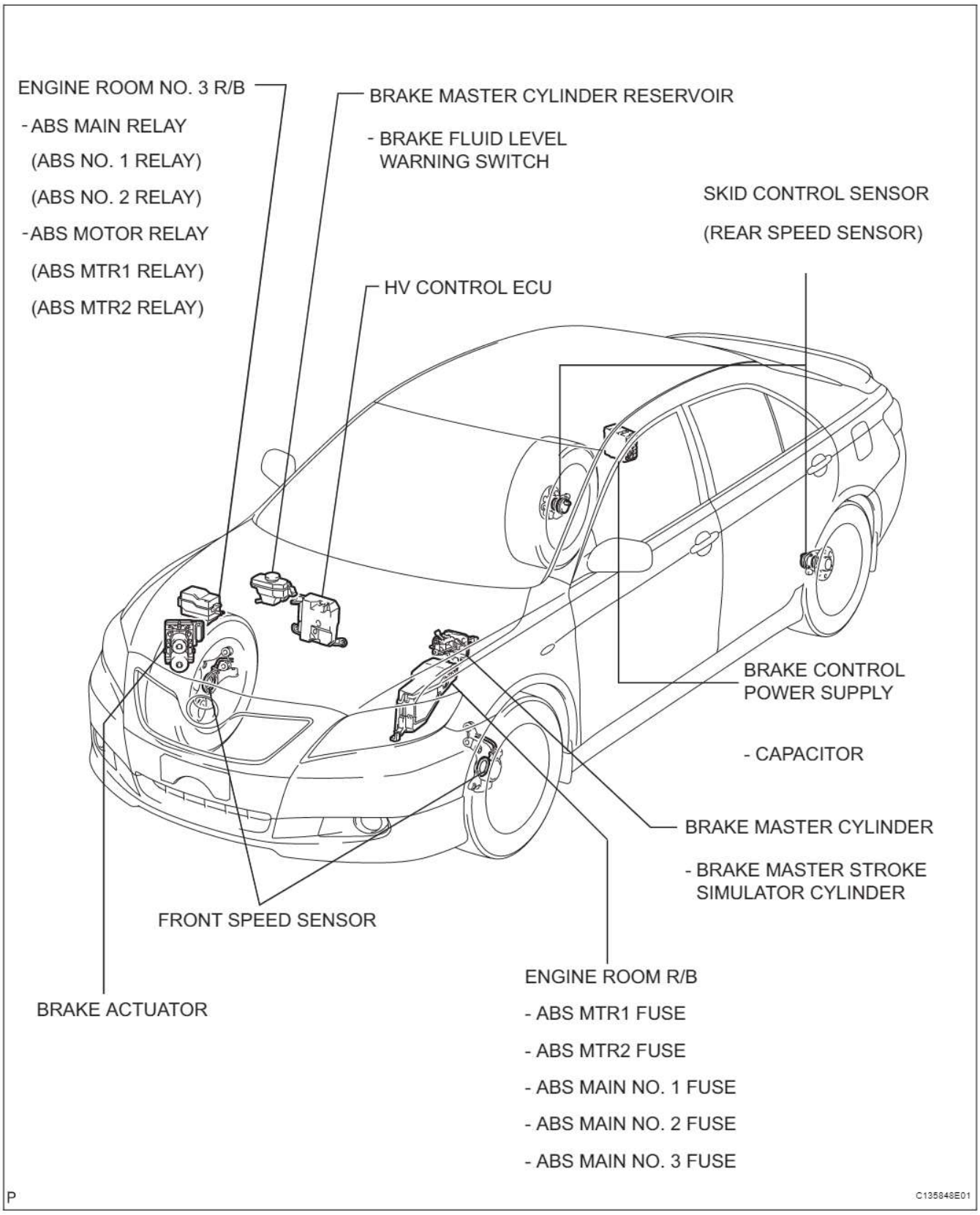
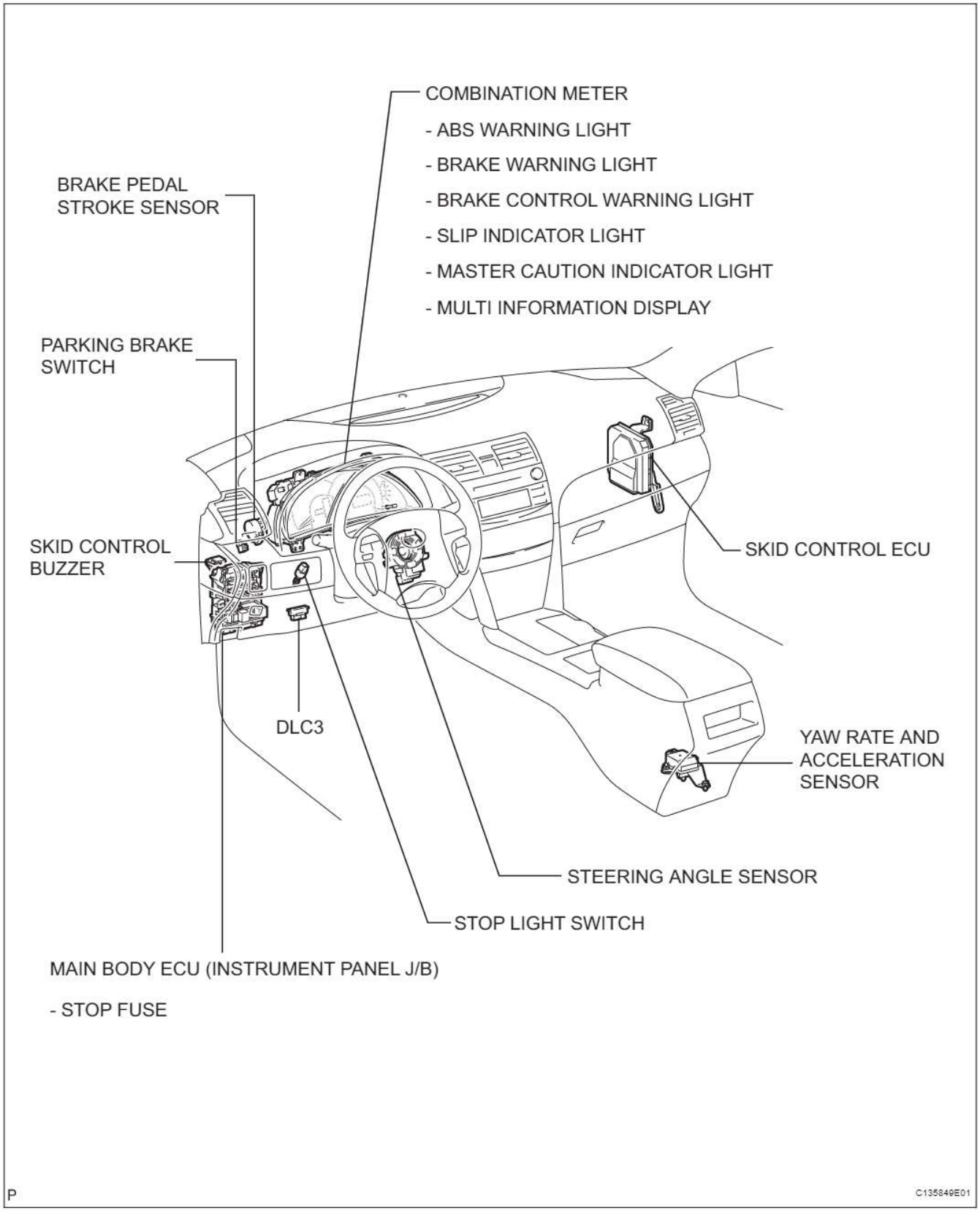
PARTS LOCATION



BC


COMBINATION METER
- ABS WARNING LIGHT
- BRAKE WARNING LIGHT
- BRAKE CONTROL WARNING LIGHT
- SLIP INDICATOR LIGHT
- MASTER CAUTION INDICATOR LIGHT
- MULTI INFORMATION DISPLAY
BRAKE PEDAL STROKE SENSOR
PARKING BRAKE SWITCH
SKID CONTROL BUZZER
SKID CONTROL ECU
DLC3
YAW RATE AND ACCELERATION SENSOR
STEERING ANGLE SENSOR
STOP LIGHT SWITCH
MAIN BODY ECU (INSTRUMENT PANEL J/B)
- STOP FUSE
P
C135849E01

BC

INSPECTION

1. INSPECT BRAKE PEDAL STROKE SENSOR

(a) Inspect the brake pedal stroke sensor. If any of the following occurs, replace the brake pedal stroke sensor with a new one:

- The surface of the brake pedal stroke sensor is cracked, dented, or chipped off.
- The connector is scratched, cracked, or damaged.
- The brake pedal stroke sensor has been dropped.

BC

INSTALLATION

1. INSTALL BRAKE PEDAL STROKE SENSOR

(a) New brake pedal stroke sensor.

(1) Install a new brake pedal stroke sensor with the 2 bolts.

Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)

NOTICE:

- **Engage the brake pedal stroke sensor lever with the brake pedal hole.**
- **Check that there is no foreign matter attached to the contact surface of the brake pedal stroke sensor.**

(2) Strongly depress the brake pedal to break the brake pedal stroke sensor lever set pin.

(3) Remove the broken lever set pin.

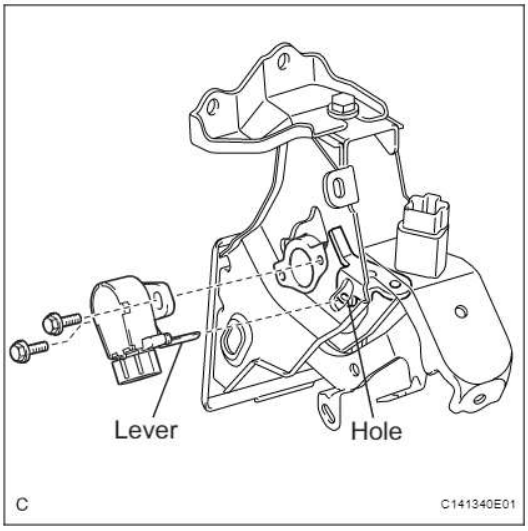
(4) Connect the brake pedal stroke sensor connector.

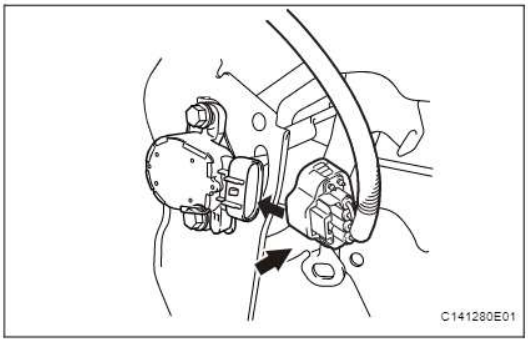
(b) Reuse of the brake pedal stroke sensor.

(1) Temporarily install the brake pedal stroke sensor with the 2 bolts.

NOTICE:

- **Engage the brake pedal stroke sensor lever with the brake pedal hole.**
- **Check that there is no foreign matter attached to the contact surface of the brake pedal stroke sensor.**

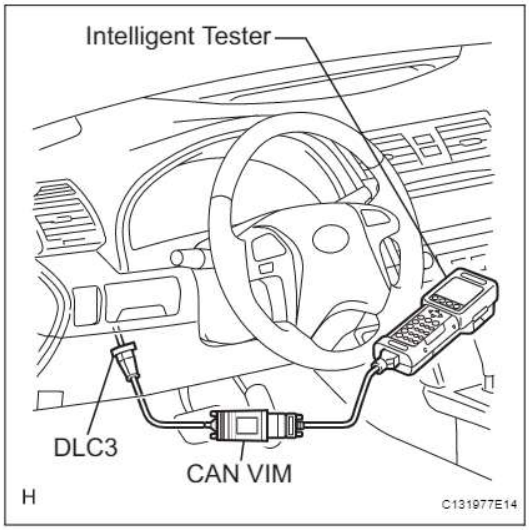




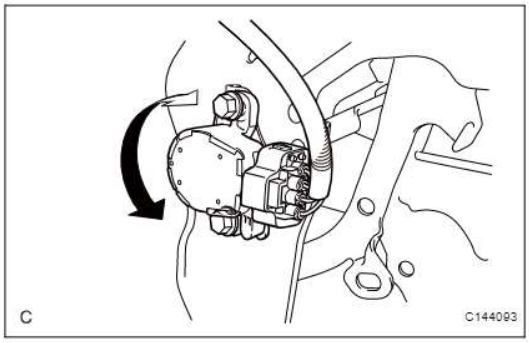
(2) Connect the connector to the brake pedal stroke sensor.

(3) Connect the cable to the negative battery terminal.

BC



(4) Connect the intelligent tester to the DLC3 with the power switch off as shown in the illustration.
(5) Turn the power switch on (IG).
(6) Turn on the intelligent tester.



(7) Reading the stroke sensor 1 value shown in the data list, slowly turn the brake pedal stroke sensor to the right and left to adjust the value to the standard voltage.
Standard voltage:
0.8 to 1.2 V
(8) Fully tighten the 2 bolts.
Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)
NOTICE:
Do not depress the brake pedal after turning the power switch on (IG).
(9) Turn off the intelligent tester and turn the power switch off.
(10) Disconnect the intelligent tester from the DLC3.

2. **INSTALL LOWER INSTRUMENT PANEL FINISH PANEL LH (See page IP-35)**

3. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY LH (See page IR-41)**

4. **INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-41)**

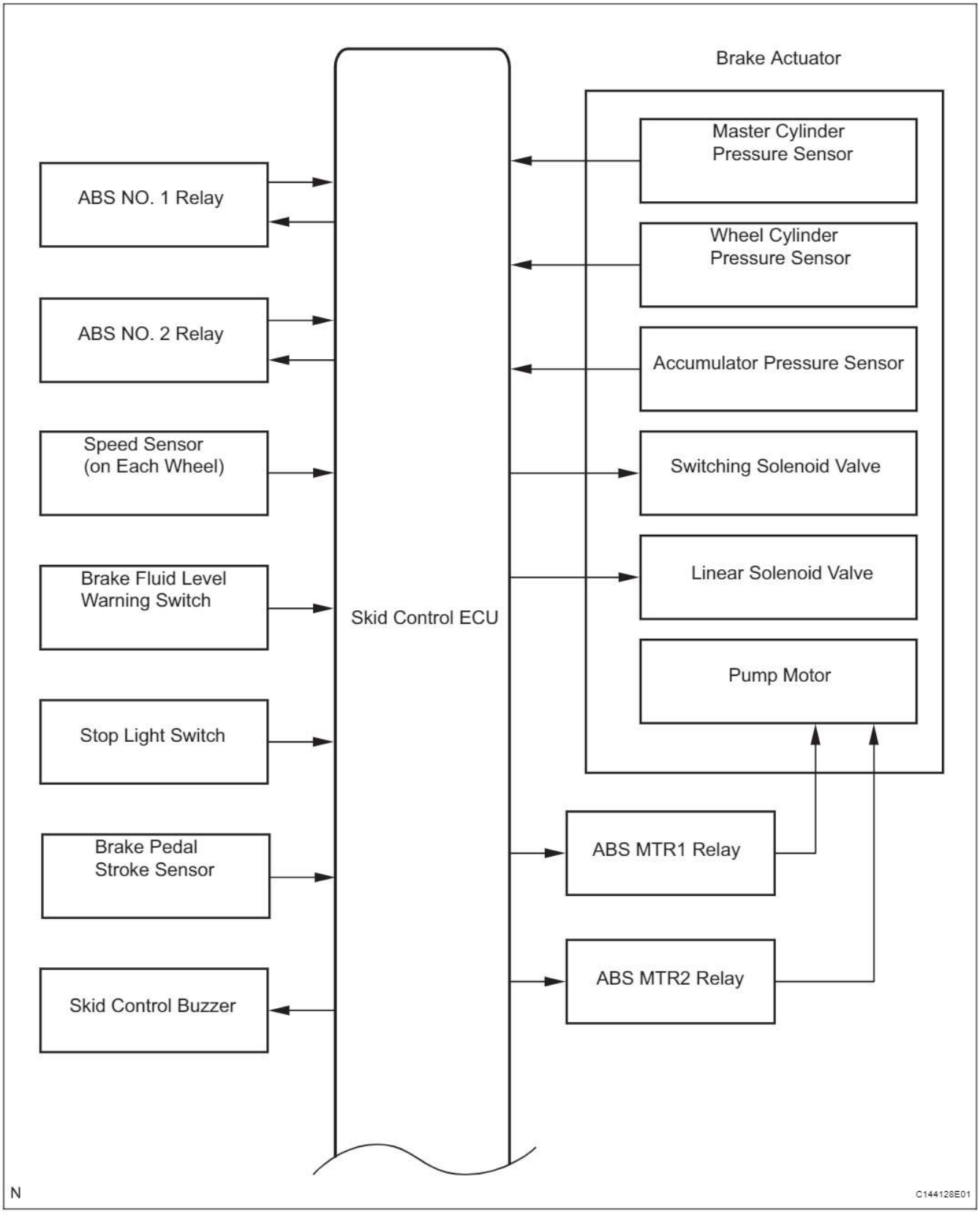
5. **PREFORM LINEAR VALVE OFFSET LEARNING**
HINT:
Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-25)

6. **CHECK AND CLEAR DTC**
HINT:
Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-57)

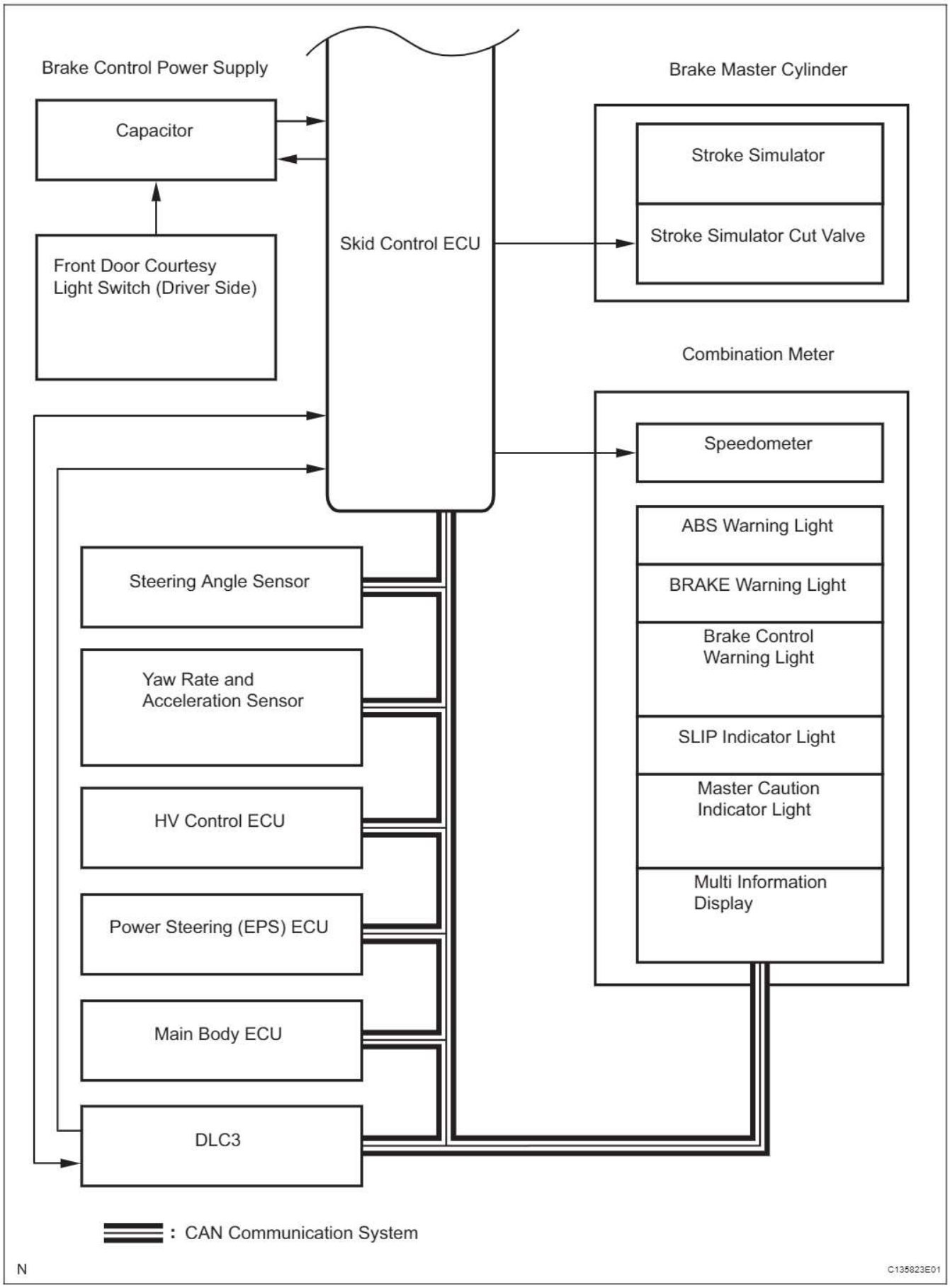
7. **PERFORM INITIALIZATION**
NOTICE:
Some systems need initialization after reconnecting the cable to the negative battery terminal. (See page IN-43)

BC

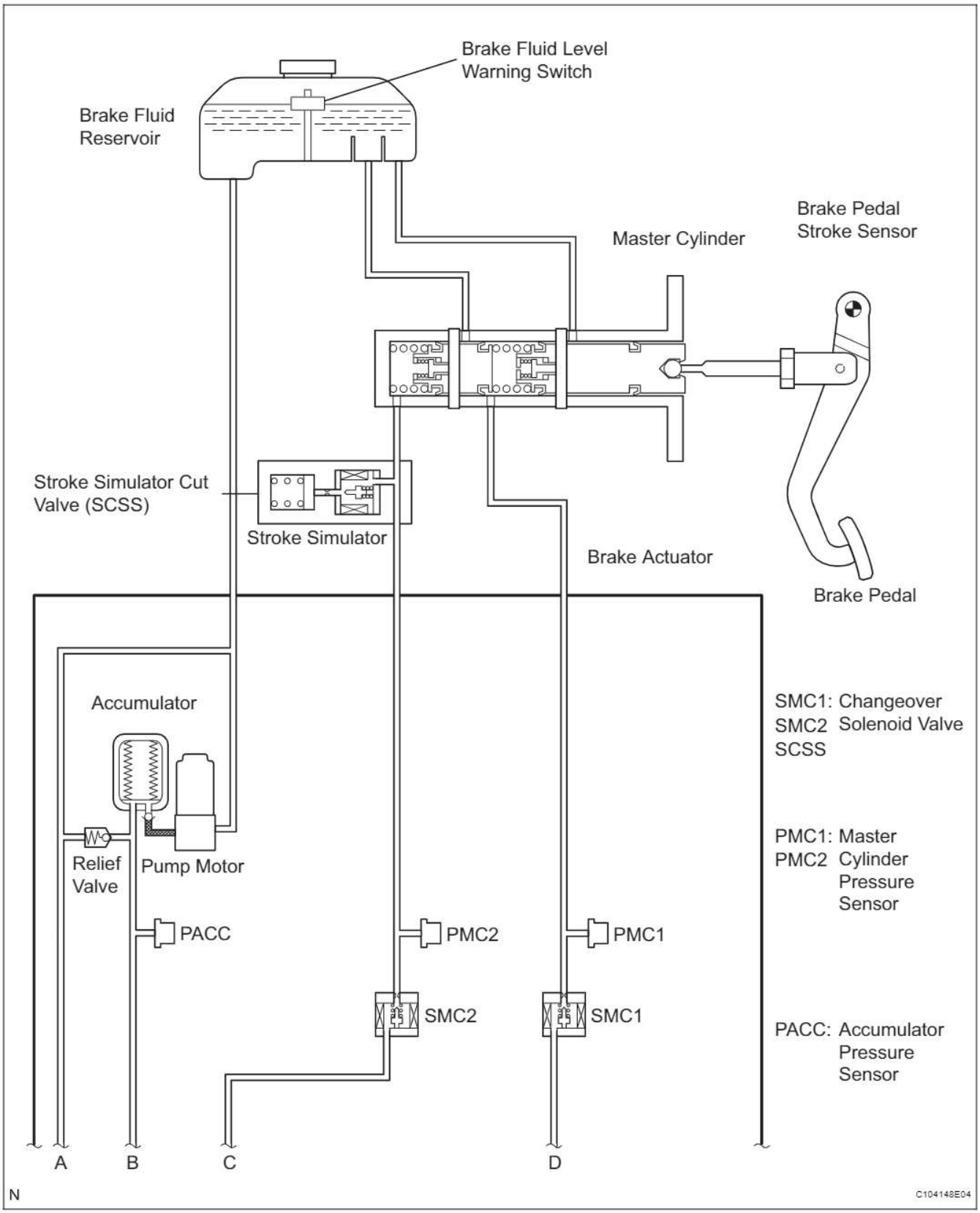
SYSTEM DIAGRAM

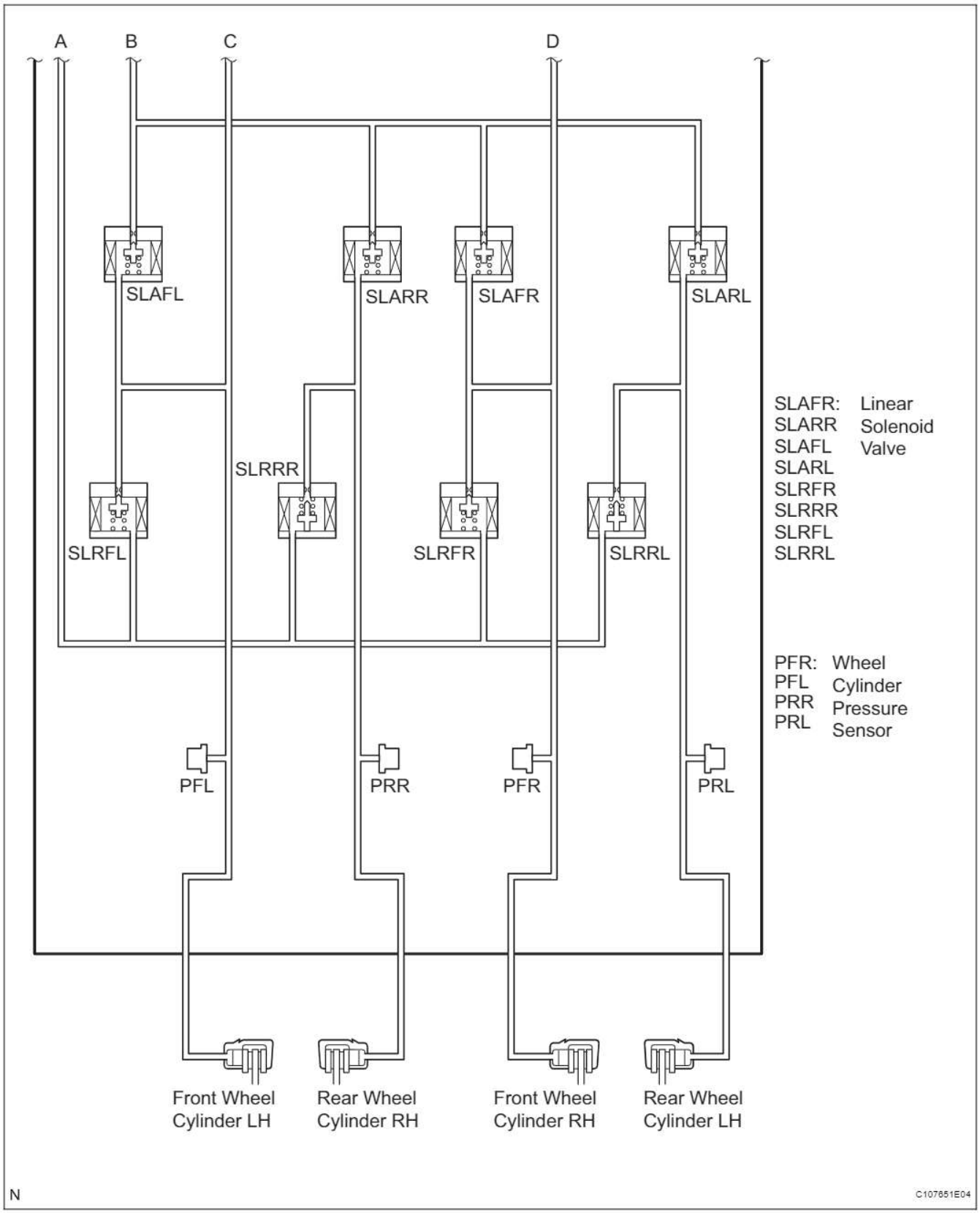


BC


Brake Control Power Supply
Capacitor
Front Door Courtesy Light Switch (Driver Side)
Skid Control ECU
Brake Master Cylinder
Stroke Simulator
Stroke Simulator Cut Valve
Combination Meter
Speedometer
ABS Warning Light
BRAKE Warning Light
Brake Control Warning Light
SLIP Indicator Light
Master Caution Indicator Light
Multi Information Display
Steering Angle Sensor
Yaw Rate and Acceleration Sensor
HV Control ECU
Power Steering (EPS) ECU
Main Body ECU
DLC3
: CAN Communication System
N
C135823E01

BC


Brake Fluid Level Warning Switch
Brake Fluid Reservoir
Master Cylinder
Brake Pedal Stroke Sensor
Stroke Simulator Cut Valve (SCSS)
Stroke Simulator
Brake Actuator
Brake Pedal
Accumulator
Relief Valve
Pump Motor
PACC
PMC2
PMC1
SMC2
SMC1
SMC1: Changeover
SMC2 Solenoid Valve
SCSS
PMC1: Master
PMC2 Cylinder
Pressure
Sensor
PACC: Accumulator
Pressure
Sensor
A
B
C
D
N
C104148E04



Transmitting ECU (Transmitter)	Receiving ECU	Signals	Communication Method
Skid control ECU	Steering angle sensor	Steering angle sensor request signal	CAN communication system
Skid control ECU	Yaw rate and acceleration sensor	Yaw rate and acceleration request signal	CAN communication system

BC

Transmitting ECU (Transmitter)	Receiving ECU	Signals	Communication Method
Skid control ECU	HV control ECU	• Wheel speed signal • VSC data signal	CAN communication system
HV control ECU	Skid control ECU	• Shift position signal • Throttle position signal • Engine revolution signal • Intake air temperature signal • Engine torque request signal • Accelerator pedal position signal	CAN communication system
Skid control ECU	Power steering (EPS) ECU	Target additional torque signal	CAN communication system
Power steering (EPS) ECU	Skid control ECU	EPS cooperative control enabling signal	CAN communication system
Main body ECU	Skid control ECU	Parking brake switch signal	CAN communication system
Skid control ECU	Combination meter	• ABS warning light ON signal • BRAKE warning light ON signal • Brake control warning light ON signal • SLIP indicator light ON signal • Master caution indicator light ON signal • Multi information display ON signal	CAN communication system

BC

SYSTEM DESCRIPTION

1. VDIM (Vehicle Dynamics Integrated Management) DESCRIPTION

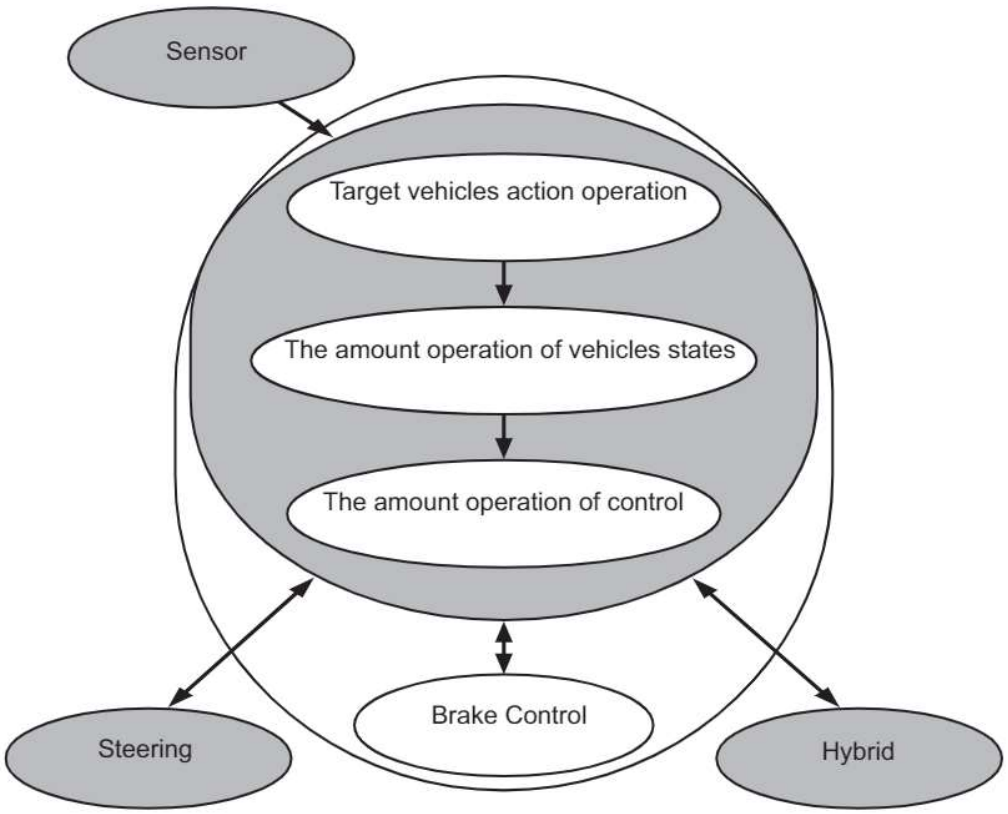
(a) This vehicle is equipped with VDIM. It is a concept of vehicle motion control that integrates brake control, drive force control and steering control.

(b) Conventional vehicles use a combination of independent functions such as ABS, TRAC, VSC and EPS. However, VDIM integrates these systems to improve "drive, turn and stop," the motion performance of the vehicle in other words.

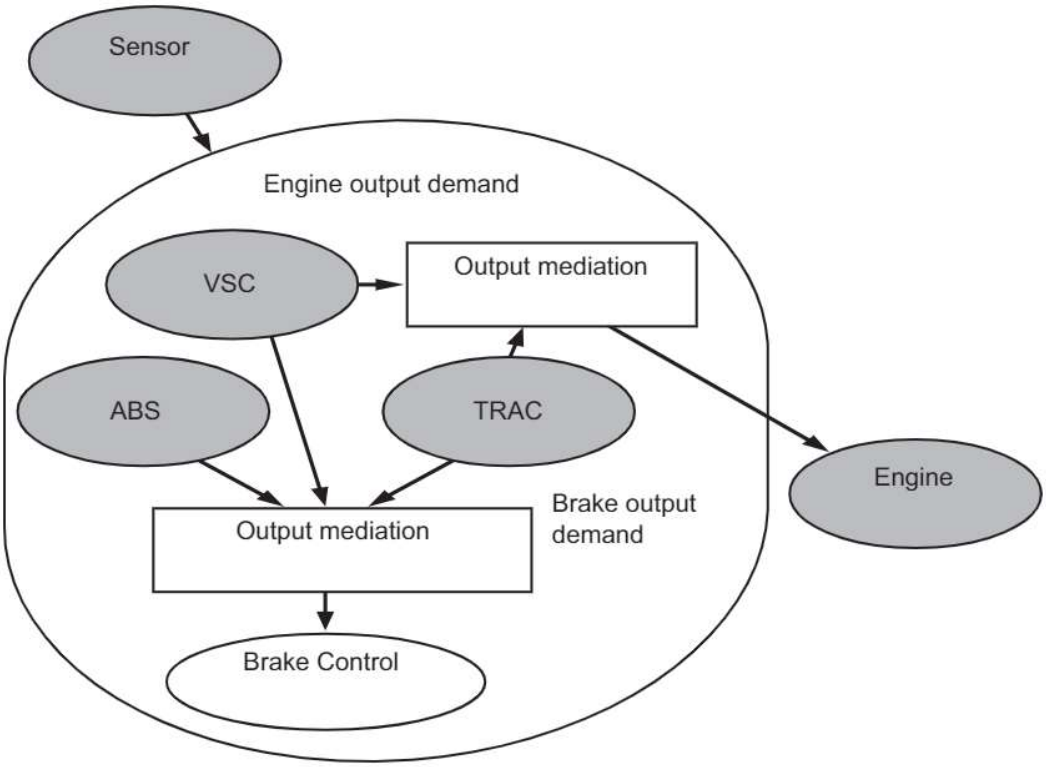
BC

(c) In conventional vehicles, control starts at the limit of the vehicle. However, VDIM exercises control before the limit is reached, creating a smooth vehicle response. This expands the limits of the vehicle, and increases driving pleasure.

VDIM:



Conventional Control (without VDIM):



N C106641E08

BC

(d) The VDIM manages all functions, such as the ABS with EBD, the BA, the TRAC, and the VSC. It is operated by the Electronically Controlled Brake system, which regulates a brake fluid pressure. The regenerative brake cooperative control and steering cooperative control functions are also available. Thus the VDIM is able to perform the comprehensive management.

(e) Conventional brake control systems begin to control either the braking or motive force in order to stabilize the vehicle motion when it becomes unstable due to loss of tire traction. In contrast, in order to maintain stable vehicle control, the VDIM commences controlling the brake, hybrid and steering systems in accordance with changes in balance before the vehicle becomes unstable. As a result, smooth vehicle control is achieved.

(f) Conventional brake control systems manage all related functions, such as the ABS with EBD, the BA, the TRAC and the VSC independently, according to the vehicle dynamics. In contrast, the VDIM provides smooth control by seamlessly integrating all those functions.

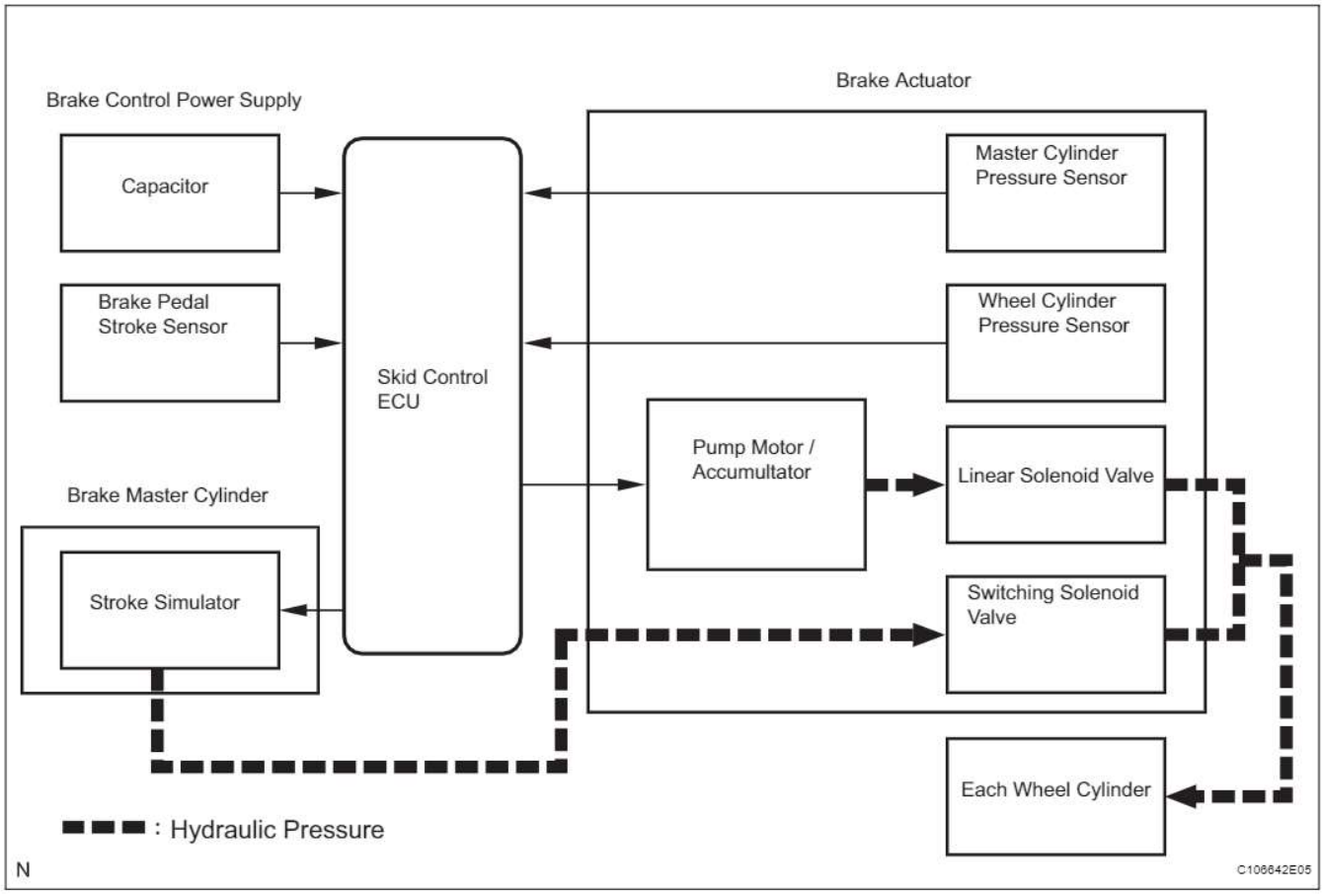
2. ELECTRONICALLY CONTROLLED BRAKE SYSTEM DESCRIPTION

(a) The system detects the degree of brake pedal operation with a brake pedal stroke sensor and two master cylinder pressure sensors, and calculates the optimum hydraulic brake force. The hydraulic pressure source is adjusted based on this so that the optimum hydraulic control is independently performed on all four wheels.

(b) Meanwhile, the Electronically Controlled Brake system performs control of the normal brakes, ABS, TRAC, VSC and BA in accordance with the operations of the driver.

BC

(c) There is a hydraulic backup mechanism that applies master cylinder pressure generated by human power to the wheel cylinder when the brake control stops. In addition, as a fail safe mechanism, when the brake control is malfunctioning, the system excludes the malfunctioning sections and continues to perform brake control on the normal sections. A power backup unit (brake control power supply) is also used to ensure a stable supply of power to the system.



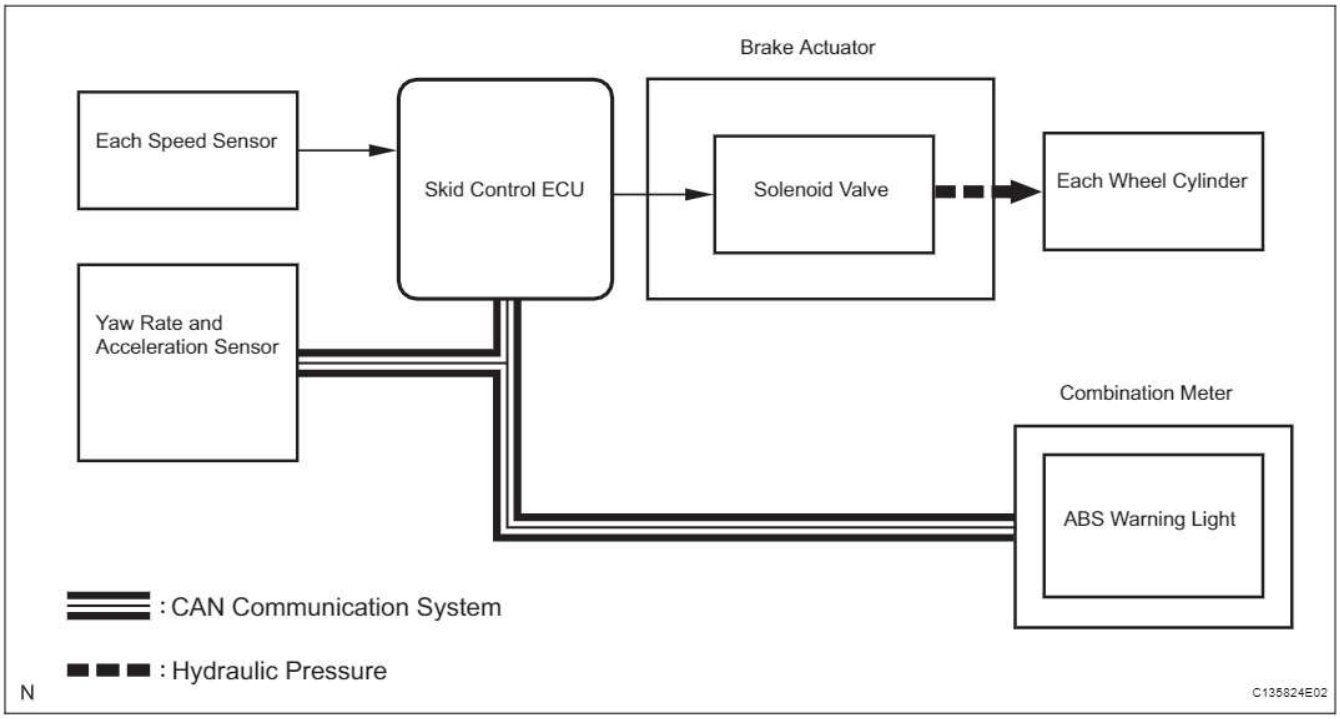
3. FUNCTION DESCRIPTION

HINT:

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

BC

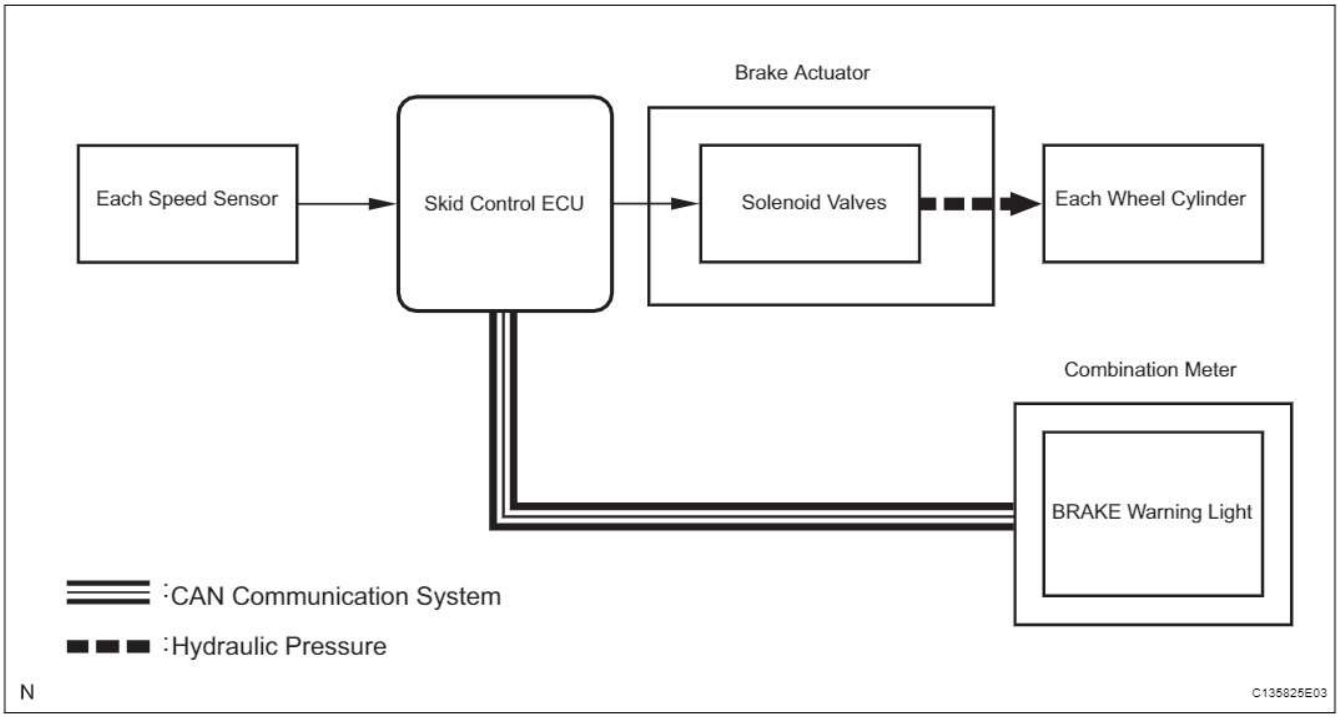
(a) ABS (Anti-lock Brake System)
The ABS helps prevent the wheels from locking when the brakes are applied suddenly and firmly or applied on a slippery surface.



(1) Operation description
The skid control ECU detects wheel lock based on speed signals it receives from the wheel speed sensors. Based on this information, the skid control ECU controls the solenoid valves. The solenoid valves are used to prevent wheel lock by controlling the hydraulic pressure applied to the brakes at each wheel. The ABS warning light will come on when the system is malfunctioning.

BC

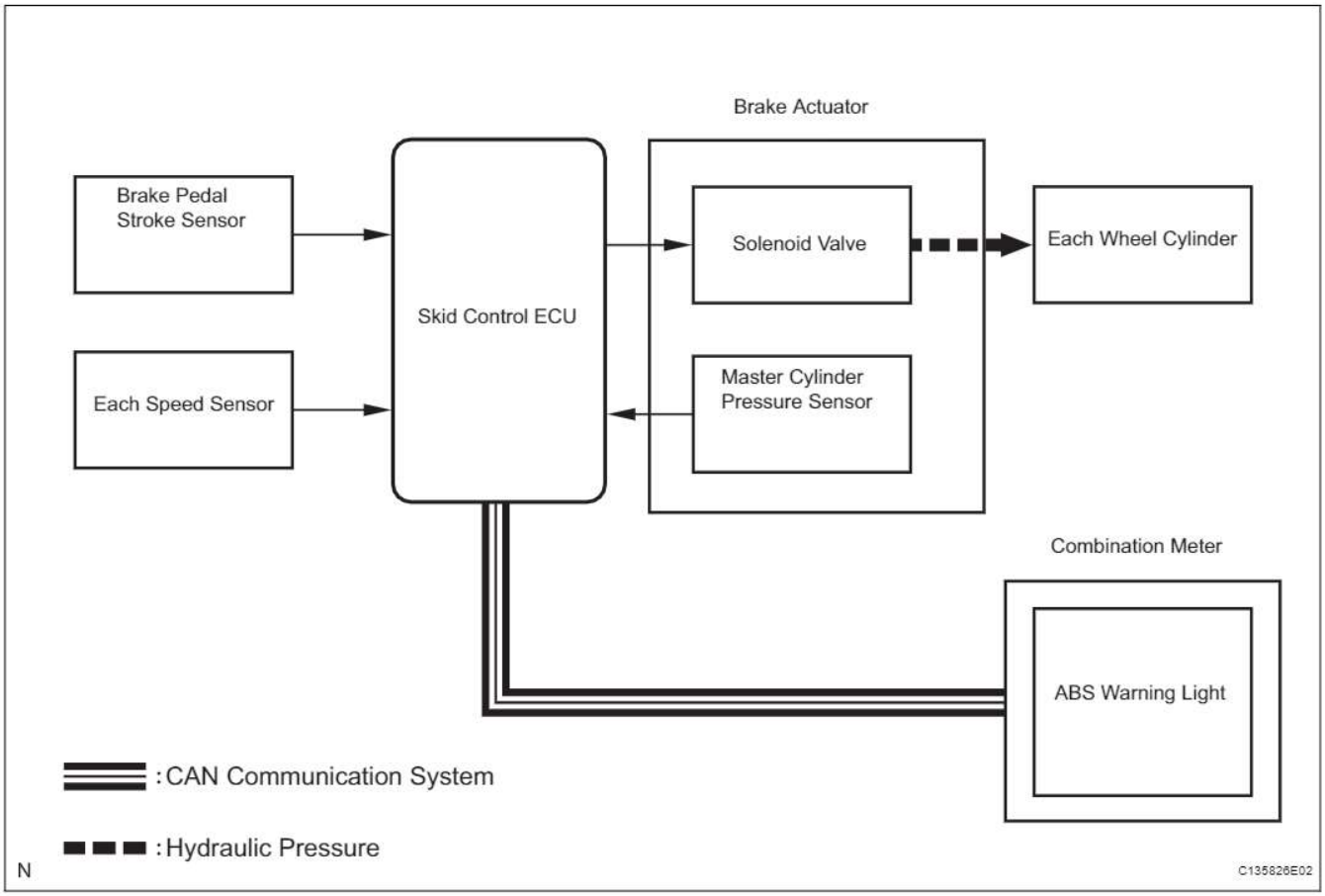
(b) EBD (Electronic Brake force Distribution)
The EBD control utilizes ABS, performing proper brake force distribution between the front and rear wheels in accordance with driving conditions.
When braking while cornering, it also controls the brake forces of the right and left wheels, helping to maintain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



(1) Operation description
The skid control ECU receives a speed signal from each wheel speed sensor, and uses these signals to detect locking of the wheels. The ECU uses this information in order to determine appropriate control of the solenoid valves.
The solenoid valves control the hydraulic pressure applied to the brake cylinder at each wheel. In this way, the solenoid valves are used to control the brake power split between the front and rear, and left and right wheels.
The BRAKE warning light will come on if there is a malfunction in the EBD system.

BC

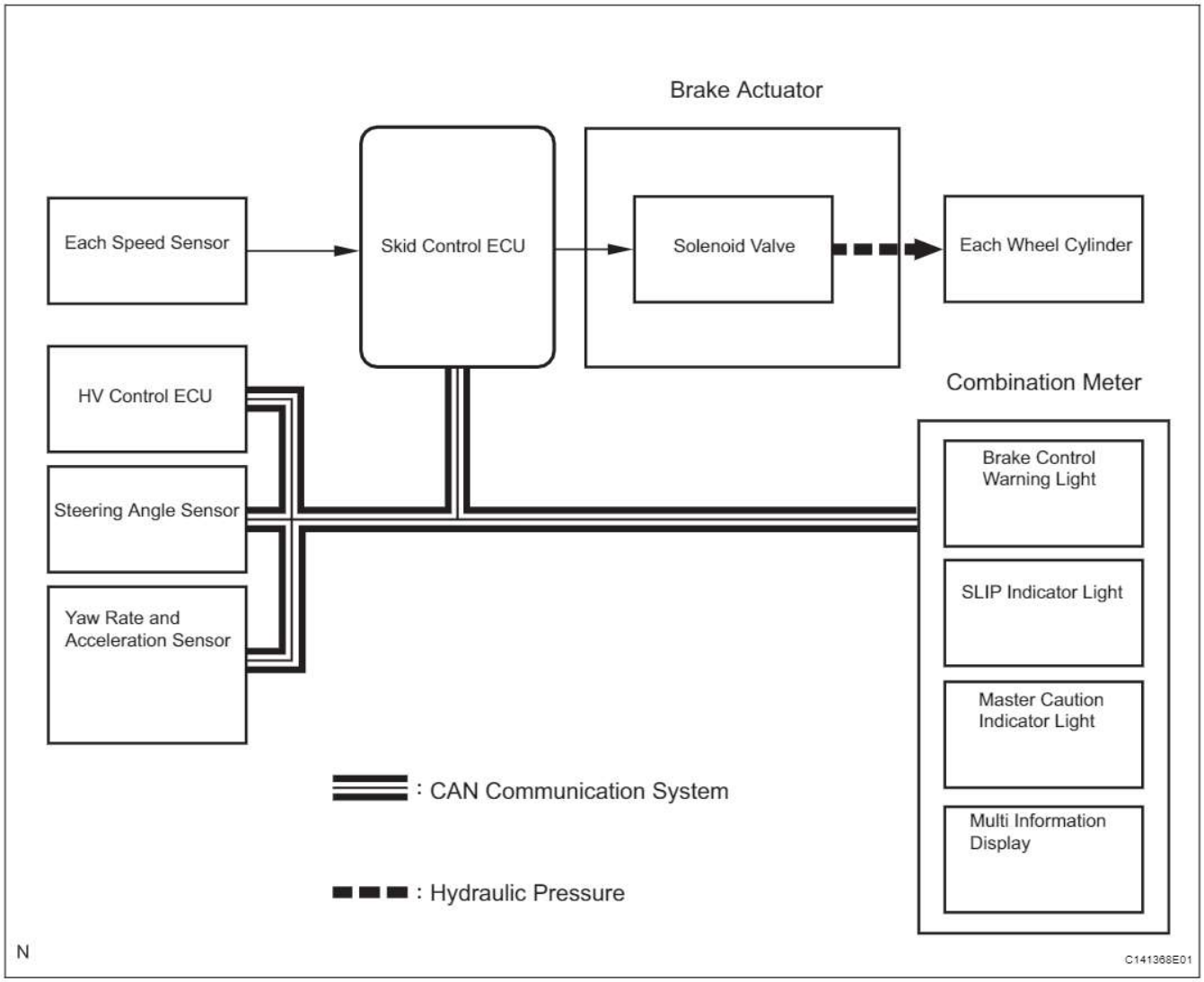
(c) BA (Brake Assist)
The primary purpose of the brake assist system is to provide auxiliary brake force to assist the driver who cannot generate a brake force large enough during emergency braking, thus helping to maximize the brake performance of the vehicle.



(1) Operation description
The skid control ECU receives the brake pedal stroke sensor signal and the oil pressure signal from the master cylinder pressure sensor to determine whether brake assist is necessary or not. If brake assist is deemed necessary, the skid control ECU will send control signals to the solenoid. The solenoid valve then controls the pressure applied to each wheel cylinder.
The ABS warning light comes on to indicate a malfunction in the BA system.

BC

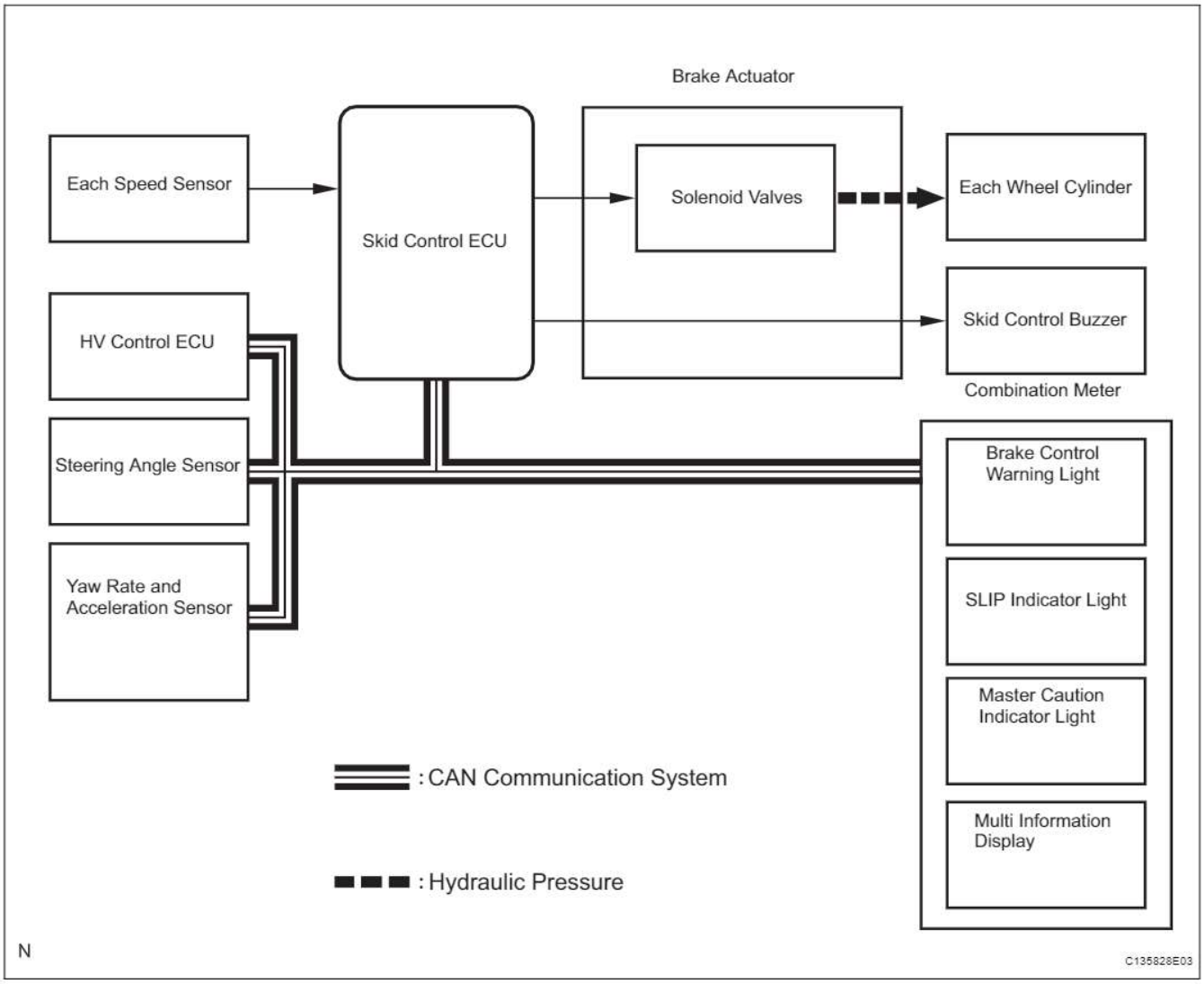
(d) TRAC (Traction Control)
The TRAC system helps prevent the drive wheels from slipping when the driver depresses the accelerator pedal excessively while starting off or accelerating on a slippery surface.



(1) Operation description
The skid control ECU detects wheelspin by receiving signals from each speed sensor and the HV control ECU via CAN communication. The skid control ECU controls engine torque with the HV control ECU via CAN communication and brake hydraulic pressure through the solenoid valve.
The SLIP indicator light blinks when the system is operating. When there is a malfunction in the TRAC system, the brake control warning, master caution indicator and SLIP indicator lights come on and DTC will appear on the multi information display.

BC

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



(1) Operation description
The skid control ECU determines the vehicle operating conditions based on signals received from the wheel speed sensors, yaw rate and acceleration sensor, and steering angle sensor. The skid control ECU sends signals via CAN communication to the HV control ECU in order to control engine torque. The skid control ECU controls brake hydraulic pressure using the solenoid valves.
The SLIP indicator light will blink, and the skid control buzzer will sound when the system is operating. If a malfunction occurs in the VSC system, both the brake control warning, master caution indicator and the SLIP indicator lights will come on. In addition, the DTC will appear on the multi information display.

BC

4. STEERING COOPERATION CONTROL

(a) The VDIM system effects coordinated control consisting of VSC and EPS (Electronic Power Steering). By integrating these preventive safety functions, the VDIM system ensures higher driving stability and maneuverability performance.

(b) If the vehicle loses stability due to a slippage, this function effects brake control by applying hydraulic pressure to the wheels. At the same time, the EPS provides steering torque assist control to facilitate the driver's steering maneuver.

5. FAIL SAFE

(a) When a failure occurs in the ABS with BA, TRAC and VSC systems, the ABS warning, brake control warning, and SLIP indicator lights come on and the DTC will be displayed on the multi information display and ABS with BA, TRAC and VSC operations will be prohibited. In addition, when there is a failure that disables the EBD operation, the BRAKE warning light also comes on and the EBD operation is prohibited.

(b) If control is prohibited due to a malfunction during operation, control will be disabled gradually. This is to avoid sudden vehicle instability.

6. INSPECTION MODE

(a) VSC operation can be disabled by operating the intelligent tester (See page IN-5).
HINT:
Refer to the intelligent tester operator's manual for further details.

7. FUNCTION OF COMPONENTS

Components	Functions
Skid control ECU	Processes the signals from each sensor to perform brake control for ABS, TRAC, and VSC. In addition, it communicates with the HV control ECU to output a control signal.
ABS main relay (ABS NO. 1, 2 relay)	Controlled by the skid control ECU. In addition to supplying power to each solenoid, it supplies power to the skid control ECU.
ABS motor relay (ABS MTR1, 2 relay)	Controlled by the skid control ECU. Supplies power to the pump motor.
Speed sensor	Detects the wheel speed and inputs the results to the skid control ECU.
Stop light switch	Detects the brake operating conditions and inputs the results to the skid control ECU. It supplies power to the skid control ECU.
Brake pedal stroke sensor	Detects the brake pedal stroke volume and inputs the results to the skid control ECU.
Brake control power supply	Provides the system with a supplementary power supply by discharging the electric charge of the capacitor. It happens when an electric charge is accumulated in the capacitor in the unit and the vehicle power voltage (12 V) is reduced.
Skid control buzzer	• Sounds intermittently to inform the driver that the VSC is active. • Sounds continuously to warn the driver of a reduction in accumulator hydraulic pressure in the brake actuator, an abnormality in the power supply system, or a reduction in the vehicle power voltage (12 V).
HV control ECU	Controls the engine output during the operation of TRAC and VSC by communicating with the skid control ECU.
Yaw rate and acceleration sensor	Detects the yaw rate (axial rotation) and the forward, rearward and lateral acceleration, and inputs the results to the skid control ECU.

BC

Components	Functions
Steering angle sensor	Detects the steering angle and direction, and outputs the results to the skid control ECU through CAN communication.
Master cylinder	Generates pressure in accordance with the force of the brake operation.
Brake fluid reservoir	Stores brake fluid for the master cylinder system and power supply system.
Brake fluid level warning switch	Detects a reduction in the level of the brake fluid in the reservoir.
Stroke simulator	Generates a natural pedal stroke in accordance with the pedal force of the driver during system operation (integrated with the master cylinder).
Stroke simulator cut valve (SCSS)	Sends brake fluid pressure generated in master cylinder to stroke simulator during system control.
Brake actuator	Controls the hydraulic pressure of each of the four wheel cylinders using the output signal of the skid control ECU.
Pump motor	Pumps up the brake fluid from the reservoir and supplies the accumulator with high hydraulic pressure.
Accumulator	Accumulates for the hydraulic pressure that was generated by the pump.
Accumulator pressure sensor (PACC)	Built into the brake actuator to detect the accumulator hydraulic pressure.
Relief valve	Prevents excessive high pressure in the power supply system. It relieves the system by sending brake fluid to the reservoir when the pump has operated continuously, for example, during an accumulator hydraulic pressure sensor malfunction.
Master cylinder pressure sensor (PMC1, PMC2)	Built into the brake actuator to detect the pressure of the master cylinder and input the results to the skid control ECU.
Wheel cylinder pressure sensor (PFR, PFL, PRR, PRL)	Built into the brake actuator to detect the brake hydraulic pressure of each wheel cylinder.
Switching solenoid valve (SMC1, SMC2)	Switches the brake hydraulic pressure route according to whether normal brakes are used, or VDIM (ABS, TRAC and VSC) control is used.
Linear solenoid valve (SLA##, SLR##)	Controls the wheel cylinder hydraulic pressure during normal brake operation, and VDIM (ABS, TRAC and VSC) control. SLA## are solenoids for controlling pressure increases, while SLR## are solenoids for controlling pressure decreases.
ABS warning light	• Comes on to inform the driver that a malfunction in the ABS or BA has occurred. • Blinks to output DTC.
BRAKE warning light	Comes on to inform the driver that the parking brake is on when the system is normal or the brake fluid has decreased.
Brake control warning light	Comes on to inform the driver that a malfunction in the Electronically Controlled Brake or VSC system has occurred.
SLIP indicator light	Blinks to inform the driver that TRAC and VSC are operating.
Master caution indicator light	Comes on to inform the driver that a malfunction in the Electronically Controlled Brake or VSC system has occurred.
Multi information display	• Displays to inform the driver that a malfunction in the Electronically Controlled Brake or VSC system has occurred. • Displays output DTC.

BC

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
*: Use the intelligent tester.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS

(a) Interview the customer and confirm the trouble (See page IN-72).

NEXT

3 CHECK DTC AND FREEZE FRAME DATA*

(a) Check and record a DTC and Freeze Frame Data.
(b) Clear the DTC and Freeze Frame Data (See page BC-57 for DTC Check/Clear, or BC-59 for Freeze Frame Data).
(c) Reconfirm the DTC.
(1) Reconfirm the DTC based on the recorded DTC and Freeze Frame Data (See page BC-57 for DTC Check/Clear, or BC-59 for Freeze Frame Data).
HINT:
If any of the DTCs U0123/62, U0124/95, U0126/63, and U0293/59 is output together with a CAN communication DTC, first check the appropriate sensor for a momentary open circuit (See page BC-23).

Result

Condition	Proceed to
DTC is output	A
DTC is not output (Problem symptom does not occur)	B
DTC is not output (Problem symptom occurs)	C

B → GO TO STEP 5

C → GO TO STEP 6

A

4 DIAGNOSTIC TROUBLE CODE CHART

(a) Proceed to Diagnostic Trouble Code Chart (See page BC-69).

NEXT

GO TO STEP 7

5	SYMPTOM SIMULATION

(a) Proceed to Diagnosis System (See page BC-54).

NEXT

6	PROBLEM SYMPTOMS TABLE

(a) Proceed to Problem Symptoms Table (See page BC-46).

NEXT

7	CIRCUIT INSPECTION*

NEXT

8	IDENTIFICATION OF PROBLEM

NEXT

9	REPAIR OR REPLACEMENT

NEXT

10	CONFIRMATION TEST*

NEXT

BC

END

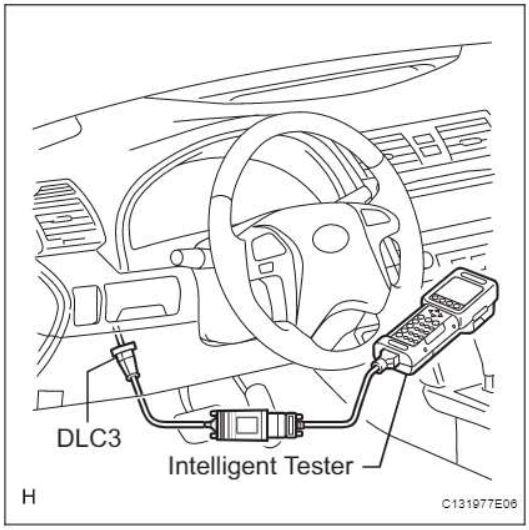
CHECK FOR INTERMITTENT PROBLEMS

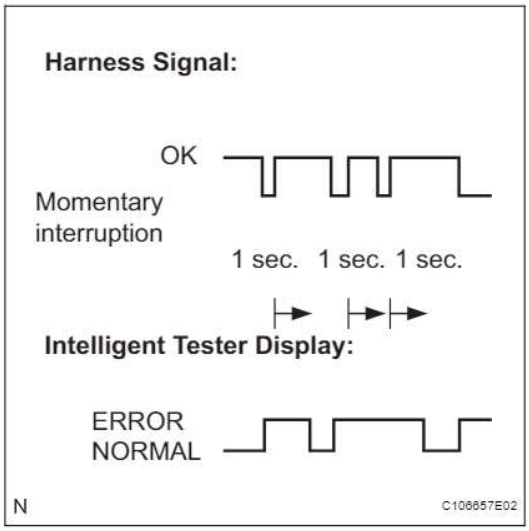
1. CHECK FOR INTERMITTENT PROBLEMS

HINT:

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

(a) Turn the power switch off and connect the intelligent tester to the DLC3.





(b) Turn the power switch on (IG). Follow the directions on the intelligent tester to display the Data List and select areas where momentary interruption should be monitored.

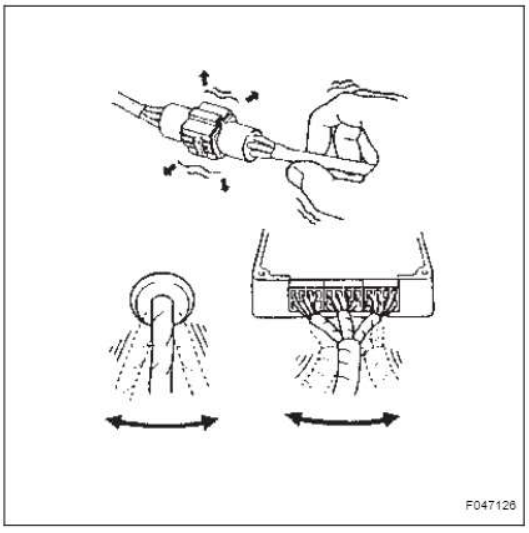
HINT:

- A momentary interruption (open circuit) cannot be detected for 3 seconds after the power switch is turned on (IG) (initial check).
- If the status remains on (ERROR displayed), check the continuity between the ECU and the sensors, or between the ECUs.
- The ERROR display on the intelligent tester remains on for 1 second after the harness signal changes from momentary interruption (open circuit) to normal condition.

BC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR SPD OPN	FR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
FL SPD OPN	FL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RR SPD OPN	RR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RL SPD OPN	RL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
HV COM OPN	HV communication open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
YAW RATE OPN	Yaw rate sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
DECELERAT OPN	Acceleration sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
STEERING OPN	Steering angle sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
M/C OPN	Master cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
M/C2 OPN	Master cylinder pressure sensor 2 open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
STROKE OPN	Stroke sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
STROKE OPN 2	Stroke sensor 2 open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
FR W/C OPN	FR wheel cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
FL W/C OPN	FL wheel cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RR W/C OPN	RR wheel cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RL W/C OPN	RL wheel cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
ACC OPEN	Accumulator pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-



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

Result:

ERROR display does not change.

HINT:

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

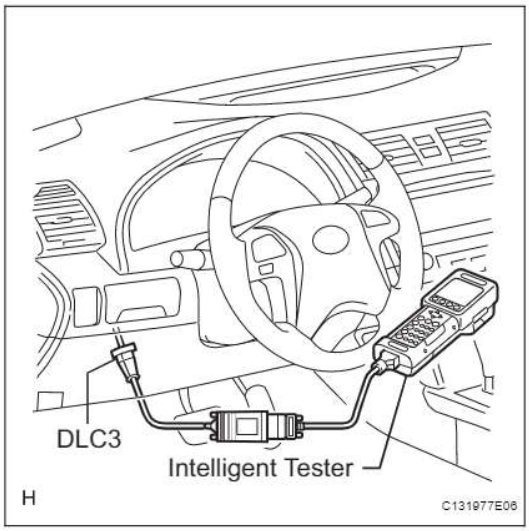
BC

INITIALIZATION

1. DESCRIPTION

(a) Perform initialization of linear solenoid valve and calibration when the skid control ECU, brake actuator or brake pedal stroke sensor is replaced. Follow the procedure to perform initialization.
HINT:
- If there is a problem with the auxiliary battery (12 V) voltage, initialization of linear solenoid valve and calibration cannot be completed normally. Make sure to check the auxiliary battery voltage before performing initialization of linear solenoid valve and calibration.
- If the actuator's temperature is high, initialization of linear solenoid valve and calibration may not be completed normally. In such a case, wait until the temperature decreases and then perform initialization of linear solenoid valve and calibration.
- If the power switch is turned off, the brake pedal is operated or vehicle speed is input while the linear solenoid valve offset learning is being performed, the learning will be cancelled.

Replacement Parts	Necessary Operation
Skid control ECU	Initialization of linear solenoid valve and calibration
Brake actuator assembly	1. Bleed air 2. Clearing stored value of linear solenoid valve and calibration data 3. Initialization of linear solenoid valve and calibration
• Brake pedal stroke sensor • Brake pedal	1. Inspection and adjustment of brake pedal height 2. Clearing stored value of linear solenoid valve and calibration data 3. Initialization of linear solenoid valve and calibration



2. PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION (INTELLIGENT TESTER)

(a) Clear the stored value of linear solenoid valve and calibration data.
(1) Turn the power switch off.
(2) Connect the intelligent tester to the DLC3.
(3) Move the shift lever to the P position.
(4) Turn the power switch on (IG) with the brake pedal released.
(5) Clear the stored value of initialization of linear solenoid valve and calibration following the screen.
HINT:
Refer to the intelligent tester operator's manual for further details.
(6) Using the intelligent tester, perform initialization of linear solenoid valve and calibration.

(b) Perform the initialization of linear solenoid valve and calibration.
(1) Turn the power switch off.
(2) Connect the intelligent tester to the DLC3.
(3) Move the shift lever to the P position.

BC

(4) Turn the power switch on (IG) with the brake pedal released.
NOTICE:
- **If the linear solenoid valve offset learning is performed without turning the power switch on (IG), the learning process may not be completed properly because of insufficient auxiliary battery voltage.**
- **When the linear solenoid valve offset learning is interrupted, or the learning process is performed with the shift lever not in the P position, DTC C1345/66 will be stored (See page BC-190).**

(5) Set the intelligent tester to Test Mode (select "ECB* UTILITY").
*: Electronically Controlled Brake
HINT:
Refer to the intelligent tester operator's manual for further details.

(6) Leave the vehicle stationary without depressing the brake pedal for 1 or 2 minutes.

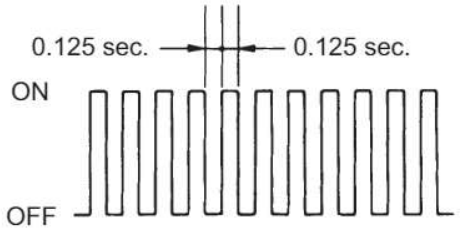
Tester Display:



*: Electronically Controlled Brake

N C145966E01

Blinking Pattern in TEST MODE:



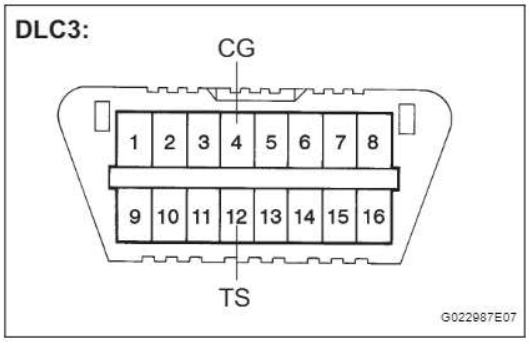
BR03904E15

(7) Check that the interval between blinks of the brake control warning light changes from 1 second to 0.25 seconds.
HINT:
- The time needed to complete initialization of linear solenoid valve and calibration varies depending on auxiliary battery voltage.
- The brake control warning light blinks at 1 second intervals during initialization of linear solenoid valve and calibration and changes to the Test Mode display.
- The brake control warning light blinks at 0.25 seconds intervals if the Test Mode is normal.

(8) Check that DTC C1345/66 which indicates trouble with stroke sensor zero point learning is not output when the brake control warning light changes to the Test Mode display upon initialization of linear solenoid valve and calibration completion.

(9) Enter the normal mode from the Test Mode following the intelligent tester prompts.
HINT:
Refer to the intelligent tester operator's manual for further details.

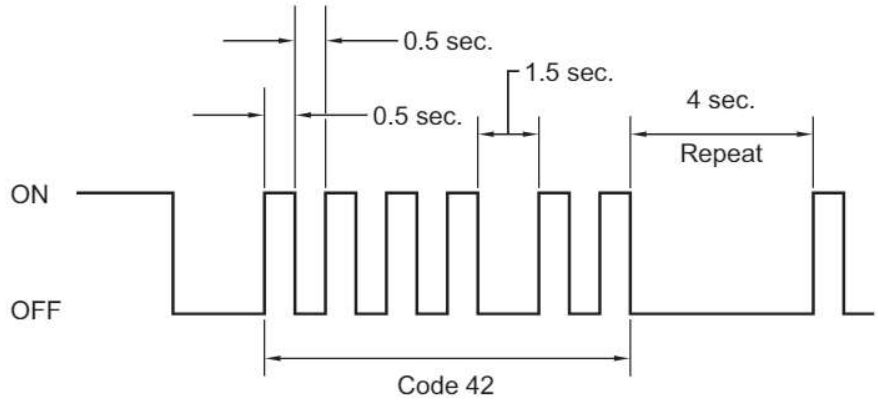
BC



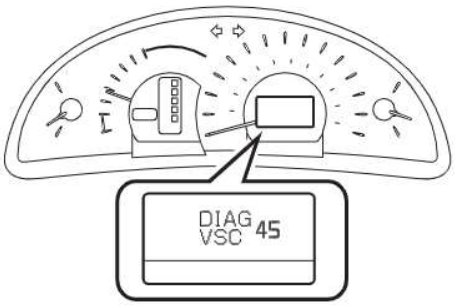
3. PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION (SST CHECK WIRE)

(a) Clear the stored value of linear solenoid valve and calibration data.
(1) Turn the power switch off.
(2) Move the shift lever to the P position.
(3) Turn the power switch on (IG) with the brake pedal released.
(4) Using SST, connect and disconnect terminals TS and CG of the DLC3 4 times or more within 8 seconds.
SST 09843-18040
(5) Check that no codes other than ABS code 42, VSC code 45 and Electronically Controlled Brake code 48, 66, or 95 are stored in the diagnostic system.

Blinking Pattern of ABS and Electronically Controlled Brake Code (Example Code 42):



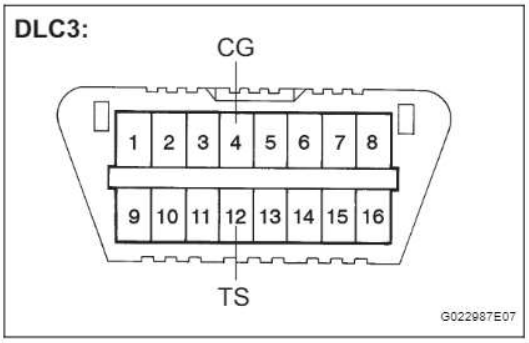
Display of VSC Code:

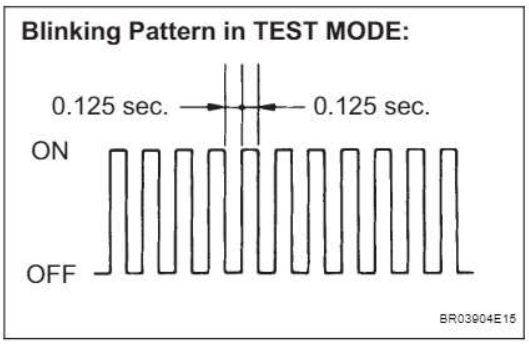


N C135830E02

HINT:
The ABS warning, brake control warning lights and multi information display do not indicate the normal system code.

BC





(6) Remove the SST from the terminals of the DLC3.
(7) Using the check wire, perform initialization of linear solenoid valve and calibration.

(b) Perform initialization of linear solenoid valve and calibration.
(1) Turn the power switch off.
(2) Using SST, connect terminals TS and CG of the DLC3.
SST 09843-18040
(3) Move the shift lever to the P position.
(4) Turn the power switch on (IG) with the brake pedal released.
NOTICE:
- **If the linear solenoid valve offset learning is performed without turning the power switch on (IG), the learning process may not be completed properly because of insufficient auxiliary battery voltage.**
- **When the linear solenoid valve offset learning is interrupted, or the learning process is performed with the shift lever not in the P position, DTC C1345/66 will be stored (See page BC-190).**

(5) Leave the vehicle stationary without depressing the brake pedal for 1 or 2 minutes.
(6) Check that the interval between blinks of the brake control warning light changes from 1 second to 0.25 seconds.
HINT:
- The time needed to complete initialization of linear solenoid valve and calibration varies depending on the auxiliary battery voltage.
- The brake control warning light blinks at 1 second intervals during initialization of linear solenoid valve and calibration and changes to the Test Mode display.
- The brake control warning light blinks at 0.25 seconds intervals if the Test Mode is normal.

(7) Check that DTC C1345/66 which indicates trouble with stroke sensor zero point learning is not output when the brake control warning light changes to the Test Mode display upon initialization of linear solenoid valve and calibration completion.
(8) Turn the power switch off and disconnect the SST from the DLC3.

BC

CALIBRATION

1. DESCRIPTION

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

Replacing Parts / Operation	Necessary Operation
Skid control ECU	Yaw rate and acceleration sensor zero point calibration.
Yaw rate and acceleration sensor	1. Clearing zero point calibration data. 2. Yaw rate and acceleration sensor zero point calibration.
Front wheel alignment adjustment	1. Clearing zero point calibration data. 2. Yaw rate and acceleration sensor zero point calibration.

2. PERFORM ZERO POINT OF YAW RATE AND ACCELERATION SENSOR (INTELLIGENT TESTER)

NOTICE:

- **While obtaining the zero point, keep the vehicle stationary and do not vibrate, tilt, move, or shake it. (Do not turn the power switch on (READY).)**
- **Be sure to perform this procedure on a level surface (with an inclination of less than 1 degree).**

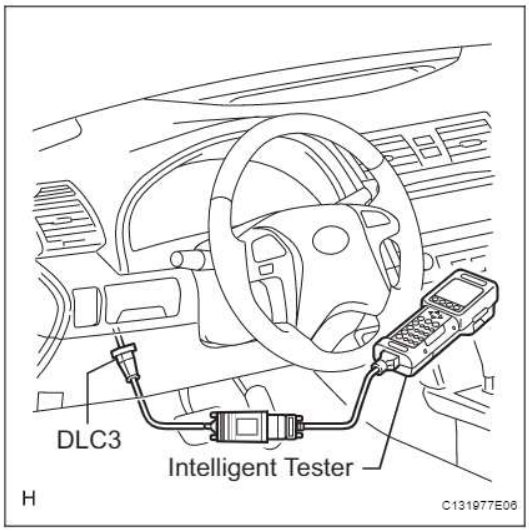
(a) Clear the zero point calibration data.

(1) Turn the power switch off.

(2) Connect the intelligent tester to the DLC3.

(3) Check that the steering wheel is centered and move the shift lever to the P position.

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



(5) Operate the intelligent tester to erase the codes (select "RESET MEMORY").
HINT:
Refer to the intelligent tester operator's manual for further details.

(6) Turn the power switch off.

(b) Perform zero point calibration of the yaw rate and acceleration sensor.

(1) Turn the power switch off.

(2) Check that the steering wheel is centered and move the shift lever to the P position.
NOTICE:
DTCs C1210/36 and C1336/98 will be recorded if the shift lever is not in the P position (See page BC-107).

Tester Display:

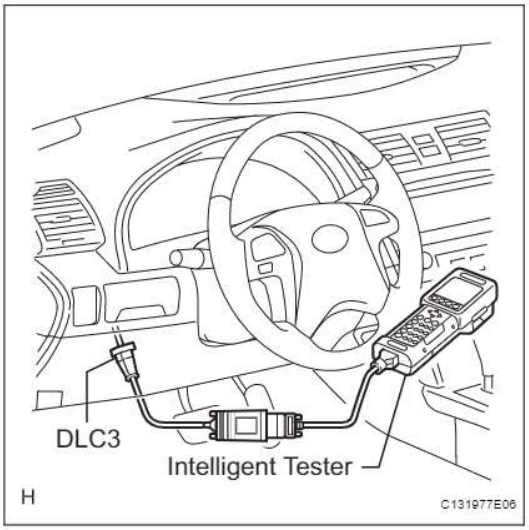
DIAGNOSTIC MENU
ABS/VSC

1 : DATA LIST
2 : DTC INFO
3 : ACTIVE TEST
4 : SNAPSHOT
5 : AIR BLEEDING
6 : RESET MEMORY
7 : SIGNAL CHECK
8 : TEST MODE
9 : ECB* UTILITY

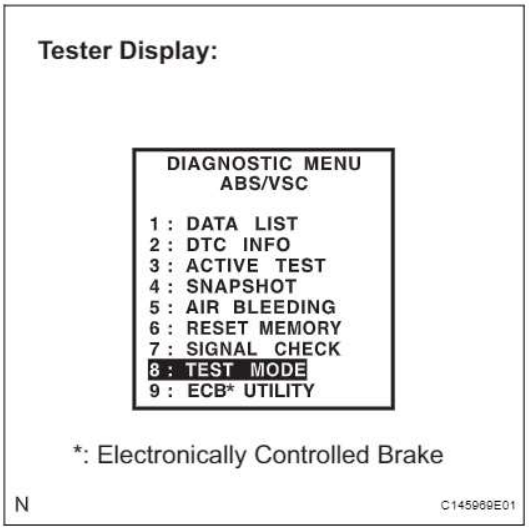
*: Electronically Controlled Brake

N C145967E01

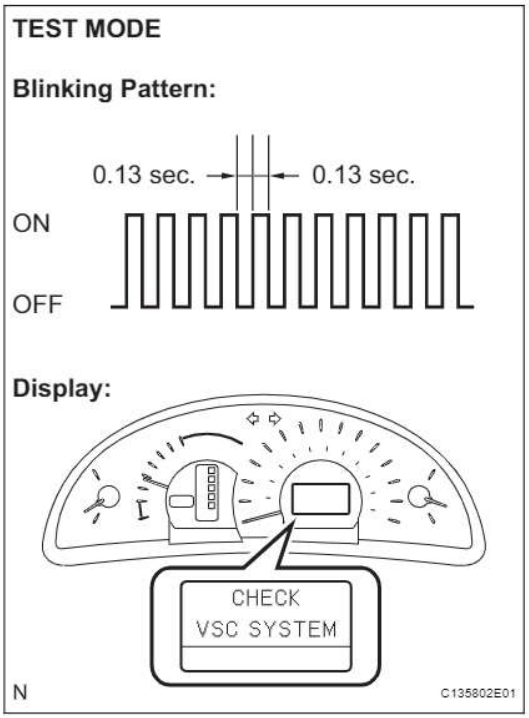
BC



(3) Connect the intelligent tester to the DLC3.
(4) Turn the power switch on (IG).



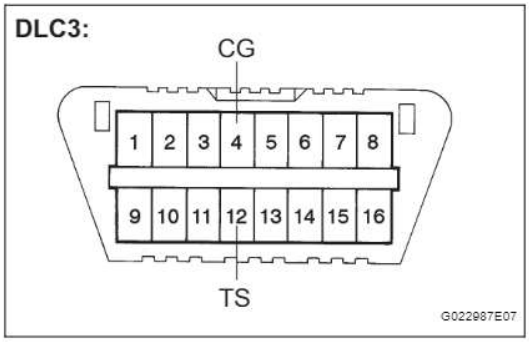
(5) Set the intelligent tester to Test Mode (select "TEST MODE").
HINT:
Refer to the intelligent tester operator's manual for further details.
(6) After the Test Mode has been entered, keep the vehicle stationary on a level surface for 2 seconds or more.



(7) Check that the ABS warning, brake control warning and master caution indicator lights blink and "CHECK VSC SYSTEM" is displayed on the multi information display (Test Mode).
HINT:
- The SLIP indicator remains on during Test Mode because TRAC is prohibited.
- If the ABS warning, brake control warning and master caution indicator lights do not blink and/or "CHECK VSC SYSTEM" is not displayed on the multi information display, perform zero point calibration again.
- The zero point calibration is performed only once after the system enters the Test Mode.
- Calibration cannot be performed again until the stored data is cleared.

(8) Turn the power switch off and disconnect the intelligent tester.

BC



3. PERFORM ZERO POINT OF YAW RATE AND ACCELERATION SENSOR (SST CHECK WIRE)

NOTICE:

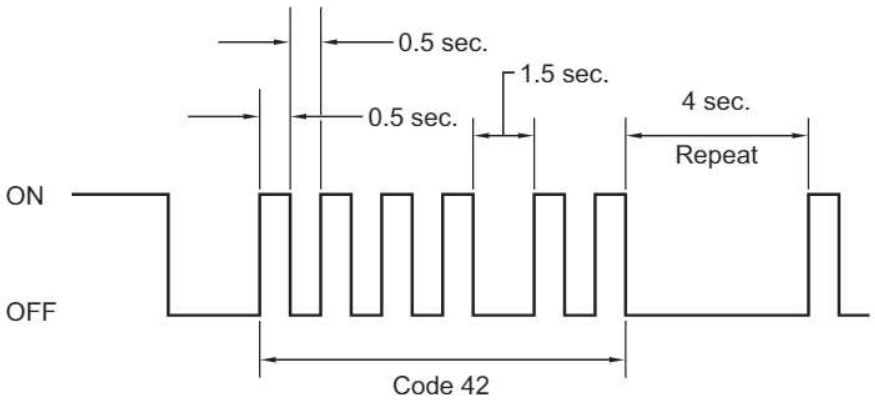
- **While obtaining the zero point, keep the vehicle stationary and do not vibrate, tilt, move, or shake it. (Do not turn the power switch on (READY).)**
- **Be sure to perform this procedure on a level surface (with an inclination of less than 1 degree).**

(a) Clear the zero point calibration data.
  (1) Turn the power switch off.
  (2) Check that the steering wheel is centered and move the shift lever to the P position.
  (3) Turn the power switch on (IG).
  (4) Check that the warning light and indicator light come on and remains on until the power switch is turned on (READY).
  (5) Turn the power switch on (IG).
  (6) Using SST, connect and disconnect terminals TS and CG of the DLC3 4 times or more within 8 seconds.
  SST 09843-18040

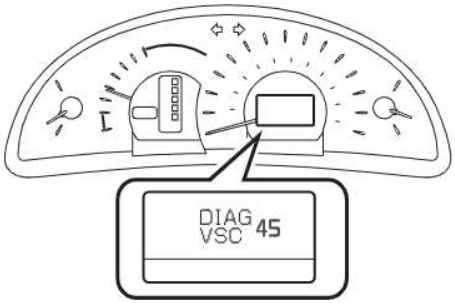
BC

(7) Check that no codes other than ABS code 42, VSC code 45 and Electronically Controlled Brake code 48, 66, or 95 are stored in the diagnostic system.

Blinking Pattern of ABS and Electronically Controlled Brake Code (Example Code 42):



Display of VSC Code:



N C135830E02

HINT:
The ABS warning, brake control warning lights, and multi information display do not indicate the normal system code.

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

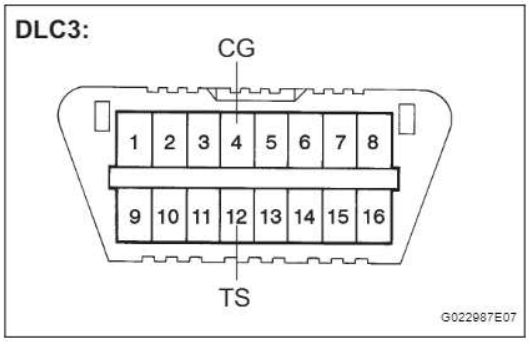
(b) Perform zero point calibration of the yaw rate and acceleration sensor.

(1) Turn the power switch off.

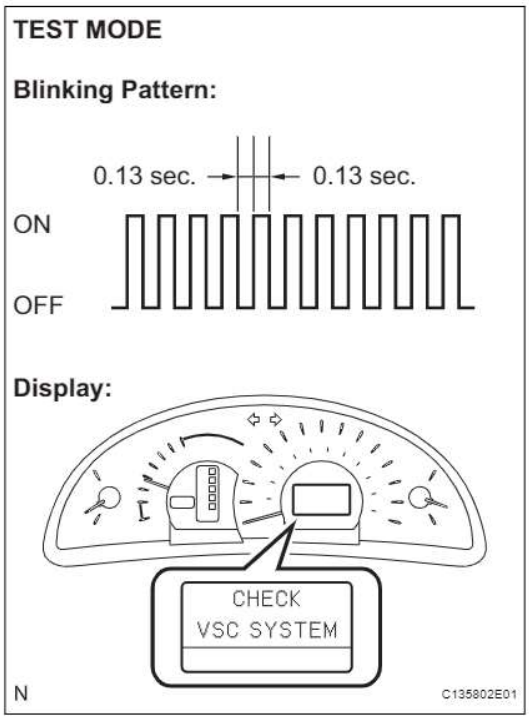
(2) Check that the steering wheel is centered and move the shift lever to the P position.

NOTICE:
DTCs C1210/36 and C1336/98 will be recorded if the shift lever is not in the P position (See page BC-107).

BC



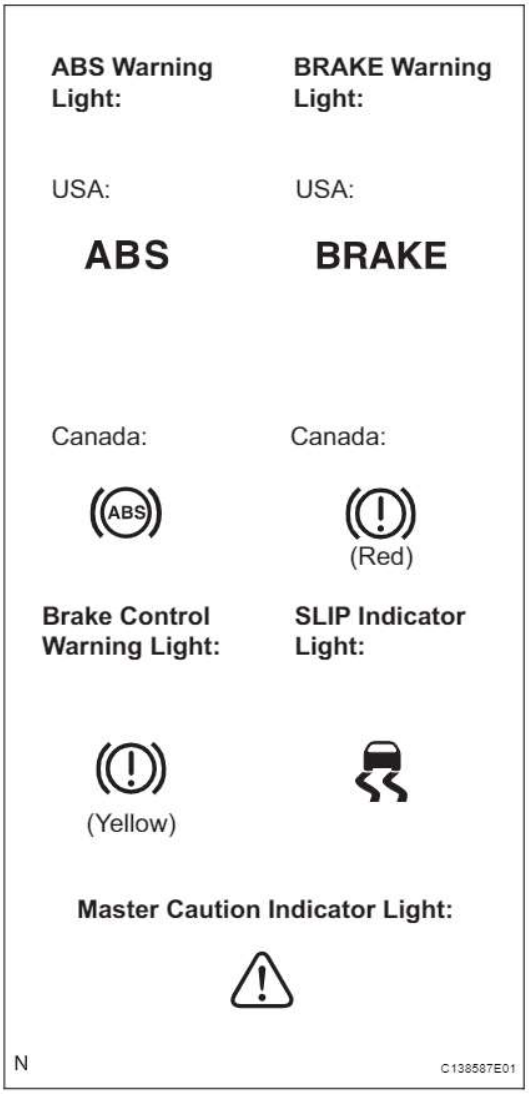
(3) Using SST, connect terminals TS and CG of the DLC3.
SST 09843-18040
(4) Turn the power switch on (IG).
(5) Keep the vehicle stationary on a level surface for 2 seconds or more.



(6) Check that the ABS warning, brake control warning and master caution indicator lights blink and "CHECK VSC SYSTEM" is displayed on the multi information display (Test Mode).
HINT:
- The SLIP indicator remains on during Test Mode because TRAC is prohibited.
- If the ABS warning, brake control warning and master caution indicator lights do not blink and/or "CHECK VSC SYSTEM" is not displayed on the multi information display, perform zero point calibration again.
- The zero point calibration is performed only once after the system enters the Test Mode.
- Calibration cannot be performed again until the stored data is cleared.

(7) Turn the power switch off and disconnect the SST from the DLC3.

BC



TEST MODE PROCEDURE

1. WARNING LIGHT AND INDICATOR LIGHT INITIAL CHECK

(a) Release the parking brake.

NOTICE:

Before releasing the parking brake, move the shift lever to the P position for safety.

HINT:

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

(b) When the power switch is turned on (IG), check that the ABS warning, BRAKE warning, brake control warning, master caution indicator, and SLIP indicator lights come on and remain on until the power switch is turned on (READY).

HINT:

If the ECU stores a DTC, the ABS warning, BRAKE warning, brake control warning, master caution indicator and SLIP indicator lights come on.

If the vehicle is equipped with a multi information display, and the vehicle stores a DTC, the master caution indicator light will illuminate, and the multi information display will indicate the malfunction.

In this case, the ABS warning, BRAKE warning, brake control warning, and SLIP indicator lights will also come on.

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

Trouble Area	See procedure
ABS warning light circuit	BC-214 or BC-219
BRAKE warning light circuit	BC-227 or BC-234
Brake control warning light circuit	BC-236 or BC-240
VSC warning light (master caution indicator light and multi information display) circuit	BC-221 or BC-225
SLIP indicator light circuit	BC-242 or BC-246

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

NOTICE:

After replacement of the brake actuator assembly and/or yaw rate and acceleration sensor, perform zero point calibration of the yaw rate and acceleration sensor.

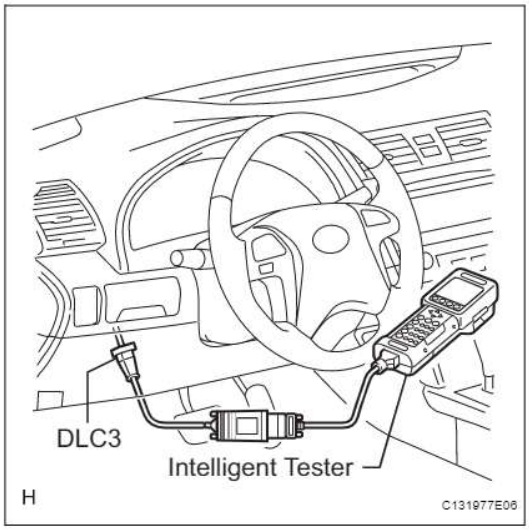
HINT:

- If the power switch is turned from on (IG) to on (ACC) or off during Test Mode (signal check), DTCs of the signal check function will be erased.

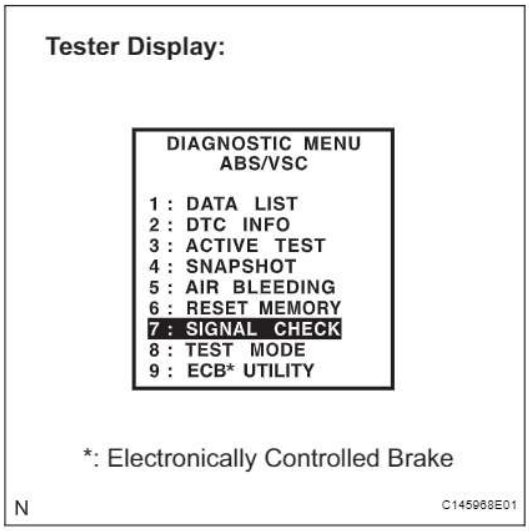
BC

- During Test Mode (signal check), the skid control ECU records all DTCs of the signal check function. By performing the Test Mode (signal check), the codes are erased if a normal condition is confirmed. The remaining codes are the codes where an abnormality was found.

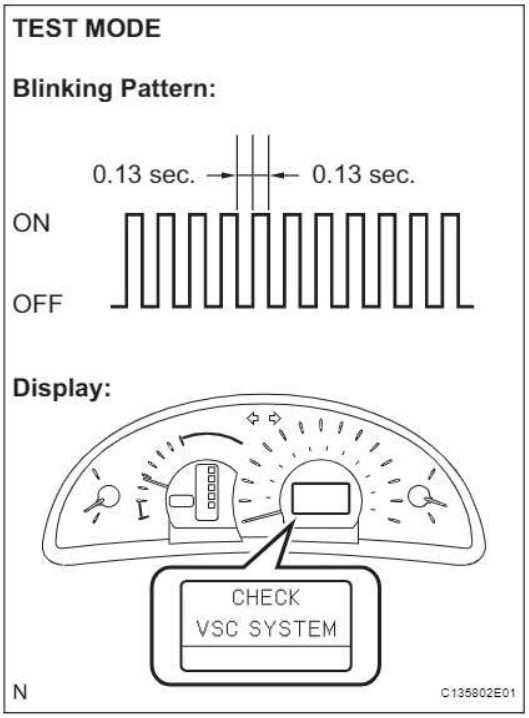
(a) Procedure to enter Test Mode.
(1) Turn the power switch off.
(2) Connect the intelligent tester to the DLC3.
(3) Check that the steering wheel is centered and move the shift lever to the P position.
(4) Turn the power switch on (IG).

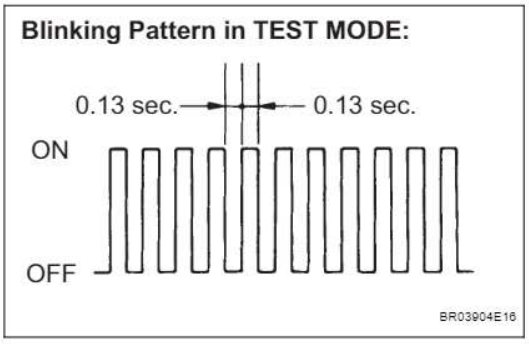


(5) Set the intelligent tester to Test Mode (select "SIGNAL CHECK").
HINT:
Refer to the intelligent tester operator's manual for further details.



BC





(6) Check that the ABS warning, brake control warning, and master caution indicator lights blink and "CHECK VSC SYSTEM" is displayed on the multi information display (Test Mode).
HINT:
- The SLIP indicator remains on during Test Mode because TRAC is prohibited.
- If the ABS warning, brake control warning, and VSC warning (master caution indicator light and multi information display) lights do not blink, inspect the TS and CG terminal circuit, and ABS warning, brake control warning, and VSC warning (master caution indicator light and multi information display) light circuits.

Trouble Area	See procedure
TS and CG terminal circuit	BC-255
ABS warning light circuit	BC-219
Brake control warning light circuit	BC-240
VSC warning light (master caution indicator light and multi information display) circuit	BC-225

(7) Check the ABS sensor.
HINT:
Check that the ABS warning light is blinking in Test Mode and perform the check.

3. ACCELERATION SENSOR CHECK (INTELLIGENT TESTER)

(a) Keep the vehicle stationary on a level surface for 1 second or more.
HINT:
Acceleration sensor check can be performed with the master cylinder pressure sensor check below.

4. MASTER CYLINDER PRESSURE SENSOR CHECK (INTELLIGENT TESTER)

(a) Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly and continuously depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second.

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

BC

- If the check of the master cylinder pressure sensor is not completed, depressing the brake pedal causes further decrease in the negative pressure, making the sensor check difficult to be completed.
- If the negative pressure is insufficient, the master cylinder pressure sensor check may not be completed. In this case, run the engine at idle to obtain sufficient negative pressure.
- If the brake pedal is strongly depressed when the negative pressure is insufficient, the BRAKE warning light may come on in accordance with the booster pressure control. In this case, run the engine at idle to obtain sufficient negative pressure.

5. SPEED SENSOR CHECK (INTELLIGENT TESTER)

(a) Check the speed sensor signal.

(1) Drive the vehicle straight ahead.

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

HINT:

The sensor check may not be completed if wheelspin occurs.

(b) Stop the vehicle.

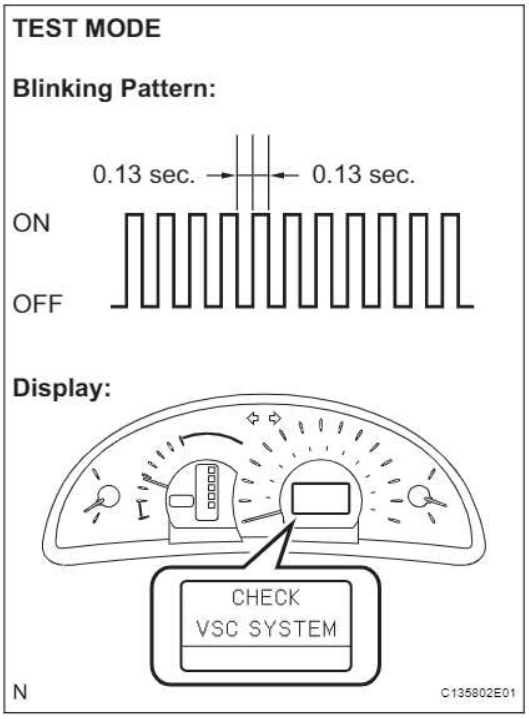
NOTICE:

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

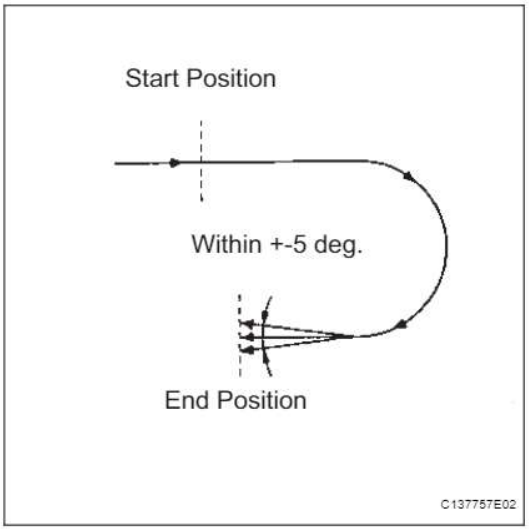
HINT:

When the sensor check has been completed, the ABS warning light goes off while driving and blinks in the Test Mode pattern while stationary.

BC



(c) Check the VSC sensor.
Check that the brake control warning, and master caution indicator lights blink and "CHECK VSC SYSTEM" is displayed on the multi information display, and perform the check.



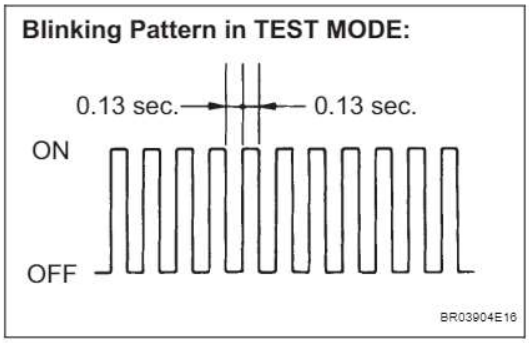
6. YAW RATE SENSOR CHECK (INTELLIGENT TESTER)

(a) Check the zero point voltage of the yaw rate sensor.
(1) Keep the vehicle in a stationary condition on a level surface for 1 second or more.

(b) Check the output of the yaw rate sensor.
(1) Move the shift lever from P to the D position and drive the vehicle at a speed of approximately 5 km/h (3 mph), and turn the steering wheel either to the left or right 90° or more until the vehicle makes a 180° turn.
(2) Stop the vehicle and move the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.
HINT:
- If the skid control buzzer sounds, the sensor check is completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit (See page BC-248), then perform the sensor check again.
- If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check the DTC.
- Make a 180° turn. At the end of the turn, the direction of the vehicle should be within 180° +-5° of its start position.
- Do not spin the wheels.
- Do not turn the power switch off while turning.

BC

- Do not move the shift lever to the P position while turning, but changing in the vehicle speed, stopping, or driving in reverse is possible.
- Complete the turn within 20 seconds.



7. END OF SENSOR CHECK (INTELLIGENT TESTER)

(a) If the sensor check is completed, the ABS warning light blinks (Test Mode) when the vehicle stops and the ABS warning light is off while the vehicle is driving.

NOTICE:

- **When the yaw rate sensor, acceleration sensor, speed sensor, and master cylinder pressure sensor checks are completed, the sensor check is completed.**
- **If the sensor check is not completed, the ABS warning light blinks even while the vehicle is driving and the ABS does not operate.**

8. READ DTC OF TEST MODE (SIGNAL CHECK) FUNCTION (INTELLIGENT TESTER)

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

NOTICE:

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

HINT:

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

9. SENSOR CHECK USING TEST MODE (SIGNAL CHECK) (SST CHECK WIRE)

NOTICE:

After replacement of the brake actuator assembly and/or yaw rate and acceleration sensor, perform zero point calibration of the yaw rate and acceleration sensor.

HINT:

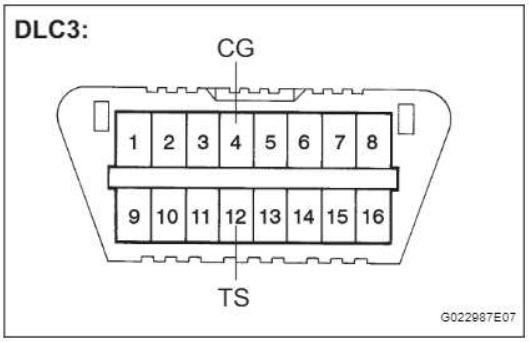
- If the power switch is turned from on (IG) to on (ACC) or off during Test Mode (signal check), DTCs of the signal check function will be erased.
- During Test Mode (signal check), the skid control ECU records all DTCs of the signal check function. By performing the Test Mode (signal check), the codes are erased if a normal condition is confirmed. The remaining codes are the codes where an abnormality was found.

(a) Procedure to enter Test Mode.

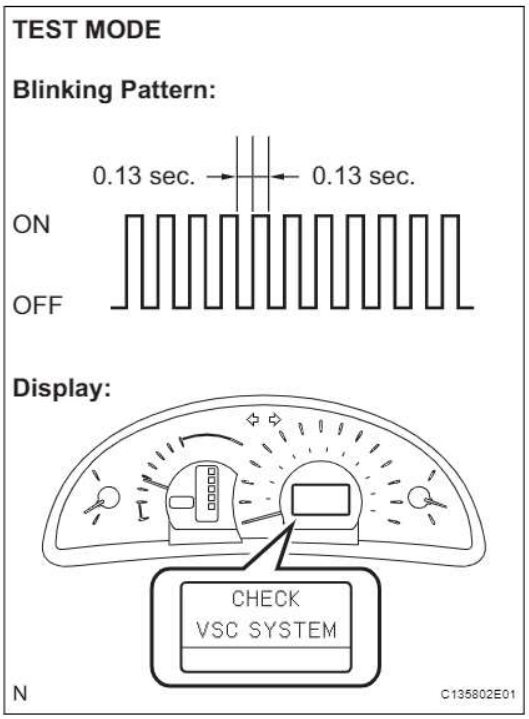
(1) Turn the power switch off.

(2) Check that the steering wheel is centered and move the shift lever to the P position.

BC

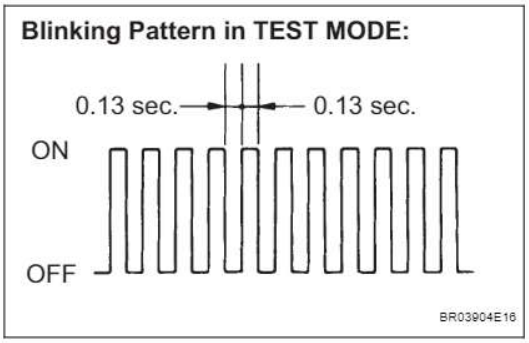


(3) Using SST, connect terminals TS and CG of the DLC3.
SST 09843-18040
(4) Turn the power switch on (IG).



(5) Check that the ABS warning, brake control warning, and master caution indicator lights blink and "CHECK VSC SYSTEM" is displayed on the multi information display (Test Mode).
HINT:
- The SLIP indicator remains on during Test Mode because TRAC is prohibited.
- If the ABS warning, brake control warning, and VSC warning (master caution indicator light and multi information display) lights do not blink, inspect the TS and CG terminal circuit, and ABS warning, brake control warning, and VSC warning (master caution indicator light and multi information display) light circuits.

Trouble Area	See procedure
TS and CG terminal circuit	BC-255
ABS warning light circuit	BC-219
Brake control warning light circuit	BC-240
VSC warning light (master caution indicator and multi information display) circuit	BC-225



(6) Check the ABS sensor.
HINT:
Check that the ABS warning light is blinking in Test Mode and perform the check.

10. ACCELERATION SENSOR CHECK (SST CHECK WIRE)

(a) Keep the vehicle stationary on a level surface for 1 second or more.
HINT:
Acceleration sensor check can be performed with the master cylinder pressure sensor check below.

11. MASTER CYLINDER PRESSURE SENSOR CHECK (SST CHECK WIRE)

(a) Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly and continuously depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second.

BC

(b) Check that the ABS warning light stays on for 3 seconds.
HINT:
- Ensure that the ABS warning light comes on.
- While the ABS warning light stays on, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
- The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.
- If the check of the master cylinder pressure sensor is not completed, depressing the brake pedal causes further decrease in the negative pressure, making the sensor check difficult to be completed.
- If the negative pressure is insufficient, the master cylinder pressure sensor check may not be completed. In this case, run the engine at idle to obtain sufficient negative pressure.
- If the brake pedal is strongly depressed when the negative pressure is insufficient, the BRAKE warning light may come on in accordance with the booster pressure control. In this case, run the engine at idle to obtain sufficient negative pressure.

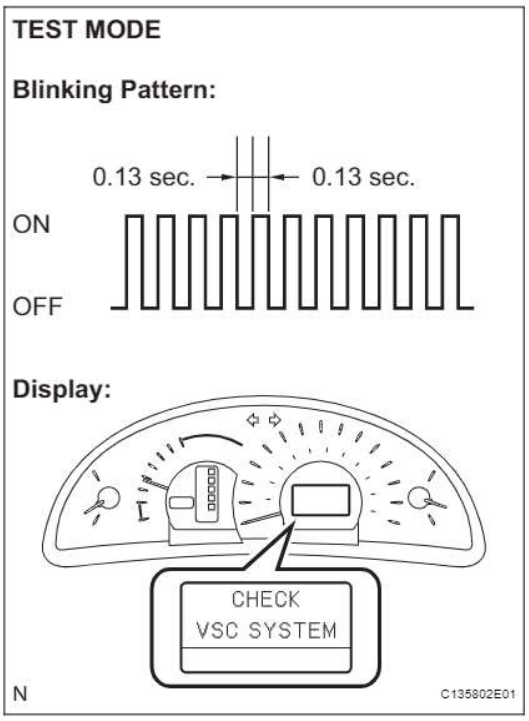
12. SPEED SENSOR CHECK (SST CHECK WIRE)

(a) Check the speed sensor signal.
(1) Drive the vehicle straight ahead.
Accelerate the vehicle to a speed of 45 km/h (28 mph) or more for several seconds and check that the ABS warning light goes off.
HINT:
The sensor check may not be completed if wheelspin occurs.

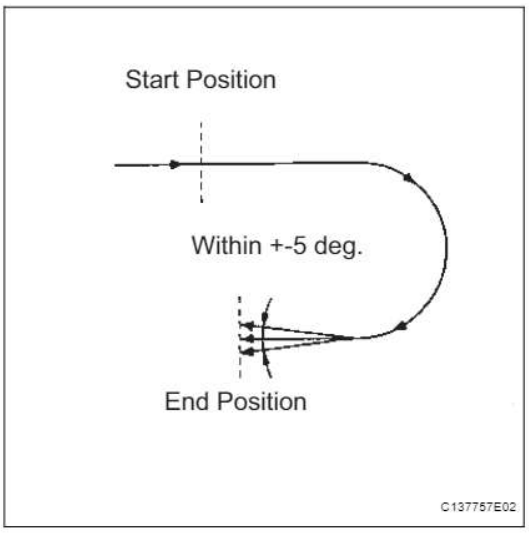
(b) Stop the vehicle.
NOTICE:
- **Before performing the speed sensor check, complete the acceleration sensor and master cylinder pressure sensor checks.**
- **The speed sensor check may not be completed if the speed sensor check is started while turning the steering wheel or spinning the wheels.**
-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

BC

HINT:
When the sensor check has been completed, the ABS warning light goes off while driving and blinks in the Test Mode pattern while stationary.



(c) Check the VSC sensor.
Check that the brake control warning, and master caution indicator lights blink and "CHECK VSC SYSTEM" is displayed on the multi information display, and perform the check.



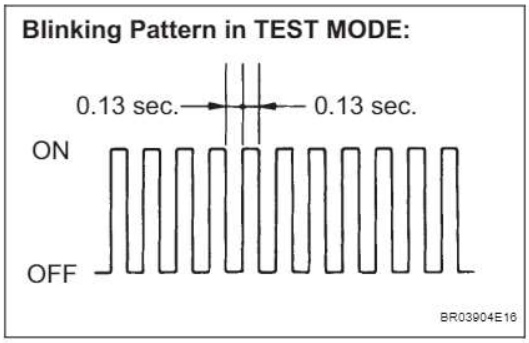
13. YAW RATE SENSOR CHECK (SST CHECK WIRE)

(a) Check the zero point voltage of the yaw rate sensor.
(1) Keep the vehicle stationary on a level surface for 1 second or more.

(b) Check the output of the yaw rate sensor.
(1) Move the shift lever from P to the D position and drive the vehicle at a vehicle speed of approximately 5 km/h (3 mph) and turn the steering wheel either to the left or right 90° or more and until the vehicle makes a 180° turn.
(2) Stop the vehicle and move the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.
HINT:
- If the skid control buzzer sounds, the sensor check is completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit (See page BC-248), then perform the sensor check again.
- If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check the DTC.
- Make a 180° turn. At the end of the turn, the direction of the vehicle should be within 180° +-5° of its start position.
- Do not spin the wheels.
- Do not turn the power switch off while turning.

BC

- Do not move the shift lever to the P position while turning, but changing in the vehicle speed, stopping, or driving in reverse is possible.
- Complete the turn within 20 seconds.

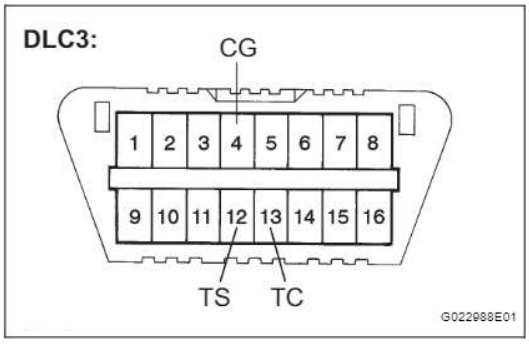


14. END OF SENSOR CHECK (SST CHECK WIRE)

(a) If the sensor check is completed, the ABS warning light blinks (Test Mode) when the vehicle stops and the ABS warning light is off while the vehicle is driving.

NOTICE:

- **When the yaw rate sensor, acceleration sensor, speed sensor, and master cylinder pressure sensor checks are completed, the sensor check is completed.**
- **If the sensor check is not completed, the ABS warning light blinks even while the vehicle is driving and the ABS does not operate.**



15. READ DTC OF SIGNAL CHECK FUNCTION (SST CHECK WIRE)

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

SST 09843-18040

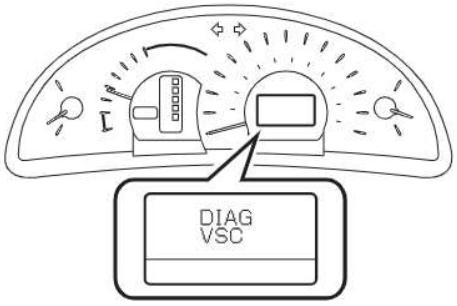
BC

(b) Count the number of blinks of the ABS warning and brake control warning lights and read "DIAG VSC" on the multi information display.

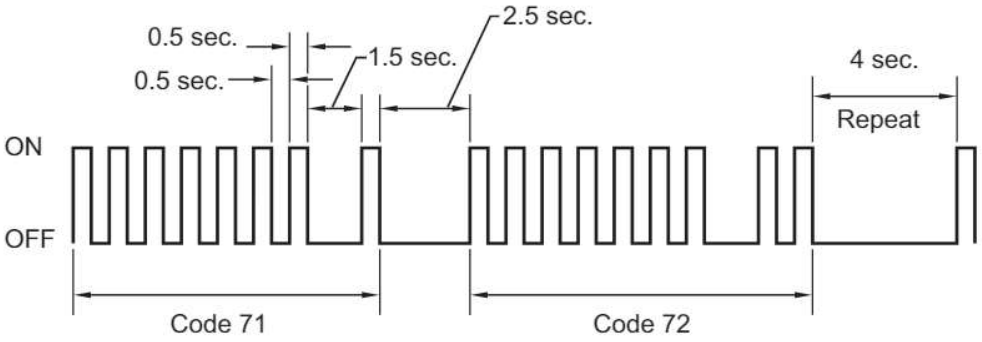
Blinking Pattern in Normal System Code:



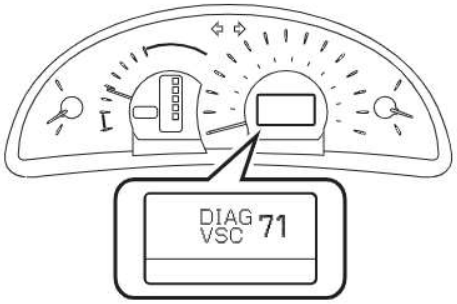
Display of Normal System Code:



Blinking Pattern in Trouble Code (Example Codes 71 and 72):



Display of Trouble Code (Example Code 71):



N C145057E02

BC

NOTICE:

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

HINT:

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

(c) After performing the check, disconnect the SST from terminals TS and CG, and TC and CG of the DLC3 and turn the power switch off.

(d) Turn the power switch on (IG).
HINT:
- If the power switch is not turned on (IG) after the SST is removed from the DLC3, the previous Test Mode will continue.
- If the power switch is turned on (IG) with terminals TS and CG shorted, the previous Test Mode will continue.

16. DTC OF TEST MODE (SIGNAL CHECK) FUNCTION (Procedure "A")

ABS sensor:

DTC Code	Detection Item	Trouble Area
C1271/71	Low output signal of front speed sensor RH	• Front speed sensor RH • Sensor installation • Speed sensor rotor
C1272/72	Low output signal of front speed sensor LH	• Front speed sensor LH • Sensor installation • Speed sensor rotor
C1273/73	Low output signal of rear speed sensor RH	• Rear speed sensor RH • Sensor installation • Speed sensor rotor
C1274/74	Low output signal of rear speed sensor LH	• Rear speed sensor LH • Sensor installation • Speed sensor rotor
C1275/75	Abnormal change in output signal of front speed sensor RH	Speed sensor rotor
C1276/76	Abnormal change in output signal of front speed sensor LH	Speed sensor rotor
C1277/77	Abnormal change in output signal of rear speed sensor RH	Speed sensor rotor
C1278/78	Abnormal change in output signal of rear speed sensor LH	Speed sensor rotor
C1279/79	Acceleration sensor output voltage malfunction	• Yaw rate and acceleration sensor • Sensor installation
C1281/81	Master cylinder pressure sensor output malfunction	• Stop light switch • Master cylinder pressure sensor

VSC sensor:

DTC Code	Detection Item	Trouble Area
C0371/71	Yaw rate sensor	Yaw rate and acceleration sensor

Electronically Controlled Brake sensor:

DTC Code	Detection Item	Trouble Area
C1346/71	Stroke sensor zero point learning malfunction	Brake pedal stroke sensor

HINT:
The codes in this table are output only in Test Mode (signal check).

BC

PROBLEM SYMPTOMS TABLE

If there are no DTCs output but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

NOTICE:

When replacing the skid control ECU, sensor, etc., make sure that the power switch is turned off, the stop light switch is off, and 2 minutes have elapsed since the driver's door was closed.

HINT:

- Inspect the fuse and relay before investigating the suspected areas shown in the table below.
- Inspect each malfunctioning circuit in numerical order for the corresponding symptom.
- Since the oil passage is blocked off by the master cut solenoid during Electronically Controlled Brake control, there is no kickback (vibration) to the brake pedal, creating a quiet operating sound even while the ABS is operating.

Electronically Controlled Brake System:

Symptom	Suspected Area	See page
ABS, BA and/or EBD does not operate	1. Use a chassis dynamometer, etc. to check the Electronically Controlled Brake operation.	-
	2. Check the DTC again and make sure that the normal system code is output.	BC-57
	3. IG power source circuit	BC-121
	4. Front speed sensor circuit	BC-80
	5. Rear speed sensor circuit	BC-89
	6. Check the brake actuator assembly with the intelligent tester. (Check brake actuator assembly operation using the Active Test function.) If abnormal, check the hydraulic circuit for leakage.	BC-259
	7. If the symptoms still occur even after the above circuits in suspected areas have been inspected and proved to be normal, replace the skid control ECU.	BC-289
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-57
	2. Front speed sensor circuit	BC-80
	3. Rear speed sensor circuit	BC-89
	4. Check the brake actuator assembly with the intelligent tester. (Check brake actuator assembly operation using the Active Test function.) If abnormal, check the hydraulic circuit for leakage.	BC-259
	5. If the symptoms still occur even after the above circuits in suspected areas have been inspected and proved to be normal, replace the skid control ECU.	BC-289
ABS warning light abnormal (Remains on)	1. ABS warning light circuit	BC-214
	2. Skid control ECU	BC-289
ABS warning light abnormal (Does not come on)	1. ABS warning light circuit	BC-219
	2. Skid control ECU	BC-289
BRAKE warning light abnormal (Remains on)	1. Brake fluid level warning switch circuit	BC-102
	2. BRAKE warning light circuit	BC-227
	3. Skid control ECU	BC-289
BRAKE warning light abnormal (Does not come on)	1. BRAKE warning light circuit	BC-234
	2. Skid control ECU	BC-289

BC

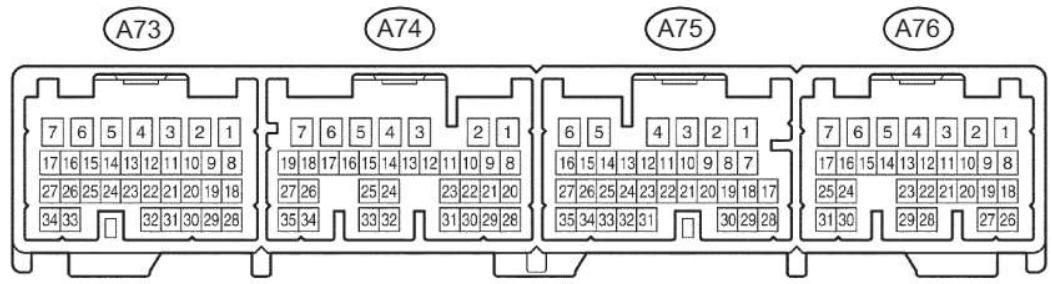
Symptom	Suspected Area	See page
VSC and/or TRAC does not operate	1. Check that traction control has not operated by carrying out diagnosis.	-
	2. Check the DTC again and make sure that the normal system code is output.	BC-57
	3. IG power source circuit	BC-121
	4. Check the hydraulic circuit for leakage.	-
	5. Front speed sensor circuit	BC-80
	6. Rear speed sensor circuit	BC-89
	7. Yaw rate and acceleration sensor circuit	BC-98
	8. Steering angle sensor circuit	BC-109
	9. If the symptoms still occur even after the above circuits in suspected areas have been inspected and proved to be normal, replace the skid control ECU.	BC-289
Brake control warning light abnormal (Remains on)	1. Brake control warning light circuit	BC-236
	2. Skid control ECU	BC-289
Brake control warning light abnormal (Does not come on)	1. Brake control warning light circuit	BC-240
	2. Skid control ECU	BC-289
VSC warning light (master caution indicator light and multi information display) abnormal (Remains on)	1. VSC warning light circuit	BC-221
	2. Skid control ECU	BC-289
VSC warning light (master caution indicator light multi information display) abnormal (Does not come on)	1. VSC warning light circuit	BC-225
	2. Skid control ECU	BC-289
SLIP indicator light abnormal (Remains on)	1. SLIP indicator light circuit	BC-242
	2. Skid control ECU	BC-289
SLIP indicator light abnormal (Does not come on)	1. SLIP indicator light circuit	BC-246
	2. Skid control ECU	BC-289
DTC check cannot be done	1. Check the DTC again and make sure that the normal system code is output.	BC-57
	2. TC and CG terminal circuit	BC-252
	3. If the symptoms still occur even after the above circuit in suspected areas has been inspected and proved to be normal, replace the skid control ECU.	BC-289
Sensor check cannot be done	1. TS and CG terminal circuit	BC-255
	2. Skid control ECU	BC-289
Skid control buzzer abnormal	1. Skid control buzzer circuit	BC-248
	2. Skid control ECU	BC-289

BC

TERMINALS OF ECU

1. **CHECK AUXILIARY BATTERY VOLTAGE**
   (a) Check the auxiliary battery voltage.
   Standard voltage:
   11 to 14 V
2. **SKID CONTROL ECU INSPECTION**
   (a) Measure the voltage between each terminal or between each terminal and body ground.
   (b) Connect the intelligent tester to the DLC3, and check the communication condition with the skid control ECU.
   (c) Using an oscilloscope, check that the pulse generates between each terminal or between each terminal and body ground.
   NOTICE:
   - **Inspection should be performed from the back of the connector with the connector connected to the skid control ECU.**
   - **The voltage between the terminals of the brake actuator assembly may become 0 V due to the fail safe function when the brake control warning light comes on (malfunctioning).**

Skid Control ECU:



C138589E03

BC

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

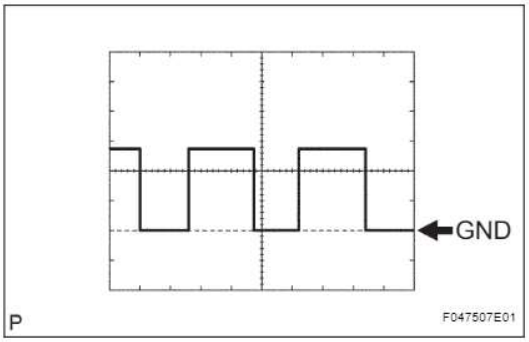
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND1 (A73-1) - Body ground	W-B - Body ground	Skid control ECU ground 1	Always	Below 1 Ω
R1+ (A73-2) - Body ground	B - Body ground	Main relay power 1	Power switch on (IG)	9.1 to 13.6 V
BS1 (A73-3) - Body ground	W - Body ground	Battery source 1	Approx. 1.5 seconds after turning power switch on (IG)	8.8 to 14 V
SMC1 (A73-4) - Body ground	W-B - Body ground	Master cut solenoid 1 output	Brake pedal depressed approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
BCTY+ (A73-5) - Body ground	LG - Body ground	Courtesy power input	Driver door open → close	Approx. 5 sec. 8 to 16 V → Below 1 V
SLAFR- (A73-6) - Body ground	R - Body ground	Front addition solenoid (-) RH output	Approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V
SLAFR+ (A73-7) - Body ground	B - Body ground	Front addition solenoid (+) RH output	Brake pedal depressed approx. 1.5 seconds after turning power switch on (IG)	Pulse generation (see waveform 1)
E (A73-8) - Body ground	R - Body ground	Pressure sensor ground	Power switch off	Below 1 Ω
VCM1 (A73-9) - Body ground	G - Body ground	Pressure sensor power	Power switch on (IG)	4.75 to 5.25 V
MR1+ (A73-11) - Body ground	B - Body ground	Motor relay power 1	Approx. 1.5 seconds after turning power switch on (IG)	8.8 to 14 V
R3+ (A73-12) - Body ground	W-B - Body ground	Main relay output 1	Approx. 1.5 seconds after turning power switch on (IG)	Below 1 V
SCSS (A73-13) - Body ground	P - Body ground	Stroke simulator cut solenoid output	Brake pedal depressed approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V
SLARL+ (A73-15) - Body ground	G - Body ground	Rear addition solenoid (+) LH output	Brake pedal depressed approx. 1.5 seconds after turning power switch on (IG)	Pulse generation (see waveform 1)
SLRRL+ (A73-16) - Body ground	L - Body ground	Rear reduction solenoid (+) LH output	Brake pedal depressed approx. 1.5 seconds after turning power switch on (IG)	Pulse generation (see waveform 1)
SLRFR+ (A73-17) - Body ground	L - Body ground	Front reduction solenoid (+) RH output	Power switch on (IG), after approx. 1.5 seconds brake pedal depressed → released	Pulse generation (see waveform 2)
PRL (A73-18) - Body ground	G - Body ground	Rear pressure sensor LH input	Power switch on (IG), brake pedal released	0.3 to 0.8 V
SG1 (A73-20) - Body ground	O - Body ground	Pressure sensor shield ground 1	Power switch off	Below 1 Ω
PACC (A73-21) - Body ground	R - Body ground	Accumulator pressure sensor input	Power switch on (IG), after pump motor operates and stops by pedal operation	3.3 to 4.7 V
FR- (A73-22) - Body ground	G - Body ground	Front sensor (-) RH input	Power switch off	Below 1 Ω
PFR (A73-23) - Body ground	Y - Body ground	Front pressure sensor RH input	Power switch on (IG), brake pedal released	0.3 to 0.8 V
MR1 (A73-25) - Body ground	LG - Body ground	Motor relay output 1	Power switch on (IG), pump motor is operating	Below 1.5 V
SLRRL- (A73-26) - Body ground	B - Body ground	Rear reduction solenoid (-) LH output	Approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V
SLARL- (A73-27) - Body ground	R - Body ground	Rear addition solenoid (-) LH output	Approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V
MTT (A73-29) - Body ground	W - Body ground	Motor test input	Power switch on (IG), pump motor is operating	3.5 V or higher
PMC1 (A73-30) - Body ground	B - Body ground	Master pressure sensor input 1	Power switch on (IG), brake pedal released	0.3 to 0.8 V
PCK1 (A73-31) - Body ground	W - Body ground	Pressure sensor check output 1	Approx. 1.5 seconds after turning power switch on (IG)	4.75 to 5.25 V
FR+ (A73-32) - Body ground	R - Body ground	Front sensor (+) RH input	Vehicle speed input	Pulse generation (see waveform 3)
SLRFR- (A73-34) - Body ground	LG - Body ground	Front reduction solenoid (-) RH output	Approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V
GND3 (A74-1) - Body ground	W-B - Body ground	Skid control ECU ground 3	Always	Below 1 Ω

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND2 (A74-2) - Body ground	W-B - Body ground	Skid control ECU ground 2	Always	Below 1 Ω
+BI1 (A74-3) - Body ground	R - Body ground	Main relay power input 1	Power switch off	10 to 14 V
+BO1 (A74-5) - Body ground	L - Body ground	Main relay power output 1	Power switch on (IG)	8.8 to 14 V
IG1 (A74-7) - Body ground	B - Body ground	IG1 power	Power switch on (IG)	10 to 14 V
BZ (A74-12) - Body ground	Y - Body ground	Skid control buzzer output	Power switch on (IG), buzzer is operating	Below 1 V
STP (A74-14) - Body ground	P - Body ground	Stop light switch signal input	Brake pedal depressed → released	8 to 14 V → Below 1.5 V
CANL (A74-18) - Body ground	W - Body ground	CAN communication (Send and receive-)	Check DTC using intelligent tester	CAN communication's DTC is not output
CANH (A74-19) - Body ground	B - Body ground	CAN communication (Send and receive+)	Check DTC using intelligent tester	CAN communication's DTC is not output
FAIL (A74-20) - Body ground	P - Body ground	Capacitor communication (Receive)	Approx. 1.5 seconds after turning power switch on (IG)	Pulse generation (see waveform 5)
SP1 (A74-22) - Body ground	L - Body ground	Speedometer output	Vehicle speed input	Pulse generation (see waveform 4)
RL- (A74-27) - Body ground	L - Body ground	Rear sensor (-) LH input	Power switch off	Below 1 Ω
ENA (A74-30) - Body ground	O - Body ground	Capacitor communication (Send)	Approx. 1.5 seconds after turning power switch on (IG)	Pulse generation (see waveform 6)
TS (A74-32) - Body ground	G - Body ground	Sensor diagnosis check input	Power switch on (IG), connect terminals TS and CG of the DLC3 → disconnect	Below 1.5 V → 9.1 to 13.6 V
VBZ (A74-33) - Body ground	B - Body ground	Skid control buzzer power	Power switch on (IG)	9.1 to 13.6 V
RL+ (A74-35) - Body ground	R - Body ground	Rear sensor (+) LH input	Vehicle speed input	Pulse generation (see waveform 3)
GND5 (A75-1) - Body ground	B - Body ground	Skid control ECU ground 5	Always	Below 1 Ω
GND4 (A75-2) - Body ground	W-B - Body ground	Skid control ECU ground 4	Always	Below 1 Ω
+BO2 (A75-4) - Body ground	R- Body ground	Main relay power output 2	Power switch on (IG)	8.8 to 14 V
+BI2 (A75-5) - Body ground	W - Body ground	Main relay power input 2	Power switch off	10 to 14 V
VCSK (A75-6) - Body ground	G - Body ground	Stroke sensor power	Power switch on (IG)	3.75 to 4.95 V
SSK (A75-7) - Body ground	BR - Body ground	Stroke sensor shield ground	Power switch off	Below 1 Ω
SKG (A75-8) - Body ground	R - Body ground	Stroke sensor ground	Power switch off	Below 1 Ω
SKS1 (A75-21) - Body ground	W - Body ground	Stroke sensor signal input 1	Power switch on (IG), brake pedal released	0.46 to 1.35 V
SKS2 (A75-22) - Body ground	B - Body ground	Stroke sensor signal input 2	Power switch on (IG), brake pedal released	2.56 to 4.35 V
RR- (A75-23) - Body ground	R - Body ground	Rear sensor (-) RH input	Power switch off	Below 1 Ω
RR+ (A75-31) - Body ground	G - Body ground	Rear sensor (+) RH input	Vehicle speed input	Pulse generation (see waveform 3)
SLAFL+ (A76-1) - Body ground	L - Body ground	Front addition solenoid (+) LH output	Brake pedal depressed approx. 1.5 seconds after turning power switch on (IG)	Pulse generation (see waveform 1)
SLAFL- (A76-2) - Body ground	B - Body ground	Front addition solenoid (-) LH output	Approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V

BC

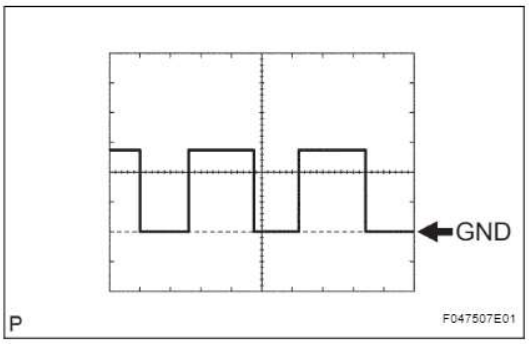
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
SMC2 (A76-3) - Body ground	LG - Body ground	Master cut solenoid 2 output	Brake pedal depressed approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V
GND6 (A76-4) - Body ground	BR - Body ground	Skid control ECU ground 6	Always	Below 1 Ω
IG2 (A76-5) - Body ground	GR - Body ground	IG2 power	Power switch on (IG)	10 to 14 V
LBL (A76-6) - Body ground	LG - Body ground	Brake fluid level warning switch input	Brake fluid level warning switch OFF → ON	4 to 8 V → Below 1.5 V
BS2 (A76-7) - Body ground	G - Body ground	Battery source 2	Approx. 1.5 seconds after turning power switch on (IG)	8.8 to 14 V
SLRFL+ (A76-8) - Body ground	B - Body ground	Front reduction solenoid (+) LH output	Power switch on (IG), after approx. 1.5 seconds, brake pedal depressed → released	Pulse generation (see waveform 2)
SLARR- (A76-9) - Body ground	B - Body ground	Rear addition solenoid (-) RH output	Approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V
SG2 (A76-12) - Body ground	BR - Body ground	Pressure sensor shield ground 2	Power switch off	Below 1 Ω
VCM2 (A76-14) - Body ground	BR - Body ground	Pressure sensor power 2	Power switch on (IG)	4.75 to 5.25 V
R4+ (A76-15) - Body ground	W - Body ground	Main relay output 2	Approx. 1.5 seconds after turning power switch on (IG)	Below 1 V
R2+ (A76-17) - Body ground	G - Body ground	Main relay power 2	Power switch on (IG)	9.1 to 13.6 V
SLRRR- (A76-18) - Body ground	G - Body ground	Rear reduction solenoid (-) RH output	Approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V
SLARR+ (A76-19) - Body ground	Y - Body ground	Rear addition solenoid (+) RH output	Brake pedal depressed approx. 1.5 seconds after turning power switch on (IG)	Pulse generation (see waveform 1)
SLRRR+ (A76-20) - Body ground	R - Body ground	Rear reduction solenoid (+) RH output	Brake pedal depressed approx. 1.5 seconds after turning power switch on (IG)	Pulse generation (see waveform 1)
PCK2 (A76-21) - Body ground	L - Body ground	Pressure sensor check output 2	Power switch on (IG)	4.75 to 5.25 V
FL- (A76-22) - Body ground	V - Body ground	Front sensor (-) LH input	Power switch off	Below 1 Ω
PFL (A76-23) - Body ground	R - Body ground	Front pressure sensor LH input	Power switch on (IG), brake pedal released	0.3 to 0.8 V
MR2+ (A76-25) - Body ground	Y - Body ground	Motor relay power 2	Approx. 1.5 seconds after turning power switch on (IG)	8.8 to 14 V
SLRFL- (A76-26) - Body ground	R - Body ground	Front reduction solenoid (-) LH output	Approx. 1.5 seconds after turning power switch on (IG)	Below 1.5 V
PMC2 (A76-27) - Body ground	W - Body ground	Master pressure sensor input 2	Power switch on (IG), brake pedal released	0.3 to 0.8 V
FL+ (A76-28) - Body ground	LG - Body ground	Front sensor (+) LH input	Vehicle speed input	Pulse generation (see waveform 3)
E2 (A76-29) - Body ground	G - Body ground	Pressure sensor ground 2	Power switch off	Below 1 Ω
MR2 (A76-30) - Body ground	O - Body ground	Motor relay output 2	Power switch on (IG), pump motor is operating	Below 1.5 V
PRR (A76-31) - Body ground	Y - Body ground	Rear pressure sensor RH input	Power switch on (IG), brake pedal released	0.3 to 0.8 V



(d) Waveform 1 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	5 V/DIV., 200 ms./DIV.
Vehicle condition	• While driving at approximately 20 km/h (12 mph) • Brake pedal depressed

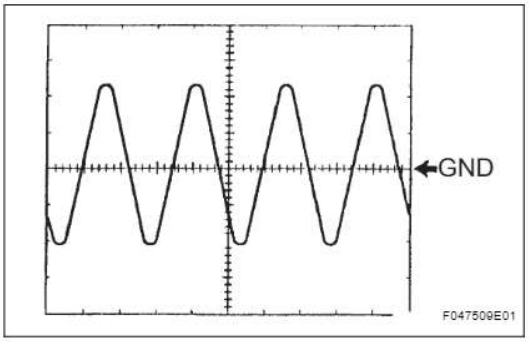
HINT:
Normal waveform is output only when BS1 and BS2 voltages are normal (10 to 14 V).



(e) Waveform 2 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	5 V/DIV., 200 ms./DIV.
Vehicle condition	• While driving at approximately 20 km/h (12 mph) • Brake pedal depressed → released

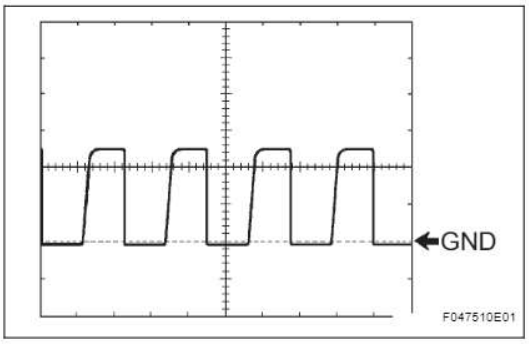
HINT:
Normal waveform is output only when BS1 and BS2 voltages are normal (10 to 14 V).



(f) Waveform 3 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	1 V/DIV., 2 ms./DIV.
Vehicle condition	While driving at approximately 30 km/h (18 mph)

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

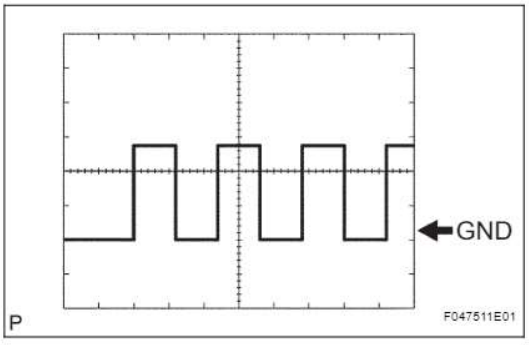


(g) Waveform 4 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	5 V/DIV., 50 ms./DIV.
Vehicle condition	While driving at approximately 20 km/h (12 mph)

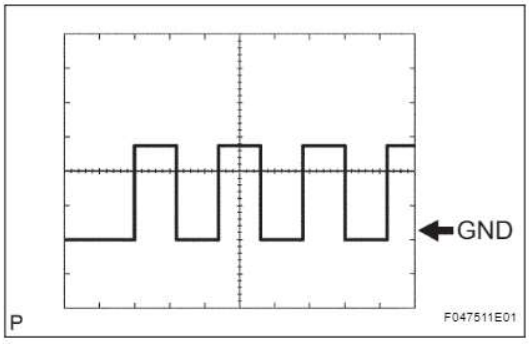
HINT:
As the vehicle speed (tire rotating speed) becomes faster, the cycle becomes shorter.

BC



(h) Waveform 5 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	5 V/DIV., 200 ms./DIV.
Vehicle condition	Turn the power switch on (IG)



(i) Waveform 6 (Reference): Using an oscilloscope:

Item	Condition
Tool setting	2 V/DIV., 100 ms./DIV.
Vehicle condition	Turn the power switch on (IG)

BC

DIAGNOSIS SYSTEM

1. DESCRIPTION

When troubleshooting a vehicle with the diagnosis system, the only difference from the usual troubleshooting procedure is connecting the intelligent tester to the vehicle and reading various data output from the vehicle's skid control ECU.

The skid control ECU records DTCs when the computer detects a malfunction in the computer itself or in its circuits.

To check for DTCs, connect the intelligent tester to the DLC3 on the vehicle. The intelligent tester enables you to erase the DTCs, activate the various actuators, and check the Freeze Frame Data and Data List.

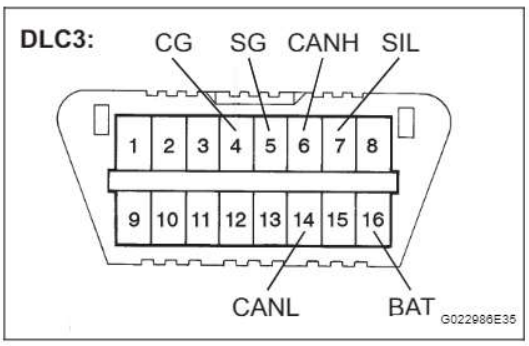
(a) Check the auxiliary battery voltage.

Standard voltage:

11 to 14 V

If the voltage is below 11 V, recharge the auxiliary battery before proceeding to the next step.

(b) Check the DLC3.



The ECU uses ISO 15765-4 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

Verify the conditions listed in the table below.

Symbols (Terminal No.)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	11 to 14 V
CANH (6) - CANL (14)	CAN bus line	Power switch off*	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Power switch off*	200 Ω or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Power switch off*	200 Ω or higher
CANH (6) - BAT (16)	HIGH-level CAN bus line	Power switch off*	6 kΩ or higher
CANL (14) - BAT (16)	LOW-level CAN bus line	Power switch off*	6 kΩ or higher

BC

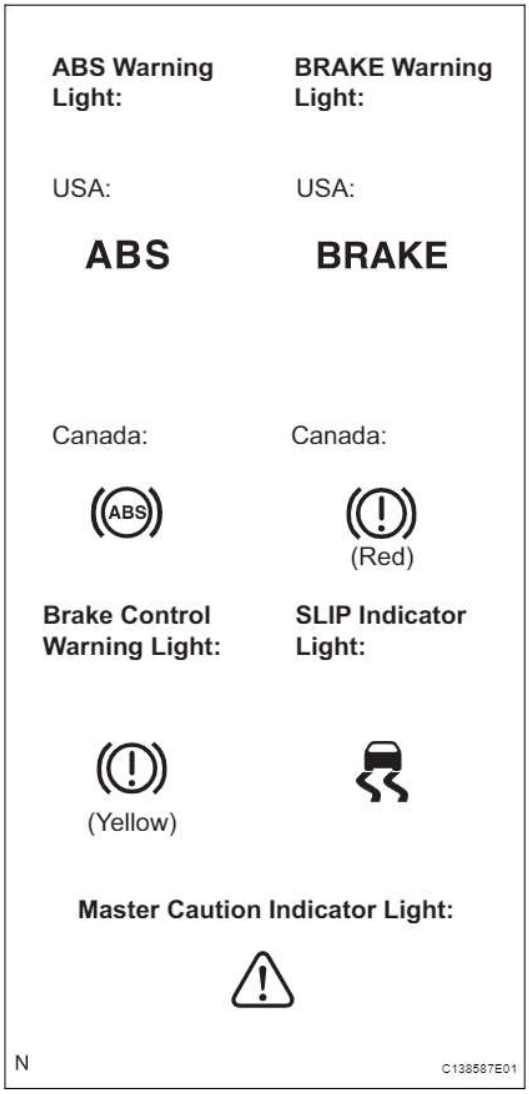
NOTICE:

***: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the power switch, any other switches or the doors.**

HINT:

Connect the cable of the intelligent tester to the DLC3, turn the power switch on (IG) and attempt to use the tester. If the display indicates that a communication error has occurred, there is a problem either with the vehicle or with the tester.

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tester is connected to another vehicle, the problem may be in the tester itself. Consult the Service Department listed in the tester operator's manual.



2. DIAGNOSIS

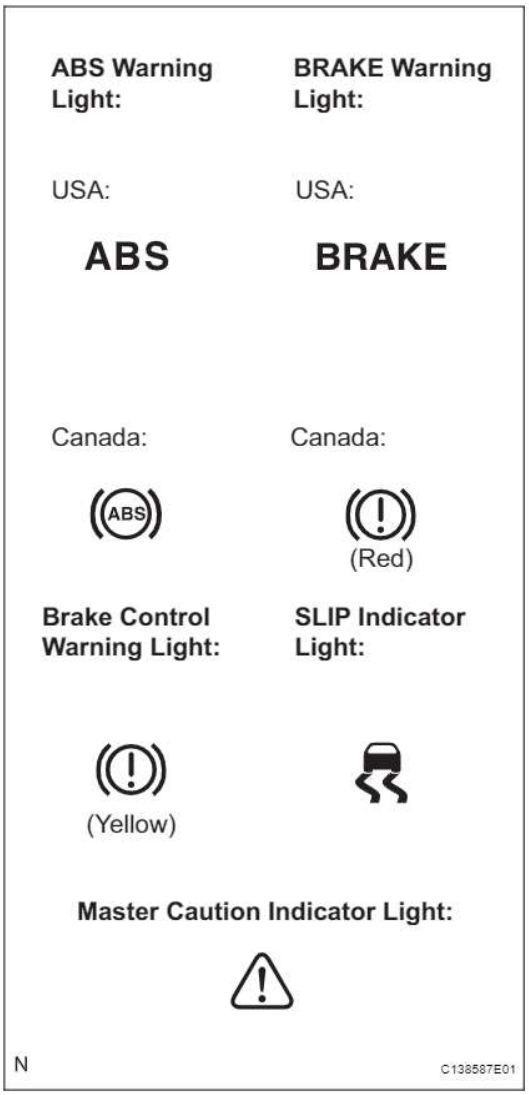
(a) If the skid control ECU detects a malfunction, the ABS warning, BRAKE warning, brake control warning, master caution indicator, and SLIP indicator lights will come on and the multi information display shows warning messages in order to warn the driver.
The table below indicates which lights will come on when there is a malfunction in a particular function.

BC

Item / Trouble Area	ABS	EBD	BA	TRAC	VSC
ABS warning light	O	O	O	-	-
BRAKE warning light	-	O	-	-	-
Brake control warning light	O	O	O	-	-
Master caution indicator light	O	O	O	O	O
Multi information display	O	O	O	O	O
SLIP indicator light	O	O	O	O	O

O: Light ON
-: Light OFF

- The DTCs are simultaneously stored in the memory. The DTCs can be read by connecting the SST between terminals TC and CG of the DLC3 and observing the blinking pattern of the ABS warning and brake control warning lights, by reading the multi information display, or by connecting the intelligent tester.
- This system has a signal check function (See page BC-35).
  The DTC can be read by connecting the intelligent tester and observing the blinking pattern of the ABS warning and brake control warning lights or by reading the multi information display.



3. WARNING LIGHT AND INDICATOR LIGHT CHECK

(a) Release the parking brake.

NOTICE:

When releasing the parking brake, move the shift lever to the P position for safety.

HINT:

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

(b) When the power switch is turned on (IG), check that the ABS warning, BRAKE warning, brake control warning, master caution indicator, and SLIP indicator lights come on and remain on until the power switch is turned on (READY).

HINT:

If the warning light and indicator light check result is not normal, proceed to troubleshooting for the ABS warning, BRAKE warning, brake control warning, VSC warning (master caution indicator), and SLIP indicator light circuits.

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

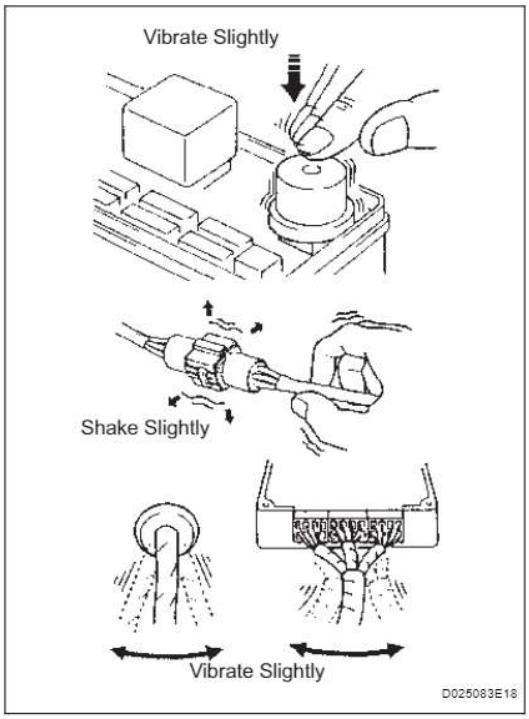
Trouble Area	See procedure
ABS warning light circuit	BC-214
BRAKE warning light circuit	BC-227
Brake control warning light circuit	BC-236
VSC warning light (master caution indicator light) circuit	BC-221
SLIP indicator light circuit	BC-242

BC

4. SYMPTOM SIMULATION

HINT:

The most difficult case in troubleshooting is when no symptoms occur. In such cases, a thorough customer problem analysis must be carried out. Then the same or similar conditions and environment in which the problem occurred in the customer's vehicle should be reproduced. No matter how experienced or skilled a technician may be, if he proceeds to troubleshoot without confirming the problem symptoms, he will likely overlook something important and make a wrong guess at some points in the repair operation. This leads to a standstill in troubleshooting.



(a) Vibration method: When vibration seems to be the major cause.

HINT:

Perform the simulation method only during the primary check period (for approximately 6 seconds after the power switch is turned on (IG)).

(1) Slightly vibrate the part of the sensor considered to be the problem cause with your fingers and check whether the malfunction occurs.

(2) Slightly shake the connector vertically and horizontally.

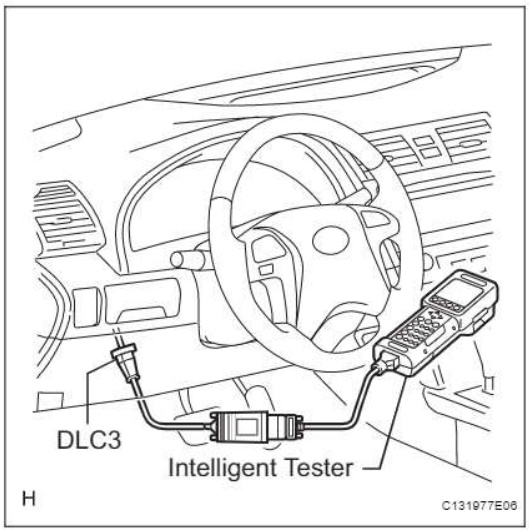
HINT:

Shaking the relays too strongly may result in open relays.

(3) Slightly shake the wire harness vertically and horizontally. The connector joint and fulcrum of the vibration are the major areas to be checked thoroughly.

DTC CHECK / CLEAR

1. DTC CHECK/CLEAR (INTELLIGENT TESTER)



(a) Check the DTC.

(1) Connect the intelligent tester to the DLC3.

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

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

(b) Clear the DTC.

(1) Connect the intelligent tester to the DLC3.

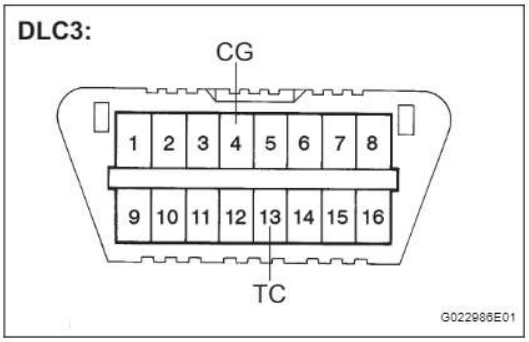
(2) Turn the power switch on (IG).

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

HINT:

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

BC



2. DTC CHECK/CLEAR (SST CHECK WIRE)

(a) Check the DTC.

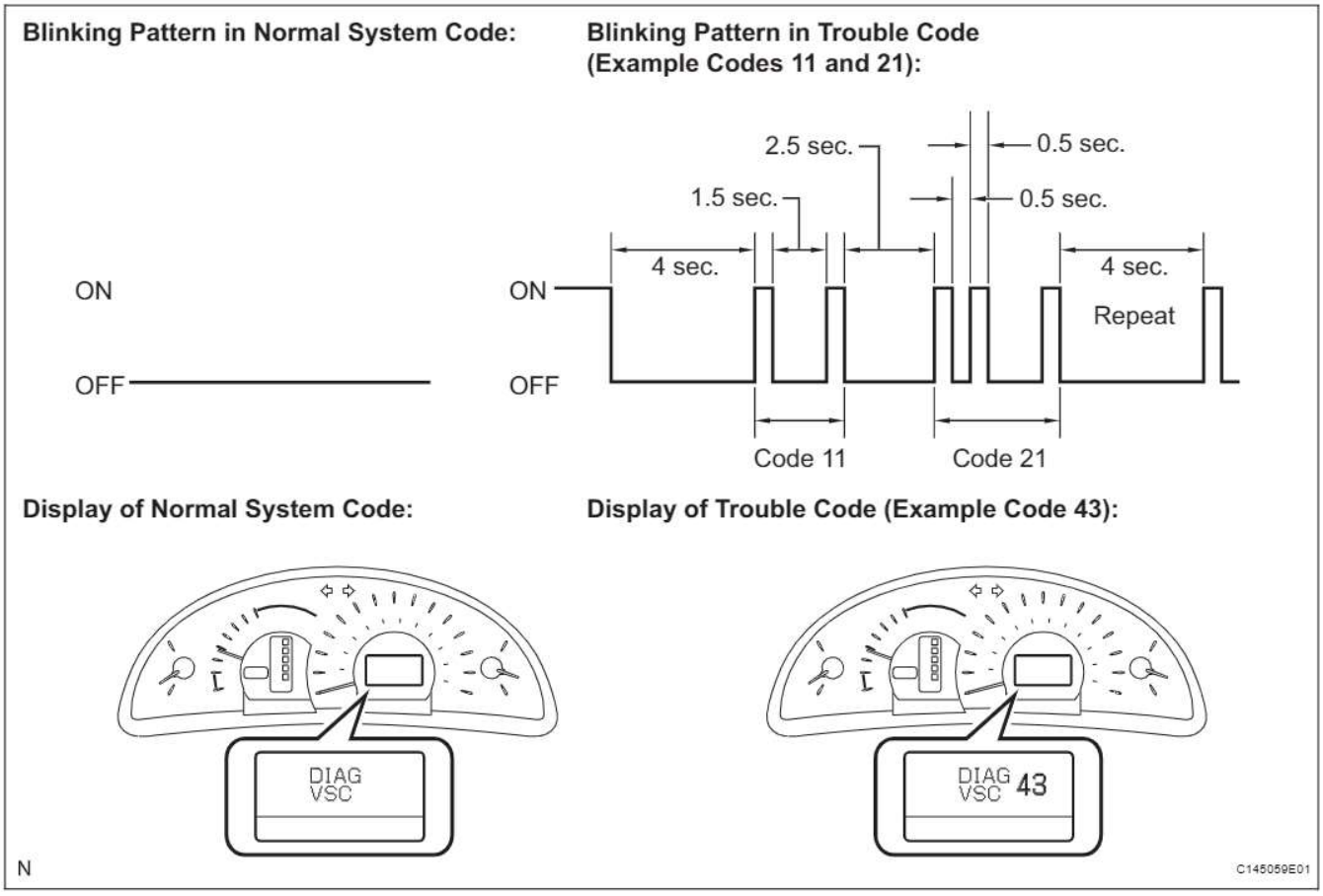
(1) Using SST, connect terminals TC and CG of the DLC3.
SST 09843-18040

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

(3) Observe the blinking pattern of the ABS warning and brake control warning lights and read the multi information display in order to identify the DTC.
HINT:
If no code appears, inspect the TC and CG terminal circuit, and ABS warning and brake control warning light circuits.

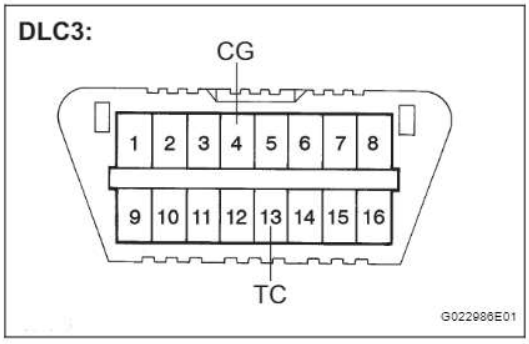
Trouble Area	See procedure
TC and CG terminal circuit	BC-252
ABS warning light circuit	BC-214 or BC-219
Brake control warning light circuit	BC-236 or BC-240
VSC warning light (multi information display) circuit	BC-221 or BC-225

(4) As an example, the illustration below shows the blinking patterns of the normal system code and trouble codes 11 and 21, and display of the normal system code and trouble code 43 on the multi information display.

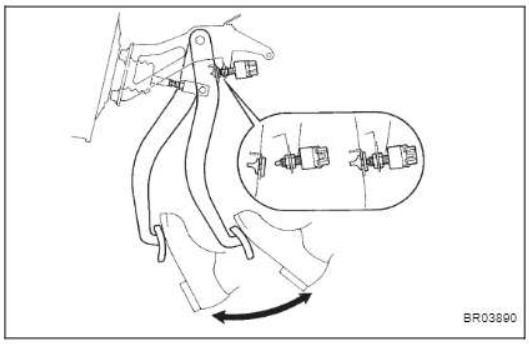


BC

(5) The codes are explained in the code table (See page BC-69).
(6) After completing the check, disconnect terminals TC and CG of the DLC3, and turn off the display. If 2 or more DTCs are detected at the same time, the DTCs will be displayed in ascending order.



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



(3) Clear the DTCs stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.
(4) Check that the warning light or multi information display indicates the normal system code.
(5) Remove the SST from the terminals of the DLC3.
HINT:
Clearing the DTCs cannot be performed by disconnecting the battery terminal or the ECU-IG NO. 2 fuse.

3. END OF DTC CHECK/CLEAR
(a) Turn the power switch on (IG).
(b) Check that the ABS warning light goes off when the power switch is turned on (READY).

BC

FREEZE FRAME DATA

1. FREEZE FRAME DATA/INFORMATION

(a) Whenever an ABS DTC is detected, the skid control ECU stores the current vehicle (sensor) state as Freeze Frame Data.

(b) The skid control ECU stores the number of times (maximum: 31) the power switch has been turned from off to on (IG) since the last time the ABS was activated.

(c) For DTCs memorized in the skid control ECU, information (INF) codes that are contained in the Freeze Frame Data can be displayed on the intelligent tester.
HINT:

- However, if the vehicle is stopped or at a low speed (7 km/h (4.3 mph) or less), or if a DTC is detected, the skid control ECU will stop counting the number.
- Freeze Frame Data at the time the ABS operates:
  The skid control ECU stores and updates data whenever the ABS system operates.
  When the ECU stores data at the time a DTC is detected, the data stored during ABS operation is erased.
- Freeze Frame Data at the time a DTC is detected:
  When the skid control ECU stores data at the time a DTC is detected, no updates will be performed until the data is cleared.

2. CHECK FREEZE FRAME DATA AND INFORMATION

(a) Connect the intelligent tester to the DLC3.

(b) Turn the power switch on (IG).

(c) On the tester display, select the Freeze Frame Data.

(d) Read the Freeze Frame Data recorded when the DTC was set.

(e) Read the information.

(1) Select the item that has an information (INF) code from the Freeze Frame Data screen.

BC

Tester Display	Measurement Item	Reference Value
VEHICLE SPD	Vehicle speed reading	Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)
STOP LAMP SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
#IG ON	Number of operations of power switch on (IG) after storing Freeze Frame Data	0 to 31
MAS CYL PRESS 1	Master cylinder pressure sensor reading	Brake pedal released: 0.3 to 0.9 V
M/C PRESS GRADE	Master cylinder pressure sensor change	Min.: -30 MPa/s, Max.: 225 MPa/s
YAW RATE	Yaw rate sensor reading	Min.: -128 deg/s, Max.: 127 deg/s
STEERING SEN	Steering angle sensor reading	Left turn: Increase Right turn: Decrease
FORWARD&REA G	Forward and backward G	Min.: -25.11 m/s^2, Max.: 24.91 m/s^2
BUZZER	Skid control buzzer signal	Skid control buzzer ON: ON, OFF: OFF
ACCELERATOR %	Accelerator opening angle %	Min.: 0 %, Max.: 128 %

Tester Display	Measurement Item	Reference Value
PARKING BRAKE SW	Parking brake switch signal	Parking brake switch ON: ON, OFF: OFF
FR WHEEL SPD	FR wheel speed	Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)
FL WHEEL SPD	FL wheel speed	Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)
RR WHEEL SPD	RR wheel speed	Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)
RL WHEEL SPD	RL wheel speed	Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)
LATERAL G	Lateral G	Min.: -25.11 m/s^2, Max.: 24.91 m/s^2
LEVER POSITION	Shift lever position information	FAIL 1st 2nd 3rd 4th 5th 6th/B D/M P, N R
OPERATED SYSTEM	Operated system status	ABS activated: ABS VSC activated: VSC TRAC activated: TRAC BA activated: BA Fail safe mode activated: FAIL No system activated: NON System prohibited: SYS
FREEZE TIME	Elapsed time after freeze trigger	Min.: 0 ms, Max.: 500 ms
TROUBLE CODE	Freeze frame DTC	Displays output DTC
PEDAL STROKE	Stroke sensor reading	Min.: 0 V, Max.: 5 V
PEDAL STROKE 2	Stroke sensor 2 reading	Min.: 0 V, Max.: 5 V
FR W/C SENS	FR wheel cylinder pressure sensor reading	Min.: 0 V, Max.: 5 V
FL W/C SENS	FL wheel cylinder pressure sensor reading	Min.: 0 V, Max.: 5 V
RR W/C SENS	RR wheel cylinder pressure sensor reading	Min.: 0 V, Max.: 5 V
RL W/C SENS	RL wheel cylinder pressure sensor reading	Min.: 0 V, Max.: 5 V
ACC PRESS SENS	Accumulator pressure sensor reading	Min.: 0 V, Max.: 5 V
MAS CYL PRESS 2	Master cylinder pressure sensor reading	Brake pedal released: 0.3 to 0.9 V
MTR VOLTAGE	Motor relay voltage value	Min.: 0 V, Max.: 20 V
SLAFR CUR	Linear solenoid (SLAFR) current	Min.: 0 A, Max.: 1.5 A
SLAFL CUR	Linear solenoid (SLAFL) current	Min.: 0 A, Max.: 1.5 A
SLARR CUR	Linear solenoid (SLARR) current	Min.: 0 A, Max.: 1.5 A
SLARL CUR	Linear solenoid (SLARL) current	Min.: 0 A, Max.: 1.5 A
SLRFR CUR	Linear solenoid (SLRFR) current	Min.: 0 A, Max.: 1.5 A
SLRFL CUR	Linear solenoid (SLRFL) current	Min.: 0 A, Max.: 1.5 A
SLRRR CUR	Linear solenoid (SLRRR) current	Min.: 0 A, Max.: 1.5 A
SLRRL CUR	Linear solenoid (SLRRL) current	Min.: 0 A, Max.: 1.5 A
FR TARGET OIL	FR wheel target oil pressure reading	Min.: 0 MPa, Max.: 20 MPa
FL TARGET OIL	FL wheel target oil pressure reading	Min.: 0 MPa, Max.: 20 MPa
RR TARGET OIL	RR wheel target oil pressure reading	Min.: 0 MPa, Max.: 20 MPa
RL TARGET OIL	RL wheel target oil pressure reading	Min.: 0 MPa, Max.: 20 MPa
DETAILED CODE	Detailed code for Freeze Frame DTC	Displays to output INF code
IG1 VOLTAGE	IG1 voltage value	Min.: 0 V, Max.: 20 V
IG2 VOLTAGE	IG2 voltage value	Min.: 0 V, Max.: 20 V
BS1 VOLTAGE	BS1 voltage value	Min.: 0 V, Max.: 20 V
BS2 VOLTAGE	BS2 voltage value	Min.: 0 V, Max.: 20 V

Tester Display	Measurement Item	Reference Value
VM1 VOLTAGE	VM1 voltage value	Min.: 0 V, Max.: 20 V
VM2 VOLTAGE	VM2 voltage value	Min.: 0 V, Max.: 20 V
+B1 VOLTAGE	+B1 voltage value	Min.: 0 V, Max.: 20 V
+B2 VOLTAGE	+B2 voltage value	Min.: 0 V, Max.: 20 V
ELAPSED TIME	Elapsed time after power switch on (IG)	Min.: 0 second, Max.: 100,661.76 seconds
CAPA MODE	Capacitor mode	Capacitor mode ON: ON, OFF: OFF
SCSS	Stroke simulator solenoid (SCSS) signal	Stroke simulator solenoid (SCSS) ON: ON, OFF: OFF
SMC1	Master cut solenoid (SMC1) signal	Master cut solenoid (SMC1) ON: ON, OFF: OFF
SMC2	Master cut solenoid (SMC2) signal	Master cut solenoid (SMC2) ON: ON, OFF: OFF
ECB* RELAY	ABS main relay signal	ABS main relay ON: ON, OFF: OFF
ECB* RELAY 2	ABS main relay 2 signal	ABS main relay 2 ON: ON, OFF: OFF
ECB* MTR RELAY	ABS motor relay signal	ABS motor relay ON: ON, OFF: OFF
ECB* MTR RELAY 2	ABS motor relay 2 signal	ABS motor relay 2 ON: ON, OFF: OFF
RESERVOIR SW	Brake fluid level warning switch signal	Brake fluid level warning switch ON: ON, OFF: OFF

*: Electronically Controlled Brake

3. **CLEAR FREEZE FRAME DATA AND INFORMATION**

NOTICE:

Clearing the DTC will also clear the Freeze Frame Data and information (INF) code.

(a) Connect the intelligent tester to the DLC3.

(b) Turn the power switch on (IG).

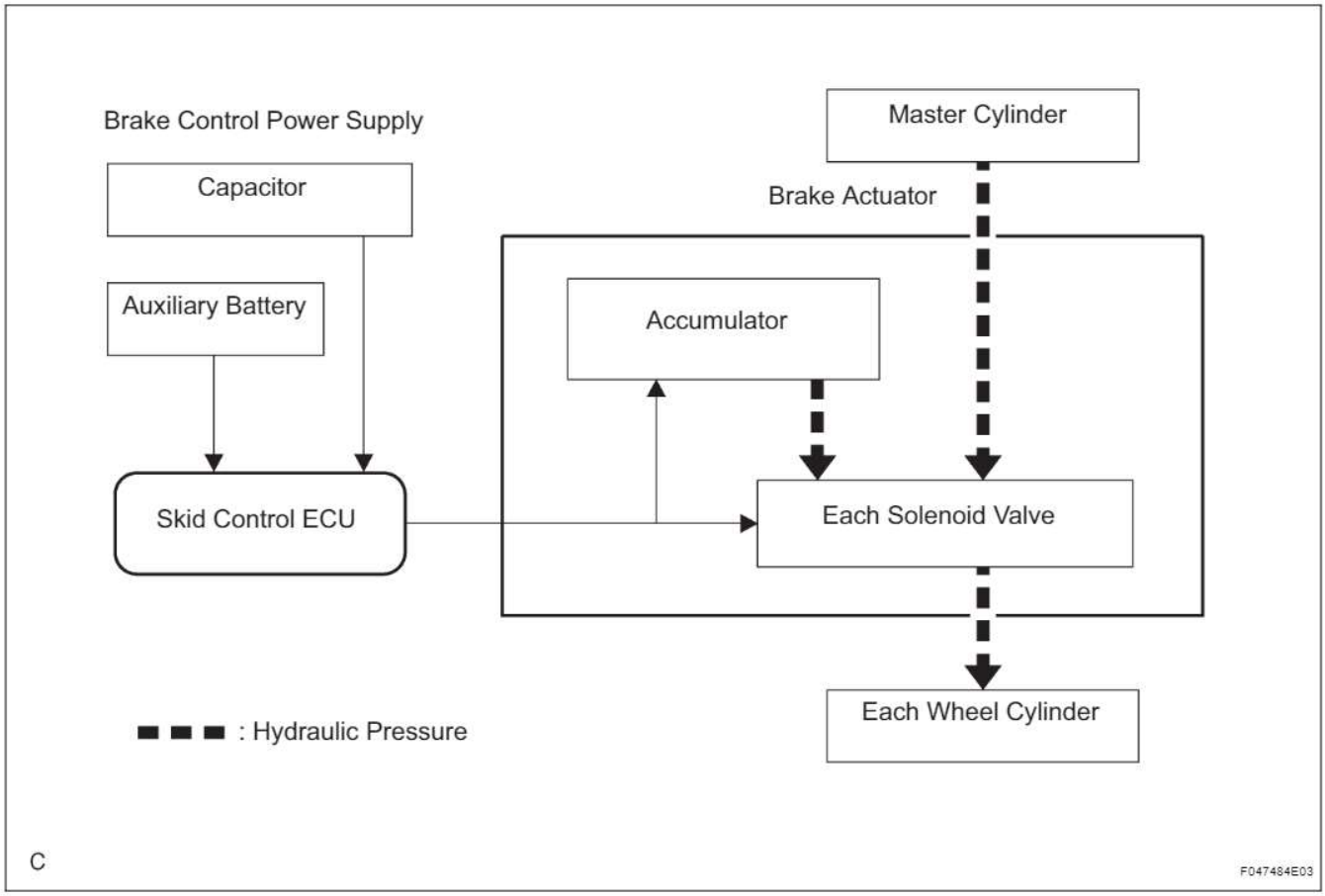
(c) Clear the DTC and Freeze Frame Data.

HINT:

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

BC

FAIL-SAFE CHART



1. FAIL-SAFE FUNCTION

(a) If a malfunction occurs in the skid control ECU, sensor signal, or actuator, rest normally operating parts will maintain brake control.

(b) When trouble occurs in the brake control system, the skid control ECU turns the warning light on, displays a DTC corresponding to the malfunctioning systems on the multi information display, and prohibits ABS, BA, and VSC operations.

ABS, EBD and BA system:

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

BC

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

TRAC and VSC system:

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

HINT:
As for the TRAC and VSC systems, different systems prohibit different controls depending on a malfunctioning part.

(c) The skid control ECU prevents operation of a malfunctioning hydraulic pressure system and continues brake control with the normal hydraulic pressure system.
HINT:
- If control of the Electronically Controlled Brake for any of the 4 wheels is prohibited, that wheel loses brake booster function or braking ability.
- If one of the 4 wheels loses brake booster function, the feeling when depressing the brake pedal changes as the stroke simulator (pedal reactive force generating solenoid) operation will be prohibited.
- If control of the Electronically Controlled Brake for all wheels is prohibited, the 2 front wheels will lose brake booster function.

(d) If the brake control is stopped under such conditions as when trouble occurs with a hydraulic pressure source, the pressure generated in the master cylinder by the driver is applied to the wheel cylinder to ensure braking force.

(e) A power back-up unit is built in as an additional power source to supply stable power to the system.

(f) If the regenerative brake alone does not operate under such conditions as a communication error with the HV control ECU, control is switched so that all braking force is generated with the hydraulic pressure brake.

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

BC

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

With the intelligent tester connected to the DLC3 and the power switch on (IG), the Electronically Controlled Brake, ABS, and VSC Data List can be displayed. Follow the prompts on the tester screen to access the Data List.

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
ECB* MTR RELAY	ABS motor relay / ON or OFF	ON: Motor relay ON OFF: Motor relay OFF	-
IDLE SW	Main idle switch / ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
STOP LAMP SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
PARKING BRAKE SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
LEVER POSITION	Shift lever position information / P/N, R, D/M, 1st-6th/B, FAIL	-	-
FR WHEEL SPD	FR wheel speed sensor reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Similar speed as indicated on speedometer
FL WHEEL SPD	FL wheel speed sensor reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Similar speed as indicated on speedometer
RR WHEEL SPD	RR wheel speed sensor reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Similar speed as indicated on speedometer
RL WHEEL SPD	RL wheel speed sensor reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Similar speed as indicated on speedometer
DECELERAT SEN	Acceleration sensor 1 reading / min.: -1.889 G, max.: 1.875 G	Approximately 0+-0.13 G while stationary	Reading changes when vehicle is bounced
DECELERAT SEN 2	Acceleration sensor 2 reading / min.: -1.889 G, max.: 1.875 G	Approximately 0+-0.13 G while stationary	Reading changes when vehicle is bounced
VEHICLE SPD	Maximum wheel speed sensor reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual vehicle speed	Speed indicated on speedometer
YAW RATE SENS 1	Yaw rate sensor 1 / min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
YAW RATE SENS 2	Yaw rate sensor 2 / min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
ZERO YAW RATE	Memorized zero value / min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
ZERO YAW RATE 2	Memorized zero value / min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
STEERING SEN	Steering angle sensor / min.: -3,276.8 deg, max.: 3,276.7 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
ACCELERATOR %	The difference of a present accelerator / min.: 0%, max.: 128%	-	-
FR SPD OPN	FR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
FL SPD OPN	FL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-

BC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR SPD OPN	RR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RL SPD OPN	RL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
YAW RATE OPN	Yaw rate sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
DECELERAT OPN	Acceleration sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
STEERING OPN	Steering angle sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
M/C OPN	Master cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
HV COM OPN	HV communication open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
#DTC	Number of DTC / min.: 0, max.: 255	-	-
ABS WARN LAMP	ABS warning light / ON or OFF	ON: Warning light ON OFF: Warning light OFF	-
BRAKE WARN LAMP	BRAKE warning light / ON or OFF	ON: Warning light ON OFF: Warning light OFF	-
SLIP INDI LAMP	SLIP indicator light / ON or OFF	ON: Indicator light ON OFF: Indicator light OFF	-
BUZZER	Skid control buzzer / ON or OFF	ON: Buzzer ON OFF: Buzzer OFF	-
VSC WARN LAMP	VSC warning (master caution indicator light and multi information display) / ON or OFF	ON: Indicator ON OFF: Indicator OFF	-
FR WHEEL ACCEL	FR wheel acceleration / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
FL WHEEL ACCEL	FL wheel acceleration / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
RR WHEEL ACCEL	RR wheel acceleration / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
RL WHEEL ACCEL	RL wheel acceleration / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
ZERO DECELERAT	Memorized zero value / min.: -25.11 m/s^2, max.: 24.91 m/s^2	Min.: -25.11 m/s^2 Max.: 24.91 m/s^2	-
ZERO DECELERAT 2	Memorized zero value / min.: -25.11 m/s^2, max.: 24.91 m/s^2	Min.: -25.11 m/s^2 Max.: 24.91 m/s^2	-
ZERO STEERING	Memorized zero value / min.: -3,276.8 deg, max.: 3,276.7 deg	Min.: -3,276.8 deg Max.: 3,276.7 deg	-
LATERAL G	Lateral G / min.: -25.11 m/s^2, max.: 24.91 m/s^2	Min.: -25.11 m/s^2 Max.: 24.91 m/s^2	-
FORWARD&REA G	Forward and rearward G / min.: -25.11 m/s^2, max.: 24.91 m/s^2	Min.: -25.11 m/s^2 Max.: 24.91 m/s^2	-
YAW RATE VALUE	Yaw rate value / min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
STEERING ANGLE	Steering angle value / min.: -3,276.8 deg, max.: 3,276.7 deg	Min.: -3,276.8 deg Max.: 3,276.7 deg	-
TRAC STATUS	TRAC control status / ON or OFF	ON: During the control	-
TRAC BRK STATUS	TRAC brake control status / ON or OFF	ON: During the control	-
FR VSC STATUS	FR wheel VSC control status / ON or OFF	ON: During the control	-

BC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FL VSC STATUS	FL wheel VSC control status / ON or OFF	ON: During the control	-
RR VSC STATUS	RR wheel VSC control status / ON or OFF	ON: During the control	-
RL VSC STATUS	RL wheel VSC control status / ON or OFF	ON: During the control	-
FR ABS STATUS	FR wheel ABS control status / ON or OFF	ON: During the control	-
FL ABS STATUS	FL wheel ABS control status / ON or OFF	ON: During the control	-
RR ABS STATUS	RR wheel ABS control status / ON or OFF	ON: During the control	-
RL ABS STATUS	RL wheel ABS control status / ON or OFF	ON: During the control	-
MAS CYL PRESS 2	Master cylinder pressure sensor 2 reading / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	Reading increases when brake pedal is depressed
PEDAL STROKE	Stroke sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.7 to 1.3 V	-
PEDAL STROKE 2	Stroke sensor 2 / min.: 0 V, max.: 5 V	When brake pedal is released: 3.7 to 4.3 V	-
ACC PRESS SENS	Accumulator pressure sensor / min.: 0 V, max.: 5 V	Specified value: 3.3 to 4.7 V	-
FR W/C SENS	FR wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	-
FL W/C SENS	FL wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	-
RR W/C SENS	RR wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	-
RL W/C SENS	RL wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	-
RESERVOIR SW	Brake fluid level warning switch / ON or OFF	ON: Reservoir level normal OFF: Reservoir level low	-
ECB* WARN LAMP	Brake control warning light / ON or OFF	ON: Warning light ON OFF: Warning light OFF	-
ECB* MTR RELAY 2	ABS motor relay 2 / ON or OFF	ON: Motor relay ON OFF: Motor relay OFF	-
ECB* RELAY	ABS main relay / ON or OFF	ON: Main relay ON OFF: Main relay OFF	-
ECB* RELAY 2	ABS main relay 2 / ON or OFF	ON: Main relay ON OFF: Main relay OFF	-
VOLT M/C SEN	Voltage of master cylinder pressure sensor / min.: -2.5 V, max.: 2.49 V	When brake pedal is released: 0.3 to 0.9 V	-
VOLT M/C SEN 2	Voltage of master cylinder pressure sensor 2 / min.: -2.5 V, max.: 2.49 V	When brake pedal is released: 0.3 to 0.9 V	-
VOLT STROK SEN	Voltage of stroke sensor / min.: -2.5 V, max.: 2.49 V	When brake pedal is released: 0.7 to 1.3 V	-
VOLT STROK SEN 2	Voltage of stroke sensor 2 / min.: -2.5 V, max.: 2.49 V	When brake pedal is released: 3.7 to 4.3 V	-
SLAFR CUR	Linear solenoid (SLAFR) current / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLAFL CUR	Linear solenoid (SLAFL) current / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLARR CUR	Linear solenoid (SLARR) current / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLARL CUR	Linear solenoid (SLARL) current / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
SLRFR CUR	Linear solenoid (SLRFR) current / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLRFL CUR	Linear solenoid (SLRFL) current / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLRRR CUR	Linear solenoid (SLRRR) current / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLRRL CUR	Linear solenoid (SLRRL) current / min.: 0 A, max.: 3 A	When brake pedal is released: 0 A	-
SLC CUR	Linear solenoid (SLC) current / min.: 0 A , max.: 3 A	When brake pedal is released: 0 A	-
M/C2 OPN	Master cylinder pressure sensor 2 open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
STROKE OPN	Stroke sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
STROKE OPN 2	Stroke sensor 2 open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
FR W/C OPN	FR wheel cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
FL W/C OPN	FL wheel cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RR W/C OPN	RR wheel cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RL W/C OPN	RL wheel cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
ACC OPEN	Accumulator pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
SMC1	Master cut solenoid (SMC1) / ON or OFF	ON: Operate OFF: Not operate	-
SMC2	Master cut solenoid (SMC2) / ON or OFF	ON: Operate OFF: Not operate	-
SCSS	Stroke simulator solenoid (SCSS) / ON or OFF	ON: Operate OFF: Not operate	-
FR RQST TORQ	FR regenerative request torque / min.: 0 N*m, max.: 65,536 N*m	-	-
FR OPERATE TORQ	FR regenerative operation torque / min.: 0 N*m, max.: 65,536 N*m	-	-
RR RQST TORQ	RR regenerative request torque / min.: 0 N*m, max.: 65,536 N*m	-	-
RR OPERATE TORQ	RR regenerative operation torque / min.: 0 N*m, max.: 65,536 N*m	-	-
REGEN COOP	Regenerative cooperation / ON or OFF	ON: Operate OFF: Not operate	-

*: Electronically Controlled Brake

2. ACTIVE TEST

HINT:

Performing the Active Test using the intelligent tester allows the relay, actuator, and other items to operate without removing any parts. Performing the Active Test as the first step in troubleshooting is one of the methods to save labor time.

It is possible to display the Data List during the Active Test.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the power switch on (IG).
(c) On the tester display, select the Active Test.
HINT:
The power switch must be turned on (IG) to proceed to the Active Test using the intelligent tester.

Tester Display	Test Part	Control Range	Diagnostic Note
ABS WARN LAMP	ABS warning light	Warning light ON / OFF	Observe combination meter
VSC WARN LAMP	VSC warning (master caution indicator light and multi information display)	Warning (light and display) ON / OFF	Observe combination meter
SLIP INDI LAMP	SLIP indicator light	Indicator light ON / OFF	Observe combination meter
BRAKE WARN LAMP	BRAKE warning light	Warning light ON / OFF	Observe combination meter
BUZZER	Skid control buzzer	Buzzer ON / OFF	Buzzer can be heard
ECB* WARN LAMP	Brake control warning light	Warning light ON / OFF	Observe combination meter
ECB* MTR RELAY	ABS motor relay	Relay ON / OFF	Operation sound of relay (clicking sound) and motor can be heard
ECB* MTR RELAY 2	ABS motor relay 2	Relay ON / OFF	Operation sound of relay (clicking sound) and motor can be heard
ECB* INVALID	Electronically Controlled Brake control invalid	Control invalid ON / OFF	Electronically Controlled Brake control is blocked (braking with no boost assist)
ZERO DOWN	Accumulator zero down activation	Activation ON / OFF	Brake fluid existing the accumulator makes noise
ACT PATTERN	Actuator air bleeding pattern activation	Activation ON / OFF	When accumulator pressure lowers, pump operation creates sound
POWER SUPPLY 1	Power supply air bleeding pattern activation 1	Activation ON / OFF	When accumulator pressure lowers, pump operation creates sound
POWER SUPPLY 2	Power supply air bleeding pattern activation 2	Activation ON / OFF	When accumulator pressure lowers, pump operation creates sound
SMC1	Master cut solenoid (SMC1)	Solenoid ON / OFF	Operation sound of solenoid (clicking sound) can be heard
SMC2	Master cut solenoid (SMC2)	Solenoid ON / OFF	Operation sound of solenoid (clicking sound) can be heard
ECB* RELAY	ABS main relay	Relay ON / OFF	Operation sound of relay (clicking sound) can be heard
ECB* RELAY 2	ABS main relay 2	Relay ON / OFF	Operation sound of relay (clicking sound) can be heard
SLRRL CLOSE	Linear solenoid (SLRRL) valve	Valve close ON / OFF	-

BC

Tester Display	Test Part	Control Range	Diagnostic Note
SLARL CLOSE	Linear solenoid (SLARL) valve	Valve close ON / OFF	-
SLRRR CLOSE	Linear solenoid (SLRRR) valve	Valve close ON / OFF	-
SLARR CLOSE	Linear solenoid (SLARR) valve	Valve close ON / OFF	-
SLRFL CLOSE	Linear solenoid (SLRFL) valve	Valve close ON / OFF	-
SLAFL CLOSE	Linear solenoid (SLAFL) valve	Valve close ON / OFF	-
SLRFR CLOSE	Linear solenoid (SLRFR) valve	Valve close ON / OFF	-
SLAFR CLOSE	Linear solenoid (SLAFR) valve	Valve close ON / OFF	-

*: Electronically Controlled Brake

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- If a trouble 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 Code in the DTC chart.
- Inspect the fuse and relay before investigating the trouble areas as shown in the table below.

DTC chart of ABS:

DTC Code	Detection Item	INF Code	Trouble Area	See page
42	Electronically Controlled Brake System Malfunction	-	Brake control (Electronically Controlled Brake) system	BC-78
C0200/31	Front Speed Sensor RH Circuit	251 252 253 254 255	1. Front speed sensor RH 2. Speed sensor circuit 3. Sensor installation 4. Speed sensor rotor 5. Skid control ECU	BC-80
C0205/32	Front Speed Sensor LH Circuit	264 265 266 267 268	1. Front speed sensor LH 2. Speed sensor circuit 3. Sensor installation 4. Speed sensor rotor 5. Skid control ECU	BC-80
C0210/33	Rear Speed Sensor RH Circuit	277 278 279 280 281	1. Rear speed sensor RH 2. Speed sensor circuit 3. Sensor installation 4. Speed sensor rotor 5. Skid control ECU	BC-89
C0215/34	Rear Speed Sensor LH Circuit	290 291 292 293 294	1. Rear speed sensor LH 2. Speed sensor circuit 3. Sensor installation 4. Speed sensor rotor 5. Skid control ECU	BC-89
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	302	1. Front speed sensor RH 2. Speed sensor circuit 3. Sensor installation 4. Speed sensor rotor 5. Skid control ECU	BC-112
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	303	1. Front speed sensor LH 2. Speed sensor circuit 3. Sensor installation 4. Speed sensor rotor 5. Skid control ECU	BC-112
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	304	1. Rear speed sensor RH 2. Speed sensor circuit 3. Sensor installation 4. Speed sensor rotor 5. Skid control ECU	BC-112
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	305	1. Rear speed sensor LH 2. Speed sensor circuit 3. Sensor installation 4. Speed sensor rotor 5. Skid control ECU	BC-112
C1243/43	Acceleration Sensor Stuck Malfunction	311 312 317	Yaw rate and acceleration sensor	BC-98
C1244/44	Open or Short in Acceleration Sensor Circuit	314	1. Yaw rate and acceleration sensor 2. Sensor installation	BC-98
C1245/45	Acceleration Sensor Output Malfunction	313	1. Yaw rate and acceleration sensor 2. Sensor installation	BC-98

BC

DTC Code	Detection Item	INF Code	Trouble Area	See page
C1336/98	Zero Point Calibration of Acceleration Sensor Undone	-	1. Skid control ECU 2. Yaw rate and acceleration sensor 3. Zero point calibration undone	BC-107
C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction	315	1. Yaw rate and acceleration sensor 2. Yaw rate and acceleration sensor power source circuit 3. Skid control ECU	BC-98
U0124/95	Lost Communication with Lateral Acceleration Sensor Module	319	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)	BC-209

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

HINT:

- In some cases, the intelligent tester cannot be used when the ABS warning light remains on.
- When U0073/94, U0123/62, U0124/95, U0126/63, U0131/67, or U0293/59 is output, inspect and repair the trouble areas indicated by these codes first.

DTC chart of VSC:

DTC Code	Detection Item	INF Code	Trouble Area	See page
43	ABS Control System Malfunction	-	ABS control system	BC-77
45	Electronically Controlled Brake System Malfunction	-	Brake control (Electronically Controlled Brake) system	BC-78
C1210/36	Zero Point Calibration of Yaw Rate Sensor Undone	-	1. Skid control ECU 2. Yaw rate and acceleration sensor 3. Zero point calibration undone	BC-107
C1231/31	Steering Angle Sensor Circuit Malfunction	-	1. Steering angle sensor 2. Steering angle sensor circuit 3. Steering angle sensor power supply 4. Skid control ECU	BC-109
C1234/34	Yaw Rate Sensor Malfunction	333 334 335 337	Yaw rate and acceleration sensor	BC-98
C1290/66	Steering Angle Sensor Zero Point Malfunction	-	1. Yaw rate and acceleration sensor zero point calibration incomplete 2. Poor adjustment of the centered position of the steering wheel 3. Poor adjustment of front wheel alignment	BC-164
C1304/27	EPS Control System Malfunction	376	Electronic power steering system	BC-167

BC

DTC Code	Detection Item	INF Code	Trouble Area	See page
C1310/51	Malfunction in HV system	156	Hybrid control system	BC-163
U0123/62	Lost Communication with Yaw Rate Sensor Module	338	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)	BC-209
U0126/63	Lost Communication with Steering Angle Sensor Module	350	CAN communication system (Skid control ECU to steering angle sensor)	BC-209
U0131/67	Lost Communication with Power Steering Control Module	374 375	CAN communication system (Skid control ECU to power steering (EPS) ECU)	BC-209

DTC chart of Electronically Controlled Brake:

DTC Code	Detection Item	INF Code	Trouble Area	See page
36	ABS Control System Malfunction	-	ABS control system	BC-77
C1202/68	Master Reservoir Level Malfunction	512	1. Fluid leakage 2. Brake fluid level 3. Brake fluid level warning switch 4. Brake fluid level warning switch circuit 5. Skid control ECU	BC-102
C1203/95	ECM Communication Circuit Malfunction	-	HV control ECU	BC-106
C1241/41 (*1)	Low Battery Positive Voltage	81 82 83 84	1. Auxiliary battery 2. ABS NO. 1 relay 3. ABS NO. 1 relay circuit 4. ABS NO. 2 relay 5. ABS NO. 2 relay circuit 6. Brake control power supply (Capacitor) 7. Hybrid control system (Charging circuit) 8. Skid control ECU	BC-121
C1242/42	Open in IG1 / IG2 Power Source Circuit	87 88	1. Auxiliary battery 2. IG1 power source circuit 3. IG2 power source circuit 4. Hybrid control system (Charging circuit) 5. Skid control ECU	BC-121
C1246/46	Master Cylinder Pressure Sensor Malfunction	191 192 194 195 197 198 199 200 201 202 205	1. Brake actuator assembly (Master cylinder pressure sensor) 2. Master cylinder pressure sensor circuit 3. Master cylinder pressure sensor power supply 4. Brake actuator assembly 5. Skid control ECU	BC-128
C1247/47	Stroke Sensor Malfunction	171 172 173 174 175 176 177 179 180	1. Brake pedal stroke sensor 2. Brake pedal stroke sensor circuit 3. Brake pedal stroke sensor power supply 4. Sensor installation 5. Skid control ECU	BC-136

BC

DTC Code	Detection Item	INF Code	Trouble Area	See page
C1249/49	Open in Stop Light Switch Circuit	520	1. STOP fuse 2. Stop light switch 3. Stop light switch circuit 4. Skid control ECU	BC-141
C1252/52	Brake Booster Pump Motor on Time Abnormally Long	130	1. ABS MTR1 relay 2. ABS MTR1 relay circuit 3. ABS MTR2 relay 4. ABS MTR2 relay circuit 5. Brake actuator assembly (Accumulator pressure sensor circuit)	BC-150
C1253/53	Hydro Booster Pump Motor Relay Malfunction	132 133 134 136 137 138 140	1. ABS MTR1 fuse 2. ABS MTR2 fuse 3. ABS MTR1 relay 4. ABS MTR1 relay circuit 5. ABS MTR2 relay 6. ABS MTR2 relay circuit 7. Brake actuator assembly (Pump motor) 8. Pump motor circuit	BC-150
C1256/57	Accumulator Low Pressure	141 143	1. Accumulator pressure 2. Brake actuator assembly (Accumulator pressure sensor) 3. Brake actuator assembly (Pump motor)	BC-160
C1259/58	HV System Regenerative Malfunction	150	Hybrid control system	BC-163
C1300	Skid Control ECU Malfunction	-	Skid control ECU	BC-166
C1311/11	Open in Main Relay 1 Circuit	1	1. ABS NO. 1 relay 2. ABS NO. 1 relay circuit 3. Skid control ECU	BC-168
C1312/12	Short in Main Relay 1 Circuit	3	1. ABS NO. 1 relay 2. ABS NO. 1 relay circuit 3. Skid control ECU	BC-168
C1313/13	Open in Main Relay 2 Circuit	4	1. ABS NO. 2 relay 2. ABS NO. 2 relay circuit 3. Skid control ECU	BC-168
C1314/14	Short in Main Relay 2 Circuit	6	1. ABS NO. 2 relay 2. ABS NO. 2 relay circuit 3. Skid control ECU	BC-168
C1315/31	SMC1 Changeover Solenoid Malfunction	61 62 63 64	1. Brake actuator assembly (SMC1) 2. SMC1 circuit 3. Skid control ECU	BC-173
C1316/32	SMC2 Changeover Solenoid Malfunction	66 67 68 69	1. Brake actuator assembly (SMC2) 2. SMC2 circuit 3. Skid control ECU	BC-173
C1319/35	SCSS Changeover Solenoid Malfunction	71 72 73 74	1. Brake master stroke simulator 2. Brake master stroke simulator circuit 3. Skid control ECU	BC-182
C1341/62	Front Hydraulic System RH Malfunction	551 552 553 554 555	1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly	BC-185

BC

DTC Code	Detection Item	INF Code	Trouble Area	See page
C1342/63	Front Hydraulic System LH Malfunction	561 562 563 564 565	1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly	BC-185
C1343/64	Rear Hydraulic System RH Malfunction	571 572 573 574 575	1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly	BC-185
C1344/65	Rear Hydraulic System LH Malfunction	581 582 583 584 585	1. Fluid leakage 2. Disc rotor 3. Brake actuator assembly	BC-185
C1345/66	Linear Solenoid Valve Offset Learning Undone	-	1. Initialization of linear solenoid valve and calibration undone 2. Skid control ECU	BC-190
C1352/21	Front Increasing Pressure Solenoid RH Malfunction	11 12 13 14	1. Brake actuator assembly (SLAFR) 2. SLAFR circuit 3. Skid control ECU	BC-173
C1353/23	Front Increasing Pressure Solenoid LH Malfunction	21 22 23 24	1. Brake actuator assembly (SLAFL) 2. SLAFL circuit 3. Skid control ECU	BC-173
C1354/25	Rear Increasing Pressure Solenoid RH Malfunction	31 32 33 34	1. Brake actuator assembly (SLARR) 2. SLARR circuit 3. Skid control ECU	BC-173
C1355/27	Rear Increasing Pressure Solenoid LH Malfunction	41 42 43 44	1. Brake actuator assembly (SLARL) 2. SLARL circuit 3. Skid control ECU	BC-173
C1356/22	Front Decreasing Pressure Solenoid RH Malfunction	16 17 18 19	1. Brake actuator assembly (SLRFR) 2. SLRFR circuit 3. Skid control ECU	BC-173
C1357/24	Front Decreasing Pressure Solenoid LH Malfunction	26 27 28 29	1. Brake actuator assembly (SLRFL) 2. SLRFL circuit 3. Skid control ECU	BC-173
C1358/26	Rear Decreasing Pressure Solenoid RH Malfunction	36 37 38 39	1. Brake actuator assembly (SLRRR) 2. SLRRR circuit 3. Skid control ECU	BC-173
C1359/28	Rear Decreasing Pressure Solenoid LH Malfunction	46 47 48 49	1. Brake actuator assembly (SLRRL) 2. SLRRL circuit 3. Skid control ECU	BC-173

DTC Code	Detection Item	INF Code	Trouble Area	See page
C1364/61	Wheel Cylinder Pressure Sensor Malfunction	221 222 224 225 227 228 230 231 233 234 236 237 239 240 242 243	1. Brake actuator assembly (Wheel cylinder pressure sensor) 2. Wheel cylinder pressure sensor circuit 3. Wheel cylinder pressure sensor power supply 4. Brake actuator assembly 5. Skid control ECU	BC-128
C1365/54	Accumulator Pressure Sensor Malfunction	211 212 214 215 216	1. Brake actuator assembly (Accumulator pressure sensor) 2. Accumulator pressure sensor circuit 3. Accumulator pressure sensor power supply 4. Brake actuator assembly 5. Skid control ECU	BC-192
C1368/67	Linear Solenoid Valve Offset Malfunction	-	1. Initialization of linear solenoid valve and calibration undone 2. Skid control ECU	BC-190
C1377/43	Capacitor Malfunction	101 102 103 105 106 107 108 109 110	1. ABS MAIN NO. 1 fuse 2. ABS MAIN NO. 2 fuse 3. ABS MAIN NO. 3 fuse 4. Apply high voltage 5. Brake control power supply (Capacitor) 6. Brake control power supply circuit	BC-196
C1378/44	Capacitor Communication Malfunction	112	1. Brake control power supply (Capacitor) 2. Brake control power supply circuit	BC-202
C1391/69	Accumulator Leak Malfunction	591	1. Fluid leakage 2. Brake actuator assembly	BC-207
C1392/48	Stroke Sensor Zero Point Calibration Undone	-	1. Brake pedal stroke sensor zero point calibration undone (Initialization of linear solenoid valve and calibration undone) 2. Skid control ECU	BC-136
U0073/94	Control Module Communication Bus OFF	360	CAN communication system	BC-209
U0293/59	Communication Error from HV ECU	152 153 154	CAN communication system (Skid control ECU to HV control ECU)	BC-209

BC

(*1): These codes are displayed to indicate the ABS and Electronically Controlled Brake DTCs.

Test Mode DTC of ABS:

DTC Code	Detection Item	INF Code	Trouble Area	See page
C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	-	1. Front speed sensor RH 2. Sensor installation 3. Speed sensor rotor	BC-80
C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	-	1. Front speed sensor LH 2. Sensor installation 3. Speed sensor rotor	BC-80
C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	-	1. Rear speed sensor RH 2. Sensor installation 3. Speed sensor rotor	BC-89
C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	-	1. Rear speed sensor LH 2. Sensor installation 3. Speed sensor rotor	BC-89
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	-	Speed sensor rotor	BC-112
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	-	Speed sensor rotor	BC-112
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	-	Speed sensor rotor	BC-112
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	-	Speed sensor rotor	BC-112
C1279/79	Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)	-	1. Yaw rate and acceleration sensor 2. Sensor installation	BC-98
C1281/81	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)	-	1. Stop light switch 2. Master cylinder pressure sensor	BC-128

Test Mode DTC of VSC:

DTC Code	Detection Item	INF Code	Trouble Area	See page
C0371/71	Yaw Rate Sensor (Test Mode DTC)	-	Yaw rate and acceleration sensor	BC-98

Test Mode DTC of Electronically Controlled Brake:

DTC Code	Detection Item	INF Code	Trouble Area	See page
C1346/71	Stroke Sensor Zero Point Learning Malfunction (Test Mode DTC)	-	Brake pedal stroke sensor	BC-136

BC

DTC	36	ABS Control System Malfunction

DTC	43	ABS Control System Malfunction

DESCRIPTION

This DTC is output when the VSC and/or Electronically Controlled Brake system detects a malfunction in the ABS control system.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
36	-	Malfunction in the ABS control system.	ABS control system
43	-	Malfunction in the ABS control system.	ABS control system

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK ABS CONTROL SYSTEM

(a) Clear the DTC (See page BC-57).
(b) Turn the power switch on (IG).
(c) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (ABS control system DTC) is not output	A
DTC (ABS control system DTC) is output	B

B → **REPAIR CIRCUIT INDICATED BY OUTPUT DTC (See page BC-69)**

A

2	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (IG).
(d) Check if the same DTC is recorded (See page BC-57).

BC

Result

Condition	Proceed to
DTCs (36 and/or 43) are not output	A
DTCs (36 and/or 43) are output	B

B → **REPLACE SKID CONTROL ECU**

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

DTC	42	Electronically Controlled Brake System Malfunction

DTC	45	Electronically Controlled Brake System Malfunction

DESCRIPTION

This DTC is output when the ABS and/or VSC system detects a malfunction in the brake control (Electronically Controlled Brake) system.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
42	-	Malfunction in the brake control (Electronically Controlled Brake) system.	Brake control (Electronically Controlled Brake) system
45	-	Malfunction in the brake control (Electronically Controlled Brake) system.	Brake control (Electronically Controlled Brake) system

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK BRAKE CONTROL (ELECTRONICALLY CONTROLLED BRAKE) SYSTEM

(a) Clear the DTC (See page BC-57).
(b) Turn the power switch on (IG).
(c) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (Brake control (Electronically Controlled Brake) system DTC) is not output	A
DTC (Brake control (Electronically Controlled Brake) system DTC) is output	B

B → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (See page BC-69)

A

2	RECONFIRM DTC

BC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (IG).
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (42 and/or 45) are not output	A
DTCs (42 and/or 45) are output	B

B → REPLACE SKID CONTROL ECU

A

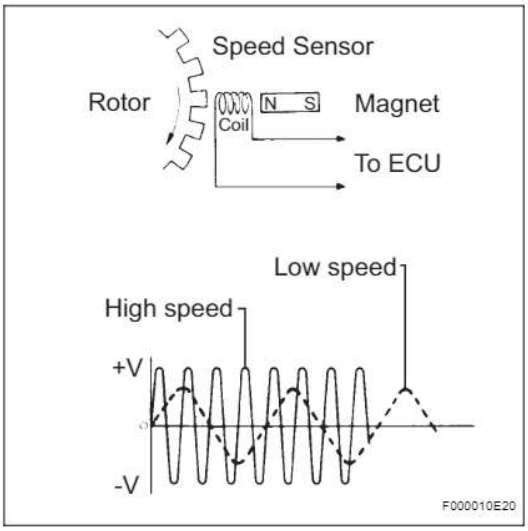
CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

DTC	C0200/31	Front Speed Sensor RH Circuit
DTC	C0205/32	Front Speed Sensor LH Circuit
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)

DESCRIPTION

The speed sensors detect wheel speed and transmit the signals to the ECU. These signals are used for control of the ABS control system. Each of the front and rear rotors has 48 serrations.
When the rotors rotate, the magnetic field generated by the permanent magnet in the speed sensor induces an AC voltage.
Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.
DTCs C1271/71 and C1272/72 can be deleted when the speed sensor sends a wheel speed signal or the Test Mode ends. DTCs C1271/71 and C1272/72 are output only in the Test Mode.



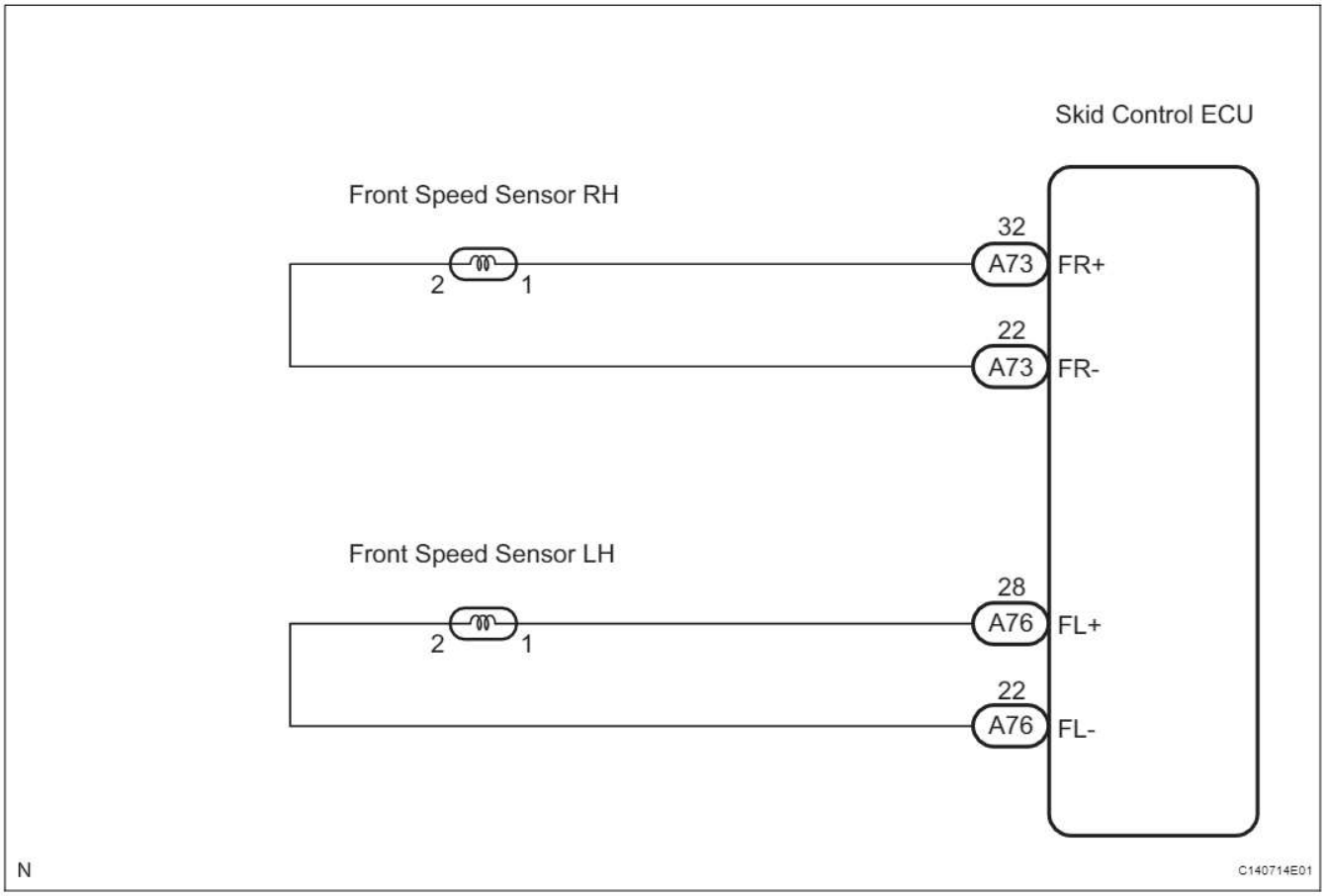
DTC Code	INF Code	DTC Detection Condition	Trouble Area
C0200/31	251	At a vehicle speed of 10 km/h (6 mph) or more, an open or short in the sensor signal circuit of the abnormal wheel continues for 1 second or more.	• Front speed sensor RH • Speed sensor circuit • Sensor installation • Speed sensor rotor • Skid control ECU
↑	252	More than 1 wheel is abnormal.	↑
↑	253	Speed sensor signal circuit is open for 0.5 seconds or more.	↑
↑	254	Momentary interruption of sensor signal from the abnormal wheel occurs 7 times or more.	↑
↑	255	Frequency of 2.7 kHz or higher is input.	• Front speed sensor RH • Speed sensor circuit • Speed sensor rotor • Skid control ECU

BC

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C0205/32	264	At a vehicle speed of 10 km/h (6 mph) or more, an open or short in the sensor signal circuit of the abnormal wheel continues for 1 second or more.	• Front speed sensor LH • Speed sensor circuit • Sensor installation • Speed sensor rotor • Skid control ECU
↑	265	More than 1 wheel is abnormal.	↑
↑	266	Speed sensor signal circuit is open for 0.5 seconds or more.	↑
↑	267	Momentary interruption of sensor signal from the abnormal wheel occurs 7 times or more.	↑
↑	268	Frequency of 2.7 kHz or higher is input.	• Front speed sensor LH • Speed sensor circuit • Speed sensor rotor • Skid control ECU
C1271/71 C1272/72	-	Detected only during Test Mode.	• Front speed sensor RH/LH • Sensor installation • Speed sensor rotor

HINT:
- DTCs C0200/31 and C1271/71 are for the front speed sensor RH.
- DTCs C0205/32 and C1272/72 are for the front speed sensor LH.
- The BRAKE warning light comes on when speed sensor malfunctions are detected in two or more wheels.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

(a) Using the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (See page BC-23).

ABS / VSC:

Tester Display	Measurement Item/Range	Normal Condition
FR SPD OPN	FR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal
FL SPD OPN	FL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal

Result

Condition	Proceed to
There are no momentary interruptions	A
There are momentary interruptions	B
There is a constant open circuit	C

HINT:
Perform the above inspection before removing the sensor and connector.

B → Go to step 11

C → Go to step 5

A

2 READ VALUE OF INTELLIGENT TESTER (FRONT SPEED SENSOR)

(a) Turn the power switch off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the power switch on (READY).
(d) Select the Data List mode on the intelligent tester.

ABS / VSC:

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

BC

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

OK:

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

NG → Go to step 5

OK

3 PERFORM TEST MODE (SIGNAL CHECK)

(a) Perform sensor check in the Test Mode procedure (See page BC-35).
OK:
All Test Mode DTCs are erased.

NG → Go to step 5

OK

4 RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Drive the vehicle at the speed of 32 km/h (20 mph) or more for at least 60 seconds.
(e) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C0200/31 and/or C0205/32) are not output	A
DTCs (C0200/31 and/or C0205/32) are output	B

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

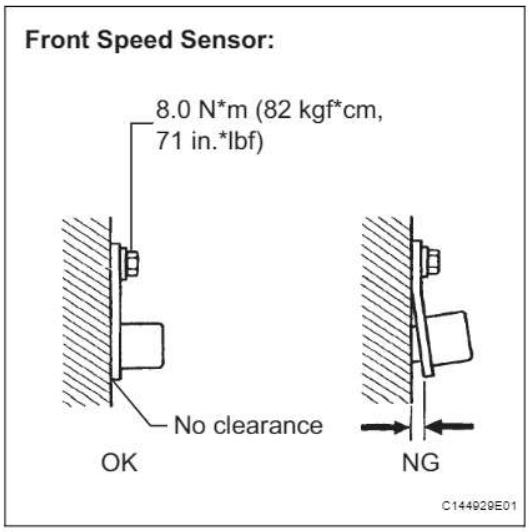
B → Go to step 7

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

5	CHECK FRONT SPEED SENSOR INSTALLATION



(a) Turn the power switch off.
(b) Check the speed sensor installation.
OK:
There is no clearance between the sensor and the front steering knuckle.
The installation bolt is tightened properly.
Torque:
8.0 N*m (82 kgf*cm, 71 in.*lbf)

NG → **INSTALL FRONT SPEED SENSOR CORRECTLY**

OK

6	CHECK FRONT SPEED SENSOR TIP

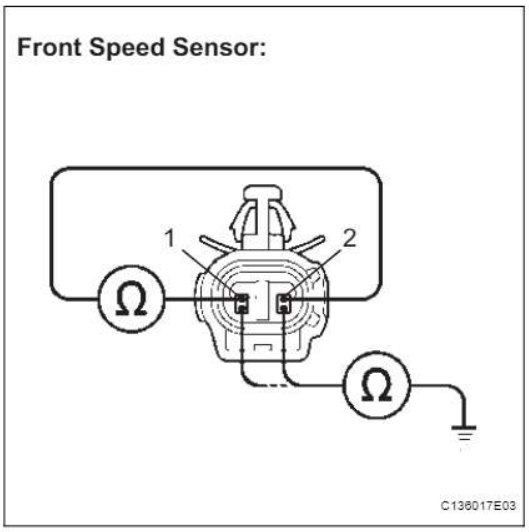
(a) Remove the front speed sensor (See page BC-272).
(b) Check the speed sensor tip.
OK:
No scratches or foreign matter on the sensor tip.
NOTICE:
Check the speed sensor signal after cleaning or replacement (See page BC-35).

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

OK

BC

7	INSPECT FRONT SPEED SENSOR



(a) Turn the power switch off.
(b) Install the front speed sensor.
(c) Disconnect the front speed sensor connector.
(d) Measure the resistance according to the value(s) in the table below.

Standard resistance:

RH

Tester Connection	Condition	Specified Condition
1 (FR+) - 2 (FR-)	Always	1.4 to 1.8 kΩ or at 20°C (68°F)
1 (FR+) - Body ground	Always	10 kΩ or higher
2 (FR-) - Body ground	Always	10 kΩ or higher

LH

Tester Connection	Condition	Specified Condition
1 (FL+) - 2 (FL-)	Always	1.4 to 1.8 kΩ or at 20°C (68°F)
1 (FL+) - Body ground	Always	10 kΩ or higher
2 (FL-) - Body ground	Always	10 kΩ or higher

NOTICE:
Check the speed sensor signal after replacement (See page BC-35).

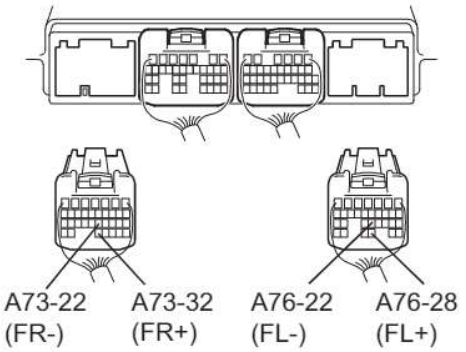
NG → REPLACE FRONT SPEED SENSOR

OK

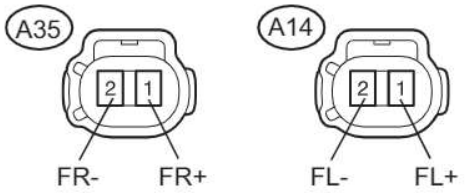
BC

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

Skid Control ECU Wire Harness View:



Front Speed Sensor Harness Side Connector Front View:



C140715E01

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

Standard resistance:

RH

Tester Connection	Condition	Specified Condition
A73-32 (FR+) - A35-1 (FR+)	Always	Below 1 Ω
A73-32 (FR+) - Body ground	Always	10 kΩ or higher
A73-22 (FR-) - A35-2 (FR-)	Always	Below 1 Ω
A73-22 (FR-) - Body ground	Always	10 kΩ or higher

LH

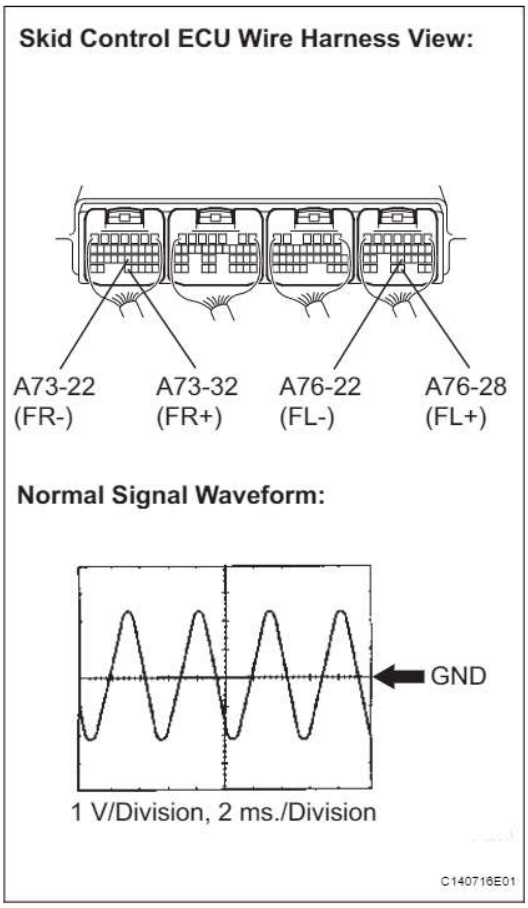
Tester Connection	Condition	Specified Condition
A76-28 (FL+) - A14-1 (FL+)	Always	Below 1 Ω
A76-28 (FL+) - Body ground	Always	10 kΩ or higher
A76-22 (FL-) - A14-2 (FL-)	Always	Below 1 Ω
A76-22 (FL-) - Body ground	Always	10 kΩ or higher

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

OK

BC

9	CHECK SPEED SENSOR AND SPEED SENSOR ROTOR SERRATIONS



(a) Reconnect the skid control ECU connectors and the front speed sensor connector.
(b) Connect the oscilloscope to the front speed sensor terminal of the skid control ECU.
(c) Check that a waveform is output when the tires are rotated.

OK:

The same waveform is output from all the 4 wheels and there is no noise or interference in the waveform.

HINT:

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

NOTICE:

Check the speed sensor signal after cleaning or replacement (See page BC-35).

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

OK

10	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Drive the vehicle at the speed of 32 km/h (20 mph) or more for at least 60 seconds.
(e) Check if the same DTC is recorded (See page BC-57).

BC

Result

Condition	Proceed to
DTCs (C0200/31 and/or C0205/32) are not output	A
DTCs (C0200/31 and/or C0205/32) are output	B

HINT:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

B → **REPLACE SKID CONTROL ECU**

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

11	REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU - FRONT SPEED SENSOR)

(a) Turn the power switch off.
(b) Repair or replace the harness or connector.
(c) Check for any momentary interruption between the skid control ECU and front speed sensor (See page BC-23).
(d) Check that there is no momentary interruption.

NEXT

12	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Drive the vehicle at the speed of 32 km/h (20 mph) or more for at least 60 seconds.
(e) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C0200/31 and/or C0205/32) are not output	A
DTCs (C0200/31 and/or C0205/32) are output	B

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

B → Go to step 2

A

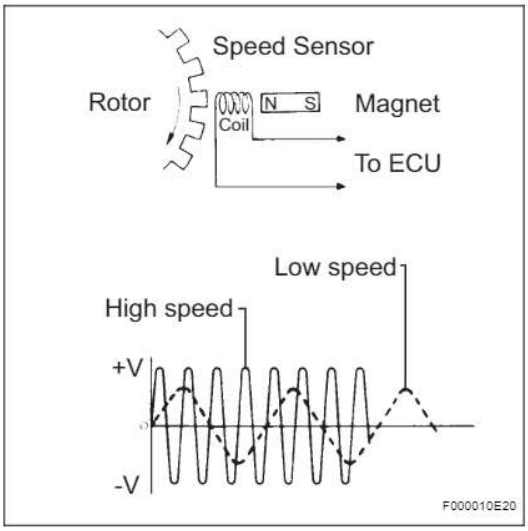
END

BC

DTC	C0210/33	Rear Speed Sensor RH Circuit
DTC	C0215/34	Rear Speed Sensor LH Circuit
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)

DESCRIPTION

The speed sensors detect wheel speed and transmit the signals to the ECU. These signals are used for control of the ABS control system. Each of the front and rear rotors has 48 serrations.
When the rotors rotate, the magnetic field generated by the permanent magnet in the speed sensor induces an AC voltage.
Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.
DTCs C1273/73 and C1274/74 can be deleted when the speed sensor sends a wheel speed signal or the Test Mode ends. DTCs C1273/73 and C1274/74 are output only in the Test Mode.



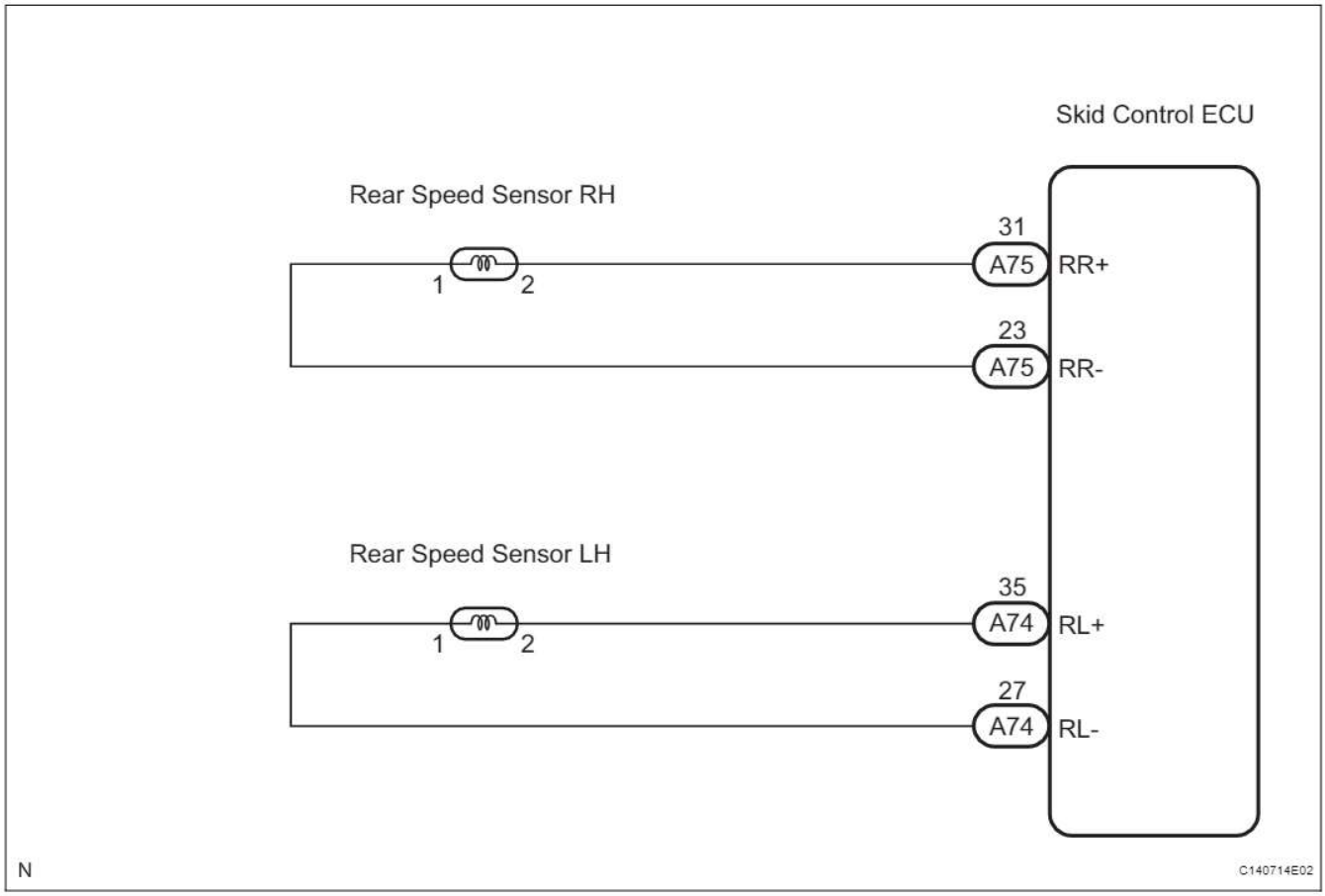
DTC Code	INF Code	DTC Detection Condition	Trouble Area
C0210/33	277	At a vehicle speed of 10 km/h (6 mph) or more, an open or short in the sensor signal circuit of the abnormal wheel continues for 1 second or more.	• Rear speed sensor RH • Speed sensor circuit • Sensor installation • Speed sensor rotor • Skid control ECU
↑	278	More than 1 wheel is abnormal.	↑
↑	279	Speed sensor signal circuit is open for 0.5 seconds or more.	↑
↑	280	Momentary interruption of sensor signal from the abnormal wheel occurs 7 times or more.	↑
↑	281	Frequency of 2.7 kHz or higher is input.	• Rear speed sensor RH • Speed sensor circuit • Speed sensor rotor • Skid control ECU

BC

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C0215/34	290	At a vehicle speed of 10 km/h (6 mph) or more, an open or short in the sensor signal circuit of the abnormal wheel continues for 1 second or more.	• Rear speed sensor LH • Speed sensor circuit • Sensor installation • Speed sensor rotor • Skid control ECU
↑	291	More than 1 wheel is abnormal.	↑
↑	292	Speed sensor signal circuit is open for 0.5 seconds or more.	↑
↑	293	Momentary interruption of sensor signal from the abnormal wheel occurs 7 times or more.	↑
↑	294	Frequency of 2.7 kHz or higher is input.	• Rear speed sensor LH • Speed sensor circuit • Speed sensor rotor • Skid control ECU
C1273/73 C1274/74	-	Detected only during Test Mode.	• Rear speed sensor RH/LH • Sensor installation • Speed sensor rotor

HINT:
- DTCs C0210/33 and C1273/73 are for the rear speed sensor RH.
- DTCs C0215/34 and C1274/74 are for the rear speed sensor LH.
- The BRAKE warning light comes on when speed sensor malfunctions are detected in two or more wheels.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

(a) Using the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (See page BC-23).

ABS / VSC:

Tester Display	Measurement Item/Range	Normal Condition
RR SPD OPN	RR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal
RL SPD OPN	RL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal

Result

Condition	Proceed to
There are no momentary interruptions	A
There are momentary interruptions	B
There is a constant open circuit	C

HINT:
Perform the above inspection before removing the sensor and connector.

B → Go to step 11

C → Go to step 5

A

2 READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

(a) Turn the power switch off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the power switch on (READY).
(d) Select the Data List mode on the intelligent tester.

ABS / VSC:

BC

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

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

OK:

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

NG → Go to step 5

OK

3	PERFORM TEST MODE (SIGNAL CHECK)

(a) Perform sensor check in the Test Mode procedure (See page BC-35).
OK:
All Test Mode DTCs are erased.

NG → Go to step 5

OK

4	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Drive the vehicle at the speed of 32 km/h (20 mph) or more for at least 60 seconds.
(e) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C0210/33 and/or C0215/34) are not output	A
DTCs (C0210/33 and/or C0215/34) are output	B

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

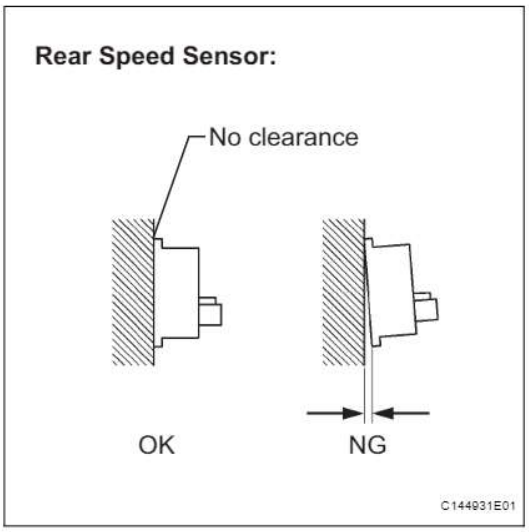
B → Go to step 6

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

5 CHECK REAR SPEED SENSOR INSTALLATION

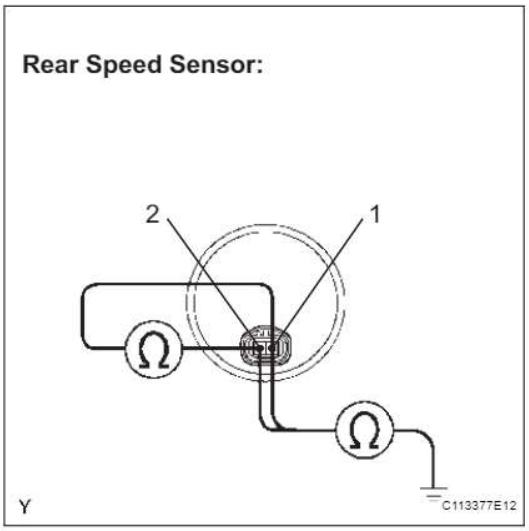


(a) Turn the power switch off.
(b) Check the speed sensor installation.
OK:
There is no clearance between the sensor and rear axle carrier.

NG → **INSTALL REAR SPEED SENSOR CORRECTLY**

OK

6 INSPECT REAR SPEED SENSOR



(a) Turn the power switch off.
(b) Disconnect the rear speed sensor connector.
(c) Measure the resistance according to the value(s) in the table below.
Standard resistance:
RH

Tester Connection	Condition	Specified Condition
2 (RR+) - 1 (RR-)	Always	Below 1.45 kΩ at 20°C (68°F)
2 (RR+) - Body ground	Always	10 kΩ or higher
1 (RR-) - Body ground	Always	10 kΩ or higher

LH

Tester Connection	Condition	Specified Condition
2 (RL+) - 1 (RL-)	Always	Below 1.45 kΩ at 20°C (68°F)
2 (RL+) - Body ground	Always	10 kΩ or higher
1 (RL-) - Body ground	Always	10 kΩ or higher

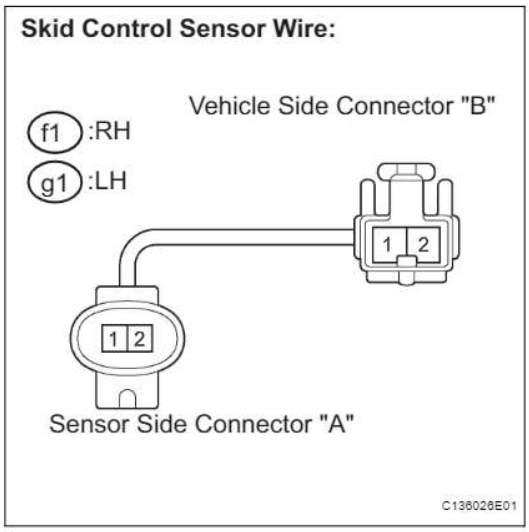
NOTICE:
Check the speed sensor signal after replacement (See page BC-35).

NG → **REPLACE REAR SPEED SENSOR**

OK

BC

7 CHECK HARNESS AND CONNECTOR (SKID CONTROL SENSOR WIRE)



(a) Disconnect the skid control sensor wire.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

RH

Tester Connection	Condition	Specified Condition
f1 ("A"-1) - f1 ("B"-2)	Always	Below 1 Ω
f1 ("A"-1) - f1 ("B"-1)	Always	10 kΩ or higher
f1 ("A"-1) - Body ground	Always	10 kΩ or higher
f1 ("A"-2) - f1 ("B"-1)	Always	Below 1 Ω
f1 ("A"-2) - f1 ("B"-2)	Always	10 kΩ or higher
f1 ("A"-2) - Body ground	Always	10 kΩ or higher

LH

Tester Connection	Condition	Specified Condition
g1 ("A"-1) - g1 ("B"-2)	Always	Below 1 Ω
g1 ("A"-1) - g1 ("B"-1)	Always	10 kΩ or higher
g1 ("A"-1) - Body ground	Always	10 kΩ or higher
g1 ("A"-2) - g1 ("B"-1)	Always	Below 1 Ω
g1 ("A"-2) - g1 ("B"-2)	Always	10 kΩ or higher
g1 ("A"-2) - Body ground	Always	10 kΩ or higher

NOTICE:
Check the speed sensor signal after replacement (See page BC-35).

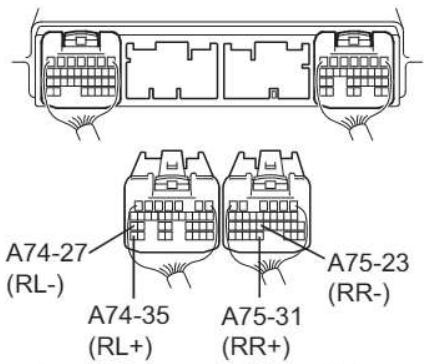
NG → REPLACE SKID CONTROL SENSOR WIRE

OK →

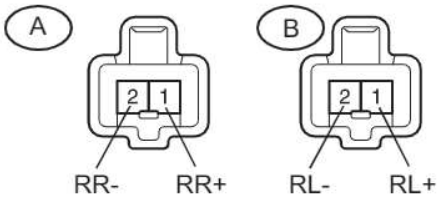
BC

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

Skid Control ECU Wire Harness View:



Rear Speed Sensor Harness Side Connector Front View:



N C140717E01

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

Standard resistance:

RH

Tester Connection	Condition	Specified Condition
A75-31 (RR+) - A-1 (RR+)	Always	Below 1 Ω
A75-31 (RR+) - Body ground	Always	10 kΩ or higher
A75-23 (RR-) - A-2 (RR-)	Always	Below 1 Ω
A75-23 (RR-) - Body ground	Always	10 kΩ or higher

LH

Tester Connection	Condition	Specified Condition
A74-35 (RL+) - B-1 (RL+)	Always	Below 1 Ω
A74-35 (RL+) - Body ground	Always	10 kΩ or higher
A74-27 (RL-) - B-2 (RL-)	Always	Below 1 Ω
A74-27 (RL-) - Body ground	Always	10 kΩ or higher

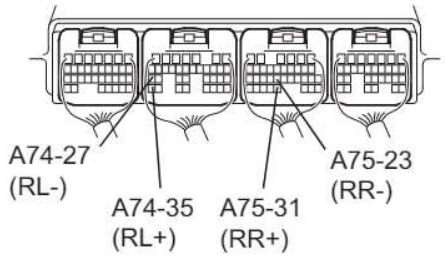
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

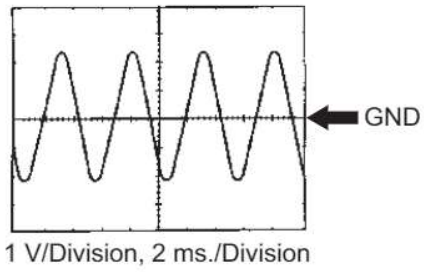
BC

9	CHECK SPEED SENSOR AND SPEED SENSOR ROTOR SERRATIONS

Skid Control ECU Wire Harness View:



Normal Signal Waveform:



(a) Reconnect the skid control sensor wire.
(b) Reconnect the skid control ECU connectors and the rear speed sensor connector.
(c) Connect the oscilloscope to the rear speed sensor terminal of the skid control ECU.
(d) Check that a waveform is output when the tires are rotated.

OK:

The same waveform is output from all the 4 wheels and there is no noise or interference in the waveform.

HINT:

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

NOTICE:

Check the speed sensor signal after cleaning or replacement (See page BC-35).

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

OK

10	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Drive the vehicle at the speed of 32 km/h (20 mph) or more for at least 60 seconds.
(e) Check if the same DTC is recorded (See page BC-57).

BC

Result

Condition	Proceed to
DTCs (C0210/33 and/or C0215/34) are not output	A
DTCs (C0210/33 and/or C0215/34) are output	B

HINT:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

B → **REPLACE SKID CONTROL ECU**

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

11	REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)

(a) Turn the power switch off.
(b) Repair or replace the harness or connector.
(c) Check for any momentary interruption between the skid control ECU and rear speed sensor (See page BC-23).
(d) Check that there is no momentary interruption.

NEXT

12	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Drive the vehicle at the speed of 32 km/h (20 mph) or more for at least 60 seconds.
(e) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C0210/33 and/or C0215/34) are not output	A
DTCs (C0210/33 and/or C0215/34) are output	B

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

B → Go to step 2

A

END

BC

DTC	C0371/71	Yaw Rate Sensor (Test Mode DTC)
DTC	C1234/34	Yaw Rate Sensor Malfunction
DTC	C1243/43	Acceleration Sensor Stuck Malfunction
DTC	C1244/44	Open or Short in Acceleration Sensor Circuit
DTC	C1245/45	Acceleration Sensor Output Malfunction
DTC	C1279/79	Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)
DTC	C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction

DESCRIPTION

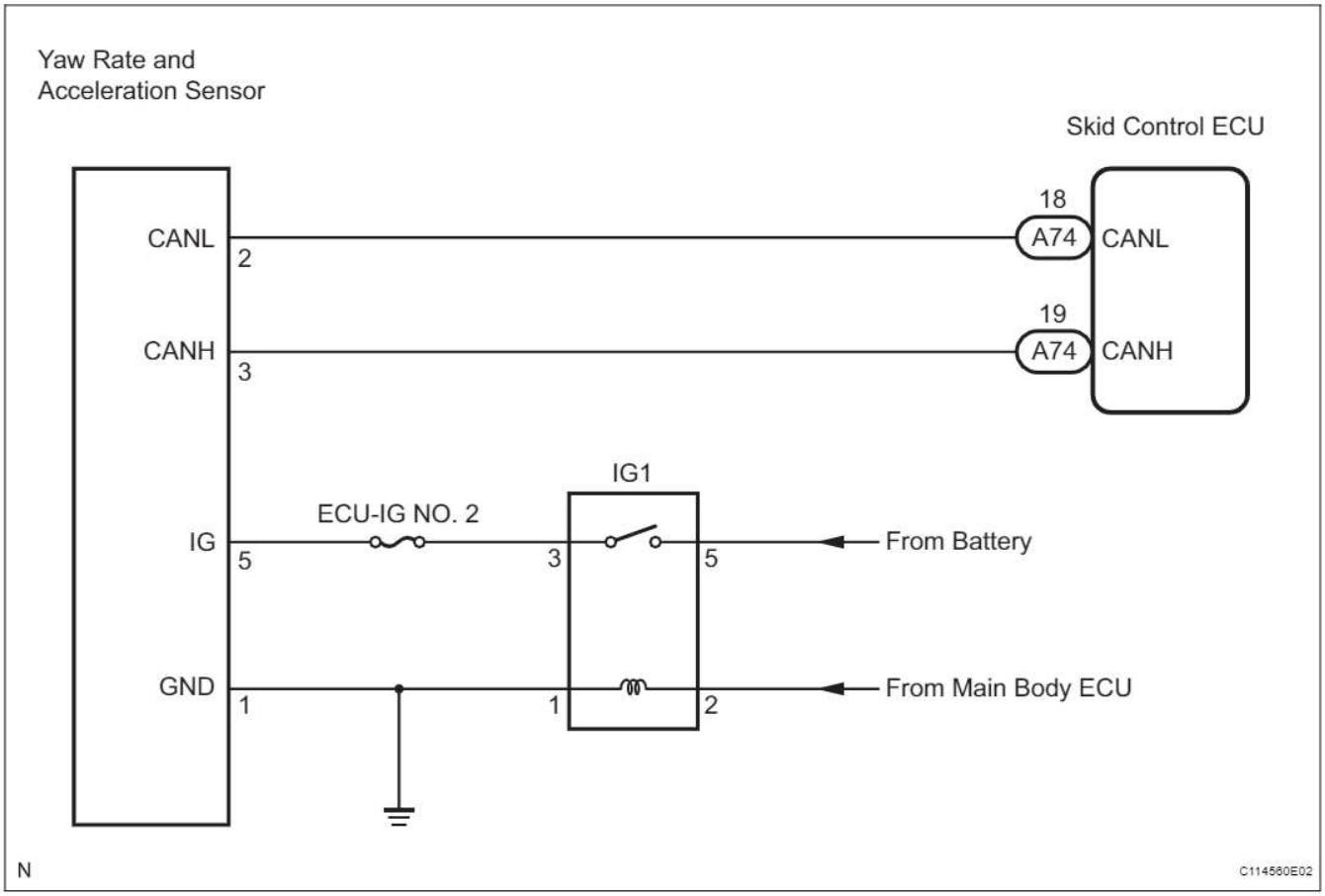
The skid control ECU receives signals from the yaw rate and acceleration sensor through the CAN communication system.
The yaw rate sensor has a built in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2).
If there is trouble in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, DTCs U0123/62 (malfunction in CAN communication with the yaw rate sensor) and U0124/95 (malfunction in CAN communication with the acceleration sensor) are output.
These DTCs are also output when calibration has not been completed.
DTCs C0371/71 and C1279/79 can be deleted when the yaw rate and acceleration sensor sends a yaw rate and/or acceleration signal or the Test Mode ends. DTCs C0371/71 and C1279/79 are output only in the Test Mode.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1234/34	333 334 335 337	Malfunction signal that is detected in sensor self check is received when communication with the sensors is valid.	Yaw rate and acceleration sensor
C1243/43	311 312 317	Sensor sticking can be seen 16 times or more in a series at a speed between 30 km/h (18 mph) and 0 km/h (0 mph).	Yaw rate and acceleration sensor
C1244/44	314	Difference between GL1 and GL2 is not less than 0.4 G for at least 60 seconds after the difference is 0.6 G or more when the vehicle speed is 0 km/h (0 mph). Malfunction signal from acceleration sensor is received.	• Yaw rate and acceleration sensor • Sensor installation
C1245/45	313	Difference between the G value calculated from deceleration sensor value and vehicle speed exceeds 0.35 G for at least 60 seconds when vehicle speed is 30 km/h (18 mph).	• Yaw rate and acceleration sensor • Sensor installation
C1381/97	315	Power source voltage is not within specified range when communication between skid control ECU and sensor is valid.	• Yaw rate and acceleration sensor • Yaw rate and acceleration sensor power source circuit • Skid control ECU
C0371/71	-	Detected only during Test Mode.	Yaw rate and acceleration sensor

BC

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1279/79	-	Detected only during Test Mode.	• Yaw rate and acceleration sensor • Sensor installation

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the yaw rate and acceleration sensor, perform zero point calibration (See page BC-29).

HINT:

When U0123/62 or U0124/95 is output together with C1234/34, C1243/43, C1244/44, C1245/45, or C1381/97, inspect and repair the trouble areas indicated by U0123/62 or U0124/95 first.

BC

1	CHECK DTC

(a) Clear the DTC (See page BC-57).
(b) Turn the power switch off.
(c) At a speed of 30 km/h (18 mph) or more, drive the vehicle, turn the steering wheel, and decelerate the vehicle (depress the brake pedal).
(d) Turn the power switch on (IG) again and check that no CAN communication system DTC is output.

(e) Check if DTCs indicating that zero point calibration of the yaw rate sensor is undone (C1210/36) or indicating that zero point calibration of the acceleration sensor is undone (C1336/98) are output.

Result

Condition	Proceed to
DTCs (C1210/36, C1336/98, and/or CAN communication system DTC) are not output	A
CAN communication system DTC is output	B
DTCs (C1210/36 and/or C1336/98) are output	C

B → **INSPECT CAN COMMUNICATION SYSTEM**

C → **REPAIR CIRCUIT INDICATED BY OUTPUT DTC (See page BC-69)**

A

2 CHECK YAW RATE AND ACCELERATION SENSOR INSTALLATION

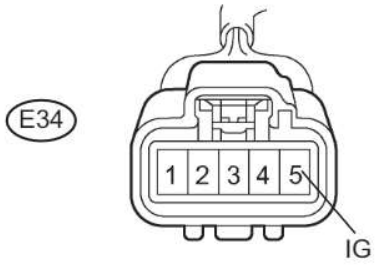
(a) Turn the power switch off.
(b) Check that the yaw rate and acceleration sensor has been installed properly (See page BC-283).
OK:
The sensor is tightened to the specified torque.
The sensor is not tilted.

NG → **INSTALL YAW RATE AND ACCELERATION SENSOR CORRECTLY**

OK

3 INSPECT YAW RATE AND ACCELERATION SENSOR (IG TERMINAL)

Yaw Rate and Acceleration Sensor Harness Side Connector Front View:



(a) Disconnect the yaw rate and acceleration sensor connector.
(b) Turn the power switch on (IG).
(c) Measure the voltage according to the value(s) in the table below.
Standard voltage

Tester Connection	Condition	Specified Condition
E34-5 (IG) - Body ground	Power switch on (IG)	10 to 14 V

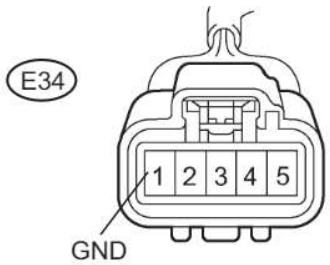
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (IG CIRCUIT)**

OK

BC

4	INSPECT YAW RATE AND ACCELERATION SENSOR (GND TERMINAL)

Yaw Rate and Acceleration Sensor Harness Side Connector Front View:



(a) Turn the power switch off.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
E34-1 (GND) - Body ground	Always	Below 1 Ω

NOTICE:
Check the yaw rate and acceleration sensor signal after replacement (See page BC-35).
HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

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

OK

REPLACE YAW RATE AND ACCELERATION SENSOR

BC

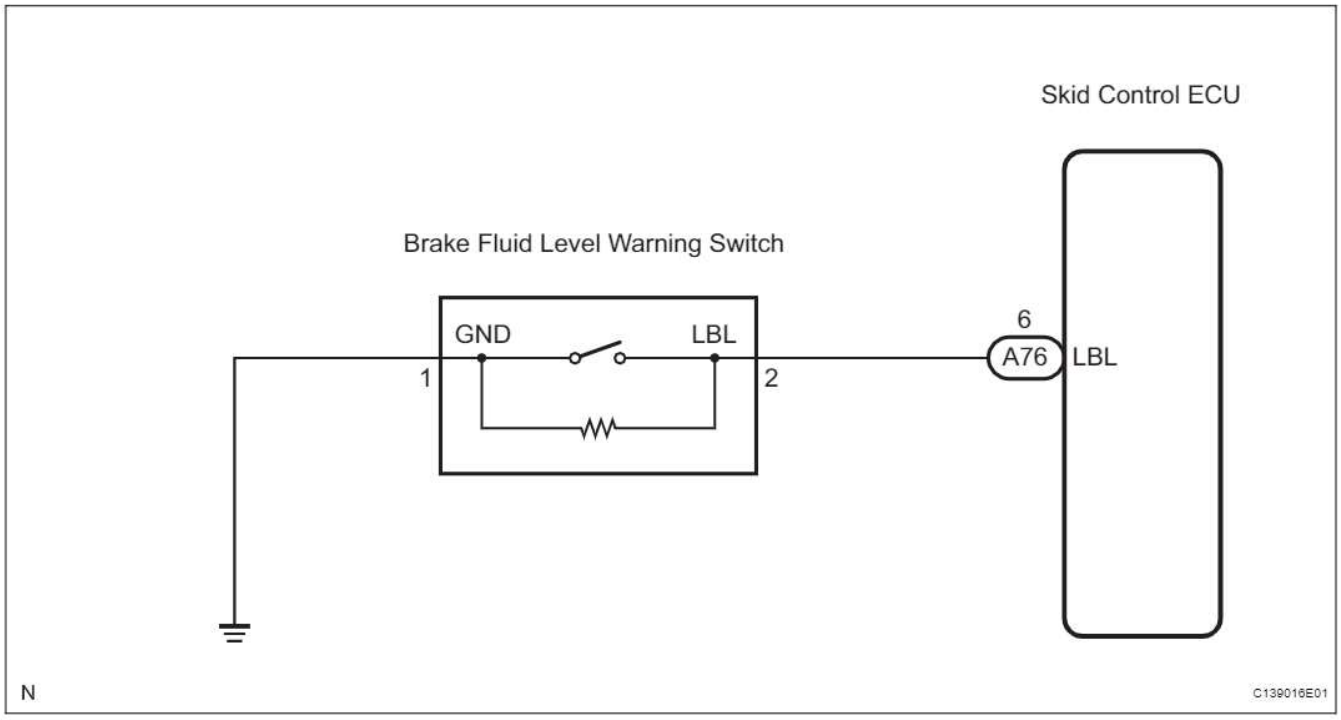
DTC	C1202/68	Master Reservoir Level Malfunction

DESCRIPTION

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

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1202/68	-	When either of the following is detected: 1. Pump motor operates for specified period when reservoir level drops. 2. Brake operation signal is input when the reservoir level is abnormal and the power switch is on (IG).	• Fluid leakage • Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit • Skid control ECU
↑	512	An open in the switch signal circuit continues for 2 seconds or more.	• Brake fluid level warning switch • Brake fluid level warning switch circuit • Skid control ECU

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).
HINT:
When releasing the parking brake, set the chocks to hold the vehicle for safety.

1	CHECK BRAKE FLUID LEVEL IN RESERVOIR

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

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

OK:

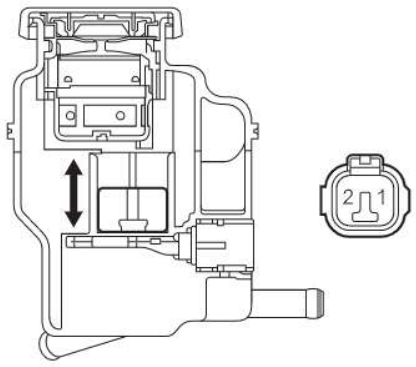
Brake fluid level is proper.

NG → **CHECK AND REPAIR BRAKE FLUID LEAKAGE OR ADD FLUID**

OK

2	INSPECT BRAKE FLUID LEVEL WARNING SWITCH

Brake Fluid Level Warning Switch:



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

HINT:
A float is located inside the reservoir. Its position can be changed by increasing or decreasing the level of brake fluid.

Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	Float up (Switch OFF)	1.9 to 2.1 kΩ
1 - 2	Float down (Switch ON)	Below 1 Ω

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

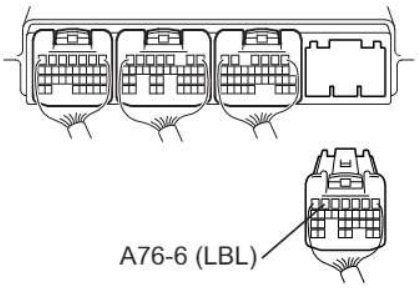
NG → **REPLACE BRAKE MASTER CYLINDER RESERVOIR ASSEMBLY (BRAKE FLUID LEVEL WARNING SWITCH)**

OK

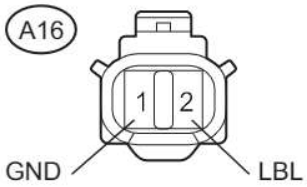
BC

3	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE FLUID LEVEL WARNING SWITCH)

Skid Control ECU Wire Harness View:



Brake Fluid Level Warning Switch Harness Side Connector Front View:



C140718E01

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

Standard resistance

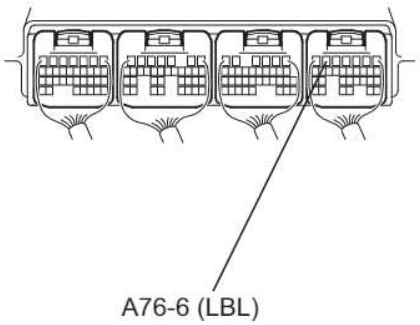
Tester Connection	Condition	Specified Condition
A76-6 (LBL) - A16-2 (LBL)	Always	Below 1 Ω
A76-6 (LBL) - Body ground	Always	10 kΩ or higher
A16-1 (GND) - Body ground	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4	INSPECT SKID CONTROL ECU (SWITCH INPUT)

Skid Control ECU Wire Harness View:



P C135838E02

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

Standard voltage

Tester Connection	Condition	Specified Condition
A76-6 (LBL) - Body ground	Power switch on (IG)	8 to 14 V

NG → REPLACE SKID CONTROL ECU

BC

OK

5	RECONFIRM DTC

(a) Turn the power switch off.
(b) Reconnect the brake fluid level warning switch connector.
(c) Clear the DTC (See page BC-57).
(d) Turn the power switch on (IG).
(e) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (C1202/68) is not output	A
DTC (C1202/68) is output	B

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

DTC C1203/95 ECM Communication Circuit Malfunction

DESCRIPTION

The circuit is used to send TRAC and VSC control information from the skid control ECU to the HV control ECU, and hybrid control information from the HV control ECU to the skid control ECU through the CAN communication system.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1203/95	-	When any of the following is detected: 1. No stored information for destination. 2. No stored information whether VSC is in operation or not. 3. Destination information from HV control ECU does not match with stored value.	HV control ECU

INSPECTION PROCEDURE

1 CHECK PART NUMBER (SKID CONTROL ECU AND HV CONTROL ECU)

(a) Check that the proper skid control ECU and HV control ECU are installed.

OK:

Proper ECUs are installed.

NG → **REPLACE ECUS WITH PROPER ONES**

OK ↓

2 RECONFIRM DTC

(a) Clear the DTC (See page BC-57).
(b) Turn the power switch on (IG).
(c) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (C1203/95) is not output	A
DTC (C1203/95) is output	B

B → **REPLACE HV CONTROL ECU**

A ↓

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

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

DTC	C1336/98	Zero Point Calibration of Acceleration Sensor Undone

DESCRIPTION

The skid control ECU receives signals from the yaw rate and acceleration sensor through the CAN communication system.
The yaw rate sensor has the built in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2).
If there is trouble in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, the DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (acceleration sensor communication trouble) are output.
The DTCs are also output when the calibration has not been completed.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1210/36	-	Yaw rate sensor zero point calibration is unfinished.	• Skid control ECU • Yaw rate and acceleration sensor • Zero point calibration undone (Perform zero point calibration and check DTC. If DTC is not output again, the sensor is normal)
C1336/98	-	When either of the following is detected: 1. Vehicle speed increases with unfinished zero point calibration. 2. Zero point calculation is not within specified range when zero point calibration is finished.	• Skid control ECU • Yaw rate and acceleration sensor • Zero point calibration undone (Perform zero point calibration and check DTC. If DTC is not output again, the sensor is normal)

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of the linear solenoid valve and calibration (See page BC-25).
HINT:
When U0123/62, U0124/95 or U0126/63 is output along with C1210/36 or C1336/98, inspect and repair trouble areas indicated by U0123/62, U0124/95 or U0126/63 first.

1	PERFORM ZERO POINT CALIBRATION OF YAW RATE AND ACCELERATION SENSOR

(a) Perform zero point calibration of the yaw rate and acceleration sensor (See page BC-29).

BC

NEXT

2	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (IG).
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1210/36 and/or C1336/98) are output	A

Condition	Proceed to
DTCs (C1210/36 and/or C1336/98) are not output	B

HINT:
- The DTCs are recorded because zero point calibration has not been completed.
- End the procedure as the same DTCs are not recorded after completion of zero point calibration.

B → END

A

3 CHECK YAW RATE AND ACCELERATION SENSOR INSTALLATION

(a) Turn the power switch off.
(b) Check that the yaw rate and acceleration sensor has been installed properly (See page BC-283).

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

NG → **INSTALL YAW RATE AND ACCELERATION SENSOR CORRECTLY**

OK

REPLACE SKID CONTROL ECU

BC

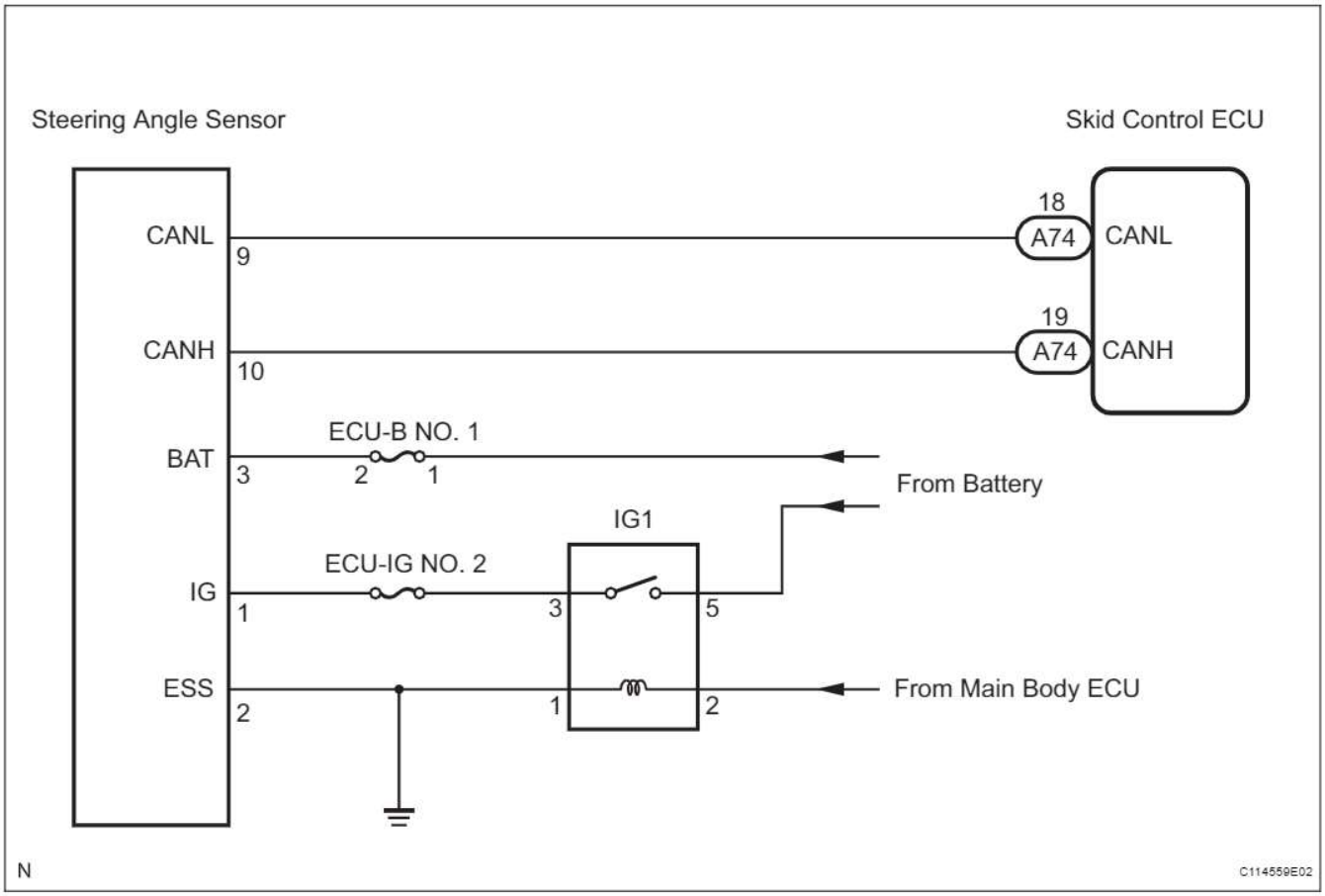
DTC	C1231/31	Steering Angle Sensor Circuit Malfunction

DESCRIPTION

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

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1231/31	-	When either of the following is detected: 1. Steering angle sensor malfunction signal is received when data transmission is valid (internal malfunction is detected in sensor self check). 2. A signal of +B open in steering angle sensor is received when communication with sensor is valid.	• Steering angle sensor • Steering angle sensor circuit • Steering angle sensor power supply • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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

BC

1 CHECK DTC

(a) Clear the DTC (See page BC-57).
(b) Turn the power switch off.
(c) Turn the power switch on (IG) again and check that no CAN communication system DTC is output.
(d) Drive the vehicle and turn the steering wheel to the right and left at the speed of 35 km/h (22 mph) and check that no speed sensor and yaw rate sensor DTCs are output.

Result

Condition	Proceed to
No CAN communication system DTC and the speed sensor or yaw rate sensor DTC are output	A
CAN communication system DTC is output	B
Speed sensor or yaw rate sensor DTC is output	C

HINT:
- If there is a malfunction in the speed sensor or the yaw rate sensor, an abnormal value may be output although the steering angle sensor is normal.
- If the speed sensor and the yaw rate sensor DTCs are output simultaneously, repair the sensors and inspect the steering angle sensor.

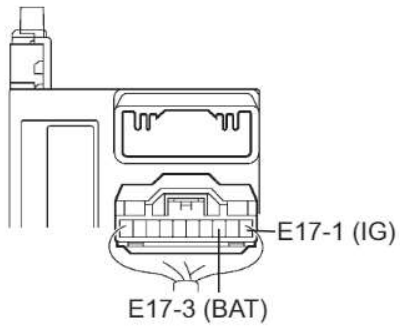
B → **INSPECT CAN COMMUNICATION SYSTEM**

C → **REPAIR CIRCUIT INDICATED BY OUTPUT DTC (See page BC-69)**

A

2 INSPECT STEERING ANGLE SENSOR (POWER SOURCE TERMINAL)

Steering Angle Sensor Wire Harness View:



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

Standard voltage

Tester Connection	Condition	Specified Condition
E17-1 (IG) - Body ground	Power switch on (IG)	10 to 14 V
E17-3 (BAT) - Body ground	Always	10 to 14 V

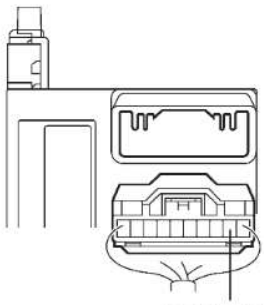
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)**

OK

BC

3	INSPECT STEERING ANGLE SENSOR (GROUND TERMINAL)

Steering Angle Sensor Wire Harness View:



(a) Turn the power switch off.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
E17-2 (ESS) - Body ground	Always	Below 1 Ω

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

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

OK

REPLACE STEERING ANGLE SENSOR

BC

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	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	C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)
DTC	C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)
DTC	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

The speed sensors detect wheel speed and transmit the signals to the ECU. These signals are used for control of the ABS control system. Each of the front and rear rotors has 48 serrations.

When the rotors rotate, the magnetic field generated by the permanent magnet in the speed sensor induces an AC voltage.

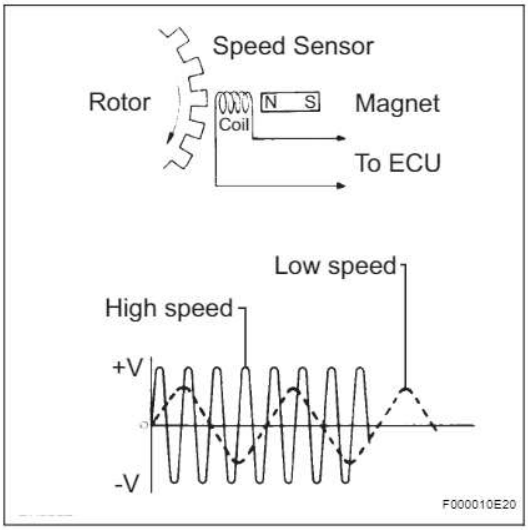
Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

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

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

DTCs C1275/75 to C1278/78 can be deleted when the speed sensor sends a wheel speed signal or the Test Mode ends. DTCs from C1275/75 to C1278/78 are output only in the Test Mode.

BC



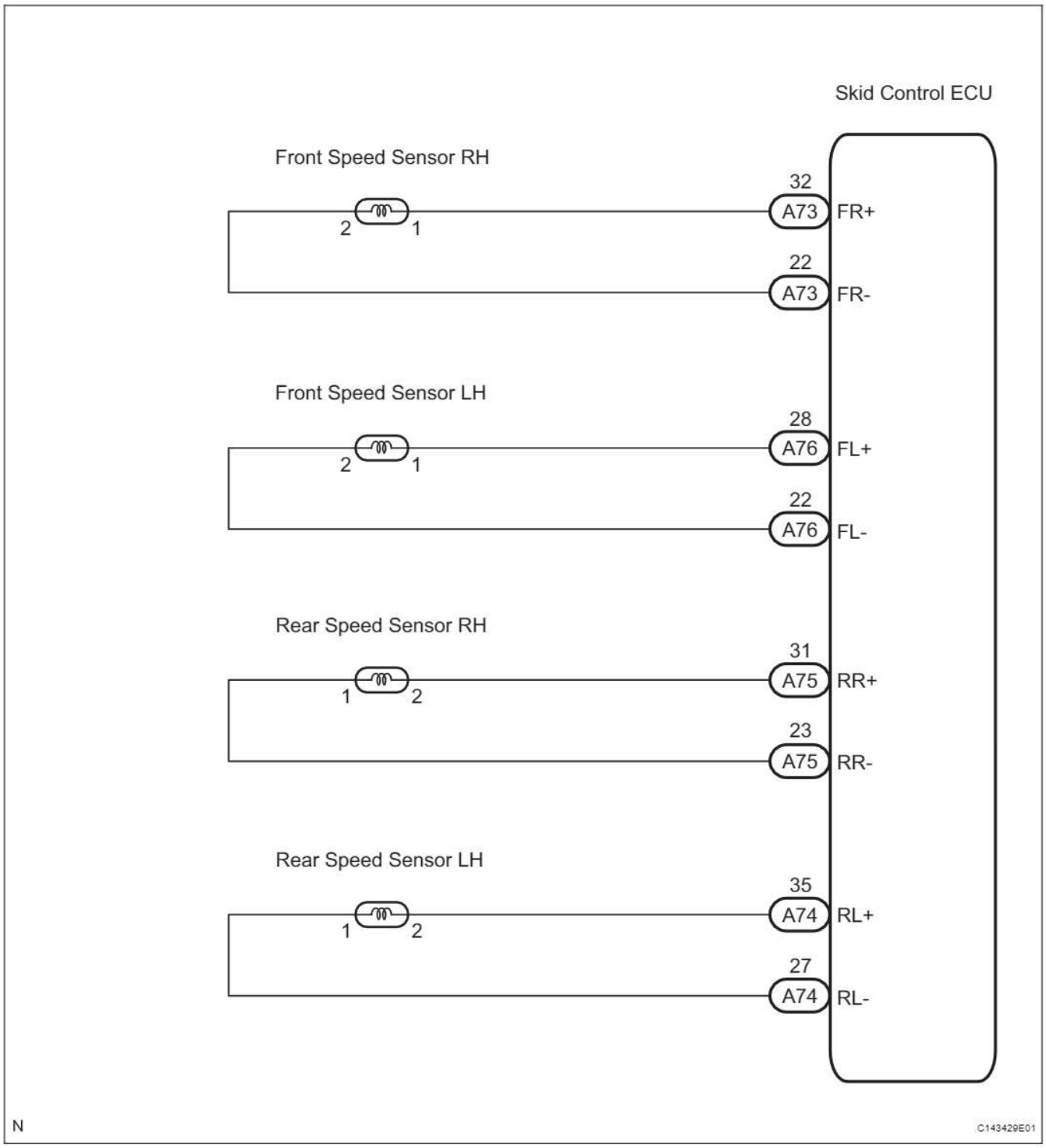
DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1235/35	302	Pulse waveform of speed sensor signal is abnormal for at least 5 seconds when vehicle speed is 20 km/h (12 mph) or more.	• Front speed sensor RH • Speed sensor circuit • Sensor installation • Speed sensor rotor • Skid control ECU
C1236/36	303	Pulse waveform of speed sensor signal is abnormal for at least 5 seconds when vehicle speed is 20 km/h (12 mph) or more.	• Front speed sensor LH • Speed sensor circuit • Sensor installation • Speed sensor rotor • Skid control ECU
C1238/38	304	Pulse waveform of speed sensor signal is abnormal for at least 5 seconds when vehicle speed is 20 km/h (12 mph) or more.	• Rear speed sensor RH • Speed sensor circuit • Sensor installation • Speed sensor rotor • Skid control ECU
C1239/39	305	Pulse waveform of speed sensor signal is abnormal for at least 5 seconds when vehicle speed is 20 km/h (12 mph) or more.	• Rear speed sensor LH • Speed sensor circuit • Sensor installation • Speed sensor rotor • Skid control ECU
C1275/75 C1276/76 C1277/77 C1278/78	-	Detected only during Test Mode.	Speed sensor rotor

HINT:

- DTCs C1235/35 and C1275/75 are for the front speed sensor RH.
- DTCs C1236/36 and C1276/76 are for the front speed sensor LH.
- DTCs C1238/38 and C1277/77 are for the rear speed sensor RH.
- DTCs C1239/39 and C1278/78 are for the rear speed sensor LH.

BC

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

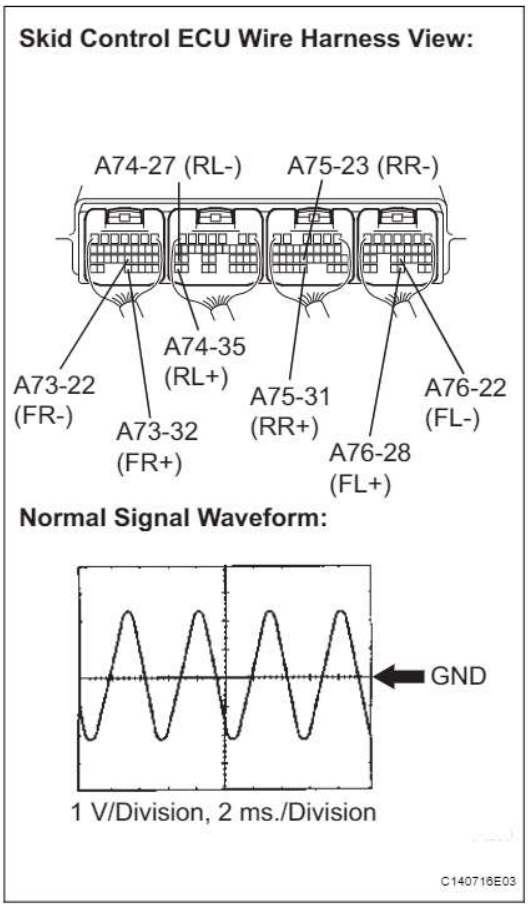
NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

HINT:

When C0200/31, C0205/32, C0210/33, or C0215/34 is output together with C1235/35, C1236/36, C1238/38, or C1239/39, inspect and repair the trouble areas indicated by C0200/31, C0205/32, C0210/33, or C0215/34 first.

1	CHECK SPEED SENSOR AND SPEED SENSOR ROTOR SERRATIONS



(a) Connect the oscilloscope to each speed sensor terminal of the skid control ECU.
(b) Check that a waveform is output when the tires are rotated (by the sensor circuit).
OK:
The same waveform is output from all the 4 wheels and there is no noise or interference in the waveform.
(c) Check that the waveform does not change while jiggling a connector or a wire harness.
OK:
The waveform does not change.
HINT:
- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows and the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, the erratic signals are generated due to speed sensor rotor's scratches, looseness or foreign matter attached to it.

NG → **Go to step 3**

OK

2	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Drive the vehicle at the speed of 20 km/h (12 mph) or more for at least 60 seconds.
(e) Check if the same DTC is recorded (See page BC-57).

BC

Result

Condition	Proceed to
DTCs (C1235/35, C1236/36, C1238/38 and/or C1239/39) are not output	A
DTCs (C1235/35, C1236/36, C1238/38 and/or C1239/39) are output	B

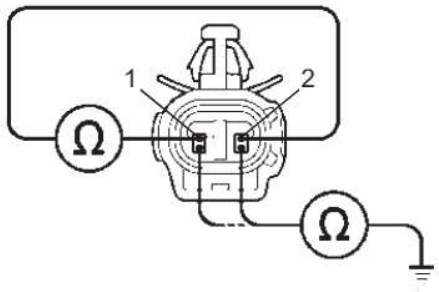
B → **REPLACE SKID CONTROL ECU**

A

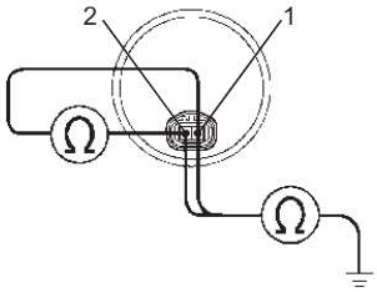
CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

3 INSPECT EACH SPEED SENSOR

Front Speed Sensor:



Rear Speed Sensor:



C136027E04

(a) Turn the power switch off.
(b) Disconnect each speed sensor connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance:

RH

Tester Connection	Condition	Specified Condition
1 (FR+) - 2 (FR-)	Always	1.4 to 1.8 kΩ at 20°C (68°F)
1 (FR+) - Body ground	Always	10 kΩ or higher
2 (FR-) - Body ground	Always	10 kΩ or higher
2 (RR+) - 1 (RR-)	Always	Below 1.45 kΩ at 20°C (68°F)
2 (RR+) - Body ground	Always	10 kΩ or higher
1 (RR-) - Body ground	Always	10 kΩ or higher

LH

Tester Connection	Condition	Specified Condition
1 (FL+) - 2 (FL-)	Always	1.4 to 1.8 kΩ at 20°C (68°F)
1 (FL+) - Body ground	Always	10 kΩ or higher
2 (FL-) - Body ground	Always	10 kΩ or higher
2 (RL+) - 1 (RL-)	Always	Below 1.45 kΩ at 20°C (68°F)
2 (RL+) - Body ground	Always	10 kΩ or higher
1 (RL-) - Body ground	Always	10 kΩ or higher

Result

Result	Proceed to
OK (for rear)	A
OK (for front)	B
NG	C

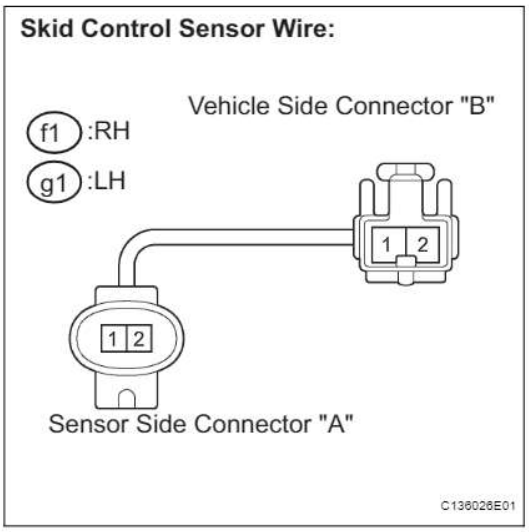
B → Go to step 5

C → REPLACE EACH SPEED SENSOR

A

BC

4	CHECK HARNESS AND CONNECTOR (SKID CONTROL SENSOR WIRE)



(a) Disconnect the skid control sensor wire.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

RH

Tester Connection	Condition	Specified Condition
f1 ("A"-1) - f1 ("B"-2)	Always	Below 1 Ω
f1 ("A"-1) - f1 ("B"-1)	Always	10 kΩ or higher
f1 ("A"-1) - Body ground	Always	10 kΩ or higher
f1 ("A"-2) - f1 ("B"-1)	Always	Below 1 Ω
f1 ("A"-2) - f1 ("B"-2)	Always	10 kΩ or higher
f1 ("A"-2) - Body ground	Always	10 kΩ or higher

LH

Tester Connection	Condition	Specified Condition
g1 ("A"-1) - g1 ("B"-2)	Always	Below 1 Ω
g1 ("A"-1) - g1 ("B"-1)	Always	10 kΩ or higher
g1 ("A"-1) - Body ground	Always	10 kΩ or higher
g1 ("A"-2) - g1 ("B"-1)	Always	Below 1 Ω
g1 ("A"-2) - g1 ("B"-2)	Always	10 kΩ or higher
g1 ("A"-2) - Body ground	Always	10 kΩ or higher

NOTICE:
Check the speed sensor signal after replacement (See page BC-35).

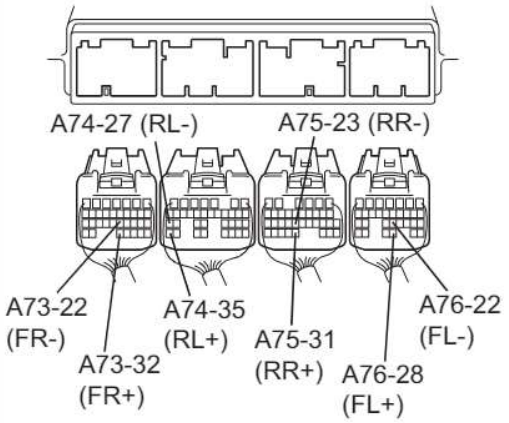
NG → REPLACE SKID CONTROL SENSOR WIRE

OK

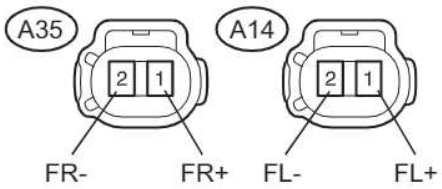
BC

5 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - EACH SPEED SENSOR)

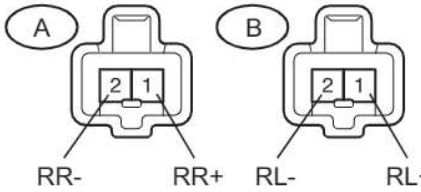
Skid Control ECU Wire Harness View:



Front Speed Sensor Harness Side Connector Front View:



Rear Speed Sensor Harness Side Connector Front View:



C140719E01

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

Standard resistance:

RH

Tester Connection	Condition	Specified Condition
A73-32 (FR+) - A35-1 (FR+)	Always	Below 1 Ω
A73-32 (FR+) - Body ground	Always	10 kΩ or higher
A73-22 (FR-) - A35-2 (FR-)	Always	Below 1 Ω
A73-22 (FR-) - Body ground	Always	10 kΩ or higher
A75-31 (RR+) - A-1 (RR+)	Always	Below 1 Ω
A75-31 (RR+) - Body ground	Always	10 kΩ or higher
A75-23 (RR-) - A-2 (RR-)	Always	Below 1 Ω
A75-23 (RR-) - Body ground	Always	10 kΩ or higher

LH

Tester Connection	Condition	Specified Condition
A76-28 (FL+) - A14-1 (FL+)	Always	Below 1 Ω
A76-28 (FL+) - Body ground	Always	10 kΩ or higher
A76-22 (FL-) - A14-2 (FL-)	Always	Below 1 Ω
A76-22 (FL-) - Body ground	Always	10 kΩ or higher
A74-35 (RL+) - B-1 (RL+)	Always	Below 1 Ω
A74-35 (RL+) - Body ground	Always	10 kΩ or higher
A74-27 (RL-) - B-2 (RL-)	Always	Below 1 Ω
A74-27 (RL-) - Body ground	Always	10 kΩ or higher

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

OK

6 RECONFIRM DTC

(a) Reconnect the skid control sensor wire.
(b) Reconnect the skid control ECU connectors and the speed sensor connector.
(c) Clear the DTC (See page BC-57).
(d) Turn the power switch on (READY).
(e) Drive the vehicle at the speed of 20 km/h (12 mph) or more for at least 60 seconds.

BC

(f) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1235/35, C1236/36, C1238/38 and/or C1239/39) are output (for front)	A
DTCs (C1235/35, C1236/36, C1238/38 and/or C1239/39) are output (for rear)	B
DTCs (C1235/35, C1236/36, C1238/38 and/or C1239/39) are not output	C

B → Go to step 8

C → CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

A

7 CHECK FRONT SPEED SENSOR TIP

(a) Turn the power switch off.
(b) Remove the front speed sensor (See page BC-272).
(c) Check the speed sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning or replacement (See page BC-35).

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

8 CHECK EACH SPEED SENSOR ROTOR

(a) Turn the power switch off.
(b) Remove each speed sensor rotor (See page DS-5 for front, or AH-15 for rear).
(c) Check the speed sensor rotor.

OK:

No scratches, missing teeth or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning or replacement (See page BC-35).

NG → CLEAN OR REPLACE EACH SPEED SENSOR ROTOR

OK

9 RECONFIRM DTC

(a) Install the front speed sensor and the speed sensor rotor.
(b) Clear the DTC (See page BC-57).

BC

(c) Turn the power switch on (READY).
(d) Drive the vehicle at the speed of 20 km/h (12 mph) or more for at least 60 seconds.
(e) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1235/35, C1236/36, C1238/38 and/or C1239/39) are not output	A
DTCs (C1235/35, C1236/36, C1238/38 and/or C1239/39) are output	B

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

DTC	C1241/41	Low Battery Positive Voltage

DTC	C1242/42	Open in IG1 / IG2 Power Source Circuit

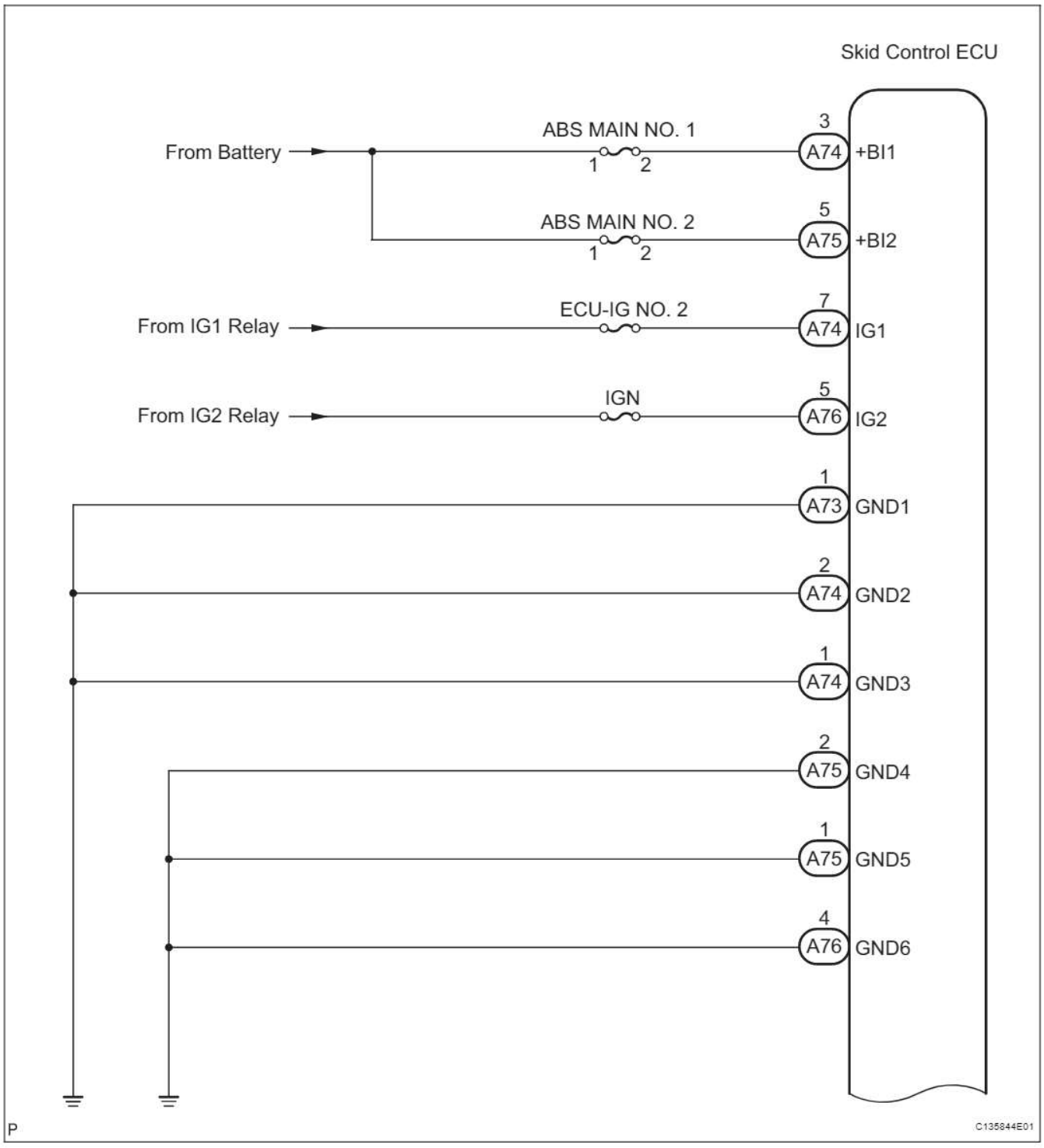
DESCRIPTION

These codes are memorized when the power source voltage for the skid control ECU drops or the voltage for the main relay 1 and main relay 2 operation drops.
Codes may be memorized when the voltage of the auxiliary battery temporarily drops.
When the power source voltage is too high, the skid control ECU stops functioning and outputs no DTCs, and the ABS and BRAKE warning lights remain on.
HINT:
DTC C1256/57 (accumulator low voltage malfunction) may be memorized if the power source voltage drops.

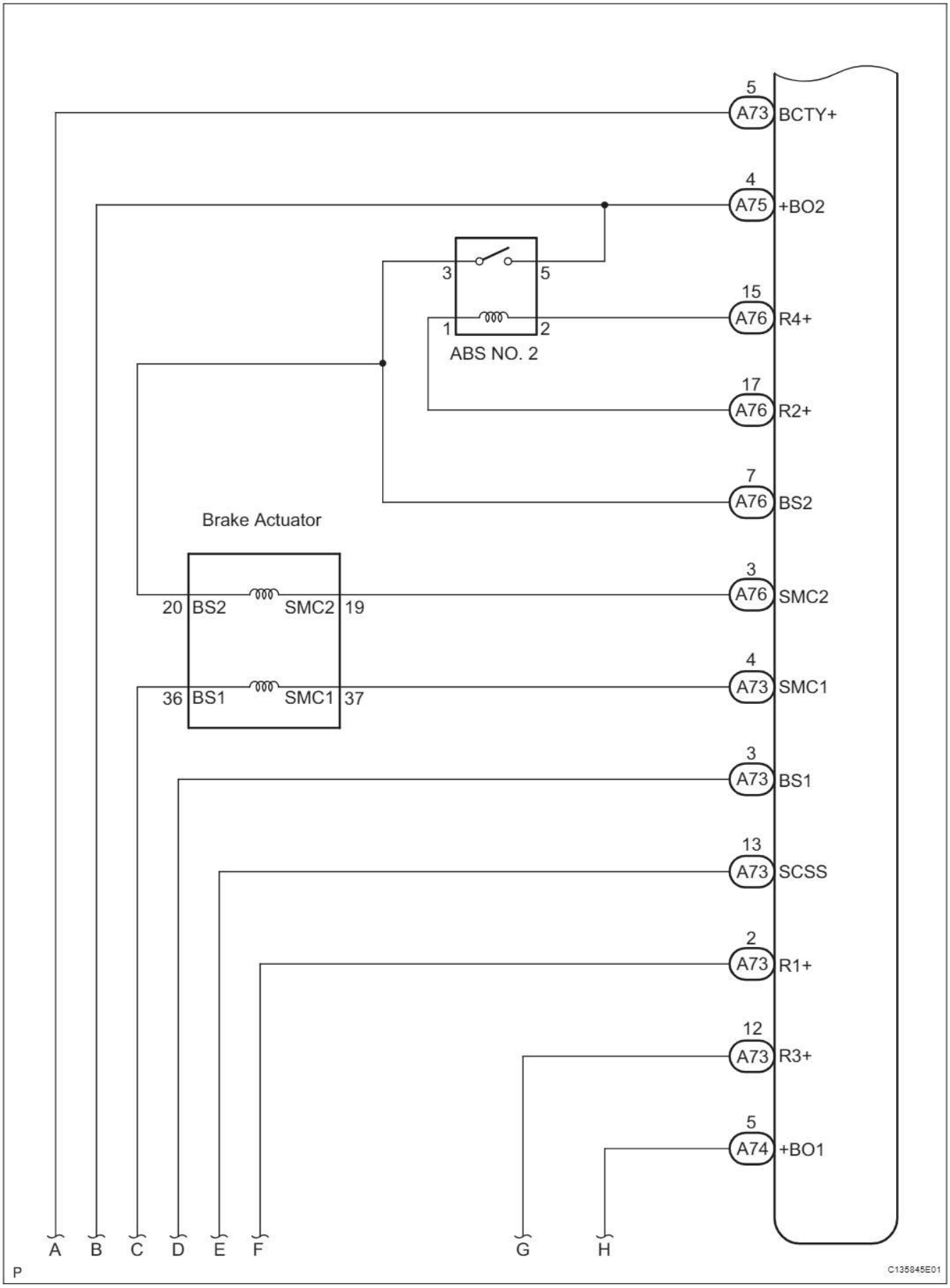
DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1241/41	81	System 1 is under the following conditions when the power switch is on (IG): • Linear solenoid cannot receive enough current (brake is applied). • BS voltage is less than 8.9 V for at least 3 seconds (brake is not applied). • 12 V power source voltage inside ECU is less than 8.5 V when main relay is opened or VCM voltage is less than 4.7 V or 5 V or more for at least 0.05 seconds.	• Auxiliary battery • ABS NO. 1 relay • ABS NO. 1 relay circuit • Brake control power supply (Capacitor) • Hybrid control system (Charging circuit) • Skid control ECU
↑	82	System 2 is under the following conditions when the power switch is on (IG): • Linear solenoid cannot receive enough current (brake is applied). • BS voltage is less than 8.9 V for at least 3 seconds (brake is not applied). • 12 V power source voltage inside ECU is less than 8.5 V when main relay is opened or VCM voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds.	• Auxiliary battery • ABS NO. 2 relay • ABS NO. 2 relay circuit • Brake control power supply (Capacitor) • Hybrid control system (Charging circuit) • Skid control ECU
↑	83	Capacitor mode signal is received from brake control power supply for 3 seconds or more when the power switch is on (IG).	• Auxiliary battery • Brake control power supply (Capacitor) • Hybrid control system (Charging circuit)
↑	84	ABS is requested to operate when the power source voltage of the main relay system is dropping.	• ABS NO. 1 relay • ABS NO. 1 relay circuit • ABS NO. 2 relay • ABS NO. 2 relay circuit • Brake control power supply (Capacitor) • Hybrid control system (Charging circuit) • Skid control ECU
C1242/42	87	The power supply voltage is not applied to the IG1 terminal, power supply voltage is applied to the IG2 terminal, and +BI1 terminal voltage is 9.5 V or more for 4 seconds or more.	• Auxiliary battery • IG1 power source circuit • Hybrid control system (Charging circuit) • Skid control ECU
↑	88	The power supply voltage is applied to the IG1 terminal, power supply voltage is not applied to the IG2 terminal, and +BI1 terminal voltage is 9.5 V or more for 4 seconds or more.	• Auxiliary battery • IG2 power source circuit • Hybrid control system (Charging circuit) • Skid control ECU

BC

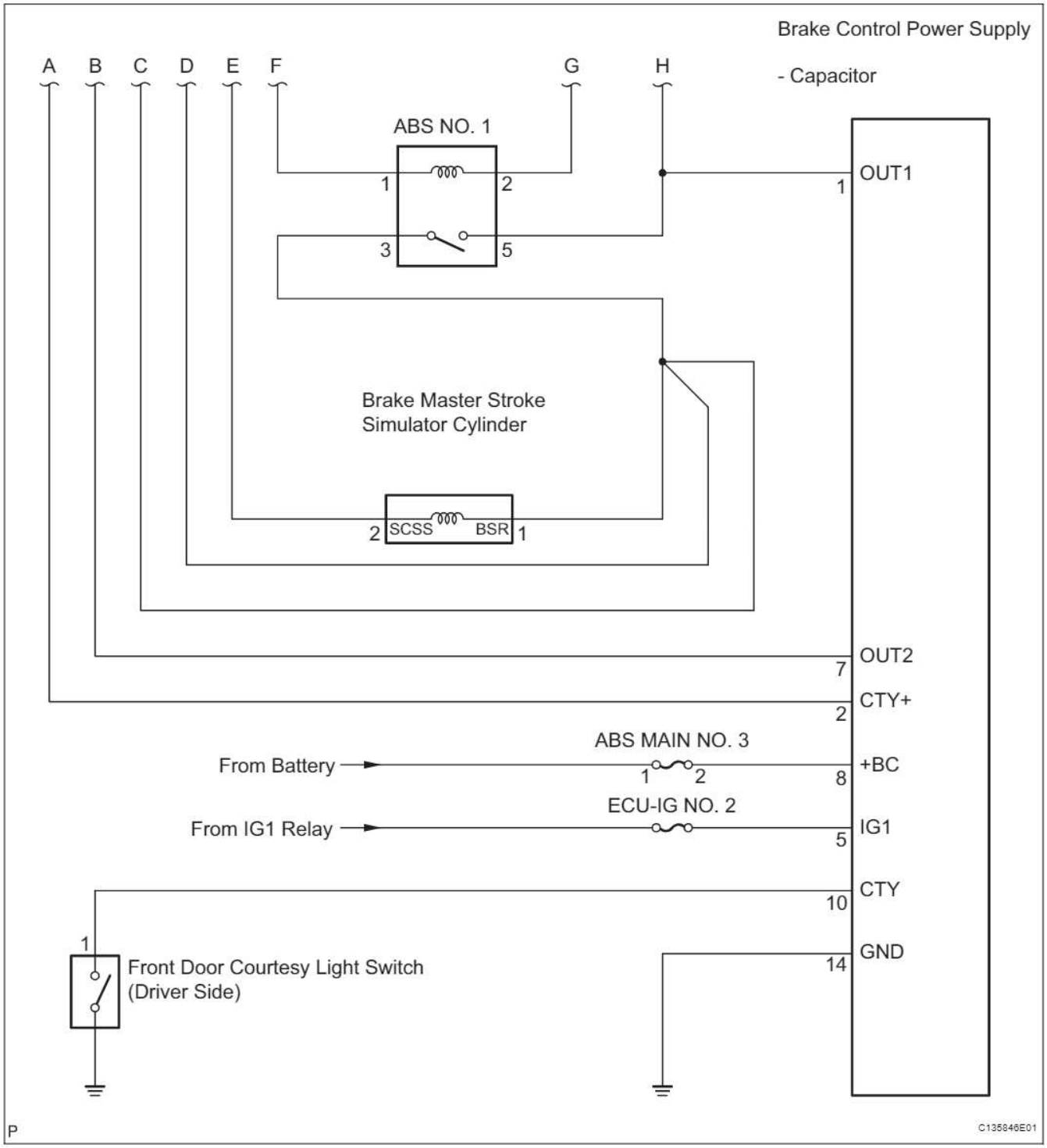
WIRING DIAGRAM



BC


5
A73
BCTY+
4
A75
+BO2
3
5
1
2
ABS NO. 2
15
A76
R4+
17
A76
R2+
7
A76
BS2
Brake Actuator
20
BS2
SMC2
19
3
A76
SMC2
36
BS1
SMC1
37
4
A73
SMC1
3
A73
BS1
13
A73
SCSS
2
A73
R1+
12
A73
R3+
5
A74
+BO1
A
B
C
D
E
F
G
H
P
C135845E01

BC



BC

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK HYBRID CONTROL SYSTEM

(a) Check if the hybrid control system DTC is output (See page HV-36).

Result

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

B → INSPECT HYBRID CONTROL SYSTEM

A

2 CHECK AUXILIARY BATTERY

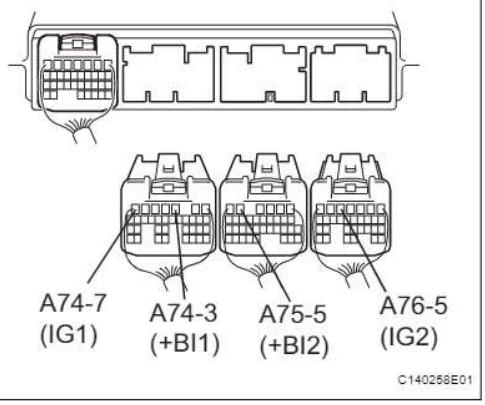
(a) Check the auxiliary battery voltage.
Standard voltage:
11 to 14 V

NG → CHARGE OR REPLACE AUXILIARY BATTERY

OK

3 INSPECT SKID CONTROL ECU (IG AND +BI TERMINAL)

Skid Control ECU Wire Harness View:



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

Tester Connection	Condition	Specified Condition
A74-7 (IG1) - Body ground	Power switch on (IG)	10 to 14 V
A76-5 (IG2) - Body ground	Power switch on (IG)	10 to 14 V
A74-3 (+BI1) - Body ground	Always	10 to 14 V
A75-5 (+BI2) - Body ground	Always	10 to 14 V

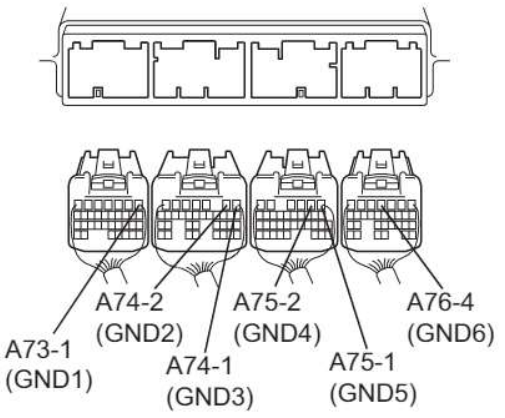
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (IG OR +BI CIRCUIT)

OK

BC

4 INSPECT SKID CONTROL ECU (GND TERMINAL)

Skid Control ECU Wire Harness View:



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

Standard resistance

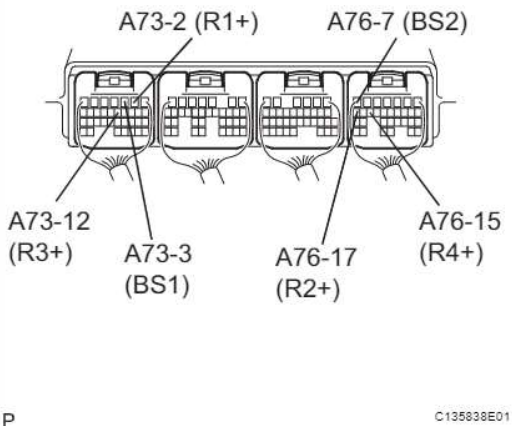
Tester Connection	Condition	Specified Condition
A73-1 (GND1) - Body ground	Always	Below 1 Ω
A74-2 (GND2) - Body ground	Always	Below 1 Ω
A74-1 (GND3) - Body ground	Always	Below 1 Ω
A75-2 (GND4) - Body ground	Always	Below 1 Ω
A75-1 (GND5) - Body ground	Always	Below 1 Ω
A76-4 (GND6) - Body ground	Always	Below 1 Ω

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

OK

5 INSPECT SKID CONTROL ECU (RELAY TERMINAL)

Skid Control ECU Wire Harness View:



(a) Reconnect the skid control ECU connectors.
(b) Turn the power switch on (IG).
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
A73-2 (R1+) - Body ground	Power switch on (IG)	9.1 to 13.6 V
A76-17 (R2+) - Body ground	Power switch on (IG)	9.1 to 13.6 V
A73-12 (R3+) - Body ground	Power switch on (IG)	Below 1 V
A76-15 (R4+) - Body ground	Power switch on (IG)	Below 1 V
A73-3 (BS1) - Body ground	Power switch on (IG)	8.8 to 14 V
A76-7 (BS2) - Body ground	Power switch on (IG)	8.8 to 14 V

BC

Result

Result	Proceed to
OK	A
NG (R1+ and/or R2+)	B
NG (R3+, R4+, BS1 and/or BS2)	C

B → REPLACE SKID CONTROL ECU

C → REPAIR OR REPLACE HARNESS OR CONNECTOR (RELAY CIRCUIT)

A

6	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (IG).
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1241/41 and/or C1242/42) are not output	A
DTCs (C1241/41 and/or C1242/42) are output	B

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

DTC	C1246/46	Master Cylinder Pressure Sensor Malfunction

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

DTC	C1364/61	Wheel Cylinder Pressure Sensor Malfunction

DESCRIPTION

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

DTC C1281/81 can be deleted when the master cylinder pressure sensor sends a master cylinder pressure signal or the Test Mode ends. DTC C1281/81 is output only in the Test Mode.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1246/46	191	Sensor power source 1 (VCM1) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds.	• Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit • Master cylinder pressure sensor power supply • Brake actuator assembly • Skid control ECU
↑	192	Ratio of M/C pressure sensor output voltage 1 (PMC1) to sensor power source 1 (VCM1) is less than 5% or 90.5% or more for at least 0.05 seconds.	• Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit • Brake actuator assembly • Skid control ECU
↑	194	Sensor power source 2 (VCM2) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds.	• Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit • Master cylinder pressure sensor power supply • Brake actuator assembly • Skid control ECU
↑	195	Ratio of M/C pressure sensor output voltage 2 (PMC2) to sensor power source 2 (VCM2) is less than 5% or 90.5% or more for at least 0.05 seconds.	• Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit • Brake actuator assembly • Skid control ECU
↑	197	M/C pressure sensor output voltage 1 (PMC1) is abnormal.	• Brake actuator assembly • Skid control ECU
↑	198	M/C pressure sensor output voltage 2 (PMC2) is abnormal.	↑
↑	199	M/C pressure sensor output 1 (PMC1) is not approx. 0 Mpa when not braking.	• Brake actuator assembly (Master cylinder pressure sensor) • Master cylinder pressure sensor circuit • Brake actuator assembly • Skid control ECU
↑	200	M/C pressure sensor output 2 (PMC2) is not approx. 0 Mpa when not braking.	↑
↑	201	PMC1 and PMC2 voltages are different when braking.	↑
↑	202	M/C pressure sensor 1 data (PMC1) is invalid.	• Master cylinder pressure sensor power supply • Brake actuator assembly • Skid control ECU

BC

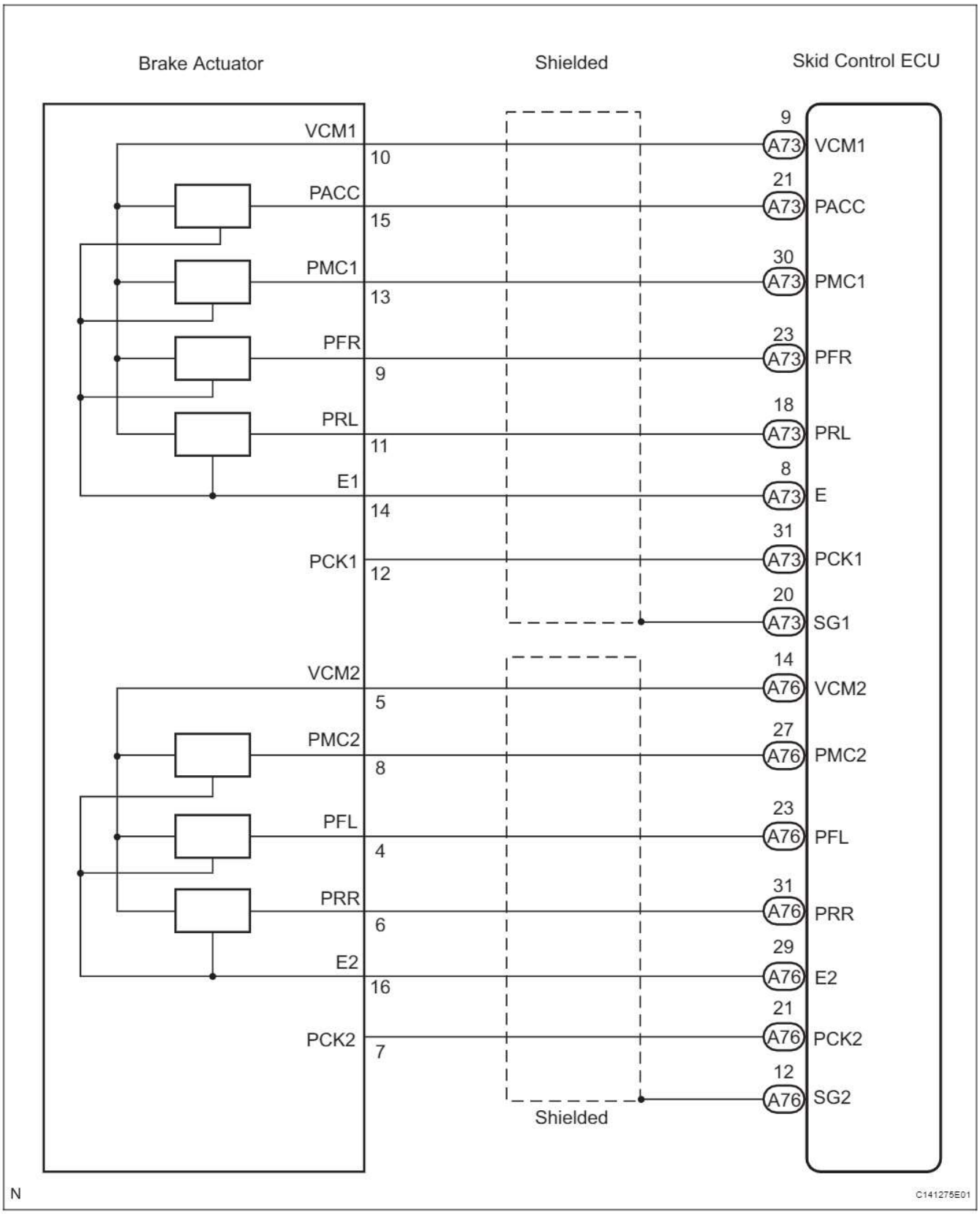
DTC Code	INF Code	DTC Detection Condition	Trouble Area
↑	205	M/C pressure sensor 2 data (PMC2) is invalid.	↑
C1364/61	221	Sensor power source 1 (VCM1) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds.	• Wheel cylinder pressure sensor power supply • Brake actuator assembly • Skid control ECU
↑	222	Ratio of FR right sensor output voltage (PFR) to sensor power source 1 (VCM1) is less than 5% or 90.5% or more for at least 0.05 seconds.	• Brake actuator assembly (Wheel cylinder pressure sensor) • Wheel cylinder pressure sensor circuit • Brake actuator assembly • Skid control ECU
↑	224	When any of the following is detected: 1. FR right sensor output (PFR) is not approx. 0 Mpa when not braking. 2. FR right sensor (PFR) zero point malfunction. 3. Open or short in FR right sensor (PFR) circuit.	↑
↑	225	Ratio of FR right sensor output voltage (PFR) to sensor power source 1 (VCM1) is less than 90.5% for at least 0.1 second when self diagnosis signal is output.	↑
↑	227	Sensor power source 2 (VCM2) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds.	• Wheel cylinder pressure sensor power supply • Brake actuator assembly • Skid control ECU
↑	228	Ratio of FR left sensor output voltage (PFL) to sensor power source 2 (VCM2) is less than 5% or 90.5% or more for at least 0.05 seconds.	• Brake actuator assembly (Wheel cylinder pressure sensor) • Wheel cylinder pressure sensor circuit • Brake actuator assembly • Skid control ECU
↑	230	When any of the following is detected: 1. FR left sensor output (PFL) is not approx. 0 Mpa when not braking. 2. FR left sensor (PFL) zero point malfunction. 3. Open or short in FR left sensor (PFR) circuit.	↑
↑	231	Ratio of FR left sensor output voltage (PFL) to sensor power source 2 (VCM2) is less than 90.5% for at least 0.1 second when self diagnosis signal is output.	↑
↑	233	Sensor power source 2 (VCM2) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds.	• Wheel cylinder pressure sensor power supply • Brake actuator assembly • Skid control ECU
↑	234	Ratio of RR right sensor output voltage (PRR) to sensor power source 2 (VCM2) is less than 5% or 90.5% or more for at least 0.05 seconds.	• Brake actuator assembly (Wheel cylinder pressure sensor) • Wheel cylinder pressure sensor circuit • Brake actuator assembly • Skid control ECU
↑	236	When any of the following is detected: 1. RR right sensor output (PRR) is not approx. 0 Mpa when not braking. 2. RR right sensor (PRR) zero point malfunction. 3. Open or short in RR right sensor (PRR) circuit.	↑
↑	237	Ratio of RR right sensor output voltage (PRR) to sensor power source 2 (VCM2) is less than 90.5% for at least 0.1 second when self diagnosis signal is output.	↑
↑	239	Sensor power source 1 (VCM1) voltage is less than 4.7 V or 5.3 V or more for at least 0.05 seconds.	• Wheel cylinder pressure sensor power supply • Brake actuator assembly • Skid control ECU

BC

DTC Code	INF Code	DTC Detection Condition	Trouble Area
↑	240	Ratio of RR left sensor output voltage (PRL) to sensor power source 1 (VCM1) is less than 5% or 90.5% or more for at least 0.05 seconds.	• Brake actuator assembly (Wheel cylinder pressure sensor) • Wheel cylinder pressure sensor circuit • Brake actuator assembly • Skid control ECU
↑	242	When any of the following is detected: 1. RR left sensor output (PRL) is not approx. 0 Mpa when not braking. 2. RR left sensor (PRL) zero point malfunction. 3. Open or short in RR left sensor (PRL) circuit.	↑
↑	243	Ratio of RR left sensor output voltage (PRL) to sensor power source 1 (VCM1) is less than 90.5% for at least 0.1 second when self diagnosis signal is output.	↑
C1281/81	-	Detected only during Test Mode.	• Stop light switch • Master cylinder pressure sensor

BC

WIRING DIAGRAM



BC

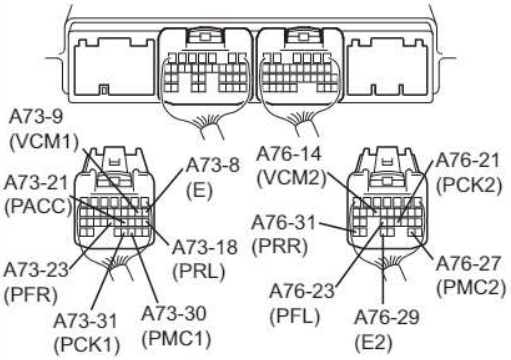
INSPECTION PROCEDURE

NOTICE:

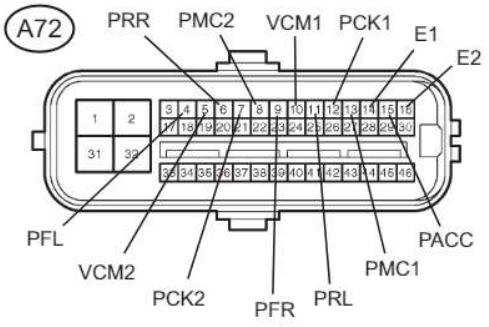
When replacing the skid control ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE ACTUATOR)

Skid Control ECU Wire Harness View:



Brake Actuator Harness Side Connector Front View:



(a) Disconnect the skid control ECU connectors and the brake actuator connector.

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

Standard resistance

Tester Connection	Condition	Specified Condition
A73-8 (E) - A72-14 (E1)	Always	Below 1 Ω
A73-8 (E) - Body ground	Always	10 kΩ or higher
A73-9 (VCM1) - A72-10 (VCM1)	Always	Below 1 Ω
A73-9 (VCM1) - Body ground	Always	10 kΩ or higher
A73-18 (PRL) - A72-11 (PRL)	Always	Below 1 Ω
A73-18 (PRL) - Body ground	Always	10 kΩ or higher
A73-21 (PACC) - A72-15 (PACC)	Always	Below 1 Ω
A73-21 (PACC) - Body ground	Always	10 kΩ or higher
A73-23 (PFR) - A72-9 (PFR)	Always	Below 1 Ω
A73-23 (PFR) - Body ground	Always	10 kΩ or higher
A73-30 (PMC1) - A72-13 (PMC1)	Always	Below 1 Ω
A73-30 (PMC1) - Body ground	Always	10 kΩ or higher
A73-31 (PCK1) - A72-12 (PCK1)	Always	Below 1 Ω
A73-31 (PCK1) - Body ground	Always	10 kΩ or higher
A76-14 (VCM2) - A72-5 (VCM2)	Always	Below 1 Ω
A76-14 (VCM2) - Body ground	Always	10 kΩ or higher
A76-21 (PCK2) - A72-7 (PCK2)	Always	Below 1 Ω
A76-21 (PCK2) - Body ground	Always	10 kΩ or higher
A76-23 (PFL) - A72-4 (PFL)	Always	Below 1 Ω
A76-23 (PFL) - Body ground	Always	10 kΩ or higher
A76-27 (PMC2) - A72-8 (PMC2)	Always	Below 1 Ω
A76-27 (PMC2) - Body ground	Always	10 kΩ or higher
A76-29 (E2) - A72-16 (E2)	Always	Below 1 Ω
A76-29 (E2) - Body ground	Always	10 kΩ or higher
A76-31 (PRR) - A72-6 (PRR)	Always	Below 1 Ω
A76-31 (PRR) - Body ground	Always	10 kΩ or higher

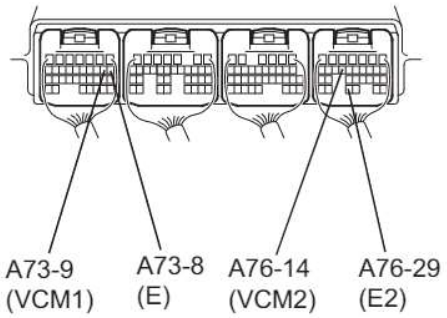
BC

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 INSPECT SKID CONTROL ECU (SENSOR INPUT)

Skid Control ECU Wire Harness View:



(a) Reconnect the skid control ECU connectors.
(b) Turn the power switch on (IG).
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
A73-9 (VCM1) - Body ground	Power switch on (IG)	4.75 to 5.25 V
A76-14 (VCM2) - Body ground	Power switch on (IG)	4.75 to 5.25 V

(d) Turn the power switch off.
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
A73-8 (E) - Body ground	Always	Below 1 Ω
A76-29 (E2) - Body ground	Always	Below 1 Ω

NG → REPLACE SKID CONTROL ECU

OK

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

(a) Reconnect the brake actuator connector.
(b) Connect the pedal effort gauge (See page BC-259).
(c) Connect the intelligent tester to the DLC3.
(d) Turn the power switch on (IG).
(e) Select the Data List mode on the intelligent tester.

ABS / VSC:

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

BC

(f) Check the output value of the master cylinder pressure sensor at each fluid pressure.
HINT:
- Check the value while Electronically Controlled Brake control is being prohibited without servo assistance.
- The brake control warning light is on while Electronically Controlled Brake control is being prohibited.

Standard voltage

Brake Effort N (kgf, lbf)	MAS CYL PRESS 1 (Data List Display)	MAS CYL PRESS 2 (Data List Display)
200 (20.4, 45)	0.9 to 1.2 V	0.9 to 1.2 V
500 (51, 112)	2.05 to 2.35 V	2.05 to 2.35 V

NG → REPLACE BRAKE ACTUATOR ASSEMBLY

OK

4 READ VALUE OF INTELLIGENT TESTER (WHEEL CYLINDER PRESSURE SENSOR)

(a) Turn the power switch off.
(b) Install the hydro LSPV gauge (SST) and bleed air (See page BC-259).
SST 09709-29018
(c) Turn the power switch on (IG).
(d) Select the Data List mode on the intelligent tester.

ABS / VSC:

Tester Display	Measurement Item/Range	Normal Condition
FR W/C SENS	FR wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
FL W/C SENS	FL wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
RR W/C SENS	RR wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
RL W/C SENS	RL wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V

(e) Check the output value of the wheel cylinder pressure sensor at each fluid pressure during the Electronically Controlled Brake control.
Standard voltage:
Front wheel cylinder pressure sensor

Hydraulic Pressure MPa (kgf/cm^2, psi)	FR W/C SENS (Data List Display)	FL W/C SENS (Data List Display)
2.6 (26.5, 376.9)	0.85 to 1.15 V	0.85 to 1.15 V
6.3 (64.3, 914.5)	1.6 to 1.9 V	1.6 to 1.9 V
8.1 (82.6, 1,174.8)	1.95 to 2.25 V	1.95 to 2.25 V
8.2 (83.6, 1,189.0)	2.0 to 2.3 V	2.0 to 2.3 V

Rear wheel cylinder pressure sensor

Hydraulic Pressure MPa (kgf/cm^2, psi)	RR W/C SENS (Data List Display)	RL W/C SENS (Data List Display)
2.6 (26.5, 376.9)	0.85 to 1.15 V	0.85 to 1.15 V
5.0 (51.0, 725.4)	1.35 to 1.65 V	1.35 to 1.65 V

NG → REPLACE BRAKE ACTUATOR ASSEMBLY

OK

5 RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Perform the road and braking test.
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1246/46 and/or C1364/61) are not output	A
DTCs (C1246/46 and/or C1364/61) are output	B

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

DTC	C1247/47	Stroke Sensor Malfunction

DTC	C1346/71	Stroke Sensor Zero Point Learning Malfunction (Test Mode DTC)

DTC	C1392/48	Stroke Sensor Zero Point Calibration Undone

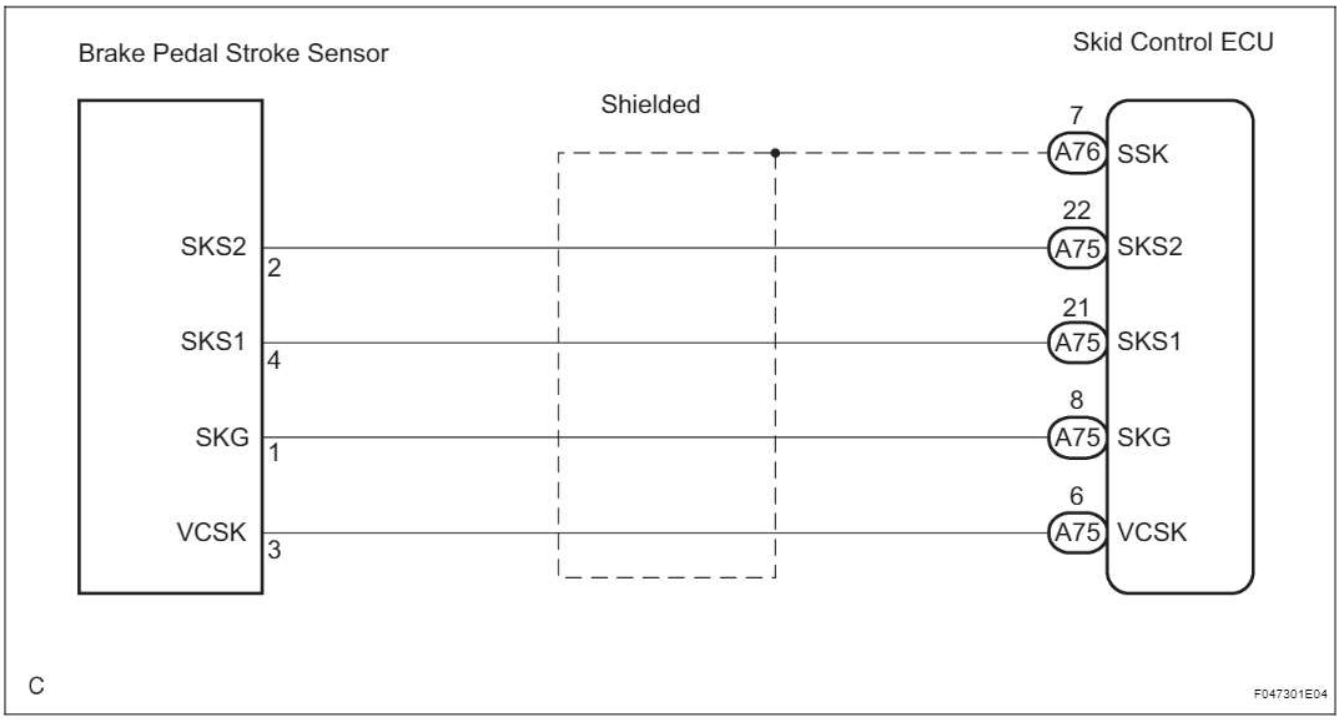
DESCRIPTION

The stroke sensor inputs the pedal stroke into the skid control ECU.
DTC C1346/71 can be deleted when the brake pedal stroke sensor sends a stroke sensor signal or the Test Mode ends. DTC C1346/71 is output only in the Test Mode.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1247/47	171	Sensor power source voltage (VCSK) is 3.6 V or less or 4.95 V or more for at least 1.2 seconds.	• Brake pedal stroke sensor • Brake pedal stroke sensor power supply • Skid control ECU
↑	172	Ratio of sensor output voltage 1 (SKS1) to sensor power source voltage (VCSK) is less than 3 % or 97 % or more for at least 1.2 seconds.	• Brake pedal stroke sensor • Brake pedal stroke sensor circuit
↑	173	Ratio of sensor output voltage 2 (SKS2) to sensor power source voltage (VCSK) is less than 3 % or 97 % or more for at least 1.2 seconds.	↑
↑	174	Sensor output 1 (SKS1) calculation value becomes 20 mm or more for at least 1.2 seconds at an interval of 0.006 seconds (changes due to interference).	↑
↑	175	Sensor output 2 (SKS2) calculation value becomes 20 mm or more for at least 1.2 seconds at an interval of 0.006 seconds (changes due to interference).	↑
↑	176	Zero point stored value (ratio to power source voltage) of sensor output 1 (SKS1) is 0.46 or more or 0.03 or less.	• Brake pedal stroke sensor • Brake pedal stroke sensor circuit • Sensor installation
↑	177	Zero point stored value (ratio to power source voltage) of sensor output 2 (SKS2) is 0.46 or more or 0.03 or less.	↑
↑	179	When either of the following is detected: 1. Sum of SKS1/VCSK and SKS2/VCSK is 1.155 or more or 0.845 or less for at least 1 second. 2. Difference between sensor output 1 (SKS1) and sensor output 2 (SKS2) is excessively large for at least 0.2 seconds.	• Brake pedal stroke sensor • Brake pedal stroke sensor circuit
↑	180	• Difference between zero point output value and stored value is 0.5 or more for at least 0.05 seconds. • Short between SKS1 and SKS2 output line.	• Brake pedal stroke sensor • Brake pedal stroke sensor circuit • Skid control ECU
C1392/48	-	Zero point calibration of stroke sensor is unfinished.	• Brake pedal stroke sensor zero point calibration undone (Initialization of linear solenoid valve and calibration undone) • Skid control ECU
C1346/71	-	Detected only during Test Mode.	Brake pedal stroke sensor

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU or brake pedal stroke sensor, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK BRAKE PEDAL

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

(b) Check the brake pedal height (See page BR-18).

OK:

The brake pedal is securely installed.

The pedal height is within the specified range.

NG → **ADJUST BRAKE PEDAL**

BC

OK

2	READ VALUE OF INTELLIGENT TESTER (BRAKE PEDAL STROKE SENSOR)

(a) Connect the intelligent tester to the DLC3.

(b) Turn the power switch on (IG).

(c) Select the Data List mode on the intelligent tester.

ABS / VSC:

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

(d) Read the pedal stroke sensor voltage value on the intelligent tester screen.
OK:
The normal condition value is displayed on the intelligent tester.

NG → **ADJUST BRAKE PEDAL STROKE SENSOR**

OK

3	PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION

(a) Perform initialization of the linear solenoid valve and calibration (See page BC-25).

NEXT

4	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Perform the road and braking test.
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1247/47 and/or C1392/48) are output	A
DTCs (C1247/47 and/or C1392/48) are not output	B

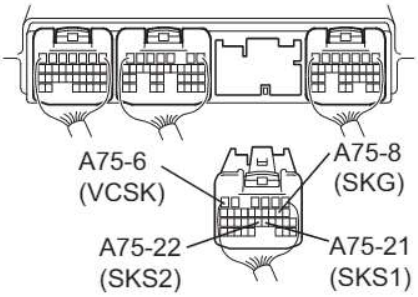
B → **END**

A

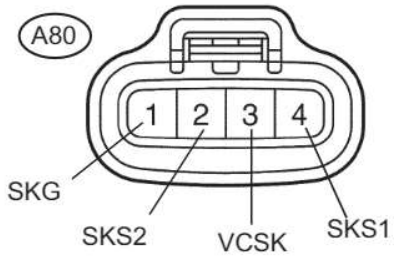
BC

5 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE PEDAL STROKE SENSOR)

Skid Control ECU Wire Harness View:



Brake Pedal Stroke Sensor Harness Side Connector Front View:



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

Standard resistance

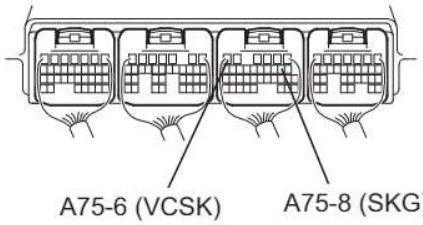
Tester Connection	Condition	Specified Condition
A75-6 (VCSK) - A80-3 (VCSK)	Always	Below 1 Ω
A75-6 (VCSK) - Body ground	Always	10 kΩ or higher
A75-8 (SKG) - A80-1 (SKG)	Always	Below 1 Ω
A75-8 (SKG) - Body ground	Always	10 kΩ or higher
A75-21 (SKS1) - A80-4 (SKS1)	Always	Below 1 Ω
A75-21 (SKS1) - Body ground	Always	10 kΩ or higher
A75-22 (SKS2) - A80-2 (SKS2)	Always	Below 1 Ω
A75-22 (SKS2) - Body ground	Always	10 kΩ or higher

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

OK

6 INSPECT SKID CONTROL ECU (SENSOR INPUT)

Skid Control ECU Wire Harness View:



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

Standard voltage

Tester Connection	Condition	Specified Condition
A75-6 (VCSK) - Body ground	Power switch on (IG)	3.75 to 4.95 V

(d) Turn the power switch off.
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
A75-8 (SKG) - Body ground	Always	Below 1 Ω

BC

NG → REPLACE SKID CONTROL ECU

OK

7 READ VALUE OF INTELLIGENT TESTER (BRAKE PEDAL STROKE SENSOR)

(a) Reconnect the brake pedal stroke sensor connector.
(b) Connect the pedal effort gauge.
(c) Connect the intelligent tester to the DLC3.
(d) Turn the power switch on (IG).
(e) Select the Data List mode on the intelligent tester.

ABS / VSC:

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

(f) When depressing the brake pedal with the amount of force listed in the table below, check that the output value displayed on the intelligent tester is normal.
HINT:
The brake pedal must be depressed gradually.

Standard voltage

Brake Effort N (kgf, lbf)	PEDAL STROKE (Data List Display)	PEDAL STROKE 2 (Data List Display)
50 (5.1, 11)	1.4 to 1.8 V	3.2 to 3.6 V
100 (10.2, 22)	1.55 to 1.95 V	3.05 to 3.45 V
150 (15.3, 34)	1.65 to 2.05 V	2.95 to 3.35 V
200 (20.4, 45)	1.7 to 2.1 V	2.9 to 3.3 V

NG → REPLACE BRAKE PEDAL STROKE SENSOR

OK

8 RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Perform the road and braking test.
(d) Check if the same DTC is recorded (See page BC-57).

BC

Result

Condition	Proceed to
DTCs (C1247/47 and/or C1392/48) are not output	A
DTCs (C1247/47 and/or C1392/48) are output	B

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

DTC	C1249/49	Open in Stop Light Switch Circuit

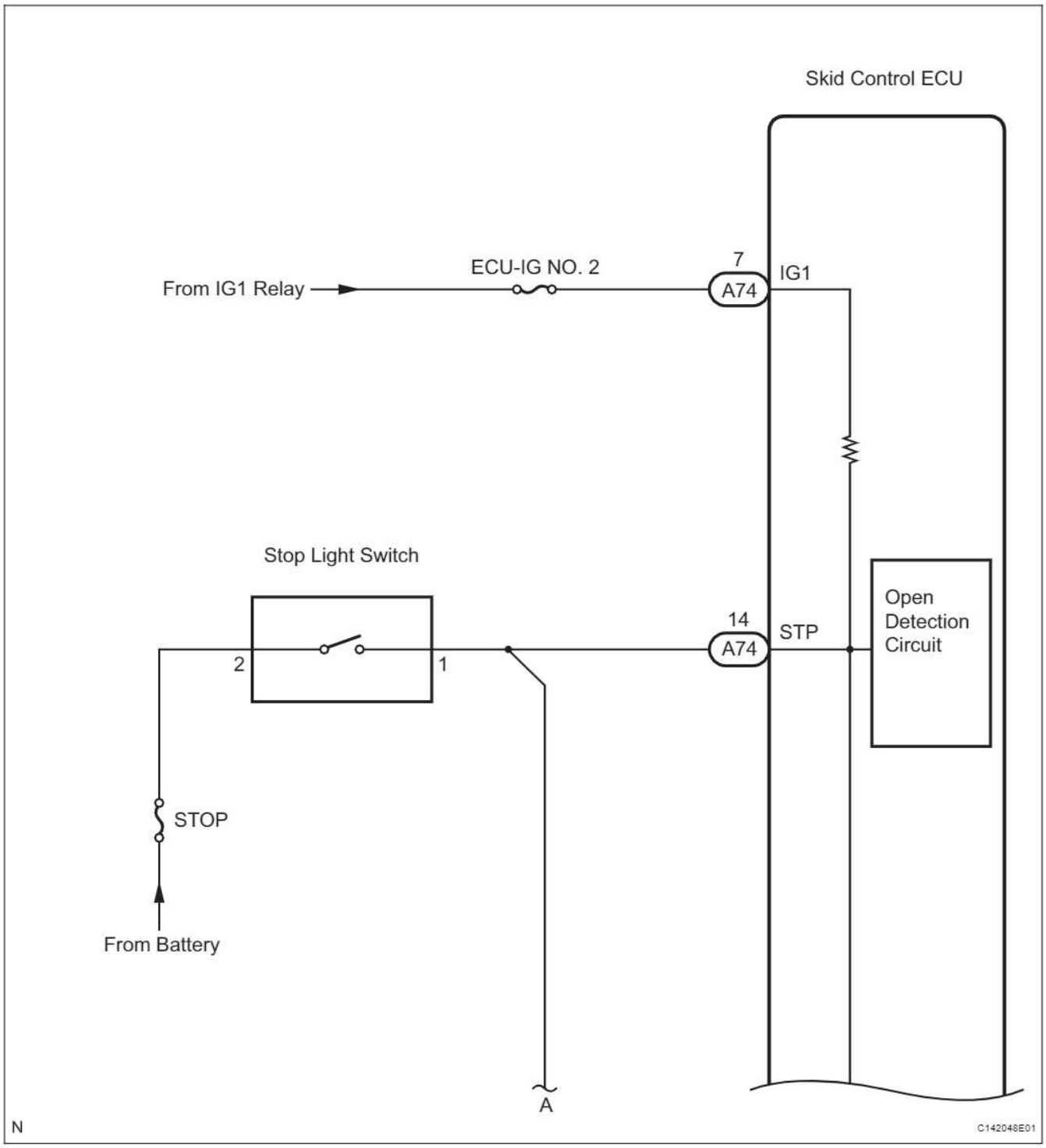
DESCRIPTION

The skid control ECU inputs the stop light switch signal and the condition of brake operation.
The skid control ECU has an open detection circuit, which outputs this DTC when detecting an open in the stop light input line while the stop light switch is OFF.

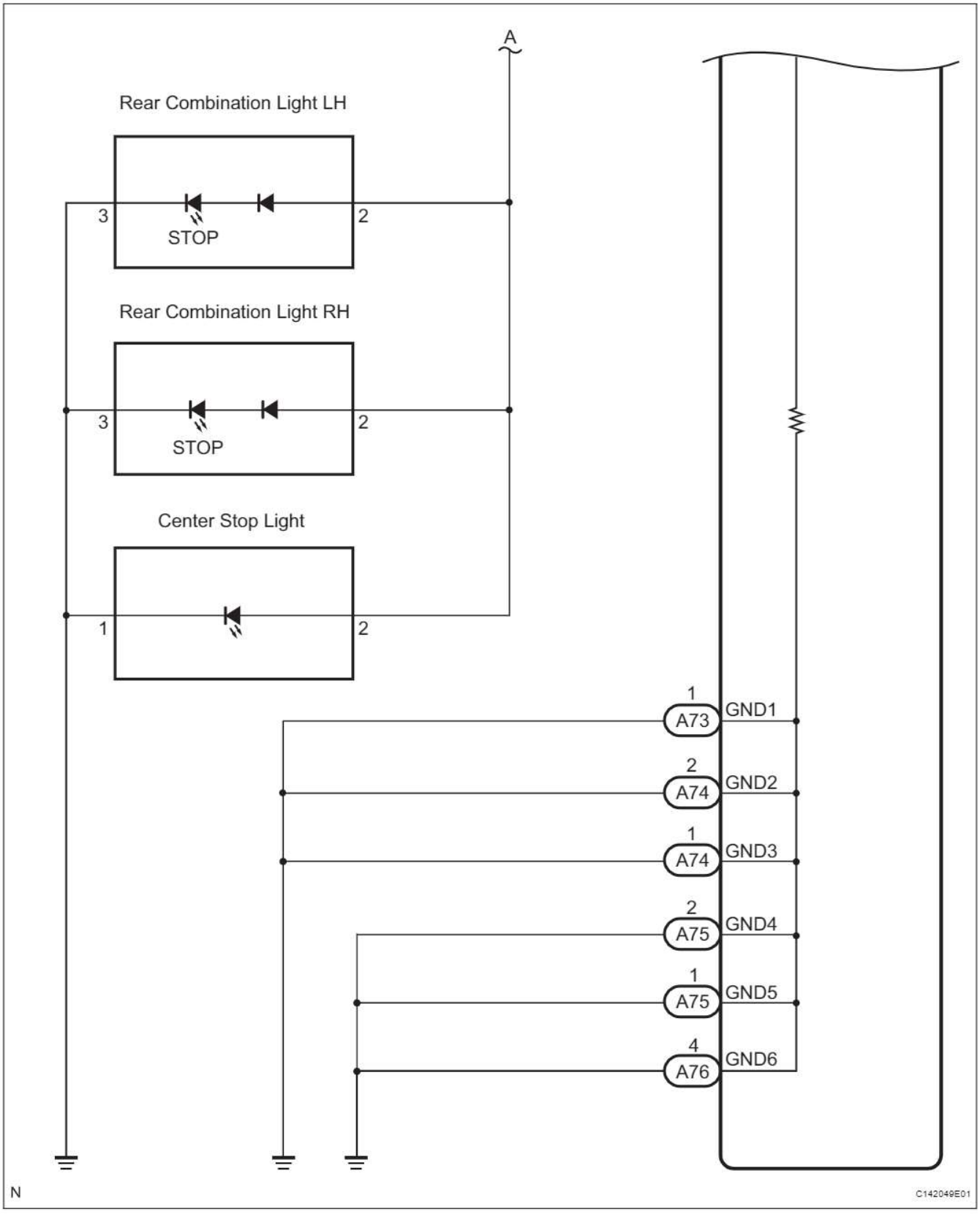
DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1249/49	520	When IG1 terminal voltage is 9.5 to 17.2 V, an open circuit of the stop light switch continues for 10 seconds or more.	• STOP fuse • Stop light switch • Stop light switch circuit • Skid control ECU

BC

WIRING DIAGRAM



BC

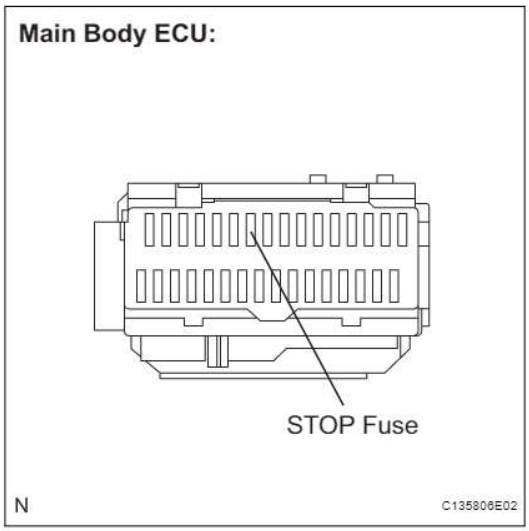


INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1 INSPECT STOP FUSE



(a) Remove the STOP fuse from the main body ECU.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
STOP (10 A) fuse	Always	Below 1 Ω

NG → **REPLACE STOP FUSE**

OK

2 CHECK STOP LIGHT OPERATION

(a) Install the STOP fuse.
(b) Check that the stop light comes on when the brake pedal is depressed, and goes off when the brake pedal is released.

OK

Condition	Illumination Condition
Brake pedal depressed	ON
Brake pedal released	OFF

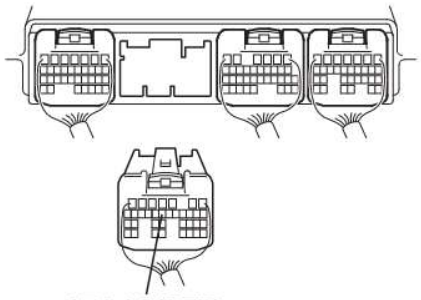
NG → **Go to step 7**

OK

BC

3 INSPECT SKID CONTROL ECU (STP TERMINAL)

Skid Control ECU Wire Harness View:



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

Standard voltage

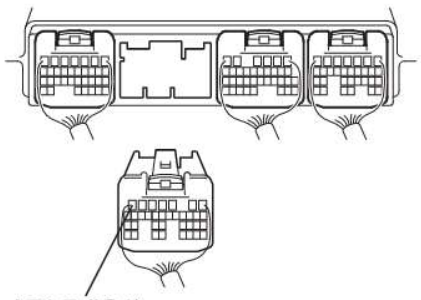
Tester Connection	Condition	Specified Condition
A74-14 (STP) - Body ground	Stop light switch ON (Brake pedal depressed)	8 to 14 V
A74-14 (STP) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

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

OK

4 INSPECT SKID CONTROL ECU (IG1 TERMINAL)

Skid Control ECU Wire Harness View:



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

Standard voltage

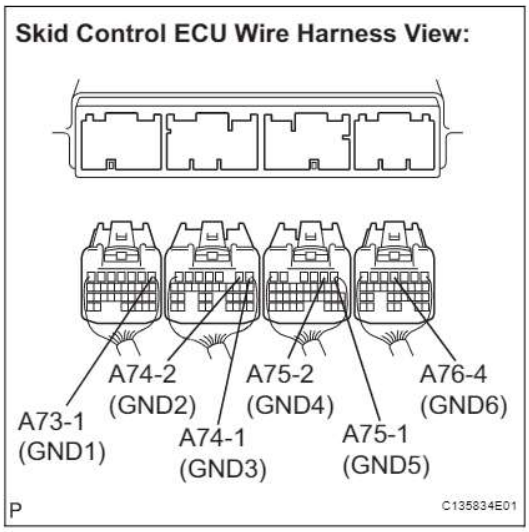
Tester Connection	Condition	Specified Condition
A74-7 (IG1) - Body ground	Power switch on (IG)	10 to 14 V

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

BC

OK

5 INSPECT SKID CONTROL ECU (GND TERMINAL)



(a) Turn the power switch off.
(b) Disconnect the skid control ECU connectors.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
A73-1 (GND1) - Body ground	Always	Below 1 Ω
A74-2 (GND2) - Body ground	Always	Below 1 Ω
A74-1 (GND3) - Body ground	Always	Below 1 Ω
A75-2 (GND4) - Body ground	Always	Below 1 Ω
A75-1 (GND5) - Body ground	Always	Below 1 Ω
A76-4 (GND6) - Body ground	Always	Below 1 Ω

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

OK

6 RECONFIRM DTC

(a) Reconnect the skid control ECU connectors.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Depress the brake pedal several times to test the stop light circuit.
(e) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (C1249/49) is not output	A
DTC (C1249/49) is output	B

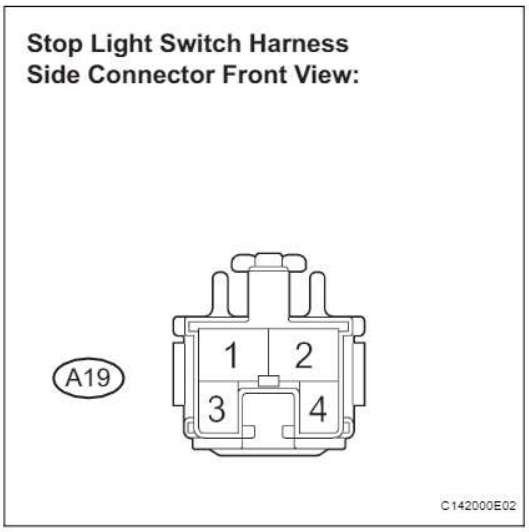
HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

B → **REPLACE SKID CONTROL ECU**

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

7 INSPECT STOP LIGHT SWITCH (POWER SOURCE TERMINAL)



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

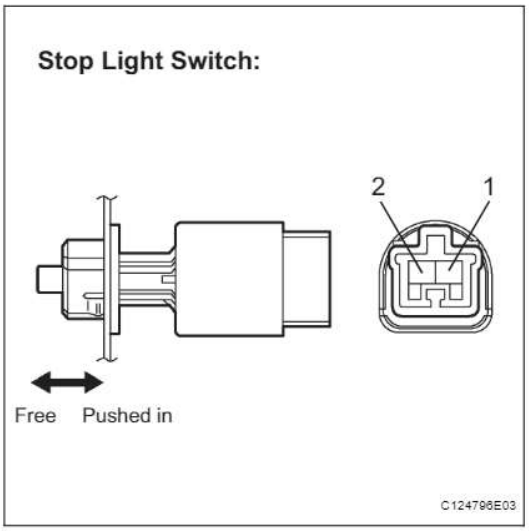
Standard voltage

Tester Connection	Condition	Specified Condition
A19-2 - Body ground	Always	10 to 14 V

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

OK

8 INSPECT STOP LIGHT SWITCH



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

Standard resistance

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

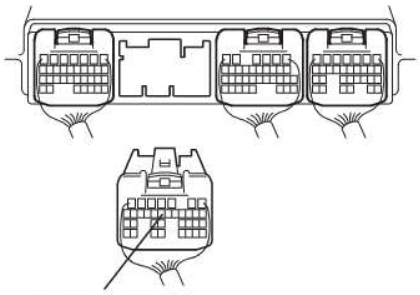
NG → REPLACE STOP LIGHT SWITCH

BC

OK

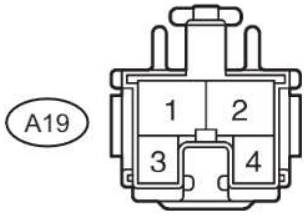
9	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - STOP LIGHT SWITCH)

Skid Control ECU Wire Harness View:



A74-14 (STP)

Stop Light Switch Harness Side Connector Front View:



C141363E01

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

Standard resistance

Tester Connection	Condition	Specified Condition
A74-14 (STP) - A19-1	Always	Below 1 Ω
A74-14 (STP) - Body ground	Always	10 kΩ or higher

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

OK

10	RECONFIRM DTC

(a) Reconnect the skid control ECU connector and the stop light switch connector.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Depress the brake pedal several times to test the stop light circuit.
(e) Check if the same DTC is recorded (See page BC-57).

BC

Result

Condition	Proceed to
DTC (C1249/49) is not output	A
DTC (C1249/49) is output	B

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

B → **REPLACE SKID CONTROL ECU**

A

INSPECT LIGHTING SYSTEM (STOP LIGHT CIRCUIT)

DTC	C1252/52	Brake Booster Pump Motor on Time Abnormally Long

DTC	C1253/53	Hydro Booster Pump Motor Relay Malfunction

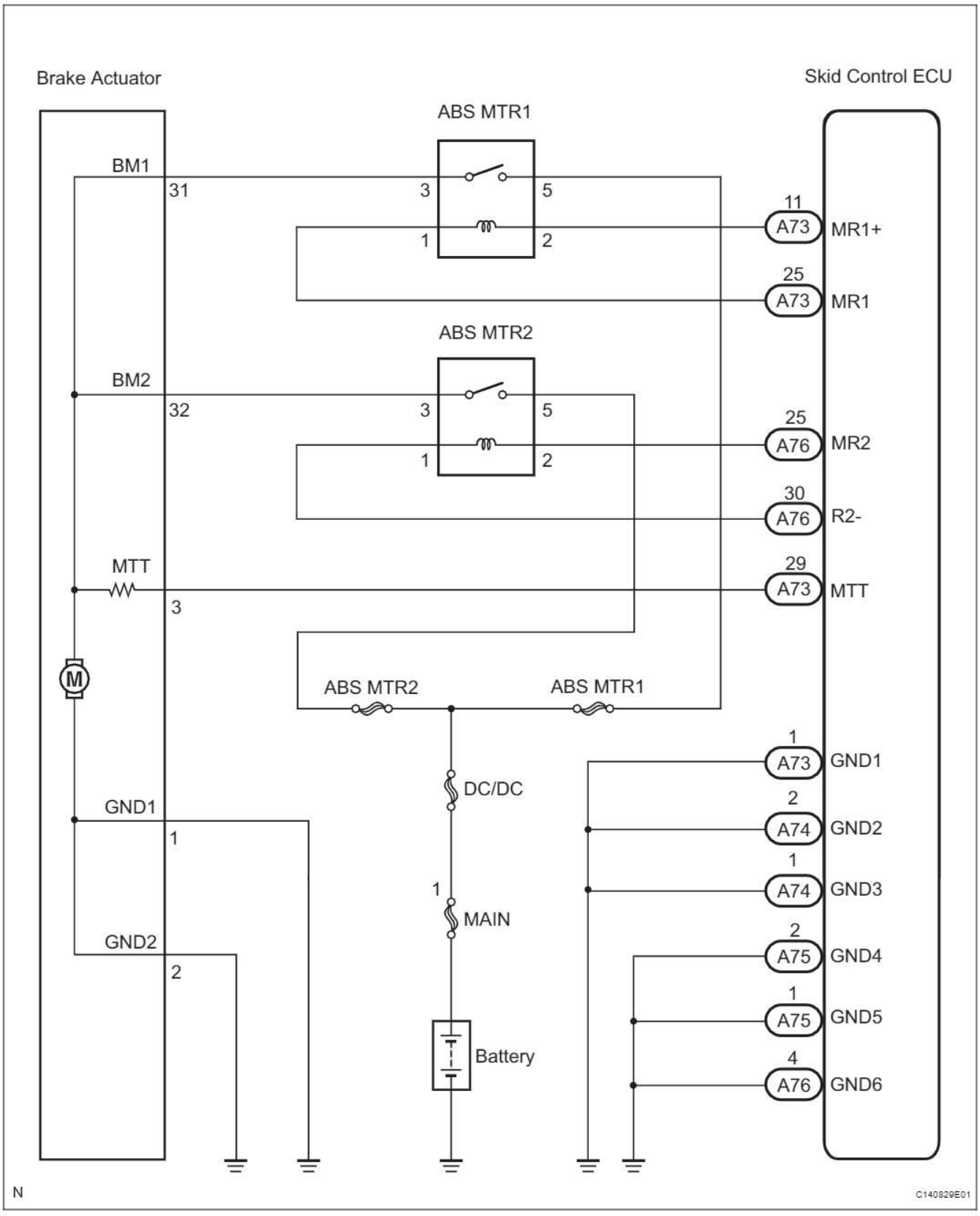
DESCRIPTION

The skid control ECU detects decreases in the accumulator pressure according to the data from the accumulator pressure sensor, and then starts and stops the pump motor by operating the motor relay. The skid control ECU usually drives the motor relay 1 for Electronically Controlled Brake control, and the motor relay 2 for ABS control. If either of them is malfunctioning, the other will substitute.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1252/52	130	Motor relay is on for at least 5 minutes.	• ABS MTR1 relay • ABS MTR1 relay circuit • ABS MTR2 relay • ABS MTR2 relay circuit • Brake actuator assembly (Accumulator pressure sensor circuit)
C1253/53	132	Motor relay 1 coil is energized for at least 1 second when linear solenoid power source voltage 1 (BS1) is 9.5 V or more and motor relay 1 is off.	• ABS MTR1 fuse • ABS MTR1 relay • ABS MTR1 relay circuit
↑	133	Motor relay 1 coil is not energized for at least 1 second when linear solenoid power source voltage 1 (BS1) is 9.5 V or more and motor relay 1 is on.	↑
↑	134	MTT input is 3.5 V or less for at least 1 second when linear solenoid power source voltage 1 (BS1) is 9.5 V or more and motor relay 1 is on.	• ABS MTR1 fuse • ABS MTR1 relay • ABS MTR1 relay circuit • Brake actuator assembly (Pump motor) • Pump motor circuit
↑	136	Motor relay 2 coil is energized for at least 1 second when linear solenoid power source voltage 2 (BS2) is 9.5 V or more and motor relay 2 is off.	• ABS MTR2 fuse • ABS MTR2 relay • ABS MTR2 relay circuit
↑	137	Motor relay 2 coil is not energized for at least 1 second when linear solenoid power source voltage 2 (BS2) is 9.5 V or more and motor relay 2 is on.	↑
↑	138	MTT input is 3.5 V or less for at least 1 second when linear solenoid power source voltage 2 (BS2) is 9.5 V or more and motor relay 2 is on.	• ABS MTR2 fuse • ABS MTR2 relay • ABS MTR2 relay circuit • Brake actuator assembly (Pump motor) • Pump motor circuit
↑	140	MTT input is 3.5 V or more for at least 2 seconds when motor relay 1 and 2 are off.	• ABS MTR1 relay • ABS MTR2 relay • Brake actuator assembly (Pump motor) • Pump motor circuit

BC

WIRING DIAGRAM



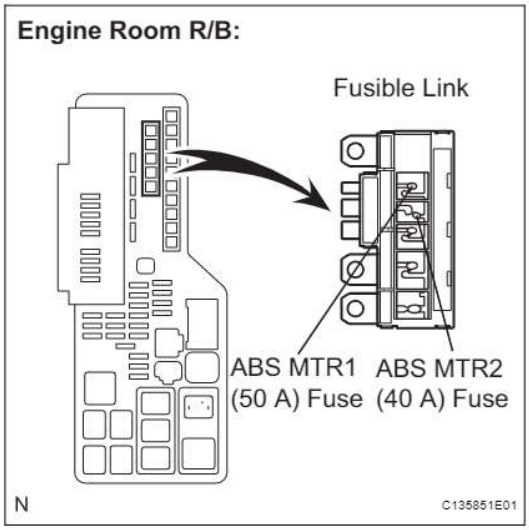
BC

INSPECTION PROCEDURE

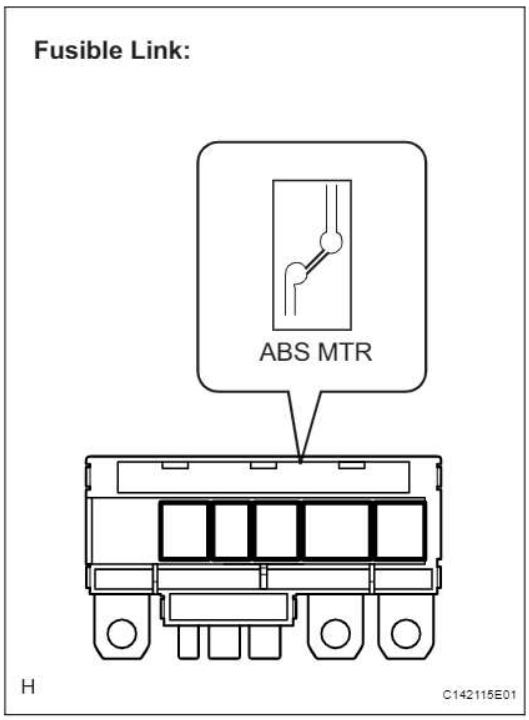
NOTICE:

When replacing the skid control ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	INSPECT ABS MTR FUSE



(a) Remove the fusible link from the engine room R/B.

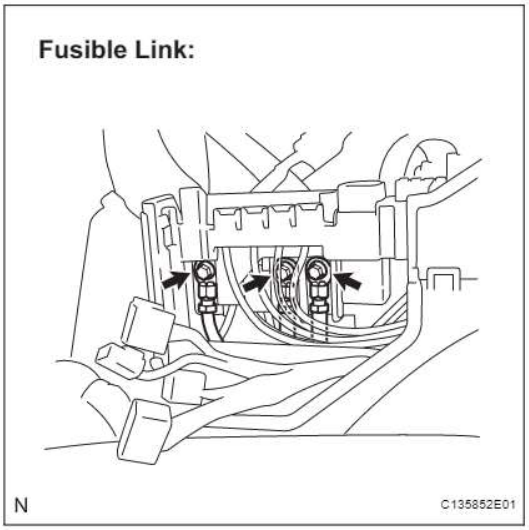


(b) Check if the fusible link is melted.

OK:

The fusible link is melted.

BC



(c) Install the fusible link to the engine room R/B with the bolt.

Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

NG → **REPLACE FUSIBLE LINK (ABS MTR FUSE)**

OK

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

(a) Connect the intelligent tester to the DLC3.
(b) Turn the power switch on (IG).
(c) Select the Active Test mode on the intelligent tester.

ABS / VSC:

Tester Display	Test Part	Control Range	Diagnostic Note
ECB* MTR RELAY	ABS motor relay	Relay ON / OFF	Operation sound of relay (clicking sound) and motor can be heard
ECB* MTR RELAY 2	ABS motor relay 2	Relay ON / OFF	Operation sound of relay (clicking sound) and motor can be heard

*: Electronically Controlled Brake

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

OK:

The operation sound of the ABS motor relay and motor should be heard.

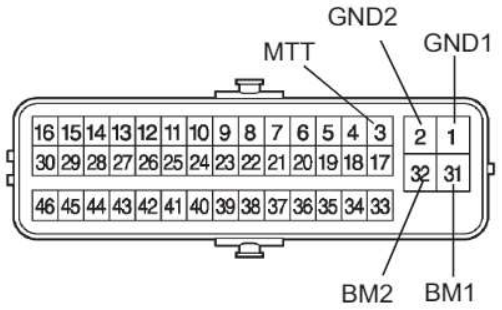
NG → **Go to step 7**

BC

OK

3 INSPECT BRAKE ACTUATOR ASSEMBLY

Brake Actuator:



(a) Turn the power switch off.
(b) Disconnect the brake actuator connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

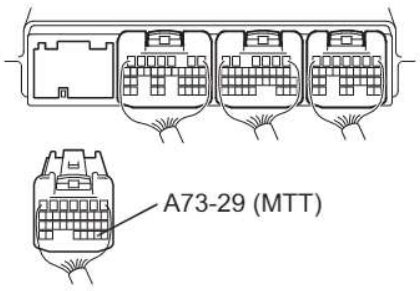
Tester Connection	Condition	Specified Condition
31 (BM1) - 1 (GND1)	Always	Below 10 Ω
32 (BM2) - 1 (GND1)	Always	Below 10 Ω
31 (BM1) - 32 (BM2)	Always	Below 1 Ω
1 (GND1) - 2 (GND2)	Always	Below 1 Ω
31 (BM1) - 3 (MTT)	Always	950 to 1,050 Ω
32 (BM2) - 3 (MTT)	Always	950 to 1,050 Ω

NG → REPLACE BRAKE ACTUATOR ASSEMBLY

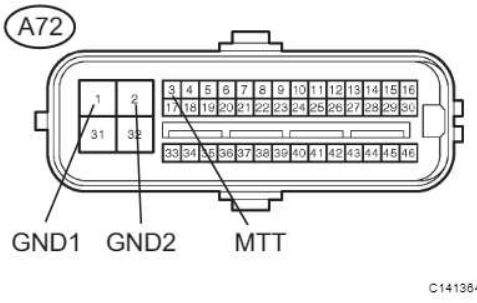
OK

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

Skid Control ECU Wire Harness View:



Brake Actuator Harness Side Connector Front View:



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

Standard resistance

Tester Connection	Condition	Specified Condition
A73-29 (MTT) - A72-3 (MTT)	Always	Below 1 Ω
A73-29 (MTT) - Body ground	Always	10 kΩ or higher
A72-1 (GND1) - Body ground	Always	Below 1 Ω
A72-2 (GND2) - Body ground	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

BC

5	READ VALUE OF INTELLIGENT TESTER (ACCUMULATOR PRESSURE SENSOR)

(a) Reconnect the skid control ECU connector and the brake actuator connector.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the power switch on (IG).
(d) Select the Data List mode on the intelligent tester.

ABS / VSC:

Tester Display	Measurement Item/Range	Normal Condition
ACC PRESS SENS	Accumulator pressure sensor / min.: 0 V, max.: 5 V	Specified value: 3.3 to 4.7 V

(e) Depress the brake pedal 4 or 5 times to operate the pump motor, and check the output value on the intelligent tester with the motor stopped (not braking).
OK:
Accumulator pressure sensor voltage does not drop.

NG → **REPLACE BRAKE ACTUATOR ASSEMBLY**

OK ↓

6	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (IG).
(d) Check if the same DTC is recorded (See page BC-57).

Result

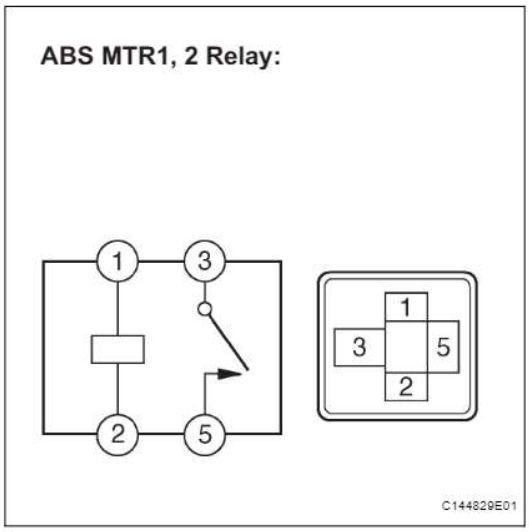
Condition	Proceed to
DTCs (C1252/52 and/or C1253/53) are not output	A
DTCs (C1252/52 and/or C1253/53) are output	B

B → **REPLACE SKID CONTROL ECU**

A ↓

BC **CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)**

7 INSPECT ABS MOTOR RELAY (ABS MTR1, 2 RELAY)



(a) Turn the power switch off.
(b) Remove the ABS MTR1 relay and the ABS MTR2 relay.
(c) Measure the resistance according to the value(s) in the table below.

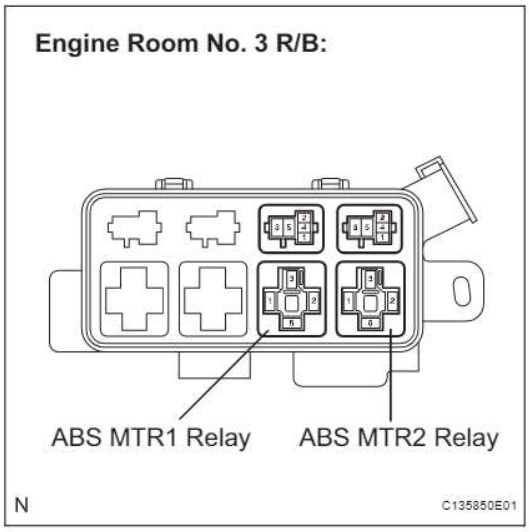
Standard resistance

Tester Connection	Condition	Specified Condition
3 - 5	Always	10 kΩ or higher
3 - 5	Apply B+ between terminals 1 and 2	Below 1 Ω

NG → REPLACE ABS MOTOR RELAY (ABS MTR1, 2 RELAY)

OK

8 INSPECT ENGINE ROOM NO. 3 RELAY BLOCK (POWER SOURCE TERMINAL)



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

Standard voltage

Tester Connection	Condition	Specified Condition
ABS MTR1 relay terminal 5 - Body ground	Always	10 to 14 V
ABS MTR2 relay terminal 5 - Body ground	Always	10 to 14 V

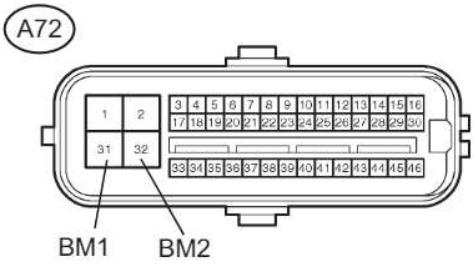
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK

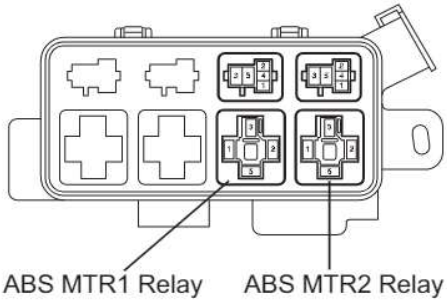
BC

9	CHECK HARNESS AND CONNECTOR (BRAKE ACTUATOR - ENGINE ROOM NO. 3 RELAY BLOCK)

Brake Actuator Harness Side Connector Front View:



Engine Room No. 3 R/B:



N C141365E01

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

Standard resistance

Tester Connection	Condition	Specified Condition
A72-31 (BM1) - ABS MTR1 relay terminal 3	Always	Below 1 Ω
A72-31 (BM1) - Body ground	Always	10 kΩ or higher
A72-32 (BM2) - ABS MTR2 relay terminal 3	Always	Below 1 Ω
A72-32 (BM2) - Body ground	Always	10 kΩ or higher

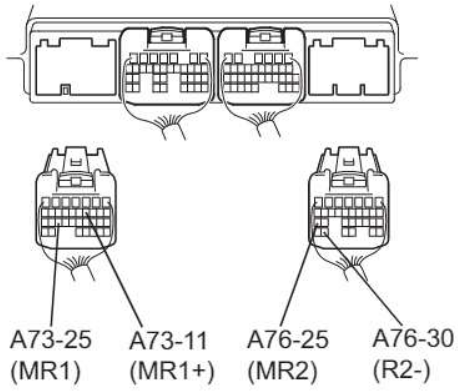
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

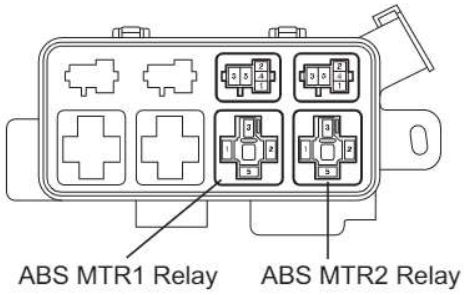
BC

10 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - ENGINE ROOM NO. 3 RELAY BLOCK)

Skid Control ECU Wire Harness View:



Engine Room No. 3 R/B:



N

C142645E01

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

Standard resistance

Tester Connection	Condition	Specified Condition
A73-11 (MR1+) - ABS MTR1 relay terminal 2	Always	Below 1 Ω
A73-11 (MR1+) - Body ground	Always	10 kΩ or higher
A73-25 (MR1) - ABS MTR1 relay terminal 1	Always	Below 1 Ω
A73-25 (MR1) - Body ground	Always	10 kΩ or higher
A76-25 (MR2) - ABS MTR2 relay terminal 2	Always	Below 1 Ω
A76-25 (MR2) - Body ground	Always	10 kΩ or higher
A76-30 (R2-) - ABS MTR2 relay terminal 1	Always	Below 1 Ω
A76-30 (R2-) - Body ground	Always	10 kΩ or higher

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

OK

11 RECONFIRM DTC

(a) Clear the DTC (See page BC-57).
(b) Turn the power switch on (IG).
(c) Check if the same DTC is recorded (See page BC-57).
HINT:
Reinstall the relays, connectors, etc. and restore the vehicle to its prior condition before rechecking for DTCs.

Result

Condition	Proceed to
DTCs (C1252/52 and/or C1253/53) are not output	A
DTCs (C1252/52 and/or C1253/53) are output	B

BC

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

DTC	C1256/57	Accumulator Low Pressure

DESCRIPTION

The accumulator pressure sensor is built into the actuator and detects the accumulator pressure. The skid control ECU turns on the brake control warning light and sounds the skid control buzzer if it senses a decrease in the accumulator pressure.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1256/57	141	When either of the following is detected: 1. Braking operation is input when accumulator pressure is less than 12.45 MPa and vehicle speed is input (detected value changes if accumulator pressure is low after system start). 2. Accumulator pressure is less than 14.62 MPa for 120 seconds (changes according to power source voltage) after system start (stores the DTC after the conditions are met, and drives buzzer).	• Accumulator pressure • Brake actuator assembly (Accumulator pressure sensor) • Brake actuator assembly (Pump motor)
↑	143	When any of the following is detected: 1. Any of the wheel cylinder pressure sensor value is lower than the target value for at least 0.5 seconds when accumulator pressure is less than 14.62 MPa and vehicle speed is input. 2. Accumulator pressure changes little when accumulator pressure is less than 14.62 MPa for at least 1 second without braking (pump motor is operating). 3. Accumulator pressure is less than 14.62 MPa for at least 0.5 seconds when motor relay is malfunctioning.	↑

WIRING DIAGRAM

Refer to DTCs C1252/52 and C1253/53 (See page BC-151).

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration (See page BC-25).

HINT:

When C1241/41, C1252/52 or C1253/53 is output together with C1256/57, inspect and repair the trouble areas indicated by C1241/41, C1252/52 or C1253/53 first.

1	BRAKE PROBLEM CHECK

BC

(a) Ask the customer if frequent braking is performed when the brake control warning light comes on.

OK

Condition	Proceed to
Frequent braking is performed	A
Frequent braking is not performed	B

HINT:

This DTC is output even if the accumulator pressure drops only temporarily due to frequent braking.

B → END

A

2 READ VALUE OF INTELLIGENT TESTER (ACCUMULATOR PRESSURE SENSOR)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the power switch on (IG).
(c) Select the Data List mode on the intelligent tester.

ABS / VSC:

Tester Display	Measurement Item/Range	Normal Condition
ACC PRESS SENS	Accumulator pressure sensor / min.: 0 V, max.: 5 V	Specified value: 3.3 to 4.7 V

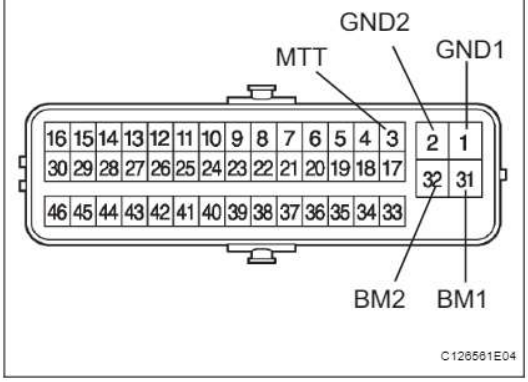
(d) Depress the brake pedal 4 or 5 times to operate the pump motor, and check the output value on the intelligent tester with the motor stopped (not braking).
OK:
Accumulator pressure sensor's output voltage does not drop.

OK → Go to step 4

NG

3 INSPECT BRAKE ACTUATOR ASSEMBLY

Brake Actuator:



(a) Turn the power switch off.
(b) Disconnect the brake actuator connector.
(c) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Condition	Specified Condition
31 (BM1) - 1 (GND1)	Always	Below 10 Ω
32 (BM2) - 1 (GND1)	Always	Below 10 Ω
31 (BM1) - 32 (BM2)	Always	Below 1 Ω
1 (GND1) - 2 (GND2)	Always	Below 1 Ω
31 (BM1) - 3 (MTT)	Always	950 to 1,050 Ω
32 (BM2) - 3 (MTT)	Always	950 to 1,050 Ω

NG → REPLACE BRAKE ACTUATOR ASSEMBLY

OK

4 RECONFIRM DTC

(a) Reconnect the brake actuator connector.
(b) Clear the DTC (See page BC-57).
(c) Perform the road and braking test.
(d) Check if the same DTC is recorded (See page BC-57).

BC

Result

Condition	Proceed to
DTC (C1256/57) is not output	A
DTC (C1256/57) is output	B

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

DTC	C1259/58	HV System Regenerative Malfunction

DTC	C1310/51	Malfunction in HV system

DESCRIPTION

The skid control ECU communicates with the HV control ECU and controls braking force according to the motor's regenerative force.
The skid control ECU sends enhanced VSC signal to the HV control ECU and inputs operating signal from the HV control ECU.
The skid control ECU uses CAN communication for communication with the HV control ECU. If a communication malfunction is memorized, the skid control ECU prohibits enhanced VSC operation and a part of Electronically Controlled Brake control by fail safe function.
C1259/58 is stored if the power switch on (IG) with the HV battery service plug disconnected.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1259/58	150	The regeneration malfunction signal is input for at least 0.02 seconds when IG2 terminal voltage is 9.5 V or more for at least 2 seconds and communication with HV control ECU is valid.	Hybrid control system
C1310/51	156	The traction control prohibition signal is received for at least 0.07 seconds when IG2 terminal voltage is 10.5 V or more for at least 1.5 seconds and communication with HV control ECU is valid.	Hybrid control system

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

INSPECTION PROCEDURE

1	CHECK HYBRID CONTROL SYSTEM

(a) Check if the hybrid control system DTC is output (See page HV-36).

Result

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

BC

B → INSPECT HYBRID CONTROL SYSTEM

A

REPLACE HV CONTROL ECU

DTC	C1290/66	Steering Angle Sensor Zero Point Malfunction

DESCRIPTION

The skid control ECU acquires steering angle sensor zero point every time the power switch is turned on (IG) and the vehicle is driven at 35 km/h (22 mph) or more for approximately 5 seconds. The ECU also stores the previous zero point.
If front wheel alignment or steering wheel position is adjusted without disconnecting the negative battery terminal, or if yaw rate and acceleration sensor zero point is not acquired after the adjustments have been completed, the skid control ECU detects the difference between the previous zero point and newly acquired zero point and outputs this DTC to indicate a poor adjustment.
Warning of the steering angle sensor zero point malfunction will be cancelled by turning the power switch off.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1290/66	-	The steering angle sensor zero point calibration position vastly differs from the recorded value	• Yaw rate and acceleration sensor zero point calibration incomplete • Poor adjustment of the centered position of the steering wheel • Poor adjustment of front wheel alignment

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	PERFORM ZERO POINT CALIBRATION OF YAW RATE AND ACCELERATION SENSOR

(a) Perform zero point calibration of the yaw rate and acceleration sensor (See page BC-29).
HINT:
- When the stored zero point of the yaw rate and acceleration sensor is erased, steering angle sensor zero point will also be erased.
- If the zero point and output value of the yaw rate and acceleration sensor and the output value of the speed sensors are not normal, steering angle sensor zero point cannot be acquired normally even if the vehicle is driven straight ahead at 35 km/h (22 mph) or more.

NEXT

BC

2	CHECK STEERING ANGLE SENSOR ZERO POINT CALIBRATION

(a) Drive the vehicle straight ahead at 35 km/h (22 mph) or more for at least 5 seconds.
(b) Check that the centered position of the steering wheel is correctly set, while driving straight ahead.
HINT:
If front wheel alignment and steering position are adjusted as a result of abnormal centered position of the steering wheel, acquire yaw rate and acceleration sensor zero point again after the adjustments are completed.

OK:
The centered position of the steering wheel is correctly set.

NG → **ADJUST FRONT WHEEL ALIGNMENT OR STEERING POSITION**

OK

3	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Drive the vehicle and turn the steering wheel to the right and left at the speed of 35 km/h (22 mph) or more.
(e) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (C1290/66) is not output	A
DTC (C1290/66) is output	B

B → **REPLACE SKID CONTROL ECU**

A

END

BC

DTC	C1300	Skid Control ECU Malfunction

DESCRIPTION

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

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1300	-	Malfunction in the skid control ECU.	Skid control ECU

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	REPLACE SKID CONTROL ECU

(a) Replace the skid control ECU (See page BC-289).

NEXT

END

BC

DTC	C1304/27	EPS Control System Malfunction

DESCRIPTION

The skid control ECU communicates with the power steering (EPS) ECU via CAN communication. If a malfunction in the electronic power steering (EPS) system is detected, cooperative control of the steering is prohibited by the fail safe function.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1304/27	376	The EPS system fail signal continues to be output for 5 seconds or more.	Electronic power steering system

INSPECTION PROCEDURE

1	CHECK ELECTRONIC POWER STEERING SYSTEM

(a) Check if the electronic power steering system DTC is output (See page PS-17).

Result

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

B → INSPECT ELECTRONIC POWER STEERING SYSTEM

A → REPLACE POWER STEERING ECU

BC

DTC	C1311/11	Open in Main Relay 1 Circuit

DTC	C1312/12	Short in Main Relay 1 Circuit

DTC	C1313/13	Open in Main Relay 2 Circuit

DTC	C1314/14	Short in Main Relay 2 Circuit

DESCRIPTION

The main relay 1 supplies power to the changeover solenoid and the linear solenoid.
The main relay remains ON for approximately 2 minutes after the power switch is turned off and the input of brake operation signals stops, and supplies power to the system to keep it ready to operate.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1311/11	1	When either of the following is detected: 1. Relay contact is off (BS1 terminal is less than 3.5 V) for at least 0.2 seconds when R1+ terminal voltage is 9.5 V or more and main relay 1 is on. 2. R1+ terminal voltage is less than 9.5 V and main relay 1 cannot be on for at least 0.2 seconds when main relay 1 is turned on (BS1 terminal is 3.5 V or more).	• ABS NO. 1 relay • ABS NO. 1 relay circuit • Skid control ECU
C1312/12	3	Relay contact is on for at least 4 seconds when main relay 1 is off.	↑
C1313/13	4	When either of the following is detected: 1. Relay contact is off (BS2 terminal is less than 3.5 V) for at least 0.2 seconds when R2+ terminal voltage is 9.5 V or more and main relay 2 is on. 2. R2+ terminal voltage is less than 9.5 V and main relay 2 cannot be on for at least 2 seconds when main relay 2 is turned on (BS2 terminal is 3.5 V or more).	• ABS NO. 2 relay • ABS NO. 2 relay circuit • Skid control ECU
C1314/14	6	Relay contact is on for at least 4 seconds when main relay 2 is off.	↑

WIRING DIAGRAM

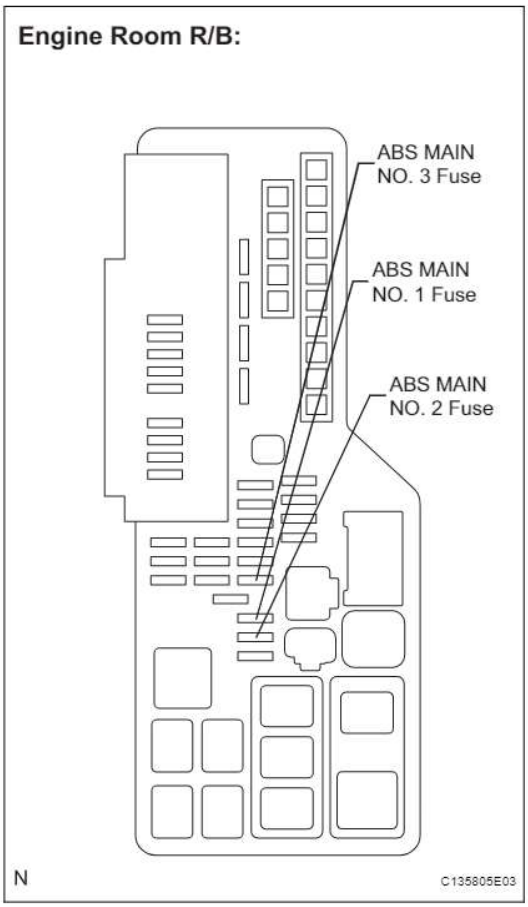
Refer to DTCs C1241/41 and C1242/42 (See page BC-122).

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

BC

1 INSPECT ABS MAIN FUSE



(a) Remove the ABS MAIN NO. 1, ABS MAIN NO. 2 and ABS MAIN NO. 3 fuses from the engine room R/B.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
ABS MAIN NO. 1 (10 A) fuse	Always	Below 1 Ω
ABS MAIN NO. 2 (10 A) fuse	Always	Below 1 Ω
ABS MAIN NO. 3 (10 A) fuse	Always	Below 1 Ω

NG → **REPLACE ABS MAIN FUSE**

OK

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

(a) Install the ABS MAIN NO. 1, ABS MAIN NO. 2 and ABS MAIN NO. 3 fuses.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the power switch on (IG).
(d) Select the Active Test mode on the intelligent tester.

BC

ABS / VSC:

Tester Display	Test Part	Control Range	Diagnostic Note
ECB* RELAY	ABS main relay	Relay ON / OFF	Operating sound of relay (clicking sound) can be heard
ECB* RELAY 2	ABS main relay 2	Relay ON / OFF	Operating sound of relay (clicking sound) can be heard

*: Electronically Controlled Brake

(e) Check the operating sound of the ABS main relay when operating it with the intelligent tester.

OK:

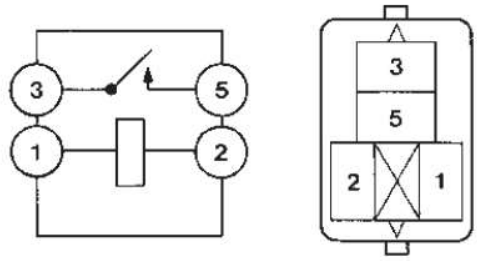
The operating sound of the ABS main relay should be heard.

OK → Go to step 6

NG

3 INSPECT ABS MAIN RELAY (ABS NO. 1, 2 RELAY)

ABS NO. 1, 2 Relay:



(a) Turn the power switch off.
(b) Remove the ABS NO. 1 relay and ABS NO. 2 relay.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

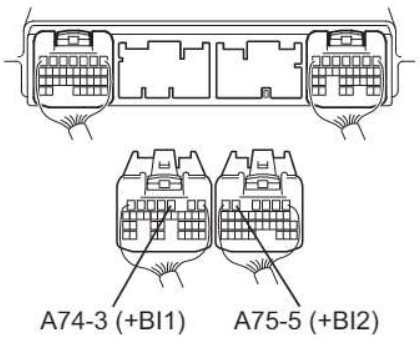
Tester Connection	Condition	Specified Condition
3 - 5	Always	10 kΩ or higher
3 - 5	Apply B+ between terminals 1 and 2	Below 1 Ω

NG → REPLACE ABS MAIN RELAY (ABS NO. 1, 2 RELAY)

OK

4 INSPECT SKID CONTROL ECU (+BI TERMINAL)

Skid Control ECU Wire Harness View:



(a) Install the ABS NO. 1 relay and ABS NO. 2 relay.
(b) Disconnect the skid control ECU connectors.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
A74-3 (+BI1) - Body ground	Always	10 to 14 V
A75-5 (+BI2) - Body ground	Always	10 to 14 V

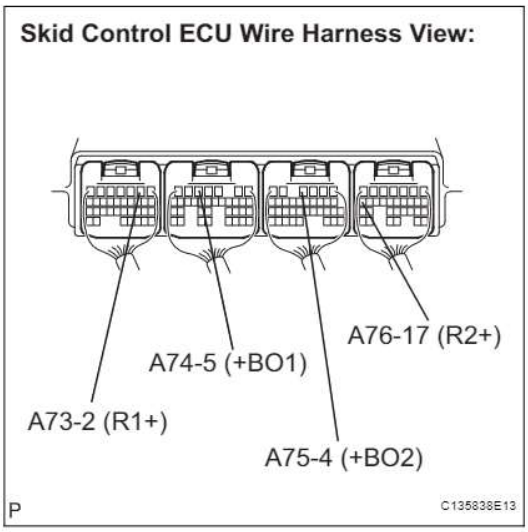
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (+BI CIRCUIT)

OK

BC

5 INSPECT SKID CONTROL ECU (RELAY TERMINAL)

Skid Control ECU Wire Harness View:



(a) Reconnect the skid control ECU connectors.
(b) Turn the power switch on (IG).
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

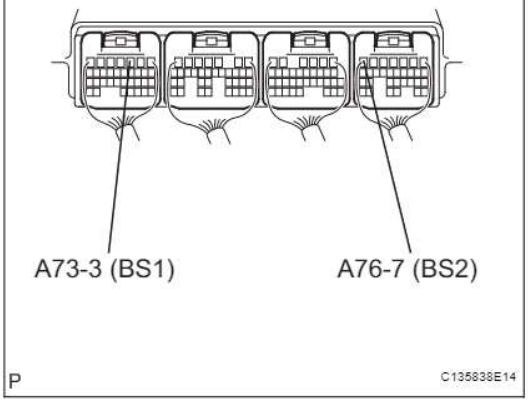
Tester Connection	Condition	Specified Condition
A73-2 (R1+) - Body ground	Power switch on (IG)	9.1 to 13.6 V
A76-17 (R2+) - Body ground	Power switch on (IG)	9.1 to 13.6 V
A74-5 (+BO1) - Body ground	Power switch on (IG)	8.8 to 14 V
A75-4 (+BO2) - Body ground	Power switch on (IG)	8.8 to 14 V

NG → REPLACE SKID CONTROL ECU

OK

6 INSPECT SKID CONTROL ECU (BS TERMINAL)

Skid Control ECU Wire Harness View:



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

Standard voltage

Tester Connection	Condition	Specified Condition
A73-3 (BS1) - Body ground	Power switch on (IG)	8.8 to 14 V
A76-7 (BS2) - Body ground	Power switch on (IG)	8.8 to 14 V

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

BC

OK

7 RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (IG).
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1311/11, C1312/12, C1313/13 and/or C1314/14) are not output	A
DTCs (C1311/11, C1312/12, C1313/13 and/or C1314/14) are output	B

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

DTC	C1315/31	SMC1 Changeover Solenoid Malfunction
DTC	C1316/32	SMC2 Changeover Solenoid Malfunction
DTC	C1352/21	Front Increasing Pressure Solenoid RH Malfunction
DTC	C1353/23	Front Increasing Pressure Solenoid LH Malfunction
DTC	C1354/25	Rear Increasing Pressure Solenoid RH Malfunction
DTC	C1355/27	Rear Increasing Pressure Solenoid LH Malfunction
DTC	C1356/22	Front Decreasing Pressure Solenoid RH Malfunction
DTC	C1357/24	Front Decreasing Pressure Solenoid LH Malfunction
DTC	C1358/26	Rear Decreasing Pressure Solenoid RH Malfunction
DTC	C1359/28	Rear Decreasing Pressure Solenoid LH Malfunction

DESCRIPTION

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

BC

The master cut solenoid (SMC1/2) is closed and blocks the master cylinder pressure from the Electronically Controlled Brake control pressure when the system is normal. The master cut solenoid is open and sends the master cylinder fluid pressure to the non-assisted brake wheel cylinders during the fail safe due to a system malfunction.

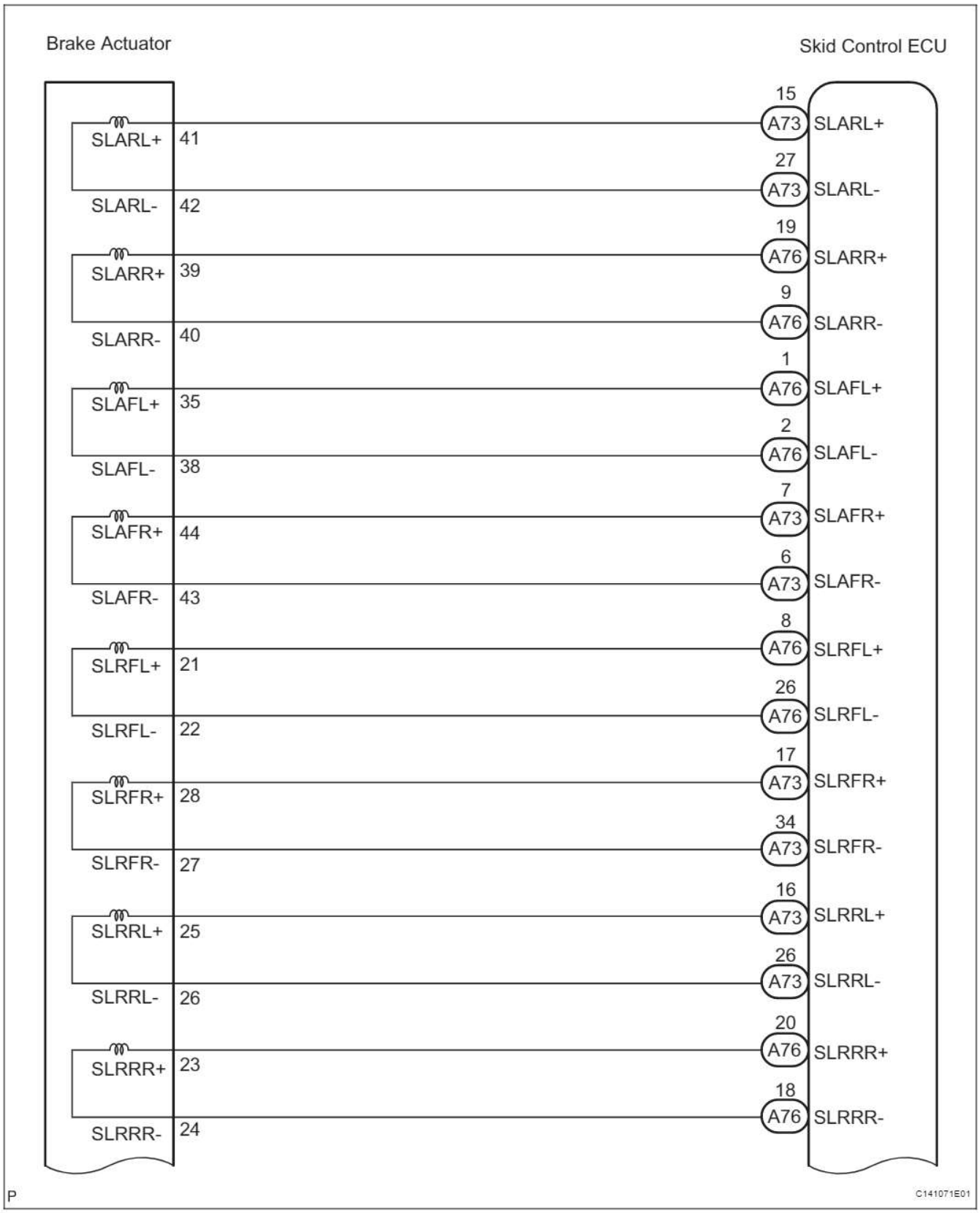
DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1315/31	61	When either of the following is detected: 1. SMC1 drive circuit is malfunctioning for 0.05 seconds or more. 2. Short to +B in SMC1.	• Brake actuator assembly (SMC1) • SMC1 circuit • Skid control ECU
↑	62	Current leaks for 0.05 seconds or more when SMC1 is off.	↑
↑	63	Open circuit in SMC1 continues for 0.05 seconds or more.	↑
↑	64	Overcurrent in SMC1 continues for 0.05 seconds or more.	↑

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1316/32	66	When either of the following is detected: 1. SMC2 drive circuit is malfunctioning for 0.05 seconds or more. 2. Short to +B in SMC2.	• Brake actuator assembly (SMC2) • SMC2 circuit • Skid control ECU
↑	67	Current leaks for 0.05 seconds or more when SMC2 is off.	↑
↑	68	Open circuit in SMC2 continues for 0.05 seconds or more.	↑
↑	69	Overcurrent in SMC2 continues for 0.05 seconds or more.	↑
C1352/21	11	Open circuit in SLAFR continues for 0.05 seconds or more when SLAFR is off.	• Brake actuator assembly (SLAFR) • SLAFR circuit • Skid control ECU
↑	12	Open circuit in SLAFR continues for 0.05 seconds or more when SLAFR is on.	↑
↑	13	Short to +B or voltage leak in SLAFR continues for 0.05 seconds or more.	↑
↑	14	Overcurrent in SLAFR continues for 0.05 seconds or more.	↑
C1353/23	21	Open circuit in SLAFL continues for 0.05 seconds or more when SLAFL is off.	• Brake actuator assembly (SLAFL) • SLAFL circuit • Skid control ECU
↑	22	Open circuit in SLAFL continues for 0.05 seconds or more when SLAFL is on.	↑
↑	23	Short to +B or voltage leak in SLAFL continues for 0.05 seconds or more.	↑
↑	24	Overcurrent in SLAFL continues for 0.05 seconds or more.	↑
C1354/25	31	Open circuit in SLARR continues for 0.05 seconds or more when SLARR is off.	• Brake actuator assembly (SLARR) • SLARR circuit • Skid control ECU
↑	32	Open circuit in SLARR continues for 0.05 seconds or more when SLARR is on.	↑
↑	33	Short to +B or voltage leak in SLARR continues for 0.05 seconds or more.	↑
↑	34	Overcurrent in SLARR continues for 0.05 seconds or more.	↑
C1355/27	41	Open circuit in SLARL continues for 0.05 seconds or more when SLARL is off.	• Brake actuator assembly (SLARL) • SLARL circuit • Skid control ECU
↑	42	Open circuit in SLARL continues for 0.05 seconds or more when SLARL is on.	↑
↑	43	Short to +B or voltage leak in SLARL continues for 0.05 seconds or more.	↑
↑	44	Overcurrent in SLARL continues for 0.05 seconds or more.	↑
C1356/22	16	Open circuit in SLRFR continues for 0.05 seconds or more when SLRFR is off.	• Brake actuator assembly (SLRFR) • SLRFR circuit • Skid control ECU
↑	17	Open circuit in SLRFR continues for 0.05 seconds or more when SLRFR is on.	↑
↑	18	Short to +B or voltage leak in SLRFR continues for 0.05 seconds or more.	↑
↑	19	Overcurrent in SLRFR continues for 0.05 seconds or more.	↑
C1357/24	26	Open circuit in SLRFL continues for 0.05 seconds or more when SLRFL is off.	• Brake actuator assembly (SLRFL) • SLRFL circuit • Skid control ECU

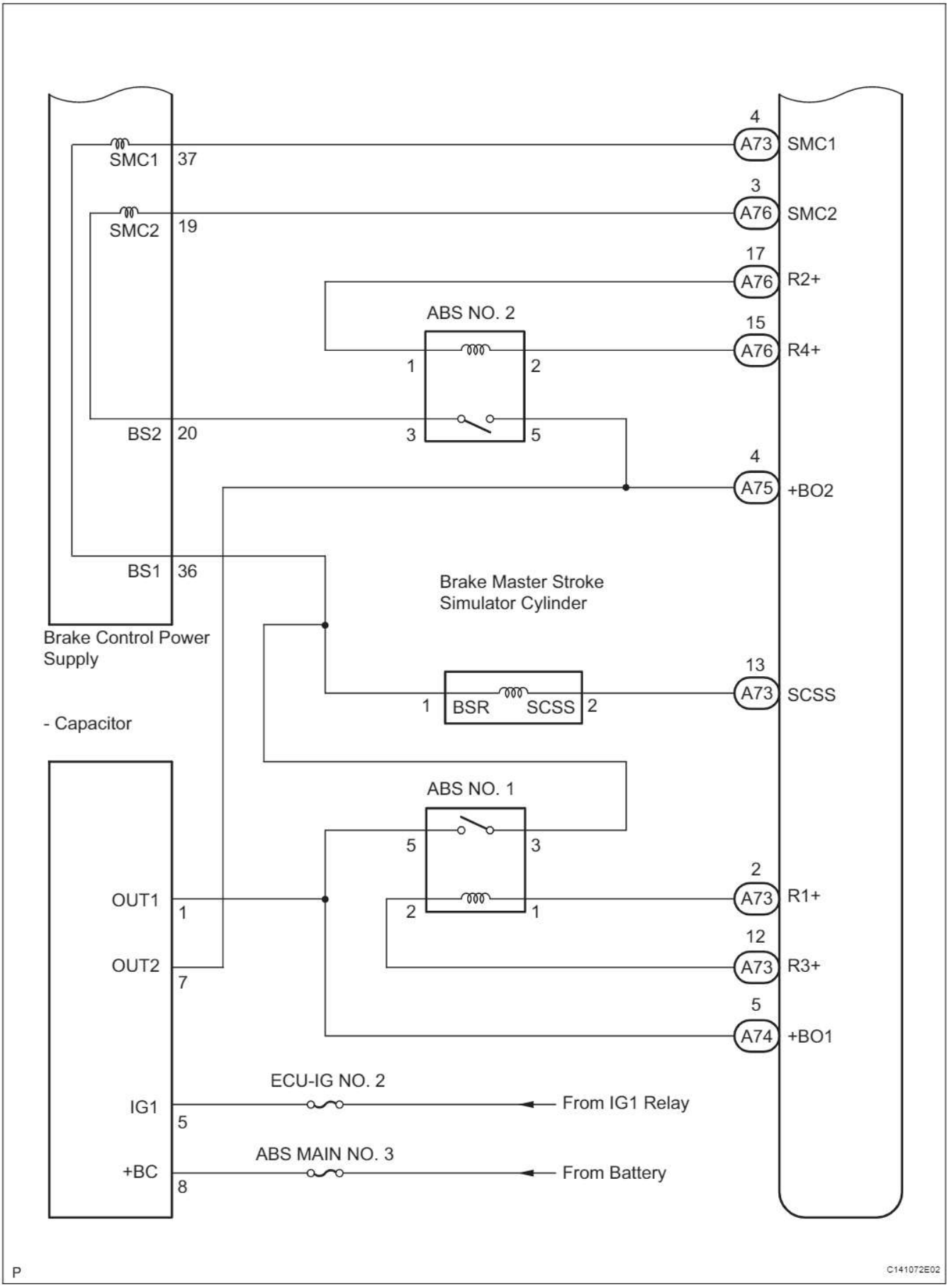
DTC Code	INF Code	DTC Detection Condition	Trouble Area
↑	27	Open circuit in SLRFL continues for 0.05 seconds or more when SLRFL is on.	↑
↑	28	Short to +B or voltage leak in SLRFL continues for 0.05 seconds or more.	↑
↑	29	Overcurrent in SLRFL continues for 0.05 seconds or more.	↑
C1358/26	36	Open circuit in SLRRR continues for 0.05 seconds or more when SLRRR is off.	• Brake actuator assembly (SLRRR) • SLRRR circuit • Skid control ECU
↑	37	Open circuit in SLRRR continues for 0.05 seconds or more when SLRRR is on.	↑
↑	38	Short to +B or voltage leak in SLRRR continues for 0.05 seconds or more.	↑
↑	39	Overcurrent in SLRRR continues for 0.05 seconds or more.	↑
C1359/29	46	Open circuit in SLRRL continues for 0.05 seconds or more when SLRRL is off.	• Brake actuator assembly (SLRRL) • SLRRL circuit • Skid control ECU
↑	47	Open circuit in SLRRL continues for 0.05 seconds or more when SLRRL is on.	↑
↑	48	Short to +B or voltage leak in SLRRL continues for 0.05 seconds or more.	↑
↑	49	Overcurrent in SLRRL continues for 0.05 seconds or more.	↑

BC

WIRING DIAGRAM



BC

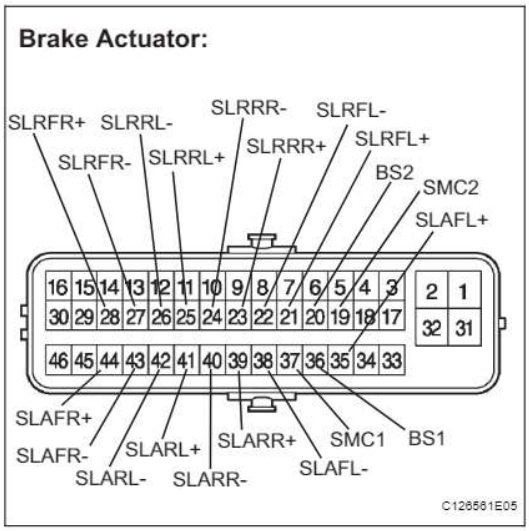

SMC1
37
SMC2
19
BS2
20
BS1
36
Brake Control Power Supply
- Capacitor
OUT1
1
OUT2
7
IG1
5
+BC
8
ECU-IG NO. 2
From IG1 Relay
ABS MAIN NO. 3
From Battery
ABS NO. 2
1
2
3
5
ABS NO. 1
5
3
2
1
Brake Master Stroke Simulator Cylinder
1
BSR
SCSS
2
4
A73
SMC1
3
A76
SMC2
17
A76
R2+
15
A76
R4+
4
A75
+BO2
13
A73
SCSS
2
A73
R1+
12
A73
R3+
5
A74
+BO1
P
C141072E02

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	INSPECT BRAKE ACTUATOR ASSEMBLY



(a) Disconnect the brake actuator connector.

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

HINT:

Check the brake actuator assembly when it is cooled down.

Standard resistance

Tester Connection	Condition	Specified Condition
37 (SMC1) - 36 (BS1)	Always	15.3 to 17.3 Ω
37 (SMC1) - Body ground	Always	10 kΩ or higher
19 (SMC2) - 20 (BS2)	Always	15.3 to 17.3 Ω
19 (SMC2) - Body ground	Always	10 kΩ or higher
44 (SLAFR+) - 43 (SLAFR-)	Always	3.6 to 4.2 Ω
44 (SLAFR+) - Body ground	Always	10 kΩ or higher
35 (SLAFL+) - 38 (SLAFL-)	Always	3.6 to 4.2 Ω
35 (SLAFL+) - Body ground	Always	10 kΩ or higher
39 (SLARR+) - 40 (SLARR-)	Always	3.6 to 4.2 Ω
39 (SLARR+) - Body ground	Always	10 kΩ or higher
41 (SLARL+) - 42 (SLARL-)	Always	3.6 to 4.2 Ω
41 (SLARL+) - Body ground	Always	10 kΩ or higher
28 (SLRFR+) - 27 (SLRFR-)	Always	3.6 to 4.2 Ω
28 (SLRFR+) - Body ground	Always	10 kΩ or higher
21 (SLRFL+) - 22 (SLRFL-)	Always	3.6 to 4.2 Ω
21 (SLRFL+) - Body ground	Always	10 kΩ or higher
23 (SLRRR+) - 24 (SLRRR-)	Always	4.4 to 5.0 Ω
23 (SLRRR+) - Body ground	Always	10 kΩ or higher
25 (SLRRL+) - 26 (SLRRL-)	Always	4.4 to 5.0 Ω
25 (SLRRL+) - Body ground	Always	10 kΩ or higher

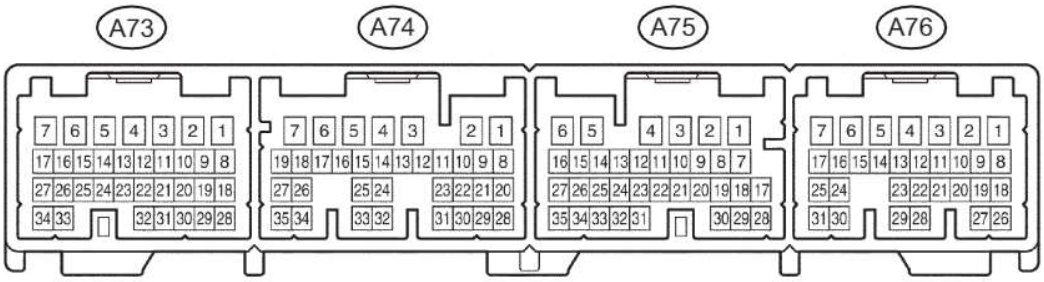
NG → REPLACE BRAKE ACTUATOR ASSEMBLY

OK

BC

2	INSPECT SKID CONTROL ECU

Skid Control ECU:



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

Standard voltage

Tester Connection	Condition	Specified Condition
A73-4 (SMC1) - Body ground	Brake pedal released	10 to 14 V
A76-3 (SMC2) - Body ground	Brake pedal released	10 to 14 V
A73-7 (SLAFR+) - Body ground	Brake pedal released	Pulse generation (see waveform 1) (See page BC-48)
A73-6 (SLAFR-) - Body ground	Brake pedal released	Pulse generation (see waveform 1) (See page BC-48)
A76-1 (SLAFL+) - Body ground	Brake pedal released	Pulse generation (see waveform 1) (See page BC-48)
A76-2 (SLAFL-) - Body ground	Brake pedal released	Pulse generation (see waveform 1) (See page BC-48)
A76-19 (SLARR+) - Body ground	Brake pedal released	Pulse generation (see waveform 1) (See page BC-48)
A76-9 (SLARR-) - Body ground	Brake pedal released	Pulse generation (see waveform 1) (See page BC-48)
A73-15 (SLARL+) - Body ground	Brake pedal released	Pulse generation (see waveform 1) (See page BC-48)
A73-27 (SLARL-) - Body ground	Brake pedal released	Pulse generation (see waveform 1) (See page BC-48)
A73-17 (SLRFR+) - Body ground	Brake pedal released	Below 1.5 V
A73-34 (SLRFR-) - Body ground	Brake pedal released	Below 1.5 V
A76-8 (SLRFL+) - Body ground	Brake pedal released	Below 1.5 V
A76-26 (SLRFL-) - Body ground	Brake pedal released	Below 1.5 V
A76-20 (SLRRR+) - Body ground	Brake pedal released	Below 1.5 V
A76-18 (SLRRR-) - Body ground	Brake pedal released	Below 1.5 V
A73-16 (SLRRL+) - Body ground	Brake pedal released	Below 1.5 V
A73-26 (SLRRL-) - Body ground	Brake pedal released	Below 1.5 V

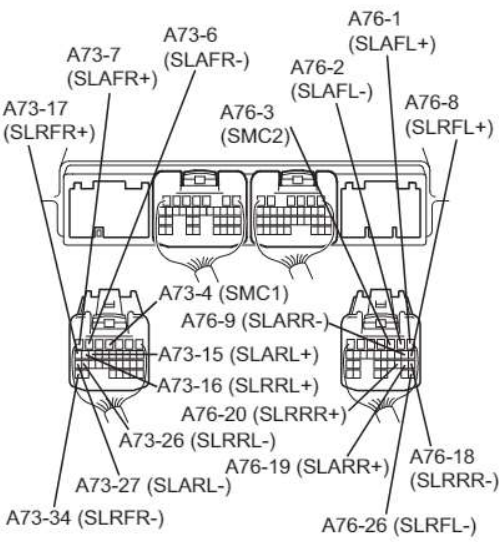
NG → REPLACE SKID CONTROL ECU

BC

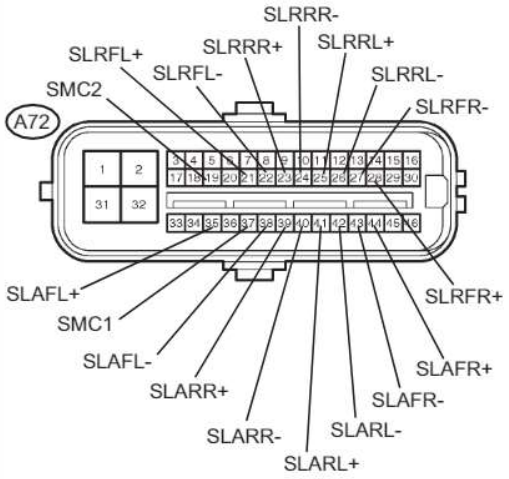
OK

3 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE ACTUATOR)

Skid Control ECU Wire Harness View:



Brake Actuator Harness Side Connector Front View:



(a) Turn the power switch off.
(b) Disconnect the skid control ECU connectors.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
A73-4 (SMC1) - A72-37 (SMC1)	Always	Below 1 Ω
A73-4 (SMC1) - Body ground	Always	10 kΩ or higher
A76-3 (SMC2) - A72-19 (SMC2)	Always	Below 1 Ω
A76-3 (SMC2) - Body ground	Always	10 kΩ or higher
A73-7 (SLAFR+) - A72-44 (SLAFR+)	Always	Below 1 Ω
A73-7 (SLAFR+) - Body ground	Always	10 kΩ or higher
A73-6 (SLAFR-) - A72-43 (SLAFR-)	Always	Below 1 Ω
A73-6 (SLAFR-) - Body ground	Always	10 kΩ or higher
A76-1 (SLAFL+) - A72-35 (SLAFL+)	Always	Below 1 Ω
A76-1 (SLAFL+) - Body ground	Always	10 kΩ or higher
A76-2 (SLAFL-) - A72-38 (SLAFL-)	Always	Below 1 Ω
A76-2 (SLAFL-) - Body ground	Always	10 kΩ or higher
A76-19 (SLARR+) - A72-39 (SLARR+)	Always	Below 1 Ω
A76-19 (SLARR+) - Body ground	Always	10 kΩ or higher
A76-9 (SLARR-) - A72-40 (SLARR-)	Always	Below 1 Ω
A76-9 (SLARR-) - Body ground	Always	10 kΩ or higher
A73-15 (SLARL+) - A72-41 (SLARL+)	Always	Below 1 Ω
A73-15 (SLARL+) - Body ground	Always	10 kΩ or higher
A73-27 (SLARL-) - A72-42 (SLARL-)	Always	Below 1 Ω
A73-27 (SLARL-) - Body ground	Always	10 kΩ or higher
A73-17 (SLRFR+) - A72-28 (SLRFR+)	Always	Below 1 Ω
A73-17 (SLRFR+) - Body ground	Always	10 kΩ or higher
A73-34 (SLRFR-) - A72-27 (SLRFR-)	Always	Below 1 Ω
A73-34 (SLRFR-) - Body ground	Always	10 kΩ or higher
A76-8 (SLRFL+) - A72-21 (SLRFL+)	Always	Below 1 Ω
A76-8 (SLRFL+) - Body ground	Always	10 kΩ or higher
A76-26 (SLRFL-) - A72-22 (SLRFL-)	Always	Below 1 Ω
A76-26 (SLRFL-) - Body ground	Always	10 kΩ or higher
A76-20 (SLRRR+) - A72-23 (SLRRR+)	Always	Below 1 Ω
A76-20 (SLRRR+) - Body ground	Always	10 kΩ or higher

BC

Tester Connection	Condition	Specified Condition
A76-18 (SLRRR-) - A72-24 (SLRRR-)	Always	Below 1 Ω
A76-18 (SLRRR-) - Body ground	Always	10 kΩ or higher
A73-16 (SLRRL+) - A72-25 (SLRRL+)	Always	Below 1 Ω
A73-16 (SLRRL+) - Body ground	Always	10 kΩ or higher
A73-26 (SLRRL-) - A72-26 (SLRRL-)	Always	Below 1 Ω
A73-26 (SLRRL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 RECONFIRM DTC

(a) Reconnect the skid control ECU connectors and the brake actuator connector.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1315/31, C1316/32, C1352/21, C1353/23, C1354/25, C1355/27, C1356/22, C1357/24, C1358/26 and/or C1359/28) are not output	A
DTCs (C1315/31, C1316/32, C1352/21, C1353/23, C1354/25, C1355/27, C1356/22, C1357/24, C1358/26 and/or C1359/28) are output	B

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

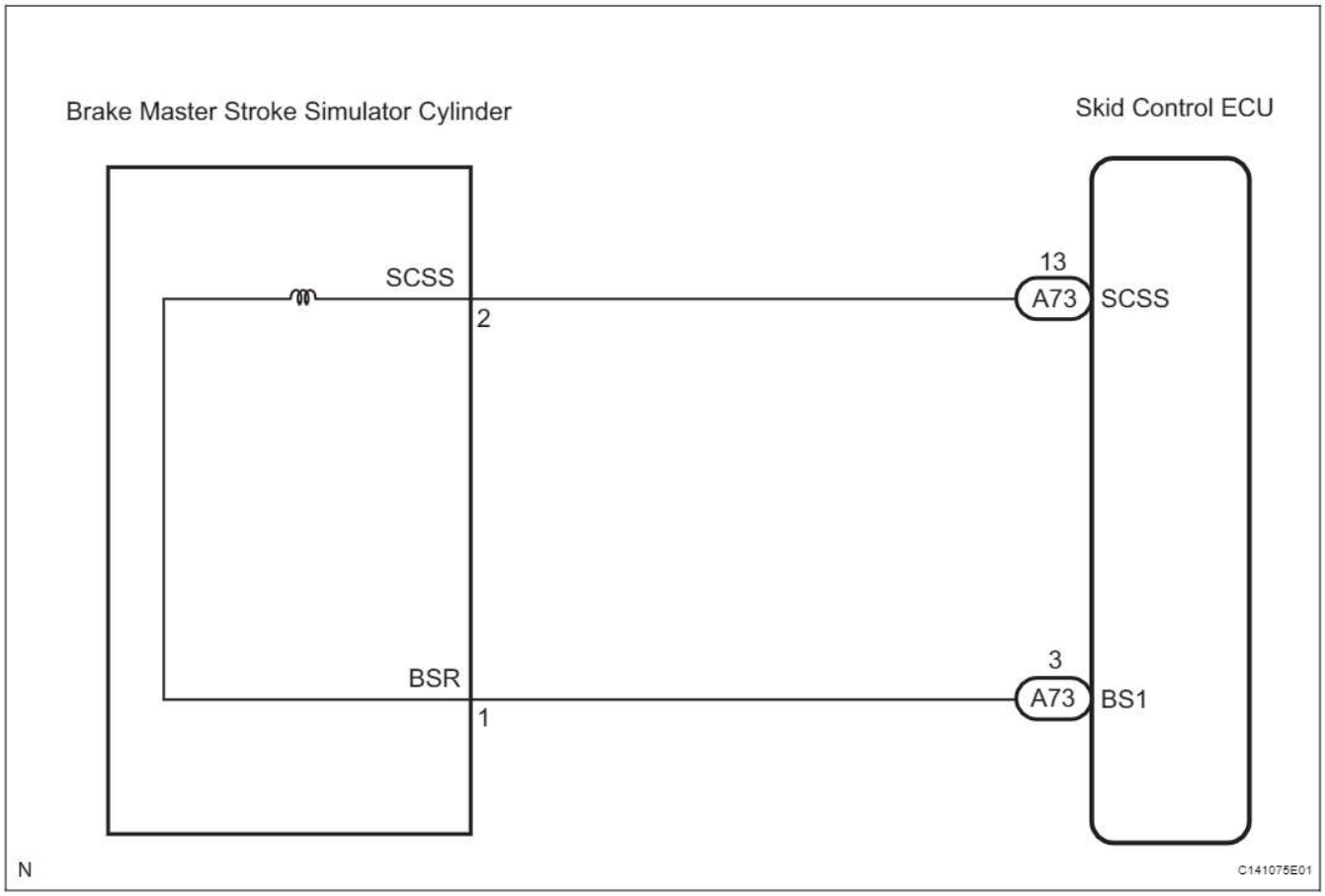
DTC	C1319/35	SCSS Changeover Solenoid Malfunction

DESCRIPTION

The stroke simulator solenoid (SCSS) generates pedal reactive effort during Electronically Controlled Brake control. If one or more of the front wheels loses brake booster function, the simulator operation is prohibited.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1319/35	71	When either of the following is detected: 1. SCSS drive circuit is malfunctioning for 0.05 seconds or more. 2. Short to +B in SCSS.	• Brake master stroke simulator • Brake master stroke simulator circuit • Skid control ECU
↑	72	Current leaks for 0.05 seconds or more when SCSS is off.	↑
↑	73	Open circuit in SCSS continues for 0.05 seconds or more.	↑
↑	74	Overcurrent in SCSS continues for 0.05 seconds or more.	↑

WIRING DIAGRAM



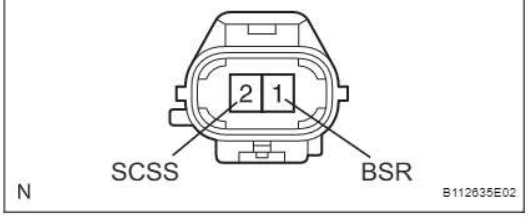
INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	INSPECT BRAKE MASTER STROKE SIMULATOR CYLINDER ASSEMBLY

Brake Master Stroke Simulator Cylinder:



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

Standard resistance

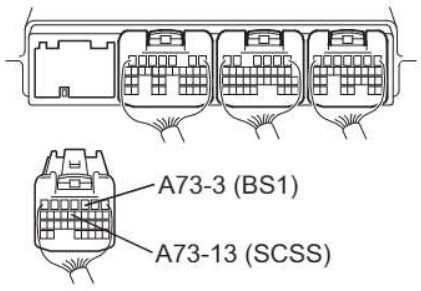
Tester Connection	Condition	Specified Condition
1 (BSR) - 2 (SCSS)	Always	21.45 to 23.15 Ω
1 (BSR) - Body ground	Always	10 kΩ or higher

NG → **REPLACE BRAKE MASTER STROKE SIMULATOR CYLINDER ASSEMBLY**

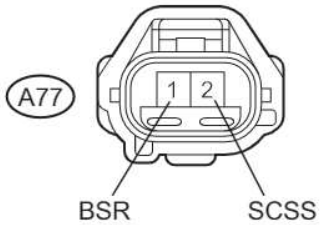
OK

2	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE MASTER STROKE SIMULATOR CYLINDER)

Skid Control ECU Wire Harness View:



Brake Master Stroke Simulator Cylinder Harness Side Connector Front View:



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

Standard resistance

Tester Connection	Condition	Specified Condition
A73-13 (SCSS) - A77-2 (SCSS)	Always	Below 1 Ω
A73-13 (SCSS) - Body ground	Always	10 kΩ or higher
A73-3 (BS1) - A77-1 (BSR)	Always	Below 1 Ω
A73-3 (BS1) - Body ground	Always	10 kΩ or higher

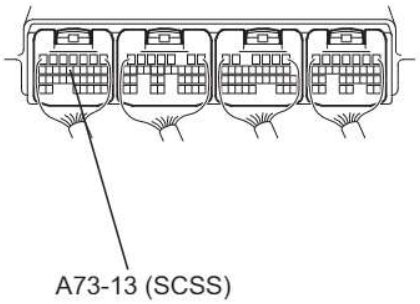
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

BC

3 INSPECT SKID CONTROL ECU (SOLENOID INPUT)

Skid Control ECU Wire Harness View:



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

Standard voltage

Tester Connection	Condition	Specified Condition
A73-13 (SCSS) - Body ground	Brake pedal depressed (Stroke simulator ON)	Below 1.5 V
A73-13 (SCSS) - Body ground	Brake pedal released (Stroke simulator OFF)	10 to 14 V

NG → **REPLACE SKID CONTROL ECU**

OK

4 RECONFIRM DTC

(a) Turn the power switch off.
(b) Reconnect the brake master stroke simulator cylinder connector.
(c) Clear the DTC (See page BC-57).
(d) Turn the power switch on (READY).
(e) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (C1319/35) is not output	A
DTC (C1319/35) is output	B

B → **REPLACE SKID CONTROL ECU**

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

DTC	C1341/62	Front Hydraulic System RH Malfunction

DTC	C1342/63	Front Hydraulic System LH Malfunction

DTC	C1343/64	Rear Hydraulic System RH Malfunction

DTC	C1344/65	Rear Hydraulic System LH Malfunction

DESCRIPTION

The skid control ECU controls braking force according to the hybrid control system regenerative braking force and inputs the fluid pressure necessary for operating each wheel cylinder according to the wheel cylinder pressure sensor.
DTCs may be stored if brake fluid leaks, the wheel cylinder vibrates due to uneven wear of the brake disc rotor, or foreign matter enters the solenoid valve.
DTCs may be stored if the line pressure drops during air bleeding.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1341/62	551 552	Hydraulic pressure control on FR wheel has deteriorated.	• Fluid leakage • Brake actuator assembly
↑	553	There is a malfunction, such as leakage in the pressure increase control valve of FR wheel.	• Fluid leakage • Disc rotor • Brake actuator assembly
↑	554 555	There is a malfunction, such as leakage in the pressure decrease control valve of FR wheel.	↑
C1342/63	561 562	Hydraulic pressure control on FL wheel has deteriorated.	• Fluid leakage • Brake actuator assembly
↑	563	There is a malfunction, such as leakage in pressure increase control valve of FL wheel.	• Fluid leakage • Disc rotor • Brake actuator assembly
↑	564 565	There is a malfunction, such as leakage in pressure decrease control valve of FL wheel.	↑
C1343/64	571 572	Hydraulic pressure control on RR wheel has deteriorated.	• Fluid leakage • Brake actuator assembly
↑	573	There is a malfunction, such as leakage in pressure increase control valve of RR wheel.	• Fluid leakage • Disc rotor • Brake actuator assembly
↑	574 575	There is a malfunction, such as leakage in pressure decrease control valve of RR wheel.	↑
C1344/65	581 582	Hydraulic pressure control on RL wheel has deteriorated.	• Fluid leakage • Brake actuator assembly
↑	583	There is a malfunction, such as leakage in pressure increase control valve of RL wheel.	• Fluid leakage • Disc rotor • Brake actuator assembly
↑	584 585	There is a malfunction, such as leakage in pressure decrease control valve of RL wheel.	↑

BC

WIRING DIAGRAM

Refer to DTCs C1246/46, C1281/81 and C1364/61 (See page BC-131).

INSPECTION PROCEDURE

NOTICE:
When replacing the brake actuator assembly, perform initialization of linear solenoid valve and calibration (See page BC-25).

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

1 CHECK FOR BRAKE FLUID LEAKS

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

NG → **REPAIR OR REPLACE APPLICABLE PART**

OK

2 PERFORM AIR BLEEDING

(a) Bleed the air from the front and rear brake systems (See page BR-5).

NEXT

3 RECONFIRM DTC

(a) Clear the DTC (See page BC-57).
(b) Repeat the braking test under malfunction conditions recreated based on the Freeze Frame Data or customer problem analysis.
(c) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1341/62, C1342/63, C1343/64 and/or C1344/65) are output	A
DTCs (C1341/62, C1342/63, C1343/64 and/or C1344/65) are not output	B

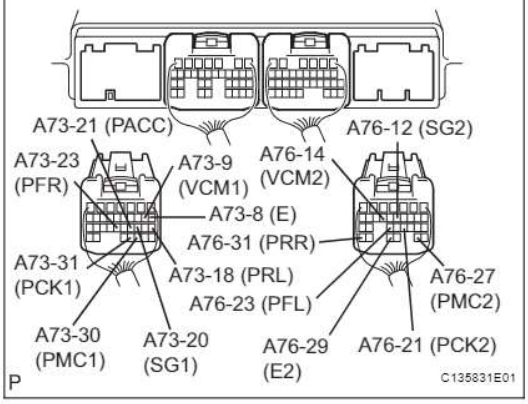
HINT:
DTC may be stored if foreign matter or air enters the solenoid valve.

B → **END**

A

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

Skid Control ECU Wire Harness View:



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

Standard resistance

Tester connection	Condition	Specified condition
A73-8 (E) - Body ground	Always	10 kΩ or higher
A73-9 (VCM1) - Body ground	Always	10 kΩ or higher
A73-18 (PRL) - Body ground	Always	10 kΩ or higher
A73-20 (SG1) - Body ground	Always	10 kΩ or higher
A73-21 (PACC) - Body ground	Always	10 kΩ or higher
A73-23 (PFR) - Body ground	Always	10 kΩ or higher
A73-30 (PMC1) - Body ground	Always	10 kΩ or higher
A73-31 (PCK1) - Body ground	Always	10 kΩ or higher
A76-12 (SG2) - Body ground	Always	10 kΩ or higher
A76-14 (VCM2) - Body ground	Always	10 kΩ or higher
A76-21 (PCK2) - Body ground	Always	10 kΩ or higher
A76-23 (PFL) - Body ground	Always	10 kΩ or higher
A76-27 (PMC2) - Body ground	Always	10 kΩ or higher
A76-29 (E2) - Body ground	Always	10 kΩ or higher
A76-31 (PRR) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 READ VALUE OF INTELLIGENT TESTER (WHEEL CYLINDER PRESSURE SENSOR)

(a) Reconnect the skid control ECU connectors and the brake actuator connector.
(b) Connect the pedal effort gauge (See page BC-259).
(c) Install the hydro LSPV gauge (SST) and bleed air (See page BC-259).

SST 09709-29018

(d) Connect the intelligent tester to the DLC3.
(e) Turn the power switch on (IG).
(f) Select the Data List mode on the intelligent tester.

ABS / VSC:

Tester Display	Measurement Item/Range	Normal Condition
FR W/C SENS	FR wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
FL W/C SENS	FL wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
RR W/C SENS	RR wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V
RL W/C SENS	RL wheel cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V

BC

(g) Check the output value of the wheel cylinder pressure at each fluid pressure during the Electronically Controlled Brake control.
Standard voltage:
Front wheel cylinder pressure sensor

Hydraulic Pressure MPa (kgf/cm^2, psi)	FR W/C SENS (Data List Display)	FL W/C SENS (Data List Display)
2.6 (26.5, 376.9)	0.85 to 1.15 V	0.85 to 1.15 V
6.3 (64.3, 914.5)	1.6 to 1.9 V	1.6 to 1.9 V
8.1 (82.6, 1174.8)	1.95 to 2.25 V	1.95 to 2.25 V
8.2 (83.6, 1189.0)	2.0 to 2.3 V	2.0 to 2.3 V

Rear wheel cylinder pressure sensor

Hydraulic Pressure MPa (kgf/cm^2, psi)	RR W/C SENS (Data List Display)	RL W/C SENS (Data List Display)
2.6 (26.5, 376.9)	0.85 to 1.15 V	0.85 to 1.15 V
5.0 (51.0, 725.4)	1.35 to 1.65 V	1.35 to 1.65 V

NG → REPLACE BRAKE ACTUATOR ASSEMBLY

OK

6 CHECK BRAKE DISC

(a) Turn the power switch off.
(b) Disconnect the brake pedal stroke sensor connector.
(c) Carry out the running and braking test according to Freeze Frame Data or customer problem analysis. Check the brake line pressure vibration caused due to uneven wear of the disc according to brake pedal vibration.
OK:
Brake pedal does not vibrate during braking.
HINT:
- The brake pedal does not kick back due to wheel cylinder piston vibration during Electronically Controlled Brake control.
- If the brake pedal stroke sensor connector is disconnected, the fail safe function will prohibit Electronically Controlled Brake control.
- The Active Test does not prohibit Electronically Controlled Brake control when the vehicle is running, so disconnect the stroke sensor connector and carry out inspection.
- Disc wear can be checked by measuring the disc thickness.

NG → REPLACE BRAKE DISC

OK

BC

7	RECONFIRM DTC

(a) Reconnect the brake pedal stroke sensor connector.
(b) Clear the DTC (See page BC-57).
(c) Repeat the braking test under malfunction conditions recreated based on the Freeze Frame Data or customer problem analysis.
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1341/62, C1342/63, C1343/64 and/or C1344/65) are not output	A
DTCs (C1341/62, C1342/63, C1343/64 and/or C1344/65) are output	B

B → REPLACE BRAKE ACTUATOR ASSEMBLY

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

DTC	C1345/66	Linear Solenoid Valve Offset Learning Undone

DTC	C1368/67	Linear Solenoid Valve Offset Malfunction

DESCRIPTION

The skid control ECU stores and corrects the difference in each individual part such as the stroke sensor, actuator solenoids, and stroke simulator solenoid. Perform initialization of linear solenoid valve and calibration if these parts are replaced.
The skid control ECU receives shift position P signals from the HV control ECU through CAN communication system.
The DTCs are cancelled when the result of linear valve offset learning is normal.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1345/66	-	Value of initialization of linear solenoid valve and calibration for the FR, FL, RR, and RL wheels is not stored.	• Initialization of linear solenoid valve and calibration undone • Skid control ECU
C1368/67	-	Value of initialization of linear solenoid valve and calibration is not within the brake actuator's standard value.	• Initialization of linear solenoid valve and calibration undone • Skid control ECU

INSPECTION PROCEDURE

NOTICE:
When replacing the brake actuator assembly, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK DTC

(a) Clear the DTC (See page BC-57).
(b) Turn the power switch off.
(c) Turn the power switch on (IG).
(d) Check that the DTCs (Electronically Controlled Brake and hybrid control system) are recorded.

Result

Condition	Proceed to
DTCs (except C1345/66, C1368/67 and/or hybrid control system DTC) are not output	A
Hybrid control system DTC is output	B
DTCs (except C1345/66 and/or C1368/67) are output	C

B → INSPECT HYBRID CONTROL SYSTEM

C → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (See page BC-69)

A

2	PERFORM INITIALIZATION OF LINEAR SOLENOID VALVE AND CALIBRATION

(a) Perform initialization of the linear solenoid valve and calibration (See page BC-25).

NEXT

3	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (IG).
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTCs (C1345/66 and/or C1368/67) are not output	A
DTCs (C1345/66 and/or C1368/67) are output	B

B → REPLACE SKID CONTROL ECU

A

END

BC

DTC	C1365/54	Accumulator Pressure Sensor Malfunction

DESCRIPTION

The accumulator pressure sensor is built into the brake actuator.
The skid control ECU detects the accumulator pressure from the data sent from the accumulator pressure sensor, and then runs and stops the pump motor by operating the motor relay.
DTCs may be output if the accumulator pressure drops due to frequent braking (this is not a malfunction).

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1365/54	211	Sensor power 1 (VCM1) voltage is 4.7 V or less or 5.3 V or more for at least 0.05 seconds.	• Brake actuator assembly (Accumulator pressure sensor) • Accumulator pressure sensor circuit • Accumulator pressure sensor power supply • Brake actuator assembly • Skid control ECU
↑	212	Ratio of accumulator pressure sensor output voltage (PACC) to sensor power 1 (VCM1) voltage is 5% or less or 90.5% or more for at least 0.05 seconds.	↑
↑	214	Total wheel cylinder pressure sensor exceeds 18 MPa after depressing brake pedal, but accumulator pressure sensor output voltage (PACC) changes less than 0.5 MPa for at least 0.5 seconds.	↑
↑	215	Ratio of accumulator pressure sensor output voltage (PACC) to sensor power 1 (VCM1) voltage is 90.5% or less for at least 0.1 second during self diagnosis.	↑
↑	216	Voltage difference is 0.3 V or more before and after changing the pull up resistance in sensor signal input circuit (loose contact).	↑

WIRING DIAGRAM

Refer to DTCs C1246/46, C1281/81 and C1364/61 (See page BC-131).

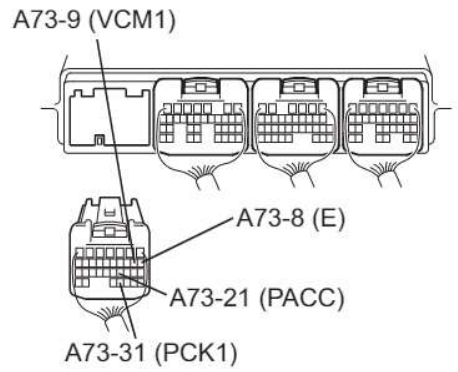
INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration (See page BC-25).

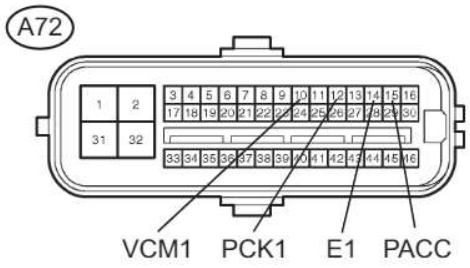
BC

1 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE ACTUATOR)

Skid Control ECU Wire Harness View:



Brake Actuator Harness Side Connector Front View:



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

Standard resistance

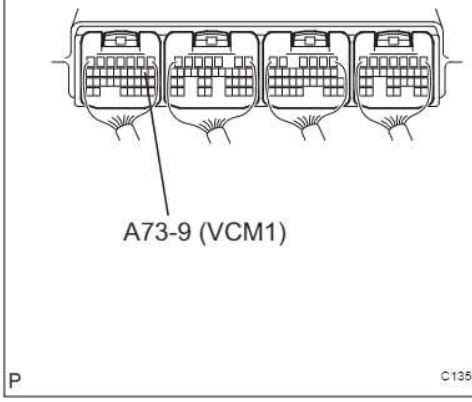
Tester Connection	Condition	Specified Condition
A73-8 (E) - A72-14 (E1)	Always	Below 1 Ω
A73-8 (E) - Body ground	Always	10 kΩ or higher
A73-9 (VCM1) - A72-10 (VCM1)	Always	Below 1 Ω
A73-9 (VCM1) - Body ground	Always	10 kΩ or higher
A73-21 (PACC) - A72-15 (PACC)	Always	Below 1 Ω
A73-21 (PACC) - Body ground	Always	10 kΩ or higher
A73-31 (PCK1) - A72-12 (PCK1)	Always	Below 1 Ω
A73-31 (PCK1) - Body ground	Always	10 kΩ or higher

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

OK

2 INSPECT SKID CONTROL ECU (SENSOR INPUT)

Skid Control ECU Wire Harness View:



(a) Reconnect the skid control ECU connector and the brake actuator connector.
(b) Turn the power switch on (IG).
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
A73-9 (VCM1) - Body ground	Power switch on (IG)	4.75 to 5.25 V

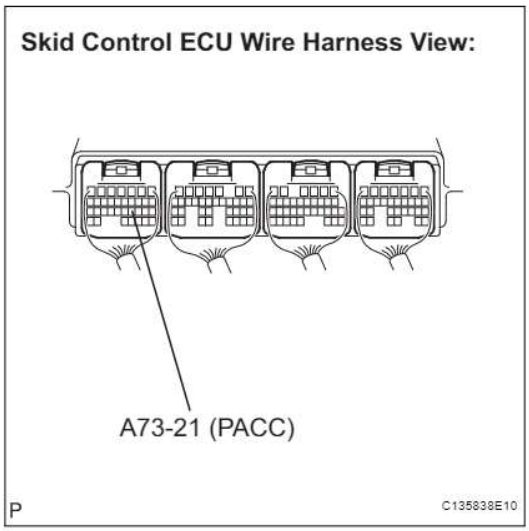
NG → **REPLACE SKID CONTROL ECU**

OK

BC

3 INSPECT SKID CONTROL ECU (SENSOR OUTPUT)

Skid Control ECU Wire Harness View:



(a) Depress the brake pedal to operate the pump motor, and then check that the pump motor stops.

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

NOTICE:

Do not depress the brake pedal until the pump motor stops and the voltage check is finished in order to keep the accumulator pressure.

Standard voltage

Tester Connection	Condition	Specified Condition
A73-21 (PACC) - Body ground	Power switch on (IG)	3.3 to 4.7 V

NG → REPLACE BRAKE ACTUATOR ASSEMBLY

OK

4 READ VALUE OF INTELLIGENT TESTER (ACCUMULATOR PRESSURE SENSOR)

(a) Turn the power switch off.

(b) Connect the intelligent tester to the DLC3.

(c) Turn the power switch on (IG).

(d) Select the Data List mode on the intelligent tester.

ABS / VSC:

Tester Display	Measurement Item/Range	Normal Condition
ACC PRESS SENS	Accumulator pressure sensor / min.: 0 V, max.: 5 V	Specified value: 3.3 to 4.7 V

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

OK:

Accumulator pressure sensor voltage does not drop.

NG → REPLACE BRAKE ACTUATOR ASSEMBLY

OK

5 RECONFIRM DTC

(a) Turn the power switch off.

(b) Clear the DTC (See page BC-57).

(c) Perform the road and braking test.

(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (C1365/54) is not output	A
DTC (C1365/54) is output	B

BC

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

DTC	C1377/43	Capacitor Malfunction

DESCRIPTION

The brake control power supply (capacitor) is used as auxiliary power for brake control when battery voltage is low.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1377/43	101	Brake control power supply is deteriorated (indicates a need to replace).	Brake control power supply (Capacitor)
↑	102	Self discharge (current leak) is excessive (internal malfunction).	↑
↑	103	Overvoltage (16.4 V or more) continues to be applied from the auxiliary battery to the capacitor voltage input (+BC) for 10 seconds or more.	Apply high voltage
↑	105	Circuit inside the power back up unit (charge) is malfunctioning.	Brake control power supply (Capacitor)
↑	106	Circuit inside the power back up unit (back up output circuit) is malfunctioning.	↑
↑	107	Malfunction in the forced discharge circuit.	↑
↑	108	Circuit inside the power back up unit (voltage monitor circuit) is malfunctioning.	↑
↑	109	Open circuit between auxiliary battery (12 V) and capacitor power input (+BC terminal).	• ABS MAIN NO. 3 fuse • Brake control power supply circuit
↑	110	When either of the following is detected: 1. Open or short circuit between auxiliary battery (12 V) and capacitor output 1 (OUT1). 2. Open or short circuit between auxiliary battery (12 V) and capacitor output 2 (OUT2).	• ABS MAIN NO. 1 fuse • ABS MAIN NO. 2 fuse • Brake control power supply circuit

WIRING DIAGRAM

Refer to DTCs C1241/41 and C1242/42 (See page BC-122).

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK FREEZE FRAME DATA

(a) Check the INF code from the Freeze Frame Data memorized when the DTC (C1377/43) is stored (See page BC-59).

BC

Result

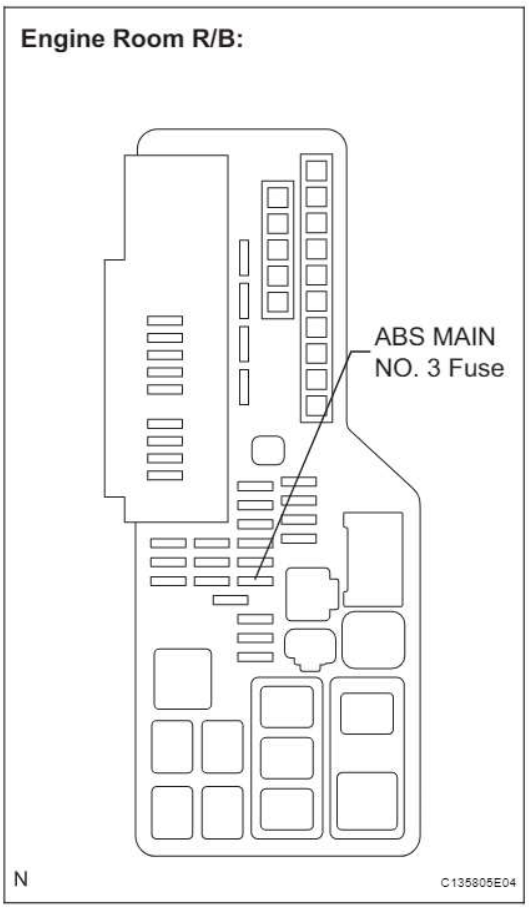
Condition	Proceed to
INF codes (109 and/or 110) are output	A
INF codes (101, 102, 105, 106, 107 and/or 108) are output	B
INF code (103) is output	C

B → REPLACE BRAKE CONTROL POWER SUPPLY (CAPACITOR)

C → Go to step 9

A

2 INSPECT ABS MAIN NO. 3 FUSE



(a) Remove the ABS MAIN NO. 3 fuse from the engine room R/B.
(b) Measure the resistance according to the value(s) in the table below.

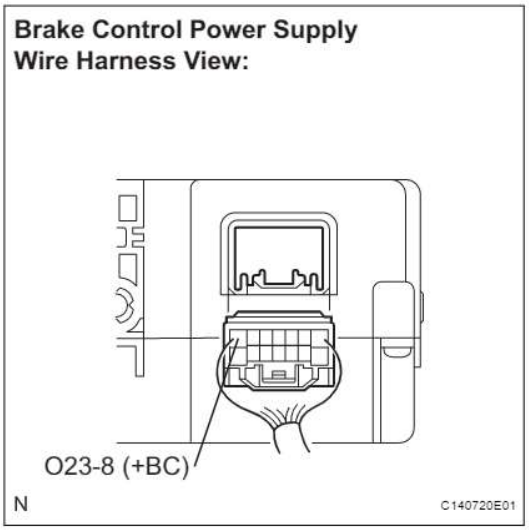
Standard resistance

Tester Connection	Condition	Specified Condition
ABS MAIN NO. 3 (10 A) fuse	Always	Below 1 Ω

NG → **REPLACE ABS MAIN NO. 3 FUSE**

OK

3 INSPECT BRAKE CONTROL POWER SUPPLY (+BC TERMINAL)



(a) Install the ABS MAIN NO. 3 fuse.
(b) Disconnect the brake control power supply connector.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
O23-8 (+BC) - Body ground	Always	10 to 14 V

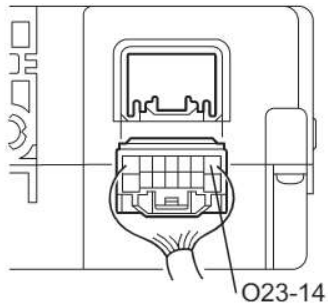
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (+BC CIRCUIT)**

BC

OK

4	INSPECT BRAKE CONTROL POWER SUPPLY (GND TERMINAL)

Brake Control Power Supply Wire Harness View:



N C140720E02

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

Standard resistance

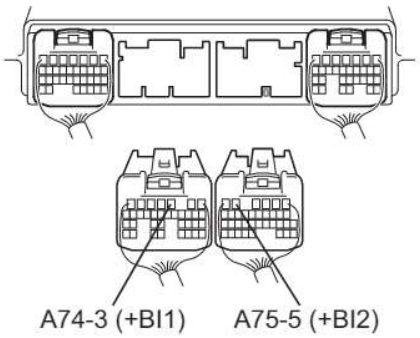
Tester Connection	Condition	Specified Condition
O23-14 (GND) - Body ground	Always	Below 1 Ω

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

OK

5	INSPECT SKID CONTROL ECU (+BI TERMINAL)

Skid Control ECU Wire Harness View:



P C135832E01

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

Standard voltage

Tester Connection	Condition	Specified Condition
A74-3 (+BI1) - Body ground	Always	10 to 14 V
A75-5 (+BI2) - Body ground	Always	10 to 14 V

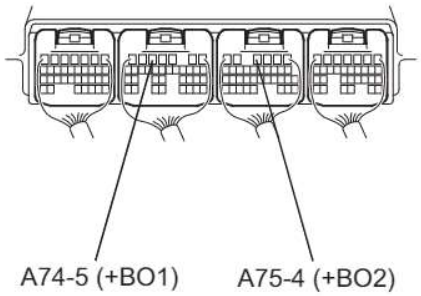
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (+BI CIRCUIT)

BC

OK

6 INSPECT SKID CONTROL ECU (RELAY INPUT)

Skid Control ECU Wire Harness View:



(a) Reconnect the skid control ECU connectors.
(b) Turn the power switch on (IG).
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

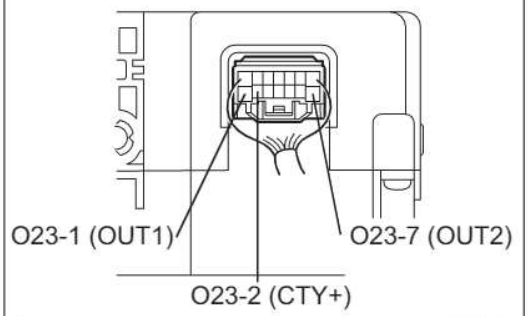
Tester Connection	Condition	Specified Condition
A74-5 (+BO1) - Body ground	Power switch on (IG)	8.8 to 14 V
A75-4 (+BO2) - Body ground	Power switch on (IG)	8.8 to 14 V

NG → REPLACE SKID CONTROL ECU

OK

7 INSPECT BRAKE CONTROL POWER SUPPLY (OUT AND CTY+ TERMINAL)

Brake Control Power Supply Wire Harness View:



(a) Reconnect the brake control power supply connector.
(b) Turn the power switch on (IG).
(c) Measure the voltage according to the value(s) in the table below.

HINT:
Perform inspection while the brake is not operated.

Standard voltage

Tester Connection	Condition	Specified Condition
O23-1 (OUT1) - Body ground	Power switch on (IG)	10 to 14 V
O23-2 (CTY+) - Body ground	Power switch on (IG)	10 to 14 V (*1)
O23-7 (OUT2) - Body ground	Power switch on (IG)	10 to 14 V

(*1): For 5 seconds after the driver's door is opened.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (OUT OR CTY+ CIRCUIT)

OK

8 RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (IG).
(d) Check if the same DTC is recorded (See page BC-57).

BC

Result

Condition	Proceed to
DTC (C1377/43) is not output	A
DTC (C1377/43) is output	B

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

9 CHECK AUXILIARY BATTERY

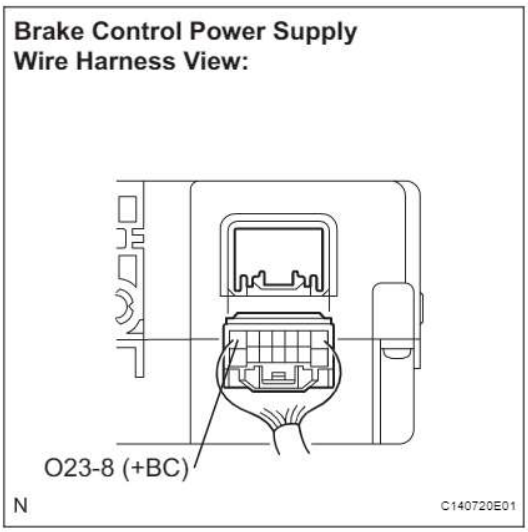
(a) Check the auxiliary battery voltage.
Standard voltage:
11 to 14 V

NG → CHARGE OR REPLACE AUXILIARY BATTERY

OK

10 INSPECT BRAKE CONTROL POWER SUPPLY (+BC TERMINAL)

Brake Control Power Supply Wire Harness View:



(a) Disconnect the brake control power supply connector.
(b) Measure the voltage according to the value(s) in the table below.
Standard voltage

Tester Connection	Condition	Specified Condition
O23-8 (+BC) - Body ground	Always	10 to 14 V

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (+BC CIRCUIT)

OK

11 RECONFIRM DTC

(a) Clear the DTC (See page BC-57).
(b) Turn the power switch on (IG).
(c) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (C1377/43) is not output	A

Condition	Proceed to
DTC (C1377/43) is output	B

B → REPLACE BRAKE CONTROL POWER SUPPLY (CAPACITOR)

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

DTC	C1378/44	Capacitor Communication Malfunction

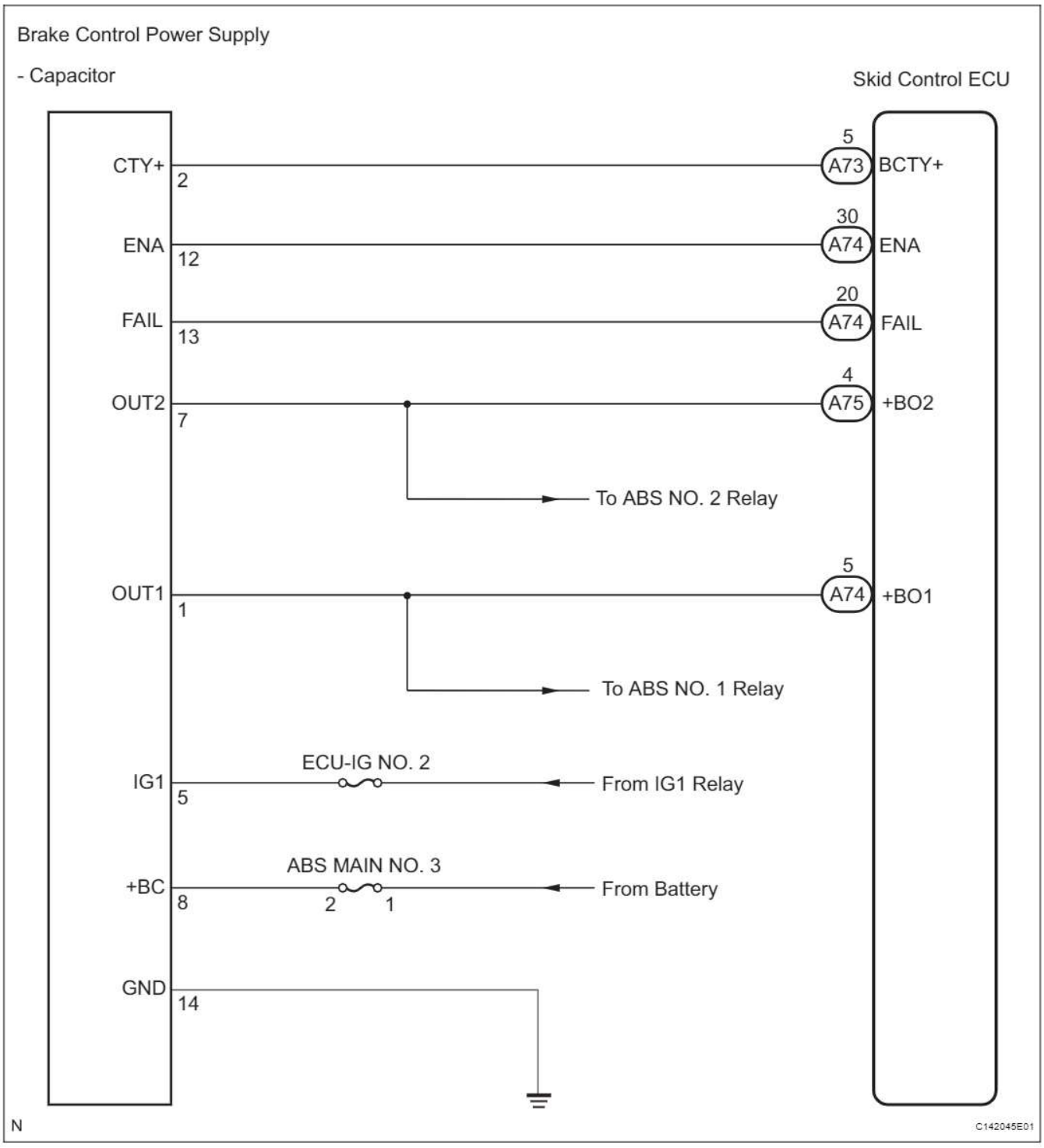
DESCRIPTION

The brake control power supply (capacitor) provides auxiliary power for brake control when an auxiliary battery (12 V) voltage drops.
The FAIL and ENA lines are placed between the skid control ECU and the brake control power supply. Signals indicating that the brake control power supply is in auxiliary mode are sent to the skid control ECU through the FAIL line.
Charge permit prohibition signals are sent to the brake control power supply through the ENA line.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1378/44	112	When either of the following is detected: 1. Open or short in FAIL line. 2. Malfunction inside the power back up unit.	• Brake control power supply (Capacitor) • Brake control power supply circuit

BC

WIRING DIAGRAM



BC

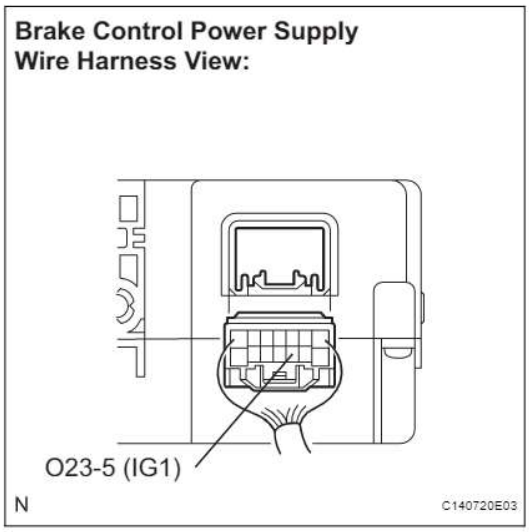
INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1 INSPECT BRAKE CONTROL POWER SUPPLY (IG1 TERMINAL)

Brake Control Power Supply Wire Harness View:



(a) Disconnect the brake control power supply connector.
(b) Turn the power switch on (IG).
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

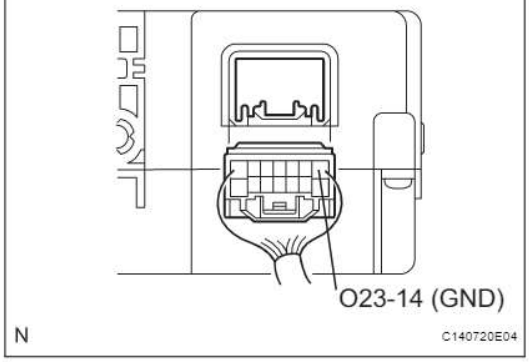
Tester Connection	Condition	Specified Condition
O23-5 (IG1) - Body ground	Power switch on (IG)	10 to 14 V

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

OK

2 INSPECT BRAKE CONTROL POWER SUPPLY (GND TERMINAL)

Brake Control Power Supply Wire Harness View:



(a) Turn the power switch off.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
O23-14 (GND) - Body ground	Always	Below 1 Ω

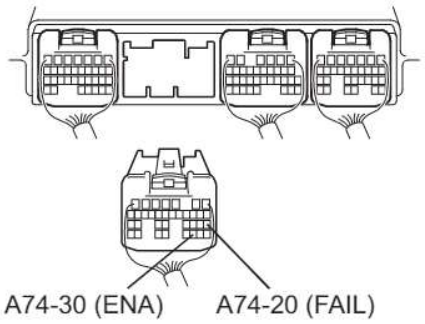
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK

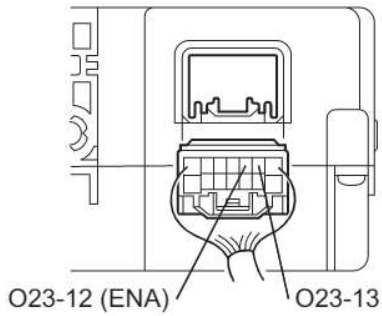
BC

3	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE CONTROL POWER SUPPLY)

Skid Control ECU Wire Harness View:



Brake Control Power Supply Wire Harness View:



C140722E01

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

Standard resistance

Tester Connection	Condition	Specified Condition
A74-30 (ENA) - O23-12 (ENA)	Always	Below 1 Ω
A74-30 (ENA) - Body ground	Always	10 kΩ or higher
A74-20 (FAIL) - O23-13 (FAIL)	Always	Below 1 Ω
A74-20 (FAIL) - Body ground	Always	10 kΩ or higher

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

OK

BC

4	RECONFIRM DTC

(a) Reconnect the skid control ECU connector and the brake control power supply connector.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (IG).
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (C1378/44) is output	A
DTC (C1378/44) is not output	B

B → CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

A

5 CHECK FREEZE FRAME DATA

(a) Check the INF code from the Freeze Frame Data memorized when the DTC (C1378/44) is stored (See page BC-59).

Result

Condition	Proceed to
INF code (112) is not output	A
INF code (112) is output	B

B → REPLACE BRAKE CONTROL POWER SUPPLY (CAPACITOR)

A

REPLACE SKID CONTROL ECU

BC

DTC C1391/69 Accumulator Leak Malfunction

DESCRIPTION

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

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1391/69	591	Accumulator performance is deteriorated (improper sealing inside the actuator, gas pressure drop inside the accumulator, leak in each pressure boosting valve).	• Fluid leakage • Brake actuator assembly

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU or brake actuator assembly, perform initialization of linear solenoid valve and calibration (See page BC-25).

1 CHECK FOR BRAKE FLUID LEAKS

(a) Check that there is no fluid leakage in the brake line between the brake actuator and the wheel cylinder which is the cause of DTCs.

(b) Check that the brake is not dragging.

OK:

There is no fluid leakage or dragging.

NG → **REPAIR OR REPLACE APPLICABLE PART**

OK ↓

2 READ VALUE OF INTELLIGENT TESTER (ACCUMULATOR PRESSURE SENSOR)

(a) Connect the intelligent tester to the DLC3.

(b) Turn the power switch on (IG).

(c) Select the Data List mode on the intelligent tester.

ABS / VSC:

Tester Display	Measurement Item/Range	Normal Condition
ACC PRESS SENS	Accumulator pressure sensor / min.: 0 V, max.: 5 V	Specified value: 3.3 to 4.7 V

(d) Wait a few minutes without operating the brake pedal.

(e) Check that the output value of the accumulator pressure sensor does not decrease and that the pump motor is not activated due to a decrease in accumulator pressure.

OK:

Accumulator pressure does not decrease and the pump motor is not activated due to a decrease in accumulator pressure.

NG → **REPLACE BRAKE ACTUATOR ASSEMBLY**

OK ↓

BC

3	RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (IG).
(d) Check if the same DTC is recorded (See page BC-57).

Result

Condition	Proceed to
DTC (C1391/69) is not output	A
DTC (C1391/69) is output	B

B → REPLACE SKID CONTROL ECU

A

CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

BC

DTC	U0073/94	Control Module Communication Bus OFF

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

DTC	U0131/67	Lost Communication with Power Steering Control Module

DTC	U0293/59	Communication Error from HV ECU

DESCRIPTION

The skid control ECU receives the signals from the HV control ECU, power steering (EPS) ECU, steering angle sensor, and yaw rate and acceleration sensor via the CAN communication system.

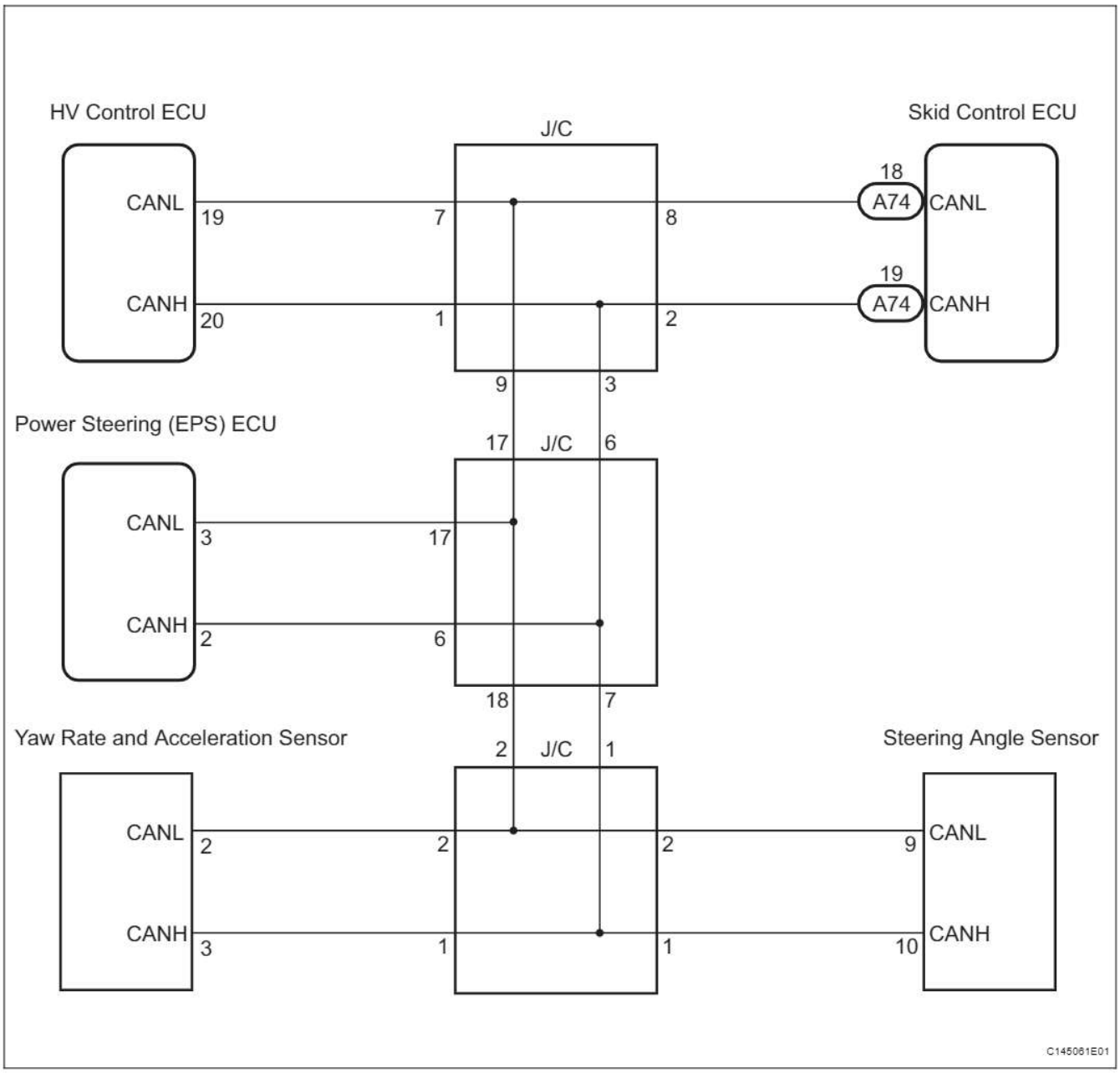
DTC Code	INF Code	DTC Detection Condition	Trouble Area
U0073/94	360	When either of the following is detected: 1. After the output of data from the skid control ECU is completed, the sending continues for 5 seconds or more. 2. The condition that bus OFF state occurs once or more within 100 ms occurs 10 times in succession. (Sent signals cannot be received.)	CAN communication system
U0123/62	338	When either of the following is detected: 1. With the IG1 terminal voltage 10 V or more, data from the yaw rate sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 10 V or more, the following occurs 10 times in succession. • The condition that data from the yaw rate sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)
U0124/95	319	When either of the following is detected: 1. With the IG1 terminal voltage 9.5 V or more, data from the deceleration sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 9.5 V or more, the following occurs 10 times in succession. • The condition that data from the deceleration sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)
U0126/63	350	When either of the following is detected: 1. With the IG1 terminal voltage 10 V or more, data from the steering sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 10 V or more, the following occurs 10 times in succession. • The condition that data from the steering angle sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to steering angle sensor)

BC

DTC Code	INF Code	DTC Detection Condition	Trouble Area
U0131/67	374 375	When either of the following is detected: 1. With the IG1 terminal voltage 10 V or more, data from the EPS ECU cannot be received for 1 second or more. 2. With the IG1 terminal voltage 10 V or more, the following occurs 10 times in succession within 60 seconds. • The condition that data from the EPS ECU cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to power steering (EPS) ECU)
U0293/59	152	With the IG2 terminal voltage at 9.5 V or more for 2 seconds or more, communication with the HV control ECU remains invalid for 2 seconds or more.	CAN communication system (Skid control ECU to HV control ECU)
↑	153	With the G2 terminal voltage at 9.5 V or more for 2 seconds or more, communication with the HV control ECU that occurs once or more within 5 seconds changes from being valid communication to being invalid communication 10 times or more within 1 minute.	↑
↑	154	With the IG2 terminal voltage at 9.5 V or more for 2 seconds or more, abnormal regenerative braking torque value or braking request torque value is received for 2 seconds or more.	↑

BC

WIRING DIAGRAM



BC INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

(a) Using the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (See page BC-23).

ABS / VSC:

Tester Display	Measurement Item/Range	Normal Condition
HV COM OPN	HV communication open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal
STEERING OPN	Steering sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal

Tester Display	Measurement Item/Range	Normal Condition
YAW RATE OPN	Yaw rate sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal

Result

Condition	Proceed to
There is a constant open circuit	A
There are no momentary interruptions	B
There are momentary interruptions	C

HINT:
Perform the above inspection before removing the sensor and connector.

B → Go to step 3

C → Go to step 4

A

2 CHECK IF EACH SENSOR AND ECU CONNECTOR IS SECURELY CONNECTED

(a) Turn the power switch off.
(b) Check if each sensor and ECU connector is securely connected.
OK:
The connector should be securely connected.

NG → **CONNECT CONNECTOR TO EACH SENSOR OR ECU CORRECTLY**

OK

3 RECONFIRM DTC

(a) Turn the power switch off.
(b) Record the output DTCs (for ABS, VSC, Electronically Controlled Brake, and CAN communication).
HINT:
If the CAN communication system DTC and the relevant sensor DTCs are output simultaneously, troubleshoot the relevant sensor DTCs (for ABS, VSC and Electronically Controlled Brake) after the CAN communication system returns to normal.

BC

Result

Condition	Proceed to
DTC (CAN communication system DTC) is output	A
DTC (ABS, VSC and/or Electronically Controlled Brake DTC) is output	B
DTC is not output	C

B → **REPAIR CIRCUIT INDICATED BY OUTPUT DTC (See page BC-69)**

C → CHECK FOR INTERMITTENT PROBLEMS (SYMPTOM SIMULATION)

A

INSPECT CAN COMMUNICATION SYSTEM

4 REPAIR OR REPLACE HARNESS OR CONNECTOR

(a) Turn the power switch off.
(b) Repair or replace the harness or connector.
(c) Check for any momentary interruption between the skid control ECU and each sensor or ECU (See page BC-23).
(d) Check that there is no momentary interruption.

NEXT

5 RECONFIRM DTC

(a) Turn the power switch off.
(b) Clear the DTC (See page BC-57).
(c) Turn the power switch on (READY).
(d) Drive the vehicle and turn the steering wheel to the right and left at a speed of 15 km/h (9 mph) or more.
(e) Check that no CAN communication system DTC is output.
(f) If ABS, VSC and Electronically Controlled Brake DTCs are output, record them.

Result

Condition	Proceed to
DTC output for the CAN communication system	A
No DTC is output (ABS, VSC and/or Electronically Controlled Brake DTC is output)	B
No DTC is output (No ABS, VSC and/or Electronically Controlled Brake DTC is output)	C

HINT:
The CAN communication system must be normal when repairing each sensor DTC (for ABS, VSC and Electronically Controlled Brake).

BC

B → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (See page BC-69)

C → END

A

INSPECT CAN COMMUNICATION SYSTEM

ABS Warning Light Remains ON

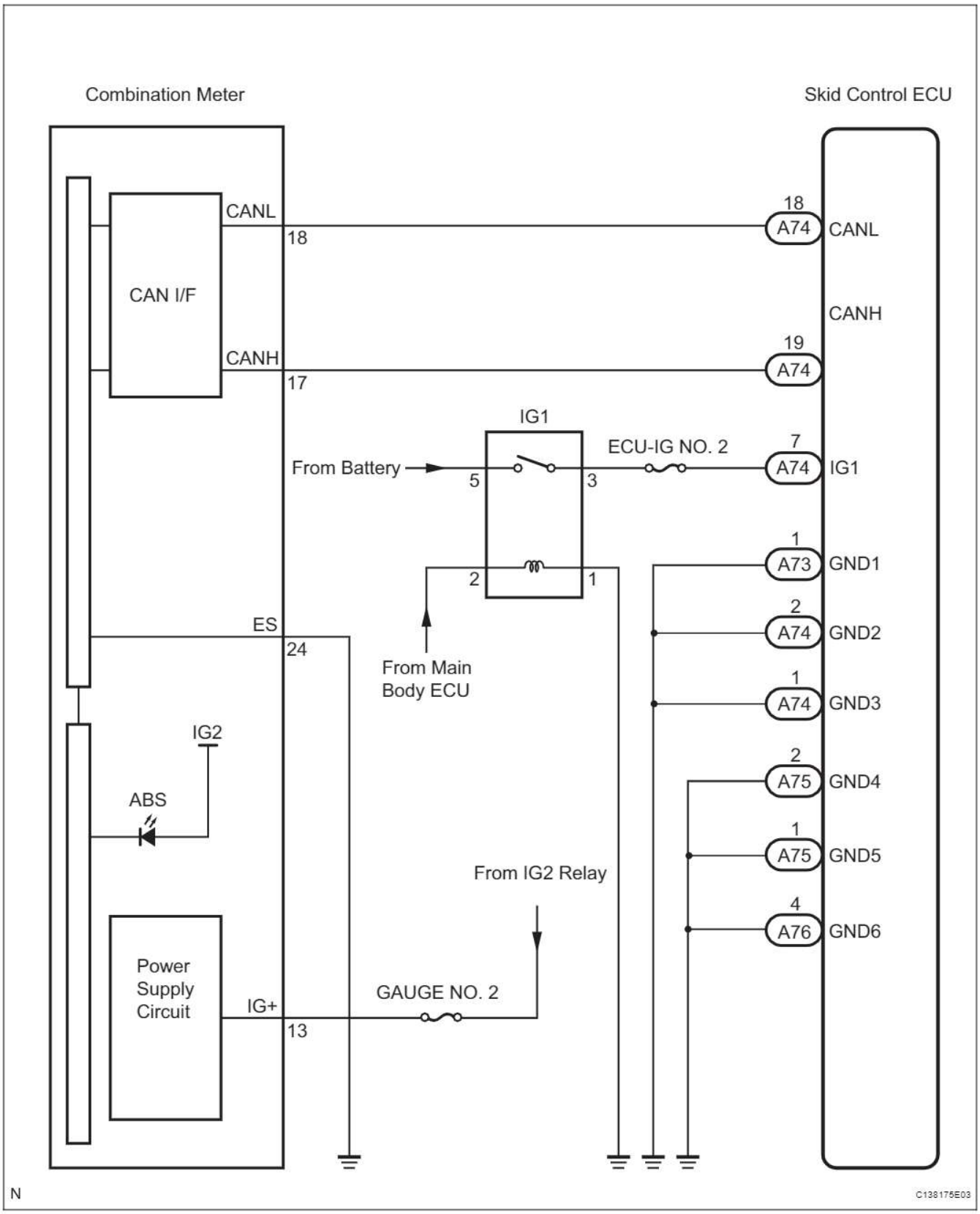
DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.
If any of the following is detected, the ABS warning light remains on.

- The skid control ECU connectors are disconnected from the skid control ECU.
- There is a malfunction in the skid control ECU internal circuit.
- There is an open in the harness between the combination meter and the skid control ECU.

HINT:
In some cases, the intelligent tester cannot be used when the skid control ECU is abnormal.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

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

B → INSPECT CAN COMMUNICATION SYSTEM

A

2	CHECK IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

(a) Check if the skid control ECU connector is securely connected.
OK:
The connector should be securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

3	CHECK AUXILIARY BATTERY

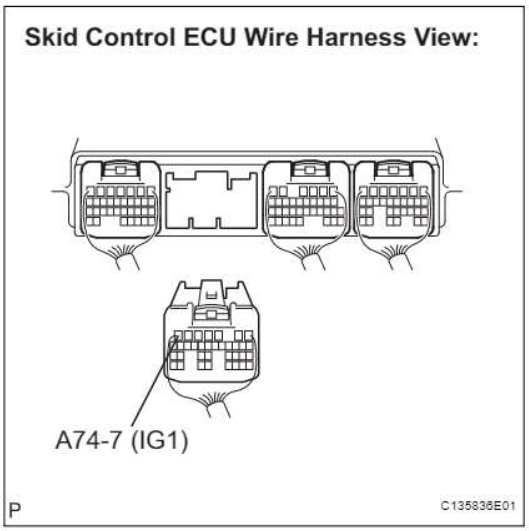
(a) Check the auxiliary battery voltage.
Standard voltage:
11 to 14 V

NG → CHARGE OR REPLACE AUXILIARY BATTERY

OK

BC

4 INSPECT SKID CONTROL ECU (IG1 TERMINAL)



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

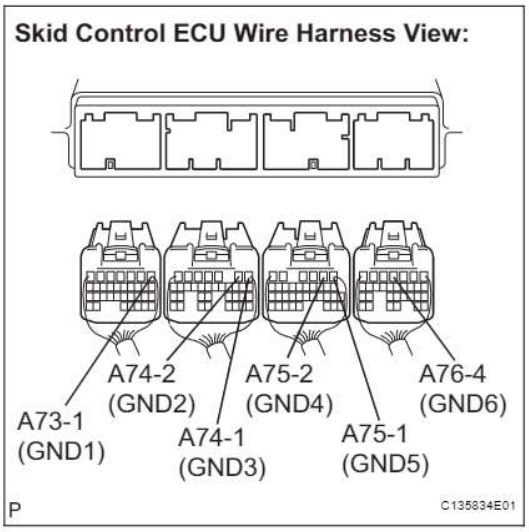
Standard voltage

Tester Connection	Condition	Specified Condition
A74-7 (IG1) - Body ground	Power switch on (IG)	10 to 14 V

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

OK

5 INSPECT SKID CONTROL ECU (GND TERMINAL)



(a) Turn the power switch off.
(b) Disconnect the skid control ECU connectors.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
A73-1 (GND1) - Body ground	Always	Below 1 Ω
A74-2 (GND2) - Body ground	Always	Below 1 Ω
A74-1 (GND3) - Body ground	Always	Below 1 Ω
A75-2 (GND4) - Body ground	Always	Below 1 Ω
A75-1 (GND5) - Body ground	Always	Below 1 Ω
A76-4 (GND6) - Body ground	Always	Below 1 Ω

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

OK

6 INSPECT COMBINATION METER ASSEMBLY

(a) Reconnect the skid control ECU connectors.
(b) Perform Active Test of the combination meter (meter CPU) using the intelligent tester (See page ME-30).

BC

OK:

The ABS warning light turns on or off in accordance with the intelligent tester.

HINT:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE SKID CONTROL ECU

BC

ABS Warning Light does not Come ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

WIRING DIAGRAM

Refer to ABS Warning Light Remains ON (See page BC-215).

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

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

B → INSPECT CAN COMMUNICATION SYSTEM

A

2	CHECK ABS WARNING LIGHT

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

OK:

The ABS warning light comes on.

HINT:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

OK → REPLACE SKID CONTROL ECU

NG

3	INSPECT COMBINATION METER ASSEMBLY

(a) Turn the power switch off.
(b) Reconnect the skid control ECU connector.
(c) Perform Active Test of the combination meter (meter CPU) using the intelligent tester (See page ME-30).

OK:

The ABS warning light turns on or off in accordance with the intelligent tester.

HINT:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE SKID CONTROL ECU

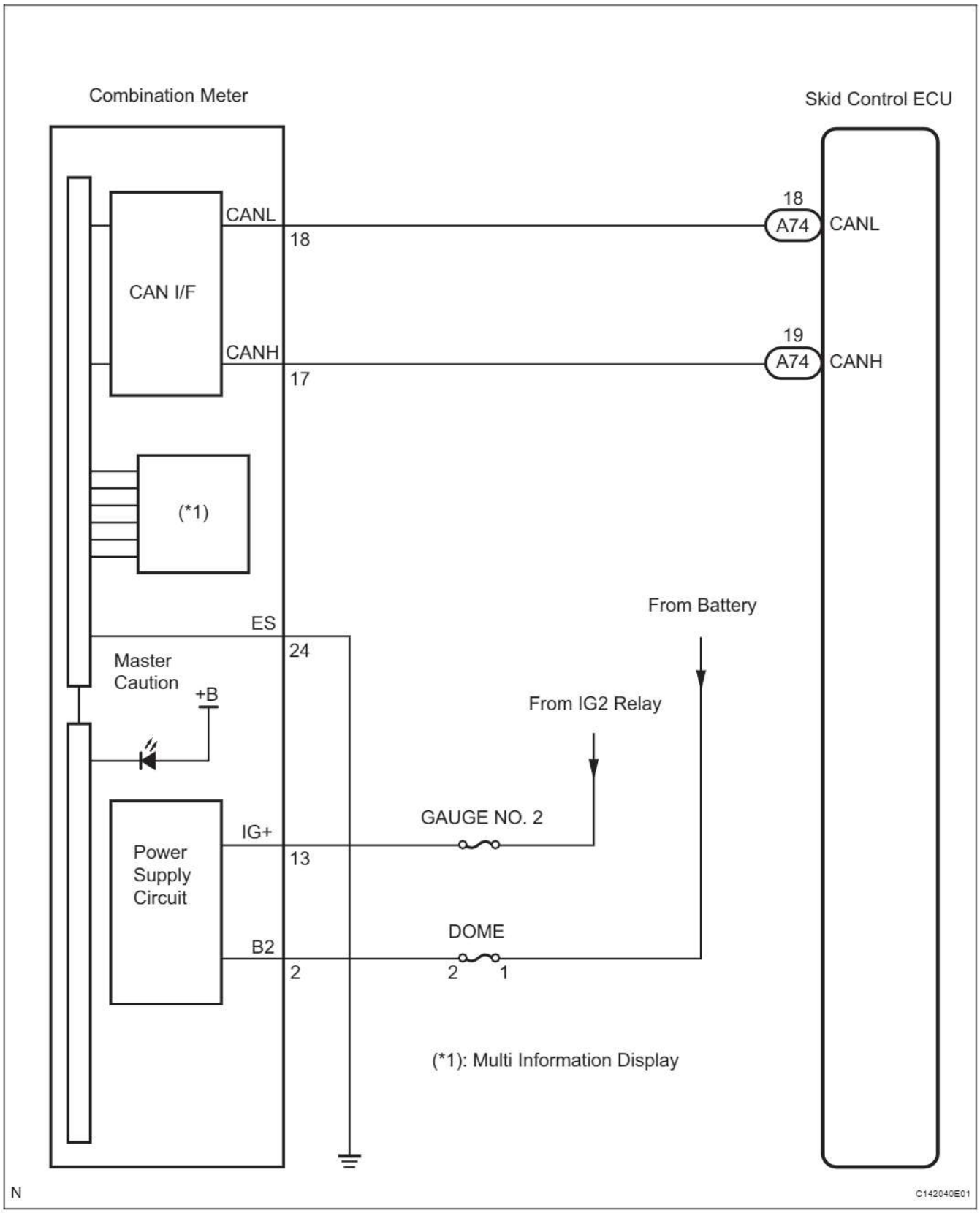
BC

VSC Warning Light Remains ON

DESCRIPTION

The skid control ECU communicates with the combination meter via CAN communication.
If the ECU stores a DTC, the master caution indicator light will come on and the DTC will be displayed on the multi information display in the combination meter.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

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

B → INSPECT CAN COMMUNICATION SYSTEM

A

2	CHECK IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

(a) Check if the skid control ECU connector is securely connected.
OK:
The connector should be securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

3	CHECK AUXILIARY BATTERY

(a) Check the auxiliary battery voltage.
Standard voltage:
11 to 14 V

NG → CHARGE OR REPLACE AUXILIARY BATTERY

BC OK

4	INSPECT COMBINATION METER ASSEMBLY

(a) Perform Active Test of the combination meter (meter CPU) using the intelligent tester (See page ME-30).
OK:
The VSC warning (master caution indicator light and multi information display) turns on or off in accordance with the intelligent tester.

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

NG → REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE SKID CONTROL ECU

VSC Warning Light does not Come ON

DESCRIPTION

The skid control ECU communicates with the combination meter via CAN communication.
If the ECU stores a DTC, the master caution indicator light will come on and the DTC will be displayed on the multi information display in the combination meter.

WIRING DIAGRAM

Refer to VSC Warning Light Remains ON (See page BC-222).

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

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

B → INSPECT CAN COMMUNICATION SYSTEM

A

2	CHECK VSC WARNING LIGHT

(a) Connect the intelligent tester to the DLC3.
(b) Turn the power switch on (READY).
(c) Select "VSC WARN LAMP" in the Active Test and operate the VSC warning (master caution indicator light and multi information display) using the intelligent tester.

ABS / VSC:

Tester Display	Test Part	Control Range	Diagnostic Note
VSC WARN LAMP	VSC warning (master caution indicator light and multi information display)	Warning (light and display) ON / OFF	Observe combination meter

BC

(d) Check that "ON" and "OFF" of the VSC warning (master caution indicator light and multi information display) are indicated on the combination meter when using the intelligent tester.

OK:

The VSC warning (master caution indicator light and multi information display) turns on or off in accordance with the intelligent tester.

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

OK → **REPLACE SKID CONTROL ECU**

NG

3	INSPECT COMBINATION METER ASSEMBLY

(a) Turn the power switch off.
(b) Perform Active Test of the combination meter (meter CPU) using the intelligent tester (See page ME-30).
OK:
The VSC warning (master caution indicator light and multi information display) turns on or off in accordance with the intelligent tester.
HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE SKID CONTROL ECU

BC

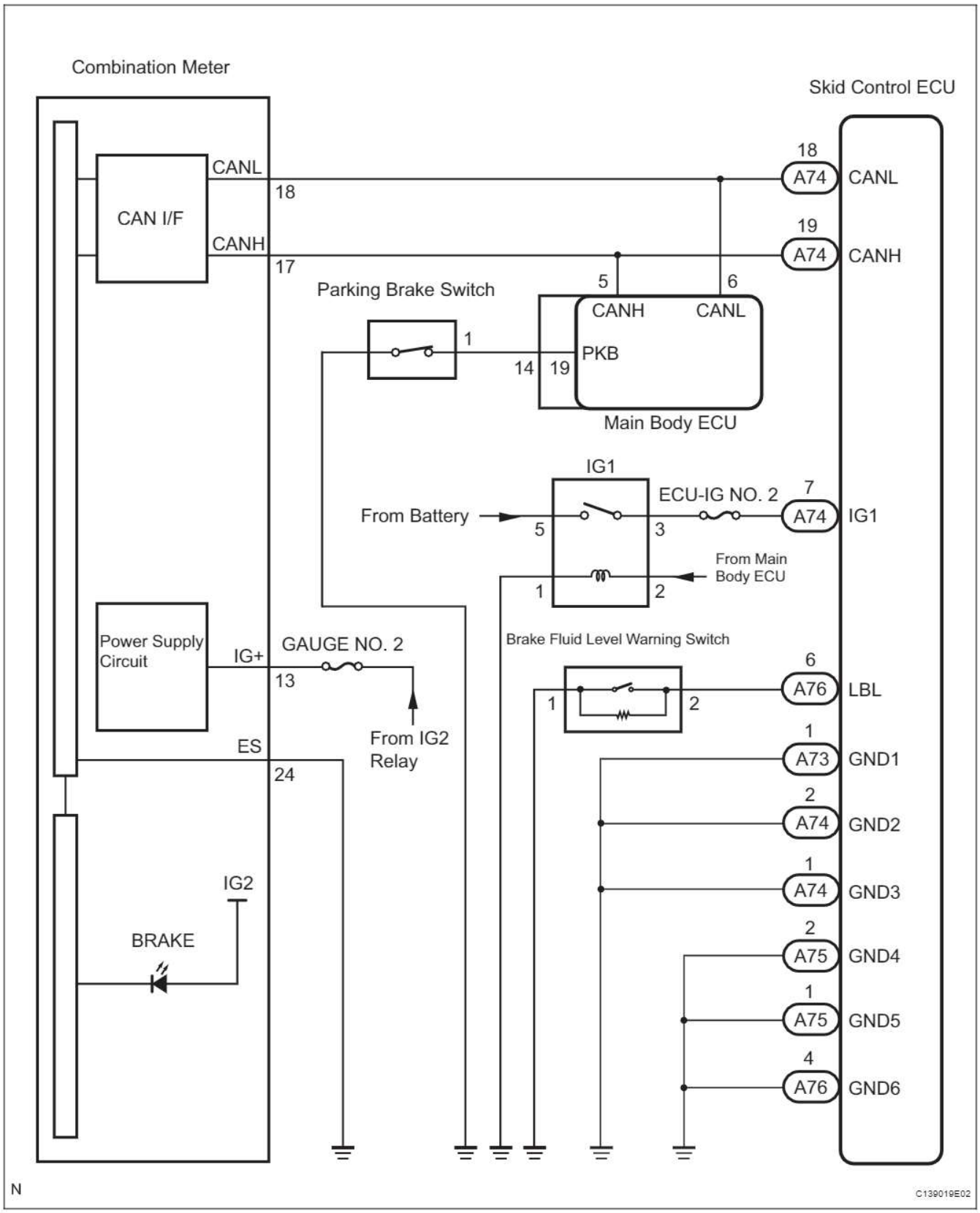
Brake Warning Light Remains ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.
If any of the following is detected, the BRAKE warning light remains on:

- The skid control ECU connector is disconnected from the skid control ECU.
- The brake fluid level is insufficient.
- The parking brake is applied.
- EBD operation is not possible.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK DTC

(a) Check if the ABS, VSC and/or Electronically Controlled Brake DTC is output (See page BC-57).

Result

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

B → **REPAIR CIRCUIT INDICATED BY OUTPUT DTC (See page BC-69)**

A

2	CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

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

B → **INSPECT CAN COMMUNICATION SYSTEM**

A

3	CHECK IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

(a) Check if the skid control ECU connector is securely connected.
OK:
The connector should be securely connected.

NG → **CONNECT CONNECTOR TO ECU CORRECTLY**

OK

4	CHECK AUXILIARY BATTERY

(a) Check the auxiliary battery voltage.
Standard voltage:
11 to 14 V

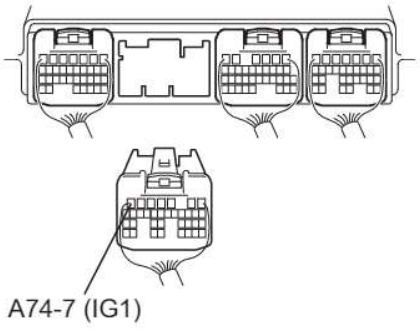
BC

NG → CHARGE OR REPLACE AUXILIARY BATTERY

OK

5 INSPECT SKID CONTROL ECU (IG1 TERMINAL)

Skid Control ECU Wire Harness View:



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

Standard voltage

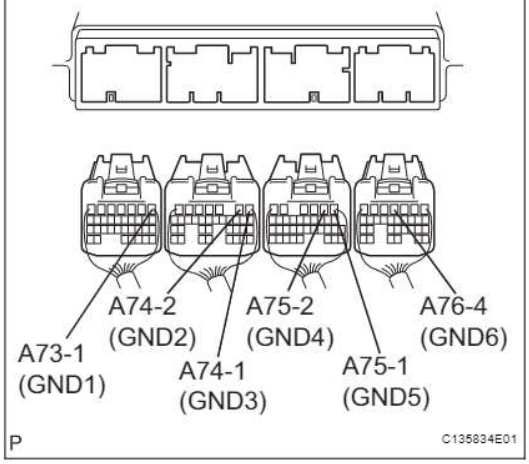
Tester Connection	Condition	Specified Condition
A74-7 (IG1) - Body ground	Power switch on (IG)	10 to 14 V

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

OK

6 INSPECT SKID CONTROL ECU (GND TERMINAL)

Skid Control ECU Wire Harness View:



(a) Turn the power switch off.
(b) Disconnect the skid control ECU connectors.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
A73-1 (GND1) - Body ground	Always	Below 1 Ω
A74-2 (GND2) - Body ground	Always	Below 1 Ω
A74-1 (GND3) - Body ground	Always	Below 1 Ω
A75-2 (GND4) - Body ground	Always	Below 1 Ω
A75-1 (GND5) - Body ground	Always	Below 1 Ω
A76-4 (GND6) - Body ground	Always	Below 1 Ω

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

OK

BC

7	READ VALUE OF INTELLIGENT TESTER (PARKING BRAKE SWITCH)

(a) Reconnect the skid control ECU connectors.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the power switch on (IG).
(d) Select the Data List mode on the intelligent tester.

ABS / VSC:

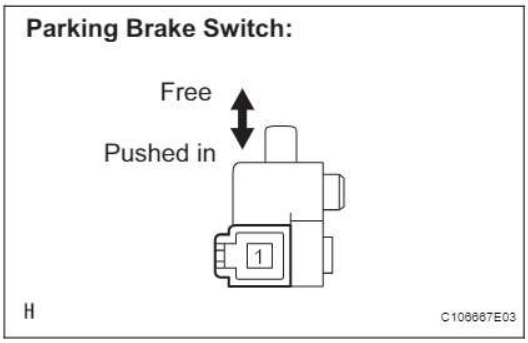
Tester Display	Measurement Item/Range	Normal Condition
PARKING BRAKE SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released

(e) Using the intelligent tester, check the input of switch operation when the parking brake pedal is operated.
OK:
When the parking brake is operated, the display changes as shown above.

OK → **Go to step 10**

NG

8	INSPECT PARKING BRAKE SWITCH



(a) Turn the power switch off.
(b) Disconnect the parking brake switch connector.
(c) Measure the resistance according to the value(s) in the table below.
Standard resistance

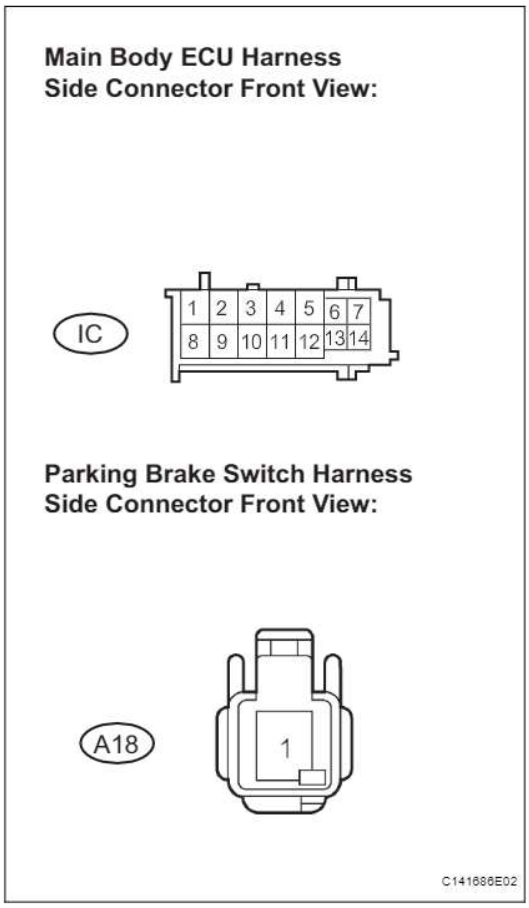
Tester Connection	Condition	Specified Condition
1 - Body ground	Parking brake switch ON (Switch pin free)	Below 1 Ω
1 - Body ground	Parking brake switch OFF (Switch pin pushed in)	10 kΩ or higher

NG → **REPLACE PARKING BRAKE SWITCH**

OK

BC

9 **CHECK HARNESS AND CONNECTOR (MAIN BODY ECU - PARKING BRAKE SWITCH)**



(a) Disconnect the main body ECU connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
IC-14 (PKB) - A18-1	Always	Below 1 Ω
IC-14 (PKB) - Body ground	Always	10 kΩ or higher

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

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

OK

REPLACE SKID CONTROL ECU

10 **INSPECT COMBINATION METER ASSEMBLY**

(a) Turn the power switch off.
(b) Perform Active Test of the combination meter (meter CPU) using the intelligent tester (See page ME-30).

OK:

The BRAKE warning light turns on or off in accordance with the intelligent tester.

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

NG → **REPLACE COMBINATION METER ASSEMBLY**

BC

OK

REPLACE SKID CONTROL ECU

Brake Warning Light does not Come ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

WIRING DIAGRAM

Refer to Brake Warning Light Remains ON (See page BC-228).

INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

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

B → **INSPECT CAN COMMUNICATION SYSTEM**

A

2 CHECK BRAKE WARNING LIGHT

(a) Disconnect the skid control ECU connector.
(b) Turn the power switch on (IG).
(c) Check that the BRAKE warning light comes on.

OK:

The BRAKE warning light comes on.

HINT:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

OK → **REPLACE SKID CONTROL ECU**

NG

3 INSPECT COMBINATION METER ASSEMBLY

(a) Turn the power switch off.
(b) Reconnect the skid control ECU connector.
(c) Perform Active Test of the combination meter (meter CPU) using the intelligent tester (See page ME-30).

BC

OK:

The BRAKE warning light turns on or off in accordance with the intelligent tester.

HINT:

If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE SKID CONTROL ECU

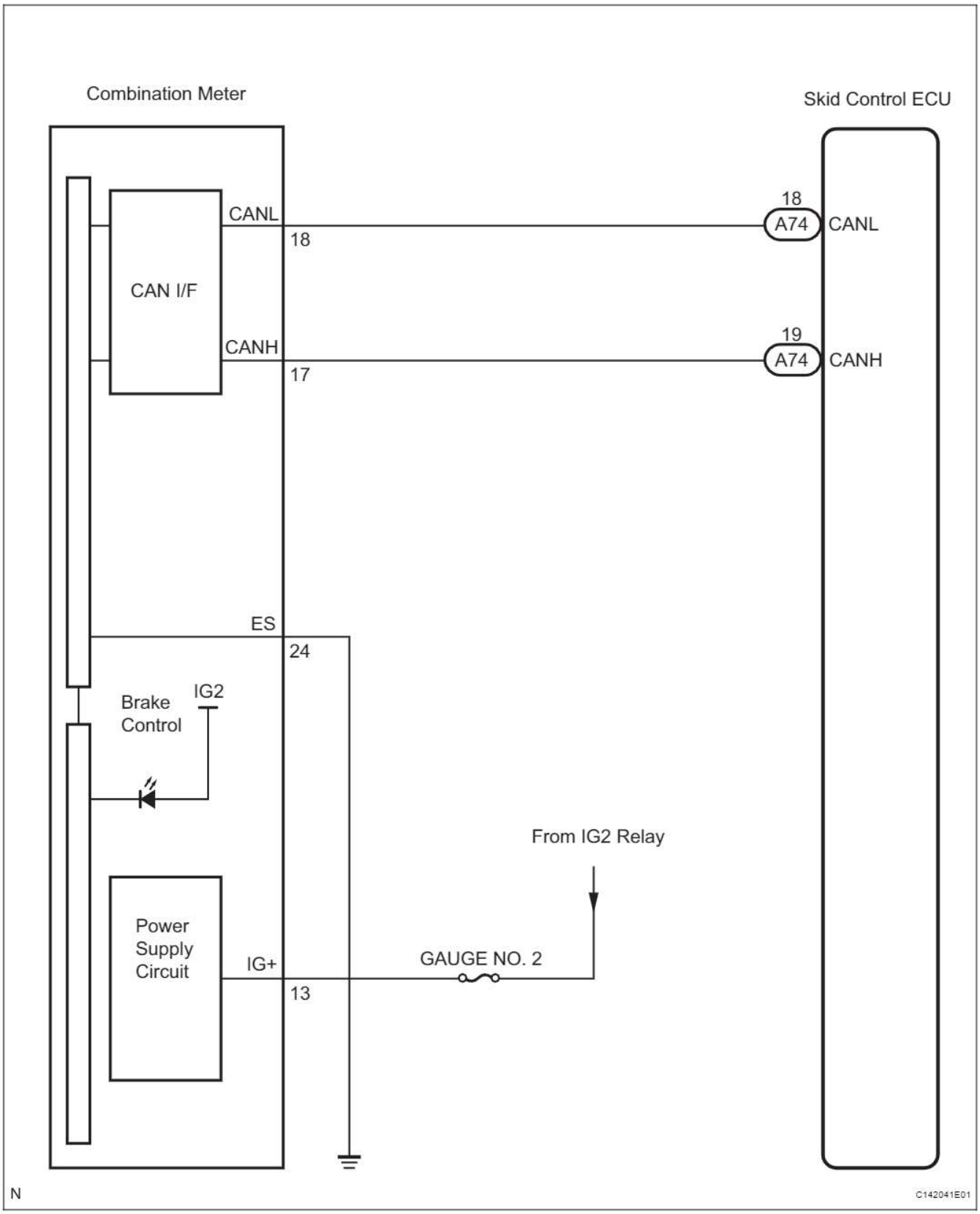
BC

Brake Control Warning Light Remains ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.
If the ECU stores a DTC, the brake control warning light comes on in the combination meter.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

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

B → INSPECT CAN COMMUNICATION SYSTEM

A

2	CHECK IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

(a) Check if the skid control ECU connector is securely connected.
OK:
The connector should be securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

3	CHECK AUXILIARY BATTERY

(a) Check the auxiliary battery voltage.
Standard voltage:
11 to 14 V

NG → CHARGE OR REPLACE AUXILIARY BATTERY

OK

BC

4	INSPECT COMBINATION METER ASSEMBLY

(a) Perform Active Test of the combination meter (meter CPU) using the intelligent tester (See page ME-30).
OK:
The brake control warning light turns on or off in accordance with the intelligent tester.

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table refer back to the table and proceed to the next step before replacing the part (See page BC-46).

NG → REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE SKID CONTROL ECU

BC

Brake Control Warning Light does not Come ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.
If the ECU stores a DTC, the brake control warning light comes on in the combination meter.

WIRING DIAGRAM

Refer to Brake Control Warning Light Remains ON (See page BC-237).

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

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

B → INSPECT CAN COMMUNICATION SYSTEM

A

2	CHECK BRAKE CONTROL WARNING LIGHT

(a) Connect the intelligent tester to the DLC3.
(b) Turn the power switch on (READY).
(c) Select "ECB* WARN LAMP" in the Active Test and operate the brake control warning light using the intelligent tester.

ABS / VSC:

Tester Display	Test Part	Control Range	Diagnostic Note
ECB* WARN LAMP	Brake control warning light	Warning light ON / OFF	Observe combination meter

*: Electronically Controlled Brake

(d) Check that "ON" and "OFF" of the brake control warning light are indicated on the combination meter when using the intelligent tester.

OK:

The brake control warning light turns on or off in accordance with the intelligent tester.

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

OK → REPLACE SKID CONTROL ECU

BC

NG

3	INSPECT COMBINATION METER ASSEMBLY

(a) Turn the power switch off.
(b) Perform Active Test of the combination meter (meter CPU) using the intelligent tester (See page ME-30).
OK:
The brake control warning light turns on or off in accordance with the intelligent tester.
HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE SKID CONTROL ECU

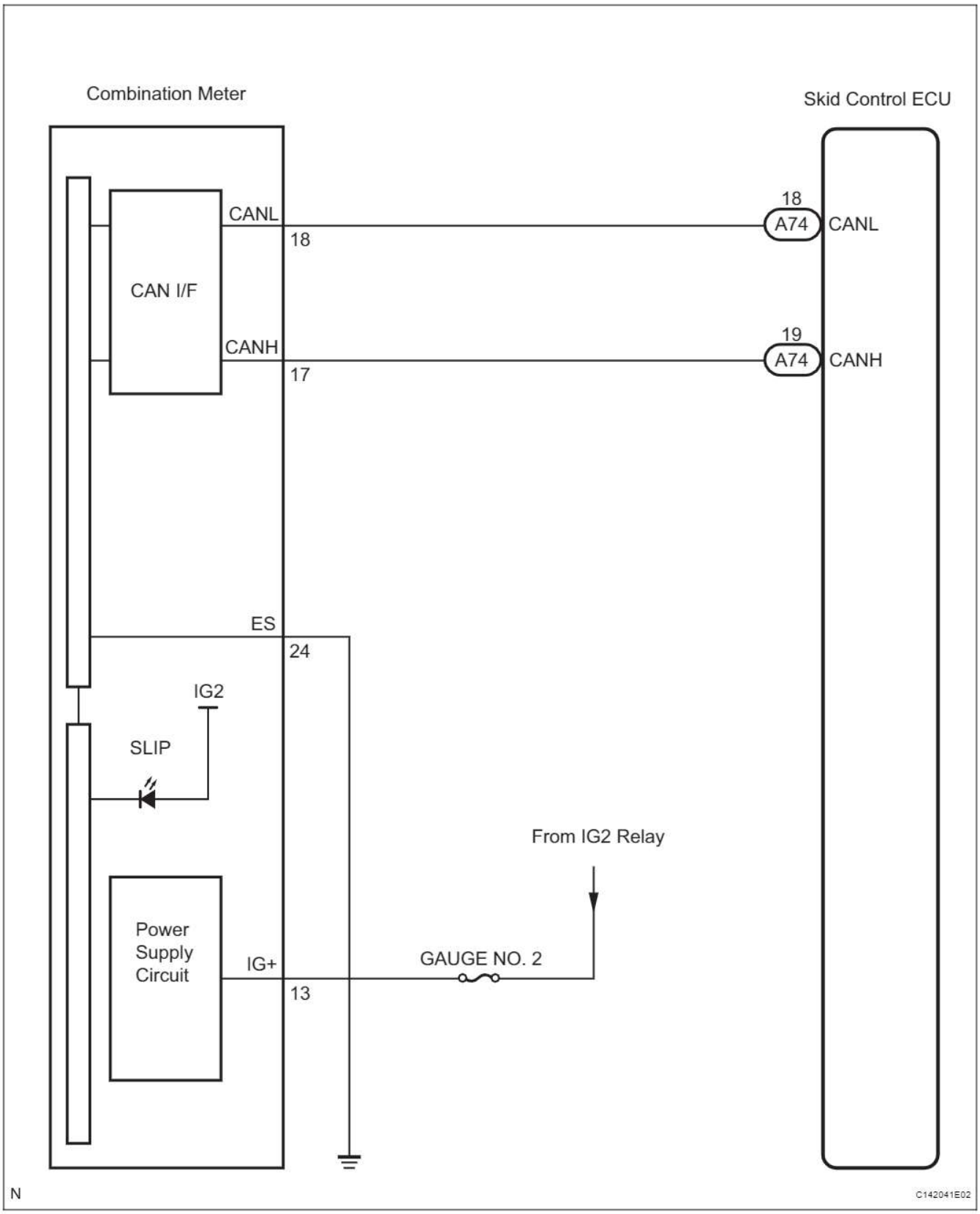
BC

Slip Indicator Light Remains ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.
The SLIP indicator blinks during VSC and/or TRAC operation.
When the system fails, the SLIP indicator comes on to warn the driver (See page BC-54).

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

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

B → INSPECT CAN COMMUNICATION SYSTEM

A

2	CHECK IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

(a) Check if the skid control ECU connector is securely connected.
OK:
The connector should be securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

3	CHECK AUXILIARY BATTERY

(a) Check the auxiliary battery voltage.
Standard voltage:
11 to 14 V

NG → CHARGE OR REPLACE AUXILIARY BATTERY

OK

BC

4	INSPECT COMBINATION METER ASSEMBLY

(a) Perform Active Test of the combination meter (meter CPU) using the intelligent tester (See page ME-30).
OK:
The SLIP indicator light turns on or off in accordance with the intelligent tester.

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

NG → REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE SKID CONTROL ECU

BC

Slip Indicator Light does not Come ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.
The SLIP indicator blinks during VSC and/or TRAC operation.
When the system fails, the SLIP indicator comes on to warn the driver (See page BC-54).

WIRING DIAGRAM

Refer to Slip Indicator Light Remains ON (See page BC-243).

INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1 CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

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

B → INSPECT CAN COMMUNICATION SYSTEM

A

2 CHECK SLIP INDICATOR LIGHT

(a) Connect the intelligent tester to the DLC3.
(b) Turn the power switch on (READY).
(c) Select "SLIP INDI LAMP" in the Active Test and operate the SLIP indicator light using the intelligent tester.

ABS / VSC:

Tester Display	Test Part	Control Range	Diagnostic Note
SLIP INDI LAMP	SLIP indicator light	Indicator light ON / OFF	Observe combination meter

(d) Check that "ON" and "OFF" of the SLIP indicator light are indicated on the combination meter when using the intelligent tester.
OK:
The SLIP indicator light turns on or off in accordance with the intelligent tester.
HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

OK → REPLACE SKID CONTROL ECU

BC

NG

3	INSPECT COMBINATION METER ASSEMBLY

(a) Turn the power switch off.
(b) Perform Active Test of the combination meter (meter CPU) using the intelligent tester (See page ME-30).
OK:
The SLIP indicator light turns on or off in accordance with the intelligent tester.
HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE SKID CONTROL ECU

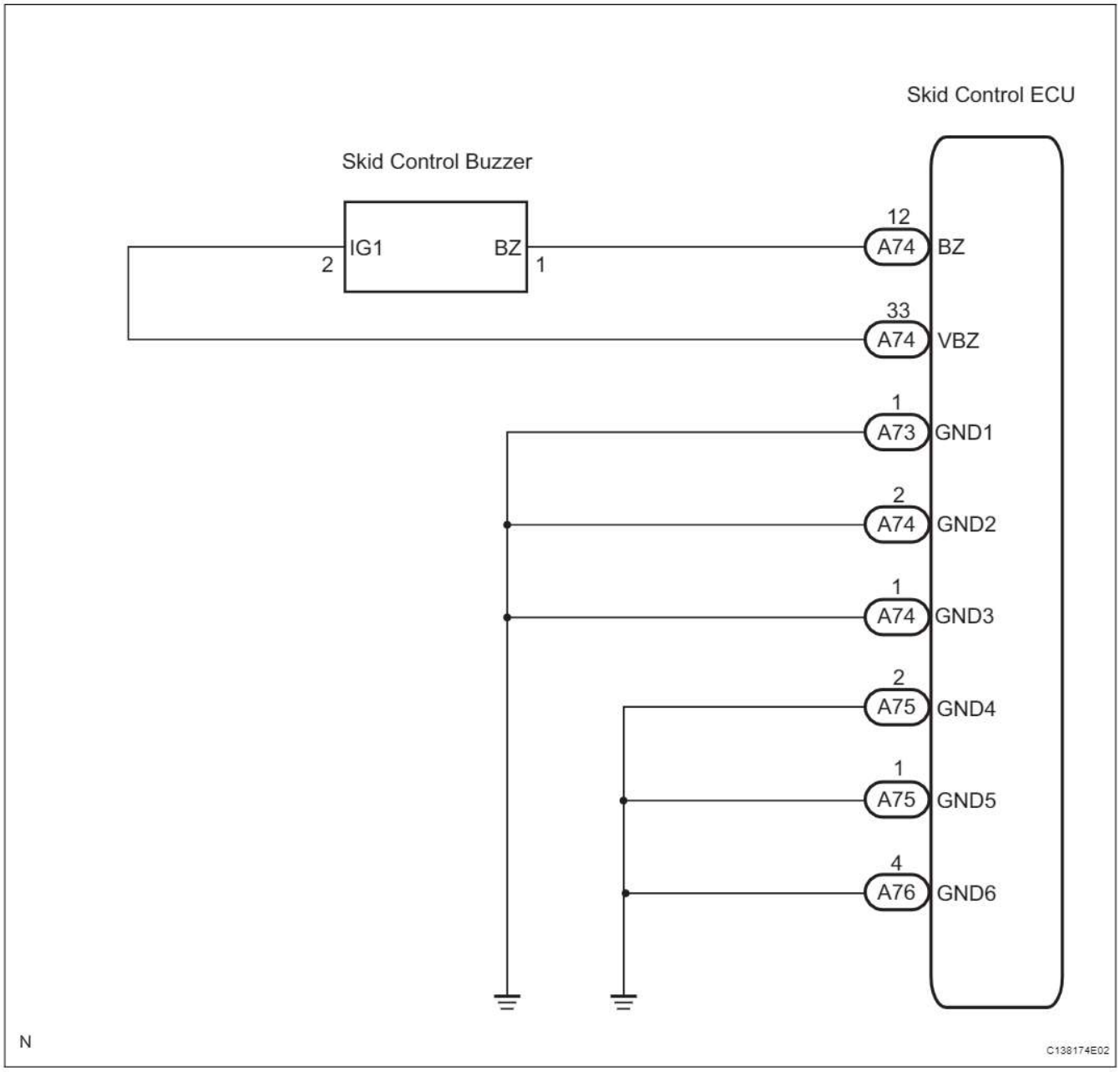
BC

Skid Control Buzzer Circuit

DESCRIPTION

The skid control buzzer sounds while the accumulator pressure is abnormally low or when an abnormality causing low fluid pressure occurs, and then the VSC is activated.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

BC

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

(a) Connect the intelligent tester to the DLC3.
(b) Turn the power switch on (READY).
(c) Select the Active Test mode on the intelligent tester.

ABS / VSC:

Tester Display	Test Part	Control Range	Diagnostic Note
BUZZER	Skid control buzzer	Buzzer ON / OFF	Buzzer can be heard

(d) Check that the buzzer sounds/stops when turning the skid control buzzer on/off by using the intelligent tester.

Result

Condition	Proceed to
Buzzer does not sound or sounds constantly	A
Buzzer sounds/stops	B

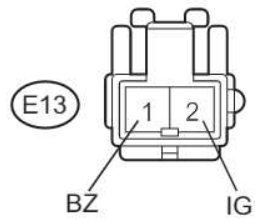
HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step (See page BC-46).

B → END

A

2	INSPECT SKID CONTROL BUZZER (POWER SOURCE TERMINAL)

Skid Control Buzzer Harness Side Connector Front View:



H

C143346E01

(a) Turn the power switch off.
(b) Disconnect the skid control buzzer connector.
(c) Turn the power switch on (IG).
(d) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
E13-2 - Body ground	Power switch on (IG)	10 to 14 V

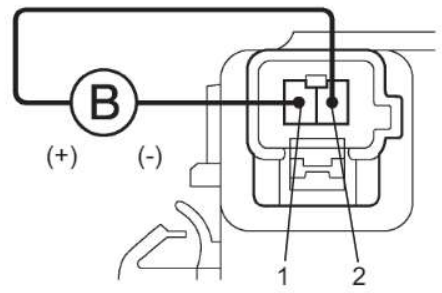
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK

BC

3	INSPECT SKID CONTROL BUZZER

Skid Control Buzzer:



(a) Apply battery negative voltage to terminal 1, and battery positive voltage to terminal 2 of the skid control buzzer, and then check that the buzzer sounds.

OK:

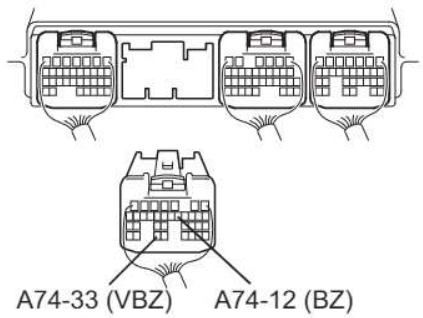
The skid control buzzer sounds.

NG → **REPLACE SKID CONTROL BUZZER**

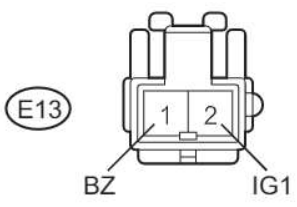
OK

4	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - SKID CONTROL BUZZER)

Skid Control ECU Wire Harness View:



Skid Control Buzzer Harness Side Connector Front View:



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

Standard resistance

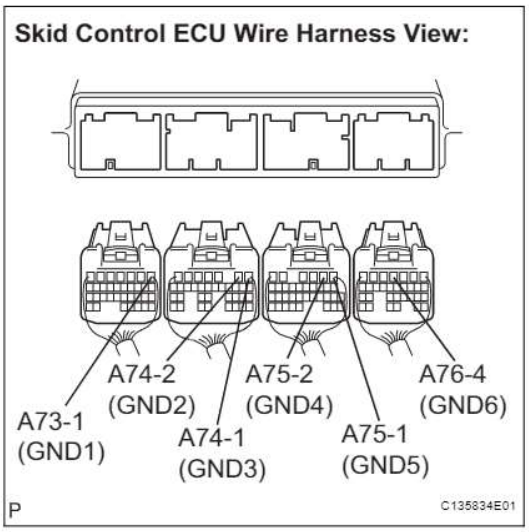
Tester Connection	Condition	Specified Condition
A74-12 (BZ) - E13-1 (BZ)	Always	Below 1 Ω
A74-12 (BZ) - Body ground	Always	10 kΩ or higher
A74-33 (VBZ) - E13-2 (IG1)	Always	Below 1 Ω
A74-33 (VBZ) - Body ground	Always	10 kΩ or higher

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

OK

BC

5	INSPECT SKID CONTROL ECU (GND TERMINAL)



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

Standard resistance

Tester Connection	Condition	Specified Condition
A73-1 (GND1) - Body ground	Always	Below 1 Ω
A74-2 (GND2) - Body ground	Always	Below 1 Ω
A74-1 (GND3) - Body ground	Always	Below 1 Ω
A75-2 (GND4) - Body ground	Always	Below 1 Ω
A75-1 (GND5) - Body ground	Always	Below 1 Ω
A76-4 (GND6) - Body ground	Always	Below 1 Ω

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

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

OK

REPLACE SKID CONTROL ECU

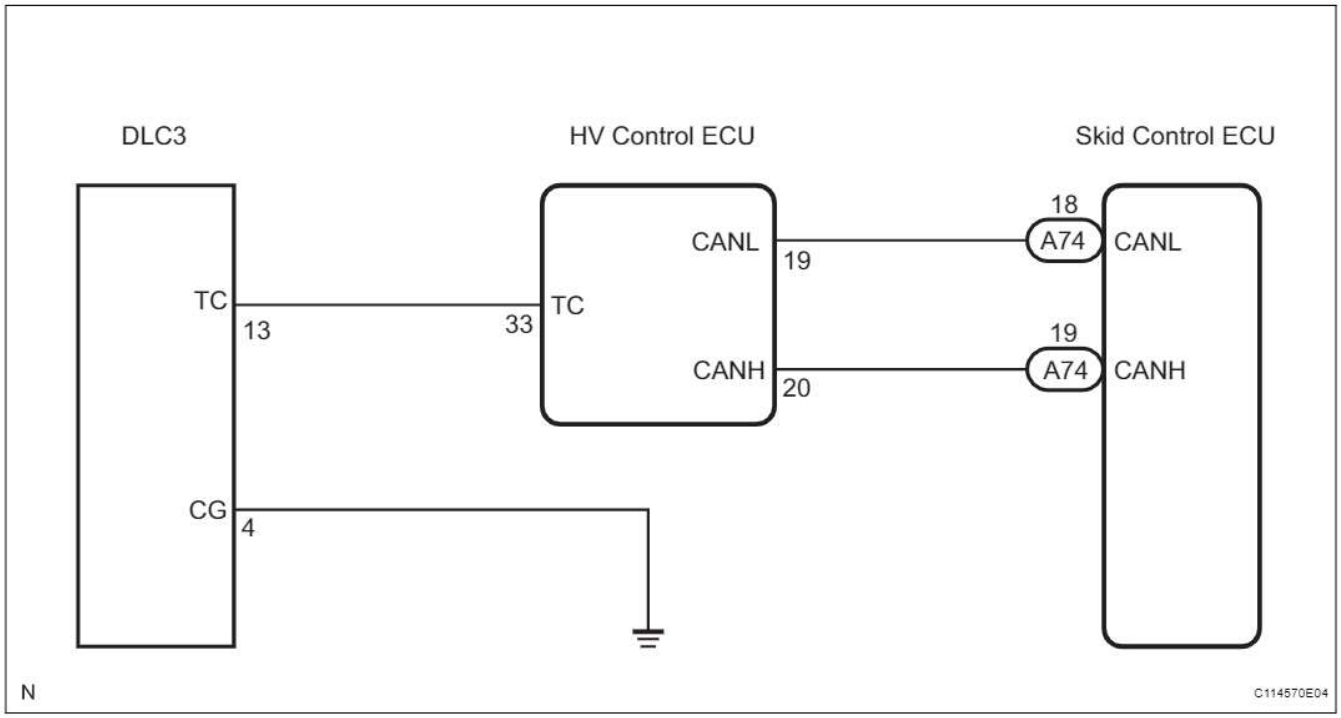
BC

TC and CG Terminal Circuit

DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

1	CHECK CAN COMMUNICATION SYSTEM

(a) Check if the CAN communication system DTC is output (See page CA-22).

Result

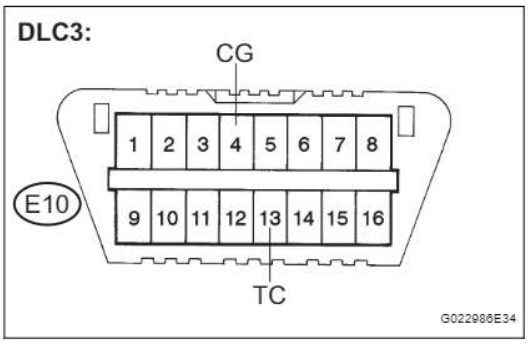
Condition	Proceed to
DTC is not output	A
DTC is output	B

B → INSPECT CAN COMMUNICATION SYSTEM

A

BC

2 INSPECT DLC3



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

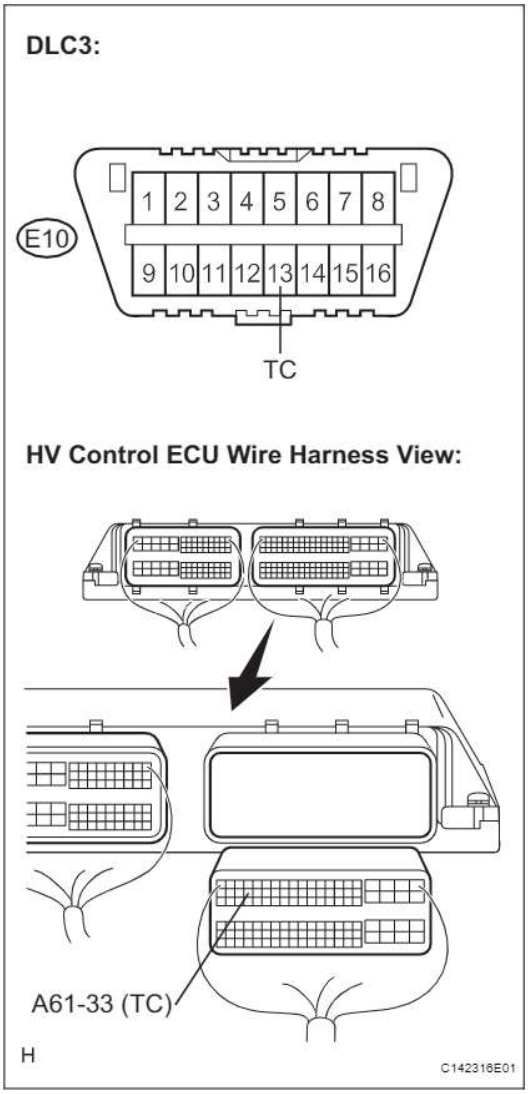
Standard voltage

Tester Connection	Condition	Specified Condition
E10-13 (TC) - E10-4 (CG)	Power switch on (IG)	10 to 14 V

OK → Go to step 5

NG

3 CHECK HARNESS AND CONNECTOR (TC of DLC3 - HV CONTROL ECU)



(a) Turn the power switch off.
(b) Disconnect the HV control ECU connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

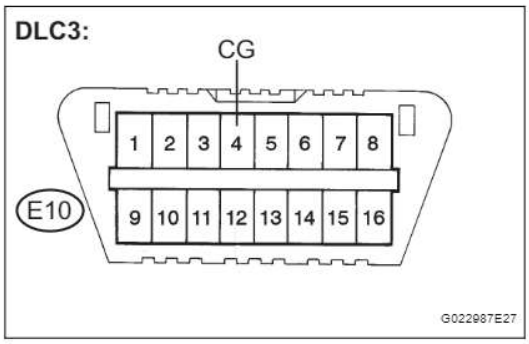
Tester Connection	Condition	Specified Condition
E10-13 (TC) - A61-33 (TC)	Always	Below 1 Ω
E10-13 (TC) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

BC

4	CHECK HARNESS AND CONNECTOR (CG of DLC3 - BODY GROUND)



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

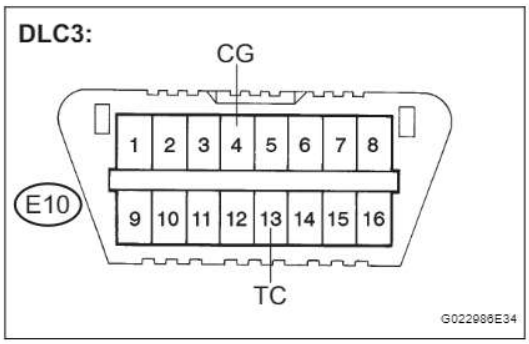
Standard resistance

Tester Connection	Condition	Specified Condition
E10-4 (CG) - Body ground	Always	Below 1 Ω

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

OK

5	CHECK HV CONTROL ECU (TC of DLC3 INPUT)



(a) Turn the power switch off.
(b) Reconnect the HV control ECU connector.
(c) Using the SST, connect terminals TC and CG of the DLC3.
(d) Turn the power switch on (IG).
(e) Check that the check engine warning light is blinking.

Result

Condition	Proceed to
Check engine warning light is blinking	A
Check engine warning light is not blinking	B

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

B → **REPAIR OR REPLACE WIRE HARNESS OR HV CONTROL ECU (TC of HV CONTROL ECU CIRCUIT)**

BC

A

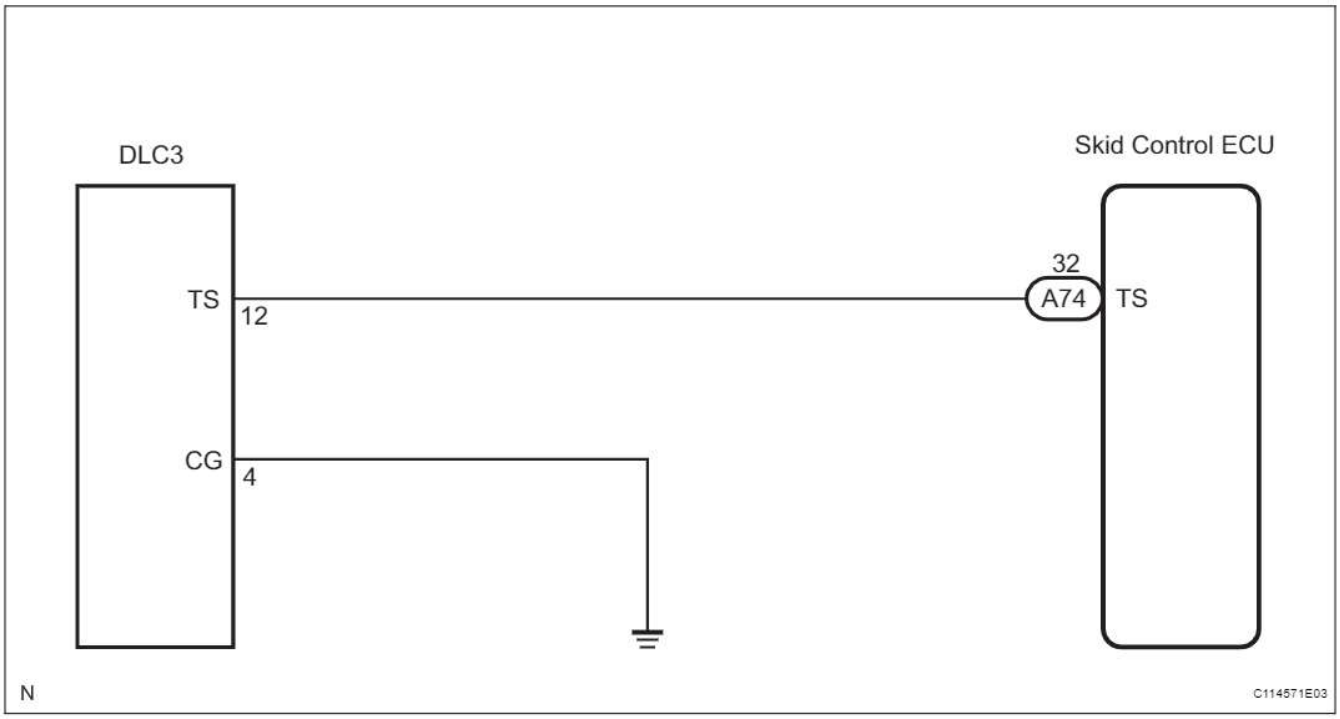
REPLACE SKID CONTROL ECU

TS and CG Terminal Circuit

DESCRIPTION

In the Test Mode (signal check), a malfunction of the speed sensor that cannot be detected when the vehicle is stopped can be detected while driving.
Transition to the sensor check mode can be performed by connecting terminals TS and CG of the DLC3 and turning the power switch from off to on (IG).

WIRING DIAGRAM

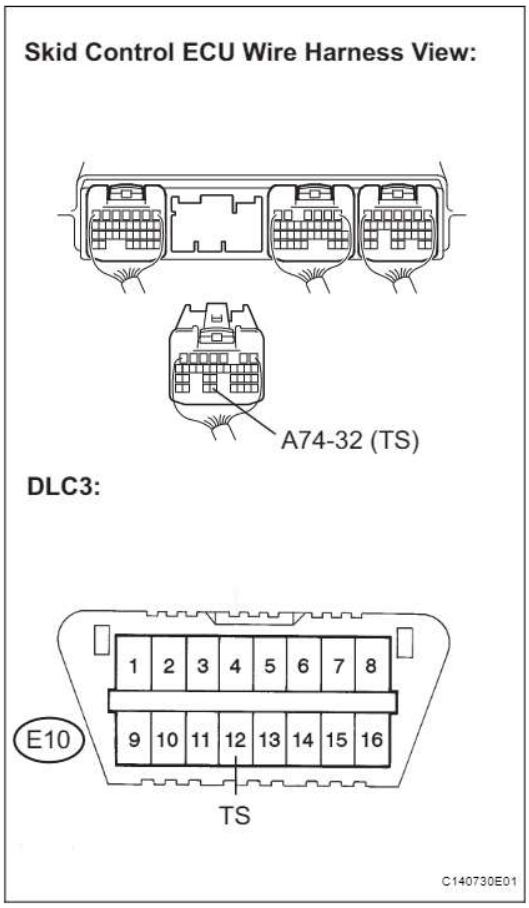


INSPECTION PROCEDURE

NOTICE:
When replacing the skid control ECU, perform initialization of linear solenoid valve and calibration (See page BC-25).

BC

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



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

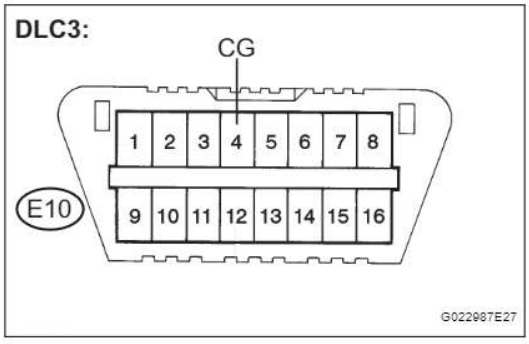
Standard resistance

Tester Connection	Condition	Specified Condition
A74-32 (TS) - E10-12 (TS)	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

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



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

Standard resistance

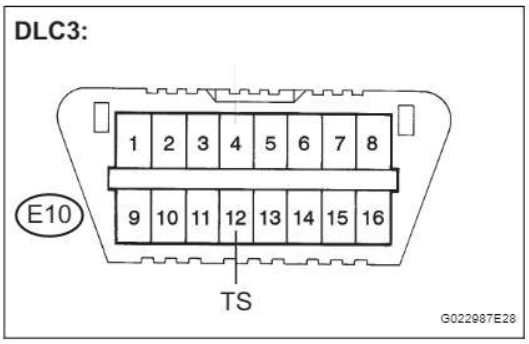
Tester Connection	Condition	Specified Condition
E10-4 (CG) - Body ground	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

BC

3	CHECK HARNESS AND CONNECTOR (TS of DLC3 - BODY GROUND)



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

Standard resistance

Tester Connection	Condition	Specified Condition
E10-12 (TS) - Body ground	Always	10 kΩ or higher

HINT:
If troubleshooting has been carried out according to the Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part (See page BC-46).

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

OK

REPLACE SKID CONTROL ECU

BC

ON-VEHICLE INSPECTION

1. INSPECT BRAKE ACTUATOR ASSEMBLY OPERATION

(a) Pre-check preparation

(1) Move the shift lever to the P position. Apply the parking brake and connect the intelligent tester to the DLC3.

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

(3) Turn on the intelligent tester. Select "MAS CYL PRS 1", "MAS CYL PRS 2", "FR PRESS SENS", "FL PRESS SENS", "RR PRESS SENS" and "RL PRESS SENS".

(b) Check the FR system solenoids (SLA**, SLR**, SMC1, SMC2).

(1) Select "SLAFR CLASE". → Enter and check the output voltage.

NOTICE:

Do not depress the brake pedal.

HINT:

- It takes approximately 35 seconds to complete the check.
- If incorrect, troubleshoot the brake system. (See page BC-46)

Standard voltage

Sensor	10 to 20 sec. after check start (V)	35 sec. or more after check start (V)
MAS CYL PRS 1	0.3 to 0.7	0.3 to 0.7
MAS CYL PRS 2	0.3 to 0.7	0.3 to 0.7
FR PRESS SENS	2.5 to 4.5	0.3 to 0.7
FL PRESS SENS	0.3 to 0.7	0.3 to 0.7
RR PRESS SENS	0.3 to 0.7	0.3 to 0.7
RL PRESS SENS	0.3 to 0.7	0.3 to 0.7

(c) Check the FL system solenoids (SLA**, SLR**, SMC1, SMC2).

(1) Select "SLAFL CLOSE". → Enter and check the output voltage.

NOTICE:

Do not depress the brake pedal.

HINT:

- It takes approximately 35 seconds to complete the check.
- If incorrect, troubleshoot the brake system. (See page BC-46)

BC

Standard voltage

Sensor	10 to 20 sec. after check start (V)	35 sec. or more after check start (V)
MAS CYL PRS 1	0.3 to 0.7	0.3 to 0.7
MAS CYL PRS 2	0.3 to 0.7	0.3 to 0.7
FR PRESS SENS	0.3 to 0.7	0.3 to 0.7
FL PRESS SENS	2.5 to 4.5	0.3 to 0.7
RR PRESS SENS	0.3 to 0.7	0.3 to 0.7
RL PRESS SENS	0.3 to 0.7	0.3 to 0.7

(d) Check the RR system solenoids (SLA**, SLR**, SMC1, SMC2).
(1) Select "SLARR CLOSE". → Enter and check the output voltage.
NOTICE:
Do not depress the brake pedal.
HINT:
- It takes approximately 35 seconds to complete the check.
- If incorrect, troubleshoot the brake system. (See page BC-46)

Standard voltage

Sensor	10 to 20 sec. after check start (V)	35 sec. or more after check start (V)
MAS CYL PRS 1	0.3 to 0.7	0.3 to 0.7
MAS CYL PRS 2	0.3 to 0.7	0.3 to 0.7
FR PRESS SENS	0.3 to 0.7	0.3 to 0.7
FL PRESS SENS	0.3 to 0.7	0.3 to 0.7
RR PRESS SENS	2.5 to 4.5	0.3 to 0.7
RL PRESS SENS	0.3 to 0.7	0.3 to 0.7

(e) Check the RL system solenoids (SLA**, SLR**, SMC1, SMC2).
(1) Select "SLAFL CLOSE". → Enter and check the output voltage.
NOTICE:
Do not depress the brake pedal.
HINT:
- It takes approximately 35 seconds to complete the check.
- If incorrect, troubleshoot the brake system. (See page BC-46)

Standard voltage

Sensor	10 to 20 sec. after check start (V)	35 sec. or more after check start (V)
MAS CYL PRS 1	0.3 to 0.7	0.3 to 0.7
MAS CYL PRS 2	0.3 to 0.7	0.3 to 0.7
FR PRESS SENS	0.3 to 0.7	0.3 to 0.7
FL PRESS SENS	0.3 to 0.7	0.3 to 0.7
RR PRESS SENS	0.3 to 0.7	0.3 to 0.7
RL PRESS SENS	2.5 to 4.5	0.3 to 0.7

(f) Check SMC1 and SMC2.
(1) Select "ELECTRONICALLY CONTROLLED BRAKE SYSTEM INVALID" on the intelligent tester menu screen to prohibit the brake control.
(2) Check that the brake control warning light comes on.
(3) Check the output voltage by depressing the brake pedal.
Standard voltage:
Difference in the output voltage between "MAS CYL PRS 1" and "FR PRESS SENS" is less than 0.4 V.

BC

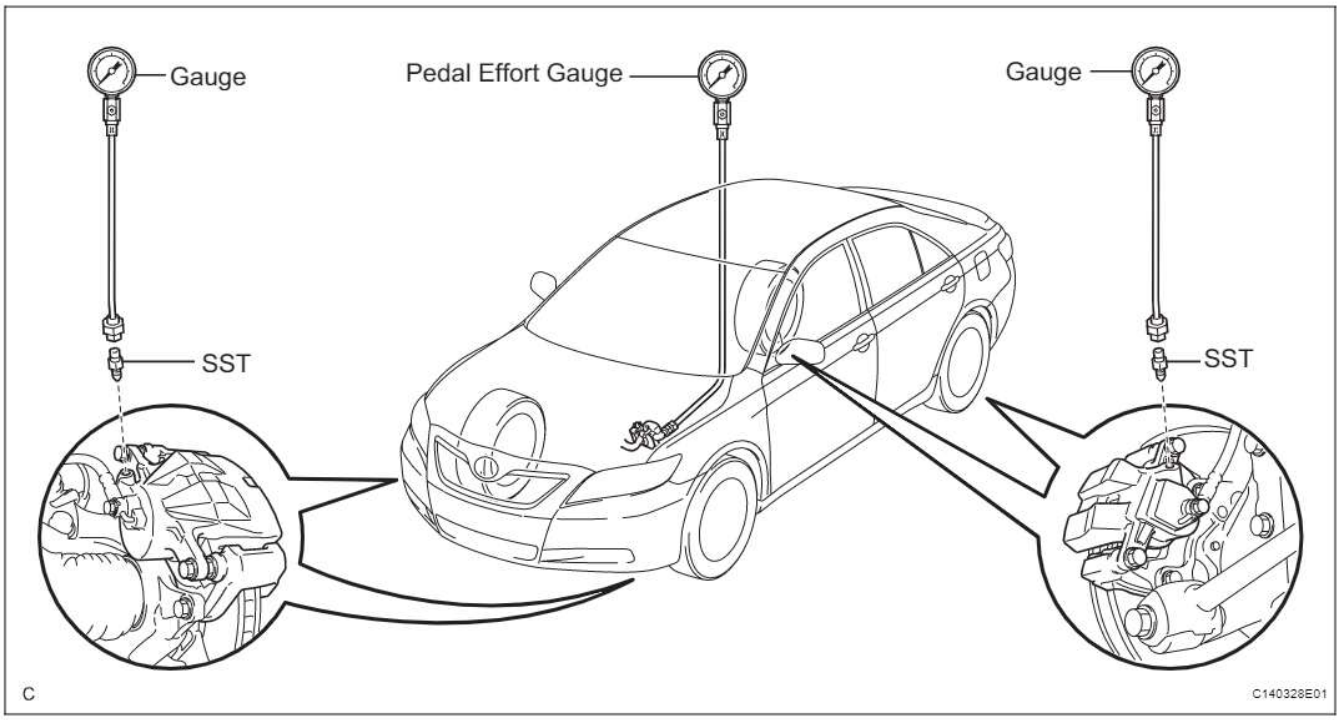
Standard Voltage:
Difference in the output voltage between "MAS CYL PRS 2" and "FL PRESS SENS" is less than 0.4 V.

(4) Press the return key on the intelligent tester and cancel brake control prohibition (ELECTRONICALLY CONTROLLED BRAKE SYSTEM INVALID).

2. INSPECT PRESSURE SENSOR OPERATION

(a) Check the battery voltage.
Standard voltage:
10 to 14 V (when the engine is not running and the power switch is off)

(b) Connect the LSPV pressure gauge (SST) and pedal effort gauge.
(1) Install the hydro LSPV gauge (SST) and brake pedal effort gauge.
SST 09709-29018



BC

(2) Bleed the air from the hydro booster pressure gauge.
(3) Move the shift lever to the P position. Connect the intelligent tester to the DLC3 with the parking brake applied.
(4) Turn the power switch on (IG).
(5) Clear the DTCs.

(c) Check the wheel cylinder pressure sensor and master pressure sensor.
(1) Turn on the intelligent tester. Select "MAS CYL PRS 1", "MAS CYL PRS 2", "FR PRESS SENS", "FL PRESS SENS", "RR PRESS SENS", and "RL PRES SENS".

(2) Check the brake pedal effort gauge, hydro booster pressure gauge reading, and output pressure voltage. If incorrect, troubleshoot the brake system. (See page BC-46)

Standard voltage

Brake effort {N (kgf, lbf)}	MAS CYL PRS 1 (V)	MAS CYL PRS 2 (V)
200 (20.4, 45)	0.85 to 1.15	0.85 to 1.15
500 (51, 112)	1.85 to 2.15	1.85 to 2.15

Standard voltage

Brake effort {N (kgf, lbf)}	Front right wheel hydraulic pressure {MPa (kgf/cm^2, psi)}	FR PRESS SENS (V)
50 (5.1, 11)	2.4 (24.5, 348)	0.85 to 1.15
100 (10.2, 22)	5.0 (51.0, 725)	1.35 to 1.65
150 (15.3, 34)	5.0 (51.0, 725)	1.35 to 1.65
200 (20.4, 45)	5.1 (52.0, 740)	1.4 to 1.7

Standard voltage

Brake effort {N (kgf, lbf)}	Front left wheel hydraulic pressure {MPa (kgf/cm^2, psi)}	FL PRESS SENS (V)
50 (5.1, 11)	2.4 (24.5, 348)	0.85 to 1.15
100 (10.2, 22)	5.0 (51.0, 725)	1.35 to 1.65
150 (15.3, 34)	5.0 (51.0, 725)	1.35 to 1.65
200 (20.4, 45)	5.1 (52.0, 740)	1.4 to 1.7

Standard voltage

Brake effort {N (kgf, lbf)}	Rear right wheel hydraulic pressure {MPa (kgf/cm^2, psi)}	RR PRESS SENS (V)
50 (5.1, 11)	2.4 (24.5, 348)	0.85 to 1.15
100 (10.2, 22)	5.0 (51.0, 725)	1.35 to 1.65
150 (15.3, 34)	5.0 (51.0, 725)	1.35 to 1.65
200 (20.4, 45)	5.0 (51.0, 725)	1.35 to 1.65

Standard voltage

Brake effort {N (kgf, lbf)}	Rear left wheel hydraulic pressure {MPa (kgf/cm^2, psi)}	RL PRESS SENS (V)
50 (5.1, 11)	2.4 (24.5, 348)	0.85 to 1.15
100 (10.2, 22)	5.0 (51.0, 725)	1.35 to 1.65
150 (15.3, 34)	5.0 (51.0, 725)	1.35 to 1.65
200 (20.4, 45)	5.0 (51.0, 725)	1.35 to 1.65

(d) Check the accumulator (ACC) pressure sensor.
(1) Move the shift lever to the P position. Apply the parking brake and connect the intelligent tester to the DLC3.
(2) Turn the power switch on (IG).
(3) Turn on the intelligent tester. Select the accumulator (ACC) pressure sensor 1 (ACC PRESS SENS) in the data list.

BC

(4) Temporarily operate the pump motor by depressing the brake pedal 4 or 5 times.
(5) After confirming that the pump motor stops, check the pressure output voltage.
Standard voltage:
2.6 to 3.8 V
If incorrect, troubleshoot the brake system.
(See page BC-46)

BC

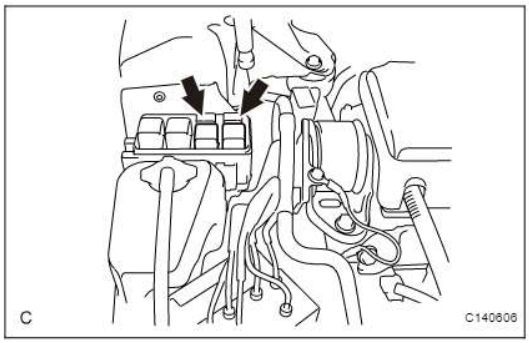
REMOVAL

NOTICE:
If brake fluid spills on any painted surface, wash or otherwise remove it completely.

1. **PERFORM ACCUMULATOR PRESSURE ZERO DOWN (See page BR-12)**

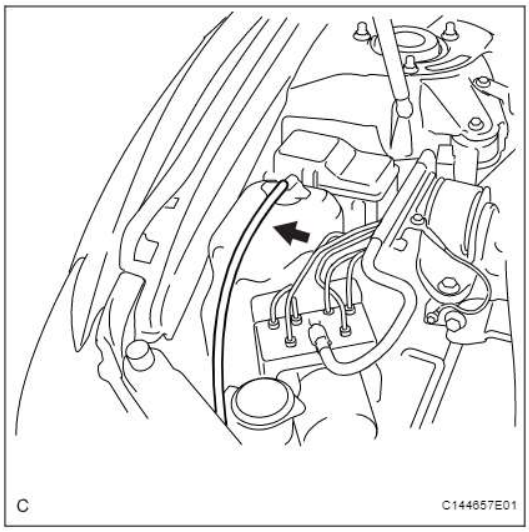
2. **DISCONNECT CABLE FROM BATTERY NEGATIVE TERMINAL**

3. **REMOVE ABS MOTOR RELAY**

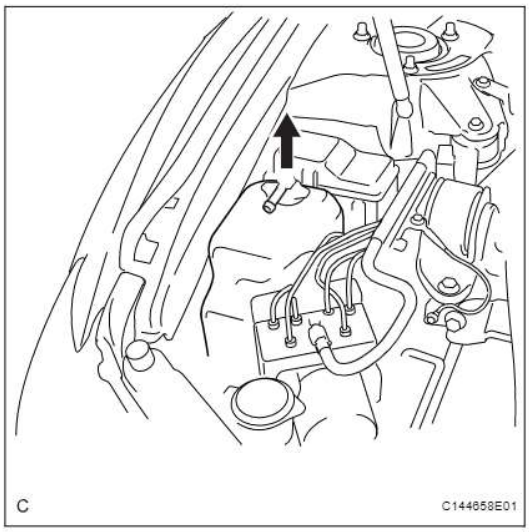


(a) In order to prohibit brake control, remove the 2 ABS motor relays with the power switch off.
NOTICE:
If the pump motor operates while air remains inside the brake actuator hose, the air will enter the actuator, resulting in difficulty in bleeding the brakes.

4. **REMOVE RADIATOR RESERVE TANK ASSEMBLY**

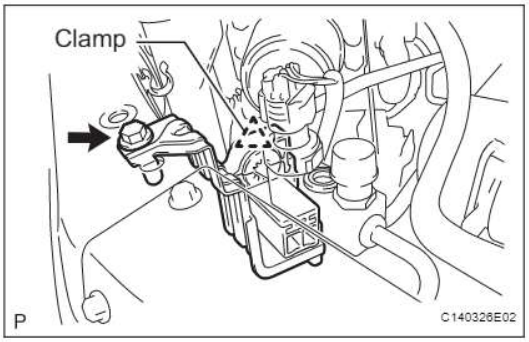


(a) Remove the radiator reservoir hose.



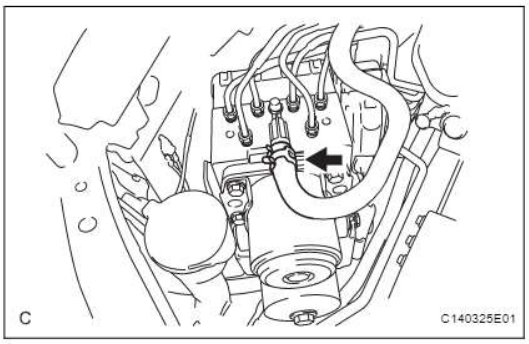
(b) Remove the radiator reserve tank assembly.

BC



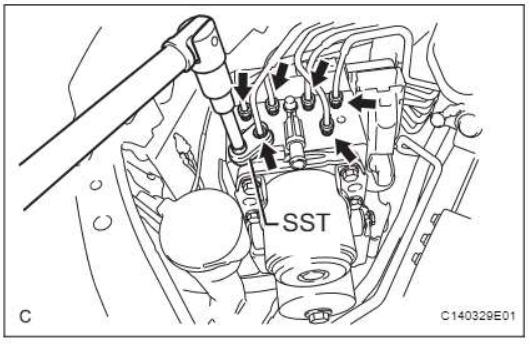
5. REMOVE COOLER BRACKET

(a) Remove the bolt, clamp and the cooler bracket.

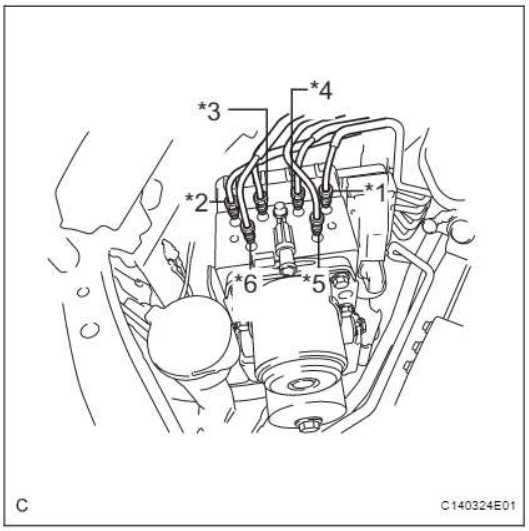


6. REMOVE BRAKE ACTUATOR WITH NO. 1 BRAKE ACTUATOR BRACKET

(a) Move the clip and disconnect the brake actuator hose from the brake actuator with No. 1 brake actuator bracket.

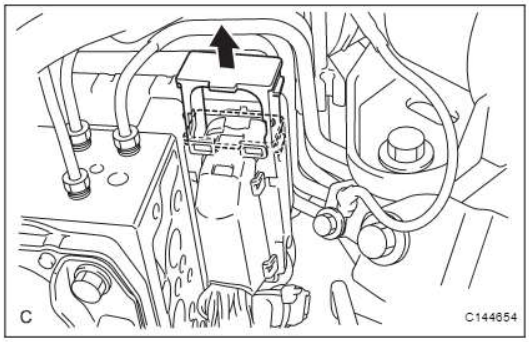


(b) Using SST, disconnect the 6 brake lines from the brake actuator with No. 1 brake actuator bracket.
SST 09023-00101

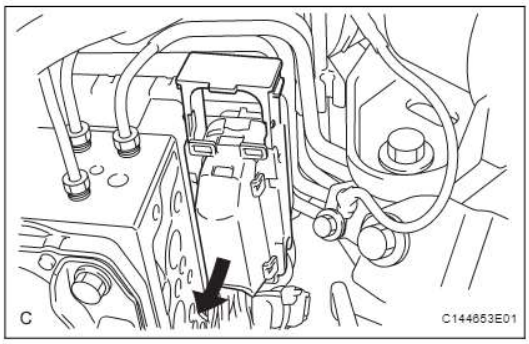


(c) Use tags or make a memo to identify the places to reconnect.
HINT:
- *1: To Front Wheel Cylinder RH
- *2: To Front Wheel Cylinder LH
- *3: To Rear Wheel Cylinder RH
- *4: To Rear Wheel Cylinder LH
- *5: From Master Cylinder
- *6: From Stroke Simulator Cylinder

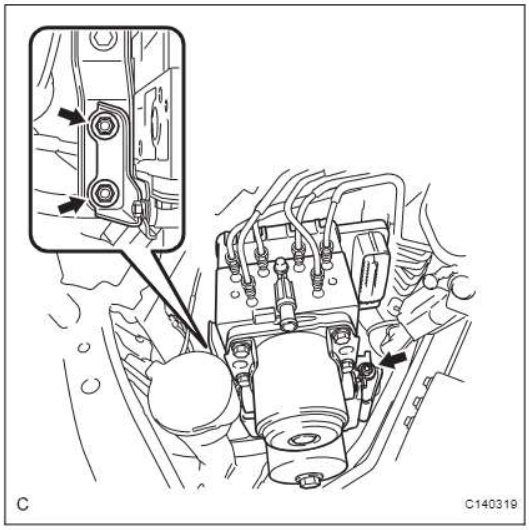
BC



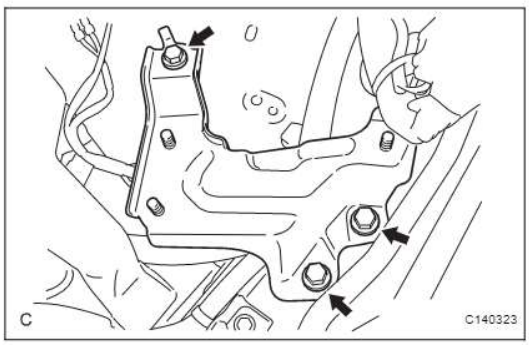
(d) Release the lock lever.



(e) Disconnect the actuator connector.



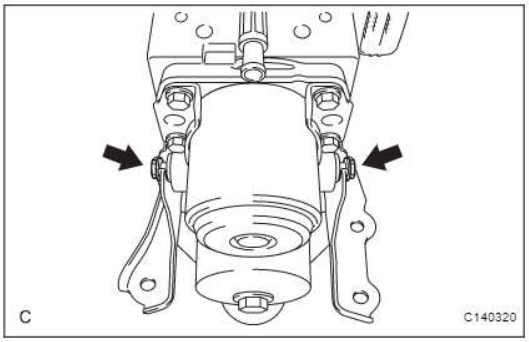
(f) Remove the 3 nuts and brake actuator with No. 1 brake actuator bracket.
NOTICE:
Do not damage the brake lines.



7. REMOVE BRAKE ACTUATOR BRACKET ASSEMBLY

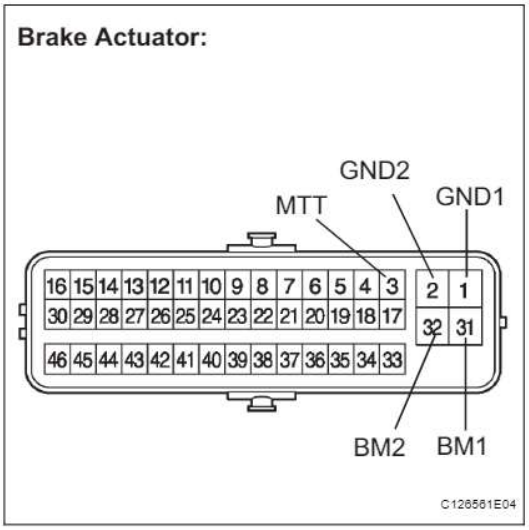
(a) Remove the 3 bolts and brake actuator bracket assembly.

BC



DISASSEMBLY

1. **REMOVE NO. 1 BRAKE ACTUATOR BRACKET**
   (a) Remove the 2 nuts and brake actuator assembly from the No. 1 brake actuator bracket.

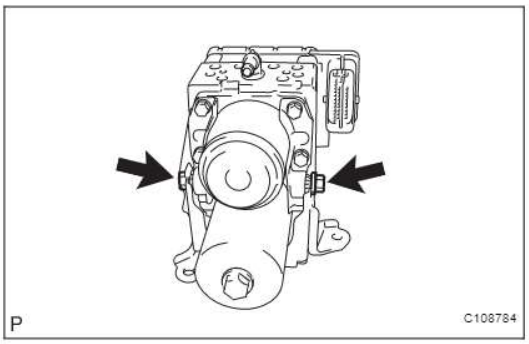


INSPECTION

1. **INSPECT BRAKE ACTUATOR ASSEMBLY**
   (a) Measure the resistance according to the value(s) in the table below.
   Standard resistance

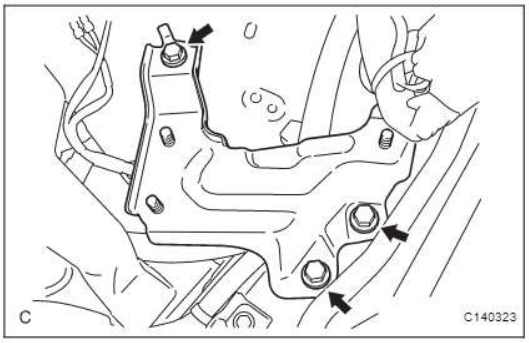
Tester Connection	Condition	Specified Condition
31 (BM1) - 1 (GND1)	Always	Below 10 Ω
32 (BM2) - 1 (GND1)	Always	Below 10 Ω
31 (BM1) - 32 (BM2)	Always	Below 1 Ω
1 (GND1) - 2 (GND2)	Always	Below 1 Ω
31 (BM1) - 3 (MTT)	Always	950 to 1,050 Ω
32 (BM2) - 3 (MTT)	Always	950 to 1,050 Ω

   If the value is not as specified, replace the brake actuator assembly.



REASSEMBLY

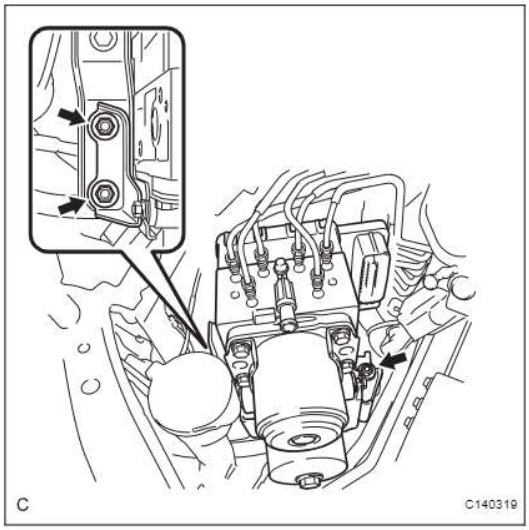
1. **INSTALL NO. 1 BRAKE ACTUATOR BRACKET**
   (a) Install the brake actuator assembly to the No. 1 brake actuator bracket with the 2 nuts.
   Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
   NOTICE:
   Do not remove the hole plug before connecting the brake line because a new brake actuator assembly is filled with brake fluid.



INSTALLATION

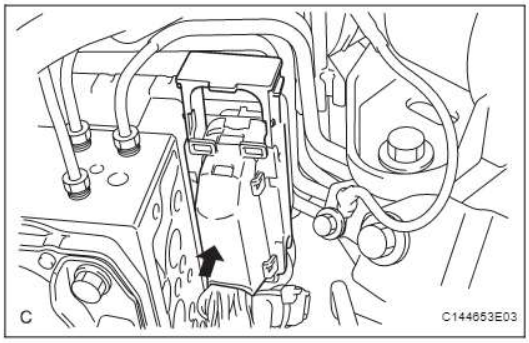
1. **INSTALL BRAKE ACTUATOR BRACKET ASSEMBLY**
   (a) Install the brake actuator bracket assembly with the 3 bolts.
   Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)

BC

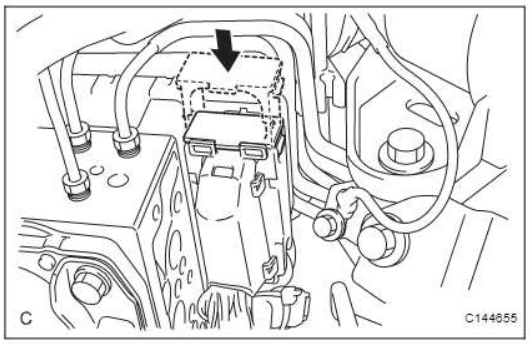


2. INSTALL BRAKE ACTUATOR WITH NO. 1 BRAKE ACTUATOR BRACKET

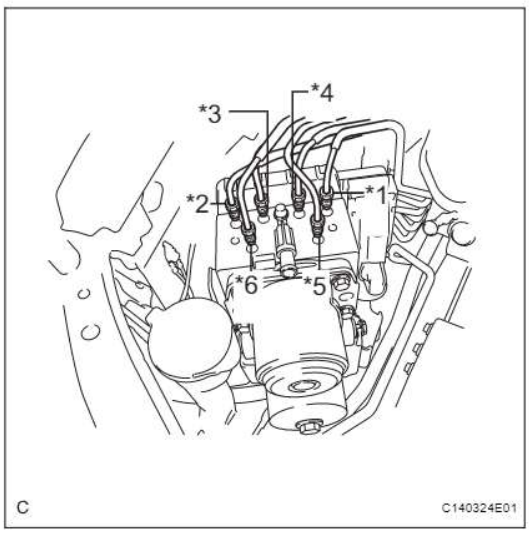
(a) Install the brake actuator with No. 1 brake actuator bracket to the body with the 3 nuts.
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)
NOTICE:
Do not damage the brake lines.



(b) Connect the brake actuator connector.

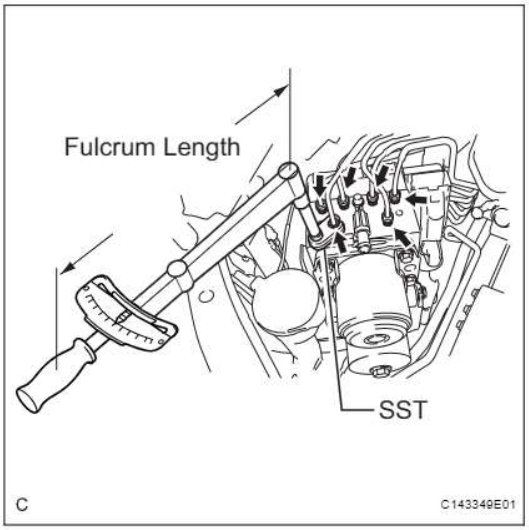


(c) Lock the lock lever.
NOTICE:
Make sure that the connector is locked securely.

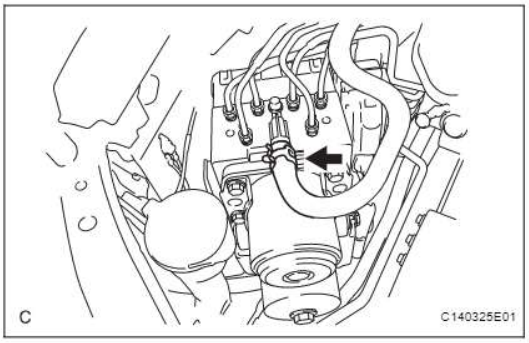


(d) Temporarily tighten each brake line to the correct positions of the brake actuator with No. 1 brake actuator bracket as shown in the illustration.
HINT:
- *1: To Front Wheel Cylinder RH
- *2: To Front Wheel Cylinder LH
- *3: To Rear Wheel Cylinder RH
- *4: To Rear Wheel Cylinder LH
- *5: From Master Cylinder
- *6: From Stroke Simulator Cylinder

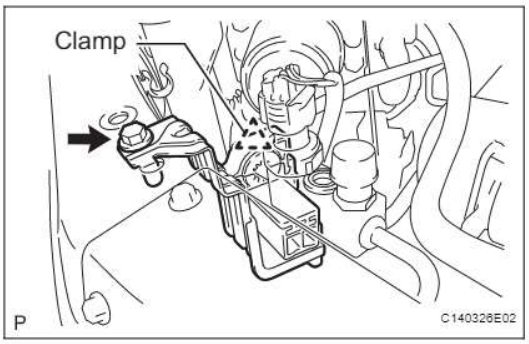
BC



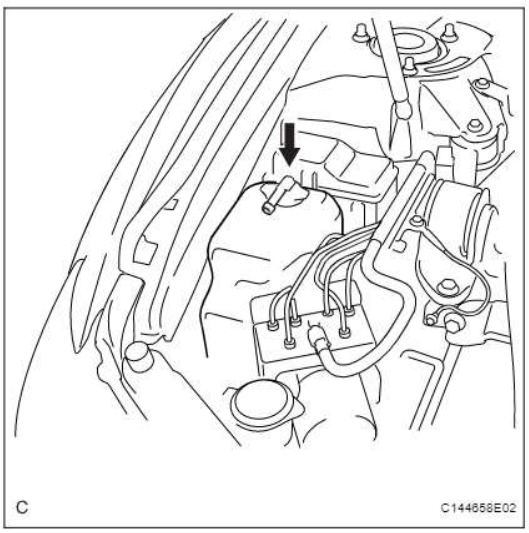
(e) Using SST, fully tighten each brake line.
SST 09023-00101
Torque: without SST
15 N*m (155 kgf*cm, 11 ft.*lbf)
with SST
14 N*m (143 kgf*cm, 10 ft.*lbf)
NOTICE:
- **Use a torque wrench with a fulcrum length of 250 mm (9.84 in.).**
- **This torque value is effective when SST is parallel to a torque wrench.**



(f) Connect the brake actuator hose to the brake actuator and move the clip.

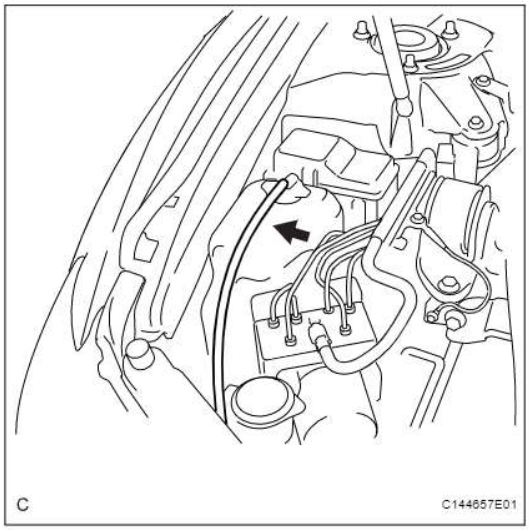


3. INSTALL COOLER BRACKET
(a) Install the cooler bracket with the bolt and clamp.
Torque: 9.8 N*m (100 kgf*cm, 87 in.*lbf)



4. INSTALL RADIATOR RESERVE TANK ASSEMBLY
(a) Install the radiator reserve tank assembly.

BC



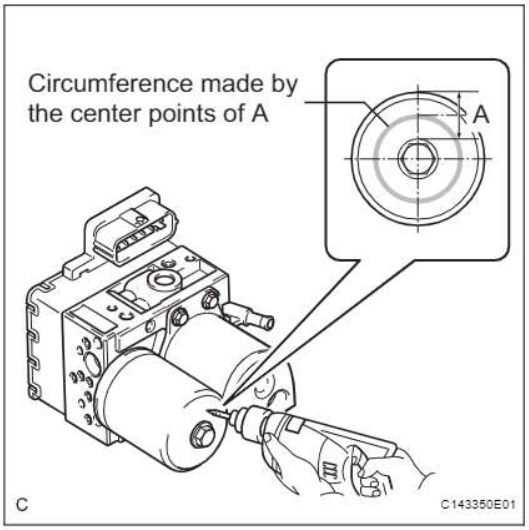
(b) Install the radiator reservoir hose.

5. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-7)**
6. **BLEED BRAKE ACTUATOR HOSE (See page BR-8)**
7. **BLEED FRONT BRAKE SYSTEM (See page BR-10)**
8. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**



9. **INSTALL ABS MOTOR RELAY**
   (a) Install the 2 ABS motor relays.
10. **CLEAR DTC FOR BRAKE CONTROL SYSTEM**
    HINT:
    Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-57)
11. **BLEED REAR BRAKE SYSTEM (See page BR-11)**
12. **PERFORM ACCUMULATOR PRESSURE ZERO DOWN (See page BR-12)**
13. **CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-13)**
14. **PERFORM LINEAR VALVE OFFSET LEARNING**
    HINT:
    Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-25)
15. **INSPECT FOR BRAKE FLUID LEAK**
16. **PERFORM INITIALIZATION**
    NOTICE:
    Some systems need initialization after reconnecting the cable to the negative battery terminal. (See page IN-43)

BC



DISPOSAL

1. DISPOSE OF BRAKE ACTUATOR ASSEMBLY

(a) Using a drill, slowly make a hole on the circumference made by the center points of A and discharge the gas.

CAUTION:

Be sure to wear protective glasses to protect the eyes from fragments that may become airborne due to high pressure.

HINT:

- The hole may be drilled up to approximately 5 to 10 mm (0.20 to 0.39 in.) away from the circumference made by the center point of A without problem.
- The gas is nitrogen, which is colorless, odorless, and harmless.

BC

INSPECTION

1. INSPECT FRONT SPEED SENSOR

(a) Inspect the front speed sensor. If any of the following occurs, replace the front speed sensor with a new one:
- The surface of the front speed sensor is cracked, dented, or chipped off.
- The connector or wire harness is scratched, cracked, or damaged.
- The front speed sensor has been dropped.

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

Standard resistance

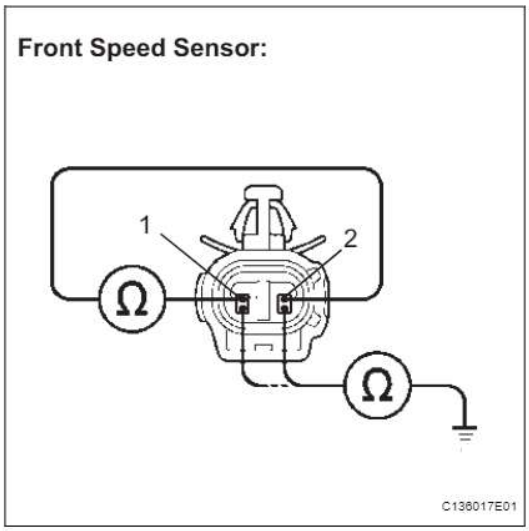
LH

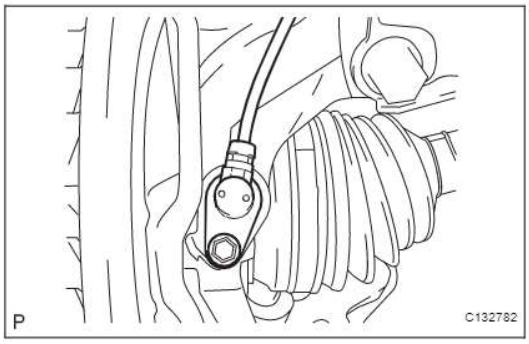
Tester Connection	Condition	Specified Condition
1 (FL+) - 2 (FL-)	Always	1.4 to 1.8 kΩ or at 20°C (68°F)
1 (FL+) - Body ground	Always	10 kΩ or higher
2 (FL-) - Body ground	Always	10 kΩ or higher

RH

Tester Connection	Condition	Specified Condition
1 (FR+) - 2 (FR-)	Always	1.4 to 1.8 kΩ or at 20°C (68°F)
1 (FR+) - Body ground	Always	10 kΩ or higher
2 (FR-) - Body ground	Always	10 kΩ or higher

If the value is not as specified, replace the front speed sensor.





INSTALLATION

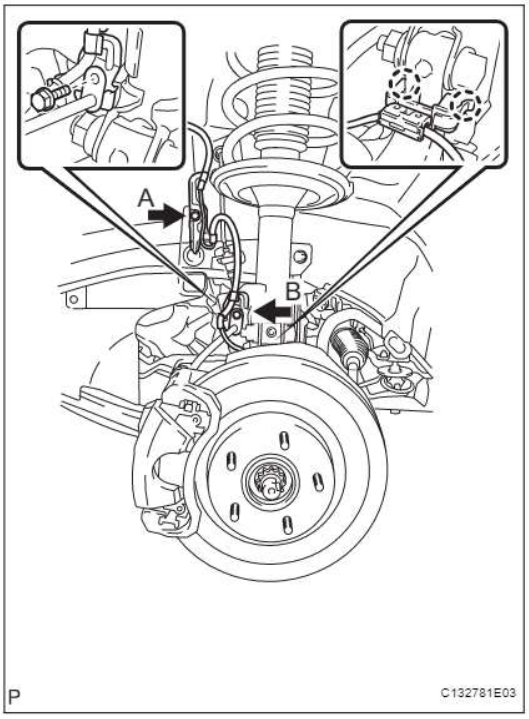
1. INSTALL FRONT SPEED SENSOR

(a) Install the front speed sensor with the bolt.

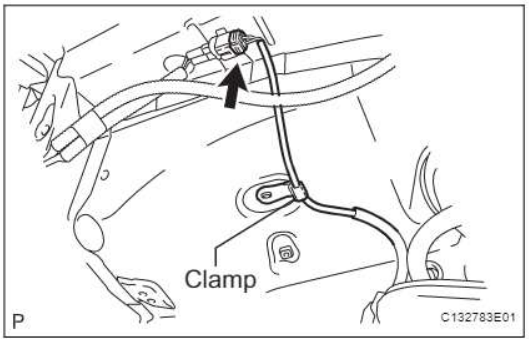
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

NOTICE:
- **Prevent foreign matter from attaching to the sensor tip.**
- **Clean the installation hole and the surface for the speed sensor every time the speed sensor is removed.**

BC



(b) Install the front speed sensor with the 2 bolts and engage the 2 claws.
Torque: Bolt A
5.0 N*m (51 kgf*cm, 44 in.*lbf)
Bolt B
19 N*m (194 kgf*cm, 14 ft.*lbf)
NOTICE:
Do not twist the wire harness for the front speed sensor when installing the speed sensor.



(c) Connect the front speed sensor connector and clamp.

2. **INSTALL FRONT FENDER LINER (See page ED-36)**
3. **INSTALL FRONT WHEEL OPENING EXTENSION PAD (See page ED-37)**
4. **INSTALL FRONT WHEEL**
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
5. **CHECK SPEED SENSOR SIGNAL**
HINT:
Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-35)

BC

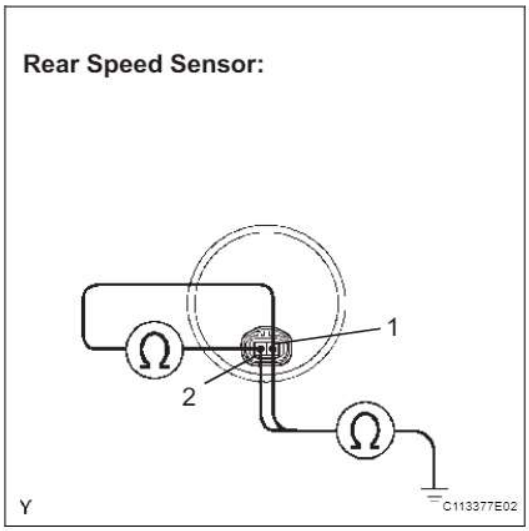
INSPECTION

1. INSPECT SKID CONTROL SENSOR

(a) Inspect the skid control sensor. If any of the following occurs, replace the skid control sensor with a new one:
- The surface of the skid control sensor is cracked, dented, or chipped off.
- The connector is scratched, cracked, or damaged.
- The skid control sensor has been dropped.

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

Standard resistance
LH

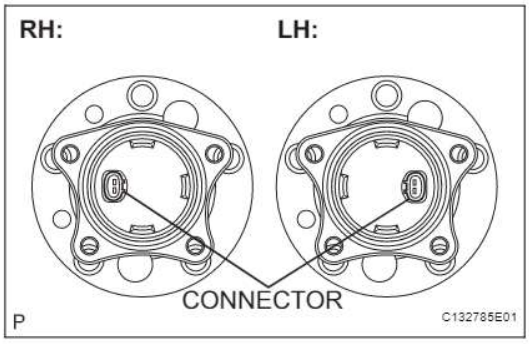


Tester Connection	Condition	Tester Connection
2 (RL+) - 1 (RL-)	Always	Below 1.45 kΩ at 20°C (68°F)
2 (RL+) - Body ground	Always	10 kΩ or higher
1 (RL-) - Body ground	Always	10 kΩ or higher

Standard resistance
RH

Tester Connection	Condition	Tester Connection
2 (RR+) - 1 (RR-)	Always	Below 1.45 kΩ at 20°C (68°F)
2 (RR+) - Body ground	Always	10 kΩ or higher
1 (RR-) - Body ground	Always	10 kΩ or higher

If the value is not as specified, replace the skid control sensor.



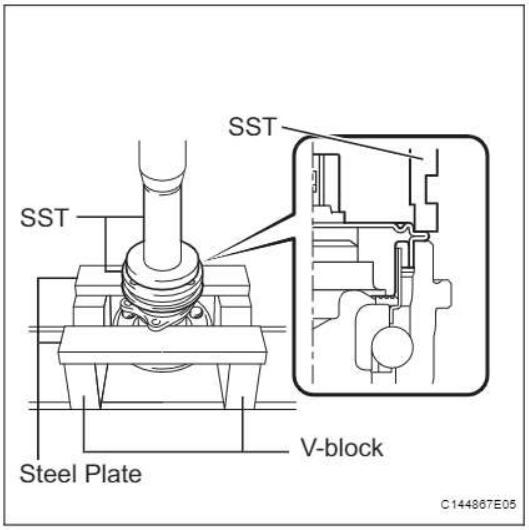
INSTALLATION

1. INSTALL SKID CONTROL SENSOR

(a) Clean the contact surface between the axle hub and a new skid control sensor.
NOTICE:
Prevent foreign matter from attaching to the sensor rotor.

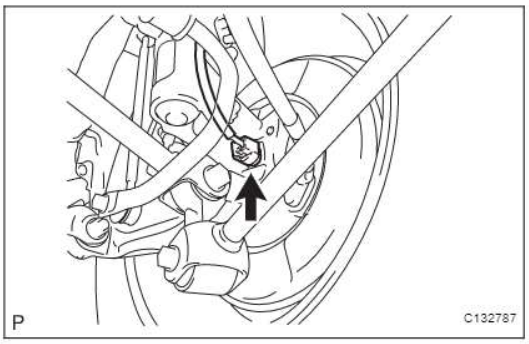
(b) Place the skid control sensor on the axle hub so that the connector is positioned as shown in the illustration.

BC



(c) Using SST, a press, 2 V-blocks, and 2 steel plates, install the skid control sensor to the axle hub.
SST 09309-36010, 09213-58013
NOTICE:
- **Keep the sensor away from magnets.**
- **Do not use a hammer on the skid control sensor.**
- **Check that there is no foreign matter such as iron chips on the detecting portion of the skid control sensor.**
- **Slowly press the skid control sensor straight.**

2. **INSTALL REAR AXLE HUB AND BEARING ASSEMBLY WITH SKID CONTROL SENSOR (See page AH-16)**
3. **INSPECT REAR AXLE HUB BEARING LOOSENESS (See page AH-15)**
4. **INSPECT REAR AXLE HUB RUNOUT (See page AH-15)**
5. **INSTALL REAR DISC (See page BR-64)**
6. **INSTALL REAR DISC BRAKE CALIPER ASSEMBLY (See page PB-40)**



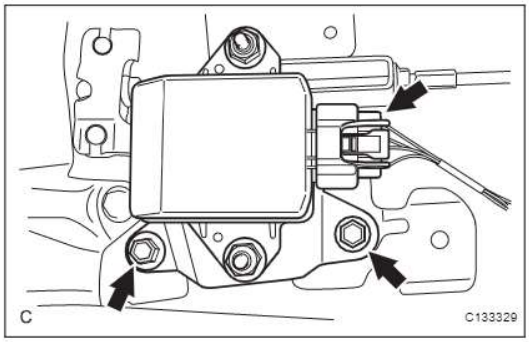
7. **CONNECT SKID CONTROL SENSOR WIRE**
(a) Connect the connector to the skid control sensor.
8. **INSTALL REAR WHEEL**
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
9. **INSPECT AND ADJUST REAR WHEEL ALIGNMENT**
HINT:
Refer the procedures up to "REAR WHEEL ALIGNMENT". (See page SP-11)
10. **CHECK SPEED SENSOR SIGNAL**
HINT:
Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-35)

BC

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
2. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (See page IP-14)
3. REMOVE NO. 1 INSTRUMENT CLUSTER FINISH PANEL GARNISH (See page IP-14)
4. REMOVE NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH (See page IP-14)
5. REMOVE FLOOR SHIFT POSITION INDICATOR HOUSING SUB-ASSEMBLY (See page IP-15)
6. REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-13)
7. REMOVE COWL SIDE TRIM SUB-ASSEMBLY LH (See page IR-14)
8. REMOVE FRONT DOOR SCUFF PLATE RH (See page IR-15)
9. REMOVE COWL SIDE TRIM SUB-ASSEMBLY RH (See page IR-15)
10. REMOVE LOWER INSTRUMENT PANEL FINISH PANEL LH (See page IP-11)
11. REMOVE INSTRUMENT PANEL NO. 2 UNDER COVER SUB-ASSEMBLY (See page IP-13)
12. REMOVE LOWER INSTRUMENT PANEL SUB-ASSEMBLY (See page IP-14)
13. REMOVE UPPER CONSOLE REAR PANEL SUB-ASSEMBLY (See page IP-15)
14. REMOVE UPPER CONSOLE PANEL SUB-ASSEMBLY (See page IP-16)
15. REMOVE CONSOLE BOX POCKET (See page IP-17)
16. REMOVE CONSOLE BOX CARPET (See page IP-17)
17. REMOVE CONSOLE BOX ASSEMBLY (See page IP-17)
18. REMOVE NO. 2 CONSOLE BOX INSERT FRONT (See page IP-18)
19. REMOVE NO. 1 CONSOLE BOX INSERT FRONT (See page IP-18)
20. REMOVE NO. 1 CONSOLE BOX DUCT (See page AC-188)

BC



21. REMOVE YAW RATE AND ACCELERATION SENSOR

(a) Disconnect the yaw rate and acceleration sensor connector.

(b) Remove the 2 bolts and yaw rate and acceleration sensor.

NOTICE:

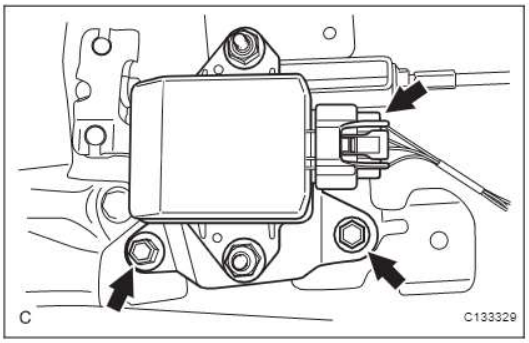
Do not remove the yaw rate and acceleration sensor from the bracket.

BC

INSPECTION

1. **INSPECT YAW RATE AND ACCELERATION SENSOR**
   (a) Inspect the yaw rate and acceleration sensor. If any of the following occurs, replace the yaw rate and acceleration sensor with a new one:
   - The surface of the yaw rate and acceleration sensor is cracked, dented, or chipped off.
   - The connector is scratched, cracked, or damaged.
   - The yaw rate and acceleration sensor has been dropped.

INSTALLATION



1. **INSTALL YAW RATE AND ACCELERATION SENSOR**
   (a) Install the yaw rate and acceleration sensor with the 2 bolts.
   Torque: 13 N*m (133 kgf*cm, 10 ft.*lbf)
   NOTICE:
   - **Do not damage the yaw rate and acceleration sensor.**
   - **Make sure that the yaw rate and acceleration sensor is installed securely.**
   (b) Connect the yaw rate and acceleration sensor connector.
2. **INSTALL NO. 1 CONSOLE BOX DUCT (See page AC-204)**
3. **INSTALL NO. 1 CONSOLE BOX INSERT FRONT (See page IP-29)**
4. **INSTALL NO. 2 CONSOLE BOX INSERT FRONT (See page IP-30)**
5. **INSTALL CONSOLE BOX ASSEMBLY (See page IP-30)**
6. **INSTALL CONSOLE BOX CARPET (See page IP-30)**
7. **INSTALL CONSOLE BOX POCKET (See page IP-30)**
8. **INSTALL UPPER CONSOLE PANEL SUB-ASSEMBLY (See page IP-31)**
9. **INSTALL UPPER CONSOLE REAR PANEL SUB-ASSEMBLY (See page IP-31)**
10. **INSTALL LOWER INSTRUMENT PANEL SUB-ASSEMBLY (See page IP-33)**
11. **INSTALL INSTRUMENT PANEL NO. 2 UNDER COVER SUB-ASSEMBLY (See page IP-33)**
12. **INSTALL LOWER INSTRUMENT PANEL FINISH PANEL LH (See page IP-35)**
13. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY RH (See page IR-42)**
14. **INSTALL FRONT DOOR SCUFF PLATE RH (See page IR-41)**

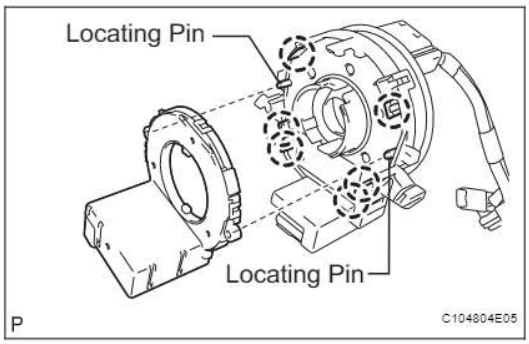
BC

15. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY LH (See page IR-41)**
16. **INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-41)**
17. **INSTALL FLOOR SHIFT POSITION INDICATOR HOUSING SUB-ASSEMBLY (See page IP-31)**
18. **INSTALL NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH (See page IP-32)**
19. **INSTALL NO. 1 INSTRUMENT CLUSTER FINISH PANEL GARNISH (See page IP-32)**
20. **INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (See page IP-32)**
21. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
22. **PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION**
    HINT:
    Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-29)
23. **INSPECT SENSOR SIGNAL**
    HINT:
    Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-35)
24. **PERFORM INITIALIZATION**
    NOTICE:
    Some systems need initialization after reconnecting the cable to the negative battery terminal. (See page IN-43)

BC

INSPECTION

1. **INSPECT STEERING ANGLE SENSOR**
   (a) Inspect the steering angle sensor. If any of the following occurs, replace the steering angle sensor with a new one:
   - The surface of the steering angle sensor is cracked, dented, or chipped off.
   - The connector is scratched, cracked, or damaged.
   - The steering angle sensor has been dropped.



INSTALLATION

1. **INSTALL STEERING ANGLE SENSOR**
   (a) Align the locating pins, engage the claws, and install the steering angle sensor to the spiral cable.
2. **INSTALL SPIRAL CABLE SUB-ASSEMBLY WITH STEERING ANGLE SENSOR (See page RS-359)**
3. **INSTALL STEERING COLUMN COVER (See page SR-41)**
4. **ADJUST SPIRAL CABLE (See page RS-360)**
5. **INSTALL STEERING WHEEL ASSEMBLY (See page SR-42)**
6. **INSPECT STEERING WHEEL CENTER POINT**
7. **INSTALL STEERING PAD (See page RS-346)**
8. **INSTALL NO. 2 LOWER STEERING WHEEL COVER (See page RS-347)**
9. **INSTALL NO. 3 LOWER STEERING WHEEL COVER (See page RS-347)**
10. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
11. **INSPECT STEERING PAD (See page RS-347)**
12. **INSPECT SRS WARNING LIGHT (See page SR-42)**
13. **PERFORM INITIALIZATION**
    NOTICE:
    Some systems need initialization after reconnecting the cable to the negative battery terminal. (See page IN-43)

BC

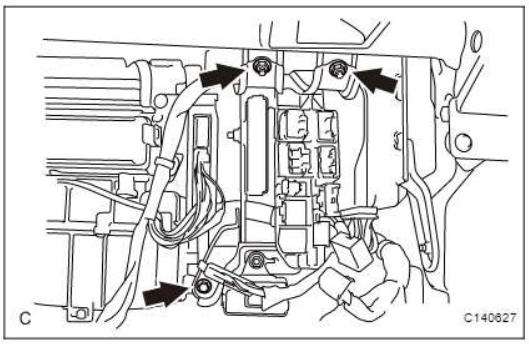
REMOVAL

1. **PRECAUTION**
   NOTICE:
   Be sure to read "PRECAUTION" thoroughly before servicing (See page RS-1).

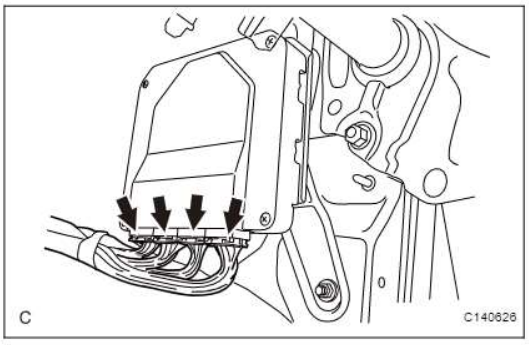
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait for 90 seconds after disconnecting the cable to prevent airbag deployment.

3. **REMOVE INSTRUMENT PANEL SAFETY PAD ASSEMBLY**
   HINT:
   Refer the procedures up to "REMOVE INSTRUMENT PANEL SAFETY PAD". (See page IP-11)

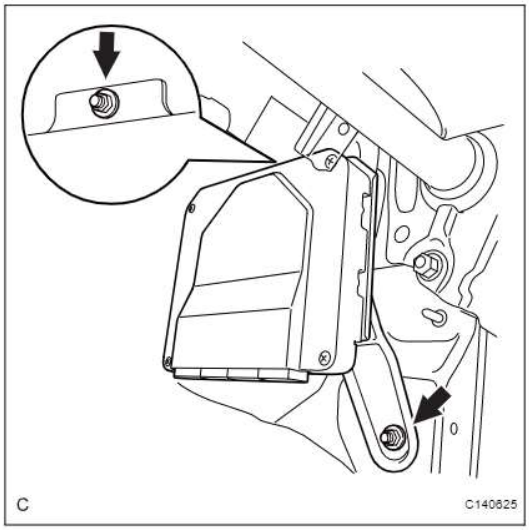
4. **SEPARATE WIRING HARNESS CLAMP BRACKET**
   (a) Disconnect the wiring harness clamp and connectors.
   (b) Remove the 2 nuts and the bolt, and separate the wiring harness clamp bracket.



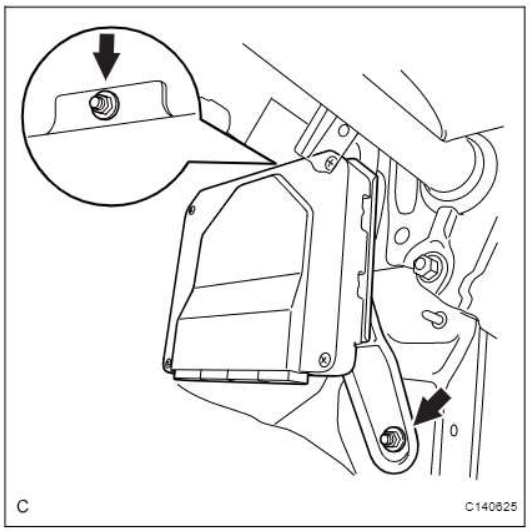
5. **REMOVE SKID CONTROL ECU**
   (a) Disconnect the 4 skid control ECU connectors.



BC

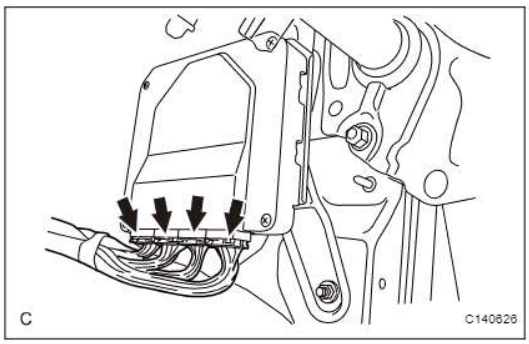


(b) Remove the 2 nuts and skid control ECU.

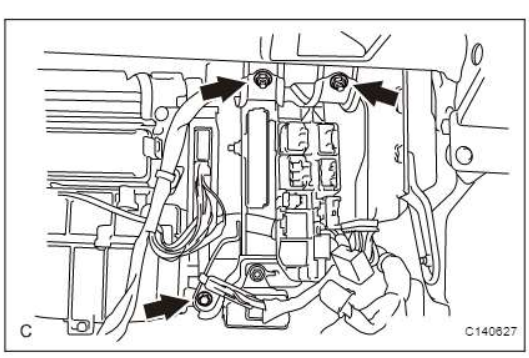


INSTALLATION

1. **INSTALL SKID CONTROL ECU**
   (a) Install the skid control ECU with the 2 nuts.
   Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)



(b) Connect the 4 skid control ECU connectors.



2. **INSTALL WIRING HARNESS CLAMP BRACKET**
   (a) Install the wiring harness clamp bracket with the 2 nuts and the bolt.
   Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
   (b) Connect the wiring harness clamp and connectors.

3. **INSTALL INSTRUMENT PANEL SAFETY PAD ASSEMBLY**
   HINT:
   Refer the procedures up to "INSTALL INSTRUMENT PANEL SAFETY PAD". (See page IP-25)

BC

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

5. **CLEAR DTC FOR BRAKE CONTROL SYSTEM**
HINT:
Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-57)

6. **PERFORM LINEAR VALVE OFFSET LEARNING**
HINT:
Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-25)

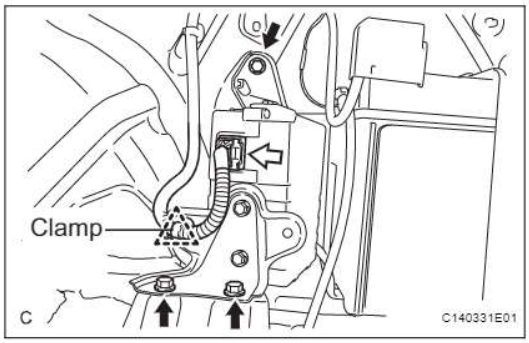
7. **PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION**
HINT:
Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-29)

8. **PERFORM INITIALIZATION**
NOTICE:
Some systems need initialization after reconnecting the cable to the negative battery terminal. (See page IN-43)

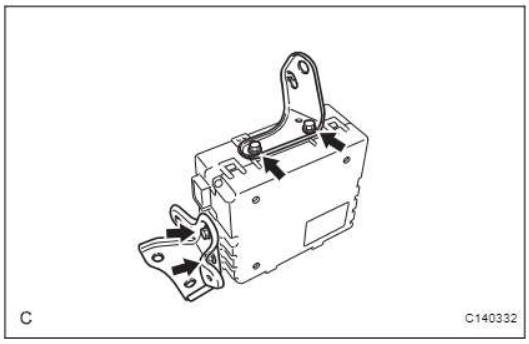
BC

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
2. REMOVE LUGGAGE COMPARTMENT TRIM HOOK NO.1 (See page ED-97)
3. REMOVE REAR FLOOR FINISH PLATE (See page ED-97)
4. REMOVE LUGGAGE COMPARTMENT REAR TRIM COVER (See page ED-97)
5. REMOVE LUGGAGE TRIM SERVICE HOLE COVER
6. REMOVE LUGGAGE COMPARTMENT INNER TRIM COVER RH (See page ED-98)
7. REMOVE BRAKE CONTROL POWER SUPPLY WITH BRACKET
   (a) Disconnect the brake control power supply connector and separate the clamp.
   (b) Remove the 3 bolts and brake control power supply with bracket.



8. REMOVE BRAKE CONTROL POWER SUPPLY ASSEMBLY
   (a) Remove the 2 bolts and No. 1 brake control power supply bracket.
   (b) Remove the 2 bolts and No. 2 brake control power supply bracket.

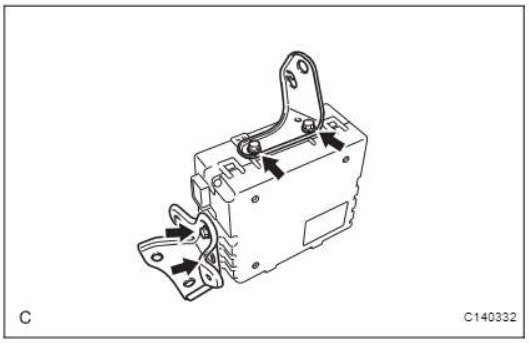


BC

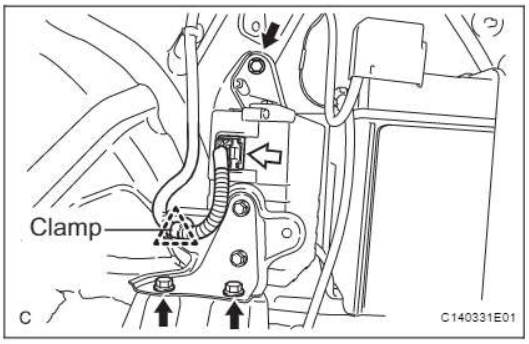
INSPECTION

1. **INSPECT BRAKE CONTROL POWER SUPPLY**
   (a) Inspect the brake control power supply assembly. If any of the following occurs, replace the brake control power supply assembly with a new one:
   - The surface of the brake control power supply assembly is cracked, dented, or chipped off.
   - The connector is scratched, cracked, or damaged.
   - The brake control power supply assembly has been dropped.

INSTALLATION



1. **INSTALL BRAKE CONTROL POWER SUPPLY ASSEMBLY**
   (a) Install the No. 2 brake control power supply bracket with the 2 bolts.
   Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)
   (b) Install the No. 2 brake control power supply bracket with the 2 bolts.
   Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)



2. **INSTALL BRAKE CONTROL POWER SUPPLY WITH BRACKET**
   (a) Install the brake control power supply with bracket with the 3 bolts.
   Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)
   (b) Connect the brake control power supply connector and install the clamp.
3. **INSTALL LUGGAGE COMPARTMENT INNER TRIM COVER RH (See page ED-102)**
4. **INSTALL LUGGAGE TRIM SERVICE HOLE COVER**
5. **INSTALL LUGGAGE COMPARTMENT REAR TRIM COVER (See page ED-102)**
6. **INSTALL REAR FLOOR FINISH PLATE (See page ED-103)**
7. **INSTALL LUGGAGE COMPARTMENT TRIM HOOK NO.1 (See page ED-103)**
8. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
9. **CLEAR DTC FOR BRAKE CONTROL SYSTEM**
   HINT:
   Refer the procedures up to "ELECTRONICALLY CONTROLLED BRAKE SYSTEM". (See page BC-57)
10. **PERFORM INITIALIZATION**
    NOTICE:
    Some systems need initialization after reconnecting the cable to the negative battery terminal. (See page IN-43)

BC

ELECTRONICALLY CONTROLLED BRAKE SYSTEM

PRECAUTION

NOTICE:
When disconnecting the negative battery terminal, initialize the following system after the terminal is reconnected:

System	See procedure
SFI system	IN-43

1. TROUBLESHOOTING PRECAUTIONS

(a) When there is a malfunction with terminal contact points or part installation problems, removal and installation of the suspected problem parts may return the system to the normal condition either completely or temporarily.

(b) In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as DTC output and the Freeze Frame Data, and record it before disconnecting each connector or removing and installing parts.

(c) Since the system may be influenced by malfunctions in systems other than the brake control system, be sure to check for DTCs in other systems.

2. HANDLING PRECAUTIONS

(a) Do not remove or install Electronically Controlled Brake parts such as the steering angle sensor, yaw rate sensor (acceleration sensor included) or brake pedal stroke sensor except when required, as they cannot be adjusted correctly after removal or installation.

(b) Be sure to perform preparation before work and confirmation after work is completed by following the direction in the repair manual when working on the Electronically Controlled Brake system.

(c) Be sure to remove and install the ECU, actuator, each sensor, etc. with the power switch off unless it is not specified in the inspection procedure.

(d) Be sure to remove the 2 main relays before removal and installation, or replacement of the Electronically Controlled Brake parts.

BC

(e) The removal or installation of the actuator, master cylinder or stroke simulator as well as some other procedures can cause the fluid level to drop below the fluid reservoir port. If this happens when performing such work, be sure to remove the 2 motor relays until the bleeding of the air in the pipeline is completed.
HINT:
- When the pump motor is operated with the air in the brake actuator hose, bleeding the air becomes difficult due to air in the actuator.
- The skid control ECU may operate the stroke simulator and drive the pump motor even when the power switch is off.
- With the power switch off, the skid control ECU can be operated for 2 minutes after the brake operation is finished.

(f) Removal of the main relay and motor relay.
(1) Wait for 2 minutes after turning the power switch off, stopping the brake pedal operation and closing the driver door before removing the 2 relays.
HINT:
The above situation occurs when the pump motor operates to prepare for the next operation just before the brake control system turns off.

(g) If the ECU, brake actuator, or a sensor has been removed and installed, it is necessary to check the system for problems after the parts have been reassembled. Check for DTCs using the intelligent tester, also check that system functions and signals received by the ECU are normal using Test Mode.

3. DTC PRECAUTION

(a) Warnings for some DTCs cannot be cleared only by repairing the malfunctioning parts. If the warning is displayed after repair work, the DTC should be cleared after turning the power switch off.
NOTICE:
If a DTC for a malfunctioning part reappears after it was cleared, then it has been stored again.

BC

4. CHASSIS DYNAMOMETER PRECAUTION

(a) Enter Test Mode to disable TRAC and VSC control when using a chassis dynamometer.
HINT:
The vehicle may move unexpectedly out of the dynamometer because of TRAC and VSC operations.
NOTICE:
- **Make sure that the brake control warning, master caution indicator lights blink and "CHECK VSC SYSTEM" is displayed on the multi information display (Test Mode is achieved).**

- **Secure the vehicle with the lock chain for safety.**

5. CAN COMMUNICATION SYSTEM PRECAUTIONS

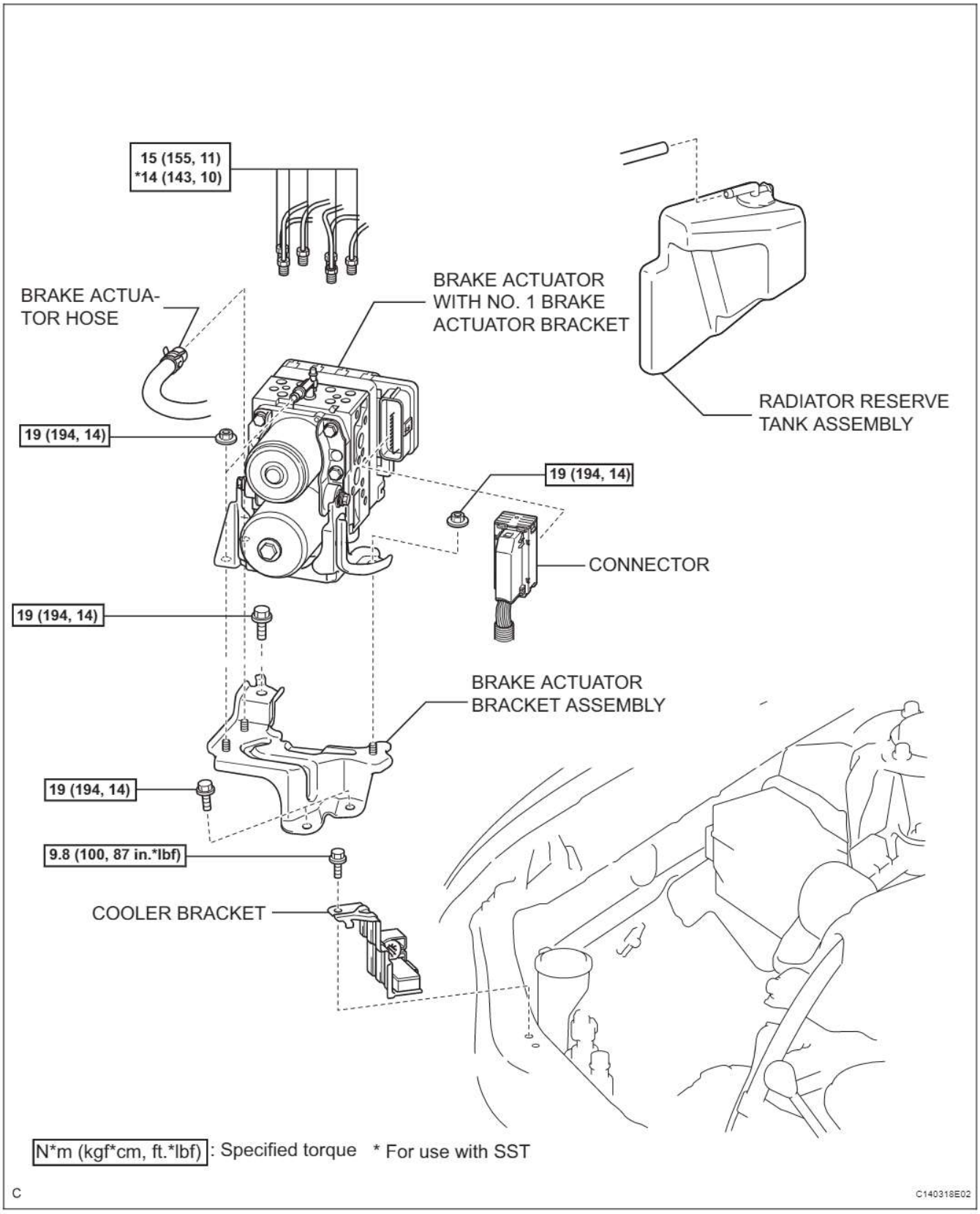
(a) The CAN communication system is used for the data communication between the skid control ECU, the steering angle sensor, the yaw rate sensor (acceleration sensor included) and other ECUs. If there is trouble in the CAN communication line, corresponding DTCs in the communication line are output.

(b) If the DTC in the CAN communication line is output, repair the malfunction in the communication line and troubleshoot the Electronically Controlled Brake system while data communication is normal.

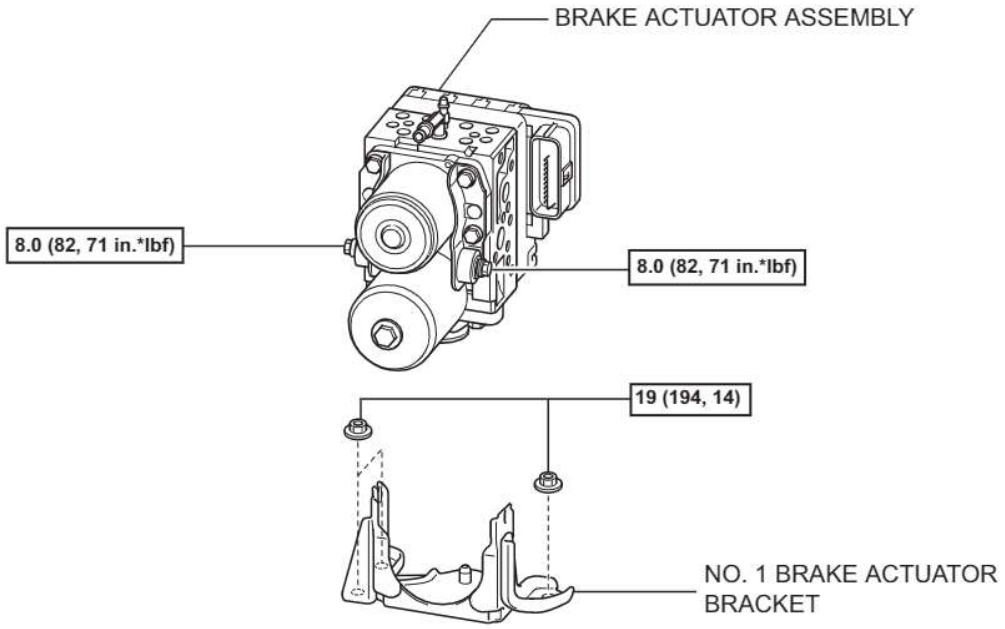
(c) In order to enable CAN communication, a specific type of wiring is used for the CAN communication lines. The wiring used for each communication line is a twisted pair of wires that have an equal length. A bypass wire should not be used, because the data being transmitted will be corrupted.

BRAKE ACTUATOR

COMPONENTS



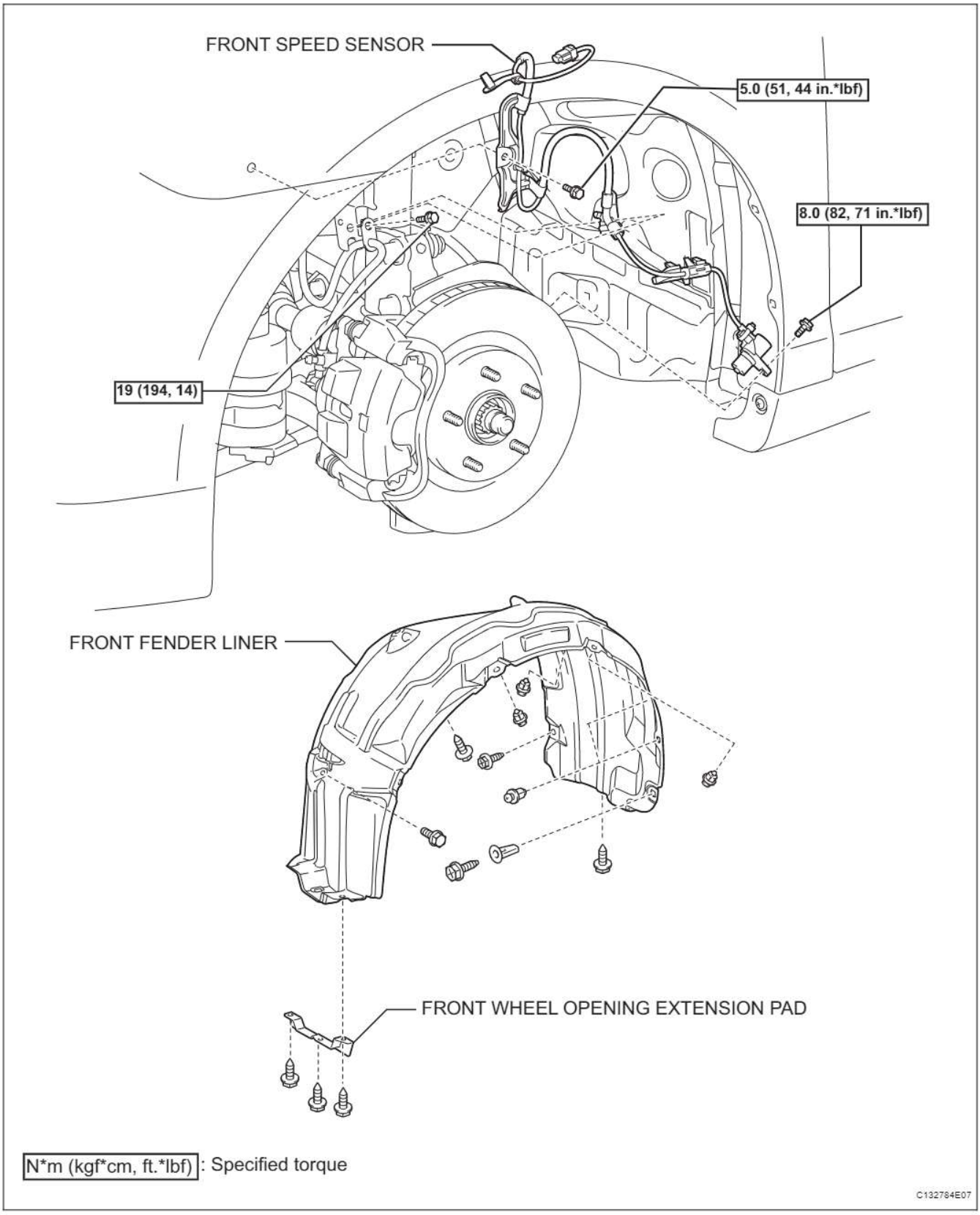
BC


BRAKE ACTUATOR ASSEMBLY
8.0 (82, 71 in.*lbf)
8.0 (82, 71 in.*lbf)
19 (194, 14)
NO. 1 BRAKE ACTUATOR BRACKET
N*m (kgf*cm, ft.*lbf): Specified torque
C143884E01

BC

FRONT SPEED SENSOR

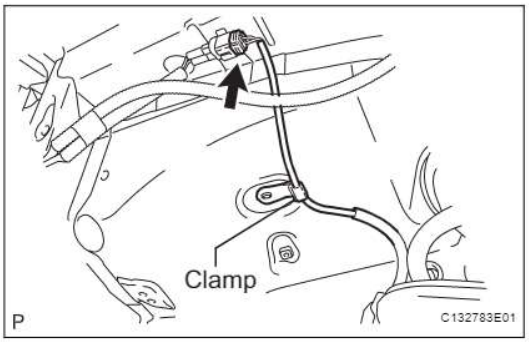
COMPONENTS

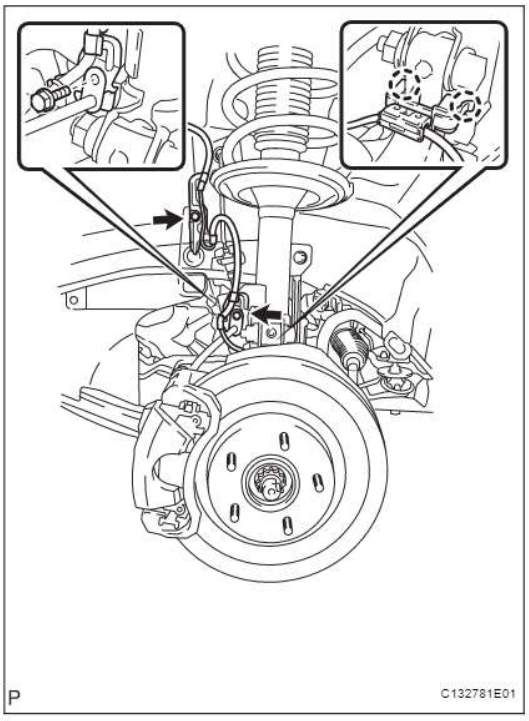


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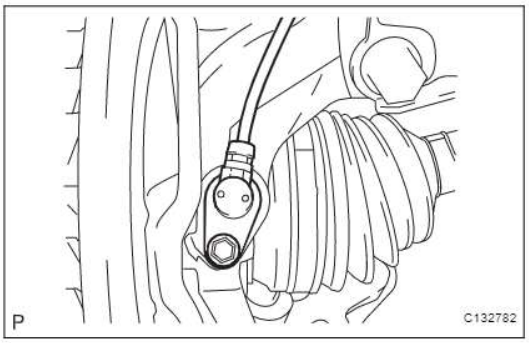
REMOVAL

1. **REMOVE FRONT WHEEL**
2. **REMOVE FRONT WHEEL OPENING EXTENSION PAD (See page ED-33)**
3. **REMOVE FRONT FENDER LINER (See page ED-33)**
4. **REMOVE FRONT SPEED SENSOR**
   (a) Disconnect the front speed sensor connector and clamp.





(b) Remove the 2 bolts from the body and the shock absorber assembly.
(c) Disengage the 2 claws from the steering knuckle.

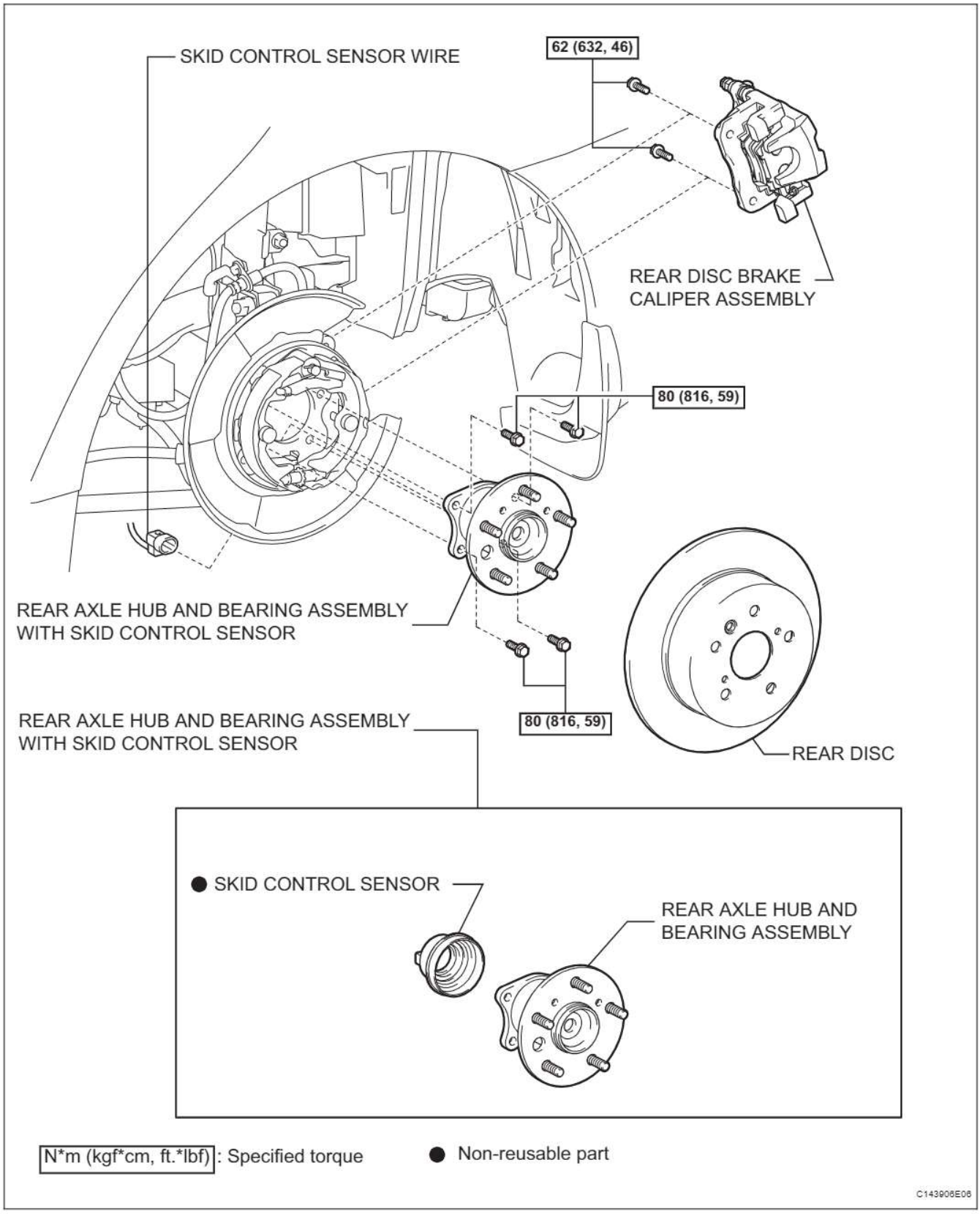


(d) Remove the bolt and the front speed sensor.
NOTICE:
- **Prevent foreign matter from attaching to the sensor tip.**
- **Clean the installation hole and the surface for the speed sensor every time the speed sensor is removed.**

BC

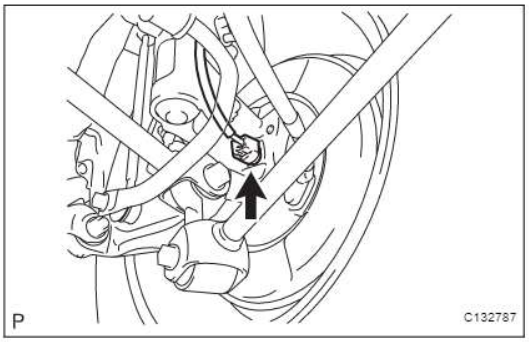
SKID CONTROL SENSOR

COMPONENTS

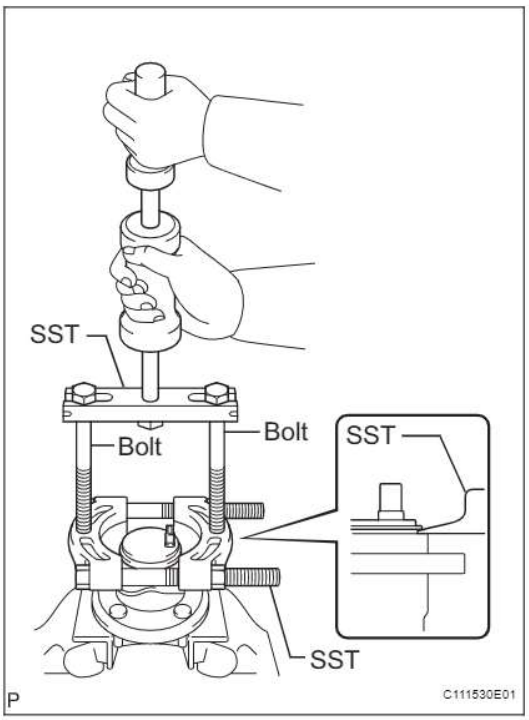


BC

REMOVAL



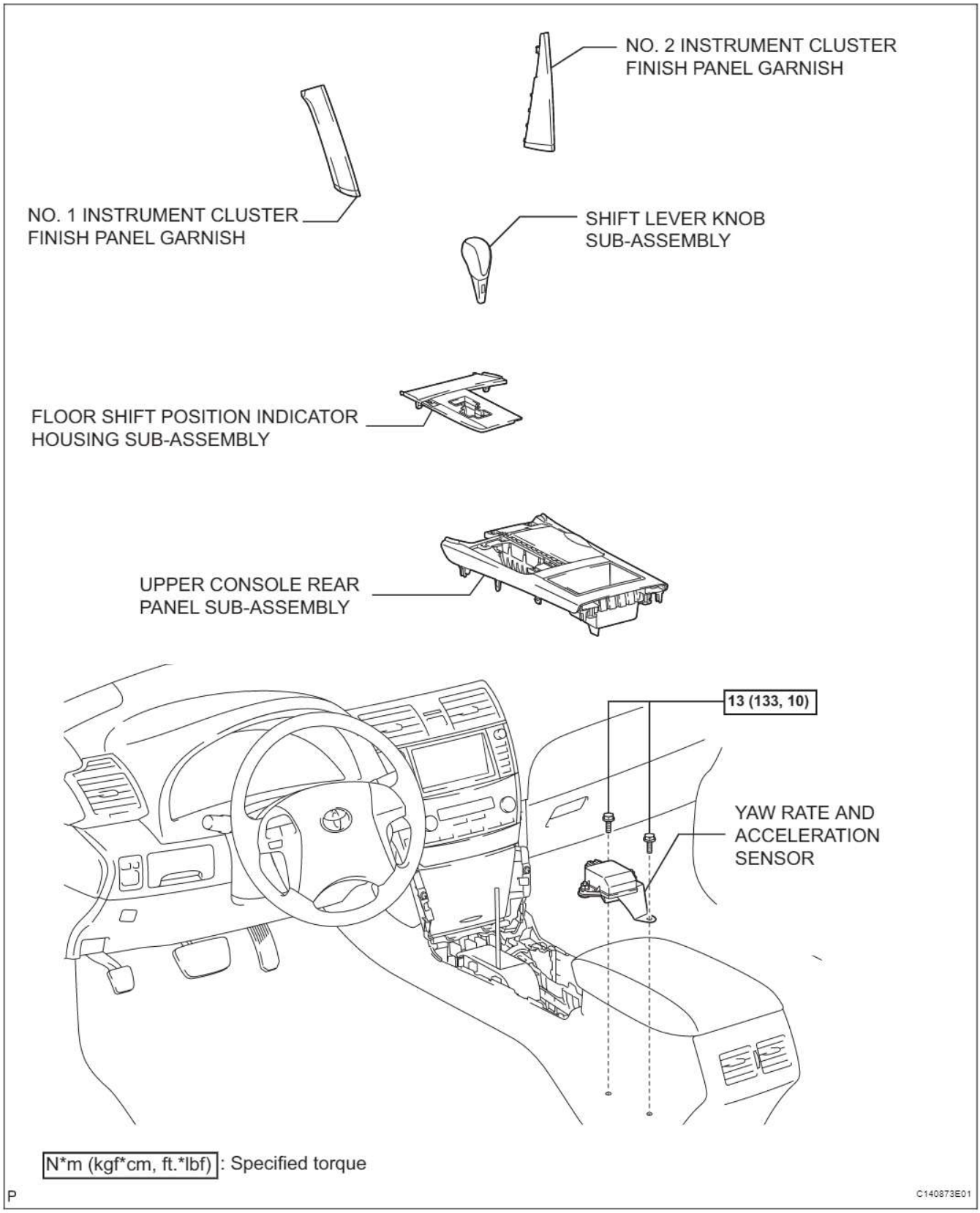
1. **REMOVE REAR WHEEL**
2. **DISCONNECT SKID CONTROL SENSOR WIRE**
   (a) Disconnect the connector from the skid control sensor.
   NOTICE:
   Be careful not to damage the speed sensor.
3. **SEPARATE REAR DISC BRAKE CALIPER ASSEMBLY (See page PB-35)**
4. **REMOVE REAR DISC (See page BR-63)**
5. **REMOVE REAR AXLE HUB AND BEARING ASSEMBLY WITH SKID CONTROL SENSOR (See page AH-15)**
6. **REMOVE SKID CONTROL SENSOR**
   (a) Mount the rear axle hub in a vise using aluminum plates.
   NOTICE:
   Replace the hub and bearing assembly if it is dropped or receives a strong shock.
   (b) Using a pin punch and hammer, drive out the 2 pins and remove the 2 attachments from SST.
   SST 09520-00031 (09521-00010, 09520-00040), 09521-00020
   (c) Using SST and 2 bolts (Diameter: 12 mm, pitch: 1.5 mm), remove the skid control sensor from the hub and bearing assembly.
   SST 09520-00031 (09521-00010, 09520-00040), 09521-00020, 09950-00020
   NOTICE:
   - **Keep the sensor away from magnets.**
   - **Pull the skid control sensor off straight, taking care not to make contact with the skid control sensor rotor.**
   - **If the speed sensor rotor is damaged or deformed, replace the hub and bearing assembly.**
   - **Do not scratch the contact surface between the axle hub and the skid control sensor.**
   - **Do not attach foreign matter to the speed sensor rotor and tip.**



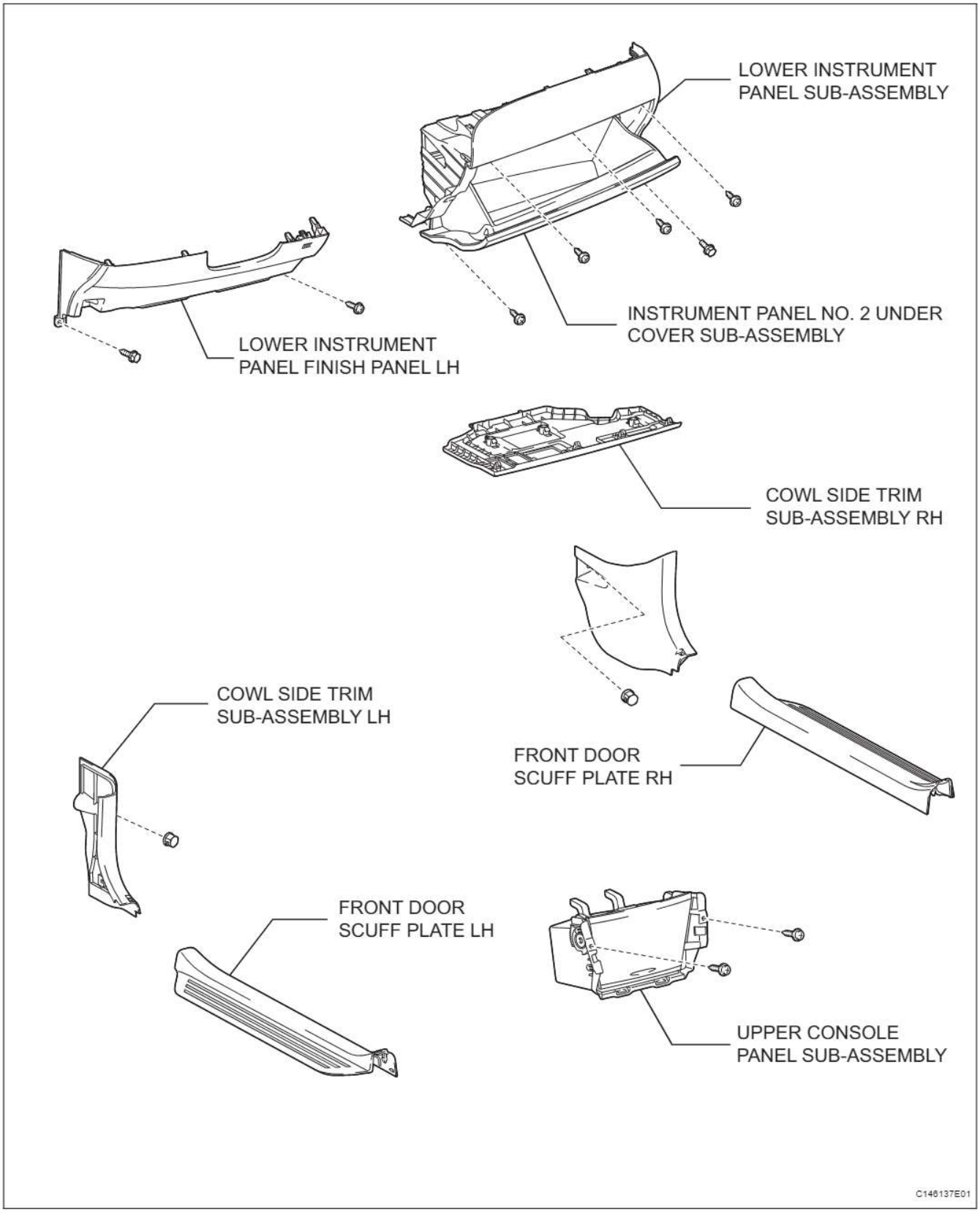
BC

YAW RATE AND ACCELERATION SENSOR

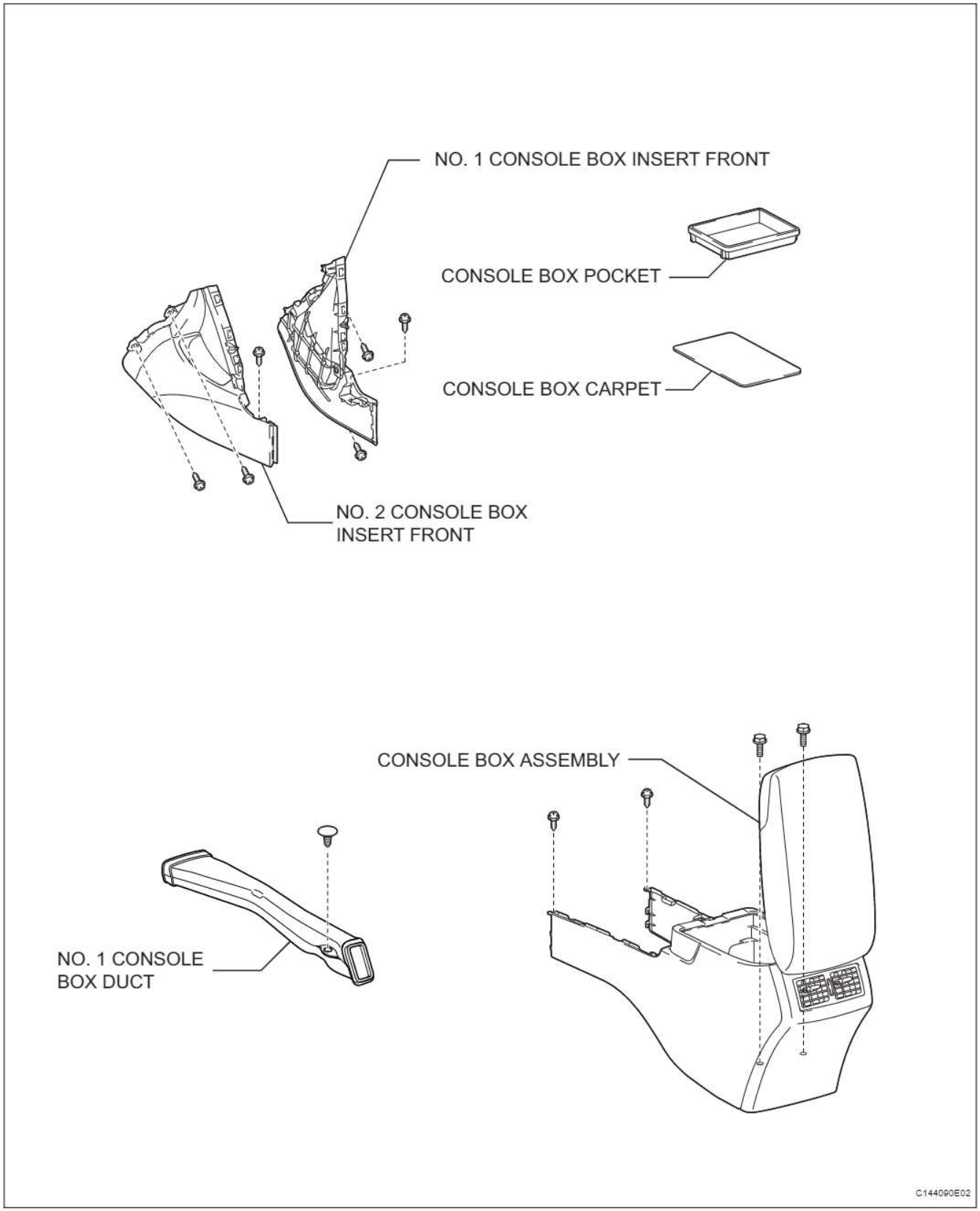
COMPONENTS



BC


LOWER INSTRUMENT PANEL SUB-ASSEMBLY
INSTRUMENT PANEL NO. 2 UNDER COVER SUB-ASSEMBLY
LOWER INSTRUMENT PANEL FINISH PANEL LH
COWL SIDE TRIM SUB-ASSEMBLY RH
COWL SIDE TRIM SUB-ASSEMBLY LH
FRONT DOOR SCUFF PLATE RH
FRONT DOOR SCUFF PLATE LH
UPPER CONSOLE PANEL SUB-ASSEMBLY
C146137E01

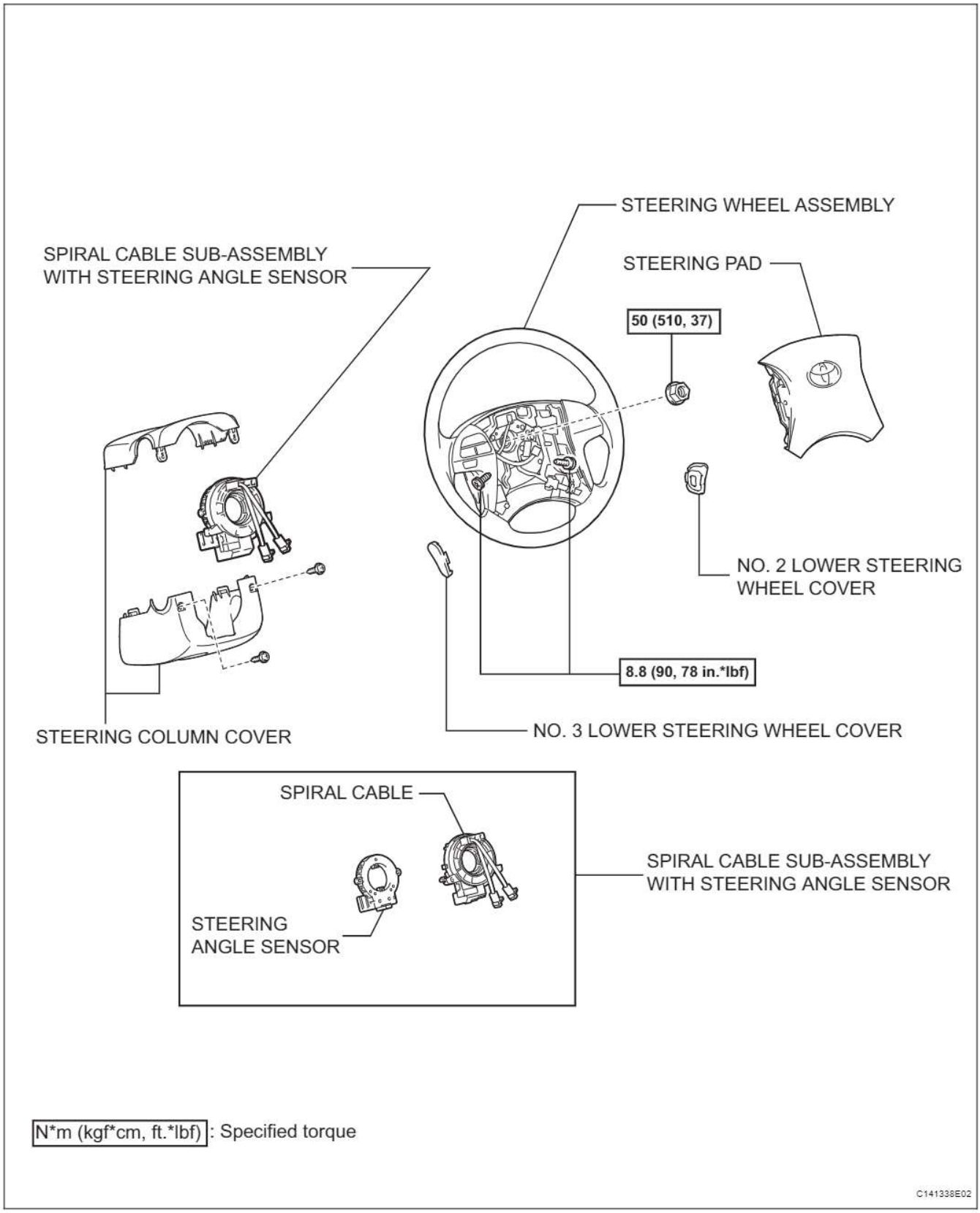
BC


NO. 1 CONSOLE BOX INSERT FRONT
CONSOLE BOX POCKET
CONSOLE BOX CARPET
NO. 2 CONSOLE BOX INSERT FRONT
CONSOLE BOX ASSEMBLY
NO. 1 CONSOLE BOX DUCT
C144090E02

BC

STEERING ANGLE SENSOR

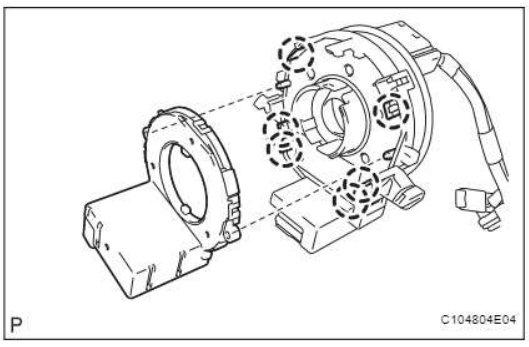
COMPONENTS



BC

REMOVAL

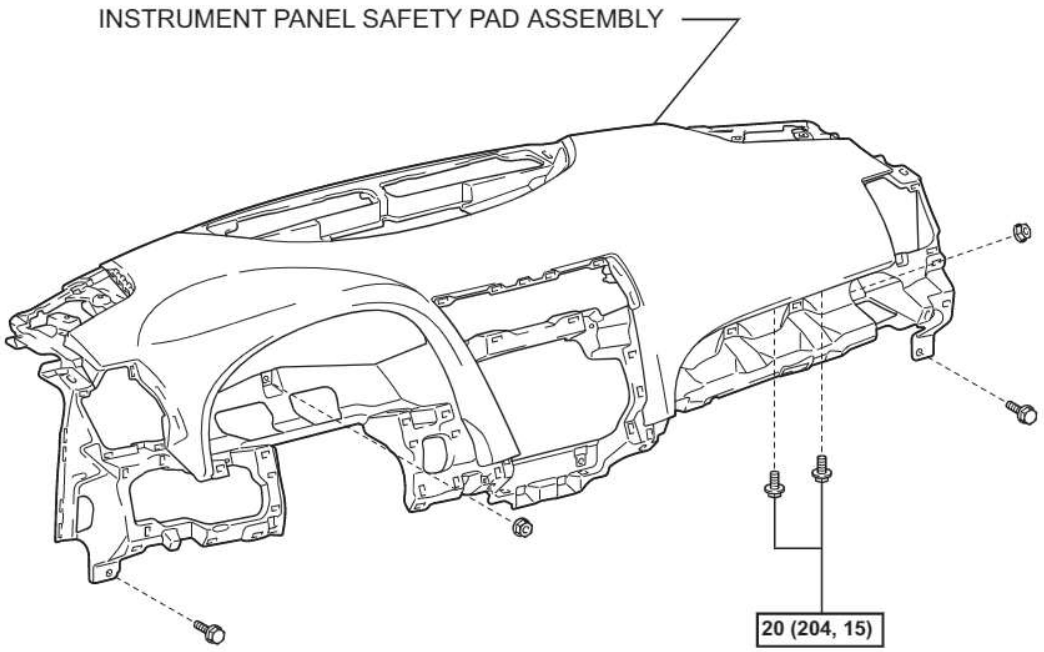
1. PRECAUTION
CAUTION:
Be sure to read "PRECAUTION" thoroughly before servicing. (See page RS-1)
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
CAUTION:
Wait for 90 seconds after disconnecting the cable to prevent airbag deployment.
3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
NOTICE:
When reconnecting the cable to the negative battery terminal after installing the steering sensor, check that the front tires and steering wheel are kept aligned straight ahead before and after connecting the cable to the negative battery terminal.
4. REMOVE NO. 2 LOWER STEERING WHEEL COVER (See page RS-345)
5. REMOVE NO. 3 LOWER STEERING WHEEL COVER (See page RS-345)
6. REMOVE STEERING PAD (See page RS-345)
7. REMOVE STEERING WHEEL ASSEMBLY (See page SR-36)
8. REMOVE STEERING COLUMN COVER (See page SR-36)
9. REMOVE SPIRAL CABLE SUB-ASSEMBLY WITH STEERING ANGLE SENSOR (See page RS-357)
10. REMOVE STEERING ANGLE SENSOR
   (a) Disengage the 6 claws and remove the steering angle sensor from the spiral cable.



BC

SKID CONTROL ECU

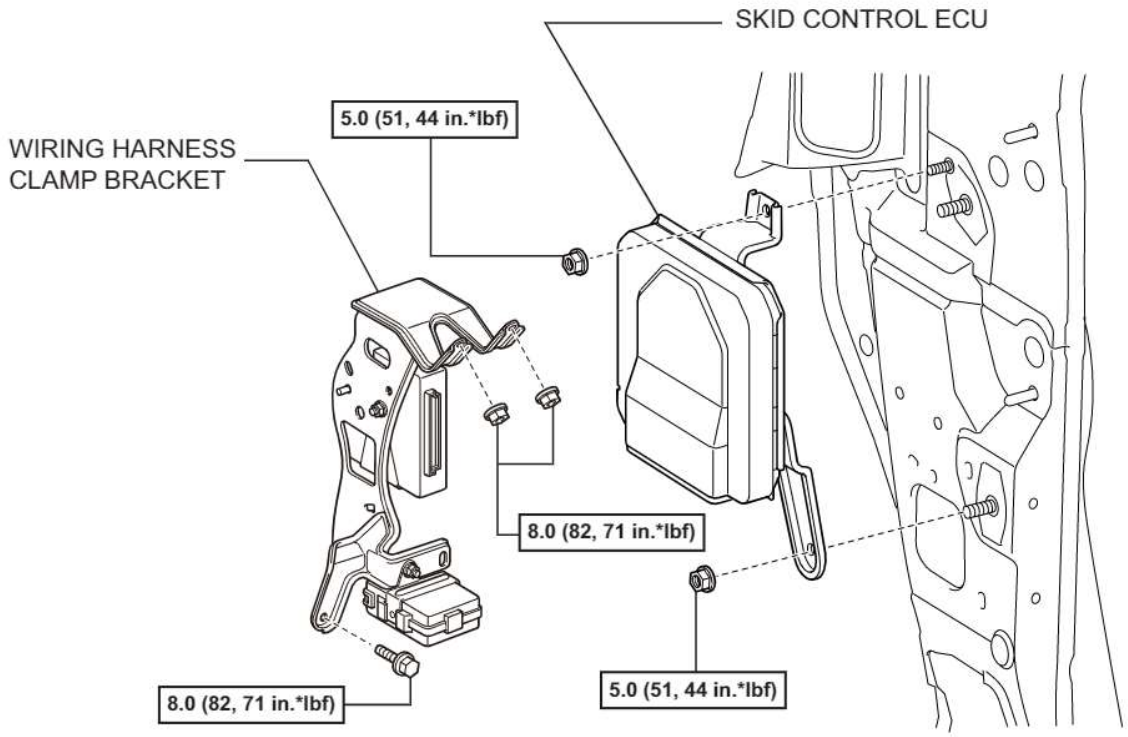
COMPONENTS



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

C146076E01

BC



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

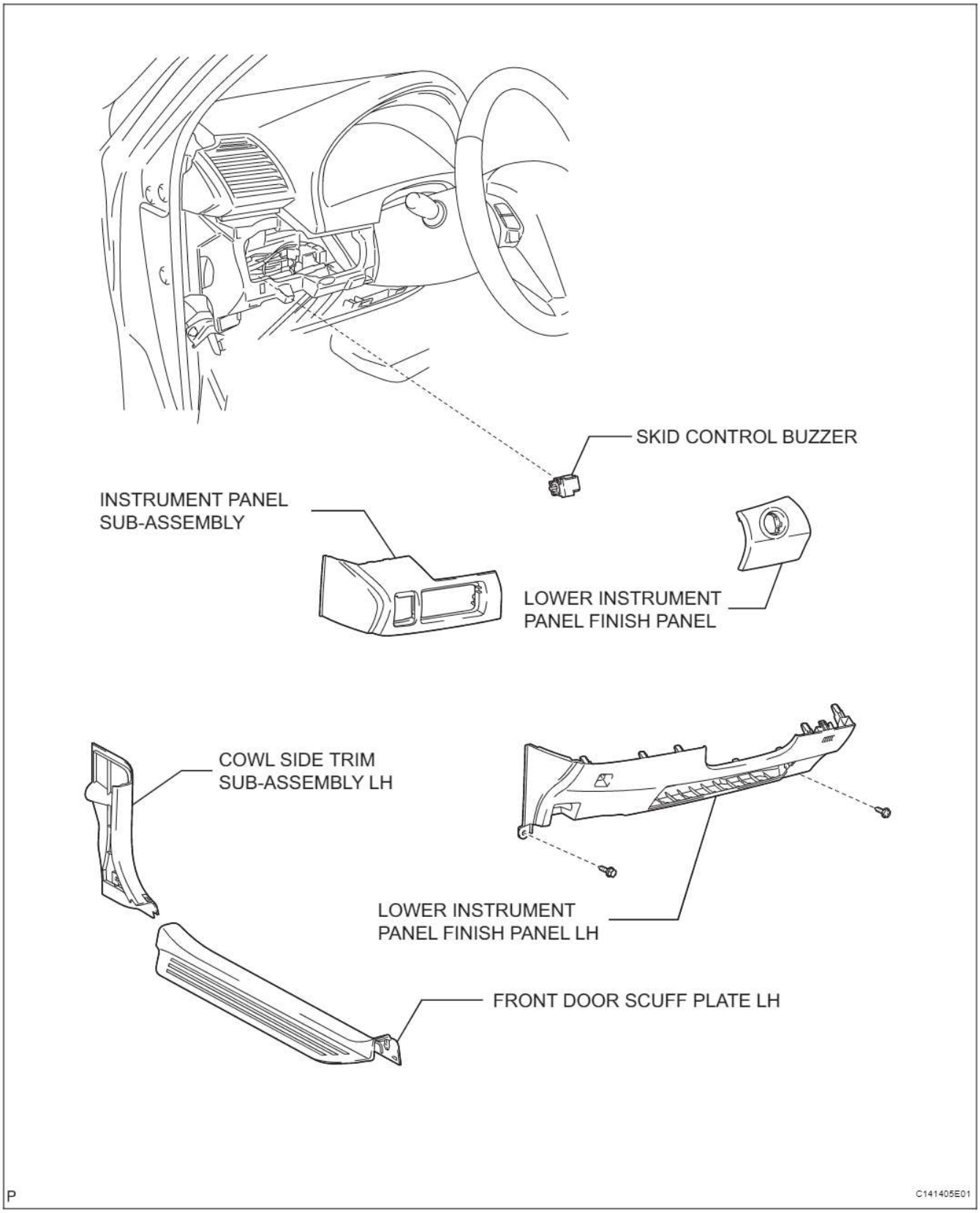
C

C140599E01

BC

SKID CONTROL BUZZER

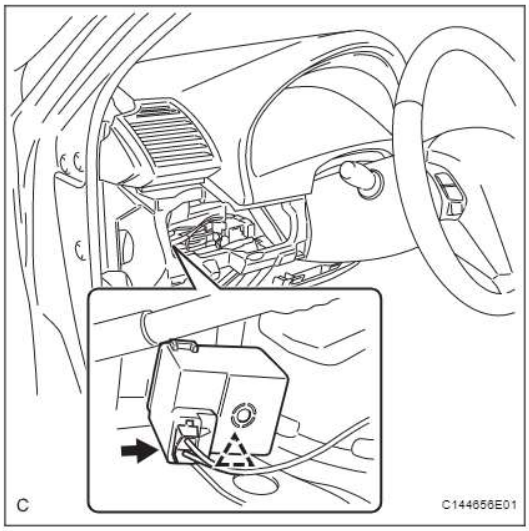
COMPONENTS



BC

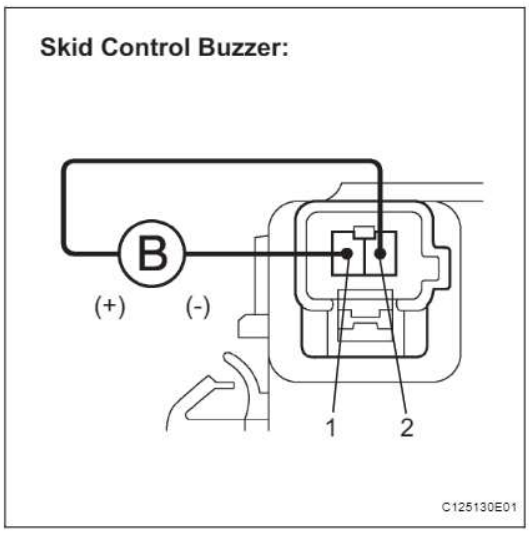
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
2. REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-13)
3. REMOVE COWL SIDE TRIM SUB-ASSEMBLY LH (See page IR-14)
4. REMOVE LOWER INSTRUMENT PANEL FINISH PANEL LH (See page IP-11)
5. REMOVE INSTRUMENT PANEL SUB-ASSEMBLY (See page IP-12)
6. REMOVE LOWER INSTRUMENT PANEL FINISH PANEL (See page IP-12)
7. REMOVE SKID CONTROL BUZZER
   (a) Disconnect the skid control buzzer connector.
   (b) Disengage the claw and remove the skid control buzzer.

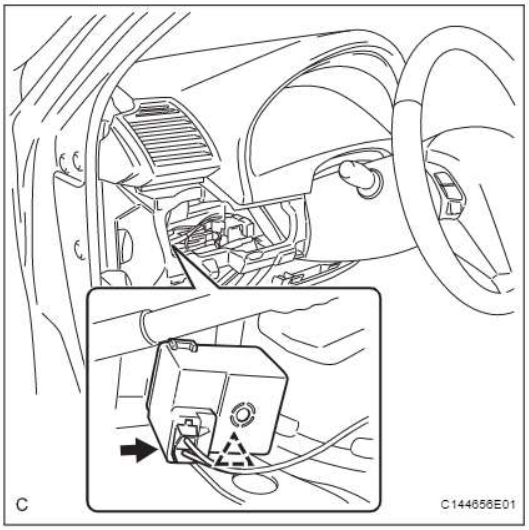


INSPECTION

1. INSPECT SKID CONTROL BUZZER
   (a) Apply battery negative voltage to terminal 1, and battery positive voltage to terminal 2 of the skid control buzzer, and then check that the buzzer sounds.
   OK:
   The skid control buzzer sounds.
   If the skid control buzzer does not sound, replace the skid control buzzer.



BC



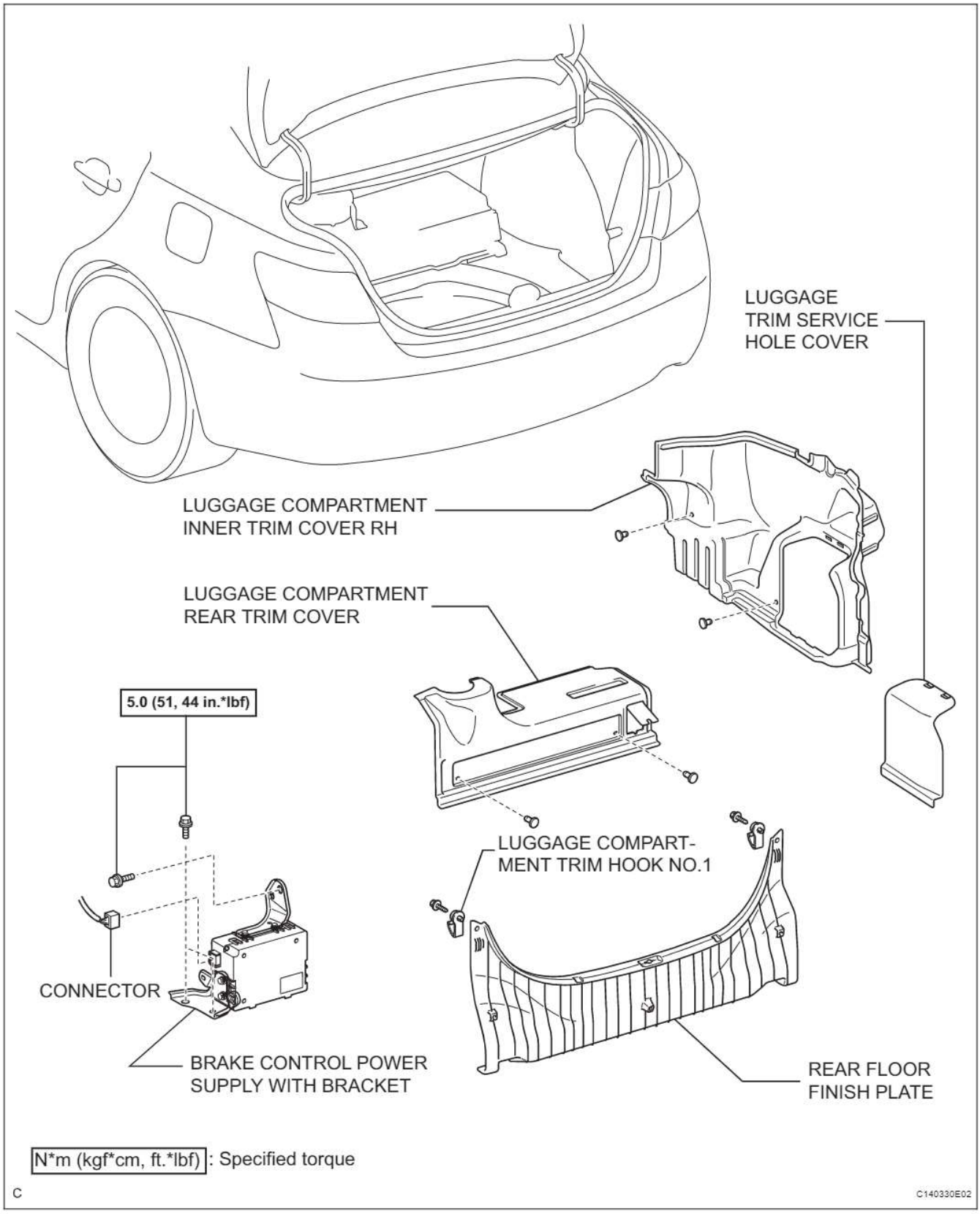
INSTALLATION

1. **INSTALL SKID CONTROL BUZZER**
   (a) Engage the claw and install the skid control buzzer.
   (b) Connect the skid control buzzer connector.
2. **INSTALL LOWER INSTRUMENT PANEL FINISH PANEL (See page IP-34)**
3. **INSTALL INSTRUMENT PANEL SUB-ASSEMBLY (See page IP-34)**
4. **INSTALL LOWER INSTRUMENT PANEL FINISH PANEL LH (See page IP-35)**
5. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY LH (See page IR-41)**
6. **INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-41)**
7. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
8. **PERFORM INITIALIZATION**
   NOTICE:
   Some systems need initialization after reconnecting the cable to the negative battery terminal. (See page IN-43)

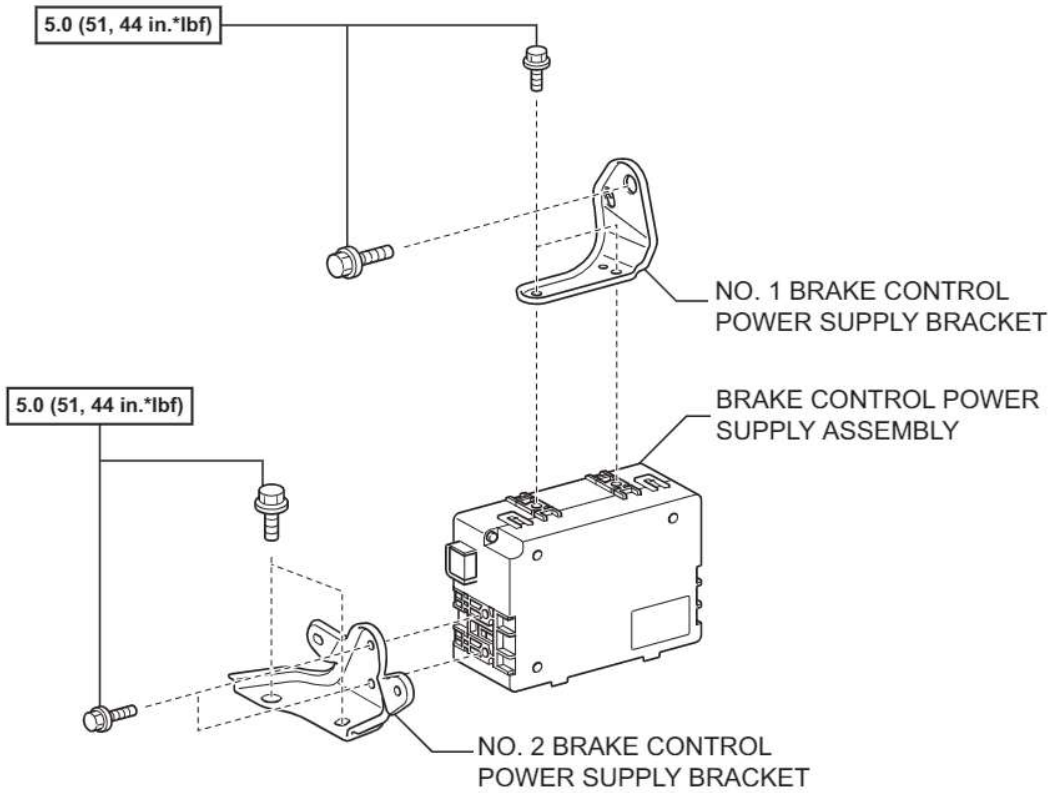
BC

BRAKE CONTROL POWER SUPPLY

COMPONENTS



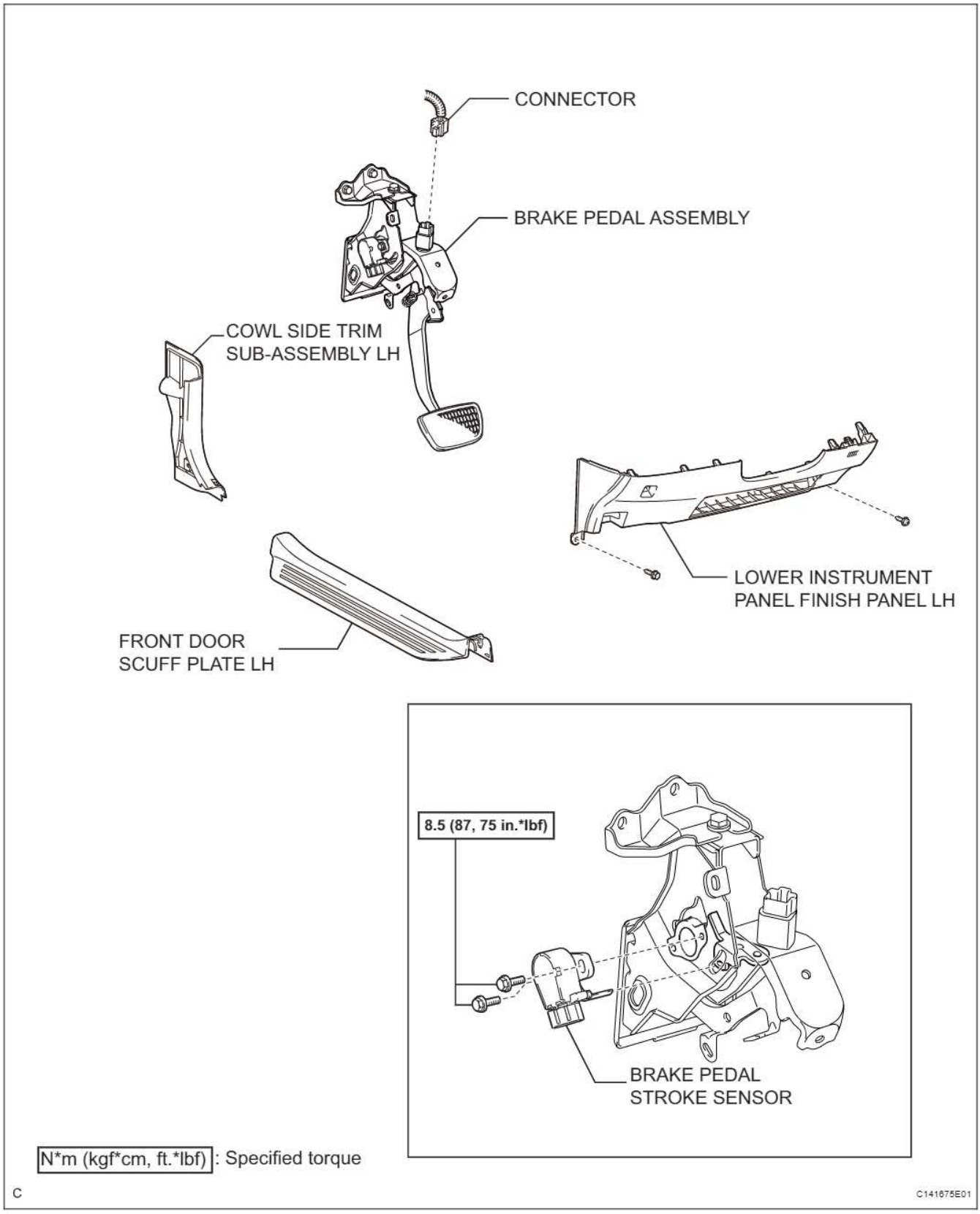
BC


5.0 (51, 44 in.*lbf)
NO. 1 BRAKE CONTROL POWER SUPPLY BRACKET
5.0 (51, 44 in.*lbf)
BRAKE CONTROL POWER SUPPLY ASSEMBLY
NO. 2 BRAKE CONTROL POWER SUPPLY BRACKET
N*m (kgf*cm, ft.*lbf): Specified torque
C143903E01

BC

BRAKE PEDAL STROKE SENSOR

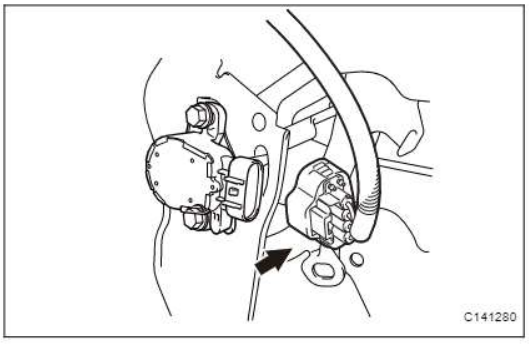
COMPONENTS



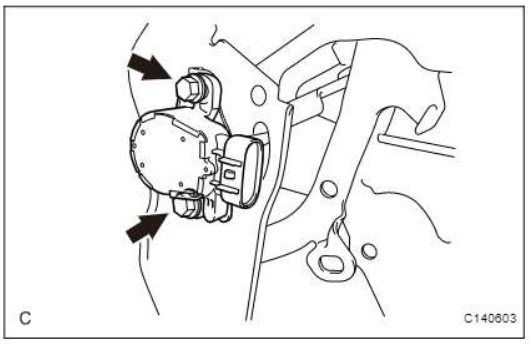
BC

REMOVAL

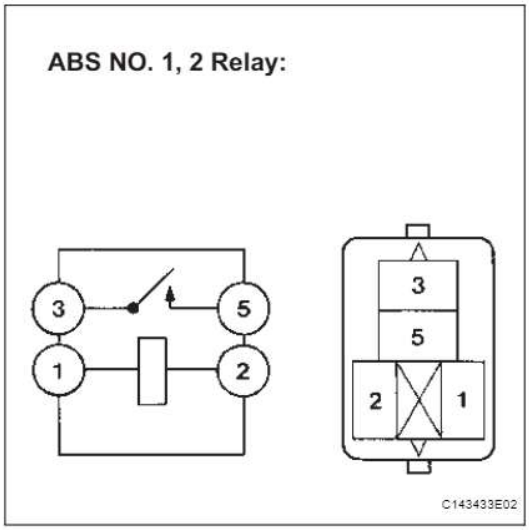
1. REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-13)
2. REMOVE COWL SIDE TRIM SUB-ASSEMBLY LH (See page IR-14)
3. REMOVE LOWER INSTRUMENT PANEL FINISH PANEL LH (See page IP-11)
4. REMOVE BRAKE PEDAL STROKE SENSOR
   (a) Disconnect the brake pedal stroke sensor connector.



   (b) Remove the 2 bolts and the brake pedal stroke sensor.



BC



ABS MAIN RELAY

INSPECTION

1. INSPECT ABS MAIN RELAY

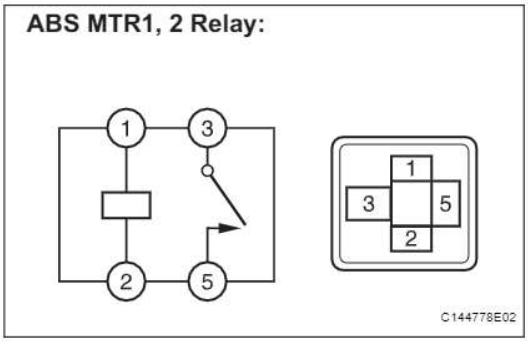
(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
3 - 5	Always	10 kΩ or higher
3 - 5	Apply B+ between terminal is 1 and 2	Below 1 Ω

If the value is not as specified, replace the ABS MAIN relay.

BC



ABS MOTOR RELAY

INSPECTION

1. INSPECT ABS MOTOR RELAY

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

Standard resistance

Tester Connection	Condition	Specified Condition
3 - 5	Always	10 kΩ or higher
3 - 5	Apply B+ between terminals 1 and 2	Below 1 Ω

If the value is not as specified, replace the ABS MOTOR relay.

BC