

ANTI-LOCK BRAKE SYSTEM

PRECAUTION

NOTICE:

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

System Name	See procedure
Power Window Control System	IN-29
Sliding Roof System	

1. TROUBLESHOOTING PRECAUTION

NOTICE:

- When there is a malfunction in the contact point of the terminals or installation problems with parts, removal and installation of the suspected problem parts may return the system to the normal condition either completely or temporarily.
- In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as by DTC output and freeze frame data output, and record it before disconnecting each connector or removing and installing parts.
- Since the ABS with EBD systems may be influenced by a malfunction in the other systems, be sure to check for DTCs in the other systems.
- Be sure to remove and install the brake actuator and each sensor with the ignition switch off unless specified in the inspection procedure.
- When removing and installing the brake actuator and each sensor, be sure to check that the normal display is output in the test mode inspection and in DTC output inspection after installing all parts.
- The CAN communication system is used for data communication between the skid control ECU and the gateway ECU. If there is trouble in the CAN communication line, the DTC of the communication line is output.
- If the DTC of the CAN communication line is output, repair the malfunction in the communication line and troubleshoot the ABS with EBD system.
- Since the CAN communication line has its own length and route, it cannot be repaired temporarily with the bypass wire, etc.

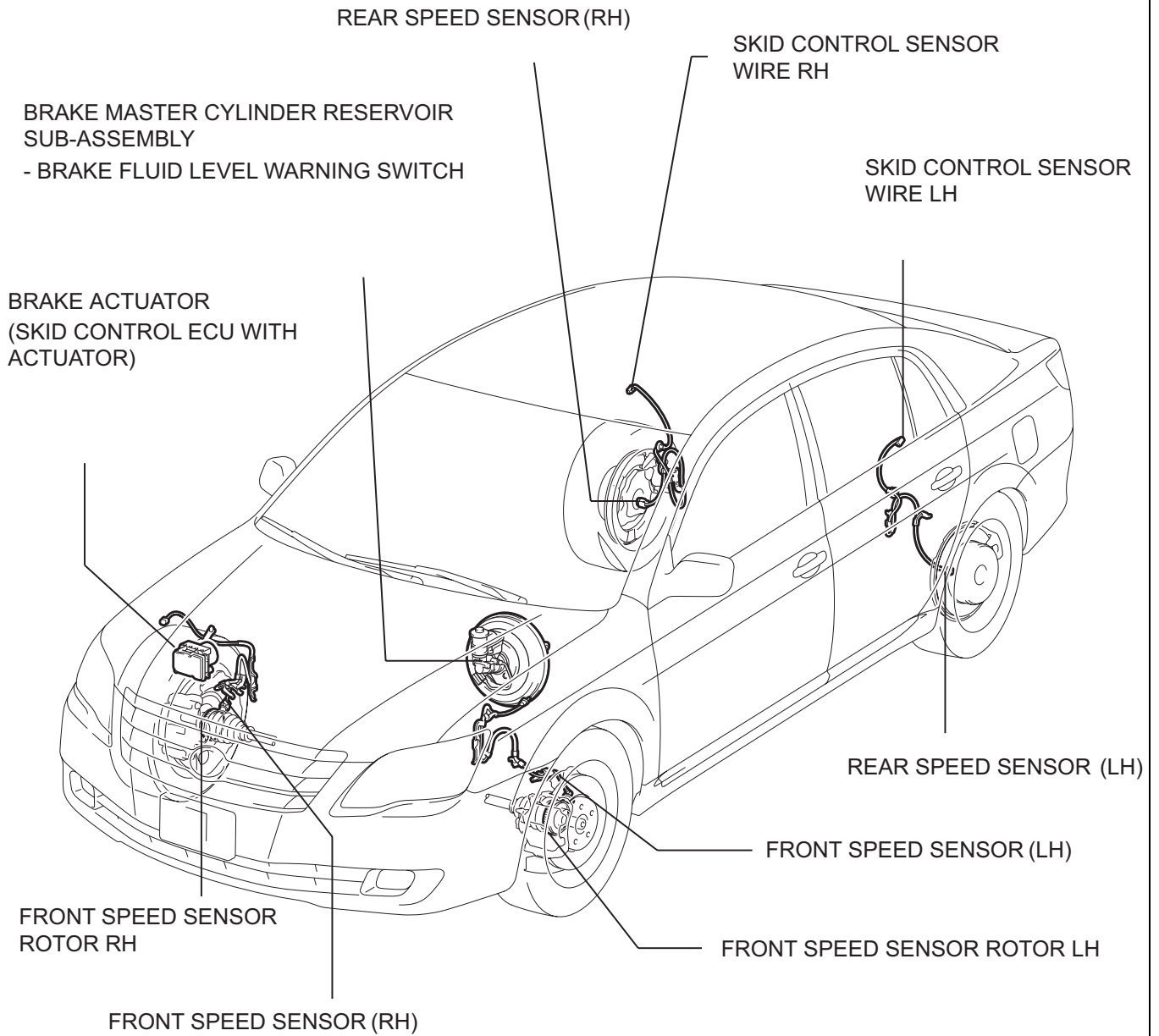
2. EXPRESSIONS OF IGNITION SWITCH

The type of ignition switch used on this model differs according to the specifications of the vehicle.

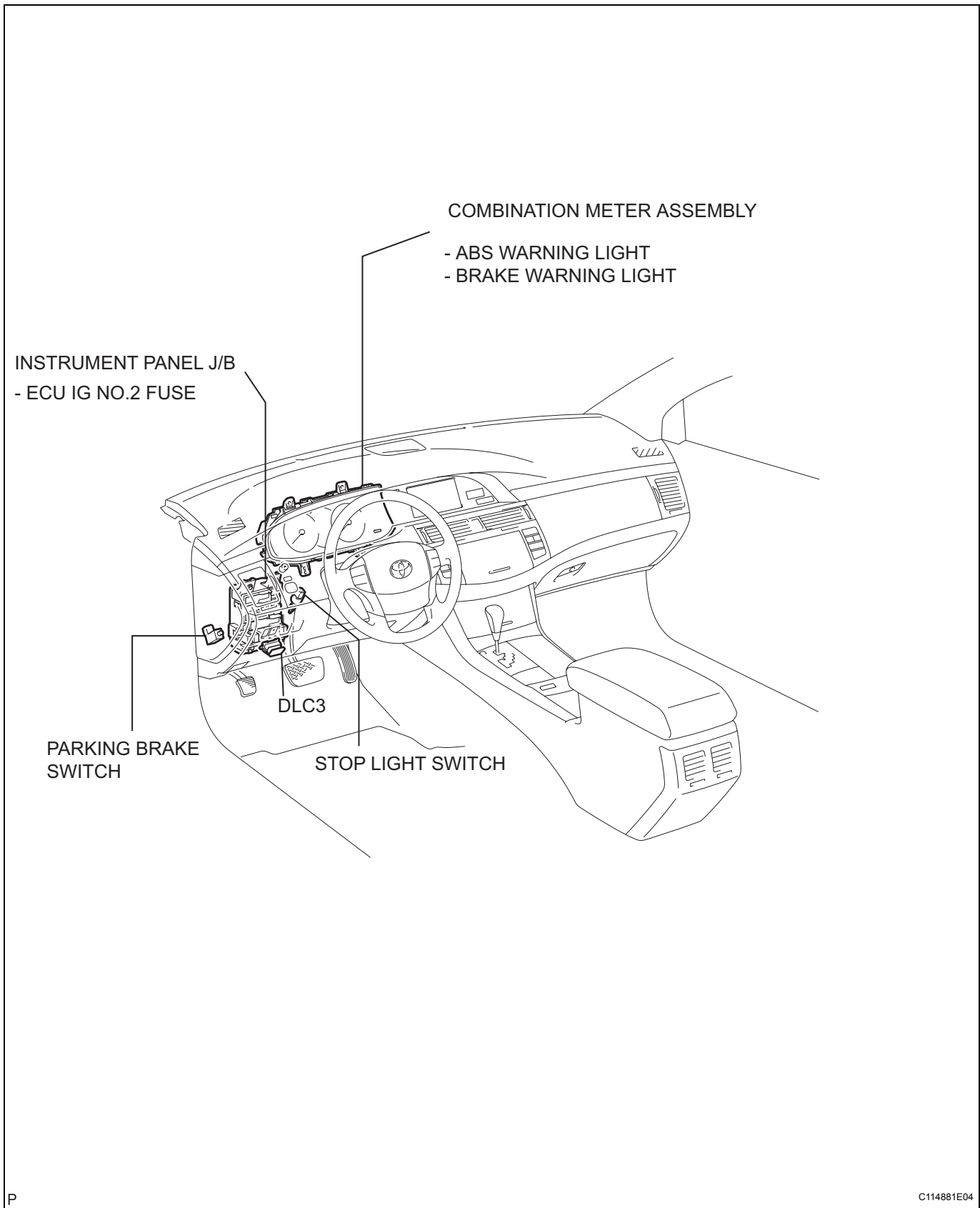
The expressions listed in the table below are used in this section.

	Switch Type	Ignition Switch (position)	Engine Switch (condition)
Expression	Ignition Switch off	LOCK	Off
	Ignition Switch on (IG)	ON	On (IG)
	Ignition Switch on (ACC)	ACC	On (ACC)
	Engine Start	START	Start

PARTS LOCATION

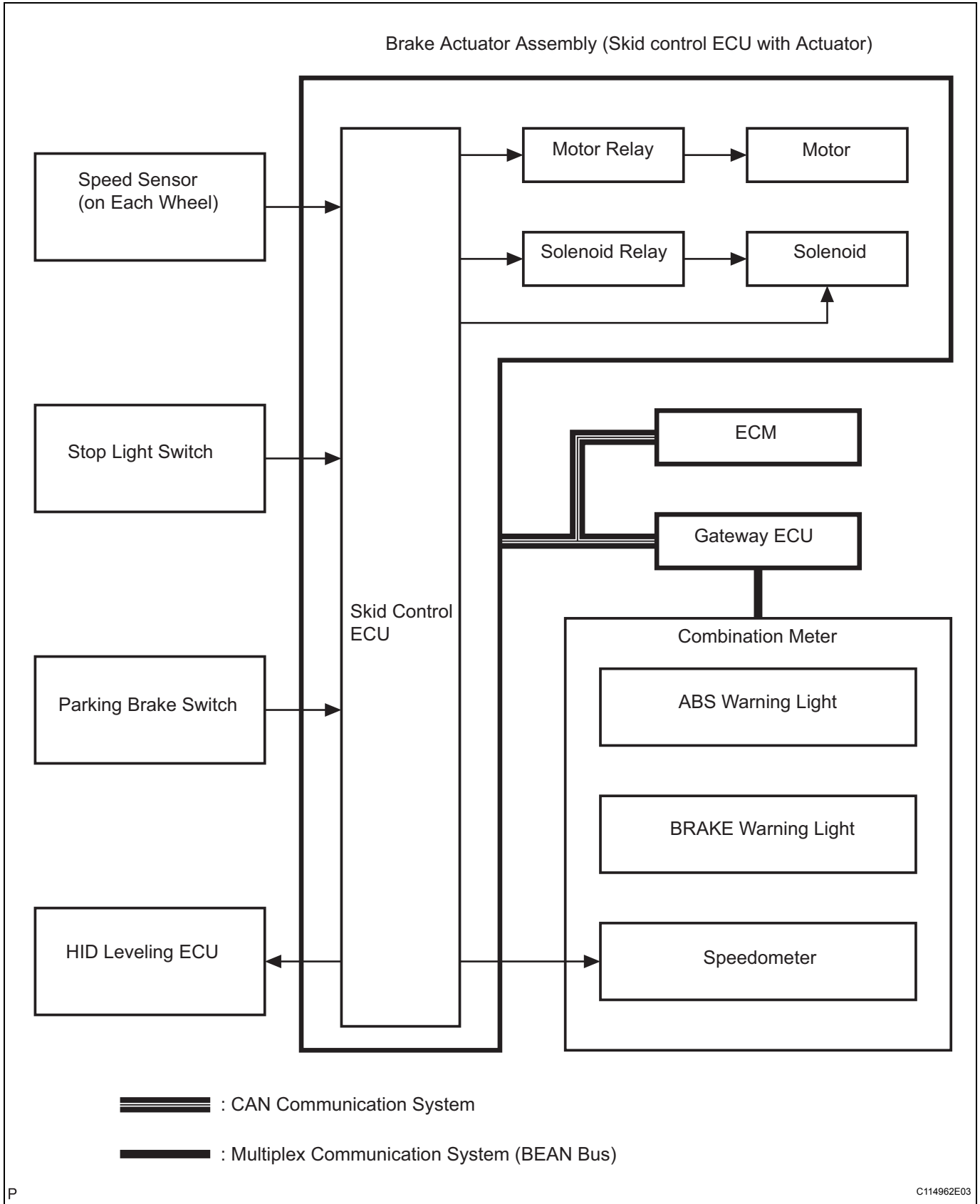


BC



BC

SYSTEM DIAGRAM



BC

Transmitting ECU	Receiving ECU	Signals	Communication method
Skid control ECU	Combination meter	<ul style="list-style-type: none">• ABS warning light signal• BRAKE warning light signal	<ul style="list-style-type: none">• CAN communication system• Multiplex communication system
ECM	Skid control ECU	Shift position signal	CAN communication system

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

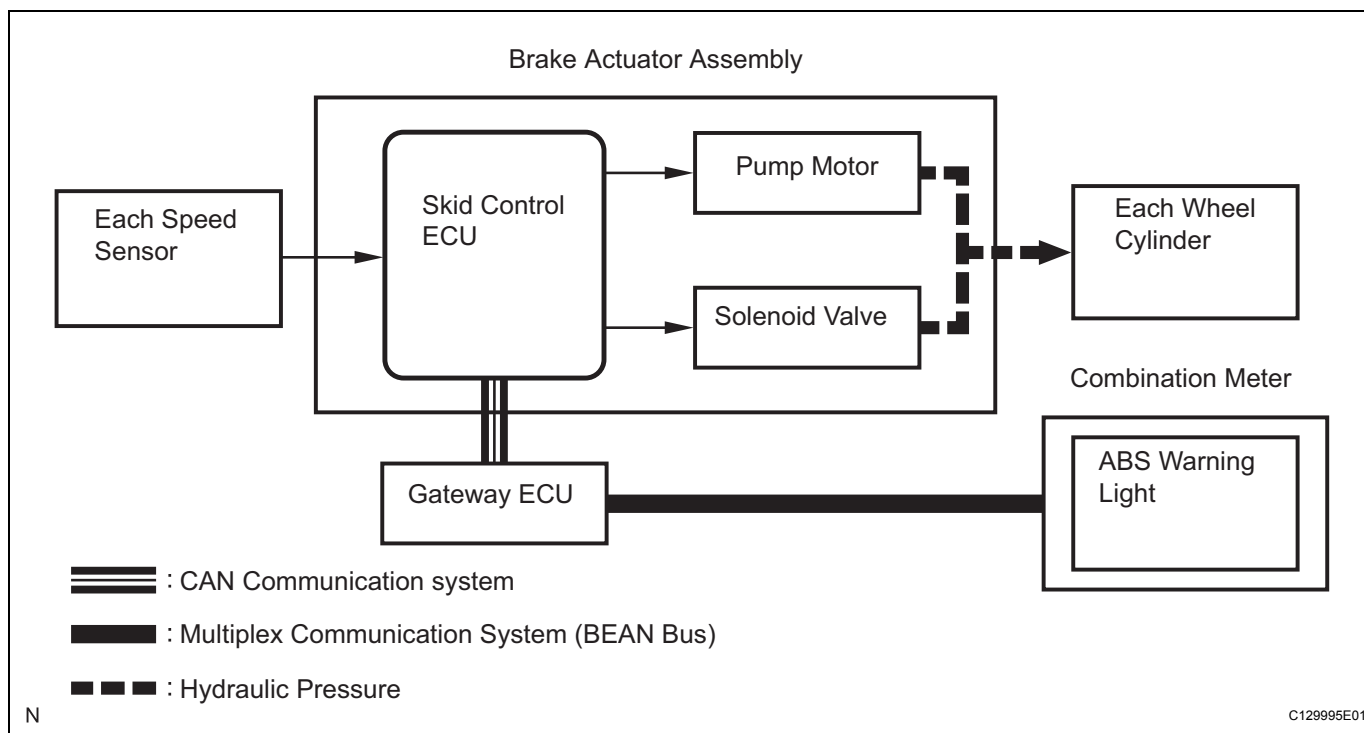
HINT:

The skid control ECU is located within the brake actuator assembly.

(a) ABS

(Anti-lock Brake System)

The ABS helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface.



(1) Operation description

The skid control ECU detects wheel lock condition by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valve.

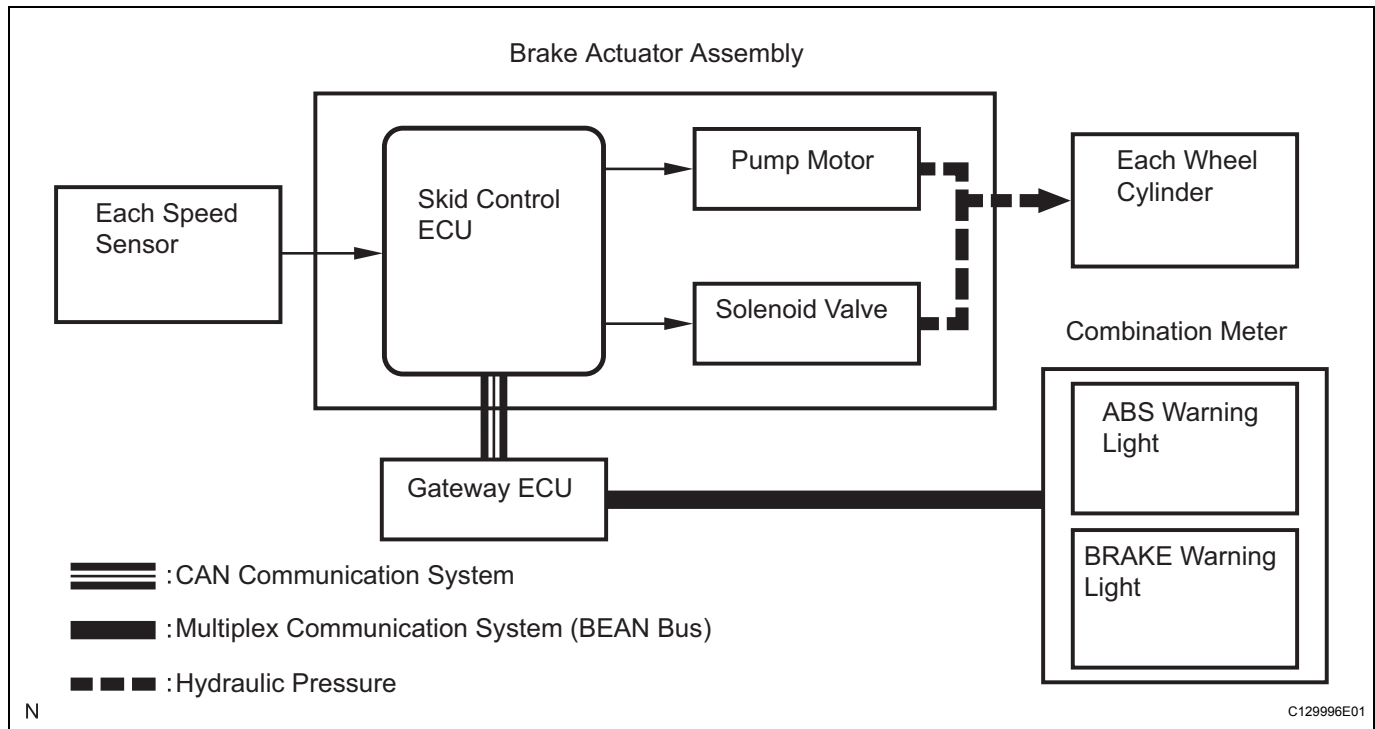
The pump motor and solenoid valve avoid wheel lock by controlling the hydraulic pressure of each wheel cylinder.

The ABS warning light comes on when the ABS system is malfunctioning.

(b) EBD

(Electronic Brake force Distribution)

The EBD control utilizes ABS, realizing proper brake force distribution between the front and rear wheels in accordance with driving conditions. In addition, when braking while cornering, it also controls the brake forces of the right and left wheels, helping to maintain vehicle behavior.



(1) Operation description

The skid control ECU receives the speed signal from each speed sensor to detect the slip condition of the wheels and sends the control signal to the solenoid.

The solenoid valve controls the hydraulic pressure of each wheel cylinder and splits the control power properly between the front and rear wheels and the right and left wheels. Both of the ABS and BRAKE warning lights come on to indicate a malfunction in the EBD system.

2. ABS with EBD OPERATION

- (a) Based on the signals received from the 4 wheel speed sensors, the skid control ECU calculates the speed of each wheel and deceleration, and checks wheel slipping condition. According to the slipping condition, the skid control ECU controls the pressure holding valve and pressure reduction valve in order to adjust the fluid pressure of each wheel cylinder.

3. FAIL SAFE FUNCTION

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

4. FUNCTION OF COMPONENTS

Components	Function
Brake actuator assembly	<ul style="list-style-type: none"> Composed of the holding solenoid valve, pressure reduction solenoid valve, pump motor, reservoir, etc., and adjusts the brake fluid pressure applied to each wheel cylinder. Houses the skid control ECU.
Skid Control ECU	Calculates brake control in accordance with sensor signals.
Speed sensor	Detects speed of each wheel and inputs the data into the skid control ECU.
Master cylinder	Generates pressure according to pedal effort.
Stop light switch	Illuminates the brake light when the brake pedal is depressed. (Sends brake on signal to the skid control ECU)
Solenoid relay	<ul style="list-style-type: none"> Supplies power to each solenoid. Housed in the skid control ECU.
Motor relay	<ul style="list-style-type: none"> Supplies power to the pump motor. Housed in the skid control ECU.
ABS warning light	<ul style="list-style-type: none"> Comes on to inform the driver that a malfunction in the ABS has occurred. Blinks to output DTC.
BRAKE warning light	<ul style="list-style-type: none"> Comes on to inform the driver that the parking brake is on when the system is normal or the brake fluid has decreased. Simultaneously comes on with the ABS warning light to inform the driver that both ABS and BED cannot operate.

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester can be used at step 3, 4, 6, 7, 11, 14, and 17.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS

HINT:
See page [IN-36](#).

NEXT

3 CHECK DTC AND FREEZE FRAME DATA

NEXT

4 CLEAR DTC AND FREEZE FRAME DATA

NEXT

5 PROBLEM SYMPTOM CONFIRMATION

NEXT

6 CHECK CAN COMMUNICATION SYSTEM

(a) Check for output DTCs.

HINT:

The ECU of this system is connected to the CAN communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN communication system.



CAN COMMUNICATION SYSTEM DTC IS OUTPUT: PROCEED TO CAN COMMUNICATION SYSTEM



NO CAN COMMUNICATION SYSTEM DTC IS OUTPUT: GO TO STEP 7

7 CHECK MULTIPLEX COMMUNICATION SYSTEM

(a) Check for output DTCs.

HINT:

The skid control ECU sends the signals of each warning light to the gateway ECU via CAN communication, and the gateway ECU sends the signals to the combination meter via the multiplex communication system (BEAN).



MULTIPLEX COMMUNICATION SYSTEM DTC IS OUTPUT: PROCEED TO MULTIPLEX COMMUNICATION SYSTEM



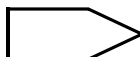
NO MULTIPLEX COMMUNICATION SYSTEM DTC IS OUTPUT: GO TO STEP 8

8 DTC CHECK AND CLEAR

NEXT

9 PROBLEM SYMPTOM SIMULATION

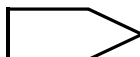
SYMPTOM DOES NOT OCCUR: GO TO STEP 10



SYMPTOM OCCURS: GO TO STEP 11

10 SYMPTOM SIMULATION

NEXT

11 DTC CHECK (OTHER THAN CAN AND MULTIPLEX COMMUNICATION SYSTEM DTC)

NORMAL SYSTEM CODE: GO TO STEP 12



TROUBLE CODE: GO TO STEP 13

12 PROBLEM SYMPTOMS TABLE

NEXT

13	DTC CHART
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NEXT

14	CIRCUIT INSPECTION
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NEXT

15	IDENTIFICATION OF PROBLEM
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NEXT

16	REPAIR OR REPLACE
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NEXT

17	CONFIRMATION TEST
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NEXT

END

TEST MODE PROCEDURE

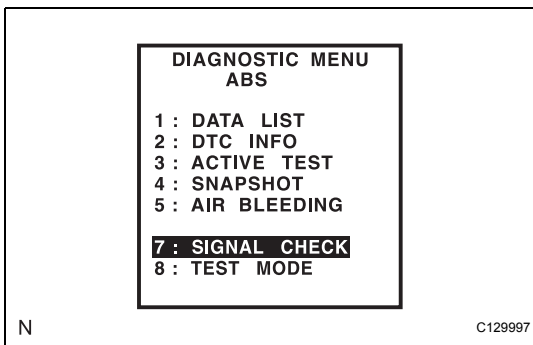
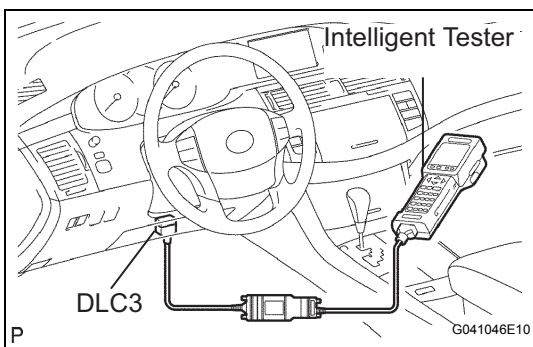
1. SPEED SENSOR SIGNAL CHECK (TEST MODE) PROCEDURE (WHEN USING INTELLIGENT TESTER:)

HINT:

- If the ignition switch is turned from on (IG) to off during test mode (SIGNAL CHECK), the DTCs of the sensor check function will be erased.
- During test mode (SIGNAL CHECK), the skid control ECU records DTCs, if the abnormal sensor signal is received.

(a) Procedures for test mode:

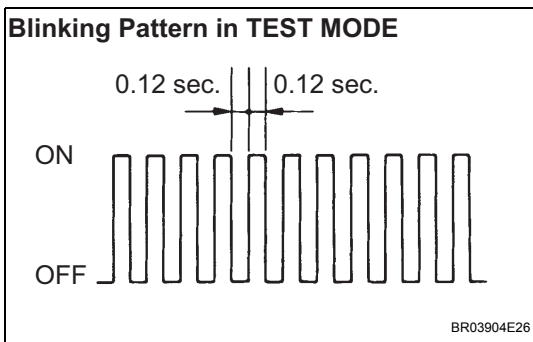
- (1) Turn the ignition switch off.
- (2) Move the shift lever to the P position.
- (3) Connect the intelligent tester to the DLC3.
- (4) Turn the ignition switch on (IG)



- (5) Select "SIGNAL CHECK" on the intelligent tester screen.

HINT:

Refer to the intelligent tester operator's manual for further details.



- (6) Check that the ABS warning light comes on for several seconds and then blinks in test mode.

HINT:

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

Trouble area	See procedure
ABS warning light circuit (Remains on)	BC-67
ABS warning light (Does not come on)	BC-71

- (7) Start the engine.

(b) Check the speed sensor signal.

- (1) Drive the vehicle straight forward.

Accelerate the vehicle to a speed of 34 mph (55 km/h) or more.

(2) Depress the brake pedal and check that the ABS warning light goes off.

HINT:

- The sensor check may not be completed if the vehicle has its wheel spun or its steering wheel turned during this check.
- The ABS warning light goes off when the sensor signal check has been completed and the brake pedal is depressed.
- The ABS warning light comes on immediately after a malfunction has been detected during the speed sensor signal check.

(3) Stop the vehicle.

(4) Read the DTCs by following the tester screen.

HINT:

See the list of DTCs (See procedure "A").

2. SPEED SENSOR SIGNAL CHECK (TEST MODE) PROCEDURE (WHEN USING SST CHECK WIRE:)

HINT:

- If the ignition switch is turned from on (IG) to off during test mode, the DTCs of the sensor signal check function will be erased.
- During test mode (SIGNAL CHECK), the skid control ECU records DTCs, if the abnormal sensor is received.

(a) Procedures for test mode:

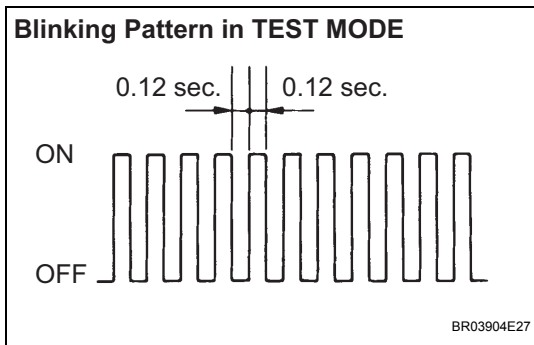
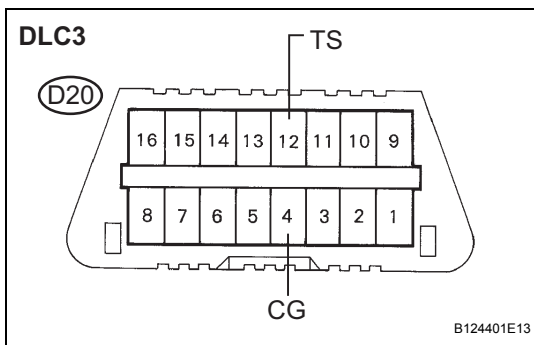
(1) Turn the ignition switch off.

(2) Move the shift lever to the P position.

(3) Using SST, connect terminals TS and CG of the DLC3.

SST 09843-18040

(4) Turn the ignition switch on (IG).



(5) Check that the ABS warning light comes on for several seconds and then blinks in test mode.

HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit and TS terminal circuit.

Trouble area	See procedure
ABS warning light circuit (Remains on)	BC-67
ABS warning light circuit (Does not come on)	BC-71
TS and CG terminal circuit	BC-86

(6) Start the engine.

BC

- (b) Check the speed sensor signal:
- (1) Drive the vehicle straight forward.
Accelerate the vehicle to a speed of 34 mph (55 km/h) or more.
 - (2) Depress the brake pedal and check that the ABS warning light goes off.

HINT:

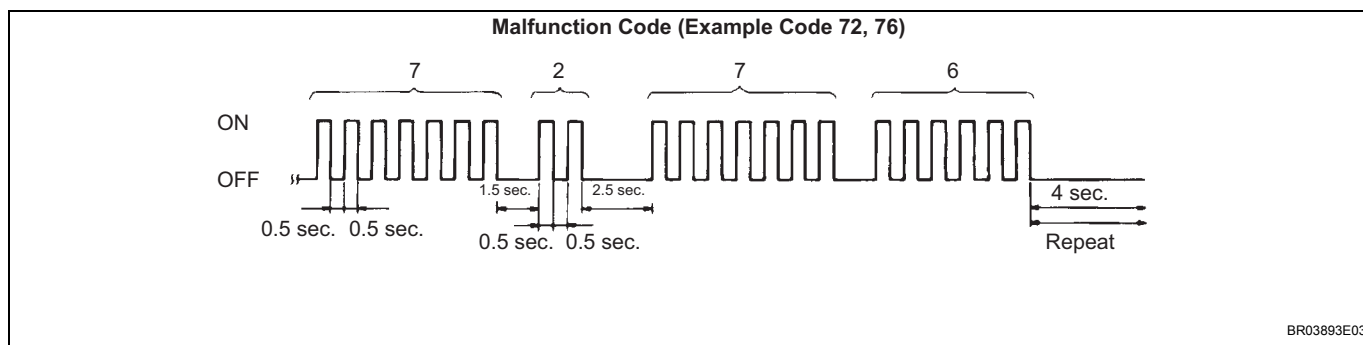
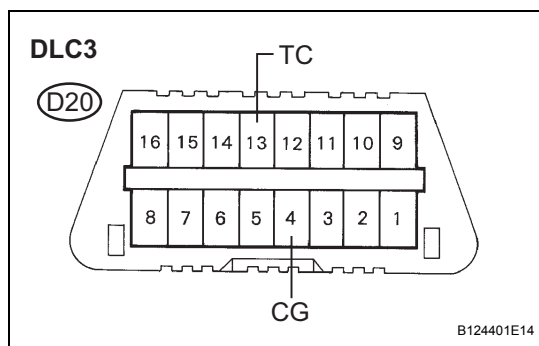
- The sensor check may not be completed if the vehicle has its wheels spun or its steering wheel turned during this check.
- The ABS warning light goes off when the sensor signal check has been completed and the brake pedal is depressed.
- The ABS warning light comes on immediately after a malfunction has been detected during the speed sensor signal check.

- (3) Stop the vehicle.

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

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- (5) Read the number of blinks of the ABS warning light.



HINT:

- See the list of DTCs (See procedure "A").
- If every sensor is normal, a normal code will be output (A cycle of 0.25 second ON and 0.25 second OFF is repeated).
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed first.

- (6) After performing the check, turn the ignition switch off, and remove the SST from the DLC3.

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- (7) Turn the ignition switch on (IG).

HINT:

If the ignition switch is not turned to the ON position after the SST is removed from the DLC3, the previous TEST MODE will continue.

3. DTC OF SIGNAL CHECK FUNCTION (test mode) (Procedure "A"):

Code No.	Diagnosis	Trouble Area
C1271/71	Low output voltage of right front speed sensor	<ul style="list-style-type: none"> • Front speed sensor RH • Front speed sensor circuit RH • Sensor installation • Sensor rotor • Brake actuator assembly (skid control ECU)
C1272/72	Low output voltage of left front speed sensor	<ul style="list-style-type: none"> • Front speed sensor LH • Front speed sensor circuit LH • Sensor installation • Sensor rotor • Brake actuator assembly (skid control ECU)
C1273/73	Low output voltage of right rear speed sensor	<ul style="list-style-type: none"> • Rear speed sensor RH • Rear speed sensor circuit RH • Sensor installation • Sensor rotor • Brake actuator assembly (skid control ECU)
C1274/74	Low output voltage of left rear speed sensor	<ul style="list-style-type: none"> • Rear speed sensor LH • Rear speed sensor circuit LH • Sensor installation • Sensor rotor • Brake actuator assembly (skid control ECU)
C1275/75	Abnormal change in output voltage of right front speed sensor	<ul style="list-style-type: none"> • Front speed sensor RH • Front speed sensor circuit RH • Sensor installation • Sensor rotor • Brake actuator assembly (skid control ECU)
C1276/76	Abnormal change in output voltage of left front speed sensor	<ul style="list-style-type: none"> • Front speed sensor RH • Front speed sensor circuit RH • Sensor installation • Sensor rotor • Brake actuator assembly (skid control ECU)
C1277/77	Abnormal change in output voltage of right rear speed sensor	<ul style="list-style-type: none"> • Front speed sensor LH • Front speed sensor circuit LH • Sensor installation • Sensor rotor • Brake actuator assembly (skid control ECU)
C1278/78	Abnormal change in output voltage of left rear speed sensor	<ul style="list-style-type: none"> • Front speed sensor LH • Front speed sensor circuit LH • Sensor installation • Sensor rotor • Brake actuator assembly (skid control ECU)

HINT:

The codes in this table are output only in signal check function (test mode).

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.

NOTICE:

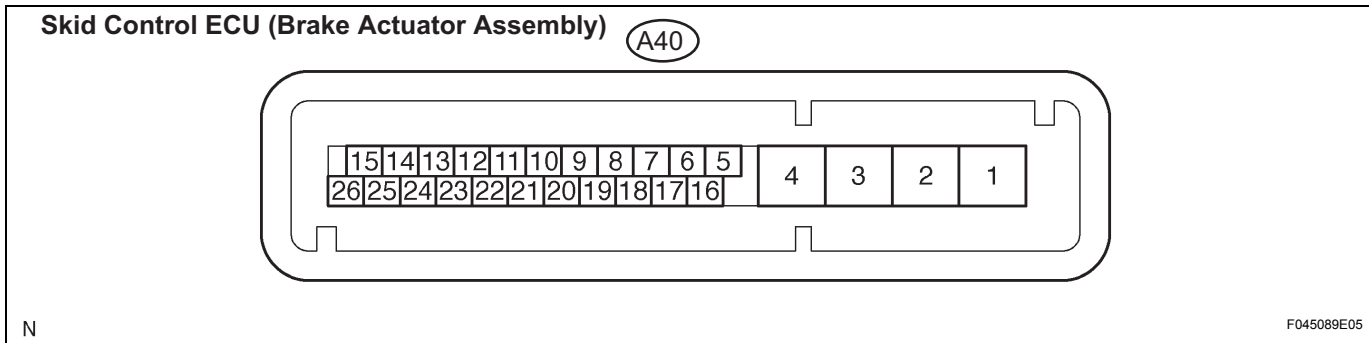
When replacing the brake actuator assembly (skid control ECU), sensor, etc., turn the ignition switch off.

ANTI LOCK BRAKE SYSTEM

Symptom	Suspected area	See page
ABS does not operate	1. Check the DTC reconfirming that the normal system code is output.	BC-19
	2. IG power source circuit	BC-56
	3. Front speed sensor circuit	BC-26
	4. Rear speed sensor circuit	BC-34
	5. Check the brake actuator assembly with the intelligent tester. (Check brake actuator assembly operation using the active test function)	BC-245
	6. If the symptoms still occur even after the above circuits in suspected areas have been inspected and proved to be normal, replace the brake actuator assembly (skid control ECU)	BC-246
ABS does not operate properly	1. Check the DTC reconfirming that the normal system code is output.	BC-19
	2. Front speed sensor circuit	BC-26
	3. Rear speed sensor circuit	BC-34
	4. Stop light switch circuit	BC-60
	5. Check the brake actuator assembly with the intelligent tester. (Check brake actuator assembly operation using the active test function)	BC-245
	6. If the symptoms still occur even after the above circuits in suspected areas have been inspected and proved to be normal, replace the brake actuator assembly (skid control ECU)	BC-246
ABS warning light malfunction (Remains on)	1. ABS warning light circuit	BC-67
	2. Brake actuator assembly (skid control ECU)	BC-246
ABS warning light malfunction (does not come on)	1. ABS warning light circuit	BC-71
	2. Brake actuator assembly (skid control ECU)	BC-246
Brake warning light malfunction (Remains on)	1. Brake warning light circuit	BC-73
	2. Brake actuator assembly (skid control ECU)	BC-246
Brake warning light malfunction (Does not come on)	1. Brake warning light circuit	BC-79
	2. Brake actuator assembly (skid control ECU)	BC-246
ABS sensor DTC check cannot be done	1. ABS warning light circuit (Remains on)	BC-67
	2. ABS warning light circuit (Does not come on)	BC-71
	3. TC and CG terminal circuit	BC-81
	4. TS and CG terminal circuit	BC-86
	5. When the above areas (1., 2. and 3.) are all normal but the problem still occurs, replace the brake actuator assembly (skid control ECU).	BC-246

TERMINALS OF ECU

1. TERMINALS OF ECU

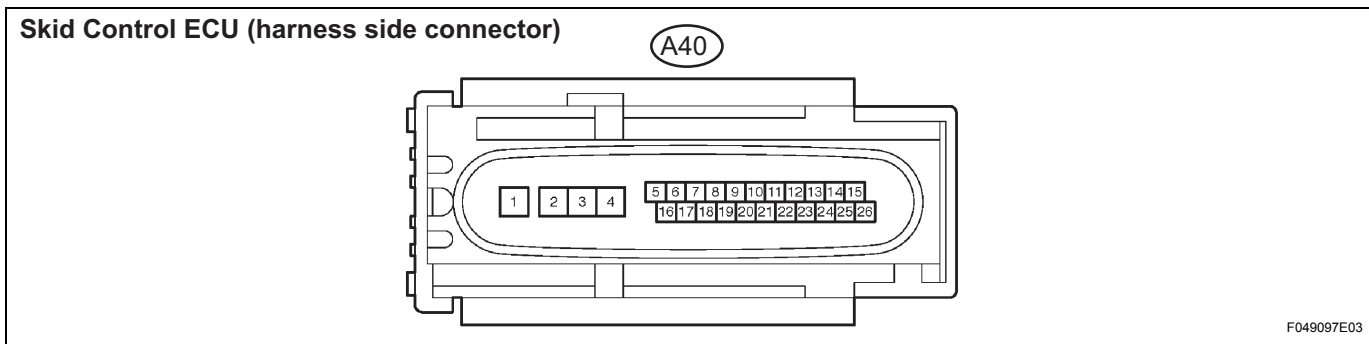


Symbols (Terminal No.)	Terminal Description
GND2 (1)	Actuator pump motor ground
+BM (2)	Motor relay power supply
+BS (3)	Solenoid valves power supply
GND1 (4)	Skid control ECU ground
FL+ (5)	Front LH (+) wheel speed signal input
FL- (6)	Front LH (-) wheel speed signal input
RL+ (7)	Front LH (+) wheel speed signal input
RR- (8)	Rear RH (-) wheel speed signal input
FR- (9)	Front RH (-) wheel speed signal input
FR+ (10)	Front RH (+) wheel speed signal input
D/G (11)	Diagnosis tester communication line
RRO (13)	Rear right wheel speed signal output
PKB (14)	Parking brake switch input
CANL (15)	CAN communication line L
RL- (17)	Rear LH (-) wheel speed signal input
IG1 (18)	ECU power supply
RR+ (19)	Rear RH (+) wheel speed signal input
STP (20)	Stop light switch input
SP1 (23)	Speed signal output for speedometer
RLO (24)	Rear left wheel speed signal output
TS (25)	Sensor check input
CANH (26)	CAN communication line H

2. TERMINAL INSPECTION

- (a) Disconnect the connector and measure the voltage or resistance on the wire harness side.

BC



HINT:

Voltage cannot be measured with the connector connected to the skid control ECU as the connector is watertight.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND2 (1) - Body ground	W-B - Body ground	Actuator pump motor ground	Always	Below 1 Ω
+BM (2) - Body ground	B - Body ground	Motor relay power supply	Always	10 to 14 Ω
+BS (3) - Body ground	W - Body ground	Solenoid valves power supply	Always	10 to 14 Ω
GND1 (4) - Body ground	W-B - Body ground	Skid control ECU ground	Always	Below 1 Ω
PKB (14) - Body ground	L - Body ground	Parking brake switch input	Parking brake switch ON	Below 1 Ω
PKB (14) - Body ground	L - Body ground	Parking brake switch input	Parking brake switch OFF	10 to 14 V
IG1 (18) - Body ground	BR - Body ground	ECU power supply	Ignition switch on (IG)	10 to 14 V
STP (20) - Body ground	L-B - Body ground	Stop light switch input	Stop light switch ON (Brake pedal depressed)	8 to 14 V
STP (20) - Body ground	L-B - Body ground	Stop light switch input	Stop light switch OFF (Brake pedal released)	Below 3 V

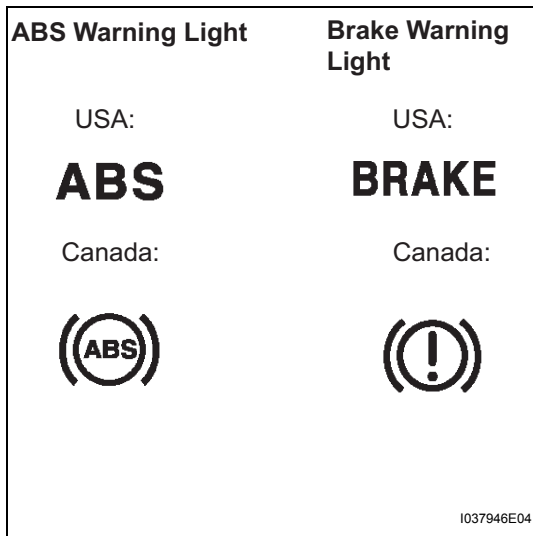
DIAGNOSIS SYSTEM

1. DIAGNOSIS

NOTICE:

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

- (a) Release the parking brake.
- (b) If the skid control ECU detects a malfunction, the ABS warning light and brake warning light will come on to warn the driver. The table below indicates which light will come on when there is a malfunction in a particular function.



Item/Trouble Area	ABS System	EBD System	Skid Control ECU
ABS Warning light	○	○	○
Brake Warning light	-	○	○

○: Light ON

- : Light OFF

- The DTCs are simultaneously stored in memory. The DTCs can be read by connecting the SST (09843-18043) between the TC and CG terminals of the DLC3 and observing the blinking pattern of the ABS warning light, or by connecting a intelligent tester (See page [BC-19](#)).
- This system has a sensor signal check function (TEST MODE).

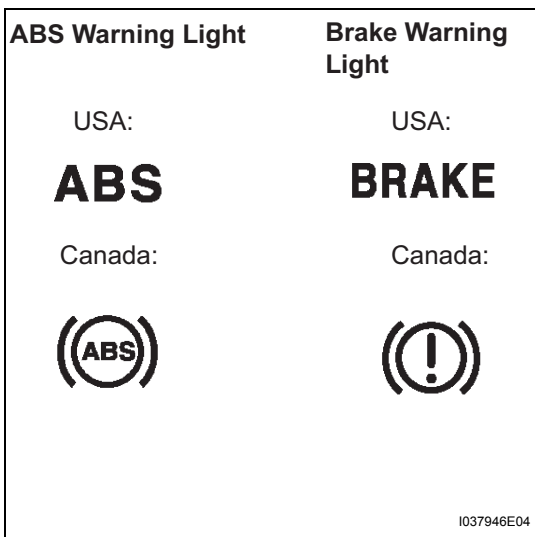
2. WARNING LIGHT INITIAL CHECK

NOTICE:

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

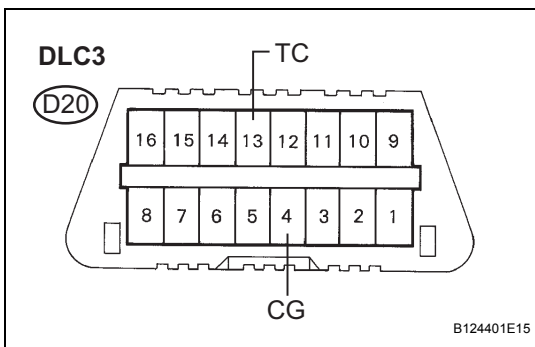
HINT:

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



- (a) Release the parking brake.
- (b) Check that the ABS warning light and brake warning light come on when the ignition switch is turned on (IG) and go off in approximately 3 seconds.
- (c) If the warning lights do not come on or remain on, inspect the ABS warning light circuit and/or brake warning light circuit.

Trouble Area	See procedure
ABS warning light circuit (Remains on)	BC-67
ABS warning light circuit (Does not come on)	BC-71
Brake warning light circuit (Remains on)	BC-73
Brake warning light circuit (Does not come on)	BC-71



DTC CHECK / CLEAR

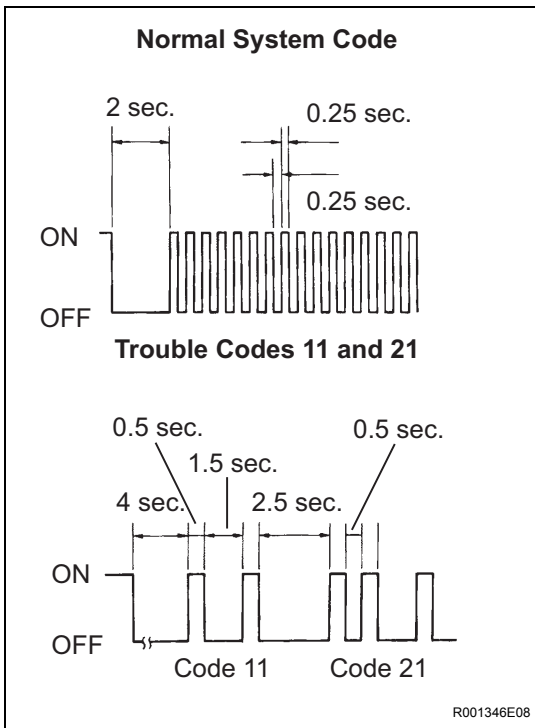
1. DTC CHECK (USING SST CHECK WIRE)

- (a) Check DTCs.
 - (1) Using SST, connect terminals TC and the CG of the DLC3.
SST 09843-18040
 - (2) Turn the ignition switch on (IG).

- (3) Read DTCs by the blinking pattern of the ABS warning light.

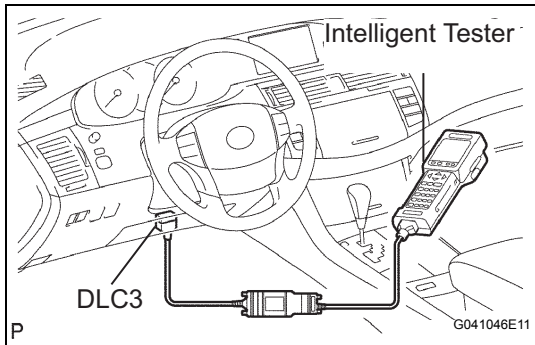
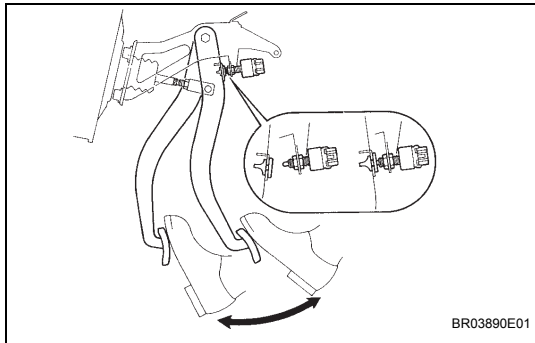
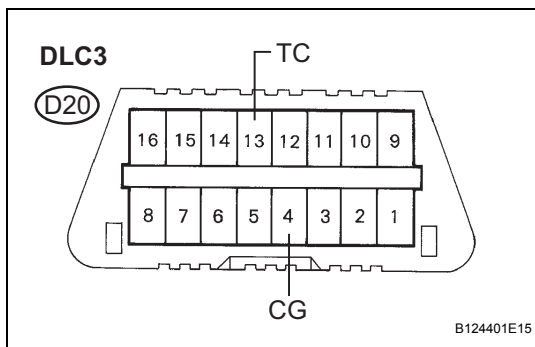
HINT:

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



Trouble Area	See procedure
TC and CG terminal circuit	BC-81
ABS warning light circuit (Remains on)	BC-67
ABS warning light circuit (Does not come on)	BC-71

- 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 (See page BC-23).
- (5) After completing the check, disconnect terminals TC and CG of the DLC3, and turn off the ignition switch.
If 2 or more DTCs are detected at the same time, the DTCs will be displayed in ascending order.



2. CLEAR DTC (USING SST CHECK WIRE)

(a) Clear the DTCs.

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

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(2) Turn the ignition switch on (IG).

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

(4) Check that the warning light indicates the normal system code.

(5) Remove the SST from the DLC3.

HINT:

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

3. DTC CHECK (USING INTELLIGENT TESTER)

(a) Check DTCs.

(1) Connect the intelligent tester to the DLC3.

(2) Turn the ignition switch on (IG).

(3) Read the DTCs by following the prompts on the tester screen.

HINT:

Refer to the intelligent tester operator's manual for further details.

4. CLEAR DTC (USING INTELLIGENT TESTER)

(a) Clear the DTCs.

(1) Connect the intelligent tester to the DLC3.

(2) Turn the ignition switch on (IG).

(3) Operate the intelligent tester to clear the codes.

HINT:

Refer to the intelligent tester operator's manual for further details.

5. END OF DTC CHECK/CLEAR

(a) Turn the ignition switch on (IG).

(b) Check that the ABS warning light goes off after approximately 3 seconds.

FREEZE FRAME DATA

1. FREEZE FRAME DATA

HINT:

- Whenever a DTC is detected or the ABS operates, the skid control ECU stores the current vehicle (sensor) status as freeze frame data.
- The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from off to the on (IG) since the last time the ABS was activated.
- Freeze frame data at the time the ABS operates: The skid control ECU stores and updates data whenever the ABS system operates. When the skid control ECU stores data at the time a DTC is detected, the data stored during ABS operation 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 intelligent tester to the DLC3.
 - (b) Turn the ignition switch on (IG).
 - (c) Select "DTC INFO" on the tester display.
 - (d) On the DTC data display screen, select the DTC data displayed with "***".

Intelligent tester display	Measurement Item	Reference Value
VEHICLE SPD	Vehicle speed	Speed indication on the meter
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
# IG ON	Number of operations of ignition switch ON after storing freeze frame data	0 to 31
SYSTEM	Operated system	ABS operated: ABS
# CODES	Number of trouble codes	min.: 0, max.: 255
TROUBLE CODE	Freeze DTC	min.: 0, max.: 255
VEHICLE ACCELERATION	Vehicle acceleration	min.: -1,869 G, max.: 1,869 G

FAIL-SAFE CHART

1. FAIL SAFE OPERATION

If there is a problem with sensor signals or brake actuator systems, the skid control ECU will prohibit power supply to the brake actuator and terminate ABS control.

ABS control will be prohibited, but EBD control continues as much as possible. If EBD control is impossible, the brake warning light will come on to warn the driver (See page [BC-17](#)).

Malfunction Area	Control Method
ABS system	Prohibits the ABS control
EBD system	Prohibits the ABS & EBD control

HINT:

If the ABS system has a malfunction, the brake system will operate normally without ABS control.

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

According to the DATA LIST displayed on the intelligent tester, the value and status of the switch, sensor, actuator and so on can be read without part removal. Reading the DATA LIST as the first step of troubleshooting is one of the methods to shorten labor time.

- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the ignition switch on (IG).
- (c) Read the "DATA LIST" on the tester display.

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
PKB SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
STOP LIGHT SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
ABS MOT RELAY	ABS motor relay / ON or OFF	ON: Motor relay ON OFF: Motor relay OFF	-
SOL RELAY	Solenoid relay / ON or OFF	ON: Solenoid relay ON OFF: Solenoid relay OFF	-
TEST MODE	Test mode / NORMAL or TEST	NORMAL: Normal mode TEST: During test mode	-
SRLR	ABS solenoid (SRLR) / ON or OFF	ON: Operates OFF: Does not operate	-
SRLH	ABS solenoid (SRLH) / ON or OFF	ON: Operates OFF: Does not operate	-
SRRR (SRR)	ABS solenoid (SRRR (SRR)) / ON or OFF	ON: Operates OFF: Does not operate	-
SRRH (SRH)	ABS solenoid (SRRH (SRH)) / ON or OFF	ON: Operates OFF: Does not operate	-
SFLR	ABS solenoid (SFLR) / ON or OFF	ON: Operates OFF: Does not operate	-
SFLH	ABS solenoid (SFLH) / ON or OFF	ON: Operates OFF: Does not operate	-
SFRR	ABS solenoid (SFRR) / ON or OFF	ON: Operates OFF: Does not operate	-
SFRH	ABS solenoid (SFRH) / ON or OFF	ON: Operates OFF: Does not operate	-
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 wheel speed	Similar speed as indicated on speedometer
IG VOLTAGE	ECU power supply voltage / TOO LOW / NORMAL / TOO HIGH	TOO HIGH: 14.0 V or over NORMAL: 9.5 V to 14.0 V TOO LOW: below 9.5 V	-

2. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the intelligent tester allows the relay, actuator and so on to operate without parts removal. 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 intelligent tester to the DLC3.
- (b) Turn the ignition switch on (IG).
- (c) According to the display on the tester, perform the "ACTIVE TEST".

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

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

Turn the ignition switch off before removing parts.

HINT:

- If no abnormality is found when inspecting parts, inspect the skid control ECU and ground points for poor contact.
- If malfunction code is displayed during the DTC check, check the circuit indicated by the DTC. For details of each code, refer to the "See page" in the DTC chart.
- When 2 or more DTCs are detected, perform circuit inspection one by one until the problem is identified.

DTC chart of ABS:

DTC No.	Detection Item	Trouble Area	See page
C0200/31	Right Front Wheel Speed Sensor Signal Malfunction	1. Front speed sensor RH 2. Front speed sensor RH circuit 3. Front speed sensor rotor RH 4. Sensor installation 5. Brake actuator assembly (skid control ECU)	BC-26
C0205/32	Left Front Wheel Speed Sensor Signal Malfunction	1. Front speed sensor LH 2. Front speed sensor LH circuit 3. Front speed sensor rotor LH 4. Sensor installation 5. Brake actuator assembly (skid control ECU)	BC-26
C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction	1. Rear speed sensor RH 2. Rear speed sensor RH circuit 3. Rear speed sensor rotor RH 4. Sensor installation 5. Brake actuator assembly (skid control ECU)	BC-34
C0215/34	Left Rear Wheel Speed Sensor Signal Malfunction	1. Rear speed sensor LH 2. Rear speed sensor LH circuit 3. Rear speed sensor rotor LH 4. Sensor installation 5. Brake actuator assembly (skid control ECU)	BC-34
C0226/21	SFR Solenoid Circuit	1. SFRR or SFRH circuit 2. Brake actuator assembly	BC-41
C0236/22	SFL Solenoid Circuit	1. SFLR or SFLH circuit 2. Brake actuator assembly	BC-41
C0246/23	SRR Solenoid Circuit	1. SRRR or SRRH circuit 2. Brake actuator assembly	BC-41
C0256/24	SRL Solenoid Circuit	1. SRLR or SRLH circuit 2. Brake actuator assembly	BC-41
C0273/13	Open in ABS Motor Relay Circuit	1. Brake actuator assembly (motor relay) 2. ABS/VSC No.1 fuse 3. Wire harness (+BM circuit)	BC-44
C0278/11	Open in ABS Solenoid Relay Circuit	1. Brake actuator assembly (solenoid relay) 2. ABS/VSC No.2 fuse 3. Wire harness (+BS circuit)	BC-49
C1237/37	Speed Sensor Rotor Faulty	1. Brake actuator assembly (skid control ECU) 2. Speed sensor rotor (front) 3. Rear axle hub & bearing assembly 4. Speed sensor 5. Speed sensor circuit 6. Tire & wheel size 7. Tire deformation	BC-53

DTC No.	Detection Item	Trouble Area	See page
C1241/41	Low Battery Positive Voltage or Abnormally High Battery Positive Voltage	1. Battery 2. Charging system 3. Power source circuit	BC-56
C1249/58	Stop Light Switch Circuit	1. Stop light switch 2. Stop light switch circuit	BC-60
C1300/62	Skid Control ECU Malfunction	Brake actuator assembly (skid control ECU)	BC-64
C1301/42	CAN Communication System Malfunction	1. CAN communication system 2. Wire harness	BC-66
C1330/35	Right Front Speed Sensor Circuit	1. Front speed sensor RH 2. Front speed sensor RH circuit 3. Sensor installation	BC-26
C1331/36	Left Front Speed Sensor Circuit	1. Front speed sensor LH 2. Front speed sensor LH circuit 3. Sensor installation	BC-26
C1332/38	Right Rear Speed Sensor Circuit	1. Rear speed sensor RH 2. Rear speed sensor RH circuit 3. Sensor installation	BC-34
C1333/39	Left Rear Speed Sensor Circuit	1. Rear speed sensor LH 2. Rear speed sensor LH circuit 3. Sensor installation	BC-34

Test Mode DTC of ABS:

DTC No.	Detection Item	Trouble Area	See page
C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	1. Front speed sensor RH 2. Front speed sensor circuit RH 3. Sensor installation 4. Sensor rotor 5. Brake actuator assembly (skid control ECU)	BC-26
C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	1. Front speed sensor LH 2. Front speed sensor circuit LH 3. Sensor installation 4. Sensor rotor 5. Brake actuator assembly (skid control ECU)	BC-26
C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	1. Rear speed sensor RH 2. Rear speed sensor circuit RH 3. Sensor installation 4. Sensor rotor 5. Brake actuator assembly (skid control ECU)	BC-34
C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	1. Rear speed sensor LH 2. Rear speed sensor circuit LH 3. Sensor installation 4. Sensor rotor 5. Brake actuator assembly (skid control ECU)	BC-34
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	1. Front speed sensor RH 2. Front speed sensor circuit RH 3. Sensor installation 4. Sensor rotor 5. Brake actuator assembly (skid control ECU)	BC-26
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	1. Front speed sensor RH 2. Front speed sensor circuit RH 3. Sensor installation 4. Sensor rotor 5. Brake actuator assembly (skid control ECU)	BC-26

DTC No.	Detection Item	Trouble Area	See page
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	1. Front speed sensor LH 2. Front speed sensor circuit LH 3. Sensor installation 4. Sensor rotor 5. Brake actuator assembly (skid control ECU)	BC-34
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	1. Front speed sensor LH 2. Front speed sensor circuit LH 3. Sensor installation 4. Sensor rotor 5. Brake actuator assembly (skid control ECU)	BC-34

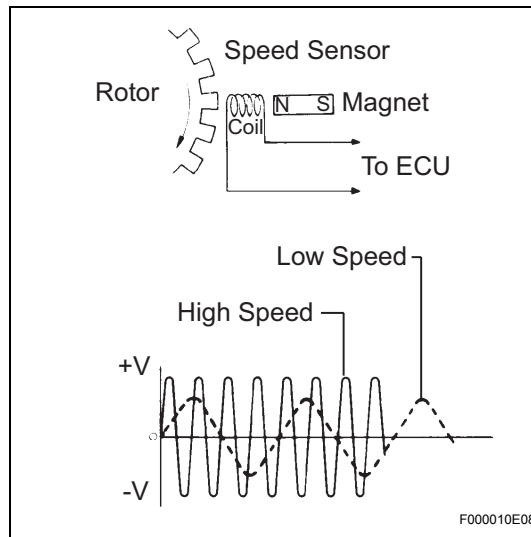
DTC	C0200/31	Right Front Wheel Speed Sensor Signal Malfunction
DTC	C0205/32	Left Front Wheel Speed Sensor Signal Malfunction
DTC	C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)
DTC	C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)
DTC	C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)
DTC	C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)
DTC	C1330/35	Right Front Speed Sensor Circuit
DTC	C1331/36	Left Front Speed Sensor Circuit

DESCRIPTION

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

When the rotors rotate, the magnetic field generated by the permanent magnet in the speed sensor induces 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 skid control ECU to detect the speed of each wheel.

DTCs C1271/71, C1272/72, C1275/75 and C1276/76 are output only in the test mode (SIGNAL CHECK). During test mode (SIGNAL CHECK), the skid control ECU records DTCs, if the abnormal sensor signal is received.



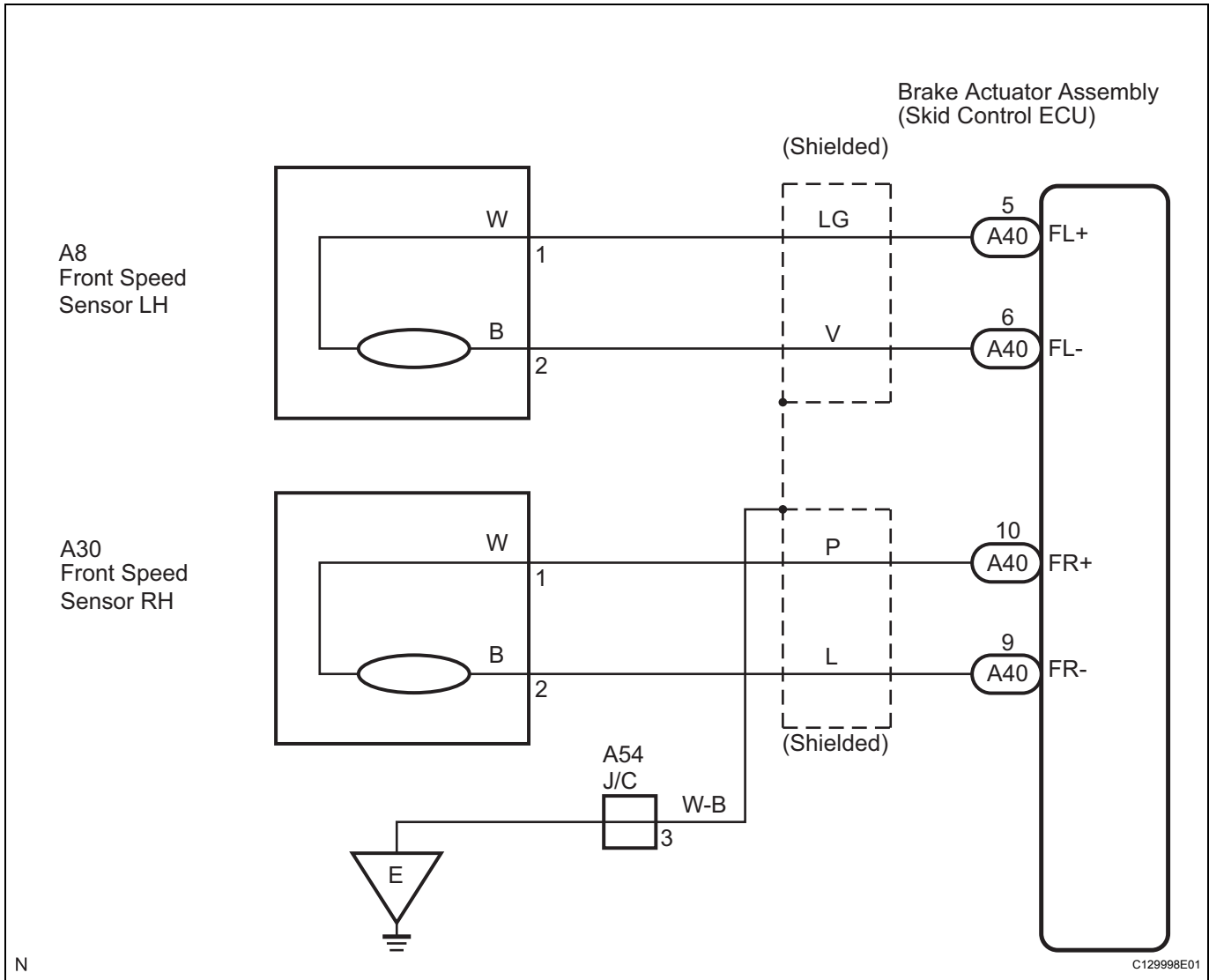
DTC No.	DTC Detecting Condition	Trouble Area
C0200/31 C0205/32	When either of the following (1 or 2) is detected : 1. Rapid acceleration/deceleration continues for 20 seconds or more with the brake pedal depressed, or for 5 seconds or more without the brake pedal depressed. 2. A wheel speed of 0 mph (0 km/h) is detected when the vehicle speed has reached 8 mph (12 km/h) after starting the vehicle.	<ul style="list-style-type: none"> • Front speed sensor RH and/or LH • Front speed sensor circuit RH and/or LH • Speed sensor rotor RH and/or LH • Sensor installation • Brake actuator assembly (skid control ECU)
C1330/35 C1331/36	Abnormality in the resistance value of each speed sensor is detected.	<ul style="list-style-type: none"> • Front speed sensor RH and/or LH • Speed sensor circuit RH and/or LH • Sensor installation

HINT:

DTC No.C0200/31 and C1330/35 are for the front speed sensor RH.

DTC No.C0205/32 and C1331/36 are for the front speed sensor LH.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the intelligent tester and start from step 2 when not using the intelligent tester.

BC

1 READ VALUE OF INTELLIGENT TESTER (FRONT SPEED SENSOR)

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select "DATA LIST" and read the value displayed on the intelligent tester.

DATA LIST: ABS

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

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

OK:

The speed value output from the speed sensor displayed on the intelligent tester is the same as the actual vehicle speed.

NG → **Go to step 5**

OK

2 | PERFORM TEST MODE (SIGNAL CHECK)

- (a) Check if test mode (signal check) DTCs are detected.

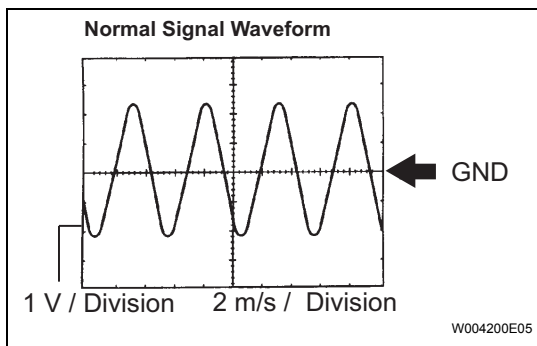
Result

Result	Proceed to
Test mode (signal check) DTC is not output	A
Test mode (signal check) DTC is output	B

B → **Go to step 5**

A

3 | INSPECT SPEED SENSOR OUTPUT SIGNAL



- (a) INSPECTION USING OSCILLOSCOPE

- (1) Disconnect the front speed sensor connector.
- (2) Connect the oscilloscope to terminals 1 and 2 of the front speed sensor.
- (3) Check that a waveform is output when the tires are rotated.

OK:

A waveform as shown in the figure should be output.

HINT:

- As vehicle speed (wheel rotation speed) increases, the width 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 rotor scratches, looseness or foreign matter attached to the speed sensor.

NG → **Go to step 11**

OK

4 | RECONFIRM DTC

- (a) Clear the DTC.

- (b) Start the engine.
- (c) Drive the vehicle at the speed of 20 mph (32 km/h) or more for 60 seconds or more.
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

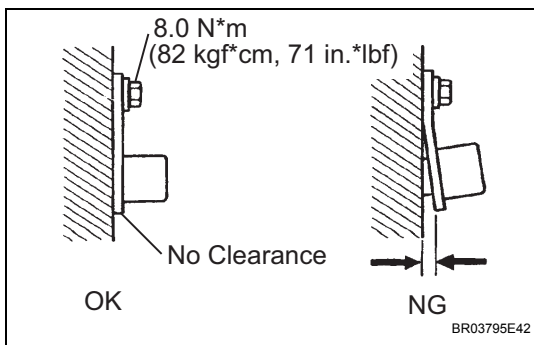
- It is suspected that the DTCs were output due to a bad connection of the connector terminal.
- If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page BC-15).

B
Go to step 5

A

END

5 INSPECT FRONT SPEED SENSOR INSTALLATION



- (a) Check the front speed sensor installation.

OK:

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

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

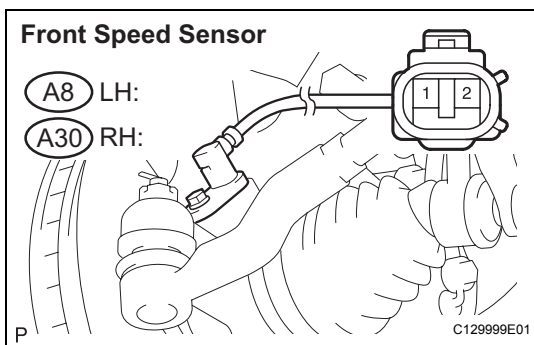
NOTICE:

Check the speed sensor signal after replacement (See page BC-11).

NG
INSTALL FRONT SPEED SENSOR CORRECTLY OR REPLACE FRONT SPEED SENSOR

OK

6 INSPECT FRONT SPEED SENSOR



- (a) Make sure that there is no looseness at the locking part and the connecting part of the connectors.
- (b) Disconnect the front speed sensor connectors.
- (c) Measure the resistance according to the value(s) in the table below.

Resistance:

LH

Tester Connection	Specified Condition
A8-1 (FL+) - A8-2 (FL-)	1.22 to 0.92 kΩ
A8-1 (FL+) - Body ground	10 kΩ or higher

Tester Connection	Specified Condition
A8-2 (FL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
A30-1 (FR+) - A30-2 (FR-)	1.22 to 0.92 kΩ
A30-1 (FR+) - Body ground	10 kΩ or higher
A30-2 (FR-) - Body ground	10 kΩ or higher

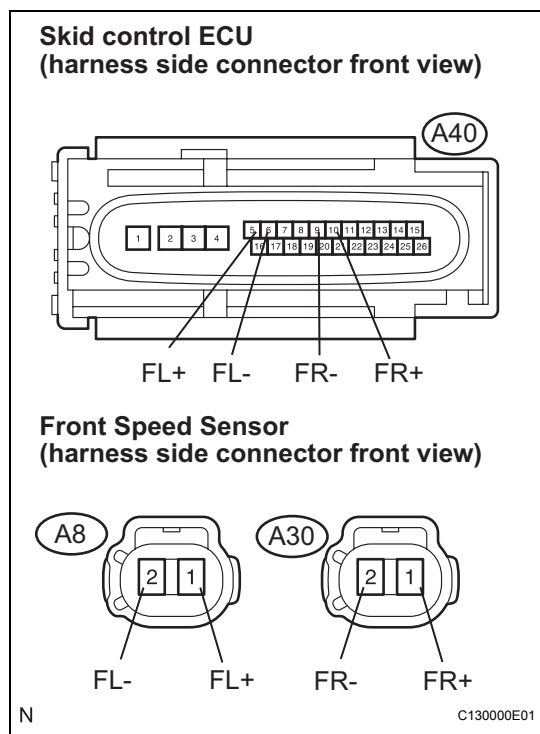
NOTICE:

Check the speed sensor signal after replacement (See page BC-11).

NG → **REPLACE FRONT SPEED SENSOR**

OK

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



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

Resistance:

LH

Tester Connection	Specified Condition
A40-5 (FL+) - A8-1 (FL+)	Below 1 Ω
A40-6 (FL-) - A8-2 (FL-)	Below 1 Ω
A8-1 (FL+) - Body ground	10 kΩ or higher
A8-2 (FL-) - Body ground	10 kΩ or higher

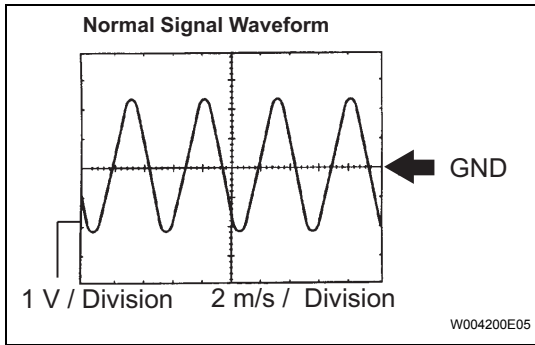
RH

Tester Connection	Specified Condition
A40-10 (FR+) - A30-1 (FR+)	Below 1 Ω
A40-9 (FR-) - A30-2 (FR-)	Below 1 Ω
A30-1 (FR+) - Body ground	10 kΩ or higher
A30-2 (FR-) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SPEED SENSOR CIRCUIT)**

OK

8 INSPECT SPEED SENSOR OUTPUT SIGNAL



- (a) INSPECTION USING OSCILLOSCOPE
- (1) Disconnect the front speed sensor connector.
 - (2) Connect the oscilloscope to terminals 1 and 2 of the front speed sensor.
 - (3) Check that a waveform is output when the tires are rotated.

OK:

A waveform as shown in the figure should be output.

HINT:

- As vehicle speed (wheel rotation speed) increases, the width 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 rotor scratches, looseness or foreign matter attached to the speed sensor.

NG →

Go to step 11

OK

9 READ VALUE OF INTELLIGENT TESTER (FRONT SPEED SENSOR)

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select "DATA LIST" and read the value displayed on the intelligent tester.

DATA LIST: ABS

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

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

OK:

The speed value output from the speed sensor displayed on the intelligent tester is the same as the actual vehicle speed.

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page BC-15).

NG →

REPLACE BRAKE ACTUATOR ASSEMBLY

OK

10 RECONFIRM DTC

- (a) Clear the DTC.
- (b) Start the engine.
- (c) Drive the vehicle at the speed of 20 mph (32 km/h) or more for 60 seconds or more.
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
TDTC is output	B

HINT:

- It is suspected that the DTCs were output due to a bad connection of the connector terminal.
- If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page BC-15).

B → **Go to step 11**

A

END

11 INSPECT SPEED SENSOR TIP

- (a) Remove the front speed sensor (See page BC-249).
- (b) Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning or replacement (See page BC-11).

NG → **CLEAN OR REPLACE SPEED SENSOR**

OK

CLEAN OR REPLACE SPEED SENSOR ROTOR

DTC	C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction
DTC	C0215/34	Left Rear Wheel Speed Sensor Signal Malfunction
DTC	C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)
DTC	C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)
DTC	C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)
DTC	C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)
DTC	C1332/38	Right Rear Speed Sensor Circuit
DTC	C1333/39	Left Rear Speed Sensor Circuit

DESCRIPTION

Refer to DTCs C0200/31, C0205/32, C1330/35, and C1331/36 (See page [BC-26](#)).

DTCs C1273/73, C1274/74, C1277/77 and C1278/78 are output only in the test mode (SIGNAL CHECK). During test mode (SIGNAL CHECK), the skid control ECU records DTCs, if the abnormal sensor signal is received.

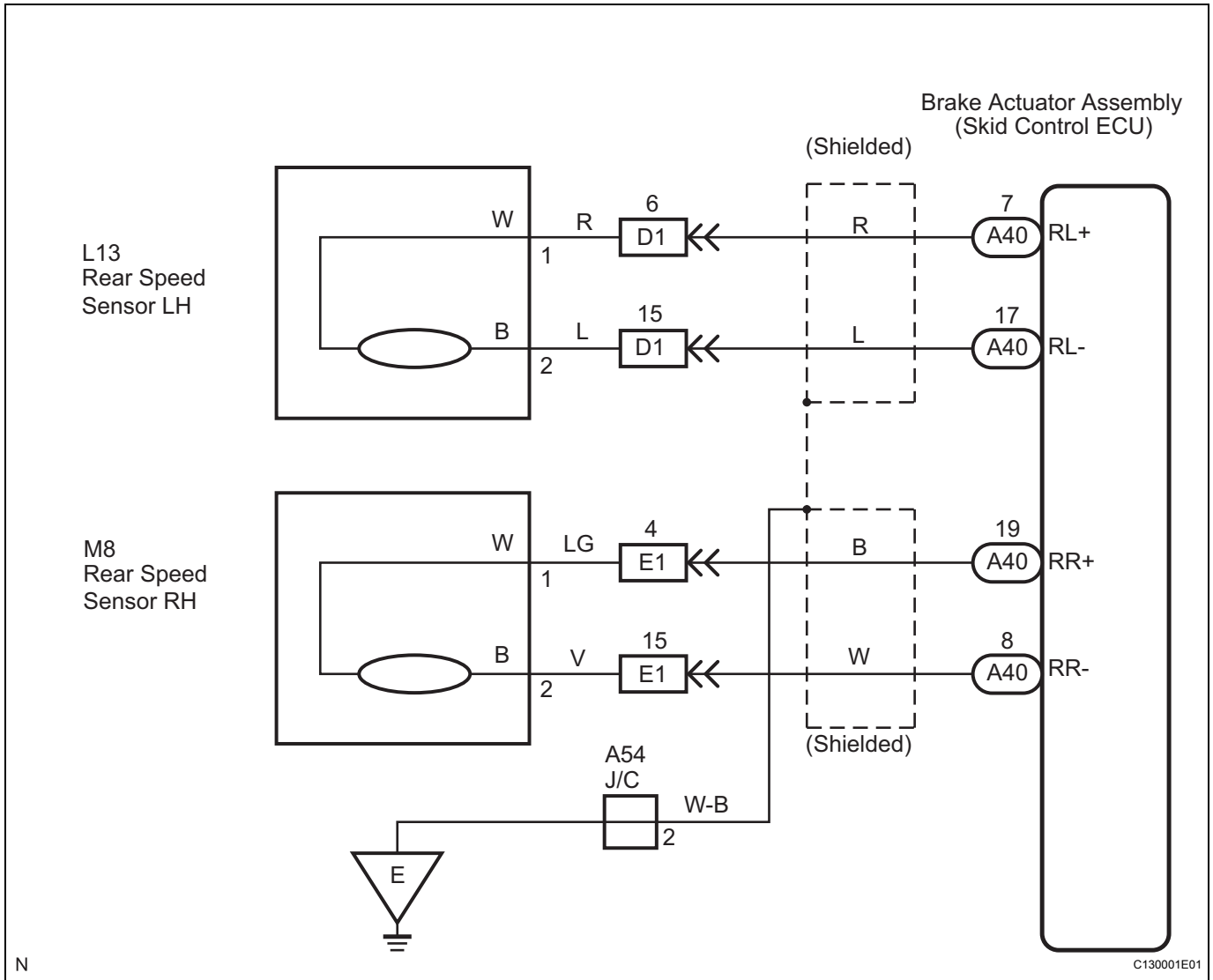
DTC No.	DTC Detecting Condition	Trouble Area
C0210/33 C0215/34	When either of the following (1 or 2) is detected : 1. Rapid acceleration/deceleration continues for 20 seconds or more with the brake pedal depressed, or for 5 seconds or more without the brake pedal depressed. 2. A wheel speed of 0 mph (0 km/h) is detected when the vehicle speed has reached 8 mph (12 km/h) after starting the vehicle.	<ul style="list-style-type: none"> • Rear speed sensor RH and/or LH • Rear speed sensor circuit RH and/or LH • Speed sensor rotor RH and/or LH • Sensor installation
C1332/38 C1333/39	Abnormality in the resistance value of each speed sensor is detected.	<ul style="list-style-type: none"> • Rear speed sensor RH and/or LH • Speed sensor circuit RH and/or LH • Sensor installation

HINT:

DTC No. C0210/33 and C1332/38 are for the rear speed sensor RH.

DTC No. C0215/34 and C1333/39 are for the rear speed sensor LH.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the intelligent tester and start from step 2 when not using the intelligent tester.

1 READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

BC

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select "DATA LIST" and read the value displayed on the intelligent tester.

DATA LIST: ABS

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

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

OK:

The speed value output from the speed sensor displayed on the intelligent tester is the same as the actual vehicle speed.

NG → **Go to step 5**

OK

2 PERFORM TEST MODE (SIGNAL CHECK)

- (a) Check if test mode (signal check) DTCs are detected.

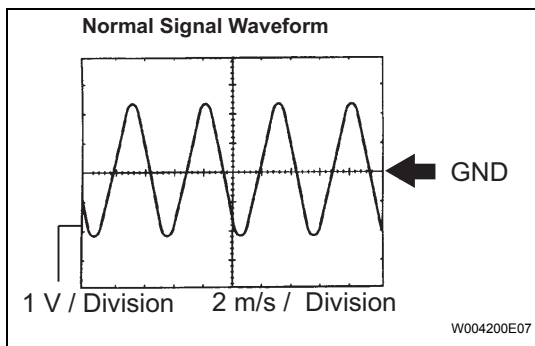
Result

Result	Proceed to
Test mode (signal check) DTC is not output	A
Test mode (signal check) DTC is output	B

B → **Go to step 5**

A

3 INSPECT SPEED SENSOR OUTPUT SIGNAL



- (a) INSPECTION USING OSCILLOSCOPE

- (1) Disconnect the rear speed sensor connector.
- (2) Connect the oscilloscope to terminals 1 and 2 of the rear speed sensor.
- (3) Check that a waveform is output when the tires are rotated.

OK:

A waveform as shown in the figure should be output.

HINT:

- As vehicle speed (wheel rotation speed) increases, the width 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 rotor scratches, looseness or foreign matter attached to the speed sensor.

NG → **CLEAN OR REPLACE SPEED SENSOR AND SENSOR ROTOR**

OK

4 RECONFIRM DTC

- (a) Clear the DTC.
- (b) Start the engine.
- (c) Drive the vehicle at the speed of 20 mph (32 km/h) or more for 60 seconds or more.
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

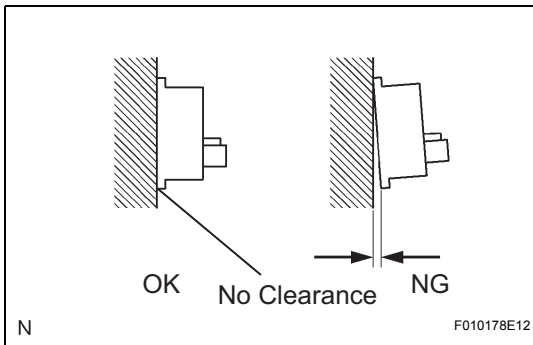
- It is suspected that the DTCs were output due to a bad connection of the connector terminal.
- If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page BC-15).

B → **Go to step 5**

A

END

5 INSPECT REAR SPEED SENSOR INSTALLATION



- (a) Check the rear speed sensor installation.

OK:

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

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

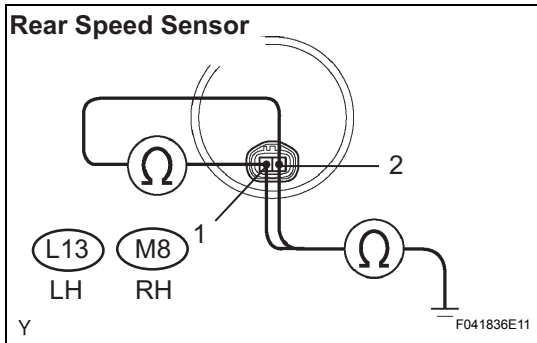
NOTICE:

Check the speed sensor signal after replacement (See page BC-11).

NG → **INSTALL REAR SPEED SENSOR CORRECTLY OR REPLACE REAR SPEED SENSOR**

OK

6 INSPECT REAR SPEED SENSOR



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

Resistance:

LH

Tester Connection	Specified Condition
L13-1 (RL+) - L13-2 (RL-)	Below 2.2 kΩ
L13-1 (RL+) - Body ground	10 kΩ or higher
L13-2 (RL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
M8-1 (RR+) - M8-2 (RR-)	Below 2.2 kΩ
M8-1 (RR+) - Body ground	10 kΩ or higher
M8-2 (RR-) - Body ground	10 kΩ or higher

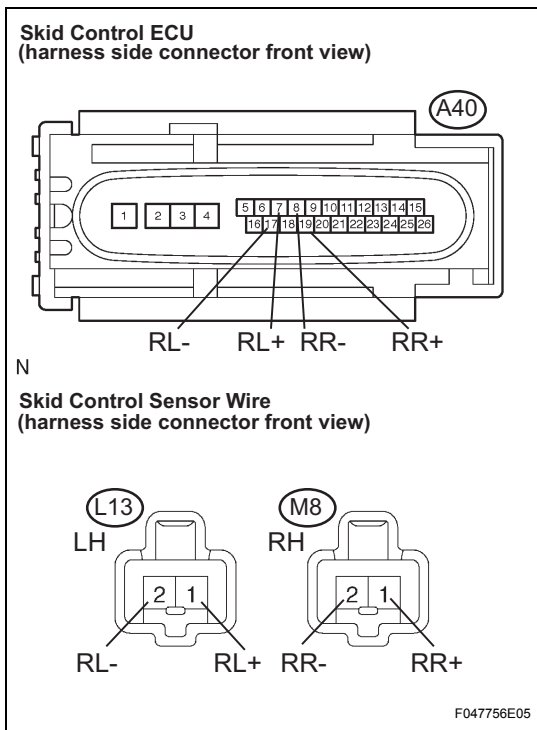
NOTICE:

Check the speed sensor signal after replacement (See page BC-11).

NG → **REPLACE REAR SPEED SENSOR**

OK

7 CHECK HARNESS AND CONNECTOR (REAR SPEED SENSOR TO SKID CONTROL ECU)



- (a) SKID CONTROL ECU TO SKID CONTROL SENSOR WIRE:
 - (1) Disconnect the skid control ECU connector and the rear speed sensor connector.
 - (2) Disconnect the skid control sensor wire.
 - (3) Measure the resistance according to the value(s) in the table below.

Resistance:

LH

Tester Connection	Specified Condition
L13-1 (RL+) - A40-7 (RL+)	Below 1 Ω
L13-2 (RL-) - A40-17 (RL-)	Below 1 Ω
L13-1 (RL+) - Body ground	10 kΩ or higher
L13-2 (RL-) - Body ground	10 kΩ or higher

RH

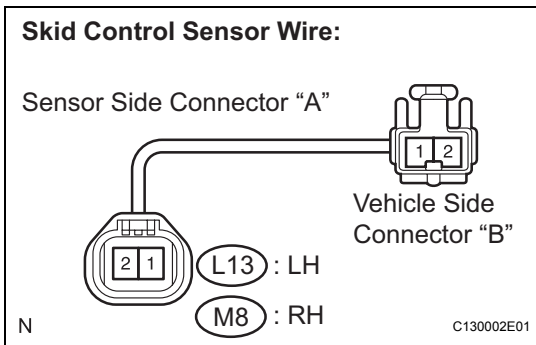
Tester Connection	Specified Condition
M8-1 (RR+) - A40-19 (RR+)	Below 1 Ω
M8-2 (RR-) - A40-8 (RR-)	Below 1 Ω
M8-1 (RR+) - Body ground	10 kΩ or higher
M8-2 (RR-) - Body ground	10 kΩ or higher

BC

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU TO SKID CONTROL SENSOR WIRE)

OK

8 CHECK SKID CONTROL SENSOR WIRE



(a) SKID CONTROL SENSOR WIRE:

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

Resistance:

LH

Tester Connection	Specified Condition
L13 (A-1) - L13 (B-1)	Below 1 Ω
L13 (A-1) - L13 (B-2)	10 kΩ or higher
L13 (A-1) - Body ground	10 kΩ or higher
L13 (A-2) - L13 (B-2)	Below 1 Ω
L13 (A-2) - L13 (B-1)	10 kΩ or higher
L13 (A-2) - Body ground	10 kΩ or higher

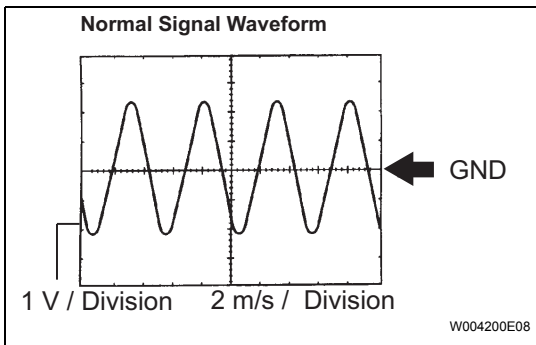
RH

Tester Connection	Specified Condition
M8 (A-1) - M8 (B-1)	Below 1 Ω
M8 (A-1) - M8 (B-2)	10 kΩ or higher
M8 (A-1) - Body ground	10 kΩ or higher
M8 (A-2) - M8 (B-2)	Below 1 Ω
M8 (A-2) - M8 (B-1)	10 kΩ or higher
M8 (A-2) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE SKID CONTROL SENSOR WIRE

OK

9 INSPECT SPEED SENSOR OUTPUT SIGNAL



(a) INSPECTION USING OSCILLOSCOPE

- (1) Disconnect the rear speed sensor connector.
- (2) Connect the oscilloscope to terminals 1 and 2 of the rear speed sensor.
- (3) Check that a waveform is output when the tires are rotated.

OK:

A waveform as shown in the figure should be output.

HINT:

- As vehicle speed (wheel rotation speed) increases, the width 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 rotor scratches, looseness or foreign matter attached to the speed sensor.

NG

CLEAN OR REPLACE SPEED SENSOR AND SENSOR ROTOR

OK

10 READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

- Connect the intelligent tester to the DLC3.
- Start the engine.
- Select "DATA LIST" and read the value displayed on the intelligent tester.

DATA LIST: ABS

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

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

OK:

The speed value output from the speed sensor displayed on the intelligent tester is the same as the actual vehicle speed.

HINT:

- It is suspected that the DTCs were output due to a bad connection of the connector terminal.
- If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page [BC-15](#)).

NG

REPLACE BRAKE ACTUATOR ASSEMBLY

OK

BC

END

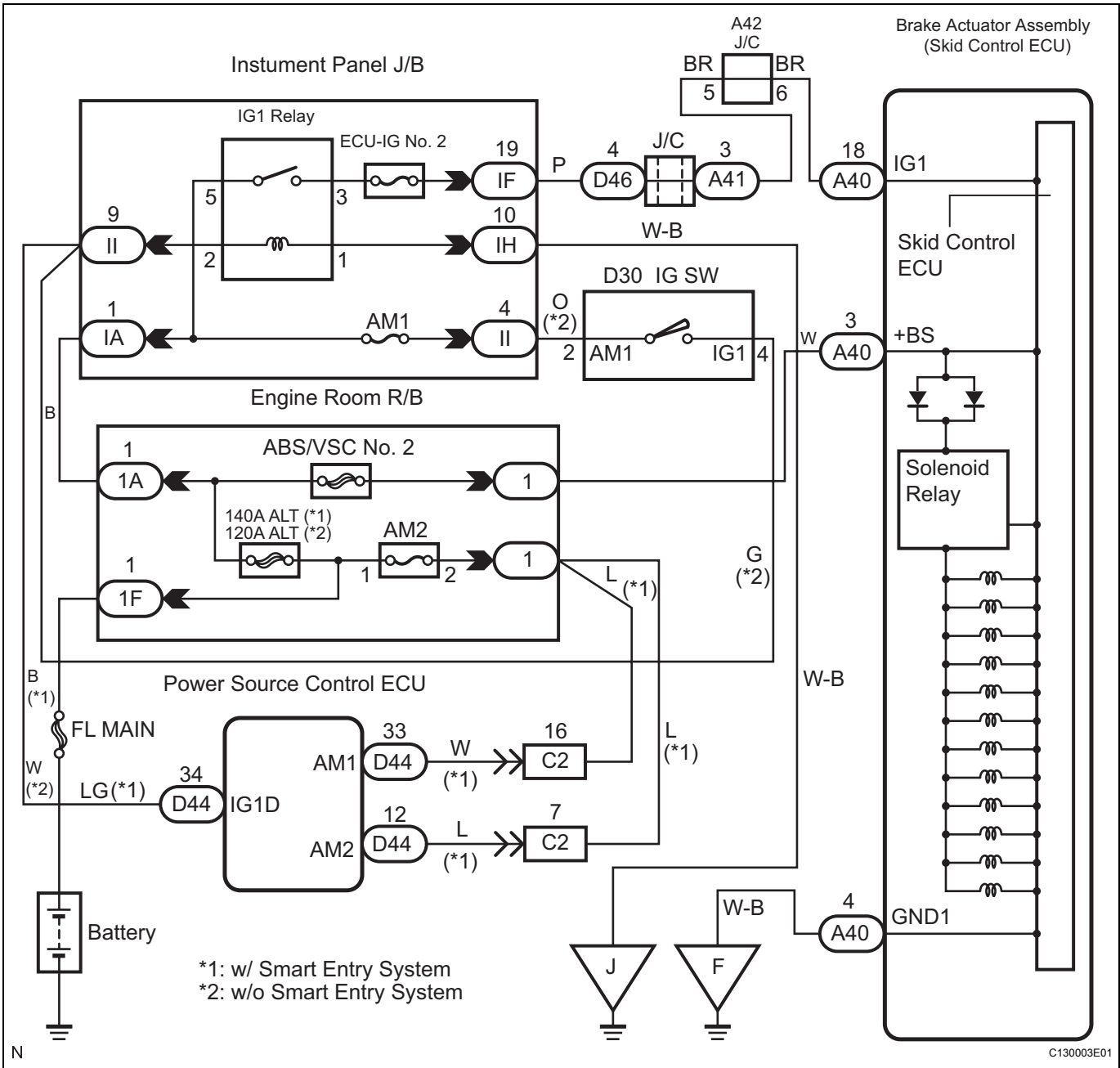
DTC	C0226/21	SFR Solenoid Circuit
DTC	C0236/22	SFL Solenoid Circuit
DTC	C0246/23	SRR Solenoid Circuit
DTC	C0256/24	SRL Solenoid Circuit

DESCRIPTION

These solenoids turn on when receiving signals from the skid control ECU and control the pressure acting on the wheel cylinders to control braking force.

DTC No.	DTC Detecting Condition	Trouble Area
C0226/21 C0236/22 C0246/23 C0256/24	Solenoid valve signal does not match the check result.	<ul style="list-style-type: none"> • Each solenoid circuit • Brake actuator assembly

WIRING DIAGRAM



BC INSPECTION PROCEDURE

1 RECONFIRM DTC

HINT:

These codes are detected when a problem is identified in the brake actuator assembly.

The solenoid circuit is in the brake actuator assembly.

Therefore, solenoid circuit inspection and solenoid unit inspection cannot be performed. Be sure to check if the DTC is output before replacing the brake actuator assembly.

- (a) Clear the DTC.
- (b) Start the engine.

- (c) Drive the vehicle at the speed of 12 mph (20km/h) or more for 30 seconds or more.
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

- If the normal system code is output (the malfunction code is not output), slightly jiggle the connectors, wire harnesses, and fuses of the brake actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the brake actuator (skid control ECU), inspect and repair the connector or wire harness.
- These DTCs may be stored due to a malfunction in the connector terminal connection, etc.

B

REPLACE BRAKE ACTUATOR ASSEMBLY

A

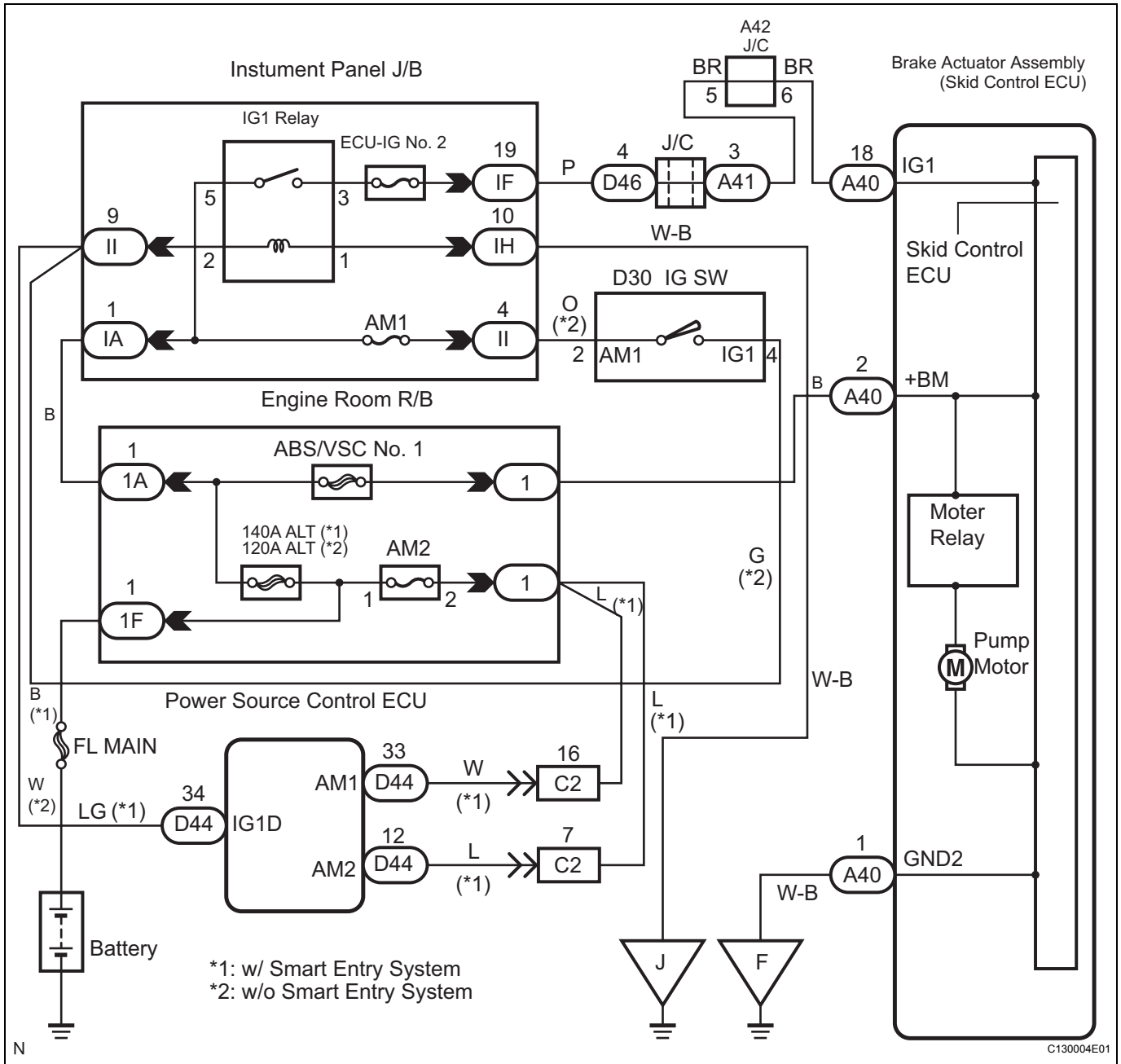
END

DTC**C0273/13****Open in ABS Motor Relay Circuit****DESCRIPTION**

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

DTC No.	DTC Detecting Condition	Trouble Area
C0273/13	When any of the following (1 to 3) is detected: 1. Pump motor voltage is 2.0 V or more for 1 sec. or more when the motor relay is off. 2. Pump motor voltage is equal to/less than the IG1 terminal voltage minus 4.0 V for 0.1 second or more when the motor relay is on. 3. Pump motor slows down irregularly after the motor relay turns off.	<ul style="list-style-type: none">• Brake actuator assembly (motor relay)• ABS/VSC No.1 fuse• Wire harness (+BM circuit)

WIRING DIAGRAM

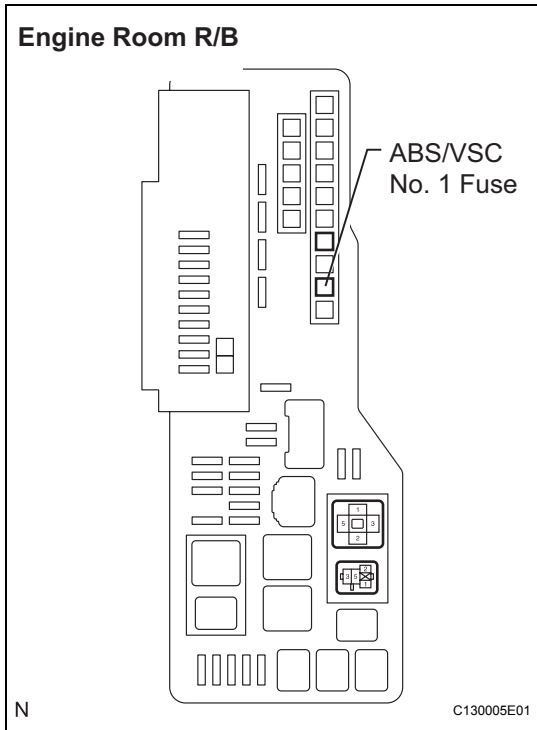


INSPECTION PROCEDURE

HINT:

When C1241/41 is output together with C0273/13, inspect and repair the trouble areas indicated by C1241/41.

1 INSPECT FUSE (ABS/VSC NO.1 FUSE)



- (a) Remove the ABS/VSC No.1 fuse from the engine room R/B.
- (b) Measure the resistance according to the value(s) in the table below.

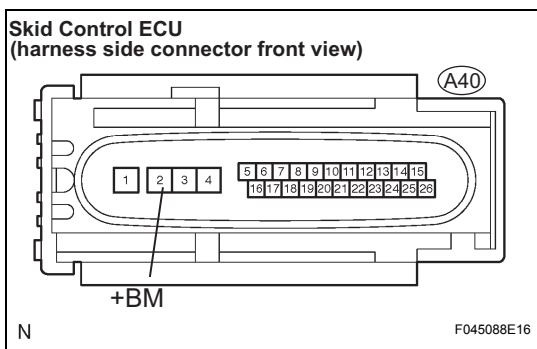
Resistance

Tester Connection	Specified Condition
ABS/VSC No.1 fuse	Below 1 Ω (Continuity)

NG INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE

OK

2 INSPECT SKID CONTROL ECU CONNECTOR (+BM TERMINAL VOLTAGE)



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

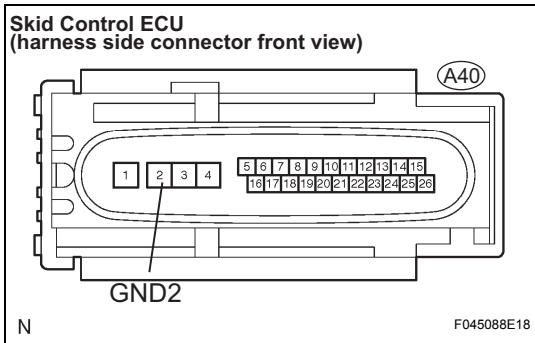
Voltage

Tester Connection	Condition	Specified Condition
A40-2 (+BM) - Body ground	Always	10 to 14V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (+BM CIRCUIT)

OK

3 INSPECT SKID CONTROL ECU CONNECTOR (GND TERMINAL CONTINUITY)



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

Resistance

Tester Connection	Specified Condition
A40-1 (GND2) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND2 CIRCUIT)**

OK

4 PERFORM ACTIVE TEST USING INTELLIGENT TESTER (ABS MOTOR RELAY)

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select "ACTIVE TEST" on the intelligent tester.

ACTIVE TEST: ABS

Item	Vehicle Condition / Test Details	Diagnostic Note
ABS MTR RELAY	Turns ABS motor relay ON / OFF	Operating sound of motor is heard

- (d) Check the operating sound of the ABS motor relay when operating it with the intelligent tester.

OK:

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

NG → **REPLACE BRAKE ACTUATOR ASSEMBLY**

OK

5 RECONFIRM DTC

HINT:

This code is detected when a problem is identified in the brake actuator assembly. The ABS motor relay is in the brake actuator assembly. Therefore, ABS motor relay inspection and motor relay unit inspection cannot be performed. Be sure to check if the DTC is output before replacing the brake actuator assembly.

- (a) Clear the DTC.
- (b) Start the engine.
- (c) Drive the vehicle at the speed of 12 mph (20 km/h) or more for 30 seconds or more.
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

- If the normal system code is output (the malfunction code is not output), slightly jiggle the connectors, wire harnesses, and fuses of the brake actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the brake actuator (skid control ECU), inspect and repair the connector or wire harness.
- These DTCs may be stored due to a malfunction in the connector terminal connection, etc.

B**REPLACE BRAKE ACTUATOR ASSEMBLY****A****END**

DTC**C0278/11****Open in ABS Solenoid Relay Circuit****DESCRIPTION**

This solenoid relay supplies power to each ABS solenoid. If the ABS initial check is OK after the ignition switch is turned on (IG), the skid control ECU will turn the ABS solenoid relay on.

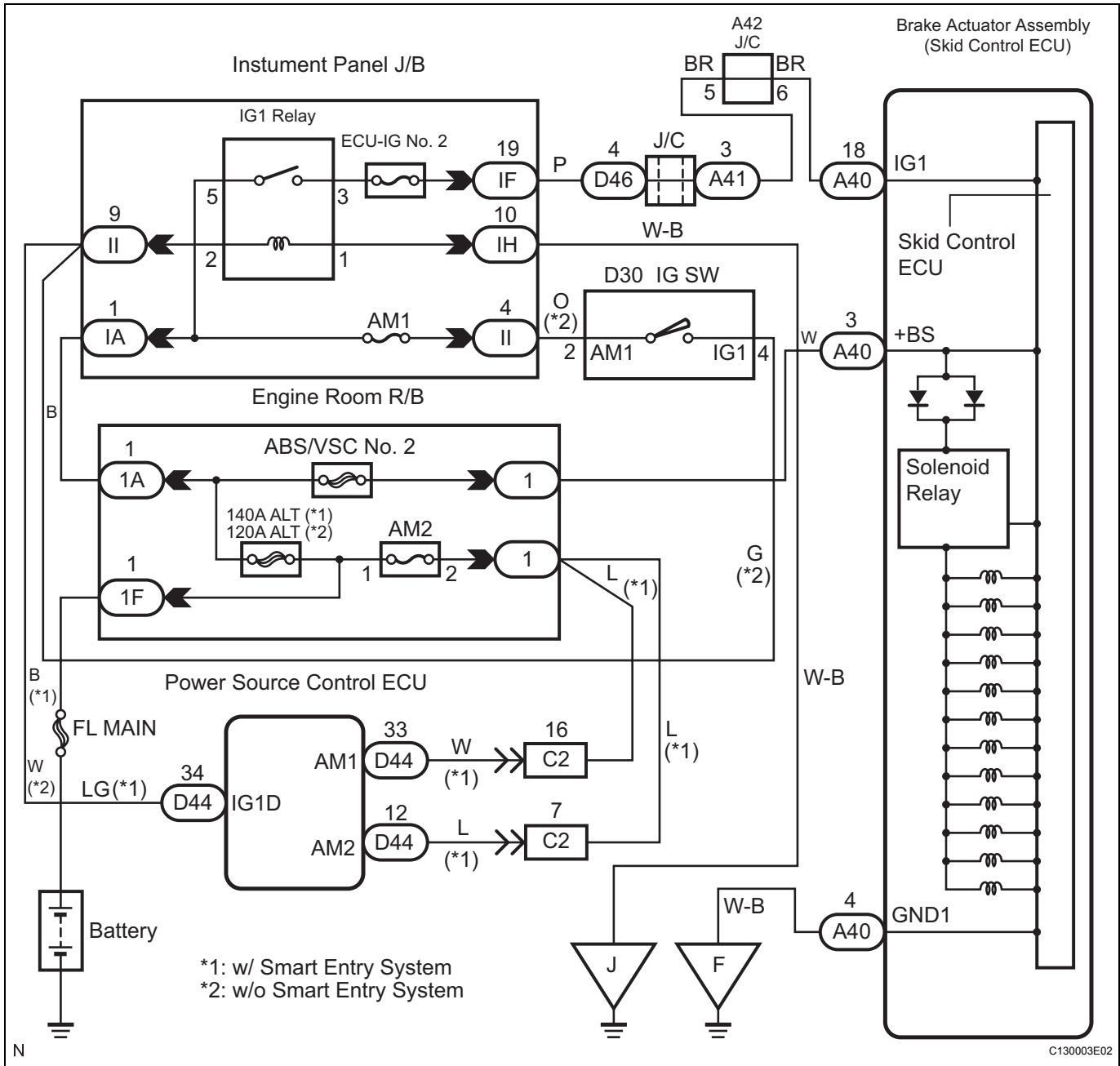
HINT:

(Initial Check)

If a speed signal of 4 mph (6km/h) or more is input to the skid control ECU, with the ignition switch on and the stop light switch off, the ECU performs self diagnosis of the motor and solenoid circuits.

DTC No.	DTC Detecting Condition	Trouble Area
C0278/11	When any of the following (1 to 3) is detected: 1. Internal circuit malfunction in the skid control ECU. 2. Solenoid relay voltage is 80% of IG voltage or less for 0.5 sec. 3. Solenoid relay voltage is high when the solenoid relay is off.	<ul style="list-style-type: none"> • Brake actuator assembly (solenoid relay) • ABS/VSC No.2 fuse • Wire harness (+BS circuit)

WIRING DIAGRAM

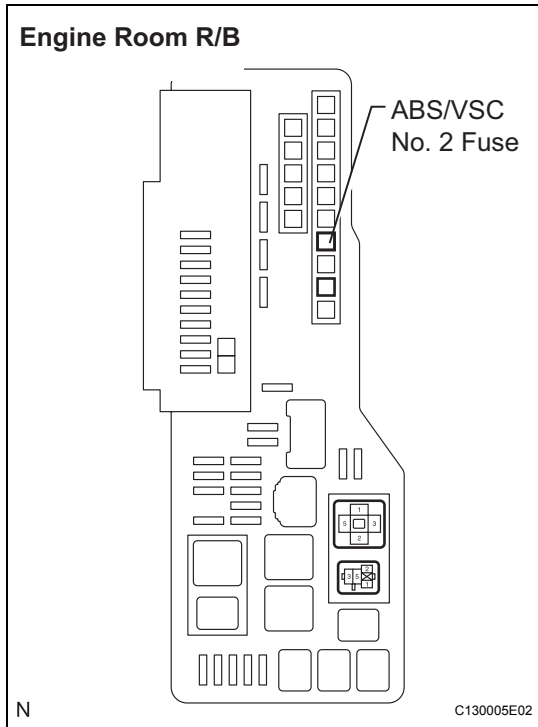


BC INSPECTION PROCEDURE

HINT:

When C1241/41 is output together with C0278/11, inspect and repair the trouble areas indicated by C1241/41.

1 INSPECT FUSE (ABS/VSC No.2 FUSE)



- (a) Remove the ABS/VSC No.2 fuse from the engine room R/B.
- (b) Measure the resistance according to the value(s) in the table below.

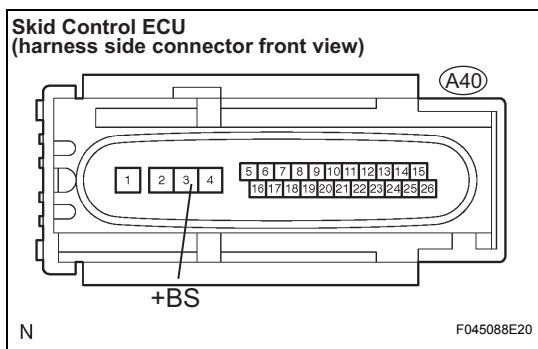
Resistance

Tester Connection	Specified Condition
ABS/VSC No.2 fuse	Below 1 Ω (Continuity)

NG INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE

OK

2 INSPECT SKID CONTROL ECU CONNECTOR (+BS TERMINAL VOLTAGE)



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

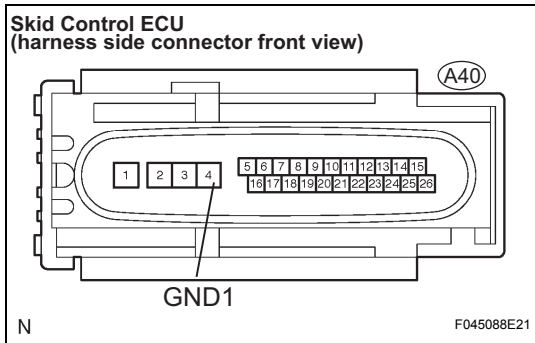
Voltage

Tester Connection	Condition	Specified Condition
A40-3 (+BS) - Body ground	Always	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (+BS CIRCUIT)

OK

3 INSPECT SKID CONTROL ECU CONNECTOR (GND TERMINAL CONTINUITY)



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

Resistance

Tester Connection	Specified Condition
A40-4 (GND1) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND1 CIRCUIT)**

OK

4 RECONFIRM DTC

HINT:

This codes is detected when a problem is identified in the brake actuator assembly. The solenoid circuit is in the brake actuator assembly. Therefore, solenoid circuit inspection and solenoid unit inspection cannot be performed. Be sure to check if the DTC code is output before replacing the brake actuator assembly.

- (a) Clear the DTC.
- (b) Start the engine.
- (c) Drive the vehicle at the speed of 12 mph (20 km/h) or more for 30 seconds or more.
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

- If the normal system code is output (the malfunction code is not output), slightly jiggle the connectors, wire harnesses, and fuses of the brake actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the brake actuator (skid control ECU), inspect and repair the connector or wire harness.
- These DTCs may be stored due to a malfunction in the connector terminal connection, etc.

B → **REPLACE BRAKE ACTUATOR ASSEMBLY**

A

END

BC

DTC	C1237/37	Speed Sensor Rotor Faulty
------------	-----------------	----------------------------------

DESCRIPTION

This code is output when a difference in tire size, foreign matter attached to a speed sensor tip or a sensor rotor, or a missing rotor serration is detected.

This code may be output when a malfunction in the terminal of the speed sensor circuit connector or wire harness is detected.

DTC No.	DTC Detecting Condition	Trouble Area
C1237/37	When any of the following (1 to 3) is detected: 1. Wheel speed difference between the wheels. 2. Wheel sensor signal failure. 3. Continuous ABS control for 60 sec. or more.	<ul style="list-style-type: none"> • Brake actuator assembly (skid control ECU) • Speed sensor rotor (Front) • Rear axle hub & bearing assembly • Speed sensor • Speed sensor circuit • Tire & wheel size • Tire deformation

INSPECTION PROCEDURE

1	INSPECT TIRE
----------	---------------------

(a) Check the size and condition of all 4 tires.

HINT:

This DTC is output when tire deformation or a difference in tire size is detected.

OK:

The diameter of all 4 tires and air pressure are the same.

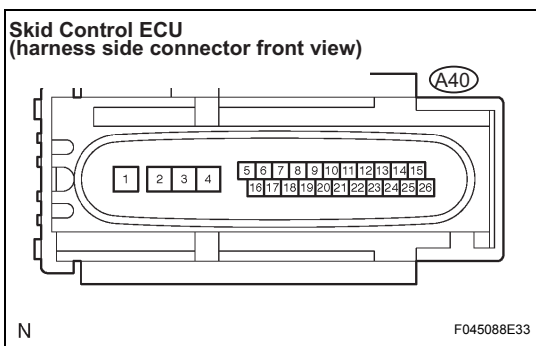
NG	REPLACE TIRES SO THAT ALL 4 TIRES ARE SAME IN SIZE
-----------	---

OK

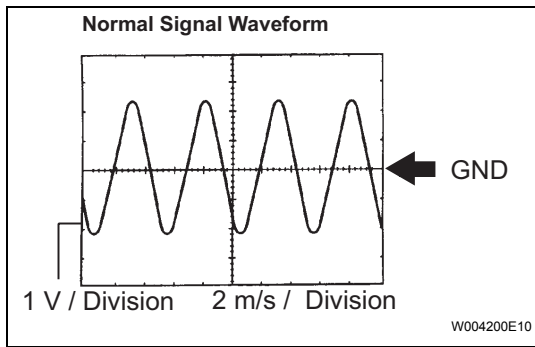
2	INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS
----------	---

(a) INSPECTION USING OSCILLOSCOPE

- (1) Disconnect the skid control ECU connector.
- (2) Connect the oscilloscope to each speed sensor terminal of the skid control ECU connector.



Connector	Circuit
A40-5 (FL+) - A40-6 (FL-)	Front left speed sensor
A40-10 (FR+) - A40-9 (FR-)	Front right speed sensor
A40-7 (RL+) - A40-17 (RL-)	Rear left speed sensor
A40-19 (RR+) - A40-8 (RR-)	Rear right speed sensor



(3) Check that a waveform is output when the tires are rotated (by the sensor circuit).

OK:

A waveform as shown in the figure should be output.

HINT:

- Each sensor circuit outputs the same waveform without noise.
- As vehicle speed (wheel rotation speed) increases, the width 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 rotor scratches, looseness or foreign matter attached to the speed sensor.

(4) Make sure that the waveform does not change while jiggling a connector or a wire harness.

OK:

The waveform does not change.

HINT:

If the waveform changes while jiggling a connector or a wire harness, there may be a malfunction in the connector or the wire harness.

Result

Result	Proceed to
OK	A
NG (waveform changes while jiggling a connector or a wire harness)	B
NG (waveform does not change while jiggling a connector or a wire harness)	C

B → **REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU TO SPEED SENSOR)**

C → **CHECK OR REPLACE SPEED SENSOR AND SENSOR ROTOR**

A

BC

3	RECONFIRM DTC
----------	----------------------

- Clear the DTC.
- Start the engine.
- Drive the vehicle at the speed of 20 mph (32 km/h) or more for 60 seconds or more.
- Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPLACE BRAKE ACTUATOR ASSEMBLY

A

END

DTC	C1241/41	Low Battery Positive Voltage or Abnormally High Battery Positive Voltage
------------	-----------------	---

DESCRIPTION

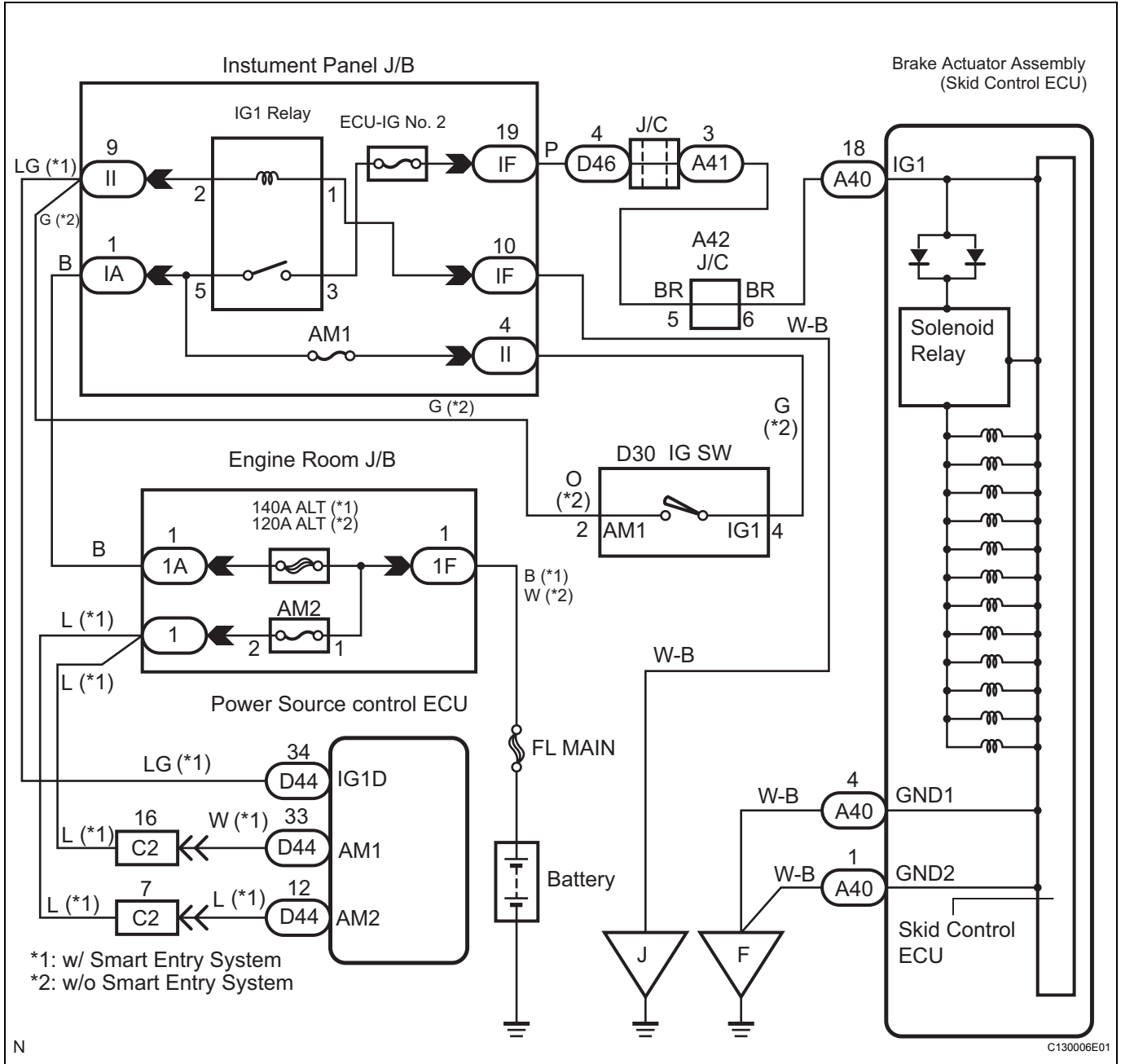
If a malfunction is detected in the power supply circuit of the brake actuator assembly (skid control ECU), the skid control ECU (housed in the actuator assembly) outputs the DTC and prohibits operation with the fail-safe function.

This DTC is output when the IG1 terminal voltage deviates from the DTC detecting condition due to a malfunction in the power supply or charging circuit such as the battery or alternator circuit, etc.

This DTC is cancelled when the IG1 terminal voltage returns to normal (only when the voltage returns to normal from a voltage lower than the specified value).

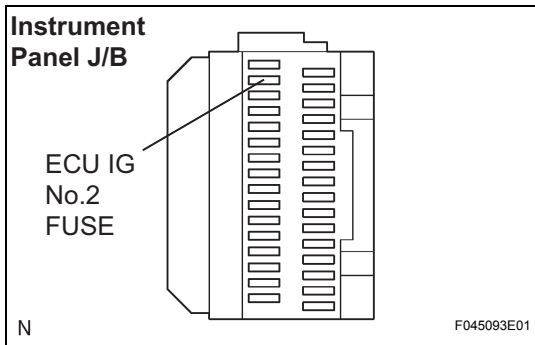
DTC No.	DTC Detecting Condition	Trouble Area
C1241/41	When either of the following (1 or 2) is detected: 1. When the vehicle speed is 4 mph (6 km/h) or more, battery voltage is 9.4 V or less with the ABS operating or 9.2 V or less with the ABS not operating. 2. IG terminal voltage is 16.9 V or more.	<ul style="list-style-type: none"> • Battery • Charging system • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT FUSE (ECU-IG NO.2 FUSE)



- (a) Remove the ECU-IG No.2 fuse from the instrument panel J/B.
- (b) Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Specified Condition
ECU-IG No.2 fuse	Below 1 Ω (Continuity)

NG INSPECT FOR SHORT IN ALL COMPONENTS CONNECTED TO FUSE AND REPAIR OR REPLACE THEM IF NEEDED, AND REPLACE FUSE

OK

2 INSPECT BATTERY

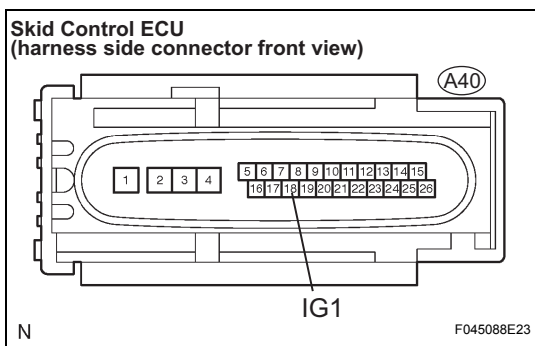
- (a) Check the battery voltage.

Voltage:
11 to 14 V

NG INSPECT CHARGING SYSTEM

OK

3 INSPECT SKID CONTROL ECU CONNECTOR (IG1 TERMINAL VOLTAGE)



- (a) Disconnect the skid control ECU connector.
- (b) Turn the ignition switch on (IG).
- (c) Measure the voltage according to the value(s) in the table below.

Voltage

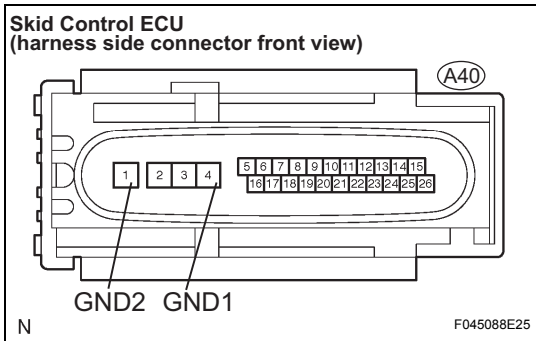
Tester Connection	Condition	Specified Condition
A40-18 (IG1) - Body ground	Ignition switch on (IG)	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)

OK

BC

4 INSPECT SKID CONTROL ECU CONNECTOR (GND TERMINAL CONTINUITY)



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

Resistance

Tester Connection	Specified Condition
A40-4 (GND1) - Body ground	Below 1 Ω
A40-1 (GND2) - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK

5 READ VALUE OF INTELLIGENT TESTER (IG VOLTAGE)

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select "DATA LIST" on the intelligent tester.

DATA LIST: ABS

Item	Measurement Item / Range (Display)	Normal condition
IG VOLTAGE	ECU power supply voltage / TOO LOW / NORMAL / TOO HIGH	TOO HIGH: 14.0 V or over NORMAL: 9.5 V to 14.0 V TOO LOW: Below 9.5 V

- (d) Read the voltage condition output from the ECU displayed on the intelligent tester.

OK:

"NORMAL" is displayed.

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page BC-15).

NG REPLACE BRAKE ACTUATOR ASSEMBLY

OK

END

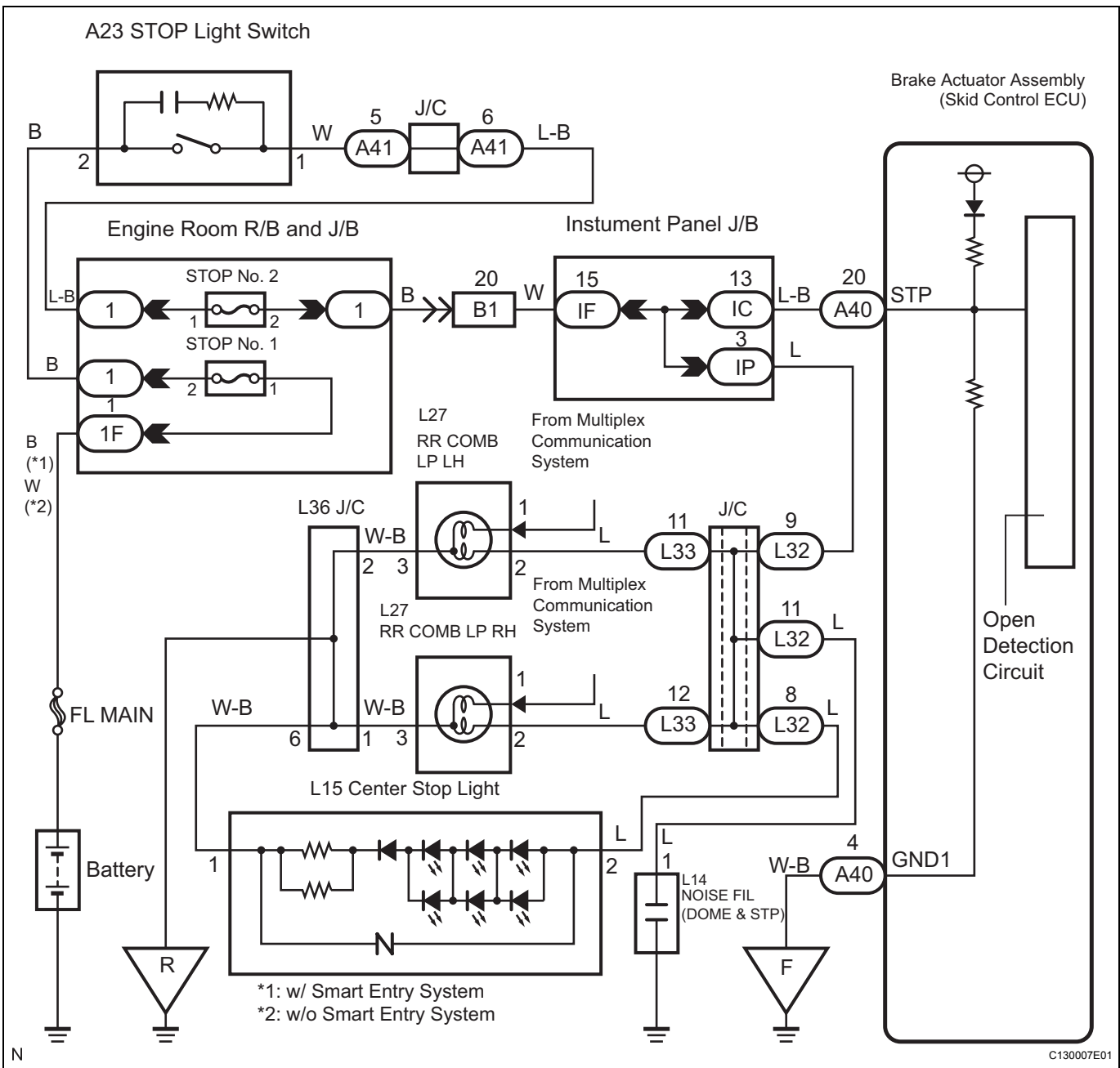
DTC	C1249/58	Stop Light Switch Circuit
------------	-----------------	----------------------------------

DESCRIPTION

This circuit recognizes brake operation by sending a stop light signal to the skid control ECU. The skid control ECU has an open detection circuit, which outputs this DTC when detecting an open in the stop light signal input line (STP terminal) or the ground line of the stop light circuit with the stop light switch OFF (brake pedal not depressed).

DTC No.	DTC Detecting Condition	Trouble Area
D1249/58	With the stop light switch OFF (brake pedal not depressed), the power supply voltage of the stop light switch is 40 % to 67 % of the battery voltage.	<ul style="list-style-type: none"> • Stop light switch • Stop light switch circuit

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 CHECK STOP LIGHT SWITCH OPERATION (STOP LIGHT SWITCH CIRCUIT)

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

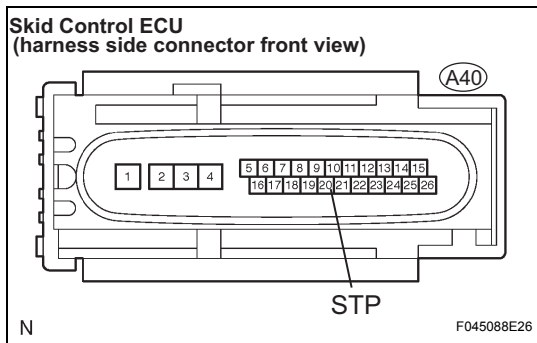
OK

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

NG → **Go to step 4**

OK

2 INSPECT SKID CONTROL ECU CONNECTOR (STP TERMINAL)



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

Voltage

Tester Connection	Switch Condition	Specified Condition
A40-20 (STP) - Body ground	Brake pedal depressed	8 to 14 V
A40-20 (STP) - Body ground	Brake pedal released	Below 4.0 V

NG → **Go to step 6**

OK

3 RECONFIRM DTC

- (a) Clear the DTC.
- (b) Start the engine.
- (c) Depress the brake pedal several times to test the stop light circuit.
- (d) Check that the same DTC is recorded.

HINT:

Reinstall the sensors, connectors, etc. and restore the vehicle to its prior condition before rechecking for DTCs.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

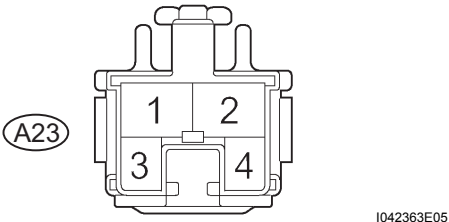
B → **REPLACE BRAKE ACTUATOR ASSEMBLY**

A

END

4 INSPECT STOP LIGHT SWITCH ASSEMBLY (POWER SOURCE TERMINAL VOLTAGE)

Stop Light Switch
(harness side connector front view)



- (a) Disconnect the stop light switch connector.
- (b) Measure the voltage according to the value(s) in the table below.

Voltage

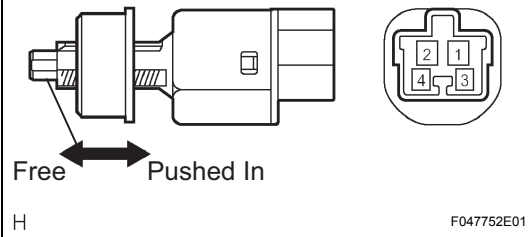
Tester Connection	Condition	Specified Condition
A23-2 - Body ground	Always	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

OK

5 INSPECT STOP LIGHT SWITCH ASSEMBLY

Stop Light Switch Assembly



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

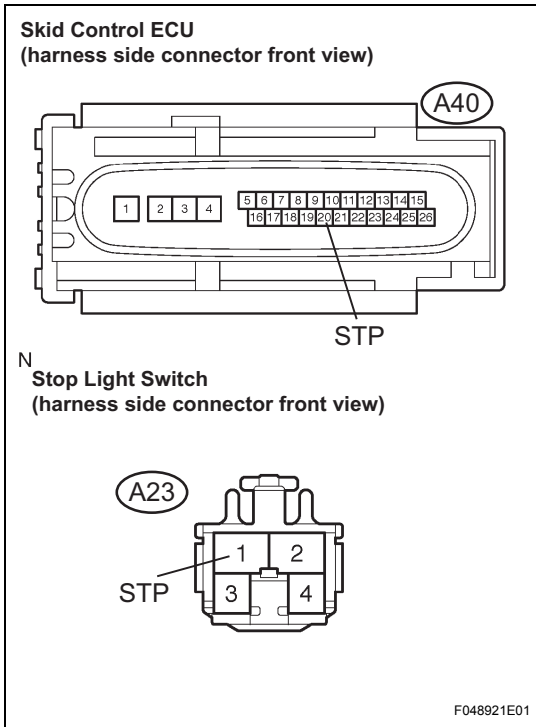
Resistance

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 LIGHT SWITCH ASSEMBLY**

OK

6 CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH TO SKID CONTROL ECU)



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

Resistance

Tester Connection	Specified Condition
A40-20 (STP) - A23-1 (STP)	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT SWITCH TO SKID CONTROL ECU)

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT CIRCUIT)

DTC	C1300/62	Skid Control ECU Malfunction
------------	-----------------	-------------------------------------

DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1300/62	Internal failure of the skid control ECU control unit.	Brake actuator assembly (skid control ECU)

INSPECTION PROCEDURE

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

(a) Check DTC.

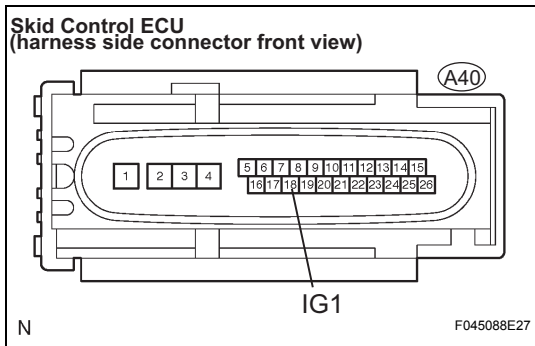
Result

Result	Proceed to
DTC C1300/62 is output (only C1300/62)	A
Other DTC is output	B

B → **REPAIR CIRCUIT INDICATED BY OUTPUT DTC**

A

2	INSPECT SKID CONTROL ECU CONNECTOR (IG1 TERMINAL VOLTAGE)
----------	--



- (a) Disconnect the skid control ECU connector.
- (b) Turn the ignition switch on (IG).
- (c) Measure the voltage according to the value(s) in the table below.

Voltage

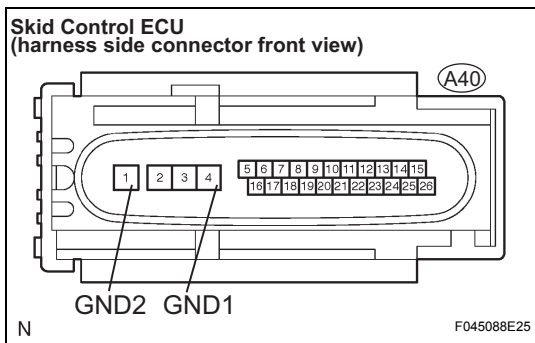
Tester Connection	Condition	Specified Condition
A40-18 (IG1) - Body ground	Ignition switch on (IG)	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)**

OK

BC

3	INSPECT SKID CONTROL ECU CONNECTOR (GND TERMINAL CONTINUITY)
----------	---



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

Resistance

Tester Connection	Specified Condition
A40-4 (GND1) - Body ground	Below 1 Ω
A40-1 (GND2) - Body ground	Below 1 Ω

NG → **CHECK AND REPAIR HARNESS AND CONNECTOR (GND CIRCUIT)**

OK

4 READ VALUE OF INTELLIGENT TESTER (IG VOLTAGE)

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select "DATA LIST" on the intelligent tester.

DATA LIST: ABS

Item	Measurement Item / Range (Display)	Normal condition
IG VOLTAGE	ECU power supply voltage / TOO LOW / NORMAL / TOO HIGH	TOO HIGH: 14.0 V or over NORMAL: 9.5 V to 14.0 V TOO LOW: Below 9.5 V

- (d) Read the voltage condition output from the ECU displayed on the intelligent tester.

OK:**"NORMAL" is displayed.****NG****REPLACE BRAKE ACTUATOR ASSEMBLY**

OK

END

DTC	C1301/42	CAN Communication System Malfunction
------------	-----------------	---

INSPECTION PROCEDURE

See page [CA-7](#).

ABS Warning Light Remains ON

If the ABS warning light remains on when reading DTCs by SST (CHECK WIRE), troubleshoot by following the inspection flow.

DESCRIPTION

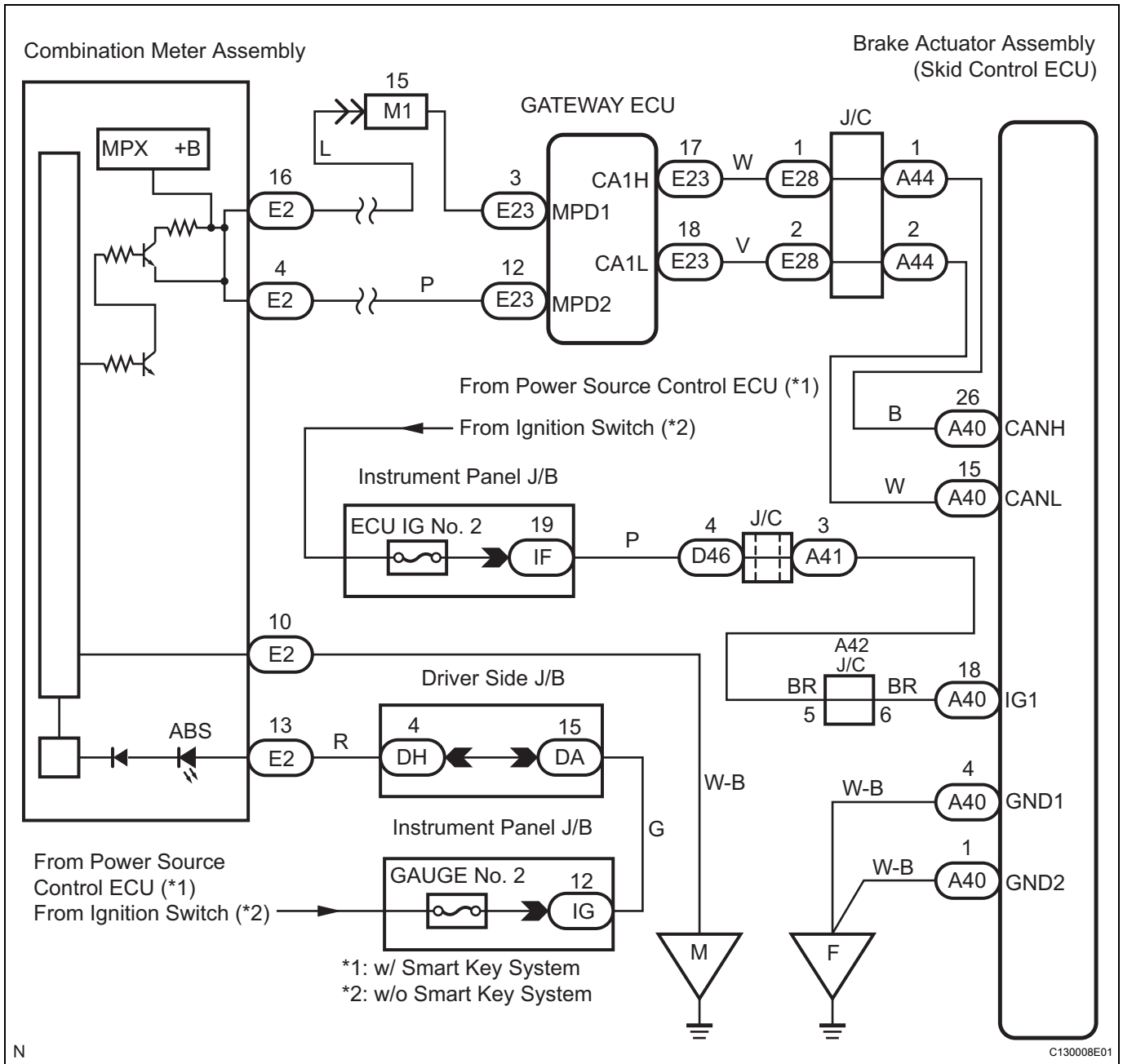
If any of the following is detected, the ABS warning light will remain on:

1. The skid control ECU connectors are disconnected from the skid control ECU.
2. There is a malfunction in the skid control ECU internal circuit.

HINT:

The intelligent tester may not be used when there is a malfunction in the skid control ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 INSPECT CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B → **REPAIR CAN COMMUNICATION SYSTEM**

A

2 INSPECT MULTIPLEX COMMUNICATION SYSTEM

(a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B → **REPAIR MULTIPLEX COMMUNICATION SYSTEM**

A

3 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

(a) Check if the skid control ECU connector is connected.

OK:

The connector should be securely connected.

NG → **CONNECT CONNECTOR TO ECU CORRECTLY**

BC

OK

4 INSPECT BATTERY

(a) Check the battery voltage.

Voltage:

11 to 14 V

NG → **INSPECT CHARGING SYSTEM**

OK

5 INSPECT SKID CONTROL ECU CONNECTOR (IG1 TERMINAL VOLTAGE)

- (a) WHEN USING INTELLIGENT TESTER
 - (1) Connect the intelligent tester to the DLC3.
 - (2) Start the engine.
 - (3) Select "DATA LIST" on the intelligent tester.

DATA LIST: ABS

Item	Measurement Item / Range (Display)	Normal Condition
IG VOLTAGE	ECU power supply voltage / TOO LOW / NORMAL / TOO HIGH	TOO HIGH: 14.0 or over NORMAL: 9.5 V to 14.0 V TOO LOW: Below 9.5 V

- (4) Read the voltage condition output from the skid control ECU displayed on the intelligent tester.

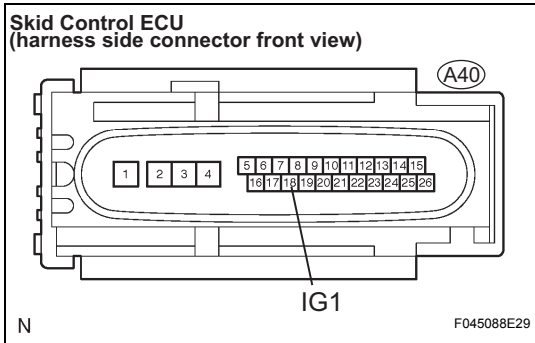
OK:

"NORMAL" is displayed.

- (b) WHEN NOT USING INTELLIGENT TESTER
 - (1) Disconnect the skid control ECU connector.
 - (2) Turn the ignition switch on (IG).
 - (3) Measure the voltage according to the value(s) in the table below.

Voltage

Tester Connection	Condition	Specified Condition
A40-18 (IG1) - Body ground	Ignition switch on (IG)	10 to 14 V



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)**

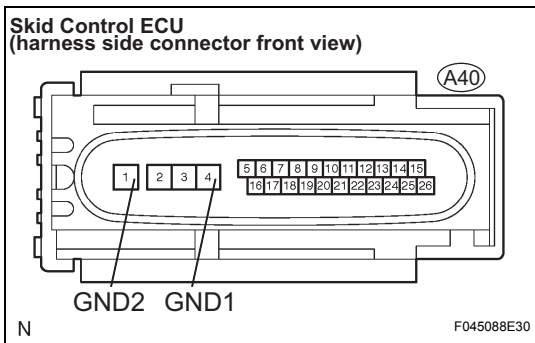
OK

6 INSPECT SKID CONTROL ECU CONNECTOR (GND TERMINAL CONTINUITY)

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

Resistance

Tester Connection	Specified Condition
A40-4 (GND1) - Body ground	Below 1 Ω
A40-1 (GND2) - Body ground	Below 1 Ω



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)**

OK

7 INSPECT COMBINATION METER ASSEMBLY

- (a) Check the combination meter assembly (See page ME-13).

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-15](#)).

NG

REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

ABS Warning Light does not Come ON

WIRING DIAGRAM

(See page [BC-67](#)).

INSPECTION PROCEDURE

1 INSPECT ABS WARNING LIGHT

HINT:

When disconnecting the skid control ECU connector, the ABS warning light comes on.

- (a) Turn the ignition switch off.
- (b) Disconnect the skid control ECU connector.
- (c) Turn the ignition switch on (IG).
- (d) Check that the ABS warning light comes on.

OK:

The ABS warning light comes on.

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-15](#)).

NG

Go to step 2

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

2 INSPECT CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

3 INSPECT MULTIPLEX COMMUNICATION SYSTEM

- (a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B → REPAIR MULTIPLEX COMMUNICATION SYSTEM

A

4 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter assembly (See page [ME-13](#)).

NG → REPLACE COMBINATION METER ASSEMBLY

OK

END

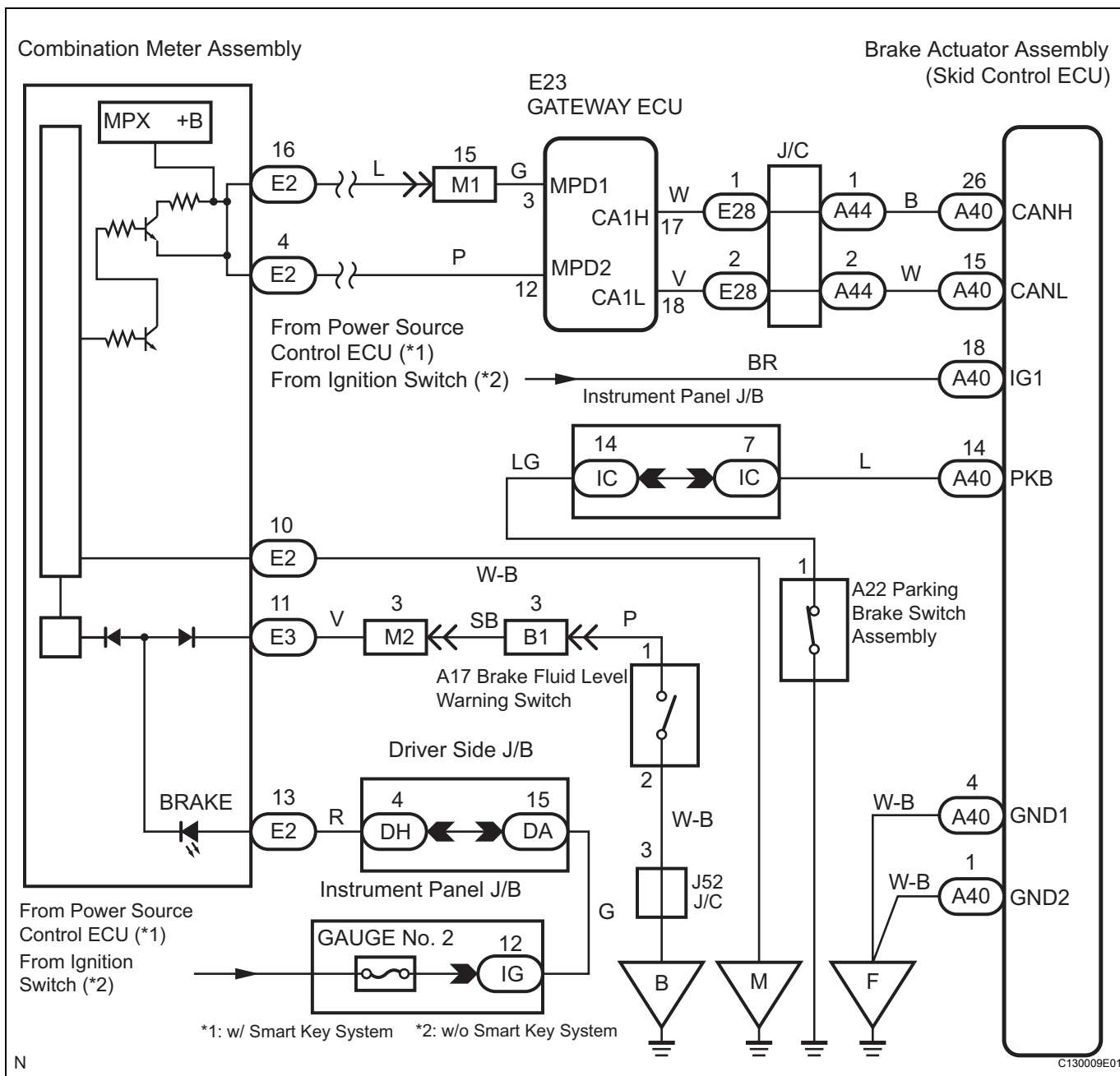
Brake Warning Light Remains ON

DESCRIPTION

If any of the following is detected, the brake warning light remains on:

1. The skid control ECU connector is disconnected from the skid control ECU.
2. The brake fluid level is insufficient.
3. The parking brake is applied.
4. The EBD is defective.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 CHECK DTC(a) Check if the ABS DTC is output (See page [BC-19](#)).**Result**

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CIRCUIT ACCORDING TO OUTPUT CODE

A

2 INSPECT CAN COMMUNICATION SYSTEM(a) Check if the CAN communication system DTC is output (See page [CA-15](#)).**Result**

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

3 INSPECT MULTIPLEX COMMUNICATION SYSTEM(a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).**Result**

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR MULTIPLEX COMMUNICATION SYSTEM

A

4 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

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

OK:**The connector should be securely connected.**

NG **CONNECT CONNECTOR TO ECU CORRECTLY**

OK

5 INSPECT BATTERY

(a) Check the battery voltage.

Voltage:
11 to 14 V

NG **INSPECT CHARGING SYSTEM**

OK

6 INSPECT SKID CONTROL ECU CONNECTOR (IG1 TERMINAL VOLTAGE)

- (a) WHEN USING INTELLIGENT TESTER
- (1) Connect the intelligent tester to the DLC3.
 - (2) Start the engine.
 - (3) Select "DATA LIST" on the intelligent tester.

DATA LIST: ABS

Item	Measurement Item / Range (Display)	Normal Condition
IG VOLTAGE	ECU power supply voltage / TOO LOW / NORMAL / TOO HIGH	TOO HIGH: 14.0 or over NORMAL: 9.5 V to 14.0 V TOO LOW: Below 9.5 V

- (4) Read the voltage condition output from the skid control ECU displayed on the intelligent tester.

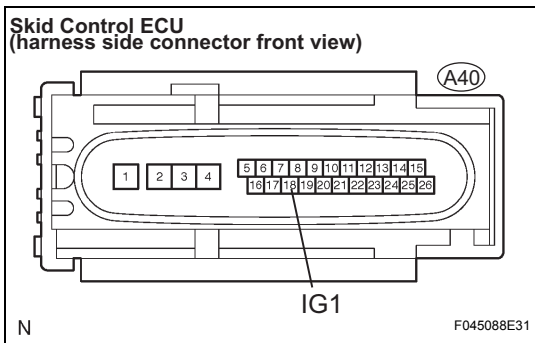
OK:

"NORMAL" is displayed.

- (b) WHEN NOT USING INTELLIGENT TESTER
- (1) Disconnect the skid control ECU connector.
 - (2) Turn the ignition switch on (IG).
 - (3) Measure the voltage according to the value(s) in the table below.

Voltage

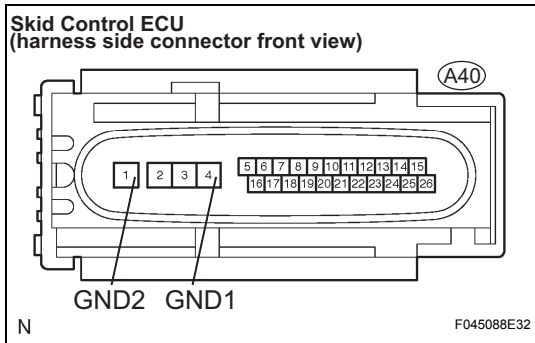
Tester Connection	Condition	Specified Condition
A40-18 (IG1) - Body ground	Ignition switch ON	10 to 14 V



NG **REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)**

OK

7 INSPECT SKID CONTROL ECU CONNECTOR (GND TERMINAL CONTINUITY)



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

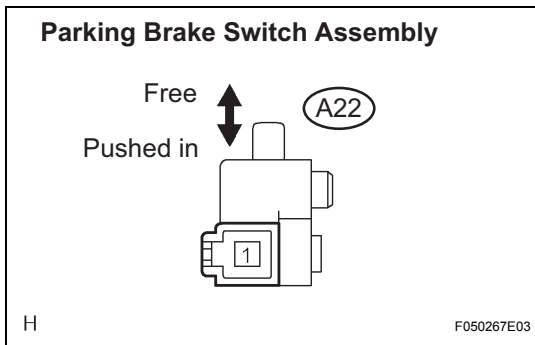
Resistance

Tester Connection	Specified Condition
A40-4 (GND1) - Body ground	Below 1 Ω
A40-1 (GND2) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)**

OK

8 INSPECT PARKING BRAKE SWITCH ASSEMBLY



- (a) Remove the parking brake switch assembly.
- (b) Measure the resistance according to the value(s) in the table below.

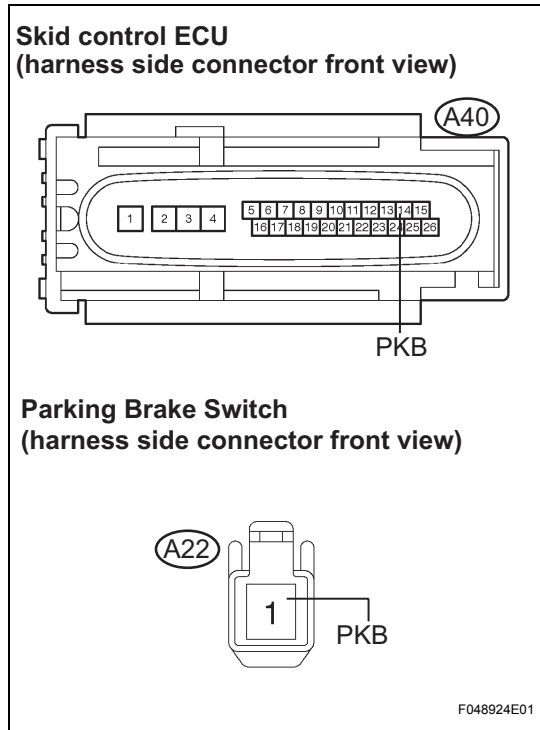
Resistance

Tester Connection	Switch Condition	Specified Condition
(A22-1) - Ground part	Free	Below 1 Ω
(A22-1) - Ground part	Pushed in	10 kΩ or higher

NG → **REPLACE PARKING BRAKE SWITCH ASSEMBLY**

OK

9 CHECK HARNESS OR CONNECTOR (SKID CONTROL ECU TO PARKING BRAKE SWITCH ASSEMBLY)



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

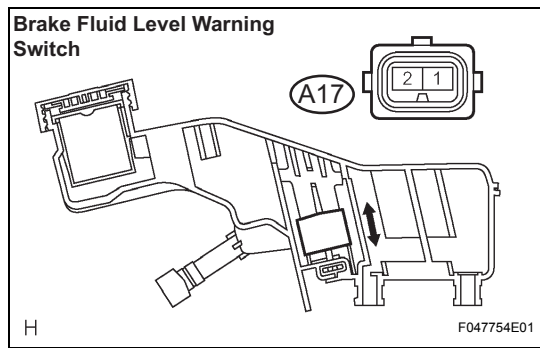
Resistance

Tester Connection	Specified Condition
A40-14 (PKB) - A22-1 (PKB)	Below 1 Ω
A40-14 (PKB) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU TO PARKING BRAKE SWITCH ASSEMBLY)

OK

10 INSPECT BRAKE FLUID LEVEL WARNING SWITCH ASSEMBLY



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

Resistance

Tester Connection	Switch Condition	Specified Condition
(A17-1) - (A17-2)	Float UP	10 kΩ or higher (No Continuity)
(A17-1) - (A17-2)	Float DOWN	Below 1 Ω (Continuity)

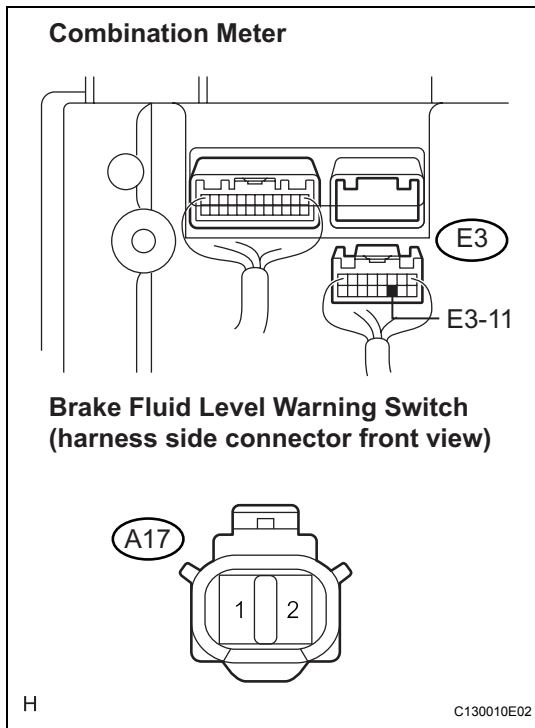
HINT:

If there is no problem after finishing the above check, adjust the brake fluid level to the MAX level.

NG REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY (BRAKE FLUID LEVEL WARNING SWITCH)

OK

11 CHECK HARNESS OR CONNECTOR (BRAKE FLUID LEVEL WARNING SWITCH TO COMBINATION METER)



- Disconnect the combination meter assembly and the brake fluid level warning switch connector.
- Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Specified Condition
(E3-11) - (A17-1)	Below 1 Ω
(E3-11) - Body ground	10 k Ω or higher
(A17-2) - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (BRAKE FLUID LEVEL WARNING SWITCH TO COMBINATION METER)

OK

12 INSPECT COMBINATION METER ASSEMBLY

- Check the combination meter assembly (See page [ME-13](#)).

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-15](#)).

NG

REPLACE COMBINATION METER ASSEMBLY

BC

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

Brake Warning Light does not Come ON

DESCRIPTION

(See page [BC-73](#)).

WIRING DIAGRAM

(See page [BC-73](#)).

INSPECTION PROCEDURE

1 INSPECT BRAKE WARNING LIGHT

HINT:

When disconnecting the skid control ECU connector, the brake warning light comes on.

- (a) Turn the ignition switch off.
- (b) Disconnect the skid control ECU connector.
- (c) Turn the ignition switch on (IG).
- (d) Check that the brake warning light comes on.

OK:

The brake warning light comes on.

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-15](#)).

NG

Go to step 2

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

2 INSPECT CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

3 INSPECT MULTIPLEX COMMUNICATION SYSTEM

- (a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B → REPAIR MULTIPLEX COMMUNICATION SYSTEM

A

4 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter assembly (See page [ME-13](#)).

NG → REPLACE COMBINATION METER ASSEMBLY

OK

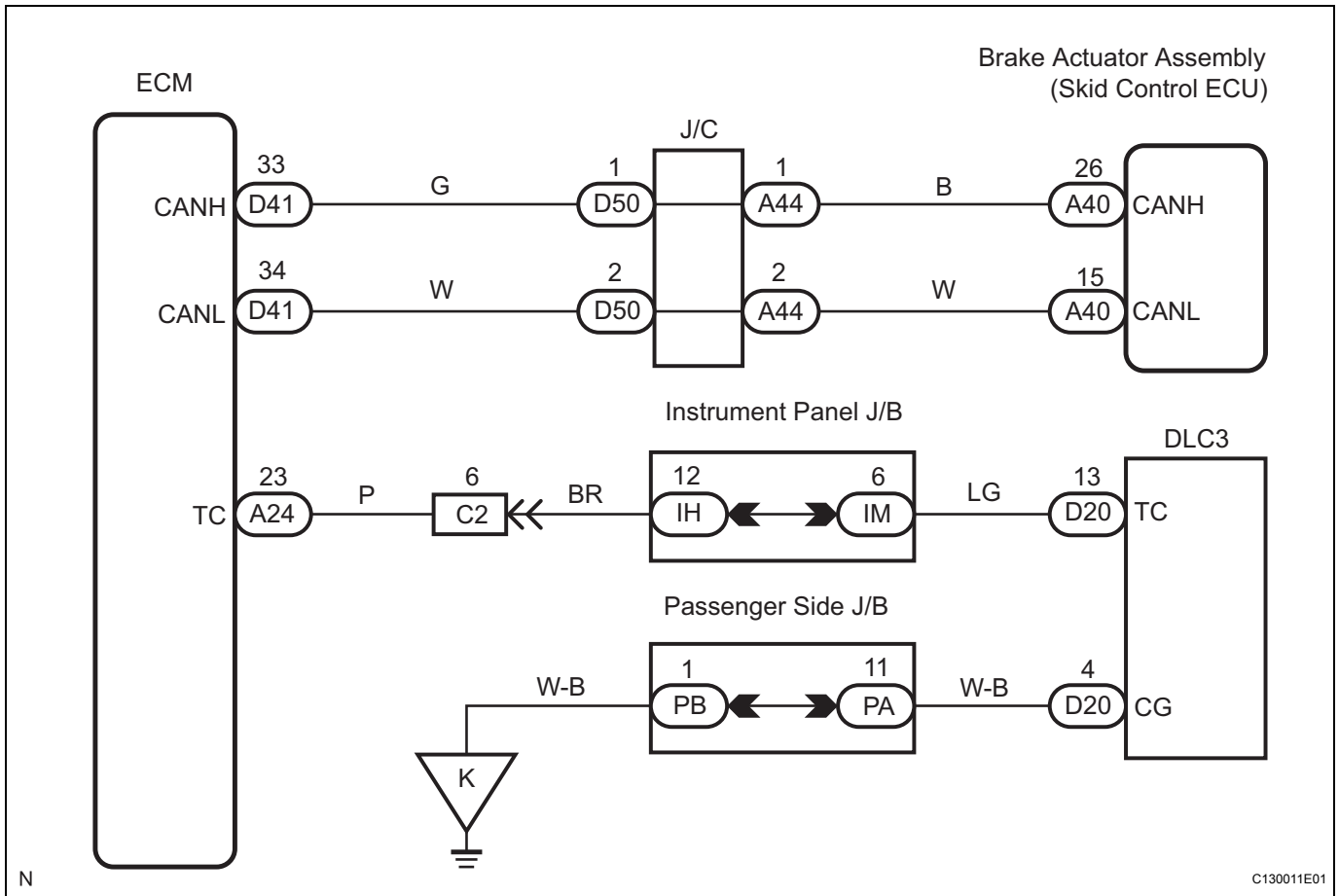
END

TC and CG Terminal Circuit

DESCRIPTION

DTC output mode is set by connecting terminals TC and CG of the DLC3. The DTCs are displayed by the blinking pattern of the ABS warning light.

WIRING DIAGRAM

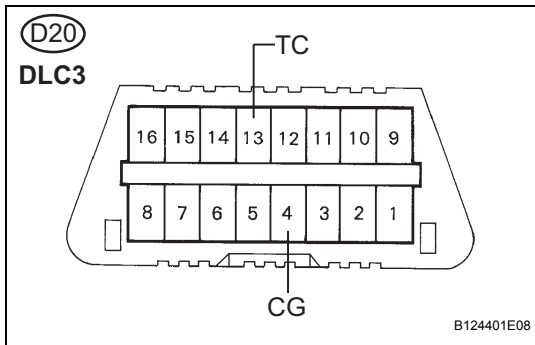


HINT:

When warning lights continue to blink, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in one or more ECUs is suspected.

INSPECTION PROCEDURE

1 INSPECT DLC3 TERMINAL VOLTAGE (TC TERMINAL VOLTAGE)



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

Voltage

Tester Connection	Condition	Specified Condition
D20-13 (TC) - Body ground	Ignition switch on (IG)	10 to 14 V

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

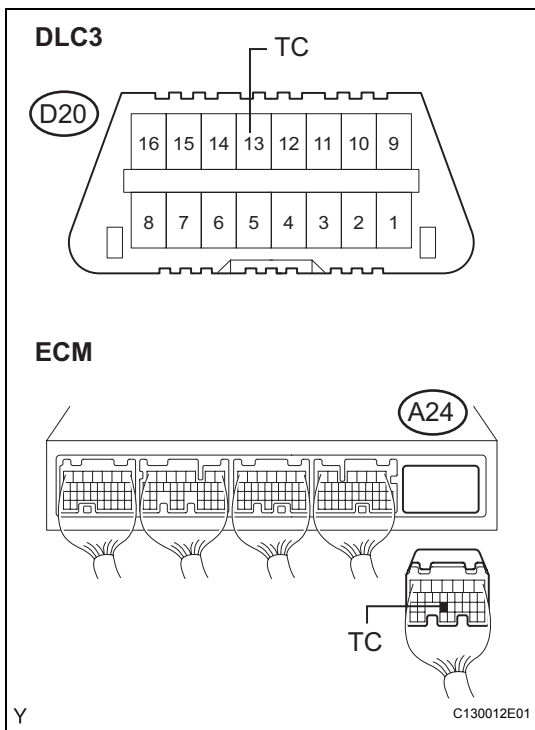
Resistance

Tester Connection	Specified Condition
D20-4 (CG) - Body ground	Below 1 Ω

NG → **Go to step 4**

OK

2 CHECK HARNESS AND CONNECTOR (ECM TO DLC3)



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

Resistance

Tester Connection	Specified Condition
A24-23 (TC) - D20-13 (TC)	Below 1 Ω

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

Resistance

Tester Connection	Specified Condition
D20-13 (TC) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (TC TERMINAL CIRCUIT)**

OK

3 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page CA-15).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

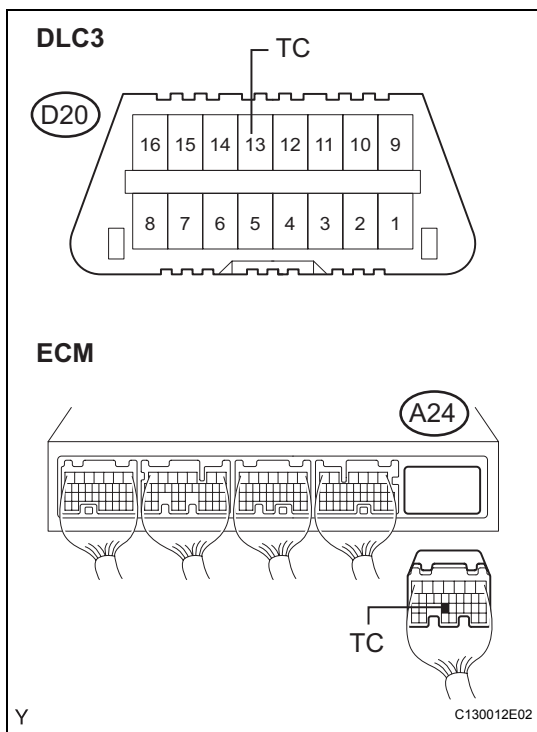
If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page BC-15).

B REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

REPLACE BRAKE ACTUATOR ASSEMBLY

4 CHECK HARNESS AND CONNECTOR (ECM TO DLC3)



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

Resistance

Tester Connection	Specified Condition
A24-23 (TC) - D20-13 (TC)	Below 1 Ω

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

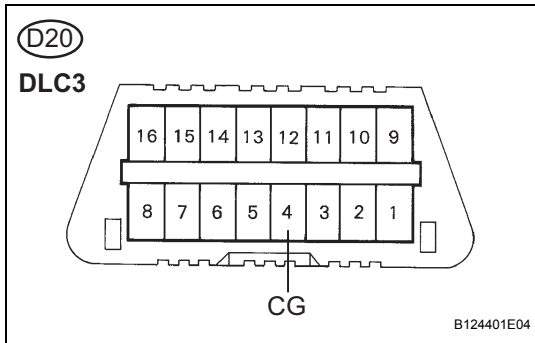
Resistance

Tester Connection	Specified Condition
D20-13 (TC) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (TC CIRCUIT)

OK

5 CHECK HARNESS AND CONNECTOR (DLC3 TO BODY GROUND)



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

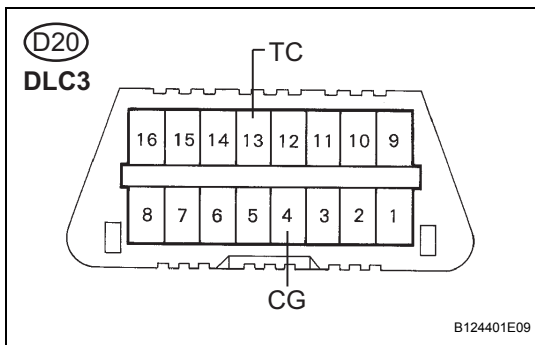
Resistance

Tester Connection	Specified Condition
D20-4 (CG) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)**

OK

6 CHECK ECM (DLC3 (TC) INPUT)



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

SST 09843-18040

(b) Check that the engine warning light is blinking.

Result

Result	Proceed to
Engine warning light is blinking	A
Engine warning light is not blinking	B

B → **REPLACE ECM**

A

7 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page [BC-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-26](#)).

B

REPAIR CIRCUIT INDICATED BY OUTPUT
CODE

A

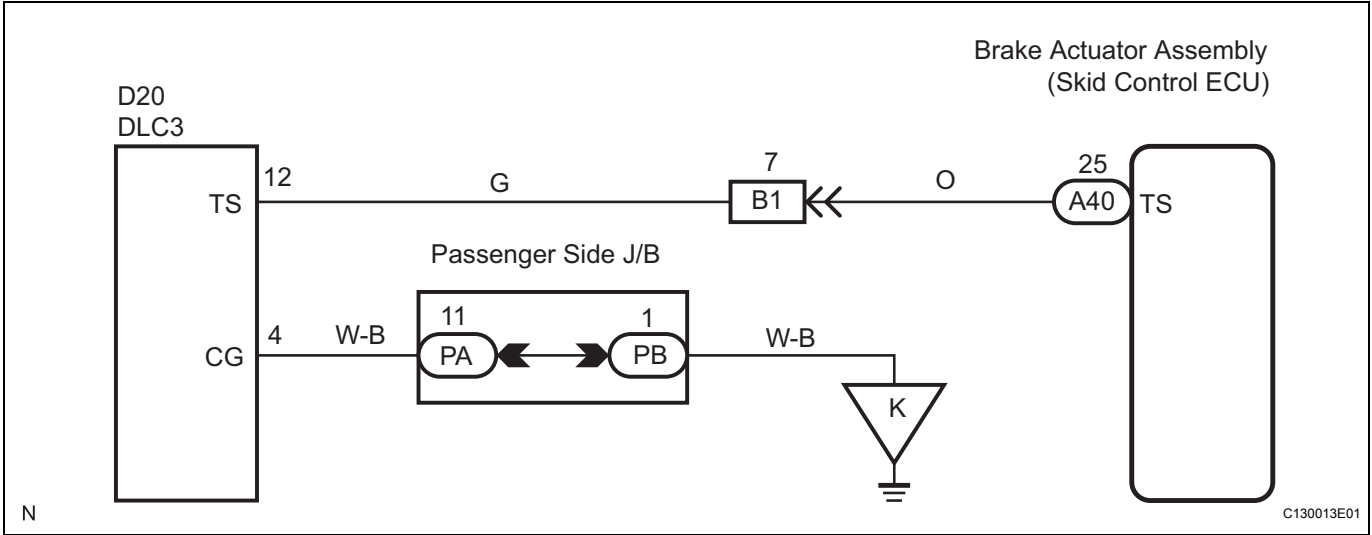
REPLACE BRAKE ACTUATOR ASSEMBLY

TS and CG Terminal Circuit

DESCRIPTION

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

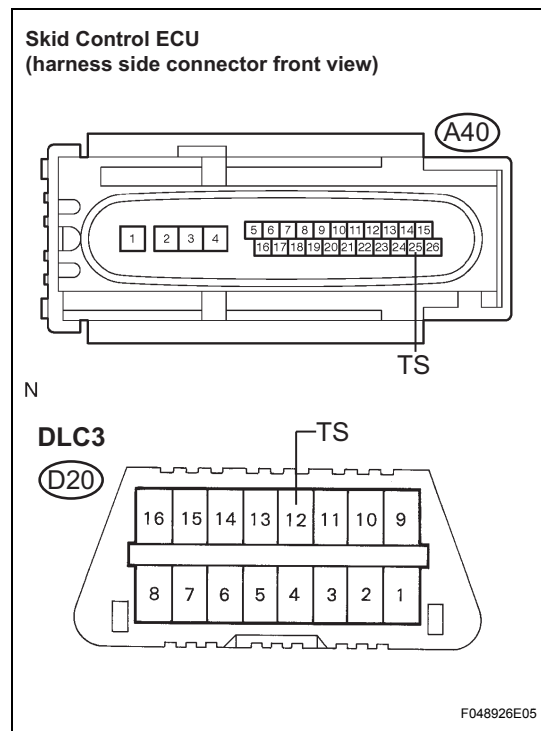
Connecting terminals TS and CG of the DLC3 starts the check.



WIRING DIAGRAM

INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR (TS of DLC3 TO TS of SKID CONTROL ECU)



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

Resistance

Tester Connection	Condition	Specified Condition
D20-12 (TS) - A40-25 (TS)	Always	Below 1 Ω

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

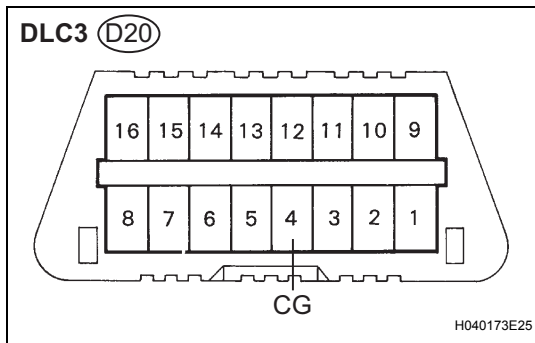
Resistance

Tester Connection	Condition	Specified Condition
A40-25 (TS) - Body ground	Always	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (TS of DLC3 TO TS of SKID CONTROL ECU)

BC

OK

2 CHECK HARNESS AND CONNECTOR (CG of DLC3 TO BODY GROUND)

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

Resistance

Tester Connection	Condition	Specified Condition
D20-4 (CG) - Body ground	Always	Below 1 Ω

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-15](#)).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (CG of DLC3 TO BODY GROUND)

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

VEHICLE STABILITY CONTROL SYSTEM

PRECAUTION

NOTICE:

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

System Name	See procedure
Power Window Control System	IN-29
Sliding Roof System	

1. TROUBLESHOOTING PRECAUTION

NOTICE:

- When there is a malfunction in the contact point of the terminals or installation problems with parts, removal and installation of the suspected problem parts may return the system to the normal condition either completely or temporarily.
- In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as by DTC output and freeze frame data output, and record it before disconnecting each connector or removing and installing parts.
- Since the ABS with EBD & BA & TRAC & VSC systems may be influenced by a malfunction in the other systems, be sure to check for DTCs in the other systems.
- Be sure to remove and install the ABS & TRACTION actuator assembly and each sensor with the ignition switch off unless specified in the inspection procedure.
- When removing and installing the ABS & TRACTION actuator assembly and each sensor, be sure to check that the normal display is output in the test mode inspection and in DTC output inspection after installing all the parts.
- After replacing the ABS & TRACTION actuator assembly and/or the yaw rate and acceleration sensor, make sure to perform yaw rate and acceleration sensor zero point calibration.
- The CAN communication system is used for data communication between the skid control ECU, the steering angle sensor, and the yaw rate sensor (the acceleration sensor is included).
If there is trouble in the CAN communication line, the DTC of the communication line is output.
- If the DTC of the CAN communication line is output, repair the malfunction in the communication line and troubleshoot the ABS with EBD & BA & TRAC & VSC systems.

- Since the CAN communication line has its own length and route, it cannot be repaired temporarily with the bypass wire, etc.

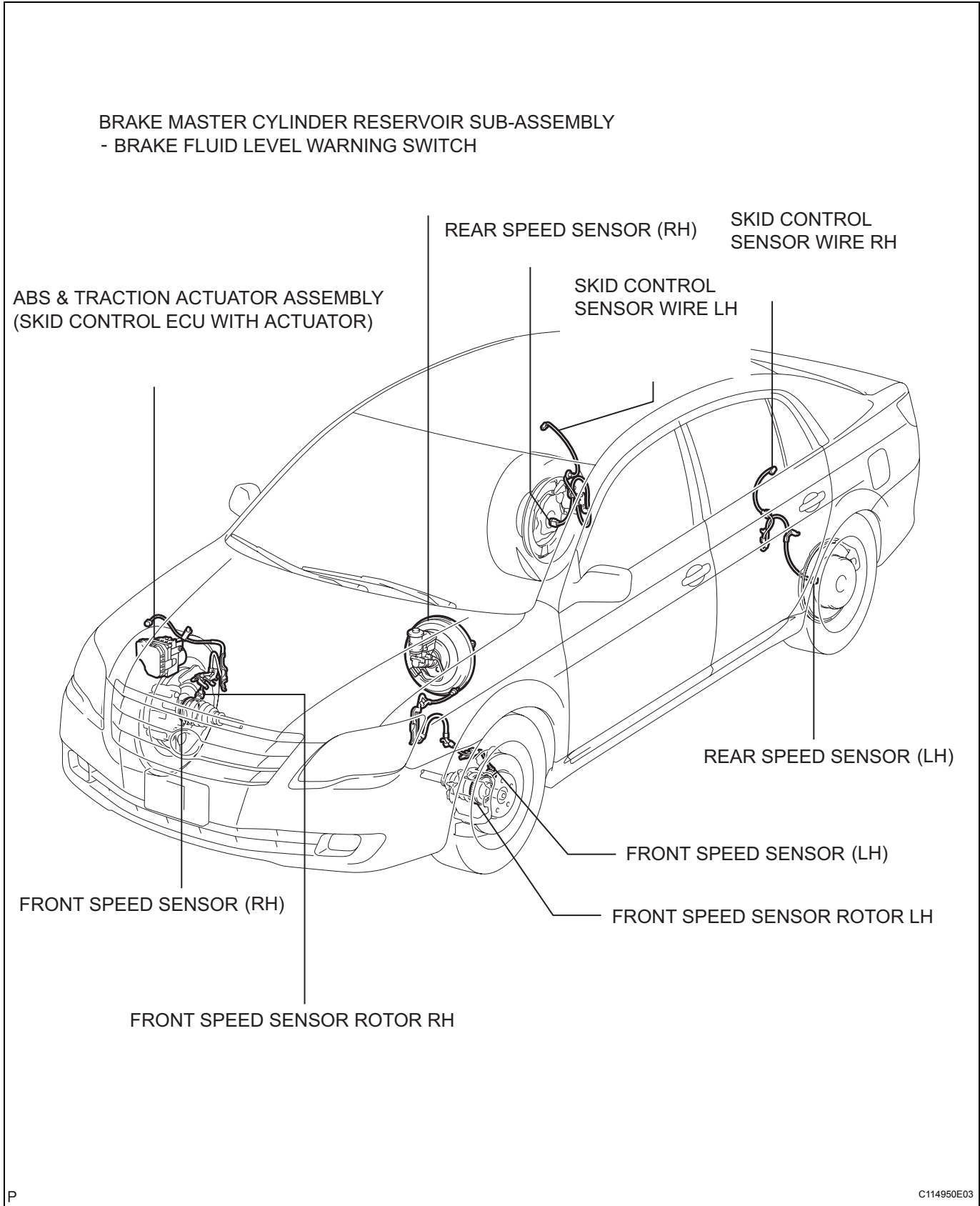
2. EXPRESSIONS OF IGNITION SWITCH

The type of ignition switch used on this model differs according to the specifications of the vehicle.

The expressions listed in the table below are used in this section.

	Switch Type	Ignition Switch (position)	Engine Switch (condition)
Expression	Ignition Switch off	LOCK	Off
	Ignition Switch on (IG)	ON	On (IG)
	Ignition Switch on (ACC)	ACC	On (ACC)
	Engine Start	START	Start

PARTS LOCATION



BC

COMBINATION METER ASSEMBLY

- ABS WARNING LIGHT
- BRAKE WARNING LIGHT
- VSC WARNING LIGHT
- SLIP INDICATOR LIGHT

SKID CONTROL BUZZER

INSTRUMENT PANEL J/B

- ECU IG NO.2 FUSE

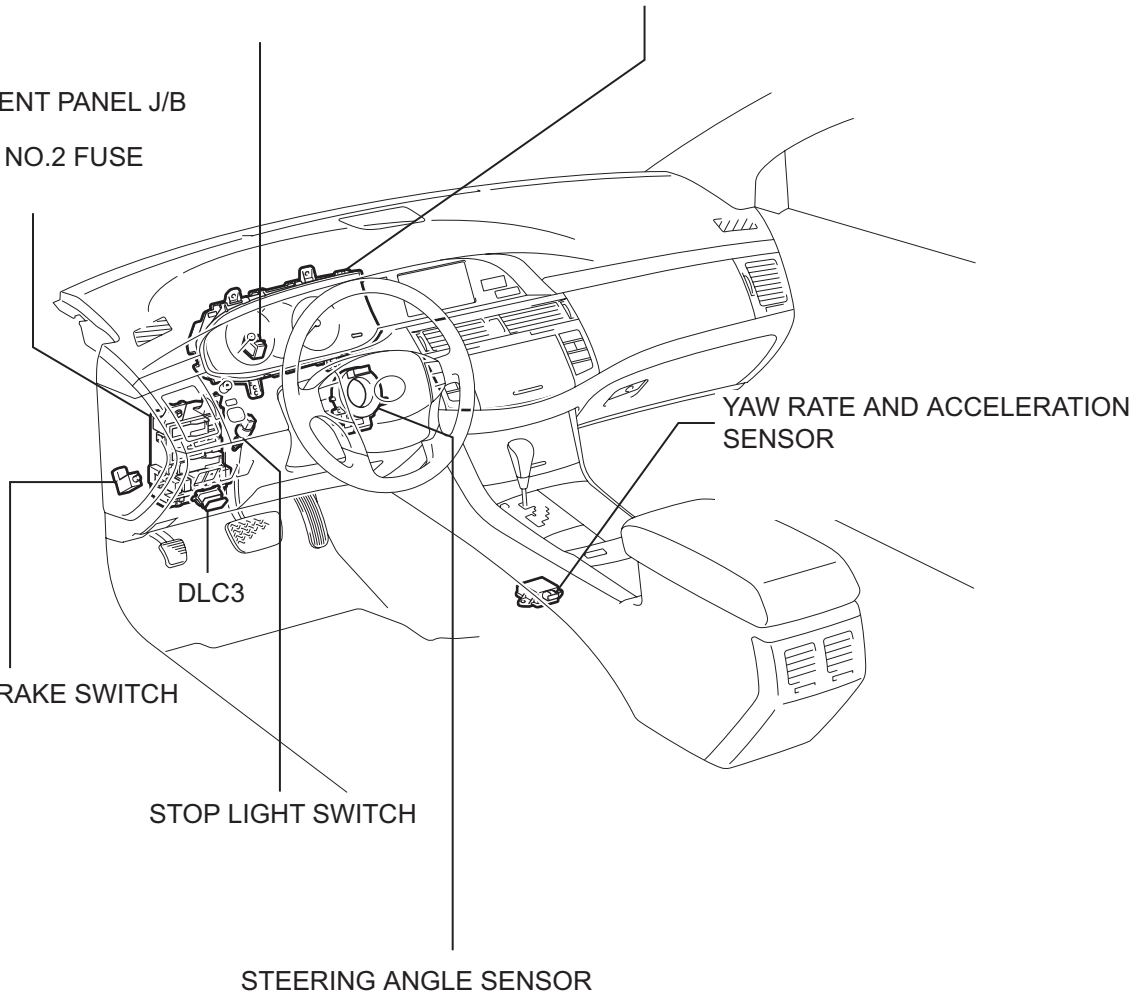
YAW RATE AND ACCELERATION
SENSOR

DLC3

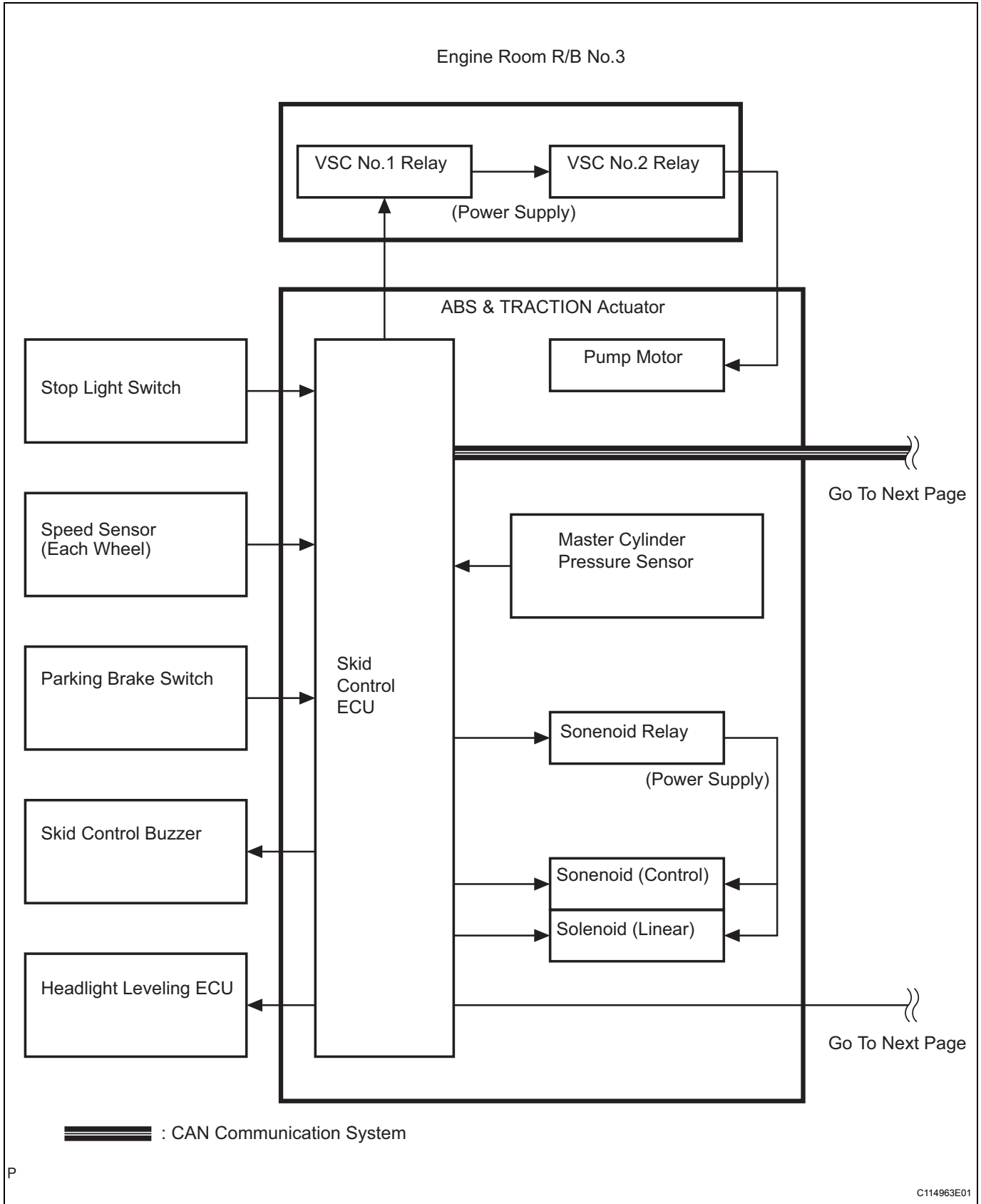
PARKING BRAKE SWITCH

STOP LIGHT SWITCH

STEERING ANGLE SENSOR

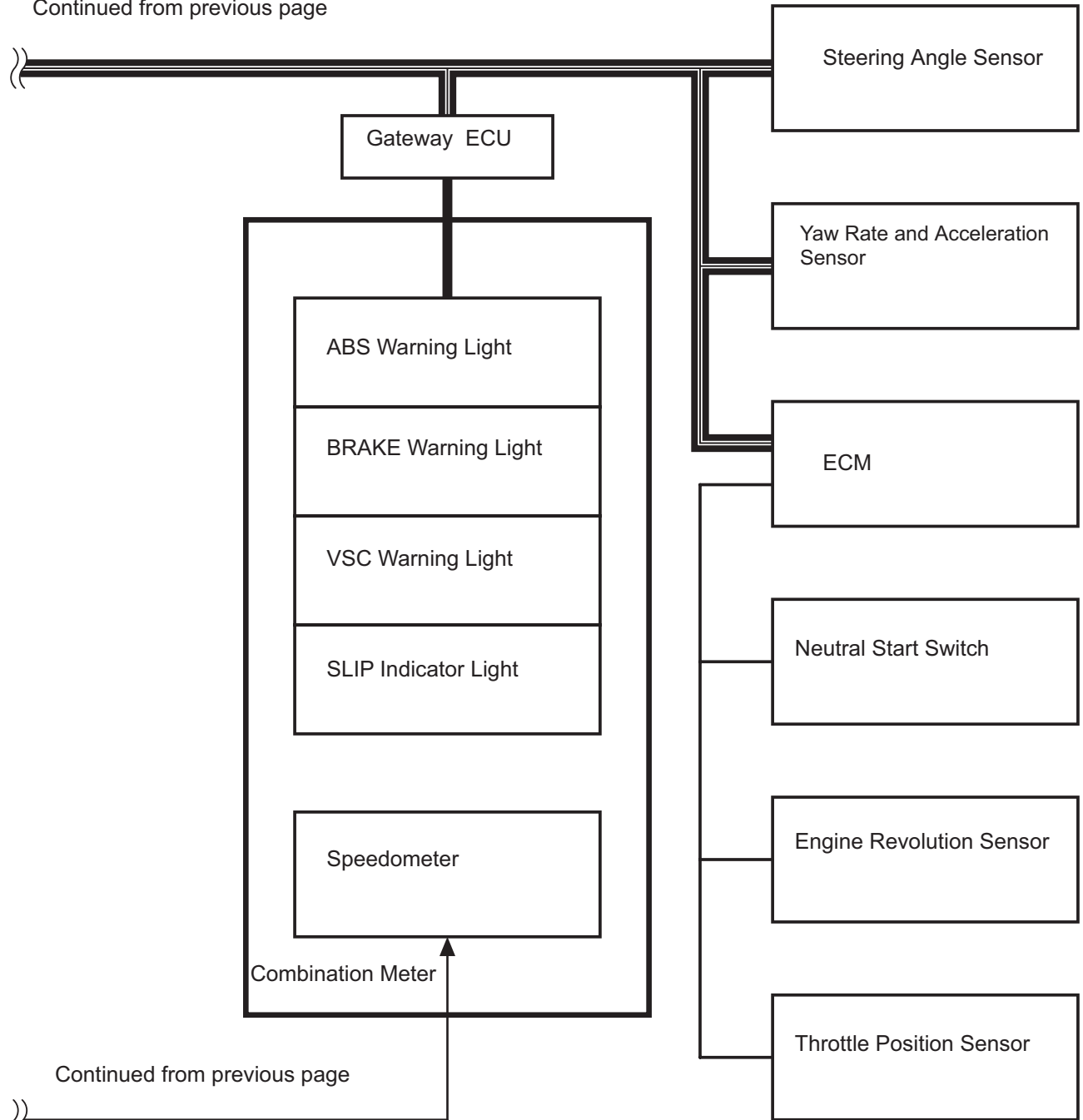


SYSTEM DIAGRAM





BC

Continued from previous page



Continued from previous page

 : CAN Communication System
 : Multiplex Communication System (BEAN Bus)

BC

P

C118754E02

Transmitting ECU (transmitter)	Receiving ECU	Signals	Communication method
ECM	Skid Control ECU	<ul style="list-style-type: none"> • Shift Position signal • Throttle Position Signal • Engine Revolution Signal 	CAN Communication System

Transmitting ECU (transmitter)	Receiving ECU	Signals	Communication method
Skid Control ECU	ECM	<ul style="list-style-type: none"> • Yaw Rate and Acceleration Signal • Torque Demand Signal 	CAN Communication System
Skid Control ECU	Combination Meter	<ul style="list-style-type: none"> • ABS Warning Light ON Signal • VSC Warning Light ON Signal • Brake Warning Light ON Signal • SLIP Indicator Light ON Signal 	<ul style="list-style-type: none"> • CAN Communication System • Multiplex communication System

SYSTEM DESCRIPTION

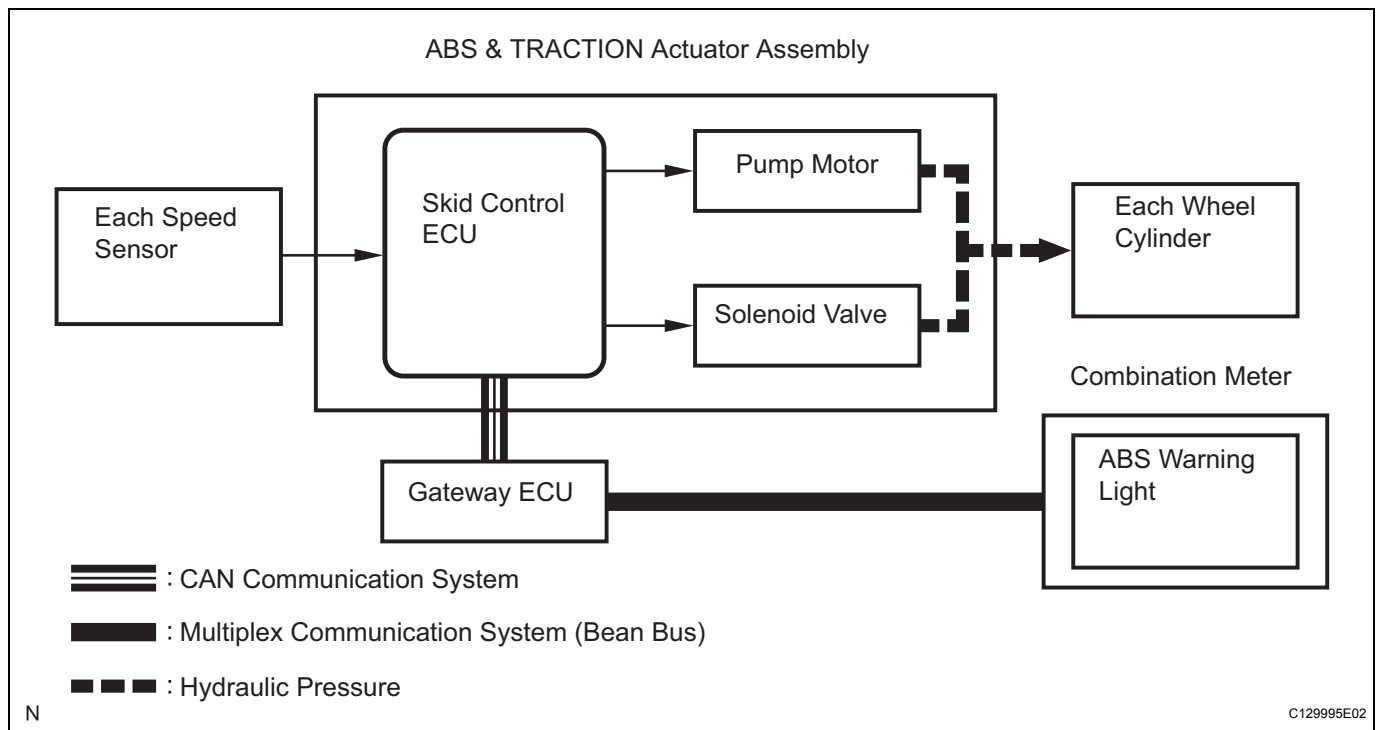
1. SYSTEM DESCRIPTION

HINT:

- The skid control ECU is located within the ABS & TRACTION actuator assembly.
- The yaw rate sensor and acceleration sensor are combined and in a signal unit. This unit communicates with the skid control ECU through CAN communication.

(a) ABS (Anti-lock Brake System)

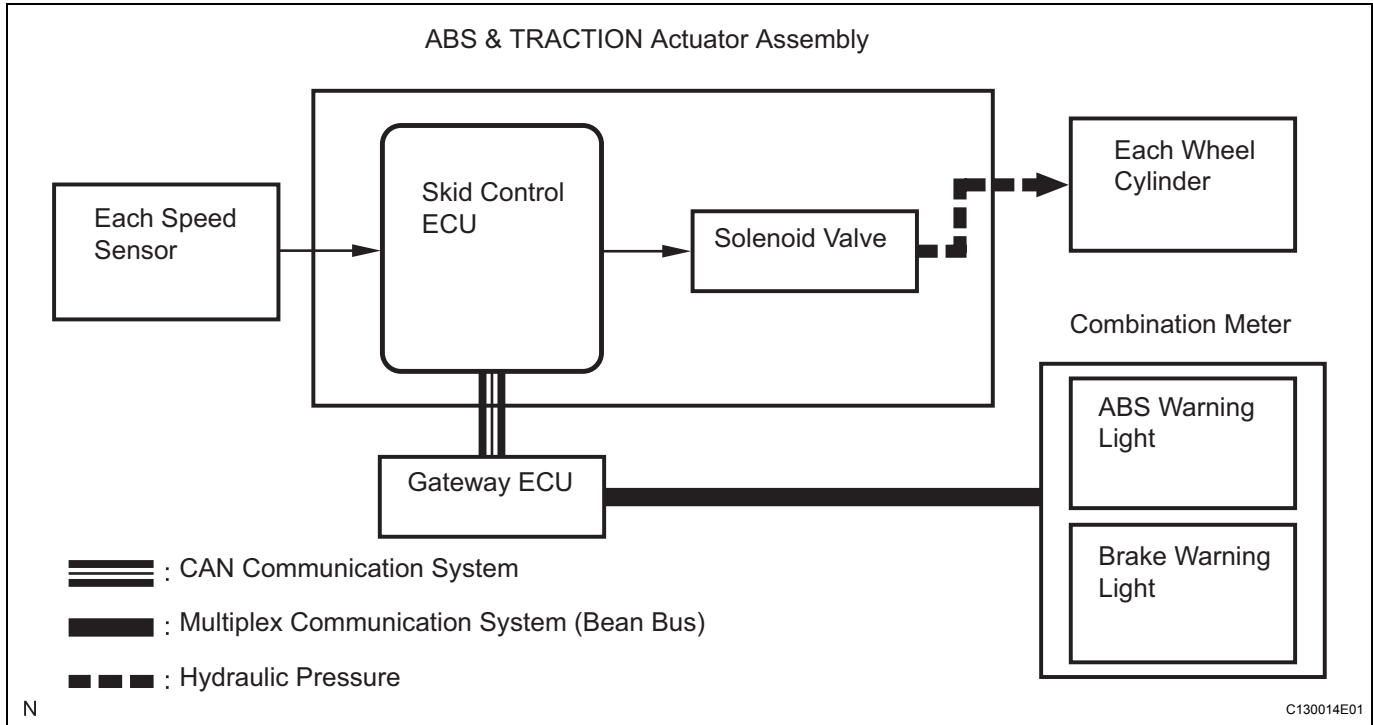
The ABS helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface.



(1) Operation description

The skid control ECU detects wheel lock condition by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valve. The pump motor and solenoid valve avoid wheel lock by controlling the hydraulic pressure of each wheel cylinder. The ABS warning light comes on when the ABS system is malfunctioning.

- (b) EBD (Electronic Brake force Distribution)
The EBD control utilizes ABS, realizing proper brake force distribution between the front and rear wheels in accordance with driving conditions. In addition, when braking while cornering, it also controls the brake forces of the right and left wheels, helping to maintain vehicle behavior.



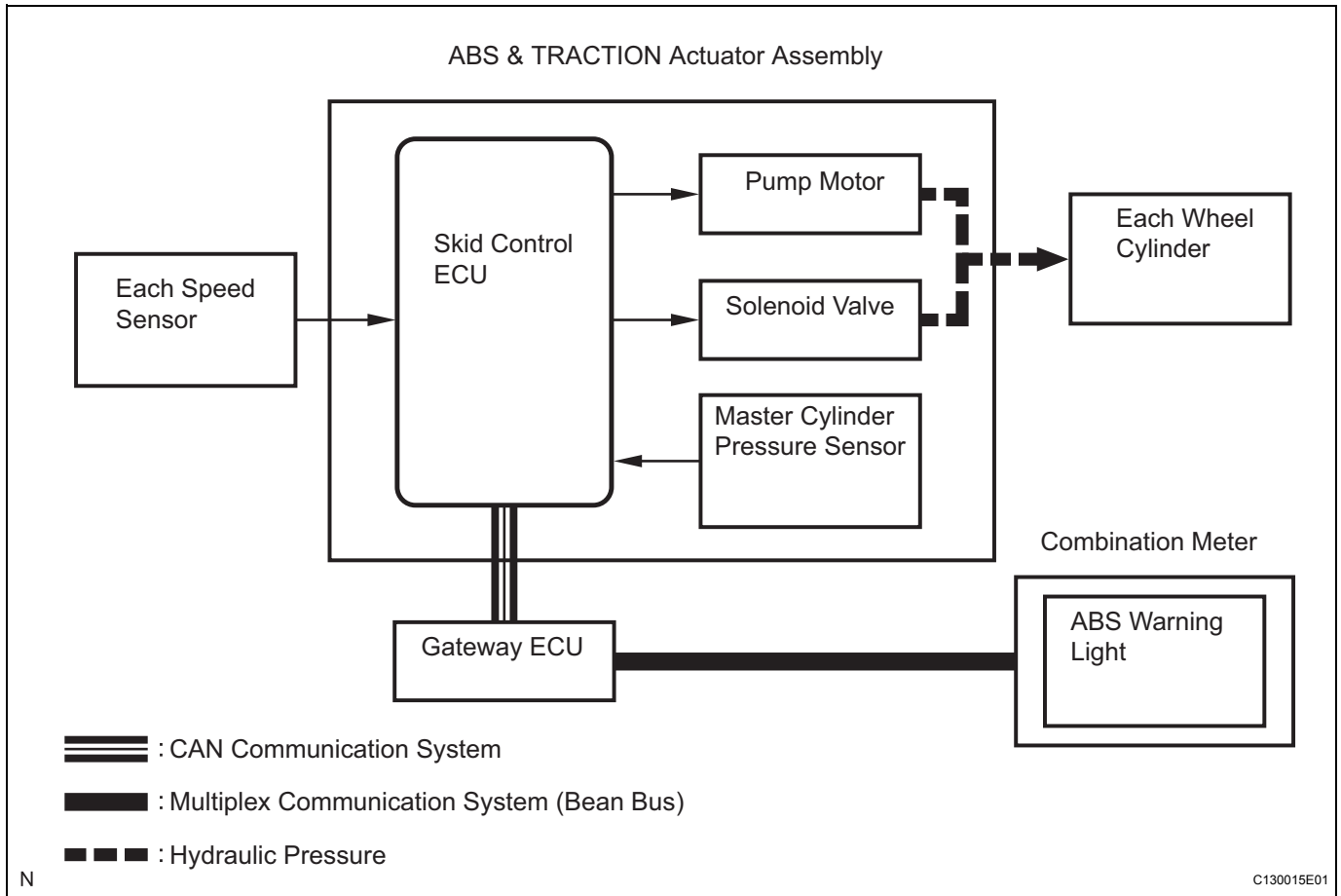
(1) Operation description

The skid control ECU receives the speed signal from each speed sensor to detect the slip condition of the wheels and sends the control signal to the solenoid.

The solenoid valve controls the hydraulic pressure of each wheel cylinder and splits the control power properly between the front and rear wheels and the right and left wheels. Both of the ABS and BRAKE warning lights come on to indicate a malfunction in the EBD system.

(c) BA (Brake Assist)

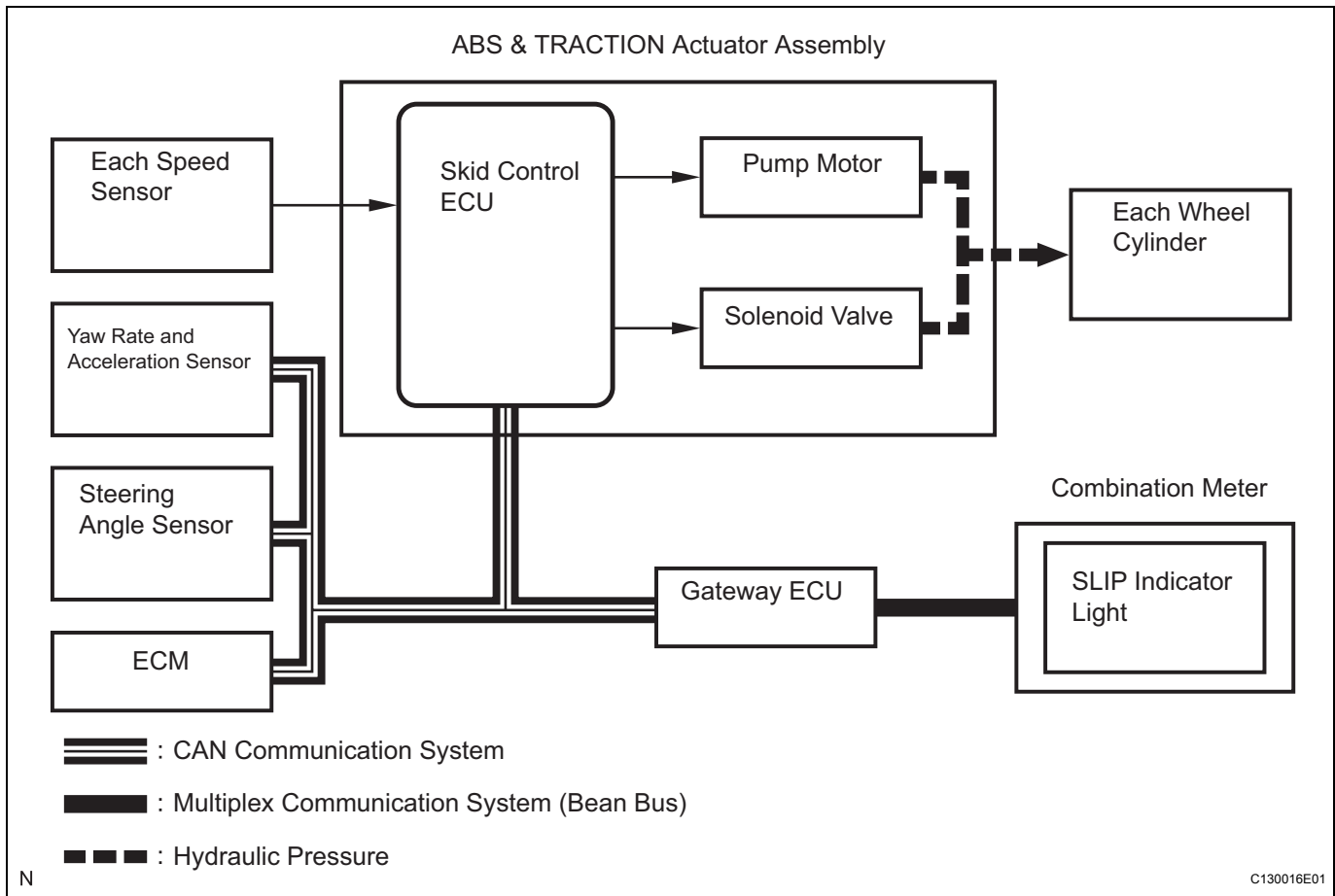
The primary purpose of the brake assist system is to provide auxiliary brake force to assist the driver who cannot generate a large enough brake force during emergency braking, thus helping to maximize the vehicle's brake performance.



(1) Operation description

The skid control ECU receives the hydraulic pressure signal from the master cylinder pressure sensor to determine whether brake assist is necessary or not. If brake assist is deemed necessary, the skid control ECU sends control signals to the pump motor and solenoid. The pump and the solenoid valve then control the pressure applied to each wheel cylinder. The ABS warning light comes on to indicate a malfunction in the BA (brake assist) system.

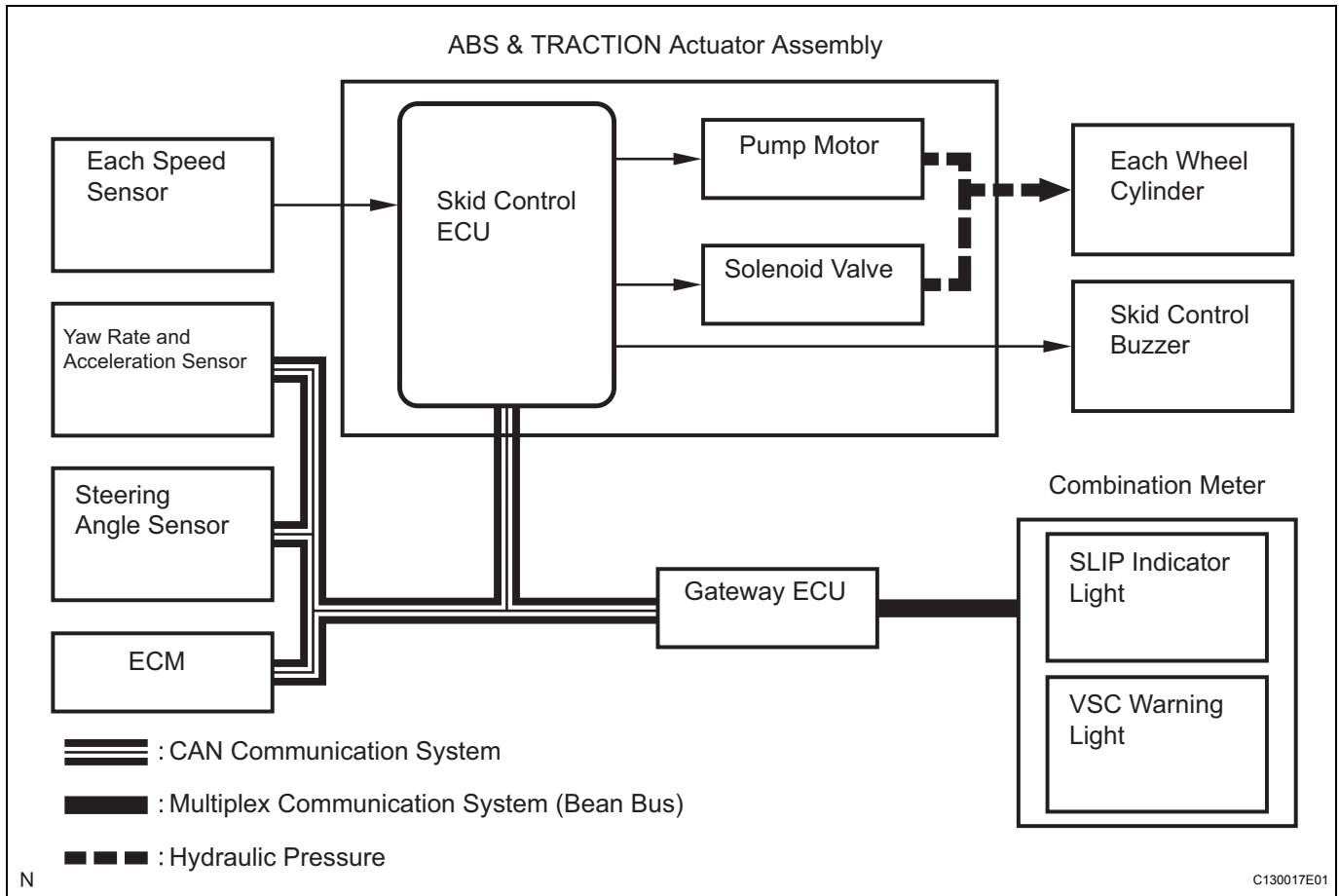
- (d) TRAC (Traction Control)
The TRAC system helps prevent the drive wheels from slipping if the driver presses down on the accelerator pedal excessively when starting off or accelerating on a slippery surface.



- (1) Operation description
The skid control ECU detects vehicle's slip condition by receiving signals from each speed sensor and ECM via CAN communication. The skid control ECU controls engine torque with the ECM via CAN communication and hydraulic pressure through the pump and solenoid valve. The SLIP indicator light blinks when the system is operating.

(e) VSC (Vehicle Stability Control)

The VSC system helps prevent the vehicle from slipping sideways as a result of strong front or rear wheel skid during cornering.



(1) Operation description

The skid control ECU determines vehicle condition by receiving signals from the speed sensor, yaw rate and acceleration sensor and steering angle sensor. The skid control ECU controls engine torque with the ECM via CAN communication, and hydraulic pressure with the pump and solenoid valve. The SLIP indicator light blinks and the buzzer sounds when the system is operating.

2. ABS with EBD & BA & TRAC & VSC OPERATION

- (a) The skid control ECU calculates vehicle stability tendency based on the signals from the speed sensor, yaw rate and acceleration sensor and steering angle sensor. In addition, it evaluates the results of the calculations to determine whether any control actions (control of the engine output torque by electronic throttle control and the wheel brake pressure by the ABS & TRACTION actuator assembly) should be implemented.

- (b) The SLIP indicator blinks and the skid control buzzer sounds to inform the driver that the VSC system is operating. The SLIP indicator also blinks when traction control is operating, and the operation being performed is displayed.

3. FAIL SAFE FUNCTION

- (a) When a failure occurs in the ABS with BA & TRAC & VSC systems, the ABS warning light and the VSC warning light come on and ABS with BA & TRAC & VSC operations are prohibited. In addition to this, when there is a failure that disables the EBD operation, the brake warning light also comes on and the EBD operation is prohibited.
- (b) If control is prohibited due to a malfunction during operation, control will be disabled gradually. This is to avoid sudden vehicle instability.

4. INITIAL CHECK

When the vehicle speed first becomes approximately 4 mph (6 km/h) or more after the ignition switch is turned on (IG), each solenoid valve and motor of the brake actuator is sequentially activated to perform an electrical check. During the initial check, the operating sound of solenoid valve and motor can be heard from the engine compartment, but this is not a malfunction.

5. FUNCTION OF COMPONENTS

Components	Function
Front and speed sensors	Detect the wheel speed and send the signal to the skid control ECU.
Skid control ECU (housed in ABS & TRACTION actuator assembly)	<ul style="list-style-type: none"> Processes the signals sent from each sensor to control the ABS, BA, TRAC, and VSC. Sends and receives the control signals to or from the ECM, yaw rate and acceleration sensor, and steering angle sensor, etc. via CAN communication.
ABS & TRACTION actuator assembly	<ul style="list-style-type: none"> Consists of the master cylinder cut solenoid valve, retention solenoid valve, pressure reduction solenoid valve, pump motor, and reservoir, and adjusts the brake hydraulic pressure applied to each wheel cylinder. Housed in the skid control ECU.
Solenoid relay	<ul style="list-style-type: none"> Supplies power to each solenoid. Houses the skid control ECU
Motor relay (VSC No.1 relay)	<ul style="list-style-type: none"> Supplies power to .pump motor. Installed in the engine room R/B No.3.
Fail-safe relay (VSC No.2 relay)	<ul style="list-style-type: none"> Cuts off power to the motor when the pump motor circuit malfunctions. Installed in the engine room R/B No.3.
Steering angle sensor	<ul style="list-style-type: none"> Installed in the combination switch. Detects the steering amount and direction and sends the signals to the skid control ECU via CAN communication. Has the magnetic resistance element which detects the rotation of the magnet housed in the detection gear in order to detect the changes of magnetic resistance and the steering amount and direction.
Yaw rate and acceleration sensor	<ul style="list-style-type: none"> Acceleration sensor measures the amount of deflection of beam in the sensor, which occurs when the vehicle is accelerated, and converts the measured value into electrical signals. Yaw rate sensor detects the vehicle's angular velocity (yaw rate) in the vertical direction based on the amount and direction of the piezoelectric ceramics deflection. Sends signals to the skid control ECU via CAN communication.
Master cylinder pressure sensor	<ul style="list-style-type: none"> Detects the hydraulic pressure in the master cylinder. Housed in the ABS & TRACTION actuator assembly.
ECM	Controls the engine output when TRAC and VSC are operating with the skid control ECU via CAN communication.

Components	Function
Skid control buzzer	Intermittently sounds to inform the driver that the VSC is operating.
ABS warning light	<ul style="list-style-type: none"> Comes on to inform the driver that a malfunction in the ABS or BA (Brake Assist) has occurred. Blinks to output DTC.
BRAKE warning light	<ul style="list-style-type: none"> Comes on to inform the driver that the parking brake is ON when the system is normal or the brake fluid has decreased. Simultaneously comes on with the ABS warning light to inform the driver that both ABS and EBD cannot operate.
VSC warning light	<ul style="list-style-type: none"> Comes on to inform the driver that a malfunction in the VSC system has occurred. Blinks to output DTC.
SLIP indicator light	Blinks to inform the driver that TRAC and VSC are operating.

6. SERVICE MODE (VSC and TRAC prohibited mode)

HINT:

VSC and TRAC control can be prohibited by switching to service mode.

(a) Procedures for service mode.

HINT:

- Perform step (See procedure "A") to (See procedure "E") within 30 seconds.
- Perform step (See procedure "C") and (See procedure "D") within 15 seconds each.
- Make sure that the shift lever is in the P position.
 - Turn the ignition switch on (IG).
 - Apply the parking brake (Procedure "A").
 - Depress and release the brake pedal twice (Procedure "B").
 - While holding the brake pedal down, release and apply the parking brake twice (Procedure "C").
 - With the parking brake applied, depress and release the brake pedal twice (Procedure "D").
 - Check that the VSC warning light and SLIP indicator light come on (Procedure "E").

HINT:

- If the VSC warning light and SLIP indicator light do not come on, repeat the procedures.
- Turning the ignition switch off ends service mode.

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester can be used at steps 3, 4, 6, 7, 11, 14, and 17.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS

NEXT

3 CHECK DTC AND FREEZE FRAME DATA

NEXT

4 CLEAR DTC AND FREEZE FRAME DATA

NEXT

5 PROBLEM SYMPTOM CONFIRMATION

NEXT

6 CHECK CAN COMMUNICATION SYSTEM

(a) Check for output DTCs.

HINT:

The ECU of this system is connected to the CAN communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the CAN communication system.

CAN COMMUNICATION SYSTEM DTC IS OUTPUT: PROCEED TO CAN COMMUNICATION SYSTEM

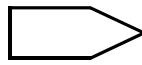
NO CAN COMMUNICATION SYSTEM DTC IS OUTPUT: GO TO STEP 7

7 CHECK MULTIPLEX COMMUNICATION SYSTEM

(a) Check for output DTCs.

HINT:

The skid control ECU sends the signals of each warning light to the gateway ECU via CAN communication, and the gateway ECU sends the signals to the combination meter via multiplex communication system (BEAN).



MULTIPLEX COMMUNICATION SYSTEM DTC IS OUTPUT: PROCEED TO MULTIPLEX COMMUNICATION SYSTEM



NO MULTIPLEX COMMUNICATION SYSTEM DTC IS OUTPUT: GO TO STEP 8

8 DTC CHECK AND CLEAR

NEXT

9 PROBLEM SYMPTOM SIMULATION



SYMPTOM DOES NOT OCCUR: GO TO STEP 10



SYMPTOM OCCURS: GO TO STEP 11

10 SYMPTOM SIMULATION

NEXT

11 DTC CHECK (OTHER THAN CAN AND MULTIPLEX COMMUNICATION SYSTEM DTC)



NORMAL SYSTEM CODE: GO TO STEP 12



TROUBLE CODE: GO TO STEP 13

12 PROBLEM SYMPTOMS TABLE

NEXT

GO TO STEP 14

13 DTC CHART

NEXT

14	CIRCUIT INSPECTION
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NEXT

15	IDENTIFICATION OF PROBLEM
-----------	----------------------------------

NEXT

16	REPAIR OR REPLACE
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NEXT

17	CONFIRMATION TEST
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NEXT

END

CHECK FOR INTERMITTENT PROBLEMS

1. CHECK FOR INTERMITTENT PROBLEMS

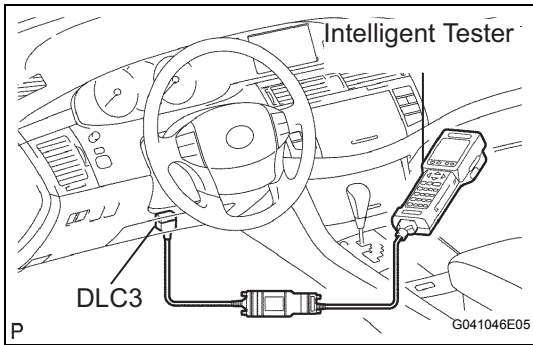
HINT:

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

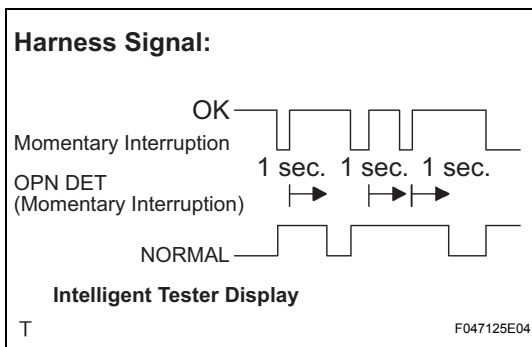
- (a) Turn the ignition switch off and connect the intelligent tester to the DLC3.
- (b) Turn the ignition switch on (IG). Follow the directions on the intelligent tester to display the DATA LIST and select areas where momentary interruption should be monitored.

HINT:

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



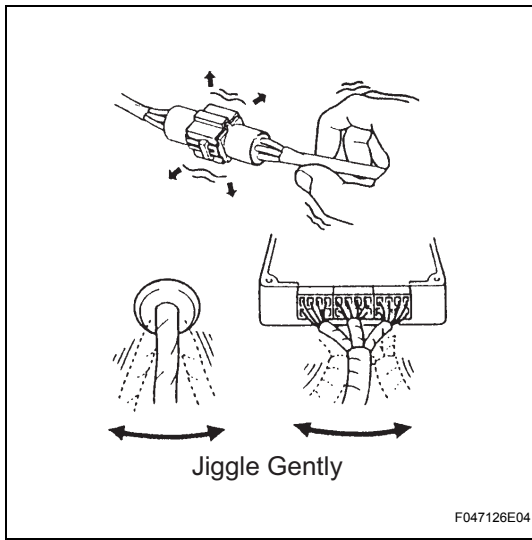
Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
SPD SEN FR	FR speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN FL	FL speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN RR	RR speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN RL	RL speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
EFI COM	EFI communication open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
YAWRATE SEN	Yaw rate sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
DECELE SEN	G sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
STEERING SEN	Steering sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
M/C SEN1	Master Cylinder pressure sensor 1 open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-



(c) Harness Signal.

HINT:

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



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

Result:

OPN DET display does not change.

HINT:

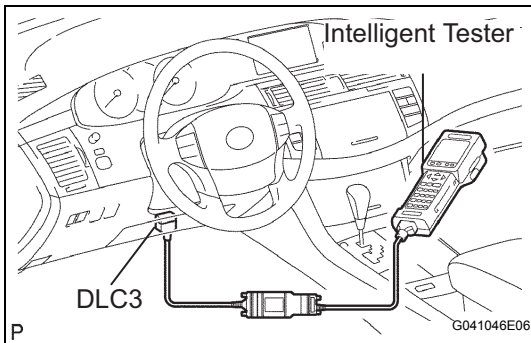
The connector and/or wire harness will be in momentary interruption (open circuit) if the display changes. Repair or replace connector and/or wire harness as one of them is faulty.

CALIBRATION

1. DESCRIPTION

- After replacing the VSC relevant components or performing "Front wheel alignment adjustment", clear and read the sensor calibration data.
- Follow the chart to perform calibration.

Replacing Parts / Operation	Necessary Operation
ABS & TRACTION Actuator Assembly (Skid Control ECU)	Yaw rate sensor and acceleration sensor zero point calibration.
Yaw Rate Sensor (Acceleration Sensor)	1. Clearing zero point calibration data. 2. Yaw rate and acceleration sensor zero point calibration.
Front Wheel Alignment Adjustment	1. Clearing zero point calibration data. 2. Yaw rate and acceleration sensor zero point calibration.



2. CLEAR ZERO POINT CALIBRATION (WHEN USING INTELLIGENT TESTER:)

- Connect the intelligent tester to the DLC3.
- Turn the ignition switch on (IG).
- Operate the intelligent tester to erase the codes (select "RESET MEMORY").
HINT:
Refer to the intelligent tester operator's manual for further details.
- Using the intelligent tester, perform zero point calibration of the yaw rate and acceleration sensor.

3. PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND ACCELERATION SENSOR (WHEN USING INTELLIGENT TESTER:)

NOTICE:

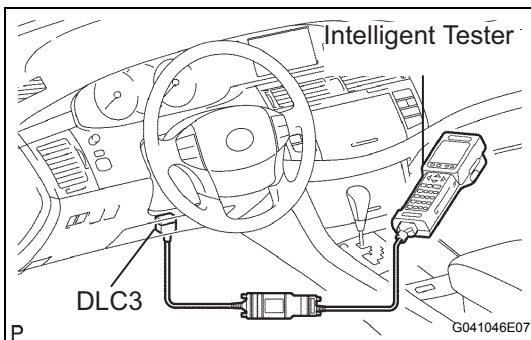
- While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not start the engine.)
- Be sure to do this on a level surface (with an inclination of less than 1 degree).

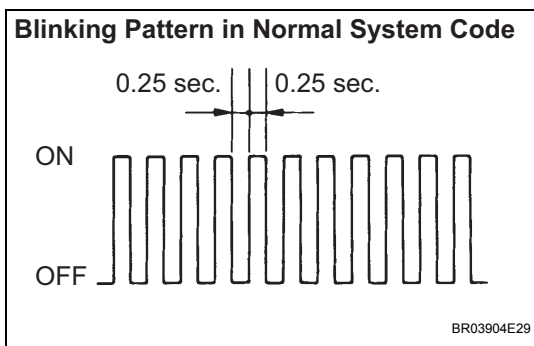
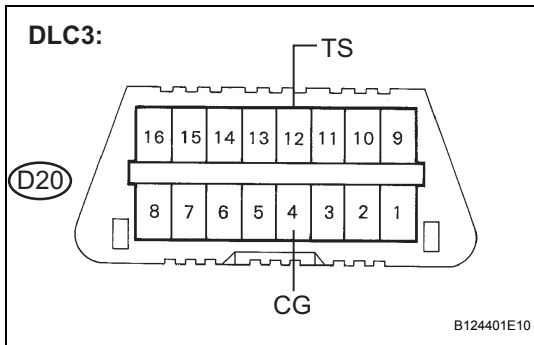
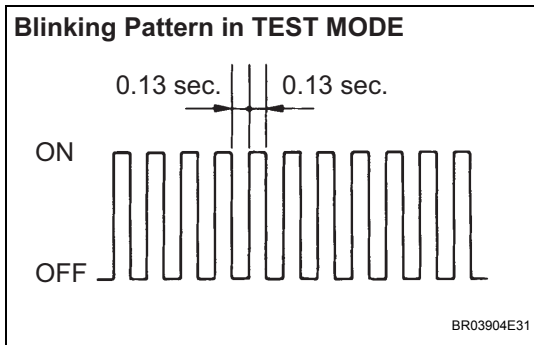
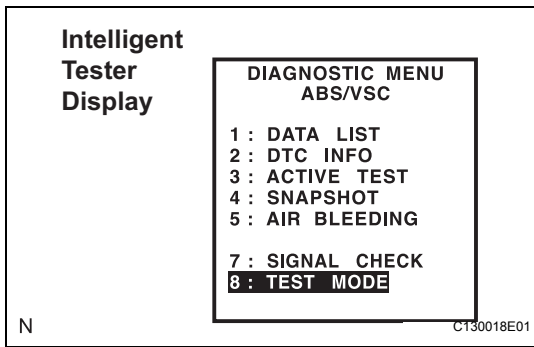
- Procedures for test mode.
 - Check that the steering wheel is in the straight-ahead position and move the shift lever to the P position.

NOTICE:

DTC C1210/36 and C1336/39 will be recorded if the shift lever is not in the P position (See page BC-165).

- Connect the intelligent tester to the DLC3.
- Turn the ignition switch on (IG).





- (4) Set intelligent tester to test mode (select "TEST MODE").
HINT:
Refer to the intelligent tester operator's manual for further details.
- (b) Obtain the zero point of the yaw rate sensor and acceleration 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 is blinking in TEST MODE.

HINT:

- If the VSC warning light does not blink, perform 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.

- (c) Turn the ignition switch off and disconnect the intelligent tester.

4. CLEAR ZERO POINT CALIBRATION

- (a) Turn the ignition switch on (IG).
- (b) Using SST, connect and disconnect terminals TS and CG of the DLC4 times or more within 8 seconds.

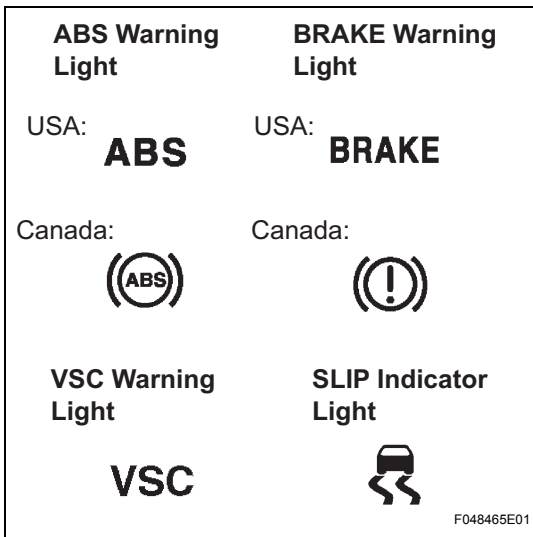
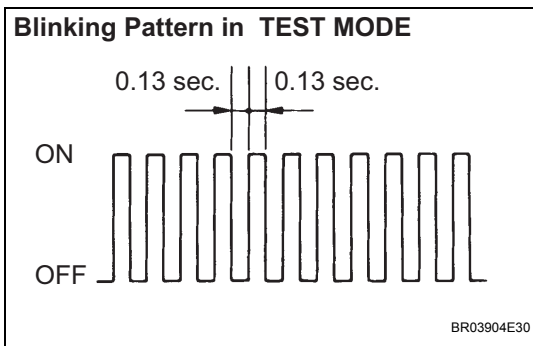
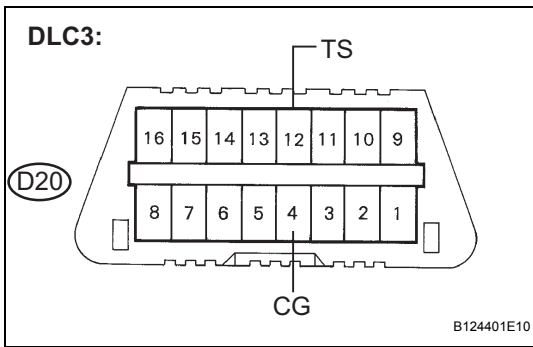
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- (c) Check that the VSC warning light indicates the normal system code.
- (d) Remove the SST from the terminals of the DLC3.
- (e) Using a check wire, perform zero point calibration of the yaw rate and acceleration sensor.

5. PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND ACCELERATION 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 of less than 1 degree).

- (a) Procedures for test mode.
 - (1) Turn the ignition switch off.



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

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(3) Check that the steering wheel is in the straight-ahead position and move the shift lever to the P position.

NOTICE:

DTC C1210/36 and C1336/39 will be recorded if the shift lever is not in the P position (See page BC-165).

- (b) Obtain the zero point of the yaw rate sensor and acceleration sensor.
 - (1) Turn the ignition switch on (IG).
 - (2) Keep the vehicle in the stationary condition on a level surface for 2 seconds or more.
 - (3) Check that the VSC warning light is blinking in TEST MODE.

HINT:

- If the VSC warning light does not blink, perform 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.

(c) Turn the ignition switch off and disconnect the SST from the DLC3.

TEST MODE PROCEDURE

1. WARNING LIGHT AND INDICATOR LIGHT CHECK

(a) Release the parking brake.

NOTICE:

Before releasing the parking brake, move the shift lever to the P position 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 ignition switch is turned on (IG), check that the ABS warning light, VSC warning light, BRAKE warning light and SLIP indicator light come on for approximately 3 seconds.

HINT:

If the skid control ECU stores any DTCs, the ABS warning light, VSC warning light and SLIP indicator light come on.

If the indicator remains on or does not come on, proceed to troubleshooting for the light circuit below.

Trouble area	See procedure
ABS warning light circuit (Remains on)	BC-202
ABS warning light circuit (Does not come on)	BC-206
VSC warning light circuit (Remains on)	BC-208
VSC warning light circuit (Does not come on)	BC-212

Trouble area	See procedure
SLIP indicator light circuit (Remains on)	BC-223
SLIP indicator light circuit (Does not come on)	BC-227
BRAKE warning circuit (Remains on)	BC-214
BRAKE warning circuit (Does not come on)	BC-221

2. SENSOR SIGNAL CHECK BY TEST MODE (WHEN USING INTELLIGENT TESTER:)

When having replaced the ABS & TRACTION actuator assembly and/or yaw rate and acceleration sensor, perform zero point calibration of the yaw rate and acceleration sensor.

HINT:

- If the ignition switch is turned from on (IG) to on (ACC) or to the ACC or off during test mode (SIGNAL CHECK), DTCs of the signal check function will be erased.
- During test mode (SIGNAL CHECK), the skid control ECU records all DTCs of the signal check function. By performing the test mode (SIGNAL CHECK), the codes are erased if normality is confirmed. The remaining codes are the codes where an abnormality was found.

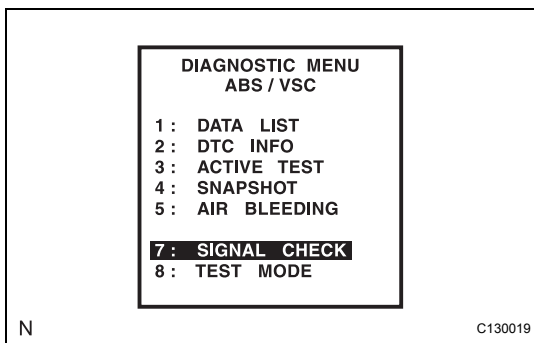
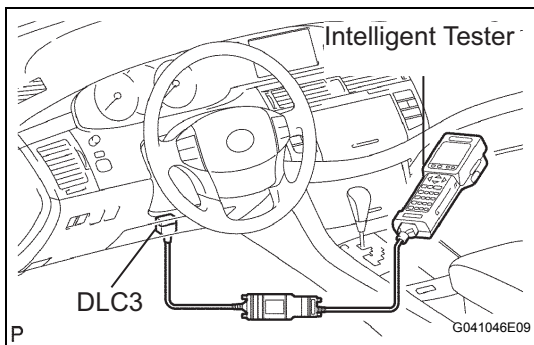
(a) Procedure for test mode.

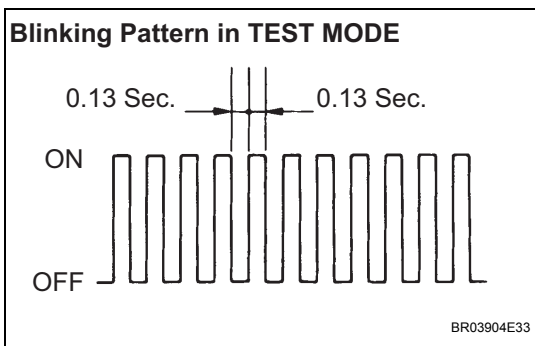
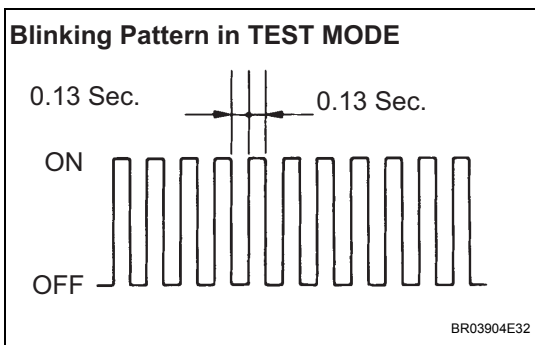
- (1) Turn the ignition switch off.
- (2) Connect the intelligent tester to the DLC3.
- (3) Check that the steering wheel is in the straight-ahead position and move the shift lever to the P position. (Procedure A)
- (4) Turn the ignition switch on (IG). (Procedure B)

- (5) Set the intelligent tester to test mode (select "SIGNAL CHECK"). (Procedure C)

HINT:

Refer to the intelligent tester operator's manual for further details.





(6) Check that the ABS and VSC warning lights are blinking in TEST MODE.

HINT:

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

Trouble area	See procedure
ABS warning light circuit (Remains on)	BC-202
ABS warning light circuit (Does not come on)	BC-206
VSC warning light circuit (Remains on)	BC-208
VSC warning light circuit (Does not come on)	BC-212

(7) Check the ABS sensor.

HINT:

Check that ABS warning light is blinking in TEST MODE and perform the check. (See procedure A to C)

3. ACCELERATION SENSOR CHECK (WHEN USING INTELLIGENT TESTER:)

(a) Keep the vehicle in the stationary condition on a level surface for 1 second or more.

HINT:

Acceleration sensor check can be performed with the following master cylinder pressure sensor check.

4. MASTER CYLINDER PRESSURE SENSOR CHECK (WHEN USING INTELLIGENT TESTER:)

(a) Leave the vehicle in a stationary condition and release the brake pedal 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.

(b) Check ABS warning light stays on for 3 seconds.

HINT:

- Ensure that the ABS warning light comes on.
- While the ABS warning light stays on, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
- The ABS warning light comes on for 3 seconds every time brake pedal operation above is performed.

5. SPEED SENSOR CHECK (WHEN USING INTELLIGENT TESTER:)

(a) Check the backward signal.

(1) Drive the vehicle in reverse for more than 1 second at 2 mph (3 km/h) or higher.

HINT:

Drive the vehicle in reverse and check the speed sensor signal. Note that the signal check cannot be completed if the vehicle speed is 28 mph (45 km/h) or more.

- (b) Check the forward signal.
- (1) Drive the vehicle straight forward.
 - Accelerate the vehicle to a speed of 28 mph (45 km/h) or higher for several seconds and check that the ABS warning light goes off.
 - HINT:
 - The signal check may not be completed if the vehicle has its wheels spun or the steering wheel turned during this check.
- (c) Stop the vehicle.

NOTICE:

- **Before performing the speed sensor signal check, complete the acceleration sensor and master cylinder pressure sensor checks.**
- **The speed sensor signal check may not be completed if the speed sensor signal check is started while turning the steering wheel or spinning the wheels.**
- **After the ABS warning light goes off and if the vehicle speed exceeds 50 mph (80 km/h), a signal check code will be stored again. Decelerate or stop the vehicle before the speed reaches 50 mph (80 km/h).**
- **If the signal check has not been completed, the ABS warning light blinks while driving and the ABS system does not operate.**

HINT:

When the signal check has been completed, the ABS warning light goes off while driving and blinks in the test mode pattern while stationary.

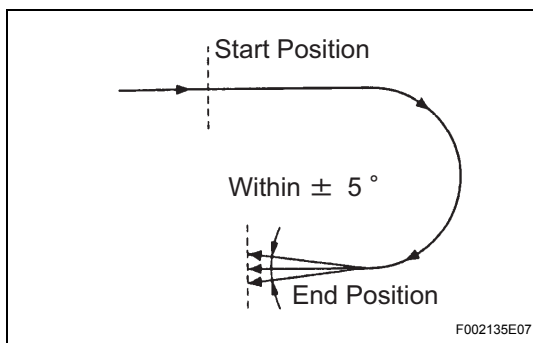
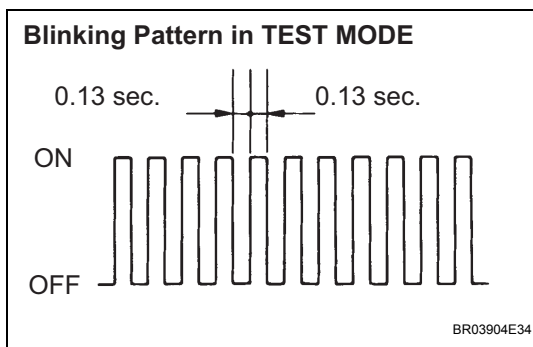
- (d) Check the VSC sensor.
- (1) Check that the VSC warning light is blinking in TEST MODE and perform the check.

6. YAW RATE SENSOR CHECK (WHEN USING INTELLIGENT TESTER:)

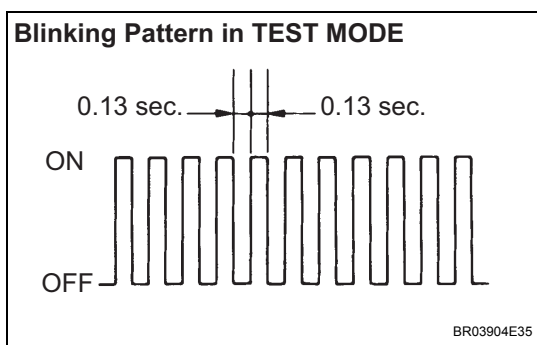
- (a) Check the VSC warning light is blinking in TEST MODE.
- (b) Check the zero point voltage of the yaw rate sensor.
 - (1) Keep the vehicle in a stationary condition on a level surface for 1 second or more.
- (c) Check the output of the yaw rate sensor and the direction of the steering angle sensor.
 - (1) Move the shift lever to the D position and drive the vehicle at a speed of approximately 3 mph (5 km/h), turn the steering wheel either to the left or right 90° or more until the vehicle makes a 180° turn.
 - (2) Stop the vehicle and move the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.

HINT:

 - If the skid control buzzer sounds, the signal check is completed normally.



- If the skid control buzzer does not sound, check the skid control buzzer circuit (See page BC-229), then perform the signal check again.
- If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check the DTC.
- Make a 180° turn. 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.
- Do not turn the ignition switch off while turning.
- Do not move the shift lever to the P position while turning, but change in the vehicle speed, stopping, or driving in reverse is possible.
- Complete the turn within 20 seconds.



7. END OF SENSOR CHECK (WHEN USING INTELLIGENT TESTER:)

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

NOTICE:

- When the yaw rate sensor, acceleration 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 light blinks even while the vehicle is driving and the ABS does not operate.

8. READ DTC OF SIGNAL CHECK FUNCTION (WHEN USING INTELLIGENT TESTER:)

- (a) Read the DTC(s) by following the tester screen.

NOTICE:

- If only the DTCs are displayed, repair the malfunction area and clear the DTCs.
- If the DTCs or test mode codes (DTC of signal check function) are displayed, repair the malfunction area, clear the DTCs and perform the test mode inspection.

HINT:

See the list of DTC.

9. DTC OF TEST MODE FUNCTION (SIGNAL CHECK) (WHEN USING INTELLIGENT TESTER:)

ABS sensor:

Code No.	Diagnosis	Trouble Area
C1271/71	Low output voltage of right front speed sensor	<ul style="list-style-type: none"> • Right front speed sensor • Sensor installation • Sensor rotor
C1272/72	Low output voltage of left front speed sensor	<ul style="list-style-type: none"> • Left front speed sensor • Sensor installation • Sensor rotor

Code No.	Diagnosis	Trouble Area
C1273/73	Low output voltage of right rear speed sensor	<ul style="list-style-type: none"> Right rear speed sensor Sensor installation Sensor rotor
C1274/74	Low output voltage of left rear speed sensor	<ul style="list-style-type: none"> 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	Acceleration sensor is faulty	<ul style="list-style-type: none"> Yaw rate (acceleration) sensor Sensor installation
C1281/81	Master cylinder pressure sensor output signal is faulty	<ul style="list-style-type: none"> Master cylinder pressure sensor Stop light switch

VSC sensor:

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

HINT:

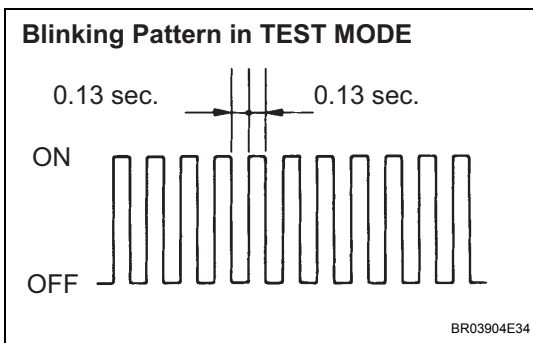
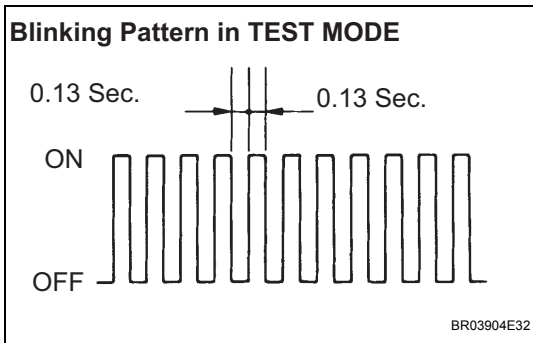
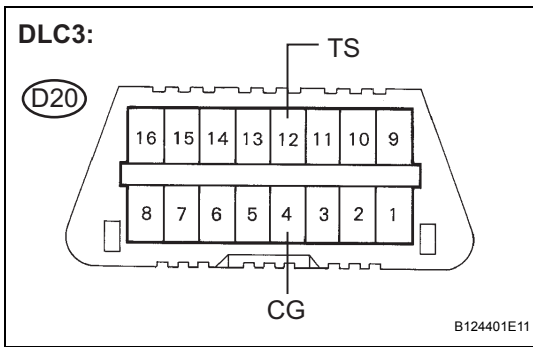
- The codes in this table are output only in test mode (SIGNAL CHECK).
- See the Trouble Area in the table to proceed with troubleshooting.
- After troubleshooting is completed, check that no DTCs are output.

10. SENSOR SIGNAL CHECK BY TEST MODE (SIGNAL CHECK) (WHEN USING SST CHECK WIRE:)

When having replaced the ABS & TRACTION actuator assembly and/or yaw rate and acceleration sensor, perform zero point calibration of the yaw rate and acceleration sensor.

HINT:

- If the ignition switch is turned from on (IG) to on (ACC) or off during test mode (SIGNAL CHECK), DTCs of the signal check function will be erased.
 - During test mode (SIGNAL CHECK), the skid control ECU records all DTCs of the signal check function. By performing the test mode (SIGNAL CHECK), the codes are erased if normality is confirmed. The remaining codes are the codes where an abnormality was found.
- (a) Procedure for test mode.
- Turn the ignition switch off.
 - Check that the steering wheel is in the straight-ahead position and move the shift lever to the P position.



(3) Using SST, connect terminals TS and CG of the DLC3.

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(4) Turn the ignition switch on (IG).

(5) Check that the ABS and VSC warning lights are blinking in TEST MODE.

HINT:

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

Trouble area	See procedure
ABS warning light circuit (Remains on)	BC-202
ABS warning light circuit (Does not come on)	BC-206
VSC warning light circuit (Remains on)	BC-208
VSC warning light circuit (Does not come on)	BC-212
TS and CG terminal circuit	BC-237

(6) Check the ABS sensor.

HINT:

Check that the ABS warning light is blinking in TEST MODE and perform the check.

11. ACCELERATION SENSOR CHECK (WHEN USING SST CHECK WIRE:)

(a) Keep the vehicle in the stationary condition on a level surface for 1 second or more.

HINT:

Acceleration sensor check can be performed with the following master cylinder pressure sensor check.

12. MASTER CYLINDER PRESSURE SENSOR CHECK (WHEN USING SST CHECK WIRE:)

(a) Leave the vehicle in a stationary condition and release the brake pedal 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.

(b) Check that the ABS warning light stays ON for 3 seconds.

HINT:

- Ensure that the ABS warning light comes on.
- While the ABS warning light stays on, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
- The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.

13. SPEED SENSOR CHECK (WHEN USING SST CHECK WIRE:)

(a) Check the backward signal.

(1) Drive the vehicle in reverse for more than 1 second at 2 mph (3 km/h) or higher.

HINT:

Drive the vehicle in reverse and check the speed sensor signal. Note that the signal check cannot be completed if the vehicle speed is 28 mph (45 km/h) or more.

(b) Check the forward signal.

(1) Drive the vehicle straight forward.

Accelerate the vehicle to a speed of 28 mph (45 km/h) or higher for several seconds and check that the ABS warning light goes off.

HINT:

The signal check may not be completed if the vehicle has its wheels spun or the steering wheel turned during this check.

(c) Stop the vehicle.

NOTICE:

- **Before performing the speed sensor signal check, complete the acceleration sensor and master cylinder pressure sensor checks.**
- **The speed sensor signal check may not be completed if the speed sensor signal check is started while turning the steering wheel or spinning the wheels.**
- **After the ABS warning light goes off and if vehicle speed exceeds 50 mph (80 km/h), a signal check code will be stored again. Decelerate or stop the vehicle before the speed reaches 50 mph (80 km/h).**
- **If the signal check has not been completed, the ABS warning light blinks while driving and the ABS system does not operate.**

HINT:

When the signal check has been completed, the ABS warning light goes off while driving and blinks in the test mode pattern while stationary.

(d) Check the VSC sensor.

(1) Check that the VSC warning light is blinking in TEST MODE and perform the check.

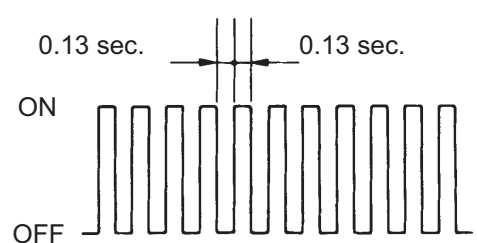
14. YAW RATE SENSOR CHECK (WHEN USING SST CHECK WIRE:)

(a) Check that the VSC warning light is blinking in TEST MODE.

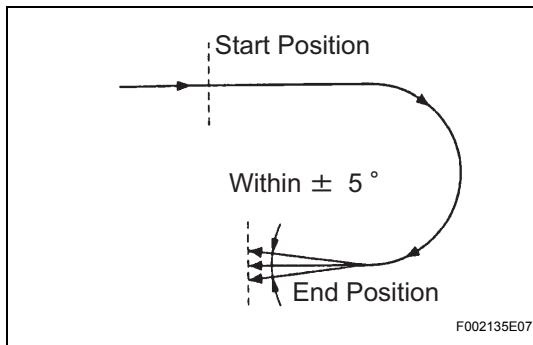
(b) Check the zero point voltage of the yaw rate sensor.

(1) Keep the vehicle in a stationary condition on a level surface for 1 second or more.

BC

Blinking Pattern in TEST MODE

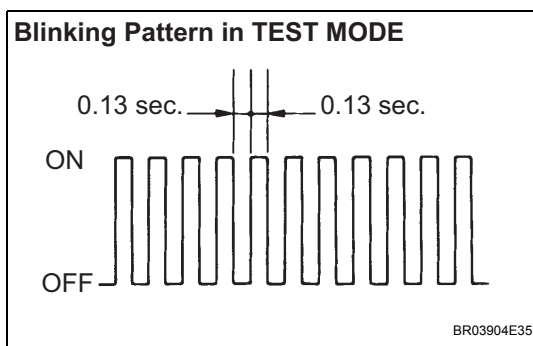
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- (c) Check the output of the yaw rate sensor and the direction of the steering angle sensor.
- (1) Move the shift lever to the D position and drive the vehicle at a speed of approximately 3 mph (5 km/h), turn the steering wheel either to the left or right 90° or more until the vehicle makes a 180° turn.
 - (2) Stop the vehicle and move the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.

HINT:

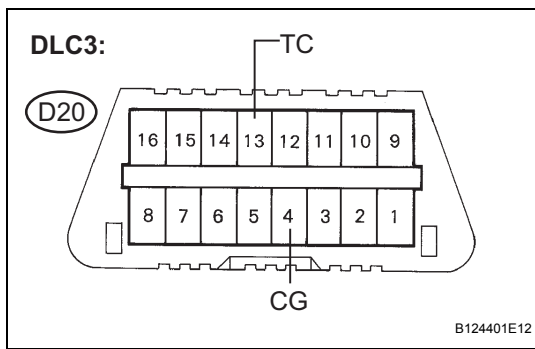
- If the skid control buzzer sounds, the signal check is completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit (See page [BC-229](#)), then perform the signal check again.
- If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check the DTC.
- Make a 180° turn. 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.
- Do not turn the ignition switch off while turning.
- Do not move the shift lever to the P position while turning, but change in the vehicle speed, stopping, or driving in reverse is possible.
- Complete the turn within 20 seconds.

**15. END OF SENSOR CHECK (WHEN USING SST CHECK WIRE:)**

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

NOTICE:

- **When the yaw rate sensor, acceleration 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 light blinks even while the vehicle is driving and the ABS does not operate.**



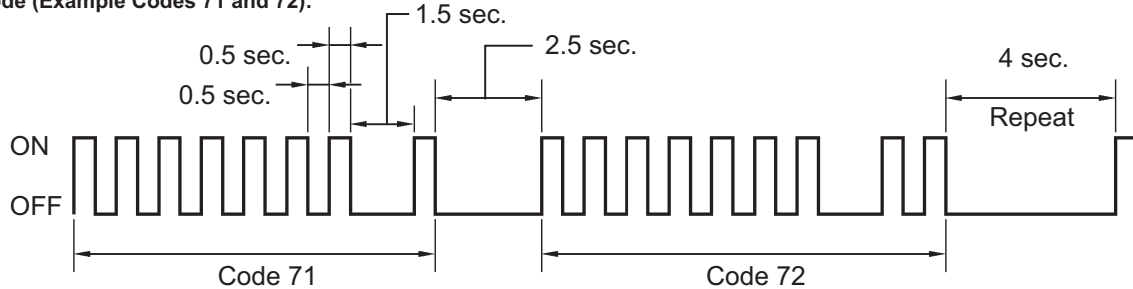
16. READ DTC OF SIGNAL CHECK FUNCTION

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

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- (b) Read the number of blinks of the ABS and VSC warning lights.

Trouble Code (Example Codes 71 and 72):



NOTICE:

- If only the DTCs are displayed, repair the malfunction area and clear the DTCs. Check if the ABS and VSC warning lights are normal system codes.
- If the DTCs or test mode codes (DTC of signal check function) are displayed, repair the malfunction area, clear the DTCs and perform the test mode inspection.

HINT:

- If more than 1 malfunction is detected at the same time, the lowest numbered code will be displayed first.
- See the list of DTC.

- (c) After performing the check, disconnect the SST from terminals TS and CG , TC and CG of the DLC3 and turn the ignition switch on (IG).

- (d) Turn the ignition switch on (IG).

HINT:

If the ignition switch is not turned on (IG) after the SST is removed from the DLC3, the previous TEST MODE will continue.

17. DTC OF TEST MODE FUNCTION (SIGNAL CHECK)

ABS sensor:

Code No.	Diagnosis	Trouble Area
C1271/71	Low output voltage of right front speed sensor	<ul style="list-style-type: none"> • Right front speed sensor • Sensor installation • Sensor rotor
C1272/72	Low output voltage of left front speed sensor	<ul style="list-style-type: none"> • Left front speed sensor • Sensor installation • Sensor rotor
C1273/73	Low output voltage of right rear speed sensor	<ul style="list-style-type: none"> • Right rear speed sensor • Sensor installation • Sensor rotor

Code No.	Diagnosis	Trouble Area
C1274/74	Low output voltage of left rear speed sensor	<ul style="list-style-type: none"> 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	Acceleration sensor is faulty	<ul style="list-style-type: none"> Yaw rate (acceleration) sensor Sensor installation
C1281/81	Master cylinder pressure sensor output signal is faulty	<ul style="list-style-type: none"> Master cylinder pressure sensor Stop light switch

VSC sensor:

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

HINT:

- The codes in this table are output only in test mode (SIGNAL CHECK).
- See the Trouble Area in the table to proceed with troubleshooting.
- After troubleshooting is completed, check that no DTCs are 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.

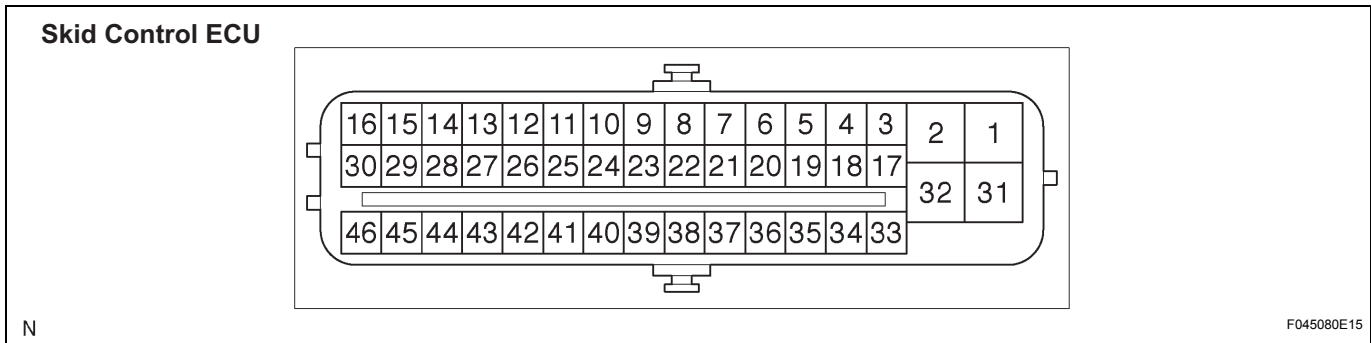
VEHICLE STABILITY CONTROL SYSTEM

Symptom	Suspected area	See page
ABS,BA and/or EBD does not operate	1. Check the DTC again and make sure that the normal system code is output	BC-121
	2. IG power source circuit	BC-177
	3. Speed sensor circuit (Front)	BC-133
	4. Speed sensor circuit (Rear)	BC-141
	5. Check the ABS & TRACTION actuator assembly with the intelligent tester (Check ABS & TRACTION actuator assembly operation using the active test function) If abnormal, check the hydraulic circuit for leakage	BC-240
	6. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the ABS & TRACTION actuator assembly (skid control ECU)	BC-241
ABS, BA and/or EBD does not operate efficiently	1. Check the DTC again and make sure that the normal system code is output	BC-121
	2. Speed sensor circuit (Front)	BC-133
	3. Speed sensor circuit (Rear)	BC-141
	4. Stop light switch circuit	BC-184
	5. Check the ABS & TRACTION actuator assembly with the intelligent tester (Check ABS & TRACTION actuator assembly operation using the active test function) If abnormal, check the hydraulic circuit for leakage	BC-240
	6. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the ABS & TRACTION actuator assembly (skid control ECU)	BC-241
VSC and/or TRACTION does not operate	1. Check the DTC again and make sure that the normal system code is output	BC-121
	2. IG power source circuit and ground circuit	BC-177
	3. Check the hydraulic circuit for leakage	-
	4. Speed sensor circuit (Front)	BC-133
	5. Speed sensor circuit (Rear)	BC-141
	6. Yaw rate/Acceleration sensor circuit (Calibration Malfunction)	BC-165
	7. Yaw rate/Acceleration sensor circuit (Circuit Malfunction)	BC-173
	8. Steering sensor circuit	BC-168
	9. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the ABS & TRACTION actuator assembly (skid control ECU)	BC-241
ABS sensor DTC check cannot be done	1. Check the DTC again and make sure that the normal system code is output	BC-121
	2. TC and CG terminal circuit	BC-233
	3. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the ABS & TRACTION actuator assembly (skid control ECU)	BC-241

Symptom	Suspected area	See page
VSC sensor DTC check cannot be done	1. Check the DTC again and make sure that the normal system code is output	BC-121
	2. TC and CG terminal circuit	BC-233
	3. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the ABS & TRACTION actuator assembly (skid control ECU)	BC-241
Sensor signal check cannot be done	1. TS and CG terminal circuit	BC-237
	2. ABS & TRACTION actuator assembly (skid control ECU)	BC-241
ABS warning light abnormal (Remains on)	1. ABS warning light circuit	BC-202
	2. ABS & TRACTION actuator assembly (skid control ECU)	BC-241
ABS warning light abnormal (Does not come on)	1. ABS warning light circuit	BC-206
	2. ABS & TRACTION actuator assembly (skid control ECU)	BC-241
VSC warning light abnormal (Remains on)	1. VSC warning light circuit	BC-208
	2. ABS & TRACTION actuator assembly (skid control ECU)	BC-241
VSC warning light abnormal (Does not come on)	1. VSC warning light circuit	BC-212
	2. ABS & TRACTION actuator assembly (skid control ECU)	BC-241
BRAKE warning light abnormal (Remains on)	1. BRAKE warning light circuit	BC-214
	2. ABS & TRACTION actuator assembly (skid control ECU)	BC-241
BRAKE warning light abnormal (Does not come on)	1. BRAKE warning light circuit	BC-221
	2. ABS & TRACTION actuator assembly (skid control ECU)	BC-241
SLIP indicator light abnormal (Remains on)	1. SLIP indicator light circuit	BC-223
	2. ABS & TRACTION actuator assembly (skid control ECU)	BC-241
SLIP indicator light abnormal (Does not come on)	1. SLIP indicator light circuit	BC-227
	2. ABS & TRACTION actuator assembly (skid control ECU)	BC-241
Skid control buzzer abnormal	1. Skid control buzzer circuit	BC-229
	2. ABS & TRACTION actuator assembly (skid control ECU)	BC-241

TERMINALS OF ECU

1. Terminals of ECU



Symbols (Terminal No.)	Terminal Description
GND 2 (1)	Motor ground
BM (2)	Motor relay test input
FR+ (3)	Front RH wheel speed signal input (+)
FL- (4)	Front LH wheel speed signal input (-)
RR+ (5)	Rear RH wheel speed signal input (+)
RL- (6)	Rear LH wheel speed signal input (-)
CANH (11)	Can communication line H
SP1 (12)	Speed signal output
DG (13)	Diagnostic tester communication line
MRF (14)	Fail safe motor relay output
MR (15)	Motor relay output
STPO (16)	Stop light relay output
FR- (17)	Front RH wheel speed signal input (-)
FL+ (18)	Front LH wheel speed signal input (+)
RR- (19)	Rear RH wheel speed signal input (-)
RL+ (20)	Rear LH wheel speed signal input (+)
STP2 (21)	Stop light relay output
TS (24)	Sensor check input
CANL (25)	Can communication line L
STP1 (27)	Stop light switch input
PKB (28)	Parking brake switch input
BZ (30)	Buzzer output
+BS (31)	Solenoid relay power supply
GND1 (32)	Skid control ECU ground
RRO (39)	Rear RH wheel speed signal output
RLO (40)	Rear LH wheel speed signal output
R+ (45)	Power supply for motor relay
IG1 (46)	IG1 power supply

2. Terminal Inspection

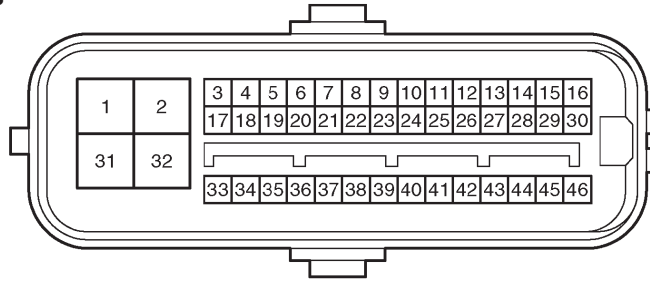
- (a) Disconnect the connector and measure the voltage on the wire harness side.

HINT:

Voltage cannot be measured with the connector connected to the skid control ECU as the connector is watertight.

Skid Control ECU (harness side connector front view)

A34



N




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Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND2 (1) - Body ground	W-B - Body ground	Motor ground	IG switch OFF	Below 1 Ω
STP (27)- GND (1,32)	L-B - W-B	Stop light switch input	Stop light switch ON (Brake pedal pushed)	8 to 14 V
STP (27)- GND (1,32)	L-B - W-B	Stop light switch input	Stop light switch OFF (Brake pedal released)	Below 1.5 Ω
PKB (28)- GND (1,32)	V - W-B	Parking brake switch input	IG switch ON (IG), parking brake switch ON	Below 1 Ω
PKB (28)- GND (1,32)	V - W-B	Parking brake switch input	IG switch ON (IG), parking brake switch OFF	10 kΩ or higher
+BS (31)- GND (1,32)	L - W-B	Solenoid relay power supply	Always	10 to 14 V
GND1 (32) - Body ground	W-B - Body ground	Skid control ECU ground	IG switch OFF	Below 1 Ω
IG1 (46) - GND (1,32)	BR - W-B	IG1 power supply	IG switch ON (IG)	10 to 14 V

DIAGNOSIS SYSTEM

1. DIAGNOSIS

- (a) If the skid control ECU detects a malfunction, the ABS, BRAKE, VSC warning lights and SLIP indicator light will come on to warn the driver. The table below indicates which lights will come on when there is a malfunction in a particular function.

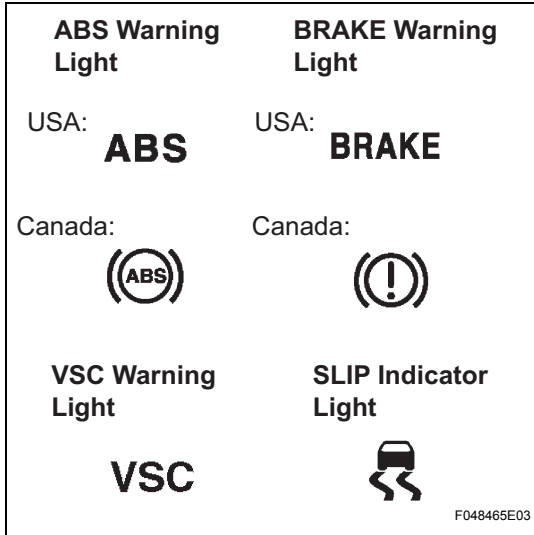
<p>ABS Warning Light</p> <p>USA:</p> <p style="font-size: 2em;">ABS</p> <p>Canada:</p> 	<p>BRAKE Warning Light</p> <p>USA:</p> <p style="font-size: 2em;">BRAKE</p> <p>Canada:</p> 
<p>VSC Warning Light</p> <p style="font-size: 2em;">VSC</p>	<p>SLIP Indicator Light</p> 

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Item / Trouble Area	ABS	EBD	(Brake Assist)	TRC	VSC
ABS Warning Light	○	○	○	-	-
Brake Warning Light	-	○	-	-	-
VSC Warning Light	○	○	○	○	○
SLIP indicator Light	○	○	○	○	○

○: Light ON
 -: Light OFF

- The DTCs are simultaneously stored in the memory. The DTCs can be read by connecting the SST between terminals TC and CG of the DLC3 and observing the blinking of the ABS and VSC warning lights, or by connecting the intelligent tester.
- This system has a signal check function (See page BC-107).
The DTC can be read by connecting the intelligent tester and observing the blinking of the ABS and VSC warning lights.



2. WARNING LIGHT AND INDICATOR LIGHT CHECK

- (a) Release the parking brake.

NOTICE:

When releasing the parking brake, set chocks 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 ignition switch is turned on (IG), check that the ABS, BRAKE, VSC warning lights and the SLIP indicator light come on for approximately 3 seconds.

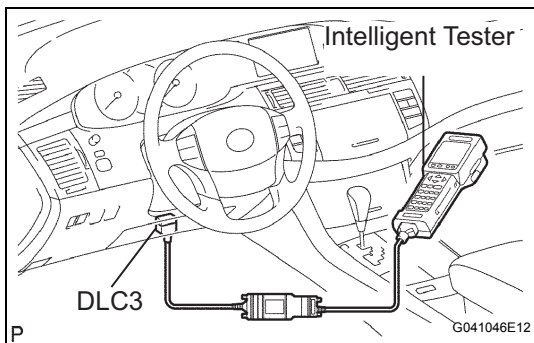
HINT:

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

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

Trouble Area	See procedure
ABS warning light circuit (Remains on)	BC-202
ABS warning light circuit (Does not come on)	BC-206
VSC warning light circuit (Remains on)	BC-208
VSC warning light circuit (Does not come on)	BC-212
BRAKE warning light (Remains on)	BC-214
BRAKE warning light (Does not come on)	BC-221
SLIP indicator light circuit (Remains on)	BC-223
SLIP indicator light circuit (Does not come on)	BC-227

BC



DTC CHECK / CLEAR

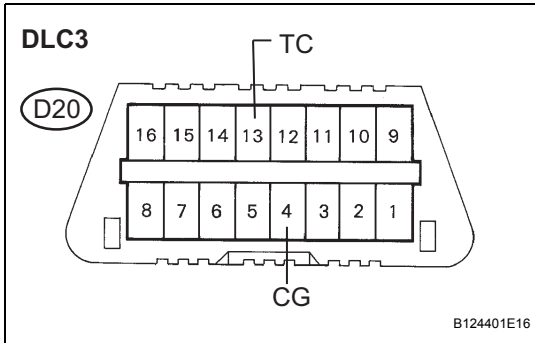
1. DTC CHECK/CLEAR (USING INTELLIGENT TESTER)

- (a) Check DTCs.
- (1) Connect the intelligent tester to the DLC3.
 - (2) Turn the ignition switch on (IG).
 - (3) Read the DTCs following the prompts on the tester screen.

HINT:

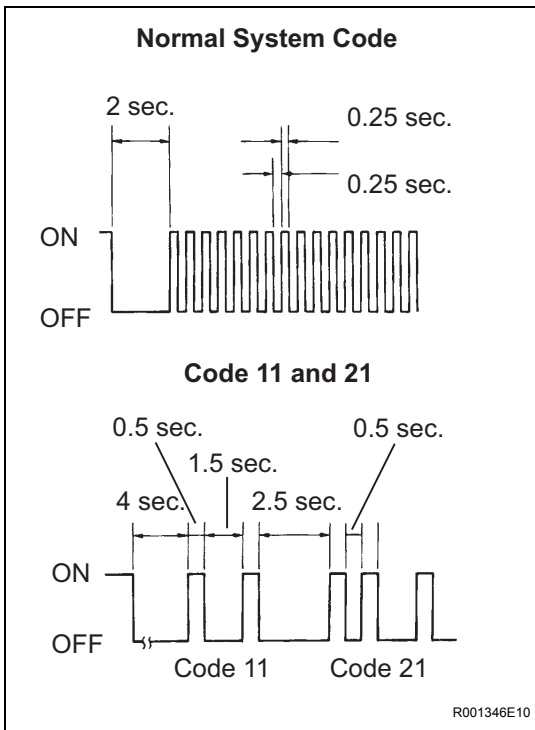
Refer to the intelligent tester operator's manual for further details.

- (b) Clear the DTCs.
 - (1) Connect the intelligent tester to the DLC3.
 - (2) Turn the ignition switch on (IG).
 - (3) Operate the intelligent tester to clear the codes.
 - HINT:
 - Refer to the intelligent tester operator's manual for further details.



2. DTC CHECK/CLEAR (USING SST CHECK WIRE)

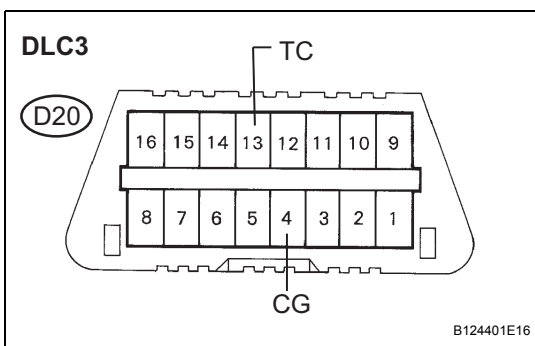
- (a) Check DTC.
 - (1) Using SST, connect terminals TC and CG of the DLC3.
 - SST 09843-18040**
 - (2) Turn the ignition switch on (IG).



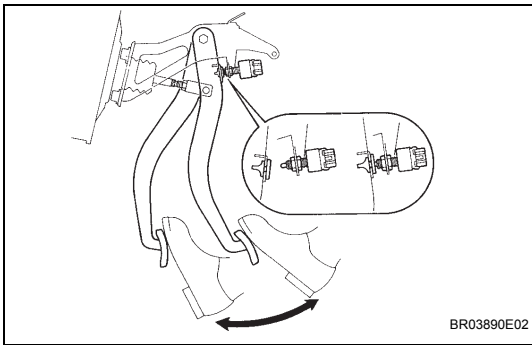
- (3) Read the number of blinks of the ABS and VSC warning lights.
 - HINT:
 - If no code appears, inspect the diagnostic circuit or ABS warning light circuit.

Trouble Area	See procedure
TC and CG terminal circuit	BC-233
ABS warning light circuit (Remains on)	BC-202
ABS warning light circuit (Does not come on)	BC-206
VSC warning light circuit (Remains on)	BC-208
VSC warning light circuit (Does not come on)	BC-212

- 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 (See page [BC-128](#)).
- (5) After completing the check, disconnect terminals TC and CG of the DLC3, and turn off the ignition switch.
 - If 2 or more DTCs are detected at the same time, the DTCs will be displayed in ascending order.



- (b) Clear the DTCs.
 - (1) Using SST, connect terminals TC and CG of the DLC3.
 - SST 09843-18040**
 - (2) Turn the ignition switch on (IG).



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

(4) Check that the ABS warning light indicates a normal system code.

(5) Remove the SST.

HINT:

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

3. END OF CHECK/CLEAR

(a) Turn the ignition switch on (IG).

(b) Check that the ABS and VSC warning lights go off within approximately 3 seconds.

FREEZE FRAME DATA

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 ignition switch has been turned from off to the on (IG) since the last time the ABS was activated. However, if the vehicle is stopped or at low speed (4.3 mph (7 km/h) or less), or if a DTC is detected, the skid control ECU will stop counting the number.
- 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 during ABS operation 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 intelligent tester to the DLC3.
 - (b) Turn the ignition switch on (IG).
 - (c) Select "DTC INFO" on the tester display.
 - (d) On the DTC data display screen, select the DTC data displayed with "**".

Intelligent tester display	Measurement Item	Reference Value
TROUBLE CODE	Freeze DTC	0 to 255
SHIFT POSITION	Shift lever position	FAIL P, N R D 4 3 2 L
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
SYSTEM	System status	ABS activated: ABS VSC/TRC activated: VSC (TRC) BA activated: BA Fail safe mode activated: FAIL SF No system activated: NO SYS
#IG ON	Number of operation of ignition switch ON after storing freeze frame data	0 to 31
VEHICLE SPD	Wheel speed sensor reading	Min.: 0 mph (0 km/h), Max.: 202 mph (326.4 km/h)
STEERING ANG	Steering sensor reading	Min.: -1152 deg, Max.: 1143 deg
YAW RATE	Yaw rate angle sensor reading	Min.: -128 deg/s, Max.: 127deg/s
MAS CYL PRESS	Master cylinder pressure sensor reading	Brake pedal release : 0.3 to 0.9 V Brake pedal depress : 0.8 to 4.5 V
MAS PRESS GRADE	Master cylinder pressure sensor change	Min.: -30 MPa/s, Max.: 225 MPa/s
G (RIGHT & LEFT)	Right and Left G	Min.: -1.859 G, Max.: 1.859 G
G (BACK & FORTH)	Back and forth G	Min.: -1.859 G, Max.: 1.859 G
PKB SW	Parking brake switch condition	Parking brake switch ON: ON, OFF: OFF

Intelligent tester display	Measurement Item	Reference Value
#CODES	Number of trouble codes	0 to 255

FAIL-SAFE CHART

1. FAIL SAFE OPERATION

- If there is a problem with sensor signals or actuator systems, the skid control ECU prohibits power supply to the ABS & TRACTION actuator assembly and informs the ECM of VSC system failure. The ABS & TRACTION actuator assembly turns off each solenoid and the ECM shuts off VSC control (traction control signal) from the skid control ECU accordingly, which turns out to be as if the ABS, TRAC and VSC systems were not installed. The ABS control will be prohibited, but EBD control continues as much as possible. If EBD control is impossible, the BRAKE warning light comes on to warn the driver (See page [BC-120](#)).
- If system components have any malfunction before starting control, immediately stop the operation. If system components have any malfunction during control, gradually stop the control so as not to trigger a sudden change in vehicle conditions. If it is impossible to control the systems, the warning light comes on to inform the driver of termination of the systems (See page [BC-120](#)).

ABS & EBD & BA system:

Malfunction Area	Control Method
ABS system	ABS, BA, TRAC and VSC control prohibited
BA system	ABS, BA, TRAC and VSC control prohibited
EBD system	ABS, EBD, BA, TRAC and VSC control prohibited

HINT:

A malfunction in either the ABS or BA system will result in an identical operation, with ABS, BA, TRAC and VSC system control prohibited.

TRAC & VSC system:

Malfunction Area	Control Method
Engine control system (TRAC and VSC systems)	Before control: Disables control During control: Uses only the brakes to effect control
Brake control system (VSC system)	Before control: Disables control During control: Uses only the brakes to effect control
Brake control system (TRAC systems)	Before control: Disables control During control: Disables control (by gradually ending control)

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

With the intelligent tester connected to the DLC3 and the ignition switch on (IG), the ABS, TRAC and VSC data list can be displayed. Follow the prompts on the intelligent tester screen to access the DATA LIST.

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
ABS MOT RELAY	ABS motor relay / ON or OFF	ON: Motor relay ON OFF: Motor relay OFF	-
SOL RELAY	Solenoid relay / ON or OFF	ON: Solenoid relay ON OFF: Solenoid relay OFF	-
IDLE SW	Main idle switch / ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
STOP LIGHT SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
PKB SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
ABS OPERT FR	ABS operation (FR) / BEFORE or OPERATE	BEFORE: No ABS operation (FR) OPERATE: During ABS operation (FR)	-
ABS OPERT FL	ABS operation (FL) / BEFORE or OPERATE	BEFORE: No ABS operation (FL) OPERATE: During ABS operation (FL)	-
ABS OPERT RR	ABS operation (RR) / BEFORE or OPERATE	BEFORE: No ABS operation (RR) OPERATE: During ABS operation (RR)	-
ABS OPERT RL	ABS operation (RL) / BEFORE or OPERATE	BEFORE: No ABS operation (RL) OPERATE: During ABS operation (RL)	-
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Actual wheel speed	Similar speed as indicated on speedometer
DECELERAT SEN	Acceleration sensor 1 reading / min.: -1.869 G, max.: 1.869 G	Approximately 0 +/- 0.13 G while stationary	Reading changes when vehicle is bounced
DECELERAT SEN2	Acceleration sensor 2 reading / min.: -1.869 G, max.: 1.869 G	Approximately 0 +/- 0.13 G while stationary	Reading changes when vehicle is bounced
IG VOLTAGE	ECU power supply voltage / TOO LOW / NORMAL / TOO HIGH	TOO HIGH: 14.0 V or more NORMAL: 9.5 V to 14.0 V TOO LOW: 9.5 V or less	-
SFRR	ABS solenoid (SFRR) / ON or OFF	ON: Operates OFF: Does not operate	-
SFRH	ABS solenoid (SFRH) / ON or OFF	ON: Operates OFF: Does not operate	-
SFLR	ABS solenoid (SFLR) / ON or OFF	ON: Operates OFF: Does not operate	-

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
SFLH	ABS solenoid (SFLH) / ON or OFF	ON: Operates OFF: Does not operate	-
SRRR (SRR)	ABS solenoid (SRRR (SRR)) / ON or OFF	ON: Operates OFF: Does not operate	-
SRRH (SRH)	ABS solenoid (SRRH (SRH)) / ON or OFF	ON: Operates OFF: Does not operate	-
SRLR	ABS solenoid (SRLR) / ON or OFF	ON: Operates OFF: Does not operate	-
SRLH	ABS solenoid (SRLH) / ON or OFF	ON: Operates OFF: Does not operate	-
SMF (BA-SOL)	TRC solenoid (SMF) / ON or OFF	ON: Operates OFF: Does not operate	-
SMR	TRC solenoid (SMR) / ON or OFF	ON: Operates OFF: Does not operate	-
ENGINE SPD	Engine speed / min.: 0 rpm max.: 6000 rpm	Actual engine speed	-
VEHICLE SPD	Maximum wheel speed sensor reading / min.: 0 mph(0 km/h), max.: 202 mph (326 km/h)	Actual vehicle speed	Speed indicated on speedometer
YAW RATE	Yaw rate sensor/ Min.: -128 deg/s, Max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
YAW ZERO VALUE	Memorized zero value/ Min.: -128 deg/s, Max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
STEERING ANG	Steering sensor/ Min.: -1152 deg, Max.: 1150.875 deg	Left turn: Increase Right turn: Decrease	-
MAS CYL PRS1	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
ACCELERATOR %	The difference of a present accelerator / min.: 0 %, max.: 128%	-	-
TORQUE	Real output torque / min.: -1024, max.: 1016 N*m	-	-
TEST MODE	Test mode / NORMAL or TEST	NORMAL: Normal mode TEST: During test mode	-
SPD SEN FR	FR speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN FL	FL speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN RR	RR speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
SPD SEN RL	RL speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
EFI COM	EFI communication open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
YAWRATE SEN	Yaw rate sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
DESELE SEN	G sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
STEERING SEN	Steering sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
M/C SEN1	Master cylinder pressure sensor 1 open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal	-
INSPECTION MODE	Inspection mode condition / INSPECT or OTHER	INSPECT: During inspect OTHER: No inspect mode	-
#IG ON2	Number of IG ON (Inspection mode) / min.: 0, max.:255	0 to 255	

2. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the intelligent tester allows the relay, 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 intelligent tester to the DLC3.
- (b) Turn the ignition switch on (IG).
- (c) According to the display on the tester, perform the "ACTIVE TEST".

HINT:

The ignition switch must be turned on (IG) to proceed to the ACTIVE TEST using the intelligent tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
SFRR	Turns ABS solenoid (SFRR) ON / OFF	Operating sound of solenoid (clicking sound) is heard
SFRH	Turns ABS solenoid (SFRH) ON / OFF	Operating sound of solenoid (clicking sound) is heard
SFLR	Turns ABS solenoid (SFLR) ON / OFF	Operating sound of solenoid (clicking sound) is heard
SFLH	Turns ABS solenoid (SFLH) ON / OFF	Operating sound of solenoid (clicking sound) is heard
SRRR	Turns ABS solenoid (SRRR) ON / OFF	Operating sound of solenoid (clicking sound) is heard
SRRH	Turns ABS solenoid (SRRH) ON / OFF	Operating sound of solenoid (clicking sound) is heard
SRLR	Turns ABS solenoid (SRLR) ON / OFF	Operating sound of solenoid (clicking sound) is heard
SRLH	Turns ABS solenoid (SRLH) ON / OFF	Operating sound of solenoid (clicking sound) is heard
SMF (BA-SOL)	Turns TRC solenoid (SRLH) ON / OFF	Operating sound of solenoid (clicking sound) is heard
SMR	Turns TRC solenoid SMR ON / OFF	Operating sound of solenoid (clicking sound) is heard
SFRR & SFRH	Turns ABS solenoid SFRR & SFRH ON / OFF	Operating sound of solenoid (clicking sound) is heard
SFLR & SFLH	Turns ABS solenoid SFLR & SFLH ON / OFF	Operating sound of solenoid (clicking sound) is heard
SRH & SRR	Turns ABS solenoid SRRR & SRRH ON / OFF	Operating sound of solenoid (clicking sound) is heard
SRLR & SRLH	Turns ABS solenoid SRLR & SRLH ON / OFF	Operating sound of solenoid (clicking sound) is heard
SFRH & SFLH	Turns ABS solenoid SFRH & SFLH ON / OFF	Operating sound of solenoid (clicking sound) is heard

Item	Vehicle Condition / Test Details	Diagnostic Note
SOL RELAY	Turns ABS solenoid relay ON / OFF	Operating sound of relay (clicking sound) is heard
ABS MOT RELAY	Turns ABS motor relay ON / OFF	Operating sound of relay (clicking sound) is heard
ABS WARN LIGHT	Turns ABS warning light ON / OFF	Observe combination meter
VSC WARN LIGHT	Turns VSC warning light ON / OFF	Observe combination meter
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 is heard
STOP LIGHT RELAY	Turns stop light ON / OFF	Stop light comes on

DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a DTC is displayed during the DTC check, check the circuit indicated by the DTC. For details of each code, refer to the "See page" in the DTC chart.

DTC chart of ABS:

DTC No.	Detection Item	Trouble Area	See page
C0200/31 (*1)	Right Front Wheel Speed Sensor Signal Malfunction	1. Right front speed sensor 2. Speed sensor circuit 3. Sensor rotor 4. Sensor installation 5. ABS & TRACTION actuator assembly (Skid control ECU)	BC-133
C0205/32 (*1)	Left Front Wheel Speed Sensor Signal	1. Left front speed sensor 2. Speed sensor circuit 3. Sensor rotor 4. Sensor installation 5. ABS & TRACTION actuator assembly (Skid control ECU)	BC-133
C0210/33 (*1)	Right Rear Wheel Speed Sensor Signal Malfunction	1. Right rear speed sensor 2. Speed sensor circuit 3. Sensor rotor 4. Sensor installation 5. ABS & TRACTION actuator assembly (Skid control ECU)	BC-141
C0215/34 (*1)	Left Rear Wheel Speed Sensor Signal	1. Left rear speed sensor 2. Speed sensor circuit 3. Sensor rotor 4. Sensor installation 5. ABS & TRACTION actuator assembly (Skid control ECU)	BC-141
C0226/21	SFR Solenoid Circuit	ABS & TRACTION actuator assembly (Solenoid circuit)	BC-149
C0236/22	SFL Solenoid Circuit	ABS & TRACTION actuator assembly (Solenoid circuit)	BC-149
C0246/23	SRR Solenoid Circuit	ABS & TRACTION actuator assembly (Solenoid circuit)	BC-149
C0256/24	SRL Solenoid Circuit	ABS & TRACTION actuator assembly (Solenoid circuit)	BC-149
C0273/13 (*1)	Open in ABS Motor Relay Circuit	1. ABS/VSC No.1 fuse 2. VSC No.1 relay 3. VSC No.1 relay circuit 4. ABS & TRACTION actuator assembly	BC-152
C0274/14	Short to B+ in ABS Motor Relay Circuit	1. ABS/VSC No.1 fuse 2. VSC No.1 relay 3. VSC No.1 relay circuit 4. ABS & TRACTION actuator assembly	BC-152
C0278/11	Open in ABS Solenoid Relay Circuit	1. ABS/VSC No.2 fuse 2. ABS & TRACTION actuator (Solenoid relay circuit)	BC-158
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	1. ABS/VSC No.2 fuse 2. ABS & TRACTION actuator (Solenoid relay circuit)	BC-158
C1225/25	SM Solenoid Circuit	ABS & TRACTION actuator assembly (Solenoid circuit)	BC-149
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	1. Right front speed sensor 2. Sensor rotor 3. Sensor installation 4. ABS & TRACTION actuator assembly (Skid control ECU)	BC-133

DTC No.	Detection Item	Trouble Area	See page
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	1. Left front speed sensor 2. Sensor rotor 3. Sensor installation 4. ABS & TRACTION actuator assembly (Skid control ECU)	BC-133
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	1. Right rear speed sensor 2. Sensor rotor 3. Sensor installation 4. ABS & TRACTION actuator assembly (Skid control ECU)	BC-141
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	1. Left rear speed sensor 2. Sensor rotor 3. Sensor installation 4. ABS & TRACTION actuator assembly (Skid control ECU)	BC-141
C1241/41	Low Battery Positive Voltage or Abnormally High Battery Positive Voltage	1. Battery 2. Charging system 3. Power source circuit 4. Internal power supply circuit of the skid control ECU	BC-177
C1243/43 (*1)	Acceleration Sensor Stuck Malfunction	1. Yaw rate and acceleration sensor 2. Yaw rate and acceleration sensor circuit	BC-173
C1244/44	Open or Short in Deceleration Sensor Circuit	1. Yaw rate and acceleration sensor 2. Yaw rate and acceleration sensor circuit	BC-173
C1245/45 (*1)	Acceleration Sensor Output Malfunction	1. Yaw rate and acceleration sensor 2. Yaw rate and acceleration sensor circuit	BC-173
C1246/46 (*2)	Master Cylinder Pressure Sensor Malfunction	1. Master cylinder pressure sensor 2. Master cylinder pressure sensor circuit 3. Stop light switch circuit 4. ABS & TRACTION actuator assembly	BC-181
C1249/49	Open in Stop Light Switch Circuit	1. Stop light switch 2. Stop light switch circuit 3. ABS & TRACTION actuator assembly	BC-184
C1251/51 (*1)	Open in Pump Motor Circuit	1. ABS & TRACTION actuator assembly (GND circuit) 2. ABS & TRACTION actuator assembly (Motor circuit)	BC-195
C1361/91	Short Circuit in ABS Motor Fail Safe Relay Circuit	1. ABS/VSC No.1 fuse 2. VSC No.2 relay 3. VSC No.2 relay circuit 4. ABS & TRACTION actuator assembly	BC-152
C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction	1. Yaw rate and acceleration sensor 2. Yaw rate and acceleration sensor power source circuit	BC-173
U0073/94	Control Module Communication Bus OFF	CAN communication system	BC-199
U0124/95	Lost Communication with Lateral Acceleration Sensor Module	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)	BC-199

*1, *2:

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

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

HINT:

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

DTC chart of VSC:

DTC No.	Detection Item	Trouble Area	See page
C1201/51	Engine Control System Malfunction	Engine control system	BC-162
C1203/53	ECM Communication Circuit Malfunction	ECM	BC-164
C1210/36	Zero Point Calibration of Yaw Rate Sensor Undone	1. ABS & TRACTION actuator assembly (Skid control ECU) 2. Zero point calibration undone	BC-165
C1223/43	ABS Control System Malfunction	ABS control system	BC-167
C1231/31	Steering Angle Sensor Circuit Malfunction	1. Steering angle sensor 2. Steering angle sensor circuit 3. Steering angle sensor power supply 4. CAN communication system	BC-168
C1232/32	Stuck in Deceleration Sensor	1. Yaw rate and acceleration sensor 2. Yaw rate and acceleration sensor circuit	BC-173
C1234/34	Yaw Rate Sensor Malfunction	1. Yaw rate and acceleration sensor 2. Yaw rate and acceleration sensor circuit	BC-173
C1336/39	Zero Point Calibration of Acceleration Sensor Undone	1. ABS & TRACTION actuator assembly (Skid control ECU) 2. Zero point calibration undone	BC-165
U0100/65	Lost Communication with ECM / PCM	CAN communication system (Skid control ECU to ECM)	BC-199
U0123/62	Lost Communication with Yaw Rate Sensor Module	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)	BC-199
U0126/63	Lost Communication with Steering Angle Sensor Module	CAN communication system (Skid control ECU to steering angle sensor)	BC-199

HINT:

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

Test Mode DTC of ABS:

DTC No.	Detection Item	Trouble Area	See page
C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	1. Right front speed sensor 2. Sensor installation 3. Sensor rotor	BC-133
C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	1. Left front speed sensor 2. Sensor installation 3. Sensor rotor	BC-133
C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	1. Right rear speed sensor 2. Sensor installation 3. Sensor rotor	BC-141
C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	1. Left rear speed sensor 2. Sensor installation 3. Sensor rotor	BC-141
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	Right front sensor rotor	BC-133
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	Left front speed sensor rotor	BC-133
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	Right rear sensor rotor	BC-141
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	Left rear speed sensor rotor	BC-141
C1279/79	Deceleration Sensor Output Voltage Malfunction (Test Mode DTC)	1. Yaw rate (acceleration) sensor 2. Sensor installation	BC-173
C1281/81	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)	1. Master cylinder pressure sensor 2. Stop light switch	BC-181

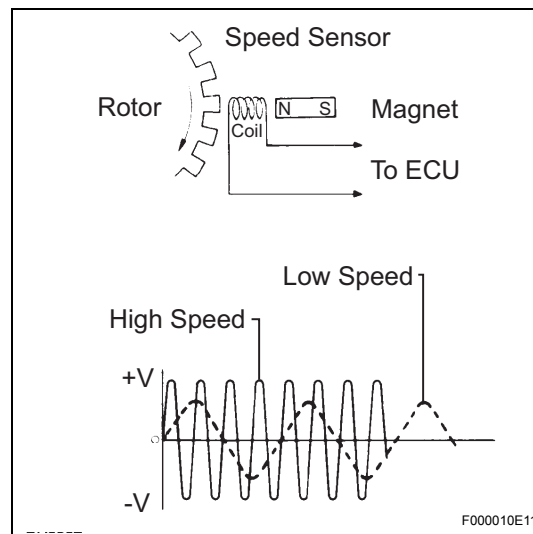
Test Mode DTC of VSC:

DTC No.	Detection Item	Trouble Area	See page
C0371/71	Yaw Rate Sensor (Test Mode DTC)	Yaw rate sensor	BC-173

DTC	C0200/31	Right Front Wheel Speed Sensor Signal Malfunction
DTC	C0205/32	Left Front Wheel Speed Sensor Signal
DTC	C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH
DTC	C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH
DTC	C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)
DTC	C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)
DTC	C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)
DTC	C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

DESCRIPTION

The speed sensor detects wheel speed and transmits the appropriate signals to the skid control ECU. These signals are used for control of the ABS system. Each of the front and rear rotors has 48 serrations. When the rotors rotate, the magnetic field generated by the permanent magnet in the speed sensor induces 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 skid control ECU to detect the speed of each wheel. DTCs C1271/71, C1272/72, C1275/75 and C1276/76 are output only in the test mode (SIGNAL CHECK).



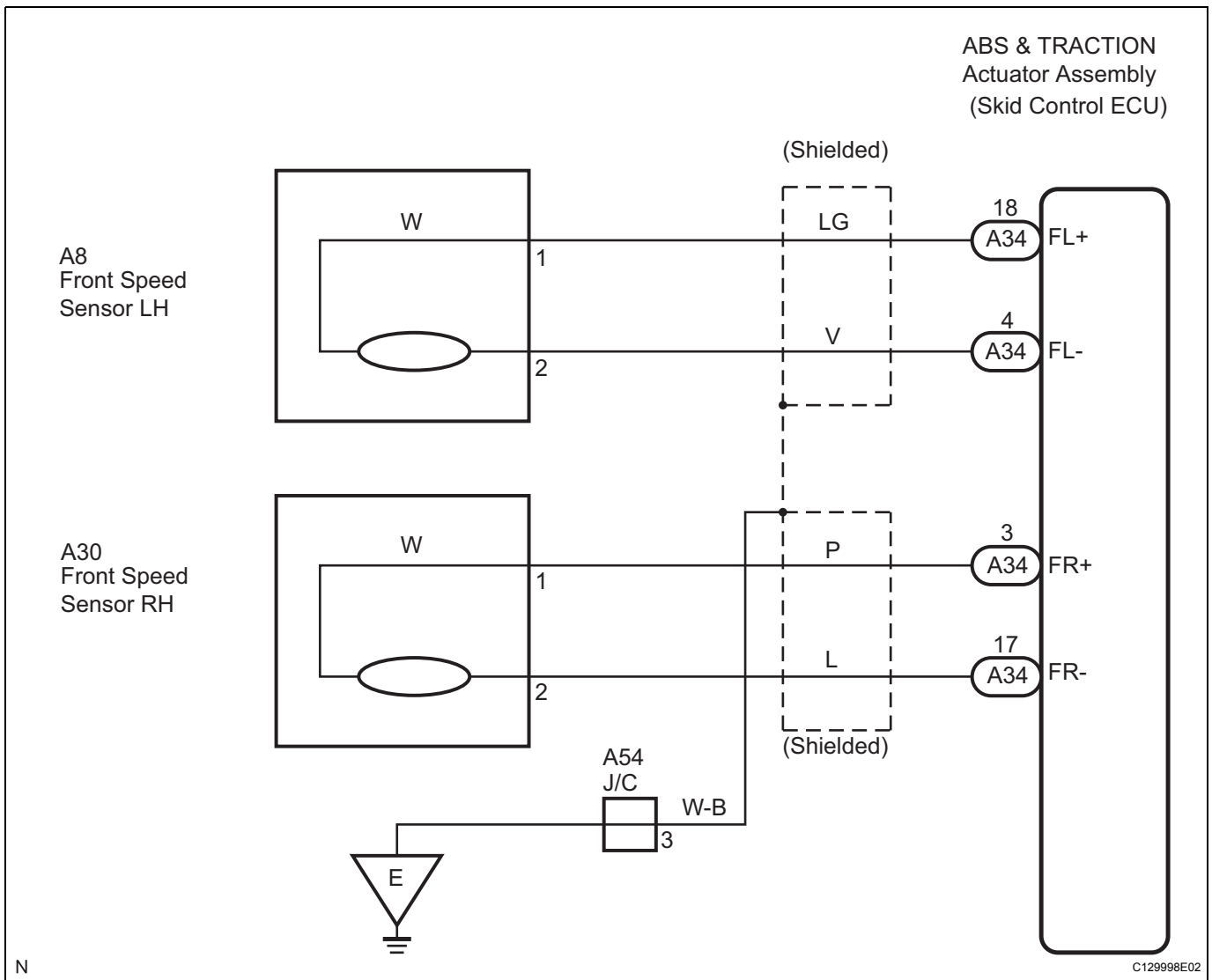
DTC No.	DTC Detecting Condition	Trouble Area
C0200/31 C0205/32	When any if the following (1 to 3) is detected: 1. All of the following conditions continue for at least 1 second. – Vehicle speed is more than 6 mph (10 km/h). – Open or short in the vehicle speed sensor signal circuit. 2. Momentary interruption of the sensor signal from the abnormally wheel has occurred 7 times or more. 3. The speed sensor signal circuit is open for 0.5 sec. or more.	<ul style="list-style-type: none"> • Right front and left front speed sensor • Each speed sensor circuit • Sensor rotor • Sensor installation • ABS & TRACTION actuator assembly (Skid control ECU)
C1235/35 C1236/36	At a vehicle speed of 12 mph (20 km/h) or more, noise occurs in the sensor signal from the abnormal wheel for 5 seconds or more.	<ul style="list-style-type: none"> • Speed sensor • Sensor rotor • Sensor installation • ABS & TRACTION actuator assembly (Skid control ECU)

HINT:

DTC No.C0200/31 and C1235/35 are for the front speed sensor RH.

DTC No.C0205/32 and C1236/36 are for the front speed sensor LH.

WIRING DIAGRAM



INSPECTION PROCEDURE**NOTICE:**

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-104).

HINT:

Start the inspection from step 1 when using the intelligent tester and start from step3 when not using the intelligent tester.

1	CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)
----------	---

- (a) Using the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (See page BC-103).

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition
SPD SEN FR	FR speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal
SPD SEN FL	FL speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG

CHECK AND REPAIR HARNESS AND CONNECTOR (SPEED SENSOR CIRCUIT)
--

OK

2	READ VALUE OF INTELLIGENT TESTER (FRONT SPEED SENSOR)
----------	--

- (a) Connect the intelligent tester to the DLC3.
 (b) Start the engine.
 (c) Select "DATA LIST" and read the value displayed on the intelligent tester.

DATA LIST: ABS/VSC

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 intelligent tester and the speed value displayed on the speedometer when driving the vehicle.

OK:

The speed value output from the speed sensor displayed on the intelligent tester is the same as the actual vehicle speed.

NG

Go to step 6

OK

3 PERFORM TEST MODE (SIGNAL CHECK)

(a) Check if test mode (signal check) DTCs are detected.

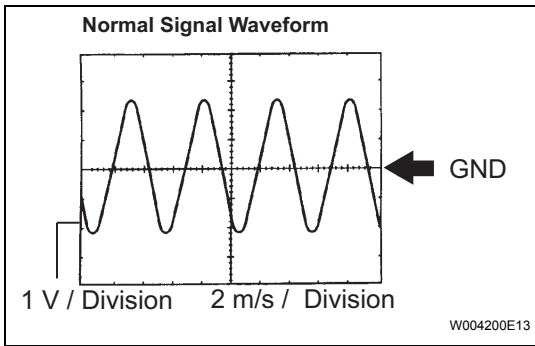
Result

Result	Proceed to
Test mode (signal check) DTC is not output	A
Test mode (signal check) DTC is output	B

B Go to step 6

A

4 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



- (a) INSPECTION USING OSCILLOSCOPE
- (1) Disconnect the front speed sensor connector.
 - (2) Connect the oscilloscope to terminals 1 and 2 of the front speed sensor.
 - (3) Check that a waveform is output when the tires are rotated.

OK:

A waveforms as shown in the figure should be output.

HINT:

- As vehicle speed (wheel rotation speed) increases, the width 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 rotor scratches, looseness or foreign matter attached to the speed sensor.

NG Go to step 12

OK

5 RECONFIRM DTC

- (a) Clear the DTC.
- (b) Start the engine.
- (c) Drive the vehicle at the speed of 20 mph (32 km/h) or more for 60 seconds or more.
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

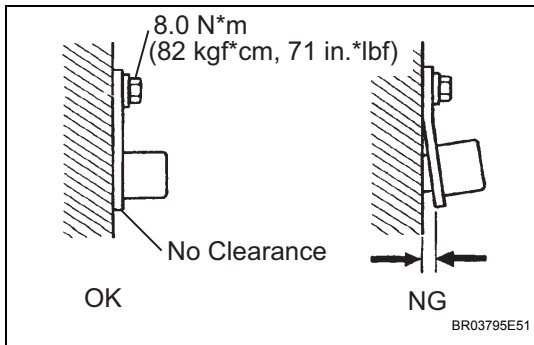
- These DTCs may be stored due to a malfunction in the connector terminal connection, etc.
- If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page BC-117).

B Go to step 6

A

END

6 INSPECT FRONT SPEED SENSOR INSTALLATION



(a) Check the front speed sensor installation.

OK:

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

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

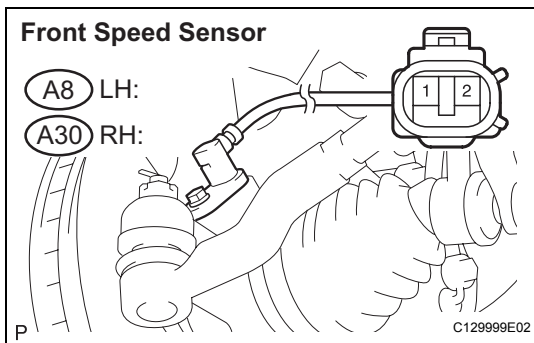
NOTICE:

Check the speed sensor signal after replacement (See page BC-107).

NG INSTALL FRONT SPEED SENSOR CORRECTLY OR REPLACE FRONT SPEED SENSOR

OK

7 INSPECT FRONT SPEED SENSOR



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

(b) Disconnect the front speed sensor connectors.

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

Resistance:

LH

Tester Connection	Specified Condition
A8-1 (FL+) - A8-2 (FL-)	1.22 to 0.92 kΩ
A8-1 (FL+) - Body ground	10 kΩ or higher
A8-2 (FL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
A30-1 (FR+) - A30-2 (FR-)	1.22 to 0.92 kΩ
A30-1 (FR+) - Body ground	10 kΩ or higher
A30-2 (FR-) - Body ground	10 kΩ or higher

BC

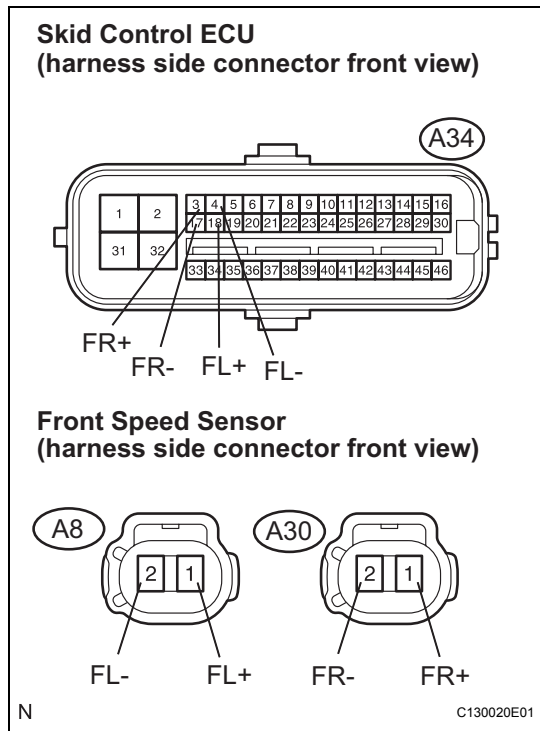
NOTICE:

Check the speed sensor signal after replacement (See page BC-107).

NG **REPLACE FRONT SPEED SENSOR**

OK

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



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

Resistance:
LH

Tester Connection	Specified Condition
A34-18 (FL+) - A8-1 (FL+)	Below 1 Ω
A34-4 (FL-) - A8-2 (FL-)	Below 1 Ω
A8-1 (FL+) - Body ground	10 kΩ or higher
A8-2 (FL-) - Body ground	10 kΩ or higher

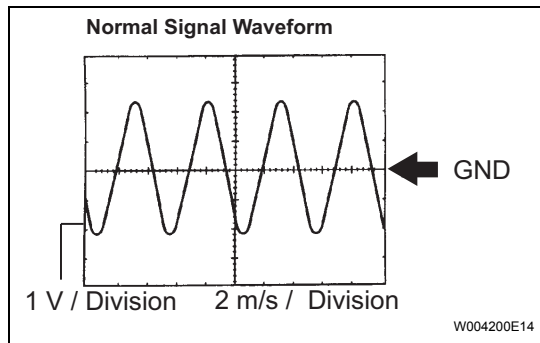
RH

Tester Connection	Specified Condition
A34-3 (FR+) - A30-1 (FR+)	Below 1 Ω
A34-17 (FR-) - A30-2 (FR-)	Below 1 Ω
A30-1 (FR+) - Body ground	10 kΩ or higher
A30-2 (FR-) - Body ground	10 kΩ or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR (SPEED SENSOR CIRCUIT)**

OK

9 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



(a) **INSPECTION USING OSCILLOSCOPE**

- (1) Disconnect the front speed sensor connector.
- (2) Connect the oscilloscope to terminals 1 and 2 of the front speed sensor.
- (3) Check that a waveform is output when the tires are rotated.

OK:

A waveforms as shown in the figure should be output.

HINT:

- As vehicle speed (wheel rotation speed) increases, the width 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 rotor scratches, looseness or foreign matter attached to the speed sensor.

NG

Go to step 12

OK

10 READ VALUE OF INTELLIGENT TESTER (FRONT SPEED SENSOR)

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select "DATA LIST" and read the value displayed on the intelligent tester.

DATA LIST: ABS/VSC

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 intelligent tester and the speed value displayed on the speedometer when driving the vehicle .

OK:

The speed value output from the speed sensor displayed on the intelligent tester is the same as the actual vehicle speed.

NG

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

OK

11 RECONFIRM DTC

- (a) Clear the DTC.
- (b) Start the engine.
- (c) Drive the vehicle at the speed of 20 mph (32 km/h) or more for 60 seconds or more.
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

These DTCs may be stored due to a malfunction in the connector terminal connection, etc.

B

Go to step 12

A

END

12 INSPECT SPEED SENSOR TIP

- (a) Remove the front speed sensor (See page [BC-249](#)).
- (b) Check the sensor tip.

OK:**No scratches or foreign matter on the sensor tip.****NOTICE:****Check the speed sensor signal after cleaning or replacement (See page [BC-107](#)).**

NG

CLEAN OR REPLACE SPEED SENSOR

OK

CLEAN OR REPLACE SPEED SENSOR ROTOR

DTC	C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction
DTC	C0215/34	Left Rear Wheel Speed Sensor Signal
DTC	C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH
DTC	C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH
DTC	C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)
DTC	C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)
DTC	C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)
DTC	C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DESCRIPTION

Refer to DTCs C0200/31, C0205/32 (See page [BC-258](#)).

DTCs C1273/73, C1274/74 C1277/77, and C1278/78 are output only in the test mode (SIGNAL CHECK).

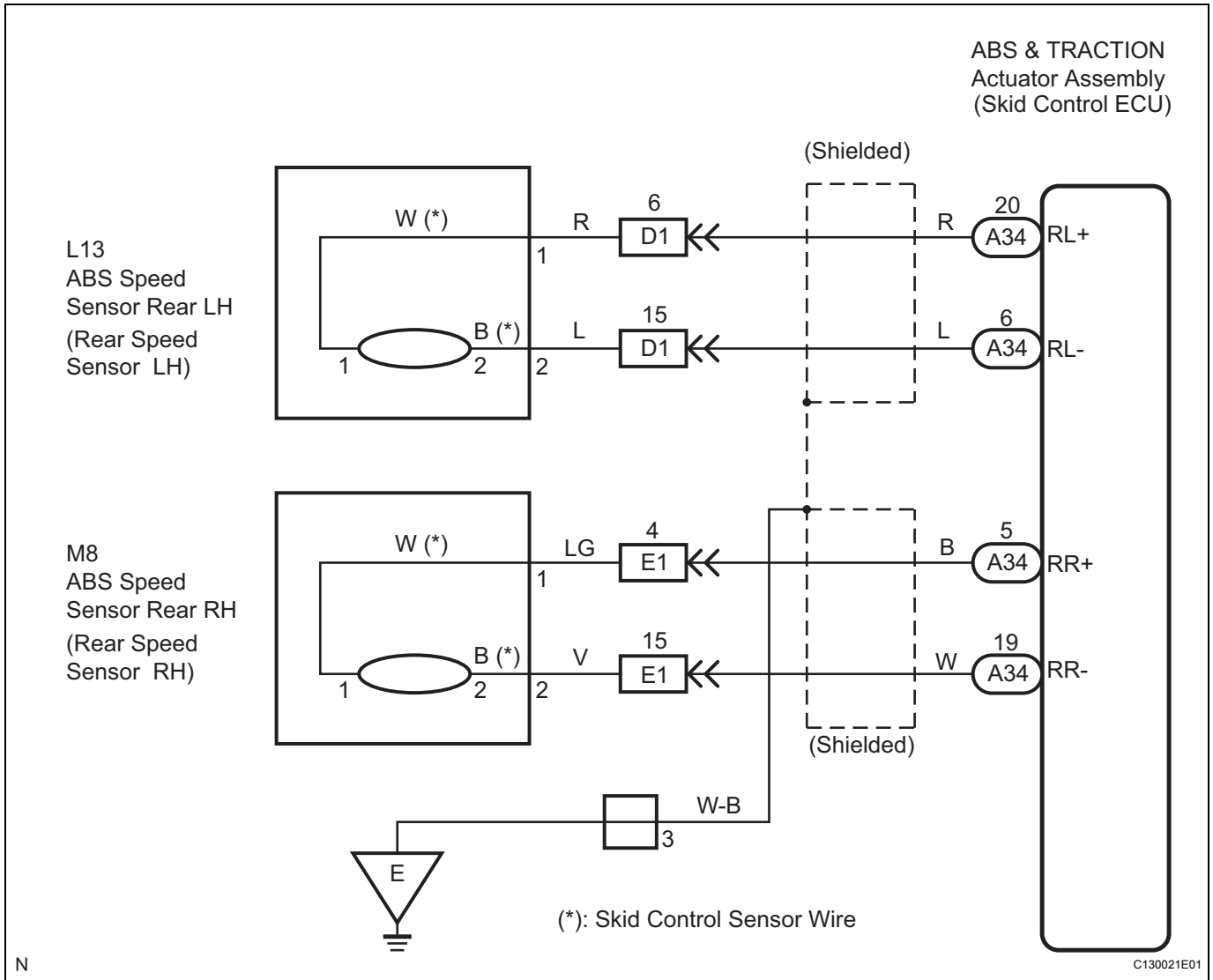
DTC No.	DTC Detecting Condition	Trouble Area
C0210/33 C0215/34	When any of the following (1 to 3) is detected: 1. All of the following conditions continue for at least 1 second. – Vehicle speed is more than 6 mph (10 km/h). – Open or short in the vehicle speed sensor signal circuit. 2. Momentary interruption of the sensor signal from the abnormal wheel has occurred 7 times or more. 3. The speed sensor signal circuit is open for 0.5 sec. or more.	<ul style="list-style-type: none"> • Right rear and left rear speed sensor • Each speed sensor circuit • Sensor rotor • Sensor installation • ABS & TRACTION actuator assembly (Skid control ECU)
C1238/38 C1239/39	At a vehicle speed of 12 mph (20 km/h) or more, noise occurs in the sensor signal from the abnormal wheel for 5 seconds or more.	<ul style="list-style-type: none"> • Speed sensor • Sensor rotor • Sensor installation • ABS & TRACTION actuator assembly (Skid control ECU)

HINT:

DTC C0210/33 and C1238/38 are for the right rear speed sensor.

DTC C0215/34 and C1239/39 are for the left rear speed sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly , perform zero point calibration (See page BC-104).

HINT:

Start the inspection from step 1 when using the intelligent tester and start from step 3 when not using the intelligent tester.

BC

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

- (a) Using the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (See page BC-103).

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition
SPD SEN RR	RR speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal
SPD SEN RL	RL speed sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG

CHECK AND REPAIR HARNESS AND CONNECTOR (SPEED SENSOR CIRCUIT)

OK

2 READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select "DATA LIST" and read the value displayed on the intelligent tester.

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal condition
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 MPH), max.: 326 km/h (202 MPH)	Actual wheel speed
WHEEL SPD RL	Wheel speed sensor (RL) 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 intelligent tester and the speed value displayed on the speedometer when driving the vehicle.

OK:

The speed value output from the speed sensor displayed on the intelligent tester is the same as the actual vehicle speed.

NG

Go to step 6

OK

3 PERFORM TEST MODE (SIGNAL CHECK)

- (a) Check if test mode (signal check) DTCs are detected.

Result

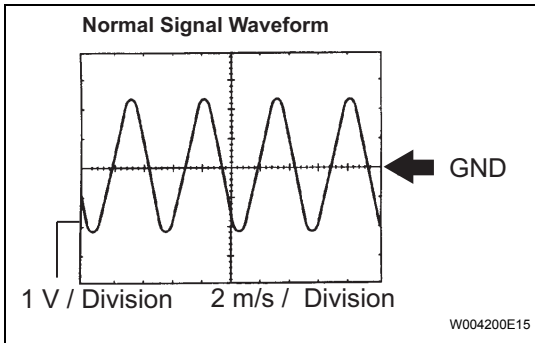
Result	Proceed to
Test mode (signal check) DTC is not output	A
Test mode (signal check) DTC is output	B

B

Go to step 6

A

4 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



- (a) INSPECTION USING OSCILLOSCOPE
- (1) Disconnect the rear speed sensor connector.
 - (2) Connect the oscilloscope to terminals 1 and 2 of the rear speed sensor.
 - (3) Check that a waveform is output when the tires are rotated.

OK:

A waveform as shown in the figure should be output.

HINT:

- As vehicle speed (wheel rotation speed) increases, the width 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 rotor scratches, looseness or foreign matter attached to the speed sensor.

NG → **CLEAN OR REPLACE SPEED SENSOR AND SENSOR ROTOR**

OK

5 RECONFIRM DTC

- (a) Clear the DTC.
- (b) Start the engine.
- (c) Drive the vehicle at the speed of 20 mph (32 km/h) or more for 60 seconds or more.
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

- These DTCs may be stored due to a malfunction in the connector terminal connection, etc.
- If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page [BC-117](#)).

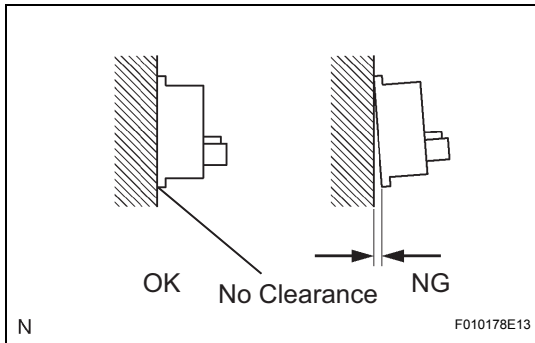
BC

B → **Go to step 6**

A

END

6 INSPECT REAR SPEED SENSOR INSTALLATION



(a) Check the rear speed sensor installation.

OK:

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

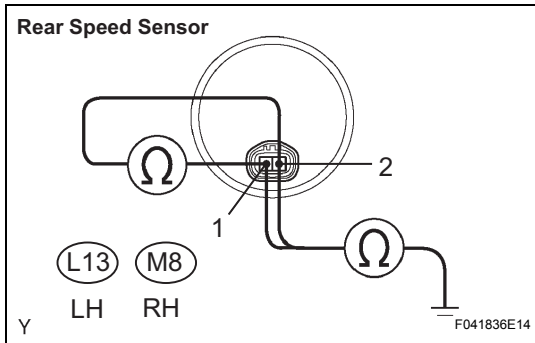
NOTICE:

Check the speed sensor signal after replacement (See page BC-107).

NG **INSTALL REAR SPEED SENSOR CORRECTLY OR REPLACE REAR SPEED SENSOR**

OK

7 INSPECT REAR SPEED SENSOR



(a) Disconnect the rear speed sensor connector.

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

Resistance:

LH

Tester Connection	Specified Condition
L13-1 (RL+) - L13-2 (RL-)	Below 2.2 kΩ
L13-1 (RL+) - Body ground	10 kΩ or higher
L13-2 (RL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
M8-1 (RR+) - M8-2 (RR-)	Below 2.2 kΩ
M8-1 (RR+) - Body ground	10 kΩ or higher
M8-2 (RR-) - Body ground	10 kΩ or higher

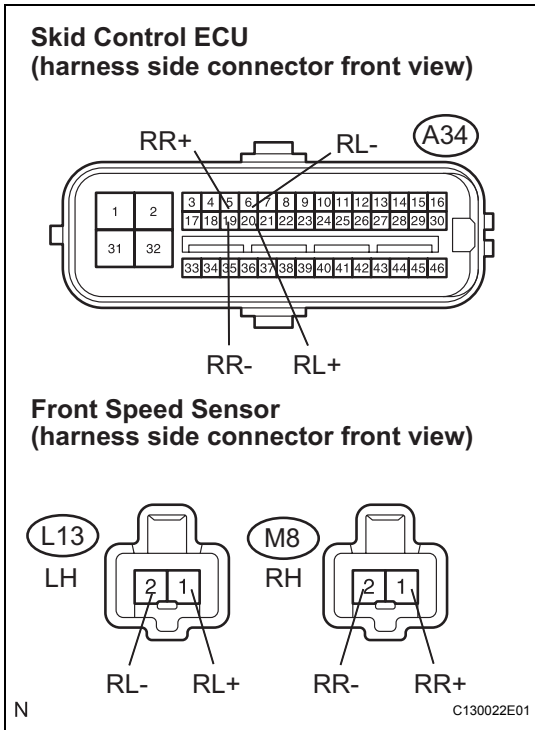
NOTICE:

Check the speed sensor signal after replacement (See page BC-107).

NG **REPLACE REAR SPEED SENSOR**

OK

8 CHECK HARNESS AND CONNECTOR (REAR SPEED SENSOR TO SKID CONTROL ECU)



- (a) SKID CONTROL ECU TO SKID CONTROL SENSOR WIRE
- (1) Disconnect the skid control ECU connector and the rear speed sensor connector.
 - (2) Disconnect the skid control sensor wire.
 - (3) Measure the resistance according to the value(s) in the table below.

Resistance:
LH

Tester Connection	Specified Condition
L13-1 (RL+) - A34-20 (RL+)	Below 1 Ω
L13-2 (RL-) - A34-6 (RL-)	Below 1 Ω
L13-1 (RL+) - Body ground	10 kΩ or higher
L13-2 (RL-) - Body ground	10 kΩ or higher

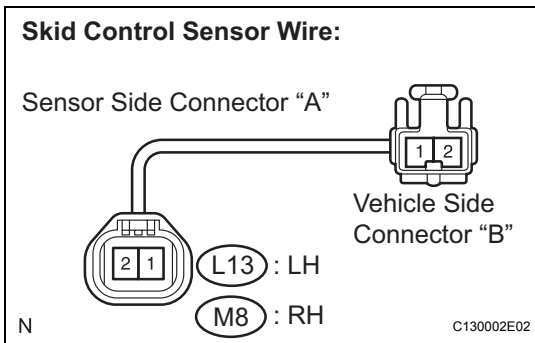
RH

Tester Connection	Specified Condition
M8-1 (RR+) - A34-5 (RR+)	Below 1 Ω
M8-2 (RR-) - A34-19 (RR-)	Below 1 Ω
M8-1 (RR+) - Body ground	10 kΩ or higher
M8-2 (RR-) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU TO SKID CONTROL SENSOR WIRE)

OK

9 CHECK SKID CONTROL SENSOR WIRE



- (a) SKID CONTROL SENSOR WIRE
- (1) Measure the resistance according to the value(s) in the table below.

Resistance:
LH

Tester Connection	Specified Condition
L13 (A-1) - L13 (B-1)	Below 1 Ω
L13 (A-1) - L13 (B-2)	10 kΩ or higher
L13 (A-1) - Body ground	10 kΩ or higher
L13 (A-2) - L13 (B-2)	Below 1 Ω
L13 (A-2) - L13 (B-1)	10 kΩ or higher
L13 (A-2) - Body ground	10 kΩ or higher

RH

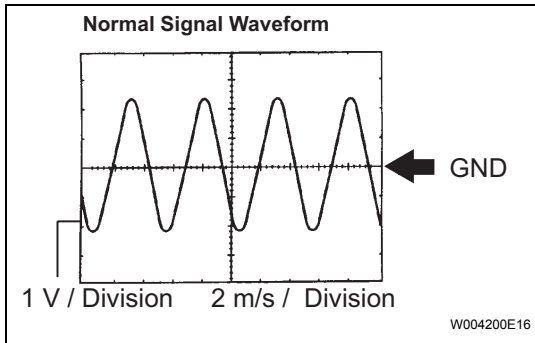
Tester Connection	Specified Condition
M8 (A-1) - M8 (B-1)	Below 1 Ω
M8 (A-1) - M8 (B-2)	10 kΩ or higher
M8 (A-1) - Body ground	10 kΩ or higher

Tester Connection	Specified Condition
M8 (A-2) - M8 (B-2)	Below 1 Ω
M8 (A-2) - M8 (B-1)	10 kΩ or higher
M8 (A-2) - Body ground	10 kΩ or higher

NG **REPAIR OR REPLACE SKID CONTROL SENSOR WIRE**

OK

10 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



- (a) INSPECTION USING OSCILLOSCOPE
- (1) Disconnect the rear speed sensor connector.
 - (2) Connect the oscilloscope to terminals 1 and 2 of the rear speed sensor.
 - (3) Check that a waveform is output when the tires are rotated.

OK:
A waveforms as shown in the figure should be output.

- HINT:**
- As vehicle speed (wheel rotation speed) increases, the width 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 rotor scratches, looseness or foreign matter attached to the speed sensor.

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

OK

11 READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

BC

- Connect the intelligent tester to the DLC3.
- Start the engine.
- Select "DATA LIST" and read the value displayed on the intelligent tester.

DATA LIST: ABS/VSC

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

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

OK:

The speed value output from the speed sensor displayed on the intelligent tester is the same as the actual vehicle speed.

HINT:

These DTCs may be stored due to a malfunction in the connector terminal connection, etc.

NG**REPLACE ABS & TRACTION ACTUATOR ASSEMBLY****OK****END**

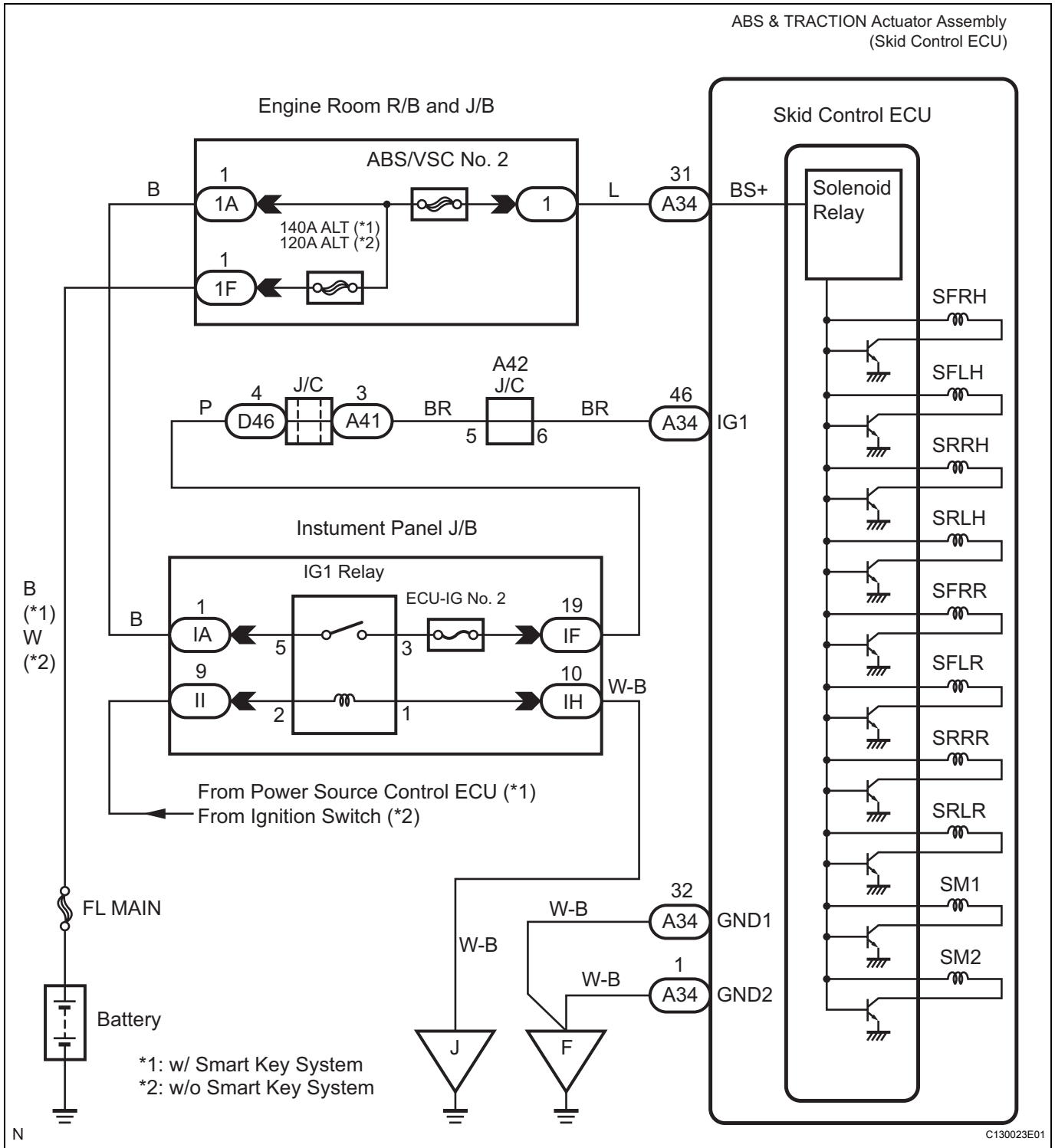
DTC	C0226/21	SFR Solenoid Circuit
DTC	C0236/22	SFL Solenoid Circuit
DTC	C0246/23	SRR Solenoid Circuit
DTC	C0256/24	SRL Solenoid Circuit
DTC	C1225/25	SM Solenoid Circuit

DESCRIPTION

These solenoids turn on when signals are received from the skid control ECU and control the pressure acting on the wheel cylinders to control the braking force.

DTC No.	DTC Detecting Condition	Trouble Area
C0226/21 C0236/22 C0246/23 C0256/24	Open or short in solenoid circuit continues for 0.05 sec. or more.	ABS & TRACTION actuator assembly (Solenoid circuit)
C1225/25	When any of the following is detected: <ul style="list-style-type: none"> • While outputting switching solenoid (SM1 or SM2) ON, overcurrent continues for 0.05 sec. or more. • While outputting switching solenoid (SM1 or SM2) OFF, an open circuit continues for 0.05 sec. or more. • While outputting switching solenoid (SM1 or SM2) ON, an open circuit continues for 0.1 sec. or more. • While outputting switching solenoid (SM1 or SM2) OFF, current continues to be applied for 0.1 sec. or more. • Short to GND in the switching solenoid (SM1 or SM2) continues for 0.1 sec. or more. • Switching solenoid SM1 and SM2 are shorted for 0.1 sec. or more. 	ABS & TRACTION actuator assembly (Solenoid circuit)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-104).

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

HINT:

This code is detected when a problem is determined in the ABS & TRACTION actuator assembly.

The solenoid circuit is in the ABS & TRACTION actuator assembly.

Therefore, solenoid circuit inspection and solenoid unit inspection cannot be performed. Be sure to check if the DTC code is output before replacing the ABS & TRACTION actuator assembly.

- (a) Clear the DTC.
- (b) Start the engine.
- (c) Drive the vehicle at the speed of 4 mph (6 km/h) or more.
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

- If a speed signal of 4 mph (6 km/h) or more is input to the skid control ECU, with the ignition switch on (IG) and the stop light switch off, the ECU performs self diagnosis of the motor and solenoid circuits.
- If the normal system code is output (the trouble code is not output), slightly jiggle the connectors, wire harness, and fuses of the ABS & TRACTION actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the ABS & TRACTION actuator (skid control ECU), inspect and repair the connector or wire harness.
- These DTCs may be stored due to a malfunction in the connector terminal connection, etc.

B	REPLACE ABS & TRACTION ACTUATOR ASSEMBLY
----------	---

A

BC

END

DTC	C0273/13	Open in ABS Motor Relay Circuit
DTC	C0274/14	Short to B+ in ABS Motor Relay Circuit
DTC	C1361/91	Short Circuit in ABS Motor Fail Safe Relay Circuit

DESCRIPTION

If a DTC of the motor line is stored, the VSC No. 2 relay cuts off the power supply to the VSC No. 1 relay and performs fail-safe.

While any of the ABS, TRAC, VSC, or BA is operating, the skid control ECU (housed in the ABS & TRACTION actuator assembly) turns the VSC No. 2 relay on and activates the pump motor in the ABS & TRACTION actuator.

This code may be stored if the motor relay (+BM) voltage becomes lower than the DTC detecting condition due to insufficient output from the battery or alternator.

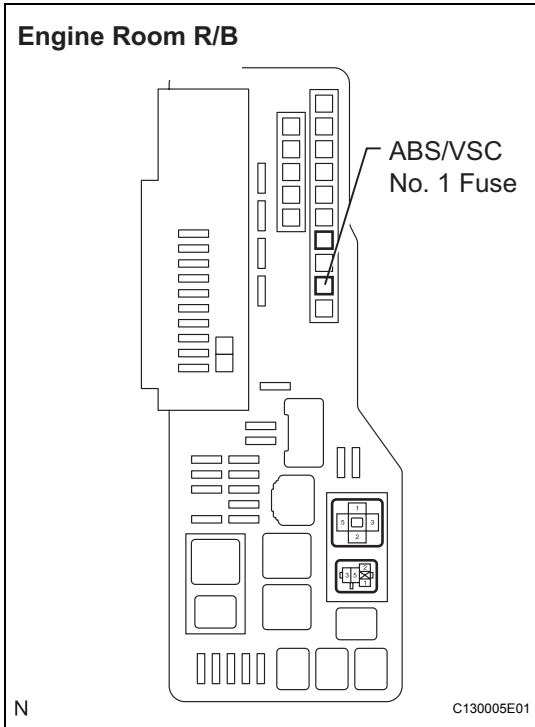
DTC No.	DTC Detecting Condition	Trouble Area
C0273/13	When any of the following (1 or 2) is detected: 1. All of the following conditions continue for 0.12 seconds or more. – The ignition terminal voltage is between 9.5 and 17.2 V. – During initial check or ABS, BA, TRAC, and VSC are in operation. – Relay contact is open when the relay is ON. 2. All of the following conditions continue for 0.12 seconds. – The ignition terminal voltage is 9.5 V or less. – Relay contact remains open when the relay is ON.	<ul style="list-style-type: none"> • ABS/VSC No. 1 fuse • VSC No. 1 relay • VSC No. 1 relay circuit • ABS & TRACTION actuator assembly
C0274/14	When the motor relay is OFF, the motor relay (VSC No.1 relay) remains closed for 4 seconds or more.	<ul style="list-style-type: none"> • ABS/VSC No. 1 fuse • VSC No. 1 relay • VSC No. 1 relay circuit • ABS & TRACTION actuator assembly
C1361/91	Immediately after the ignition switch is turned on (IG), the relay contact is closed for 2 seconds when the motor fail-safe relay (VSC No.2 relay) is OFF.	<ul style="list-style-type: none"> • ABS/VSC No. 1 fuse • VSC No. 2 relay • VSC No. 2 relay circuit • ABS & TRACTION actuator assembly

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-104).

1 INSPECT FUSE (ABS/VSC NO. 1 FUSE)



- (a) Remove the ABS/VSC No. 1 fuse from the engine room R/B.
- (b) Measure the resistance according to the value(s) in the table below.

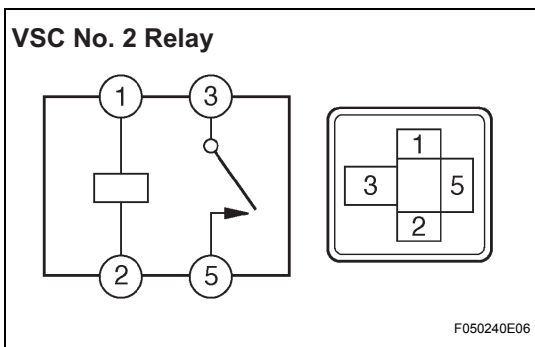
Resistance

Tester Connection	Specified Condition
ABS/VSC No.1 fuse	Below 1 Ω (Continuity)

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

OK

2 INSPECT VSC NO.2 RELAY



- (a) Remove the VSC No. 2 relay.
- (b) Measure the resistance according to the value(s) in the table below.

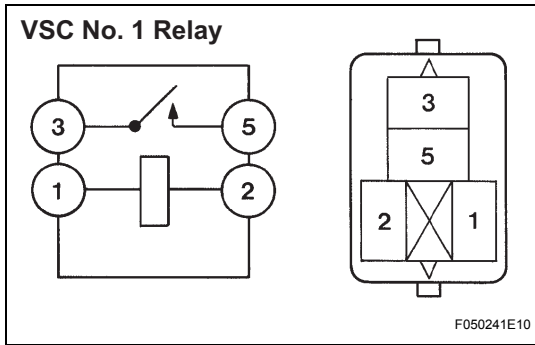
Resistance

Tester Connection	Condition	Specified Condition
1 - 2	Always	80 Ω (Continuity)
3 - 5	Always	10 kΩ or higher (No continuity)
3 - 5	Apply B + between terminal 1 and 2	Below 1 Ω (Continuity)

NG REPLACE VSC NO.2 RELAY

OK

3 INSPECT VSC NO.1 RELAY



- (a) Remove the VSC No. 1 relay.
- (b) Measure the resistance according to the value(s) in the table below.

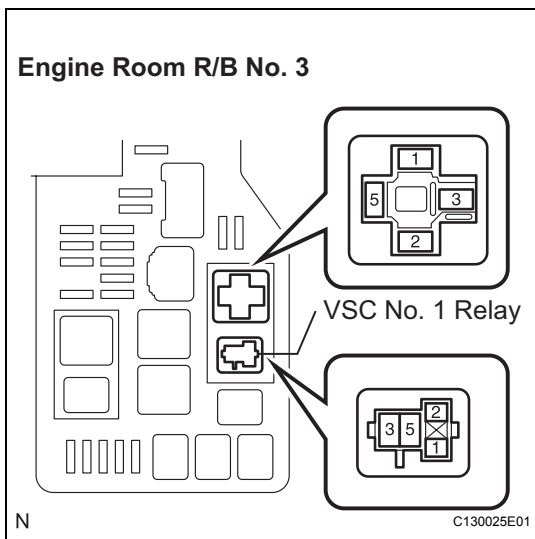
Resistance

Tester Connection	Condition	Specified Condition
1 - 2	Always	100 Ω (Continuity)
3 - 5	Always	10 kΩ or higher (No continuity)
3 - 5	Apply B + between terminal 1 and 2	Below 1 Ω (Continuity)

NG → **REPLACE VSC NO.1 RELAY**

OK

4 INSPECT ENGINE ROOM R/B No.3 (VSC NO. 1 RELAY POWER SOURCE CIRCUIT)



- (a) Remove the VSC No. 1 relay from the engine room R/B No. 3.
- (b) Turn the ignition switch on (IG).
- (c) Measure the voltage according to the value(s) in the table below.

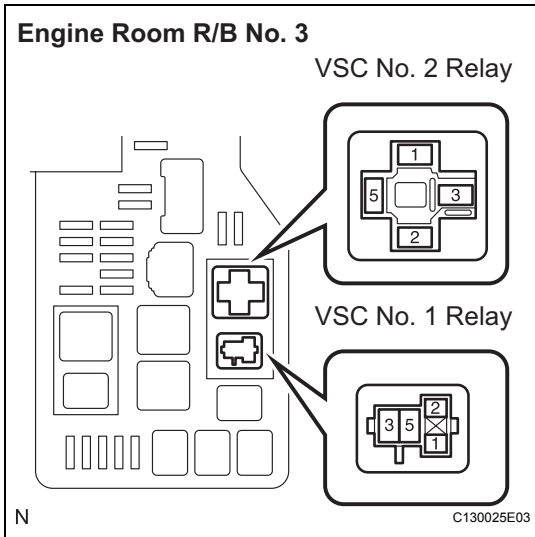
Voltage

Tester Connection	Condition	Specified Condition
VSC No. 1 relay terminal 5 - Body ground	Ignition switch on (IG)	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

OK

5 INSPECT ENGINE ROOM R/B No.3



- (a) Remove the VSC No. 1 and No. 2 relays.
- (b) Measure the resistance according to the value(s) in the table below.

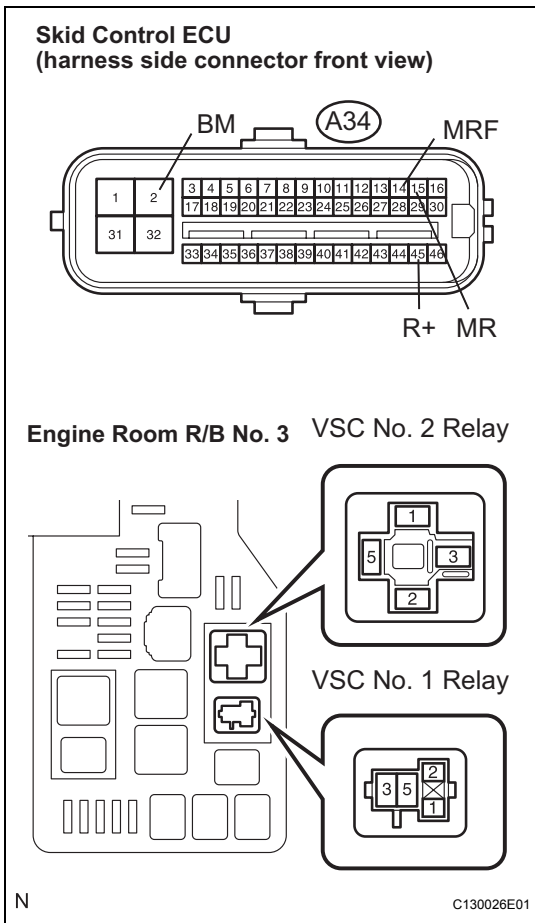
Resistance

Tester Connection	Specified Condition
VSC No. 1 relay terminal 1 - VSC No. 2 relay terminal 1	Below 1 Ω
VSC No. 1 relay terminal 3 - VSC No. 2 relay terminal 5	Below 1 Ω

NG REPAIR OR REPLACE ENGINE ROOM R/B No.3

OK

6 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU TO ENGINE ROOM R/B No. 3)



- (a) Disconnect the skid control ECU connector.
- (b) Remove the VSC No. 1 relay and VSC No. 2 relay from the engine room R/B No. 3.
- (c) Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Specified Condition
A34-2 (BM) - VSC No. 2 relay 3	Below 1 Ω
A34-14 (MRF) - VSC No. 1 relay 2	Below 1 Ω
A34-15 (MR) - VSC No. 2 relay 2	Below 1 Ω
A34-45 (R+) - VSC No. 1 relay 1	Below 1 Ω
A34-45 (R+) - VSC No. 2 relay 1	Below 1 Ω

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

Resistance

Tester Connection	Specified Condition
A34-2 (BM) - Body ground	10 kΩ or higher
A34-14 (MRF) - Body ground	10 kΩ or higher
A34-15 (MR) - Body ground	10 kΩ or higher
A34-45 (R+) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7 RECONFIRM DTC

- (a) Clear the DTC.
- (b) Start the engine.
- (c) Drive the vehicle at the speed of 4 mph (6 km/h) or more.
- (d) Check that the same DTC is recorded.

HINT:

Reinstall the sensors, connectors, etc. and restore the vehicle to its prior conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

- If a speed signal of 4 mph (6 km/h) or more is input to the skid control ECU, with the ignition switch on (IG) and the stop light switch off, the ECU performs self diagnosis of the motor and solenoid circuits.
- If the normal system code is output (the trouble code is not output), slightly jiggle the connectors, wire harness, and fuses of the ABS & TRACTION actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the ABS & TRACTION actuator (skid control ECU), inspect and repair the connector or wire harness.

HINT:

It is suspected that the DTCs were output due to a bad connection of the connector terminal.

B → **REPLACE ABS & TRACTION ACTUATOR ASSEMBLY**

A

DTC	C0278/11	Open in ABS Solenoid Relay Circuit
DTC	C0279/12	Short to B+ in ABS Solenoid Relay Circuit

DESCRIPTION

The ABS solenoid relay supplies power to the ABS solenoid and TRAC solenoid.

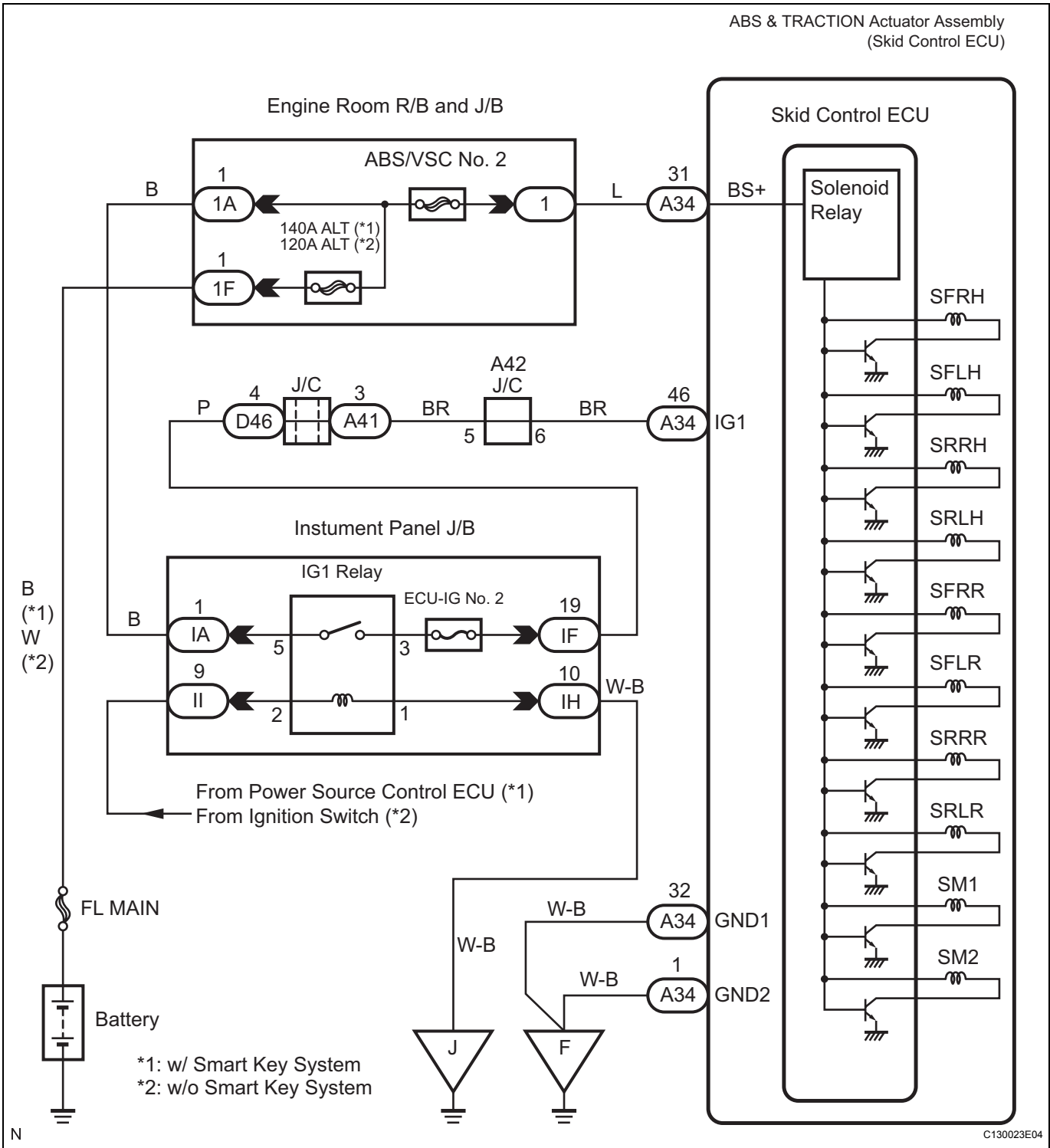
The solenoid relay is turned on 1.5 seconds after the ignition switch is turned on (IG), and is turned off if an open or short in the solenoid is detected by self diagnosis performed when the vehicle starts running. The ABS solenoid relay is housed in the skid control ECU in the ABS & TRACTION actuator assembly.

HINT:

If a speed signal of 4 mph (6 km/h) or more is input to the skid control ECU, with the ignition switch on (IG) and the stop light switch off, the ECU performs self diagnosis of the motor and solenoid circuits.

DTC No.	DTC Detecting Condition	Trouble Area
C0278/11	<p>When any of the following (1 or 2) is detected:</p> <ol style="list-style-type: none"> All of the following conditions continue for 0.2 seconds or more. <ul style="list-style-type: none"> The ignition terminal voltage is between 9.5 and 17.2 V. The solenoid relay contact is open when the relay is on. All of the following conditions continue for 0.2 seconds or more. <ul style="list-style-type: none"> IG1 terminal voltage becomes lower than 9.5 V or less when the relay is turned on. The relay contact remains open. 	<ul style="list-style-type: none"> ABS/VSC No. 2 fuse ABS & TRACTION actuator assembly (Solenoid relay circuit)
C0279/12	<p>Immediately after the ignition switch is turned on (IG), the solenoid relay contact is closed for 0.2 seconds when the relay is turned on.</p>	<ul style="list-style-type: none"> ABS/VSC No. 2 fuse ABS & TRACTION actuator assembly (Solenoid relay circuit)

WIRING DIAGRAM



INSPECTION PROCEDURE

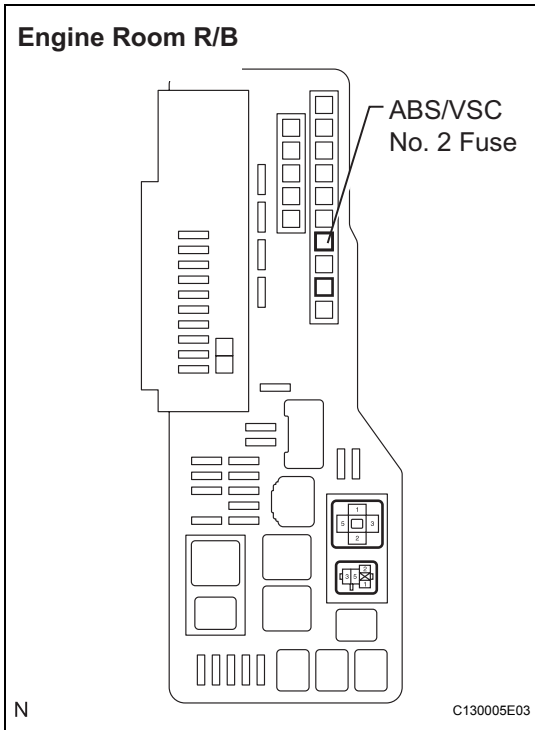
NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-104).

HINT:

When C1241/41 is output along with C0278/11, inspect and repair the trouble areas indicated by C1241/41 first.

1 INSPECT FUSE (ABS/VSC NO.2 FUSE)



- (a) Remove the ABS/VSC No. 2 fuse from the engine room R/B.
- (b) Measure the resistance according to the value(s) in the table below.

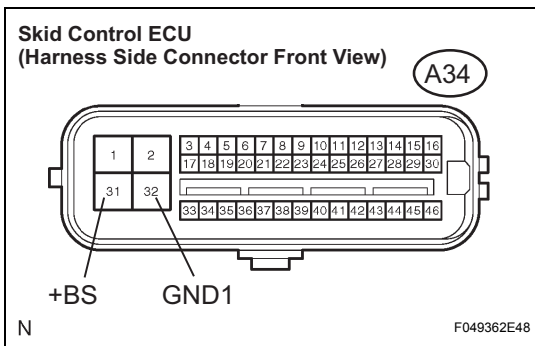
Resistance

Tester Connection	Specified Condition
ABS/VSC No. 2 fuse	Below 1 Ω (Continuity)

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

OK

2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (+BS TERMINAL VOLTAGE AND GND CIRCUIT)



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

Voltage

Tester Connection	Condition	Specified Condition
A34-31 (+BS) - Body ground	Always	10 to 14 V

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

Resistance

Tester Connection	Specified Condition
A34-32 (GND1) - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (+BS, GND1 CIRCUIT)

OK

3 RECONFIRM DTC

- (a) Clear the DTC.

- (b) Start the engine.
- (c) Check that the same DTC is recorded.

HINT:

Reinstall the sensors, connectors, etc. and restore the vehicle to its prior conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

- If the normal system code is output (the malfunction code is not output), slightly jiggle the connectors, wire harnesses, and fuses of the ABS & TRACTION actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the ABS & TRACTION actuator (skid control ECU), inspect and repair the connector or wire harness.

HINT:

It is suspected that the DTCs were output due to a bad connection of the connector terminal.



REPLACE ABS & TRACTION ACTUATOR ASSEMBLY



END

DTC	C1201/51	Engine Control System Malfunction
------------	-----------------	--

DESCRIPTION

If a malfunction in the engine control system is detected, the operations of VSC and TRAC are prohibited by the fail-safe function. When the signals from the engine are input normally, the fail-safe is cancelled and the DTC is not stored.

DTC No.	DTC Detecting Condition	Trouble Area
C1201/51	Engine control system malfunction signal continues for 5 seconds.	Engine control system

INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)
----------	---

- (a) Using the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (See page [BC-103](#)).

DATA LIST: ABS/VSC/TRC

Item	Measurement Item / Range (Display)	Normal Condition
EFI COM	EFI communication open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG	Go to step 3
-----------	---------------------

OK

2	CHECK DTC FOR ENGINE CONTROL SYSTEM
----------	--

- (a) Clear the DTC (engine control system).
- (b) Check the DTC (engine control system).

Result

Result	Proceed to
DTC (engine control system) is not output	A
DTC (engine control system) is output	B

B	REPAIR ENGINE CONTROL SYSTEM ACCORDING TO DTC OUTPUT
----------	---

A

REPLACE ECM

3 REPAIR OR REPLACE HARNESS OR CONNECTOR (ECM TO SKID CONTROL ECU)

NEXT

4 RECONFIRM DTC

- (a) Clear the DTC.
- (b) Perform a road test.
- (c) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

Go to step 2

A

END

DTC**C1203/53****ECM Communication Circuit Malfunction****DESCRIPTION**

The circuit is used to send TRAC & VSC control information from the skid control ECU to the ECM, and engine control information from the ECM to the skid control ECU.

DTC No.	DTC Detecting Condition	Trouble Area
C1203/53	Engine, drive source and destination variations that are sent from the ECM do not match the ones of the skid control ECU.	ECM

INSPECTION PROCEDURE**1****REPLACE ECM****NEXT****END**

DTC	C1210/36	Zero Point Calibration of Yaw Rate Sensor Undone
DTC	C1336/39	Zero Point Calibration of Acceleration Sensor Undone

DESCRIPTION

The ABS & TRACTION actuator assembly receives signals from the yaw rate sensor (acceleration sensor) via CAN communication system.

The yaw rate sensor has the built-in acceleration sensor.

If there is trouble in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, the DTCs U0123/62 (lost communication with the yaw rate sensor module) and U0124/95 (lost communication with the lateral acceleration sensor module) are output.

The DTCs are also output when the calibration has not been completed.

DTC No.	DTC Detecting Condition	Trouble Area
C1210/36	Zero point calibration of yaw rate sensor undone.	<ul style="list-style-type: none"> ABS & TRACTION actuator assembly (Skid control ECU) Zero point calibration undone (Perform zero point calibration and check DTC. If DTC is not output again, the sensor is normal)
C1336/39	Zero point calibration of acceleration sensor undone.	<ul style="list-style-type: none"> ABS & TRACTION actuator assembly (Skid control ECU) Zero point calibration undone (Perform zero point calibration and check DTC. If DTC is not output again, the sensor is normal)

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

HINT:

When U0123/62, U0124/95 or U0126/63 is output along with C01210/36 or C1336/39, inspect and repair the trouble areas indicated by U0123/62, U0124/95 or U0126/63 first.

1	CHECK SENSOR INSTALLATION
----------	----------------------------------

- (a) Check that the yaw rate and acceleration sensor has been installed properly (See page [BC-258](#)).

OK:

The sensor should be tightened to the specified torque.

The sensor should not be tilted.

NG

INSTALL YAW RATE SENSOR CORRECTLY

OK

2**PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND ACCELERATION SENSOR**

- (a) Perform the zero point calibration of the yaw rate sensor and acceleration sensor (See page [BC-104](#)).

NEXT**3****RECONFIRM DTC**

- (a) Clear the DTC.
 (b) Start the engine.
 (c) Drive the vehicle and turn the steering wheel to the right and left at a speed of 24 mph (35 km/h) or more.
 (d) Check that the same DTCs are recorded.

HINT:

Reinstall the sensors, connectors, etc. and restore the vehicle to its prior conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

- The DTCs are recorded because zero point calibration has not been completed.
- End the procedure since the same DTCs are not recorded after completion of zero point calibration.
- If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page [BC-117](#)).

B**REPLACE ABS & TRACTION ACTUATOR ASSEMBLY****A****END****BC**

DTC**C1223/43****ABS Control System Malfunction****DESCRIPTION**

This DTC is output when the VSC system detects a malfunction in the ABS system.

DTC No.	DTC Detecting Condition	Trouble Area
C1223/43	Malfunction in the ABS control system	ABS control system

INSPECTION PROCEDURE**1 CHECK DTC (FOR ABS SYSTEM)**

- (a) Clear the DTC.
- (b) Turn the ignition switch on (IG).
- (c) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

These DTCs may be stored due to a malfunction in the connector terminal connection, etc.

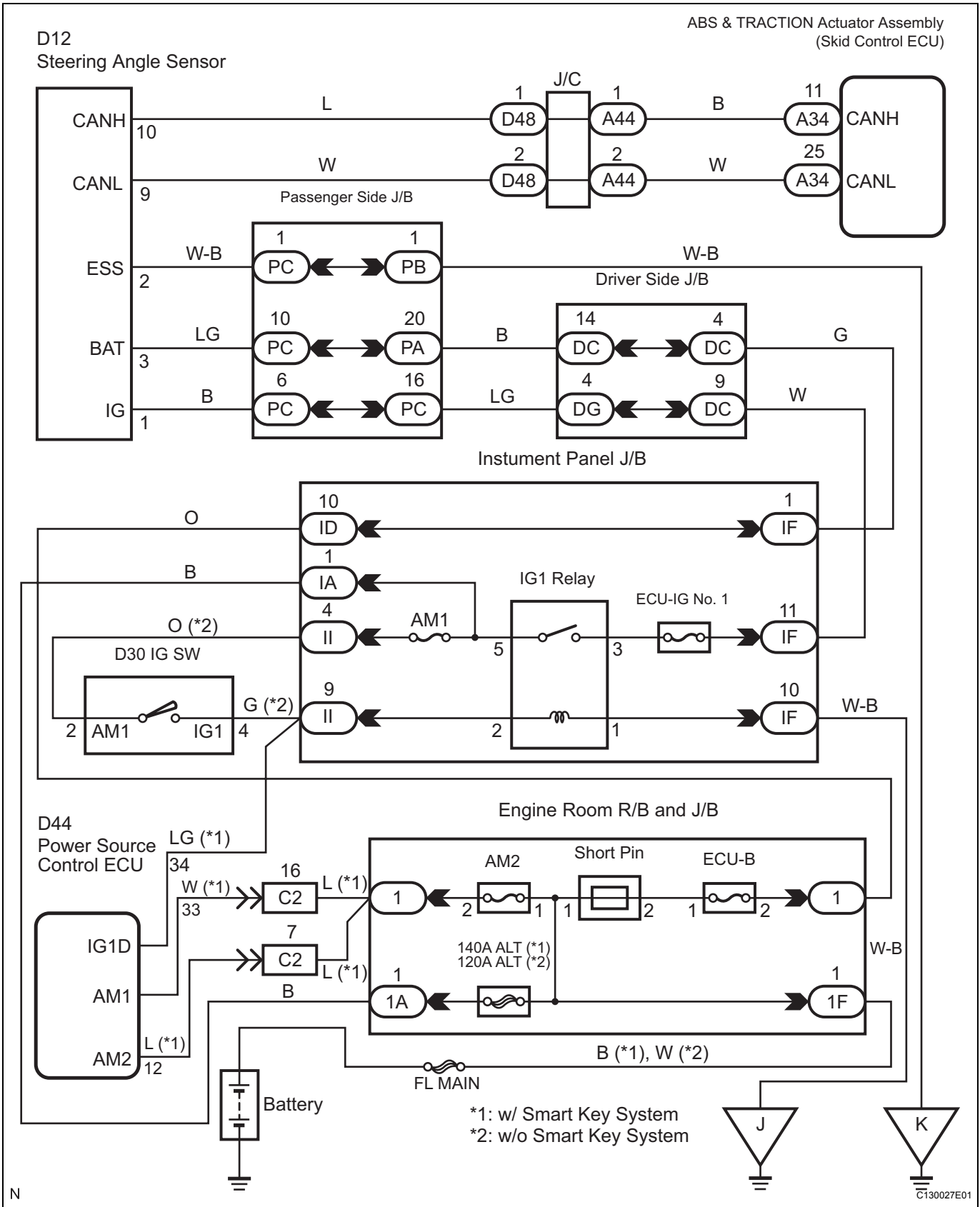
B**REPAIR CIRCUIT INDICATED BY OUTPUT DTC****A****END**

DTC**C1231/31****Steering Angle Sensor Circuit Malfunction****DESCRIPTION**

The steering angle sensor signal is sent to the skid control ECU via CAN communication system. When there is a malfunction in the CAN communication system, it will be detected by the diagnosis function.

DTC No.	DTC Detecting Condition	Trouble Area
C1231/31	When ECU IG1 terminal voltage is 9.5 V or more, the steering angle sensor malfunction signal is received.	<ul style="list-style-type: none">• Steering angle sensor• Steering angle sensor circuit• Steering angle sensor power supply• CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- When U0121/94, U0123/62, U0124/95 or U0126/63 is output together with C1231/31, inspect and repair the trouble areas indicated by U0121/94, U0123/62, U0124/95 or U0126/63 first.
- When the speed sensor or the yaw rate 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 sensor first, and then inspect and repair the steering angle sensor.
- Start the inspection from step 1 when using the intelligent tester and start from step 2 when not using the intelligent tester.

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

- (a) Using the intelligent tester, check for any momentary interruption in the wire harness and connectors between the skid control ECU and the steering angle sensor (See page [BC-103](#)).

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition
STEERING SEN	Steering sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG**Go to step 4****OK****2 CHECK STEERING ANGLE SENSOR**

- (a) Clear the DTC.
 (b) Turn the ignition switch off.
 (c) Turn the ignition switch on (IG) again and check that no CAN communication system DTC is output.
 (d) Start the engine.
 (e) Drive the vehicle and turn the steering wheel to the right and left at the speed of 24 mph (35 km/h) and check that no speed sensor and yaw rate sensor DTCs are output.

Result

Result	Proceed to
No CAN communication system DTC and the speed sensor or yaw rate sensor DTC are output.	A
CAN communication system DTC is output. Speed sensor or yaw rate sensor DTC is output.	B

HINT:

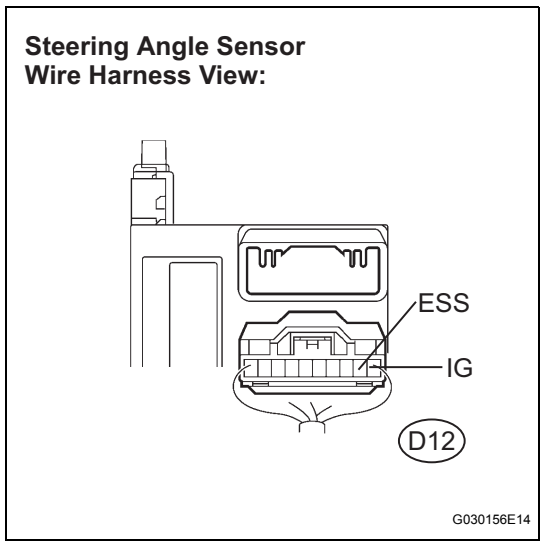
- If there is a malfunction in the speed sensor or the yaw rate sensor, an abnormal value may be output although the steering sensor is normal.

- If the speed sensor and the yaw rate sensor DTCs are output simultaneously, repair the sensors and inspect the steering sensor.

B REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

3 CHECK TERMINAL VOLTAGE (STEERING ANGLE SENSOR CONNECTOR)



- Remove the steering wheel and the column lower cover.
- Disconnect the steering angle sensor connector.
- Turn the ignition switch on (IG).
- Measure the voltage according to the value(s) in the table below.

Voltage

Tester Connection	Condition	Specified Condition
D12-1 (IG) - D12-2 (ESS)	Ignition switch on (IG)	10 to 14 V

- Turn the ignition switch off.
- Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Specified Condition
D12-2 (ESS) - Body ground	Below 1 Ω

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page BC-117).

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (IG, ESS CIRCUIT)

OK

REPLACE STEERING ANGLE SENSOR

BC

4 CHECK AND REPAIR HARNESS AND CONNECTOR (STEERING ANGLE SENSOR TO SKID CONTROL ECU)

NEXT

5 RECONFIRM DTC

- Clear the DTC.
- Start the engine.
- Drive the vehicle and turn the steering wheel to the right and left at the speed of 24 mph (35 km/h) or more.
- Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page [BC-117](#)).



DTC	C1232/32	Stuck in Deceleration Sensor
DTC	C0371/71	Yaw Rate Sensor (Test Mode DTC)
DTC	C1234/34	Yaw Rate Sensor Malfunction
DTC	C1243/43	Acceleration Sensor Stuck Malfunction
DTC	C1244/44	Open or Short in Acceleration Sensor Circuit
DTC	C1245/45	Acceleration Sensor Output Malfunction
DTC	C1279/79	Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)
DTC	C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction

DESCRIPTION

The skid control ECU receives signals from the yaw rate and acceleration sensor via the CAN communication system.

The yaw rate sensor has a built-in acceleration sensor.

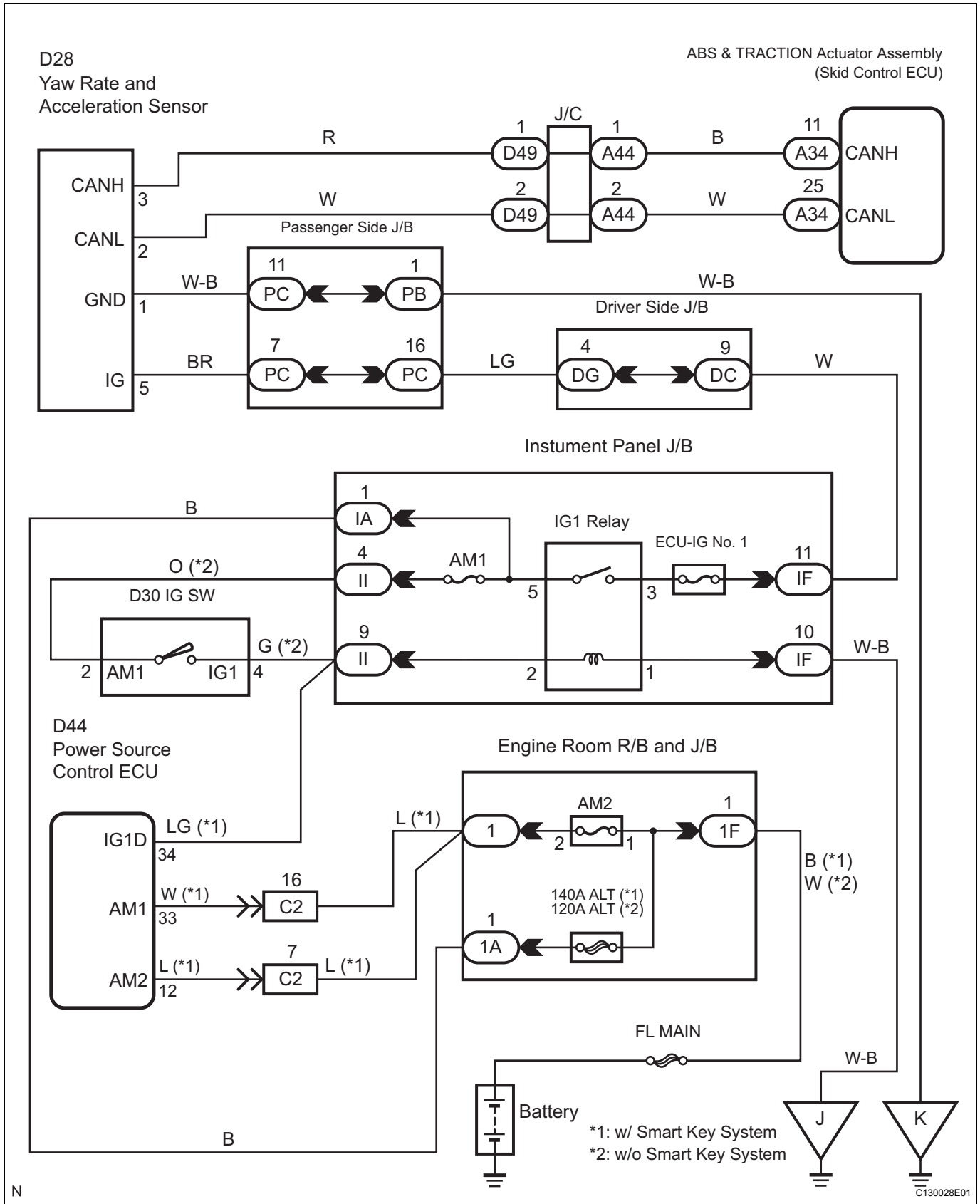
If there is trouble in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, the DTC U0123/62 (lost communication with yaw rate sensor module) and U0124/95 (lost communication with lateral acceleration sensor module) are output.

These DTCs are also output when the calibration has not been completed.

DTCs C1279/79 and C0371/71 are output only in the test mode (SIGNAL CHECK).

DTC No.	DTC Detecting Condition	Trouble Area
C1232/32	At a vehicle speed of 6 mph (10 km/h) or more, either GL1 or GL2 (input signal) does not change for 30 seconds or more.	<ul style="list-style-type: none"> • Yaw rate and acceleration sensor • Yaw rate and acceleration sensor circuit
C1234/34	Sensor malfunction signal is received from the yaw rate sensor.	<ul style="list-style-type: none"> • Yaw rate and acceleration sensor • Yaw rate and acceleration sensor circuit
C1243/43	While the vehicle speed changes from 19 mph (30 km/h) to 0 mph (0 km/h), the condition that the values of GL1 and GL2 do not change occurs 16 times or more.	<ul style="list-style-type: none"> • Yaw rate and acceleration sensor • Yaw rate and acceleration sensor circuit
C1244/44	When either of the following is detected: 1. A data malfunction signal is received from the acceleration sensor. 2. After the difference between GL1 and GL2 becomes 0.6 G or more with the vehicle stationary, the difference remains 0.4 G or more for 60 seconds or more.	<ul style="list-style-type: none"> • Yaw rate and acceleration sensor • Yaw rate and acceleration sensor circuit
C1245/45	At a vehicle speed of 19 mph (30 km/h) or more, the difference between the forward and backward G calculated from the acceleration sensor value and that calculated from the vehicle speed sensor exceeds 0.35 G for 60 seconds or more.	<ul style="list-style-type: none"> • Yaw rate and acceleration sensor • Yaw rate and acceleration sensor circuit
C1381/97	At a vehicle speed of more than 2 mph (3 km/h), the acceleration sensor power source malfunction signal is received for 10 seconds or more.	<ul style="list-style-type: none"> • Yaw rate and acceleration sensor • Yaw rate and acceleration sensor power source circuit

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

HINT:

When U0123/62, U124/95 or U0126/63 is output together with C1232/32, C1234/34, C1243/43, C1244/44, C1245/45, and C1381/97, inspect and repair the trouble areas indicated by U0123/62, U0124/95 or U0126/63 first.

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

- (a) Clear the DTC.
- (b) Turn the ignition switch off.
- (c) At a speed of 18 mph (30 km/h) or more, drive the vehicle, turn the steering wheel, and decelerate (depress the brake pedal).
- (d) Turn the ignition switch on (IG) again and check that no CAN communication system DTC is output.
- (e) Check that no DTCs for zero point calibration of the yaw rate sensor undone (C1210/36) and for zero point calibration of the acceleration sensor undone (C1336/39) are output.

Result

Result	Proceed to
DTCs (C1210/36, C1336/39, and CAN communication system malfunction) are not output.	A
CAN communication system DTC is output.	B
C1210/36 and C1336/39 are output.	

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

2	CHECK SENSOR INSTALLATION (YAW RATE SENSOR)
----------	--

- (a) Check that the yaw rate and acceleration sensor has been installed properly (See page [BC-258](#)).

OK:

The sensor is tightened to the specified torque.
The sensor is not tilted.

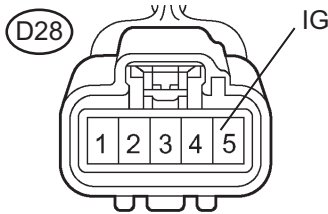
NG

INSTALL YAW RATE AND ACCELERATION SENSOR CORRECTLY

OK

3 CHECK HARNESS AND CONNECTOR (IG TERMINAL)

Yaw Rate and Acceleration Sensor (harness side connector front view)



- (a) Disconnect the yaw rate and acceleration sensor connector.
- (b) Turn the ignition switch on (IG).
- (c) Measure the voltage according to the value(s) in the table below.

Voltage

Tester Connection	Condition	Specified Condition
D28-5 (IG) - Body ground	Ignition switch on (IG)	10 to 14 V

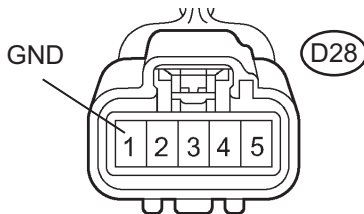
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (IG CIRCUIT)

OK

4 CHECK HARNESS AND CONNECTOR (GND TERMINAL)

Yaw Rate and Acceleration Sensor (harness side connector front view)



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

Resistance

Tester Connection	Specified Condition
D28-1 (GND) - Body ground	Below 1 Ω

NOTICE:

- When replacing the yaw rate and acceleration sensor, perform zero point calibration (See page [BC-104](#)).
- Check the yaw rate and acceleration sensor signal after replacement (See page [BC-107](#)).

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page [BC-117](#)).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK

REPLACE YAW RATE AND ACCELERATION SENSOR

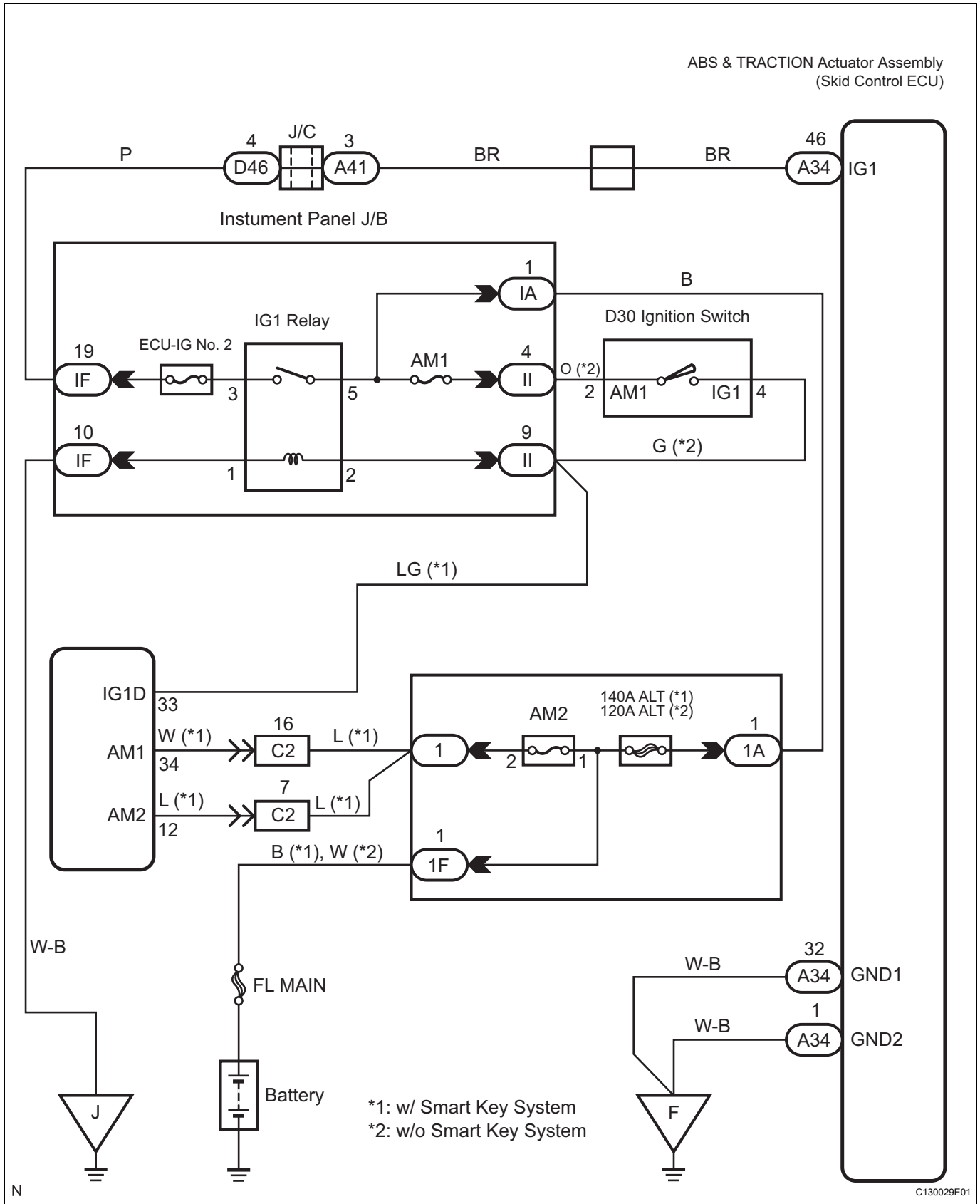
DTC	C1241/41	Low Battery Positive Voltage or Abnormally High Battery Positive Voltage
------------	-----------------	---

DESCRIPTION

If a malfunction is detected in the power supply circuit, the skid control ECU (housed in the ABS & TRACTION actuator assembly) outputs the DTC and prohibits operation with the fail-safe function. This DTC is stored when the IG1 terminal voltage deviates from the DTC detecting condition due to a malfunction in the power supply or charging circuit such as the battery or alternator circuit, etc. The DTC is cancelled when the IG1 terminal voltage returns to normal.

DTC No.	DTC Detecting Condition	Trouble Area
C1241/41	when any of the following is detected: 1. At a vehicle speed of 2 mph (3 km/h) or more, the IG1 terminal voltage is 9.5 V or less for 10 seconds or more. 2. When the solenoid relay remains ON and the IG1 terminal voltage is 9.5 V or less, the relay contact is open for 0.2 seconds or more.	<ul style="list-style-type: none"> • Battery • Charging system • Power source circuit • Internal power supply circuit of the skid control ECU

WIRING DIAGRAM

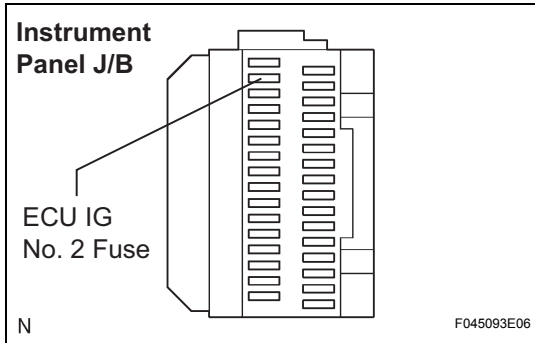


INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-104).

1 INSPECT FUSE (ECU-IG NO.2 FUSE)



- (a) Remove the ECU-IG No. 2 fuse from the instrument panel J/B.
- (b) Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Specified Condition
ECU-IG No. 2 fuse	Below 1 Ω (Continuity)

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

OK

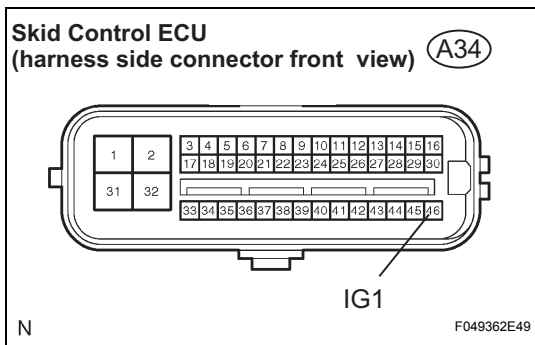
2 INSPECT BATTERY

- (a) Check the battery voltage.
- Voltage:**
10 to 14 V

NG → **INSPECT CHARGING SYSTEM**

OK

3 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (IG1 TERMINAL)



- (a) Disconnect the skid control ECU connector.
- (b) Turn the ignition switch on (IG).
- (c) Measure the voltage according to the value(s) in the table below.

Voltage

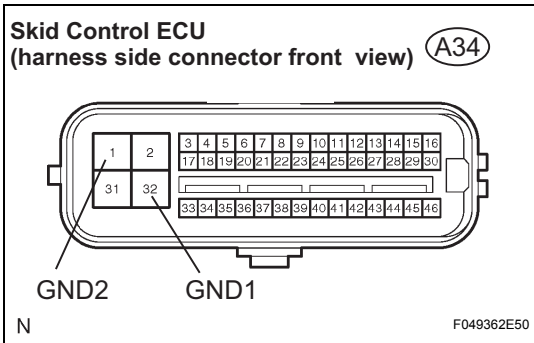
Tester Connection	Condition	Specified Condition
A34-46 (IG1) - Body ground	Ignition switch on (IG)	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)**

OK

BC

4 INSPECT SKID CONTROL ECU (GND TERMINAL CONTINUITY)



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

Resistance

Tester Connection	Specified Condition
A34-32 (GND1) - Body ground	Below 1 Ω
A34-1 (GND2) - Body ground	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK

5 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (IG1 TERMINAL)

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

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition
IG VOLTAGE	ECU power supply voltage / TOO LOW / NORMAL / TOO HIGH	TOO HIGH: 14 V or more NORMAL: 9.5 V to 14 V TOO LOW: 9.5 V or less

- (d) Read the voltage condition output from the ECU displayed on the intelligent tester.

OK:

"NORMAL" is displayed.

HINT:

- These DTCs may be restored due to a malfunction in the connector terminal connection, etc.
- If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page BC-117).

NG → REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

OK

BC

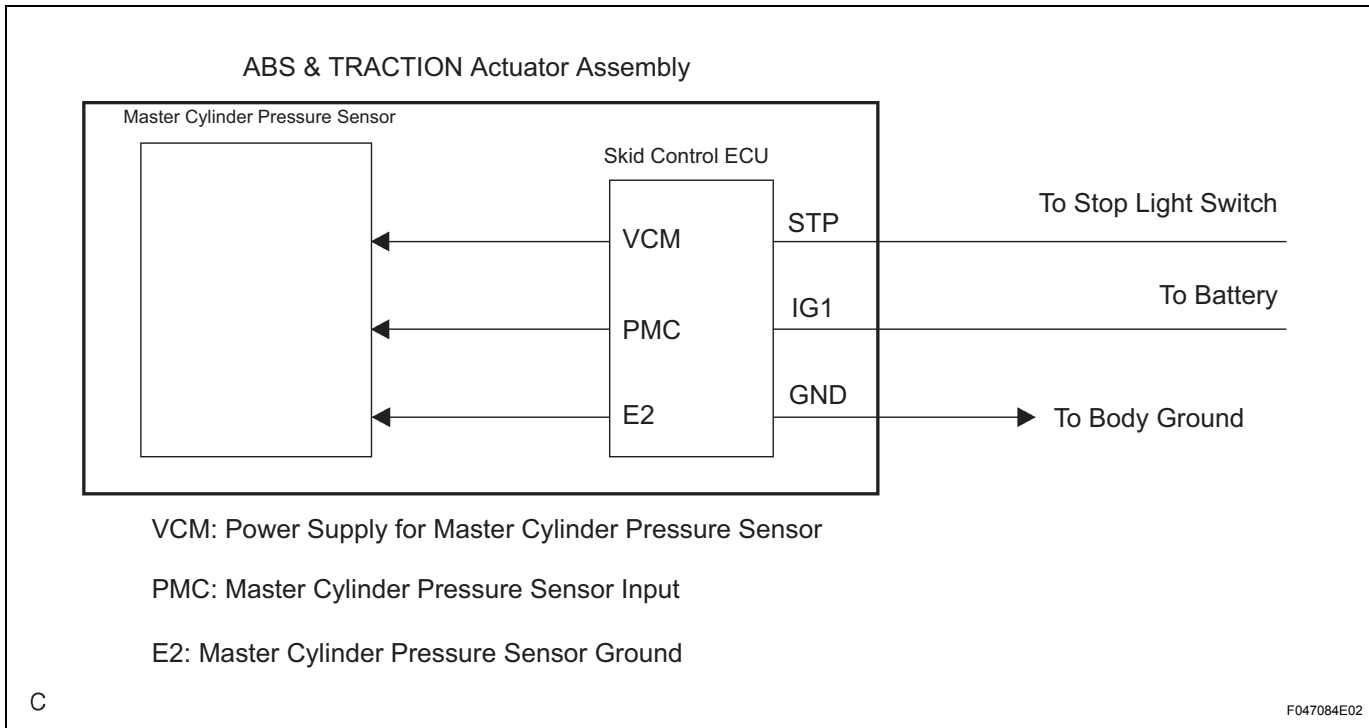
END

DTC	C1246/46	Master Cylinder Pressure Sensor Malfunction
DTC	C1281/81	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)

DESCRIPTION

Master cylinder pressure sensor is connected to the skid control ECU in the ABS & TRACTION actuator assembly.

DTC C1281/81 is output only in the test mode (SIGNAL CHECK).



DTC No.	DTC Detecting Condition	Trouble Area
C1246/46	<p>When any of the following is detected:</p> <ul style="list-style-type: none"> At a vehicle speed of 4.3 mph (7 km/h) or more, when the PMC terminal voltage is over 0.86 V, it does not change by 0.005 V or more for 30 seconds. Noise occurs in the PMC terminal 7 times or more within 5 seconds. When the stop light switch is OFF, the PMC terminal voltage is more than 0.86 V or less than 0.3 V for 5 seconds or more. With the IG1 terminal voltage between 9.5 and 17.2 V, the VCM terminal voltage is not between 4.4 and 5.6 V for 1.2 seconds or more. When the VCM terminal voltage is between 4.4 and 5.6 V, the PMC terminal voltage is not between 0.14 and 4.85 V for 1.2 seconds or more. 	<ul style="list-style-type: none"> Master cylinder pressure sensor Master cylinder pressure sensor circuit Stop light switch circuit ABS & TRACTION actuator assembly

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

1 INSPECT STOP LIGHT OPERATION

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

OK

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

NG

CHECK STOP LIGHT CIRCUIT

OK

2 READ VALUE OF INTELLIGENT TESTER (MASTER CYLINDER PRESSURE SENSOR)

- (a) Connect the intelligent tester to the DLC3.
 (b) Start the engine.
 (c) Select "DATA LIST" on the intelligent tester.

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition
MAS CYL PRS1	Master cylinder pressure sensor 1 reading/ min.: 0 V, max.: 5V	When brake pedal is released: 0.3 to 0.9 V

- (d) Check that the brake fluid pressure value of the master cylinder pressure sensor observed on the intelligent tester changes when the brake pedal is depressed.

OK:

When the pedal is depressed, voltage displayed on the intelligent tester increases.

NG

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

OK

3 READ VALUE OF INTELLIGENT TESTER (STOP LIGHT SWITCH OPERATION)

- (a) Connect the intelligent tester to the DLC3.
 (b) Start the engine.
 (c) Select "DATA LIST" on the intelligent tester.

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition
STOP LIGHT SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released

- (d) Check that the stop light observed on the intelligent tester changes when the brake pedal is depressed.

OK:

When the brake pedal is depressed, the intelligent tester displays "ON".

NG

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

OK

4 RECONFIRM DTC

- (a) Clear the DTC.
- (b) Start the engine.
- (c) At a speed of 18 mph (30 km/h) or more, drive the vehicle and perform braking test (decelerate the vehicle by depressing the brake pedal).
- (d) Check that the same DTC is recorded.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

These DTCs may be restored due to a malfunction in the connector terminal connection, etc.

B

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

A

END

DTC**C1249/49****Open in Stop Light Switch Circuit****DESCRIPTION**

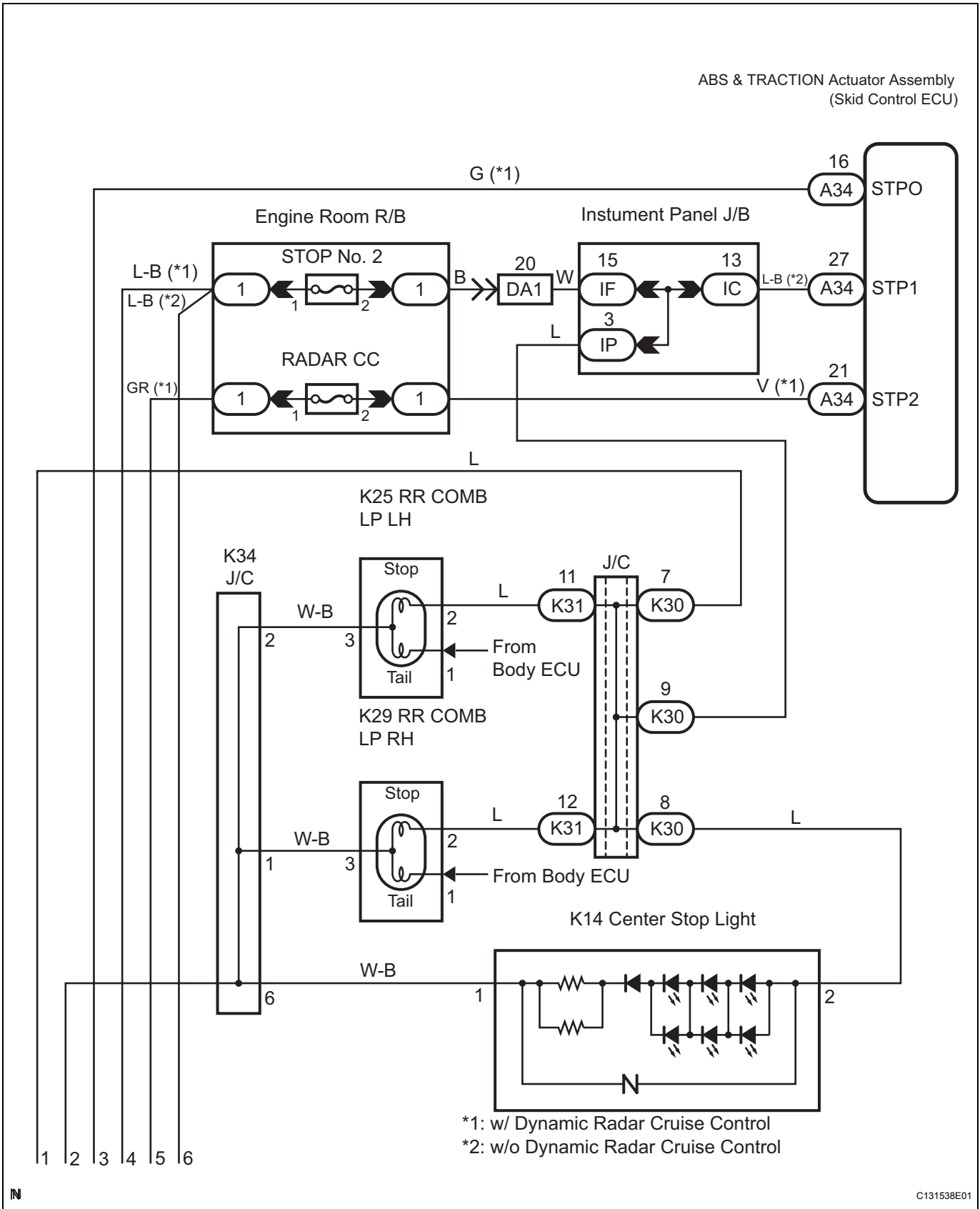
The skid control ECU (housed in the ABS & TRACTION actuator assembly) inputs the stop light switch signal and the condition of brake operation.

The skid control ECU has an open detection circuit, which outputs this DTC when detecting an open in the stop light input line while the stop light switch is OFF.

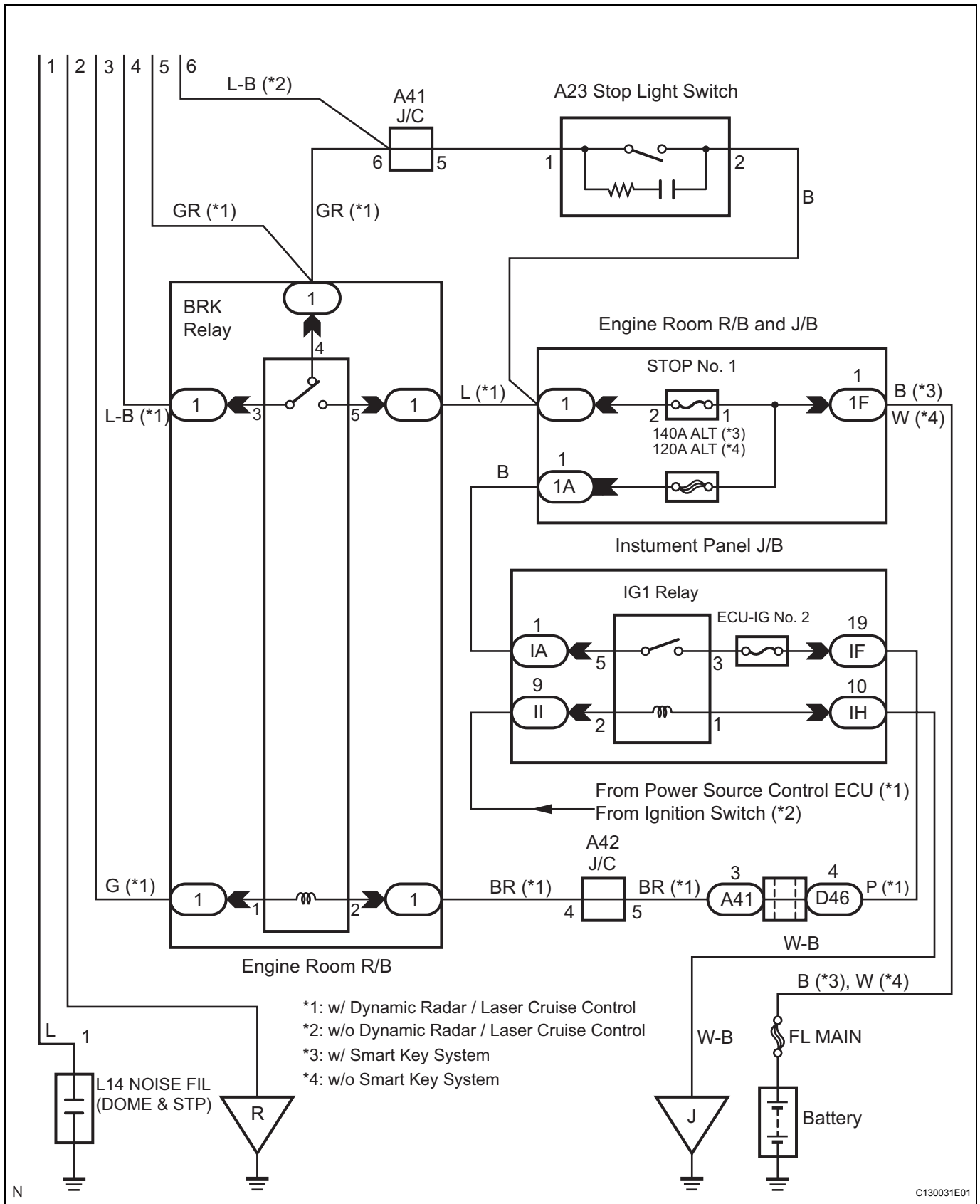
DTC No.	DTC Detecting Condition	Trouble Area
C1249/49	When IG1 terminal voltage is 9.5 to 17.2 V, an open circuit of the stop light switch continues for 0.3 sec. or more.	<ul style="list-style-type: none">• Stop light switch• Stop light switch circuit• ABS & TRACTION actuator assembly

WIRING DIAGRAM

ABS & TRACTION Actuator Assembly
(Skid Control ECU)



BC



BC

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-104).

HINT:

After steps 1, 2 and 3 are completed, start the inspection from step 4 when using the intelligent tester and start from step 5 when not using the intelligent tester.

1 CHECK STOP LIGHT SWITCH OPERATION

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

OK:

Stop light switch function is normal.

HINT:

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

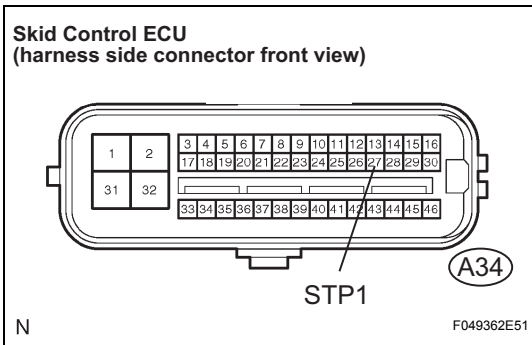
NG → **Go to step 9**

OK

2 INSPECT SKID CONTROL ECU (STP1 TERMINAL VOLTAGE)

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

Voltage



Tester Connection	Condition	Specified Condition
A34-27 (STP1) - Body ground	Stop light switch ON (Brake pedal depressed)	8 to 14 V
A34-27 (STP1) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

Result

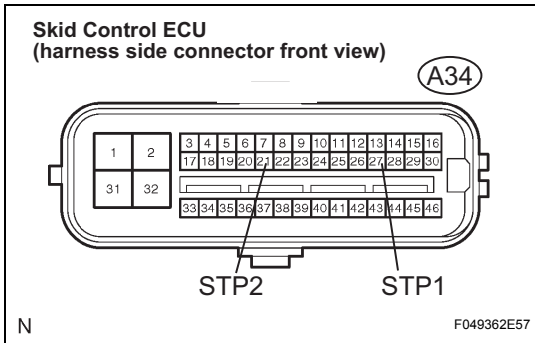
Result	Proceed to
OK (w/ Dynamic radar cruise control)	A
OK (w/o Dynamic radar cruise control)	B
NG	C

B → **Go to step 8**

C → **REPAIR OR REPLACE HARNESS OR CONNECTOR (STP1 CIRCUIT)**

A

3 CHECK HARNESS AND CONNECTOR (STP1 TO STP2 CIRCUIT)



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

Resistance

Tester Connection	Specified Condition
A34-27 (STP1) - A34-21 (STP2)	Below 1 Ω
A34-27 (STP1) - Body ground	1- kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (STP1 TO STP2 CIRCUIT)

OK

4 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (STOP LIGHT RELAY)

- (a) Reconnect the skid control ECU connector.
- (b) Connect the intelligent tester to the DLC3.
- (c) Turn the ignition switch on (IG) and turn the intelligent tester main switch on.
- (d) Select "ACTIVE TEST" on the intelligent tester.

DATA LIST: ABS/VSC

Item	Vehicle Condition / Test Details	Diagnostic Note
STOP LIGHT RELAY	Turns stop light operation relay ON/OFF	Observe rear combination light (Does not come on for 5 sec. or more)

(e) Check that "ON" and "OFF" of the stop light can be shown on the rear combination light by the intelligent tester.

OK:

The stop light turns on or off in accordance with the intelligent tester.

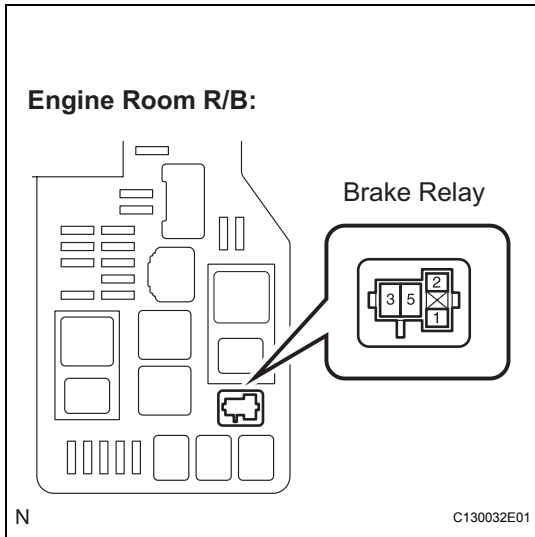
HINT:

Reinstall the sensors, connectors, etc. and restore the vehicle to its prior conditions before rechecking for DTCs.

OK Go to step 8

NG

5 INSPECT ENGINE ROOM R/B (BRAKE RELAY POWER SOURCE TERMINAL VOLTAGE)



- (a) Remove the brake relay.
- (b) Turn the ignition switch on (IG).
- (c) Measure the voltage according to the value(s) in the table below.

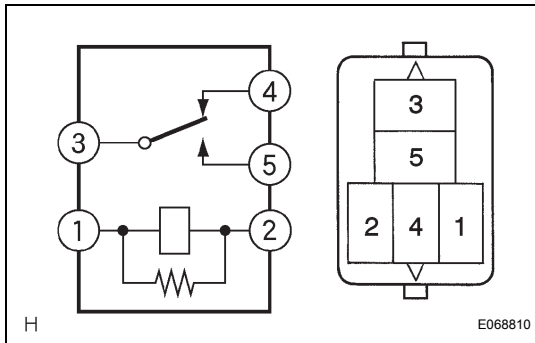
Voltage

Tester Connection	Condition	Specified Condition
2 - Body ground	IG switch on (IG)	8 to 14 V
5 - Body ground	IG switch on (IG)	8 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

OK

6 INSPECT BRAKE RELAY



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

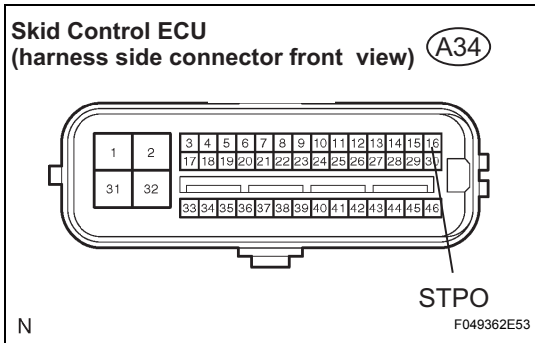
Resistance

Tester Connection	Specified Condition
3 - 4	Below 1 Ω
3 - 5	10 kΩ or higher
3 - 4	10 kΩ or higher (When battery positive voltage is applied to terminal 1 and battery negative voltage to terminal 2.)
3 - 5	Below 1 Ω (When battery positive voltage is applied to terminal 1 and battery negative voltage to terminal 2.)

NG → **REPLACE BRAKE RELAY**

OK

7 INSPECT SKID CONTROL ECU CONNECTOR (STPO TERMINAL VOLTAGE)



- (a) Install the stop light operation (DAC) relay.
- (b) Disconnect the skid control ECU connector.
- (c) Turn the ignition switch on (IG).
- (d) Measure the voltage according to the value(s) in the table below.

Voltage

Tester Connection	Condition	Specified Condition
S34-16 (STPO) - Body ground	IG switch on (IG)	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (STPO CIRCUIT)

OK

8 RECONFIRM DTC

- (a) Clear the DTC.
 - (b) Depress the brake pedal several times to test the stop light circuit.
 - (c) Check if the same DTC is detected.
- HINT:
Reinstall the sensors, connectors, etc. and restore the vehicle to its prior conditions before rechecking for DTCs.

Result

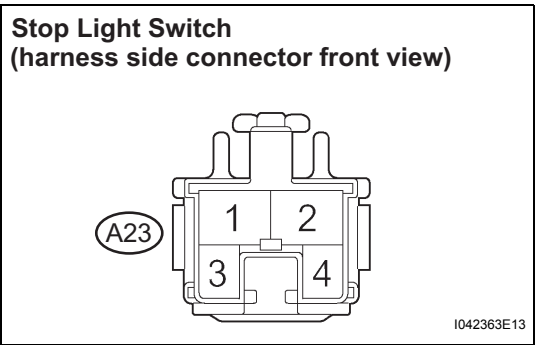
Result	Proceed to
DTC is output	A
DTC is not output	B

B END

A

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

9 INSPECT STOP LIGHT SWITCH ASSEMBLY (POWER SOURCE TERMINAL VOLTAGE)



- (a) Disconnect the stop light switch connector.
- (b) Measure the voltage according to the value(s) in the table below.

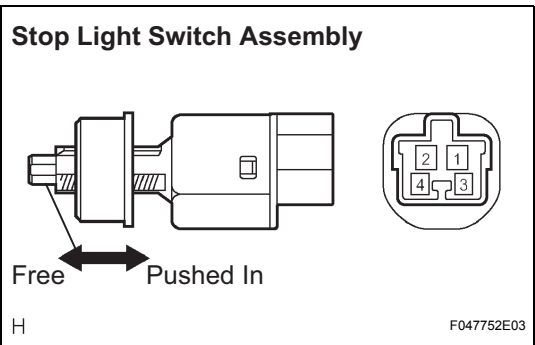
Voltage

Tester Connection	Condition	Specified Condition
A23-2 - Body ground	Always	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK

10 INSPECT STOP LIGHT SWITCH ASSEMBLY



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

Resistance

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

Result

Result	Proceed to
OK (w/ Dynamic radar cruise control)	A
OK (w/o Dynamic radar cruise control)	B
NG	C

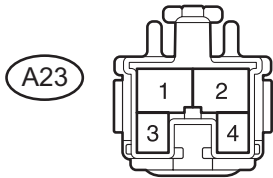
B Go to step 14

C REPLACE STOP LIGHT SWITCH ASSEMBLY

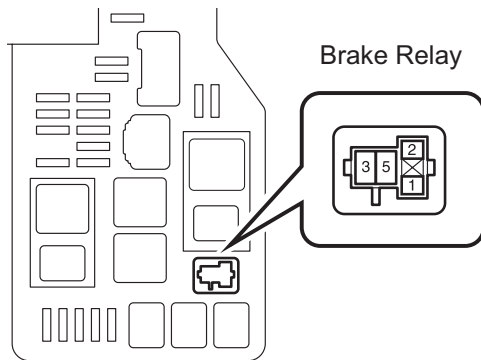
BC **A**

11 CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH TO BRAKE RELAY)

Stop Light Switch
(harness side connector front view)



Engine Room R/B:



N

C130033E01

OK

- (a) Remove the brake relay.
- (b) Measure the resistance according to the value(s) in the table below.

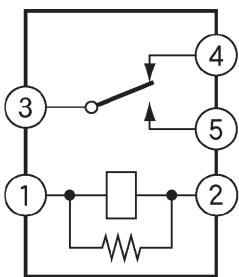
Resistance

Tester Connection	Specified Condition
A23-1 - Brake relay 4	Below 1 Ω
A23-1 - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT SWITCH TO BRAKE RELAY)

12 INSPECT BRAKE RELAY



H

E068810

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

Resistance

Tester Connection	Specified Condition
3 - 4	Below 1 Ω

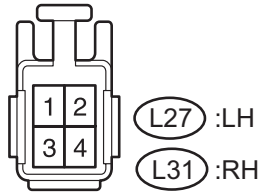
NG

REPLACE BRAKE RELAY

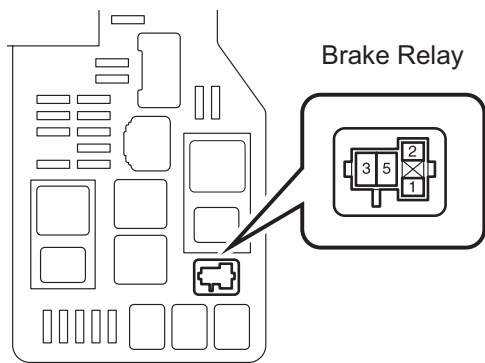
OK

13 CHECK HARNESS AND CONNECTOR (BETWEEN REAR COMBINATION LIGHT, BODY GROUND AND BRAKE RELAY)

Combination Light
(harness side connector front view)



Engine Room R/B



N

C130034E01

- (a) Disconnect the rear combination light connector.
- (b) Measure the resistance according to the value(s) in the table below.

Resistance
LH:

Tester Connection	Specified Condition
L27-2 - Brake relay 3	Below 1 Ω
L27-1 - Body ground	10 kΩ or higher
L27-3 - Body ground	Below 1 Ω

RH:

Tester Connection	Specified Condition
L31-2 - Brake relay 3	Below 1 Ω
L31-1 - Body ground	10 kΩ or higher
L31-3 - Body ground	Below 1 Ω

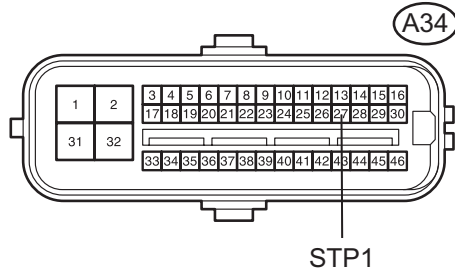
NG **REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT CIRCUIT)**

OK

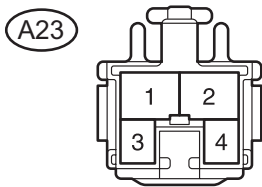
END

14 CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH TO SKID CONTROL ECU)

**Skid Control ECU
(harness side connector front view)**



**Stop Light Switch
(harness side connector front view)**



N

C131066E01

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

Resistance

Tester Connection	Specified Condition
A34-27 (STP1) - A23-1 (STP)	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT SWITCH TO SKID CONTROL ECU)

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT CIRCUIT)

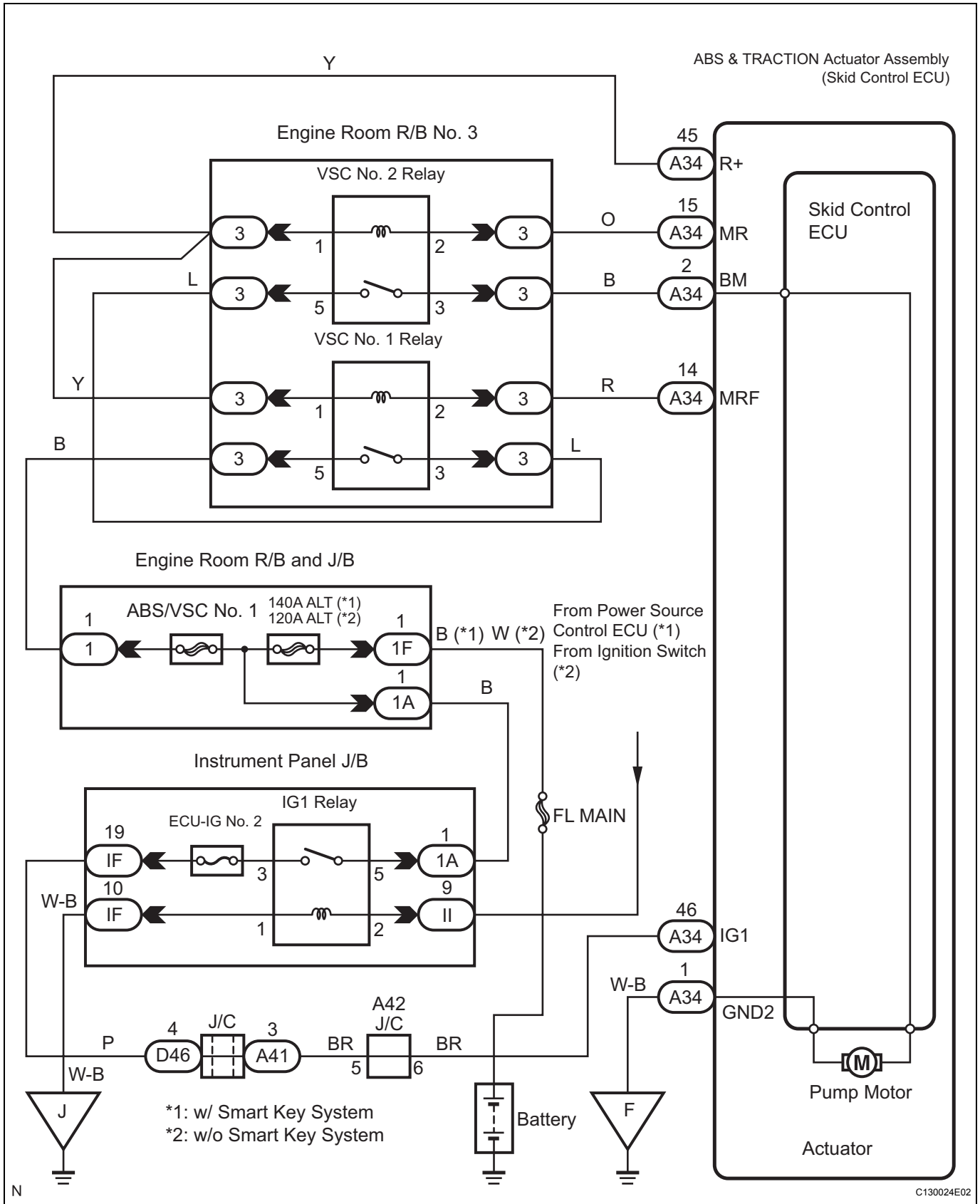
DTC	C1251/51	Open in Pump Motor Circuit
------------	-----------------	-----------------------------------

DESCRIPTION

The pump motor is located inside the ABS & TRACTION actuator assembly.

DTC No.	DTC Detecting Condition	Trouble Area
C1251/51	<ul style="list-style-type: none">• Actuator pump motor does not operate properly.• Open in actuator pump motor circuit continues for at least 2 sec.	<ul style="list-style-type: none">• ABS & TRACTION actuator assembly (GND circuit)• ABS & TRACTION actuator assembly (Motor circuit)

WIRING DIAGRAM



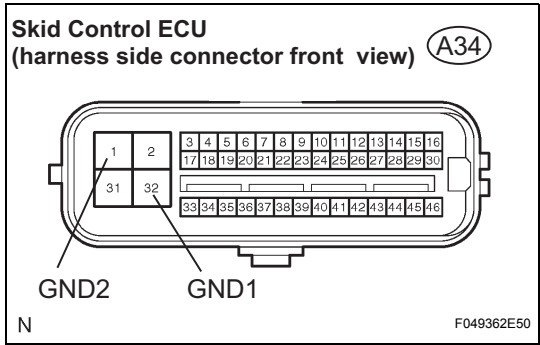
BC

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-104).

1 INSPECT SKID CONTROL ECU (GND TERMINAL CONTINUITY)



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

Resistance

Tester Connection	Specified Condition
A34-1 (GND2) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND2 CIRCUIT)**

OK

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (ABS MOTOR RELAY OPERATION)

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select "ACTIVE TEST" on the intelligent tester.
- (d) Check the operating sound of the ABS motor relay when operating it with the intelligent tester.

ACTIVE TEST: ABS/VSC

Item	Vehicle Condition / Test Details	Diagnostic Note
ABS MOT RELAY	Turns ABS motor relay ON or OFF	Operating sound of relay (clicking sound) is heard

OK:
The operating sound of the ABS motor relay is heard.

NG → **REPLACE ABS & TRACTION ACTUATOR ASSEMBLY**

OK

3 RECONFIRM DTC

- (a) Clear the DTC.
 - (b) Start the engine.
 - (c) Drive the vehicle at the speed of 4.3 mph (7 km/h) or more.
 - (d) Check that the same DTC is recorded.
- HINT:**
Reinstall the sensors, connectors, etc. and restore the vehicle to its prior conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

- If a speed signal of 4 mph (6 km/h) or more is input to the skid control ECU, with the ignition switch on (IG) and the stop light switch OFF, the ECU performs self diagnosis of the motor and solenoid circuits.
- If a normal system code is output (trouble code is not output), slightly jiggle the connectors, wire harness, and fuses of the ABS & TRACTION actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the ABS & TRACTION actuator assembly, inspect and repair the connector or wire harness.

HINT:

It is suspected that the DTCs were output due to a bad connection of the connector terminal.

B

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

A**END**

DTC	U0073/94	Control Module Communication Bus OFF
DTC	U0100/65	Lost Communication with ECM / PCM
DTC	U0123/62	Lost Communication with Yaw Rate Sensor Module
DTC	U0124/95	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126/63	Lost Communication with Steering Angle Sensor Module

DESCRIPTION

The skid control ECU inputs the signals from the ECM, steering sensor, and yaw rate sensor via CAN communication system.

DTC No.	DTC Detecting Condition	Trouble Area
U0073/94	When either of the following is detected: 1. After the output of data from the skid control ECU is completed, the sending continues for 5 seconds or more. 2. The condition that bus OFF state occurs once or more within 100 ms occurs 10 times in succession. (Sent signals cannot be received.)	CAN communication system
U0100/65	When either of the following is detected: 1. With the IG1 terminal voltage 10 V or more and the vehicle speed 9 mph (15 km/h) or more, either of the following occurs 10 times in succession. – The condition that data cannot be sent to the ECM occurs once or more within 5 seconds. – The condition that data from the ECM cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to ECM)
U0123/62	When either of the following is detected: 1. With the IG1 terminal voltage 10 V or more, data from the yaw rate sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 10 V or more, the following occurs 10 times in succession. – The condition that data from the yaw rate sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)
U0124/95	When either of the following is detected: 1. With the IG1 terminal voltage 10 V or more, data from the deceleration sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 10 V or more, the following occurs 10 times in succession. – The condition that data from the deceleration sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)

DTC No.	DTC Detecting Condition	Trouble Area
U0126/63	When either of the following is detected: 1. With the IG1 terminal voltage 10 V or more, data from the steering sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 10 V or more, the following occurs 10 times in succession. – The condition that data from the steering sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to steering angle sensor)

INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

- (a) Using the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (See page [BC-103](#)).

DATA LIST: ABS/VSC/TRC

Item	Measurement Item / Range (Display)	Normal Condition
EFI COM	EFI communication open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal
STEERING SEN	STEERING SEN Steering sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal
YAWRATE SEN	Yaw rate sensor open detection / OPN DET or NORMAL	OPN DET: Momentary interruption NORMAL: Normal

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG

Go to step 3

OK

2 RECONFIRM DTC

- (a) Record the output DTCs (for ABS, VSC, and CAN communication).

HINT:

If the CAN communication system DTC and the relevant sensor DTCs are output simultaneously, troubleshoot the relevant sensor DTCs (for ABS and VSC) after the CAN communication system returns to normal.

NEXT

REPAIR CAN COMMUNICATION SYSTEM

3 REPAIR OR REPLACE HARNESS AND CONNECTOR

- (a) Repair or replace the harness and connector.

- (b) Check for any momentary interruption between the skid control ECU and each sensor or ECM (See page BC-103).
- (c) Check that there is no momentary interruption.

NEXT

4 RECONFIRM DTC

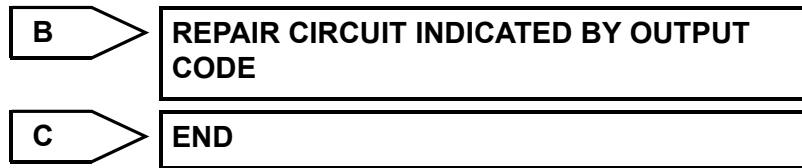
- (a) Clear the DTC.
- (b) Start the engine.
- (c) Drive the vehicle and turn the steering wheel to the right and left at a speed of 9 mph (15 km/h) or more.
- (d) Check that no CAN communication system DTC is output.
- (e) If ABS and VSC DTCs are output, record them.

Result

Result	Proceed to
DTC output for the CAN communication system	A
No DTC is output (ABS and VSC DTCs are output)	B
No DTC is output (No ABS and VSC DTCs are output)	C

HINT:

- The CAN communication system must be normal when repairing each sensor DTC (for ABS and VSC).
- These DTCs may be restored due to a malfunction in the connector terminal connection, etc.



A

REPAIR CAN COMMUNICATION SYSTEM

ABS Warning Light Remains ON

DESCRIPTION

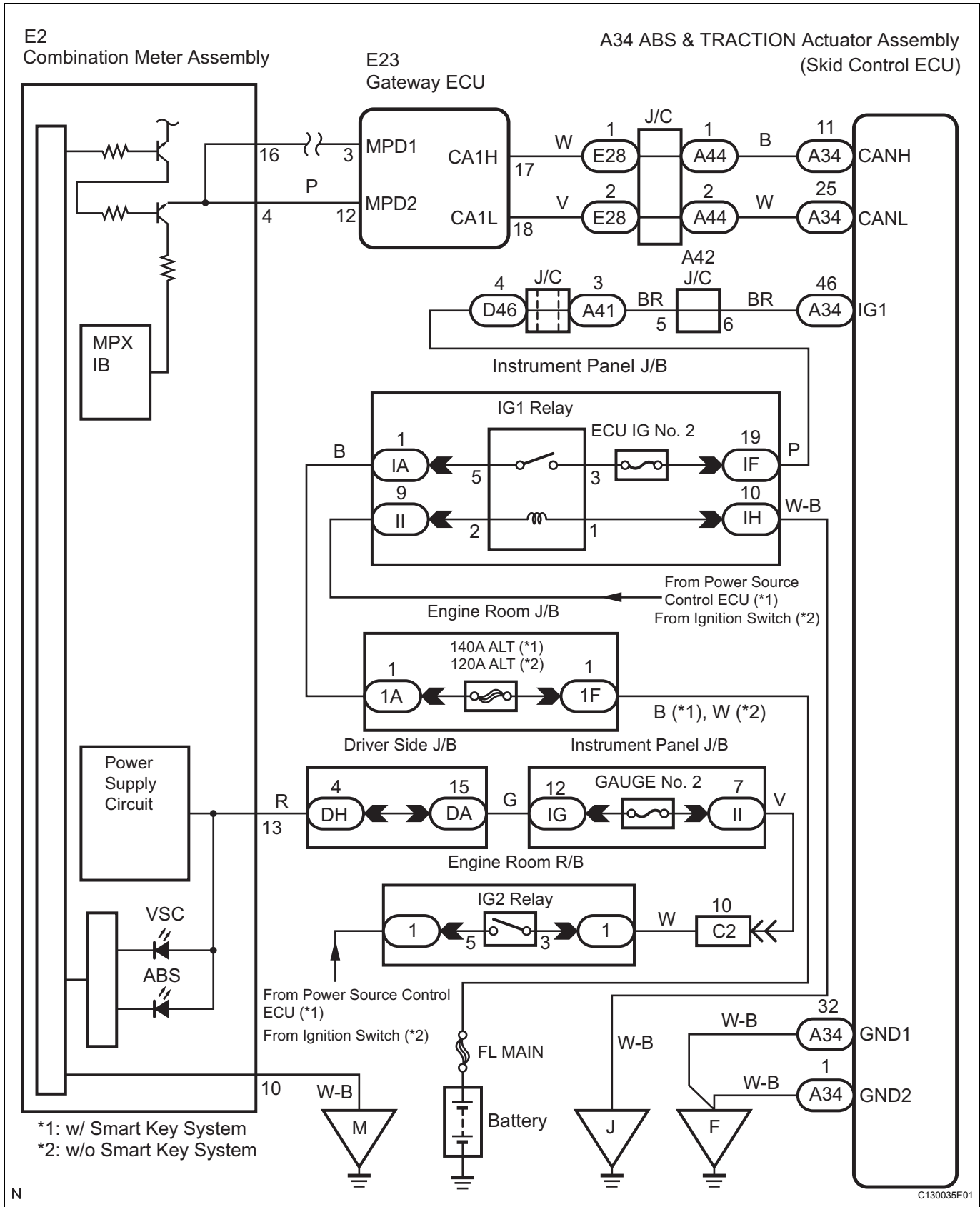
If any of the following is detected, the ABS warning light remains on.

- The skid control ECU connectors are disconnected from the skid control ECU.
- The combination meter connector is disconnected from the combination meter assembly.
- There is a malfunction in the skid control ECU internal circuit.
- There is an open in the harness between the combination meter and the skid control ECU.

HINT:

In some cases, the intelligent tester cannot be used when the skid control ECU is abnormal.

WIRING DIAGRAM



BC

N

INSPECTION PROCEDURE**NOTICE:**

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

1 INSPECT CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**REPAIR CAN COMMUNICATION SYSTEM****A****2 INSPECT MULTIPLEX COMMUNICATION SYSTEM**

- (a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**REPAIR MULTIPLEX COMMUNICATION SYSTEM****A****3 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED**

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

OK:

The connector should be securely connected.

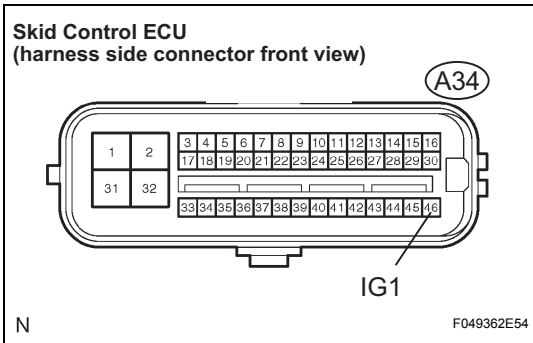
NG**CONNECT CONNECTOR TO ECU CORRECTLY****OK****4 INSPECT BATTERY**

- (a) Check the battery voltage.

Voltage:**11 to 14 V****NG****INSPECT CHARGING SYSTEM**

OK

5 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (IG1 TERMINAL VOLTAGE)



- (a) Disconnect the skid control ECU connector.
- (b) Turn the ignition switch on (IG).
- (c) Measure the voltage according to the value(s) in the table below.

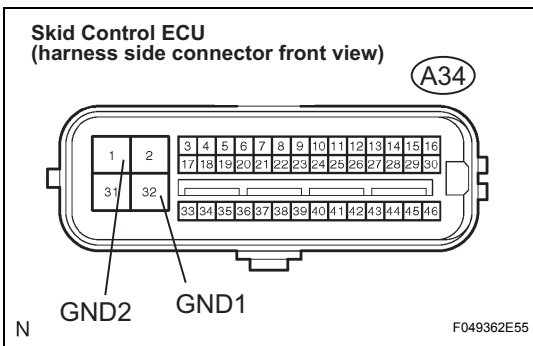
Voltage

Tester Connection	Condition	Specified Condition
A34-46 (IG1) - Body ground	Ignition switch on (IG)	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)

OK

6 INSPECT SKID CONTROL ECU (GND TERMINAL CONTINUITY)



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

Resistance

Tester Connection	Specified Condition
A34-32 (GND1) - Body ground	Below 1 Ω
A34-1 (GND2) - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK

7 INSPECT COMBINATION METER ASSEMBLY

- (a) Check the combination meter assembly (See page [ME-13](#)).

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-117](#)).

NG REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

ABS Warning Light does not Come ON

WIRING DIAGRAM

See page [BC-203](#).

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

1 INSPECT CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

2 INSPECT MULTIPLEX COMMUNICATION SYSTEM

- (a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR MULTIPLEX COMMUNICATION SYSTEM

A

3 INSPECT ABS WARNING LIGHT

- (a) Disconnect the skid control ECU connector.
 (b) Turn the ignition switch on (IG).
 (c) Check that the ABS warning light comes on.

OK:

ABS warning light comes on.

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-117](#)).

NG

Go to step 4

OK

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

4

INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter assembly (See page [ME-13](#)).

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page [BC-117](#)).

NG

REPLACE COMBINATION METER ASSEMBLY

OK

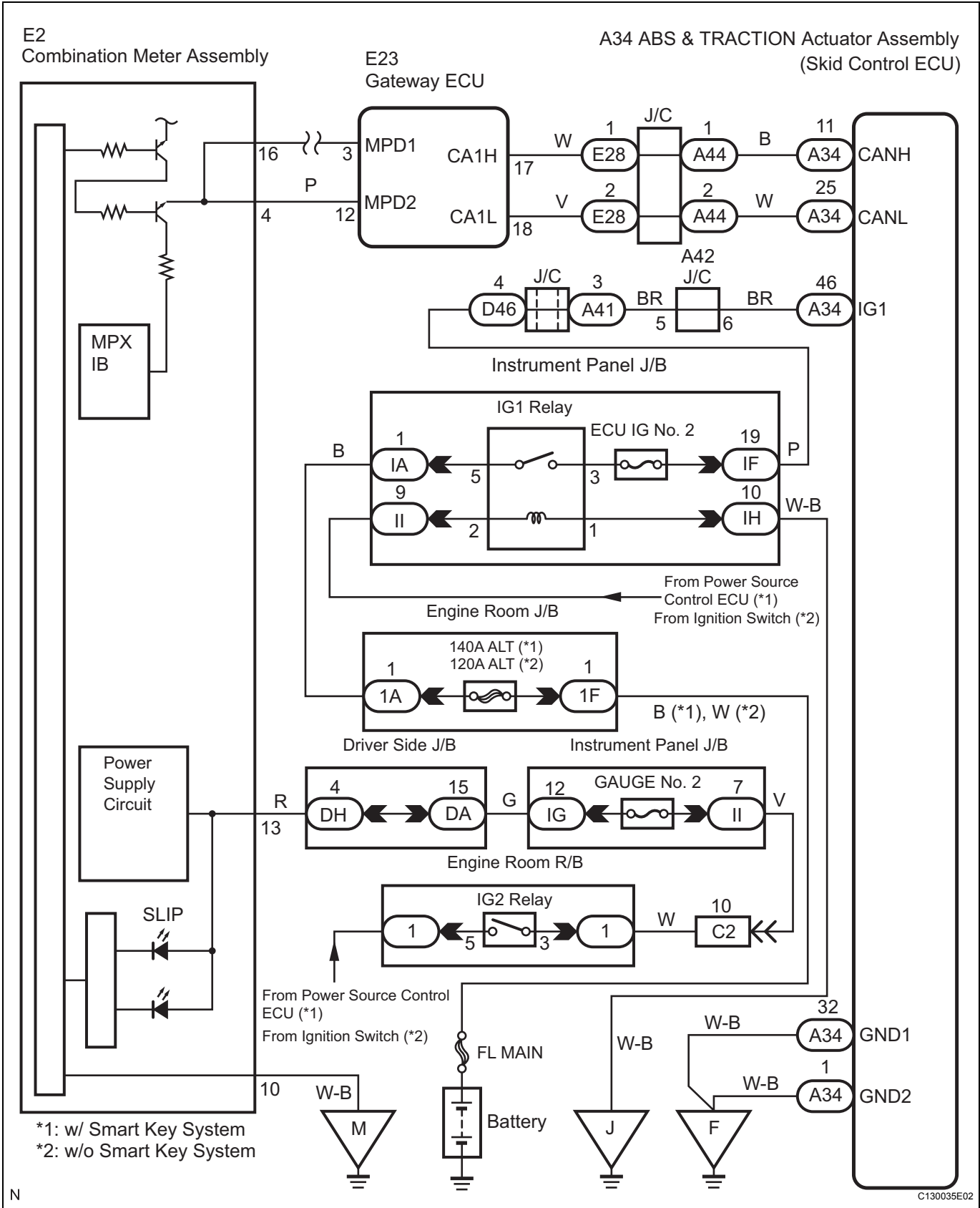
END

VSC Warning Light Remains ON**DESCRIPTION**

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

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

WIRING DIAGRAM



BC

N

C130035E02

INSPECTION PROCEDURE**NOTICE:**

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

1 INSPECT CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**REPAIR CAN COMMUNICATION SYSTEM****A****2 INSPECT MULTIPLEX COMMUNICATION SYSTEM**

- (a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**REPAIR MULTIPLEX COMMUNICATION SYSTEM****A****3 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED**

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

OK:

The connector should be securely connected.

NG**CONNECT CONNECTOR TO ECU CORRECTLY****OK****4 INSPECT BATTERY**

- (a) Check the battery voltage.

Voltage:**11 to 14 V****NG****INSPECT CHARGING SYSTEM**

OK

5 INSPECT COMBINATION METER ASSEMBLY

- (a) Check the combination meter assembly (See page [ME-13](#)).

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-117](#)).

NG

REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

VSC Warning Light does not Come ON

DESCRIPTION

See page [BC-208](#).

WIRING DIAGRAM

See page [BC-209](#).

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

1 INSPECT CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

2 INSPECT MULTIPLEX COMMUNICATION SYSTEM

- (a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR MULTIPLEX COMMUNICATION SYSTEM

A

3 INSPECT VSC WARNING LIGHT

- (a) Connect the intelligent tester to the DLC3.
 (b) Start the engine.
 (c) Select "ACTIVE TEST" on the intelligent tester.

ACTIVE TEST: ABS/VSC

Item	Vehicle Condition / Test Details	Normal Condition
VSC WARN LIGHT	Turn 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 intelligent tester.

OK:

The VSC warning light turns on or off in accordance with the intelligent tester.

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-117](#)).

NG

Go to step 4

OK

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

4 INSPECT COMBINATION METER ASSEMBLY

- (a) Check the combination meter assembly (See page [ME-13](#)).

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page [BC-117](#)).

NG

REPLACE COMBINATION METER ASSEMBLY

OK

END

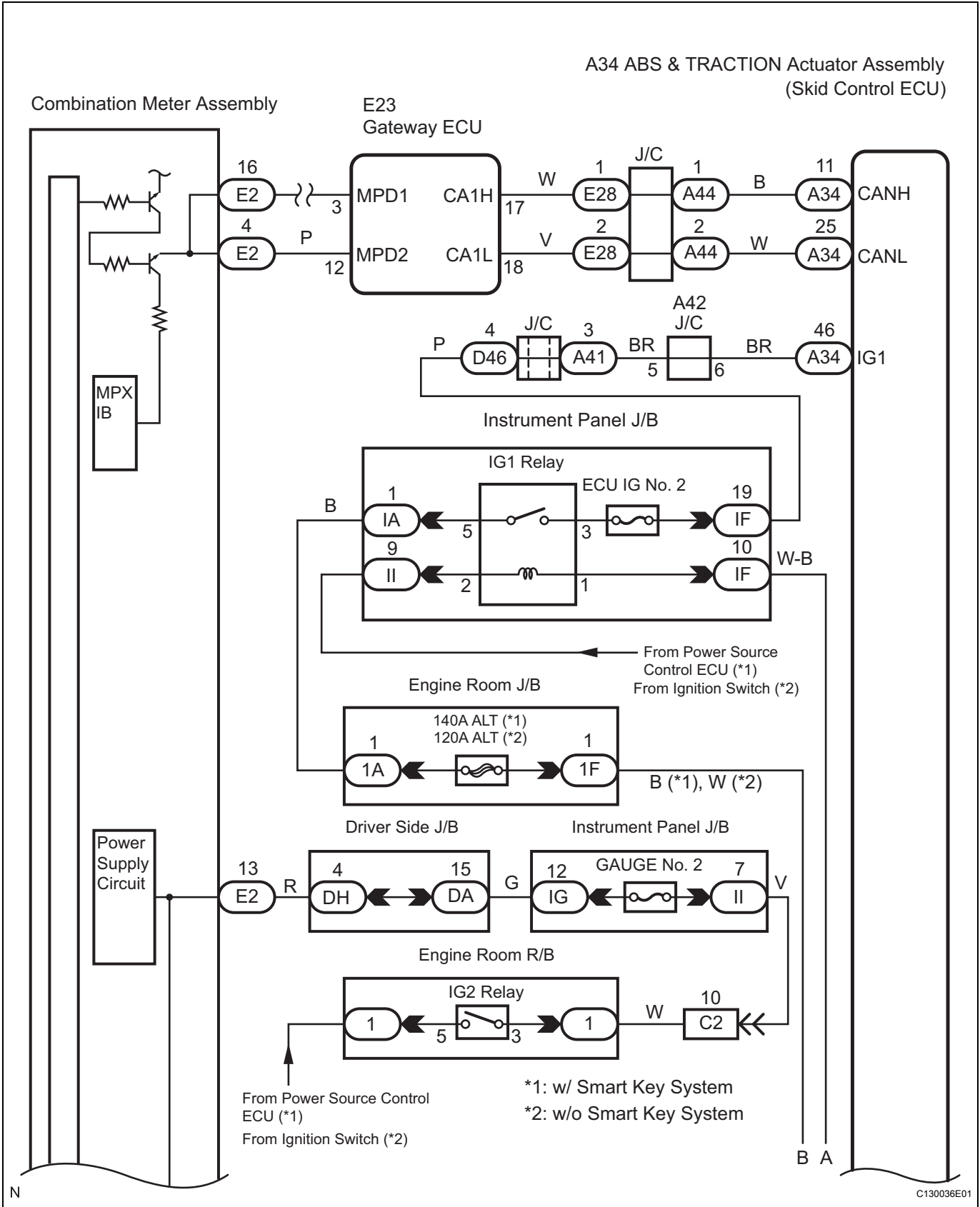
Brake Warning Light Remains ON

DESCRIPTION

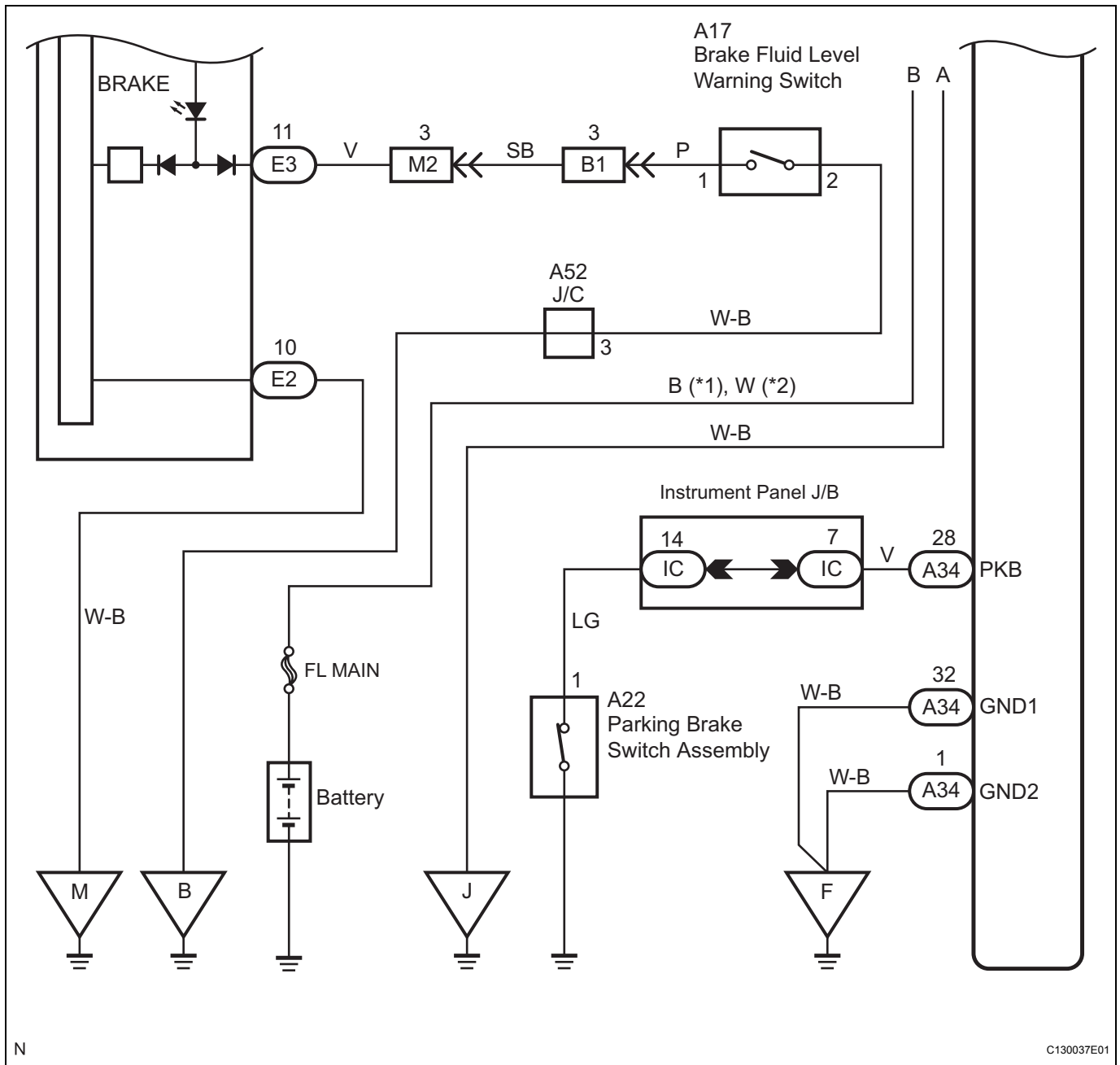
If any of the following is detected, the BRAKE warning light remains on:

- The skid control ECU connector is disconnected from the skid control ECU.
- The combination meter connector is disconnected from the combination meter assembly.
- The brake fluid level is insufficient.
- The parking brake is applied.
- The EBD is defective.
- There is a malfunction in the skid control ECU internal circuit.

WIRING DIAGRAM



BC



INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-104).

BC

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

(a) Check if the ABS and/or VSC DTC is output (See page BC-121).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

2 INSPECT CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

3 INSPECT MULTIPLEX COMMUNICATION SYSTEM

- (a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR MULTIPLEX COMMUNICATION SYSTEM

A

4 INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

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

OK:

The connector should be securely connected.

NG

CONNECT CONNECTOR TO ECU CORRECTLY

OK

5 INSPECT BATTERY

- (a) Check the battery voltage.

Voltage:

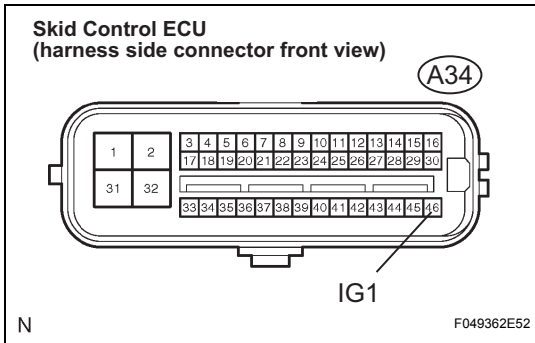
11 to 14 V

NG

INSPECT CHARGING SYSTEM

OK

6 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (IG1 TERMINAL VOLTAGE)



- (a) Disconnect the skid control ECU connector.
- (b) Turn the ignition switch on (IG).
- (c) Measure the voltage according to the value(s) in the table below.

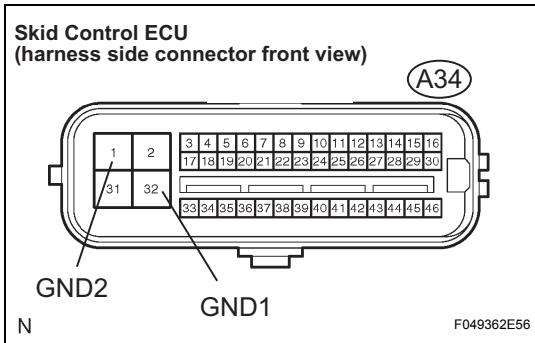
Voltage

Tester Connection	Condition	Specified Condition
A34-46 (IG1) - Body ground	Ignition switch on (IG)	10 to 14 V

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)

OK

7 INSPECT SKID CONTROL ECU ASSEMBLY (GND TERMINAL CONTINUITY)



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

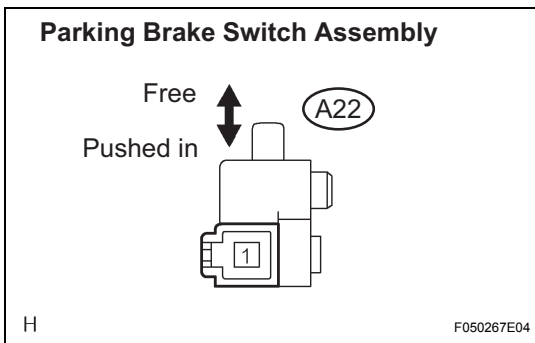
Resistance

Tester Connection	Specified Condition
A34-1 (GND2) - Body ground	Below 1 Ω
A34-32 (GND1) - Body ground	Below 1 Ω

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK

8 INSPECT PARKING BRAKE SWITCH ASSEMBLY



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

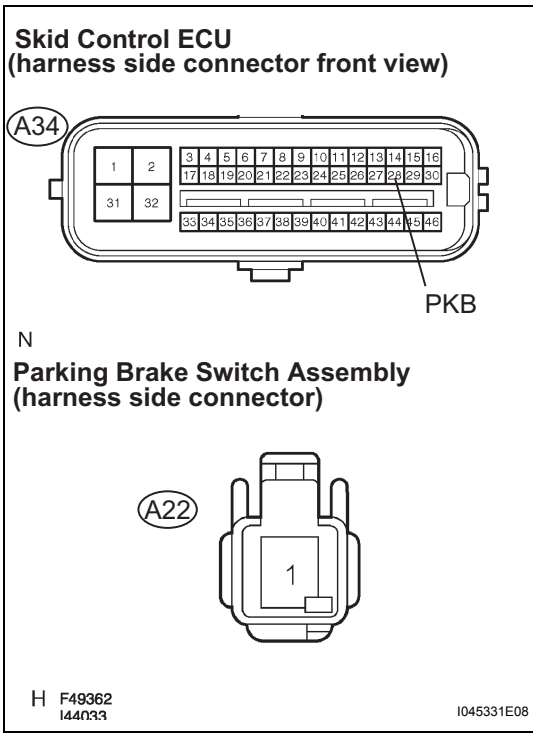
Resistance

Tester Connection	Condition	Specified Condition
A22-1 - Body ground	Parking brake switch ON (Switch pin free)	Below 1 Ω
A22-1 - Body ground	Parking brake switch OFF (Switch pin pushed in)	10 kΩ or higher

NG REPLACE PARKING BRAKE SWITCH ASSEMBLY

OK

9 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU TO PARKING BRAKE SWITCH ASSEMBLY)



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

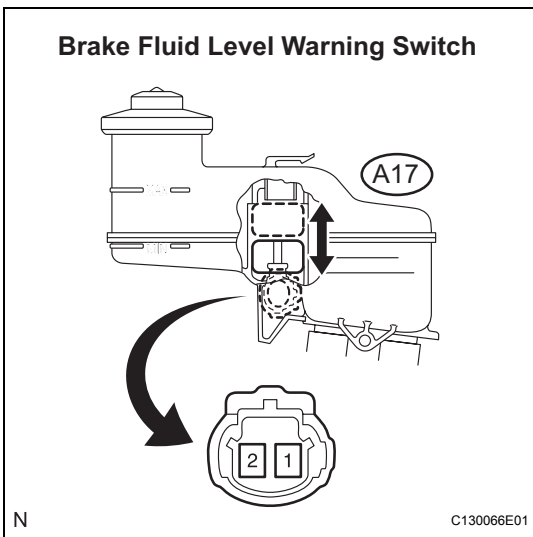
Resistance

Tester Connection	Specified Condition
A34-28 (PKB) - A22-1	Below 1 Ω
A34-28 (PKB) - Body ground	10 kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (PKB CIRCUIT)

OK

10 INSPECT BRAKE FLUID LEVEL WARNING SWITCH



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

Resistance

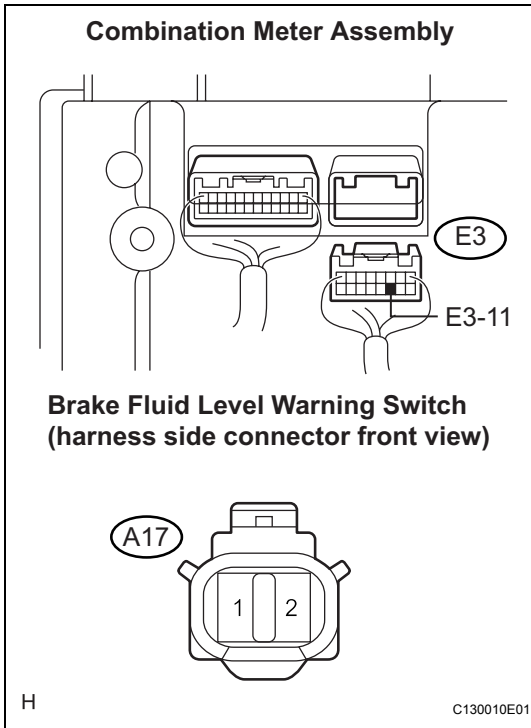
Tester Connection	Condition	Specified Condition
(A17-1) - (A17-2)	Proper	1.8 to 2.16 kΩ
(A17-1) - (A17-2)	Below min. level	Below 1 Ω

NG REPLACE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

OK

BC

11 CHECK HARNESS AND CONNECTOR (BRAKE FLUID LEVEL WARNING SWITCH TO COMBINATION METER)



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

Resistance

Tester Connection	Specified Condition
E3-11 - A17-1	Below 1 Ω
A17-2 - Body ground	Below 1 Ω
E3-11 - Body ground	10kΩ or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR (BRAKE FLUID LEVEL WARNING SWITCH CIRCUIT)

OK

12 INSPECT COMBINATION METER ASSEMBLY

- (a) Check the combination meter assembly (See page [ME-13](#)).
- HINT:
If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-117](#)).

NG REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

Brake Warning Light does not Come ON

DESCRIPTION

See page [BC-214](#).

WIRING DIAGRAM

See page [BC-215](#).

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

1 INSPECT CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

2 INSPECT MULTIPLEX COMMUNICATION SYSTEM

- (a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR MULTIPLEX COMMUNICATION SYSTEM

A

3 INSPECT BRAKE WARNING LIGHT

- (a) Disconnect the skid control ECU connector.
 (b) Turn the ignition switch on (IG).
 (c) Check that the BRAKE warning light comes on.

OK:

BRAKE warning light comes on.

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-117](#)).

NG

Go to step 4

OK

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

4

INSPECT COMBINATION METER ASSEMBLY

- (a) Check the combination meter assembly (See page [ME-13](#)).

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page [BC-117](#)).

NG

REPLACE COMBINATION METER ASSEMBLY

OK

END

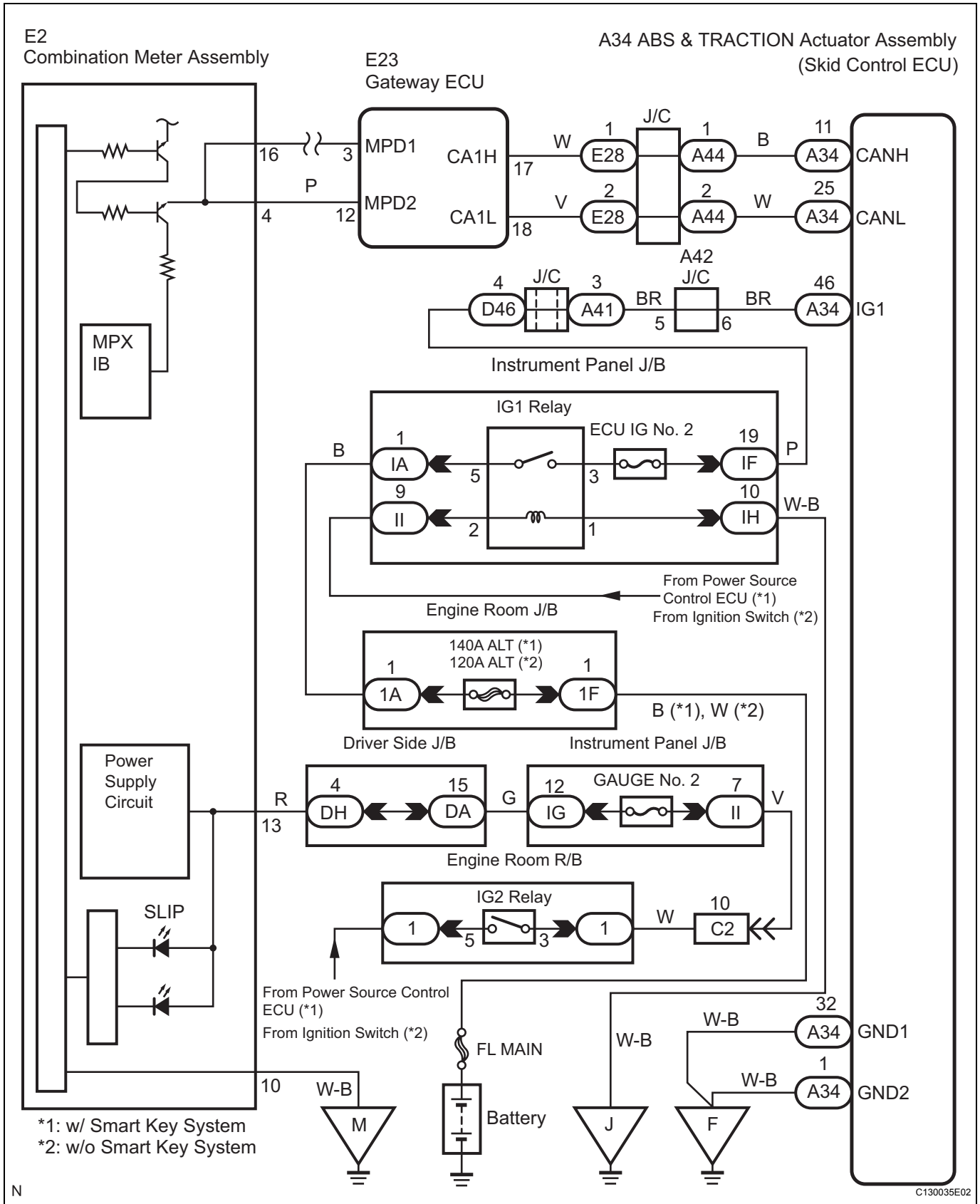
Slip Indicator Light Remains ON**DESCRIPTION**

The SLIP indicator blinks during VSC and/or TRAC operation.

When the system fails, the SLIP indicator comes on to warn the driver.

The SLIP indicator comes on when traction control is terminated by pressing the traction control switch.

WIRING DIAGRAM



INSPECTION PROCEDURE**NOTICE:**

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

1 CHECK DTC

(a) Check if the ABS and/or VSC DTC is output.

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A**2 INSPECT CAN COMMUNICATION SYSTEM**

(a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A**3 INSPECT MULTIPLEX COMMUNICATION SYSTEM**

(a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR MULTIPLEX COMMUNICATION SYSTEM

A**4 INSPECT COMBINATION METER ASSEMBLY**

(a) Check the combination meter assembly (See page [ME-13](#)).

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-117](#)).

NG

**REPLACE COMBINATION METER
ASSEMBLY**

OK

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

Slip Indicator Light does not Come ON

DESCRIPTION

See page [BC-223](#).

WIRING DIAGRAM

See page [BC-224](#).

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

1 INSPECT CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page [CA-15](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

2 INSPECT MULTIPLEX COMMUNICATION SYSTEM

- (a) Check if the multiplex communication system DTC is output (See page [MP-23](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR MULTIPLEX COMMUNICATION SYSTEM

A

3 INSPECT SLIP INDICATOR LIGHT

- (a) Connect the intelligent tester to the DLC3.
 (b) Start the engine.
 (c) Select "ACTIVE TEST" on the intelligent tester.

ACTIVE TEST: ABS/VSC

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

- (d) Check that "ON" and "OFF" of the SLIP indicator light are indicated on the combination meter when using the intelligent tester.

OK:

The SLIP indicator light turns on or off in accordance with the intelligent tester.

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page [BC-117](#)).

NG

Go to step 4

OK

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

4

INSPECT COMBINATION METER ASSEMBLY

- (a) Check the combination meter assembly (See page [ME-13](#)).

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page [BC-117](#)).

NG

REPLACE COMBINATION METER ASSEMBLY

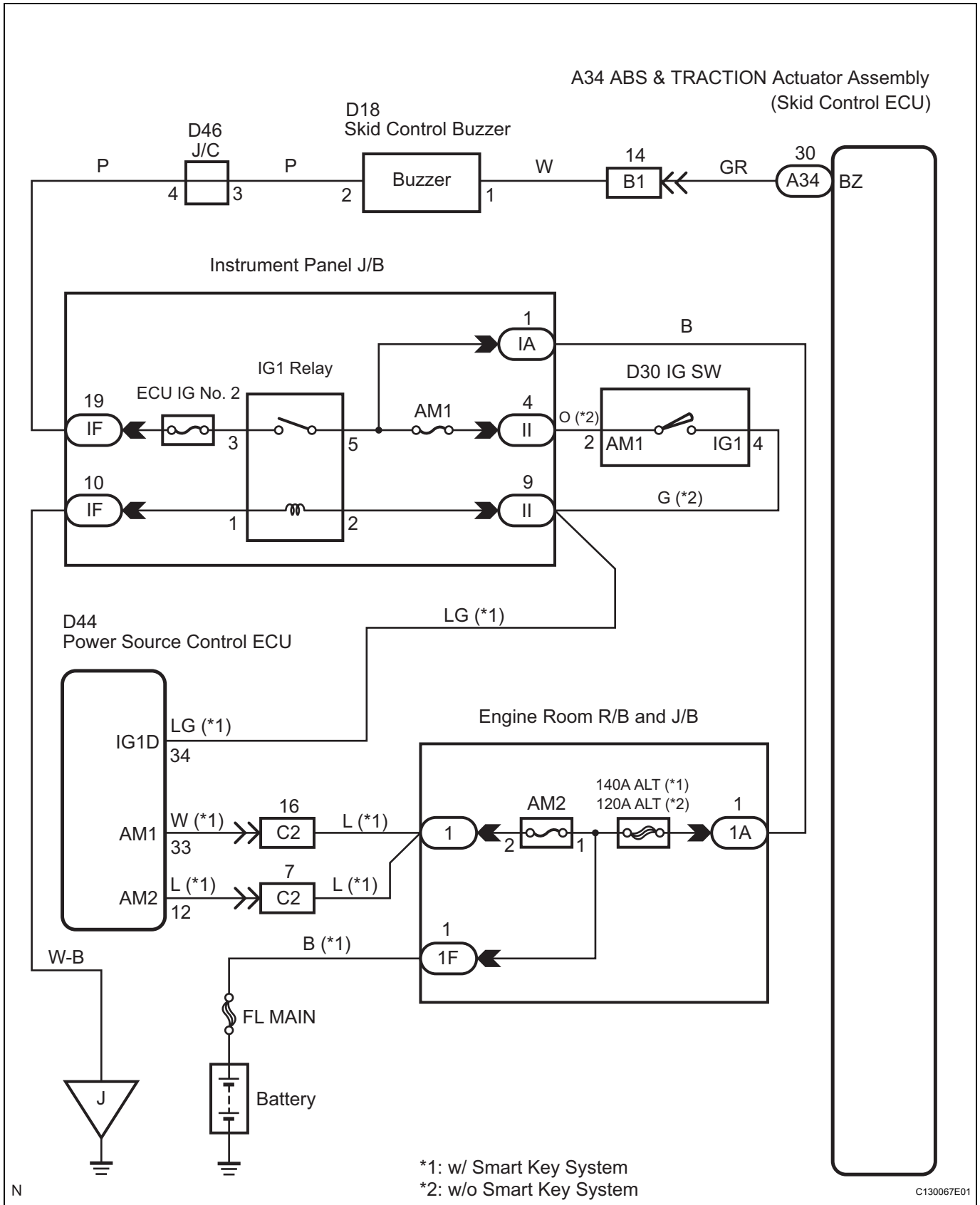
OK

END

Skid Control Buzzer Circuit**DESCRIPTION**

The skid control buzzer sounds and SLIP indicator light blinking during VSC operated.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-104).

1 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (SKID CONTROL BUZZER)

- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the ignition switch on (IG) and turn the intelligent tester main switch on.
- (c) Select "ACTIVE TEST" on the intelligent tester.

ACTIVE TEST: ABS/VSC

Item	Vehicle Condition / Test Details	Diagnostic Note
VSC/BR WARN BUZ	Turns skid control buzzer ON/OFF	Buzzer is heard

- (d) Check that the buzzer sounds/stops when turning the skid control buzzer on/off by using the intelligent tester.

Result

Result	Proceed to
Buzzer sounds / stops	A
Buzzer does not sound or sounds constantly	B

HINT:

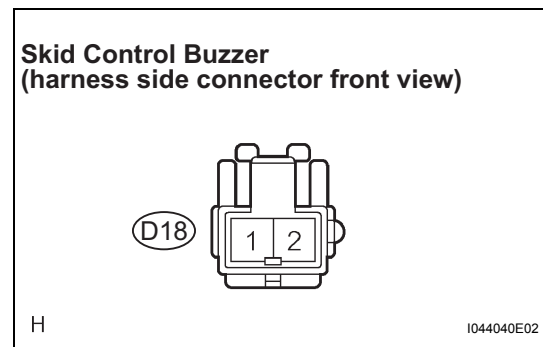
If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step (See page BC-117).

B → **Go to step 2**

A

END

2 INSPECT SKID CONTROL BUZZER (POWER SOURCE TERMINAL VOLTAGE)



- (a) Disconnect the skid control buzzer connector.
- (b) Turn the ignition switch on (IG).
- (c) Measure the voltage according to the value(s) in the table below.

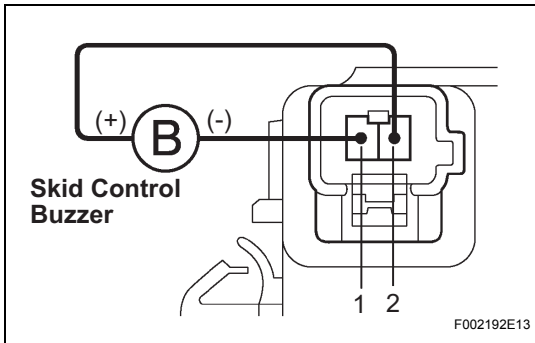
Voltage

Tester Connection	Condition	Specified Condition
D18-2 - Body ground	Ignition switch on (IG)	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

OK

3 INSPECT SKID CONTROL BUZZER



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

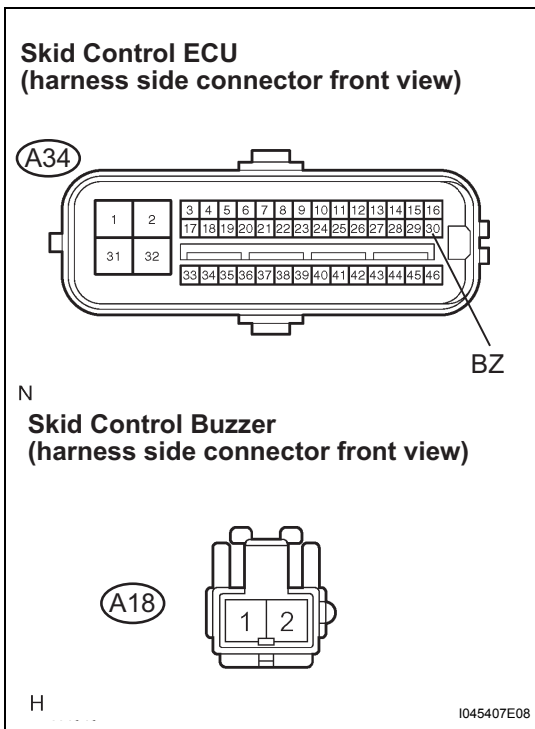
OK:

Skid control buzzer sounds.

NG → **REPLACE SKID CONTROL BUZZER**

OK

4 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU TO SKID CONTROL BUZZER)



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

Resistance

Tester Connection	Specified Condition
A34-30 (BZ) - B18-1	Below 1 Ω
A34-30 (BZ) - Body ground	10 kΩ or higher

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page BC-117).

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (BZ CIRCUIT)**

OK

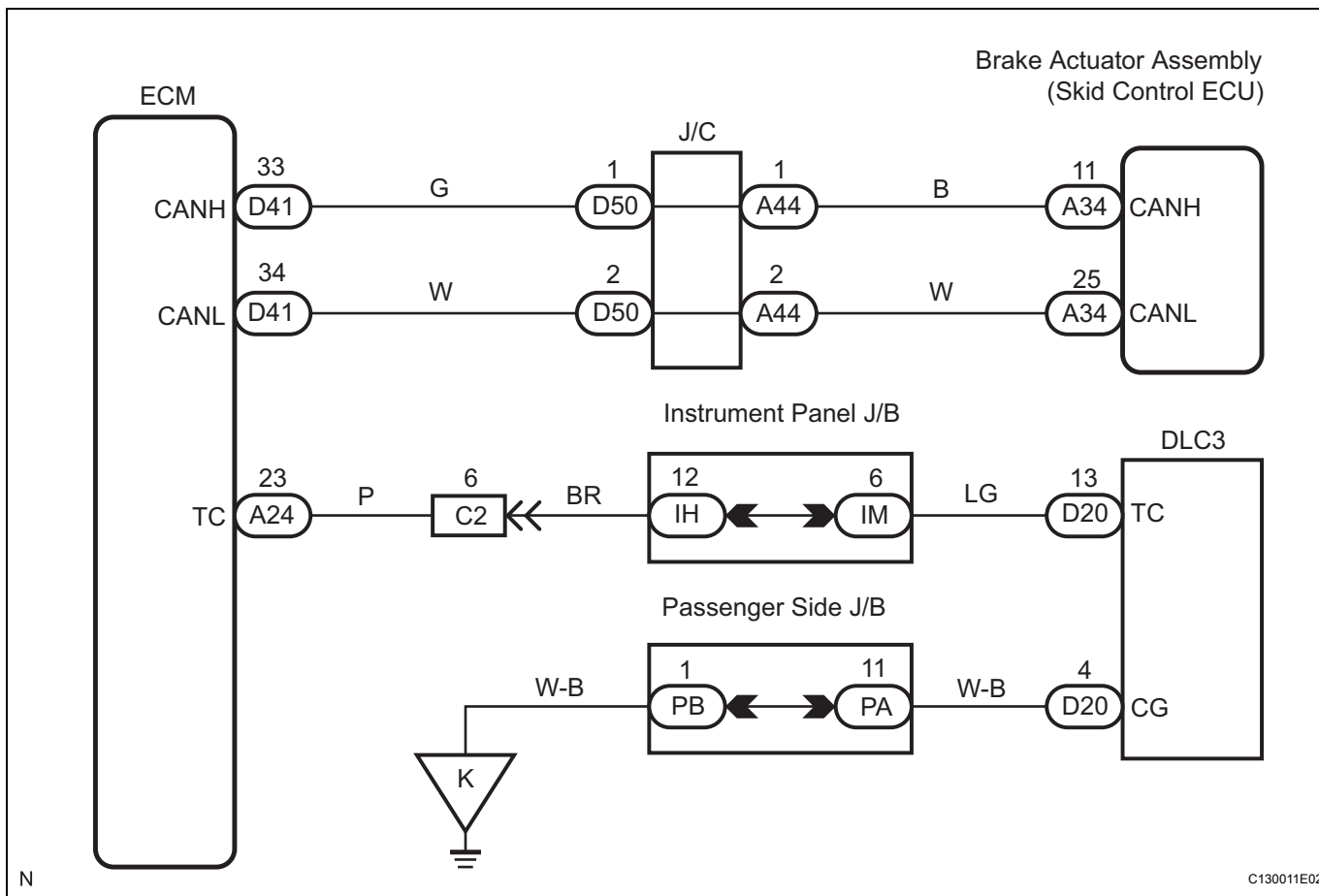
REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

TC and CG Terminal Circuit

DESCRIPTION

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

WIRING DIAGRAM

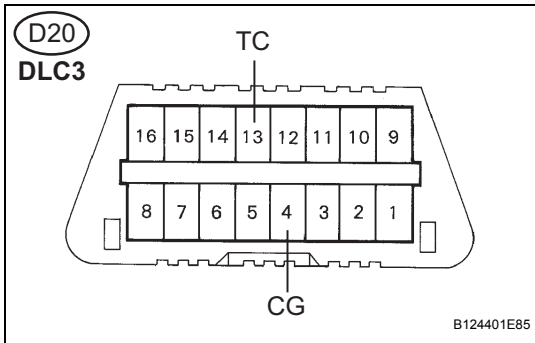


INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

1 INSPECT DLC3 TERMINAL VOLTAGE (TC TERMINAL VOLTAGE)



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

Voltage

Tester Connection	Condition	Specified Condition
D20-13 (TC) - Body ground	Ignition switch on (IG)	10 to 14 V

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

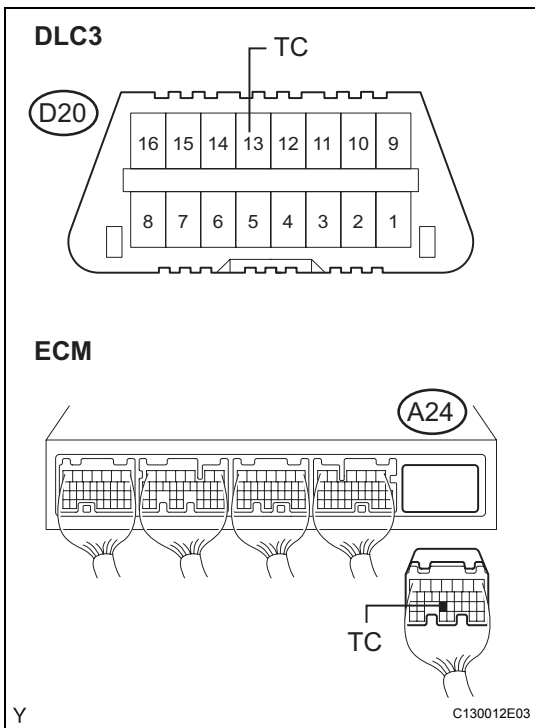
Resistance

Tester Connection	Specified Condition
D20-4 (CG) - Body ground	Below 1 Ω

NG → **Go to step 4**

OK

2 CHECK HARNESS AND CONNECTOR (ECM TO DLC3)



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

Resistance

Tester Connection	Specified Condition
A24-23 (TC) - D20-13 (TC)	Below 1 Ω

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

Resistance

Tester Connection	Specified Condition
D20-13 (TC) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (TC TERMINAL CIRCUIT)**

OK

3 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (See page CA-15).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:

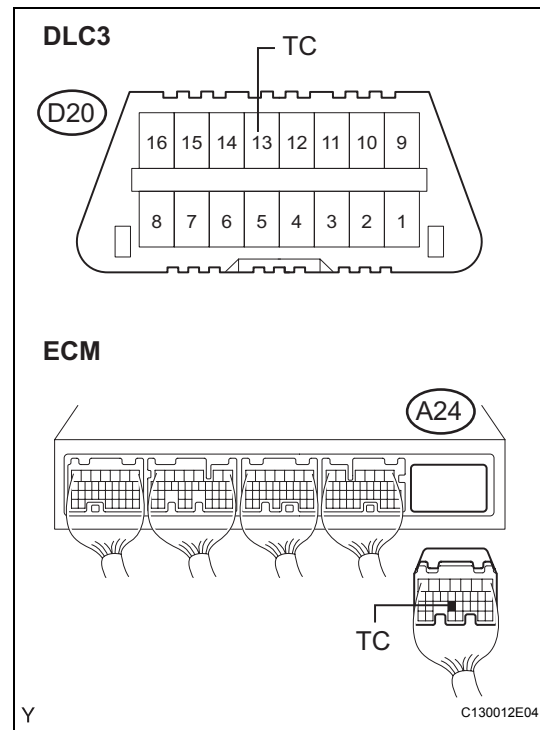
If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page BC-117).

B **REPAIR CIRCUIT INDICATED BY OUTPUT CODE**

A

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

4 CHECK HARNESS AND CONNECTOR (ECM TO DLC3)



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

Resistance

Tester Connection	Specified Condition
A24-23 (TC) - D20-13 (TC)	Below 1 Ω

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

Resistance

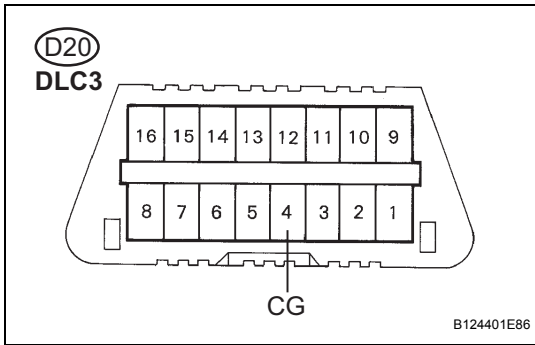
Tester Connection	Specified Condition
D20-13 (TC) - Body ground	10 kΩ or higher

NG **REPAIR OR REPLACE HARNESS OR CONNECTOR (TC CIRCUIT)**

BC

OK

5 CHECK HARNESS AND CONNECTOR (DLC3 TO BODY GROUND)



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

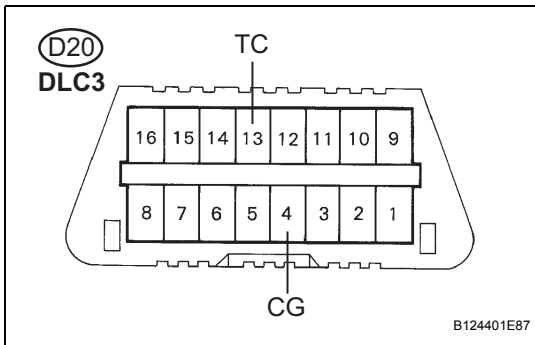
Resistance

Tester Connection	Specified Condition
D20-4 (CG) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)**

OK

6 CHECK ECM (DLC3 (TC) INPUT)



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

SST 09843-18040

(b) Check that the engine warning light is blinking.

Result

Engine warning light is blinking	Engine warning light is not blinking
A	B

B → **REPLACE ECM**

A

7 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-15).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

HINT:
If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page CA-15).

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

A

REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

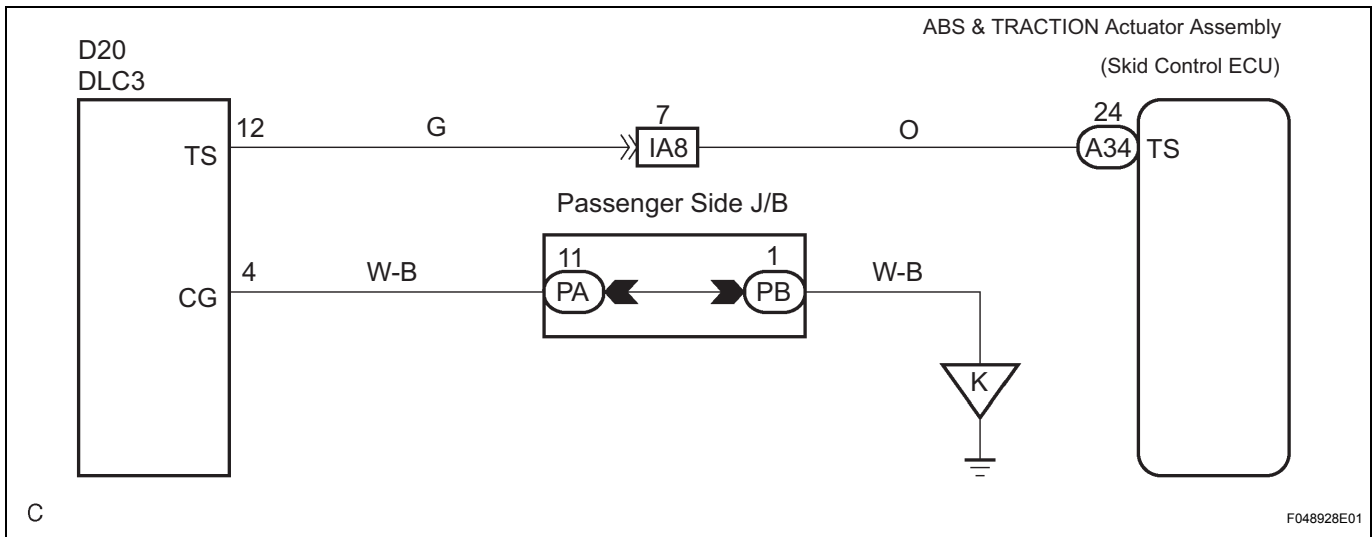
TS and CG Terminal Circuit

DESCRIPTION

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

Transition to the sensor signal check mode can be performed by connecting terminals TS and CG of the DLC3 and turning the ignition switch from off to on (IG).

WIRING DIAGRAM



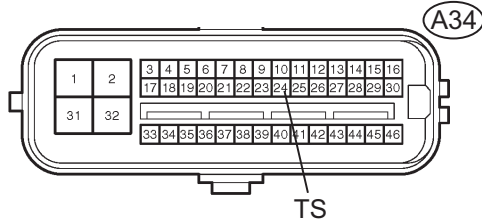
INSPECTION PROCEDURE

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-104](#)).

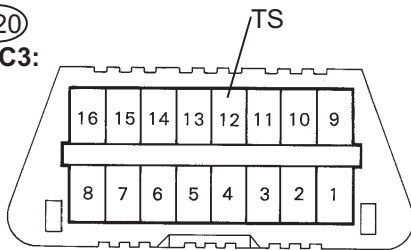
1 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU TO DLC3 (TS))

Skid Control ECU
(harness side connector front view)



N

D20
DLC3:



F49362
C52361

I045562E09

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

Resistance

Tester Connection	Specified Condition
A34-24 (TS) - D20-12 (TS)	Below 1 Ω

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

Resistance

Tester Connection	Specified Condition
D20-12 (TS) - Body ground	10 kΩ or higher

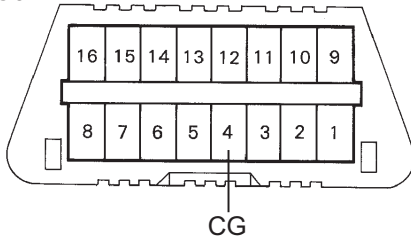
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (TS CIRCUIT)

OK

2 CHECK HARNESS AND CONNECTOR (DLC3 (CG) TO BODY GROUND)

D20
DLC3



B124401E88

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

Resistance

Tester Connection	Specified Condition
D20-4 (CG) - Body ground	Below 1 Ω

HINT:

If troubleshooting has been carried out according to the PROBLEM SYMPTOMS TABLE, refer back to the table and proceed to the next step before replacing the part (See page BC-233).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (CG CIRCUIT)

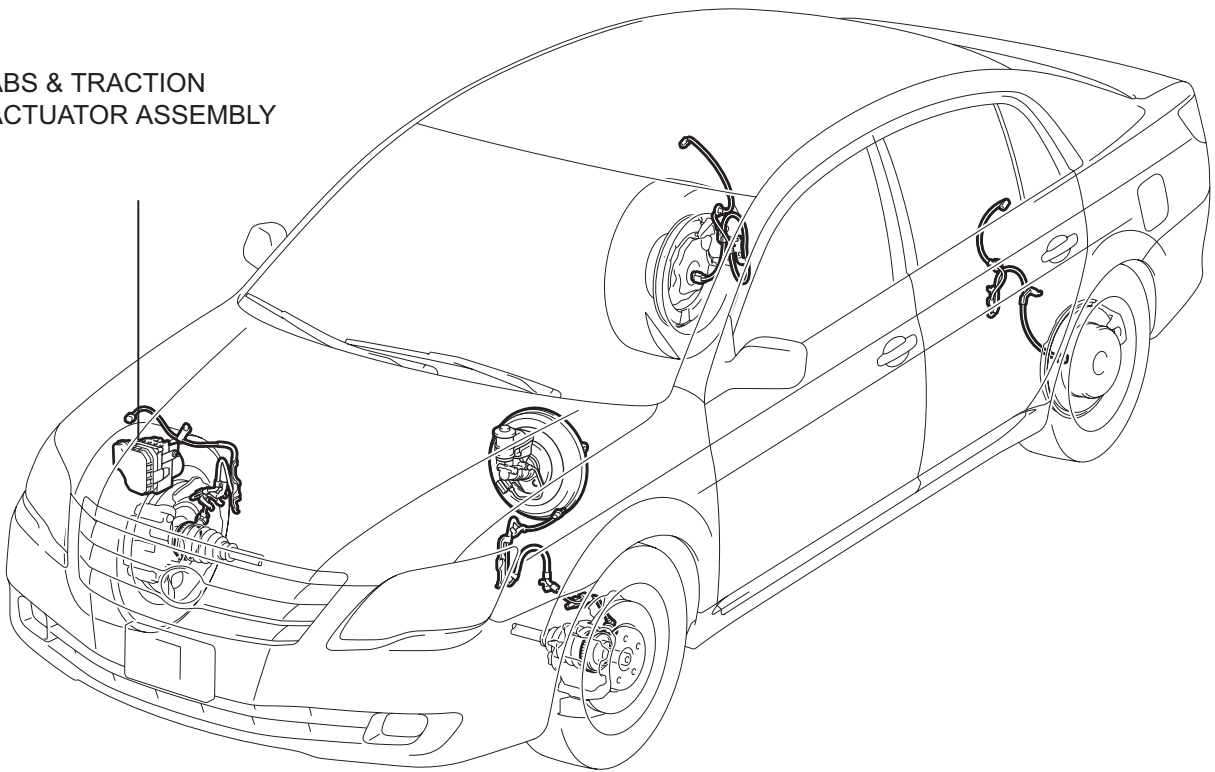
OK

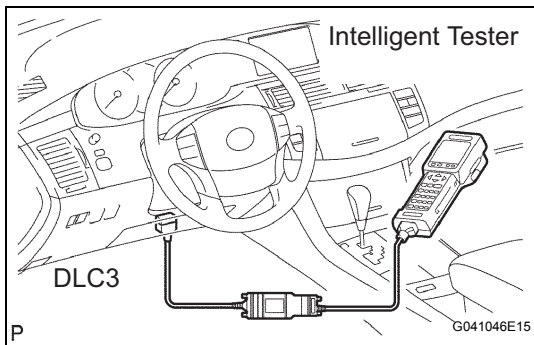
REPLACE ABS & TRACTION ACTUATOR ASSEMBLY

BRAKE ACTUATOR (w/ VSC)

COMPONENTS

ABS & TRACTION
ACTUATOR ASSEMBLY





ON-VEHICLE INSPECTION

1. CONNECT INTELLIGENT TESTER

- Connect the intelligent tester to the DLC3.
- Start the engine and run at idle.
- Select the ACTIVE TEST mode on the intelligent tester.

HINT:

Refer to the intelligent tester operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

- With the motor relay on, check the actuator motor operation noise.
- Turn the motor relay off.
- Depress the brake pedal and hold it for approximately 15 seconds. Check that the brake pedal cannot be depressed further.
- With the motor relay on, check that the pedal does not pulsate.

NOTICE:

Do not keep the motor relay turned on for more than 5 seconds continuously. When operating it continuously, set an interval of more than 20 seconds.

- Turn the motor relay off and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

NOTICE:

Never turn on the solenoids in a manner different from those described below.

- With the brake pedal depressed, perform the following operations.
- Turn the SFRH and SFRR solenoids on simultaneously, and check that the pedal cannot be depressed.

NOTICE:

Do not keep the solenoids turned on for more than 10 seconds continuously. When operating them continuously, set an interval of more than 20 seconds.

- Turn the SFRH and SFRR solenoids off simultaneously, and check that the pedal can be depressed.
- Turn the motor relay on, and check that the pedal returns.

NOTICE:

Do not keep the motor relay turned on for more than 5 seconds continuously. When operating it continuously, set an interval of more than 20 seconds.

- Turn the motor relay off and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

- (a) Using the same procedure, check the solenoids of the other wheels.

HINT:

Left front wheel: SFLH, SFLR

Right rear wheel: SRRH, SRRR

Left rear wheel: SRLH, SRLR

REMOVAL

1. DRAIN BRAKE FLUID

NOTICE:

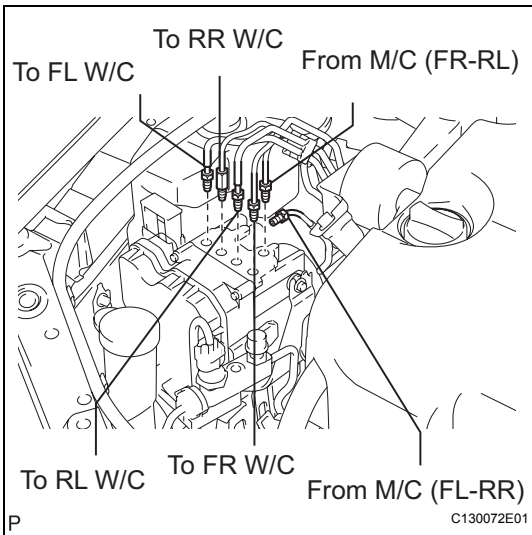
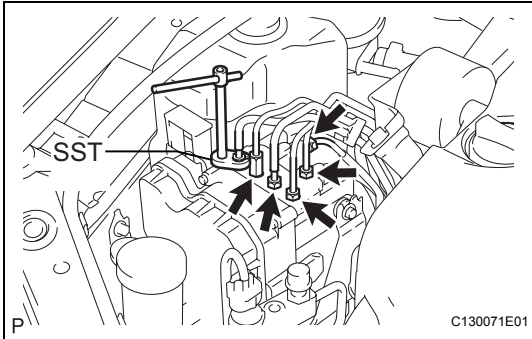
Wash brake fluid off immediately if it adheres to any painted surface.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL (See page [RS-303](#))

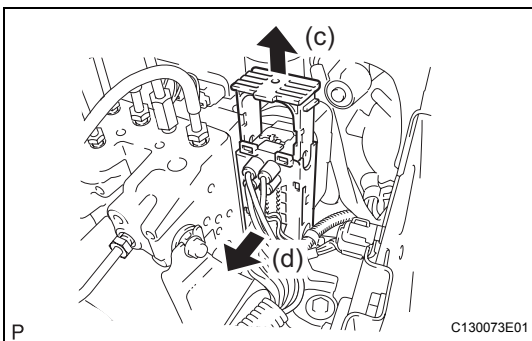
3. REMOVE BRAKE ACTUATOR WITH BRACKET

(a) Using SST, disconnect the 6 brake tubes from the actuator with bracket.

SST 09023-00101

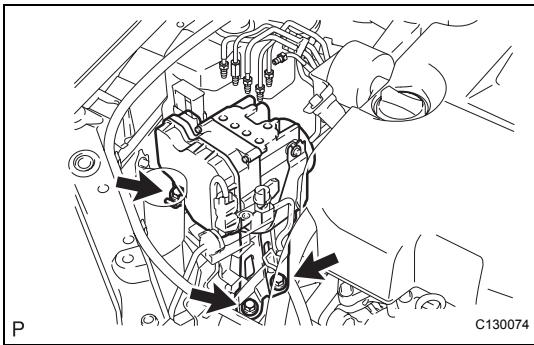


(b) Use tags or make a memo to identify the reconnection points.



(c) Pull the lock lever upward.

(d) Disconnect the actuator connector.



- (e) Remove the 3 bolts and the actuator with bracket.

NOTICE:

Do not damage the brake tubes and wire harness.

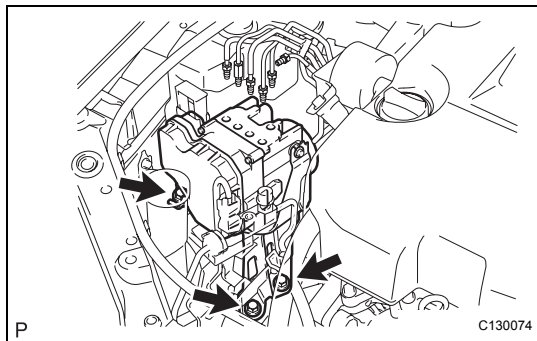
DISASSEMBLY

- 1. REMOVE ABS & TRACTION ACTUATOR ASSEMBLY**
 - (a) Remove the 2 nuts and the brake actuator assembly from the brake actuator bracket.

REASSEMBLY

1. INSTALL ABS & TRACTION ACTUATOR ASSEMBLY

- (a) Install the brake actuator assembly with the 2 nuts.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)



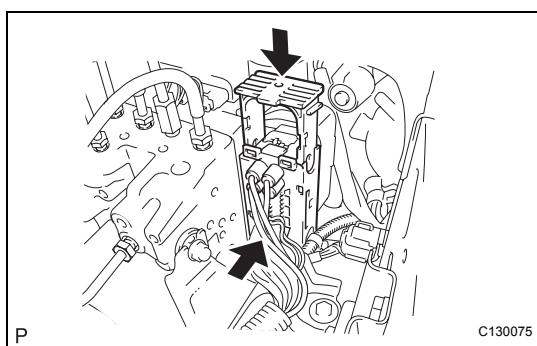
INSTALLATION

1. INSTALL BRAKE ACTUATOR WITH BRACKET

- (a) Install the actuator with bracket with the 3 bolts.
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)

NOTICE:

Do not damage the brake tubes and wire harness.

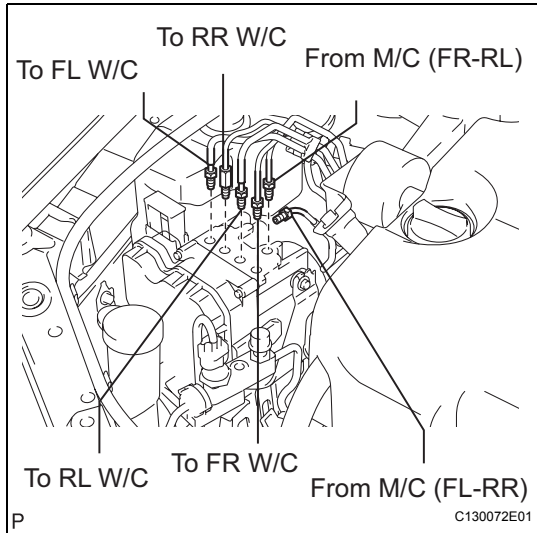


- (b) Connect the actuator connector.

- (c) Using SST, connect each brake tube to correct positions of the actuator with bracket as shown in the illustration.

SST 09023-00101

Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf)



2. FILL RESERVOIR WITH BRAKE FLUID (See page [BR-3](#))

3. BLEED MASTER CYLINDER (See page [BR-3](#))

4. BLEED BRAKE LINE (See page [BR-3](#))

5. CHECK BRAKE FLUID LEAKAGE

6. CHECK FLUID LEVEL IN RESERVOIR (See page [BR-6](#))

7. CONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

8. PERFORM INITIALIZATION

- (a) Some systems need initialization after reconnecting the negative battery cable.

9. PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION

- (a) Perform the yaw rate sensor zero point calibration (See page [BC-104](#)).

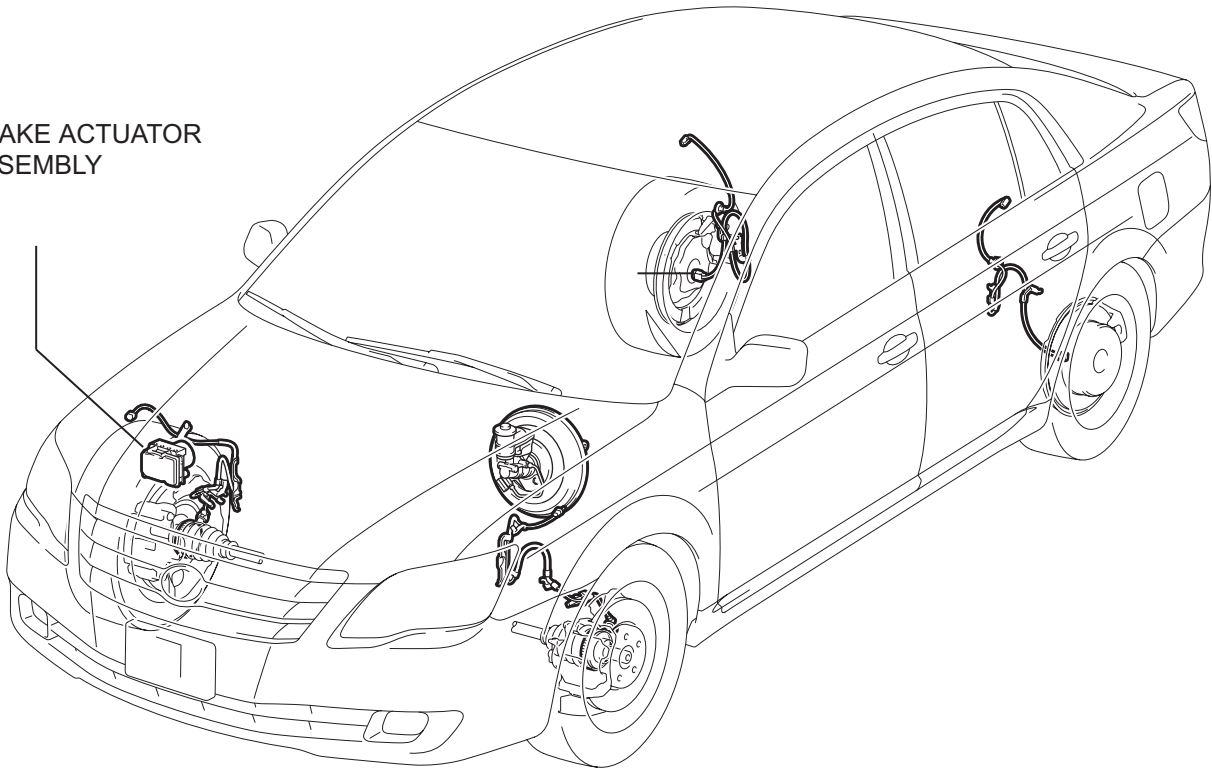
10. CHECK BRAKE ACTUATOR WITH INTELLIGENT TESTER

- (a) Check the brake actuator (See page [BC-240](#)).

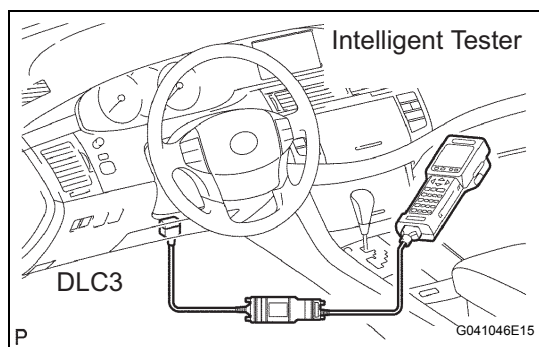
BRAKE ACTUATOR (w/o VSC)

COMPONENTS

BRAKE ACTUATOR
ASSEMBLY



BC



ON-VEHICLE INSPECTION

1. CONNECT INTELLIGENT TESTER

- Connect the intelligent tester to the DLC3.
- Start the engine and run at idle.
- Select the ACTIVE TEST mode on the intelligent tester.

HINT:

Refer to the intelligent tester operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

- With the motor relay on, check the actuator motor operation noise.
- Turn the motor relay off.
- Depress the brake pedal and hold it for approximately 15 seconds. Check that the brake pedal cannot be depressed further.
- With the motor relay on, check that the pedal does not pulsate.

NOTICE:

Do not keep the motor relay turned on for more than 5 seconds continuously. When operating it continuously, set an interval of more than 20 seconds.

- Turn the motor relay off and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

NOTICE:

Never turn on the solenoids in a manner different from those described below.

- With the brake pedal depressed, perform the following operations.
- Turn the SFRH and SFRR solenoids on simultaneously, and check that the pedal cannot be depressed.

NOTICE:

Do not keep the solenoids turned on for more than 5 seconds continuously. When operating them continuously, set an interval of more than 20 seconds.

- Turn the SFRH and SFRR solenoids off simultaneously, and check that the pedal can be depressed.
- Turn the motor relay on, and check that the pedal returns.

NOTICE:

Do not keep the motor relay turned on for more than 5 seconds continuously. When operating it continuously, set an interval of more than 20 seconds.

- Turn the motor relay off and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

- (a) Using the same procedure, check the solenoids of the other wheels.

HINT:

Left front wheel: SFLH, SFLR

Right rear wheel: SRRH, SRRR

Left rear wheel: SRLH, SRLR

REMOVAL

1. DRAIN BRAKE FLUID

NOTICE:

Wash brake fluid off immediately if it adheres to any painted surface.

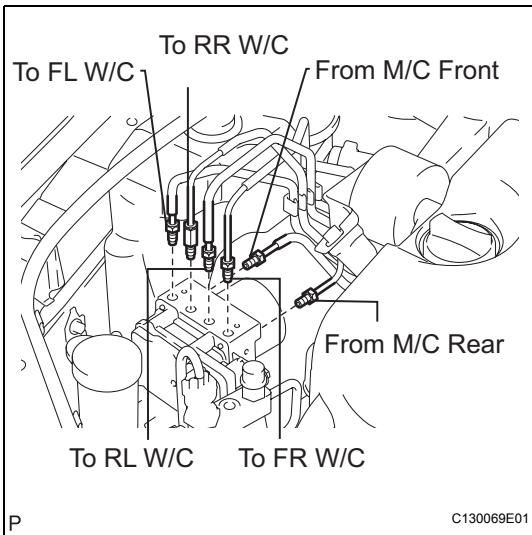
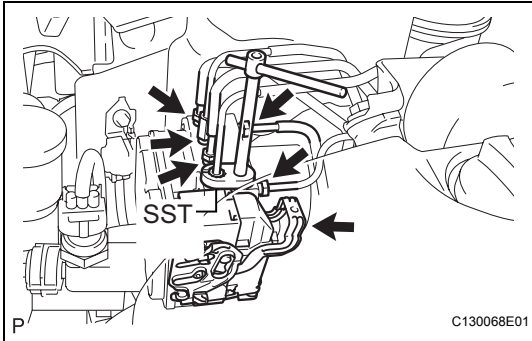
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL (See page RS-303)

3. REMOVE BRAKE ACTUATOR WITH BRACKET

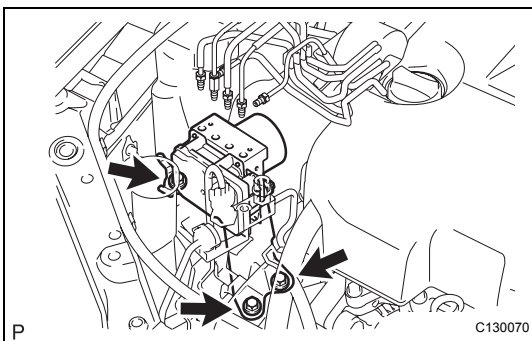
(a) Release the latch of the brake actuator connector to disconnect the connector.

(b) Using SST, disconnect the 6 brake tubes from the brake actuator.

SST 09023-00101



(c) Use tags or make a memo to identify the reconnection points.



(d) Remove the 3 bolts and brake actuator with bracket.

NOTICE:

Do not damage the brake tubes and wire harness.

DISASSEMBLY

1. REMOVE BRAKE ACTUATOR ASSEMBLY

- (a) Remove the 2 nuts and brake actuator from the brake actuator bracket.

REASSEMBLY

1. INSTALL BRAKE ACTUATOR ASSEMBLY

- (a) Install the brake actuator to the brake actuator bracket with the 2 nuts.

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

INSTALLATION

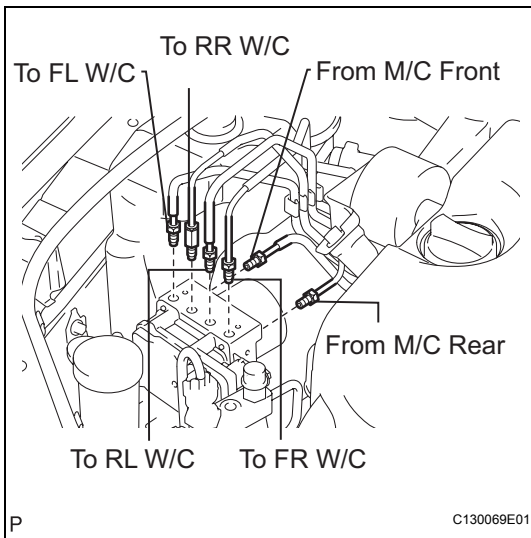
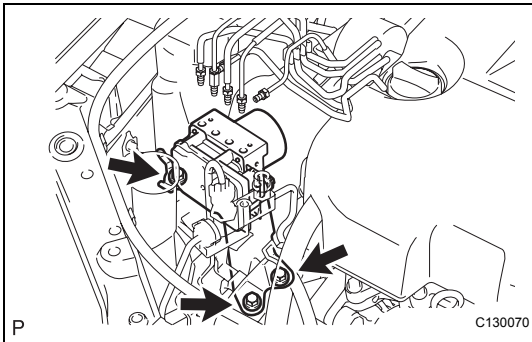
1. INSTALL BRAKE ACTUATOR WITH BRACKET

- (a) Install the brake actuator with bracket with the 3 bolts.

Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)

NOTICE:

Do not damage the brake tubes and wire harness.



- (b) Using SST, connect each brake line to the correct position of the brake actuator as shown in the illustration.

Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf)

- (c) Connect the brake actuator connector.

2. FILL RESERVOIR WITH BRAKE FLUID (See page [BR-3](#))

3. BLEED MASTER CYLINDER (See page [BR-3](#))

4. BLEED BRAKE LINE (See page [BR-3](#))

5. CHECK BRAKE FLUID LEAKAGE

6. CHECK FLUID LEVEL IN RESERVOIR (See page [BR-6](#))

7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

8. PERFORM INITIALIZATION

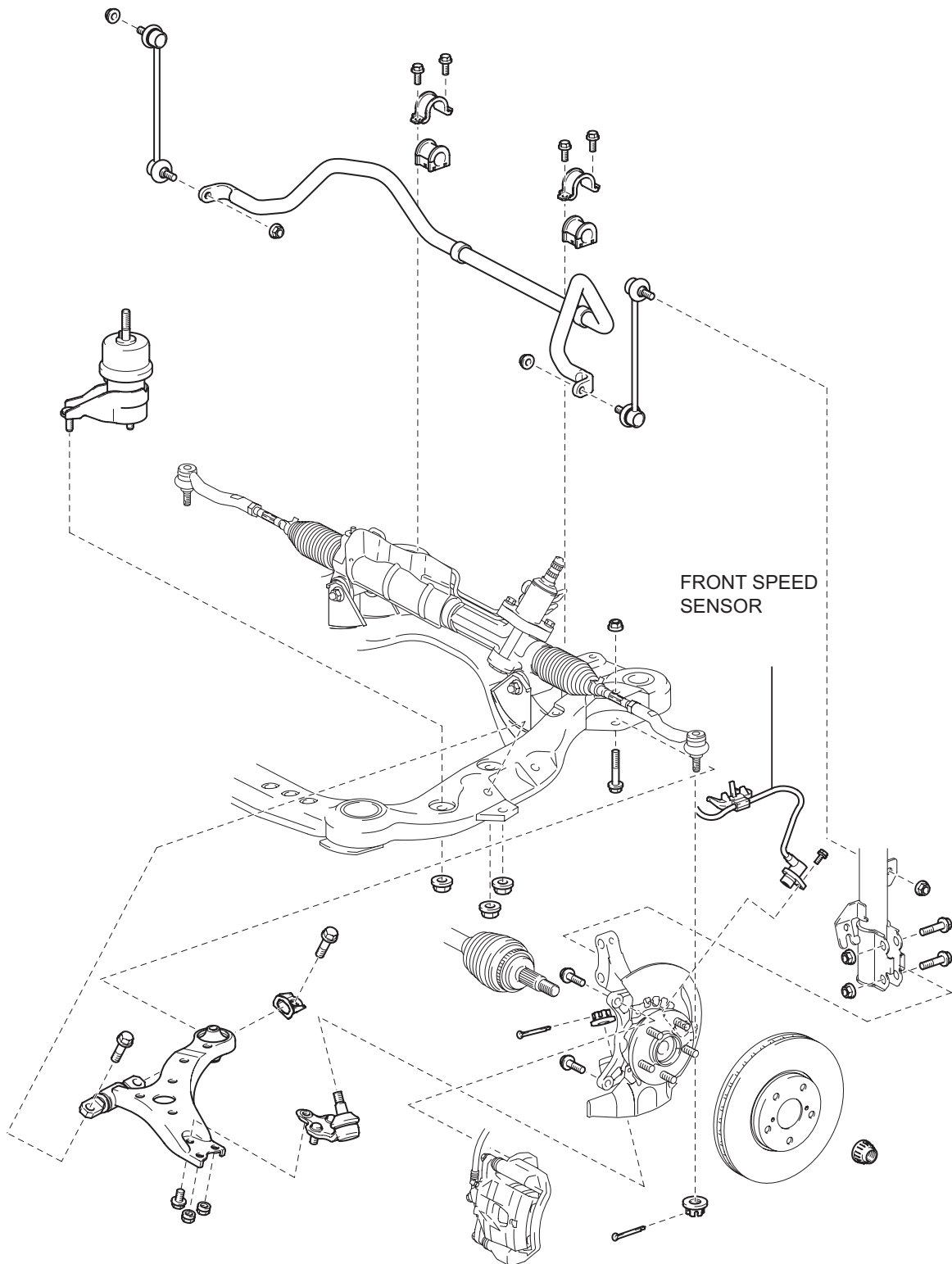
- (a) Some systems need initialization after reconnecting the negative battery cable.

9. CHECK BRAKE ACTUATOR WITH INTELLIGENT TESTER

- (a) Check the brake actuator (See page [BC-245](#)).

FRONT SPEED SENSOR

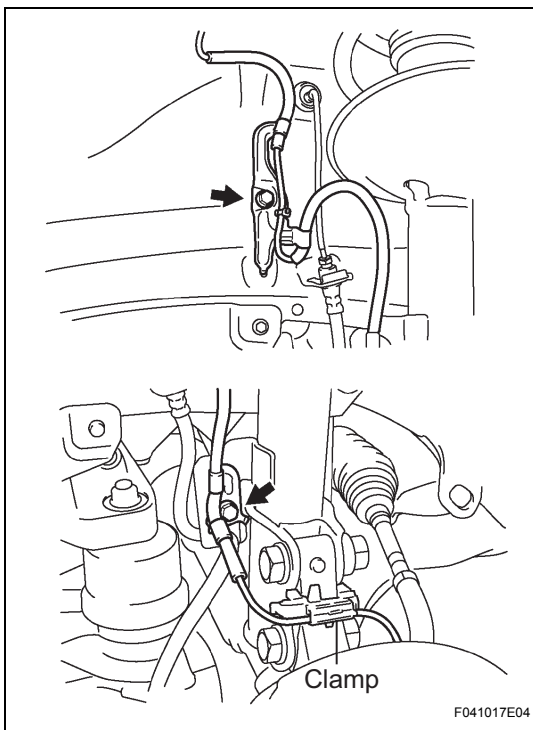
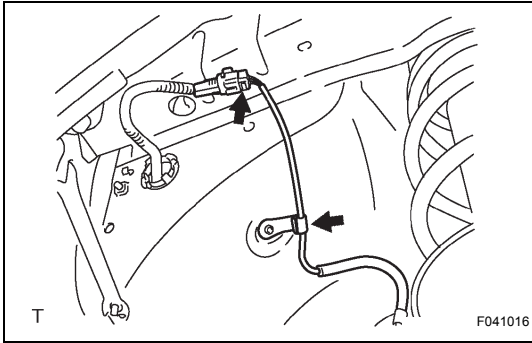
COMPONENTS



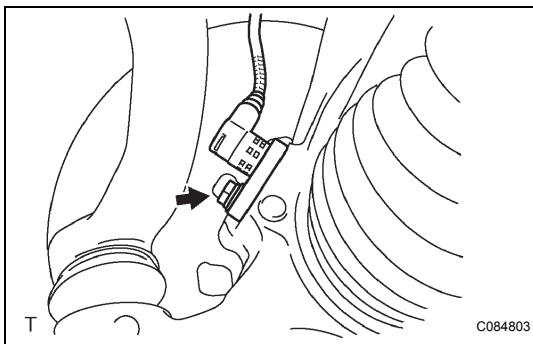
BC

REMOVAL

1. REMOVE FRONT WHEEL
2. REMOVE FRONT FENDER LINER LH
3. REMOVE FRONT SPEED SENSOR
 - (a) Disconnect the speed sensor connector and clamp.



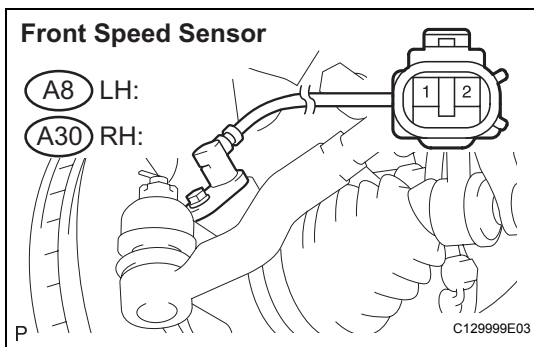
- (b) Remove the 2 bolts and separate the speed sensor harness from the body and shock absorber assembly.
- (c) Remove the clamp from the steering knuckle.



- (d) Remove the bolt and the front speed sensor.

NOTICE:

 - Prevent foreign matter from attaching to the sensor tip.
 - Clean the installation hole and surface for the speed sensor every time the speed sensor is removed.



INSPECTION

1. INSPECT FRONT SPEED SENSOR

- (a) Make sure that there is no looseness at the locking part and the connecting part of the connectors.
- (b) Disconnect the front speed sensor connectors.
- (c) Measure the resistance according to the value(s) in the table below.

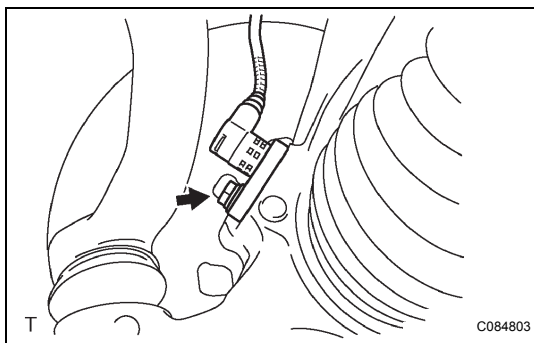
Resistance:

LH

Tester Connection	Specified Condition
A8-1 (FL+) - A8-2 (FL-)	1.22 to 0.92 kΩ
A8-1 (FL+) - Body ground	10 kΩ or higher
A8-2 (FL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
A30-1 (FR+) - A30-2 (FR-)	1.22 to 0.92 kΩ
A30-1 (FR+) - Body ground	10 kΩ or higher
A30-2 (FR-) - Body ground	10 kΩ or higher



INSTALLATION

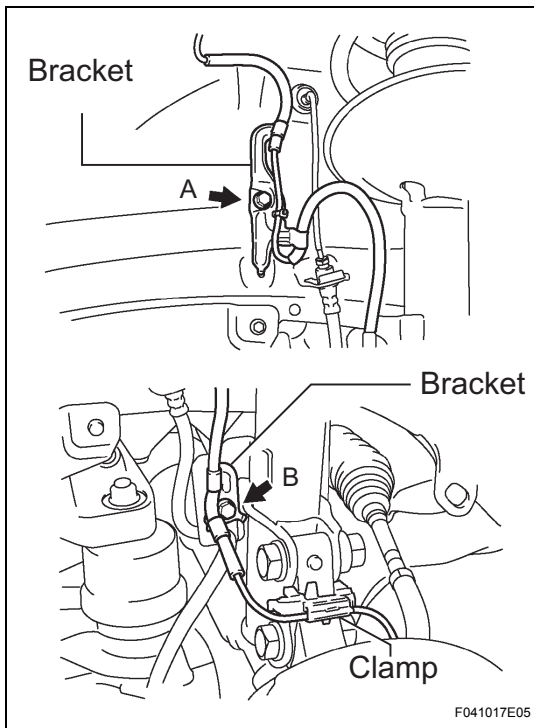
1. INSTALL FRONT SPEED SENSOR

- (a) Install the speed sensor front LH with the bolt.

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

NOTICE:

Prevent foreign matter from attaching to the sensor tip.



- (b) Install the sensor harness brackets with the 2 bolts to the body and shock absorber assembly.

Torque: Bolt A

5.0 N*m (51 kgf*cm, 44 in.*lbf)

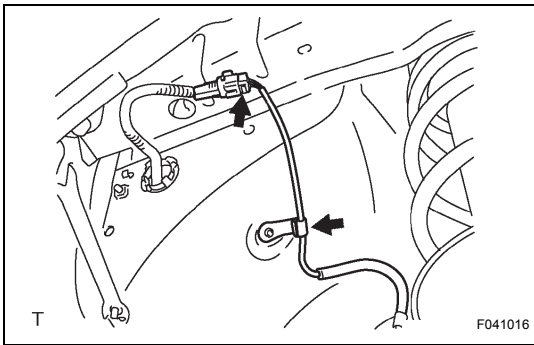
Bolt B

19 N*m (192 kgf*cm, 14 ft.*lbf)

- (c) Connect the clamp to the steering knuckle.

NOTICE:

Do not twist the wire harness for speed sensor front LH when installing the speed sensor.



(d) Connect the speed sensor connector and clamp.

2. INSTALL FRONT FENDER LINER LH

3. INSTALL FRONT WHEEL

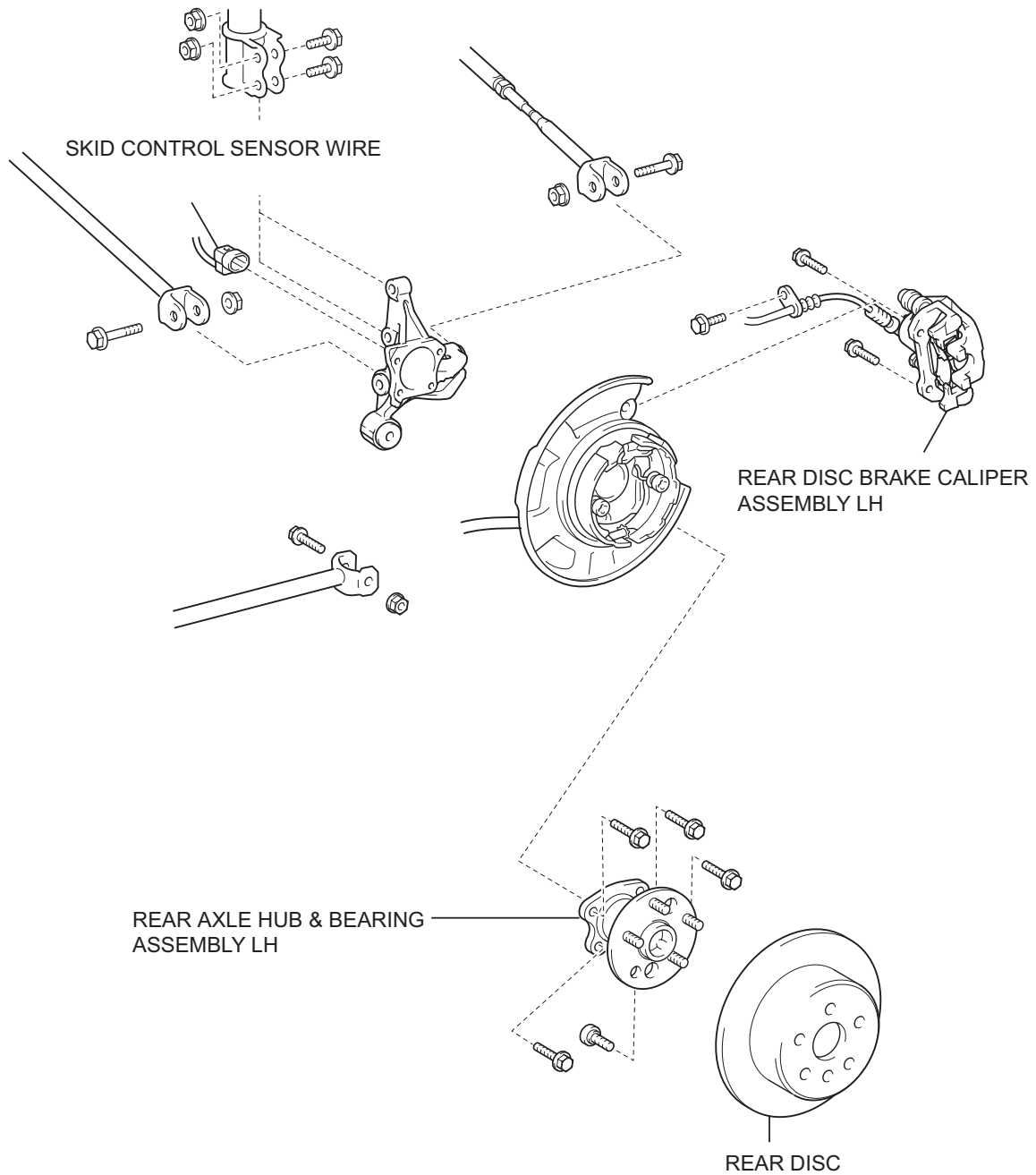
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

4. CHECK ABS SPEED SENSOR SIGNAL

(a) Check the ABS speed sensor signal (See page [BC-11](#) without VSC, or [BC-107](#) with VSC).

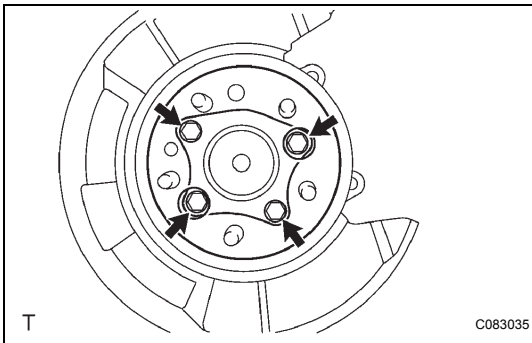
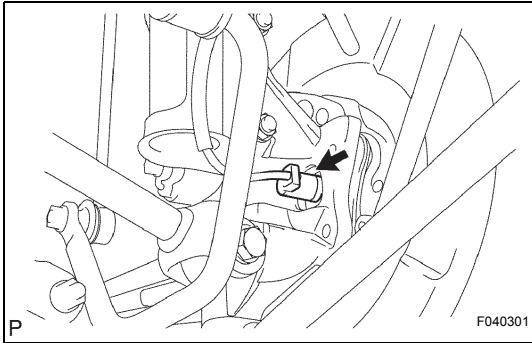
REAR SPEED SENSOR

COMPONENTS

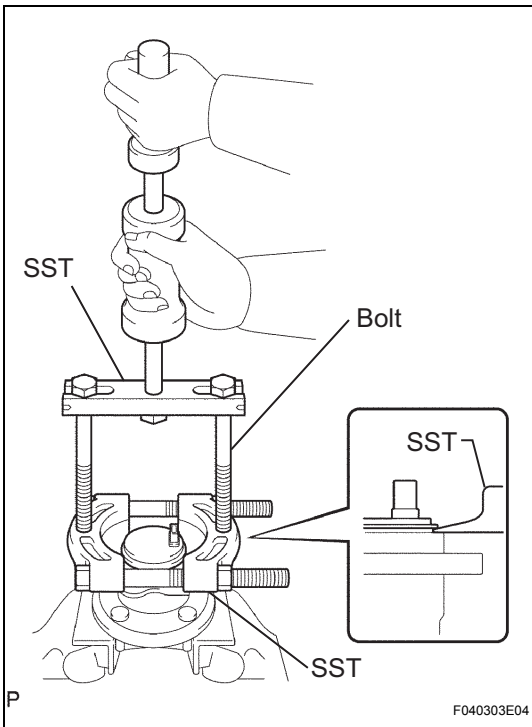


REMOVAL

1. REMOVE REAR WHEEL
2. DISCONNECT SKID CONTROL SENSOR WIRE
 - (a) Disconnect the connector from the skid control sensor.
3. REMOVE REAR DISC BRAKE CALIPER ASSEMBLY LH (See page AH-19)
4. REMOVE REAR DISC



5. REMOVE REAR AXLE HUB & BEARING ASSEMBLY LH
 - (a) Remove the 4 bolts and rear axle hub & bearing assembly.



6. REMOVE REAR SPEED SENSOR
 - (a) Mount the rear axle hub in a vise between aluminum plates.

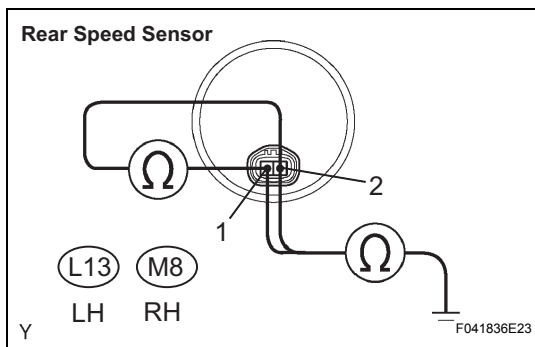
NOTICE:
Replace the axle hub & bearing assembly if it is dropped or receives a strong shock.
 - (b) Using a pin punch and hammer, drive out the 2 pins and remove the 2 attachments (09521-00010) from SST.

SST 09520-00031
 - (c) Using SST and 2 bolts (Diameter: 12 mm, pitch: 1.5 mm), remove the rear speed sensor from the rear axle hub.

SST 09520-00031 (09520-00040), 09521-00020, 09950-00020

NOTICE:

 - If damage is inflicted on the sensor rotor, replace the axle hub & bearing assembly.
 - Do not scratch the contact surface of axle hub and speed sensor.



INSPECTION

1. INSPECT REAR SPEED SENSOR

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

Resistance:
LH

Tester Connection	Specified Condition
K13-1 (RL+) - K13-2 (RL-)	Below 2.2 kΩ
K13-1 (RL+) - Body ground	10 kΩ or higher
K13-2 (RL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
M8-1 (RR+) - M8-2 (RR-)	Below 2.2 kΩ
M8-1 (RR+) - Body ground	10 kΩ or higher
M8-2 (RR-) - Body ground	10 kΩ or higher

INSTALLATION

1. INSTALL REAR SPEED SENSOR

- Clean the contact surface of the axle hub and a new skid control sensor.

NOTICE:

Prevent foreign matter from attaching to the sensor rotor.

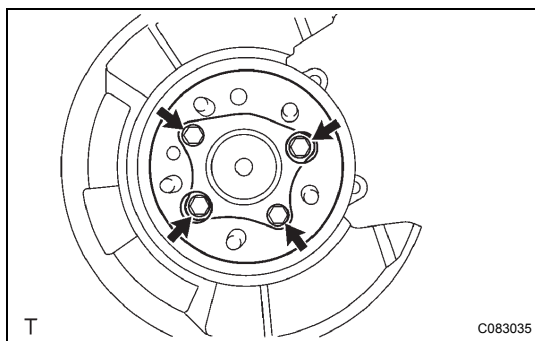
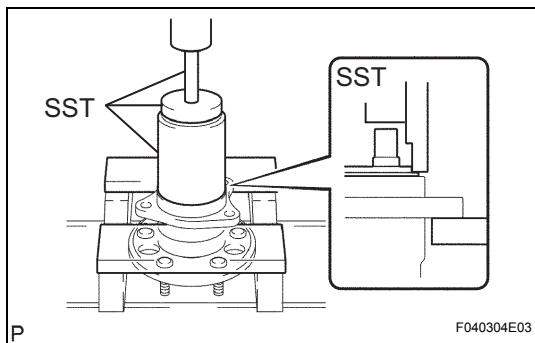
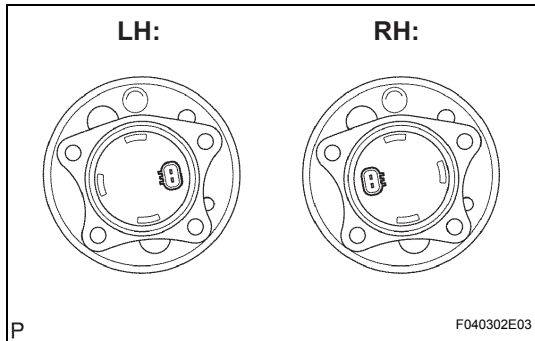
- Place the skid control sensor on the axle hub so that the connector is positioned as shown in the illustration.

- Using SST and a press, install the skid control sensor to the axle hub.

SST 09830-36010, 09950-60010 (09951-00650), 09950-70010 (09951-07100)

NOTICE:

- Do not tap the skid control sensor with a hammer directly.
- Check that there should be no foreign matter on the skid control sensor detection portion.
- Press the skid control sensor in the axle hub straight and slowly.



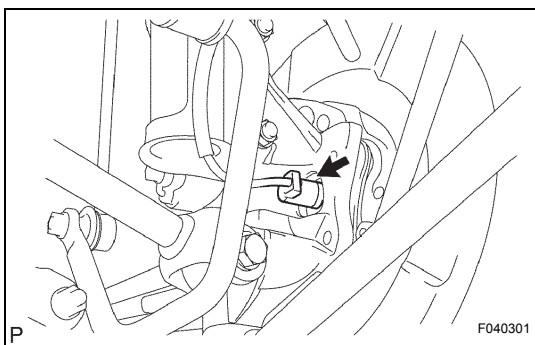
2. INSTALL REAR AXLE HUB & BEARING ASSEMBLY LH

- Install the rear axle hub & bearing assembly with the 4 bolts.

Torque: 80 N*m (816 kgf*cm, 59 ft.*lbf)

3. INSTALL REAR DISC

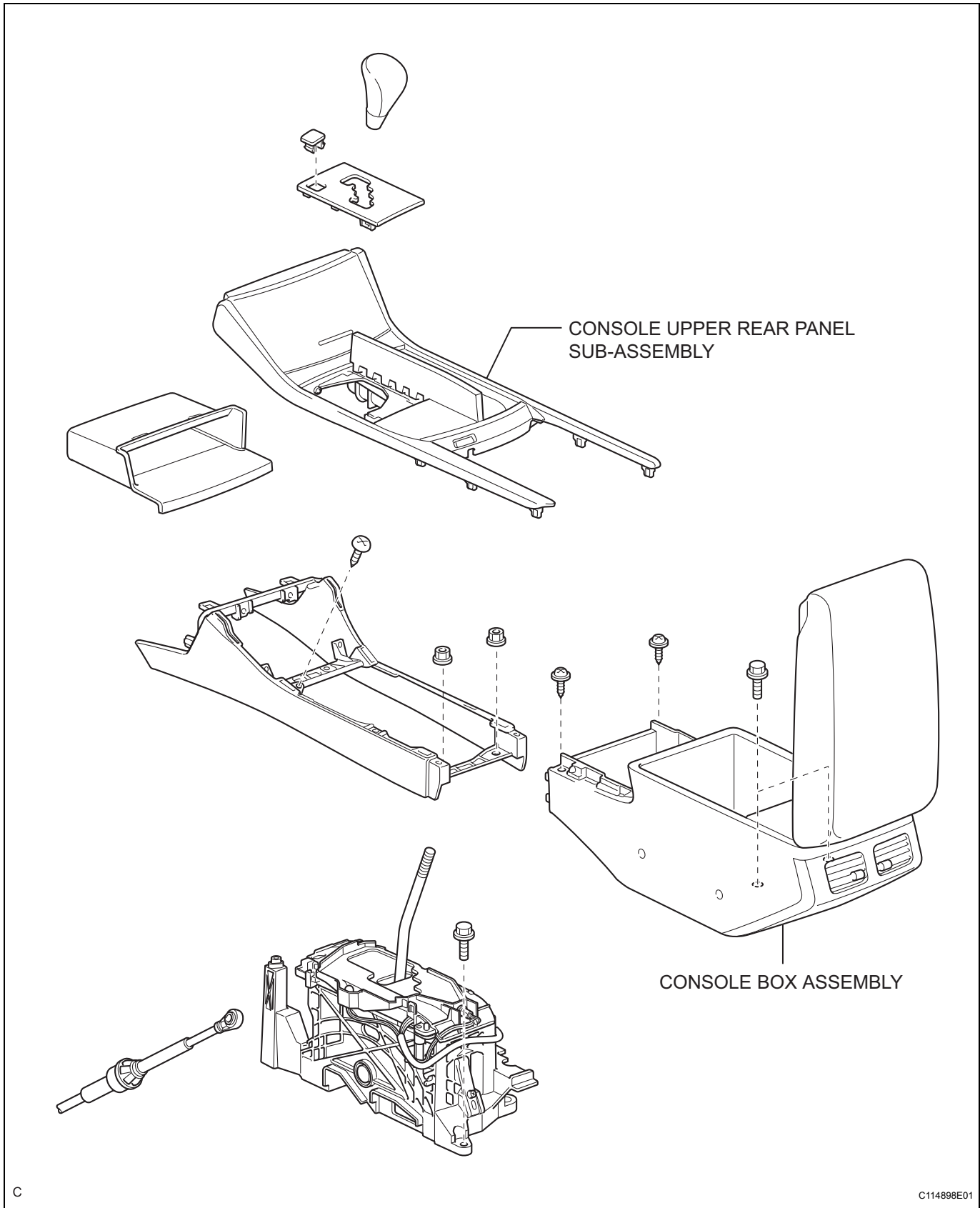
4. INSTALL REAR DISC BRAKE CALIPER ASSEMBLY LH (See page AH-21)



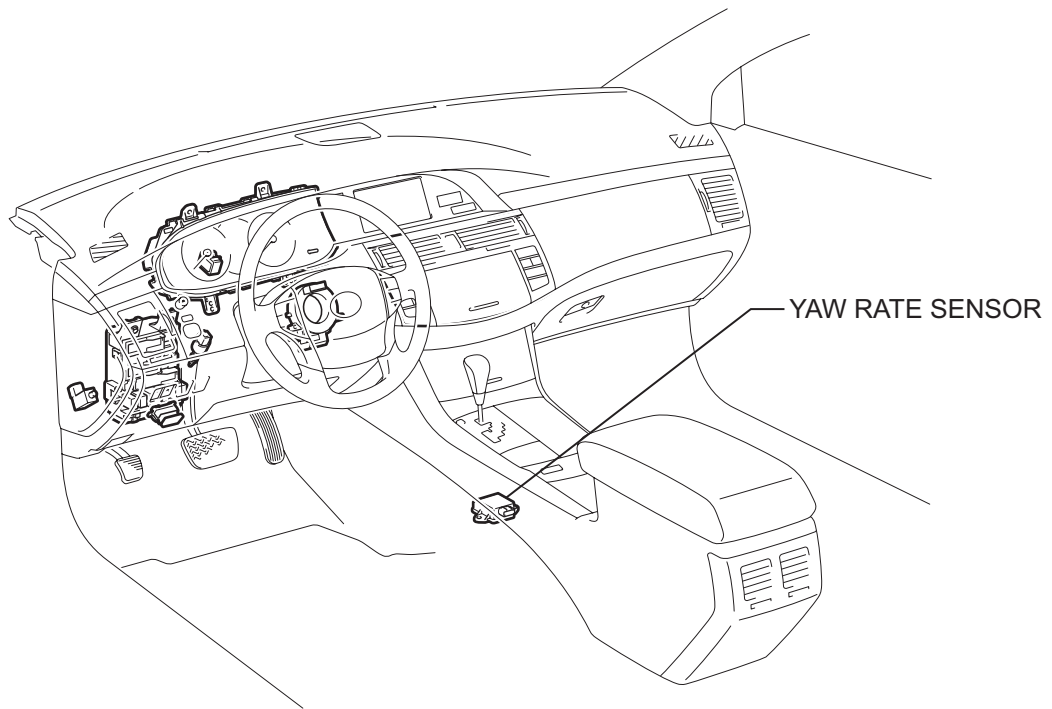
5. **CONNECT SKID CONTROL SENSOR WIRE**
 - (a) Connect the connector to the skid control sensor.
6. **INSTALL REAR WHEEL**
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
7. **INSPECT REAR WHEEL ALIGNMENT**
8. **CHECK ABS SPEED SENSOR SIGNAL**
 - (a) Check the ABS speed sensor signal (See page [BC-11](#) without VSC, or [BC-107](#) with VSC).

YAW RATE AND ACCELERATION SENSOR

COMPONENTS



BC

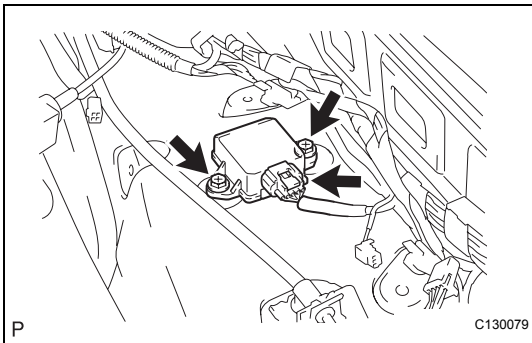
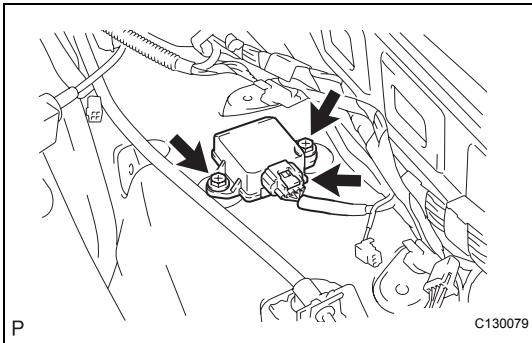


REMOVAL

NOTICE:

- Do not use dropped or damaged yaw rate sensors.
- Prevent foreign matter from attaching between the yaw rate sensor bracket and body.
- Confirm that the sensor direction is correct.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE CONSOLE UPPER REAR PANEL SUB-ASSEMBLY** (See page [IP-13](#))
3. **REMOVE CONSOLE BOX ASSEMBLY** (See page [IP-13](#))
4. **REMOVE YAW RATE SENSOR**
 - (a) Disconnect the yaw rate sensor connector.
 - (b) Remove the 2 bolts and yaw rate sensor.

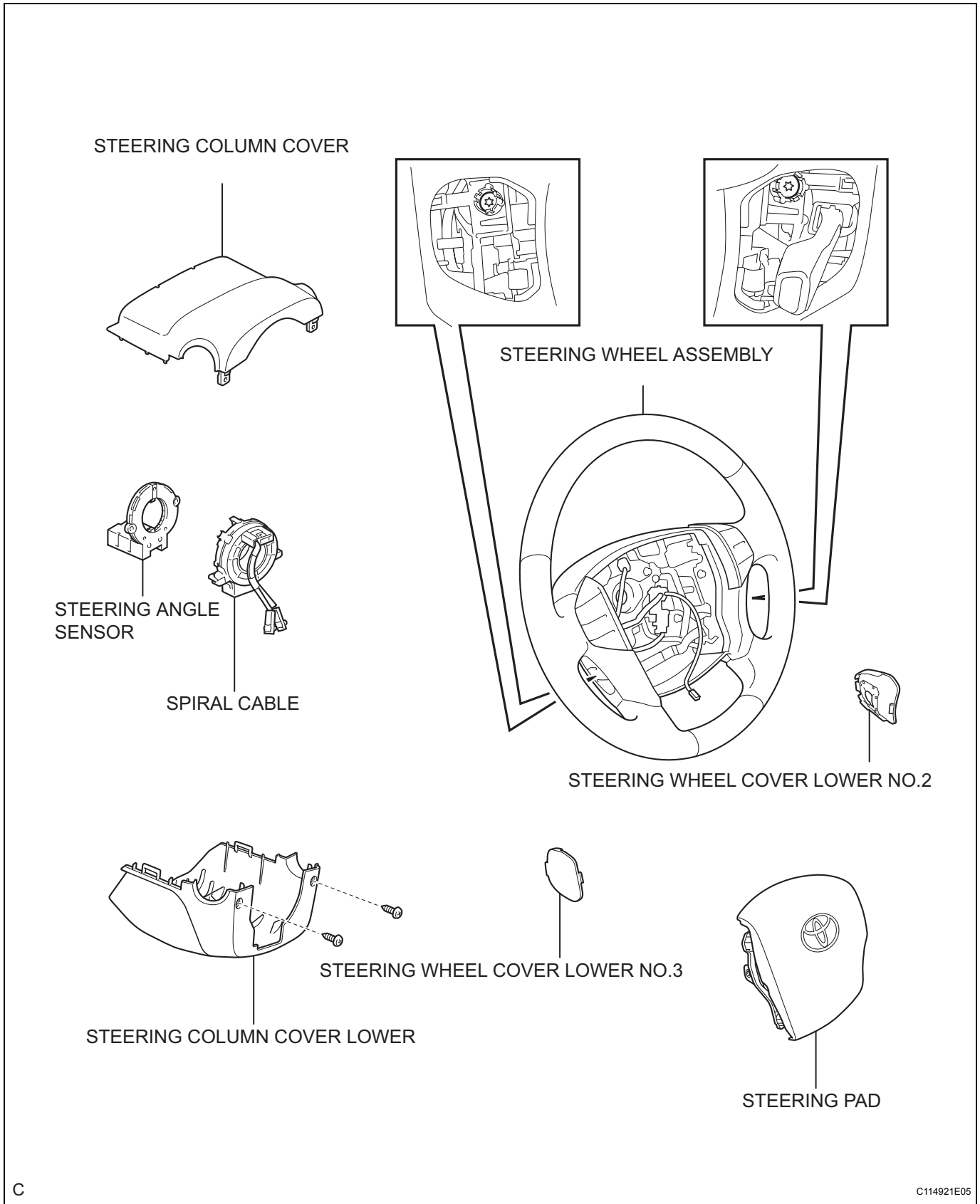


INSTALLATION

1. **INSTALL YAW RATE SENSOR**
 - (a) Install the yaw rate sensor with the 2 bolts.
Torque: 14 N*m (143 kgf*cm, 10 ft.*lbf)
 - (b) Connect the yaw rate sensor connector.
2. **INSTALL CONSOLE BOX ASSEMBLY**
3. **INSTALL CONSOLE UPPER REAR PANEL SUB-ASSEMBLY**
4. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
5. **PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION**
 - (a) Perform the yaw rate sensor zero point calibration (See page [BC-104](#)).
6. **INSPECT ABS WARNING LIGHT AND VSC WARNING LIGHT**
 - (a) Check that the ABS and VSC warning lights (See page [BC-120](#)).
7. **PERFORM INITIALIZATION**
 - (a) Some systems need initialization after reconnecting the negative battery cable.

STEERING ANGLE SENSOR

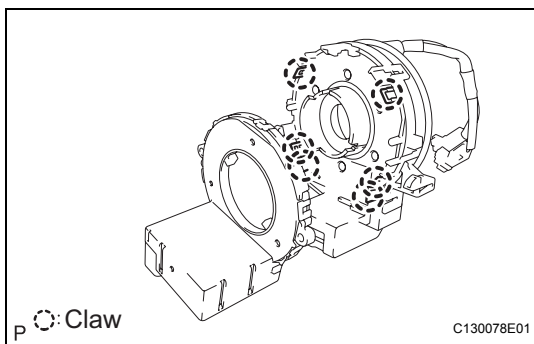
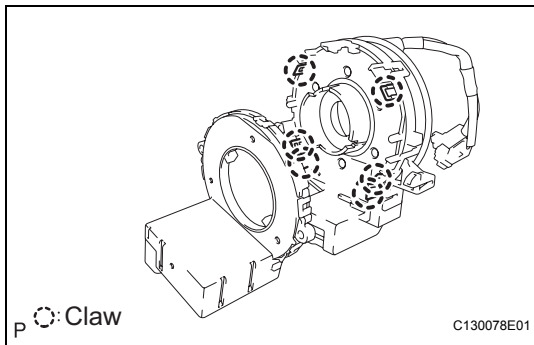
COMPONENTS



BC

REMOVAL

1. **PRECAUTION** (See page [RS-303](#))
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL** (See page [RS-303](#))
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
4. **REMOVE STEERING WHEEL COVER LOWER NO.2** (See page [RS-304](#))
5. **REMOVE STEERING WHEEL COVER LOWER NO.3** (See page [RS-304](#))
6. **REMOVE STEERING PAD** (See page [RS-304](#))
7. **REMOVE STEERING WHEEL ASSEMBLY** (See page [SR-36](#))
8. **REMOVE STEERING COLUMN COVER LOWER**
9. **REMOVE STEERING COLUMN COVER**
10. **REMOVE SPIRAL CABLE**
11. **REMOVE STEERING ANGLE SENSOR**
 - (a) Disengage the 6 claws and remove the steering angle sensor from the spiral cable.



INSTALLATION

1. **INSTALL STEERING ANGLE SENSOR**
 - (a) Install the steering angle sensor to the spiral cable.

NOTICE:

 - Engage the claws securely.
 - Do not damage the claws.
2. **INSPECT SPIRAL CABLE** (See page [RS-315](#))
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
4. **INSTALL SPIRAL CABLE** (See page [RS-315](#))
5. **CENTER SPIRAL CABLE** (See page [RS-316](#))
6. **INSTALL STEERING WHEEL ASSEMBLY** (See page [SR-46](#))
7. **INSTALL STEERING PAD** (See page [RS-305](#))
8. **INSPECT STEERING PAD** (See page [RS-305](#))
9. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
10. **INSPECT SRS WARNING LIGHT** (See page [RS-306](#))

11. PERFORM INITIALIZATION

- (a) Some systems need initialization after reconnecting the negative battery cable.