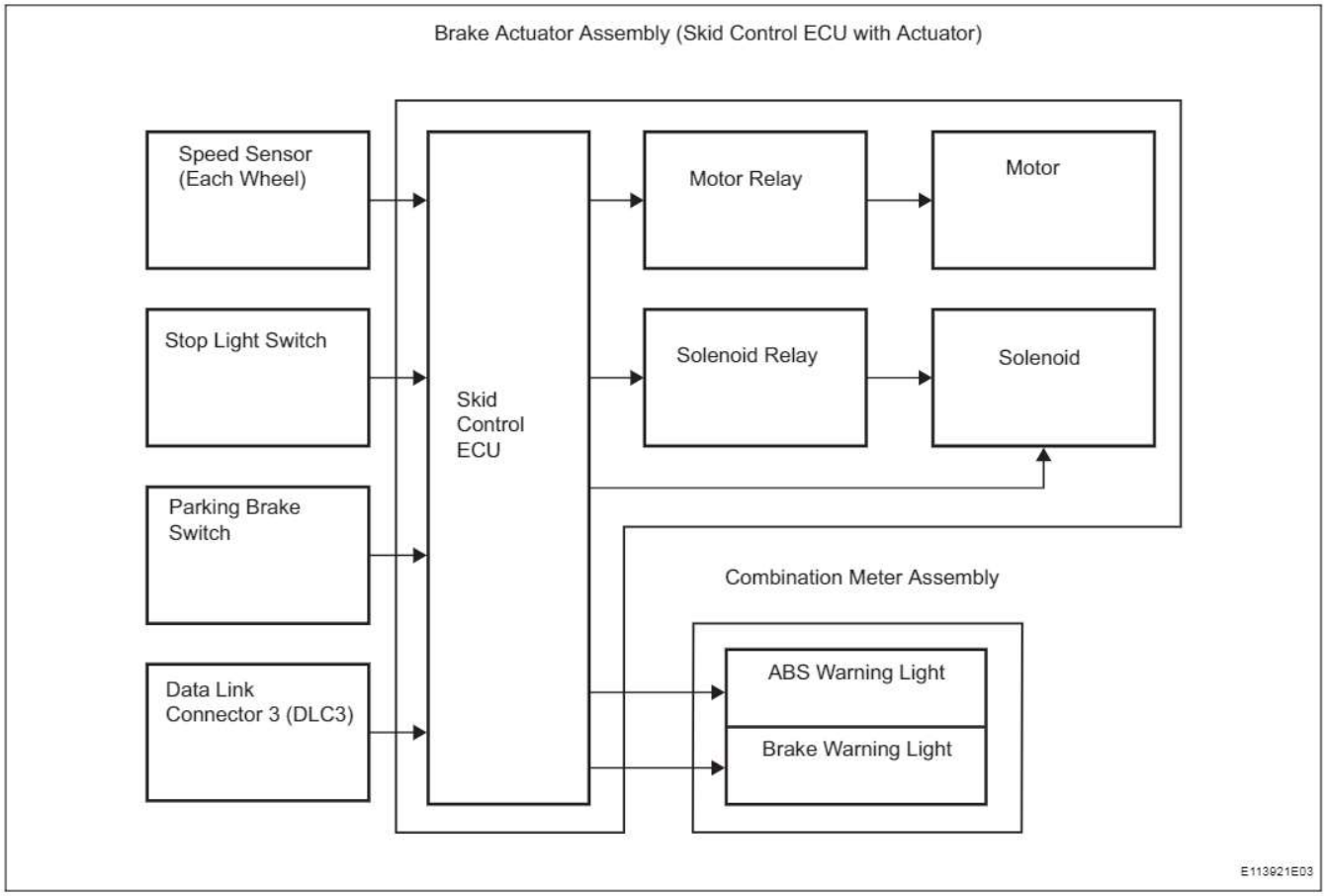
SYSTEM DIAGRAM



BC

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

HINT:

The skid control ECU has a built-in brake actuator.

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

2. ABS OPERATION

(a) Using each wheel's speed sensor signal, the skid control ECU calculates wheel speed and deceleration to check each wheel's slipping condition. Depending on the slipping condition, the ECU will control the pressure holding valve and pressure reduction valve to adjust the fluid pressure of each wheel cylinder.

3. FAIL-SAFE FUNCTION

(a) When a failure occurs in the ABS, the ABS warning light illuminates and ABS operation is prohibited.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the anti-lock brake system.
- *: Use the intelligent tester.

1	VEHICLE BROUGHT TO WORKSHOP

NEXT

2	INSPECT BATTERY VOLTAGE

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

3	CHECK AND CLEAR DTC*

NEXT

4	PROBLEM SYMPTOM CONFIRMATION

Result

Result	Proceed to
Symptom does not occur	A
Symptom occurs	B

B → Go to step 6

A

5	SYMPTOM SIMULATION

NEXT

6	CHECK FOR DTC*

Result

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

BC

B → Go to step 9

A

7 PROBLEM SYMPTOMS TABLE

Result

Result	Proceed to
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

B → Go to step 9

A

8 OVERALL ANALYSIS AND TROUBLESHOOTING

(a) Terminals of ECU (see page BC-7)
(b) DATA LIST / ACTIVE TEST (see page BC-11)

NEXT

9 CHECK FOR FLUID LEAKAGE

NEXT

10 REPAIR OR REPLACE

NEXT

11 CONFIRMATION TEST

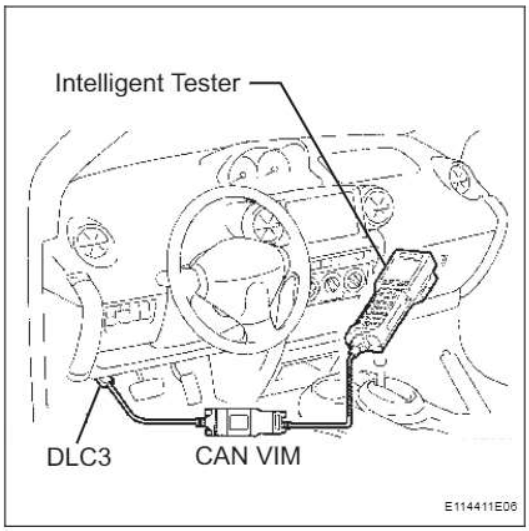
NEXT

BC **END**

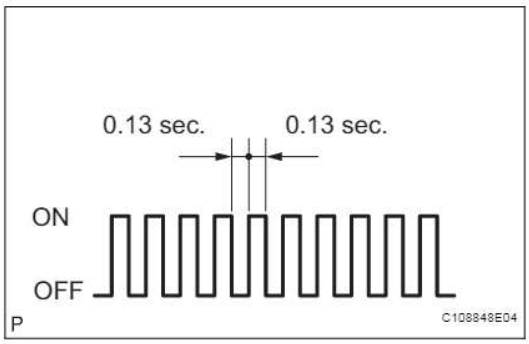
OPERATION CHECK

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

HINT:
If the ignition switch is turned from ON to ACC or OFF during test mode, the DTCs will be erased.



(a) Procedures for test mode:
(1) Turn the ignition switch OFF.
(2) Check that the shift lever is on P.
(3) Connect the intelligent tester (with CAN VIM) to the DLC3.
(4) Turn the ignition switch ON.
(5) Select the test mode using the intelligent tester.
HINT:
Refer to the intelligent tester operator's manual for further details.



(6) Check that the ABS warning light blinks.
HINT:
If the ABS warning light does not blink, check the ABS warning light circuit.

Trouble area	See procedure
ABS warning light circuit	BC-43

(b) Check the speed sensor.
(1) Drive the vehicle straight forward at the following speeds. Then check that the ABS warning light is as follows.

Vehicle Speed	Check	ABS Warning Light
45 km/h (28 mph) or higher	Deviations of sensor signal	Turns off

HINT:
The sensor signal check may not be completed if the vehicle's wheels slip or the steering wheel is turned during this check.
(2) Stop the vehicle.
(c) Read the DTC by following the tester screen.
HINT:
Refer to the intelligent tester operator's manual for further details.

BC

PROBLEM SYMPTOMS TABLE

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

NOTICE:

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

Anti-lock brake system

Symptom	Suspected area	See page
ABS does not operate	1. Check DTC and confirm that normal code is output	BC-8
	2. IG power source circuit	BC-34
	3. Front speed sensor circuit	BC-16
	4. Rear speed sensor circuit	BC-22
	5. Check skid control ECU with actuator with intelligent tester. If abnormal, check hydraulic circuit for leakage.	-
ABS does not operate efficiently	1. Check DTC and confirm that normal code is output	BC-8
	2. Front speed sensor circuit	BC-16
	3. Rear speed sensor circuit	BC-22
	4. Stop light switch circuit	BC-37
	5. Check skid control ECU with actuator with intelligent tester. If abnormal, check hydraulic circuit for leakage.	-
ABS warning light abnormality	1.ABS warning light circuit	BC-43
	2. Skid control ECU with actuator	-
DTC check cannot be done	1.ABS warning light circuit	BC-43
	2. TC and CG terminal circuit	BC-57
Speed sensor signal check cannot be done	1. Skid control ECU with actuator	-

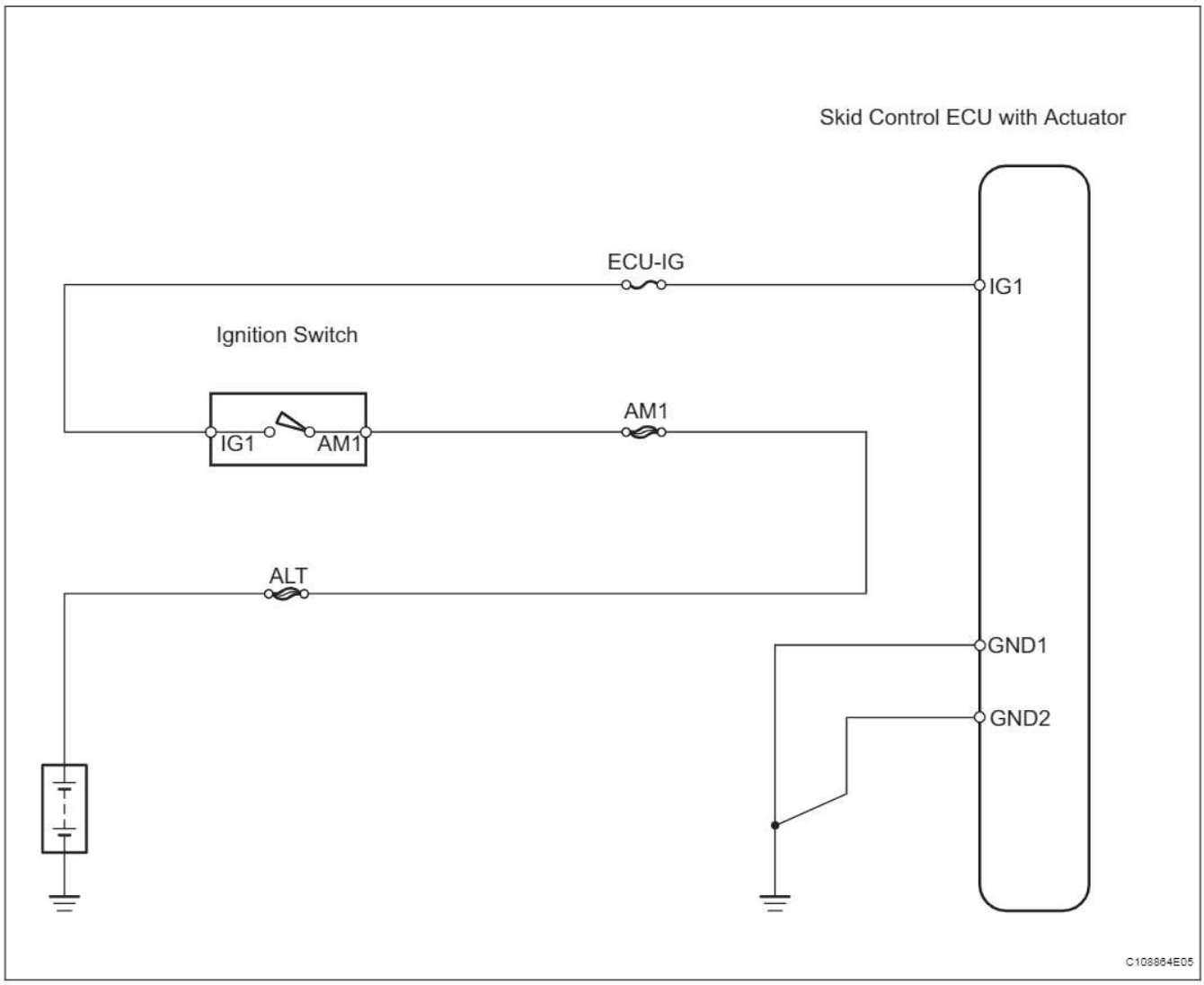
BC

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

DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1241/41	When either of following is detected: 1. Both conditions continue for at least 10 seconds • Vehicle speed is more than 3 km/h (2 mph) • IG1 terminal voltage is less than 9.5 V 2. All conditions continue for at least 0.2 seconds • Solenoid relay remains ON • Relay contact is open • IG1 terminal voltage is less than 9.5 V	• Battery • Charging system • Power source circuit

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 **INSPECT FUSE (ECU-IG)**

(a) Remove the ECU-IG fuse from the instrument panel junction block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω
Result

Result	Proceed to
OK (when using intelligent tester)	A
OK (when not using intelligent tester)	B
NG	C

B → Go to step 3

C → REPLACE FUSE

A

2 **READ INTELLIGENT TESTER (IG VOLTAGE)**

(a) Check the DATA LIST for proper functioning of the IG power voltage.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
IG VOLTAGE	ECU power supply voltage / NORMAL / TOO LOW	NORMAL: 10 to 14 V TOO LOW: Below 10 V	-

Result

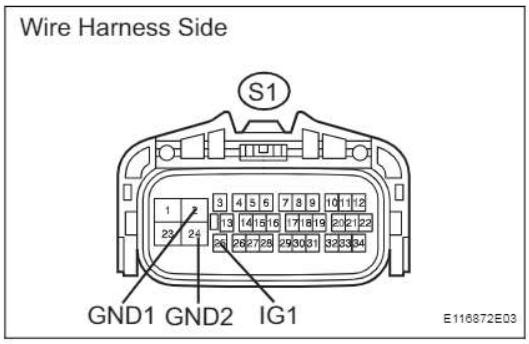
Result	Proceed to
Display is not NORMAL	A
Display is NORMAL	B

B → REPLACE BRAKE ACTUATOR ASSEMBLY

A

BC

3 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S1-25 (IG1) - Body ground	Ignition switch ON	10 to 14 V

Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
S1-2 (GND1) - Body ground	Below 1 Ω
S1-24 (GND2) - Body ground	

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

OK

4 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-8).
(b) Drive the vehicle at approximately 32 km/h (20 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-8).
Result

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

B → **END**

A

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

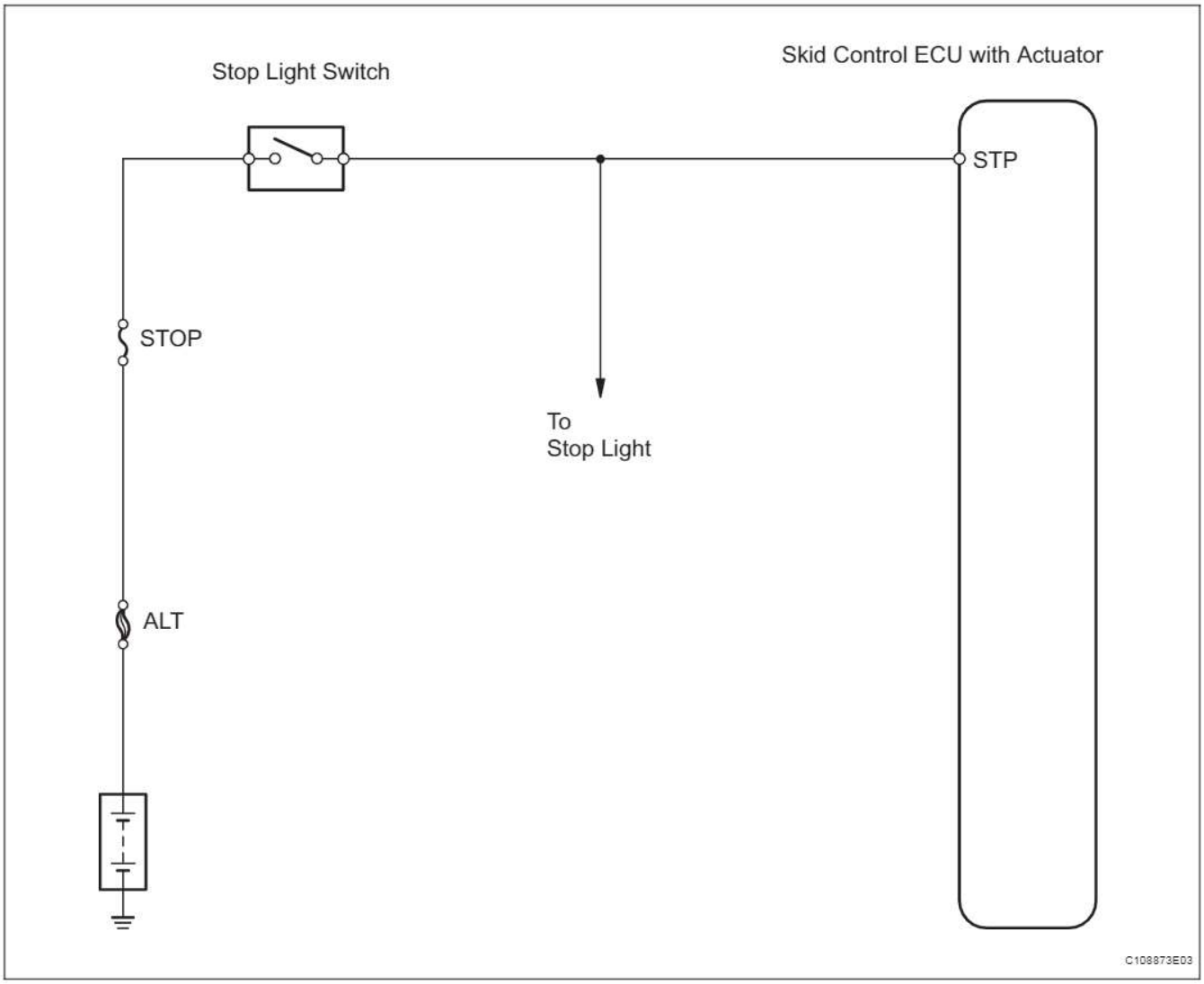
DTC	C1249/49	Open in Stop Light Switch Circuit

DESCRIPTION

This circuit recognizes brake operation by sending a stop light signal to the skid control ECU.

DTC No.1	DTC Detection Condition	Trouble Area
C1249/49	Both conditions continue for at least 1.0 seconds: • IG1 terminal voltage is between 10 and 16 V • Open in stop light switch circuit	• Stop light switch assembly • Stop light switch circuit

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 CHECK STOP LIGHT SWITCH (OPERATION)

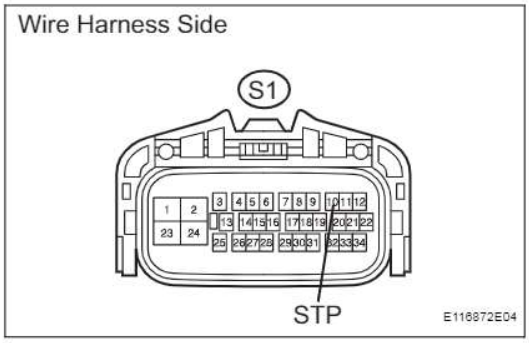
(a) Check that the stop light illuminates when the brake pedal is depressed, and turns off when the brake pedal is released.
OK

Condition	Stop Light Condition
Brake pedal depressed	Illuminates
Brake pedal released	Turns off

NG → Go to step 4

OK

2 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connectors.
Standard voltage

Tester Connection	Switch Condition	Specified Condition
S1-10 (STP) - Body ground	Brake pedal depressed	10 to 14 V
	Brae pedal released	Below 1 V

NG → Go to step 5

OK

3 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see pae BC-8).
(b) Drive the vehicle at approximately 32 km/h (20 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-8).
Result

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

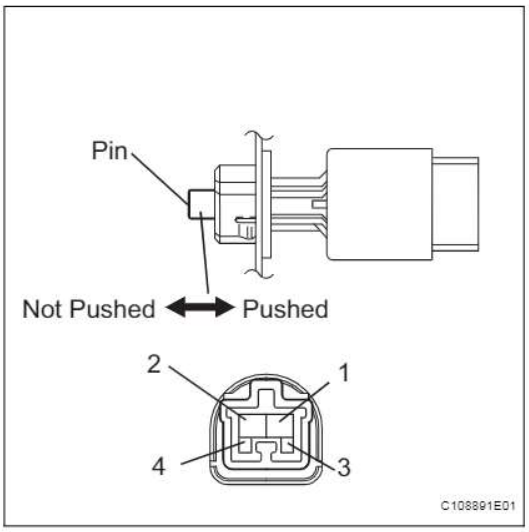
B → END

A

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

4 INSPECT STOP LIGHT SWITCH ASSEMBLY



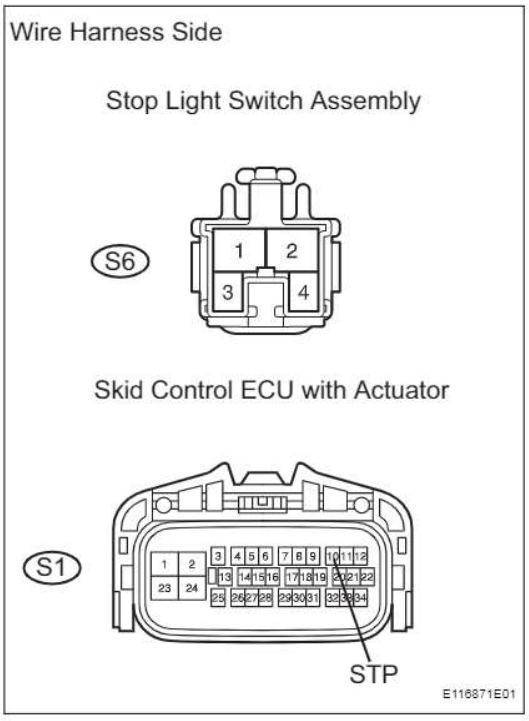
(a) Disconnect the S6 switch connector.
(b) Measure the resistance of the switch.
Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Pin not pushed	Below 1 Ω
	Pin pushed	10 kΩ or higher

NG → **REPLACE STOP LIGHT SWITCH ASSEMBLY**

OK

5 CHECK WIRE HARNESS (STOP LIGHT SWITCH - SKID CONTROL ECU AND BATTERY)



(a) Disconnect the S6 switch connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Specified Condition
S6-2 - Body ground	10 to 14 V

(d) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
S6-1 - S1-27 (STP)	Below 1 Ω

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

OK

6 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-8).
(b) Drive the vehicle at approximately 32 km/h (20 mph) or more for 60 seconds or more.

(c) Check for DTCs (see page BC-11).
Result

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

B → END

A

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

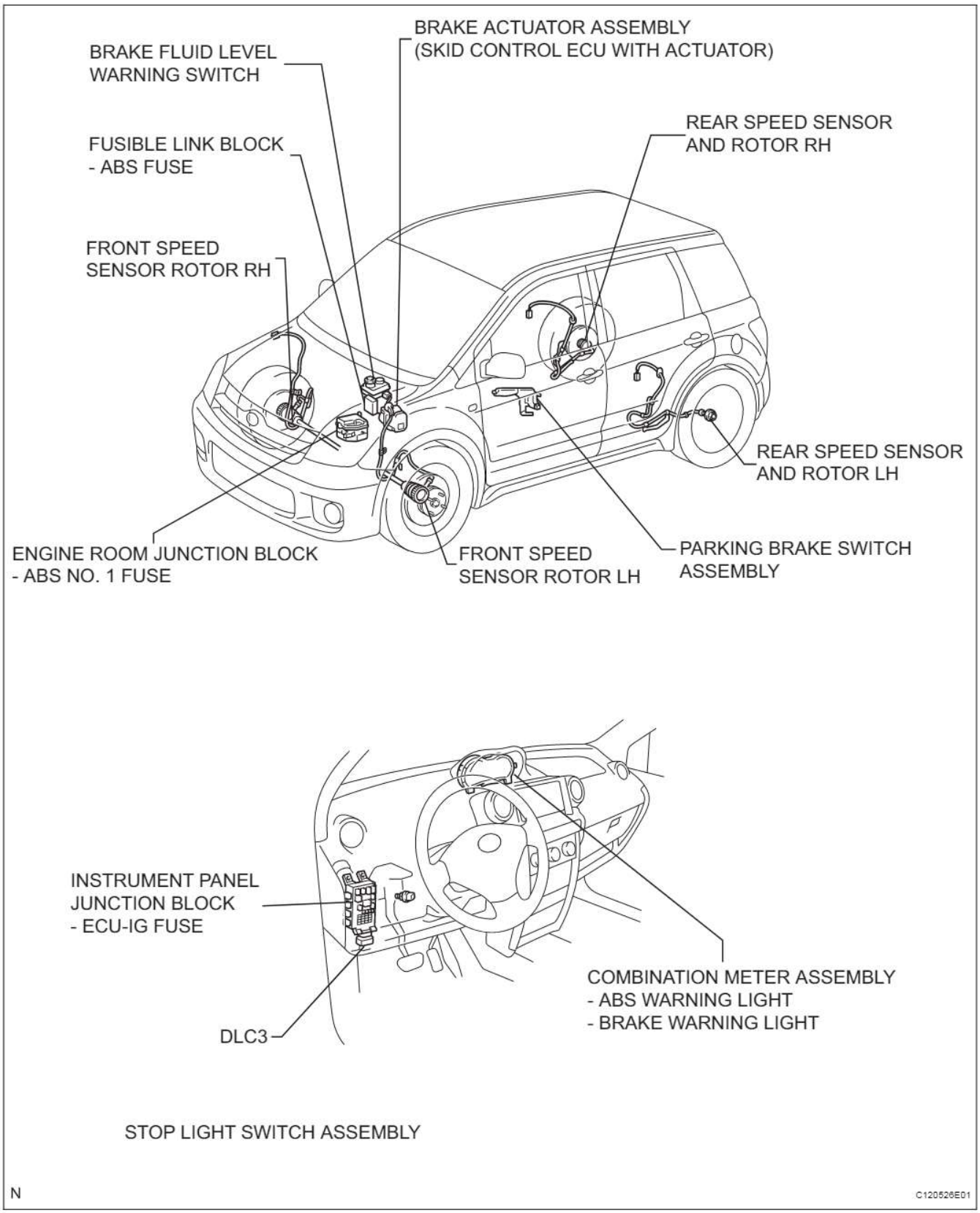
ANTI-LOCK BRAKE SYSTEM

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 anti-lock brake system may be influenced by a malfunction in other systems, be sure to check for DTCs in other systems.
- Be sure to remove and install the skid control ECU with actuator (brake actuator assembly) and each sensor with the ignition switch OFF unless specified in the inspection procedure.
- When removing and installing the skid control ECU with actuator and each sensor, be sure to check that the normal display is output in the test mode inspection and in the DTC output inspection after installing all the parts.

PARTS LOCATION



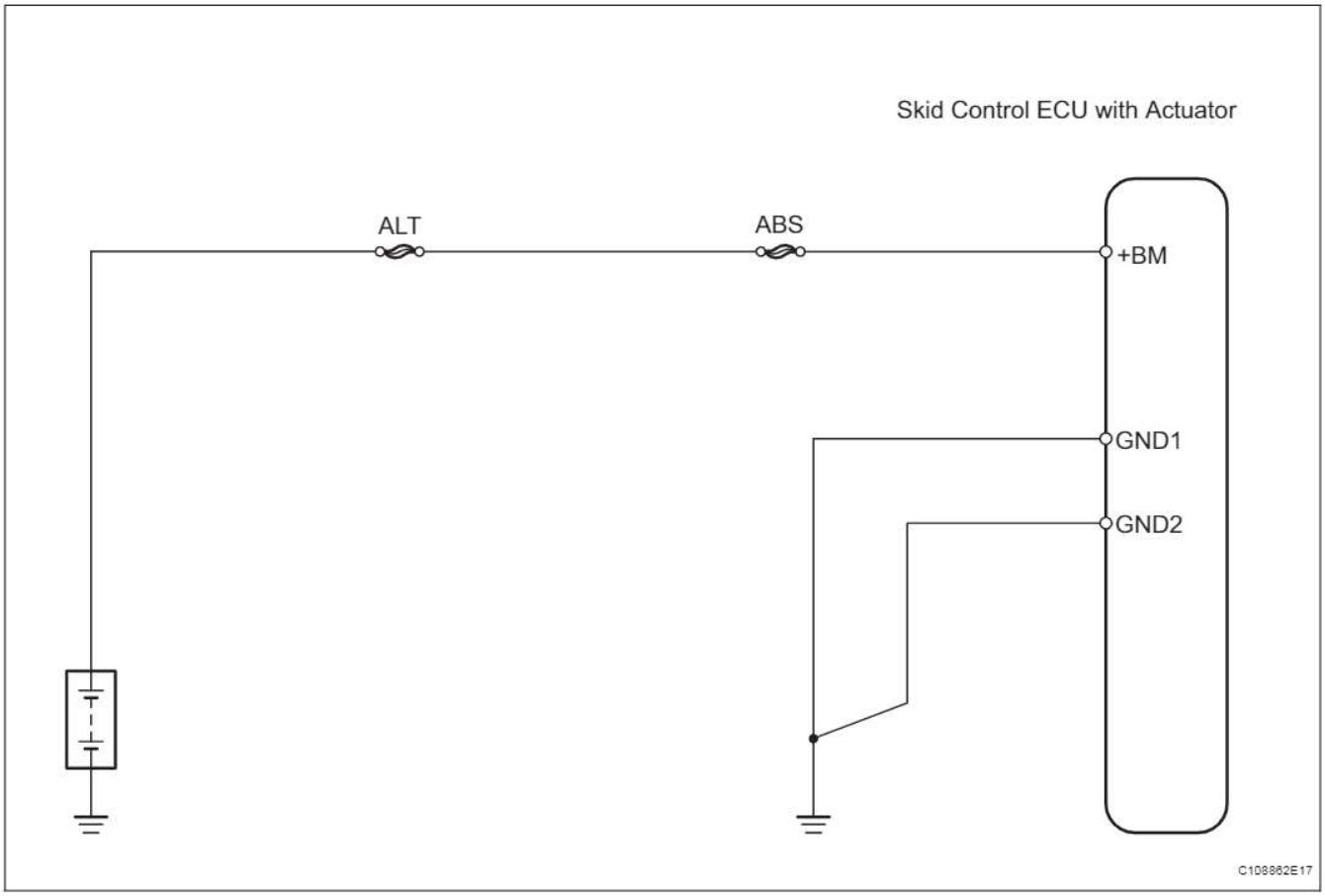
BC

DTC	C1251/51	Open in Pump Motor Circuit

DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1251/51	ABS actuator pump motor is not operating normally during initial check	ABS pump motor

WIRING DIAGRAM



INSPECTION PROCEDURE

BC

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 3

A

2	PERFORM ACTIVE TEST BY INTELLIGENT TESTER (ABS MOTOR RELAY)

(a) Select the ACTIVE TEST, generate a control command, and then check that the ABS motor relay operates.

Skid control ECU with actuator

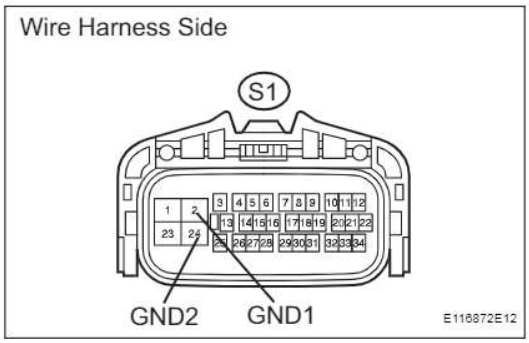
Item	Vehicle Condition/Test Details	Diagnostic Note
ABS MOT RELAY	Turns ABS motor relay ON/OFF	Operation sound of motor can be heard

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

OK → REPLACE BRAKE ACTUATOR ASSEMBLY

NG

3	CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connector	Specified Condition
S1-2 (GND1) - Body ground	Below 1 Ω
S1-24 (GND2) - Body ground	

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

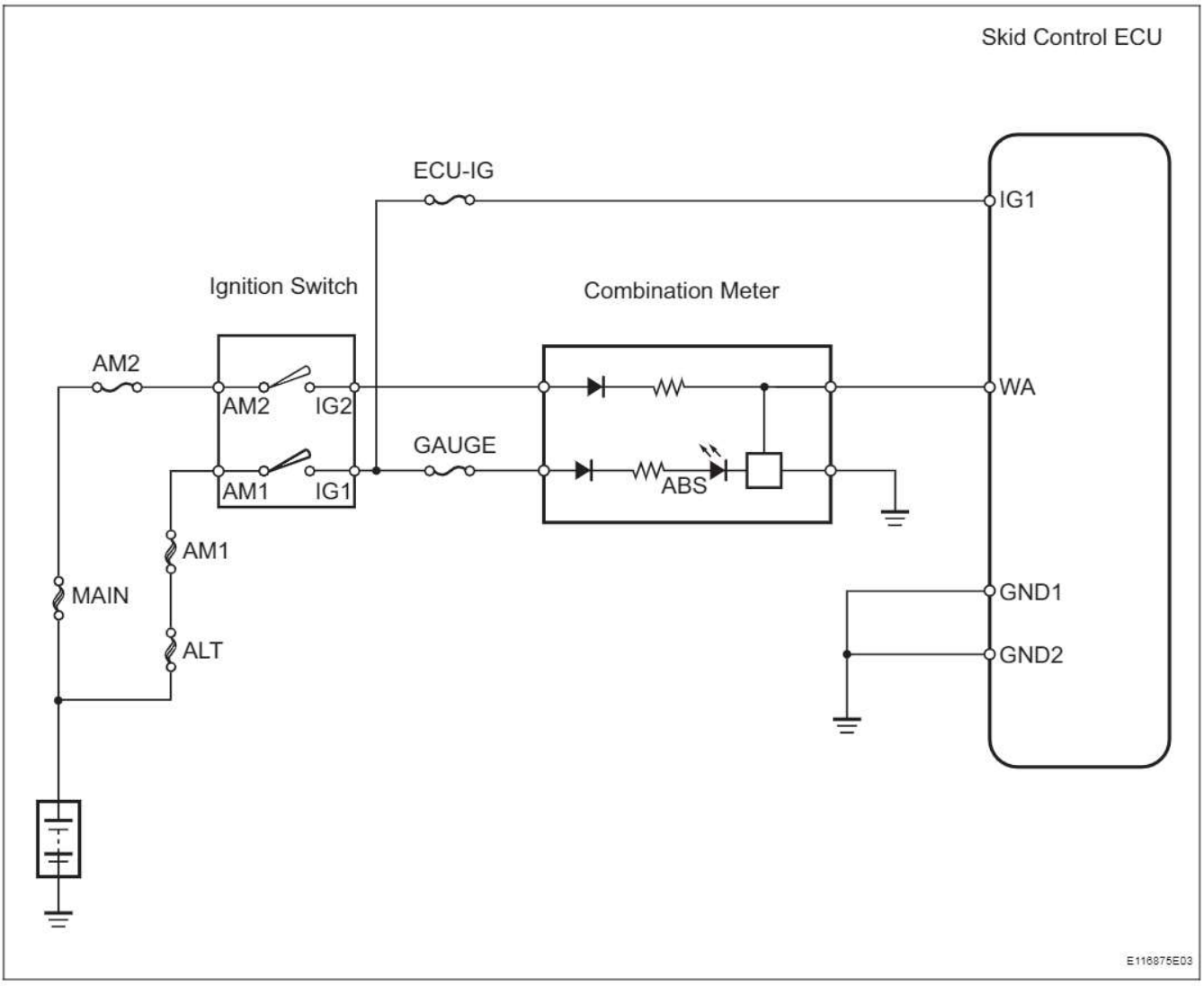
BC

ABS Warning Light Remains ON

DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
Always ON	When either condition below is met: 1. Voltage of ECU terminal IG1 remains at more than 17 V 2. There is a malfunction in ECU internal circuit	• Power source circuit • ABS warning light circuit • Skid control ECU with actuator • Charging system

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHECK FOR DTC

(a) Turn the ignition switch ON.
(b) Check that the ABS warning light illuminates.
(c) Check for DTCs (see page BC-8).

Result

Result	Proceed to
DTC is not output (when using intelligent tester)	A
DTC is not output (when not using intelligent tester)	B
DTC is output	C

B → Go to step 7

C → REPAIR CIRCUIT INDICATED BY OUTPUT DTC

A

2 INSPECT SKID CONTROL ECU CONNECTOR

(a) Check that each ECU connector is properly installed.
OK:
Each ECU connector is properly installed.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

3 READ VALUE OF INTELLIGENT TESTER (IG VOLTAGE)

(a) Check the DATA LIST for proper functioning of the IG power voltage.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
IG VOLTAGE	ECU power supply voltage / NORMAL / TOO LOW	NORMAL: 10 to 14 V TOO LOW: Below 10 V	-

Result

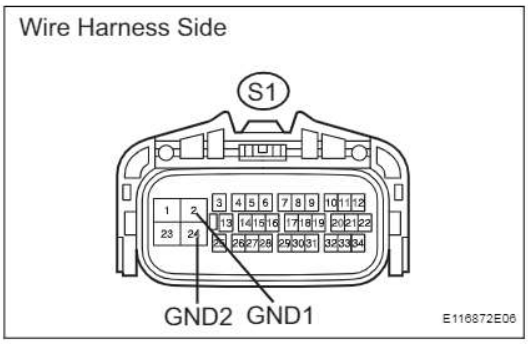
Result	Proceed to
Display is NORMAL	A
Display is not NORMAL	B

B → Go to step 11

A

BC

4 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the resistance of the wire harness side connector.

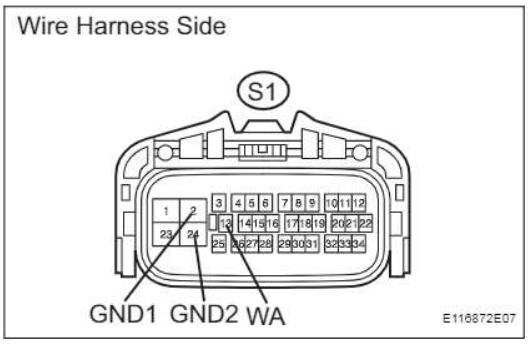
Standard resistance

Tester Connection	Specified Condition
S1-2 (GND1) - Body ground	Below 1 Ω
S1-24 (GND2) - Body ground	

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

OK

5 CHECK ABS WARNING LIGHT



(a) Disconnect the S1 ECU connector.
(b) Turn the ignition switch ON.
(c) Using a service wire, connect terminal WA (S1-13) to GND1 (S1-2) or GND2 (S1-24) of the connector. Check the ABS warning light.

OK:

ABS warning light turns off.

(d) Turn the ignition switch OFF.
(e) Remove the service wire.
(f) Turn the ignition switch ON.
(g) Check the ABS warning light.

OK:

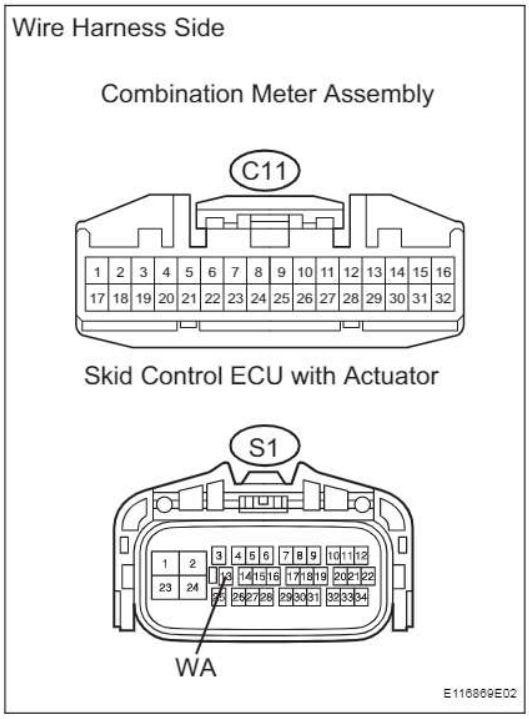
ABS warning light illuminates.

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

BC

6	CHECK WIRE HARNESS (COMBINATION METER - SKID CONTROL ECU AND BODY GROUND)



(a) Disconnect the C11 meter connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
C11-11 - S1-13 (WA)	Below 1 Ω
C11-11 - Body ground	10 kΩ or higher

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

OK

REPLACE COMBINATION METER ASSEMBLY

7	INSPECT SKID CONTROL ECU CONNECTOR

(a) Check that each ECU connector is properly installed.

OK:

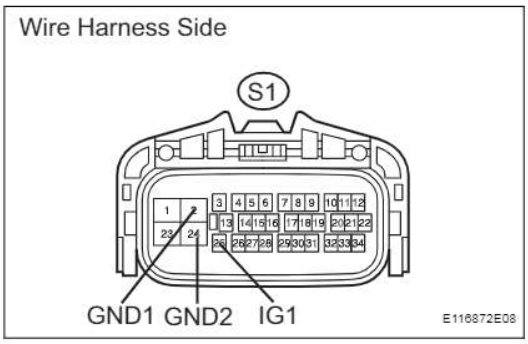
Each ECU connector is properly installed.

NG → **CONNECT CONNECTOR TO ECU CORRECTLY**

OK

BC

8 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S1-25 (IG1) - Body ground	Ignition switch ON	10 to 14 V

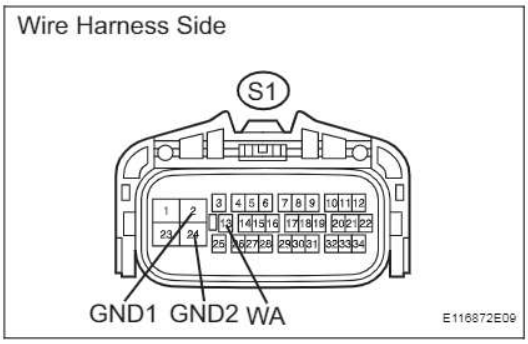
(c) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
S1-2 (GND1) - Body ground	Below 1 Ω
S1-24 (GND2) - Body ground	

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

OK

9 CHECK ABS WARNING LIGHT



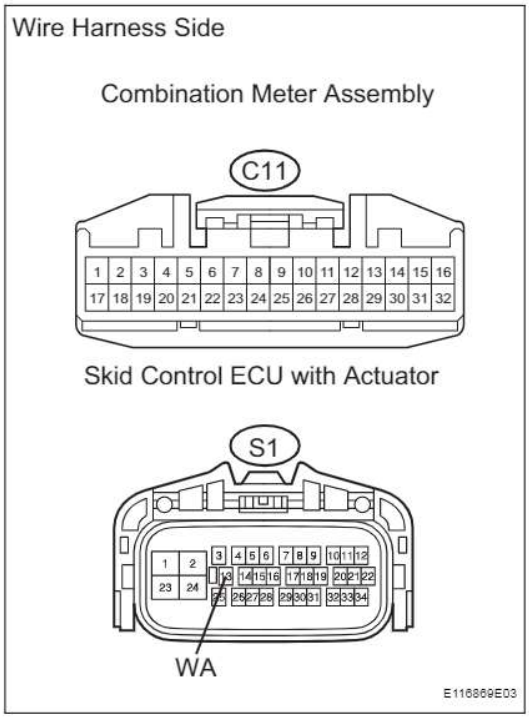
(a) Disconnect the S1 ECU connector.
(b) Turn the ignition switch ON.
(c) Using a service wire, connect terminal WA (S1-13) to GND1 (S1-2) or GND2 (S1-24) of the S1 ECU connector.
Check the ABS warning light.
OK:
ABS warning light turns off.
(d) Turn the ignition switch OFF.
(e) Remove the service wire.
(f) Turn the ignition switch ON.
(g) Check the ABS warning light.
OK:
ABS warning light illuminates.

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

BC

10 CHECK WIRE HARNESS (COMBINATION METER - SKID CONTROL ECU AND BODY GROUND)



(a) Disconnect the C11 meter connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

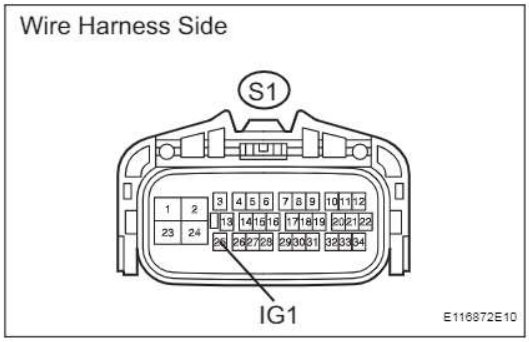
Tester Connection	Specified Condition
C11-11 - S1-13 (WA)	Below 1 Ω
C11-11 - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE COMBINATION METER ASSEMBLY

11 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
S1-25 (IG1) - Body ground	Ignition switch ON	10 to 14 V

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

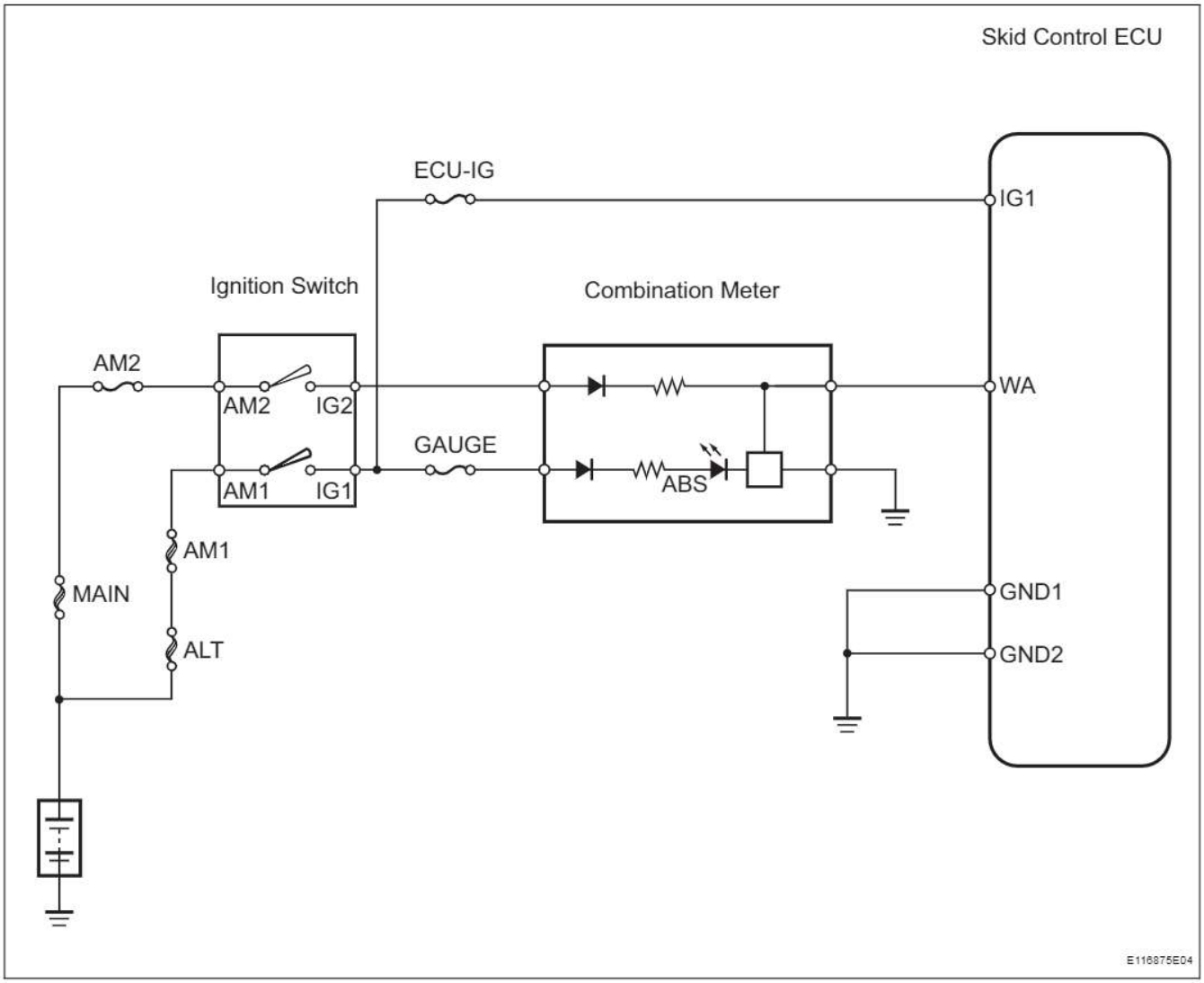
REPLACE BRAKE ACTUATOR ASSEMBLY

ABS Warning Light does not Come ON

DESCRIPTION

If the ECU detects trouble, it will prohibit ABS control, turn on the ABS warning light, and store a DTC. Connect terminals TC and CG of the DLC3 to make the ABS warning light blink and output a DTC.

WIRING DIAGRAM



BC INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 3

A

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (ABS WARNING LIGHT)

(a) Select the ACTIVE TEST, generate a control command, and then check that the ABS warning light illuminates.

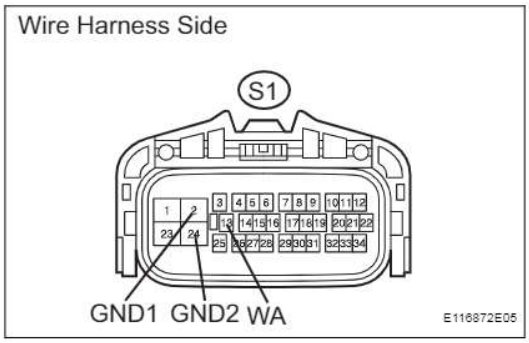
Skid control ECU with actuator

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

OK → REPLACE BRAKE ACTUATOR ASSEMBLY

NG

3 CHECK ABS WARNING LIGHT



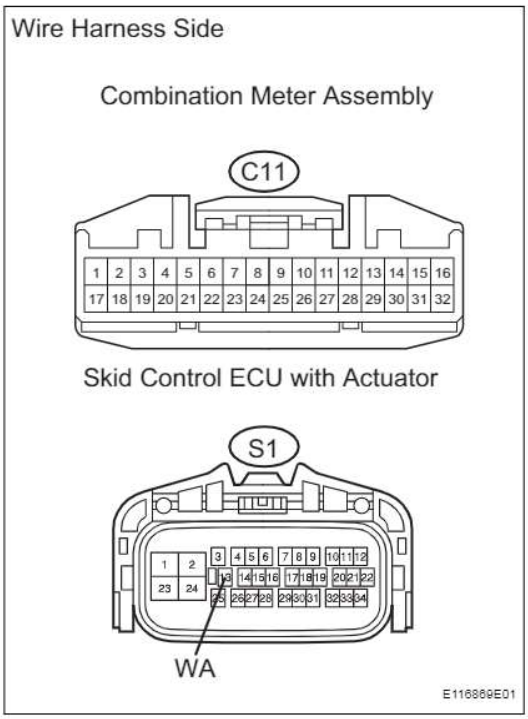
(a) Disconnect the S1 ECU connector.
(b) Turn the ignition switch ON.
(c) Using a service wire, connect terminal WA (S1-13) to GND1 (S1-2) or GND2 (S1-24) of the S1 ECU connector.
(d) Check the ABS warning light.
OK:
ABS warning light turns off.
(e) Turn the ignition switch OFF.
(f) Remove the service wire.
(g) Turn the ignition switch ON.
(h) Check the ABS warning light.
OK:
ABS warning light illuminates.

OK → REPLACE BRAKE ACTUATOR ASSEMBLY

NG

BC

4	CHECK WIRE HARNESS (COMBINATION METER - SKID CONTROL ECU)



(a) Disconnect the C11 meter connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connector	Specified Condition
C11-11 - S1-13 (WA)	Below 1 Ω

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

OK

REPLACE COMBINATION METER ASSEMBLY

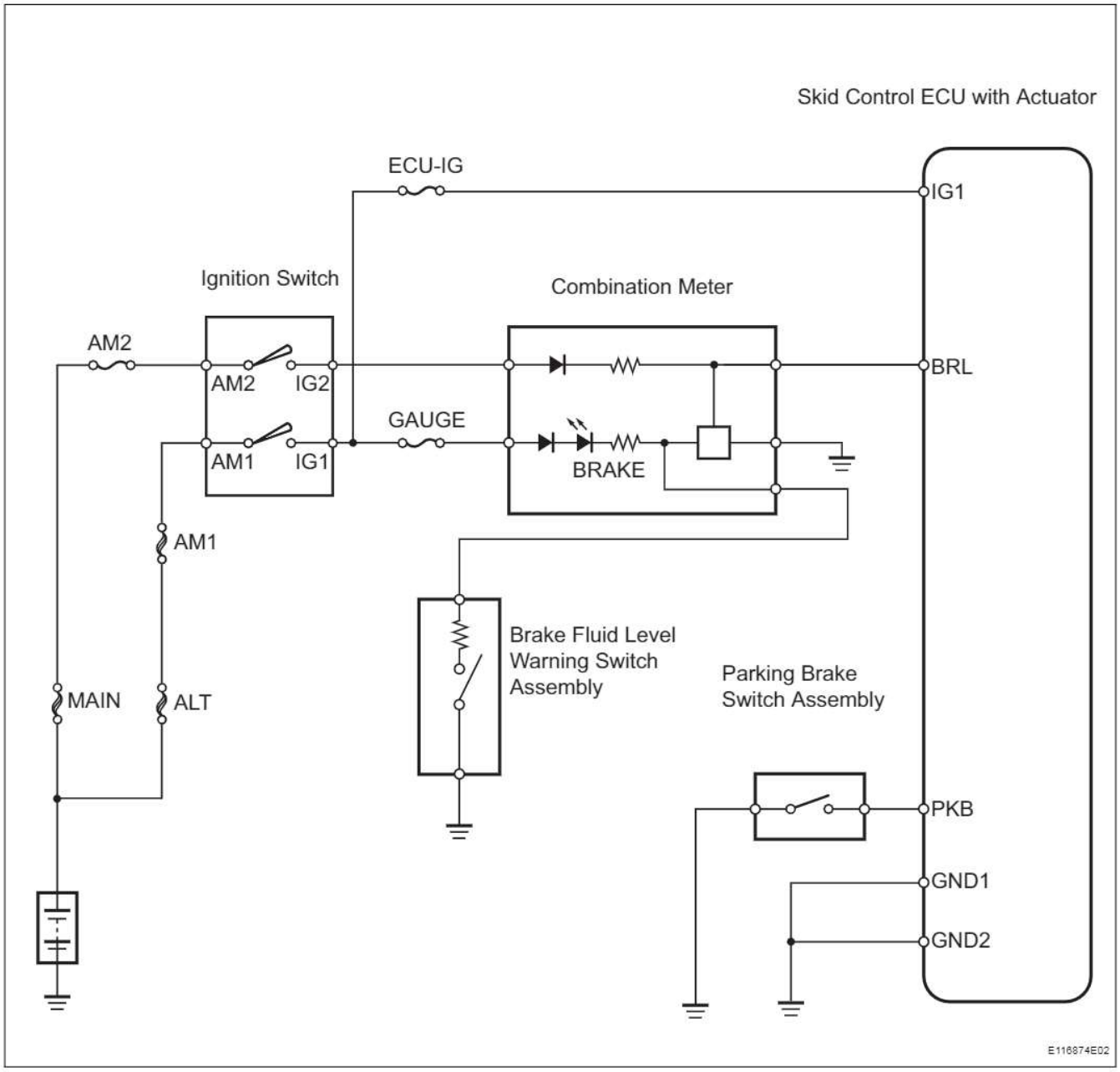
BC

Brake Warning Light Circuit

DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.

BC

Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 3

A

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (BRAKE WARNING LIGHT)

(a) Select the ACTIVE TEST, generate a control command, and then check that the brake warning light illuminates.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Diagnostic Note
BRAKE WRN LIGHT	Turns brake warning light ON / OFF	Observe combination meter

OK:
Brake warning light illuminates.

OK → REPLACE BRAKE ACTUATOR ASSEMBLY

NG

3 CHECK DTC FOR ABS

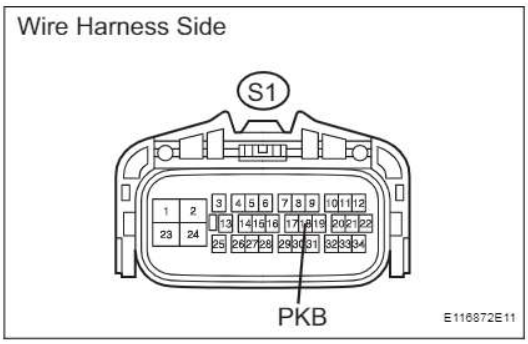
(a) Check for DTCs (see page BC-8).
Result

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

B → REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

4 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)



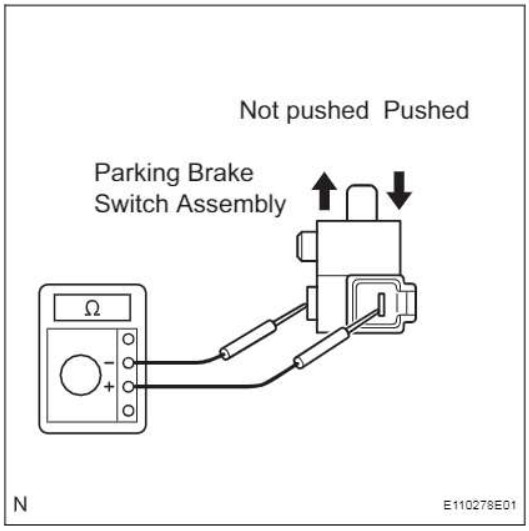
(a) Disconnect the S1 ECU connector.
(b) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Switch Condition	Specified Condition
S1-18 (PKB) - Body ground	Parking brake switch ON	Below 1 Ω
	Parking brake switch OFF	10 kΩ or higher

OK → Go to step 7

NG

5 INSPECT PARKING BRAKE SWITCH ASSEMBLY



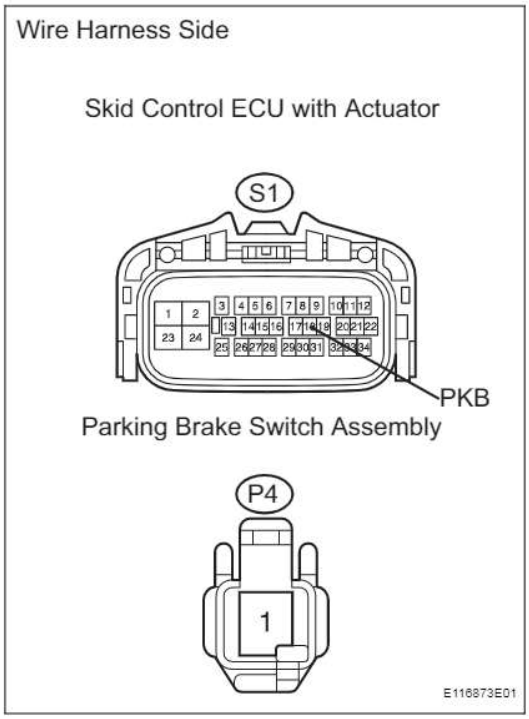
(a) Remove the parking brake switch.
(b) Measure the resistance of the switch.
Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - Body ground	Pushed	Below 1 Ω
	Not pushed	10 kΩ or higher

NG → **REPLACE PARKING BRAKE SWITCH ASSEMBLY**

OK

6 CHECK WIRE HARNESS (SKID CONTROL ECU - PARKING BRAKE SWITCH)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the P4 switch connector.
(c) Measure the resistance of the wire harness side connectors.
Standard resistance

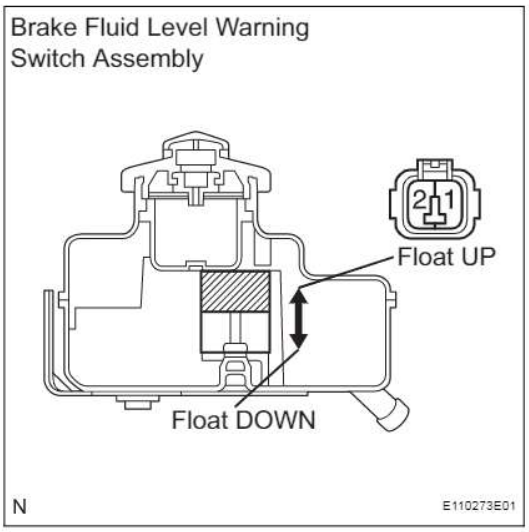
Tester Connection	Specified Condition
S1-18 (PKB) - P4-1	Below 1 Ω

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

OK

BC

7 INSPECT BRAKE FLUID LEVEL WARNING SWITCH ASSEMBLY



(a) Remove the reservoir tank cap and strainer.
(b) Disconnect the B2 switch connector.
(c) Measure the resistance of the switch.

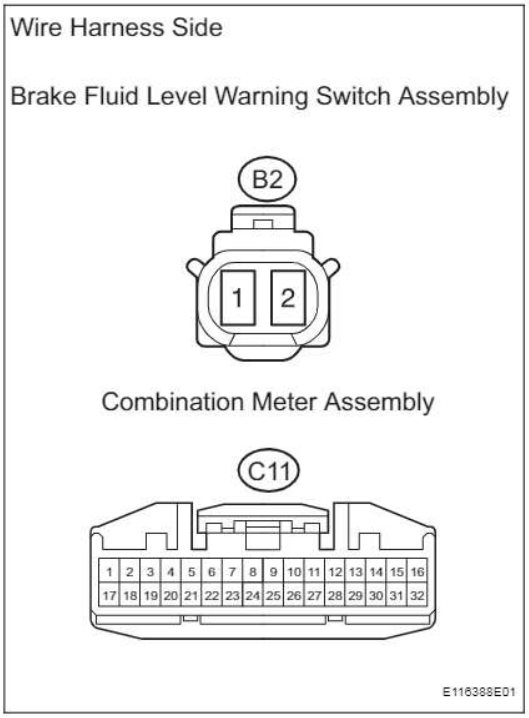
Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Float DOWN	Below 1 Ω
	Float UP	10 kΩ or higher

NG → **REPLACE BRAKE MASTER CYLINDER SUB-ASSEMBLY**

OK

8 CHECK WIRE HARNESS (WARNING SWITCH - COMBINATION METER AND BODY GROUND)



(a) Disconnect the B2 switch connector.
(b) Disconnect the C11 meter connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

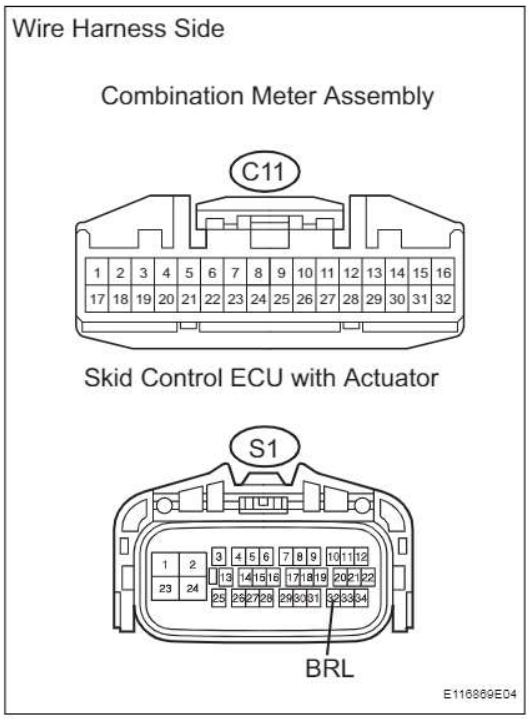
Tester Connection	Specified Condition
B2-1 - C11-15	Below 1 Ω
B2-2 - Body ground	

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

OK

BC

9	CHECK WIRE HARNESS (COMBINATION METER - SKID CONTROL ECU)



(a) Disconnect the C11 meter connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
C11-14 - S1-32 (BRL)	Below 1 Ω

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

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

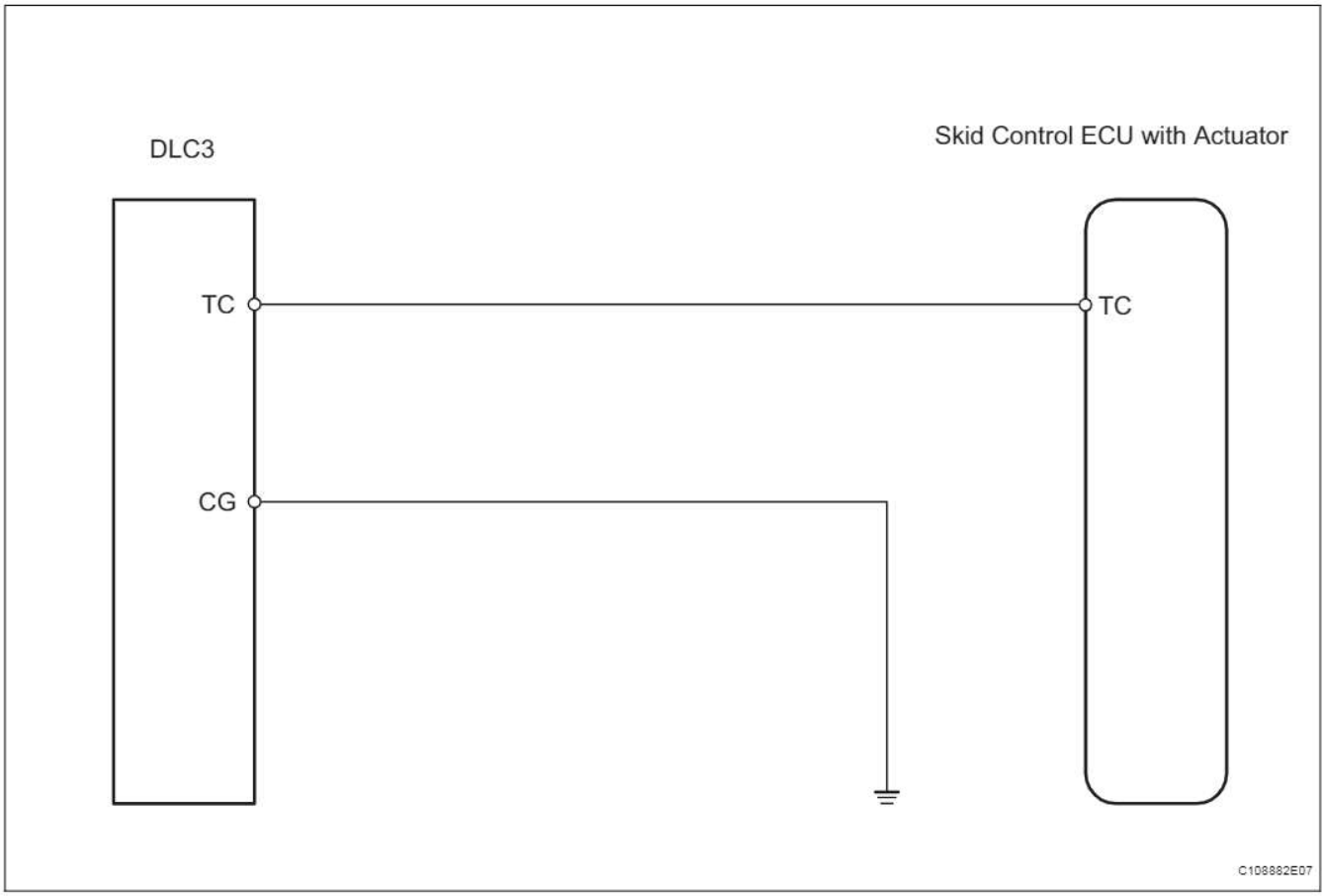
BC

TC and CG Terminal Circuit

DESCRIPTION

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

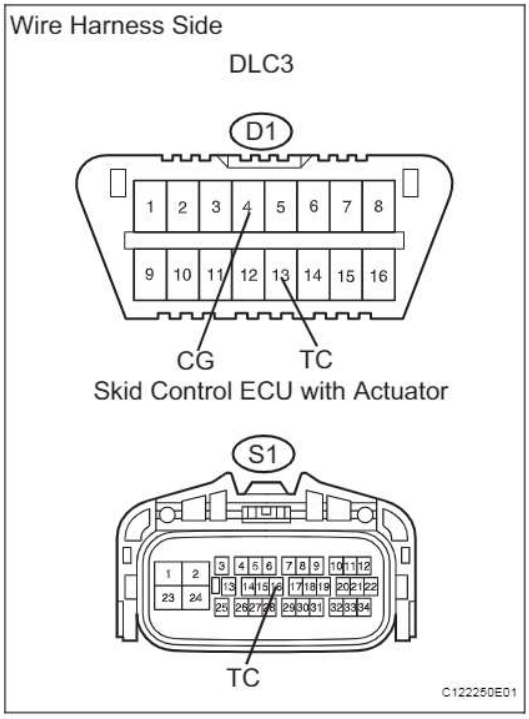
WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHECK WIRE HARNESS (DLC3 - SKID CONTROL ECU AND BODY GROUND)



(a) Disconnect the D1 DLC3 connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connector	Specified Condition
D1-13 (TC) - S1-16 (TC)	Below 1 Ω
D1-4 (CG) - Body ground	

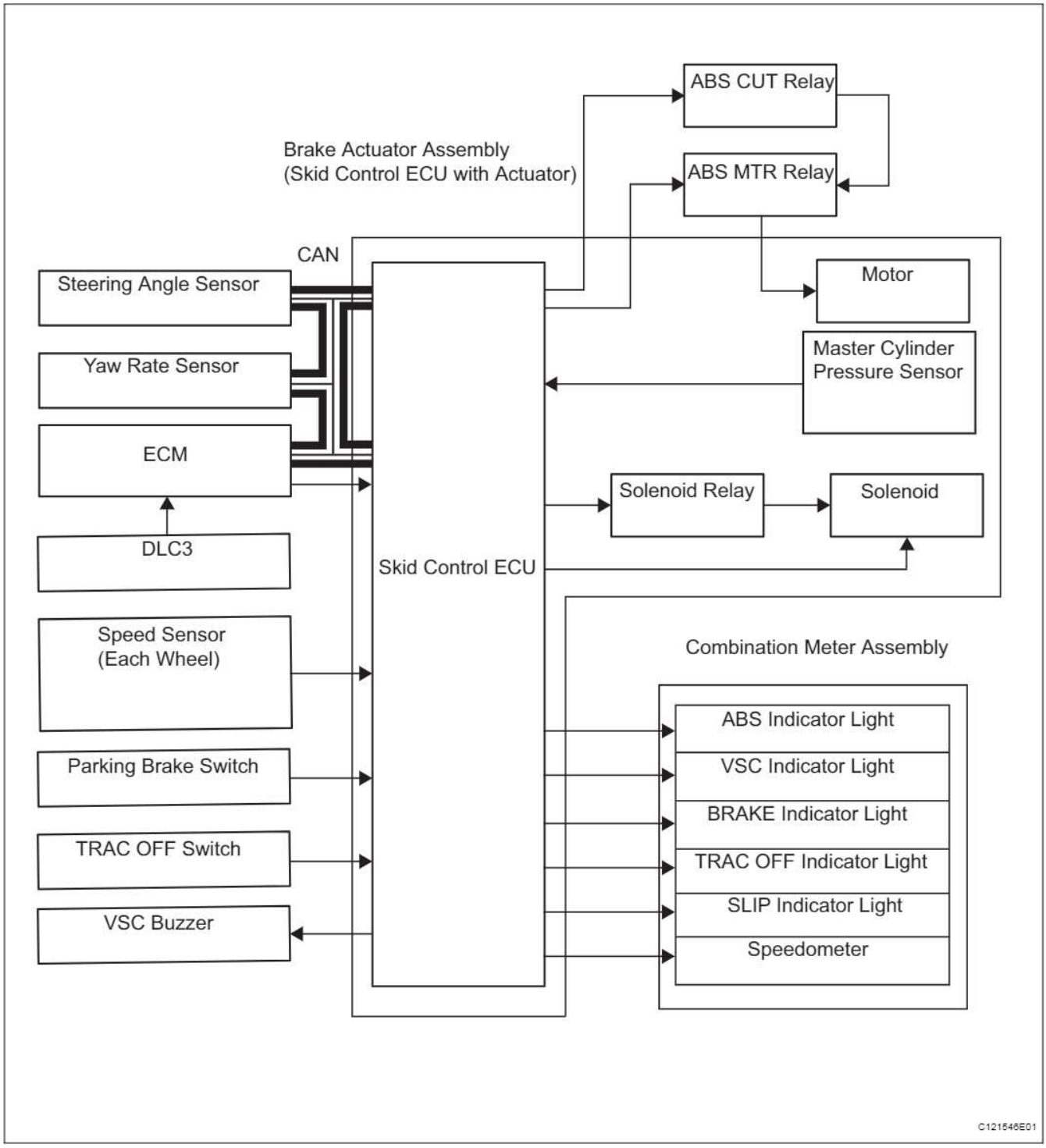
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

SYSTEM DIAGRAM



BC

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

HINT:

The yaw rate sensor and deceleration sensor are combined in a single unit. This unit communicates with the skid control ECU through the CAN communication system.

(a) ABS (Anti-lock brake system)
The ABS helps prevent the wheel from locking when the brakes are applied firmly or when braking on a slippery surface.
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.

(b) EBD (Electronic brake force distribution)
The EBD control utilizes the ABS, realizing proper brake force distribution between the front and rear.

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

(d) TRC (Traction control)
The TRC 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.

(e) VSC (Vehicle stability control)
The VSC system helps prevent the vehicle from slipping sideways as a result of strong front wheel skid or strong rear wheel skid when cornering.

CAN communication (☐: Receiving signal from skid control ECU with actuator)

Related ECU / Parts	Signal
Steering Angle Sensor	☐: Steering angle signal
Yaw rate (deceleration) sensor	☐: Yaw rate signal ☐: Deceleration sensor signal

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

(a) The skid control ECU calculates vehicle stability tendency based on signals of the master cylinder pressure sensor, speed sensors, yaw rate (deceleration) sensor and steering angle sensor. The skid control ECU judges whether the control of engine output torque by the electronic control throttle and control of wheel brake pressure by the skid control ECU with actuator will start or not by the calculation results.

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

BC

3. FAIL-SAFE FUNCTION

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

(b) If some control is prohibited due to a malfunction during its operation, that control will be cut off gradually so that vehicle stability will not change.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the vehicle stability control system.
- *: Use the intelligent tester.

1	VEHICLE BROUGHT TO WORKSHOP

NEXT

2	INSPECT BATTERY VOLTAGE

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

3	CHECK AND CLEAR DTC*

NEXT

4	PROBLEM SYMPTOM CONFIRMATION

Result

Result	Proceed to
Symptom does not occur	A
Symptom occurs	B

B → Go to step 6

A

5	SYMPTOM SIMULATION

BC

NEXT

6	CHECK FOR DTC*

Result

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

B → Go to step 9

A

7 PROBLEM SYMPTOMS TABLE

Result

Result	Proceed to
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

B → Go to step 9

A

8 OVERALL ANALYSIS AND TROUBLESHOOTING

(a) Terminals of ECU (see page BC-72)
(b) DATA LIST / ACTIVE TEST (see page BC-77)

NEXT

9 CHECK FOR FLUID LEAKAGE

NEXT

10 REPAIR OR REPLACE

NEXT

11 CONFIRMATION TEST

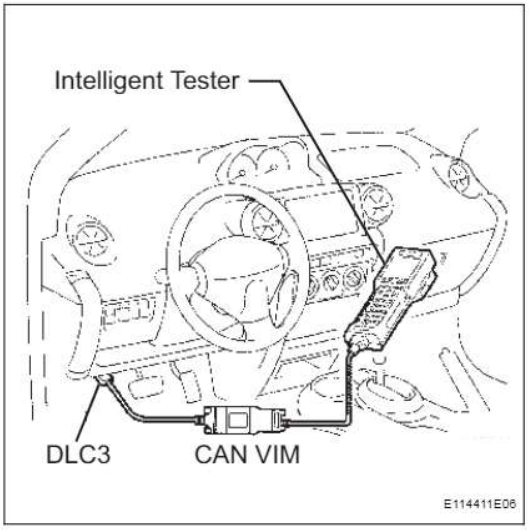
NEXT

END

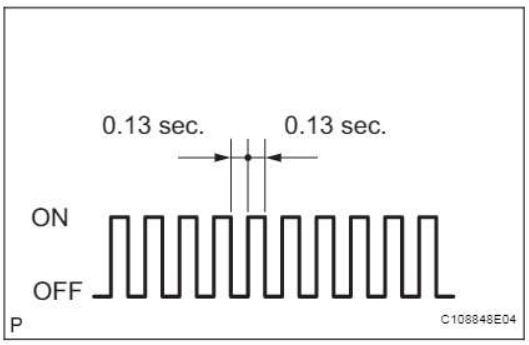
BC

OPERATION CHECK

1. **CHECK SENSOR SIGNAL BY TEST MODE (When Using Intelligent Tester)**
NOTICE:
After replacing the yaw rate sensor and/or skid control ECU with actuator (brake actuator assembly), perform zero point calibration of the yaw rate sensor (see page BC-69).
HINT:
If the ignition switch is turned from ON to ACC or OFF during test mode, the DTCs will be erased.



(a) Procedures for test mode:
(1) Turn the ignition switch OFF.
(2) Check that the shift lever is on P.
(3) Connect the intelligent tester (with CAN VIM) to the DLC3.
(4) Turn the ignition switch ON.
(5) Select the Test Mode using the intelligent tester.
HINT:
Refer to the intelligent tester operator's manual for further details.



(6) Check that the ABS warning light and VSC warning light blink.
HINT:
If the ABS warning light and VSC warning light do not blink, check the ABS warning light and VSC warning light circuits.

Trouble area	See procedure
ABS warning light circuit	BC-132
VSC warning light circuit	BC-139

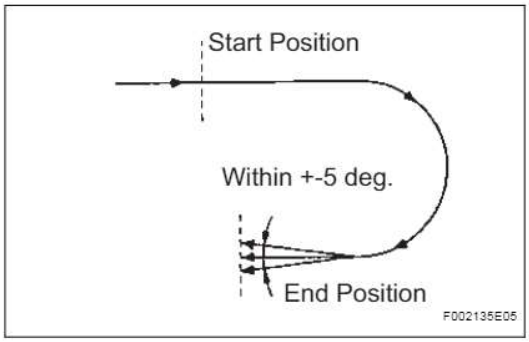
(b) Check the master cylinder pressure sensor.
(1) Leave the vehicle in a stationary condition and the brake pedal in a free condition for 1 second or more. Then, quickly depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second or more.
HINT:
At this time, the ABS warning light and VSC warning light illuminate for 3 seconds.

BC

(c) Check the speed sensor.
(1) Drive the vehicle straightforward at the following speeds. Then check that the ABS warning light is as follows.

Vehicle Speed	Check	ABS Warning Light
45 km/h (28 mph) or higher	Deviations of sensor signal	Turns off

HINT:
The sensor signal check may not be completed if the vehicle's wheels slip or the steering wheel is turned during this check.
(2) Stop the vehicle.

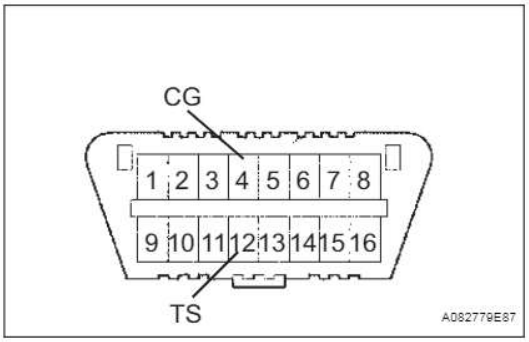


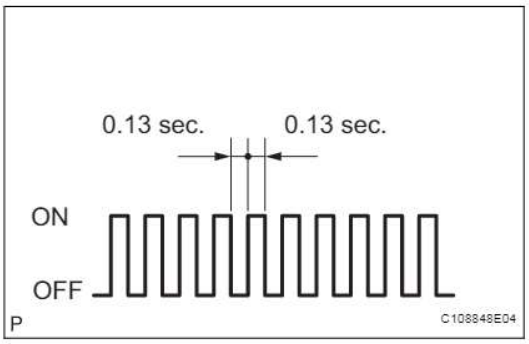
(d) Check the yaw rate sensor.
(1) Move the shift lever to the D position and drive the vehicle at 5 km/h (3 mph). Turn the steering wheel either to the left or right 90°or more, and drive the vehicle in a half-circle pattern.
(2) Stop the vehicle and move the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.
If the skid control buzzer sounds, the sensor check is completed normally.
If the skid control buzzer does not sound, check the skid control buzzer circuit (see page BC-155), and then perform the sensor check again.
If the skid control buzzer still does not sound, there is a malfunction in the VSC sensor. Check the DTC.
HINT:
- Drive the vehicle in a half-circle. At the end of the turn, the direction of the vehicle should be within 180°+-5° of its start position.
- Do not spin the wheels.

(e) Read the DTC by following the tester screen.
HINT:
Refer to the intelligent tester operator's manual for further details.

2. **CHECK SENSOR SIGNAL BY TEST MODE (When not Using Intelligent Tester)**
NOTICE:
After replacing the yaw rate sensor and/or skid control ECU with actuator (brake actuator assembly), perform zero point calibration of the yaw rate sensor (see page BC-69).
HINT:
If the ignition switch is turned from ON to ACC or OFF during test mode, the DTCs will be erased.
During test mode, the ECU records all DTCs of the sensor check function.
By performing the sensor signal check, the codes are erased. If proper function is confirmed the codes left over are the codes when problems were found.

BC





(a) Procedures for test mode:
(1) Turn the ignition switch OFF.
(2) Using SSt, connect terminal 12 (TS) and 4 (CG) of the DLC3.
SST 09843-18040
(3) Check that the steering wheel is in the center position and move the shift lever to a P position.
(4) Turn the ignition switch ON.

(5) Check that the ABS warning light and VSC warning light blink as shown in the illustration.
HINT:
If the ABS warning light or VSC warning light does not blink, check the ABS warning light circuit, VSC warning light circuit or TC and CG terminal circuit.

Trouble area	See procedure
ABS warning light circuit	BC-132
VSC warning light circuit	BC-139
TS and CG terminal circuit	BC-159

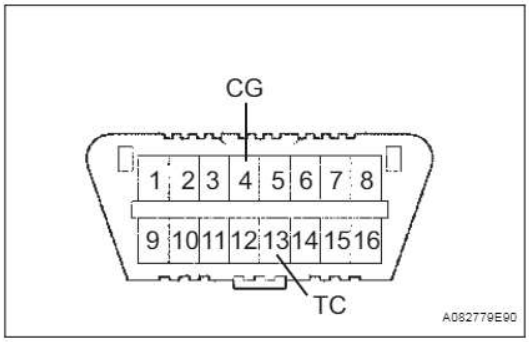
(b) Check the master cylinder pressure sensor.
(1) Leave the vehicle in a stationary condition and the brake pedal in a free condition for 1 second or more. Then, quickly depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second or more.
HINT:
At this time, the ABS warning light illuminates for 3 seconds.

(c) Check the speed sensor.
(1) Drive the vehicle straight forward at the following speeds. Then check that the ABS warning light is as follows.

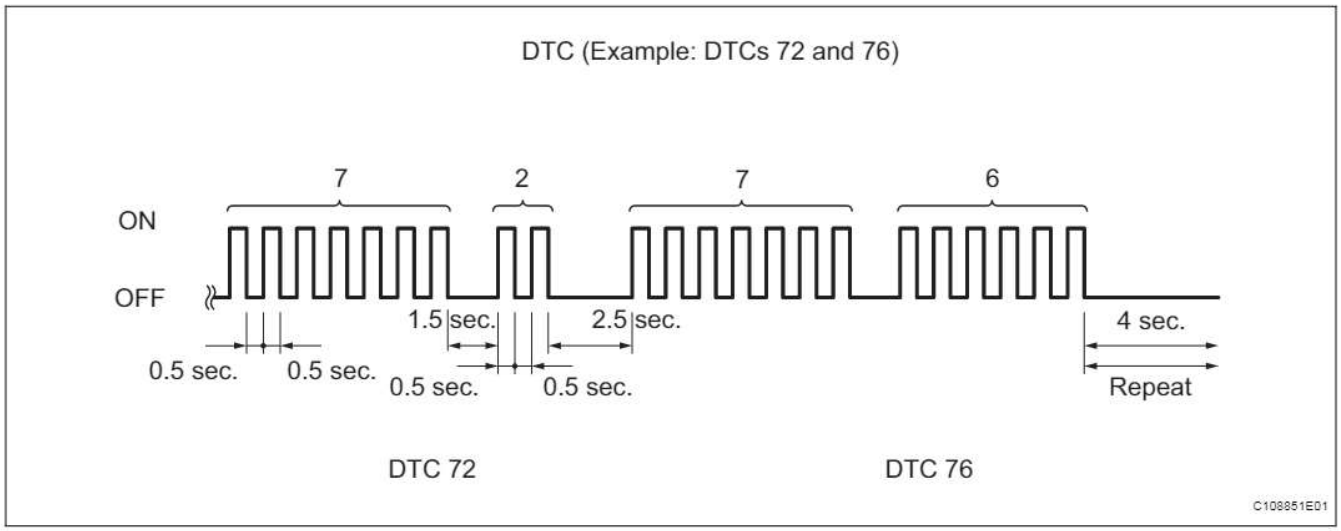
Vehicle Speed	Check	ABS Warning Light
45 km/h (28 mph) or higher	Deviations of sensor signal	Turns off

HINT:
The sensor signal check may not be completed if the vehicle's wheels slip or the steering wheel is turned during this check.
(2) Stop the vehicle.

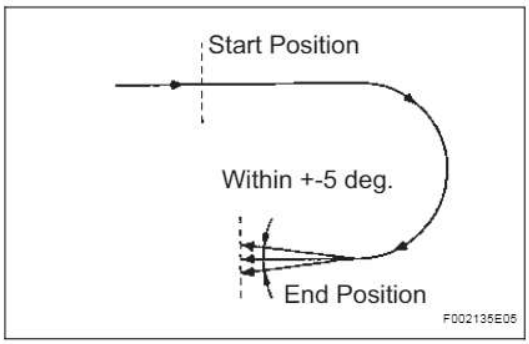
BC



(d) Read the DTCs.
(1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040
(2) Read the number of blinks of the ABS warning light.
HINT:
- As an example, the blinking patterns for DTCs 72 and 76 are shown below.
- The conditions are explained in the Diagnostic Trouble Code Chart.
- For the normal code, the light cycles between ON and OFF at intervals of 0.25 seconds.
- If more than 1 DTC is detected at the same time, the codes will be displayed in numerical order.



(e) After the check, disconnect SST from terminals 13 (TC) and 4 (CG) of the DLC3.



(f) Check the yaw rate sensor.
(1) Move the shift lever to the D position and drive the vehicle at 5 km/h (3 mph). Turn the steering wheel either to the left or right 90°or move, and drive the vehicle in a half-circle pattern.
(2) Stop the vehicle and move the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.
If the skid control buzzer sounds, the sensor check is completed normally.
If the skid control buzzer does not sound, check the skid control buzzer circuit (see page BC-155), and then perform the sensor check again.
If the skid control buzzer still does not sound, there is a malfunction in the VSC sensor. Check the DTC.
HINT:
- Drive the vehicle in a half-circle. At the end of the turn, the direction of the vehicle should be within 180°+-5° of its start position.

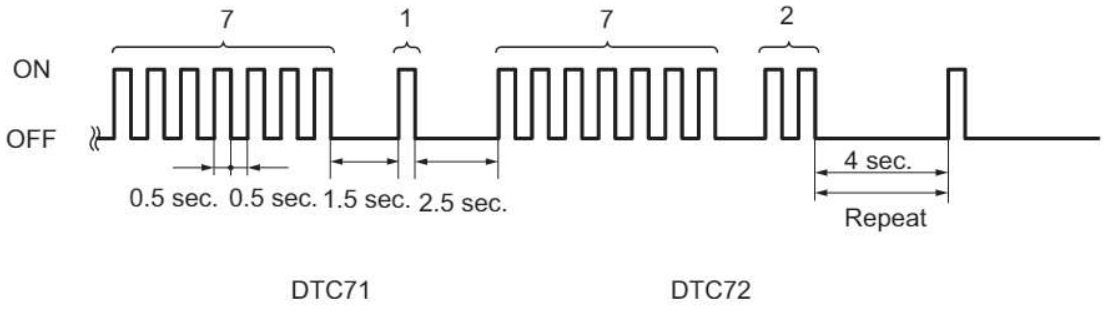
BC

- Do not spin the wheels.

(3) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040

(4) Read the number of blinks of the VSC warning light.
HINT:
- As an example, the blinking patterns for DTCs 71 and 72 are shown below.
- The conditions are explained in the Diagnostic Trouble Code Chart.
- For the normal code, the light cycles between ON and OFF at intervals of 0.25 seconds.
- If more than 1 DTC is detected at the same time, the codes will be displayed in numerical order.

Malfunction Code (Example Code 71 and 72)

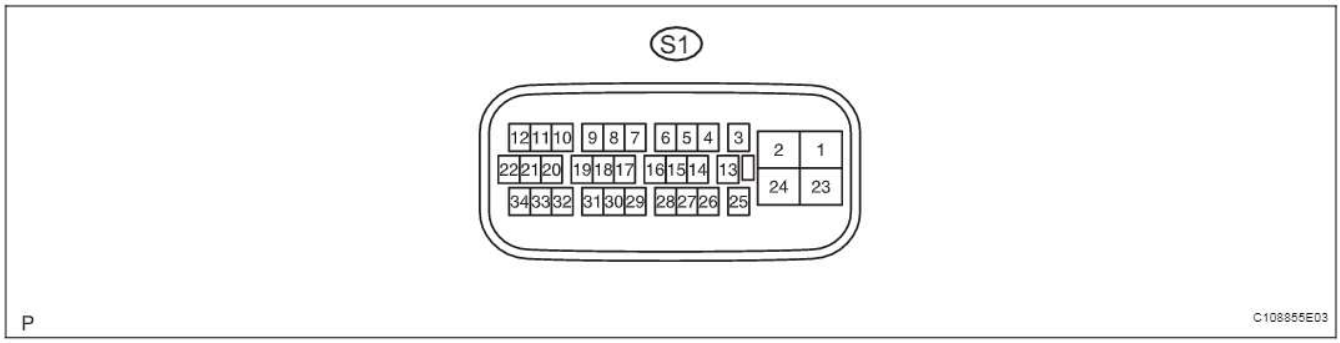


(5) After performing the check, disconnect the SST from terminals 13 (TS) and 4 (CG) of the DLC3, and turn the ignition switch OFF.

BC

TERMINALS OF ECU

1. CHECK BRAKE ACTUATOR ASSEMBLY (SKID CONTROL ECU ASSEMBLY WITH ACTUATOR)

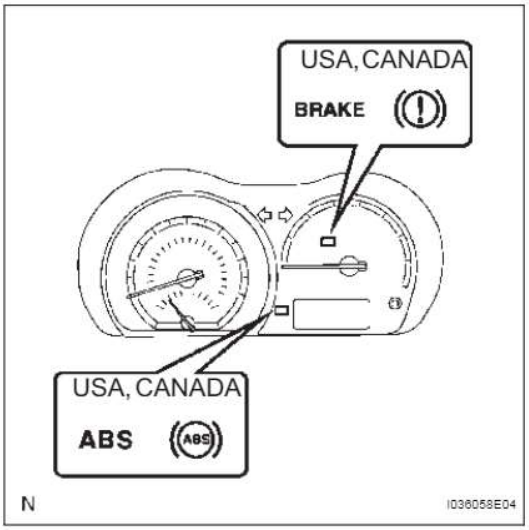


(a) Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+BS (S1-1) - GND (S1-2, 24)	B - W-B	Solenoid relay power supply	Always	11 to 14 V
FR+ (S1-31) - FR- (S1-30)	G-W - G-O	Front RH wheel speed signal input	Ignition switch ON, slowly turn right front wheel	AC generation
FL+ (S1-9) - FL- (S1-8)	R - G	Front LH wheel speed signal input	Ignition switch ON, slowly turn left front wheel	AC generation
RR+ (S1-33) - RR- (S1-34)	LG-B - LG-R	Rear RH wheel speed signal input	Ignition switch ON, slowly turn right rear wheel	AC generation
RL+ (S1-11) - RL- (S1-12)	Y-B - P-B	Rear LH wheel speed signal input	Ignition switch ON, slowly turn left rear wheel	AC generation
SP1 (S1-26) - GND (S1-2, 24)	W-R - W-B	Speed signal output	Vehicle driving at about 20 km/h (12 mph)	AC generation
D/G (S1-14) - GND (S1-2, 24)	W - W-B	Diagnostic communication line	Ignition switch ON	11 to 14 V
TC (S1-16) - GND (S1-2, 24)	P-B - W-B	Diagnosis tester communication line	Ignition switch ON	11 to 14 V
+BM (S1-23) - GND (S1-2, 24)	B - W-B	Motor relay test input	Always	11 to 14 V
STP (S1-10) - GND (S1-2, 24)	G-W - W-B	Stop light input signal	Stop light switch ON (Brake pedal depressed)	8 to 14 V
PKB (S1-18) - GND (S1-2, 24)	Y-B - W-B	Parking brake switch input	Ignition switch ON, parking brake switch ON	Below 1.5 V
			Ignition switch ON, parking brake switch OFF	11 to 14 V
WA (S1-13) - GND (S1-2, 24)	P - W-B	ABS warning light output	Ignition switch ON, ABS warning light ON	8 to 14 V
BRL (S1-32) - GND (S1-2, 24)	B-Y - W-B	Brake warning line output	Ignition switch ON, brake warning light ON	8 to 14 V
IG1 (S1-25) - GND (S1-2, 24)	B-L - W-B	IG1 power supply	Ignition switch ON	11 to 14 V

If the result is not as specified, there may be a malfunction in the ECU.

BC



DIAGNOSIS SYSTEM

1. CHECK INDICATOR

(a) Check the warning lights.

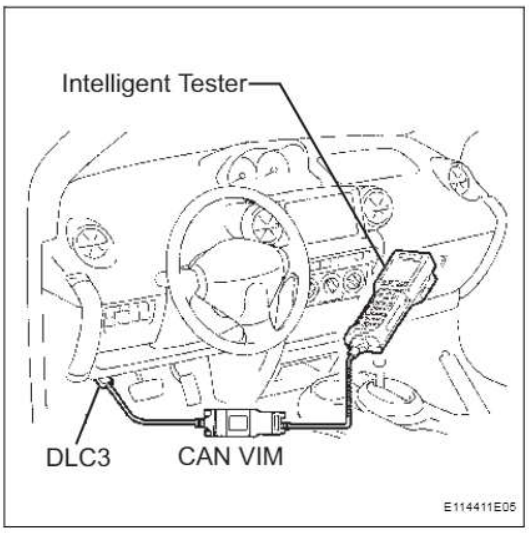
(1) Release the parking brake lever.

(2) When the ignition switch is ON, check that the ABS warning light and brake warning light illuminate for approximately 3 seconds.

HINT:

- When the parking brake is applied or brake fluid level is low, the brake warning light illuminates.
- If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light and brake warning light circuit. If the indicator remains on, proceed to troubleshooting for the light circuit below.

Trouble Area	See procedure
ABS warning light circuit	BC-43
Brake warning light circuit	BC-52



DTC CHECK / CLEAR

1. CHECK DTC (WHEN USING INTELLIGENT TESTER)

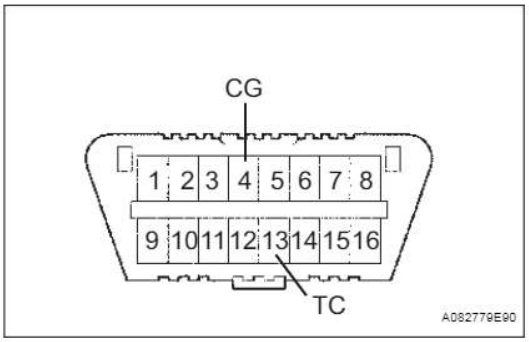
(a) Connect the intelligent tester (with CAN VIM) to the DLC3.

(b) Turn the ignition switch ON.

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

HINT:

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



2. CHECK DTC (WHEN NOT USING INTELLIGENT TESTER:)

(a) Check the DTCs.

(1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST 09843-18040

(2) Turn the ignition switch ON.

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

HINT:

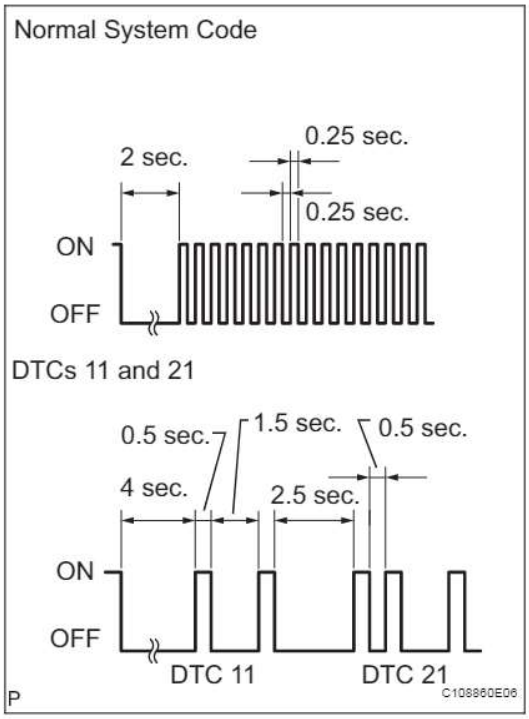
- If no code appears, check the TC and CG terminal circuit or ABS warning light circuit.

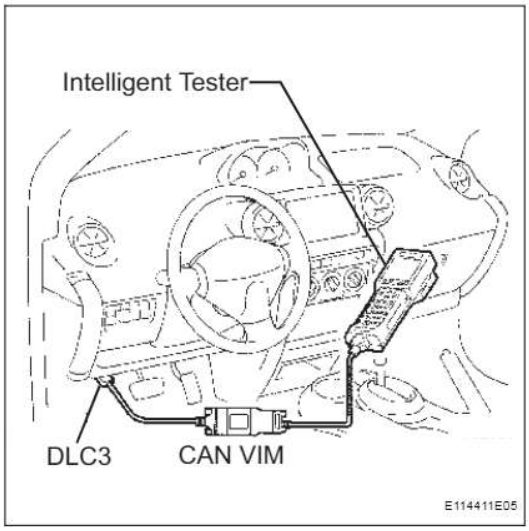
Trouble Area	See procedure
ABS warning light circuit	BC-43
TC and CG terminal circuit	BC-57

BC

- If more than 1 DTC is detected at the same time, the DTCs will be displayed in numerical order.
- As an example, the blinking patterns for a normal system code and DTCs 11 and 21 are shown in the illustration.
- DTCs are explained in the Diagnostic Trouble Code Chart.

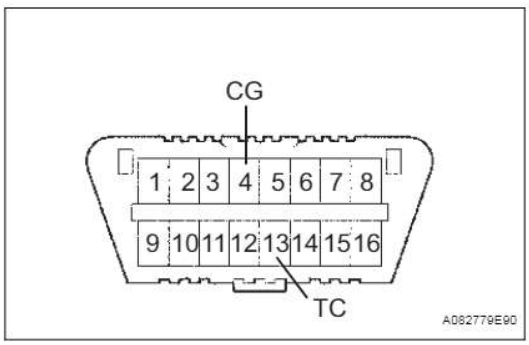
(b) After completing the check, disconnect terminals 13 (TC) and 4 (CG) of the DLC3, and turn off the display.
If 2 or more DTCs are detected at the same time, the DTCs will be displayed first.





3. CLEAR DTC (WHEN USING INTELLIGENT TESTER)

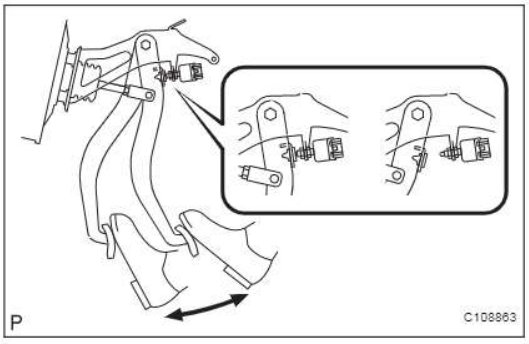
(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch ON.
(c) Operate the intelligent tester to erase the codes.
HINT:
Refer to the intelligent tester operator's manual for further details.



4. CLEAR DTC (WHEN NOT USING INTELLIGENT TESTER)

(a) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040
(b) Turn the ignition switch ON.

BC



(c) Clear the DTCs stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.
(d) Check that the ABS warning light and brake warning light displays the normal system code.
(e) Remove SST from the terminals of the DLC3.
HINT:
DTCs cannot be cleared by removing the battery cable or ECU-IG fuse.

BC

CALIBRATION

1. PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND DECELERATION SENSOR (When not Using Intelligent Tester)

HINT:
After replacing the yaw rate sensor and/or the skid control ECU with actuator (brake actuator assembly), make sure to perform the yaw rate sensor and deceleration sensor zero point calibration.

NOTICE:

- **While performing the calibration, do not tilt, move or shake the vehicle. Keep it in a stationary condition. Do not start the engine.**
- **Be sure to perform the calibration on a level surface that has an inclination of less than 1 degree.**

(a) Move the shift lever to P.

(b) Clear the zero point calibration using the SST check wire.

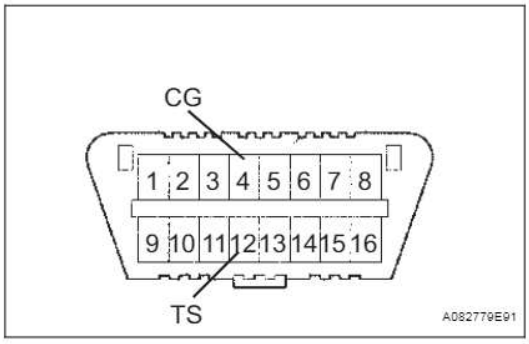
SST 09843-18040

(1) Turn the ignition switch ON.

(2) Using SST, connect and disconnect terminals 12 (TS) and 4 (CG) of the DLC3 4 times or more within 8 seconds.

(3) Check that the warning light indicates the normal code.

(4) Remove the SST from the terminals of the DLC3.



(c) Procedure for test mode:

(1) Turn the ignition switch OFF.

(2) Apply the parking brake (the parking brake switch is turned ON).

(3) Using SST, connect and disconnect terminals 12 (TS) and 4 (CG) of the DLC3.

SST 09843-18040

(4) Check that the steering wheel is in the center position and move the shift lever to P.

(5) Turn the ignition switch ON.

(d) Keep the vehicle in a stationary condition on a level surface for 2 seconds or more.

(e) Check that the VSC warning light blinks.

HINT:
If the VSC warning light does not blink, perform the zero point calibration again.

2. PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND DECELERATION SENSOR (When Using Intelligent Tester)

NOTICE:

- **While performing the calibration, do not tilt, move or shake the vehicle. Keep it in a stationary condition. Do not start the engine.**
- **Be sure to perform the calibration on a level surface (within an inclination of 1 degree).**

BC

(a) Check that the steering wheel is in the center position and move the shift lever to the P position.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch ON.
(d) Operate the intelligent tester to test mode (SIGNAL CHECK).
(e) Obtain zero point of the yaw rate sensor and deceleration sensor:
    (1) Keep the vehicle in a stationary condition on a level surface for 2 seconds or more.
    (2) Check that the VSC warning light blinks.
    HINT:
    If the VSC warning light does not blink, perform the zero point calibration again.
(f) Turn the ignition switch OFF.

PROBLEM SYMPTOMS TABLE

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

NOTICE:

- **When replacing the skid control ECU, sensors, etc., turn the ignition switch OFF.**
- **When replacing the yaw rate sensor and/or the brake actuator assembly, make sure to perform the yaw rate sensor zero point calibration (see page BC-69)**

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-74
	2. IG power source circuit	BC-120
	3. Front speed sensor circuit	BC-83
	4. Rear speed sensor circuit	BC-89
	5. Check the ABS and TRACTION actuator assembly with the intelligent tester (Check the skid control ECU with actuator operation using the active test function). If abnormal, check the hydraulic circuit for leakage.	BC-74
	6. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the skid control ECU with actuator	-
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-74
	2. Front speed sensor circuit	BC-83
	3. Rear speed sensor circuit	BC-89
	4. Stop light switch circuit	BC-125
	5. Check the skid control ECU with actuator operation using the active test function. If abnormal, check the hydraulic circuit for leakage	BC-74
	6. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the skid control ECU with actuator	-
ABS warning light abnormal (Remains on)	1. ABS warning light circuit	BC-132
	2. Skid control ECU with actuator (brake actuator assembly)	-
ABS sensor DTC check cannot be done	1. Check the DTC again and make sure that the normal system code is output	BC-74
	2. TC and CG terminal circuit	BC-157
	3. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the skid control ECU with actuator	-
Sensor signal check cannot be done	1. Skid control ECU with actuator	-
VSC and/or TRAC does not operate	1. Check the DTC again and make sure that the normal system code is output	BC-74
	2, IG1 power source circuit	BC-120
	3. Check hydraulic circuit for leakage	-
	4. Front speed sensor circuit	BC-83
	5. Rear speed sensor circuit	BC-89
	6. Yaw rate sensor circuit (Deceleration sensor)	BC-117
	7. Steering sensor circuit	BC-115
SLIP indicator light abnormal	1. SLIP indicator light circuit	BC-153
	2. Skid control ECU with actuator	-

BC

Symptom	Suspected area	See page
TRAC OFF indicator abnormal	1. Check the DTC again and make sure that the normal system code is output	BC-74
	2. TRAC OFF switch circuit	BC-149
VSC DTC check cannot be done	1. Check the DTC again and make sure that the normal system code is output	BC-74
	2. TC and CG terminal circuit	BC-157
VSC warning light abnormal	1. Check the DTC again and make sure that the normal system code is output	BC-74
	2. VSC warning circuit	BC-139

VEHICLE STABILITY CONTROL SYSTEM

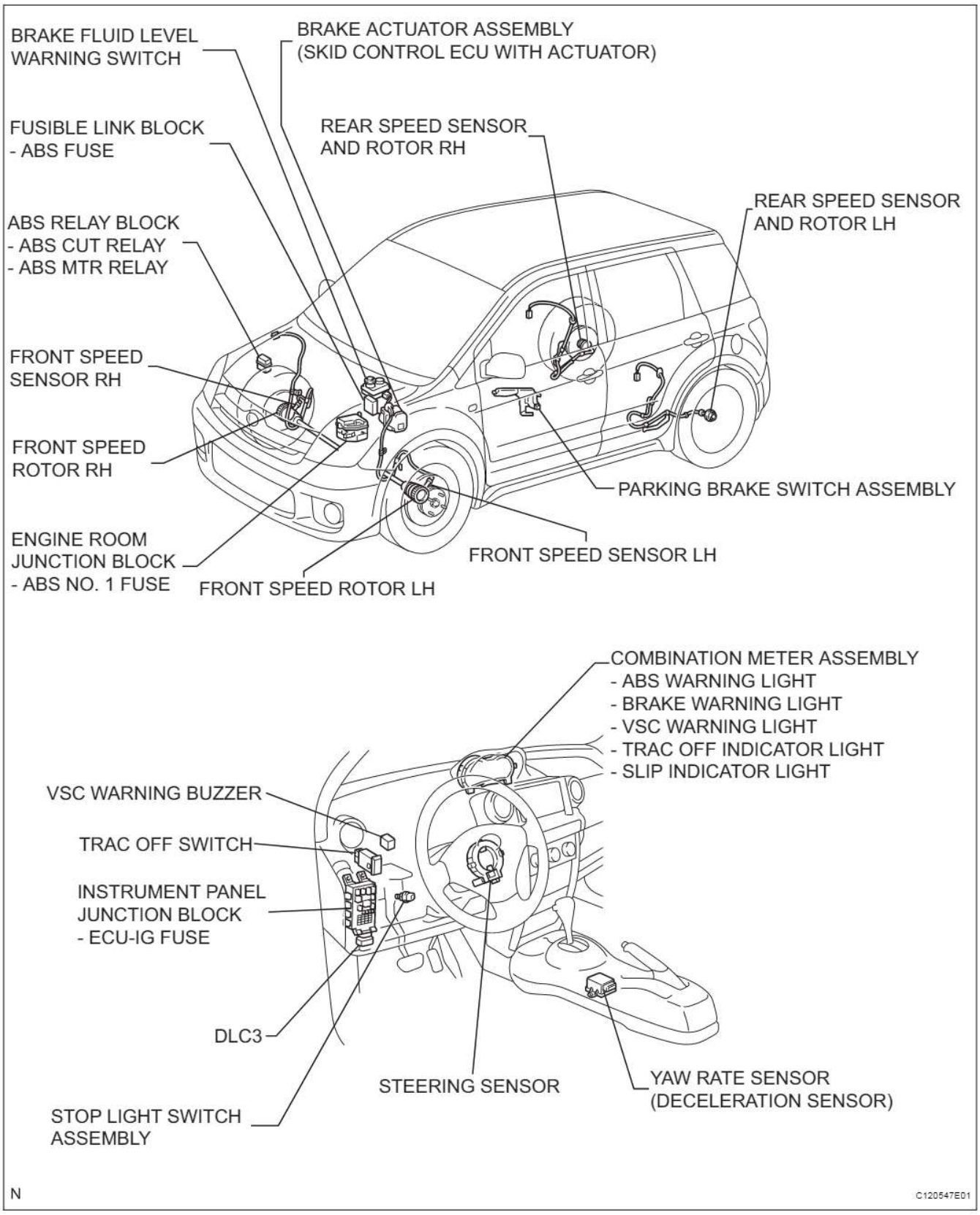
PRECAUTION

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 vehicle stability control system 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 assembly and each sensor with the ignition switch OFF unless specified in the inspection procedure.
- When removing and installing the brake actuator assembly and each sensor, be sure to check that the normal display is output in test mode inspection and in DTC output inspection after installing all the parts.
- After replacing the brake actuator assembly and/or the yaw rate (deceleration) sensor, make sure to perform yaw rate (deceleration) sensor zero point calibration (see page BC-69).
- The CAN communication system is used for data communication between the skid control ECU, the steering angle sensor, and the yaw rate (deceleration) sensor. If there is trouble in the CAN communication line, the DTC of the communication line is output.
- If a DTC of the CAN communication line is output, repair the malfunction in the communication line and troubleshoot the vehicle stability control system.
- Since the CAN communication line has its own length and route, it cannot be repaired temporarily with the bypass wire, etc.

BC

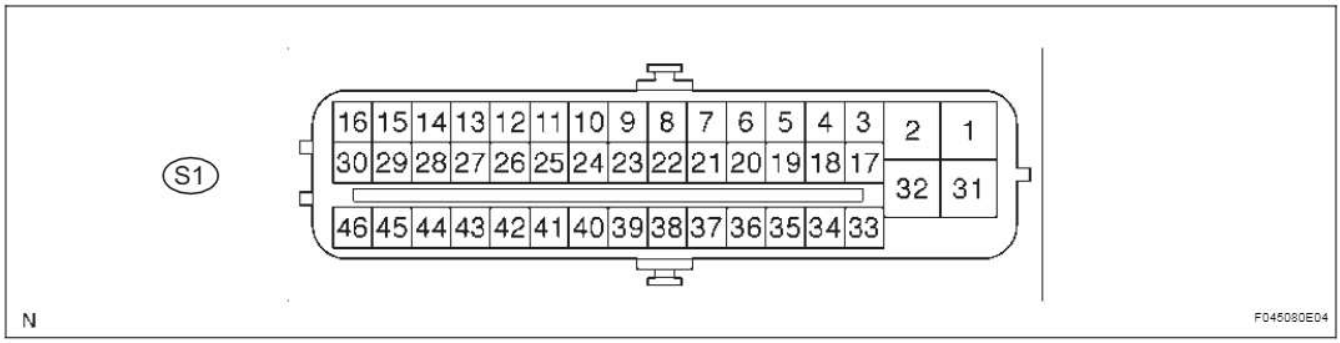
PARTS LOCATION



BC

TERMINALS OF ECU

1. CHECK BRAKE ACTUATOR ASSEMBLY (SKID CONTROL ECU ASSEMBLY WITH ACTUATOR)

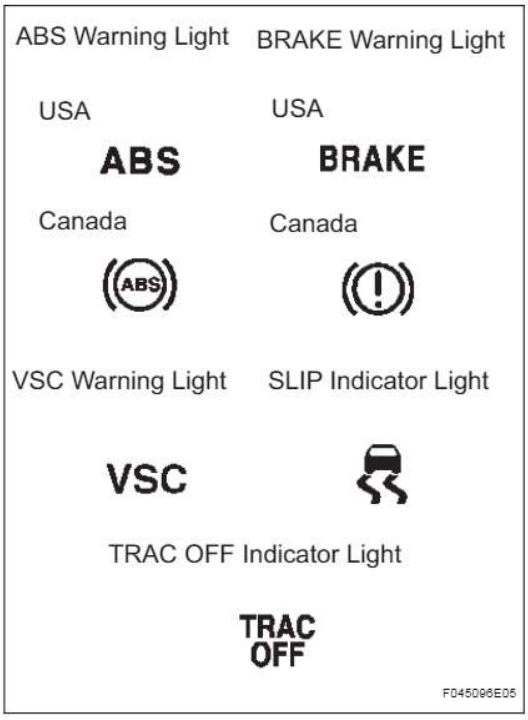


(a) Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
BM (S1-2) - GND1, 2 (S1-1, 32)	W-L - W-B	Motor relay test input	Ignition switch ON, pump motor running	11 to 14 V
FR+ (S1-3) - FR- (S1-17)	G-W - G-O	Front RH wheel speed signal input	Ignition switch ON, slowly turn right front wheel	AC generation
FL+ (S1-18) - FL- (S1-4)	R - G	Front LH wheel speed signal input	Ignition switch ON, slowly turn left front wheel	AC generation
RR+ (S1-5) - RR- (S1-19)	LG-B - LG-R	Rear RH wheel speed signal input	Ignition switch ON, slowly turn right rear wheel	AC generation
RL+ (S1-20) - RL- (S1-6)	Y-B - Y-B	Rear LH wheel speed signal input	Ignition switch ON, slowly turn left rear wheel	AC generation
NEO (S1-10) - GND1, 2 (S1-1, 32)	V - W-B	Engine rpm signal input	Engine idling	Pulse generation
CANH (S1-11) - CANL (S1-25)	B - W	CAN communication line	Ignition switch ON	Pulse generation
D/G (S1-13) - GND1, 2 (S1-1, 32)	W - W-B	Diagnostic communication line	Ignition switch ON	11 to 14 V
MRF (S1-14) - R+ (S1-45)	GR - R-W	Fail-safe motor relay output	Ignition switch ON	11 to 14 V
MR (S1-15) - R+ (S1-45)	P - R-W	Ignition switch ON, pump motor running	Motor relay output	11 to 14 V
+BS (S1-31) - GND1, 2 (S1-1, 32)	B - W-B	Solenoid relay power supply	Always	11 to 14 V
STP (S1-27) - GND1, 2 (S1-1, 32)	G-W - W-B	Stop light input signal	Stop light switch ON (Brake pedal depressed)	8 to 14 V
			Stop light switch OFF (Brake pedal released)	Below 1.5 V
PKB (S1-28) - GND1, 2 (S1-1, 32)	Y-B - W-B	Parking brake switch input	Ignition switch ON, parking brake switch ON	Below 1.5 V
			Ignition switch ON, parking brake switch OFF	9 to 14 V
WA (S1-29) - GND1, 2 (S1-1, 32)	P - W-B	ABS warning light output	Ignition switch ON, ABS warning light ON	4 to 14 V
			Ignition switch ON, ABS warning light OFF	Below 2.0 V
Bz (S1-30) - GND1, 2 (S1-1, 32)	R-W - W-B	Buzzer output	Ignition switch ON, VSC buzzer sounds	Below 1.0 V
			Ignition switch ON, VSC buzzer does not sound	6 to 14 V
IND (S1-34) - GND1, 2 (S1-1, 32)	B-R - W-B	SLIP input	Ignition switch ON	11 to 14 V

BC

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
WT (S1-35) - GND1, 2 (S1-1, 32)	R-L - W-B	TRAC OFF input	Ignition switch ON	11 to 14 V
VSCW (S1-36) - GND1, 2 (S1-1, 32)	BR-W - W-B	VSC warning light output	Ignition switch ON, VSC warning light ON	Below 2.0 V
			Ignition switch ON, VSC warning light OFF	11 to 14 V
WFSE (S1-42) - GND1, 2 (S1-1, 32)	R - W-B	WIFSE input	Ignition switch ON	11 to 14 V
CSW (S1-43) - GND1, 2 (S1-1, 32)	W-L - W-B	TRAC OFF switch input	TRAC OFF switch OFF	11 to 14 V
BRL (S1-44) - GND1, 2 (S1-1, 32)	B-Y - W-B	Brake warning line output	Ignition switch ON, brake warning light ON	4 to 14 V
			Ignition switch ON, brake warning light OFF	Below 1.0 V
R+ (S1-45) - GND1, 2 (S1-1, 32)	R-W - W-B	Power supply for motor relay	Ignition switch ON, ABS warning light OFF	11 to 14 V
IG1 (S1-46) - GND1, 2 (S1-1, 32)	B-L - W-B	IG1 power supply	Ignition switch ON	11 to 14 V



If the result is not as specified, there may be a malfunction in the ECU.

DIAGNOSIS SYSTEM

1. CHECK INDICATOR

(a) Check the warning lights.

(1) Release the parking brake lever.

(2) When the ignition switch ON, check that the ABS warning light, VSC warning light, TRAC OFF indicator light, brake warning light and SLIP indicator light illuminate for approximately 3 seconds.

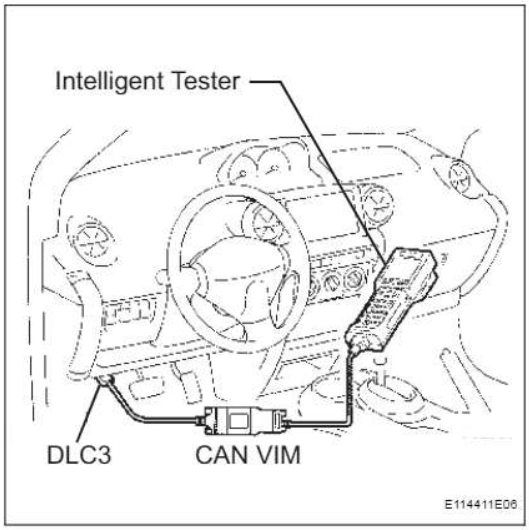
HINT:

- When the parking brake is applied or brake fluid level is low, the brake warning light illuminates.
- If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light, VSC warning light, TRAC OFF indicator light, brake warning light 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	BC-132
Brake warning light circuit	BC-139
VSC warning light circuit	BC-143
TRAC OFF warning light circuit	BC-149
SLIP indicator light circuit	BC-153

BC



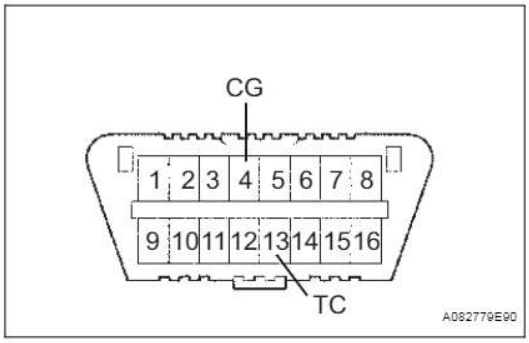
DTC CHECK / CLEAR

1. CHECK DTC (When Using Intelligent Tester)

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.

(b) Turn the ignition switch ON.

(c) Read the DTCs by following the prompts on the tester screen.
HINT:
Refer to the intelligent tester operator's manual for further details.



2. CHECK DTC (When not Using Intelligent Tester)

(a) Check the DTCs.

(1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040

(2) Turn the ignition switch ON.

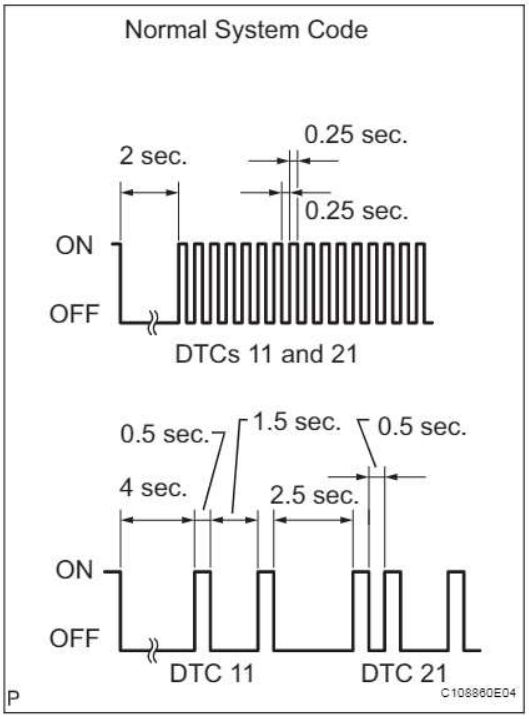
(3) Read the DTC from the ABS warning light and VSC warning light on the combination meter.
HINT:

- If no code appears, check the TC and CG circuit or ABS warning light and VSC warning light circuits.

Trouble Area	See procedure
ABS warning light circuit	BC-132
VSC warning light circuit	BC-139
TC and CG terminal circuit	BC-157

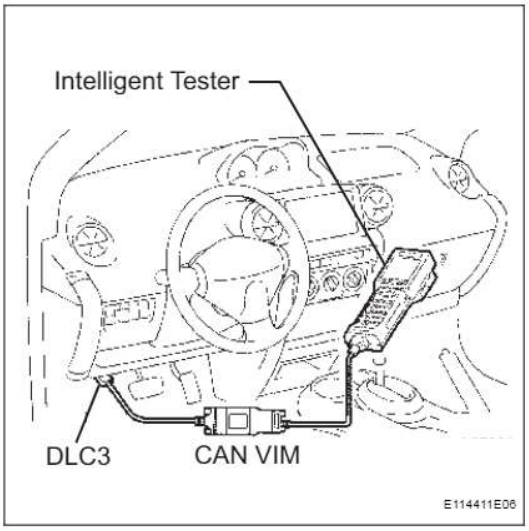
- If more than 1 DTC is detected at the same time, the DTCs will be displayed in numerical order.

BC



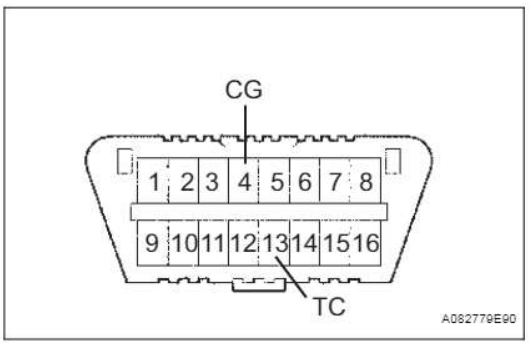
- As an example, the blinking patterns for a normal system code and DTCs 11 and 21 are shown in the illustration.
- DTCs are explained in the Diagnostic Trouble Code Chart.

(b) After completing the check, disconnect terminals 13 (TC) and 4 (CG) of the DLC3.
If 2 or more DTCs are detected at the same time, the DTCs will be displayed first.



3. CLEAR DTC (When Using Intelligent Tester)

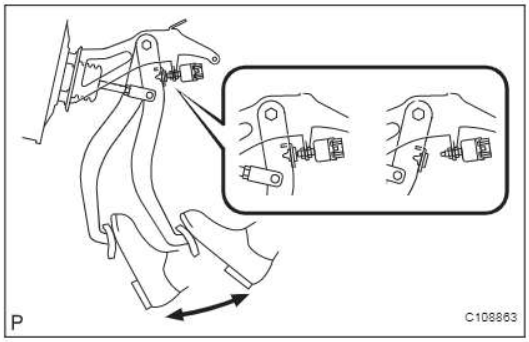
(a) Connect the intelligent tester (with CAN VIM) to the DLC3.
(b) Turn the ignition switch ON.
(c) Operate the intelligent tester to erase the codes.
HINT:
Refer to the intelligent tester operator's manual for further details.



4. CLEAR DTC (When not Using Intelligent Tester)

(a) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040
(b) Turn the ignition switch ON.

BC



(c) Clear the DTCs stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.
(d) Check that the ABS warning light and VSC warning light indicate the normal system code.
(e) Remove SST from the terminals of the DLC3.
HINT:
DTCs cannot be cleared by removing the battery cable or ECU-IG fuse.

BC

FREEZE FRAME DATA

1. FREEZE FRAME DATA

HINT:

- When 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 ON since the last time the ABS was activated. However, if the vehicle is stopped, the vehicle is driven at 7 km/h (4.3 mph) or less, or a DTC is detected, the ECU will not count the next time the ignition switch is turned from OFF to ON.
- Freeze frame data at the time the ABS operates: The skid control ECU stores data or updates stored data when the ABS operates. This data is erased when the ECU stores data at the time a DTC is detected.
- Freeze frame data at the time a DTC is detected: When the skid control ECU stores data at the time a DTC is detected, the data will not be updated until the data is cleared.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch ON.
(c) From the display on the tester, select FREEZE FRAME DATA.

Intelligent tester display	Measurement item	Reference value
VEHICLE SPD	Vehicle speed	Speed indication on meter
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON Stop light switch OFF: OFF
# IG ON	Number of ignition switch OFF to ON operations after memorizing freeze frame data	0 to 31
MAS CYL PRESS	Master cylinder pressure sensor reading	Brake pedal released: 0.3 to 0.9 V Brake pedal depressed: 0.8 to 4.5 V
MASS PRESS GRADE	Master cylinder pressure sensor change	Min.: -30 MPa/s Max.: 200 MPa/s
SYSTEM	Information about system / mode status	No system activated: NO SYS ABS operating: ABS Fail-safe mode activated: FAIL SF
YAW RATE	Yaw rate sensor reading	-100 to 100
STEERING ANG	Steering angle sensor reading	Left turn: Increase Right turn: Drop
THROTTLE	Throttle position sensor reading	Release accelerator pedal: Approx. 0 deg. Depress accelerator pedal: Approx. 90 deg.
G (RIGHT & LEFT)	Forward and rearward gravitational force (G)	Min.: -1.869 Max.: 1.869
G (BACK & FORTH)	Forward and rearward gravitational force (G)	Min.: -1.869 Max.: 1.869
VSC (TRAC) OFF SW	VSC OFF switch signal	Traction OFF switch ON: OFF, OFF: ON
SHIFT POSITION	Shift lever position	FAIL P*, N* R D 2 L

BC

HINT:
*: The A/C switch is OFF and all accessory switches are OFF.

DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.

(b) Turn the ignition switch ON.

(c) Read the DATA LIST according to the display on the tester.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
PKB SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake not applied	-
STOP LIGHT SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal not depressed	-
VSC/TRAC OFF SW	VSC/TRAC OFF switch/ON or OFF	ON: TRAC OFF switch ON	-
IDLE SW	Main idle switch/ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
ABS MOT RELAY	ABS MTR relay / ON or OFF	ON: MTR relay ON OFF: MTR 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: Test mode	-
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	Speed similar to that of speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
IG VOLTAGE	ECU power supply voltage / TOO LOW / NORMAL	NORMAL: 10 to 14.0 V TOO LOW: Below 10 V	-

BC

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
DECELERATION SENSOR	Deceleration sensor 1 reading / min.: -1.869 G, max.: 1.869 G	Approximately 0 +-0.13 G when vehicle is not moving	Reading changes when vehicle is shaken
DECELERATION SENSOR 2	Deceleration sensor 2 reading / min.: -1.869 G, max.: 1.869 G	Approximately 0 +-0.13 G when vehicle is not moving	Reading changes when vehicle is shaken
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)	-
SRLR	ABS solenoid (SRLR)/ON or OFF	ON: Operated OFF: Not operated	-
SRLH	ABS solenoid (SRLH)/ON or OFF	ON: Operated OFF: Not operated	-
SM1 (BA-SOL)	TRAC solenoid (SMF)/ON or OFF	ON: Operated OFF: Not operated	-
SM2	TRAC solenoid (SMR)/ON or OFF	ON: Operated OFF: Not operated	-
THROTTLE	Throttle position sensor/ Min.: 0 deg, Max.: 125 deg	Release accelerator pedal: Approx. 0 deg. Depress accelerator pedal: Approx. 90 deg.	-
ENGINE SPD	Engine Speed/ Min.: 0 rpm, Max.: 6000 rpm	Actual engine speed	-
VEHICLE SPD	Maximum wheel speed sensor reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual engine speed	Speed indicated on speedometer
YAW RATE	Yaw rate sensor/ Min.: -128 deg/s, Max.: 128 deg/s	Min.: -128 deg/s Max.: 128 deg/s	-
YAW ZERO VALUE	Yaw rate sensor/ Min.: -128 deg/s, Max.: 128 deg/s	Min.: -128 deg/s Max.: 128 deg/s	-
STEERING ANG	Steering sensor/ Min.: -1152 deg, Max.: 1150.875 deg	Left turn: Increase Right turn: Decrease	-
MAS CYL PRESS 1	Master cylinder pressure sensor 1 reading / Min.: 0 V, Max.: 5 V	When brake pedal is released : 0.3 to 0.9 V	Reading increases when brake pedal is depressed
AIR BLD SUPPORT	Air bleed support/ NOT SUP or SUPPORT	Not supported	-
SPD SEN FR	FR speed sensor open detection/ OPN DET/NORMAL	NORMAL	-
SPD SEN FL	FL speed sensor open detection/ OPN DET/NORMAL	NORMAL	-
SPD SEN RR	RR speed sensor open detection/ OPN DET/NORMAL	NORMAL	-
SPD SEN RL	RL speed sensor open detection/ OPN DET/NORMAL	NORMAL	-
EFI COM	EFI communication open detection/ OPN DET/NORMAL	NORMAL	-
YAWRATE SEN	Yaw rate sensor open detection/ OPN DET/NORMAL	NORMAL	-

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
DECELE SEN	Deceleration sensor open detection/ OPN DET/NORMAL	NORMAL	-
STEERING SEN	Steering sensor open detection/ OPN DET/NORMAL	NORMAL	-
TEST MODE	Test mode/NORMAL or TEST	NORMAL: Normal mode TEST: During test mode	-
#CODES	Number of DTC recorded/ Min.: 0, Max.: 255	Min.: 0, Max.: 39	-

2. PERFORM ACTIVE TEST

HINT:

Performing the intelligent tester's ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time. The DATA LIST can be displayed during the ACTIVE TEST.

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.

(b) Turn the ignition switch ON.

(c) Perform the ACTIVE TEST according to the display on the tester.

Skid control ECU with actuator

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

DIAGNOSTIC TROUBLE CODE CHART

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

DTC chart of VSC

DTC No.	Detection Item	Trouble Area	See page
C0200/31	Right Front Wheel Speed Sensor Signal Malfunction	- Front speed sensor - Front speed sensor circuit - Speed sensor rotor	BC-83
C0205/32	Left Front Wheel Speed Sensor Signal Malfunction	- Front speed sensor - Front speed sensor circuit - Speed sensor rotor	BC-83
C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction	- Rear speed sensor - Rear speed sensor circuit - Speed sensor rotor	BC-89
C0215/34	Left Rear Wheel Speed Sensor Signal Malfunction	- Rear speed sensor - Rear speed sensor circuit - Speed sensor rotor	BC-89
C0226/21	SFR Solenoid Circuit	- SFRR or SFRH circuit - Skid control ECU with actuator	BC-94
C0236/22	SFL Solenoid Circuit	- SRRR or SRRH circuit - Skid control ECU with actuator	BC-94
C0246/23	SRR Solenoid Circuit	- SRLR or SRLH circuit - Skid control ECU with actuator	BC-94
C0256/24	SRL Solenoid Circuit	- SFRR or SFRH circuit - Skid control ECU with actuator	BC-94
C0273/13	Open in ABS Motor Relay Circuit	- ABS MTR relay - ABS MTR relay circuit - Skid control relay - ABS NO. 1 H-fuse - ABS MTR relay power source circuit	BC-97
C0274/14	Short to B+ in ABS Motor Relay Circuit	- ABS MET relay - ABS MET relay circuit - Skid control relay - ABS NO. 1 H-fuse	BC-97
C0278/11	Open in ABS Solenoid Relay Circuit	- Skid control ECU with actuator - ABS solenoid relay circuit	BC-102
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	- Skid control ECU with actuator - ABS solenoid relay circuit	BC-102
C1201/51	Engine Control System Malfunction	Engine control system	BC-105
C1203/53	ECM Communication Circuit Malfunction	- CAN communication system - ECM	BC-106
C1210/36	Zero Point Calibration of Yaw Rate Sensor Undone	- Yaw rate sensor - Yaw rate sensor circuit - Zero point calibration not done	BC-108
C1223/43	ABS Control System Malfunction	Anti-lock brake system	BC-111
C1224/44	NE Signal Circuit	- NEO circuit - ECM - Skid control ECU with actuator	BC-112
C1225/25	SMC Solenoid Circuit	- SM1 or SM2 circuit - Skid control ECU with actuator	BC-94
C1231/31	Steering Angle Sensor Circuit Malfunction	- Steering angle sensor - Steering angle sensor circuit - Power source circuit	BC-115

BC

DTC No.	Detection Item	Trouble Area	See page
C1232/32	Stuck in Deceleration Sensor	- Yaw rate sensor - Yaw rate sensor circuit - Wire harness	BC-117
C1234/34	Yaw Rate Sensor Malfunction	- Yaw rate sensor - Yaw rate sensor circuit - Wire harness	BC-117
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	- Front speed sensor - Front speed sensor circuit	BC-83
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	- Front speed sensor - Front speed sensor circuit	BC-83
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	- Rear speed sensor - Rear speed sensor circuit	BC-89
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	- Rear speed sensor - Rear speed sensor circuit	BC-89
C1241/41	Low Battery Positive Voltage or Abnormally High Battery Positive Voltage	- Battery - Charging system - Power source circuit	BC-120
C1246/46	Master Cylinder Pressure Sensor Malfunction	- Master cylinder pressure sensor - Master cylinder pressure sensor circuit	BC-123
C1249/49	Open in Stop Light Switch Circuit	- Stop light switch assembly - Stop light switch circuit	BC-125
C1251/51	Open in Pump Motor Circuit	- Skid control ECU with actuator - Skid control ECU with actuator circuit	BC-129
C1243/43	Acceleration Sensor Stuck Malfunction	- Yaw rate sensor - Yaw rate sensor circuit - Wire harness	BC-117
C1244/44	Open or Short in Deceleration Sensor Circuit	- Yaw rate sensor - Yaw rate sensor circuit - Wire harness	BC-117
C1245/45	Acceleration Sensor Output Malfunction	- Yaw rate sensor - Yaw rate sensor circuit - Wire harness	BC-117
C1361/91	Short Circuit in ABS Motor Fail Safe Relay Circuit	- ABS MET relay - ABS MET relay circuit - Skid control relay - ABS NO. 1 H-fuse	BC-97
C1336/39	Zero Point Calibration of Acceleration Sensor Undone	- Yaw rate sensor (Deceleration sensor) - Yaw rate sensor circuit (Deceleration sensor) - Zero point calibration not done	BC-108
C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction	- Battery - Power source circuit - Charging system	BC-117
U0100/65	Lost Communication with ECM / PCM	CAN communication system	BC-131
U0121/94	CAN Communication Function Fault	CAN communication system	BC-131
U0123/62	Lost Communication with Yaw Rate Sensor Module	CAN communication system	BC-131
U0124/95	Lost Communication with Lateral Acceleration Sensor Module	CAN communication system	BC-131
U0126/63	Lost Communication with Steering Angle Sensor Module	CAN communication system	BC-131

BC

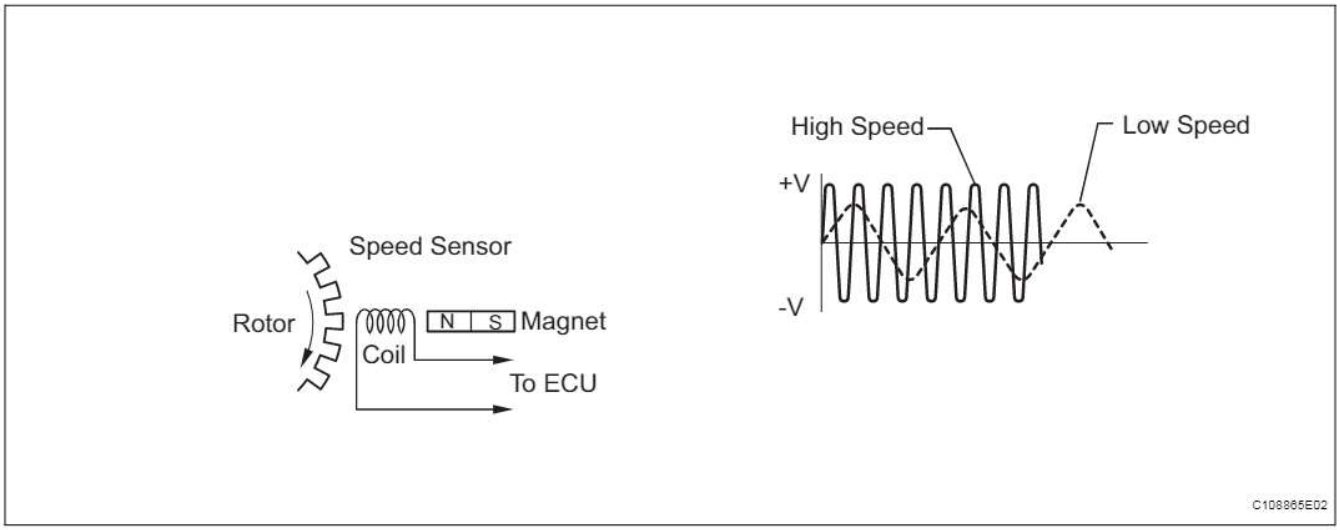
DTC chart of sensor check function

DTC No.	Detection Item	Trouble Area	See page
C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	- Front speed sensor RH - Sensor installation - Sensor rotor	BC-83
C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	- Front speed sensor LH - Sensor installation - Sensor rotor	BC-83
C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	- Rear speed sensor RH - Sensor installation - Sensor rotor	BC-89
C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	- Rear speed sensor LH - Sensor installation - Sensor rotor	BC-89
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	- Front speed sensor rotor RH	BC-83
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	- Front speed sensor rotor LH	BC-83
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	- Rear speed sensor rotor RH	BC-89
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	- Rear speed sensor rotor LH	BC-89
C1279/79	Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)	- Deceleration sensor - Sensor installation	BC-117
C1281/81	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)	- Master cylinder pressure sensor	BC-123

BC

DTC	C0200/31	Right Front Wheel Speed Sensor Signal Malfunction
DTC	C0205/32	Left Front Wheel Speed Sensor Signal Malfunction
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 ECU. These signals are used for control of the ABS.

BC

Each of the front and rear rotors have 48 serrations. When the rotors rotate, the magnetic field generated by the permanent magnet in the speed sensor produces AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.
DTCs C1271/71, C1272/72, C1275/75 and C1276/76 can be deleted when the speed sensor sends a vehicle speed signal or the test mode ends. DTCs C1271/71, C1272/72, C1275/75 and C1276/76 are output only in the test mode.

DTC No.	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When one of following occurs • With vehicle speed at 10 km/h (6 mph) or more, sensor signal circuit of faulty wheel is open or short for 1 second or more • Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more • Sensor signal circuit is open for 0.5 seconds or more	• Front speed sensor • Front speed sensor circuit • Speed sensor rotor
C1235/35 C1236/36	At vehicle speed of 20 km/h (12 mph) or more, condition that noise is included in speed sensor signal continues for 5 seconds or more.	• Front speed sensor • Front speed sensor circuit
C1271/71	Detected only during test mode	• Front speed sensor RH • Sensor installation • Sensor rotor
C1272/72	Detected only during test mode	• Front speed sensor LH • Sensor installation • Sensor rotor
C1275/75	Detected only during test mode	Front speed sensor rotor RH
C1276/76	Detected only during test mode	Front speed sensor rotor LH

HINT:
- DTCs C0200/31 and C1235/35 are for the front speed sensor RH.
- DTCs C0205/32 and C1236/36 are for the front speed sensor LH.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 4

A

2	READ VALUE OF INTELLIGENT TESTER (FRONT SPEED SENSOR)

(a) Check the DATA LIST for proper functioning of the front speed sensor.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer

OK:
There is almost no difference between actual wheel speed and displayed speed value.

NG → Go to step 4

OK

3	CHECK DTC IF OUTPUT RECURS

(a) Clear the DTCs (see page BC-74).
(b) Drive the vehicle at approximately 32 km/h (20 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-74).
Result

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

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

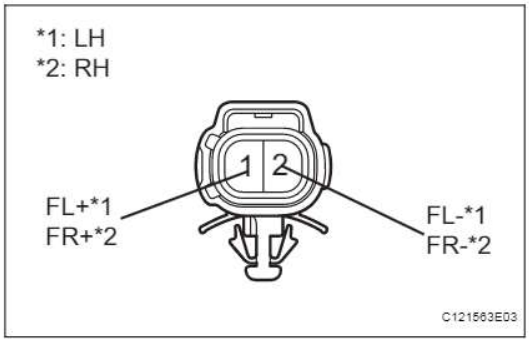
B → CHECK FOR INTERMITTENT PROBLEMS

BC

A

REPLACE BRAKE ACTUATOR ASSEMBLY

4 INSPECT FRONT SPEED SENSOR



(a) Disconnect the A3 and A4 sensor connectors.
(b) Measure the resistance of the speed sensors.
Standard resistance:
LH

Tester Connection	Specified Condition
1 (FL+) - 2 (FL-)	0.6 to 2.5 kΩ at 40 to 120°C
1 (FL+) - Body ground	10 kΩ or higher
2 (FL-) - Body ground	

RH

Tester Connection	Specified Condition
1 (FR+) - 2 (FR-)	0.6 to 2.5 kΩ at 40 to 120°C
1 (FR+) - Body ground	10 kΩ or higher
2 (FR-) - Body ground	

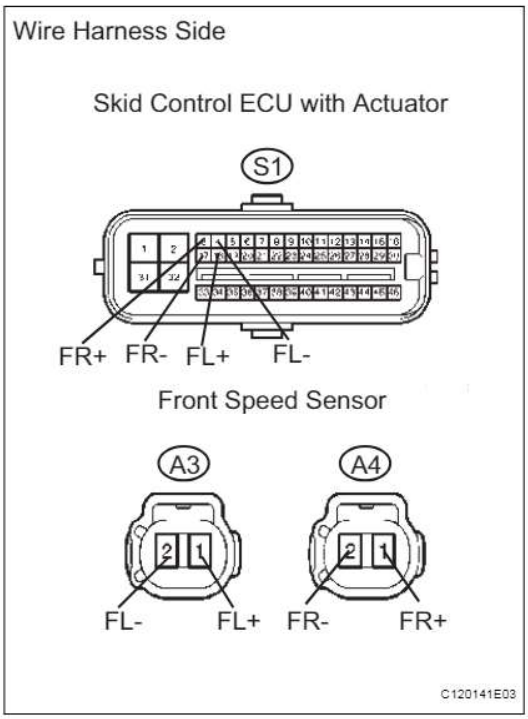
HINT:
- Check the speed sensor signal after the speed sensor replacement (see page BC-65).
- When replacing the speed sensor, clean the installation hole of the sensor.

NG → **REPLACE FRONT SPEED SENSOR**

OK

BC

5 CHECK WIRE HARNESS (SKID CONTROL ECU - FRONT SPEED SENSOR)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the A3 and A4 speed sensor connectors.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance:

LH

Tester Connection	Specified Condition
S1-18 (FL+) - A3-1 (FL+)	Below 1 Ω
S1-4 (FL-) - A3-2 (FL-)	
A3-1 (FL+) - Body ground	10 kΩ or higher
A3-2 (FL-) - Body ground	

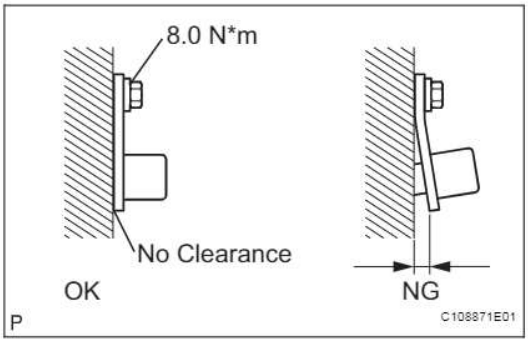
RH

Tester Connection	Specified Condition
S1-3 (FR+) - A4-1 (FR+)	Below 1 Ω
S1-17 (FR-) - A4-2 (FR-)	
A4-1 (FR+) - Body ground	10 kΩ or higher
A4-2 (FR-) - Body ground	

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

OK

6 INSPECT FRONT SPEED SENSOR (INSTALLATION)



(a) Check the speed sensor installation.

OK:

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

HINT:

- Check the speed sensor signal after the speed sensor replacement (see page BC-65).
- When replacing the speed sensor, clean the installation hole of the sensor.

NG → **SECURELY REINSTALL FRONT SPEED SENSOR**

OK

BC

7 INSPECT SPEED SENSOR (TIP)

(a) Remove the front speed sensor.
(b) Check the sensor tip.

OK:

No scratches or foreign matter on sensor tip.

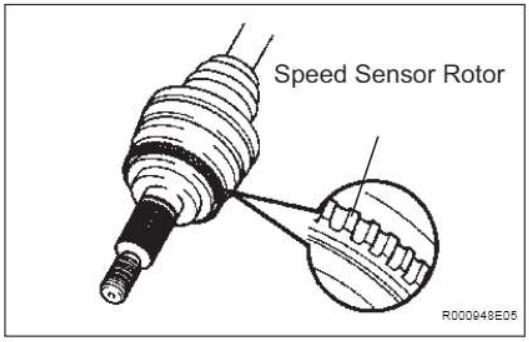
HINT:

Check the speed sensor signal after cleaning or replacing the speed sensor (see page BC-65).

NG → **CLEAN OR REPLACE SPEED SENSOR**

OK

8 INSPECT SPEED SENSOR ROTOR



(a) Remove the front axle hub.

(b) Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign matter on sensor rotor.

HINT:

- If foreign matter is attached, remove it and check the output waveform after reassembly.
- Check the speed sensor signal after cleaning or replacing the speed sensor rotor (see page BC-65).

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

OK

9 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-74).

(b) Drive the vehicle at approximately 30 km/h (19 mph) or more for 60 seconds or more.

(c) Check for DTCs (see page BC-74).

Result

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

HINT:

When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

NG → **END**

A

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

DTC	C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction
DTC	C0215/34	Left Rear Wheel Speed Sensor Signal Malfunction
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, C1235/35 and C1236/36.

DTCs C1273/73, C1274/74, C1277/77 and C1278/78 can be deleted when the speed sensor sends a vehicle speed signal or the test mode ends. DTCs C1273/73, C1274/74, C1277/77 and C1278/78 are output only in the test mode.

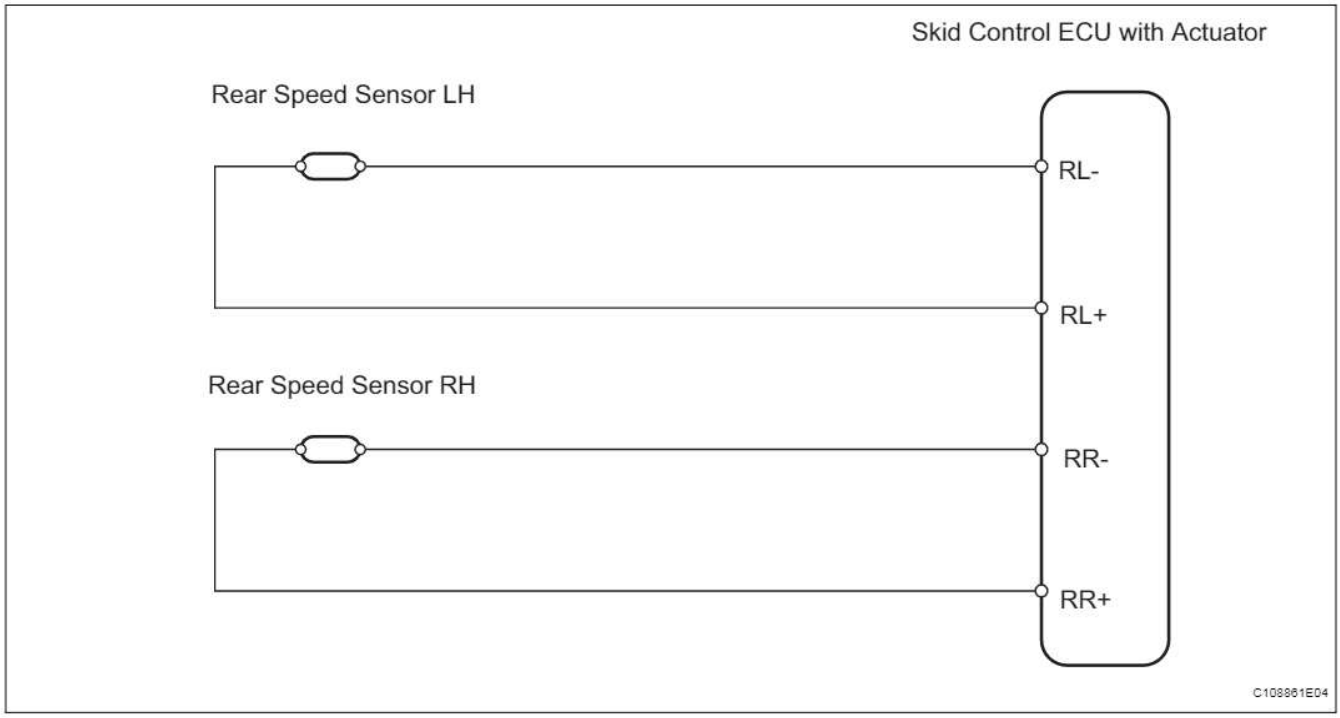
DTC No.	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When one of following occurs • With vehicle speed at 10 km/h (6 mph) or more, sensor signal circuit of faulty wheel is open or short for 1 second or more • Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more • Sensor signal circuit is open for 0.5 seconds or more	• Rear speed sensor • Rear speed sensor circuit • Speed sensor rotor
C1238/38 C1239/39	At vehicle speed of 20 km/h (12 mph) or more, condition that noise is included in speed sensor signal continues for 5 seconds or more	• Rear speed sensor • Rear speed sensor circuit
C1273/73	Detected only during test mode	• Rear speed sensor RH • Sensor installation • Sensor rotor
C1274/74	Detected only during test mode	• Rear speed sensor LH • Sensor installation • Sensor rotor

BC

DTC No.	DTC Detection Condition	Trouble Area
C1277/77	Detected only during test mode	Rear speed sensor RH
C1278/78	Detected only during test mode	Rear speed sensor LH

HINT:
- DTCs C0210/33 and C1233/38 are for the rear speed sensor RH.
- DTCs C0215/34 and C1239/39 are for the rear speed sensor LH.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → **Go to step 4**

A

2 READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

(a) Check the DATA LIST for proper functioning of the rear speed sensor.

BC

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer

OK:
There is almost no difference between actual wheel speed and displayed speed value.

NG → **Go to step 4**

OK ↓

3 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-74).
(b) Drive the vehicle at approximately 32 km/h (20 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-74).
Result

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

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

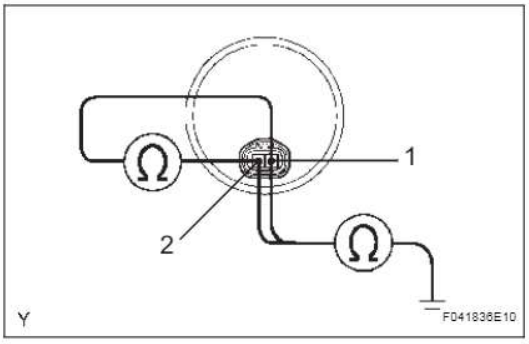
B → **END**

A ↓

REPLACE BRAKE ACTUATOR ASSEMBLY

4 INSPECT REAR SPEED SENSOR

BC



(a) Disconnect the A15 and A16 sensor connectors.
(b) Measure the resistance of the speed sensors.
Standard resistance:
LH

Tester Connection	Specified Condition
1 (RL-) - 2 (FL+)	1.0 to 1.4 kΩ at 20°C
1 (RL-) - Body ground	10 kΩ or higher
2 (RL+) - Body ground	

RH

Tester Connection	Specified Condition
1 (RR-) - 2 (RR+)	1.0 to 1.4 kΩ at 20°C

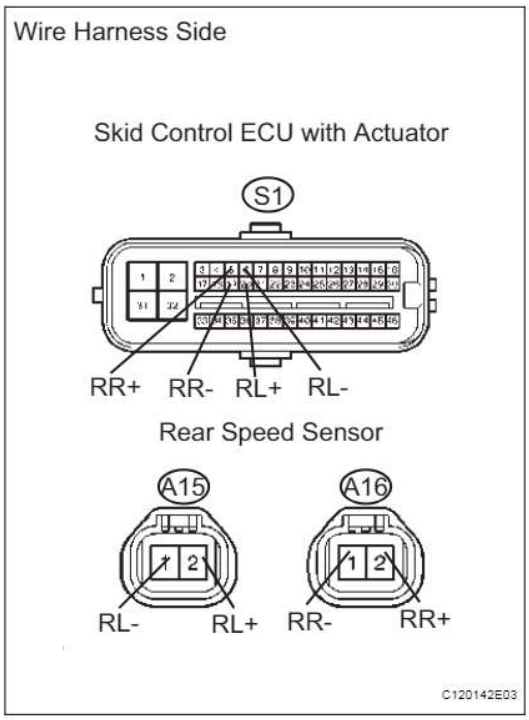
Tester Connection	Specified Condition
1 (RR-) - Body ground	10 kΩ or higher
2 (RR+) - Body ground	

HINT:
Check the speed sensor signal after the speed sensor replacement (see page BC-65).

NG → REPLACE REAR SPEED SENSOR

OK

5 CHECK WIRE HARNESS (SKID CONTROL ECU - REAR SPEED SENSOR)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the A15 and A16 speed sensor connectors.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance:

LH

Tester Connection	Specified Condition
S1-20 (RL+) - A15-2	Below 1 Ω
S1-6 (RL-) - A15-1	
A15-2 - Body ground	10 kΩ or higher
A15-1 - Body ground	

RH

Tester Connection	Specified Condition
S1-5 (RR+) - A16-2	Below 1 Ω
S1-19 (RR-) - A16-1	
A16-2 - Body ground	10 kΩ or higher
A16-1 - Body ground	

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

6 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-74).
(b) Drive the vehicle at approximately 30 km/h (19 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-74).

Result

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

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

BC

B → END

A

REPLACE BRAKE ACTUATOR ASSEMBLY

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	SMC Solenoid Circuit

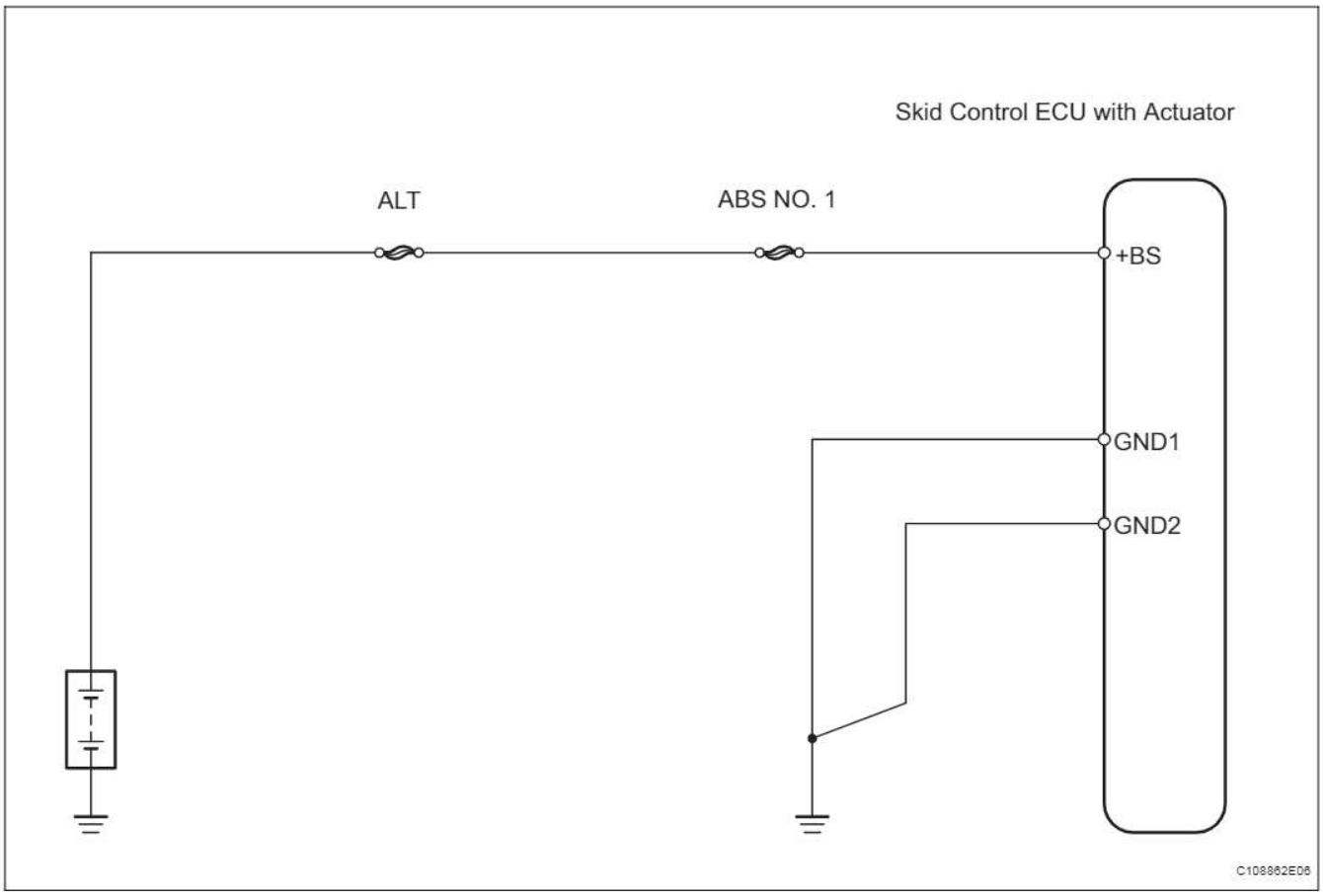
DESCRIPTION

ABS solenoids turn on when receiving signals from the ECU. They control braking force by adjusting the pressure applied to the wheel cylinders.

DTC No.	DTC Detection Condition	Trouble Area
C0226/21	Open or short circuit in front right solenoid circuit (SFRR or SFRH) continues for 0.05 seconds or more	• SFRR or SFRH circuit • Skid control ECU with actuator
C0236/22	Open or short circuit in front left solenoid circuit (SFLR or SFLH) continues for 0.05 seconds or more	• SFLR or SFLH circuit • Skid control ECU with actuator
C0246/23	Open or short circuit in rear right solenoid circuit (SRRR or SRRH) continues for 0.05 seconds or more	• SRRR or SRRH circuit • Skid control ECU with actuator
0256/24	Open or short in rear left solenoid circuit (SRLR or SRLH) continues for 0.05 seconds or more	• SRLR or SRLH circuit • Skid control ECU with actuator
C1255/25	Detection of any of conditions 1. to 5.: 1. When SM1 or SM2 is ON, excessive electric current on SM1 or SM2 continues for 0.05 seconds or more 2. When SM1 or SM2 is OFF, open circuit in SM1 or SM2 continues for 0.05 seconds or more 3. When SM1 or SM2 is ON and electric current is 0.348 A or more, duty ratio between SM1 and SM2 is 2.08 or more, or below 0.48 for 0.2 seconds or more 4. When SM1 or SM2 is OFF, electric current is 0.15 A or more for 0.05 seconds or more 5. All of following conditions continue • When switch solenoid (SM1 or SM2) outputs ON signal • Output current is more than 0.348 A • Ratio of monitored current to target current is more than 2 A for 0.1 second, or less than 0.15 A for 0.5 seconds.	• SM1 or SM2 circuit • Skid control ECU with actuator

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

1	RECONFIRM DTC

HINT:
These codes are output when a problem is detected in the brake actuator assembly.
As the solenoid circuit is built into the brake actuator assembly, 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 DTCs (see page BC-74).
(b) Turn the ignition switch ON and check that the ABS warning light illuminates for approximately 3 seconds.
(c) Check for DTCs (see page BC-74).

Result

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

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

BC

B → REPLACE BRAKE ACTUATOR ASSEMBLY

A

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

FREEZE FRAME DATA

1. FREEZE FRAME DATA

HINT:

- When 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 the ignition switch has been turned from OFF to ON (maximum: 31) since the last time the ABS was activated. However, if the vehicle is stopped, the vehicle is driven at 7 km/h (4.3 mph) or less, or a DTC is detected, the ECU will not count the next time the ignition switch is turned from OFF to ON.
- Freeze frame data at the time the ABS operates: The skid control ECU stores data or updates stored data when the ABS operates. This data is erased when the ECU stores data at the time a DTC is detected.
- Freeze frame data at the time a DTC is detected: When the skid control ECU stores data at the time a DTC is detected, the data will not be updated until the data is cleared.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch ON.
(c) From the display on the tester, select FREEZE FRAME DATA.

Intelligent tester display	Measurement item	Reference value*
VEHICLE SPD	Vehicle speed	Speed indication on meter
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON Stop light switch OFF: OFF
# IG ON	Number of ignition switch OFF to ON operations after memorizing freeze frame data	0 to 31
SYSTEM	Information about system / mode status	No system activated: NO SYS ABS operating: ABS Fail-safe mode activated: FAIL SF

HINT:
*: The A/C switch is OFF and all accessory switches are OFF.

BC

DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.

(b) Turn the ignition switch ON.

(c) Read the DATA LIST according to the display on the tester.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
PKB SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake not applied	-
STOP LIGHT SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal not depressed	-
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: Test mode	-
SRRR	ABS solenoid (SRRR) / ON or OFF	ON: Operates OFF: Does not operate	-
SRRH	ABS solenoid (SRRH) / ON or OFF	ON: FOperates OF: 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	-
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	-
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
IG VOLTAGE	ECU power supply voltage / NORMAL / TOO LOWT	NORMAL: 10 to 14.0 V TOO LOW: Below 10 V	-
ABS OPERT FR	ABS operation (FR) / Before or Operate	Before: No ABS operation (FR) Operate: During ABS operation (FR)	-

BC

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
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)	-
AIR BLD SUPPORT	Air bleed support / SUPPORT or NOT SUP	Supported	-
#CODES	Number of DTC recorded / Min.: 0, Max.: 255	Min.: 0, Max.: 19	-

2. PERFORM ACTIVE TEST

HINT:

Performing the intelligent tester's ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time. The DATA LIST can be displayed during the ACTIVE TEST.

(a) Connect the intelligent tester (with CAN VIM) to the DLC3.

(b) Turn the ignition switch ON.

(c) Perform the ACTIVE TEST according to the display on the tester.

Skid control ECU with actuator

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

Item	Vehicle Condition / Test Details	Diagnostic Note
SOL RELAY	Turns ABS solenoid relay ON / OFF	Operation of solenoid (clicking sound) can be heard
ABS WARNING LIGHT	Turns warning light ON / OFF	Observe combination meter
BRAKE WRN LIGHT	Brake warning light ON / OFF	Operation of solenoid (clicking sound) can be heard

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

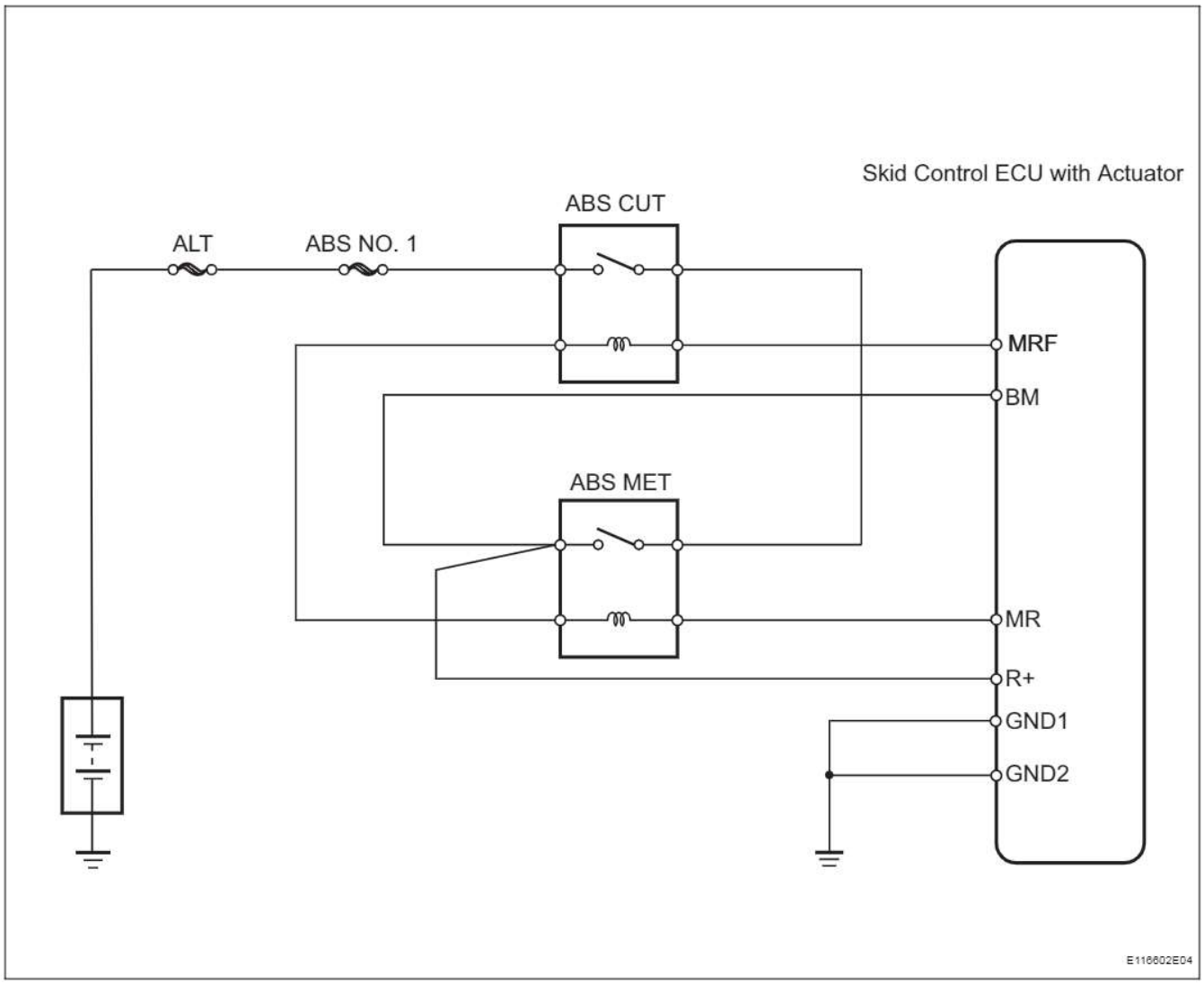
DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
C0273/13	When any of following (1 or 2) is detected: 1. All of following conditions continue for 0.12 seconds or more – IG1 terminal voltage is between 9.5 to 17.2 V – During initial check or ABS, BA, TRAC, and VSC are in operation – Relay contact is open when relay is ON 2. Both of following conditions continue for 0.12 seconds or more – IG1 terminal voltage is 9.5 V or less – Relay contact remains open when relay is ON	• ABS MTR relay • ABS MTR relay circuit • Skid control relay • ABS NO. 1 H-fuse • ABS MTR relay power source circuit
C0274/14	When motor relay is OFF, motor relay remains closed for 4 seconds or more	• ABS MTR relay • ABS MTR relay circuit • Skid control relay • ABS NO. 1 H-fuse
C1361/91	All of following conditions continue for at least 4 seconds: • Immediately after turning ignition switch ON • Relay contact is closed when fail-safe relay is OFF	• ABS MTR relay • ABS MTR relay circuit • Skid control relay • ABS NO. 1 H-fuse

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.

Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 3

A

BC

2	PERFORM ACTIVE TEST BY INTELLIGENT TESTER (ABS MOTOR RELAY)

(a) Select the ACTIVE TEST, generate a control command, and then check that the ABS motor relay operates.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Diagnostic Note
ABS MOT RELAY	Turns ABS motor relay ON / OFF	Operation sound of motor can be heard

OK:
Operation sound of motor can be heard.
HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

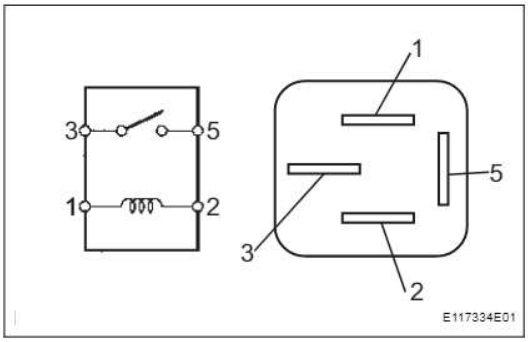
3	INSPECT FUSE (ABS)

(a) Remove the ABS H-fuse from the engine room relay block.
(b) Measure the resistance of the H-fuse.
Standard resistance:
Below 1 Ω

NG → **REPLACE FUSE**

OK

4	INSPECT RELAY (Marking: ABS MTR)



(a) Remove the ABS MTR relay from the ABS relay block.
(b) Measure the resistance of the relay.
Standard resistance

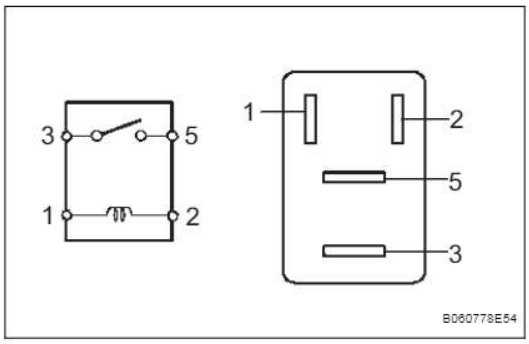
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG → **REPLACE RELAY**

OK

BC

5 INSPECT RELAY (Marking: ABS CUT)



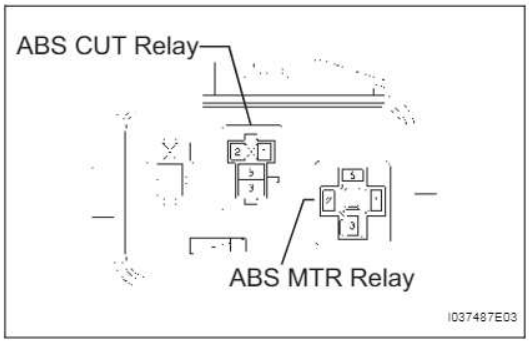
(a) Remove the ABS CUT relay from the ABS relay block.
(b) Measure the resistance of the relay.
Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG → REPLACE RELAY

OK

6 CHECK WIRE HARNESS (ABS CUT RELAY - ABS MTR RELAY AND BATTERY)



(a) Remove the ABS CUT relay and ABS MTR relay from the ABS relay block.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Specified Condition
ABS CUT relay terminal 5 - Body ground	10 to 14 V

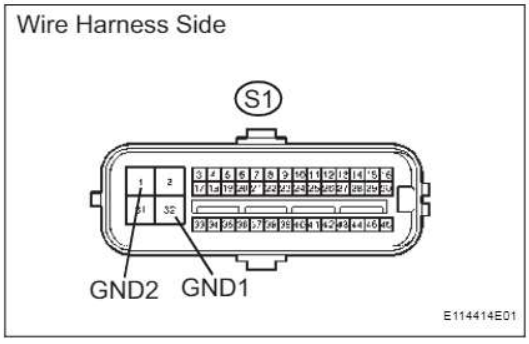
(c) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
ABS CUT relay terminal 3 - ABS MTR relay terminal 5	Below 1 Ω
ABS CUT relay terminal 1 - ABS MTR relay terminal 1	

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

7 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the resistance of the wire harness side connector.
Standard resistance

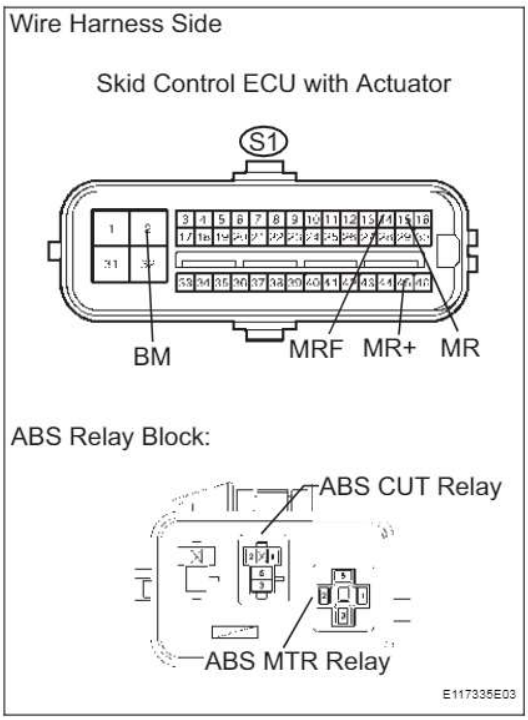
Tester Connection	Specified Condition
S1-32 (GND1) - Body ground	Below 1 Ω
S1-1 (GND2) - Body ground	

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

BC

OK

8	CHECK WIRE HARNESS (SKID CONTROL ECU - ABS CUT RELAY AND ABS MTR RELAY)



(a) Disconnect the S1 ECU connector.
(b) Remove the ABS CUT relay and ABS MTR relay from the ABS relay block.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
S1-14 (MRF) - ABS CUT relay terminal 2	Below 1 Ω
S1-2 (BM) - ABS MTR relay terminal 3	
S1-15 (MR) - ABS MTR relay terminal 2	
S1-45 (R+) - ABS MTR relay terminal 3	

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

DTC	C0278/11	Open in ABS Solenoid Relay Circuit

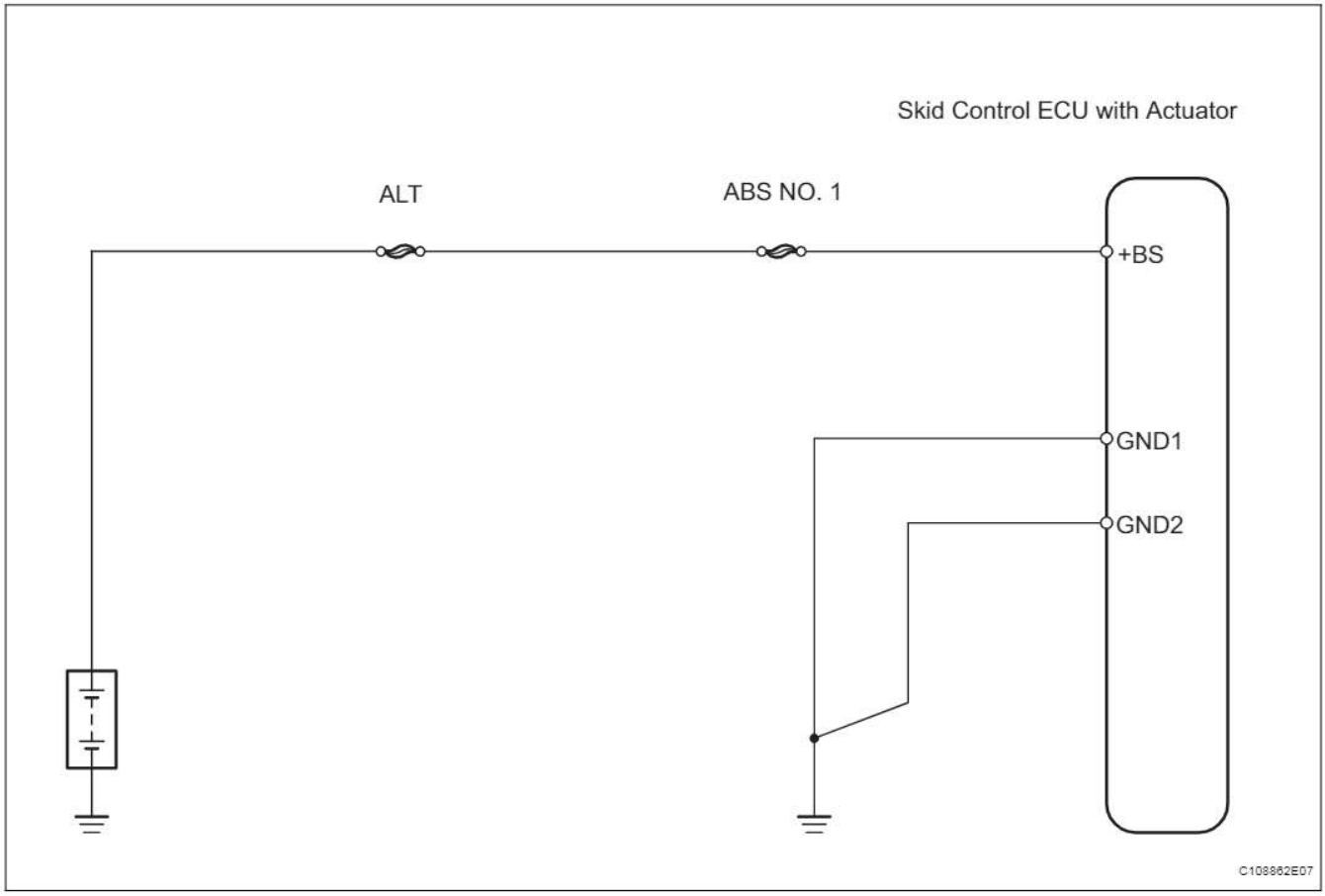
DTC	C0279/12	Short to B+ in ABS Solenoid Relay Circuit

DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
C0278/11	When either of following is detected: 1. Both conditions continue for at least 0.2 seconds • IG voltage is between 9.5 and 17.2 V • Relay contact is open when relay is ON 2. Both conditions continue for at least 0.2 seconds • IG voltage is less than 9.5 V • Relay contact remains open when relay is ON	• Skid control ECU with actuator • ABS solenoid relay circuit
C0279/12	When relay is OFF, turning ignition switch ON closes relay contact immediately and continues for at least 0.2 seconds	• Skid control ECU with actuator • ABS solenoid relay circuit

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

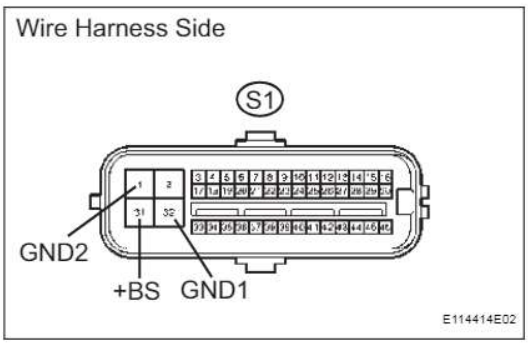
1	INSPECT FUSE (ALT, ABS NO. 1)

(a) Remove the ALT and ABS NO. 1 H-fuses from the engine room junction block.
(b) Measure the resistance of the H-fuses.
Standard resistance:
Below 1 Ω

NG → **REPLACE FUSE**

OK

2	CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Specified Condition
S1-31 (+BS) - Body ground	10 to 14 V

(c) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
S1-32 (GND1) - Body ground	Below 1 Ω
S1-1 (GND2) - Body ground	

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

OK

3	RECONFIRM DTC

HINT:
These codes are output when a problem is detected in the brake actuator assembly.
As the ABS motor relay is built into the brake actuator assembly, ABS motor relay 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 DTCs (see page BC-74).
(b) Drive the vehicle at 6 km/h (4 mph) or more.
(c) Check for DTCs (see page BC-74).
Result

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

BC

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

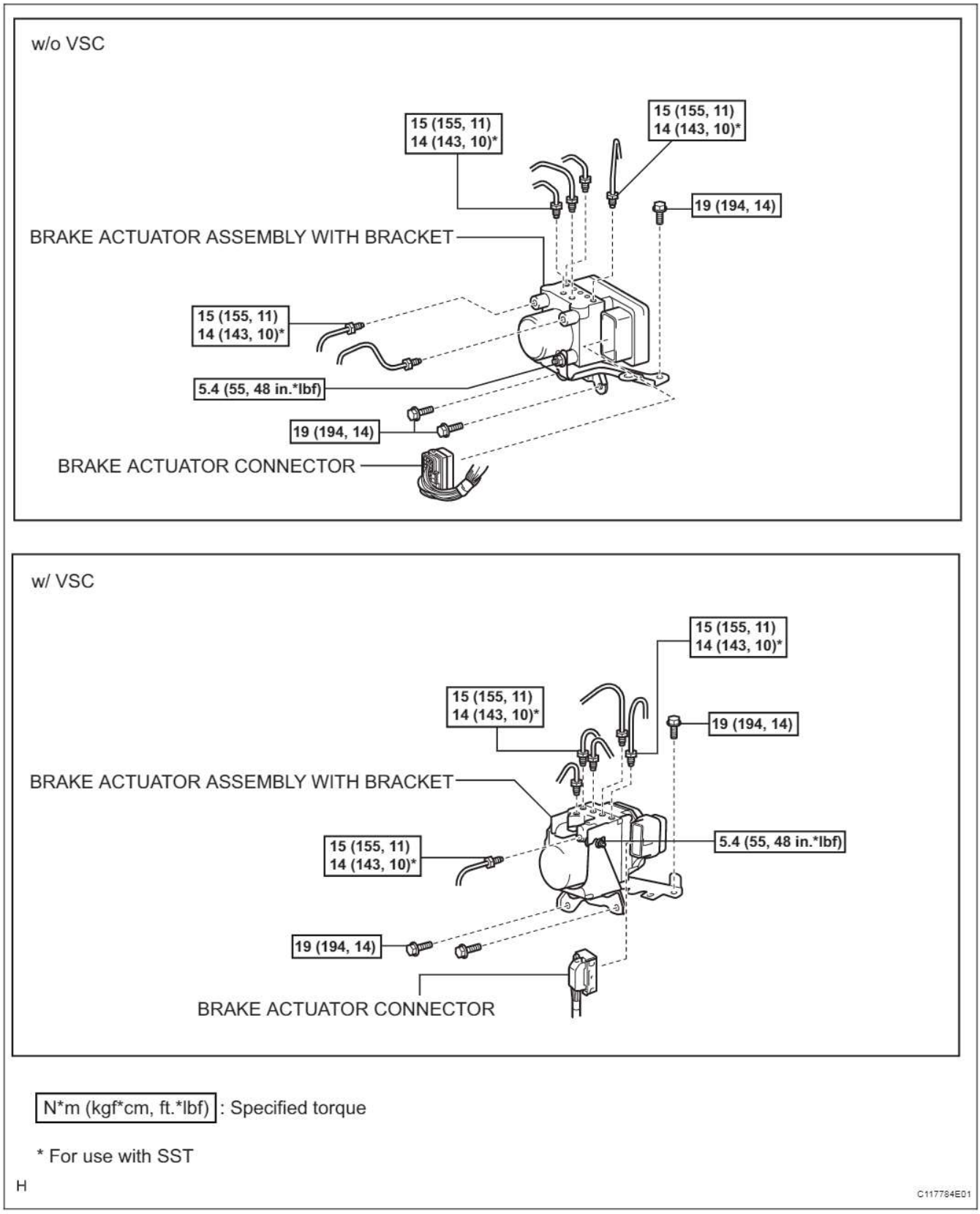
B → END

A

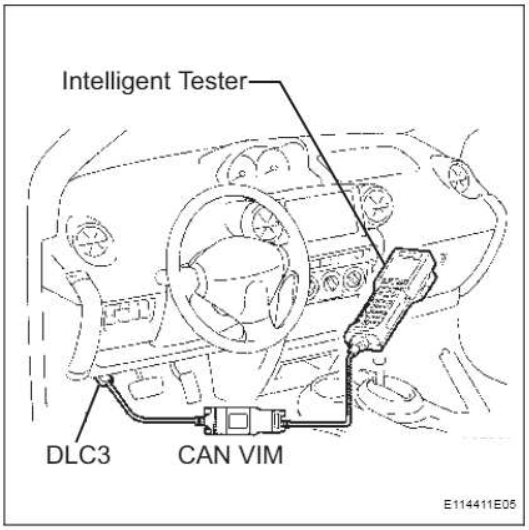
REPLACE BRAKE ACTUATOR ASSEMBLY

BRAKE ACTUATOR

COMPONENTS



BC



ON-VEHICLE INSPECTION

1. **CONNECT INTELLIGENT TESTER**
   (a) Connect the intelligent tester to the DLC3.
   (b) Start the engine and idle it.
   (c) Select the Active Test mode on the intelligent tester.
   HINT:
   Please refer to the intelligent tester operator's manual for further details.

2. **CHECK ACTUATOR MOTOR OPERATION**
   NOTICE:
   Do not keep a motor relay ON for more than 5 seconds. When operating it consecutively, wait 20 seconds between each operation.
   (a) Turn the motor relay ON and check the actuator motor operation noise.
   (b) Turn the motor relay OFF.
   (c) Fully depress the brake pedal and hold it for approximately 15 seconds. Check that the pedal's initial depth is maintained for the entire 15 seconds.
   (d) Turn the motor relay ON and check that the pedal does not pulsate.
   (e) Turn the motor relay OFF and release the pedal.

3. **CHECK RIGHT FRONT WHEEL OPERATION**
   NOTICE:
   - **Be sure to follow the procedures below when turning ON a solenoid.**
   - **Do not keep a solenoid ON for more than 10 seconds. When operating it consecutively, wait 20 seconds between each operation.**

   (a) With the pedal depressed as much as possible, perform the following operations.
   (b) Turn the SFRH and SFRR solenoids ON simultaneously, and check that the pedal cannot be depressed further.
   (c) Turn the SFRH and SFRR solenoids OFF simultaneously, and check that the pedal can be depressed further.
   (d) Turn the motor relay ON. Check that the pedal returns to the "depressed as much as possible" position.
   (e) Turn the motor relay OFF and release the pedal.

4. **CHECK OTHER WHEEL OPERATION**
   (a) Using the same procedures, check the solenoids of the other wheels.
   NOTICE:
   The pedal must be depressed if only the reduction solenoid SFLR, SRRR or SRLR is turned on.
   HINT:
   Left front wheel: SFLH, SFLR
   Right rear wheel: SRRH, SRRR
   Left rear wheel: SRLH, SRLR

BC

DTC	C1201/51	Engine Control System Malfunction

DESCRIPTION

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

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

INSPECTION PROCEDURE

1	CHECK DTC FOR ENGINE

Result

Result	Proceed to
Normal Code	A
Malfunction Code	B

B → REPAIR ENGINE CONTROL SYSTEM ACCORDING TO CODE OUTPUT

A

REPLACE ECM

BC

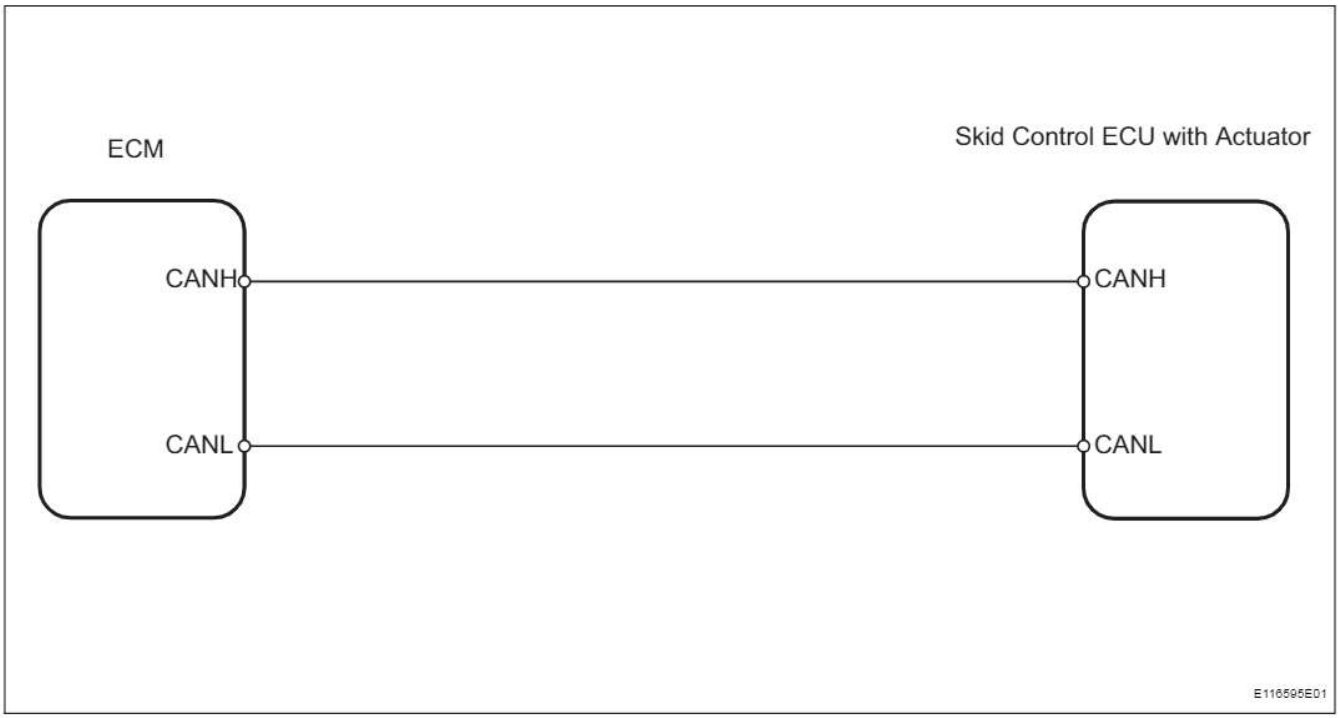
DTC	C1203/53	ECM Communication Circuit Malfunction

DESCRIPTION

This 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 Detection Condition	Trouble Area
C1203/53	Data about engine, drive system, and user country from ECM are not same as skid control ECU	• CAN Communication System • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	RECONFIRM DTC

(a) Clear the DTC (see page BC-74).
(b) Turn the ignition switch ON.
(c) Drive the vehicle at a speed of 15 km/h (9 mph) and turn the steering wheel to the right and left.
(d) Check for DTC (see page BC-74). If a DTC of the ABS and VSC is output, make a note of them.

BC

Result

Result	Proceed to
DTC is output for CAN communication system CA-6	A
DTC is output (ABS and VSC DTCs are output)	B
DTC is not output	C

B	REPAIR CIRCUIT INDICATED BY OUTPUT CODE
C	END

A

GO TO CAN COMMUNICATION SYSTEM

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

DTC	C1336/39	Zero Point Calibration of Acceleration Sensor Undone

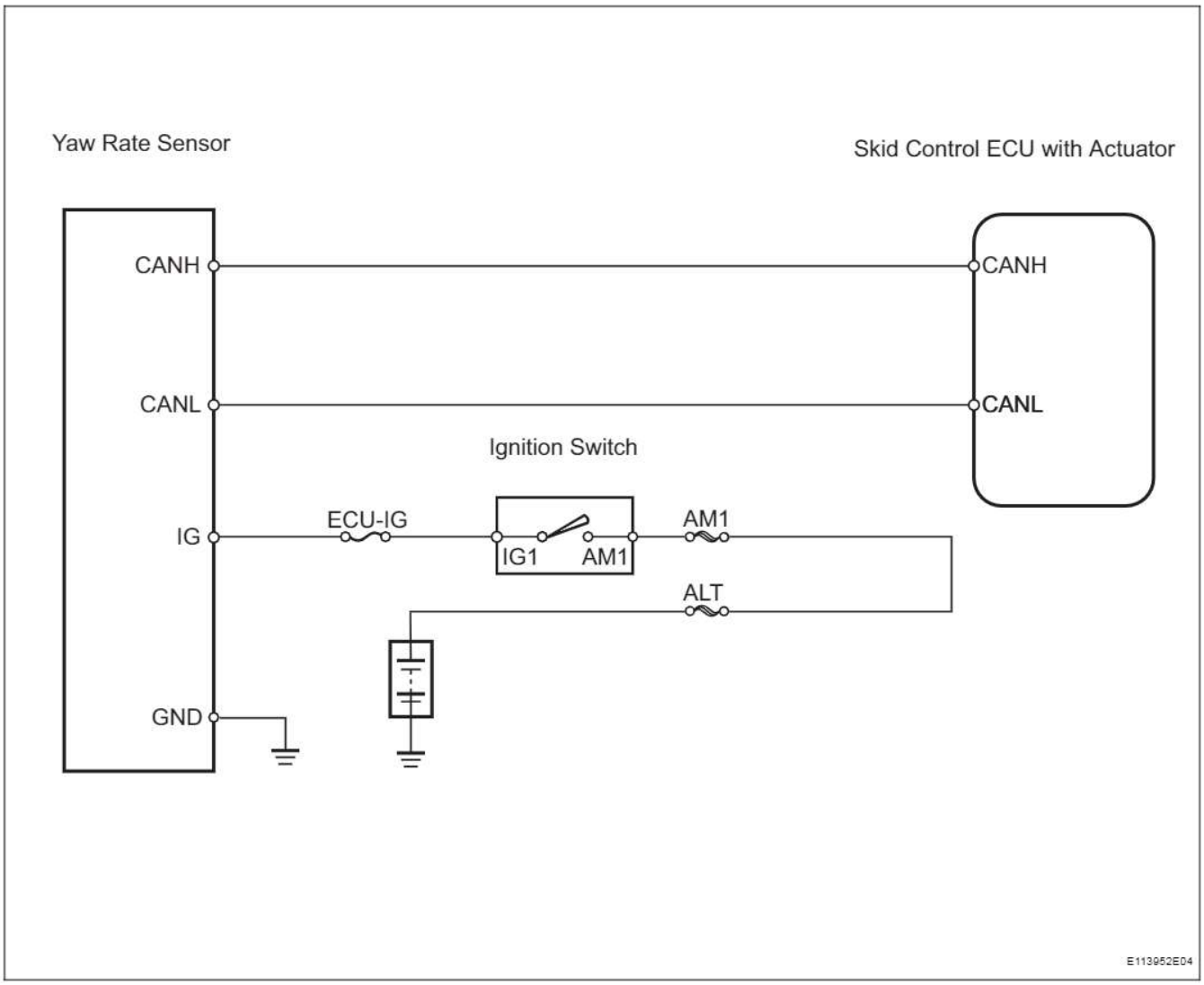
DESCRIPTION

The deceleration sensor is built into the yaw rate sensor.

DTC No.	DTC Detection Condition	Trouble Area
C1210/36	When either condition below is met: • After ECU was replaced, shift lever was moved to position other than P within 15 seconds immediately after ECU terminal IG1 turns ON for first time. • Yaw rate sensor zero point recorded in ECU is deleted	• Yaw rate sensor • Yaw rate sensor circuit • Zero point calibration not done
C1336/39	After initial time after replacing ECU, or after erasing deceleration sensor memory by connecting terminals TS and CG of DLC3, ignition switch is turned ON and vehicle is driven in any mode except for test mode	• Yaw rate sensor • Yaw rate sensor circuit (Deceleration sensor) • Zero point calibration not done

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
When U0121/94, U0123/62, U0124/95 or U0126/63 is output along with C1210/36 or C1336/98, inspect and repair the trouble areas indicated by U0123/62, U0124/95 or U0126/63 first.

1	**PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR (DECELERATION SENSOR)**

BC

(a) Perform the zero point calibration of the yaw rate sensor (see page BC-69).

NEXT

2	**CHECK YAW RATE SENSOR (INSTALLATION)**

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

NG → INSTALL YAW RATE SENSOR CORRECTLY

OK

3	RECONFIRM DTC

(a) Clear the DTCs (see page BC-74).
(b) Turn the ignition switch ON.
(c) Check for DTCs (see page BC-74).
OK:
Same DTCs are output.

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

NG → END

OK

REPLACE YAW RATE SENSOR

BC

DTC	C1223/43	ABS Control System Malfunction

DESCRIPTION

This DTC is displayed when the VSC system receives the malfunction signal from the ABS.

DTC No.	DTC Detection Condition	Trouble Code
C1223/43	Malfunction in anti-lock brake system	Anti-lock brake system

INSPECTION PROCEDURE

1	CHECK DTC

(a) Check that the DTCs for the ABS other than C1223/43 are recorded (see page BC-74).

NEXT

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

BC

DTC	C1224/44	NE Signal Circuit

DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
C1224/44	Detection of either condition 1. or 2.: 1. When vehicle speed is 30 km/h (19 mph) or more and data reception from ECM is in normal condition, open or short circuit of engine revolution signal continues for 10 seconds or more 2. When TRAC is in operation, open or short circuit of engine revolution signal continues for 0.24 seconds or more	• NEO circuit • ECM • Skid control ECU with actuator

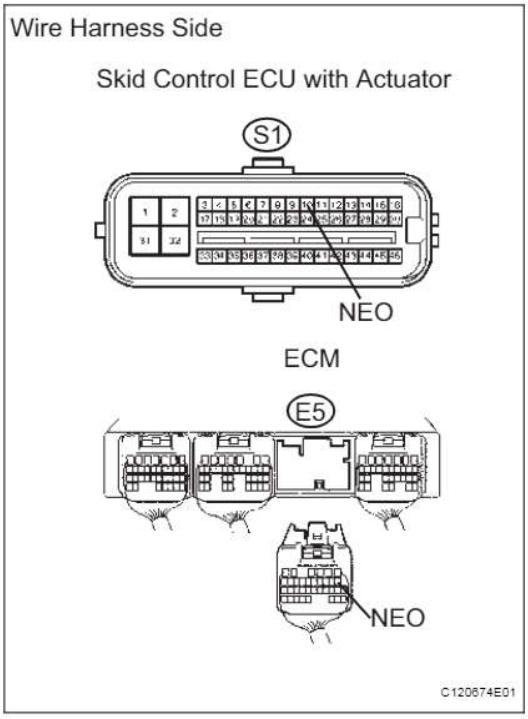
WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 CHECK WIRE HARNESS (SKID CONTROL ECU - ECM)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the E5 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

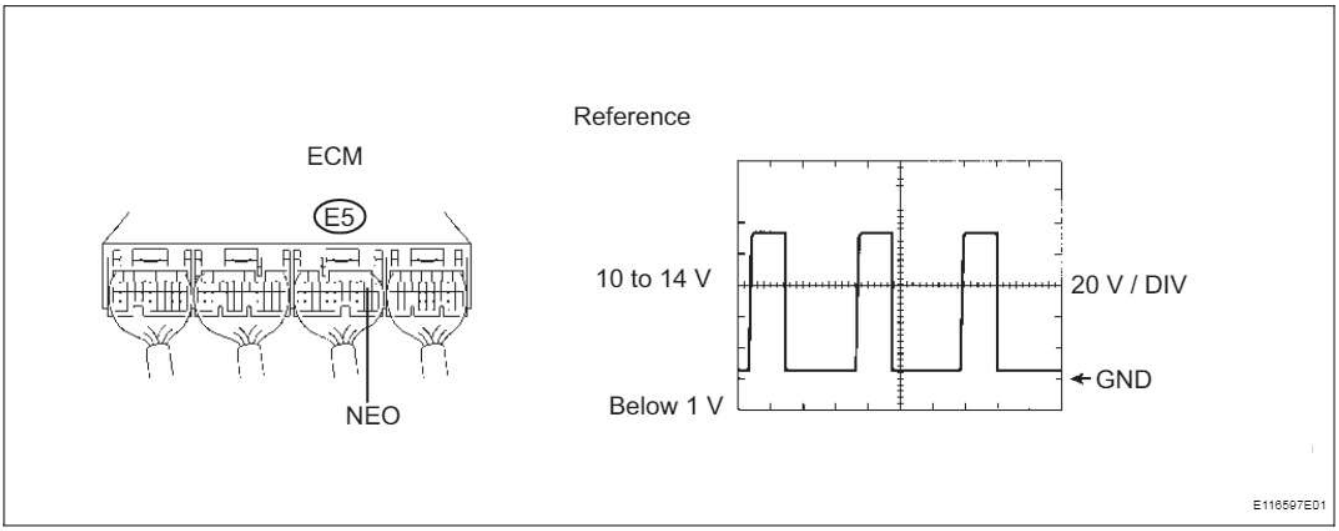
Standard resistance

Tester Connection	Specified Condition
S1-10 (NEO) - E5-7 (NEO)	Below 1 Ω
S1-10 (NEO) - Body ground	10 kΩ or higher

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

OK

2 CHECK ECM (NEO TERMINAL)



(a) Measure the voltage of the ECM.

Standard voltage

Tester Connection	Engine Condition	Specified Condition
E5-7 (NEO) - Body ground	OFF (Ignition switch ON)	Alternating between 10 to 14 V and below 1 V
	ON (Idling)	

BC

NG → REPLACE ECM

OK

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

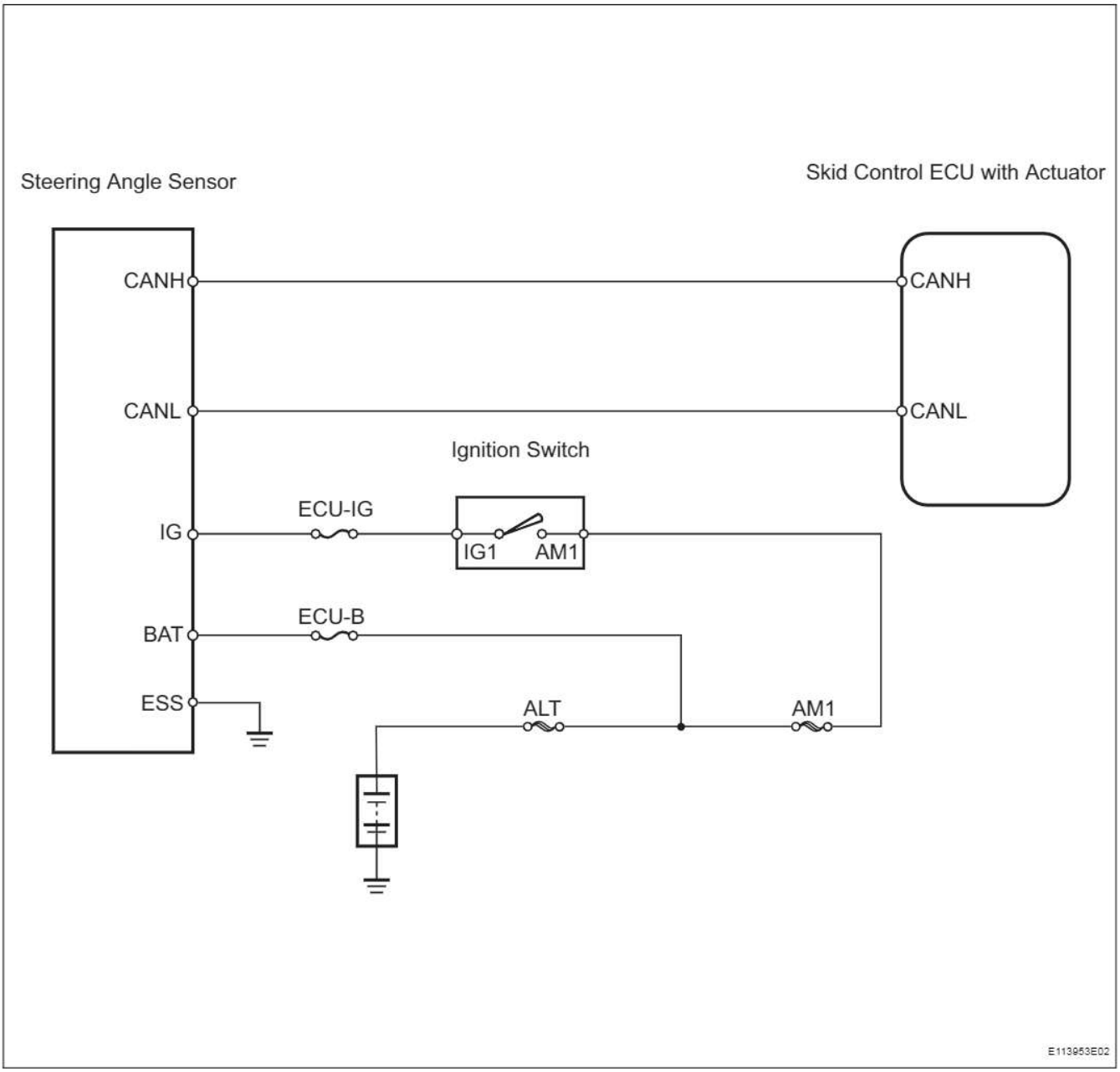
DTC	C1231/31	Steering Angle Sensor Circuit Malfunction

DESCRIPTION

The steering angle sensor signal is sent to the skid control ECU through the CAN communication system. When there is a malfunction in the communication system, the DTC will be detected by the diagnosis function.

DTC No.	DTC Detection Condition	Trouble Area
C1231/31	When ECU IG1 terminal voltage is 9.5 V or more, steering angle sensor malfunction signal is received	• Steering angle sensor • Steering angle sensor circuit • Power source circuit

WIRING DIAGRAM



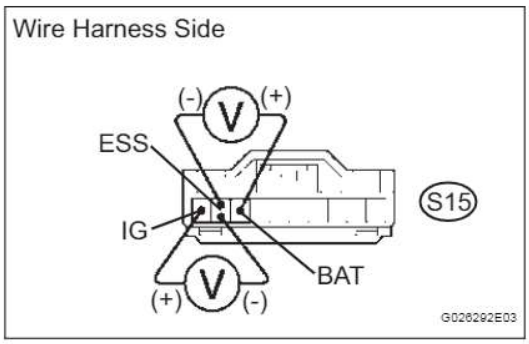
BC

INSPECTION PROCEDURE

HINT:

- When U0121/94, U0123/62, U0124/95 or U0126/63 is output along with C1210/36 or C1336/98, inspect and repair the trouble areas indicated by U0123/62, U0124/95 or U0126/63 first.
- When the speed sensor or the yaw rate sensor has a problem, 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 with other DTCs for the steering angle sensor, inspect and repair the speed sensor and yaw rate sensor first. Then inspect and repair the steering angle sensor.

1 CHECK WIRE HARNESS (STEERING ANGLE SENSOR - BATTERY)



(a) Disconnect the S15 sensor connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Switch Condition	Specified Condition
S15-1 (IG) - S15-2 (ESS)	Ignition switch ON	10 to 14 V
S15-3 (BAT) - S15-2 (ESS)	Always	

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

OK

REPLACE STEERING ANGLE SENSOR

BC

DTC	C1232/32	Stuck in Deceleration Sensor
DTC	C1234/34	Yaw Rate Sensor Malfunction
DTC	C1243/43	Acceleration Sensor Stuck Malfunction
DTC	C1244/44	Open or Short in Deceleration 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

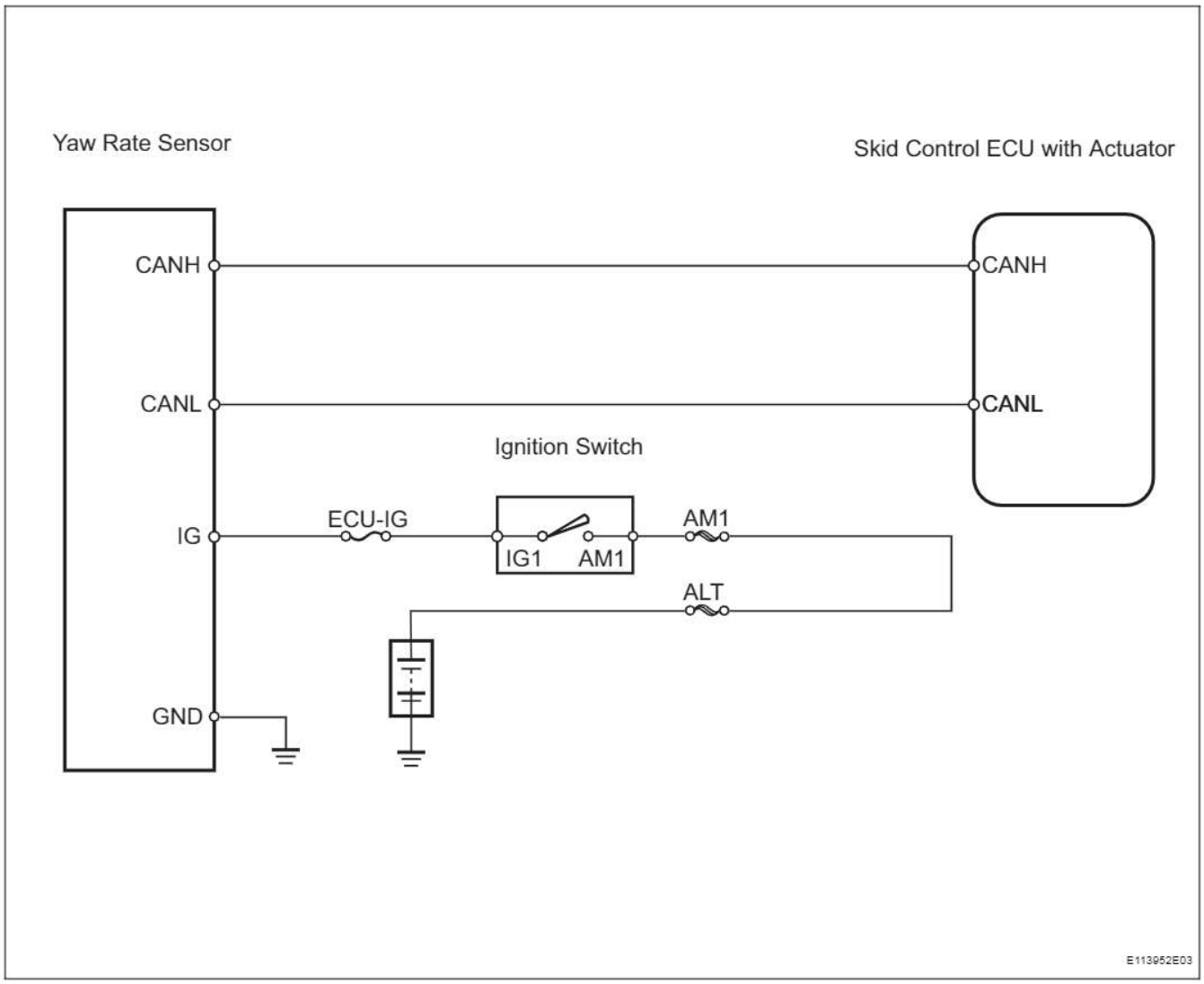
DESCRIPTION

The deceleration sensor is built into the yaw rate sensor.
The yaw rate sensor signal is sent to the skid control ECU through the CAN communication system.
When there is a malfunction in communication, it will be detected by the diagnosis function.

DTC No.	DTC Detection Condition	Trouble Area
C1232/32	While vehicle speed becomes 0 km/h (0 mph) from 30 km/h (18 mph), the condition that GL1 and GL2 signals of ECU terminals do not change to 0.04 V or less occurs 16 times in a row	• Yaw rate sensor (Deceleration sensor) • Yaw rate sensor (Deceleration sensor) circuit • Wire harness
C1234/34	Yaw rate sensor malfunction signal is received	• Yaw rate sensor • Yaw rate sensor circuit • Wire harness
C1243/43	While the vehicle speed changes from 30 km/h (19 mph) to 0 km/h (0 mph), the condition that either GL1 or GL2 does not change occurs 16 times in a row	• Yaw rate sensor • Yaw rate sensor circuit • Wire harness for deceleration sensor system
C1244/44	Either condition (1 or 2) is detected 1. While the vehicle is not running, the condition that the difference between GL1 and GL2 once became 0.6 G or more but has not become below 0.4 G since then continues for 60 seconds or more 2. Data malfunction signal is received from G sensor	• Yaw rate sensor • Yaw rate sensor circuit • Wire harness
C1245/45	With vehicle speed at 30 km/h (19 mph) or more, the condition that the difference between acceleration and deceleration values of computation from deceleration sensor and vehicle speed becomes more than 0.35 G continues for 60 seconds or more	• Yaw rate sensor • Yaw rate sensor circuit • Wire harness for deceleration sensor system
C1381/97	With vehicle speed at 3 km/h (2 mph) or more, malfunction signal of deceleration sensor battery has been received constantly for 10 seconds or more	• Battery • Power source circuit • Charging system
C1279/79	Detected only during test mode	• Deceleration sensor • Sensor installation

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
When U0121/94, U0123/62, U0124/95 or U0126/63 are output along with C1210/36 or C1336/39, inspect and repair the trouble areas indicated by U0121/94, U0123/62, U0124/95 or U0126/63 first.

1	CHECK YAW RATE SENSOR (INSTALLATION)

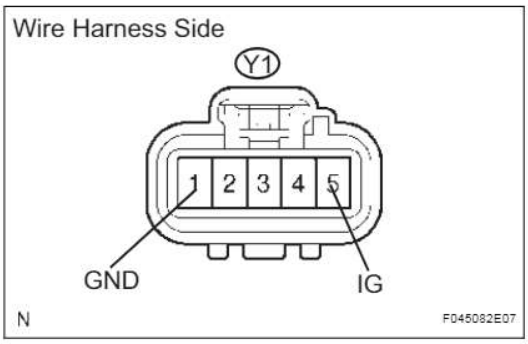
(a) Check that the yaw rate sensor has been installed properly.

NG → INSTALL YAW RATE SENSOR CORRECTLY

OK

BC

2	CHECK WIRE HARNESS (YAW RATE SENSOR - BATTERY AND BODY GROUND)



(a) Disconnect the Y1 sensor connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Switch Condition	Specified Condition
Y1-5 (IG) - Body ground	Ignition switch ON	10 to 14 V

(c) Measure the resistance of the wire harness side connector.
Standard resistance

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

HINT:
When replacing the yaw rate sensor, perform the zero point calibration (see page BC-69).

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

OK

REPLACE YAW RATE SENSOR

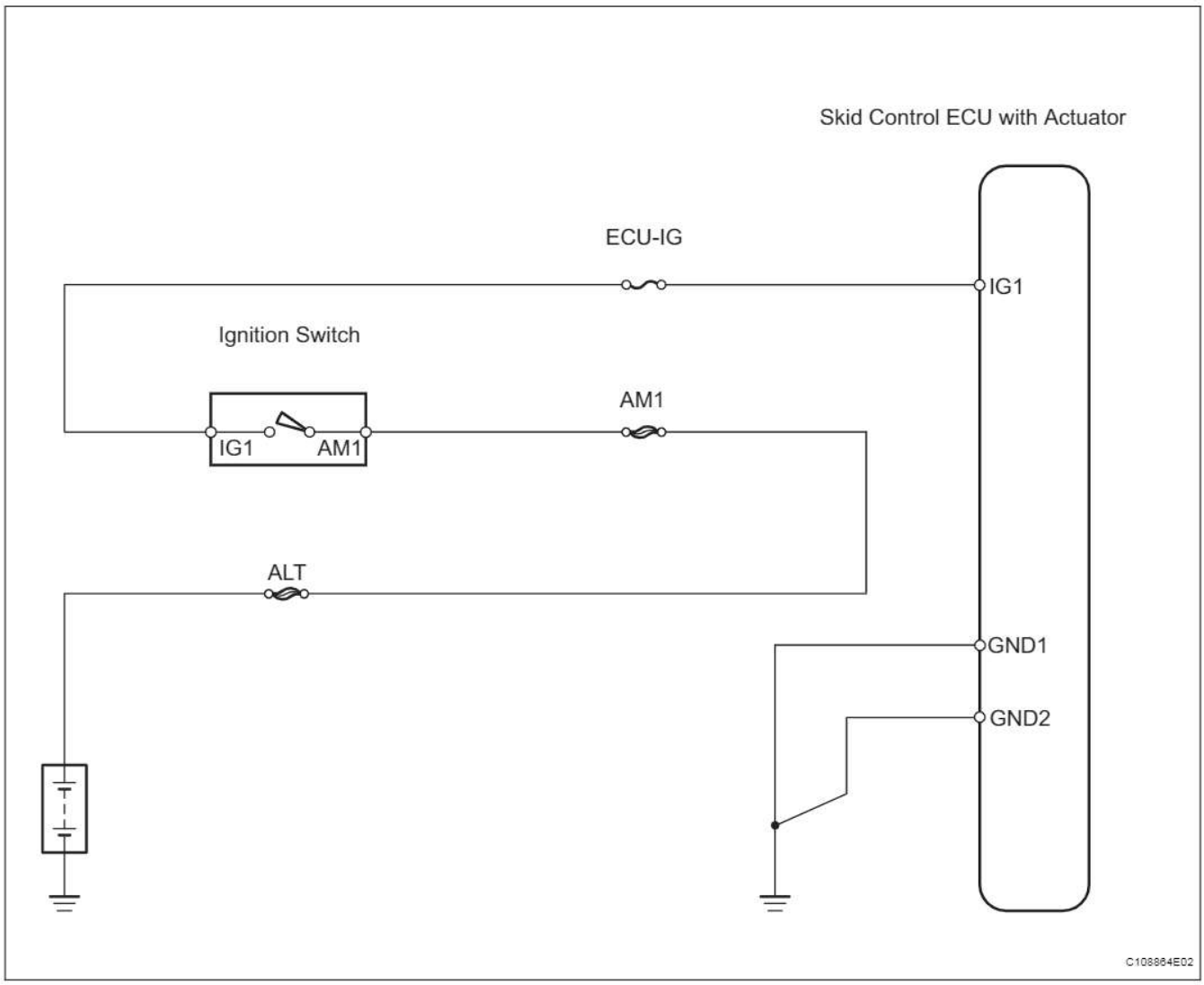
BC

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

DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1241/41	When either of following is detected: 1. Both conditions continue for at least 10 seconds • Vehicle speed is more than 3 km/h (2 mph) • IG1 terminal voltage is less than 9.5 V 2. All conditions continue for at least 0.2 seconds • Solenoid relay remains ON • Relay contact is open • IG1 terminal voltage is less than 9.5 V	• Battery • Charging system • Power source circuit

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	INSPECT FUSE (ECU-IG)

(a) Remove the ECU-IG fuse from the instrument panel junction block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω
Result

Result	Proceed to
OK (when using intelligent tester)	A
OK (when not using intelligent tester)	B
NG	C

B → Go to step 3

C → REPLACE FUSE

A

2	READ DATA LIST (IG VOLTAGE)

(a) Check the DATA LIST for proper functioning of the IG voltage.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
IG VOLTAGE	ECU power supply voltage / NORMAL / TOO LOW	NORMAL: 9.5 to 14 V TOO LOW: Below 9.5 V	-

Result

Result	Proceed to
Display is not NORMAL	A
Display is NORMAL	B

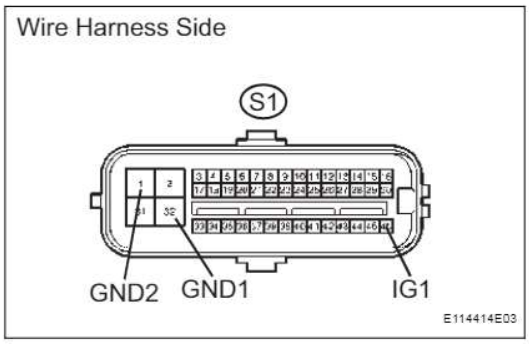
HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

B → REPLACE BRAKE ACTUATOR ASSEMBLY

BC

A

3 CHECK WIRE HARNESS (SKID CONTROL ECU- BATTERY AND BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S1-46 (IG1) - Body ground	Ignition switch ON	10 to 14 V

(c) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
S1-32 (GND1) - Body ground	Below 1 Ω
S1-1 (GND2) - Body ground	

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

OK

4 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-74).
(b) Drive the vehicle at approximately 30 km/h (19 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-74).
Result

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

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

B → **END**

A

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

DTC	C1246/46	Master Cylinder Pressure Sensor Malfunction

DTC	C1281/81	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)

DESCRIPTION

The master cylinder pressure sensor is connected to the skid control ECU with actuator.
DTC C128181 can be deleted when the master cylinder pressure sensor sends a master cylinder pressure signal or the test mode ends. DTC C1281/81 is output only in the test mode.

DTC No.	DTC Detection Condition	Trouble Area
C1246/46	• When vehicle speed is 7 km/h (4 mph) or more and PMC terminal voltage of skid control ECU exceeds 0.86 V, condition that voltage does not change by 0.005 V or more continues for 30 seconds • Noise in terminal PMC of skid control ECU occurs 7 times or more within 5 seconds • When stop light switch is OFF, condition that PMC terminal voltage of skid control ECU is 0.86 V or more, or less than 0.3 V continues for 5 seconds or more • When IG1 terminal voltage is 9.5 to 17.2 V, condition that VCM terminal voltage of skid control ECU is out of range from 4.4 to 5.6 V continues for 1.2 seconds or more • When VCM terminal voltage of skid control ECU is 4.4 to 5.6 V, condition that PMC terminal voltage of skid control ECU is out of range from 0.14 to 4.85 V continues for 1.2 seconds or more	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
C121/81	Detected only during test mode	Master cylinder pressure sensor

INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

BC

B → Go to step 3

A

2	READ VALUE OF INTELLIGENT TESTER (MASTER CYLINDER PRESSURE SENSOR)

(a) Check the DATA LIST for proper functioning of the master cylinder pressure sensor.

Skid control ECU with actuator

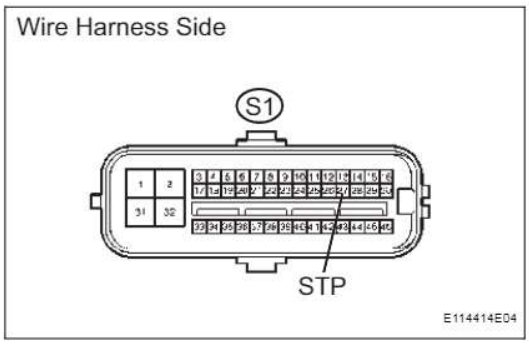
Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
MAS CYL PRESS 1	Master cylinder pressure sensor 1 reading / Min.: 0 V, Max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	Reading increases when brake pedal is depressed

OK:
Brake fluid pressure value (voltage) changes from 0.3 to 0.9 V.
HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

3 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S1-27 (STP) - Body ground	Brake pedal is depressed	8 to 14 V
	Brake pedal is released	Below 1 V

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

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

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

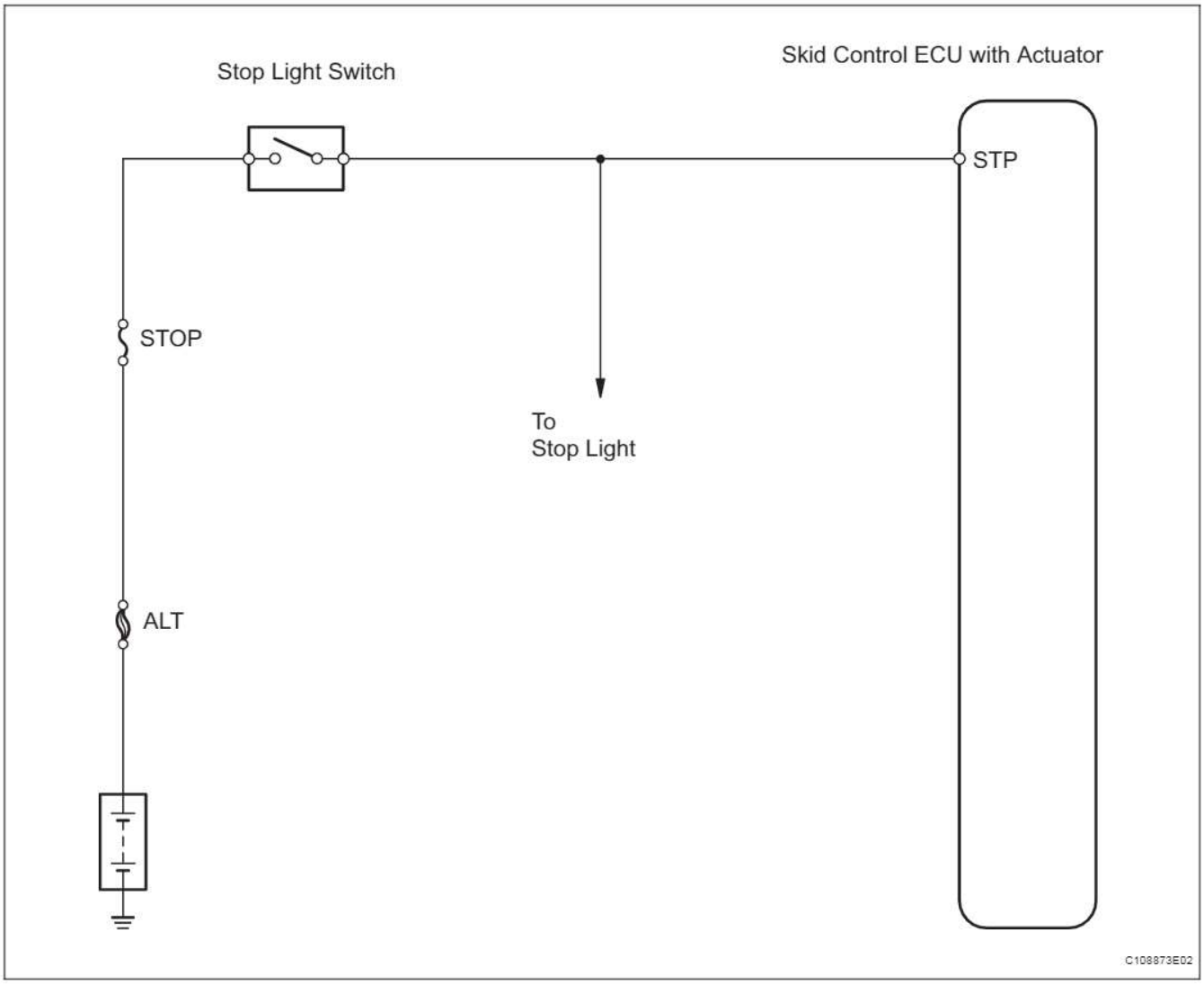
DTC	C1249/49	Open in Stop Light Switch Circuit

DESCRIPTION

This circuit recognizes brake operation by sending a stop light signal to the skid control ECU.

DTC No.1	DTC Detection Condition	Trouble Area
C1249/49	Both conditions continue for at least 0.3 seconds: • IG1 terminal voltage is between 9.5 and 17.2 V • Open in stop light switch circuit	• Stop light switch assembly • Stop light switch circuit

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 CHECK STOP LIGHT SWITCH ASSEMBLY (OPERATION)

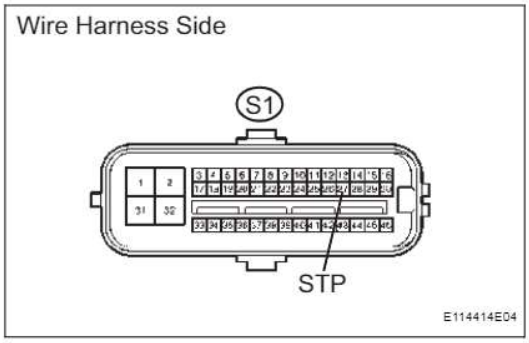
(a) Check that the stop light illuminates when the brake pedal is depressed, and turns off when the brake pedal is released.
OK

Condition	Stop Light Condition
Brake pedal depressed	Illuminates
Brake pedal released	Turns off

NG → Go to step 4

OK

2 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Switch Condition	Specified Condition
S1-27 (STP) - Body ground	Brake pedal depressed	10 to 14 V
	Brake pedal released	Below 1 V

NG → Go to step 5

OK

3 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-74).
(b) Drive the vehicle at approximately 30 km/h (19 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-69).
Result

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

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-74).

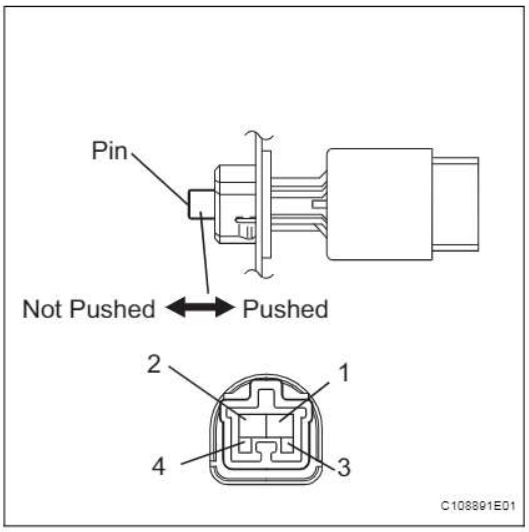
B → END

A

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

4 INSPECT STOP LIGHT SWITCH ASSEMBLY



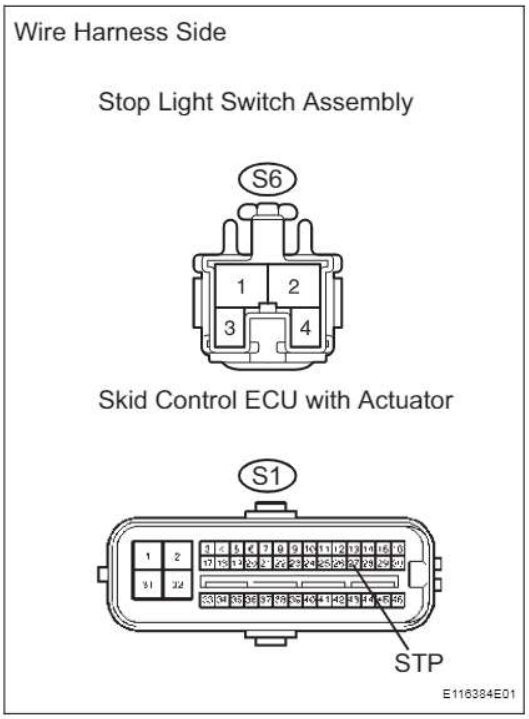
(a) Disconnect the S6 switch connector.
(b) Measure the resistance of the switch.
Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Pin not pushed	Below 1 Ω
	Pin pushed	10 kΩ or higher

NG → **REPLACE STOP LIGHT SWITCH ASSEMBLY**

OK

5 CHECK WIRE HARNESS (STOP LIGHT SWITCH - SKID CONTROL ECU AND BATTERY)



(a) Disconnect the S6 switch connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Specified Condition
S6-2 - Body ground	10 to 14 V

(d) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
S6-1 - S1-27 (STP)	Below 1 Ω

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

OK

6 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-74).
(b) Drive the vehicle at approximately 30 km/h (19 mph) or more for 60 seconds or more.

BC

(c) Check for DTCs (see page BC-74).
Result

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

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

B → END

A → REPLACE BRAKE ACTUATOR ASSEMBLY

BC

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:
When removing parts, turn the ignition switch OFF.
HINT:

- Using SST 09843-18040, connect terminals TC and CG of the DLC3.
- If any abnormality is not found when inspecting parts, inspect the ECU and ground points for poor contact.
- If a trouble code is displayed during the DTC check, check the circuit listed for that code. For details of each code, turn to the page shown under the "See page" for respective "DTC No." in the DTC chart.
- When 2 or more DTCs are recorded and the problem is not identified, perform circuit inspection of the other DTCs.

Anti-lock brake system

DTC No.	Detection Item	Trouble Area	See page
C0200/31	Right Front Wheel Speed Sensor Signal Malfunction	- Front speed sensor RH - Front speed sensor RH circuit - Front speed sensor rotor RH - Sensor installation	BC-16
C0205/32	Left Front Wheel Speed Sensor Signal Malfunction	- Front speed sensor LH - Front speed sensor LH circuit - Front speed sensor rotor LH - Sensor installation	BC-16
C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction	- Rear speed sensor RH - Rear speed sensor RH circuit - Rear speed sensor rotor RH - Sensor installation	BC-22
C0215/34	Left Rear Wheel Speed Sensor Signal Malfunction	- Rear speed sensor LH - Rear speed sensor LH circuit - Rear speed sensor rotor LH - Sensor installation	BC-22
C0226/21	SFR Solenoid Circuit	- Skid control ECU with actuator (Brake actuator assembly) - SFRR or SFRH circuit	BC-27
C0236/22	SFL Solenoid Circuit	- Skid control ECU with actuator (Brake actuator assembly) - SFLR or SFLH circuit	BC-27
C0246/23	SRR Solenoid Circuit	- Skid control ECU with actuator (Brake actuator assembly) - SRRR or SRRH circuit	BC-27
C0256/24	SRL Solenoid Circuit	- Skid control ECU with actuator (Brake actuator assembly) - SRLR or SRLH circuit	BC-27
C0273/13	Open in ABS Motor Relay Circuit	- ABS motor relay - ABS motor relay circuit	BC-29
C0274/14	Short to B+ in ABS Motor Relay Circuit	- ABS motor relay - ABS motor relay circuit	BC-29
C0278/11	Open in ABS Solenoid Relay Circuit	- ABS solenoid relay - ABS solenoid relay circuit - Skid control ECU with actuator (Brake actuator assembly)	BC-32
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	- ABS solenoid relay - ABS solenoid relay circuit - Skid control ECU with actuator (Brake actuator assembly)	BC-32
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	- Front speed sensor RH - Front speed sensor rotor RH	BC-16
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	- Front speed sensor LH - Front speed sensor rotor LH	BC-16

BC

DTC No.	Detection Item	Trouble Area	See page
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	- Rear speed sensor RH - Rear speed sensor rotor RH	BC-22
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	- Rear speed sensor LH - Rear speed sensor rotor LH	BC-22
C1241/41	Low Battery Positive Voltage or Abnormally High Battery Positive Voltage	- Battery - Charging system - Power source circuit	BC-34
C1249/49	Open in Stop Light Switch Circuit	- Stop light switch - Stop light swich circuit	BC-37
C1251/51	Open in Pump Motor Circuit	- ABS pump motor	BC-41

DTC chart of sensor check function

DTC No.	Detection Item	Trouble Area	See page
C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	- Front speed sensor RH - Sensor installation - Sensor rotor	BC-16
C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	- Front speed sensor LH - Sensor installation - Sensor rotor	BC-16
C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	- Rear speed sensor RH - Sensor installation - Sensor rotor	BC-22
C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	- Rear speed sensor LH - Sensor installation - Sensor rotor	BC-22
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	- Front speed sensor rotor RH	BC-16
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	- Front speed sensor rotor LH	BC-16
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	- Rear speed sensor rotor RH	BC-22
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	- Rear speed sensor rotor LH	BC-22

BC

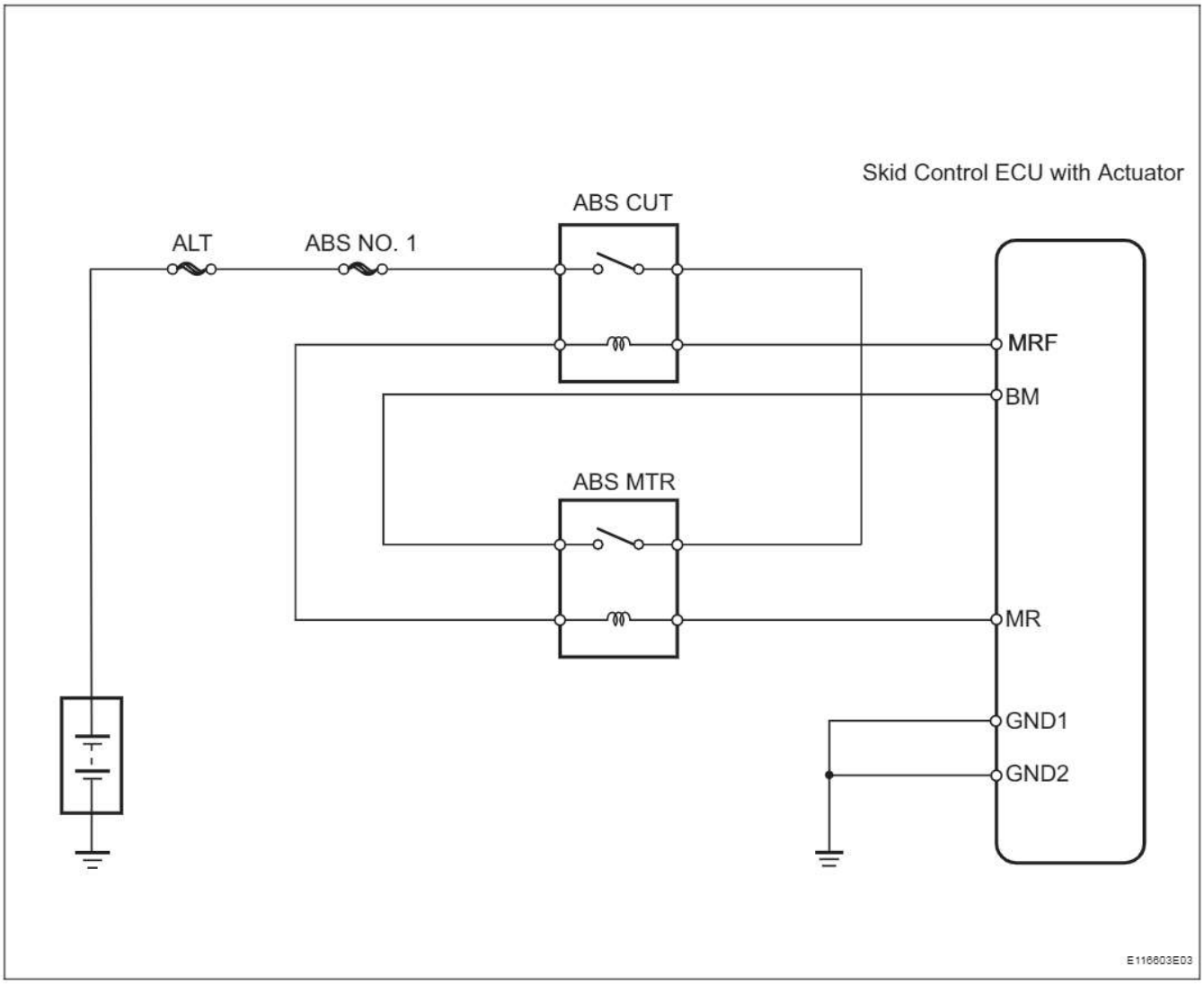
DTC	C1251/51	Open in Pump Motor Circuit

DESCRIPTION

The ABS pump motor is located inside the brake actuator.

DTC No.	DTC Detection Condition	Trouble Area
C1251/51	When either condition below is met: • Actuator pump motor does not operate properly • Actuator pump motor circuit remains open for at least 2 seconds	• Skid control ECU with actuator • Skid control ECU with actuator circuit

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.

Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 3

A

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (ABS MTR RELAY)

(a) Select the ACTIVE TEST, generate a control command, and then check that the ABS MTR relay operates.

Skid control ECU with actuator

Item	Vehicle Condition / Test Details	Diagnostics Note
ABS MOT RELAY	Turn ABS MTR relay ON / OFF	Operation sound of motor can be heard

OK:

Operation sound of ABS motor is heard.

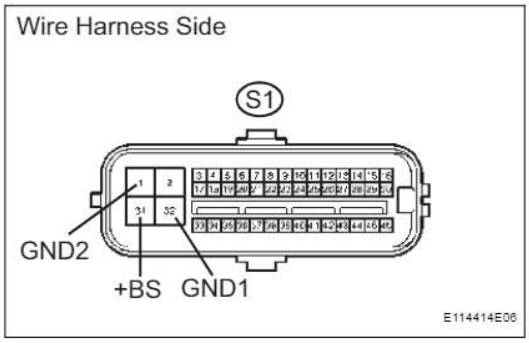
HINT:

When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

OK → REPLACE BRAKE ACTUATOR ASSEMBLY

NG

3 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)



(a) Disconnect the S1 ECU connector.

(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Specified Condition
S1-31 (+BM) - Body ground	10 to 14 V

(c) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
S1-32 (GND1) - Body ground	Below 1 Ω
S1-1 (GND2) - Body ground	

HINT:

When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

DTC	U0100/65	Lost Communication with ECM / PCM
DTC	U0121/94	CAN Communication Function Fault
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

INSPECTION PROCEDURE

1	RECONFIRM DTC

(a) Clear the DTC (see page BC-74).
(b) Turn the ignition switch ON.
(c) Drive the vehicle at a speed of 15 km/h (9 mph) and turn the steering wheel to the right and left.
(d) Check for DTC (see page BC-74). If a DTC of the ABS and VSC is output, make a note of them.

Result

Result	Proceed to
DTC is output fot the CAN communication systemCA-6	A
DTC is output (ABS and VSC DTCs are output)	B
DTC is not output	C

B → REPLACE CIRCUIT INDICATOR BY OUTPUT CODE

C → END

A

BC GO TO CAN COMMUNICATION SYSTEM

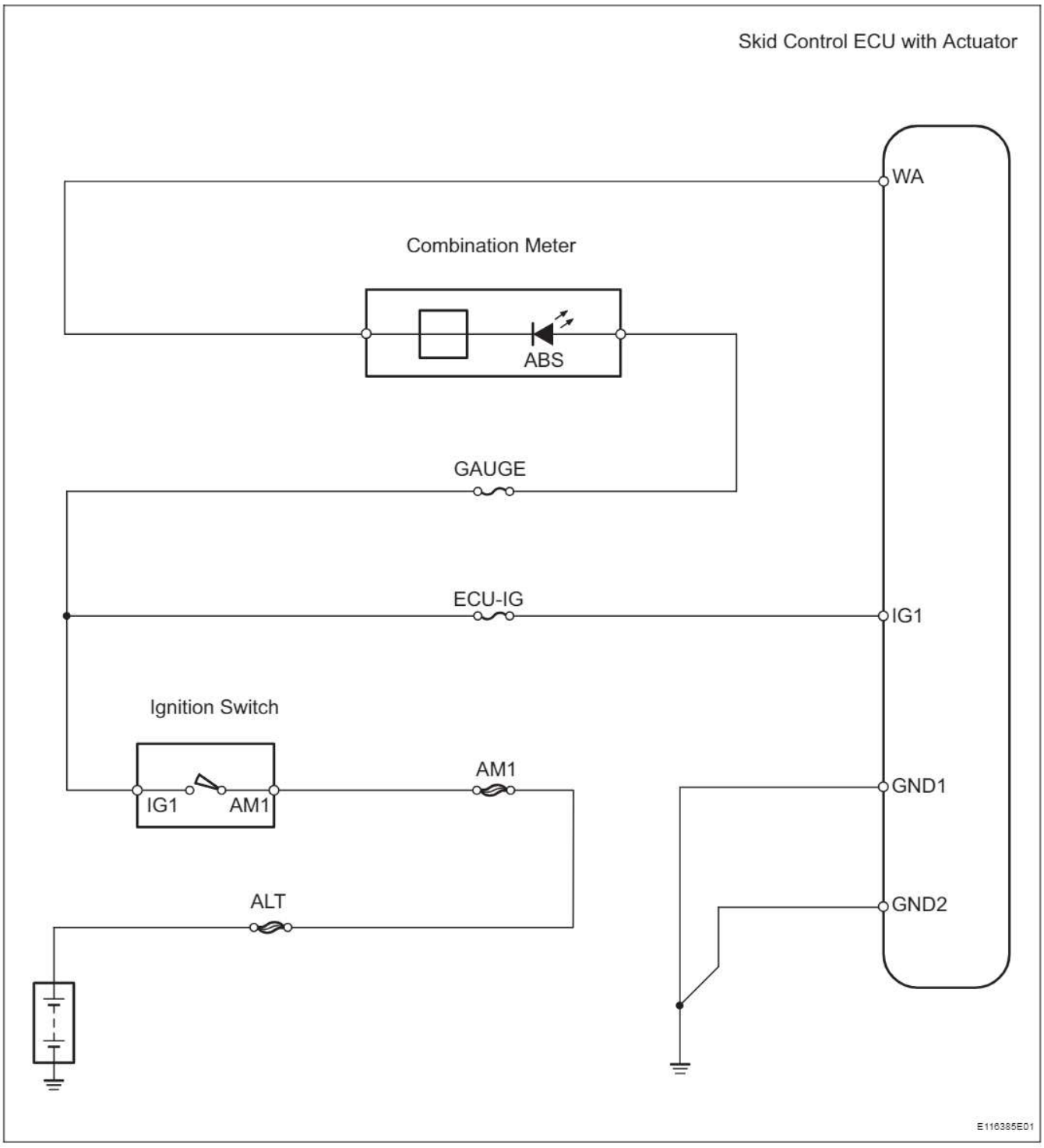
ABS Warning Light Remains ON

DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
Always ON	Either condition (1. or 2.) is detected: 1. Voltage of ECU terminal IG1 remains at more than 17 V 2. There is a malfunction in ECU internal circuit	• Power source circuit • ABS warning light circuit • Skid control ECU with actuator • Charging system

BC

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHECK FOR DTC

(a) Turn the ignition switch ON.
(b) Check that the ABS warning light illuminates.
(c) Check for DTCs (see page BC-74).

Result

Result	Proceed to
DTC is not output (when using intelligent tester)	A
DTC is not output (when not using intelligent tester)	B
DTC is output	C

B → Go to step 7

C → REPAIR CIRCUIT INDICATED BY OUTPUT DTC

A

2 INSPECT SKID CONTROL ECU CONNECTOR

(a) Check that each ECU connector is properly installed.
OK:
Each ECU connector is properly installed.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

3 READ VALUE OF INTELLIGENT TESTER (IG VOLTAGE)

(a) Check the DATA LIST for proper functioning of the IG voltage.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
IG VOLTAGE	ECU power supply voltage / NORMAL / TOO LOW	NORMAL: 9.5 to 14 V TOO LOW: Below 9.5 V	-

Result

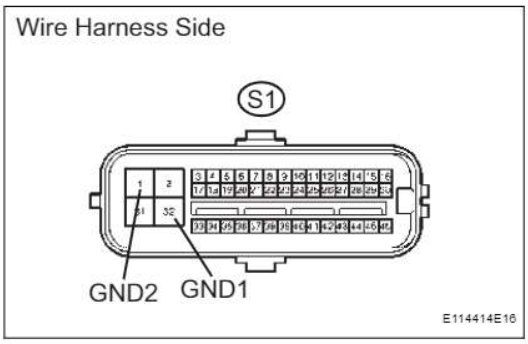
Result	Proceed to
Display is NORMAL	A
Display is not NORMAL	B

B → Go to step 11

A

BC

4 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the resistance of the wire harness side connector.

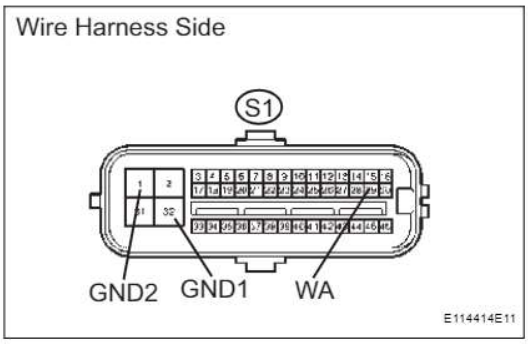
Standard resistance

Tester Connection	Specified Condition
S1-32 (GND1) - Body ground	Below 1 Ω
S1-1 (GND2) - Body ground	

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

OK

5 CHECK ABS WARNING LIGHT



(a) Disconnect the S1 ECU connector.
(b) Turn the ignition switch ON.
(c) Using a service wire, connect terminal WA (S1-29) to GND1 (S1-32) or GND2 (S1-1) of the connector. Check the ABS warning light.

OK:

ABS warning light turns off.

(d) Turn the ignition switch OFF.
(e) Remove the service wire.
(f) Turn the ignition switch ON.
(g) Check the ABS warning light.

OK:

ABS warning light illuminates.

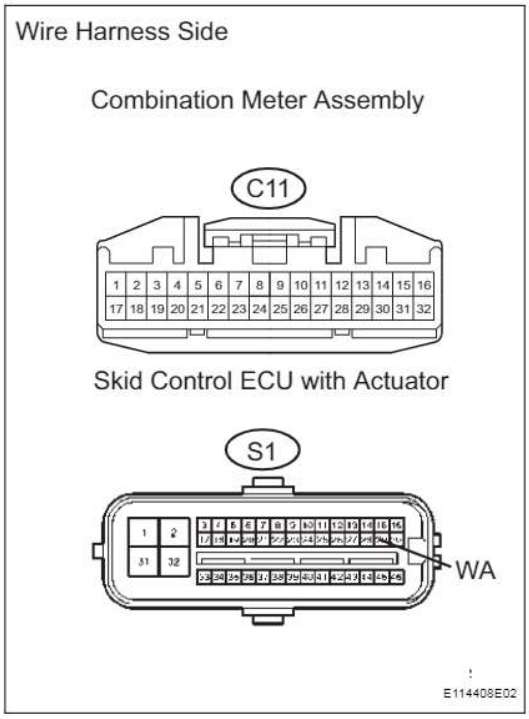
HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

BC

6	CHECK WIRE HARNESS (COMBINATION METER - SKID CONTROL ECU AND BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the C11 meter connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
S1-29 (WA) - C11-11	Below 1 Ω
S1-29 (WA) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE COMBINATION METER ASSEMBLY

7	INSPECT SKID CONTROL ECU CONNECTOR

(a) Check that each ECU connector is properly installed.

OK:

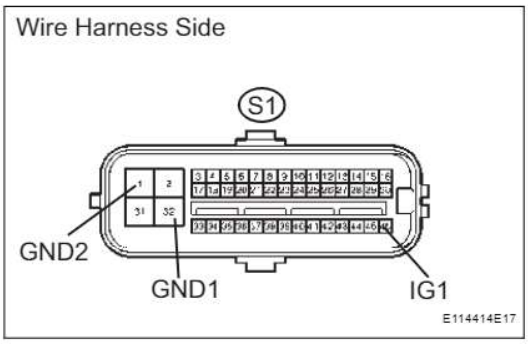
Each ECU connector is properly installed.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

BC

8 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S1-46 (IG1) - Body ground	Ignition switch ON	10 to 14 V

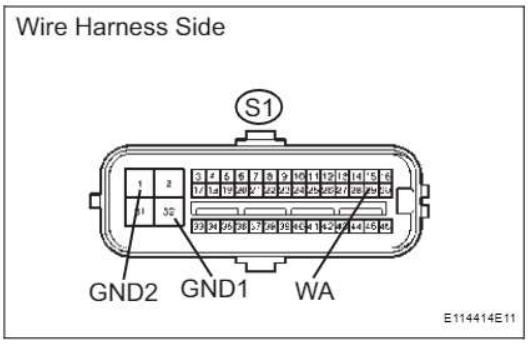
(c) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
S1-32 (GND1) - Body ground	Below 1 Ω
S1-1 (GND2) - Body ground	

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

OK

9 CHECK ABS WARNING LIGHT



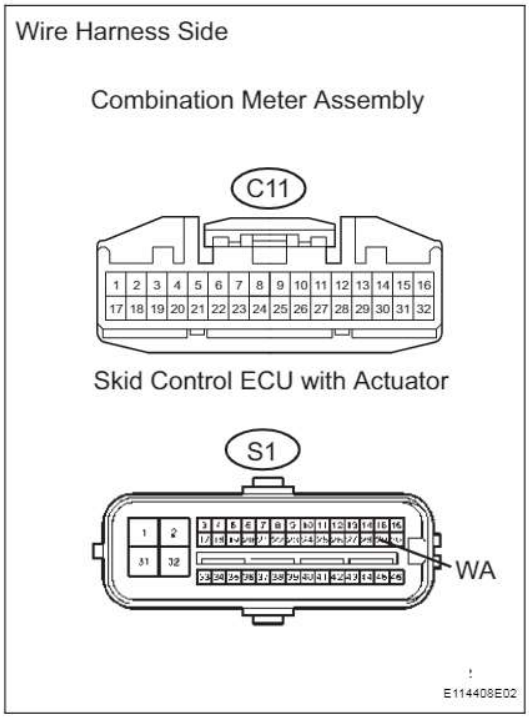
(a) Disconnect the S1 ECU connector.
(b) Turn the ignition switch ON.
(c) Using a service wire, connect terminal WA (S1-29) to GND1 (S1-32) or GND2 (S1-1) of the S1 ECU connector.
Check the ABS warning light.
OK:
ABS warning light turns off.
(d) Turn the ignition switch OFF.
(e) Remove the service wire.
(f) Turn the ignition switch ON.
(g) Check the ABS warning light.
OK:
ABS warning light illuminates.
HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

BC

10	CHECK WIRE HARNESS (COMBINATION METER - SKID CONTROL ECU AND BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the C11 meter connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

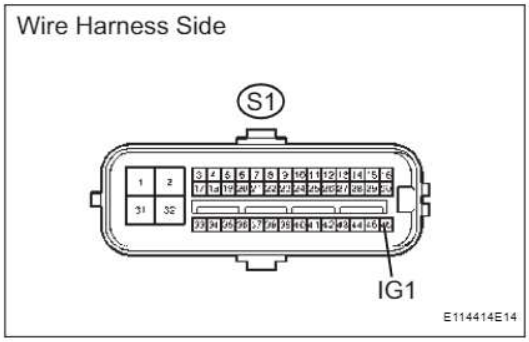
Tester Connection	Specified Condition
S1-29 (WA) - C11-11	Below 1 Ω
S1-29 (WA) - Body ground	10 kΩ or higher

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

OK

REPLACE COMBINATION METER ASSEMBLY

11	CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
S1-46 (IG1) - Body ground	Ignition switch ON	10 to 14 V

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

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

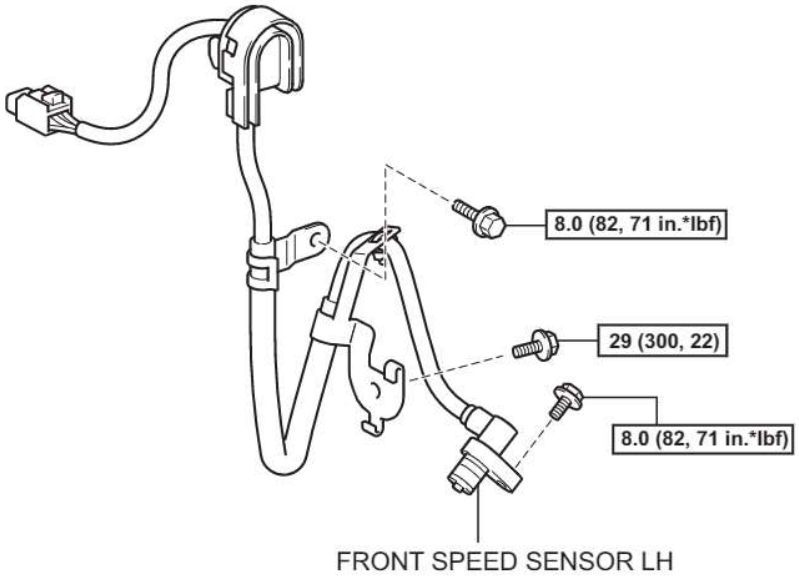
OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

FRONT SPEED SENSOR

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

H

C117773E01

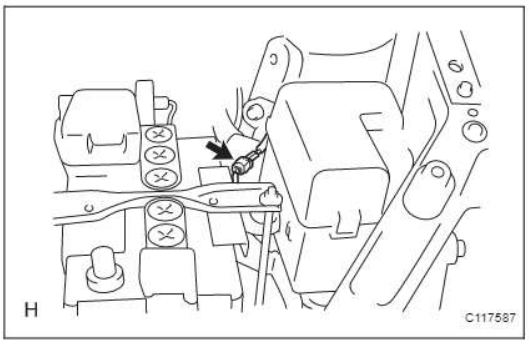
BC

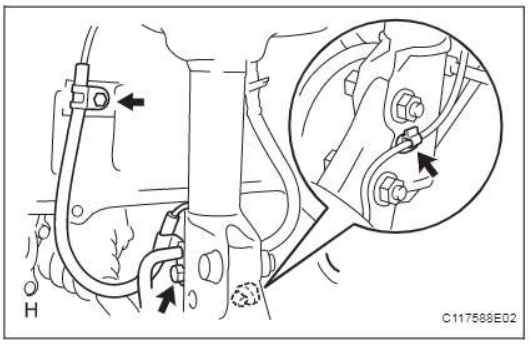
REMOVAL

HINT:

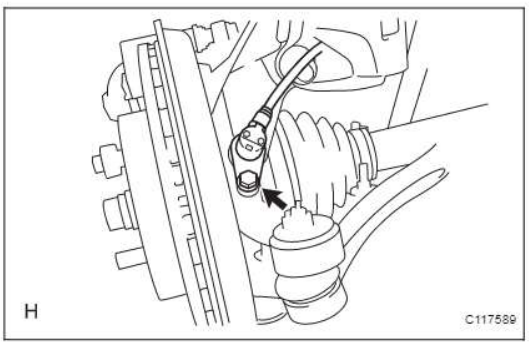
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT WHEEL**
3. **REMOVE FRONT SPEED SENSOR LH**
   (a) Disconnect the speed sensor connector.





(b) Remove the 2 clamp bolts holding the speed sensor wire harness from the body and shock absorber.
(c) Disconnect the resin clip and speed sensor wire harness from shock absorber.



(d) Remove the bolt and speed sensor.
NOTICE:
Keep the sensor tip and sensor installation hole free from foreign matter.

BC

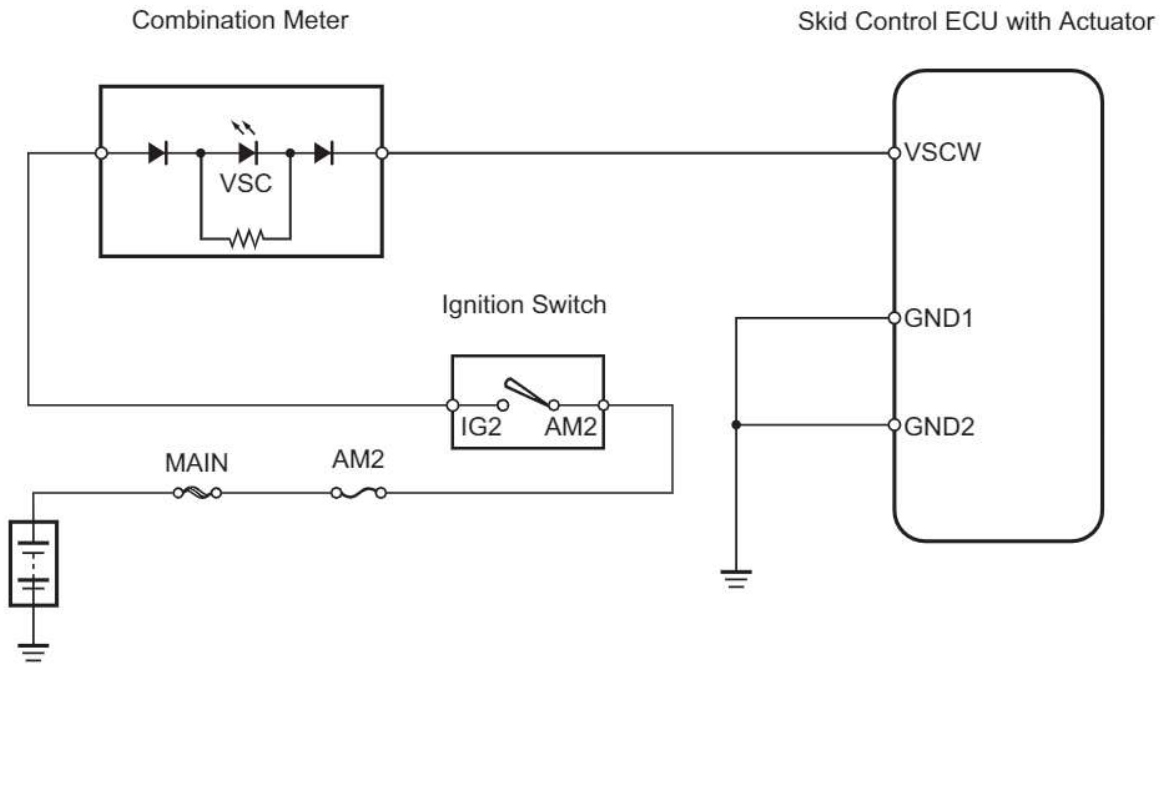
VSC Warning Light Remains ON

DESCRIPTION

If the ECU stores a DTC, the VSC illuminates.

DTC No.	DTC Detection Condition	Trouble Area
Always ON	Malfunction in skid control ECU with actuator	• VSC warning light circuit • Power source circuit • Skid control ECU with actuator

WIRING DIAGRAM



INSPECTION PROCEDURE

BC

1	CHECK FOR DTC

(a) Check for DTCs (see page BC-74).

Result

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

B → REPAIR CIRCUIT INDICATED BY OUTPUT CODE

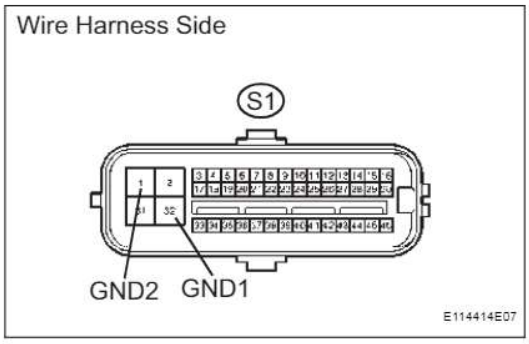
A

2 INSPECT SKID CONTROL ECU CONNECTOR SECURELY CONNECTED

NO → CONNECT CONNECTOR TO ECU

YES

3 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the resistance of the wire harness side connector.

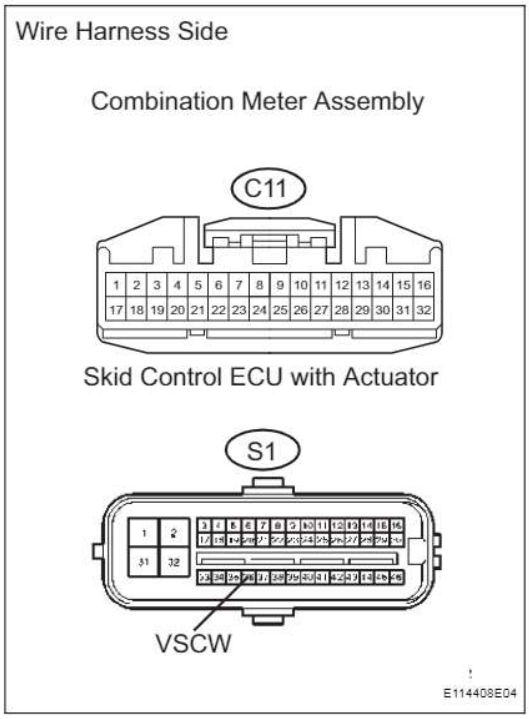
Standard resistance

Tester Connection	Specified Condition
S1-32 (GND1) - Body ground	Below 1 Ω
S1-1 (GND2) - Body ground	

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4 CHECK WIRE HARNESS (COMBINATION METER - SKID CONTROL ECU)



(a) Disconnect the C11 meter connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
C11-10 - S1-36 (VSCW)	Below 1 Ω
C11-10 - Body ground	10 kΩ or higher

Result

Result	Proceed to
OK (when using intelligent tester)	A
OK (when not using intelligent tester)	B
NG	C

BC

B → Go to step 7

C → REPAIR OR REPLACE HARNESS AND CONNECTOR

A

5	READ VALUE OF INTELLIGENT TESTER (IG VOLTAGE)

(a) Check the DATA LIST for proper functioning of the IG power voltage.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
IG VOLTAGE	ECU power supply voltage / NORMAL / TOO LOW	NORMAL: 10 to 14 V TOO LOW: Below 10 V	-

OK:
NORMAL is displayed.

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

OK ↓

6	PERFORM ACTIVE TEST BY INTELLIGENT TESTER (VSC WARNING LIGHT)

(a) Select the ACTIVE TEST, generate a control command, and then check that the VSC warning light illuminates.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Diagnostic Note
VSC WARN LIGHT	Turns VSC warning light ON / OFF	Operation of solenoid (clicking sound) can be heard

OK:
VSC warning light illuminates.

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

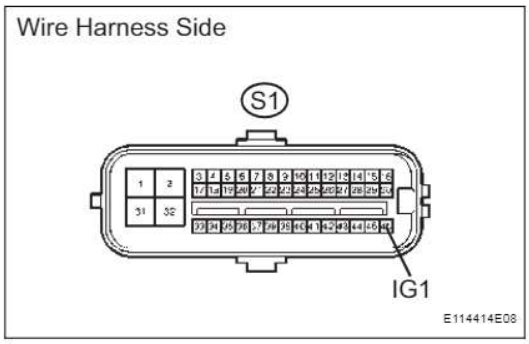
NG → **REPLACE COMBINATION METER ASSEMBLY**

OK ↓

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

7 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)



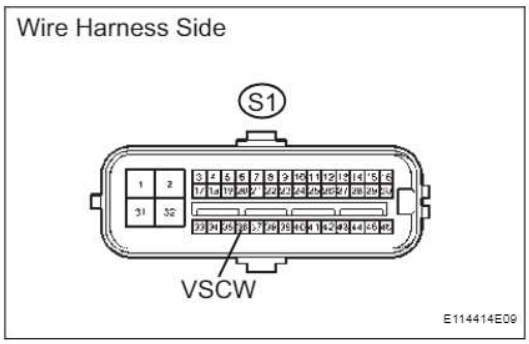
(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Switch Condition	Specified Condition
S1-46 (IG1) - Body ground	Ignition switch ON	10 to 14 V

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

OK

8 CHECK VSC WARNING LIGHT



(a) Disconnect the S1 ECU connector.
(b) Turn the ignition switch ON.
(c) Check that the VSC warning light turns off.
OK:
VSC warning light turns off.

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

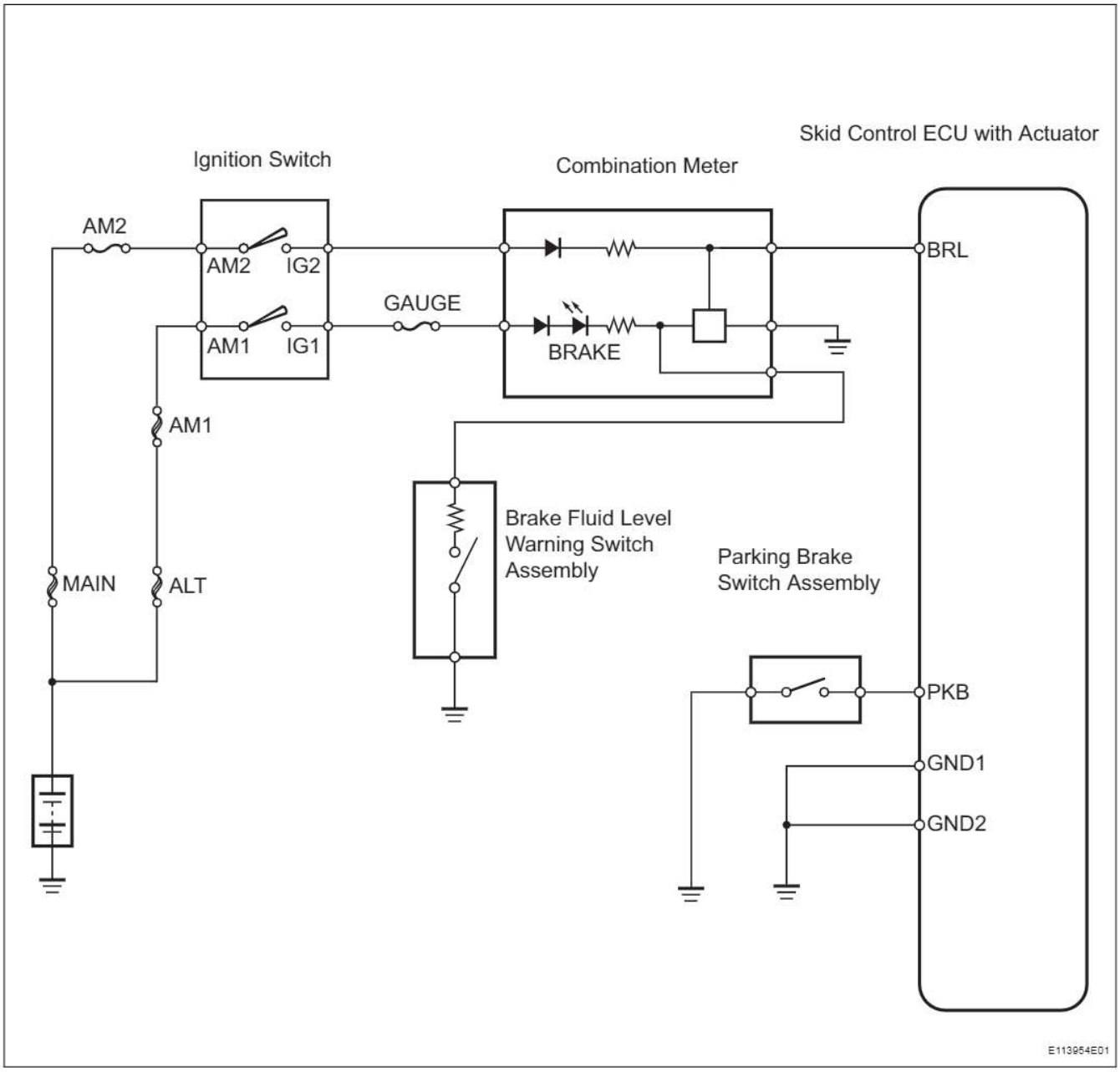
BC

Brake Warning Light Circuit

DESCRIPTION

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

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.

Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 3

A

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (BRAKE WARNING LIGHT)

(a) Select the ACTIVE TEST, generate a control command, and then check that the BRAKE warning light illuminates.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Diagnostic Note
BRAKE WRN LIGHT	Turns brake warning light ON / OFF	Operation of solenoid (clicking sound) can be heard

OK:

Brake warning light illuminates.

HINT:

When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

OK → REPLACE BRAKE ACTUATOR ASSEMBLY

NG

3 CHECK DTC FOR ABS

(a) Check for DTCs (see page BC-74).

Result

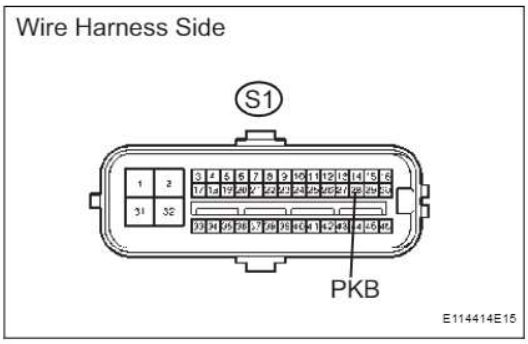
Result	Proceed to
DTC is not output	A
DTC is output	B

B → REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

BC

4 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the resistance of the wire harness side connector.

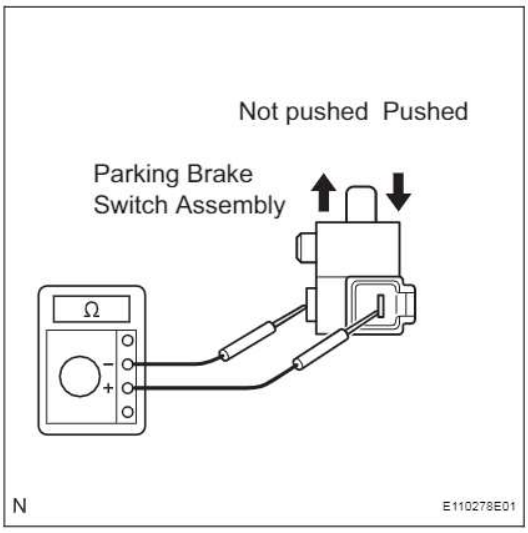
Standard resistance

Tester Connection	Switch Condition	Specified Condition
S1-28 (PKB) - Body ground	Parking brake switch ON	Below 1 Ω
	Parking brake switch OFF	10 kΩ or higher

OK → Go to step 7

NG

5 INSPECT PARKING BRAKE SWITCH ASSEMBLY



(a) Remove the parking brake switch.
(b) Measure the resistance of the switch.

Standard resistance

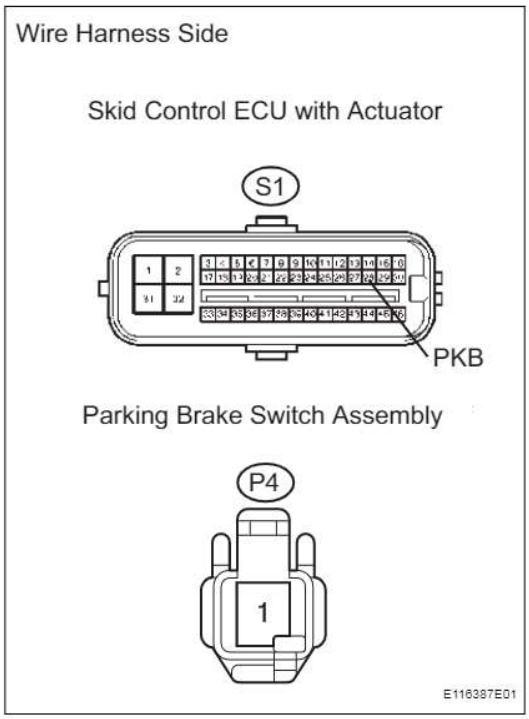
Tester Connection	Switch Condition	Specified Condition
1 - Body ground	Pushed	Below 1 Ω
	Not pushed	10 kΩ or higher

NG → REPLACE PARKING BRAKE SWITCH ASSEMBLY

OK

BC

6 CHECK WIRE HARNESS (SKID CONTROL ECU - PARKING BRAKE SWITCH)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the P4 switch connector.
(c) Measure the resistance of the wire harness side connectors.

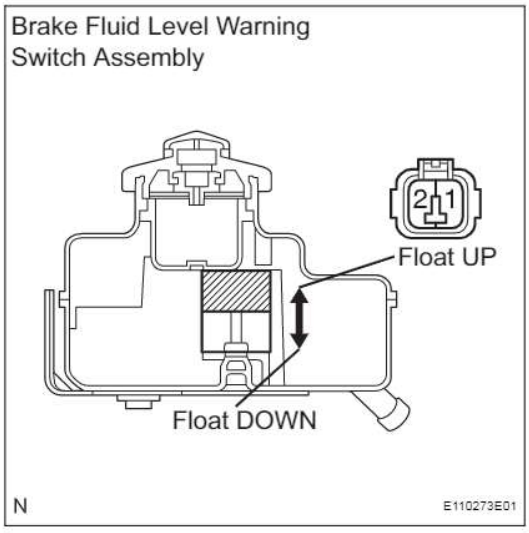
Standard resistance

Tester Connection	Specified Condition
S1-28 (PKB) - P4-1	Below 1 Ω

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

OK

7 INSPECT BRAKE FLUID LEVEL WARNING SWITCH ASSEMBLY



(a) Remove the reservoir tank cap and strainer.
(b) Disconnect the B2 switch connector.
(c) Measure the resistance of the switch.

Standard resistance

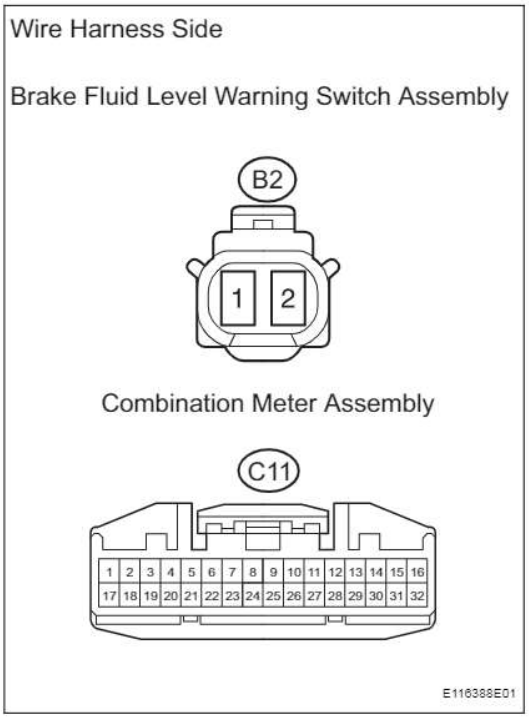
Tester Connection	Switch Condition	Specified Condition
1 - 2	Float DOWN	Below 1 Ω
	Float UP	10 kΩ or higher

NG → **REPLACE BRAKE MASTER CYLINDER SUB-ASSEMBLY**

OK

BC

8	CHECK WIRE HARNESS (WARNING SWITCH - COMBINATION METER AND BODY GROUND)



(a) Disconnect the B2 switch connector.
(b) Disconnect the C11 meter connector.
(c) Measure the resistance of the wire harness side connectors.

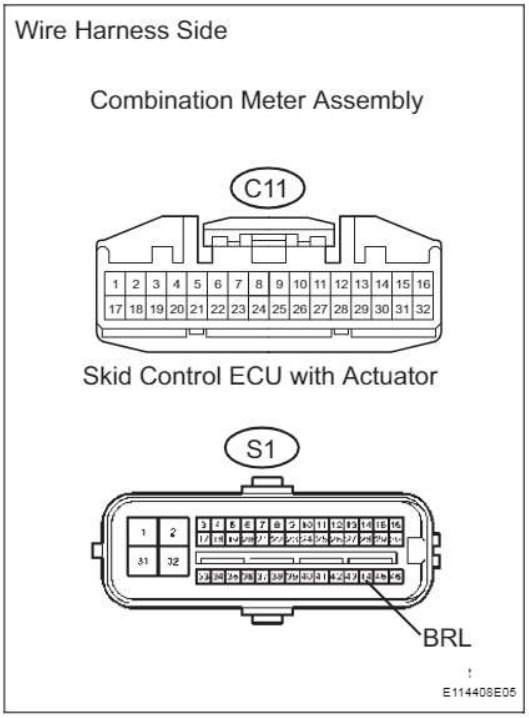
Standard resistance

Tester Connection	Specified Condition
B2-1 - C11-15	Below 1 Ω
B2-2 - Body ground	

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

OK

9	CHECK WIRE HARNESS (SKID CONTROL ECU - COMBINATION METER)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the C11 meter connector.
Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
S1-44 (BRL) - C11-14	Below 1 Ω

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

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

BC

OK

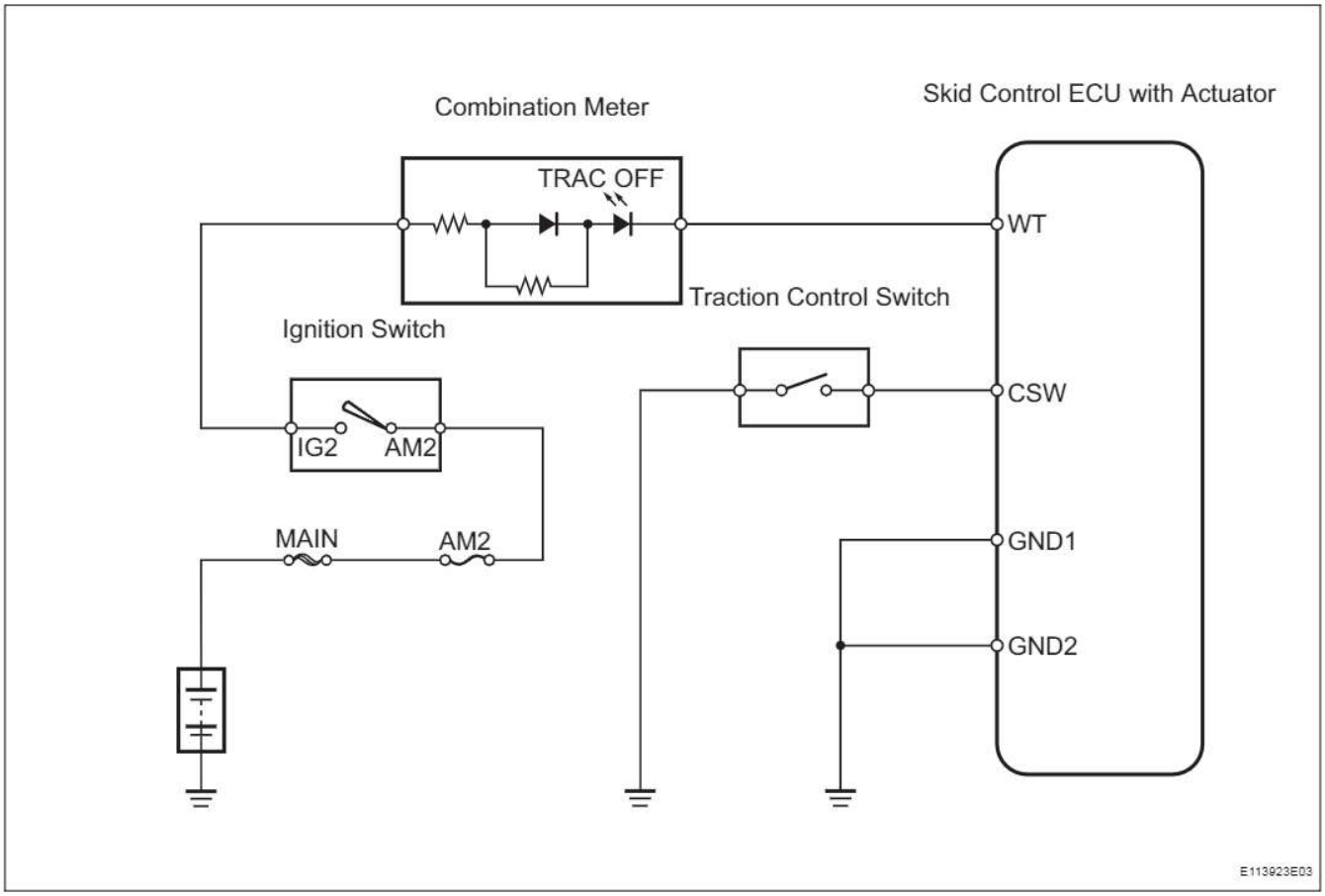
REPLACE BRAKE ACTUATOR ASSEMBLY

TRAC OFF Indicator Light, TRAC OFF Switch Circuit

DESCRIPTION

This is the TRAC control main switch. When the TRAC control switch is pushed, TRAC control turns off and the TRAC OFF indicator light turns on. When the ignition switch is turned OFF and then turned ON, the TRAC control automatically turns on again.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

BC

(a) Choose the diagnosis method.
Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 3

A

2	PERFORM ACTIVE TEST BY INTELLIGENT TESTER (TRAC OFF INDICATOR LIGHT)

(a) Select the ACTIVE TEST, generate a control command, and then check that the TRAC OFF indicator light illuminates.

Skid control ECU with actuator

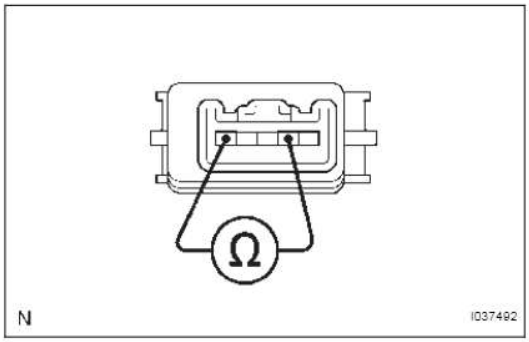
Item	Measurement Item / Range (Display)	Diagnostic Note
VSC / TRC OFF IND	Turns VSC / TRAC OFF indicator light ON / OFF	Observe combination meter

OK:
VSC / TRAC OFF indicator light illuminates.

NG → **Go to step 5**

OK

3	INSPECT TRACTION CONTROL SWITCH



(a) Remove the traction control switch.
(b) Measure the resistance of the switch.
Standard resistance

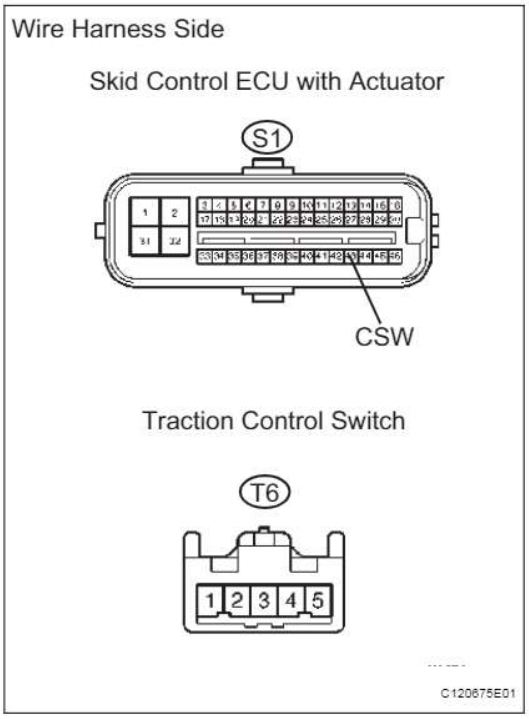
Tester Connection	Switch Condition	Specified Condition
2 - 5	Pushed (ON)	Below 1 Ω
	Not pushed (OFF)	10 kΩ or higher

NG → **REPLACE TRACTION CONTROL SWITCH**

OK

BC

4	CHECK WIRE HARNESS (TRACTION CONTROL SWITCH - SKID CONTROL ECU AND BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the T6 switch connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T6-5 - S1-43 (CSW)	Below 1 Ω
T6-2 - Body ground	

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

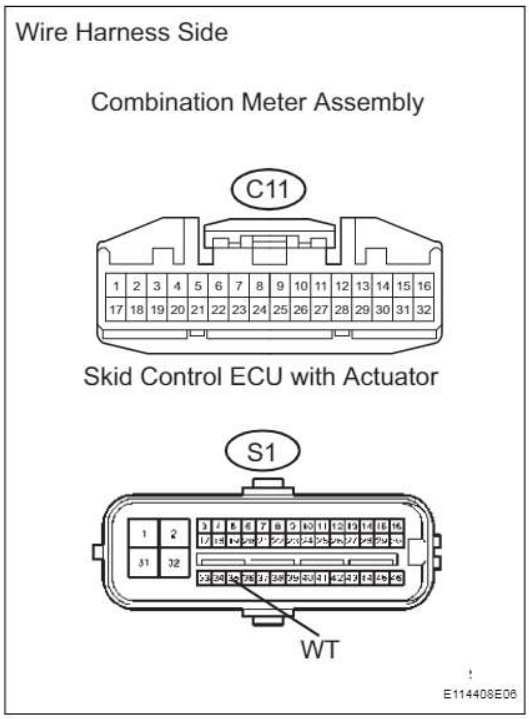
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

5	CHECK WIRE HARNESS (COMBINATION METER - SKID CONTROL ECU)



(a) Disconnect the C11 meter connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
C1-30 - S1-35 (WT)	Below 1 Ω

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

OK → **REPLACE COMBINATION METER ASSEMBLY**

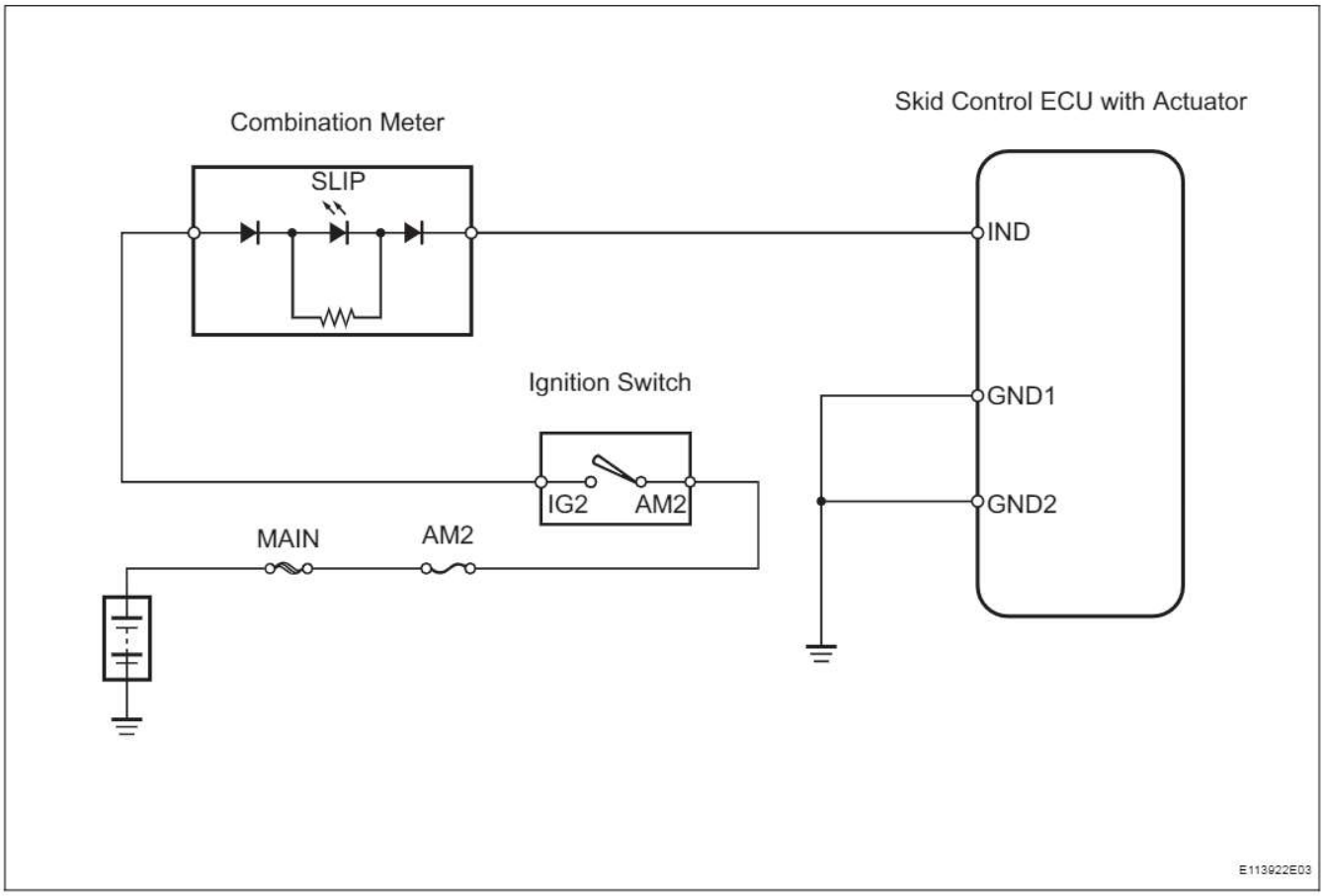
BC

Slip Indicator Light Circuit

DESCRIPTION

The SLIP indicator light blinks during TRAC and VSC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 4

A

BC

2	PERFORM ACTIVE TEST BY INTELLIGENT TESTER (SLIP INDICATOR LIGHT)

(a) Select the ACTIVE TEST, generate a control command, and then check that the SLIP indicator light illuminates.

Skid control ECU with actuator

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

NG → Go to step 4

OK

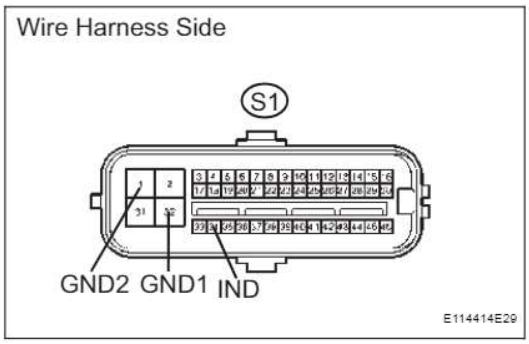
3	CHECK SLIP INDICATOR LIGHT

(a) Check that the SLIP indicator light turns on for 3 seconds soon after the ignition switch is turned ON.

OK → END

NG

4	CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connector	Condition	Specified Condition
S1-34 (IND) - S1-32 (GND1) or S1-1 (GND2)	Ignition switch ON	10 to 14 V

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

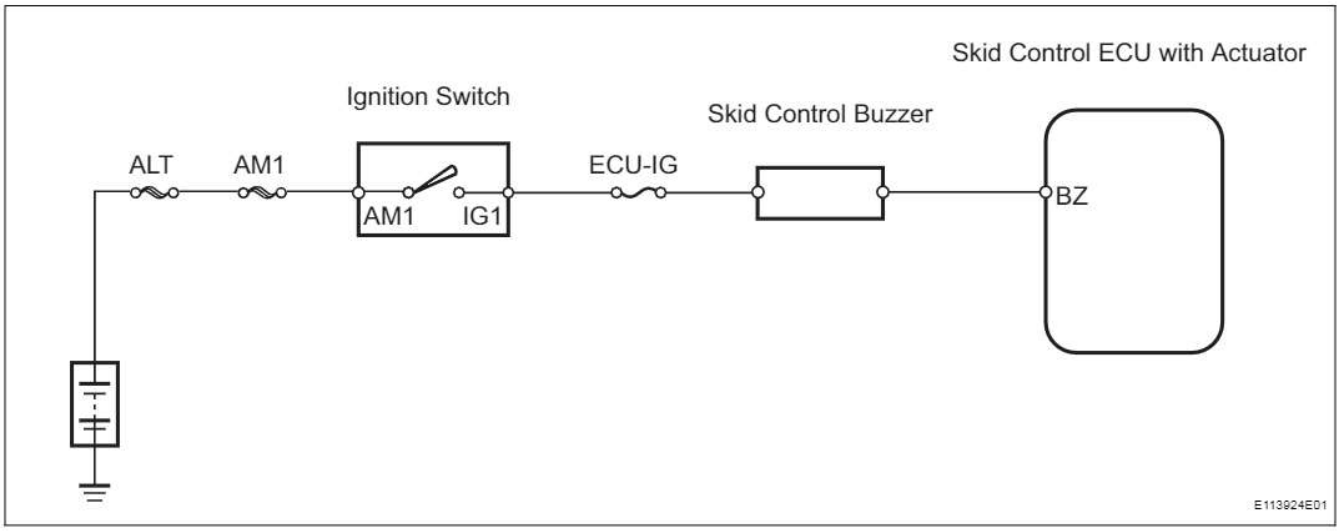
BC

Skid Control Buzzer Circuit

DESCRIPTION

The skid control buzzer sounds during VSC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → **Go to step 3**

A

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (SKID CONTROL BUZZER)

BC

(a) Select the ACTIVE TEST, generate a control command, and then check that the skid control buzzer sounds.

Skid control ECU with actuator

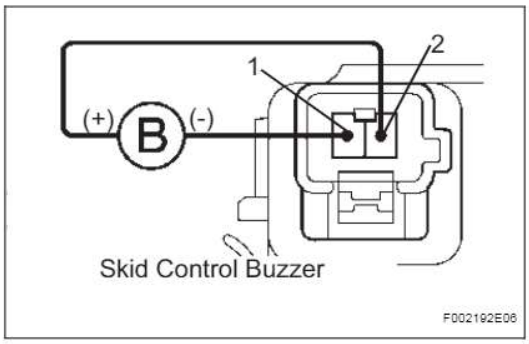
Item	Vehicle Condition / Test Details	Diagnostic Note
VSC / BR WARN BUZ	Turns VSC / BRAKE warning buzzer ON / OFF	Buzzer can be heard

OK:
Normal operation.
HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

OK → REPLACE BRAKE ACTUATOR ASSEMBLY

NG

3 INSPECT SKID CONTROL BUZZER ASSEMBLY

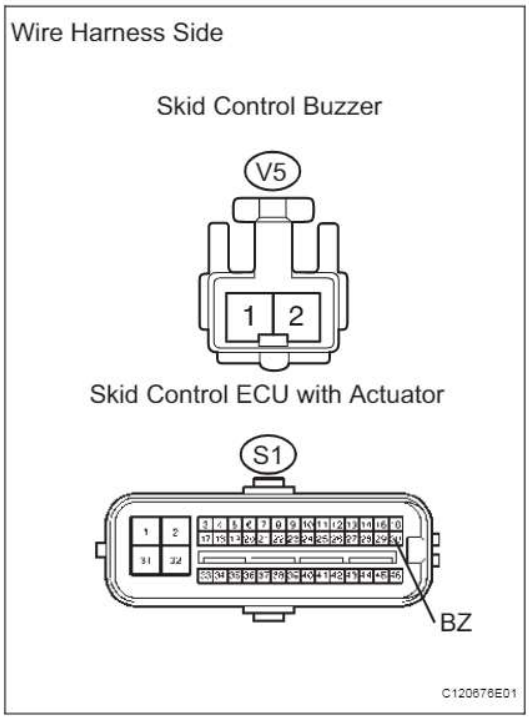


(a) Disconnect the skid control buzzer connector.
(b) Apply positive (+) battery voltage to terminals 1 and 2 of the skid control buzzer connector. Check that the buzzer sounds.
OK:
Skid control buzzer sound is heard.

NG → REPLACE SKID CONTROL BUZZER ASSEMBLY

OK

4 CHECK WIRE HARNESS (SKID CONTROL BUZZER - SKID CONTROL ECU AND BATTERY)



(a) Disconnect the V5 buzzer connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
V5-1 - S1-30 (BZ)	Below 1 Ω

(d) Measure the voltage of the wire harness side connectors.
Standard voltage

Tester Connection	Specified Condition
V5-2 - Body ground	10 to 14 V

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

BC

OK

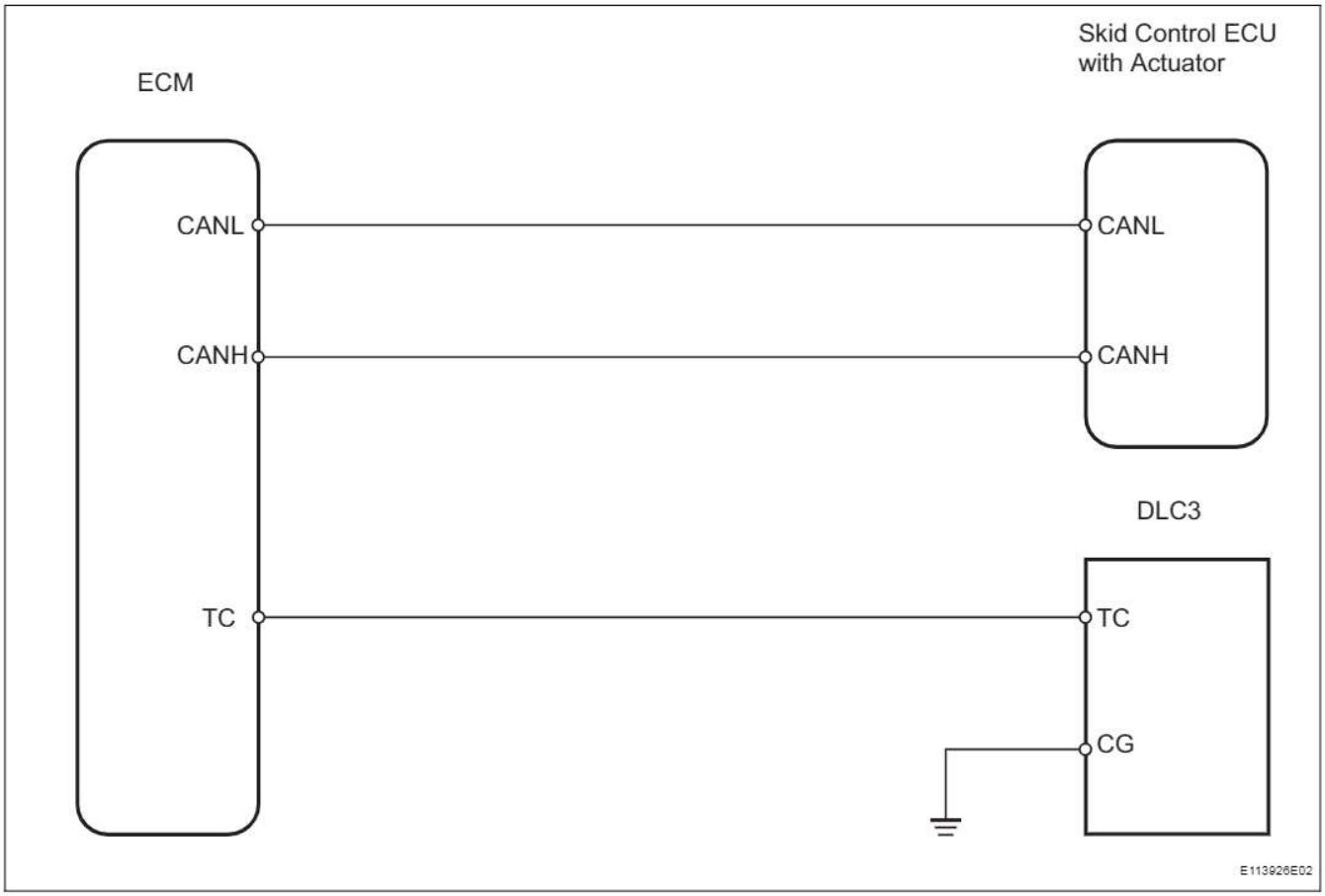
REPLACE BRAKE ACTUATOR ASSEMBLY

TC and CG Terminal Circuit

DESCRIPTION

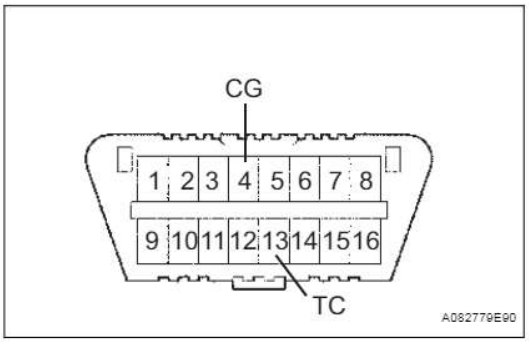
Connecting terminals TC and CG of the DLC3 causes the ECU to display DTCs by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK DLC3 (TC VOLTAGE)



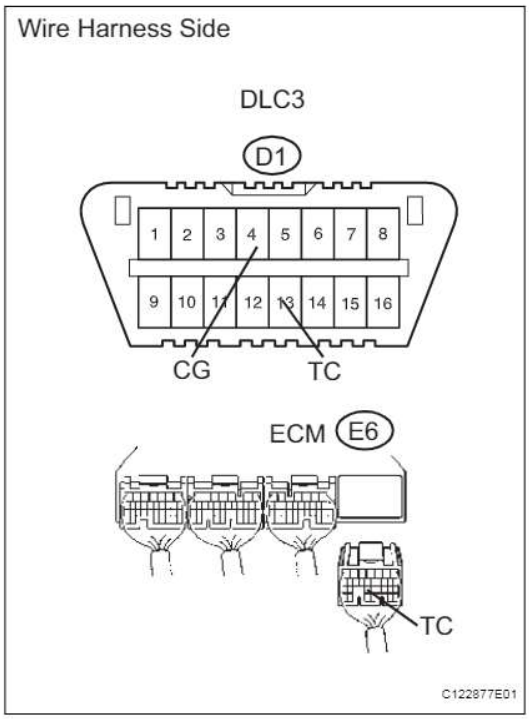
(a) Measure the voltage of the connector.
Standard voltage

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

OK → GO TO CAN COMMUNICATION SYSTEM

NG

2	CHECK WIRE HARNESS (DLC3 - ECM AND BODY GROUND)



(a) Disconnect the D1 DLC3 connector.
(b) Disconnect the E6 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
D1-13 (TC) - E6-20 (TC)	Below 1 Ω
D1-4 (CG) - Body ground	

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

OK

GO TO CAN COMMUNICATION SYSTEM

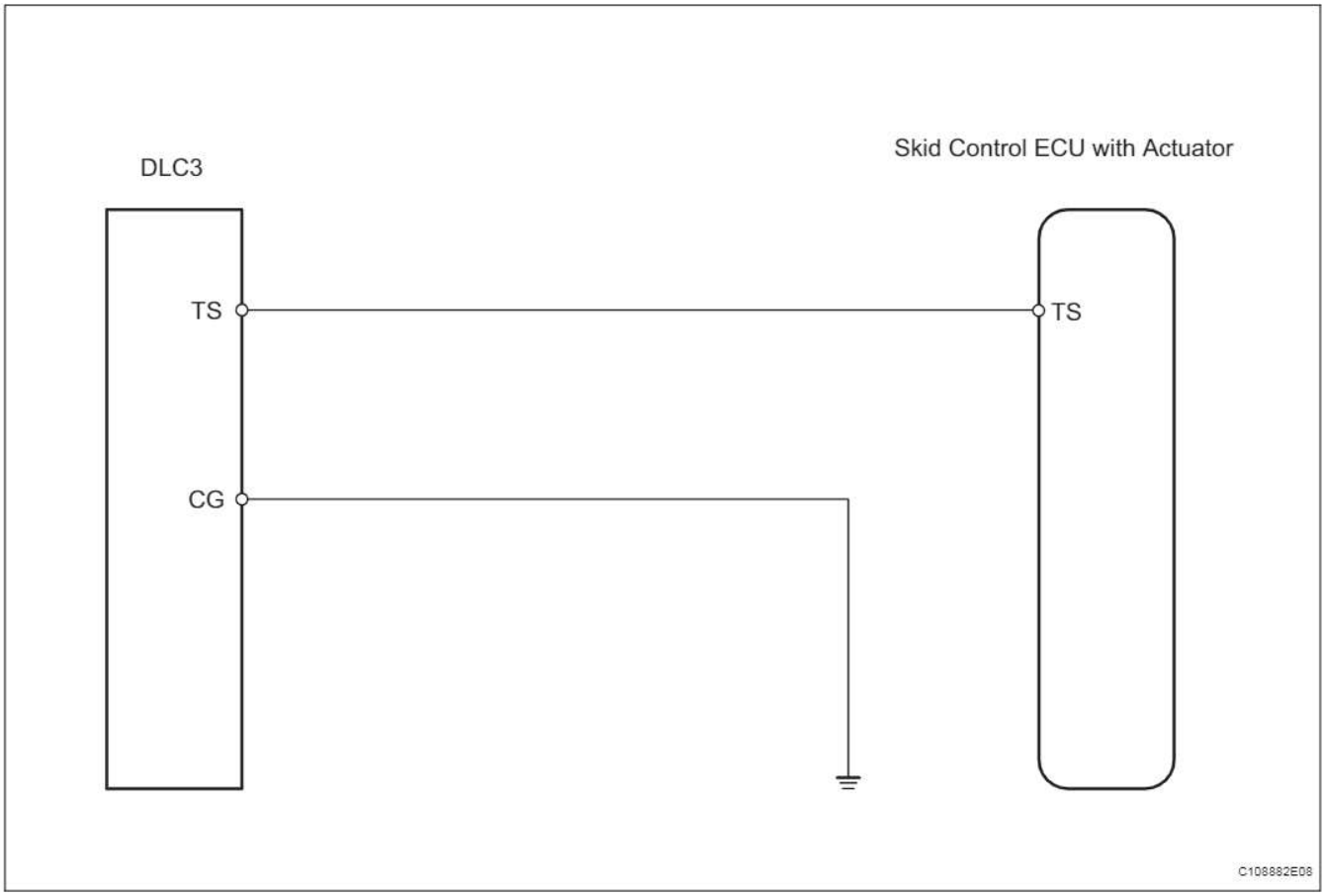
BC

TS and CG Terminal Circuit

DESCRIPTION

The sensor check circuit detects abnormalities in the sensor signal when they cannot be detected with the DTC check.
Connecting terminals TS and CG of the DLC3 starts the check.

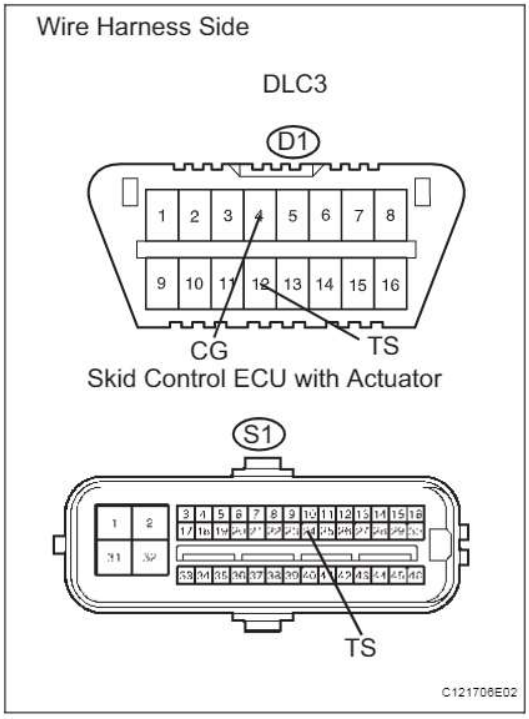
WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHECK WIRE HARNESS (DLC3 - SKID CONTROL ECU AND BODY GROUND)



(a) Disconnect the D1 DLC3 connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
D1-4 (CG) - Body ground	Below 1 Ω
D1-12 (TS) - S1-24 (TS)	

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-69).

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

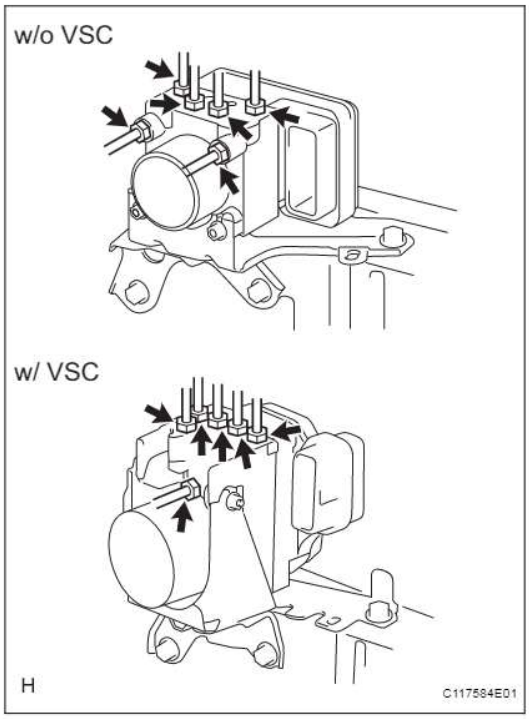
OK

REPLACE BRAKE ACTUATOR ASSEMBLY

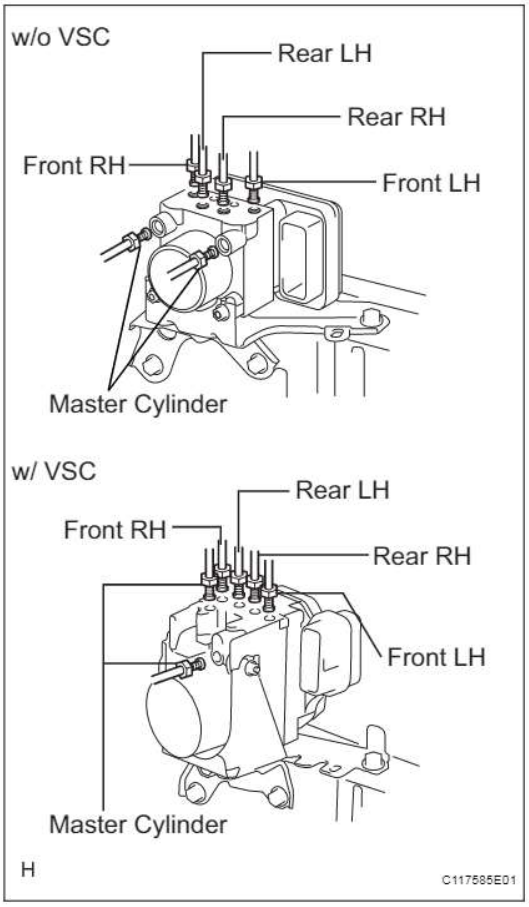
BC

REMOVAL

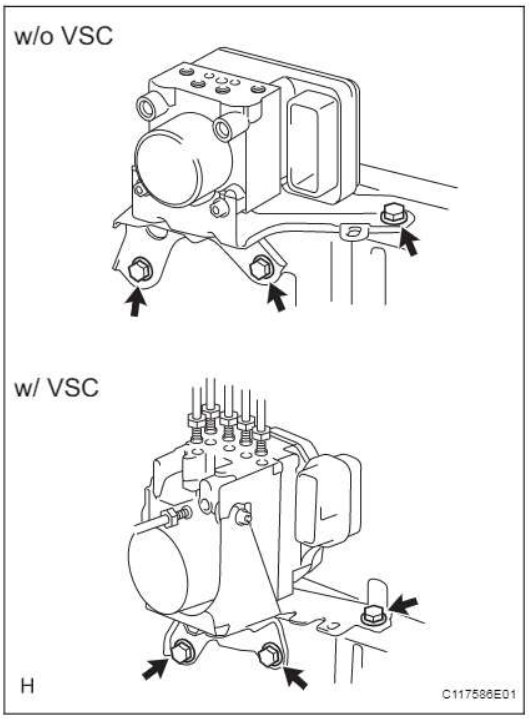
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **DRAIN BRAKE FLUID**
   NOTICE:
   Wash off brake fluid immediately if it comes in contact with any painted surface.
3. **REMOVE BRAKE ACTUATOR ASSEMBLY WITH BRACKET**
   (a) Release the latch of the actuator connector and disconnect the connector.
   (b) Using SST, disconnect the 6 brake lines from the brake actuator.
   SST 09023-00101



BC



(c) Place tags or marks to identify the installation locations of each brake line.



(d) Remove the 3 bolts and brake actuator with the bracket.

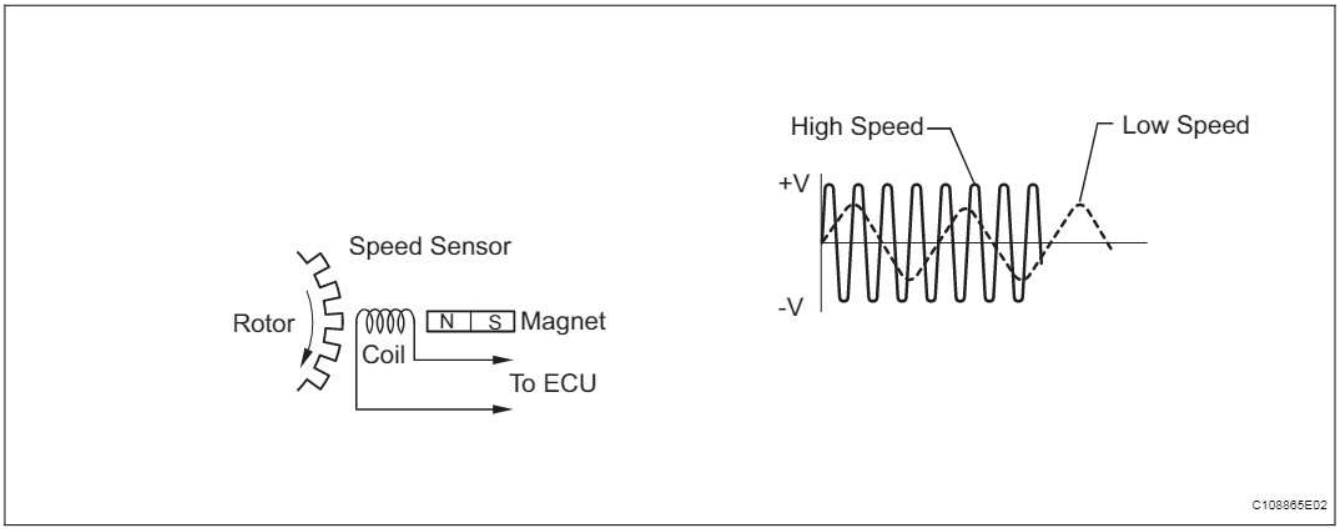
4. REMOVE BRAKE ACTUATOR ASSEMBLY

(a) Remove the 2 nuts and brake actuator from the bracket.

BC

DTC	C0200/31	Right Front Wheel Speed Sensor Signal Malfunction
DTC	C0205/32	Left Front Wheel Speed Sensor Signal Malfunction
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 ECU. These signals are used for control of the ABS.

BC

Each of the front and rear rotors have 48 serrations. When the rotors rotate, the magnetic field generated by the permanent magnet in the speed sensor produces AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.
DTCs C1271/71, C1272/72, C1275/75 and C1276/76 can be deleted when the speed sensor sends a vehicle speed signal or the test mode ends. DTCs C1271/71, C1272/72, C1275/75 and C1276/76 are output only in the test mode.

DTC No.	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When one of following occurs • With vehicle speed at 10 km/h (6 mph) or more, sensor signal circuit of faulty wheel is open or short for 1 second or more • Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more • Sensor signal circuit is open for 0.5 seconds or more	• Front speed sensor • Front speed sensor circuit • Speed sensor rotor
C1235/35 C1236/36	At vehicle speed of 20 km/h (12 mph) or more, condition that noise is included in speed sensor signal continues for 5 seconds or more	• Front speed sensor • Front speed sensor circuit
C1271/71	Detected only during test mode	• Front speed sensor RH • Sensor installation • Sensor rotor
C1272/72	Detected only during test mode	• Front speed sensor LH • Sensor installation • Sensor rotor
C1275/75	Detected only during test mode	Front speed sensor rotor RH
C1276/76	Detected only during test mode	Front speed sensor rotor LH

HINT:
- DTCs C0200/31 and C1235/35 are for the front speed sensor RH.
- DTCs C0205/32 and C1236/36 are for the front speed sensor LH.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 4

A

2 READ VALUE OF INTELLIGENT TESTER (FRONT SPEED SENSOR)

(a) Check DATA LIST for proper functioning of the front speed sensor.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer

OK:
There is almost no difference between actual wheel speed and displayed speed value.

NG → Go to step 4

OK

3 CHECK DTC OUTPUT RECUR

(a) Clear the DTCs (see page BC-8).
(b) Drive the vehicle at approximately 32 km/h (20 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-8).
Result

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

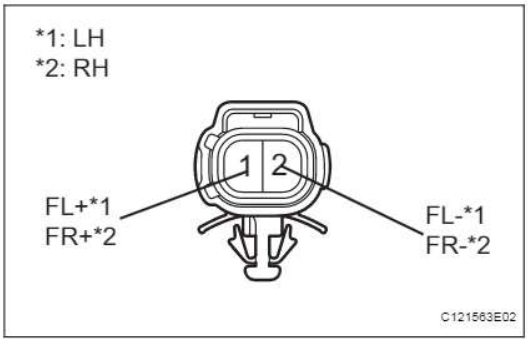
B → CHECK FOR INTERMITTENT PROBLEMS

BC

A

REPLACE BRAKE ACTUATOR ASSEMBLY

4 INSPECT FRONT SPEED SENSOR



(a) Disconnect the A3 and A4 sensor connectors.
(b) Measure the resistance of the speed sensors.
Standard resistance:
LH

Tester Connection	Specified Condition
1 (FL+) - 2 (FL-)	1.4 to 1.8 kΩ at 20 °C
1 (FL+) - Body ground	10 kΩ or higher
2 (FL-) - Body ground	

RH

Tester Connection	Specified Condition
1 (FR+) - 2 (FR-)	1.4 to 1.8 kΩ at 20 °C
1 (FR+) - Body ground	10 kΩ or higher
2 (FR-) - Body ground	

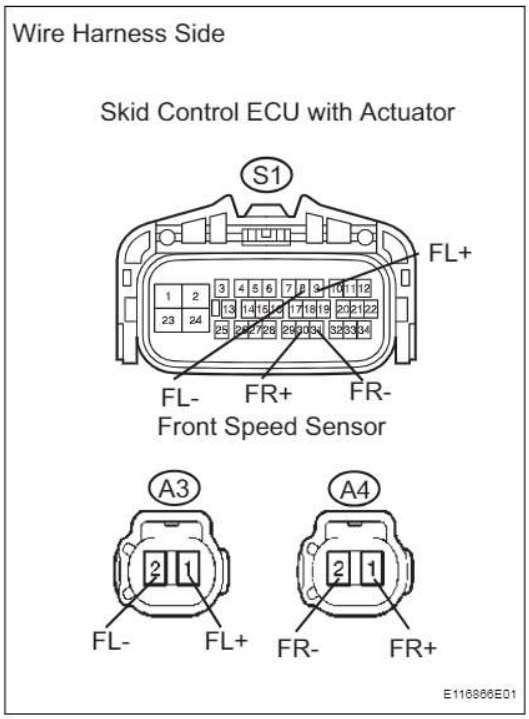
HINT:
Check the speed sensor signal after the speed sensor replacement (see page BC-5).

NG → **REPLACE FRONT SPEED SENSOR**

OK

BC

5 CHECK WIRE HARNESS (SKID CONTROL ECU - FRONT SPEED SENSOR)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the A3 and A4 speed sensor connectors.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance:

LH

Tester Connection	Specified Condition
S1-9 (FL+) - A3-1 (FL+)	Below 1 Ω
S1-8 (FL-) - A3-2 (FL-)	
A3-1 (FL+) - Body ground	10 kΩ or higher
A3-2 (FL-) - Body ground	

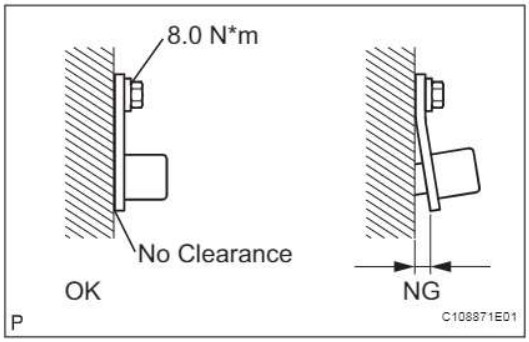
RH

Tester Connection	Specified Condition
S1-31 (FR+) - A4-1 (FR+)	Below 1 Ω
S1-30 (FR-) - A4-2 (FR-)	
A4-1 (FR+) - Body ground	10 kΩ or higher
A4-2 (FR-) - Body ground	

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

OK

6 INSPECT FRONT SPEED SENSOR (INSTALLATION)



(a) Check the 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)

HINT:
Check the speed sensor signal after the speed sensor replacement (see page BC-5).

NG → **SECURELY REINSTALL FRONT SPEED SENSOR**

OK

7 INSPECT SPEED SENSOR (TIP)

(a) Remove the front speed sensor.
(b) Check the sensor tip.

OK:

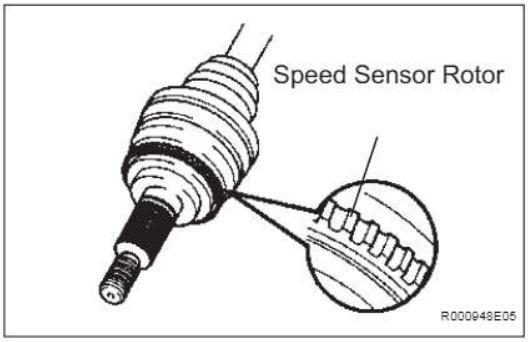
No scratches or foreign matter on sensor tip.

HINT:
Check the speed sensor signal after cleaning or replacing the speed sensor (see page BC-5).

NG → **CLEAN OR REPLACE SPEED SENSOR**

OK

8 INSPECT SPEED SENSOR ROTOR



(a) Remove the front axle hub.
(b) Check the sensor rotor serrations.
OK:
No scratches, missing teeth or foreign matter on sensor rotor.
HINT:
- If foreign matter is attached, remove it and check the output waveform after reassembly.
- Check the speed sensor signal after cleaning or replacing the speed sensor rotor (see page BC-5).

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

OK

9 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-8).
(b) Drive the vehicle at approximately 32 km/h (20 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-8).
Result

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

NG → **END**

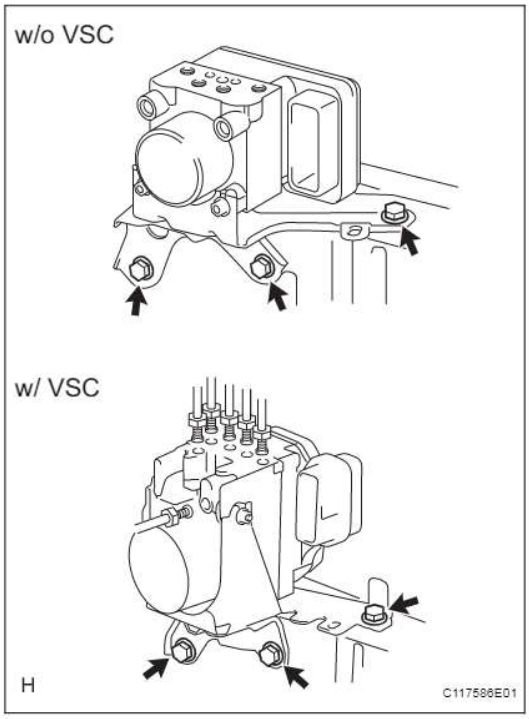
A

BC **REPLACE BRAKE ACTUATOR ASSEMBLY**

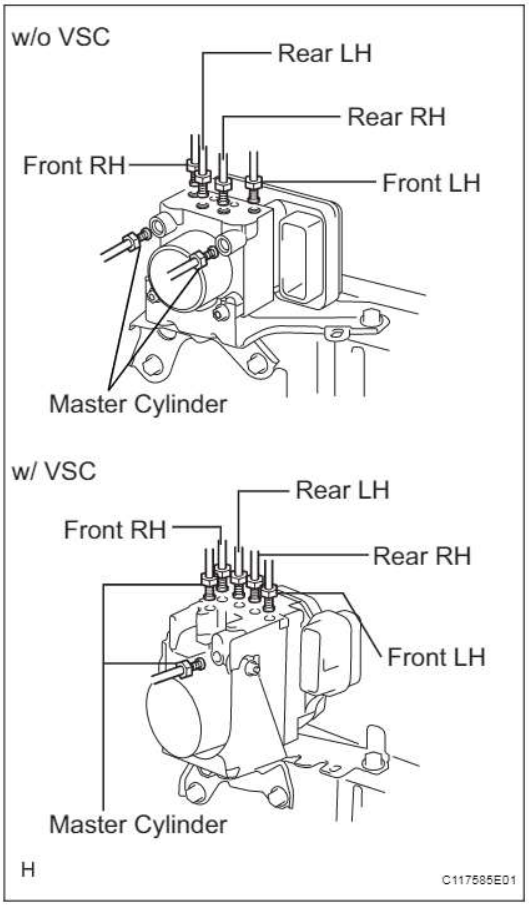
INSTALLATION

1. **INSTALL BRAKE ACTUATOR ASSEMBLY**
   (a) Install the brake actuator to the bracket with the 2 nuts.
   Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

2. **INSTALL BRAKE ACTUATOR ASSEMBLY WITH BRACKET**
   (a) Install the brake actuator with bracket with the 3 bolts.
   Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)



BC



(b) Using SST, connect the 6 brake lines to the correct positions of the brake actuator, as shown in the illustration.
SST 09023-00101
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf) without SST
14 N*m (143 kgf*cm, 10 ft.*lbf) with SST
HINT:
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).
(c) Connect the brake actuator connector.

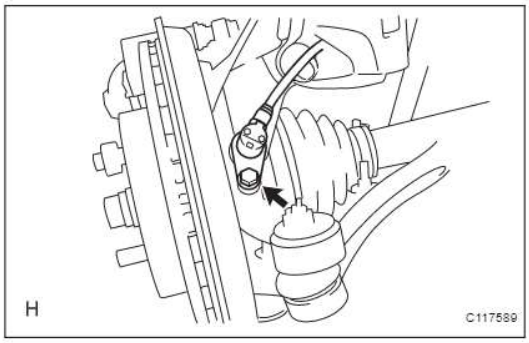
3. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)**
4. **BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)**
5. **BLEED AIR FROM BRAKE LINE (See page BR-4)**
6. **BLEED AIR FROM BRAKE ACTUATOR (w/ VSC) (See page BR-4)**
7. **CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-6)**
8. **CHECK FOR BRAKE FLUID LEAKAGE**
9. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
10. **CHECK BRAKE ACTUATOR WITH INTELLIGENT TESTER**
    (a) Check the brake actuator with the intelligent tester (see page BC-162).
11. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

BC

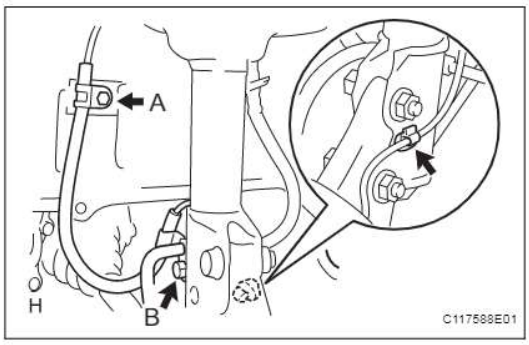
INSTALLATION

HINT:

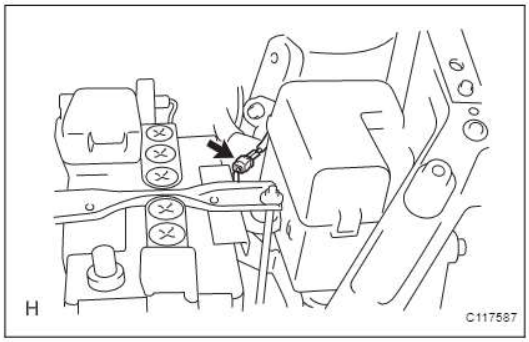
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.



1. **INSTALL FRONT SPEED SENSOR LH**
   (a) Install the speed sensor with the bolt.
   Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
   NOTICE:
   Keep the sensor tip and sensor installation hole free from foreign matter.



   (b) Install the speed sensor wire harness to the body and shock absorber with the 2 clamp bolts.
   Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf) for bolt A
   29 N*m (300 kgf*cm, 21 ft.*lbf) for bolt B
   NOTICE:
   Do not twist the sensor wire when installing it.
   (c) Connect the resin clip and speed sensor wire harness to the shock absorber.
   NOTICE:
   Do not twist the sensor wire when installing it.



   (d) Connect the speed sensor connector.
   NOTICE:
   Do not twist the sensor wire when installing it.

2. **INSTALL FRONT WHEEL**
   Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

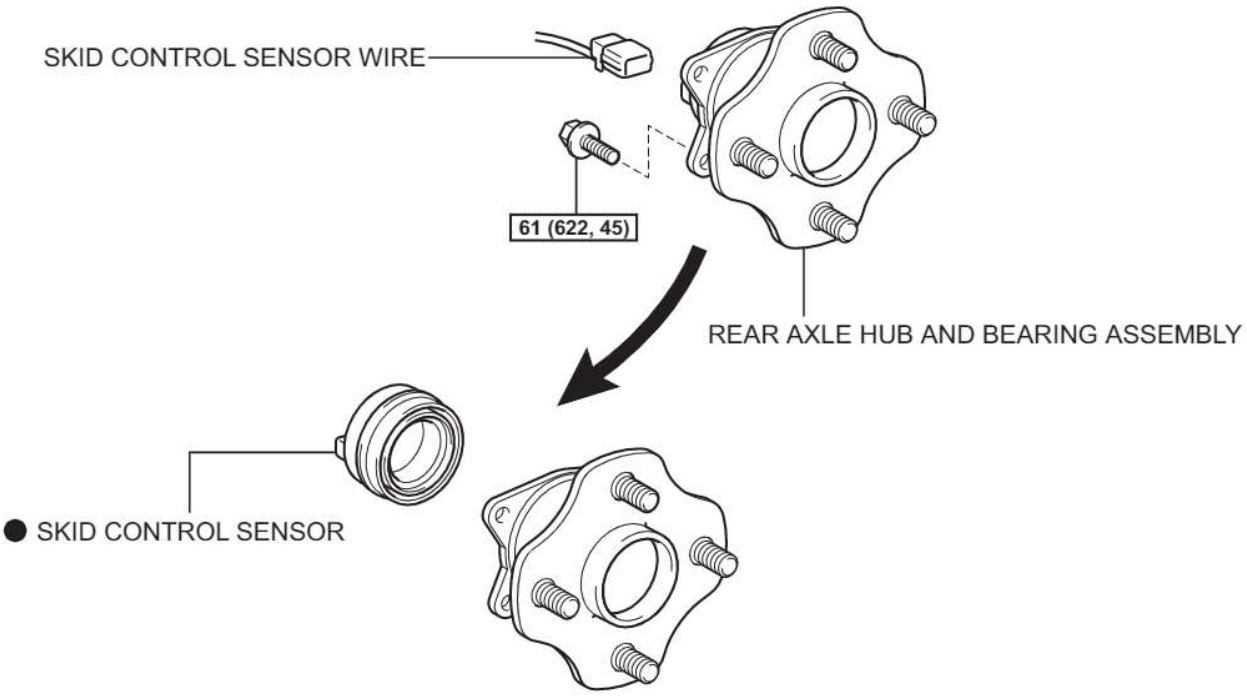
4. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

5. **CHECK ABS SPEED SENSOR SIGNAL**
   (a) Check the ABS speed sensor signal (see page BC-73).

BC

SKID CONTROL SENSOR

COMPONENTS

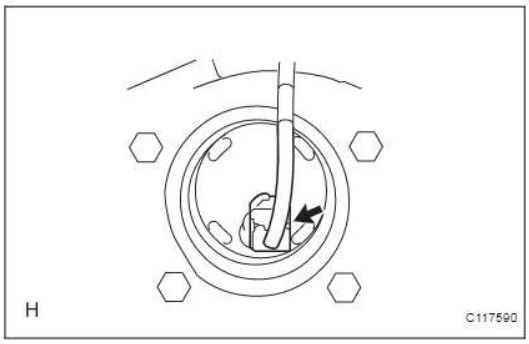


BC

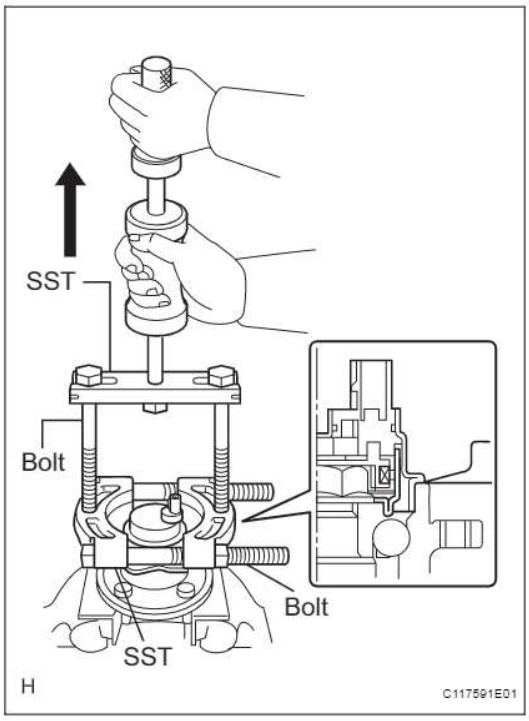
REMOVAL

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE REAR WHEEL**
3. **DISCONNECT SKID CONTROL SENSOR WIRE**
   (a) Disconnect the connector from the skid control sensor.
4. **REMOVE REAR BRAKE DRUM SUB-ASSEMBLY**
   (a) Put matchmarks on the rear brake drum and axle hub.
   (b) Remove the rear brake drum.
5. **REMOVE REAR AXLE HUB AND BEARING ASSEMBLY**



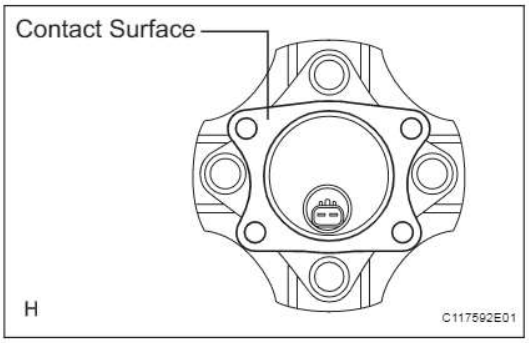
6. **REMOVE SKID CONTROL SENSOR**
   (a) Mount the hub and bearing in a soft jaw vise.
   NOTICE:
   Replace the hub and bearing if it is dropped or receives a strong shock.
   (b) Using a pin punch and hammer, drive out the 2 pins of SST, and remove the 2 attachments from SST.
   SST 09520-00031
   (c) Using SST and 2 bolts (Diameter: 12 mm, pitch: 1.5 mm), remove the skid control sensor from the rear axle hub.
   SST 09520-00031 (09520-00040), 09521-00020, 09950-00020
   NOTICE:
   - **If the sensor rotor is damaged, replace the hub and bearing.**
   - **Do not scratch the contacting surface of the axle hub and speed sensor.**



BC

INSTALLATION

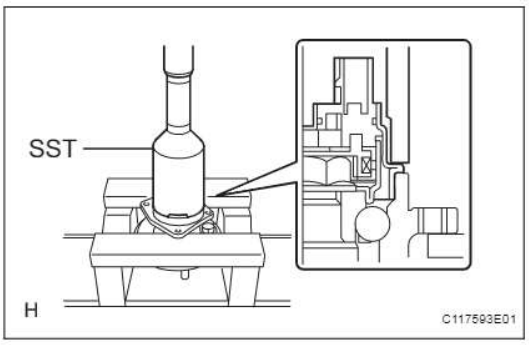
HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.



1. INSTALL SKID CONTROL SENSOR

(a) Clean the contacting surface of the rear axle hub and a new skid control sensor.
NOTICE:
Keep the sensor rotor clean.

(b) Place the skid control sensor on the rear axle hub so that the connector is as low as possible when installed to the vehicle.

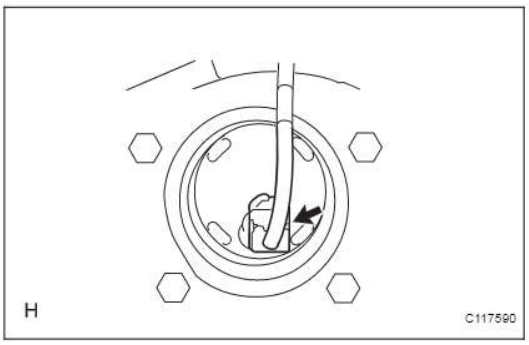


(c) Using SST and a press, install the skid control sensor on the rear axle hub.
SST 09214-76011
NOTICE:
- **Do not tap the skid control sensor directly with a hammer.**
- **Check that there is no foreign matter on the skid control sensor detection portion.**
- **Press in the skid control sensor straight and slowly.**

2. INSTALL REAR AXLE HUB AND BEARING ASSEMBLY (See page AH-15)

3. INSPECT REAR AXLE DEVIATION AND BACKLASH (See page AH-15)

4. INSTALL REAR BRAKE DRUM SUB-ASSEMBLY



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. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

8. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

9. CHECK ABS SPEED SENSOR SIGNAL

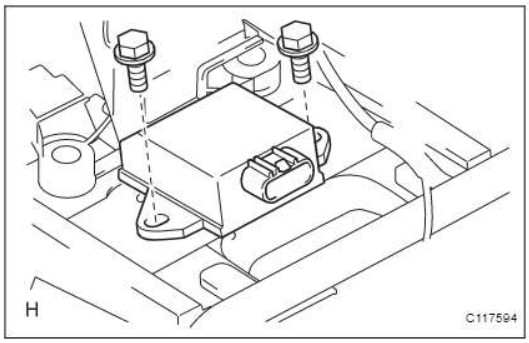
(a) Check the ABS speed sensor signal (see page BC-73).

BC

INSTALLATION

NOTICE:

- **Do not use the dropped or damaged yaw rate sensor.**
- **Keep the area between the yaw rate sensor bracket and body free from foreign matter.**
- **Make sure of the sensor direction.**



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 REAR CONSOLE BOX ASSEMBLY**
   (a) Install the rear console box (see pageIP-27).
3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
4. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
5. **PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION**
   (a) Perform yaw rate sensor zero point calibration (see page BC-69).
6. **CHECK VSC SENSOR SIGNAL**
   (a) Check the VSC sensor signal (see page BC-73).

BC

DTC	C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction
DTC	C0215/34	Left Rear Wheel Speed Sensor Signal Malfunction
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, C1235/35 and C1236/36.
DTCs C1273/73, C1274/74, C1277/77 and C1278/78 can be deleted when the speed sensor sends a vehicle speed signal or the test mode ends. DTCs C1273/73, C1274/74, C1277/77 and C1278/78 are output only in the test mode.

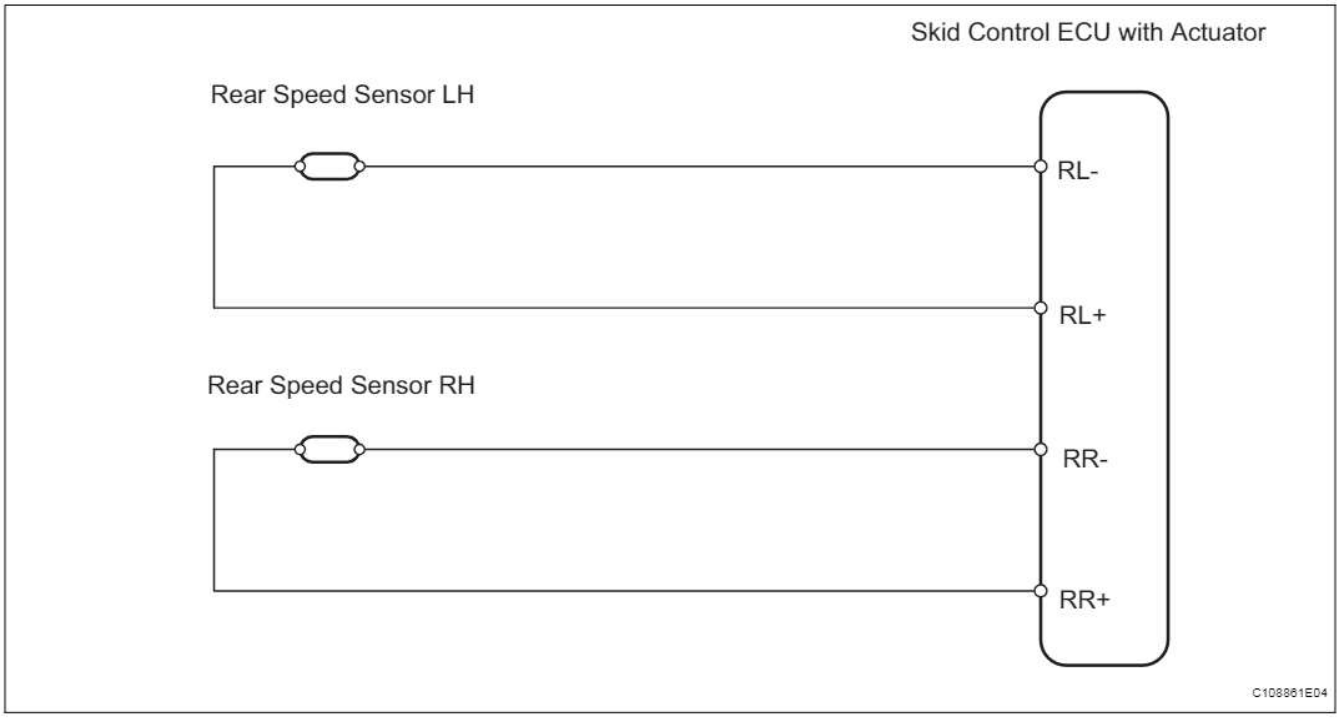
DTC No.	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When one of following occurs • With vehicle speed at 10 km/h (6 mph) or more, sensor signal circuit of faulty wheel is open or short for 15 seconds • Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more • Sensor signal circuit is open for 0.2 seconds or more	• Rear speed sensor • Rear speed sensor circuit • Speed sensor rotor
C1238/38 C1239/39	At vehicle speed of 20 km/h (12 mph) or more, condition that noise is included in speed sensor signal continues for 5 seconds or more	• Rear speed sensor • Rear speed sensor circuit
C1273/73	Detected only during test mode	• Rear speed sensor RH • Sensor installation • Sensor rotor
C1274/74	Detected only during test mode	• Rear speed sensor LH • Sensor installation • Sensor rotor

BC

DTC No.	DTC Detection Condition	Trouble Area
C1277/77	Detected only during test mode	Rear speed sensor rotor RH
C1278/78	Detected only during test mode	Rear speed sensor rotor LH

HINT:
- DTCs C0210/33 and C1238/38 are for the rear speed sensor RH.
- DTCs C0215/34 and C1239/39 are for the rear speed sensor LH.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

BC

B → **Go to step 4**

A

2 READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

(a) Check the DATA LIST for proper functioning of the rear speed sensor.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Speed similar to that of speedometer

OK:
There is almost no difference between actual wheel speed and displayed speed value.

NG → **Go to step 4**

OK

3 CHECK DTC OUTPUT RECUR

(a) Clear the DTCs (see page BC-8).
(b) Drive the vehicle at approximately 32 km/h (20 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-8).
Result

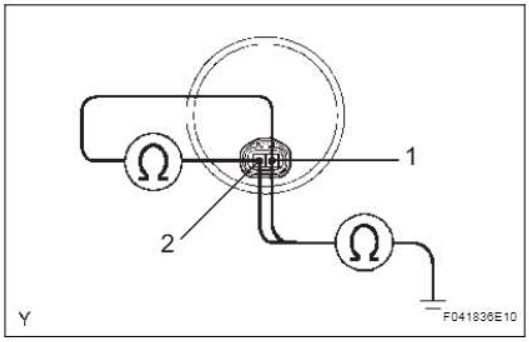
Result	Proceed to
DTC is output	A
DTC is not output	B

B → **CHECK FOR INTERMITTENT PROBLEMS**

A

REPLACE BRAKE ACTUATOR ASSEMBLY

4 INSPECT REAR SPEED SENSOR



(a) Disconnect the A15 and A16 sensor connectors.
(b) Measure the resistance of the speed sensors.
Standard resistance:
LH

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

RH

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

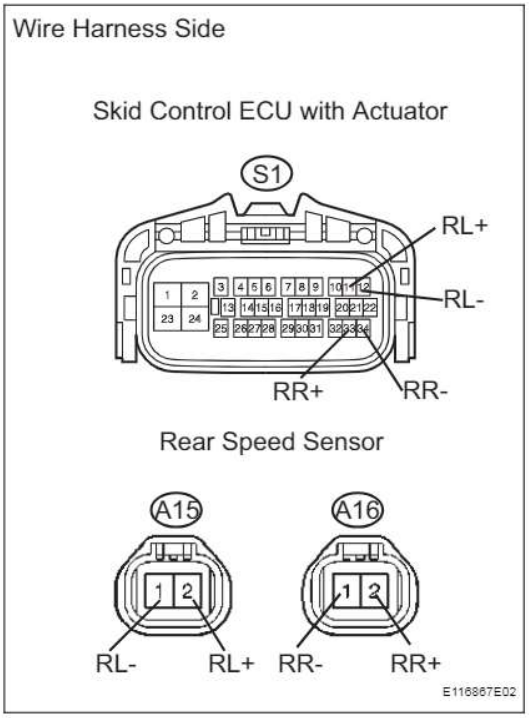
BC

HINT:
Check the speed sensor signal after the speed sensor replacement (see page BC-5).

NG → REPLACE REAR SPEED SENSOR

OK

5 CHECK WIRE HARNESS (SKID CONTROL ECU - REAR SPEED SENSOR)



(a) Disconnect the S1 ECU connector.
(b) Disconnect the A15 and A16 speed sensor connectors.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance:

LH

Tester Connection	Specified Condition
S1-11 (RL+) - A15-2 (RL+)	Below 1 Ω
S1-12 (RL-) - A15-1 (RL-)	
A15-2 (RL+) - Body ground	10 kΩ or higher
A15-1 (RL-) - Body ground	

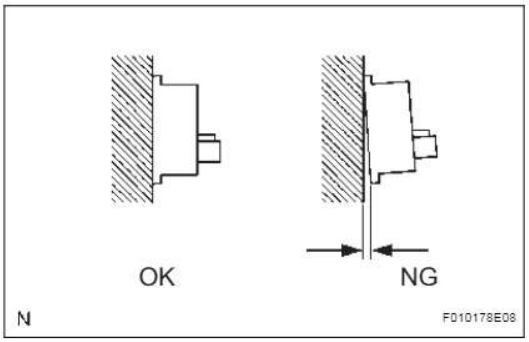
RH

Tester Connection	Specified Condition
S1-33 (RR+) - A16-2 (RR+)	Below 1 Ω
S1-34 (RR-) - A16-1 (RR-)	
A16-2 (RR+) - Body ground	10 kΩ or higher
A16-1 (RR-) - Body ground	

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

6 INSPECT REAR SPEED SENSOR (INSTALLATION)



(a) Check the sensor installation.

OK:

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

HINT:
Check the speed sensor signal after replacement (see page BC-5).

NG → REPLACE REAR SPEED SENSOR

OK

7 INSPECT SPEED SENSOR (TIP)

(a) Remove the rear speed sensor.

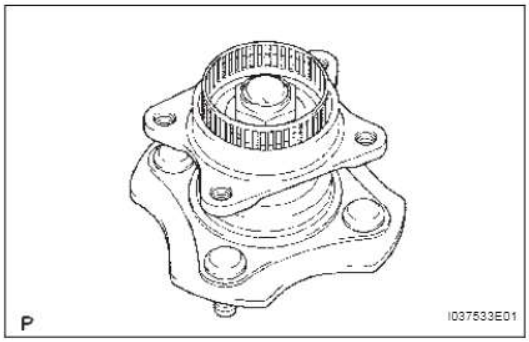
BC

(b) Check the sensor tip.
OK:
No scratches or foreign matter on the sensor tip.
HINT:
Check the speed sensor signal after replacement (see page BC-5).

NG → **REPLACE REAR SPEED SENSOR**

OK

8	INSPECT REAR AXLE HUB AND BEARING ASSEMBLY



(a) Remove the axle hub and disconnect the rear speed sensor.
(b) Check the sensor rotor serrations.
OK:
No scratches, missing teeth or foreign matter.
Do not reuse skid control sensor.
HINT:
Check the speed sensor signal after replacement (see page BC-5).

NG → **REPLACE REAR AXLE HUB & BEARING ASSEMBLY**

OK

9	CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-8).
(b) Drive the vehicle at approximately 30 km/h (19 mph) or more for 60 seconds or more.
(c) Check for DTCs (see page BC-8).
Result

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

B → **END**

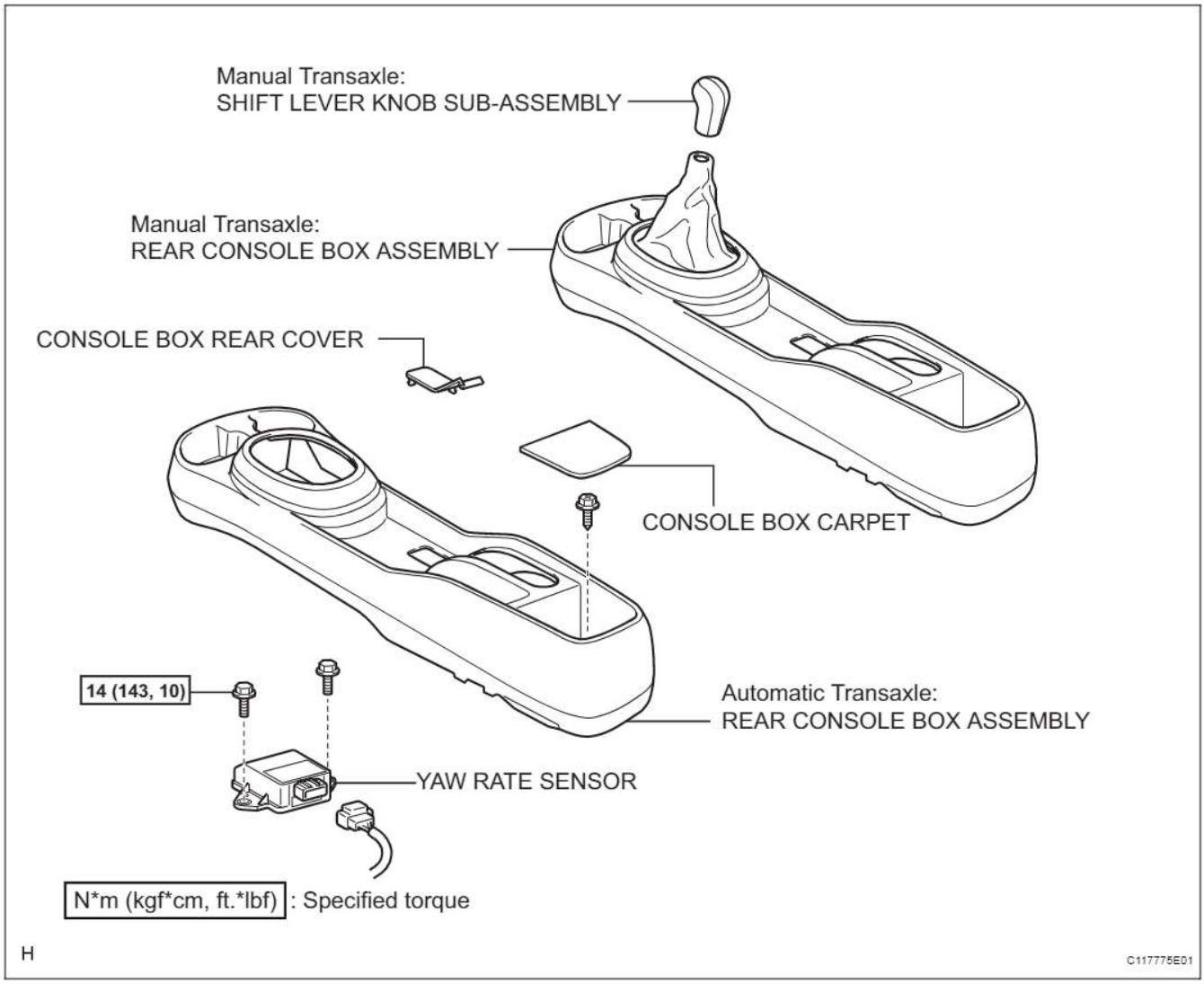
A

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

YAW RATE AND ACCELERATION SENSOR (w/ VSC)

COMPONENTS



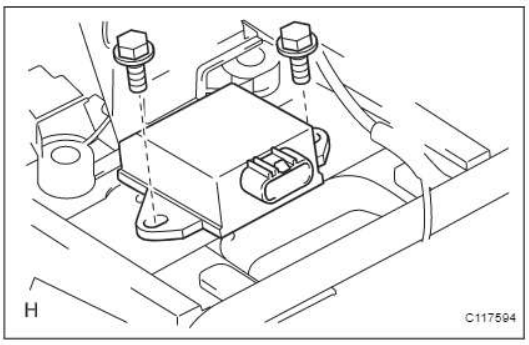
BC

REMOVAL

NOTICE:

- **Do not use the dropped or damaged yaw rate sensor.**
- **Keep the area between the yaw rate sensor bracket and body free from foreign matter.**
- **Make sure of the sensor direction.**

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE REAR CONSOLE BOX ASSEMBLY**
   (a) Remove the rear console box (see page IP-26).
3. **REMOVE YAW RATE SENSOR**
   (a) Disconnect the yaw rate sensor connector.
   (b) Remove the 2 bolts and yaw rate sensor.



BC

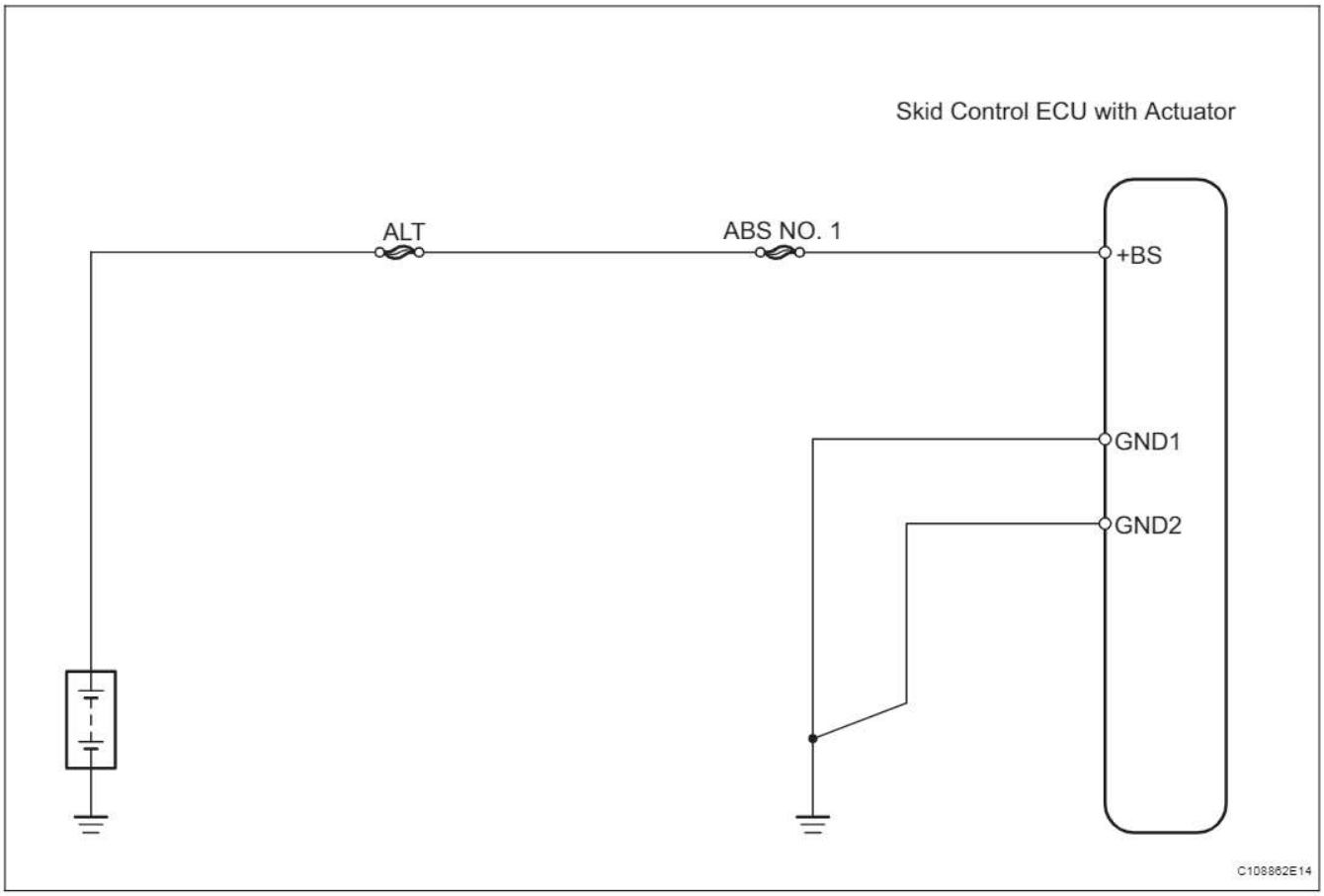
DTC	C0226/21	SFR Solenoid Circuit
DTC	C0236/22	SFL Solenoid Circuit
DTC	C0246/23	SRR Solenoid Circuit
DTC	C0256/24	SRL Solenoid Circuit

DESCRIPTION

ABS solenoids turn on when receiving signals from the ECU. They control braking force by adjusting the pressure applied to the wheel cylinders.

DTC No.	DTC Detection Condition	Trouble Area
C0226/21 C0236/22 C0246/23 C0256/24	When either condition below is met: 1. With IG1 terminal voltage at 10 to 16 V, solenoid circuit is open or short for 0.05 seconds or longer 2. With IG1 terminal voltage at 10 to 16 V, ABS control solenoid relay contact is OFF for 0.05 seconds or longer	• Each solenoid circuit • Skid control ECU with actuator

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	RECONFIRM DTC

HINT:
These codes are output when a problem is detected in the brake actuator assembly.
As the solenoid circuit is built into the brake actuator assembly, solenoid circuit inspection and solenoid unit inspection cannot be performed.
Be sure to check if a DTC is output before replacing the brake actuator assembly.

(a) Clear the DTCs (see page BC-8).
(b) Turn the ignition switch ON and check that the ABS warning light illuminates for approximately 3 seconds.
(c) Check for DTCs (see page BC-8).

Result

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

B → REPLACE BRAKE ACTUATOR ASSEMBLY

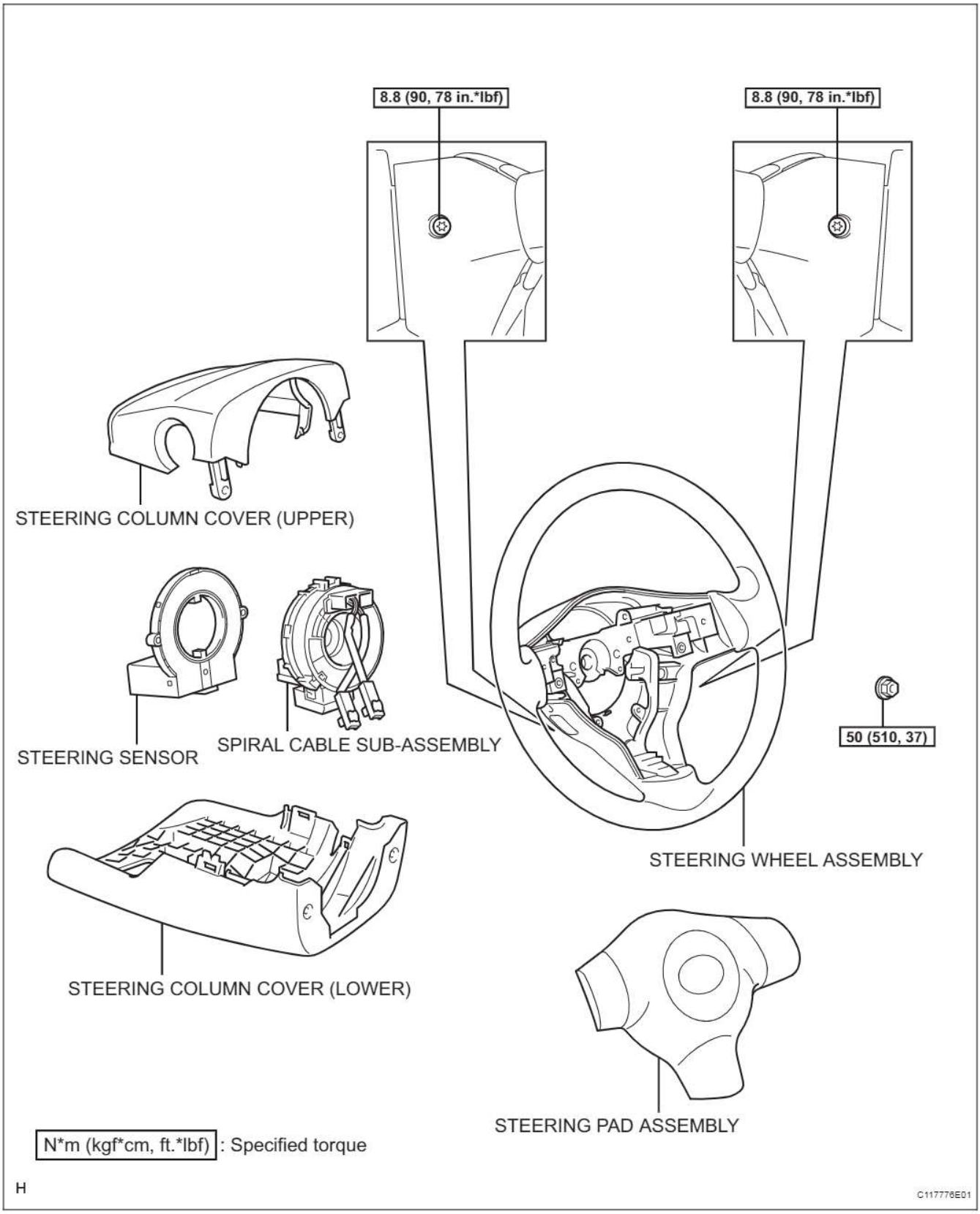
A

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

BC

STEERING ANGLE SENSOR (w/ VSC)

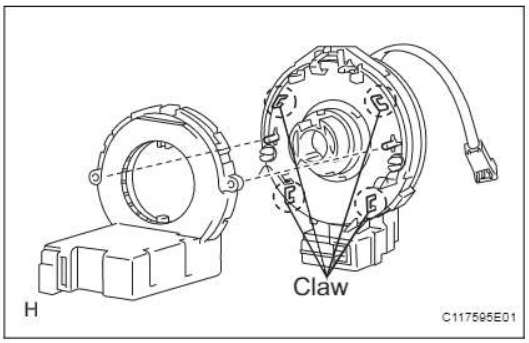
COMPONENTS

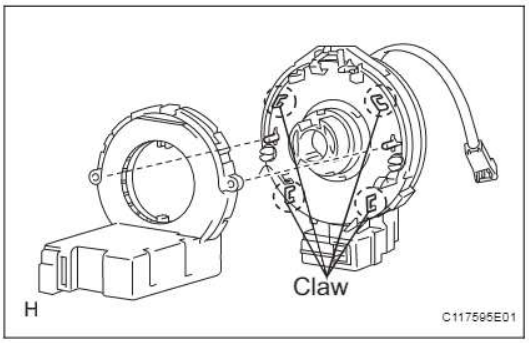


BC

REMOVAL

1. **PRECAUTION**
   (a) Follow the PRECAUTION (see page RS-1).
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
4. **REMOVE STEERING PAD ASSEMBLY**
5. **REMOVE STEERING WHEEL ASSEMBLY**
6. **REMOVE STEERING COLUMN COVER**
7. **REMOVE SPIRAL CABLE SUB-ASSEMBLY**
8. **REMOVE STEERING SENSOR**
   (a) Release the 4 claw fittings and remove the steering sensor from the spiral cable.





INSTALLATION

1. **INSTALL STEERING SENSOR**
   (a) Install the steering sensor to the spiral cable.
   NOTICE:
   - **Install the claw securely.**
   - **Do not damage the claw fittings.**
2. **ADJUST FRONT WHEEL TO CENTER**
3. **ADJUST SPIRAL CABLE SUB-ASSEMBLY**
4. **INSTALL STEERING COLUMN COVER**
5. **INSTALL STEERING WHEEL ASSEMBLY**
6. **INSPECT STEERING WHEEL CENTER POINT**
7. **INSTALL STEERING PAD ASSEMBLY**
8. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
9. **INSPECT STEERING PAD ASSEMBLY**
10. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

BC

11. **CHECK SRS WARNING LIGHT**
    (a) Check the SRS warning light (see page RS-28).
12. **PERFORM VSC SYSTEM CALIBRATION**
    (a) Perform VSC system calibration (see page BC-69).
13. **CHECK ABS WARNING LIGHT**
    (a) Check the ABS warning light (see page).
14. **CHECK VSC WARNING LIGHT**
    (a) Check the VSC warning light (see page BC-73).

DTC	C0273/13	Open in ABS Motor Relay Circuit

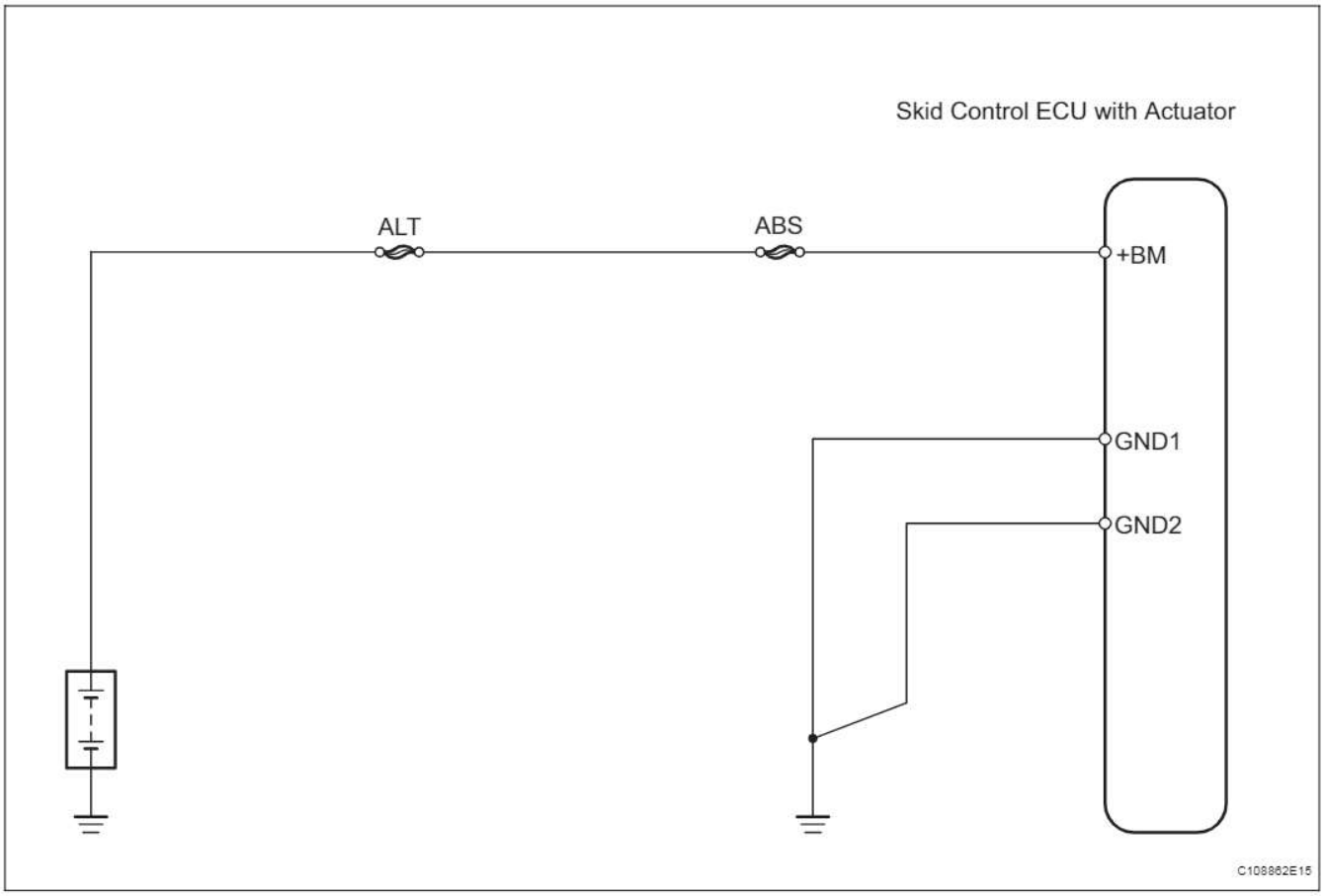
DTC	C0274/14	Short to B+ in ABS Motor Relay Circuit

DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
C0273/13	With IG1 voltage 10 V or below during initial check or ABS control, pump motor relay is turned on, and relay contact is not on for 0.2 seconds or longer	• ABS motor relay • ABS motor relay circuit
C0274/14	When pump motor relay is turned off, relay contact is on for 3 seconds or longer	• ABS motor relay • ABS motor relay circuit

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.

Method

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 3

A

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (ABS MOTOR RELAY)

(a) Select the ACTIVE TEST, generate a control command, and then check that the ABS motor relay operates.

Skid control ECU with actuator

Item	Measurement Item / Range (Display)	Diagnostic Note
ABS MOT RELAY	Turns ABS motor relay ON / OFF	Operation sound of motor can be heard

OK:
Operation sound of motor can be heard.

OK → REPLACE BRAKE ACTUATOR ASSEMBLY

NG

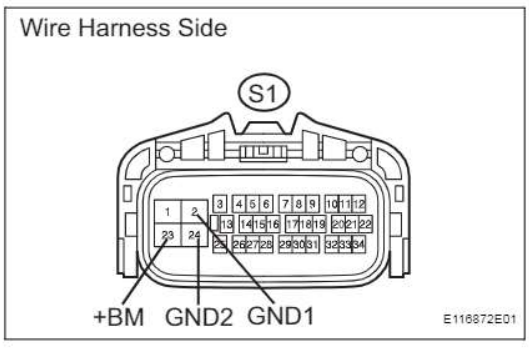
3 INSPECT FUSE (ABS)

(a) Remove the ABS H-fuse from the fusible link block.
(b) Measure the resistance of the H-fuse.
Standard resistance:
Below 1 Ω

NG → REPLACE FUSE

OK

4 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connectors.
Standard voltage

Tester Connection	Specified Condition
S1-23 (+BM) - Body ground	10 to 14 V

(c) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
S1-32 (GND1) - Body ground	Below 1 Ω
S1-1 (GND2) - Body ground	

BC

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5 RECONFIRM DTC

(a) Clear the DTCs (see page BC-8).
(b) Drive the vehicle at a speed of 4 mph (6 km/h) or more.
(c) Check for DTCs (see page BC-8).
Result

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

HINT:
- The skid control ECU inspects the motor relay circuit when the stop light switch is turned off and the vehicle is running at a speed of 4 mph (6 km/h) or more.
- These DTCs may be memorized due to a malfunction in the connector terminal condition, etc.

B → END

A

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

DTC	C0278/11	Open in ABS Solenoid Relay Circuit

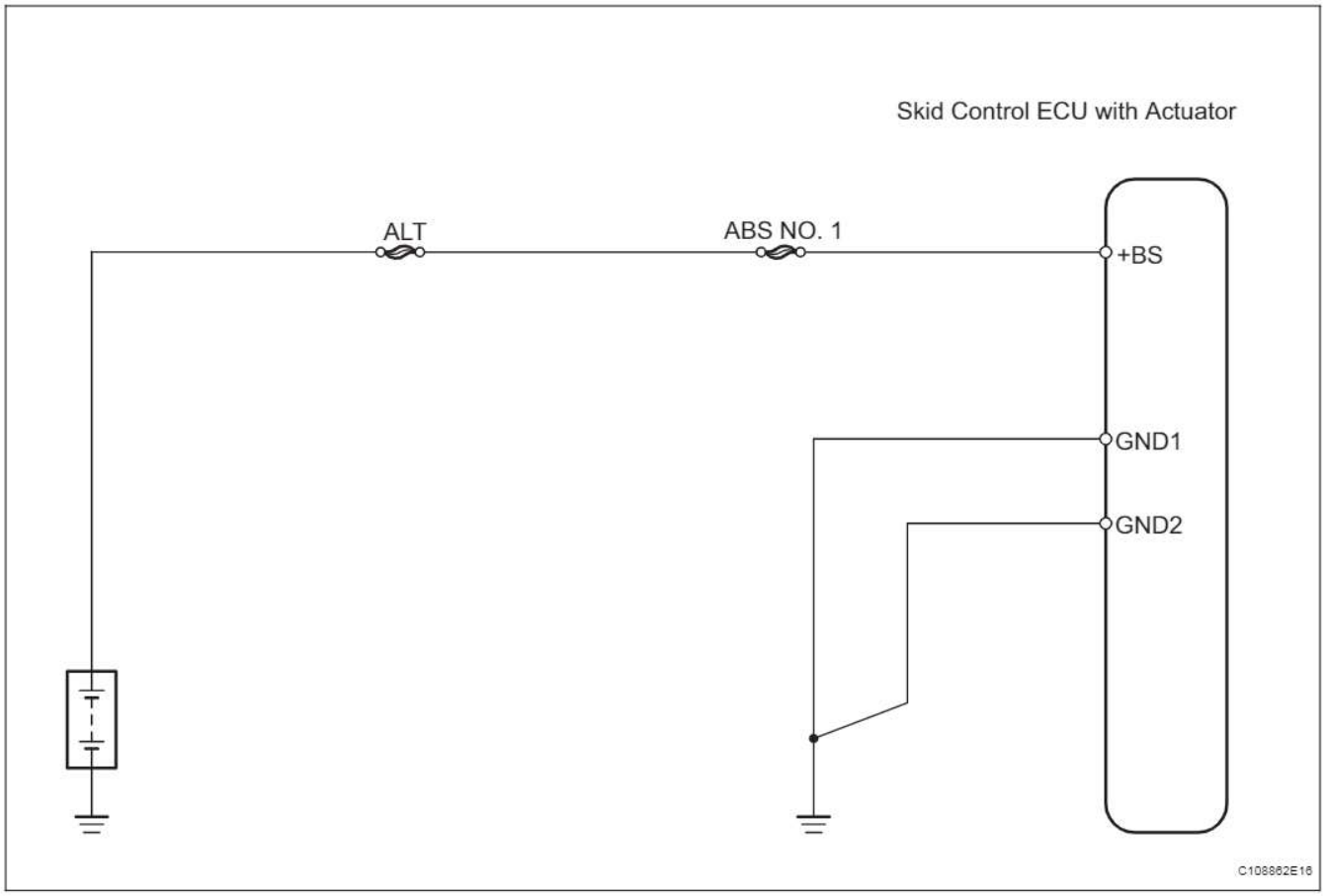
DTC	C0279/12	Short to B+ in ABS Solenoid Relay Circuit

DESCRIPTION

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

DTC No.	DTC Detection Condition	Trouble Area
C0278/11	When solenoid relay is turned on, relay contact is off for 0.2 seconds or longer	• ABS solenoid relay • ABS solenoid relay circuit • Skid control ECU with actuator
C0279/12	Immediately after IG1 is turned on, when solenoid relay is turned off, relay contact is on for 0.2 seconds or longer	• ABS solenoid relay • ABS solenoid relay circuit • Skid control ECU with actuator

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	INSPECT FUSE (ALT, ABS NO. 1)

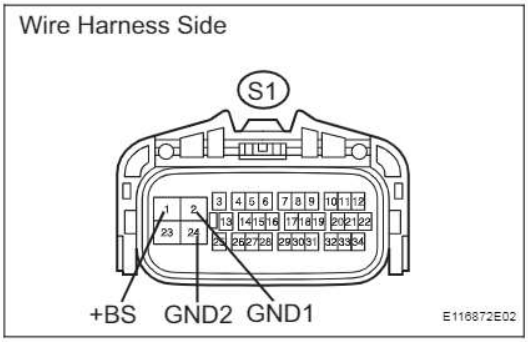
(a) Remove the ALT and ABS NO. 1 H-fuses from the engine room junction block.
(b) Measure the resistance of the H-fuses.

Standard resistance:
Below 1 Ω

NG → **REPLACE FUSE**

OK

2 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)



(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Specified Condition
S1-1 (+BS) - Body ground	10 to 14 V

(c) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
S1-2 (GND1) - Body ground	Below 1 Ω
S1-24 (GND2) - Body ground	

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

OK

3 RECONFIRM DTC

HINT:
These codes are output when a problem is detected in the brake actuator assembly.
As the ABS motor relay is built into the brake actuator assembly, ABS motor relay and solenoid unit inspection cannot be performed.
Be sure to check if a DTC is output before replacing the brake actuator assembly.
(a) Clear the DTCs (see page BC-8).
(b) Drive the vehicle at 6 km/h (4 mph) or more.
(c) Check for DTCs (see page BC-8).
Result

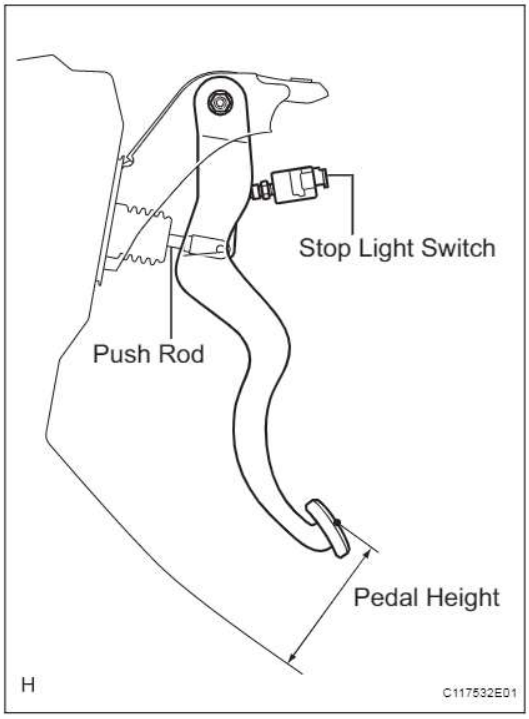
BC

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

B → **END**

A

REPLACE BRAKE ACTUATOR ASSEMBLY

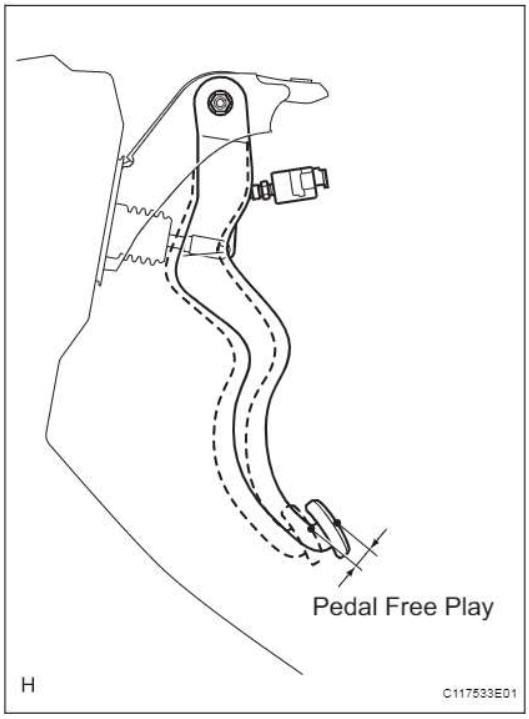


ADJUSTMENT

1. CHECK AND ADJUST BRAKE PEDAL HEIGHT

(a) Check brake pedal height.
Standard pedal height from dash panel:
124.5 to 134.5 mm (4.902 to 5.293 in.)

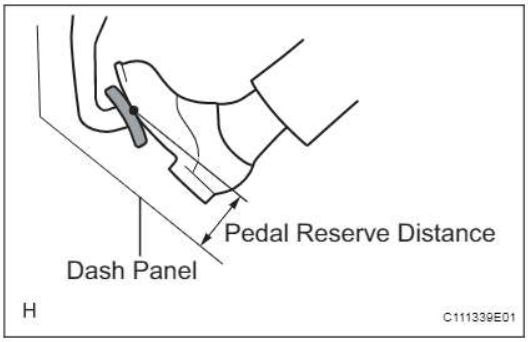
(b) Adjust brake pedal height.
(1) Remove the lower instrument finish panel.
(2) Disconnect the connector from the stop light switch.
(3) Loosen the stop light switch lock nut, and remove the stop light switch.
(4) Loosen the brake master cylinder push rod clevis lock nut.
(5) Adjust the pedal height by turning the pedal push rod.
(6) Tighten the push rod lock nut.
Torque: 26 N*m (265 kgf*cm, 19 ft.*lbf)
(7) Install the stop light switch.
(8) Connect the connector to the stop light switch.
(9) Depress the pedal 5 to 15 mm (0.20 to 0.59 in.). Rotate the switch until the stop lights illuminate. Then tighten the lock nut.
(10) After the installation, depress the pedal 5 to 15 mm (0.20 to 0.59 in.), and check that the stop lights illuminate.



2. CHECK BRAKE PEDAL FREE PLAY

(a) Stop the engine and depress the brake pedal several times until there is no vacuum in the booster. Then release the pedal.
(b) Depress the pedal until resistance is felt.
(c) Check the pedal's free play by measuring the distance between the position in the previous step and the pedal's released position.
Standard pedal free play:
1.0 to 6.0 mm (0.04 to 0.24 in.)
If the clearance is not as specified, check the switch clearance in the next step.
If the free play is as specified, proceed to the "check brake pedal reserve distance" procedures.
(d) Check the switch clearance.
Standard stop light switch clearance:
0.5 to 2.4 mm (0.020 to 0.094 in.)
If the clearance is not as specified, adjust the clearance and recheck the pedal's free play.
If the clearance is as specified, troubleshoot the brake system and proceed to the "check brake pedal reserve distance" procedures.

BR



3. CHECK BRAKE PEDAL RESERVE DISTANCE

(a) Release the parking brake lever. Start the engine.

(b) Depress the pedal and check the pedal reserve distance.

(1) Depress the pedal with a force of 490 N (50 kgf, 110 lbf).

(2) Measure the distance between the pedal and asphalt sheet shown in the illustration.

Standard pedal reserve distance

Model	Specified Condition
w/ VSC	More than 55 mm (2.17 in.)
w/o VSC	More than 50 mm (1.97 in.)

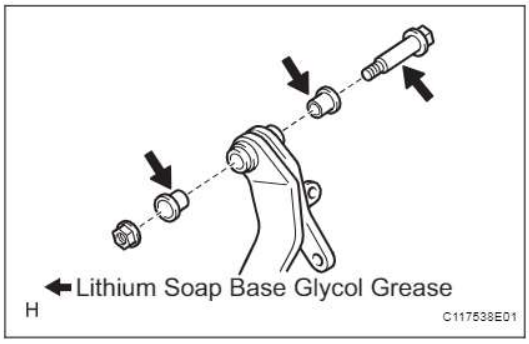
If the distance is not as specified, troubleshoot the brake system.

BR

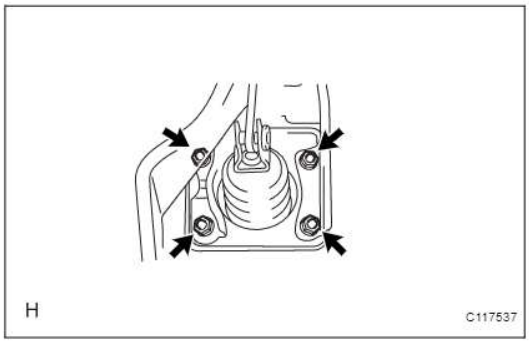
INSTALLATION

1. **INSTALL BRAKE PEDAL PAD**
   (a) Install the brake pedal pad to the brake pedal.

2. **INSTALL STOP LIGHT SWITCH ASSEMBLY**
   (a) Install the stop light switch to the support with the nut.
   Torque: 26 N*m (265 kgf*cm, 19 ft.*lbf)

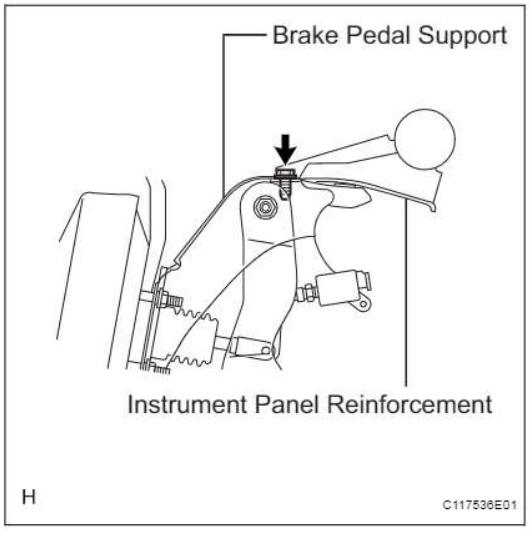


3. **INSTALL BRAKE PEDAL SUB-ASSEMBLY**
   (a) Apply lithium soap base glycol grease to the ends and sides of 2 new brake pedal bushes and brake pedal shaft.
   (b) Install the switch cushion.
   (c) Install the brake pedal and 2 brake pedal bushes to the brake pedal support with the brake pedal shaft and nut.
   Torque: 37 N*m (375 kgf*cm, 27 ft.*lbf)

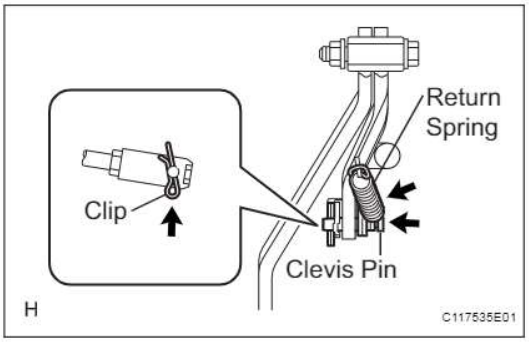


4. **INSTALL BRAKE PEDAL SUPPORT SUB-ASSEMBLY**
   (a) Install the brake pedal support with the 4 nuts.
   Torque: 13 N*m (127 kgf*cm, 9 ft.*lbf)

   (b) Install the bolt on the brake pedal support.
   Torque: 21 N*m (214 kgf*cm, 15 ft.*lbf)



BR



5. **CONNECT MASTER CYLINDER PUSH ROD CLEVIS**
   (a) Apply lithium soap base glycol grease to the clevis pin.
   (b) Install the clevis pin and clip.
   NOTICE:
   The direction for the clip installation is as shown in the illustration.
   (c) Install the brake pedal return spring.
   (d) Connect the stop light switch connector to the stop light switch.
6. **INSTALL INSTRUMENT PANEL SUB-ASSEMBLY**
   (a) Install the instrument panel (see page IP-10).
7. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
8. **CHECK AND ADJUST BRAKE PEDAL HEIGHT (See page BR-9)**
9. **CHECK BRAKE PEDAL FREE PLAY (See page BR-9)**
10. **CHECK BRAKE PEDAL RESERVE DISTANCE (See page BR-10)**
11. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
12. **CHECK SRS WARNING LIGHT (w/ SRS Airbag)**
    (a) Check the SRS warning light (see page RS-28).

BR

INSPECTION

1. **CHECK AND ADJUST BRAKE BOOSTER PUSH ROD**

NOTICE:

The brake booster interior must not be a vacuum when adjusting the booster. Stop the engine and depress the brake pedal several times until there is no vacuum in the booster.

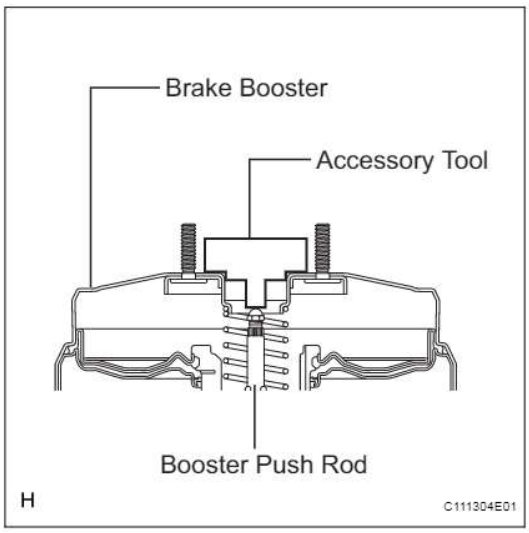
HINT:

Adjust the booster push rod when the master cylinder is replaced with a new one. Adjustment is not necessary when the master cylinder is reinstalled and booster is replaced with a new one.

(a) Apply chalk to the tip of an accessory tool.

HINT:

An accessory tool is included with each new master cylinder.



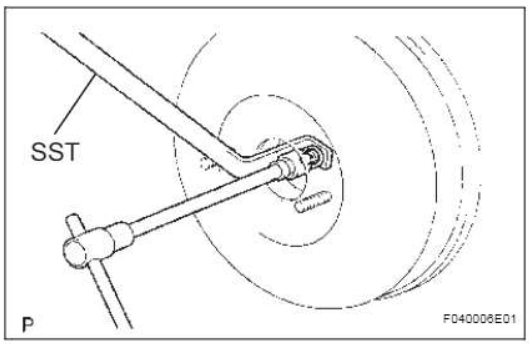
(b) Place the accessory tool on the booster.

(c) Confirm that there is no clearance between the booster push rod and accessory tool.

If there is clearance between the tool and shell of the booster, the rod is protruding too far.

If chalk does not transfer from the tool to the rod, the rod is not protruding far enough.

In both cases, adjust the rod in the next step.



(d) To adjust the clearance of the rod, first depress the pedal so that the rod protrudes. Then fix the rod in place using SST and rotate the hexagon cap nut to adjust the clearance.

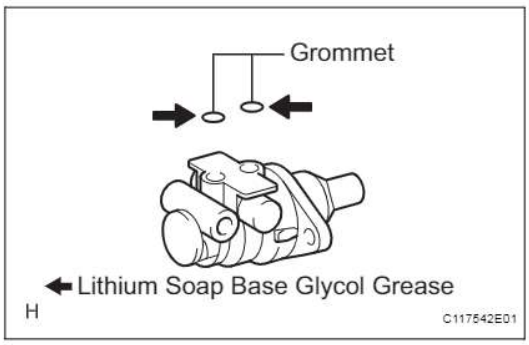
SST 09737-00020

INSTALLATION

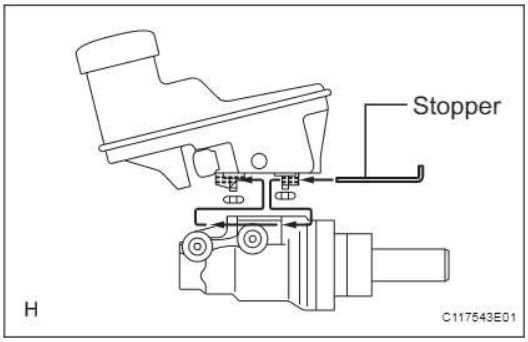
1. **INSTALL BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY**

(a) Apply lithium soap base glycol grease to 2 new grommets and install them to the brake master cylinder.

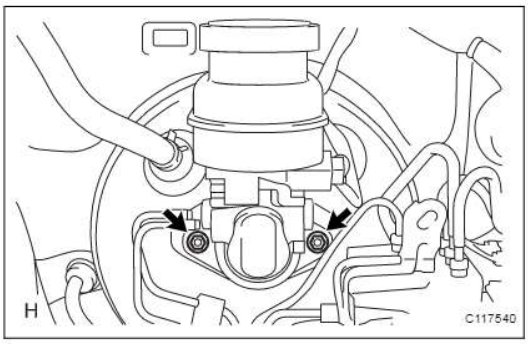
(b) Install the cap and strainer to the brake master cylinder reservoir.



BR

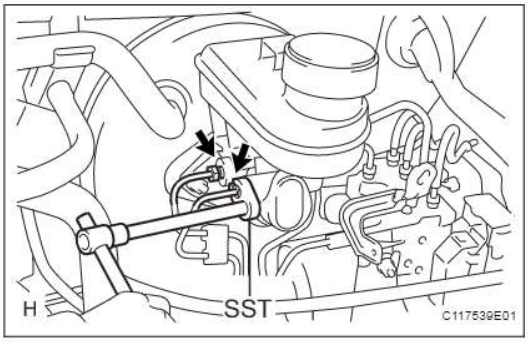


(c) Install the brake master cylinder reservoir with the reservoir stopper.
NOTICE:
Install the stopper securely to the groove of the reservoir and master cylinder.



2. INSTALL BRAKE MASTER CYLINDER SUB-ASSEMBLY

(a) Install the brake master cylinder to the booster with the 2 nuts.
Torque: 13 N*m (127 kgf*cm, 9 ft.*lbf)



(b) Using SST, connect the 2 brake lines to the brake master cylinder.
SST 09023-00101
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf) without SST
14 N*m (143 kgf*cm, 10 ft.*lbf) with SST
HINT:
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

(c) Connect the level warning light switch connector.

3. CONNECT CLUTCH RESERVOIR TUBE (for Manual Transaxle)

(a) Slide the clip and connect the clutch reservoir tube.

4. INSTALL AIR CLEANER CAP SUB-ASSEMBLY

5. FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)

6. BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)

7. BLEED AIR FROM BRAKE LINE (See page BR-4)

8. BLEED AIR FROM CLUTCH LINE (for Manual Transaxle) (See page CL-12)

9. CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-6)

10. CHECK FOR BRAKE FLUID LEAKAGE

BR

BRAKE SYSTEM

PRECAUTION

- Take extra care to replace each part properly. Improper installation or repair could affect the performance of the brake system and cause a driving hazard.
- It is very important to keep the brake system parts and the work area clean when repairing the brake system.
- If the vehicle is equipped with a mobile communication system, refer to the precautions in the INTRODUCTION section.

PROBLEM SYMPTOMS TABLE

HINT:
Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

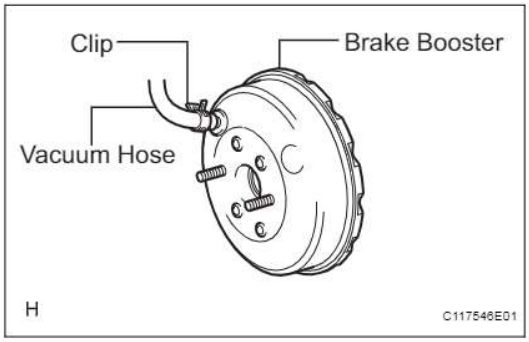
Brake system

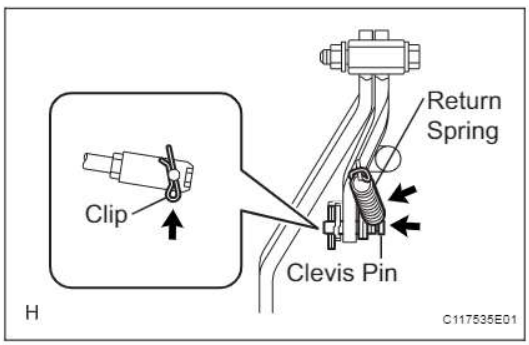
Symptom	Suspected area	See page
Low pedal or spongy pedal	1. Fluid leaks in brake system	-
	2. Air in brake system	BR-3
	3. Piston seals (worn or damaged)	BR-25
	4. Wheel cylinder cup (worn or damaged)	BR-33
	5. Rear brake shoe clearance (adjustment necessary)	BR-38
	6. Brake master cylinder (faulty)	BR-12
	7. Booster push rod (adjustment necessary)	BR-13
Brake drag	1. Brake pedal free play (minimal)	BR-9
	2. Parking brake lever travel (adjustment necessary)	PB-1
	3. Parking brake wire (stuck)	PB-4
	4. Rear brake shoe clearance (adjustment necessary)	BR-38
	5. Pad (cracked or distorted)	BR-26
	6. Lining (cracked or distorted)	BR-33
	7. Piston, for front (stuck or frozen)	BR-25
	8. Piston, for rear (stuck or frozen)	BR-33
	9. Tension or return spring (faulty)	BR-31
	10. Booster push rod (adjustment necessary)	BR-13
	11. Vacuum leaks in booster system	BR-18
Brake pull	1. Piston, for front (stuck or frozen)	BR-25
	2. Piston, for rear (stuck or frozen)	BR-33
	3. Pad (oily, cracked or distorted)	BR-26
	4. Lining (oily, cracked or distorted)	BR-33
	5. Disc (scored)	BR-26
Brake pedal is depressed firmly but brake is insufficient	1. Fluid leaks in brake system	-
	2. Air in brake system	BR-3
	3. Pad (worn, cracked, distorted, oily or glazed)	BR-26
	4. Lining (worn, cracked, distorted, oily or glazed)	BR-33
	5. Rear brake shoe clearance (adjustment necessary)	BR-38
	6. Disc (scored)	BR-26
	7. Booster push rod (adjustment necessary)	BR-13
	8. Vacuum leaks in booster system	BR-18
Noise from brakes	1. Pad (cracked, distorted, dirty or glazed)	BR-26
	2. Lining (cracked, distorted, dirty or glazed)	BR-33
	3. Installation bolt (loose)	BR-23
	4. Disc (scored)	BR-26
	5. Pad support plate (loose)	BR-23
	6. Sliding pin (worn)	BR-23
	7. Anchor, return or tension spring (faulty)	BR-31
	8. Anti squeal shim (damaged)	BR-23
	9. Shoe hold down spring (damaged)	BR-31

BR

REMOVAL

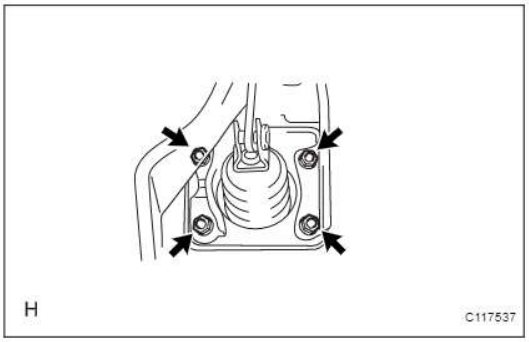
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **DRAIN BRAKE FLUID**
   NOTICE:
   Wash off brake fluid immediately if it comes in contact with any painted surface.
3. **REMOVE AIR CLEANER CAP SUB-ASSEMBLY**
4. **DISCONNECT CLUTCH RESERVOIR TUBE (for Manual Transaxle)**
   (a) Slide the clip and disconnect the clutch reservoir tube.
5. **REMOVE BRAKE MASTER CYLINDER SUB-ASSEMBLY**
   (a) Remove the brake master cylinder (see page BR-12).
6. **REMOVE BATTERY**
7. **REMOVE BRAKE ACTUATOR ASSEMBLY WITH BRACKET**
   (a) Remove the brake actuator with bracket (see page BC-163).
8. **REMOVE BRAKE BOOSTER ASSEMBLY**
   (a) Slide the clip and disconnect the vacuum hose from the brake booster.





   (b) Remove the brake pedal return spring, clip and clevis pin.
   (c) Loosen the push rod clevis lock nut.

BR

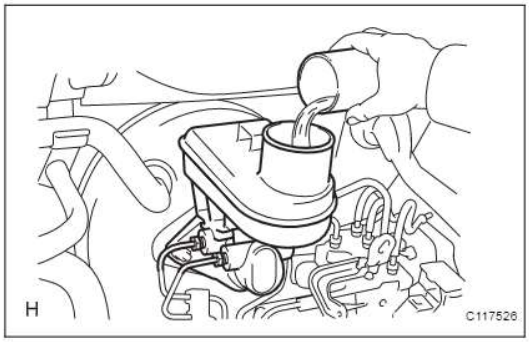


(d) Remove the 4 nuts and push rod clevis.
(e) Pull out the brake booster and gasket.

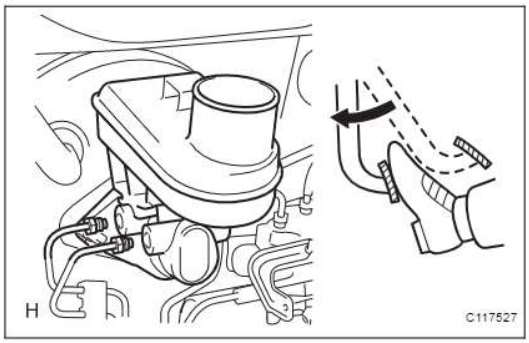
BRAKE FLUID

BLEEDING

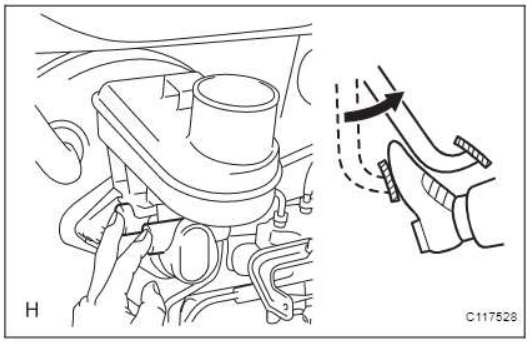
HINT:
If any work is performed on the brake system or if air in the brake lines is suspected, bleed air from the brake system.
NOTICE:
Wash off brake fluid immediately if it comes in contact with any painted surface.



1. **FILL RESERVOIR WITH BRAKE FLUID**
   Fluid:
   SAE J1703 or FMVSS No. 116 DOT3

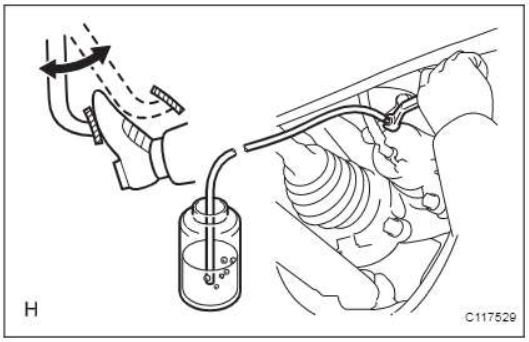


2. **BLEED AIR FROM BRAKE MASTER CYLINDER**
   HINT:
   If the master cylinder has been disassembled or if the reservoir becomes empty, bleed air from the master cylinder.
   (a) Using SST, disconnect the brake lines from the master cylinder.
   SST 09023-00101
   (b) Slowly depress and hold the brake pedal.



   (c) Cover the outer holes with your fingers, and release the pedal.
   (d) Repeat the 2 previous steps 3 or 4 times.
   (e) Using SST, connect the brake lines to the master cylinder.
   SST 09023-00101
   Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf) without SST
   14 N*m (143 kgf*cm, 10 ft.*lbf) with SST
   HINT:
   Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

BR



3. BLEED AIR FROM BRAKE LINE

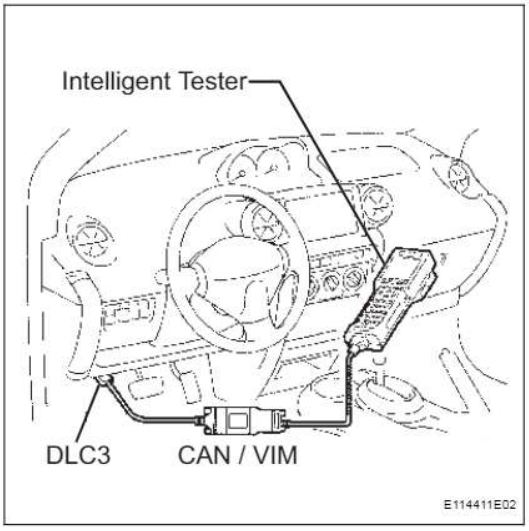
(a) Remove the bleeder plug cap.
(b) Connect a vinyl tube to one of the bleeder plugs.
(c) Depress the pedal several times, and then loosen the bleeder plug with the pedal depressed.
(d) When fluid stops coming out, immediately tighten the bleeder plug. Then release the pedal.
(e) Repeat the 2 previous steps until all the air in the fluid is gone.
(f) Tighten the bleeder plug.
Torque: 8.3 N*m (85 kgf*cm, 73 in.*lbf)
(g) Install the cap.
(h) Bleed air from the brake line for each wheel by repeating the above procedures.

4. BLEED AIR FROM BRAKE ACTUATOR (w/ VSC)

NOTICE:

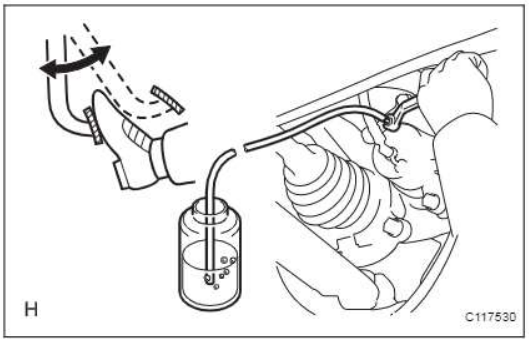
- **After bleeding air from the brake system, the height and/or feel of the pedal may still be awkward. If so, use the intelligent tester to bleed air from the actuator.**
- **Perform the air bleeding by following the steps displayed on the intelligent tester.**
- **Make sure that the fluid in the reservoir does not become empty.**

(a) With the engine stopped, depress the pedal more than 20 times.



(b) Connect the intelligent tester (with CAN VIM) to the DLC3, and then turn the ignition switch ON.
NOTICE:
Do not start the engine.
(c) Select "AIR BLEEDING" on the intelligent tester.
HINT:
Please refer to the intelligent tester operator's manual for further details.
(d) Bleed air from the brake line in "Step 1: Increase" on the intelligent tester display.
(1) Remove the bleeder plug cap.

BR



(2) Connect a vinyl tube to either one of the bleeder plugs.
(3) Depress the pedal several times, and then loosen the bleeder plug with the pedal depressed.
(4) When fluid stops coming out, immediately tighten the bleeder plug. Then release the pedal.
(5) Repeat the 2 previous steps until all the air in the fluid is gone.

(6) Tighten the bleeder plug.
Torque: 8.3 N*m (85 kgf*cm, 73 in.*lbf)
(7) Install the cap.
(8) Repeat the 7 previous steps to bleed air from the brake line for each wheel.

(e) Bleed air from the suction line in "Step 2: Inhalation" on the intelligent tester display.
(1) Remove the bleeder plug cap.
(2) Connect a vinyl tube to the bleeder plug at the right front wheel or the right rear wheel and loosen the bleeder plug.
(3) Using the intelligent tester, operate the actuator to bleed the air.
NOTICE:
The operation stops automatically in 4 seconds. At this time, be sure to release the pedal.
(4) View the intelligent tester display and check that the operation has stopped.
(5) Repeat the 2 previous steps until all the air in the fluid is gone.
(6) Tighten the bleeder plug.
Torque: 8.3 N*m (85 kgf*cm, 73 in.*lbf)
(7) Install the cap.
(8) Repeat the 7 previous steps to bleed air from the brake line for each wheel.

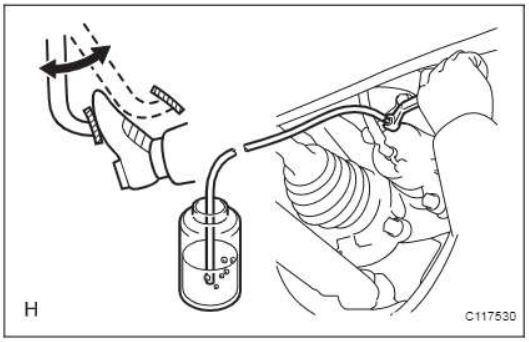
(f) Bleed air from the pressure reduction line in "Step 3: Decrease" on the intelligent tester display.
(1) Remove the bleeder plug cap.
(2) Connect a vinyl tube to either one of the bleeder plugs.
(3) Loosen the bleeder plug.
(4) Using the intelligent tester, operate the actuator. At the same time, depress the pedal and maintain this position.
NOTICE:
- **The operation stops automatically in 4 seconds. When performing this procedure continuously, an interval of at least 20 seconds is required.**
- **When the operation is completed, the pedal slightly goes down. This is normal and it occurs when the solenoid opens.**
- **During this procedure, the pedal may seem heavy, but completely depress it so that the fluid comes out from the bleeder plug.**
- **Be sure to keep depressing the pedal. Never depress and release the pedal repeatedly.**

(5) Tighten the bleeder plug, and then release the pedal.
Torque: 8.3 N*m (85 kgf*cm, 73 in.*lbf)

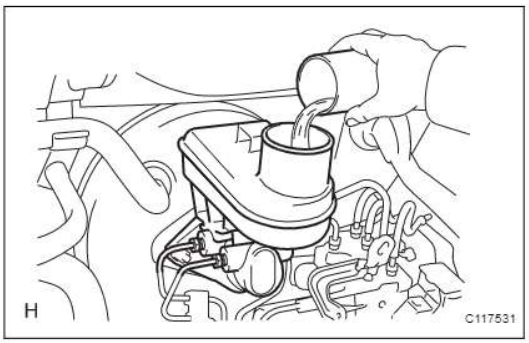
BR

(6) Repeat the 3 previous steps until all the air in the fluid is gone.
(7) Install the cap.
(8) Repeat the 7 previous steps to bleed air from the brake line for each wheel.

(g) Bleed air from the brake line again in "Step 4: Increase" on the intelligent tester display.
(1) Remove the bleeder plug cap.



(2) Connect a vinyl tube to one of the bleeder plugs.
(3) Depress the pedal several times, and then loosen the bleeder plug with the pedal depressed.
(4) When fluid stops coming out, immediately tighten the bleeder plug. Then release the pedal.
(5) Repeat the 2 previous steps until all the air in the fluid is gone.
(6) Tighten the bleeder plug.
Torque: 8.3 N*m (85 kgf*cm, 73 in.*lbf)
(7) Install the cap.
(8) Repeat the 7 previous steps to bleed air from the brake line for each wheel.



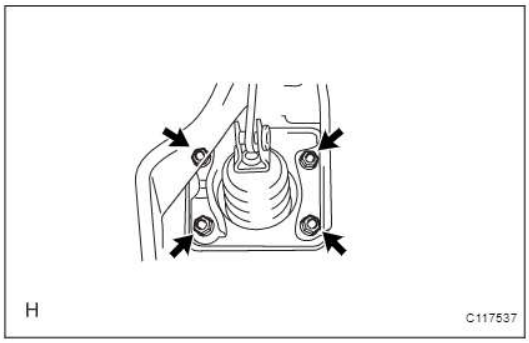
5. CHECK BRAKE FLUID LEVEL IN RESERVOIR

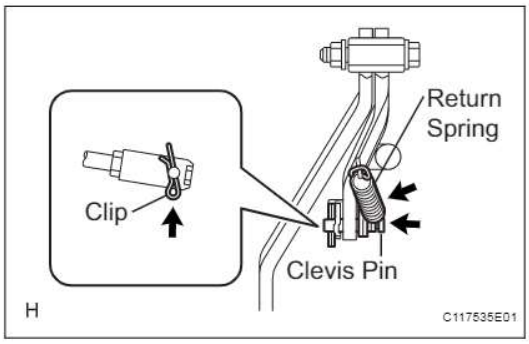
(a) Check the fluid level. If necessary, add fluid.
Fluid:
SAE J1703 or FMVSS No. 116 DOT3

BR

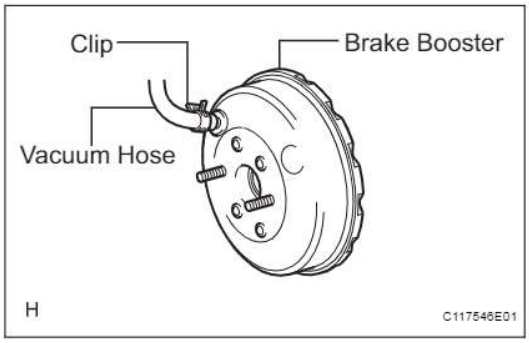
INSTALLATION

1. **INSTALL BRAKE BOOSTER ASSEMBLY**
   (a) Install the brake booster and a new gasket.
   (b) Install the booster and a new gasket with the 4 nuts.
   Torque: 13 N*m (127 kgf*cm, 9 ft.*lbf)
   (c) Install the push rod clevis to the booster.





   (d) Apply lithium soap base glycol grease to the clevis pin.
   (e) Install the clip and clevis pin.
   NOTICE:
   The clip must be installed as shown in the illustration.
   (f) Install the brake pedal return spring.



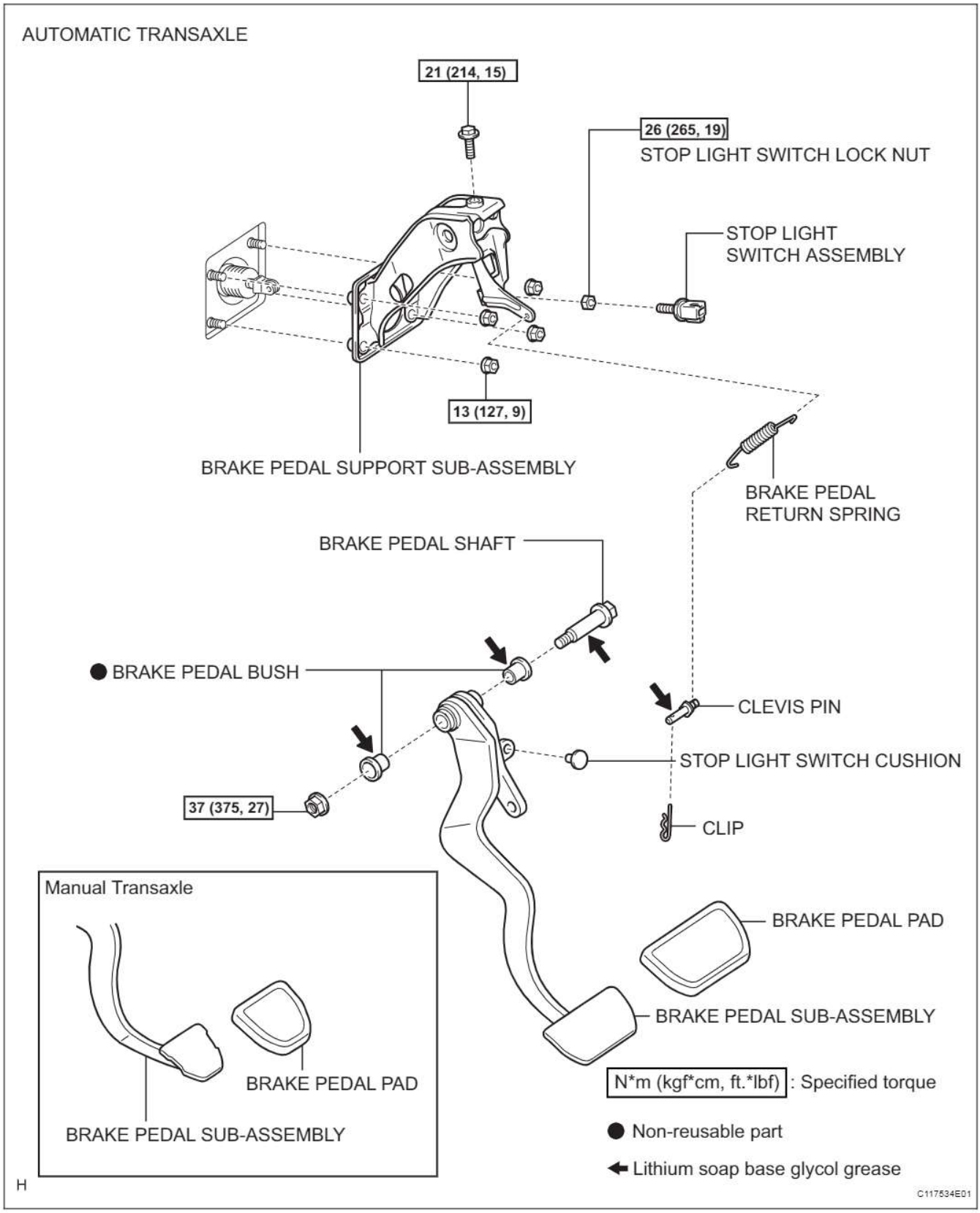
   (g) Connect the vacuum hose to the brake booster and slide the clip.
2. **CHECK AND ADJUST BRAKE BOOSTER PUSH ROD (See page BR-13)**
3. **INSTALL BRAKE ACTUATOR ASSEMBLY WITH BRACKET (See page BC-165)**
4. **INSTALL BRAKE MASTER CYLINDER SUB-ASSEMBLY (See page BR-15)**
5. **CONNECT CLUTCH RESERVOIR TUBE (for Manual Transaxle)**
   (a) Slide the clip and connect the clutch reservoir tube.
6. **INSTALL AIR CLEANER CAP SUB-ASSEMBLY**
7. **INSTALL BATTERY**
8. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)**
9. **BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)**
10. **BLEED AIR FROM BRAKE LINE (See page BR-4)**
11. **BLEED AIR FROM CLUTCH LINE (for Manual Transaxle) (See page CL-12)**
12. **CHECK AND ADJUST BRAKE PEDAL HEIGHT (See page BR-9)**
13. **CHECK BRAKE PEDAL FREE PLAY (See page BR-9)**

BR

14. **CHECK BRAKE PEDAL RESERVE DISTANCE (See page BR-10)**
15. **CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-6)**
16. **CHECK FOR BRAKE FLUID LEAKAGE**
17. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
18. **CHECK BRAKE ACTUATOR WITH INTELLIGENT TESTER**
    (a) Check the brake actuator with the intelligent tester (see page BC-162).
19. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

BRAKE PEDAL

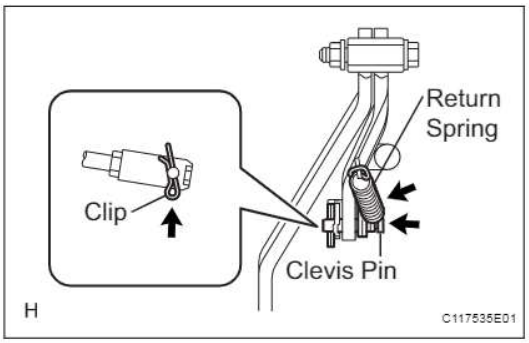
COMPONENTS



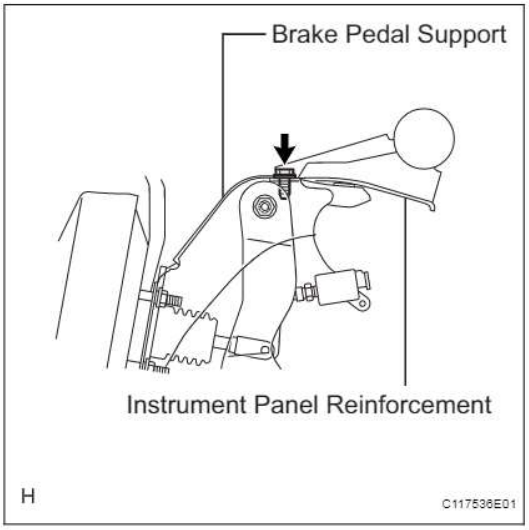
BR

REMOVAL

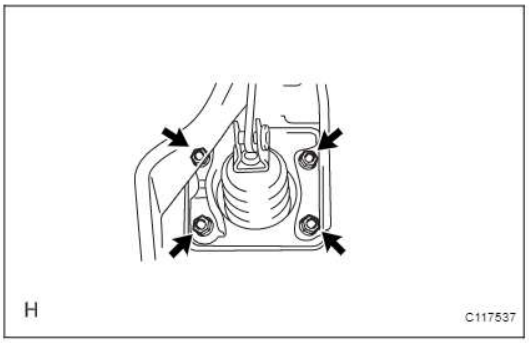
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE INSTRUMENT PANEL SUB-ASSEMBLY (See page IP-6)**
3. **DISCONNECT MASTER CYLINDER PUSH ROD CLEVIS**
   (a) Disconnect the stop light switch connector.
   (b) Remove the brake pedal return spring.
   (c) Remove the clip and clevis pin, and disconnect the master cylinder push rod clevis from the brake pedal.



4. **REMOVE BRAKE PEDAL SUPPORT SUB-ASSEMBLY**
   (a) Remove the bolt from the brake pedal support.



   (b) Remove the 4 nuts and brake pedal support.



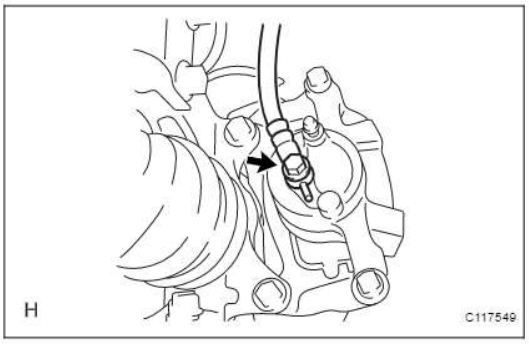
5. **REMOVE BRAKE PEDAL SUB-ASSEMBLY**
   (a) Remove the brake pedal shaft and nut from the brake pedal support.
   (b) Remove the brake pedal and 2 bushes.
   (c) Remove the stop lamp switch cushion.
6. **REMOVE STOP LIGHT SWITCH ASSEMBLY**
   (a) Loosen the stop light switch lock nut.
   (b) Remove the stop light switch from the brake pedal support.
7. **REMOVE BRAKE PEDAL PAD**
   (a) Remove the brake pedal pad from the brake pedal.

BR

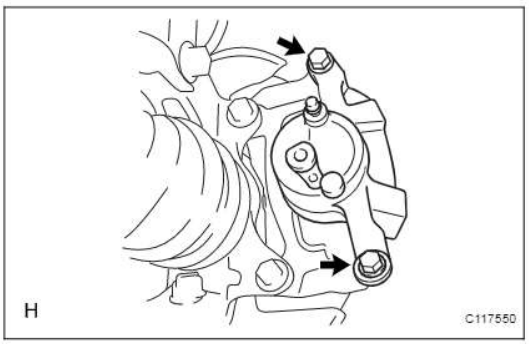
REMOVAL

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

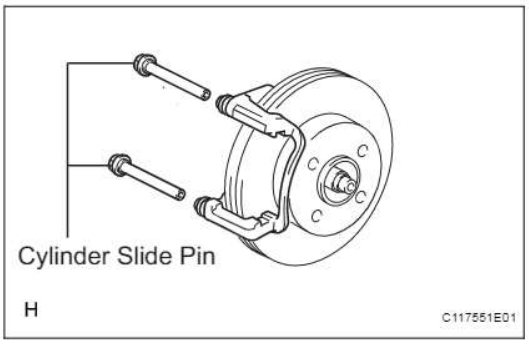
1. **REMOVE FRONT WHEEL**
2. **DRAIN BRAKE FLUID**
   NOTICE:
   Wash off brake fluid immediately if it comes in contact with any painted surface.
3. **REMOVE FRONT DISC BRAKE CYLINDER SUB-ASSEMBLY LH**
   (a) Remove the union bolt and gasket from the front disc brake cylinder, and then disconnect the flexible hose.



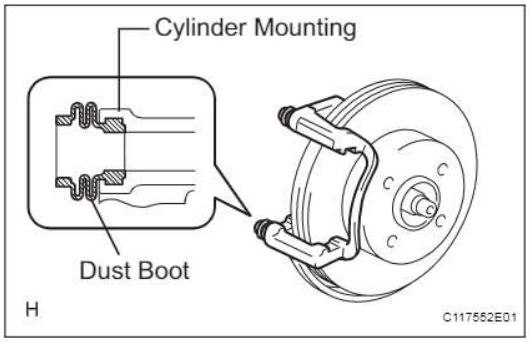
   (b) Hold the brake cylinder slide pin, and remove the 2 bolts and brake cylinder.



4. **REMOVE FRONT DISC BRAKE PAD**
   (a) Remove the 2 pads with anti squeal shims.
5. **REMOVE FRONT ANTI SQUEAL SHIM**
   (a) Remove the No. 1 and No. 2 shims from each pad.
6. **REMOVE FRONT DISC BRAKE PAD SUPPORT PLATE**
   (a) Remove the 2 support plates from the cylinder mounting.
7. **REMOVE FRONT DISC BRAKE CYLINDER SLIDE PIN**
   (a) Remove the 2 slide pins from the cylinder mounting.

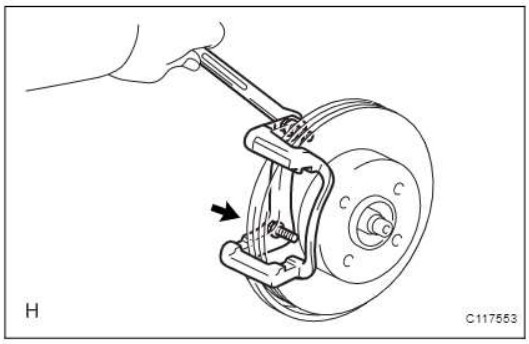


BR



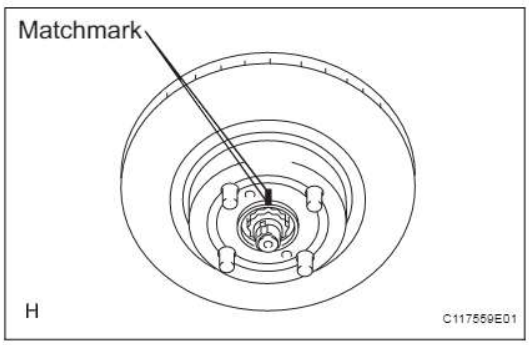
8. REMOVE FRONT DISC BRAKE DUST BOOT

(a) Remove the 2 bush dust boots from the cylinder mounting.



9. REMOVE FRONT DISC BRAKE CYLINDER MOUNTING LH

(a) Remove the 2 bolts and cylinder mounting.



10. REMOVE FRONT DISC

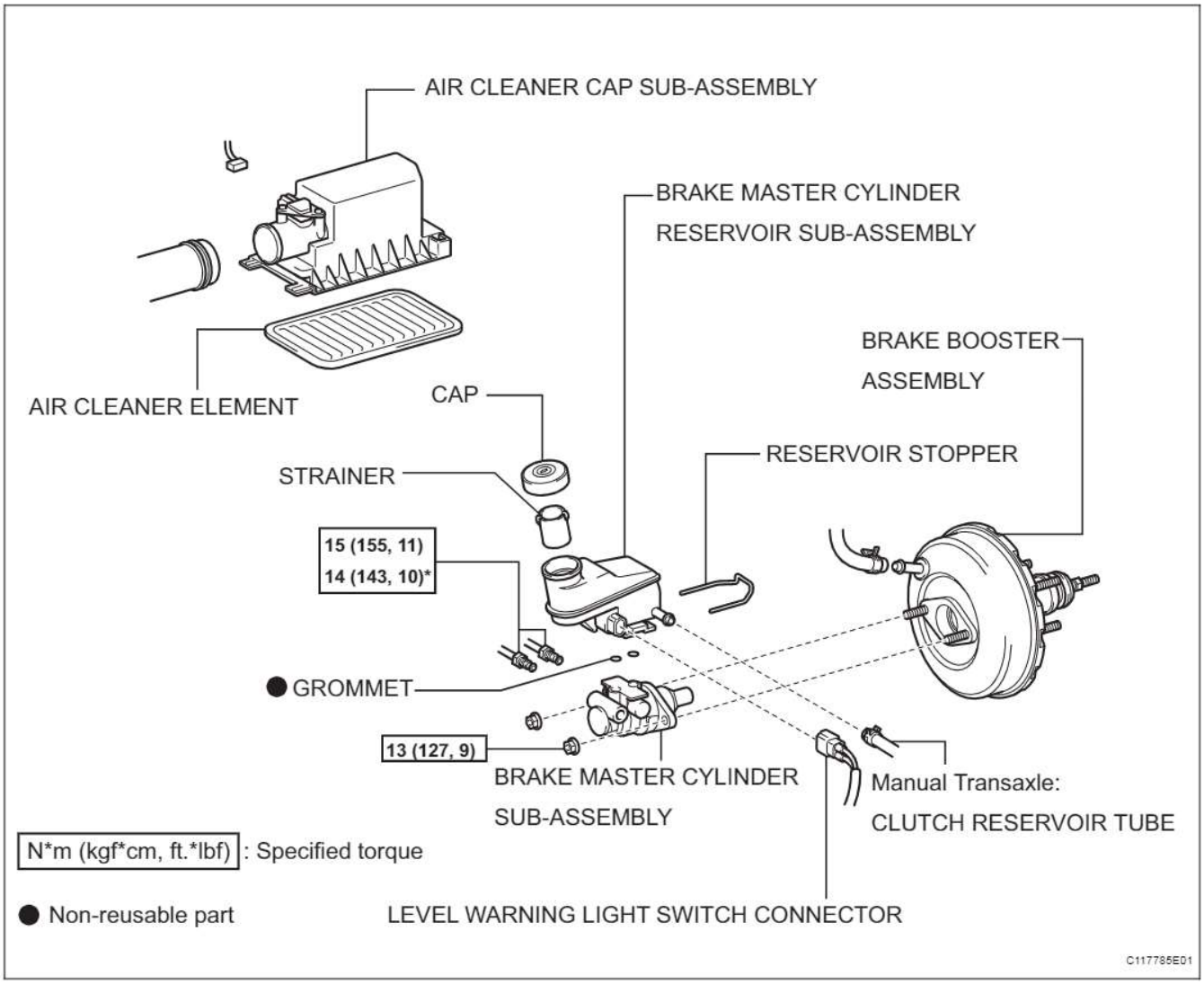
(a) Place matchmarks on the disc and axle hub.

(b) Remove the disc.

BR

BRAKE MASTER CYLINDER

COMPONENTS



BR

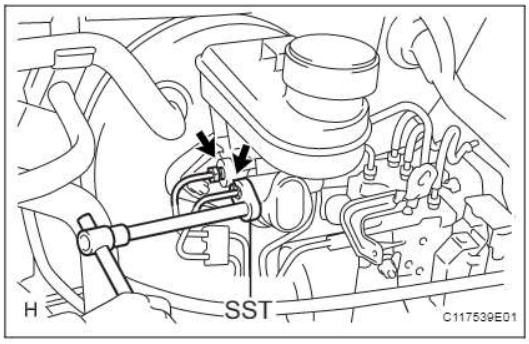
REMOVAL

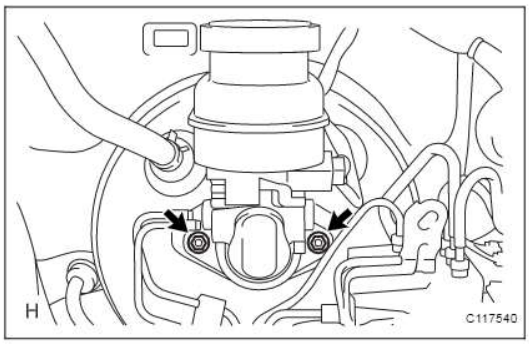
1. **DRAIN BRAKE FLUID**
   NOTICE:
   Wash off brake fluid immediately if it comes in contact with any painted surface.

2. **REMOVE AIR CLEANER CAP SUB-ASSEMBLY**

3. **DISCONNECT CLUTCH RESERVOIR TUBE (for Manual Transaxle)**
   (a) Slide the clip and disconnect the clutch reservoir tube.

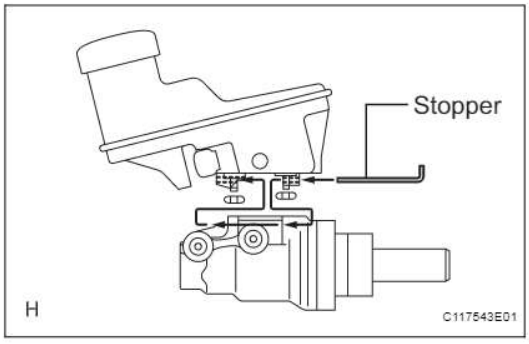
4. **REMOVE BRAKE MASTER CYLINDER SUB-ASSEMBLY**
   (a) Disconnect the level warning light switch connector.
   (b) Using SST, disconnect the 2 brake lines from the brake master cylinder.
   SST 09023-00101



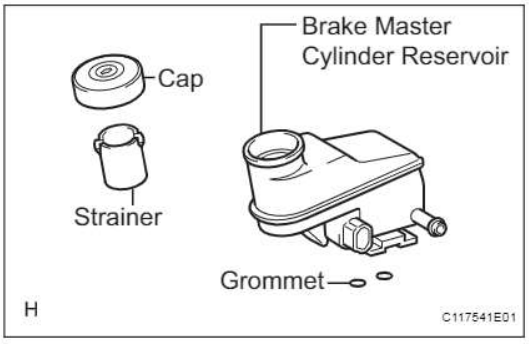


   (c) Remove the 2 nuts, and pull out the brake master cylinder.

5. **REMOVE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY**
   (a) Pull out the brake master cylinder reservoir stopper.



BR

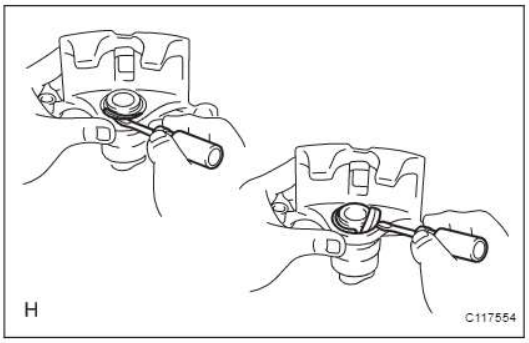


(b) Remove the brake master cylinder reservoir and 2 grommets from the brake master cylinder.
(c) Remove the cap and strainer from the brake master cylinder reservoir.

DISASSEMBLY

HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.



1. REMOVE CYLINDER BOOT

(a) Using a screwdriver, remove the set ring and cylinder boot.

NOTICE:

Be careful not to damage the brake piston and cylinder.



2. REMOVE FRONT DISC BRAKE PISTON

(a) Place a cloth between the brake piston and brake cylinder.

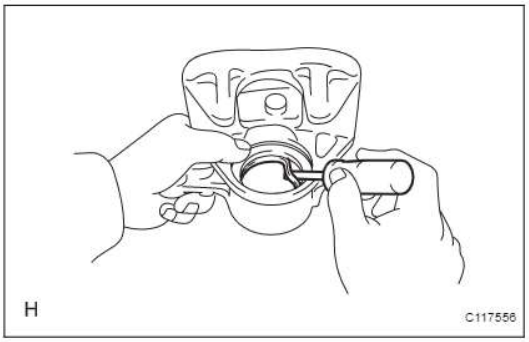
(b) Use compressed air to remove the piston from the cylinder.

CAUTION:

Do not place your fingers in front of the piston when using compressed air.

NOTICE:

Be careful not to spatter the brake fluid.



3. REMOVE PISTON SEAL

(a) Using a screwdriver, pry out the piston seal from the brake cylinder.

NOTICE:

Be careful not to damage the inner cylinder and cylinder groove.

4. REMOVE FRONT DISC BRAKE BLEEDER PLUG

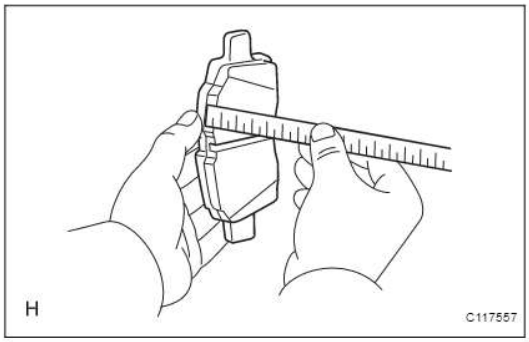
(a) Remove the bleeder plug from the brake cylinder.

BR

INSPECTION

1. CHECK BRAKE CYLINDER AND PISTON

(a) Check the cylinder bore and piston for rust or scoring.
If necessary, replace the cylinder and piston.

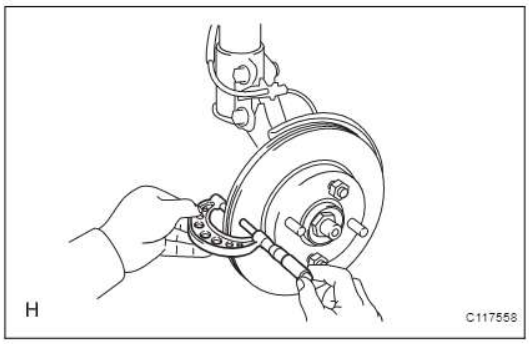


2. CHECK PAD LINING THICKNESS

(a) Using a ruler, measure the pad lining thickness.
Standard thickness:
11.0 mm (0.433 in.)
Minimum thickness:
1.0 mm (0.039 in.)
If the pad lining thickness is equal to or less than the minimum, replace the pad.

3. CHECK FRONT DISC BRAKE PAD SUPPORT PLATE

(a) Check the 2 support plates.
HINT:
Make sure that the support plates have sufficient rebound and are free from deformation, cracks, wear, rust and dirt.
If necessary, replace the support plates.



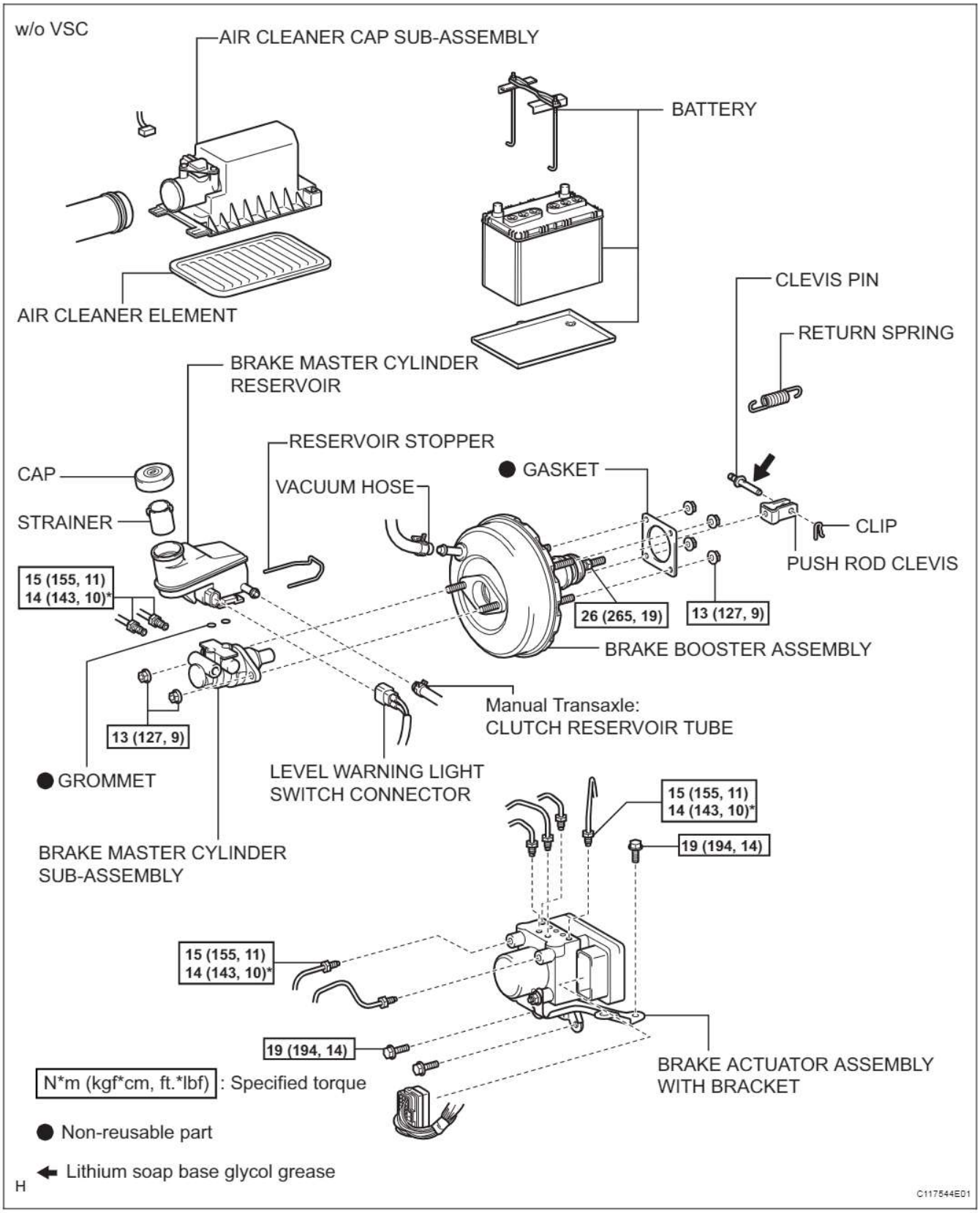
4. CHECK DISC THICKNESS

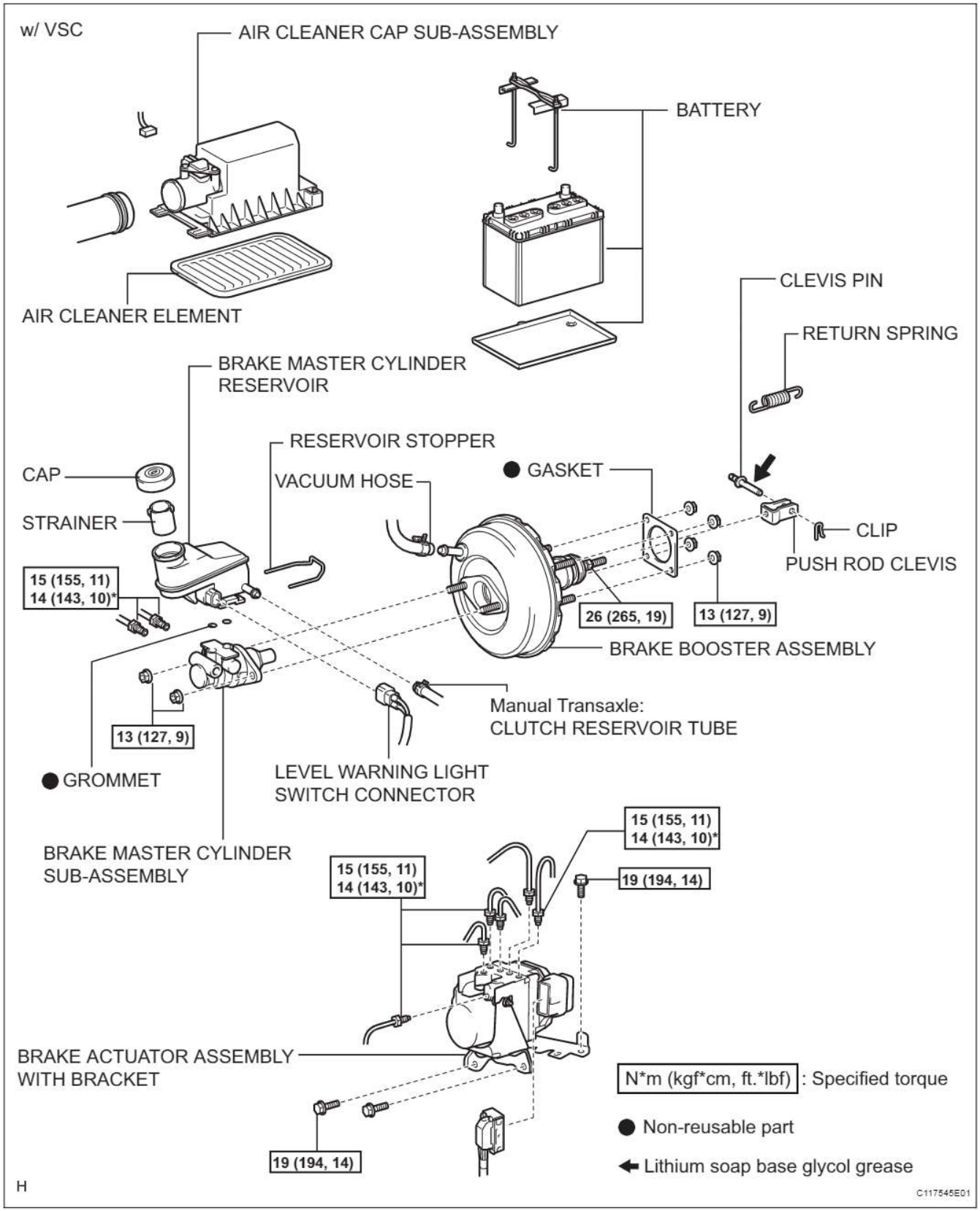
(a) Using a micrometer, measure the disc thickness.
Standard thickness:
22.0 mm (0.866 in.)
Minimum thickness:
20.0 mm (0.787 in.)
If the disc thickness is less than the minimum, replace the disc.

BR

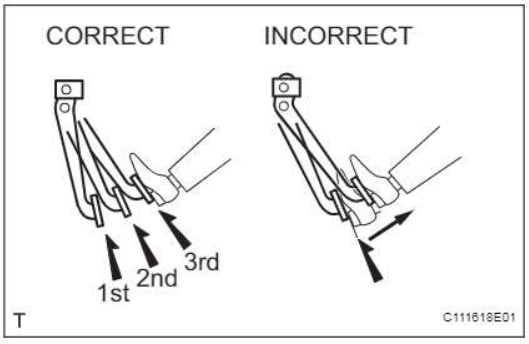
BRAKE BOOSTER

COMPONENTS




w/ VSC
AIR CLEANER CAP SUB-ASSEMBLY
AIR CLEANER ELEMENT
BATTERY
CLEVIS PIN
RETURN SPRING
BRAKE MASTER CYLINDER RESERVOIR
RESERVOIR STOPPER
CAP
STRAINER
VACUUM HOSE
● GASKET
CLIP
PUSH ROD CLEVIS
15 (155, 11)
14 (143, 10)*
26 (265, 19)
13 (127, 9)
BRAKE BOOSTER ASSEMBLY
Manual Transaxle:
CLUTCH RESERVOIR TUBE
13 (127, 9)
● GROMMET
LEVEL WARNING LIGHT SWITCH CONNECTOR
BRAKE MASTER CYLINDER SUB-ASSEMBLY
15 (155, 11)
14 (143, 10)*
19 (194, 14)
BRAKE ACTUATOR ASSEMBLY WITH BRACKET
19 (194, 14)
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
Lithium soap base glycol grease
H
C117545E01

BR



ON-VEHICLE INSPECTION

1. CHECK BRAKE BOOSTER ASSEMBLY

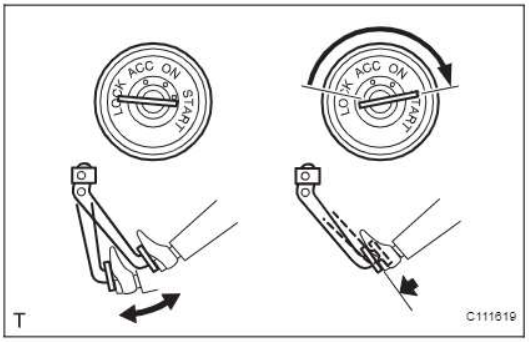
(a) Airtightness check.

(1) Start the engine and stop it after 1 or 2 minutes. Depress the brake pedal several times slowly.

(2) Make sure the booster is airtight. Check that the distance the pedal can be depressed decreases gradually in correlation with each subsequent press of the pedal.
If the pedal is not as specified, check the check valve.
If the check valve is normal, replace the booster.

(3) Start the engine. Depress and hold down the pedal, and stop the engine.

(4) Make sure the booster is airtight. Hold the pedal for 30 seconds and check that there is no change in the pedal reserve distance.
If the pedal is not as specified, check the check valve.
If the check valve is normal, replace the booster.



(b) Operation check.

(1) Depress the pedal several times with the ignition switch OFF and check that there is no change in the pedal reserve distance.

(2) Depress and hold down the pedal, and start the engine. Check that the pedal can only be depressed slightly.
If the pedal is not as specified, check the check valve.
If the check valve is normal, replace the booster.

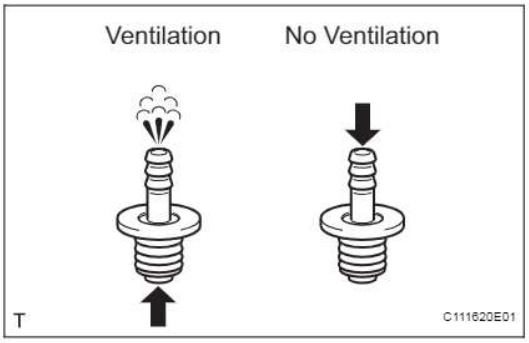
2. CHECK BRAKE VACUUM CHECK VALVE ASSEMBLY

(a) Check the check valve.

(1) Slide the clip and disconnect the vacuum hose.

(2) Remove the check valve from the booster.

(3) Check that there is ventilation from the booster to the engine, and no ventilation from the engine to the booster.
If the results are not as specified, replace the check valve.



BR

REASSEMBLY

HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. TEMPORARILY TIGHTEN FRONT DISC BRAKE BLEEDER PLUG

(a) Install the bleeder plug to the brake cylinder.
HINT:
The bleeder plug will be tightened to a torque specification in the "bleed air from brake line" procedures.

(b) Install the bleeder plug cap.

2. INSTALL PISTON SEAL

(a) Apply lithium soap base glycol grease to a new piston seal.

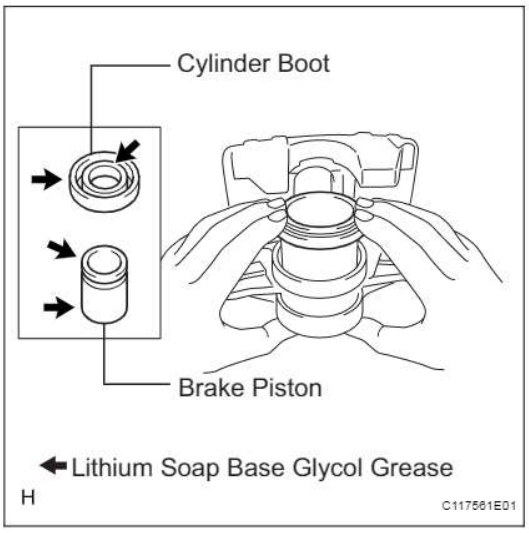
(b) Install the piston seal to the brake cylinder.

3. INSTALL FRONT DISC BRAKE PISTON

(a) Apply lithium soap base glycol grease to the brake piston and a new cylinder boot.

(b) Install the cylinder boot to the brake piston.

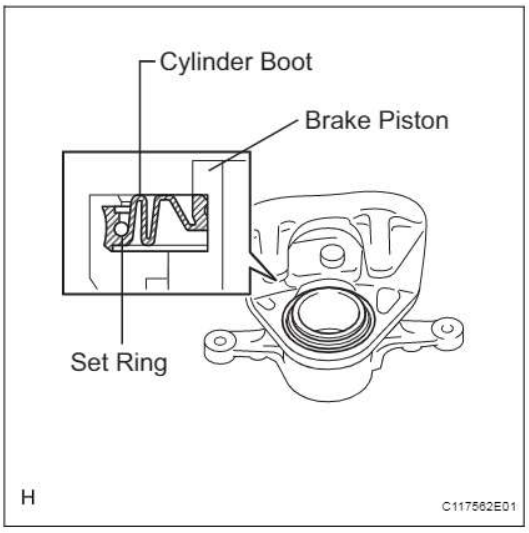
(c) Install the piston (with boot) to the brake cylinder.
NOTICE:
Do not forcibly install the piston to the cylinder.



4. INSTALL CYLINDER BOOT

(a) Install the cylinder boot to the brake cylinder.
NOTICE:
Install the boot securely to the grooves of the cylinder and piston.

(b) Using a screwdriver, install the set ring.
NOTICE:
Be careful not to damage the boot.

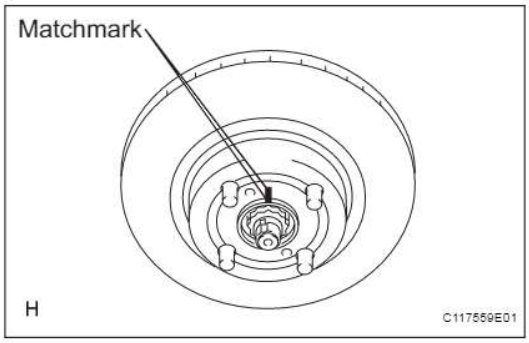


BR

INSTALLATION

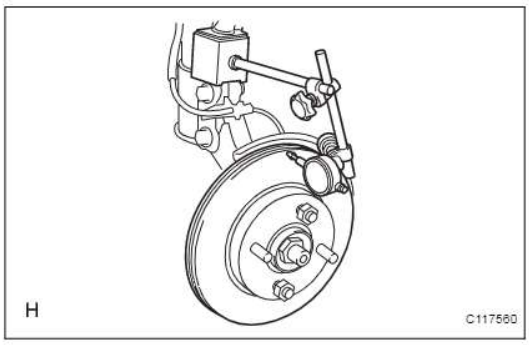
HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.



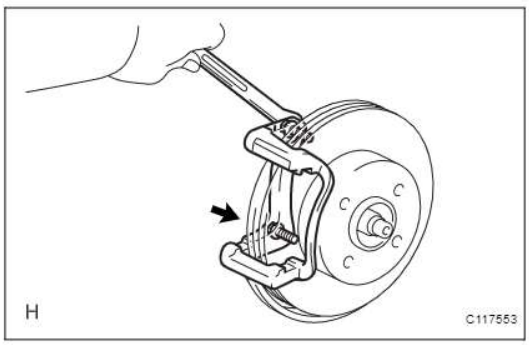
1. INSTALL FRONT DISC

(a) Align the matchmarks and install the disc.
HINT:
When replacing the disc with a new one, select the installation position where the front disc has the minimum runout.



2. CHECK DISC RUNOUT

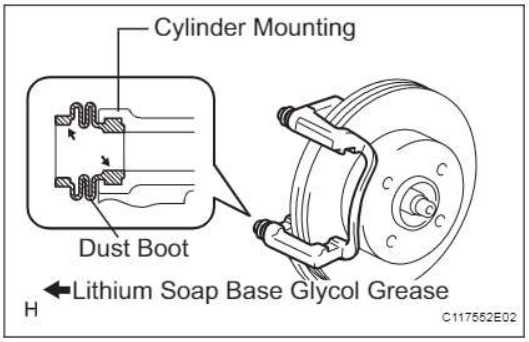
(a) Check the bearing play in the axial direction and check the axle hub runout (see page AH-15).
(b) Temporarily install the disc to the hub with the hub nuts.
(c) Using a dial indicator, measure the disc runout 10.0 mm (0.39 in.) from the outer edge of the disc.
Maximum disc runout:
0.05 mm (0.0020 in.)
If the runout is greater than the maximum, change the installation positions of the disc and axle so that the runout will become minimal.
If the runout is greater than the maximum even when the installation positions are changed, grind the disc.
If the disc thickness is less than the minimum, replace the disc.
(d) Remove the 2 hub nuts.



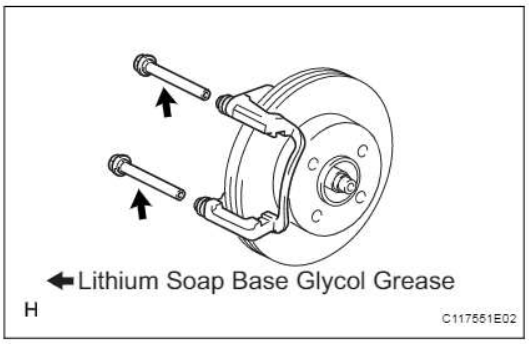
3. INSTALL FRONT DISC BRAKE CYLINDER MOUNTING LH

(a) Install the cylinder mounting with the 2 bolts.
Torque: 88 N*m (900 kgf*cm, 65 ft.*lbf)

BR

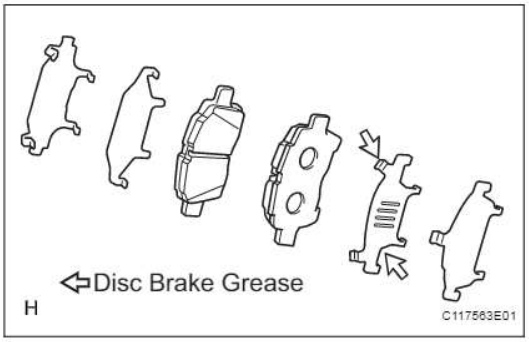


4. **INSTALL FRONT DISC BRAKE DUST BOOT**
   (a) Apply lithium soap base glycol grease to the contact surface of the 2 bush dust boots.
   (b) Install the 2 bush dust boots to the cylinder mounting.



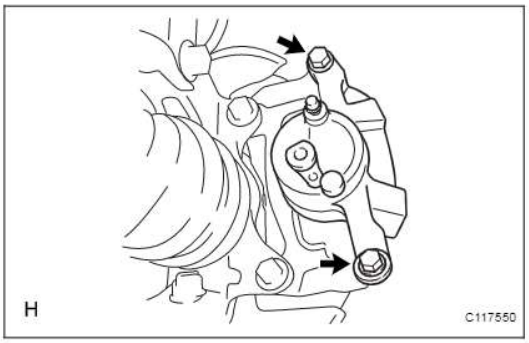
5. **INSTALL FRONT DISC BRAKE CYLINDER SLIDE PIN**
   (a) Apply lithium soap base glycol grease to the sliding part and contact surface of the 2 slide pins.
   (b) Install the 2 slide pins to the cylinder mounting.

6. **INSTALL FRONT DISC BRAKE PAD SUPPORT PLATE**
   (a) Install the 2 support plates to the cylinder mounting.



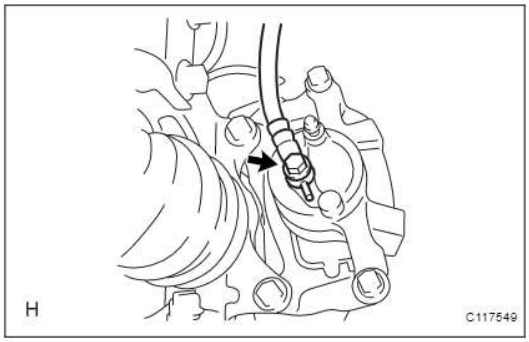
7. **INSTALL FRONT ANTI SQUEAL SHIM**
   (a) Apply disc brake grease to the both sides of each No. 1 shim.
   (b) Install the No. 1 and No. 2 shims to each pad.
   NOTICE:
   - **When replacing worn pad, the shims must be replaced together with the pads.**
   - **Install the shims in the correct positions and direction.**

8. **INSTALL FRONT DISC BRAKE PAD**
   (a) Install the 2 brake pads to the cylinder mounting.
   NOTICE:
   There should be no oil or grease on the friction surfaces of the pads and disc.



9. **INSTALL FRONT DISC BRAKE CYLINDER SUB-ASSEMBLY LH**
   (a) Install the brake cylinder with the 2 bolts.
   Torque: 34 N*m (347 kgf*cm, 25 ft.*lbf)

BR



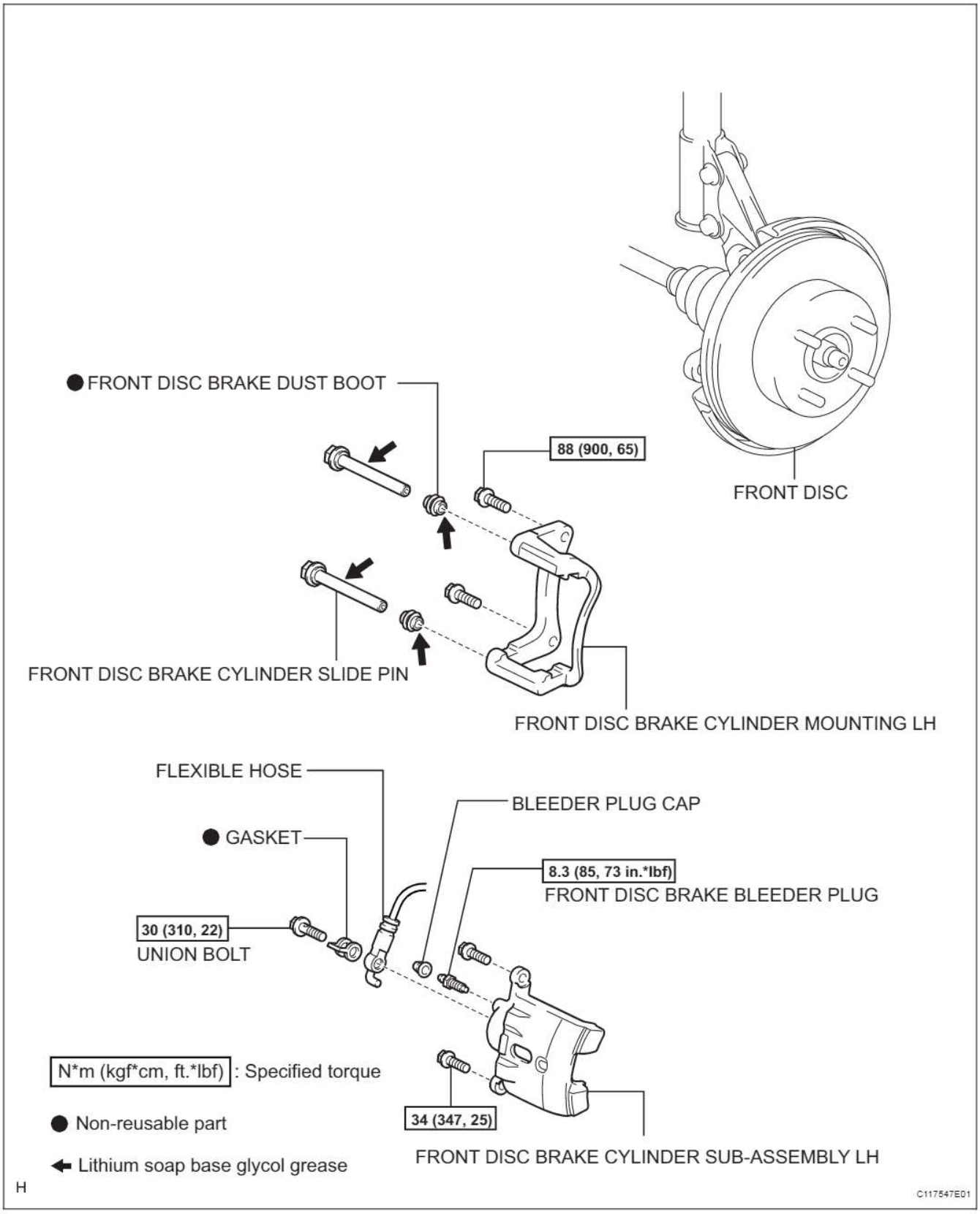
(b) Connect the flexible hose with a new gasket and the union bolt.
Torque: 30 N*m (310 kgf*cm, 22 ft.*lbf)
HINT:
Install the flexible hose lock securely in the lock hole in the brake cylinder.

10. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)**
11. **BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)**
12. **BLEED AIR FROM BRAKE LINE (See page BR-4)**
13. **CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-6)**
14. **CHECK FOR BRAKE FLUID LEAKAGE**
15. **INSTALL FRONT WHEEL**
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

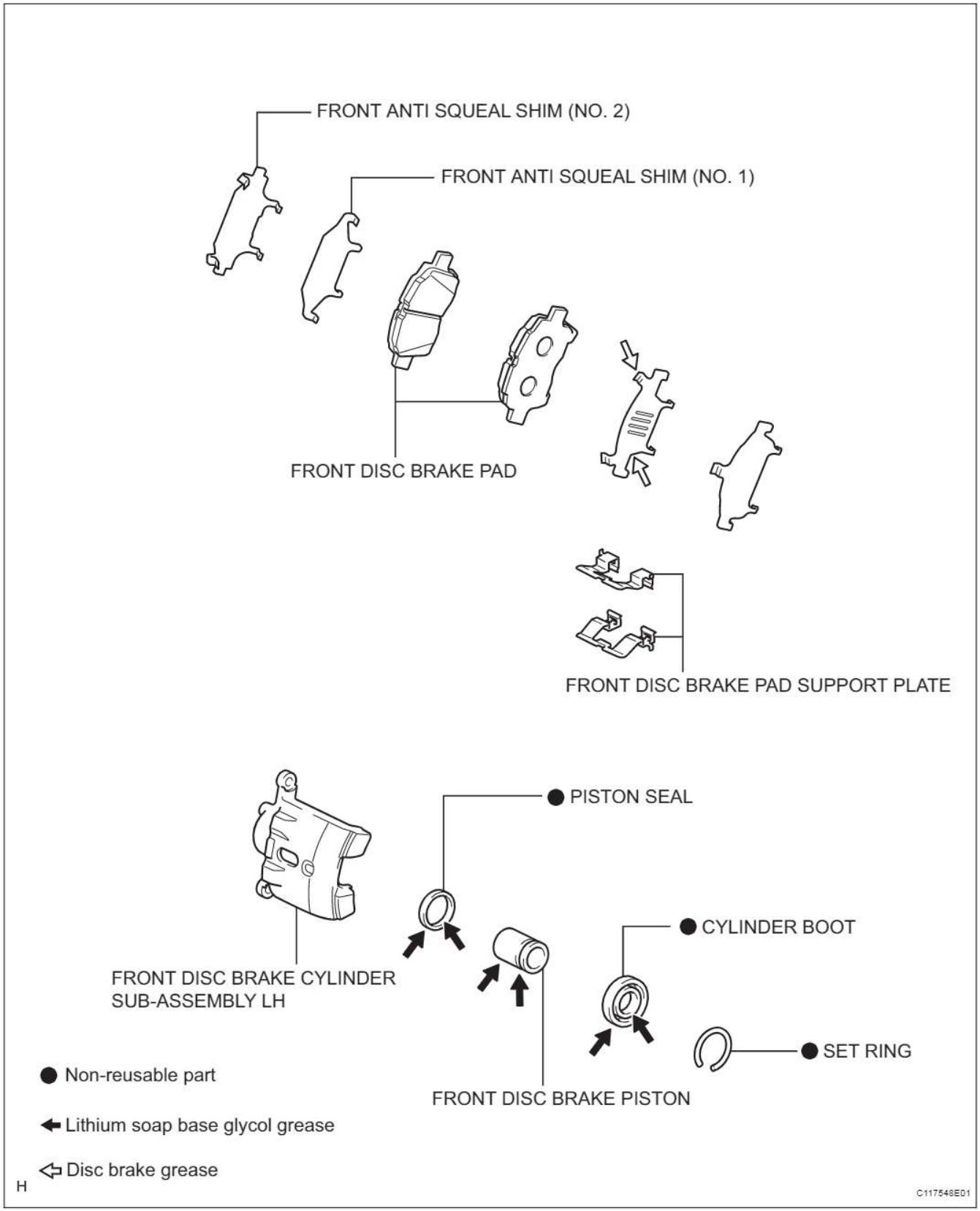
BR

FRONT BRAKE

COMPONENTS



BR

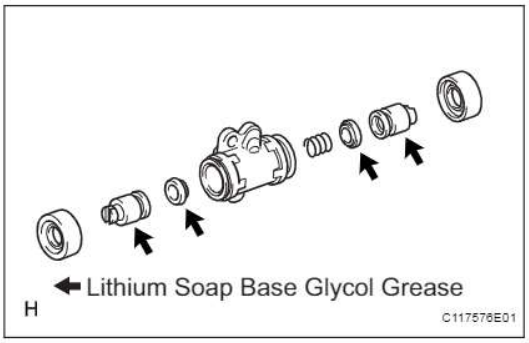

FRONT ANTI SQUEAL SHIM (NO. 2)
FRONT ANTI SQUEAL SHIM (NO. 1)
FRONT DISC BRAKE PAD
FRONT DISC BRAKE PAD SUPPORT PLATE
PISTON SEAL
CYLINDER BOOT
FRONT DISC BRAKE CYLINDER SUB-ASSEMBLY LH
SET RING
FRONT DISC BRAKE PISTON
Non-reusable part
Lithium soap base glycol grease
Disc brake grease
H
C117548E01

BR

REASSEMBLY

HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

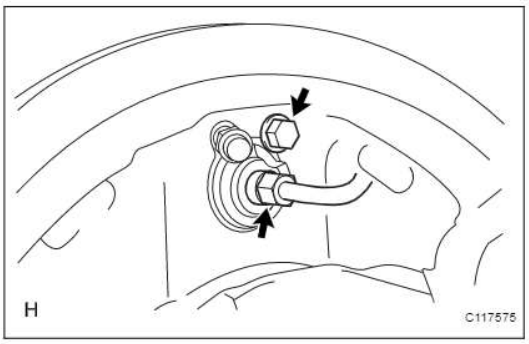


1. INSTALL REAR WHEEL CYLINDER CUP KIT

(a) Apply lithium soap base glycol grease to 2 new wheel cylinder cups and the 2 pistons.
(b) Install the 2 wheel cylinder cups on each piston.
(c) Install the compression spring and 2 pistons to the wheel brake cylinder.
(d) Install 2 new cylinder dust boots to the wheel brake cylinder.

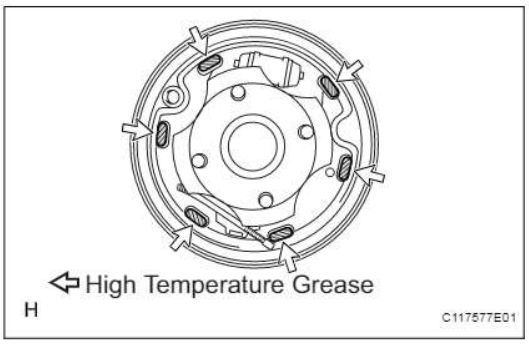
2. TEMPORARILY TIGHTEN REAR BRAKE DRUM BLEEDER PLUG

(a) Install the bleeder plug to the cylinder.
HINT:
The bleeder plug will be tightened to a torque specification in the "bleed air from brake line" procedures.
(b) Install the bleeder plug cap.



3. INSTALL REAR WHEEL BRAKE CYLINDER ASSEMBLY LH

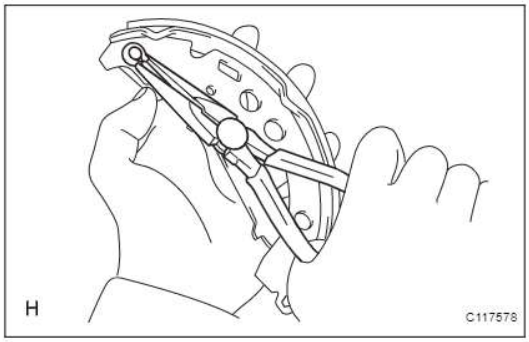
(a) Install the wheel brake cylinder with the bolt.
Torque: 9.8 N*m (100 kgf*cm, 87 in.*lbf)
(b) Using SST, connect the brake line.
SST 09023-00101
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf) without SST
14 N*m (143 kgf*cm, 10 ft.*lbf) with SST
HINT:
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).



4. APPLY HIGH TEMPERATURE GREASE

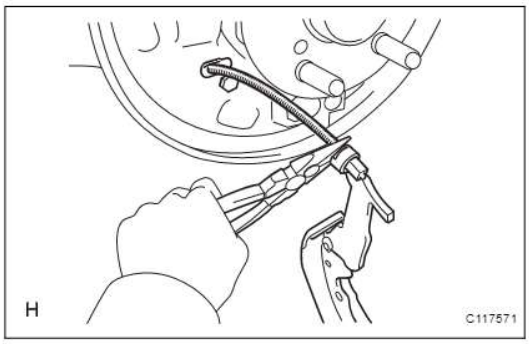
(a) Apply high temperature grease to the surface of the backing plate to which the shoe is attached.

BR



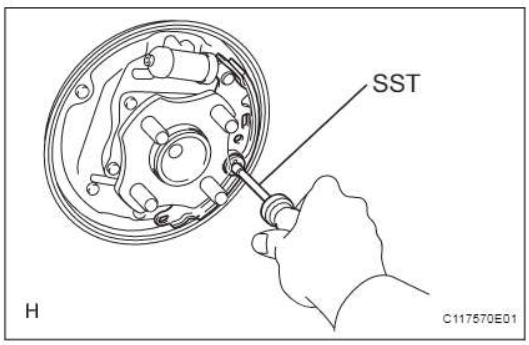
5. INSTALL REAR BRAKE PARKING BRAKE SHOE LEVER SUB-ASSEMBLY

(a) Using needle-nose pliers, install the parking brake lever with a new C-washer.

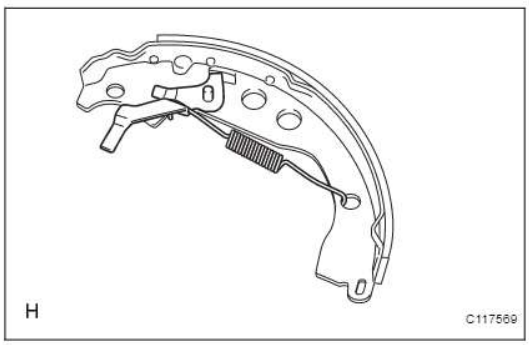


6. INSTALL REAR BRAKE SHOE

(a) Using needle-nose pliers, connect the No. 3 parking brake cable to the parking brake shoe lever.

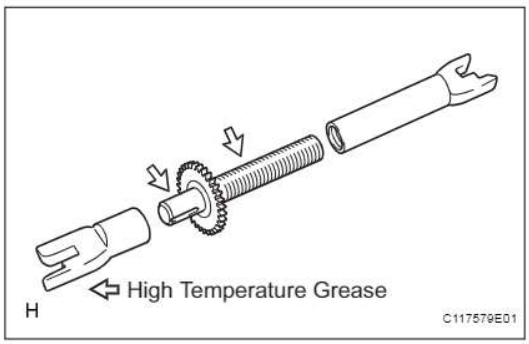


(b) Using SST, install the rear brake shoe, pin, shoe hold down spring and shoe hold down spring cup.
SST 09718-00010



7. INSTALL REAR BRAKE AUTOMATIC ADJUST LEVER LH

(a) Install the automatic adjust lever and automatic adjust lever tension spring to the front brake shoe.

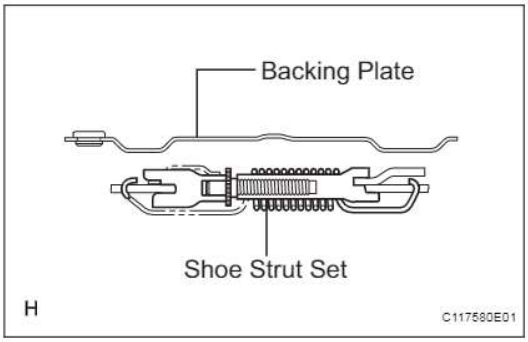


8. INSTALL PARKING BRAKE SHOE STRUT LH

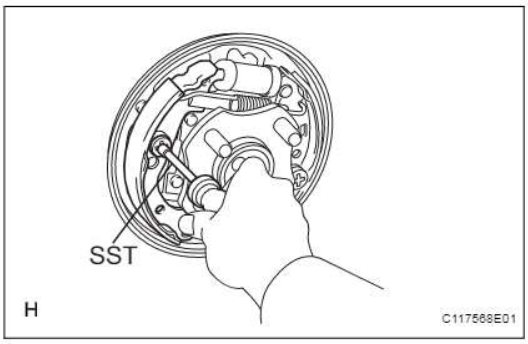
(a) Disassemble the strut. Apply high temperature grease to the areas indicated by the arrows in the illustration. Then assemble the shoe strut.

(b) Install the shoe return spring to the shoe strut.

BR



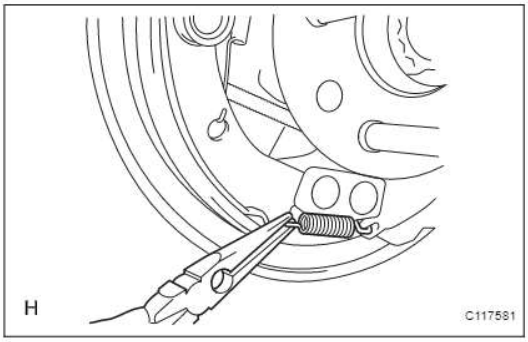
(c) Install the shoe strut as shown in the illustration.



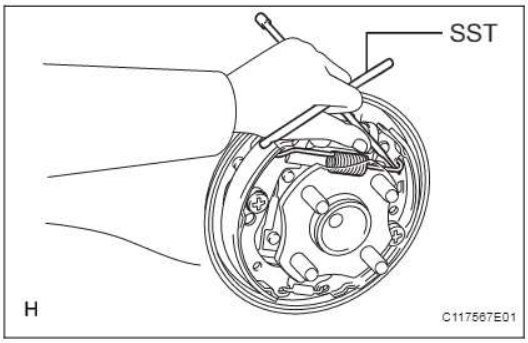
9. INSTALL FRONT BRAKE SHOE

(a) Connect the tension spring to the front brake shoe and rear brake shoe.

(b) Using SST, install the front brake shoe, pin, shoe hold down spring and shoe hold down spring cup.
SST 09718-00010



(c) Using needle-nose pliers, connect the tension spring to the front brake shoe and rear brake shoe.



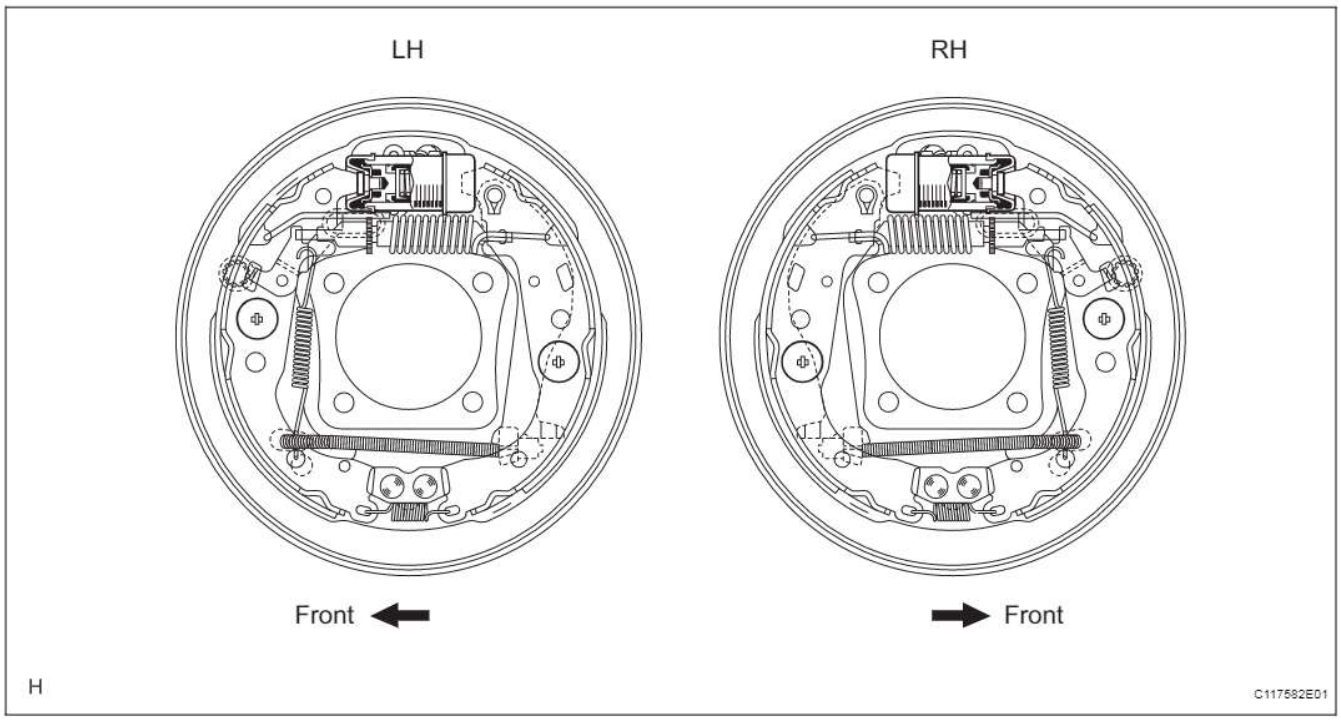
10. CONNECT PARKING BRAKE SHOE STRUT LH

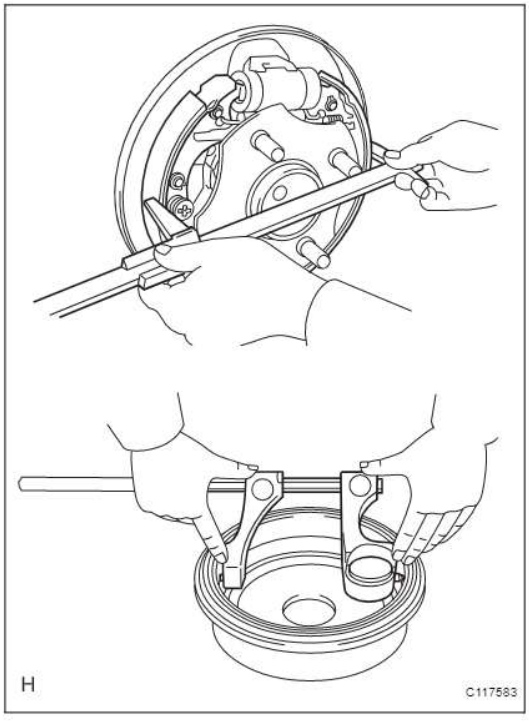
(a) Using SST, connect the shoe return spring to the front brake shoe and rear brake shoe.
SST 09703-30011
NOTICE:
Be careful not to damage the wheel cylinder boot.

BR

11. CHECK REAR BRAKE DRUM INSTALLATION

(a) Check that each part is installed properly.





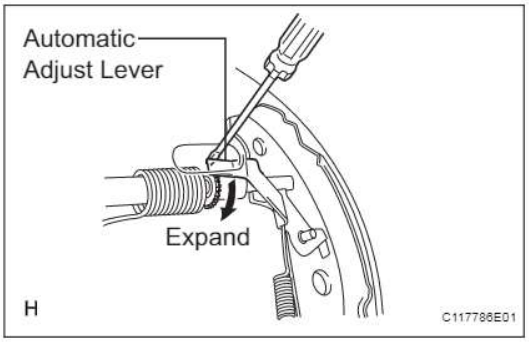
(b) Measure the inside diameter of the brake drum and diameter of the brake shoe. Check that the difference between the diameters is the correct shoe clearance.

Standard shoe clearance:
0.6 mm (0.024 in.)

NOTICE:
There should be no oil or grease on the contact surfaces of the brake shoe and brake drum.

12. INSTALL REAR BRAKE DRUM SUB-ASSEMBLY

BR

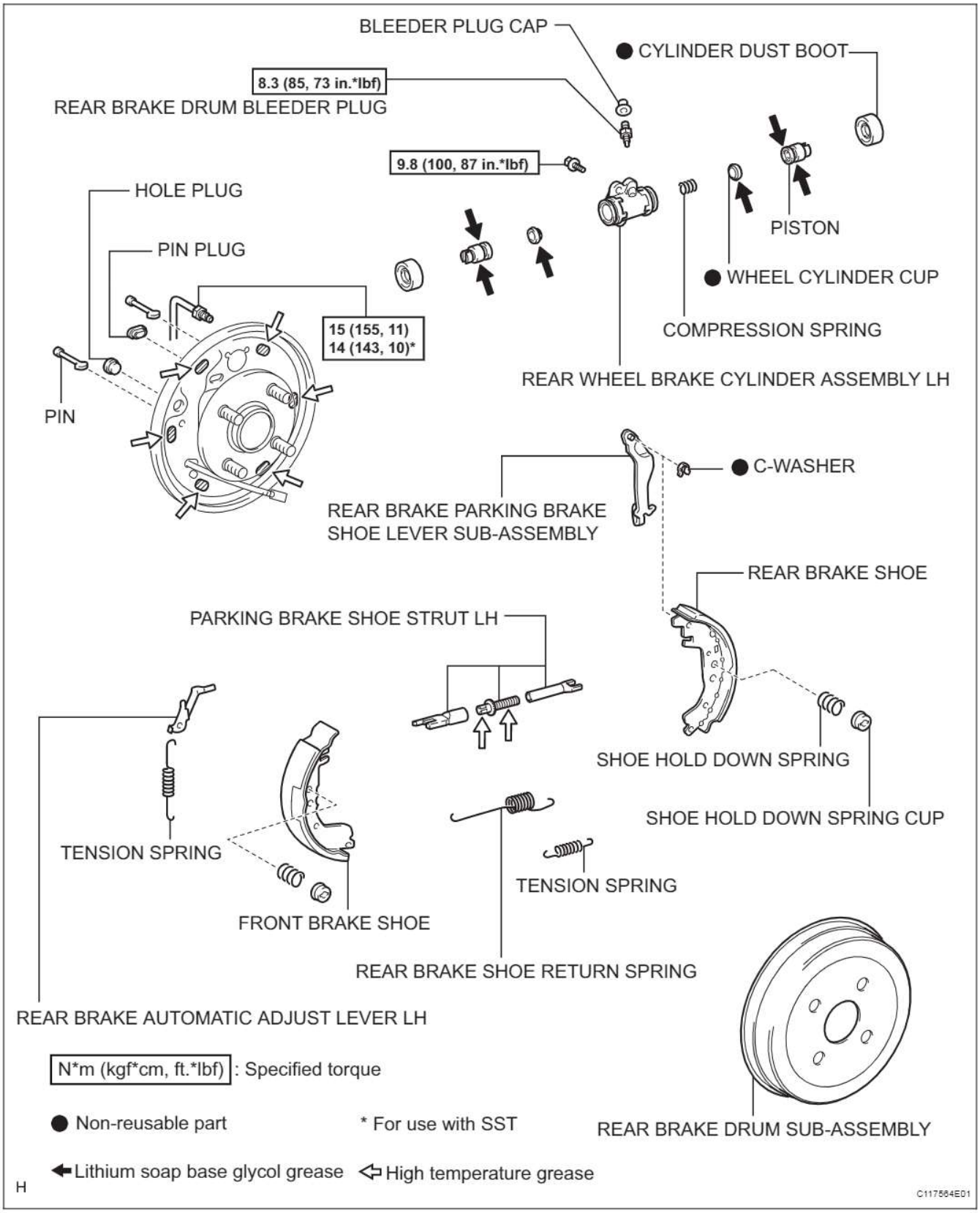


13. **ADJUST REAR BRAKE DRUM SHOE CLEARANCE**
    (a) Temporarily install the 2 hub nuts.
    (b) Remove the pin plug, and turn the adjuster to expand the shoe until the drum locks.
    (c) Rotate the adjuster backwards by 8 notches.
    (d) Install the hole plug.
    (e) Remove the 2 hub nuts.
14. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)**
15. **BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)**
16. **BLEED AIR FROM BRAKE LINE (See page BR-4)**
17. **CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-6)**
18. **CHECK FOR BRAKE FLUID LEAKAGE**
19. **INSTALL REAR WHEEL**
    Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
20. **CHECK PARKING BRAKE LEVER TRAVEL (See page PB-1)**
21. **ADJUST PARKING BRAKE LEVER TRAVEL (See page PB-1)**

BR

REAR BRAKE

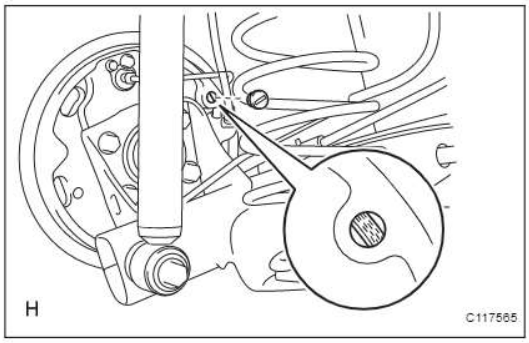
COMPONENTS



BR

DISASSEMBLY

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.



1. CHECK BRAKE SHOE LINING THICKNESS

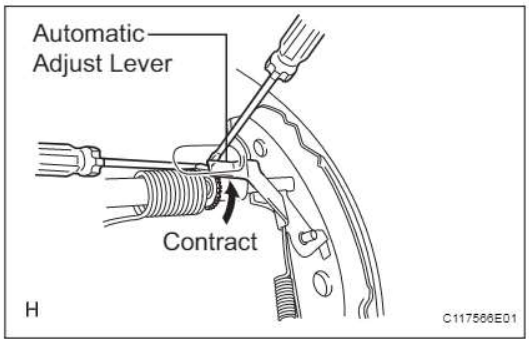
(a) Remove the hole plug, and check the shoe lining thickness through the hole.
Minimum thickness:
1.0 mm (0.039 in.)
If the lining thickness is less than the minimum, replace the brake shoe.

2. REMOVE REAR WHEEL

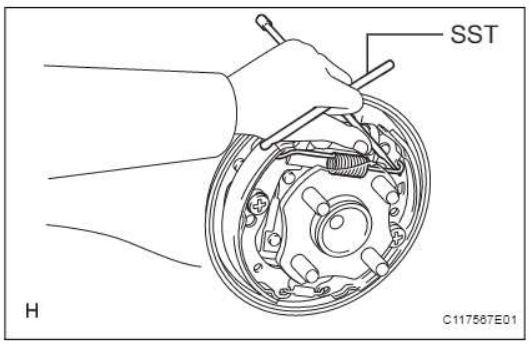
3. DRAIN BRAKE FLUID
NOTICE:
Wash off brake fluid immediately if it comes in contact with any painted surface.

4. REMOVE REAR BRAKE DRUM SUB-ASSEMBLY

(a) Release the parking brake lever, and remove the brake drum.
HINT:
If the brake drum cannot be removed easily, perform the following procedures.



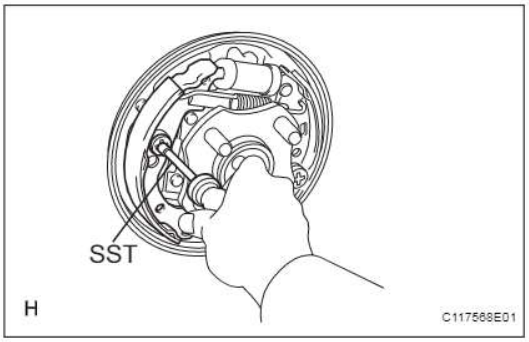
(b) Remove the pin plug, insert a screwdriver into the hole on the backing plate, and hold the automatic adjust lever away from the adjuster.
(c) Using another screwdriver, compress the brake shoe adjuster by turning the adjusting wheel.



5. DISCONNECT PARKING BRAKE SHOE STRUT LH

(a) Using SST, disconnect the shoe return spring from the front brake shoe and the rear brake shoe.
SST 09703-30011
NOTICE:
Be careful not to damage the wheel cylinder boot.

BR



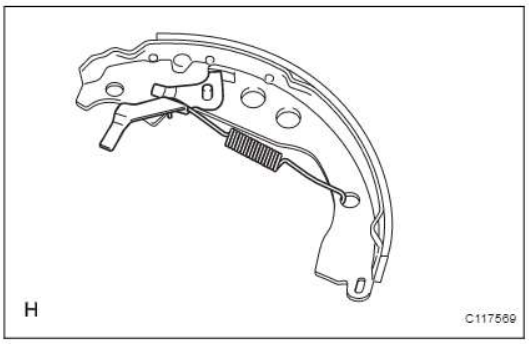
6. REMOVE FRONT BRAKE SHOE

(a) Using SST, remove the shoe hold down spring cup, shoe hold down spring and pin.
SST 09718-00010

(b) Remove the front brake shoe and tension spring.

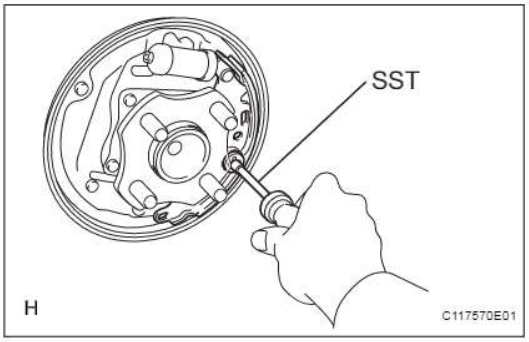
7. REMOVE PARKING BRAKE SHOE STRUT LH

(a) Remove the parking brake shoe strut from the rear brake shoe.



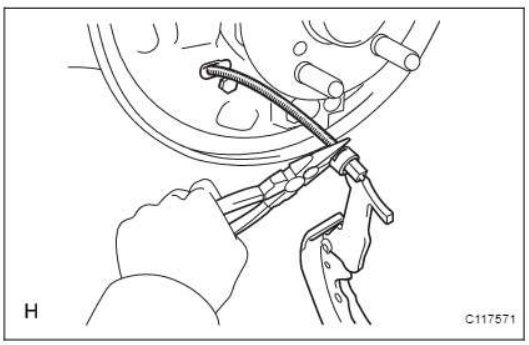
8. REMOVE REAR BRAKE AUTOMATIC ADJUST LEVER LH

(a) Remove the adjust lever tension spring and automatic adjust lever.



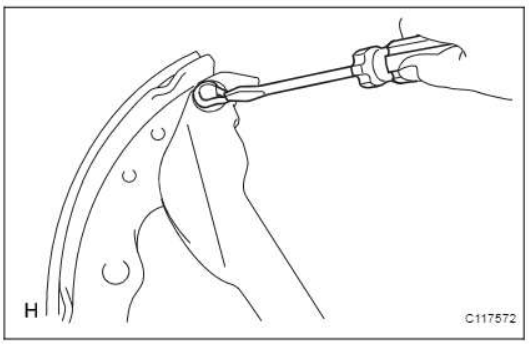
9. REMOVE REAR BRAKE SHOE

(a) Using SST, remove the shoe hold down spring cup, shoe hold down spring and pin.
SST 09718-00010



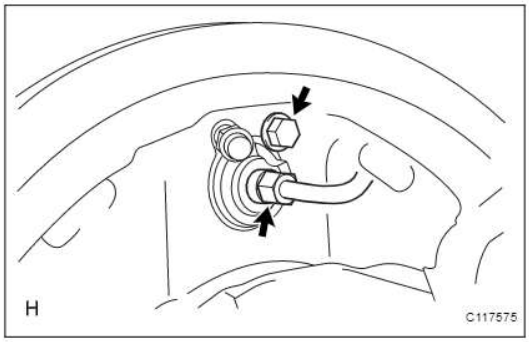
(b) Using needle-nose pliers, disconnect the No. 3 parking brake cable from the parking brake shoe lever.

BR



10. REMOVE REAR BRAKE PARKING BRAKE SHOE LEVER SUB-ASSEMBLY

(a) Using a screwdriver, remove the C-washer and parking brake shoe lever.



11. REMOVE REAR WHEEL BRAKE CYLINDER ASSEMBLY LH

(a) Using SST, disconnect the brake line.
SST 09023-00101

(b) Remove the bolt and wheel brake cylinder.

12. REMOVE REAR WHEEL CYLINDER CUP KIT

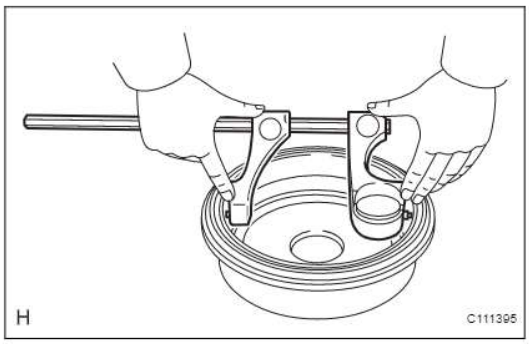
(a) Remove the 2 cylinder dust boots from the wheel brake cylinder.

(b) Remove the 2 pistons and compression spring.

(c) Remove the 2 wheel cylinder cups from each piston.

13. REMOVE REAR BRAKE DRUM BLEEDER PLUG

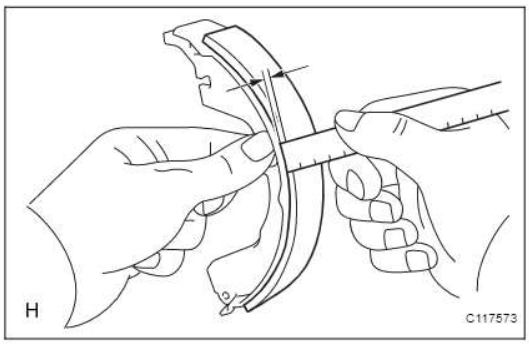
(a) Remove the bleeder plug from the wheel brake cylinder.



INSPECTION

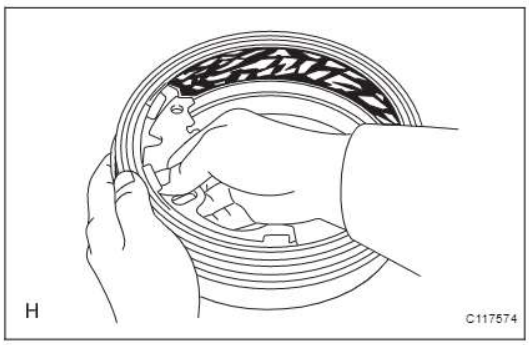
1. CHECK BRAKE DRUM INSIDE DIAMETER

(a) Using a drum gauge or equivalent, measure the inside diameter of the drum.
Standard diameter:
200.0 mm (7.874 in.)
Maximum diameter:
201.0 mm (7.913 in.)
If the inside diameter of the drum is greater than the maximum, replace the drum.



2. CHECK BRAKE SHOE LINING THICKNESS

(a) Using a ruler, measure the thickness of the shoe lining.
Standard thickness:
4.0 mm (0.157 in.)
Minimum thickness:
1.0 mm (0.039in.)
If the lining thickness is equal to or less than the minimum, or if severe or uneven wear is present, replace the brake shoe.
HINT:
If any of the brake shoes have to be replaced, replace all of the shoes in order to maintain even braking.



3. CHECK BRAKE DRUM AND BRAKE SHOE LINING FOR PROPER CONTACT

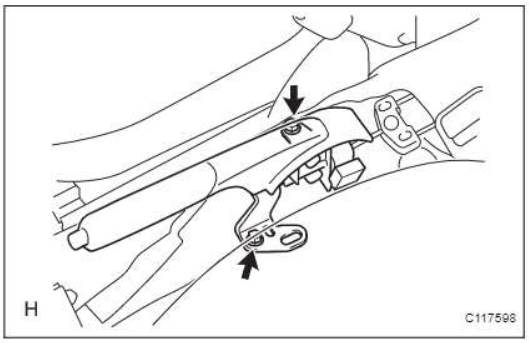
(a) Apply chalk to the inside surface of the drum. Then grind the brake shoe lining on the drum until full contact is achieved.
HINT:
If the drum and brake shoe lining do not have full contact, use a brake shoe grinder or replace the brake shoe.

(b) After the inspection, wipe chalk off of the inside surface of the drum and lining surface.

4. CHECK REAR WHEEL BRAKE CYLINDER

(a) Check the cylinder bore and piston for rust or scoring.
If necessary, replace the cylinder and piston.

BR



INSTALLATION

1. **INSTALL PARKING BRAKE SWITCH ASSEMBLY**
   (a) Install the parking brake switch with the screw.
2. **INSTALL PARKING BRAKE LEVER SUB-ASSEMBLY**
   (a) Connect the parking brake pull rod to the lever.
   (b) Install the parking brake lever with the 2 bolts.
   Torque: 13 N*m (127 kgf*cm, 9 ft.*lbf)
   (c) Connect the parking brake switch connector.
3. **INSTALL NO. 1 WIRE ADJUSTING NUT**
   (a) Install the wire adjusting nut and lock nut.
   Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)
4. **INSTALL REAR CONSOLE BOX ASSEMBLY (See page IP-27)**
5. **INSTALL CONSOLE BOX CARPET**
6. **INSTALL REAR CONSOLE BOX COVER**
7. **INSTALL STEREO JACK ADAPTER ASSEMBLY**
8. **INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle)**
9. **CHECK PARKING BRAKE LEVER TRAVEL (See page PB-1)**
10. **ADJUST PARKING BRAKE LEVER TRAVEL (See page PB-1)**

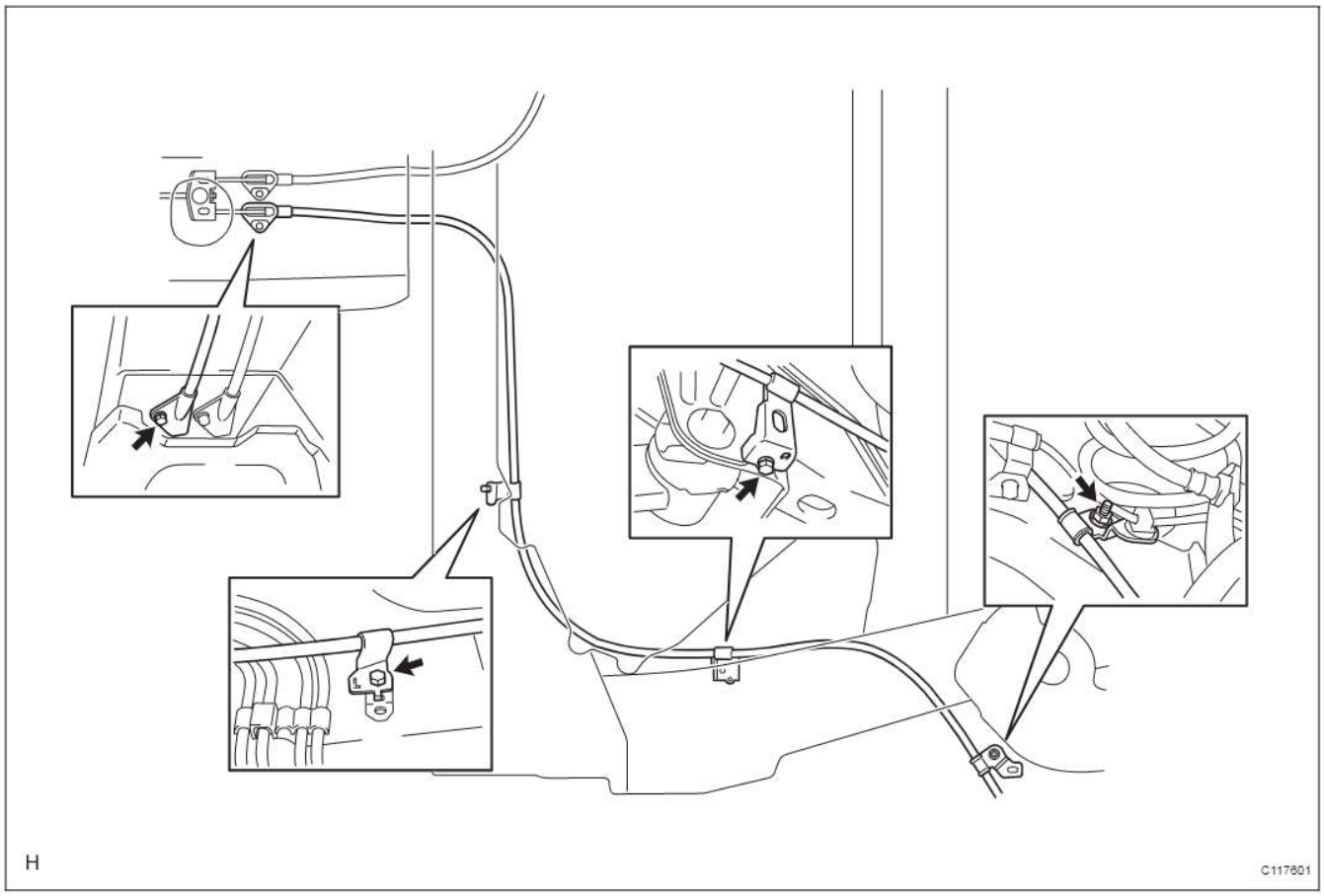
PB

INSTALLATION

HINT:

- Use the same procedures for the No. 2 parking brake cable and No. 3 parking brake cable.
- The procedures listed below are for the No. 3 parking brake cable.

1. **INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY**
   (a) Connect the parking brake cable to the parking brake equalizer.
   (b) Install the parking brake cable to the body with the nut and 3 bolts.
   Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)



2. **CONNECT NO. 3 PARKING BRAKE CABLE ASSEMBLY**
   (a) Connect the parking brake cable to the backing plate with the bolt.
   Torque: 7.8 N*m (80 kgf*cm, 69 in.*lbf)
3. **APPLY HIGH TEMPERATURE GREASE (See page BR-34)**
4. **INSTALL REAR BRAKE SHOE (See page BR-35)**
5. **INSTALL REAR BRAKE AUTOMATIC ADJUST LEVER LH (See page BR-35)**
6. **INSTALL PARKING BRAKE SHOE STRUT LH (See page BR-35)**

PB

7. **INSTALL FRONT BRAKE SHOE (See page BR-36)**
8. **CONNECT REAR BRAKE SHOE RETURN SPRING (See page BR-36)**
9. **CHECK REAR BRAKE DRUM INSTALLATION (See page BR-37)**
10. **INSTALL REAR BRAKE DRUM SUB-ASSEMBLY**
11. **ADJUST REAR BRAKE DRUM SHOE CLEARANCE (See page BR-38)**
12. **INSTALL REAR WHEEL**
    Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
13. **INSTALL FRONT NO. 2 FLOOR HEAT INSULATOR**
    (a) Install the heat insulator with the 3 bolts.
    Torque: 5.5 N*m (55 kgf*cm, 48 in.*lbf)
14. **INSTALL FRONT EXHAUST PIPE ASSEMBLY (See page EX-3)**
15. **INSTALL FRONT FLOOR PANEL BRACE**
    (a) Install the floor panel brace with the 2 bolts.
16. **TEMPORARILY TIGHTEN NO. 1 WIRE ADJUSTING NUT**
    (a) Temporarily tighten the wire adjusting nut.
17. **CHECK PARKING BRAKE LEVER TRAVEL (See page PB-1)**
18. **ADJUST PARKING BRAKE LEVER TRAVEL (See page PB-1)**
19. **INSTALL REAR CONSOLE BOX ASSEMBLY (See page IP-26)**
20. **INSTALL CONSOLE BOX CARPET**
21. **INSTALL REAR CONSOLE BOX COVER**
22. **INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle)**
23. **CHECK EXHAUST GAS LEAKAGE**

PB

PARKING BRAKE SYSTEM

PROBLEM SYMPTOMS TABLE

HINT:
Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

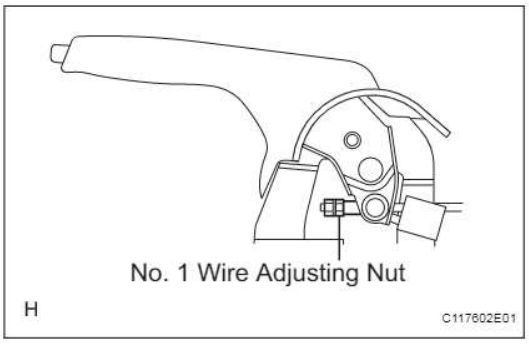
Parking brake system

Symptom	Suspected area	See page
Parking brake drags	1. Parking brake lever travel (adjustment necessary)	PB-1
	2. Parking brake cable (stuck)	PB-4
	3. Parking brake shoe clearance (adjustment necessary)	BR-38
	4. Parking brake shoe lining (cracked or distorted)	BR-33
	5. Tension or return spring (damaged)	BR-31

PB

ADJUSTMENT

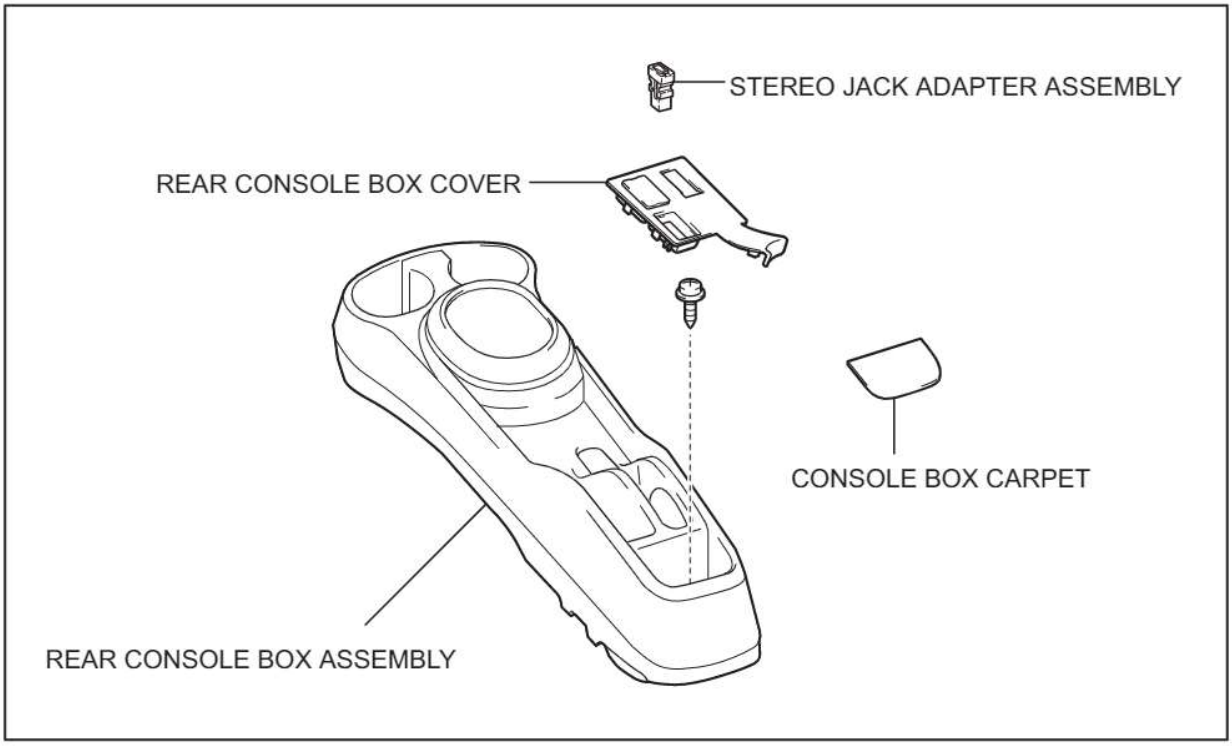
1. **REMOVE REAR WHEEL**
2. **ADJUST REAR BRAKE DRUM SHOE CLEARANCE**
   (See page BR-38)
3. **INSTALL REAR WHEEL**
   Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
4. **CHECK PARKING BRAKE LEVER TRAVEL**
   (a) Pull the lever upward with a force of approximately 196 N (20 kgf, 44.1 lbf) and count the number of clicks.
   OK:
   6 to 9 clicks
5. **REMOVE CONSOLE BOX REAR COVER**
6. **REMOVE CONSOLE BOX CARPET**
7. **REMOVE REAR CONSOLE BOX ASSEMBLY**
8. **ADJUST PARKING BRAKE LEVER TRAVEL**
   (a) Loosen the lock nut.
   (b) Turn the No. 1 wire adjusting nut until the lever travel is correct.
   (c) Tighten the lock nut.
   Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

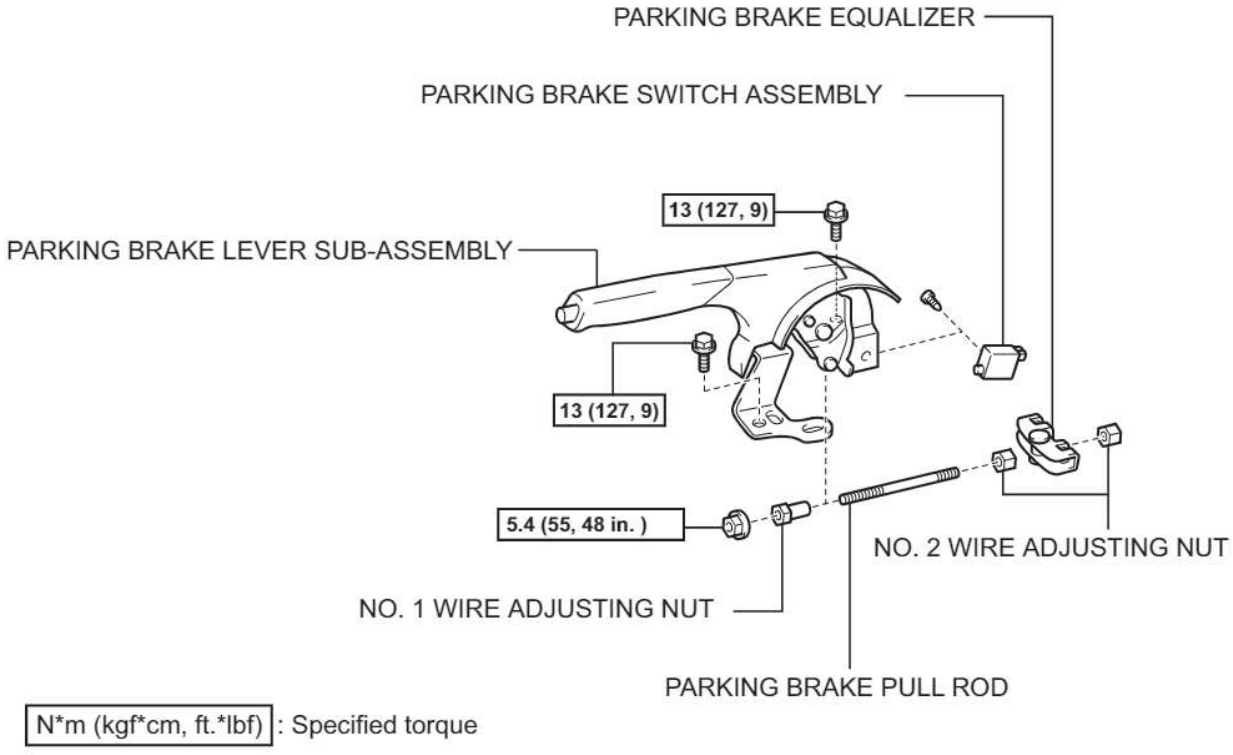


PB

PARKING BRAKE LEVER

COMPONENTS





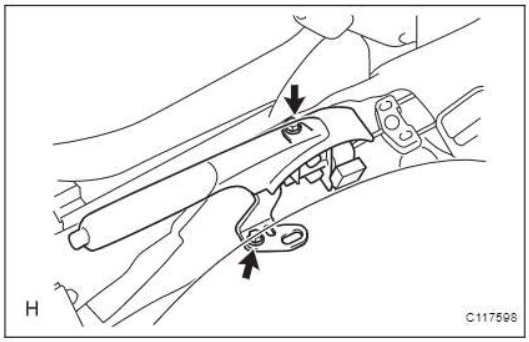
N*m (kgf*cm, ft.*lbf) : Specified torque

C122651E01

PB

REMOVAL

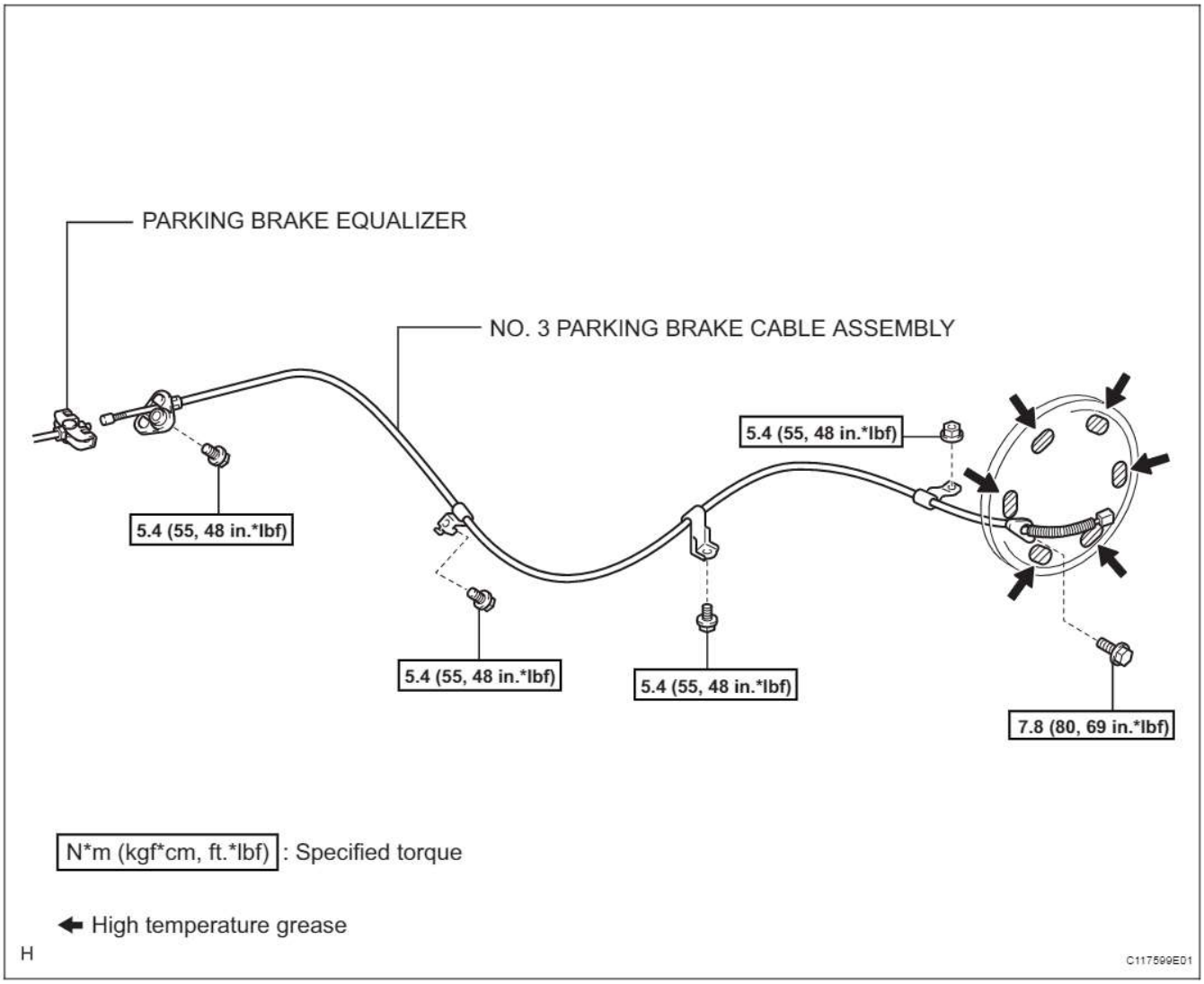
1. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle)**
2. **REMOVE STEREO JACK ADAPTER ASSEMBLY**
3. **REMOVE REAR CONSOLE BOX COVER**
4. **REMOVE CONSOLE BOX CARPET**
5. **REMOVE REAR CONSOLE BOX ASSEMBLY (See page IP-26)**
6. **REMOVE NO. 1 WIRE ADJUSTING NUT**
   (a) Remove the lock nut and wire adjusting nut.
7. **REMOVE PARKING BRAKE LEVER SUB-ASSEMBLY**
   (a) Disconnect the parking brake switch connector.
   (b) Disconnect the parking brake pull rod.
   (c) Remove the 2 bolts and parking brake lever.
8. **REMOVE PARKING BRAKE SWITCH ASSEMBLY**
   (a) Remove the screw and parking brake switch.



PB

PARKING BRAKE CABLE

COMPONENTS



PB

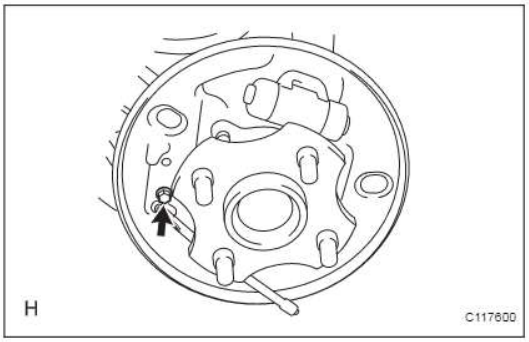
REMOVAL

HINT:

- Use the same procedures for the No. 2 parking brake cable and No. 3 parking brake cable.
- The procedures listed below are for the No. 3 parking brake cable.

1. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle)**
2. **REMOVE REAR CONSOLE BOX COVER**
3. **REMOVE CONSOLE BOX CARPET**
4. **REMOVE REAR CONSOLE BOX ASSEMBLY (See page IP-26)**
5. **REMOVE NO. 1 WIRE ADJUSTING NUT**
   (a) Remove the No. 1 wire adjusting nut.
6. **REMOVE FRONT FLOOR PANEL BRACE**
   (a) Remove the 2 bolts and floor panel brace.
7. **REMOVE FRONT EXHAUST PIPE ASSEMBLY (See page EX-3)**
8. **REMOVE FRONT NO. 2 FLOOR HEAT INSULATOR**
   (a) Remove the 3 bolts and heat insulator.
9. **DISCONNECT NO. 3 PARKING BRAKE CABLE ASSEMBLY**
   (a) Remove the nut and 3 bolts, and then disconnect the parking brake cable from the body.
   (b) Disconnect the parking brake cable from the parking brake equalizer.
10. **REMOVE REAR WHEEL**
11. **REMOVE REAR BRAKE DRUM SUB-ASSEMBLY (See page BR-31)**
12. **DISCONNECT PARKING BRAKE SHOE STRUT LH (See page BR-31)**
13. **REMOVE FRONT BRAKE SHOE (See page BR-32)**
14. **REMOVE PARKING BRAKE SHOE STRUT LH (See page BR-32)**
15. **REMOVE REAR BRAKE AUTOMATIC ADJUST LEVER LH (See page BR-32)**
16. **REMOVE REAR BRAKE SHOE (See page BR-32)**

PB



17. REMOVE NO. 3 PARKING BRAKE CABLE ASSEMBLY

(a) Remove the bolt and then disconnect the parking brake cable from the backing plate.

PB