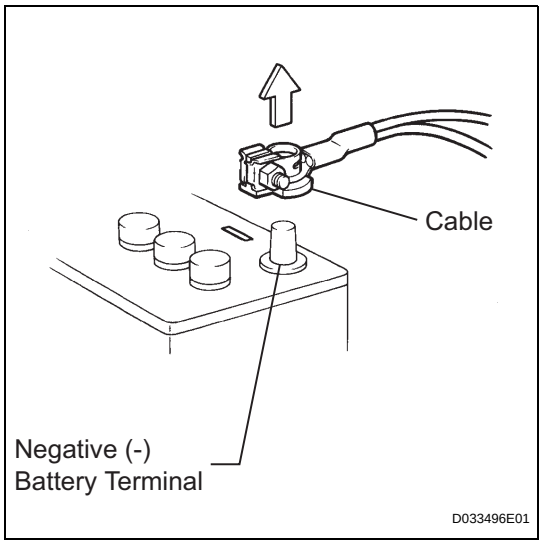
VEHICLE STABILITY CONTROL SYSTEM

PRECAUTION

1. TROUBLESHOOTING PRECAUTION

- When there is a malfunction in the contact points of the terminals or installation problems with parts, removal and reinstallation of the suspected problem parts may return the system to its normal condition either completely or temporarily.
- In order to determine the location of the malfunction, be sure to check the engine conditions at the time the malfunction occurred, through data such as DTC and freeze frame data outputs. Record this information before disconnecting any connectors and removing or installing any parts.
- Since the Vehicle Stability Control system may be influenced by malfunctions in other systems, be sure to check for DTCs in other systems.
- Be sure to remove and reinstall the hydraulic brake booster and each sensor with the ignition switch OFF unless specified in the inspection procedure.
- When removing and installing the hydraulic brake booster and each sensor, be sure to check that the normal display is output during a test mode inspection and a DTC output inspection after reinstalling all the parts.
- After replacing the master cylinder solenoid (skid control ECU) and/or the yaw rate sensor and deceleration sensor, be sure to perform the yaw rate sensor and deceleration sensor zero point calibration (See page BC-24).
- The CAN communication system is used for data communication between the skid control ECU, the steering angle sensor, and the yaw rate sensor (the deceleration sensor is included).
- If there is trouble in the CAN communication line, the DTC relating to the communication line is output. If a DTC relating to the CAN communication line is output, repair the malfunction in the communication line and troubleshoot the Vehicle Stability Control system.
- Since the CAN communication line has a specific length and route, it cannot be repaired temporarily with a bypass wire.



2. DISCONNECT AND RECONNECT CABLE OF NEGATIVE BATTERY TERMINAL

(a) Before performing electronic work, disconnect the cable from the negative (-) battery terminal in order to prevent it from shorting and burning out.

(b) Before disconnecting and reconnecting the battery cable, turn the ignition switch OFF and the headlight dimmer switch OFF. Then loosen the terminal nut completely. Do not damage the cable or terminal.

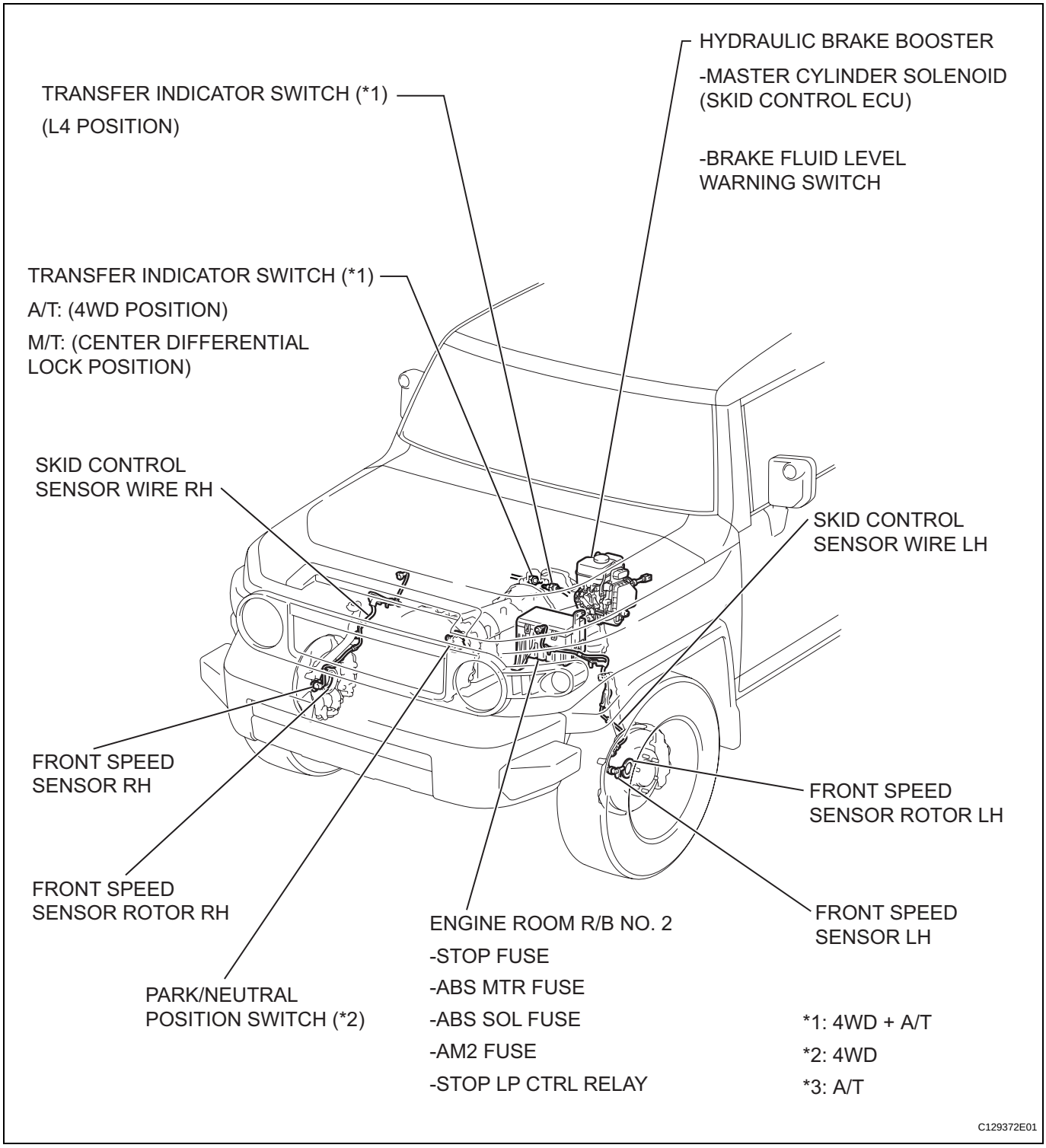
(c) When the battery cable is disconnected, the clock and radio settings and stored DTCs are erased. Therefore, before disconnecting the battery cable, make a note of them.

NOTICE:

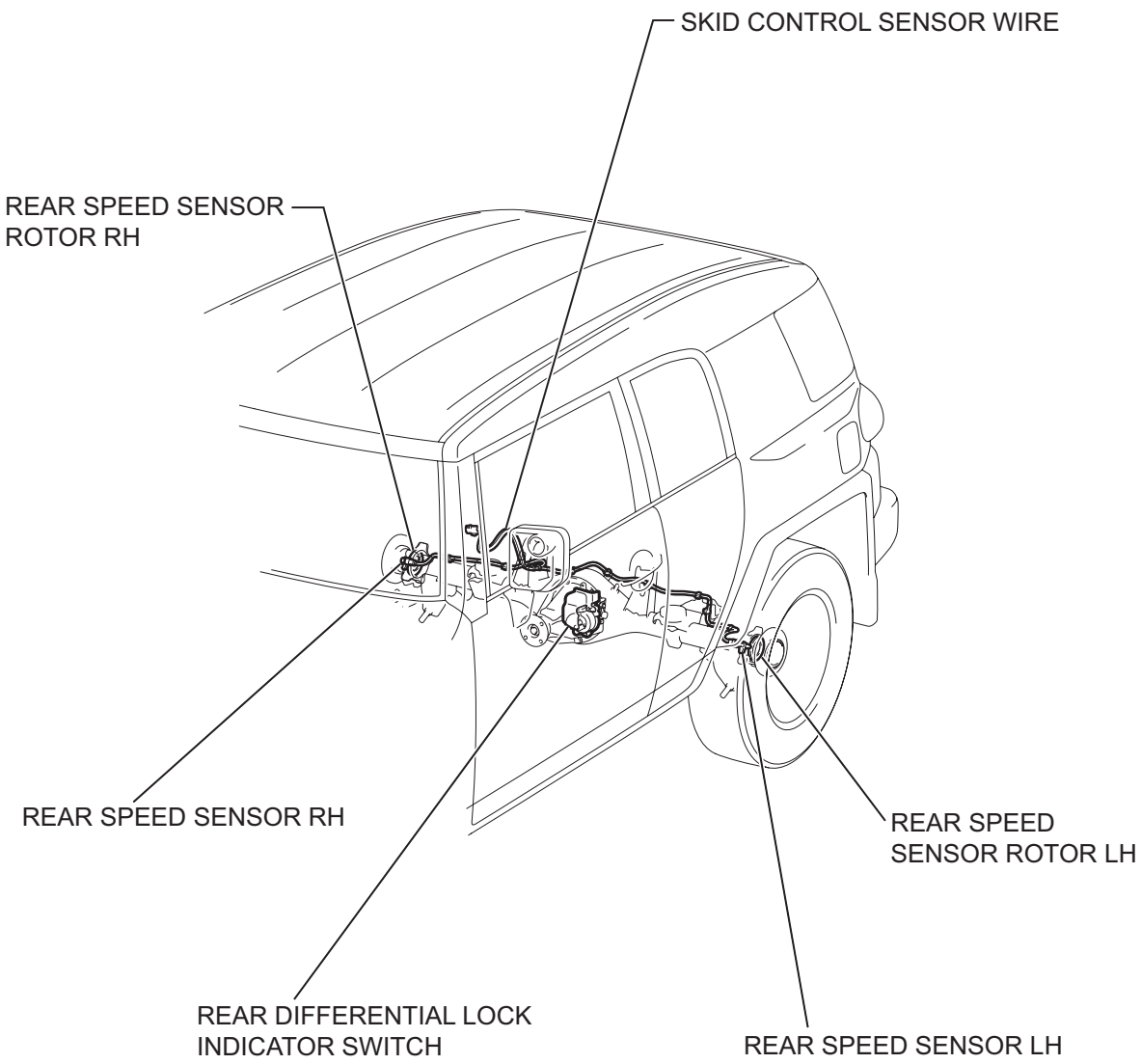
When the cable is disconnected from the negative (-) battery terminal, initialize the following system(s) after the cable is reconnected.

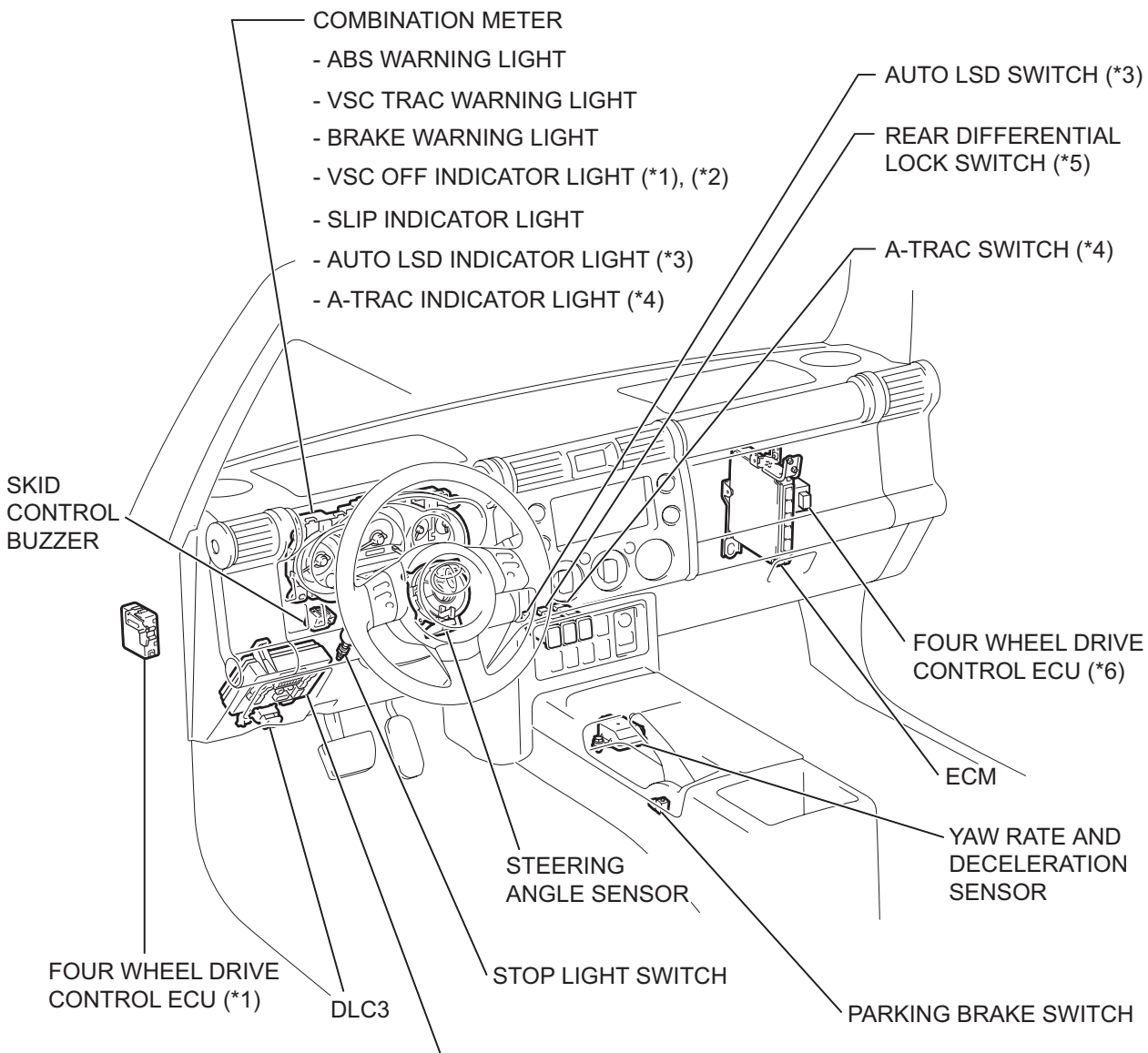
System name	See procedure
METER / GAUGE SYSTEM	ME-10

PARTS LOCATION



BC


SKID CONTROL SENSOR WIRE
REAR SPEED SENSOR ROTOR RH
REAR SPEED SENSOR RH
REAR SPEED SENSOR ROTOR LH
REAR DIFFERENTIAL LOCK INDICATOR SWITCH
REAR SPEED SENSOR LH
C139135E01

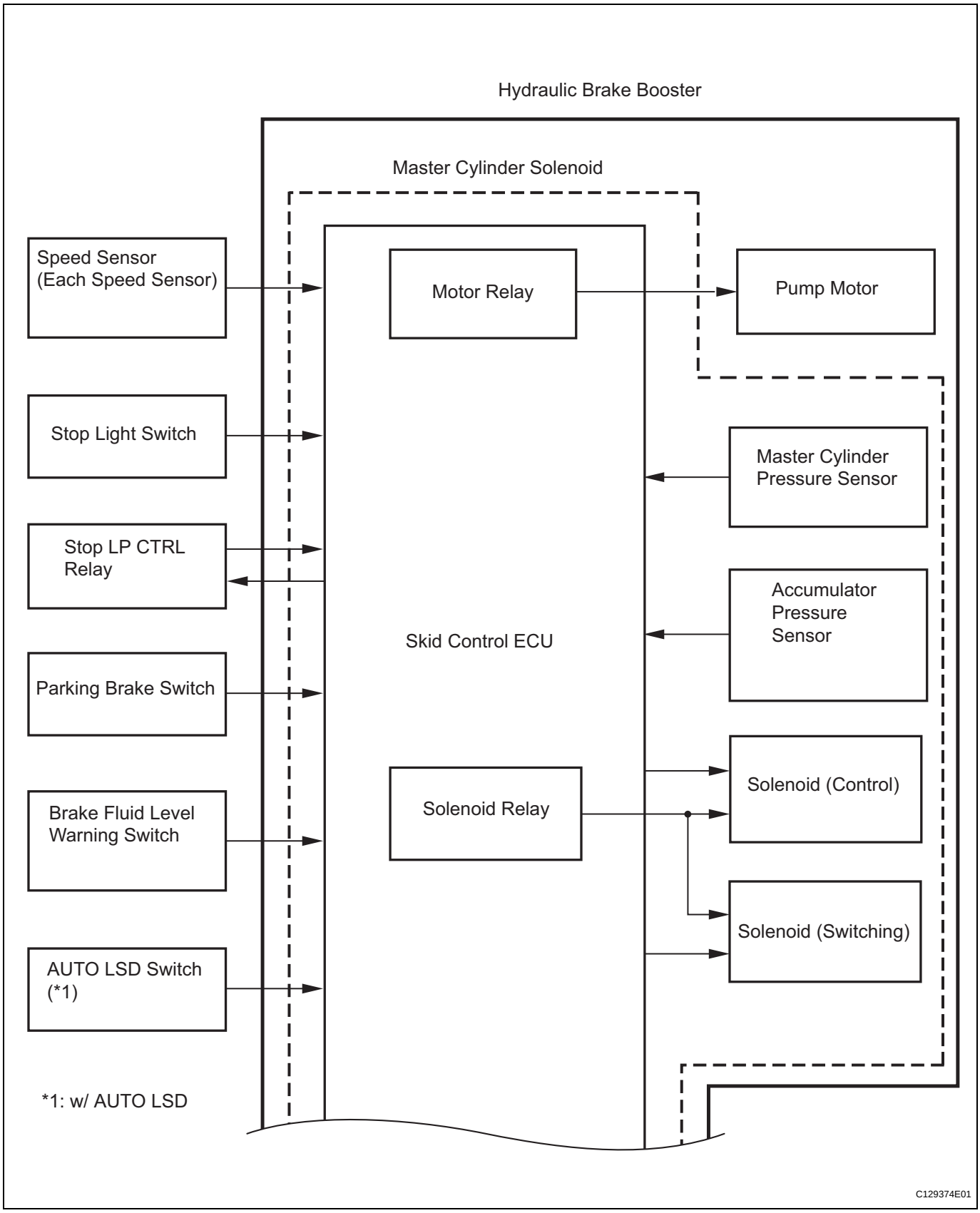


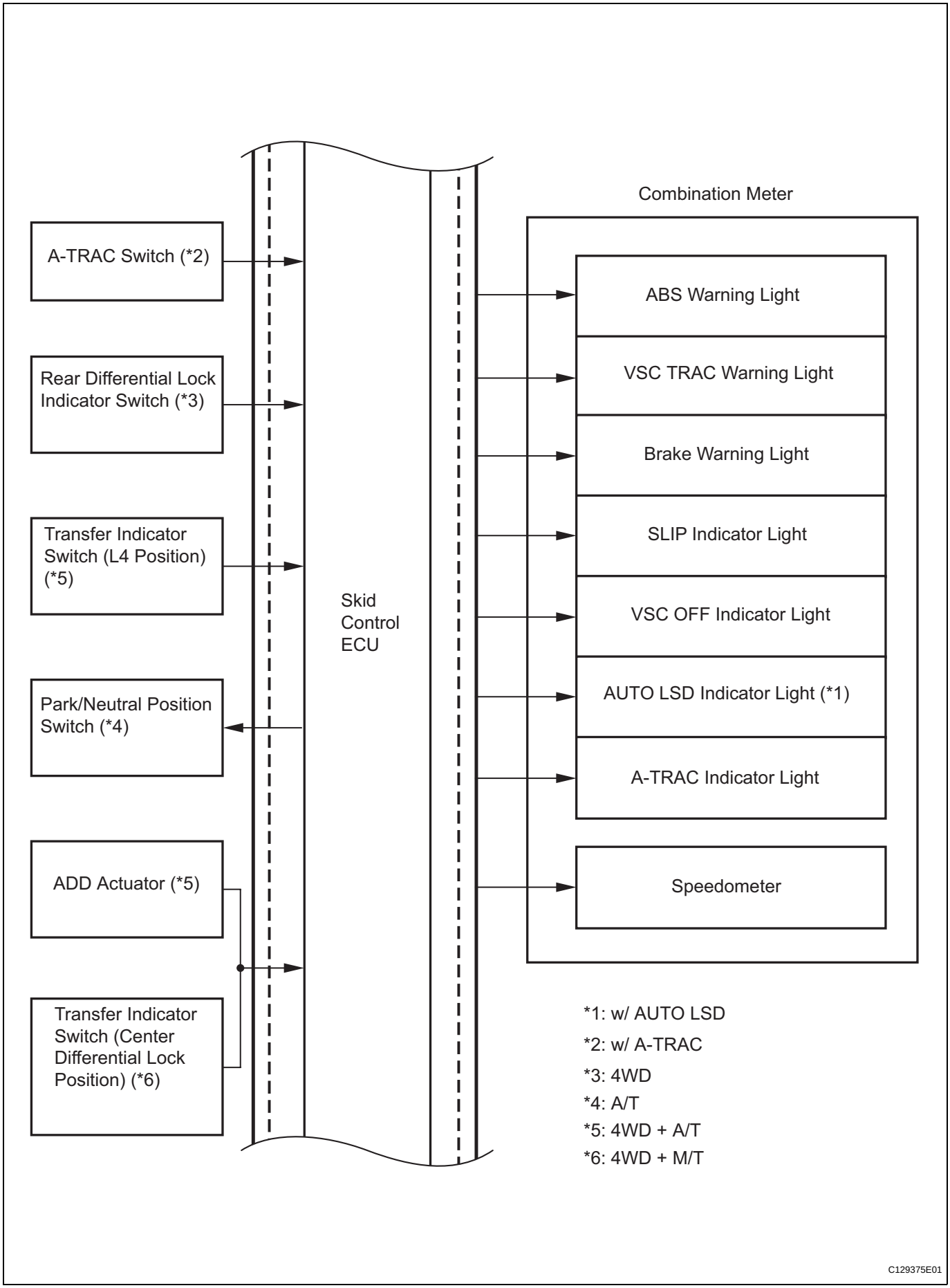
*1: 2WD with rear differential lock
*2: 4WD
*3: with AUTO LSD
*4: with A-TRAC
*5: with rear differential lock
*6: 4WD + A/T

P

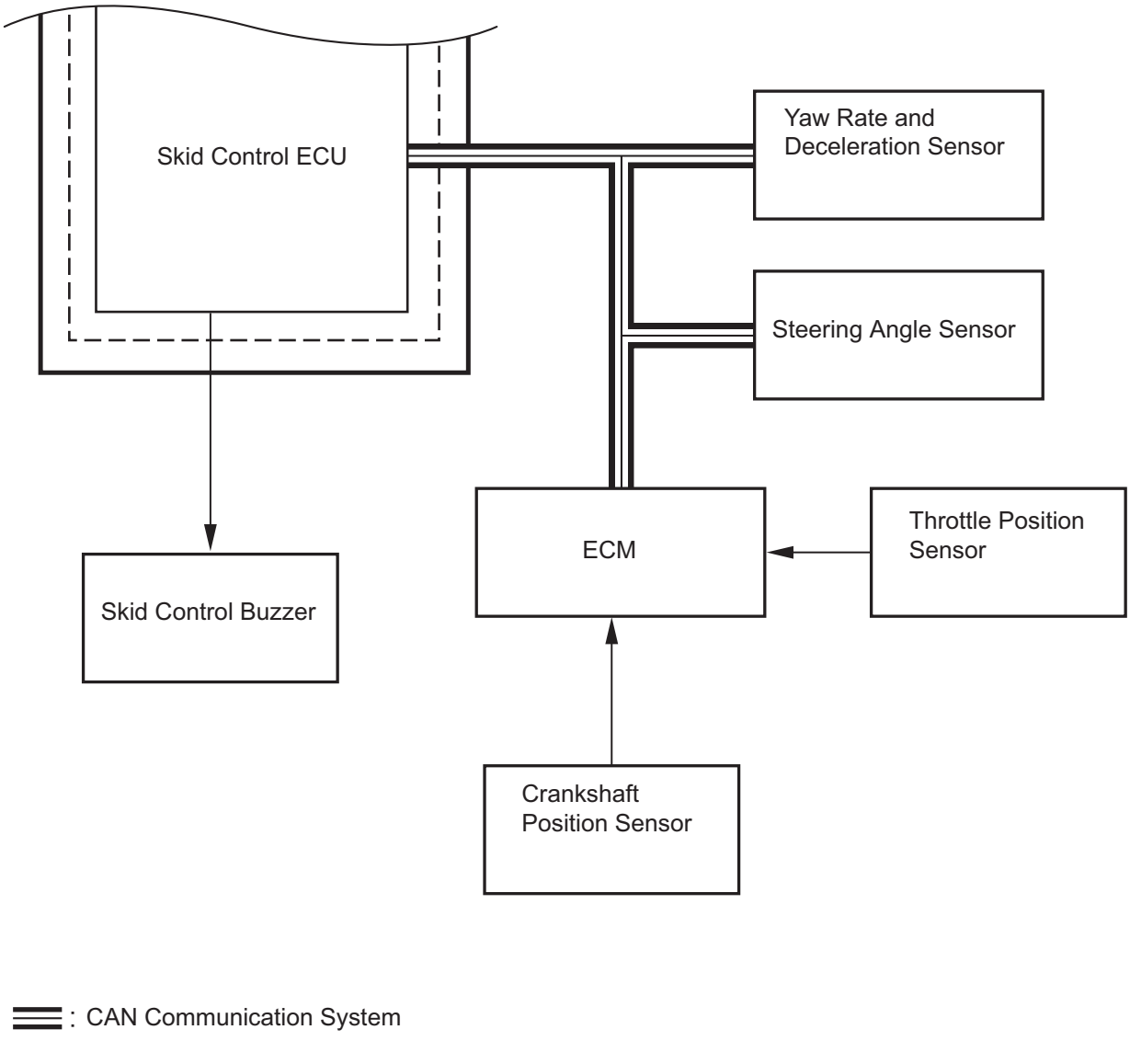
C135288E01

SYSTEM DIAGRAM




A-TRAC Switch (*2)
Rear Differential Lock Indicator Switch (*3)
Transfer Indicator Switch (L4 Position) (*5)
Park/Neutral Position Switch (*4)
ADD Actuator (*5)
Transfer Indicator Switch (Center Differential Lock Position) (*6)
Skid Control ECU
Combination Meter
ABS Warning Light
VSC TRAC Warning Light
Brake Warning Light
SLIP Indicator Light
VSC OFF Indicator Light
AUTO LSD Indicator Light (*1)
A-TRAC Indicator Light
Speedometer
*1: w/ AUTO LSD
*2: w/ A-TRAC
*3: 4WD
*4: A/T
*5: 4WD + A/T
*6: 4WD + M/T
C129375E01

BC



Transmitting ECU (Transmitter)	Receiving ECU	Signals	Communication Method
ECM	Skid control ECU	Throttle position signal	CAN communication system
ECM	Skid control ECU	Engine revolution signal	CAN communication system
ECM	Skid control ECU	Accelerator pedal position signal	CAN communication system
ECM	Skid control ECU	Intake temperature signal	CAN communication system
Skid control ECU	ECM	Yaw rate and deceleration signal	CAN communication system
Skid control ECU	ECM	Steering angle signal	CAN communication system
Skid control ECU	ECM	Throttle opening angle request signal	CAN communication system

SYSTEM DESCRIPTION

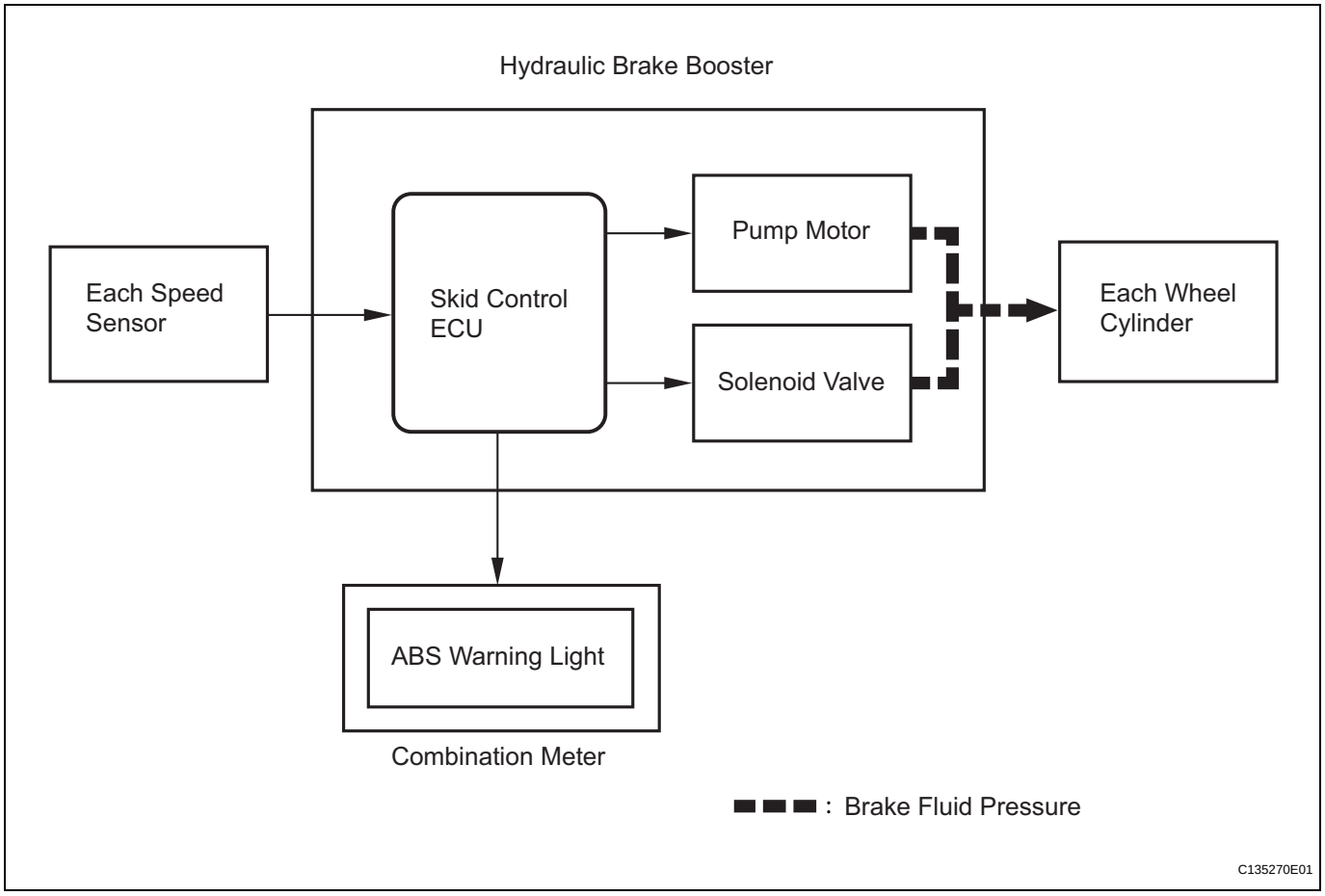
1. SYSTEM DESCRIPTION

HINT:

The skid control ECU forms a single unit with the hydraulic brake booster.

(a) ABS (Anti-lock Brake System)

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

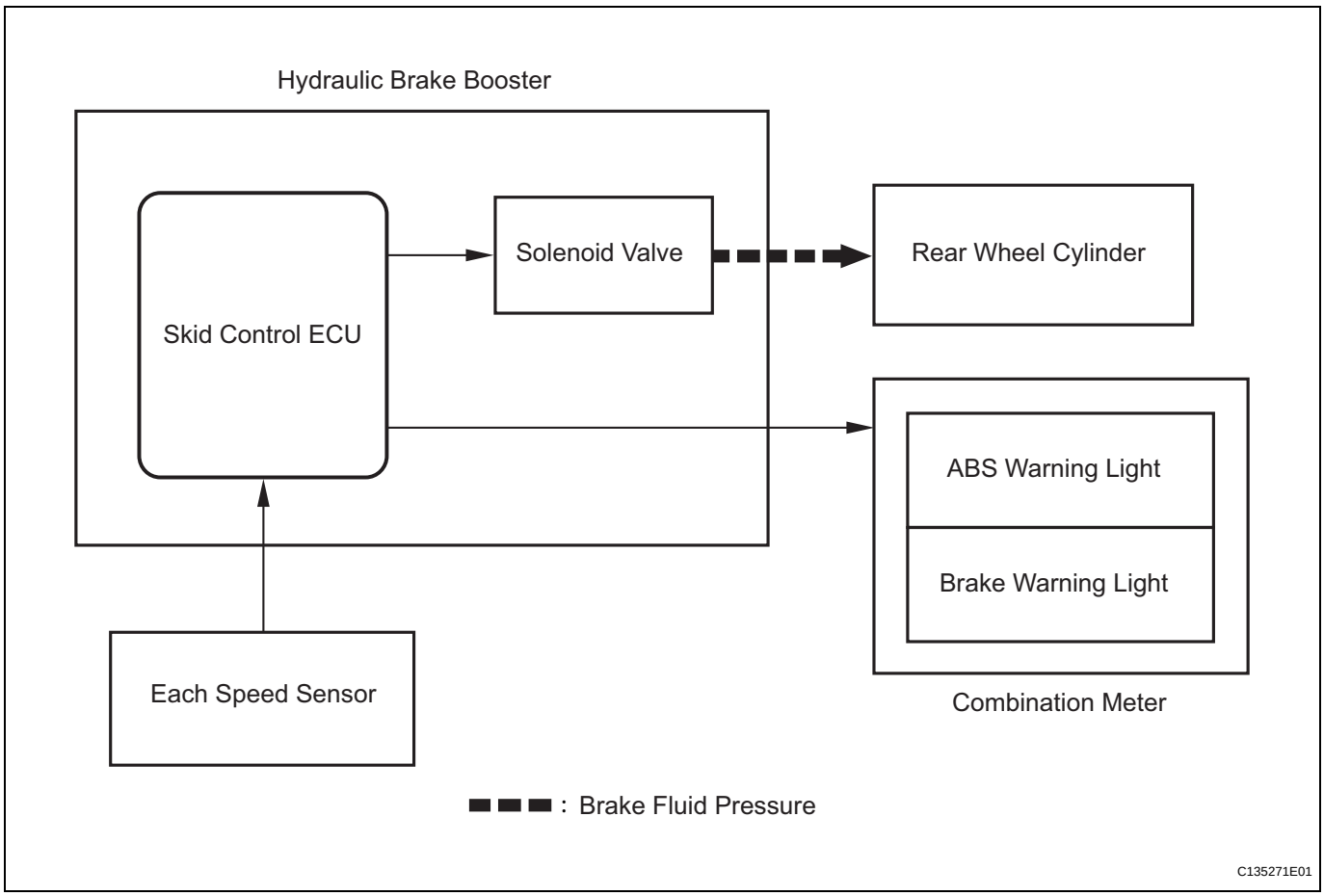


(1) Operation description

The skid control ECU detects the wheel lock condition by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valves to prevent the wheels from locking by controlling the oil pressure of each wheel cylinder.

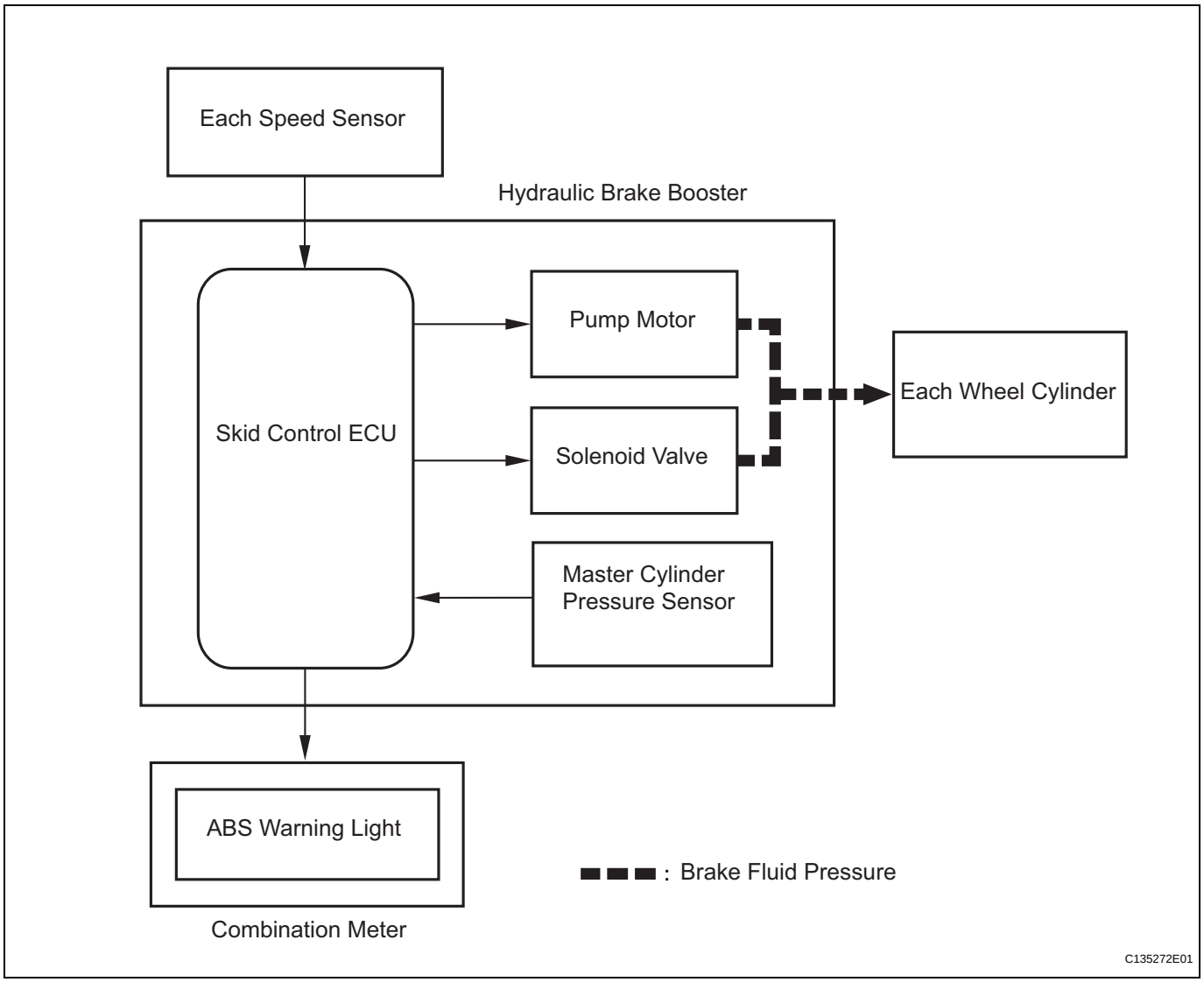
The ABS warning light comes on when the ABS system malfunctions.

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



(1) Operation description
The skid control ECU receives the speed signals from each speed sensor to detect the slip condition of the wheels and sends the control signal to the solenoid.
The solenoid valves control the oil pressure of the rear wheel cylinder and divide the control power appropriately between the front and rear wheels and the right and left wheels.
Both of the ABS and the brake warning lights come on when the EBD system malfunctions.

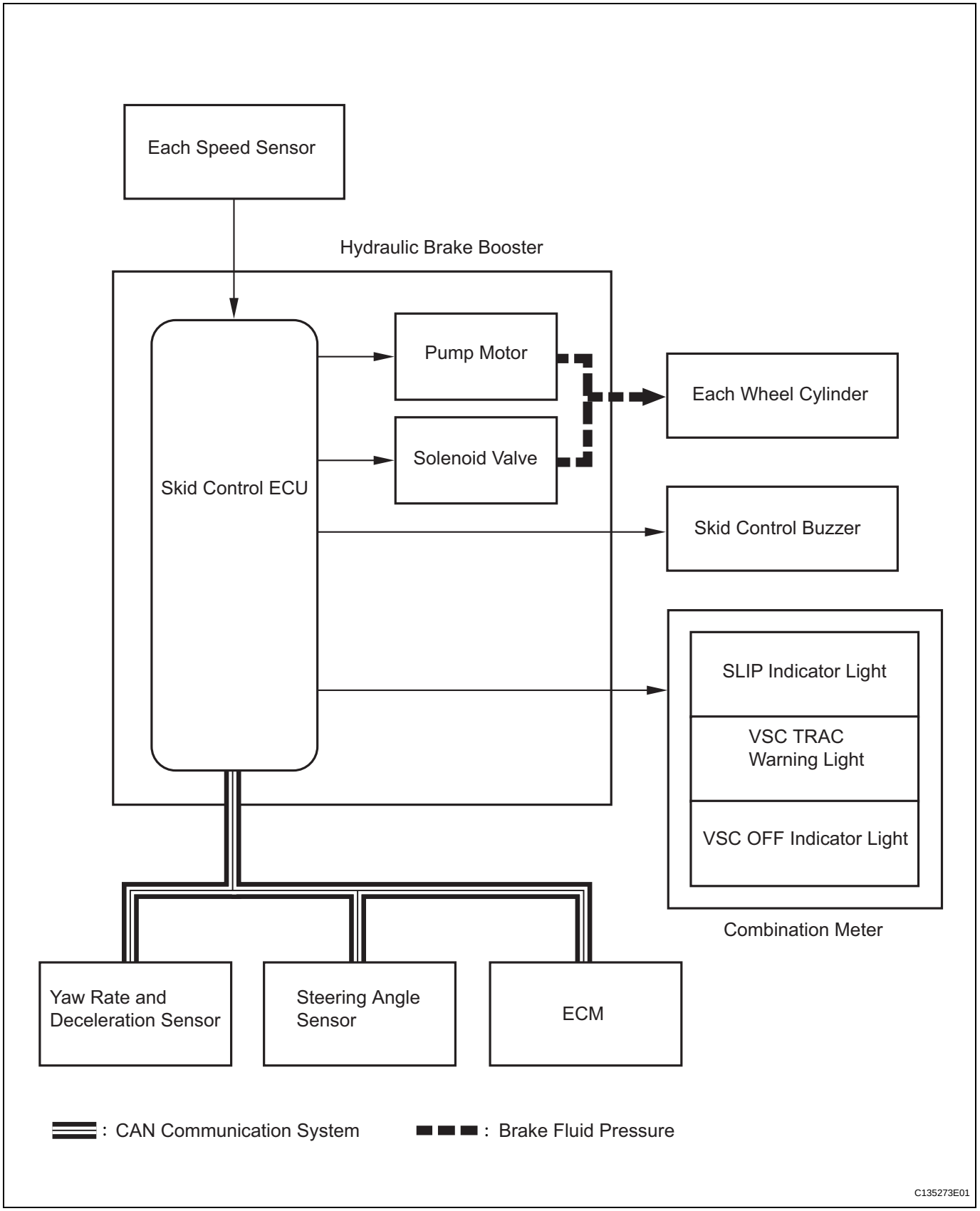
(c) BA (Brake Assist)
The primary purpose of the brake assist system is to provide an auxiliary brake force to assist drivers who cannot generate a large enough brake force during emergency braking, thus helping to maximize the vehicle's brake performance.



(1) Operation description
The skid control ECU receives the speed signals from each speed sensor and the fluid pressure signal from the master cylinder pressure sensor to determine whether brake assist is necessary. If brake assist is deemed necessary, the skid control ECU sends control signals to the pump motor and solenoid. The pump and the solenoid valves then control the pressure applied to each wheel cylinder.
The ABS warning light comes on when the BA system malfunctions.

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

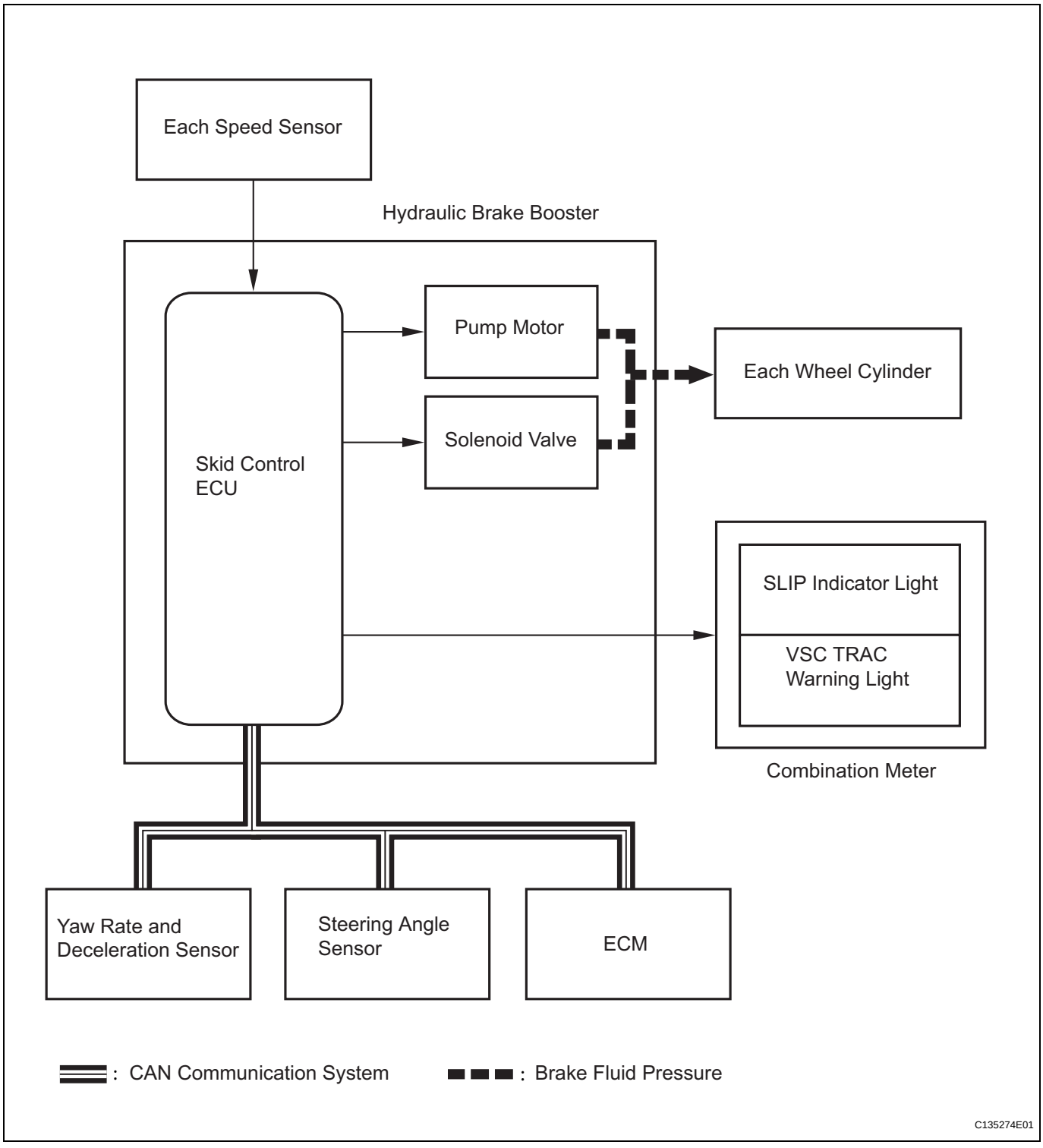
BC



(1) Operation description
The skid control ECU determines the vehicle condition by receiving signals from the speed sensors, yaw rate and deceleration sensor and steering angle sensor. The skid control ECU controls the engine torque through the ECM via CAN communication, and brake fluid pressure through the pump and solenoid valves.
The SLIP indicator light blinks and the skid control buzzer sounds when the system is operating. The VSC TRAC warning light and the VSC OFF indicator light (for 2WD with rear differential lock or 4WD) come on when the VSC system malfunctions.

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

BC



(1) Operation description

The skid control ECU detects the vehicle's slip condition by receiving signals from each speed sensor and the ECM via CAN communication. The skid control ECU controls engine torque through the ECM via CAN communication, and brake fluid pressure through the pump and solenoid valves.

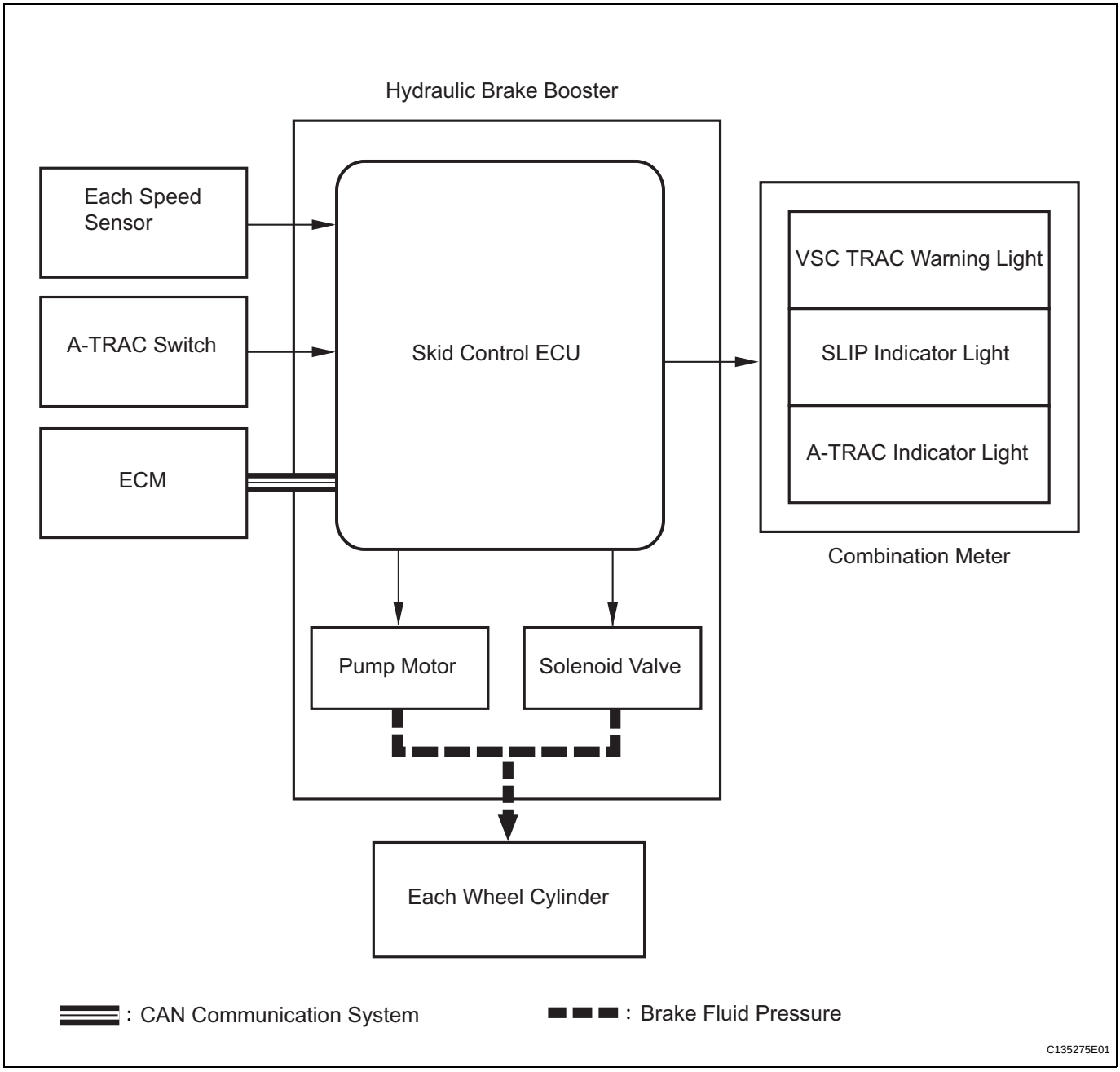
The SLIP indicator light blinks when the system is operating. The VSC TRAC warning light and SLIP indicator light come on when the TRAC system malfunctions.

(f) A-TRAC (Active Traction Control)

During rugged off-road driving, this function controls the engine output and the brake fluid pressure that is applied to slipping wheels, and distributes the drive force that would have been lost through the slippage to the remaining wheels in order to achieve a LSD (Limited Slip Differential) effect. As a result, the vehicle's off-road drivability and ability to free itself from moguls have been increased.

HINT:

The A-TRAC system operates when 4WD mode is selected (4WD vehicles only).


Hydraulic Brake Booster
Each Speed Sensor
A-TRAC Switch
ECM
Skid Control ECU
VSC TRAC Warning Light
SLIP Indicator Light
A-TRAC Indicator Light
Combination Meter
Pump Motor
Solenoid Valve
Each Wheel Cylinder
: CAN Communication System
: Brake Fluid Pressure
C135275E01

(1) Operation description

When the A-TRAC switch is pressed and the A-TRAC system is operative, the A-TRAC indicator light comes on. When the system is operating, the SLIP indicator light blinks.

The VSC TRAC warning light and SLIP indicator light come on when the A-TRAC system malfunctions.

HINT:

If the A-TRAC system operates constantly for a long time, the temperature of the actuator in the hydraulic brake booster may increase excessively. In such cases, the skid control buzzer sounds intermittently and the SLIP indicator light comes on. If this condition continues, the skid control buzzer sounds for approximately 1 second and the A-TRAC system is temporarily deactivated. After a while, the SLIP indicator light goes off and the A-TRAC system is reactivated. The vehicle can be driven normally while the A-TRAC system is deactivated.

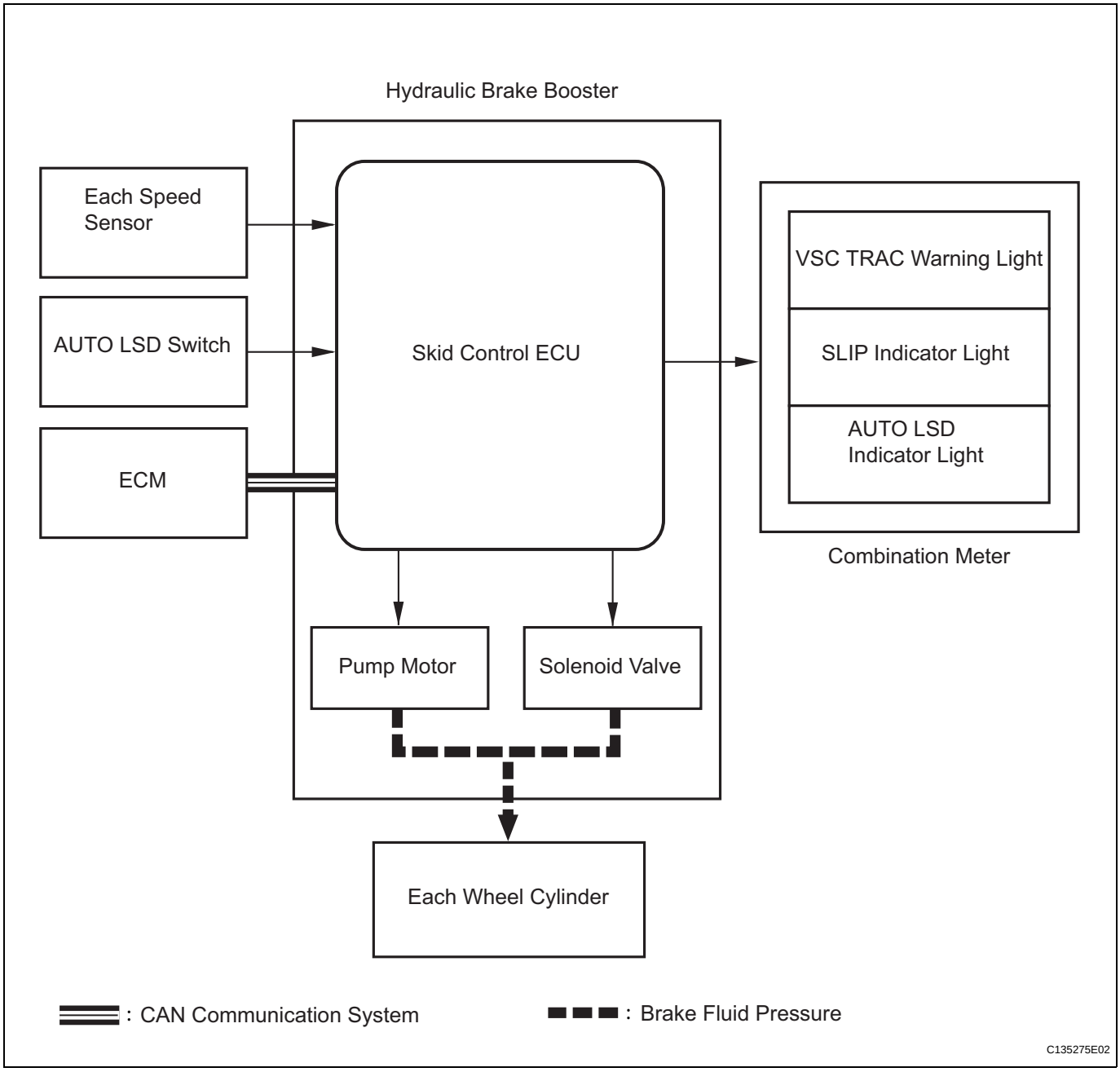
(g) AUTO-LSD (Auto Limited Slip Differential)

The AUTO LSD operates with the AUTO LSD switch on and the accelerator pedal depressed. The TRAC system restrains brake pressure and reduces differential move, thus transmitting the drive torque to the other drive wheel to ensure stability under the following conditions:

- Wheels run off the road.
- Drive wheels run idle when starting on a slope with one wheel on snow/ice.

HINT:

Depressing the brake pedal cancels control of the AUTO LSD system.


Hydraulic Brake Booster
Each Speed Sensor
AUTO LSD Switch
ECM
Skid Control ECU
VSC TRAC Warning Light
SLIP Indicator Light
AUTO LSD Indicator Light
Combination Meter
Pump Motor
Solenoid Valve
Each Wheel Cylinder
: CAN Communication System
: Brake Fluid Pressure
C135275E02

(1) Operation description

When the AUTO LSD switch is pressed and the AUTO LSD system is operative, the AUTO LSD indicator light comes on. When the system is operating, the SLIP indicator light blinks.

The VSC TRAC warning light and SLIP indicator light come on when the AUTO LSD system malfunctions.

HINT:

If the AUTO LSD system operates constantly for a long time, the temperature of the actuator in the hydraulic brake booster may increase excessively. In such cases, the skid control buzzer sounds intermittently and the SLIP indicator light comes on. If this condition continues, the skid control buzzer sounds for approximately 1 second and the AUTO LSD system is temporarily deactivated. After a while, the SLIP indicator light goes off and the AUTO LSD system is reactivated. The vehicle can be driven normally while the AUTO LSD system is deactivated.

2. ABS with EBD, BA, TRAC, AUTO LSD, A-TRAC and VSC OPERATION

(a) The skid control ECU calculates vehicle stability tendency based on the signals from the 4 wheel speed sensors, the yaw rate and deceleration sensor and the steering angle sensor. In addition, it evaluates the results of the calculations to determine whether any control actions (control of the engine output torque by electronic throttle control and of the brake fluid pressure by the hydraulic brake booster) should be implemented.

3. FAIL SAFE FUNCTION

(a) When a failure occurs in the ABS with BA, TRAC, AUTO LSD, A-TRAC and VSC systems, the ABS and VSC TRAC warning lights, and VSC OFF and SLIP indicator lights come on, and the operation of those systems is prohibited. In addition to this, when a failure which disables the EBD operation occurs, the brake warning light comes on and its operation is prohibited.

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

4. INITIAL CHECK

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

5. FUNCTION OF COMPONENTS

Components	Function
Hydraulic brake booster	• Consists of master cylinder solenoid, pump motor and accumulator reservoir, and adjusts brake fluid pressure applied to each wheel cylinder. • Houses skid control ECU.
Skid control ECU	• Processes signals from each sensor to control ABS, BA, TRC, VSC, A-TRAC and AUTO LSD. • Sends and receives control signals to and from ECM, yaw rate and deceleration sensor, steering angle sensor, etc. via CAN communication. • Housed in hydraulic brake booster.
Master cylinder pressure sensor	• Detects brake fluid pressure in master cylinder. • Housed in hydraulic brake booster.
Accumulator pressure sensor	• Detects accumulator pressure in accumulator. • Housed in hydraulic brake booster.
Front speed sensor	• Detects wheel speed and sends signal to skid control ECU. • Front speed sensor (semiconductor speed sensor) with integrated bearing and sensor rotor (magnetic sensor rotor) are installed on front axle hub. • Magnetic sensor rotor is equipped with north and south poles (48 poles each), which are evenly spaced around its circumference. • Magnetic field changes as magnetic sensor rotor rotates. Semiconductor speed sensor detects change and outputs it as vehicle speed pulse.
Rear speed sensor	• Rear speed sensor (semiconductor speed sensor) and sensor rotor (magnetic sensor rotor) are installed on rear axle carrier. • Rear speed sensor has same structure and functions as front speed sensor.
ABS warning light	Illuminates to inform driver that skid control ECU has detected ABS system malfunction and terminated ABS system operation.
BRAKE warning light	Illuminates to inform driver that skid control ECU has detected BRAKE system malfunction.
VSC TRAC warning light	Illuminates to inform driver that skid control ECU has detected VSC system malfunction and terminated VSC system operation.
SLIP indicator light	Blinks to inform driver that VSC, TRAC, A-TRAC or AUTO LSD is in operation.
A-TRAC indicator light	Illuminates to inform driver that A-TRAC is ready to operate.
AUTO LSD indicator light	Illuminates to inform driver that AUTO LSD is ready to operate.
Yaw rate and deceleration sensor	Detects vehicle's yaw rate and deceleration and sends signal to skid control ECU via CAN communication system.
Steering angle sensor	Detects steering wheel's steering angle and amount of movement, then sends signal to skid control ECU via CAN communication system.
Skid control buzzer	• Sounds intermittently to inform driver that VSC activating. • Sounds intermittently to inform driver if temperature of hydraulic brake booster has increased excessively due to continuous operation of TRAC, A-TRAC and AUTO LSD. • Sounds continuously to alert driver that hydraulic pressure of accumulator in hydraulic brake booster has decreased.
ECM	• Sends sensor signals (throttle opening angle, engine rpm) to skid control ECU. • Engine controlled based on traction control signal from skid control ECU via CAN communication system.
A-TRAC switch	Allows driver to turn A-TRAC on and off.
AUTO LSD switch	Allows driver to turn AUTO LSD on and off.

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester can be used in steps 3, 5 and 6.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS

NEXT

3 DTCS AND FREEZE FRAME DATA CHECK AND CLEARANCE

NEXT

4 PROBLEM SYMPTOM CONFIRMATION

Result

Result	Proceed to
Symptom does not occur	A
Symptom occurs	B

B → SYMPTOM SIMULATION

A

5 CHECK CAN COMMUNICATION SYSTEM

(a) Check for the output DTCs relating to the CAN communication system.
HINT:
The ECU of this system is connected to the CAN communication system. Therefore, before starting troubleshooting, be sure to check that there is no trouble in the CAN communication system.

Result

Result	Proceed to
CAN communication system DTC not output	A
CAN communication system DTC output	B

B → CAN COMMUNICATION SYSTEM

A

6	DTC CHECK

HINT:
See page BC-45.

BC

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → PROBLEM SYMPTOMS TABLE

A

7	DTC CHART

HINT:
See page BC-53.

NEXT

8	CIRCUIT INSPECTION

HINT:
When 2 or more DTCs are detected, perform circuit inspections one by one until the problem is identified.

NEXT

9	PROBLEM IDENTIFICATION

NEXT

10	REPAIR OR REPLACEMENT

NEXT

11	CONFIRMATION TEST

NEXT

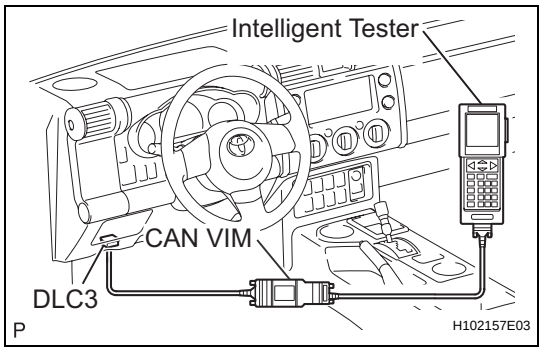
END

CHECK FOR INTERMITTENT PROBLEMS

1. DESCRIPTION

HINT:

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



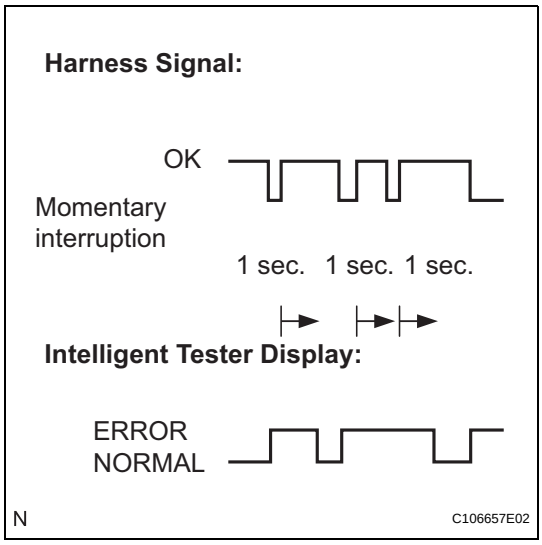
(a) Turn the ignition switch off and connect the intelligent tester to the DLC3.

(b) Turn the ignition switch on. Follow the on-screen directions on the intelligent tester to display the DATA LIST and select areas which should be monitored for momentary interruptions.

HINT:

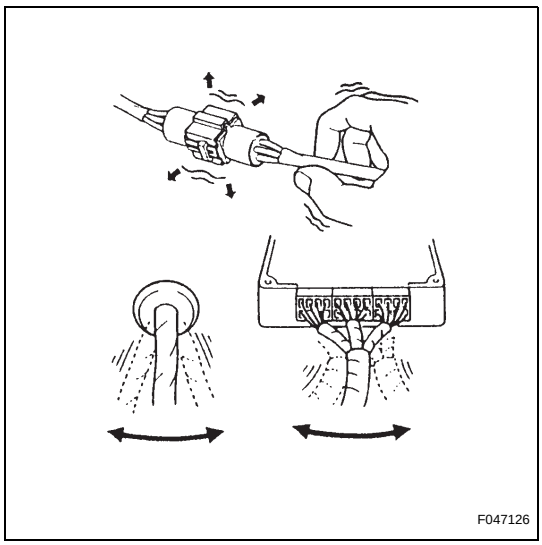
A momentary interruption (open circuit) cannot be detected for 3 seconds after the ignition switch is turned on (initial check).

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
SPD SEN FR	FR speed sensor open detection / OPN_DET or NORMAL	OPN_DET : Momentary interruption NORMAL : Normal	-
SPD SEN FL	FL speed sensor open detection / OPN_DET or NORMAL	OPN_DET : Momentary interruption NORMAL : Normal	-
SPD SEN RR	RR speed sensor open detection / OPN_DET or NORMAL	OPN_DET : Momentary interruption NORMAL : Normal	-
SPD SEN RL	RL speed sensor open detection / OPN_DET or NORMAL	OPN_DET : Momentary interruption NORMAL : Normal	-
EFI COM	EFI communication open detection / OPN_DET or NORMAL	OPN_DET : Momentary interruption NORMAL : Normal	-
YAWRATE SEN	Yaw rate sensor open detection / OPN_DET or NORMAL	OPN_DET : Momentary interruption NORMAL : Normal	-
DECELE SEN	Deceleration sensor open detection / OPN_DET or NORMAL	OPN_DET : Momentary interruption NORMAL : Normal	-
STEERING SEN	Steering angle sensor open detection / OPN_DET or NORMAL	OPN_DET : Momentary interruption NORMAL : Normal	-
ACC SEN	Accumulator pressure sensor open detection / OPN_DET or NORMAL	OPN_DET : Momentary interruption NORMAL : Normal	-



HINT:

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



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

OK:

OPEN-screen display does not change.

CALIBRATION

1. DESCRIPTION

(a) After replacing the VSC relevant components or performing "Front wheel alignment adjustment", clearing and reading the sensor calibration data are necessary.

(b) Follow the chart to perform calibration.

Replacing Parts	Necessary Operations
Skid Control ECU	Yaw rate sensor and deceleration sensor zero point calibration.
Yaw Rate Sensor	1. Clearing zero point calibration data. 2. Yaw rate sensor and deceleration sensor zero point calibration.
Front Wheel Alignment	1. Clearing zero point calibration data. 2. Yaw rate sensor and deceleration sensor zero point calibration.

2. CLEAR ZERO POINT CALIBRATION (for Using a Intelligent Tester)

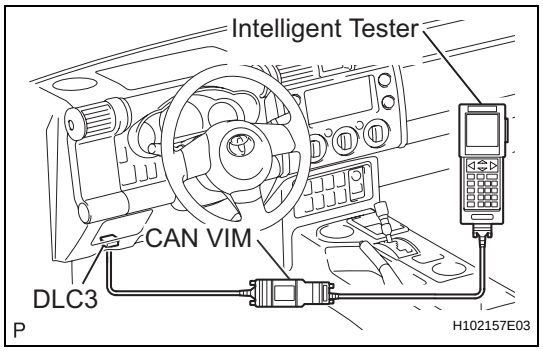
HINT:

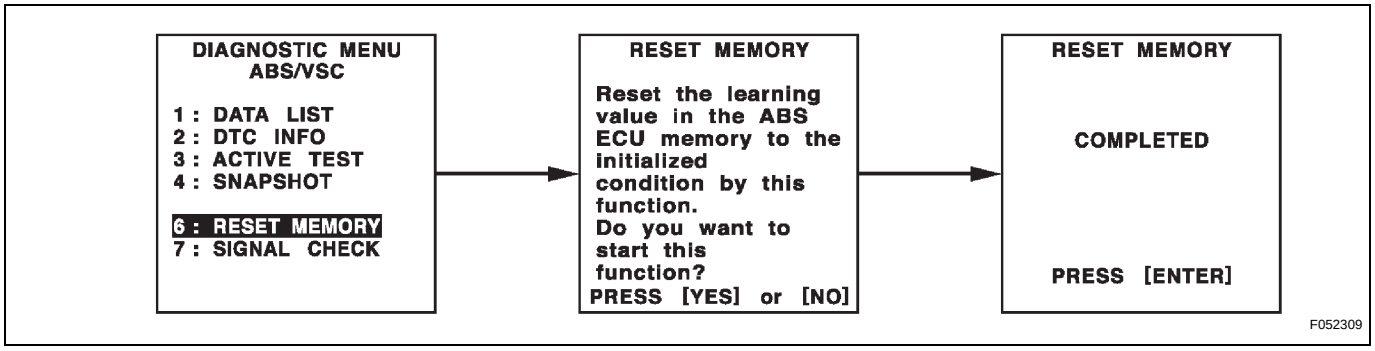
After replacing the yaw rate and deceleration sensor or adjusting the front wheel alignment, be sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

(a) Connect the intelligent tester to the DLC3.

(b) Turn the ignition switch on.

(c) Operate the intelligent tester to erase the DTCs.





3. PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND DECELERATION SENSOR (for Using a Intelligent Tester)

HINT:

After replacing the skid control ECU and/or yaw rate and deceleration sensor, or adjusting the front wheel alignment, be sure to perform yaw rate sensor and deceleration sensor zero point calibration.

BC

NOTICE:

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

(a) Procedures for test mode.

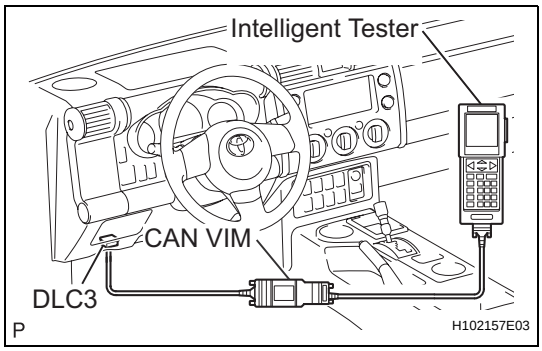
(1) Turn the ignition switch off.

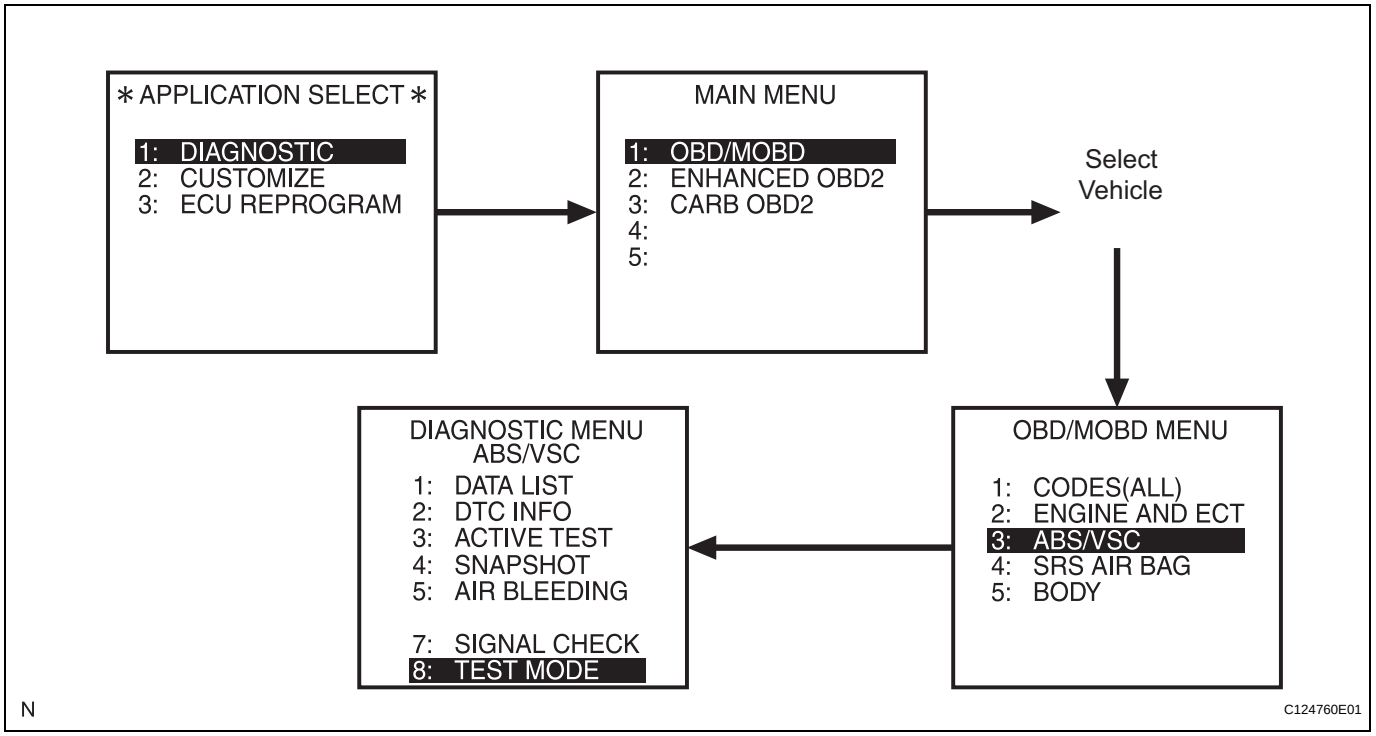
(2) Check that the steering wheel is in the straight-ahead position.

(3) A/T: Check that the shift lever is in the P position and apply the parking brake.
M/T: Check that the shift lever is in neutral and apply the parking brake.
NOTICE:
DTC C1210/36 and C1336/39 will be recorded if the shift lever is not in the P position.

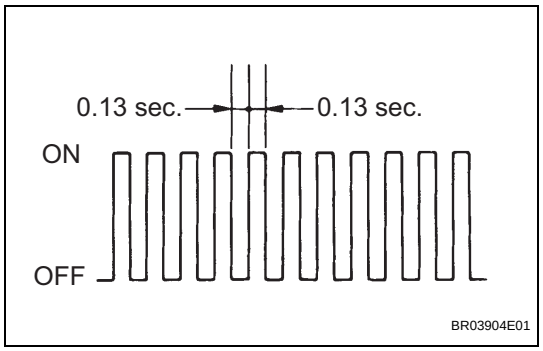
(4) Connect the intelligent tester to the DLC3.

(5) Turn the ignition switch on.





Switch the ECU to test mode using the intelligent tester.
Select the following menu items: DIAGNOSTIC / OBD/MOBD / select vehicle / ABS/VSC / TEST MODE.



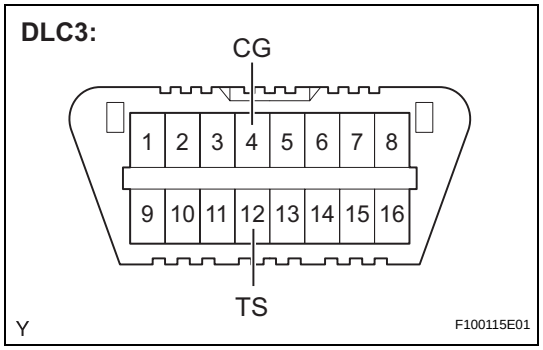
(7) Keep the vehicle stationary on a level surface for 2 seconds or more.

(8) Check that the VSC TRAC warning light blinks as shown in the illustration.
NOTICE:
The VSC TRAC warning light (and VSC OFF indicator light (4WD or 2WD with rear differential lock)) stay ON when obtaining the zero point.
HINT:
- If the VSC TRAC warning light does not blink, perform the zero point calibration again.
- The zero point calibration is performed only once after the system enters test mode.
- Calibration cannot be performed again until the stored data is cleared once.

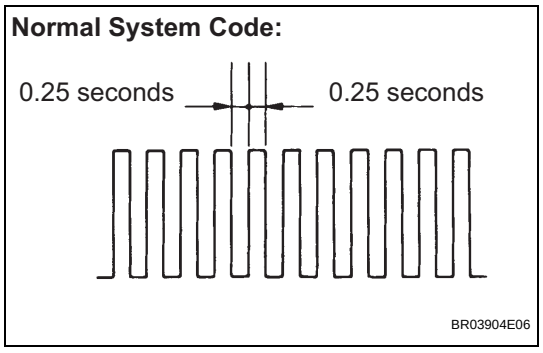
4. CLEAR ZERO POINT CALIBRATION (for Using a SST Check Wire)

HINT:
After replacing the yaw rate and deceleration sensor or adjusting the front wheel alignment, be sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

(a) Turn the ignition switch on.



(b) Using SST, connect and disconnect terminals TS and CG of the DLC3 4 times or more within 8 seconds.
SST 09843-18040



(c) Check that the warning light blinks in a normal system indication pattern.

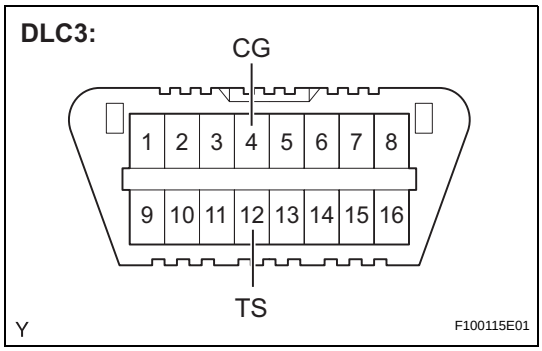
5. PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND DECELERATION SENSOR (for Using a SST Check Wire)

HINT:
After replacing the skid control ECU and/or yaw rate and deceleration sensor, or adjusting the front wheel alignment, be sure to perform yaw rate sensor and deceleration sensor zero point calibration.
NOTICE:
- **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it stationary. (Do not start the engine.)**
- **Be sure to do this on a level surface (with an inclination of less than 1 degree).**

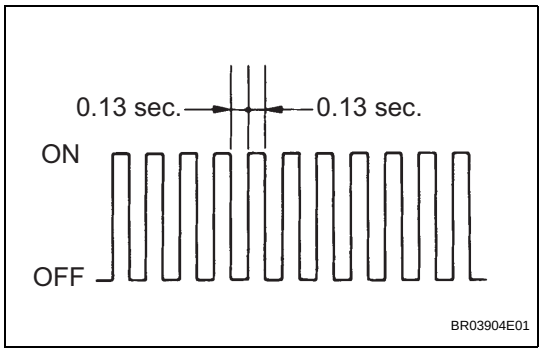
(a) Procedures for test mode:
(1) Turn the ignition switch off.

BC

(2) Check that the steering wheel is in the straight-ahead position.
(3) A/T: Check that the shift lever is in the P position and apply the parking brake.
M/T: Check that the shift lever is in neutral and apply the parking brake.
NOTICE:
DTC C1210/36 and C1336/39 will be recorded if the shift lever is not in the P position.



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



(7) Check that the VSC TRAC warning light blinks as shown in the illustration.
NOTICE:
The VSC TRAC warning light (and VSC OFF indicator light (4WD or 2WD with rear differential lock)) stay ON when obtaining the zero point.
HINT:
- If the VSC TRAC warning light does not blink, perform the zero point calibration again.
- The zero point calibration is performed only once after the system enters test mode.
- Calibration cannot be performed again until the stored data is cleared once.

TEST MODE PROCEDURE

1. TEST MODE PROCEDURE (for Using a Intelligent Tester)

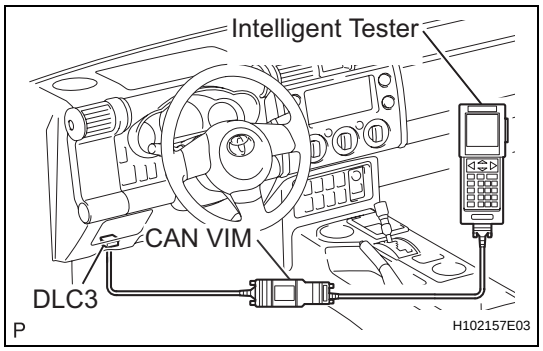
HINT:

- After replacing the yaw rate and deceleration sensor, be sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.
- If the ignition switch is turned from the ON to the ACC or LOCK position during test mode, DTCs related to the signal check function will be erased.
- During test mode, the skid control ECU records all DTCs related to the signal check function. By performing the signal check, the codes are erased if normality is confirmed. The codes left over are the codes where an abnormality was found.

(a) Turn the ignition switch off.

(b) Check that the steering wheel is in the straight-ahead position.

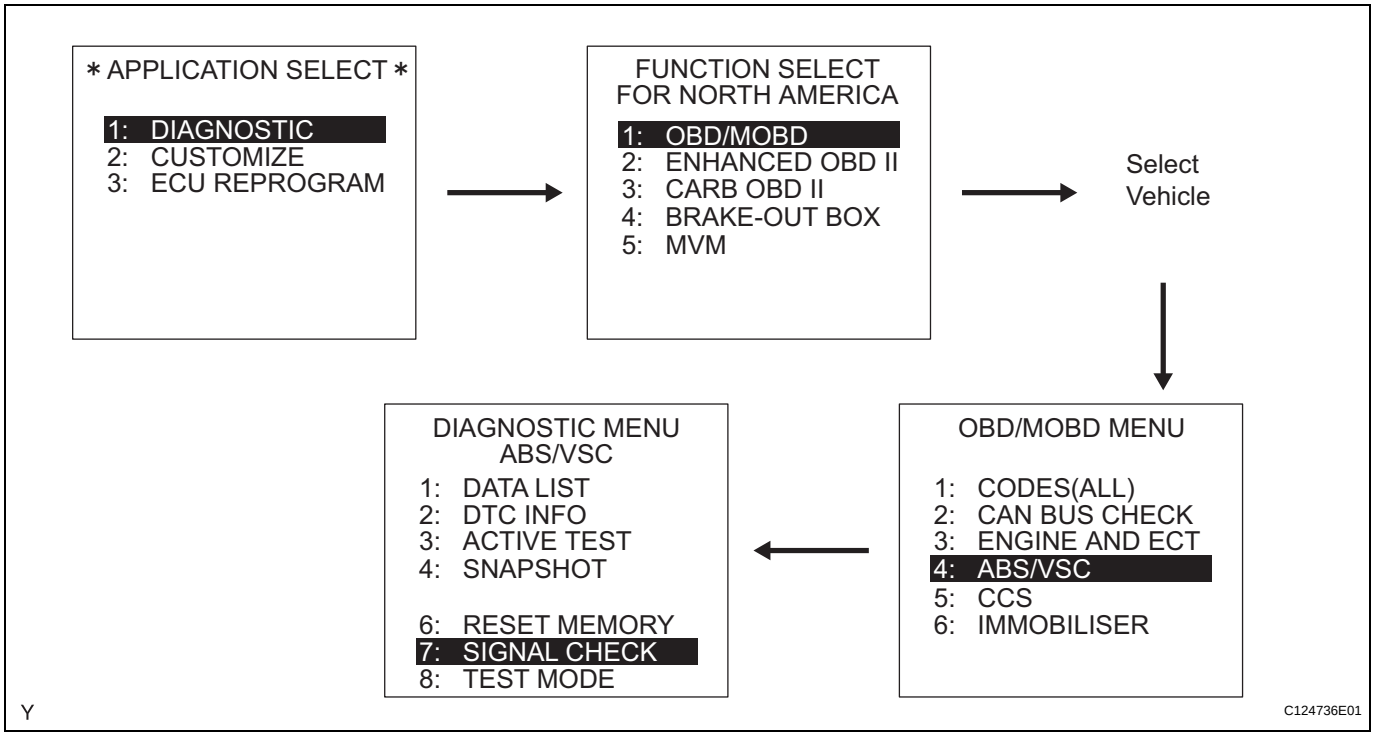
(c) A/T: Check that the shift lever is in the P position and apply the parking brake.
M/T: Check that the shift lever is in neutral and apply the parking brake.

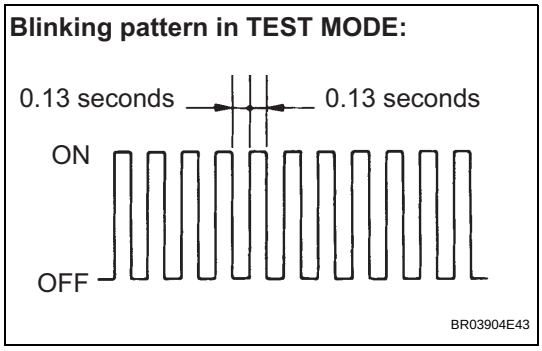


(d) Connect the intelligent tester to the DLC3.

(e) Start the engine.

(f) Switch the ECU to test mode using the intelligent tester. Select the following menu items: DIAGNOSIS / OBD/MOBD /select vehicle / ABS/ VSC / SIGNAL CHECK.





(g) Check that the ABS and VSC TRAC warning lights blink as shown in the illustration.
HINT:
If the ABS warning light and VSC TRAC warning light do not blink, inspect the ABS warning light circuit and VSC TRAC warning light circuit.

Trouble area	See page
ABS warning light circuit	BC-151 BC-154
VSC TRAC warning light circuit	BC-156 BC-159

(h) Activate the ABS sensors (deceleration sensor, master cylinder pressure sensor, 4WD detection switch, L4 detection switch and speed sensor) and VSC sensor (yaw rate and deceleration sensor) in test mode (SIGNAL CHECK) using a intelligent tester.

2. TEST MODE PROCEDURE (for Using a SST Check Wire)

HINT:

- After replacing the yaw rate and deceleration sensor, be sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

- If the ignition switch is turned from the ON to the ACC or LOCK position during test mode, DTCs relating to the signal check function will be erased.
- During test mode, the skid control ECU records all DTCs relating to the signal check function. By performing the signal check, the codes are erased if normality is confirmed. The remaining codes are those indicating where an abnormality was found.

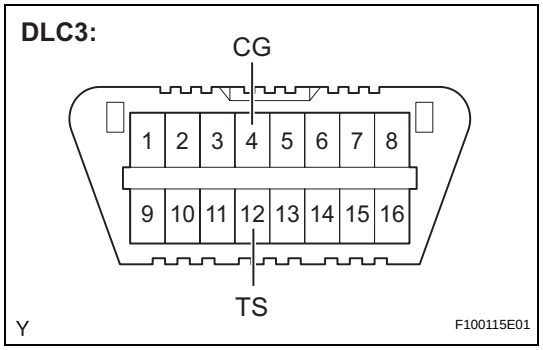
(a) Turn the ignition switch off.

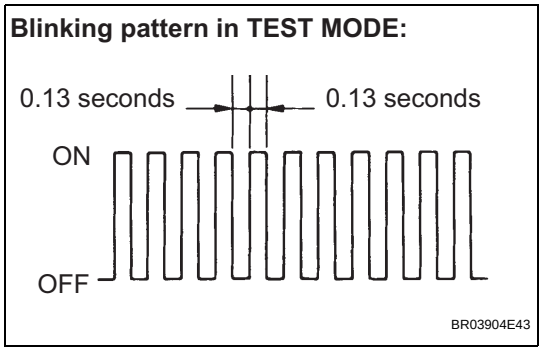
(b) Check that the steering wheel is in the straight-ahead position.

(c) A/T: Check that the shift lever is in the P position and apply the parking brake.
M/T: Check that the shift lever is in neutral and apply the parking brake.

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

(e) Start the engine.





(f) Check that the ABS and VSC TRAC warning lights blink as shown in the illustration.
HINT:
If the ABS warning light and VSC TRAC warning light do not blink, inspect the TS and CG terminal circuit, the ABS warning light circuit and VSC TRAC warning light circuit.

Trouble area	See page
ABS warning light circuit	BC-151 BC-154
VSC TRAC warning light circuit	BC-156 BC-159
TS and CG terminal circuit	BC-193

(g) Activate the ABS sensors (deceleration sensor, master cylinder pressure sensor, 4WD detection switch, L4 detection switch and speed sensor) and VSC sensor (yaw rate and deceleration sensor) in test mode (SIGNAL CHECK) using a check wire.

3. DECELERATION SENSOR SIGNAL CHECK

(a) Keep the vehicle stationary on a level surface for 1 second or more.
HINT:
The ABS warning light continues blinking at this time.

4. MASTER CYLINDER PRESSURE SENSOR CHECK

(a) Keep the vehicle stationary and release the brake pedal for 1 second or more, and quickly depress the brake pedal with a force of 98 N (10 kgf) or more for 1 second or more.

(b) Check that the ABS warning light comes on for 3 seconds.

HINT:

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

5. 4WD DETECTION SWITCH SIGNAL CHECK (for 4WD models)

(a) M/T:

(1) Move the transfer high and low shift lever to HL or HH to lock the center differential.

(2) Move the transfer high and low shift lever to H to unlock the center differential.

(b) A/T:

(1) Move the transfer high and low shift lever to H4 or L4 to put the vehicle in 4WD mode.

(2) Move the transfer high and low shift lever to H2 to put the vehicle in 2WD mode.

6. L4 DETECTION SWITCH SIGNAL CHECK (for 4WD models of A/T)

(a) Move the transfer high and low shift lever to the L4 position.

(b) Move the transfer high and low shift lever to H2 or H4.

HINT:

Move the vehicle either a little forward or a little backward to engage the L4 position.

7. SPEED SENSOR CHECK

(a) Drive the vehicle straight rearward at a speed of 1.9 mph (3 km/h) or more for 1 second or more.

NOTICE:

At this time, if the vehicle speed exceeds 28 mph (45 km/h), a signal check code will be stored again. Decelerate or stop the vehicle before the speed reaches 28 mph (45 km/h).

(b) Drive the vehicle straight forward at a speed of 56 mph (90 km/h) or more.

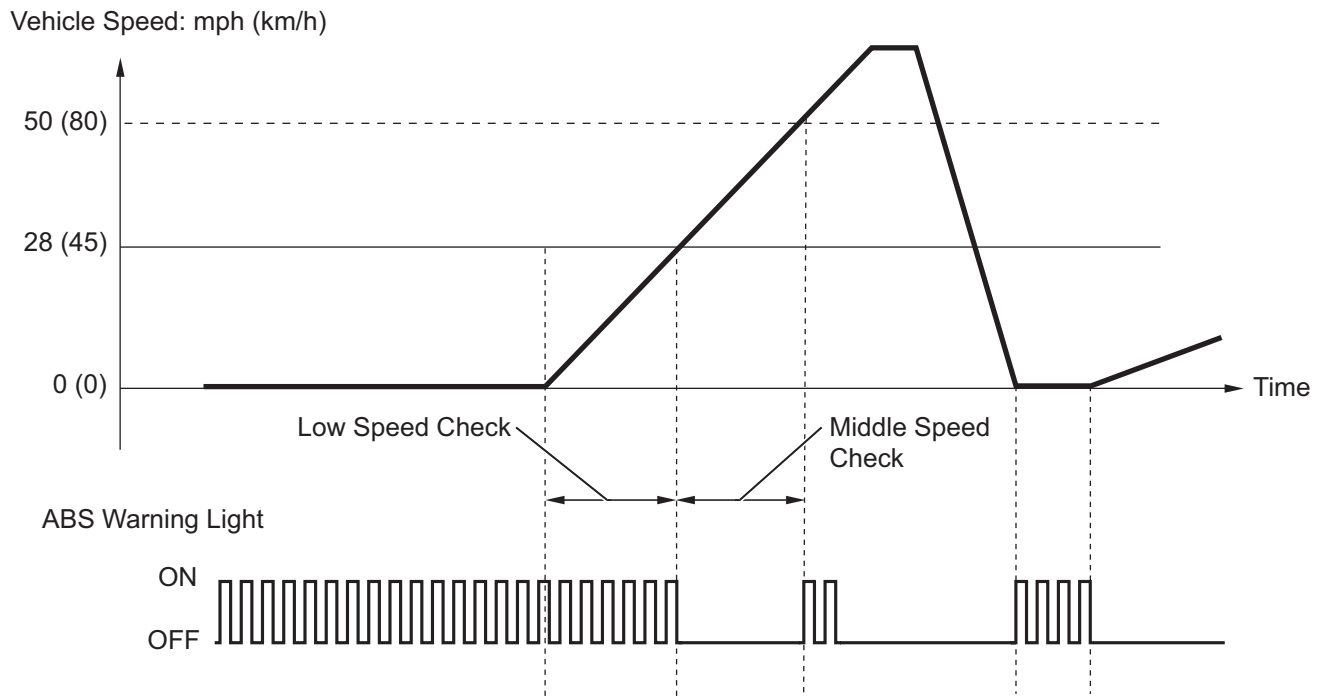
(c) Check that the ABS warning light goes off.

NOTICE:

- **Before performing the speed sensor signal check, complete the deceleration sensor, master cylinder pressure sensor, 4WD detection switch and L4 detection switch signal checks.**

- **The speed sensor signal check may not be completed if the speed sensor signal check is started while turning the steering wheel or spinning the wheels.**
- **After the ABS warning light goes off, if the vehicle speed exceeds 28 mph (45 km/h), a signal check code will be stored again. Decelerate or stop the vehicle before the speed reaches 28 mph (45 km/h).**
- **If the signal check has not been completed, the ABS warning light blinks while driving and the ABS system does not operate.**

Blinking pattern in speed sensor check:



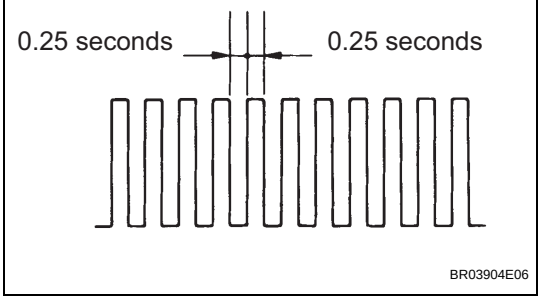
(d) Stop the vehicle.
HINT:
When the signal check has been completed, the ABS warning light goes off while driving and blinks in test mode while stationary.

8. READ DTC OF ABS SENSOR (for Using a Intelligent Tester)

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

BC

Normal System Code:



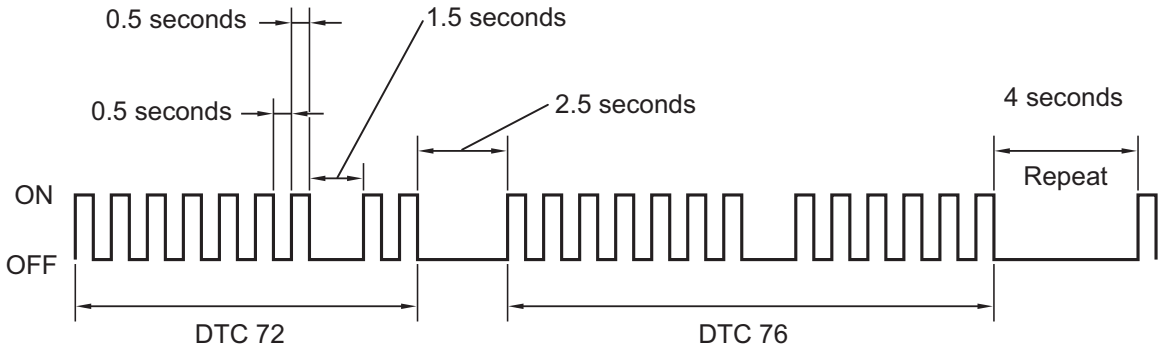
9. READ DTC OF ABS SENSOR (for Using a SST Check Wire)

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

(b) Turn the ignition switch on.

(c) Read the number of blinks of the ABS warning light.
- If every sensor is normal, the normal code is displayed (A cycle of 0.25 seconds ON and 0.25 seconds OFF is repeated).
- If 2 or more malfunctions are detected at the same time, the lowest numbered DTC is displayed first.

Example: Indication of DTCs 72 and 76



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

(e) Turn the ignition switch off.

10. AUTO LSD SWITCH CHECK (for vehicles with AUTO LSD)

(a) Press the AUTO LSD switch.

(b) Check that the AUTO LSD indicator light comes on.

(c) Press the AUTO LSD switch again to turn the AUTO LSD indicator off.

11. A-TRAC SWITCH CHECK (for vehicles with A-TRAC)

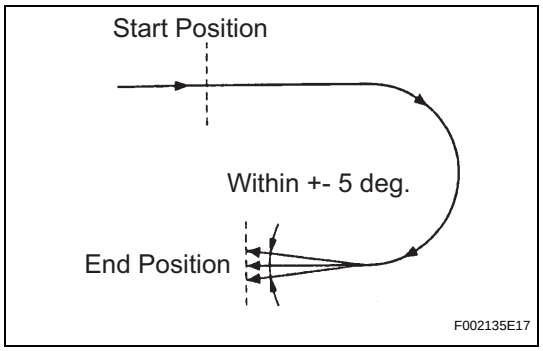
(a) Press the A-TRAC switch.

(b) Check that the A-TRAC indicator light comes on.

(c) Press the A-TRAC switch again to turn the A-TRAC indicator off.

12. YAW RATE SENSOR CHECK

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



(b) Shift the shift lever to the D position (A/T) and drive the vehicle at a speed of approximately 3 mph (5 km/h), turn the steering wheel either to the left or right 90°or more, and turn the vehicle through 180 degrees.

(c) A/T: Stop the vehicle, check that the shift lever is in the P position, and then apply the parking brake.
M/T: Stop the vehicle, check that the shift lever is in neutral, and then apply the parking brake.

(d) Check that the skid control (VSC warning) buzzer sounds for 3 seconds.
HINT:
- If the skid control (VSC warning) buzzer sounds, the signal check has been completed normally.
- If the skid control (VSC warning) buzzer does not sound, check the skid control buzzer circuit (See page BC-187), then perform the signal check again.
- If the skid control (VSC warning) buzzer still doesn't sound, there is a malfunction in the yaw rate sensor, so check the DTC.
- Drive the vehicle in a 180° semi circle. At the end of the turn, the direction of the vehicle should be within 180+-5° of its start position.
- The vehicle turn should be completed within 20 seconds.
- Do not spin the wheels.

13. READ DTC OF VSC SENSOR (for Using a Intelligent Tester)

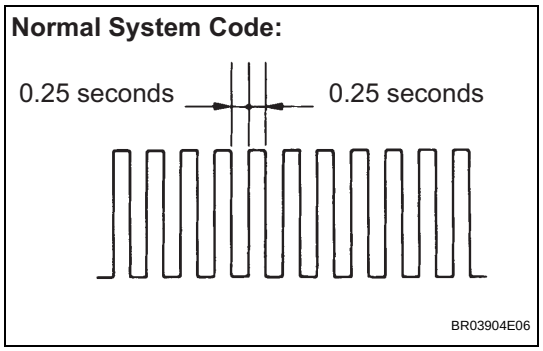
(a) Read the DTC(s) by following the tester screen.
- Refer to the intelligent tester operator's manual for further details.

14. READ DTC OF VSC SENSOR (for Using a SST Check Wire)

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

(b) Turn the ignition switch on.

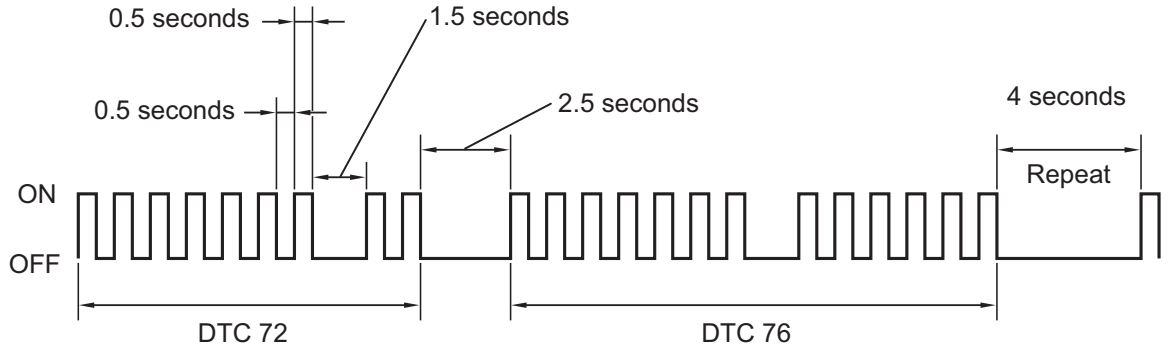
(c) Read the number of blinks of the VSC TRAC warning light.
- If every sensor is normal, the normal code is displayed (A cycle of 0.25 seconds ON and 0.25 seconds OFF is repeated).



- If 2 or more malfunctions are detected at the same time, the lowest numbered DTC is displayed first.

BC

Example: Indication of DTCs 72 and 76



(d) After the check, disconnect the SST from terminals TC and CG of the DLC3.
(e) Turn the ignition switch off.

15. DTC OF SIGNAL CHECK FUNCTION

ABS sensor

DTC No.	Diagnosis	Trouble Areas
C1271/71	Low output voltage of right front speed sensor	• Front speed sensor RH • Front speed sensor RH circuit • Sensor installation • Skid control sensor wire • Master cylinder solenoid (skid control ECU)
C1272/72	Low output voltage of left front speed sensor	• Front speed sensor LH • Front speed sensor LH circuit • Sensor installation • Skid control sensor wire • Master cylinder solenoid (skid control ECU)
C1273/73	Low output voltage of right rear speed sensor	• Rear speed sensor RH • Rear speed sensor RH circuit • Sensor installation • Skid control sensor wire • Master cylinder solenoid (skid control ECU)
C1274/74	Low output voltage of left rear speed sensor	• Rear speed sensor LH • Rear speed sensor LH circuit • Sensor installation • Skid control sensor wire • Master cylinder solenoid (skid control ECU)
C1275/75	Abnormal change in output voltage of right front speed sensor	• Front speed sensor RH • Front speed sensor RH circuit • Master cylinder solenoid (skid control ECU)
C1276/76	Abnormal change in output voltage of left front speed sensor	• Front speed sensor LH • Front speed sensor LH circuit • Master cylinder solenoid (skid control ECU)
C1277/77	Abnormal change in output voltage of right rear speed sensor	• Rear speed sensor RH • Rear speed sensor RH circuit • Master cylinder solenoid (skid control ECU)
C1278/78	Abnormal change in output voltage of left rear speed sensor	• Rear speed sensor LH • Rear speed sensor LH circuit • Master cylinder solenoid (skid control ECU)
C1279/79	Deceleration sensor faulty	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit

DTC No.	Diagnosis	Trouble Areas
C1281/81	Master cylinder pressure sensor output malfunction	• Hydraulic brake booster (master cylinder pressure sensor) • Master cylinder solenoid (skid control ECU) • Stop light switch circuit
C1282/82 (*1)	Center differential lock position switch malfunction	• Transfer indicator switch (4WD position) (A/T) • Transfer indicator switch (4WD position) circuit (A/T) • Transfer indicator switch (center differential lock position) (M/T) • Transfer indicator switch (center differential lock position) circuit (M/T)
C1283/83 (*2)	L4 detection switch malfunction	• Transfer indicator switch (L4 position) • Transfer indicator switch (L4 position) circuit

HINT:

- *1: 4WD only
- *2: 4WD + A/T

VSC sensor

DTC No.	Diagnosis	Trouble Areas
C0371/71	Yaw rate sensor output signal malfunction	Yaw rate and deceleration sensor

HINT:

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

BC

PROBLEM SYMPTOMS TABLE

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

NOTICE:

When replacing the skid control ECU, sensor or etc., turn the ignition switch off.

VEHICLE STABILITY CONTROL SYSTEM

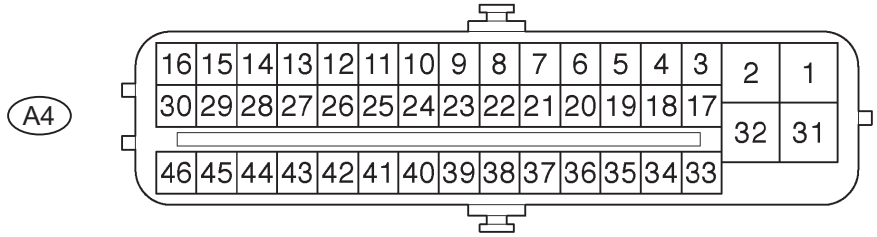
Symptom	Suspected area	See page
ABS, BA and/or EBD does not operate	1. Check for DTCs again and make sure that normal system code displayed.	BC-45
	2. IG1 power source circuit	BC-97
	3. IG2 power source circuit	BC-101
	4. Front speed sensor circuit	BC-59
	5. Rear speed sensor circuit	BC-67
	6. Check hydraulic brake booster using intelligent tester (Check hydraulic brake booster operation using active test function) If abnormal, check hydraulic circuit for leakage.	BR-19
	7. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	BR-33
ABS, BA and/or EBD does not operate efficiently	1. Check for DTCs again and make sure that normal system code displayed.	BC-45
	2. Front speed sensor circuit	BC-59
	3. Rear speed sensor circuit	BC-67
	4. Stop light switch circuit	BC-111
	5. Check hydraulic brake booster using intelligent tester (Check hydraulic brake booster operation using active test function) If abnormal, check hydraulic circuit for leakage.	BR-19
	6. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	BR-33
VSC and/or TRC does not operate	1. Check for DTCs again and make sure that normal system code displayed.	BC-45
	2. IG1 power source circuit	BC-97
	3. IG2 power source circuit	BC-101
	4. Front speed sensor circuit	BC-59
	5. Rear speed sensor circuit	BC-67
	6. Yaw rate and deceleration sensor circuit	BC-79
	7. Steering angle sensor circuit	BC-93
	8. Check hydraulic brake booster using intelligent tester (Check hydraulic brake booster operation using active test function) If abnormal, check hydraulic circuit for leakage.	BR-19
	9. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	BR-33
AUTO LSD does not operate	1. Check for DTCs again and make sure that normal system code displayed.	BC-45
	2. Check hydraulic brake booster using intelligent tester (Check hydraulic brake booster operation using active test function) If abnormal, check hydraulic circuit for leakage.	BR-19
	3. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	BR-33

Symptom	Suspected area	See page
A-TRAC does not operate	1. Check for DTCs again and make sure that normal system code displayed.	BC-45
	2. Check hydraulic brake booster using intelligent tester (Check hydraulic brake booster operation using active test function) If abnormal, check hydraulic circuit for leakage.	BR-19
	3. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	BR-33
DTC check cannot be performed	1. Check for DTCs again and make sure that normal system code displayed.	BC-45
	2. TC and CG terminal circuit	BC-190
	3. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	BR-33
Sensor signal check cannot be performed	1. TS and CG terminal circuit	BC-193
	2. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	BR-33
ABS warning light remains on	1. ABS warning light circuit	BC-151
	2. Master cylinder solenoid	BR-33
ABS warning light does not come on	1. ABS warning light circuit	BC-154
	2. Master cylinder solenoid	BR-33
VSC TRAC warning light remains on	1. VSC TRAC warning light circuit	BC-156
	2. Master cylinder solenoid	BR-33
VSC TRAC warning light does not come on	1. VSC TRAC warning light circuit	BC-159
	2. Master cylinder solenoid	BR-33
BRAKE warning light remains on	1. BRAKE warning light circuit	BC-161
	2. Master cylinder solenoid	BR-33
BRAKE warning light does not come on	1. BRAKE warning light circuit	BC-166
	2. Master cylinder solenoid	BR-33
VSC OFF indicator light remains on	1. VSC OFF indicator light circuit	BC-168
	2. Master cylinder solenoid	BR-33
VSC OFF indicator light does not come on	1. VSC OFF indicator light circuit	BC-171
	2. Master cylinder solenoid	BR-33
SLIP indicator light remains on	1. SLIP indicator light circuit	BC-173
	2. Master cylinder solenoid	BR-33
SLIP indicator light does not come on	1. SLIP indicator light circuit	BC-175
	2. Master cylinder solenoid	BR-33
AUTO LSD indicator light remains on	1. AUTO LSD indicator light circuit	BC-177
	2. Master cylinder solenoid	BR-33
AUTO LSD indicator light does not come on	1. AUTO LSD indicator light circuit	BC-180
	2. Master cylinder solenoid	BR-33
A-TRAC indicator light remains on	1. A-TRAC indicator light circuit	BC-182
	2. Master cylinder solenoid	BR-33
A-TRAC indicator light does not come on	1. A-TRAC indicator light circuit	BC-185
	2. Master cylinder solenoid	BR-33
Skid control buzzer abnormal	1. Skid control buzzer circuit	BC-187
	2. Master cylinder solenoid	BR-33

TERMINALS OF ECU

1. TERMINALS OF ECU

Skid control ECU:

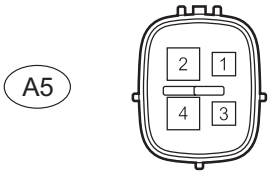


N C110610E06

Symbols (Terminal No.)	Terminal Description
GND1 (1)	Skid control ECU ground
+BM1 (2)	Power supply for motor
FR+ (3)	Front right wheel speed sensor power supply output
FL- (4)	Front left wheel speed signal input
RR+ (5)	Rear right wheel speed sensor power supply output
RL- (6)	Rear left wheel speed signal input
STP (7)	Stop light switch input
NEO (10) (*1)	2WD/4WD change over switch input
CANH (11)	CAN communication line H
SP1 (12) (*2)	Speed signal output for combination meter
D/G (13)	Diagnosis tester communication line
P (14) (*2)	Shift position indicator P signal input
INFR (15) (*3)	AUTO LSD indicator light output
STPO (16)	Stop light operated relay output
FR- (17)	Front right wheel speed sensor input
FL+ (18)	Front left wheel speed sensor power supply output
RR- (19)	Rear right wheel speed sensor input
RL+ (20)	Rear left wheel speed sensor power supply output
EXI4 (21) (*4)	Transfer indicator switch (L4) input
TS (24)	Sensor test terminal (Sensor check switch) input
CANL (25)	CAN communication line L
EXI3 (26) (*5)	Rear differential lock position switch input
EXI (27) (*4)	Transfer indicator switch (A/T: 4WD position, M/T: center differential lock position) input
PKB (28)	Parking brake switch input
WA (29)	ABS warning light input
BZ (30)	Skid control buzzer output
+BS (31)	Power supply for solenoid
GND2 (32)	Skid control ECU ground
HDCW (33) (*6)	A-TRAC indicator light output
IND (34)	SLIP indicator light output
WT (35) (*7)	VSC OFF indicator light output
VSCW (36)	VSC TRAC warning light output
LBL (41)	Brake fluid level warning switch input
WFSE (42)	Write flash enable input
CSW (43) (*3)	AUTO LSD switch input

Symbols (Terminal No.)	Terminal Description
HDCS (44) (*6)	A-TRAC switch input
STP2 (45)	Stop light switch input
IG1 (46)	IG1 power supply

Skid Control ECU:



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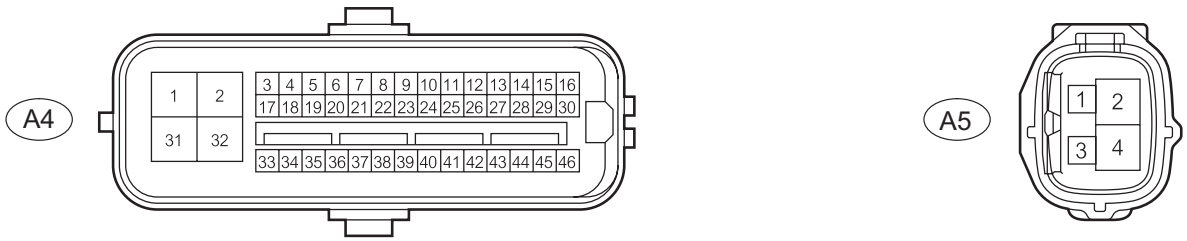
Symbols (Terminal No.)	Terminal Description
IG2 (1)	IG2 power supply
+BM2 (2)	Power supply for motor
BRL (3)	BRAKE warning light output
GND3 (4)	Skid control ECU ground

(*1): 4WD, A/T
(*2): A/T
(*3): with AUTO LSD
(*4): 4WD
(*5): with rear differential lock
(*6): with A-TRAC
(*7): 4WD or 2WD with rear differential lock

2. TERMINAL INSPECTION

Disconnect the connector and measure the voltage or resistance on the wire harness side.
HINT:
Voltage cannot be measured with the connector connected to the skid control ECU as the connector is water resistant.

Skid Control ECU (Wire Harness Side)
Connector Front View:



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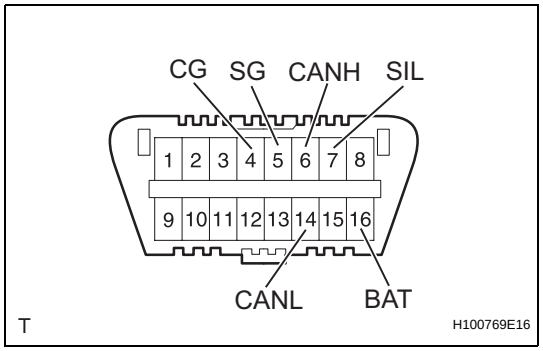
Standard

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+BM1 (A4-2) - GND1, GND2 (A4-1, 32)	L-Y - W-B	Power supply for motor from battery	Always	11 to 14 V
IG1 (A4-46) - GND1, GND2 (A4-1, 32)	B-R - W-B	IG1 power supply	IG switch OFF	Below 1 V
IG1 (A4-46) - GND1, GND2 (A4-1, 32)	B-R - W-B	IG1 power supply	IG switch ON	11 to 14 V
STP (A4-7) - GND1, GND2 (A4-1, 32)	G-B - W-B	Stop light switch input	Stop light switch OFF (Brake pedal released)	Below 1.5 V
STP (A4-7) - GND1, GND2 (A4-1, 32)	G-B - W-B	Stop light switch input	Stop light switch ON (Brake pedal released)	8 to 14 V
P (A4-14) - GND1, GND2 (A4-1, 32) (*1)	Y-B - W-B	Shift position indicator P signal input	IG switch ON, shift P position	8 to 14 V
P (A4-14) - GND1, GND2 (A4-1, 32) (*1)	Y-B - W-B	Shift position indicator P signal input	IG switch ON, any shift position except P	Below 1 V
EXI4 (A4-21) - GND1, GND2 (A4-1, 32) (*1) (*2)	W-L - W-B	Transfer indicator switch (L4) input	IG switch ON, transfer position L4	Below 1.5 V
EXI4 (A4-21) - GND1, GND2 (A4-1, 32) (*1) (*2)	W-L - W-B	Transfer indicator switch (L4) input	IG switch ON, transfer condition except L4	8 to 14 V
EXI3 (A4-26) - GND1, GND2 (A4-1, 32) (*3)	L-Y - W-B	Rear differential lock detection switch input	IG switch ON, rear differential lock switch ON	Below 1.5 V
EXI3 (A4-26) - GND1, GND2 (A4-1, 32) (*3)	L-Y - W-B	Rear differential lock detection switch input	IG switch ON, rear differential lock switch OFF	8 to 14 V
EXI (A4-27) - GND1, GND2 (A4-1, 32) (*2)	GR - W-B	Transfer indicator switch (A/T: 4WD position, M/T: center differential lock position) input	A/T: IG switch ON, transfer condition H4 or L4 M/T: IG switch ON, transfer condition HH or HL	8 to 14 V
EXI (A4-27) - GND1, GND2 (A4-1, 32) (*2)	GR - W-B	Transfer indicator switch (A/T: 4WD position, M/T: center differential lock position) input	A/T: IG switch ON, transfer condition H2 M/T: IG switch ON, transfer condition H	Below 1.5 V
PKB (A4-28) - GND1, GND2 (A4-1, 32)	W-R - W-B	Parking brake switch input	IG switch ON, parking brake switch ON	Below 1.5 V
PKB (A4-28) - GND1 , GND2 (A4-1, 32)	W-R - W-B	Parking brake switch input	IG switch ON, parking brake switch OFF	11 to 14 V
+BS (A4-31) - GND1, GND2 (A4-1, 32)	Y - W-B	Power supply for solenoid from battery	Always	11 to 14 V
LBL (A4-41) - GND1, GND2 (A4-1, 32)	V-R - W-B	Brake fluid level warning switch input	Brake fluid level min. -5mm	Below 1 Ω
LBL (A4-41) - GND1, GND2 (A4-1, 32)	V-R - W-B	Brake fluid level warning switch input	Brake fluid level max.	1.9 k to 2.1 kΩ
CSW (A4-43) - GND1, GND2 (A4-1, 32) (*4)	R-L - W-B	AUTO LSD switch input	Ignition switch ON, AUTO LSD switch ON	Below 1.5 V
CSW (A4-43) - GND1, GND2 (A4-1, 32) (*4)	R-L - W-B	AUTO LSD switch input	Ignition switch ON, AUTO LSD switch OFF	8 to 14 V
HDCS (A4-44) - GND1, GND2 (A4-1, 32) (*5)	P-G - W-B	A-TRAC switch input	Ignition switch ON, A-TRAC switch ON	Below 1.5 V
HDCS (A4-44) - GND1, GND2 (A4-1, 32) (*5)	P-G - W-B	A-TRAC switch input	Ignition switch ON, A-TRAC switch OFF	8 to 14 V
STP2 (A4-45) - GND1, GND2 (A4-1, 32)	G-Y - W-B	Stop light switch input	Stop light switch OFF (Brake pedal released)	Below 1.5 V
STP2 (A4-45) - GND1, GND2 (A4-1, 32)	G-Y - W-B	Stop light switch input	Stop light switch ON (Brake pedal released)	8 to 14 V
IG2 (A5-1) - GND3 (A5-4)	B-O - W-B	IG2 power supply	IG switch OFF	Below 1 V
IG2 (A5-1) - GND3 (A5-4)	B-O - W-B	IG2 power supply	IG switch ON	11 to 14 V

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+BM2 (A5-2) - GND3 (A5-4)	L-Y - W-B	Power supply for motor from battery	Always	11 to 14 V

HINT:

- (*1): A/T
- (*2): 4WD
- (*3): with rear differential lock
- (*4): with AUTO LSD
- (*5): with A-TRAC



DIAGNOSIS SYSTEM

1. CHECK DLC3

(a) The ECU uses ISO 15765-4 for communication. The terminal arrangement of the DLC3 complies with ISO 15031-3 and matches the ISO 15765-4 format.

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	10 to 14 V
CANH (6) - CANL (14)	HIGH-level CAN bus line	Ignition switch OFF*	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Ignition switch OFF*	200 Ω or more
CANL (14) - CG (4)	LOW-level CAN bus line	Ignition switch OFF*	200 Ω or more
CANH (6) - BAT (16)	HIGH-level CAN bus line	Ignition switch OFF*	6 kΩ or more
CANL (14) - BAT (16)	LOW-level CAN bus line	Ignition switch OFF*	6 kΩ or more

NOTICE:

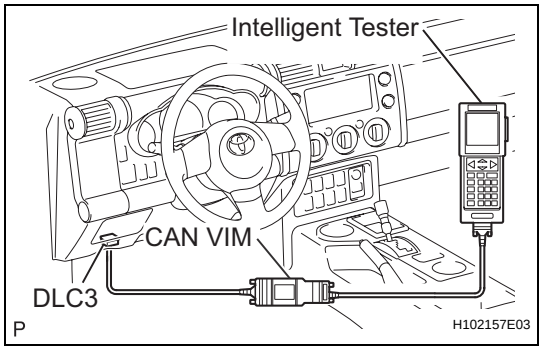
***: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches or the doors.**

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

HINT:

Connect the cable of the intelligent tester to the CAN VIM, connect the CAN VIM to the DLC3, turn the ignition switch ON 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 of the original vehicle.



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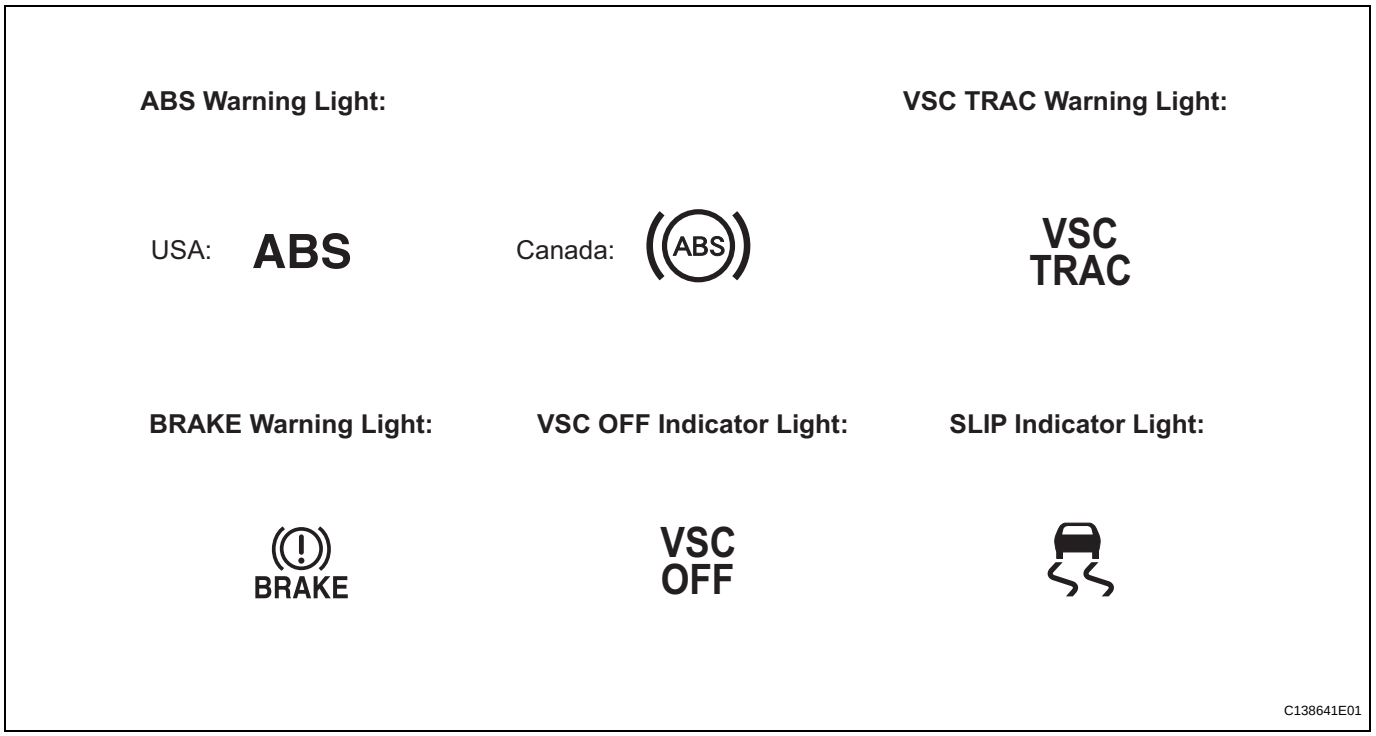
- If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself. Consult the Service Department listed in the tester's instruction manual.

2. DIAGNOSIS

(a) If the skid control ECU detects a malfunction, the ABS warning light, VSC TRAC warning light, BRAKE warning light, VSC OFF indicator light and/or SLIP indicator light come on in accordance with the trouble area to warn the driver.
The table below indicates which lights come on when there is a malfunction in a particular function.



Indicator / Trouble Area	ABS	EBD	BA	VSC	TRAC	AUTO LSD	A-TRAC
ABS Warning Light	○	○	○	-	-	-	-
VSC TRAC Warning Light	-	-	-	○	○	○	○
Brake Warning Light	-	○	-	-	-	-	-
VSC OFF Indicator Light	-	-	-	○	-	-	-
Slip Indicator Light	-	-	-	-	○	○	○

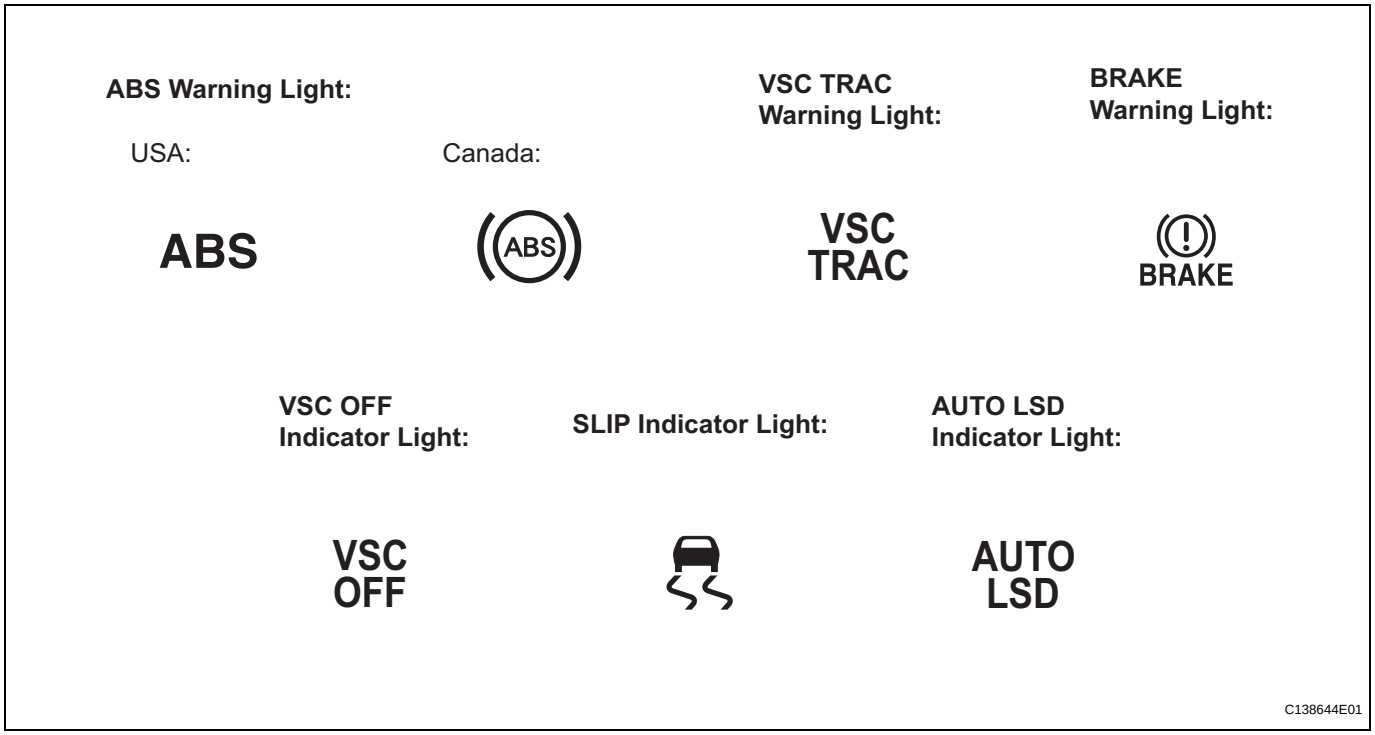
○: Light ON, -: Light OFF

HINT:

- The DTCs are simultaneously stored in the memory. The DTCs can be read by connecting the intelligent tester.

- This system has a sensor signal check function (See page BC-28). The DTCs can be read by connecting SST (09843-18040) between terminals TS and CG of the DLC3 and observing the blinking of the ABS warning light and VSC TRAC warning light, or by connecting the intelligent tester.

3. WARNING LIGHT AND INDICATOR LIGHT CHECK



(a) Release the parking brake.
NOTICE:
When releasing the parking brake, set chocks to hold the vehicle for safety.
HINT:
When the parking brake is applied or the level of the brake fluid is low, the BRAKE warning light comes on.

(b) Check that the ABS warning light, VSC TRAC warning light, BRAKE warning light, VSC OFF indicator light, SLIP indicator light and AUTO LSD indicator light come on when the ignition switch is turned on, and go off in about 3 seconds.
HINT:
If the lights do not illuminate, confirm whether the bulbs have burned out, and also check the wire harness between the skid control ECU and the combination meter.
If the light remains on, troubleshoot the effected light circuit by proceeding to the page indicated below.

Trouble Area	See Page
ABS warning light circuit	BC-151
VSC TRAC warning light circuit	BC-156
BRAKE warning light circuit	BC-161

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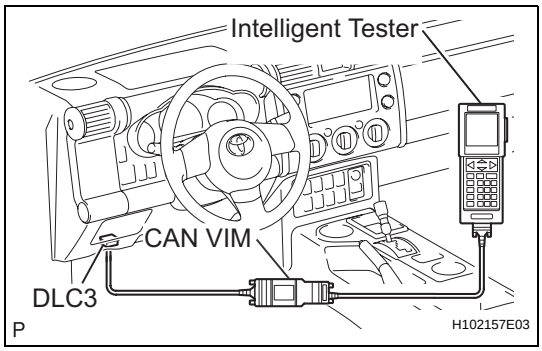
Trouble Area	See Page
VSC OFF indicator light circuit	BC-168
SLIP indicator light circuit	BC-173
AUTO LSD indicator light	BC-177



DTC CHECK / CLEAR

1. DTC CHECK (for Using a Intelligent Tester)

(a) Check DTCs.

(1) Connect the intelligent tester to the DLC3.

(2) Turn the ignition switch on.

(3) Turn the tester on.

(4) Read the DTCs using the intelligent tester. Select the following menu items: DIAGNOSIS / OBD/MOBD/ select vehicle / ABS/VSC / DTC INFO / TROUBLE CODES.

2. DTC CLEAR (for Using a Intelligent Tester)

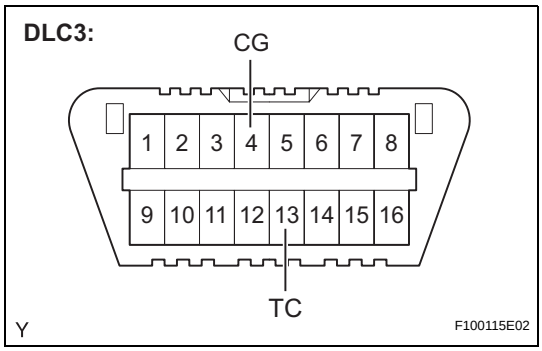
(a) Clear DTCs.

(1) Connect the intelligent tester to the DLC3.

(2) Turn the ignition switch on.

(3) Turn the tester on.

(4) Clear the DTCs using the intelligent tester. Select the following menu items: DIAGNOSIS / OBD/MOBD/ select vehicle / ABS/VSC / DTC INFO / CLEAR CODES.



3. DTC CHECK (for Using a SST Check Wire)

(a) Check DTCs.

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

SST 09843-18040

(2) Turn the ignition switch on.

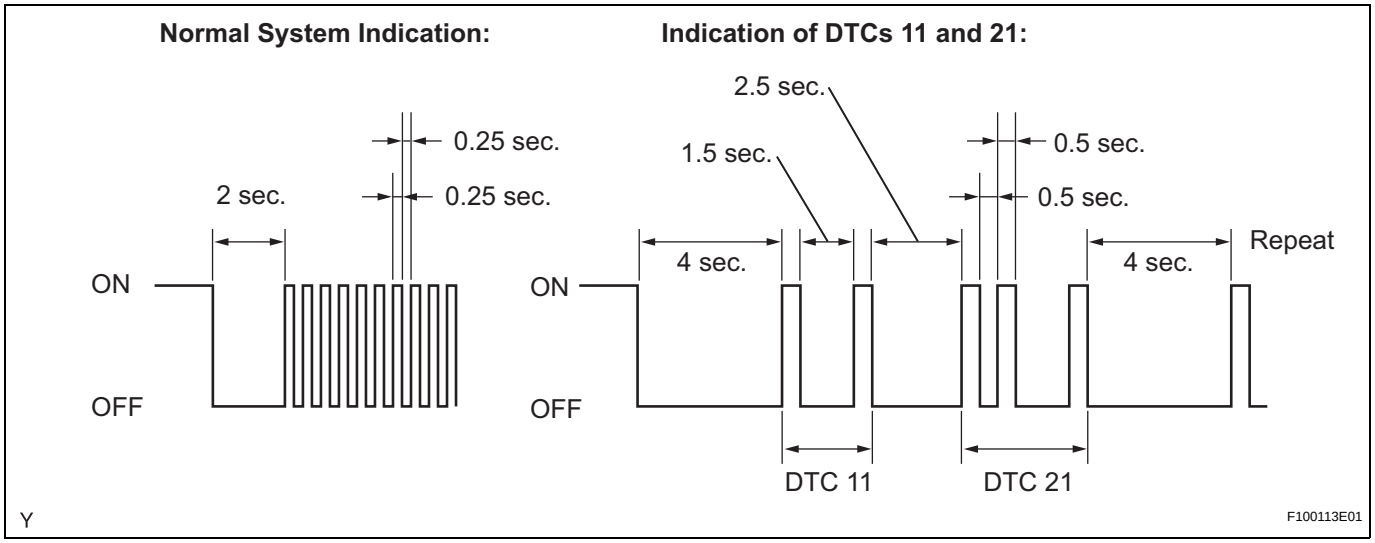
(3) Read 2-digit DTCs by observing the blinking of the ABS warning light and the VSC TRAC warning light on the combination meter.

HINT:

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

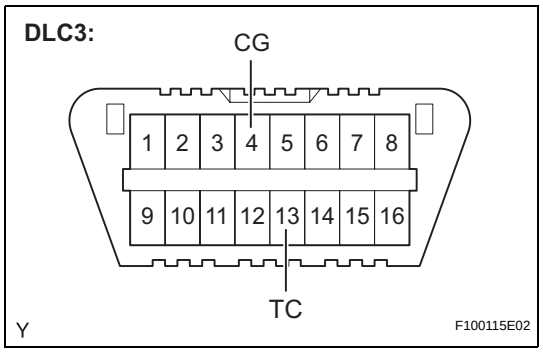
Trouble Area	See page
ABS warning light circuit	BC-151 BC-154
VSC TRAC warning light circuit	BC-156 BC-159
TC and CG terminal circuit	BC-190

- As an example, the blinking patterns of the normal system indication and DTCs 11 and 21 are shown below.



- DTCs are explained in DTC chart (See page BC-53).

(4) After completing the check, disconnect SST from terminals TC and CG of the DLC3, and turn the ignition switch off.
If 2 or more malfunctions are detected at the same time, the lowest numbered DTC is displayed first.

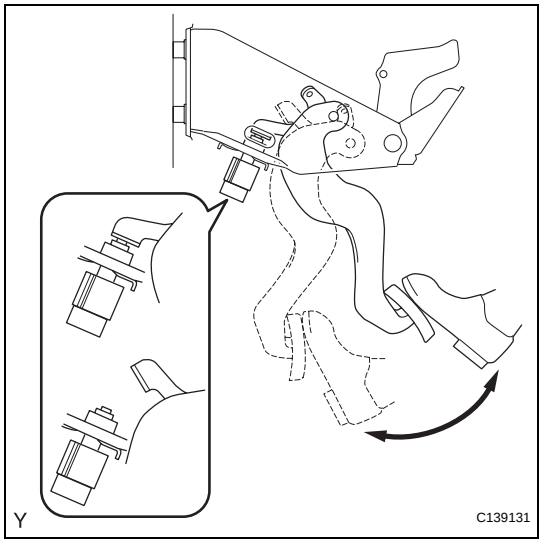


4. DTC CLEAR (for Using a Intelligent Tester)

(a) Clear DTCs.

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

(2) Turn the ignition switch on.
SST 09843-18040



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

(4) Check that the ABS warning light and VSC TRAC warning light blink in normal code pattern.

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

(6) Turn the ignition switch off.
HINT:
Clearing the DTCs cannot be performed by removing the battery cable.

5. END OF DTC CHECK/CLEAR

(a) Turn the ignition switch to the ON position

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

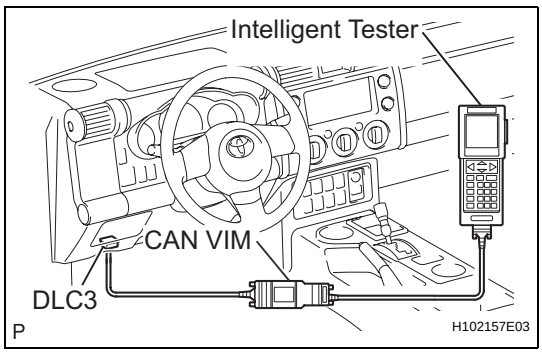
(c) Turn the ignition switch to OFF.

BC

FREEZE FRAME DATA

HINT:

- Whenever a DTC is detected or the ABS operates, the skid control ECU stores the current vehicle (sensor) state as freeze frame data.
- The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from OFF to the ON position since the last time the ABS was activated. However, if the vehicle was stopped or at low speed (4.3 mph (7 km/h) or less), or if a DTC is detected, the skid control ECU will not count the number after that.
- Freeze frame data at the time the ABS operates: The skid control ECU stores and updates the data whenever the ABS system operates. When the ECU stores data at the time a DTC is detected, the data stored when the ABS operated is erased.
- Freeze frame data at the time a DTC is detected: When the skid control ECU stores data at the time a DTC is detected, no updates will be performed until the data is cleared.



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

Intelligent Tester	Measurement Item	Reference Value
TROUBLE CODE	Freeze DTC	min.: 0, max.: 65535
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
VSC/TRC OFF SW	VSC OFF switch signal	VSC OFF SW ON: ON, OFF: OFF
SHIFT POSITION	Shift lever position	FAIL P,N R D 4 3 2 L
SYSTEM	System status	ABS activated: ABS VSC/TRAC activated: VSC/TRAC BA activated: BA Fail safe mode activated: FAIL SF No system activated: NO SYS
# IG ON	Number of operations turning ignition switch to ON since freeze frame data stored	0 to 31
VEHICLE SPD	Wheel speed sensor reading	Speed indicated on speedometer
STEERING ANG	Steering sensor reading	Left turn: Increase Right turn: Drop (Deceleration)
YAW RATE	Yaw rate angle sensor reading	-128 to 127

Intelligent Tester	Measurement Item	Reference Value
MAS CYL PRESS	Master cylinder pressure sensor reading	Brake pedal released: 0.3 to 0.9 V Brake pedal depressed: 0.8 to 4.5 V
MAS PRESS GRADE	Master cylinder pressure sensor change	-30 to 225 MPa/s
G (RIGHT & LEFT)	Right and left G (Yaw Rate)	-1.869 to 1.869
G (BACK & FORTH)	Back and forth G (Deceleration)	-1.869 to 1.869
WHEEL DIR FR	Front right wheel direction	Wheel direction BACK: BACK Wheel direction FORWARD: FORWARD
WHEEL DIR FL	Front left wheel direction	Wheel direction BACK: BACK Wheel direction FORWARD: FORWARD
WHEEL DIR RR	Rear right wheel direction	Wheel direction BACK: BACK Wheel direction FORWARD: FORWARD
WHEEL DIR RL	Rear left wheel direction	Wheel direction BACK: BACK Wheel direction FORWARD: FORWARD
BUZZER	VSC buzzer signal	VSC buzzer ON: ON, OFF: OFF
RESERVOIR SW	Reservoir level warning switch signal	Reservoir level warning Switch ON: ON, OFF: OFF
PKB SW	Parking brake switch signal	Parking brake Switch ON: ON, OFF: OFF

BC

FAIL-SAFE CHART

1. FAIL SAFE OPERATION

- If there is a problem with any sensor signals or hydraulic brake booster systems, the skid control ECU prohibits the power supply to the actuator in the hydraulic brake booster and informs the ECM of VSC system failure.
  The hydraulic brake booster turns off solenoids and the ECM shuts off the VSC control (traction control signal) from the skid control ECU accordingly, the result of which is as if the ABS, TRAC and VSC systems were not installed.
  ABS control is prohibited, but EBD control continues as far as possible. If EBD control is impossible, the BRAKE warning light comes on to warn the driver (See page BC-41).
- If system components have any malfunctions before starting control, the operation stops immediately.
  If system components have any malfunctions during control, the control stops gradually so as not to trigger a sudden change in vehicle conditions.
  If it is impossible to control the systems, the warning light comes on to inform the driver of the malfunction in the systems (See page BC-41).

HINT:

- If the ABS, BA, TRAC, A-TRAC, VSC and AUTO LSD systems malfunction, the brake system will operate normally without ABS, BA, TRAC, VSC and AUTO LSD controls.
- If the hydraulic brake booster malfunctions, a gradual loss of brake performance is expected, and ABS, BA, TRAC, A-TRAC, VSC and AUTO LSD system controls are prohibited.

(a) ABS, EBD and BA systems:
HINT:
If the ABS, BA or EBD system malfunctions, the following controls are prohibited as shown in the table below.

Malfunction Area	Fail-Safe Operation
ABS system	ABS, BA, TRAC, A-TRAC, VSC and AUTO LSD control prohibited
BA system	ABS, BA, TRAC, A-TRAC, VSC and AUTO LSD control prohibited
EBD system	ABS, BA, EBD, TRAC, A-TRAC, VSC and EBD control prohibited

(b) TRAC, A-TRAC, VSC and AUTO LSD systems:
HINT:
If TRAC, A-TRAC, VSC and/or AUTO LSD malfunction, the following controls are prohibited as shown in the table below.

Malfunction Area	Fail-Safe Operation
Engine control system (TRAC, A-TRAC and VSC systems)	Before control: Disables control During control: Uses only brakes to effect control
Brake control system (VSC system)	Before control Disables control During control Uses only brakes to effect control

Malfunction Area	Fail-Safe Operation
Brake control system (TRAC, A-TRAC and AUTO LSD systems)	Before control: Disables control During control: Disables control (by gradually ending control)

2. SYSTEM TEMPERATURE PROTECTION OPERATION

If the TRAC, A-TRAC or AUTO LSD system has been used constantly for a long time, the temperature of the hydraulic brake booster may increase excessively. If the temperature increases excessively, the skid control buzzer sounds intermittently. If the temperature increases further, the skid control buzzer sounds for 3 seconds repeatedly and the indicator light either comes on or blinks.

System	Indicator Condition
TRAC or A-TRAC system	SLIP indicator light comes on
AUTO LSD system	SLIP indicator light comes on AUTO LSD indicator light stays on

BC

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

By referring to the DATA LIST displayed on the intelligent tester, the value and status of parts such as switches, sensors and actuator can be read without removing any parts. Reading the DATA LIST as the first step of troubleshooting is one method of shortening diagnostic time.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the intelligent tester on.
(d) Select the following menu items: Chassis / ABS/ VSC/TRC / Data List.

Item	Measurement Item : Range (Display)	Normal Condition	Diagnostic Note
HB MOT RELAY	HB motor relay : ON or OFF	ON : Motor relay ON OFF : Motor relay OFF	-
SOL RELAY	Solenoid relay : ON or OFF	ON : Solenoid relay ON OFF : Solenoid relay OFF	-
IDLE SW	Main idle switch : ON or OFF	ON : Accelerator pedal released OFF : Accelerator pedal depressed	-
STOP LIGHT SW	Stop light switch : ON or OFF	ON : Brake pedal depressed OFF : Brake pedal released	-
PKB SW	Parking brake switch : ON or OFF	ON : Parking brake applied OFF : Parking brake released	-
RESERVOIR SW	Reservoir level warning switch : ON or OFF	ON : Switch ON OFF : Switch OFF	-
ABS OPERT FR	ABS operation (FR) : BEFORE or OPERATE	BEFORE : No ABS operation (FR) OPERATE : During ABS operation (FR)	-
ABS OPERT FL	ABS operation (FL) : BEFORE or OPERATE	BEFORE : No ABS operation (FL) OPERATE : During ABS operation (FL))	-
ABS OPERT RR	ABS operation (RR) : BEFORE or OPERATE	BEFORE : No ABS operation (RR) OPERATE : During ABS operation (RR)	-
ABS OPERT RL	ABS operation (RL) : BEFORE or OPERATE	BEFORE : No ABS operation (RL) OPERATE : During ABS operation (RL)	-
WHEEL SPD FR	Wheel speed sensor (FR) reading : min.: 0 MPH (0 km:h), max.: 202 MPH (326 km:h)	Actual wheel speed	Similar speed to that indicated on speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading : min.: 0 MPH (0 km:h), max.: 202 MPH (326 km:h)	Actual wheel speed	Similar speed to that indicated on speedometer
WHEEL SPD RR	Wheel speed sensor (RR) reading : min.: 0 MPH (0 km:h), max.: 202 MPH (326 km:h)	Actual wheel speed	Similar speed to that indicated on speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading : min.: 0 MPH (0 km:h), max.: 202 MPH (326 km:h)	Actual wheel speed	Similar speed to that indicated on speedometer
DECELERAT SEN	Deceleration sensor 1 reading : min.: -1.869 G, max.: 1.869 G	Approximately 0 +- 0.13G in still condition	Reading changes when vehicle bounced

Item	Measurement Item : Range (Display)	Normal Condition	Diagnostic Note
DECELERAT SEN2	Deceleration sensor 2 reading : min.: -1.869 G, max.: 1.869 G	Approximately 0 +- 0.13G in still condition	Reading changes when vehicle bounced
IG VOLTAGE	ECU power supply voltage : TOO LOW : NORMAL : TOO HIGH	TOO HIGH: 14 V or more NORMAL: 9.5 V or 14V TOO LOW: Below 9.5 V	-
SFRR	ABS solenoid (SFRR) : ON or OFF	ON: Operates OFF: Does not operate	-
SFRH	ABS solenoid (SFRH) : ON or OFF	ON: Operates OFF: Does not operate	-
SFLR	ABS solenoid (SFLR) : ON or OFF	ON: Operates OFF: Does not operate	-
SFLH	ABS solenoid (SFLH) : ON or OFF	ON: Operates OFF: Does not operate	-
SRRR (SRR)	ABS solenoid (SRRR [SRR]) : ON or OFF	ON: Operates OFF: Does not operate	-
SRRH (SRH)	ABS solenoid (SRRH [SRH]) : ON or OFF	ON: Operates OFF: Does not operate	-
SRLR	ABS solenoid (SRLR) : ON or OFF	ON: Operates OFF: Does not operate	-
SRLH	ABS solenoid (SRLH) : ON or OFF	ON: Operates OFF: Does not operate	-
SRCF (SA1)	TRAC solenoid (SRCF [SMCF]) : ON or OFF	ON: Operates OFF: Does not operate	-
SRCR (SA2)	TRAC solenoid (SRCR [SREA]) : ON or OFF	ON: Operates OFF: Does not operate	-
SRMF (SMCF, SA3)	TRAC solenoid (SRMF [SREC]) : ON or OFF	ON: Operates OFF: Does not operate	-
SRMR (SMCR, STR)	TRAC solenoid (SRMR [SMCR, STR]) : ON or OFF	ON: Operates OFF: Does not operate	-
VEHICLE SPD	Maximum wheel speed sensor reading : min.: 0 MPH (0 km:h), max.: 202 MPH (326 km:h)	Actual engine speed	Speed indicated on speedometer
MAS CYL PRS 1	Master cylinder pressure sensor 1 reading : min.: 0 V, max.: 5 V	When brake pedal released : 0.3 V to 0.9 V	Reading increases when brake pedal depressed
WHEEL DIR FR	Front right wheel direction	Wheel direction BACK: BACK, FORWARD: FORWARD	-
WHEEL DIR FL	Front left wheel direction	Wheel direction BACK: BACK, FORWARD: FORWARD	-
WHEEL DIR RR	Rear right wheel direction	Wheel direction BACK: BACK, FORWARD: FORWARD	-
WHEEL DIR RL	Rear left wheel direction	Wheel direction BACK: BACK, FORWARD: FORWARD	-
SPD SEN FR	FR speed sensor open detection : OPN_DET or NORMAL	OPN_DET: Momentary interruption NORMAL: Normal	-
SPD SEN FL	FL speed sensor open detection : OPN_DET or NORMAL	OPN_DET: Momentary interruption NORMAL: Normal	-
SPD SEN RR	RR speed sensor open detection : OPN_DET or NORMAL	OPN_DET: Momentary interruption NORMAL: Normal	-
SPD SEN RL	RL speed sensor open detection : OPN_DET or NORMAL	OPN_DET: Momentary interruption NORMAL: Normal	-
EFI COM	EFI communication open detection : OPN_DET or NORMAL	OPN_DET: Momentary interruption NORMAL: Normal	-

Item	Measurement Item : Range (Display)	Normal Condition	Diagnostic Note
YAWRATE SEN	Yaw rate sensor open detection : OPN_DET or NORMAL	OPN_DET: Momentary interruption NORMAL: Normal	-
DECELE SEN	Deceleration sensor open detection : OPN_DET or NORMAL	OPN_DET: Momentary interruption NORMAL: Normal	-
STEERING SEN	Steering angle sensor open detection : OPN_DET or NORMAL	OPN_DET: Momentary interruption NORMAL: Normal	-
ACC SEN	Accumulator pressure sensor open detection : OPN_DET or NORMAL	OPN_DET: Momentary interruption NORMAL: Normal	-
ACCELERATOR %	Different % of present accelerator	min.: 0 max.: 128	-
TORQUE	Real output torque	min.: -1024 max.: 1016	-
TEST MODE	Test mode : Normal or TEST	NORMAL: Normal mode TEST: During test mode	-
MAS CYL PRESS 1	Master cylinder pressure sensor 1 reading : min.: 0V, max.: 5V	When brake pedal released: 0.3 to 0.9V	Reading increases when brake pedal depressed
ACC PRESS SENS	Accumulator pressure sensor reading : min.: 0 V, max.: 5 V	min.: 3 V max.: 5 V	If value constant regardless of pump operation, accumulator pressure sensor malfunction suspected.
#CODES	Number of DTC recorded : min.: 0, max.: 255	min.: 0 max.: 255	-

2. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the intelligent tester allows relays and actuators to be operated without removing any parts. Performing the ACTIVE TEST as the first step of troubleshooting is one method of shortening diagnostic time.

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

(a) Connect the intelligent tester to the DLC3.

(b) Turn the ignition switch on.

(c) Turn the tester on.

(d) By following the prompts on the tester, perform the ACTIVE TEST.

HINT:

- The ignition switch must be turned on to proceed to the ACTIVE TEST using the intelligent tester.
- The motors stop automatically after 5 seconds of activation to prevent them from being damaged. When repeatedly activated, certain intervals are required.
- Each solenoid stops automatically after 2 seconds of activation to prevent them from being damaged, and can be operated again after a certain interval.
- Do not depress the brake pedal while only the pressure reduction solenoid valves are on.

- Do not drive 2 or more solenoids simultaneously except to operate the pressure holding solenoid valves and pressure reduction solenoid valves of each wheel.

Item	Test Details	Diagnostic Note
SFRR	Turns ABS solenoid (SFRR) ON or OFF	Operation of solenoid (clicking sound) can be heard
SFRH	Turns ABS solenoid (SFRH) ON or OFF	Operation of solenoid (clicking sound) can be heard
SFLR	Turns ABS solenoid (SFLR) ON or OFF	Operation of solenoid (clicking sound) can be heard
SFLH	Turns ABS solenoid (SFLH) ON or OFF	Operation of solenoid (clicking sound) can be heard
SRRR	Turns ABS solenoid (SrRR) ON or OFF	Operation of solenoid (clicking sound) can be heard
SRRH	Turns ABS solenoid (SRRH) ON or OFF	Operation of solenoid (clicking sound) can be heard
SRLR	Turns ABS solenoid (SRLR) ON or OFF	Operation of solenoid (clicking sound) can be heard
SRLH	Turns ABS solenoid (SFLH) ON or OFF	Operation of solenoid (clicking sound) can be heard
SRCF (SA1)	Turns TRAC solenoid SRCF (SMCF) ON or OFF	Operation of solenoid (clicking sound) can be heard
SRCR (SA2)	Turns TRAC solenoid SRCR (SREA) ON or OFF	Operation of solenoid (clicking sound) can be heard
SRMF (SMCF, SA3)	Turns TRAC solenoid SRMF (SREC) ON or OFF	Operation of solenoid (clicking sound) can be heard
SRMR (SMCR, STR)	Turns TRAC solenoid SRMR (STR) ON or OFF	Operation of solenoid (clicking sound) can be heard
SOL RELAY	Turns ABS solenoid relay ON or OFF	Operation of solenoid (clicking sound) can be heard
ABS MOT RELAY	Turns ABS motor relay ON or OFF	Operation of motor can be heard
ABS WARN LIGHT	Turns ABS warning light ON or OFF	Operation of motor can be heard
VSC WARN LIGHT	Turns VSC TRAC warning light ON or OFF	Operation of motor can be heard
VSC/TRC OFF IND	Turns VSC OFF indicator ON or OFF	Operation of motor can be heard
SLIP INDI LIGHT	Turn SLIP indicator light ON or OFF	Operation of motor can be heard
BRAKE WRN LIGHT	Turns BRAKE warning light ON or OFF	Operation of motor can be heard
VSC/BR WARN BUZ	Turns skid control buzzer ON or OFF	Buzzer can be heard
STP LIGHT RELAY	Turns stop light relay ON or OFF	Observe stop light

BC

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

When removing any parts, turn the ignition switch off.

HINT:

- If no abnormality is found when inspecting parts, check the skid control ECU and check for poor contact at ground points.
- If a DTC is displayed during the DTC check, check the circuit for the DTC listed in the table below. For details of each DTC, refer to the page indicated.
- When 2 or more DTCs are detected, perform circuit inspections one by one until the problem is identified.
- All DTCs in the table below are detected in accordance with 1 trip detection logic.

DTC chart of ABS

DTC No.	Detection Item	Trouble Areas	See page
C0200/31 (*1)	Front Speed Sensor RH Circuit	1. Front speed sensor RH 2. Front speed sensor RH circuit 3. Sensor installation 4. Skid control sensor wire 5. Master cylinder solenoid (skid control ECU)	BC-59
C0205/32 (*1)	Front Speed Sensor LH Circuit	1. Front speed sensor LH 2. Front speed sensor LH circuit 3. Sensor installation 4. Skid control sensor wire 5. Master cylinder solenoid (skid control ECU)	BC-59
C0210/33 (*1)	Rear Speed Sensor RH Circuit	1. Rear speed sensor RH 2. Rear speed sensor RH circuit 3. Sensor installation 4. Skid control sensor wire 5. Master cylinder solenoid (skid control ECU)	BC-67
C0215/34 (*1)	Rear Speed Sensor LH Circuit	1. Rear speed sensor LH 2. Rear speed sensor LH circuit 3. Sensor installation 4. Skid control sensor wire 5. Master cylinder solenoid (skid control ECU)	BC-67
C0226/21	SFR Solenoid Circuit	Master cylinder solenoid	BC-74
C0236/22	SFL Solenoid Circuit	Master cylinder solenoid	BC-74
C0246/23	SRR Solenoid Circuit	Master cylinder solenoid	BC-74
C0256/24	SRL Solenoid Circuit	Master cylinder solenoid	BC-74
C0278/11	Open in ABS Solenoid Relay Circuit	1. ABS SOL fuse 2. +BS terminal circuit 3. Master cylinder solenoid (skid control ECU)	BC-76
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	1. ABS SOL fuse 2. +BS terminal circuit 3. Master cylinder solenoid (skid control ECU)	BC-76
C1202/58	Brake Fluid Level Low / Open Circuit in Brake Fluid Level Warning Switch Circuit	1. Brake fluid level 2. Brake master cylinder reservoir sub-assembly (brake fluid level warning switch) 3. Brake fluid level warning switch circuit 4. Master cylinder solenoid (skid control ECU)	BC-83

DTC No.	Detection Item	Trouble Areas	See page
C1225/25	SMC Solenoid Circuit	Master cylinder solenoid	BC-74
C1226/26	SPC Solenoid Circuit	Master cylinder solenoid	BC-74
C1227/27	SRC Solenoid Circuit	Master cylinder solenoid	BC-74
C1228/28	STR Solenoid Circuit	Master cylinder solenoid	BC-74
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	1. Front speed sensor RH 2. Front speed sensor RH circuit 3. Master cylinder solenoid (skid control ECU)	BC-59
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	1. Front speed sensor LH 2. Front speed sensor LH circuit 3. Master cylinder solenoid (skid control ECU)	BC-59
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	1. Rear speed sensor RH 2. Rear speed sensor RH circuit 3. Master cylinder solenoid (skid control ECU)	BC-67
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	1. Rear speed sensor LH 2. Rear speed sensor LH circuit 3. Master cylinder solenoid (skid control ECU)	BC-67
C1241/41	Low Battery Positive Voltage	1. Battery 2. Charging system 3. ECU-IG fuse 4. Power source circuit 5. Master cylinder solenoid (skid control ECU)	BC-97
C1242/42	IG2 Power Source Circuit	1. Battery 2. Charging system 3. IGN fuse 4. Power source circuit 5. Master cylinder solenoid (skid control ECU)	BC-101
C1243/43 (*1)	Deceleration Sensor Stuck Malfunction	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-79
C1244/44	Open or Short in Deceleration Sensor Circuit	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-79
C1245/45 (*1)	Deceleration Sensor Output Malfunction	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-79
C1246/46	Master Cylinder Pressure Sensor Malfunction	1. Hydraulic brake booster (master cylinder pressure sensor) 2. Stop light switch circuit 3. Master cylinder solenoid (skid control ECU)	BC-104
C1248/48	Open Circuit in Rear Differential Lock	1. Rear differential lock position switch 2. Rear differential lock position switch circuit 3. Master cylinder solenoid (skid control ECU)	BC-108
C1249/49	Open in Stop Light Switch Circuit	1. Stop light switch assembly 2. Stop light switch circuit 3. Master cylinder (skid control ECU)	BC-111
C1251/51 (*4)	Open in Pump Motor Circuit	1. Brake booster pump assembly 2. Master cylinder solenoid (skid control ECU)	BC-115

DTC No.	Detection Item	Trouble Areas	See page
C1252/52 (*2) (*4)	Brake Booster Pump Motor on Time Abnormally Long	1. Brake booster pump assembly 2. Hydraulic brake booster (accumulator pressure sensor) 3. Master cylinder solenoid (skid control ECU)	BC-117
C1253/53 (*2)	Hydro Booster Pump Motor Relay Malfunction	1. ABS MTR fuse 2. +BS terminal circuit 3. Master cylinder solenoid (skid control ECU)	BC-120
C1254/54	Pressure Switch Circuit	1. Master cylinder solenoid (skid control ECU) 2. Hydraulic brake booster (accumulator pressure sensor) 3. Hydraulic brake booster (master cylinder pressure sensor)	BC-124
C1256/56 (*2) (*4)	Accumulator Low Pressure	1. Hydraulic circuit 2. Hydraulic brake booster (accumulator pressure sensor) 3. Master cylinder solenoid (skid control ECU)	BC-127
C1257/57	IG Power Source	1. Brake booster pump assembly 2. Master cylinder solenoid (skid control ECU)	BC-130
C1268/68 (*3)	Transfer "L4" Position Switch Circuit	1. Transfer indicator switch (L4 position) 2. Transfer indicator switch (L4 position) circuit 3. Master cylinder solenoid (skid control ECU)	BC-138
C1337/37	Different Diameter Tire Malfunction	1. Speed sensor circuit 2. Tire sizes 3. Master cylinder solenoid (skid control ECU)	BC-142
C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-79
U0073/94	Control Module Communication Bus OFF	CAN communication system	BC-149
U0124/95	Lost Communication with Lateral Acceleration Sensor Module	CAN communication system	BC-149

HINT:

(*1), (*2):

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

- (*1):
  (a) Drive the vehicle at 12 mph (20 km/h) for 30 seconds or more and check that the ABS warning light goes off.
  (b) Clear the DTC.
- (*2):
  (a) Keep the vehicle stationary for 5 seconds or more and depress the brake pedal several times.
  (b) Repeat the above operation 3 times or more and check that the ABS warning light goes off.
  (c) Clear the DTC.
- (*3): 4WD only
- (*4): Skid control buzzer sounds.

DTC chart of VSC

DTC No.	Detection Item	Trouble Areas	See page
C1201/51	Engine Control System Malfunction	Engine control system	BC-82
C1203/53	ECM Communication Circuit Malfunction	1. CAN communication system 2. ECM	BC-86
C1210/36	Zero Point Calibration of Yaw Rate Sensor Undone	1. Yaw rate sensor and deceleration sensor 2. Zero point calibration not complete 3. PNP switch circuit (P position) (A/T) 4. Parking brake switch circuit (M/T) 5. Master cylinder solenoid (skid control ECU)	BC-87
C1223/43	ABS Control System Malfunction	ABS control system	BC-92
C1231/31	Steering Angle Sensor Circuit Malfunction	1. Steering angle sensor 2. Steering angle sensor circuit 3. CAN communication system 4. Master cylinder solenoid (skid control ECU)	BC-93
C1232/32	Stuck in Deceleration Sensor	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-79
C1234/34	Yaw Rate Sensor Malfunction	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-79
C1258/58	Transfer 4WD Position Switch Circuit	1. Transfer indicator switch (4WD position) (A/T) 2. Transfer indicator switch (4WD position) circuit (A/T) 3. Transfer indicator switch (center differential lock position) (M/T) 4. Transfer indicator switch (center differential lock position) circuit (A/T) 5. Master cylinder solenoid (skid control ECU)	BC-131
C1290/66	Steering Angle Sensor Zero Point Malfunction	Steering angle sensor	BC-93
C1336/39	Zero Point Calibration of Acceleration Sensor Undone	1. Yaw rate sensor and deceleration sensor 2. Zero point calibration not complete 3. PNP switch circuit (P position) (A/T) 4. Parking brake switch circuit (M/T) 5. Master cylinder solenoid (skid control ECU)	BC-87
C1380/64	Stop Light Control Relay Malfunction	1. Stop light switch assembly 2. Stop light switch circuit 3. Stop LP CTRL relay 4. Master cylinder solenoid (skid control ECU)	BC-144
U0100/65	Lost Communication with ECM / PCM	CAN communication system	BC-149
U0123/62	Lost Communication with Yaw Rate Sensor Module	CAN communication system	BC-149
U0126/63	Lost Communication with Steering Angle Sensor Module	CAN communication system	BC-149

Test Mode DTC of ABS

DTC No.	Detection Item	Trouble Areas	See page
C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	1. Front speed sensor RH 2. Front speed sensor RH circuit 3. Sensor installation 4. Skid control sensor wire 5. Master cylinder solenoid (skid control ECU)	BC-59
C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	1. Front speed sensor LH 2. Front speed sensor LH circuit 3. Sensor installation 4. Skid control sensor wire 5. Master cylinder solenoid (skid control ECU)	BC-59
C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	1. Rear speed sensor RH 2. Rear speed sensor RH circuit 3. Sensor installation 4. Skid control sensor wire 5. Master cylinder solenoid (skid control ECU)	BC-67
C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	1. Rear speed sensor LH 2. Rear speed sensor LH circuit 3. Sensor installation 4. Skid control sensor wire 5. Master cylinder solenoid (skid control ECU)	BC-67
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	1. Front speed sensor RH 2. Front speed sensor RH circuit 3. Master cylinder solenoid (skid control ECU)	BC-59
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	1. Front speed sensor LH 2. Front speed sensor LH circuit 3. Master cylinder solenoid (skid control ECU)	BC-59
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	1. Rear speed sensor RH 2. Rear speed sensor RH circuit 3. Master cylinder solenoid (skid control ECU)	BC-67
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	1. Rear speed sensor LH 2. Rear speed sensor LH circuit 3. Master cylinder solenoid (skid control ECU)	BC-67
C1279/79	Deceleration Sensor Output Voltage Malfunction (Test Mode DTC)	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-79
C1281/81	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)	1. Hydraulic brake booster (master cylinder pressure sensor) 2. Stop light switch circuit 3. Master cylinder solenoid (skid control ECU)	BC-104
C1282/82	Center Differential Lock Position Switch Malfunction (Test Mode DTC)	1. Transfer indicator switch (4WD position) (A/T) 2. Transfer indicator switch (4WD position) circuit (A/T) 3. Transfer indicator switch (center differential lock position) (M/T) 4. Transfer indicator switch (center differential lock position) circuit (A/T) 5. Master cylinder solenoid (skid control ECU)	BC-131

DTC No.	Detection Item	Trouble Areas	See page
C1283/83	L4 Position Switch Malfunction (Test Mode DTC)	1. Transfer indicator switch (L4 position) 2. Transfer indicator switch (L4 position) circuit 3. Master cylinder solenoid (skid control ECU)	BC-138

Test Mode DTC of VSC

DTC No.	Detection Item	Trouble Areas	See page
C0371/71	Yaw Rate Sensor (Test Mode DTC)	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-79

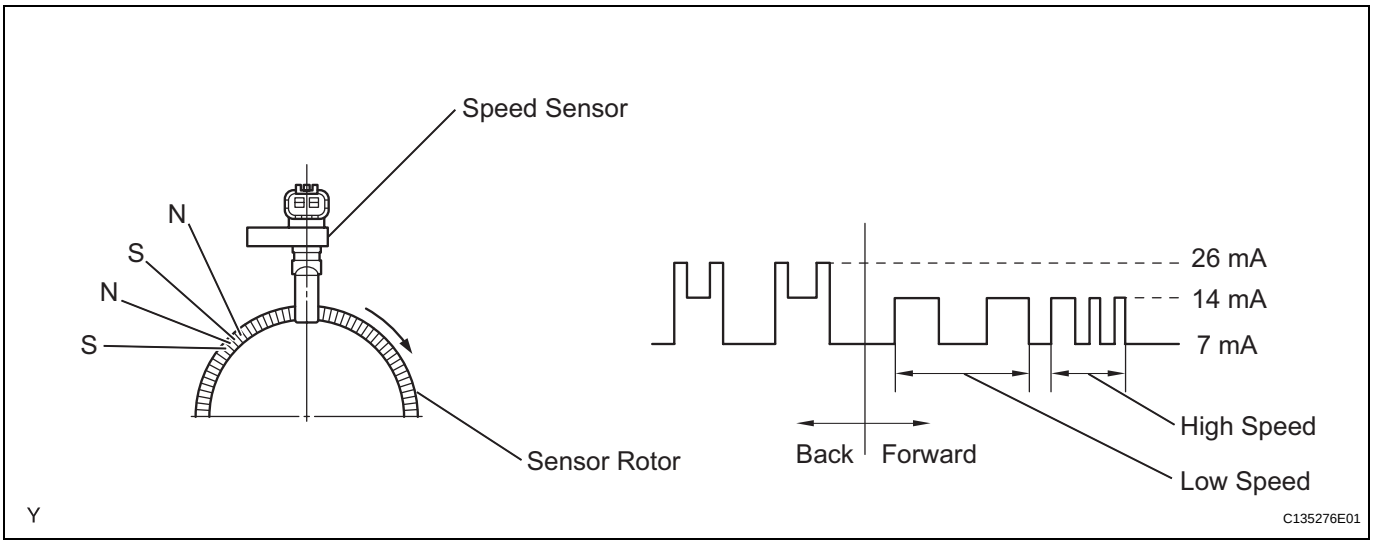
DTC	C0200/31	Front Speed Sensor RH Circuit
DTC	C0205/32	Front Speed Sensor LH Circuit
DTC	C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH
DTC	C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH
DTC	C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)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

BC

DESCRIPTION

The speed sensors detect the wheel speeds and send appropriate signals to the skid control ECU. Speed sensor rotors have rows of alternating N and S magnetic poles, and their magnetic fields change as the rotors turn.

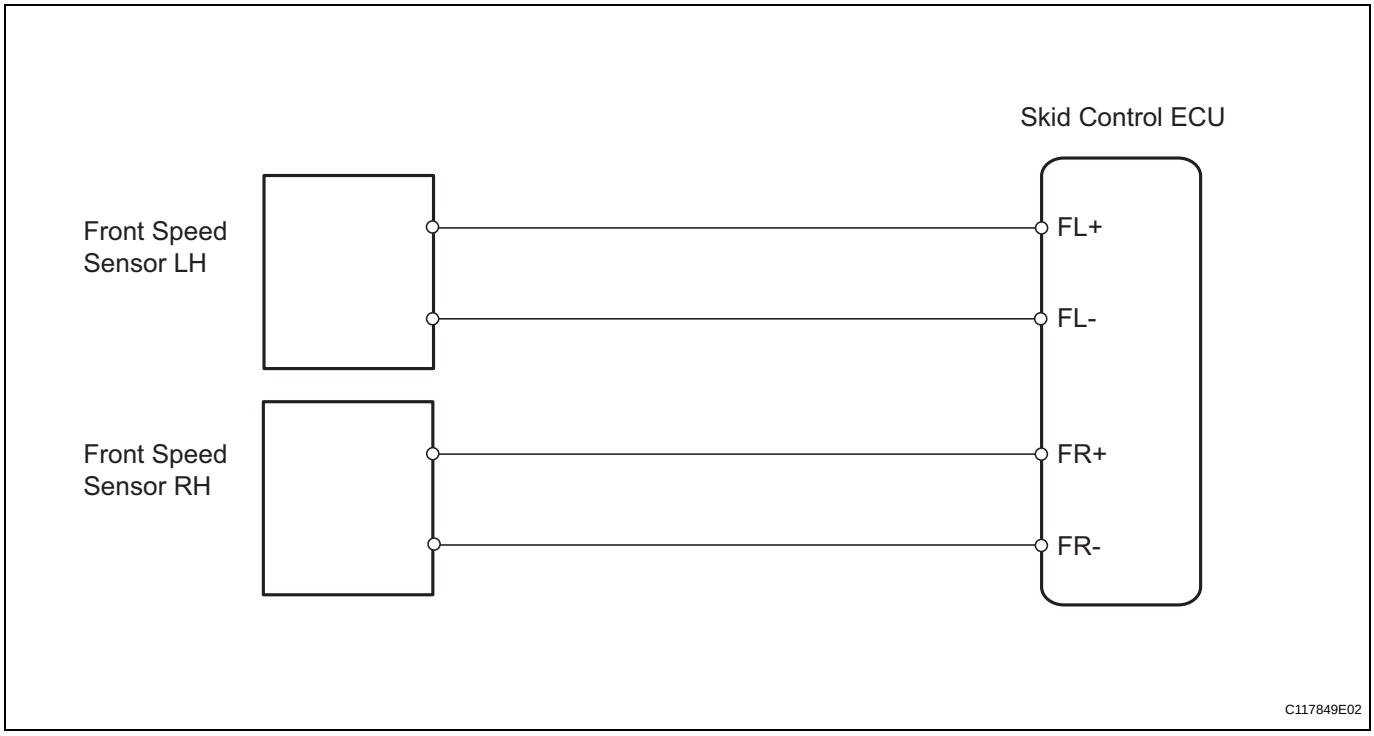
The speed sensors detect those magnetic changes and send pulse signals to the skid control ECU. The ECU monitors the wheel speeds through these pulse signals to control the ABS system.



DTC No.	DTC Detecting Conditions	Trouble Areas
C0200/31 C0205/32	When any one of following conditions met: 1. At vehicle speed of 6 mph (10 km/h) or more, speed sensor signal circuit open or short for 1 second or more. 2. Speed sensor signal open circuit occurs at least 255 times. 3. Speed sensor signal circuit open for 0.5 seconds or more. 4. With ignition switch on and vehicle speed at 2 mph (3 km/h) or more, 3 wheels output reverse rotation signals and 1 wheel outputs high-frequency pulse 75 times. 5. At vehicle speed of 6 mph (10 km/h) or more, speed sensor output halves for 5 seconds. 6. At vehicle speed of 6 mph (10 km/h) or more, changing of normal rotation signal and reverse rotation signal occurs 7 times within 0.006 seconds while ignition switch on. 7. Signal output of any one wheel different from signals of other 3 wheels for 1 second, at vehicle speed of 18 mph (30 km/h) or more. 8. Reverse rotation signal produced for 1 second or more at vehicle speed of 62 mph (100 km/h) or more. 9. At vehicle speed of 18 mph (30 km/h) or more, one speed sensor malfunctions and differs in signal direction from other 3 wheels. 10. When voltage at IG1 terminal 9.5 V or more, voltage of sensor power supply decreases for 0.5 seconds or more.	• Front speed sensor • Front speed sensor circuit • Sensor installation • Skid control sensor wire • Master cylinder solenoid (skid control ECU)
C1235/35 C1236/36	When either of following conditions (1 or 2) detected: 1. At vehicle speed of 12 mph (20 km/h) or more, noise in speed sensor signal continues for 5 seconds or more. 2. At vehicle speed of 6 mph (10 km/h) or more, noise detected as rotor turns, for 15 seconds or more.	• Front speed sensor • Front speed sensor circuit • Master cylinder solenoid (skid control ECU)
C1271/71 C1272/72	Detected only during test mode.	• Front speed sensor • Front speed sensor circuit • Sensor installation • Skid control sensor wire • Master cylinder solenoid (skid control ECU)
C1275/75 C1276/76	Detected only during test mode.	• Front speed sensor • Front speed sensor rotor • Master cylinder solenoid (skid control ECU)

BC

WIRING DIAGRAM

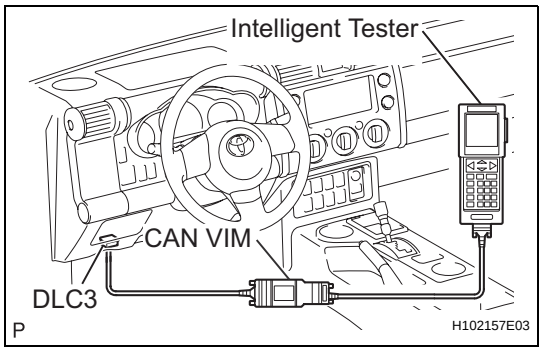


INSPECTION PROCEDURE

NOTICE:

- **When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).**
- **Check the speed sensor signal in test mode after clearing or replacement (See page BC-28).**

1	CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Using a intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC.
Select the following menu items: DIAGNOSIS / OBD/ MOBD / select vehicle / ABS/VSC / DATA LIST.

DATA LIST: ABS/VSC

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

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 READ VALUE OF DATA LIST (FRONT SPEED SENSOR)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Read the wheel speed value using the intelligent tester. Select the following menu items: DIAGNOSIS / OBD/ MOBD / select vehicle / ABS/VSC / DATA LIST.
(e) Select the item "FR (FL) Wheel Speed" in the DATA LIST and read the value displayed on the intelligent tester.

DATA LIST: ABS/VSC

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

(f) Check that there is no significant difference between the speed value displayed on the intelligent tester and the speed value displayed on the speedometer when driving the vehicle.
OK:
There is almost no difference in the displayed speed values.
HINT:
There is a tolerance of +- 10% in the speedometer indication.

NG → Go to step 5

OK

3 PERFORM TEST MODE INSPECTION (SIGNAL CHECK)

(a) Perform a TEST MODE inspection and check for DTCs (See page BC-28).
OK:
No DTC output.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 RECONFIRM DTC

(a) Clear the DTC(s) (See pageBC-45).

(b) Start the engine.
(c) Drive the vehicle at a speed of 12 mph (20 km/h) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (See page BC-45).

Result

BC

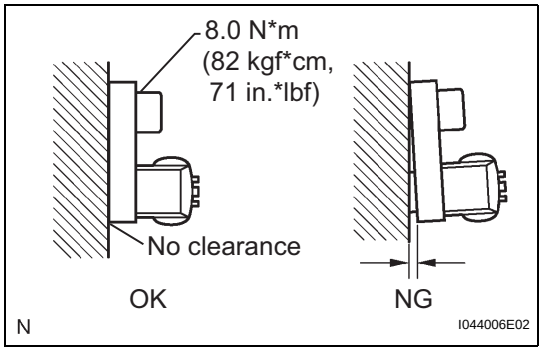
Result	Proceed to
DTC not output	A
DTC output	B

B → **Go to step 11**

A

END

5 CHECK FRONT SPEED SENSOR INSTALLATION



(a) Check that the speed sensor installation bolt is tightened properly.
OK:
The installation bolt is tightened properly.
Torque: 8.0 N*m (82 kgf*cm, 72 in.*lbf)

NG → **TIGHTEN BOLT PROPERLY**

OK

6 CHECK FRONT SPEED SENSOR

(a) Visually check the speed sensor for deformation and damage.
OK:
No scratches or foreign matter on the speed sensor tip.
No deformation or damage.
There is no gap between the sensor and steering knuckle.

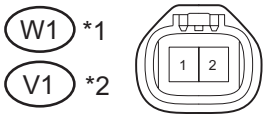
NG → **REPLACE FRONT SPEED SENSOR**

OK

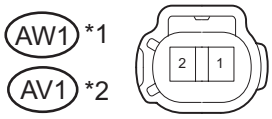
7 INSPECT SKID CONTROL SENSOR WIRE

Skid Control Sensor Wire:

Sensor Side Connector:



Vehicle Side Connector:



C135284E01

(a) Disconnect the skid control sensor wire.
(b) Measure the resistance.

Standard resistance (LH)

Tester Connection	Specified Condition
W1-1 - AW1-1	Below 1 Ω
W1-1 - AW1-2	10 kΩ or higher
W1-1 - Body ground	10 kΩ or higher
W1-2 - AW1-1	10 kΩ or higher
W1-2 - AW1-2	Below 1 Ω
W1-2 - Body ground	10 kΩ or higher

Standard resistance (RH)

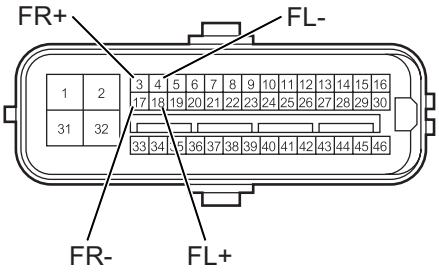
Tester Connection	Specified Condition
V1-1 - AV1-1	Below 1 Ω
V1-1 - AV1-2	10 kΩ or higher
V1-1 - Body ground	10 kΩ or higher
V1-2 - AV1-1	10 kΩ or higher
V1-2 - AV1-2	Below 1 Ω
V1-2 - Body ground	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE

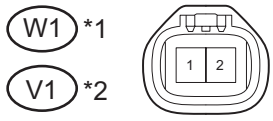
OK

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

Skid Control ECU (harness side connector): A4



Front Speed Sensor (harness side connector):



C138455E01

(a) Disconnect the skid control ECU connector and the front speed sensor connector.
(b) Measure the resistance.

Standard resistance (LH)

Tester Connection	Specified Condition
A4-18 (FL+) - W1-2	Below 1 Ω
A4-18 (FL+) - Body ground	10 kΩ or higher
A4-4 (FL-) - W1-1	Below 1 Ω
A4-4 (FL-) - Body ground	10 kΩ or higher

Standard resistance (RH)

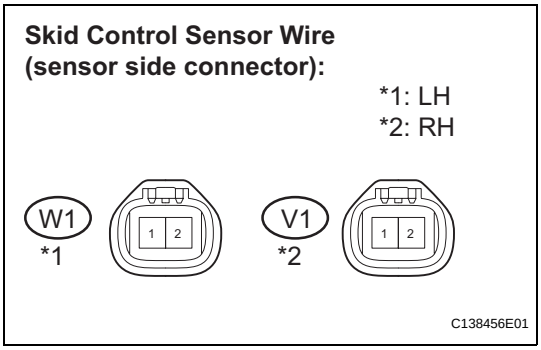
Tester Connection	Specified Condition
A4-3 (FR+) - V1-2	Below 1 Ω
A4-3 (FR+) - Body ground	10 kΩ or higher
A4-17 (FR-) - V1-1	Below 1 Ω
A4-17 (FR-) - V1-1	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9	INSPECT FRONT SPEED SENSOR (INPUT VOLTAGE)

BC



(a) Disconnect the speed sensor connector.
(b) Turn the ignition switch on.
(c) Measure the voltage.

Standard voltage (LH)

Tester Connection	Specified Condition
W1-2 - Body ground	5.7 to 17.3 V

Standard voltage (RH)

Tester Connection	Specified Condition
V1-2 - Body ground	5.7 to 17.3 V

NG → REPLACE MASTER CYLINDER SOLENOID

OK

10	RECONFIRM DTC

(a) Clear the DTC(s) (See page BC-45).
(b) Start the engine.
(c) Drive the vehicle at a speed of 12 mph (20 km/h) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

11	REPLACE FRONT SPEED SENSOR

(a) Replace the front speed sensor.

NEXT

12	RECONFIRM DTC

(a) Clear the DTC(s) (See page BC-45).
(b) Start the engine.
(c) Drive the vehicle at a speed of 12 mph (20 km/h) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

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

BC

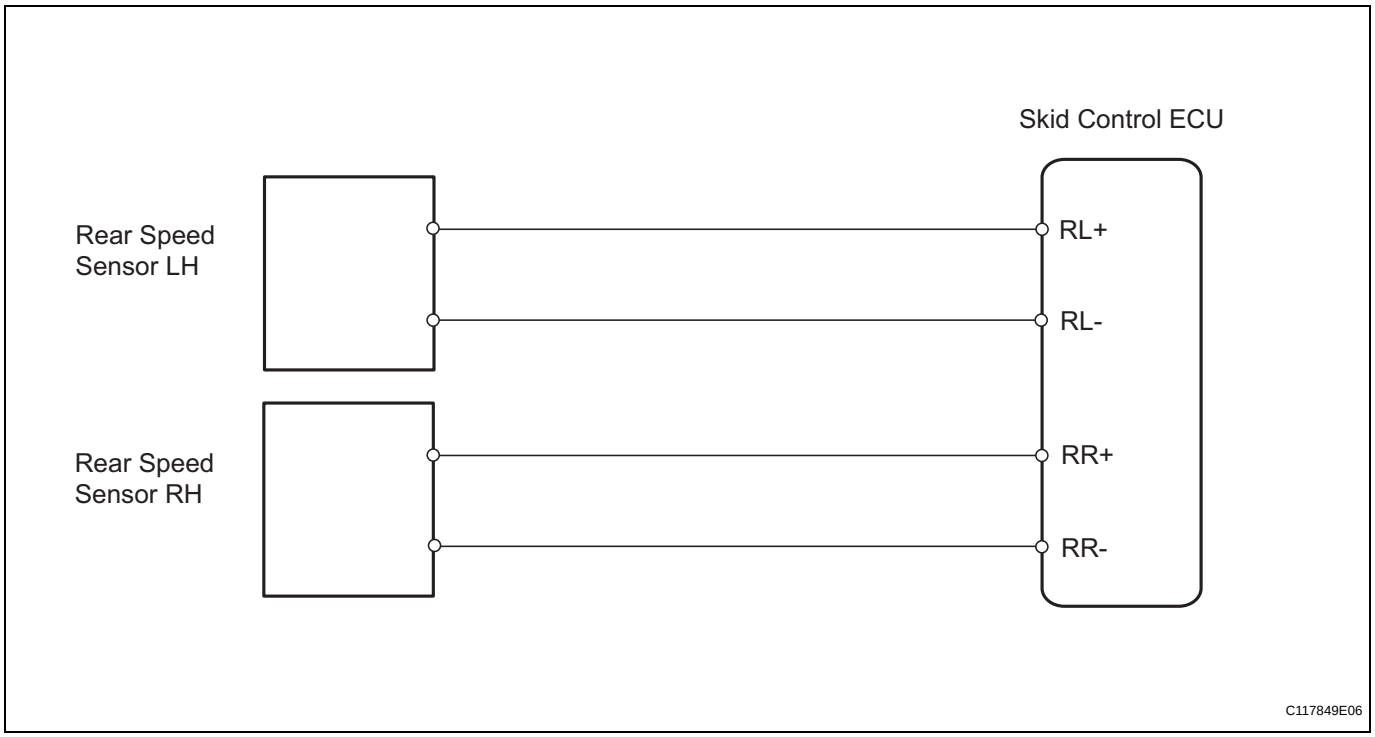
DESCRIPTION

Refer to DTC C0200/31 (See page BC-59).

DTC No.	DTC Detecting Conditions	Trouble Areas
C0210/33 C0215/34	When any of following conditions detected: 1. At vehicle speed of 6 mph (10 km/h) or more, open or short in sensor signal circuit continues for 1 second or more. 2. Momentary interruption of sensor signal from abnormal wheel occurs 255 times or more. 3. Open in speed sensor signal circuit continues for 0.5 seconds or more. 4. With IG1 terminal voltage 9.5 V or more, sensor power supply voltage decreases for 0.5 seconds or more. 5. When vehicle driven at speed of more than 10 km/h (6 mph), one of wheel speeds below one-seventh of other wheel speeds for 15 seconds or more.	• Rear speed sensor • Rear speed sensor circuit • Sensor installation • Skid control sensor wire • Master cylinder solenoid (skid control ECU)
C1238/38 C1239/39	When either of following conditions (1 or 2) detected: 1. At vehicle speed of 12 mph (20 km/h) or more, noise in speed sensor signal continues for 5 seconds or more. 2. At vehicle speed of 6 mph (10 km/h) or more, noise detected as rotor turns, for 15 seconds or more.	• Rear speed sensor • Rear speed sensor circuit • Master cylinder solenoid (skid control ECU)

DTC No.	DTC Detecting Conditions	Trouble Areas
C1273/73 C1274/74	Detected only during test mode.	• Rear speed sensor • Rear speed sensor circuit • Sensor installation • Skid control sensor wire • Master cylinder solenoid (skid control ECU)
C1277/77 C1278/78	Detected only during test mode.	• Rear speed sensor • Rear speed sensor circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM

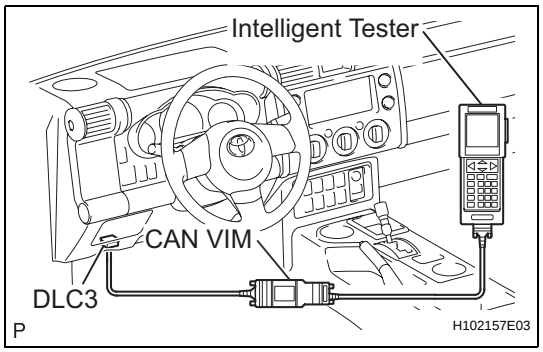


INSPECTION PROCEDURE

NOTICE:

- **When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).**
- **Check the speed sensor signal in test mode after clearing or replacement (See page BC-28).**

1	CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Using the intelligent tester, check for any momentary interruption in the wire harness and connector of the speed sensor.

Select the following menu items: DIAGNOSIS / OBD/ MOBD / select vehicle / ABS/VSC / DATA LIST.

DATA LIST: ABS/VSC

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

BC

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

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

OK

2	READ VALUE OF DATA LIST

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine and drive the vehicle.
(c) Turn the tester on.
(d) Select the following menu items: DIAGNOSIS / OBD/ MOBD / select vehicle / ABS/VSC / DATA LIST.
(e) Select the item "RR (RL) WHEEL SPD" in the DATA LIST and read the value displayed on the intelligent tester.

DATA LIST: ABS/VSC

Item (Display)	Measurement Item / Range (Display)	Normal Condition
WHEEL SPD RR	Wheel speed sensor (RR) reading : min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Similar to speed indicated on speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading : min.: 0 mph (0 km/h), max.: 202 mph (326 km/h)	Similar to speed indicated on speedometer

(f) Check that there is no significant difference between the speed value displayed on the intelligent tester and the speed value displayed on the speedometer when driving the vehicle.

OK:

There is no significant difference in the displayed speed values.

HINT:

There is a tolerance of +- 10% in the speedometer indication.

NG → **Go to step 5**

OK

3	PERFORM TEST MODE INSPECTION

(a) Perform a TEST MODE inspection and check for DTCs (See page BC-28).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 RECONFIRM DTC

(a) Clear the DTC(s) (See page BC-45).
(b) Start the engine.
(c) Drive the vehicle at a speed of 12 mph (20 km/h) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (See page BC-45).

Result

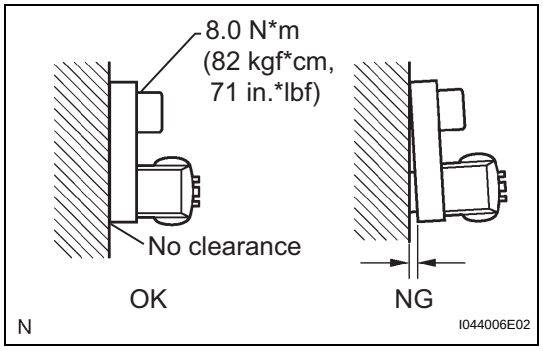
Result	Proceed to
DTC not output	A
DTC output	B

B → Go to step 11

A

END

5 CHECK REAR SPEED SENSOR INSTALLATION



(a) Check that the speed sensor installation bolt is tightened properly.
OK:
The installation bolt is tightened properly.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

NG → TIGHTEN BOLT PROPERLY

OK

6 CHECK REAR SPEED SENSOR

(a) Visually check the speed sensor for deformation and damage.
OK:
No deformation or damage.
There is no gap between the sensor and rear axle carrier.

NG → REPLACE REAR SPEED SENSOR

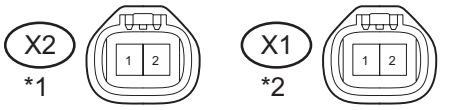
OK

7	INSPECT SKID CONTROL SENSOR WIRE

BC

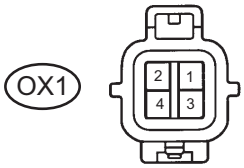
Skid Control Sensor Wire:

Sensor Side Connector:



*1: LH
*2: RH

Vehicle Side Connector:



C138457E01

(a) Disconnect the rear speed sensor wire.
(b) Measure the resistance.

Standard resistance (LH)

Tester Connection	Specified Condition
X2-2 - OX1-1	10 kΩ or higher
X2-2 - OX1-2	Below 1 Ω
X2-2 - OX1-3	10 kΩ or higher
X2-2 - OX1-4	10 kΩ or higher
X2-2 - Body ground	10 kΩ or higher
X2-1 - OX1-1	Below 1 Ω
X2-1 - OX1-2	10 kΩ or higher
X2-1 - OX1-3	10 kΩ or higher
X2-1 - OX1-4	10 kΩ or higher
X2-1 - Body ground	10 kΩ or higher

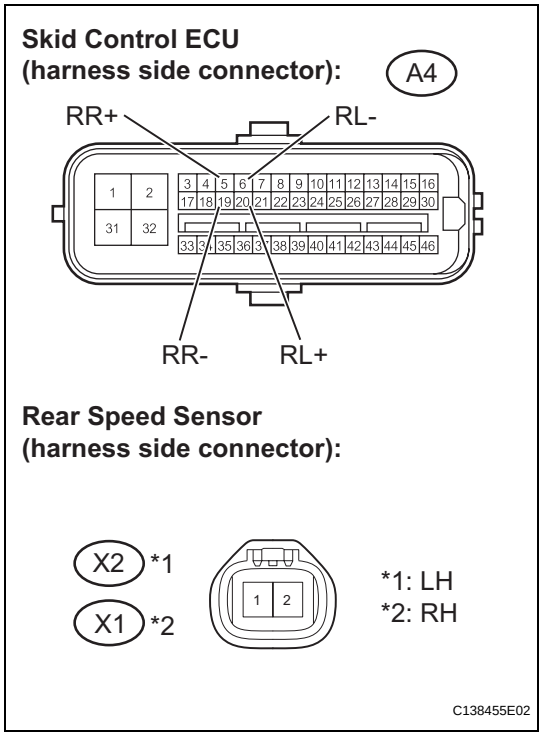
Standard resistance (RH)

Tester Connection	Specified Condition
X1-1 - OX1-1	Below 1 Ω
X1-1 - OX1-2	10 kΩ or higher
X1-1 - OX1-3	10 kΩ or higher
X1-1 - OX1-4	10 kΩ or higher
X1-1 - Body ground	10 kΩ or higher
X1-2 - OX1-1	10 kΩ or higher
X1-2 - OX1-2	Below 1 Ω
X1-2 - OX1-3	10 kΩ or higher
X1-2 - OX1-4	10 kΩ or higher
X1-2 - Body ground	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE

OK

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



(a) Disconnect the skid control ECU connector.
(b) Disconnect the rear speed sensor connector.
(c) Measure the resistance.

Standard resistance (LH)

Tester Connection	Specified Condition
A4-20 (RL+) - X2-2	Below 1 Ω
A4-6 (RL-) - X2-1	Below 1 Ω

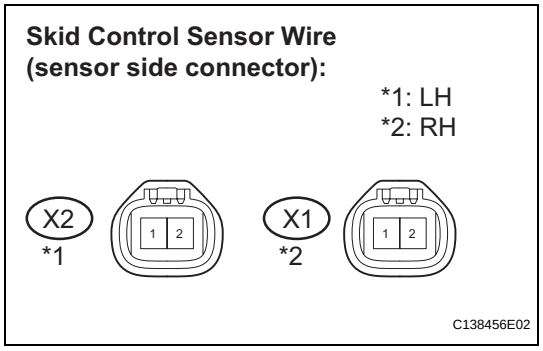
Standard resistance (RH)

Tester Connection	Specified Condition
A4-5 (RR+) - X1-2	Below 1 Ω
A4-19 (RR-) - X1-1	Below 1 Ω

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

OK

9 CHECK SKID CONTROL SENSOR (INPUT VOLTAGE)



(a) Disconnect the rear speed sensor connector.
(b) Turn the ignition switch on.
(c) Measure the voltage.

Standard voltage (LH)

Tester Connection	Specified Condition
X2-2 - Body ground	5.7 to 17.3 V

Standard voltage (RH)

Tester Connection	Specified Condition
X1-2 - Body ground	5.7 to 17.3 V

NG → **REPLACE MASTER CYLINDER SOLENOID**

OK

10 RECONFIRM DTC

(a) Clear the DTC(s) (See page BC-45).
(b) Start the engine.
(c) Drive the vehicle at a speed of 12 mph (20 km/h) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

BC

B → END

A

11	REPLACE REAR SPEED SENSOR

(a) Replace the rear speed sensor (See page BC-198).

NEXT

12	RECONFIRM DTC

(a) Clear the DTC(s) (See page BC-45).
(b) Start the engine.
(c) Drive the vehicle at a speed of 12 mph (20 km/h) or more for at least 60 seconds.
(d) Check if the same DTC(s) is output (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

DTC	C0226/21	SFR Solenoid Circuit

DTC	C0236/22	SFL Solenoid Circuit

DTC	C0246/23	SRR Solenoid Circuit

DTC	C0256/24	SRL Solenoid Circuit

DTC	C1225/25	SMC Solenoid Circuit

DTC	C1226/26	SPC Solenoid Circuit

DTC	C1227/27	SRC Solenoid Circuit

DTC	C1228/28	STR Solenoid Circuit

DESCRIPTION

The solenoid goes on when signals are received from the skid control ECU and controls the pressure action on the wheel cylinders thus controlling the braking force.

DTC No.	DTC Detecting Conditions	Trouble Areas
C0226/21	Open or short in SFRH or SFRR circuit continues for 0.05 seconds or more.	Master cylinder solenoid
C0236/22	Open or short in SFLH or SFLR circuit continues for 0.05 seconds or more.	Master cylinder solenoid
C0246/23	Open or short in SRRH or SRRR circuit continues for 0.05 seconds or more.	Master cylinder solenoid
C0256/24	Open or short in SRLH or SRLR circuit continues for 0.05 seconds or more.	Master cylinder solenoid
C1225/25	Open or short in SMCR circuit continues for 0.05 seconds or more.	Master cylinder solenoid
C1226/26	Open or short in SREA circuit continues for 0.05 seconds or more.	Master cylinder solenoid
C1227/27	Open or short in SREC circuit continues for 0.05 seconds or more.	Master cylinder solenoid
C1228/28	Open or short in STR circuit continues for 0.05 seconds or more.	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	RECONFIRM DTC

HINT:

These DTCs are set when a problem is identified in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

Therefore, solenoid circuit inspection and solenoid unit inspection cannot be performed. Be sure to check if the DTCs are output before replacing the master cylinder solenoid.

(a) Clear the DTC (See page BC-45).

(b) Check if the same DTCs are detected.

Result

BC

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

DTC	C0278/11	Open in ABS Solenoid Relay Circuit

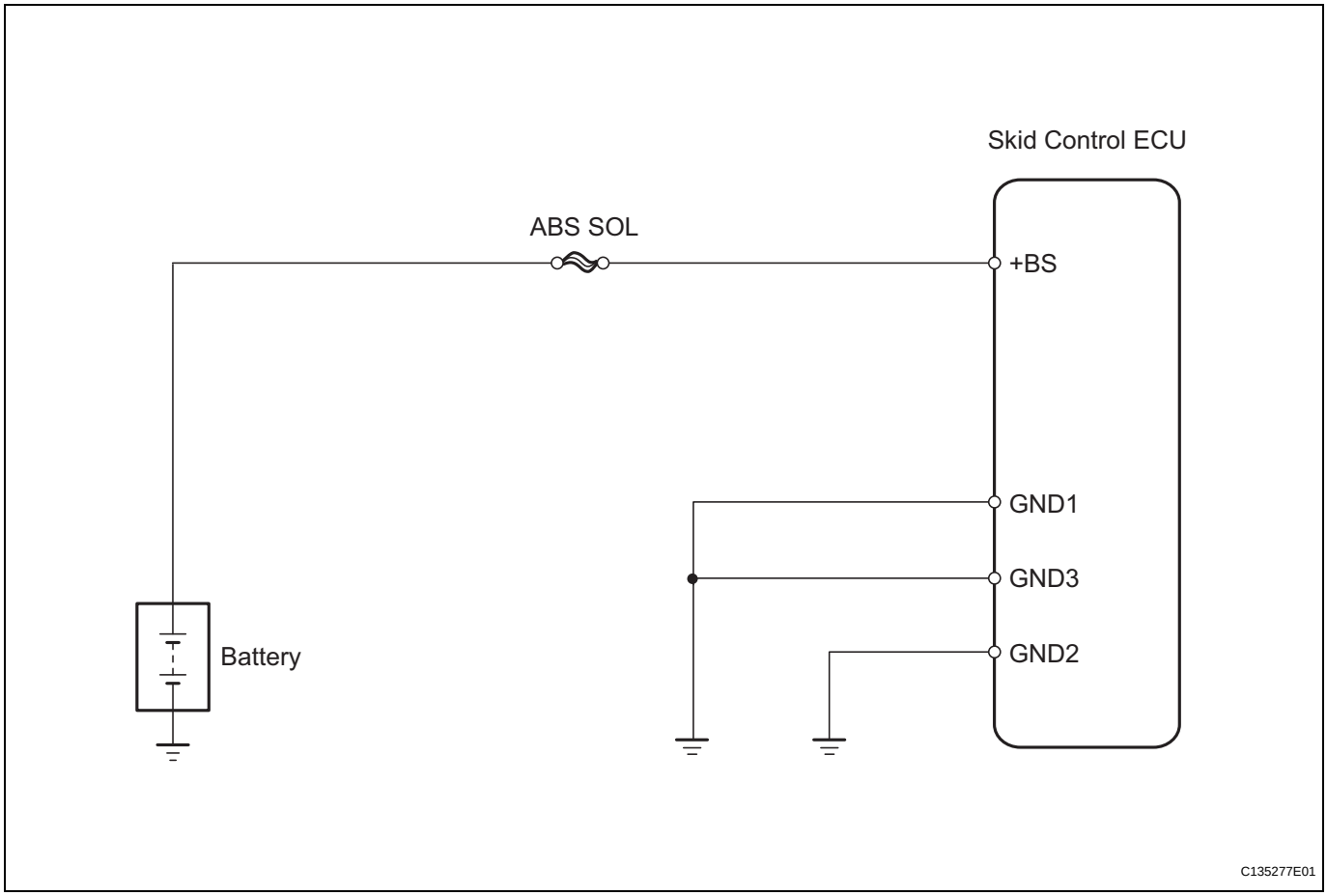
DTC	C0279/12	Short to B+ in ABS Solenoid Relay Circuit

DESCRIPTION

The solenoid relay supplies power to the ABS solenoid and TRAC solenoid.
After the ignition switch is turned on, the vehicle speed has reached 4 mph (6 km/h) and the solenoid is determined to be normal by the initial check self- diagnosis, the relay switches on. If any open or short circuits are detected, the relay switches off.
These DTCs may be set if the voltage supply to the solenoid relay (+BS) falls below the DTC detection threshold due to the battery or generator outputs being insufficient.

DTC No.	DTC Detecting Condition	Trouble Areas
C0278/11	When either of following conditions detected: 1. Both of following conditions continue for at least 0.2 seconds. (a) IG voltage between 9.5 V and 17 V. (b) Relay contact open when relay ON 2. Both of following conditions continue for at least 0.2 seconds. (a) IG voltage 9.5 V or less when relay ON. (b) Relay contact remains open.	• ABS SOL fuse • +BS terminal circuit • Master cylinder solenoid (skid control ECU)
C0279/12	Following condition continues for at least 0.2 seconds. • Relay contact closed immediately after turning IG switch to ON when relay OFF.	• ABS SOL fuse • +BS terminal circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

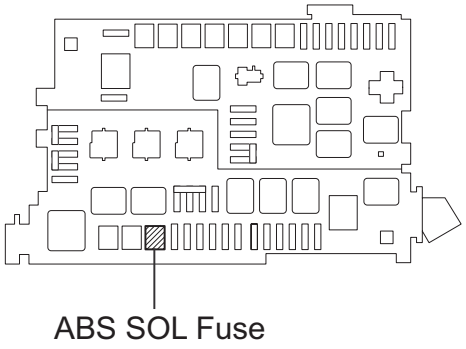
NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

BC

1	INSPECT FUSE (ABS SOL)

Engine Room R/B No. 2:



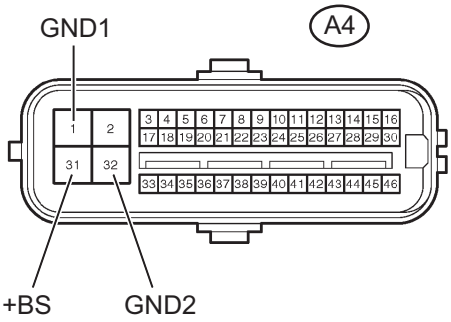
(a) Remove the ABS SOL fuse from the engine room R/B No. 2.
(b) Measure the resistance.
Standard resistance:
Below 1 Ω

NG → **CHECK FOR SHORTS IN ALL HARNESSES AND CONNECTORS CONNECTED TO FUSE AND REPLACE FUSE**

OK

2	CHECK SKID CONTROL ECU TERMINAL VOLTAGE (+BS)

Skid Control ECU (harness side connector):



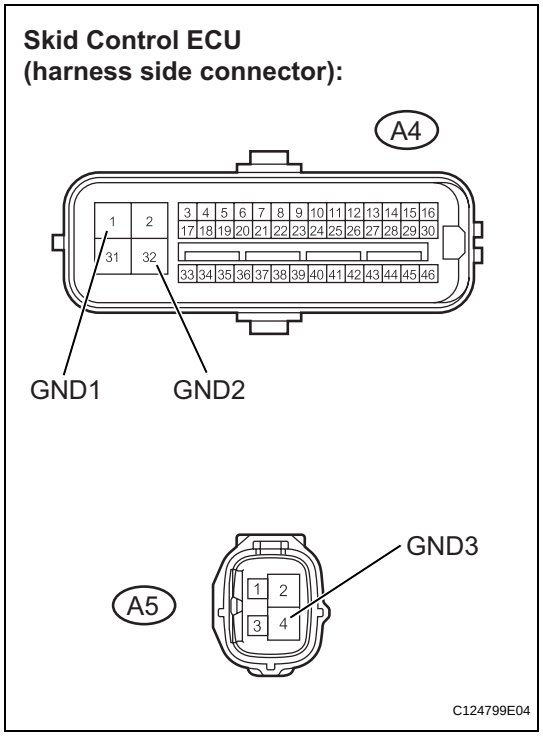
(a) Disconnect the skid control ECU connector.
(b) Measure the voltage.
Standard voltage

Tester Connection	Specified Condition
A4-31 (+BS) - A4-1, 32 (GND1, GND2)	11 to 14 V

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

OK

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



(a) Disconnect the skid control ECU connector.
(b) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-1, 32 (GND1, GND2) - Body ground	Below 1 Ω
A5-4 (GND3) - Body ground	Below 1 Ω

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

OK

4	RECONFIRM DTC

(a) Clear the DTC(s) (See page BC-45).
(b) Check if the same DTC(s) is output (See page BC-45).

B → **END**

OK

REPLACE MASTER CYLINDER SOLENOID

DTC	C0371/71	Yaw Rate Sensor (Test Mode DTC)

DTC	C1232/32	Stuck in Deceleration Sensor

BC

DTC	C1234/34	Yaw Rate Sensor Malfunction

DTC	C1243/43	Deceleration Sensor Stuck Malfunction

DTC	C1244/44	Open or Short in Deceleration Sensor Circuit

DTC	C1245/45	Deceleration Sensor Output Malfunction

DTC	C1279/79	Deceleration Sensor Output Voltage Malfunction (Test Mode DTC)

DTC	C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction

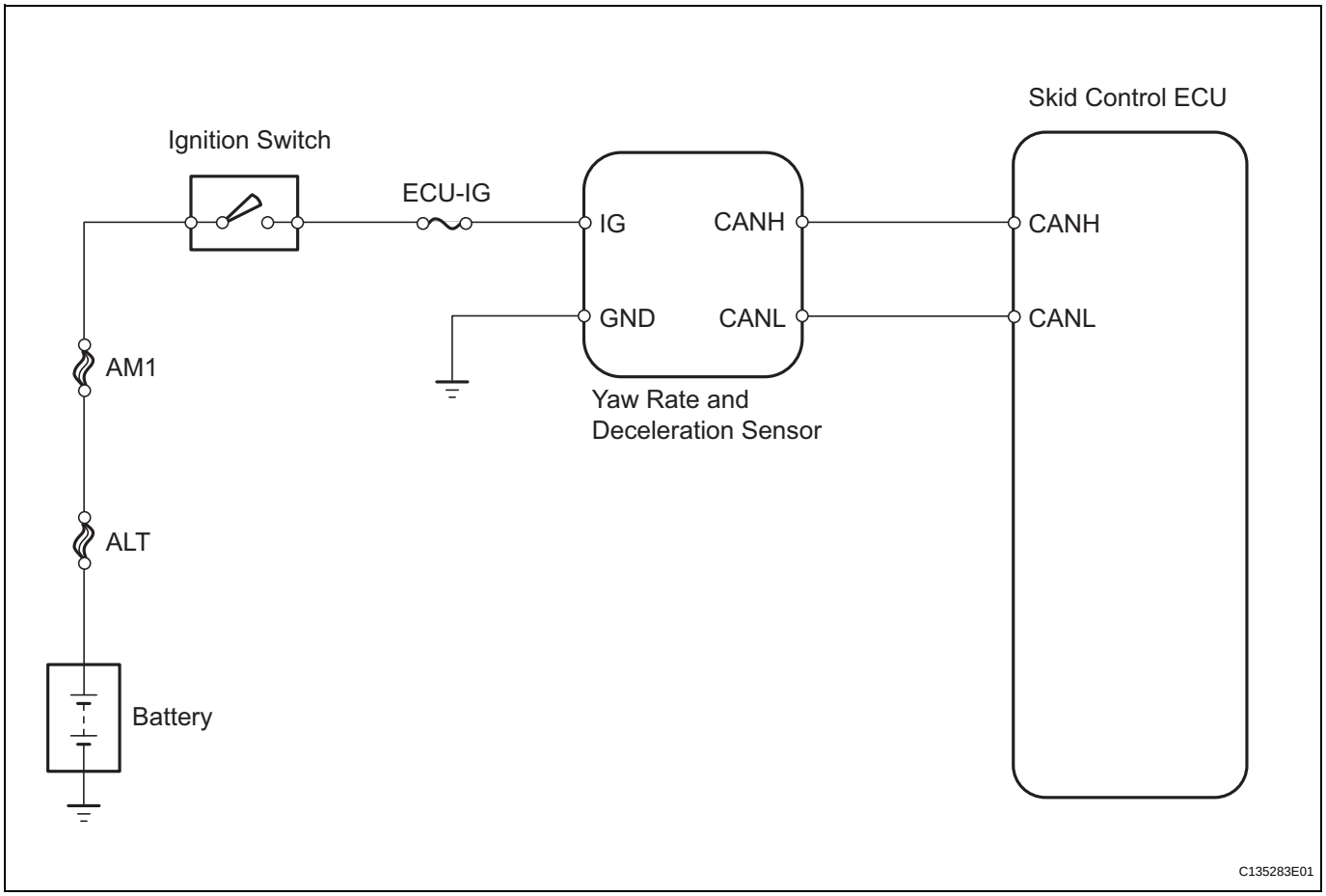
DESCRIPTION

The skid control ECU receives signals from the yaw rate sensor and deceleration sensor via the CAN communication system.
The deceleration sensor is built into the yaw rate sensor.
If there is trouble in the bus lines between the yaw rate sensor and deceleration sensor and the CAN communication system, DTC U0123/62 (yaw rate sensor communication trouble) and U0124/95 (deceleration sensor communication trouble) are output.

DTC No.	DTC Detecting Conditions	Trouble Areas
C0371/71	Detected only during test mode	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1232/32	At vehicle speed of 6 mph (10 km/h) or more, signal from either GL1 or GL2 does not change for 30 seconds or more.	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1234/34	Sensor malfunction signal received from yaw rater sensor.	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1243/43	Following condition repeats 16 times. • GL1 and GL2 do not change by more than 2LSB when vehicle decelerates from 19 mph (30 km/h) to 0 mph (0 km/h).	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1244/44	When either of following (1 or 2) detected: 1. Both of following conditions continue for at least 60 seconds. (a) Vehicle stopped. (b) Difference between GL1 and GL2 does not drop below 0.4 G once it reaches 0.6 G or more. 2. Data malfunction signal received from deceleration sensor.	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system
C1245/45	Following condition continues for at least 60 seconds. • Difference between values calculated from deceleration sensor value and vehicle speed exceeds 0.35 G.	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit • CAN communication system

DTC No.	DTC Detecting Conditions	Trouble Areas
C1279/79	Detected only during test mode	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit
C1381/97	Deceleration sensor power source malfunction signal received for at least 10 seconds at speed of more than 2 mph (3 km/h).	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the yaw rate and deceleration sensor, perform zero point calibration (See page BC-24).

HINT:

When U0073/94, U0123/62, U0124/95 or U0126/63 are output together with C1232/32 or C1234/34, inspect and repair the trouble areas indicated by U0073/94, U0123/62, U0124/95 or U0126/63 first.

1	CHECK DTC

(a) Clear the DTC(s) (See page BC-45).

(b) Check if the DTCs U0073/94, U0123/62, C1210/36 and/or C1336/39 are detected (See page BC-45).

Result

Result	Proceed to
DTC U0073/94, U0123/62, C1210/36 and/or C1336/39 not output	A

Result	Proceed to
DTC U0073/94 and/or U0123/62 output	B
DTC C1210/36 and/or C1336/39 output	C

B → REPAIR CAN COMMUNICATION SYSTEM

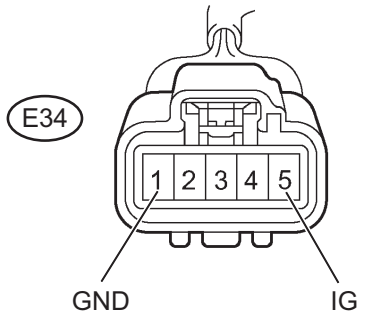
C → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

BC

A

2 INSPECT YAW RATE AND DECELERATION SENSOR

Yaw Rate Sensor (harness side connector):



(a) Disconnect the yaw rate and deceleration sensor connector.

(b) Measure the voltage.

Standard voltage

Tester Connection	Condition	Specified Condition
E34-5 (IG) - Body ground	Ignition switch ON	11 to 14 V

(c) Measure the resistance.

Standard resistance

Tester Connection	Condition	Specified Condition
E34-1 (GND) - Body ground	Ignition switch OFF	Below 1 Ω

Result

Result	Proceed to
OK (When troubleshooting in accordance with DTC CHART)	A
OK (When troubleshooting in accordance with PROBLEM SYMPTOMS TABLE)	B
NG	C

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

REPLACE YAW RATE AND DECELERATION SENSOR

DTC	C1201/51	Engine Control System Malfunction

DESCRIPTION

If trouble occurs in the engine control system, the skid control ECU disables TRAC, A-TRAC and VSC controls.

DTC No.	DTC Detecting Conditions	Trouble Areas
C1201/51	Malfunction signal received from ECM	Engine control system

INSPECTION PROCEDURE

1	CHECK DTC (ENGINE CONTROL SYSTEM)

(a) Check if any DTC is recorded for the engine control system (See page ES-38).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → REPLACE ECM

A → REPAIR ENGINE CONTROL SYSTEM

DTC	C1202/58	Brake Fluid Level Low / Open Circuit in Brake Fluid Level Warning Switch Circuit

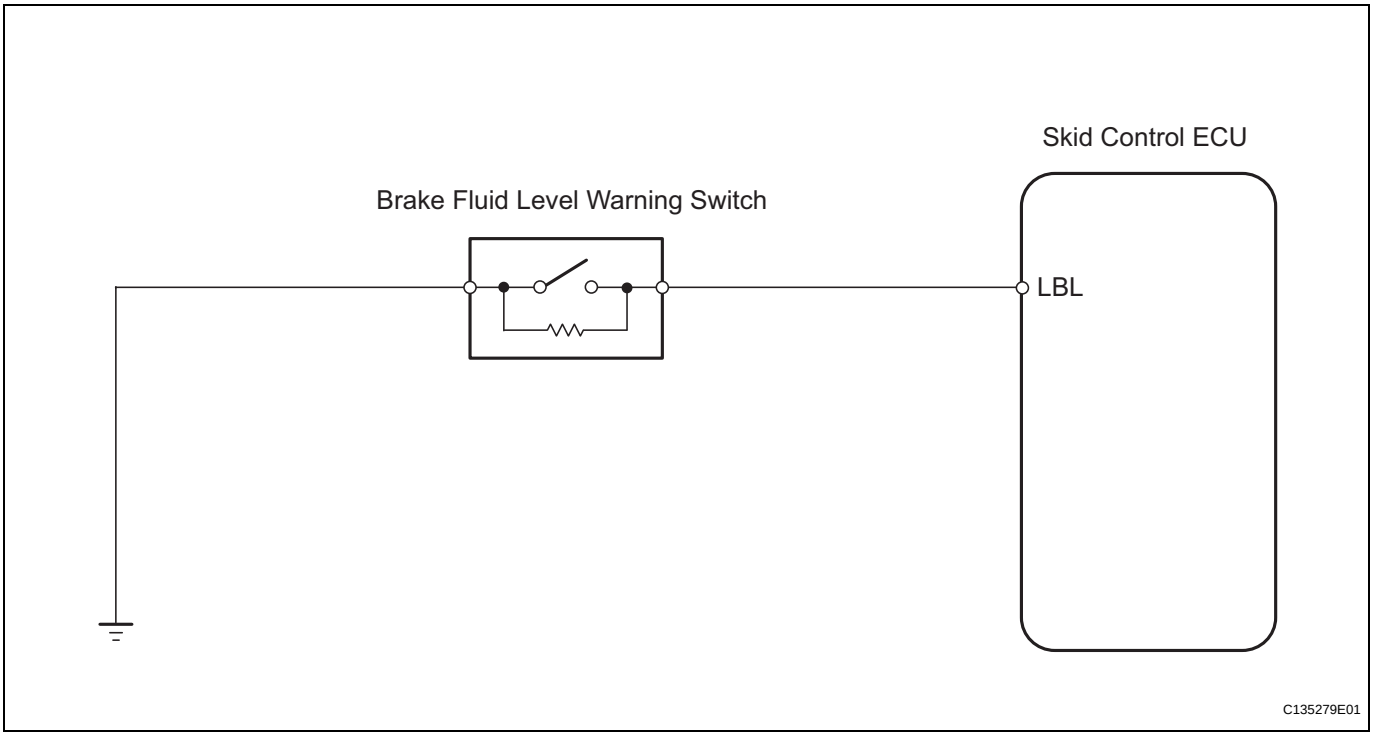
DESCRIPTION

BC

The brake fluid level warning switch sends the appropriate signal to the skid control ECU when the brake fluid level drops.

DTC No.	DTC Detecting Conditions	Trouble Areas
C1202/58	When any of following conditions detected: 1. Fluid level of brake master cylinder reservoir tank stays low for 30 seconds or more when vehicle stops, or for 60 seconds or more when driving. 2. With ECU terminal IG1 voltage 9.5 V to 17.2 V, open circuit for brake fluid level warning switch circuit continues for 2 seconds or more. 3. Fluid level of master cylinder reservoir tank LOW for 4 seconds or 40 seconds after ignition switch turned ON, or for 7 seconds during pump motor operation.	• Brake fluid level • Brake master cylinder reservoir sub-assembly (brake fluid level warning switch) • Brake fluid level warning switch circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

HINT:

When C1241/41 and/or C1242/42 is output together with C1202/58, inspect and repair the trouble areas indicated by C1241/41 and/or C1242/42 first.

1	CHECK BRAKE FLUID LEVEL

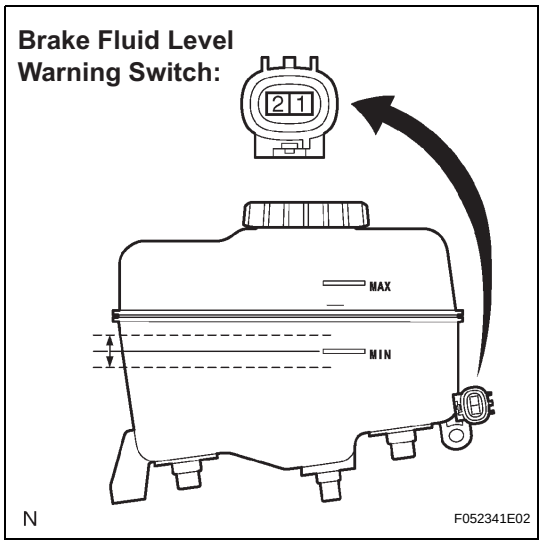
(a) Turn the ignition switch off.

(b) Depress the brake pedal 20 times or more (until the pedal reaction feels light and pedal stroke becomes longer).
HINT:
When the ignition switch is turned on, brake fluid is sent to the accumulator and the fluid level decreases by approximately 5 mm from the level when the ignition switch is off (normal).
NOTICE:
Do not move the wheels with the ignition switch off.
OK:
Brake fluid level is correct.

NG → **CHECK FOR LEAKAGE AND REPAIR**

OK

2 INSPECT BRAKE FLUID LEVEL WARNING SWITCH



(a) Disconnect the brake fluid level warning switch connector.
(b) Measure the resistance.
Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	Float UP (Switch OFF)	1.9 k to 2.1 kΩ
1 - 2	Float DOWN (Switch ON)	Below 1 Ω

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

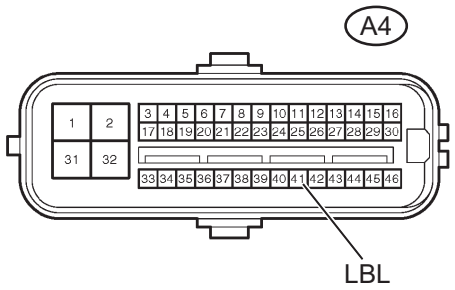
NG → **REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY**

OK

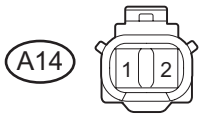
3	CHECK HARNESS AND CONNECTOR (BRAKE FLUID LEVEL WARNING SWITCH - SKID CONTROL ECU)

BC

Skid Control ECU (harness side connector):



Brake Fluid Level Warning Switch (harness side connector):



C124798E02

(a) Disconnect the skid control ECU connector.
(b) Disconnect the brake fluid level warning switch connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-41 (LBL) - A14-2	Below 1 Ω
A4-41 (LBL) - Body ground	1.9 k to 2.1 kΩ

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

OK

4	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is output (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

DTC	C1203/53	ECM Communication Circuit Malfunction

DESCRIPTION

The circuit sends TRAC, A-TRAC and VSC control information from the skid control ECU to the ECM, and engine control information from the ECM to the skid control ECU via the CAN communication system.

DTC No.	DTC Detecting Condition	Trouble Areas
C1203/53	Information relating to engine drive source or destination stored in ECM does not match that stored in skid control ECU.	• CAN communication system • ECM

INSPECTION PROCEDURE

1	CHECK DTC (CAN COMMUNICATION SYSTEM)

(a) Check if any DTC is recorded for the CAN communication system (See page CA-14).

Result

Result	Proceed to
DTC not output	A
DTC output	B

B → REPAIR CAN COMMUNICATION SYSTEM

A

2	CHECK DTC (ENGINE CONTROL SYSTEM)

(a) Check if any DTC is recorded for the engine control system (See page ES-38).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → REPLACE ECM

A

REPAIR ENGINE CONTROL SYSTEM

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

DTC	C1336/39	Zero Point Calibration of Acceleration Sensor Undone

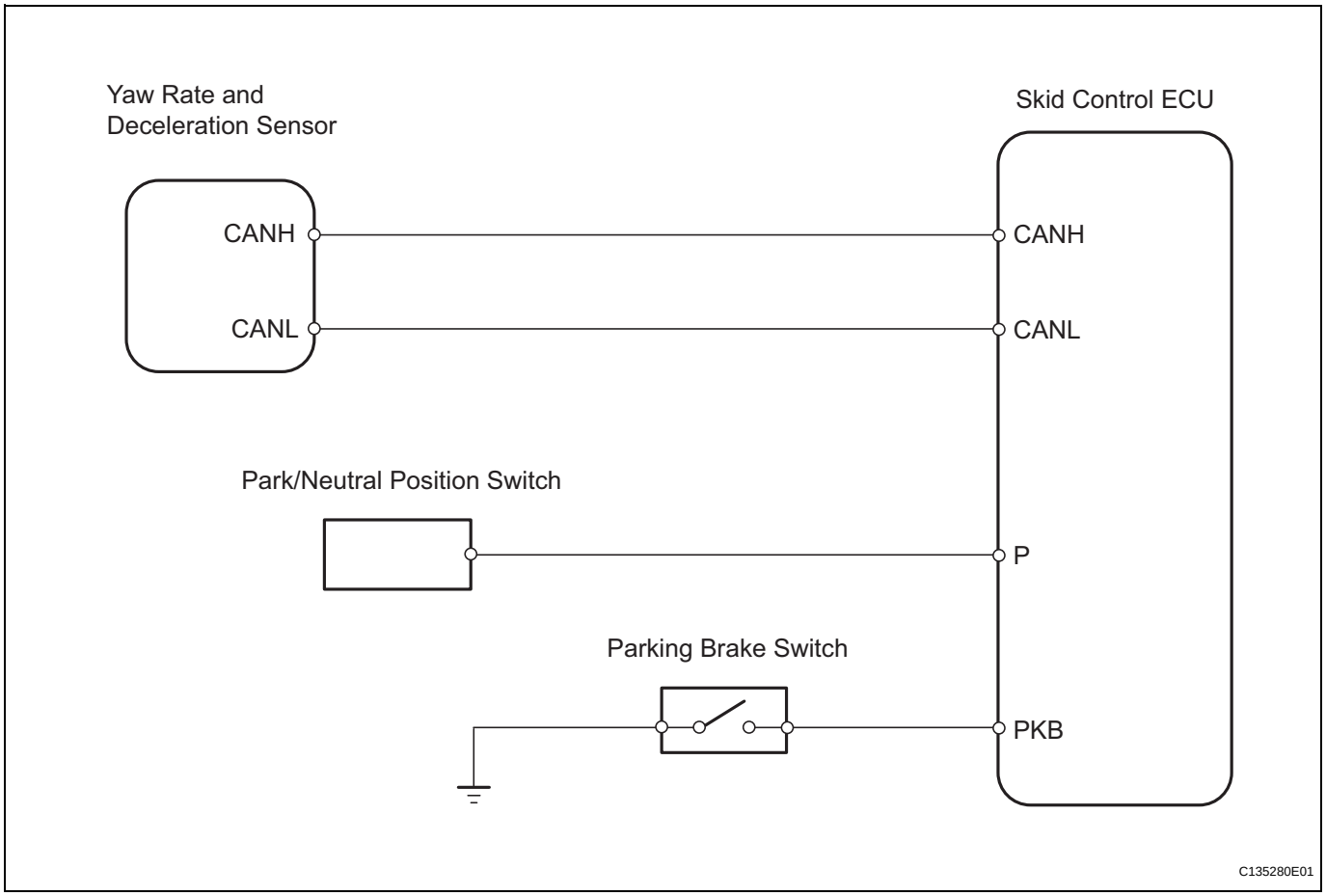
BC

DESCRIPTION

The skid control ECU receives signals from the yaw rate sensor and deceleration sensor via the CAN communication system.
The deceleration sensor is built into the yaw rate sensor.
If there is trouble in the bus lines between the yaw rate sensor and deceleration sensor and the CAN communication system, the DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (deceleration sensor communication trouble) are output.
These DTCs are also output when the calibration has not been completed.

DTC No.	DTC Detecting Conditions	Trouble Areas
C1210/36	When either of following 1 or 2 detected: 1. When battery terminal connected, shift lever moved to non-P position (A/T) or parking brake OFF (M/T) within 15 seconds of ECU terminal IG1 initially turned ON. 2. Yaw rate sensor zero point recorded in ECU deleted.	• Yaw rate sensor and deceleration sensor • Zero point calibration not complete • PNP switch circuit (P position) (A/T) • Parking brake switch circuit (M/T) • Master cylinder solenoid (skid control ECU)
C1336/39	When either of following 1 or 2 detected: 1. In TEST mode, shift lever shifted to non-P position (A/T) or parking brake OFF (M/T) 2 seconds after ECU terminal IG1 initially turned ON. 2. Deceleration sensor zero point recorded in ECU deleted.	• Yaw rate sensor and deceleration sensor • Zero point calibration not complete • PNP switch circuit (P position) (A/T) • Parking brake switch circuit (M/T) • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
When U0073/94, U0100/65, U0123/62, U0124/95 or U0126/63 are output accompanied by C1210/36 or C1336/39, inspect and repair the trouble areas indicated by U0073/94, U0100/65,U0123/62, U0124/95 or U0126/63 first.

1	PERFORM YAW RATE AND DECELERATION SENSOR ZERO POINT CALIBRATION

(a) Perform the zero point calibration of the yaw rate sensor and deceleration sensor (See page BC-24).

NEXT

2	RECONFIRM DTC

(a) Clear the DTCs (See page BC-45).
(b) Check if the same DTCs are recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

BC

3	CHECK YAW RATE AND DECELERATION SENSOR INSTALLATION

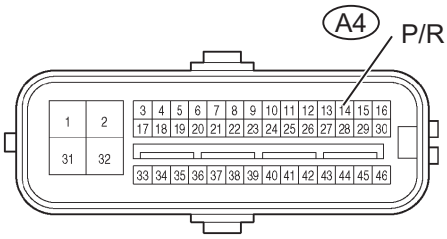
(a) Check that the yaw rate and deceleration sensor has been installed properly (See page BC-202).
OK:
The sensor is tightened to the specified torque.
The sensor is not tilted.

NG → **INSTALL YAW RATE SENSOR CORRECTLY**

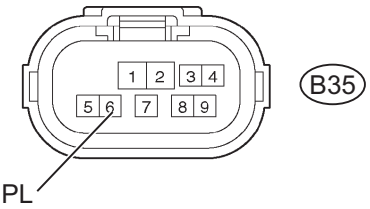
OK

4	CHECK HARNESS AND CONNECTOR (ECU - PARK/NEUTRAL POSITION SWITCH OR PARKING BRAKE SWITCH)

Skid Control ECU
(harness side connector):



Park/Neutral Position Switch
(harness side connector):

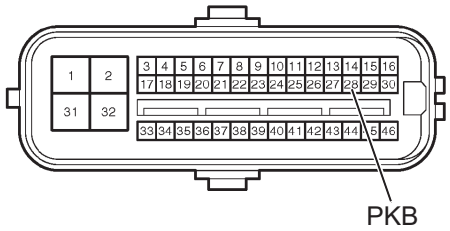


Y F052381E02

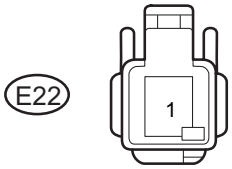
(a) A/T
(1) Disconnect the skid control ECU connector.
(2) Disconnect the Park/Neutral position switch connector.
(3) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-14 (P/R) - B35-6 (PL)	Below 1 Ω

Skid Control ECU
(harness side connector): A4



Parking Brake Switch
(harness side connector):



C124797E02

(b) M/T:
(1) Disconnect the skid control ECU connector.
(2) Disconnect the parking brake switch connector.
(3) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-28 (PKB) - E22-1	Below 1 Ω

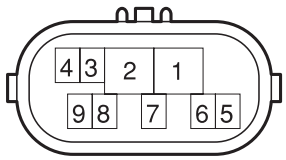
BC

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

OK

5 INSPECT PARK/NEUTRAL POSITION SWITCH OR PARKING BRAKE SWITCH

PNP Switch:

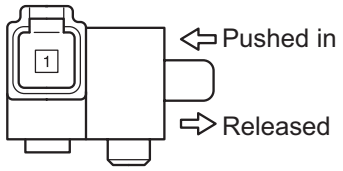


P C124790E04

(a) Inspect the Park/Neutral Position (PNP) switch (for A/T models).
(1) Disconnect the PNP switch connector.
(2) Check the resistance when the transmission gear selector lever is moved to each position.
Standard resistance

Gear Selector Lever Positions	Tester Connections	Specified Conditions
P	2 - 6, 4 - 5	Below 1 Ω
R	1 - 2	Below 1 Ω
N	2 - 9, 4 - 5	Below 1 Ω
D	2 - 7	Below 1 Ω
2	2 - 3	Below 1 Ω
L	2 - 8	Below 1 Ω

Parking Brake Switch:



Y C129357E04

(b) Inspect the parking brake switch (for M/T models).
(1) Disconnect the parking brake switch connector.
(2) Measure the resistance.
Standard resistance

Tester Connection	Condition	Specified Condition
1 - Ground part	Parking brake switch ON (Switch pin released)	Below 1 Ω
1 - Ground part	Parking brake switch OFF (Switch pin pushed in)	10 kΩ or higher

NG → REPLACE PARK/NEUTRAL POSITION SWITCH OR PARKING BRAKE SWITCH

OK

BC

6	REPLACE YAW RATE AND DECELERATION SENSOR

(a) Replace the yaw rate and deceleration sensor (See page BC-201).

NEXT

7	PERFORM YAW RATE AND DECELERATION SENSOR ZERO POINT CALIBRATION

(a) Perform the zero point calibration of the yaw rate sensor and deceleration sensor (See page BC-24).

NEXT

8	RECONFIRM DTC

(a) Clear the DTCs (See page BC-45).
(b) Check if the same DTCs are recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

DTC	C1223/43	ABS Control System Malfunction

DESCRIPTION

This DTC is output when the VSC system detects a malfunction in the ABS system. When DTC C1223/43 is stored, there is no malfunction in the skid control ECU.

DTC No.	DTC Detecting Condition	Trouble Areas
C1223/43	ABS control system abnormal	ABS control system

INSPECTION PROCEDURE

1	CHECK DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

DTC	C1231/31	Steering Angle Sensor Circuit Malfunction

DTC	C1290/66	Steering Angle Sensor Zero Point Malfunction

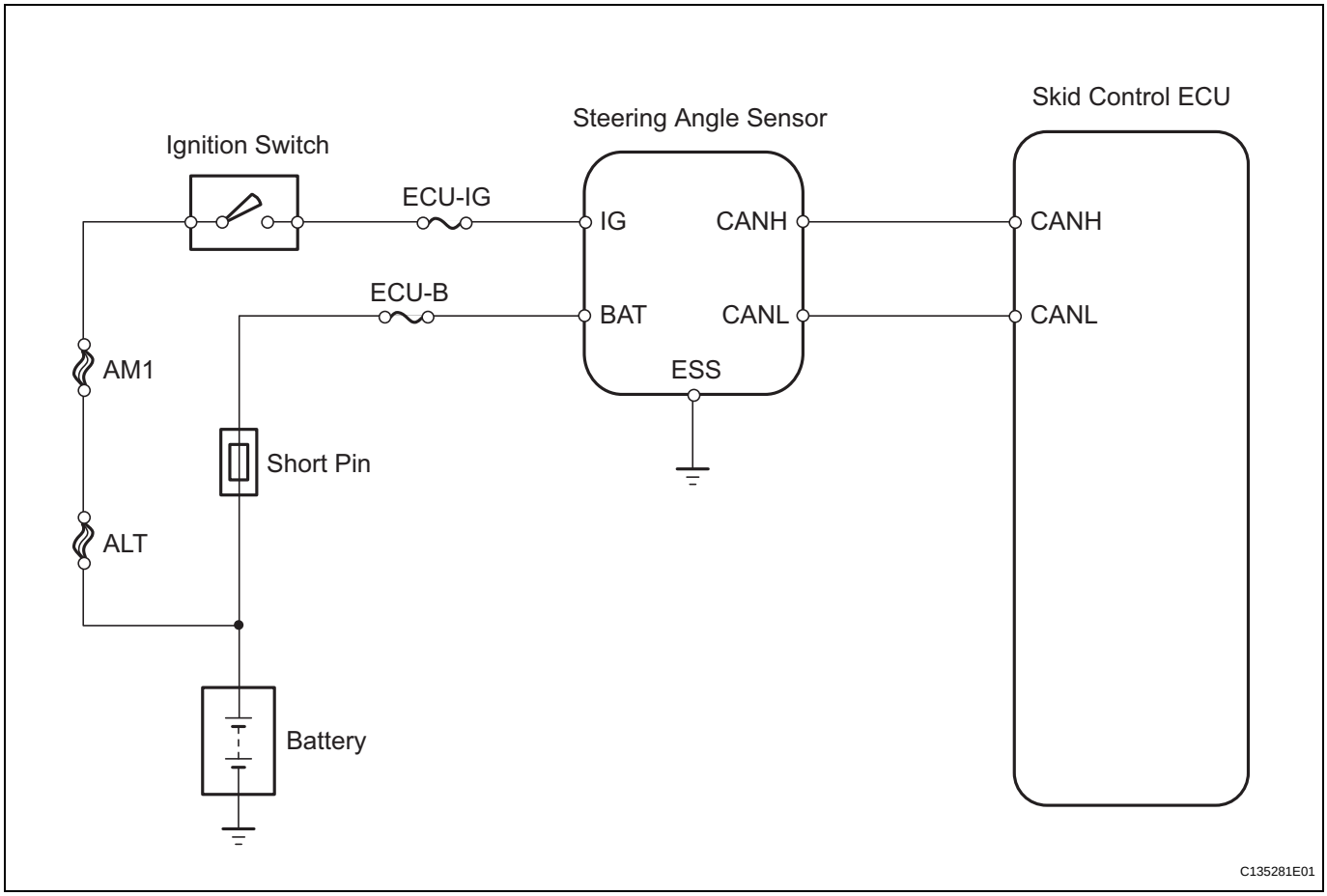
BC

DESCRIPTION

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

DTC No.	DTC Detecting Conditions	Trouble Areas
C1231/31	When ECU IG1 terminal voltage 9.5 V or more, steering angle sensor malfunction signal received.	• Steering angle sensor • Steering angle sensor circuit • CAN communication system • Master cylinder solenoid (skid control ECU)
C1290/66	Steering angle sensor zero point calibration position significantly differs from recorded value.	Steering angle sensor

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

HINT:

- When U0073/94, U0123/62, U0124/95 or U0126/63 are output together with C1231/31, inspect and repair the trouble areas indicated by U0073/94, U0123/62, U0124/95 or U0126/63 first.

- When the speed sensor or the yaw rate sensor has trouble, DTCs relating to the steering angle sensor may be output even when the steering angle sensor is normal. When DTCs relating to the speed sensor (C0200/31, C0205/32, C0210/33, C0215/34, C1235/35, C1236/36, C1238/38, C1239/39) or yaw rate (deceleration) sensor (C1232/32, C1234/34, C1243/43, C1244/44, C1245/45, C1381/97) are output together with other DTCs relating to the steering angle sensor, inspect and repair the speed sensor and yaw rate (deceleration) sensor first, and then inspect and repair the steering angle sensor.

1	CHECK CAN COMMUNICATION SYSTEM

(a) Check for CAN communication system DTCs (See page CA-14).

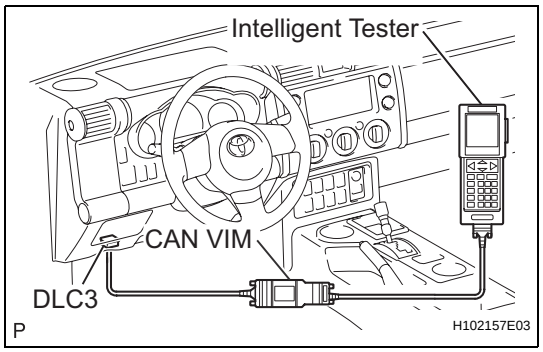
Result

Result	Proceed to
DTC not output	A
DTC output	B

B → REPAIR CAN COMMUNICATION SYSTEM

A

2	CHECK MOMENTARY INTERRUPTION (STEERING ANGLE SENSOR)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Using a intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC.
Select the following menu items: DIAGNOSIS / OBD/ MOBD / select vehicle / ABS/VSC / DATA LIST.

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition
STEERING SEN	Steering angle sensor open detection : OPN_DET or NORMAL	OPN_DET: Momentary interruption NORMAL: Normal

OK:
There are no momentary interruptions.

Result

Result	Proceed to
OK (When troubleshooting in accordance with DTC CHART)	A
OK (When troubleshooting in accordance with PROBLEM SYMPTOMS TABLE)	B
NG	C

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C → Go to step 4

A

3	RECONFIRM DTC

BC

(a) Clear the DTCs (See page BC-45).
(b) Check if the same DTCs are recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

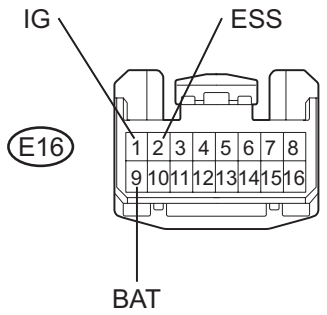
B → END

A

REPLACE MASTER CYLINDER SOLENOID

4	CHECK TERMINAL VOLTAGE (STEERING ANGLE SENSOR)

Steering Angle Sensor (harness side connector):



(a) Remove the steering wheel and the column lower cover.
(b) Disconnect the steering angle sensor connector.
(c) Turn the ignition switch on.
(d) Measure the voltage.

Standard voltage

Tester Connection	Specified Condition
E16-1 (IG) - E16-2 (ESS)	11 to 14 V
E16-9 (BAT) - E16-2 (ESS)	11 to 14 V

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5	REPLACE STEERING ANGLE SENSOR

(a) Replace the steering angle sensor (See page BC-205).

NEXT

6	RECONFIRM DTC

(a) Clear the DTCs (See page BC-45).
(b) Check if the same DTCs are recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

DTC	C1241/41	Low Battery Positive Voltage

DESCRIPTION

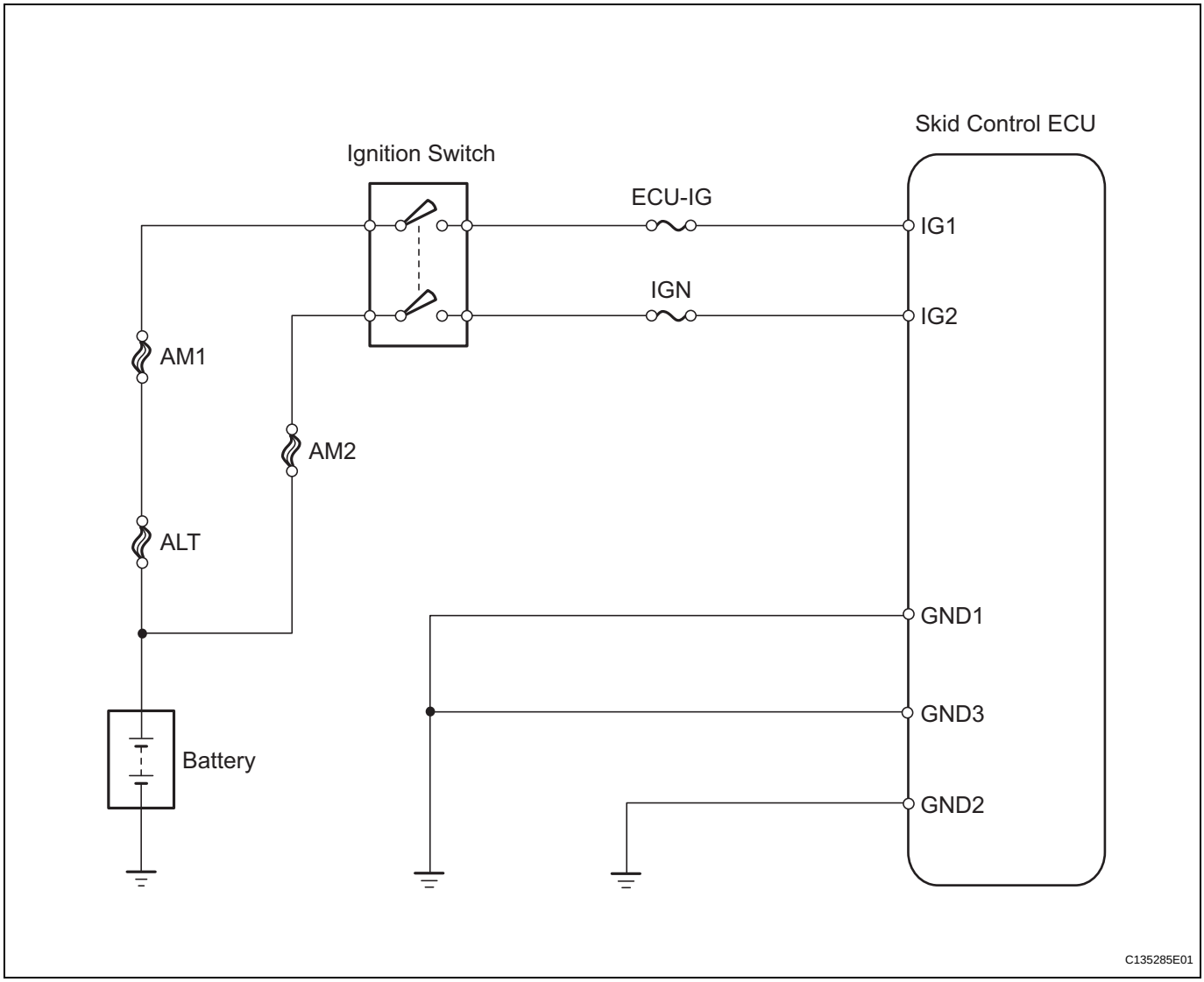
If there is a problem with the master cylinder solenoid (skid control ECU) power supply circuit, the skid control ECU outputs the DTC and prohibits operation under the fail-safe function.

BC

If the voltage supplied to terminal IG1 is not within the DTC detection threshold due to malfunctions in parts such as the battery and generator circuit, this DTC is stored.

DTC No.	DTC Detecting Conditions	Trouble Areas
C1241/41	When either of following conditions detected: 1. Both of following conditions continue for at least 10 seconds. • Vehicle speed more than 2 mph (3 km/m). • IG1 terminal voltage less than 9.5 V. 2. All of following conditions continue for at least 0.2 seconds. • Solenoid relay remains ON. • IG1 terminal voltage less than 9.5 V. • Relay contact open.	• Battery • Charging system • ECU-IG fuse • Power source circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

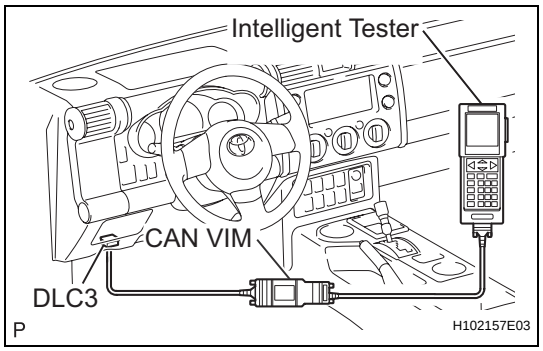
1	INSPECT BATTERY

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

NG → **CHECK CHARGING SYSTEM**

OK

2	READ VALUE OF DATA LIST (IG VOLTAGE)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the intelligent tester on.
(d) Select "DATA LIST" mode on the intelligent tester.

DATA LIST: ABS/VSC

Item	Measurement Item : Range (Display)	Normal Condition
IG VOLTAGE	ECU power supply voltage : TOO LOW / NORMAL / TOO HIGH	TOO HIGH: 14 V or more NORMAL: 9.5 V or 14V TOO LOW: Below 9.5 V

(e) Measure the voltage output from the ECU displayed on the intelligent tester.
OK:
"Normal" is displayed.

NG → **Go to step 4**

OK

3	RECONFIRM DTC

(a) Clear the DTCs (See page BC-45).
(b) Drive the vehicle at a speed of 2 mph (3 km/h) or more for 10 seconds or more.
(c) Check if the same DTC is detected (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

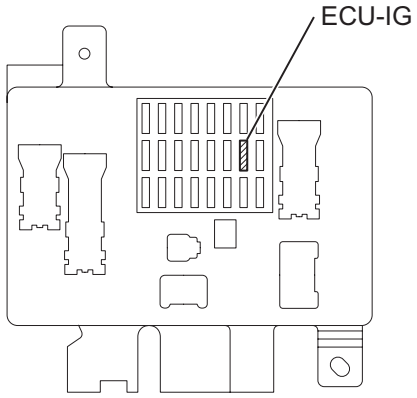
A

REPLACE MASTER CYLINDER SOLENOID

BC

4 INSPECT FUSE (ECU-IG)

Driver Side J/B:



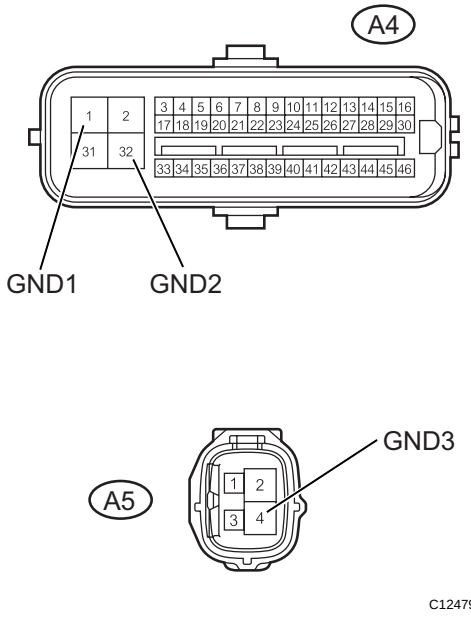
(a) Remove the ECU-IG fuse from the driver side J/B.
(b) Measure the resistance.
Standard resistance:
Below 1 Ω

NG → **CHECK FOR SHORTS IN ALL HARNESSES AND CONNECTORS CONNECTED TO FUSE AND REPLACE FUSE**

OK

5 CHECK HARNESS AND CONNECTOR (GND TERMINAL CONTINUITY)

Skid Control ECU (harness side connector):



(a) Disconnect the skid control ECU connectors.
(b) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-1 (GND1) - Body ground	Below 1 Ω
A4-32 (GND2) - Body ground	Below 1 Ω
A5-4 (GND3) - Body ground	Below 1 Ω

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

OK

REPLACE MASTER CYLINDER SOLENOID

DTC	C1242/42	IG2 Power Source Circuit

DESCRIPTION

If there is a problem with the master cylinder solenoid (skid control ECU) power supply circuit, the skid control ECU outputs the DTC and prohibits operation under the fail-safe function.
If the voltage supplied to terminal IG2 is not within the DTC detection threshold due to malfunctions in parts such as the battery and generator circuit, this DTC is stored.

DTC No.	DTC Detecting Conditions	Trouble Areas
C1242/42	Vehicle speed 2 mph (3 km/h) or more and voltage of skid control ECU terminal IG2 remains at below 6.5 for more than 7 seconds.	• Battery • Charging system • IGN fuse • Power source circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM

See page BC-97.

INSPECTION PROCEDURE

NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CHECK BATTERY VOLTAGE

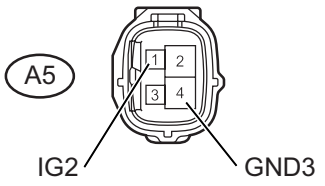
(a) Check the battery voltage.
Standard voltage:
11 to 14 V

NG → **CHECK CHARGING SYSTEM**

OK

2	CHECK SKID CONTROL ECU TERMINAL VOLTAGE (IG2)

Skid Control ECU
(harness side connector):



(a) Disconnect the skid control ECU A5 connector.
(b) Measure the voltage.
Standard voltage

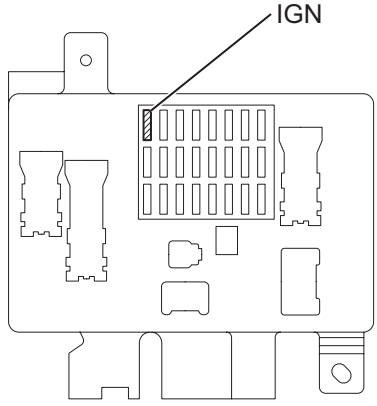
Tester Connection	Specified Condition
A5-1 (IG2) - A5-4 (GND3)	11 to 14 V

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

OK

3	INSPECT FUSE (IGN)

Driver Side J/B:



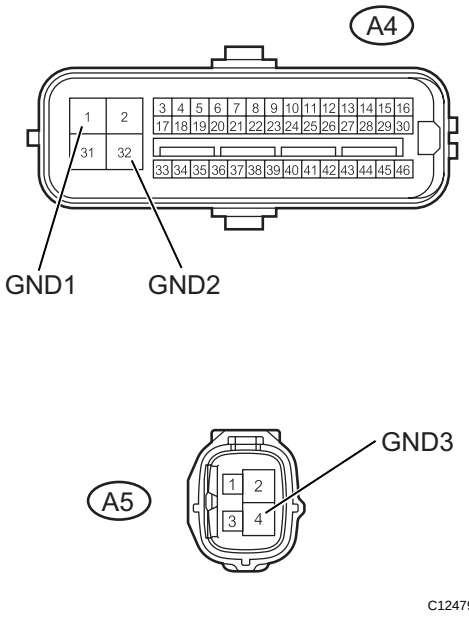
(a) Remove the IGN fuse from the driver side J/B.
(b) Measure the resistance.
Standard resistance:
Below 1 Ω

NG → **CHECK FOR SHORTS IN ALL HARNESSES AND CONNECTORS CONNECTED TO FUSE AND REPLACE FUSE**

OK

4	CHECK HARNESS AND CONNECTOR (GND TERMINAL CONTINUITY)

Skid Control ECU
(harness side connector):



(a) Confirm that the skid control ECU connector and speed sensor connector are properly connected.
(b) Disconnect the skid control ECU connectors.
(c) Inspect both the connector case and the terminal for deformation and corrosion.
OK:
No deformation or corrosion.
(d) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-1 (GND1) - Body ground	Below 1 Ω
A4-32 (GND2) - Body ground	Below 1 Ω
A5-4 (GND3) - Body ground	Below 1 Ω

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

OK

5	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).

(b) Drive the vehicle at a speed of 2 mph (3 km/h) or more for 7 seconds or more.
(c) Check if the same DTC is output (See page BC-45).

B → **END**

BC

A

REPLACE MASTER CYLINDER SOLENOID

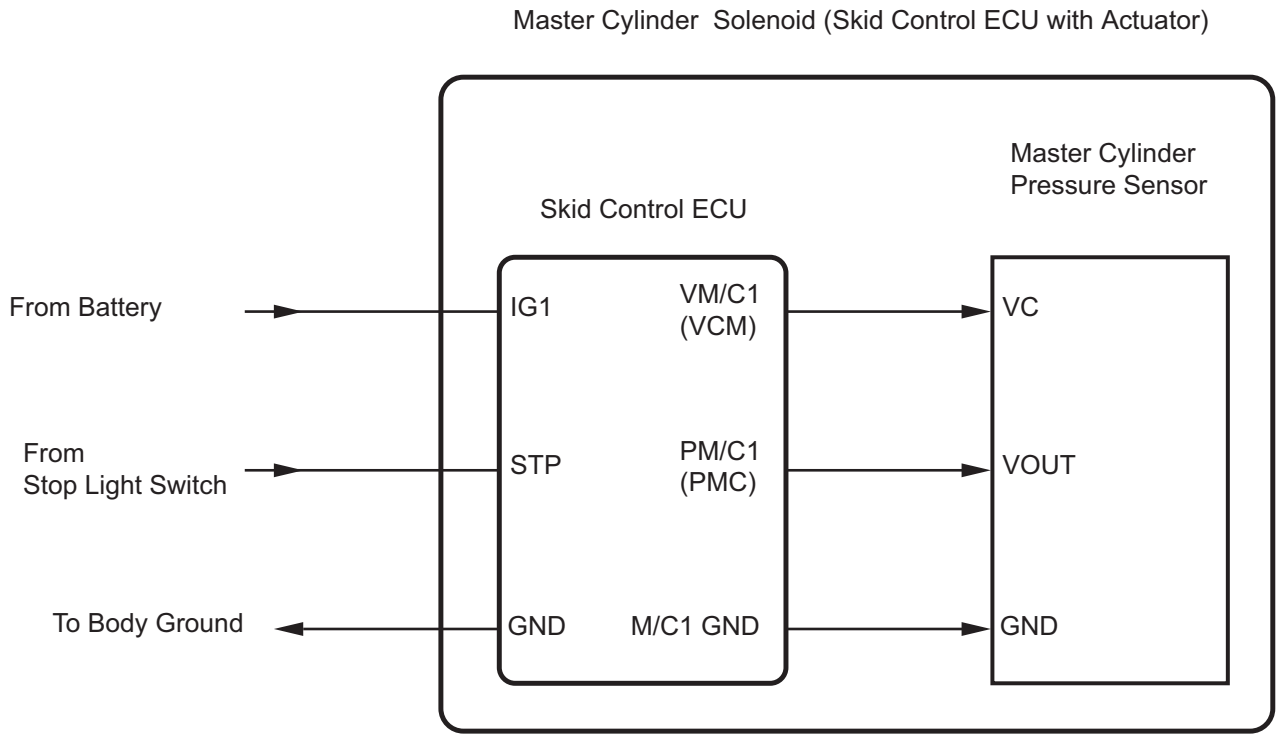
DTC	C1246/46	Master Cylinder Pressure Sensor Malfunction

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

BC

DESCRIPTION

The master cylinder pressure sensor is connected to the skid control ECU in the master cylinder solenoid.



VM/C1 (VCM): Master Cylinder Pressure Sensor Power Supply Output
PM/C1 (PMC): Master Cylinder Pressure Sensor Signal Input
M/C1 GND: Master Cylinder Pressure Sensor Ground

N

C124773E01

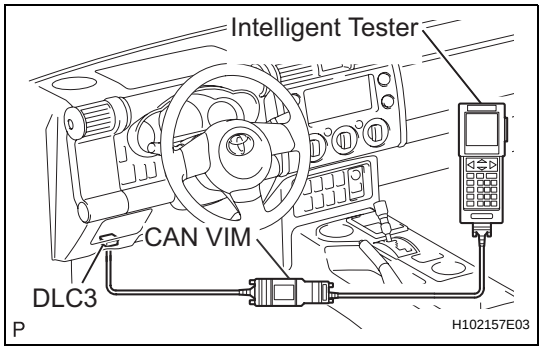
DTC No.	DTC Detecting Conditions	Trouble Areas
C1246/46	When any of following conditions detected: 1. Both of following conditions continue for at least 30 seconds. • Vehicle speed more than 4 mph (7 km/h). • PM/C1 terminal voltage does not change by more than 0.005 V once it exceeds 0.86 V. 2. PM/C1 terminal receives noise at least 7 times within 5 seconds. 3. Both of following conditions continue for at least 5 seconds. • Stop switch OFF. • PM/C1 terminal voltage more than 0.86 V or less than 0.3 V. 4. Both of following conditions continue for at least 1.2 seconds. • IG1 terminal voltage between 9.5 V and 17.0 V. • VM/C1 terminal voltage not within 4.4 V and 5.6 V. 5. Both of following conditions continue for at least 1.2 seconds. • VM/C1 terminal voltage between 4.4 V and 5.6 V. • PM/C1 terminal voltage not within 0.14 V and 4.85 V.	• Hydraulic brake booster (master cylinder pressure sensor) • Master cylinder solenoid (skid control ECU) • Stop light switch circuit
C1281/81	Detected only during test mode	• Hydraulic brake booster (master cylinder pressure sensor) • Master cylinder solenoid (skid control ECU) • Stop light switch circuit

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	READ VALUE OF DATA LIST (MASTER CYLINDER PRESSURE SENSOR)



(a) Connect the intelligent tester to the DLC3.
(b) Start the engine.
(c) Turn the intelligent tester on.
(d) Select the DATA LIST mode on the intelligent tester.

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
MAS CYL PRS 1	Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V	• When brake pedal released: 0.3 to 0.9 V • When stop lights turned on: 0.3 to 0.9 V	Reading increases when brake pedal depressed
MAS CYL PRESS 1	Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V	• When brake pedal released: 0.3 to 0.9 V • When stop lights turned on: 0.3 to 0.9 V	Reading increases when brake pedal depressed

(e) Check that the master cylinder pressure value of the master cylinder pressure sensor displayed on the intelligent tester changes when the brake pedal is depressed.

Result

Result	Proceed to
Master cylinder pressure sensor value normal	A
Master cylinder pressure sensor value changes but not normal	B
Master cylinder pressure sensor value does not change	C

B → Go to step 3

C → REPLACE HYDRAULIC BRAKE BOOSTER

A

2 RECONFIRM DTC

(a) Clear the DTCs (See page BC-45).
(b) Check if the same DTC is detected (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

3 CHECK BRAKE PEDAL HEIGHT

(a) Check the brake pedal height.
(b) Check the stop light switch installation.

OK:

The brake pedal and stop light switch are normal.

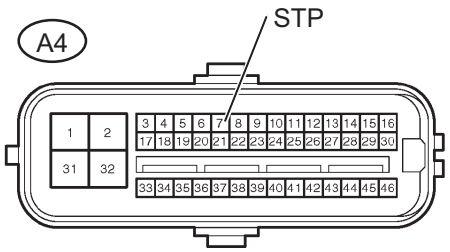
NG → ADJUST BRAKE PEDAL HEIGHT

OK

BC

4	INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (STP TERMINAL)

Skid Control ECU
(harness side connector):



C121700E51

(a) Disconnect the skid control ECU connector.
(b) Measure the voltage.

Standard voltage

Tester Connection	Condition	Specified Condition
A4-7 (STP) - Body ground	Stop light switch ON (Brake pedal depressed)	8 to 14 V
A4-7 (STP) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is detected (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

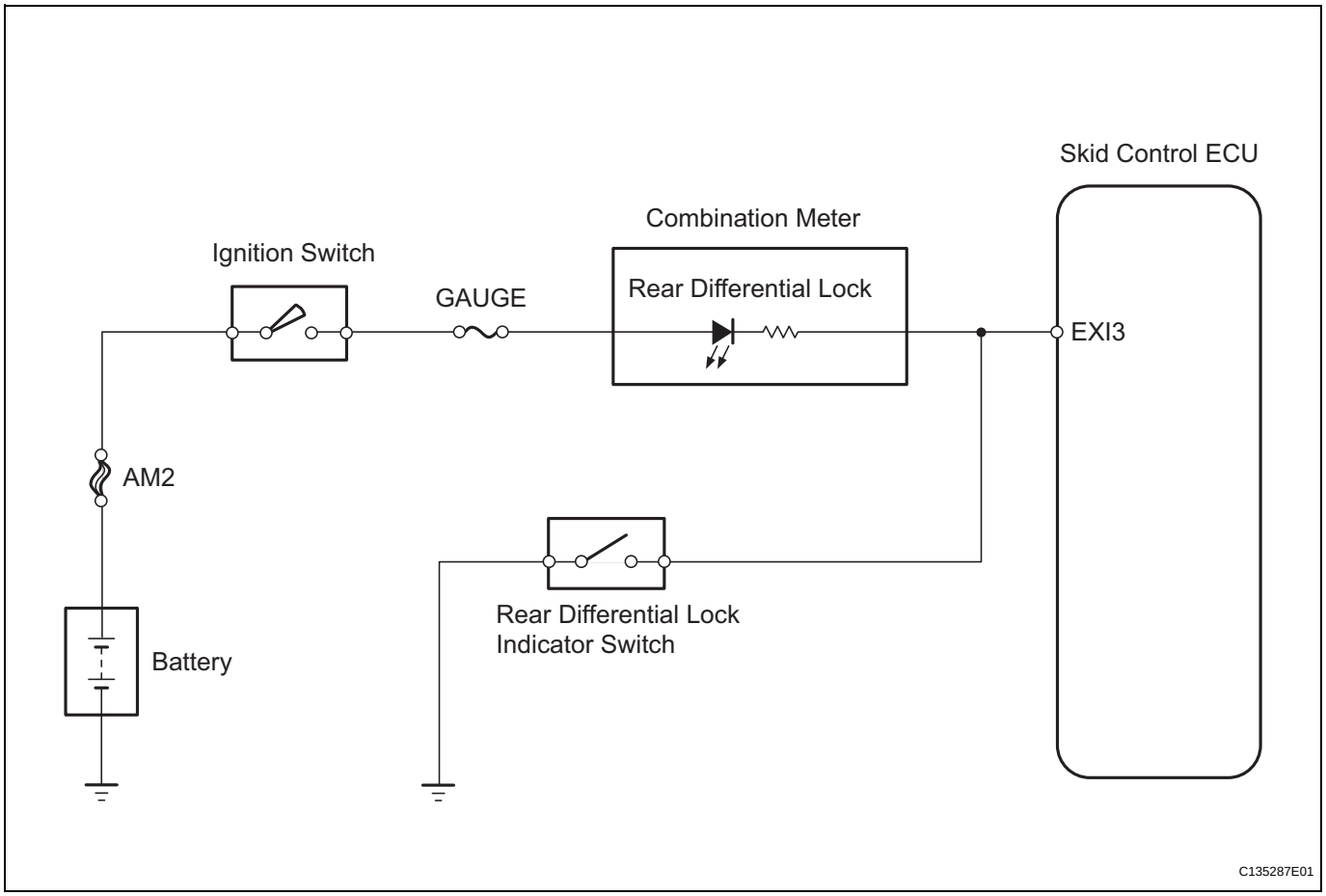
DTC	C1248/48	Open Circuit in Rear Differential Lock

DESCRIPTION

The 4WD control ECU stimulates the actuator to lock the rear differential in accordance with the rear differential lock switch. The skid control ECU monitors the transfer indicator switch (rear differential lock) and if the rear differential is locked, at which time the rear differential lock indicator light is illuminated, prohibits ABS, TRAC and VSC controls. At the same time, the skid control ECU illuminates the ABS warning light, VSC OFF indicator light and SLIP indicator light.

DTC No.	DTC Detecting Condition	Trouble Areas
C1248/48	At vehicle speed of 31 mph (50 km/h) or more, 3 seconds or more elapse after rear differential changes from free to lock.	• Rear differential lock indicator switch • Rear differential lock indicator switch circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

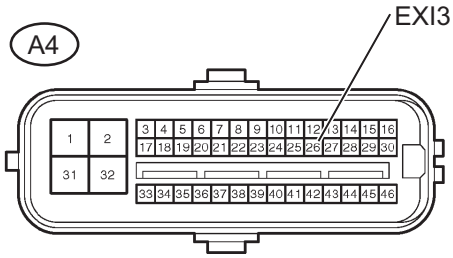
NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

BC

1	INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (EXI3)

Skid Control ECU
(harness side connector):



C121700E52

(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch on.
(c) Measure the voltage.

Standard voltage

Tester Connection	Vehicle Condition	Rear Differential Lock Indicator Light	Specified Condition
A4-26 (EXI3) - Body ground	Rear Differential free	OFF	8 to 14 V
A4-26 (EXI3) - Body ground	Rear Differential locked	ON	1.5 V

NG → Go to step 3

OK

2	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Drive the vehicle at 31 mph (50 km/h) or more for 3 seconds or more with the rear differential free.
(c) Check if the same DTC is detected (See page BC-45).

Result

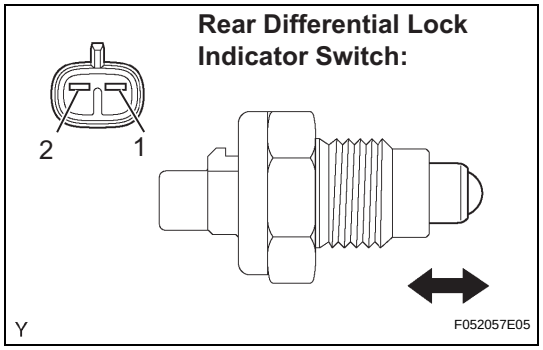
Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

3 **INSPECT REAR DIFFERENTIAL LOCK INDICATOR SWITCH**



(a) Disconnect the rear differential lock indicator switch connector.
(b) Remove the rear differential lock indicator switch.
(c) Measure the resistance.

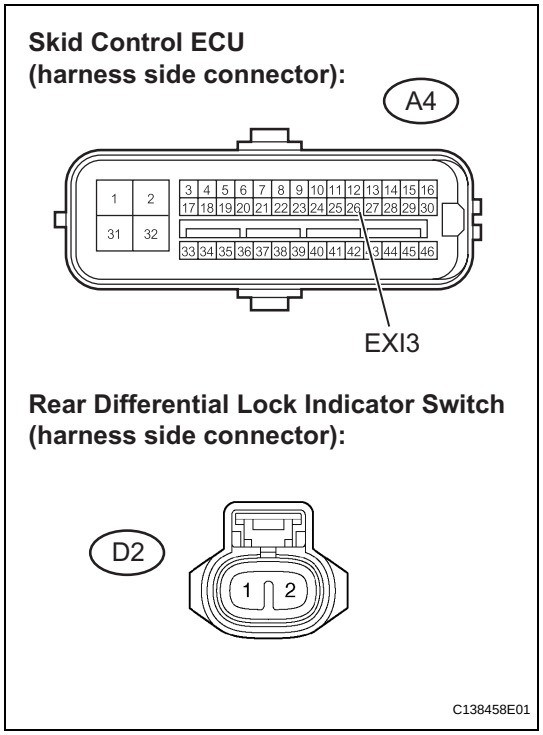
Standard resistance

Tester Connection	Condition	Specified Condition
D2-1 - D2-2	Pushed	Below 1 Ω
D2-1 - D2-2	Free	10 kΩ or higher

NG → **REPLACE REAR DIFFERENTIAL LOCK INDICATOR SWITCH**

OK

4 **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR DIFFERENTIAL LOCK INDICATOR SWITCH)**



(a) Disconnect the skid control ECU connector.
(b) Disconnect the rear differential lock indicator switch connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-26 (EXI3) - D2-2	Below 1 Ω
D2-1 - Body ground	10 kΩ or higher

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

OK

REPLACE MASTER CYLINDER SOLENOID

DTC	C1249/49	Open in Stop Light Switch Circuit

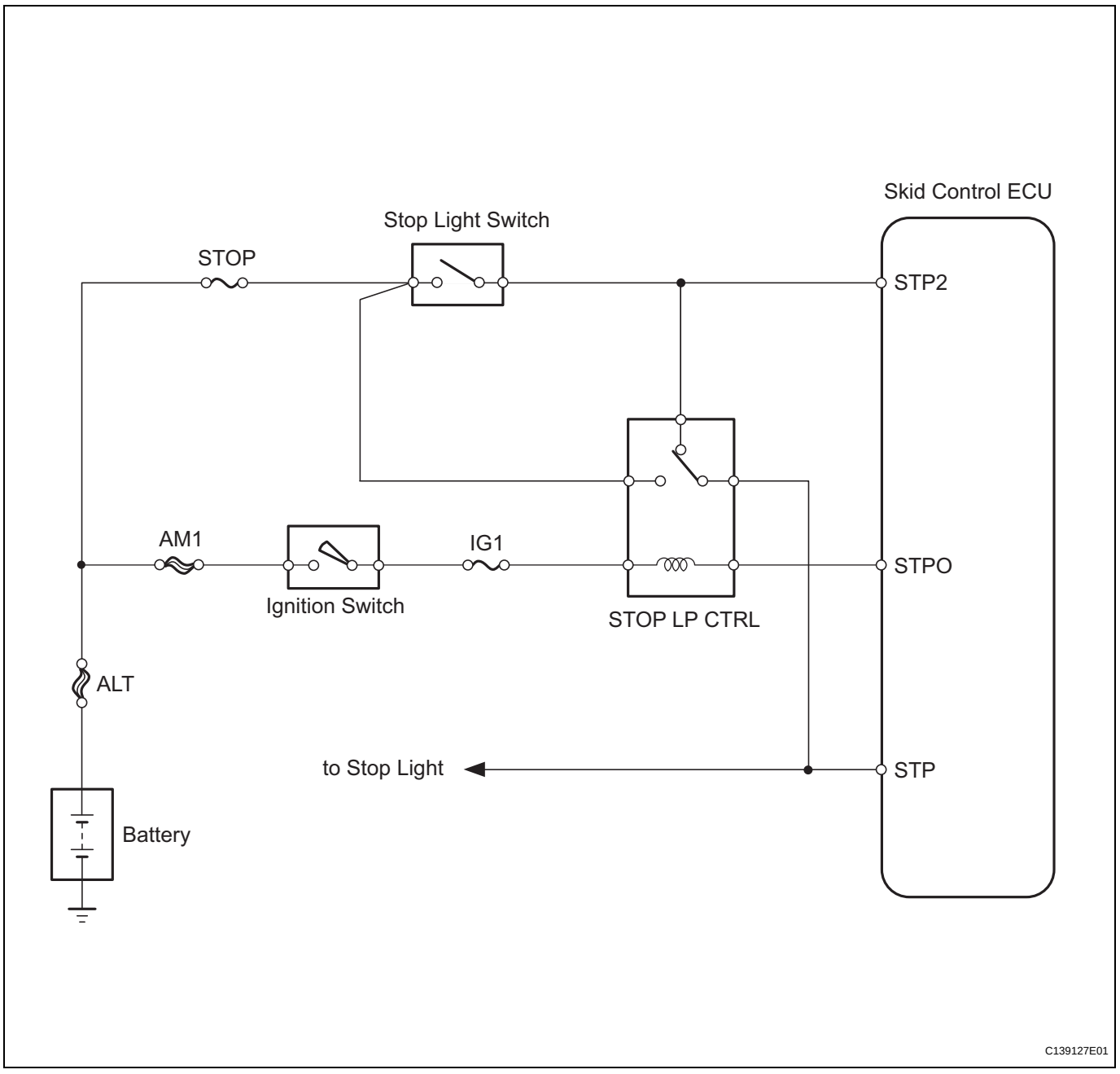
DESCRIPTION

The skid control ECU inputs the stop light switch signal and detects the status of the brake operation.

BC

DTC No.	DTC Detecting Condition	Trouble Areas
C1249/49	When ECU terminal IG1 voltage 9.5 V to 17.0 V and ABS non-operational, open in stop light switch circuit continues for 0.3 seconds or more.	• Stop light switch assembly • Stop light switch circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1 CHECK STOP LIGHT SWITCH OPERATION

(a) Check that the stop lights come on when the brake pedal is depressed and go off when the brake pedal is released.

OK

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

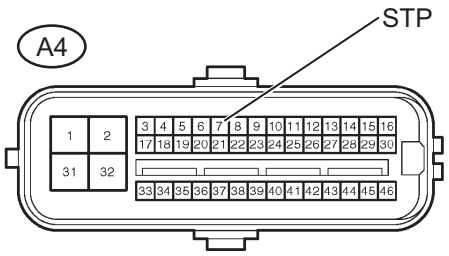
HINT:
Check the stop light bulbs as they may have burnt out.

NG → **Go to step 4**

OK

2 INSPECT SKID CONTROL ECU (STP TERMINAL VOLTAGE)

Skid Control ECU (harness side connector):



C121700E53

(a) Disconnect the skid control ECU connector.
(b) Measure the voltage.

Standard voltage

Tester Connection	Condition	Specified Condition
A4-7 (STP) - Body ground	Stop light switch ON (Brake pedal depressed)	8 to 14 V
A4-7 (STP) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

Result

Result	Proceed to
OK (When troubleshooting in accordance with DTC CHART)	A
OK (When troubleshooting in accordance with PROBLEM SYMPTOMS TABLE)	B
NG	C

B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

C → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

A

3	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is detected (See page BC-45).

BC

Result

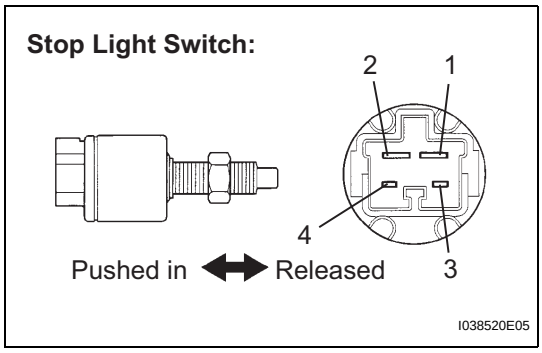
Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

4	INSPECT STOP LIGHT SWITCH ASSEMBLY



(a) Disconnect the stop light switch connector.
(b) Measure the resistance.

Standard resistance

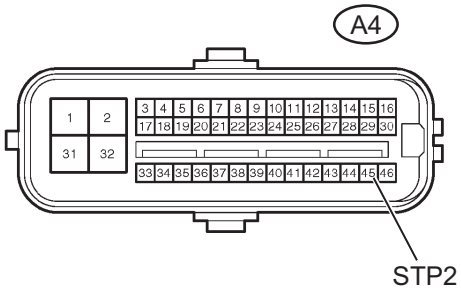
Tester Connection	Condition	Specified Condition
1 - 2	Switch pin released	Below 1 Ω
3 - 4	Switch pin released	10 kΩ or higher
1 - 2	Switch pin pushed in	10 kΩ or higher
3 - 4	Switch pin pushed in	Below 1 Ω

NG → REPLACE STOP LIGHT SWITCH ASSEMBLY

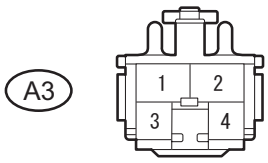
OK

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

Skid Control ECU (harness side connector):



Stop Light Switch (harness side connector):



C121702E06

(a) Disconnect the skid control ECU connector.
(b) Disconnect the stop light switch connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-45 (STP2) - A3-1	Below 1 Ω

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

OK

6 RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is detected (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

DTC	C1251/51	Open in Pump Motor Circuit

DESCRIPTION

The motor relay (semiconductor relay) is built into the master cylinder solenoid and drives the pump motor based on a signal from the skid control ECU.

BC

DTC No.	DTC Detecting Condition	Trouble Areas
C1251/51	Open in motor system circuit (motor input circuit)	• Brake booster pump assembly • Master cylinder solenoid (skid control ECU)

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

HINT:

Remove the hydraulic brake booster before the inspection (See page BR-28).

1	CHECK BRAKE PUMP MOTOR WIRE HARNESS CONNECTION (MT+ / MT-)

(a) Using a screwdriver, remove the 2 plugs from the hydraulic brake booster (See page BR-32).

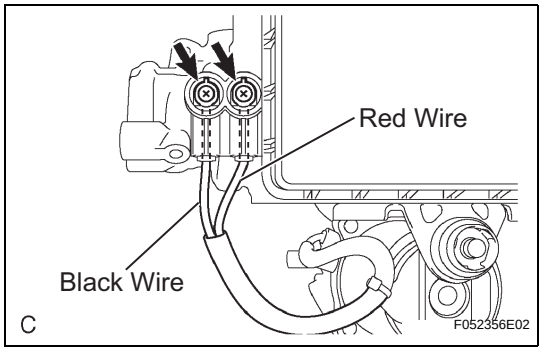
(b) Check the tightening torque of 2 screws which fasten the wire harness connecting the hydraulic brake booster and brake booster pump (See page BR-36).

Torque: 2.9 N*m (30 kgf*cm, 26 in.*lbf)

NG → **RETIGHTEN SCREWS**

OK

2	CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS (MT+/MT-)



(a) Using a screwdriver, remove the 2 screws and pull the wire harness from the hydraulic brake booster.

(b) Measure the resistance between the red wire (MT+) and black wire (MT-).

Standard resistance:

Below 2 Ω

NG → **REPLACE BRAKE BOOSTER PUMP ASSEMBLY**

OK

3	RECONFIRM DTC

(a) Reassemble the hydraulic brake booster, then reinstall the hydraulic brake booster.

(b) Clear the DTC (See page BC-45).

(c) Check if the same DTC is detected (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

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

DESCRIPTION

BC

The motor relay (semiconductor relay) is built into the master cylinder solenoid and drives the pump motor based on a signal from the skid control ECU.

DTC No.	DTC Detecting Condition	Trouble Areas
C1252/52	Motor operates for 3 minutes or more.	• Brake booster pump assembly • Hydraulic brake booster (accumulator pressure sensor) • Master cylinder solenoid (skid control ECU)

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

HINT:

When C1253/53, C1254/54 or C1256/56 is output together with C1252/52, inspect and repair the trouble areas indicated by C1253/53, C1254/54 or C1256/56 first.

1	CHECK HYDRAULIC BRAKE BOOSTER PUMP MOTOR OPERATION

(a) Turn the ignition switch off.
(b) Depress the brake pedal more than 20 times.
(c) Turn the ignition switch on.
(d) Check how the hydraulic brake booster pump motor operates.

Result

Result	Proceed to
Pump motor does not operate	A
Pump motor operates continuously (Does not stop)	B
Pump motor operates intermittently	C
Pump motor operates, then stops	D

B → REPLACE BRAKE BOOSTER PUMP ASSEMBLY

C → Go to step 4

D → Go to step 5

A

2	CHECK BRAKE PUMP MOTOR WIRE HARNESS CONNECTION (MT+ / MT-)

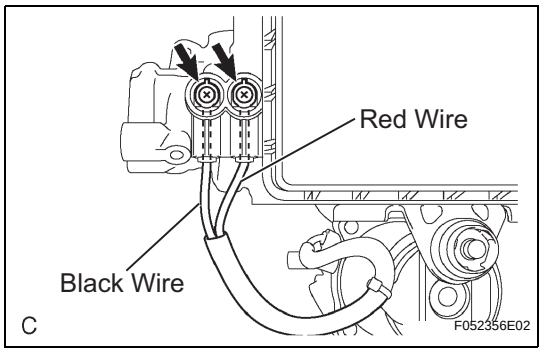
(a) Using a screwdriver, remove the 2 plugs from the hydraulic brake booster (See page BR-32).
(b) Check the tightening torque of 2 screws which fasten the wire harness connecting the hydraulic brake booster and brake booster pump (See page BR-36).

Torque: 2.9 N*m (30 kgf*cm, 26 in.*lbf)

NG → RETIGHTEN SCREWS

OK

3 CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS (MT+/MT-)

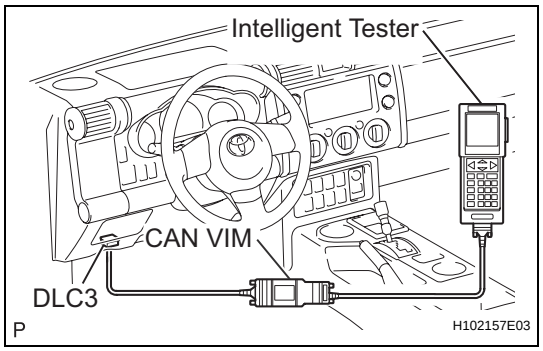


(a) Using a screwdriver, remove the 2 screws and pull the wire harness from the hydraulic brake booster assembly.
(b) Measure the resistance between the red wire (MT+) and black wire (MT-).
Standard resistance:
Below 2 Ω

NG → REPLACE BRAKE BOOSTER PUMP ASSEMBLY

OK

4 READ VALUE OF DATA LIST (ACCUMULATOR PRESSURE SENSOR)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Select the DATA LIST mode on the intelligent tester.

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
ACC PRESS SENS	Accumulator pressure sensor reading / min.: 0 V, max.: 5 V	3.58 to 5 V	If value constant regardless of pump operation, accumulator pressure sensor malfunction suspected.

(e) Check that the accumulator pressure sensor output is normal.

Result

Result	Proceed to
Output value varies within "Normal Condition" range	A
Output value does not reach "Normal Condition" range	B
Output value constant regardless of pump motor operation	C

B → REPLACE BRAKE BOOSTER PUMP ASSEMBLY

C → REPLACE HYDRAULIC BRAKE BOOSTER

A

5	RECONFIRM DTC

BC

(a) Clear the DTC (See page BC-45).
(b) Turn the ignition switch off.
(c) Turn the ignition switch on.
(d) Wait for more than 5 minutes.
(e) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **REPLACE BRAKE BOOSTER PUMP ASSEMBLY**

A

REPLACE MASTER CYLINDER SOLENOID

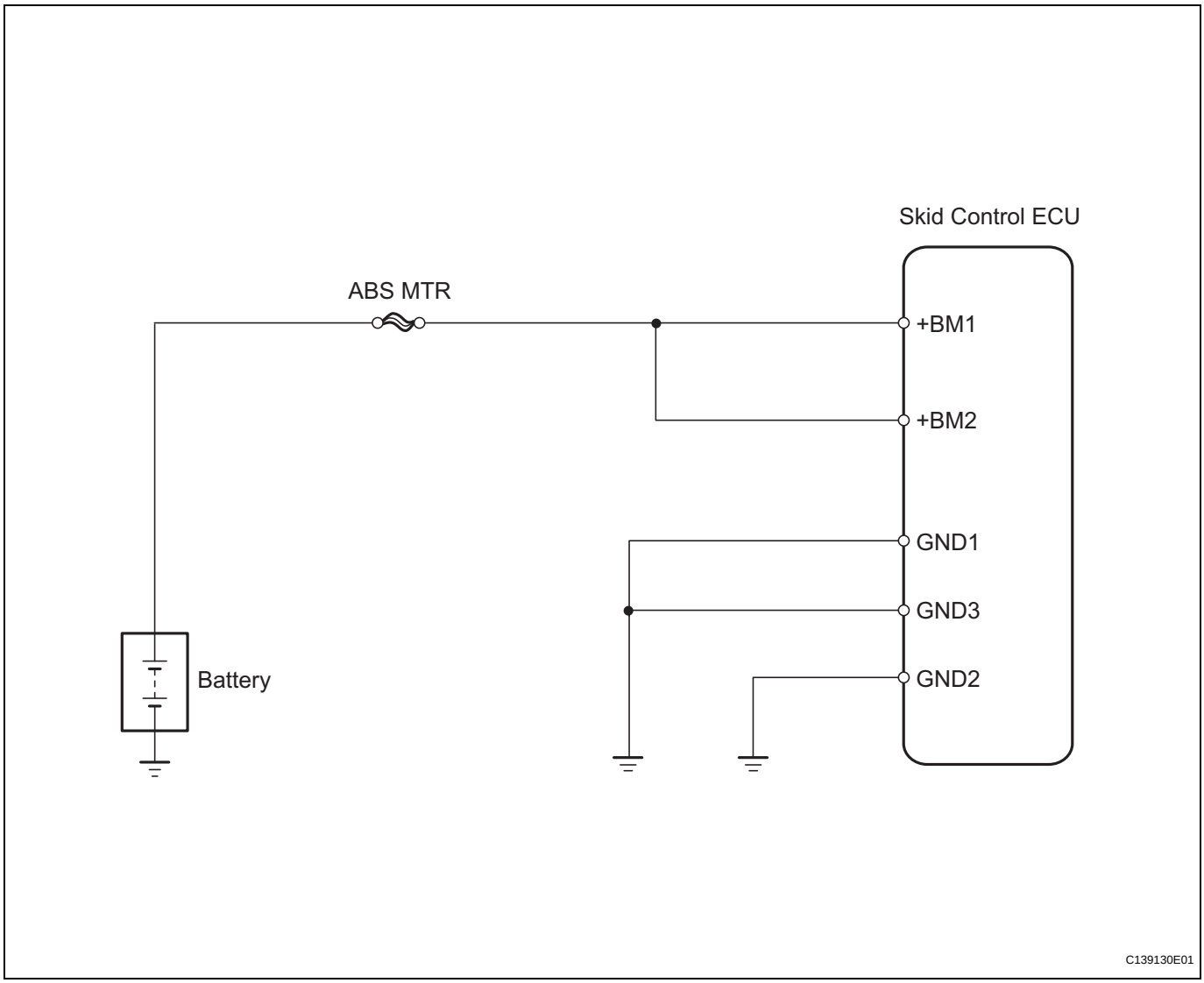
DTC	C1253/53	Hydro Booster Pump Motor Relay Malfunction

DESCRIPTION

The motor relay (semiconductor relay) is built into the master cylinder solenoid and drives the pump motor based on a signal from the skid control ECU.

DTC No.	DTC Detecting Condition	Trouble Areas
C1253/53	Open in motor system circuit (motor input circuit)	• ABS MTR fuse • +BM terminal circuit • Hydraulic brake booster

WIRING DIAGRAM



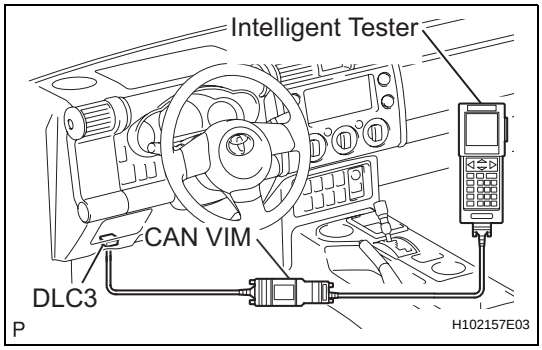
INSPECTION PROCEDURE

NOTICE:

When replacing the hydraulic brake booster, perform zero point calibration (See page BC-24).

BC

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



(a) Connect a intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Select the "ABS MOT RELAY" in the ACTIVE TEST and operate the actuator motor using the intelligent tester. Select the following menu items: DIAGNOSIS / OBD/ MOBD / select vehicle / ABS/VSC / ACTIVE TEST.

ACTIVE TEST: ABS/VSC

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

(e) Check for operation sound of the actuator motor when it is operated with the intelligent tester.
OK:
The operation sound of the actuator motor can be heard.

NG → **Go to step 3**

OK

2	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Turn the ignition switch off
(c) Depress the brake pedal more than 20 times.
(d) Turn the ignition switch on.
(e) Wait until the pump motor stops.
(f) Depress the brake pedal several times until the pump motor is turned on.
(g) Wait until the pump stops.
(h) Repeat (f) and (g) three times.
(i) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

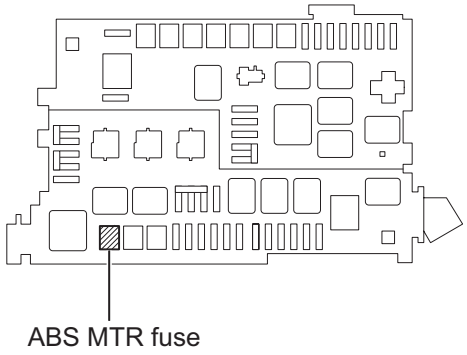
B → **END**

A

REPLACE HYDRAULIC BRAKE BOOSTER

3	INSPECT FUSE (ABS MTR)

Engine Room R/B No. 2:



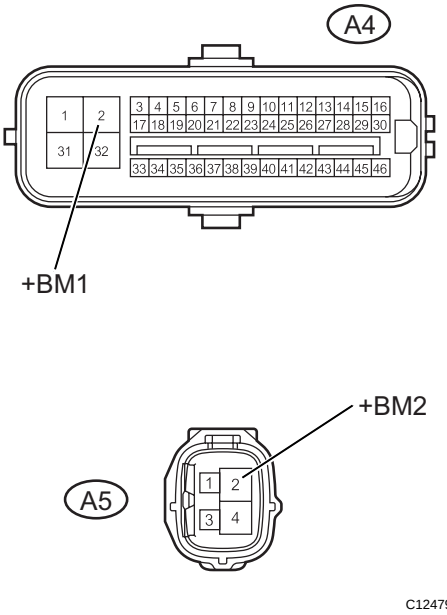
(a) Remove the ABS MTR fuse from the engine room R/B No. 2.
(b) Measure the resistance.
Standard resistance:
Below 1 Ω

NG → **CHECK FOR SHORTS IN ALL HARNESSES AND CONNECTORS CONNECTED TO FUSE AND REPLACE FUSE**

OK

4	INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (+BM, +BM2 TERMINAL)

Skid Control ECU
(harness side connector):



(a) Disconnect the skid control ECU connectors.
(b) Measure the voltage.
Standard voltage

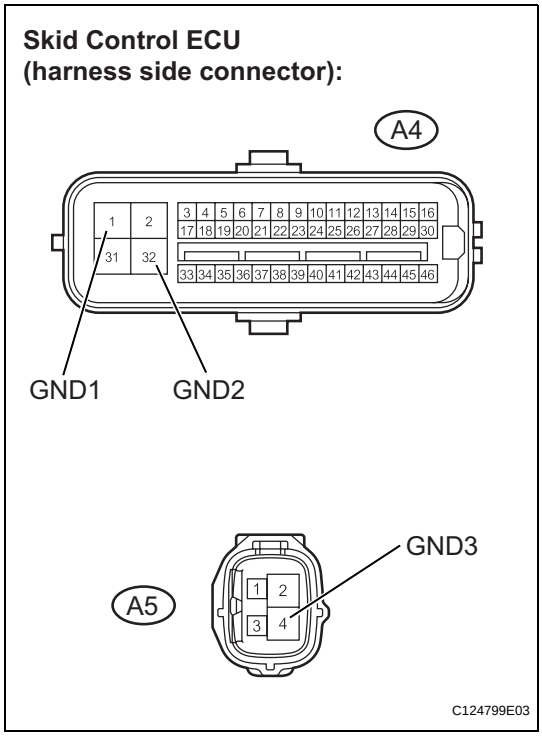
Tester Connection	Specified Condition
A4-2 (+BM1) - Body ground	11 to 14 V
A5-2 (+BM2) - Body ground	11 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (+BM1 AND +BM2 CIRCUIT)**

OK

BC

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



(a) Disconnect the skid control ECU connectors.
(b) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-1 (GND1) - Body ground	Below 1 Ω
A4-32 (GND2) - Body ground	Below 1 Ω
A5-4 (GND3) - Body ground	Below 1 Ω

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

OK

6 RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Turn the ignition switch off.
(c) Depress the brake pedal more than 20 times.
(d) Turn the ignition switch on.
(e) Wait until the pump motor stops.
(f) Depress the brake pedal several times until the pump motor is turned on.
(g) Wait until the pump stops.
(h) Repeat (f) and (g) three times.
(i) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

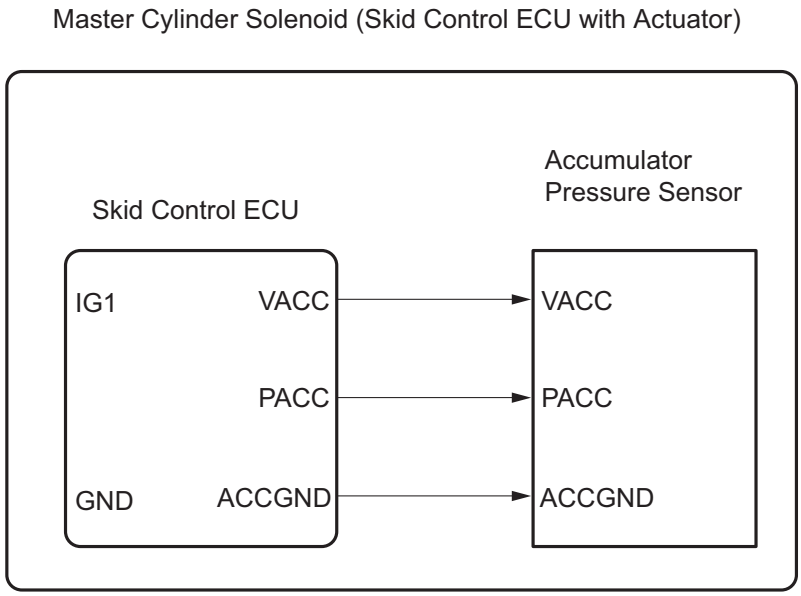
A

REPLACE HYDRAULIC BRAKE BOOSTER

DTC	C1254/54	Pressure Switch Circuit

DESCRIPTION

The accumulator pressure sensor is connected to the skid control ECU in the master cylinder solenoid.



VACC: Accumulator Pressure Sensor Power Supply Output

PACC: Accumulator Pressure Sensor Signal Input

ACCGND: Accumulator Pressure Sensor Ground

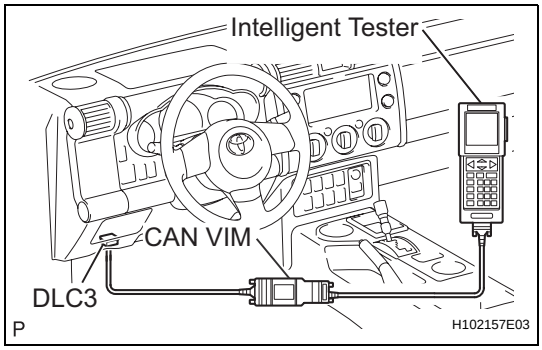
Y

C124776E01

DTC No.	DTC Detecting Condition	Trouble Areas
C1254/54	Accumulator pressure sensor fault (Fluid pressure does not change when it should e.g. pump operates, brake pedal depressed/released).	• Master cylinder solenoid (skid control ECU) • Hydraulic brake booster (accumulator pressure sensor) • Hydraulic brake booster (master cylinder pressure sensor)

INSPECTION PROCEDURE

1	READ VALUE OF DATA LIST (ACCUMULATOR PRESSURE SENSOR)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch off.
(c) Depress the brake pedal more than 20 times.
(d) Turn the ignition switch on.
(e) Select the DATA LIST mode on the intelligent tester.

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition
ACC PRESS SENS	Accumulator pressure sensor reading / min.: 0 V, max.: 5 V	3.58 to 5 V

(f) Confirm whether the accumulator output voltage is normal.

Result

Result	Proceed to
Output value normal	A
Output value not normal	B

B → **REPLACE HYDRAULIC BRAKE BOOSTER**

A

2	READ VALUE OF DATA LIST (MASTER CYLINDER PRESSURE SENSOR)

(a) Turn the ignition switch off.
(b) Depress the brake pedal more than 20 times.
(c) Install a brake pedal effort gauge (SST), and bleed air.
(d) Connect the intelligent tester to the DLC3.
(e) Turn the ignition switch on.
(f) Select the DATA LIST mode on the intelligent tester.

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
MAS CYL PRS 1	Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V	0.3 to 1.9 V With pedal pressure of 49 N (5 kgf, 11 lbf)	Front brake pressure: 770 to 1280 kpa (7.9 to 13.1 kgf/cm2, 112 to 186 psi)

(g) Check that the master cylinder output value is in the Normal Condition range.
OK:
Master cylinder pressure sensor value is in the Normal Condition.

NG → **REPLACE HYDRAULIC BRAKE BOOSTER**

OK

3	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Turn the ignition switch off.
(c) Depress the brake pedal more than 20 times.
(d) Turn the ignition switch on.
(e) Wait until the pump motor stops.
(f) Depress the brake pedal and release it.
(g) Wait for 25 minutes.
(h) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

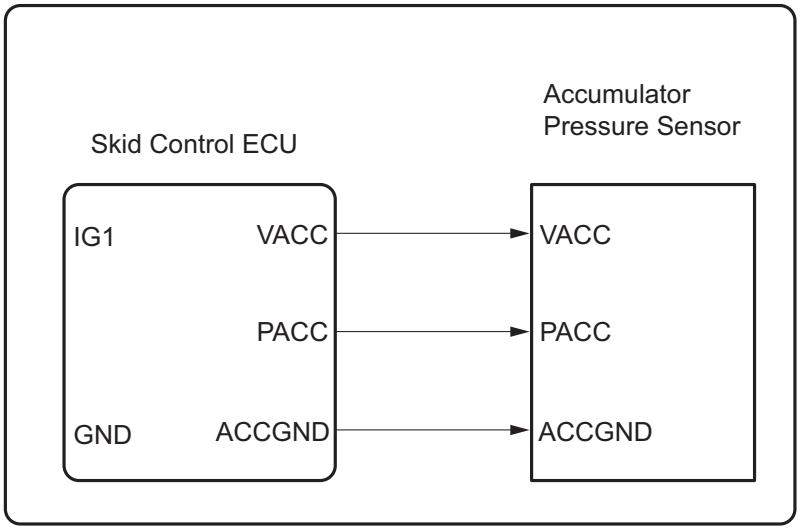
DTC	C1256/56	Accumulator Low Pressure

DESCRIPTION

The accumulator pressure sensor is connected to the skid control ECU in the master cylinder solenoid.

BC

Master Cylinder Solenoid (Skid Control ECU with Actuator)



VACC: Accumulator Pressure Sensor Power Supply Output

PACC: Accumulator Pressure Sensor Signal Input

ACCGND: Accumulator Pressure Sensor Ground

Y

C124776E01

DTC No.	DTC Detecting Condition	Trouble Areas
C1256/56	Fluid pressure inside the accumulator drops below the specification value.	• Hydraulic circuit • Hydraulic brake booster (accumulator pressure sensor) • Master cylinder solenoid (skid control ECU)

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Turn the ignition switch off.
(c) Depress the brake pedal more than 20 times.
(d) Turn the ignition switch on.
(e) Wait for 99 seconds.
(f) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

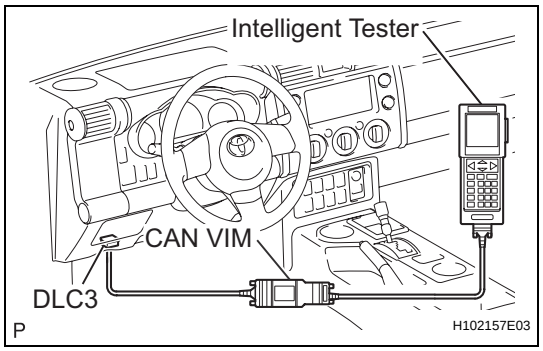
2	CHECK HYDRAULIC CIRCUIT

(a) Perform hydraulic brake booster on-vehicle inspection (See page BR-19).
OK:
Hydraulic circuit is normal (No leakage).

NG → REPAIR HYDRAULIC CIRCUIT

OK

3	READ VALUE OF DATA LIST (MASTER CYLINDER PRESSURE SENSOR)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Select the "DATA LIST" mode on the intelligent tester.

DATA LIST: ABS/VSC

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
ACC PRESS SENS	Accumulator pressure sensor reading / min.: 0 V, max.: 5 V	3.58 to 5 V	If value constant regardless of pump operation, accumulator pressure sensor malfunction suspected.

(e) Check that the accumulator's output value is in the Normal Condition range.

OK:
Accumulator pressure sensor value is in the Normal Condition.

NG → **REPLACE HYDRAULIC BRAKE BOOSTER**

BC

OK

4	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

DTC	C1257/57	IG Power Source

DESCRIPTION

The motor relay (semiconductor relay) is built into the hydraulic brake booster and drives the pump motor based on a signal from the skid control ECU.

DTC No.	DTC Detecting Condition	Trouble Areas
C1257/57	Open in pump motor input circuit	• Brake booster pump assembly • Master cylinder solenoid (skid control ECU)

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1 CHECK HYDRAULIC BRAKE BOOSTER PUMP MOTOR OPERATION

(a) Turn the ignition switch off.
(b) Disconnect the skid control ECU connector (A4).
(c) Depress the brake pedal more than 20 times.
(d) Check the hydraulic brake booster pump motor operation.

OK:

Hydraulic brake booster pump operates.

NG → **REPLACE BRAKE BOOSTER PUMP ASSEMBLY**

OK ↓

2 RECONFIRM DTC

(a) Turn the ignition switch off.
(b) Reconnect the skid control ECU connector (A4).
(c) Turn the ignition switch on.
(d) Clear the DTC (See page BC-45).
(e) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A ↓

REPLACE MASTER CYLINDER SOLENOID

DTC	C1258/58	Transfer 4WD Position Switch Circuit

DTC	C1282/82	Center Differential Lock Position Switch Malfunction (Test Mode DTC)

BC

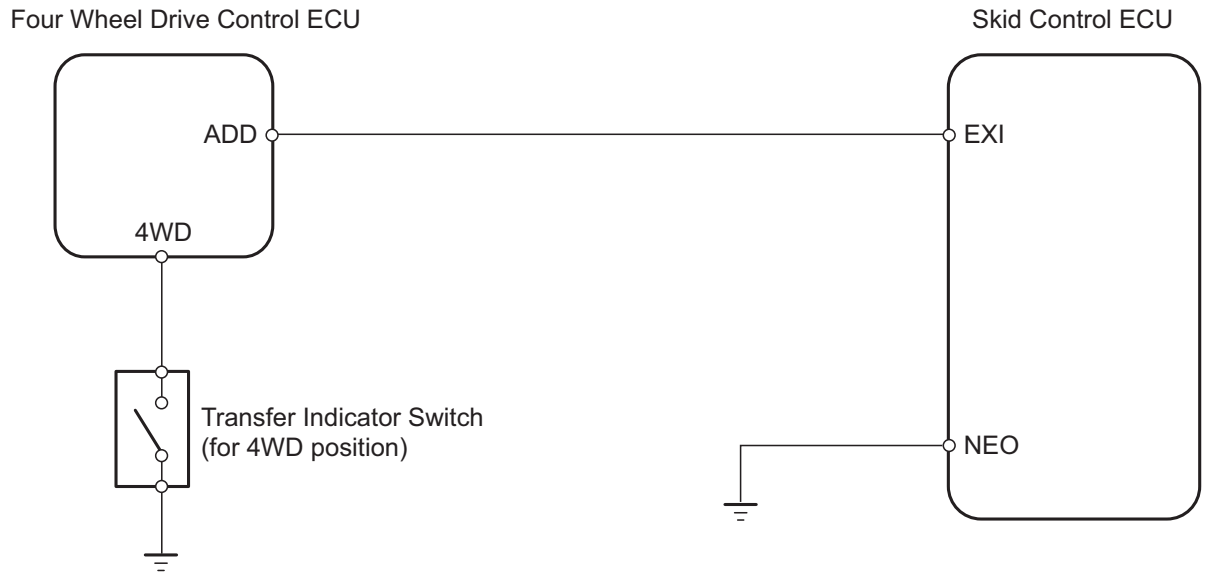
DESCRIPTION

This circuit monitors whether the transfer is in 2WD or 4WD mode and inputs the signal to the skid control ECU.
In 2WD mode, TRAC is activated.
In 4WD mode, A-TRAC is activated.

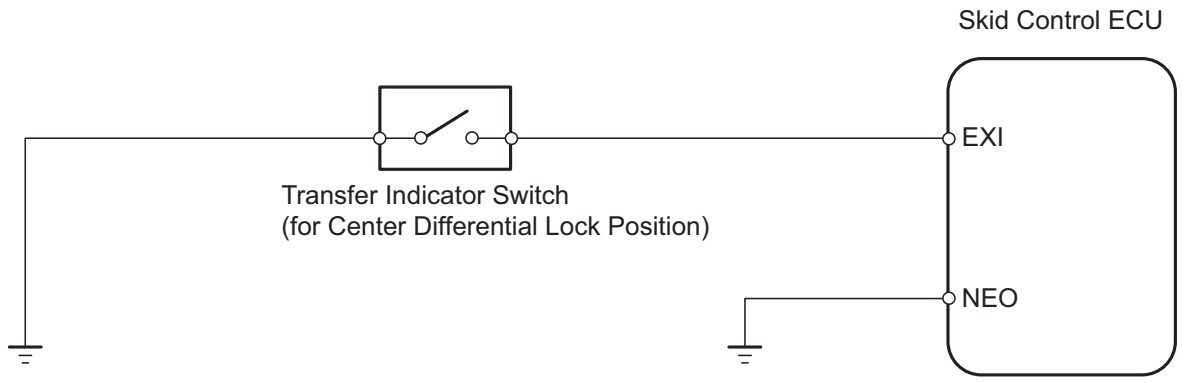
DTC No.	DTC Detecting Conditions	Trouble Areas
C1258/58	• 4WD Open in 4WD detecting circuit • 2WD Terminal NEO ground short, or abnormal signals transmitted to terminal EXI	• Transfer indicator switch (4WD position) (A/T) • Transfer indicator switch (4WD position) circuit (A/T) • Transfer indicator switch (center differential lock position) (M/T) • Transfer indicator switch (center differential lock position) circuit (M/T) • Master cylinder solenoid (skid control ECU)
C1282/82	Detected only during test mode	• Transfer indicator switch (4WD position) (A/T) • Transfer indicator switch (4WD position) circuit (A/T) • Transfer indicator switch (center differential lock position) (M/T) • Transfer indicator switch (center differential lock position) circuit (M/T)

WIRING DIAGRAM

for A/T:



for M/T:



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CONFIRM VEHICLE TYPE

(a) Confirm the vehicle drive train.

Result

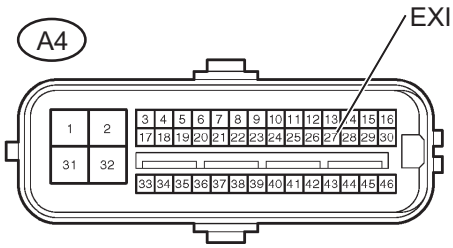
Result	Proceed to
4WD	A
2WD	B

B → **Go to step 3**

A

2	INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (EXI)

Skid Control ECU
(harness side connector):



(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch on.
(c) A/T:
  (1) Move the transfer high and low shift lever to the H2, H4, and L4 ranges, and measure the voltages in each range.

Standard voltage

Tester Connection	Transfer Range	Specified Condition
A4-27 (EXI) - Body ground	H2	8 to 14 V
A4-27 (EXI) - Body ground	H4, L4	Below 1.5 V

(d) M/T:
  (1) Move the transfer high and low shift lever to the H, HL, and LL ranges, and measure the voltages in each range.

BC

Standard voltage

Tester Connection	Transfer Range	Specified Condition
A4-27 (EXI) - Body ground	H	8 to 14 V
A4-27 (EXI) - Body ground	HL, LL	Below 1.5 V

Result

Result	Proceed to
OK	A
NG (A/T)	B
NG (M/T)	C

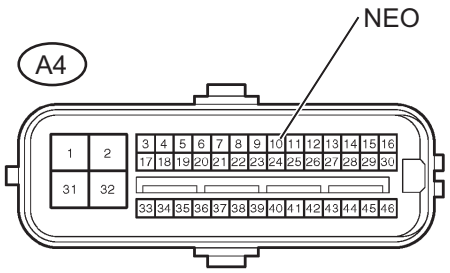
B → Go to step 5

C → Go to step 10

A

3 CHECK HARNESS AND CONNECTOR (NEO TERMINAL - BODY GROUND)

Skid Control ECU (harness side connector):



C121700E56

(a) Disconnect the skid control ECU connector.
(b) Measure the resistance.

Standard resistance

Tester Connection	Vehicle Drive Train	Specified Condition
A4-10 (NEO) - Body ground	2WD	10 kΩ or higher
A4-10 (NEO) - Body ground	4WD	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

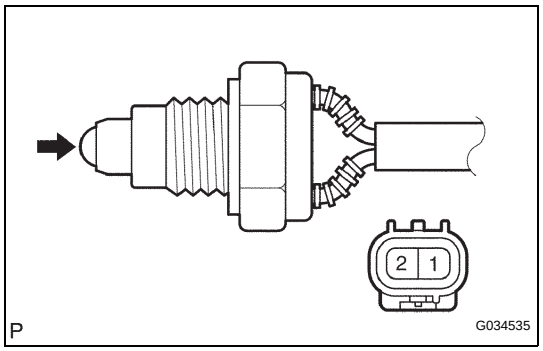
B → END

A

REPLACE MASTER CYLINDER SOLENOID

BC

5 INSPECT TRANSFER INDICATOR SWITCH (for 4WD position)



(a) Disconnect the transfer indicator switch (4WD position) connector.
(b) Remove the transfer indicator switch (4WD position).
(c) Measure the resistance.

Standard resistance

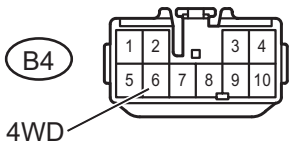
Tester Connection	Switch Position	Specified Condition
1 - 2	Pushed	Below 1 Ω
1 - 2	Released	10 kΩ or higher

NG → **REPLACE TRANSFER INDICATOR SWITCH (for 4WD POSITION)**

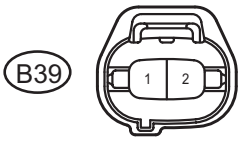
OK

6 CHECK HARNESS AND CONNECTOR (FOUR WHEEL DRIVE CONTROL ECU - TRANSFER INDICATOR SWITCH)

Four Wheel Drive Control ECU (harness side connector):



Transfer Indicator Switch (for 4WD position) (harness side connector):



C138463E01

(a) Disconnect the four wheel drive control ECU connector.
(b) Disconnect the transfer indicator switch (for 4WD position) connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
B4-6 (4WD) - B39-2	Below 1 Ω
B4-6 (4WD) - Body ground	10 kΩ or higher

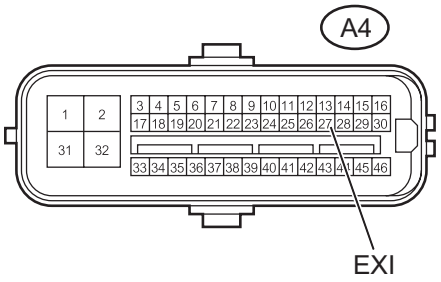
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

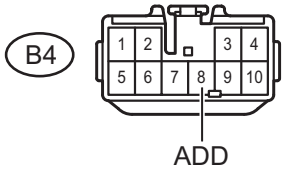
7	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - FOUR WHEEL DRIVE CONTROL ECU)

BC

Skid Control ECU (harness side connector):



Four Wheel Drive Control ECU (harness side connector):



C138464E01

(a) Disconnect the skid control ECU connector.
(b) Disconnect the 4WD control ECU connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-27 (EXI) - B4-8 (ADD)	Below 1 Ω
A4-27 (EXI) - Body ground	10 kΩ or higher

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

OK

8	REPLACE FOUR WHEEL DRIVE CONTROL ECU

(a) Replace the four wheel drive control ECU.

NEXT

9	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is recorded (See page BC-45).

Result

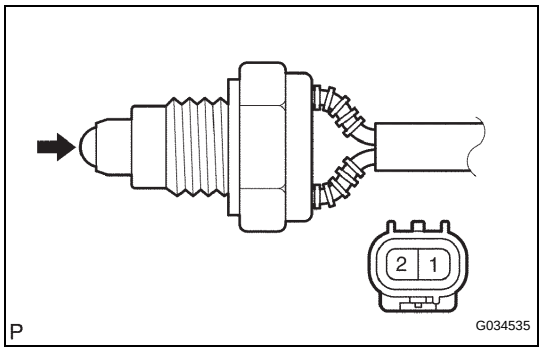
Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

10 **INSPECT TRANSFER INDICATOR SWITCH (for CENTER DIFFERENTIAL LOCK POSITION)**



(a) Disconnect the transfer indicator switch (center differential lock position) connector.
(b) Remove the transfer indicator switch (center differential lock position).
(c) Measure the resistance.

Standard resistance

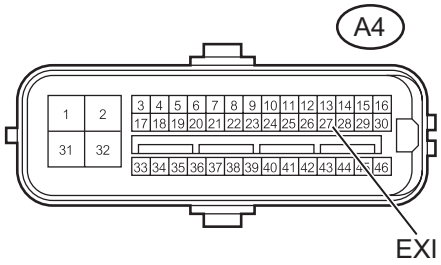
Tester Connection	Switch Position	Specified Condition
1 - 2	Pushed	Below 1 Ω
1 - 2	Released	10 kΩ or higher

NG → **REPLACE TRANSFER INDICATOR SWITCH (for CENTER DIFFERENTIAL LOCK POSITION)**

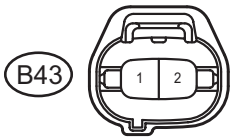
OK

11 **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - TRANSFER INDICATOR SWITCH)**

Skid Control ECU (harness side connector):



Transfer Indicator Switch (for center differential lock position) (harness side connector):



C138465E01

(a) Disconnect the skid control ECU connector.
(b) Disconnect the transfer indicator switch (center differential lock position) connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-27 (EXI) - B43-2	Below 1 Ω
A4-27 (EXI) - Body ground	10 kΩ or higher

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

OK

12 **RECONFIRM DTC**

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

BC

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

DTC	C1268/68	Transfer "L4" Position Switch Circuit

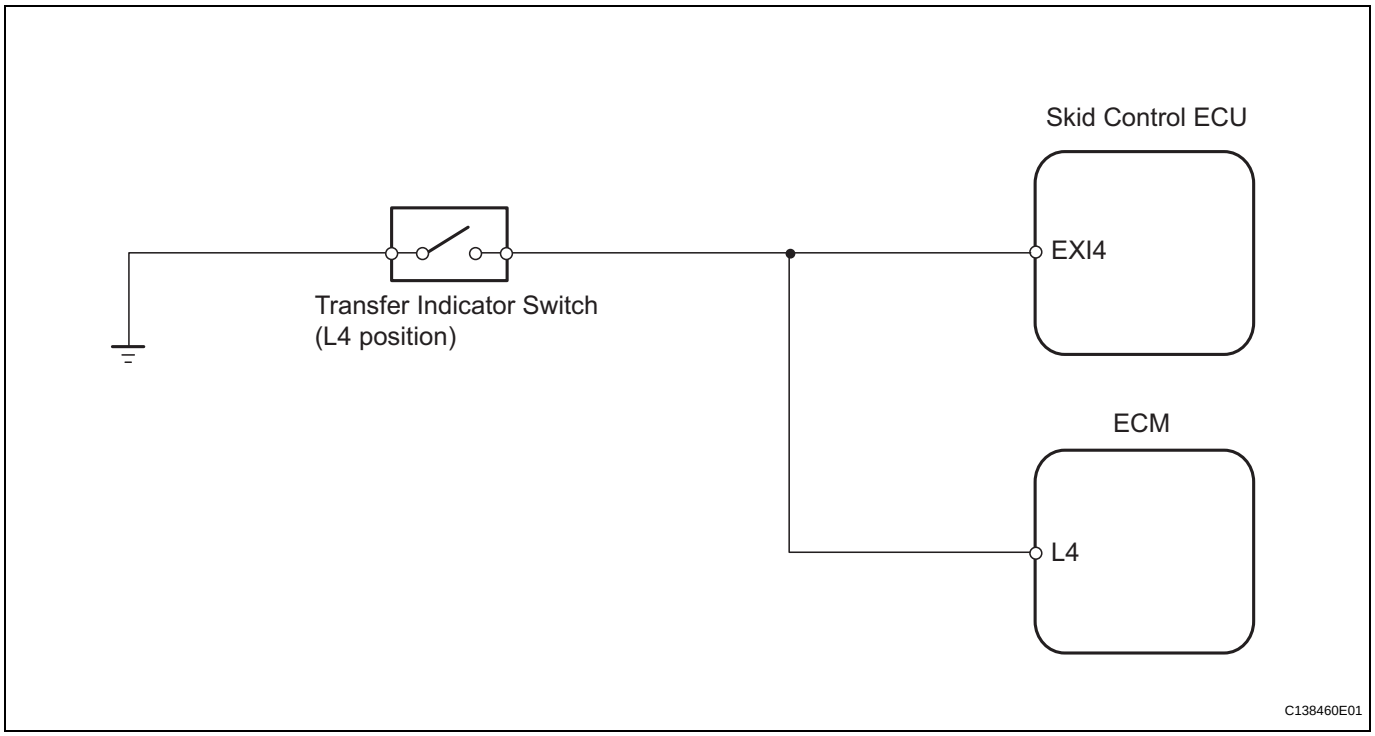
DTC	C1283/83	L4 Position Switch Malfunction (Test Mode DTC)

DESCRIPTION

A-TRAC is activated if wheel skid is detected while the transfer is in the L4 position.

DTC No.	DTC Detecting Condition	Trouble Areas
C1268/68	L4 switch signal input to skid control ECU does not match L4 switch signal output from ECM.	• Transfer indicator switch (L4 position) • Transfer indicator switch (L4 position) circuit • Master cylinder solenoid (skid control ECU)
C1283/83	Detected only during test mode	• Transfer indicator switch (L4 position) • Transfer indicator switch (L4 position) circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

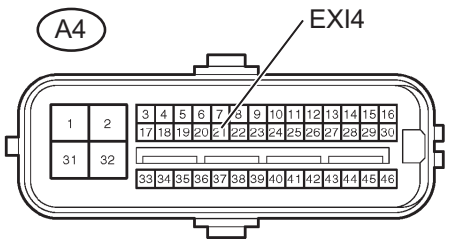
NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

BC

1 INSPECT SKID CONTROL ECU (EXI4 TERMINAL VOLTAGE)

Skid Control ECU (harness side connector):



C121700E54

(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch on.
(c) Measure the voltage.

Standard voltage

Tester Connection	Transfer Condition	Specified Condition
A4-21 (EXI4) - Body ground	L4	Below 1.5 V
A4-21 (EXI4) - Body ground	Other than above	8 to 14 V

NG → Go to step 4

OK

2 PERFORM TEST MODE INSPECTION (SIGNAL CHECK)

(a) Check if the test mode DTC (C1283/83) is detected.

Result

Result	Proceed to
Test mode DTC (C1283/83) not output	A
Test mode DTC (C1283/83) output	B

B → REPAIR TRANSFER INDICATOR SWITCH CIRCUIT (L4 POSITION)

A

3 RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is recorded (See page BC-45).

Result

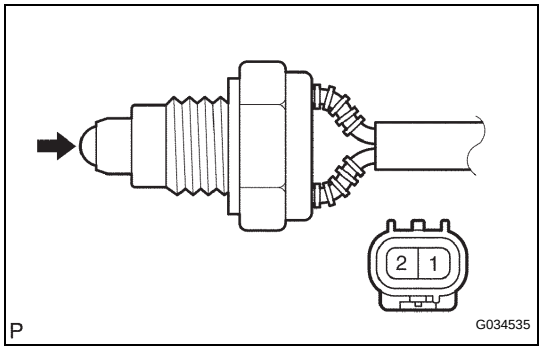
Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

4 INSPECT TRANSFER INDICATOR SWITCH (L4 POSITION)



(a) Disconnect the transfer indicator switch (L4 position) connector.
(b) Remove the transfer indicator switch (L4 position).
(c) Measure the resistance.

Standard resistance

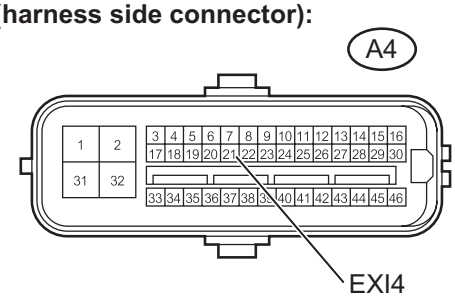
Tester Connection	Switch Position	Specified Condition
1 - 2	Pushed	Below 1 Ω
1 - 2	Free	10 kΩ or higher

NG → **REPLACE TRANSFER INDICATOR SWITCH**

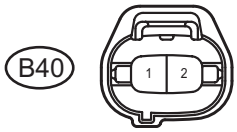
OK

5 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - TRANSFER INDICATOR SWITCH (L4 POSITION))

Skid Control ECU (harness side connector):



Transfer Indicator Switch (for L4 position) (harness side connector)



C138459E01

(a) Disconnect the skid control ECU connector.
(b) Disconnect the transfer indicator switch (L4 position) connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-21 (EXI4) - B40-1	Below 1 Ω
A4-21 (EXI4) - Body ground	10 kΩ or higher

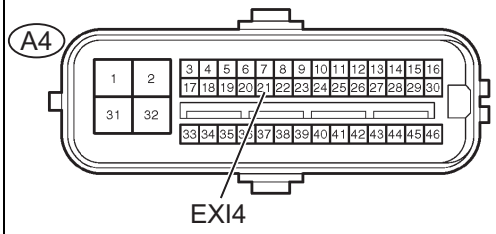
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

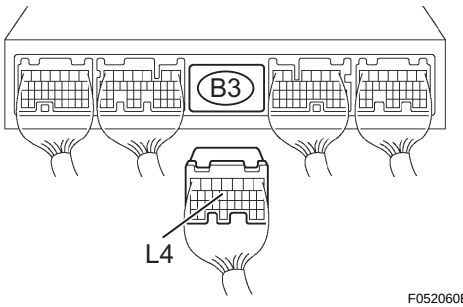
6	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - ECM)

BC

Skid Control ECU
(harness side connector):



ECM:



Y

F052060E02

(a) Disconnect the skid control ECU connector.
(b) Disconnect the ECM connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-21 (EXI4) - B3-13 (L4)	Below 1 Ω
A4-21 (EXI4) - Body ground	10 kΩ or higher
B3-13 (L4) - Body ground	10 kΩ or higher

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

OK

REPLACE MASTER CYLINDER SOLENOID

DTC	C1337/37	Different Diameter Tire Malfunction

DESCRIPTION

The skid control ECU measures the speed of each wheel by receiving signals from the speed sensors. These signals are used for recognizing whether all 4 wheels are operating properly. Therefore, all wheel signals must be equal.

DTC No.	DTC Detecting Condition	Trouble Areas
C1337/37	When either of following conditions detected: • Diameters different of 2 front wheels and 2 rear wheels. • Wheel speed sensor fault	• Speed sensor circuit • Tire sizes • Master cylinder solenoid (skid control ECU)

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CHECK DTC

(a) Check if the DTC(s) relating to the speed sensor circuit is output (See page BC-45).

Result

Result	Proceed to
DTC not output	A
DTC output	B

B → REPAIR SPEED SENSOR CIRCUIT

A

2	CHECK TIRE SIZE

(a) Check tire size and condition of all 4 wheels.

OK:

All 4 wheels are the same size and in the same condition.

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

OK

3	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).

(b) Drive the vehicle at more than 13 mph (20 km/h) for more than 60 seconds.

(c) Check if the same DTC is detected (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

BC **REPLACE MASTER CYLINDER SOLENOID**

DTC	C1380/64	Stop Light Control Relay Malfunction

DESCRIPTION

The skid control ECU inputs the stop light switch signal and detects the status of the brake operation.

DTC No.	DTC Detecting Conditions	Trouble Areas
C1380/64	Either of following conditions met when IG1 terminal voltage between 10 V and 14 V: • Despite STPO (stop light driving output) being on, no signal input to STP terminal for 5 seconds or more • Despite STPO being off, input signals of STP and STP2 do not match	• Stop light switch assembly • Stop light switch circuit • STOP LP CTRL relay • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM

See page BC-111.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CHECK STOP LIGHT SWITCH OPERATION

(a) Check that the stop lights come on when the brake pedal is depressed and go off when the brake pedal is released.

OK

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

HINT:

Check the stop light bulbs as they may have burnt out.

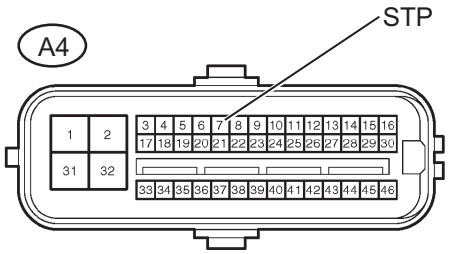
NG → **CHECK STOP LIGHT SWITCH CIRCUIT**

OK

BC

2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (STP)

Skid Control ECU (harness side connector):



C121700E58

(a) Disconnect the skid control ECU connector.
(b) Measure the voltage.
Standard voltage

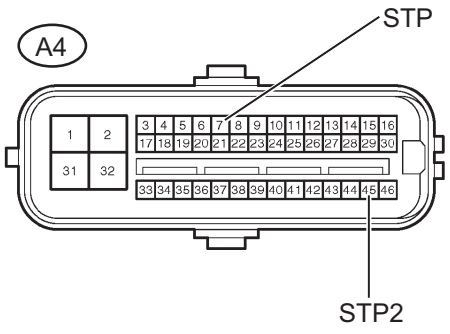
Tester Connection	Switch condition	Specified Condition
A4-7 (STP) - Body ground	Brake pedal depressed	8 to 14 V
A4-7 (STP) - Body ground	Brake pedal released	Below 1.5 V

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

OK

3 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (STP2)

Skid Control ECU (harness side connector):



C121700E57

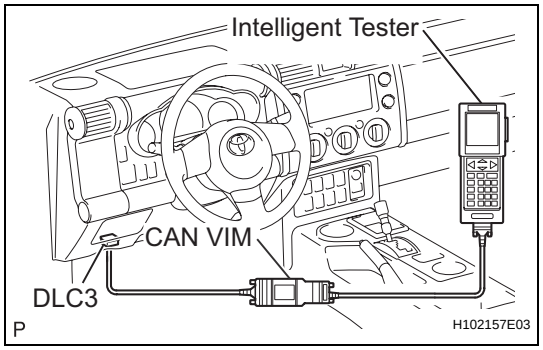
(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch on.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-7 (STP) - A4-45 (STP2)	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (STP2 CIRCUIT)**

OK

4	PERFORM ACTIVE TEST USING INTELLIGENT TESTER (STOP LIGHT RELAY)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the intelligent tester on.
(d) Select the ACTIVE TEST mode on the intelligent tester.

BC

ACTIVE TEST: ABS/VSC

Item	Vehicle Condition / Test Details	Diagnostic Note
STP LIGHT RELAY	Turns stop light relay ON / OFF	Observe stop lights

(e) Check that the stop lights turn on and off on the rear combination light when using the intelligent tester.

OK:

The stop lights turn on and off according to the intelligent tester operations.

NG → **Go to step 6**

OK

5	RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

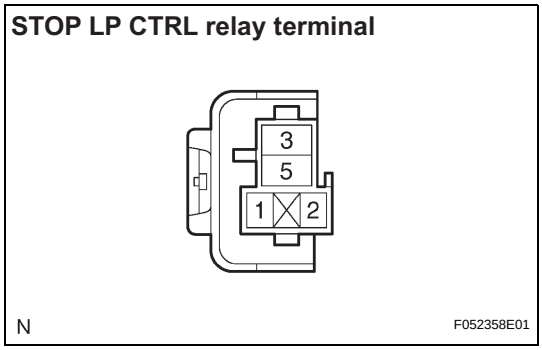
B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

BC

6 CHECK STOP LP CTRL RELAY



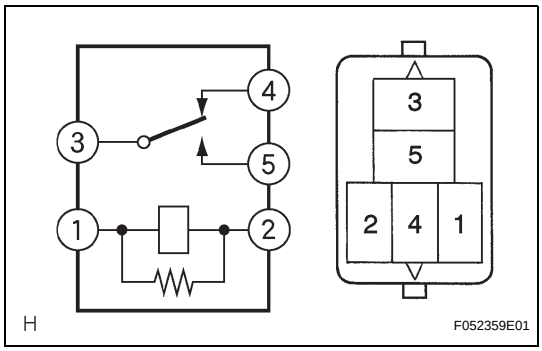
(a) Disconnect the STOP LP CTRL relay.
(b) Turn the ignition switch on.
(c) Measure the voltage.
Standard voltage

Tester Connection	Condition	Specified Condition
Terminal 5 - Body ground	Always	8 to 14 V
Terminal 1 - Body ground	Always	8 to 14 V

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

OK

7 INSPECT STOP CTRL LP RELAY



(a) Remove the STOP LP CTRL relay from the engine room R/B No. 2.
(b) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
3 - 4	Below 1 Ω
3 - 5	10 kΩ or higher

(c) Measure the resistance.
Standard resistance

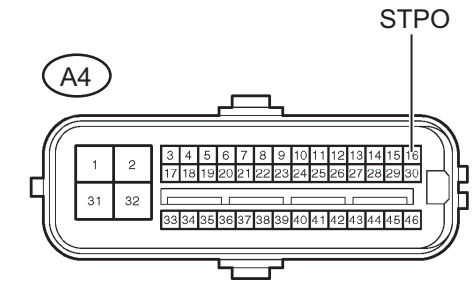
Tester Connection	Condition	Specified Condition
3 - 4	Battery voltage applied between terminals 1 (+) and 2 (-)	10 kΩ or higher
3 - 5	Battery voltage applied between terminals 1 (+) and 2 (-)	Below 1 Ω

NG → **REPLACE STOP LP CTRL RELAY**

OK

8 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (STPO)

Skid Control ECU (harness side connector):



C121700E59

(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch on.
(c) Measure the voltage.

Standard voltage

Tester Connection	Condition	Specified Condition
A4-16 (STPO) - Body ground	Brake pedal depressed	11 to 14 V

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

OK

9 RECONFIRM DTC

(a) Clear the DTC (See page BC-45).
(b) Check if the same DTC is recorded (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

DTC	U0073/94	Control Module Communication Bus OFF

DTC	U0100/65	Lost Communication with ECM / PCM

BC

DTC	U0123/62	Lost Communication with Yaw Rate Sensor Module

DTC	U0124/95	Lost Communication with Lateral Acceleration Sensor Module

DTC	U0126/63	Lost Communication with Steering Angle Sensor Module

DESCRIPTION

DTC No.	DTC Detecting Conditions	Trouble Area
U0073/94	When either of following conditions (1 or 2) detected: 1. After data output from skid control ECU completed, output continues for 5 seconds or more. 2. Bus off condition occurs once or more per 0.1 seconds 10 times in succession.	CAN communication system
U100/65	When IG1 terminal voltage 10 V or more and vehicle speed 9 mph (15 km/h) or more, either of following conditions (1 or 2) occurs 10 times in succession: 1. Data cannot be sent to ECM once or more within 5 seconds. 2. Data from ECM cannot be received once or more within 5 seconds.	CAN communication system
U0123/62	When IG1 terminal voltage 10 V or more, either of following conditions (1 or 2) detected: 1. Data from yaw rate sensor cannot be received for 1 second or more. 2. Data from yaw rate sensor cannot be received once or more within 5 seconds.	CAN communication system
U0124/95	When IG1 terminal voltage 9.5 V or more, either of following conditions (1 or 2) detected: 1. Data from deceleration sensor cannot be received for 1 second or more. 2. Data from deceleration sensor cannot be received once or more within 5 seconds.	CAN communication system
U0123/63	When IG1 terminal voltage 10 V or more, either of following conditions (1 or 2) detected: 1. Data from steering angle sensor cannot be received for 1 second or more. 2. Data from steering angle sensor cannot be received once or more within 5 seconds.	CAN communication system

INSPECTION PROCEDURE

1	RECONFIRM DTC

(a) Clear the DTC(s) (See page BC-45).
(b) Check if the same DTC(s) is output (See page BC-45).

Result

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPAIR CAN COMMUNICATION SYSTEM

ABS Warning Light Remains ON

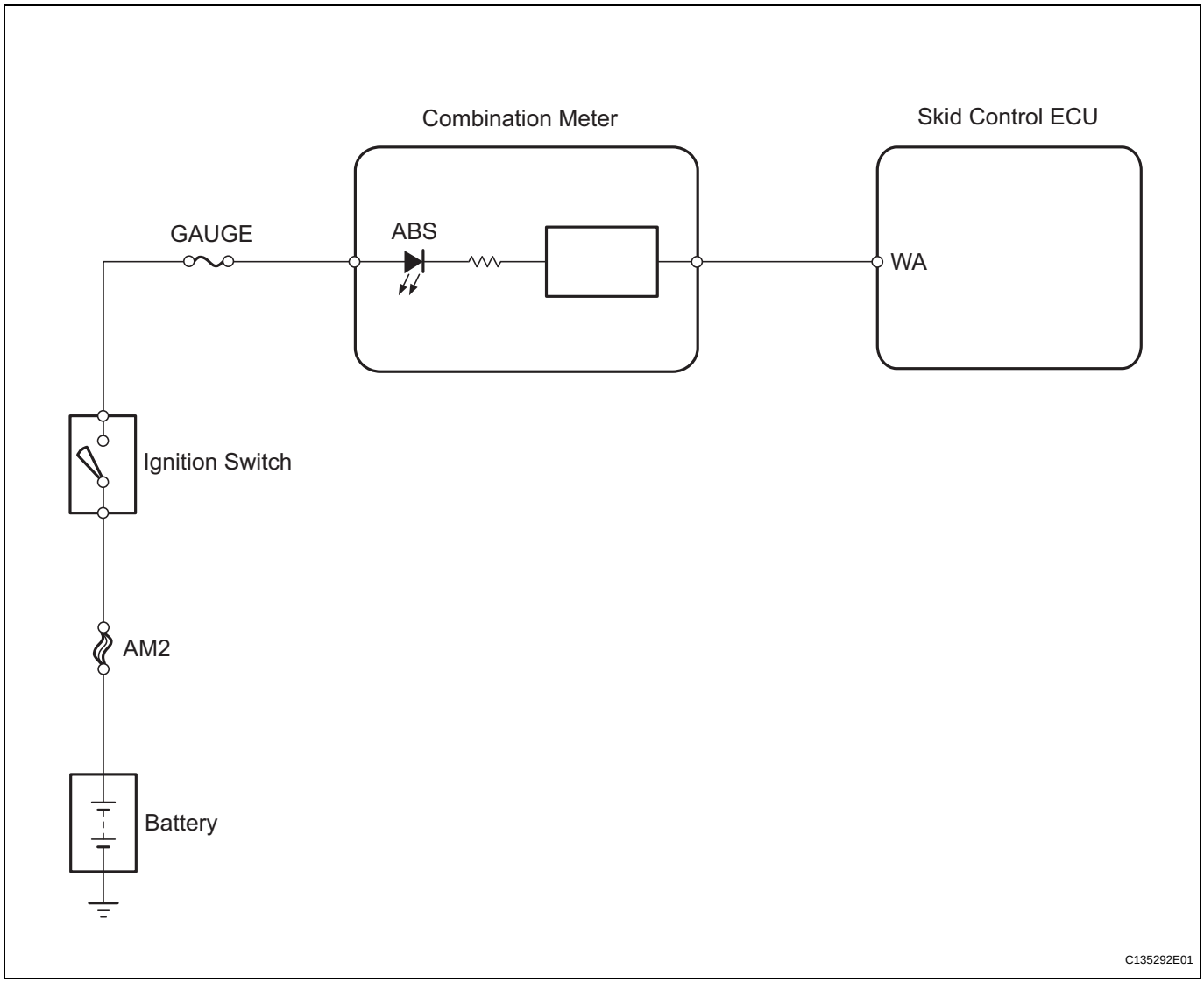
DESCRIPTION

If any of the following is detected, the ABS warning light remains ON.

1. The skid control ECU connectors are disconnected from the skid control ECU.
2. There is a malfunction in the skid control ECU internal circuit.
3. There is an open in the harness between the combination meter and skid control ECU.

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	**CHECK DTC**

(a) Check if DTCs for ABS are recorded (See page BC-45).

Result

Result	Proceed to
DTC not output	A
DTC output	B

B → **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS**

BC

A

2 INSPECT SKID CONTROL ECU CONNECTOR

(a) Check that the ECU connector is securely connected.

OK:

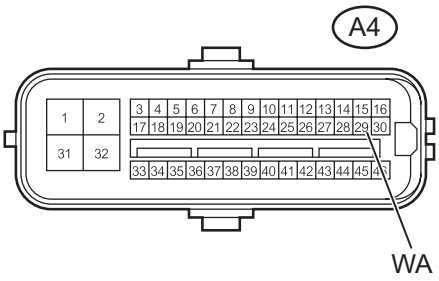
The connector is securely connected.

NG → **CONNECT CONNECTOR CORRECTLY**

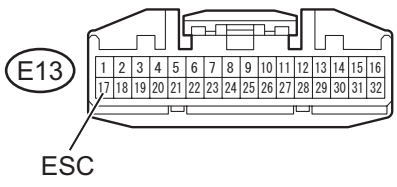
OK

3 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU (harness side connector):



Combination Meter (harness side connector):



C135293E01

(a) Disconnect the skid control ECU connector.

(b) Disconnect the combination meter connector.

(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-29 (WA) - E13-17 (ESC)	Below 1 Ω

(d) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-29 (WA) - Body ground	10 kΩ or higher

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

OK

4 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-15).

OK:

Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

BC

REPLACE MASTER CYLINDER SOLENOID

ABS Warning Light does not Come ON

DESCRIPTION

If the ECU detects trouble, it illuminates the ABS warning light while at the same time prohibiting ABS control.
At this time, the ECU records a DTC in its memory.
Connecting terminals TC and CG of the DLC3 causes the ECU to display 2-digit DTCs by blinking the ABS warning light.

WIRING DIAGRAM

See page BC-151.

INSPECTION PROCEDURE

NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CHECK ABS WARNING LIGHT

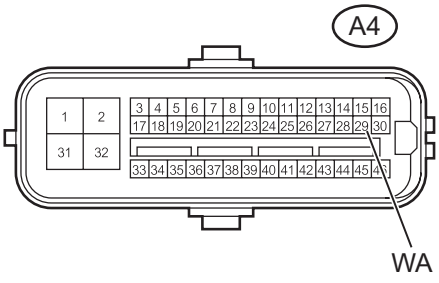
(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch on.
(c) Check that the ABS warning light comes on.
OK:
ABS warning light comes on.

OK → **REPLACE MASTER CYLINDER SOLENOID**

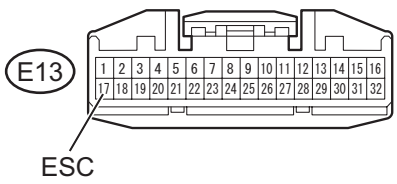
NG

2	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU
(harness side connector):



Combination Meter
(harness side connector):



C135293E01

(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-29 (WA) - E13-17 (ESC)	Below 1 Ω
A4-29 (WA) - Body ground	10 kΩ or higher

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

OK

3	INSPECT COMBINATION METER ASSEMBLY

BC

(a) Check the combination meter system (See page BC-36).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

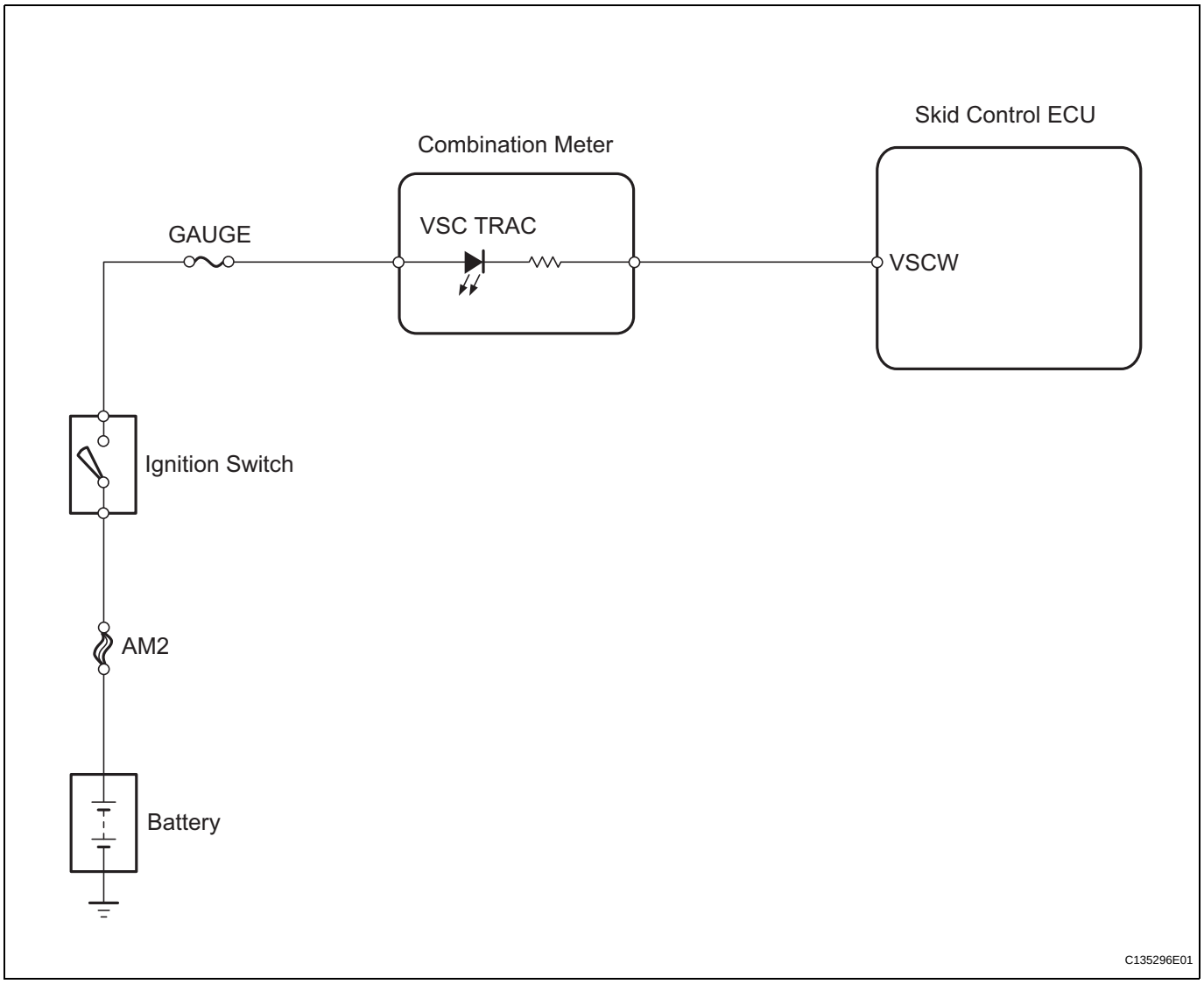
CHECK FOR INTERMITTENT PROBLEMS

VSC TRAC Warning Light Remains ON

DESCRIPTION

When the skid control ECU stores DTCs, the VSC and TRAC functions are deactivated and the VSC TRAC warning light comes on in the combination meter.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CHECK DTC

(a) Check if DTCs for VSC are recorded (See page BC-45).

Result

Result	Proceed to
DTC not output	A
DTC output	B

B → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

A

BC

2 INSPECT SKID CONTROL ECU CONNECTOR

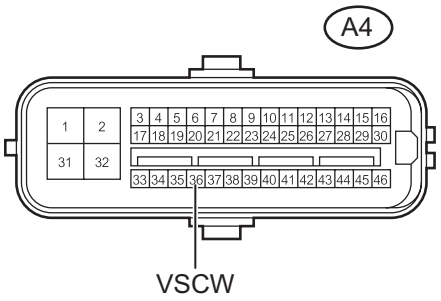
(a) Check that the ECU connector is securely connected.
OK:
The connector is securely connected.

NG → CONNECT CONNECTOR CORRECTLY

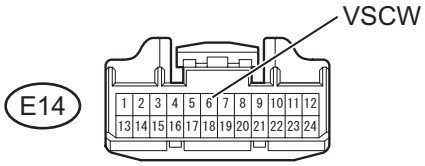
OK

3 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU (haness side connector):



Combination Meter (harness side connector):



C135294E01

(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-36 (VSCW) - E14-6 (VSCW)	Below 1 Ω
A4-36 (VSCW) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).
OK:
Combination meter is normal.

NG → REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE MASTER CYLINDER SOLENOID

VSC TRAC Warning Light does not Come ON

DESCRIPTION

When the ECU stores DTCs, the VSC warning light illuminates on the combination meter.

BC

WIRING DIAGRAM

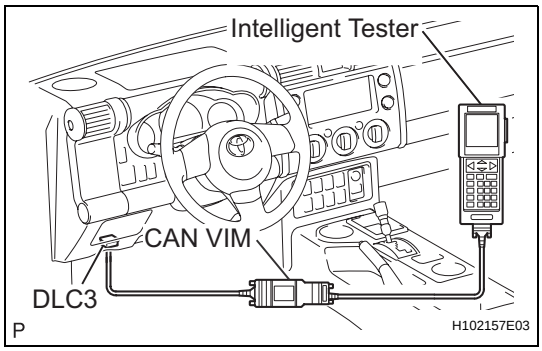
See page BC-156.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	PERFORM ACTIVE TEST USING INTELLIGENT TESTER (VSC TRAC WARNING LIGHT)



(a) Connect an intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Select the "VSC WARN LIGHT" in the ACTIVE TEST and operate the VSC TRAC warning light using the intelligent tester.
Select the following menu items: DIAGNOSIS / OBD/ MOBD / select vehicle / ABS/VSC / ACTIVE TEST.

ACTIVE TEST: ABS/VSC

Item (Display)	Test Details	Diagnostic Note
VSC WARN LIGHT	Turns VSC TRAC warning light ON and OFF	Observe combination meter

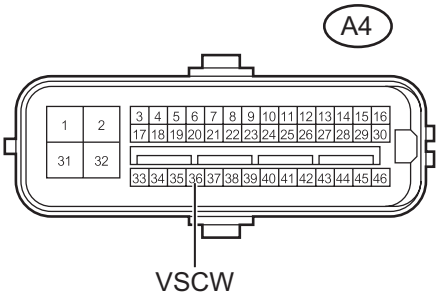
(e) Check that the VSC TRAC warning light turns on and off in the combination meter using the intelligent tester.
OK:
The VSC TRAC warning light turns ON and OFF in accordance with the intelligent tester operation.

OK → **REPLACE MASTER CYLINDER SOLENOID**

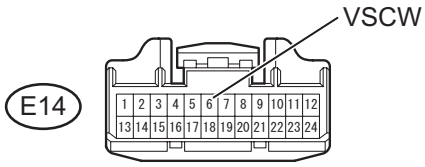
NG

2 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU (haness side connector):



Combination Meter (harness side connector):



C135294E01

(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-36 (VSCW) - E14-6 (VSCW)	Below 1 Ω
A4-36 (VSCW) - Body ground	10 kΩ or higher

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

OK

3 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

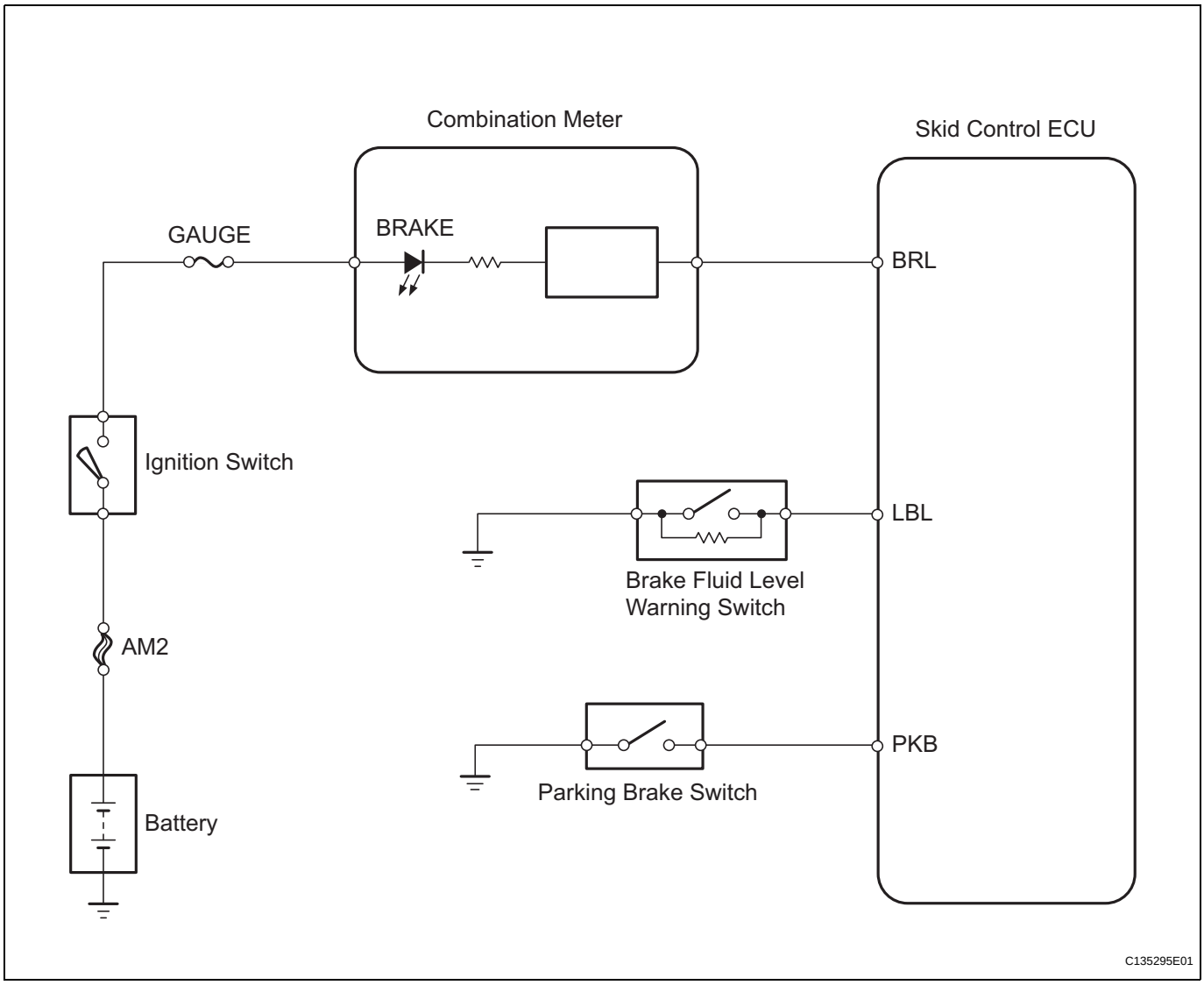
Brake Warning Light Remains ON

DESCRIPTION

The BRAKE warning light lights up when the brake fluid is insufficient, the parking brake is applied or the EBD is defective.

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CHECK DTC

(a) Check for the DTCs (See page BC-45).

Result

Result	Proceed to
DTC not output	A
DTC output	B

B → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

A

2 CHECK BRAKE FLUID LEVEL

(a) Check the amount of brake fluid in the brake reservoir.
OK:
Brake fluid level is correct.

NG → ADD BRAKE FLUID

OK

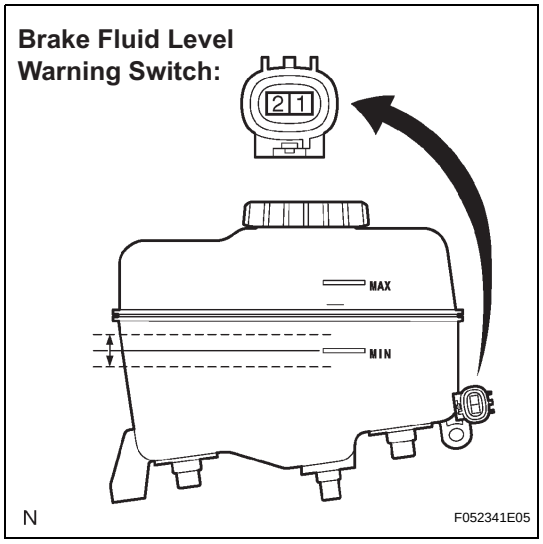
3 CHECK SKID CONTROL ECU CONNECTOR

(a) Check whether the skid control ECU connector is connected securely.
OK:
The skid control ECU connector is connected securely.

NG → CONNECT CONNECTOR CORRECTLY

OK

4 INSPECT BRAKE FLUID LEVEL WARNING SWITCH



(a) Disconnect the brake fluid level warning switch connector.
(b) Measure the resistance.
Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	Float UP	1.9 k to 2.1 kΩ
1 - 2	Float DOWN	Below 1 Ω

HINT:
If the result is as specified, adjust the brake fluid level to the MAX level after measuring the resistance.

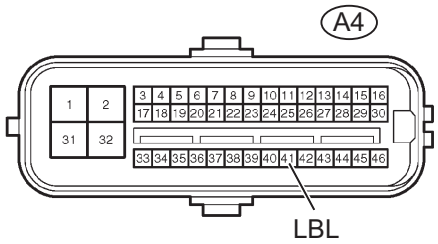
NG → REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

OK

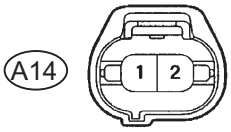
5	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE FLUID LEVEL WARNING SWITCH)

BC

Skid Control ECU (harness side connector):



Brake Fluid Level Warning Switch (harness side connector):



F051748E03

(a) Disconnect the skid control ECU connector.
(b) Disconnect the brake fluid level warning switch connector.
(c) Measure the resistance.
Standard resistance

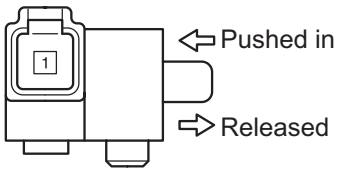
Tester Connection	Specified Condition
A4-41 (LBL) - A14-2	Below 1 Ω
A4-41 (LBL)- Body ground	10 kΩ or higher

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

OK

6	INSPECT PARKING BRAKE SWITCH ASSEMBLY

Parking Brake Switch:



Y C129357E04

(a) Disconnect the parking brake switch connector.
(b) Measure the resistance.
Standard resistance

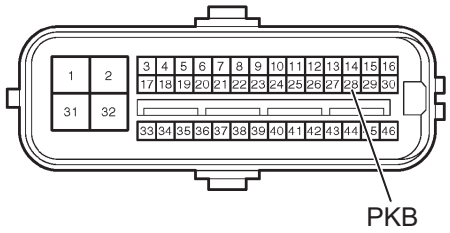
Tester Connection	Switch Condition	Specified Condition
1 - Body ground	Released	Below 1 Ω
1 - Body ground	Pushed in	10 kΩ or higher

NG → **REPLACE PARKING BRAKE SWITCH ASSEMBLY**

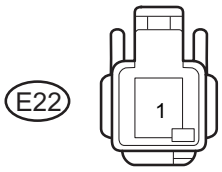
OK

7 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - PARKING BRAKE SWITCH)

Skid Control ECU (harness side connector): A4



Parking Brake Switch (harness side connector):



C124797E03

(a) Disconnect the skid control ECU.
(b) Disconnect the parking brake switch connector.
(c) Measure the resistance.

Standard resistance

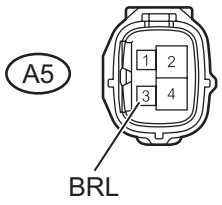
Tester Connection	Specified Condition
A4-28 (PKB) - E22-1	Below 1 Ω
A4-28 (PKB) - Body ground	10 kΩ or higher

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

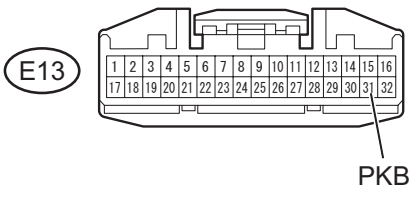
OK

8 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU (harness side connector):



Combination Meter (harness side connector):



C135297E01

(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A5-3 (BRL) - E13-31 (PKB)	Below 1 Ω
A5-3 (BRL) - Body ground	10 kΩ or higher

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

OK

9	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK ↓

REPLACE MASTER CYLINDER SOLENOID

Brake Warning Light does not Come ON

WIRING DIAGRAM

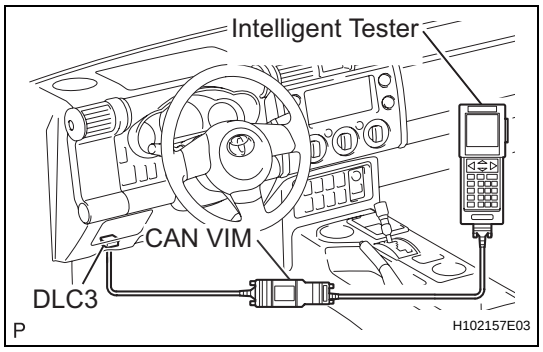
See page BC-161.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	PERFORM ACTIVE TEST USING INTELLIGENT TESTER



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Select the "BRAKE WRN LIGHT" in the ACTIVE TEST and operate the BRAKE warning light using the intelligent tester.
Select the following menu items: DIAGNOSTIC / OBD/ MOBD / select vehicle / ABS/VSC / ACTIVE TEST.

ACTIVE TEST: ABS/VSC

Item (Display)	Test Details	Diagnostic Note
BRAKE WRN LIGHT	Turns BRAKE warning light ON and OFF	Observe combination meter

(e) Check that the BRAKE warning light turns on and off in the combination meter using the intelligent tester.
OK:
The BRAKE warning light turns ON and OFF in accordance with the intelligent tester operation.

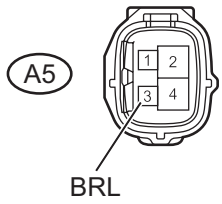
OK → **REPLACE MASTER CYLINDER SOLENOID**

NG

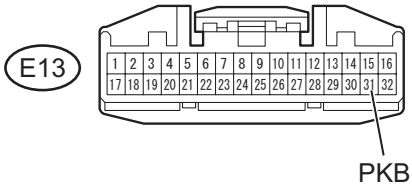
2	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

BC

Skid Control ECU (harness side connector):



Combination Meter (harness side connector):



C135297E01

(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A5-3 (BRL) - E13-31 (PKB)	Below 1 Ω
A5-3 (BRL) - Body ground	10 kΩ or higher

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

OK

3	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

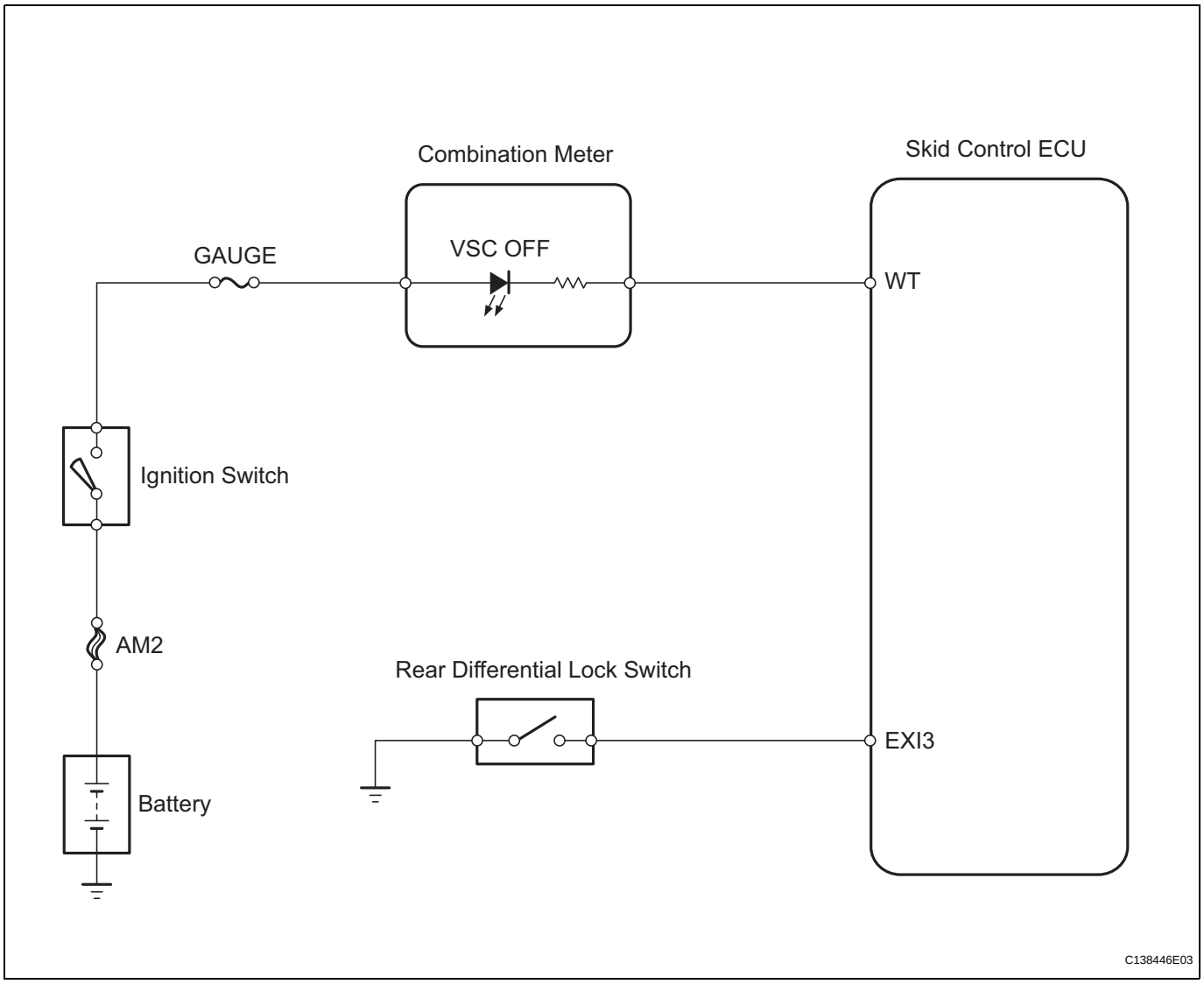
VSC OFF Indicator Light Remains ON

DESCRIPTION

When the rear differential is locked or during the 4WD mode, VSC control turns off and the VSC OFF indicator illuminates. Also, the VSC OFF indicator light is ON when the VSC system is in fail-safe control.

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CHECK DTC

(a) Check if DTCs for VSC are recorded (See page BC-45).

Result

Result	Proceed to
DTC not output	A
DTC output	B

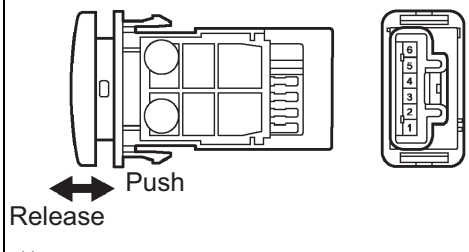
B → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

A

BC

2 INSPECT REAR DIFFERENTIAL LOCK SWITCH

Rear Differential Lock Switch:



(a) Remove the rear differential lock switch.
(b) Disconnect the rear differential lock switch connector
(c) Measure the resistance.

Standard resistance

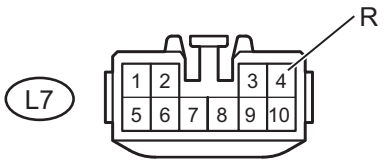
Tester Connection	Switch Condition	Specified Condition
3 - 4	Released	10 kΩ or higher
3 - 4	Pushed in	Below 1 Ω

NG → REPLACE DIFFERENTIAL LOCK SWITCH

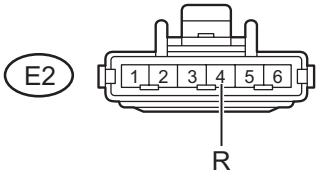
OK

3 CHECK HARNESS AND CONNECTOR (FOUR WHEEL DRIVE CONTROL ECU - DIFFERENTIAL LOCK SWITCH)

Four Wheel Drive Control ECU (harness side connector):



Differential Lock Switch (harness side connector):



(a) Disconnect the four wheel drive control ECU connector.
(b) Disconnect the differential lock switch connector.
(c) Measure the resistance.

Standard resistance

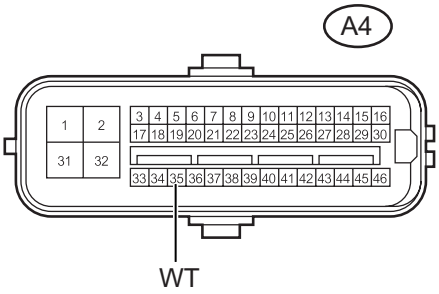
Tester Connection	Specified Condition
L7-4 (R) - E2-4	Below 1 Ω
L7-4 (R) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

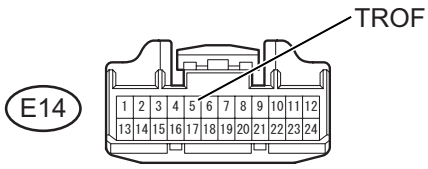
OK

4	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU (haness side connector):



Combination Meter (harness side connector):



C135294E02

(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-35 (WT) - E14-5 (TROF)	Below 1 Ω
A4-35 (WT) - Body ground	10 kΩ or higher

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

OK

5	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

BC

VSC OFF Indicator Light does not Come ON

DESCRIPTION

See page BC-168.

BC

WIRING DIAGRAM

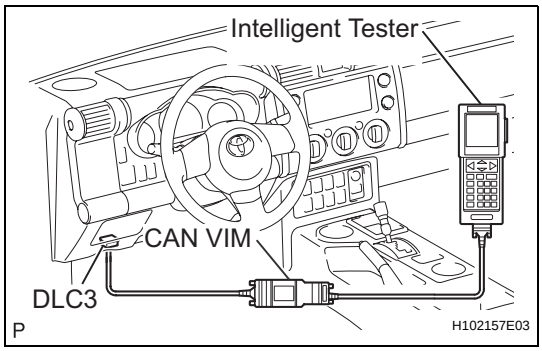
See page BC-168.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	PERFORM ACTIVE TEST USING INTELLIGENT TESTER (VSC OFF INDICATOR LIGHT)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Select the "VSC/BR OFF IND" in the ACTIVE TEST and operate the VSC OFF indicator light using the intelligent tester.
Select the following menu items: DIAGNOSIS / OBD/ MOBD /select vehicle / ABS/VSC / ACTIVE TEST.

ACTIVE TEST : ABS/VSC

Item (Display)	Test Details	Diagnostic Notes
VSC/TRC OFF IND	Turns VSC OFF indicator light ON and OFF	Observe combination meter

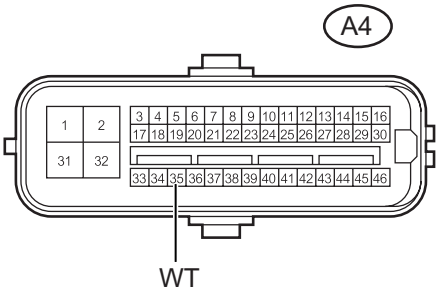
(e) Check that the VSC OFF indicator light turns on and off in the combination meter using the intelligent tester.
OK:
The VSC OFF indicator light turns ON and OFF in accordance with the intelligent tester operation.

OK → **REPLACE MASTER CYLINDER SOLENOID**

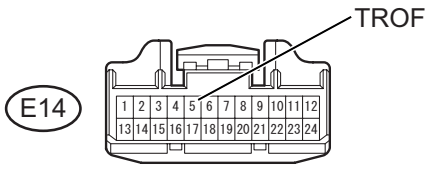
NG

2 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU (haness side connector):



Combination Meter (harness side connector):



C135294E02

(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-35 (WT) - E14-5 (TROF)	Below 1 Ω
A4-35 (WT) - Body ground	10 kΩ or higher

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

OK

3 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

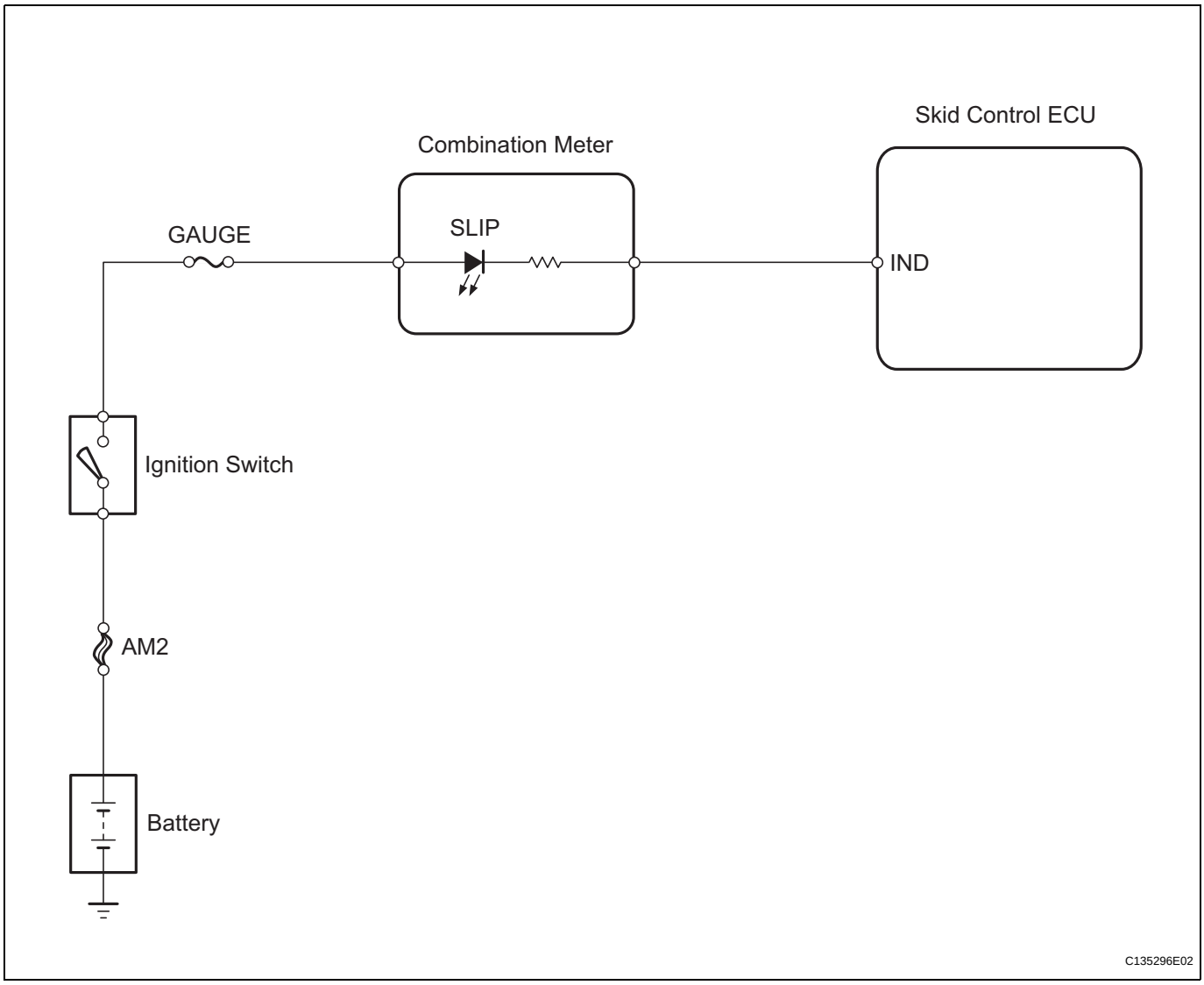
Slip Indicator Light Remains ON

DESCRIPTION

- The SLIP indicator blinks when any of the TRAC, VSC and AUTO LSD operate.
- When the system fails, the SLIP indicator light illuminates to warn the driver.

BC

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CHECK DTC

(a) Check for the DTCs (See page BC-45).

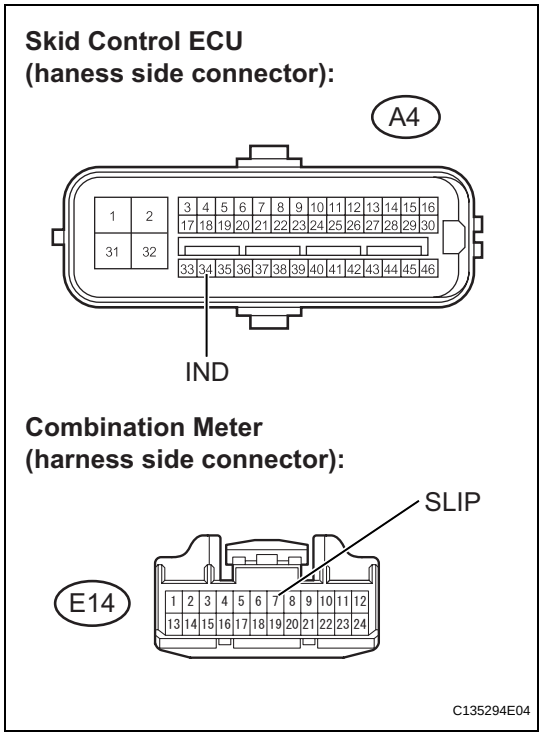
Result

Result	Proceed to
DTC not output	A
DTC output	B

B → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

A

2 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)



(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-34 (IND) - E14-7 (SLIP)	Below 1 Ω
A4-34 (IND) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).
OK:
Combination meter is normal.

NG → REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE MASTER CYLINDER SOLENOID

Slip Indicator Light does not Come ON

WIRING DIAGRAM

See page BC-173

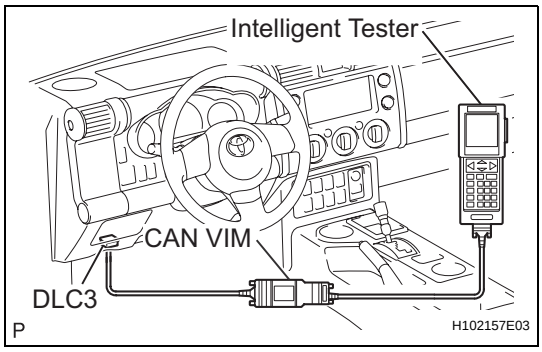
BC

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	PERFORM ACTIVE TEST USING INTELLIGENT TESTER (SLIP INDICATOR LIGHT)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on.
(c) Turn the tester on.
(d) Select the "SLIP INDI LIGHT" in the ACTIVE TEST and operate the SLIP indicator light using the intelligent tester.
Select the following menu items: DIAGNOSIS / OBD/ MOBD /select vehicle / ABS/ VSC / ACTIVE TEST.

ACTIVE TEST: ABS/VSC

Item (Display)	Test Details	Diagnostic Notes
SLIP INDI LIGHT	Turns SLIP indicator light ON and OFF	Observe combination meter

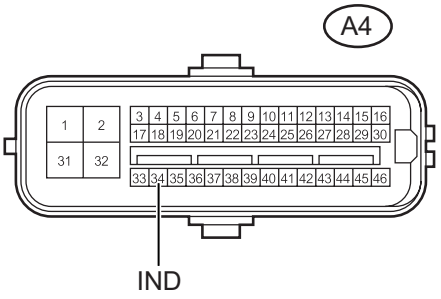
(e) Check that the SLIP indicator light turns on and off in the combination meter using the intelligent tester.
OK:
The SLIP indicator light turns ON and OFF in accordance with the intelligent tester operation.

OK → **REPLACE MASTER CYLINDER SOLENOID**

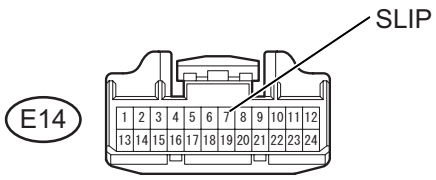
NG

2 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU (haness side connector):



Combination Meter (harness side connector):



C135294E04

(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-34 (IND) - E14-7 (SLIP)	Below 1 Ω
A4-34 (IND) - Body ground	10 kΩ or higher

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

OK

3 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

BC

AUTO LSD Indicator Light Remains ON

DESCRIPTION

This is the AUTO LSD main switch circuit. When the AUTO LSD switch is pushed on, the AUTO LSD function is available and the AUTO LSD indicator light illuminates.

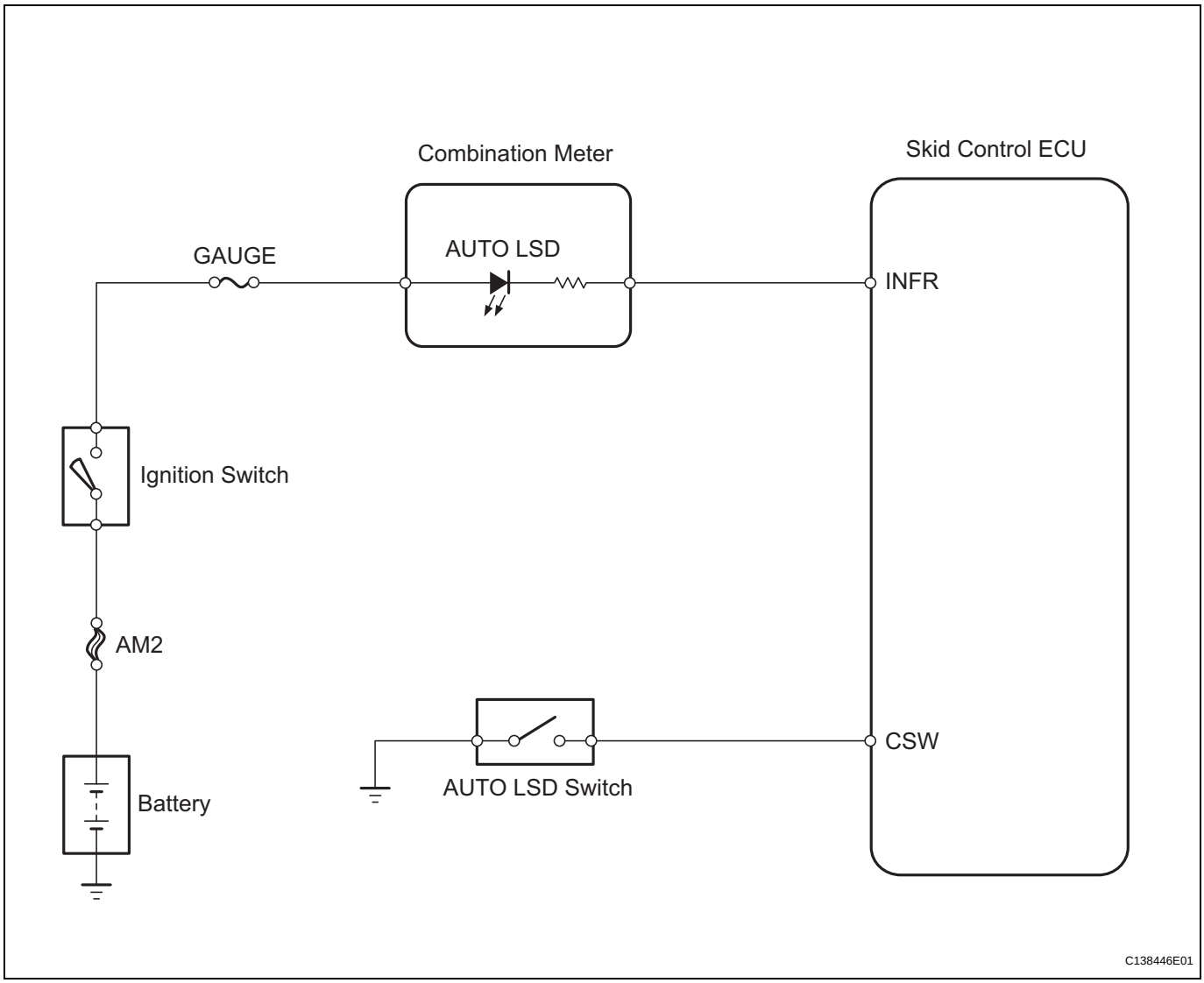
BC

HINT:

The AUTO LSD does not operate even if the AUTO LSD switch is pressed under the following conditions:

- TRAC or VSC system is faulty.
- Temperature inside the hydraulic brake booster increases and the AUTO LSD operation is suspended.

WIRING DIAGRAM



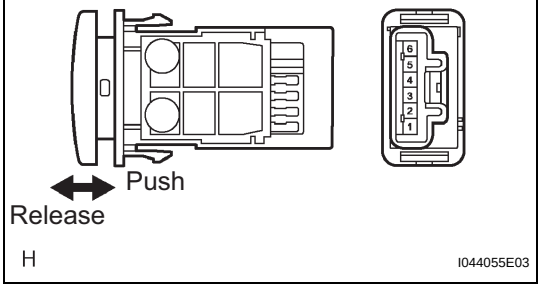
INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1 INSPECT AUTO LSD SWITCH

AUTO LSD Switch:



(a) Remove the AUTO LSD switch.
(b) Disconnect the AUTO LSD switch connector.
(c) Measure the resistance.
Standard resistance

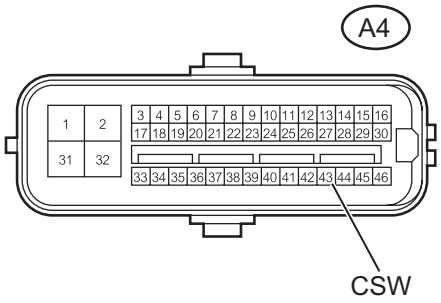
Tester Connection	Switch Condition	Specified Condition
3 - 4	Released	10 kΩ or higher
3 - 4	Pushed in	Below 1 Ω

NG → **REPLACE AUTO LSD SWITCH**

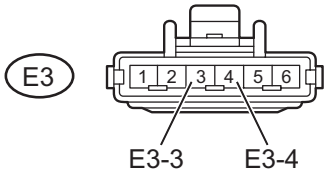
OK

2 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - AUTO LSD SWITCH)

Skid Control ECU (harness side connector):



AUTO LSD Switch (harness side connector):



(a) Disconnect the skid control ECU connector.
(b) Disconnect the AUTO LSD connector.
(c) Measure the resistance.
Standard resistance

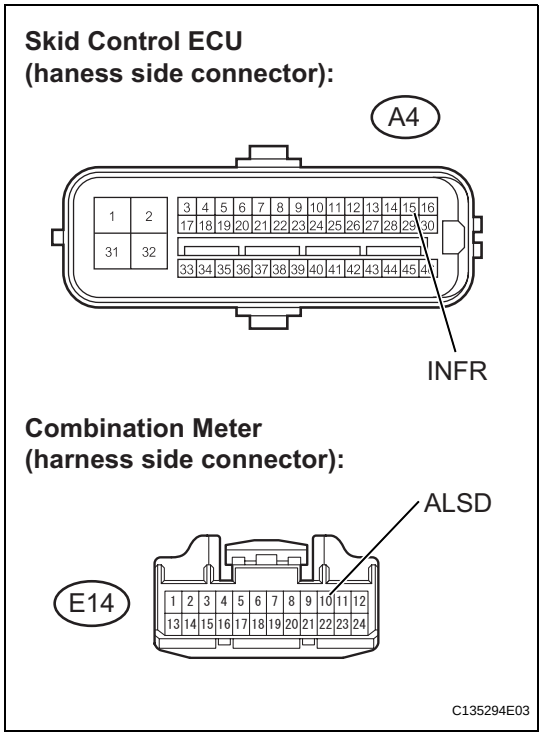
Tester Connection	Specified Condition
A4-43 (CSW) - E3-3	Below 1 Ω
A4-43 (CSW) - Body ground	10 kΩ or higher
E3-4 - Body ground	Below 1 Ω

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

OK

BC

3	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)



(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-15 (INFR) - E14-10 (ALSD)	Below 1 Ω
A4-15 (INFR) - Body ground	10 kΩ or higher

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

OK

4	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).

OK:

Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

AUTO LSD Indicator Light does not Come ON

DESCRIPTION

See page BC-177.

WIRING DIAGRAM

See page BC-177.

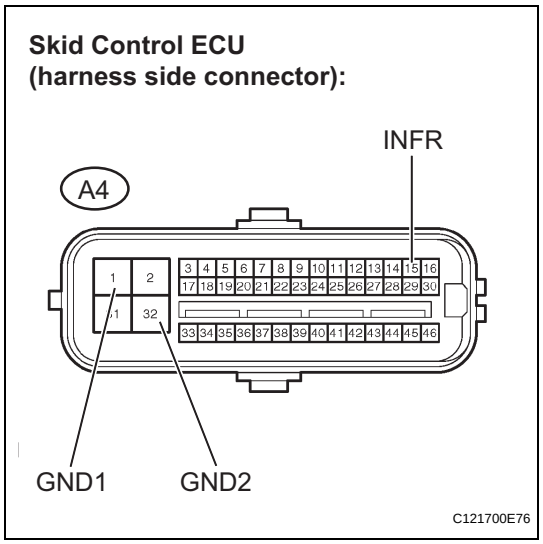
BC

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CHECK AUTO LSD INDICATOR LIGHT



(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch on.
(c) Ground terminal INFR of the skid control ECU.
(d) Check the AUTO LSD indicator light.

OK

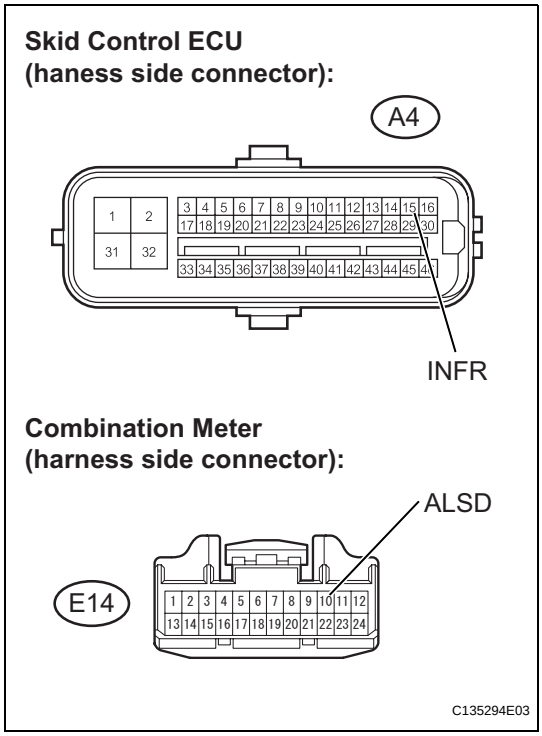
INFR - GND Condition	Illumination Condition
Connecting	ON
Disconnecting	OFF

OK → **REPLACE MASTER CYLINDER SOLENOID**

NG

BC

2 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)



(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.

Standard resistance

Tester Connection	Specified Condition
A4-15 (INFR) - E14-10 (ALSD)	Below 1 Ω
A4-15 (INFR) - Body ground	10 kΩ or higher

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

OK

3 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).

OK:

Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

A-TRAC Indicator Light Remains ON

DESCRIPTION

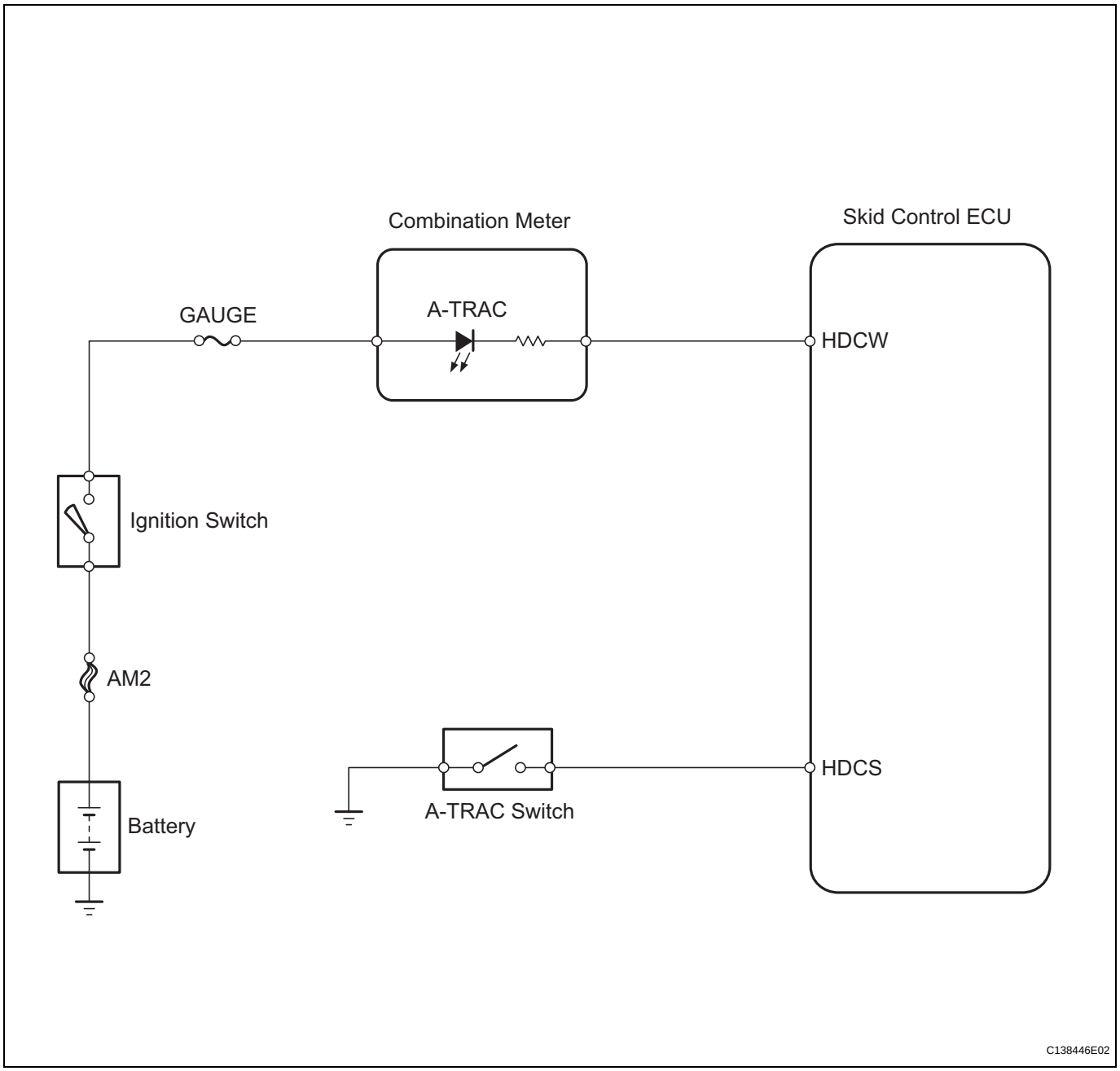
This is the A-TRAC main switch circuit. When the A-TRAC switch is pushed on, the A-TRAC function is available and the A-TRAC indicator light illuminates.

HINT:

The A-TRAC does not operate even if the A-TRAC switch is pressed under the following conditions:

- TRAC or VSC system is faulty.
- Temperature inside the hydraulic brake booster increases and the A-TRAC operation is suspended.

WIRING DIAGRAM



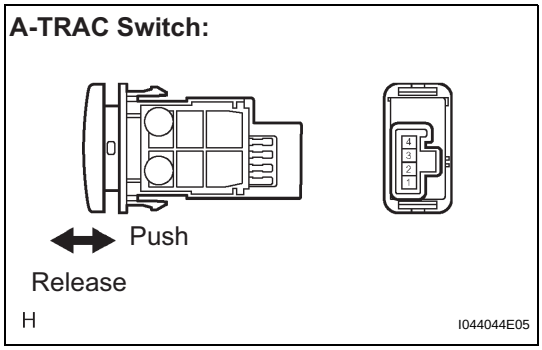
INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

BC

1	INSPECT A-TRAC SWITCH



(a) Remove the A-TRAC switch.
(b) Disconnect the A-TRAC switch connector.
(c) Measure the resistance.

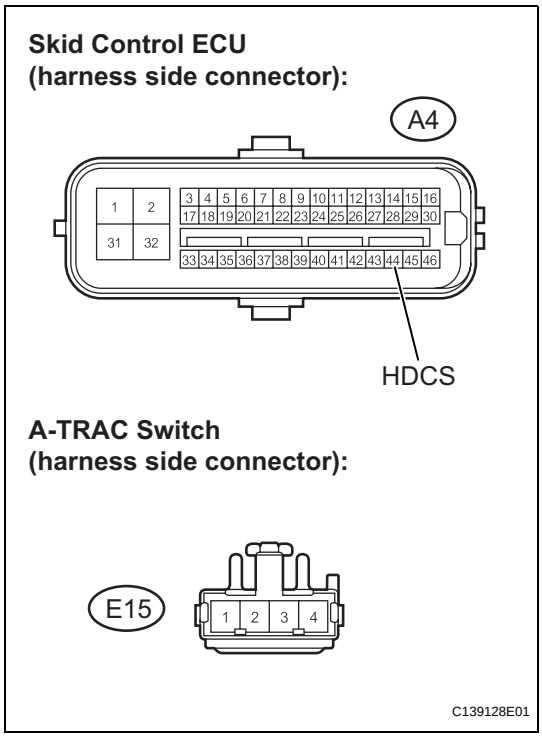
Standard resistance

Tester Connection	Switch Condition	Specified Condition
3 - 4	Released	10 kΩ or higher
3 - 4	Pushed in	Below 1 Ω

NG → **REPLACE A-TRAC SWITCH**

OK

2	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - A-TRACK SWITCH)



(a) Disconnect the skid control ECU connector.
(b) Disconnect the A-TRAC connector.
(c) Measure the resistance.

Standard resistance

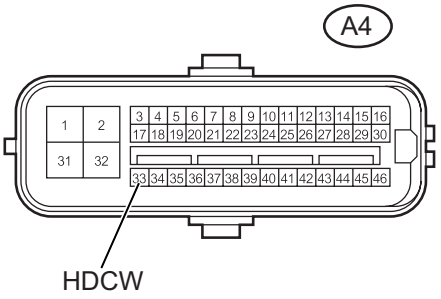
Tester Connection	Specified Condition
A4-44 (HDCS) - E15-4	Below 1 Ω
A4-44 (HDCS) - Body ground	10 kΩ or higher
E15-4 - Body ground	Below 1 Ω

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

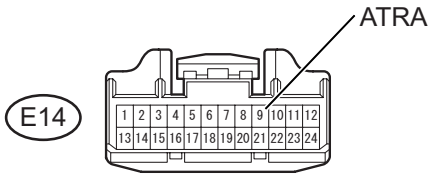
OK

3 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU (haness side connector):



Combination Meter (harness side connector):



C135294E05

(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-33 (HDCW) - E14-9	Below 1 Ω
A4-33 (HDCW) - Body ground	10 kΩ or higher

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

OK

4 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

BC

A-TRAC Indicator Light does not Come ON

DESCRIPTION

See page BC-182.

BC

WIRING DIAGRAM

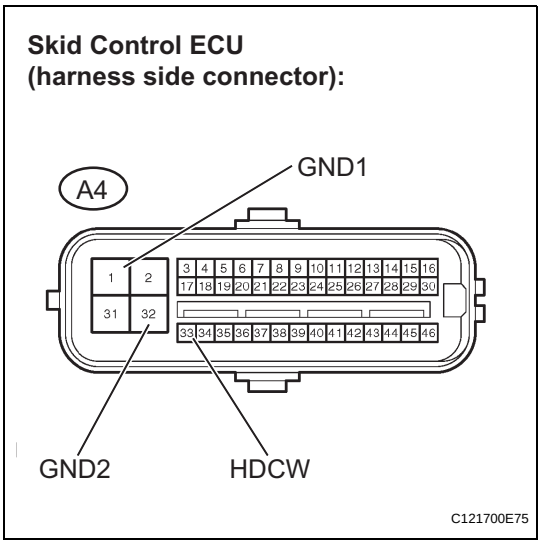
See page BC-182.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	CHECK A-TRAC INDICATOR LIGHT



(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch on.
(c) Ground terminal HDCW of the skid control ECU.
(d) Check the A-TRAC indicator light.

OK

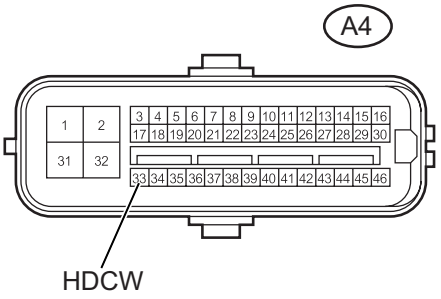
HDCW - GND Condition	Illumination Condition
Connecting	ON
Disconnecting	OFF

OK → **REPLACE MASTER CYLINDER SOLENOID**

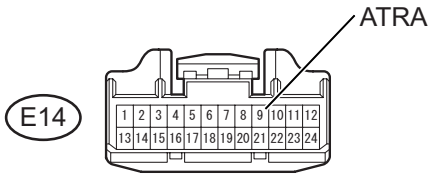
NG

2	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU
(haness side connector):



Combination Meter
(harness side connector):



C135294E05

(a) Disconnect the skid control ECU connector.
(b) Disconnect the combination meter connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-33 (HDCW) - E14-9 (ATRA)	Below 1 Ω
A4-33 (HDCW) - Body ground	10 kΩ or higher

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

OK

3	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-29).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE COMBINATION METER ASSEMBLY

Skid Control Buzzer Circuit

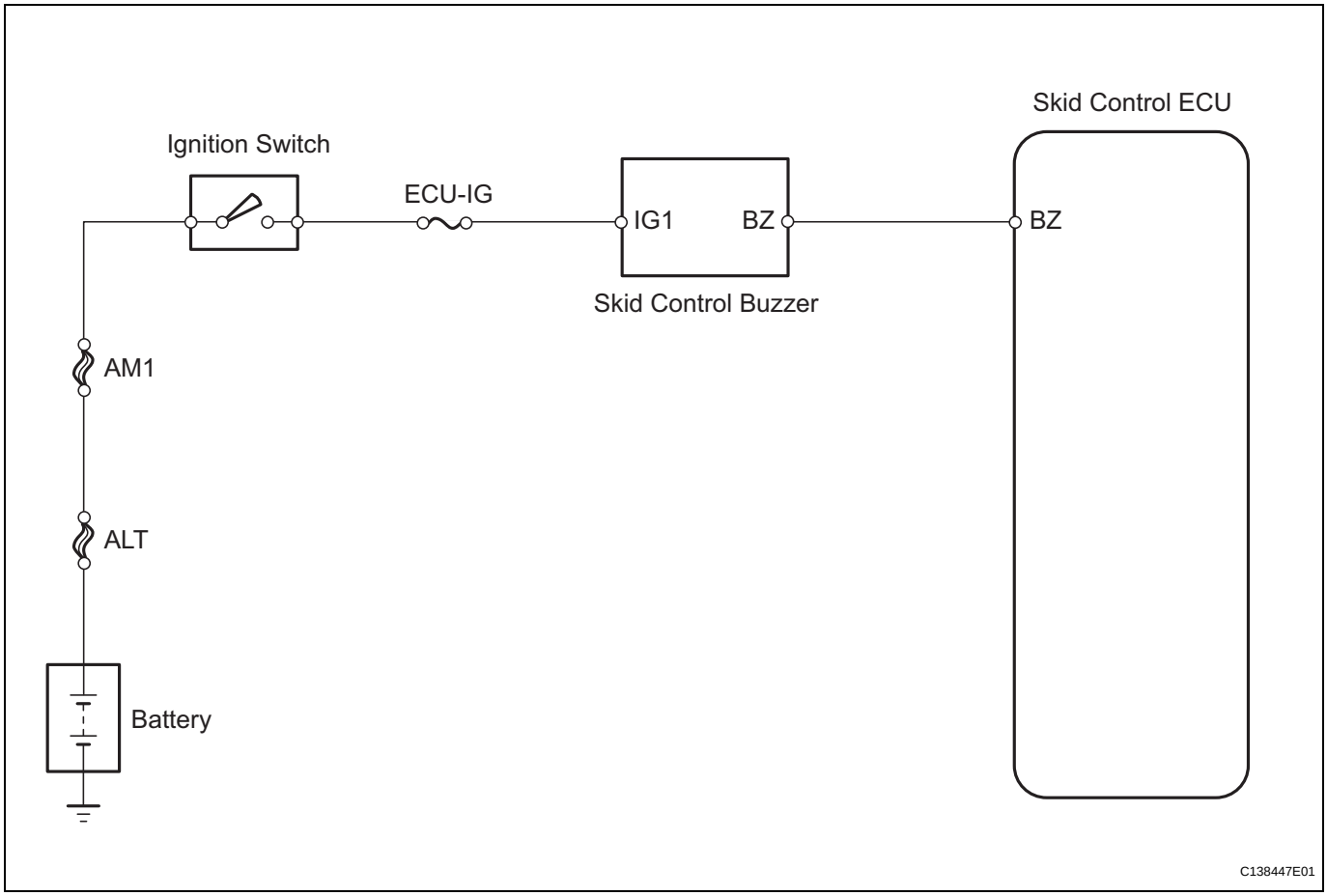
DESCRIPTION

The skid control buzzer sounds intermittently when the temperature of the actuator increases excessively during TRAC or A-TRAC system operation.

BC

This buzzer sounds continuously when a low pressure malfunction occurs in the accumulator.

WIRING DIAGRAM

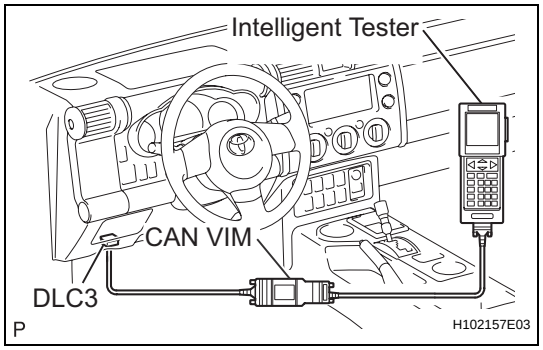


INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1 PERFORM ACTIVE TEST USING INTELLIGENT TESTER (SKID CONTROL BUZZER)



(a) Connect the intelligent tester to the DLC3.
(b) Start the engine.
(c) Select the item "VSC/BR WARN BUZ" in the ACTIVE TEST and operate the skid control buzzer on the intelligent tester.
Select the following menu items: DIAGNOSIS / OBD/ MOBD /select vehicle / ABS/VSC / ACTIVE TEST.

BC

ACTIVE TEST: ABS/VSC

Item	Vehicle Condition / Test Details	Diagnostic note
VSV / BR WARN BUZ	Turns skid control buzzer ON and OFF	Buzzer can be heard

(d) Check that the buzzer sounds/stops when the skid control buzzer is turned on/off by using the intelligent tester.

Result

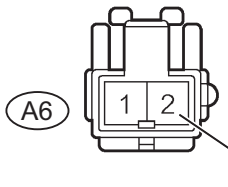
Result	Proceed to
Buzzer does not sound or sounds constantly	A
Buzzer sounds/stops	B

B → CHECK FOR INTERMITTENT PROBLEMS

A

2 INSPECT SKID CONTROL BUZZER (POWER SOURCE CIRCUIT)

Skid Control Buzzer (harness side connector):



(a) Disconnect the skid control buzzer connector.
(b) Turn the ignition switch on.
(c) Measure the voltage.
Standard voltage

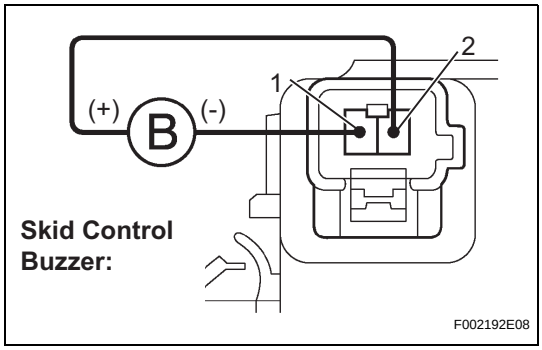
Tester Connection	Specified Condition
A6-2 (IG1) - Body ground	11 to 14 V

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

OK

BC

3	INSPECT SKID CONTROL BUZZER ASSEMBLY

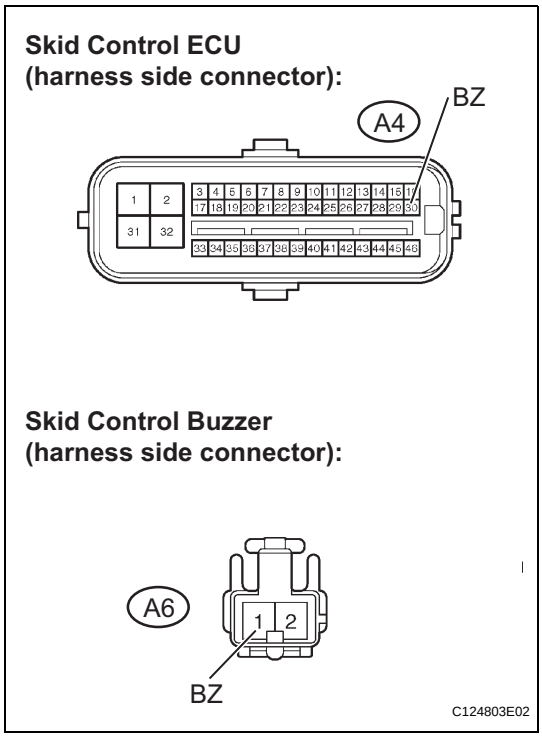


(a) Disconnect the skid control buzzer connector.
(b) Apply battery voltage to terminals 1 and 2 of the skid control buzzer connector, and check that the buzzer sounds.
OK:
The skid control buzzer sound should be heard.

NG → **REPLACE SKID CONTROL BUZZER ASSEMBLY**

OK

4	CHECK HARNESS AND CONNECTOR (SKID CONTROL BUZZER - SKID CONTROL ECU)



(a) Disconnect the skid control ECU connector.
(b) Disconnect the skid control buzzer connector.
(c) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
A4-30 (BZ) - A6-1 (BZ)	Below 1 Ω
A4-30 (BZ) - Body ground	10 kΩ or higher

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

OK

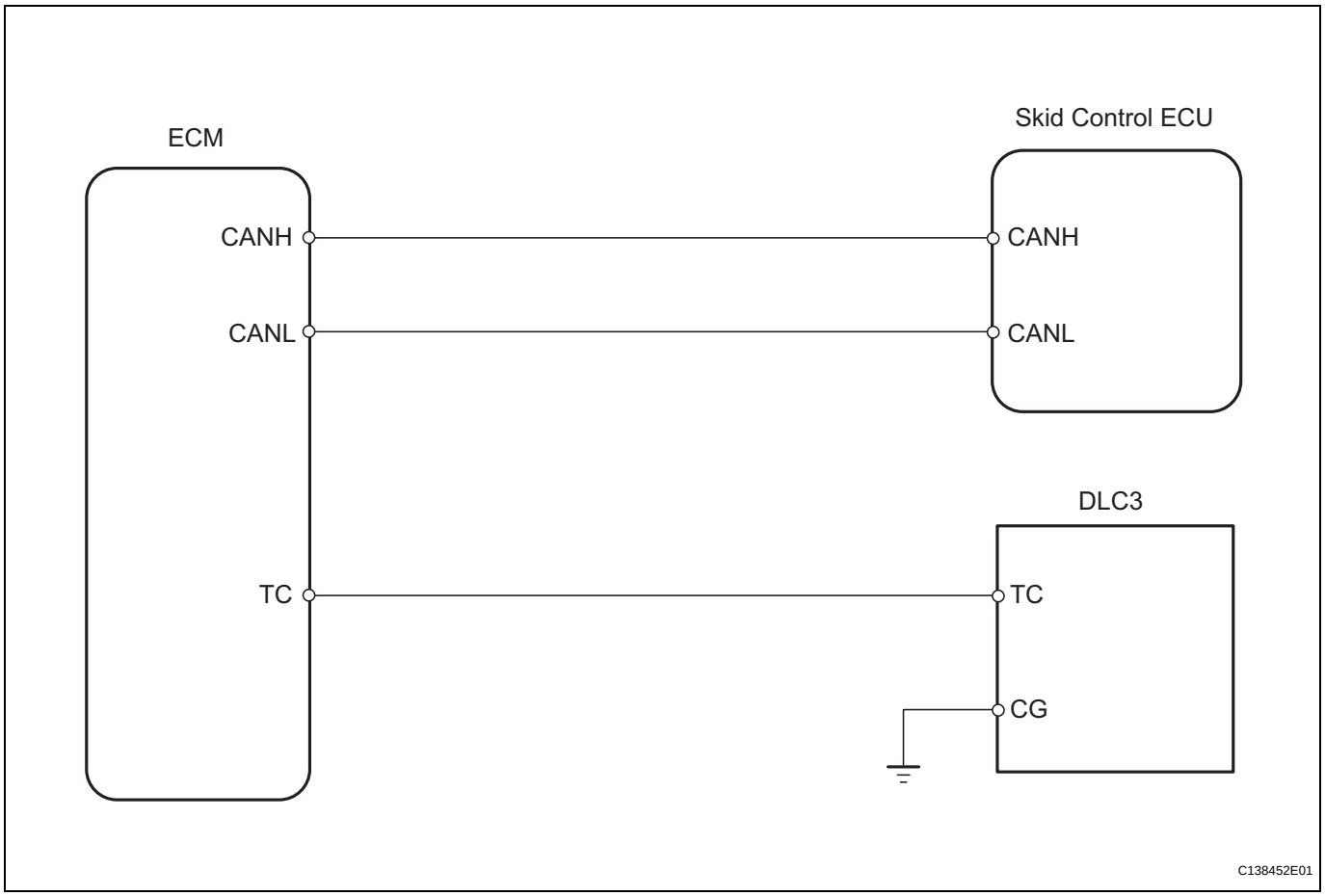
REPLACE MASTER CYLINDER SOLENOID

TC and CG Terminal Circuit

DESCRIPTION

Connecting terminals TC and CG of the DLC3 causes the ECU to display 2-digit DTCs by blinking the ABS and VSC TRAC warning lights.

WIRING DIAGRAM

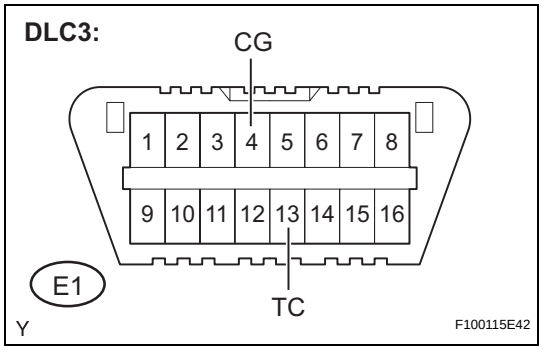


INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform the zero point calibration (See page BC-24).

1	INSPECT DLC3 TERMINAL VOLTAGE (TC)



(a) Turn the ignition switch on.
(b) Measure the voltage.

Standard voltage

Tester Connection	Specified Condition
E1-13 (TC) - E1-4 (CG)	11 to 14 V

NG	Go to step 3

OK

2	CHECK CAN COMMUNICATION SYSTEM

BC

(a) Check whether CAN communication DTC(s) is output (See page CA-14).

Result

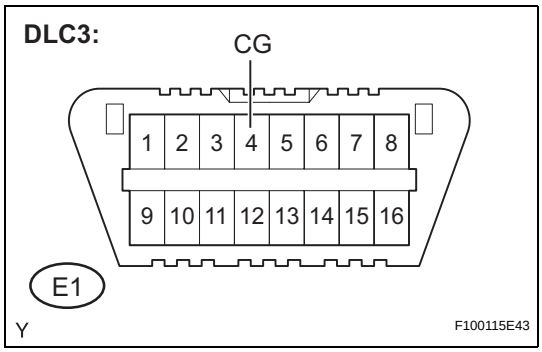
Result	Proceed to
DTC not output	A
DTC output	B

B → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

A

REPLACE MASTER CYLINDER SOLENOID

3	CHECK HARNESS AND CONNECTOR (DLC3 - BODY GROUND)



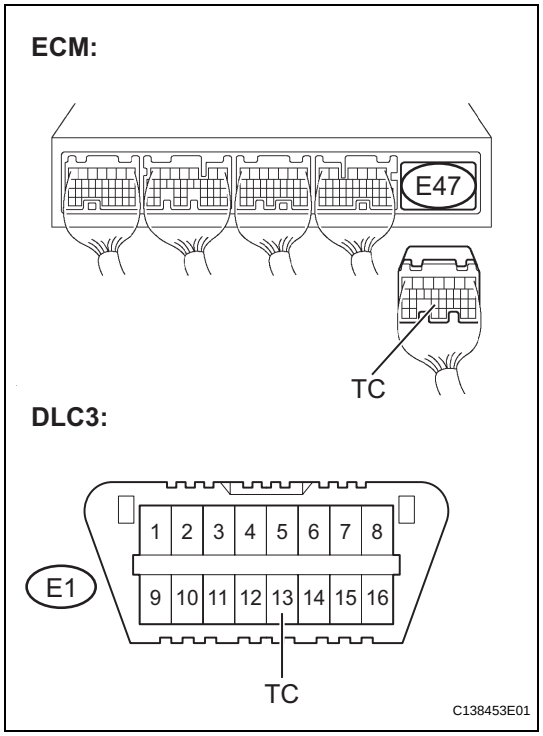
(a) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
E1-4 (CG) - Body ground	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR (ECM - DLC3)



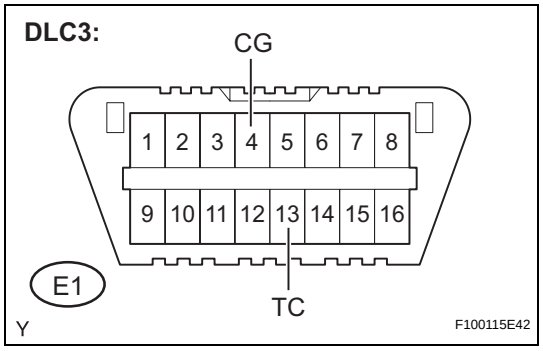
(a) Disconnect the ECM connector.
(b) Measure the resistance.
Standard resistance

Tester Connection	Specified Condition
E47-23 (TC) - E1-13 (TC)	Below 1 Ω
E1-13 (TC) - Body ground	10 kΩ or higher

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

OK

5 CHECK ECM (DLC3 INPUT)



(a) Connect terminals TC and CG of the DLC3.
(b) Turn the ignition switch on.
(c) Check that the MIL is blinking.
OK:
MIL is blinking.

NG → **REPLACE ECM**

OK

REPLACE MASTER CYLINDER SOLENOID

BC

TS and CG Terminal Circuit

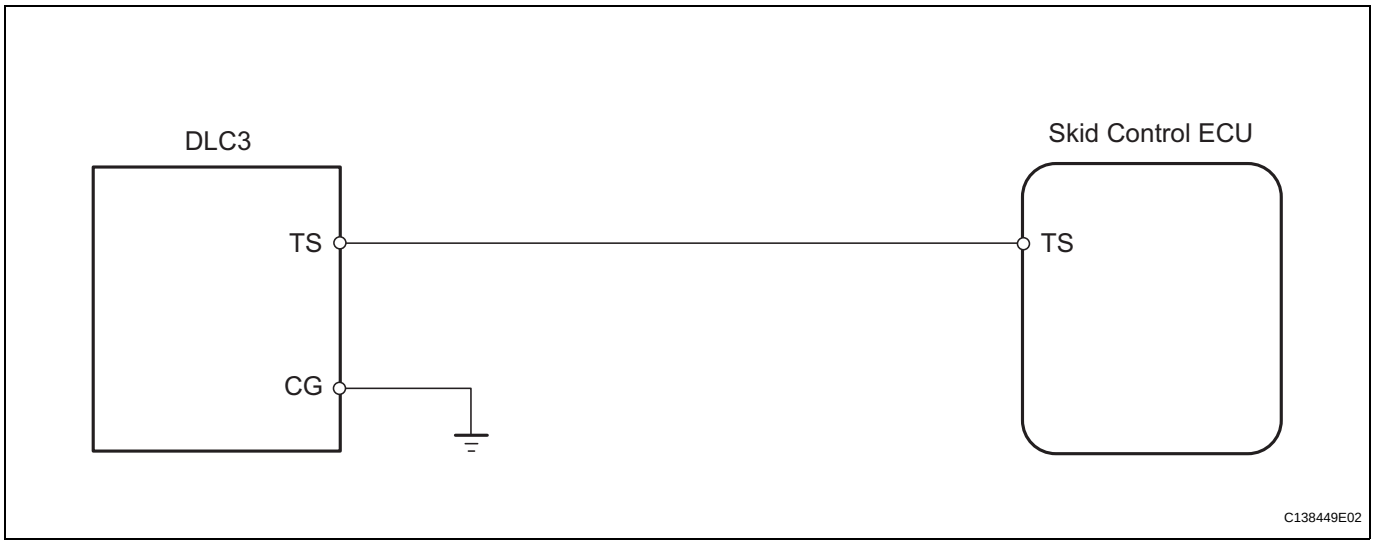
DESCRIPTION

In sensor check mode, malfunctions of the speed sensor that cannot be detected when the vehicle is stopped are detected while driving.

BC

Transition to the sensor check mode can be performed by connecting terminals TS and CG of the DLC3 and turning the ignition switch from OFF to ON.

WIRING DIAGRAM

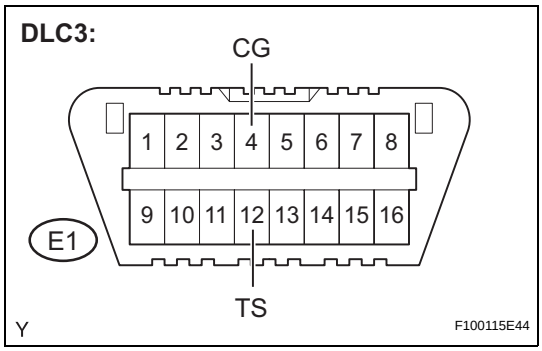


INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (See page BC-24).

1	INSPECT DLC3 TERMINAL VOLTAGE (TS)



(a) Turn the ignition switch on.

(b) Measure the voltage.

Standard voltage

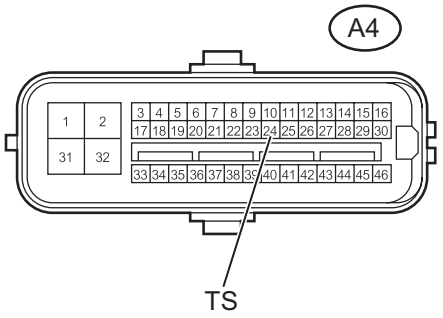
Tester Connection	Specified Condition
E1-12 (TS) - E1-4 (CG)	11 to 14 V

OK → **REPLACE MASTER CYLINDER SOLENOID**

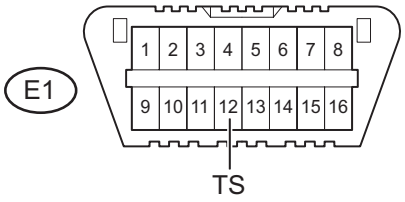
NG

2 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DLC3)

Skid Control ECU (harness side connector):



DLC3:



C138450E02

(a) Disconnect the skid control ECU connector.
(b) Measure the resistance.
Standard resistance

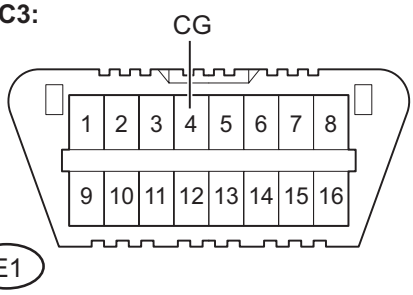
Tester Connection	Specified condition
A4-24 (TS) - E1-12 (TS)	Below 1 Ω
A4-24 (TS) - Body ground	10 kΩ or higher

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

OK

3 CHECK HARNESS AND CONNECTOR (BODY GROUND - DLC3)

DLC3:



Y

F100115E43

(a) Measure the resistance.
Standard resistance

Tester Connection	Specified condition
E1 (CG) - Body ground	Below 1 Ω

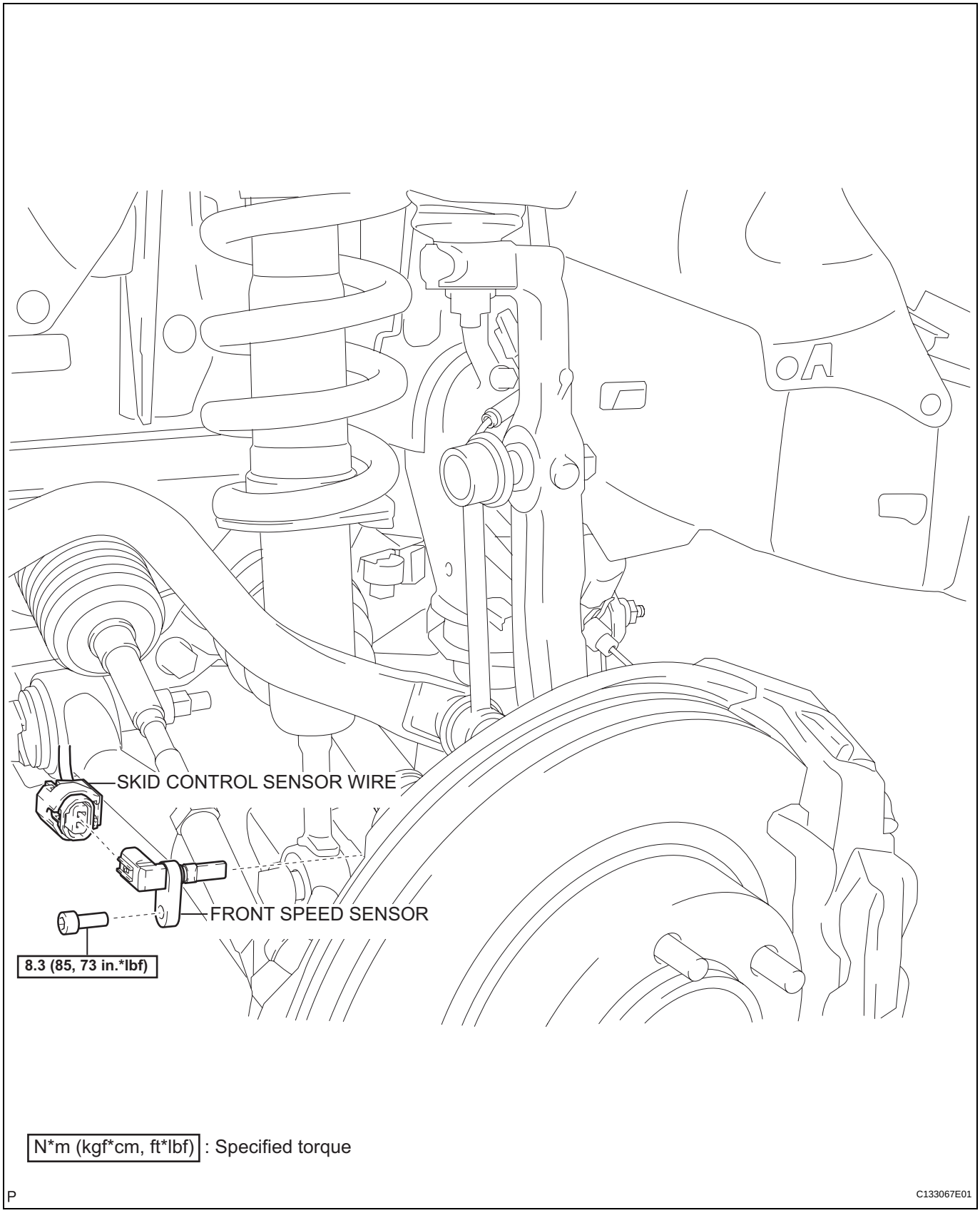
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASTER CYLINDER SOLENOID

FRONT SPEED SENSOR

COMPONENTS



BC

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

2. REMOVE FRONT WHEEL

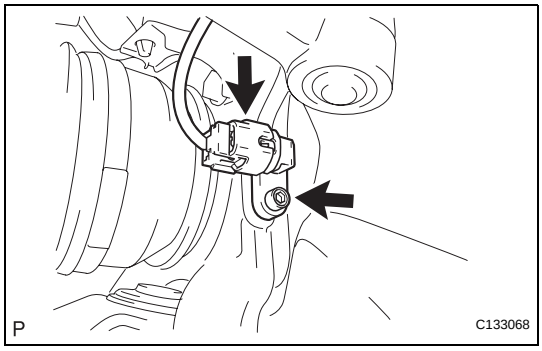
3. REMOVE FRONT SPEED SENSOR

(a) Disconnect the skid control sensor wire.

(b) Using a 5 mm hexagon wrench, remove the bolt and the front speed sensor.

NOTICE:

- **Do not attach any foreign matter to the sensor tip.**
- **Ensure that no foreign matter enters the sensor installation part.**



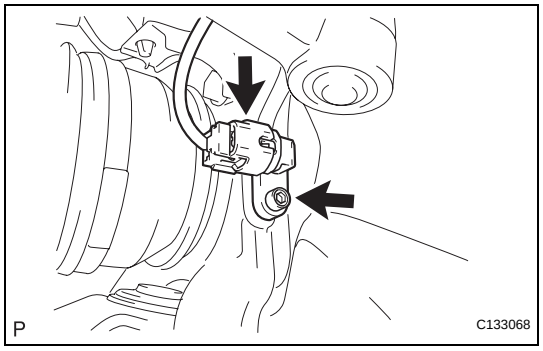
INSPECTION

1. INSPECT FRONT SPEED SENSOR

(a) Check the speed sensor.

If any of the following occurs, replace the speed sensor with a new one.

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



INSTALLATION

1. INSTALL FRONT SPEED SENSOR

(a) Using a 5 mm hexagon wrench, install the front speed sensor with the bolt.

Torque: 8.3 N*m (85 kgf*cm, 73 in.*lbf)

NOTICE:

Make sure that the sensor tip is clean.

(b) Connect the skid control sensor wire.

2. INSTALL FRONT WHEEL

Torque: 112 N*m (1,137 kgf*cm, 82 ft.*lbf)

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

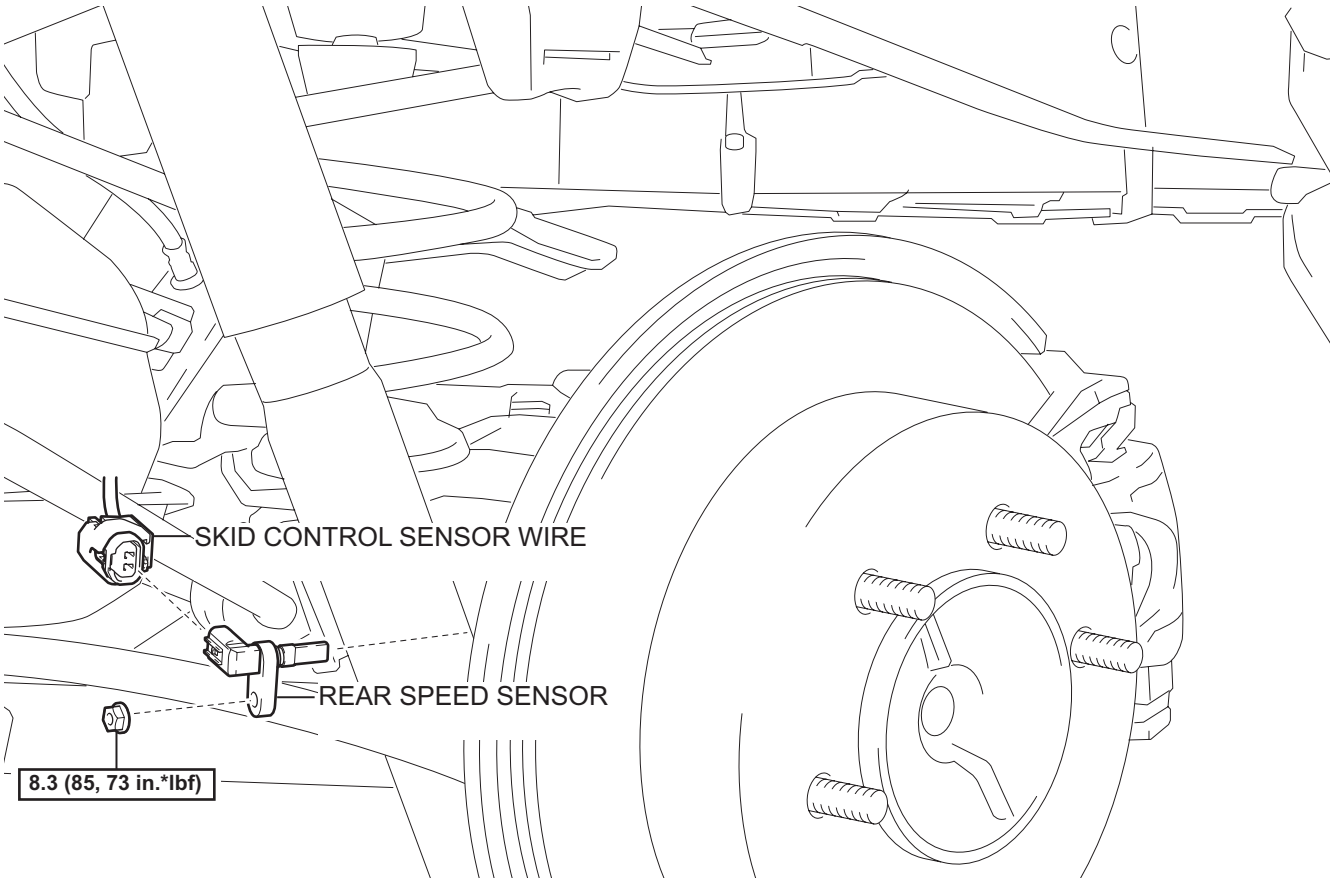
Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

4. CHECK VSC SENSOR SIGNAL

(See page BC-28)

REAR SPEED SENSOR

COMPONENTS



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

P

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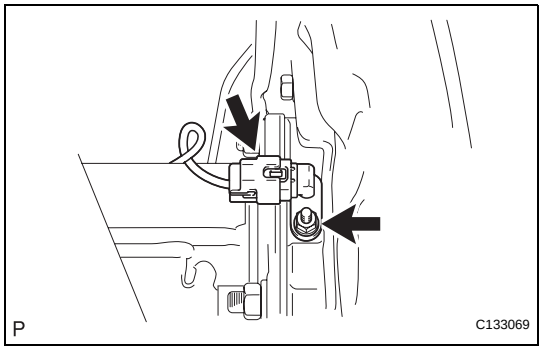
BC



REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE REAR WHEEL**
3. **REMOVE REAR SPEED SENSOR**
   (a) Disconnect the skid control sensor wire.
   (b) Remove the nut and rear speed sensor.
   NOTICE:
   - **Do not attach any foreign matter to the sensor tip.**
   - **Ensure that no foreign matter enters the sensor installation part.**

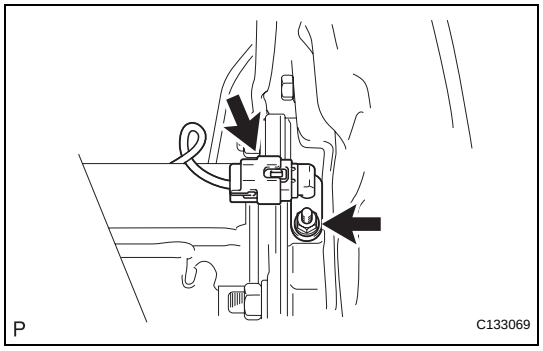
INSPECTION

1. INSPECT REAR SPEED SENSOR

(a) Check the speed sensor.

If any of the following occurs, replace the speed sensor with a new one.

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



INSTALLATION

1. INSTALL REAR SPEED SENSOR

(a) Install the rear speed sensor with the nut.

Torque: 8.3 N*m (85 kgf*cm, 73 in.*lbf)

NOTICE:

Make sure that the sensor tip is clean.

(b) Connect the skid control sensor wire.

2. INSTALL REAR WHEEL

Torque: 112 N*m (1,137 kgf*cm, 82 ft.*lbf)

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

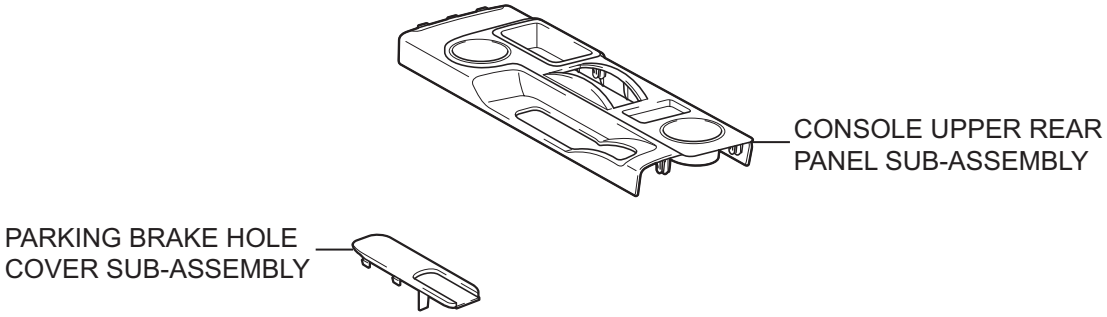
4. CHECK VSC SENSOR SIGNAL

(See page BC-28)

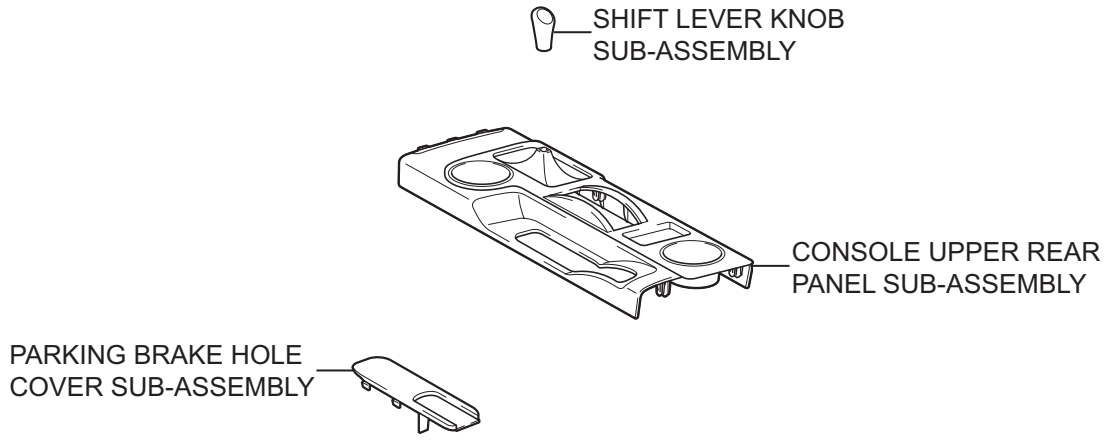
YAW RATE AND DECELERATION SENSOR

COMPONENTS

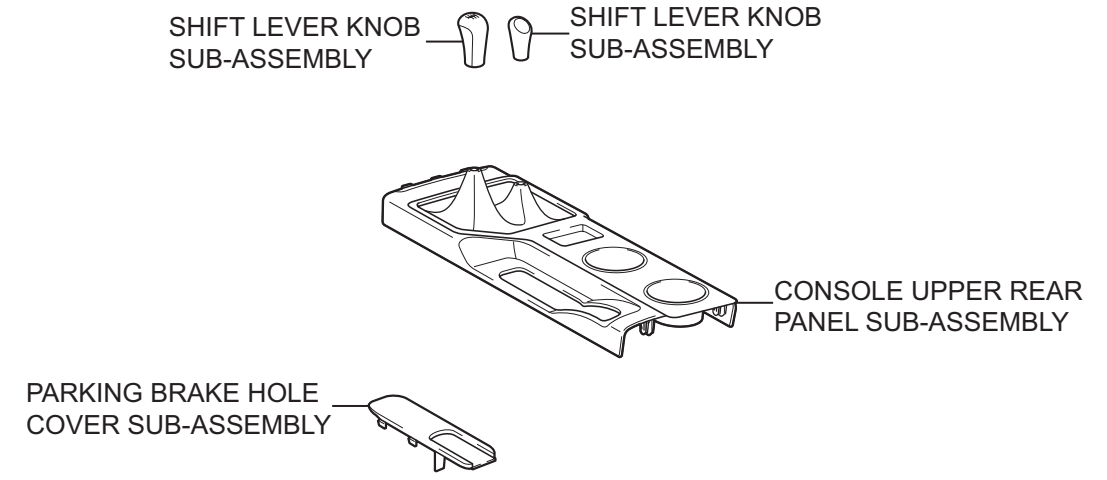
for Automatic Transmission 2WD:



for Automatic Transmission 4WD:



for Manual Transmission 4WD:

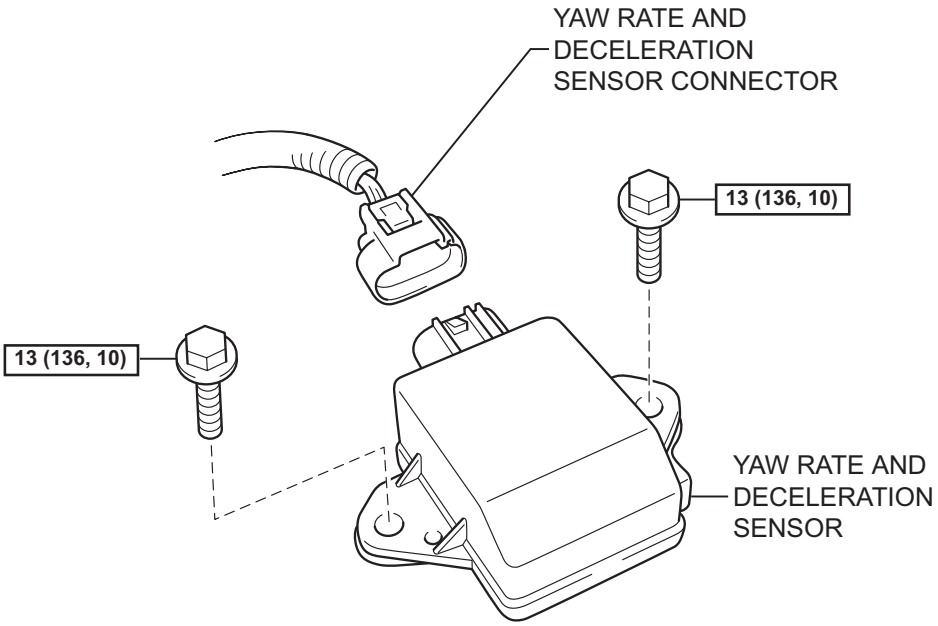


P

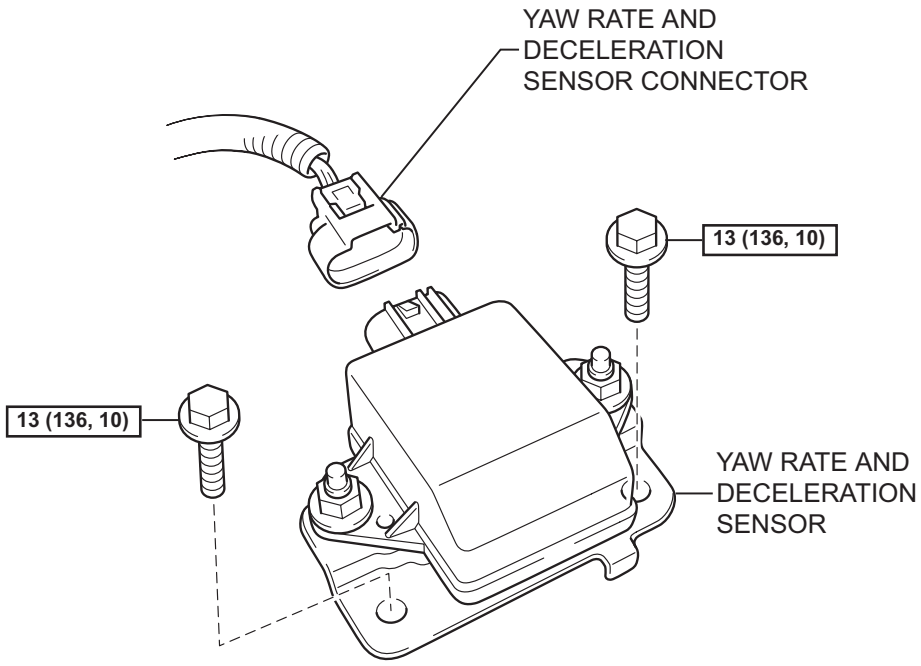
C133108E01

BC

for Automatic Transmission:



for Manual Transmission:



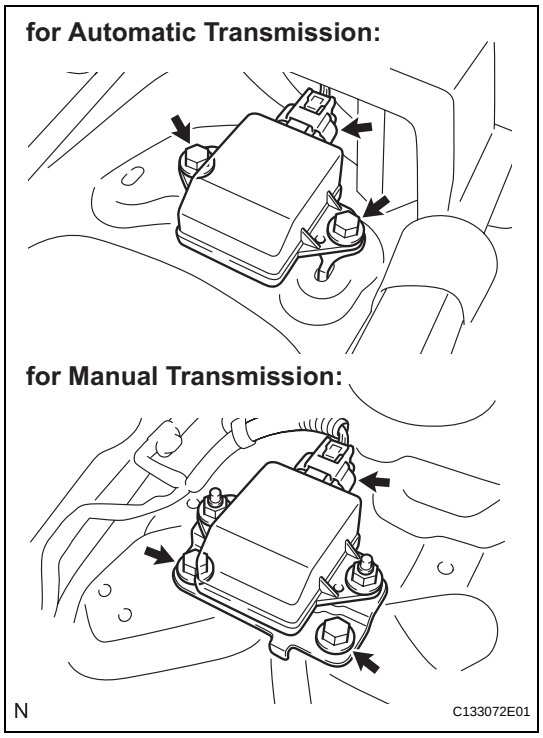
N*m (kgf*cm, ft*lbf) : Specified torque

N

C133071E01

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE PARKING BRAKE HOLE COVER SUB-ASSEMBLY (See page IP-11)**
3. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transmission) (See page IP-11)**
4. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for 4WD) (See page IP-11)**
5. **REMOVE CONSOLE UPPER REAR PANEL SUB-ASSEMBLY (See page IP-12)**
6. **REMOVE YAW RATE AND DECELERATION SENSOR**
   (a) Disconnect the yaw rate and deceleration sensor connector.
   (b) Remove the 2 bolts and remove the yaw rate and deceleration sensor.

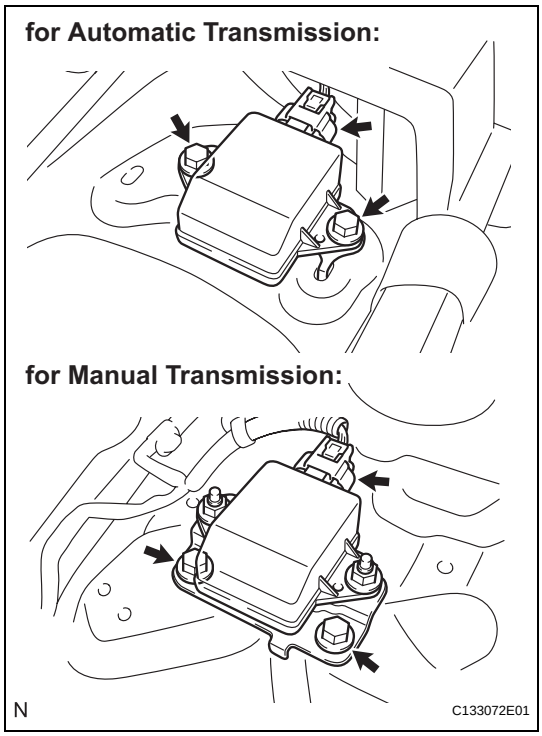


BC

INSPECTION

1. **INSPECT YAW RATE AND DECELERATION SENSOR**
   (a) Check the yaw rate and deceleration sensor.
   If any of the following occurs, replace the yaw rate and deceleration sensor with a new one.
   - The surface of the yaw rate and deceleration sensor is cracked, dented or chipped.
   - The connector is scratched, cracked, or damaged.
   - The yaw rate and deceleration sensor has been dropped.

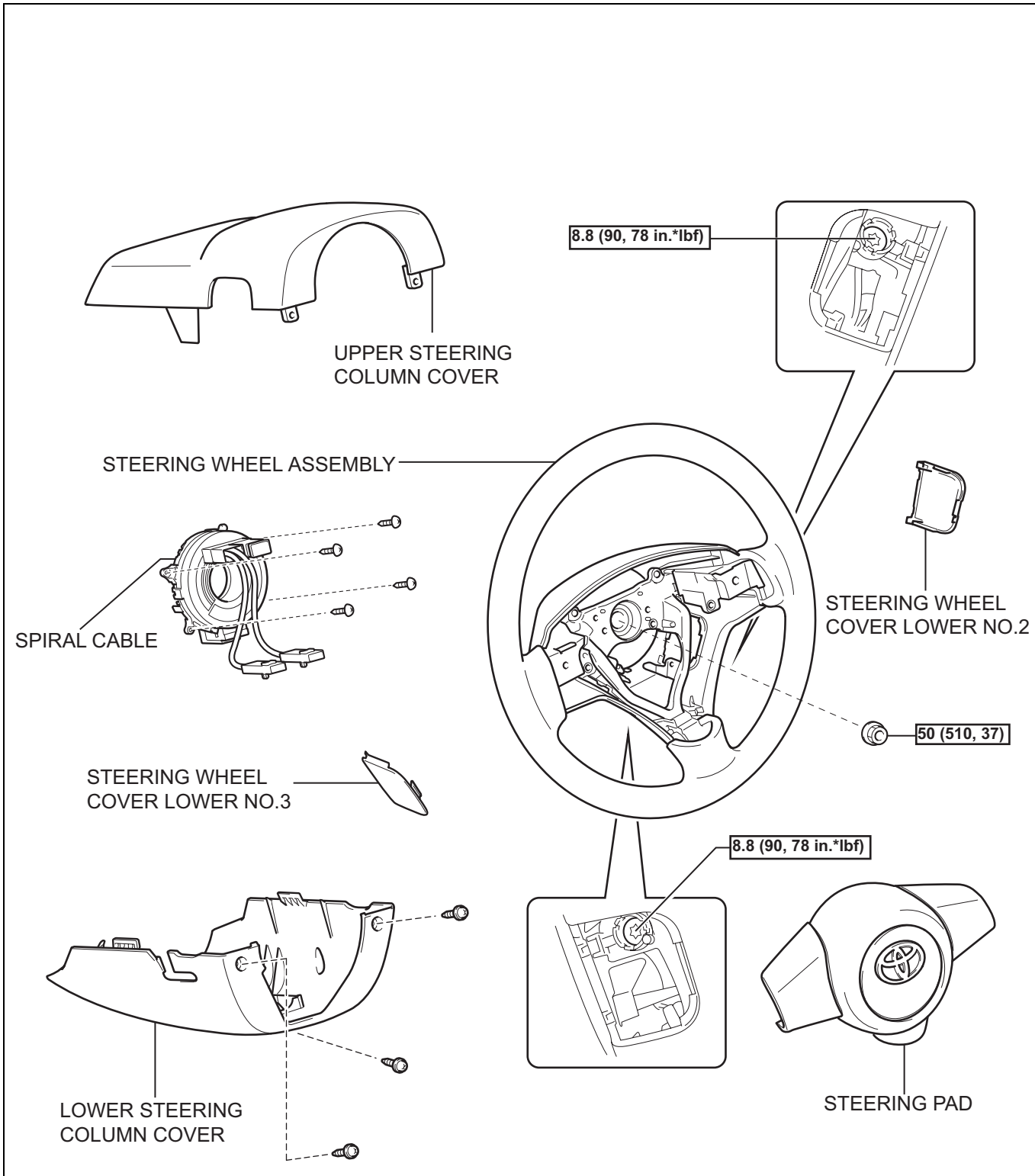
INSTALLATION



1. **INSTALL YAW RATE AND DECELERATION SENSOR**
   (a) Install the yaw rate and deceleration sensor with the 2 bolts.
   Torque: 13 N*m (136 kgf*cm, 10 ft.*lbf)
   NOTICE:
   Make sure that the sensor is at the correct angle when installing.
   (b) Connect the yaw rate and deceleration sensor connector.
2. **INSTALL CONSOLE UPPER REAR PANEL SUB-ASSEMBLY (See page IP-31)**
3. **INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for 4WD) (See page IP-32)**
4. **INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transmission) (See page IP-32)**
5. **INSTALL PARKING BRAKE HOLE COVER SUB-ASSEMBLY (See page IP-32)**
6. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
   Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)
7. **PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION**
   (See page BC-24)
8. **CHECK VSC SENSOR SIGNAL**
   (See page BC-28)

STEERING ANGLE SENSOR

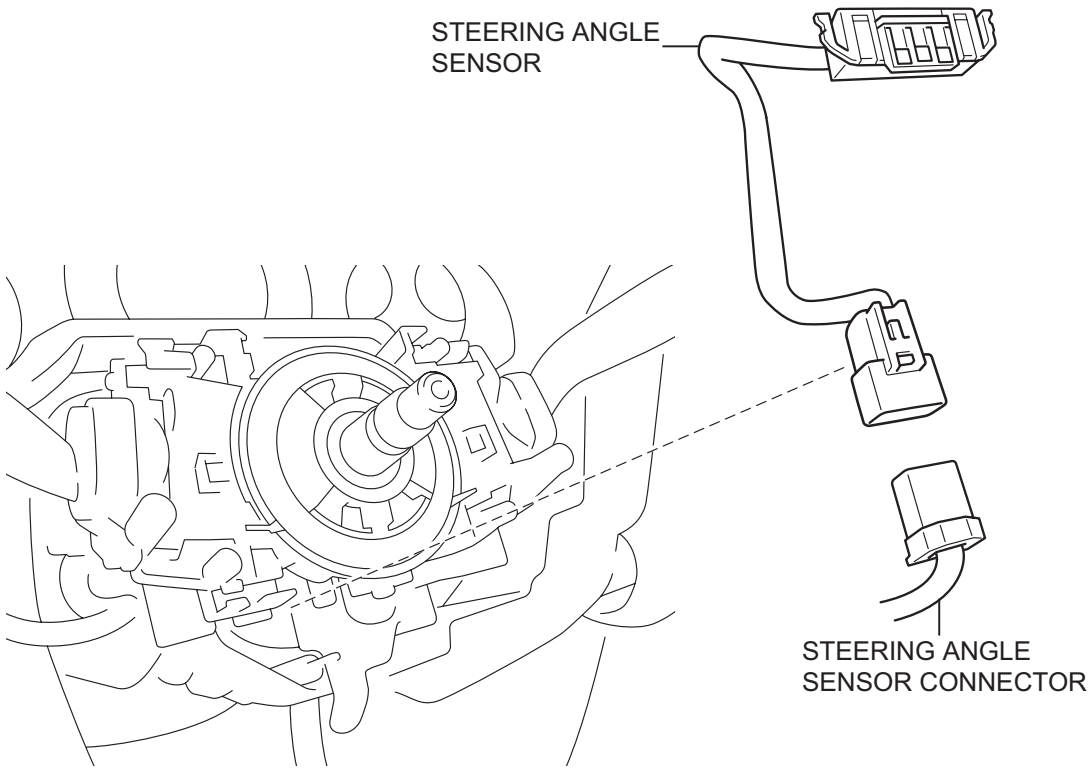
COMPONENTS



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

C128334E01

BC

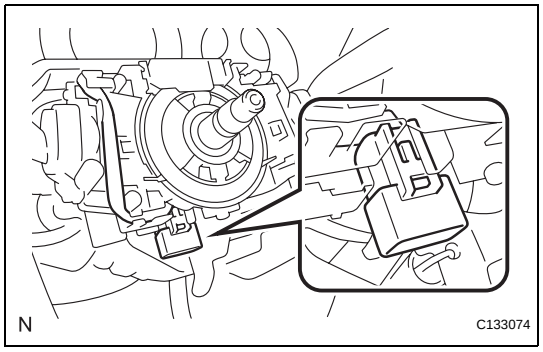


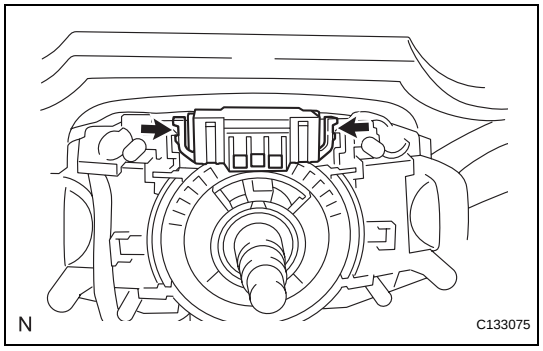
N

C133073E01

REMOVAL

1. **PRECAUTION**
   (See page RS-1)
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
4. **REMOVE STEERING WHEEL COVER LOWER NO.3 (See page RS-345)**
5. **REMOVE STEERING WHEEL COVER LOWER NO.2 (See page RS-345)**
6. **REMOVE STEERING PAD (See page RS-346)**
7. **REMOVE STEERING WHEEL ASSEMBLY (See page SR-8)**
8. **REMOVE LOWER STEERING COLUMN COVER (See page SR-8)**
9. **REMOVE UPPER STEERING COLUMN COVER (See page SR-8)**
10. **REMOVE SPIRAL CABLE (See page RS-357)**
11. **REMOVE STEERING ANGLE SENSOR**
    (a) Disconnect the steering angle sensor connector.
    (b) Disengage the claw and disconnect the steering angle sensor connector and harness.





(c) Disengage the 2 claws and remove the steering angle sensor.

INSPECTION

1. INSPECT STEERING ANGLE SENSOR

(a) Check the steering angle sensor.

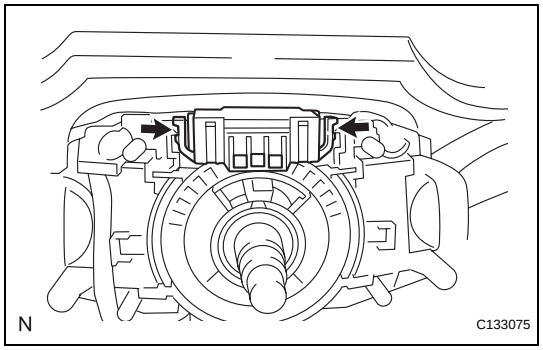
If any of the following occurs, replace the steering angle sensor with a new one.

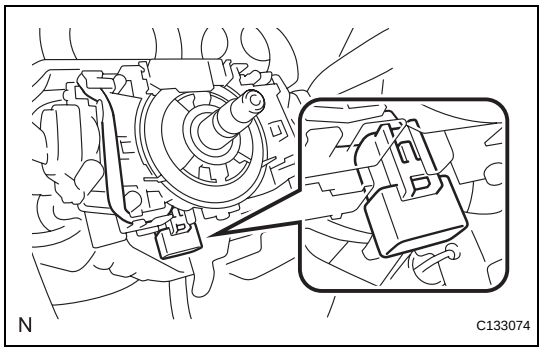
- The surface of the steering angle sensor is cracked, dented or chipped.
- The connector is scratched, cracked, or damaged.
- The steering angle sensor has been dropped.

INSTALLATION

1. **PRECAUTION**
   (See page RS-1)

2. **INSTALL STEERING ANGLE SENSOR**
   (a) Install the steering angle sensor.





   (b) Connect the harness and steering angle sensor connector.
   (c) Connect the steering sensor connector.

3. **INSTALL SPIRAL CABLE (See page RS-358)**

4. **INSTALL UPPER STEERING COLUMN COVER (See page SR-17)**

5. **INSTALL LOWER STEERING COLUMN COVER (See page SR-18)**

6. **ADJUST SPIRAL CABLE (See page RS-359)**

7. **INSTALL STEERING WHEEL ASSEMBLY (See page SR-18)**

8. **INSPECT STEERING WHEEL CENTER POINT**

9. **INSTALL STEERING PAD (See page RS-346)**

10. **INSTALL STEERING WHEEL COVER LOWER NO.2 (See page RS-347)**

11. **INSTALL STEERING WHEEL COVER LOWER NO.3 (See page RS-347)**

12. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
    Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

13. **INSPECT STEERING PAD (See page RS-347)**

14. **PERFORM INITIALIZATION**
    (See page IN-31)

15. **INSPECT SRS WARNING LIGHT**
    (See page RS-29)