIST displayed by the hand–held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as a first step of troubleshooting is one of the method to shorten the labor time.

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch to ON.

(c) According to the display on tester, read the "DATA LIST".

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
ABS MOT RELAY	ABS motor relay / ON or OFF		
SOL RELAY	Solenoid relay / ON or OFF		
STOP LIGHT SW	Stop light switch / ON or OFF	ON : Brake pedal depressed OFF : Brake pedal released	
PKB SW	Parking brake switch / ON or OFF	ON : Parking brake applied OFF : Parking brake released	
ABS OPERT FR	ABS operation (FR) / BEFORE or OPERATE	BEFORE : No ABS operation (FR) OPERATE : During ABS operation (FR)	
ABS OPERT FL	ABS operation (FL) / BEFORE or OPERATE	BEFORE : No ABS operation (FL) OPERATE : During ABS operation (FL)	
ABS OPERT RR	ABS operation (RR) / BEFORE or OPERATE	BEFORE : No ABS operation (RR) OPERATE : During ABS operation (RR)	
ABS OPERT RL	ABS operation (RL) / BEFORE or OPERATE	BEFORE : No ABS operation (RL) OPERATE : During ABS operation (RL)	
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Speed indicated on speedometer
IG VOLTAGE	ECU power supply voltage / NORMAL or TOO LOW	NORMAL : 9.5 V or over TOO LOW : Below 9.5 V	
SFRR	ABS solenoid (SFRR) ON / OFF		

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Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
SFRH	ABS solenoid (SFRH) ON / OFF		
SFLR	ABS solenoid (SFLR) ON / OFF		
SFLH	ABS solenoid (SFLH) ON / OFF		
SRRR (SRR)	ABS solenoid (SRRR (SRR)) ON / OFF		
SRRH (SRH)	ABS solenoid (SRRH (SRH)) ON / OFF		
SRLR	ABS solenoid (SRLR) ON / OFF		
SRLH	ABS solenoid (SRLH) ON / OFF		
AIR BLD SUPPORT	Air bleed support / SUPPORT or NOT SUP	Supported	
TEST MODE	Test mode / NORMAL or TEST	NORMAL : Normal mode TEST : During test mode	
#CODES	Number of DTC recorded / min.: 0, max.: 255	Min.: 0, max.: 20	

3. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the hand–held tester allows the relay, the actuator and so on to operate without parts removal. Performing the ACTIVE TEST as a first step of troubleshooting is one of the method to shorten the labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON.

(c) According to the display on tester, perform the "ACTIVE TEST".

Item	Vehicle Condition / Test Details	Diagnostic Note
SFRR	Turns ABS solenoid (SFRR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH	Turns ABS solenoid (SFRH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLR	Turns ABS solenoid (SFLR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLH	Turns ABS solenoid (SFLH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRR	Turns ABS solenoid (SRRR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRH	Turns ABS solenoid (SRRH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLR	Turns ABS solenoid (SRLR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLH	Turns ABS solenoid (SRLH) ON / OFF	Operation of solenoid (clicking sound) can be heard

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Item	Vehicle Condition / Test Details	Diagnostic Note
SFRR & SFRH	Turns ABS solenoid SFRR & SFRH ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLR & SFLH	Turns ABS solenoid SFLR & SFLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SRH & SRR	Turns ABS solenoid SRH & SRR ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLR & SRLH	Turns ABS solenoid SRLR & SRLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH & SFLH	Turns ABS solenoid SFRH & SFLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SOL RELAY	Turns ABS solenoid relay ON / OFF	Operation of solenoid (clicking sound) can be heard
ABS MOT RELAY	Turns ABS motor relay ON / OFF	Operation of motor can be heard
ABS WARN LIGHT	Turns ABS warning light ON / OFF	Observe combination meter
BRAKE WRN LIGHT	Turns BRAKE warning light ON / OFF	Observe combination meter

4. FREEZE FRAME DATA

(a) The vehicle (sensor) status at the occurrence of abnormality of the diagnosis code and during the ABS operation can be memorized and displayed using the hand–held tester.

(b) Only one record of the freeze frame data is stored, however, the freeze frame data during the ABS operating is always up–dated. After the storage of the freeze frame data, up to 31 ignition "ON" operations are stored and displayed.

HINT:

If the ignition switch "ON" operation exceeds 31 times, "31" appears on the display.

(c) If the diagnosis code abnormality occurs, the freeze frame data at the occurrence of the abnormality is stored but the ABS actuation data is deleted.

Hand–held Tester Display	Measurement Item	Reference Value*
VEHICLE SPD	Wheel speed reading	Speed indication of a meter
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
# IG ON	Number of operations of ignition switch ON after memorizing freeze frame data	0 – 31
SYSTEM	System status	ABS activated: ABS Fail safe mode activated: FAIL SF No system activated: NO SYS

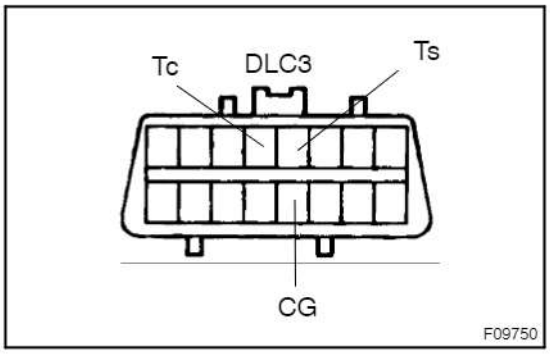
*: If no conditions are specifically stated for "Idling", it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

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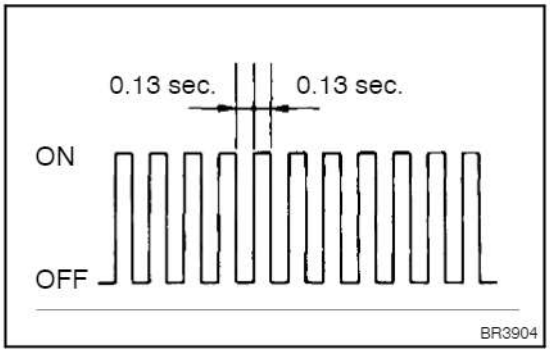
5. SPEED SENSOR SIGNAL

HINT:

- If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC of sensor check function will be erased.
- During test mode, ECU records all DTC of sensor check function. By preforming sensor signal check, the codes are erased if normality is confirmed. The codes remain if abnormality is found.



(a) In case of not using hand–held tester:
Check the speed sensor signal.
(1) Turn the ignition switch to OFF.
(2) Using SST, connect terminal Ts and CG of DLC3.
SST 09843–18040
(3) Start the engine.



(4) Check that the ABS warning light blinks.

HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit and the Ts circuit (See page DI–39 and DI–46).

(5) Drive vehicle straight forward.

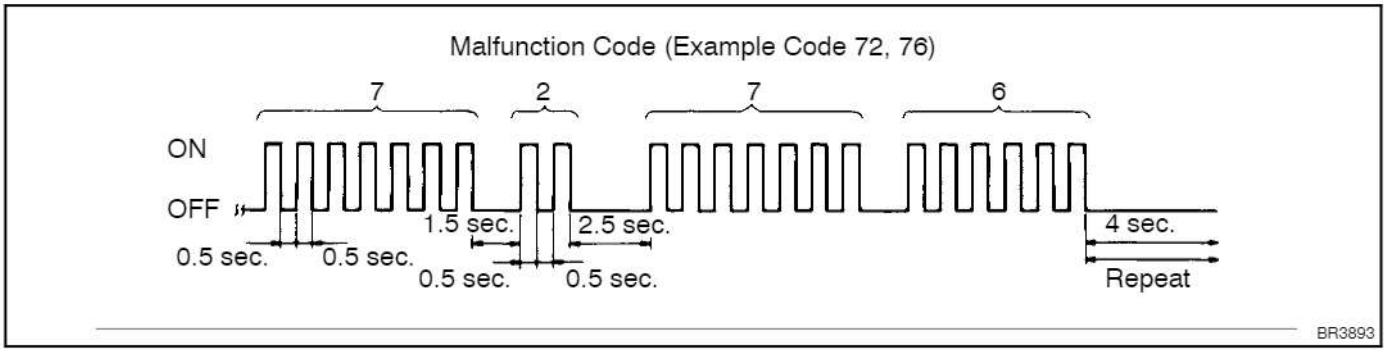
HINT:

Drive vehicle faster than 45 km/h (28 mph) for several seconds.

(6) Stop the vehicle.
(7) Using SST, connect terminal Tc and CG of DLC3.
SST 09843–18040
(8) Read the number of times of the ABS warning light blinks.

HINT:

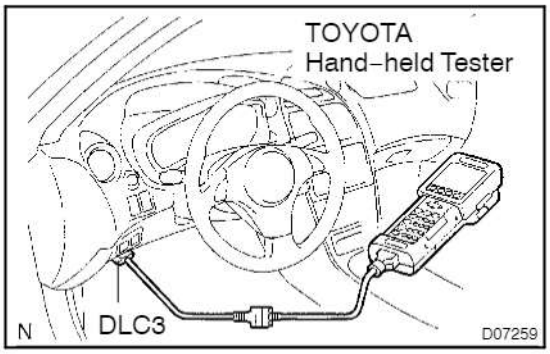
- See the list of DTC shown on the DTC chart (See page DI–10).
- If every sensor is normal, a normal code is output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed first.



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(9) After doing the check, disconnect the SST from terminal Ts and CG, Tc and CG of DLC3, and turn the ignition switch to OFF.

SST 09843–18040



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

HINT:
Please refer to the hand–held tester operator's manual for further details.

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DI6MA–02

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- Using SST 09843–18040, connect the terminals Tc and CG of the DLC3.
- If any abnormality is not found as inspecting parts, inspect ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed for the code. For details of each code, turn to the page referred to under the "See page" for respective "DTC No." in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area
C0278/11 (DI–27)	Open circuit in ABS solenoid relay circuit	• ABS solenoid relay • ABS solenoid relay circuit • ABS actuator
C0279/12 (DI–27)	Short circuit in ABS solenoid relay circuit	
C0273/13 (DI–24)	Open circuit in ABS motor relay circuit	• ABS motor relay • ABS motor relay circuit • ABS actuator
C0274/14 (DI–24)	Short circuit in ABS motor relay circuit	
C0226/21 (DI–22)	Open or short circuit in 2–position solenoid circuit for right front wheel	• ABS actuator • SFRR or SFRH circuit
C0236/22 (DI–22)	Open or short circuit in 2–position solenoid circuit for left front wheel	• ABS actuator • SFLR or SFLH circuit
C0246/23 (DI–22)	Open or short circuit in 2–position solenoid circuit for right rear wheel	• ABS actuator • SRRR or SRRH circuit
C0256/24 (DI–22)	Open or short circuit in 2–position solenoid circuit for left rear wheel	• ABS actuator • SRLR or SRLH circuit
C0200/31 (DI–15)	Right front wheel speed sensor signal malfunction	• Right front or left front speed sensor • Each speed sensor circuit • Speed sensor rotor
C0205/32 (DI–15)	Left front wheel speed sensor signal malfunction	
C0210/33 (DI–15)	Right rear wheel speed sensor signal malfunction	• Right rear or left rear speed sensor • Each speed sensor circuit • Speed sensor rotor • Rear axle hub
C0215/34 (DI–15)	Left rear wheel speed sensor signal malfunction	
C1235/35 (DI–15)	Foreign matter is stuck on the tip of the right front sensor	• Right front, left front, right rear or left rear speed sensor • Each speed sensor circuit • Speed sensor rotor
C1236/36 (DI–15)	Foreign matter is stuck on the tip of the left front sensor	
C1238/38 (DI–15)	Foreign matter is stuck on the tip of the right rear sensor	
C1239/39 (DI–15)	Foreign matter is stuck on the tip of the left rear sensor	
C1241/41 (DI–30)	Power source voltage down	• Battery • Charging system • Power source circuit
C1249/49 (DI–33)	Open circuit in stop light switch circuit	• Stop light switch • Stop light switch circuit • Stop light bulb

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C1251/51 (DI–35)	Pump motor is locked	• ABS pump motor
Always ON (DI–37)	Malfunction in ECU	• Battery • Charging system • Skid control ECU

HINT:

There is a case that hand–held tester cannot be used when the ABS warning light remains ON.

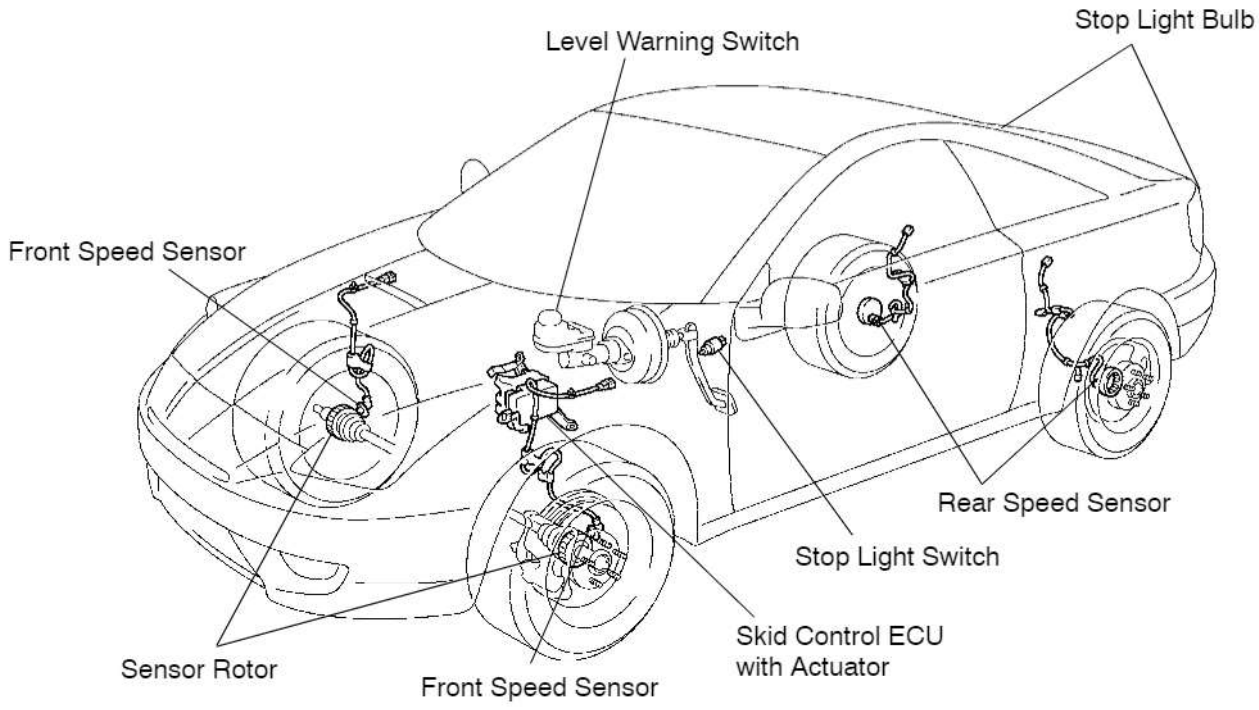
DTC of speed sensor check function:

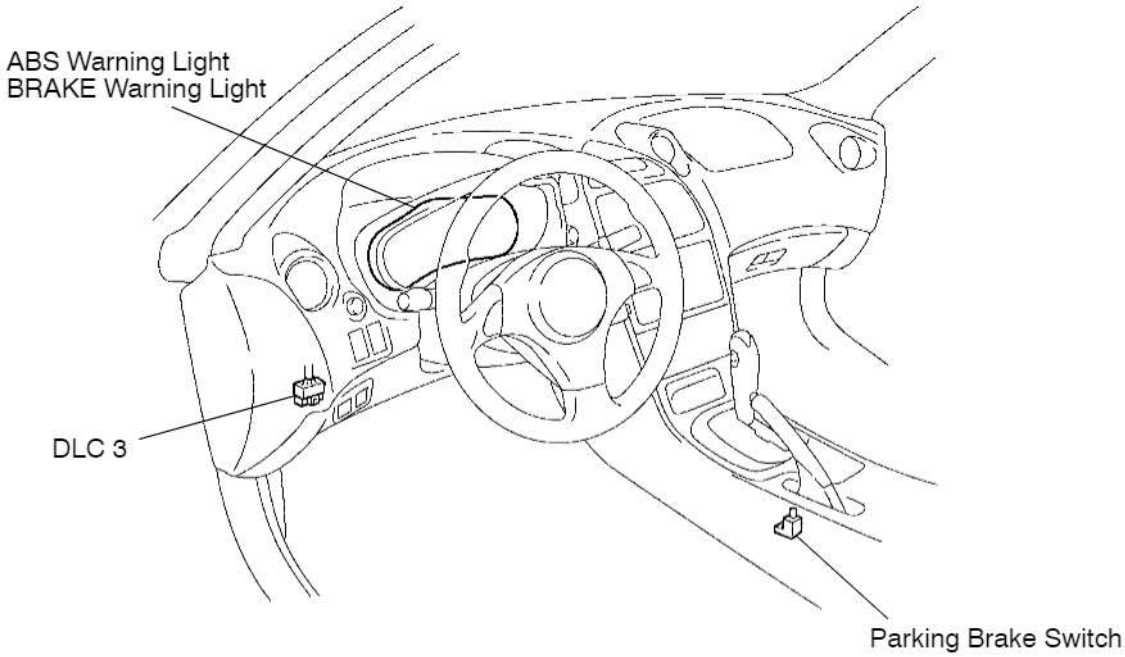
Code No.	Diagnosis	Trouble Area
C1271/71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Right front speed sensor rotor
C1272/72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Left front speed sensor rotor
C1273/73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Right rear speed sensor rotor
C1274/74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Left rear speed sensor rotor
C1275/75	Abnormal change in output voltage of right front speed sensor	Right front speed sensor rotor
C1276/76	Abnormal change in output voltage of left front speed sensor	Left front speed sensor rotor
C1277/77	Abnormal change in output voltage of right rear speed sensor	Right rear speed sensor rotor
C1278/78	Abnormal change in output voltage of left rear speed sensor	Left rear speed sensor rotor

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DI6MB–03

PARTS LOCATION





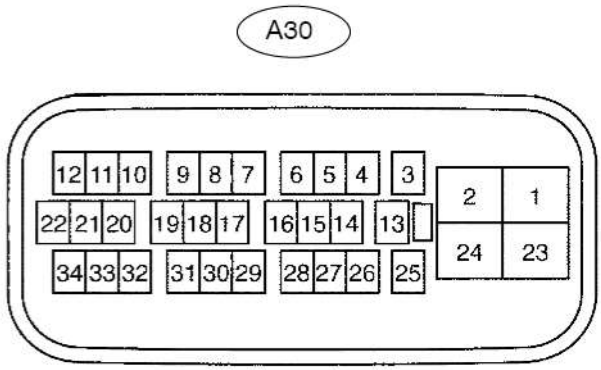
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DI6SJ–08

TERMINALS OF ECU



F17747

Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
+BS (A30–1) – GND (A30–2, 24)	L ↔ W–B	Always	11 – 14
FL+ (A30–9) – FL– (A30–8)	Y – BR	IG switch ON, slowly turn left front wheel	AC generation
STP (A30–10) – GND (A30–2, 24)	G–W ↔ W–B	Stop light switch ON	10 – 14
		Stop light switch OFF	Below 1.0
RL+ (A30–11) – RL– (A30–12)	R ↔ G	IG switch ON, slowly turn left rear wheel	AC generation
WA (A30–13) – GND (A30–2, 24)	V ↔ W–B	IG switch ON, ABS warning light ON	10 – 14
		IG switch ON, ABS warning light OFF	Below 2.0
D/G (A30–14) – GND (A30–2, 24)	W ↔ W–B	IG switch ON	10 – 14
Ts (A30–15) – GND (A30–2, 24)	W–R ↔ W–B	IG switch ON	10 – 14
Tc (A30–16) – GND (A30–2, 24)	P–B ↔ W–B	IG switch ON	10 – 14
PKB (A30–18) – GND (A30–2, 24)	R–B ↔ W–B	IG switch ON, parking switch ON	Below 1.0
		IG switch ON, parking switch OFF	10 – 14
+BM (A30–23) – GND (A30–2, 24)	L ↔ W–B	Always	11 – 14
IG1 (A30–25) – GND (A30–2, 24)	B–O ↔ W–B	IG switch ON	10 – 14
SP1 (A30 – 26) – GND (A30–2, 24)	L–B ↔ W–B	Vehicle drives at about 20 km/h (12 mph)	Pulse generation
FR+ (A30–31) – FR– (A30–30)	P ↔ L	IG switch ON, slowly turn right front wheel	AC generation
BRL (A30–32) – GND (A30–2, 24)	GR ↔ W–B	IG switch ON, brake warning light ON	10 – 14
		IG switch ON, brake warning light OFF	Below 2.0
RR+ (A30–33) – RR– (A30–34)	W ↔ B	IG switch ON, slowly turn right rear wheel	AC generation

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DI6MD–04

PROBLEM SYMPTOMS TABLE

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

NOTICE:

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

Symptom	Suspect Area	See page
ABS does not operate	Only when 1. to 4. are all normal and the problem is still occurring, replace the Skid Control ECU. 1. Check the DTC reconfirming that the normal code is output. 2. IG power source circuit 3. Speed sensor circuit 4. Check the ABS actuator with a hand–held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–49).	DI–3 DI–30 DI–15 BR–18
ABS does not operate efficiently	Only when 1. to 4. are all normal and the problem is still occurring, replace the Skid Control ECU. 1. Check the DTC reconfirming that the normal code is output. 2. Speed sensor circuit 3. Stop light switch circuit 4. Check the ABS actuator with a hand–held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–49).	DI–3 DI–15 DI–33 BR–18
ABS warning light abnormal	1. ABS warning light circuit 2. Skid Control ECU	DI–39
BRAKE warning light abnormal	1. BRAKE warning light circuit 2. Skid Control ECU	DI–42
DTC check cannot be done	Only when 1. and 2. are all normal and the problem is still occurring, replace the Skid Control ECU. 1. ABS warning light circuit 2. Tc terminal circuit	DI–39 DI–44
Speed sensor signal check cannot be done	1. Ts terminal circuit 2. Skid Control ECU	DI–46

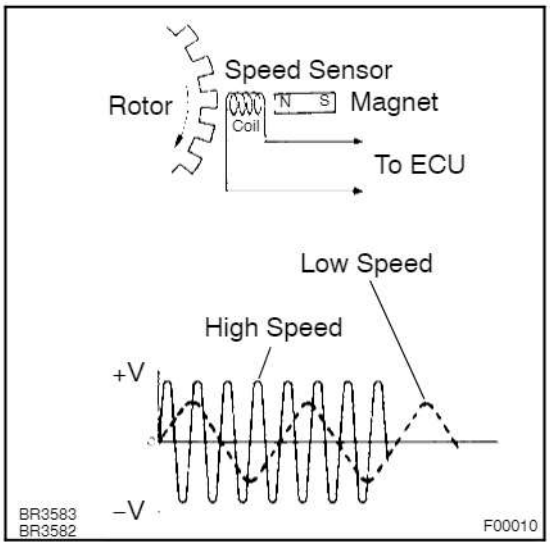
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DI6GL–05

CIRCUIT INSPECTION

DTC	C0200/31 to C1239/39	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. The front and the rear rotors each have 48 serrations.

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

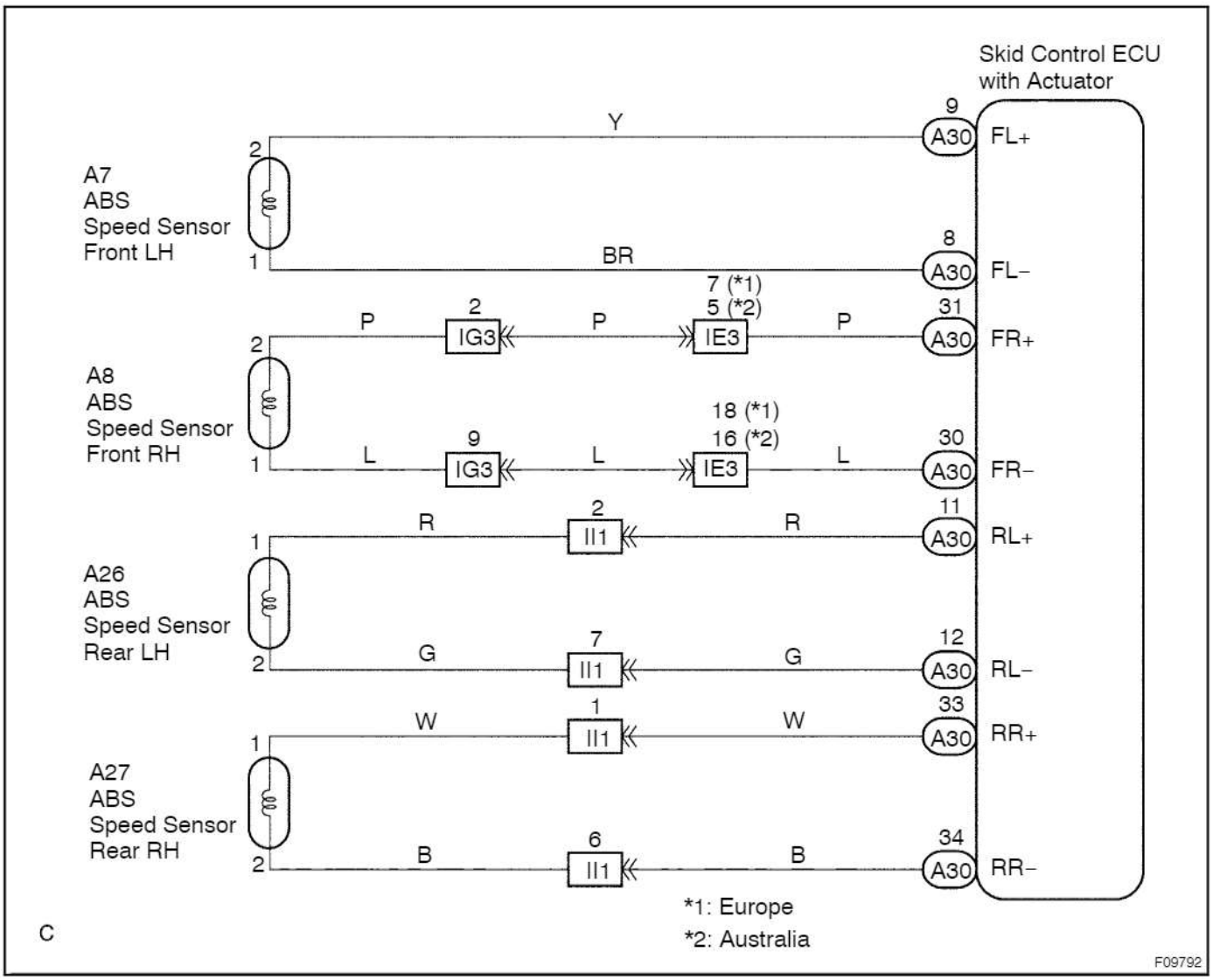
DTC No.	DTC Detecting Condition	Trouble Area
C0200/31 C0205/32	Detection of any of conditions from 1. through 3.: 1. Vehicle speed is at 10 km/h (6 mph) or more and the speed sensor signal circuit is open or short circuit continues for 15 sec. or more. 2. Momentary interruption of the speed sensor signal occurs 7 times or more. 3. Open circuit condition of the speed sensor signal circuit continues for 0.5 sec. or more.	• Right front or left front speed sensor • Each speed sensor circuit • Speed sensor rotor
C0210/33 C0215/34		• Right rear and left rear speed sensor • Each speed sensor circuit • Speed sensor rotor • Rear axle hub
C1235/35 C1236/36 C1238/38 C1239/39	Vehicle speed is at 20 km/h (12mph) or more and interference on the speed sensor signal continues for 5 sec. or more.	• Right front, left front, right rear or left rear speed sensor • Each speed sensor circuit • Speed sensor rotor

HINT:

- DTC No. C0200/31 and C1235/35 is for the right front speed sensor.
- DTC No. C0205/32 and C1236/36 is for the left front speed sensor.
- DTC No. C0210/33 and C1238/38 is for the right rear speed sensor.
- DTC No. C0215/34 and C1239/39 is for the left rear speed sensor.

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WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

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

1	**Check output value of speed sensor.**

PREPARATION:

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

CHECK:

Check that there is no difference between the speed value output from the speed sensor displayed on the hand–held tester and the speed value displayed on the speedometer when driving the vehicle.

OK:

There is almost no difference between the two displayed speed values.

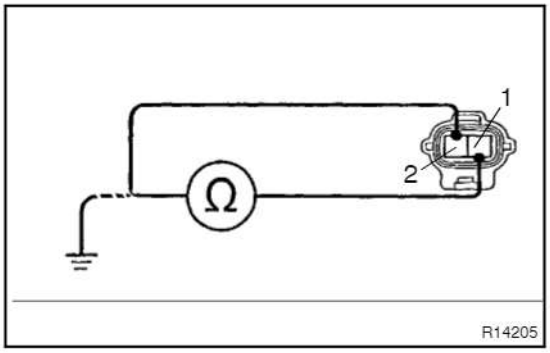
HINT:

There is tolerance of ± 10 % in the speedometer indication.

OK → **Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)**

NG

2	**Check speed sensor.**



Front:

PREPARATION:

(a) Remove the front fender liner.
(b) Make sure that there is no looseness at the connector lock part and the connecting part of the connector.
(c) Disconnect the speed sensor connector.

CHECK:

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

OK:

Resistance: 1.4 – 1.8 kΩ at 20 °C

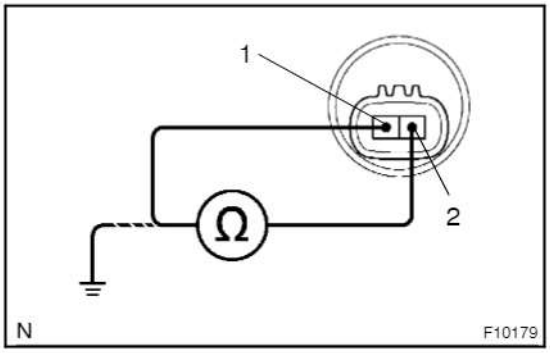
CHECK:

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

OK:

Resistance: 10 MΩ or higher

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Rear speed sensor:

PREPARATION:

(a) Make sure that there is no looseness at the connector lock part and the connecting part of the connector.

(b) Disconnect the speed sensor connector at hub bearing .

CHECK:

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

OK:

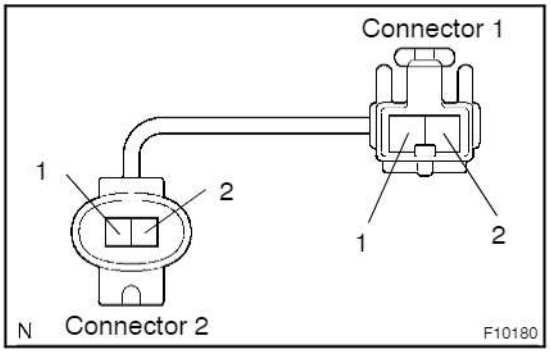
Resistance: 2.2 kΩ or less

CHECK:

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

OK:

Resistance: 1 MΩ or higher



Rear speed sensor sub–wire harness:

PREPARATION:

(a) Remove the seat cushion and the seatback.

(b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.

(c) Disconnect the speed sensor sub–wire harness connector inside vehicle.

CHECK:

(a) Measure the resistance between terminal 1 of connector 1 and terminal 2 of connector 2.

(b) Measure the resistance between terminal 2 of connector 1 and terminal 1 of connector 2.

OK:

Resistance: below 1 Ω

CHECK:

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

OK:

Resistance: 10 MΩ or higher

NG	**Replace speed sensor or sub–wire harness.**

NOTICE:

Check the speed sensor signal last (See page DI–3).

OK

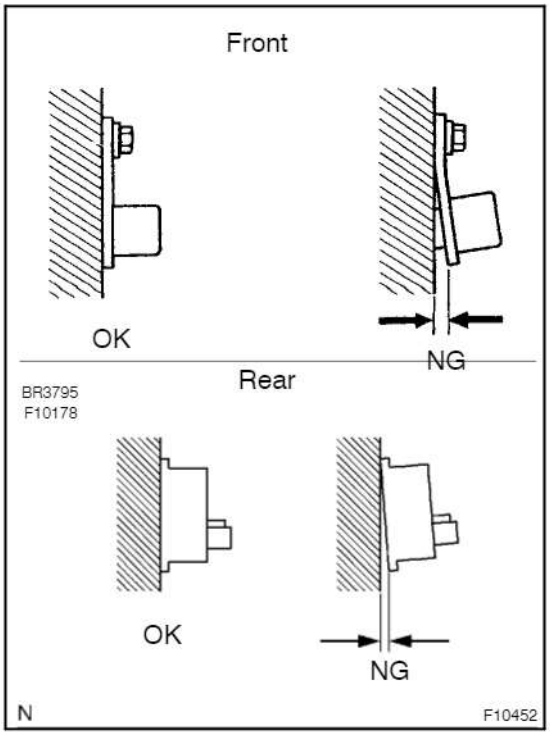
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3	**Check for open and short circuit in harness and connector between each speed sensor and Skid Control ECU (See page IN–30).**

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

OK

4	**Check speed sensor installation.**



CHECK:
Check the speed sensor installation.
OK:

Front:
The installation bolt is tightened properly and there is no clearance between the sensor and the steering knuckle.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)
Rear:
There is no clearance between the sensor and the rear axle carrier.

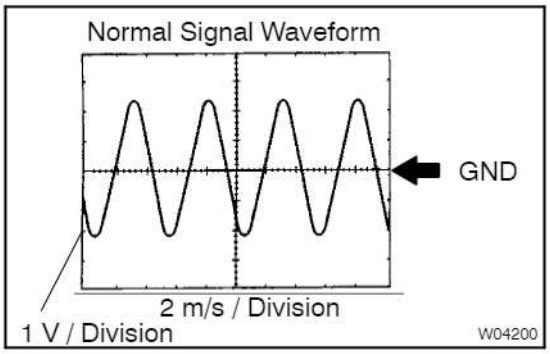
NG → **Replace speed sensor.**

NOTICE:
Check the speed sensor signal again at the end of the procedure (See page DI–3).

OK

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5	Check speed sensor and sensor rotor serrations.



REFERENCE: INSPECTION USING OSCILLOSCOPE

PREPARATION:

(a) Disconnect the Skid Control ECU connector.

(b) Connect the oscilloscope to the terminal FR+ – FR–, FL+ – FL–, RR+ – RR– and RL+ – RL– of the Skid Control ECU harness side connector.

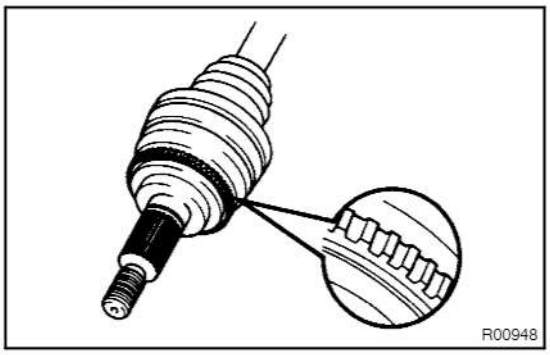
CHECK:

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

OK	Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)

NG

6	Check sensor rotor and sensor tip.



Front:

PREPARATION:

Remove the front drive shaft.

CHECK:

Check the sensor rotor serrations.

OK:

No scratches or missing teeth or foreign objects.

PREPARATION:

Remove the front speed sensor.

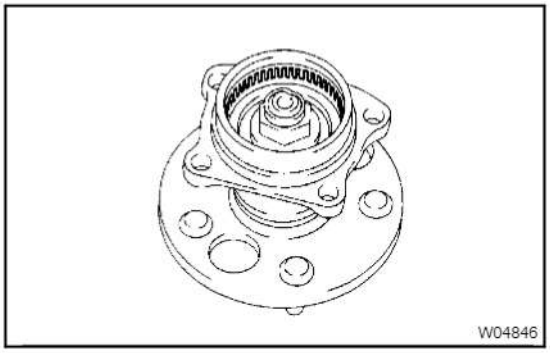
CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

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Rear:

PREPARATION:

Remove the rear speed sensor.

CHECK:

Check the sensor rotor serrations.

OK:

No scratches or missing teeth or foreign objects.

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 again at the end of the procedure (See page DI–3).

OK

Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)

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DI6SM–07

DTC	C0226/21 to C0256/24	ABS Solenoid Valve Circuit

CIRCUIT DESCRIPTION

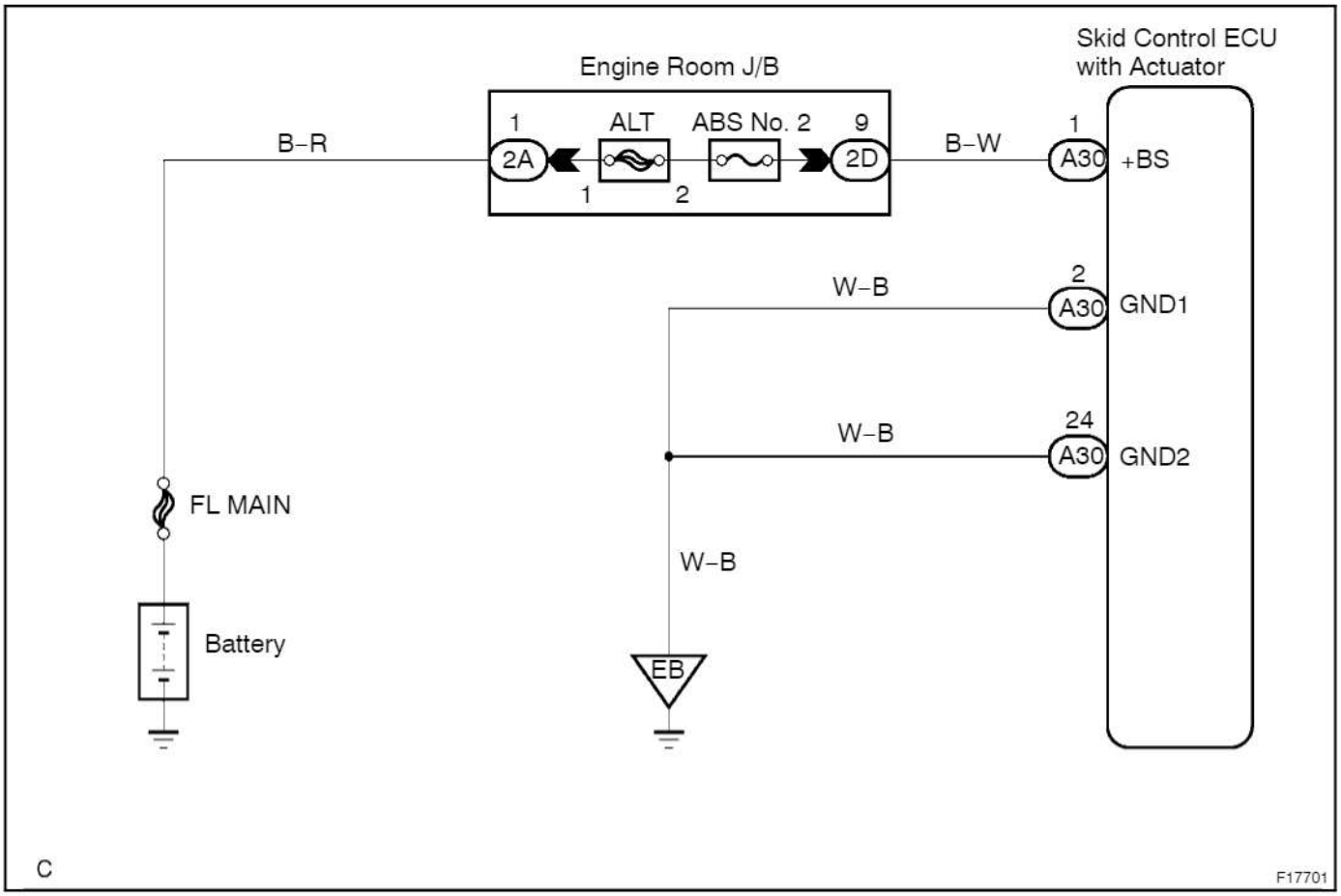
The ABS solenoid valve turns on when signals are sent from the ECU and controls the pressure operating the wheel cylinders, thus the braking force is controlled.

DTC No.	DTC Detection Condition	Trouble Area
C0226/21 C0236/22	1. When solenoid relay is ON and IG1 terminal voltage is 9.5 – 18.5 V, solenoid circuit is open or short for 0.05 sec. or longer 2. IG1 terminal voltage of skid control ECU is 9.5 – 18.5 V, and while ABS is control in operation, there is solenoid relay contact OFF for 0.05 sec. or longer.	• ABS actuator • SFRR, SFRH, SFLR or SFLH circuit
C0246/23 C0256/24		• ABS actuator • SRRR, SRRH, SRLR or SRLH circuit

HINT:

- DTC No. C0226/21 is for right front solenoid valve.
- DTC No. C0236/22 is for left front solenoid valve.
- DTC No. C0246/23 is for right rear solenoid valve.
- DTC No. C0256/24 is for left rear solenoid valve.

WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check the DTC once more.**

PREPARATION:

(a) Clear DTC (See page DI–3).

(b) Turn the ignition switch to OFF.

CHECK:

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

YES → **Replace ABS Actuator Assembly.**

NO

2	**Perform ACTIVE TEST by hand–held tester.**

(a) Select the item "ABS SOLENOID RELAY" in the ACTIVE TEST and operate the ABS solenoid relay on the hand–held tester.

(b) Operat the ABS solenoid relay by the hand–held tester.

CHECK:

Check that the same DTC is stored in the memeoty.

NO → **No problem.**

YES

Replace ABS Actuator Assembly.

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DIAIK–02

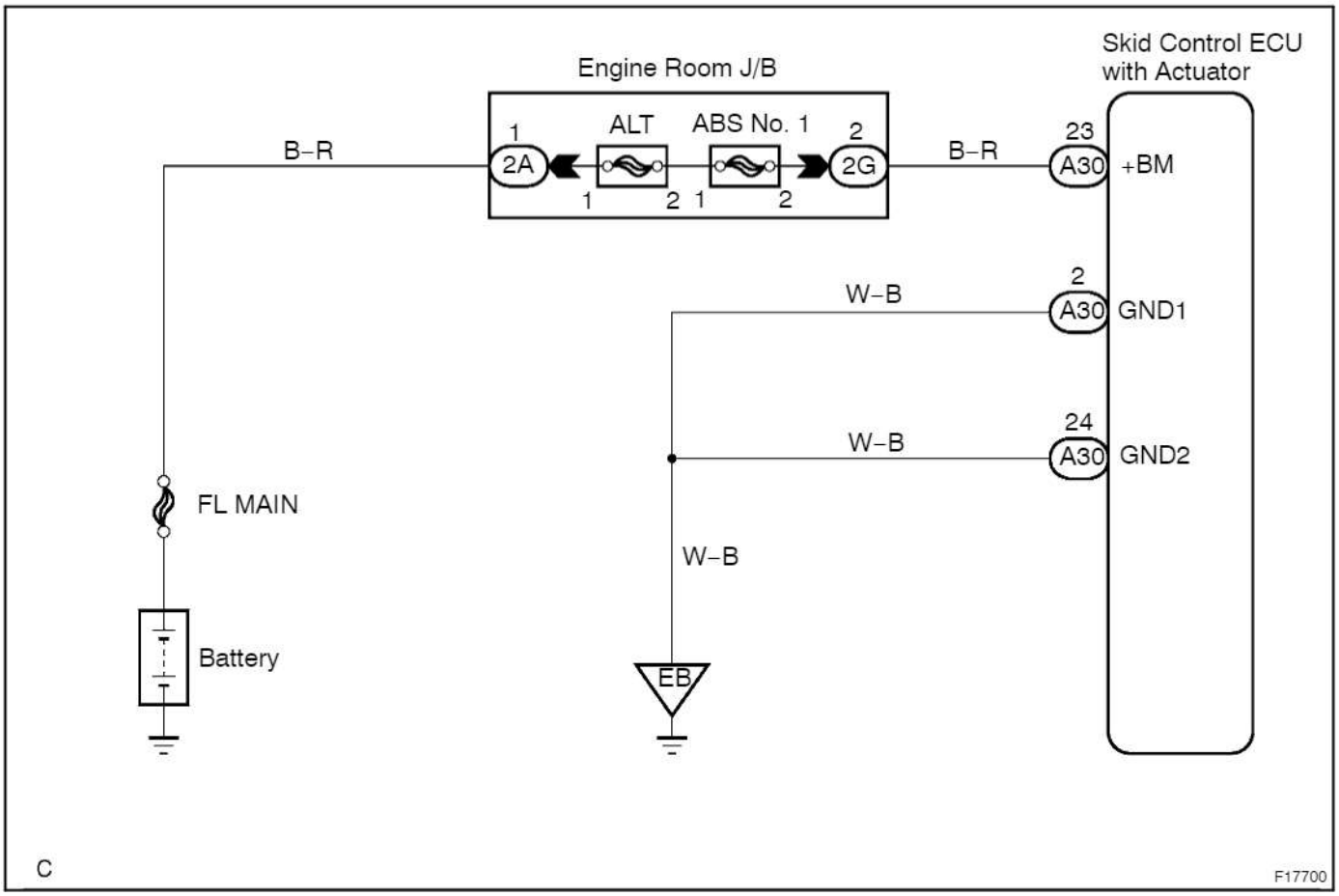
DTC	C0273/13, C0274/14	ABS Motor Relay Circuit

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
C0273/13	• IG1 terminal voltage is from 9.5 V to 18.5 V and the relay contact OFF condition remains for 0.2 sec. or more, despite turning the relay ON during the initial check or while ABS is in operation. • IG1 terminal voltage decreases in 9.5 V or less and the relay contact OFF condition remains for 0.2 sec. or more, despite turning the relay ON during the initial check or while ABS is in operation.	• ABS actuator • ABS motor relay • ABS motor relay circuit
C0274/14	The relay contact ON condition continues for 4 sec. when the relay is OFF.	

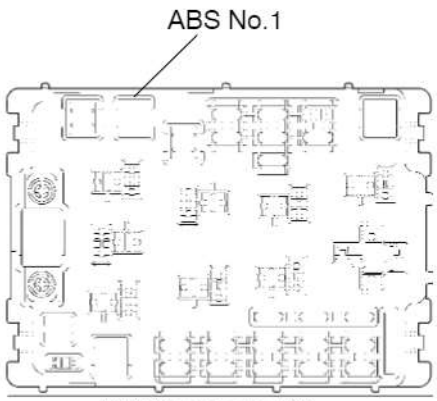
WIRING DIAGRAM



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INSPECTION PROCEDURE

1	Check ABS No.1 fuse.



PREPARATION:
Remove the ABS No.1 fuse from Engine Room J/B.
CHECK:
Check continuity of the ABS No.1 fuse.
OK:
Continuity

NG → **Check for short circuit in all the harness and components connected to ABS No.1 fuse (See attached wiring diagram).**

OK

2	Check the DTC once more.

PREPARATION:
(a) Clear the DTC (See page DI–3).
(b) Turn the ignition switch to OFF.
CHECK:
Turn the ignition switch to ON, and check that the same DTC is stored in the memory.

YES → **Replace ABS Actuator Assembly.**

NO

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3	Check ABS motor relay operation.

PREPARATION:

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

CHECK:

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

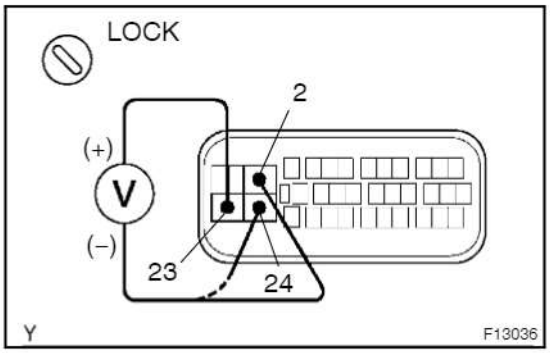
OK:

The operation sound of the ABS motor should be heard.

NG → **Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)**

OK

4	Check voltage between terminals +BM (23) and GND (2, 24) of Skid Control ECU connector.



PREPARATION:

Disconnect the Skid Control ECU connector.

CHECK:

Measure the voltage between terminal 23 and 2, 24 of the Skid Control ECU harness side connector.

OK:

Voltage: 10 – 14 V

NG → **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 connection is normal, the ECU may be defective.

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DIAIL–02

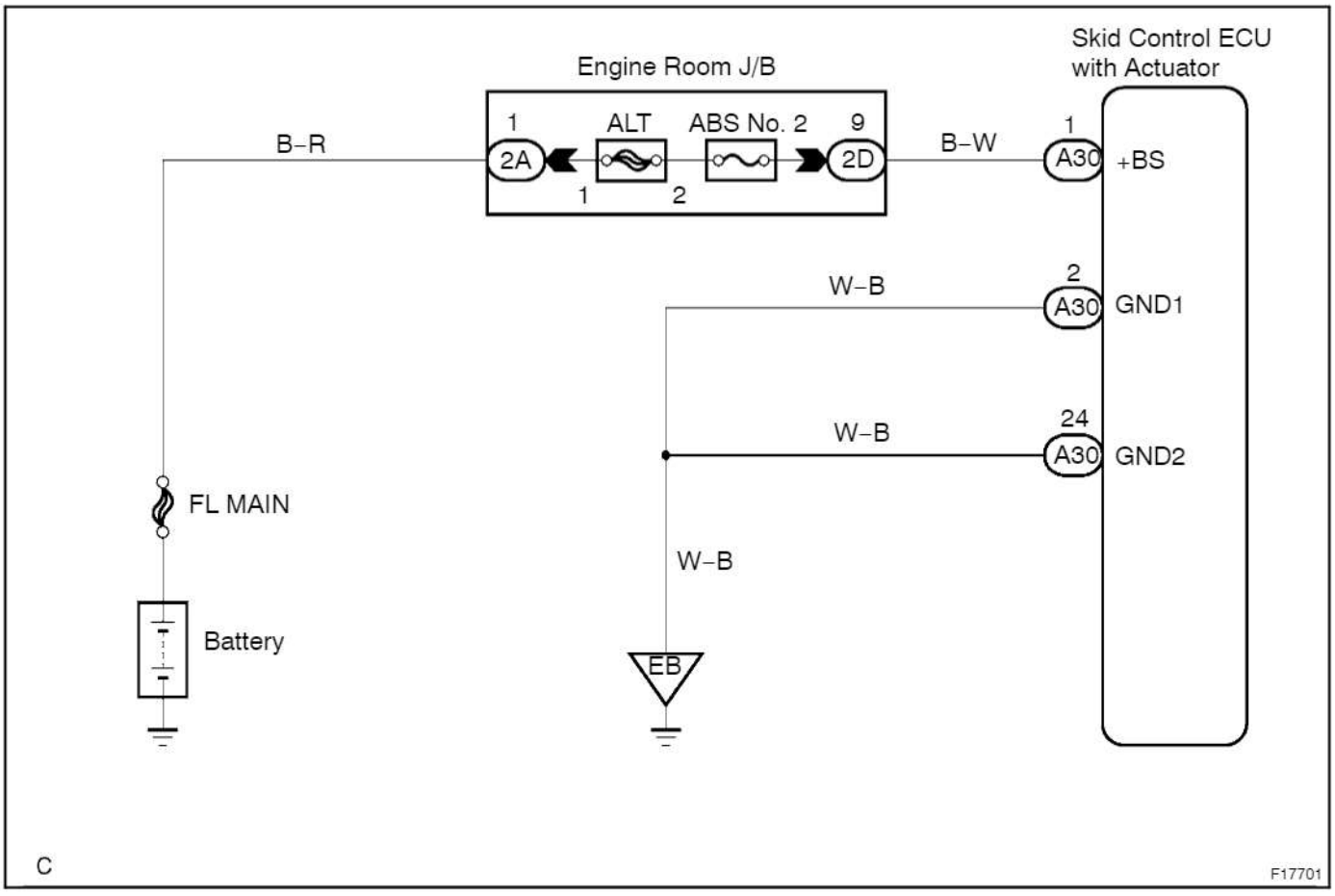
DTC	C0278/11, C0279/12	ABS Solenoid Relay Circuit

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
C0278/11	• IG1 terminal voltage is from 9.5 V to 18.5 V and the relay contact OFF condition continues for 0.2 sec. or more. • IG1 terminal voltage decreases in 9.5 V or less because of the relay ON driving, and the relay contact OFF condition elapses for 0.2 sec. or more.	• ABS solenoid relay • ABS solenoid relay circuit • ABS actuator
C0279/12	Immediately after IG switch has been turned ON, when the solenoid relay is OFF.	

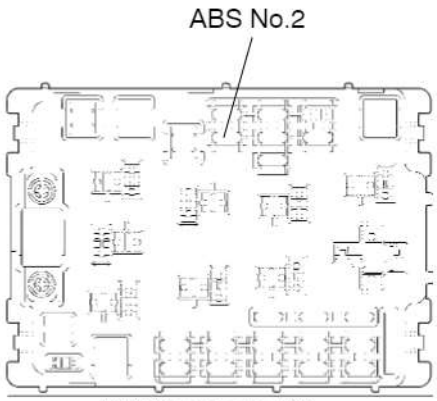
WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check ABS No.2 fuse.**



PREPARATION:
Remove the ABS No.2 fuse from the Engine Room J/B.
CHECK:
Check continuity of ABS No.2 fuse.
OK:
Continuity

NG → **Check for short circuit in all the harness and components connected to ABS No.2 fuse (See attached wiring diagram).**

OK

2	**Check the DTC once more.**

PREPARATION:
(a) Clear DTC (See page DI–3).
(b) Turn the ignition switch to OFF.
CHECK:
Turn the ignition switch to ON, and check that the same DTC is stored in the memory.

YES → **Replace ABS Actuator Assembly.**

NO

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3	Check ABS solenoid relay operation.

PREPARATION:

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

CHECK:

Check the operation sound of the ABS solenoid relay when operating it with the hand–held tester.

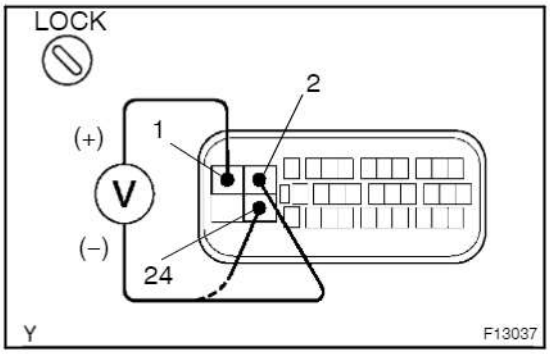
OK:

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

NG → **Check and replace ABS Actuator Assembly.**

OK

4	Check voltage between terminals +BS (1) and GND (2, 24) of skid control ECU.



PREPARATION:

Disconnect the Skid Control ECU connector.

CHECK:

Measure the voltage between terminal 1 and 2, 24 of the Skid Control ECU harness side connector.

OK:

Voltage: 10 – 14 V

NG → **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 connection is normal, the ECU may be defective.

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DI6SP–08

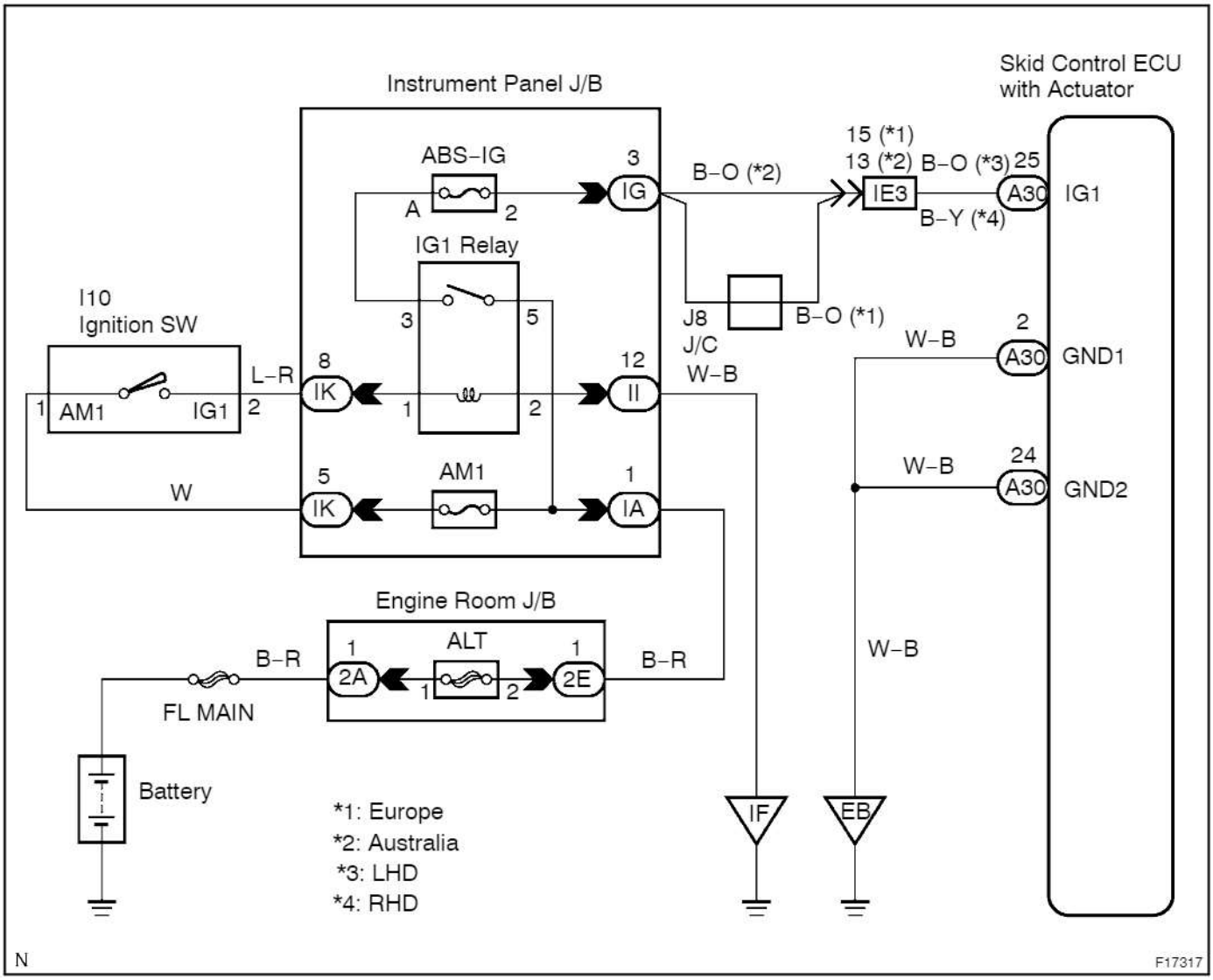
DTC	C1241/41	IG Power Source Circuit

CIRCUIT DESCRIPTION

This is the power source of ECU, hence of CPU, and of the ABS actuator.

DTC No.	DTC Detection Condition	Trouble Area
C1241/41	Condition 1. or 2. is detected: 1. Vehicle speed is at 3 km/h (1.9 mph) or more and ECU terminal IG1 voltage is 9.5 V or less, which continues for 10 sec. or more 2. When IG terminal voltage is less than 9.5 V, there is open circuit in the motor relay or in the solenoid relay, or the solenoid circuit malfunction.	• Battery • Charging system • Power source circuit

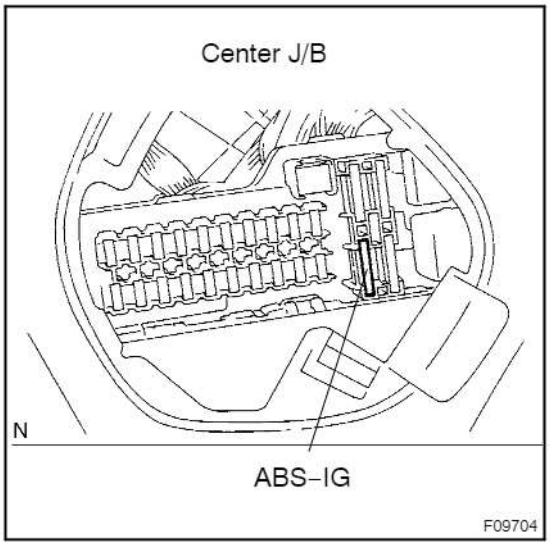
WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check ABS–IG fuse.**



PREPARATION:
Remove the ABS–IG fuse from Center J/B.
CHECK:
Check continuity of the ABS–IG fuse.
OK:
Continuity

NG → **Check for short circuit in all the harness and components connected to ABS–IG fuse (See attached wiring diagram).**

OK

2	**Check battery voltage.**

OK:
Voltage: 10 – 14 V

NG → **Check and repair the charging system (See page IN–30).**

OK

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3	Check voltage of the ECU IG power source.

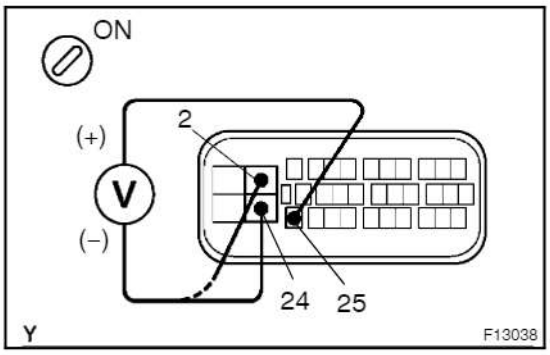
In the case of using the hand–held tester:

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch to ON and push the hand–held tester main switch ON.
(c) Select the item "IG VOLTAGE" in the DATA LIST and read its value displayed on the hand–held tester.
(d) Check the voltage condition output from the ECU and displayed on the hand–held tester.

CHECK:

OK: "Normal" is displayed. (Voltage: 10 – 14 V)



In the case of not using the hand–held tester:

PREPARATION:

(a) Disconnect the Skid Control ECU connector.
(b) Turn the ignition switch to ON.

CHECK:

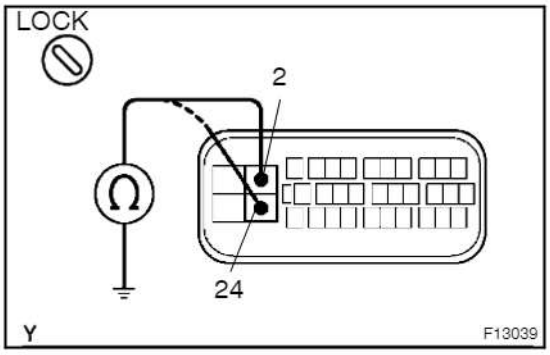
Measure the voltage between terminal 25 and 2 or 24 of the skid control ECU connector.

OK: 10 – 14 V

OK	Check or replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)

NG

4	Check continuity between terminals GND (2, 24) of Skid Control ECU connector and body ground.



CHECK:

Measure the resistance between terminal 2 and 24 of Skid Control ECU harness side connector and body ground.

OK:

Resistance: 1 Ω or less

NG	Repair or replace harness or connector.

OK

Check for open circuit in harness and connector between Skid Control ECU and ABS–IG fuse (See page IN–30).

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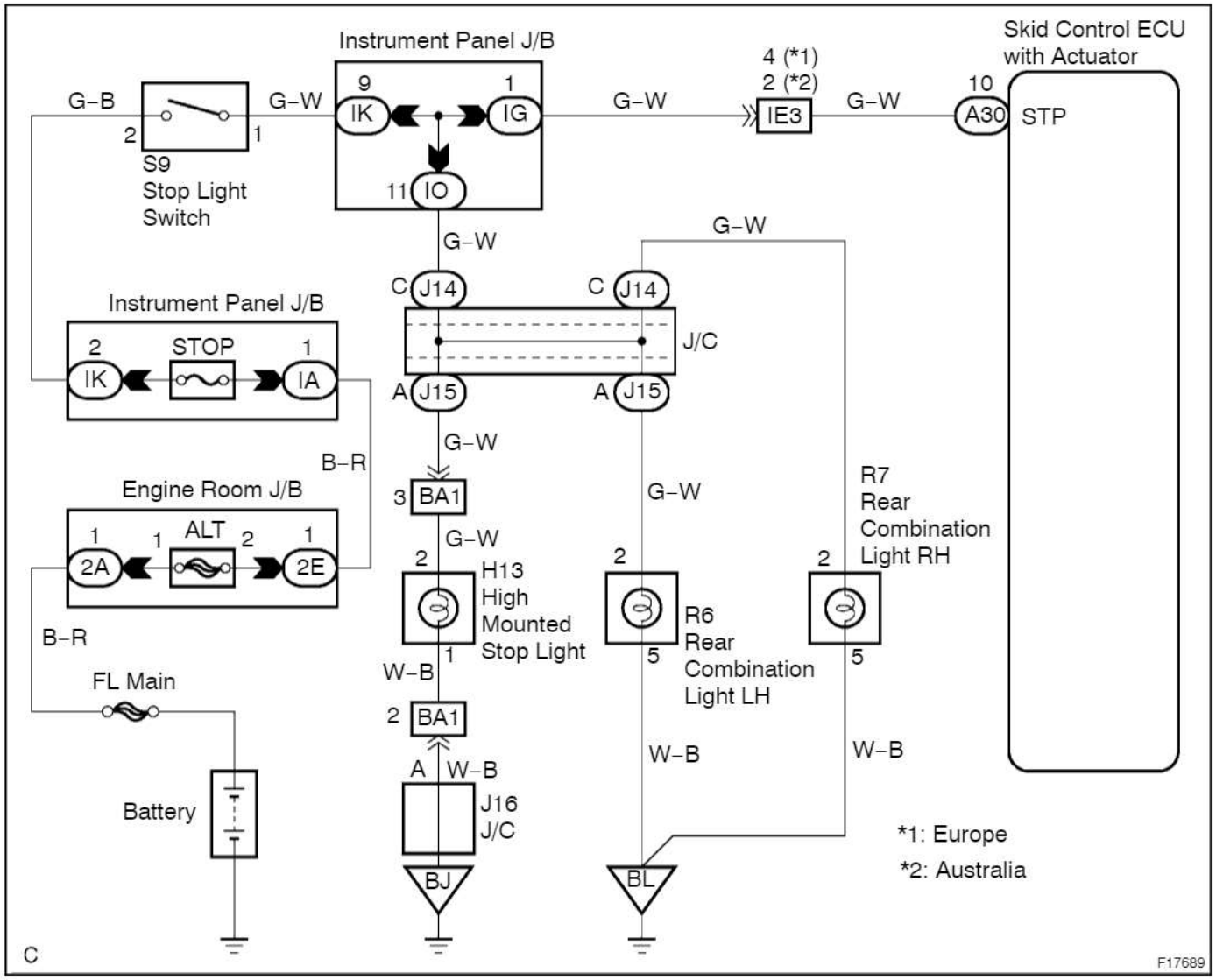
DI6SQ-05

DTC	C1249/49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1249/49	When IG1 terminal voltage is from 9.5 V to 18.5 V and ABS is not in operation, the open circuit of the stop light switch circuit continues for 0.3 sec. or more.	• Stop light switch • Stop light switch circuit • Stop light bulb

WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check operation of stop light.**

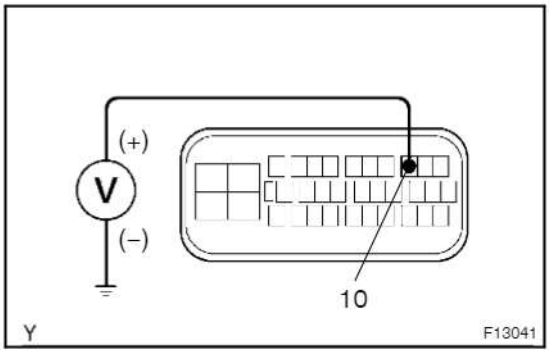
CHECK:

Check that stop light comes on when brake pedal is depressed and goes off when brake pedal is released.

NG → **Repair stop light circuit.**

OK

2	**Check voltage between terminal STP (10) of Skid Control ECU and body ground.**



PREPARATION:

Disconnect Skid Control ECU connector.

CHECK:

Measure the voltage between terminal 10 of Skid Contorl ECU harness side connector and body ground when brake pedal is depressed.

OK:

Voltage: 10 – 14 V

OK → **Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)**

NG

3	**Check for open circuit in harness and connector between Skid Control ECU and stop light switch (See page IN–30).**

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

OK

Check and replace Skid Contorl ECU (ABS Actuator Assembly). (See page IN–30)

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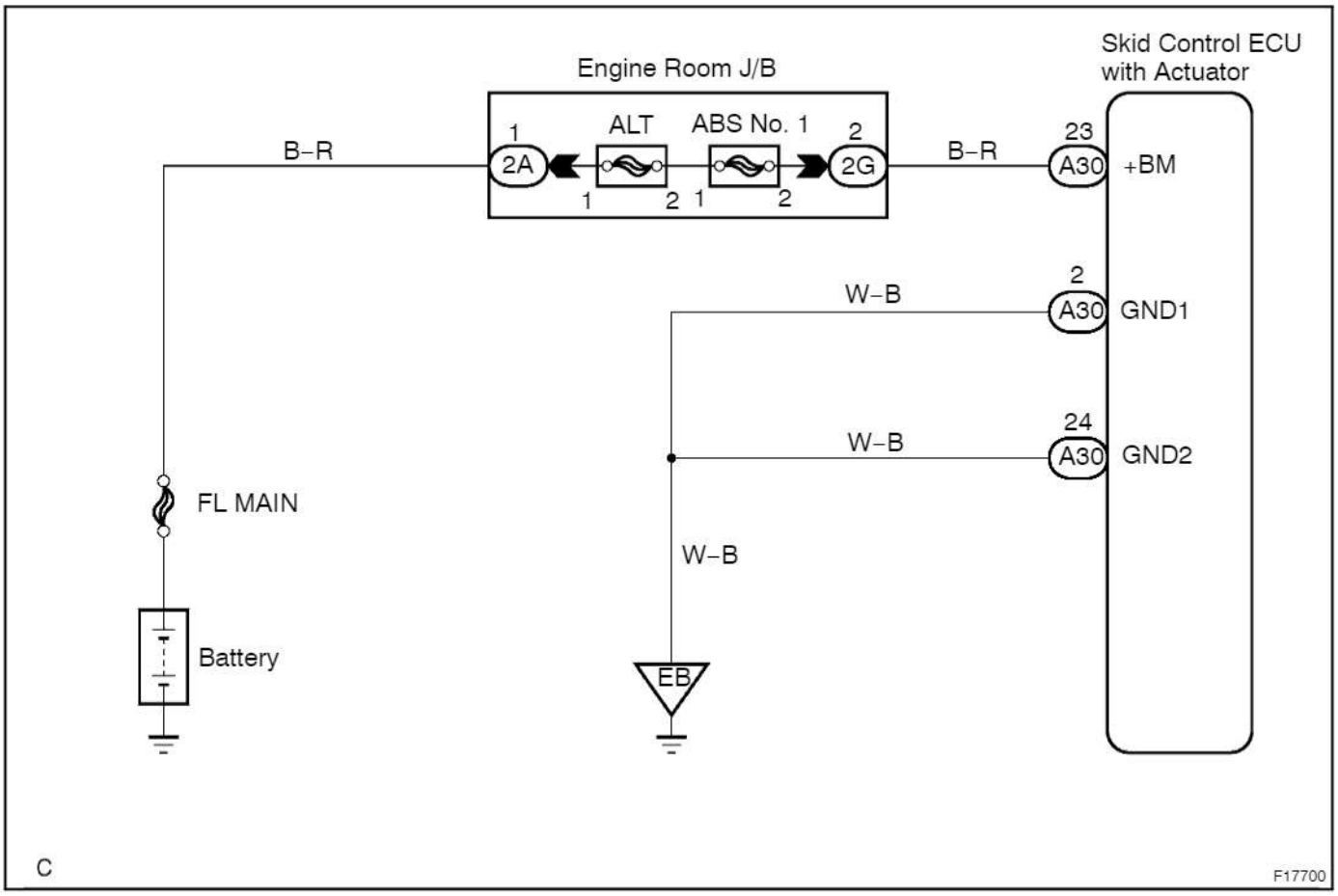
DIAIM-02

DTC	C1251/51	ABS Pump Motor Lock

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1251/51	When the actuator pump drive motor dose not rotate correctly.	ABS pump motor

WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check ABS pump motor operation.**

PREPARATION:

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

CHECK:

Check the operation sound of the ABS pump motor when operating it with the hand–held tester.

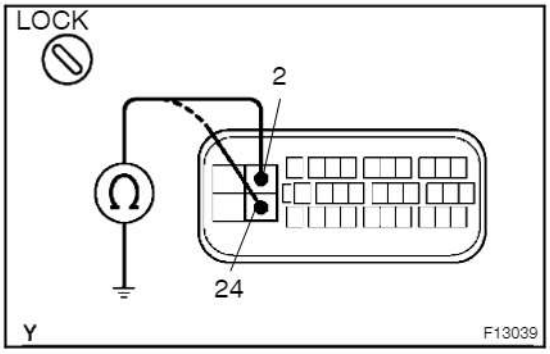
OK:

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

OK → **Proceed to next circuit inspection shown in problem symptoms chart (See page DI–14).**

NG

2	**Check continuity between terminals GND (2, 24) of Skid Control ECU connector and body ground.**



CHECK:

Measure the resistance between terminals 2 and 24 of Skid Control ECU harness side connector and body ground.

OK:

Resistance: 1 Ω or less

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

OK

Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)

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DI6MM–03

DTC	Always ON	Skid Control ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Detection of any conditions in 1. and 2.: 1. Skid control ECU internal malfunction is detected 2. There is a malfunction in the ECU internal circuit	• Battery • Charging system • Skid control ECU

INSPECTION PROCEDURE

1	Is DTC output?

Check DTC on page DI–3.

YES → Repair circuit indicated by the code output.

NO

2	Is normal code displayed?

YES → Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)

NO

3	Does ABS warning light go off?

YES → Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)

NO

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4	**Check battery voltage.**

CHECK:

Check the battery voltage.

OK:

10 – 14 V

NG → **Check and repair the charging system.**

OK

5	**Check ABS warning light.**

PREPARATION:

(a) Disconnect the connector from the Skid Comtrol ECU.

(b) Connect the terminal WA (S11 – 13) of the wire harness and the terminal GND (S11 – 2, 24) of the wire harness.

(c) Turn the ignition switch to ON.

CHECK:

Check the ABS warning light goes off.

OK → **Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)**

NG

Check for short circuit in harness and connector between ABS warning light, combination meter and Skid Control ECU (See page IN–30).

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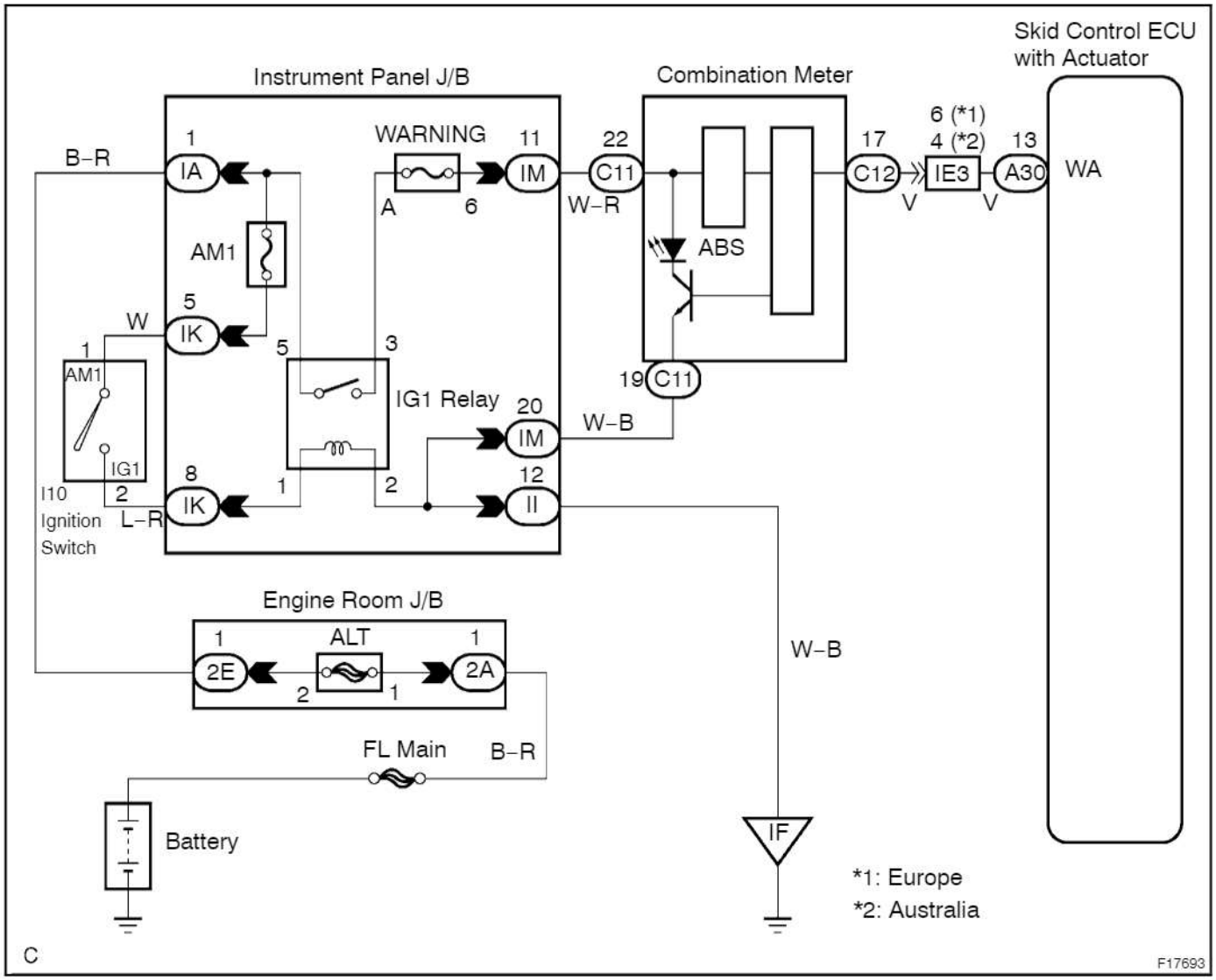
DI6MN-22

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If ECU detects trouble, it turns on the ABS warning light, and prohibit the ABS control at the same time. At this time, the ECU records a DTC in memory.
Connect terminal Tc and CG of the DLC3 to make the ABS warning light blink and output DTC.

WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

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

ABS warning light does not come on	*1
ABS warning light remains on	*2

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

*2: After inspection of step 3, start the inspection from step 4 in the case of using the hand–held tester and start from step 5 in the case of not using hand–held tester.

1	**Check operation of the ABS warning light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

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

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that "ON" of the ABS warning light can be shown on the combination meter using the hand–held tester.

HINT:

ABS warning light turns "OFF" automatically 2 seconds after it is turnd "ON".

OK → **Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)**

NG

2	**Check ABS warning light.**

See combination meter troubleshooting on page BE–2.

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

OK

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3	**Check that the ECU connector is securely connected to the ECU.**

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

YES

Check for open circuit in harness and connector between combination meter and Skid Control ECU (ABS Actuator Assembly) (See page IN–30).

4	**Check operation of the ABS warning light (See step 1).**

OK → **Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)**

NG

5	**Is DTC output?**

Check DTC on page DI–3.

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

NO

Check for short circuit in harness and connector between DLC3 and Skid Control ECU (See page IN–30).

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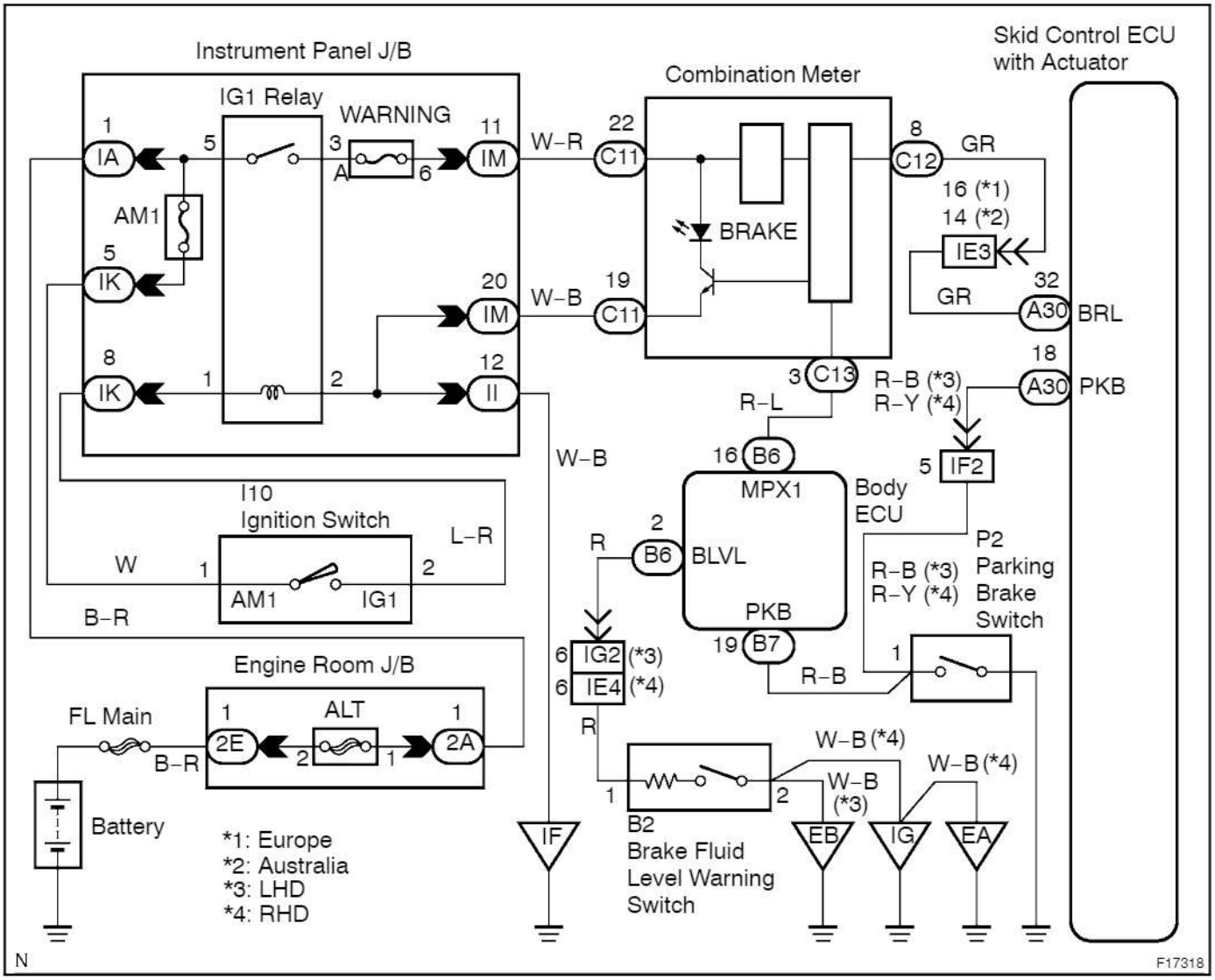
DI6MO–03

BRAKE Warning Light Circuit

CIRCUIT DESCRIPTION

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

WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check parking brake switch circuit (See page BE–2).**

NG → **Repair or replace parking brake switch circuit.**

OK

2	**Check brake fluid level warning switch circuit (See page BE–2).**

NG → **Repair or replace brake fluid level warning switch circuit.**

OK

3	**Is DTC output for ABS?**

Check DTC on page DI–3.

Yes → **Repair circuit indicated by the output code.**

No

4	**Check BRAKE warning light.**

See combination meter troubleshooting on page BE–2.

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

OK

Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)

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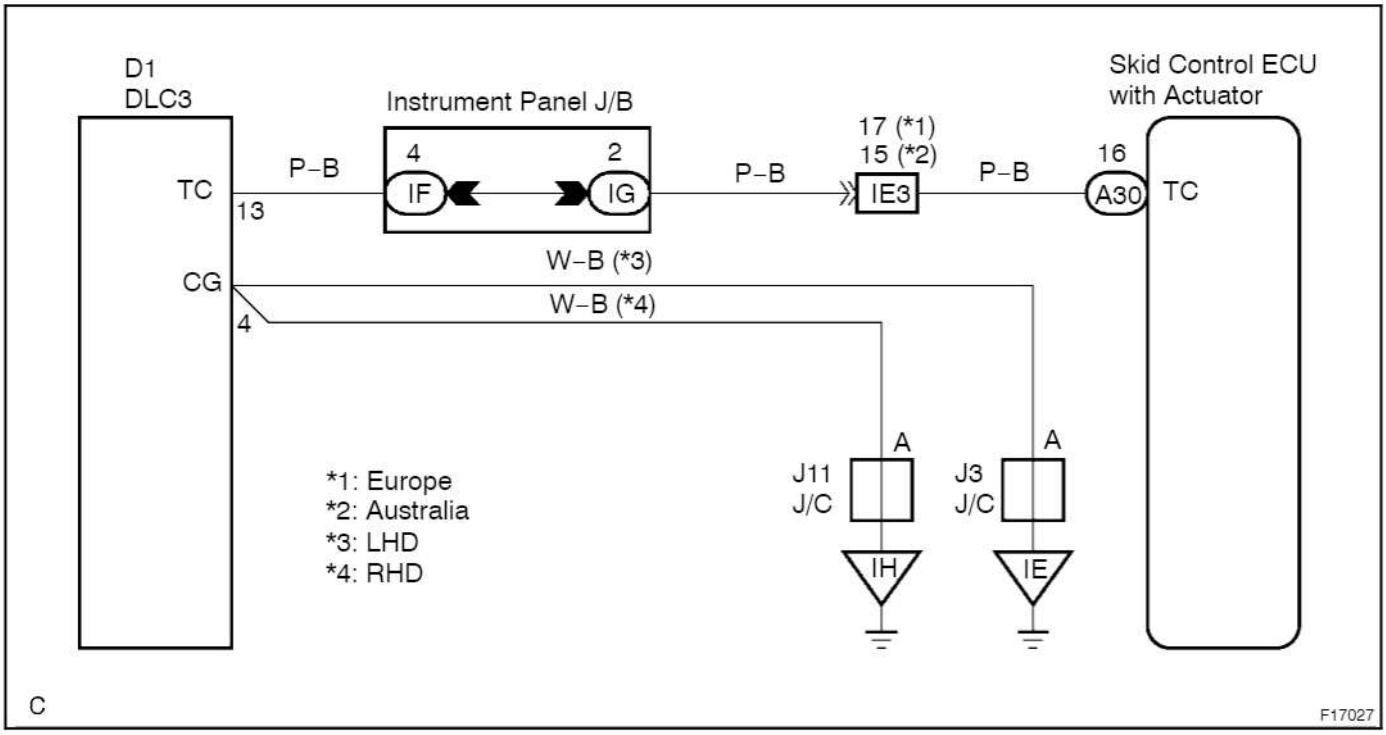
DIAIN–02

Tc Terminal Circuit

CIRCUIT DESCRIPTION

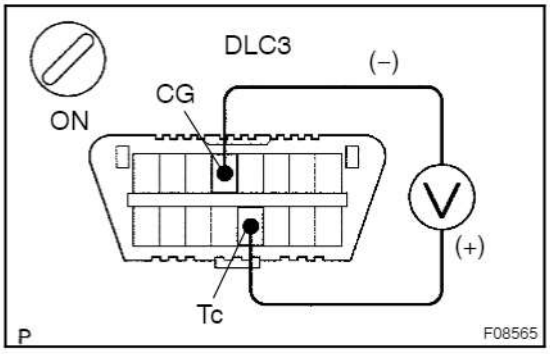
Connecting between terminal Tc and CG of the DLC3 causes the ECU to display DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

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



CHECK:

(a) Turn the ignition switch to ON.

(b) Measure the voltage between terminal Tc and CG of DLC3.

OK:

Voltage: 10 – 14 V

NG	**Go to step 3.**

OK

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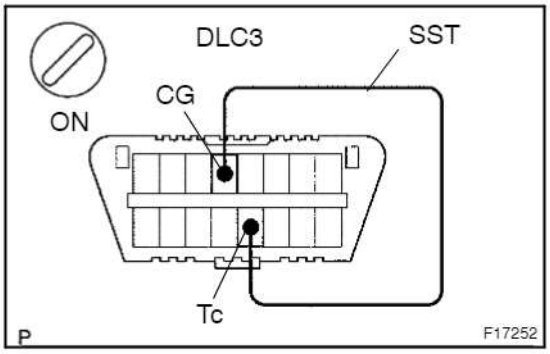
2	**Check for open and short circuit in harness and connector between Skid Control ECU and DLC3, DLC3 and body ground (See page IN–30).**

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

OK

Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)

3	**Check ABS warning light.**



(a) Using SST, connect the terminal Tc and CG of the DLC3.
SST 09843–18040
(b) Turn the ignition switch to ON.
(c) Check the ABS warning light.

OK:

ABS warning light blinks

OK → **END**

NG

Check and replace Skid Control ECU (ABS Actuato Assembly). (See page IN–30)

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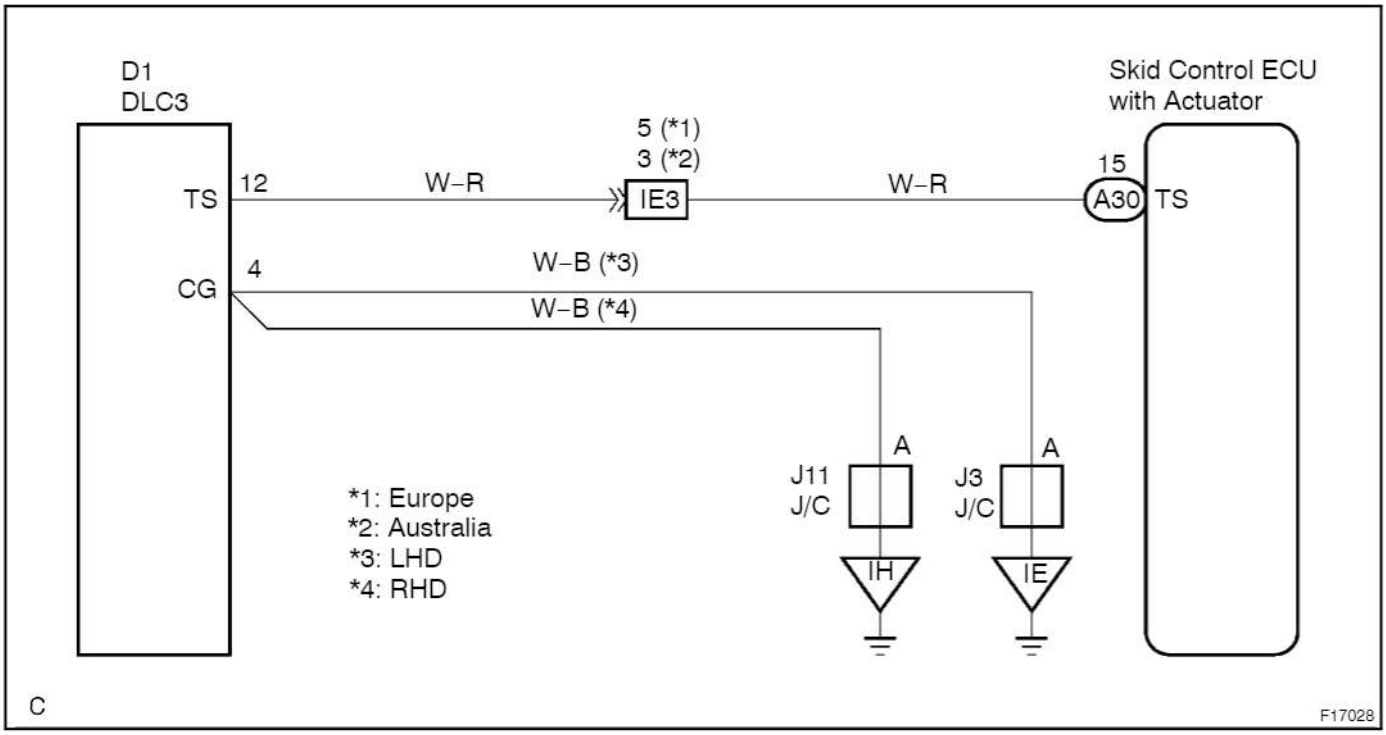
DIAIO–02

Ts Terminal Circuit

CIRCUIT DESCRIPTION

The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected with the DTC check.
Connecting terminal Ts and CG of the DLC3 starts the check.

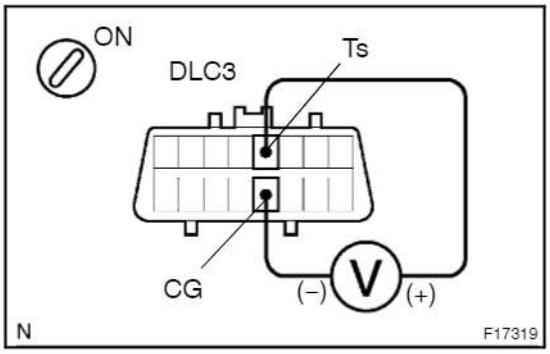
WIRING DIAGRAM



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INSPECTION PROCEDURE

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



CHECK:

(a) Turn the ignition switch to ON.

(b) Measure the voltage between terminal Ts and CG of DLC3.

OK:

Voltage: 10 – 14 V

NG → **Go to step 3.**

OK

2	**Check for open and short circuit in harness and connector between Skid Control ECU and DLC3, DLC3 and body ground (See page IN–30).**

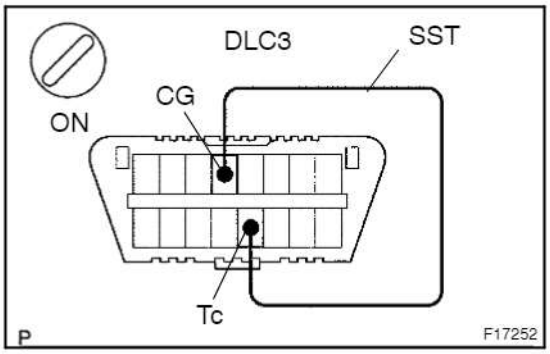
NG → **Repair or replace harness or connector.**

OK

Check and replace Skid Control ECU (ABS Actuator Assembly). (See page IN–30)

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3	Check ABS warning light.



(a) Using SST, connect the terminal Tc and CG of the DLC3.
SST 09843–18040
(b) Turn the ignition switch to ON.
(c) Check the ABS warning light.

OK:

ABS warning light blinks

OK → **END**

NG

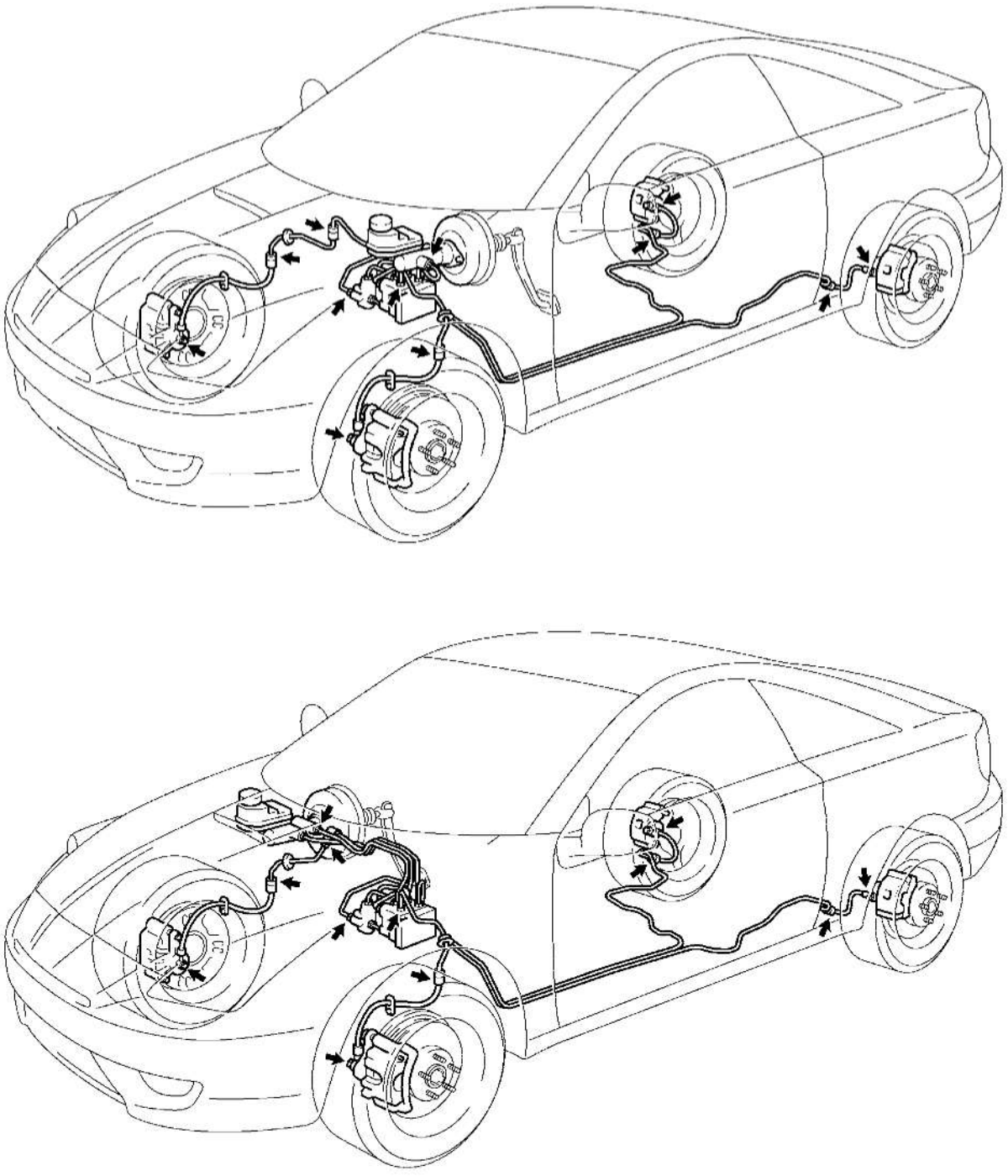
Check and replace Skid Control ECU (ABS Actuato Assembly). (See page IN–30)

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DI6MR-03

Check for Fluid Leakage

Check for fluid leakage from the actuator or the hydraulic lines.



N

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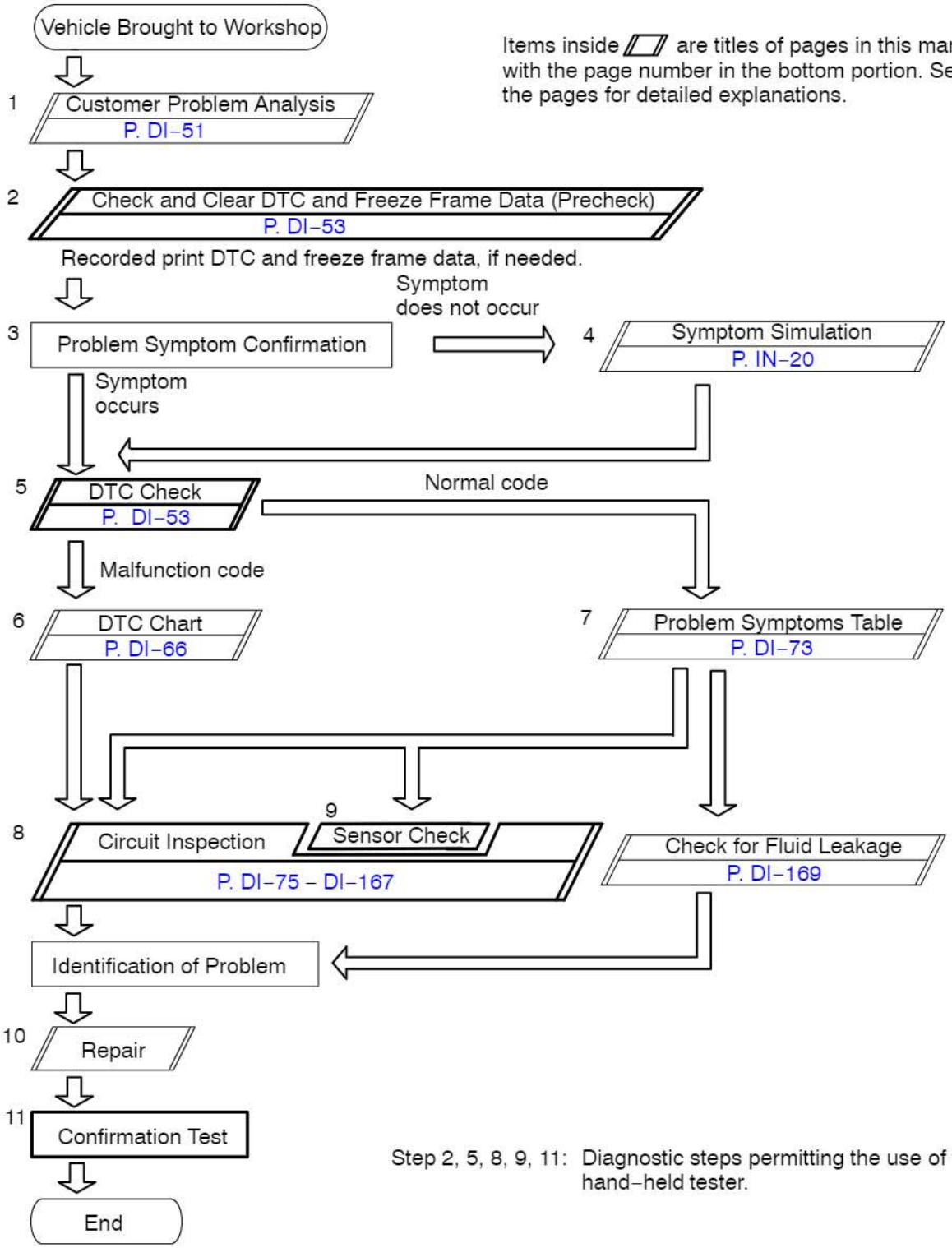
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ABS WITH EBD & BA & TRC & VSC SYSTEM

DI7ZB-03

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following pages.



Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the hand–held tester.

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

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DI7ZC-02

CUSTOMER PROBLEM ANALYSIS CHECK

ABS & EBD & BA 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	☐ Continuously ☐ Intermittently (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	☐ BA does not operate.	
	☐ EBD does not operate.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	Brake Warning Light Abnormal (PKB released)	☐ Remains ON ☐ Does not Light Up

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

Freeze Frame Data	STOP LIGHT SW	☐ ON ☐ OFF
	SYSTEM	☐ NO SYS ☐ ABS ☐ BA ☐ FAIL SF
	#IG ON	
	VEHICLE SPD	km/h MPH

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TRAC & VSC Check Sheet

Inspector's Name :

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

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

Symptoms	☐ TRAC does not operate. (Wheels spin when starting rapidly.)	
	☐ VSC does not operate. (Wheels sideslip at the time of sharp turning.)	
	TRAC OFF Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up
	VSC Warning Indicator Abnormal	☐ Displays ☐ Does not Display
	SLIP Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up
	Skid Control Buzzer Abnormal	☐ Sounds ☐ Does not Sound

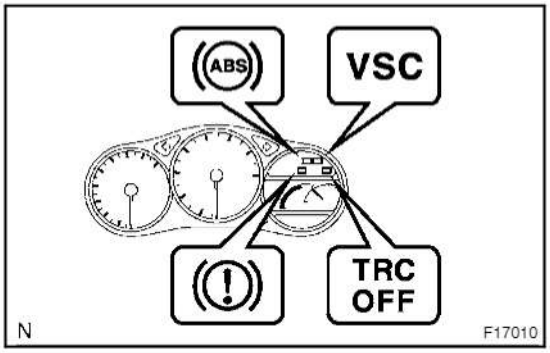
Check Item	**ABS Warning Light**	☐ Normal ☐ Malfunction Code (Code)
	Malfunction Indicator Light	☐ Normal ☐ Malfunction Code (Code)

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

Freeze Frame Data	VSC/TRC OFF SW	☐ ON ☐ OFF
	SYSTEM	☐ VSC/TRC
	STEERING ANG	deg
	YAW RAT	deg/s
	MAS CYL PRESS	V
	THROTTLE	deg
	MAS PRESS GRADE	MPa/s
	G (RIGHT&LEFT)	G
	G (BACK&FORTH)	G

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DI9IB-02



PRE–CHECK

1. DIAGNOSIS SYSTEM

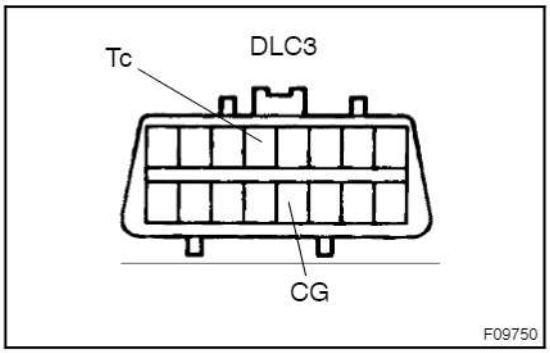
(a) Inspect the battery voltage.
Battery voltage: 10 – 14 V

(b) Check the warning lights and indicator lights.
(1) Release the parking brake lever.
(2) When the ignition switch is ON, check that the ABS warning light, BRAKE warning light, TRC OFF indicator light and SLIP indicator light, VSC warning light go on for 3 sec.

HINT:

- If the ECU stores DTC, VSC warning light, ABS warning light, BRAKE warning light and TRC OFF indicator light are ON.
- If the check result is not normal, proceed to troubleshooting for the light circuit.

Trouble Area	See Page
ABS warning light circuit	DI–148
BRAKE warning light circuit	DI–157
VSC warning light circuit	DI–162
TRC OFF indicator light circuit	DI–151
SLIP indicator light circuit	DI–154



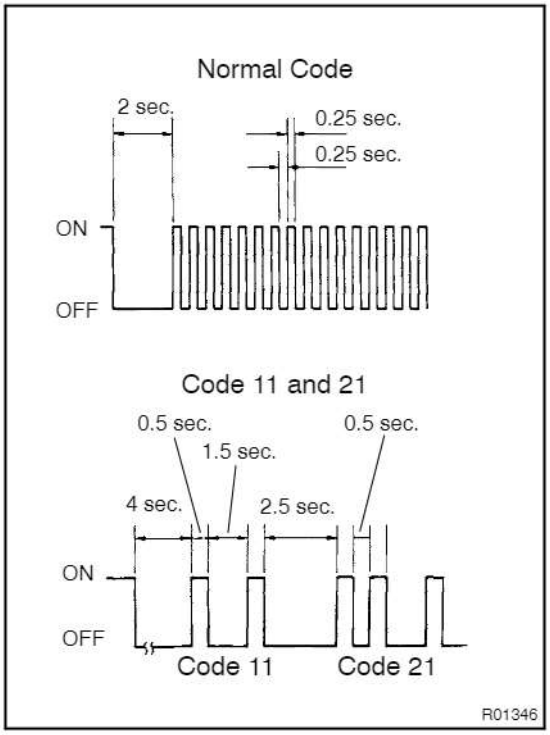
(c) In case of not using the hand–held tester:
Check the DTC of ABS system.
(1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(2) Turn the ignition switch ON.
(3) Read the DTC from the ABS warning light and VSC warning light on the combination meter.

HINT:

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

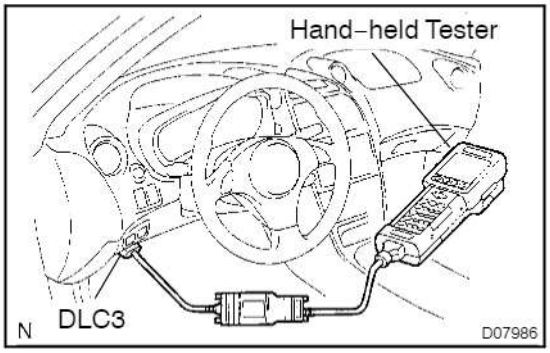
Trouble Area	See page
ABS warning light circuit	DI–148
VSC warning light circuit	DI–159

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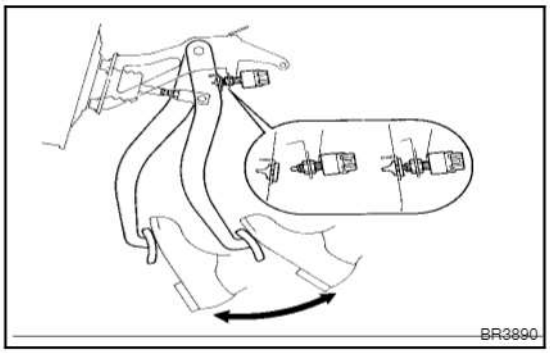
- As an example, the blinking patterns for the normal code and codes 11 and 21 are shown on the left.
  (4) Codes are examples in the code table on page DI–66.
  (5) After completing the check, disconnect terminal Tc and CG of DLC3, and turn off the display.

If 2 or more malfunctions are detected at the same time, the lowest numbered DTC will be displayed 1st.



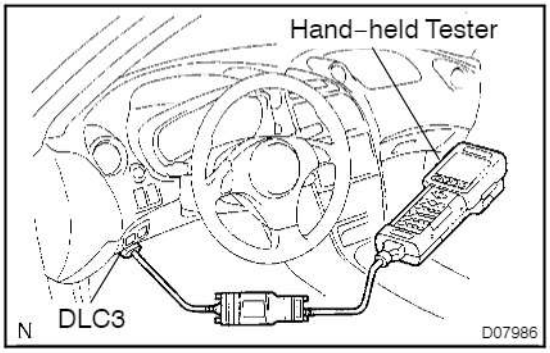
(d) In case of using the hand–held tester:
Check the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.



(e) In case of not using the hand–held tester:
Clear the DTC.
(1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(2) Turn the ignition switch ON.
(3) Clear the DTC stored in ECU by depressing the brake pedal 8 times or more within 5 sec.
(4) Check that the warning light show the normal code.
(5) Remove the SST from the terminals of DLC3.
SST 09843–18040

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(f) In case of using the hand–held tester:
Clear the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand–held tester to erase the codes.

HINT:
Please refer to the hand–held tester operator's manual for further details.

2. DATA LIST

HINT:
According to the DATA LIST displayed by the hand–held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as a first step of troubleshooting is one of the method to shorten the labor time.

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON.
(c) According to the display on tester, read the "DATA LIST".

Item	Measurement Item / Range (Display	Normal Condition	Diagnostic Note
ABS MOT RELAY	ABS motor relay / ON or OFF		
SOL RELAY	Solenoid relay / ON or OFF		
VSC / TRAC OFF SW	VSC / TRAC OFF switch / ON or OFF		
IDLE SW	Main idle switch / ON or OFF	ON : Accelerator pedal released OFF : Accelerator pedal depressed	
STOP LIGHT SW	Stop light switch / ON or OFF	ON : Brake pedal depressed OFF : Brake pedal released	
PKB SW	Parking brake switch / ON or OFF	ON : Parking brake applied OFF : Parking brake released	
ABS OPERT FR	ABS operation (FR) / BEFORE or OPERATE	BEFORE : No ABS operation (FR) OPERATE : During ABS operation (FR)	
ABS OPERT FL	ABS operation (FL) / BEFORE or OPERATE	BEFORE : No ABS operation (FL) OPERATE : During ABS operation (FL)	
ABS OPERT RR	ABS operation (RR) / BEFORE or OPERATE	BEFORE : No ABS operation (RR) OPERATE : During ABS operation (RR)	
ABS OPERT RL	ABS operation (RL) / BEFORE or OPERATE	BEFORE : No ABS operation (RL) OPERATE : During ABS operation (RL)	

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Item	Measurement Item / Range (Display	Normal Condition	Diagnostic Note
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Speed indicated on speedometer
DECELERAT SENS	Deceleration sensor 1 reading / min.: −1.869 G, max.: 1.869 G	Approximately 0 ± 0.13G at still condition	Reading changes when vehicle is bounced
DECELERAT SENS2	Deceleration sensor 2 reading / min.: −1.869 G, max.: 1.869 G	Approximately 0 ± 0.13G at still condition	Reading changes when vehicle is bounced
IG VOLTAGE	ECU power supply voltage / NORMAL or TOO LOW	NORMAL : 9.5 V or over TOO LOW : Below 9.5 V	
SFRR	ABS solenoid (SFRR) / ON or OFF		
SFRH	ABS solenoid (SFRH) / ON or OFF		
SFLR	ABS solenoid (SFLR) / ON or OFF		
SFLH	ABS solenoid (SFLH) / ON or OFF		
SRRR (SRR)	ABS solenoid (SRRR (SRR)) / ON or OFF		
SRRH (SRH)	ABS solenoid (SRRH (SRH)) / ON or OFF		
SRLR	ABS solenoid (SRLR) / ON or OFF		
SRLH	ABS solenoid (SRLH) / ON or OFF		
SMF (BA–SOL)	TRAC solenoid (SMF) / ON or OFF		
SMR	TRAC solenoid (SMR) / ON or OFF		
ENGINE SPD	Maximum revolution sensor reading / min.: 0rpm, max.: 6000 rpm	Actual engine speed	
VEHICLE SPD	Maximum wheel speed sensor reading / min.: 0 km/h (0 MPH), max.: 326 km/h (202 MPH)	Actual vehicle speed	Speed indicated on speedometer
YAW RATE	Yaw rate sensor reading / min.: −128 deg / s, max.: 127 deg / s		

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Item	Measurement Item / Range (Display	Normal Condition	Diagnostic Note
YAW ZERO VALUE	Yaw rate sensor reading / min.: –128 deg / s, max.: 127 deg / s		
STEERING ANG	Steering angle sensor reading / min.: –1152 deg, max.: 1150.875 deg		
MAS CYL PRS 1	Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V	When brake pedal is released : 0.3 – 0.9 V	Reading increases when brake pedal is depressed
AIR BLD SUPPORT	Air bleed support / SUPPORT or NOT SUP	w / BA : Supported w / VSC : Not supported	
TEST MODE	Test mode / NORMAL or TEST	NORMAL : Normal mode TEST : During test mode	
#CODES	Number of DTC recorded / min.: 0, max.: 255	Min.: 0, max.: 39	

3. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the hand–held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as a first step of troubleshooting is one of the method to shorten the labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON.

(c) According to the display on tester, perform the "ACTIVE TEST".

HINT:

IG must be turned ON to proceed Active Test using a hand–held tester.

*1: For VSC equipped vehicles only

Item	Vehicle Condition / Test Details	Diagnostic Note
SFRR	Turns ABS solenoid (SFRR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH	Turns ABS solenoid (SFRH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLR	Turns ABS solenoid (SFLR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLH	Turns ABS solenoid (SFLH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRR	Turns ABS solenoid (SRRR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRH	Turns ABS solenoid (SRRH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLR	Turns ABS solenoid (SRLR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLH	Turns ABS solenoid (SRLH) ON / OFF	Operation of solenoid (clicking sound) can be heard

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Item	Vehicle Condition / Test Details	Diagnostic Note
SMF (BA–SOL)	Turns TRAC solenoid SMF (BA–SOL) ON / OFF	Operation of solenoid (clicking sound) can be heard
SMR	Turns TRAC solenoid SMR ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRR & SFRH	Turns ABS solenoid SFRR & SFRH ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLR & SFLH	Turns ABS solenoid SFLR & SFLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SRH & SRR	Turns ABS solenoid SRH & SRR ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLR & SRLH	Turns ABS solenoid SRLR & SRLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH & SFLH	Turns ABS solenoid SFRH & SFLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SOL RELAY	Turns ABS solenoid relay ON / OFF	Operation of solenoid (clicking sound) can be heard
ABS MOT RELAY	Turns ABS motor relay ON / OFF	Operation of motor can be heard
ABS WARN LIGHT	Turns ABS warning light ON / OFF	Observe combination meter
VSC WARN LIGHT	Turns VSC warning light ON / OFF	Observe combination meter
VSC / TRC OFF IND	Turns VSC / TRAC OFF indicator ON / OFF	Observe combination meter
SLIP INDI LIGHT	Turns SLIP indicator light ON / OFF	Observe combination meter
BRAKE WRN LIGHT	Turns BRAKE warning light ON / OFF	Observe combination meter
VSC / BR WARN BUZ	Turns VSC / BRAKE warning buzzer ON / OFF	Buzzer can be heard

4. FREEZE FRAME DATA

(a) The vehicle (sensor) status at the occurrence of abnormality of the diagnosis code and during the ABS operating can be memorized and displayed using the hand–held tester.

(b) Only one record of freeze frame data is stored, however, freeze frame data during the ABS operating is always up–dated. After the storage of freeze frame data, up to 31 ignition "ON" operations are stored and displayed.

HINT:

If the ignition switch "ON" operation exceeds 31 times, "31" appears on the display.

(c) If the diagnosis code abnormality occurs, the freeze frame data at the occurrence of the abnormality is stored but the ABS actuation data is deleted.

Hand–held tester display	Measurement Item	Reference Value*
VEHICLE SPD	Vehicle speed	Speed indication of a meter
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
# IG ON	Numbers of operations of ignition switch ON after memorizing freeze frame data	0 – 31
MAS CYL PRESS	Master cylinder pressure sensor output voltage	Release brake pedal: 0.3 – 0.9 V Depress brake pedal: 3.2 – 4.5 V

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MASS PRESS GRADE	Master cylinder pressure sensor changing declivity	–30 – 200 MPa/s
SYSTEM	Operate system	ABS operate: ABS BA operate: BA
YAW RATE	Yaw rate angle sensor output value	–70 – 70
STEERING ANG	Steering angle sensor output value	Left turn: Increase Right turn: Drop
G (RIGHT & LEFT)	Right and left G	–1.5 – 1.5
G (BACK & FORTH)	Back and forth G	–1.5 – 1.5
VSC / TRC OFF SW	TRAC OFF switch signal	TRAC OFF SW ON: ON OFF: OFF

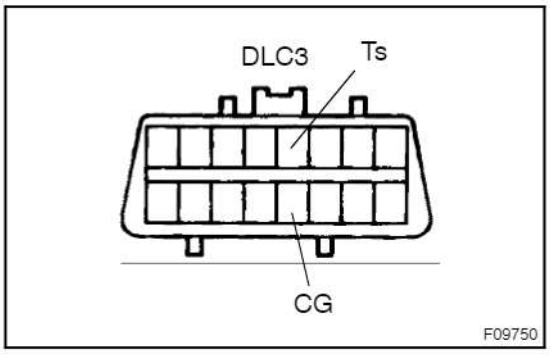
If no conditions are specifically stated for "Idling", it means the A/C switch is OFF and all accessory switches are OFF.

5. In case of not using the hand–held tester:
ABS SENSOR SIGNAL CHECK (TEST MODE)

NOTICE:

When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 9.).

(a) Procedures for test mode:
(1) Turn the ignition switch OFF.
(2) Set the parking brake.



(3) Using SST, connect terminals Ts and CG of DLC3.
SST 09846–18040
(4) Check that the steering wheel is in the straight–ahead position.
(5) Turn the ignition switch ON.
(6) Check that the ABS warning light blinks.

HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit or Ts terminal circuit.

Trouble Area	See page
Ts terminal circuit	DI–167
ABS warning light circuit	DI–148

(b) Check the deceleration sensor.
Keep the vehicle in a stationary condition on a level place for 1 sec. or more.
(c) Check the master cylinder pressure sensor.

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(1) Leaving the vehicle in a stationary condition and the brake pedal in free condition for 1 sec. or more, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 sec. or more.
(2) While the vehicle is stopped, release the brake pedal.
(3) While the vehicle is stopped, quickly depress the brake pedal once or more and check the ABS warning light is lit for 3 sec.

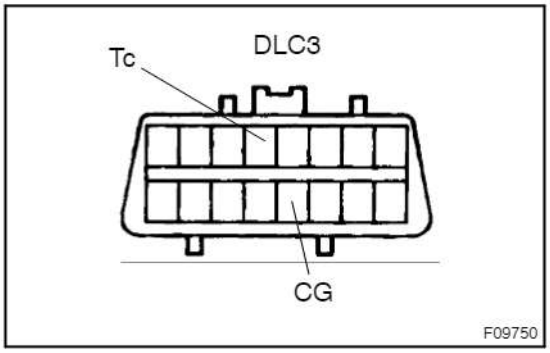
HINT:
Repeat the operation until the ABS warning light is lit.

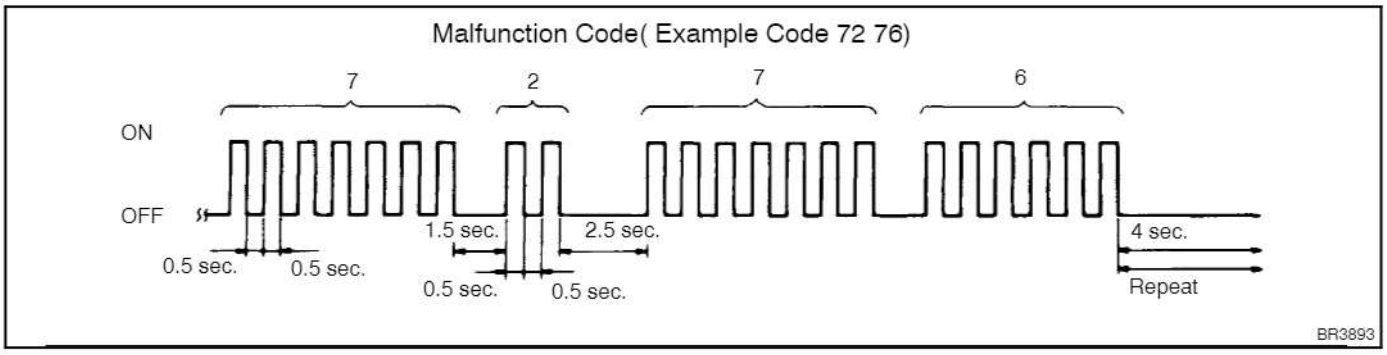
(d) Check the speed sensor signal.
Drive the vehicle straightforward.
Drive the vehicle with the speed faster than 45 km/h (28 mph) for several seconds and check that the ABS warning light comes off.

HINT:
The sensor check may not be completed if the wheels spin or the steering wheel is steered during this check.

(e) Stop the vehicle.
(f) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(g) Read the number of blinks of the ABS warning light.

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





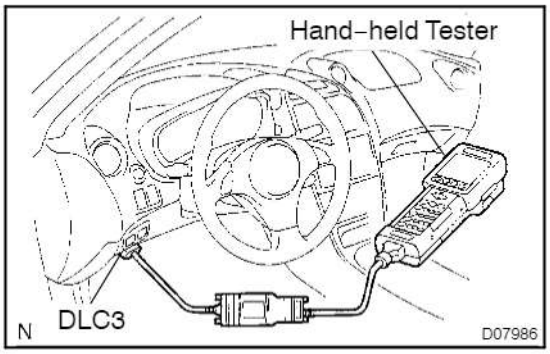
(h) After doing the check, disconnect the SST from terminals Ts and CG, Tc and CG of DLC3 and turn the ignition switch OFF.
SST 09843–18040

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6. In case of using the hand–held tester:
ABS SENSOR SIGNAL CHECK (TEST MODE)

NOTICE:

When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 9.). Make sure that this operation should be done before starting the following.



(a) Hook up the hand–held tester to the DLC3.
(b) Do steps 3.–(a)–(2), (4) and (5) and from (b) to (e) on the previous pages.
(c) Read the DTC by following the prompts on the tester screen.

HINT:

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

DTC of ABS sensor check function:

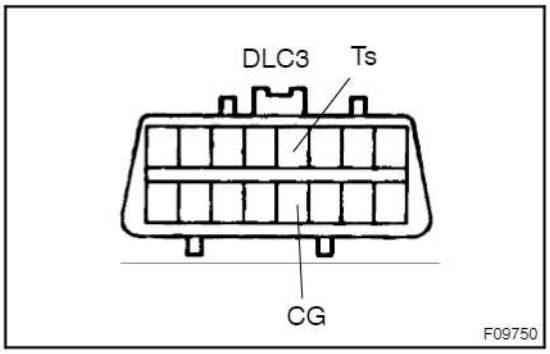
Code No.	Diagnosis	Trouble Area
C1271 / 71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Sensor rotor
C1272 / 72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Sensor rotor
C1273 / 73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Sensor rotor
C1274 / 74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Sensor rotor
C1275 / 75	Abnormal change in output voltage of right front speed sensor	Right front speed sensor rotor
C1276 / 76	Abnormal change in output voltage of Left front speed sensor	Left front speed sensor rotor
C1277 / 77	Abnormal change in output voltage of right rear speed sensor	Right rear speed sensor rotor
C1278 / 78	Abnormal change in output voltage of Left rear speed sensor	Left rear speed sensor rotor
C1279 / 79	Deceleration sensor is faulty	• Deceleration sensor • Sensor installation
C1281 / 81	Master cylinder pressure sensor output signal is faulty	Master cylinder pressure sensor

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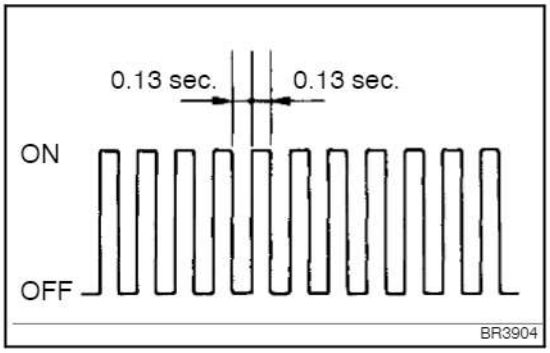
7. In case of not using the hand–held tester:
VSC SENSOR SIGNAL CHECK (TEST MODE)

NOTICE:

When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 9.).



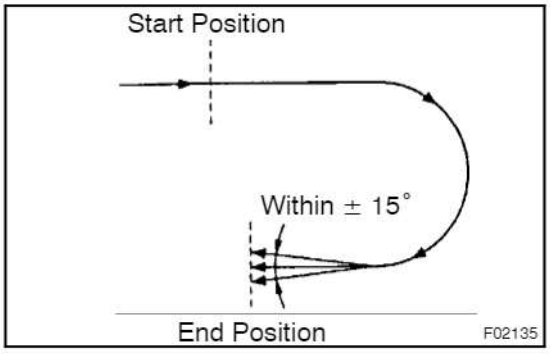
(a) Procedures for test mode:
(1) Turn the ignition switch OFF.
(2) Turn the steering wheel to the straight–ahead position.
(3) Using SST, connect terminals Ts and CG of DLC3.
SST 09843–18040
(4) Start the engine.



(5) Check that the VSC warning light blinks.

HINT:

If the VSC warning light does not blink, inspect the VSC warning light circuit and Ts terminal circuit (See page DI–290, DI–307).



(b) Check the yaw rate sensor.
(1) Drive the vehicle at the vehicle speed of approx. 5 km/h (3 mph). Turn the steering wheel either to left or right for 90° or more, and maintain 180° circular drive for the vehicle.
Stop the vehicle and set the parking brake. Check that the VSC warning buzzer sounds for 3 sec.

If the VSC warning buzzer sounds, the sensor check is in normal completion.

If the VSC warning buzzer does not sound, check the VSC warning buzzer circuit, then do the sensor check again.

Trouble Area	See page
VSC warning buzzer circuit	DI–162

If the VSC warning buzzer still does not sound, there is malfunction in the VSC sensor, so check the DTC.

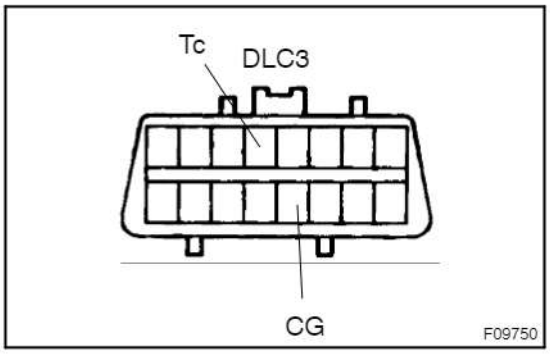
HINT:

- Drive the vehicle circularly by 180°. At the end of the turn, the direction of the vehicle should be within 180° ± 15° from its start position.

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- Do not spin the wheels.

(2) Check the steering angle sensor.
Turn the steering wheel to either left or right to the full lock position, from the vehicle stationary condition, and turn back the steering wheel to the neutral position.



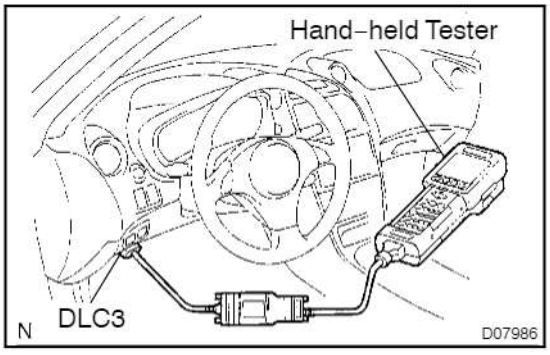
(c) Read the DTC.
(1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(2) Read the number of blinks of the VSC warning light.

HINT:
- See the list of DTC shown in the next page.
- If every sensor is normal, a normal code is output. (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated.)

(3) After doing the check, disconnect the SST from terminals Ts and CG ,Tc and CG of DLC3 and turn the ignition switch OFF.
SST 09843–18040

8. In case of using the hand–held tester:
VSC SENSOR SIGNAL CHECK (TEST MODE)

NOTICE:
When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 9.). Make sure that this operation should be done before starting the following.



(a) Hook up the hand–held tester to the DLC3.
(b) Do steps 5.–(a)–(2), (a)–(4) and (b) on the previous pages.
(c) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.

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DTC of VSC sensor check function:

Code No.	Diagnosis	Trouble Area
C0371 / 71	Yaw rate sensor output signal malfunction	• Yaw rate sensor • Yaw rate sensor circuit

9. IF NECESSARY, PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSORS

HINT:

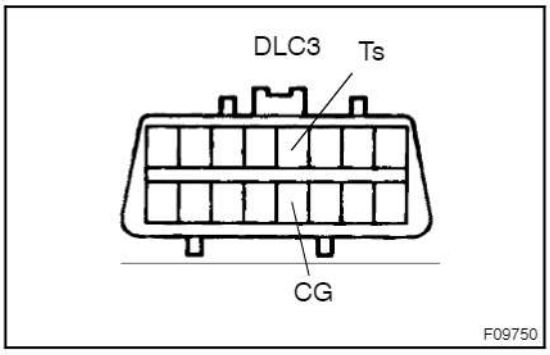
- When having replaced the yaw rate sensor, deceleration sensor or the ECU, make sure to perform yaw rate and deceleration sensors' zero point calibration. Be sure to complete this step 6. once it is started.
- During step 6., a not–replaced sensor also requires zero point calibration.

NOTICE:

- **While obtaining the zero point, do not give any vibration to the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not start the engine.)**
- **Be sure to do this on a level surface (within an inclination of 1 %).**

(a) Clear the zero points of the yaw rate and deceleration sensors.

(1) Turn the ignition switch ON in a stationary condition.



(2) With the lit switch ON, using SST, repeat a cycle of short and open between terminals Ts and CG of DLC3 4 times or more within 8 sec. Check that the TRC OFF indicator light and VSC warning light is lit indicating the recorded zero point is erased.

SST 09843–18040

(3) Turn the ignition switch OFF.

(b) Obtain zero point of the yaw rate sensor.

(1) Make the terminals Ts and CG of DLC3 disconnected.

(2) Turn the ignition switch ON.

HINT:

The vehicle should be in a stationary condition with the shift lever in P range.

(3) Check that the lit TRC OFF indicator light and VSC warning light goes off about 15 sec. after the ignition switch is turned ON.

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HINT:
Even if the ignition is not turned OFF in step (a)–(4) and remains ON, the yaw rate sensor zero point calibration can be completed. In this case, the TRC OFF indicator light and VSC warning light is lit for about 15 sec. and then VSC warning light starts blinking.

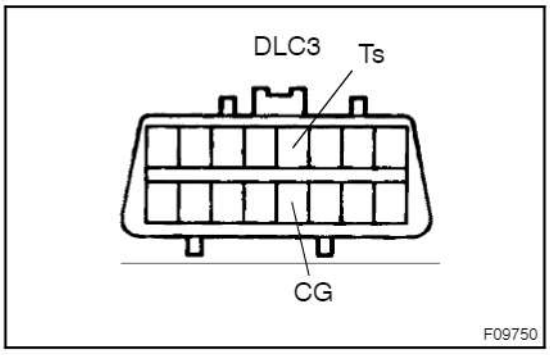
(4) After ensuring that the TRC OFF indicator light and VSC warning light remains OFF for 2 sec., turn the ignition switch OFF.

HINT:
If the ignition switch is not turned OFF in step (a)–(4), make sure that the VSC warning light light blinks for 2 sec. Then turn the ignition switch OFF.

(c) Perform deceleration sensor zero point calibration.

NOTICE:

After step (b) (the yaw rate sensor zero point calibration), the VSC warning light goes off. At this time, if the vehicle is driven without performing step (c) (deceleration sensor zero point calibration), deceleration sensor zero point calibration malfunction will be detected and the TRC OFF indicator light and VSC warning light will light up. Therefore, perform step (c) right after step (b).

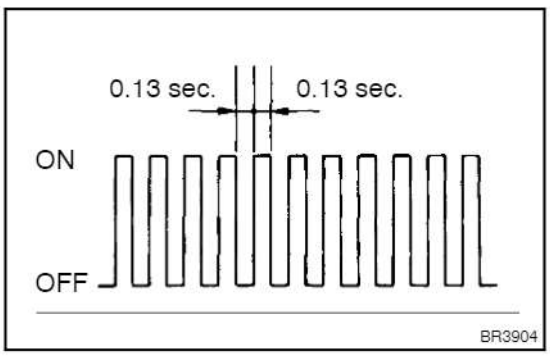


(1) Using SST, connect the terminals Ts and CG of DLC3.

SST 09843–18040

(2) Turn the ignition switch ON.

HINT:
Place the vehicle in a stationary condition.



(3) After turning the ignition switch ON, check that the VSC warning light is lit for about 4 sec. and then starts quick blinking at 0.13 sec. intervals.

(4) After ensuring the blinking of the VSC warning light for 2 sec., turn the ignition switch OFF.

(5) Remove the SST and make the terminals Ts and CG of DLC3 disconnected.

SST 09843–18040

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DI0WA-19

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

Before replacing or removing the part, turn the ignition switch OFF.

HINT:

- Using SST 09843–18040, connect the terminals Tc and CG of DLC3.
- If any abnormality is not found on inspected parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit indicated by DTC. For details of each code, turn to the pages in the "See page" for respective "DTC No." in the DTC chart.

DTC chart of ABS:

DTC No. (See Page)	Detection Item	Trouble Area
C0200 / 31*1 (DI–75)	Right front wheel speed sensor signal malfunction	• Right front, left front, right rear, left rear speed sensor • Each speed sensor circuit • Sensor rotor
C0205 / 32*1 (DI–75)	Left front wheel speed sensor signal malfunction	
C0210 / 33*1 (DI–75)	Right rear wheel speed sensor signal malfunction	
C0215 / 34*1 (DI–75)	Left rear wheel speed sensor signal malfunction	
C0226 / 21 (DI–82)	Open or short circuit in brake actuator solenoid circuit (SFR circuit)	• Brake actuator • SFRH or SFRR circuit
C0236 / 22 (DI–82)	Open or short circuit in brake actuator solenoid circuit (SFL circuit)	• Brake actuator • SFLH or SFLR circuit
C0246 / 23 (DI–82)	Open or short circuit in brake actuator solenoid circuit (SRR circuit)	• Brake actuator • SRRH or SRRR circuit
C0256 / 24 (DI–82)	Open or short circuit in brake actuator solenoid circuit (SRL circuit)	• Brake actuator • SRLH or SRLR circuit
C0273 / 13*1 (DI–85)	Open circuit in ABS MTR relay circuit	• ABS MTR relay • ABS MTR relay circuit
C0274 / 14 (DI–85)	Short circuit in ABS MTR relay circuit	
C0278 / 11 (DI–90)	Open circuit in ABS SOL relay circuit	• ABS SOL relay • ABS SOL relay circuit
C0279 / 12 (DI–90)	Short circuit in ABS SOL relay circuit	
C1225 / 25 (DI–104)	Open or short circuit in brake actuator solenoid circuit (SM circuit)	• Brake actuator • SM1 or SM2 circuit
C1235 / 35 (DI–75)	Foreign matter is attached on the tip of the right front sensor	• Right front, left front, right rear, left rear speed sensor • Sensor rotor
C1236 / 36 (DI–75)	Foreign matter is attached on the tip of the left front sensor	
C1238 / 38 (DI–75)	Foreign matter is attached on the tip of the right rear sensor	
C1239 / 39 (DI–75)	Foreign matter is attached on the tip of the left rear sensor	
C1241 / 41 (DI–117)	Low battery voltage	• Battery • Charging system • Power source circuit
C1243 / 43*1 (DI–120)	Malfunction in deceleration sensor (constant output)	• Deceleration sensor • Wire harness for deceleration sensor system

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C1244 / 44 (DI–120)	Open or short circuit in deceleration sensor circuit	• Deceleration sensor • Deceleration sensor circuit
C1245 / 45*1 (DI–120)	Malfunction in deceleration sensor (output error)	• Deceleration sensor • Wire harness for deceleration sensor system
C1246 / 46*2 (DI–125)	Malfunction in master cylinder pressure sensor	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
C1249 / 49 (DI–128)	Open circuit in stop light switch circuit	• Stop light bulb • Stop light switch circuit
C1251 / 51*1 (DI–131)	ABS pump motor is locked Open circuit in pump motor circuit	ABS pump motor
C1361 / 91 (DI–125)	Short circuit in MTR CUT relay circuit	• ABS CUT relay • ABS CUT relay circuit
Always ON (DI–141)	Malfunction in skid control ECU	• Power source circuit • ABS warning light circuit • Multiplex communication circuit • Skid control ECU

*1, *2:

Even after the troubled areas are repaired, ABS warning light will not go OFF unless the following operations are performed.

- *1:
  (1) Drive the vehicle at 20 km/h (12 mph) for 30 seconds or more and check that the ABS warning light goes off.
  (2) Clear the DTC (See page DI–53).
- *2:
  (1) Keep the vehicle in the stationary condition for 5 seconds or more and depress the brake pedal lightly 2 or 3 times.
  (2) Drive the vehicle at the vehicle speed 50 km/h (31 mph) and keep depressing the brake pedal strongly for about 3 seconds.
  (3) Repeat the above operation 3 times or more and check that the ABS warning light goes off.
  (4) Clear the DTC (See page DI–53).

HINT:

There is a case that hand–held tester cannot be used when ABS warning light is always on.

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DTC chart of VSC:

DTC No. (See Page)	Detection Item	Trouble Area
C1201 / 51 (DI–96)	Malfunction in engine and ECT ECU	Engine control system
C1203 / 53 (DI–97)	Malfunction in engine and ECT ECU communication circuit	• TRC+ or TRC– circuit • ENG+ or ENG– circuit • Engine and ECT ECU
C1210/36 (DI–99)	Zero point calibration of yaw rate sensor undone	• Yaw rate sensor • Yaw rate sensor circuit • P position switch circuit
C1223 / 43 (DI–101)	Malfunction in ABS control system	ABS control system
C1224 / 44 (DI–102)	Open or short circuit in NEO signal circuit	• NEO circuit • Engine and ECT ECU
C1231 / 31 (DI–106)	Malfunction in steering angle sensor	• Steering angle sensor • Steering angle sensor circuit
C1232/32 (DI–111)	Malfunction in deceleration sensor	• Deceleration sensor • Deceleration sensor circuit
C1233 / 33 (DI–113)	Open or short circuit in yaw rate sensor circuit	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34 (DI–113)	Malfunction in yaw rate sensor	
C1335 / 35 (DI–106)	Open circuit in steering angle sensor	• Steering angle sensor • Steering angle sensor circuit
C1336/39 (DI–134)	Zero point calibration of deceleration sensor undone	• Deceleration sensor • Deceleration sensor circuit • P position switch circuit
Always ON (DI–145)	Malfunction in skid control ECU Open circuit in VSC warning indicator circuit	• Power source circuit • Skid control ECU

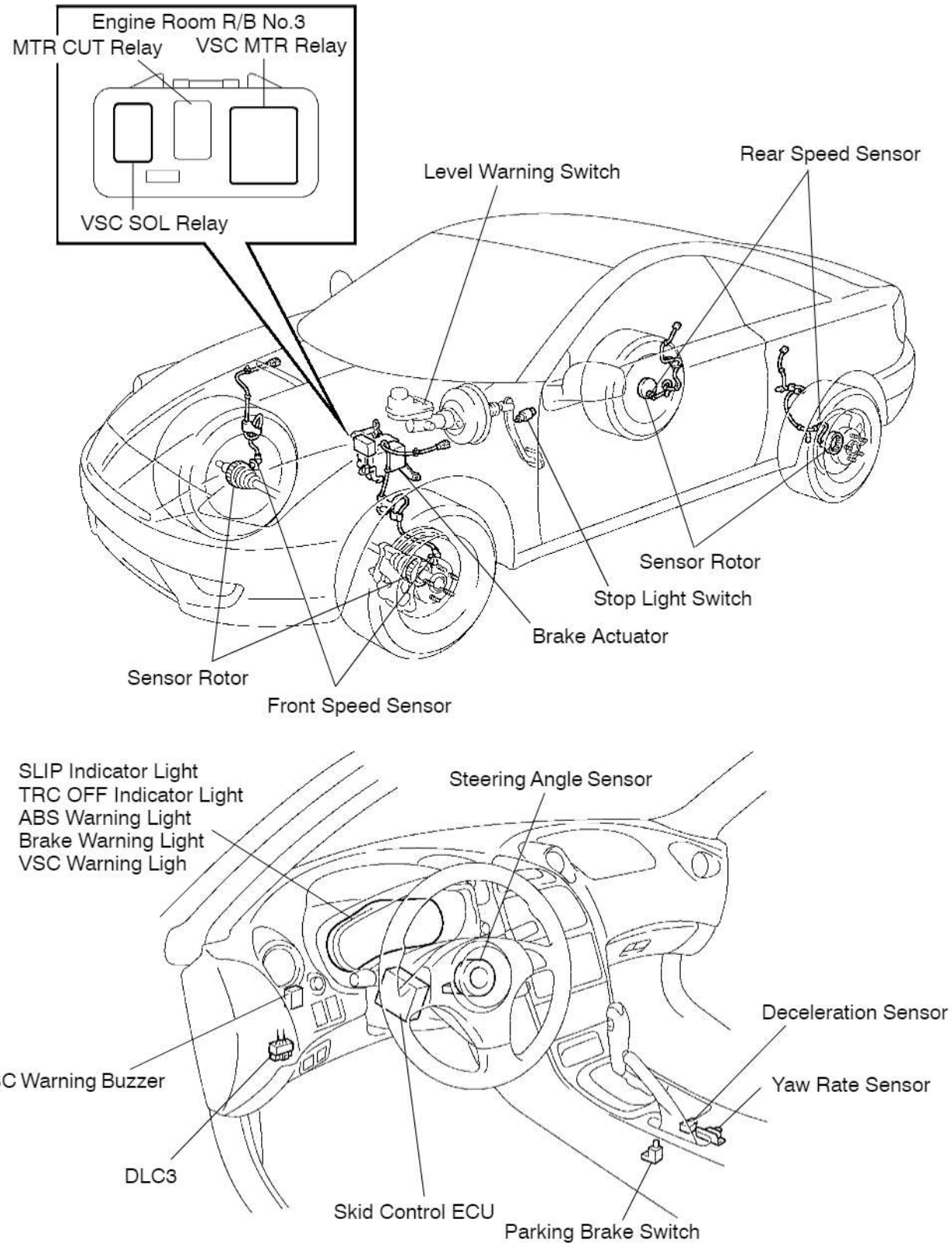
HINT:

In some cases hand–held tester cannot be used when VSC warning light is always on.

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DI9IC-02

PARTS LOCATION



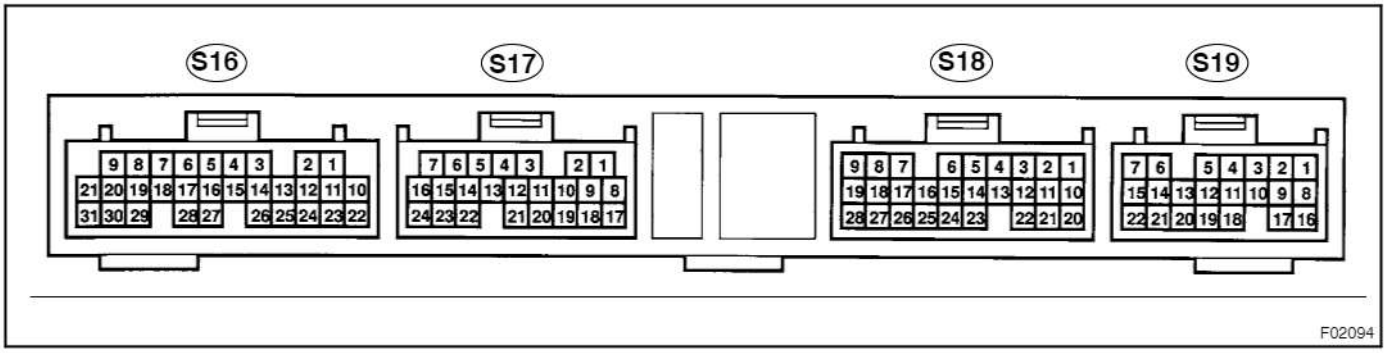
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DI1GG-12

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SRLR (S19 – 1) – GND (S16 – 2, 3, S19 – 15, 22)	L–O ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SM1– (S19 – 2) – GND (S16 – 2, 3, S19 – 15, 22)	V–W ↔ W–B	IG switch OFF	Continuity
SM1+ (S19 – 3) – GND (S16 – 2, 3, S19 – 15, 22)	P–L ↔ W–B	IG switch ON, ABS warning light OFF	Below 1.0
SM2– (S19 – 4) – GND (S16 – 2, 3, S19 – 15, 22)	V–G ↔ W–B	IG switch OFF	Continuity
SM2+ (S19 – 5) – GND (S16 – 2, 3, S19 – 15, 22)	V–R ↔ W–B	IG switch ON, ABS warning light OFF	Below 1.0
AST (S19 – 6) – GND (S16 – 2, 3, S19 – 15, 22)	B–L ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRLH (S19 – 7) – GND (S16 – 2, 3, S19 – 15, 22)	L–Y ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFRR (S19 – 8) – GND (S16 – 2, 3, S19 – 15, 22)	B–Y ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
PMC (S19 – 10) – E2 (S19 – 19)	B ↔ R	IG switch ON, stop light switch OFF	0.3 – 0.8
FSS (S19 – 13) – GND (S16 – 2, 3, S19 – 15, 22)	Shielded ↔ W–B	IG switch OFF	Continuity
MT (S19 – 14) – GND (S16 – 2, 3, S19 – 15, 22)	V–Y ↔ W–B	IG switch ON (Motor relay is OFF)	Below 1.5
SFRH (S19 – 16) – GND (S16 – 2, 3, S19 – 15, 22)	B–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
E2 (S19 – 19) – GND (S16 – 2, 3, S19 – 15, 22)	R ↔ W–B	IG switch OFF	Continuity
VCM (S19 – 20) – GND (S16 – 2, 3, S19 – 15, 22)	W ↔ W–B	IG switch ON	4.5 – 5.5
VYS (S18 – 1) – GND (S16 – 2, 3, S19 – 15, 22)	Y–R ↔ W–B	IG switch ON	4.5 – 5.5
VGS (S18–2) – GND (S16 – 2, 3, S19 – 15, 22)	W ↔ W–B	IG switch ON	4.5 – 5.5
YSS (S18 – 3) – GND (S16 – 2, 3, S19 – 15, 22)	Shielded ↔ W–B	IG switch OFF	Continuity
TRIG (S18 – 6) – GND (S16 – 2, 3, S19 – 15, 22)	B–L ↔ W–B	IG switch ON	Above 3.5
CSW (S18 – 7) – GND (S16 – 2, 3, S19 – 15, 22)	V–W ↔ W–B	IG switch ON, TRC OFF switch OFF	10 – 14

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YAW (S18 – 10) – GND (S16 – 2, 3, S19 – 15, 22)	L–R ↔ W–B	IG switch ON, yawrate sensor is stationary	2 – 3
GGND (S18 – 11) – GND (S16 – 2, 3, S19 – 15, 22)	R ↔ W–B	IG switch OFF	Continuity
GSS (S18 – 12) – GND (S16 – 2, 3, S19 – 15, 22)	Shielded ↔ W–B	IG switch OFF	Continuity
YD (S18 – 16) – GND (S16 – 2, 3, S19 – 15, 22)	Y ↔ W–B	IG switch ON, VSC warning light OFF	Above 4.5
SS1+ (S18 – 18) – SS1– (S18 – 27)	G–B ↔ G–O	Engine idling, slowly tun steering wheel	Pulse generation
GYAW (S18 – 20) – GND (S16 – 2, 3, S19 – 15, 22)	L ↔ W–B	IG switch OFF	Continuity
GL1 (S18 – 21) – GND (S16 – 2, 3, S19 – 15, 22)	G ↔ W–B	IG switch ON, vehicle is stopped	0.5 – 4.5
GL2 (S18 – 22) – GND (S16 – 2, 3, S19 – 15, 22)	B ↔ W–B	IG switch ON, vehicle is stopped	0.5 – 4.5
NEO (S18 – 26) – GND (S16 – 2, 3, S19 – 15, 22)	BR–R ↔ W–B	Engine idling	Pulse generation
D/G (S18 – 28) – GND (S16 – 2, 3, S19 – 15, 22)	W ↔ W–B	IG switch ON	10 – 14
WA (S17 – 1) – GND (S16 – 2, 3, S19 – 15, 22)	V ↔ W–B	IG switch ON, ABS warning light ON	4 – 8
		IG switch ON, ABS warning light OFF	Below 2.0
SP1 (S17 – 2) – GND (S16 – 2, 3, S19 – 15, 22)	LG ↔ W–B	Vehicle drives at about 20 km/h (12 mph)	Pulse generation
STP (S17 – 3) – GND (S16 – 2, 3, S19 – 15, 22)	G–W ↔ W–B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
WT (S17 – 4) – GND (S16 – 2, 3, S19 – 15, 22)	L–O ↔ W–B	IG switch ON, TRAC OFF indicator light ON	Below 2.0
		IG switch ON, TRAC OFF indicator light OFF	10 – 14
BZ (S17 – 5) – GND (S16 – 2, 3, S19 – 15, 22)	B–W ↔ W–B	IG switch ON, VSC buzzer is sounded	Below 1.0 ↔ 10 – 14
		IG switch ON, VSC buzzer is not sounded	10 – 14
IND (S17 – 6) – GND (S16 – 2, 3, S19 – 15, 22)	BR–W ↔ W–B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 – 14
IG1 (S17 – 7) – GND (S16 – 2, 3, S19 – 15, 22)	B–O ↔ W–B	IG switch ON	10 – 14
BRL (S17 – 8) – GND (S16 – 2, 3, S19 – 15, 22)	GR ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level and parking brake switch is OFF (Brake warning light is OFF)	Below 2.0
		IG switch ON, fluid in master cylinder reservoir below MIN level or parking brake switch is ON (Brake warning light ON)	10 – 14
ENG+ (S17 – 9) – ENG– (S17 – 18)	P–B ↔ P–L	IG switch ON	Pulse generation
Ts (S17 – 10) – GND (S16 – 2, 3, S19 – 15, 22)	W–R ↔ W–B	IG switch ON	10 – 14
TRC+ (S17 – 11) – TRC– (S17 – 20)	V ↔ O	IG switch ON	Pulse deneration
VSCW (S17 – 4) – GND (S16 – 2, 3, S19 – 15, 22)	P–G ↔ W–B	IG switch ON, VSC warning light ON	Below 2.0
		IG switch ON, VSC warning light OFF	10 – 14
RR+ (S17 – 16) – RR– (S17 – 15)	W ↔ B	IG switch ON, slowly turn right rear wheel	Pulse generation

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Tc (S17 – 19) – GND (S16 – 2, 3, S19 – 15, 22)	P–B ↔ W–B	IG switch ON	10 – 14
PKB (S17 – 21) – GND (S16 – 2, 3, S19 – 15, 22)	R–B ↔ W–B	IG switch ON, parking brake switch ON	Below 1.5
		IG switch ON, parking brake switch OFF	10 – 14
RL+ (S17 – 22) – RL– (S17 – 23)	R ↔ G	IG switch ON, slowly turn left rear wheel	Pulse generation
+BO (S17 – 24) – GND (S16 – 2, 3, S19 – 15, 22)	B–W ↔ W–B	Always	10 – 14
R+ (S16 – 1) – GND (S16 – 2, 3, S19 – 15, 22)	GR–R ↔ W–B	IG switch ON	10 – 14
SFLH (S16 – 6) – GND (S16 – 2, 3, S19 – 15, 22)	B–O ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFLR (S16 – 7) – GND (S16 – 2, 3, S19 – 15, 22)	L–B ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRH (S16 – 8) – GND (S16 – 2, 3, S19 – 15, 22)	L–W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRR (S16 – 9) – GND (S16 – 2, 3, S19 – 15, 22)	L–R ↔ W–B	IG switch ON, ABS warning light OFF	10 –14
SR (S16 – 10) – R+ (S16 – 1)	GR ↔ GR–R	IG switch ON, ABS warning light OFF	Below 1.0
FR+ (S16 – 13) – FR– (S16 – 12)	P ↔ L	IG switch ON, slowly turn right front wheel	Pulse generation
+BI (S16 – 22) – GND (S16 – 2, 3, S19 – 15, 22)	B–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
MR (S16 – 23) – GND (S16 – 2, 3, S19 – 15, 22)	R–Y ↔ W–B	IG switch ON, ABS motor stops	10 – 14
MRF (S16 – 24) – GND (S16 – 2, 3, S19 – 15, 22)	R–L ↔ W–B	IG switch ON	10 – 14
FL+ (S16 – 28) – FL– (S16 – 27)	Y ↔ BR	IG switch ON, slowly turn left front wheel	Pulse generation

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DI0WG–19

PROBLEM SYMPTOMS TABLE

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

NOTICE:

When replacing skid control ECU, sensor or etc., turn the ignition switch OFF.

Symptom	Suspect Area	See page
ABS does not operate BA does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. IG power source circuit 3. Speed sensor circuit 4. Check the brake actuator with a hand–held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–169).	 DI–53 DI–117 DI–75 BR–22
ABS does not operate efficiently BA does not operate efficiently	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure 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–169).	 DI–53 DI–75 DI–128 BR–22
ABS warning light abnormal	1. ABS warning light circuit 2. Skid control ECU	DI–148 IN–30
DTC of ABS check cannot be done	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output.	 DI–53
Sensor signal check cannot be done	1. Ts terminal circuit 2. Skid control ECU	DI–167 IN–30
TRC does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit	 DI–53 DI–117 DI–169 DI–75
VSC does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit 5. Deceleration sensor circuit 6. Yaw rate sensor circuit 7. Steering angle sensor circuit	 DI–53 DI–117 DI–169 DI–75 DI–120 DI–113 DI–106

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SLIP indicator light abnormal	1. SLIP indicator light circuit 2. Skid control ECU	DI–154 IN–30
TRC OFF indicator abnormal	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. TRC OFF switch circuit	 DI–53 DI–151
DTC of VSC check cannot be done	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output.	 DI–53
VSC warning indicator abnormal	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. VSC warning indicator circuit	 DI–53 DI–159

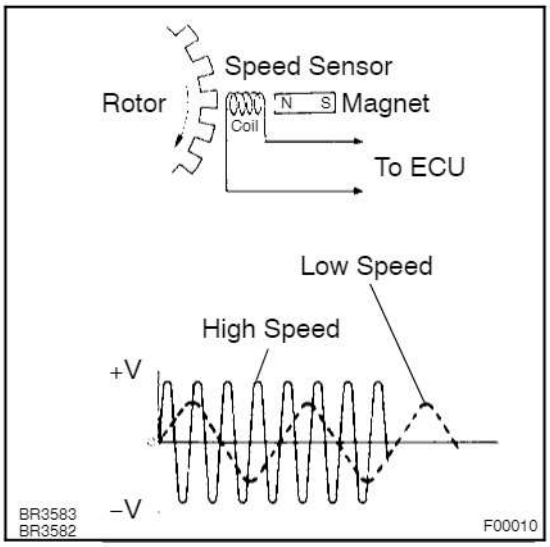
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DIANC-01

CIRCUIT INSPECTION

DTC	C0200 / 31 – C1239 / 39	Speed Sensor Circuit

CIRCUIT DESCRIPTION



The speed sensor measures wheel speed and sends the corresponding signals to the ECU. These signals are used for control of both the ABS & TRC & VSC control system. Both the front and rear rotors have 48 serrations.
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to measure the speed of each wheel.

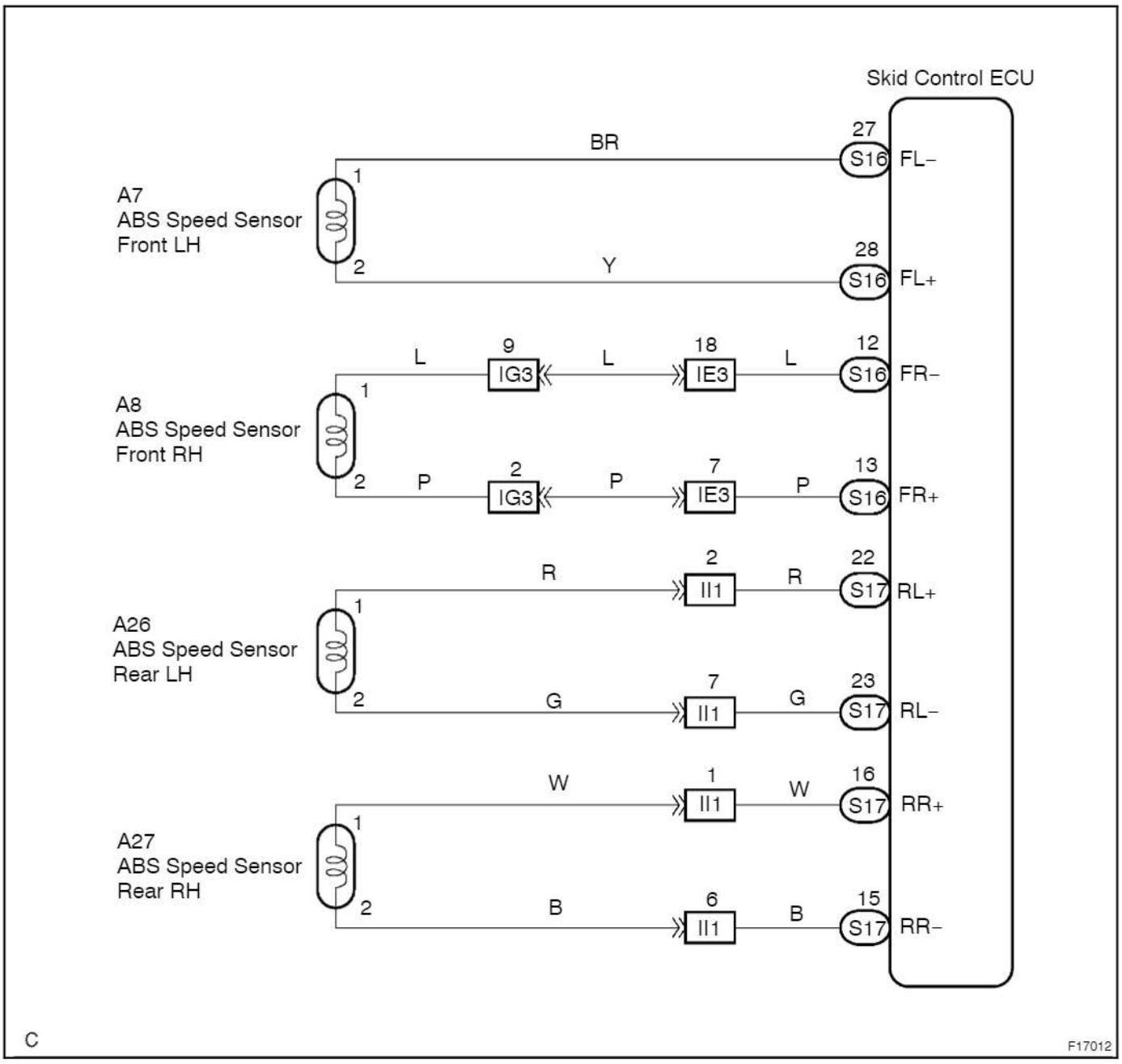
DTC No.	DTC Detecting Condition	Trouble Area
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of conditions 1. through 3.: 1. At vehicle speed of 10 km/h (6 mph) or more, open or short circuit of the speed sensor signal circuit continues for 1 sec. 2. Momentary interruption of the speed sensor signal occurs 7 times or more. 3. Open circuit of the speed sensor signal circuit continues for 0.5 sec. or more.	• Right front, left front, right rear, left rear speed sensor • Each speed sensor circuit • Sensor rotor
C1235 / 35 C1236 / 36 C1238 / 38 C1239 / 39	At the vehicle speed of 20 km/h (12mph) or more, the condition that noise is included in the speed sensor signal continues for 5 sec. or more.	• Right front, left front, right rear, left rear speed sensor • Sensor rotor

HINT:

- DTC No. C0200 / 31 and C1235 / 35 are for the right front speed sensor.
- DTC No. C0205 / 32 and C1236 / 36 are for the left front speed sensor.
- DTC No. C0210 / 33 and C1238 / 38 are for the right rear speed sensor.
- DTC No. C0215 / 34 and C1239 / 39 are for the left rear speed sensor.

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WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of speed sensor.**

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

CHECK:
Check that there is no difference between the speed value output from the speed sensor observed in the hand–held tester and the speed value displayed by the speedometer when the vehicle is in motion.

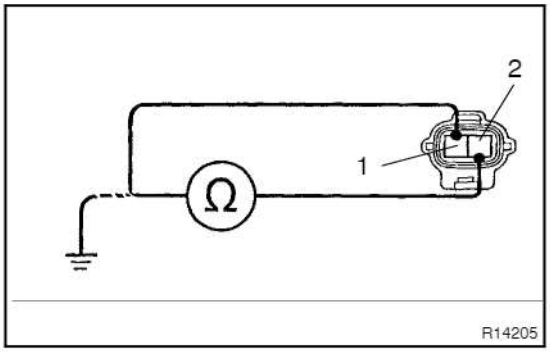
OK:
There is almost no difference in the displayed speed values.

HINT:
There is tolerance of ± 10 % in the speedometer indication.

OK → **Go to step 4.**

NG

2	**Check speed sensor.**



Front:

PREPARATION:
(a) Make sure that the speed sensor connector and the wire harness side connector are securely connected.
(b) Disconnect the speed sensor connector.
(c) Turn the ignition switch OFF.

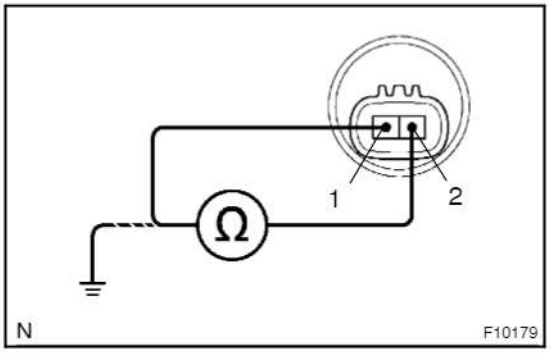
CHECK:
Measure resistance between terminals 1 and 2 of the speed sensor connector.

OK:
Resistance: 1.6 – 1.8 kΩ at 20°C

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

OK:
Resistance: 1 MΩ or higher

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Rear Speed Sensor:

PREPARATION:

(a) Make sure that the speed sensor connector and the wire harness side connector are securely connected.
(b) Disconnect the speed sensor connector.
(c) Turn the ignition switch OFF.

CHECK:

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

OK:

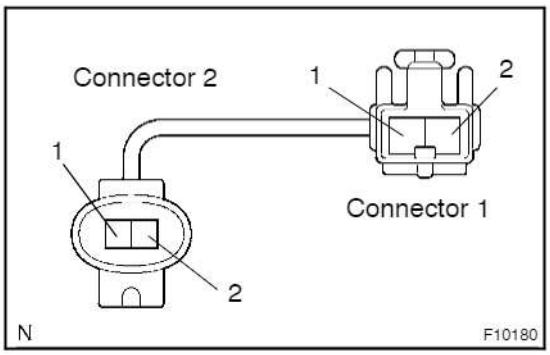
Resistance: 2.2 kΩ or less

CHECK:

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

OK:

Resistance: 1 MΩ or higher



Rear Speed Sensor Sub–wire Harness:

PREPARATION:

(a) Remove the seat cushion and seatback.
(b) Make sure that there is no looseness at the connector lock part and connecting part of the connector.
(c) Disconnect the speed sensor connector inside vehicle.

CHECK:

(a) Measure resistance between terminal 1 of connector 1 and terminal 2 of connector 2.
(b) Measure resistance between terminal 2 of connector 1 and terminal 1 of connector 2.

OK:

Resistance: 10MΩ or higher

NG	**Replace speed sensor or sub–wire harness.**

NOTICE:

Check the speed sensor signal last (See page DI–53).

OK

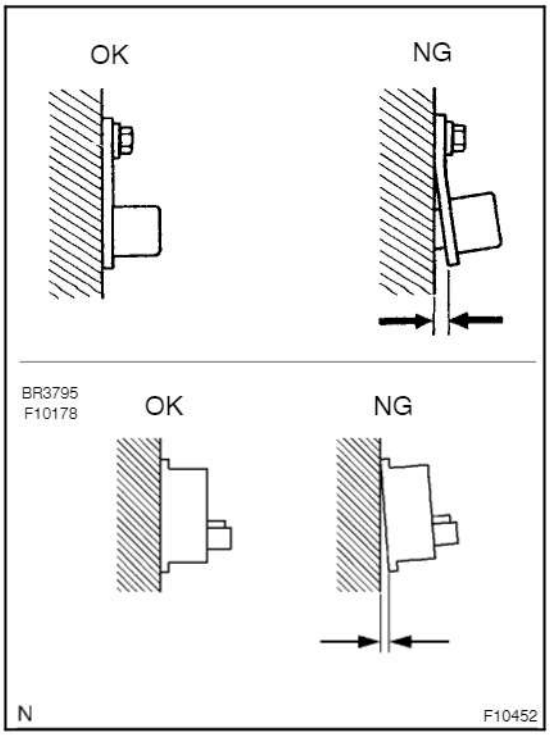
3	**Check for open and short circuit in harness and connector between each speed sensor and skid control ECU (See page IN–30).**

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

OK

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4	Check sensor installation.



CHECK:

Check the speed sensor installation.

OK:

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

NG	Replace speed sensor.

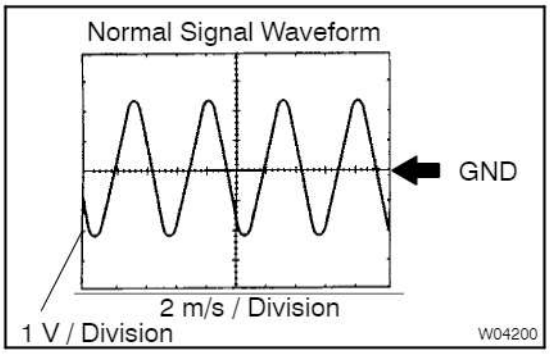
NOTICE:

Check the speed sensor signal last (See page DI–53).

OK

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5	Check speed sensor and sensor rotor serrations.



(REFERENCE) INSPECTION USING OSCILLOSCOPE

PREPARATION:

(a) Remove the skid control ECU with the connector still connected.

(b) Connect the oscilloscope to the terminals FR+ – FR–, FL+ – FL–, RR+ – RR– and RL+ – RL– of the skid control ECU.

CHECK:

Drive the vehicle at the speed of about 20 km/h (12 mph), and check the signal waveform.

HINT:

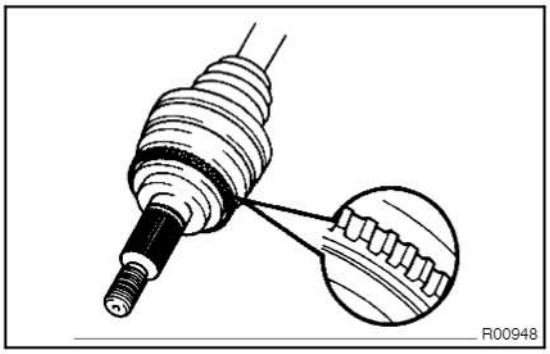
- As the vehicle speed (rpm of the wheels) increases, a cycle of the waveform becomes shorter and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter deposited on it.

OK	Check and replace skid control ECU.

NG

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6	Check sensor rotor and sensor tip.



Front:

PREPARATION:

Remove the front drive shaft.

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects on the sensor rotor.

PREPARATION:

Remove the front speed sensor.

CHECK:

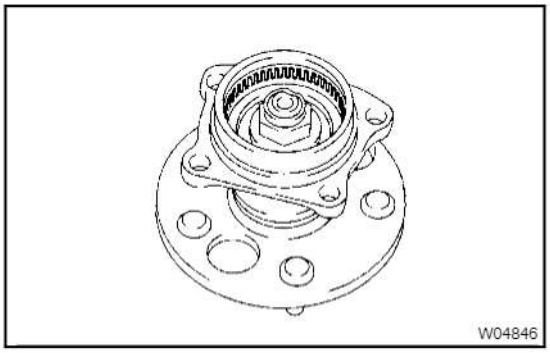
Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.



Rear:

PREPARATION:

Remove the rear speed sensor.

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.

NG	Replace speed sensor or rotor.

NOTICE:

Check the speed sensor signal last (See page DI–53).

OK

Check and replace skid control ECU.

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DI1GI–13

DTC	C0226 / 21 – C0256 / 24	ABS–Related Solenoid Circuits

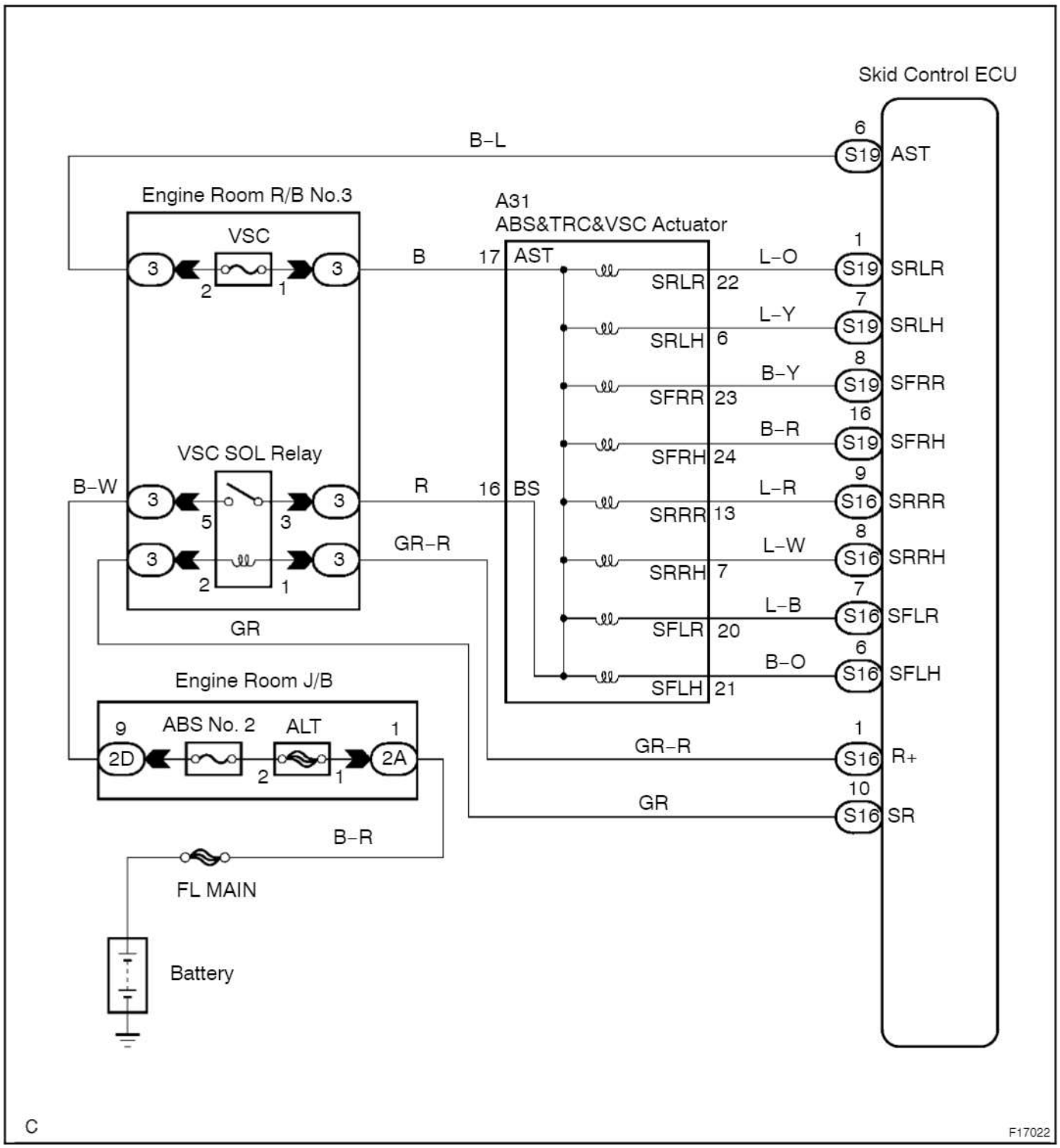
CIRCUIT DESCRIPTION

ABS–related solenoids operate when signals are received from the ECU, and control the pressure acting on the wheel cylinders thus controlling the braking force.

DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	Open or short circuit for SFRH or SFRR circuit continues for 0.05 sec. or more.	• Brake actuator • SFRH or SFRR circuit
C0236 / 22	Open or short circuit for SFLH or SFLR circuit continues for 0.05 sec. or more.	• Brake actuator • SFLH or SFLR circuit
C0246 / 23	Open or short circuit for SRRH or SRRR circuit continues for 0.05 sec. or more.	• Brake actuator • SRRH or SRRR circuit
C0256 / 24	Open or short circuit for SRLH or SRLR circuit continues for 0.05 sec. or more.	• Brake actuator • SRLH or SRLR circuit

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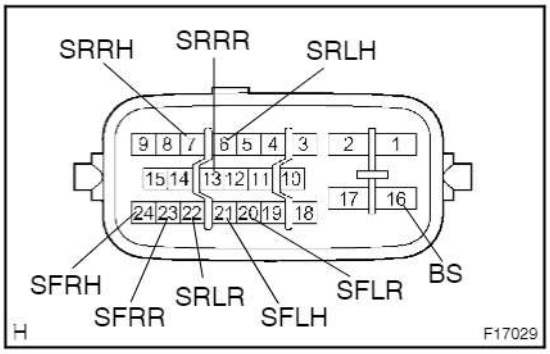
WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check brake actuator solenoid.**



PREPARATION:

(a) Turn the ignition switch OFF.

(b) Disconnect the brake actuator connector.

CHECK:

Check continuity between terminal BS and terminals SFRH, SFLH, SRRH, SRLH, SFRR, SFLR, SRRR and SRLR of brake actuator.

OK:

Continuity

HINT:

Resistance of each solenoid at 25 °C

SFRH, SFLH, SRRH, SRLH: 8.1 – 9.1 Ω

SFRR, SFLR, SRRR, SRLR: 4.0 – 4.6 Ω

NG	**Replace brake actuator.**

OK

2	**Check for open and short circuit in harness and connector between skid control ECU and brake actuator (See page IN–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.

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DI1GJ-19

DTC	C0273 / 13, C0274 / 14	ABS MTR Relay Circuit

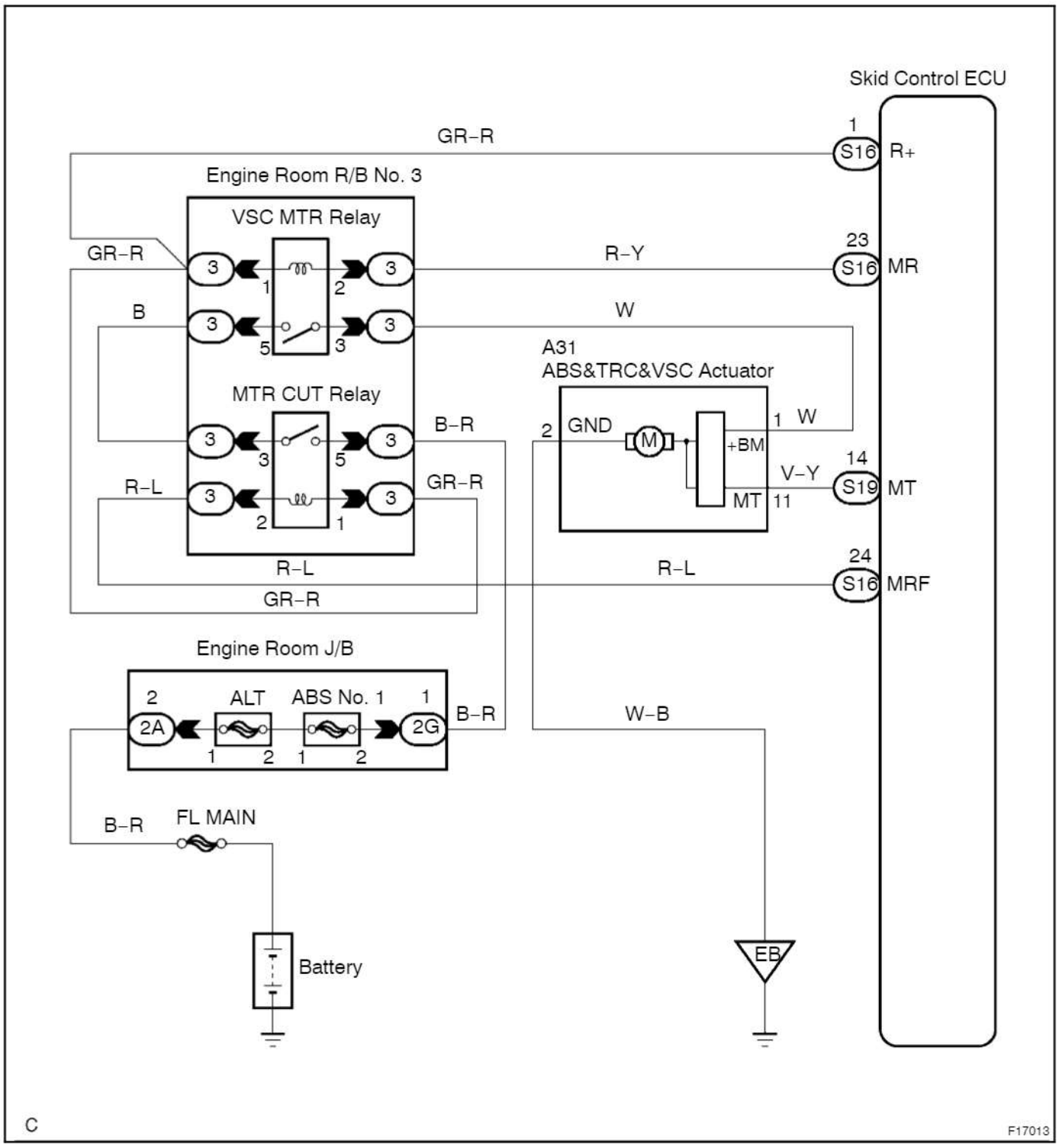
CIRCUIT DESCRIPTION

The ABS MTR relay supplies power to the ABS pump motor. While the ABS & TRC are activated, the ECU switches the motor relay ON and operates the ABS pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C0273 / 13	Conditions 1. and 2. continued for 0.12 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V in the initial check or ABS, TRC, VSC and BA are in operation, and when the MTR relay is ON, however, the contact point of the MTR relay is OFF. 2. ECU terminal IG1 is 9.5 V or less, and when the MTR relay is ON, but the contact point of the MTR relay does not become ON.	• ABS MTR relay • ABS MTR relay circuit • Skid control ECU
C0274 / 14	When the MTR relay is OFF, the condition that the contact point of MTR relay is ON continues for 4 sec. or more.	

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WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

After step 1, go to step 2 in case of using the hand–held tester and start go to step 3 in case of not using hand–held tester.

1	**Is there DTC C1361/91 being indicated?**

YES → **Repair circuit indicated by C1361/91.**

NO

2	**Check VSC MTR relay operation.**

PREPARATION:

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

CHECK:

Check the operation sound of the VSC MTR relay when operating it with the hand–held tester.

OK:

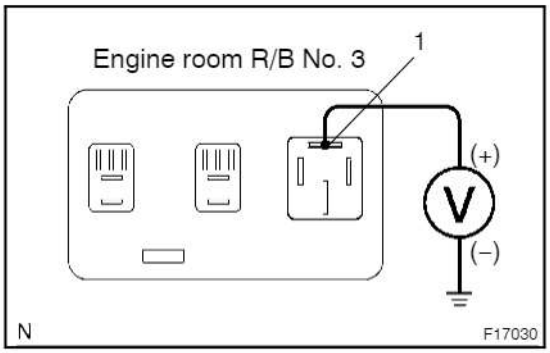
The operation sound of the VSC MTR relay should be heard.

OK → **Go to step 4.**

NG

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



PREPARATION:

(a) Turn the ignition switch OFF.
(b) Remove the VSC MTR relay from the engine room R/B No. 3.
(c) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal 1 of engien room R/B No. 3 (for VSC MTR relay) and body ground.

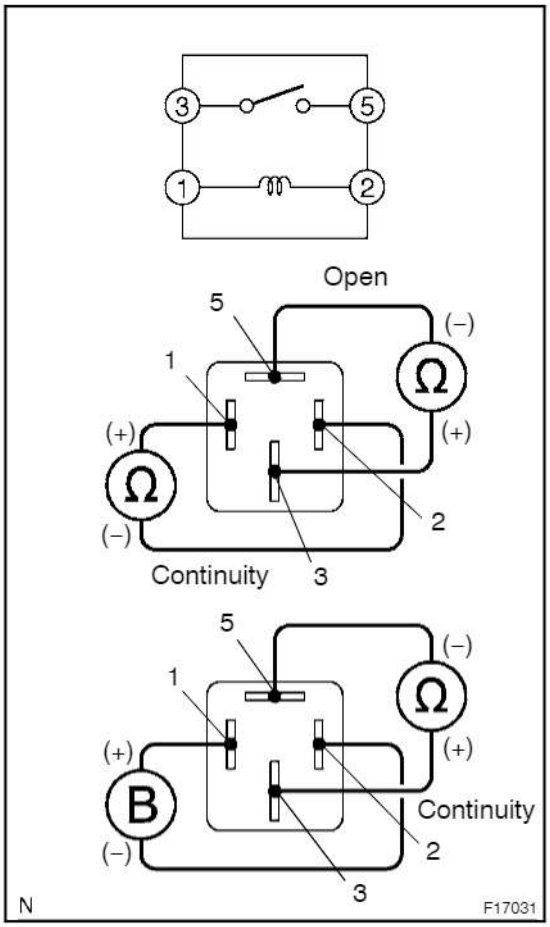
OK:

Voltage: 10 – 14 V

NG	Check and repair harness or connector.

OK

4	Check VSC MTR relay.



CHECK:

Check continuity between each pair of terminal of VSC MTR relay.

OK:

Terminals 1 and 2	Continuity (Reference value 62 Ω)
Terminals 3 and 5	Open

CHECK:

(a) Apply battery voltage between terminals 1 and 2.
(b) Check continuity between terminals.

OK:

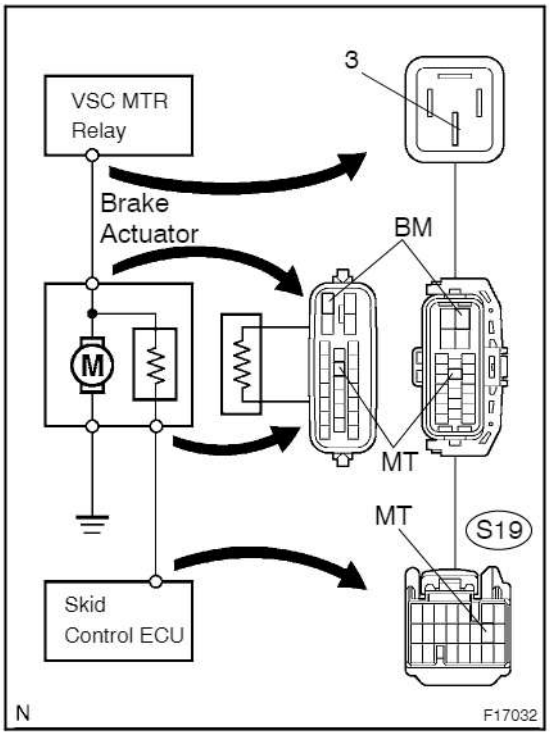
Terminals 3 and 5	Continuity

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NG → **Replace VSC MTR relay.**

OK

5	**Check continuity between terminals 3 of engine room R/B No. 3 (for VSC MTR relay) and terminal MT of skid control ECU.**



PREPARATION:

(a) Remove the VSC MTR relay from the engine room R/B No. 3.

(b) Disconnect the connector from the skid control ECU.

CHECK:

Check continuity between terminals 3 of engine roomR/B No. 3 (for VSC MTR relay) and terminal MT of skid control ECU harness side connector.

OK:

Continuity

HINT:

There is a no continuity between terminals BM and MT of brake actuator.

NG → **Repair or replace harness or brake actuator.**

OK

6	**Check for open and short circuit in harness and connector between VSC MTR relay and skid control 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.

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DTC	C0278 / 11, C0279 / 12	ABS SOL Relay Circuit

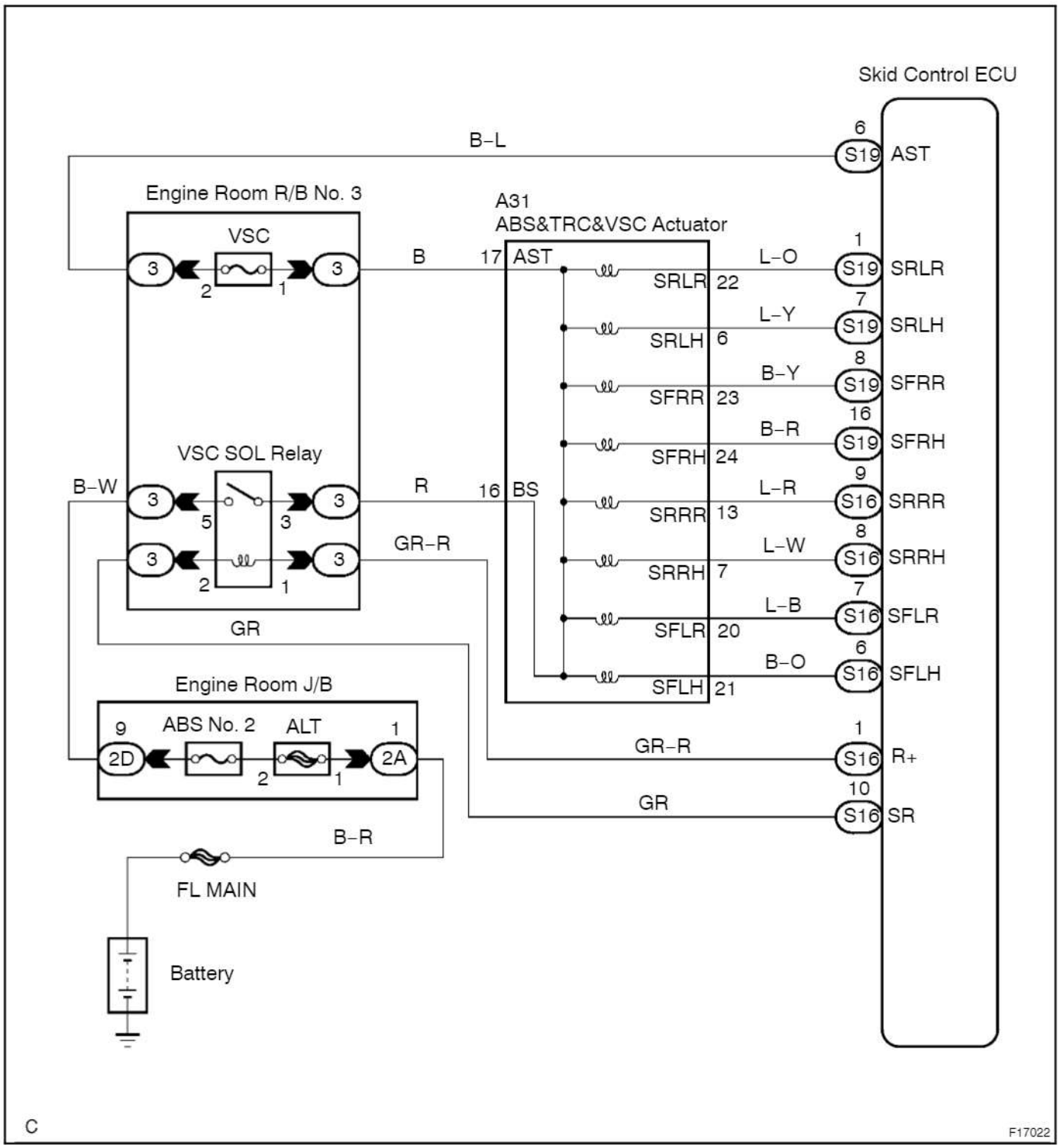
CIRCUIT DESCRIPTION

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

DTC No.	DTC Detecting Condition	Trouble Area
C0278 / 11	Conditions 1. and 2. continue for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V and the SOL relay is ON, however, the contact point of the SOL relay is OFF. 2. With SOL relay ON driving, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the SOL relay does not become ON.	• ABS SOL relay • ABS SOL relay circuit • Skid control ECU
C0279 / 12	Immediately after ECU terminal IG1 becomes ON, and SOL relay is OFF, however, when the condition that the contact point of the SOL relay is ON continues for 0.2 sec. or more.	

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WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

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

1	**Check VSC SOL relay operation.**

PREPARATION:

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

CHECK:

Check the operation sound of the VSC SOL relay when operating it with the hand–held tester.

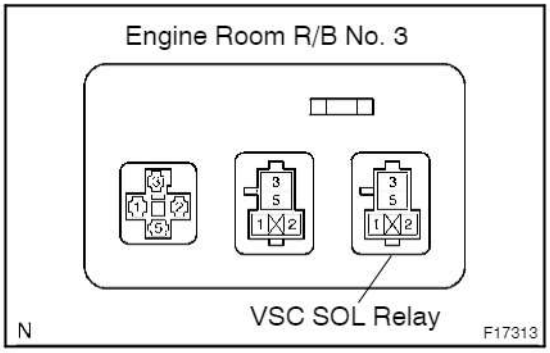
OK:

The operation sound of the VSC SOL relay should be heard.

OK → **Go to step 4.**

NG

2	**Check voltage between terminals 5 of engine room R/B NO. 3 (for VSC SOL relay) and body ground.**



PREPARATION:

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

CHECK:

Measure the voltage between terminals 5 of engine room R/B No. 3(for ABS SOL relay)and body ground.

OK:

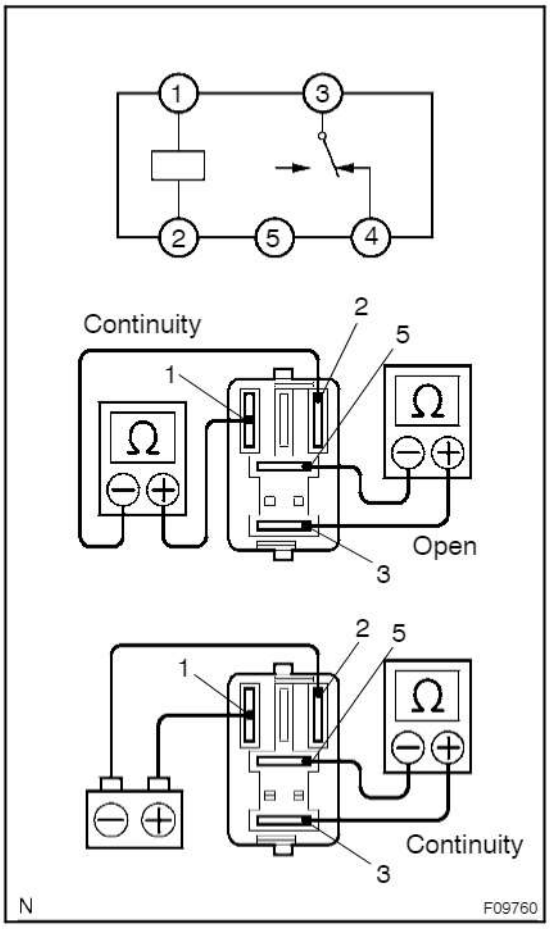
Voltage: 10 – 14 V

NG → **Go to step 7.**

OK

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3	Check VSC SOL relay.



CHECK:

Check continuity between each terminal of VSC SOL relay.

OK:

Terminals 1 and 2	Continuity (Reference value 62 Ω)
Terminals 3 and 5	Open

CHECK:

(a) Apply battery voltage between terminals 1 and 2.

(b) Check continuity between each terminal of VSC SOL relay.

OK:

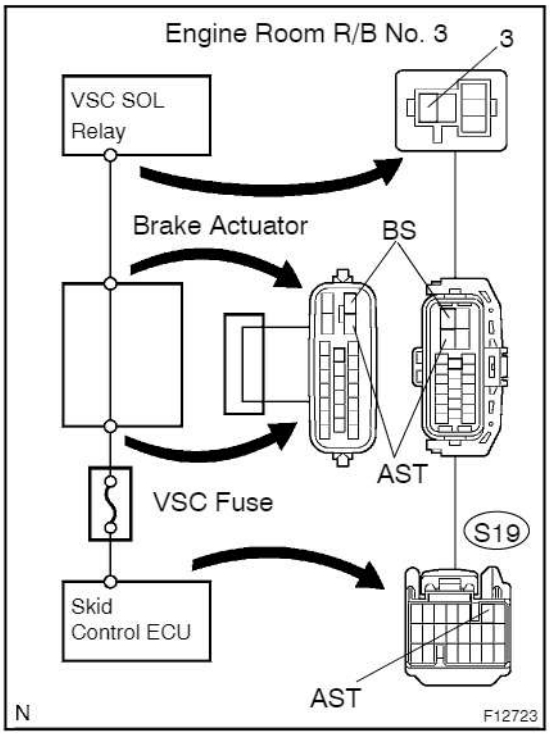
Terminals 3 and 5	Continuity

NG → **Replace VSC SOL relay.**

OK

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4	**Check continuity between terminals 3 of engine room R/B No. 3 (for VSC SOL relay) and terminal AST of skid control ECU.**



PREPARATION:

(a) Remove the VSC SOL relay from the engine room R/B No. 3.

(b) Disconnect the connector from the skid control ECU.

CHECK:

Check continuity between terminals 3 of engine room R/B No. 3 (for VSC SOL relay) and terminal AST of skid control ECU harness side connector.

OK:

Continuity

NG → **Repair or replace harness or brake actuator.**

OK

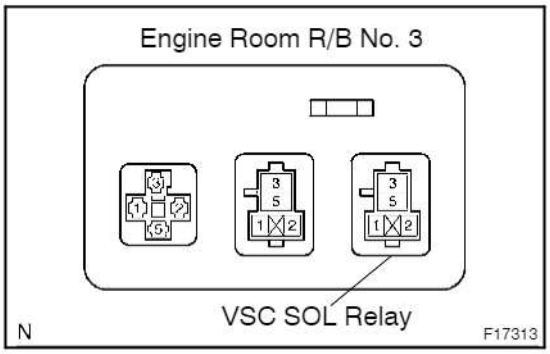
5	**Check for open and short circuit in harness and connector between ABS SOL relay and skid control ECU (See page IN–30).**

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

OK

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6	Check VSC fuse.



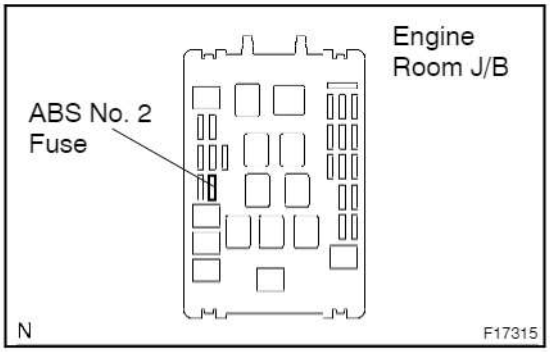
PREPARATION:
Remove the VSC fuse from the engine room R/B No. 3.
CHECK:
Check continuity of VSC fuse.
OK:
Continuity

NG	Replace the VSC fuse.

OK

Reapair or replace harness or connector.

7	Check ABS No. 2 fuse.



PREPARATION:
Remove the ABS No. 2 fuse from the engine room J/B.
CHECK:
Check continuity of ABS No. 2 fuse.
OK:
Continuity

NG	Replace the ABS No. 2 fuse.

OK

Repair or replace harness or connector.

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DI1GY–17

DTC	C1201 / 51	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If any trouble occurs in the engine control system, the ECU prohibits TRC and VSC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51	At the engine speed of 500 rpm, a trouble signal in the engine cotrol system continues for 5 sec. or more.	• Engine control system

INSPECTION PROCEDURE

1	**Check the DTC for the engine (See Pub. No. RM733E, page DI–18).**

*1 → **Repair engine control system according to the code output.**

*2

Check for engine ECU connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON

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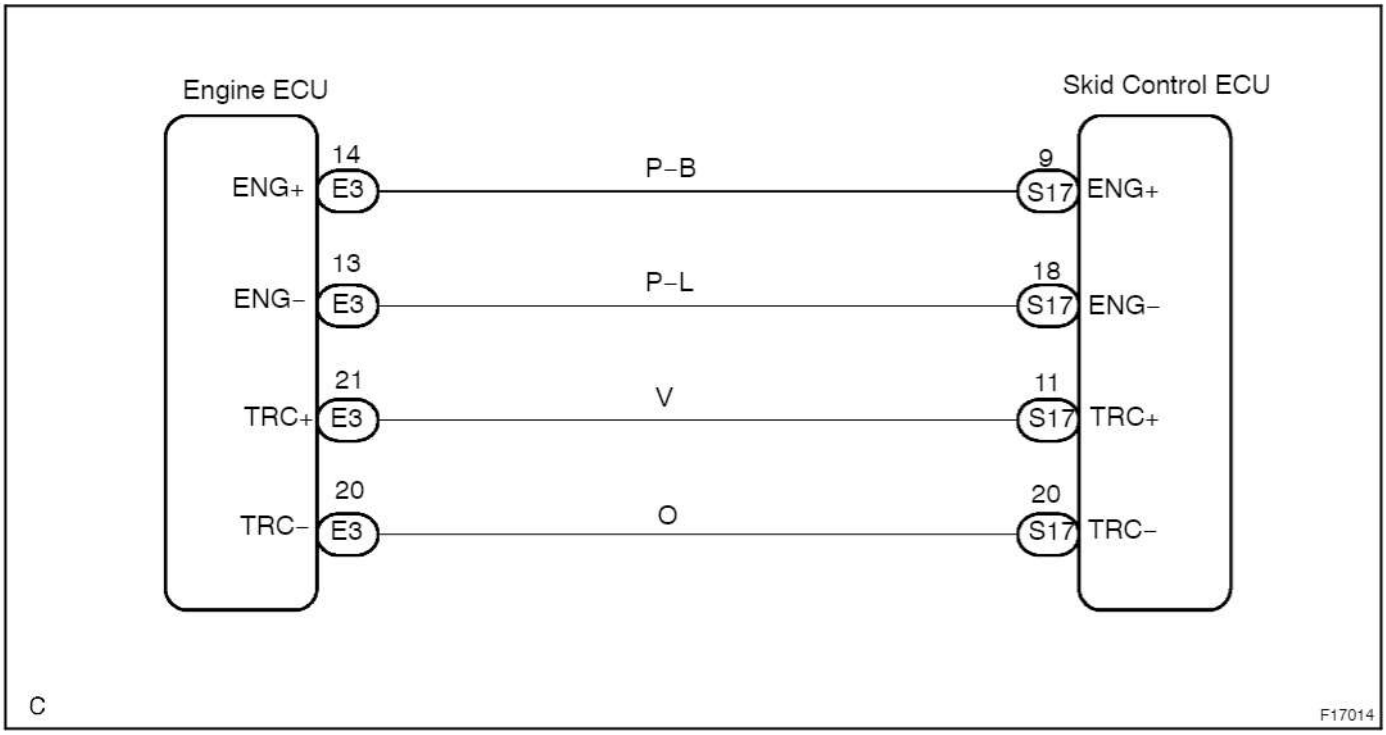
DTC	C1203 / 53	Engine ECU Communication Circuit Malfunction

CIRCUIT DESCRIPTION

The circuit is used to send TRC and VSC control information from the skid control ECU to the engine and ECT ECU (TRC+, TRC–), and engine control information from the engine and ECT ECU to the skid control ECU (ENG+, ENG–).

DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	1. Either of the following (a) or (b) continues for 5 sec.: (a) When ECU terminal IG1 voltage is 9.5 V or more, the condition that the data is not transmitted to engine ECU continues for more than 5 sec. (b) When ECU terminal IG1 voltage is 9.5 V or more, engine speed is 500 rpm or more and data receipt from engine ECU is impossible. 2. Either of the following (a) or (b) continues 10 times: (a) Data transmission failure to the engine ECU occurs more than once within 5 sec. (b) Data reception failure from the engine ECU occurs more than once within 5 sec. 3. When the engine drive system variation from the engine ECU and the information for the destination don't meet the skid control ECU.	• TRC+ or TRC– circuit • ENG+ or ENG– circuit • Engine ECU • Skid control ECU

WIRING DIAGRAM



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INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminals ENG+, ENG–, TRC+, TRC– of skid control ECU and engine ECU (See page IN–30).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU or skid control ECU.

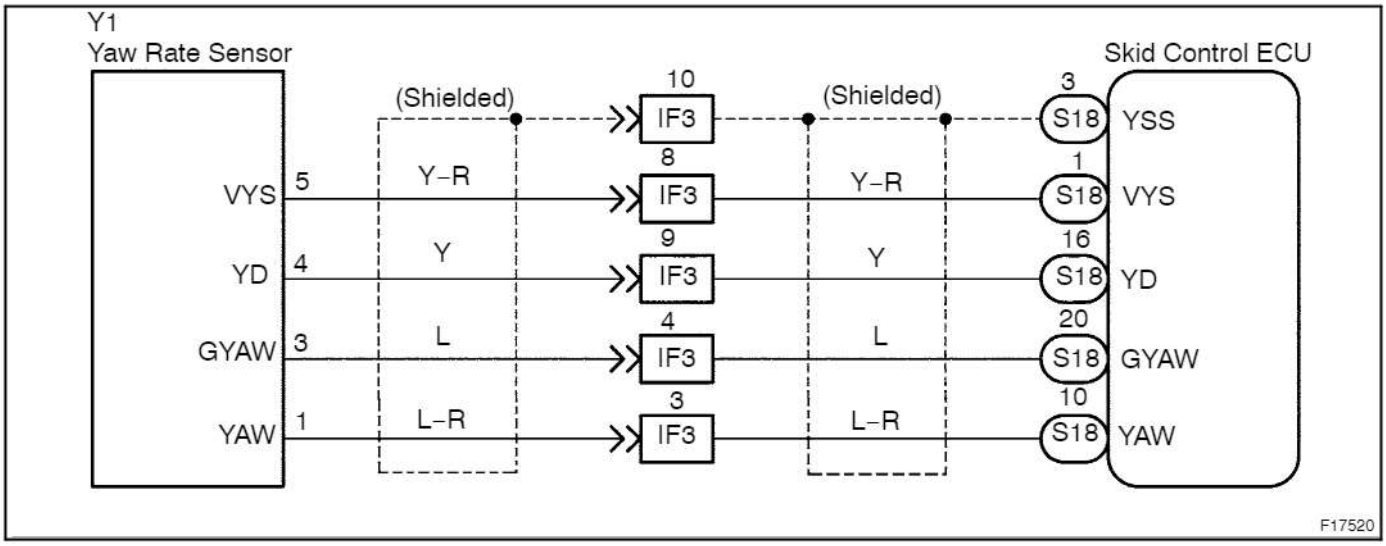
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DTC	C1210 / 36	Zero Point Calibration of Yaw Rate Sensor Undone

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1210 / 36	After battery terminal was connected, when the shift lever was moved other than to P position within 15 sec. soon after ECU terminal IG1 become ON for the first time.	• Yaw rate sensor • Yaw rate sensor circuit • P position switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check if zero point calibration of yaw rate sensor has done or not.**

Obtains the zero point calibration of the yaw rate sensor (See page DI–53).

CHECK:

Check that the VSC indicator light comes on and the both indicators go off after 15 seconds.

YES	**No problem.**

NO

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2	Check for open and short circuit in harness and connector between P position switch and skid control ECU and engine ECU (See page IN–30).

NG → Repair or replace harness or connector.

OK

3	Check for open and short circuit in harness and connector between yaw rate sensor and skid control ECU (See page IN–30).

NG → Repair or replace harness or connector.

OK

4	Check yaw rate sensor (See page DI–113).

NG → Replace yaw rate sensor assembly.

OK

Check and replace skid control ECU.

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DI1H3–13

DTC	C1223 / 43	ABS Control System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1223 / 43	ABS control system is abnormal.	• ABS control system

INSPECTION PROCEDURE

1	**Check the DTC for the ABS (See page DI–53).**

*1 → **Repair ABS control system according to the code output.**

*2

Check for ECU connected to malfunction indicator lamp.

*1: Output NG code
*2: Malfunction indicator lamp remains ON

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DI9IE-02

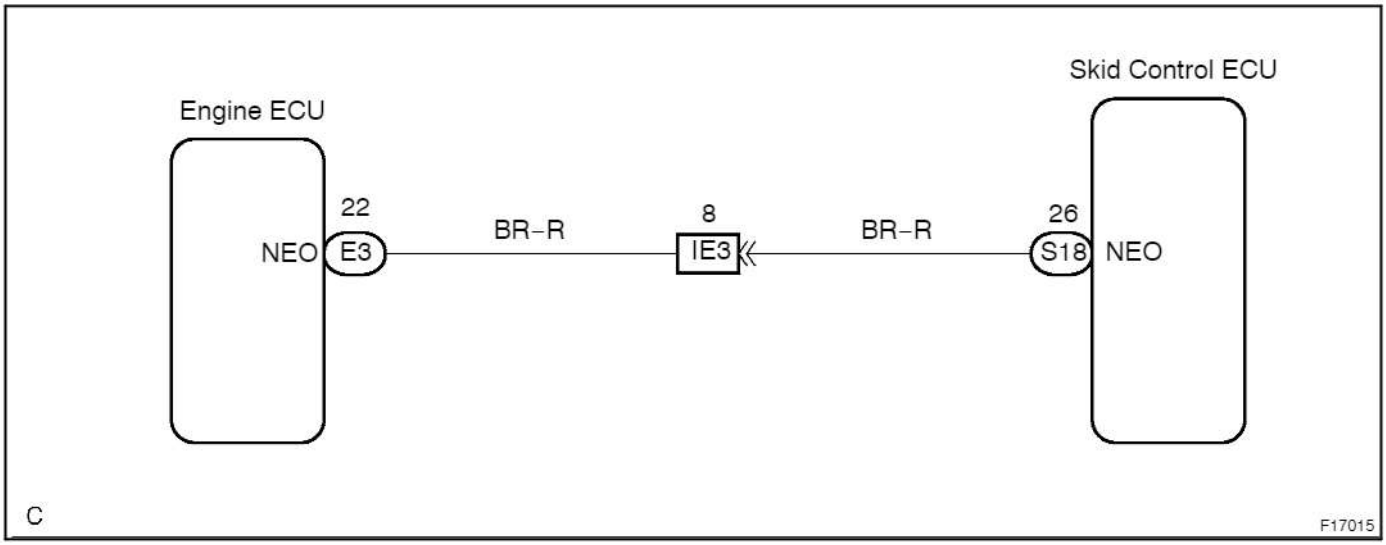
DTC	C1224 / 44	NE Signal Circuit

CIRCUIT DESCRIPTION

The skid control ECU receives engine revolution speed signals (NE signals) from the engine ECU.

DTC No.	DTC Detecting Condition	Trouble Area
C1224 / 44	When any of the following 1. through 2. is detected: 1. At vehicle speed of 30 km/h (19 mph) or more, and when data receiving from the engine ECU is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more. 2. While TRC is operating and when open or short circuit for engine revolution signal circuit continues for 0.24 sec. or more.	• NEO circuit • Engine ECU • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

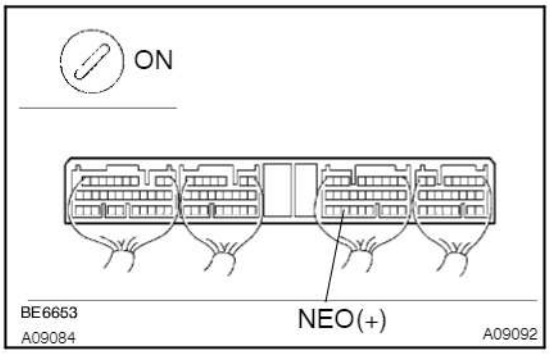
1	**Check for open and short circuit in harness and connector between terminals NEO of skid control ECU and terminal NEO of engine ECU (See page IN–30).**

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

OK

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2	**Check voltage between terminals NEO of skid control ECU and body ground.**



PREPARATION:

(a) Remove the skid control ECU with connectors still connected.

(b) Turn the ignition switch ON.

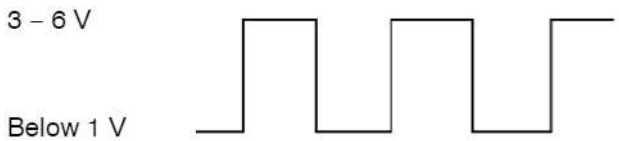
CHECK:

Measure voltage between terminal NEO of skid control ECU and body ground for the engine conditions below.

OK:

Engine condition	Voltage
OFF (IG ON)	3 – 6 V or below 1 V
ON (Idling)	3 – 6 V ↔ below 1 V (Pulse)

(Reference)



NG → **Check and replace skid control ECU or engine ECU.**

OK

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

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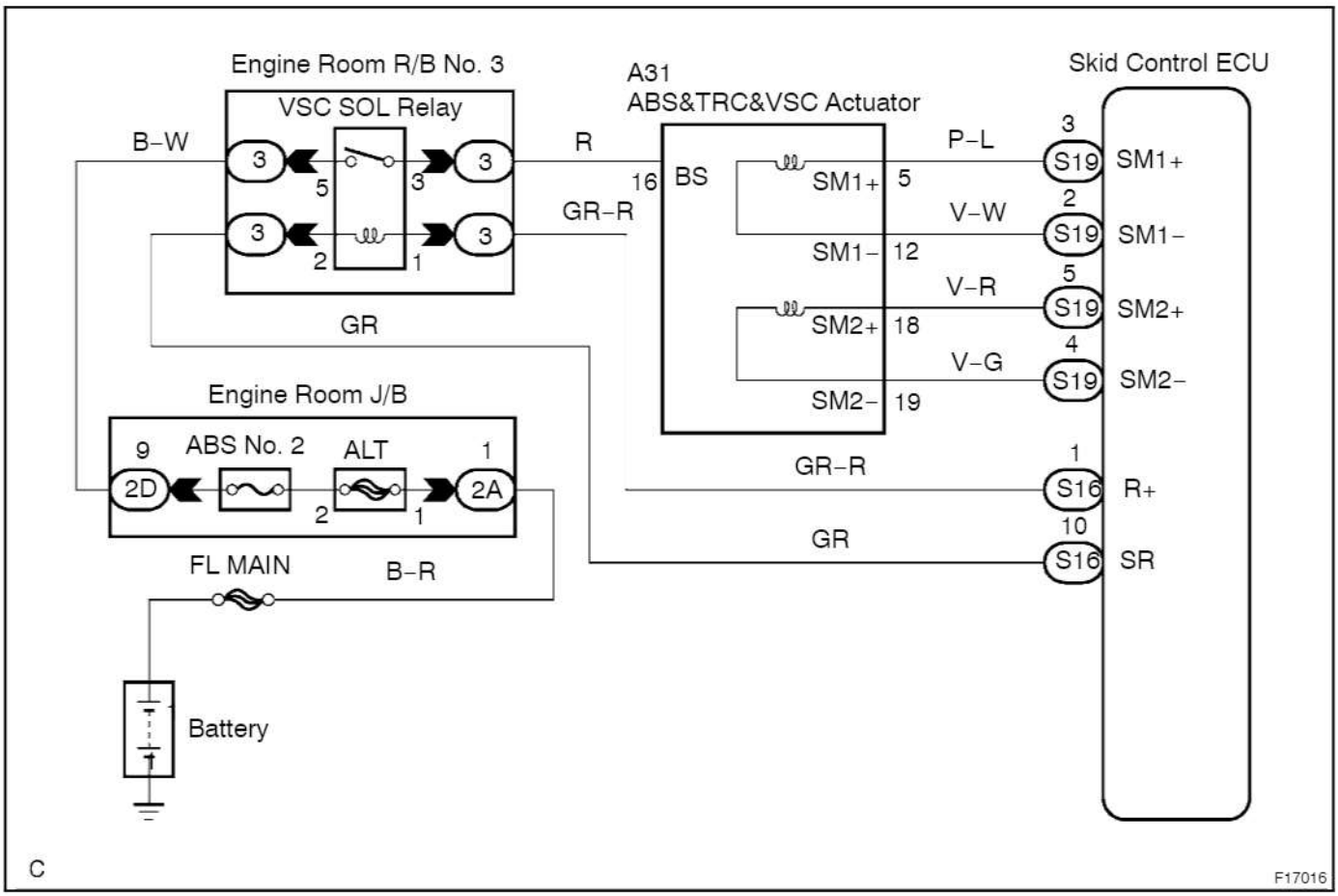
DTC	C1225 / 25	TRC & VSC–Related Solenoid Circuits

CIRCUIT DESCRIPTION

The TRC & VSC solenoids operate in accordance with signals from the ECU and raise the fluid pressure in and release it from the brake cylinders.

DTC No.	DTC Detecting Condition	Trouble Area
C1225 / 25	Detection of any of conditions 1. through 4.: 1. When SM1 or SM2 is ON, excessive electric current on SM1 or SM2 continues for 0.05 sec. or more. 2. When SM1 or SM2 is OFF, open circuit of SM1 or SM2 continues for 0.05 sec. or more. 3. When SM1 or SM2 is ON, open circuit of SM1 or SM2 continues for 0.1 sec. or more. 4. When SM1 or SM2 is OFF, electric current application on SM1 or SM2 continues for 0.1 sec. or more.	• Brake actuator • SM1 or SM2 circuit

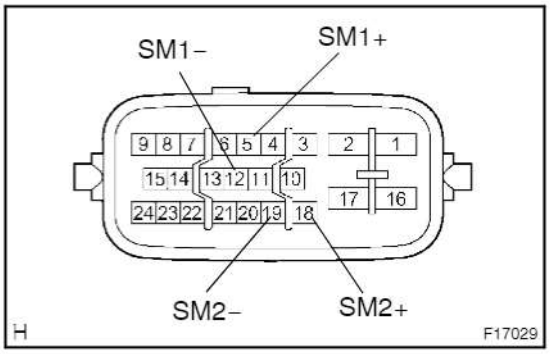
WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check brake actuator solenoid.**



PREPARATION:
Disconnect the brake actuator connector.
CHECK:
Check continuity between terminals SM1+ – SM1–, and terminals SM2+ – SM2– of brake actuator.
OK:

Continuity

HINT:
Resistance of each solenoid: 8.1 – 9.1 Ω at 25 °C

NG → **Replace brake actuator.**

OK

2	**Check for open and short circuit in harness and connector between skid control ECU and brake actuator (See page IN–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.

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DI1H5–16

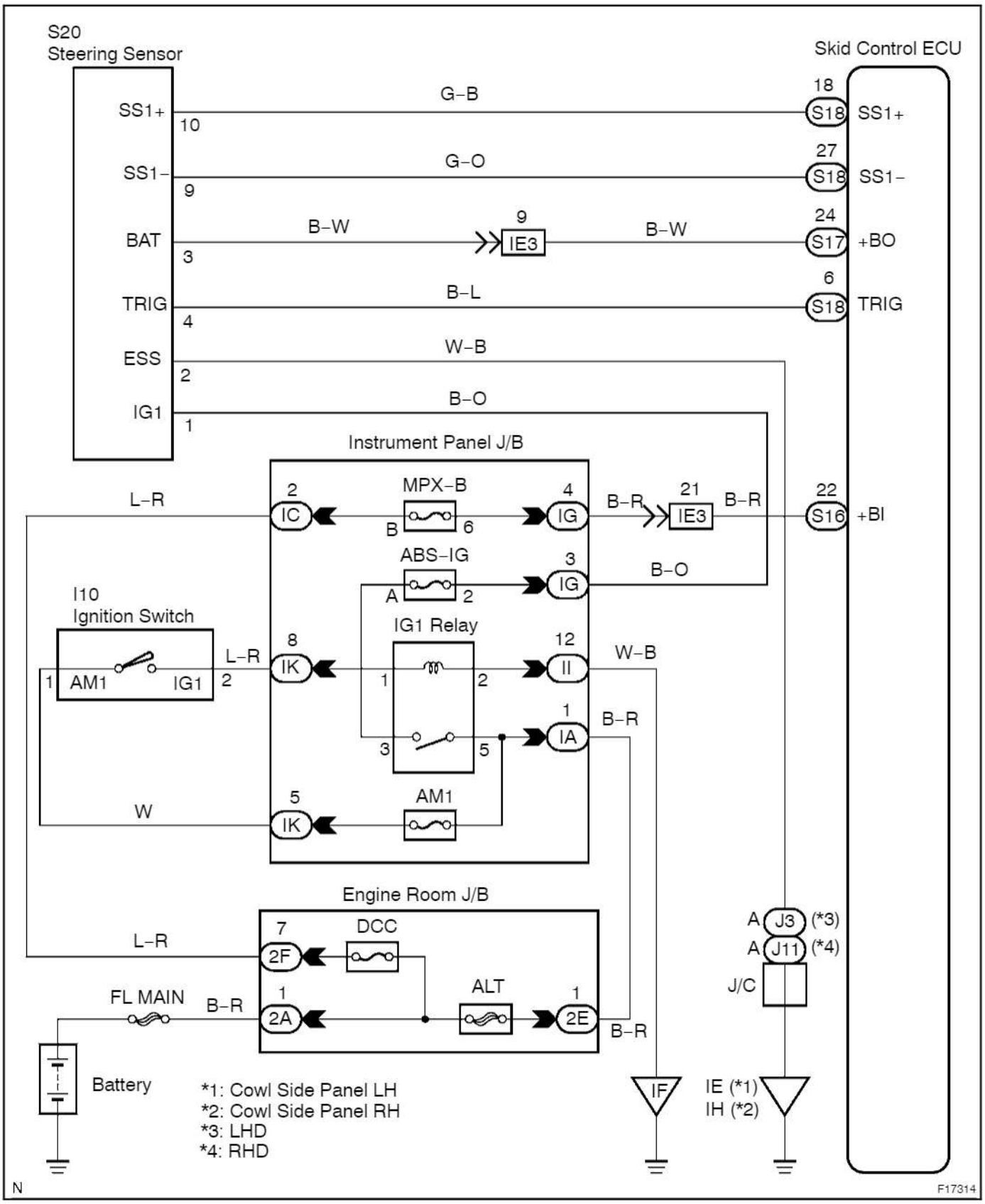
DTC	C1231 / 31, C1335 / 35	Steering Angle Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1231 / 31	When ECU IG1 terminal voltage is 9.5 V or more, ECU does not receive data from the steering angle sensor for 1 sec. or more.	• Steering angle sensor • Steering angle sensor circuit • +BI circuit
C1335 / 35	Detection of either condition 1. or 2.: 1. When the ECU IG1 terminal voltage is 9.5 V or more, data transmission from the steering angle sensor is impossible for 1 sec. or more. 2. Immediately after the terminal BAT is connected and when IG1 terminal voltage is 9.5 V or more, open circuit of terminal TRIG continues for 15 sec. or more.	

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WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of the steering angle sensor.**

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

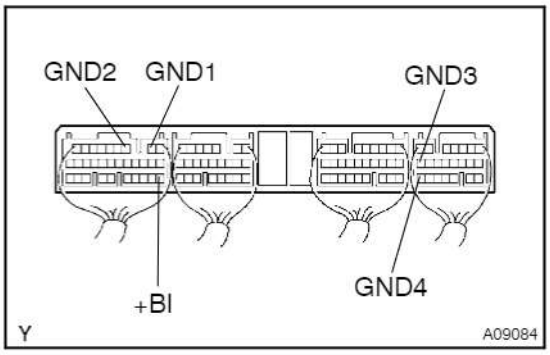
CHECK:
Check that the steering wheel turning angle value of the steering angle sensor observed in the hand–held tester is changing as the steering wheel is turned.

OK:
Steering wheel turning angle value must be changing.

OK → **Go to step 5.**

NG

2	**Check voltage between terminals +BI and GND of skid control ECU.**



PREPARATION:
(a) Remove the skid control ECU with the connector still connected.
(b) Turn the ignition switch ON.
(c) Measure voltage between terminal +BI and GND of skid control ECU.

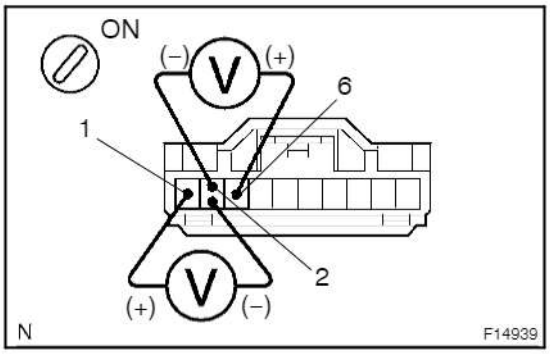
OK:
Voltage: 10 – 14 V

NG → **Check and replace harness and connector.**

OK

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3	Check input voltage of the steering angle sensor.



PREPARATION:

(a) Remove the steering wheel and column lower cover.
(b) Disconnect the steering angle sensor connector.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals 1 and 2, 2 and 3 of the steering angle sensor harness side connector.

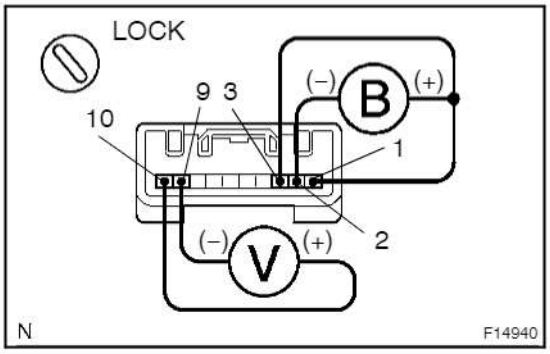
OK:

Voltage: 10 – 14 V

NG	Check and replace harness and connector.

OK

4	Check steering angle sensor.



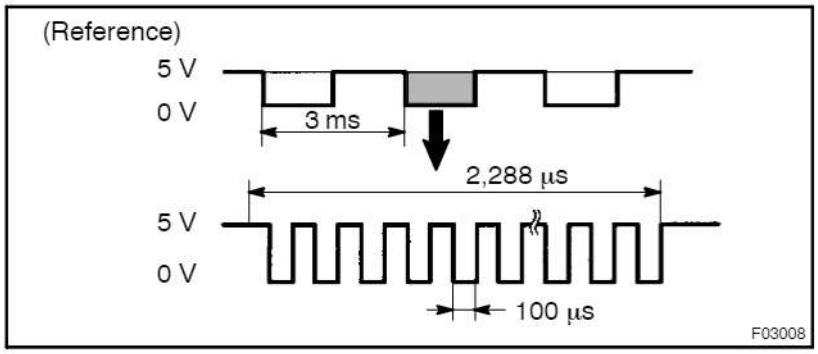
PREPARATION:

(a) Apply battery voltage between terminals 1 and 2, 2 and 3 of the steering angle sensor.
(b) Connect the oscilloscope to the terminals 9 and 10 of the steering angle sensor.

CHECK:

Turn the steering wheel slowly and check the signal waveform.

OK:



HINT:

The above signal wave form does not repeat ON and OFF regularly and this ON–OFF interval changes case by case according to the data.

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NG → Replace steering angle sensor.

OK

Check and replace skid control ECU.

5	Check DTC for ABS.

NG → Check and replace skid control ECU.

OK

No problem.

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DI1H6–09

DTC	C1232 / 32	Deceleration Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1232 / 32	Detection of any of conditions 1. through 2. : 1. At the vehicle speed of 10 km/h (6 mph) or more, the condition that ECU terminal GL1 signal change range is less than 20 mV continues for 30 sec., and ECU terminal GL2 signal change range swings by 0.47 V or more. 2. At the vehicle speed of 10 km/h (6 mph) or more, the condition that ECU terminal GL2 signal change range is less than 20 mV continues for 30 sec., and ECU terminal GL1 signal change range swings by 0.47 V or more.	• Deceleration sensor • Deceleration sensor circuit

INSPECTION PROCEDURE

HINT:

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

1	**Check output value of the deceleration sensor.**

PREPARATION:

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

CHECK:

Check that the deceleration value of the deceleration sensor displayed by the hand–held tester is changing when tilting the vehicle.

OK:

Deceleration value must be changing.

OK → **Check and replace skid control ECU.**

NG

2	**Check deceleration sensor (See page DI–53).**

NG → **Replace deceleration sensor assembly.**

OK

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3	Check for open or short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN–30).

NG → Repair or replace harness and connector.

OK

Check and replace skid control ECU.

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DI8DW–05

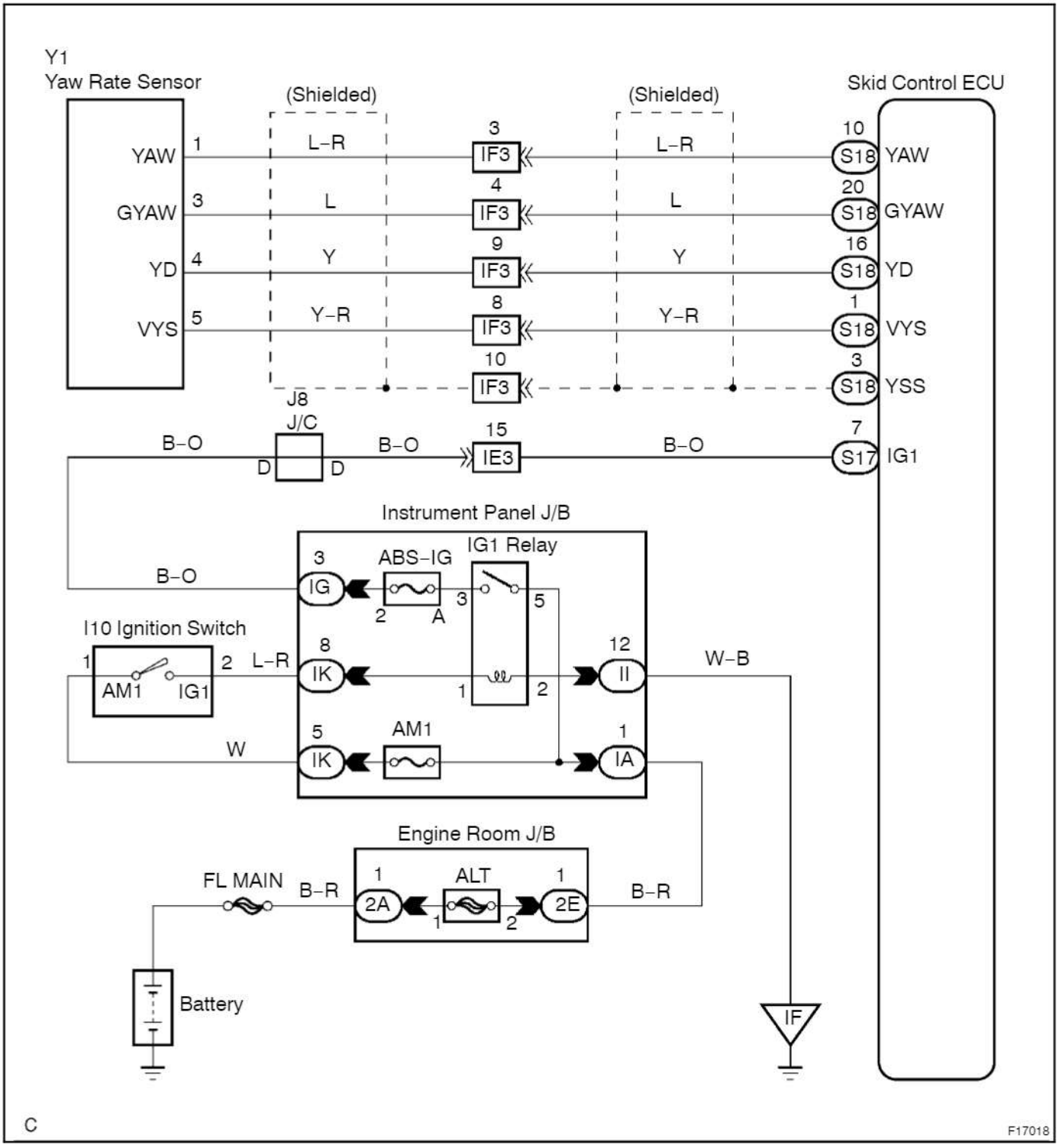
DTC	C1233 / 33, C1234 / 34	Yaw Rate Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1233 / 33	Detection of any of conditions 1. through 4.: 1. When the ECU IG1 terminal voltage is 9.5 to 17.2 V, the yaw rate sensor voltage is out of the range from 0.25 to 4.75 V for 1 sec. or more. 2. The yaw rate sensor open circuit detect signal is ON for 1 sec. or more. 3. The yaw rate sensor power source voltage is out of the range from 4.4 to 5.6 V for 1 sec. or more. 4. Momentary open circuit of the yaw rate sensor signal occurs 10 times or more.	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34	When the yaw rate sensor VYS terminal voltage is 4.4 to 5.6 V, YD malfunction signal of the yaw rate sensor is ON for 5 sec. or more.	

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WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Perform zero point calibration of the yaw rate sensor (See page DI–53).**

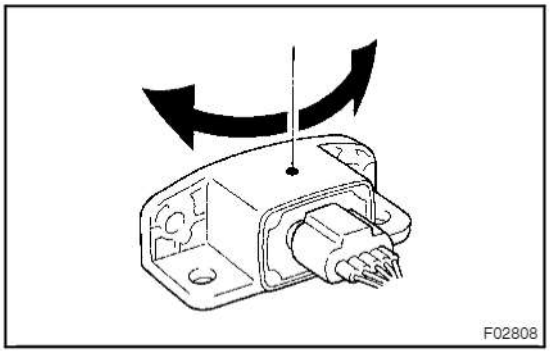
2	**Is DTC still output?**

Check DTC on page DI–53.

NO → **No problem.**

YES

3	**Check output value of the yaw rate sensor.**



In case of using the hand–held tester:

PREPARATION:

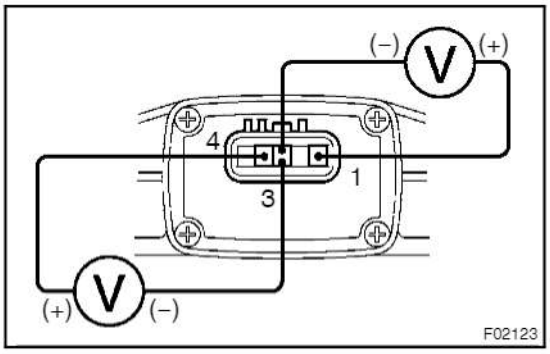
(a) Remove the consol box.
(b) Remove the 2 nuts and the yaw rate sensor with the connector still connected to it.
(c) Connect the hand–held tester to the DLC3.
(d) Turn the ignition switch ON and push the hand–held tester main switch ON.
(e) Select the DATALIST mode on the hand–held tester.

CHECK:

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

OK:

Yaw rate value must be changing.
(Reference)
When the yaw rate sensor is stationary
output value: ± 4 deg/s



In case of not using the hand–held tester:

PREPARATION:

(a) Remove the consol box then remove the yaw rate sensor with the connector still connected to it.
(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals YAW (1) – GYAW (3), and terminals YD (4) – GYAW (3) of the yaw rate sensor.

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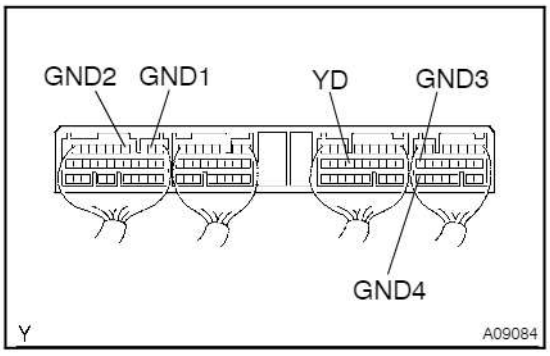
OK:

Terminals 1 and 3 (YAW – GYAW)	About 2.42 – 2.58 V
Terminals 4 and 3 (YD – GYAW)	About 4.5 V – 5.3 V

NG → **Replace yaw rate sensor.**

OK

4	**Check voltage between terminals YD and GND of skid control ECU.**



PREPARATION:
Remove the skid control ECU with the connector still connected to it.

CHECK:
(a) Turn the ignition switch ON.
(b) Measure voltage between terminals YD and GND of skid control ECU.

OK:
Voltage: 4.5 – 5.3 V

OK → **Check and replace skid control ECU.**

NG

5	**Check for open and short circuit in harness and connector between yaw rate sensor and skid contorl ECU (See page IN–30).**

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

OK

Check and replace skid control ECU.

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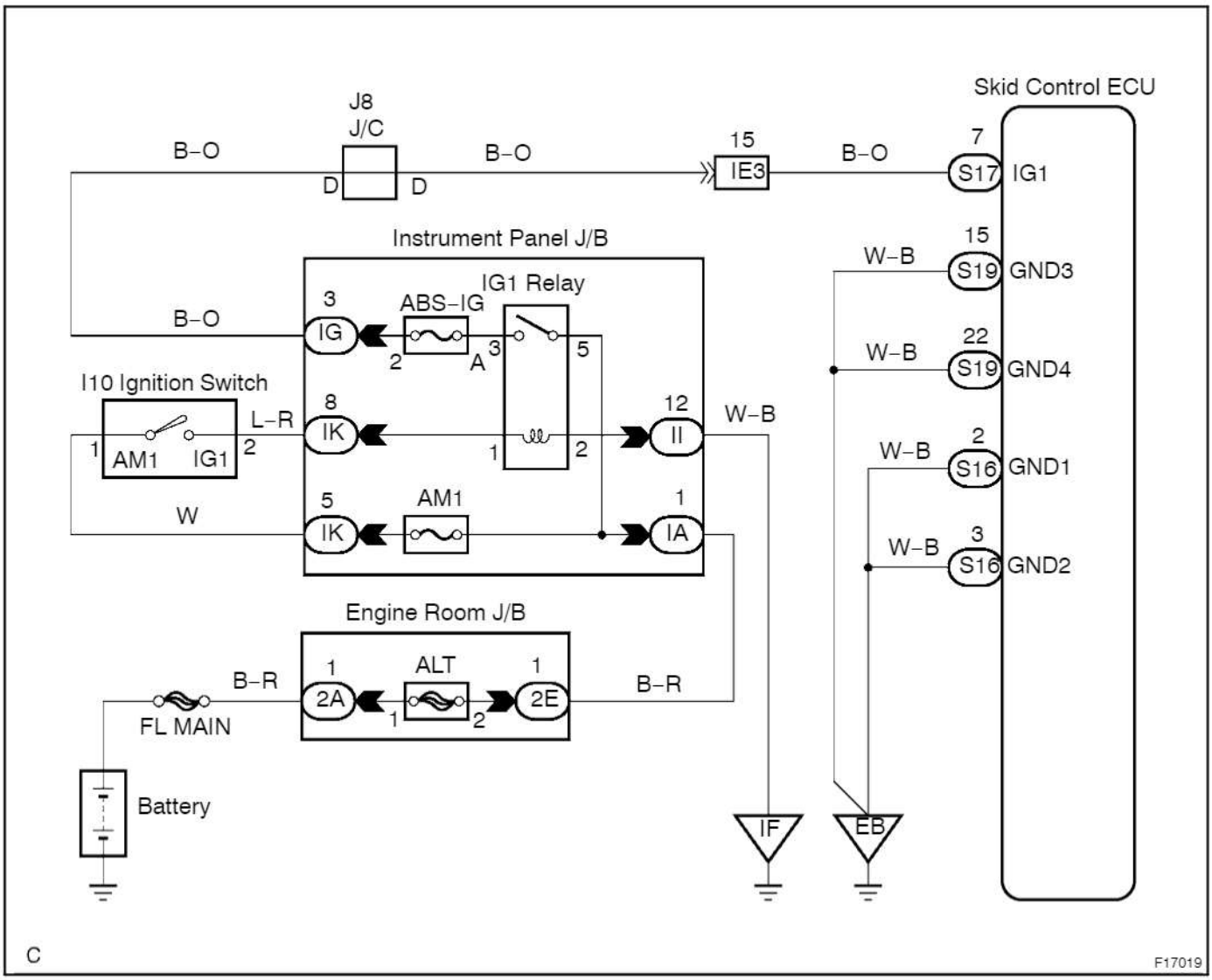
DI9IG-02

DTC	C1241 / 41	IG Power Source Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of either conditions 1. through 2.: 1. Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG remains at below 9.5 V for more than 10 sec. 2. While the condition that the solenoid relay is ON continues, ECU terminal IG1 voltage becomes 9.5 V or less, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 sec. or more.	• Battery • Charging system • Power source circuit • Skid Control ECU

WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check ABS–IG fuse.**

PREPARATION:
Remove ABS–IG fuse from instrument panel J/B.
CHECK:
Check continuity of ABS–IG fuse.
OK:
Continuity

NG → **Check for short circuit in all the harness and components connected to ABS fuse (See attached wiring diagram).**

OK

2	**Check battery voltage.**

OK:
Voltage: 10 – 14 V

NG → **Check and repair the charging system.**

OK

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3	Check voltage of the ECU IG power souce.

In case of using the hand–held tester.

PREPARATION:

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

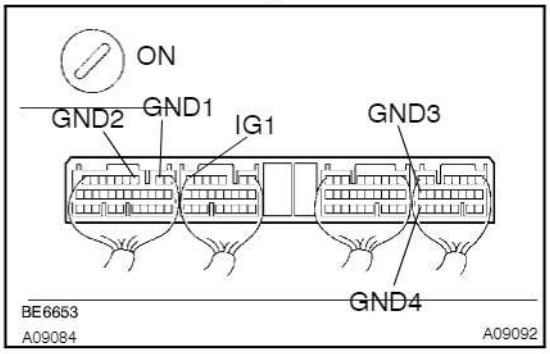
CHECK:

Check the voltage condition output from the ECU displayed by the hand–held tester.

OK:

"Normal" is displayed.

In case of not using the hand–held tester.



PREPARATION:

Remove the skid control ECU with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals IG1 and GND of skid control ECU.

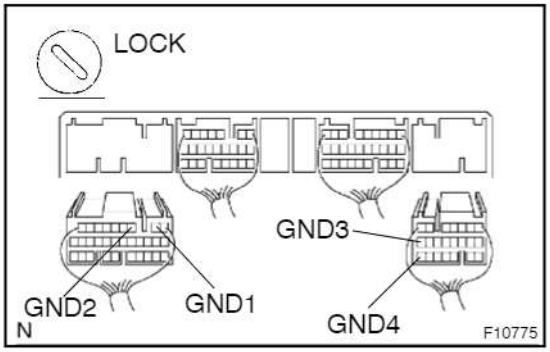
OK:

Voltage: 10 – 14 V

OK	Ignition switch OFF, check and replace skid control ECU.

NG

4	Check continuity between terminal GND of skid control ECU connector and body ground.



CHECK:

(a) Disconnect the 2 connector from the skid control ECU.
(b) Measure resistance between terminal GND of skid control ECU connector and body ground.

OK:

Resistance: 1 Ω or less

NG	Repair or replace harness or connector.

OK

Check for open circuit in harness and connector between skid control ECU and battery (See page IN–30).

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DI8DX–05

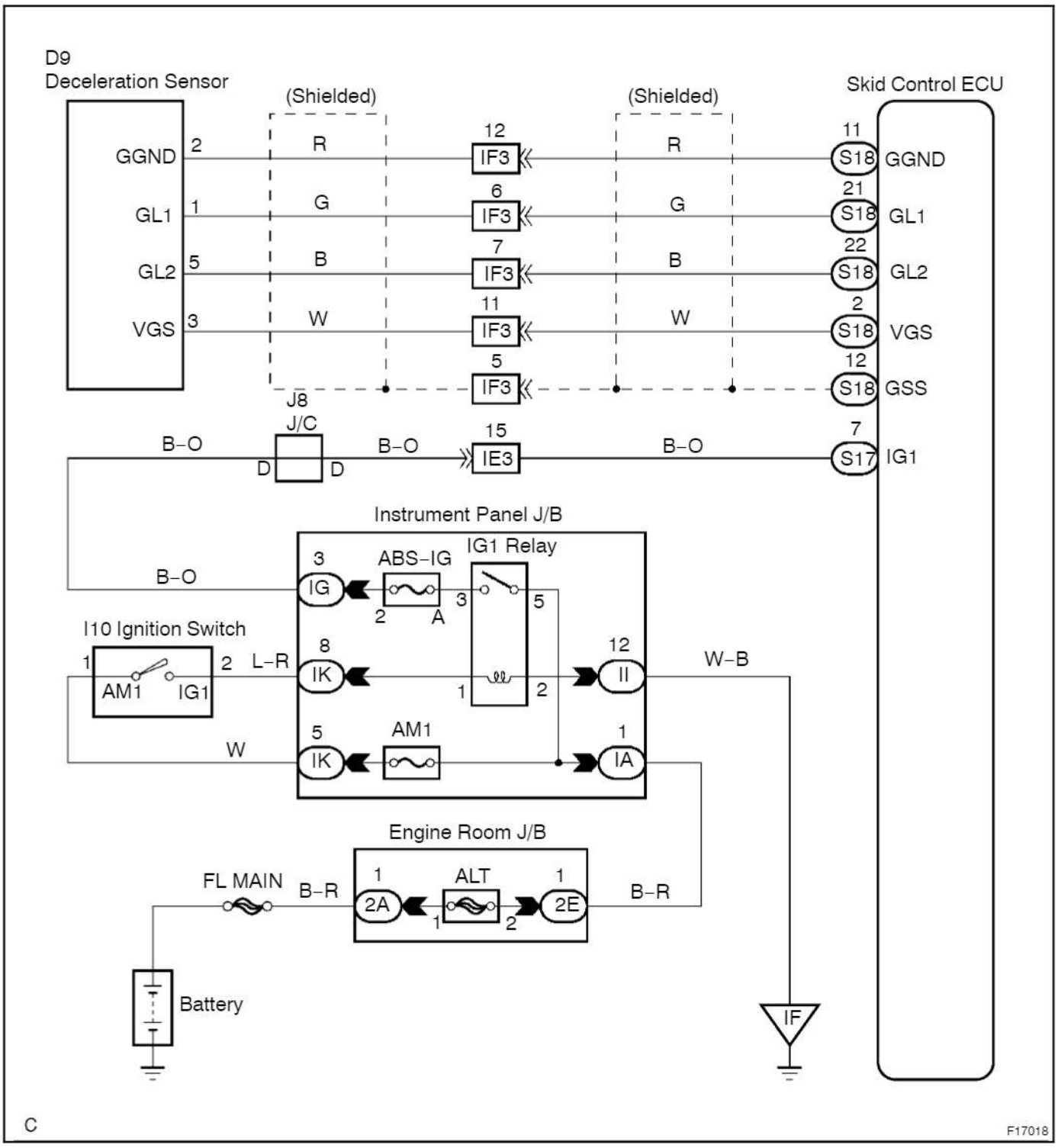
DTC	C1243 / 43, C1245 / 45	Malfunction in Deceleration Sensor

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1243 / 43	While vehicle speed becomes 0 km/h (0 mph) from 30 km/h (18 mph) or more, the condition that both GL1 and GL2 signals of ECU terminals do not change 10 mV or more occurs 16 times continuously.	• Deceleration sensor • Wire harness for deceleration sensor system
C1245 / 45	At the vehicle speed of 30 km/h (18 mph), the acceleration and deceleration values calculated from the deceleration sensor values and from vehicle speed are different, and the condition that the difference exceeds 0.35 G continues for 60 sec. or more.	

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WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

After step 1 and 2, go to step 3 in case of using the hand–held tester, and go to step 5 in case of not using the hand–held tester.

1	**Perform zero point calibration of the Deceleration sensor (See page DI–53).**

2	**Is DTC still output?**

Check DTC on page DI–53.

NO → **No problem.**

YES

3	**Check output value of the deceleration sensor.**

PREPARATION:

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

CHECK:

Check that the deceleration value of the deceleration sensor observed in the hand–held tester is changing when the vehicle is tilted.

OK:

Deceleration value must be changing.

OK → **Go to step 5.**

NG

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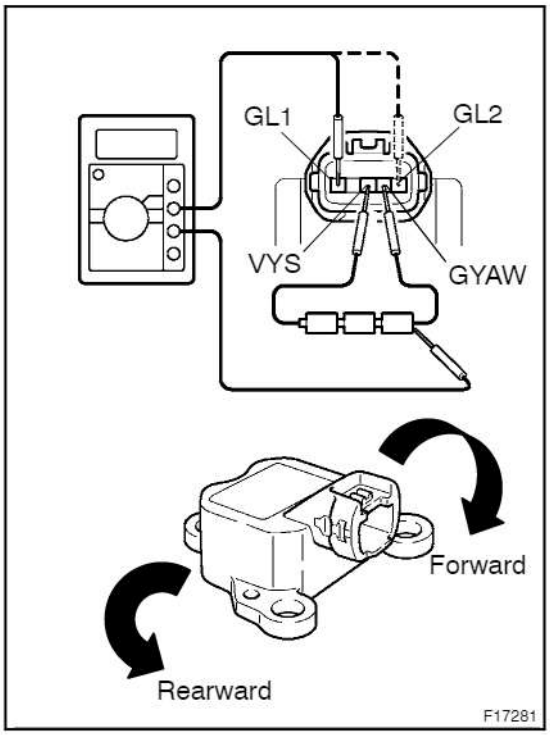
4	**Check for open or short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN–30).**

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

OK

Replace deceleration sensor.

5	**Check deceleration sensor.**



PREPARATION:

(a) Remove the consol box.
(b) Connect 3 dry batteries of 1.5 V in series.
(c) Connect VGS terminal to the batteries' positive (+) terminal, and GGND terminal to the batteries' negative (–) terminal. Apply about 4.5 V between VGS and GGND terminals.

NOTICE:

Do not apply voltage of 6 V or more to terminals VYS and GYAW.

CHECK:

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

OK:

Symbols	Condition	Standard Value
GL1	Horizontal	About 2.3 V
GL1	Lean rearward	0.4 V – about 2.3 V
GL1	Lean forward	About 2.3 V – 4.1 V
GL2	Horizontal	About 2.3 V
GL2	Lean rearward	About 2.3 V – 4.1 V
GL2	Lean forward	0.4 V – about 2.3 V

HINT:

- If the sensor is tilted too much it may show the wrong value.
- If dropped, the sensor should be replaced with a new one.
- The sensor removed from the vehicle should not be placed upside down.

NG → **Replace deceleration sensor.**

OK

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6	Check for open or short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN–30).

NG → Repair or replace harness or connector.

OK →

Check and replace skid control ECU.

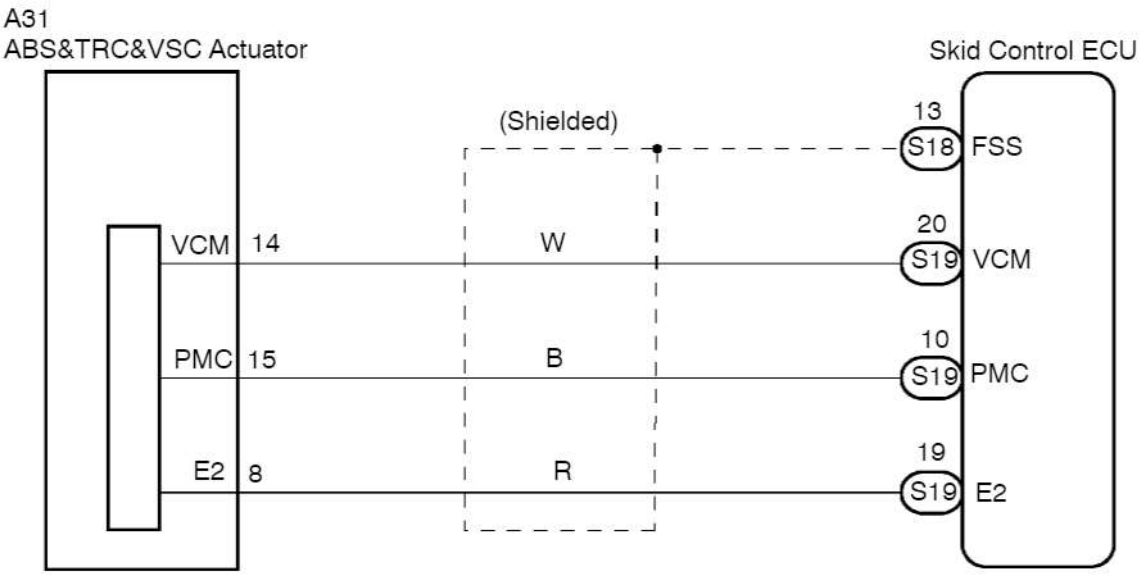
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DTC	C1246 / 46	Master Cylinder Pressure Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246 / 46	Detection of any of conditions 1. through 5.: 1. When the vehicle speed is 7 km/h (4 mph) or more and ECU PMC terminal voltage exceeds 0.86 V, the condition that the voltage does not change 0.005 V or more continues for 30 sec. 2. Noise in ECU PMC terminal occurs 7 times or more in 5 sec. 3. When the ECU STP terminal is OFF, the condition that ECU PMC terminal voltage is 0.86 V or more, or less than 0.3 V continues for 5 sec. or more. 4. When IG1 terminal voltage is 9.5 to 17.2 V, the condition that ECU VCM terminal voltage is out of the range from 4.4 to 5.6 V continues for 1.2 sec. or more. 5. When ECU VCM terminal voltage is 4.4 to 5.6 V, the condition that the ECU PMC terminal voltage is out of the range from 0.19 to 4.57 V continues for 1.2 sec. or more.	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit

WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of the master cylinder pressure sensor.**

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

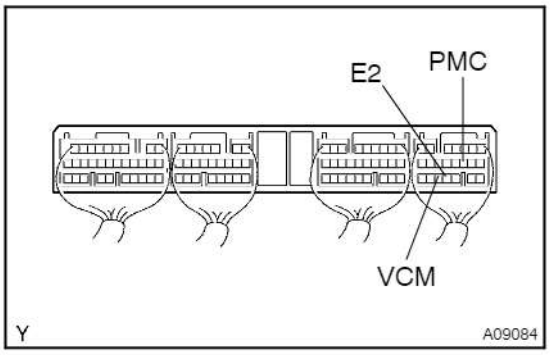
CHECK:
Check that the brake fluid pressure value of the master cylinder pressure sensor observed in the hand–held tester is changing when the brake pedal is being depressed.

OK:
Brake fluid pressure value must be changing.

OK → **Go to step 4.**

NG

2	**Check master cylinder pressure sensor.**



PREPARATION:
Install LSPV gauge to the front caliper bleeder plug portion, and bleed air from LSPV gauge.
SST 09709–29018

CHECK:
Start the engine and depress the brake pedal, then check how the fluid pressure affects voltage of PMC and E2 terminals of the skid contorol ECU with connector still connected.

OK:

Front brake caliper fluid pressure	Voltage
0 kPa (0 kgf/cm^2, 0 psi)	0.37 – 0.63 V
5,883 kPa (60 kgf/cm^2, 853 psi)	1.57 – 1.83 V
11,768 kPa (120 kgf/cm^2, 1,706 psi)	2.77 – 3.03 V

HINT:
Voltage of between terminals VCM and E2: 4.7 – 5.3 V

NG → **Replace brake actuator.**

OK

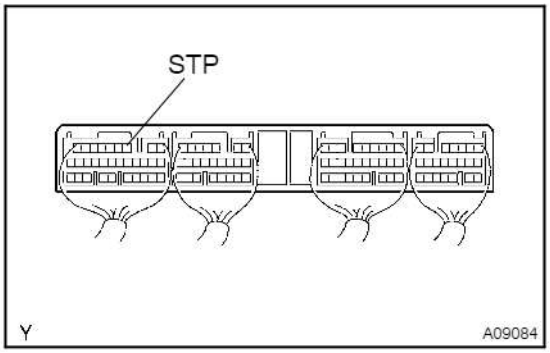
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3	**Check for open and short circuit in harness and connector between each master cylinder pressure sensor and skid control ECU (See page IN–30).**

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

OK

4	**Check voltage between terminal STP of skid control ECU and body ground.**



PREPARATION:
Remove the skid control ECU with connectors still connected.
CHECK:
Measure the voltage between terminal STP of skid control ECU and body ground when brake pedal is depressed.
OK:
8 – 14 V
CHECK:
Measure voltage between terminal STP of skid control ECU and body ground when brake pedal is released.
OK:
Bellow 1.5 V

NO → **Check stop light switch circuit.**

YES

Check and replace skid control ECU.

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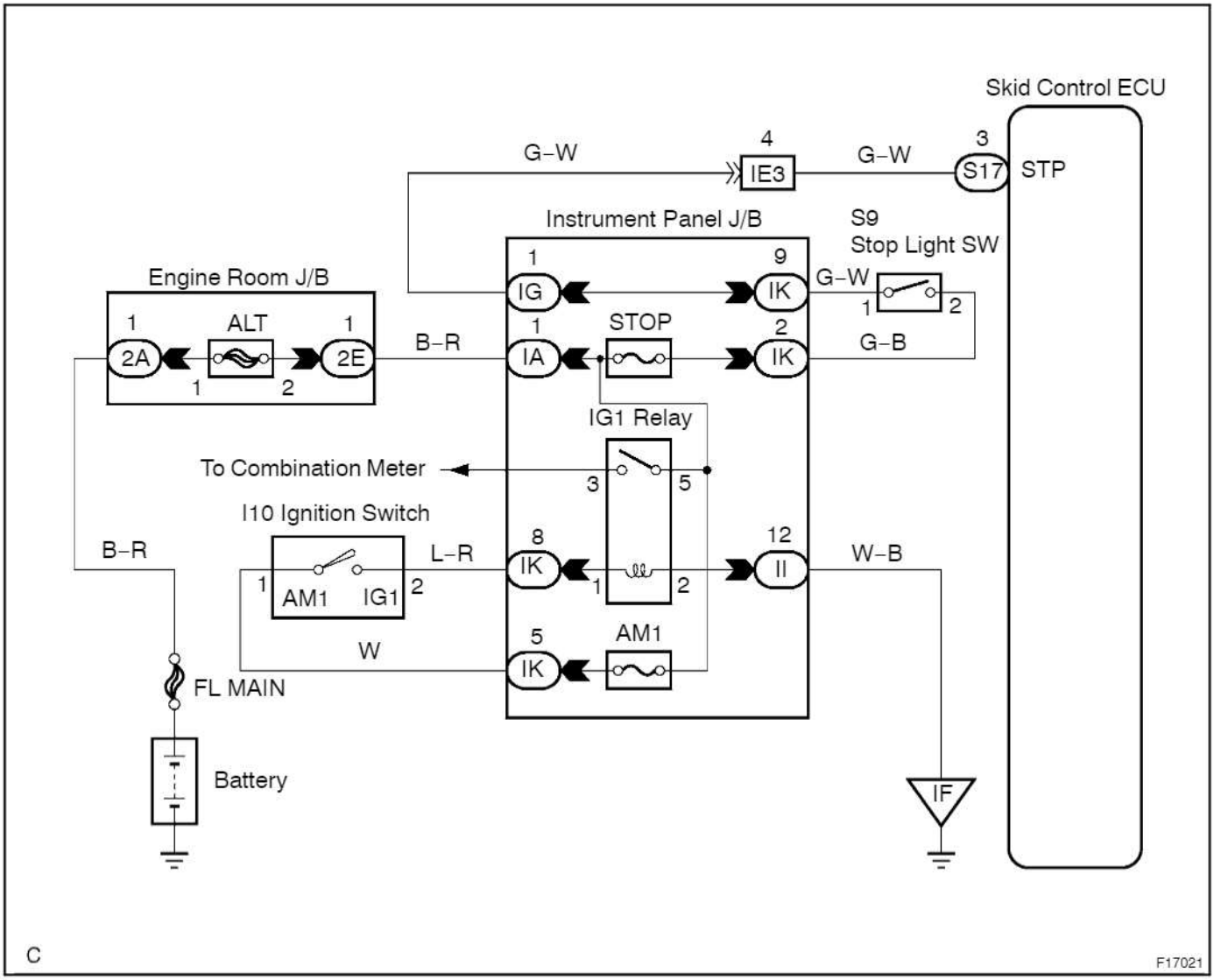
DI0WX–18

DTC	C1249 / 49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	ECU terminal IG1 voltage is 9.5 to 17.2 V and ABS is in non–operation, the open circuit of stop light switch circuit continues for 0.3 sec. or more.	• Stop light switch • Stop light switch circuit • Skid Control ECU

WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check operation of the stop light switch.**

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

OK → **Go to step 3.**

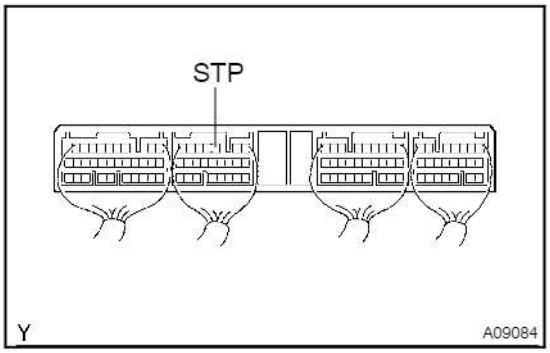
NG

2	**Check stop light circuit.**

NG → **Repair or replace stop light circuit.**

OK

3	**Check voltage between terminal STP of skid control ECU and body ground.**



PREPARATION:
Remove skid control ECU with connectors still connected.
CHECK:
Measure voltage between terminal STP of skid control ECU and body ground when brake pedal is depressed.
OK:
Voltage: 8 – 14 V

OK → **Check and replace skid control ECU.**

NG

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4	Check for open circuit in harness and connector between skid control ECU and stop light switch (See page IN–30).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–73).

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DI9IH-02

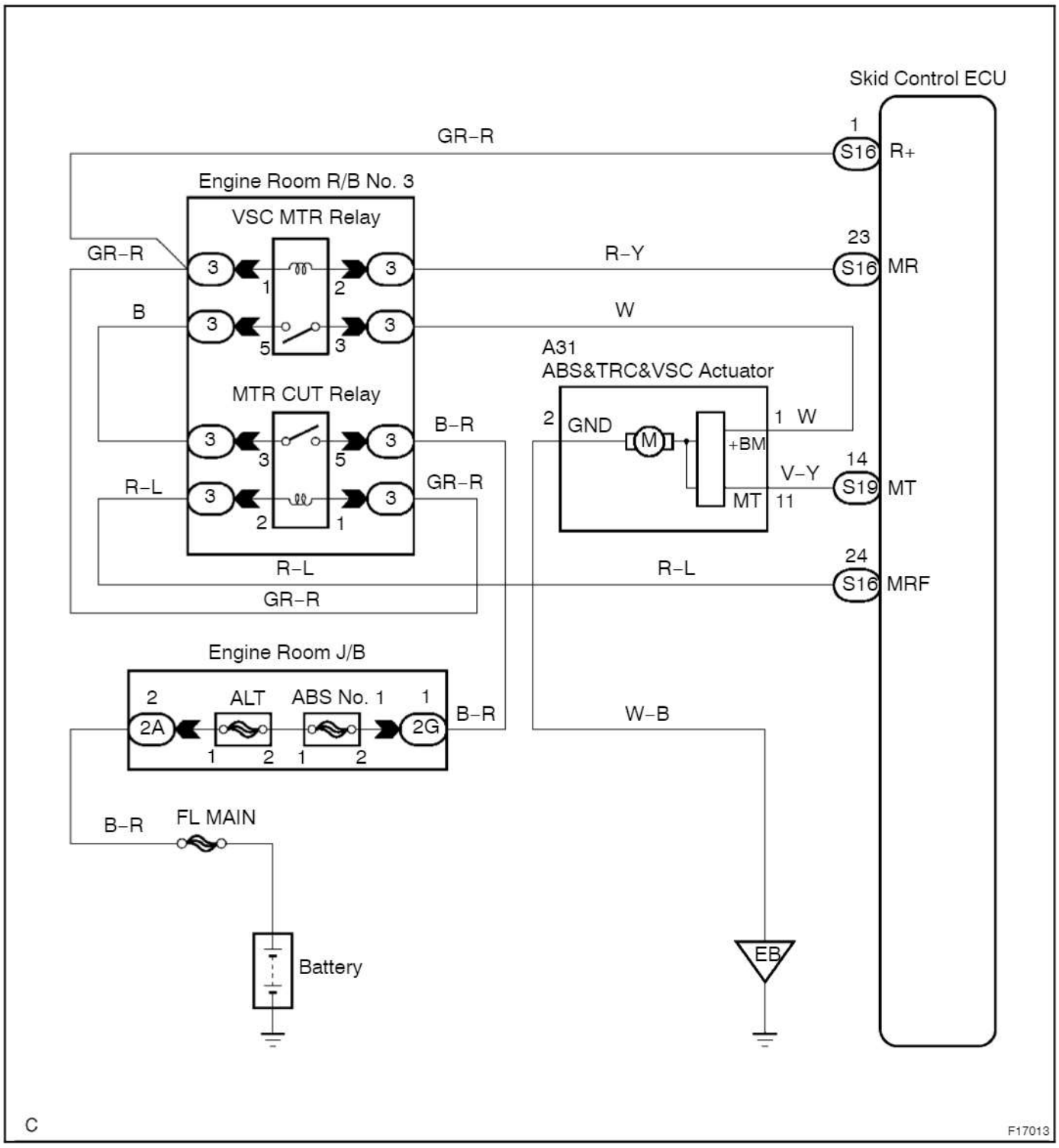
DTC	C1251 / 51	ABS Pump Motor Lock

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	Either of the following 1. or 2. is detected: 1. Actuator drive motor is not operating normally. 2. Open circuit condition of actuator drive motor continues for 2 sec. or more.	• Brake Actuator • Brake Actuator Circuit

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WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

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

1	**Check ABS motor operation.**

PREPARATION:

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

CHECK:

Check the operation sound of the ABS motor when operating it with the hand–held tester.

OK:

The operation sound of the ABS motor should be heard.

NG → **Replace brake actuator.**

OK

2	**Is there DTC C1251/51 being output again?**

YES → **Check and replace skid control ECU.**

NO

No problem.

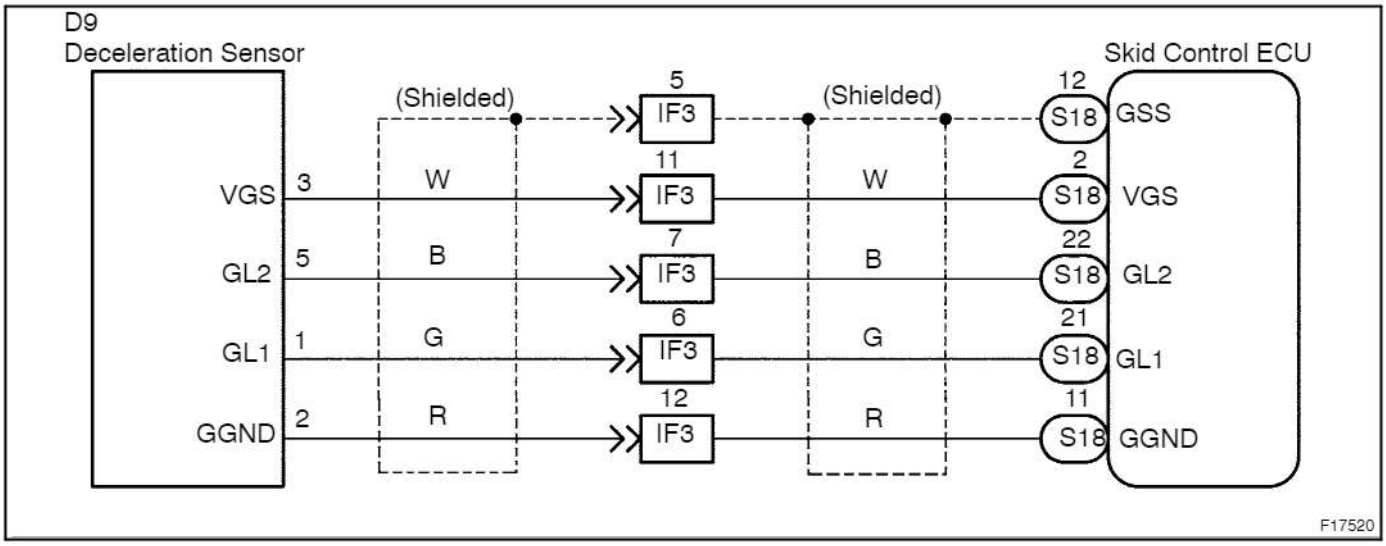
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DTC	C1336 / 39	Zero Point Calibration of Deceleration Sensor Undone

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1336 / 39	After battery terminal was connected, when the shift lever was moved other than to P position within 15 sec. soon after ECU terminal IG1 become ON for the first time.	• Deceleration sensor • Deceleration sensor circuit • P position switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check if zero point calibration of deceleration sensor has done or not.**

Obtains the zero point calibration of the deceleration sensor (See page DI–53).

CHECK:

Check that the VSC indicator light comes on and the both indicators go off after 15 seconds.

YES	**No problem.**

NO

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2	Check for open and short circuit in harness and connector between P position switch and skid control ECU and ECM (See page IN–30).

NG → Repair or replace harness or connector.

OK

3	Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN–30).

NG → Repair or replace harness or connector.

OK

4	Check deceleration sensor (See page DI–113).

NG → Replace deceleration sensor assembly.

OK

Check and replace skid control ECU.

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DIANH–01

DTC	C1361 / 91	MTR CUT Relay Circuit

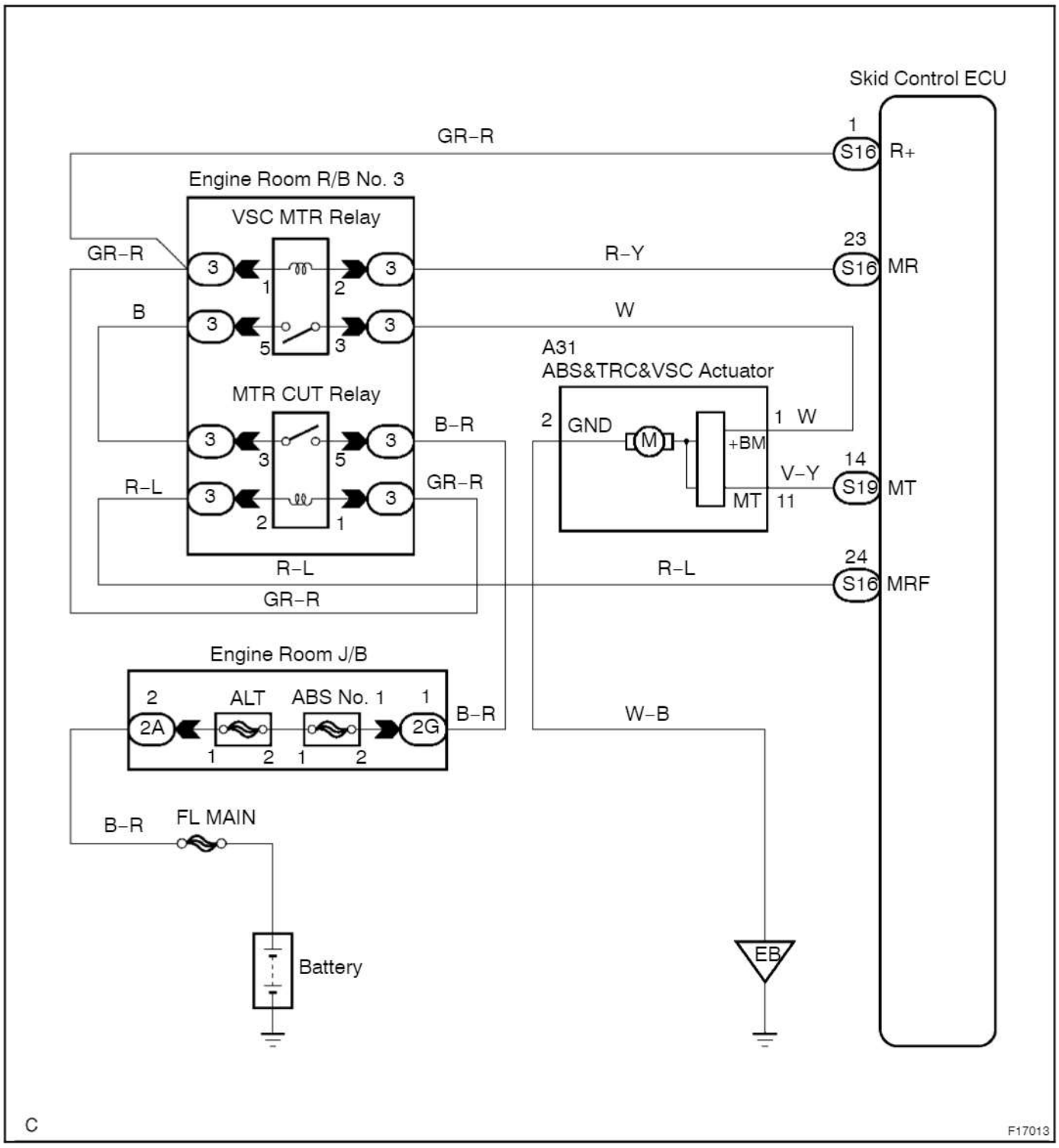
CIRCUIT DESCRIPTION

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
C1361 / 91	Immediately after ECU terminal IG1 becomes ON, and solenoid relay signal is OFF, however, when the condition that the contact point of the solenoid relay is ON continues for 4 sec. or more.	• ABS CUT relay • ABS CUT relay circuit • Skid control ECU

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WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check MTR CUT relay operation.**

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

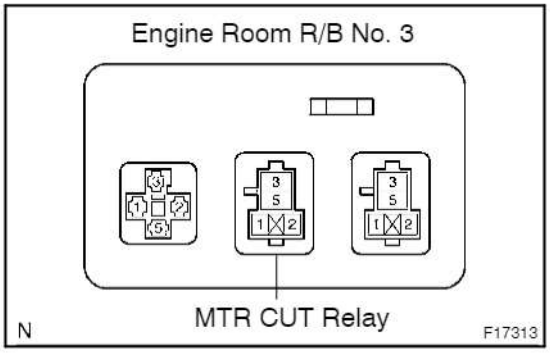
CHECK:
Check the operation sound of the MTR CUT relay when operating it with the hand–held tester.

OK:
The operation sound of the MTR CUT relay should be heard.

OK	**Go to step 4.**

NG

2	**Check voltage between terminals 1 and 2 of engine room R/B No. 3 (for MTR CUT relay).**



PREPARATION:
(a) Turn the ignition switch OFF.
(b) Remove the MTR CUT relay from the engine room R/B No. 3.
(c) Turn the igniton switch ON.

CHECK:
Measure the voltage between terminals 1 and 2 of engine room R/B No. 3 (for MTR CUT relay).

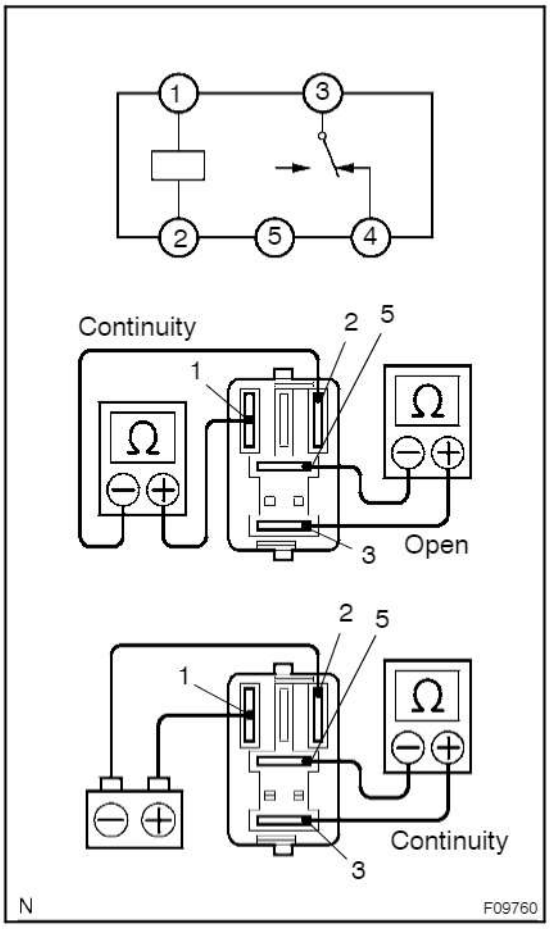
OK:
Voltage: 10 – 14 V

NG	**Check and repair harness or connector.**

OK

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3	Check MTR CUT relay.



CHECK:

Check continuity between each terminal of MTR CUT relay.

OK:

Terminals 1 and 2	Continuity (Reference value 80 Ω)
Terminals 3 and 5	Open

CHECK:

(a) Apply battery voltage between terminals 1 and 2.

(b) Check continuity between each terminal of MTR CUT relay.

OK:

Terminals 3 and 5	Continuity

NG → **Replace MTR CUT relay.**

OK

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4	**Check continuity between terminals 3 of engine room R/B No. 3 (for MTR CUT relay) and terminal 5 of engine room R/B No. 3 (for VSC MTR relay).**

PREPARATION:
Remove the MTR CUT relay and VSC MTR relay from the engine room R/B No. 3.
CHECK:
Check continuity between terminals 3 of engine room R/B No. 3 (for MTR CUT relay) and terminal 5 of engine room R/B No. 3 (for VSC MTR relay).
OK:

Continuity

NG → **Repair or replace harness.**

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.

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DI8E1–07

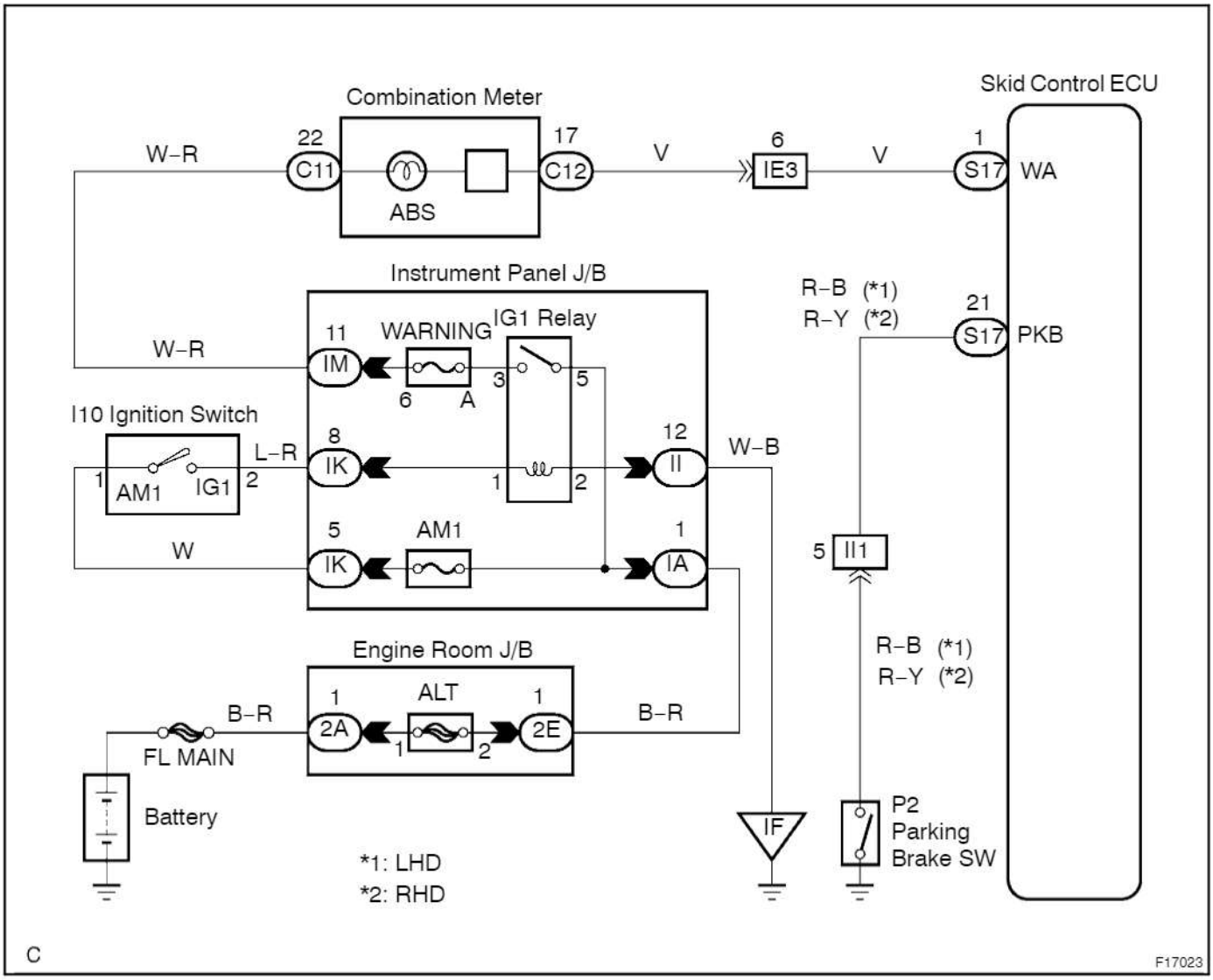
DTC	Always ON	Malfunction in ECU ABS Warning Light Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Malfunction in skid control ECU	• Power source circuit • ABS warming light circuit • Multiplex communication circuit • Skid control ECU

HINT:
In some cases the hand–held tester cannot be used when the skid control ECU is abnormal.

WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Is DTC output?**

Check DTC on page DI–53.

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

NO

2	**Check that the skid control ECU connectors are securely connected to the skid control ECU.**

NG → **Connect the connector to the skid control ECU.**

OK

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3	Check voltage of the ECU IG power source.

In case of using the hand–held tester:

PREPARATION:

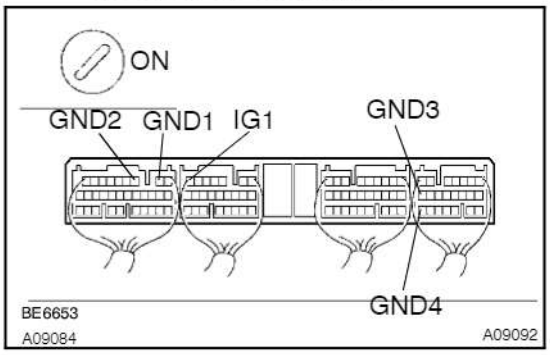
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and turn the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

CHECK:

Check the voltage condition output from the ECU observed in the hand–held tester.

OK:

"Normal" is displayed.



In case of not using the hand–held tester:

PREPARATION:

Remove the skid control ECU with the connectors still connected to it.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between the terminals IG1 and GND of the skid control ECU.

OK:

Voltage: 10 – 14 V

OK	Check and replace skid control ECU.

NG

4	Check battery voltage.

CHECK:

Check the battery voltage.

OK:

Voltage: 10 – 14 V

NG	Check and repair the charging system.

OK

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5	**Check for open and short circuit in harness and connector between terminals Tc of DLC3 to skid control ECU (See page IN–30).**

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

OK

6	**Check operation of the ABS warning light.**

In case of using the hand–held tester:

PREPARATION:

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

CHECK:

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

In case of not using the hand–held tester:

PREPARATION:

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

CHECK:

Check that the ABS warning light lights up.

OK → **Check and replace skid control ECU.**

NG

7	**Check for short circuit in harness and connector between skid control ECU and combination meter (See page IN–30).**

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

OK

Repair or replace combination meter.

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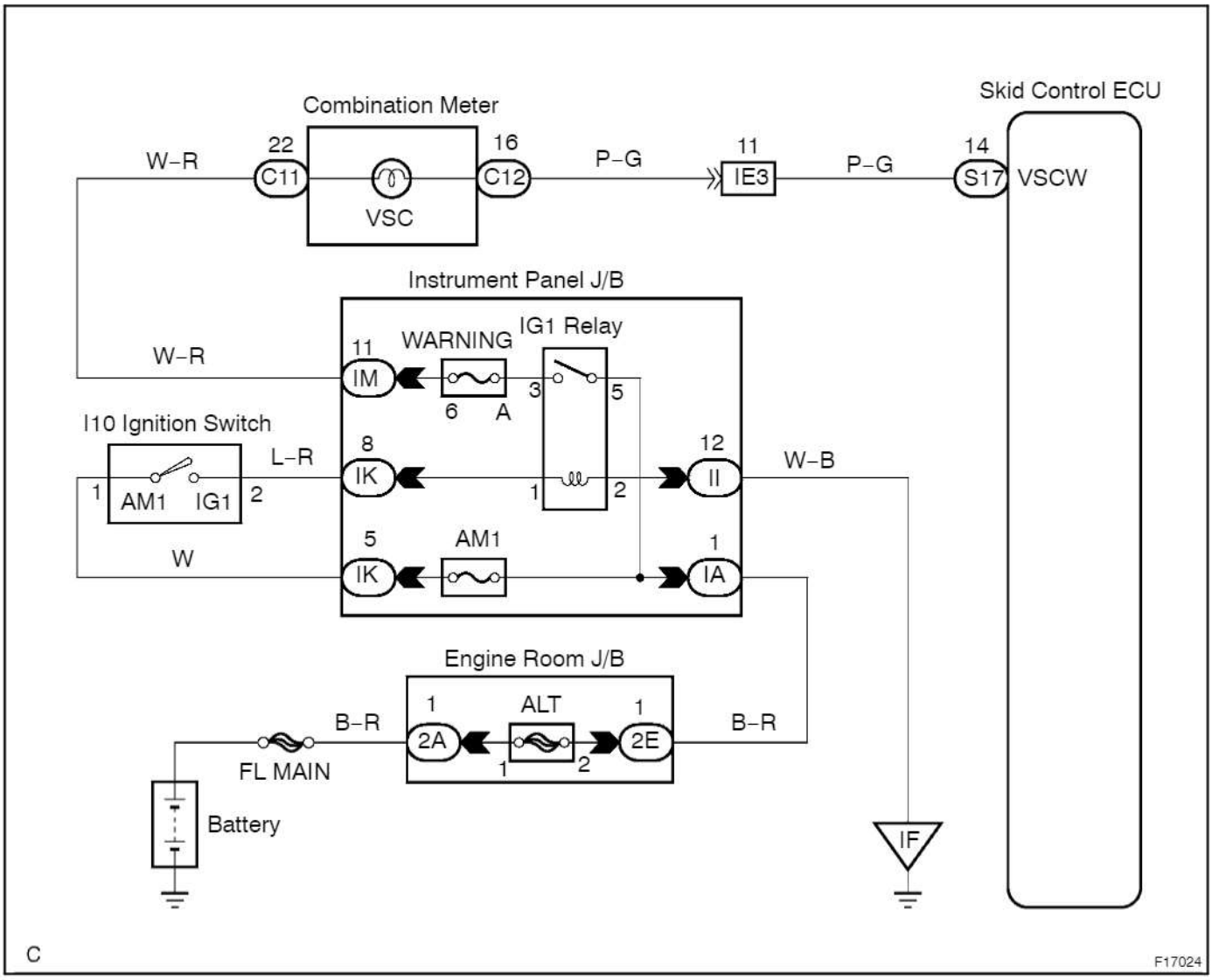
DI9II–02

DTC	Always ON	Malfunction in ECU VSC Warning Light Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	There is a malfunction in the ECU internal circuit.	• Power source circuit • VSC warning light circuit • skid control ECU

WIRING DIAGRAM



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INSPECTION PROCEDURE

1	Is DTC output for VSC?

Check DTC on page DI–53.

YES → Repair circuit indicated by the output code.

NO

2	Is normal code displayed?

YES → Check for short circuit in harness and connector between engine ECU and DLC3 (See page IN–30).

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

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4	**Check battery voltage.**

PREPARATION:
Start the engine.
CHECK:
Check the battery voltage.
OK:
Voltage: 10 – 16 V

NG → **Check and repair the charging system.**

OK ↓

5	**Check operation of the VSC warning light.**

In case of using the hand–held tester.
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.
CHECK:
Check that "ON" and "OFF" of the VSC warning light can be shown on the combination meter with the hand–held tester.
In case of not using the hand–held tester.
PREPARATION:
(a) Turn the ignition switch OFF.
(b) Disconnect the connector from the skid control ECU.
(c) Turn the ignition switch ON.
CHECK:
Check the VSC warning light goes off.

OK → **Check and replace skid control ECU.**

NG ↓

Check for short circuit in harness and connector between combination meter and skid control ECU, combination meter and DLC3 (See page IN–30).

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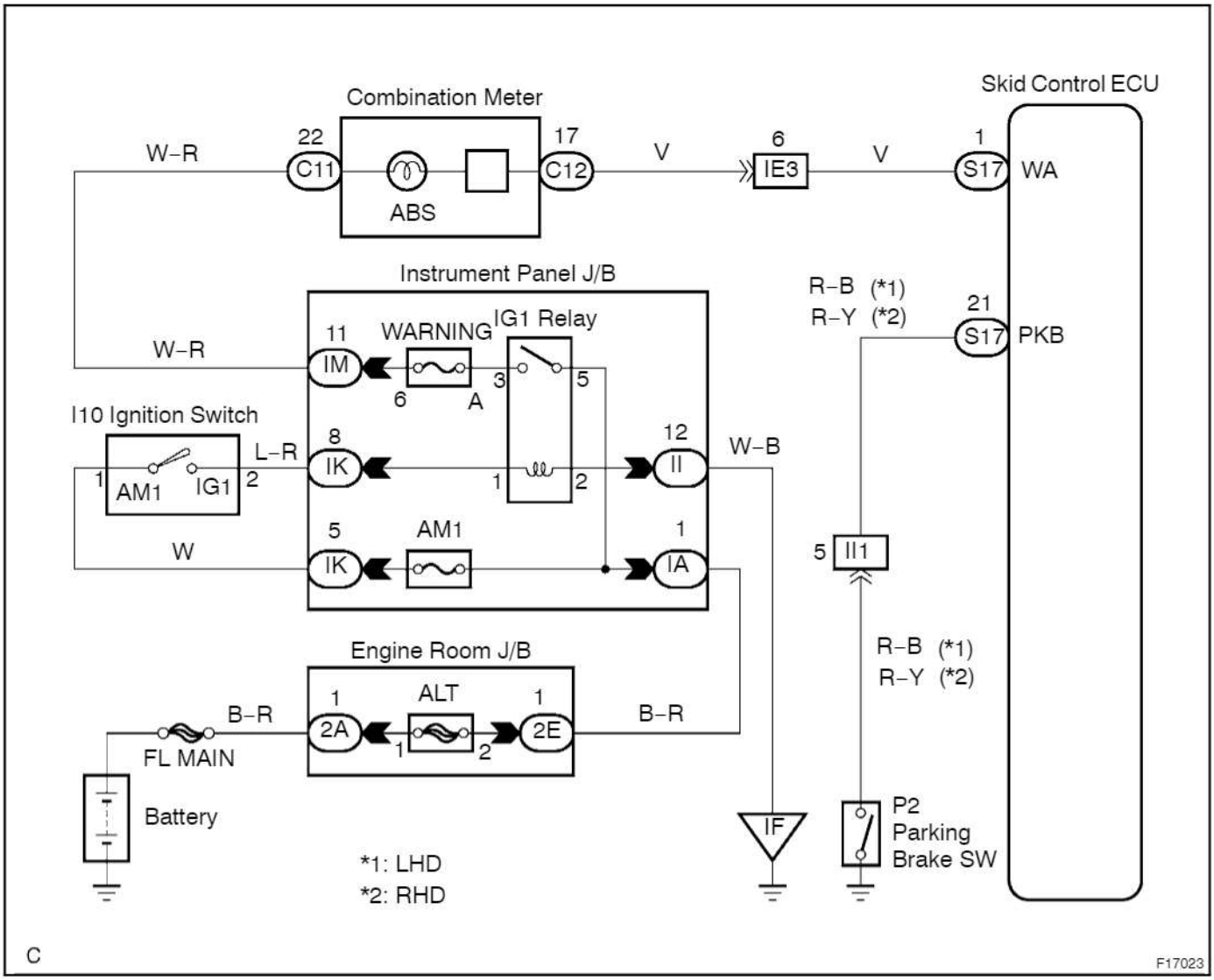
DI9IJ-02

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects a trouble, it lights the ABS warning light while at the same time prohibiting ABS control. At this time, the ECU records a DTC in memory.
Connect terminals Tc and CG of the DLC3 to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

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

ABS warning light does not light up	*1
ABS warning light remains on	*2

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

*2: After inspection with step 3, start the inspection from step 4 in case of using the hand–held tester and start from step 5 in case of not using hand–held tester.

1	**Check operation of the ABS warning light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

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

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

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

HINT:

ABS warning light turns "OFF" automatically 2 sec. after is turned "ON".

OK → **Check and replace skid control ECU.**

NG

2	**Check ABS warning light.**

See combination meter troubleshooting.

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

OK

Repair or replace and check for open circuit in harness and connector between combination meter and skid control ECU (See page IN–30).

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3	**Check that the skid control ECU connectors are securely connected to the skid control ECU.**

NO → **Connect the connector to the skid control ECU.**

YES

4	**Check operation of the ABS warning light (See step 1).**

OK → **Check and replace skid control ECU.**

NG

5	**Is DTC output?**

Check DTC on page DI–53.

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

NO

Check for short circuit in harness and connector between check connector and VSC SOL relay (See page IN–30).

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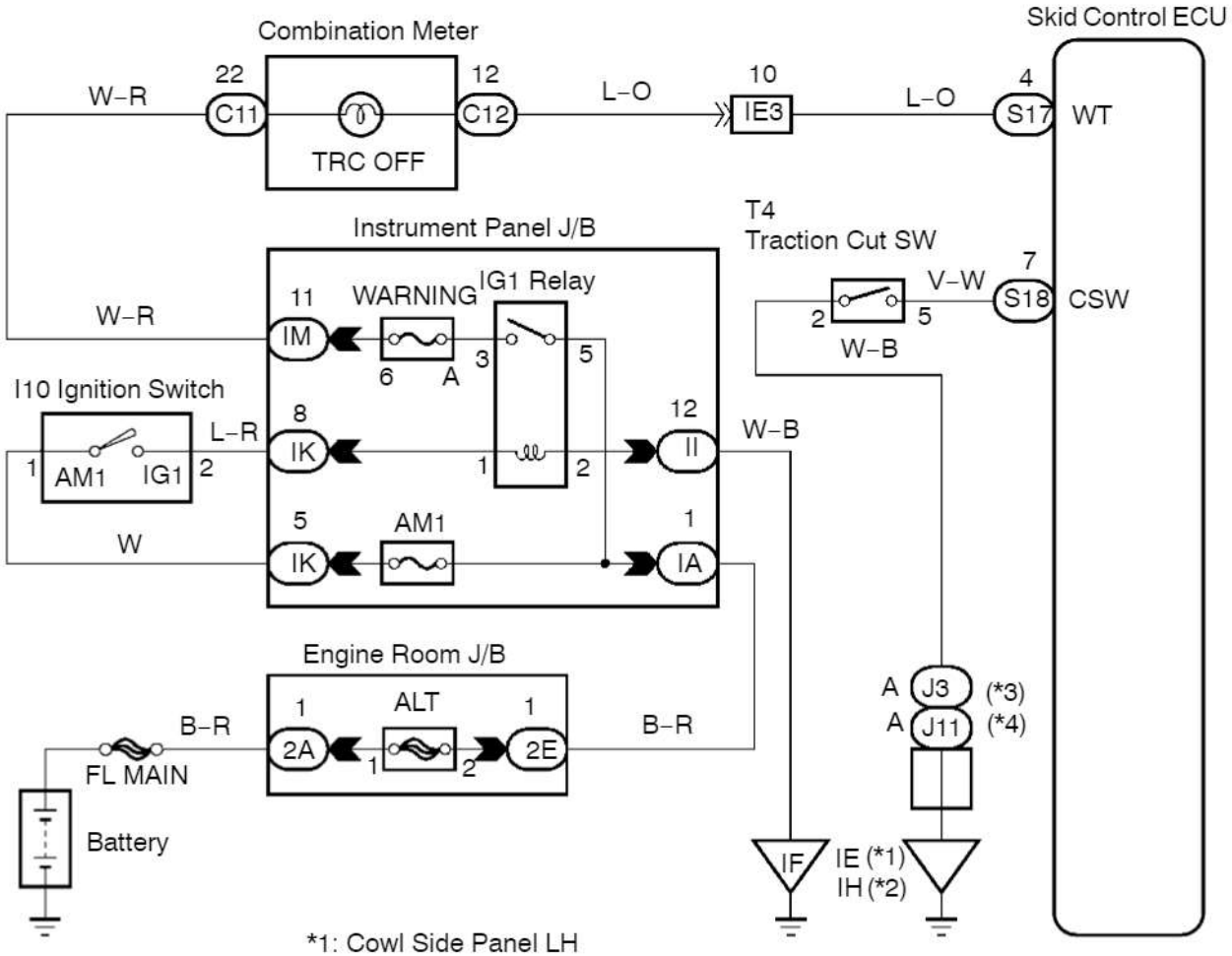
DI559–11

TRC OFF Indicator, TRC Cut Switch Circuit

CIRCUIT DESCRIPTION

This is the TRC control main switch. When the TRC cut switch is pushed on, TRC control goes off and the TRC OFF indicator lights up. This indicator blinks for warnings when the trouble occurs and for displaying DTC.

WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the TRC OFF indicator light.**

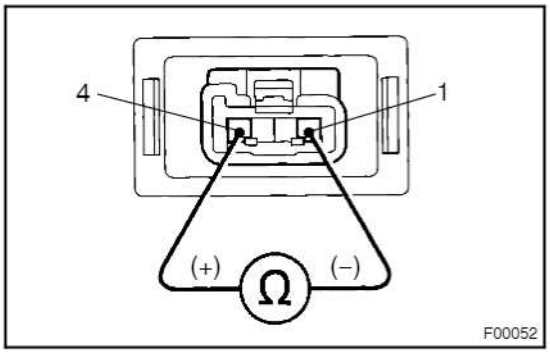
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:
Check that "ON" and "OFF" of the TRC OFF indicator light can be shown on the combination meter by the hand–held tester.

NG → **Go to step 4.**

OK

2	**Check TRC OFF switch.**



PREPARATION:
Remove the TRC OFF switch and disconnect the connector from the TRC OFF switch.

CHECK:
Measure resistance between terminals 1 and 4 TRC OFF switch when TRC OFF switch is on and off.

OK:

TRC OFF switch	Resistance
Pushed in	Continuity
Released	1 MΩ or higher

NG → **Replace TRC OFF switch.**

OK

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3	**Check for open and short circuit in harness and connector between terminal CSW of skid control ECU and TRC OFF switch and body ground (See page IN–30).**

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

OK

4	**Check TRC OFF indicator light.**

See combination meter troubleshooting.

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

OK

5	**Check for open and short circuit in harness and connector between terminal WT of skid control ECU and TRC OFF indicator light (See page IN–30).**

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

OK

Check and replace skid control ECU.

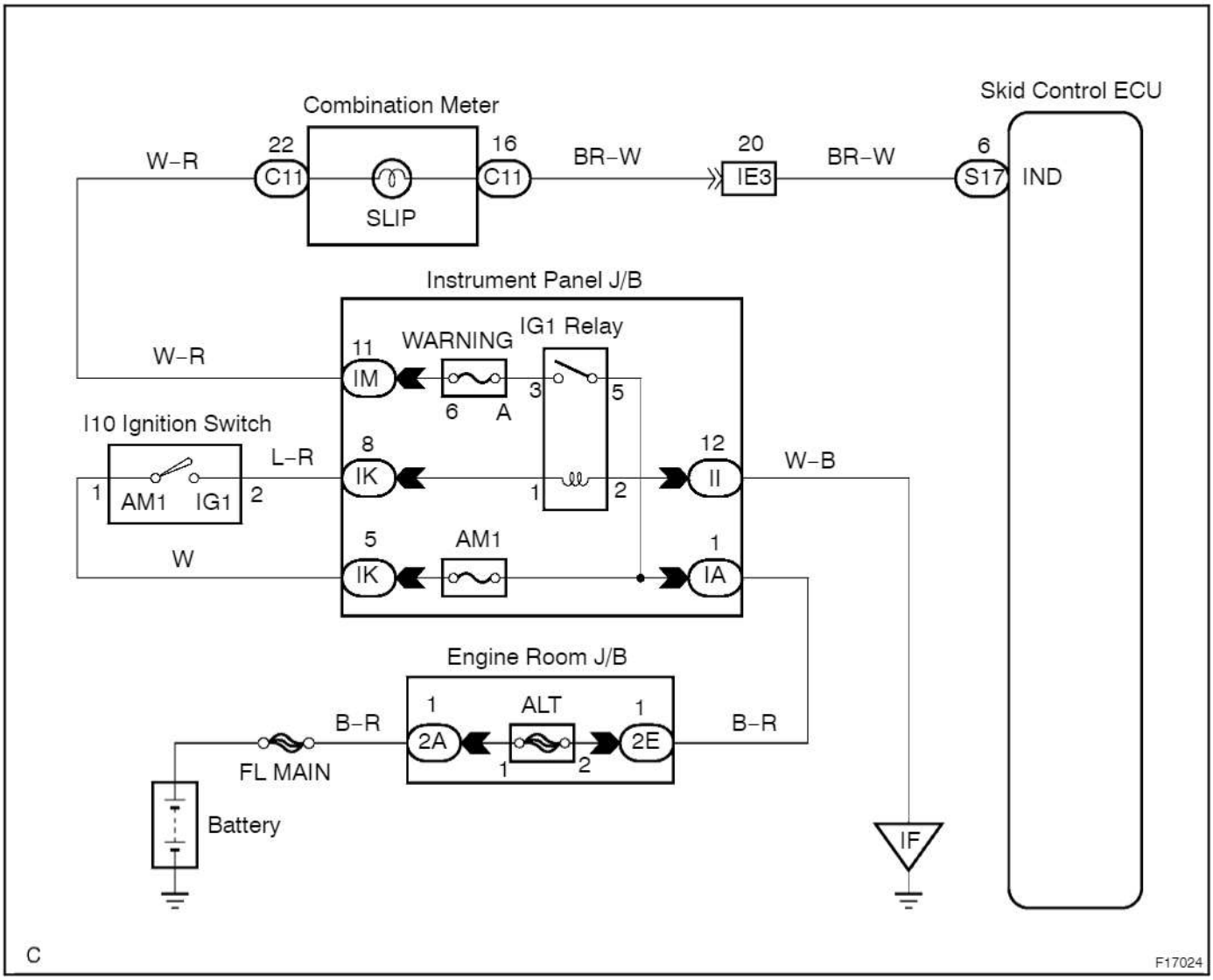
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SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during TRC operation.

WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

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

1	**Check operation of the SLIP indicator light.**

PREPARATION:

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

CHECK:

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

OK → **Go to step 4.**

NG

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

OK → **Check and replace skid control ECU.**

NG

3	**Check SLIP indicator light.**

See combination meter troubleshooting.

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

OK

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4	**Check for open and short circuit in harness and connector between skid control ECU and SLIP indicator light (See page IN–30).**

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

OK

Check and replace skid control ECU.

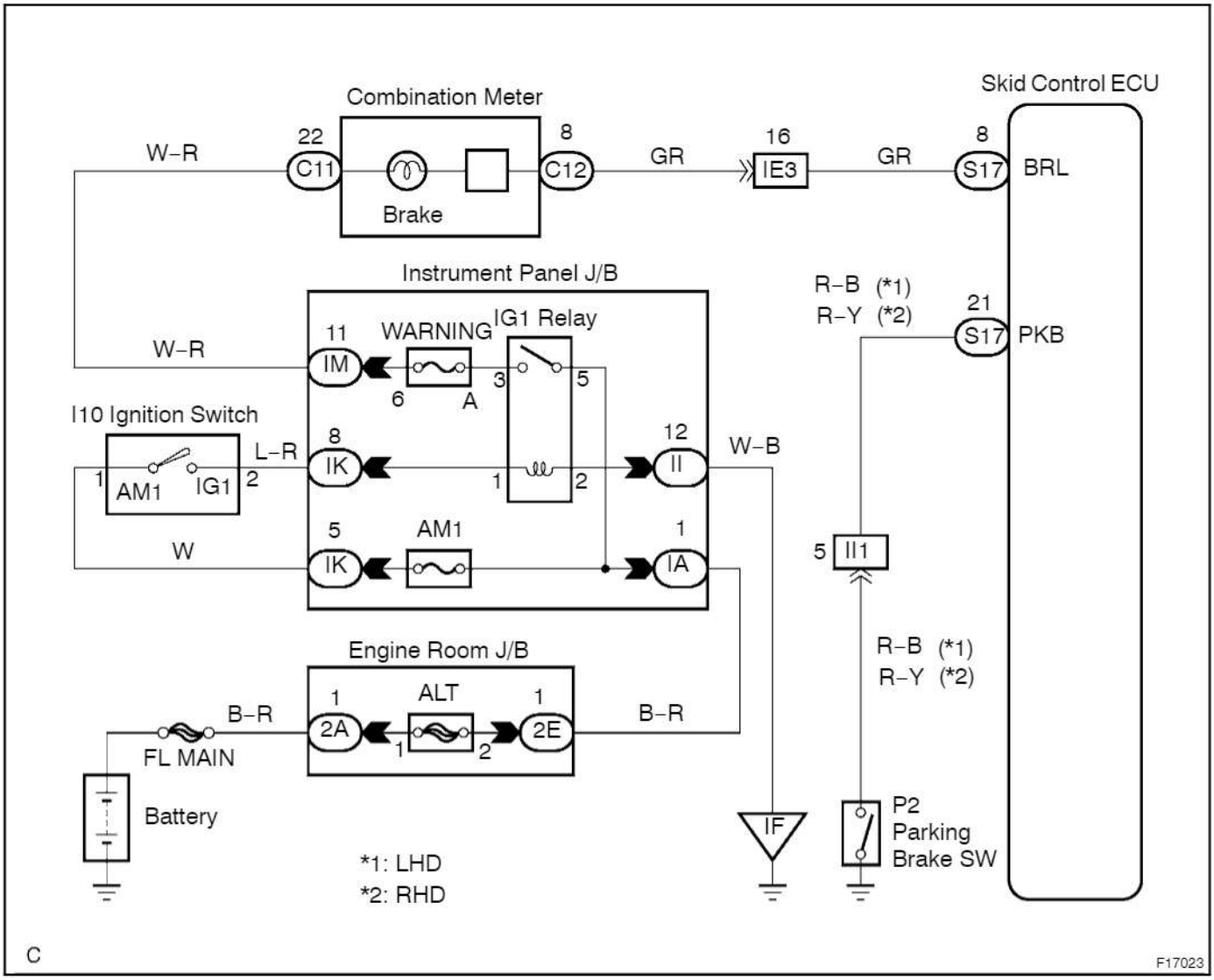
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BRAKE Warning Light Circuit

CIRCUIT DESCRIPTION

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

WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check parking brake switch circuit.**

NG → **Repair or replace parking brake switch circuit.**

OK

2	**Is DTC output for ABS?**

Check DTC on page DI–53.

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

NO

3	**Check the brake warning light.**

See combination meter troubleshooting.

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

OK

Check and replace skid control ECU.

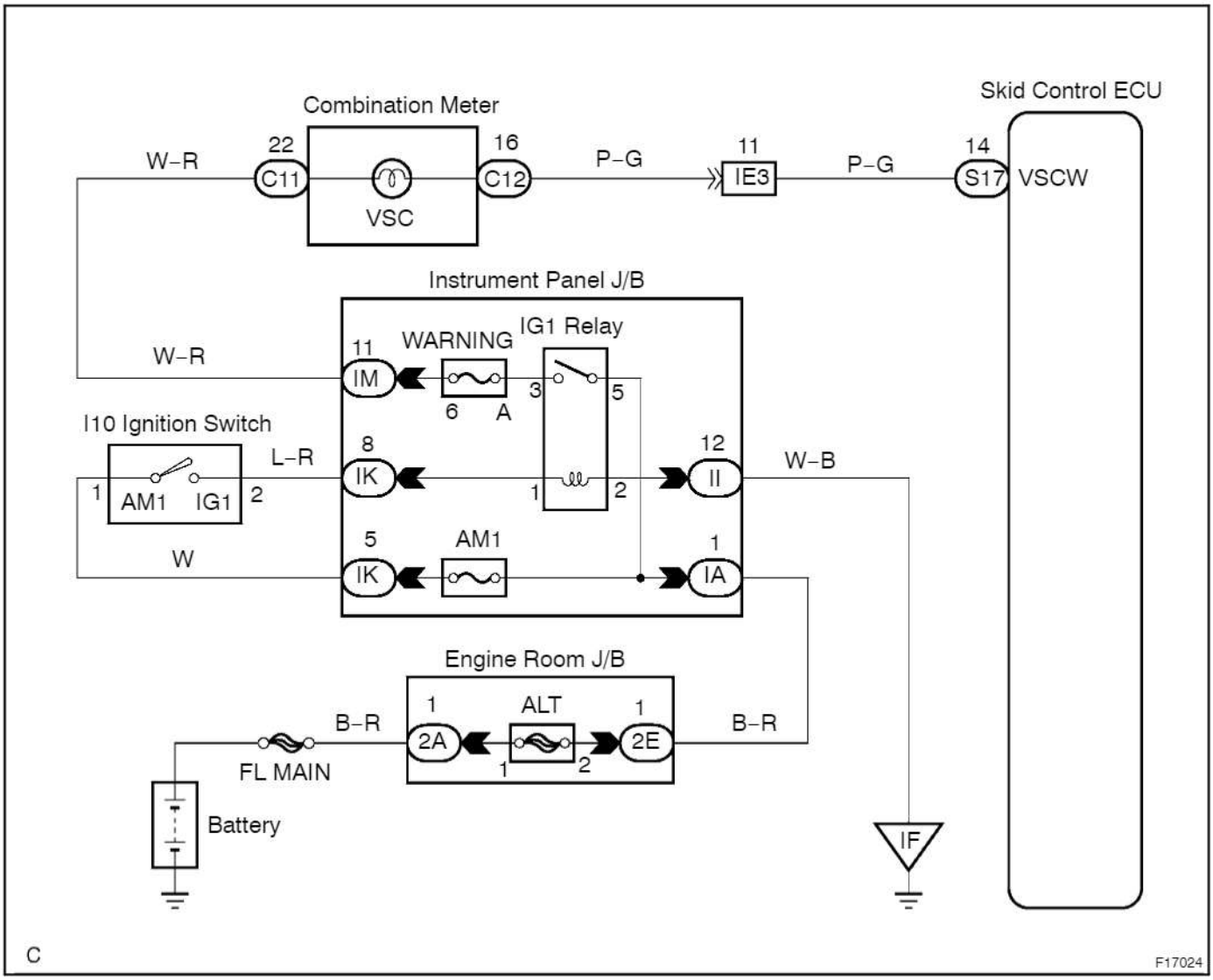
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VSC Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU stores DTC, the VSC warning light lights on the combination meter.

WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

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

1	**Check operation of the VSC warning indicator.**

PREPARATION:

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

CHECK:

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

OK → **Check and replace skid control ECU.**

NG

2	**Is DTC output for VSC?**

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

NO

3	**Check for open and short circuit in harness and connector between skid control ECU and VSC warning light (See page IN–30).**

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

OK

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4	**Check VSC warning light.**

See combination meter troubleshooting.

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

OK

Check and replace skid control ECU.

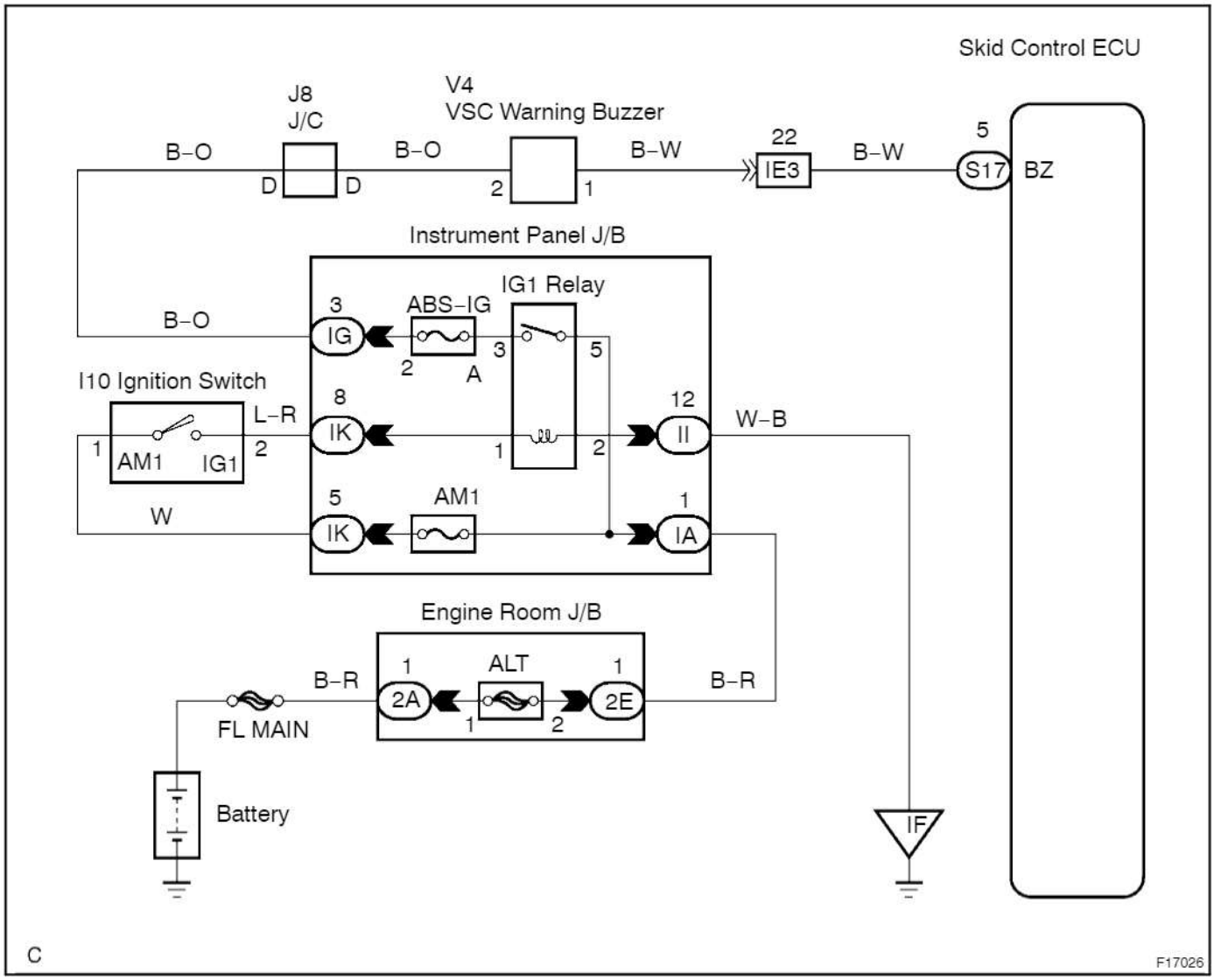
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VSC Warning Buzzer Circuit

CIRCUIT DESCRIPTION

The VSC warning buzzer sounds during VSC operation.

WIRING DIAGRAM



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INSPECTION PROCEDURE

HINT:

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

1	**Check operation of the VSC warning buzzer.**

PREPARATION:

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

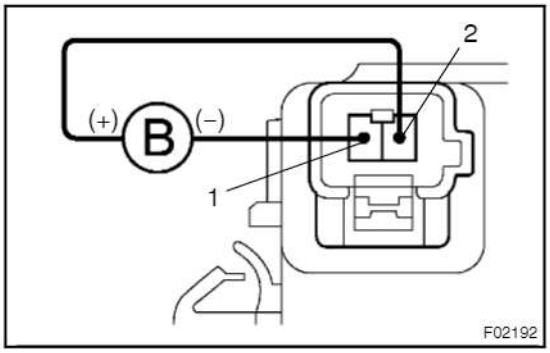
CHECK:

Check "beep, beep" sound of the VSC warning buzzer by the hand–held tester.

OK → **Check and replace skid control ECU.**

NG

2	**Check VSC warning buzzer.**



PREPARATION:

Disconnect the VSC warning buzzer connector.

CHECK:

Apply battery voltage to the terminals 1 and 2 of VSC warning buzzer connector. Check that the VSC warning buzzer sound.

NG → **Replace the VSC warning buzzer.**

OK

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3	Check for open and short circuit in harness and connector between skid control ECU and the VSC warning buzzer (See page IN–30).

NG → Repair or replace harness or connector.

OK

Check and replace skid control ECU.

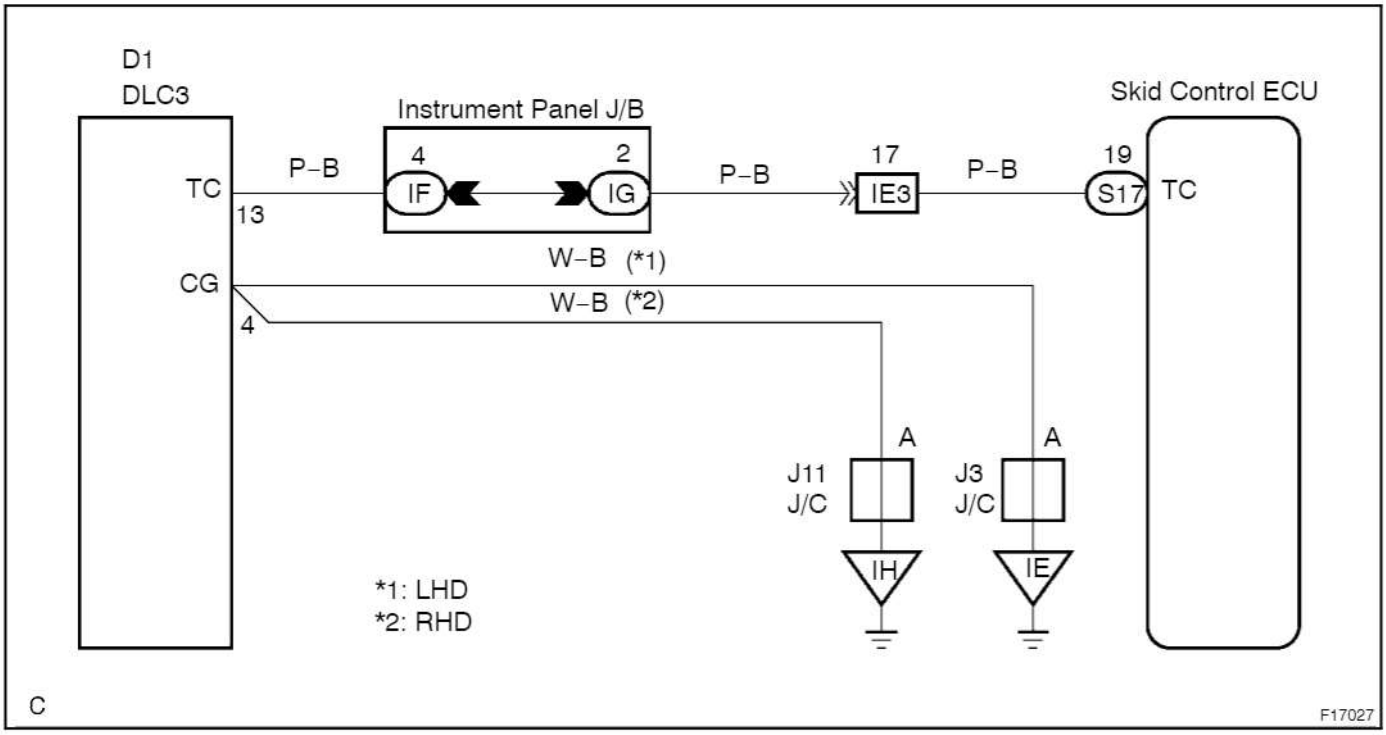
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Tc Terminal Circuit

CIRCUIT DESCRIPTION

Connecting terminals Tc and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light and VSC warning light.

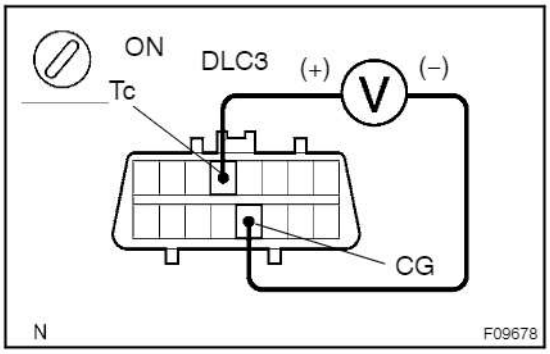
WIRING DIAGRAM



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INSPECTION PROCEDURE

1	**Check voltage between terminals Tc and CG of the DLC3.**



PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure voltage between terminal Tc and CG of DLC3.
OK:
Voltage: 10 – 14 V

OK	**If ABS warning light and VSC warning light does not blink even after Tc and CG have been connected, the ECU may be defective.**

NG

2	**With ignition switch OFF, check for open and short circuit in harness and connector between skid control ECU and DLC3, DLC3 and body ground (See page IN–30).**

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

OK

Check and replace skid control ECU.

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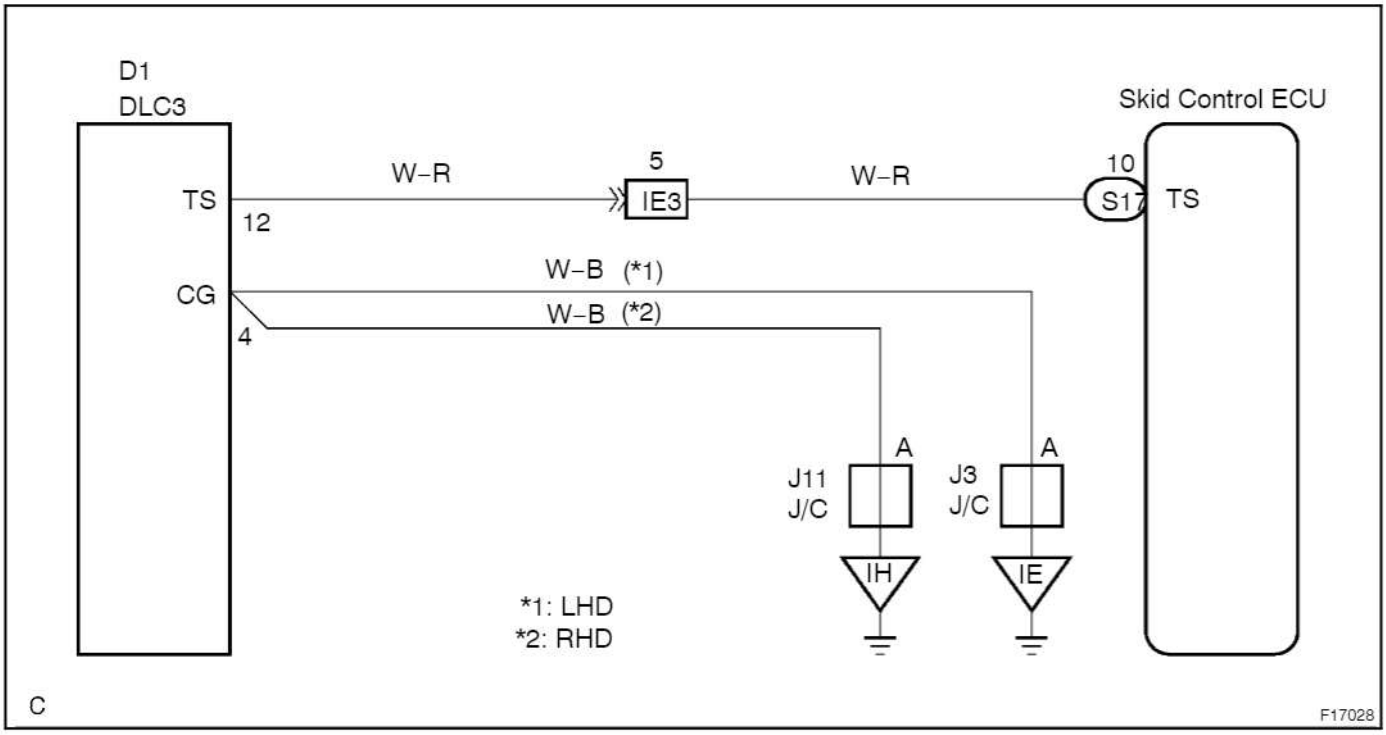
DI0CM–11

Ts Terminal Circuit

CIRCUIT DESCRIPTION

The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected with the DTC check. Connecting terminals Ts and CG of the DLC3 starts the check.

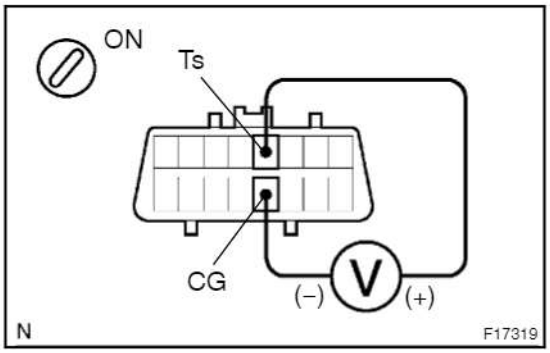
WIRING DIAGRAM



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INSPECTION PROCEDURE

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



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Ts and CG of DLC3.

OK:

Voltage: 10 – 14 V

OK → **If ABS warning light does not blink even after Ts and CG have been connected, the ECU may be defective.**

NG

2	**Check for open and short circuit in harness and connector between skid control ECU and DLC3, DLC3 and body ground (See page IN–30).**

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

OK

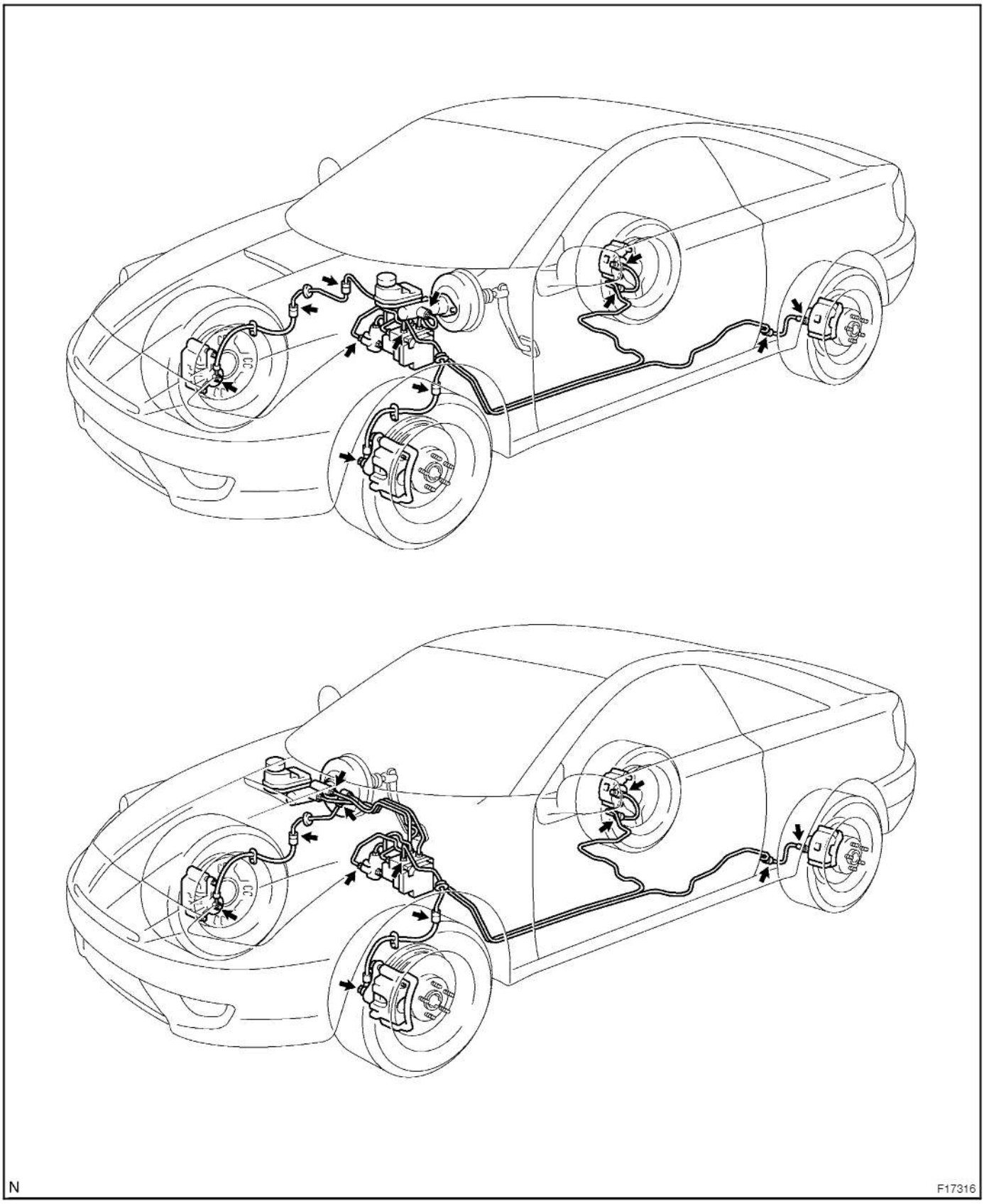
Check and replace skid control ECU.

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DI7V2-06

Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



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