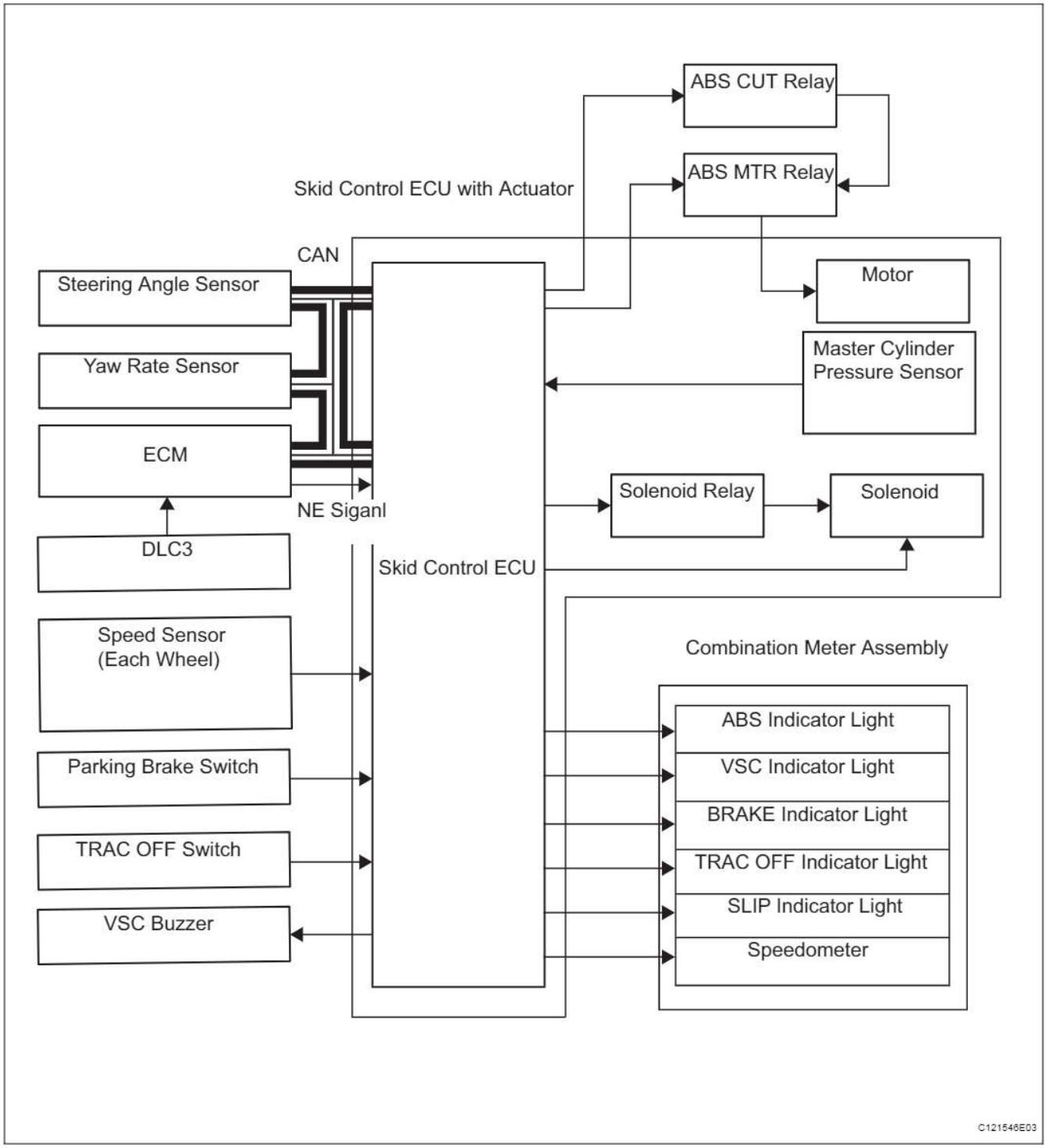
SYSTEM DIAGRAM



BC

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

HINT:

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

(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.
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 wheels in accordance with driving conditions.

(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 turns 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 suddenly.

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-14)
(b) DATA LIST / ACTIVE TEST (see page BC-19)

NEXT

9 CHECK FOR FLUID LEAKAGE

NEXT

10 REPAIR OR REPLACE

NEXT

11 CONFIRMATION TEST

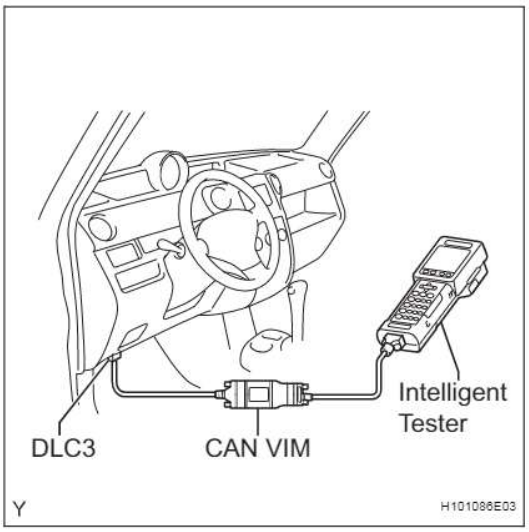
NEXT

END

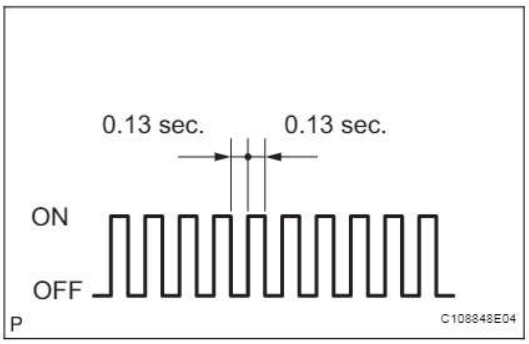
BC

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, perform zero point calibration of the yaw rate sensor (see page BC-11).
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-74
VSC warning light circuit	BC-81

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

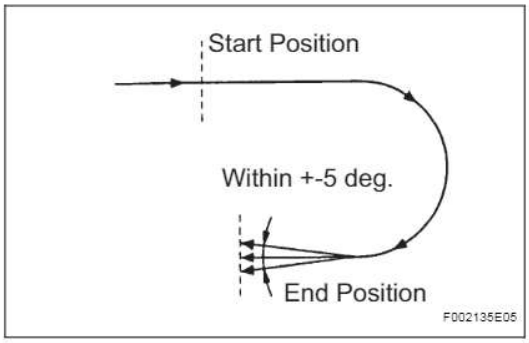
(c) Check the speed sensor.
(1) Drive the vehicle straight forward at the following speeds. Then check that the ABS warning light is as follows.

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

BC

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.



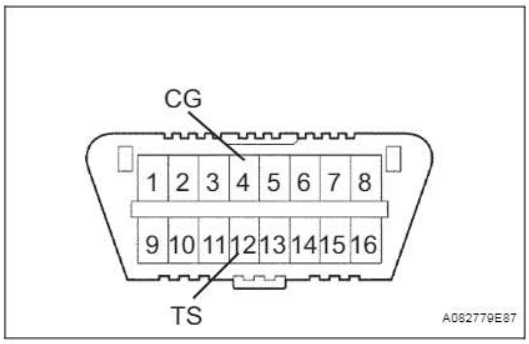
(d) Check the yaw rate sensor.
(1) Move the shift lever to the D position and drive the vehicle at 5 km/h (3 mph). Turn the steering wheel either to the left or right 90°or more, and drive the vehicle in a half-circle pattern.
(2) Stop the vehicle and move the shift lever to the P position. Check that 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-97), 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)

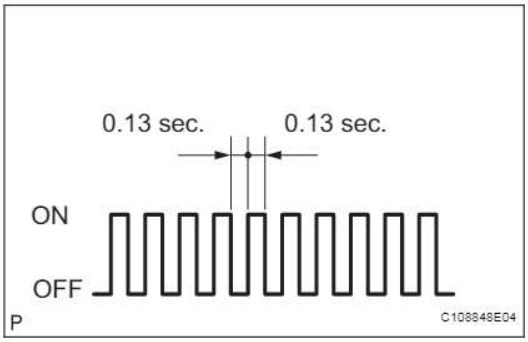
NOTICE:
After replacing the yaw rate sensor and/or skid control ECU with actuator, perform zero point calibration of the yaw rate sensor (see page BC-11).

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) Using SST, connect terminals 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 the P position.
(4) Turn the ignition switch ON.

BC



(5) Check that the ABS warning light and VSC warning light blinks 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.

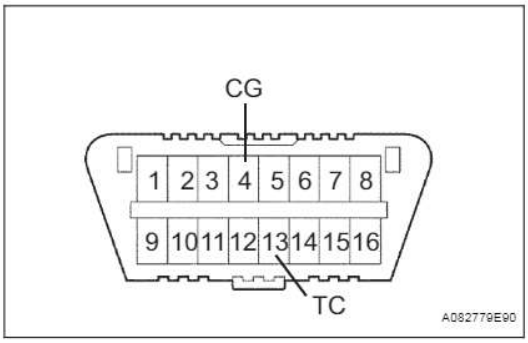
Trouble area	See procedure
ABS warning light circuit	BC-74
VSC warning light circuit	BC-81
TS and CG terminal circuit	BC-101

(b) Check the master cylinder pressure sensor.
(1) Leaving the vehicle in a stationary condition and the brake pedal in a free condition for 1 second or more, depress the brake pedal with a force 98 N (10 kgf, 22 lbf) or more, and maintain it 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.

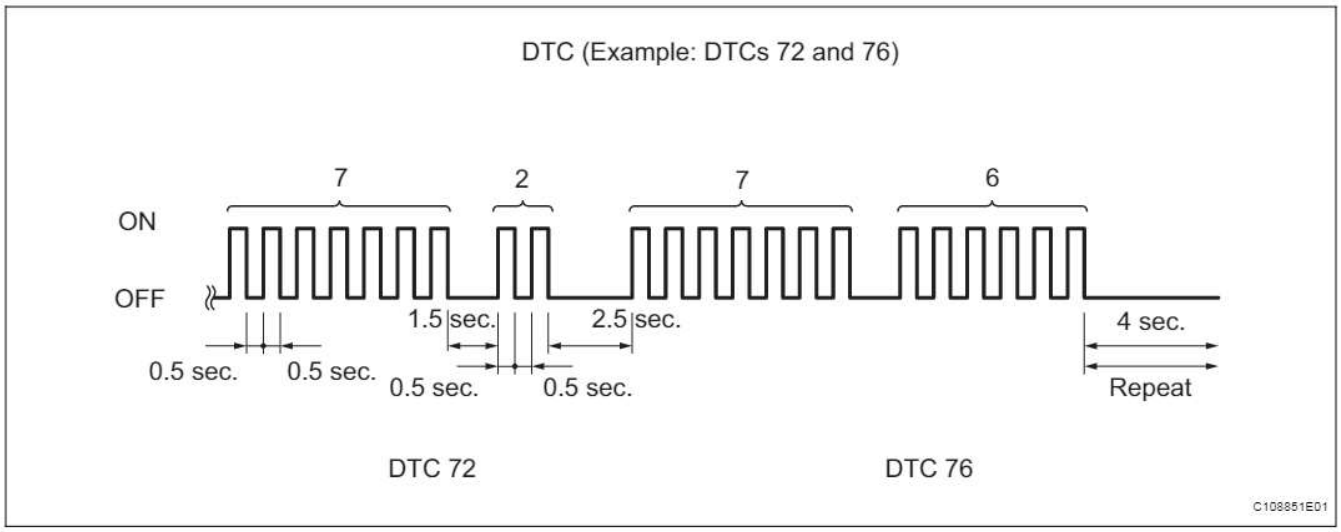
Vehicle Speed	Check	ABS Warning Light
45 km/h (28 mph) or higher	Deviations of sensor signal	Turns off

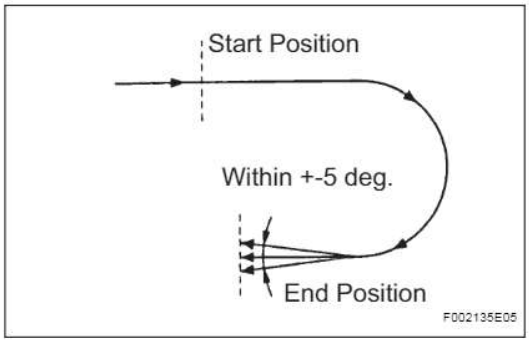
HINT:
The sensor signal check may not be completed if the vehicle's wheels slip or the steering wheel is turned during this check.
(2) Stop the vehicle.



(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.

BC





(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-97), 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.

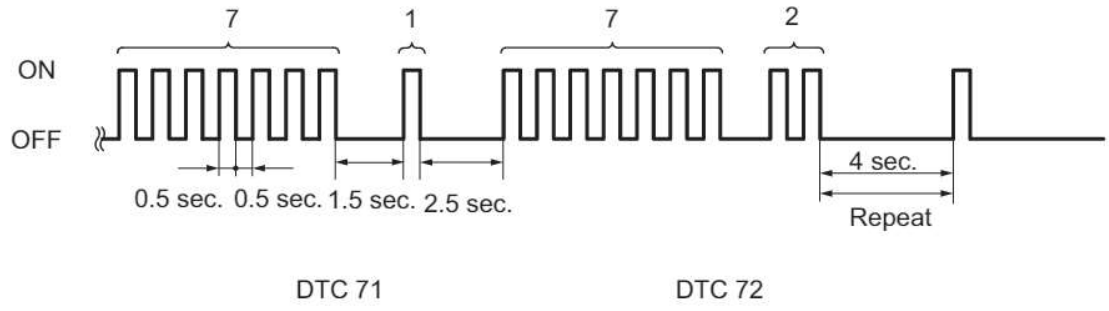
(3) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040

(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.

BC

- 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

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, 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.

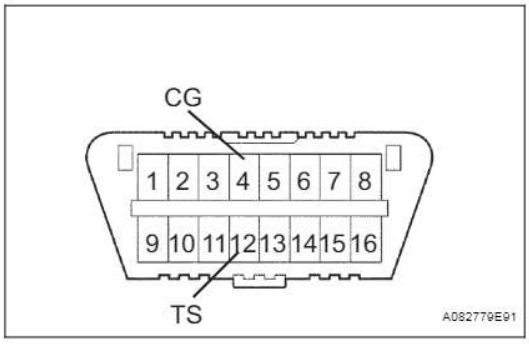
SST 09843-18040

(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.

BC

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-11).**

Vehicle stability control system

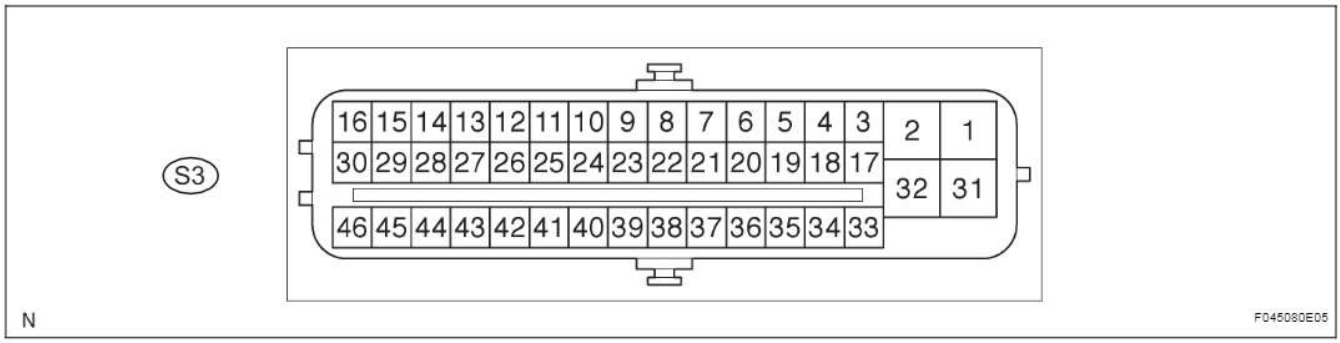
Symptom	Suspected area	See page
ABS, BA and/or EBD does not operate	1. Check the DTC again and make sure that the normal system code is output	BC-16
	2. IG power source circuit	BC-62
	3. Front speed sensor circuit	BC-25
	4. Rear speed sensor circuit	BC-31
	5. Check the skid control ECU with actuator 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-16
	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-16
	2. Front speed sensor circuit	BC-25
	3. Rear speed sensor circuit	BC-31
	4. Stop light switch assembly	BC-67
	5. Check the skid control ECU with actuator 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-16
	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-74
	2. Skid control ECU with actuator	-
ABS sensor DTC check cannot be done	1. Check the DTC again and make sure that the normal system code is output	BC-16
	2. TC and CG terminal circuit	BC-99
	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-16
	2. IG power source circuit	BC-62
	3. Check hydraulic circuit for leakage	-
	4. Front speed sensor circuit	BC-25
	5. Rear speed sensor circuit	BC-31
	6. Yaw rate sensor circuit (Deceleration sensor)	BC-59
	7. Steering sensor circuit	BC-57

BC

Symptom	Suspected area	See page
SLIP indicator light abnormal	1. SLIP indicator light circuit	BC-95
	2. Skid control ECU with actuator	-
TRAC OFF indicator abnormal	1. Check the DTC again and make sure that the normal system code is output	BC-16
	2. TRAC OFF switch circuit	BC-91
VSC DTC check cannot be done	1. Check the DTC again and make sure that the normal system code is output	BC-16
	2. TC and CG terminal circuit	BC-99
VSC warning light abnormal	1. Check the DTC again and make sure that the normal system code is output	BC-16
	2. VSC warning circuit	BC-81

TERMINALS OF ECU

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



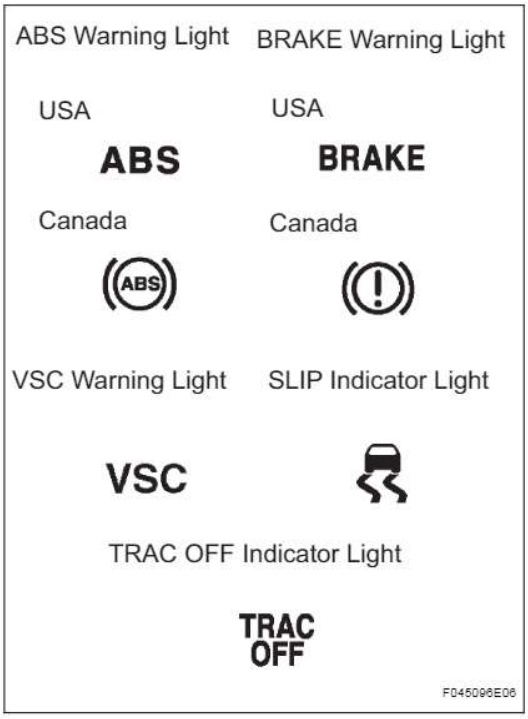
(a) Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
BM (S3-2) - GND1, 2 (S3-32, 1)	B-R - W-B	Motor relay test input	Ignition switch ON, pump motor running	11 to 14 V
FR+ (S3-3) - FR- (S3-17)	BR-Y - BR	Front RH wheel speed signal input	Ignition switch ON, slowly turn right front wheel	AC generation
FL+ (S3-18) - FL- (S3-4)	R - G	Front LH wheel speed signal input	Ignition switch ON, slowly turn left front wheel	AC generation
RR+ (S3-5) - RR- (S3-19)	LG-B - LG-R	Rear RH wheel speed signal input	Ignition switch ON, slowly turn right rear wheel	AC generation
RL+ (S3-20) - RL- (S3-6)	Y - B	Rear LH wheel speed signal input	Ignition switch ON, slowly turn left rear wheel	AC generation
NEO (S3-10) - GND1, 2 (S3-32, 1)	V - W-B	Engine rpm signal input	Engine idling	Pulse generation
CANH (S3-11) - CANL (S3-25)	B - W	CAN communication line	Ignition switch ON	Pulse generation
D/G (S3-13) - GND1, 2 (S3-32, 1)	W - W-B	Diagnostic communication line	Ignition switch ON	11 to 14 V
MRF (S3-14) - R+ (S3-45)	B - R	Fail-safe motor relay output	Ignition switch ON	11 to 14 V
MR (S3-15) - R+ (S3-45)	L - R	Ignition switch ON, pump motor running	Motor relay output	11 to 14 V
+BS (S3-31) - GND1, 2 (S3-32, 1)	B - W-B	Solenoid relay power supply	Always	11 to 14 V
STP (S3-27) - GND1, 2 (S3-32, 1)	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 (S3-28) - GND1, 2 (S3-32, 1)	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 (S3-29) - GND1, 2 (S3-32, 1)	P - W-B	ABS warning light output	Ignition switch ON, ABS warning light ON	11 to 14 V
			Ignition switch ON, ABS warning light OFF	Below 2.0 V
Bz (S3-30) - GND1, 2 (S3-32, 1)	R-W - W-B	Buzzer output	Ignition switch ON, VSC buzzer sounds	Below 1.0 V
			Ignition switch ON, VSC buzzer does not sound	11 to 14 V
IND (S3-34) - GND1, 2 (S3-32, 1)	B-R - W-B	SLIP input	Ignition switch ON	11 to 14 V

BC

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
VSCW (S3-36) - GND1, 2 (S3-32, 1)	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 (S3-42) - GND1, 2 (S3-32, 1)	R - W-B	WFSE input	Ignition switch ON	11 to 14 V
CSW (S3-43) - GND1, 2 (S3-32, 1)	W-L - W-B	TRAC OFF switch input	TRAC OFF switch OFF	11 to 14 V
BRL (S3-44) - GND1, 2 (S3-32, 1)	B-Y - W-B	Brake warning line output	Ignition switch ON, brake warning light ON	11 to 14 V
			Ignition switch ON, brake warning light OFF	Below 2.0 V
R+ (S3-45) - GND1, 2 (S3-32, 1)	R-W - W-B	Power supply for motor relay	Ignition switch ON, ABS warning light OFF	11 to 14 V
IG1 (S3-46) - GND1, 2 (S3-32, 1)	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.

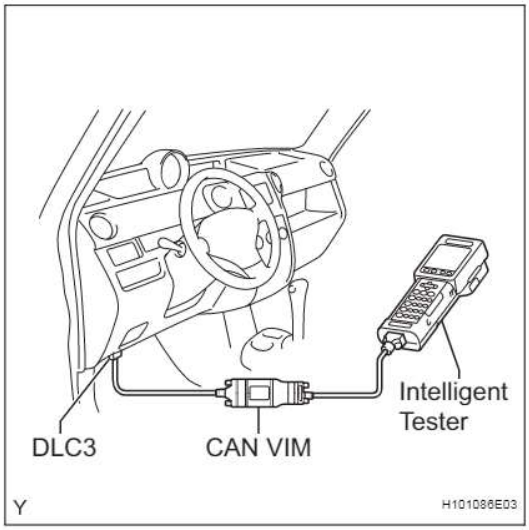
HINT:

- 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-74
VSC warning light circuit	BC-81
Brake warning light circuit	BC-85
TRAC OFF warning light circuit	BC-91
SLIP indicator light circuit	BC-95

BC



DTC CHECK / CLEAR

1. CHECK DTC (When Using Intelligent Tester)

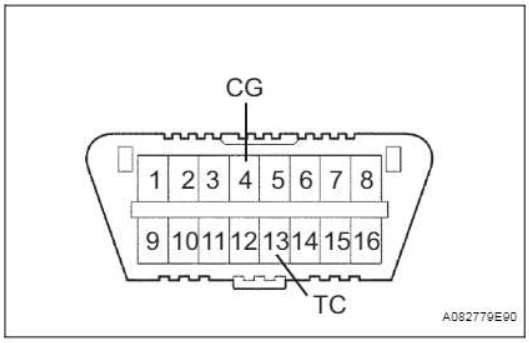
(a) Connect the intelligent tester (with CAN VIM) to the DLC3.

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

SST 09843-18040

(b) Turn the ignition switch ON.

(c) Read the DTC from the ABS warning light and VSC warning light on the combination meter.

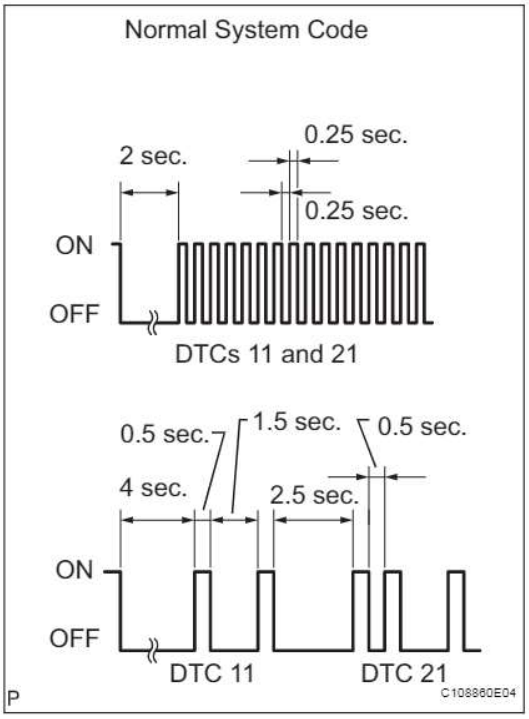
HINT:

- 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-74
VSC warning light circuit	BC-81
TC and CG terminal circuit	BC-99

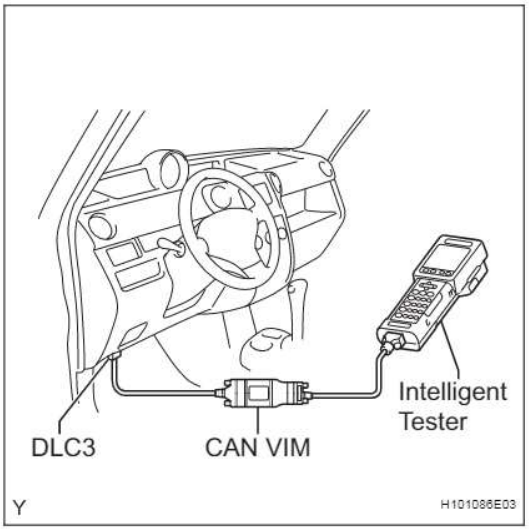
- If more than 1 DTC is detected at the same time, the DTCs will be displayed in numerical order.

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.

(d) 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 in numerical order.

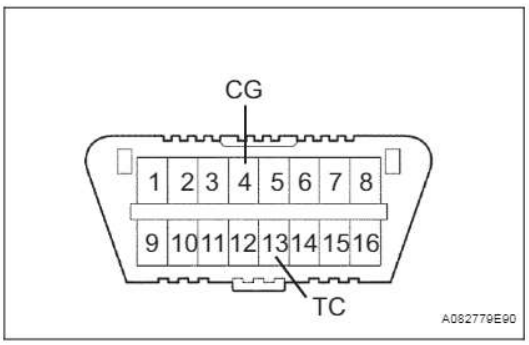


3. CLEAR DTC (When Using Intelligent Tester)

(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.

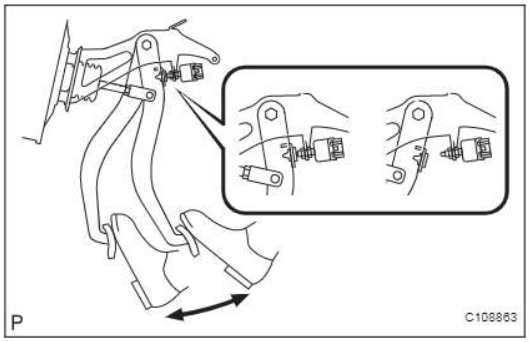


4. CLEAR DTC (When not Using Intelligent Tester)

(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

BC

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-25
C0205/32	Left Front Wheel Speed Sensor Signal Malfunction	- Front speed sensor - Front speed sensor circuit - Speed sensor rotor	BC-25
C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction	- Rear speed sensor - Rear speed sensor circuit - Speed sensor rotor	BC-31
C0215/34	Left Rear Wheel Speed Sensor Signal Malfunction	- Rear speed sensor - Rear speed sensor circuit - Speed sensor rotor	BC-31
C0226/21	SFR Solenoid Circuit	- SFRR or SFRH circuit - Skid control ECU with actuator	BC-36
C0236/22	SFL Solenoid Circuit	- SFLR or SFLH circuit - Skid control ECU with actuator	BC-36
C0246/23	SRR Solenoid Circuit	- SRRR or SRRH circuit - Skid control ECU with actuator	BC-36
C0256/24	SRL Solenoid Circuit	- SRRR or SRRH circuit - Skid control ECU with actuator	BC-36
C0273/13	Open in ABS Motor Relay Circuit	- ABS MTR relay - Skid control relay - ABS MTR relay circuit - ABS No. 2 fuse	BC-39
C0274/14	Short to B+ in ABS Motor Relay Circuit	- ABS MTR relay - Skid control relay - ABS MTR relay circuit - ABS No. 2 fuse	BC-39
C0278/11	Open in ABS Solenoid Relay Circuit	- Skid control ECU with actuator	BC-44
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	- Skid control ECU with actuator	BC-44
C1201/51	Engine Control System Malfunction	Engine control system	BC-47
C1203/53	ECM Communication Circuit Malfunction	CAN communication system	BC-48
C1210/36	Zero Point Calibration of Yaw Rate Sensor Undone	- Yaw rate sensor - Yaw rate sensor circuit - Zero point calibration not done	BC-50
C1223/43	ABS Control System Malfunction	- Anti-lock brake system	BC-53
C1224/44	NE Signal Circuit	- NEO circuit - ECM - Skid control ECU with actuator	BC-54
C1225/25	SMC Solenoid Circuit	- SM1 or SM2 circuit - Skid control ECU with actuator	BC-36
C1231/31	Steering Angle Sensor Circuit Malfunction	- Steering angle sensor - Steering angle sensor circuit - Power source circuit	BC-57
C1232/32	Stuck in Deceleration Sensor	- Yaw rate sensor - Yaw rate sensor circuit - Wire harness	BC-59

DTC No.	Detection Item	Trouble Area	See page
C1234/34	Yaw Rate Sensor Malfunction	- Yaw rate sensor - Yaw rate sensor circuit - Wire harness	BC-59
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	- Front speed sensor - Front speed sensor circuit	BC-25
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	- Front speed sensor - Front speed sensor circuit	BC-25
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	- Rear speed sensor - Rear speed sensor circuit	BC-31
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	- Rear speed sensor - Rear speed sensor circuit	BC-31
C1241/41	Low Battery Positive Voltage or Abnormally High Battery Positive Voltage	- Battery - Charging system - Power source circuit	BC-62
C1243/43	Acceleration Sensor Stuck Malfunction	- Yaw rate sensor - Yaw rate sensor circuit - Wire harness	BC-59
C1244/44	Open or Short in Deceleration Sensor Circuit	- Yaw rate sensor - Yaw rate sensor circuit - Wire harness	BC-59
C1245/45	Acceleration Sensor Output Malfunction	- Yaw rate sensor - Yaw rate sensor circuit - Wire harness	BC-59
C1246/46	Master Cylinder Pressure Sensor Malfunction	- Master cylinder pressure sensor - Master cylinder pressure sensor circuit	BC-65
C1249/49	Open in Stop Light Switch Circuit	- Stop light switch assembly - Stop light switch circuit	BC-67
C1251/51	Open in Pump Motor Circuit	- Skid control ECU with actuator - Skid control ECU with actuator circuit	BC-71
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-50
C1361/91	Short Circuit in ABS Motor Fail Safe Relay Circuit	- ABS MTR relay - Skid control relay - ABS MTR relay circuit - ABS No. 2 fuse	BC-39
C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction	- Battery - Power source circuit - Charging system	BC-59
U0100/65	Lost Communication with ECM / PCM	CAN communication system	BC-73
U0121/94	CAN Communication Function Fault	CAN communication system	BC-73
U0123/62	Lost Communication with Yaw Rate Sensor Module	CAN communication system	BC-73
U0124/95	Lost Communication with Lateral Acceleration Sensor Module	CAN communication system	BC-73
U0126/63	Lost Communication with Steering Angle Sensor Module	CAN communication system	BC-73

BC

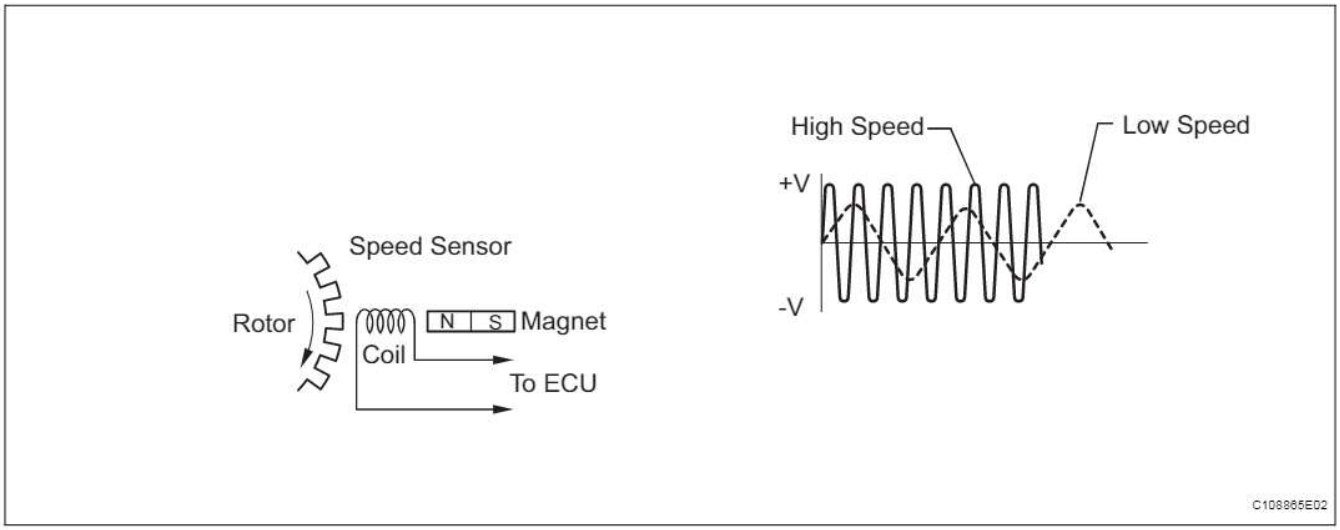
DTC chart of sensor check function

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-25

DTC No.	Detection Item	Trouble Area	See page
C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	- Front speed sensor LH - Sensor installation - Sensor rotor	BC-25
C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	- Rear speed sensor RH - Sensor installation - Sensor rotor	BC-31
C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	- Rear speed sensor LH - Sensor installation - Sensor rotor	BC-31
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	- Front speed sensor rotor RH	BC-25
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	- Front speed sensor rotor LH	BC-25
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	- Rear speed sensor rotor RH	BC-31
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	- Rear speed sensor rotor LH	BC-31
C1279/79	Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)	- Deceleration sensor - Sensor installation	BC-59
C1281/81	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)	- Master cylinder pressure sensor	BC-65

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 IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-16).
(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-16).
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-11).

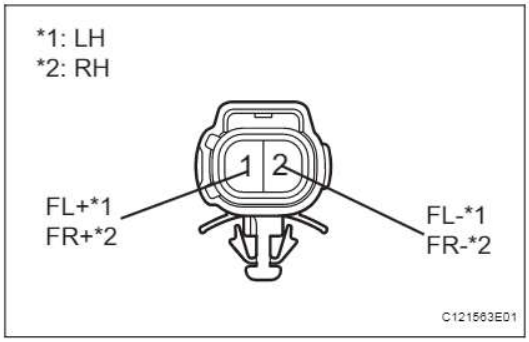
B → CHECK FOR INTERMITTENT PROBLEMS

BC

A

REPLACE BRAKE ACTUATOR ASSEMBLY

4 INSPECT FRONT SPEED SENSOR



(a) Disconnect the A4 and A5 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	

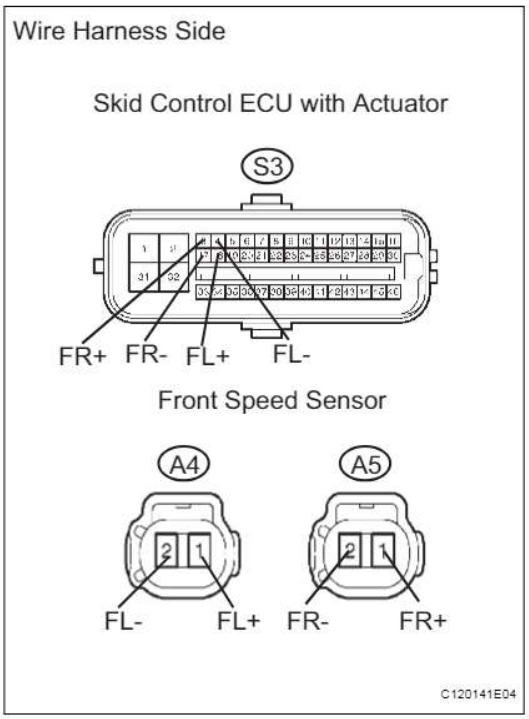
HINT:
- Check the speed sensor signal after the speed sensor replacement (see page BC-7).
- When replacing the speed sensor, clean the installation hole of the sensor.

NG → **REPLACE FRONT SPEED SENSOR**

OK

BC

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



(a) Disconnect the S3 ECU connector.
(b) Disconnect the A4 and A5 speed sensor connectors.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance:

LH

Tester Connection	Specified Condition
S3-18 (FL+) - A4-1 (FL+)	Below 1 Ω
S3-4 (FL-) - A4-2 (FL-)	
A4-1 (FL+) - Body ground	10 kΩ or higher
A4-2 (FL-) - Body ground	

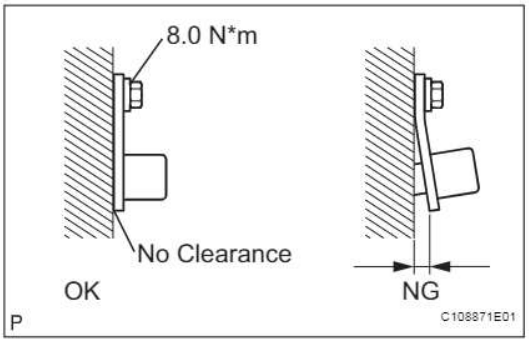
RH

Tester Connection	Specified Condition
S3-3 (FR+) - A5-1 (FR+)	Below 1 Ω
S3-17 (FR-) - A5-2 (FR-)	
A5-1 (FR+) - Body ground	10 kΩ or higher
A5-2 (FR-) - Body ground	

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

OK

6 CHECK 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-7).
- When replacing the speed sensor, clean the installation hole of the sensor.

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.

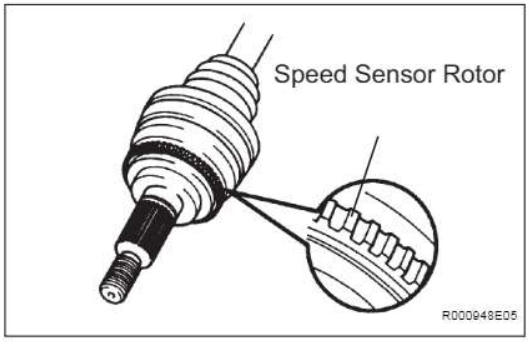
HINT:

Check the speed sensor signal after cleaning or replacing the speed sensor (see page BC-7).

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-7).

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

OK

9 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-16).

(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-16).

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-11).

NG → **END**

A

REPLACE BRAKE ACTUATOR ASSEMBLY

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.

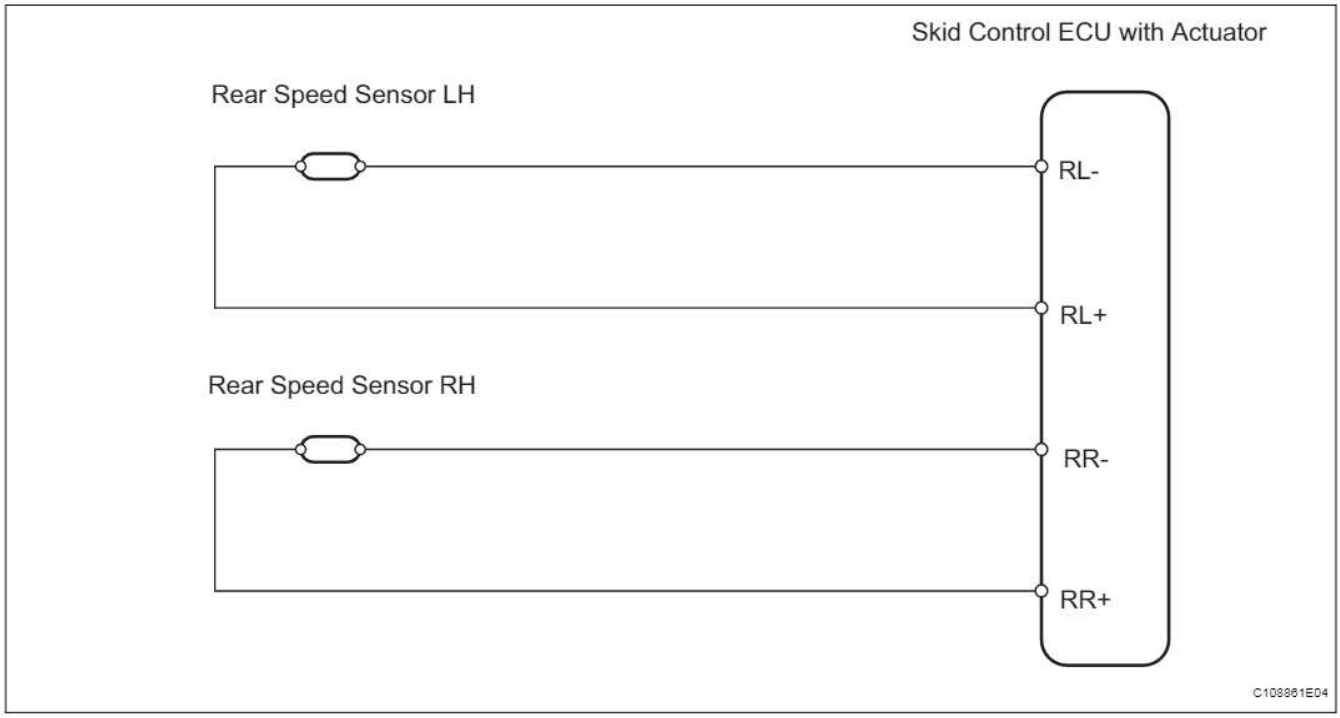
DTC No.	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When one of following occurs • With vehicle speed at 10 km/h (6 mph) or more, sensor signal circuit of faulty wheel is open or short for 1 second or more • Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more • 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 rotor RH
C1278/78	Detected only during test mode	Rear speed sensor rotor 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-16).
(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-16).
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-11).

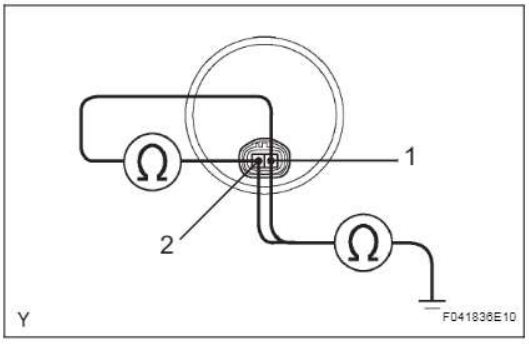
B → **END**

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

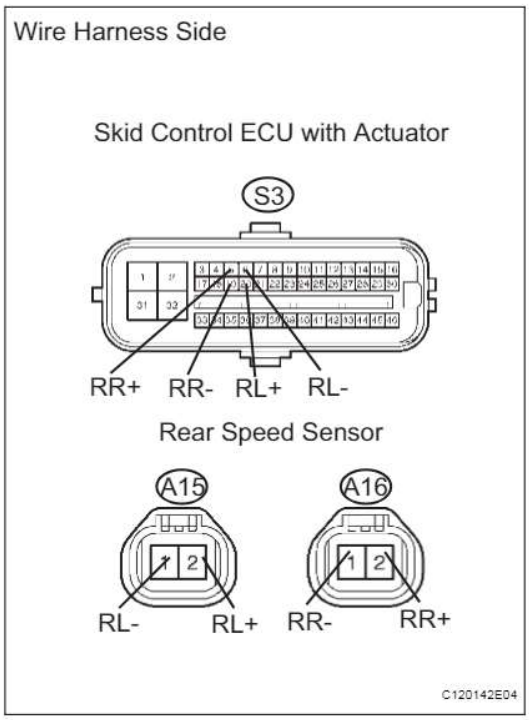
Tester Connection	Specified Condition
1 (RR-) - Body ground	10 kΩ or higher
2 (RR+) - Body ground	

HINT:
Check the speed sensor signal after the speed sensor replacement (see page BC-7).

NG → REPLACE REAR SPEED SENSOR

OK

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



(a) Disconnect the S3 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
S3-20 (RL+) - A15-2	Below 1 Ω
S3-6 (RL-) - A15-1	
A15-2 - Body ground	10 kΩ or higher
A15-1 - Body ground	

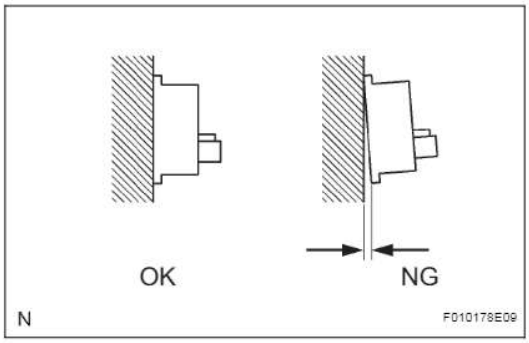
RH

Tester Connection	Specified Condition
S3-5 (RR+) - A16-2	Below 1 Ω
S3-19 (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 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-7)

NG → REPLACE REAR SPEED SENSOR

OK

BC

7	INSPECT SPEED SENSOR (TIP)

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

OK:

No scratches or foreign objects on the sensor tip.

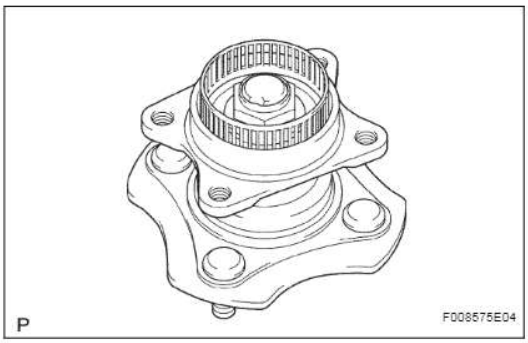
HINT:

Check the speed sensor signal after replacement (see page BC-7)

NG → **CLEAR OR REPAIR SPEED SENSOR**

OK

8	INSPECT REAR AXLE HUB AND BEARING ASSEMBLY (SENSOR ROTOR)



(a) Remove the axle hub and disconnect the rear speed sensor.

OK:

No scratches, missing teeth or foreign objects.

HINT:

Check the speed sensor signal after replacement (see page BC-7)

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

OK

9	CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-16).
(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-16).

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-11).

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

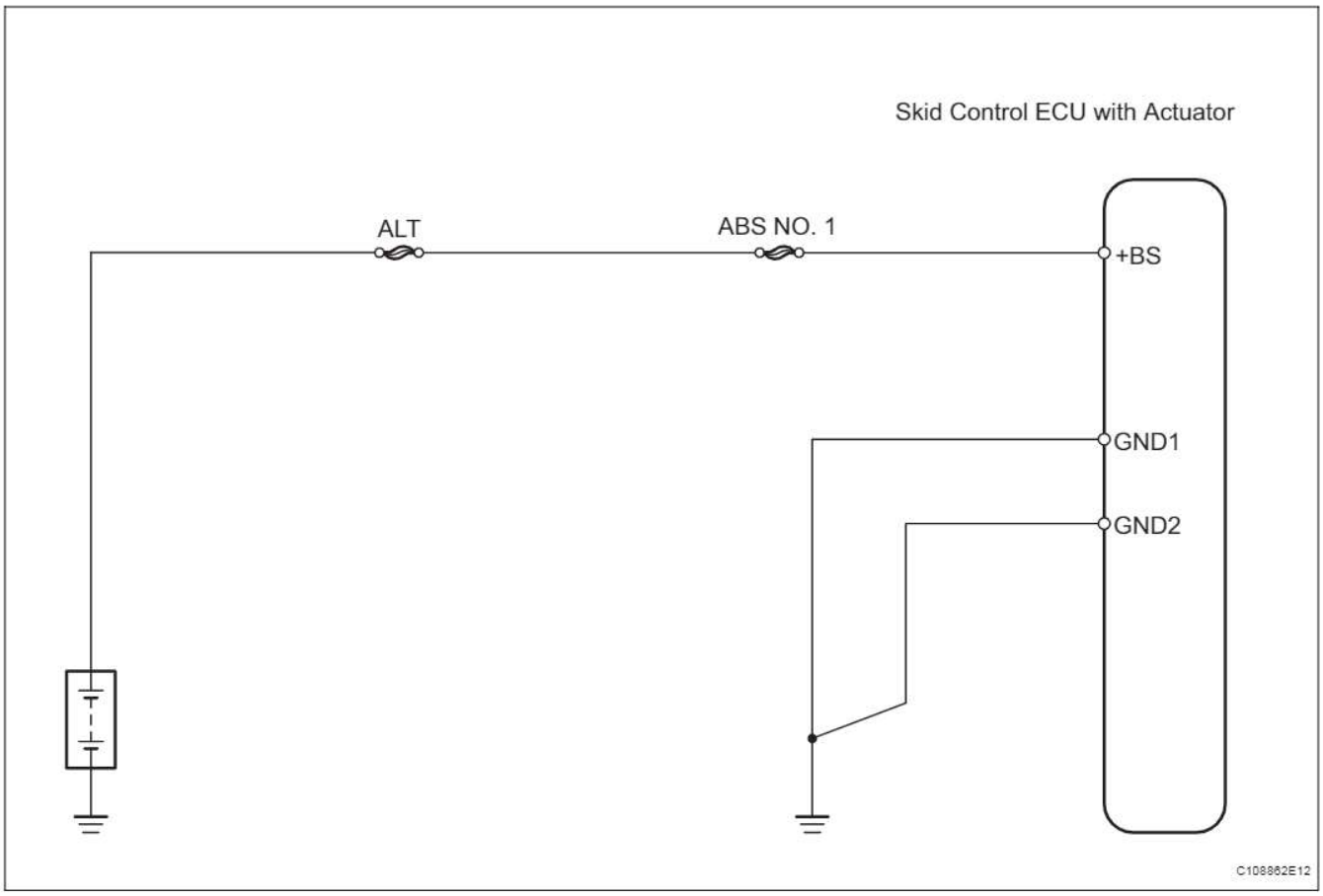
DESCRIPTION

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 the 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 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-16).
(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-16).

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-11).

BC

B → REPLACE BRAKE ACTUATOR ASSEMBLY

A

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

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

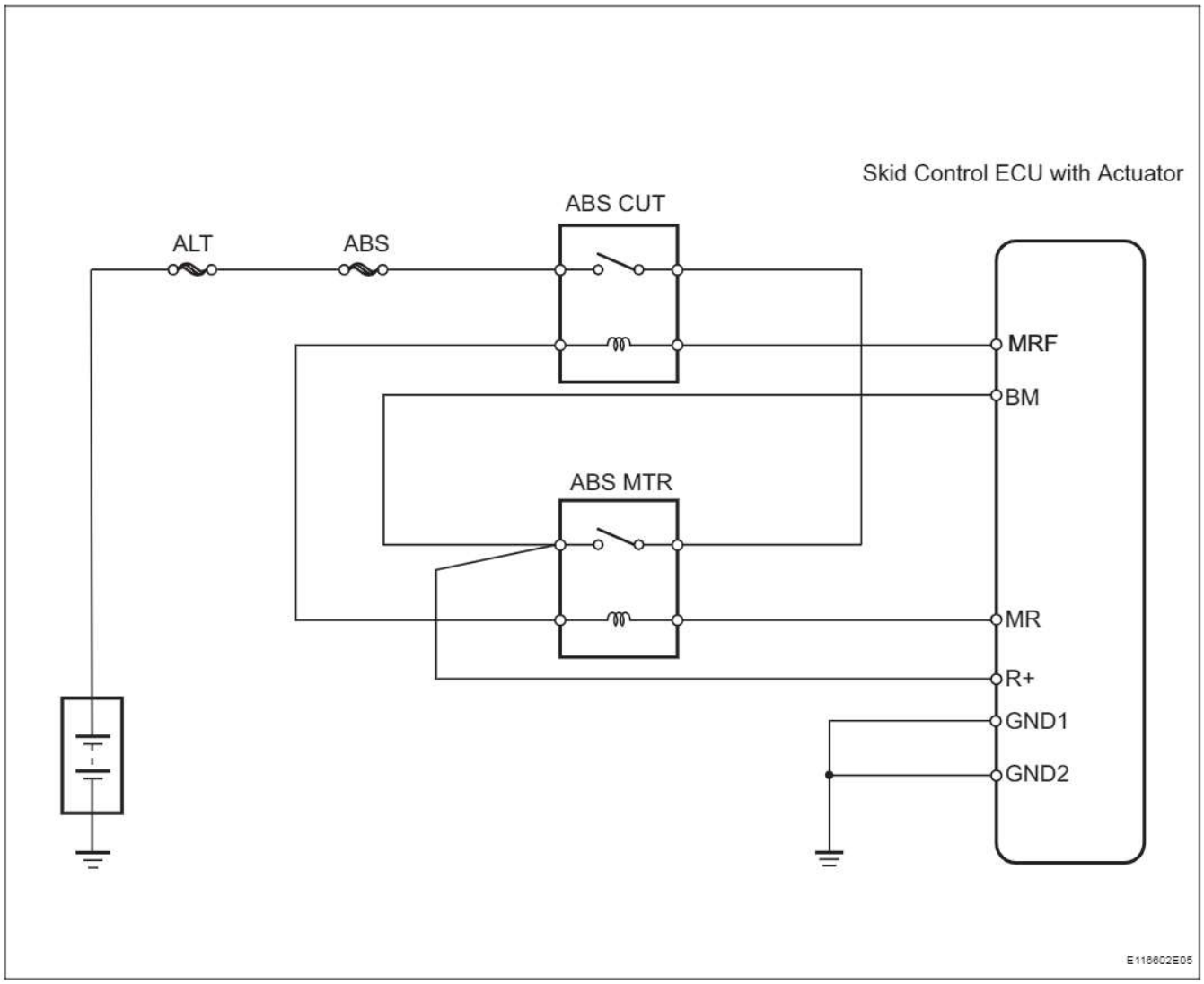
DESCRIPTION

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 the 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 • ABS MTR relay power source circuit • ABS NO. 2 H-fuse
C0274/14	When motor relay is OFF, motor relay remains closed for 4 seconds or more	• ABS MTR relay • ABS MTR relay circuit • ABS MTR relay power source circuit • ABS NO. 2 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 • ABS MTR relay power source circuit • ABS NO. 2 H-fuse

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis MTRhod.

MTRhod

MTRhod	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-11).

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

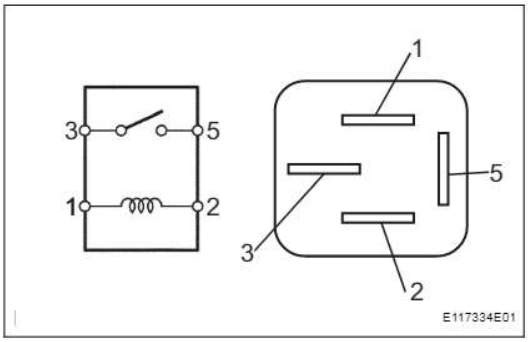
3	INSPECT FUSE (ABS, ALT)

(a) Remove the ABS and ALT H-fuses from the fusible link block.
(b) Measure the resistance of the H-fuses.
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

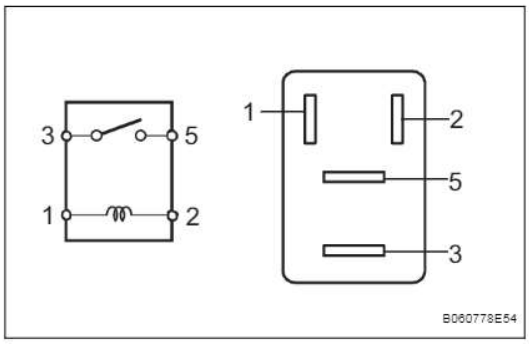
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG → **REPLACE RELAY**

OK

BC

5 INSPECT RELAY (Marking: ABS CUT)



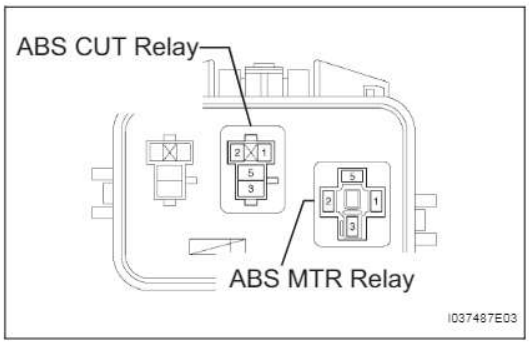
(a) Remove the ABS CUT relay from the ABS relay block.
(b) Measure the resistance of the relay.
Standard resistance

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

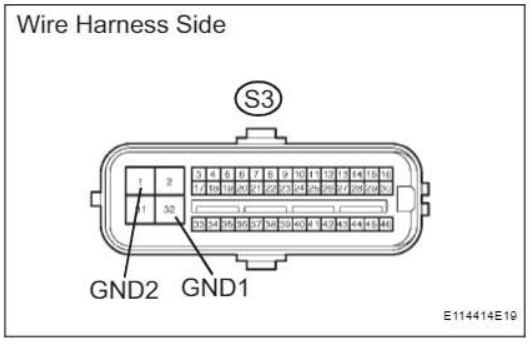
(c) Measure the resistance of the wire harness side connector.
Standard resistance

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 S3 ECU connector.
(b) Measure the resistance of the wire harness side connector.
Standard resistance

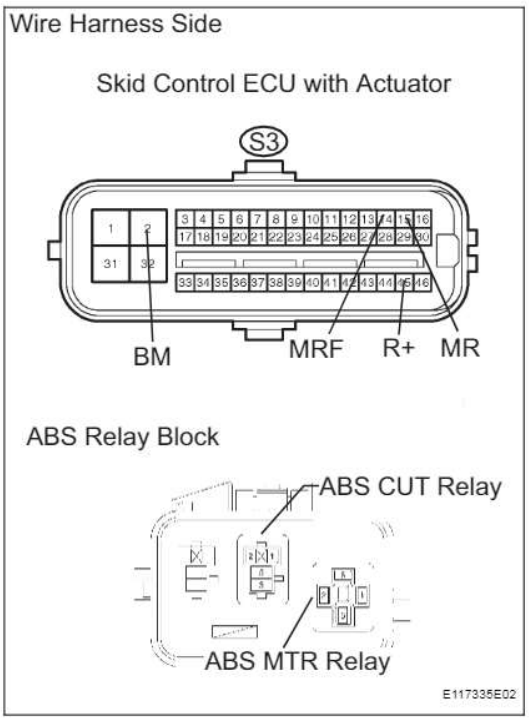
Tester Connection	Specified Condition
S3-32 (GND1) - Body ground	Below 1 Ω
S3-1 (GND2) - Body ground	

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 S3 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
S3-14 (MRF) - ABS CUT relay terminal 2	Below 1 Ω
S3-2 (BM) - ABS MTR relay terminal 3	
S3-15 (MR) - ABS MTR relay terminal 2	
S3-45 (R+) - ABS MTR relay terminal 3	

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

DTC	C0278/11	Open in ABS Solenoid Relay Circuit

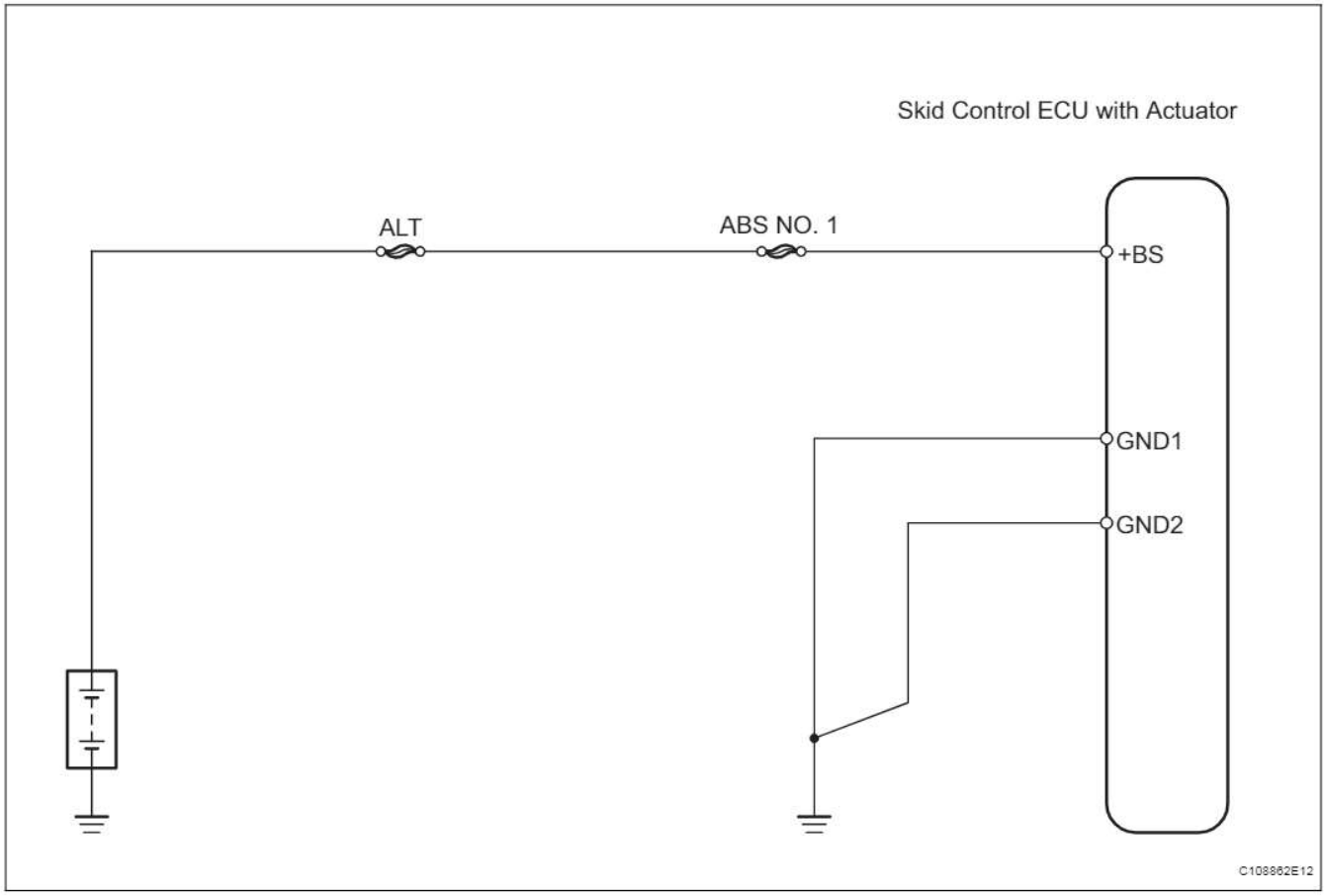
DTC	C0279/12	Short to B+ in ABS Solenoid Relay Circuit

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

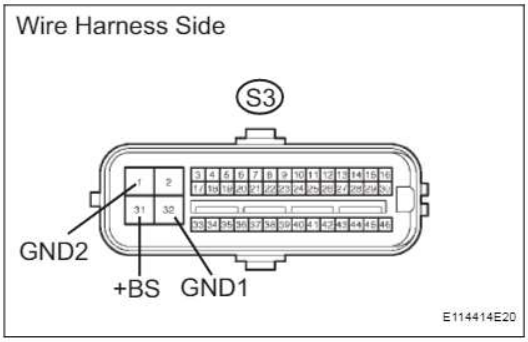
1	INSPECT FUSE (ALT, ABS NO. 1)

(a) Remove the ABS NO. 1 H-fuse from the engine room junction block.
(b) Remove the ALT H-fuse from the fusible link.
(c) 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 S3 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Specified Condition
S3-31 (+BS) - Body ground	10 to 14 V

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

Tester Connection	Specified Condition
S3-32 (GND1) - Body ground	Below 1 Ω
S3-1 (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-16).
(b) Drive the vehicle at 6 km/h (4 mph) or more.
(c) Check for DTCs (see page BC-16).
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-11).

B → END

A

REPLACE BRAKE ACTUATOR ASSEMBLY

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

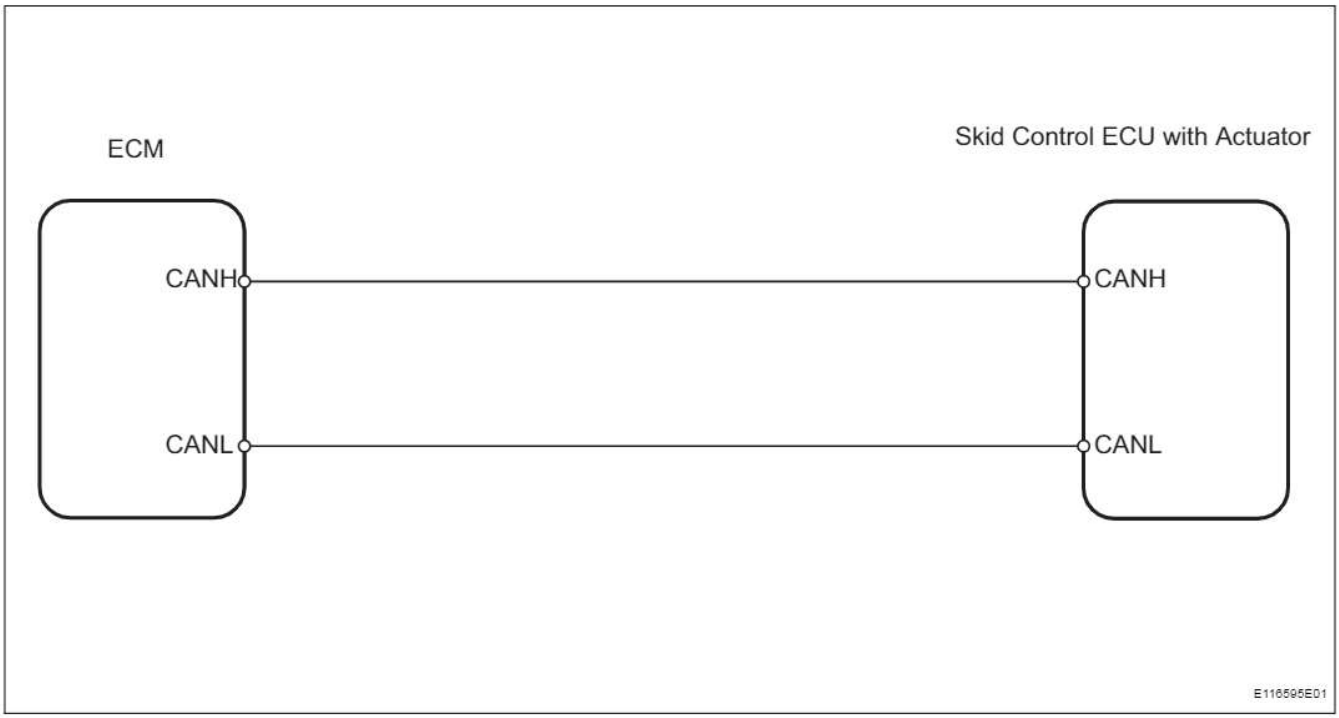
DTC	C1203/53	ECM Communication Circuit Malfunction

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-16).
(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 that no CAN communication system DTC is output. If ABS and VSC DTCs are output, record 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

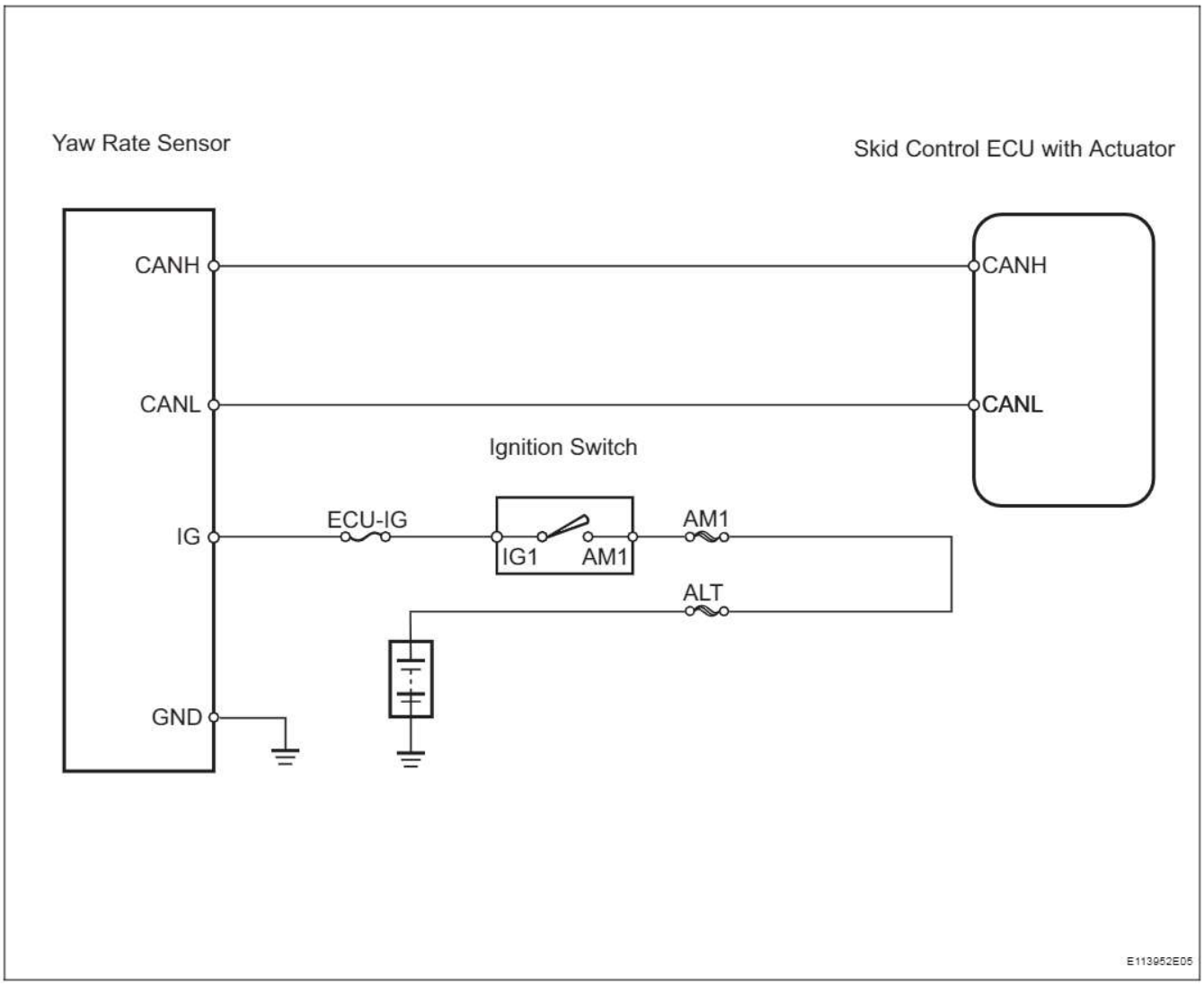
DESCRIPTION

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 (Deceleration 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 C1336/39, 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-11).

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-16).
(b) Turn the ignition switch ON.
(c) Check for DTCs (see page BC-16).
OK:
Same DTCs are output.

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

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 Area
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-16).

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

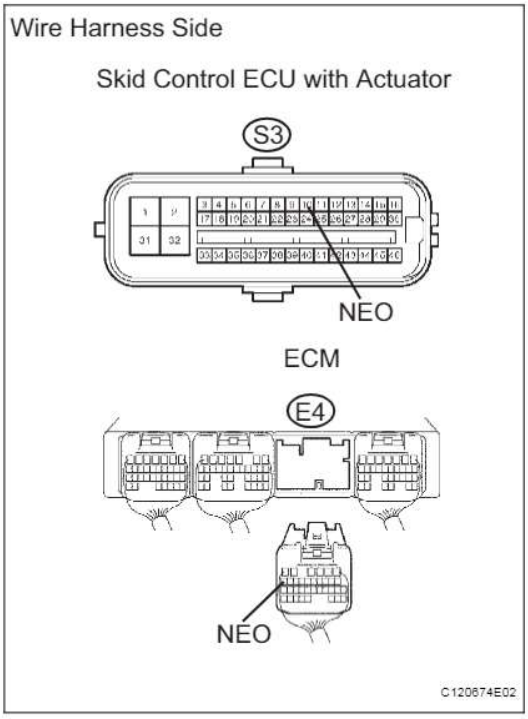
WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHECK WIRE HARNESS (SKID CONTROL ECU - ECM)



(a) Disconnect the S3 ECU connector.
(b) Disconnect the E4 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

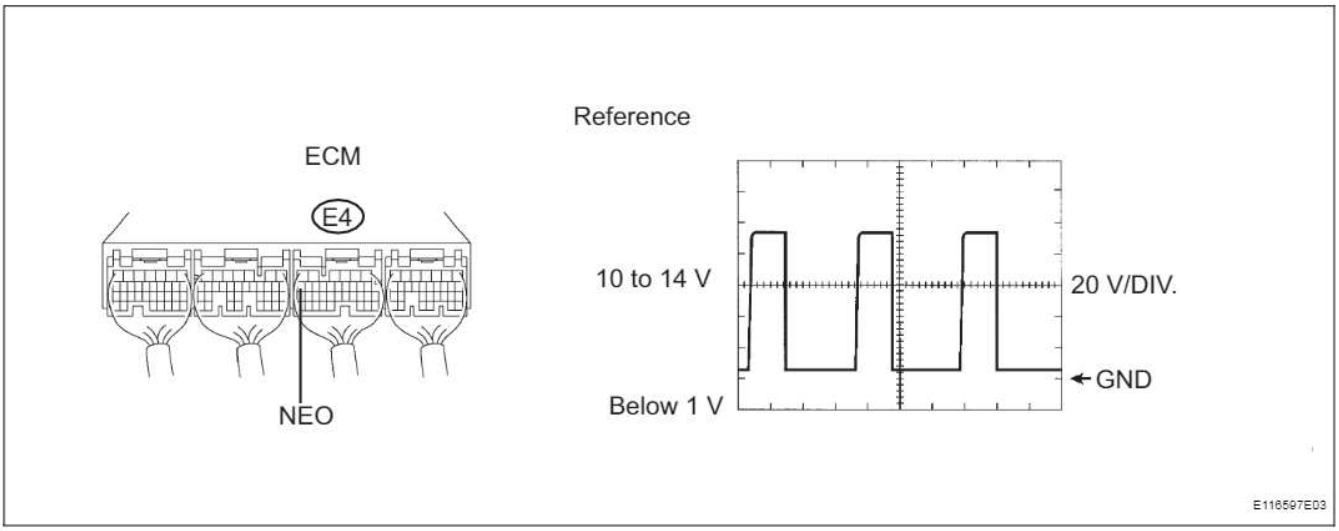
Standard resistance

Tester Connection	Specified Condition
S3-10 (NEO) - E4-7 (NEO)	Below 1 Ω
S3-10 (NEO) - Body ground	10 kΩ or higher

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

OK

2	CHECK ECM (NEO VOLTAGE)



(a) Measure the voltage of the ECM.

Standard voltage

Tester Connection	Engine Condition	Specified Condition
E4-7 (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

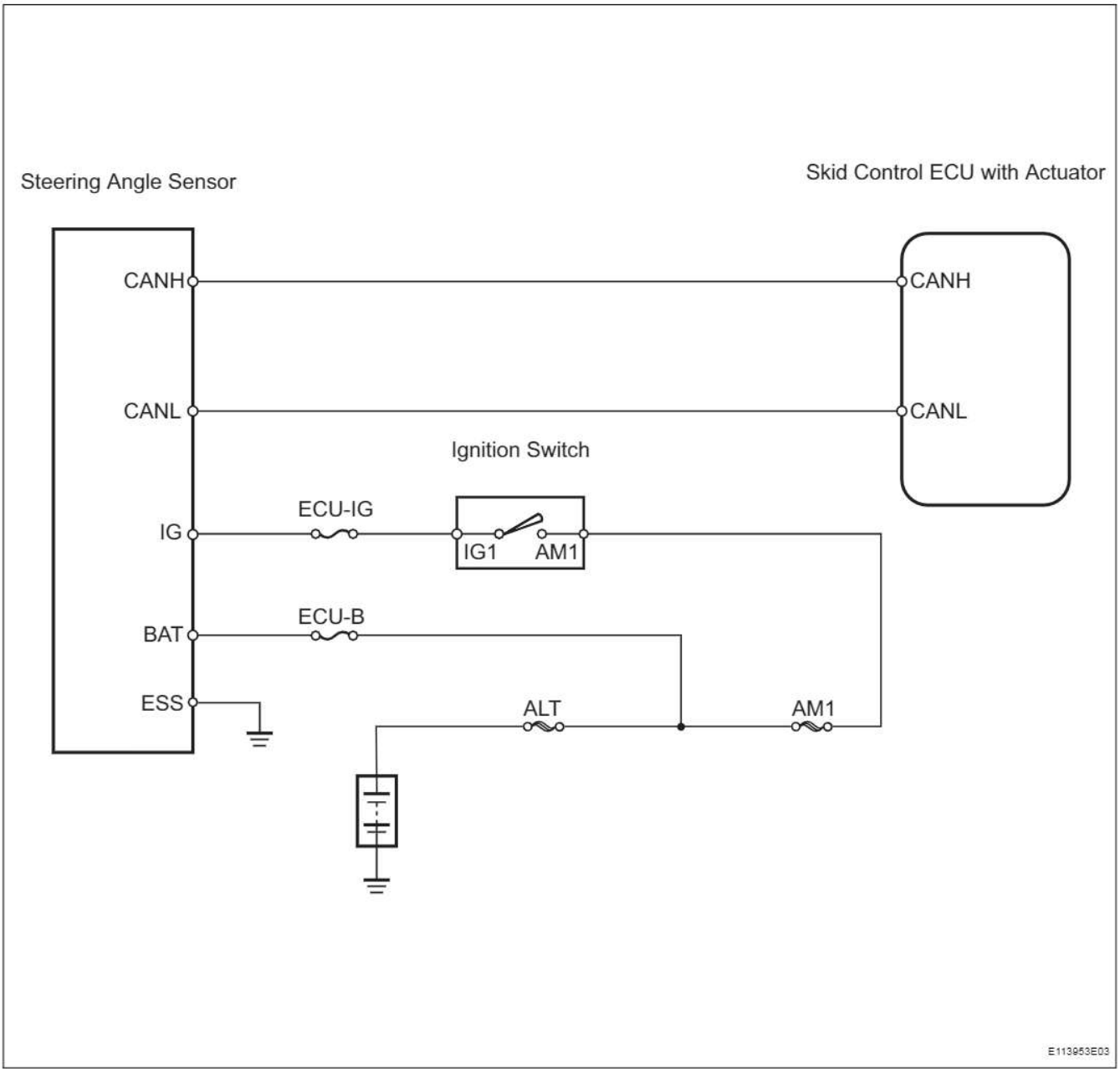
DTC	C1231/31	Steering Angle Sensor Circuit Malfunction

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



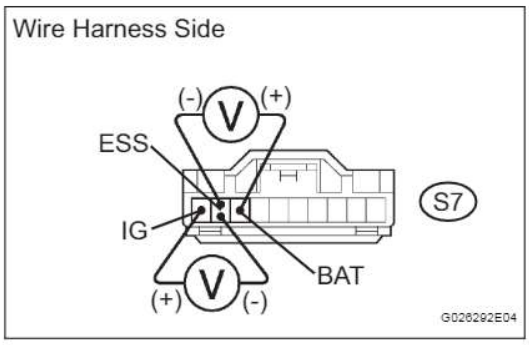
BC

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 S7 sensor connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Switch Condition	Specified Condition
S7-1 (IG) - S7-2 (ESS)	Ignition switch ON	10 to 14 V
S7-3 (BAT) - S7-2 (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

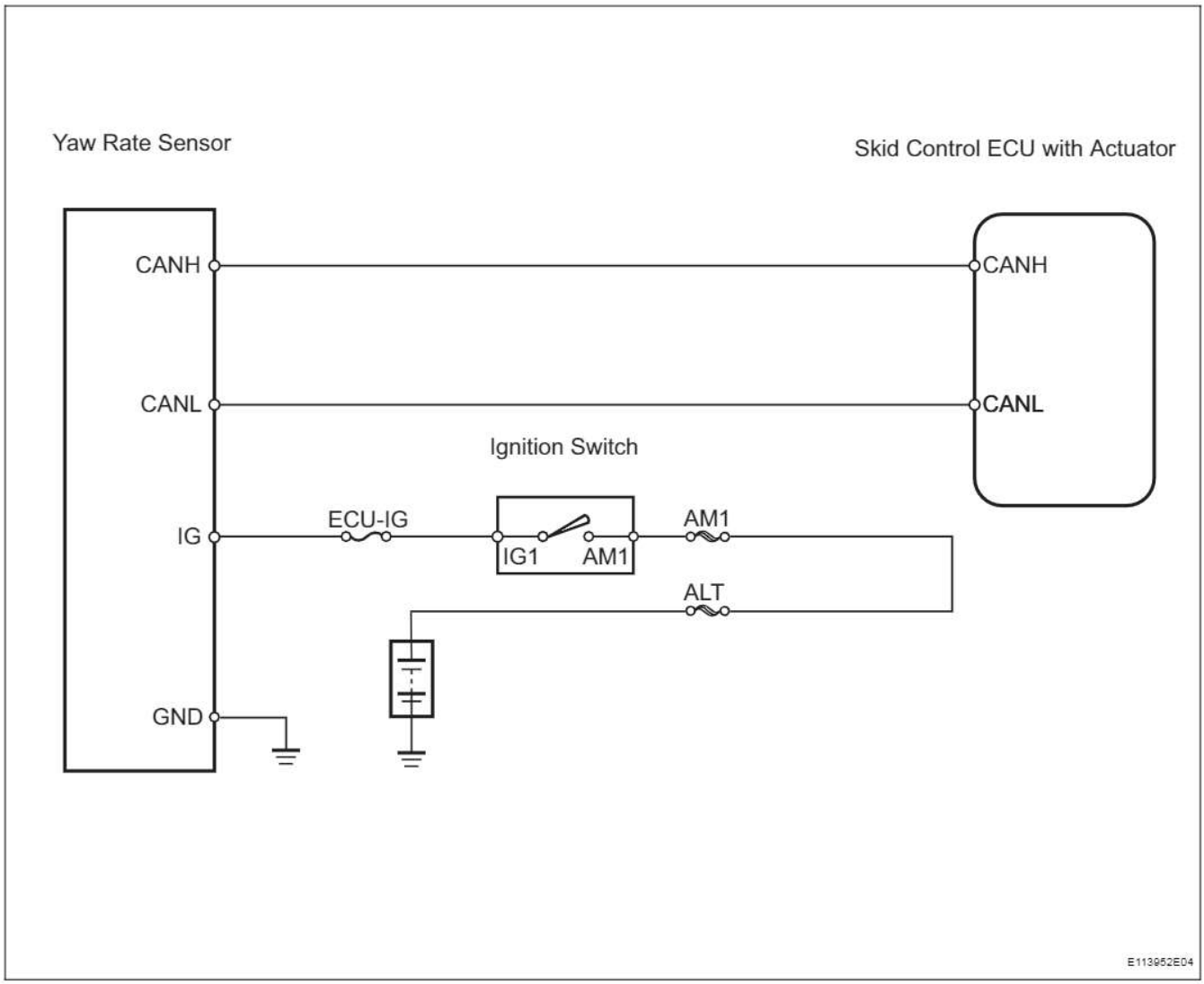
DESCRIPTION

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 C1279/79 can be deleted when the deceleration sensor sends a deceleration sensor signal or the test mode ends. DTC C1279/79 is output only in the test mode.

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

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
When U0121/94, U0123/62, U0124/95 or U0126/63 are output accompanied 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)

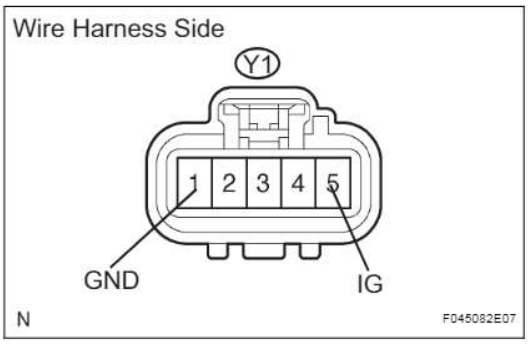
BC

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

NG → INSTALL YAW RATE SENSOR CORRECTLY

OK

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-11).

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

OK

REPLACE YAW RATE SENSOR

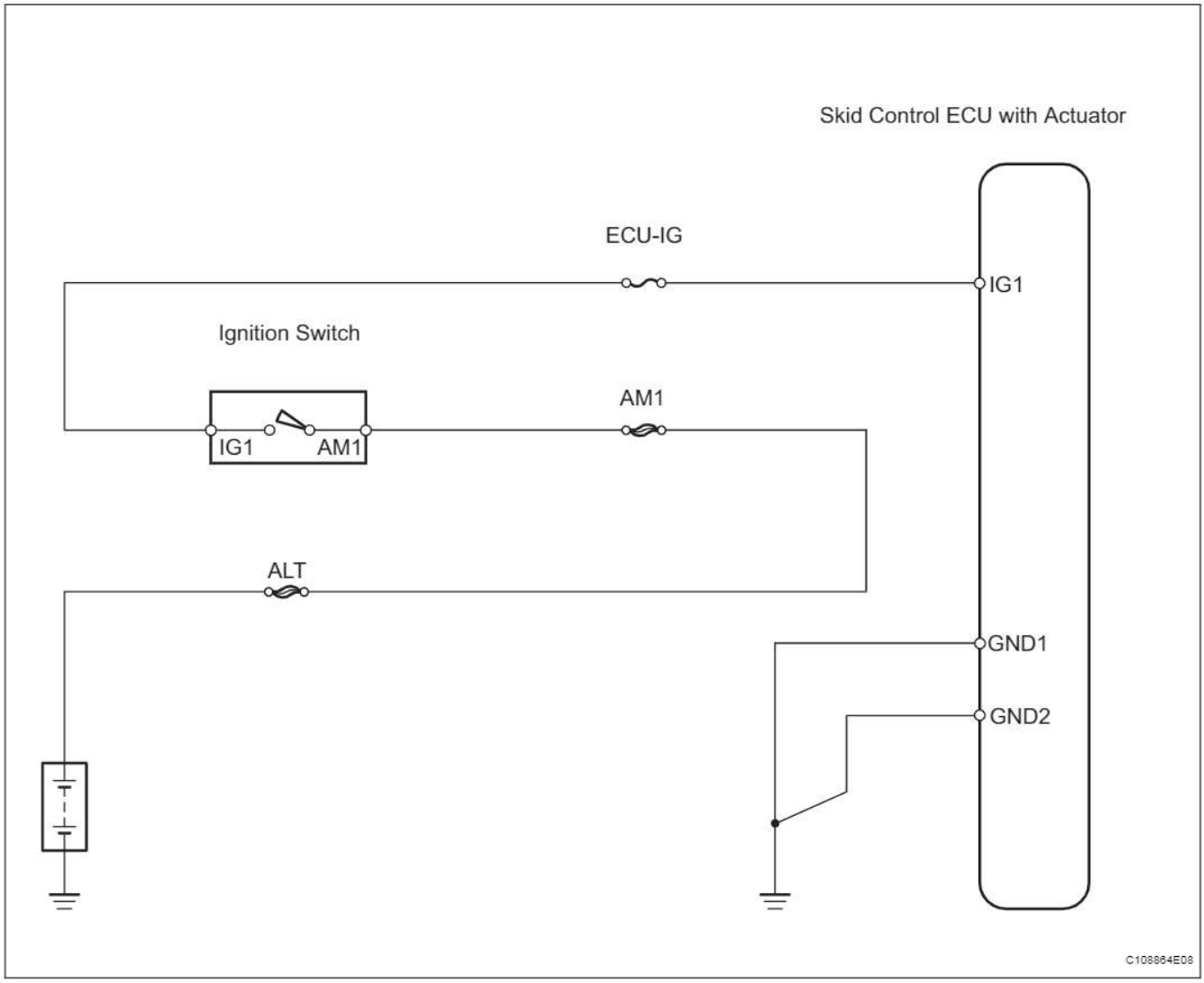
BC

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 (IG1 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

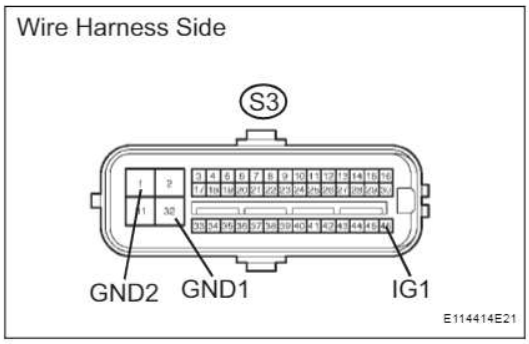
HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

B → REPLACE BRAKE ACTUATOR ASSEMBLY

BC

A

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



(a) Disconnect the S3 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S3-46 (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
S3-32 (GND1) - Body ground	Below 1 Ω
S3-1 (GND2) - Body ground	

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

OK

4 CHECK IF DTC OUTPUT RECURS

(a) Clear the DTCs (see page BC-16).
(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-16).
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-11).

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 C1281/81 can be deleted when the master cylinder pressure sensor sends a master cylinder pressure sensor 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
C1281/81	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

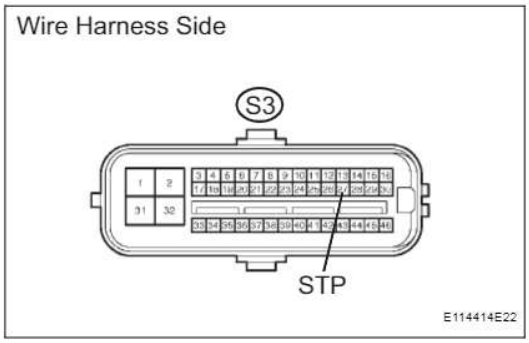
OK:
Brake fluid pressure value (voltage) changes from 0.3 to 0.9 V.

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

3 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)



(a) Disconnect the S3 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S3-27 (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-11).

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

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

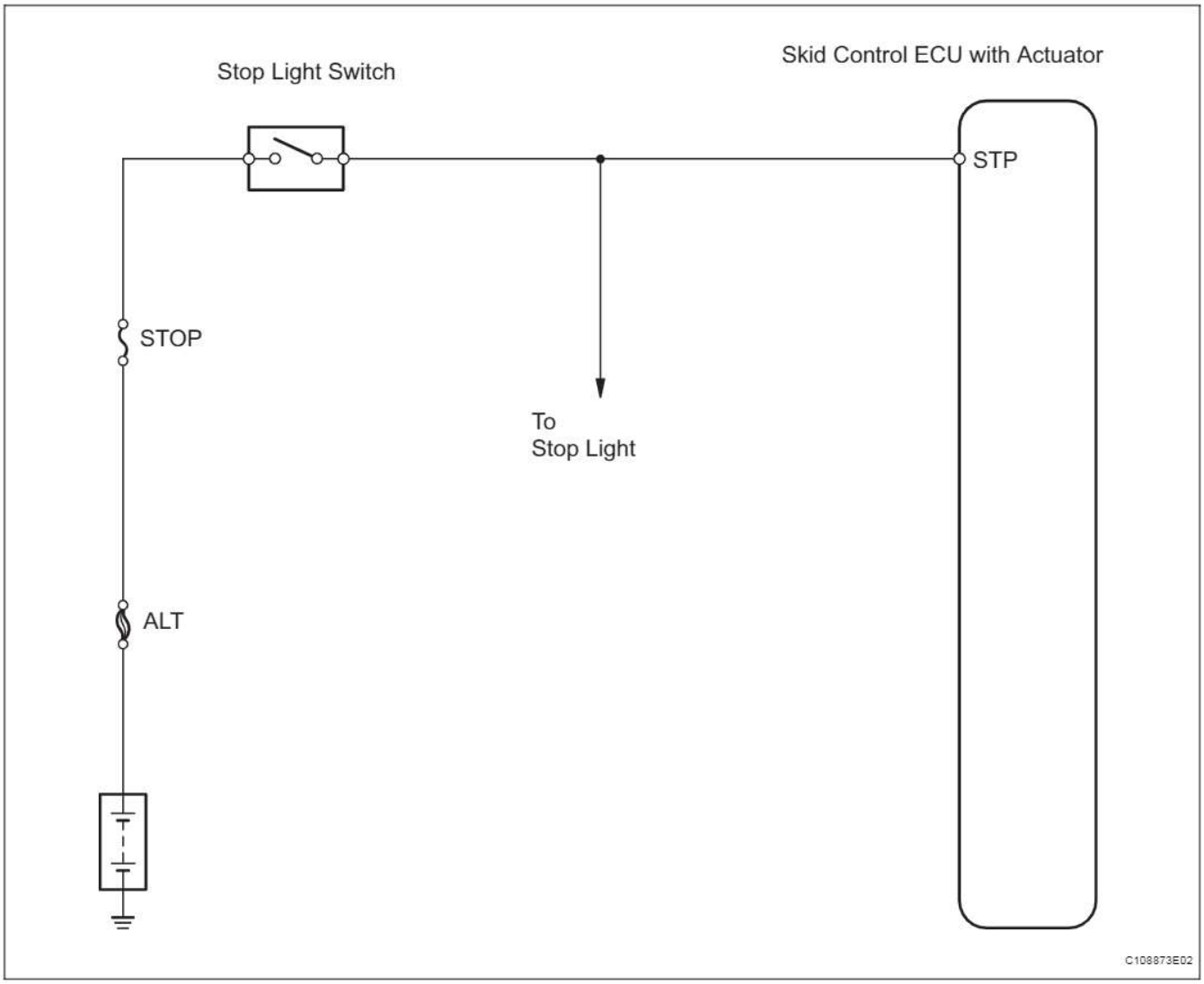
DTC	C1249/49	Open in Stop Light Switch Circuit

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

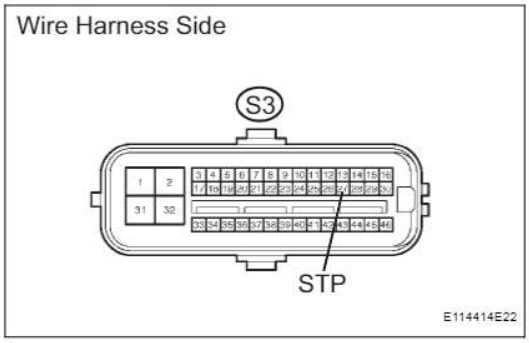
(a) Check that the stop light illuminates when the brake pedal is depressed, and turns off when the brake pedal is released.
OK

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 S3 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Switch Condition	Specified Condition
S3-27 (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-16).
(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-16).
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-11).

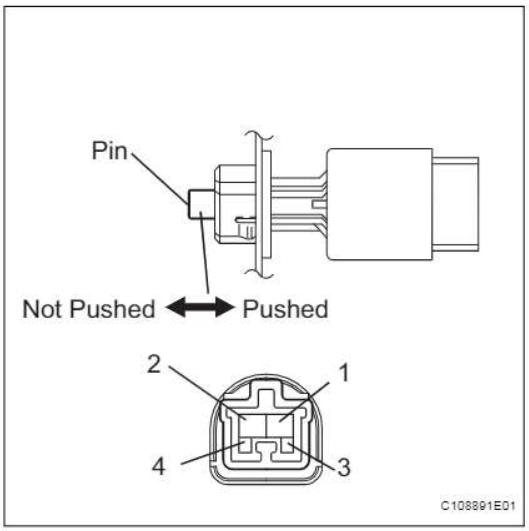
B → END

A

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

4	INSPECT STOP LIGHT SWITCH ASSEMBLY



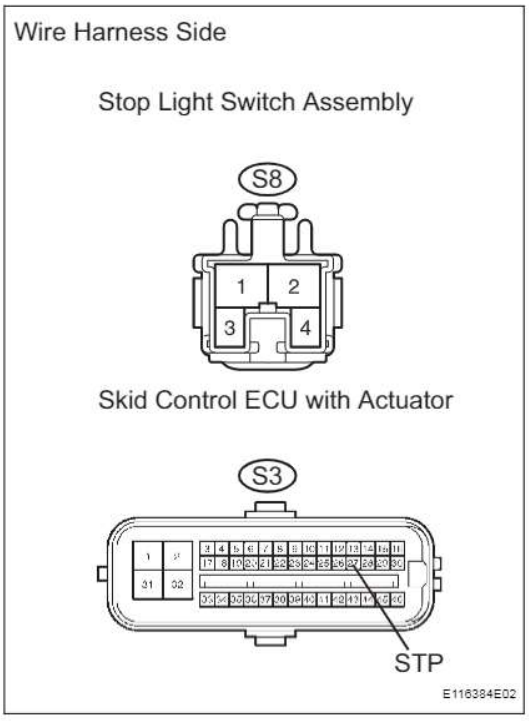
(a) Disconnect the S8 switch connector.
(b) Measure the resistance of the switch.
Standard resistance

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 S8 switch connector.
(b) Disconnect the S3 ECU connector.
(c) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Specified Condition
S8-2 - Body ground	10 to 14 V

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

Tester Connection	Specified Condition
S8-1 - S3-27 (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-16).
(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-19).
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-11).

B → END

A

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

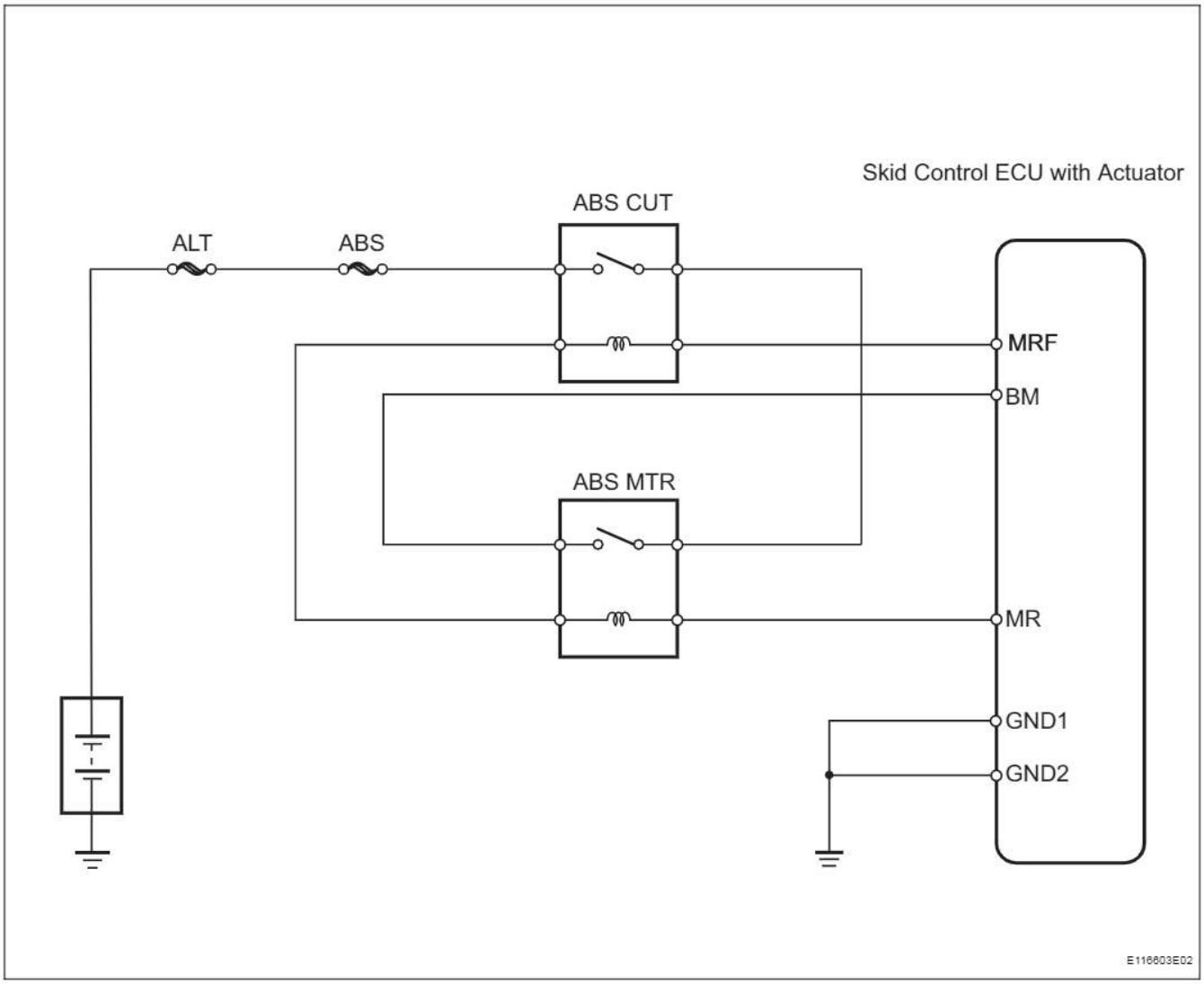
DTC	C1251/51	Open in Pump Motor Circuit

DESCRIPTION

The ABS pump MTR is located inside the brake actuator.

DTC No.	DTC Detection Condition	Trouble Area
C1251/51	When either condition below is met: • Actuator pump MTR does not operate properly • Actuator pump MTR 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 MTR can be heard

OK:

Operation sound of ABS MTR is heard.

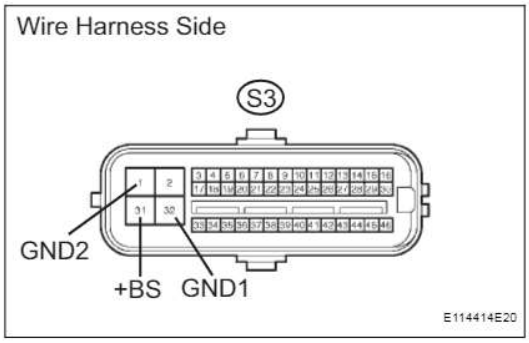
HINT:

When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

OK → REPLACE BRAKE ACTUATOR ASSEMBLY

NG

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



(a) Disconnect the S3 ECU connector.

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

Standard voltage

Tester Connection	Specified Condition
S3-31 (+BS) - Body ground	10 to 14 V

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

Standard resistance

Tester Connection	Specified Condition
S3-32 (GND1) - Body ground	Below 1 Ω
S3-1 (GND2) - Body ground	

HINT:

When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

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-16).
(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-16). 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

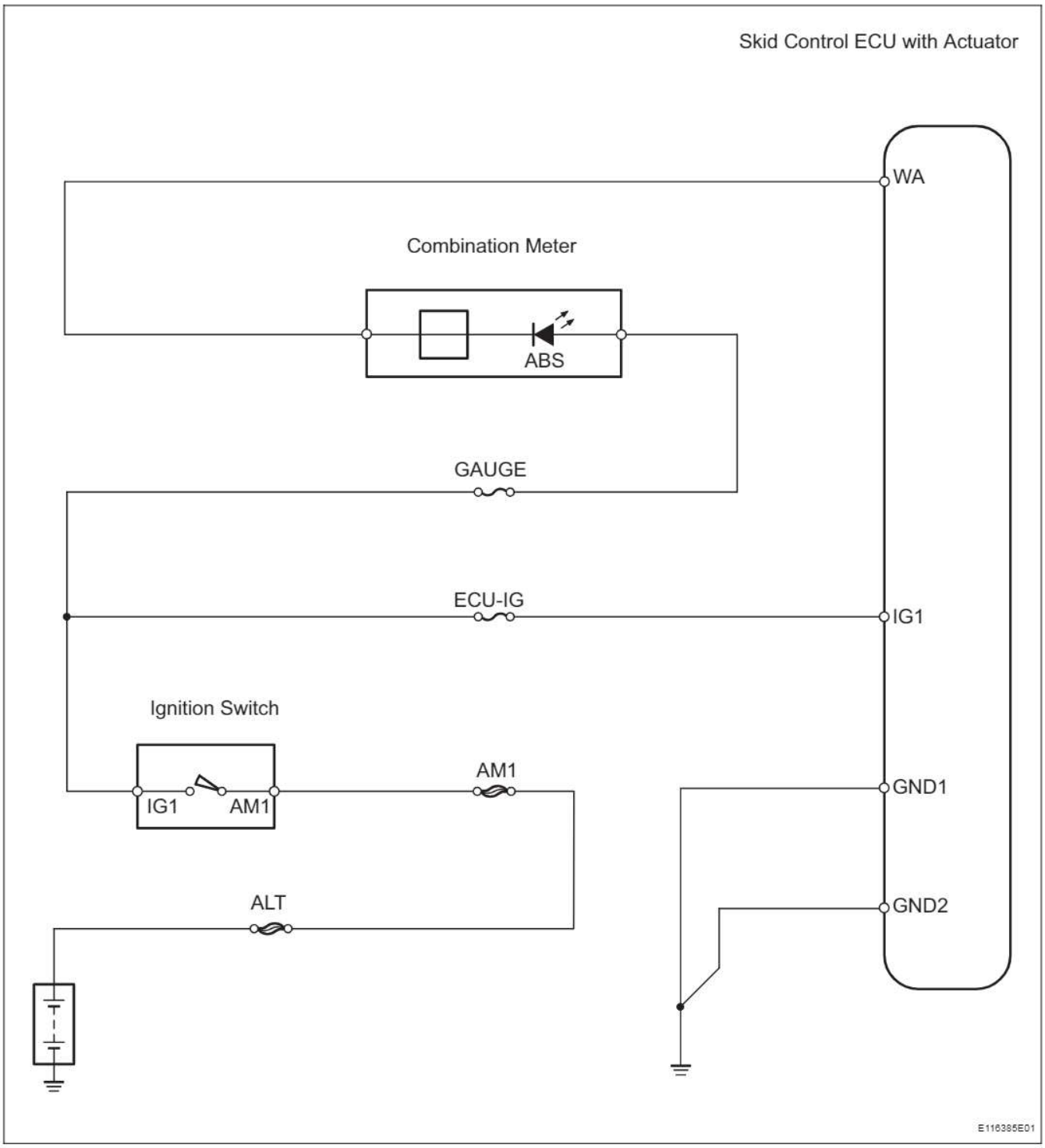
ABS Warning Light Remains ON

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-16).

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 (IG1 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

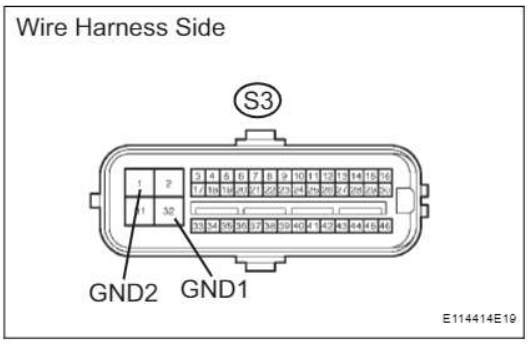
Result	Proceed to
Display is NORMAL	A
Display is not NORMAL	B

B → Go to step 11

A

BC

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



(a) Disconnect the S3 ECU connector.
(b) Measure the resistance of the wire harness side connector.

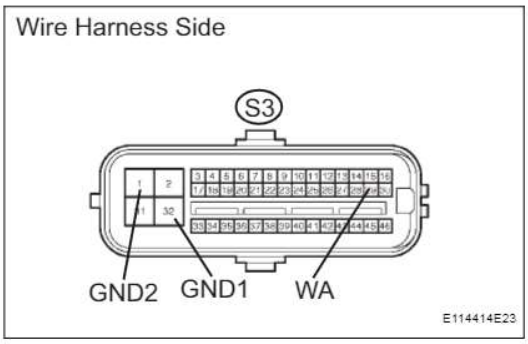
Standard resistance

Tester Connection	Specified Condition
S3-32 (GND1) - Body ground	Below 1 Ω
S3-1 (GND2) - Body ground	

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

OK

5 CHECK ABS WARNING LIGHT



(a) Disconnect the S3 ECU connector.
(b) Turn the ignition switch ON.
(c) Using a service wire, connect terminal S3-29 (WA) to S3-32 (GND1) or S3-1 (GND2) 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.

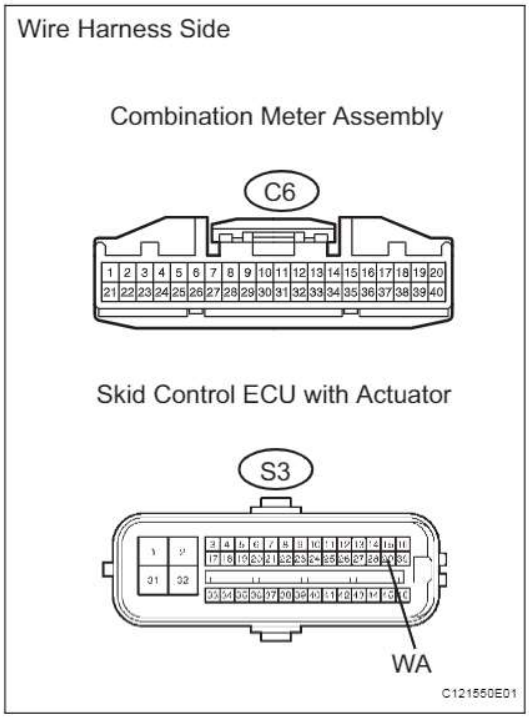
HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

BC

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



(a) Disconnect the S3 ECU connector.
(b) Disconnect the C6 meter connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
S3-29 (WA) - C6-11	Below 1 Ω
S3-29 (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:

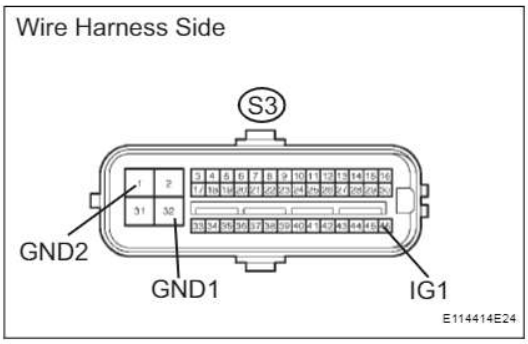
Each ECU connector is properly installed.

NG → **CONNECT CONNECTOR TO ECU CORRECTLY**

OK

BC

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



(a) Disconnect the S3 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S3-46 (IG1) - Body ground	Ignition switch ON	10 to 14 V

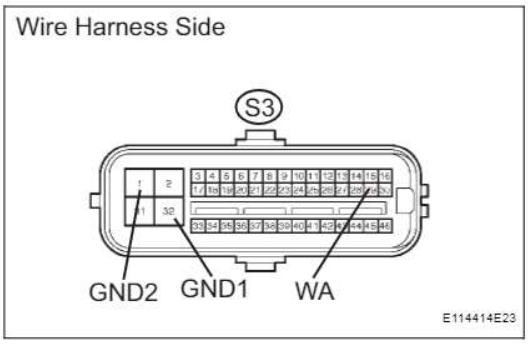
(c) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
S3-32 (GND1) - Body ground	Below 1 Ω
S3-1 (GND2) - Body ground	

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

OK

9 CHECK ABS WARNING LIGHT



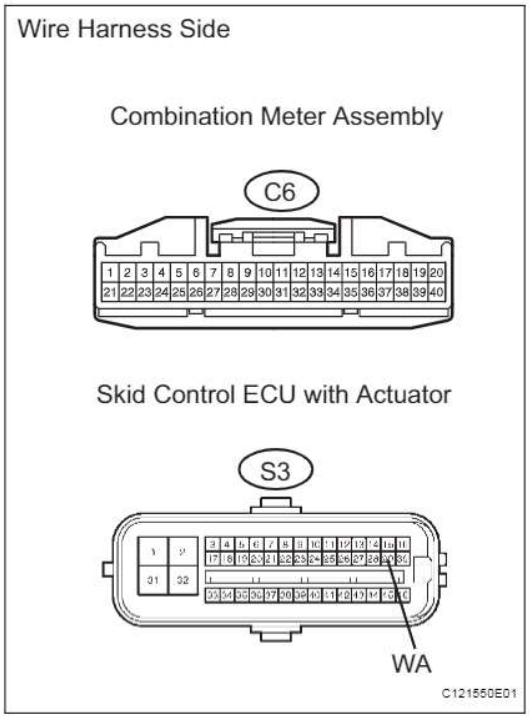
(a) Disconnect the S3 ECU connector.
(b) Turn the ignition switch ON.
(c) Using a service wire, connect terminal S3-29 (WA) to S3-32 (GND1) or S3-1 (GND2) of the connector. Check the ABS warning light.
OK:
ABS warning light turns off.
(d) Turn the ignition switch OFF.
(e) Remove the service wire.
(f) 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-11).

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

BC

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



(a) Disconnect the S3 ECU connector.
(b) Disconnect the C6 meter connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

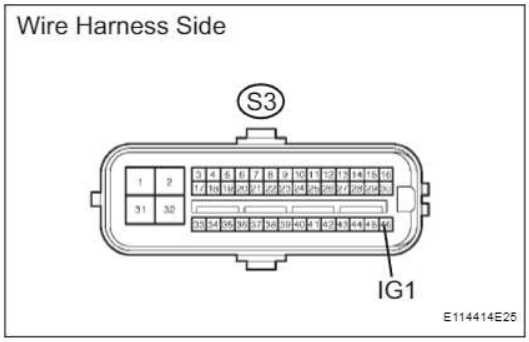
Tester Connection	Specified Condition
S3-29 (WA) - C6-11	Below 1 Ω
S3-29 (WA) - Body ground	10 kΩ or higher

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

OK

REPLACE COMBINATION METER ASSEMBLY

11 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)



(a) Disconnect the S3 ECU connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
S3-46 (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-11).

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

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

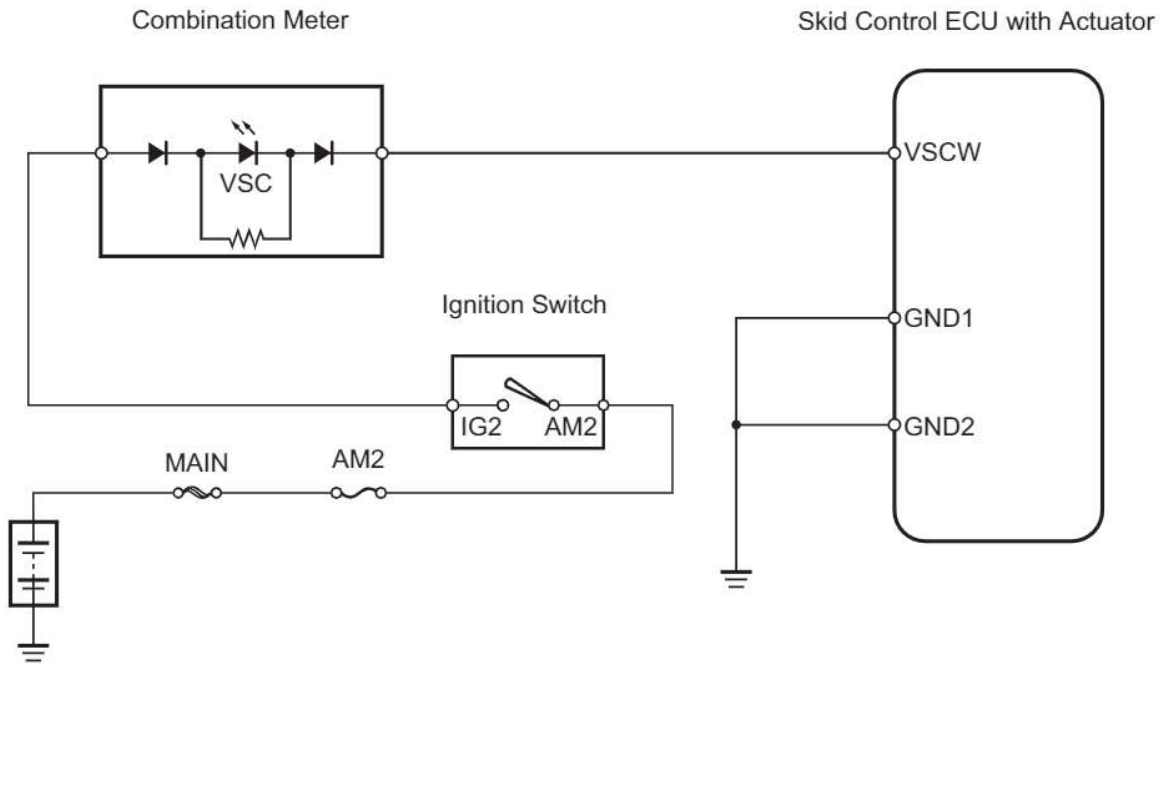
VSC Warning Light Remains ON

DESCRIPTION

If the ECU stores a DTC, the VSC warning light 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-16).

Result

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

B → REPAIR CIRCUIT INDICATED BY OUTPUT CODE

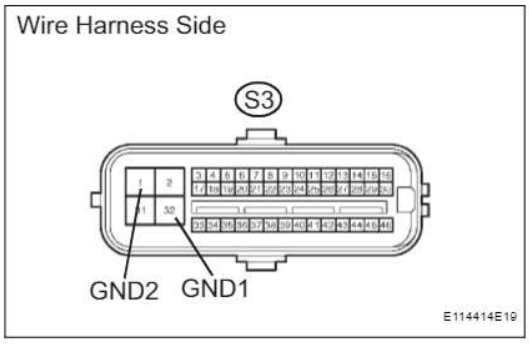
A

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 S3 ECU connector.
(b) Measure the resistance of the wire harness side connector.

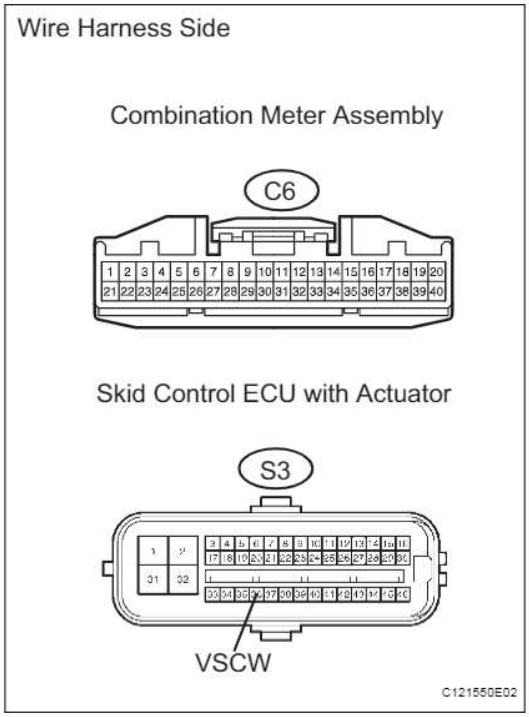
Standard resistance

Tester Connection	Specified Condition
S3-32 (GND1) - Body ground	Below 1 Ω
S3-1 (GND2) - Body ground	

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

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



(a) Disconnect the C6 meter connector.
(b) Disconnect the S3 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
C6-10 - S3-36 (VSCW)	Below 1 Ω
C6-10 - 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 (IG1 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	Observe combination meter

OK:
VSC warning light illuminates.

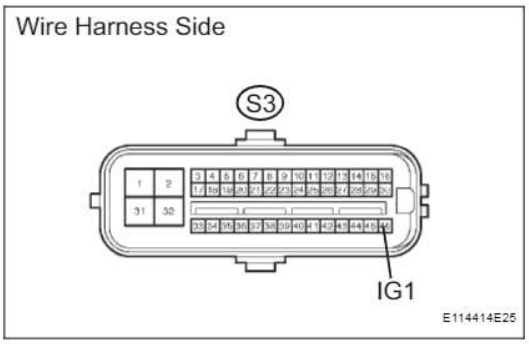
HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK ↓

REPLACE BRAKE ACTUATOR ASSEMBLY

7	CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)



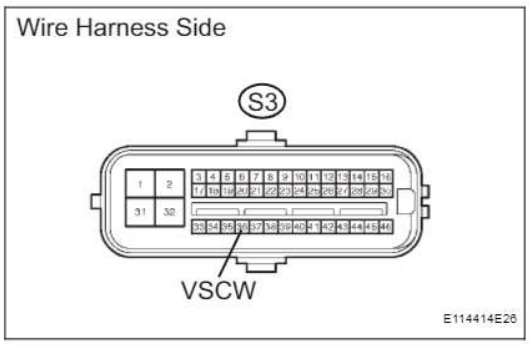
(a) Disconnect the S3 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Switch Condition	Specified Condition
S3-46 (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 S3 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-11).

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

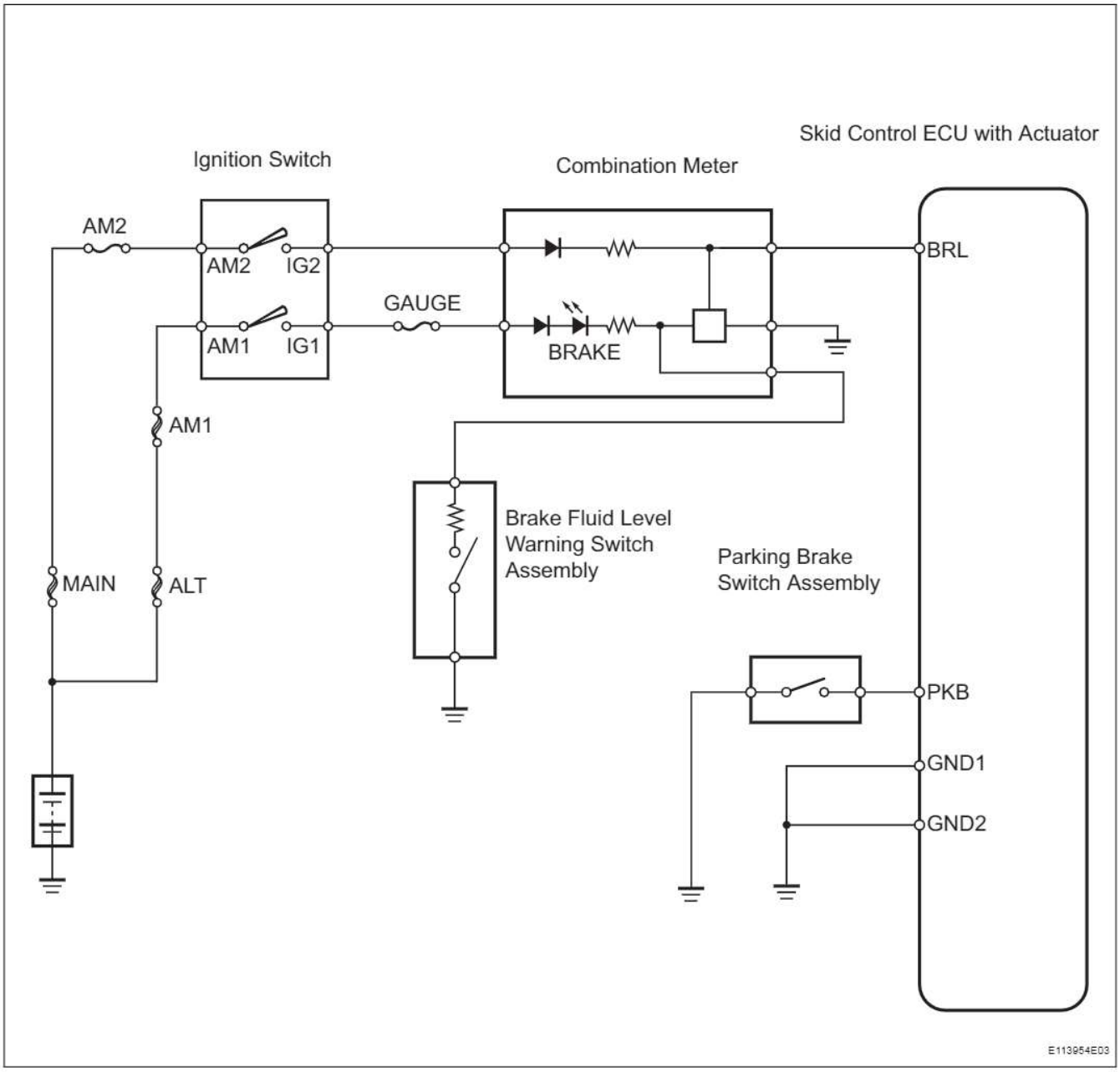
BC

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	Observe combination meter

OK:

Brake warning light illuminates.

HINT:

When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

OK → REPLACE BRAKE ACTUATOR ASSEMBLY

NG

3 CHECK DTC FOR ABS

(a) Check for DTCs (see page BC-16).

Result

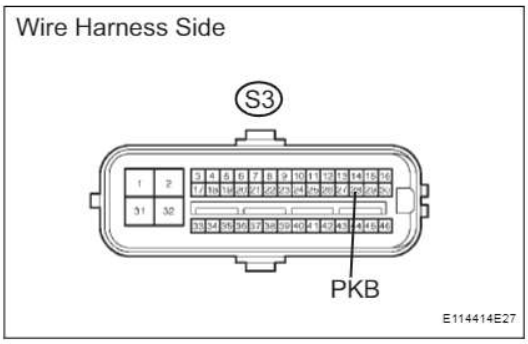
Result	Proceed to
DTC is not output	A
DTC is output	B

B → REPAIR CIRCUIT INDICATED BY OUTPUT CODE

A

BC

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



(a) Disconnect the S3 ECU connector.
(b) Measure the resistance of the wire harness side connector.

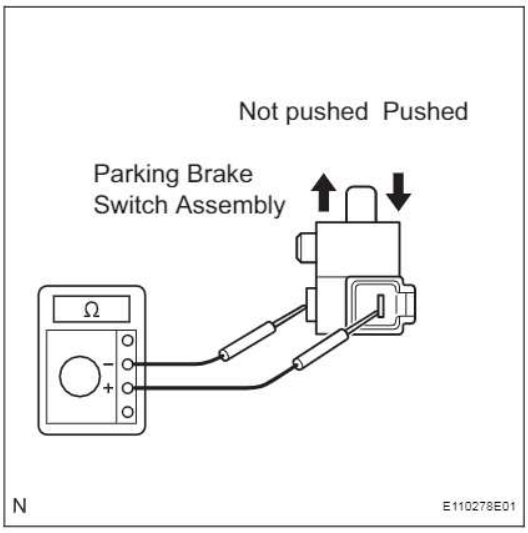
Standard resistance

Tester Connection	Switch Condition	Specified Condition
S3-28 (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

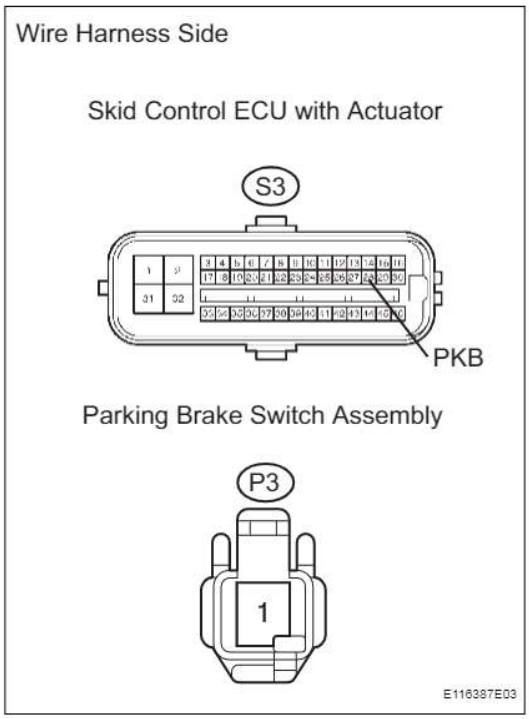
Tester Connection	Switch Condition	Specified Condition
1 - Body ground	Pushed	Below 1 Ω
	Not pushed	10 kΩ or higher

NG → REPLACE PARKING BRAKE SWITCH ASSEMBLY

OK

BC

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



(a) Disconnect the S3 ECU connector.
(b) Disconnect the P3 switch connector.
(c) Measure the resistance of the wire harness side connectors.

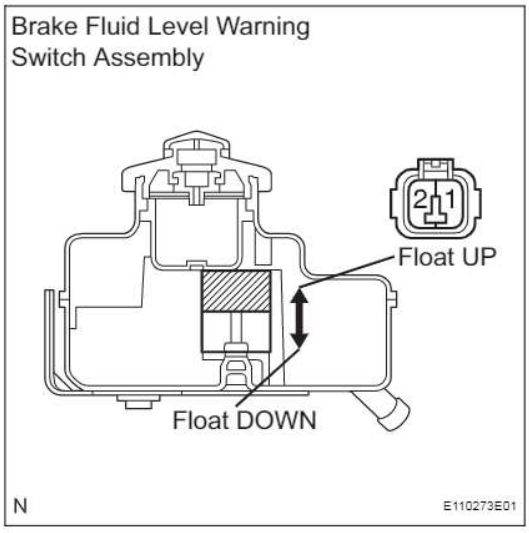
Standard resistance

Tester Connection	Specified Condition
S3-28 (PKB) - P3-1	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

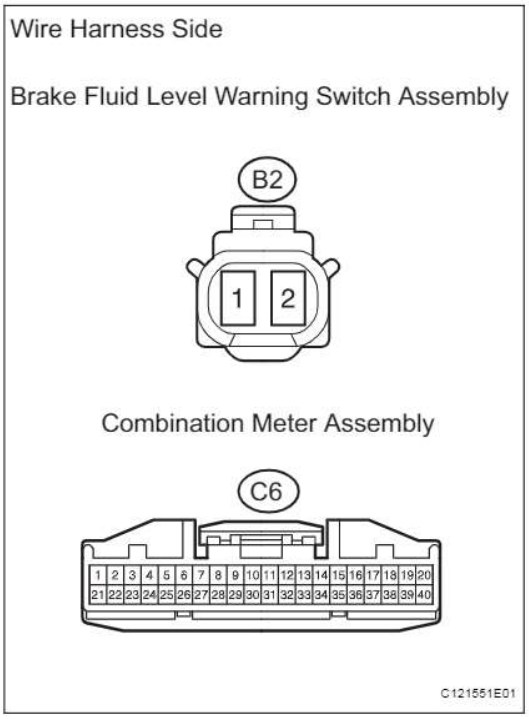
Tester Connection	Switch Condition	Specified Condition
1 - 2	Float DOWN	Below 1 Ω
	Float UP	10 kΩ or higher

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 C6 meter connector.
(c) Measure the resistance of the wire harness side connectors.

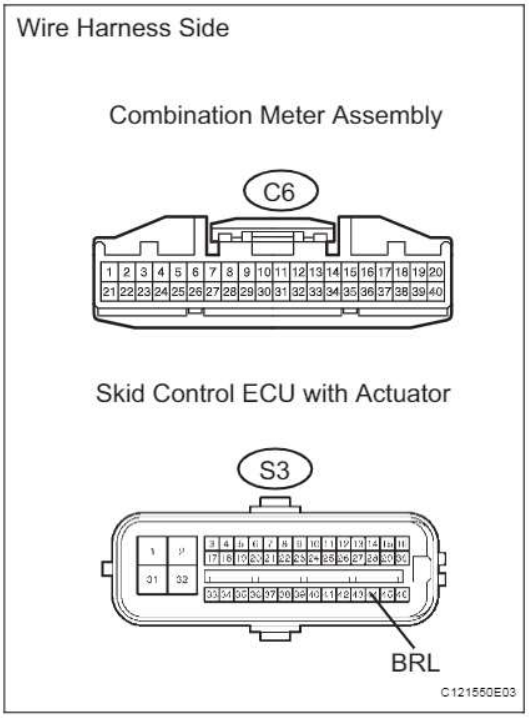
Standard resistance

Tester Connection	Specified Condition
B2-1 - C6-36	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 S3 ECU connector.
(b) Disconnect the C6 meter connector.
Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
S3-44 (BRL) - C6-38	Below 1 Ω

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

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

BC

OK

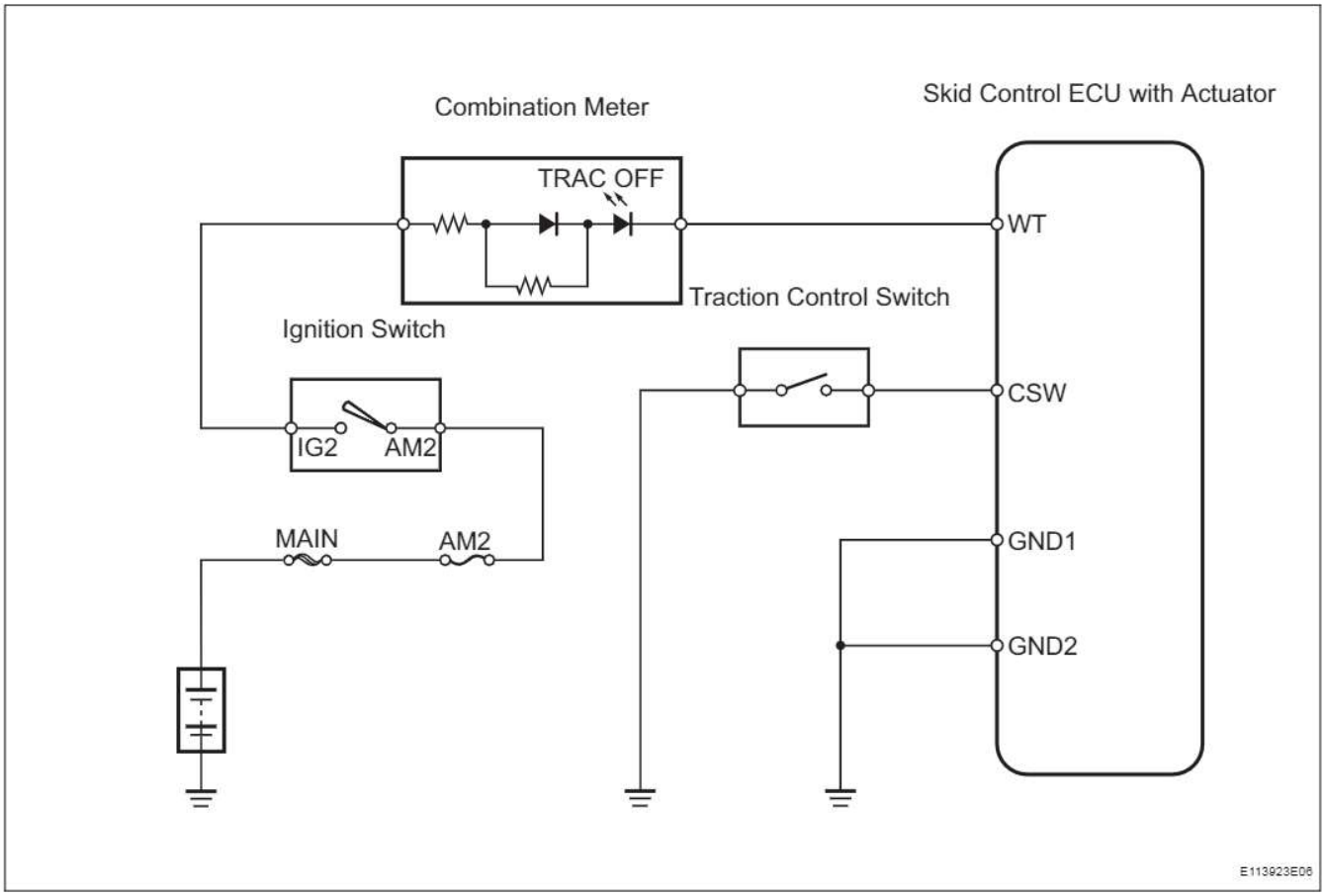
REPLACE BRAKE ACTUATOR ASSEMBLY

TRAC OFF Indicator Light, TRAC OFF Switch Circuit

DESCRIPTION

This is the TRAC control 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 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

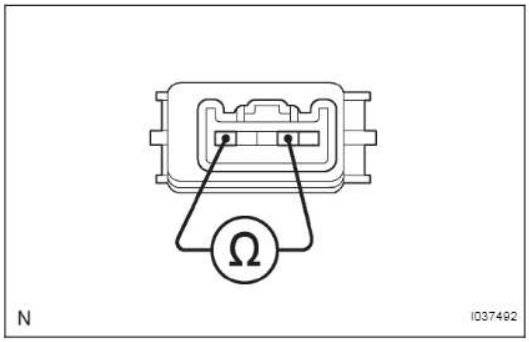
Item	Measurement Item / Range (Display)	Diagnostic Note
VSC / TRC OFF IND	Turns VSC / TRAC OFF indicator light ON / OFF	Observe combination meter

OK:
VSC / TRAC OFF indicator light illuminates.

NG → **Go to step 5**

OK

3	INSPECT TRACTION CONTROL SWITCH



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

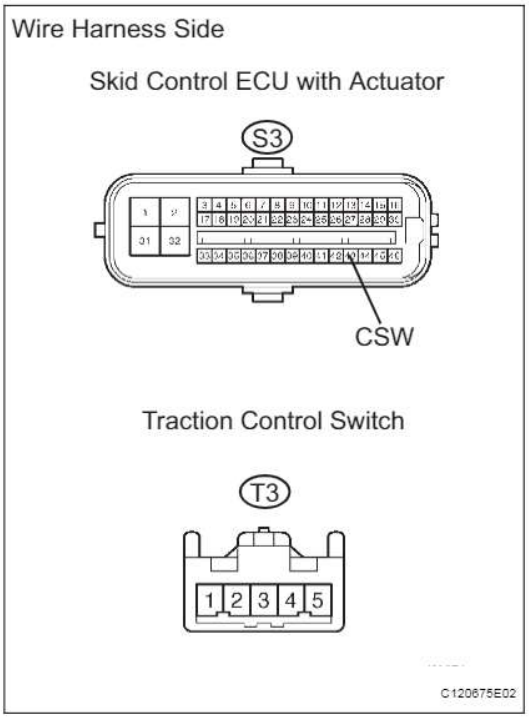
Tester Connection	Switch Condition	Specified Condition
2 - 5	Pushed (ON)	Below 1 Ω
	Not pushed (OFF)	10 kΩ or higher

NG → **REPLACE TRACTION CONTROL SWITCH**

OK

BC

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



(a) Disconnect the S3 ECU connector.
(b) Disconnect the T3 switch connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T3-5 - S3-43 (CSW)	Below 1 Ω
T3-2 - Body ground	

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

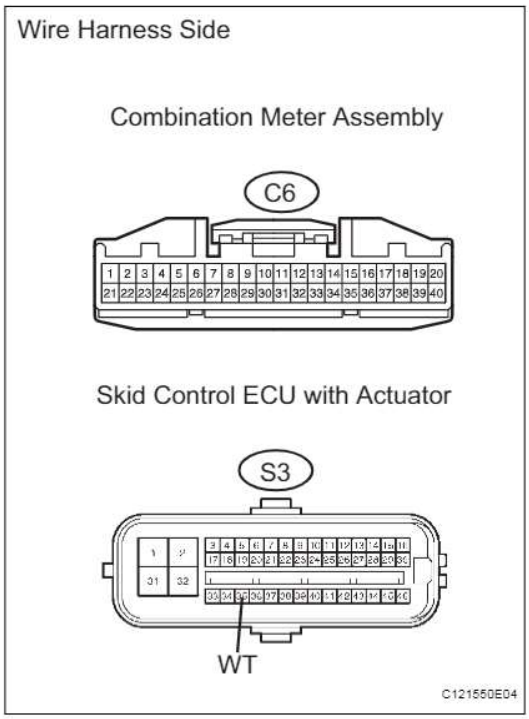
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

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



(a) Disconnect the C6 meter connector.
(b) Disconnect the S3 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
C6-19 - S3-35 (WT)	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE COMBINATION METER ASSEMBLY

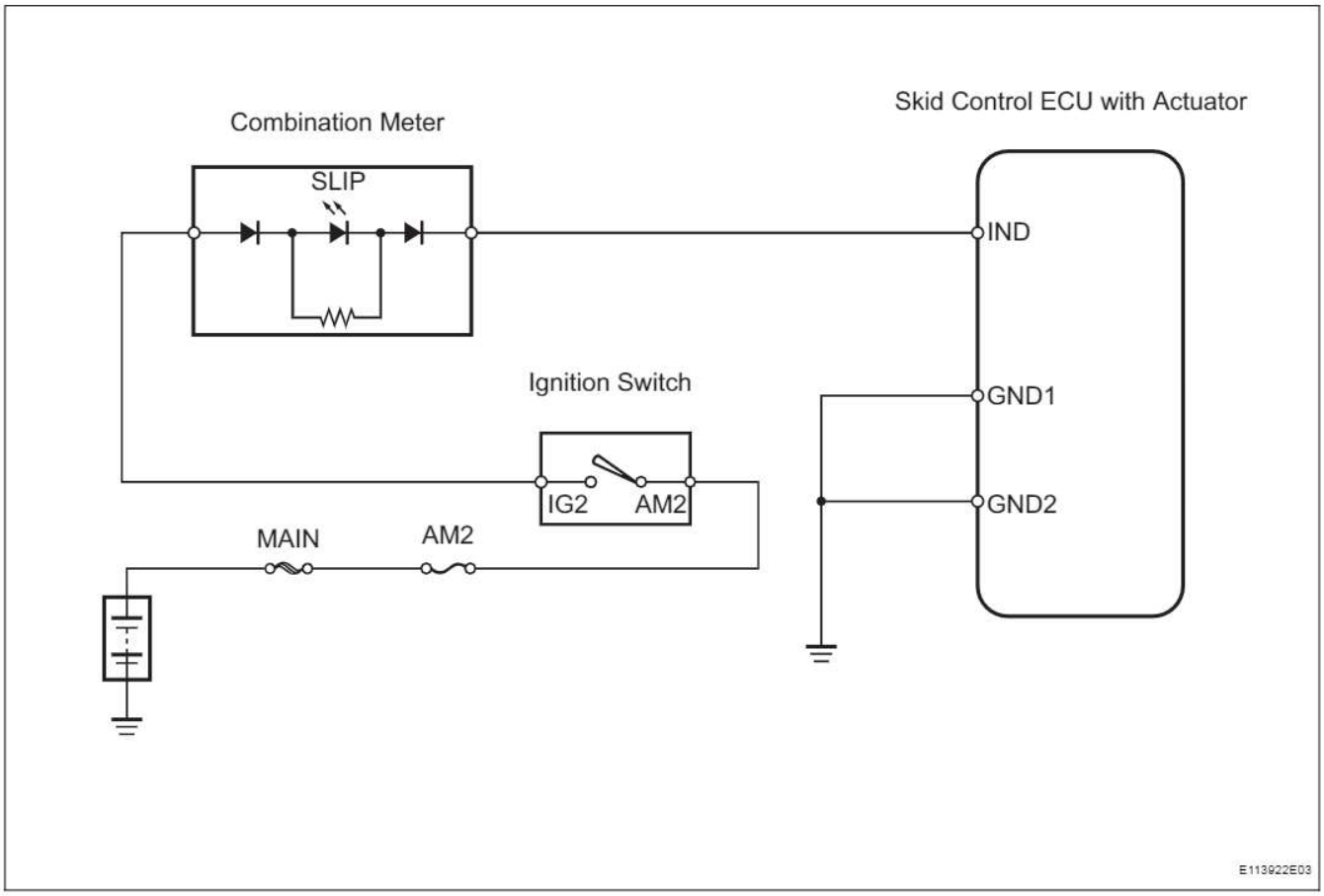
BC

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 F	Turns SLIP indicator light ON / OFF	Observe combination meter

NG → Go to step 4

OK

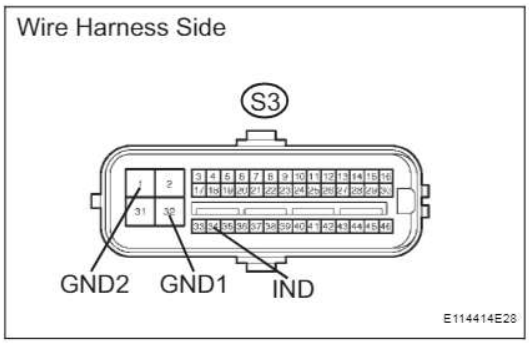
3 CHECK SLIP INDICATOR LIGHT

(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 - BATTERY AND BODY GROUND)



(a) Disconnect the S3 ECU connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connector	Condition	Specified Condition
S3-34 (IND) - S3-32 (GND1) or S3-1 (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-11).

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

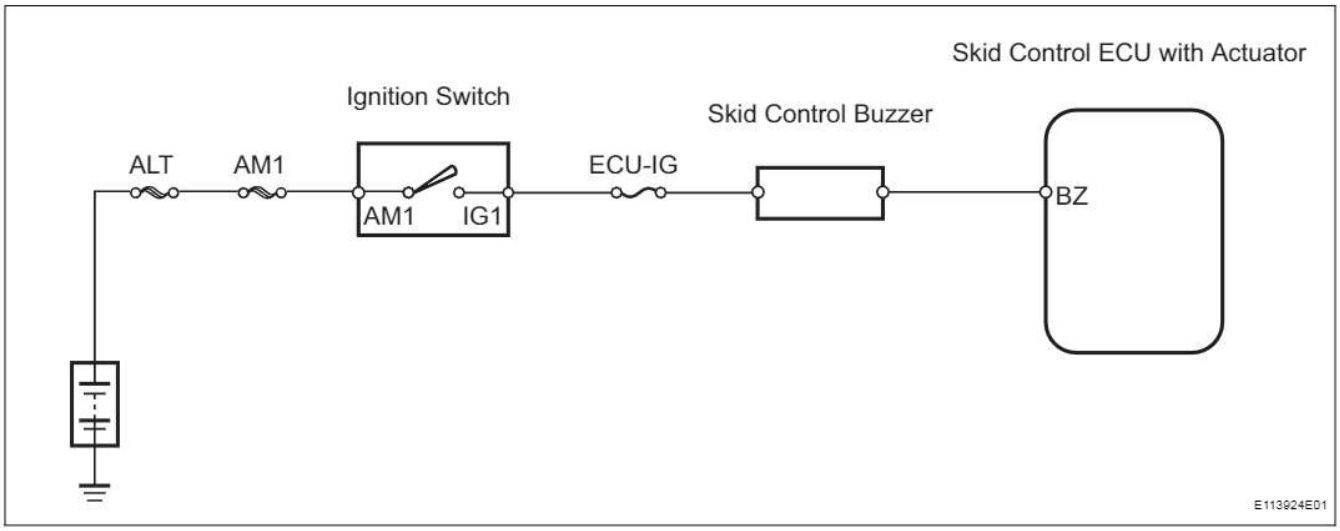
BC

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

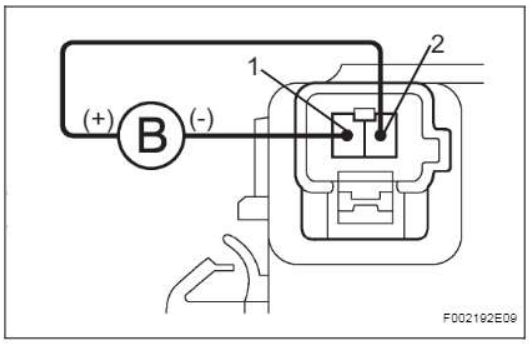
Item	Vehicle Condition / Test Details	Diagnostic Note
VSC / BR WARN BUZ	Turns VSC / BRAKE warning buzzer ON / OFF	Buzzer can be heard

OK:
Normal operation.
HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

OK → REPLACE BRAKE ACTUATOR ASEMBLY

NG

3 INSPECT SKID CONTROL BUZZER ASSEMBLY

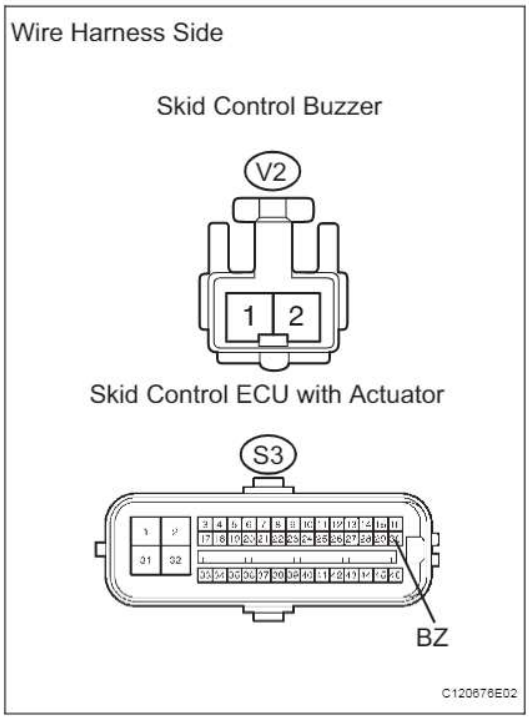


(a) Disconnect the skid control buzzer connector.
(b) Apply positive (+) battery voltage to terminals 1 and 2 of the skid control buzzer connector. Check that the buzzer sounds.
OK:
Skid control buzzer sound is heard.

NG → REPLACE SKID CONTROL BUZZER ASSEMBLY

OK

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



(a) Disconnect the V2 buzzer connector.
(b) Disconnect the S3 ECU connector.
(c) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
V2-1 - S3-30 (BZ)	Below 1 Ω

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

Tester Connection	Specified Condition
V2-2 - Body ground	10 to 14 V

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE BRAKE ACTUATOR ASEMBLY

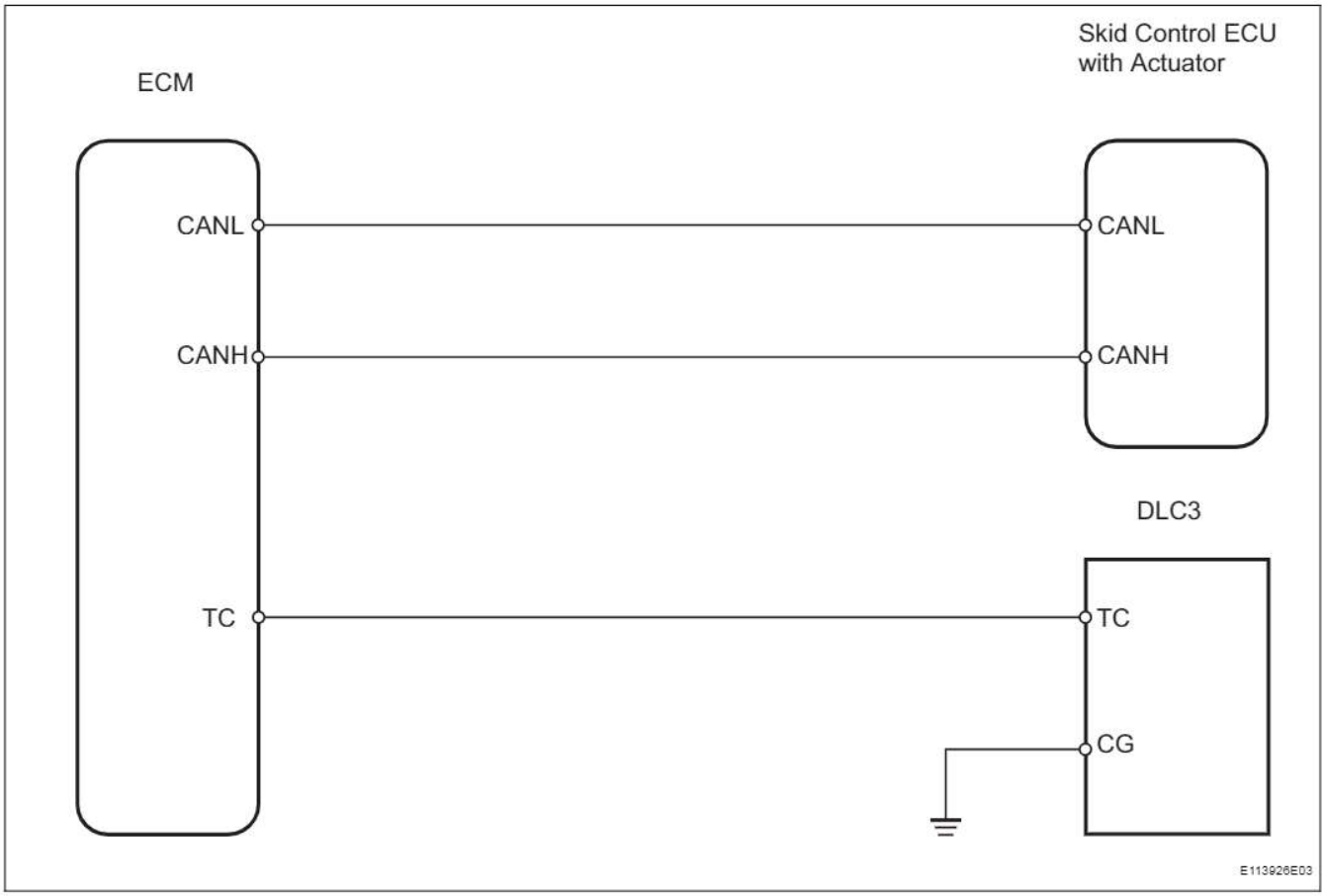
BC

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.

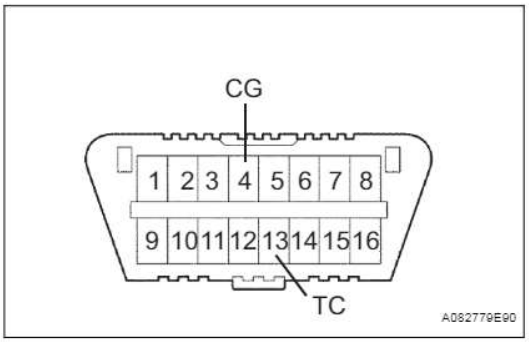
WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK DLC3 (TC VOLTAGE)

BC



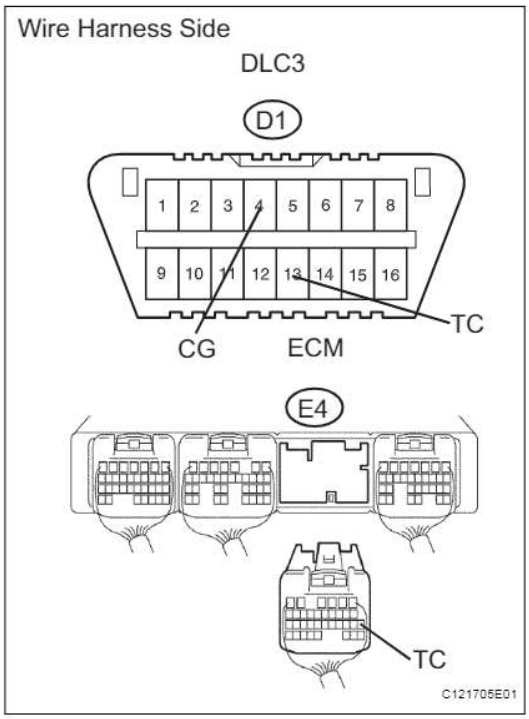
(a) Measure the voltage of the connector.
Standard voltage

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 E4 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
D1-13 (TC) - E4-17 (TC)	Below 1 Ω
D1-4 (CG) - Body ground	

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

OK

GO TO CAN COMMUNICATION SYSTEM

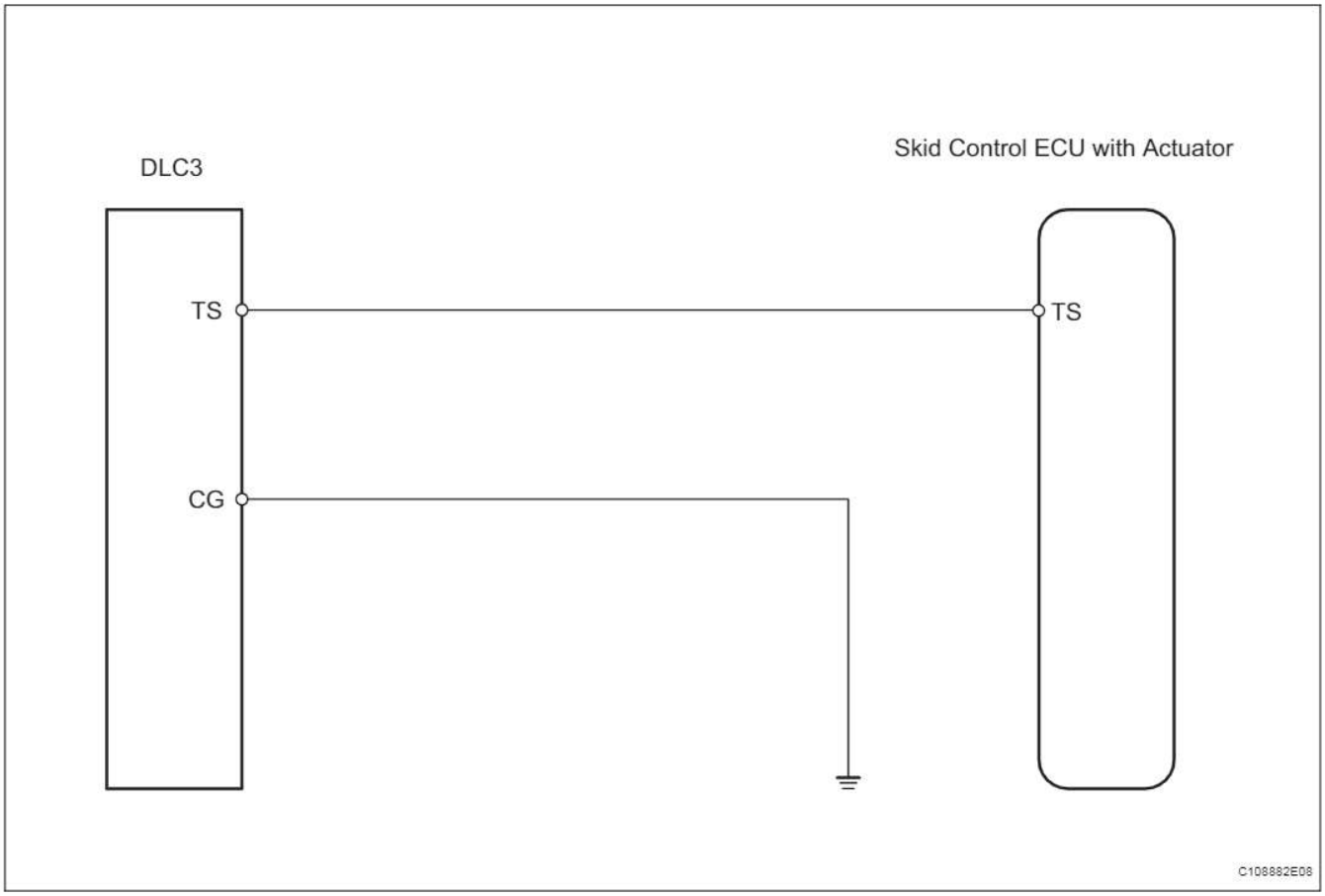
BC

TS and CG Terminal Circuit

DESCRIPTION

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

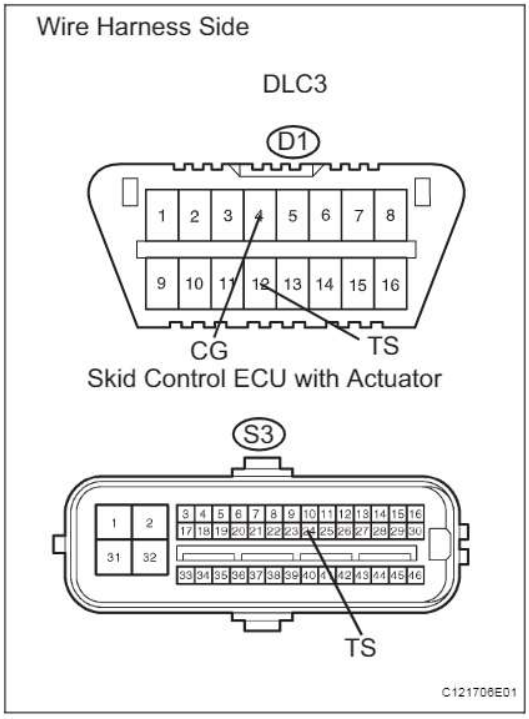
WIRING DIAGRAM



BC

INSPECTION PROCEDURE

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



(a) Disconnect the D1 DLC3 connector.
(b) Disconnect the S3 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) - S3-24 (TS)	

HINT:
When replacing the skid control ECU with actuator, perform the zero point calibration (see page BC-11).

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

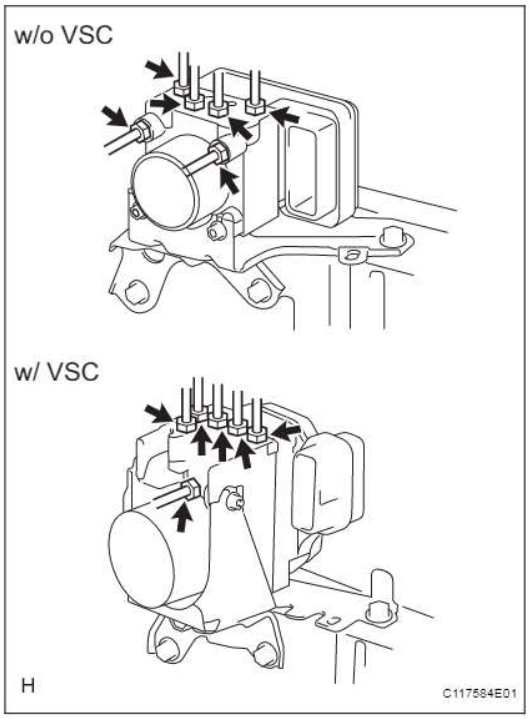
OK →

REPLACE BRAKE ACTUATOR ASSEMBLY

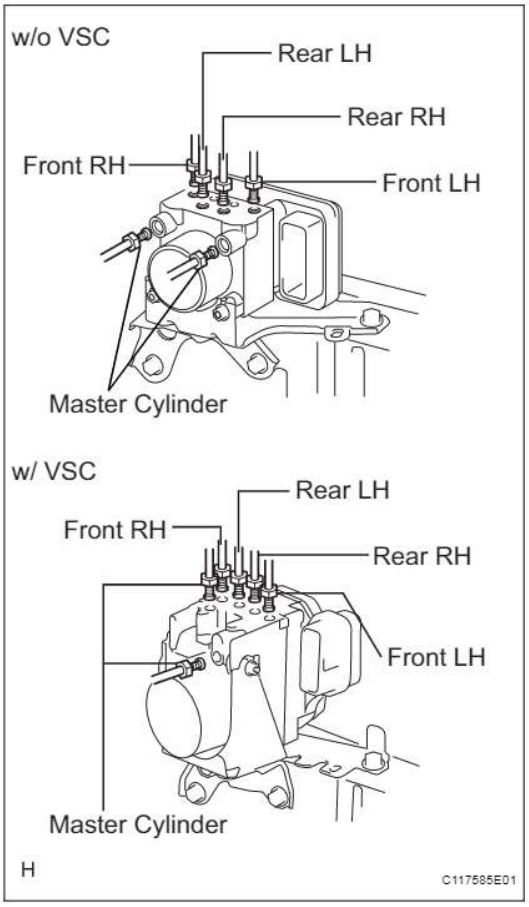
BC

REMOVAL

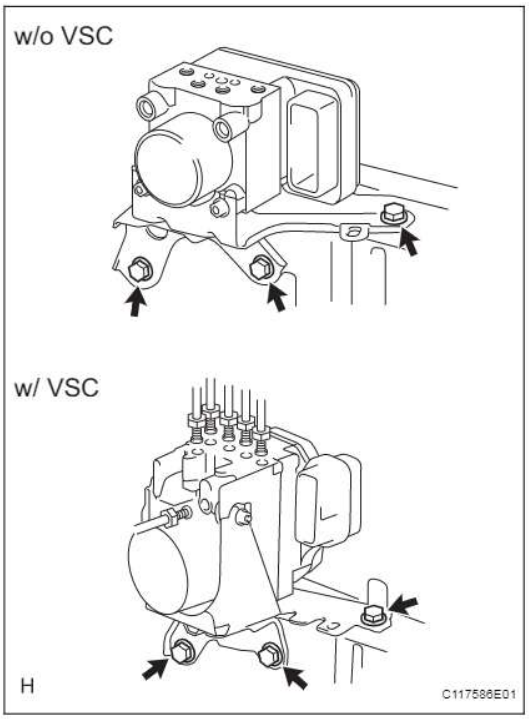
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **DRAIN BRAKE FLUID**
   NOTICE:
   Wash off brake fluid immediately if it comes 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

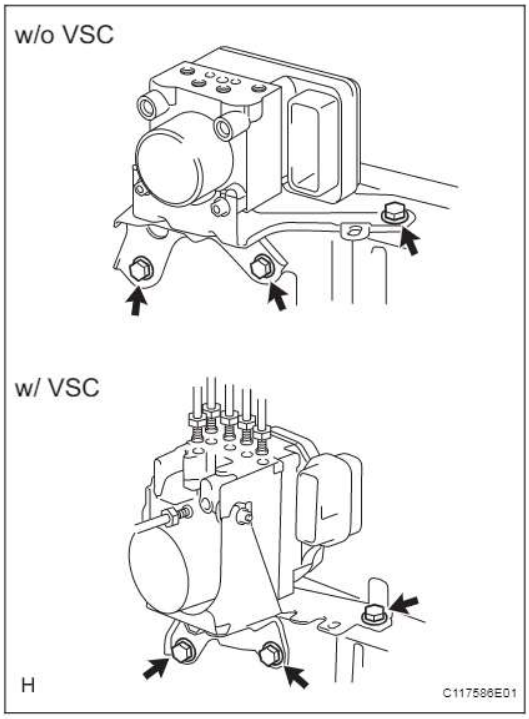
(a) Remove the 2 nuts and brake actuator from the bracket.

BC

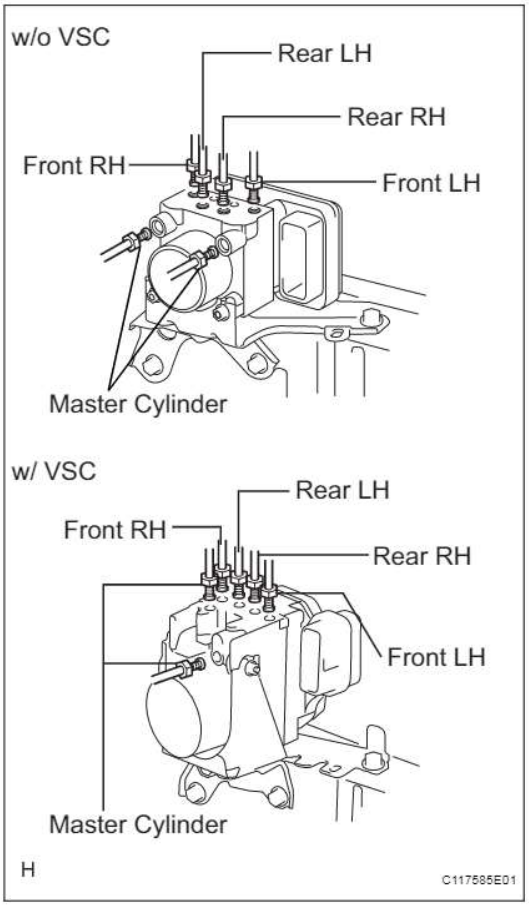
INSTALLATION

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.

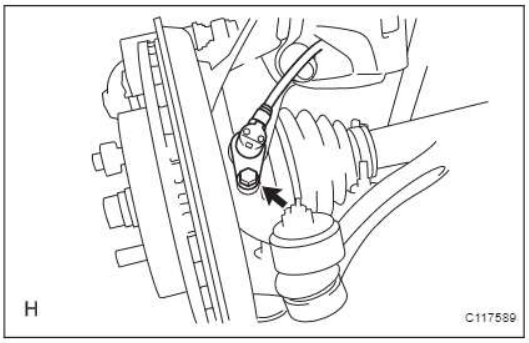
3. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)**
4. **BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)**
5. **BLEED AIR FROM BRAKE LINE (See page BR-4)**
6. **BLEED AIR FROM BRAKE ACTUATOR (w/ VSC) (See page BR-4)**
7. **CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-6)**
8. **CHECK FOR 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-104).

BC

INSTALLATION

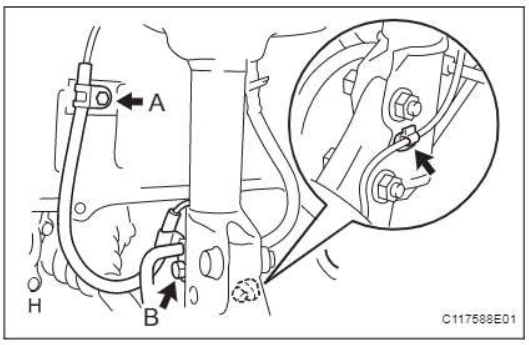
HINT:

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



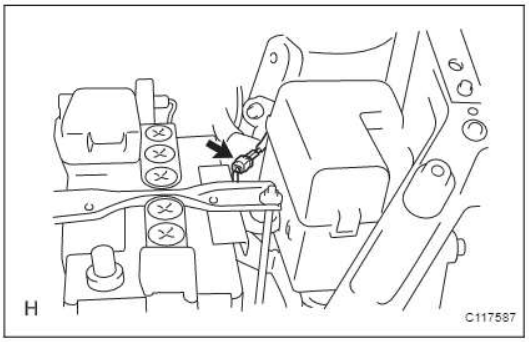
1. INSTALL FRONT SPEED SENSOR LH

(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. CHECK ABS SPEED SENSOR SIGNAL

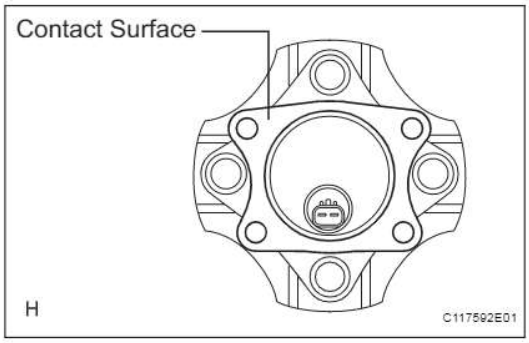
(a) Check the ABS speed sensor signal (see page BC-7).

BC

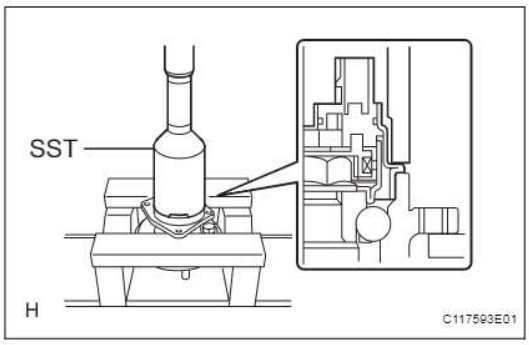
INSTALLATION

HINT:

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

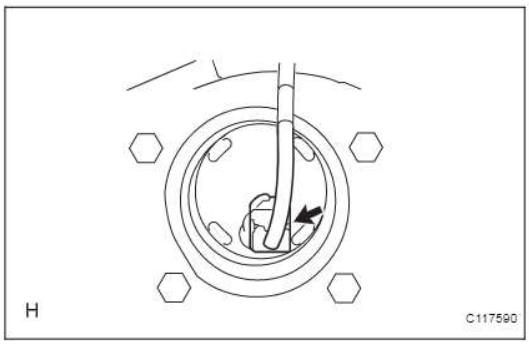


1. **INSTALL SKID CONTROL SENSOR**
   (a) Clean the contacting surface of the rear axle hub and a new skid control sensor.
   NOTICE:
   Keep the sensor rotor clean.
   (b) Place the skid control sensor on the rear axle hub so that the connector is as low as possible when installed to the vehicle.



   (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**



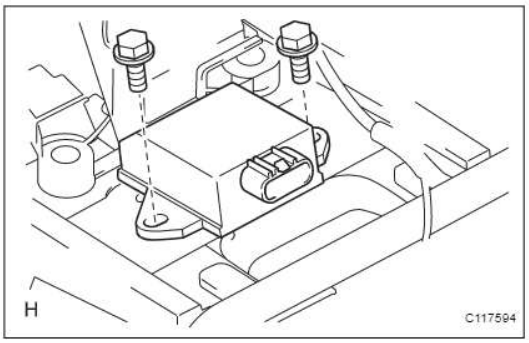
5. **CONNECT SKID CONTROL SENSOR WIRE**
   (a) Connect the connector to the skid control sensor.
6. **INSTALL REAR WHEEL**
   Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
7. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
8. **CHECK ABS SPEED SENSOR SIGNAL**
   (a) Check the ABS speed sensor signal (see page BC-7).

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-42).
3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
4. **PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION**
   (a) Perform yaw rate sensor zero point calibration (see page BC-11).
5. **CHECK VSC SENSOR SIGNAL**
   (a) Check the VSC sensor signal (see page BC-7).

BC

VEHICLE STABILITY CONTROL SYSTEM

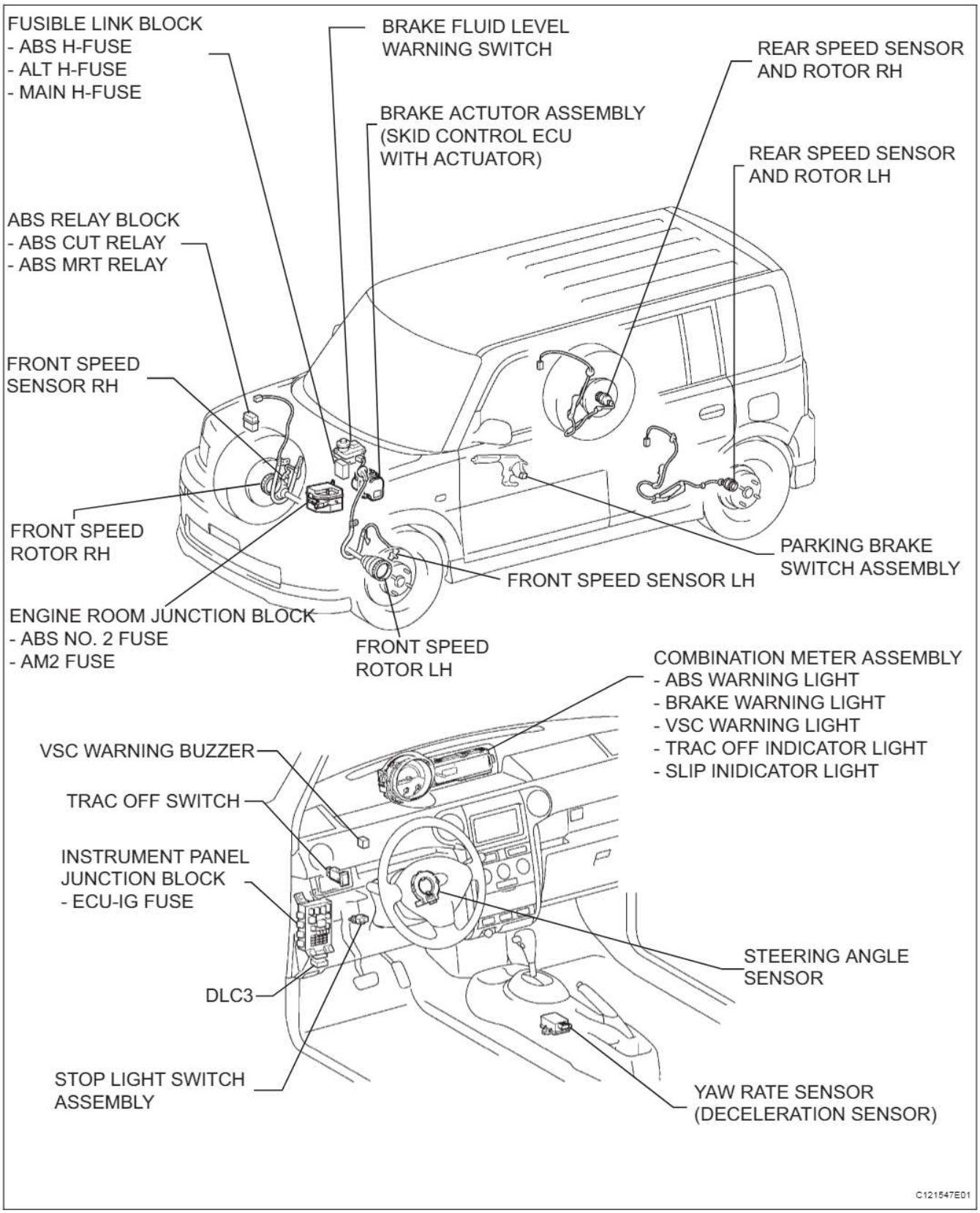
PRECAUTION

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 skid control ECU with actuator 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 test mode inspection and in DTC output inspection after installing all the parts.
- After replacing the skid control ECU with actuator and/or the yaw rate (deceleration) sensor, make sure to perform yaw rate (deceleration) sensor zero point calibration (see page BC-11).
- The CAN communication system is used for data communication between the skid control ECU, the steering angle sensor, and the yaw rate sensor (the acceleration sensor is included). If there is trouble in the CAN communication line, the DTC of the communication line is output.
- If 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

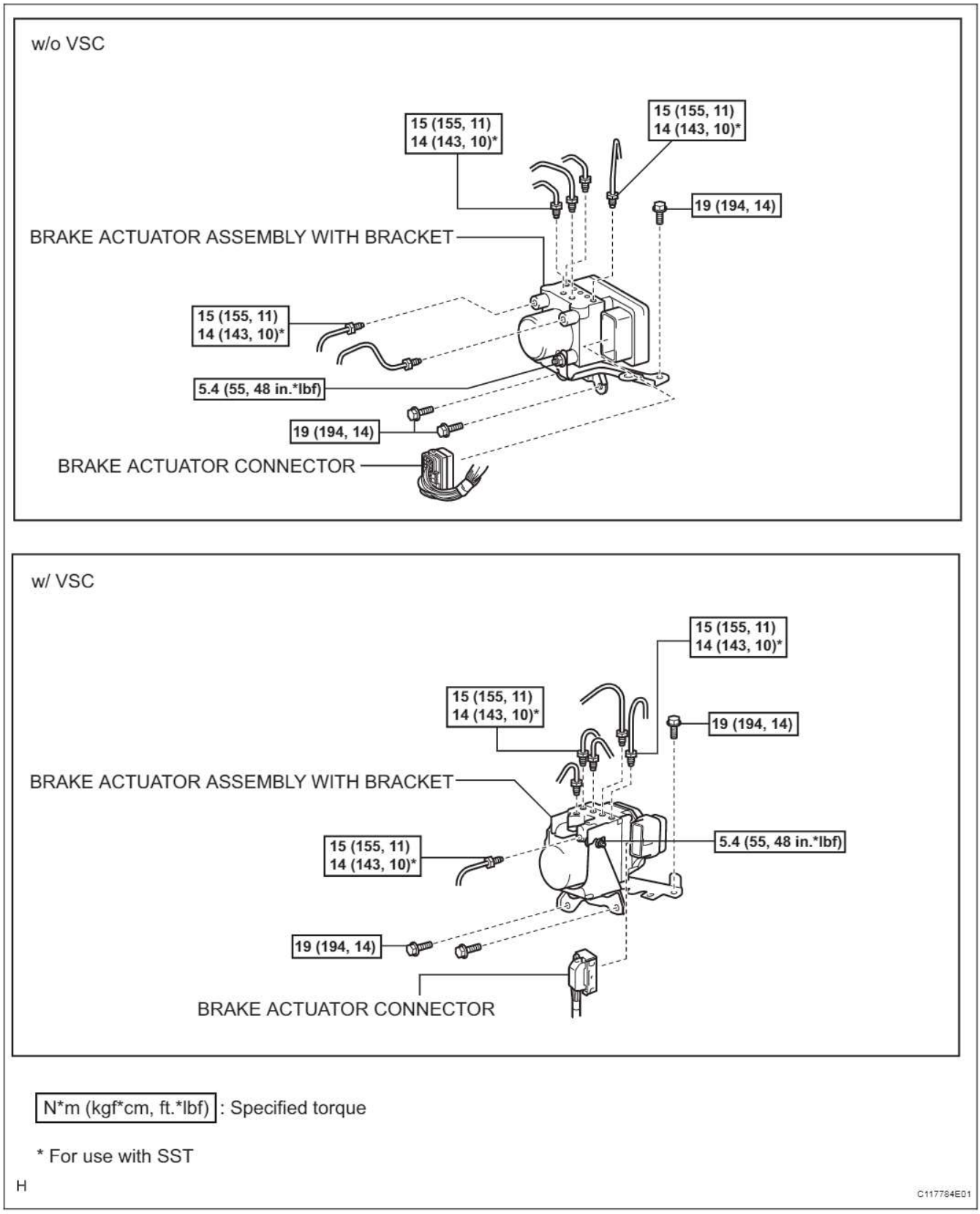
PARTS LOCATION



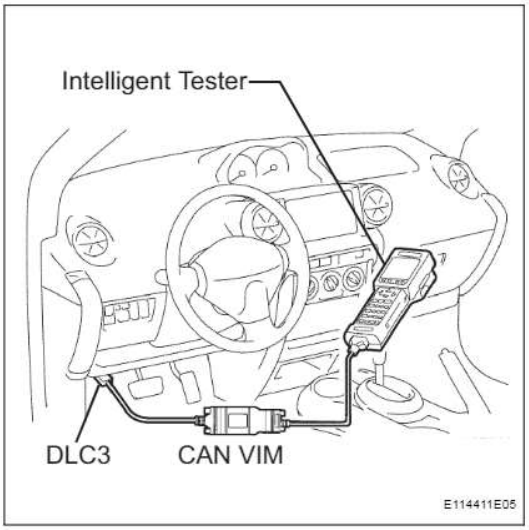
BC

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.**

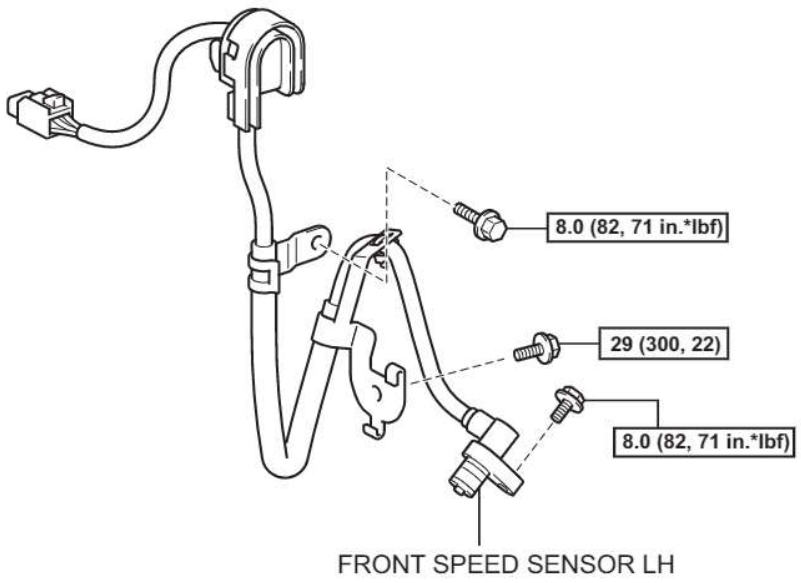
   (a) With the pedal depressed as much as possible, perform the following operations.
   (b) Turn the SFRH and SFRR solenoids ON simultaneously, and check that the pedal cannot be depressed further.
   (c) Turn the SFRH and SFRR solenoids OFF simultaneously, and check that the pedal can be depressed further.
   (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

FRONT SPEED SENSOR

COMPONENTS



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

H

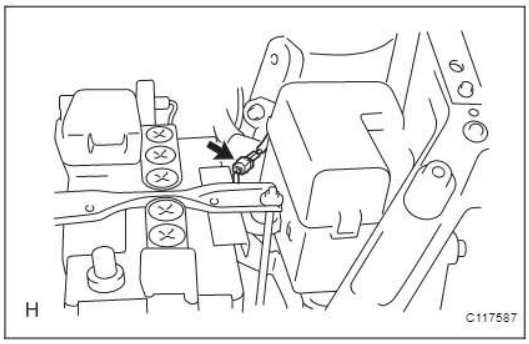
C117773E01

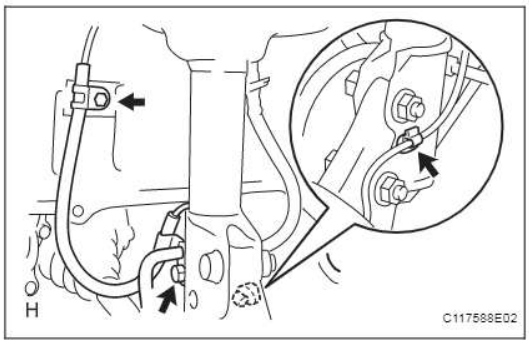
BC

REMOVAL

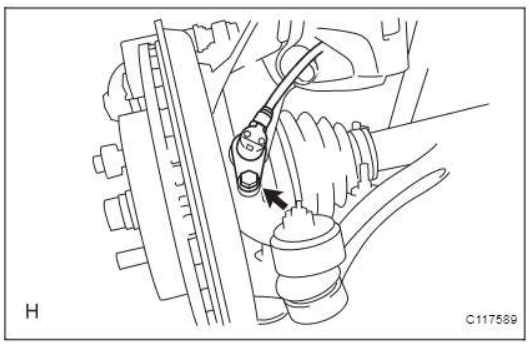
HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

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.

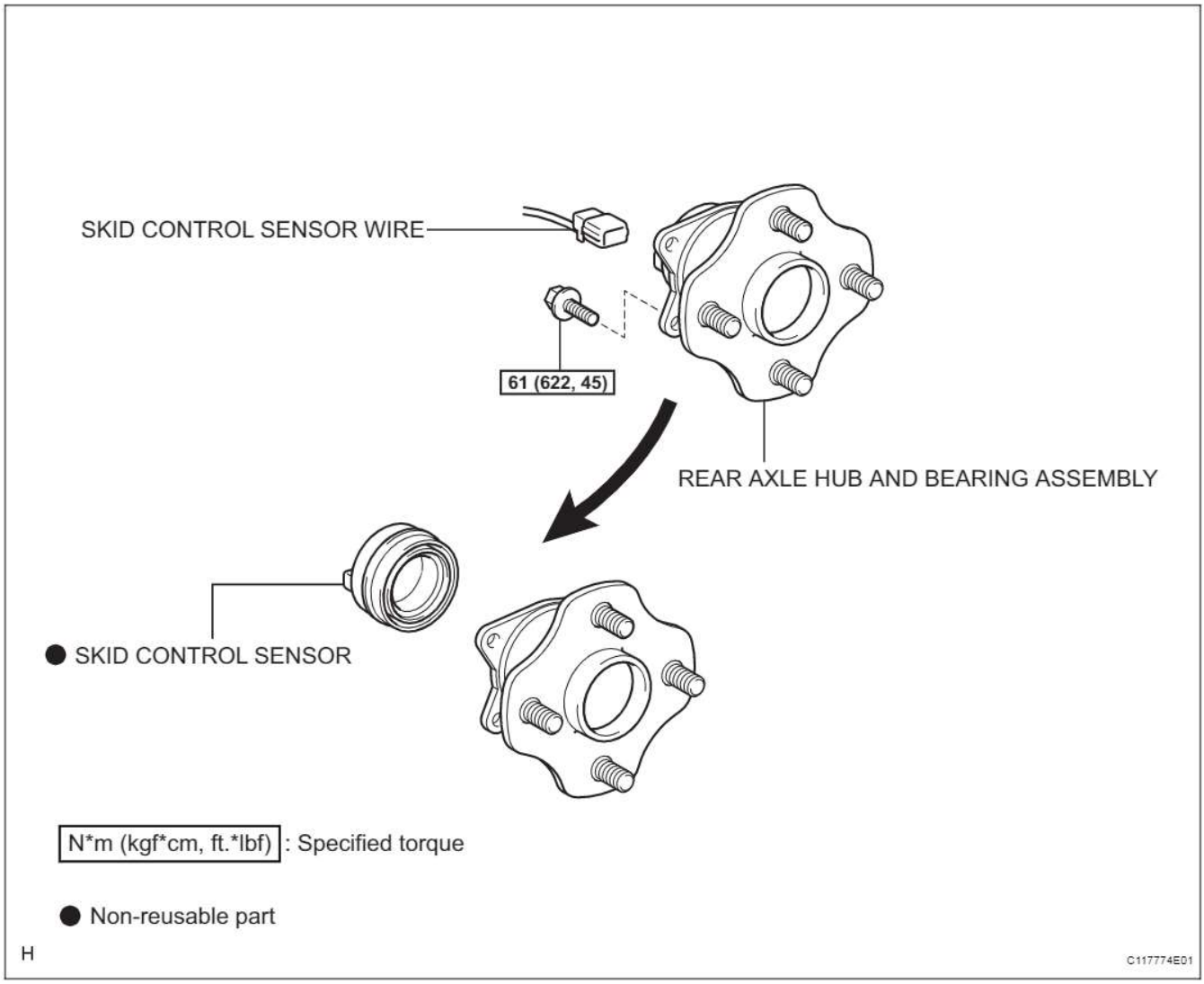


(d) Remove the bolt and speed sensor.
NOTICE:
Keep the sensor tip and sensor installation hole free from foreign matter.

BC

SKID CONTROL SENSOR

COMPONENTS

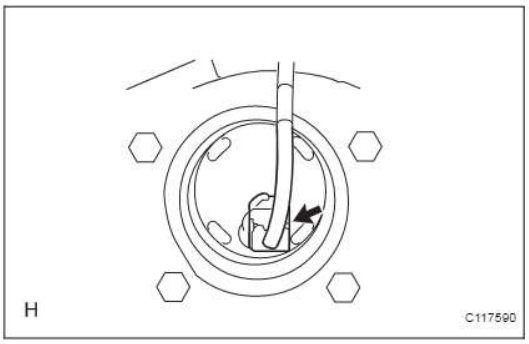


BC

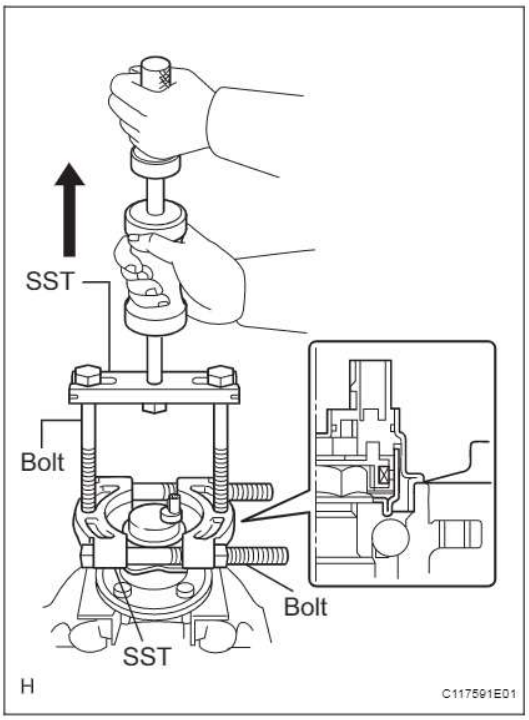
REMOVAL

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**



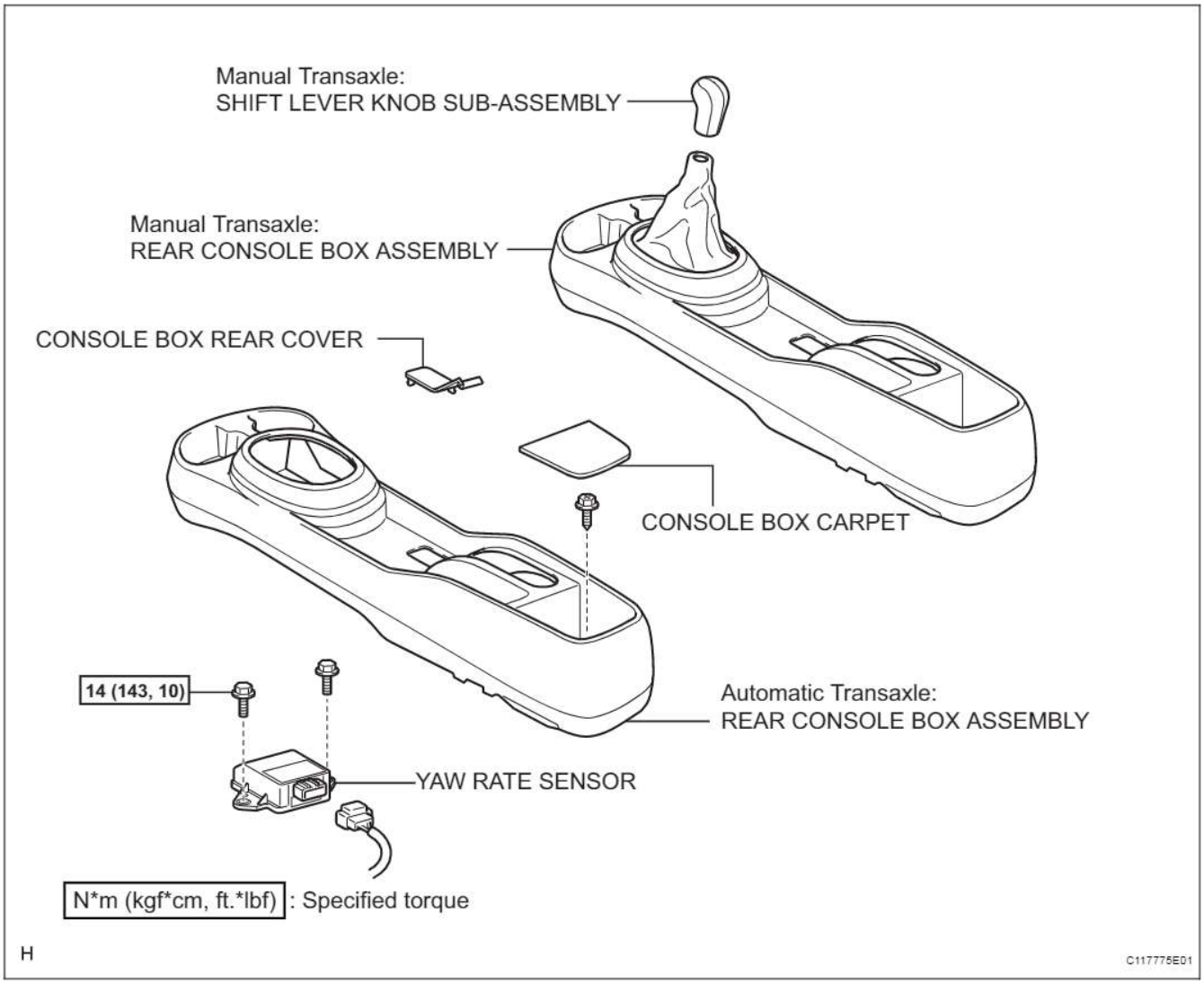
6. **REMOVE SKID CONTROL SENSOR**
   (a) Mount the hub and bearing in a soft jaw vise.
   NOTICE:
   Replace the hub and bearing if it is dropped or receives a strong shock.
   (b) Using a pin punch and hammer, drive out the 2 pins of SST, and remove the 2 attachments from SST.
   SST 09520-00031
   (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

YAW RATE AND ACCELERATION SENSOR (w/ VSC)

COMPONENTS



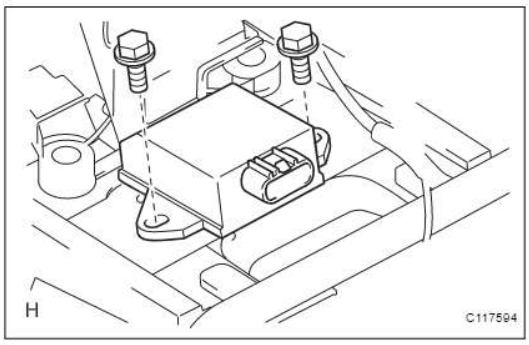
BC

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.**

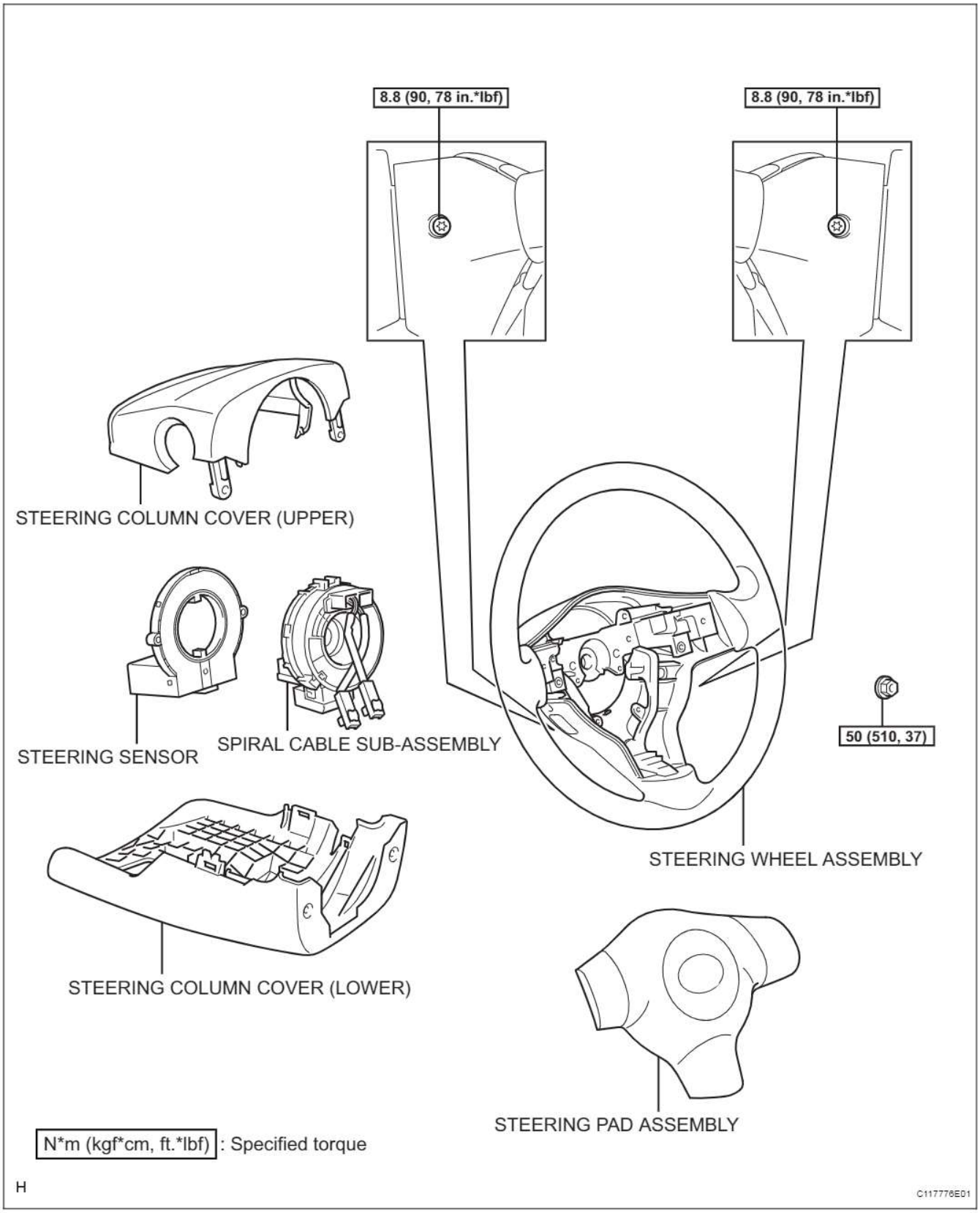
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE REAR CONSOLE BOX ASSEMBLY**
   (a) Remove the rear console box (see page IP-41).
3. **REMOVE YAW RATE SENSOR**
   (a) Disconnect the yaw rate sensor connector.
   (b) Remove the 2 bolts and yaw rate sensor.



BC

STEERING ANGLE SENSOR (w/ VSC)

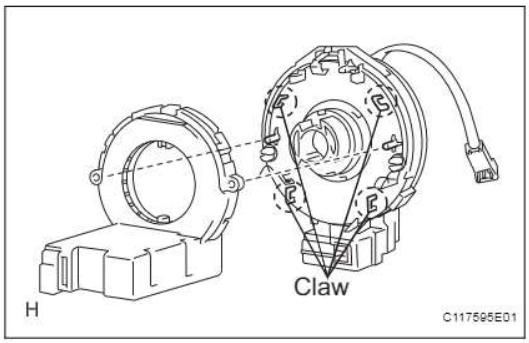
COMPONENTS

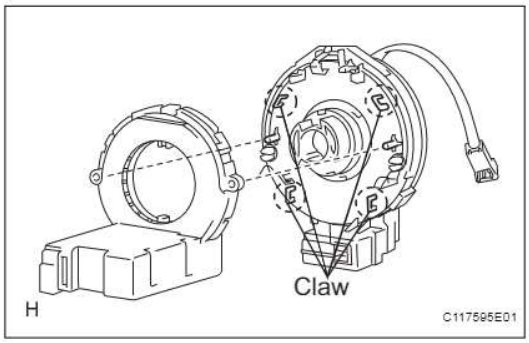


BC

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. **CHECK SRS WARNING LIGHT**
    (a) Check the SRS warning light (see page RS-37).
11. **PERFORM VSC SYSTEM CALIBRATION**
    (a) Perform VSC system calibration (see page BC-11).

BC

12. **CHECK ABS WARNING LIGHT**
    (a) Check the ABS warning light (see page BC-15).
13. **CHECK VSC WARNING LIGHT**
    (a) Check the VSC warning light (see page BC-15).