

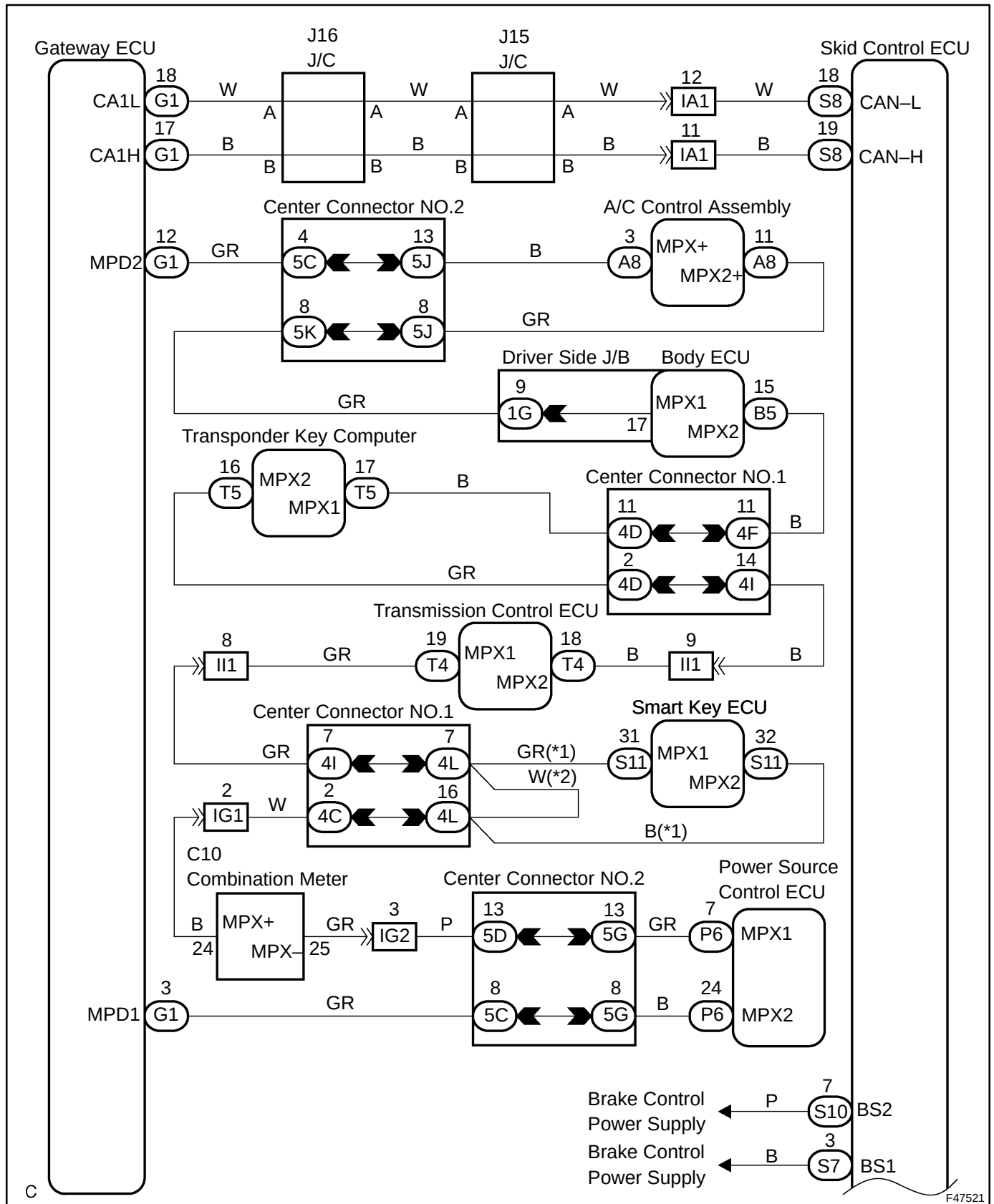
ABS WARNING LIGHT CIRCUIT (REMAINS ON)

CIRCUIT DESCRIPTION

Inform the driver that there is trouble with ABS by illuminating the ABS warning light.

When DTC output is normal and the ABS warning lamp remains on, perform troubleshooting as indicated below.

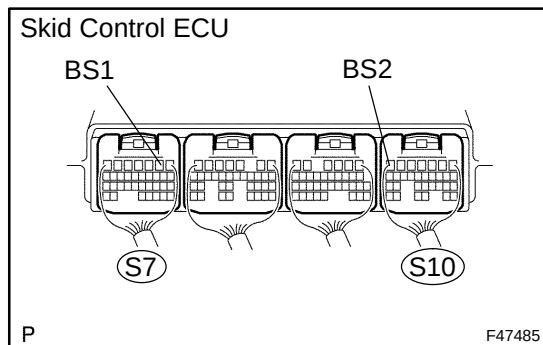
WIRING DIAGRAM



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INSPECTION PROCEDURE

1 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (BS1, BS2)

- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Specified Condition
S7-3 (BS1) – Body ground	10 to 14 V
S10-7 (BS2) – Body ground	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

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

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the power switch ON (READY).
 (c) Select the item "ABS WARN LIGHT" in the ACTIVE TEST and operate the ABS warning light on the hand-held tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
ABS WARN LIGHT	Turns ABS warning light ON / OFF	Observe combination meter

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

OK:

The ABS warning light turns on or off in accordance with the hand-held tester.

NG

REPAIR OR REPLACE COMBINATION METER ASSY (SEE PAGE 05-1986)

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

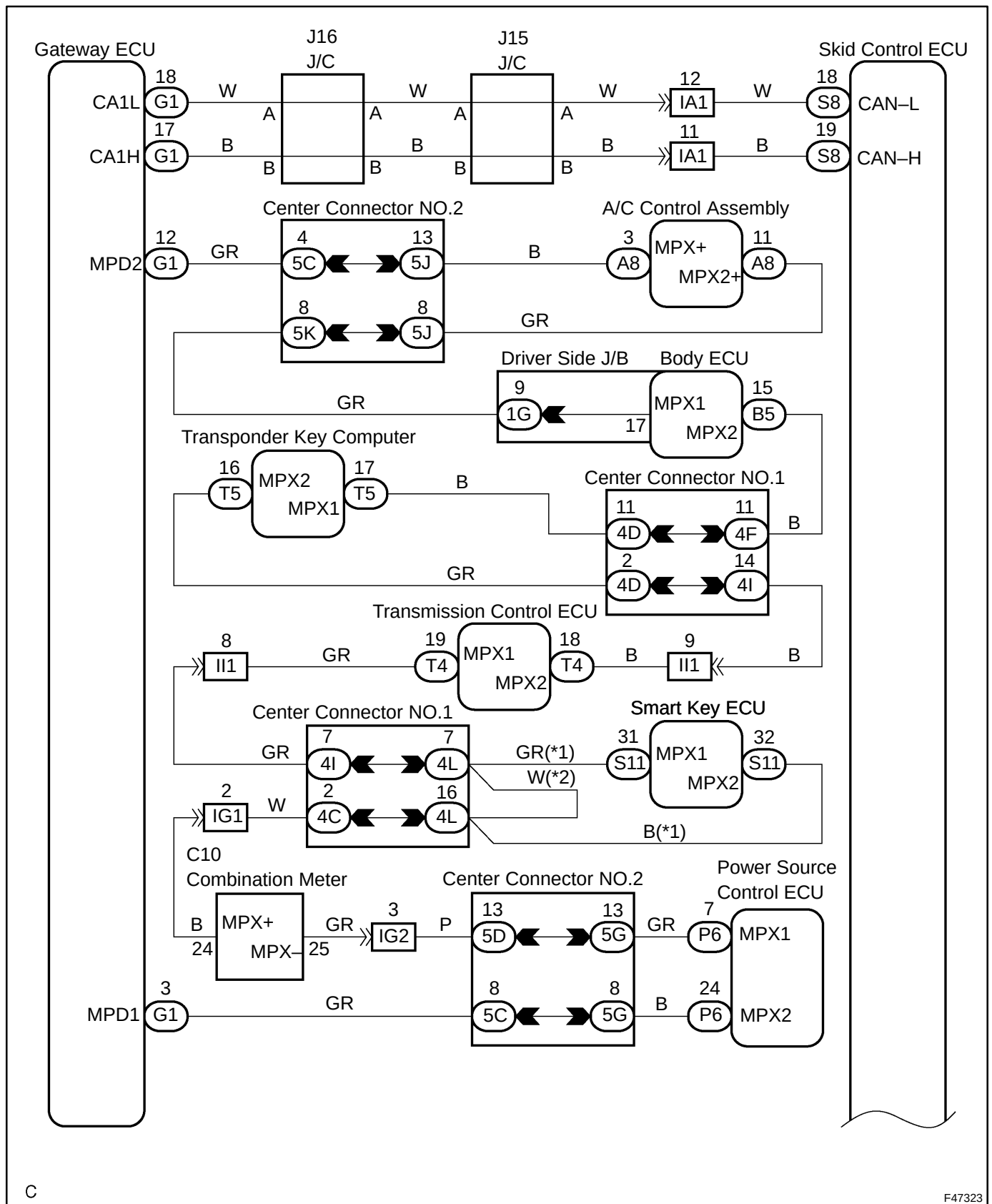
When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

BRAKE WARNING LIGHT CIRCUIT

CIRCUIT DESCRIPTION

The BRAKE warning light comes on when the brake fluid is insufficient or the parking brake is applied. The skid control ECU is connected to the combination meter via CAN and Multiplex communications. When DTC is normal and BRAKE warning light remains on, perform troubleshooting as indicated below.

WIRING DIAGRAM



C

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INSPECTION PROCEDURE

1 CHECK BRAKE FLUID LEVEL IN RESERVOIR

(a) Check that the brake fluid level is sufficient.

HINT:

- If the fluid level drops, check for a fluid leak, and repair if found.
- If no leaks exist, add and adjust fluid and then check that the trouble code is not output again.

OK:

Brake fluid level is proper.

NG

ADD BRAKE FLUID

OK

2 CHECK DTC FOR ABS

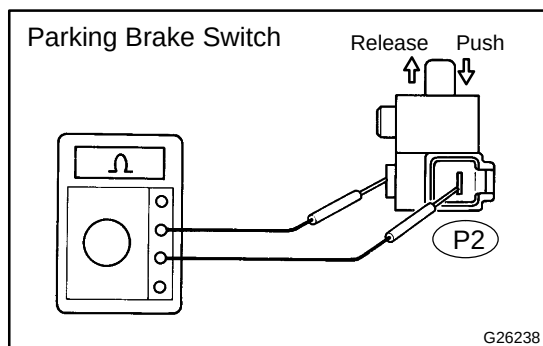
Are the DTCs recorded? (see page [05-975](#))

NO

Go to step 3

YES

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

3 INSPECT PARKING BRAKE SWITCH ASSY

(a) Remove the parking brake switch connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard:

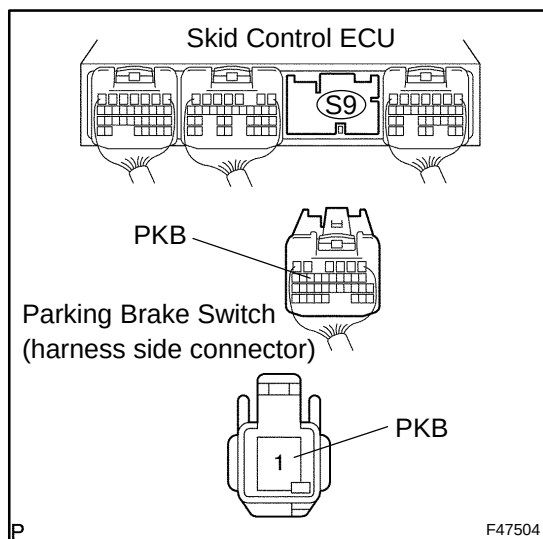
Tester Connection	Switch Condition	Specified Condition
P2-1 – Ground part	Released	Below 1 Ω
P2-1 – Ground part	Pushed in	10 k Ω or higher

NG

REPLACE PARKING BRAKE SWITCH ASSY

OK

4 CHECK HARNESS AND CONNECTOR(SKID CONTROL ECU – PARKING BRAKE SWITCH)



- Disconnect the skid control ECU connector and the parking brake switch connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S9-14 (PKB) – P3-1 (PKB)	Below 1 Ω

- Measure the resistance according to the value(s) in the table below.

Standard:

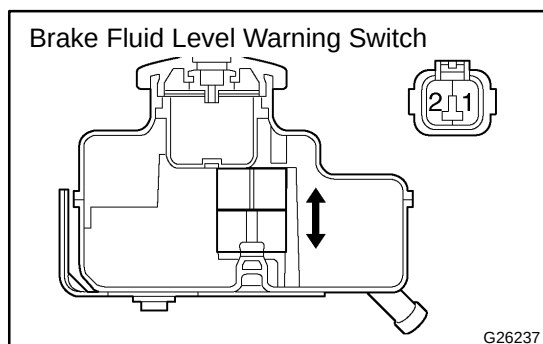
Tester Connection	Specified Condition
S9-14 (PKB) – Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 INSPECT BRAKE FLUID LEVEL WARNING SWITCH



- Remove the reservoir tank cap and strainer.
- Disconnect the brake fluid level warning switch connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Fluid Level	Specified Condition
(B1-1) – (B1-2)	Proper	1.8 to 2.16 k Ω
(B1-1) – (B1-2)	Below min.: level	Below 1 Ω

NG

REPLACE BRAKE FLUID LEVEL WARNING SWITCH

OK

6 INSPECT SKID CONTROL ECU CONNECTOR

- Check the skid control ECU connector's connecting condition.

OK:

The connector should be securely connected.

NG

CONNECT CONNECTOR TO ECU CORRECTLY

OK

7 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch ON (READY).
- (c) Select the item "ABS WARN LIGHT" in the ACTIVE TEST and operate the ABS Warning light on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal Condition
BRAKE WARN LIGHT	Turns BRAKE warning light ON / OFF	Observe combination meter

- (d) Check that "ON" and "OFF" of the VSC warning light are indicated on the combination meter when using the hand-held tester.

OK:**The ABS warning light turns on or off in accordance with the hand-held tester.****NG****REPAIR OR REPLACE COMBINATION METER ASSY****A****REPLACE SKID CONTROL ECU (SEE PAGE 32-68)****NOTICE:**

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

ABS WARNING LIGHT CIRCUIT (DOES NOT LIGHT UP)

INSPECTION PROCEDURE

1 INSPECT CAN COMMUNICATION SYSTEM (SEE PAGE 05-2605)

- (a) Is the DTC output for CAN communication system?

Result:

DTC is not output	A
DTC is output	B

B

**REPAIR CAN COMMUNICATION SYSTEM
(SEE PAGE 05-2619)**

A

2 INSPECT MULTIPLEX COMMUNICATION SYSTEM (SEE PAGE 05-2549)

- (a) Is the DTC output for Multiplex communication system?

Result:

DTC is not output	A
DTC is output	B

B

**REPAIR MULTIPLEX COMMUNICATION
SYSTEM (SEE PAGE 05-2558)**

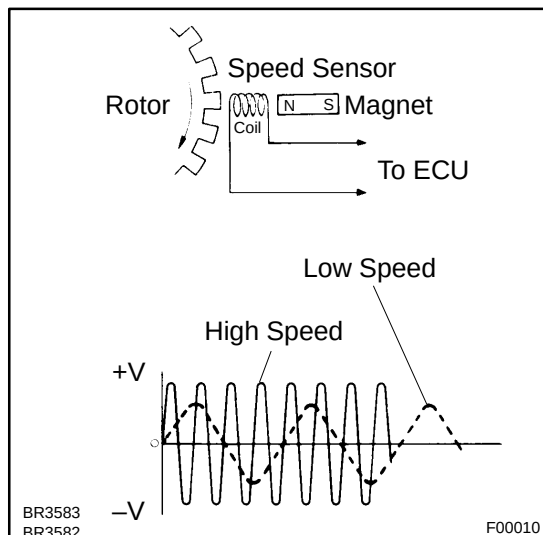
A

REPAIR OR REPLACE COMBINATION METER ASSY (SEE PAGE 05-1986)

DTC	C0200/31	RIGHT FRONT SPEED SENSOR CIRCUIT
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DTC	C0205/32	LEFT FRONT SPEED SENSOR CIRCUIT
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CIRCUIT DESCRIPTION



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

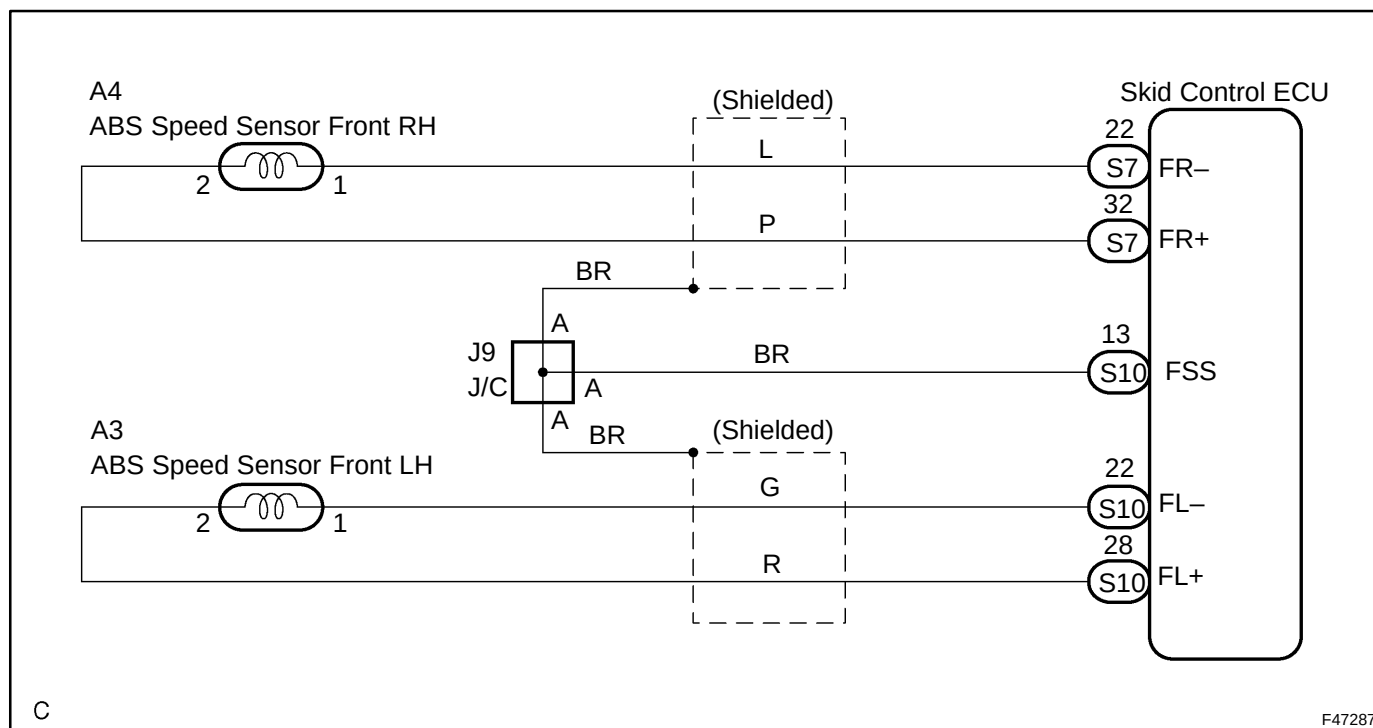
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200/31 C0205/32	- Speed of a malfunctioning wheel is 0 mph (0 km/h) for at least 15 sec. when vehicle speed is 6 mph (10 km/h) or more. - Speed of the slowest wheel is less than 1/7th of the 2nd slowest wheel for at least 15 sec. when vehicle speed is 6 mph (10 km/h) or more. - Abnormal high wheel speed pulse is input for at least 15 sec. - Abnormal high wheel speed pulse is input at least 7 times when ECU is on. - Speed sensor pulse signal is instantly cut 7 times or more. - Speed sensor signal line is open for at least 0.5 sec.	- Right front and left front speed sensor - Each speed sensor circuit - Sensor rotor - Sensor installation

HINT:

- DTC C0200/31 is for the right front speed sensor.
- DTC C0205/32 is for the left front speed sensor.
- The BRAKE warning light comes on when speed sensor malfunctions are detected in two or more wheels.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(MOMENTARY INTERRUPTION)

- (a) Using the hand-held tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (see page 05-956).

Item	Measurement Item / Range (Display)	Normal Condition
SPD SEN FR	FR speed sensor open detection / OPEN or NORMAL	NORMAL : Normal condition
SPD SEN FL	FL speed sensor open detection / OPEN or NORMAL	NORMAL : Normal condition

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG

Go to step 5

OK

2 READ VALUE OF HAND-HELD TESTER(FRONT SPEED SENSOR)

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the power switch ON (READY).
 (c) Select the DATA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal Condition
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed

- (d) 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:

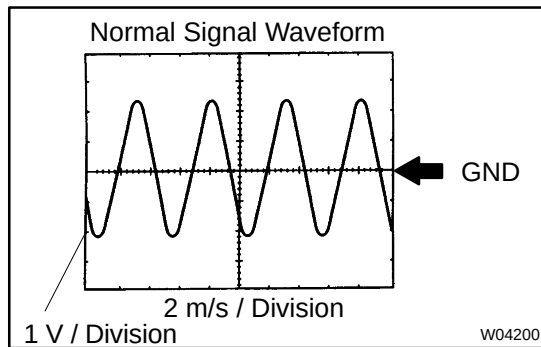
There is tolerance of $\pm 10\%$ in the speedometer indication.

NG

Go to step 4

OK

3 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



INSPECTION USING OSCILLOSCOPE

- Connect the oscilloscope to terminal FR+ – FR– or FL+ – FL– of the skid control ECU.
- Drive the vehicle at approximately 19 mph (30 km/h), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

HINT:

- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows 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 attached to it.

NG

Go to step 6

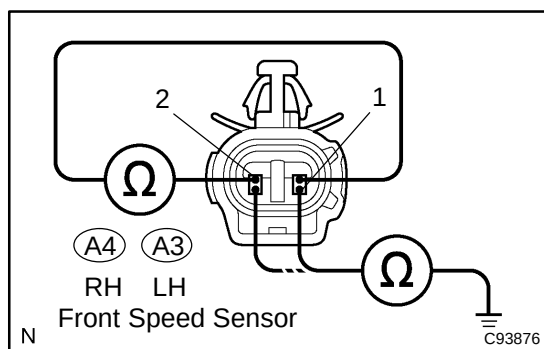
OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

4 INSPECT FRONT SPEED SENSOR



- Make sure that there is no looseness at the connector's locking part and connecting part of the connector A3 or A4.
- Disconnect the speed sensor connector.
- Measure the resistance according to the value(s) in the table below.

Standard:**LH:**

Tester Connection	Specified Condition
A3-2 (FL+) – A3-1 (FL-)	1.4 to 1.8 kΩ

RH:

Tester Connection	Specified Condition
A4-2 (FR+) – A4-1 (FR-)	1.4 to 1.8 kΩ

- Measure the resistance according to the value(s) in the table below.

Standard:**LH:**

Tester Connection	Specified Condition
A3-1 (FL-) – Body ground	10 kΩ or higher
A3-2 (FL+) – Body ground	10 kΩ or higher

RH:

Tester Connection	Specified Condition
A4-1 (FL-) – Body ground	10 kΩ or higher
A4-2 (FL+) – Body ground	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (see page [05-961](#)).

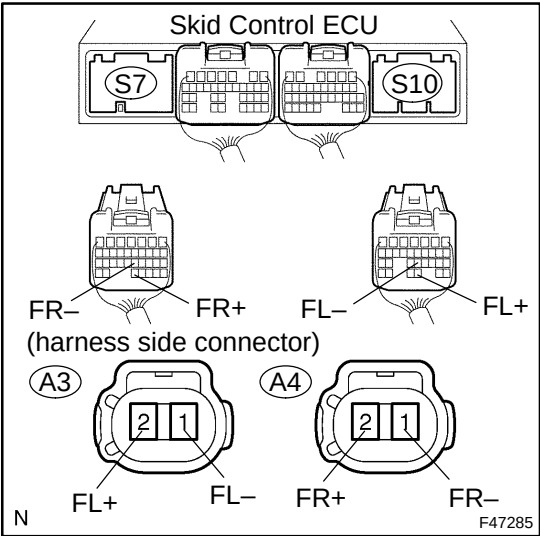
NG

REPLACE FRONT SPEED SENSOR
(SEE PAGE [32-62](#))

OK

5

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



- (a) Disconnect the skid control ECU connector and the front speed sensor connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

LH:

Tester Connection	Specified Condition
A3-1 (FL-) – S10-22 (FL-)	Below 1 Ω
A3-2 (FL+) – S10-28 (FL+)	Below 1 Ω

RH:

Tester Connection	Specified Condition
A4-1 (FR-) – S7-22 (FR-)	Below 1 Ω
A4-2 (FR+) – S7-32 (FR+)	Below 1 Ω

- (c) Measure the resistance according to the value(s) in the table below.

Standard:

LH:

Tester Connection	Specified Condition
A3-2 (FL+) – Body ground	10 kΩ or higher
A3-1 (FL-) – Body ground	10 kΩ or higher

RH:

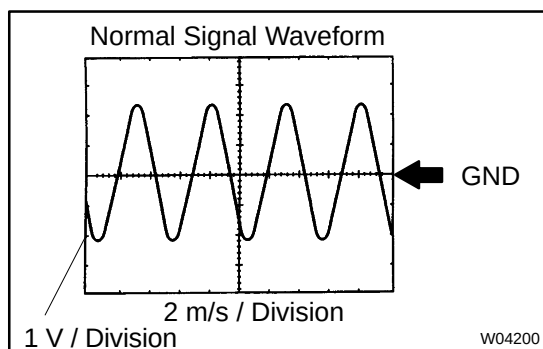
Tester Connection	Specified Condition
A4-2 (FR+) – Body ground	10 kΩ or higher
A4-1 (FR-) – Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



INSPECTION USING OSCILLOSCOPE

- Connect the oscilloscope to terminals FR+ – FR– or FL+ – FL– of the skid control ECU.
- Drive the vehicle at approximately 19mph (30 km/h), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

HINT:

- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows 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 attached to it.

NG

Go to step 7

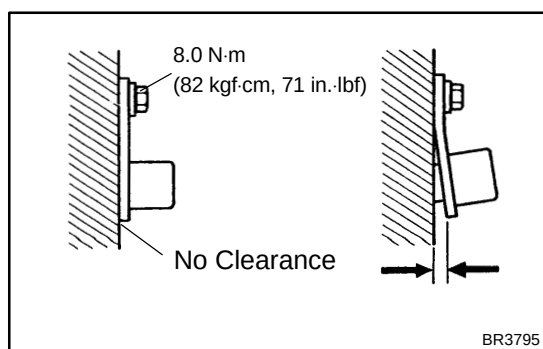
OK

REPAIR OR REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

7 INSPECT FRONT SPEED SENSOR INSTALLATION



- Check the speed sensor installation.

OK:

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

NOTICE:

Check the speed sensor signal after the replacement (see page 05-961).

NG

REPLACE FRONT SPEED SENSOR

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C0210/33	RIGHT REAR SPEED SENSOR CIRCUIT
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DTC	C0215/34	LEFT REAR SPEED SENSOR CIRCUIT
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CIRCUIT DESCRIPTION

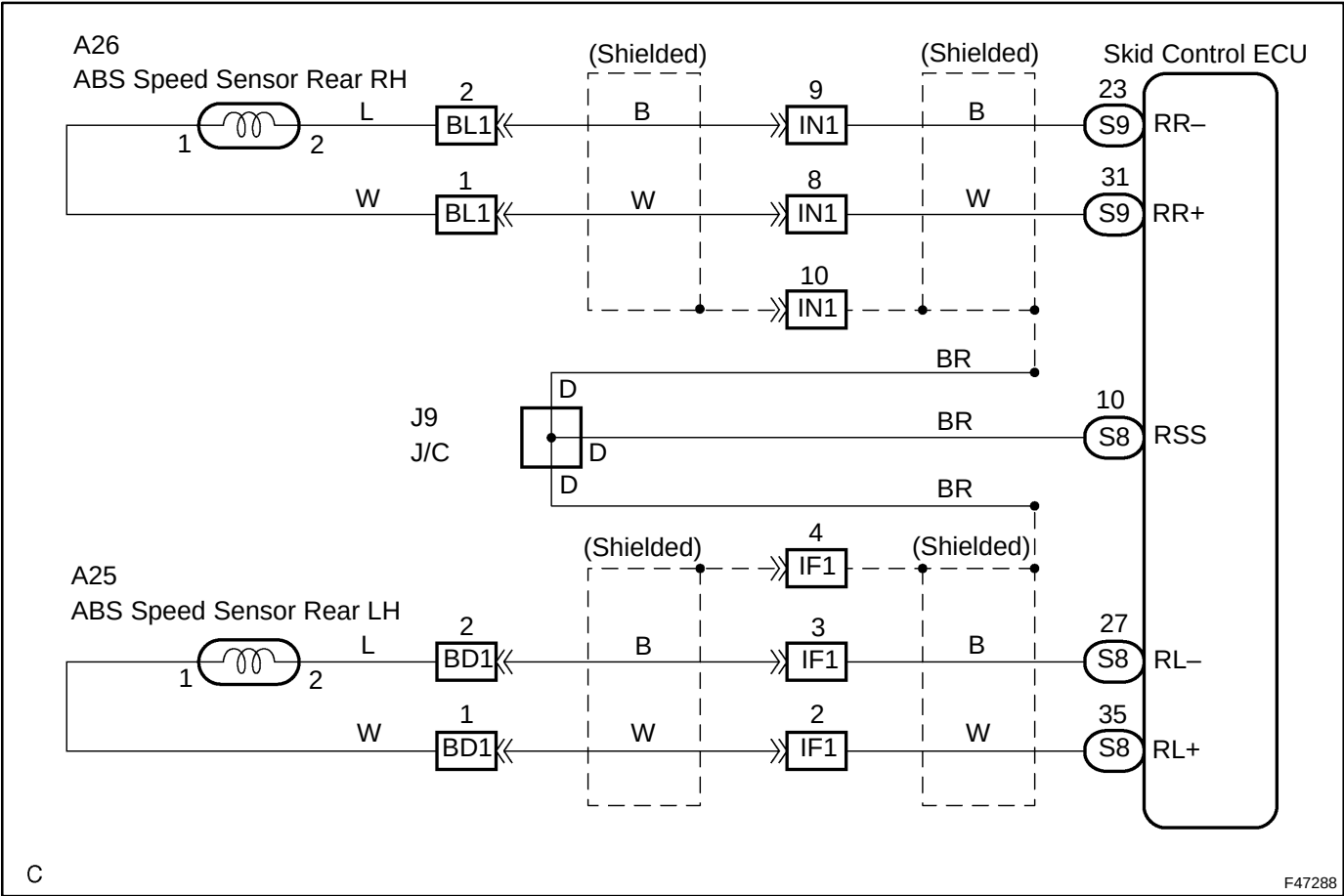
Refer to DTC C0200/31, C0205/32 on page 05-991.

DTC No.	DTC Detecting Condition	Trouble Area
C0210/33 C0215/34	- Speed of a malfunctioning wheel is 0 mph (0 km/h) for at least 15 sec. when vehicle speed is 6 mph (10 km/h) or more. - Speed of the slowest wheel is less than 1/7th of the 2nd slowest wheel for at least 15 sec. when vehicle speed is 6 mph (10 km/h) or more. - Abnormal high wheel speed pulse is input for at least 15 sec. - Abnormal high wheel speed pulse is input at least 7 times when ECU is on. - Speed sensor pulse signal is instantly cut 7 times or more. - Speed sensor signal line is open for at least 0.5 sec.	- Right rear and left rear speed sensor - Each speed sensor circuit - Sensor rotor - Sensor installation - Skid control ECU

HINT:

- DTC C0210/33 is for the right rear speed sensor.
- DTC C0215/34 is for the left rear speed sensor.
- The BRAKE warning light comes on when speed sensor malfunctions are detected in two or more wheels.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR(MOMENTARY INTERRUPTION)

- (a) Using the hand-held tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (see page 05-956).

Item	Measurement Item / Range (Display)	Normal Condition
SPD SEN RR	RR speed sensor open detection / OPEN or NORMAL	NORMAL : Normal condition
SPD SEN RL	RL speed sensor open detection / OPEN or NORMAL	NORMAL : Normal condition

OK:

There are no momentary interruption.

HINT:

Perform the above inspection before removing the sensor and connector.

NG

Go to step 5

OK

2 READ VALUE OF HAND-HELD TESTER(REAR SPEED SENSOR)

- (a) Connect the hand-held tester to the DLC3.
 (b) Start the engine.
 (c) Select the DATA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal Condition
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed

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

OK:

There is almost no difference in the displayed speed value.

HINT:

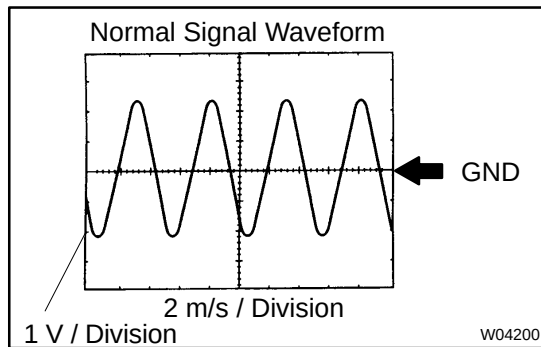
There is tolerance of $\pm 10\%$ in the speedometer indication.

NG

Go to step 4

OK

3 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



INSPECTION USING OSCILLOSCOPE

- Connect the oscilloscope to terminals RR+ – RR– or RL+ – RL– of the skid control ECU.
- Drive the vehicle at approximately 19 mph (30 km/h), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

HINT:

- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows 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 attached to it.

NG

Go to step 7

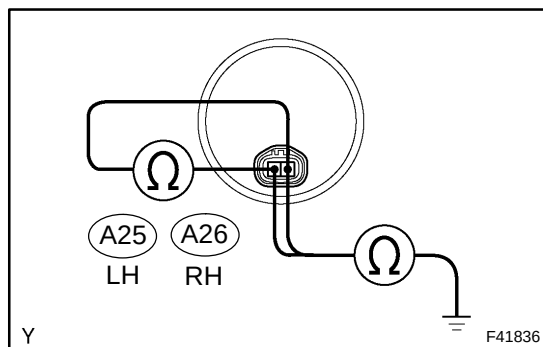
OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

4 INSPECT REAR SPEED SENSOR



- Disconnect the rear speed sensor connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
1 – 2	1.04 to 1.30 k Ω

- Measure the resistance according to the value(s) in the table below.

Standard:

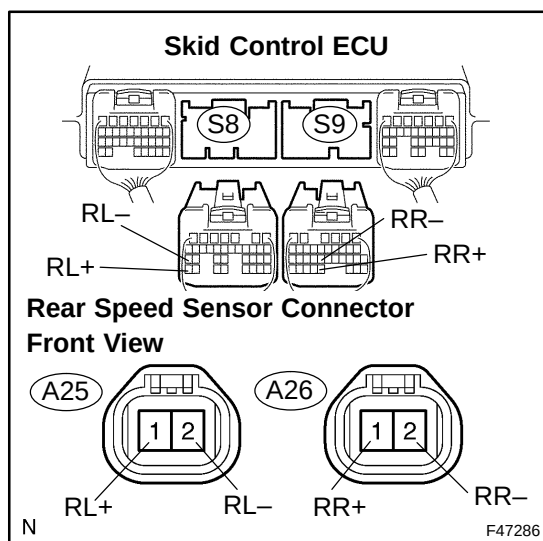
Tester Connection	Specified Condition
1 – Body ground	10 k Ω or higher
2 – Body ground	10 k Ω or higher

NG

REPLACE REAR SPEED SENSOR

OK

5 CHECK HARNESS AND CONNECTOR(REAR SPEED SENSOR – SKID CONTROL ECU)



- Disconnect the skid control ECU connector and rear speed sensor connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

LH:

Tester Connection	Specified Condition
A25-1 (RL+) – S8-35 (RL+)	Below 1 Ω
A25-2 (RL-) – S8-27 (RL-)	Below 1 Ω

RH:

Tester Connection	Specified Condition
A26-1 (RR+) – S10-31 (RR+)	Below 1 Ω
A26-2 (RR-) – S10-23 (RR-)	Below 1 Ω

- Measure the resistance according to the value(s) in the table below.

Standard:

LH:

Tester Connection	Specified Condition
A25-1 (RL+) – Body ground	10 k Ω or higher
A25-2 (RL-) – Body ground	10 k Ω or higher

RH:

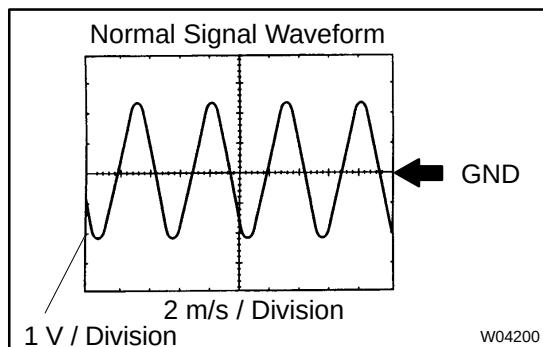
Tester Connection	Specified Condition
A26-1 (RR+) – Body ground	10 k Ω or higher
A26-2 (RR-) – Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



INSPECTION USING OSCILLOSCOPE

- Connect the oscilloscope to terminals RR+ – RR– or RL+ – RL– of the skid control ECU.
- Drive the vehicle at approximately 19 mph (30 km/h), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

HINT:

- As vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows 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 attached to it.

NG

Go to step 7

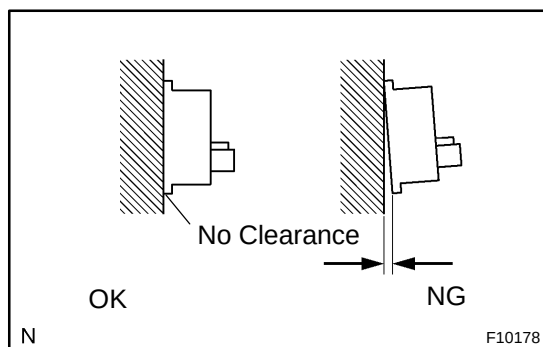
OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

7 INSPECT REAR SPEED SENSOR INSTALLATION



- Check the sensor installation.

OK:

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

NOTICE:

Check the speed sensor signal after the replacement (see page 05-961).

NG

REPLACE REAR SPEED SENSOR

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

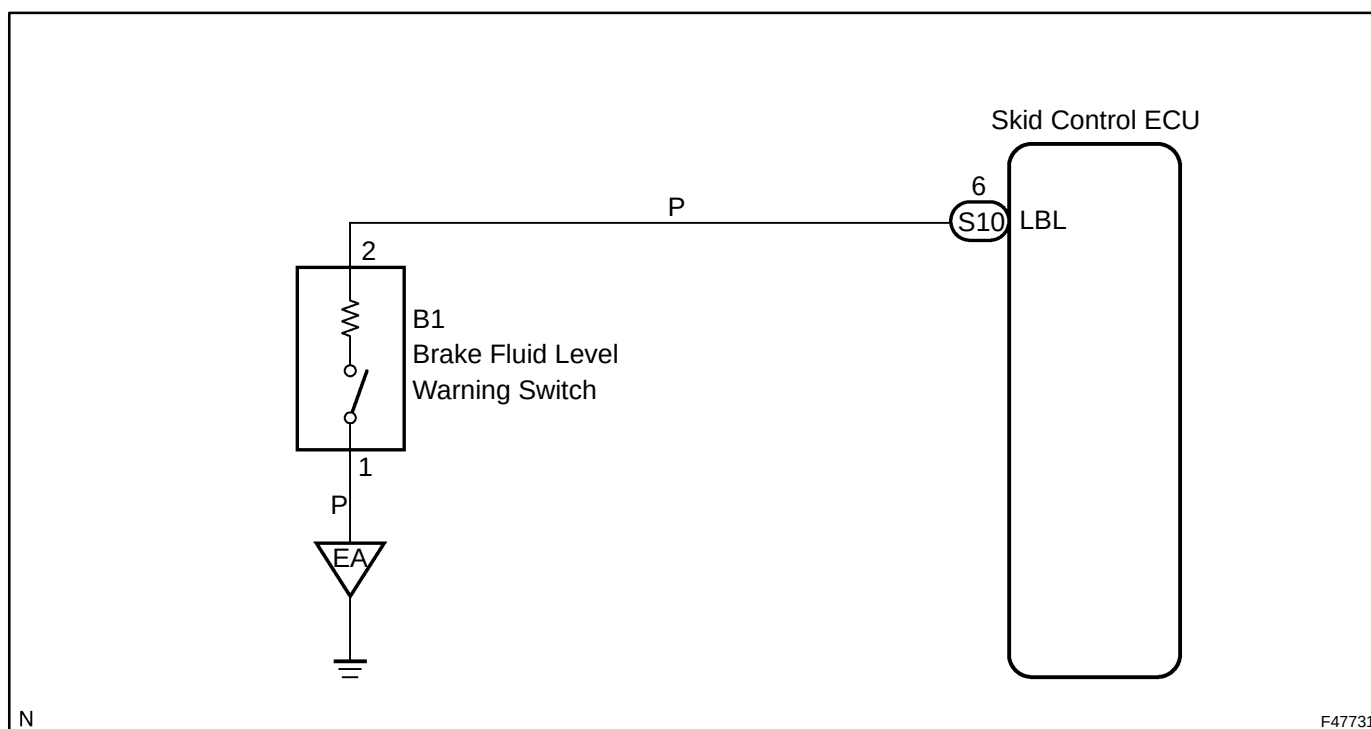
When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C1202/68	BRAKE FLUID LEVEL LOW
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CIRCUIT DESCRIPTION

When a fluid level drop in the master cylinder reservoir is detected, the signal is input to the skid control ECU. When the DTC for the fluid level drop is memorized, the warning is canceled if the fluid level returns to normal and the other DTCs are not input.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1202/68	511	- Pump motor operates for specified period when reservoir level drops - Brake operation signal is input when the reservoir level is abnormal and the power switch is on.	- Brake fluid level - Brake fluid level warning switch - Harness or connector - Skid control ECU
C1202/68	512	SW signal circuit is open for 2 sec. or more.	- Brake fluid level switch - Harness or connector - Skid control ECU



INSPECTION PROCEDURE

HINT:

When releasing the parking brake, set the chocks to hold the vehicle for safety.

1 CHECK BRAKE FLUID LEVEL IN RESERVOIR

(a) Check that the brake fluid level is sufficient.

HINT:

- If the fluid level drops, check for a fluid leak, and repair if found.
- If no leaks exist, add and adjust fluid and then check that the trouble code is not output again.

OK:

Brake fluid level is proper.

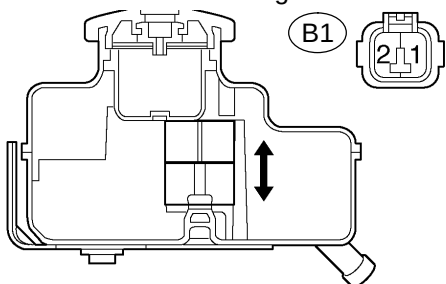
NG

ADD BRAKE FLUID

OK

2 INSPECT BRAKE FLUID LEVEL WARNING SWITCH

Brake Fluid Level Warning Switch



- Remove the reservoir tank cap and strainer.
- Disconnect the brake fluid level warning switch connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

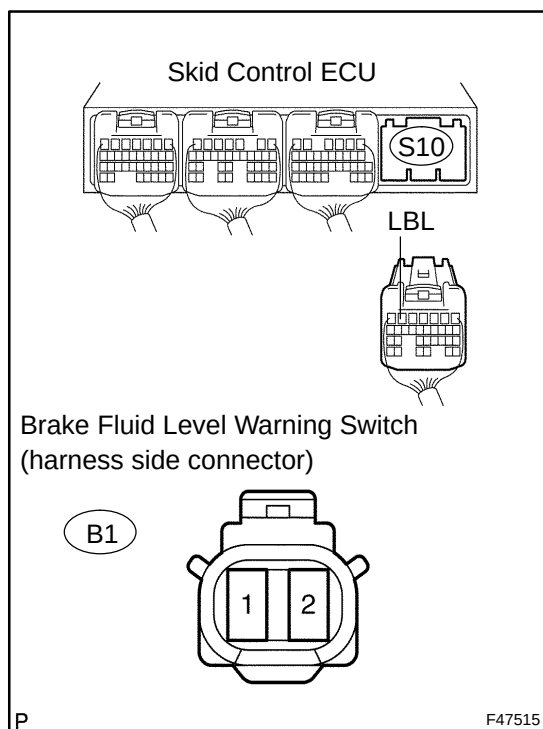
Tester Connection	Fluid Level	Specified Condition
(B1-1) – (B1-2)	Proper	1.8 to 2.16 kΩ
(B1-1) – (B1-2)	Below min.: level	Below 1 Ω

NG

REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSY

OK

3 CHECK HARNESS AND CONNECTOR



- Disconnect the skid control ECU connector and the brake fluid level warning switch connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S10-6 (LBL) – (B1-2)	Below 1 Ω

- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S10-6 (LBL) – Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 RECONFIRM DTC

- Clear the DTCs (see page 05-975).
- Turn the power switch ON (READY).
- Check the same DTCs are recorded (see page 05-975).

Result:

DTC is output	A
DTC is not output	B

B

END
HINT:

This DTC may be memorized due to a malfunction in the connector terminal connection, etc.

A

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)
NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C1210/36	ZERO POINT CALIBRATION OF YAW RATE SENSOR UNDONE
DTC	C1232/32	MALFUNCTION IN DECELERATION SENSOR
DTC	C1234/34	MALFUNCTION IN YAW RATE SENSOR
DTC	C1243/43	MALFUNCTION IN DECELERATION SENSOR
DTC	C1244/44	OPEN OR SHORT IN DECELERATION SENSOR CIRCUIT
DTC	C1245/45	MALFUNCTION IN DECELERATION SENSOR
DTC	C1336/39	ZERO POINT CALIBRATION OF DECELERATION SENSOR UNDONE
DTC	C1381/97	MALFUNCTION IN POWER SUPPLY VOLTAGE YAW/DECELERATION SENSOR

CIRCUIT DESCRIPTION

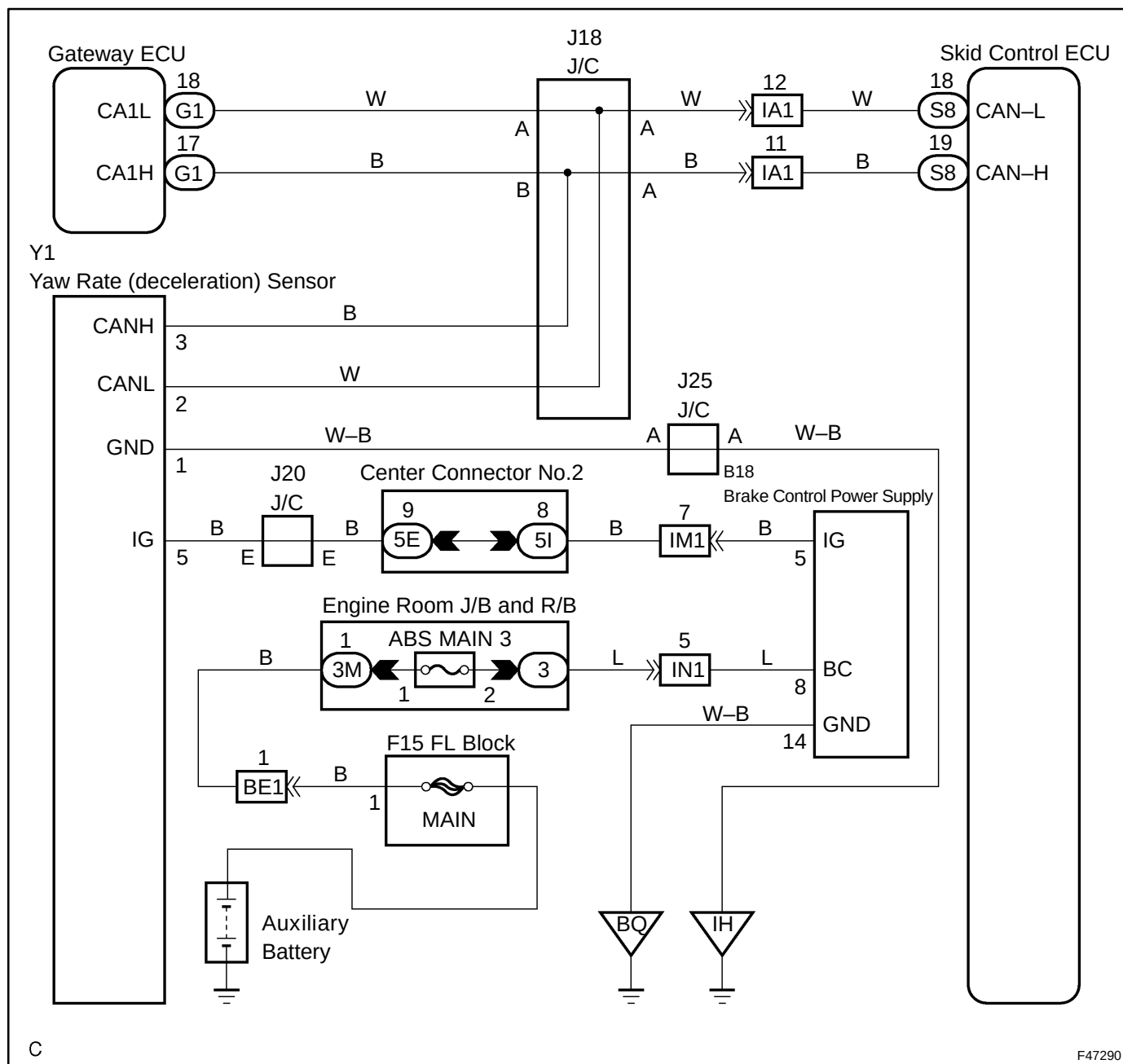
The yaw rate (deceleration) sensor detects any gravity applied to the vehicle and transmits the signal to the skid control ECU via CAN communication system (vehicle equipped with Enhanced VSC).

The deceleration sensor is built into the yaw rate sensor and detects the vehicle condition in the 2 systems (GL1, GL2).

When a malfunction occurs in the communication line with the yaw rate sensor, DTC U0123/62 (yaw rate sensor communication malfunction) and DTC U0124/95 (deceleration sensor communication malfunction) are output.

DTC No.	DTC Detecting Condition	Trouble Area
C1210/36	Yaw rate sensor zero point calibration is unfinished.	Zero point calibration undone (Perform zero point calibration and check DTC. If DTC is not output again, the sensor is normal.)
C1232/32	One GL1/2 signal fluctuation is within 80 mV and the other is 1.9 V or more for at least 30 sec. when vehicle speed is 6 mph (10 km/h)	- Yaw rate (deceleration) sensor - Skid control ECU
C1234/34	Signal of malfunction that is detected at sensor self-check is received when communication with the sensors is valid.	Yaw rate (deceleration) sensor
C1243/43	Sensor sticking can be seen 16 times or more in a series at a speed between 18 mph (30 km/h) and 0 mph (0 km/h).	- Yaw rate (deceleration) sensor - Skid control ECU
C1244/44	Difference between GL1 and GL2 is not less than 0.4 G for at least 60 sec. after the difference is 0.6 G or more when the vehicle speed is 0 mph (0 km/h). Malfunction signal from deceleration sensor is received.	- Yaw rate (deceleration) sensor - Yaw rate (deceleration) sensor installation - Zero point calibration not done - Skid control ECU
C1245/45	Difference between the G value calculated from deceleration sensor value and vehicle speed exceeds 0.35 G for at least 60 sec. when vehicle speed is 18 mph (30 km/h).	- Yaw rate (deceleration) sensor - Zero point calibration not done - Skid control ECU
C1336/39	Vehicle speed increases with unfinished zero point calibration. Zero point calculation is not within specified range when zero point calibration is finished.	Zero point calibration undone (Perform zero point calibration and check DTC. If DTC is not output again, the sensor is normal.)
C1381/97	Power source voltage is not within specified range when communication between skid control ECU and sensor is valid.	- Yaw rate (deceleration) sensor circuit - Harness and connector - Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK DTC

- (a) Clear the DTCs (see page 05-975).
 (b) Turn the power switch ON (READY).
 (c) Check that the trouble code for CAN communication DTCs U0073/94 and U0123/62 are not output.

Result:

A	CAN communication DTCs are not output.
B	CAN communication DTC U0073 or U0123/62 is output.
C	Only unfinished zero point calibration DTC C1210/36 or C1336/36 is output.

B**REPAIR CIRCUIT INDICATED BY OUTPUT CODE****C****Go to step 5****A****2 CHECK SENSOR INSTALLATION(YAW RATE (DECELERATION) SENSOR)**

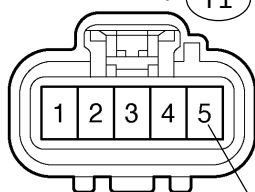
- (a) Check that the yaw rate (deceleration) sensor has been installed properly.

OK:

- The sensor should be tightened to the specified torque.
- The sensor should not be tilted.

NG**INSTALL YAW RATE SENSOR CORRECTLY
(SEE PAGE 32-70)****OK****3 CHECK HARNESS AND CONNECTOR(IG TERMINAL)**

Yaw Rate (Deceleration) Sensor
(harness side connector) Y1



N

F45082

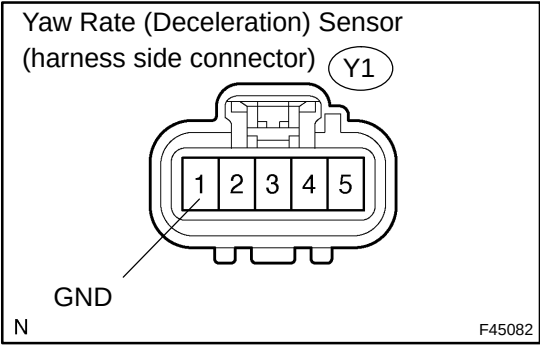
- (a) Disconnect the yaw rate (deceleration) sensor connector.
 (b) Turn the power switch ON (READY).
 (c) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
Y1-5 (IG) – Body ground	10 to 14 V

NG**REPAIR OR REPLACE HARNESS OR
CONNECTOR (IG CIRCUIT)****OK**

4 CHECK HARNESS AND CONNECTOR(GND TERMINAL)



- (a) Disconnect the yaw rate (deceleration) sensor connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
Y1-1 (GND) – Body ground	Below 1 Ω

NG

REPAIR OR
CONNECTOR

REPLACE HARNESS OR

OK

REPLACE YAW RATE SENSOR

5 PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND DECELERATION SENSOR

- (a) Perform the zero point calibration of the yaw rate (deceleration) sensor.
(see page 05-960).

NEXT

6 RECONFIRM DTC

- (a) Clear the DTCs.
- (b) Turn the power switch ON (READY).
- (c) Check the same DTCs are recorded (see page 05-975).

Result:

DTC is not output	A
DTC is output	B

B

REPLACE YAW RATE SENSOR

A

END

HINT:
This DTC may be memorized due to a malfunction in the connector terminal.

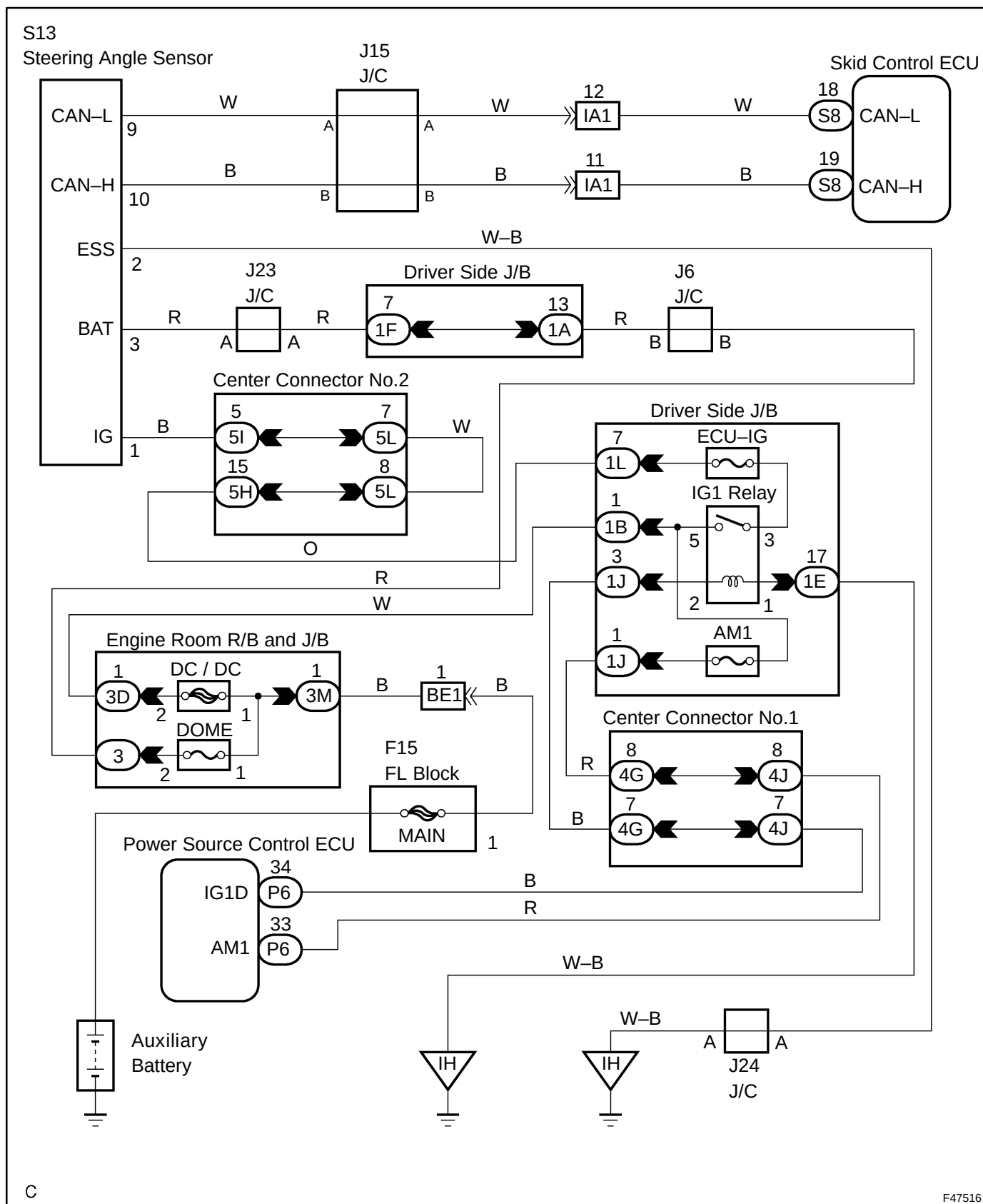
DTC	C1231/31	MALFUNCTION IN STEERING ANGLE SENSOR CIRCUIT
------------	-----------------	---

CIRCUIT DESCRIPTION

The skid control ECU inputs the steering sensor signal through the CAN communication. When a malfunction occurs in the communication line with the steering sensor, DTC U0126/63 (malfunction in communication with steering angle sensor) is output.

DTC No.	DTC Detecting Condition	Trouble Area
C1231/31	- Steering angle sensor malfunction signal is received when data transmission is valid (internal malfunction is detected at sensor self-check). - A signal of +B open in steering angle sensor is received when communication with sensor is valid.	- Steering angle sensor - Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- When U0126 is output together with C1231/31, inspect and repair the trouble areas indicated by U0126/63 first.
- When the speed sensor or the yaw rate (deceleration) sensor has trouble, DTCs for the steering angle sensor may be output even when the steering angle sensor is normal. When DTCs for the speed sensor or yaw rate sensor are output together with other DTCs for the steering angle sensor, inspect and repair the speed sensor and yaw rate (deceleration) sensor first, and then inspect and repair the steering angle sensor.

1 CHECK HARNESS AND CONNECTOR(MOMENTARY INTERRUPTION)

- (a) Using the hand-held tester, check for any momentary interruption in the wire harness and connectors between the skid control ECU and steering angle sensor (see page 05-956).

Item	Measurement Item / Range (Display)	Normal Condition
YAWRATE SEN	Yaw rate sensor open detection	NORMAL : Normal condition

OK:

There are no momentary interruptions.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the power switch ON (READY).
 (c) Select the DATA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal Condition
STEERING ANG	Steering sensor/ Min.: -1152 deg, Max.: 1150.875 deg	Left turn: Increase Right turn: Decrease

- (d) Check that the steering angle sensor value of the steering angle sensor observed in the hand-held tester changes when the steering wheel is moved.

OK:

Steering angle value should change.

NG

Go to step 3

OK

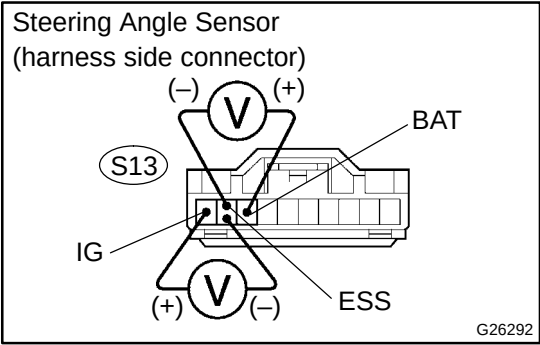
REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

3

CHECK TERMINAL VOLTAGE(STEERING ANGLE SENSOR CONNECTOR)



- (a) Remove the steering wheel and the column lower cover.
- (b) Disconnect the steering angle sensor connector.
- (c) Turn the power switch ON (READY).
- (d) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S13-1 (IG) – S13-2 (ESS)	10 to 14 V

- (e) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S13-3 (BAT) – S13-2 (ESS)	10 to 14 V

NG

REPAIR OR
CONNECTOR

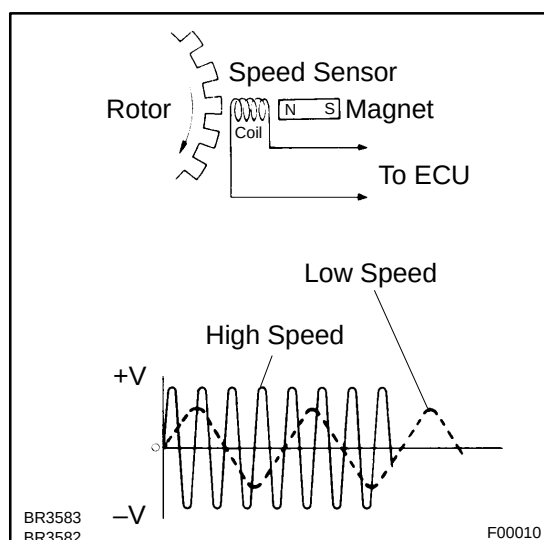
REPLACE HARNESS OR

OK

REPLACE STEERING ANGLE SENSOR (SEE PAGE 32-71)

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
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



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

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.

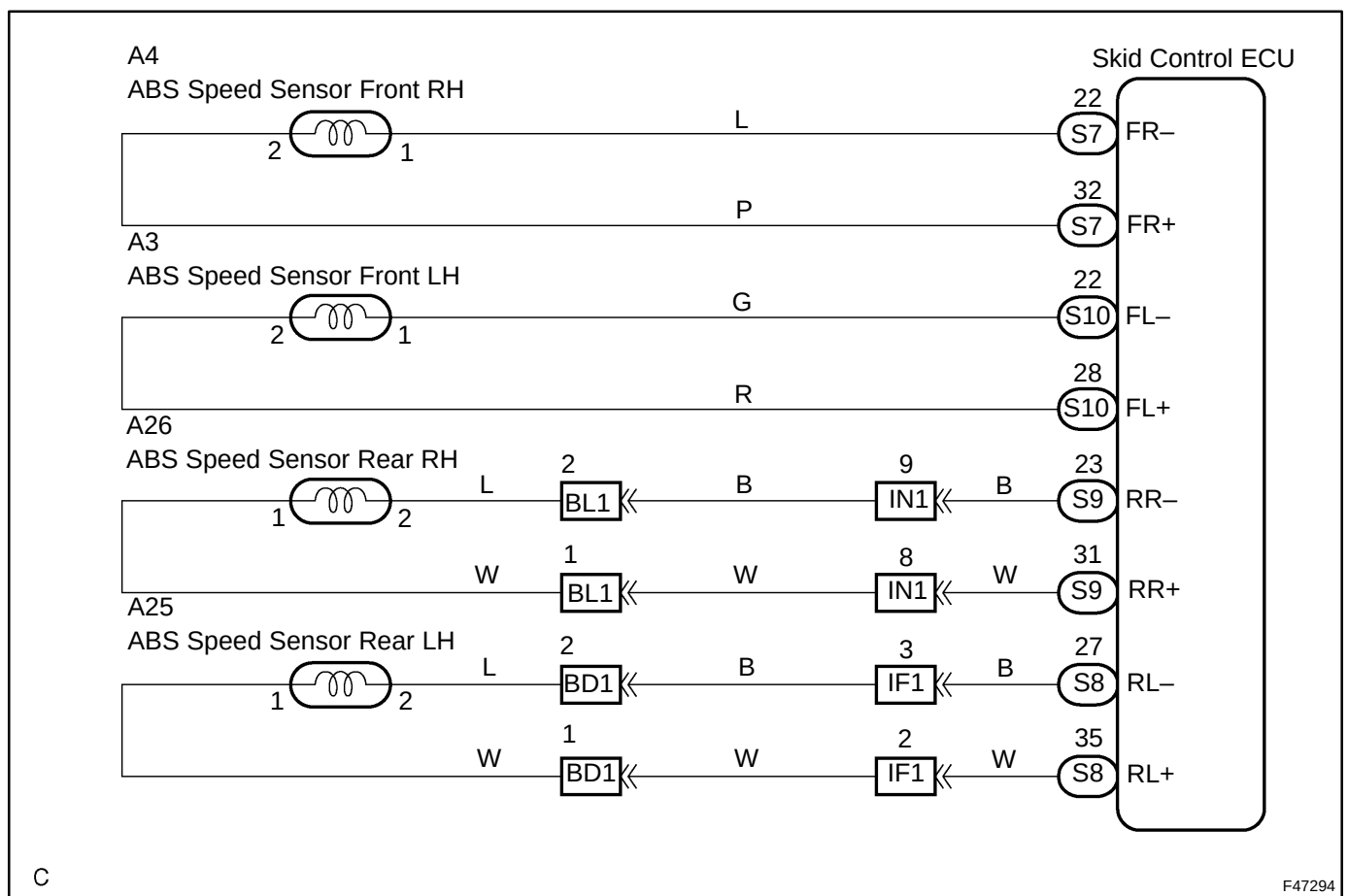
When foreign matter adheres to the speed sensor tip or sensor rotor, or the rotor teeth are chipped, these DTCs are output. An abnormal waveform input from the sensor determines these conditions.

These DTCs may be detected when a malfunction occurs in the connector terminals or wire harness of the speed sensor circuit.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1235/35	–	Pulse waveform of speed sensor signal is abnormal for at least 5 sec. when vehicle speed is 12 mph (20 km/h) or more.	• Right front speed sensor • Each speed sensor circuit • Sensor installation • Skid control ECU
C1236/36	303	Pulse waveform of speed sensor signal is abnormal for at least 5 sec. when vehicle speed is 12 mph (20 km/h) or more.	• Left front speed sensor • Each speed sensor circuit • Sensor installation • Skid control ECU
C1238/38	304	Pulse waveform of speed sensor signal is abnormal for at least 5 sec. when vehicle speed is 12 mph (20 km/h) or more.	• Right rear speed sensor • Each speed sensor circuit • Skid control ECU
C1239/39	305	Pulse waveform of speed sensor signal is abnormal for at least 5 sec. when vehicle speed is 12 mph (20 km/h) or more.	• Left rear speed sensor • Each speed sensor circuit • Skid control ECU

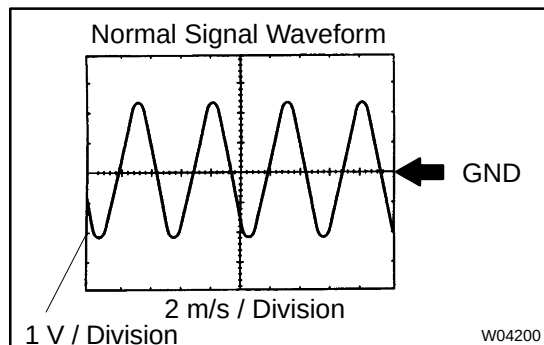
HINT:

- DTC C1235/35 is for the right front speed sensor.
- DTC C1236/36 is for the left front speed sensor.
- DTC C1238/38 is for the right rear speed sensor.
- DTC C1239/39 is for the left rear speed sensor.

WIRING DIAGRAM

INSPECTION PROCEDURE

1 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



INSPECTION USING OSCILLOSCOPE

- Connect the oscilloscope to terminal FR+ – FR– or FL+ – FL– of the skid control ECU.
- Drive the vehicle at approximately 19 mph (30 km/h), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

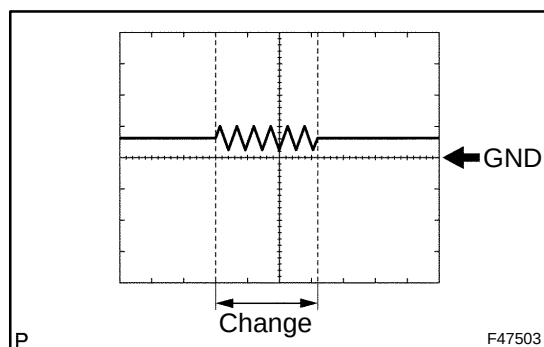
- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign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

NG

Go to step 4

OK

2 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



INSPECTION USING OSCILLOSCOPE

- Connect the oscilloscope to terminal FR+ – FR– or FL+ – FL– of the skid control ECU.
- Check if the oscilloscope has any change when the wire harness connector is subject to vibration while the vehicle is stopped and the ignition switch is on.
(If the connector is poorly connected, vibration of the wire harness connector may cause a temporary stop in current flow.)

OK:

There is no change in a waveform.

Result:

OK	No Change	A
NG	Change	B

B

REPAIR OR REPLACE HARNESS OR CONNECTOR

A

3 RECONFIRM DTC

- (a) Clear the DTCs (see page 05-975).
- (b) Turn the power switch ON (READY).
- (c) Check the same DTCs are recorded (see page 05-975).

Result:

DTC is not output	A
DTC is output	B

B**REPLACE SKID CONTROL ECU ASSY****A**

**PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-966)**

4 INSPECT SPEED SENSOR TIP

- (a) Remove the front axle hub and front speed sensor.
- (b) Check the sensor tip.

OK:**No scratches or foreign matter on the sensor tip.****NOTICE:**

**Check the speed sensor signal after the replacement
(see page 05-961).**

NG**CLEAN OR REPLACE SPEED SENSOR****OK****5 INSPECT SPEED SENSOR ROTOR**

- (a) Remove the front axle hub and front speed sensor rotor.
- (b) Check the sensor rotor serrations.

OK:**No scratches, missing teeth or foreign matter on the rotors.****HINT:**

If there is foreign matter in the rotor, remove it and check the output waveform after reassembly.

NOTICE:

Check the speed sensor signal after the replacement (see page 05-961).

NG**CLEAN OR REPLACE SPEED SENSOR ROTOR****OK****REPLACE SPEED SENSOR**

DTC	C1241/41	LOW BATTERY POSITIVE VOLTAGE OR ABNORMALLY HIGH BATTERY POSITIVE VOLTAGE
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DTC	C1242/42	IG2 POWER SOURCE CIRCUIT
------------	-----------------	---------------------------------

CIRCUIT DESCRIPTION

These codes are memorized when the power source voltage for the skid control ECU drops or the voltage for the ABS No.1, ABS No.2 relay operation drops.

Codes may be memorized when the voltage of the auxiliary battery temporarily drops.

When the power source voltage is too high, the skid control ECU stops functioning and outputs no DTCs, and the ABS and BRAKE warning light remain on.

HINT:

DTC C1256/56 (accumulator low voltage malfunction) may be memorized if the power source voltage drops.

DTC No.	Detailed Code	DTC Condition	Trouble Area
C1241/41	81	System 1 is under the following conditions when READY is on: - Linear solenoid cannot receive enough current (brake is applied). - BS voltage is less than 8.9 V for at least 3 sec. (brake is not applied). 12 V-power source voltage inside ECU is less than 8.5 V when main relay is opened or VCM voltage is less than 4.7 V or 5 V or more for at least 0.05 sec.	- ABS No.1 relay - Harness and connector - Skid control power supply circuit - Brake control power supply assy - Hybrid control system
C1241/41	82	System 2 is under the following conditions when READY is on: - Linear solenoid cannot receive enough current (brake is applied). - BS voltage is less than 8.9 V for at least 3 sec. (brake is not applied). 12 V-power source voltage inside ECU is less than 8.5 V when main relay is opened or VCM voltage is less than 4.7 V or 5.3 V or more for at least 0.05 sec.	- ABS No.2 relay - Harness and connector - Skid control power supply circuit - Brake control power supply assy - Hybrid control system
C1241/41	83	Capacitor mode signal is received from brake control power supply for 3 sec. or more when READY is on.	- Brake control power supply assy - Brake control power supply - Hybrid control system
C1241/41	84	ABS is requested to operate when the power source voltage of the main relay system is dropping.	- ABS No.1 relay - ABS No.2 relay - Harness and connector

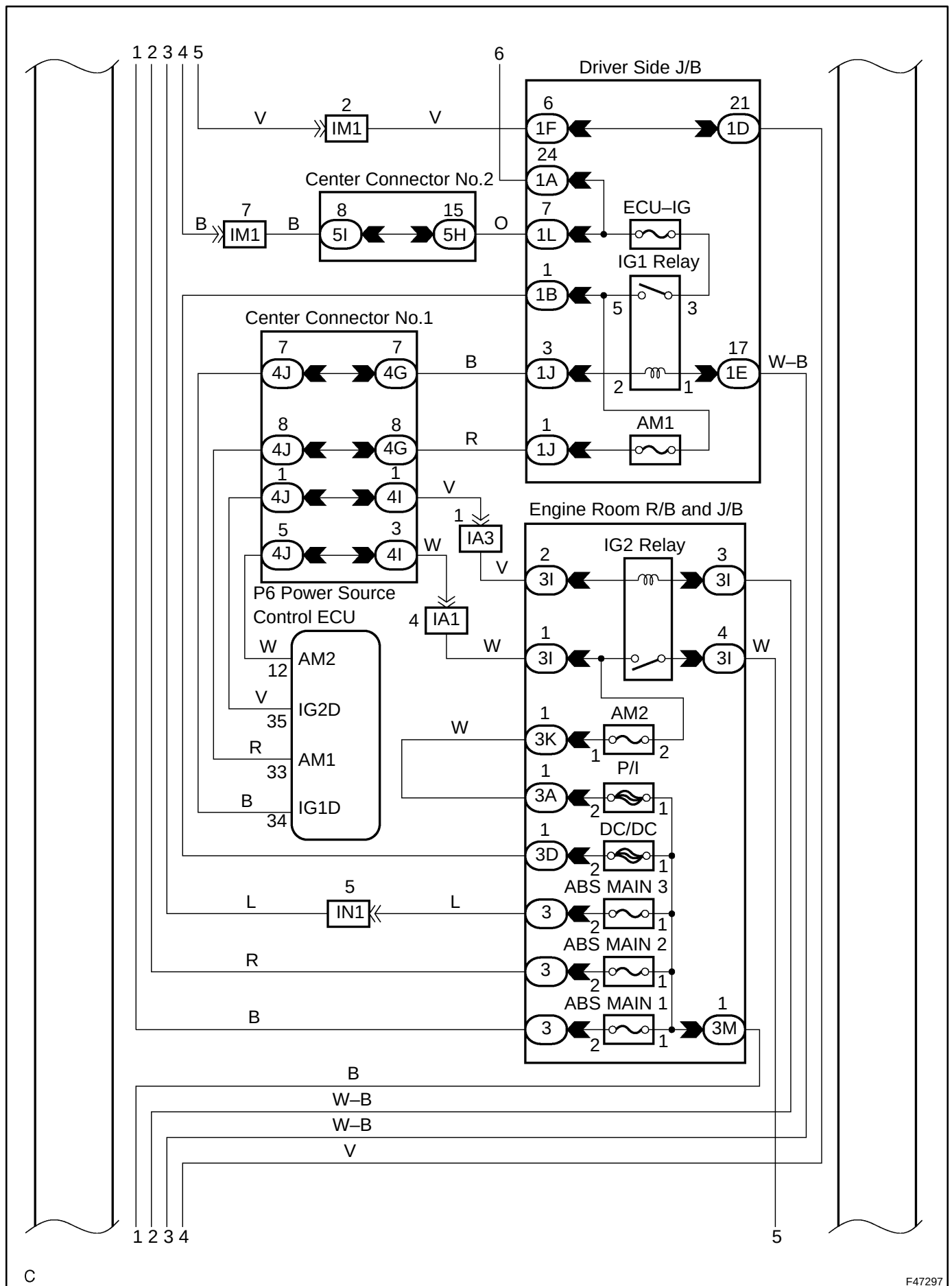
DTC No.	Detailed Code	DTC Condition	Trouble Area
C1242/42	87	Voltage is applied to IG2 terminal, but not applied to IG1 terminal for at least 4 sec.	• ABS No.1 relay • Harness and connector • Skid control power supply circuit • Brake control power supply assy • Hybrid control system
C1242/42	88	Voltage is applied to IG 1 terminal, but not applied to IG 2 terminal for at least 4 sec.	• ABS No.2 relay • Harness and connector • Skid control power supply circuit • Brake control power supply assy • Hybrid control system

A2 Brake Actuator

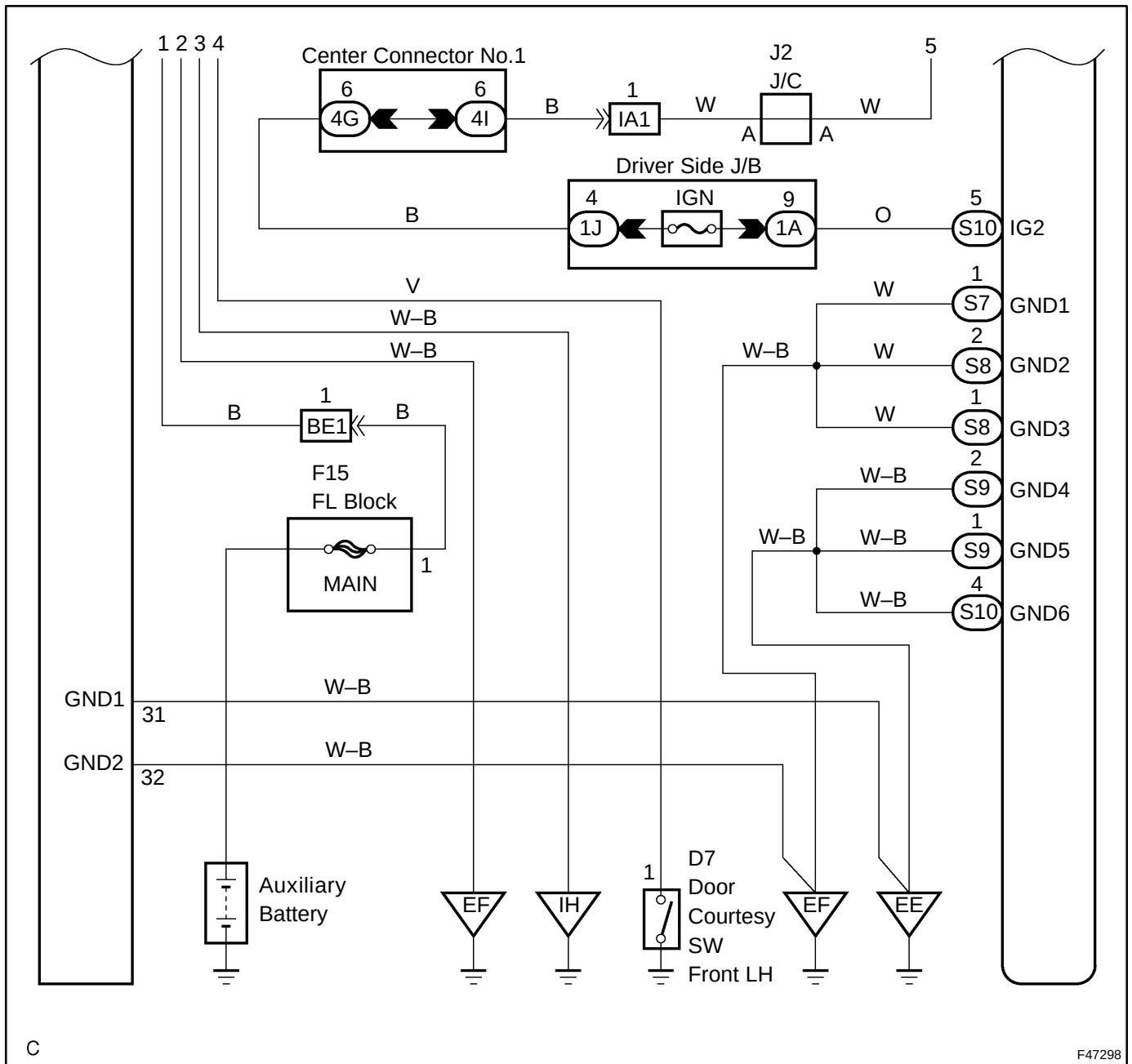
Skid Control ECU

Wiring Diagram Details:

- Top Connections:**
 - SMC1 (20) to S7 (4) via wire Y.
 - SMC2 (6) to S10 (3) via wire LG.
 - BS1 (19) to S10 (7) via wire P.
 - BS1 (19) to S10 (17) via wire Y.
- Engine Room R/B:**
 - Contains ABS No.2 Relay and ABS No.1 Relay.
 - Wires connect to S10 (15) SR2 via wire V.
 - Wires connect to S7 (12) SR1 via wire L.
 - Wires connect to S7 (2) R1+ via wire P.
 - Wires connect to S7 (3) BS1 via wire B.
 - Wires connect to S7 (13) SCSS via wire BR.
 - Wires connect to S8 (3) +BI1 via wire B.
 - Wires connect to S9 (5) +BI2 via wire R.
 - Wires connect to S9 (4) +BO2 via wire C.
 - Wires connect to S8 (5) +BO1 via wire C.
 - Wires connect to S7 (5) +BCTY via wire V.
 - Wires connect to S8 (7) IG1 via wire B.
- Other Components:**
 - Short Connector:** Connects S2 (1) to S3 (1) and S2 (2) to S3 (2) via wire P.
 - B17 Brake Master Stroke Simulator Cylinder Assembly:** Connects BR (2) to BDSS and P (1) to BSR.
 - B18 Brake Control Power Supply:**
 - BC OUT2 (7) to IN1 (6) via wire W.
 - IG (5) to IN1 (7) via wire Y.
 - BCTY (10) to IK1 (8) via wire V.



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INSPECTION PROCEDURE

1 CHECK DTC(HYBRID CONTROL SYSTEM)

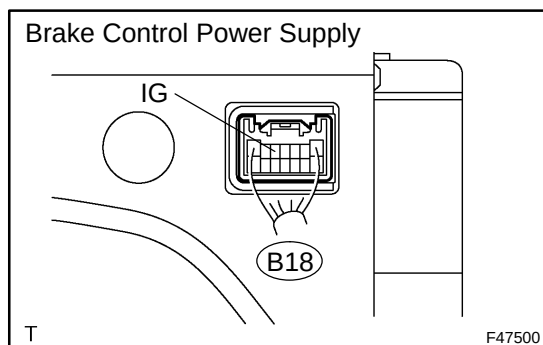
- (a) Is DTC output for HYBRID CONTROL SYSTEM?

Result:

DTC is not output	A
DTC is output	B

B**REPAIR HYBRID CONTROL SYSTEM
(SEE PAGE 05-440)****A****2 CHECK AUXILIARY BATTERY VOLTAGE**

- (a) Check the auxiliary battery voltage.

Standard:**10 to 14 V****NG****CHARGE OR REPLACE AUXILIARY BATTERY****OK****3 CHECK BRAKE CONTROL POWER SUPPLY**

- (a) Measure the voltage according to the value(s) in the table below.

HINT:

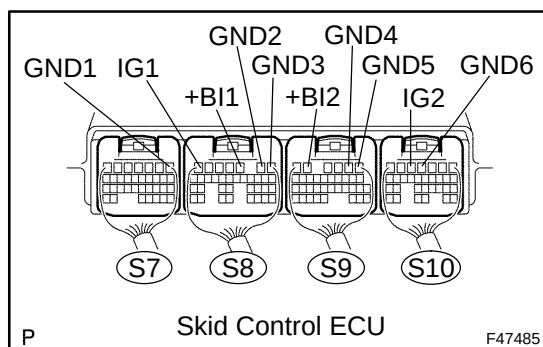
Measure the voltage behind the connector with the connector connected.

Standard:

Tester Connection	Specified Condition
B18-5 (IG) – Body ground	10 to 14 V

NG**CHARGE OR REPLACE BRAKE CONTROL
POWER SUPPLY****OK**

4 CHECK HARNESS AND CONNECTOR



- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Specified Condition
S8-7 (IG1) – Body ground	10 to 14 V
S10-5 (IG2) – Body ground	10 to 14 V
S8-3 (+BI1) – Body ground	10 to 14 V
S9-5 (+BI2) – Body ground	10 to 14 V

- (b) Measure the resistance according to the value(s) in the table below.

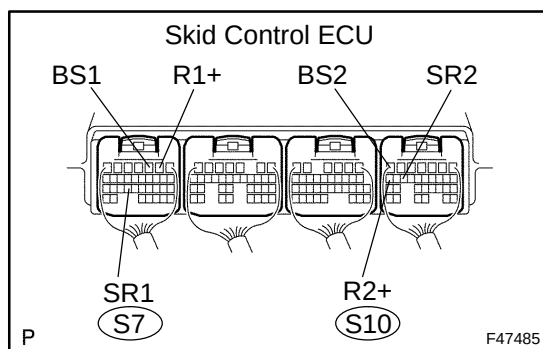
Standard:

Tester Connection	Specified Condition
S7-1 (GND1) – Body ground	Below 1 Ω
S8-2 (GND2) – Body ground	Below 1 Ω
S8-1 (GND3) – Body ground	Below 1 Ω
S9-2 (GND4) – Body ground	Below 1 Ω
S9-1 (GND5) – Body ground	Below 1 Ω
S10-4 (GND6) – Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE

- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Condition	Specified Condition
S7-2 (R1+) – Body ground	Power switch ON (READY)	8 to 13 V
S10-17 (R2+) – Body ground	Power switch ON (READY)	8 to 13 V
S7-12 (SR1) – Body ground	Power switch ON (READY)	Below 1.5 V
S10-15 (SR2) – Body ground	Power switch ON (READY)	Below 1.5 V
S7-3 (BS1) – Body ground	Power switch ON (READY)	10 to 14 V
S10-7 (BS2) – Body ground	Power switch ON (READY)	10 to 14 V

Result:

All OK	A
NG (R1+, R2+)	B
NG (SR1, SR2, BS1, BS2)	C

B**REPLACE SKID CONTROL ECU ASSY****C****REPAIR OR REPLACE HARNESS OR CONNECTOR****A****6 RECONFIRM DTC**

- (a) Clear the DTCs.
 (b) Turn the power switch ON (READY).
 (c) Check the same DTCs are recorded (see page 05-975).

Result:

DTC is not output	A
DTC is output	B

B**REPLACE SKID CONTROL ECU ASSY
(SEE PAGE 32-68)****A****END (DTC MAY BE STORED DUE TO TEMPORARY POWER SOURCE VOLTAGE DROP)**

DTC	C1246/46	MALFUNCTION IN MASTER CYLINDER PRESSURE SENSOR
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DTC	C1364/61	MALFUNCTION IN W/C PRESSURE SENSOR
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CIRCUIT DESCRIPTION

The master cylinder pressure sensor and the wheel cylinder pressure sensor are built into the brake actuator, and measure the master cylinder pressure and the wheel cylinder pressure send to the skid control ECU.

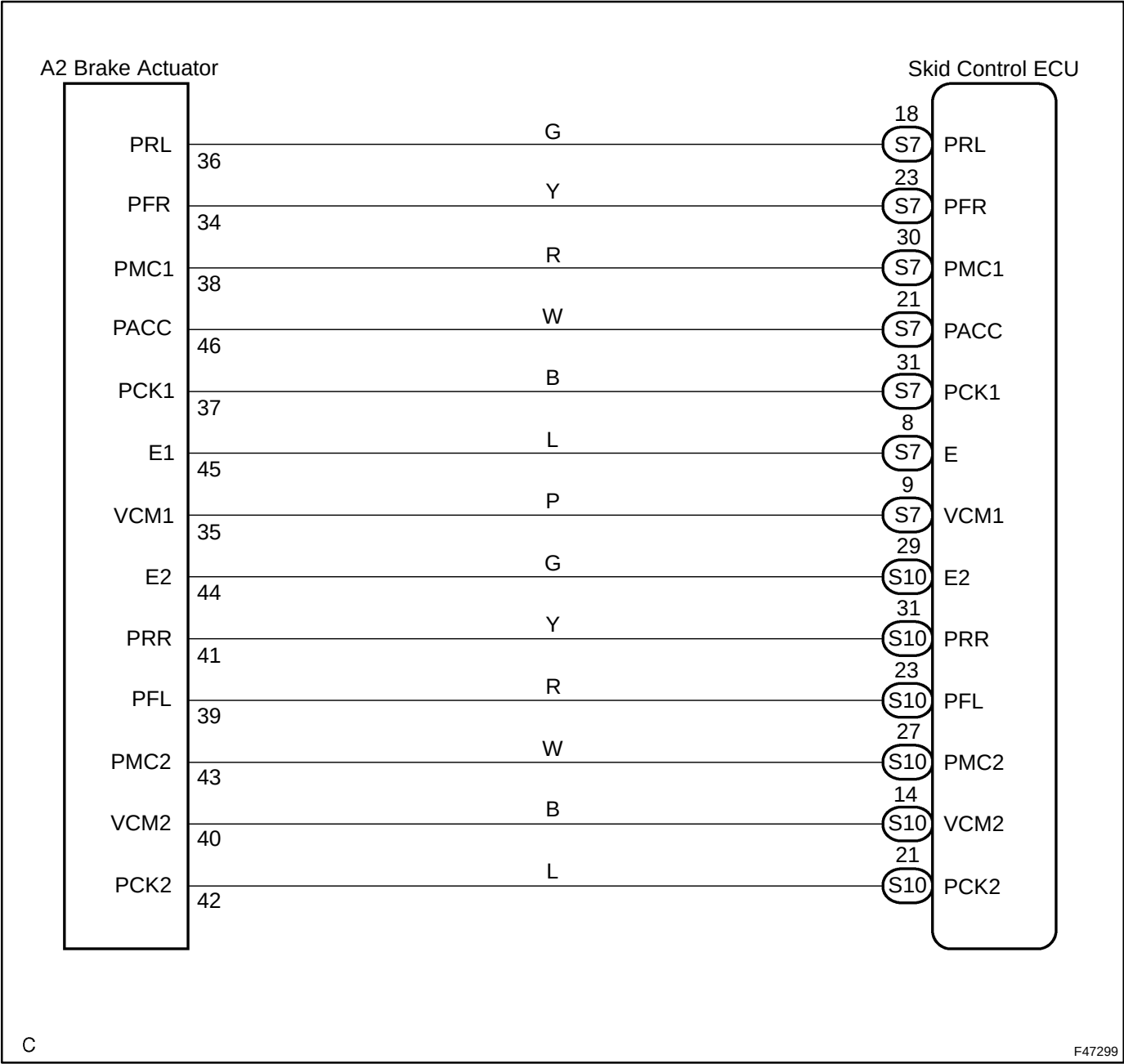
DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1246/46	191	Sensor power source 1 (VMC1) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 sec.	• Brake actuator assy • Skid control ECU • Harness and connector
C1246/46	192	Ratio of master pressure sensor output voltage 1 (PMC1) to sensor power source (VMC1) is less than 5% or 90.5% or more for at least 0.05 sec.	• Brake actuator assy • Skid control ECU • Harness and connector
C1246/46	194	Sensor power source 2 (VMC2) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 sec.	• Brake actuator assy • Skid control ECU • Harness and connector
C1246/46	195	Ratio of master pressure sensor output voltage 2 (PMC2) to sensor power source (VMC2) is less than 5% or 90.5% or more for at least 0.05 sec.	• Brake actuator assy • Skid control ECU • Harness and connector
C1246/46	197	Master pressure sensor output voltage 1 (PMC1) is abnormal.	• Brake actuator assy • Skid control ECU
C1246/46	198	Master pressure sensor output voltage 2 (PMC2) is abnormal.	• Brake actuator assy • Skid control ECU
C1246/46	199	Master pressure sensor output 1 (PMC1) is not approx. 0 Mpa when not braking.	• Brake actuator assy • Skid control ECU • Harness and connector • Stop input signal
C1246/46	200	Master pressure sensor output 2 (PMC2) is not approx. 0 Mpa when not braking.	• Brake actuator assy • Skid control ECU • Harness and connector • Stop input signal
C1246/46	201	PMC1 and PMC2 voltages are different when braking.	• Brake actuator assy • Skid control ECU • Harness and connector
C1246/46	202	Master pressure sensor 1 data (PMC1) is invalid.	• Brake actuator assy • Skid control ECU • Harness and connector
C1246/46	205	Master pressure sensor 2 data (PMC2) is invalid.	• Brake actuator assy • Skid control ECU • Harness and connector
C1364/61	221	Sensor power source 1 (VMC1) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 sec.	• Harness and connector • Skid control ECU
C1364/61	222	Ratio of FR right sensor output voltage (PFR) to sensor power source (VCM1) is less than 5% or 90.5% or more for at least 0.05 sec.	• Brake actuator assy • Skid control ECU • Harness and connector

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1364/61	224	- FR right sensor output (PFR) is not approx. 0 Mpa when not braking. - FR right sensor (PFR) zero point malfunction. - Open or short in FR right sensor (PFR) circuit.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	225	Ratio of FR right sensor output voltage (PFR) to sensor power source (VCM1) is less than 90.5% for at least 0.1 sec. when self-diagnosis signal is output.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	227	Sensor power source 2 (VMC2) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 sec.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	228	Ratio of FR left sensor output voltage (PFL) to sensor power source (VCM2) is less than 5% or 90.5% or more for at least 0.05 sec.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	230	- FR left sensor (PFL) is not approx. 0 Mpa when not braking. - FR left sensor (PFL) zero point malfunction - Open or short in FR right sensor (PFL) circuit.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	231	Ratio of FR left sensor output voltage (PFL) to sensor power source (VCM2) is less than 90.5% for at least 0.1 sec. when self-diagnosis signal is output.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	233	Sensor power source 2 (VCM2) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 sec.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	234	Ratio of RR right sensor output voltage (PRR) to sensor power source (VCM2) is less than 5% or 90.5% or more for at least 0.05 sec.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	236	- RR right sensor output voltage (PRR) is not approx. 0 Mpa when not braking. - RR right sensor (PRR) zero point malfunction. - Open or short in RR sensor (PRR) circuit.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	237	Ratio of RR right sensor output voltage (PRR) to sensor power source (VCM2) is less than 90.5% for at least 0.1 sec. when self-diagnosis signal is output.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	239	Sensor power source (VMC1) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 sec.	- Brake actuator assy - Skid control ECU - Harness and connector
C1364/61	240	Ratio of RR left sensor output voltage (PRL) to sensor power source (VCM1) is less than 5% or 90.5% or more for at least 0.05 sec.	- Brake actuator assy - Skid control ECU - Harness and connector

DIAGNOSTICS – ELECTRONICALLY CONTROLLED BRAKE SYSTEM

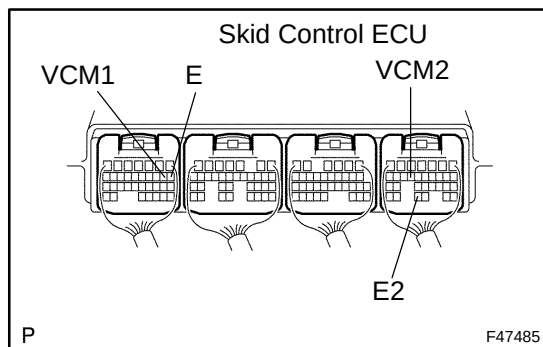
DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1364/61	226	Voltage difference before and after changing the pull-up resistance in the sensor signal input circuit is 0.3 V or more (poor connection).	• Brake actuator assy • Skid control ECU • Harness and connector
C1364/61	232	Voltage difference before and after changing the pull-up resistance in the sensor signal input circuit is 0.3 V or more (poor connection).	• Brake actuator assy • Skid control ECU • Harness and connector
C1364/61	238	Voltage difference before and after changing the pull-up resistance in the sensor signal input circuit is 0.3 V or more (poor connection).	• Brake actuator assy • Skid control ECU • Harness and connector
C1364/61	242	• RR left sensor output (PRL) is not approx. 0 Mpa when not braking. • RR left sensor (PRL) zero point malfunction. • Open or short in RR left sensor (PRL) circuit.	• Brake actuator assy • Skid control ECU • Harness and connector
C1364/61	243	• Ratio of RR left sensor output voltage (PRL) to sensor power source (VCM1) is less than 90.5% for at least 0.1 sec. when sel-diagnosis signal is output.	• Brake actuator assy • Skid control ECU • Harness and connector
C1364/61	244	Voltage difference before and after changing the pull-up resistance in the sensor signal input circuit is 0.3 V or more (poor connection).	• Brake actuator assy • Skid control ECU • Harness and connector

WIRING DIAGRAM



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2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE



- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Condition	Specified Condition
S7-9 (VCM1) – Body ground	Power switch ON (READY)	4.75 to 5.25 V
S10-14 (VCM2) – Body ground	Power switch ON (READY)	4.75 to 5.25 V

- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S7-8 (E) – Body ground	Below 1 Ω
S10-29 (E2) – Body ground	Below 1 Ω

NG

**REPLACE SKID CONTROL ECU ASSY
(SEE PAGE 32-68)**

OK

3 READ VALUE OF HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
(b) Select the DATA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal Condition
MAS CYL PRS 1	Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
MAS CYL PRS 2	Master cylinder pressure sensor 2 reading / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V

- (c) Check the output value of the master cylinder pressure sensor on the hand-held tester display.

OK:

When the pedal is depressed, displayed voltage on the hand-held tester increase.

NG

**REPLACE BRAKE ACTUATOR ASSY
(SEE PAGE 32-54)**

OK

4 READ VALUE OF HAND-HELD TESTER

- (a) Connect the pedal effort gauge.
- (b) Install the LSPV gauge (SST) and bleed air (see page 32-4).
SST 09709-29018
- (c) Connect the hand-held tester to the DLC3.
- (d) Select the DATA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal Condition
FR PRESS SENS	Front Right pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
FL PRESS SENS	Front Left pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
RR PRESS SENS	Rear Right pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
RL PRESS SENS	Rear Left pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V

- (e) Check the output value of the wheel cylinder pressure sensor at each fluid pressure during the ECB control.

Standard:

Fluid Pressure MPa (kgf/cm ² , psi)	FR PRESS SENS (DATA-LIST)	FL PRESS SENS (DATA-LIST)	RR PRESS SENS (DATA-LIST)	RL PRESS SENS (DATA-LIST)
1 (10.2, 145.0)	0.65 to 0.75 V	0.65 to 0.75 V	0.65 to 0.75 V	0.65 to 0.75 V
3 (30.6, 435.2)	1.05 to 1.2 V	1.05 to 1.2 V	1.05 to 1.2 V	1.05 to 1.2 V
7 (71.4, 1015.5)	1.8 to 2.05 V	1.8 to 2.05 V	–	–
10 (102.0, 1450.7)	2.4 to 2.7 V	2.4 to 2.7 V	–	–

NG

**REPLACE BRAKE ACTUATOR ASSY
(SEE PAGE 32-54)**

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C1247/47	MALFUNCTION IN STROKE SENSOR
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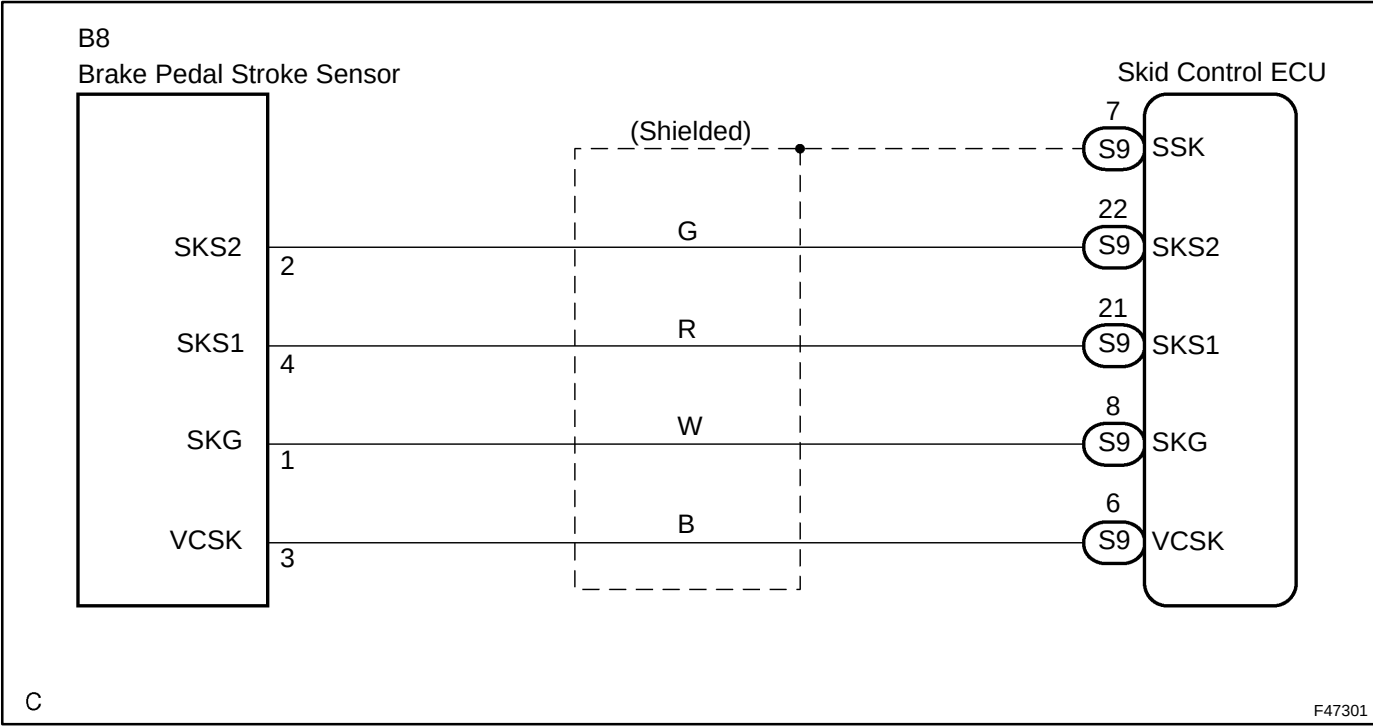
DTC	C1392/48	UN-CORRECTION OF A ZERO POINT OF THE STROKE SENSOR
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CIRCUIT DESCRIPTION

The stroke sensor inputs the pedal stroke into the skid control ECU.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1247/47	171	Sensor power source voltage (VCSK) is 3.6 V or less or 4.95 V or more for at least 1.2 sec.	• Brake pedal stroke sensor • Skid control ECU • Harness and connector
C1247/47	172	Ratio of sensor output voltage 1 (SKS1) to sensor power source voltage (VCSK) is less than 3% or 97% or more for at least 1.2 sec.	• Brake pedal stroke sensor • Skid control ECU • Harness and connector
C1247/47	173	Ratio of sensor output voltage 2 (SKS2) to sensor power source voltage (VCSK) is less than 3% or 97% or more for at least 1.2 sec.	• Brake pedal stroke sensor • Skid control ECU • Harness and connector
C1247/47	174	Sensor output 1 (SKS1) calculation value becomes 20 mm or more for at least 1.2 sec. at an interval of 0.006 sec. (changes due to interference).	• Brake pedal stroke sensor • Skid control ECU • Harness and connector
C1247/47	175	Sensor output 2 (SKS2) calculation value becomes 20 mm or more for at least 1.2 sec. at an interval of 0.006 sec. (changes due to interference).	• Brake pedal stroke sensor • Skid control ECU • Harness and connector
C1247/47	176	Zero point stored value (ratio to power source voltage) of sensor output 1 (SKS1) is 0.46 or more or 0.03 or less.	• Brake pedal stroke sensor • Skid control ECU • Harness and connector
C1247/47	177	Zero point stored value (ratio to power source voltage) of sensor output 2 (SKS2) is 0.97 or more or 0.48 or less.	• Brake pedal stroke sensor • Skid control ECU • Harness and connector
C1247/47	179	• Sum of SKS1/VCSK and SKS2/VCSK is 1.155 or more or 0.845 or less for at least 1 sec. • Difference between sensor output 1 (SKS1) and sensor output 2 (SKS2) is excessively large for at least 0.2 sec.	• Brake pedal stroke sensor • Skid control ECU • Harness and connector
C1247/47	180	• Difference between zero point output value and stored value is 0.5 or more for at least 0.05 sec. • Short between SKS1 and SKS2 output line.	• Brake pedal stroke sensor • Skid control ECU • Harness and connector
C1392/48	178	Zero point calibration of stroke sensor is unfinished.	• Brake pedal stroke sensor zero point calibration undone (initialization of linear solenoid valve and calibration undone) • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE**1 CHECK BRAKE PEDAL**

- (a) Check that the brake pedal and the brake pedal stroke sensor are properly installed and that the pedal can be operated normally.
- (b) Check the brake pedal height.

OK:

- The brake pedal is securely installed.
- The pedal height is within the specified range (see page 32-16).

NG**ADJUST BRAKE PEDAL (SEE PAGE 32-16)****OK****2 READ VALUE OF HAND-HELD TESTER**

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch ON (READY).
- (c) Select the DATA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal condition
PEDAL STROKE	Stroke sensor / min.:0 V, max.: 5 V	When brake pedal is released: 0.7 to 1.3 V
PEDAL STROKE 2	Stroke sensor 2 / min.: 0 V, max.: 5 V	When brake pedal is released: 3.7 to 4.3 V

- (d) Read the pedal stroke sensor voltage value on the hand-held tester screen.

OK:**The Normal condition value displayed on the hand-held tester.****NG****ADJUST BRAKE PEDAL STROKE SENSOR ASSY****OK****3 PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION (SEE PAGE 05-958)****NEXT**

4 RECONFIRM DTC

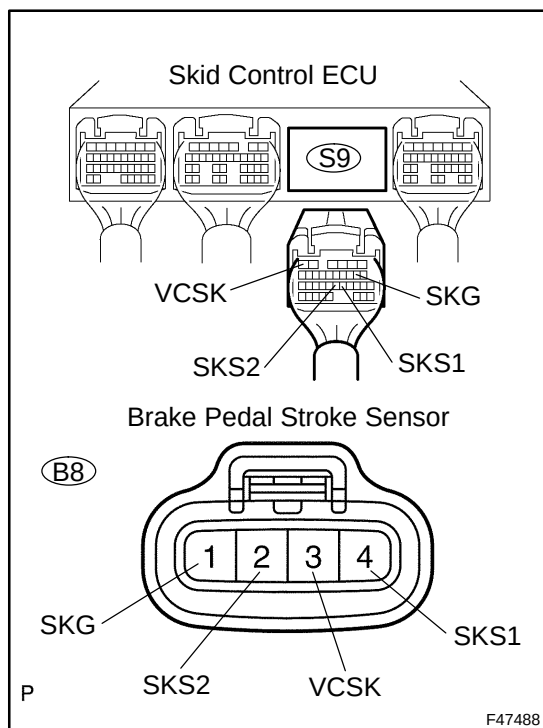
- (a) Clear the DTCs (see page 05-975).
- (b) Turn the power switch ON (READY).
- (c) Check the same DTCs are recorded.

Result:

DTC is output	A
DTC is not output	B

B **END****HINT:**

This DTC may be memorized due to a malfunction in the connector terminal connection, etc.

A**5 CHECK HARNESS AND CONNECTOR(SKID CONTROL ECU – BRAKE PEDAL STROKE SENSOR)**

- (a) Disconnect the skid control ECU connector and brake pedal stroke sensor connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

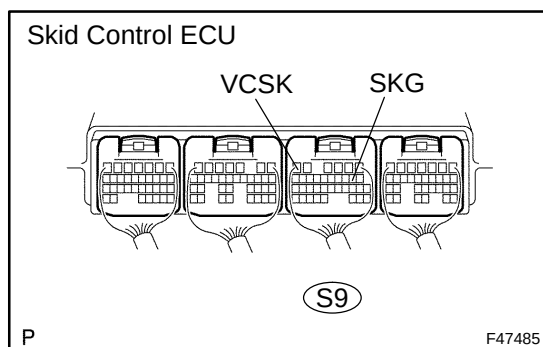
Tester Connection	Specified Condition
S9-6 (VCSK) – B8-3 (VCSK)	Below 1 Ω
S9-8 (SKG) – B8-1 (SKG)	Below 1 Ω
S9-21 (SKS1) – B8-4 (SKS1)	Below 1 Ω
S9-22 (SKS2) – B8-2 (SKS2)	Below 1 Ω

- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S9-6 (VCSK) – Body ground	10 k Ω or higher
S9-8 (SKG) – Body ground	10 k Ω or higher
S9-21 (SKS1) – Body ground	10 k Ω or higher
S9-22 (SKS2) – Body ground	10 k Ω or higher

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

6 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(VCSK, SKG TERMINAL)

- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

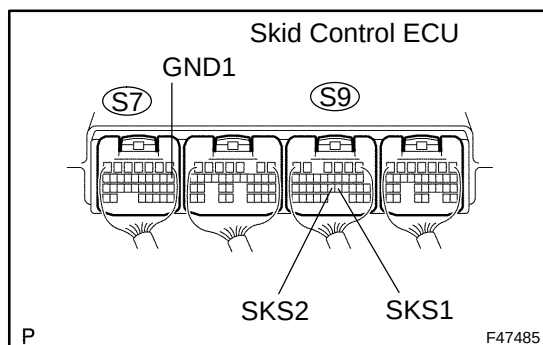
Standard:

Tester Connection	Specified Condition
S9-6 (VCSK) – S9-8 (SKG)	3.6 to 4.95 V

NG

**REPLACE SKID CONTROL ECU ASSY
(SEE PAGE 32-68)**

OK

7 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(SKS1, SKS2 TERMINAL)

- (a) Measure the voltage according to the value(s) in the table below.

HINT:

- Measure the voltage from behind the connector with the connector connected to the skid control ECU.
- Slowly depress the brake pedal and check if the voltage between the skid control ECU terminal changes in accordance with the pedal operation.

Standard:

Tester Connection	Specified Condition
S9-21 (SKS1) – S7-1 (GND1)	1.8 to 3.1 V
S9-22 (SKS2) – S7-1 (GND1)	1.8 to 3.1 V

NG

REPLACE BRAKE PEDAL STROKE SENSOR ASSY

OK

REPLACE SKID CONTROL ECU ASSY(SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

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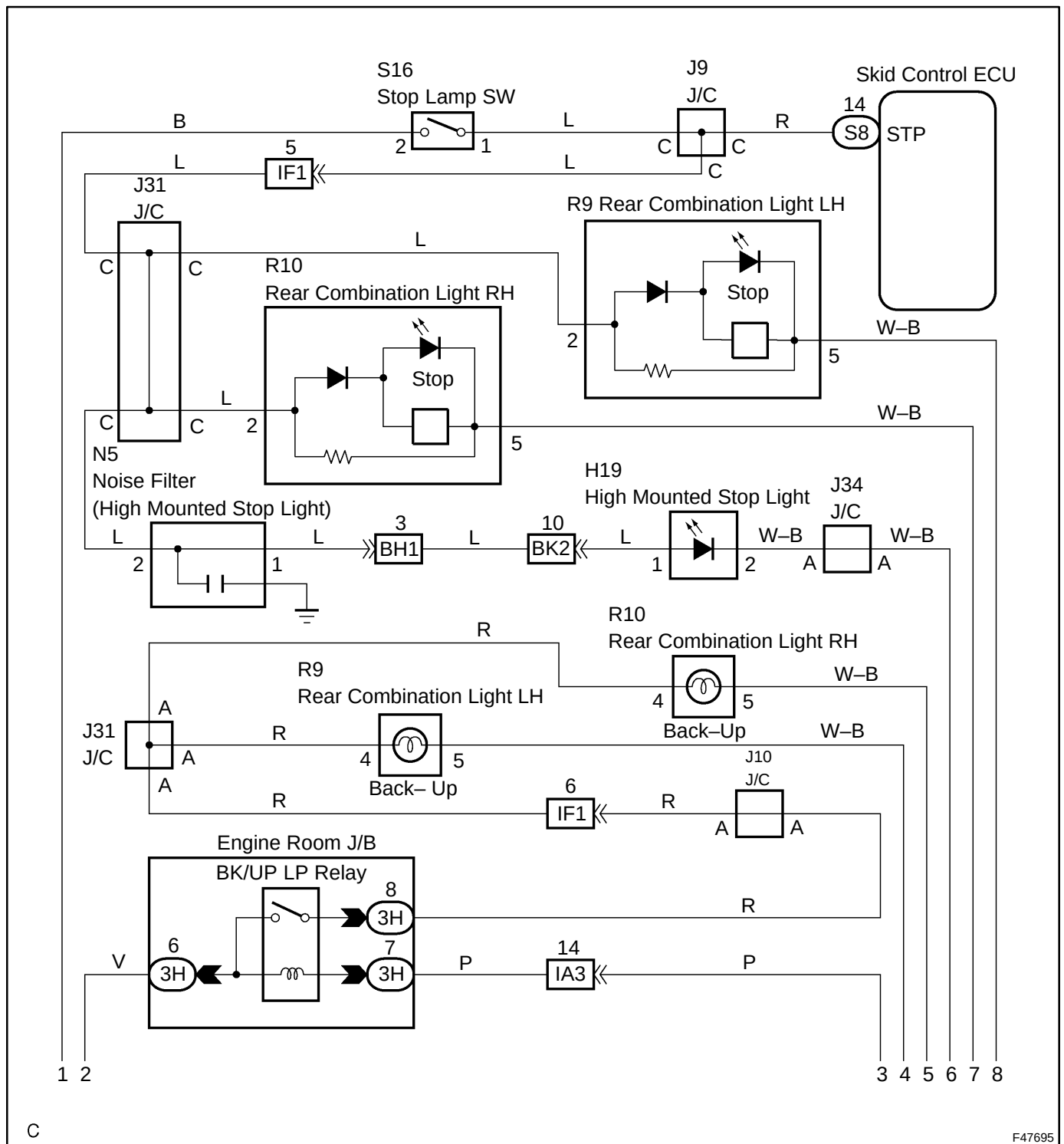
CIRCUIT DESCRIPTION

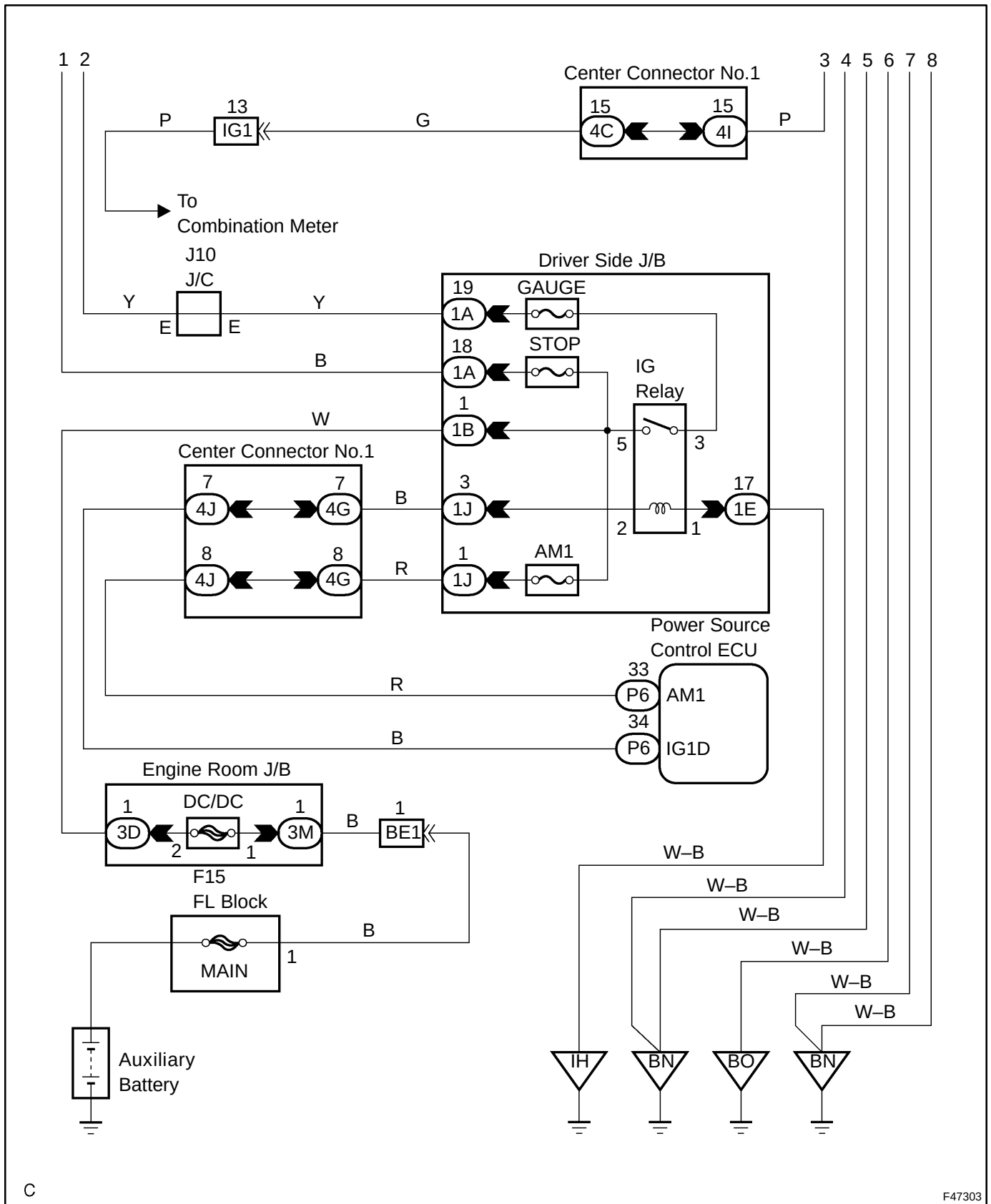
The skid control ECU inputs the stop lamp switch signal and detects braking condition.

The skid control ECU has a circuit for open detection inside. The skid control ECU outputs the DTC if it detects an open in the stop lamp signal input line when the stop lamp switch is off or an open in the stop lamp circuit (GND side).

DTC No.	Detailed Code	DTC Detected Condition	Trouble Area
C1249/49	520	Stop lamp switch circuit is open for at least 10 sec. when IG1 terminal voltage is between 9.5 V and 17.02 V.	• Stop lamp switch • Stop lamp switch circuit • Stop lamp bulb

WIRING DIAGRAM





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INSPECTION PROCEDURE

1 CHECK STOP LAMP SWITCH OPERATION

- (a) Check that the stop light comes on when the brake pedal is depressed and turns off when the brake pedal is released.

OK:

Pedal Condition	Illumination Condition
Brake pedal depressed	ON
Brake pedal released	OFF

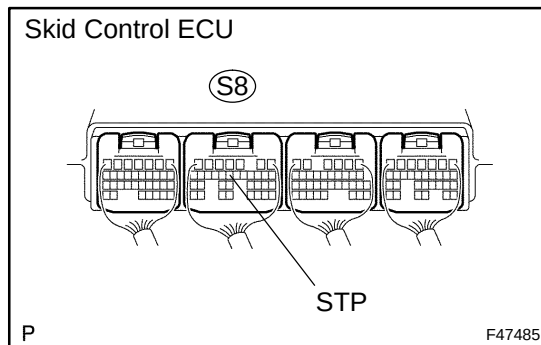
NG

Go to step 4

HINT:

Check the stop lamp bulb as it may have burnt out.

OK

2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE

- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Switch Condition	Specified Condition
S8-14 (STP) – Body ground	Brake pedal depressed	8 to 14 V
S8-14 (STP) – Body ground	Brake pedal released	Below 1 V

NG

Go to step 4

OK

3 RECONFIRM DTC

- (a) Clear the DTCs (see page 05-975).
- (b) Turn the power switch ON (READY).
- (c) Check the same DTCs are recorded (see page 05-975).

Result:

DTC is not output	A
DTC is output	B

B

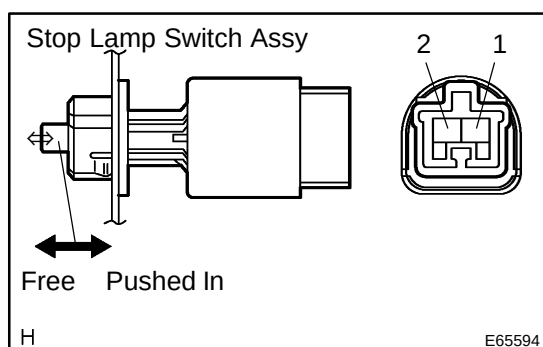
**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-966)**

A

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

4 INSPECT STOP LAMP SWITCH ASSY

- (a) Disconnect the stop lamp switch assy connector.
- (b) Measure the resistance according to the value(s) in the table below.

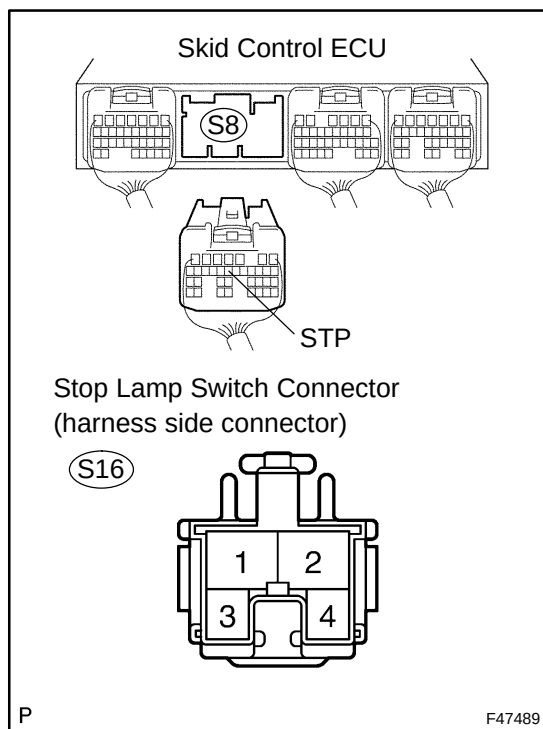
Standard:

Switch Condition	Tester Connection	Specified Condition
Switch pin free	1 – 2	Below 1 Ω
Switch pin pushed in	1 – 2	10 k Ω or higher

NG

REPLACE STOP LAMP SWITCH ASSY

OK

5 CHECK HARNESS AND CONNECTOR(STOP LAMP SWITCH – SKID CONTROL ECU)

- (a) Disconnect the stop lamp switch connector and skid control ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S8-14 (STP) – S16-1	Below 1 Ω

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)****NOTICE:**

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C1252/52	BRAKE BOOSTER PUMP MOTOR ON TIME ABNORMALLY LONG
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DTC	C1253/53	BRAKE BOOSTER PUMP MOTOR CIRCUIT
------------	-----------------	---

CIRCUIT DESCRIPTION

The skid control ECU detects decreases in the accumulator pressure according to the data from the accumulator pressure sensor, and then starts and stops the pump motor by operating the motor relay.

The skid control ECU usually drives the motor relay 1 for ECB control, and the motor relay 2 for ABS control. If either is malfunctioning, the other substitutes.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1252/52	130	Motor relay is ON for at least 5 min.	• Brake actuator assy
C1253/53	132	Motor relay 1 coil (monitor) is energized for at least 1 sec. when main relay 1 monitor (BS1) is 9.5 V or more and motor relay 1 is off.	• ABS MTR relay • ABS MTR2 relay • Harness and connector • Brake actuator assy
C1253/53	133	Motor relay 1 coil (monitor) is not energized for at least 1 sec. when main relay 1 monitor (BS1) is 9.5 V or more and motor relay 1 is on.	• ABS MTR relay • ABS MTR2 relay • Harness and connector • Brake actuator assy
C1253/53	134	MTT input is 3.5 V or less for at least 0.2 sec. when main relay 1 monitor (BS1) is 9.5 V or more and motor relay 1 is on.	• ABS MTR relay • ABS MTR2 relay • Harness and connector • Brake actuator assy
C1253/53	136	Motor relay 2 coil (monitor) is energized for at least 1 sec. when main relay 2 monitor (BS2) is 9.5 V or more and motor relay 2 is off.	• ABS MTR relay • ABS MTR2 relay • Harness and connector • Brake actuator assy
C1253/53	137	Motor relay 2 coil (monitor) is not energized for at least 1 sec. (0.2 sec. during initial check) when main relay 2 monitor (BS2) is 9.5 V or more and motor relay 2 is on.	• ABS MTR relay • ABS MTR2 relay • Harness and connector • Brake actuator assy
C1253/53	138	MTT input is 3.5 V or less for at least 1 sec. (0.2 sec. during initial check) when main relay 1 monitor (BS1) is 9.5 V or more and motor relay 2 is on.	• ABS MTR relay • ABS MTR2 relay • Harness and connector • Brake actuator assy
C1253/53	140	MTT input is 3.5 V or more for at least 2 sec. when motor relay 1 and 2 are off.	• ABS MTR relay • ABS MTR2 relay • Harness and connector • Brake actuator assy

The diagram illustrates the electrical system for the A2 Brake Actuator and Skid Control ECU. It shows the following components and connections:

- A2 Brake Actuator:** Includes terminals MTT (33), BM1 (2), BM2 (1), GND1 (31), and GND2 (32). It is connected to an Auxiliary Battery and a 3M motor.
- Engine Room J/B:** Contains ABS-1 and ABS-2 relays, connected to the actuator and the engine room relay box.
- Engine Room R/B:** Contains ABS MTR Relay and ABS MTR2 Relay, which control the actuator's operation.
- Skid Control ECU:** Features terminals for MTT (29), MR1+ (11), MR1 (25), MR2 (30), MR2+ (25), GND (1), GND2 (2), GND3 (1), GND4 (2), GND5 (1), and GND6 (4).
- Wiring:** Shows the flow of power and signals between these components, including ground connections (GND1, GND2, GND3, GND4, GND5, GND6) and specific signal lines (W, W-B, W, W-B).

INSPECTION PROCEDURE

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

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch ON (READY).
- (c) Select the ACTIVE TEST mode on the hand-held tester.
- (d) Check the operation sound of the ABS motor individually when operating it with the hand-held tester.

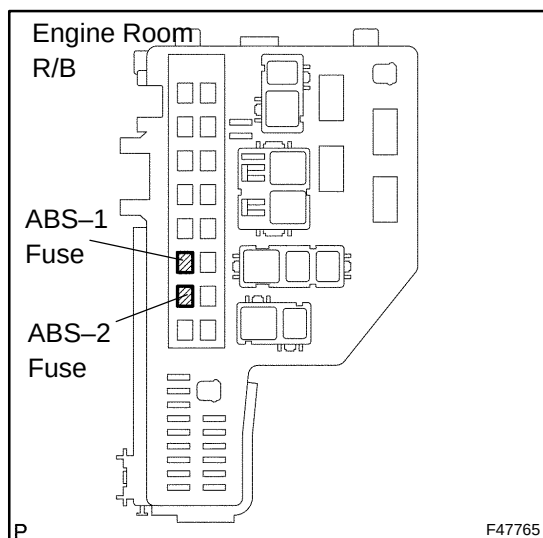
Item	Measurement Item / Range (Display)	Normal Condition
MOTOR RELAY 1	Turns MOTOR RELAY 1 ON / OFF	Operation of solenoid (clicking sound) can be heard
MOTOR RELAY 2	Turns MOTOR RELAY 2 ON / OFF	Operation of solenoid (clicking sound) can be heard

OK:

The operation sound of the ABS motor should be heard.

NG

Go to step 6

OK**2 INSPECT FUSE(ABS-1, ABS-2 FUSE)**

- (a) Remove the ABS-1 and ABS-2 fuse from the engine room R/B
- (b) Measure the resistance according to the value(s) in the table below.

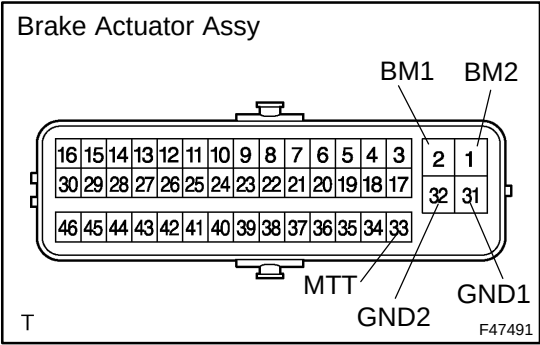
Standard:

ABS-1	Below 1 Ω (Continuity)
ABS-2	Below 1 Ω (Continuity)

NG**CHECK FOR SHORT IN ALL HARNESS AND CONNECTOR CONNECTED TO FUSE AND REPLACE FUSE****OK**

3

INSPECT BRAKE ACTUATOR ASSY



- (a) Disconnect the brake actuator assy connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
1 (BM2) – 31 (GND1)	Below 10 Ω
2 (BM1) – 31 (GND1)	Below 10 Ω
1 (BM2) – 2 (BM1)	Below 1 Ω
31 (GND1) – 32 (GND2)	Below 1 Ω
1 (BM2) – 33 (MTT)	About 33 Ω
2 (BM1) – 33 (MTT)	About 33 Ω

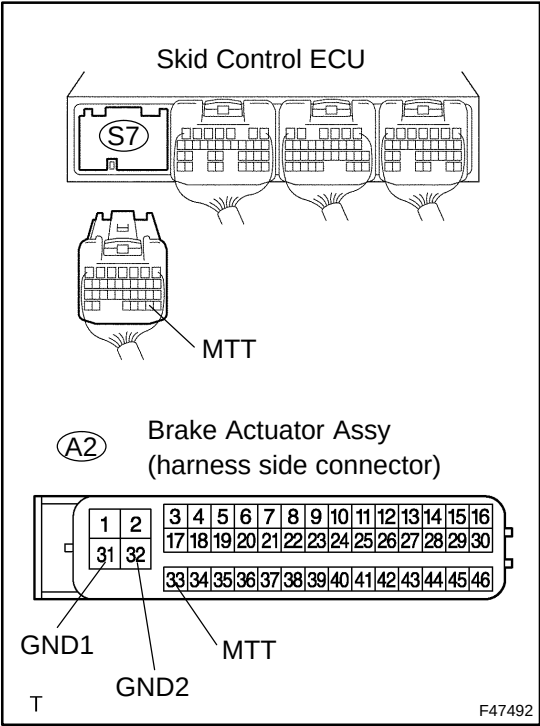
NG

REPLACE BRAKE ACTUATOR ASSY

OK

4

CHECK HARNESS AND CONNECTOR(SKID CONTROL ECU – BRAKE ACTUATOR ASSY)



- (a) Disconnect the skid control ECU connector and brake actuator assy connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S7-29 (MTT) – A2-33 (MTT)	Below 1 Ω
A2-31 (GND1) – Body ground	Below 1 Ω
A2-32 (GND2) – Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 READ VALUE OF HAND-HELD TESTER

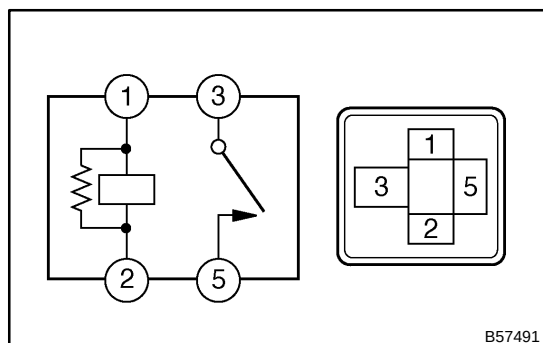
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch ON (READY).
- (c) Select the DTA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal Condition
ACC PRESS SENS 1	Accumulator pressure sensor 1 / min.: 0 V, max.: 5 V	Specified value: 3.2 to 4.0 V

- (d) Depress the brake pedal 4 or 5 times to operate the pump motor, and check the output value on the hand-held tester with the motor stopped (not braking).

OK:**Accumulator (ACC) pressure sensor voltage does not drop.****NG****REPLACE BRAKE ACTUATOR ASSY
(SEE PAGE 32-54)****OK****REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)****NOTICE:**

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

6 INSPECT ABS MOTOR RELAY

- (a) Remove the ABS motor relay and ABS motor relay 2.
- (b) Measure the resistance according to the value(s) in the table below.

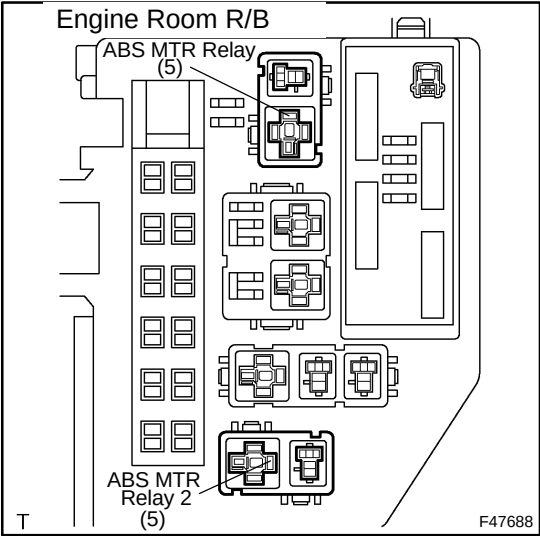
Standard:

Tester Connection	Connection	Specified Resistance
3 – 5	Always	10 kΩ or higher (No continuity)
3 – 5	Apply B+ between terminal 1 and 2	Below 1 Ω

NG**REPLACE ABS MOTOR RELAY****OK**

7

CHECK HARNESS AND CONNECTOR



- (a) Remove the ABS motor relay and ABS motor relay 2.
- (b) Measure the voltage according to the value(s) in the table below.

Standard:

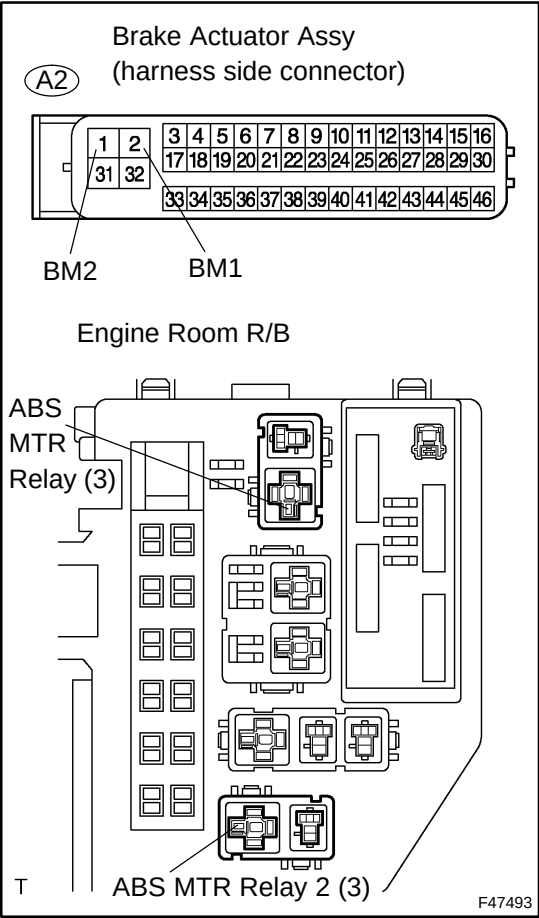
Tester Connection	Specified Condition
ABS Motor Relay (5) – Body ground	10 to 14 V
ABS Motor Relay 2 (5) – Body ground	10 to 14 V

OK

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

8 CHECK HARNESS AND CONNECTOR(ENGINE ROOM R/B – BRAKE ACTUATOR)



- (a) Disconnect the brake actuator assy connector.
(b) Remove the ABS MTR Relay and ABS MTR Relay 2.
(c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
A2-1 (BM2) – ABS MTR Relay 2 (3)	Below 1 Ω
A2-2 (BM1) – ABS MTR Relay (3)	Below 1 Ω

- (d) Measure the resistance according to the value(s) in the table below.

Standard:

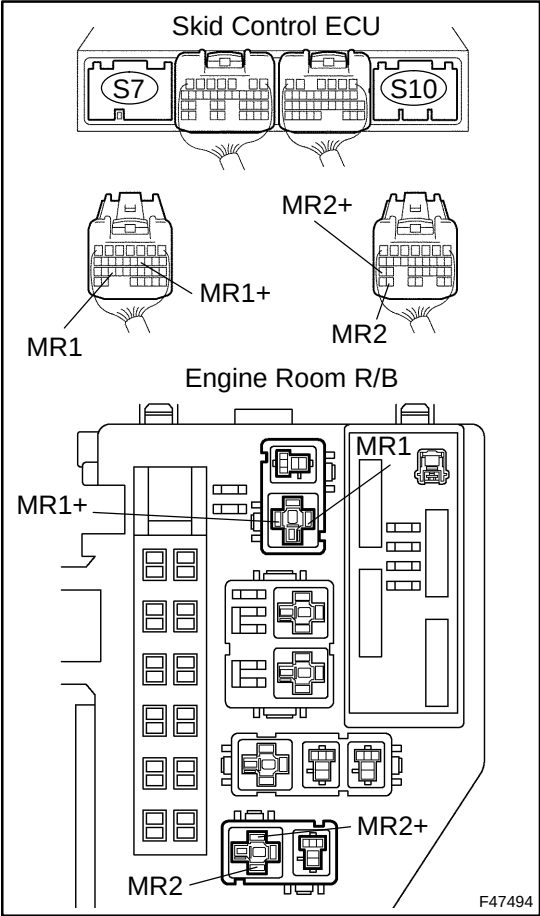
Tester Connection	Specified Condition
A2-1 (BM2) – Body ground	10 k Ω or higher
A2-2 (BM1) – Body ground	10 k Ω or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9

CHECK HARNESS AND CONNECTOR(ENGINE ROOM R/B – SKID CONTROL ECU)



- (a) Disconnect the skid control ECU connector.
- (b) Remove the ABS MTR Relay and ABS MTR Relay 2.
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S7-11 (MR1+) – ABS MTR Relay (2)	Below 1 Ω
S7-25 (MR1) – ABS MTR Relay (1)	Below 1 Ω
S10-25 (MR2+) – ABS MTR 2 Relay (2)	Below 1 Ω
S10-30 (MR2) – ABS MTR 2 Relay (1)	Below 1 Ω

- (d) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S7-11 (MR1+) – Body ground	10 kΩ or higher
S7-25 (MR1) – Body ground	10 kΩ or higher
S10-25 (MR2+) – Body ground	10 kΩ or higher
S10-30 (MR2) – Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:
When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C1256/57	ACCUMULATOR LOW PRESSURE
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CIRCUIT DESCRIPTION

The accumulator pressure sensor is built into the actuator and detects the accumulator pressure.

The skid control ECU turns on the Brake Control warning lamp and sounds the skid control buzzer if it senses a decrease in the accumulator pressure.

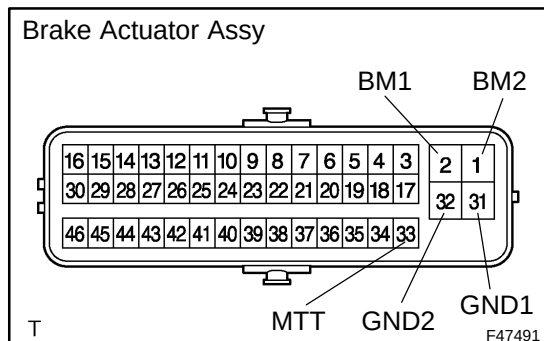
DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1256/57	141	- Braking operation is input when accumulator pressure is less than 12.45 MPa and vehicle speed is input (detected value changes if accumulator pressure is low after system start). - Accumulator pressure is less than 14.62 MPa for 120 sec. (changes according to power source voltage) after system start (stores the DTC after the conditions are met, and drives buzzer).	Brake actuator assy (accumulator pressure, accumulator pressure sensor, pump motor)
C1256/57	143	- Any of the wheel cylinder pressure sensor value is lower than the target value for at least 0.5 sec. when accumulator pressure is less than 14.62 MPa and vehicle speed is input. - Accumulator pressure changes little when accumulator pressure is less than 14.62 MPa for at least 1 sec. without braking (pump motor is operating). - Accumulator pressure is less than 14.62 MPa for at least 0.5 sec. when motor relay is malfunctioning.	Brake actuator assy (accumulator pressure, accumulator pressure sensor, pump motor)

INSPECTION PROCEDURE

HINT:

DTCs may be output if the accumulator pressure drops due to frequent braking (this is not a malfunction).

1 INSPECT BRAKE ACTUATOR ASSY



- Disconnect the brake actuator assy connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
1 (BM2) – 31 (GND1)	Below 10 Ω
2 (BM1) – 31 (GND1)	Below 10 Ω
1 (BM2) – 2 (BM1)	Below 1 Ω
31 (GND1) – 32 (GND2)	Below 1 Ω
1 (BM2) – 33 (MTT)	About 10 Ω
2 (BM1) – 33 (MTT)	About 10 Ω

NG

REPLACE BRAKE ACTUATOR ASSY

OK

2 READ VALUE OF HAND-HELD TESTER

- Connect the hand-held tester to the DLC3.
- Turn the power switch ON (READY).
- Select the DATA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal condition
ACC PRESS SENS 1	Accumulator pressure sensor 1 / min.: 0 V, max.: 5 V	Specified value: 3.2 to 4.0 V

- Depress the brake pedal 4 or 5 times to operate the pump motor, and check the output value on the hand-held tester with the motor stopped (not braking).

OK:

ACC pressure sensor's output voltage does not drop.

NG

**REPLACE BRAKE ACTUATOR ASSY
(SEE PAGE 32-54)**

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C1259/58	HV SYSTEM REGENERATIVE MALFUNCTION
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DTC	C1310/51	MALFUNCTION IN HV SYSTEM
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CIRCUIT DESCRIPTION

The skid control ECU communicates with the hybrid control ECU and controls braking force according to the motor's regenerative force.

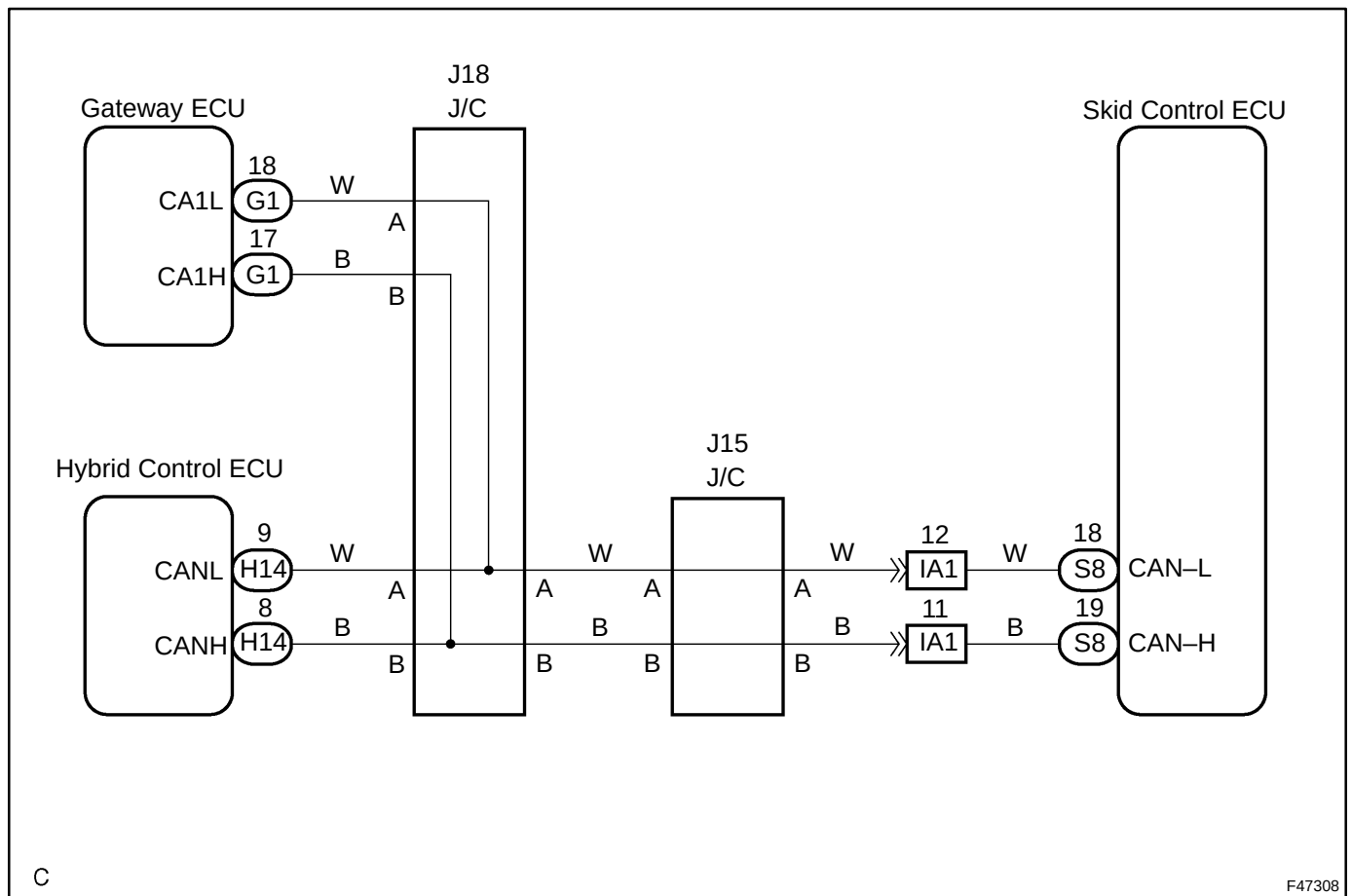
The skid control ECU sends Enhanced VSC signal to the hybrid control ECU and inputs operating signal from the hybrid control ECU.

The skid control ECU uses CAN communication for communication with the hybrid control ECU. If a communication malfunction is memorized, the skid control ECU prohibits Enhanced VSC operation and a part of ECB control by fail safe function.

C1259/59 is stored if the power switch ON (READY) with the HV battery service plug disconnected.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1259/58	150	The regeneration malfunction signal is input for at least 0.02 sec. when IG2 terminal voltage is 9.5 V or more for at least 2 sec. and communication with hybrid control computer is valid.	• Hybrid control system
C1310/51	–	The traction control prohibition signal is received for at least 0.07 sec. when IG2 terminal voltage is 10.5 V or more for at least 1.5 sec. and communication with hybrid control computer is valid.	• Hybrid control system (Enhanced VSC)

WIRING DIAGRAM



HINT:

This DTC is output from the skid control ECU when the hybrid control ECU sends a malfunction signal to the skid control ECU.

INSPECTION PROCEDURE

CHECK HYBRID CONTROL SYSTEM (SEE PAGE 05-440)

DTC	C1300/-	MALFUNCTION IN ECU
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CIRCUIT DESCRIPTION

The skid control ECU outputs this DTC if malfunctions are found in the circuit inside the computer by self-diagnosis.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1300/-	—	Malfunction in skid control ECU	Skid control ECU

INSPECTION PROCEDURE

1	CHECK DTC
----------	------------------

- (a) Clear the DTCs (see page 05-975).
- (b) Turn the power switch ON (READY).
- (c) Check the same DTCs are recorded.

Result:

DTC is output	A
DTC is not output	B

B

**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE
(SEE PAGE 05-966)**

A

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

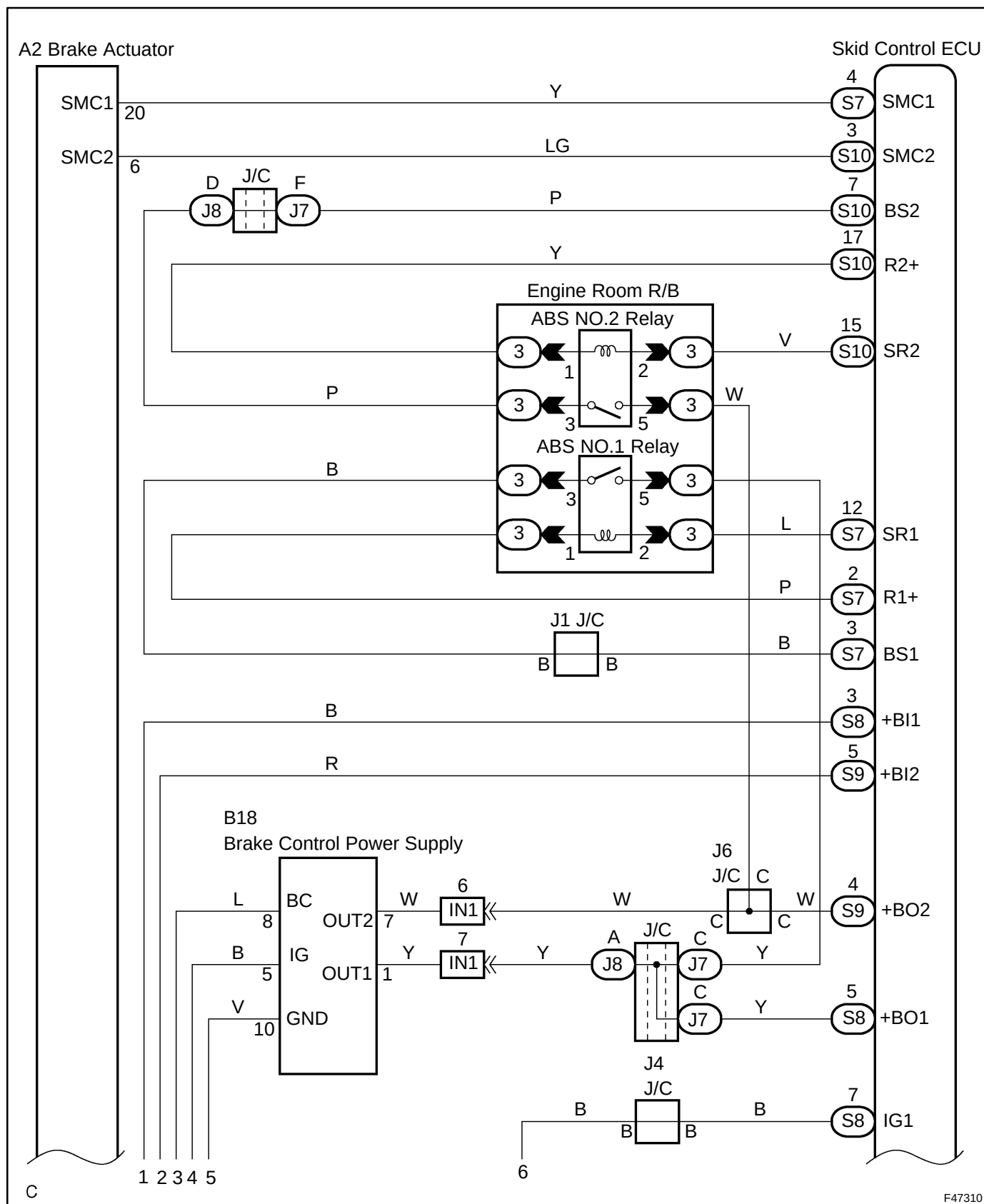
DTC	C1311/11	OPEN CIRCUIT IN MAIN RELAY 1
DTC	C1312/12	SHORT CIRCUIT IN MAIN RELAY 1
DTC	C1313/13	OPEN CIRCUIT IN MAIN RELAY 2
DTC	C1314/14	SHORT CIRCUIT IN MAIN RELAY 2

CIRCUIT DESCRIPTION

ABS main relay 1 (ABS No.1 relay) supplies power to the changeover solenoid and the linear solenoid. ABS main relay 2 (ABS No.2 relay) goes on for approximately 5 seconds after the power switch is turned off and the braking effort signal input is terminated. ABS main relay 2 (ABS No.2 relay) supplies electricity and maintains operating condition for the brake system when the power switch is off.

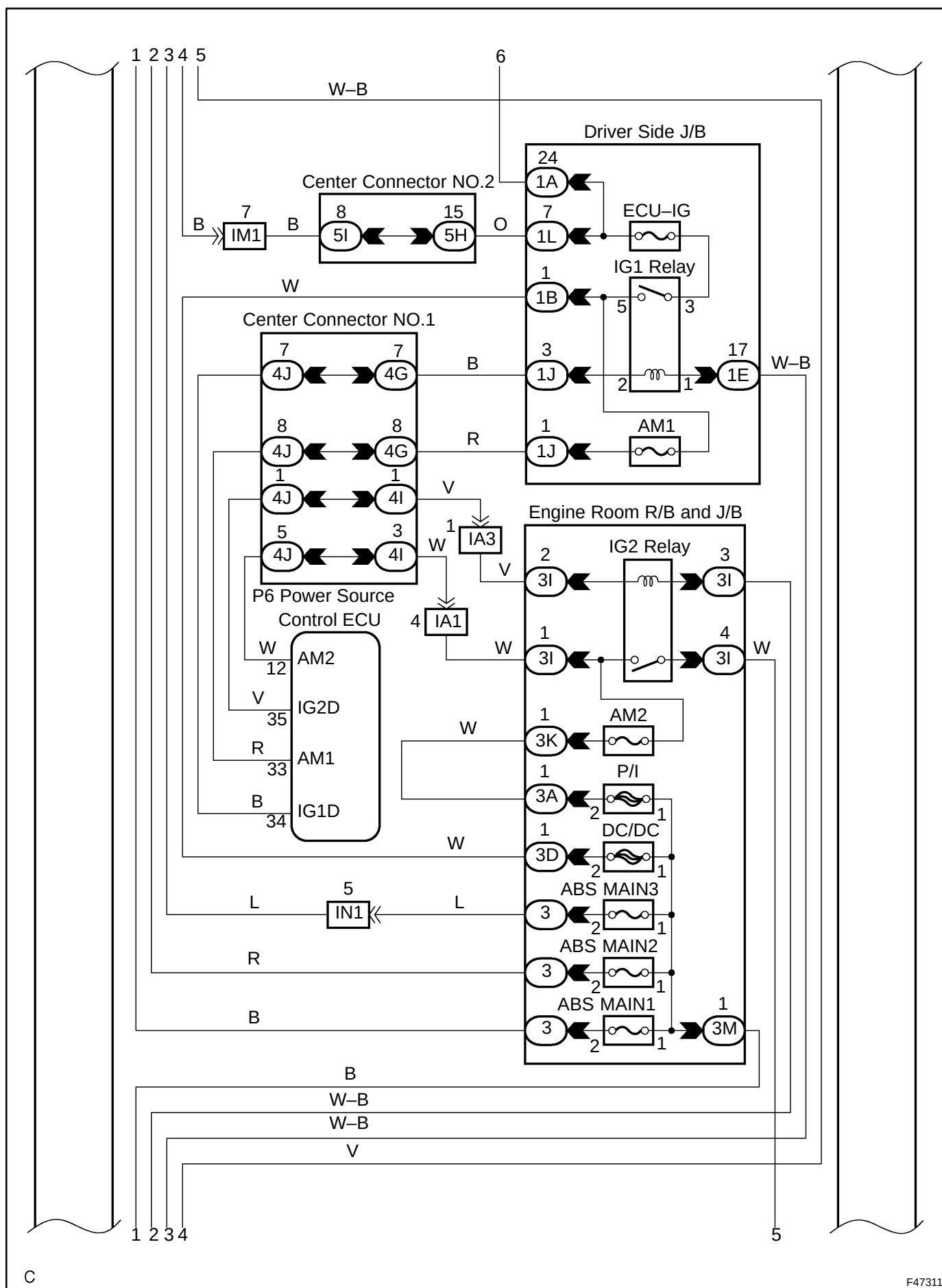
DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1311/11	1	- Relay contact is off (BS 1 terminal is less than 3.5 V) for at least 0.2 sec. when R1+ terminal voltage is 9.5 V or more and main relay 1 is on. - R1+ terminal voltage is less than 9.5 V and main relay 1 cannot be on for at least 0.2 sec. when main relay 1 is turned on (BS 1 terminal is 3.5 V or more).	- ABS main relay 1 (ABS No.1 relay) - Skid control ECU - Harness and connector
C1312/12	3	Relay contact is on for at least 4 sec. when main relay 1 is off.	- ABS main relay 1 (ABS No.1 relay) - Skid control ECU - Harness and connector
C1313/13	4	- Relay contact is off (BS2 terminal is less than 3.5 V) for at least 0.2 sec. when R2+ terminal voltage is 9.5 V or more and main relay 2 is on. - R2+ terminal voltage is less than 9.5 V and main relay 2 cannot be on for at least 2 sec. when main relay 2 is turned on (BS 1 terminal is 3.5 V or more).	- ABS main relay 2 (ABS No.2 relay) - Skid control ECU - Harness and connector
C1314/14	6	Relay contact is on for at least 4 sec. when main relay 2 is off.	- ABS main relay 2 (ABS No.2 relay) - Skid control ECU - Harness and connector

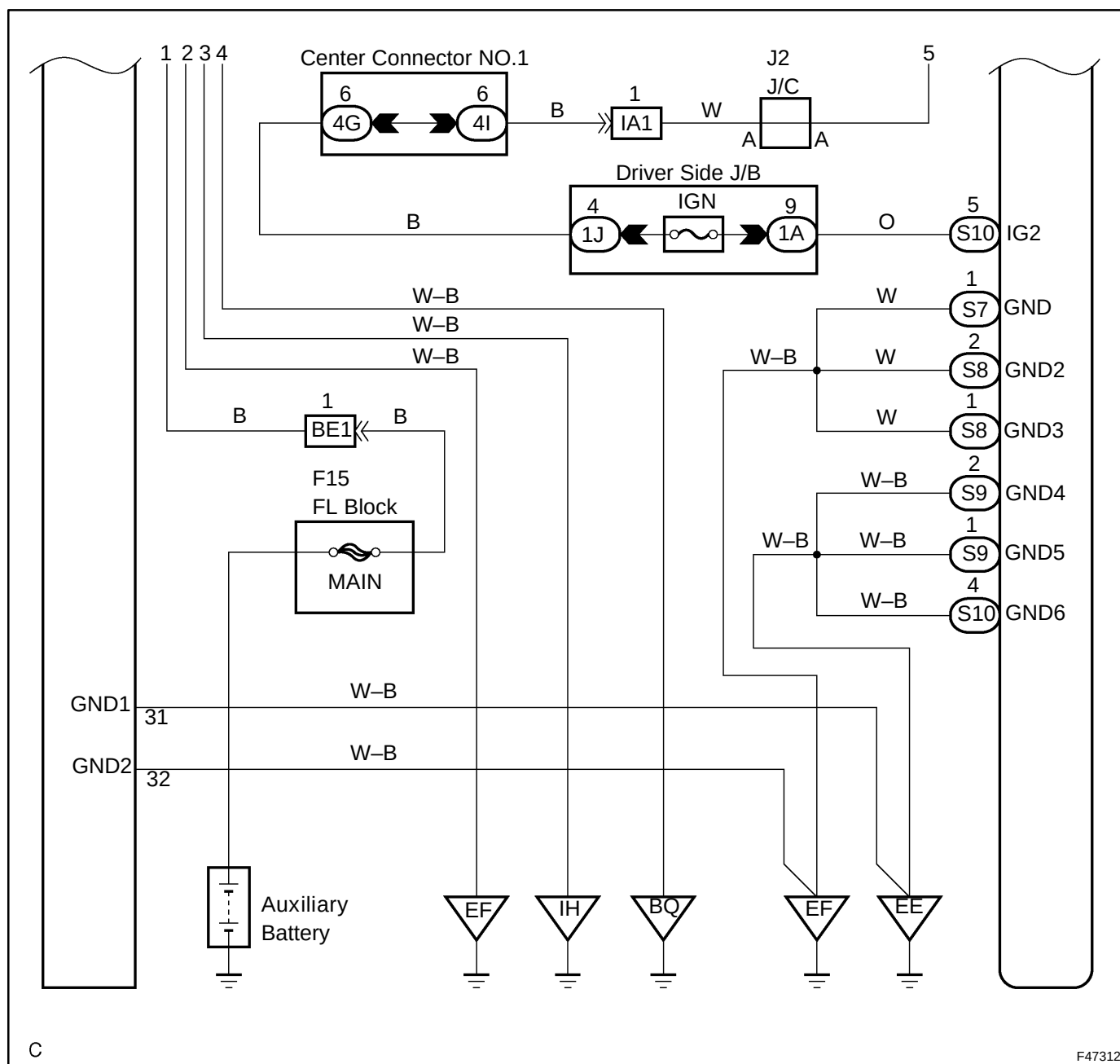
WIRING DIAGRAM



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INSPECTION PROCEDURE

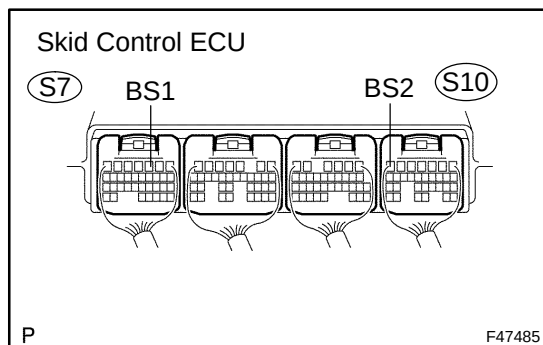
1 PERFORM ACTIVE TEST BY HAND-HELD TESTER(ABS NO.1 RELAY, ABS NO.2 RELAY OPERATION)

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch ON (READY).
- (c) Select the ACTIVE TEST mode on the hand-held tester.
- (d) Check the operation sound of the ABS No.1, ABS No.2 relay.

Item	Vehicle Condition / Test Details	Diagnostic Note
MAIN RELAY 2	Turns MAIN RELAY 1 ON / OFF	Operation of solenoid (clicking sound) can be heard
MAIN RELAY 1	Turns MAIN RELAY 2 ON / OFF	Operation of solenoid (clicking sound) can be heard

OK:

Operation sound of ABS No.1 relay and ABS No.2 relay should be heard.

NG**Go to step 3****OK****2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(BS1, BS2 TERMINAL)**

- (a) Measure the voltage according to the value(s) in the table below.

HINT:

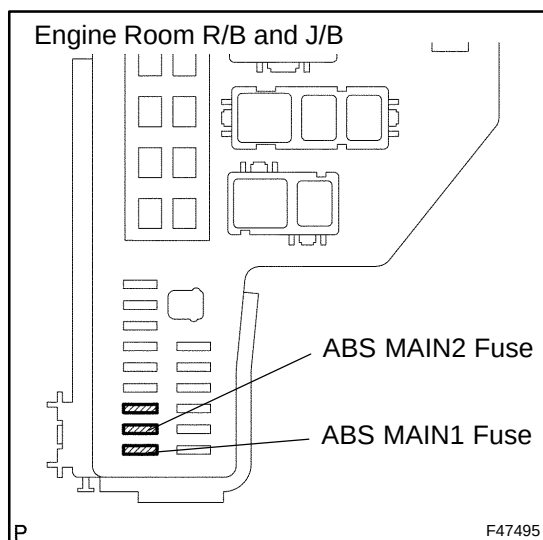
Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Specified Condition
S7-3 (BS1) – Body ground	10 to 14 V
S10-7 (BS2) – Body ground	10 to 14 V

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)****NOTICE:**

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

3 INSPECT FUSE (ABS MAIN 1, ABS MAIN 2 FUSE)

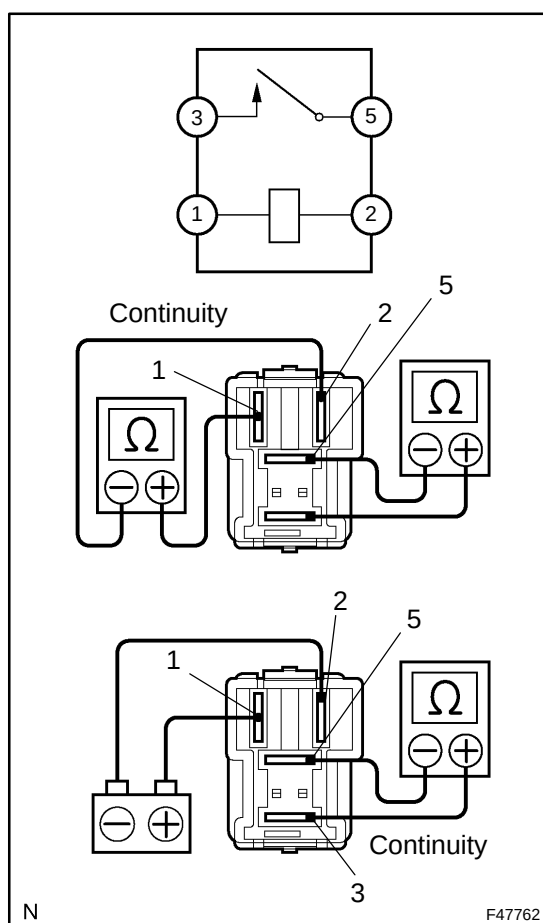
- Remove the ABS MAIN 1 and ABS MAIN 2 fuse.
- Measure the resistance according to the value(s) in the table below.

Standard:

ABS MAIN 1 Fuse	Below 1 Ω (Continuity)
ABS MAIN 2 Fuse	Below 1 Ω (Continuity)

NG

CHECK FOR SHORT IN ALL HARNESS AND CONNECTOR CONNECTED TO FUSE AND REPLACE FUSE

OK**4 INSPECT ABS RELAY(ABS MAIN RELAY 1, ABS MAIN RELAY 2)**

- Remove the ABS main relay 1 (ABS No.1 relay) and ABS main relay 2 (ABS No.2 relay).
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
Terminal 1 – Terminal 2	100 Ω
Terminal 3 – Terminal 5	10 k Ω or higher (No Continuity)

- Apply battery voltage between terminals 1 and 2.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
Terminal 3 – Terminal 5	Below 1 Ω (Continuity)

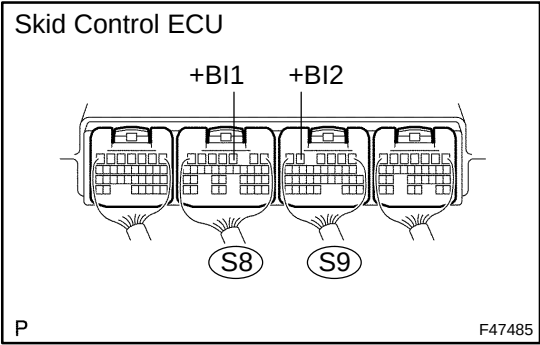
NG

REPLACE ABS RELAY

OK

5

INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(+BI1, +BI2 TERMINAL)



(a) Measure the voltage according to the value(s) in the table below.

HINT:
Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Specified Condition
S8-3 (+BI1) – Body ground	10 to 14 V
S9-5 (+BI2) – Body ground	10 to 14 V

NG

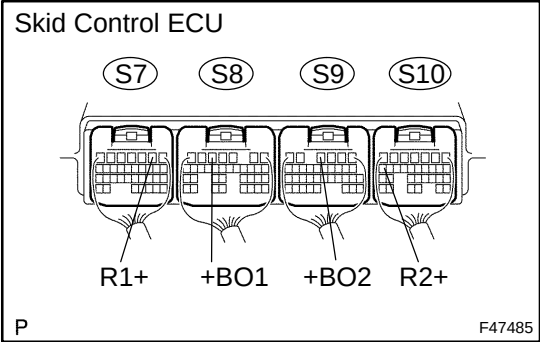
REPAIR OR
CONNECTOR

REPLACE HARNESS OR

OK

6

INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(+BO1, +BO2, R1+, R2+ TERMINAL)



(a) Measure the voltage according to the value(s) in the table below.

HINT:
Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Specified Condition
S7-2 (R1+) – Body ground	10 to 14 V
S8-5 (+BO1) – Body ground	10 to 14 V
S9-4 (+BO2) – Body ground	10 to 14 V
S10-17 (R2+) – Body ground	10 to 14 V

NG

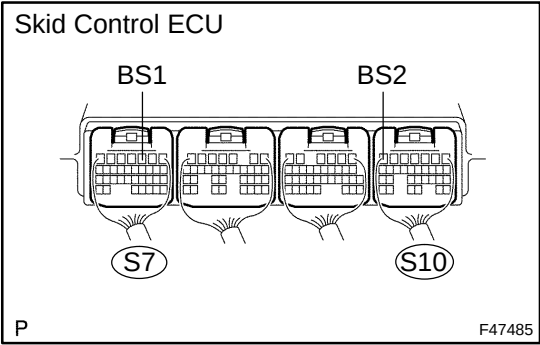
REPAIR OR
CONNECTOR

REPLACE HARNESS OR

OK

7

INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(BS1, BS2 TERMINAL)



(a) Measure the voltage according to the value(s) in the table below.

HINT:
Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Specified Condition
S7-3 (BS1) – Body ground	10 to 14 V
S10-7 (BS2) – Body ground	10 to 14 V

NG

REPAIR OR CONNECTOR

REPLACE HARNESS OR

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:
When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C1315/31	CHANGEOVER SOLENOID MALFUNCTION (SMC1)
DTC	C1316/32	CHANGEOVER SOLENOID MALFUNCTION (SMC2)
DTC	C1352/21	INCREASING PRESSURE SOLENOID MALFUNCTION (FR)
DTC	C1353/23	INCREASING PRESSURE SOLENOID MALFUNCTION (FL)
DTC	C1354/25	INCREASING PRESSURE SOLENOID MALFUNCTION (RR)
DTC	C1355/27	INCREASING PRESSURE SOLENOID MALFUNCTION (RL)
DTC	C1356/22	DECREASING PRESSURE SOLENOID MALFUNCTION (FR)
DTC	C1357/24	DECREASING PRESSURE SOLENOID MALFUNCTION (FL)
DTC	C1358/26	DECREASING PRESSURE SOLENOID MALFUNCTION (RR)
DTC	C1359/28	DECREASING PRESSURE SOLENOID MALFUNCTION (RR)

CIRCUIT DESCRIPTION

Each solenoid adjusts pressure which affects each wheel cylinder according to signals from the skid control ECU and controls the vehicle.

The master cut solenoid (SMC 1/2) is closed and blocks the master cylinder pressure from the ECB control pressure when the system is normal. The master cut solenoid is open and sends the master cylinder fluid pressure to the non-assisted brake wheel cylinders during the fail safe due to system malfunction.

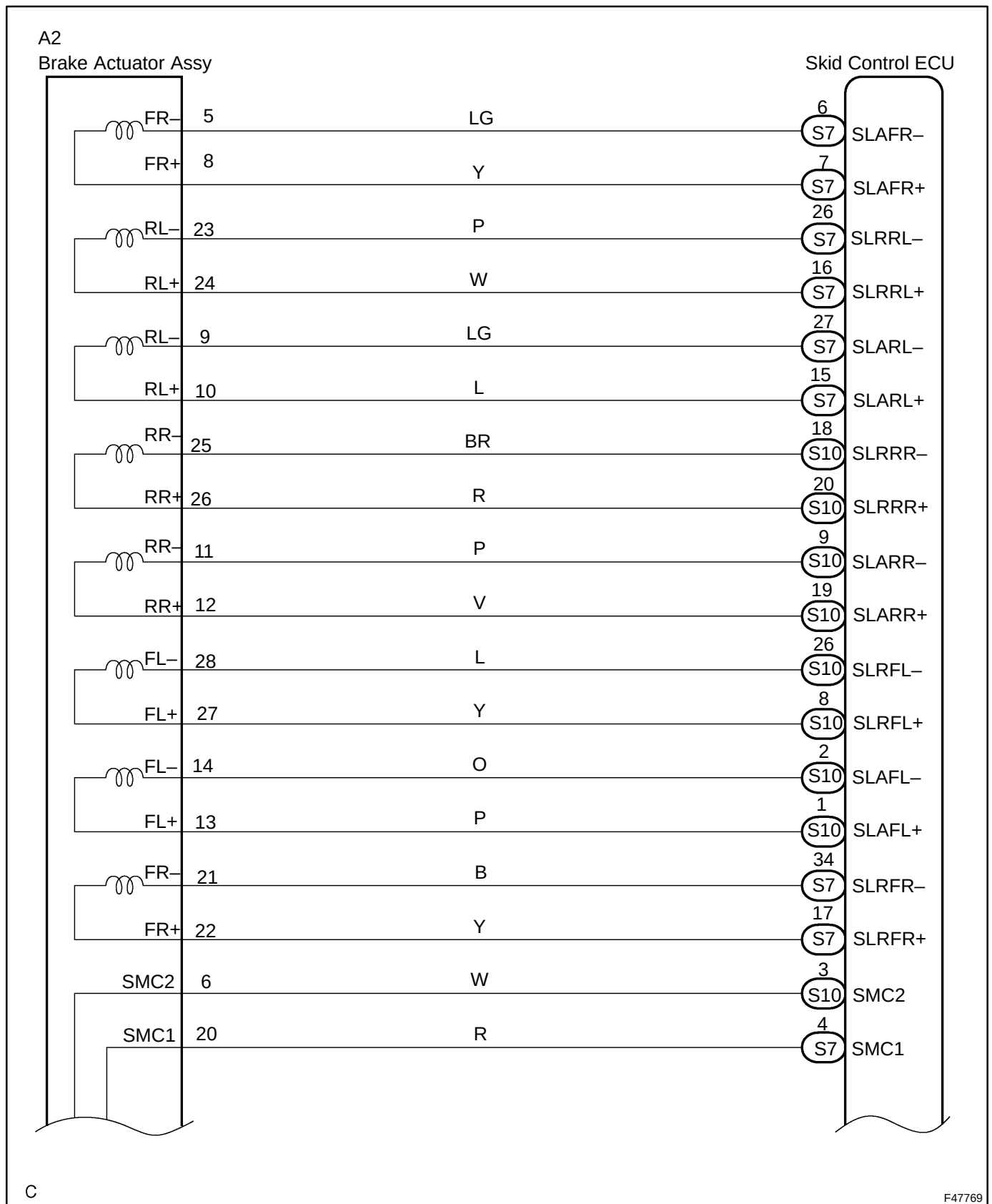
DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1315/31	61	• SMC1 drive circuit is malfunctioning for 0.05 sec. or more. • Short to +B.	• Brake actuator assy (SMC1) • Skid control ECU • Harness and connector
C1315/31	62	Open circuit in SMC1 continues for 0.05 sec. or more when SMC1 is off	• Brake actuator assy (SMC1) • Skid control ECU • Harness and connector
C1315/31	63	Open circuit in SMC1 continues for 0.05 sec. or more when SMC1 is off.	• Brake actuator assy (SMC1) • Skid control ECU • Harness and connector
C1315/31	64	Over current in SMC1 continues for 0.05 sec. or more.	• Brake actuator assy (SMC1) • Skid control ECU • Harness and connector
C1316/32	66	• SMC1 driver circuit is malfunctioning for 0.05 sec. or more. • Short to +B.	• Brake acutator assy (SMC2) • Skid control ECU • Harness and connector
C1316/32	67	Open circuit in SMC2 continues for 0.05 sec. or more when SMC2 is off.	• Brake acutator assy (SMC2) • Skid control ECU • Harness and connector
C1316/32	68	Open circuit in SMC2 continues for 0.05 sec. or more.	• Brake acutator assy (SMC2) • Skid control ECU • Harness and connector
C1316/32	69	Over current in SMC2 continues for 0.05 sec. or more.	• Brake acutator assy (SMC2) • Skid control ECU • Harness and connector
C1352/21	11	Open circuit in SLAFR continues for 0.05 sec. or more when SLAFR is off.	• Brake actuator assy • Skid control ECU • Harness and connector
C1352/21	12	Open circuit in SLAFR continues for 0.05 sec. or more when SLAFR is on.	• Brake actuator assy • Skid control ECU • Harness and connector
C1352/21	13	Short to +B or voltage leak in SLAFR continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1352/21	14	Over current in SLAFR continues for 0.05 sec. or more	• Brake actuator assy • Skid control ECU • Harness and connector
C1353/23	21	Open circuit in SLAFL continues for 0.05 sec. or more when SLAFL is off.	• Brake acutator assy • Skid control ECU • Harness and connector
C1353/23	22	Open circuit in SLAFL continues for 0.05 sec. or more when SLAFL is on.	• Brake acutator assy • Skid control ECU • Harness and connector
C1353/23	23	Short to +B or voltage leak in SLAFL continues for 0.05 sec. or more.	• Brake acutator assy • Skid control ECU • Harness and connector
C1353/23	24	Over current in SLAFL continues for 0.05 sec. or more.	• Brake acutator assy • Skid control ECU • Harness and connector
C1354/25	31	Open circuit in SLARR continues for 0.05 sec. or more when SLARR is off	• Brake actuator assy • Skid control ECU • Harness and connecotor

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1354/25	32	Open circuit in SLARR continues for 0.05 sec. or more when SLARR is on.	• Brake actuator assy • Skid control ECU • Harness and connector
C1354/25	33	Short to +B or voltage leak in SLARR continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1354/25	34	Over current in SLARR continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1355/27	41	Open circuit in SLARL continues for 0.05 sec. or more when SLARL is off.	• Brake actuator assy • Skid control ECU • Harness and connector
C1355/27	42	Open circuit in SLARL continues for 0.05 sec. or more when SLARL is on.	• Brake actuator assy • Skid control ECU • Harness and connector
C1355/27	43	Short to +B or voltage leak in SLARL continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1355/27	44	Over current in SLARL continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1356/22	16	Open circuit in SLRFR continues for 0.05 sec. or more when SLRFR is off.	• Brake actuator assy • Skid control ECU • Harness and connector
C1356/22	17	Open circuit in SLRFR continues for 0.05 sec. or more when SLRFR is on.	• Brake actuator assy • Skid control ECU • Harness and connector
C1356/22	18	Short to +B or voltage leak in SLRFR continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1356/22	19	Over current in SLRFR continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1357/24	26	Open circuit in SLRFL continues for 0.05 sec. or more when SLRFL is off.	• Brake actuator assy • Skid control ECU • Harness and connector
C1357/24	27	Open circuit in SLRFL continues for 0.05 sec. or more when SLRFL is on.	• Brake actuator assy • Skid control ECU • Harness and connector
C1357/24	28	Short to +B or voltage leak in SLRFL continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1357/24	29	Over current in SLRFL continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1358/26	36	Open circuit in SLRRR continues for 0.05 sec. or more when SLRRR is off.	• Brake actuator assy • Skid control ECU • Harness and connector
C1358/26	37	Open circuit in SLRRR continues for 0.05 sec. or more when SLRRR is on.	• Brake actuator assy • Skid control ECU • Harness and connector
C1358/26	38	Short to +B or voltage leak in SLRRR continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1358/26	39	Over current in SLRRR continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector

DIAGNOSTICS – ELECTRONICALLY CONTROLLED BRAKE SYSTEM

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1359/28	46	Open circuit in SLRRL continues for 0.05 sec. or more when SLRRL is off.	• Brake actuator assy • Skid control ECU • Harness and connector
C1359/28	47	Open circuit in SLRRL continues for 0.05 sec. or more when SLRRL is on.	• Brake actuator assy • Skid control ECU • Harness and connector
C1359/28	48	Short to +B or voltage leak in SLRRL continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector
C1359/28	49	Over current in SLRRL continues for 0.05 sec. or more.	• Brake actuator assy • Skid control ECU • Harness and connector

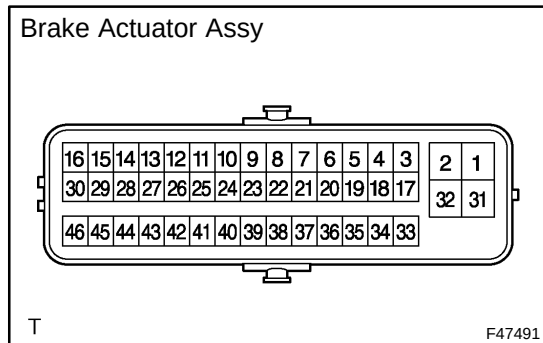
WIRING DIAGRAM





INSPECTION PROCEDURE

1 INSPECT BRAKE ACTUATOR ASSY



- (a) Disconnect the brake actuator connector.
 (b) Measure the resistance according to the value(s) in the table below.

HINT:

Check the brake actuator assy when it is cooled down.

Standard:

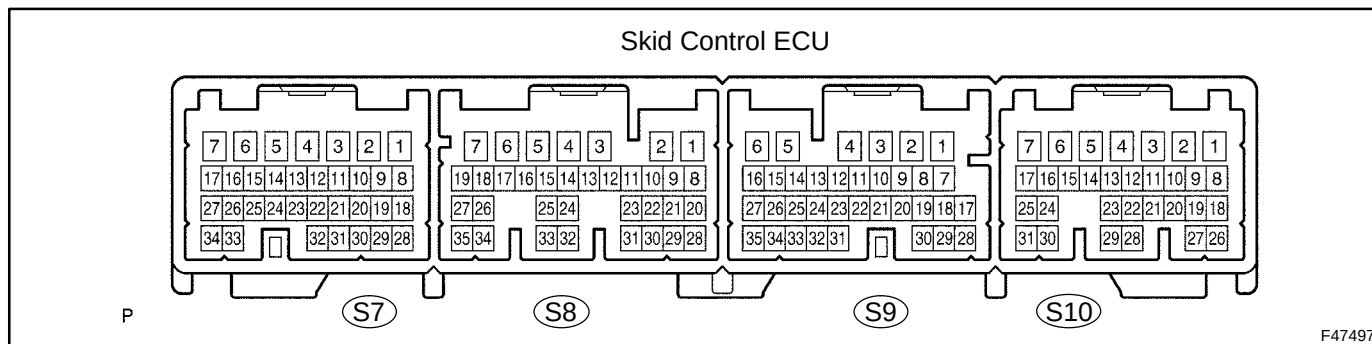
Tester Connection	Specified Condition
20 (SMC1) – 7 (BS2)	14.6 to 24.6 Ω
6 (SMC2) – 19 (BS1)	14.6 to 24.6 Ω
8 (FR+) – 5 (FR-)	3.5 to 4.3 Ω
22 (FR+) – 21 (FR-)	3.5 to 4.3 Ω
13 (FL+) – 14 (FL-)	3.5 to 4.3 Ω
27 (FL+) – 28 (FL-)	3.5 to 4.3 Ω
12 (RR+) – 11 (RR-)	3.5 to 4.3 Ω
10 (RL+) – 9 (RL-)	3.5 to 4.3 Ω

NG

REPLACE BRAKE ACTUATOR ASSY

OK

2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE



- (a) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S7-4 (SMC1) – Body ground	Power switch ON (READY) Brake pedal release	Below 10 to 14 V
S10-3 (SMC2) – Body ground	Power switch ON (READY) Brake pedal release	Below 10 to 14 V
S7-7 (SLAFR+) – Body ground	Power switch ON (READY) Brake pedal release	Pulse generation (see waveform 5) (see page 05-968)
S7-6 (SLAFR-) – Body ground	Power switch ON (READY) Brake pedal release	Pulse generation (see waveform 5) (see page 05-968)
S10-1 (SLAFL+) – Body ground	Power switch ON (READY) Brake pedal release	Pulse generation (see waveform 5) (see page 05-968)
S10-2 (SLAFL-) – Body ground	Power switch ON (READY) Brake pedal release	Pulse generation (see waveform 5) (see page 05-968)
S10-19 (SLARR+) – Body ground	Power switch ON (READY) Brake pedal release	Pulse generation (see waveform 5) (see page 05-968)

Tester Connection	Condition	Specified Condition
S10-9 (SLARR-) – Body ground	Power switch ON (READY) Brake pedal release	Pulse generation (see waveform 5) (see page 05-968)
S7-15 (SLARL+) – Body ground	Power switch ON (READY) Brake pedal release	Pulse generation (see waveform 5) (see page 05-968)
S7-27 (SLARL-) – Body ground	Power switch ON (READY) Brake pedal release	Pulse generation (see waveform 5) (see page 05-968)
S7-17 (SLRFR+) – Body ground	Power switch ON (READY) Brake pedal release	Below 1.5 V
S10-8 (SLRFL+) – Body ground	Power switch ON (READY) Brake pedal release	Below 1.5 V
S10-20 (SLRRR+) – Body ground	Power switch ON (READY) Brake pedal release	Below 1.5 V
S7-16 (SLRRL+) – Body ground	Power switch ON (READY) Brake pedal release	Below 1.5 V
S7-34 (SLRFR-) – Body ground	Power switch ON (READY)	Below 1.5 V
S10-26 (SLRFL-) – Body ground	Power switch ON (READY) Brake pedal release	Below 1.5 V
S10-18 (SLRRR-) – Body ground	Power switch ON (READY) Brake pedal release	Below 1.5 V
S7-26 (SLRRL-) – Body ground	Power switch ON (READY) Brake pedal release	Below 1.5 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C1319/35	CHANGEOVER SOLENOID MALFUNCTION
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CIRCUIT DESCRIPTION

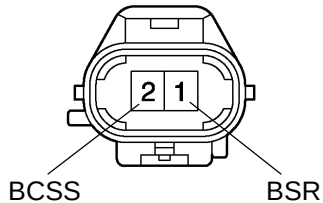
The stroke simulator solenoid (SCSS) generates pedal reactive effort during ECB control. If one of the 4 wheels loses brake booster function, the stroke simulator operation is prohibited.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1319/35	71	• SCSS drive circuit is malfunctioning for 0.05 sec. or more. • Short to +B in SCSS.	• Stroke simulator • Skid control ECU • Harness and connector
C1319/35	72	Current leaks for 0.05 sec. or more when SCSS is off.	• Stroke simulator • Skid control ECU • Harness and connector
C1319/35	73	Open circuit in SCSS continues for 0.05 sec. or more.	• Stroke simulator • Skid control ECU • Harness and connector
C1319/35	74	Over current in SCSS continues for 0.05 sec. or more.	• Stroke simulator • Skid control ECU • Harness and connector

The diagram illustrates the electrical architecture for an ABS system. Key components and their connections include:

- Brake Actuator (A2):** Features a BS1 terminal (pin 19) connected to the Skid Control ECU.
- Brake Master Stroke Simulator Cylinder Assembly (B17):** Contains BCSS (pin 2) and BSR (pin 1) terminals. BCSS connects to the Skid Control ECU via a Short Connector (S2, S3). BSR connects to the Skid Control ECU via a J1 J/C.
- Skid Control ECU:** Receives signals at SCSS (pin S7) and BS1 (pin S7). It controls the R1+ (pin S7) and SR1 (pin S7) solenoids.
- Engine Room R/B:** Houses the ABS NO.1 Relay, which controls the R1+ and SR1 solenoids.
- Driver Side J/B:** Contains the ECU-IG, IG1 Relay, and AM1 solenoid. It receives signals from the Power Source Control ECU and the Engine Room R/B.
- Power Source Control ECU:** Controls the IG1D (pin 34) and AM1 (pin 33) solenoids. It connects to the Driver Side J/B via Center Connector NO.1 and NO.2.
- Engine Room R/B and J/B:** Houses the DC/DC converter and the ABS MAIN solenoid. It receives signals from the Power Source Control ECU and the Auxiliary Battery.
- Auxiliary Battery:** Provides power to the ABS MAIN solenoid via a F15 FL Block and a MAIN terminal.

INSPECTION PROCEDURE

1 INSPECT BRAKE MASTER STROKE SIMULATOR CYLINDER ASSYBrake Master Stroke Simulator
Cylinder Assy

T

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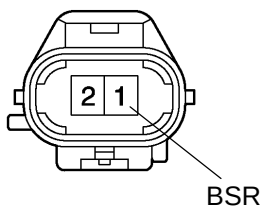
- (a) Disconnect brake master stroke simulator cylinder assy connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
1 (BSR) – 2 (BCSS)	22.3 to 38 Ω

NG**REPLACE BRAKE MASTER STROKE
SIMULATOR CYLINDER ASSY****OK****2 INSPECT BRAKE MASTER STROKE SIMULATOR CYLINDER ASSY(BSR
TERMINAL VOLTAGE)**Brake Master Stroke Simulator
Cylinder Assy

(B18)



T

F47498

- (a) Connect the brake master stroke simulator cylinder assy connector.
- (b) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from the behind the connector with the connector connected.

Standard:

Tester Connection	Condition	Specified Condition
B17-1 (BSR) – Body ground	Power switch ON (READY)	10 to 14 V

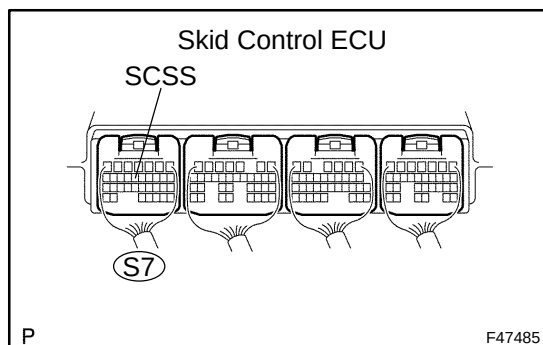
NG**REPAIR OR REPLACE HARNESS OR
CONNECTOR****OK**

3 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(SCSS TERMINAL)

- (a) Connect the hand-held tester to the DLC3.
 (b) Select the ACTIVE TEST mode on the hand-held tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
ACC PATTERN	Stroke simulator cut valve pattern activation ON / OFF	Operation of solenoid (clicking sound) can be heard

- (c) Using hand-held tester, turn the stroke simulator cylinder assy ON/OFF.



- (d) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Condition	Specified Condition
S7-13 (SCSS) – Body ground	Brake Master Stroke Simulator Cylinder assy ON	Below 1.5 V
S7-13 (SCSS) – Body ground	Brake Master Stroke Simulator Cylinder assy OFF	10 to 14 V

NG**REPAIR OR
CONNECTOR****REPLACE****HARNESS****OR****OK****REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)****NOTICE:**

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C1341/62	MALFUNCTION IN HYDRAULIC SYSTEM (FR)
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DTC	C1342/63	MALFUNCTION IN HYDRAULIC SYSTEM (FL)
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DTC	C1343/64	MALFUNCTION IN HYDRAULIC SYSTEM (RR)
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DTC	C1344/65	MALFUNCTION IN HYDRAULIC SYSTEM (RL)
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CIRCUIT DESCRIPTION

The skid control ECU controls braking force according to the hybrid system regenerative braking force and inputs the fluid pressure necessary for operating each wheel cylinder according to the wheel cylinder pressure sensor.

DTCs may be stored if brake fluid leaks, wheel cylinder vibrates due to uneven wear of the brake disc rotor, or foreign matter enters the solenoid valve.

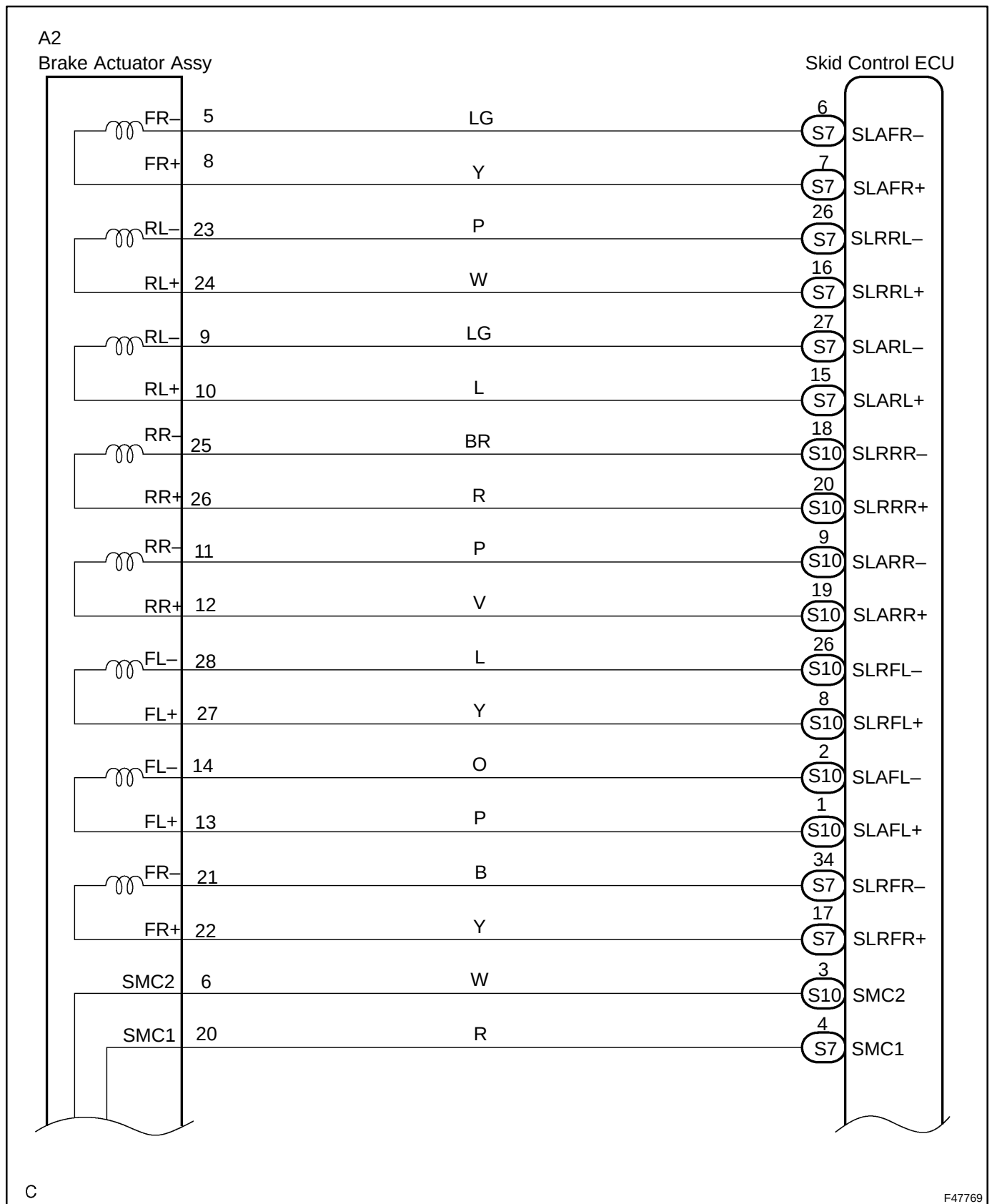
DTCs may be stored if the line pressure drops during air bleeding.

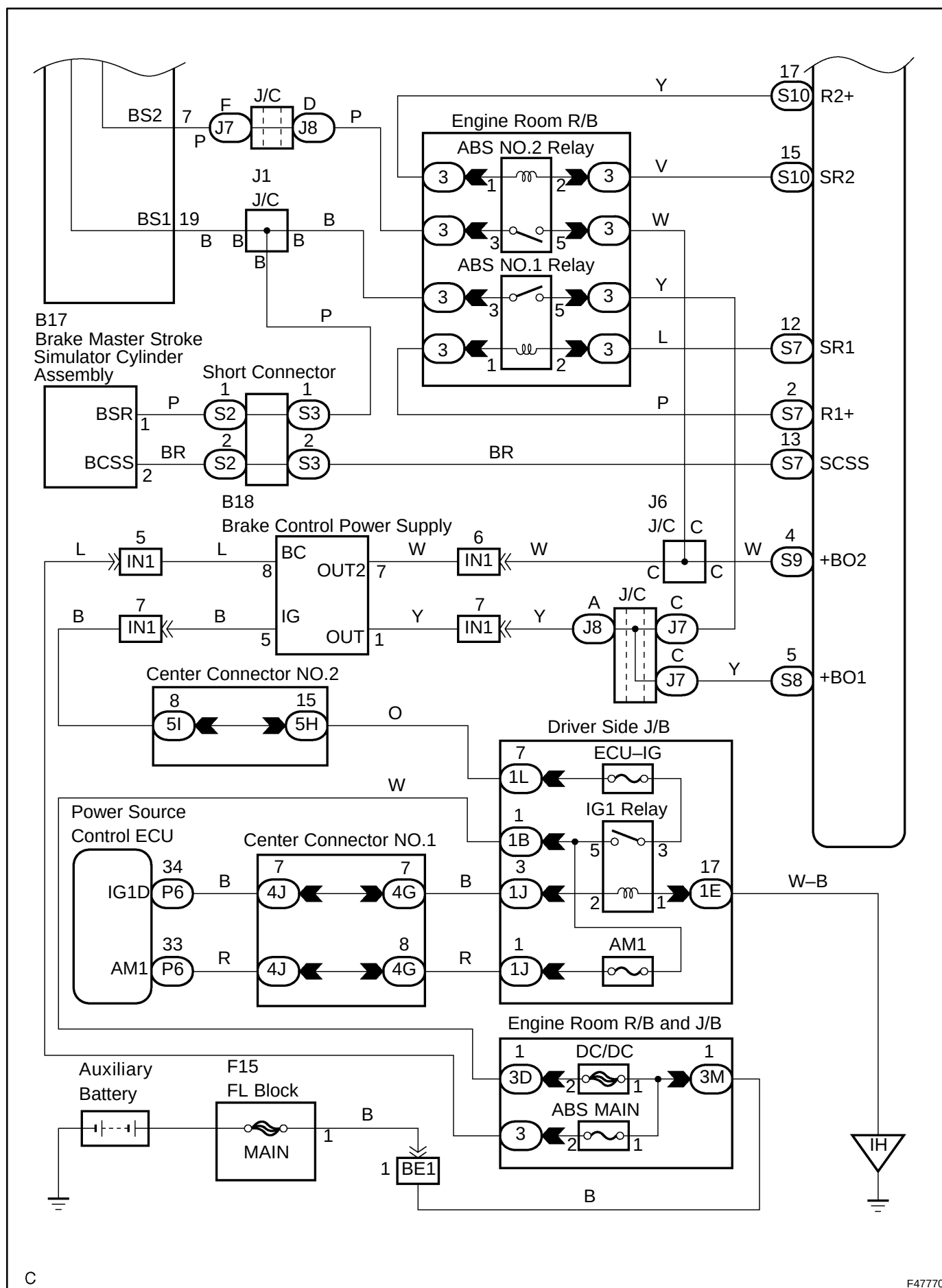
DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1341/62	551	Hydraulic pressure control on FR wheel has deteriorated.	• Fluid leakage • Brake actuator assy
C1341/62	552	Hydraulic pressure control on FR wheel has deteriorated.	• Fluid leakage • Brake actuator assy
C1341/62	553	There is a malfunction, such as leakage in the pressure increase control valve of FR wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1341/62	554	There is a malfunction, such as leakage in the pressure decrease control valve of FR wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1341/62	555	There is a malfunction, such as leakage in the pressure decrease control valve of FR wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1342/63	561	Hydraulic pressure control on FL wheel has deteriorated.	• Fluid leakage • Brake actuator
C1342/63	562	Hydraulic pressure control on FL wheel has deteriorated.	• Fluid leakage • Brake actuator
C1342/63	563	There is a malfunction, such as leakage in pressure increase control valve of FL wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1342/63	564	There is a malfunction, such as leakage in pressure decrease control valve of FL wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1342/63	565	There is a malfunction, such as leakage in pressure decrease control valve of FL wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1343/64	571	Hydraulic pressure control on RR wheel has deteriorated.	• Fluid leakage • Brake actuator
C1343/64	572	Hydraulic pressure control on RR wheel has deteriorated.	• Fluid leakage • Brake actuator

DIAGNOSTICS – ELECTRONICALLY CONTROLLED BRAKE SYSTEM

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1343/64	573	There is a malfunction, such as leakage in pressure increase control valve of RR wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1343/64	574	There is a malfunction, such as leakage in pressure decrease control valve of RR wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1343/64	575	There is a malfunction, such as leakage in pressure decrease control valve of RR wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1344/65	581	Hydraulic pressure control on RL wheel has deteriorated.	• Fluid leakage • Brake actuator
C1344/65	582	Hydraulic pressure control on RL wheel has deteriorated.	• Fluid leakage • Brake actuator
C1344/65	583	There is a malfunction, such as leakage in pressure increase control valve of RR wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1344/65	584	There is a malfunction, such as leakage in pressure decrease control valve of RR wheel.	• Fluid leakage • Brake actuator assy • Disc rotor
C1344/65	585	There is a malfunction, such as leakage in pressure decrease control valve of RL wheel.	• Fluid leakage • Brake actuator assy • Disc rotor

WIRING DIAGRAM





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INSPECTION PROCEDURE

HINT:

When C1364/61 is output together with C1341/62, C1342/63, C1343/64 and C1344/65, inspect and repair the trouble areas indicated by C1364/61 first.

1 CHECK BRAKE FLUID LEAKAGE

- (a) Check that there is no fluid leakage in the brake line between the brake actuator and the wheel cylinder which is the cause of DTCs.
- (b) Check that the brake is not dragging.

OK:

There is no fluid leakage or dragging.

NG

REPAIR OR REPLACE APPLICABLE PART

OK

2 PERFORM AIR BLEED (SEE PAGE 32-4)

- (a) Bleed the air out of the front and rear systems (see page 32-4).

3 RECONFIRM DTC

- (a) Clear the DTCs.
- (b) Turn the power switch ON (READY).
- (c) Check the same DTCs are recorded (see page 05-975).

Result:

DTC is output	A
DTC is not output	B

B

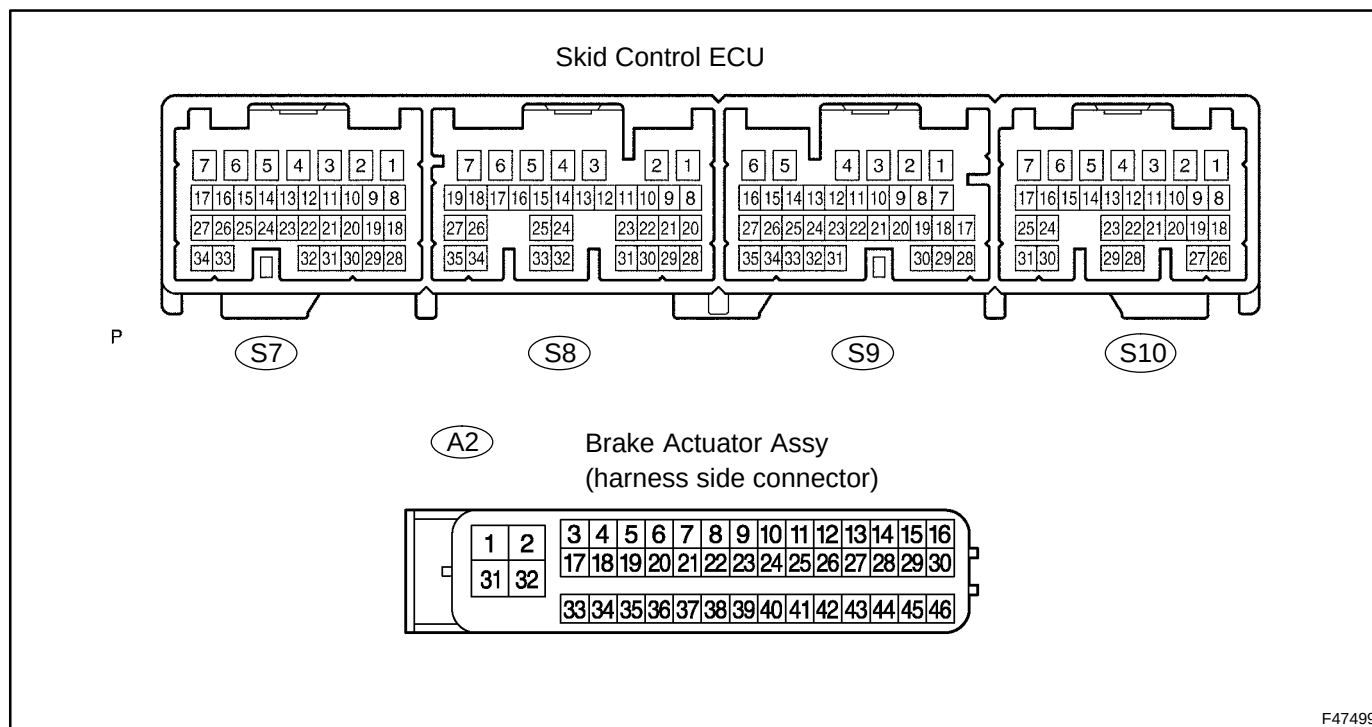
END

HINT:

DTC may be stored if foreign matter or air enters the solenoid valve.

A

4 CHECK HARNESS AND CONNECTOR(SKID CONTROL ECU – BRAKE ACTUATOR ASSY)



- Disconnect the skid control ECU connectors and brake actuator connector.
- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S7-6 (SLAFR-) – A2-5 (FR-)	Below 1 Ω
S7-7 (SLAFR+) – A2-8 (FR+)	Below 1 Ω
S7-15 (SLARL+) – A2-10 (RL+)	Below 1 Ω
S7-16 (SLRRL+) – A2-24 (RL+)	Below 1 Ω
S7-17 (SLRFR+) – A2-22 (FR+)	Below 1 Ω
S7-26 (SLRRL-) – A2-23 (RL-)	Below 1 Ω
S7-27 (SLARL-) – A2-9 (RL-)	Below 1 Ω
S7-34 (SLRFR-) – A2-21 (FR-)	Below 1 Ω
S10-1 (SLAFL+) – A2-13 (FL+)	Below 1 Ω
S10-2 (SLAFL-) – A2-14 (FL-)	Below 1 Ω
S10-8 (SLRFL+) – A2-27 (FL+)	Below 1 Ω
S10-9 (SLARR-) – A2-11 (RR-)	Below 1 Ω
S10-18 (SLRRR-) – A2-25 (RR-)	Below 1 Ω
S10-19 (SLARR+) – A2-12 (RR+)	Below 1 Ω
S10-20 (SLRRR+) – A2-26 (RR+)	Below 1 Ω
S10-26 (SLRFL-) – A2-28 (FL-)	Below 1 Ω

(c) Measure the resistance according to the value(s) in the table below.

Tester Connection	Specified Condition
S7-6 (SLAFR-) – Body ground	10 kΩ or higher
S7-7 (SLAFR+) – Body ground	10 kΩ or higher
S7-15 (SLARL+) – Body ground	10 kΩ or higher
S7-16 (SLRRL+) – Body ground	10 kΩ or higher
S7-17 (SLRFR+) – Body ground	10 kΩ or higher
S7-26 (SLRRL-) – Body ground	10 kΩ or higher
S7-27 (SLARL-) – Body ground	10 kΩ or higher
S7-34 (SLRFR-) – Body ground	10 kΩ or higher
S10-1 (SLAFL+) – Body ground	10 kΩ or higher
S10-2 (SLAFL-) – Body ground	10 kΩ or higher
S10-8 (SLRFL+) – Body ground	10 kΩ or higher
S10-9 (SLARR-) – Body ground	10 kΩ or higher
S10-18 (SLRRR-) – Body ground	10 kΩ or higher
S10-19 (SLARR+) – Body ground	10 kΩ or higher
S10-20 (SLRRR+) – Body ground	10 kΩ or higher
S10-26 (SLRFL-) – Body ground	10 kΩ or higher

NG

REPAIR OR
CONNECTOR

REPLACE HARNESS OR

OK

5 READ VALUE OF HAND-HELD TESTER

- (a) Connect the pedal effort gauge.
- (b) Install the LSPV gauge (SST) and bleed air (see page 32-4).
SST 09709-29018
- (c) Connect the hand-held tester to the DLC3.
- (d) Select the DATA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal Condition
FR PRESS SENS	Front Right pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
FL PRESS SENS	Front Left pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
RR PRESS SENS	Rear Right pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
RL PRESS SENS	Rear Left pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V

- (e) Check the output value of the wheel cylinder pressure at each fluid pressure during the ECB control.

Standard:

Fluid Pressure MPa (kgf/cm, psi)	FR PRESS SENS (DATA-LIST)	FL PRESS SENS (DATA-LIST)	RR PRESS SENS (DATA-LIST)	RL PRESS SENS (DATA-LIST)
1 (10.2, 145.0)	0.65 to 0.75 V	0.65 to 0.75 V	0.65 to 0.75 V	0.65 to 0.75 V
3 (30.6, 435.2)	1.05 to 1.2 V	1.05 to 1.2 V	1.05 to 1.2 V	1.05 to 1.2 V
7 (71.4, 1015.5)	1.8 to 2.05 V	1.8 to 2.05 V	–	–
10 (102.0, 1450.7)	2.4 to 2.7 V	2.4 to 2.7 V	–	–

NG

**REPLACE BRAKE ACTUATOR ASSY
(SEE PAGE 32-54)**

OK

6 CHECK BRAKE DISC

- (a) Disconnect the brake pedal stroke sensor connector.
- (b) Carry out the running and braking test according to freeze frame data or customer problem analysis. Check the brake line pressure vibration caused due to uneven wear of the disc according to brake pedal vibration.

OK:

Brake pedal is not vibrates during braking.

HINT:

- The brake pedal does not kick back due to wheel cylinder piston vibration during ECB control.
- If the brake pedal stroke sensor connector is disconnected, the fail-safe function prohibits ECB control.
- The active test does not prohibit ECB control when the vehicle is running, so disconnect the stroke sensor connector and carry out inspection.
- Disc wear can be checked by measuring the disc thickness.

NG**REPLACE BRAKE DISC****OK****REPLACE BRAKE ACTUATOR ASSY (SEE PAGE [32-54](#))**

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page [05-958](#)).

DTC	C1345/66	NOT LEARNING LINEAR VALVE OFF SET ABNORMALITY
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DTC	C1368/67	LINER VALVE OFFSET MALFUNCTION
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CIRCUIT DESCRIPTION

The skid control ECU stores and corrects the difference in each individual part such as the stroke sensor, actuator solenoids, and stroke simulator solenoid. Perform initialization of linear solenoid valve and calibration if these parts are replaced.

The skid control ECU inputs the shift position P signal.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1345/66	501	Value of initialization of linear solenoid valve and calibration for the FR wheel is not stored.	• Initialization of linear solenoid valve and calibration undone
C1345/66	502	Value of initialization of linear solenoid valve and calibration for the FL wheel is not stored.	• Initialization of linear solenoid valve and calibration undone
C1345/66	503	Value of initialization of linear solenoid valve and calibration for the RR wheel is not stored.	• Initialization of linear solenoid valve and calibration undone
C1345/66	504	Value of initialization of linear solenoid valve and calibration for the RL wheel is not stored.	• Initialization of linear solenoid valve and calibration undone
C1368/67	505	Value of initialization of linear solenoid valve and calibration is not within the brake actuator's standard value.	• Initialization of linear solenoid valve and calibration undone • Skid control ECU

INSPECTION PROCEDURE

1	PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION (SEE PAGE 05-958)
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2	RECONFIRM DTC
----------	----------------------

- Clear the DTCs.
- Turn the power switch ON (READY).
- Check the same DTCs are recorded (see page 05-975).

Result:

DTC is not output	A
DTC is output	B

B

REPLACE BRAKE ACTUATOR ASSY (SEE PAGE 32-54)

A

END

DTC	C1365/54	MALFUNCTION IN ACC PRESSURE SENSOR
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CIRCUIT DESCRIPTION

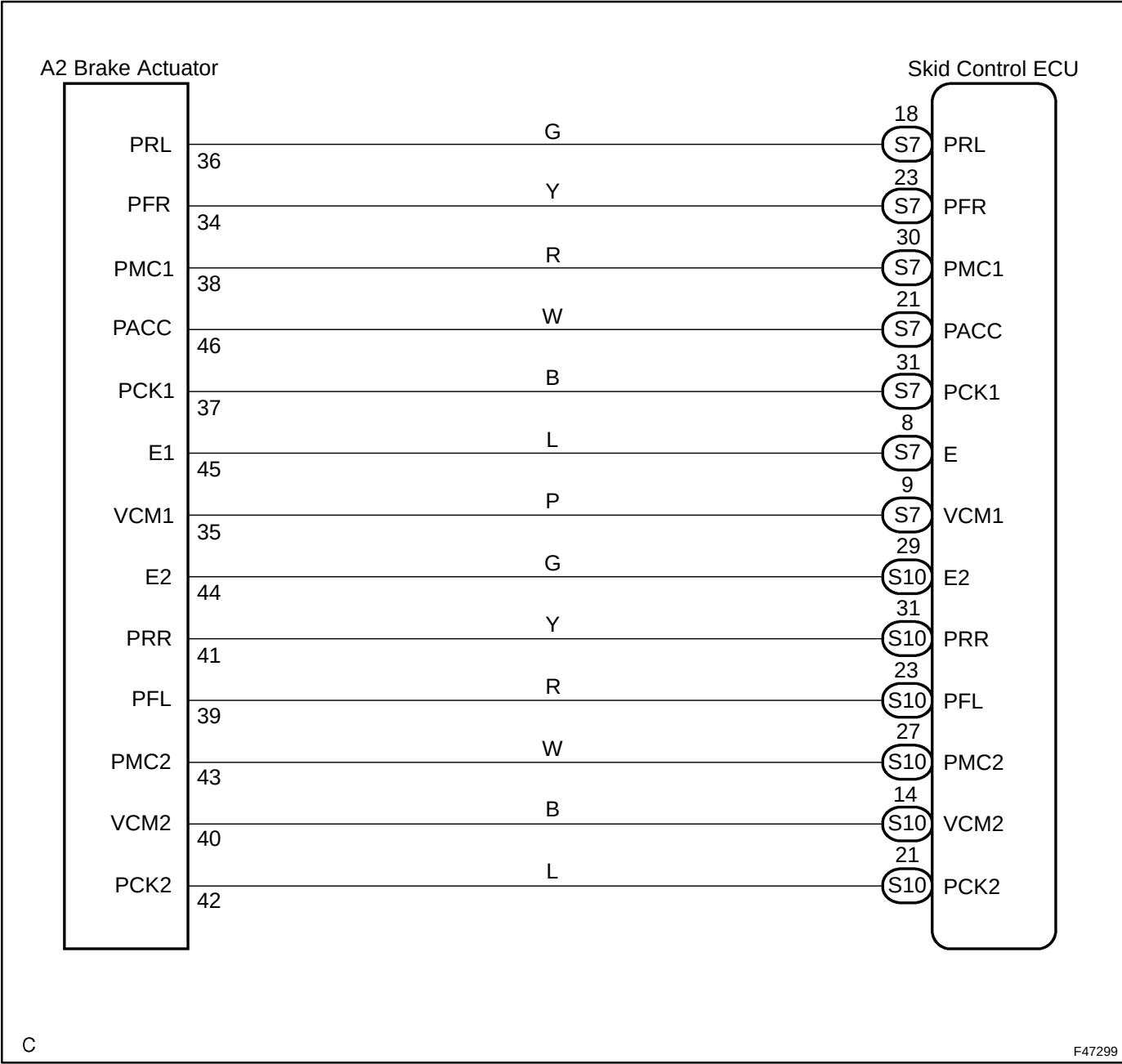
The accumulator (ACC) pressure sensor is built into the brake actuator.

The skid control ECU detects the accumulator pressure from the data sent from the accumulator pressure sensor, and then runs and stops the pump motor by operating the motor relay.

DTCs may be output if the accumulator pressure drops due to frequent braking (this is not a malfunction).

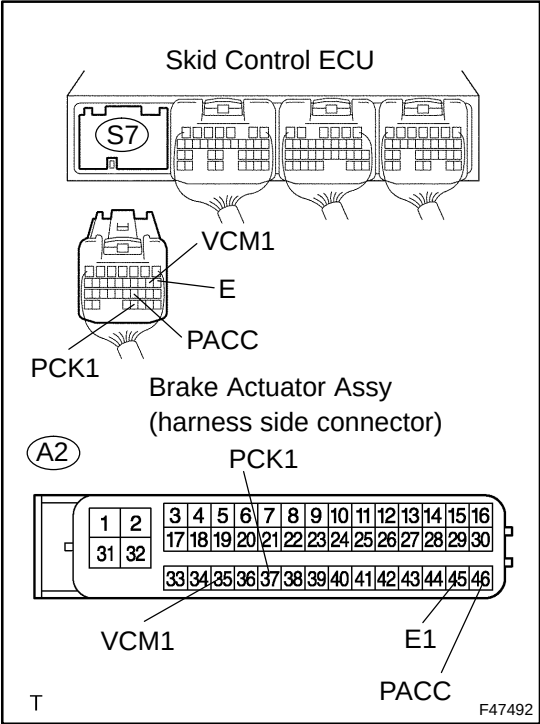
DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1365/54	211	Sensor power 1 (VCM1) voltage is 4.7 V or less or 5.3 V or more for at least 0.05 sec.	• Brake actuator assy (accumulator pressure sensor) • Skid control ECU
C1365/54	212	Ratio of accumulator pressure sensor output voltage (PACC) to sensor power 1 (VCM1) voltage is 5% or less or 90.5% or more for at least 0.05 sec.	• Brake actuator assy (accumulator pressure sensor) • Skid control ECU
C1365/54	214	Total wheel cylinder pressure sensor exceeds 12 MPa after depressing brake pedal, but accumulator pressure sensor output voltage (PACC) changes less than 0.5 MPa for at least 0.5 sec.	• Brake actuator assy (accumulator pressure sensor) • Skid control ECU
C1365/54	215	Ratio of accumulator pressure sensor output voltage (PACC) to sensor power 1 (VCM1) voltage is 90.5% or less for at least 0.1 sec. during self-diagnosis.	• Brake actuator assy (accumulator pressure sensor) • Skid control ECU
C1365/54	216	Voltage difference is 0.3 V or more before and after changing the pull up resistance in sensor signal input circuit (loose contact).	• Brake actuator assy (accumulator pressure sensor) • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR



- (a) Disconnect the skid control ECU connector and brake actuator connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S7-8 (E) – A2-45 (E1)	Below 1 Ω
S7-9 (VCM1) – A2-35 (VCM1)	Below 1 Ω
S7-21 (PACC) – A2-46 (PACC)	Below 1 Ω
S7-31 (PCK1) – A2-37 (PCK1)	Below 1 Ω

- (c) Measure the resistance according to the value(s) in the table below.

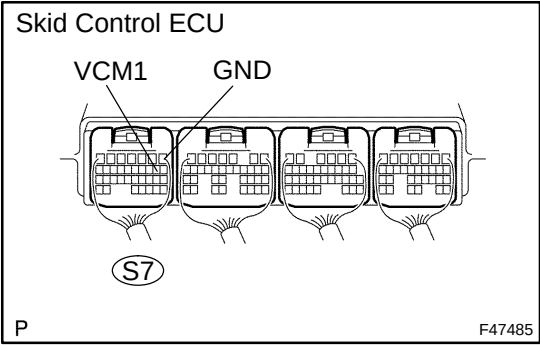
Standard:

Tester Connection	Specified Condition
S7-8 (E) – Body ground	10 kΩ or higher
S7-9 (VCM1) – Body ground	10 kΩ or higher
S7-21 (PACC) – Body ground	10 kΩ or higher
S7-31 (PCK1) – Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(VCM1 – GND)



- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

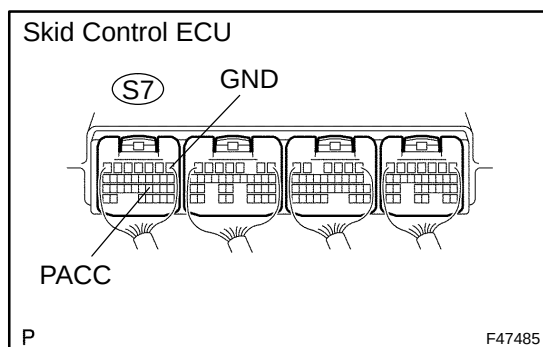
Standard:

Tester Connection	Condition	Specified Condition
S7-9 (VCM1) – S7-1 (GND)	Power switch ON (READY)	4.75 to 5.25 V

NG REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-54)

OK

3 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(PACC – GND)



- Check the auxiliary battery voltage.
Standard: 10 to 14 V
- Depress the brake pedal to operate the pump motor, and then check that the pump motor stops.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S7-21 (PACC) – S7-1 (GND)	3.3 to 4.7 V

NOTICE:

- Do not depress the brake until after the pump motor stops and the voltage check is finished in order to keep the accumulator pressure.
- Check from behind the connector with the connector connected to the skid control ECU.
- Do not use a DATA LIST, as the sensor itself must be checked.

NG

**REPLACE BRAKE ACTUATOR ASSY
(SEE PAGE 32-54)**

OK

4 READ VALUE OF HAND-HELD TESTER

- Connect the hand-held tester to the DLC3.
- Turn the power switch ON (READY).
- Select the DATA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal Condition
ACC PRESS SENS 1	Accumulator pressure sensor 1 / min.: 0 V, max.: 5 V	Specified value: 3.2 to 4.0 V

- Depress the brake pedal 4 or 5 times to operate the pump motor, and check the output value on the hand-held tester with the motor stopped (no braking).

OK:

Accumulator (ACC) pressure sensor voltage does not drop.

NG

**REPLACE BRAKE ACTUATOR ASSY
(SEE PAGE 32-54)**

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

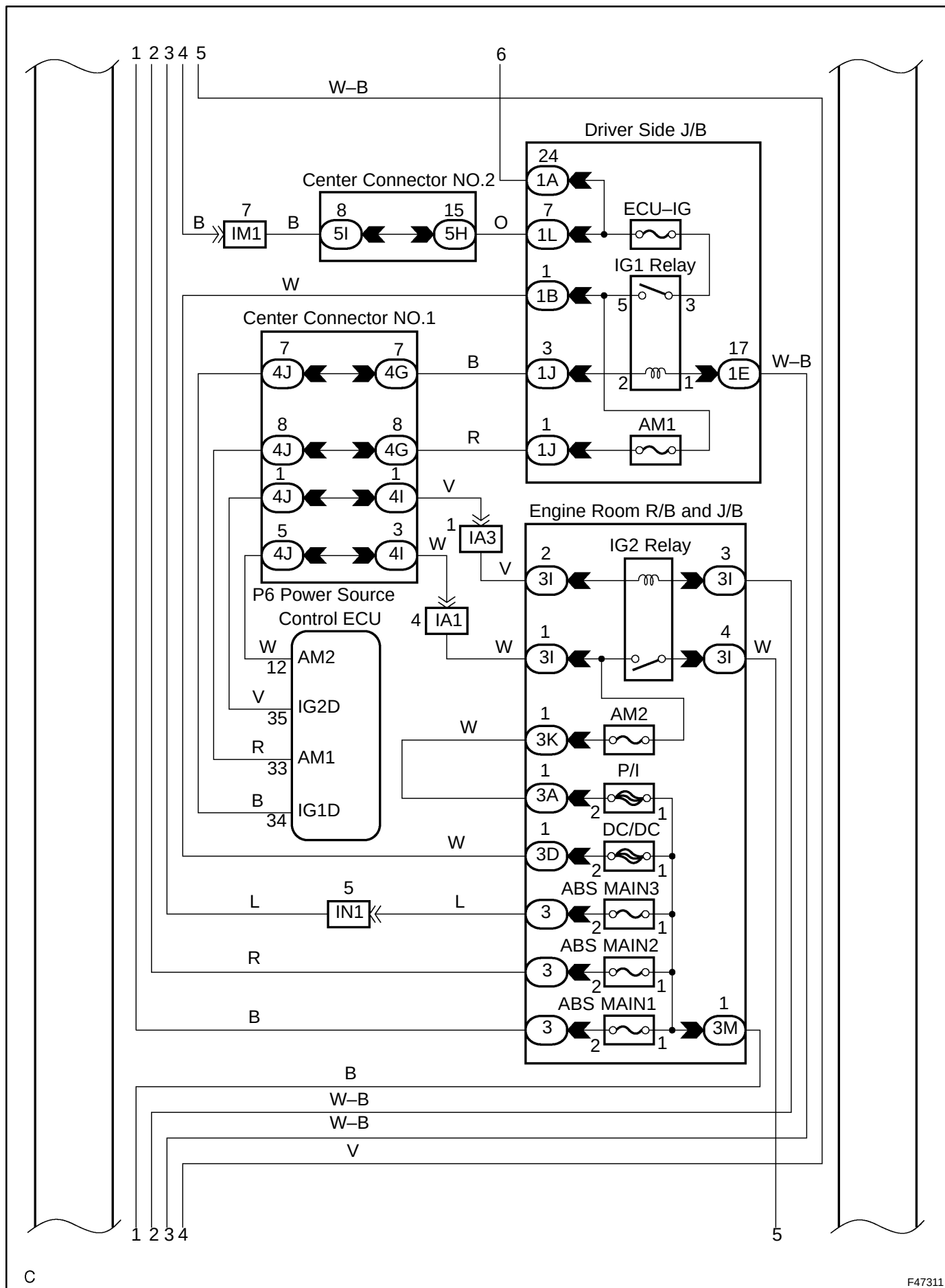
DTC	C1377/43	CAPACITOR MALFUNCTION
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CIRCUIT DESCRIPTION

The brake control power supply assy (capacitor) provides auxiliary power for brake control when an auxiliary battery (12 V) voltage drops.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1377/43	101	Brake control power supply assy is deteriorated (indicates a need to replace).	• Brake control power supply
C1377/43	102	Self-discharge (current leak) is excessive (internal malfunction).	• Brake control power supply
C1377/43	103	Input voltage from the auxiliary battery (12 V) to the brake control power supply is 16.4 V or more for at least 10 sec.	• Brake control power supply
C1377/43	105	Circuit inside the power back up unit (charge) is malfunctioning.	• Brake control power supply
C1377/43	106	Circuit inside the power back up unit (back up output circuit) is malfunctioning.	• Brake control power supply
C1377/43	108	Circuit inside the power back up unit (voltage monitor circuit) is malfunctioning.	• Brake control power supply
C1377/43	109	Open circuit between auxiliary battery (12 V) and brake control power supply power input (+BC terminal).	• Harness and connector • ABS No.3 fuse
C1377/43	110	• Open or short circuit between auxiliary battery (12 V) and brake control power supply output 1 (OUT 1). • Open or short circuit between auxiliary battery (12 V) and brake control power supply output 2 (OUT 2)	• Harness and connector • ABS No.1 fuse • ABS No.2 fuse

[illegible]

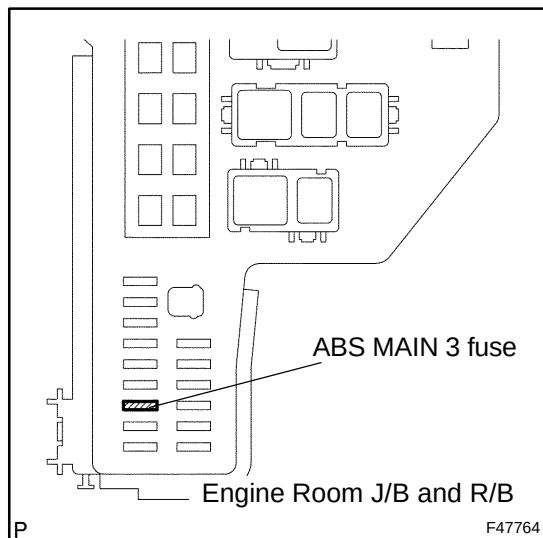


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INSPECTION PROCEDURE

1 INSPECT FUSE(ABS MAIN3 FUSE)

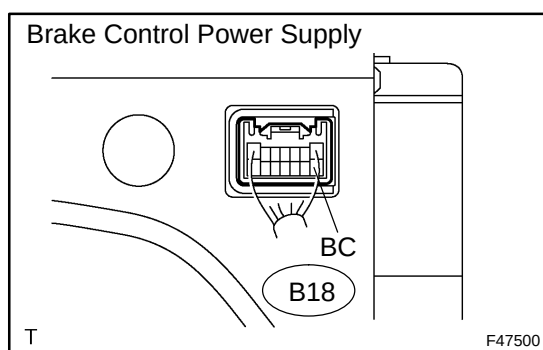
- (a) Remove the ABS MAIN3 fuse from the engine room J/B and R/B.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

ABS MAIN3 fuse	Below 1 Ω (Continuity)
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NG

CHECK FOR SHORT IN ALL HARNESS AND CONNECTOR CONNECTED TO FUSE AND REPLACE FUSE

OK**2 INSPECT BRAKE CONTROL POWER SUPPLY(BC TERMINAL VOLTAGE)**

- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected.

Standard:

Tester Connection	Specified Condition
B18-8 (BC) – Body ground	10 to 14 V

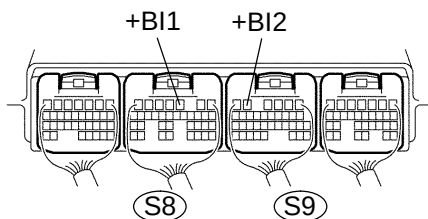
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE

Skid Control ECU



- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Specified Condition
S8-3 (+BI1) – Body ground	10 to 14 V
S9-5 (+BI2) – Body ground	10 to 14 V

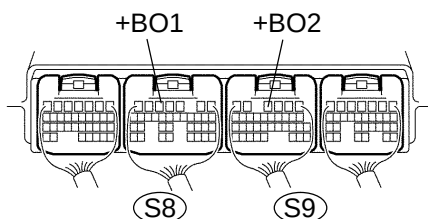
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REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE

Skid Control ECU



- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Specified Condition
S8-5 (+BO1) – Body ground	10 to 14 V
S9-4 (+BO2) – Body ground	10 to 14 V

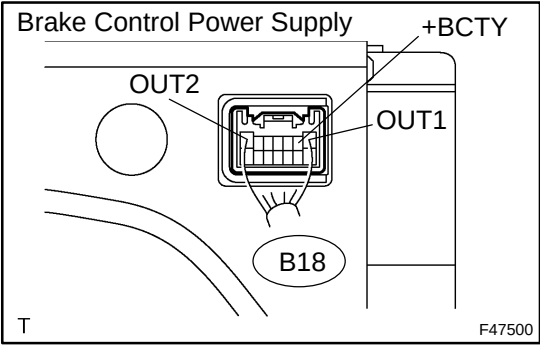
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REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5

INSPECT BRAKE CONTROL POWER SUPPLY



- (a) Turn the power switch ON (READY).
- (b) Measure the voltage according to the value(s) in the table below.

HINT:
Measure the voltage from behind the connector with the connector connected.

Standard:

Tester Connection	Condition	Specified Condition
B18-1 (OUT1) – Body ground	Power switch ON (READY)	9 to 13 V
B18-2 (+BCTY) – Body ground	Power switch ON (READY)	9 to 13 V
B18-7 (OUT2) – Body ground	Power switch ON (READY)	9 to 13 V

NG

REPLACE BRAKE CONTROL POWER SUPPLY

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

DTC	C1378/44	CAPACITOR COMMUNICATION CIRCUIT MALFUNCTION
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CIRCUIT DESCRIPTION

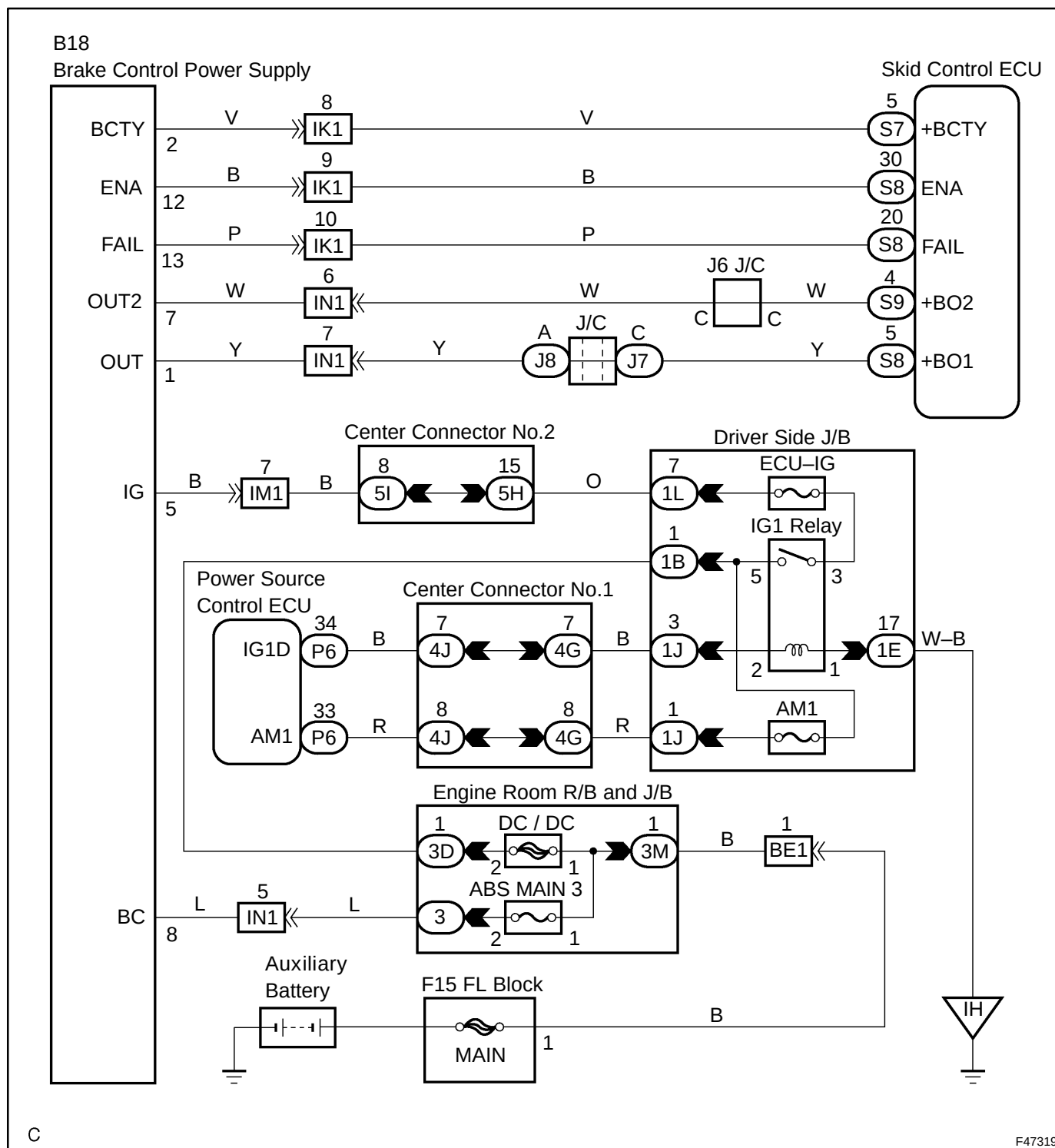
The brake control power supply assy (capacitor) provides auxiliary power for brake control when an auxiliary battery (12 V) voltage drops.

The FAIL and ENA line are placed between the skid control ECU and the brake control power supply assy. Signals indicating that the brake control power supply is in auxiliary mode are sent to the skid control ECU through the FAIL line.

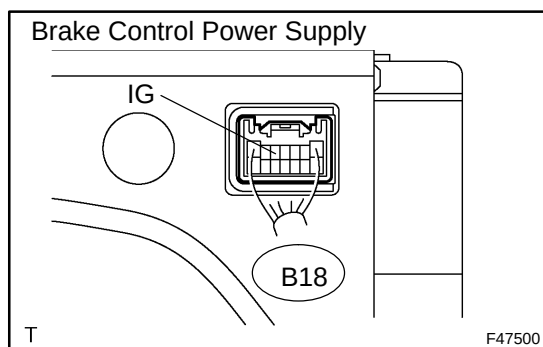
Charge permit prohibition signals are sent to the brake control power supply through the ENA line.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1378/44	112	• Open or short in FAIL line. • Malfunction inside the power back up unit.	• Harness and connector • Skid control ECU
C1378/44	113	• Open or short in ENA line • Malfunction inside the skid control ECU (circuit for communication with the capacitor)	• Harness and connector • Skid control ECU

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INSPECTION PROCEDURE

1 INSPECT BRAKE CONTROL POWER SUPPLY TERMINAL VOLTAGE (IG TERMINAL)

- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

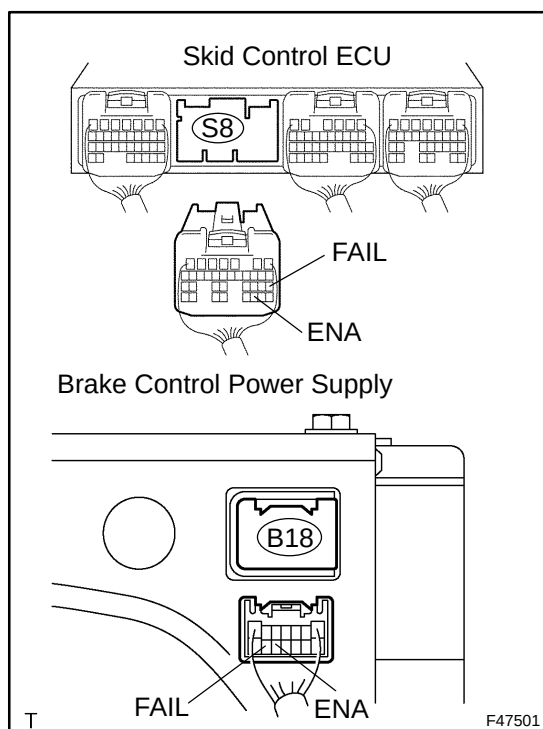
Standard:

Tester Connection	Condition	Specified Condition
B18-5 (IG) – Body ground	Power switch ON (READY)	10 to 14 V

NG

REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE(FAIL, ENA TERMINAL)

- (a) Turn the power switch OFF.
 (b) Disconnect the skid control ECU connector and brake control power supply connector.
 (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S8-30 (ENA) – B18-12 (ENA)	Below 1 Ω
S8-20 (FAIL) – B18-13 (FAIL)	Below 1 Ω

- (d) Measure the resistance according to the value(s) in the table below.

Tester Connection	Specified Condition
S8-30 (ENA) – Body ground	10 k Ω or higher
S8-20 (FAIL) – Body ground	10 k Ω or higher

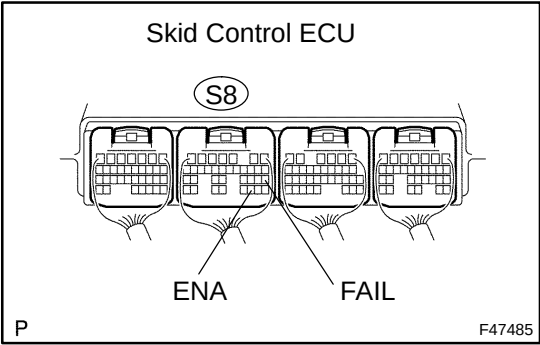
NG

REPLACE BRAKE CONTROL POWER SUPPLY

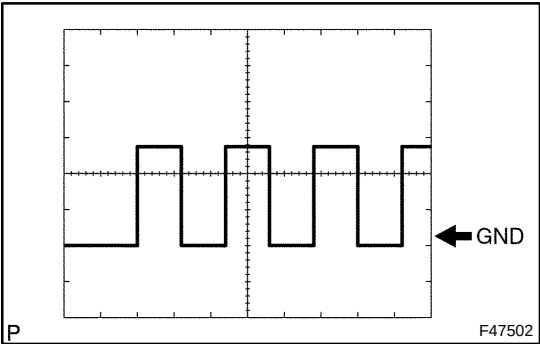
OK

3

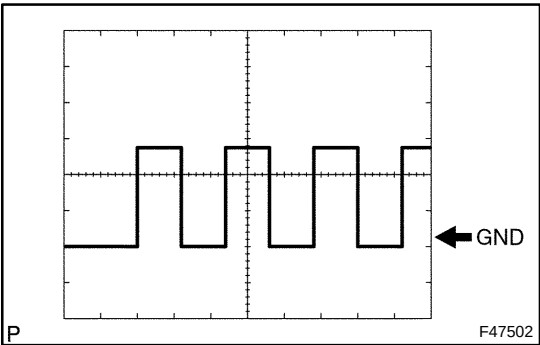
INSPECT SKID CONTROL ECU ASSY



- (a) Check the waveform between terminal S8-20 (FAIL) and the ground of the skid control ECU using an oscilloscope.
- (b) Check the waveform between terminal S8-30 (ENA) and the ground of the skid control ECU using an oscilloscope.
- OK:
- Waveform is output as shown in the illustration.



- (1) Oscilloscope waveform (FAIL)
- HINT:
- Terminals FAIL ⇔ GND
 - Instrument 5 V / DIV, 200 ms / DIV
 - Condition READY is displayed on the meter



- (2) Oscilloscope waveform (ENA)
- HINT:
- Terminals ENA ⇔ GND
 - Instrument 5 V / DIV, 100 ms / DIV
 - Condition READY is displayed on the meter

Result:

A	Both waveforms are normal
B	Waveform (ENA) is abnormal
C	Waveform (FAIL) is abnormal

B

REPLACE BRAKE CONTROL POWER SUPPLY

C

REPLACE SKID CONTROL ECU ASSY
(SEE PAGE 32-68)

A

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:
When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

DTC	C1391/69	ABNORMAL LEAK OF ACC PRESS
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CIRCUIT DESCRIPTION

The DTC is stored if a brake fluid, internal or other leak is detected due to improper sealing in the actuator. Internal leakage is suspected if the pump motor operates frequently without braking.

DTC No.	Detailed Code	DTC Detecting Condition	Trouble Area
C1391/69	591	Accumulation performance is deteriorated (improper sealing inside the actuator, gas pressure drop inside the accumulator, leak in each pressure boosting valve).	• Fluid leakage • Brake actuator assy

INSPECTION PROCEDURE

1 CHECK BRAKE FLUID LEAKAGE

- Check that there is no fluid leakage in the brake line between the brake actuator and the wheel cylinder which is the cause of DTCs.
- Check that the brake is not dragging.

OK:

There is no fluid leakage or dragging.

NG

REPAIR OR REPLACE APPLICABLE PART

OK

2 READ VALUE OF HAND-HELD TESTER

- Connect the hand-held tester to the DLC3.
- Turn the power switch ON (READY).
- Select the DATA LIST mode on the hand-held tester.

Item	Measurement Item / Range (Display)	Normal Condition
ACC PRESS SENS 1	Accumulator pressure sensor 1 / min.: 0 V, max.: 5 V	Specified value: 3.2 to 4.0 V

- Depress the brake pedal 4 or 5 times to operate the pump motor, and check the output value on the hand-held tester with the motor and check the output value on the hand-held tester with the motor stopped (no braking).

OK:

Accumulator (ACC) pressure sensor voltage does not drop.

NG

REPLACE BRAKE ACTUATOR ASSY

OK

REPLACE SKID CONTROL ECU (SEE PAGE 32-68)

NOTICE:

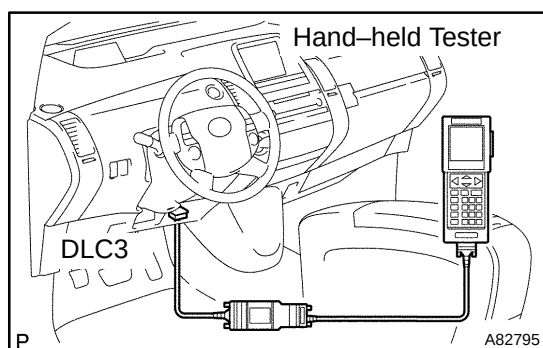
When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

CALIBRATION

1. DESCRIPTION

- (a) Zero point calibration is not performed until the data is cleared when the zero point is once stored. Zero point calibration should be performed after the zero point is cleared if the yaw rate (deceleration) sensor is replaced.
- (b) Steering sensor zero point calibration is automatically performed with the vehicle driving straight.
- (c) Follow the chart to perform calibration.

Replacing Parts	Necessary Operation
Skid Control ECU	Yaw rate (deceleration) sensor zero point calibration.
Yaw Rate (deceleration) sensor	2. Clearing zero point calibration data. 3. Yaw rate sensor and deceleration sensor zero point calibration.



2. CLEAR ZERO POINT CALIBRATION

- (a) Clearing the DTCs.
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the power switch ON (READY).
 - (3) Operate the hand-held tester to erase the codes.

HINT:

Refer to the hand-held tester Operator's Manual for further details.

3. PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND DECELERATION SENSOR

NOTICE:

- While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not start the engine.)
 - Be sure to do this on a level surface (with an inclination less than 1 degree).
- (a) Check that the steering wheel is in the straight-ahead position and move the shift lever to the P position.
 - (b) Connect the hand-held tester to the DLC3.
 - (c) Turn the power switch ON (READY).
 - (d) Operate the hand-held tester to test mode.
 - (e) Obtain the zero point of the yaw rate sensor and deceleration sensor.
 - (1) Keep the vehicle in the stationary condition on a level surface for 2 seconds or more.
 - (2) Check that the VSC warning light blinks.

HINT:

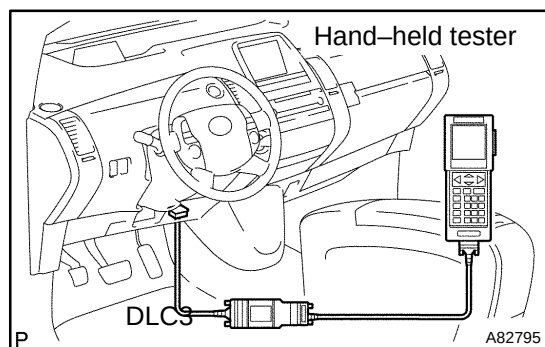
- If the VSC warning light does not blink, perform the zero point calibration again.
 - The zero point calibration is performed only once after the system enters the test mode.
 - Calibration cannot be performed again until the stored data is cleared once.
- (f) Turn the power switch OFF.

CHECK FOR INTERMITTENT PROBLEMS

1. CHECK FOR INTERMITTENT PROBLEMS

HINT:

A momentary interruption (open circuit) in the connectors and/or wire harness between the sensors and ECUs can be detected in the ECU data monitor function of the hand-held tester.



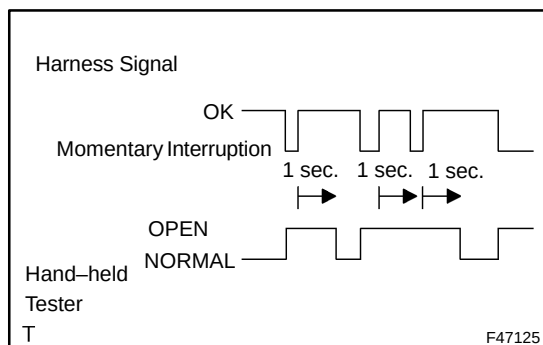
- Turn the power switch off and connect the hand-held tester to the DLC3.
- Turn the ignition switch on. Follow the on-screen directions on the hand-held tester to display the DATA LIST and select areas where momentary interruption should be monitored.

HINT:

A momentary interruption (open circuit) cannot be detected for 3 seconds after the ignition switch is turned on (initial check).

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
SPD SEN FR	FR speed sensor open detection / OPEN or NORMAL	NORMAL : Normal condition	–
SPD SEN FL	FL speed sensor open detection / OPEN or NORMAL	NORMAL : Normal condition	–
SPD SEN RR	RR speed sensor open detection / OPEN or NORMAL	NORMAL : Normal condition	–
SPD SEN RL	RL speed sensor open detection / OPEN or NORMAL	NORMAL : Normal condition	–
TAWRATE SEN	Yaw rate sensor open detection	NORMAL : Normal condition	–
DECELE SEN	G sensor open detection	NORMAL : Normal condition	–
STEERING SEN	Steering sensor open detection	NORMAL : Normal condition	–
M/C SEN 1	Master Cylinder pressure sensor 1 open detection	NORMAL : Normal condition	–
M/C SEN 2	Master Cylinder pressure sensor 1 open detection	NORMAL : Normal condition	–
STROKE SEN 1	Pedal stroke 1 open	NORMAL : Normal condition	–
FR W/C SEN	FR Wheel cylinder open	NORMAL : Normal condition	–
FL W/C SEN	FR Wheel cylinder open	NORMAL : Normal condition	–
RR W/C SEN	FR Wheel cylinder open	NORMAL : Normal condition	–
RL W/C SEN	FR Wheel cylinder open	NORMAL : Normal condition	–

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
HV COM	HV communication open detection	NORMAL : Normal condition	–
ACC SEN	Accumulator pressure sensor open detection	NORMAL : Normal condition	–



HINT:

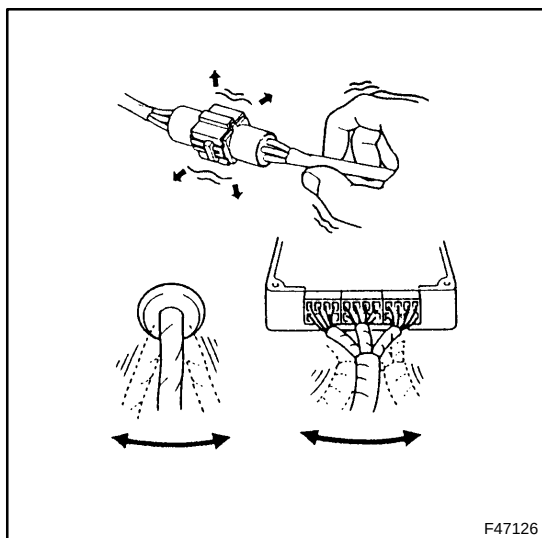
- If the status remains on, check the continuity between the ECU and the sensors, or between ECUs.
- The OPEN display on the hand-held tester remains on for 1 second after the harness signal changes from momentary interruption (open circuit) to normal condition.

- (c) While observing the screen, gently jiggle the connector or wire harness between the ECU and sensors, or between ECUs.

Result: Open-screen display does not change.

HINT:

- The connector and/or wire harness will be in momentary interruption (open circuit) if the chart fluctuates. Repair or replace connector and/or wire harness as one of them is faulty.

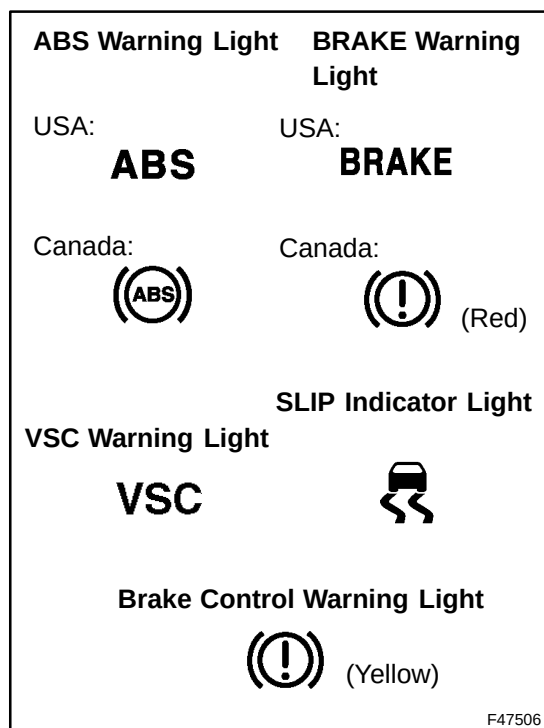


DIAGNOSIS SYSTEM

1. DIAGNOSIS FUNCTION

On the combination meter, the BRAKE warning light (Red), BRAKE warning light ((Yellow) Brake Control warning light), ABS warning light or VSC warning light come on to inform the driver if trouble occurs in the skid control ECU input signal or actuator system.

If there is trouble in the oil pressure source (pump motor, accumulator) or the vehicle power supply is insufficient, the skid control buzzer sounds to warn the driver.



ABS Warning Light	Comes on when a failure in ABS, EBD or Enhanced VSC occurs
VSC Warning Light	Comes on when a failure in Enhanced VSC occurs
SLIP Indicator Light	Comes on while operating ABS or Enhanced VSC
BRAKE Warning Light ((Yellow) Brake Control warning light)	Comes on when a minor failure that does not affect normal driving occurs in the brake control system
BRAKE Warning Light (Red)	Comes on when a failure in the brake control system Comes on when the parking brake is applied or the brake fluid level is low.

2. DIAGNOSIS DISPLAY FUNCTION

DTCs detected by the ECU can be read by connecting the hand-held tester and performing the read command. The DTC has a detailed code that can be checked on the freeze frame data screen.

3. BRAKE SYSTEM DISPLAY INITIAL CHECK

Turn the power switch ON (READY) and check that the ABS warning light, VSC warning light, Brake Control warning light, BRAKE warning light and SLIP indicator light come on, and then go off after approximately 3 seconds.

If any of the lights do not come on, check the bulb and the multiplex communication diagnosis.

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

With the hand-held tester connected to the DLC3 and the power switch in the ON position, the ECB, ABS, and Enhanced VSC data list can be displayed. Follow the prompts on the tester screen to access the DATA LIST.

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
YAW RATE	Yaw rate sensor / Min.: -128 deg/s, Max.: 128 deg/s	Min.: -128 deg/s Max.: 128 deg/s	—
YAW ZERO VALUE	Memorized zero value / Min.: -128 deg/s, Max.: 128 deg/s	Min.: -128 deg/s Max.: 128 deg/s	—
STEERING ANG	Steering sensor / Min.: -1152 deg, Max.: 1150.875 deg	Left turn: Increase Right turn: Decrease	—
1 SYS BRAKE	1 system brake / OPERATE or BEFORE	OPERATE: During operation	—
REGEN CO OPRT	Regenerate co operation / OPERATE or BEFORE	OPERATE: During operation	—
AIR BLD SUPPORT	Air bleed availability / SUPPORT or NOT SUP	SUPPORT: During support	—
PKB SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	—
STOP LIGHT SW	Stop lamp switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	—
TEST MODE	Test mode / NORMAL or TEST	NORMAL: Normal mode TEST: During test mode	—
RESERVOIR SW	Reservoir level warning switch / ON or OFF	ON: Reservoir level Normal NG: Reservoir level Low	—
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 MPH), max.: 326 km/h (202 MPH)	Actual wheel speed	Similar speed as 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	Similar speed as 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	Similar speed as 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	Similar speed as indicated on speedometer
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
IG VOLTAGE	ECU power supply voltage TOO HIGH / TOO LOW / NORMAL	TOO HIGH: 9.5 V or over NORMAL: 9.5 V TOO LOW: Below 9.5 V	—

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
DECELERAT SENS	Deceleration sensor 1 reading / min.: -1.869 G, max.: 1.869 G	Approximately 0 ± 0.13 G 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 ± 0.13 G at still condition	Reading changes when vehicle is bounced
MAS CYL PRS 1	Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	Reading increases when brake pedal is depressed
MAS CYL PRS 2	Master cylinder pressure sensor 2 reading / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	Reading increases when brake pedal is depressed
SLAFR CUR	Current of SLAFR solenoid / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLAFL CUR	Current of SLAFL solenoid / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLARR CUR	Current of SLARR solenoid / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLARL CUR	Current of SLARL solenoid / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLRFR CUR	Current of SLAFR solenoid / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLRFL CUR	Current of SLAFL solenoid / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLRRR CUR	Current of SLARR solenoid / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLRRL CUR	Current of SLARL solenoid / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
PEDAL STROKE	Stroke sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.7 to 1.3 V	-
PEDAL STROKE 2	Stroke sensor 2 / min.: 0 V, max.: 5 V	When brake pedal is released: 3.7 to 4.3 V	-
MC 2	MC2 / ON or OFF	ON: Operate	-
MC 1	MC1 / ON or OFF	ON: Operate	-
SSC	SSC / ON or OFF	ON: Operate	-
PATTERN	A pattern drive is under enforcement / ON or OFF	ON: Operate	-
MAIN RELAY 2	Main relay 2 for ECB / ON or OFF	ON: Operate	-
MAIN RELAY 1	Main relay 1 for ECB / ON or OFF	ON: Operate	-
ACC PRESS SENS 1	Accumulator pressure sensor 1 / min.: 0 V, max.: 5 V	Specified value: 3.2 to 4.0 V	-
FR PRESS SENS	Front Right pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	-
FL PRESS SENS	Front Left pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	-
RR PRESS SENS	Rear Right pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	-
RL PRESS SENS	Rear Left pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	-
MOTOR RELAY 2	Motor relay 2 / ON or OFF	ON: Motor relay ON	-
MOTOR RELAY 1	Motor relay 1 / ON or OFF	ON: Motor relay ON	-
VSC	Existence of VSC / WITH or WITHOUT	WITH: WITH Enhanced VSC System	-

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
2 FRAMES	There is two or more frame for freeze frame data / YES or NO	YES: There are two or more freeze frame data	–
REGEN TORQ FR	Regenerative request torque (FR) / min.: 0 N·m, max.: 4080 N·m	ECB is not operate: 0 N·m	–
REGEN TORQ FL	Regenerative request torque (FL) / min.: 0 N·m, max.: 4080 N·m	ECB is not operate: 0 N·m	–
REGEN TORQ RR	Regenerative request torque (RR) / min.: 0 N·m, max.: 4080 N·m	–	–
REGEN TORQ RL	Regenerative request torque (RL) / min.: 0 N·m, max.: 4080 N·m	–	–
SPD SEN FR	FR speed sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
SPD SEN FL	FL speed sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
SPD SEN RR	RR speed sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
SPD SEN RL	RL speed sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
YAW RATE SEN	Yaw rate sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
DECELE SEN	Deceleration sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
STEERING SEN	Steering sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
M/C SEN 1	Master cylinder pressure sensor 1 open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
M/C SEN 2	Master cylinder pressure sensor 2 open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
STROKE SEN 1	Stroke sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
FR W/C SEN	FR wheel cylinder pressure sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
FL W/C SEN	FL wheel cylinder pressure sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
RR W/C SEN	RR wheel cylinder pressure sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
RL W/C SEN	FR wheel cylinder pressure sensor open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
HV COM	HV communication open detection / OPN-DET or NORMAL	NORMAL: Normal condition	–
ACC SEN	Accumulator pressure sensor open detection	NORMAL: Normal condition	–
BUZZER	Buzzer / ON or OFF	ON: Operate	–
RESERVOIR SW	Reservoir level warning switch / ON or OFF	ON: Operate	–
SHIFT POSITION	Shift position / FAIL / L / 2 / 3 / 4 / D (M) / R / P.N	–	
VSC/TRC OFF SW	TRAC control switch / ON or OFF	ON: TRAC control switch ON	–
STOP LIGHT SW	Stop light switch / ON or OFF	ON: Operate	–
SYSTEM	SYSTEM / ABS / VSC (TRAC) / BA / HAB / FAIL SAFE / PB / NOSYS	–	–
# IG ON	# IG ON / 0 – 31	0	–
STEERING ANG	Steering sensor / Min.: –1152 deg, Max.: 1150.875 deg	Left turn: Increase Right turn: Decrease	–
YAW RATE	Yaw rate sensor / Min.: –128 deg/s, Max.: 128 deg/s	Min.: –128 deg/s Max.: 128 deg/s	–
MAS CYL PRESS	Master cylinder pressure / min.: 0 V, max.: 5 V	When brake pedal is released : 0.3 to 0.9 V	Reading increases when brake pedal is depressed
PEDAL STROKE	Stroke sensor / min.: 0 V, max.: 5 V	When brake pedal is released (SKS1): 0.7 to 1.5 V When brake pedal is released (SKS2): 3.7 to 4.3 V	–
THROTTLE	Throttle position sensor / min.: 0 deg, max.: 125 deg	Release accelerator pedal: Approx. 0 deg. Depress accelerator pedal: Approx. 90 deg.	–
MAS PRESS GRADE	Master pressure sensor grade / min.: –30Mpa/s, max.: 225 Mpa/s	When brake pedal is released: 0 MPa	–
G (RIGHT & LEFT)	Right and left G / min.: –1.869 G, max.: 1.869 G	Approximately 0 ± 0.13 G at still condition	–
G (BACK & FORTH)	Back and forth G / min.: –1.869 G, max.: 1.869 G	Approximately 0 ± 0.13 G at still condition	–
SPD GRADE	Vehicle speed grade / min.: –1.869 G, max.: 1.869 G	Approximately 0 ± 0.13 G at still condition	–
# CODES	Number of DTC recorded / min.: 0, max.: 255	Min.: 0, max.: 39	–

2. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the hand-held tester allows the relay and actuator, etc. to operate without removing any parts. Performing the ACTIVE TEST as the first step of troubleshooting is one of the methods to shorten labor time.

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

- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch ON (READY).
- (c) According to the display on the tester, perform the "ACTIVE TEST".

HINT:

Ignition switch must be turned to the ON position to proceed to the Active Test using the hand-held tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
ABS WARN LIGHT	Turns ABS warning light ON / OFF	Observe combination meter
VSC WARN LIGHT	Turns VSC warning light ON / OFF	Observe combination meter
SLIP INDI LIGHT	Turns SLIP indicator light ON / OFF	Observe combination meter
BRAKE WARN 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
ECB INDI LIGHT	Turns Brake Control warning light ON / OFF	Observe combination meter
MAIN RELAY 1	Turns MAIN RELAY 1 ON / OFF	Operation of solenoid (clicking sound) can be heard
MAIN RELAY 2	Turns MAIN RELAY 2 ON / OFF	Operation of solenoid (clicking sound) can be heard
MC 1	Turns Master cut valve 1 activation ON / OFF	Operation of solenoid (clicking sound) can be heard
MC 2	Turns Master cut valve 2 activation ON / OFF	Operation of solenoid (clicking sound) can be heard
MOTOR RELAY 1	Turns MOTOR RELAY 1 ON / OFF	Operation of solenoid (clicking sound) can be heard
MOTOR RELAY 2	Turns MOTOR RELAY 2 ON / OFF	Operation of solenoid (clicking sound) can be heard
ECB INVALID	Turns ECB invalid ON / OFF	Operation of solenoid (clicking sound) can be heard
ACC PATTERN	Actuator air bleeding pattern activation ON / OFF	Operation of solenoid (clicking sound) can be heard
SCC PATTERN	Stroke simulator cut valve pattern activation ON / OFF	Operation of solenoid (clicking sound) can be heard
POWER SUPPLY 1	Power supply air bleeding pattern activation 1 ON / OFF	Operation of solenoid (clicking sound) can be heard
POWER SUPPLY 2	Power supply air bleeding pattern activation 2 ON / OFF	Operation of solenoid (clicking sound) can be heard

Item	Vehicle Condition / Test Details	Diagnostic Note
RL AIR BLEEDING	RL wheel air bleeding pattern activation ON / OFF	Operation of solenoid (clicking sound) can be heard
RR AIR BLEEDING	RR wheel air bleeding pattern activation ON / OFF	Operation of solenoid (clicking sound) can be heard
ZERO DOWN	Accumulator zero down activation ON / OFF	Operation of solenoid (clicking sound) can be heard
PUMP PATTERN	Pump check pattern activation ON / OFF	Operation of solenoid (clicking sound) can be heard
DRAIN PATTERN	Drain system air bleeding pattern activation ON / OFF	Operation of solenoid (clicking sound) can be heard

DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a malfunction code is displayed during the DTC check, check the circuit indicated by the DTC. For details of each code, turn to the page for the respective "DTC No." in the DTC chart.

DTC chart of ABS:

DTC No. (See page)	Detection Item	Trouble Area
C0200/31 (05-991)	Right front wheel speed sensor signal malfunction	• Right front speed sensor • Speed sensor circuit • Sensor rotor • Sensor installation
C0205/32 (05-991)	Left front wheel speed sensor signal malfunction	• Left front speed sensor • Speed sensor circuit • Sensor rotor • Sensor installation
C0210/33 (05-998)	Right rear wheel speed sensor signal malfunction	• Right rear speed sensor • Speed sensor circuit • Sensor rotor • Sensor installation
C0215/34 (05-998)	Left rear wheel speed sensor signal malfunction	• Left rear speed sensor • Speed sensor circuit • Sensor rotor • Sensor installation
C1235/35 (05-1015)	Metal stick to speed sensor (FR)	• Right front speed sensor • Speed sensor circuit • Sensor installation
C1236/36 (05-1015)	Metal stick to speed sensor (FL)	• Left front speed sensor • Speed sensor circuit • Sensor installation
C1238/38 (05-1015)	Metal stick to speed sensor (RR)	• Right rear speed sensor • Speed sensor circuit • Sensor installation
C1239/39 (05-1015)	Metal stick to speed sensor (RL)	• Left rear speed sensor • Speed sensor circuit • Sensor installation
C1243/43 (05-1006)	Malfunction in deceleration sensor (constant output)	• Yaw rate (deceleration) sensor • Skid control ECU
C1244/44 (05-1006)	Open or short circuit in deceleration sensor circuit	• Yaw rate (deceleration) sensor • Yaw rate (deceleration) sensor installation • Zero point calibration not done • Skid control ECU
C1245/45 (05-1006)	Malfunction in deceleration sensor	• Yaw rate (deceleration) sensor • Zero point calibration not done • Skid control ECU
C1381/97 (05-1006)	Malfunction in power supply voltage of yaw/deceleration sensor	• Yaw rate (deceleration) sensor circuit • Harness and connector • Skid control ECU

- (1) Drive the vehicle at the vehicle speed of 31 mph (50 km/h) and keep depressing the brake pedal strongly for approximately 3 seconds.
- (2) Repeat the above operation 3 times or more and check that the ABS warning light goes off.
- (3) Clear the DTC (see page 05-975).

HINT:

In some cases, the intelligent tester II cannot be used when ABS warning light remains on.

DTC chart of Enhanced VSC:

DTC No. (See page)	Detection Item	Trouble Area
C1210/36 (05-1006)	Zero point calibration of yaw rate sensor undone	Zero point calibration undone (Perform zero point calibration and check DTC. If DTC is not output again, the sensor is normal.)
C1231/31 (05-1011)	Malfunction in steering angle sensor	- Steering angle sensor - Skid control ECU
C1232/32 (05-1006)	Malfunction in deceleration sensor	- Yaw rate (deceleration) sensor - Skid control ECU
C1234/34 (05-1006)	Malfunction in yaw rate sensor	Yaw rate (deceleration) sensor
C1310/51 (05-1055)	Malfunction in HV system	Hybrid control system (Enhanced VSC, TRAC system)
C1336/39 (05-1006)	Zero point calibration of deceleration sensor undone	Zero point calibration undone (Perform zero point calibration and check DTC. If DTC is not output again, the sensor is normal.)

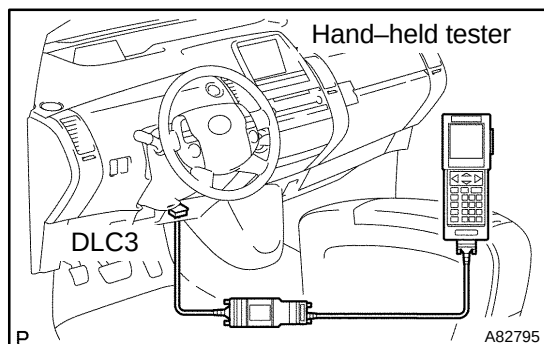
DTC chart of ECB:

DTC No. (See page)	Detection Item	Trouble Area
C1202/68 (05-1003)	Brake fluid level low / Open circuit in brake fluid level warning switch circuit	- Brake fluid level - Brake fluid level warning switch - Harness and connector - Skid control ECU
C1241/41 (05-1019)	Low battery positive voltage or abnormally high battery positive voltage	- ABS No.1 relay - ABS No.2 relay - Harness and connector - Skid control power supply circuit - Brake control power supply assy - Hybrid control system
C1242/42 (05-1019)	Open circuit in IG2 circuit	- ABS No.1 relay - ABS No.2 relay - Harness and connector - Skid control power supply circuit - Brake control power supply assy - Hybrid control system
C1246/46 (05-1027)	Malfunction in master cylinder pressure sensor	- Brake actuator assy - Skid control ECU - Harness and connector
C1247/47 (05-1034)	Malfunction in stroke sensor	- Brake pedal stroke sensor - Skid control ECU - Harness and connector

C1249/49 (05-1039)	Open circuit in stop light switch circuit	• Stop lamp switch • Stop lamp switch circuit • Stop lamp bulb
C1252/52 (05-1045)	Hydro-booster pump motor malfunction	• Brake actuator assy
C1253/53 (05-1045)	Hydro-booster pump motor relay malfunction	• ABS MTR relay • ABS MTR2 relay • Harness and connector • Brake actuator assy
C1256/57 (05-1053)	Accumulator low pressure malfunction	• Brake actuator assy (accumulator pressure, accumulator pressure sensor, pump motor)
C1259/58 (05-1055)	HV system regenerative malfunction	• Hybrid control system
C1300/- (05-1057)	Malfunction in ECU	• Skid control ECU
C1311/11 (05-1058)	Open circuit in main relay 1	• ABS No.1 relay • Skid control ECU • Harness and connector
C1312/12 (05-1058)	Short circuit in main relay 1	• ABS No.1 relay • Skid control ECU • Harness and connector
C1313/13 (05-1058)	Open circuit in main relay 2	• ABS No.2 relay • Skid control ECU • Harness and connector
C1314/14 (05-1058)	Short circuit in main relay 2	• ABS No.2 relay • Skid control ECU • Harness and connector
C1315/31 (05-1066)	Changeover solenoid malfunction(SMC1)	• Brake actuator assy (SMC1) • Skid control ECU • Harness and connector
C1316/32 (05-1066)	Changeover solenoid malfunction(SMC2)	• Brake actuator assy (SMC2) • Skid control ECU • Harness and connector
C1319/35 (05-1074)	Changeover solenoid malfunction(SCSS)	• Stroke simulator • Skid control ECU • Harness and connector
C1341/62 (05-1078)	Malfunction in hydraulic system(FR)	• Fluid leakage • Brake actuator assy • Disc rotor
C1342/63 (05-1078)	Malfunction in hydraulic system(FL)	• Fluid leakage • Brake actuator assy • Disc rotor
C1343/64 (05-1078)	Malfunction in hydraulic system(RR)	• Fluid leakage • Brake actuator assy • Disc rotor
C1344/65 (05-1078)	Malfunction in hydraulic system(RL)	• Fluid leakage • Brake actuator assy • Disc rotor
C1345/66 (05-1087)	Not learning linear valve offset abnormality	• Initialization of linear solenoid valve and calibration undone
C1352/21 (05-1066)	Increasing pressure solenoid malfunction(FR)	• Brake actuator assy • Skid control ECU • Harness and connector

C1353/23 (05-1066)	Increasing pressure solenoid malfunction(FL)	• Brake actuator assy • Skid control ECU • Harness and connector
C1354/25 (05-1066)	Increasing pressure solenoid malfunction(RR)	• Brake actuator assy • Skid control ECU • Harness and connector
C1355/27 (05-1066)	Increasing pressure solenoid malfunction(RL)	• Brake actuator assy • Skid control ECU • Harness and connector
C1356/22 (05-1066)	Decreasing pressure solenoid malfunction(FR)	• Brake actuator assy • Skid control ECU • Harness and connector
C1357/24 (05-1066)	Decreasing pressure solenoid malfunction(FL)	• Brake actuator assy • Skid control ECU • Harness and connector
C1358/26 (05-1066)	Decreasing pressure solenoid malfunction(RR)	• Brake actuator assy • Skid control ECU • Harness and connector
C1359/28 (05-1066)	Decreasing pressure solenoid malfunction(RL)	• Brake actuator assy • Skid control ECU • Harness and connector
C1364/61 (05-1027)	Malfunction in W/C pressure sensor	• Brake actuator assy • Skid control ECU • Harness and connector
C1365/54 (05-1088)	Malfunction in ACC pressure sensor	• Brake actuator assy (accumulator pressure sensor) • Skid control ECU
C1368/67 (05-1088)	Linear valve offset malfunction	• Initialization of linear solenoid valve and calibration undone • Skid control ECU
C1377/43 (05-1092)	Capacitor malfunction	• Brake control power supply • Harness and connector • ABS No.1 fuse • ABS No.2 fuse • ABS No.3 fuse • Apply high voltage
C1378/44 (05-1099)	Capacitor communication circuit malfunction	• Harness and connector • Skid control ECU
C1391/69 (05-1103)	Abnormal leak of ACC PRESS	• Fluid leakage • Brake actuator assy
C1392/48 (05-1034)	Un-correction of a zero point of the stroke sensor	• Brake pedal stroke sensor zero point calibration undone (initialization of linear solenoid valve and calibration undone) • Skid control ECU

DTC CHECK/CLEAR



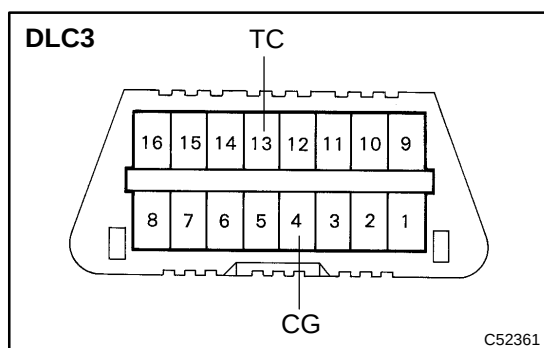
1. DTC CHECK (USING HAND-HELD TESTER)

(a) Checking DTCs.

- (1) Connect the hand-held tester to the DLC3.
- (2) Turn the power switch ON (READY).
- (3) Read the DTCs following the prompts on the tester screen.

HINT:

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



2. DTC CHECK (USING SST CHECK WIRE)

(a) Check DTCs.

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

SST 09843-18040

- (2) Turn the power switch ON (READY).

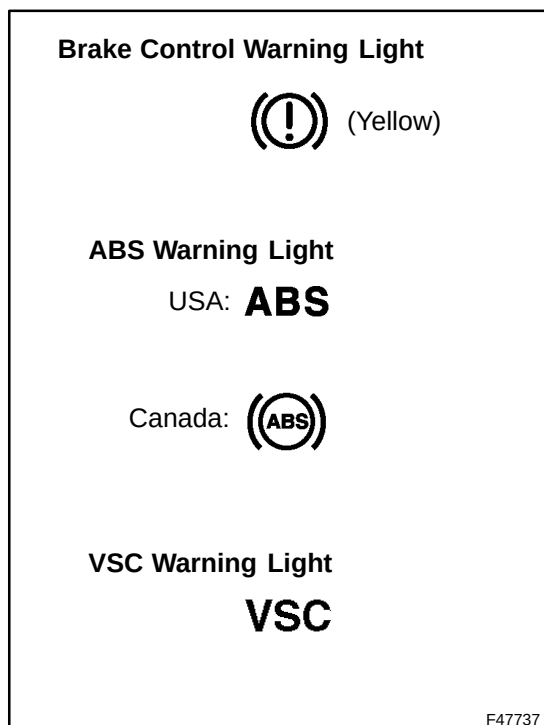
- (3) Read the DTC from the Brake Control warning light, ABS warning light and VSC warning light on the combination meter.

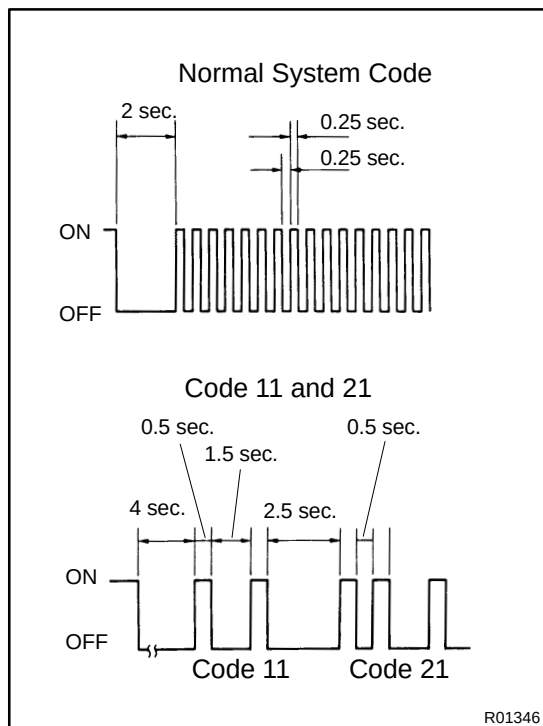
Brake Control warning light	DTC of ECB system
ABS warning light	DTC of ABS system
VSC warning light	DTC of Enhanced VSC system

HINT:

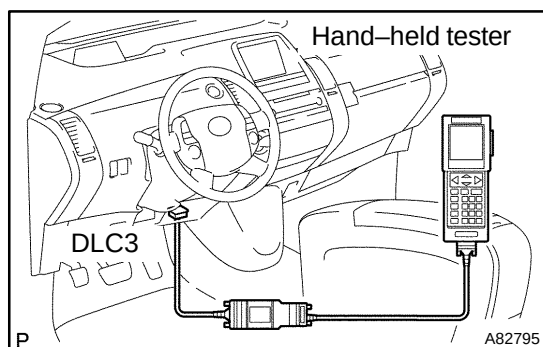
- If no code appears, inspect the diagnostic circuit or ABS warning light circuit.

Trouble Area	See page
TC and CG terminal circuit	05-1132
Brake Control warning light circuit	05-1104
ABS warning light circuit	05-1109
VSC warning light circuit	05-1114





- As an example, the blinking patterns for a normal system code and trouble codes 11 and 21 are shown on the left.
 - (4) Codes are explained in the code table on page [05-987](#).
 - (5) After completing the check, disconnect terminals TC and CG of the DLC3, and turn off the display.
- If 2 or more DTCs are detected at the same time, the DTCs will be displayed in ascending order.

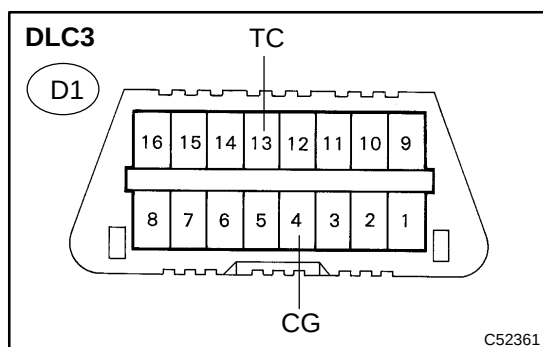


3. CLEAR DTC (USING HAND-HELD TESTER)

- (a) Clearing the DTCs.
- Connect the hand-held tester to the DLC3.
 - Turn the power switch ON (READY).
 - Operate the hand-held tester to clear the codes.

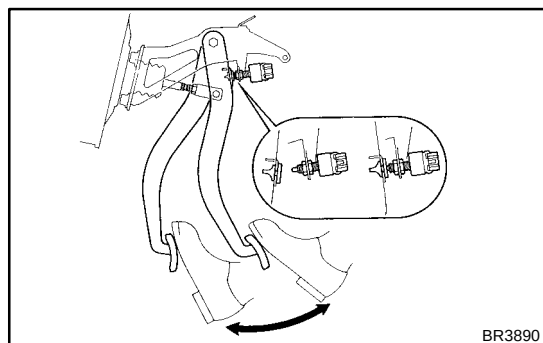
HINT:

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



4. CLEAR DTC (USING SST CHECK WIRE)

- (a) Clear the DTCs using the SST check wire.
- Using SST, connect terminals TC and CG of the DLC3.
- SST 09843-18040
- Turn the power switch ON (READY).



- Clear the DTCs stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.
- Check that the warning light indicates a normal system code.
- Remove the SST.

HINT:

Clearing the DTCs cannot be performed by removing the battery cable or the ECU-IG fuse.

5. END OF CHECK/CLEAR

- (a) Turn the power switch ON (READY).
- (b) Check that the Brake Control warning light, ABS warning light and VSC warning light go off within approximately 3 seconds.

BRAKE CONTROL WARNING LIGHT CIRCUIT (DOES NOT LIGHT UP)**INSPECTION PROCEDURE****1 INSPECT CAN COMMUNICATION SYSTEM (SEE PAGE 05-2605)**

(a) Is the DTC output for CAN communication system?

Result:

DTC is not output	A
DTC is output	B

B**REPAIR CAN COMMUNICATION SYSTEM
(SEE PAGE 05-2619)****A****2 INSPECT MULTIPLEX COMMUNICATION SYSTEM (SEE PAGE 05-2549)**

(a) Is the DTC output for Multiplex communication system?

Result:

DTC is not output	A
DTC is output	B

B**REPAIR MULTIPLEX COMMUNICATION
SYSTEM (SEE PAGE 05-2558)****A****REPAIR OR REPLACE COMBINATION METER ASSY (SEE PAGE 05-1986)**

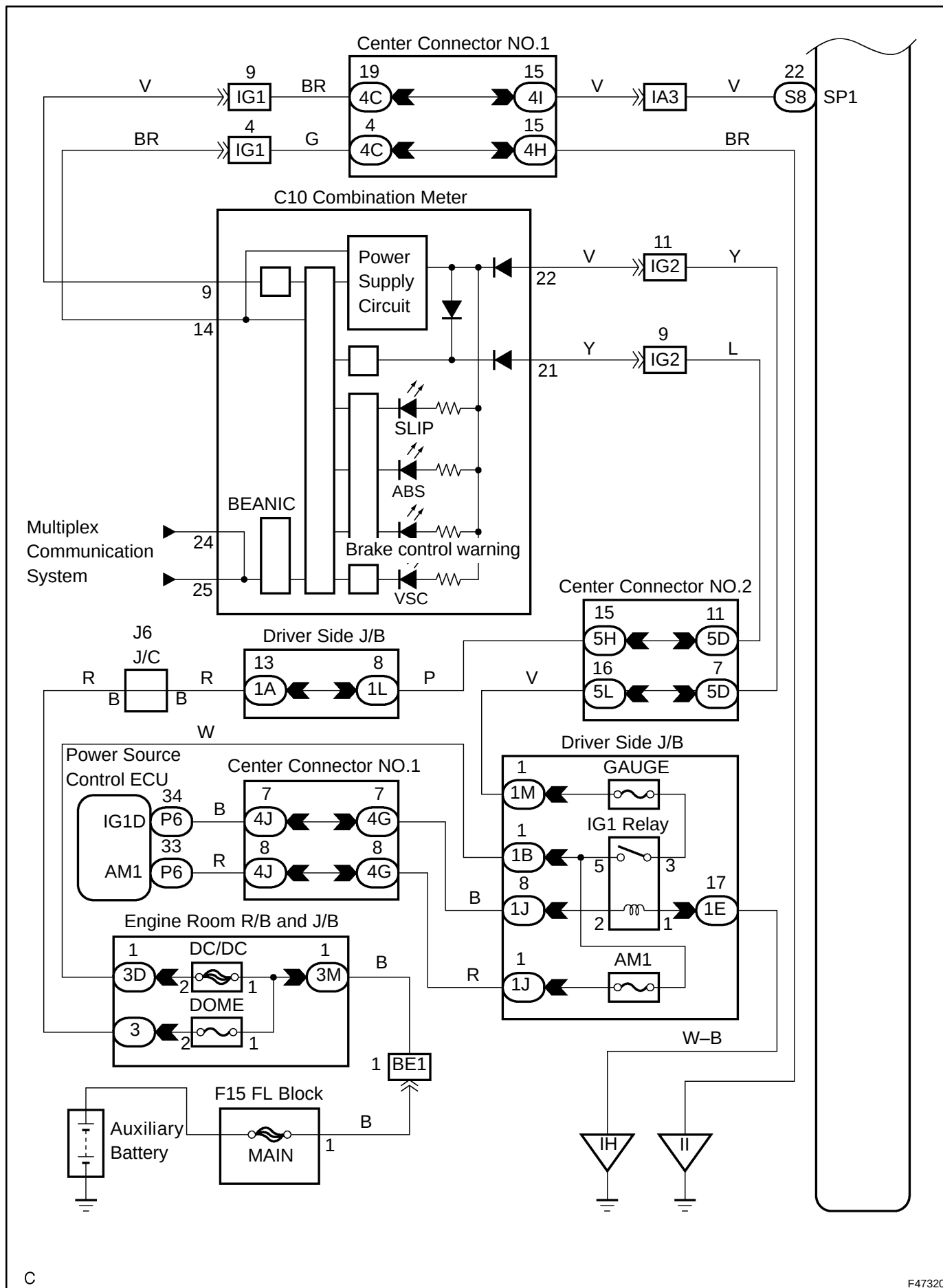
BRAKE CONTROL WARNING LIGHT CIRCUIT (REMAINS ON)**CIRCUIT DESCRIPTION**

The skid control ECU is connected to the combination meter via CAN and Multiplex communications. Informs the driver when there is trouble with ECB or a problem with the brake system that has no influence on driving, by turning on.

The diagram illustrates the electrical connections for the 2007 Toyota Camry Hybrid. It shows the following components and their interconnections:

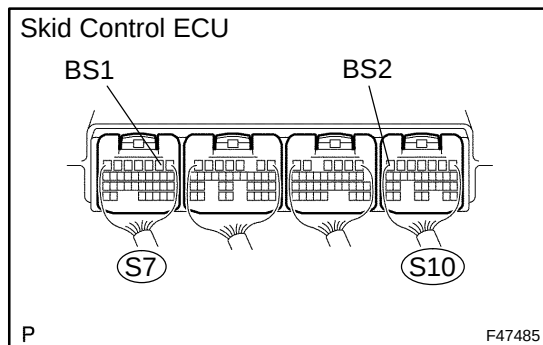
- Gateway ECU**: Connected to **J16 J/C** and **J15 J/C**. It includes terminals CA1L (18, G1), CA1H (17, G1), and MPD2 (12, G1).
- J16 J/C** and **J15 J/C**: Junction boxes connecting the Gateway ECU to the Skid Control ECU.
- Skid Control ECU**: Includes terminals 18 (S8), 19 (S8), and 12 (IA1), 11 (IA1).
- Center Connector NO.2**: Connects MPD2 (12, G1) to the A/C Control Assembly and the Transponder Key Computer.
- A/C Control Assembly**: Includes terminals 3 (A8), 11 (A8), and 17 (B5).
- Driver Side J/B**: Connects the A/C Control Assembly to the Body ECU.
- Body ECU**: Includes terminals 15 (B5) and 17 (B5).
- Transponder Key Computer**: Includes terminals 16 (T5), 17 (T5), and 17 (B5).
- Center Connector NO.1**: Connects the Transponder Key Computer to the Transmission Control ECU.
- Transmission Control ECU**: Includes terminals 8 (II1), 19 (T4), 18 (T4), and 9 (II1).
- Smart Key ECU**: Includes terminals 31 (S11), 32 (S11), and 7 (P6), 24 (P6).
- C10 Combination Meter**: Includes terminals 2 (IG1), 24 (B), and 3 (G1).
- Center Connector NO.2**: Connects the C10 Combination Meter to the Power Source Control ECU.
- Power Source Control ECU**: Includes terminals 7 (P6), 24 (P6), and 7 (S10), 3 (S7).
- Brake Control Power Supply**: Includes terminals 7 (S10) and 3 (S7).

The diagram uses various symbols for connectors (G1, T5, II1, S8, S11, S7, S10), relays (MPX1, MPX2, MPX+, MPX2+), and junction boxes (J16 J/C, J15 J/C). It also shows the flow of power and data between these components.



INSPECTION PROCEDURE

1 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (BS1, BS2)



- (a) Measure the voltage according to the value(s) in the table below.

HINT:

Measure the voltage from behind the connector with the connector connected to the skid control ECU.

Standard:

Tester Connection	Specified Condition
S7-3 (BS1) – Body ground	10 to 14 V
S10-7 (BS2) – Body ground	10 to 14 V

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 PERFORM ACTIVE TEST BY HAND-HELD TESTER (BRAKE CONTROL WARNING LIGHT)

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the power switch ON (READY).
 (c) Select the item "ECB INDI LIGHT" in the ACTIVE TEST and operate the Brake Control warning light on the hand-held tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
ECB INDI LIGHT	Turns Brake Control warning light ON / OFF	Observe combination meter

- (d) Check that "ON" and "OFF" of the Brake Control warning light are indicated on the combination meter when using the hand-held tester.

OK:

The Brake Control warning light turns on or off in accordance with the hand-held tester.

NG

REPAIR OR REPLACE COMBINATION METER ASSY (SEE PAGE 05-1986)

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

FREEZE FRAME DATA OF ABS

1. FREEZE FRAME DATA

HINT:

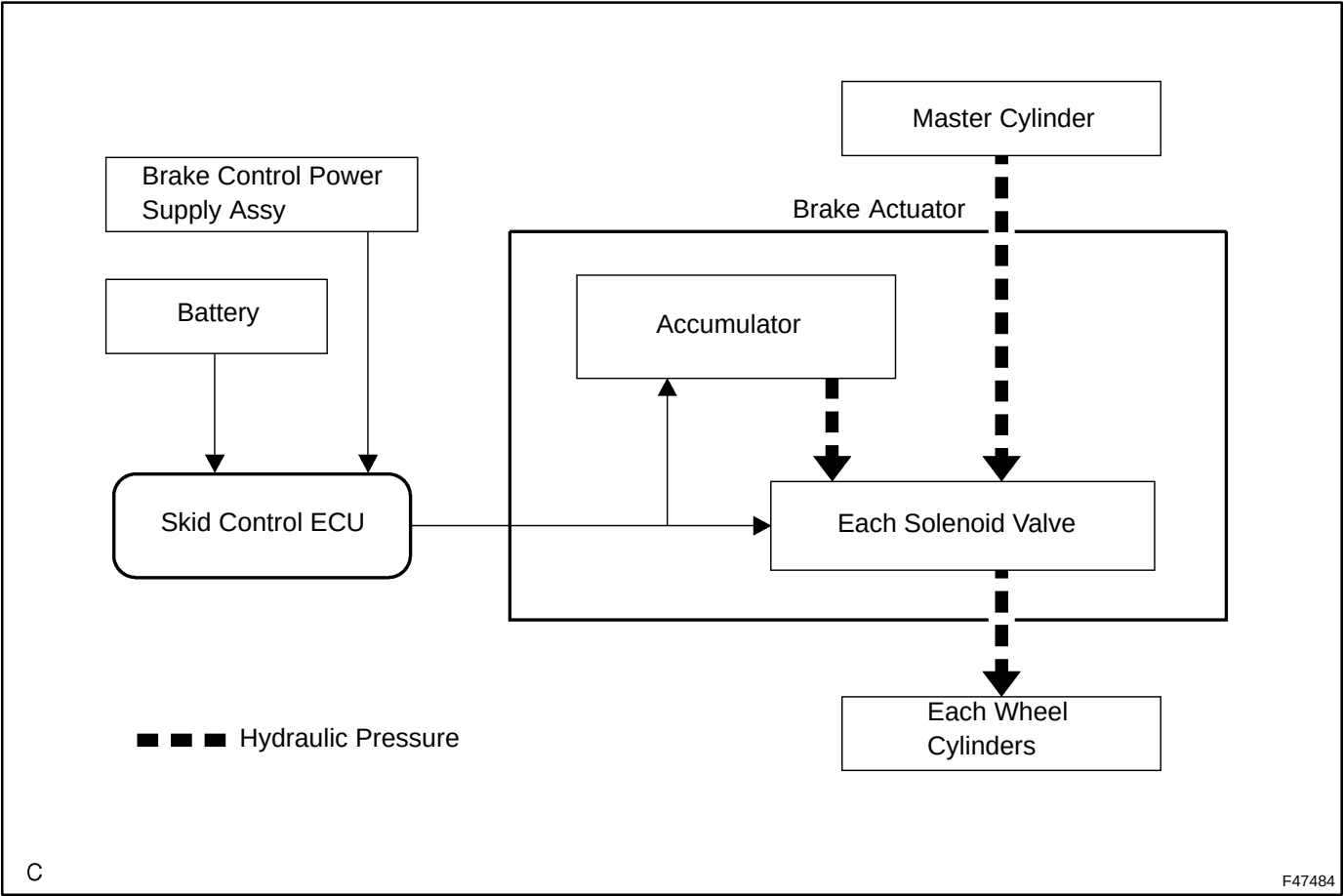
- Whenever a DTC is detected or the ABS operates, the skid control ECU stores the current vehicle (sensor) state as freeze frame data.
 - The skid control ECU stores the number of times (maximum: 31) the power switch has been turned from off to the On position since the last time ABS was activated. However, if the vehicle was stopped or at low speed (4.3 mph (7 km/h) or less), or if a DTC is detected, the skid control ECU will not count the number since then.
 - Freeze frame data at the time the ABS operates:
The skid control ECU stores and updates data whenever the ABS system operates.
When the ECU stores data at the time a DTC is detected, the data stored when the ABS operated is erased.
 - Freeze frame data at the time a DTC is detected:
When the skid control ECU stores data at the time a DTC is detected, no updates will be performed until the data is cleared.
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn the power switch ON (READY).
- (c) From the display on the tester, select the "FREEZE FRAME DATA".

Hand-held tester display	Measurement Item	Reference Value
BUZZER	Buzzer	Buzzer ON: ON, OFF: OFF
RESERVOIR SW	Reservoir level warning switch	Reservoir level warning switch ON: ON, OFF: OFF
PKB SW	PKB sw	PKB switch ON: ON, OFF: OFF
SHIFT POSITION	Shift SFT Position	• Fail • P, N • R • D (M) • 4 • 3 • 2 • L
VSC/TRC OFF SW	VSC OFF switch	VSC OFF switch ON: ON, OFF: OFF
STOP LIGHT SW	Stop light switch	Stop light switch ON: ON, OFF: OFF
SYSTEM	SYSTEM	• ABS • VSC (TRC) • BA • HAB • FAIL SAFE • PBA • PB • NO SYS
# IG ON	# IG ON	0 – 31
VEHICLE SPD	Vehicle speed	Speed indicated on speedometer
STEERING ANG	Steering sensor	• Left turn: Increase • Right turn: Drop (Deceleration)
YAW RATE	Yaw rate sensor	–128 to 127
MAS CYL PRESS	Master cylinder pressure	0 to 5 V
PEDAL STROKE	Stroke sensor	0 to 5.1 V
THROTTLE	Throttle position sensor	Release accelerator pedal: Approx. 0 deg. Depress accelerator pedal: Approx. 125 deg.
MAS PRESS GRADE	Master pressure sensor grade	30 to 225 Mpa/s

DIAGNOSTICS – ELECTRONICALLY CONTROLLED BRAKE SYSTEM

Hand-held tester display	Measurement Item	Reference Value
G (RIGHT & LEFT)	Right and left G	–1869 to 1869
G (BACK & FORTH)	Back and forth G	–1869 to 1869
SPD GRADE	Vehicle speed grade	–1869 to 1869
FR W/C SENS	FR wheel cylinder pressure sensor	0 to 5 V
FL W/C SENS	FL wheel cylinder pressure sensor	0 to 5 V
RR W/C SENS	RR wheel cylinder pressure sensor	0 to 5 V
RL W/C SENS	RL wheel cylinder pressure sensor	0 to 5 V
ACCUM PRESS	Accumulator Pressure Sensor	0 to 5 V
MAS CYL PRESS 2	Master cylinder pressure sensor 2	0 to 5 V
PEDAL STROKE 2	Stroke sensor 2	0 to 5 V
MTT	MTT	0 to 5 V
IG1 VOLTAGE	Voltage value of IG1	0 to 20 V
IG2 VOLTAGE	Voltage value of IG2	0 to 20 V
BS1	BS1	0 to 20 V
BS2	BS2	0 to 20 V
VM1	VM1	0 to 20 V
VM2	VM2	0 to 20 V
+B1	+B1	0 to 5 V
+B2	+B2	0 to 5 V
FR TARGET OIL	Target oil pressure (FR)	0 to 20 V
FL TARGET OIL	Target oil pressure (FL)	0 to 20 V
RR TARGET OIL	Target oil pressure (RR)	0 to 20 V
RL TARGET OIL	Target oil pressure (RL)	0 to 20 V
SLAFR CUR	Current of SLAFR solenoid	0 to 1.5 A
SLAFL CUR	Current of SLAFL solenoid	0 to 1.5 A
SLARR CUR	Current of SLARR solenoid	0 to 1.5 A
SLARL CUR	Current of SLARL solenoid	0 to 1.5 A
SLRFR CUR	Current of SLRFR solenoid	0 to 1.5 A
SLRFL CUR	Current of SLRFL solenoid	0 to 1.5 A
SLRRR CUR	Current of SLRRR solenoid	0 to 1.5 A
SLRRL CUR	Current of SLRRL solenoid	0 to 1.5 A
WHEEL SPD FR	Front Right Wheel speed	0 to 255 km/h
WHEEL SPD FL	Front Left Wheel speed	0 to 255 km/h
WHEEL SPD RR	Rear Right Wheel speed	0 to 255 km/h
WHEEL SPD RL	Rear Left Wheel speed	0 to 255 km/h
CAPA MODE	Capacitor mode	ON: ON, OFF: OFF
SCSS	SCSS	ON: ON, OFF: OFF
SMC2	SMC2	ON: ON, OFF: OFF
SMC1	SMC1	ON: ON, OFF: OFF
MOTOR RELAY 2	Motor relay 2	ON: ON, OFF: OFF
MOTOR RELAY 1	Motor relay 1	ON: ON, OFF: OFF
MAIN RELAY 2	Main relay 2 for ECB	ON: ON, OFF: OFF
MAIN RELAY 1	Main relay 1 for ECB	ON: ON, OFF: OFF
DETAILED CODE	Detailed code for freeze DTC	0 to 65535

FAIL-SAFE CHART



1. FAIL-SAFE FUNCTION

- (a) If a malfunction occurs in the skid control ECU, sensor signal, or actuator, rest normally operating parts will maintain brake control.
- (b) If the brake control is stopped under such conditions as when trouble occurs with a hydraulic pressure source, the pressure generated in the master cylinder by the driver is applied to the wheel cylinder to ensure braking force.
- (c) A power back-up unit is built in as an additional power source to supply stable power to the system.
- (d) If the regenerative brake alone does not operate under such conditions as a communication error with the HV ECU, control is switched so that all braking force is generated with the hydraulic pressure brake.

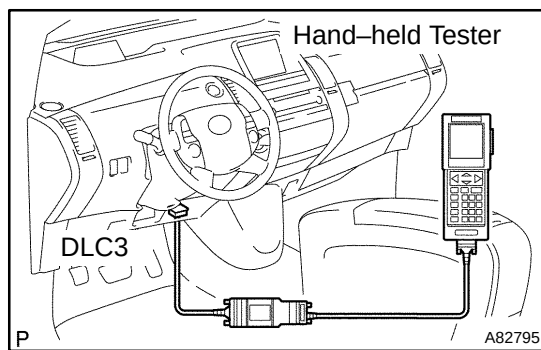
Trouble area	Generated braking force
Skid control ECU	Normally operating parts will control brake and generate braking force
Hydraulic pressure controlling parts	Normally operating parts will control brake and generate braking force
Hydraulic pressure source	Braking force generated by the driver

INITIALIZATION

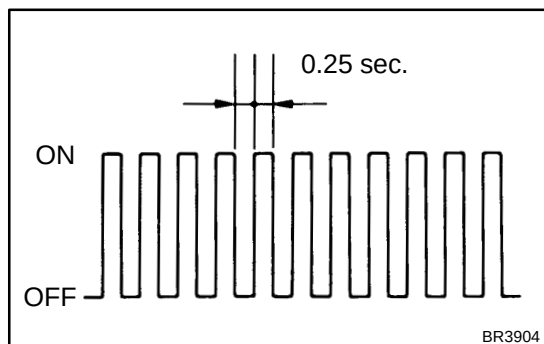
1. INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION

HINT:

- Perform initialization of linear solenoid valve and calibration when the skid control ECU, brake actuator or brake pedal stroke sensor is replaced.
- First perform the pedal stroke sensor zero point calibration and then initialization of linear solenoid valve and calibration when the brake stroke sensor is removed/installed or the brake pedal height is adjusted(see page 32-16).
- First bleed air and then perform initialization of linear solenoid valve and calibration when the brake actuator is replaced.
- Initialization of linear solenoid valve and calibration cannot be performed again once it is stored unless the data is cleared or damaged. Perform initialization of linear solenoid valve and calibration after the stored value is initialized, except when replacing the skid control ECU.
- DTC C1259/59 is stored and ECB control is partly prohibited when the power switch is turned ON (READY) while the service plug grip of the HV battery is removed, preventing initialization of linear solenoid valve and calibration from being normally performed. In this case, connect the service plug grip with the power switch OFF and turn the power switch ON (READY) again to cancel the warning (ECB control prohibition).
- If there is a problem with auxiliary battery (12V) voltage, initialization of linear solenoid valve and calibration cannot be completed normally. Make sure to check battery voltage before performing initialization of linear solenoid valve and calibration.
- If the actuator's temperature is high, initialization of linear solenoid valve and calibration may not be completed normally. In that case, wait until the temperature decreases and then perform initialization of linear solenoid valve and calibration.
- Do not depress the brake pedal during the initialization of linear solenoid valve and calibration procedure.



- (a) Clear stored value of "initialization of linear solenoid valve and calibration".
 - (1) Connect the hand-held tester to the DLC3 with the power switch off.
 - (2) Turn the power switch ON (READY) with the brake pedal released.
 - (3) Check that the "P" position switch indicator (P) is on.
 - (4) Turn the hand-held tester power switch on and clear the stored value of initialization of linear solenoid valve and calibration following the screen.
- (b) Perform "initialization of linear solenoid valve and calibration".
 - (1) Connect the hand-held tester to the DLC3 with the power switch off.
 - (2) Turn the power switch ON (READY) with the brake pedal released.
 - (3) Check that the main switch (parking switch) indicator (P) is on.



- (4) Turn the power switch ON (READY) with the brake pedal depressed to display the "READY ON" indicator on the meter.
- (5) Select the TEST MODE following the hand-held tester screen.
- (6) Leave the vehicle stationary without depressing the brake pedal for 1 to 2 minutes. Check that the interval between blinks of the Brake Control warning light (BRAKE warning (Yellow)) changes from 1 second to 0.25 second.

NOTICE:

- Leave the meter's "READY" indicator on during the initialization of linear solenoid valve and calibration. Do not drive the vehicle or depress the brake pedal.
- A DTC that indicates trouble with initialization of linear solenoid valve and calibration is stored if entering the TEST MODE with the shift lever in any position other than P.

HINT:

- The time needed to complete initialization of linear solenoid valve and calibration varies depending on battery voltage.
 - The Brake Control warning light (BRAKE warning (Yellow)) blinks at 1 second intervals during the initialization of linear solenoid valve and calibration and changes to the TEST MODE display when it is completed.
 - The Brake Control warning light (BRAKE warning (Yellow)) blinks at 0.25 second intervals if the TEST MODE is normal.
- (7) Check that DTC C1346/66 that indicates trouble with stroke sensor zero point learning is not output when the Brake Control warning light changes to the TEST MODE display upon initialization of linear solenoid valve and calibration completion.
 - (8) Enter the NORMAL MODE from the TEST MODE following the hand-held tester screen.

2. YAW RATE SENSOR/DECELERATION SENSOR INITIALIZATION**HINT:**

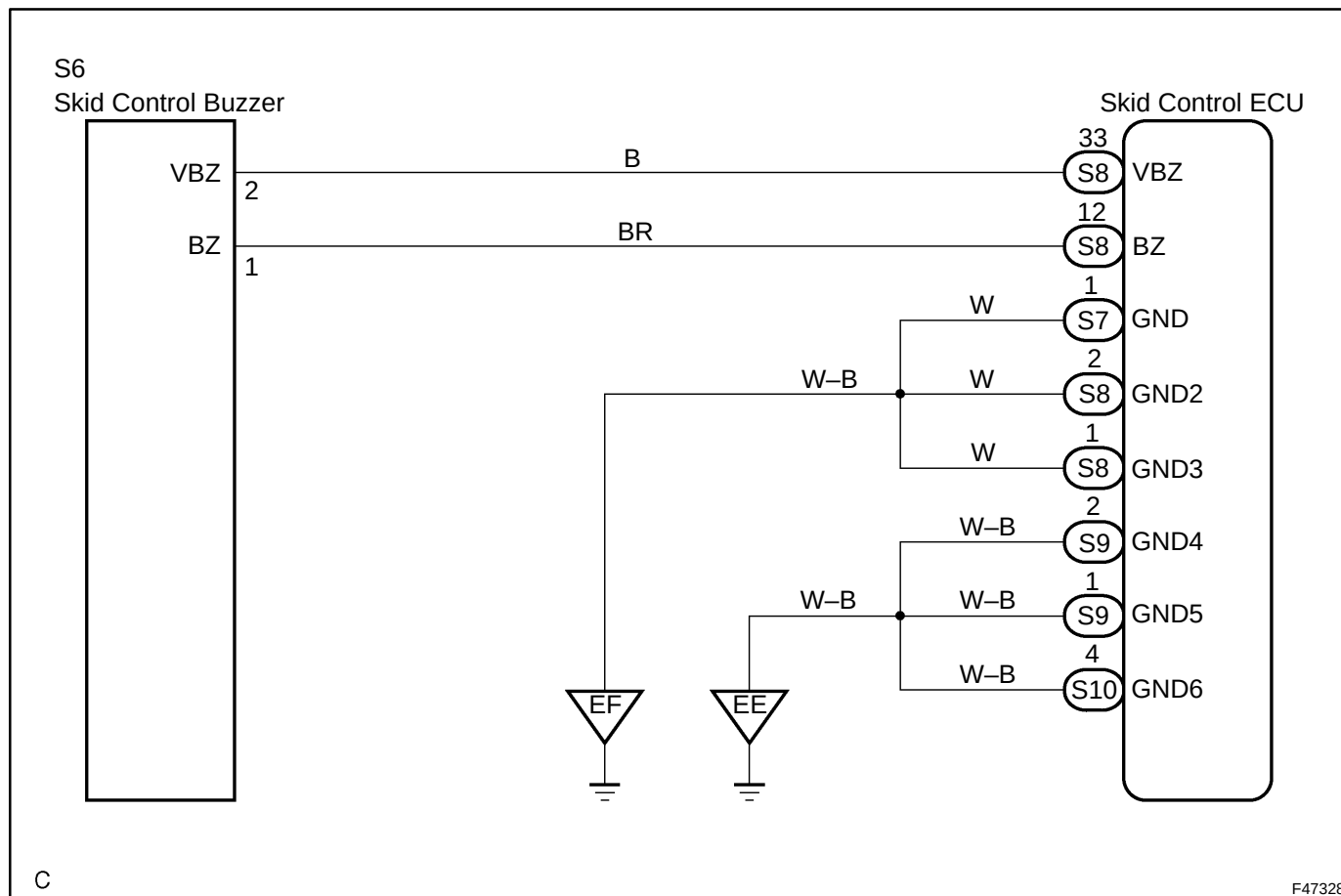
The zero point data of the yaw rate/deceleration sensor stored in the skid control ECU must be cleared when the yaw rate/deceleration sensor is replaced (see page [05-960](#)).

SKID CONTROL BUZZER CIRCUIT

CIRCUIT DESCRIPTION

The skid control buzzer sounds and VSC warning lamp comes ON during Enhanced VSC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

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

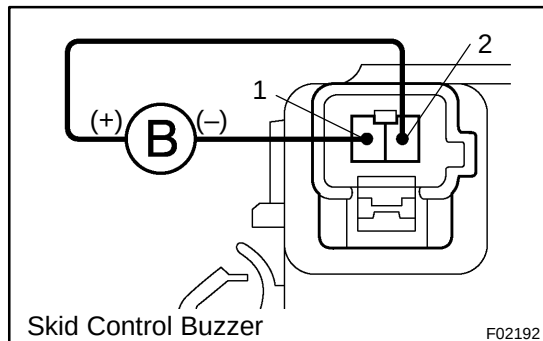
- (a) Connect the hand-held tester to the DLC3.
- (b) Turn power switch ON (READY).
- (c) Select the item "VSC/BR WARN BUZ" in the ACTIVE TEST and operate the skid control buzzer on the hand-held tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
VSC / BR WARN BUZ	Turns VSC / BRAKE warning buzzer ON / OFF	Buzzer can be heard

- (d) Check that skid control buzzer sounds by operating with the hand-held tester.

OK:**The skid control buzzer sounds in accordance with operation of the hand-held tester.****NG****Go to step 2****OK****REPLACE SKID CONTROL ECU (SEE PAGE 32-68)****NOTICE:**

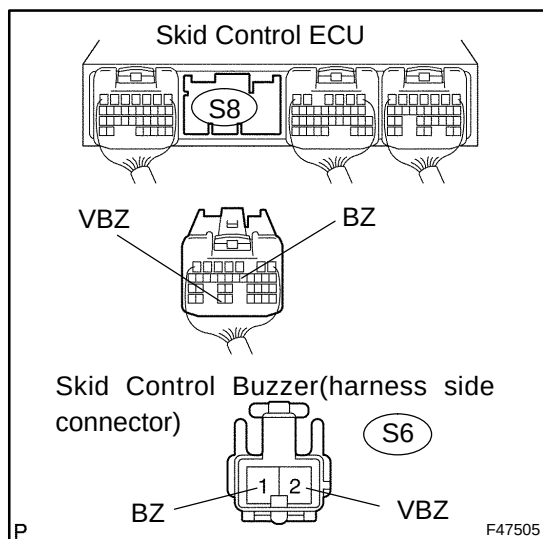
When replacing the skid control ECU Assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

2 INSPECT SKID CONTROL BUZZER ASSY

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

OK:**The skid control buzzer sound should be heard.****NG****REPLACE SKID CONTROL BUZZER ASSY****OK**

3 CHECK HARNESS AND CONNECTOR(SKID CONTROL BUZZER – SKID CONTROL ECU)



- (a) Disconnect the skid control buzzer connector and the skid control ECU connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S8-33 (VBZ) – S6-2 (VBZ)	Below 1 Ω
S8-12 (BZ) – S6-1 (BZ)	Below 1 Ω

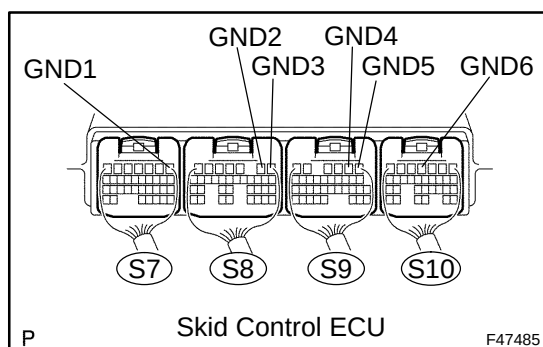
- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S8-33 (VBZ) – Body ground	10 k Ω or higher
S8-12 (BZ) – Body ground	10 k Ω or higher

NG
REPAIR OR REPLACE HARNESS OR CONNECTOR
OK

4 CHECK HARNESS AND CONNECTOR(GND – BODY GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S7-1 (GND1) – Body ground	Below 1 Ω
S8-2 (GND2) – Body ground	Below 1 Ω
S8-1 (GND3) – Body ground	Below 1 Ω
S9-2 (GND4) – Body ground	Below 1 Ω
S9-1 (GND5) – Body ground	Below 1 Ω
S10-4 (GND6) – Body ground	Below 1 Ω

NG
REPAIR OR REPLACE HARNESS OR CONNECTOR
OK
REPLACE SKID CONTROL ECU (SEE PAGE 32-68)
NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

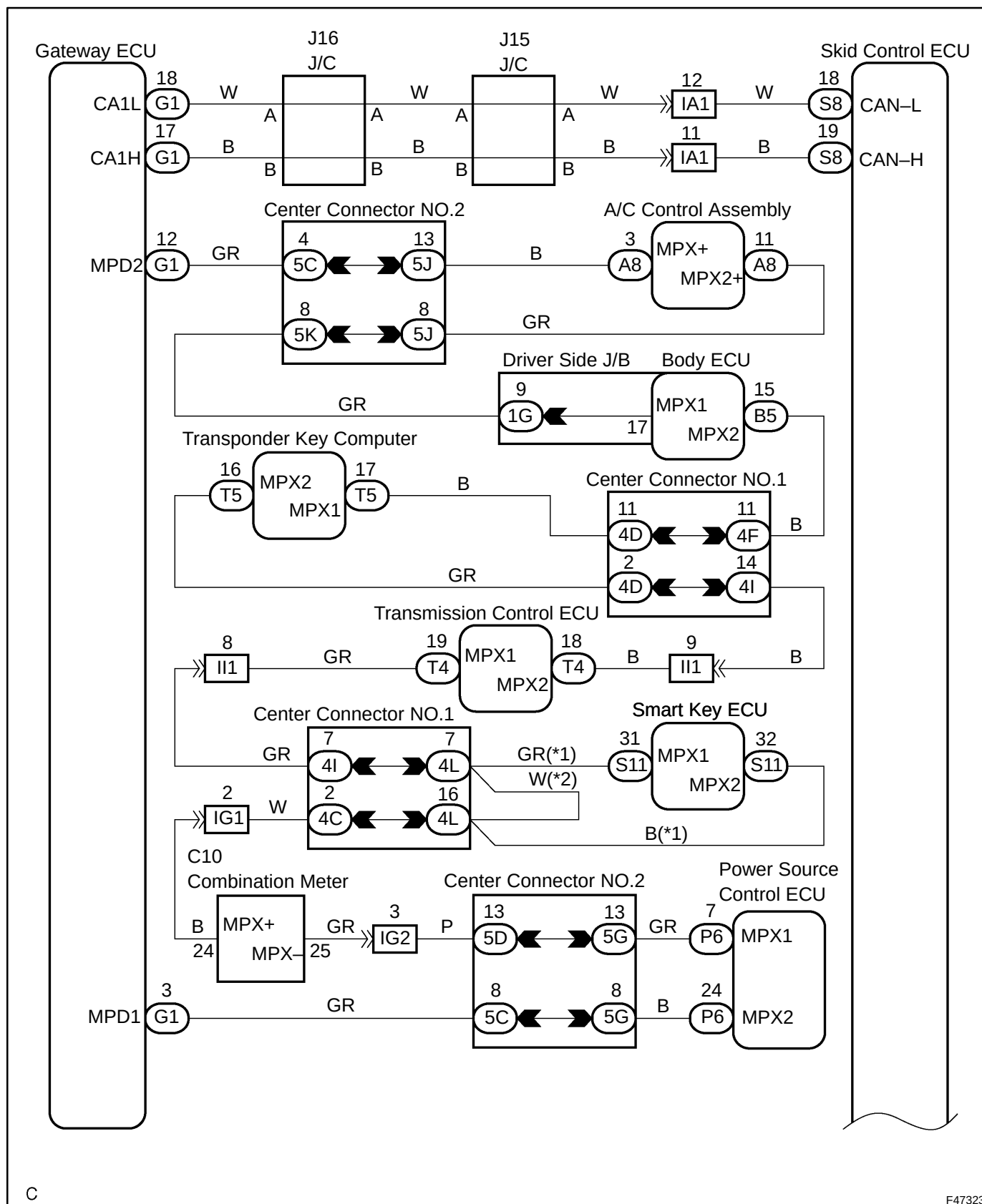
SLIP INDICATOR LIGHT CIRCUIT

CIRCUIT DESCRIPTION

The SLIP indicator blinks during Enhanced VSC operation.

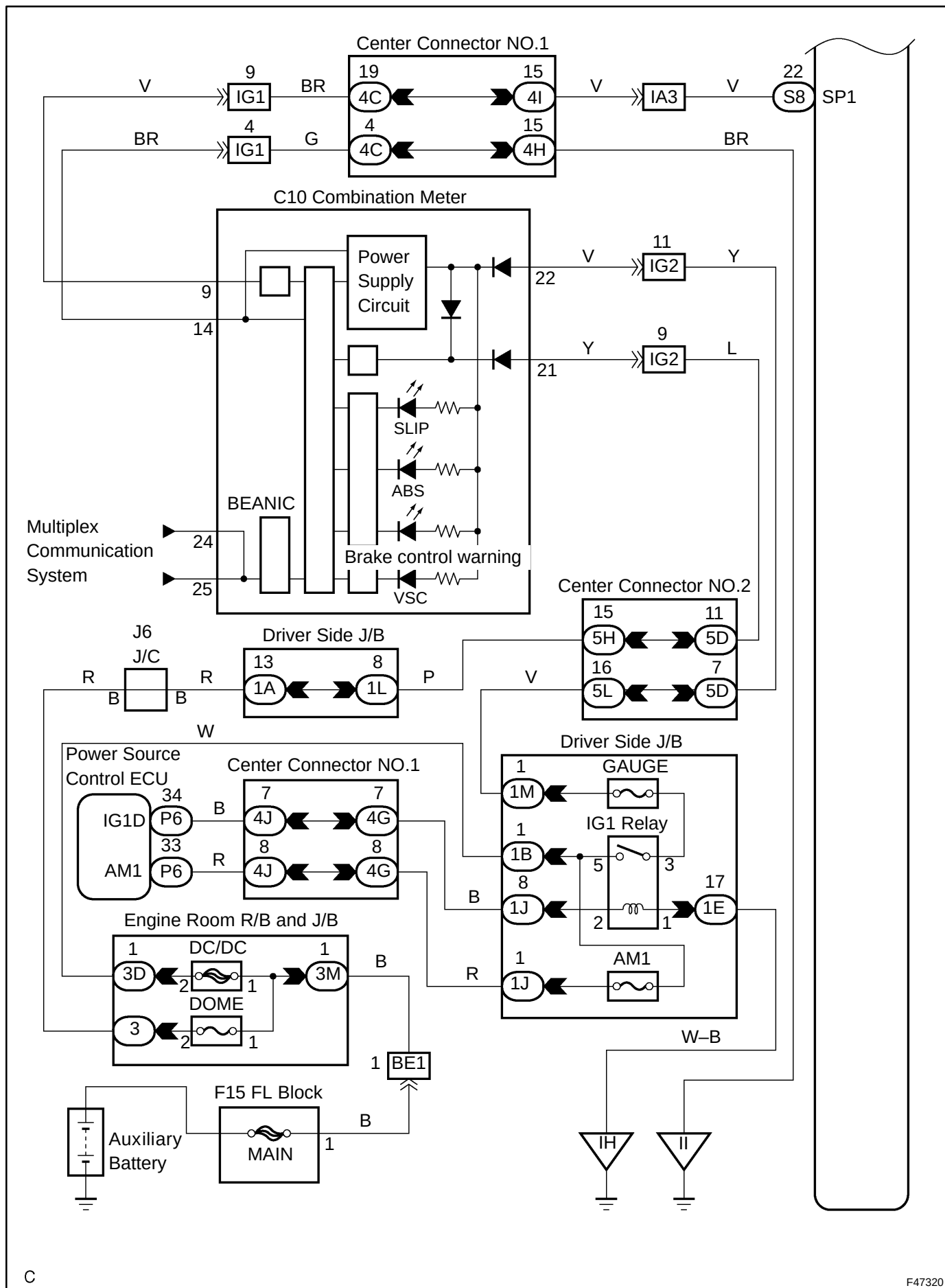
The skid control ECU is connected to the combination meter via CAN and Multiplex communications.

WIRING DIAGRAM



C

F47323



INSPECTION PROCEDURE

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

- Connect the hand-held tester to the DLC3.
- Turn power switch ON (READY).
- Select the item "SLIP INDI LIGHT" in the ACTIVE TEST and operate the SLIP indicator light on the hand-held tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
SLIP INDI LIGHT	Turns SLIP indicator light ON / OFF	Observe combination meter

- Check that "ON" and "OFF" of the SLIP indicator light are indicated on the combination meter when using the hand-held tester.

OK:

Turn the SLIP indicator light on or off in accordance with the hand-held tester.

NG

Go to step 2

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

2 INSPECT CAN COMMUNICATION SYSTEM (SEE PAGE 05-2605)

- Is the DTC output for CAN communication system?

Result:

DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM
(SEE PAGE 05-2619)

A

3 INSPECT MULTIPLEX COMMUNICATION SYSTEM (SEE PAGE 05-2549)

- Is the DTC output for Multiplex communication system?

Result:

DTC is not output	A
DTC is output	B

B

REPAIR MULTIPLEX COMMUNICATION
SYSTEM (SEE PAGE 05-2558)

A

REPAIR OR REPLACE COMBINATION METER ASSY (SEE PAGE 05-1986)

SYSTEM DESCRIPTION

1. COMPONENTS AND FUNCTION

Skid Control ECU (*)	Calculates brake control in accordance with sensor/ECU signals or communication with the hybrid ECU.
Brake Control Power Supply Assy (*)	Charges the capacitor inside the unit and supplies power source to the system by discharging when the voltage of the vehicle's power source drops.
Speed sensor	Detects speed of each wheel and inputs the data into the skid control ECU.
Pedal stroke sensor (*)	Detects brake pedal stroke and inputs the data into the skid control ECU.
Yaw rate/deceleration sensor (*)	Detects forward/rearward and lateral acceleration, and then inputs the data into the skid control ECU.
Steering sensor	Detects steering wheel angle and steering wheel direction, and then inputs the data into the skid control ECU.
Accumulator	Accumulates fluid pressure generated by the pump.
Accumulator pressure sensor (PACC)	Detects accumulator pressure and inputs the data into the skid control ECU.
Master cylinder	Generates pressure according to pedal effort.
Brake fluid reservoir	Stores master cylinder system/power supply system brake fluid. The brake fluid level warning switch built into the reservoir detects decrease of brake fluid.
Stroke simulator	Generates smooth pedal stroke in accordance with pedal effort during system control.
Stroke simulator cut valve (SCSS)	Changes intake/cutoff of brake fluid from master cylinder to stroke simulator. Sends oil pressure generated in master cylinder to stroke simulator during system control. Cuts brake fluid flow from master cylinder to stroke simulator when system is not controlling.
Master cylinder pressure sensor 1, 2 (PMC1, PMC2)	Detects fluid pressure inside the master cylinder and inputs the data into the skid control ECU.
Relief valve	Releases brake fluid into the reservoir and prevents excessively high power supply system pressure when the pump operates continuously due to malfunctions in parts such as accumulator oil pressure sensor.
Wheel cylinder pressure sensor	Detects the pressure in each wheel cylinder and inputs the data into the skid control ECU.
ABS No.1 relay ABS No.2 relay	Supplies power to each solenoid according to the skid control ECU signals. Supplies power to the skid control ECU. Stores power source after turning the power source off.
ABS MTR1 relay ABS MTR2 relay	Supplies power to each motor according to the skid control ECU signals. Drives relay1 under normal condition and drives relay 2 under the ABS operation. Substitutes relay operation when one relay malfunctions.
Changeover solenoid valve (SMC1, SMC2)	The changeover solenoid valve switches the brake hydraulic pressure passage depending on whether the system is in operation or not operation.
Linear solenoid valve (SLA##, SLR##)	Controls wheel cylinder hydraulic pressure according to regenerative braking force in order to generate braking force required by the driver under normal brake operation. Controls the hydraulic pressure of each wheel cylinder under ABS, VSC brake operation. SLA## adjusts the pressure increase level. SLR## adjusts the pressure decrease level.
Stop lamp switch	Illuminates the brake light when the brake pedal is depressed. (Sends brake ON signal to skid control ECU)
BRAKE warning light (Red)	Informs the driver that there is trouble with the ECB (normal brake) by turning on. Informs the driver when the parking brake is applied and brake fluid level drops by turning on.
BRAKE warning light ((Yellow) Brake Control warning light)	Informs the driver when there is trouble with ECB or a problem with the brake system that has no influence on driving, by turning on.
ABS warning light	Informs the driver that there is trouble with ABS by illuminating the light.
VSC warning light	Informs the driver that there is trouble with Enhanced VSC by illuminating the light.
SLIP indicator	Informs the driver that Enhanced VSC and ABS are operating by blinking the light.
Skid control buzzer	Informs the driver when there is trouble with the hydraulic pressure source or power source by continuous buzzer sound. Informs that Enhanced VSC is operating by an intermittent buzzer sound.

*: The initialization of linear solenoid valve and calibration must be initialized when the skid control ECU, actuator, stroke sensor, yaw rate (deceleration) sensor, brake control power supply assy, and steering sensor are replaced (see page 05-958).

It is necessary to perform zero point calibration of yaw rate (deceleration) sensor (see page 05-960).

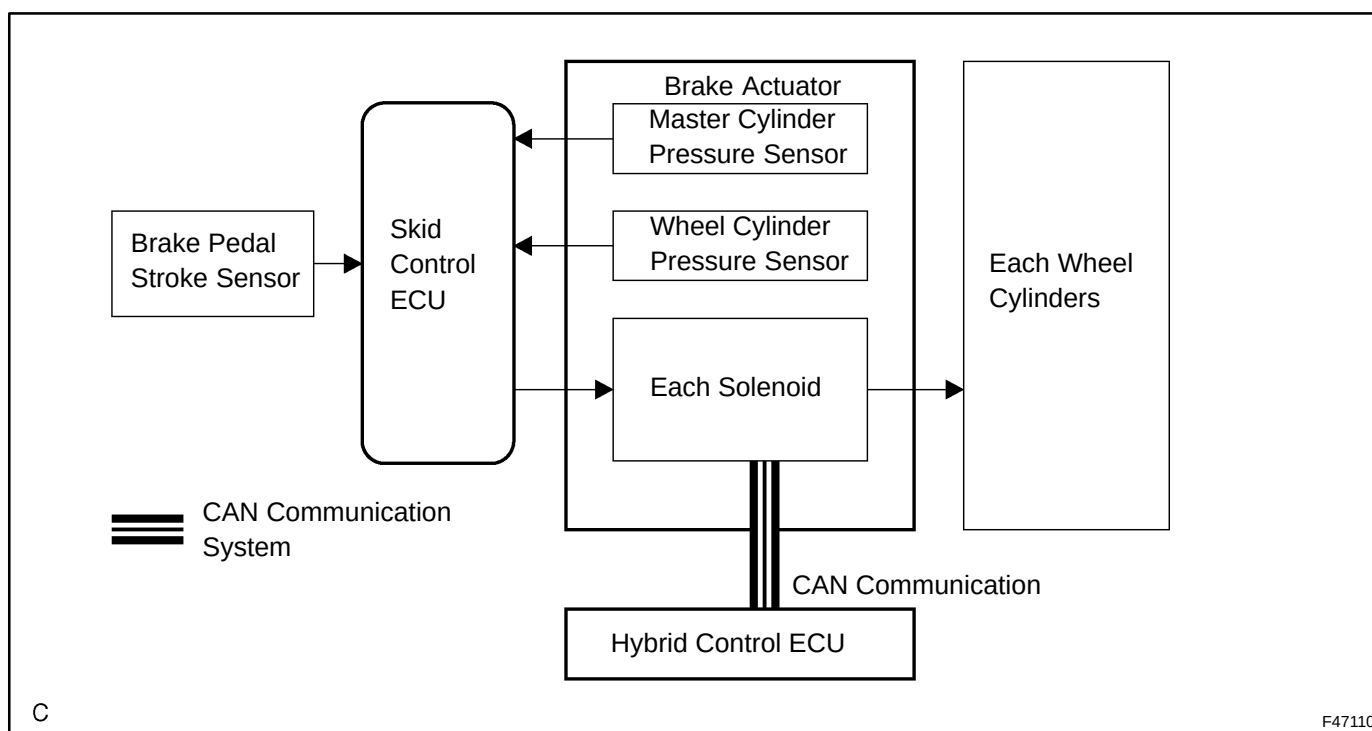
2. OPERATION DESCRIPTION

ECB (Electronically Controlled Brake):

The skid control ECU receives signals from the pedal stroke sensor, master cylinder sensor and wheel cylinder pressure sensor. Based on these signals, the skid control ECU calculates necessary braking force for each wheel. The necessary hydraulic pressure braking force signal is sent to the Hybrid Control ECU via CAN communication. The skid control ECU receives a braking force (regenerative braking force) signal from the Hybrid Control motor via CAN communication. The ECU calculates the necessary hydraulic pressure braking force based on the necessary braking force and regenerative braking force.

Necessary hydraulic pressure is supplied to each wheel by adjusting the brake accumulator (hydraulic pressure source) pressure with each solenoid valve.

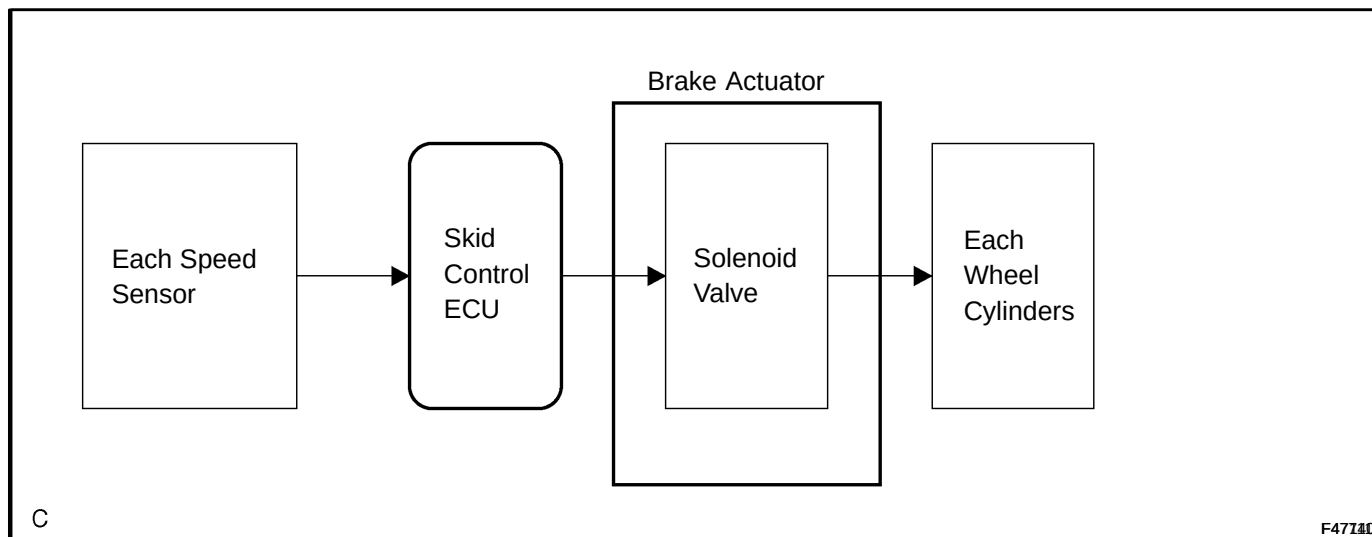
If there is a problem with braking function, rest normally operating parts will maintain brake control as a fail-safe.



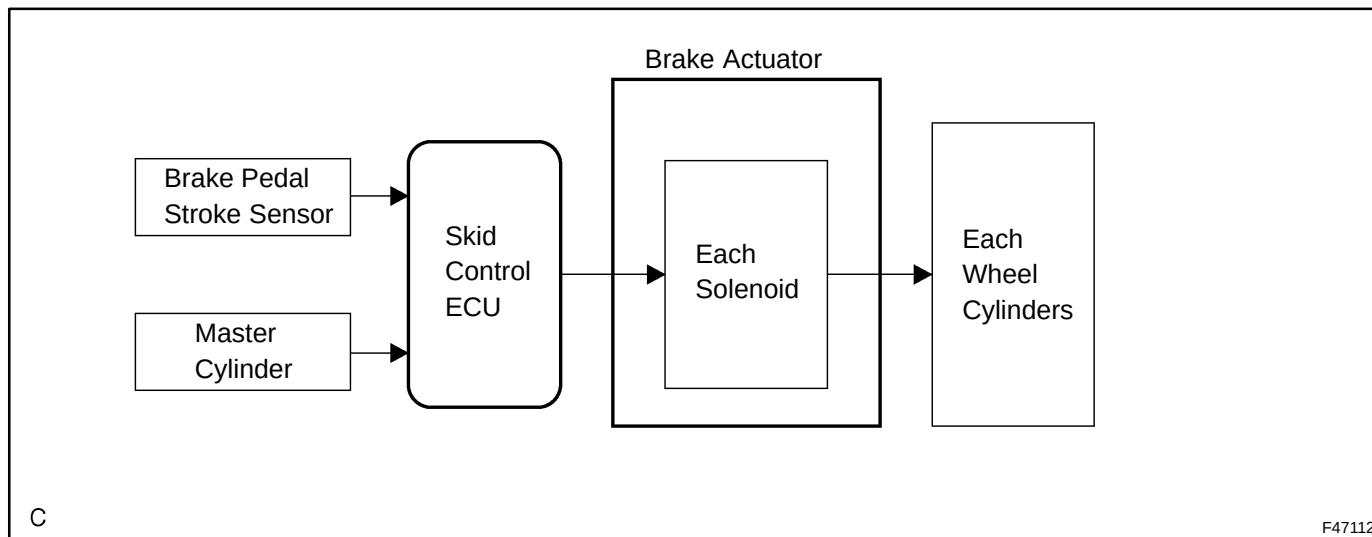
ABS with EBD & Enhanced VSC:

The skid control ECU receives a vehicle speed signal from each speed sensor and detects wheel's slip condition and then sends a control signal to the solenoid.

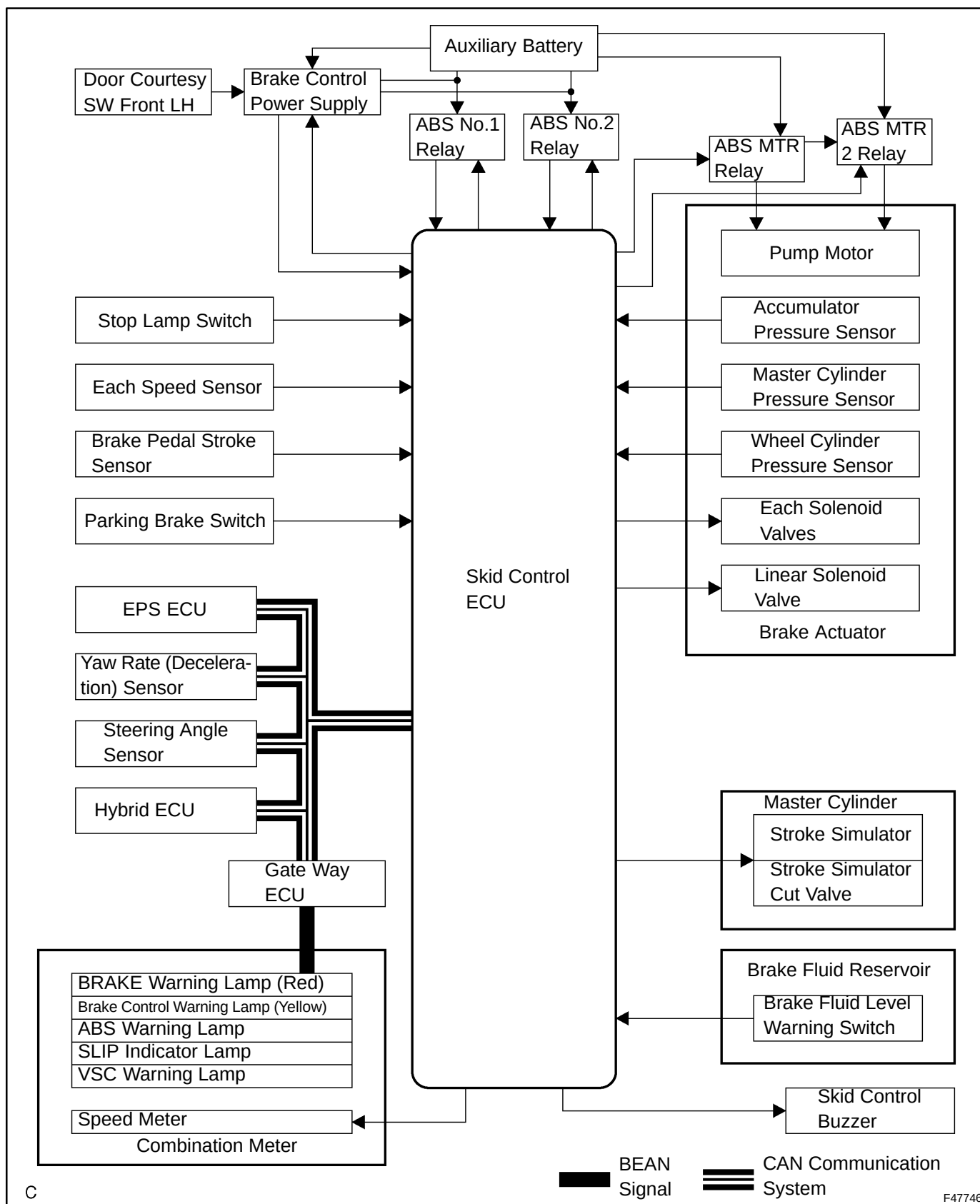
The solenoid valve controls each wheel cylinder's hydraulic pressure and optimizes hydraulic pressure allocation to each wheel cylinder.

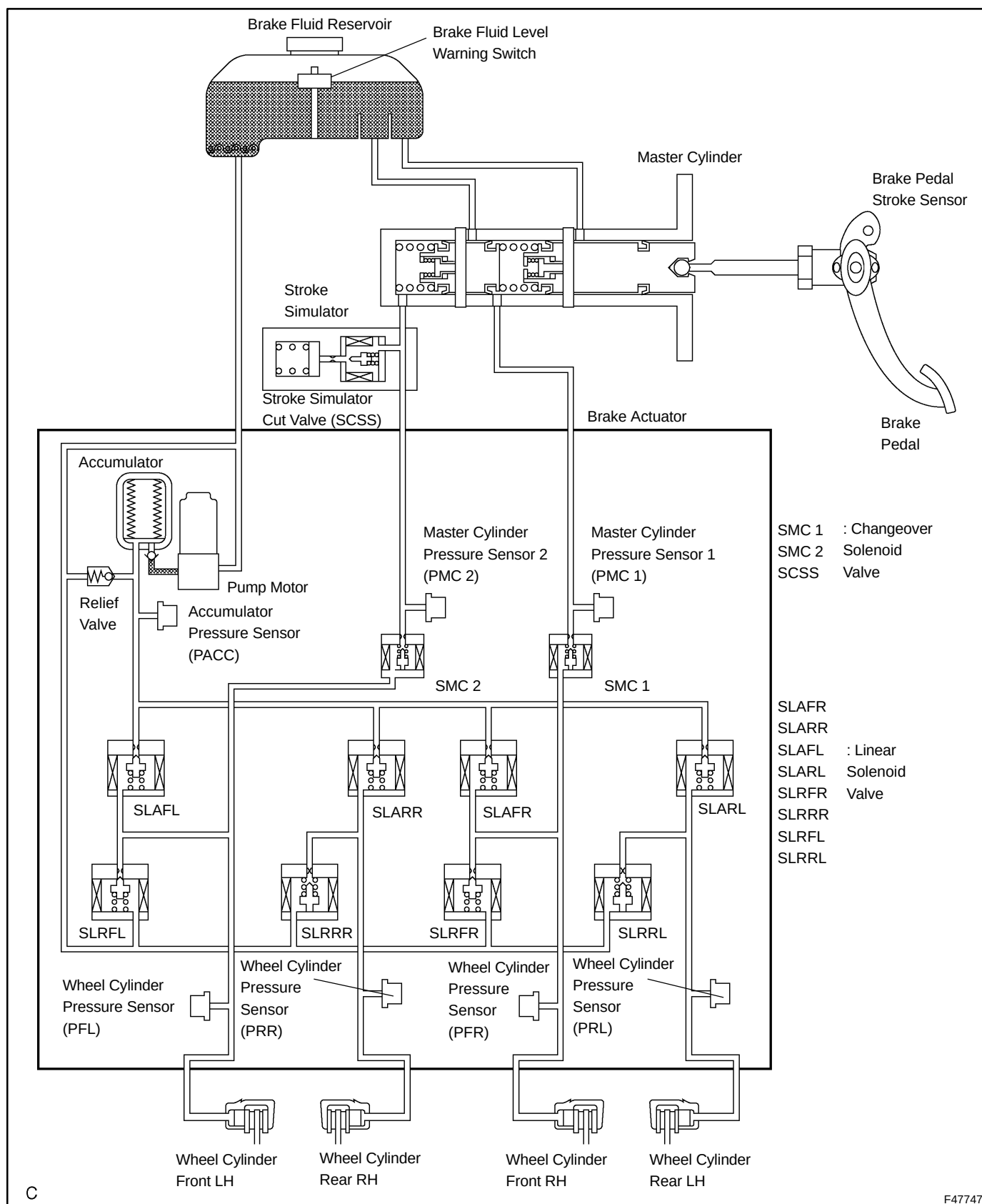
**BA (Brake Assist):**

The skid control ECU receives the brake pedal stroke sensor signal and hydraulic pressure signal from the master cylinder pressure sensor and determines whether brake assist operation is necessary or not. If it is determined that brake assist operation is necessary, the ECU changes target hydraulic pressure applied to each wheel.



SYSTEM DIAGRAM





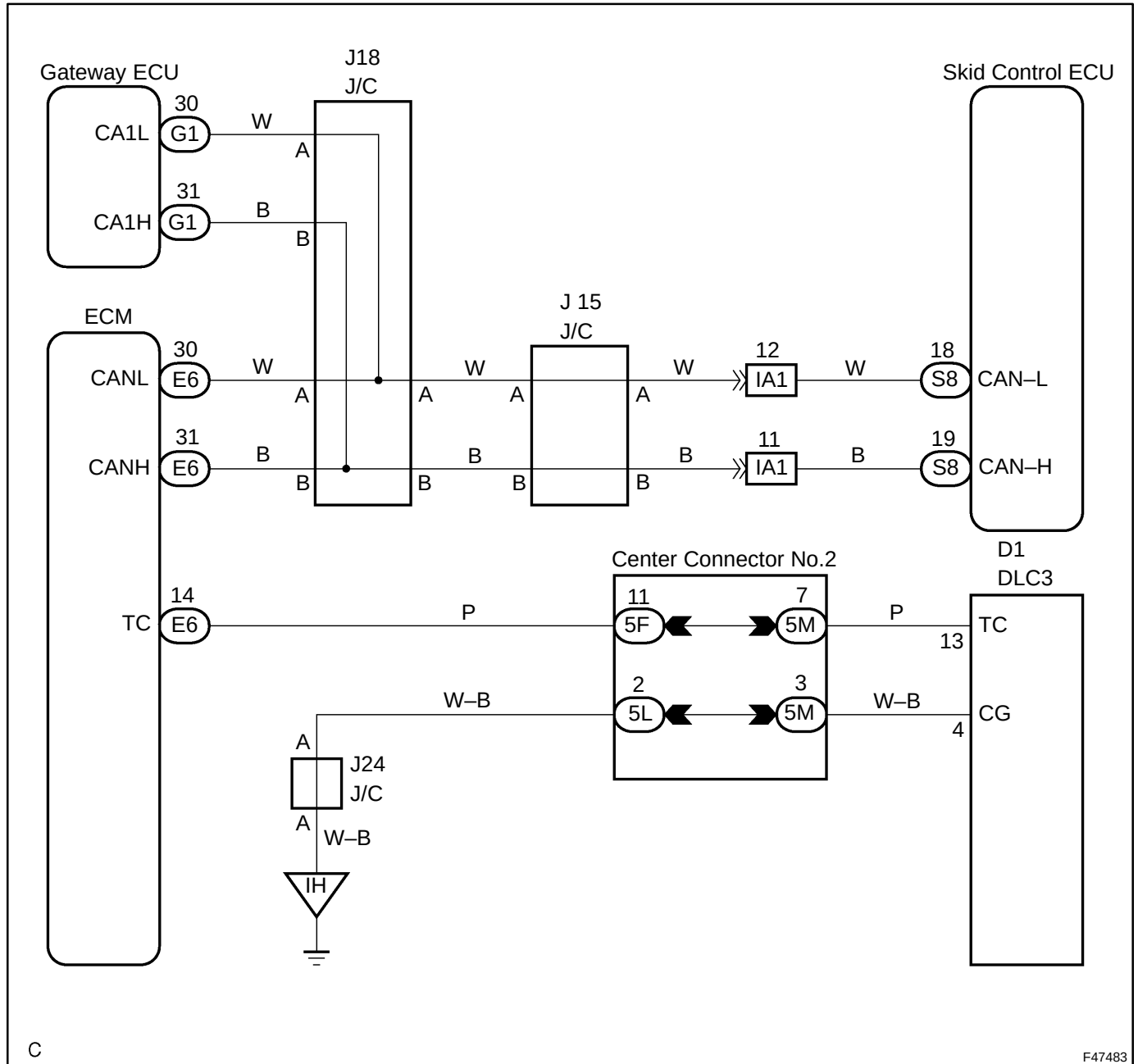
Transmitting ECU	Receiving ECU	Signal name	Communication line
Skid control ECU	Gateway ECU	Warning signal	CAN communication
Skid control ECU	Hybrid Control ECU	Vehicle wheel lock signal	CAN communication
Skid control ECU	Hybrid Control ECU	Vehicle wheel speed sensor signal	CAN communication
Skid control ECU	Hybrid Control ECU	Enhanced VSC, torque control signal	CAN communication
Skid control ECU	Hybrid Control ECU	ABS operation signal	CAN communication
Skid control ECU	Hybrid Control ECU	Cruise control cancel demand signal	CAN communication
Skid control ECU	Hybrid Control ECU	Communication error signal (from HV to ECB)	CAN communication
Skid control ECU	Hybrid Control ECU	Demand drive torque signal	CAN communication
Skid control ECU	Hybrid Control ECU	Braking torque signal	CAN communication
Skid control ECU	Hybrid Control ECU	Regeneration performing demand signal	CAN communication
Skid control ECU	Hybrid Control ECU	STP SW signal	CAN communication
Skid control ECU	Hybrid Control ECU	STP SW open signal	CAN communication
Skid control ECU	Hybrid Control ECU	Parking brake signal	CAN communication
Skid control ECU	Yaw rate (deceleration) sensor	Yaw rate (deceleration) signal	CAN communication
Skid control ECU	EPS ECU	Steering signal	CAN communication
Hybrid Control ECU	Skid control ECU	Regeneration prohibit signal	CAN communication
Hybrid Control ECU	Skid control ECU	Regeneration deterioration notice signal	CAN communication
Hybrid Control ECU	Skid control ECU	Regeneration error signal	CAN communication
Hybrid Control ECU	Skid control ECU	Performing torque recognition signal	CAN communication
Hybrid Control ECU	Skid control ECU	Performing torque recognition signal	CAN communication
Hybrid Control ECU	Skid control ECU	Destination signal	CAN communication
Hybrid Control ECU	Skid control ECU	Throttle opening angle signal	CAN communication
Hybrid Control ECU	Skid control ECU	Accelerator information signal (Idle SW)	CAN communication
Hybrid Control ECU	Skid control ECU	Communication error signal (from ECB to HV)	CAN communication
Hybrid Control ECU	Skid control ECU	Wheel lock braking start signal	CAN communication
Hybrid Control ECU	Skid control ECU	Shift information signal	CAN communication
Hybrid Control ECU	Skid control ECU	Ready condition signal	CAN communication
Hybrid Control ECU	Skid control ECU	Braking torque demand signal	CAN communication
Hybrid Control ECU	Skid control ECU	SLIP indicator ON demand signal	CAN communication

TC AND CG TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

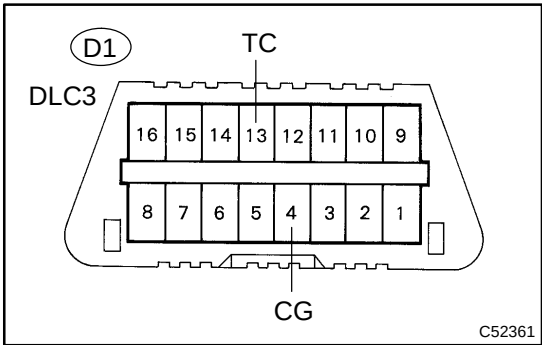
Connecting terminals TC and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT DLC3 TERMINAL VOLTAGE(TC TERMINAL)



- Turn the ignition switch to the ON position.
- Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
D1-13 (TC) – D1-4 (CG)	10 to 14 V

- Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
D1-4 (CG) – Body ground	Below 1 Ω

NG Go to step 3

OK

2 INSPECT CAN COMMUNICATION SYSTEM (SEE PAGE 05-2605)

- Is the DTC output for CAN communication system?

Result:

DTC is not output	A
DTC is output	B

B REPAIR CIRCUIT INDICATED BY OUTPUT CODE (SEE PAGE 05-2619)

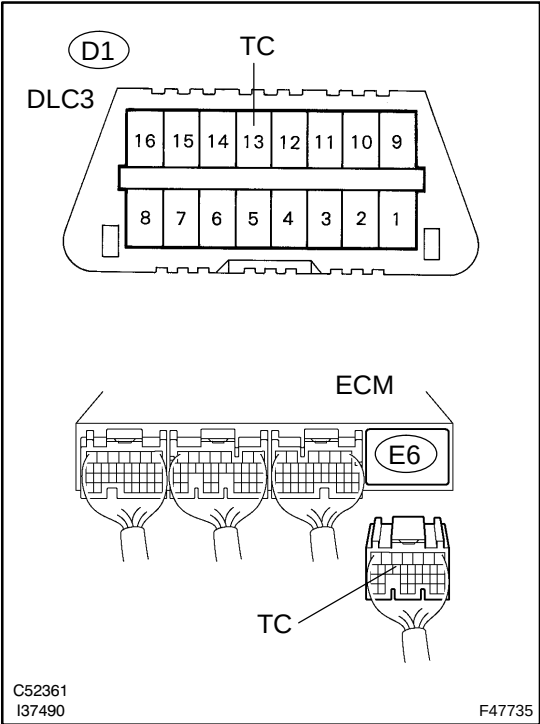
A

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

3 INSPECT HARNESS AND CONNECTOR (SKID CONTROL ECU – ECM)



- (a) Disconnect the slid control ECU connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
D1-13 (TC) – E6-14 (TC)	Below 1 Ω

- (c) Measure the resistance according to the value(s) in the table below.

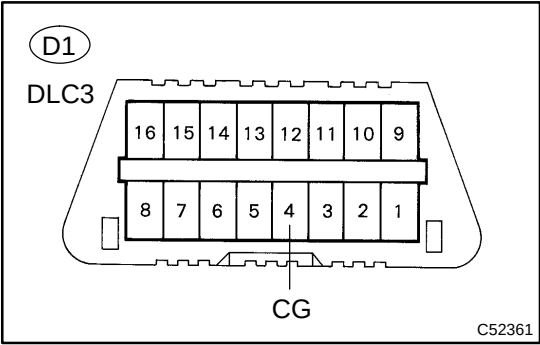
Standard:

Tester Connection	Specified Condition
D1-13 (TC) – Body ground	10 kΩ or higher

B REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 INSPECT HARNESS AND CONNECTOR (DLC3 – BODY GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
D1-4 (CG) – Body ground	Below 1 Ω

B REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5	INSPECT CAN COMMUNICATION SYSTEM (SEE PAGE 05-2605)
----------	--

(a) Is the DTC output for CAN communication system?

Result:

DTC is not output	A
DTC is output	B

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE (SEE PAGE 05-2619)

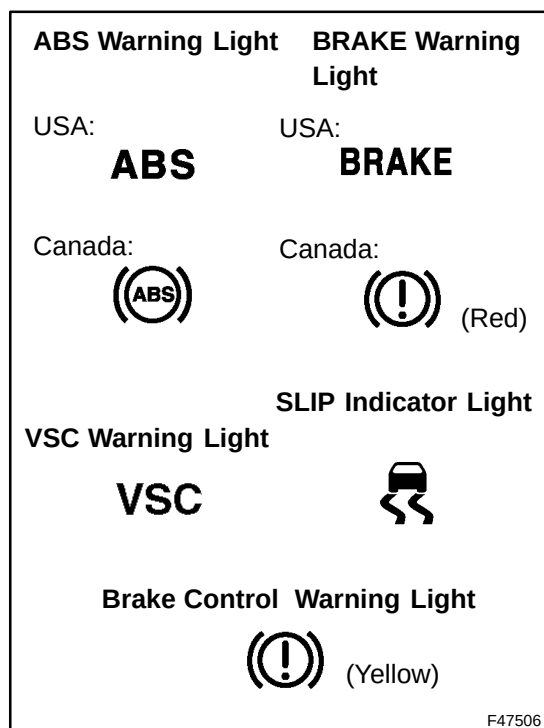
A

REPLACE SKID CONTROL ECU (SEE PAGE 32-68)
--

NOTICE:
When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

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TEST MODE PROCEDURE



1. WARNING LIGHT AND INDICATOR LIGHT CHECK

- (a) Release the parking brake pedal.

NOTICE:

When releasing the parking brake, move the "P" position switch into the P position to hold the vehicle for safety.

HINT:

When the parking brake is applied or the level of the brake fluid is low, the BRAKE warning light comes on.

- (b) When the power switch ON (READY) check that the ABS warning light, VSC warning light, BRAKE warning light, Brake Control warning light and SLIP indicator light come on for approximately 3 seconds.

HINT:

If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit, VSC warning light circuit, BRAKE warning light circuit, Brake Control warning light circuit or SLIP indicator light circuit.

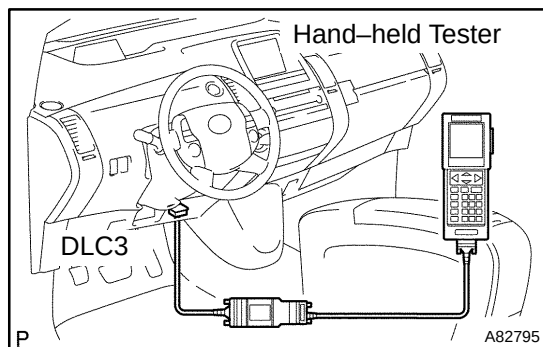
If the indicator remains on, proceed to troubleshooting for the light circuit below.

Trouble area	See Page
ABS warning light circuit	05-1109
VSC warning light circuit	05-1114
BRAKE warning light circuit	05-1119
Brake Control warning light circuit	05-1104
SLIP indicator light circuit	05-1128

2. SENSOR SIGNAL CHECK BY TEST MODE

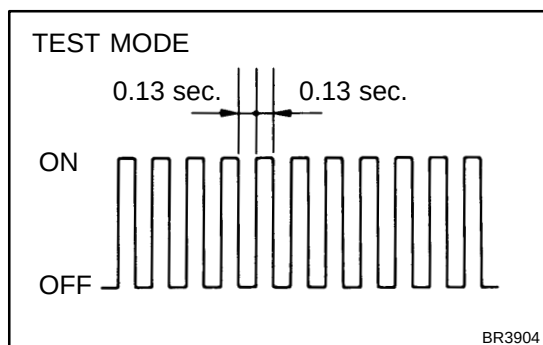
HINT:

- Set the vehicle in the TEST MODE and perform the following procedures to check operation of the deceleration sensor, master cylinder pressure sensor, speed sensor and yaw rate sensor.
- Check results are indicated by DTCs output only in the TEST MODE.
- Perform the following procedures (a) to (e) as a set.
- When entering the test mode, the skid control ECU once records all the test mode codes and clears the codes judged to be normal.
- The Enhanced VSC function does not operate independent of whether the sensor check is normal or abnormal during test mode.
- When the mode returns to the normal mode, all the test mode codes are cleared.
- The ABS warning lamp and VSC warning light comes on if the sensor has a malfunction.



(a) PROCEDURES FOR TEST MODE

- (1) Turn the power switch OFF.
- (2) Connect the hand-held tester to the DLC3.
- (3) Check that the steering wheel is in the straight-ahead position and move the shift lever to the P position.
- (4) Turn the power switch ON (READY).



- (5) Check that the ABS warning light and VSC warning light indicates TEST MODE .

HINT:

If the ABS warning light and VSC warning light do not blink, inspect the ABS warning light circuit and VSC warning light circuit.

Trouble area	See Page
ABS warning light circuit	05-1109
VSC warning light circuit	05-1114

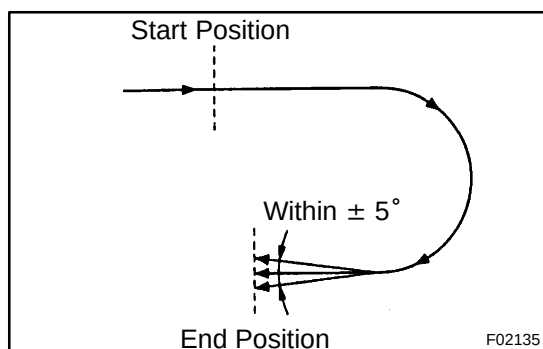
- (6) Start the engine.

(b) DECELERATION SENSOR CHECK

- (1) Check that the ABS warning light is blinking in TEST MODE.
- (2) Keep the vehicle in the stationary condition on a level surface for 1 second or more.

HINT:

The blinking pattern of the ABS warning light and VSC warning light do not change. When the sensor is normal and in the test mode, if the above conditions are met, the check is completed.



(c) YAW RATE SENSOR CHECK

- (1) Shift the shift lever to the D range and drive the vehicle at the vehicle speed of approx. 3 mph (5 km/h), turn the steering wheel either to left or right 90° or more, and maintain 180° circular drive for the vehicle.

NOTICE:

- The vehicle direction at the beginning and the end should be 180 ± 5 degrees or less.
- While turning do not move the shift lever to the P position. Do not turn the ignition switch off.

HINT:

- The turning direction is not important.
- Turning should be completed within 2.0 seconds. However, it is possible to change the vehicle speed, stop or more backward.

- (2) Stop the vehicle and move the shift lever to the P position, check that the skid control buzzer sounds for 3 sec.

HINT:

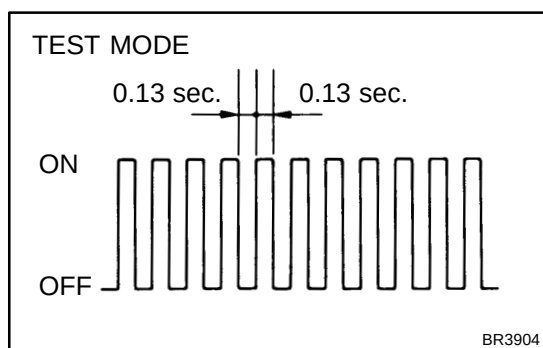
- If the skid control buzzer sounds, the sensor check is completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit (see page 05-1125), then perform the sensor check again.
- If the skid control buzzer still won't sound, there is a malfunction in the Enhanced 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.

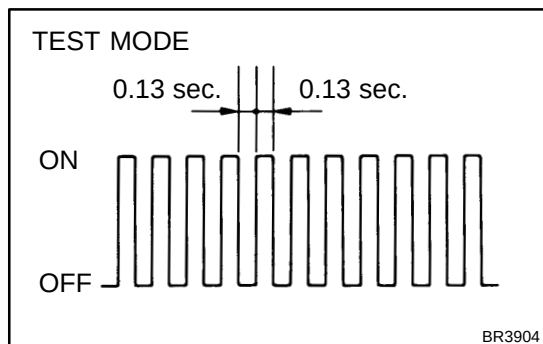
(d) MASTER CYLINDER PRESSURE SENSOR CHECK

- (1) Check that the ABS warning light is blinking in TEST MODE.
- (2) Leave the vehicle in a stationary condition and the brake pedal in free condition for 1 second or more, and quickly depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second or more.
- (3) While the vehicle is stopped, release the brake pedal.
- (4) While the vehicle is stopped, quickly depress the brake pedal once or more and check the ABS warning light is lit for 3 seconds.

HINT:

- While the ABS warning light is lit, maintain the condition a brake pedal load of approximately 98 N or more is applied.
- During the test mode, the ABS warning light comes on for 3 seconds every time the above pedal operation.
- If the master cylinder pressure sensor check is not completed, randomly depressing the brake pedal will cause the negative pressure to decrease further and the sensor check will be difficult to be completed.
- If the negative pressure is insufficient, the master cylinder pressure sensor check may not be completed. In this case, turn the engine idle to make the negative pressure sufficient.
- Strongly depress the brake pedal when the negative pressure is insufficient the brake warning lamp may come on with the fail-safe function.





(e) SPEED SENSOR CHECK

- (1) Check the ABS warning light is blinking of TEST MODE.
- (2) Start the sensor signal check.
- (3) Drive the vehicle straight forward.
Drive the vehicle at a speed of 28 to 50 mph (45 to 80 km/h) or higher for several seconds and check that the ABS warning light goes off.

Vehicle Speed	Test	Check
0 to 28 mph (0 to 45 km/h)	Low speed test	Response of sensors
28 to 50 mph (45 to 80 km/h)	Middle speed test	Deviations of sensor signal

NOTICE:

- Before the speed sensor check, the yaw rate sensor, deceleration sensor and master cylinder pressure sensor checks should be completed.
- If the sensor check begins with the steering wheel turned or the wheel spin, the speed sensor check may not be completed.
- After the warning lamp goes off, driving at 50 mph (80 km/h) or more will cause the test mode codes to be recorded again, before the speed reaches at 50 mph (80 km/h), decelerate and stop the vehicle.
- If the sensor check is not completed, the ABS warning lamp blinks even while driving and the ABS does not operate.

HINT:

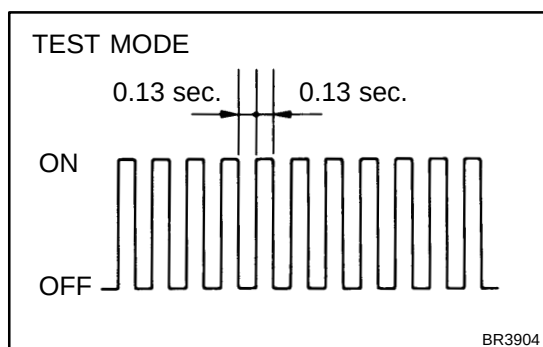
If the speed sensor check is completed, the ABS warning lamp does not come on while driving and blinks at test mode when the vehicle stops.

(f) END OF SENSOR CHECK

- (1) If the sensor check is completed, the ABS warning lamp blinks (test mode) when the vehicle stops and the warning lamp is off when the vehicle is driving.

NOTICE:

- When the yaw rate sensor, deceleration sensor, speed sensor and master cylinder pressure sensor checks are completed, the sensor check is completed.
- If the sensor check is not completed, the ABS warning lamp blinks even while the vehicle is driving and the ABS does not operate.
- If the DTC is detected during the test mode, the ABS warning lamp and VSC warning lamp comes on.



(g) READ TEST MODE CODE

- (1) Using hand-held tester, check the DTCs in the test mode. (Refer to the step h)

NOTICE:

- If only the DTCs are displayed, repair the malfunction area and clear the DTC. Check if the ABS warning lamp and VSC warning lamp are normal.
- If only the test mode codes are displayed, perform the test mode again.
- If the DTCs or test mode codes are displayed, repair the malfunction area, clear the DTCs and perform the test mode inspection.

HINT:

- The test mode codes and DTCs are displayed.
- If the ABS is normal, the ABS warning lamp comes on for 0.25 seconds and goes off for 0.25 seconds repeatedly.

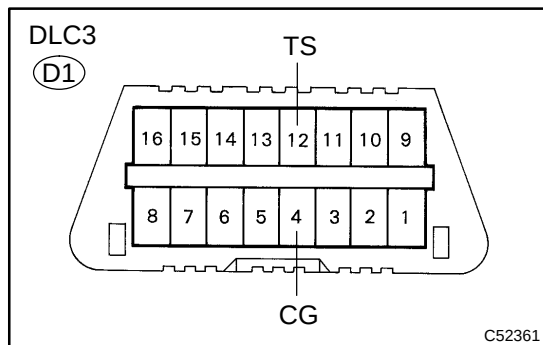
(h) DTC of TEST MODE:

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	• Yaw rate (Deceleration) sensor • Sensor installation
C1281/81	Master cylinder pressure sensor output signal is faulty	Master cylinder pressure sensor
C0371/71	Signal malfunction	Yaw rate sensor (Deceleration sensor)

HINT:

The code in this table are output only in TEST MODE.

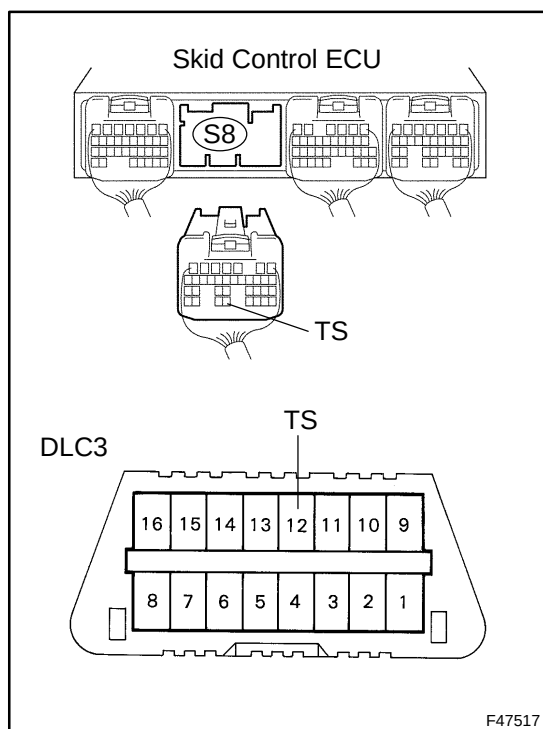
INSPECTION PROCEDURE

1 INSPECT DLC3 TERMINAL VOLTAGE(TS TERMINAL)

- (a) Turn the ignition switch to the ON position.
 (b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
D1-12 (TS) – D1-4 (CG)	10 to 14 V

NG**Go to step 3****OK****2 CHECK HARNESS AND CONNECTOR(DLC3 – SKID CONTROL ECU)**

- (a) Disconnect the skid control ECU connector.
 (b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S8-32 (TS) – D1-12 (TS)	Below 1 Ω

- (c) Measure the resistance according to the value(s) in the table below.

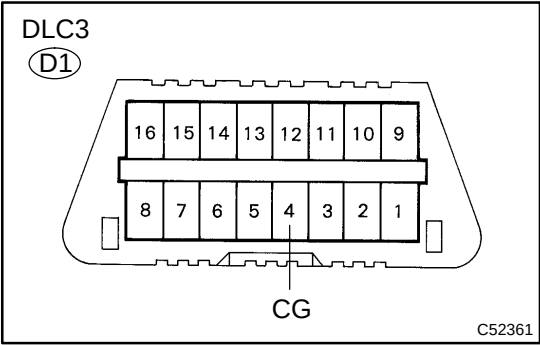
Standard:

Tester Connection	Specified Condition
S8-32 (TS) – Body ground	10 k Ω or higher

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)****NOTICE:**

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

3 CHECK HARNESS AND CONNECTOR(DLC3 – BODY GROUND)



- (a) Measure the resistance according to the value(s) in the table below.

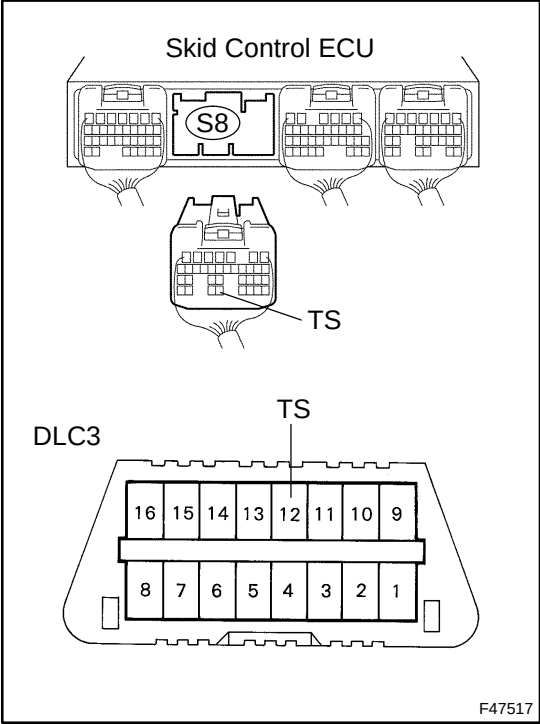
Standard:

Tester Connection	Specified Condition
D1-4 (CG) – Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR(DLC3 – SKID CONTROL ECU)



- (a) Disconnect the skid control ECU connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S8-32 (TS) – D1-12 (TS)	Below 1 Ω

- (c) Measure the resistance according to the value(s) in the table below.

Standard:

Tester Connection	Specified Condition
S8-32 (TS) – Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32-68)

NOTICE:
When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

VSC WARNING LIGHT CIRCUIT (REMAINS ON)

CIRCUIT DESCRIPTION

Inform the driver that there is trouble with Enhanced VSC by illuminating the VSC warning light.

When DTC output is normal and the VSC warning lamp remains on, perform troubleshooting as indicated below.

This wiring diagram illustrates the electrical connections for the 2007 Toyota Camry 2.5L 4-cylinder engine. The diagram is organized into two main vertical sections: the left side for the Gateway ECU and the right side for the Skid Control ECU. The central area contains various components and connectors.

Gateway ECU (Left):

- CA1L (18) and CA1H (17) are connected to the J16 J/C.
- MPD2 (12) is connected to the Center Connector NO.2.
- MPD1 (3) is connected to the Center Connector NO.2.

Skid Control ECU (Right):

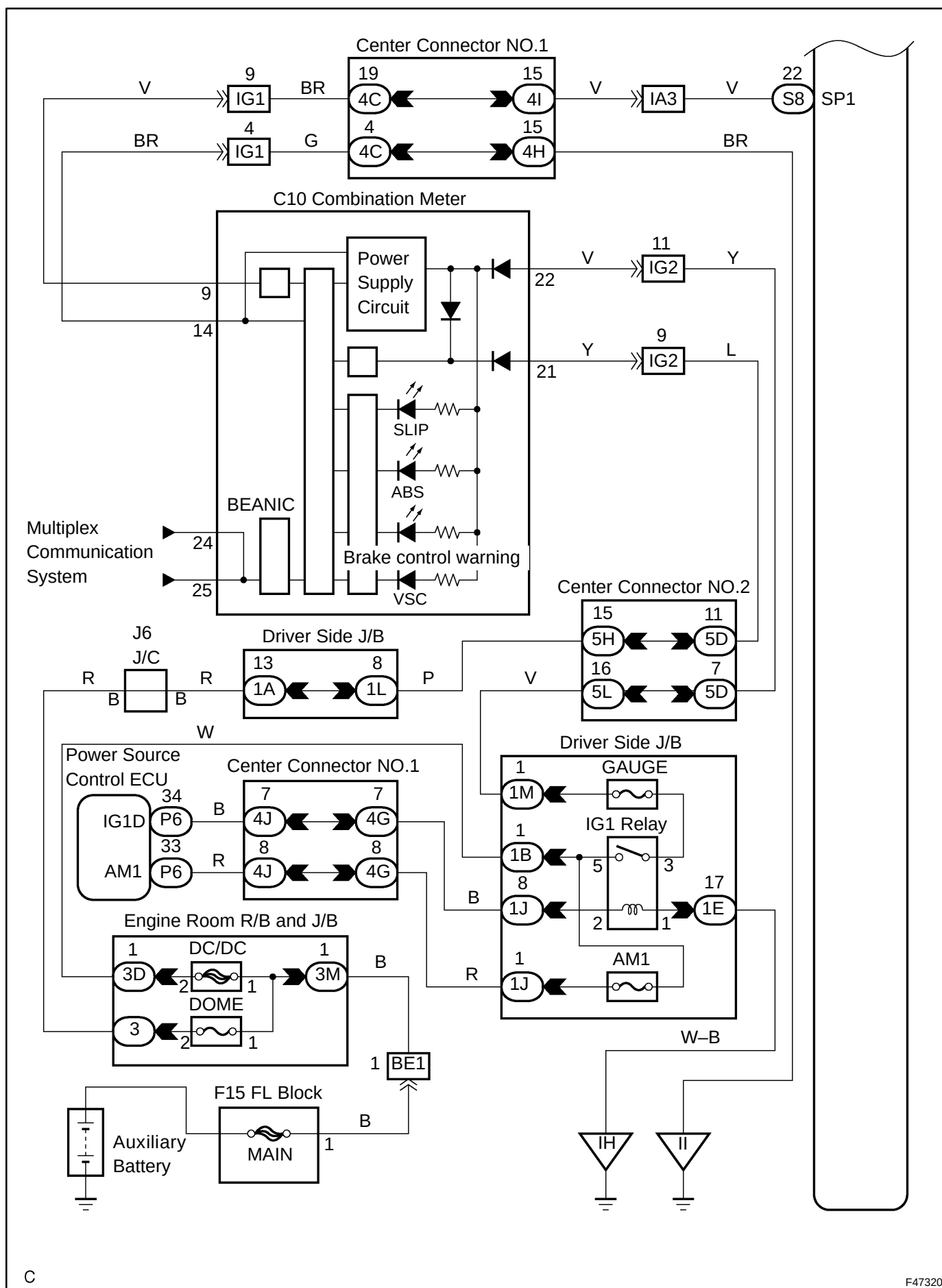
- CAN-L (18) and CAN-H (19) are connected to the J15 J/C.
- MPX1 (15) and MPX2 (17) are connected to the Center Connector NO.1.
- MPX1 (31) and MPX2 (32) are connected to the Smart Key ECU.

Central Components and Connectors:

- J16 J/C:** Connects the Gateway ECU to the central components.
- J15 J/C:** Connects the Skid Control ECU to the central components.
- Center Connector NO.1:** Connects the Transponder Key Computer, Driver Side J/B, and Smart Key ECU.
- Center Connector NO.2:** Connects the A/C Control Assembly, Driver Side J/B, and Power Source Control ECU.
- Transponder Key Computer:** Contains MPX1 and MPX2.
- Driver Side J/B:** Contains MPX1 and MPX2.
- Smart Key ECU:** Contains MPX1 and MPX2.
- Power Source Control ECU:** Contains MPX1 and MPX2.
- A/C Control Assembly:** Contains MPX+ and MPX2+.
- Transmission Control ECU:** Contains MPX1 and MPX2.
- Combination Meter:** Contains MPX+ and MPX-.

Wiring Details:

- Wires:** W (White), B (Black), GR (Green), P (Purple), and others.
- Terminals:** G1, G2, G3, G4, G5, G6, G7, G8, G9, G10, G11, G12, G13, G14, G15, G16, G17, G18, G19, G20, G21, G22, G23, G24, G25, G26, G27, G28, G29, G30, G31, G32, G33, G34, G35, G36, G37, G38, G39, G40, G41, G42, G43, G44, G45, G46, G47, G48, G49, G50, G51, G52, G53, G54, G55, G56, G57, G58, G59, G60, G61, G62, G63, G64, G65, G66, G67, G68, G69, G70, G71, G72, G73, G74, G75, G76, G77, G78, G79, G80, G81, G82, G83, G84, G85, G86, G87, G88, G89, G90, G91, G92, G93, G94, G95, G96, G97, G98, G99, G100.
- Connectors:** I1, I2, I3, I4, I5, I6, I7, I8, I9, I10, I11, I12, I13, I14, I15, I16, I17, I18, I19, I20, I21, I22, I23, I24, I25, I26, I27, I28, I29, I30, I31, I32, I33, I34, I35, I36, I37, I38, I39, I40, I41, I42, I43, I44, I45, I46, I47, I48, I49, I50, I51, I52, I53, I54, I55, I56, I57, I58, I59, I60, I61, I62, I63, I64, I65, I66, I67, I68, I69, I70, I71, I72, I73, I74, I75, I76, I77, I78, I79, I80, I81, I82, I83, I84, I85, I86, I87, I88, I89, I90, I91, I92, I93, I94, I95, I96, I97, I98, I99, I100.



C

F47320

INSPECTION PROCEDURE

1 INSPECT SKID CONTROL ECU CONNECTOR

- (a) Check the skid control ECU connector's connecting condition.

OK:

The connector should be securely connected.

NG

CONNECT CONNECTOR TO ECU CORRECTLY

OK

2 PERFORM ACTIVE TEST BY HAND-HELD TESTER

- (a) Connect the hand-held tester to the DLC3.
 (b) Turn the power switch ON (READY).
 (c) Select the item "VSC WARN LIGHT" in the ACTIVE TEST and operate the VSC Warning light on the hand-held tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
VSC WARN LIGHT	Turns VSC warning light ON / OFF	Observe combination meter

- (d) Check that "ON" and "OFF" of the VSC warning light are indicated on the combination meter when using the hand-held tester.

OK:

The VSC warning light turns on or off in accordance with the hand-held tester.

NG

REPAIR OR REPLACE COMBINATION METER ASSY (SEE PAGE 05-1986)

OK

REPLACE SKID CONTROL ECU (SEE PAGE 32-68)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05-958).

VSC WARNING LIGHT CIRCUIT (DOES NOT LIGHT UP)**INSPECTION PROCEDURE****1 INSPECT CAN COMMUNICATION SYSTEM (SEE PAGE 05-2605)**

(a) Is the DTC output for CAN communication system?

Result:

DTC is not output	A
DTC is output	B

B

**REPAIR CAN COMMUNICATION SYSTEM
(SEE PAGE 05-2619)**

A

2 INSPECT MULTIPLEX COMMUNICATION SYSTEM (SEE PAGE 05-2549)

(a) Is the DTC output for Multiplex communication system?

Result:

DTC is not output	A
DTC is output	B

B

**REPAIR MULTIPLEX COMMUNICATION
SYSTEM (SEE PAGE 05-2558)**

A

REPAIR OR REPLACE COMBINATION METER ASSY (SEE PAGE 05-1986)

CUSTOMER PROBLEM ANALYSIS CHECK

ABS & EBD Check Sheet

Inspector's :
Name _____

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate 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.	
	Brake Control Warning Light Abnormal	☐ Remains ON ☐ Does not Come On
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Come On
	Brake Warning Light Abnormal (PKB released)	☐ Remains ON ☐ Does not Come On

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

Enhanced VSC Check Sheet

Inspector's
Name _____

Customer's Name		VIN	
		Production Date	/ /
		Licence Plate 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.)	
	☐ Enhanced VSC does not operate. (Wheels sideslip at the time of sharp turning.)	
	Brake Control Warning Light Abnormal	☐ Remains ON ☐ Does not Come On
	VSC Warning Indicator Abnormal	☐ Displays ☐ Does not Display
	SLIP Indicator Light Abnormal	☐ Remains ON ☐ Does not Come On
	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/TRAC OFF SW	☐ ON ☐ OFF
	SYSTEM	☐ VSC/TRC
	SHIFT POSITION	☐ P,N ☐ 2 ☐ R ☐ 3 ☐ D ☐ 4 ☐ L ☐ FAIL
	STEERING ANGLE	deg
	YAW RATE	deg/s
	MAS CYL PRESS	V
	THROTTLE	deg
	MAS PRESS GRADE	MPa/s
	G (RIGHT & LEFT)	G
	G (BACK & FORTH)	G

HOW TO PROCEED WITH TROUBLESHOOTING

The hand-held tester can be used at step 3, 6, 9, 12.

1 Vehicle Brought to Workshop



2 Customer Problem Analysis (SEE PAGE 05-954)



3 Check and Clear DTCs and Freeze Frame Data (SEE PAGE 05-975)



4 Problem Symptom Confirmation



Symptom does not occur: Go to step 5



Symptom occur: Go to step 6

5 Symptom Simulation (SEE PAGE 01-47)



6 DTC Check (SEE PAGE 05-975)



There is no output: Go to step 7



There is output: Go to step 8

7 Problem Symptoms Table (SEE PAGE 05-966)



Check for fluid leakage and Go to step 10

8 DTC Chart (SEE PAGE 05-987)



9 Circuit Inspection (SEE PAGE 05-991 to 05-1136)



10 Identification of Problem



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

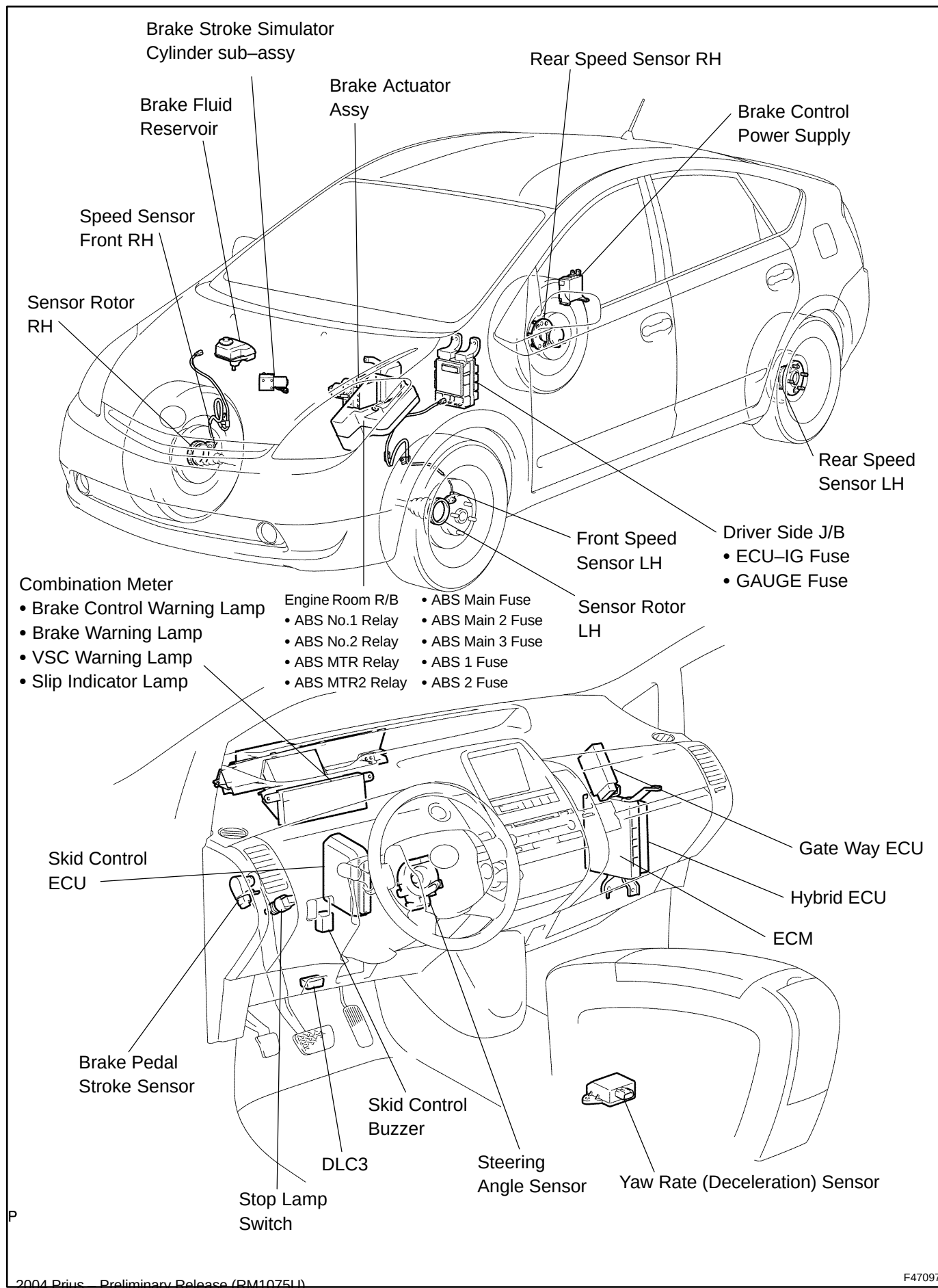


12	Confirmation Test
----	-------------------



End

LOCATION



P

ELECTRONICALLY CONTROLLED BRAKE SYSTEM

05IYU-01

PRECAUTION

1. TROUBLESHOOTING PRECAUTIONS

- (a) When there is a malfunction with terminal contact points or part installation problems, removal and installation of the suspected problem parts may return the system to the normal condition either completely or temporarily.
- (b) In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as DTC output and the freeze frame data, and record it before disconnecting each connector or removing and installing parts.
- (c) Since the system may be influenced by malfunctions in systems other than the brake control system, be sure to check for DTCs in other systems.

2. HANDLING PRECAUTIONS

- (a) Do not remove or install the Enhanced VSC or Electronically Controlled Brake (ECB) parts such as the steering sensor, yaw rate sensor or brake pedal stroke sensor except when required, as they cannot be adjusted correctly after removal or installation.
- (b) Be sure to perform preparation before work and confirmation after work is completed by following the direction in the repair manual when working on the Enhanced VSC or ECB system.
- (c) Be sure to remove and install the ECU, actuator, each sensor, etc. with the power switch off unless it is not specified in the inspection procedure.
- (d) Be sure to remove the 2 main relays before removal and installation, or replacement of the Enhanced VSC or ECB parts.
- (e) The removal or installation of the actuator, master cylinder or stroke simulator as well as some other procedures can cause the fluid level to drop below the fluid reservoir port. If this happens when performing such work, be sure to remove the 2 motor relays until the bleeding of the air in the pipeline is completed.

HINT:

- When the pump motor is operated with the air in the brake actuator hose, bleeding the air becomes difficult due to air in the actuator.
 - The skid control ECU may operate the stroke simulator and drive the pump motor even when the power switch is off.
 - The ECB system has its own auxiliary power source. This system can be operated after disconnecting the negative terminal from the auxiliary battery (12V) until the discharge is completed.
 - With the power switch off, the skid control ECU can be operated for 2 minutes after the brake operation is finished.
- (f) Removal of the main relay and motor relay
 - (1) Wait for 2 minutes after turning the power switch off, stopping the brake pedal operation and closing the driver door before removing the 2 relays.

HINT:

When the pump motor operates to prepare for the next operation just before the brake control system turns off.

- (g) When removing and installing the ECU, actuator and each sensor, be sure to check that the normal display is output in test mode inspection and in DTC output inspection after installing all the parts.

3. DTC PRECAUTION

- (a) Warnings for some DTCs cannot be cleared only by repairing the malfunctioning parts. If the warning is displayed after repair work, the DTC should be cleared after turning the power switch off.

NOTICE:

The DTC for a malfunctioning part that repeats after clearing the code is stored again.

4. FAIL SAFE FUNCTION

- (a) When a trouble occurs in the brake control systems, the skid control ECU lights up the warning lights (ECB, ABS, Enhanced VSC and BRAKE) corresponding to the malfunctioning systems and prohibits ABS, Enhanced VSC and brake assist operation.
- (b) The control of the ECB can be continued by the normal parts except the malfunctioning parts according to the malfunction.

HINT:

- If control of the ECB for any of the 4 wheels is prohibited, that wheel loses brake booster function or braking ability.
- If one of the 4 wheels loses brake booster function, the feel when depressing brake pedal changes as the stroke simulator (pedal reactive force generating solenoid) operation is prohibited.
- If control of the ECB for all wheels is prohibited, the 2 front wheels lose brake booster function.

5. DRUM TESTER PRECAUTION

- (a) When using the drum tester, be sure to follow the procedures below to prohibit the Enhanced VSC operation.

NOTICE:

- **Make sure that the Enhanced VSC warning light is blinking (move to TEST MODE)**
- **Secure the vehicle with the lock chain for safety**

6. CAN COMMUNICATION SYSTEM PRECAUTION

- (a) The CAN communication system is used for the data communication between the skid control ECU, the steering sensor, the yaw rate sensor (deceleration sensor included) and other ECUs. If there is trouble with the CAN communication line, corresponding DTCs in the communication line are output.
- (b) If the DTC in the CAN communication line is output, repair the malfunction in the communication line and troubleshoot the Enhanced VSC system while data communication is normal.
- (c) Since the CAN communication line has its own length and route, it cannot be repaired temporarily with the bypass wire, etc.

NOTICE:

When disconnecting the negative (–) battery terminal, initialize the following system after the terminal is reconnected.

System Name	See Page
Power Window Control System	01-28

NOTICES FOR HYBRID SYSTEM ACTIVATION:

- **When the warning lamp is illuminated or the battery has been disconnected and reconnected, pressing the power switch may not start the system on the first try. If so, press the power switch again.**
- **With the power switch's power mode changed to ON (IG), disconnect the battery. If the key is not in the key slot during reconnection, DTC B2799 may be output.**

PROBLEM SYMPTOMS TABLE

If there are no DTCs output 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.

Symptoms	Suspect Areas	See page
ABS does not operate BA does not operate EBD does not operate	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 brake actuator with a hand-held tester. (Check brake actuator operation using the active test function.) 5. If the symptoms still occur even after the above circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU.	05-975 05-1019 05-991 05-998 32-50
ABS does not operate efficiently BA does not operate efficiently EBD does not operate efficiently	1. Check the DTC again and make sure that the normal code is output. 2. Speed sensor circuit 3. Stop lamp switch circuit 4. Check the brake actuator with a hand-held tester. If abnormal, check the hydraulic circuit for leakage. 5. If the symptoms still occur even after the above circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU.	05-975 05-991 05-998 05-1039 32-50
ABS warning light abnormal	1. ABS warning light circuit 2. Skid control ECU	05-1109 or 05-1113 –
DTC of ABS check cannot be done	1. Check the DTC again and make sure that the normal code is output. 2. TC terminal circuit 3. If the symptoms still occur even after the above circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU.	05-975 05-1132
Sensor signal check cannot be done	1. TS terminal circuit 2. Skid control ECU	05-1136 –
VSC does not operate	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 5. Yaw rate/Deceleration sensor circuit 6. Steering sensor circuit 7. If the symptoms still occur even after the above circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU.	05-975 05-1019 – 05-991 05-998 05-1006 05-1011
SLIP indicator light abnormal	1. SLIP indicator light circuit 2. Skid control ECU	05-1128 –

DIAGNOSTICS – ELECTRONICALLY CONTROLLED BRAKE SYSTEM

Symptoms	Suspect Areas	See page
DTC of VSC check cannot be done	1. Check the DTC again and make sure that the normal code is output. 2. TC terminal circuit 3. If the symptoms still occur even after the above circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU.	05-975 05-1132
VSC warning light abnormal	1. Check the DTC again and make sure that the normal code is output. 2. VSC warning circuit 3. If the symptoms still occur even after the above circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU.	05-975 05-1114 or 05-1118
Brake Control warning light abnormal	1. Check the DTC again and make sure that the normal code is output. 2. Brake Control warning circuit 3. If the symptoms still occur even after the above circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU.	05-975 05-1104 or 05-1108

TERMINALS OF ECU

1. CHECK BATTERY VOLTAGE

- (a) Measure the battery voltage.

Standard: 10 to 14 V

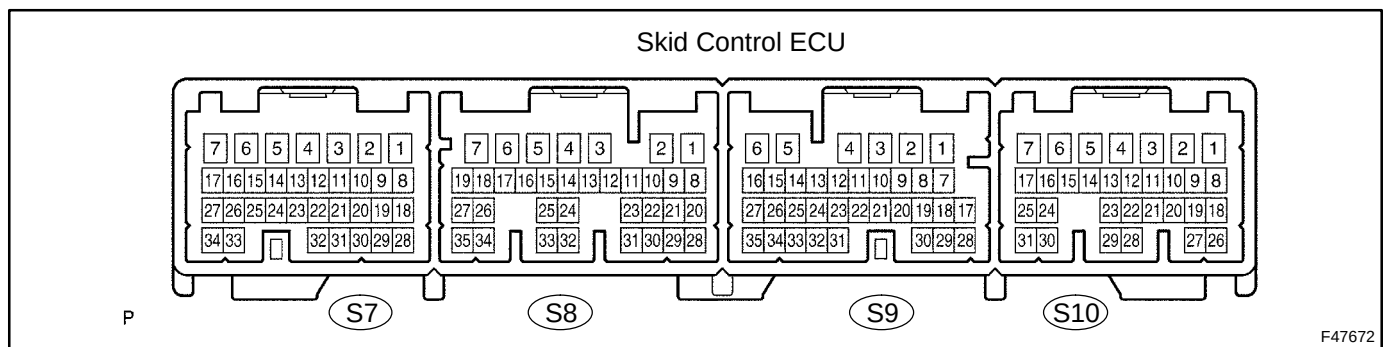
2. SKID CONTROL ECU ASSY INSPECTION

- (a) Measure the voltage between each terminal or between each terminal and the body ground.
 (b) Connect the hand-held tester to the DLC3, and check the communication condition with the skid control ECU.
 (c) Using an oscilloscope, check that the pulse generates between each terminal or between each terminal and the body ground.

NOTICE:

- Inspection should be performed from the back of the connector with the connector connected to the skid control ECU.
- The voltage between terminals of the brake actuator assy may become 0 V due to the fail safe function when the ECB warning light comes on (malfunctioning).

SKID CONTROL ECU



HINT: Inspect the ECU from the wire harness side while the connector is connected.

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
R1+ (S7-2) – GND (S7-1)	P – W	Main relay power 1	Push start switch ON (READY)	9.1 to 13.6 V
BS1 (S7-3) – GND (S7-1)	B – W	Battery source 1	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	8.8 to 14 V
SMC1 (S7-4) – GND (S7-1)	Y – W	Master cut solenoid 1 output	Push start switch ON (READY) Brake pedal depressed approx. 1.5 sec. after pushing start switch ON (READY)	Below 1.5 V
+BCTY (S7-5) – GND (S7-1)	V – W	Courtesy power input	Driver door open → close	Approx. 5 sec. 8 to 16 V → Below 1 V
SLAFR– (S7-6) – GND (S7-1)	W – W	FR solenoid (–) output	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Below 1.5 V
SLAFR+ (S7-7) – GND (S7-1)	R – W	FR solenoid (+) output	Push start switch ON (READY) Brake pedal depressed approx. 1.5 sec. after pushing start switch ON (READY)	Pulse generation (see waveform 1)
E (S7-8) – GND (S7-1)	L – W	Pressure sensor ground	Push start switch OFF	Below 1 Ω
VCM1 (S7-9) – GND (S7-1)	P – W	Pressure sensor power	Push start switch ON (READY)	4.75 to 5.25 V

DIAGNOSTICS – ELECTRONICALLY CONTROLLED BRAKE SYSTEM

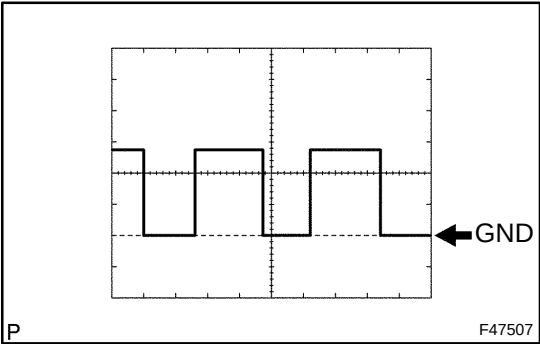
MR1+ (S7-11) – GND (S7-1)	GR – W	Motor relay power 1	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	8.8 to 14 V
SR1 (S7-12) – GND (S7-1)	L – W	Main relay output 1	Push start switch ON (READY) Approx. 1.5 sec. or more after pushing start switch ON (READY)	Below 1 V
SCSS (S7-13) – GND (S7-1)	BR – W	Stroke simulator cut solenoid output	Push start switch ON (READY) Brake pedal depressed	Below 1.5 V
SLARL+ (S7-15) – GND (S7-1)	L – W	RL solenoid (+) output	Push start switch ON (READY) Brake pedal depressed approx. 1.5 sec. after pushing start switch ON (READY)	Pulse generation (see waveform 1)
SLRRL+ (S7-16) – GND (S7-1)	W – W	RL solenoid (+) output	Push start switch ON (READY) Brake pedal depressed approx. 1.5 sec. after pushing start switch ON (READY)	Pulse generation (see waveform 1)
SLRFR+ (S7-17) – GND (S7-1)	Y – W	FR solenoid (+) output	Push start switch ON (READY) After approx. 1.5 sec., brake pedal depressed → released	Pulse generation (see waveform 2)
PRL (S7-18) – GND (S7-1)	G – W	RL pressure sensor input	Push start switch ON (READY) Brake pedal released	0.3 to 0.8 V
SG1 (S7-20) – GND (S7-1)	BR – W	Pressure sensor shield ground 1	Push start switch OFF	Below 1 Ω
PACC (S7-21) – GND (S7-1)	W – W	Accumulator pressure sensor input	Push start switch ON (READY) After pump motor operates and stops by pedal operation	3.3 to 4.7 V
FR– (S7-22) – GND (S7-1)	L – W	FR sensor (–) input	Push start switch OFF	Below 1 Ω
PFR (S7-23) – GND (S7-1)	Y – W	FR pressure sensor input	Push start switch ON (READY) Brake pedal released	0.3 to 0.8 V
MR1 (S7-25) – GND (S7-1)	L – W	Motor relay output 1	Push start switch ON (READY) Pump motor is operating	Below 1.5 V
SLRRL– (S7-26) – GND (S7-1)	P – W	RL solenoid (–) output	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Below 1.5 V
SLARL– (S7-27) – GND (S7-1)	LG – W	RL solenoid (–) output	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Below 1.5 V
MTT (S7-29) – GND (S7-1)	R – W	Motor test input	Push start switch ON (READY) Pump motor is operating	3.5 V or higher
PMC1 (S7-30) – GND (S7-1)	R – W	Master pressure sensor input 1	Push start switch ON (READY) Brake pedal released	0.3 to 0.8 V
PCK1 (S7-31) – GND (S7-1)	B – W	Pressure sensor check output 1	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	4.75 to 5.25 V
FR+ (S7-32) – GND (S7-1)	P – W	FR sensor (+) input	Vehicle speed input	Pulse generation (see waveform 3)
SLRFR– (S7-34) – GND (S7-1)	B – W	FR solenoid (–) output	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Below 1.5 V
+BI1 (S8-3) – GND (S8-1, 2)	B – W	Main relay power input 1	Push start switch OFF	10 to 14 V
+BO1 (S8-5) – GND (S8-1, 2)	Y – W	Main relay power output 1	Push start switch ON	8.8 to 14 V
IG1 (S8-7) – GND (S8-1, 2)	B – W	IG1 power	Push start switch ON	10 to 14 V

RSS (S8-10) – GND (S8-1, 2)	BR – W	Speed sensor shield ground	Push start switch OFF	Below 1 Ω
BZ (S8-12) – GND (S8-1, 2)	BR – W	Warning buzzer output	Push start switch ON (READY) Buzzer is operating	Below 1 V
STP (S8-14) – GND (S8-1, 2)	R – W	Stop light switch signal input	Push start switch ON (READY) Brake pedal depressed → released	10 to 12 V → Below 1.5 V
CAN-L (S8-18) – GND (S8-1, 2)	W – W	CAN communication (Send and receive-)	Check DTC using hand-held tester	CAN communication's DTC is not output
CAN-H (S8-19) – GND (S8-1, 2)	B – W	CAN communication (Send and receive+)	Check DTC using hand-held tester	CAN communication's DTC is not output
FAIL (S8-20) – GND (S8-1, 2)	P – W	Capacitor communication (Receive)	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Pulse generation (see waveform 5)
SP1 (S8-22) – GND (S8-1, 2)	V – W	Speed meter output	Vehicle speed input	Pulse generation (see waveform 4)
RL- (S8-27) – GND (S8-1, 2)	B – W	RL sensor (-) input	Push start switch OFF	Below 1 Ω
D/G (S8-28) – GND (S8-1, 2)	W – W	Diagnosis output	Push start switch ON (READY)	9.1 to 13.6 V
ENA (S8-30) – GND (S8-1, 2)	B – W	Capacitor communication (Send)	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Pulse generation (see waveform 6)
TS (S8-32) – GND (S8-1, 2)	L – W	Sensor diagnosis check input	Push start switch ON (READY)	Below 1.5 V → 9.1 to 13.6 V
VBZ (S8-33) – GND (S8-1, 2)	B – W	Warning buzzer power	Push start switch ON (READY)	9.1 to 13.6 V
RL+ (S8-35) – GND (S8-1, 2)	W – W	RL sensor (+) input	Vehicle speed input	Pulse generation (see waveform 3)
+BO2 (S9-4) – GND (S9-1, 2)	W – W-B	Main relay power output 2	Push start switch ON (READY)	8.8 to 14 V
+BI2 (S9-5) – GND (S9-1, 2)	R – W-B	Main relay power input 2	Push start switch OFF	10 to 14 V
VCSK (S9-6) – GND (S9-1, 2)	B – W-B	Stroke sensor power	Push start switch ON (READY)	3.75 to 4.95 V
SSK (S9-7) – GND (S9-1, 2)	Shielded – W-B	Stroke sensor shield ground	Push start switch OFF	Below 1 Ω
SKG (S9-8) – GND (S9-1, 2)	W – W-B	Stroke sensor ground	Push start switch OFF	Below 1 Ω
PKB (S9-14) – GND (S9-1, 2)	R – W-B	Parking brake signal input	Parking brake applied → released	Below 1.5 V → 9.1 to 13.6 V
SKS1 (S9-21) – GND (S9-1, 2)	R – W-B	Stroke sensor signal input 1	Push start switch ON (READY) Brake pedal released	0.46 to 1.35 V
SKS2 (S9-22) – GND (S9-1, 2)	G – W-B	Stroke sensor signal input 2	Push start switch ON (READY) Brake pedal released	2.56 to 4.35 V
RR- (S9-23) – GND (S9-1, 2)	B – W-B	RR sensor (-) input	Push start switch OFF	Below 1 Ω
RR+ (S9-31) – GND (S9-1, 2)	W – W-B	RR sensor (+) input	Vehicle speed input	Pulse generation (see waveform 3)
SLAFL+ (S10-1) – GND (S10-4)	P – W-B	FL solenoid (+) output	Push start switch ON (READY) Brake pedal depressed approx. 1.5 sec. after pushing start switch ON (READY)	Pulse generation (see waveform 1)
SLAFL- (S10-2) – GND (S10-4)	O – W-B	FL solenoid (-) output	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Below 1.5 V
SMC2 (S10-3) – GND (S10-4)	LG – W-B	Master cut solenoid 2 output	Push start switch ON (READY) Brake pedal depressed approx. 1.5 sec. after pushing start switch ON (READY)	Below 1.5 V

DIAGNOSTICS – ELECTRONICALLY CONTROLLED BRAKE SYSTEM

IG2 (S10-5) – GND (S10-4)	O – W-B	IG2 power	Push start switch ON (READY)	10 to 14 V
LBL (S10-6) – GND (S10-4)	P – W-B	Brake fluid level switch input	Reservoir level switch OFF → ON	4 to 4.65 → Below 1.5 V
BS2 (S10-7) – GND (S10-4)	P – W-B	Battery source 2	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	8.8 to 14 V
SLRFL+ (S10-8) – GND (S10-4)	Y – W-B	FL solenoid (+) output	Push start switch ON (READY) After approx. 1.5 sec., brake pedal depressed → released	Pulse generation (see waveform 2)
SLARR- (S10-9) – GND (S10-4)	P – W-B	RR solenoid (–) output	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Below 1.5 V
SG2 (S10-12) – GND (S10-4)	Shielded – W-B	Pressure sensor shield ground 2	Push start switch OFF	Below 1 Ω
FSS (S10-13) – GND (S10-4)	BR – W-B	Speed sensor shield ground	Push start switch OFF	Below 1 Ω
VCM2 (S10-14) – GND (S10-4)	B – W-B	Pressure sensor power 2	Push start switch ON (READY)	4.75 to 5.25 V
SR2 (S10-15) – GND (S10-4)	V – W-B	Main relay output 2	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Below 1 V
R2+ (S10-17) – GND (S10-4)	Y – W-B	Main relay power 2	Push start switch ON (READY)	9.1 to 13.6 V
SLRRR- (S10-18) – GND (S10-4)	BR – W-B	RR solenoid (–) output	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Below 1.5 V
SLARR+ (S10-19) – GND (S10-4)	V – W-B	RR solenoid (+) output	Push start switch ON (READY) Brake pedal depressed approx. 1.5 sec. after pushing start switch ON (READY)	Pulse generation (see waveform 1)
SLRRR+ (S10-20) – GND (S10-4)	R – W-B	RR solenoid (+) output	Push start switch ON (READY) Brake pedal depressed approx. 1.5 sec. after pushing start switch ON (READY)	Pulse generation (see waveform 1)
PCK2 (S10-21) – GND (S10-4)	L – W-B	Pressure sensor check output 2	Push start switch ON (READY)	4.75 to 5.25 V
FL- (S10-22) – GND (S10-4)	G – W-B	FL sensor (–) input	Push start switch OFF	Below 1 Ω
PFL (S10-23) – GND (S10-4)	R – W-B	FL pressure sensor input	Push start switch ON (READY) Brake pedal released	0.3 to 0.8 V
MR2+ (S10-25) – GND (S10-4)	R – W-B	Motor relay power 2	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	8.8 to Below 14 V
SLRFL- (S10-26) – GND (S10-4)	L – W-B	FL solenoid (–) output	Push start switch ON (READY) Approx. 1.5 sec. after pushing start switch ON (READY)	Below 1.5 V
PMC2 (S10-27) – GND (S10-4)	W – W-B	Master pressure sensor input 2	Push start switch ON (READY) Brake pedal released	0.3 to 0.8 V
FL+ (S10-28) – GND (S10-4)	R – W-B	FL sensor (+) input	Vehicle speed input	Pulse generation (see waveform 3)
E2 (S10-29) – GND (S10-4)	G – W-B	Pressure sensor ground 2	Push start switch OFF	Below 1 Ω

MR2 (S10-30) – GND (S10-4)	G – W-B	Motor relay output 2	Push start switch ON (READY) Pump motor is operating	Below 1.5 V
PRR (S10-31) – GND (S10-4)	Y – W-B	RR pressure sensor input	Push start switch ON (READY) Brake pedal released	0.3 to 0.8 V

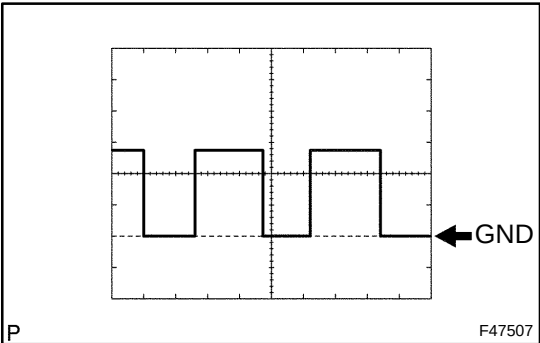


Waveform 1

NOTICE:
Normal waveform is output only when BS 1 and 2 voltages are normal (10 to 14 V).

HINT:

- While driving at approximately 12 mph (20 km/h).
- 5V/DIV, 200 ms/DIV.
- Brake pedal depressed.

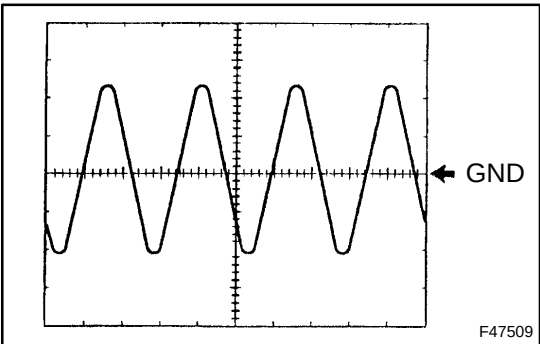


Waveform 2

NOTICE:
Normal waveform is output only when BS 1 and 2 voltages are normal (10 to 14 V).

HINT:

- While driving at approximately 12 mph (20 km/h).
- 5V/DIV, 200 ms/DIV.
- Brake pedal depress → released

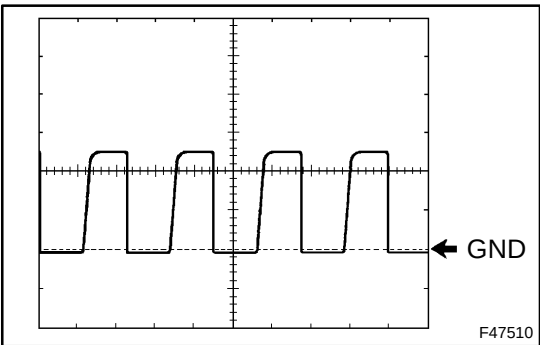


Waveform 3

NOTICE:
As the vehicle speed (tire rotating speed) becomes faster the cycle becomes shorter and the output voltage larger.

HINT:

- 1V/DIV, 2 ms/DIV.
- While driving at approximately 18 mph (30 km/h).

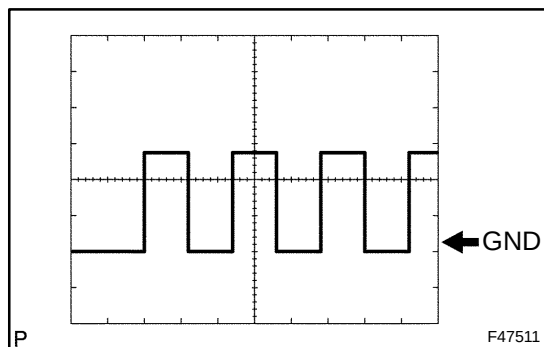


Waveform 4

NOTICE:
As the vehicle speed (tire rotating speed) becomes faster the cycle becomes shorter.

HINT:

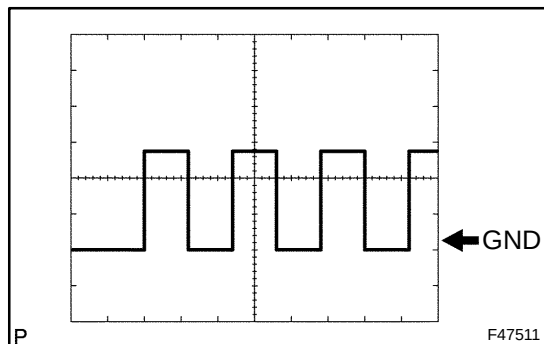
- 5V/DIV, 50 ms/DIV.
- While driving at approximately 12 mph (20 km/h).



Waveform 5

HINT:

- 5V/DIV, 200 ms/DIV.
- Power switch ON (READY)



Waveform 6

HINT:

- 5V/DIV, 100 ms/DIV.
- Power switch ON (READY)