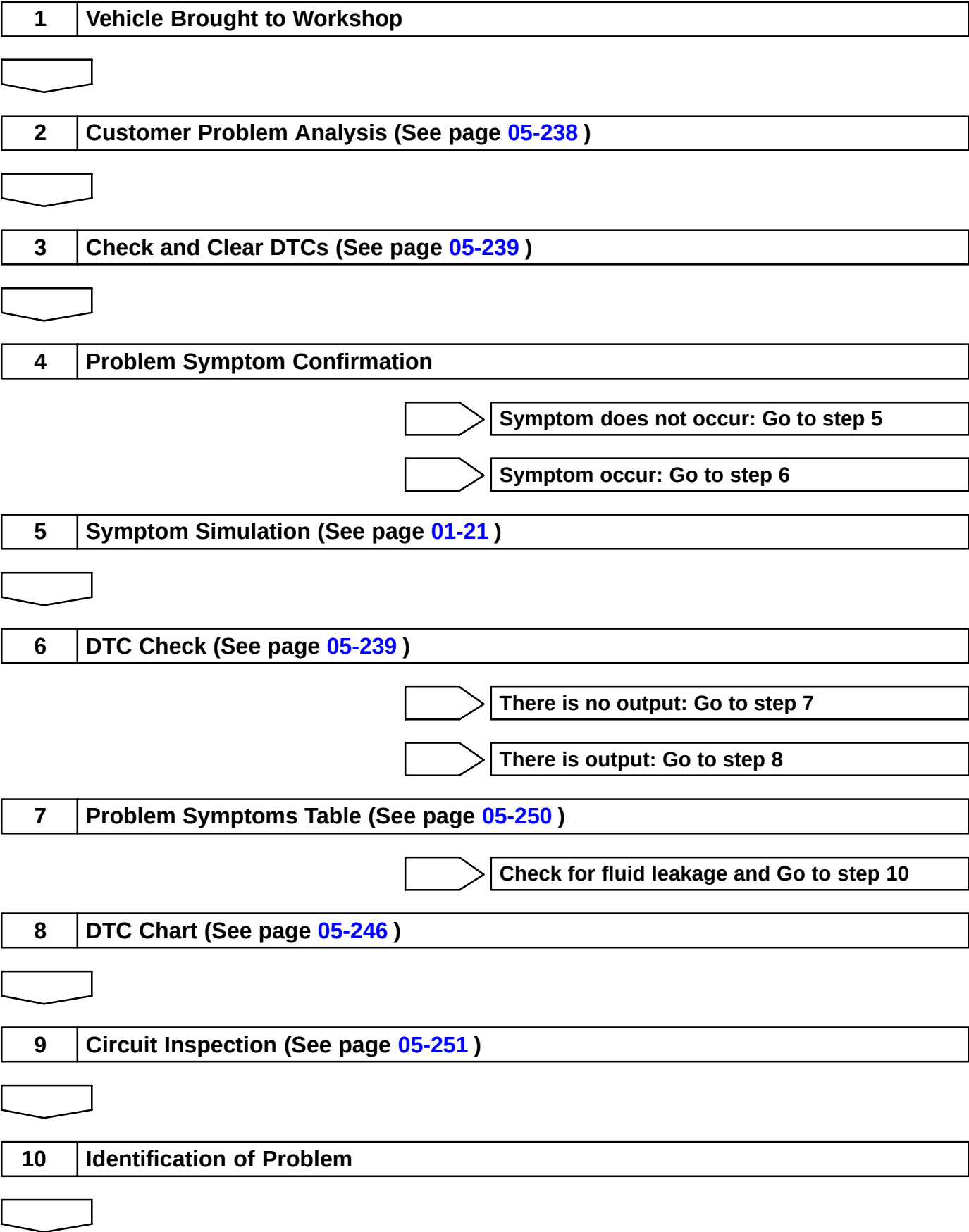


ABS WITH EBD SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

055XF-02



11	Repair
-----------	---------------



12	Confirmation Test
-----------	--------------------------



End

HINT:

Step 3, 6, 9, 12:

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 is turns on and the ABS operation is prohibited. In addition to this, when there is a failure which disables the EBD operation, the brake warning light is also turns on and the EBD operation is prohibited.

CUSTOMER PROBLEM ANALYSIS CHECK

ABS Check Sheet

 Inspector's :
 Name _____

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

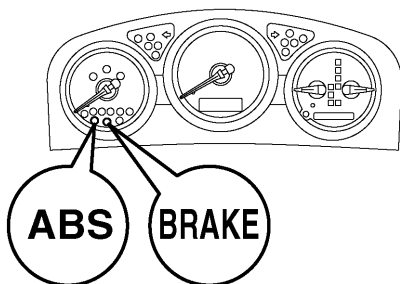
Date Problem First Occurred	/ /
Frequency the Problem Occurs	☐ Continuously ☐ Intermittently (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	Brake Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

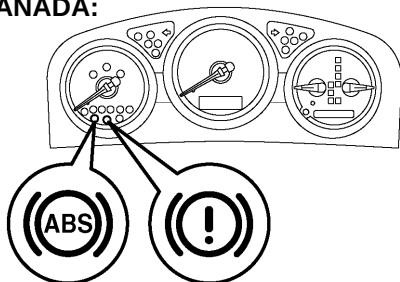
DTC Check	1st Time	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

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

USA:



CANADA:



Y

F16280

PRE-CHECK

1. DIAGNOSIS SYSTEM

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

When the ignition switch is turned ON, check that the ABS warning light and BRAKE warning light turns on for 3 sec.

HINT:

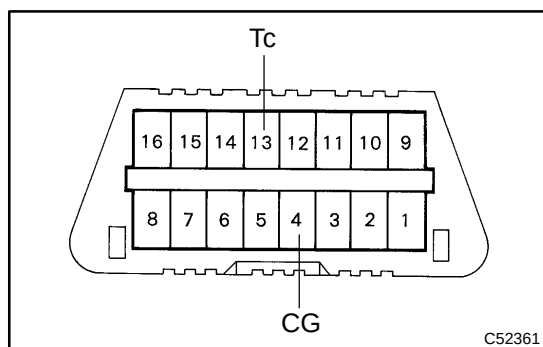
- When the parking brake is applied or the level of the brake fluid is low, the BRAKE warning light is lit.
- If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit (See page [05-275](#) or [05-277](#)) or BRAKE warning light circuit (See page [05-278](#)).

- (c) In case of not using hand-held tester:
Check the DTC.

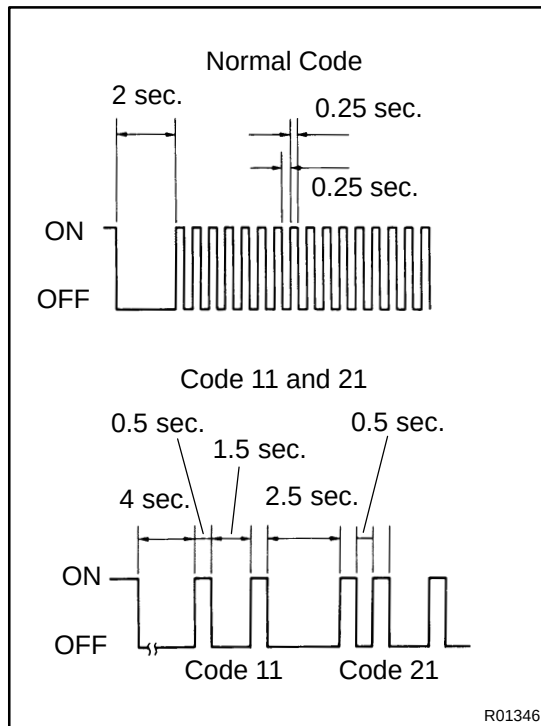
- (1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843-18040
- (2) Turn the ignition switch ON.
- (3) Read the DTC from the ABS warning light on the combination meter.

HINT:

- If a code does not appear, inspect the diagnostic circuit or ABS warning light circuit (See page [05-275](#) or [05-277](#)).



C52361



- 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 [05-246](#).

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

(5) After completing the check, remove the SST from the DLC3.

SST 09843-18040

(d) In case of using hand-held tester:

Check the DTC.

(1) 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.

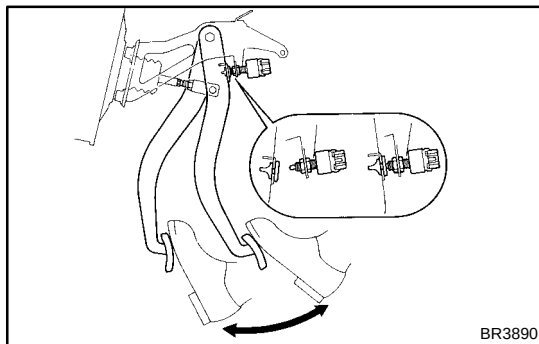
(e) In case of not using hand-held tester:

Clear DTC.

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

SST 09843-18040

(2) Turn the ignition switch ON.



(3) Clear DTC stored in ECU by depressing the brake pedal 8 or more times within 5 sec.

(4) Check that the ABS warning light shows the normal code.

(5) Remove the SST from the DLC3.

SST 09843-18040

HINT:

Disconnecting the battery cable during repairs will not erase the DTC in the ECU.

(f) In case of using hand-held tester:

Clear the DTC.

(1) Turn the ignition switch ON.

(2) 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		
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		

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, 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.

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

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 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.

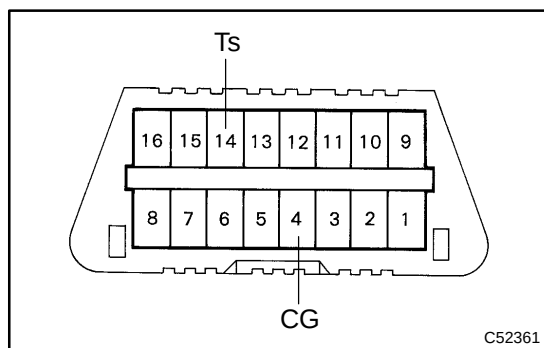
Hand-held Tester Display	Measurement Item	Reference Value*
VEHICLE SPD	Wheel speed reading	Speed indication of a meter
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
# IG ON	Number of operations of ignition switch ON after memorizing freeze frame data	0 - 31
SYSTEM	System status	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.

5. SPEED SENSOR SIGNAL CHECK

HINT:

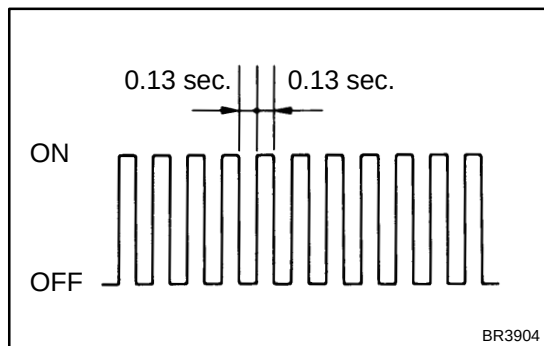
- If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC of sensor check function will be erased.
 - During test mode, ECU records all DTC of sensor check function. By performing sensor signal check, the codes are erased if normality is confirmed. The codes left over are the codes where abnormality was found.
- (a) In case of not using hand-held tester:
Check the speed sensor signal.
- (1) Turn the ignition switch ON.



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

SST 09843-18040

- (3) Start the engine.



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

HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit and Ts circuit (See page [05-275](#) , [05-277](#) and [05-282](#)).

- (5) Drive the vehicle straight forward.

HINT:

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

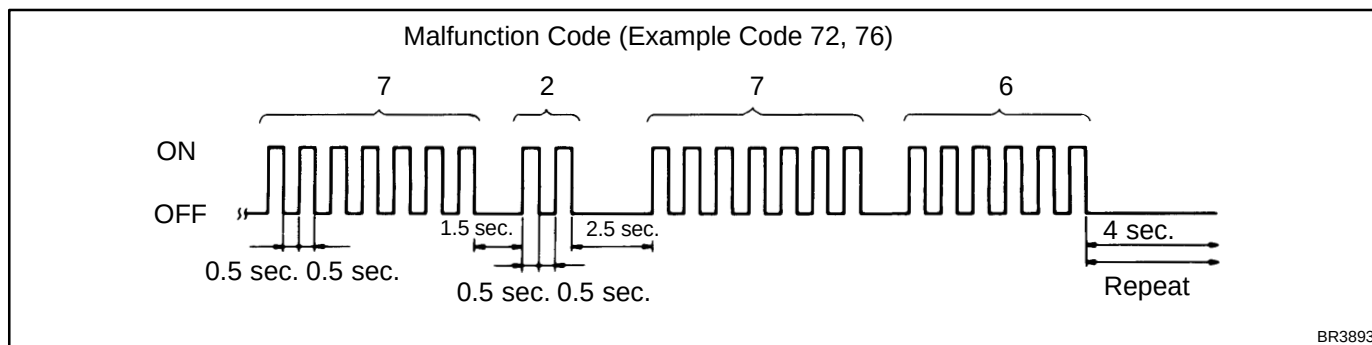
- (6) Stop the vehicle.
- (7) Using SST, connect the terminals Tc and CG of the DLC3.

SST 09843-18040

(8) Read the number of blinks of the ABS warning light.

HINT:

- See the list of DTC shown on the [05-246](#).
- 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.



(9) After doing the check, turn the ignition switch OFF, and remove the SST from the DLC3.

SST 09843-18040

(b) In case of using hand-held tester:

Check the sensor signal.

- (1) Do step (3) to (6) on the previous page.
- (2) 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.

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- Using SST 09843-18040, connect the terminals Tc and CG of the DLC3.
- If any abnormalities are not found when inspecting the parts, inspect the ECU and wire harness.
- If a malfunction code is displayed during the DTC check, check the circuit listed in the code. For details of each code, refer to the "See page" under the respective "DTC No." in the following DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area
C0278/11 (05-263)	Open circuit in ABS solenoid relay circuit	• Fusible link block • ABS No. 2 fuse
C0279/12 (05-263)	Short circuit in ABS solenoid relay circuit	• ABS solenoid relay • ABS solenoid relay circuit
C0273/13 (05-261)	Open circuit in ABS motor relay circuit	• Fusible link block • ABS No. 3 fuse
C0274/14 (05-261)	Short circuit in ABS motor relay circuit	• ABS motor relay • ABS motor relay circuit
C0226/21 (05-259)	Open or short circuit in 2-position solenoid circuit for right front wheel	• Brake actuator • SFRR or SFRH circuit
C0236/22 (05-259)	Open or short circuit in 2-position solenoid circuit for left front wheel	• Brake actuator • SFLR or SFLH circuit
C0246/23 (05-259)	Open or short circuit in 2-position solenoid circuit for right rear wheel	• Brake actuator • SRRR or SRRH circuit
C0256/24 (05-259)	Open or short circuit in 2-position solenoid circuit for left rear wheel	• Brake actuator • SRLR or SRLH circuit
C0200/31 (05-251)	Right front wheel speed sensor signal malfunction	• Right front, left front speed sensor • Speed sensor rotor • Speed sensor rotor installation • Each speed sensor circuit
C0205/32 (05-251)	Left front wheel speed sensor signal malfunction	
C0210/33 (05-255)	Right rear wheel speed sensor signal malfunction	
C0215/34 (05-255)	Left rear wheel speed sensor signal malfunction	
C1235/35 (05-251)	Foreign matter is attached on the tip of the right front sensor	• Right front or left front speed sensor • Speed sensor rotor
C1236/36 (05-251)	Foreign matter is attached on the tip of the left front sensor	
C1238/38 (05-255)	Foreign matter is attached on the tip of the right rear sensor	• Right rear or left rear speed sensor • Speed sensor rotor
C1239/39 (05-255)	Foreign matter is attached on the tip of the left rear sensor	
C1241/41 (05-265)	Power source voltage down	• Power source harness and connector • Battery • Charging system • Power source circuit
C1249/49 (05-268)	Open circuit in stop light switch circuit	• Stop lamp switch harness and connector • Stop light bulb • Stop light switch circuit • Stop lamp switch

C1251/51 (05-270)	Pump motor is locked	ABS pump motor
Always ON (05-272)	Malfunction in ECU or power source voltage up	• Battery • Charging system • Skid control ECU

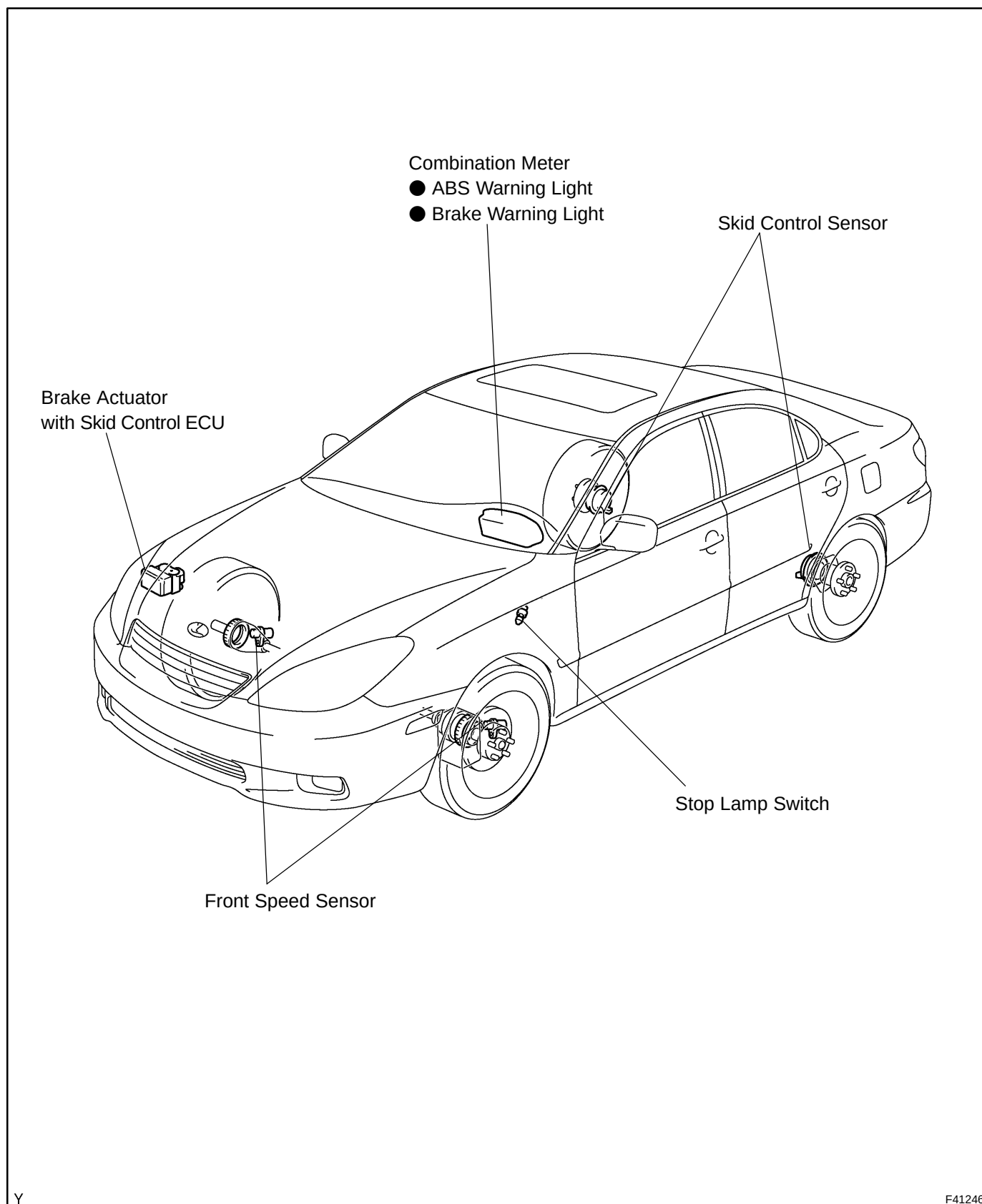
HINT:

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

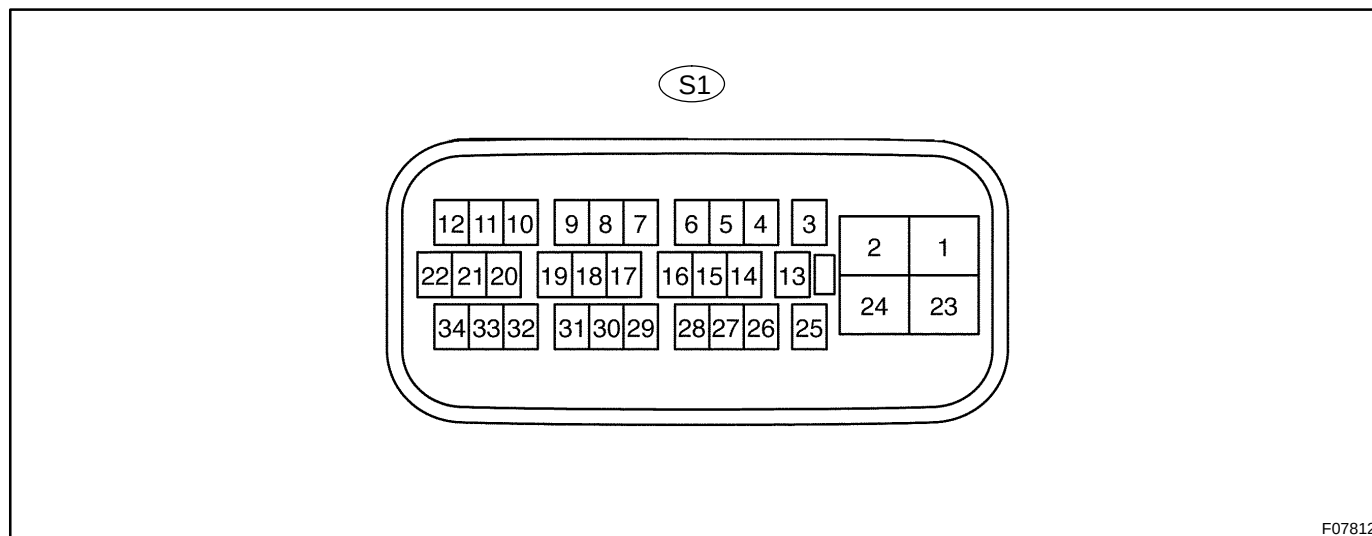
DTC of speed sensor check function:

DTC No.	Detection Item	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

LOCATION



TERMINALS OF ECU



F07812

Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
+BS (S1-1) - GND (S1-2, 24)	L - W-B	Always	11 - 14
FL+ (S1-9) - FL- (S1-8)	BR - Y	IG switch ON, slowly turn left front wheel	AC generation
STP (S1-10) - GND (S1-2, 24)	G-W - W-B	Stop light switch ON	10 - 14
		Stop light switch OFF	Below 1.0
RL+ (S1-11) - RL- (S1-12)	R - G	IG switch ON, slowly turn left rear wheel	AC generation
WA (S1-13) - GND (S1-2, 24)	R-B - W-B	IG switch ON, ABS warning light ON	10 - 14
		IG switch ON, ABS warning light OFF	Below 2.0
D/G (S1 - 14) - GND (S1-2, 24)	W - W-B	IG switch ON	10 - 14
Ts (S1 - 15) - GND (S1-2, 24)	LG-B - W-B	IG switch ON	10 - 14
Tc (S1-16) - GND (S1-2, 24)	P-B - W-B	IG switch ON	10 - 14
PKB (S1-18) - GND (S1-2, 24)	R-W - W-B	IG switch ON, parking switch ON	Below 1.0
		IG switch ON, parking switch OFF	10 - 14
+BM (S1-23) - GND (S1-2, 24)	L - W-B	Always	11 - 14
IG (S1-25) - GND (S1-2, 24)	B-R - W-B	IG switch ON	10 - 14
FR+ (S1-31) - FR- (S1-30)	W - B	IG switch ON, slowly turn right front wheel	AC generation
RR+ (S1-33) - RR- (S1-34)	P - L	IG switch ON, slowly turn right rear wheel	AC generation
BRL (S1-32) - GND (S1-2, 24)	R-Y - W-B	IG switch ON, brake warning light ON	10 - 14
		IG switch ON, brake warning light OFF	Below 2.0

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check although 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.

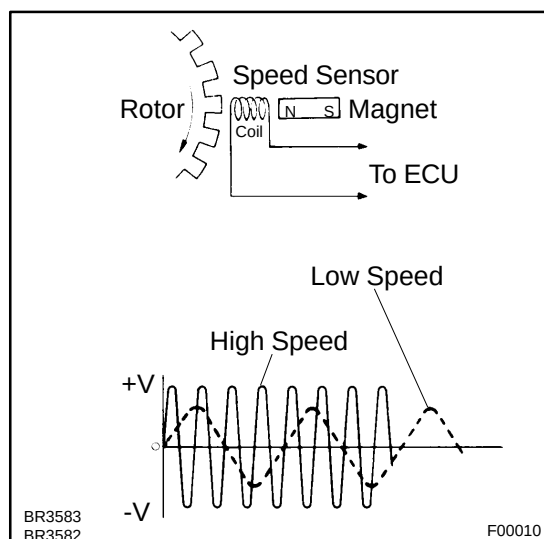
NOTICE:

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

Symptom	Suspected Area	See page
ABS does not operate	Only when 1 to 4 are all normal but problem still occurs, replace skid control ECU 1. Check DTC reconfirming that normal code is output 2. IG power source circuit and ground circuit 3. Speed sensor circuit 4. Check brake actuator with a hand-held tester If abnormal, check hydraulic circuit for leakage	05-239 05-265 05-251 05-255 32-43
ABS does not operate efficiently	Only when 1 to 5 are all normal but problem still occurs, replace skid control ECU 1. Check DTC reconfirming that normal code is output 2. IG power source circuit and ground circuit 3. Speed sensor circuit 4. Stop light switch circuit 5. Check brake actuator with a hand-held tester If abnormal, check hydraulic circuit for leakage	05-239 05-265 05-251 05-255 05-268 32-43
ABS warning light is abnormal	1. ABS warning light circuit 2. Skid control ECU	05-275 05-277
Brake warning light is abnormal	1. Brake warning light circuit 2. Skid control ECU	05-278
DTC check	Only when 1 and 2 are all normal and problem still occurs, replace skid control ECU 1. ABS warning light circuit 2. Tc terminal circuit	05-275 05-277 05-280
Speed sensor signal check is impossible	1. Ts terminal circuit 2. Skid control ECU	05-282

DTC	C0200/31	RIGHT FRONT SPEED SENSOR CIRCUIT
DTC	C0205/32	LEFT FRONT SPEED SENSOR CIRCUIT
DTC	C1235/35	FOREIGN MATTER IS ATTACHED ON TIP OF RIGHT FRONT SENSOR
DTC	C1236/36	FOREIGN MATTER IS ATTACHED ON TIP OF LEFT FRONT SENSOR

CIRCUIT DESCRIPTION



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

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

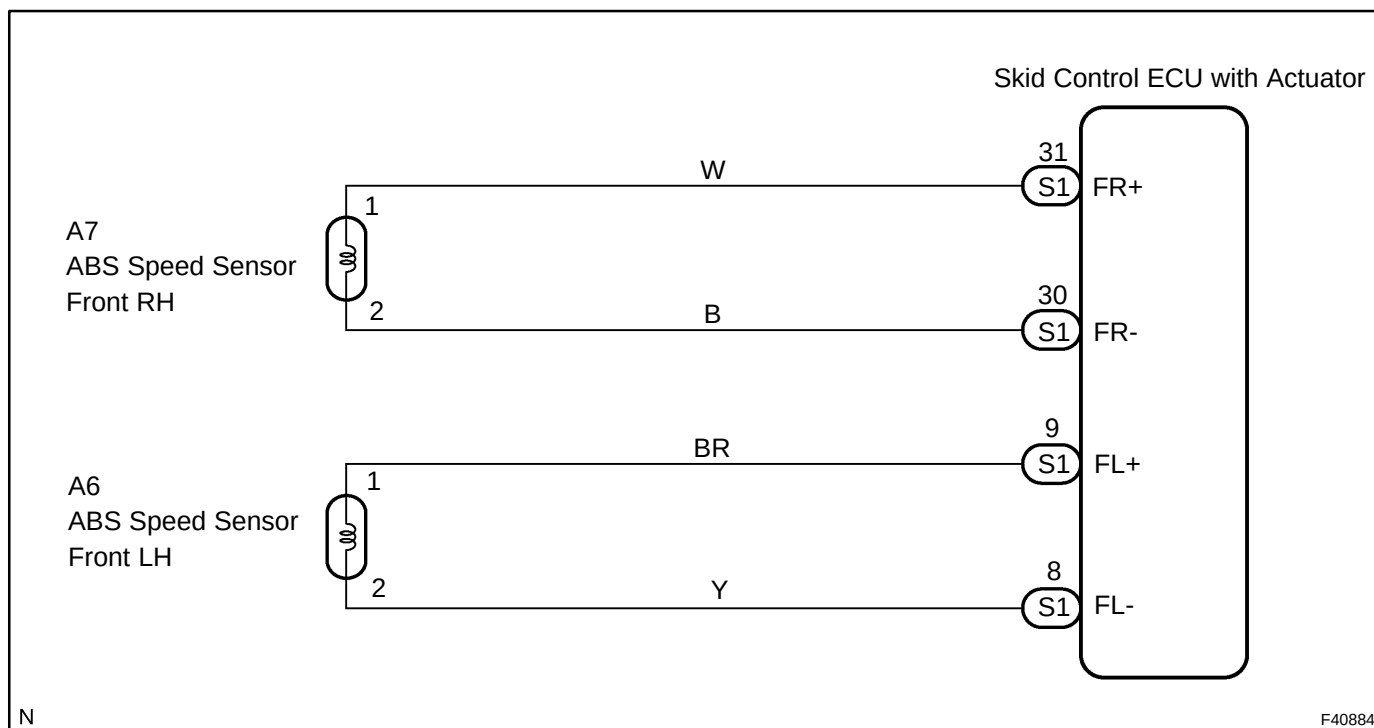
DTC No.	DTC Detecting Condition	Trouble Area
C0200/31 C0205/32	Detection of any of conditions from 1. to 3.: 1. With vehicle speed at 10 km/h or more, sensor signal circuit of faulty wheel is open or short for 15 sec. or longer. 2. Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more. 3. Sensor signal circuit is open for 0.5 sec. or longer.	• Right front, left front speed sensor • Speed sensor circuit • Sensor installation • Sensor rotor
C1235 / 35 C1236 / 36	Continuous noise occurs in to the speed sensor signals with the vehicle speed at 20 km/h (12 mph) or more continues for 5 sec or more.	• Right front, left front speed sensor • Speed sensor rotor

HINT:

DTC No. C0200/31, C1235/35 is for the right front speed sensor.

DTC No. C0205/32, C1236/36 is for the left front speed sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1	READ VALUE OF HAND-HELD TESTER(SPEED SENSOR OUTPUT VALUE)
----------	--

- Select the item "WHEEL SPEED FL (FR)" in the DATA LIST and read its value displayed on the hand-held tester.
- 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 from the displayed speed value.

HINT:

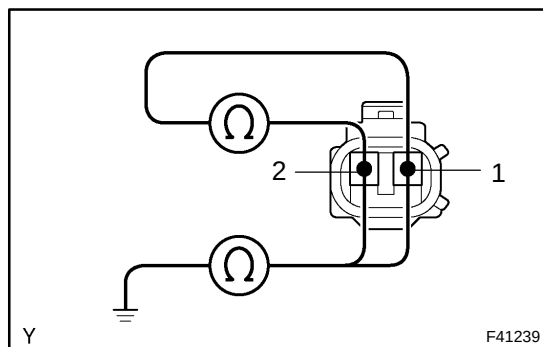
There is tolerance of $\pm 10\%$ in the speedometer indication.

OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY

NG

2 INSPECT FRONT SPEED SENSOR



- Remove the front fender liner.
- Make sure that there is no looseness at the connector lock part and connecting part of the connector.
- Disconnect the speed sensor connector.
- Measure resistance between terminals 1 and 2 of speed sensor connector.
OK: 1.4 - 1.8 kΩ at 20 °C
- Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.
OK: 1 MΩ or higher

A	OK
B	NG (Right front speed sensor)
C	NG (Left front speed sensor)

B → **REPLACE SPEED SENSOR FRONT RH**

C → **REPLACE SPEED SENSOR FRONT LH**

NOTICE:

Check the speed sensor signal last (See page 05-239).

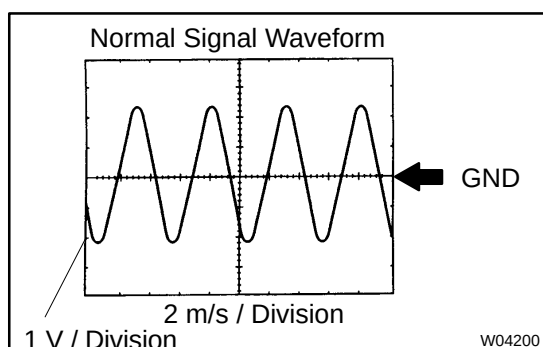
A

3 CHECK HARNESS AND CONNECTOR(SPEED SENSOR - SKID CONTROL ECU ASSY)(See page 01-31)

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4 CHECK SPEED SENSOR AND SENSOR ROTOR SERRATIONS



(REFERENCE) INSPECTION USING OSCILLOSCOPE

- Connect the oscilloscope to the terminals FR+ - FR-, FL+ - FL- of the skid control ECU.
- Drive the vehicle with about 20 km/h (12 mph), and check the signal waveform.

HINT:

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

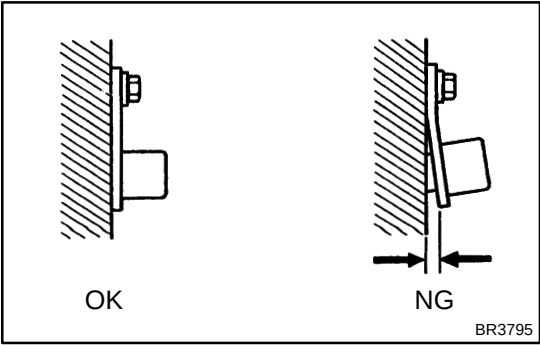
OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY

NG

5

CHECK FRONT SPEED SENSOR INSTALLATION



- (a) Check the speed sensor installation.
The installation bolt is tightened properly and there is no clearance between the sensor and front steering knuckle.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

A	OK
B	NG (Right front speed sensor)
C	NG (Left front speed sensor)

B

REPLACE SPEED SENSOR FRONT RH

C

REPLACE SPEED SENSOR FRONT LH

NOTICE:
Check the speed sensor signal last (See page 05-239).

A

6

CHECK SPEED SENSOR ROTOR AND SENSOR TIP

NG

CLEAN OR REPLACE SPEED SENSOR AND SENSOR ROTOR SERRATIONS

NOTICE:
Check the speed sensor signal last (See page 05-239).

OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY

DTC	C0210/33	RIGHT REAR SPEED SENSOR CIRCUIT
DTC	C0215/34	LEFT REAR SPEED SENSOR CIRCUIT
DTC	C1238/38	FOREIGN MATTER IS ATTACHED ON TIP OF RIGHT REAR SENSOR
DTC	C1239/39	FOREIGN MATTER IS ATTACHED ON TIP OF LEFT REAR SENSOR

CIRCUIT DESCRIPTION

Refer to DTC C0200/31, C0205/32, C1235/35, C1236/36 on page 05-251 .

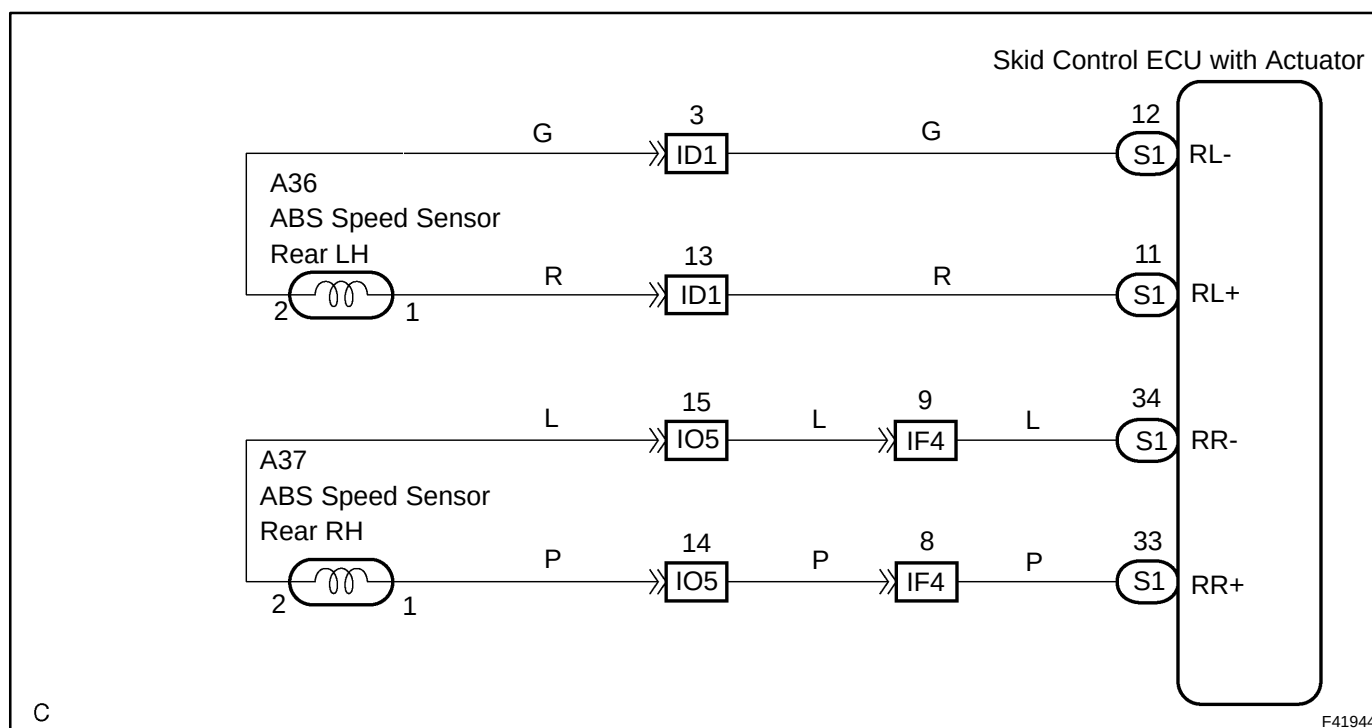
DTC No.	DTC Detecting Condition	Trouble Area
C0210/33 C0215/34	Detection of any of conditions from 1. to 4.: 1. With vehicle speed at 10 km/h or more, sensor signal circuit of faulty wheel is open or short for 15 sec. or longer. 2. Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more. 3. Sensor signal circuit is open for 0.5 sec. or longer.	• Right rear, left rear speed sensor • Each speed sensor circuit • Sensor installation • Sensor rotor
C1238 / 38 C1239 / 39	Continuous noise occurs in to the speed sensor signals with the vehicle speed at 20 km/h (12 mph) or more continues for 5 sec or more.	• Right rear, left rear speed sensor • Speed sensor rotor

HINT:

DTC No. C0210/33, C1238/38 is for the right rear speed sensor.

DTC No. C0215/34, C1239/39 is for the left rear speed sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1 READ VALUE OF HAND-HELD TESTER(SKID CONTROL SENSOR)

- Select the item "WHEEL SPEED RL (RR)" in the DATA LIST and read its value displayed on the hand-held tester.
- 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 from the displayed speed value.

HINT:

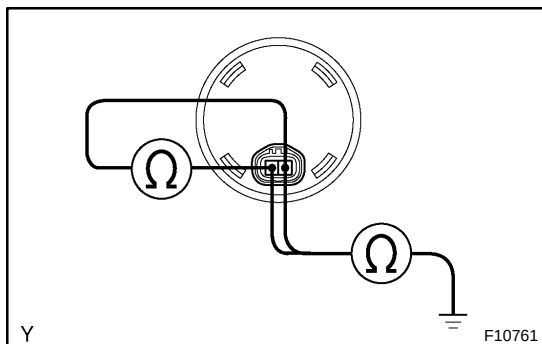
There is tolerance of $\pm 10\%$ in the speedometer indication.

OK

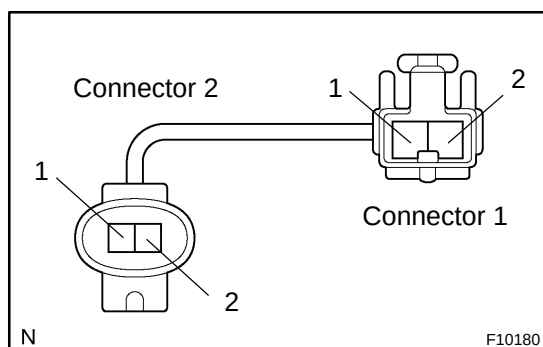
CHECK AND REPLACE BRAKE ACTUATOR ASSY

NG

2 INSPECT SKID CONTROL SENSOR



- Make sure that there is no looseness at the connector lock part and connecting part of the connector.
- Disconnect the sensor connector.
- Measure resistance between terminals 1 and 2 of sensor connector.
OK: 1.3 - 1.6 k Ω at 20°C
- Measure resistance between terminals 1 and 2 of sensor connector and body ground.
OK: 1 M Ω or higher



Skid control Sensor Sub-Wire Harness:

- Remove the seat cushion and seatback.
- Make sure that there is no looseness at the connector lock part and connecting part of the connector.
- Measure resistance between terminal 1 of connector 1 and terminal 2 of connector 2.
- Measure resistance between terminal 2 of connector 1 and terminal 1 of connector 2.
OK: 1 Ω or lower
- Measure resistance between terminals 1 and 2 of speed sensor connector 1 and body ground.
OK: 10 M Ω or higher

NG

REPLACE SKID CONTROL SENSOR OR SUB-WIRE HARNESS

NOTICE:

Check the speed sensor signal last (See page 05-239).

OK

3 CHECK HARNESS AND CONNECTOR(SKID CONTROL SENSOR - BRAKE ACTUATOR ASSEMBLY)(See page 01-31)

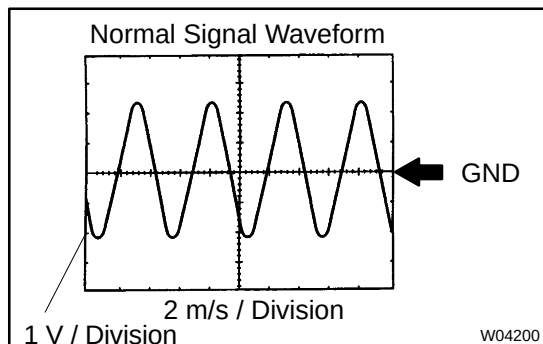
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 INSPECT SENSOR AND SENSOR ROTOR SERRATIONS

(REFERENCE) INSPECTION USING OSCILLOSCOPE



- Connect the oscilloscope to the terminals RR+ - RR- or RL+ - RL- of the skid control ECU.
- Drive the vehicle with about 20 km/h (12 mph), and check the signal waveform.

HINT:

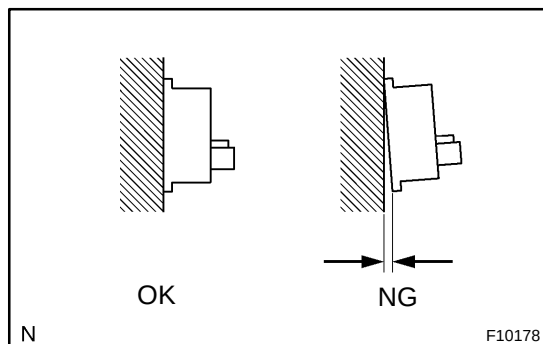
- As the vehicle speed (rpm of the wheels) increases, a cycle of the waveform becomes shorter and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or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

OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY

NG

5 INSPECT SKID CONTROL SENSOR INSTALLATION



- Check the sensor installation.

OK:

There is no clearance between the sensor and rear axle carrier.

NG

REPLACE SKID CONTROL SENSOR

NOTICE:

Check the speed sensor signal last (See page 05-239).

OK

6**INSPECT SPEED SENSOR ROTOR AND SENSOR TIP****OK****CHECK AND REPLACE BRAKE ACTUATOR
ASSY****NOTICE:**Check the speed sensor signal last (See page [05-239](#)).**NG****CLEAN OR REPLACE SPEED SENSOR AND SENSOR ROTOR**

DTC	C0226/21	SFR SOLENOID CIRCUIT
DTC	C0236/22	SFL SOLENOID CIRCUIT
DTC	C0246/23	SRR SOLENOID CIRCUIT
DTC	C0256/24	SRL SOLENOID CIRCUIT

CIRCUIT DESCRIPTION

The ABS solenoid valve goes 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	• Brake actuator • SFRR, SFRH, SFLR or SFLH circuit
C0246/23 C0256/24	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.	• Brake 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.

1	RECONFIRM DTC
---	---------------

```
graph TD
    NO --> END
```

YES

REPLACE BRAKE ACTUATOR ASSY

DTC	C0273/13	OPEN CIRCUIT IN ABS MOTOR RELAY CIRCUIT
------------	-----------------	--

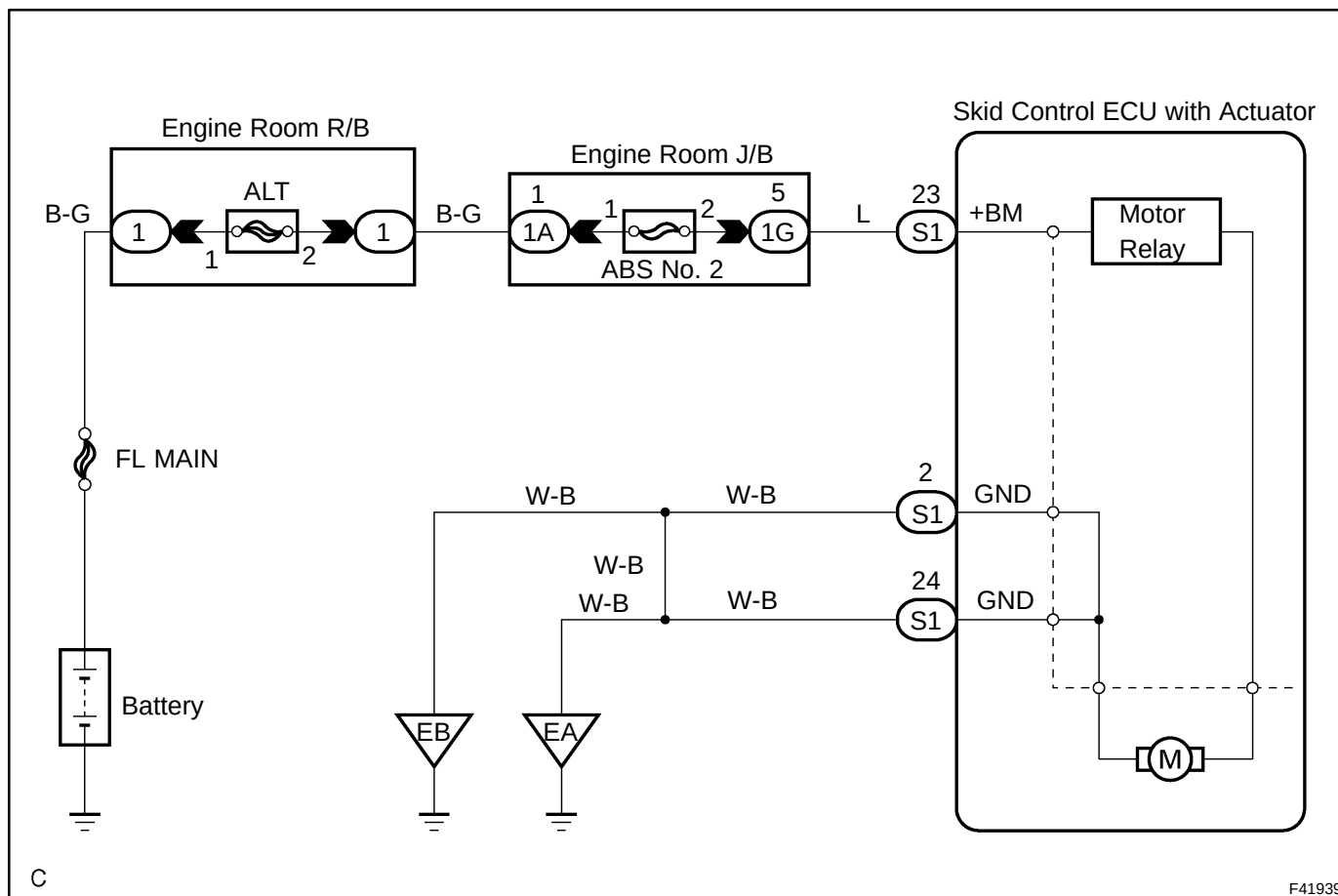
DTC	C0274/14	B+ SHORT CIRCUIT IN ABS MOTOR RELAY CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
C0273/13	Condition 1. or 2. continues for 0.2 sec. or more: 1. ABS ECU terminal IG1 voltage is 9.5 V to 18.5 V, and when motor relay is ON in the midst of initial check or in operation of ABS control.*1 2. Motor relay is ON driving in the midst of initial check or in operation of ABS control, ABS ECU terminal IG1 voltage becomes 9.5 V or less.*2	• Fusible link block • ABS No. 3 fuse • ABS motor relay • ABS motor relay circuit
C0274/14	Condition below continues for 4 sec. or more: When the motor relay is OFF, there is open circuit in MT terminal of ABS ECU.	

WIRING DIAGRAM



C

F41939

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 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Select the item "ABS MOT RELAY" in the ACTIVE TEST and operate the ABS motor relay on the hand-held tester.
- (b) Check the operation sound of the ABS motor relay when operating it with the hand-held tester.

OK:

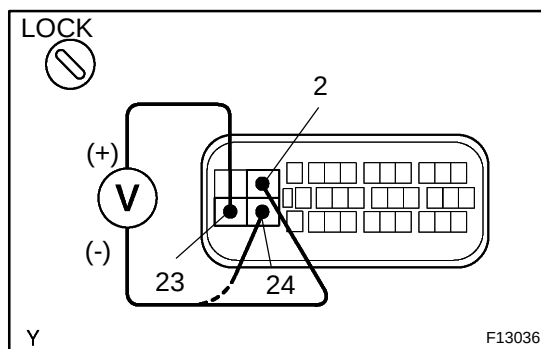
The operation sound of the pump motor should be heard.

NG

CHECK AND REPLACE BRAKE ACTUATOR ASSY

OK

2 CHECK TERMINAL VOLTAGE(+BM AND GND OF SKID CONTROL ECU)



- (a) Disconnect the skid control ECU connector.
- (b) Measure the voltage between terminals 23 and 2 or 24 of the skid control ECU connector.

OK: 11 - 14 V

NG

CHECK AND REPAIR HARNESS AND CONNECTOR

OK

IF THE SAME CODE IS STILL OUTPUT AFTER THE DTC IS DELETED, CHECK THE CONTACT THE CONDITION OF EACH CONNECTION

DTC	C0278/11	OPEN CIRCUIT IN ABS SOLENOID RELAY CIRCUIT
------------	-----------------	---

DTC	C0279/12	SHORT CIRCUIT IN ABS SOLENOID RELAY CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
C0278/11	Condition 1. or 2. continues for 0.2 sec. or more: 1. IG1 terminal voltage of skid control ECU is 9.5 - 18.5 V, and when the solenoid relay is ON.* ¹ 2. With solenoid relay ON driving, when IG terminal of skid control ECU is less than 9.5 V.* ¹	• Fusible link block • ABS No. 2 fuse • ABS solenoid relay • ABS solenoid relay circuit
C0279/12	Immediately after IG switch has been turned ON, when the solenoid relay is OFF.* ²	

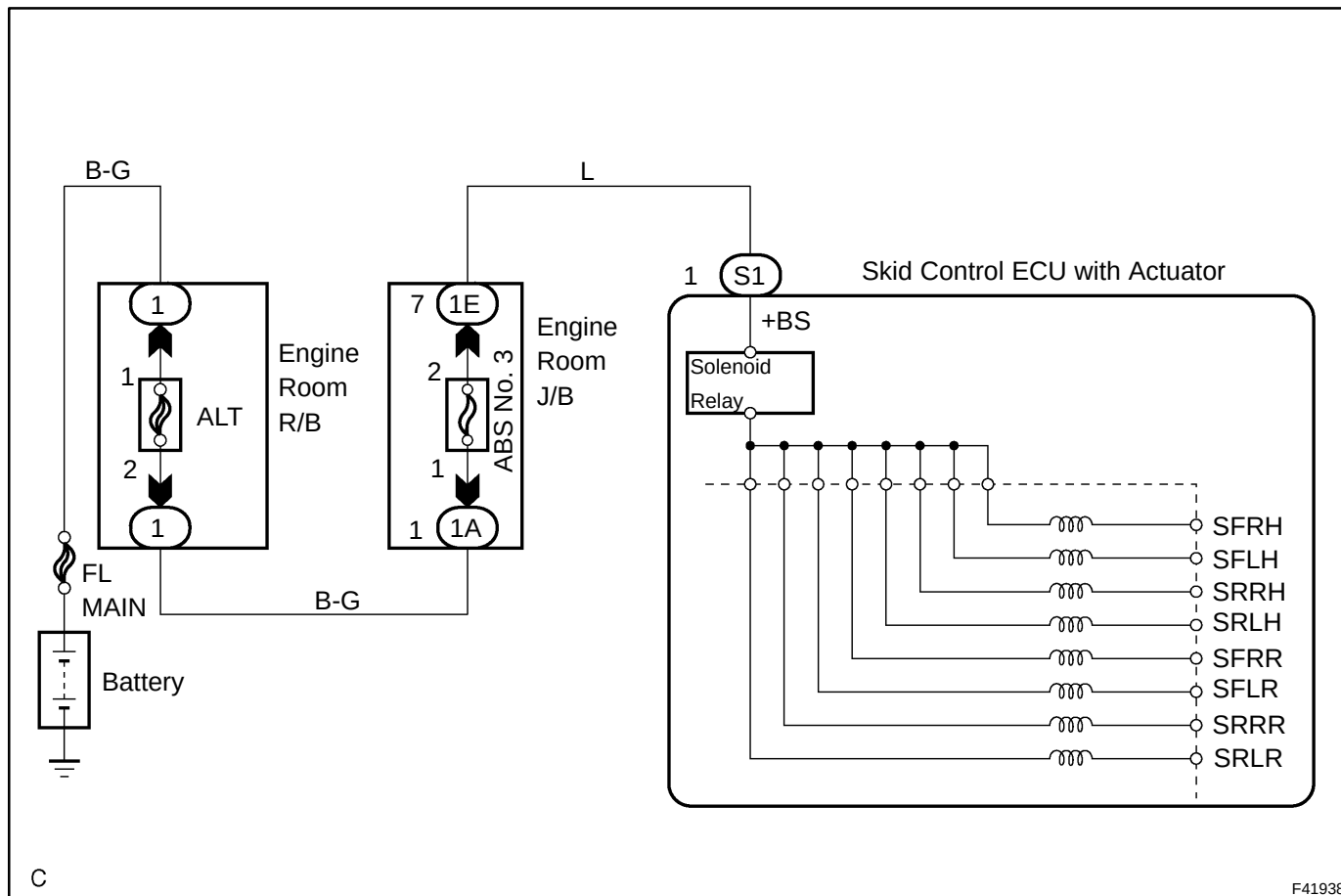
*¹ Solenoid relay contact OFF condition:

All of solenoid terminal voltage is half of IG terminal voltage or less than.

*² Solenoid relay contact ON condition:

All of solenoid terminal voltage is half of IG terminal voltage or more.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER(ABS SOLENOID RELAY OPERATION)

- (a) Select the item "ABS SOL RELAY" in the ACTIVE TEST and operate the ABS solenoid relay on the hand-held tester.
- (b) Check the operation sound of the ABS solenoid relay when operating it with the hand-held tester.

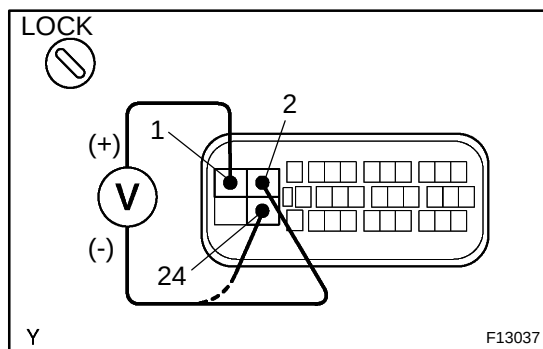
OK: The operation sound of the ABS solenoid should be heard.

OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY

NG

2 CHECK TERMINAL VOLTAGE(+BS AND GND OF SKID CONTROL ECU)



- (a) Disconnect the skid control ECU connector.
- (b) Measure the voltage between terminals 1 and 2 or 24 of the skid control ECU connector.

OK: 11 - 14 V

NG

CHECK AND REPAIR HARNESS AND CONNECTOR

OK

IF THE SAME CODE IS STILL OUTPUT AFTER THE DTC IS DELETED, CHECK THE CONTACT THE CONDITION OF EACH CONNECTION

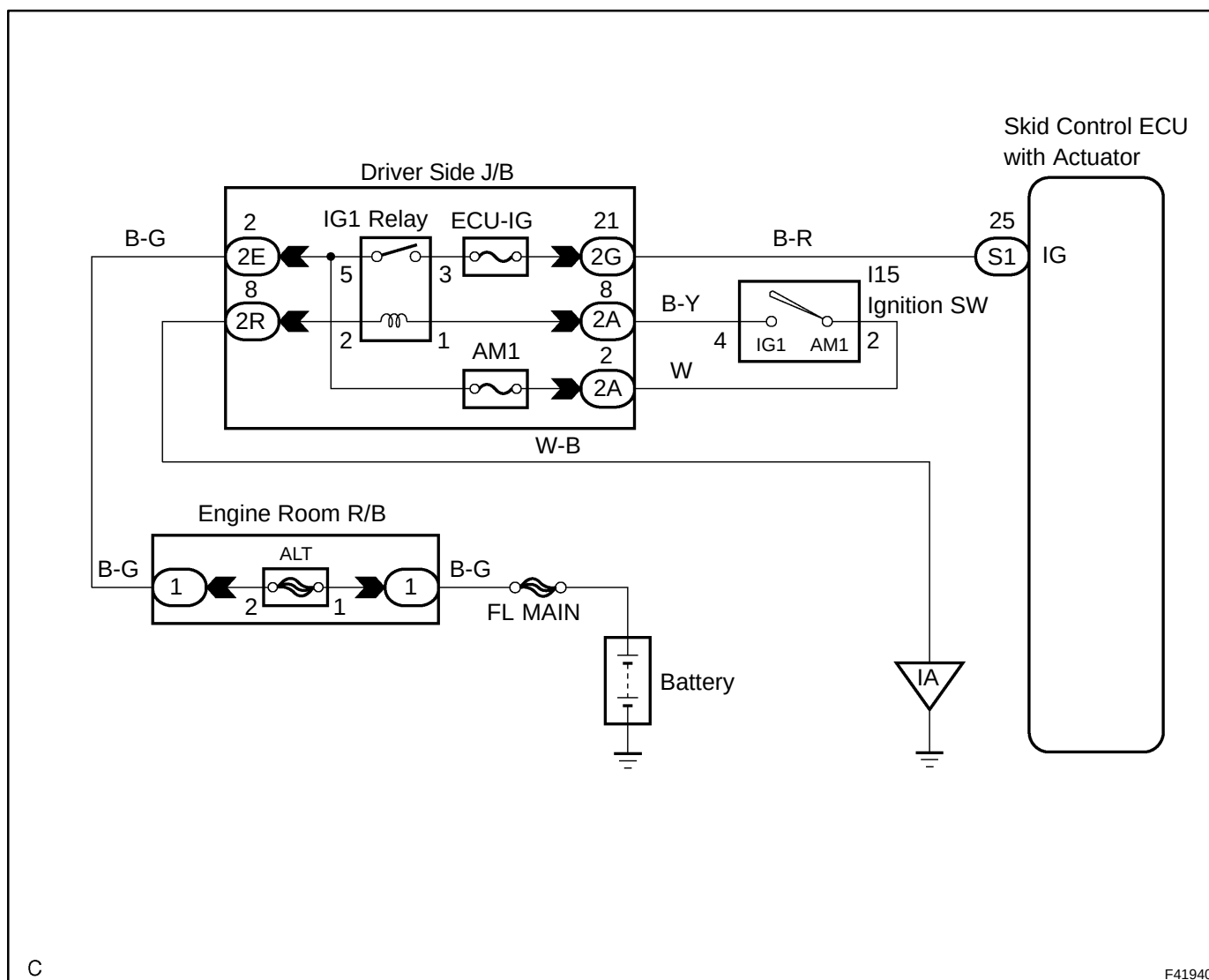
DTC	C1241/41	LOW BATTERY POSITIVE VOLTAGE OR ABNORMALLY HIGH BATTERY POSITIVE VOLTAGE
------------	-----------------	---

CIRCUIT DESCRIPTION

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

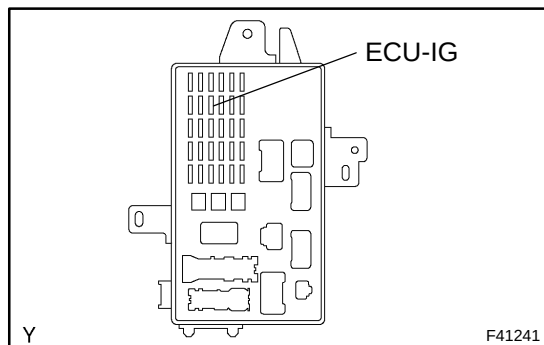
DTC No.	DTC Detection Condition	Trouble Area
C1241/41	Condition 1. or 2. is detected: - Vehicle speed is at 3 km/h (1.9 mph) or more and ECU terminal IG voltage is 9.5 V or less, which continues for 10 sec. or more - When IG terminal voltage is less than 9.5 V, there is open circuit in the motor relay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

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT FUSE(ECU-IG OF DRIVER SIDE J/B)



- (a) Remove the ECU-IG fuse from the driver side J/B.
- (b) Check the continuity of the ECU-IG fuse.

OK: Continuity

NG

REPLACE FUSE

OK

2 INSPECT BATTERY(TERMINAL VOLTAGE)

OK: 10 - 14 V

NG

CHECK AND REPLACE CHARGING SYSTEM

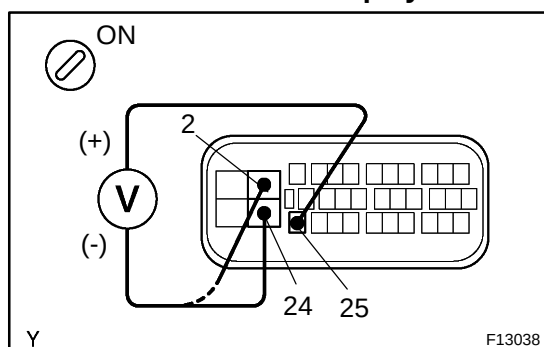
OK

3 CHECK VOLTAGE OF ECU IG POWER SOURCE

In case of using the hand-held tester:

- (a) Select the item "IG VOLTAGE" in the DATA LIST and read its value displayed on the hand-held tester.
- (b) Check the voltage condition output from the ECU and displayed on the hand-held tester.

OK: "Normal" is displayed.



In case of not using the hand-held tester:

- (a) Disconnect the skid control ECU connector.
- (b) Turn the ignition switch ON.
- (c) Measure the voltage between terminals 25 and 2 or 24 of the skid control ECU connector.

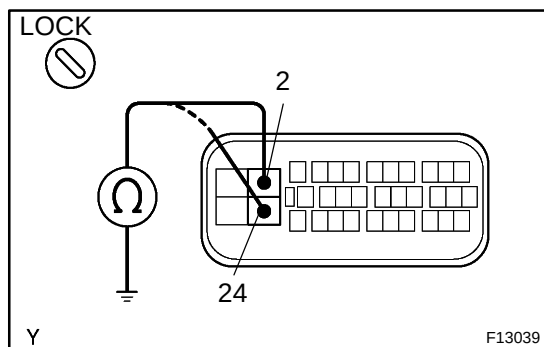
OK: 10 - 14 V

OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY

NG

4 CHECK CONTINUITY(GND OF SKID CONTROL ECU CONNECTOR - BODY GROUND)



- (a) Measure the resistance between terminals 2 and 24 of the skid control ECU connector and the body ground.
OK: 1 Ω or less

NG

CHECK AND REPAIR HARNESS AND CONNECTOR

OK

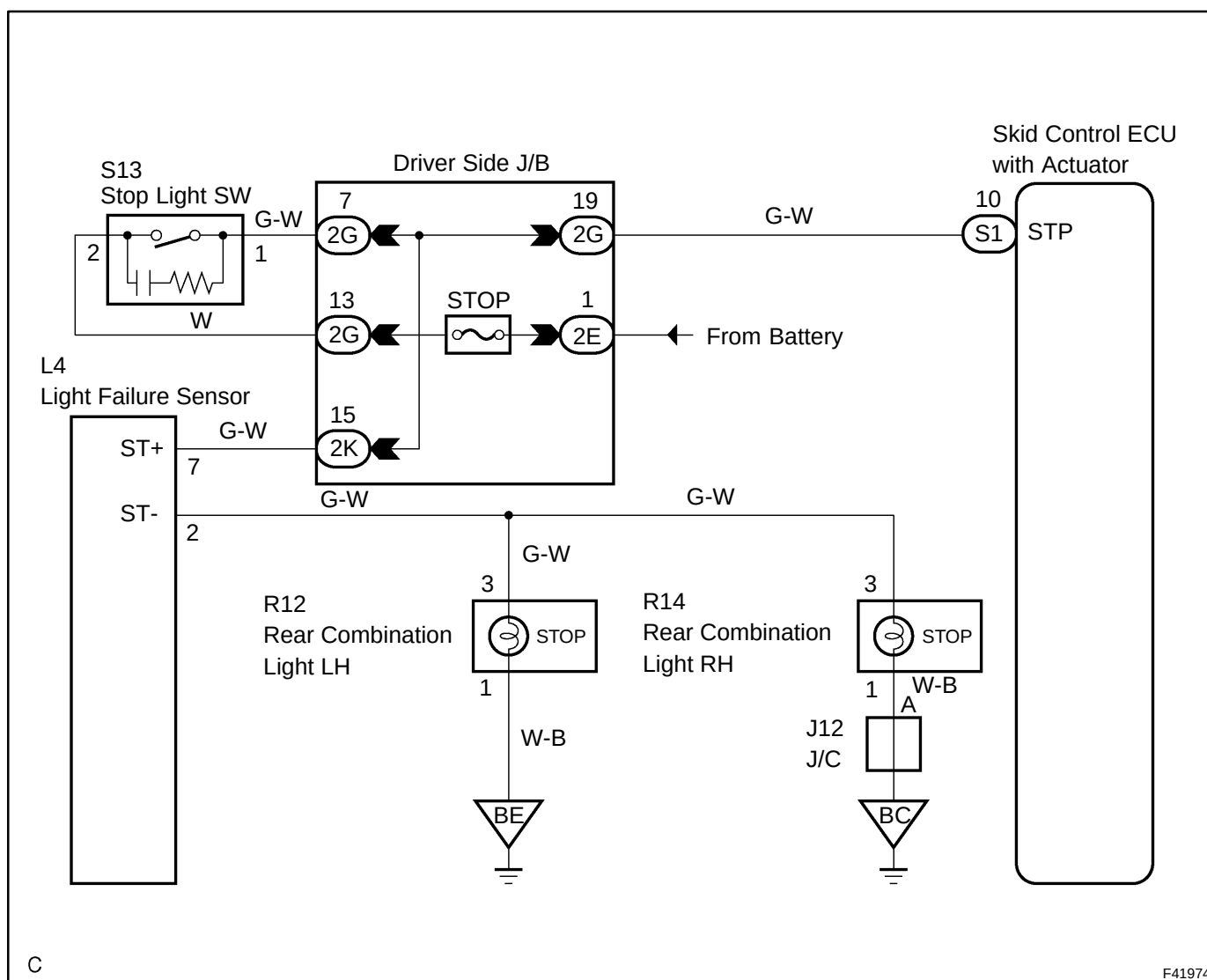
CHECK AND REPLACE BRAKE ACTUATOR ASSY

DTC	C1249/49	OPEN CIRCUIT IN STOP LIGHT SWITCH CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1249/49	ECU terminal IG voltage is 9.5 V to 18.5 V and ABS is in non-operation, the open circuit of the stop light switch circuit continues for 0.3 sec. or more.	• Stop lamp switch harness and connector • Stop light bulb • Stop light switch circuit • Stop lamp switch

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK OPERATION OF STOP LIGHT

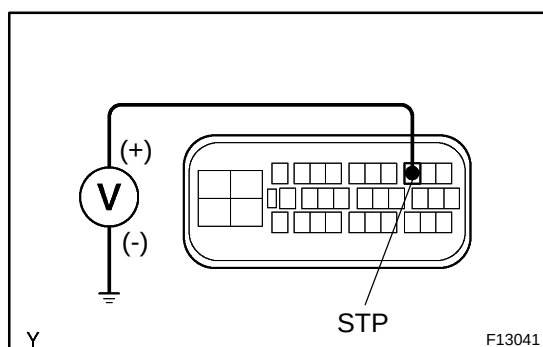
- (a) Check that stop light turns ON when the brake pedal is depressed and turns OFF when the brake pedal is released.

NG

REPAIR STOP LIGHT SWITCH CIRCUIT

OK

2 CHECK TERMINAL VOLTAGE(STP OF SKID CONTROL ECU - BODY GROUND)



- (a) Disconnect the skid control ECU connector.
 (b) Measure the voltage between terminal STP of the skid control ECU connector and the body ground when the brake pedal is depressed.

OK:

Brake pedal is depressed: 10 - 14 V

Brake pedal is released: 0 V

OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY

NG

3 CHECK HARNESS AND CONNECTOR(STOP LAMP SWITCH - SKID CONTROL ECU)(See page 01-31)

NG

CHECK AND REPLACE HARNESS AND CONNECTOR

OK

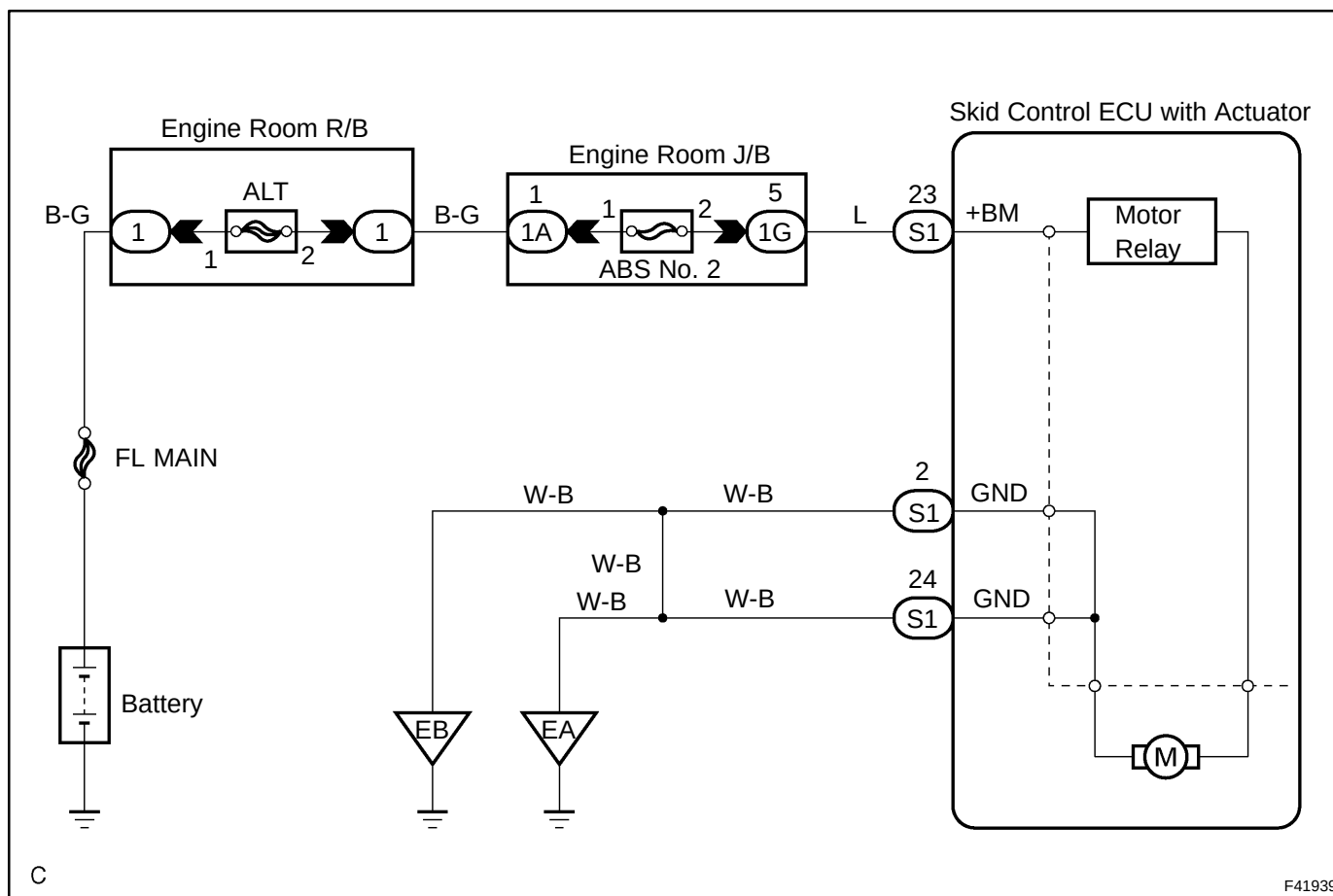
CHECK AND REPLACE BRAKE ACTUATOR ASSY

DTC	C1251/51	PUMP MOTOR IS LOCKED/OPEN CIRCUIT IN PUMP MOTOR GROUND
------------	-----------------	---

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1251/51	Conditions 1., 2. and 3. continue for 0.024 sec.: 1. While checking self diagnosis of ECU, after current flows to motor for 0.3 sec. within 0.054 sec. from turning OFF motor relay. 2. While checking self diagnosis of ECU, after current flows to motor for 1.4 sec. within 0.054 sec. from turning OFF motor relay 3. Motor relay contact turned OFF	ABS pump motor

WIRING DIAGRAM



INSPECTION PROCEDURE

1	PERFORM ACTIVE TEST BY HAND-HELD TESTER(ABS PUMP MOTOR OPERATION)
----------	--

- (a) Select the item "ABS MOT RELAY" in the ACTIVE TEST and operate the ABS motor relay on the hand-held tester.
- (b) Check the operation sound of the ABS pump motor when operating it with the hand-held tester.

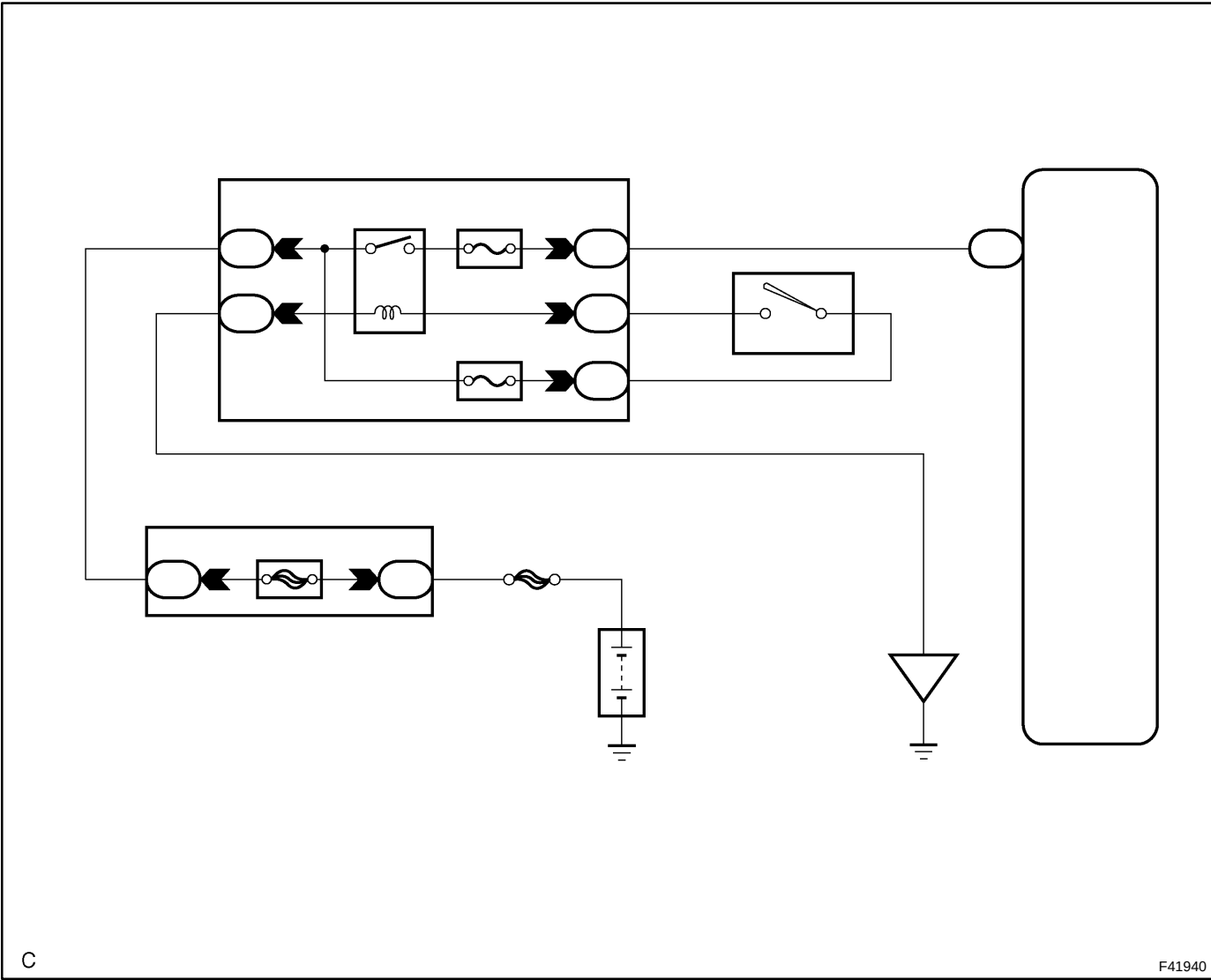
OK:**The operation sound of the ABS pump motor should be heard.****NG****CHECK AND REPLACE BRAKE ACTUATOR ASSY****OK****PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE(See page [05-250](#))**

DTC	AlwaysON	MALFUNCTION IN ABS ECU
-----	----------	------------------------

CIRCUIT DESCRIPTION

DTC No.	DTC Detection 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

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK SKID CONTROL ECU CONNECTOR SECURELY CONNECTED

NG CONNECT CONNECTOR TO ECU

OK

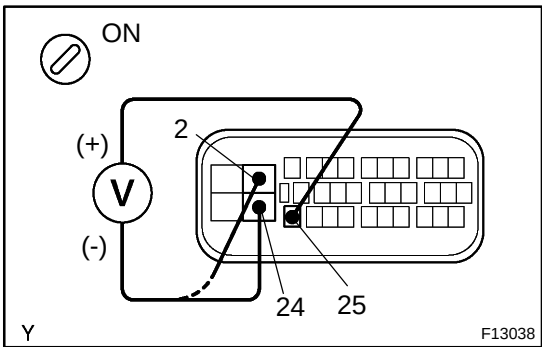
2 RECONFIRM DTC(See page 05-239)

A	Normal Code
B	Malfunction Code

B REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

3 CHECK VOLTAGE OF ECU IG POWER SOURCE



- (a) Disconnect the skid control ECU connector.
 - (b) Turn the ignition switch ON.
 - (c) Measure the voltage between terminals 25 and 2 or 24 of the skid control ECU connector.
- OK: 10 - 14 V**

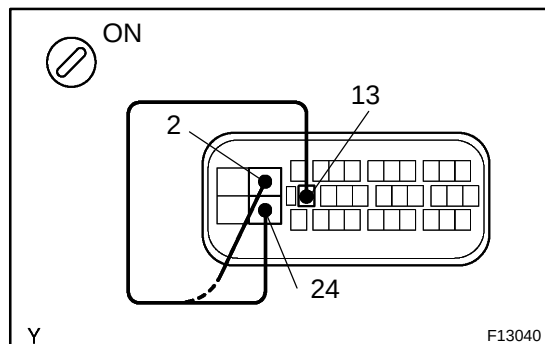
NG CHECK AND REPLACE HARNESS AND CONNECTOR

OK

4 CHECK ABS WARNING LIGHT

In case of using the hand-held tester:

- Select the item "ABS WARN LIGHT" in the ACTIVE TEST and operate the ABS warning light on the hand-held tester.
- Check that "ON" and "OFF" operation of the ABS warning light can be done on the combination meter by the hand-held tester.



In case of not using the hand-held tester:

- Disconnect the skid control ECU connector.
- Using a service wire, connect terminal WA (13) and GND (2 or 24) of the skid control ECU connector.
- Turn the ignition switch ON.

OK: ABS warning light turns off

OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY

NG

CHECK AND REPLACE HARNESS AND CONNECTOR

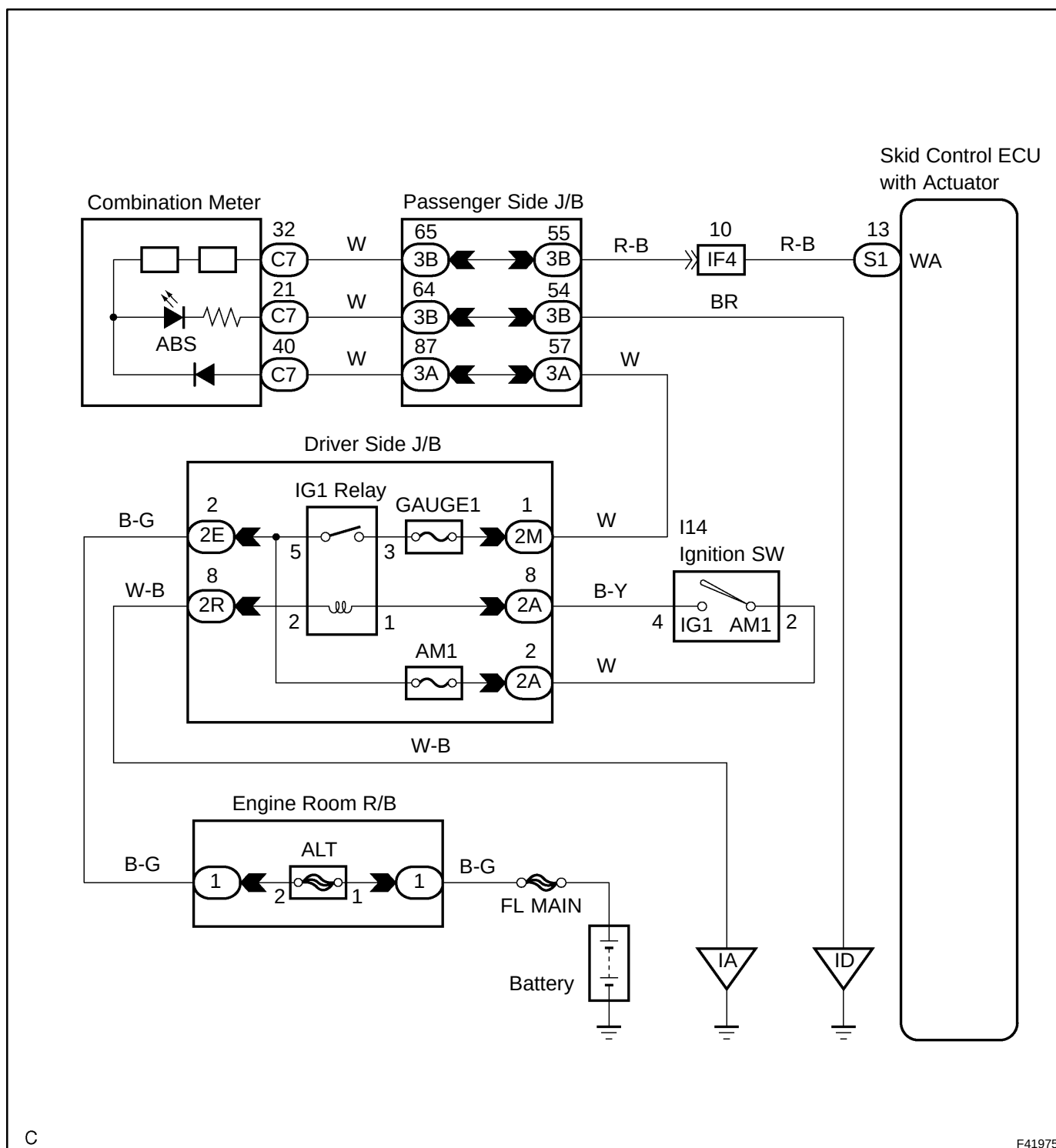
ABS WARNING LIGHT CIRCUIT (REMAINS ON)

CIRCUIT DESCRIPTION

If the ECU detects trouble, it lights the ABS warning light while at the same time prohibiting ABS control. At this time, the ECU records a DTC in memory.

Connect terminals Tc and CG of the DLC3 to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



C

F41975

INSPECTION PROCEDURE

1	RECONFIRM DTC(See page 05-239)
----------	--

A	Normal Code
B	Malfunction Code

B**REPAIR CIRCUIT INDICATED BY OUTPUT CODE****A**

2	CHECK HARNESS AND CONNECTOR(See page 01-31)
----------	---

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

CHECK AND REPLACE BRAKE ACTUATOR ASSY
--

ABS WARNING LIGHT CIRCUIT (DOES NOT LIGHT UP)

CIRCUIT DESCRIPTION

Refer to ABS Warning Light Circuit (Remains ON) on page 05-275 .

WIRING DIAGRAM

Refer to ABS Warning Light Circuit (Remains ON) on page 05-275 .

INSPECTION PROCEDURE

1	PERFORM ACTIVE TEST BY HAND-HELD TESTER(ABS WARNING LIGHT OPERATION)
----------	---

- (a) Select the item "ABS WARN LIGHT" in the ACTIVE TEST and operate the ABS warning light on the hand-held tester.
- (b) Check that "ON" and "OFF" operation of the ABS warning light can be done on the combination meter by the hand-held tester.

OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY

NG

2	INSPECT COMBINATION METER ASSY(ABS WARNING LIGHTY CIRCUIT)
----------	---

NG

REPAIR COMBINATION METER ASSY

OK

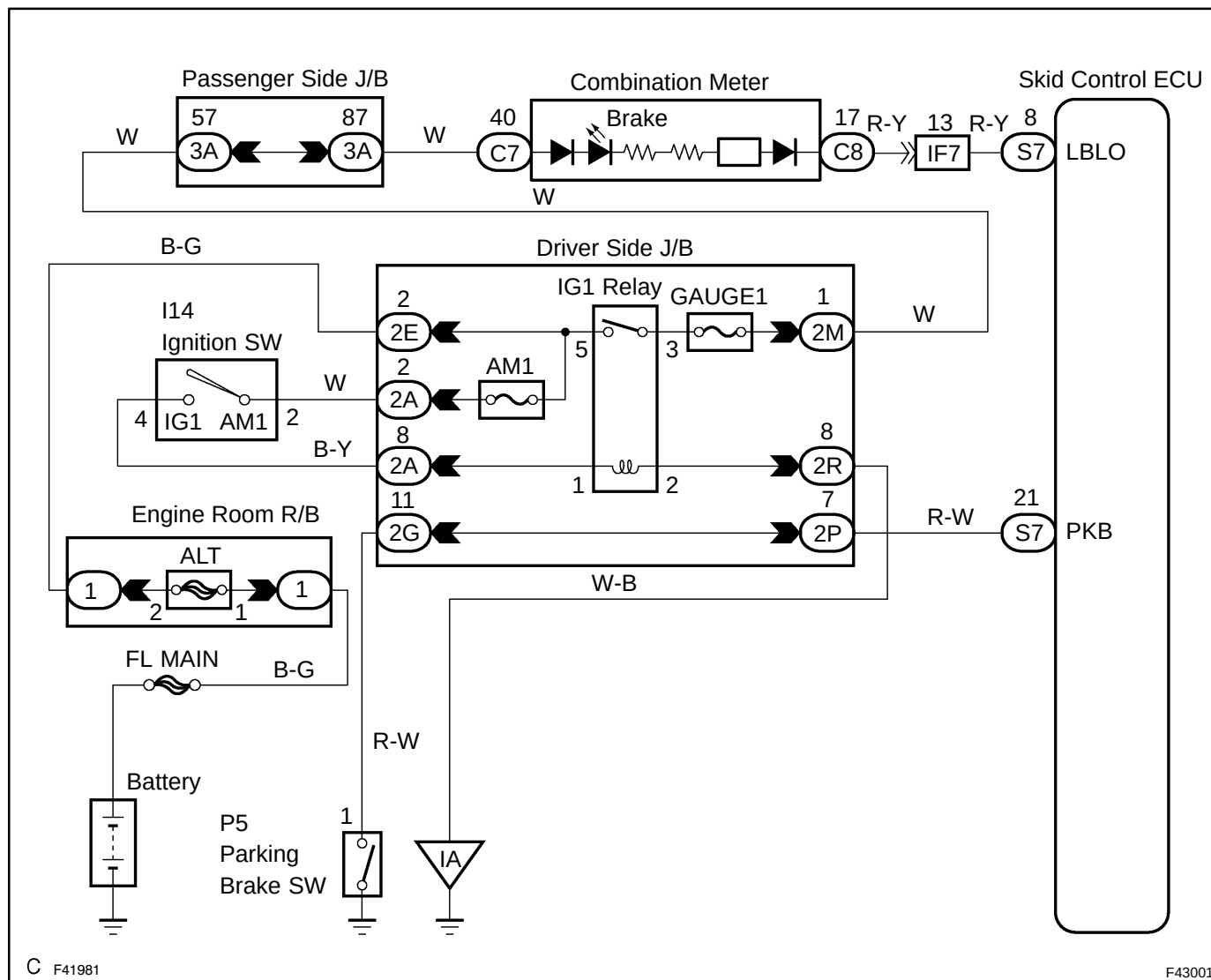
CHECK AND REPAIR HARNESS AND CONNECTOR

BRAKE WARNING LIGHT CIRCUIT

CIRCUIT DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK PARKING BRAKE SWITCH CIRCUIT

NG

REPAIR OR REPLACE PARKING BRAKE SWITCH CIRCUIT

OK

2 CHECK BRAKE FLUID LEVEL WARNING SWITCH CIRCUIT

NG

REPAIR OR REPLACE BRAKE FLUID LEVEL WARNING SWITCH CIRCUIT

OK

3 RECONFIRM DTC(See page 05-239)

A	Normal Code
B	Malfunction Code

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

4 INSPECT COMBINATION METER ASSY(BRAKE WARNING LIGHT CIRCUIT)

NG

REPAIR OR REPLACE COMBINATION METER ASSY

OK

5 CHECK HARNESS AND CONNECTOR(SKID CONTROL ECU - COMBINATION METER)(See page 01-31)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

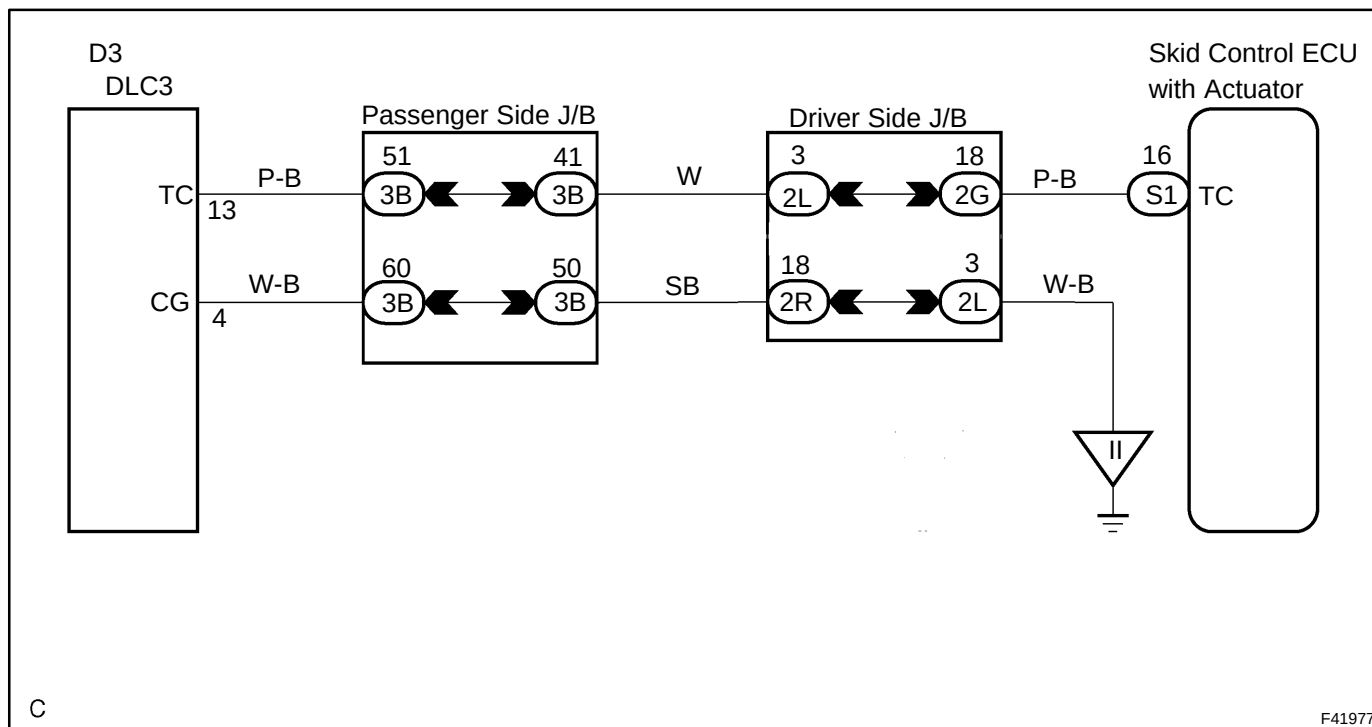
CHECK AND REPLACE BRAKE ACTUATOR ASSY

TC TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

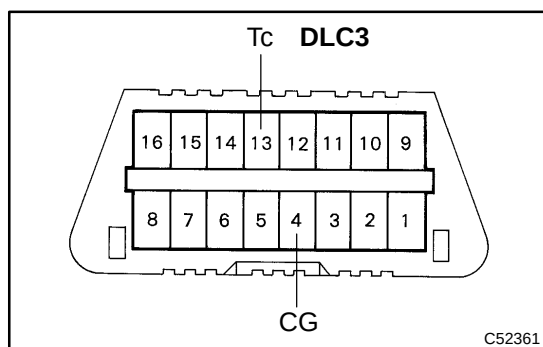
Connecting terminals Tc and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT DLC3



- Turn the ignition switch ON.
- Measure voltage between terminals Tc and CG of DLC3.
OK: : 10 - 14 V

NG

Go to step 3

OK

2	CHECK HARNESS AND CONNECTOR(DLC3 - SKID CONTROL ECU, DLC3 - BODY GROUND)(See page 01-31)
----------	--

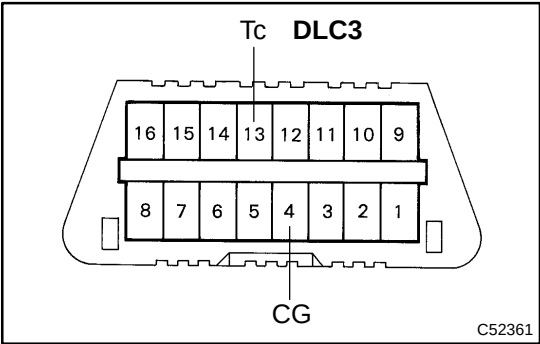
NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
-----------	---

OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY
--

3	CHECK ABS WARNING LIGHT
----------	--------------------------------

SST 09843-18040



- (a) Using SST, connect the terminals Tc and CG of the DLC3.
 - (b) Check the ABS warning light.
- OK: ABS warning light blinks**

OK	END
-----------	------------

NG

CHECK AND REPLACE BRAKE ACTUATOR ASSY
--

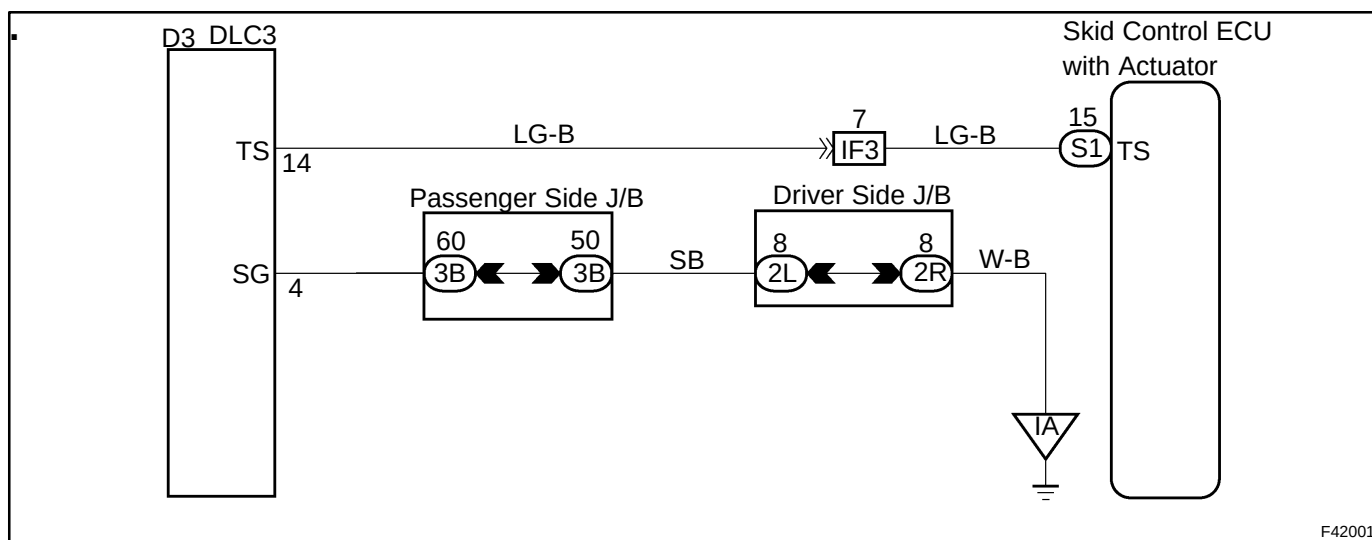
TS TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

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

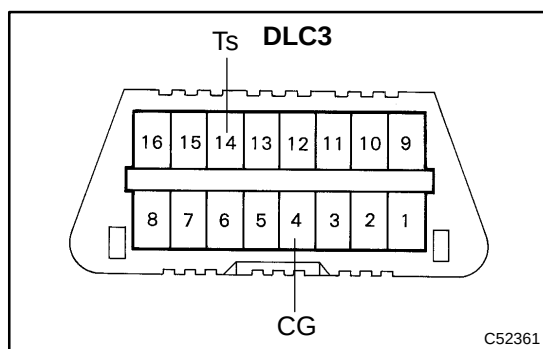
Connecting terminals Ts and CG of the DLC3 starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT DLC3



- Turn the ignition switch ON.
- Measure voltage between terminals Ts and CG of DLC3.
OK: 10 - 14 V

NG

Go to step 3

OK

2 CHECK HARNESS AND CONNECTOR(DLC3 - SKID CONTROL ECU, DLC3 - BODY GROUND)(See page 01-31)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

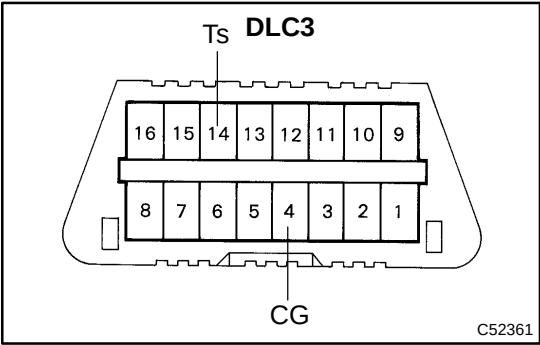
OK

CHECK AND REPLACE BRAKE ACTUATOR ASSY

3

CHECK ABS WARNING LIGHT

SST 09843-18040



- (a) Using SST, connect the terminals Ts and CG of the DLC3.
 - (b) Check the ABS warning light.
- OK: ABS warning light blinks**

OK

END

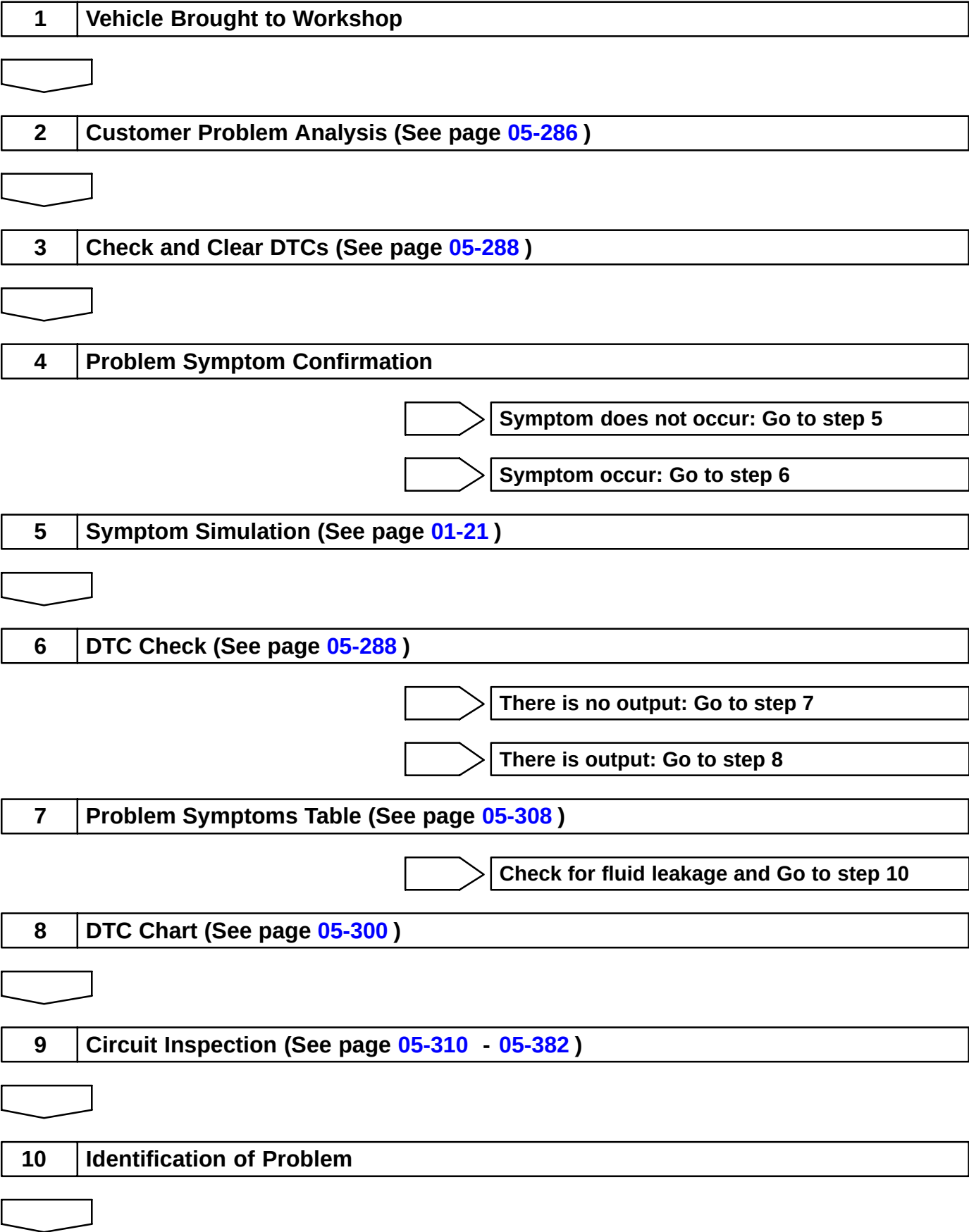
NG

CHECK AND REPLACE BRAKE ACTUATOR ASSY

ABS WITH EBD & BA & TRAC & VSC SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

0529D-03



11	Repair
-----------	---------------



12	Confirmation Test
-----------	--------------------------



End

HINT:

Step 3, 6, 9, 12:

Diagnostic steps permitting the use of the hand-held tester.

Fail safe function:

When a failure occurs in the ABS & BA & TRAC & VSC systems, the ABS warning light, the VSC warning light and the TRAC OFF indicator light turns on and the ABS & BA & TRAC & VSC operations are prohibited. In addition to this, when there failure that disables the EBD operation, the brake warning light also turns on and the EBD operation is prohibited.

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

TRAC & VSC Check Sheet

Inspector's
Name _____

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

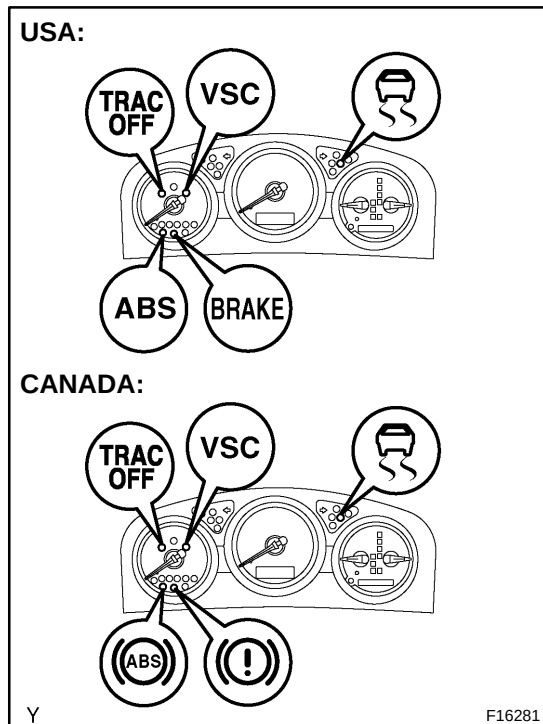
Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

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
	SHIFT POSITION	☐ P,N ☐ 2 ☐ R ☐ 3 ☐ D ☐ 4 ☐ L ☐ FAIL
	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



PRE-CHECK

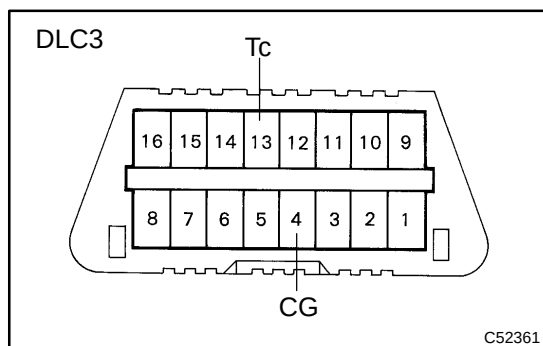
1. DIAGNOSIS SYSTEM

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

HINT:

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

Trouble Area	See page
ABS warning light circuit	05-369
BRAKE warning light circuit	05-370
VSC warning light circuit	05-372
TRAC OFF indicator light circuit	05-372
SLIP indicator light circuit	05-374

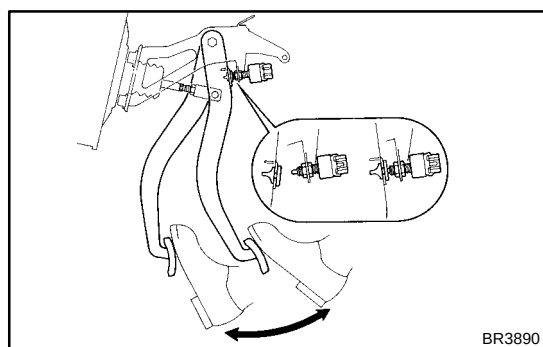
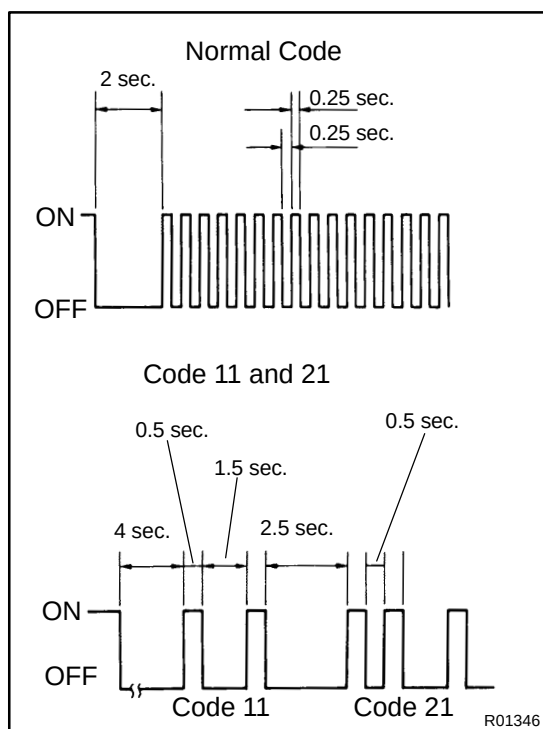


- (b) In case of not using hand-held tester:
Check the DTC.
- (1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843-18040
 - (2) Turn the ignition switch ON.
 - (3) Read the DTC from the ABS warning light or VSC warning light on the combination meter.

HINT:

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

Trouble Area	See page
Tc terminal circuit	05-380
ABS warning light circuit	05-369
VSC warning light circuit	05-372



- As an example, the blinking patterns for the normal code and codes 11 and 21 are shown on the left.
- (4) Codes are explained in the code table on page [05-300](#).
- (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, DTC will be displayed in ascending order.

- (c) 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.

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

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

SST 09843-18040

- (2) Turn the ignition switch ON.
- (3) Clear DTC stored in ECU by depressing the brake pedal 8 or more times within 5 sec.
- (4) Check that the ABS warning light and VSC warning light shows the normal code.
- (5) Remove the SST from the DLC3.

SST 09843-18040

HINT:

Disconnect the battery cable during repairs will not erase the DTC in the ECU.

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

- (1) Turn the ignition switch ON.
- (2) 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	
RESERVOIR SW	Reservoir level switch / ON or OFF	ON : Fluid is below low level on reservoir tank OFF : Fluid is above low level on reservoir tank	
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

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
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		
SRCF (SA1)	TRAC solenoid (SRCF (SA1)) / ON or OFF		
SRCR (SA2)	TRAC solenoid (SRCR (SA2)) / ON or OFF		
SRMF (SMCF, SA3)	TRAC solenoid (SRMF (SMCF, SA3)) / ON or OFF		
SRMR (SMCR, STR)	TRAC solenoid (SRMR (SMCR, STR)) / ON or OFF		
SMF (BA-SOL)	TRAC solenoid (SMF) / ON or OFF		
SMR	TRAC solenoid (SMR) / ON or OFF		
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
MAS CYL PRESS 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
MAS CYL PRESS 2	Master cylinder pressure sensor 2 reading / min.: 0 V, max.: 5 V	When brake pedal is released : 0.3 - 0.9 V	Reading increases when brake pedal is depressed

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
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.

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON.
- 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
SRCF (SA1)	Turns TRAC solenoid SRCF (SA1) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRCR (SA2)	Turns TRAC solenoid SRCF (SA2) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRMF (SMCF, SA3)	Turns TRAC solenoid SRMF (SMCF, SA3) ON / OFF	Operation of solenoid (clicking sound) can be heard

Item	Vehicle Condition / Test Details	Diagnostic Note
SRMR (SMCR, STR)	Turns TRAC solenoid SRMR (SMCR, STR) ON / OFF	Operation of solenoid (clicking sound) can be heard
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
SRCF & SRCR	Turns ABS solenoid SRCF & SRCR ON / OFF	Operation of solenoid (clicking sound) can be heard
SRMF & SRMR	Turns ABS solenoid SRMF & SRMR 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 memorized during ABS and/or VSC operation or at the time of error code detection can be displayed by the hand-held tester.
- (b) Only one record of freeze frame data is stored and the freeze frame data generated during ABS and/or VSC operation are constantly updated. Also, the number of the ignition switch's "ON" after the freeze frame data is stored can be memorized up to 31 and it can be 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.

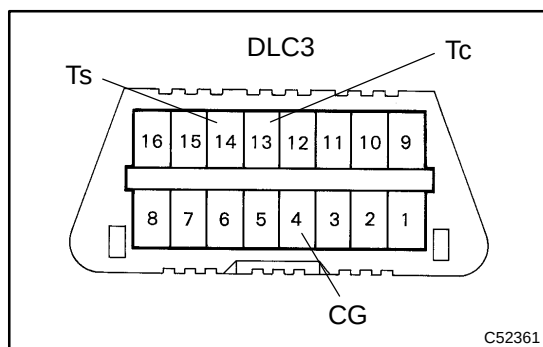
Hand-held tester display	Measurement Item	Reference Value*
VEHICLE SPD	Wheel speed sensor reading	Speed indicated on speedometer
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
# IG ON	Number of operations of ignition switch ON after memorizing freeze frame data	0 - 31
MAS CYL PRESS	Master cylinder pressure sensor reading	Brake pedal release : 0.3 - 0.9 V Brake pedal depress: 0.8 - 4.5 V
MASS PRESS GRADE	Master cylinder pressure sensor change	-30 - 200 MPa/s
SYSTEM	System status	ABS activated: ABS VSC/TRC activated: VSC/TRC BA activated: BA Fail safe mode activated: FAIL SF No system activated: NO SYS
YAW RATE	Yaw rate angle sensor reading	-100 - 100
STEERING ANG	Steering sensor reading	Left turn: Increase Right turn: Drop
THROTTLE	Throttle position sensor reading	Release accelerator pedal: Approx. 0 deg. Depress accelerator pedal: Approx. 90 deg.
G (RIGHT & LEFT)	Right and left G	-1.869 - 1.869
G (BACK & FORTH)	Back and forth G	-1.869 - 1.869
VSC (TRC) OFF SW	VSC OFF switch signal	TRAC OFF SW ON: ON OFF: OFF
SHIFT POSITION	Shift lever position	FAIL P,N R D 4 3 2 L
THROTTLE	Throttle sensor reading	0 - 125 deg.

*: 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.

5. SENSOR SIGNAL CHECK (TEST MODE)

HINT:

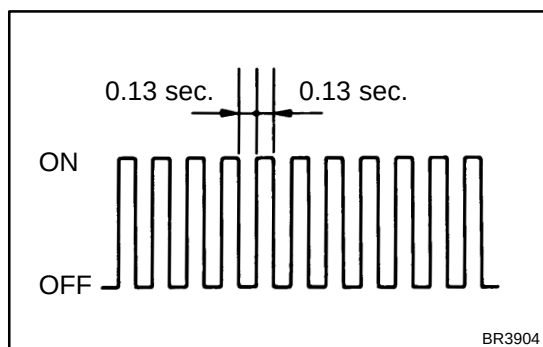
- If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC of sensor check function will be erased.
- During test mode, ECU records all DTC of sensor check function. By performing sensor signal check, the codes are erased if normality is confirmed. The codes left over are the codes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



(a) In case of not using hand-held tester:

Check the ABS sensor signal.

- (1) Turn the ignition switch OFF.
- (2) Using SST, connect terminals Ts and CG of DLC3.
SST 09843-18040
- (3) Start the engine.



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

HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit and Ts terminal circuit (See page [05-368](#) , [05-369](#) and [05-380](#)).

- (5) Keep the vehicle in the stationary condition on a flat place for 1 sec. or more.
- (6) Keeping the vehicle in the stationary condition and the brake pedal in free condition for 1 sec. or more, continue to depress the brake pedal with 147 N (15 kgf, 33 lbf) or more for 1 sec. or more.
- (7) Keeping the vehicle in the stationary condition, depress the brake pedal with 98 N (10 kgf, 22 lbf) or more quickly.

HINT:

Under the above mentioned condition, the ABS warning light turns ON for 3 seconds.

- (8) Drive vehicle straight forward.
When driving the vehicle at the speed faster than 45 km/h (28 mph) for several seconds, check that the ABS warning light comes off.

HINT:

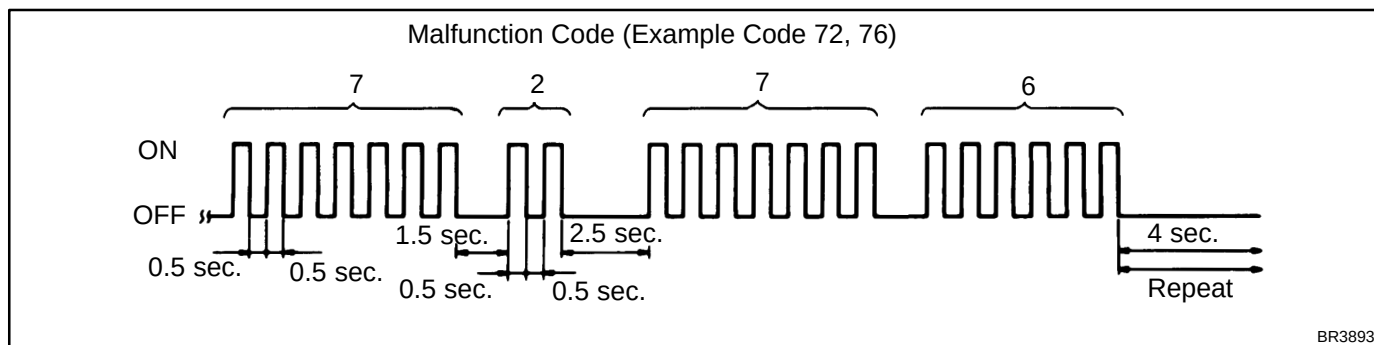
There is a case that the sensor check is not completed if the vehicle has its wheels spun or its steering wheel steered during this check.

- (9) Stop the vehicle.
- (10) Using SST, connect terminals Tc and CG of DLC3.
SST 09843-18040

(11) Read the number of blinks of the ABS warning light.

HINT:

- See the list of DTC (See page 05-300).
- If every sensor is normal, there is a normal code output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.



(12) After performing the check, disconnect terminals Ts and CG, Tc and CG of DLC3, and turn the ignition switch OFF.

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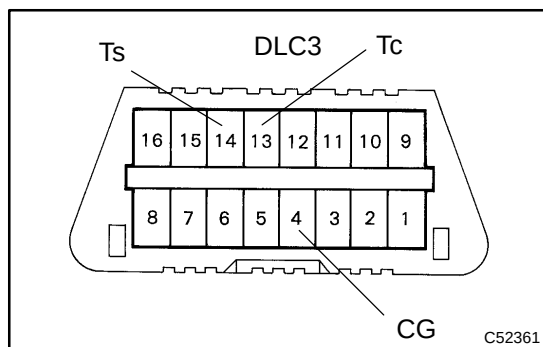
(b) In case of using hand-held tester:

Check the ABS sensor signal.

- (1) Perform step (3) to (9) of the step (a).
- (2) Read the DTC by following the prompts on the tester screen.

HINT:

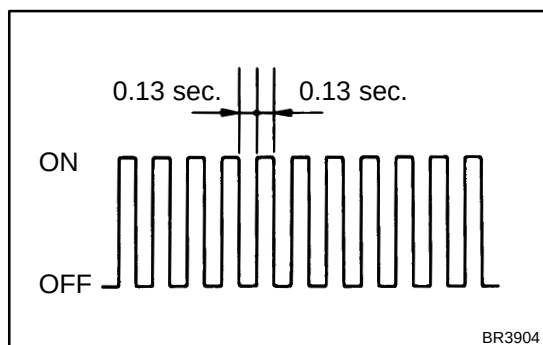
Please refer to the hand-held tester operator's manual for further details.



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

Check the VSC sensor signal.

- (1) Turn the ignition switch OFF.
 - (2) Check that the shift lever position is at P range, turn the steering wheel to the neutral position.
 - (3) Using SST, connect terminals Ts and CG of DLC3.
- SST 09843-18040
- (4) Start the engine.



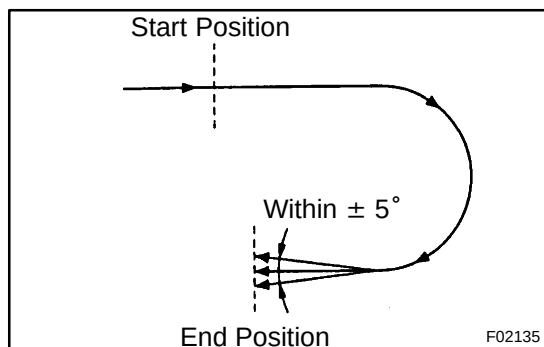
(5) Check that the VSC warning light blinks.

HINT:

If the VSC warning light does not blink, inspect the VSC warning light circuit and Ts terminal circuit (See page 05-372 , and 05-382).

- (6) When a new ECU is installed:
Start the engine and keep the vehicle in the stationary condition on the flat place for 3 sec. or more.
- (7) Check the steering angle sensor.

From the vehicle stationary condition, turn the steering wheel to either left or right to the full lock position, and turn back the steering wheel to the neutral position.



- (8) Check the yaw rate sensor.
Shift the shift lever to the D range and drive the vehicle at the vehicle speed of approx. 5 km/h (3 mph), turn the steering wheel either to left or right 90° or more, and maintain 180° circular drive. Stop the vehicle and shift the shift lever to the P position, check that the skid control buzzer sounds for 3 sec.

HINT:

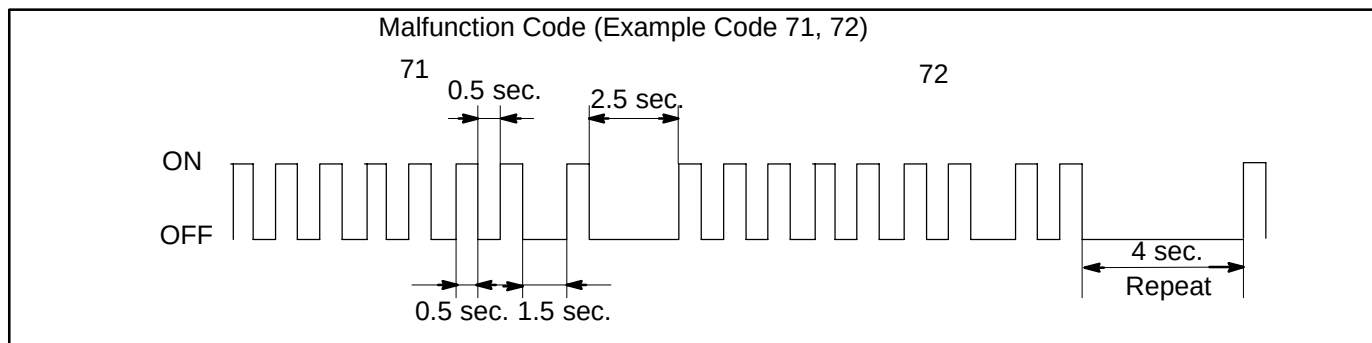
- If the skid control buzzer sounds, the sensor check is completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit (See page 05-378), then perform the sensor check again.
- If the skid control buzzer still won't sound, there is a malfunction in the VSC sensor, so check the DTC.
- Drive the vehicle in a 180° circle. At the end of the turn, the direction of the vehicle should be within 180° ± 5° of its start position.
- Do not spin the wheels.

(9) Using SST, connect terminals Tc and CG of DLC3.
SST 09843-18040

(10) Read the number of blinks of the VSC warning light.

HINT:

- See the list of DTC (See page 05-300).
- If every sensor is normal, there is a normal code output. (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated.)
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.



- (11) After performing the check, disconnect the SST from terminals Ts and CG, Tc and CG of DLC3 and turn the ignition switch OFF.

SST 09843-18040

- (d) In case of using hand-held tester:
Check the VSC sensor signal.
- (1) Perform step (4) to (8) of the step (c).
 - (2) Read the DTC by following the tester screen.

HINT:

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

6. YAW RATE SENSOR ZERO POINT CALIBRATION**HINT:**

- When having replaced the yaw rate sensor, deceleration sensor or the ECU, make sure to perform yaw rate and deceleration sensors' zero point calibration. Be sure to complete this step 6. once it is started.
- During step 6., an unreplaced sensor also requires zero point calibration.

NOTICE:

- **While obtaining the zero point, keep the vehicle in stationary condition and do not tilt, move or shake the vehicle**
- **Be sure to perform this on a level surface (within an inclination of 1 %).**

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

- (1) Shift the shift lever to P range.
- (2) Turn the ignition switch ON in a stationary condition.
- (3) 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 is lit indicating the recorded zero point is erased.

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- (4) 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.

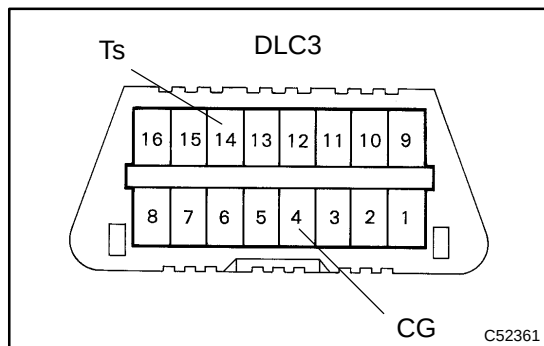
HINT:

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

- (3) Check that the lit TRC OFF indicator light turns off about 15 sec. after the ignition switch is turned ON.

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 is lit for about 15 sec. and then starts blinking. (Normal code)



- (4) After ensuring that the TRC OFF indicator 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 TRC OFF indicator 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 VSC warning light will light up. Therefore, perform step (c) right after step (b).

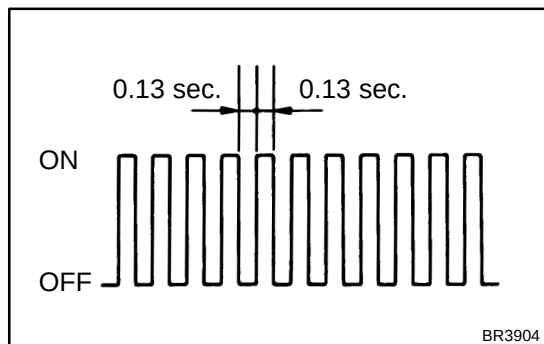
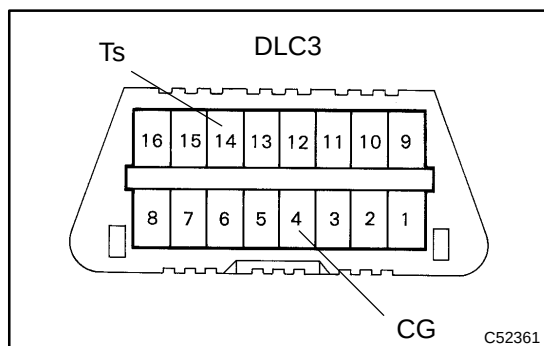
- (1) Using SST, connect the terminals Ts and CG of DLC3.

SST 09843-18040

- (2) Turn the ignition switch ON.

HINT:

Place the vehicle in a stationary condition with the shift lever in P range.



- (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 confirming the blinking of the TRC OFF indicator 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

7. DECELERATION SENSOR OPERATION DIAGNOSIS SYSTEM

CAUTION:

While checking the deceleration sensor operating diagnosis system, ABS does not operate and brake system operates as a conventional brake system.

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 and wire harness.
- 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 (05-310)	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 (05-310)	Left front wheel speed sensor signal malfunction	
C0210 / 33*1 (05-315)	Right rear wheel speed sensor signal malfunction	
C0215 / 34*1 (05-315)	Left rear wheel speed sensor signal malfunction	
C0226 / 21 (05-319)	Open or short circuit in brake actuator solenoid circuit (SFR circuit)	• Brake actuator • SFRH or SFRR circuit
C0236 / 22 (05-319)	Open or short circuit in brake actuator solenoid circuit (SFL circuit)	• Brake actuator • SFLH or SFLR circuit
C0246 / 23 (05-319)	Open or short circuit in brake actuator solenoid circuit (SRR circuit)	• Brake actuator • SRRH or SRRR circuit
C0256 / 24 (05-319)	Open or short circuit in brake actuator solenoid circuit (SRL circuit)	• Brake actuator • SRLH or SRLR circuit
C0273 / 13*1 (05-322)	Open circuit in ABS MTR relay circuit	• Fusible link block • ABS No.3 fuse • ABS MTR relay • ABS MTR relay circuit
C0274 / 14 (05-322)	Short circuit in ABS MTR relay circuit	
C0278 / 11 (05-326)	Open circuit in ABS SOL relay circuit	• ABS SOL relay • ABS SOL relay circuit
C0279 / 12 (05-326)	Short circuit in ABS SOL relay circuit	
C1225 / 25 (05-342)	Open or short circuit in brake actuator solenoid circuit (SM circuit)	• Brake actuator • SM1 or SM2 circuit
C1226 / 26 (05-342)	Open or short circuit in brake actuator solenoid circuit (SRM circuit)	• Brake actuator • SRM1 or SRM2 circuit
C1227 / 27 (05-342)	Open or short circuit in brake actuator solenoid circuit (SRC circuit)	• Brake actuator • SRC1 or SRC2 circuit
C1235 / 35 (05-310)	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 (05-310)	Foreign matter is attached on the tip of the left front sensor	
C1238 / 38 (05-315)	Foreign matter is attached on the tip of the right rear sensor	
C1239 / 39 (05-315)	Foreign matter is attached on the tip of the left rear sensor	

C1241 / 41 (05-350)	Low battery voltage	• Power source harness and connector • Battery • Charging system • Power source circuit
C1243 / 43*1 (05-353)	Malfunction in deceleration sensor (constant output)	• Deceleration sensor • Wire harness for deceleration sensor system
C1244 / 44 (05-348)	Open or short circuit in deceleration sensor circuit	• Deceleration sensor • Deceleration sensor circuit
C1245 / 45*1 (05-353)	Malfunction in deceleration sensor (output error)	• Deceleration sensor • Wire harness for deceleration sensor system
C1246 / 46*2 (05-356)	Malfunction in master cylinder pressure sensor	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
C1249 / 49 (05-359)	Open circuit in stop light switch circuit	• Stop light bulb • Stop light switch circuit
C1251 / 51*1 (05-361)	ABS pump motor is locked Open circuit in pump motor circuit	ABS pump motor
Always ON (05-363)	Malfunction in skid control ECU	• Power source circuit • ABS warning light 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 05-288).
- *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 05-288).

HINT:

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

DTC Chart of VSC:

DTC No. (See Page)	Detection Item	Trouble Area
C1201 / 51 (05-331)	ECM system malfunction	Engine control system
C1202/52 (05-332)	Brake fluid level low open circuit in brake fluid level warning switch circuit	• Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit
C1203 / 53 (05-334)	ECM communication circuit malfunction	• TRC+ or TRC - circuit • ENG+ or ENG - circuit • ECM
C1210 / 36 (05-336)	Zero point calibration of yaw rate sensor undone	• Yaw rate sensor • Yaw rate sensor circuit • P range switch circuit
C1223 / 43 (05-339)	Malfunction in ABS control system	ABS control system
C1224 / 44 (05-340)	Open or short circuit in NE signal circuit	• NEO circuit • ECM • Skid control ECU
C1231 / 31 (05-345)	Malfunction in steering angle sensor	• Steering angle sensor • Steering angle sensor circuit • +BI circuit
C1232 / 32 (05-348)	Malfunction in deceleration sensor	• Deceleration sensor • Deceleration sensor circuit
C1233 / 33 (05-336)	Open or short circuit in yaw rate sensor circuit	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34 (05-336)	Malfunction in yaw rate sensor	• Yaw rate sensor • Yaw rate sensor circuit
C1335 / 35 (05-345)	Open circuit in steering angle sensor	• Steering angle sensor • Steering angle sensor circuit
C1336 / 39 (05-353)	Zero point calibration of deceleration sensor undone	• Deceleration sensor • Deceleration sensor circuit • Zero point calibration not done
C1360 / 61 (05-356)	Malfunction in comparative master cylinder pressure sensor	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
Always ON (05-366)	Malfunction of skid control ECU	• Battery • IC regulator • Power source circuit • Skid control ECU

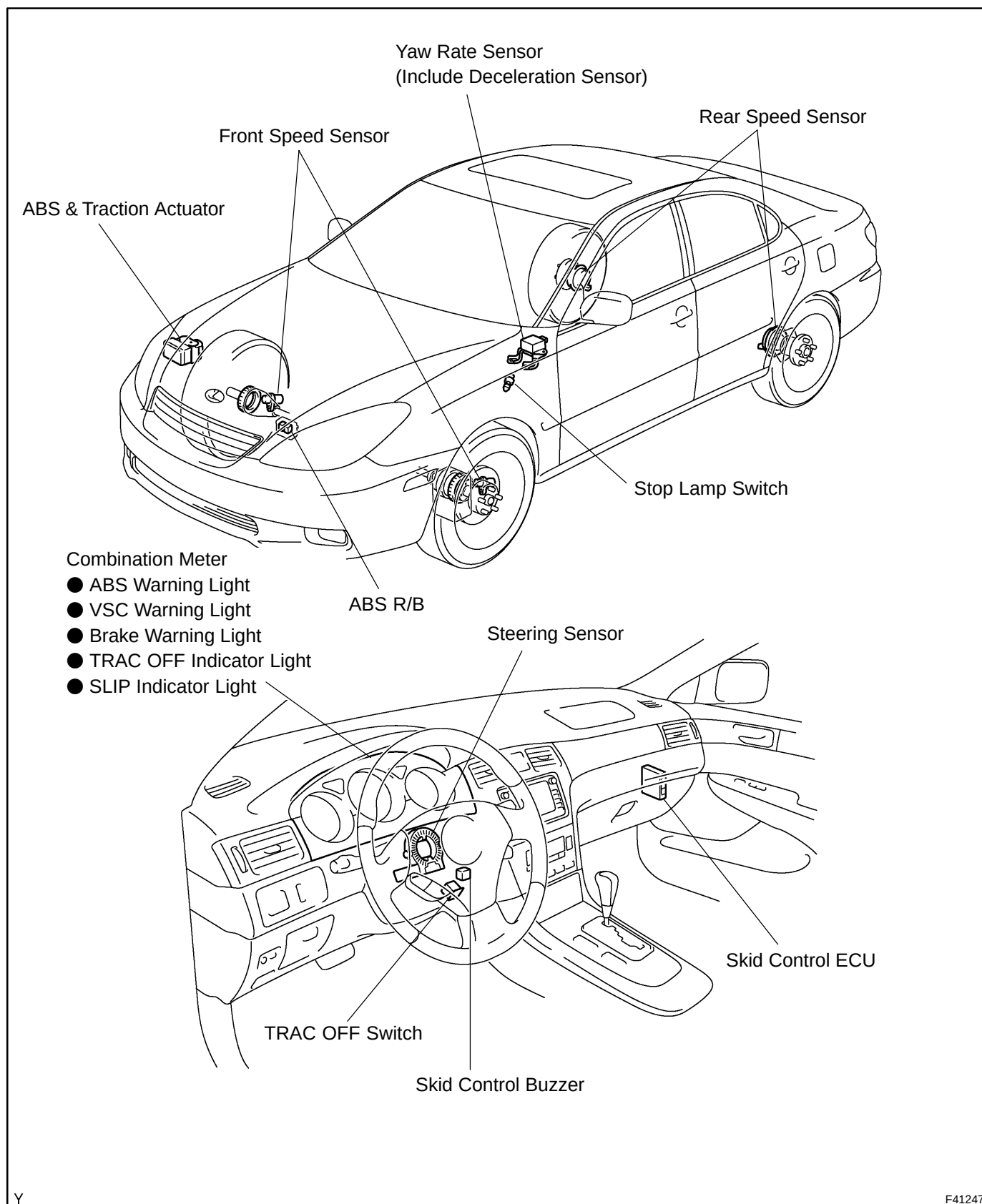
HINT:

There is a case that hand-held tester cannot be used when ABS and/or VSC warning light is always on.

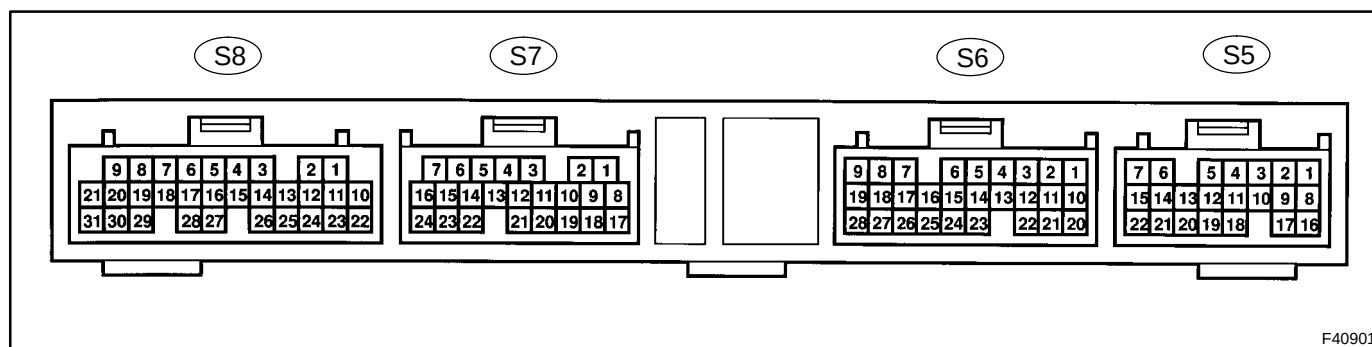
DTC of sensor check function:

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

LOCATION



TERMINALS OF ECU



F40901

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SRLR (S5 - 1) - GND (S5 - 15, 22, S8 - 2, 3)	LG-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SM1- (S5 - 2) - GND (S5 - 15, 22, S8 - 2, 3)	Y-G ↔ W-B	IG switch OFF	Below 1.0
SM1+ (S5 - 3) - GND (S5 - 15, 22, S8 - 2, 3)	L-R ↔ W-B	IG switch ON, ABS warning light OFF	Below 1.0
SM2- (S5 - 4) - GND (S5 - 15, 22, S8 - 2, 3)	B-L ↔ W-B	IG switch OFF	Below 1.0
SM2+ (S5 - 5) - GND (S5 - 15, 22, S8 - 2, 3)	B-W ↔ W-B	IG switch ON, ABS warning light OFF	Below 1.0
AST (S5 - 6) - GND (S5 - 15, 22, S8 - 2, 3)	R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRLH (S5 - 7) - GND (S5 - 15, 22, S8 - 2, 3)	G-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFRR (S5 - 8) - GND (S5 - 15, 22, S8 - 2, 3)	W-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
PMC (S5 - 10) - E2 (S5 - 19)	B ↔ W	IG switch ON, stop light switch OFF	0.3 - 0.9
E3 (S5 - 12) - GND (S5 - 15, 22, S8 - 2, 3)	R ↔ W-B	IG switch OFF	Continuity
FSS (S5 - 13) - GND (S5 - 15, 22, S8 - 2, 3)	Shielded ↔ W-B	IG switch OFF	Continuity
MT (S5 - 14) - GND (S5 - 15, 22, S8 - 2, 3)	R-W ↔ W-B	IG switch ON (Motor relay is OFF)	Below 1.5
SFRH (S5 - 16) - GND (S5 - 15, 22, S8 - 2, 3)	R-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
PMC2 (S5 - 18) - E3 (S5 - 12)	W ↔ R	IG switch ON, stop light switch OFF	0.3 - 0.9
E2 (S5 - 19) - GND (S5 - 15, 22, S8 - 2, 3)	W ↔ W-B	IG switch OFF	Continuity
VCM (S5 - 20) - GND (S5 - 15, 22, S8 - 2, 3)	R ↔ W-B	IG switch ON	4.5 - 5.5
VCM2 (S5 - 21) - GND (S5 - 15, 22, S8 - 2, 3)	B ↔ W-B	IG switch ON	4.5 - 5.5
VYS (S6 - 1) - GND (S5 - 15, 22, S8 - 2, 3)	R ↔ W-B	IG switch ON	4.5 - 5.5
YSS (S6 - 3) - GND (S5 - 15, 22, S8 - 2, 3)	Shielded ↔ W-B	IG switch OFF	Continuity
TRIG (S6 - 6) - GND (S5 - 15, 22, S8 - 2, 3)	Y-R ↔ W-B	IG switch ON	Above 3.5

CSW (S6 - 7) - GND (S5 - 15, 22, S8 - 2, 3)	LG ↔ W-B	IG switch ON, TRC OFF switch OFF	10 - 14
P (S6 - 9) - GND (S5 - 15, 22, S8 - 2, 3)	G-W ↔ W-B	IG switch ON, shift lever is in P range	8 - 14
		IG switch ON, shift lever is in other than P range	Below 1.5
YAW2 (S6 - 10) - GND (S5 - 15, 22, S8 - 2, 3)	W ↔ W-B	IG switch ON, yawrate sensor is stationary	2 - 3
GSS (S6 - 11) - GND (S5 - 15, 22, S8 - 2, 3)	Shielded ↔ W-B	IG switch OFF	Continuity
YD (S6 - 16) - GND (S5 - 15, 22, S8 - 2, 3)	G ↔ W-B	IG switch ON, VSC warning light OFF	Above 4.5
SS1+ (S6 - 18) - SS1- (S6 - 27)	P ↔ V	Engine idling, slowly turn steering wheel	Pulse generation
GYAW (S6 - 20) - GND (S5 - 15, 22, S8 - 2, 3)	B ↔ W-B	IG switch OFF	Continuity
GL1 (S6 - 21) - GND (S5 - 15, 22, S8 - 2, 3)	Y ↔ W-B	IG switch ON, vehicle is stopped	0.5 - 4.5
GL2 (S6 - 22) - GND (S5 - 15, 22, S8 - 2, 3)	L ↔ W-B	IG switch ON, vehicle is stopped	0.5 - 4.5
NEO (S6 - 26) - GND (S5 - 15, 22, S8 - 2, 3)	BR-W ↔ W-B	Engine idling	Pulse generation
D/G (S6 - 28) - GND (S5 - 15, 22, S8 - 2, 3)	W ↔ W-B	IG switch ON	10 - 14
WA (S7 - 1) - GND (S5 - 15, 22, S8 - 2, 3)	R-B ↔ W-B	IG switch ON, ABS warning light ON	4 - 8
		IG switch ON, ABS warning light OFF	Below 2.0
SP1 (S7 - 2) - GND (S5 - 15, 22, S8 - 2, 3)	L-O ↔ W-B	Vehicle drives at about 20 km/h (12 mph)	Pulse generation
STP (S7 - 3) - GND (S5 - 15, 22, S8 - 2, 3)	G-W ↔ W-B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 - 14
WT (S7 - 4) - GND (S5 - 15, 22, S8 - 2, 3)	L ↔ W-B	IG switch ON, TRAC OFF indicator light ON	Below 2.0
		IG switch ON, TRAC OFF indicator light OFF	10 - 14
BZ (S7 - 5) - GND (S5 - 15, 22, S8 - 2, 3)	P-B ↔ W-B	IG switch ON, skid control buzzer is sounded	Below 1.0 ↔ 10 - 14
		IG switch ON, skid control buzzer is not sounded	10 - 14
IND (S7 - 6) - GND (S5 - 15, 22, S8 - 2, 3)	LG ↔ W-B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 - 14
IG1 (S7 - 7) - GND (S5 - 15, 22, S8 - 2, 3)	B-R ↔ W-B	IG switch ON	10 - 14
LBLO (S7 - 8) - GND (S5 - 15, 22, S8 - 2, 3)	R-W ↔ W-B	IG switch ON, fluid in master cylinder reservoir above MIN level and parking brake switch is OFF (Brake warning light is OFF)	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+ (S7 - 9) - ENG- (S7 - 18)	W ↔ B	IG switch ON	Pulse generation
Ts (S7 - 10) - GND (S5 - 15, 22, S8 - 2, 3)	LG-B ↔ W-B	IG switch ON	10 - 14
TRC+ (S7 - 11) - TRC- (S7 - 20)	G ↔ L	IG switch ON	Pulse generation
FRO (S7 - 13) - GND (S5 - 15, 22, S8 - 2, 3)	GR-R ↔ W-B	Vehicle drives at about 20 km/h (12 mph)	Pulse generation

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

VSCW (S7 - 14) - GND (S5 - 15, 22, S8 - 2, 3)	R-L ↔ W-B	IG switch ON, VSC warning light ON	Below 2.0
		IG switch ON, VSC warning light OFF	10 - 14
RR+ (S7 - 16) - RR- (S7 - 15)	P ↔ L	IG switch ON, slowly turn right rear wheel	Pulse generation
Tc (S7 - 19) - GND (S5 - 15, 22, S8 - 2, 3)	P-B ↔ W-B	IG switch ON	10 - 14
PKB (S7 - 21) - GND (S5 - 15, 22, S8 - 2, 3)	P ↔ L	IG switch ON, parking brake switch ON	Below 1.5
		IG switch ON, parking brake switch OFF	10 - 14
RL+ (S7 - 22) - RL- (S7 - 23)	R ↔ G	IG switch ON, slowly turn left rear wheel	Pulse generation
+BO (S7 - 24) - GND (S5 - 15, 22, S8 - 2, 3)	P ↔ W-B	Always	10 - 14
R+ (S8 - 1) - GND (S5 - 15, 22, S8 - 2, 3)	GR-R ↔ W-B	IG switch ON	10 - 14
SRM1 (S8 - 4) - GND (S5 - 15, 22, S8 - 2, 3)	Y-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRC2 (S8 - 5) - GND (S5 - 15, 22, S8 - 2, 3)	B-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFLH (S8 - 6) - GND (S5 - 15, 22, S8 - 2, 3)	L-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFLR (S8 - 7) - GND (S5 - 15, 22, S8 - 2, 3)	W-L ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRRH (S8 - 8) - GND (S5 - 15, 22, S8 - 2, 3)	W-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRRR (S8 - 9) - GND (S5 - 15, 22, S8 - 2, 3)	R-G ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SR (S8 - 10) - R+ (S10 - 1)	GR ↔ L-B	IG switch ON, ABS warning light OFF	Below 1.0
FR+ (S8 - 13) - FR- (S8 - 12)	W ↔ B	IG switch ON, slowly turn right front wheel	Pulse generation
SRM2 (S8 - 21) - GND (S5 - 15, 22, S8 - 2, 3)	Y-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
+BI (S8 - 22) - GND (S5 - 15, 22, S8 - 2, 3)	W-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
MR (S8 - 23) - GND (S5 - 15, 22, S8 - 2, 3)	W-B ↔ W-B	IG switch ON, ABS motor stops	10 - 14
MRF (S8 - 24) - GND (S5 - 15, 22, S8 - 2, 3)	GR-L ↔ W-B	IG switch ON	Below 1.0
LBL- (S8 - 25) - GND (S5 - 15, 22, S8 - 2, 3)	R-W ↔ W-B	IG switch ON, fluid in master cylinder reservoir above MIN level	4 - 8
FL+ (S8 - 28) - FL- (S8 - 27)	BR ↔ Y	IG switch ON, slowly turn left front wheel	Pulse generation
SRC1 (S8 - 31) - GND (S5 - 15, 22, S8 - 2, 3)	B-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14

PROBLEM SYMPTOMS TABLE

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

NOTICE:

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

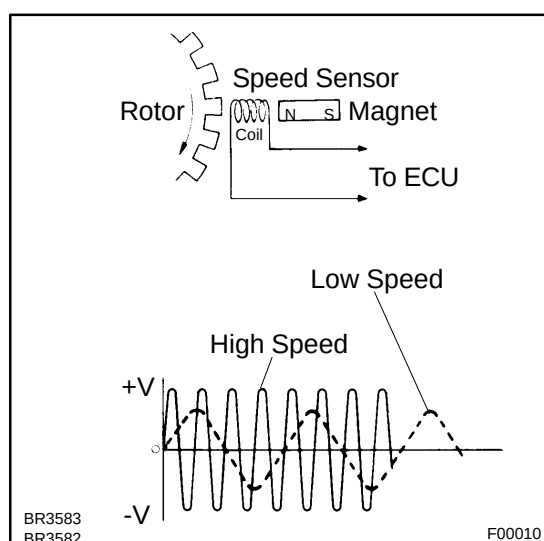
Symptom	Suspect Area	See page
ABS does not operate BA does not operate EBD does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. IG power source circuit and ground circuit 3. Speed sensor circuit 4. Check the ABS & Traction actuator with a hand-held tester. If abnormal, check the hydraulic circuit for leakage.	05-288 05-350 05-310 05-315 32-43
ABS does not operate efficiently BA does not operate efficiently EBD 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. IG power source circuit and ground circuit 3. Speed sensor circuit 4. Stop light switch circuit 5. Check the ABS & Traction actuator with a hand-held tester. If abnormal, check the hydraulic circuit for leakage.	05-288 05-350 05-310 05-315 05-359 32-43
ABS warning light abnormal	1. ABS warning light circuit 2. Skid control ECU	05-369 05-363
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. 2. Tc terminal circuit	05-288 05-380
Sensor signal check cannot be done	1. Ts terminal circuit 2. Skid control ECU	05-382 05-363
TRAC 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 and ground circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit	05-288 05-350 - 05-310 05-315

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

Symptom	Suspect Area	See page
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 sensor circuit	05-288 05-350 - 05-310 05-315 05-348 05-336 05-345
SLIP indicator light abnormal	1. SLIP indicator light circuit 2. Skid control ECU	05-374 05-363
TRAC 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. TRAC OFF switch circuit	05-288 05-376
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. 2. Tc terminal circuit	05-288 05-380
VSC warning light 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 circuit	05-288 05-372

DTC	C0200/31	RIGHT FRONT SPEED SENSOR CIRCUIT
DTC	C0205/32	LEFT FRONT SPEED SENSOR CIRCUIT
DTC	C1235/35	FOREIGN MATTER IS ATTACHED ON TIP OF RIGHT FRONT SENSOR
DTC	C1236/36	FOREIGN MATTER IS ATTACHED ON TIP OF LEFT FRONT SENSOR

CIRCUIT DESCRIPTION



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

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

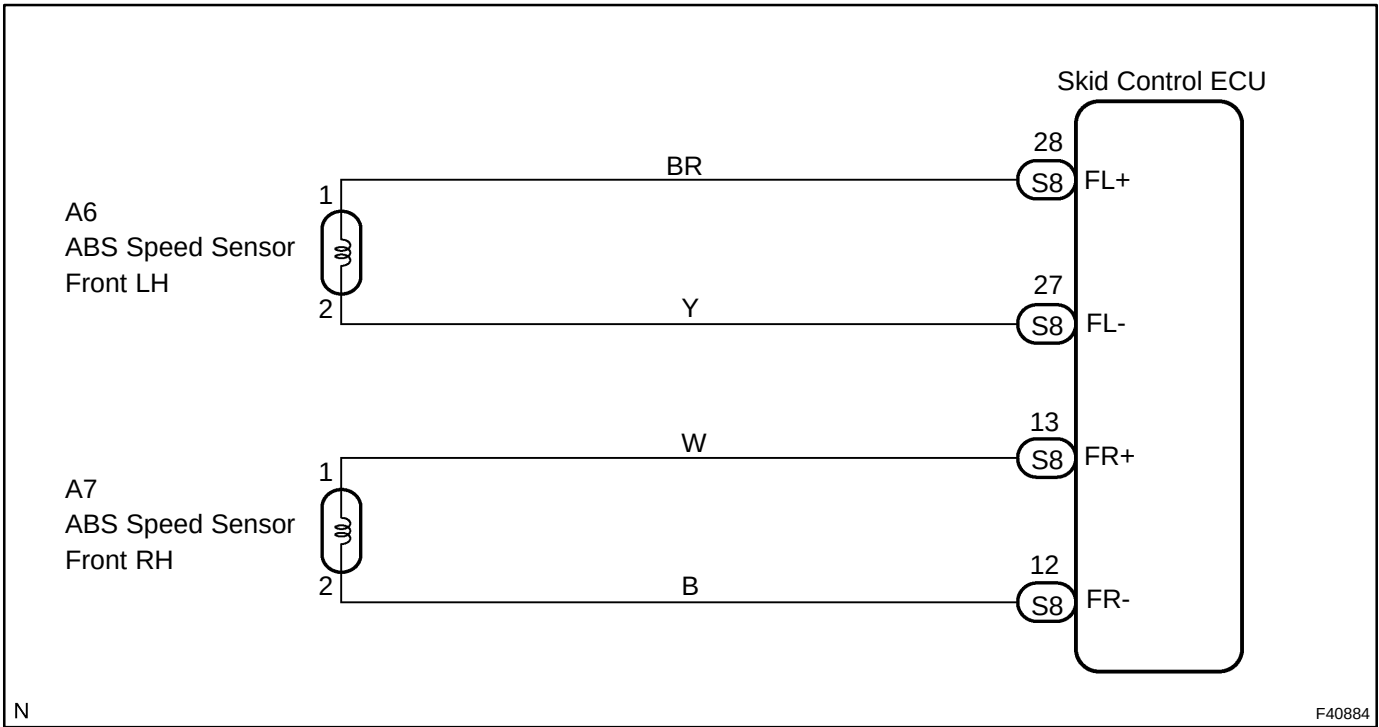
DTC No.	DTC Detecting Condition	Trouble Area
C0200/31 C0205/32	Detection of any of conditions 1. through 3.: 1. At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. 2. Momentary interruption of the speed sensor signal occurs at least 7 times in the time between switching the ignition switch ON and switching it OFF. 3. The condition that the speed sensor signal circuit is open continues for 0.5 sec. or more.	• Right front and left front speed sensor • Each speed sensor circuit • Speed sensor rotor
C1235/35 C1236/36	At the vehicle speed of 20 km/h (12 mph) or more, the condition that noise is included in the speed sensor signal continues for 5 sec. or more.	• Right front and left front speed sensor • Speed sensor rotor

HINT:

DTC No. C0200/31 and C1235/35 is the right front speed sensor.

DTC No. C0205/32 and C1236/36 is the left front speed sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1	READ VALUE OF HAND-HELD TESTER(SPEED SENSOR OUTPUT VALUE)
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- (a) Select the item "WHEEL SPEED FL (FR)" in the DATA LIST and read its value displayed on the hand-held tester.
- (b) 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 from the displayed speed value.

HINT:

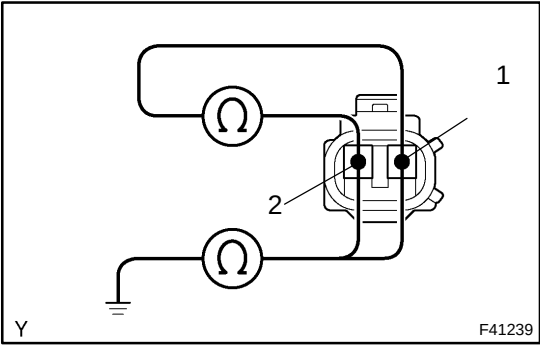
There is tolerance of $\pm 10\%$ in the speedometer indication.

OK	CHECK AND REPLACE SKID CONTROL ECU ASSY
-----------	--

NG

2

INSPECT FRONT SPEED SENSOR



- (a) Remove the fender liner.
- (b) Disconnect the speed sensor connector.
- (c) Measure resistance between terminals 1 and 2 of the speed sensor connector.
OK: 1.4 - 1.8 kΩ at 20°C
- (d) Measure resistance between each of terminals 1 and 2 of speed sensor connector and body ground.
OK: 1 MΩ or higher

A	OK
B	NG (Right front speed sensor)
C	NG (Left front speed sensor)

B

REPLACE SPEED SENSOR FRONT RH

C

REPLACE SPEED SENSOR FRONT LH

NOTICE:

Check the speed sensor signal last (See page 05-288).

A

3

CHECK HARNESS AND CONNECTOR(FRONT SPEED SENSOR-SKID CONTROL ECU ASSY)

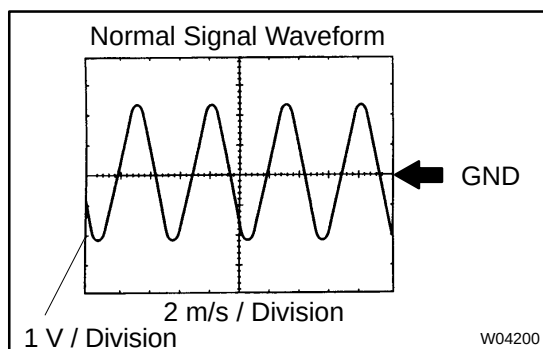
- (a) Check for open and short circuit in harness and connector between each speed sensor and skid control ECU connector (See page 01-31).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK SPEED SENSOR AND SENSOR ROTOR SERRATIONS



(REFERENCE) INSPECTION USING OSCILLOSCOPE

- Remove the skid control ECU with connectors still connected.
- Connect the oscilloscope to the terminals FR+ - FR- and FL+ - FL- of the skid control ECU.
- Drive the vehicle at about 30 km/h (19 mph), and check the signal waveform.

HINT:

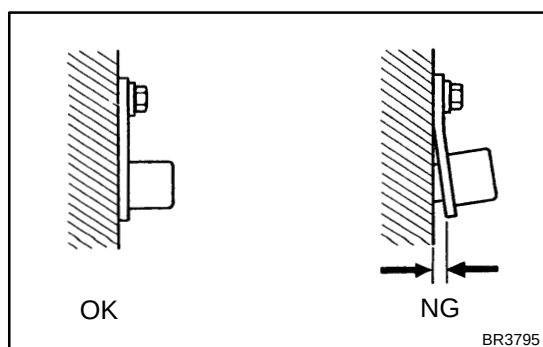
- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform becomes shorter and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness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

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

NG

5 CHECK FRONT SPEED SENSOR INSTALLATION



- Check the speed sensor installation.

OK:

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

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

A	OK
B	NG (Right front speed sensor)
C	NG (Left front speed sensor)

B

REPLACE SPEED SENSOR FRONT RH

C

REPLACE SPEED SENSOR FRONT LH

NOTICE:

Check the speed sensor signal last (See page [05-288](#)).

A

6**CHECK SPEED SENSOR ROTOR AND SENSOR TIP****NG****CLEAN OR REPLACE SPEED SENSOR AND
SENSOR ROTOR SERRATIONS****NOTICE:**Check the speed sensor signal last (See page [05-288](#)).**OK****CHECK AND REPLACE SKID CONTROL ECU ASSY**

DTC	C0210/33	RIGHT REAR SPEED SENSOR CIRCUIT
DTC	C0215/34	LEFT REAR SPEED SENSOR CIRCUIT
DTC	C1238/38	FOREIGN MATTER IS ATTACHED ON TIP OF RIGHT REAR SENSOR
DTC	C1239/39	FOREIGN MATTER IS ATTACHED ON TIP OF LEFT REAR SENSOR

CIRCUIT DESCRIPTION

Refer to DTC C0200/31, C0205/32, C1235/35, C1236/36 on page [05-310](#) .

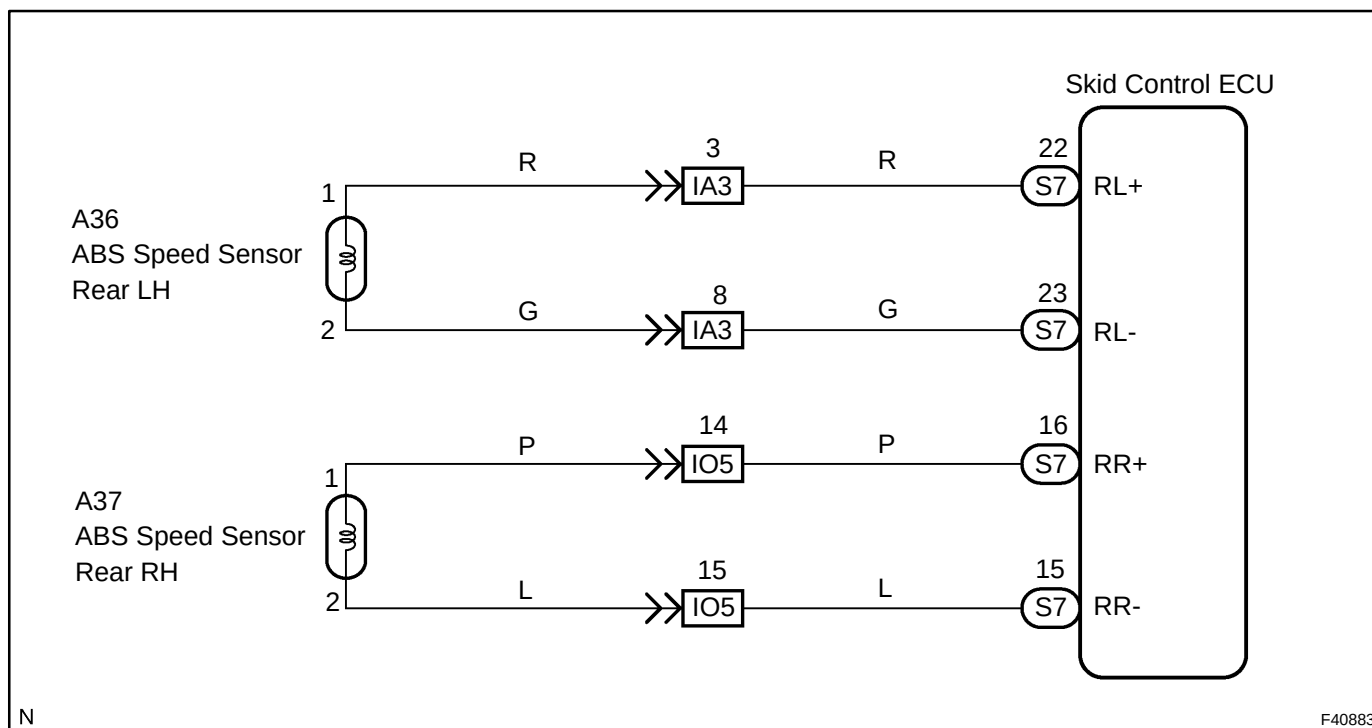
DTC No.	DTC Detecting Condition	Trouble Area
C0210/33 C0215/34	Detection of any of conditions 1. through 3.: 1. At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. 2. Momentary interruption of the speed sensor signal occurs at least 7 times in the time between switching the ignition switch ON and switching it OFF. 3. The condition that the speed sensor signal circuit is open continues for 0.5 sec. or more.	• Right rear and left rear speed sensor • Each speed sensor circuit • Speed sensor rotor
C1238/38 C1239/39	At the vehicle speed of 20 km/h (12 mph) or more, the condition that noise is included in the speed sensor signal continues for 5 sec. or more.	• Right rear and left rear speed sensor • Speed sensor rotor

HINT:

DTC No. C0210/33, C1238/38 is the right rear speed sensor.

DTC No. C0215/34, C1239/39 is the left rear speed sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1	READ VALUE OF HAND-HELD TESTER(SPEED SENSOR OUTPUT VALUE)
----------	--

- (a) Select the item "WHEEL SPEED RL (RR)" in the DATA LIST and read its value displayed on the hand-held tester.
- (b) 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 from the displayed speed value.

HINT:

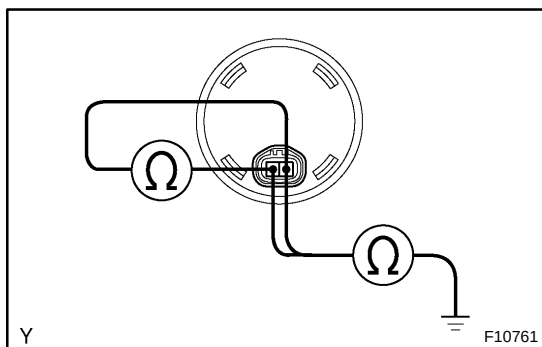
There is tolerance of $\pm 10\%$ in the speedometer indication.

OK

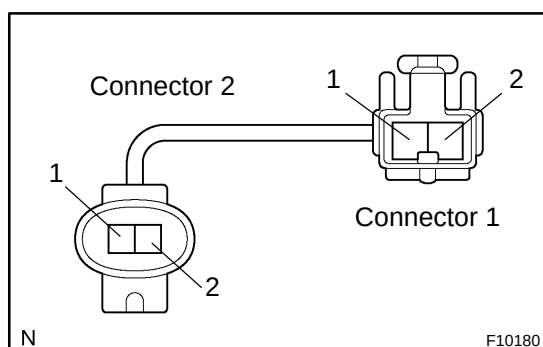
CHECK AND REPLACE SKID CONTROL ECU ASSY
--

NG

2 INSPECT SKID CONTROL SENSOR



- (a) Disconnect the sensor connector.
- (b) Measure resistance between terminals 1 and 2 of the sensor connector.
OK: 1.2 - 1.6 k Ω at 20°C
- (c) Measure resistance between each of terminals 1 and 2 of sensor connector and body ground.
OK: 1 M Ω or higher



Skid control Sensor Sub-Wire Harness:

- (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) Measure resistance between terminal 1 of connector 1 and terminal 2 of connector 2.
- (d) Measure resistance between terminal 2 of connector 1 and terminal 1 of connector 2.
OK: 1 Ω or lower
- (e) Measure resistance between terminals 1 and 2 of speed sensor connector 1 and body ground.
OK: 10 M Ω or higher

NG

REPLACE SKID CONTROL SENSOR OR SUB-WIRE HARNESS

NOTICE:

Check the speed sensor signal last (See page [05-288](#)).

OK

3 CHECK HARNESS AND CONNECTOR(SKID CONTROL SENSOR - SKID CONTROL ECU)

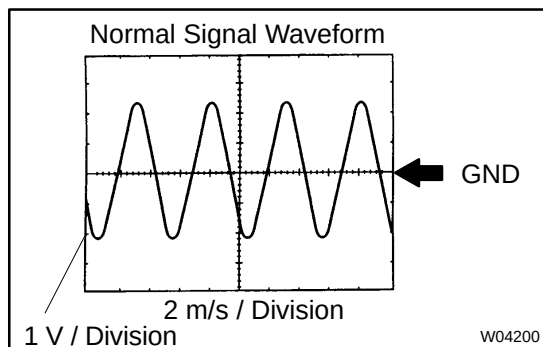
- (a) Check for open and short circuit in harness and connector between each sensor and skid control ECU connector (See page [01-31](#)).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK SENSOR AND SENSOR ROTOR SERRATIONS



(REFERENCE) INSPECTION USING OSCILLOSCOPE

- Remove the skid control ECU with connector still connected.
- Connect the oscilloscope to the terminals RR+, RR- and GND of the skid control ECU.
- Drive the vehicle at about 30 km/h (19 mph), and check the signal waveform.

HINT:

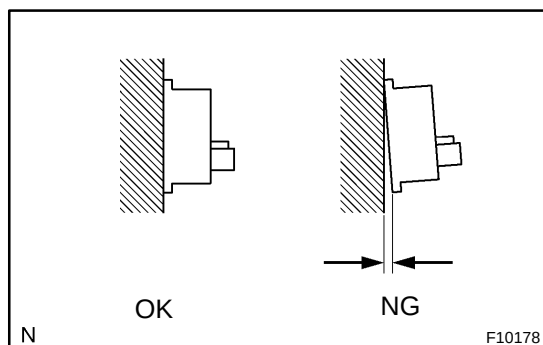
- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform becomes shorter and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness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

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

NG

5 CHECK SKID CONTROL SENSOR INSTALLATION



- Check the speed sensor installation.

OK:

There is no clearance between the sensor and rear axle hub.

NG

REPAIR OR REPLACE SKID CONTROL SENSOR

NOTICE:

Check the speed sensor signal last (See page [05-288](#)).

OK

6 CHECK SPEED SENSOR ROTOR AND SENSOR TIP

NG

CLEAN OR REPLACE SPEED SENSOR AND SENSOR ROTOR SERRATIONS

NOTICE:

Check the speed sensor signal last (See page [05-288](#)).

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

DTC	C0226/21	SFR SOLENOID CIRCUIT
------------	-----------------	-----------------------------

DTC	C0226/21	SFR SOLENOID CIRCUIT
------------	-----------------	-----------------------------

DTC	C0236/22	SFL SOLENOID CIRCUIT
------------	-----------------	-----------------------------

DTC	C0246/23	SRR SOLENOID CIRCUIT
------------	-----------------	-----------------------------

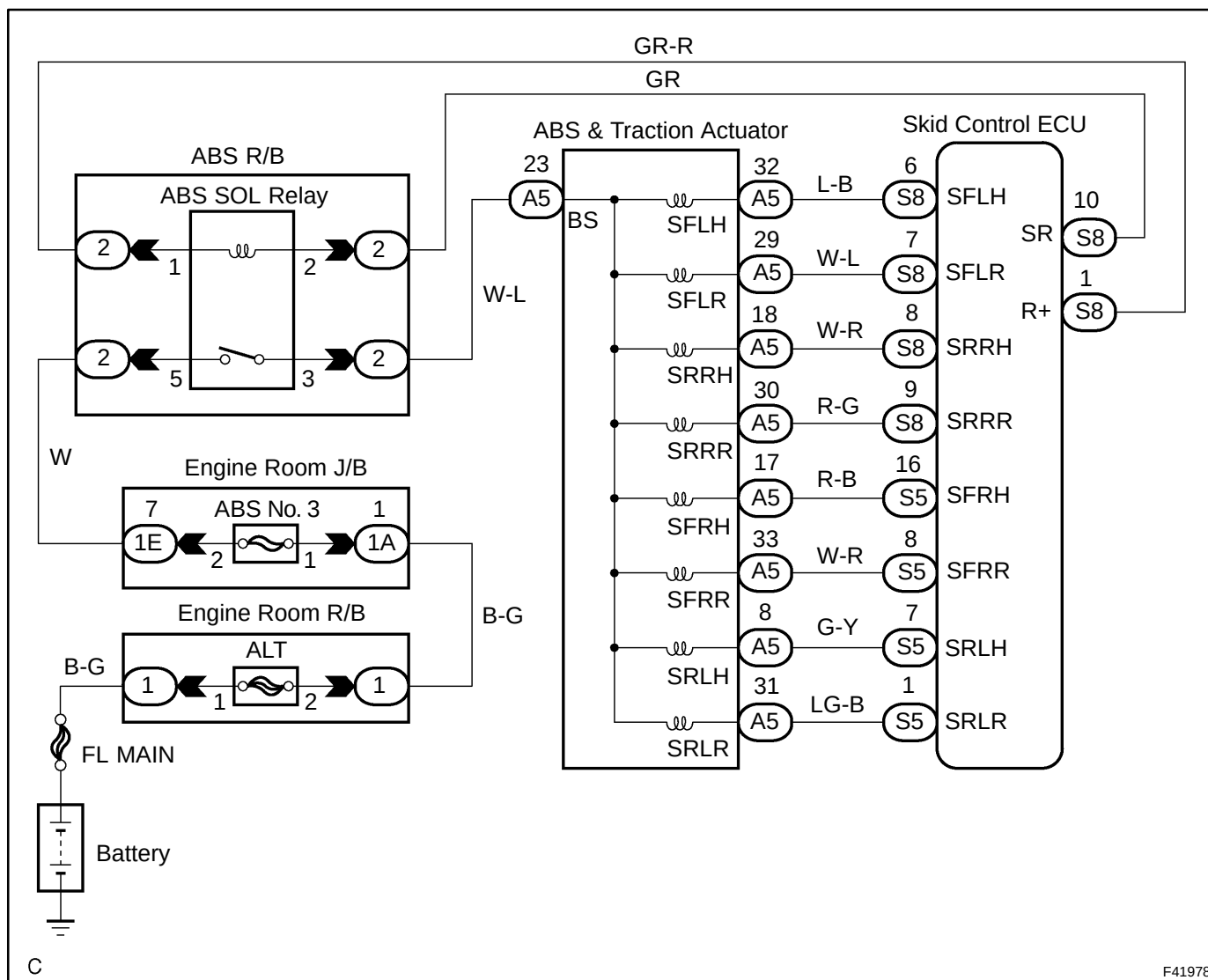
DTC	C0256/24	SRL SOLENOID CIRCUIT
------------	-----------------	-----------------------------

CIRCUIT DESCRIPTION

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

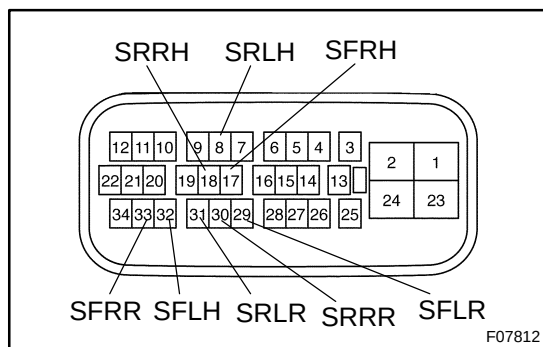
DTC No.	DTC Detecting Condition	Trouble Area
C0226/21	• Open or short in SFRH or SFRR circuit for 0.05 sec. or more. • IG1 terminal voltage of skid control ECU is 9.5 - 18.5 V, and while ABS is control in operation, there is solenoid relay contact OFF for 0.05 sec. or longer.	• Brake actuator • SFRH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

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 INSPECT ABS & TRACTION ACTUATOR ASSY(SFRH, SFLH, SRRH, SRLH, SFRR, SFLR, SRRR, SRLR SOLENOID)



- (a) Disconnect the brake actuator connector.
- (b) 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

SFRH, SFLH, SRRH, SRLH: 8.1 - 9.1 Ω

SFRR, SFLR, SRRR, SRLR: 4.0 - 4.6 Ω

NG

REPLACE ABS & TRACTION ACTUATOR ASSY

OK

2 CHECK HARNESS AND CONNECTOR(ABS & TRACTION ACTUATOR ASSY - SKID CONTROL ECU ASSY)(See page 01-31)
NG
REPAIR OR REPLACE HARNESS OR CONNECTOR
OK
3 CHECK SKID CONTROL ECU TERMINAL VOLTAGE(SR TERMINAL)

- (a) Remove the skid control ECU with connectors still connected.
 (b) Turn the ignition switch ON, measure between terminal SR and GND.

OK: 1V or less
NG
CHECK AND REPAIR HARNESS AND ABS SOLENOID RELAY
OK
4 RECONFIRM DTC(See page 05-288)

A	Malfunction Code
B	Normal Code

B
END
A
5 CHECK CONTACT CONDITION(EACH CONNECTION)
NG
CHECK AND REPAIR HARNESS AND CONNECTOR
OK
CHECK AND REPLACE SKID CONTROL ECU ASSY

DTC	C0273/13	OPEN CIRCUIT IN ABS MOTOR RELAY CIRCUIT
------------	-----------------	--

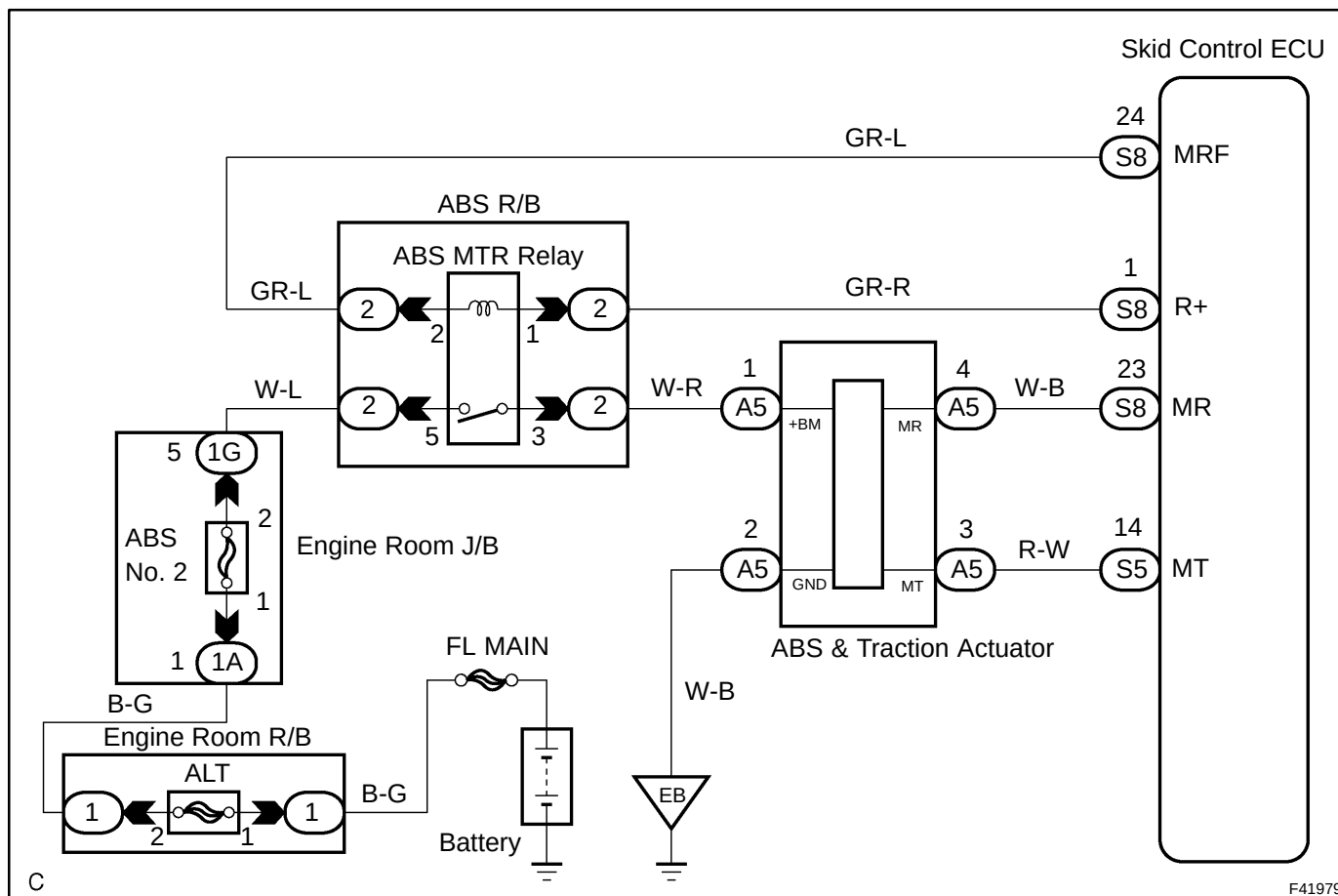
DTC	C0274/14	B+ SHORT CIRCUIT IN ABS MOTOR RELAY CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
C0273/13	Condition 1. or 2. continues for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 18.5 V, and when motor relay is ON in the midst of initial check or in operation of ABS control.*1 2. Motor relay is ON driving in the midst of initial check or in operation of ABS control, ECU terminal IG1 voltage becomes 9.5 V or less.*2	- Fusible link block - ABS No. 3 fuse - ABS motor relay - ABS motor relay circuit
C0274/14	Condition below continues for 4 sec. or more: When the motor relay is OFF, there is open circuit in MT terminal of ECU.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER(ABS MOTOR RELAY OPERATION)

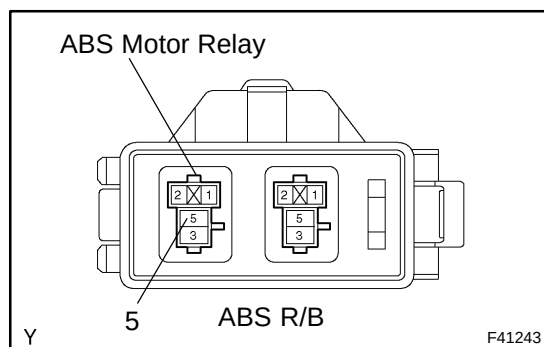
- (a) Select the item "ABS MOT RELAY" in the ACTIVE TEST and operate the ABS motor relay on the hand-held tester.
- (b) Check the operation sound of the ABS motor relay when operating it with the hand-held tester.
OK: The operation sound of the pump motor should be heard.

OK

Go to step 4

NG

2 CHECK TERMINAL VOLTAGE(ABS MOTOR RELAY 5 TERMINAL OF ABS R/B)



- (a) Remove the ABS motor relay from ABS R/B.
- (b) Measure voltage between terminal 5 of ABS R/B (for ABS motor relay) and body ground.

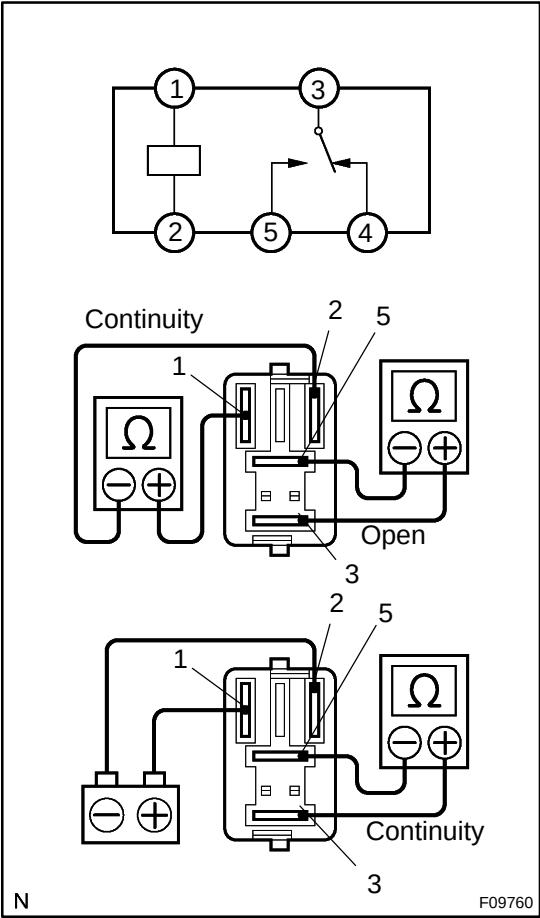
OK: 10 - 14 V

NG

Go to step 5

OK

3INSPECT ABS MOTER RELAY



(a) Check continuity between each terminal of ABS motor relay.

OK:

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

(b) Apply battery positive voltage between terminals 1 and 2.

(c) Check continuity between terminals 3 and 5 of ABS motor relay.

OK:

Terminals 3 and 5	Continuity
-------------------	------------

NGREPLACE ABS MOTER RELAY

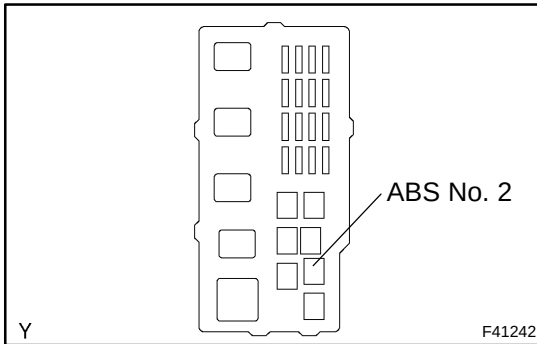
OK

4CHECK HARNESS AND CONNECTOR(ABS MOTOR RELAY - SKID CONTROL ECU ASSY)(See page 01-31)

NGREPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK AND REPLACE IF THE SAME CODE IS STILL OUTPUT AFTER THE DTC IS DELETED, CHECK THE CONTACT THE CONDITION OF EACH CONNECTION

5 INSPECT FUSE(ABS NO.2 OF ENGINE ROOM J/B)

- (a) Remove ABS No. 2 fuse from the engine room J/B.
- (b) Check continuity of fuse.

OK: Continuity**OK****REPAIR OR REPLACE HARNESS AND CONNECTOR****NG****REPLACE FUSE**

DTC	C0278/11	OPEN CIRCUIT IN ABS SOLENOID RELAY CIRCUIT
------------	-----------------	---

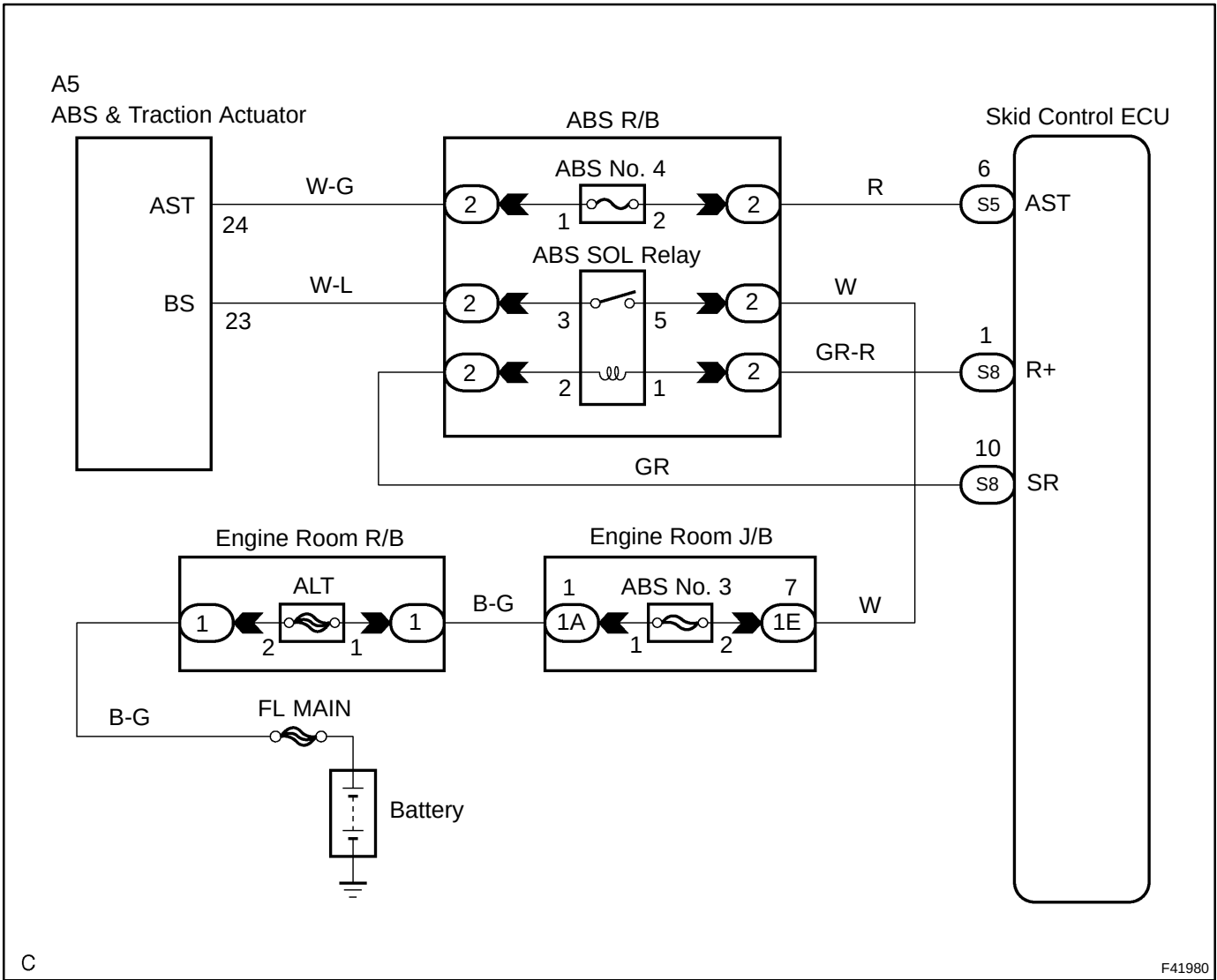
DTC	C0279/12	SHORT CIRCUIT IN ABS SOLENOID RELAY CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detecting Condition	Trouble Area
C0278/11	Conditions 1. and 2. continue for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.0 V and the solenoid relay is ON, however, the contact point of the solenoid relay is OFF. 2. With solenoid relay ON, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the solenoid relay does not become ON.	•ABS SOL relay •ABS SOL relay circuit
C0279/12	Immediately after ECU terminal IG1 becomes ON, and solenoid relay is OFF, however, when the condition that the solenoid relay due to the contact point is ON continues for 0.2 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

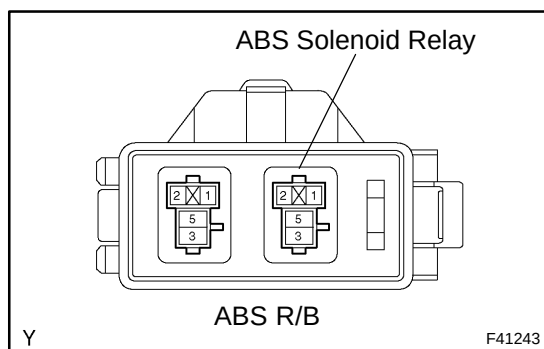
Start the inspection from step 1 in case of using hand-held tester and start from step 2 in case of not using the hand-held tester.

1	PERFORM ACTIVE TEST BY HAND-HELD TESTER(ABS SOLENOID RELAY OPERATION)
---	--

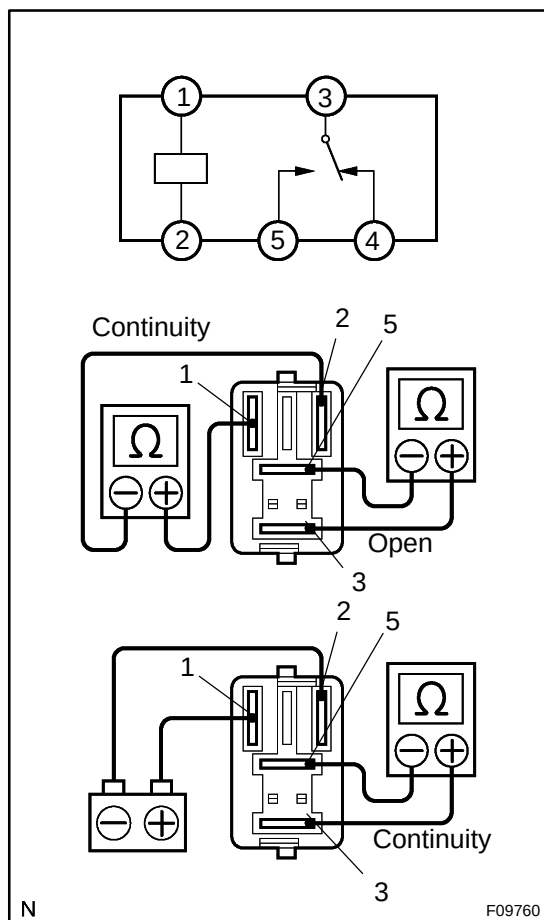
- Select the item "ABS SOL RELAY" in the ACTIVE TEST and operate the ABS solenoid relay on the hand-held tester.
- Check the operation sound of the ABS solenoid relay when operating it with the hand-held tester.
OK: The operation sound of the ABS solenoid relay should be heard.

OK → Go to step 4

NG

2 CHECK TERMINAL VOLTAGE(ABS SOLENOID RELAY 5 TERMINAL OF ABS R/B)

- (a) Remove the ABS solenoid relay from ABS R/B .
 (b) Measure the voltage between terminal 5 of ABS R/B (for ABS solenoid relay) and body ground.

OK: 10 - 14 V**NG****Go to step 7****OK****3 INSPECT ABS SOLENOID RELAY**

- (a) Check continuity between each terminal of ABS SOL relay.

OK:

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

- (b) Apply battery positive voltage between terminals 1 and 2.
 (c) Check continuity between terminals 3 and 5 of ABS SOL relay.

OK:

Terminals 3 and 5	Continuity
-------------------	------------

NG**REPLACE ABS SOLENOID RELAY****OK**

OK: Continuity

OK

REPLACE ABS & TRACTION ACTUATOR ASSY

NG

OK

IF THE SAME CODE IS STILL OUTPUT AFTER THE DTC IS DELETED, CHECK THE CONTACT THE CONDITION OF EACH CONNECTION

NG

ABS No. 4

ABS R/B

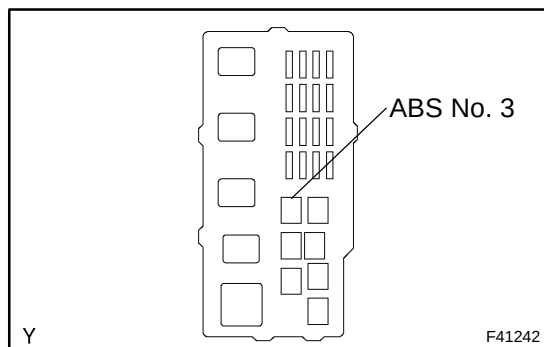
- ## OK: Continuity

NG

REPLACE FUSE

OK

482

7 INSPECT FUSE(ABS NO.3 OF ENGINE ROOM J/B)

- (a) Remove ABS No. 3 fuse from the engine room J/B.
- (b) Check continuity of fuse.

OK: Continuity**NG****REPLACE FUSE****OK****CHECK AND REPAIR HARNESS AND CONNECTOR**

DTC	C1201/51	ENGINE CONTROL SYSTEM MALFUNCTION
------------	-----------------	--

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1201/51	Conditions 1. and 2. continue for 5 sec.: 1. Engine speed: 500 rpm or more. 2. A trouble signal in the engine control system is input.	Engine control system

HINT:

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

INSPECTION PROCEDURE

1	CHECK DTC FOR ENGINE(See page 05-5)
----------	---

A	Normal Code
B	Malfunction Code

B

**REPAIR ENGINE CONTROL SYSTEM
ACCORDING TO CODE OUTPUT**

A

CHECK AND REPLACE ECM

DTC	C1202/52	BRAKE FLUID LEVEL LOW/OPEN CIRCUIT IN BRAKE FLUID LEVEL WARNING SWITCH CIRCUIT
------------	-----------------	---

CIRCUIT DESCRIPTION

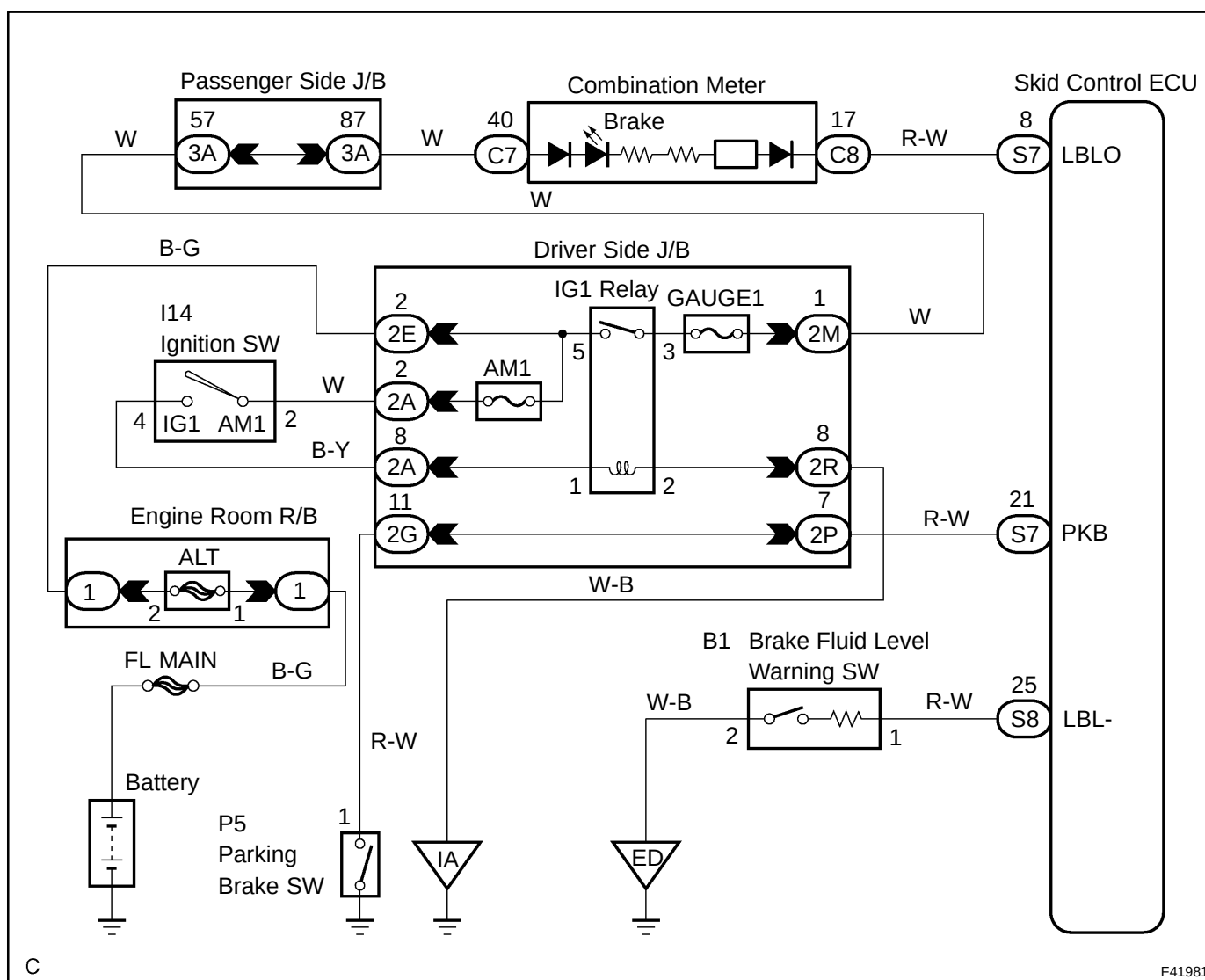
The brake fluid level warning switch sends the appropriate signal to the ECU when the brake fluid level drops.

HINT:

Depress the parking brake pedal and also turns on the brake warning light but does not diagnose DTC No. C1202 / 52.

DTC No.	DTC Detecting Condition0	Trouble Area
C1202 / 52	ECU terminal IG1 voltage is 9.5 V to 17.2 V and open circuit for the brake fluid level warning switch circuit continues for 2 sec. or more.	• Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit

WIRING DIAGRAM



C

F41981

INSPECTION PROCEDURE

1 CHECK BRAKE FLUID LEVEL IN RESERVOIR

- (a) Check the amount of brake fluid in the reservoir.

NG

CHECK AND REPAIR BRAKE FLUID LEAKAGE
AND ADD FLUID

OK

2 INSPECT BRAKE MASTER CYLINDER RESERVOIR SUB-ASSY(FULUID LEVEL WARNING SWITCH)

- (a) Check that continuity exists between the terminals.

OK:

Float up: About 2 k Ω

Float down: Continuity

NG

REPLACE BRAKE MASTER CYLINDER
RESERVOIR SUB-ASSY

OK

3 CHECK FOR OPEN CIRCUIT IN ALL HARNESS AND COMPONENTS CONNECTED TO BRAKE WARNING LIGHT

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

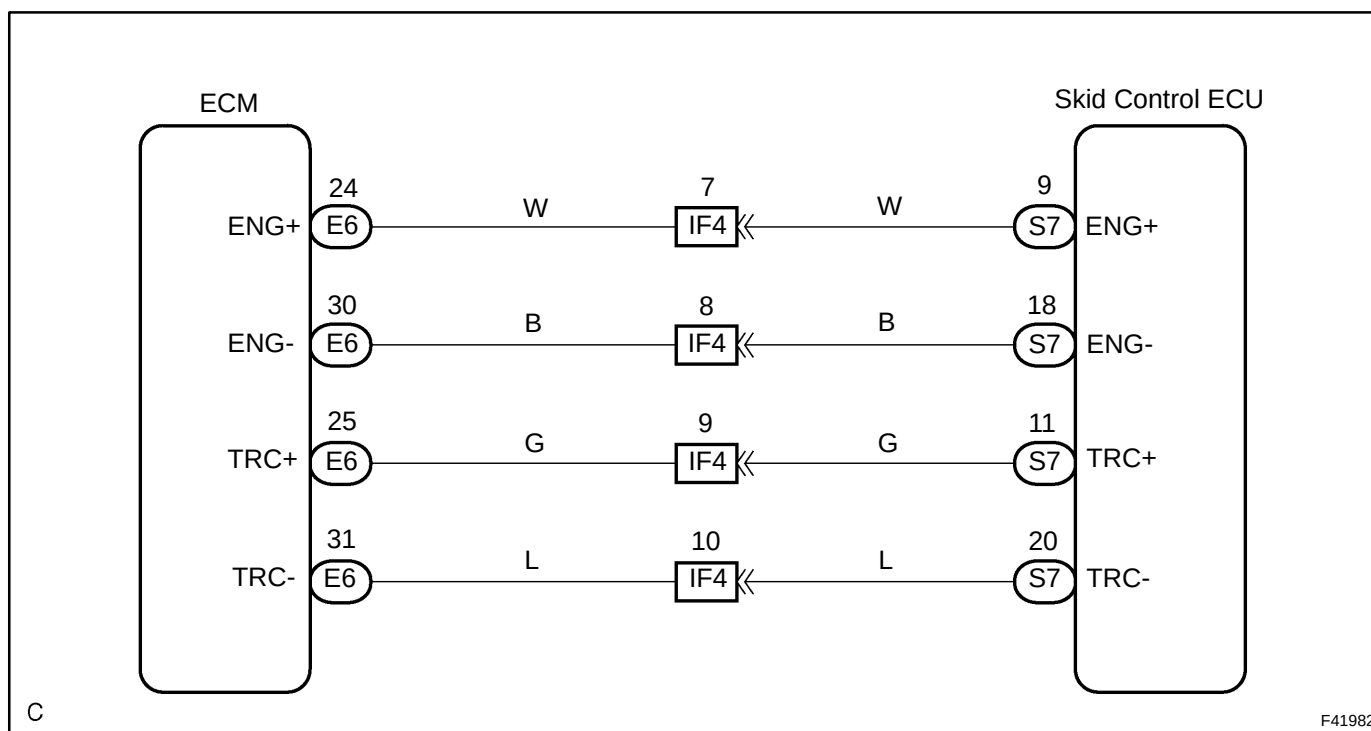
DTC	C1203/53	ECM COMMUNICATION CIRCUIT MALFUNCTION
------------	-----------------	--

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	Either of the following 1., 2. or 3. continues for 5 sec.: - When ECU terminal IG1 voltage is 9.5 V or more, the condition that the data is not transmitted to ECM continues for more than 5 sec. - When ECU terminal IG1 voltage is 9.5 V or more, engine speed is 500 rpm or more and data receipt from ECM is impossible. - The condition that data transmission and reception to/from ECM become impossible once or more within 5 sec. repeatedly occurs 10 times.	• TRC+ or TRC- circuit • ENG+ or ENG- circuit • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR(ENG+, ENG-, TRC+, TRC- OF ECM AND SKID CONTROL ECU)
----------	--

- (a) Check for open and short circuit in harness and connector between each of terminals ENG+, ENG-, TRC+, TRC- of skid control ECU and the same one of the ECM (See page [01-31](#)).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE ECM AND SKID CONTROL ECU

DTC	C1210/36	ZERO POINT CALIBRATION OF YAW RATE SENSOR UNDONE
------------	-----------------	---

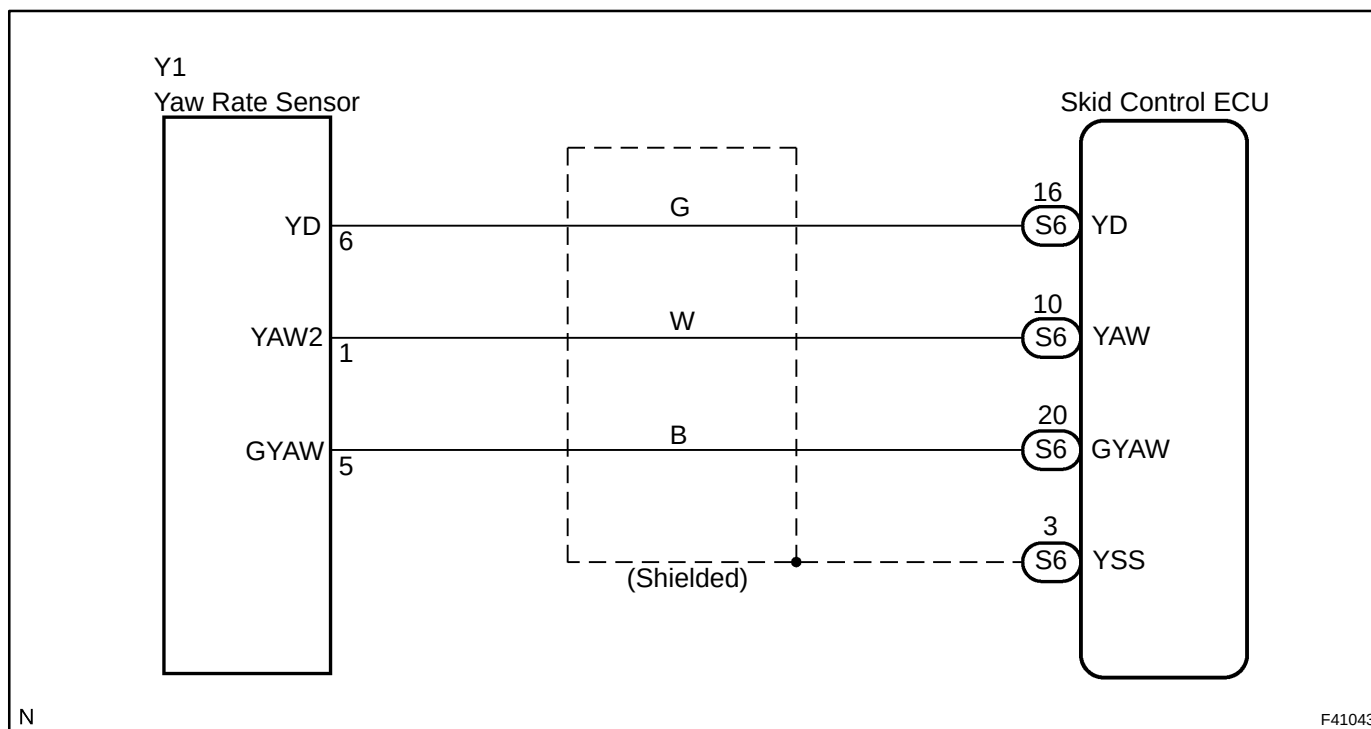
DTC	C1233/33	OPEN OR SHORT CIRCUIT IN YAW RATE SENSOR CIRCUIT
------------	-----------------	---

DTC	C1234/34	MALFUNCTION IN YAW RATE SENSOR
------------	-----------------	---------------------------------------

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1210/36	- After ECU was replaced, 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. - When the yaw rate sensor zero point recorded in ECU is deleted.	- Yaw rate sensor - Yaw rate sensor circuit - P position switch circuit
C1233/33	Detection of any of conditions 1. through 4.: - 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. - The yaw rate sensor open circuit detect signal is ON for 1 sec. or more. - The yaw rate sensor power source voltage is out of the range from 4.4 to 5.6 V for 1 sec. or more. - 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.	

WIRING DIAGRAM

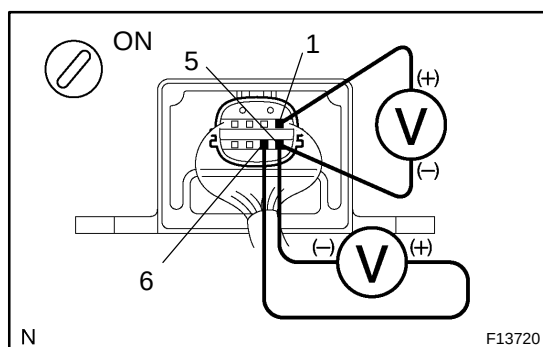


INSPECTION PROCEDURE

1 PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR
 (See page 05-288)

2 RECONFIRM DTC(See page 05-288)

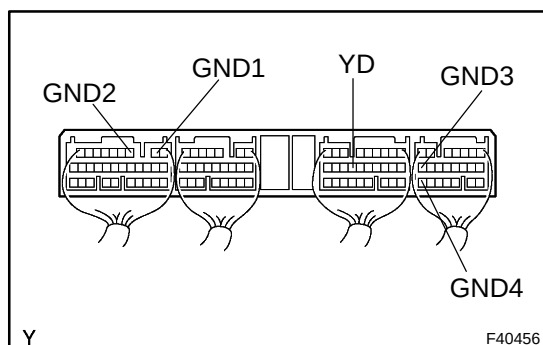
A	Malfunction Code
B	Normal Code

B → **END**
A
3 INSPECT YAWRATE SENSOR


- Remove the console box then remove the yaw rate sensor with the connector still connected to it.
- Turn the ignition switch ON.
- Measure voltage between terminals YAW2 (1) - GYAW (5), and terminals YD (6) - GYAW (5) of the yaw rate sensor.

OK:

Terminals 1 and 5 (YAW2 - GYAW)	About 2.42 - 2.58 V
terminals 6 and 5 (YD - GYAW)	About 4.5 - 5.3 V

NG → **REPLACE YAWRATE SENSOR**
OK
4 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(YD TERMINAL)


- Remove the skid control ECU with the connector still connected to it.
- Turn the ignition switch ON.
- Measure voltage between terminals YD and GND of skid control ECU.

OK: 4.5 - 5.3 V
OK → **CHECK AND REPLACE SKID CONTROL ECU ASSY**
NG

5	CHECK HARNESS AND CONNECTOR(YAW RATE SENSOR - SKID CONTROL ECU)
----------	--

- (a) Check for open and short circuit in harness and connector between terminal YD of yaw rate sensor and skid control ECU (See page [01-31](#)).

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****CHECK AND REPLACE SKID CONTROL ECU ASSY**

DTC	C1223/43	ABS CONTROL SYSTEM MALFUNCTION
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CIRCUIT DESCRIPTION

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

INSPECTION PROCEDURE

1	CHECK DTC(See page 05-288)
----------	------------------------------------

A	Normal Code
B	Malfunction Code

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

CHECK ABS WARNING LIGHT CIRCUIT
--

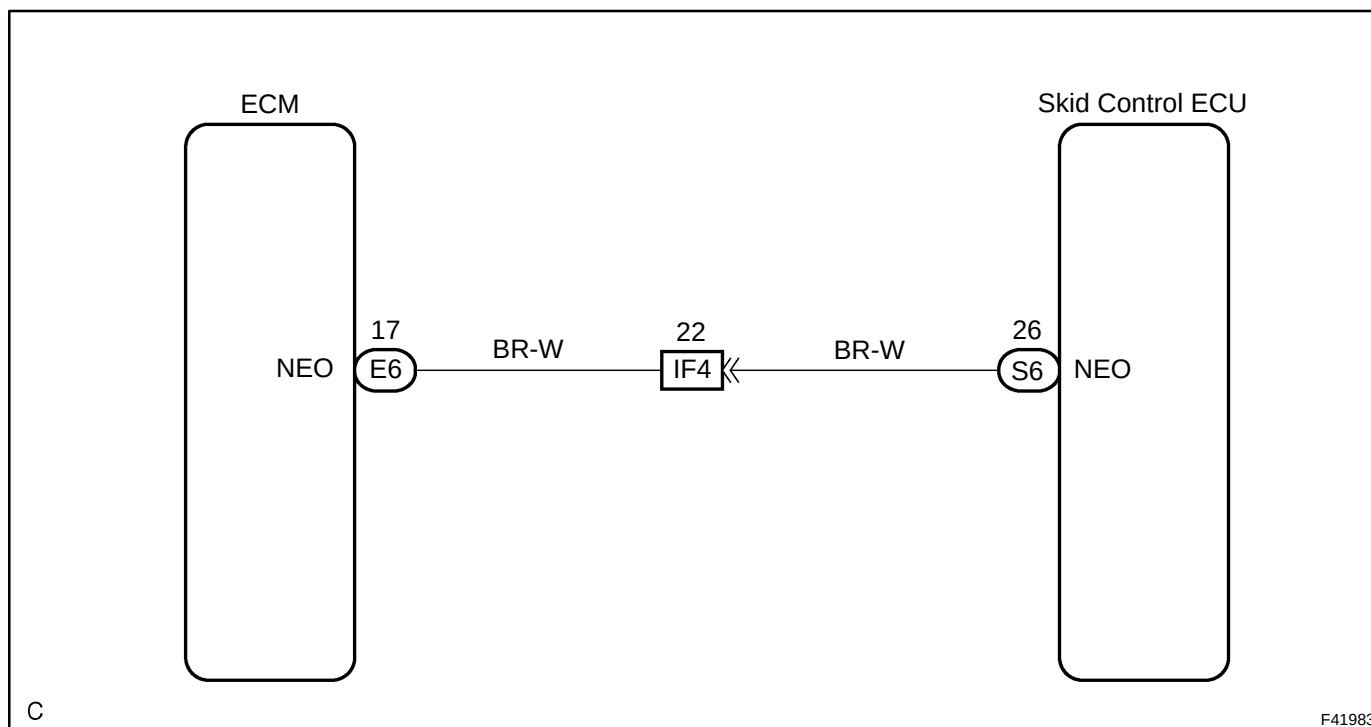
DTC	C1224/44	NE SIGNAL CIRCUIT
-----	----------	-------------------

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detecting Condition	Trouble Area
C1224/44	When any of the following 1. through 2. is detected: 1. At vehicle speed of 30 km/h (19 mph) or more, and when data received from the ECM is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more. 2. While TRAC is operating, the conditions that open or short circuit in engine revolution signal circuit is detected, main throttle opening degree is 0 and IDL switch is OFF continue for 0.24 sec. or more.	• NEO circuit • ECM • Skid control ECU

WIRING DIAGRAM



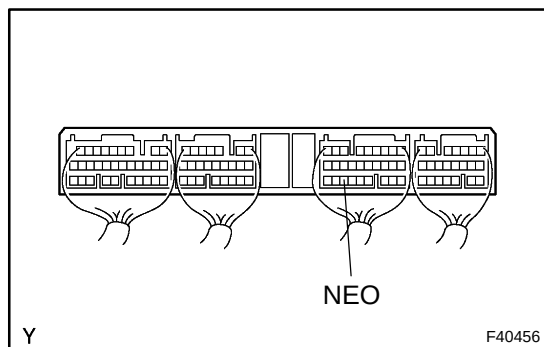
INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR(TERMINAL NEO OF SKID CONTROL ECU ASSY - ECM)(See page 01-31)
---	---

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK SKID CONTROL ECU TERMINAL VOLTAGE(NEO TERMINAL)

- Remove skid control ECU with connectors still connected.
- Turn ignition switch ON.
- Measure voltage between terminal NEO of skid control ECU and body ground for the engine conditions below.

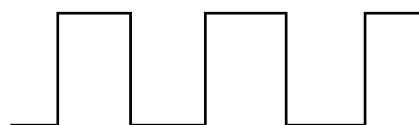
OK:

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

(Reference)

3 - 6 V

Below 1 V



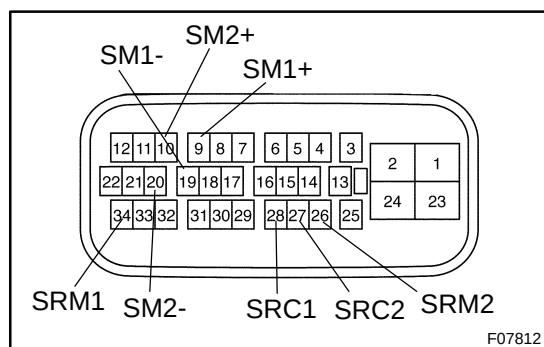
F03007

NG**CHECK AND REPLACE ECM AND SKID CONTROL ECU****OK****3 RECONFIRM DTC(See page 05-288)**

A	Malfunction Code
B	Normal Code

B**END****A****4 CHECK CONTACT CONDITION(EACH CONNECTION)****NG****CHECK AND REPAIR HARNESS AND CONNECTOR****OK****CHECK AND REPLACE ECM AND SKID CONTROL ECU**

INSPECTION PROCEDURE

1 INSPECT ABS & TRACTION ACTUATOR ASSY(SRM1, SRM2, SCR1, SCR2, SM1, SM2 SOLENOID)


- (a) Disconnect the brake actuator connector.
 (b) 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

- (c) Check continuity between terminal BS and terminals SRC1, SRC2, SRM1 and SRM2 of brake actuator.

OK: Continuity

HINT:

Resistance of each solenoid

SRC1, SRC2: 8.1 - 9.1 Ω

SRM1, SRM2: 4.9 - 5.5 Ω

NG

REPLACE ABS & TRACTION ACTUATOR ASSY

OK

2 CHECK HARNESS AND CONNECTOR(ABS & TRACTION ACTUATOR ASSY - SKID CONTROL ECU ASSY)(See page 01-31)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 CHECK SKID CONTROL ECU TERMINAL VOLTAGE(SR TERMINAL)

- (a) Remove the skid control ECU with connectors still connected.
 (b) Turn the ignition switch ON, measure between terminal SR and GND.

OK: 1V or less

NG

CHECK AND REPAIR HARNESS AND ABS SOLENOID RELAY

OK

4 RECONFIRM DTC(See page 05-288)

A	Malfunction Code
B	Normal Code

B

END

A

5	CHECK CONTACT CONDITION(EACH CONNECTION)
---	--

NG	CHECK AND REPAIR HARNESS AND CONNECTOR
----	--

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

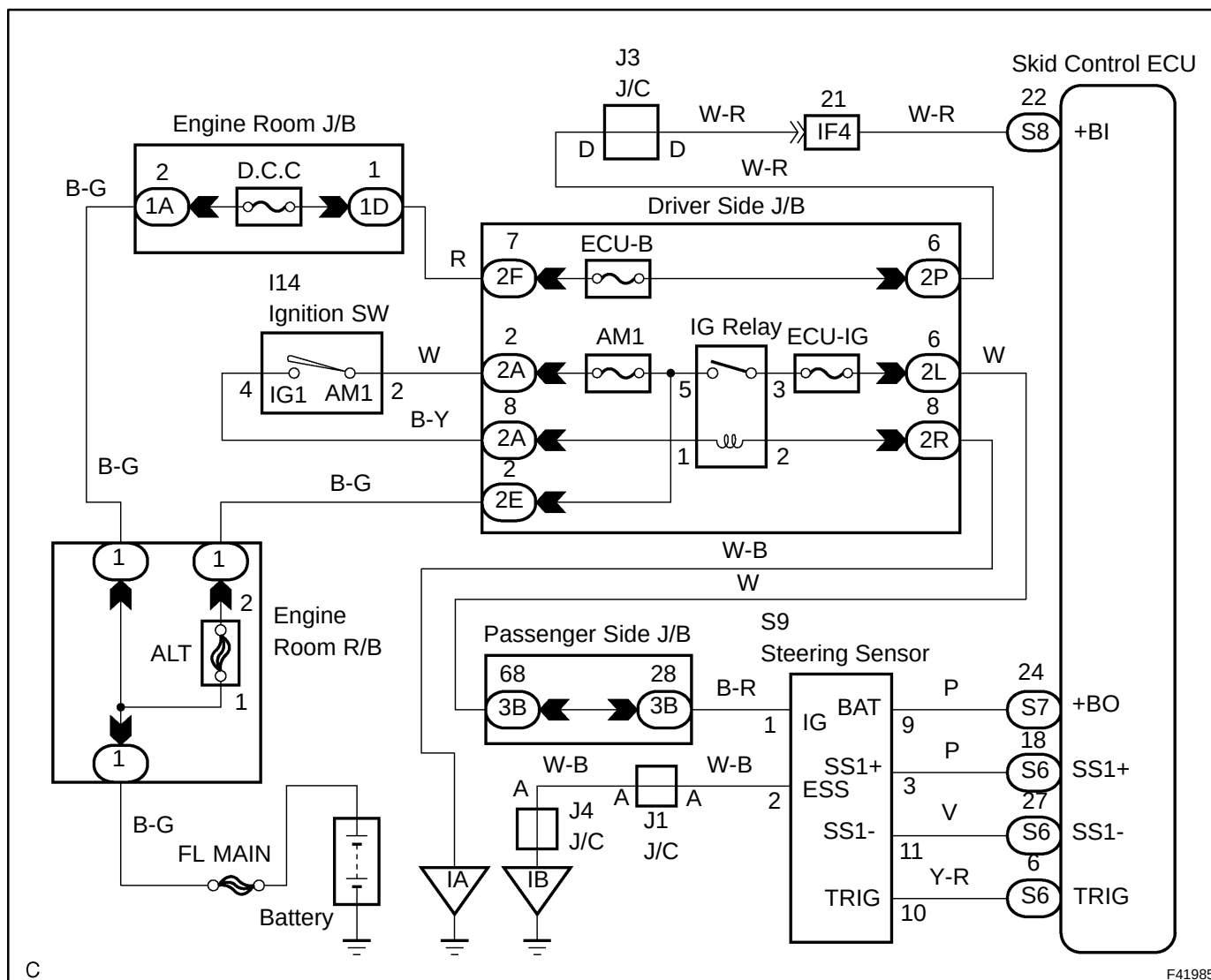
DTC	C1231/31	MALFUNCTION IN STEERING ANGLE SENSOR CIRCUIT
------------	-----------------	---

DTC	C1335/35	STEERING ANGLE SENSOR CIRCUIT
------------	-----------------	--------------------------------------

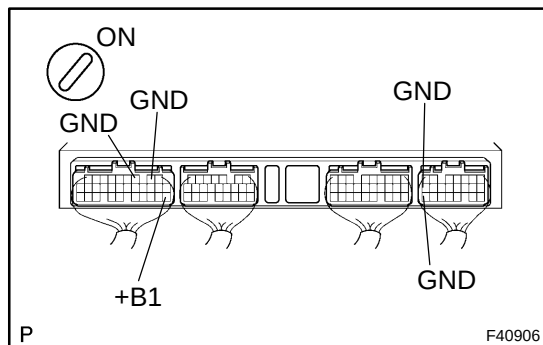
CIRCUIT DESCRIPTION

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.	- Steering angle sensor - Steering angle sensor circuit

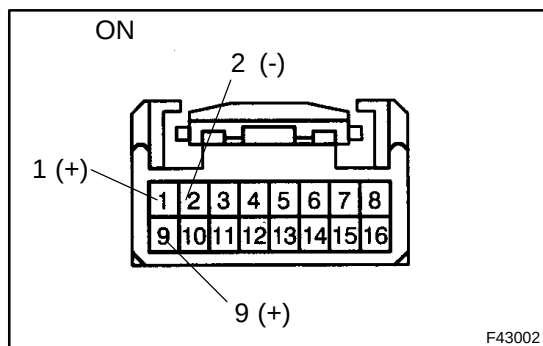
WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(+BI TERMINAL)

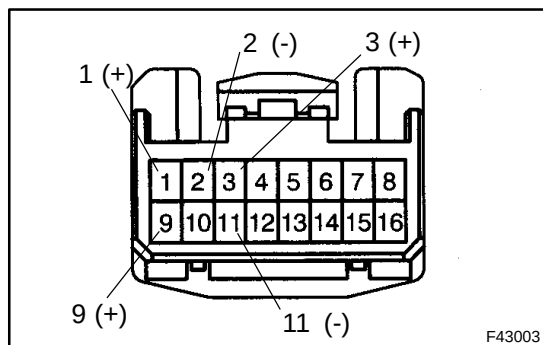
- (a) Remove the skid control ECU with the connector still connected.
- (b) Turn the ignition switch ON.
- (c) Measure voltage between terminal +BI and GND of skid control ECU and body ground.

OK: 10 - 14 V**OK****CHECK AND REPLACE SKID CONTROL ECU ASSY****NG****2 CHECK HARNESS AND CONNECTOR(STEERING ANGLE SENSOR - SKID CONTROL ECU ASSY)**

- (a) Remove the steering wheel and column lower cover (See page 50-8).
- (b) Disconnect the steering sensor connector.
- (c) Turn the ignition switch ON.
- (d) Measure voltage between terminal 1 and 2, 2 and 9 of the steering sensor harness side connector.

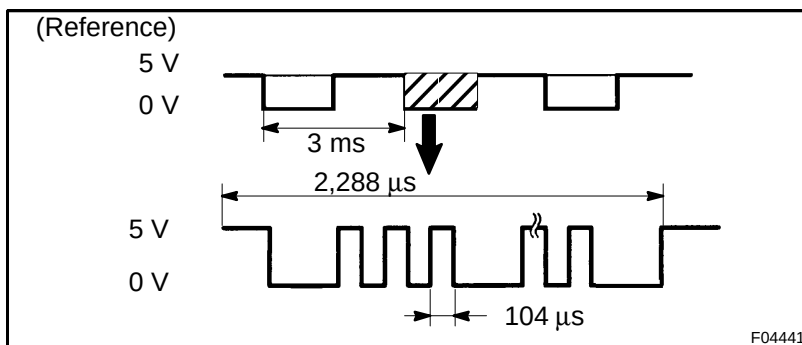
OK: 10 - 14 V**NG****REPAIR OR REPLACE HARNESS OR CONNECTOR****OK**

3 INSPECT STEERING SENSOR



- Remove the steering wheel and column lower cover (See page 50-8).
- Disconnect the steering angle sensor connector.
- Apply battery positive voltage between terminals 1 and 2, 2 and 9.
- Connect the oscilloscope to the terminals 3 and 11 of the steering angle sensor.
- Turn the steering column shaft slowly and check the signal waveform.

OK:



HINT:

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

NG

REPLACE STEERING SENSOR

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

DTC	C1232/32	MALFUNCTION IN DECELERATION SENSOR
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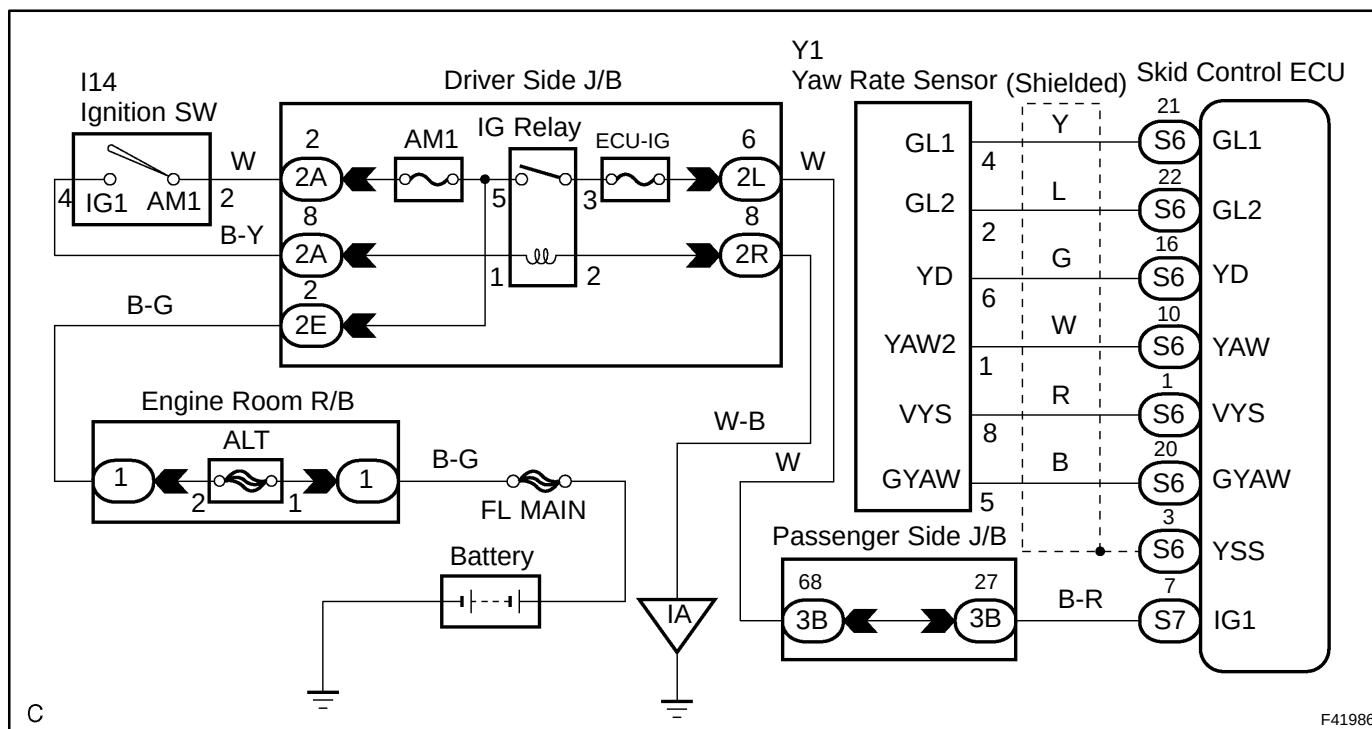
DTC	C1244/44	OPEN OR SHORT IN DECELERATION SENSOR CIRCUIT
------------	-----------------	---

CIRCUIT DESCRIPTION

This sensor detects deceleration on the vehicle. The sensor signal is used in ABS & BA & TRAC & VSC control. If the sensor functions abnormally, the ABS warning light comes on.

DTC No.	DTC Detecting Condition	Trouble Area
C1232/32	While vehicle speed becomes 0 km/h (0 mph) from 30 km/h (18 mph), and the condition that GL1 and GL2 signals of ECU terminals did not change 40 mV or less continued in a sequence 16 times.	
C1244/44	Either of the following 1., 2., 3. or 4. is detected: - The condition that ECU terminals GL1 and GL2 values are 1.5G or less or 1.5G or more continues for 1.2 sec. or more. - The condition that the deceleration sensor terminal VGS voltage is 4.4 V or less or 5.6 G or more continues for 1.2 sec. or more. - At the vehicle speed of 0 km (0 mph), after the difference of output value between deceleration sensor terminals GL1 and GL2 becomes 0.6 G or more, and the condition that does not become 0.4 G or less continues for 60 sec. or more. - Deceleration sensor signal momentary open occurs for 7 times or more.	• Deceleration sensor • Deceleration sensor circuit

WIRING DIAGRAM



C

F41986

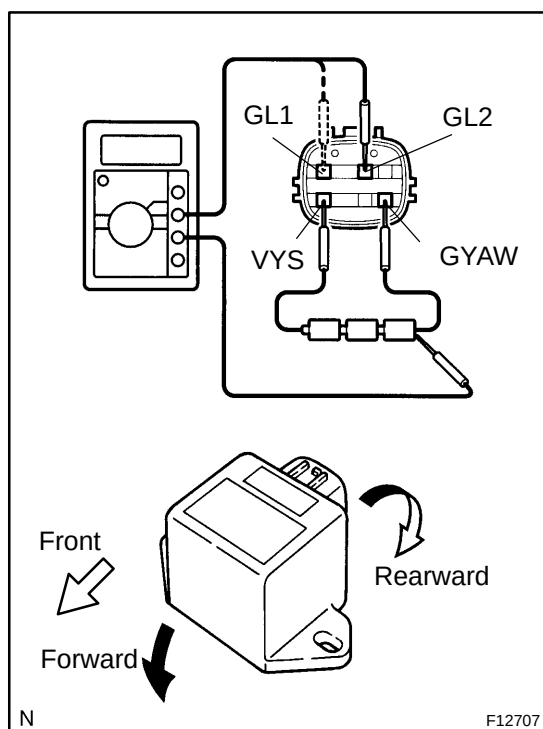
INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(YAW RATE SENSOR (DECELERATION SENSOR) - SKID CONTROL ECU ASSY)(See page 01-31)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT YAWRATE SENSOR(DECELERATION SENSOR)


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

NOTICE:

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

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

OK:

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

HINT:

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

NG

REPLACE YAWRATE SENSOR

OK

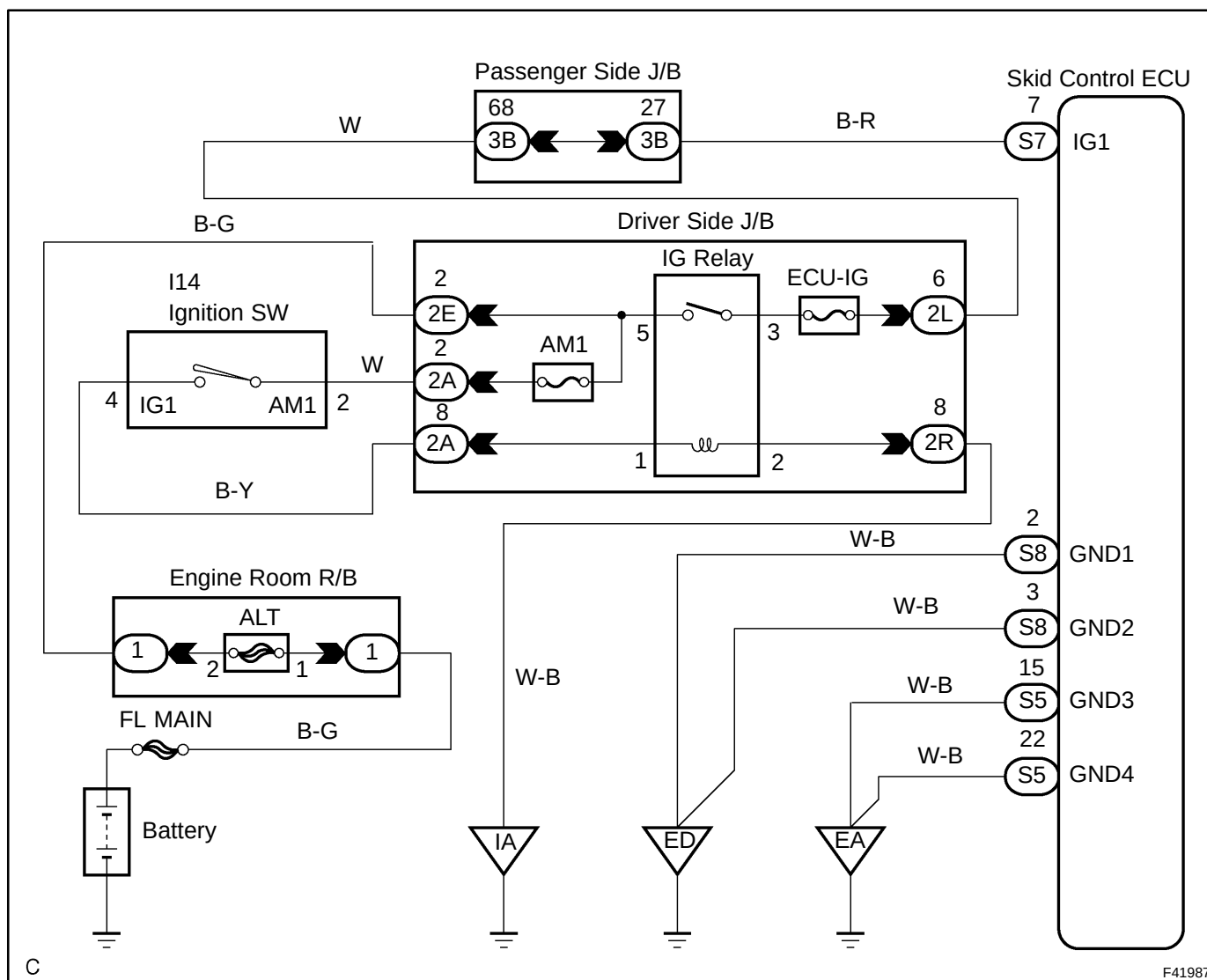
CHECK AND REPLACE SKID CONTROL ECU ASSY

DTC	C1241/41	LOW BATTERY POSITIVE VOLTAGE OR ABNORMALLY HIGH BATTERY POSITIVE VOLTAGE
------------	-----------------	---

CIRCUIT DESCRIPTION

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 IG1 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.	• Power source harness and connector • Battery • Charging system • Power source circuit

WIRING DIAGRAM

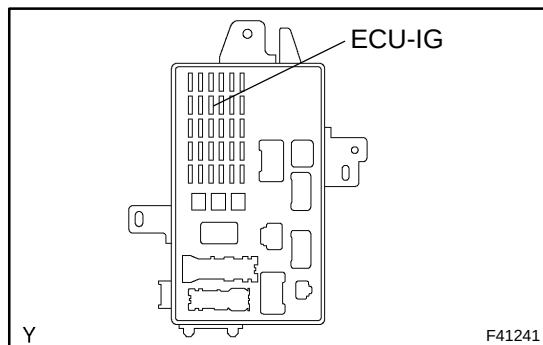


C

F41987

INSPECTION PROCEDURE

1 INSPECT FUSE(ECU-IG OF DRIVER SIDE J/B)



- (a) Remove ECU-IG fuse from the driver side J/B.
- (b) Check continuity of ECU-IG fuse.

OK: Continuity

NG

INSPECT FOR SHORT CIRCUIT IN ALL HARNESS AND COMPONENTS CONNECTED TO ECU-IG FUSE

OK

2 INSPECT BATTERY(TERMINAL VOLTAGE)

- (a) Check the battery positive voltage.

OK: 10 - 14 V

NG

CHECK CHARGING SYSTEM
(See page [19-11](#))

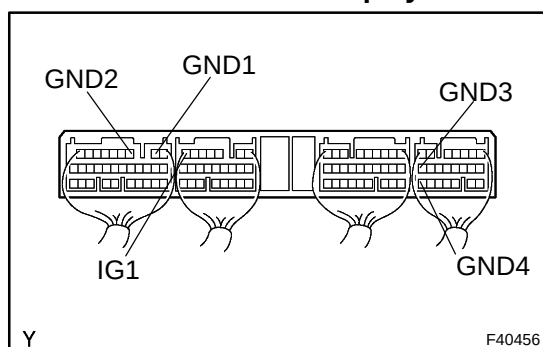
OK

3 CHECK VOLTAGE OF ECU IG POWER SOURCE

IN CASE OF USING THE HAND-HELD TESTER:

- (a) Select the item "IG VOLTAGE" in the DATA LIST and read its value displayed on the hand-held tester.
- (b) Check the voltage condition output from the ECU displayed on the hand-held tester.

OK: "Normal" is displayed.



IN CASE OF NOT USING THE HAND-HELD TESTER:

- (a) Remove the skid control ECU with connectors still connected.
- (b) Turn the ignition switch ON, measure voltage between terminals IG1 and GND of skid control ECU connector.

OK: 10 - 14 V

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

NG

4	CHECK CONTINUITY(SKID CONTROL ECU ASSY - BODY GROUND)
---	---

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK

CHECK AND REPAIR HARNESS AND CONNECTOR

DTC	C1243/43	MALFUNCTION IN DECELERATION SENSOR
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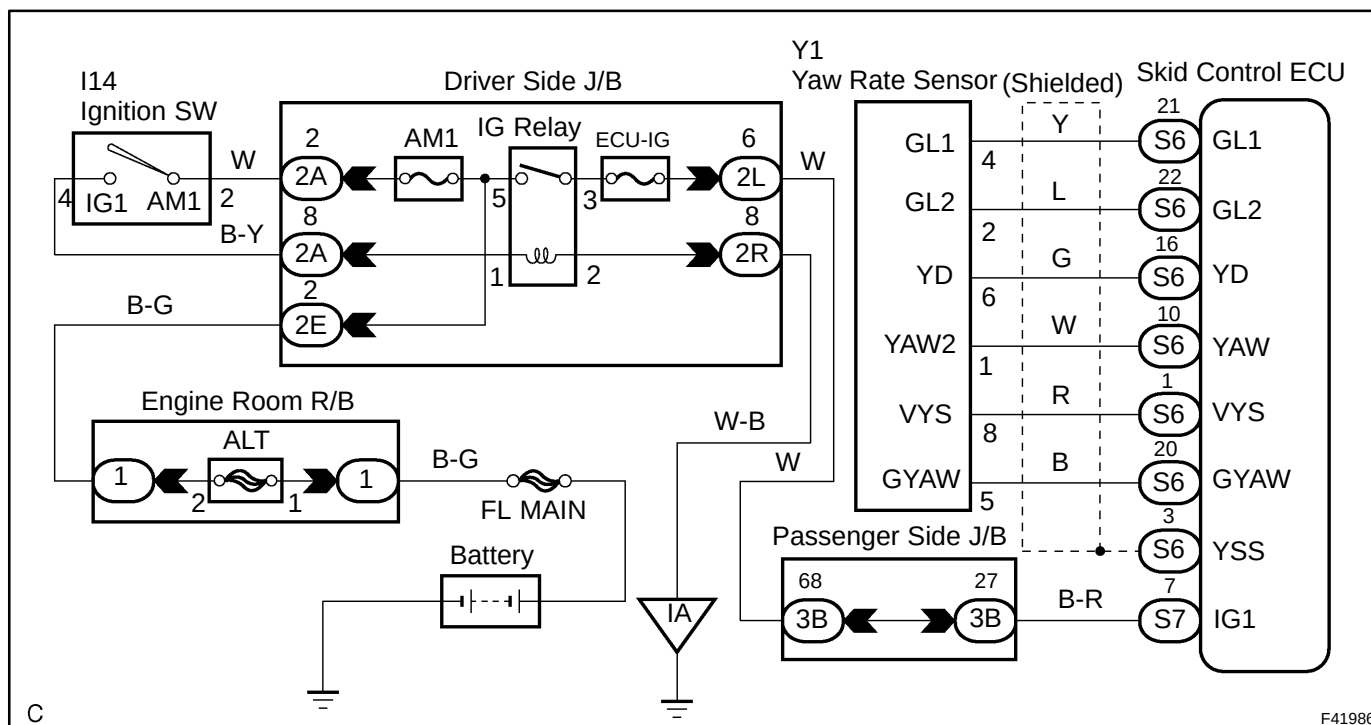
DTC	C1245/45	MALFUNCTION IN DECELERATION SENSOR
------------	-----------------	---

DTC	C1336/39	ZERO POINT CALIBRATION OF DECELERATION SENSOR UNDONE
------------	-----------------	---

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1243/43	While vehicle speed gets to 0 km/h (0 mph) from 30 km/h (18 mph), and the condition that GL1 and GL2 signals of ECU terminals did not change 2 LSB or more continued in a sequence 16 times.	• Deceleration sensor • Wire harness for deceleration sensor system
C1245/45	At the vehicle speed of 30 km/h (18 mph) or more, and the condition that the difference between acceleration and deceleration values of computation from deceleration sensor and vehicle speed becomes more than 0.35 G continues for 60 sec. or more.	
C1336/39	At the initial time after replacing the computer, or after erasing the deceleration sensor memory by operating the terminals Ts and CG of DLC3, the ignition is turned ON and the vehicle is driven in any mode except for the test mode.	• Deceleration sensor • Deceleration sensor circuit • Zero point calibration not done

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1	PERFORM DECELERATION SENSOR ZERO POINT CALIBRATION (See page 05-239)
----------	---



2	RECONFIRM DTC(See page 05-288)
----------	--

A	Malfunction Code
B	Normal Code

B	END
----------	------------



3	READ VALUE OF HAND-HELD TESTER(DECELERATION SENSOR OUTPUT VALUE)
----------	---

- (a) Select the item "DECELERAT SEN, DECELERAT SEN2" in the DATA LIST and read its value displayed on the hand-held tester.
- (b) Check that the deceleration value of the deceleration sensor observed in the hand-held tester is changing when the vehicle is tilted.

OK:

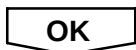
Deceleration value must be changing.

OK	CHECK AND REPLACE SKID CONTROL ECU ASSY
-----------	--

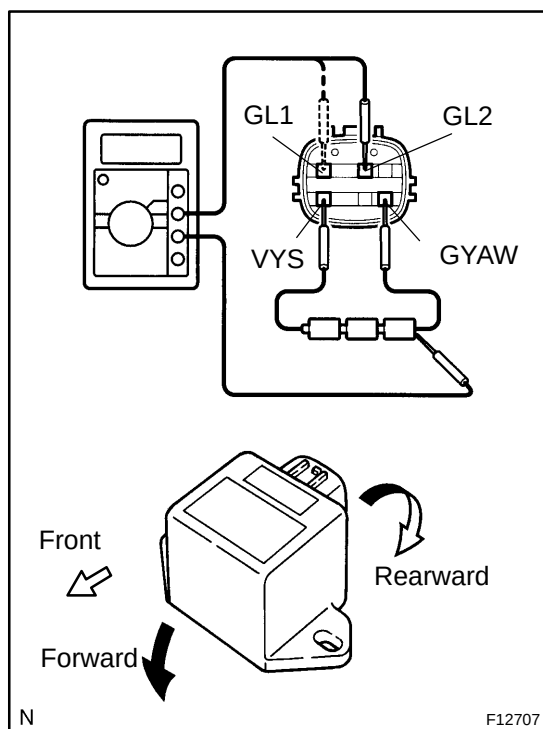


4	CHECK HARNESS AND CONNECTOR(YAW RATE SENSOR(DECELERATION SENSOR) - SKID CONTROL ECU ASSY)(See page 01-31)
----------	---

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
-----------	---



REPLACE YAWRATE SENSOR

5 INSPECT YAWRATE SENSOR(INCLUDE DECELERATION SENSOR)

- Remove the consol box.
- Connect 3 dry batteries of 1.5 V in series.
- Connect VYS terminal to the batteries' positive (+) terminal, and GYAW terminal to the batteries' negative (-) terminal. Apply about 4.5 V between VYS and GYAW terminals.

NOTICE:

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

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

OK:

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

HINT:

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

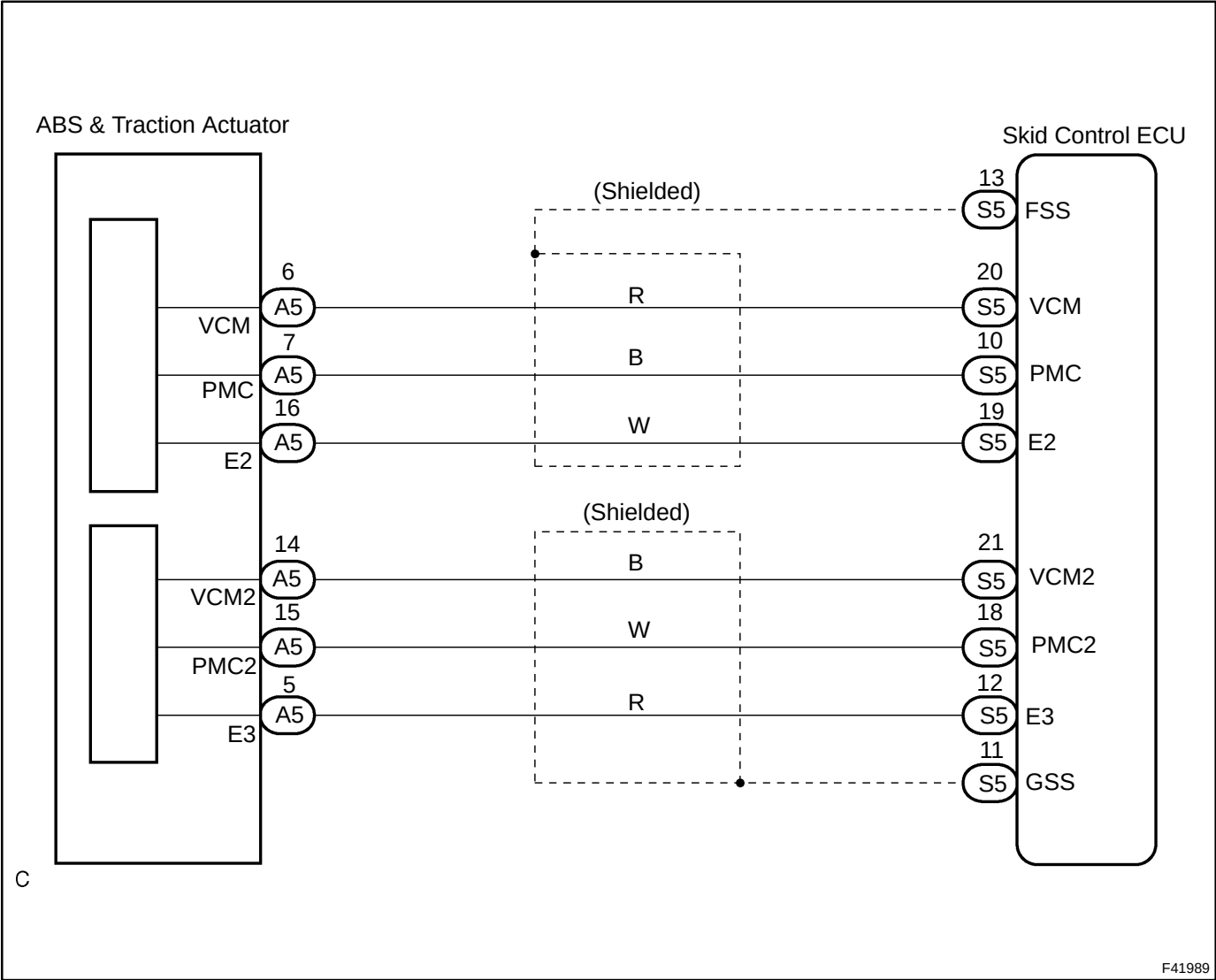
NG**REPLACE YAWRATE SENSOR****OK****6 CHECK HARNESS AND CONNECTOR(YAW RATE SENSOR(DECELERATION SENSOR) - SKID CONTROL ECU ASSY)(See page 01-31)****NG****END****OK****CHECK AND REPLACE SKID CONTROL ECU ASSY**

DTC	C1246/46	MALFUNCTION IN MASTER CYLINDER PRESSURE SENSOR
DTC	C1360/61	MALFUNCTION IN COMPARATIVE MASTER CYLINDER PRESSRRE SENSOR

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246/46 C1360/61	Either of the following 1., 2., 3., or 4. is detected: 1. At the vehicle speed of 7 km/h (4 mph) or more, master cylinder pressure sensor does not change continues for 30 sec. 2. Interference occurs 7 times or more for 5 sec. 3. ECU terminal STP is OFF, and the condition that master cylinder pressure sensor voltage becomes more than 0.86 V or less than 0.3 V continues for 5 sec. or more. 4. Master cylinder pressure sensor circuit is open or short for 1.2 sec. or more.	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1 READ VALUE OF HAND-HELD TESTER(MASTER CYLINDER PRESSURE SENSOR OUTPUT VALUE)

- Select the item "MAS CYL PRESS 1, MAS CYL PRESS 2" in the DATA LIST and read its value displayed on the hand-held tester.
- Check that the brake fluid pressure value of the master cylinder pressure sensor displayed on the hand-held tester is changing when depressing the brake pedal.

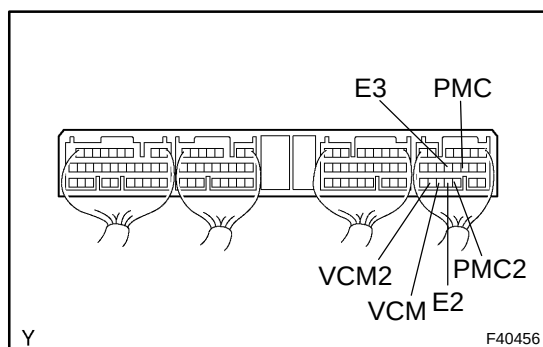
OK: Brake fluid pressure value must be changing.

OK

Go to step 4

NG

2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(PMC, PMC2 TERMINAL VOLTAGE)



- Install LSPV gauge to the front brake caliper bleeder plug portion, and bleed air from LSPV gauge.
- Start the engine and depress the brake pedal, then check the relation between the fluid pressure and voltage of PMC and E2, PMC2 and E3 terminals of the skid control ECU with connector still connected.

OK:

Front brake caliper fluid pressure	Voltage
0 kPa (0 Kg/cm ² , 0 psi)	0.37 - 0.63 V
5,883 kPa (60 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 between terminals VCM and E2, VCM2 and E3: 4.7 - 5.3 V

OK

Go to step 4

NG

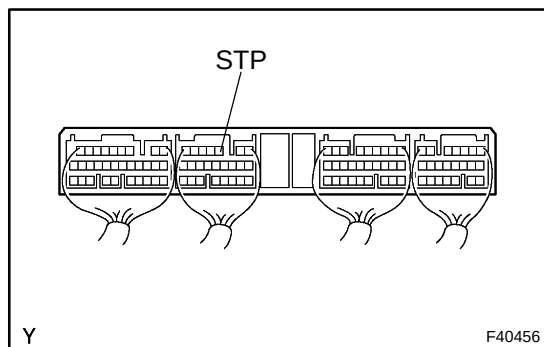
3 CHECK HARNESS AND CONNECTOR(MASTER CYLINDER PRESSURE SENSOR - SKID CONTROL ECU ASSY)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ABS & TRACTION ACTUATOR ASSY

4 CHECK SKID CONTROL ECU TERMINAL VOLTAGE(STP TERMINAL)

- (a) Remove the skid control ECU with connectors still connected.
- (b) Measure voltage between terminal STP of skid control ECU and body ground when brake pedal is depressed.
OK: 8 - 14 V
- (c) Measure voltage between terminal STP of skid control ECU and body ground when brake pedal is released.
OK: Below 1.5 V

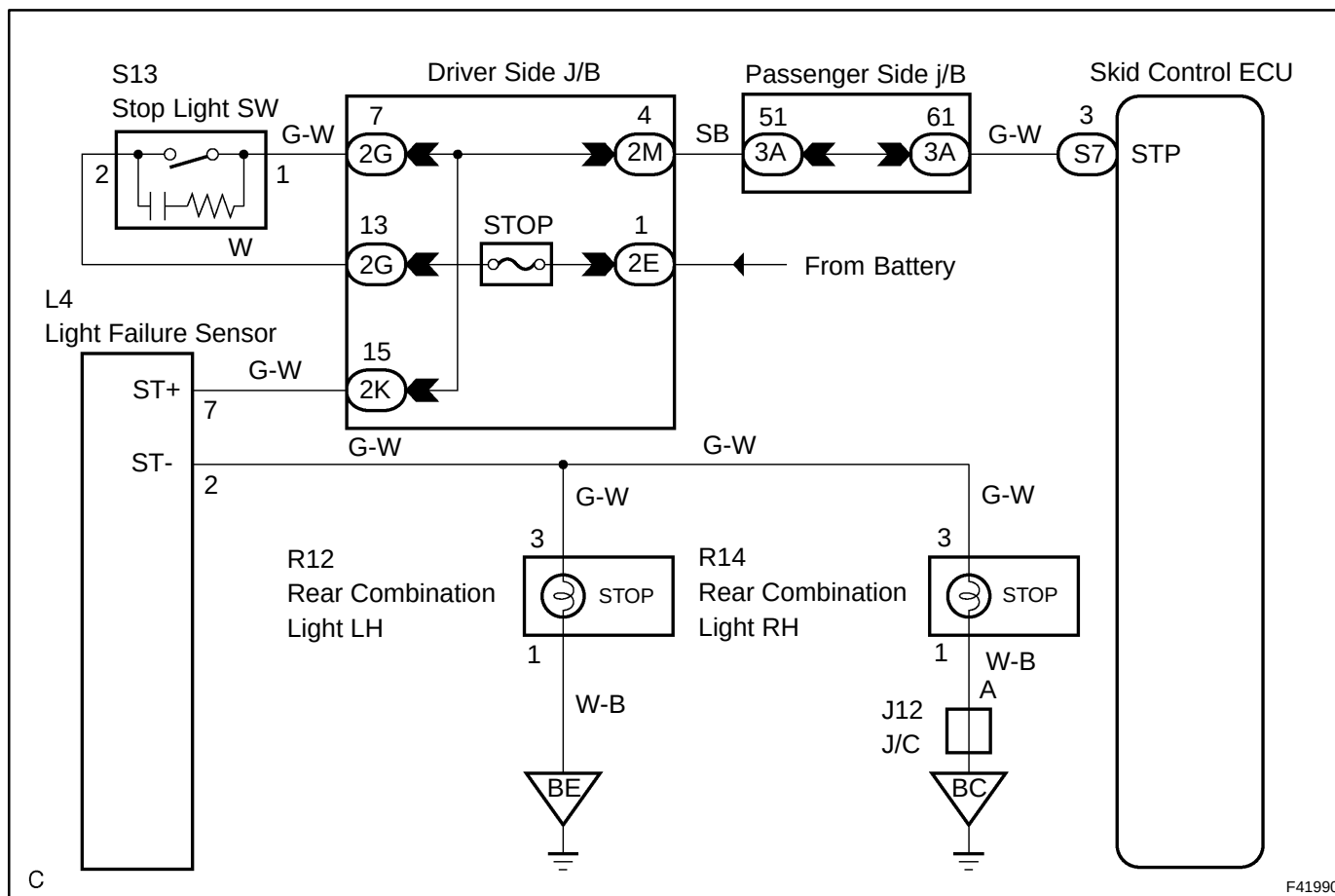
NG**REPAIR OR REPLACE STOP LAMP SWITCH CIRCUIT****OK****CHECK AND REPLACE SKID CONTROL ECU ASSY**

DTC	C1249/49	OPEN CIRCUIT IN STOP LIGHT SWITCH CIRCUIT
------------	-----------------	--

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249/49	ECU terminal IG1 voltage is 9.5 to 18.5 V and ABS is in non-operation, the open in circuit stop light switch circuit continues for 10 sec. or more.	- Stop light bulb - Stop light switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK STOP LAMP SWITCH OPERATION**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

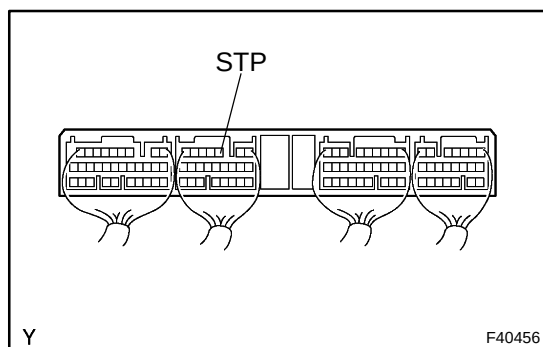
NG

2 CHECK STOP LAMP SWITCH CIRCUIT

NG

REPAIR OR REPLACE STOP LAMP SWITCH CIRCUIT

OK

3 CHECK SKID CONTROL ECU TERMINAL VOLTAGE(STP TERMINAL)

- (a) Remove the skid control ECU with connectors still connected.
- (b) Measure voltage between terminal STP of skid control ECU and body ground when brake pedal is depressed.
OK: 8 - 14 V
- (c) Measure voltage between terminal STP of skid control ECU and body ground when brake pedal is released.
OK: Below 1.5 V

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

NG

4 CHECK HARNESS AND CONNECTOR(STOP LAMP SWITCH - SKID CONTROL ECU ASSY)(See page 01-31)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

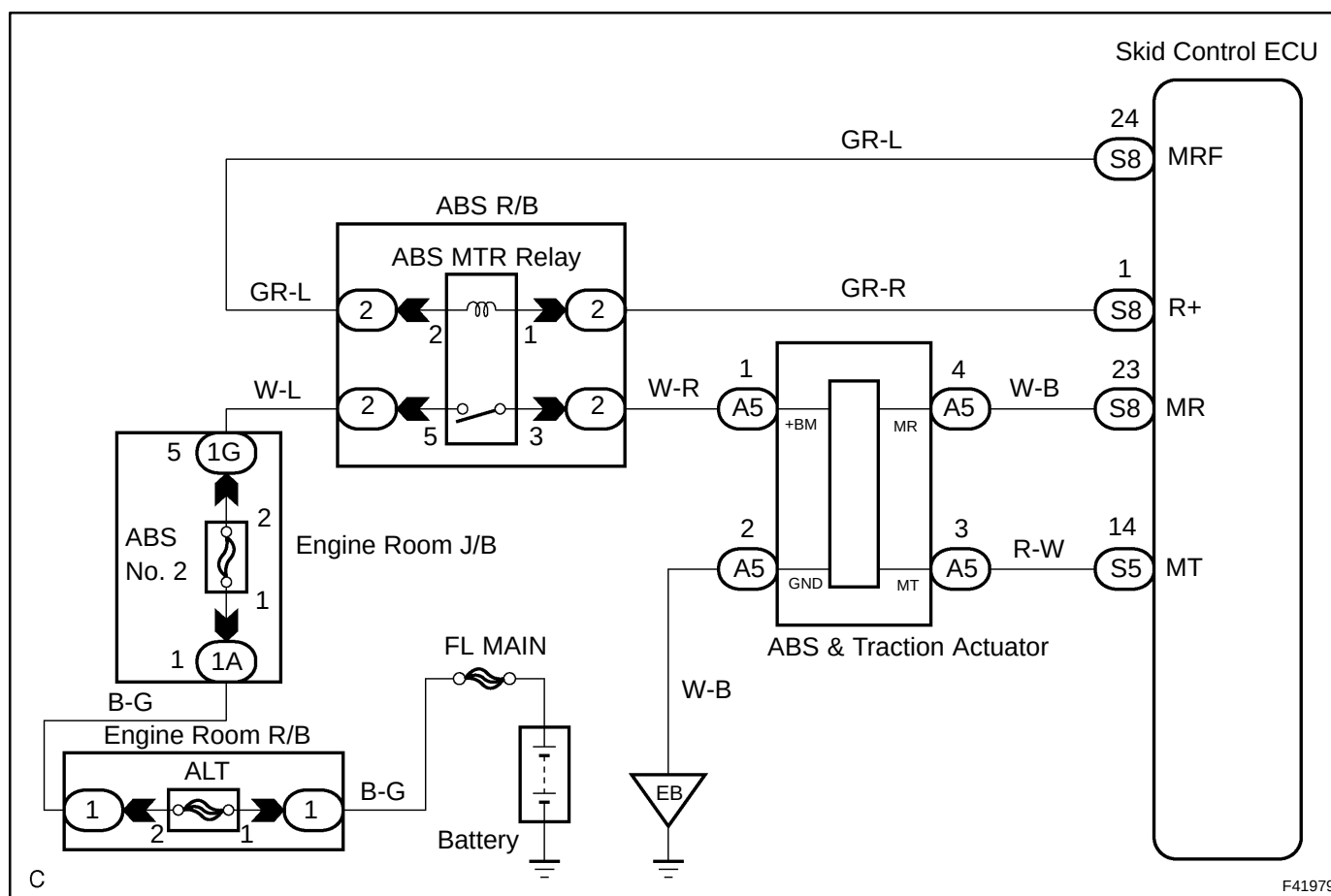
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN ON PROBLEM SYMPTOMS TABLE
(See page 05-308)

DTC	C1251/51	PUMP MOTOR IS LOCKED/OPEN CIRCUIT IN PUMP MOTOR GROUND
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CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1251/51	Conditions 1., 2. and 3. continue for 0.024 sec.: - While checking self diagnosis of ECU, after current flows to motor for 0.3 sec. within 0.054 sec. from turning OFF motor relay. - While checking self diagnosis of ECU, after current flows to motor for 1.4 sec. within 0.054 sec. from turning OFF motor relay - Motor relay contact turned OFF	ABS pump motor

WIRING DIAGRAM



INSPECTION PROCEDURE

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 PERFORM ACTIVE TEST BY HAND-HELD TESTER(ABS PUMP MOTOR OPERATION)

- (a) Select the item "ABS MOT RELAY" in the ACTIVE TEST and operate the ABS motor relay on the hand-held tester.
- (b) Check the operation sound of the ABS pump motor when operating it with the hand-held tester.

OK:

The operation sound of the pump motor should be heard.

NG

REPLACE ABS & TRACTION ACTUATOR ASSY

OK

2 RECONFIRM DTC(See page 05-288)

A	Normal Code
B	Malfunction Code

B

CHECK AND REPLACE SKID CONTROL ECU ASSY

A

END

DTC	AlwaysON	MALFUNCTION IN ABS ECU
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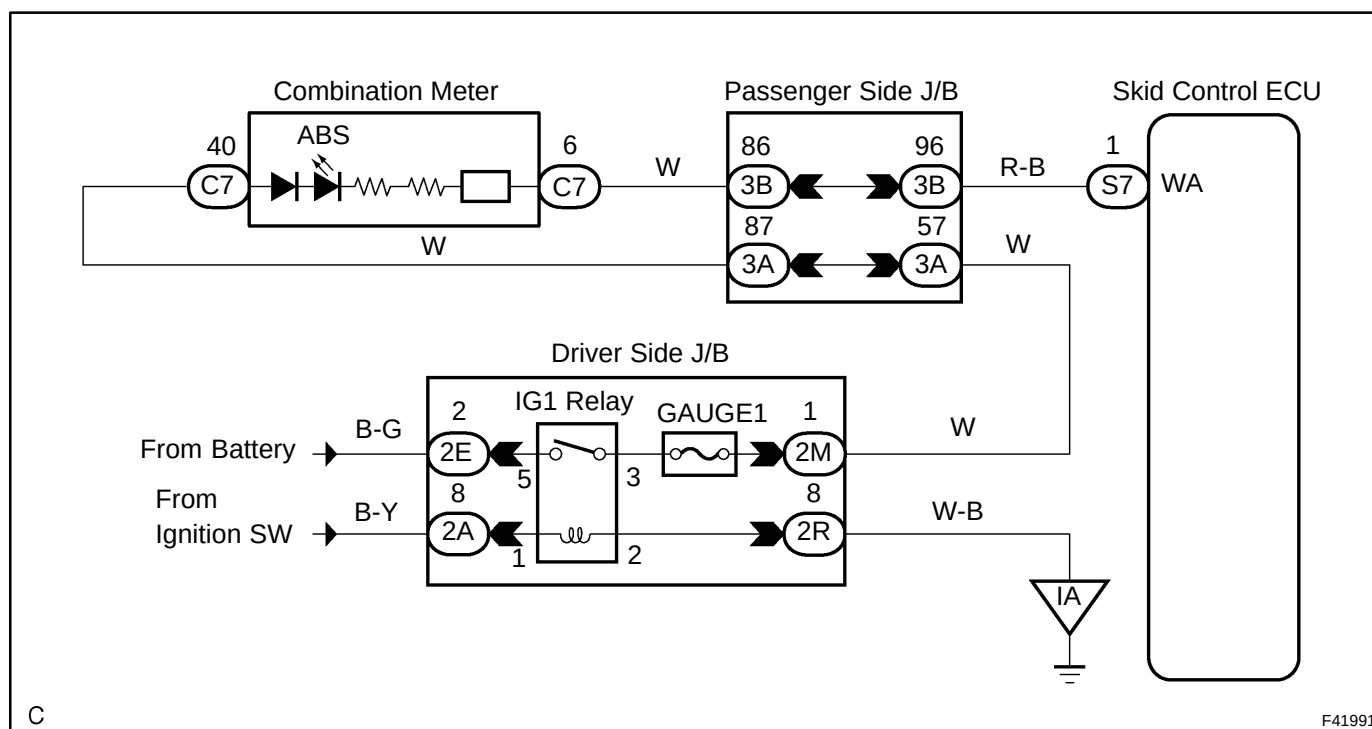
CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Either of the following 1., 2. or 3. is detected: 1. Voltage of ECU terminal IG1 remains at more than 17 V. 2. The ECU connectors are off from the ECU. 3. There is a malfunction in the ECU internal circuit.	• Battery • Charging system • Power source circuit • Skid control ECU

HINT:

There is a case that hand-held tester cannot be used when ECU is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK SKID CONTROL ECU CONNECTOR SECURELY CONNECTED
----------	--

NG

CONNECT CONNECTORS

OK

2	RECONFIRM DTC(See page 05-288)
----------	--

A	Normal Code
B	Malfunction Code

B

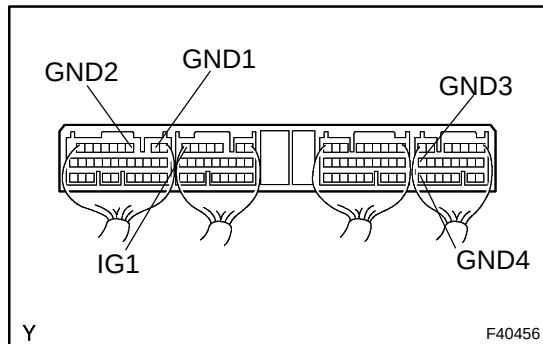
REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

3 CHECK VOLTAGE OF ECU IG POWER SOURCE**IN CASE OF USING THE HAND-HELD TESTER:**

- (a) Select the item "IG VOLTAGE" in the DATA LIST and read its value displayed on the hand-held tester.
- (b) Check the voltage condition output from the ECU displayed on the hand-held tester.

OK: "Normal" is displayed.

**IN CASE OF NOT USING THE HAND-HELD TESTER:**

- (a) Remove the skid control ECU with connectors still connected.
- (b) Turn the ignition switch ON, measure voltage between terminals IG1 and GND of skid control ECU connector.

OK: 10 - 14 V

OK

CHECK AND REPAIR HARNESS AND CONNECTOR

NG

4 INSPECT BATTERY(TERMINAL VOLTAGE)

- (a) Check the battery positive voltage.

OK: 10 - 14 V

NG

CHECK AND REPLACE CHARGING SYSTEM

OK

5 CHECK HARNESS AND CONNECTOR(BATTERY - SKID CONTROL ECU ASSY)

NG

CHECK AND REPAIR HARNESS AND CONNECTOR

OK

6 CHECK ABS WARNING LIGHT**IN CASE OF USING THE HAND-HELD TESTER:**

- (a) Select the item "ABS WARN LIGHT" in the ACTIVE TEST and operate the ABS warning light on the hand-held tester.
- (b) 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:

- (a) Turn the ignition switch OFF and disconnect the connector from the skid control ECU.
- (b) Turn the ignition switch ON.
- (c) Check the ABS warning light turns off.

OK**CHECK AND REPLACE COMPUTER ASSY,
SKID CONTROL****NG****CHECK AND REPLACE METER ASSY, COMBINATION**

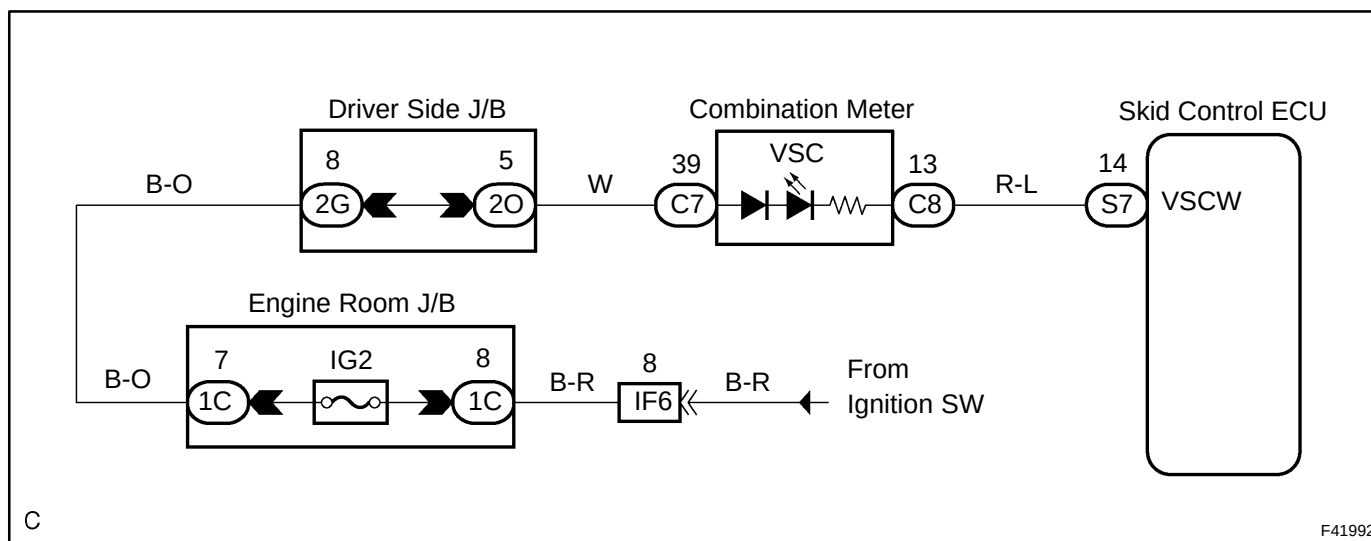
DTC	Always ON	MALFUNCTION IN ECU(VSC WARNING LIGHT)
------------	------------------	--

CIRCUIT DESCRIPTION

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

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Malfunction in skid control ECU	• Battery • IC regulator • Power source circuit • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	RECONFIRM DTC(See page 05-288)
----------	--

A	Normal Code
B	Malfunction Code

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

2	CHECK VSC WARNING LIGHT
----------	--------------------------------

(a) Check VSC warning light go off.

YES

CHECK AND REPAIR HARNESS AND CONNECTOR

NO

3 INSPECT BATTERY(TERMINAL VOLTAGE)

- (a) Check the battery positive voltage.

OK: 10 - 14 V

NG

CHECK AND REPLACE CHARGING SYSTEM

OK

4 CHECK VSC WARNING LIGHT**IN CASE OF USING THE HAND-HELD TESTER:**

- (a) Select the item "VSC WARN LIGHT" in the ACTIVE TEST and operate the VSC warning light on the hand-held tester.
- (b) Check that "ON" and "OFF" of the VSC warning light can be shown on the combination meter on the hand-held tester.

IN CASE OF NOT USING THE HAND-HELD TESTER:

- (a) Turn the ignition switch OFF.
- (b) Disconnect the connector from the skid control ECU.
- (c) Turn the ignition switch ON.
- (d) Check the VSC warning light goes off.

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

NG

CHECK AND REPAIR HARNESS OR CONNECTOR

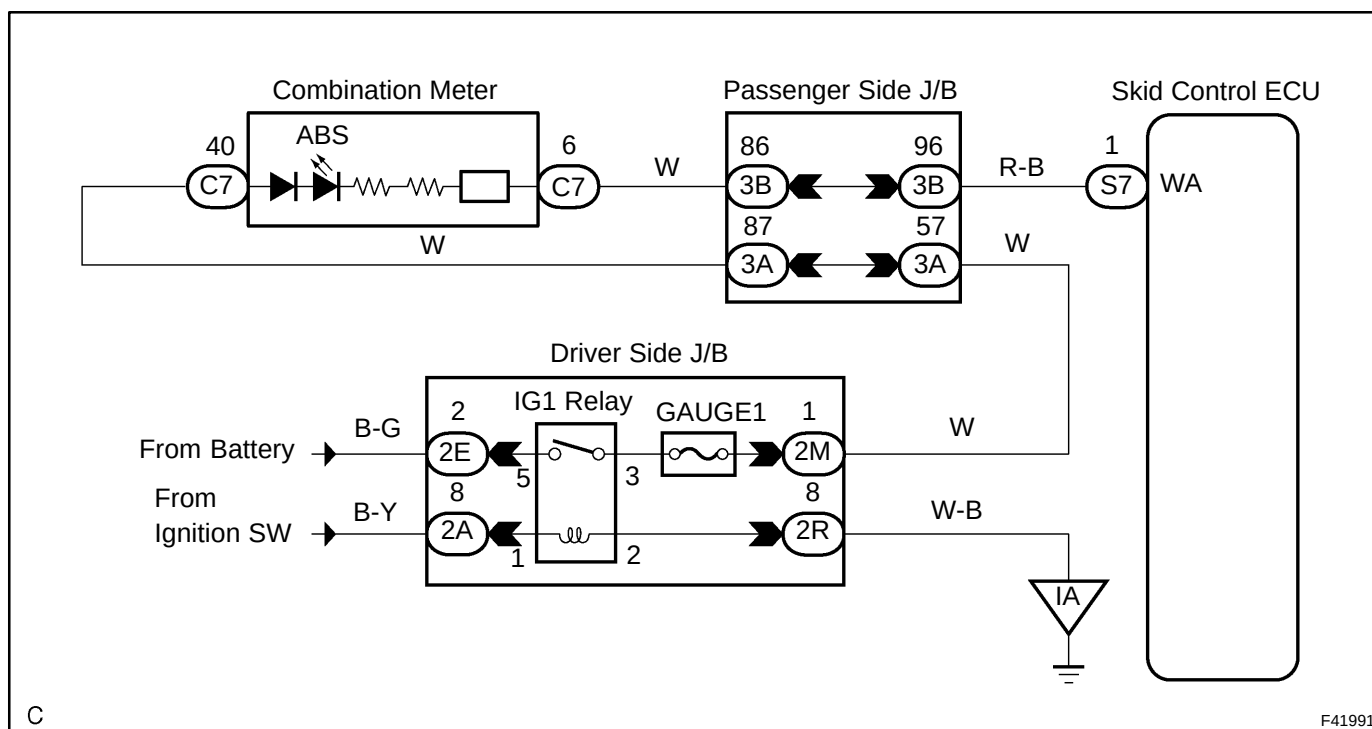
ABS WARNING LIGHT CIRCUIT (REMAINS ON)

CIRCUIT DESCRIPTION

If the ECU detects trouble, it lights the ABS warning light while prohibiting ABS control. At this time, the ECU records a DTC in memory.

Connect terminals Tc and CG of the DLC3 to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	RECONFIRM DTC(See page 05-288)
---	---------------------------------

A	Normal Code
B	Malfunction Code

B	REPAIR CIRCUIT INDICATED BY OUTPUT CODE
---	---

A

2	CHECK HARNESS AND CONNECTOR(DLC3 - SKID CONTROL ECU ASSY) (See page 01-31)
---	--

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
----	--

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

ABS WARNING LIGHT CIRCUIT (DOES NOT LIGHT UP)

CIRCUIT DESCRIPTION

Refer to ABS Warning Light Circuit (Remains ON) on page 05-368 .

WIRING DIAGRAM

Refer to ABS Warning Light Circuit (Remains ON) on page 05-368 .

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	PERFORM ACTIVE TEST BY HAND-HELD TESTER(ABS WARNING LIGHT OPERATION)
----------	---

- (a) Select the item "ABS WARN LIGHT" in the ACTIVE TEST and operate the ABS warning light on the hand-held tester.
- (b) Check that "ON" of the ABS warning light can be shown on the combination meter using the hand-held tester.

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

NG

2	INSPECT COMBINATION METER ASSY(ABS WARNING LIGHT CIRCUIT)
----------	--

NG

REPAIR COMBINATION METER ASSY

OK

CHECK AND REPAIR HARNESS AND CONNECTOR

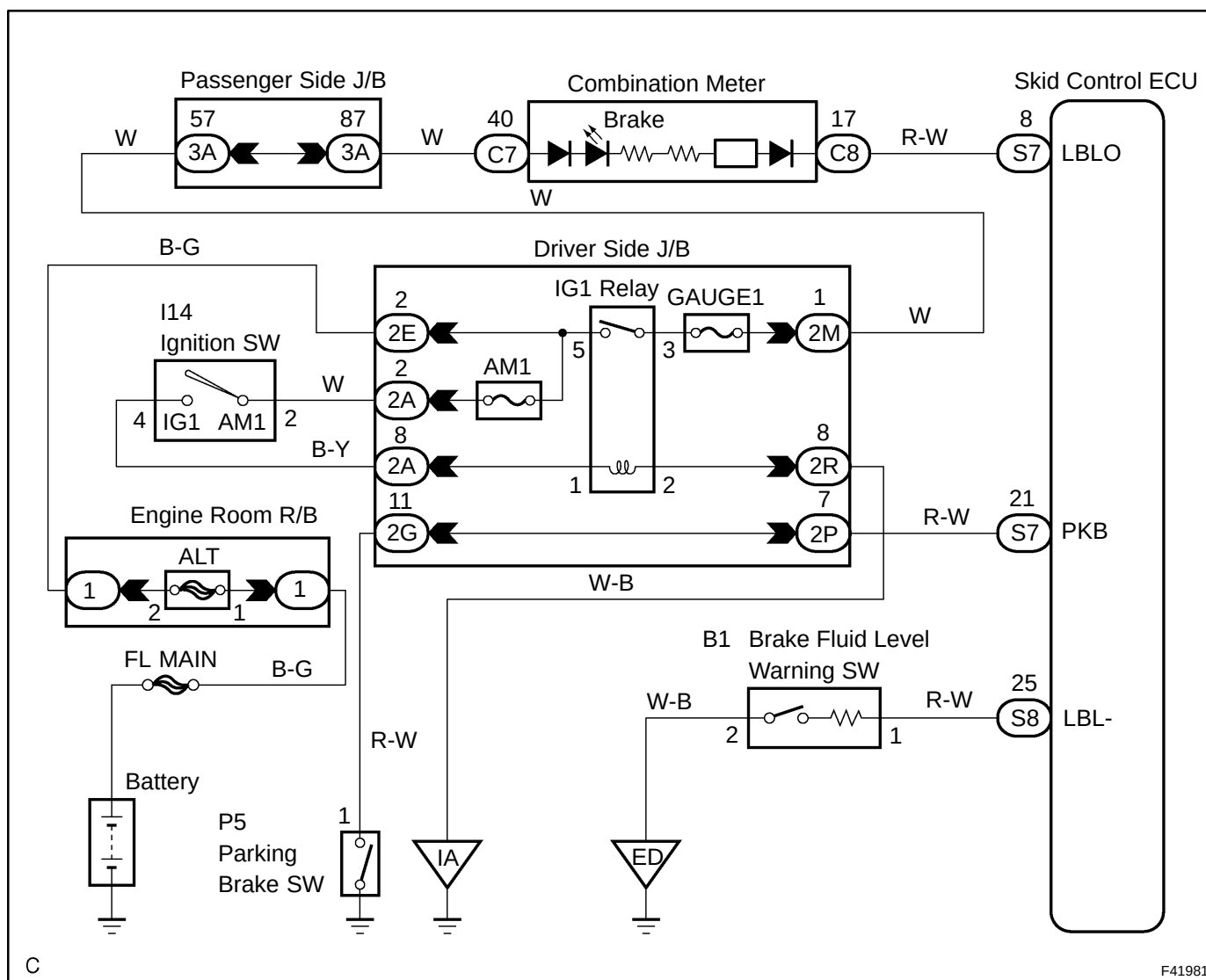
BRAKE WARNING LIGHT CIRCUIT

CIRCUIT DESCRIPTION

If the ECU detects trouble, it lights the brake warning light while prohibiting ABS control. At this time, the ECU records a DTC in memory.

Connect terminals Tc and CG of the DLC3 to make the brake warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK PARKING BRAKE SWITCH CIRCUIT

NG

REPAIR OR REPLACE PARKING BRAKE SWITCH CIRCUIT

OK

2 CHECK BRAKE FLUID LEVEL WARNING SWITCH CIRCUIT**NG****REPAIR OR REPLACE BRAKE FLUID LEVEL WARNING SWITCH CIRCUIT****OK****3 RECONFIRM DTC(See page 05-288)**

A	Normal Code
B	Malfunction Code

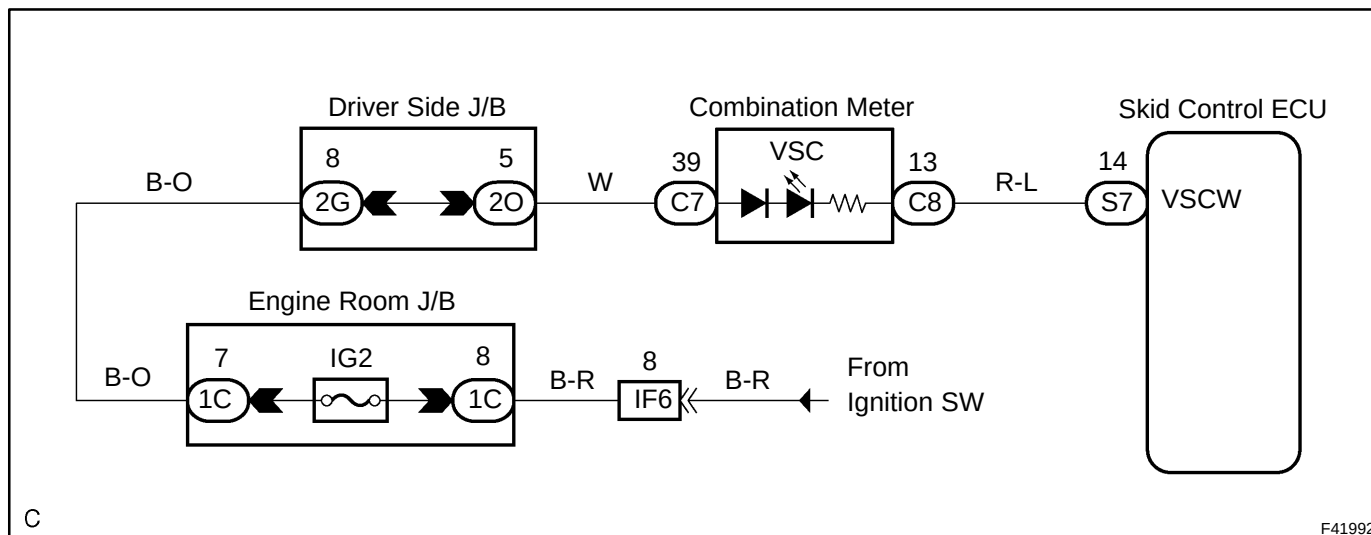
B**REPAIR CIRCUIT INDICATED BY OUTPUT CODE****A****4 INSPECT COMBINATION METER ASSY(BRAKE WARNING LIGHT CIRCUIT)****NG****REPAIR OR REPLACE COMBINATION METER ASSY****OK****5 CHECK HARNESS AND CONNECTOR(COMBINATION METER - SKID CONTROL ECU ASSY)(See page 01-31)****NG****REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****CHECK AND REPLACE SKID CONTROL ECU ASSY**

VSC WARNING LIGHT CIRCUIT

CIRCUIT DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER(VSC WARNING LIGHT CIRCUIT)

- Select the item "VSC WARN LIGHT" in the ACTIVE TEST and operate the VSC warning light on the hand-held tester.
- 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 ASSY

NG

2 INSPECT VSC WARNING LIGHT

- See combination meter troubleshooting on page 71-1.

NG

REPAIR OR REPLACE COMBINATION METER ASSY

OK

3	CHECK HARNESS AND CONNECTOR(SKID CONTORL ECU ASSY - COMBINATION METER)(See page 01-31)
---	---

NG	REPAIR OR REPLACE HARNESS OR CONNECTOR
----	--

OK

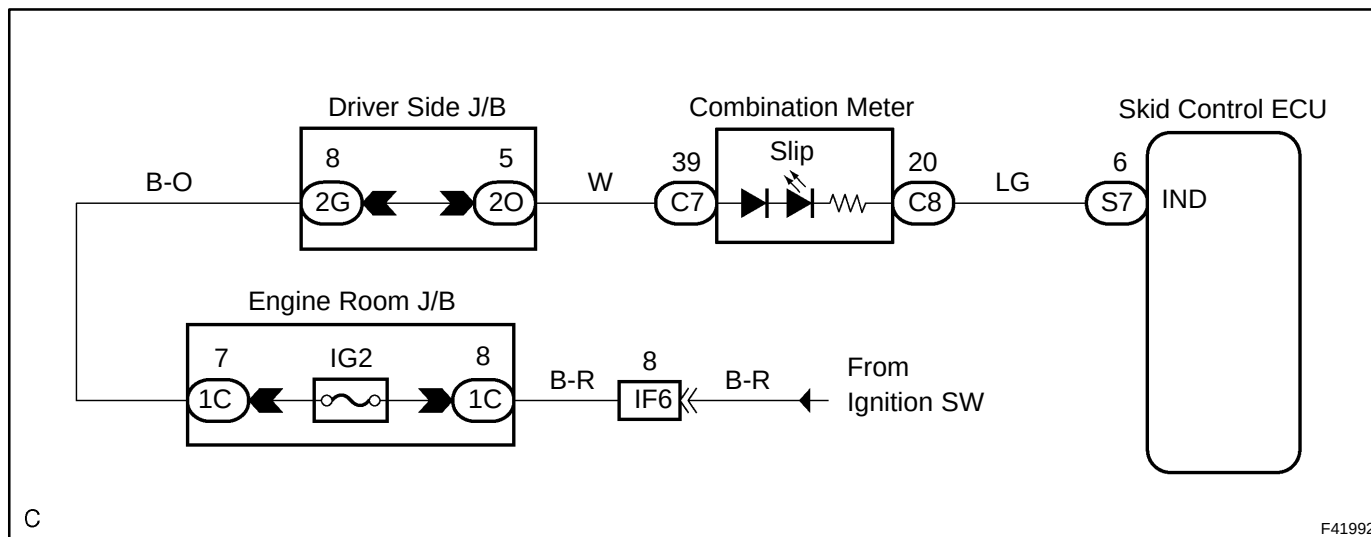
CHECK AND REPLACE SKID CONTROL ECU ASSY

SLIP INDICATOR LIGHT CIRCUIT

CIRCUIT DESCRIPTION

The SLIP indicator blinks during TRAC & VSC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER(SLIP INDICATOR LIGHT OPERATION)

- Select the item "SLIP INDI LIGHT" in the ACTIVE TEST and operate the SLIP indicator light on the hand-held tester.
- 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

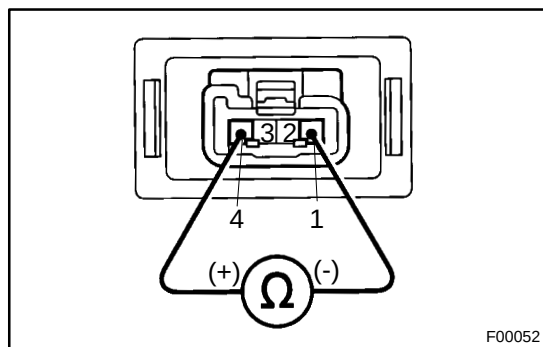
2 CHECK SLIP INDICATOR LIGHT

- Check that the SLIP indicator light is on for 3 seconds soon after ignition switch ON.

OK → END

NG

3 INSPECT COMBINATION METER ASSY(SLIP INDICATOR LIGHT CIRCUIT)**NG****REPAIR OR REPLACE COMBINATION METER ASSY****OK****4 CHECK HARNESS AND CONNECTOR(COMBINATION METER - SKID CONTROL ECU ASSY)(See page [01-31](#))****NG****REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****CHECK AND REPLACE SKID CONTROL ECU ASSY**

2 INSPECT TRACTION CONTROL SWITCH

- (a) Remove TRAC control switch.
- (b) Disconnect TRAC control switch connector.
- (c) Measure resistance between terminals 1 and 4 of TRAC control switch when TRAC control switch is on and off.

OK:

TRAC cut switch	Resistance
Pushed in	Continuity

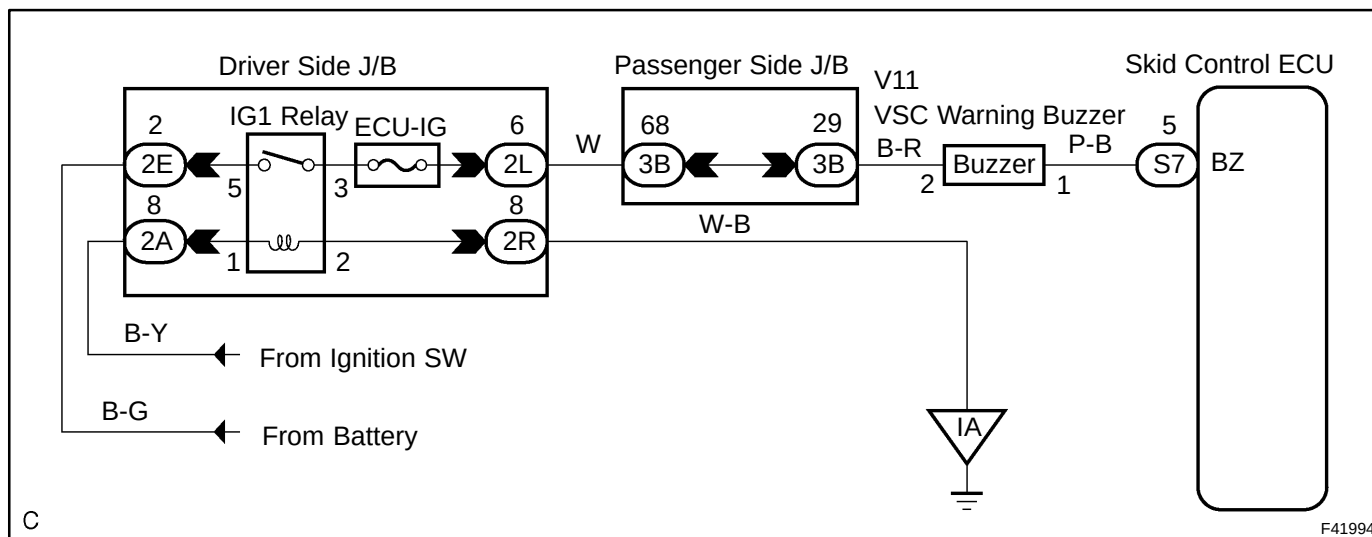
NG**REPLACE TRACTION CONTROL SWITCH****OK****3 CHECK HARNESS AND CONNECTOR(TRACTION CONTROL SWITCH - BODY GROUND)(See page 01-31)****NG****REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****4 INSPECT COMBINATION METER ASSY(TRAC OFF INDICATOR LIGHT CIRCUIT)****NG****REPAIR OR REPLACE COMBINATION METER ASSY****OK****5 CHECK HARNESS AND CONNECTOR(COMBINATION METER - SKID CONTROL ECU ASSY)(See page 01-31)****NG****REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****CHECK AND REPLACE SKID CONTROL ECU ASSY**

VSC BUZZER CIRCUIT

CIRCUIT DESCRIPTION

The skid control buzzer sounds during VSC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

1	PERFORM ACTIVE TEST BY HAND-HELD TESTER(SKID CONTROL BUZZER OPERATION)
----------	---

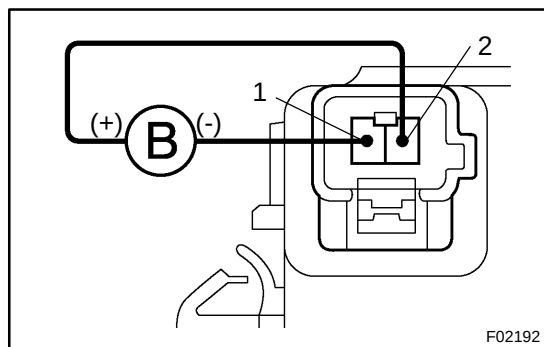
- Select the item "VSC/BR WARN BUZ" in the ACTIVE TEST and operate the skid control buzzer on the hand-held tester.
- Check that skid control buzzer sounds "ON" and "OFF" with the hand-held tester.

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

NG

2 INSPECT SKID CONTROL BUZZER ASSY



- (a) Disconnect the skid control buzzer connector.
- (b) Apply battery positive voltage to the terminals 1 and 2 of skid control buzzer connector, check that the buzzer sounds.

NG

REPLACE SKID CONTROL BUZZER ASSY

OK

3 CHECK HARNESS AND CONNECTOR(SKID CONTROL BUZZER - SKID CONTROL ECU)(See page 01-31)

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

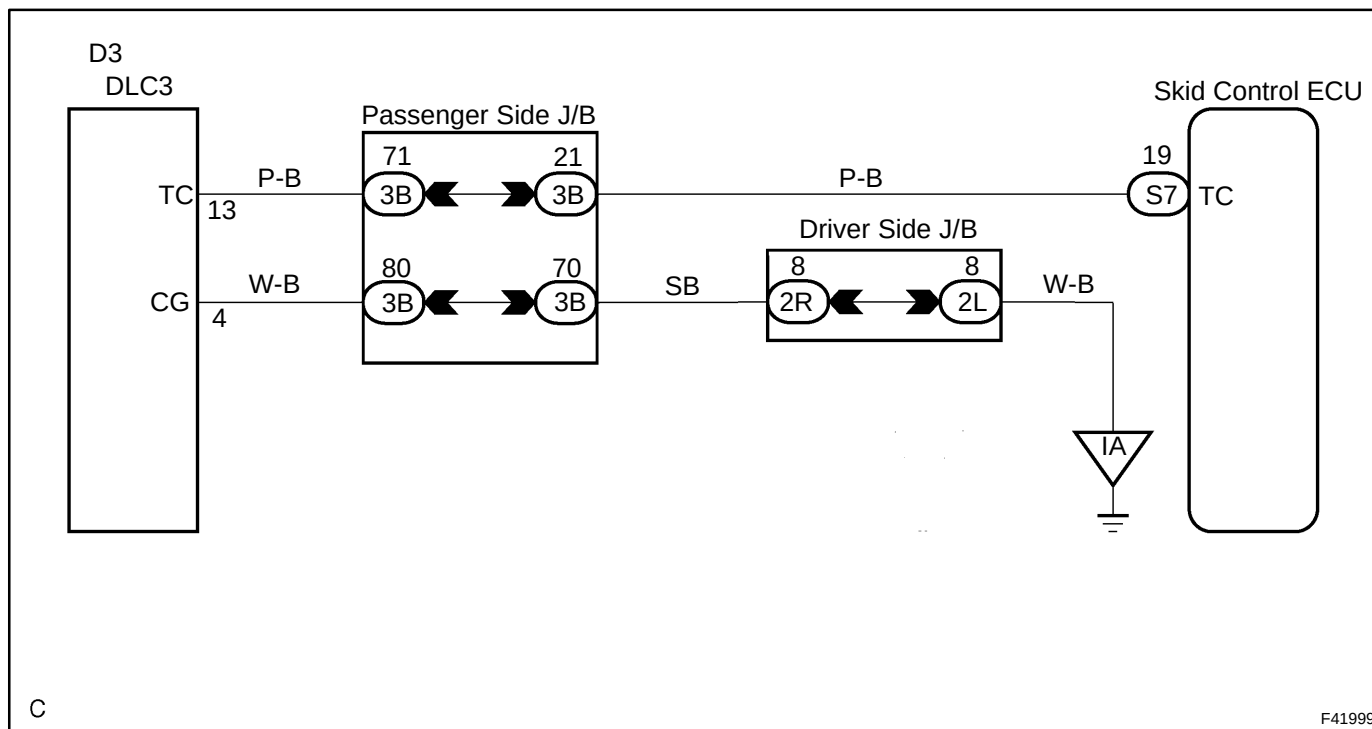
CHECK AND REPLACE SKID CONTROL ECU ASSY

TC TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

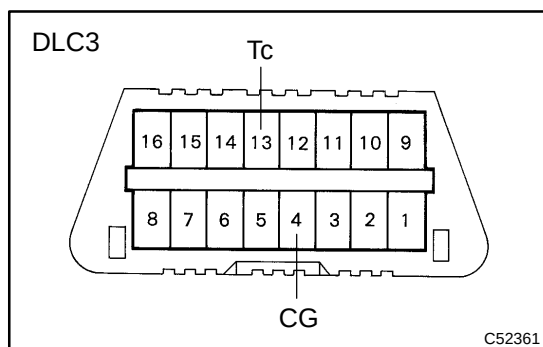
Connecting terminals Tc and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT DLC3(TC TERMINAL VOLTAGE)



- Turn the ignition switch ON.
- Measure voltage between terminals Tc and CG of DLC3.
OK: 10 - 14 V

OK

Go to step 3

NG

2 CHECK HARNESS AND CONNECTOR(SKID CONTROL ECU ASSY - DLC3, DLC3 - BODY GROUND)

- (a) Check for open and short circuit in harness and connector between terminal Tc of the skid control ECU and DLC3 (See page 01-31).
- (b) Check for open circuit in harness and connector between terminal CG of the DLC3 and body ground (See page 01-31).

NG

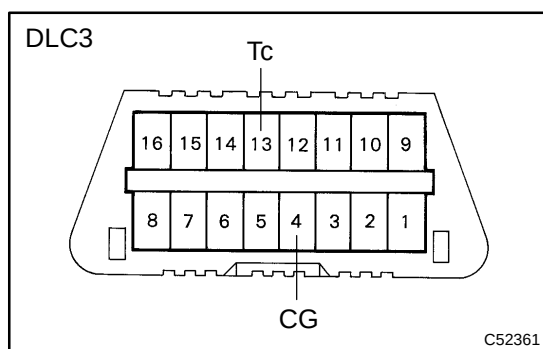
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

3 INSPECT ABS AND VSC WARNING LIGHT

SST 09843-18040



- (a) Using SST, connect the terminals Tc and CG of the DLC3.
- (b) Turn the ignition switch ON.
- (c) Check the ABS and VSC warning light.

OK: Warning light blinking

OK

END

NG

CHECK AND REPLACE SKID CONTROL ECU ASSY

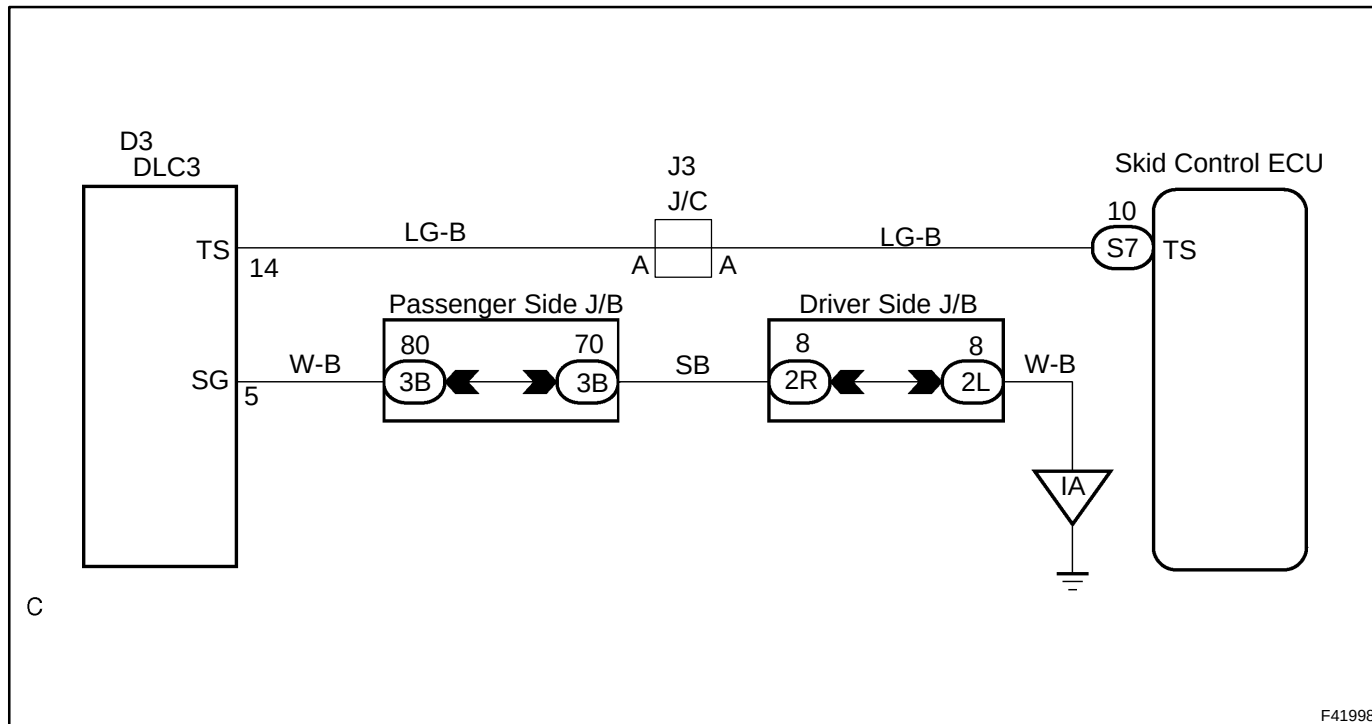
TS TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

In the sensor check mode, a malfunction of the speed sensor that cannot be judged when the vehicle is stopped is judged while driving.

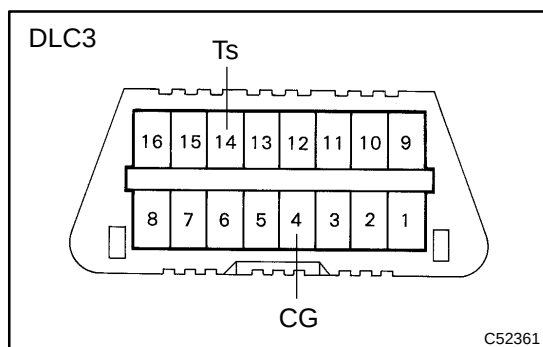
Transition to the sensor check mode can be performed by connecting terminals Ts and CG of the DLC3 and turning the ignition switch from OFF to ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT DLC3 TERMINAL VOLTAGE(TS TERMINAL)



- Turn the ignition switch ON.
- Measure voltage between terminals Ts and CG of DLC3.
OK: 10 - 14 V

OK

Go to step 3

NG

2 CHECK HARNESS AND CONNECTOR(DLC3 - SKID CONTROL ECU, DLC3 - BODY GROUND)

- (a) Check for open and short circuit in harness and connector between terminal Ts of the DLC3 and skid control ECU, CG of DLC3 and body ground (See page [01-31](#)).

NG

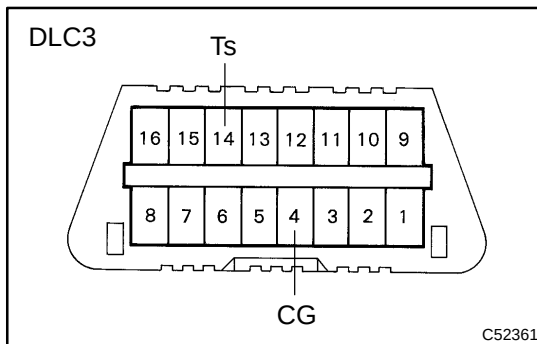
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

3 INSPECT ABS AND VSC WARNING LIGHT

SST 09843-18040



- (a) Using SST, connect the terminals Ts and CG of the DLC3.
 (b) Turn the ignition switch ON.
 (c) Check the ABS and VSC warning right.

OK: Warning light blinking

OK

END

NG

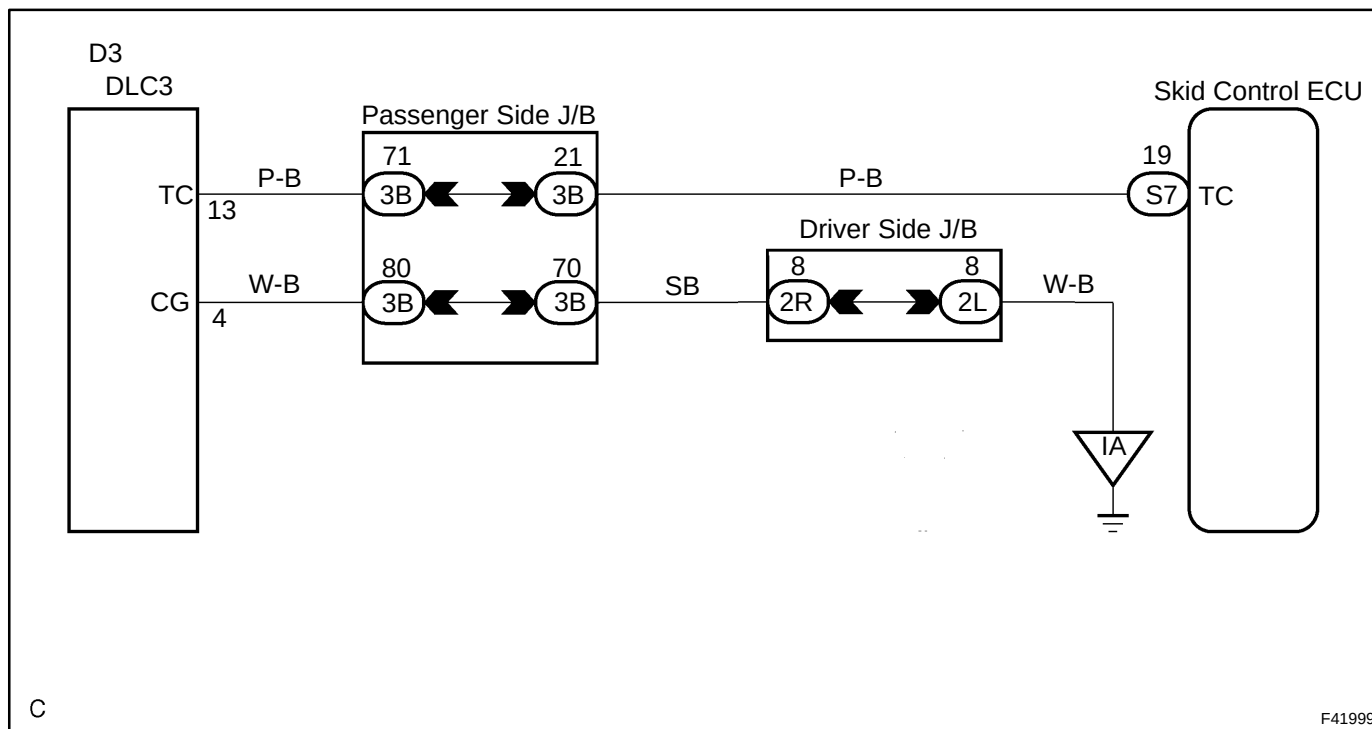
CHECK AND REPLACE SKID CONTROL ECU ASSY

TC TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

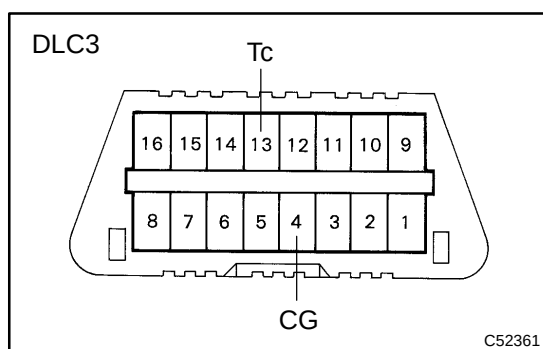
Connecting terminals Tc and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT DLC3(TC TERMINAL VOLTAGE)



- Turn the ignition switch ON.
- Measure voltage between terminals Tc and CG of DLC3.
OK: 10 - 14 V

OK

Go to step 3

NG

2 CHECK HARNESS AND CONNECTOR(SKID CONTROL ECU ASSY - DLC3, DLC3 - BODY GROUND)

- (a) Check for open and short circuit in harness and connector between terminal Tc of the skid control ECU and DLC3 (See page 01-31).
- (b) Check for open circuit in harness and connector between terminal CG of the DLC3 and body ground (See page 01-31).

NG

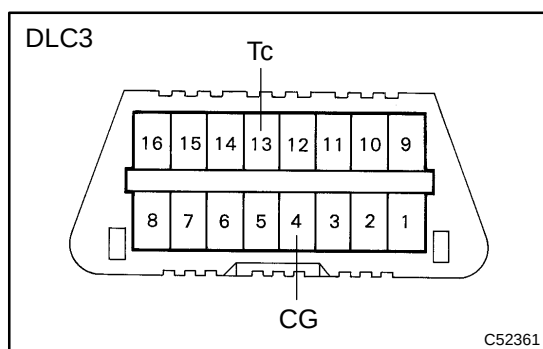
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK AND REPLACE SKID CONTROL ECU ASSY

3 INSPECT ABS AND VSC WARNING LIGHT

SST 09843-18040



- (a) Using SST, connect the terminals Tc and CG of the DLC3.
- (b) Turn the ignition switch ON.
- (c) Check the ABS and VSC warning right.

OK: Warning light blinking

OK

END

NG

CHECK AND REPLACE SKID CONTROL ECU ASSY