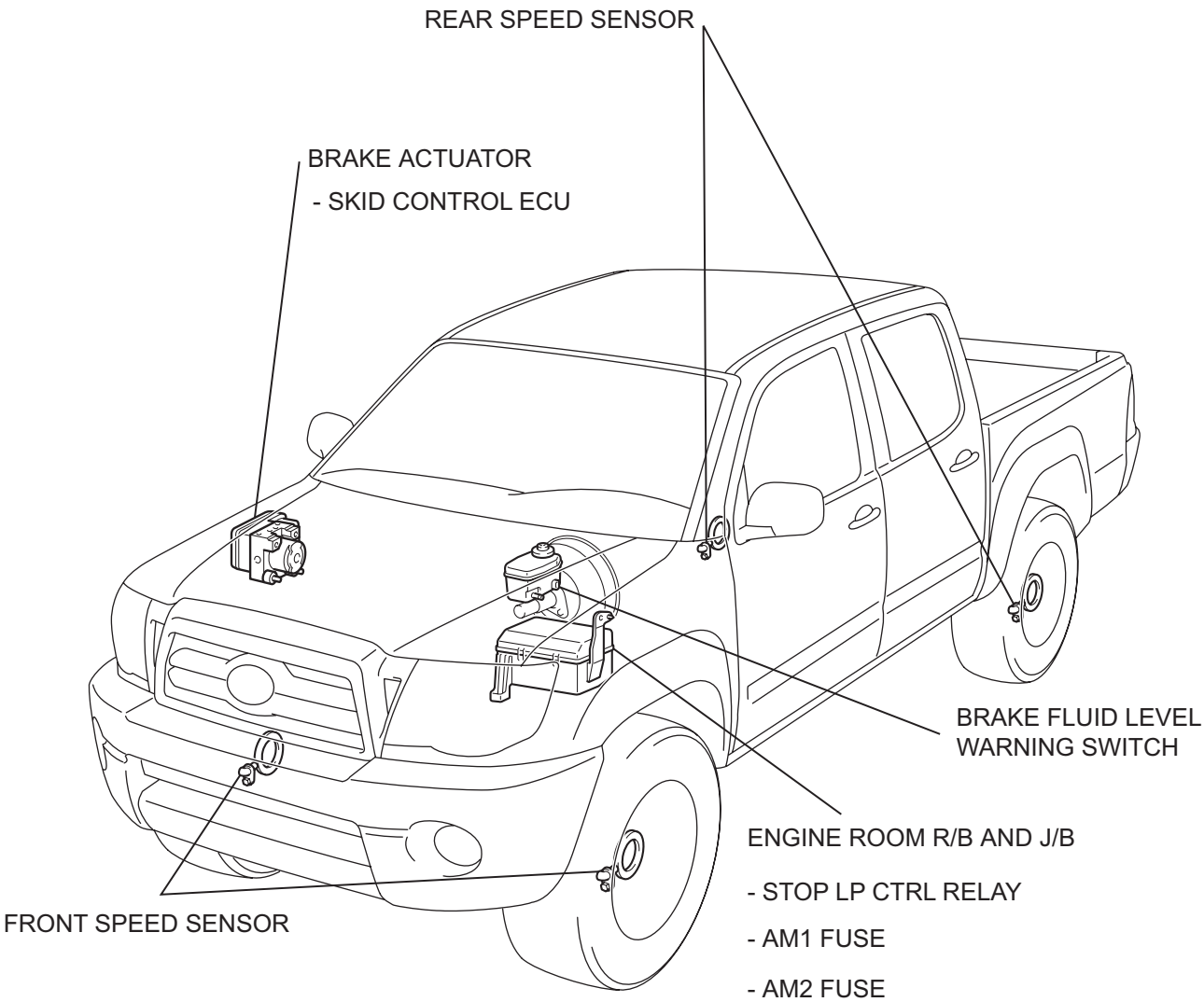
ANTI-LOCK BRAKE SYSTEM

PRECAUTION

- When there is a malfunction in the contact point of the terminals or installation problems with any parts, removal and reinstallation of the suspected problem parts may return the system to the normal condition either completely or temporarily.
- In order to determine the location of the malfunction, be sure to check the 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.
- Be sure to remove and install the brake actuator and each sensor with the ignition switch off, unless specified in the inspection procedures.
- When removing and installing the brake actuator assembly and each sensor, be sure to check that the normal display is output during a test mode inspection and a DTC output inspection after installing all the parts.

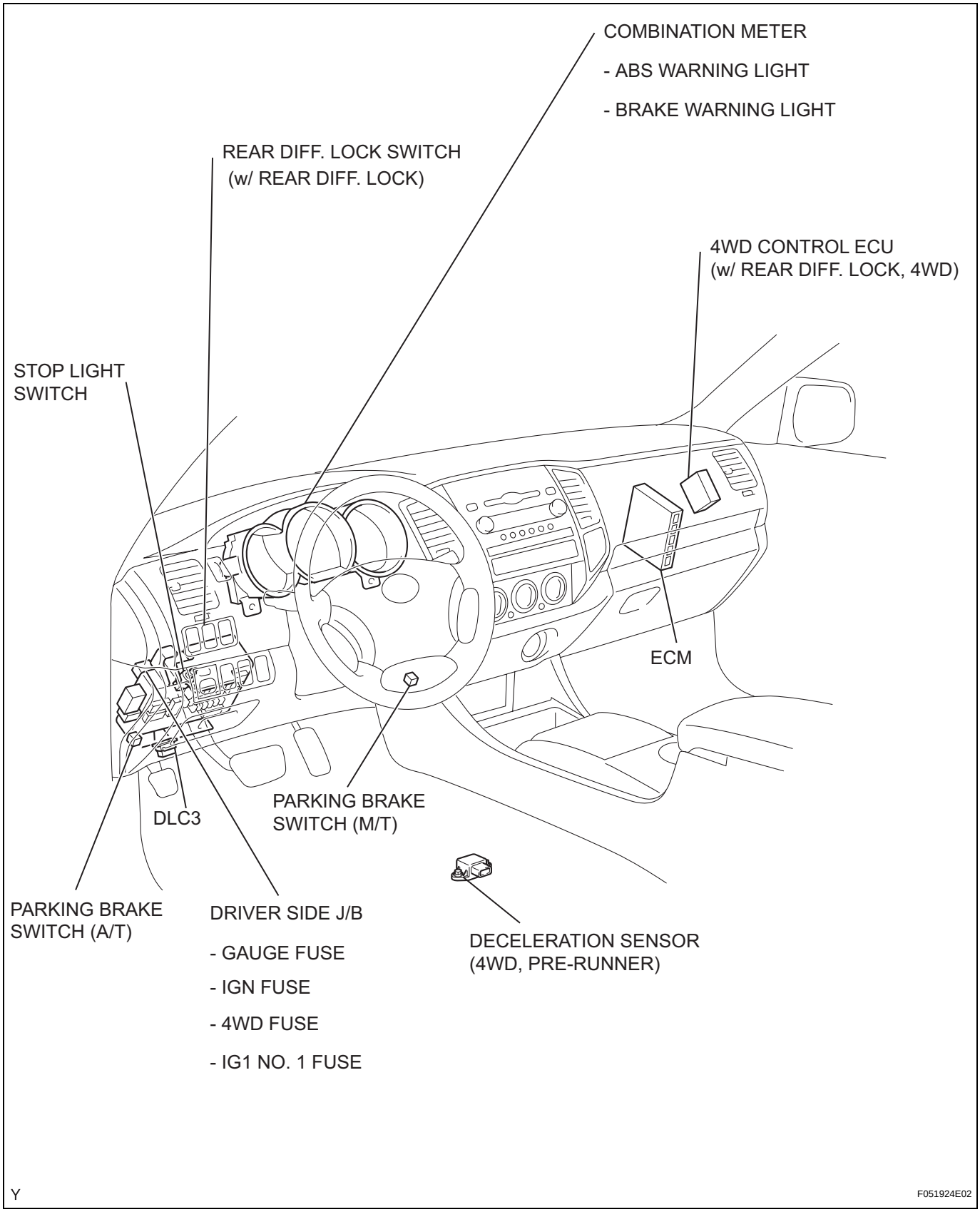
PARTS LOCATION



BC

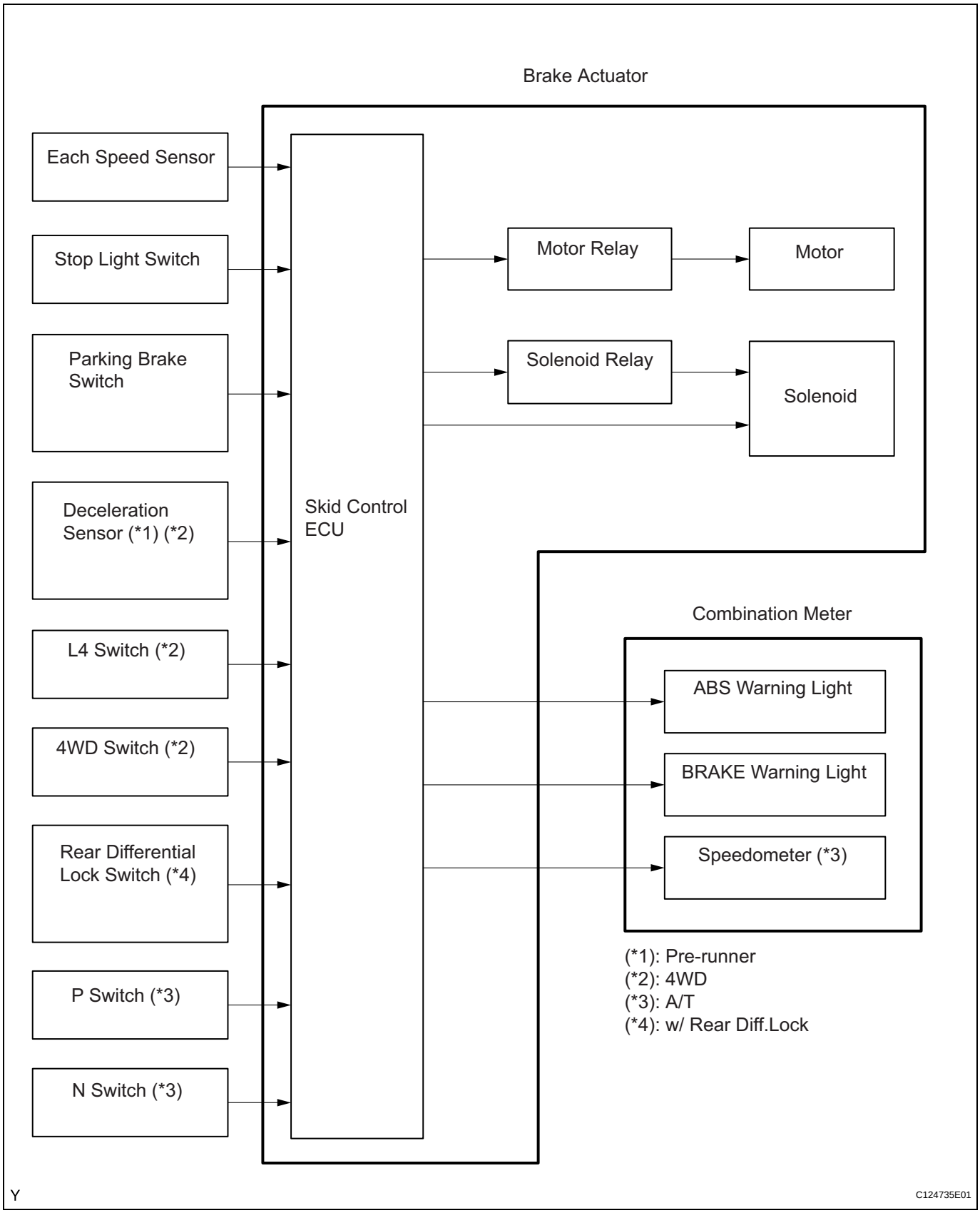
Y

F051923E02


COMBINATION METER
- ABS WARNING LIGHT
- BRAKE WARNING LIGHT
REAR DIFF. LOCK SWITCH
(w/ REAR DIFF. LOCK)
4WD CONTROL ECU
(w/ REAR DIFF. LOCK, 4WD)
STOP LIGHT
SWITCH
ECM
DLC3
PARKING BRAKE
SWITCH (M/T)
PARKING BRAKE
SWITCH (A/T)
DRIVER SIDE J/B
- GAUGE FUSE
- IGN FUSE
- 4WD FUSE
- IG1 NO. 1 FUSE
DECELERATION SENSOR
(4WD, PRE-RUNNER)
Y
F051924E02

BC

SYSTEM DIAGRAM



BC

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

HINT:

The skid control ECU is a single unit with brake actuator.

(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.

(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. In addition, when braking while cornering, it also controls the brake forces of the right and left wheels, helping to maintain the vehicle behavior.

2. ABS with EBD OPERATION

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

3. FAIL SAFE FUNCTION

(a) When a failure occurs in the ABS system, the ABS warning light comes on and its operation is prohibited.

In addition to this, when a failure which disables the EBD operation occurs, the brake warning light comes on as well and operation is prohibited (See page BC-19).

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
The intelligent tester can be used at step 3, 6, 9, 12.

1 **VEHICLE BROUGHT TO WORKSHOP**

NEXT

2 **CUSTOMER PROBLEM ANALYSIS**

NEXT

3 **DTCS AND FREEZE FRAME DATA CHECK AND CLEARANCE**

HINT:
See page BC-18 and BC-16

NEXT

4 **PROBLEM SYMPTOM CONFIRMATION**

Result	Proceed to
Symptom occurs	A
Symptom does not occur	B

B → **SYMPTOM SIMULATION**

A

5 **DTC CHECK**

HINT:
See page BC-16

Result	Proceed to
DTC output	A
DTC not output	B

B → **PROBLEM SYMPTOMS TABLE**

A

6 **DTC CHART**

HINT:
See page BC-22

NEXT

7	**CIRCUIT INSPECTION**

HINT:
When 2 or more DTCs are recorded, and the problem cannot be identified, perform circuit inspection of the other DTCs.

NEXT

8	**PROBLEM IDENTIFICATION**

NEXT

9	**REPAIR OR REPLACEMENT**

NEXT

10	**CONFIRMATION TEST**

NEXT

END

TEST MODE PROCEDURE

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

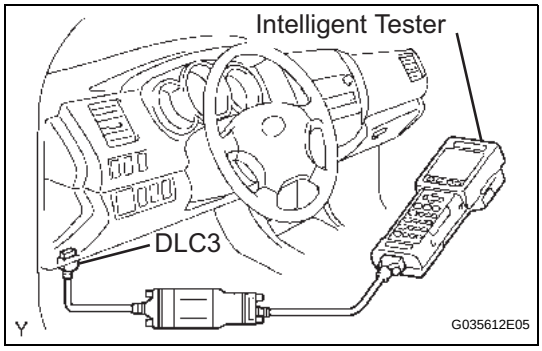
HINT:

- 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 to 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.

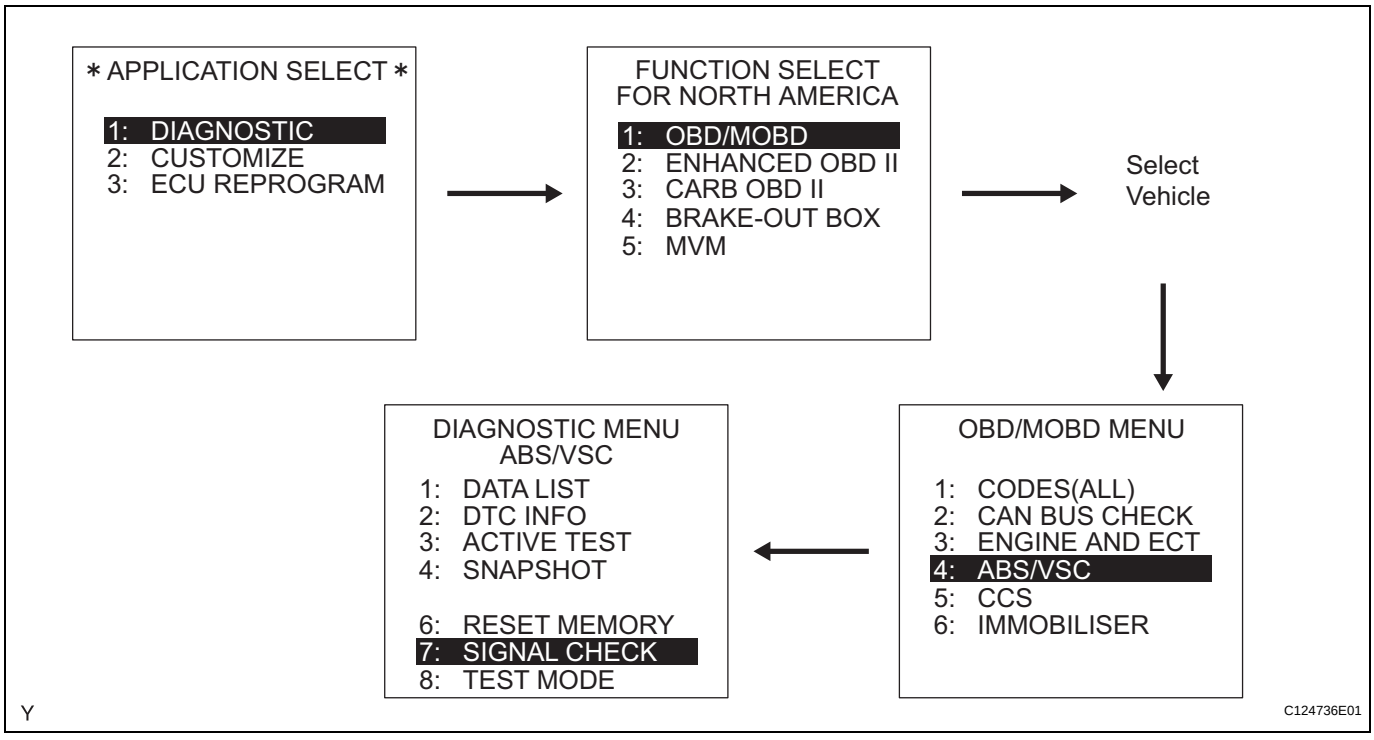


(d) Connect the intelligent tester to the DLC3.

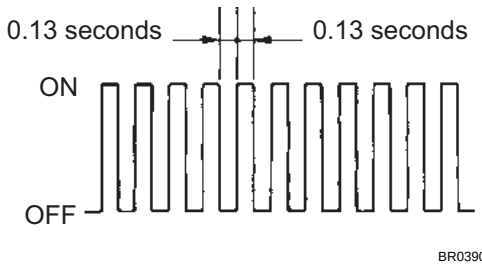
(e) Turn the ignition switch to the ON position.

(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.

BC



Blinking pattern in TEST MODE:



(g) Check that the ABS warning light blinks as shown in the illustration.
HINT:
If the ABS warning light does not blink, inspect the ABS warning light circuit and the TS and CG terminal circuit.

Trouble Areas	See Page
ABS warning light circuit	BC-64 BC-68
TS and CG terminal circuit	BC-78

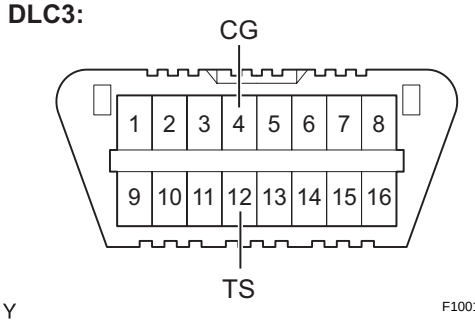
(h) Start the engine.
(i) Active the ABS sensor (deceleration sensor, 4WD detection switch, L4 detection switch and speed sensor) in test mode (SIGNAL CHECK) using intelligent tester.

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

HINT:
- 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.

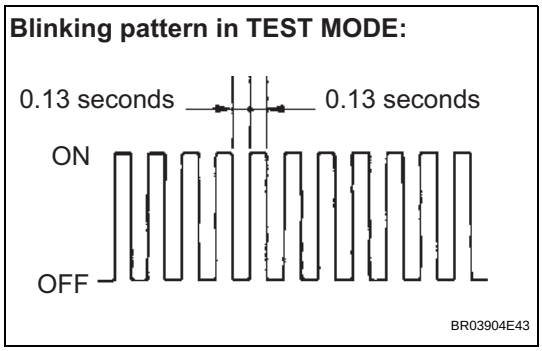
(a) Turn the ignition switch to OFF.
(b) Check that the steering wheel is in the straight-ahead position.
(c) A/T: Check that the shift lever is in the P position and apply the parking brake.
M/T: Check that the shift lever is in neutral and apply the parking brake.

DLC3:



(d) Using SST, connect terminals TS and CG of the DLC3.
SST 09843-18040
(e) Turn the ignition switch to the ON position.

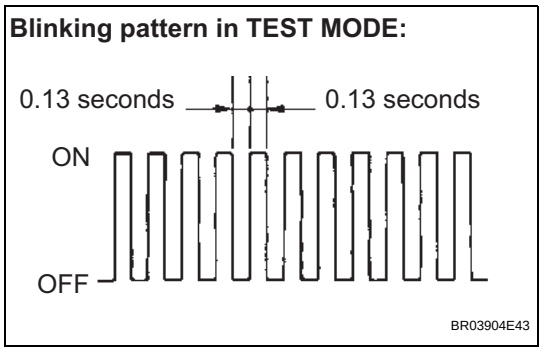
BC



(f) Check that the ABS warning light is blinking as shown in the illustration.
HINT:
If the ABS warning light does not blink, inspect the ABS warning light circuit and TS and CG terminal circuit.

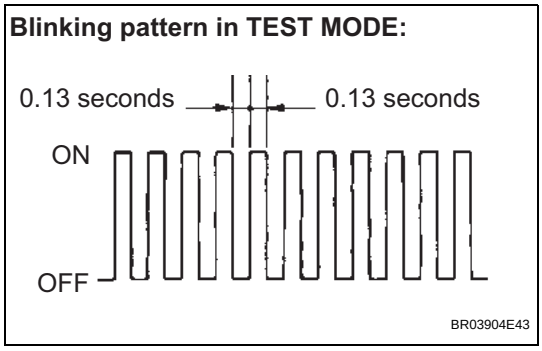
Trouble Areas	See Page
ABS warning light circuit	BC-64 BC-68
TS and CG terminal circuit	BC-78

(g) Start the engine.
(h) Activate the ABS sensor (deceleration sensor, 4WD detection switch, L4 detection switch and speed sensor) in test mode (SIGNAL CHECK) using a check wire.



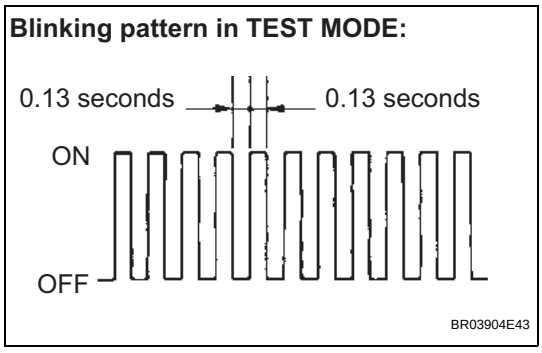
3. DECELERATION SENSOR SIGNAL CHECK (for 4WD and Pre-runner)

(a) Check that the ABS warning light is blinking as shown in the illustration.
(b) Keep the vehicle stationary on a level surface for 1 second or more.



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

(a) Check that the ABS warning light is blinking as shown in the illustration.
(b) Check the transfer indicator switch (4WD position).
(1) Push the 4 wheel drive control switch on to put the vehicle in 4WD mode.
(2) Push the 4 wheel drive control switch off to put the vehicle in 2WD mode.

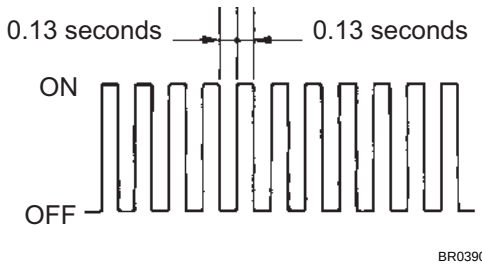


5. L4 DETECTION SWITCH SIGNAL CHECK (for 4WD)

(a) Check that the ABS warning light is blinking as shown in the illustration.
(b) Check the transfer indicator switch (L4 position).
(1) Turn the 4 wheel drive control switch to the L position to put the vehicle in L4 mode.
(2) Turn the 4 wheel drive control switch to the H position to put the vehicle in H4 mode.
HINT:
Move the vehicle either a little forward or a little backward to engage the L4 position.

BC

Blinking pattern in TEST MODE:



6. SPEED SENSOR CHECK

(a) Check that the ABS warning light is blinking as shown in the illustration.

(b) Check thee speed sensor signal.

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

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

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

HINT:

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

(c) Stop the vehicle.

NOTICE:

- **Before performing the speed sensor signal check, complete the deceleration 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.**

HINT:

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

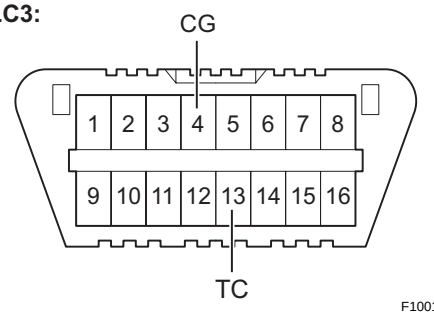
7. READ DTC OF ABS SENSOR (for Using a Intelligent Tester)

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

HINT:

- Refer to the intelligent tester operator's manual for further details.
- See the list of DTC.

DLC3:



8. 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 to the ON position.

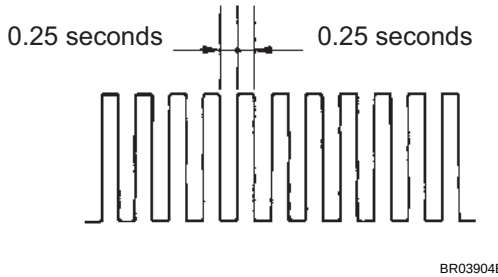
(c) Read the number of blinks of the ABS warning light.

HINT:

- See the list of DTC.

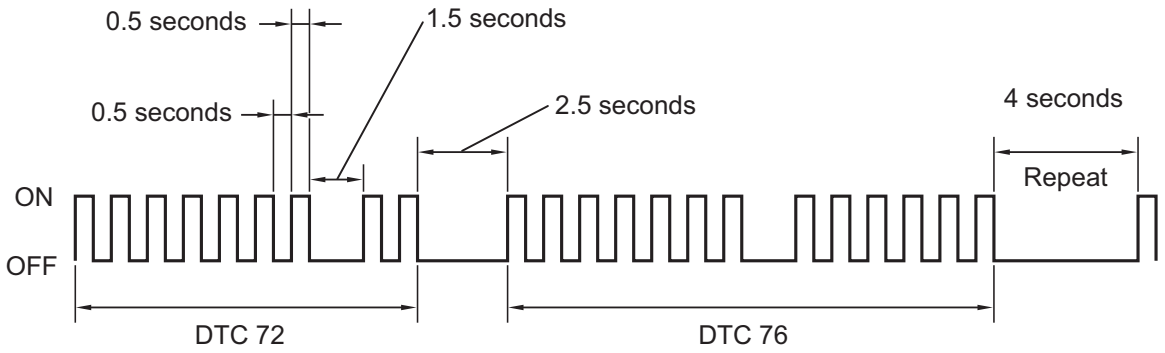
BC

Normal System Code:



- 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 to OFF.

9. DTC OF SIGNAL CHECK FUNCTION

DTC No.	Diagnosis	Trouble Areas
C1271/71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Speed sensor rotor
C1272/72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Speed sensor rotor
C1273/73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Speed sensor rotor
C1274/74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Speed sensor rotor
C1275/75	Abnormal change in output voltage of right front speed sensor	Right front speed sensor rotor
C1276/76	Abnormal change in output voltage of left front speed sensor	Left front speed sensor rotor
C1277/77	Abnormal change in output voltage of right rear speed sensor	Right rear speed sensor rotor
C1278/78	Abnormal change in output voltage of left rear speed sensor	Left rear speed sensor rotor
C1279/79 (*1), (*2)	Deceleration sensor faulty	• Deceleration sensor • Sensor installation
C1282/82 (*2)	Center differential lock position switch malfunction	Transfer indicator switch (4WD position)
C1283/83 (*2)	L4 detection switch malfunction	Transfer indicator switch (L4 position)

(*1): Pre-runner
(*2): 4WD
HINT:
The DTCs in this table are only output in test mode.

PROBLEM SYMPTOMS TABLE

If no DTCs are 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 brake actuator or sensor, turn the ignition switch to OFF.

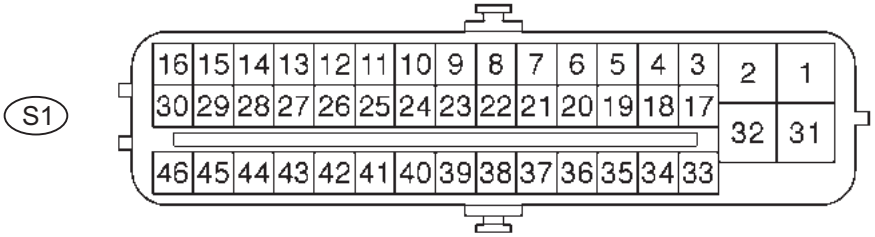
ANTI-LOCK BRAKE SYSTEM

Symptom	Suspected Areas	See Page
ABS does not operate	1. Check DTC reconfirming that normal code output.	BC-16
	2. IG power source circuit	BC-43
	3. Speed sensor circuit	BC-24
	4. Check brake actuator with intelligent tester. If abnormal, check hydraulic circuit for leakage.	BC-299
	5. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace brake actuator.	BC-300
ABS does not operate efficiently	1. Check DTC reconfirming that normal code output.	BC-16
	2. Speed sensor circuit	BC-24
	3. Stop light switch circuit	BC-55
	4. Check brake actuator with intelligent tester. If abnormal, check hydraulic circuit for leakage.	BC-299
	5. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace brake actuator.	BC-300
ABS warning light abnormal	1. ABS warning light circuit	BC-64
	2. Skid control ECU (brake actuator)	BC-300
DTC check cannot be performed	1. ABS warning light circuit	BC-64
	2. TC and CG terminal circuit	BC-75
	3. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace brake actuator.	BC-300
Speed sensor signal check cannot be performed	1. Skid control ECU (brake actuator)	BC-300

TERMINALS OF ECU

1. Terminals of ECU

Skid control ECU:



Symbols (Terminals No.)	Terminal Description
GND1 (1)	Skid control ECU ground
+BS (2)	Solenoid valve power supply
GL1 (4) (*1) (*3)	Deceleration sensor signal input
P (6) (*2)	Shift position indicator P signal input
EXI2 (7) (*3)	Rear differential lock detection switch input
GGND (8) (*1) (*3)	Deceleration sensor ground
FL- (9)	Front LH wheel speed signal input
FL+ (10)	Front LH wheel speed sensor power supply
D/G (13)	Diagnosis tester communication line
STP (14)	Stop light switch input
RL+ (15)	Rear LH wheel speed sensor power supply
RL- (16)	Rear LH wheel speed signal input
WA (17)	ABS warning light output
SP1 (18) (*2)	Speed signal output for meter
TS (20)	Sensor diagnosis check input
TC (21)	Diagnosis tester communication line
PKB (23)	Parking brake switch input
EXI (24) (*3)	ADD change over actuator switch input
+BM (31)	Motor relay power supply
GND2 (32)	Skid control ECU ground
N (36) (*2)	Shift position indicator N signal input
VGS (37) (*1) (*3)	Deceleration sensor power supply
EXI4 (38) (*3)	Detection (L4) switch input
FR- (39)	Front RH wheel speed signal input
FR+ (40)	Front RH wheel speed sensor power supply
BRL (43)	Brake warning light input
RR+ (44)	Rear RH wheel speed sensor power supply
RR- (45)	Rear RH wheel speed signal input
IG1 (46)	ECU power supply

HINT:

(*1): Pre-runner

(*2): A/T

(*3): 4WD

BC

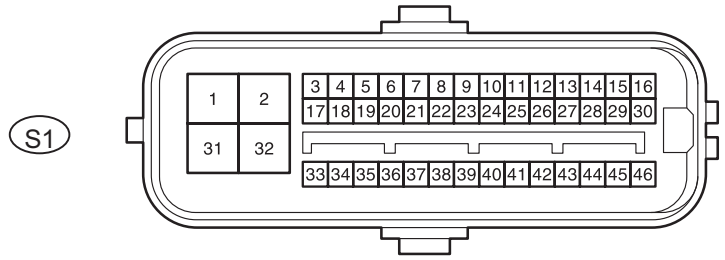
2. Terminal Inspection

Disconnect the connector and measure the voltage on the wire harness side.

HINT:

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

Skid Control ECU (harness side connector)



N

C124738E01

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage (V)
+BS (2) - GND1 (1)	Y - W-B	Solenoid valve power supply	Always	10 to 14 V
STP (14) - GND1 (1)	L - W-B	Stop light switch input	Stop light switch ON	10 to 14 V
WA (17) - GND1 (1)	O - W-B	ABS warning light output	IG switch ON, ABS warning light ON	4 V or higher
PKB (23) - GND1 (1)	G-Y - W-B	Parking brake switch input	IG switch ON, parking brake switch ON	Below 2.0 V
PKB (23) - GND1 (1)	G-Y - W-B	Parking brake switch input	IG switch ON, parking brake switch OFF	8 to 14 V
+BM (31) - GND2 (32)	R - W-B	Motor relay power supply	Always	10 to 14 V
BRL (43) - GND1 (1)	B-W - W-B	Brake warning light output	IG switch ON, brake warning light ON	4 V or higher
IG (46) - GND1 (1)	LG - W-B	ECU power supply	IG switch ON	10 to 14 V

BC

ABS Warning Light:

USA: ABS

Canada: (ABS)

BRAKE Warning Light:

(!) BRAKE

F052120E02

DIAGNOSIS SYSTEM

1. DIAGNOSIS

(a) If the skid control ECU detects a malfunction, the ABS and/or BRAKE warning lights 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.

Item/Trouble Area	ABS System	EBD System	Skid Control ECU
ABS Warning light	O	O	O
BRAKE Warning light	-	O	O

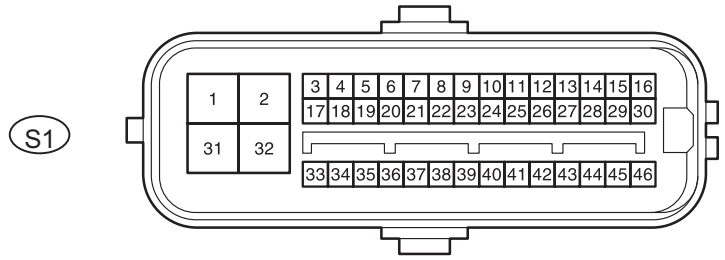
2. Terminal Inspection

Disconnect the connector and measure the voltage on the wire harness side.

HINT:

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

Skid Control ECU (harness side connector)



N

C124738E01

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	STD Voltage (V)
+BS (2) - GND1 (1)	Y - W-B	Solenoid valve power supply	Always	10 to 14 V
STP (14) - GND1 (1)	L - W-B	Stop light switch input	Stop light switch ON	10 to 14 V
WA (17) - GND1 (1)	O - W-B	ABS warning light output	IG switch ON, ABS warning light ON	4 V or higher
PKB (23) - GND1 (1)	G-Y - W-B	Parking brake switch input	IG switch ON, parking brake switch ON	Below 2.0 V
PKB (23) - GND1 (1)	G-Y - W-B	Parking brake switch input	IG switch ON, parking brake switch OFF	8 to 14 V
+BM (31) - GND2 (32)	R - W-B	Motor relay power supply	Always	10 to 14 V
BRL (43) - GND1 (1)	B-W - W-B	Brake warning light output	IG switch ON, brake warning light ON	4 V or higher
IG (46) - GND1 (1)	LG - W-B	ECU power supply	IG switch ON	10 to 14 V

BC

ABS Warning Light:

USA: ABS

Canada: (ABS)

BRAKE Warning Light:

(!) BRAKE

F052120E02

DIAGNOSIS SYSTEM

1. DIAGNOSIS

(a) If the skid control ECU detects a malfunction, the ABS and/or BRAKE warning lights 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.

Item/Trouble Area	ABS System	EBD System	Skid Control ECU
ABS Warning light	O	O	O
BRAKE Warning light	-	O	O

○: 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-7). The DTCs can be read by connecting SST (09843-18043) between terminals TC and CG of the DLC3 and observing the blinking of the ABS warning light, or by connecting a intelligent tester (See page BC-16).

2. WARNING 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 and BRAKE warning light come on when the ignition switch is turned on and go off in about 3 seconds.
HINT:
If the warning 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 warning light remains on, troubleshoot the effected light circuit by proceeding to the page indicated below:

Trouble Areas	See Page
ABS warning light circuit	BC-64
BRAKE warning light circuit	BC-70

ABS Warning Light:

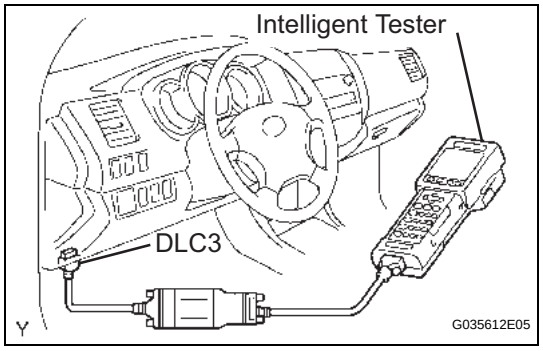
USA: ABS

Canada: (ABS)

BRAKE Warning Light:

(BRAKE)

F052120E02

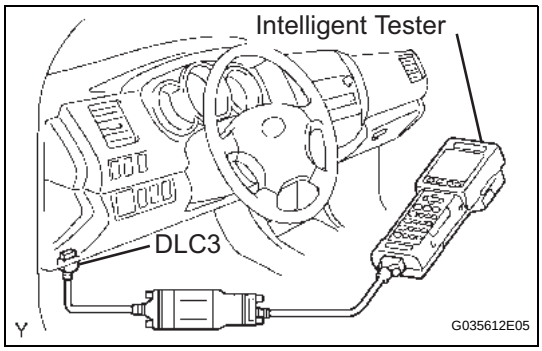


DTC CHECK / CLEAR

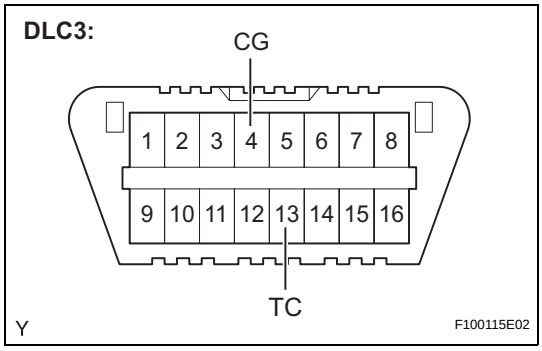
1. DTC CHECK / CLEAR (for Using a Intelligent Tester)

(a) Check DTCs.
(1) Connect the intelligent tester to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Turn the tester ON.
(4) Read the DTCs by following the prompts on the tester screen.

BC



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

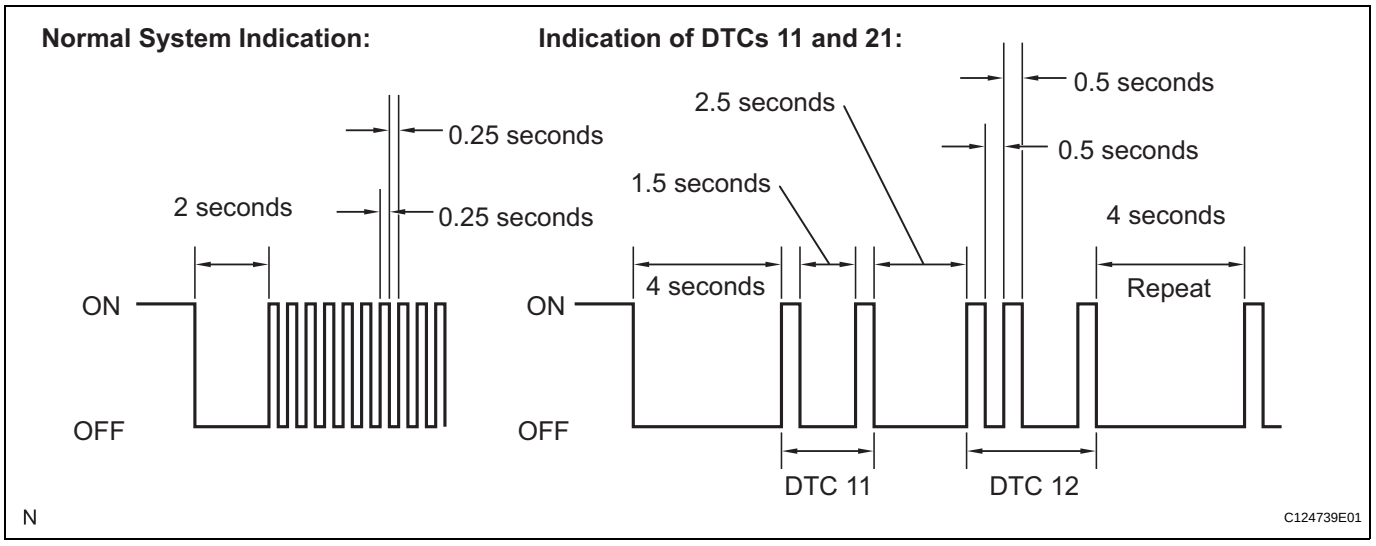


2. DTC CHECK / CLEAR (for Using a SST Check Wire)

(a) Check DTCs.
(1) Using SST, connect terminals TC and CG of the DLC3.
SST 09843-18040
(2) Turn the ignition switch to the ON position.
(3) Read 2-digit DTCs by observing the blinking of the ABS warning light on the combination meter.
HINT:
- If no code appears, inspect the ABS warning light circuit or TC and CG terminal circuit.

Trouble Areas	See Page
ABS warning light circuit	BC-64 BC-68
TC and CG terminal circuit	BC-75

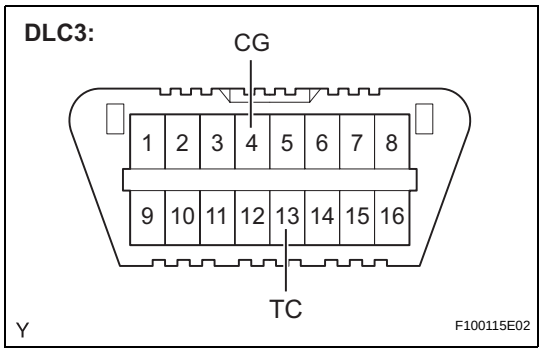
- As an example, the blinking patterns of the normal system indication and DTCs 11 and 21 are shown below.



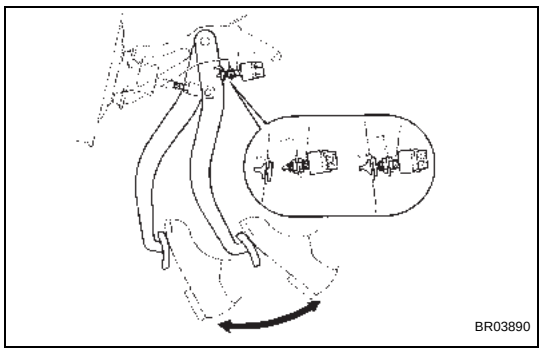
- DTCs are explained in DTC chart (See page BC-22).

BC

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



(b) Clear DTCs.
(1) Using SST, connect terminals TC and CG of the DLC3.
(2) Turn the ignition switch to the ON position.
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 warning light blinks in the normal system indication pattern.
(5) Remove SST from the terminals of the DLC3.
(6) Turn the ignition switch to OFF.
HINT:
Clearing the DTCs cannot be performed by removing the battery cable.

3. END OF DTC CHECK / CLEAR

(a) Turn the ignition switch to the ON position.
(b) Check that the ABS warning light goes off within approximately 3 seconds.
(c) Turn the ignition switch to OFF.

BC

FREEZE FRAME DATA

1. FREEZE FRAME DATA

HINT:

- Whenever a DTC is detected or the ABS operates, the skid control ECU stores the current vehicle (sensor) state as freeze frame data.
- The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from off to the On position since the last time 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 since then.
- Freeze frame data at the time the ABS operates: The skid control ECU stores and updates data whenever the ABS system operates.
  When the ECU stores data at the time a DTC is detected, the data stored 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 to the ON position.
(c) From the display on the tester, select the "FREEZE FRAME DATA".

Intelligent tester display	Measurement Item	Reference Value
TROUBLE CODE	Freeze DTC	min.: 0, max.: 255
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
SYSTEM	System status	ABS activated: ABS Fail safe mode activated: FAIL SF No system activated: NO SYS
#IG ON	Number of operations turning ignition switch to ON after memorizing freeze frame data	0 to 31
VEHICLE SPD	Vehicle speed	min.: 0, max.: 326.4 km/h
G (BACK and FORTH)	Back and Forth G	min.: -1.869, max.: 1.869
SPD GRADE	Vehicle speed grade	min.: -1.869, max.: 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

FAIL-SAFE CHART

1. FAIL SAFE OPERATION

If there is a problem with any sensor signals or actuator systems, the skid control ECU prohibits the power supply to the brake actuator and prohibits ABS control.
ABS control will be prohibited, but EBD control continues as far as possible. If EBD control is impossible, the brake warning light comes on to warn the driver.

Malfunction	Symptom
ABS system	ABS control prohibited
EBD system	ABS & EBD control prohibited

HINT:
If the ABS system encounters a malfunction, the brake system will operate normally without ABS control.

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

By referring to the DATA LIST displayed on the intelligent tester, you can read the value and status of parts such as switches, sensors and actuators 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 to the ON position.
(c) Turn the intelligent tester.
(d) From the display on the tester, read the "DATA LIST".

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
ABS MOT RELAY	ABS motor relay / ON or OFF	ON: Motor relay ON	-
SOL RELAY	Solenoid relay / ON or OFF	ON: Solenoid relay ON	-
STOP LIGHT SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
PKB SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
ABS OPERT FR	ABS operation (FR) / BEFORE or OPERATE	BEFORE: No ABS operation (FR) OPERATE: During ABS operation (FR)	-
ABS OPERT FL	ABS operation (FL) / BEFORE or OPERATE	BEFORE: No ABS operation (FL) OPERATE: During ABS operation (FL)	-
ABS OPERT RR	ABS operation (RR) / BEFORE or OPERATE	BEFORE: No ABS operation (RR) OPERATE: During ABS operation (RR)	-
ABS OPERT RL	ABS operation (RL) / BEFORE or OPERATE	BEFORE: No ABS operation (RL) OPERATE: During ABS operation (RL)	-
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Similar speed as indicated on speed meter
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Similar speed as indicated on speed meter
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Similar speed as indicated on speed meter
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Similar speed as indicated on speed meter
DECELERAT SEN (*1)	Deceleration sensor 1 reading / min.: -1.869 G, max.: 1.869 G	Approximately 0 +- 0.13G in still condition	Reading changes when vehicle bounced
DECELERAT SEN2 (*1)	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 to 14 V TOO LOW: Below 9.5 V	-
SFRR	ABS solenoid (SFRR) ON / OFF	ON: Operate	-
SFRH	ABS solenoid (SFRH) ON / OFF	ON: Operate	-
SFLR	ABS solenoid (SFLR) ON / OFF	ON: Operate	-
SFLH	ABS solenoid (SFLH) ON / OFF	ON: Operate	-

BC

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
SRRR (SRR)	ABS solenoid (SRRR (SRR)) ON / OFF	ON: Operate	-
SRRH (SRH)	ABS solenoid (SRRH (SRH)) ON / OFF	ON: Operate	-
SRLR	ABS solenoid (SRLR) ON / OFF	ON: Operate	-
SRLH	ABS solenoid (SRLH) ON / OFF	ON: Operate	-
VEHICLE SPD	Maximum wheel speed sensor reading / min.: 0 mph (0 km/h), max.: 202MPH (326 km/h)	Actual vehicle speed	Speed indicated on speedometer
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 / OPEN or NORMAL	OPEN: Momentary interruption	-
SPD SEN FL	FL speed sensor open detection / OPEN or NORMAL	OPEN: Momentary interruption	-
SPD SEN RR	RR speed sensor open detection / OPEN or NORMAL	OPEN: Momentary interruption	-
SPD SEN RL	RL speed sensor open detection / OPEN or NORMAL	OPEN: Momentary interruption	-
TEST MODE	Test Mode / NORMAL or TEST	NORMAL: Normal mode TEST: During test mode	-
#CODES	Number of DTC recorded / min.: 0, max.: 255	min.: 0 max.: 255	-

BC

HINT:

(*1): Pre-runner, 4WD

2. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the intelligent tester allows the relay, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one of the methods to shorten labor time.

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

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the intelligent tester ON.
(d) According to the display on the tester, perform the "ACTIVE TEST".

HINT:

Ignition switch must be turned to the ON position to proceed to the ACTIVE TEST using the intelligent tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
SFRR	Turns ABS solenoid (SFRR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH	Turns ABS solenoid (SFRH) ON / OFF	Operation of solenoid (clicking sound) can be heard

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

DIAGNOSTIC TROUBLE CODE CHART

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

HINT:

- Using SST 09843-18040, connect terminal TC and CG of the DLC3.
- If no abnormality is found when inspecting parts, inspect the ECU and ground points for poor contact.
- 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 recorded and the problem cannot be identified, perform circuit inspection of the other DTCs.

DTC No.	Detection Item	Trouble Areas	See page
C0200/31 (*1)	Right Front Wheel Speed Sensor Signal Malfunction	1. Right front speed sensor 2. Speed sensor circuit 3. Sensor installation 4. Brake actuator (skid control ECU)	BC-24
C0205/32 (*1)	Left Front Wheel Speed Sensor Signal Malfunction	1. Left front speed sensor 2. Speed sensor circuit 3. Sensor installation 4. Brake actuator (skid control ECU)	BC-24
C0210/33 (*1)	Right Rear Wheel Speed Sensor Signal Malfunction	1. Right rear speed sensor 2. Speed sensor circuit 3. Sensor installation 4. Brake actuator (skid control ECU)	BC-24
C0215/34 (*1)	Left Rear Wheel Speed Sensor Signal Malfunction	1. Left rear speed sensor 2. Speed sensor circuit 3. Sensor installation 4. Brake actuator (skid control ECU)	BC-24
C0226/21	SFR Solenoid Circuit	1. Brake actuator 2. SFRR or SFRH circuit	BC-31
C0236/22	SFL Solenoid Circuit	1. Brake actuator 2. SFLR or SFLH circuit	BC-31
C0246/23	SRR Solenoid Circuit	1. Brake actuator 2. SRRR or SRRH circuit	BC-31
C0256/24	SRL Solenoid Circuit	1. Brake actuator 2. SRLR or SRLH circuit	BC-31
C0273/13	Open or Short Circuit in ABS Motor Relay Circuit	1. ABS motor relay 2. ABS motor relay circuit	BC-33
C0274/14	Short to B+ in ABS Motor Relay Circuit	1. ABS motor relay 2. ABS motor relay circuit	BC-33
C0278/11	Open or Short Circuit in ABS Solenoid Relay Circuit	1. Brake actuator (skid control ECU) 2. ABS solenoid relay circuit	BC-36
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	1. Brake actuator (skid control ECU) 2. ABS solenoid relay circuit	BC-36
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	1. Right front speed sensor 2. Speed sensor rotor 3. Brake actuator (skid control ECU)	BC-38

DTC No.	Detection Item	Trouble Areas	See page
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	1. Left front speed sensor 2. Speed sensor rotor 3. Brake actuator (skid control ECU)	BC-38
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	1. Right rear speed sensor 2. Speed sensor rotor 3. Brake actuator (skid control ECU)	BC-38
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	1. Left front speed sensor 2. Speed sensor rotor 3. Brake actuator (skid control ECU)	BC-38
C1241/41	Low Battery Positive Voltage	1. Battery 2. Charging system 3. Power source circuit	BC-43
C1243/43	Acceleration Sensor Stuck Malfunction	1. Deceleration sensor 2. Deceleration sensor circuit 3. Brake actuator (skid control ECU)	BC-46
C1244/44	Open or Short in Deceleration Sensor Circuit	1. Deceleration sensor 2. Deceleration sensor circuit 3. Brake actuator (skid control ECU)	BC-46
C1245/45	Acceleration Sensor Output Malfunction	1. Deceleration sensor 2. Deceleration sensor circuit 3. Brake actuator (skid control ECU)	BC-46
C1248/48	Open Circuit in Rear Differential Lock	1. Transfer indicator switch (rear diff. lock) 2. Rear differential lock circuit 3. Brake actuator (skid control ECU) 4. 4WD control ECU	BC-50
C1249/49	Open in Stop Light Switch Circuit	1. Stop light switch 2. Stop light switch circuit	BC-55
C1251/51	Open in Pump Motor Circuit	1. Brake actuator 2. Brake actuator circuit	BC-59
C1337/37	Different Diameter Tire Malfunction	1. Speed sensor 2. Speed sensor circuit 3. Speed sensor rotor 4. Tire size 5. Brake actuator (skid control ECU)	BC-62

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

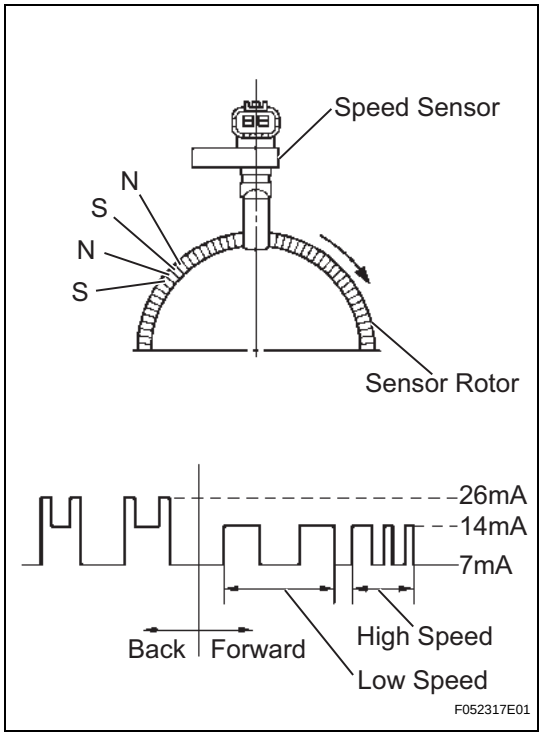
1. Drive the vehicle at 12 mph (20 km/h) for 30 seconds or more and check that the ABS warning light goes off.
2. Clear the DTC.

DTC	**C0200/31**	**Right Front Wheel Speed Sensor Signal Malfunction**
DTC	**C0205/32**	**Left Front Wheel Speed Sensor Signal Malfunction**
DTC	**C0210/33**	**Right Rear Wheel Speed Sensor Signal Malfunction**
DTC	**C0215/34**	**Left Rear Wheel Speed Sensor Signal Malfunction**

DESCRIPTION

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

Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU. The ECU monitors the wheel speeds according to the speed signals to control the ABS control system.

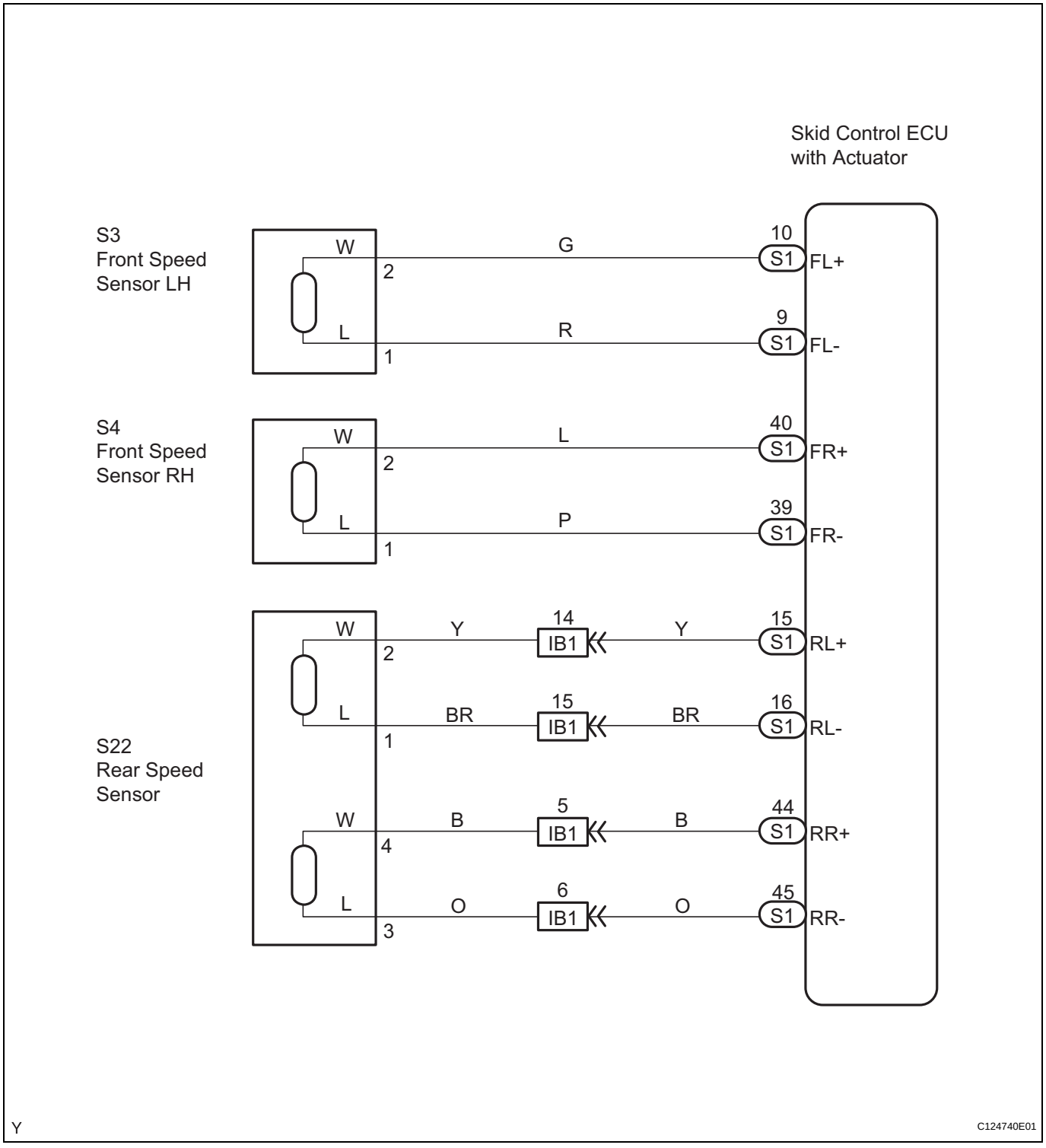


DTC No.	DTC Detecting Conditions	Trouble Areas
C0200/31 C0205/32 C0210/33 C0215/34	1. At vehicle speed of 6 mph (10 km/h) or more, speed sensor signal circuit open or short for 1 second or more. 2. Speed sensor signal open circuit occurs at least 255 times. 3. Speed sensor signal circuit open for 0.5 seconds or more. 4. With ignition switch ON and vehicle speed at 2 mph (3km/h) or more, 3 wheels output reverse rotation signal 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.	• Speed sensor • Speed sensor circuit • Speed sensor installation • Brake actuator (skid control ECU)

BC

HINT:
DTC C0200/31 relates to the front right speed sensor.
DTC C0205/32 relates to the front left speed sensor.
DTC C0210/33 relates to the rear right speed sensor.
DTC C0215/34 relates to the rear left speed sensor.

WIRING DIAGRAM



1	READ VALUE OF DATA LIST (SPEED SENSOR)

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

BC

Item	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 speed to that indicated on speedometer
WHEEL SPD FL	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 RR	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 RL	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

(d) Check that there is no difference between the speed value output from each speed sensor displayed on the intelligent tester and the speed value displayed on the speedometer when driving the vehicle.
OK:
There is almost no difference with the displayed speed value.

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

NG → **Go to step 6**

OK

2 PERFORM TEST MODE INSPECTION (SPEED SENSOR CHECK)

(a) Check if test mode DTCs are detected (See page BC-7).

Result	Proceed to
Test mode DTC output	A
Test mode DTC not output	B

B → **Go to step 4**

A

3 RECONFIRM DTC

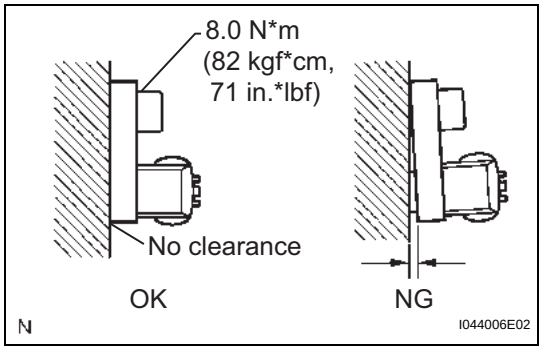
(a) Clear the DTCs (See page BC-16).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → **CHECK FOR INTERMITTENT PROBLEMS**

A

4	CHECK SPEED SENSOR INSTALLATION



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

NG → **TIGHTEN BOLT PROPERLY**

OK

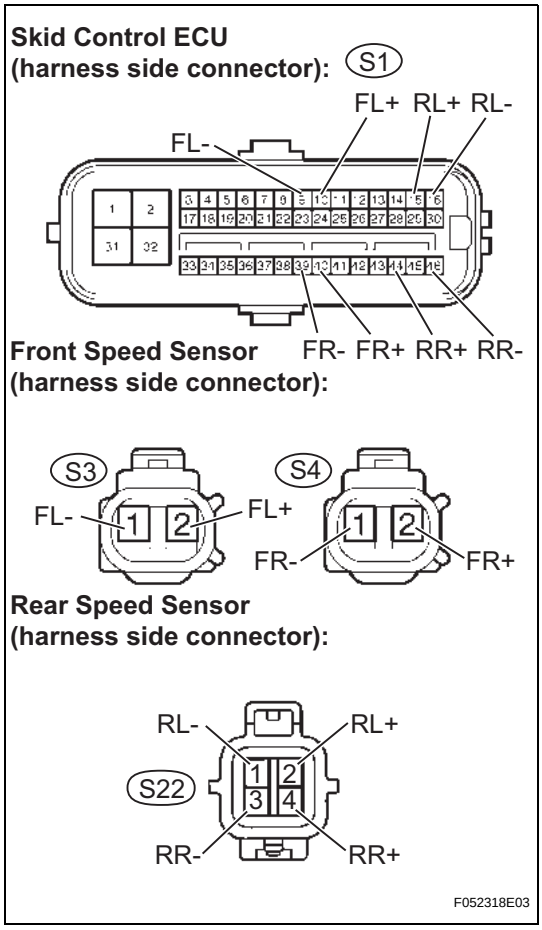
5	INSPECT SPEED SENSOR

(a) Remove the speed sensor.
(b) Check the sensor tip.
OK:
No scratches or foreign matter on the sensor tip.

NG → **CLEAN OR REPLACE SPEED SENSOR**

OK

6	CHECK HARNESS AND CONNECTOR



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

Standard Resistance

Tester Connection	Specified Condition
S1-10 (FL+) - S3-2 (FL+)	Below 1 Ω
S1-9 (FL-) - S3-1 (FL-)	Below 1 Ω
S1-40 (FR+) - S4-2 (FR+)	Below 1 Ω
S1-39 (FR-) - S4-1 (FR-)	Below 1 Ω
S1-15 (RL+) - S22-2 (RL+)	Below 1 Ω
S1-16 (RL-) - S22-1 (RL-)	Below 1 Ω
S1-44 (RR+) - S22-4 (RR+)	Below 1 Ω
S1-45 (RR-) - S22-3 (RR-)	Below 1 Ω

(d) Measure the resistance.

Standard Resistance

Tester Connection	Specified Condition
S1-10 (FL+) - Body ground	10 kΩ or higher
S1-9 (FL-) - Body ground	10 kΩ or higher
S1-40 (FR+) - Body ground	10 kΩ or higher
S1-39 (FR-) - Body ground	10 kΩ or higher
S1-15 (RL+) - Body ground	10 kΩ or higher
S1-16 (RL-) - Body ground	10 kΩ or higher
S1-44 (RR+) - Body ground	10 kΩ or higher
S1-45 (RR-) - Body ground	10 kΩ or higher

(e) Reconnect the speed sensor connectors.
(f) Reconnect the skid control ECU connector.

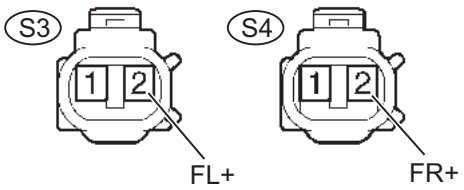
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

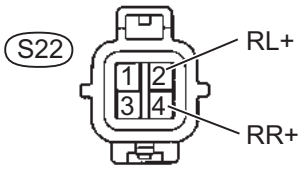
BC

7 INSPECT BRAKE ACTUATOR (TERMINAL VOLTAGE)

Front Speed Sensor (harness side connector):



Rear Speed Sensor (harness side connector):



F052319E02

(a) Disconnect the speed sensor connectors.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage.

Standard voltage

Tester Connection	Specified Condition
S3-2 (FL+) - Body ground	7.5 to 12 V
S4-2 (FR+) - Body ground	7.5 to 12 V
S22-2 (RL+) - Body ground	7.5 to 12 V
S22-4 (RR+) - Body ground	7.5 to 12 V

(d) Turn the ignition switch to OFF.
(e) Reconnect the speed sensor connectors.

NG → **REPLACE BRAKE ACTUATOR**

OK

8 RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → **CHECK FOR INTERMITTENT PROBLEMS**

A

REPLACE BRAKE ACTUATOR

BC

DTC	C0226/21	SFR Solenoid Circuit

DTC	C0236/22	SFL Solenoid Circuit

DTC	C0246/23	SRR Solenoid Circuit

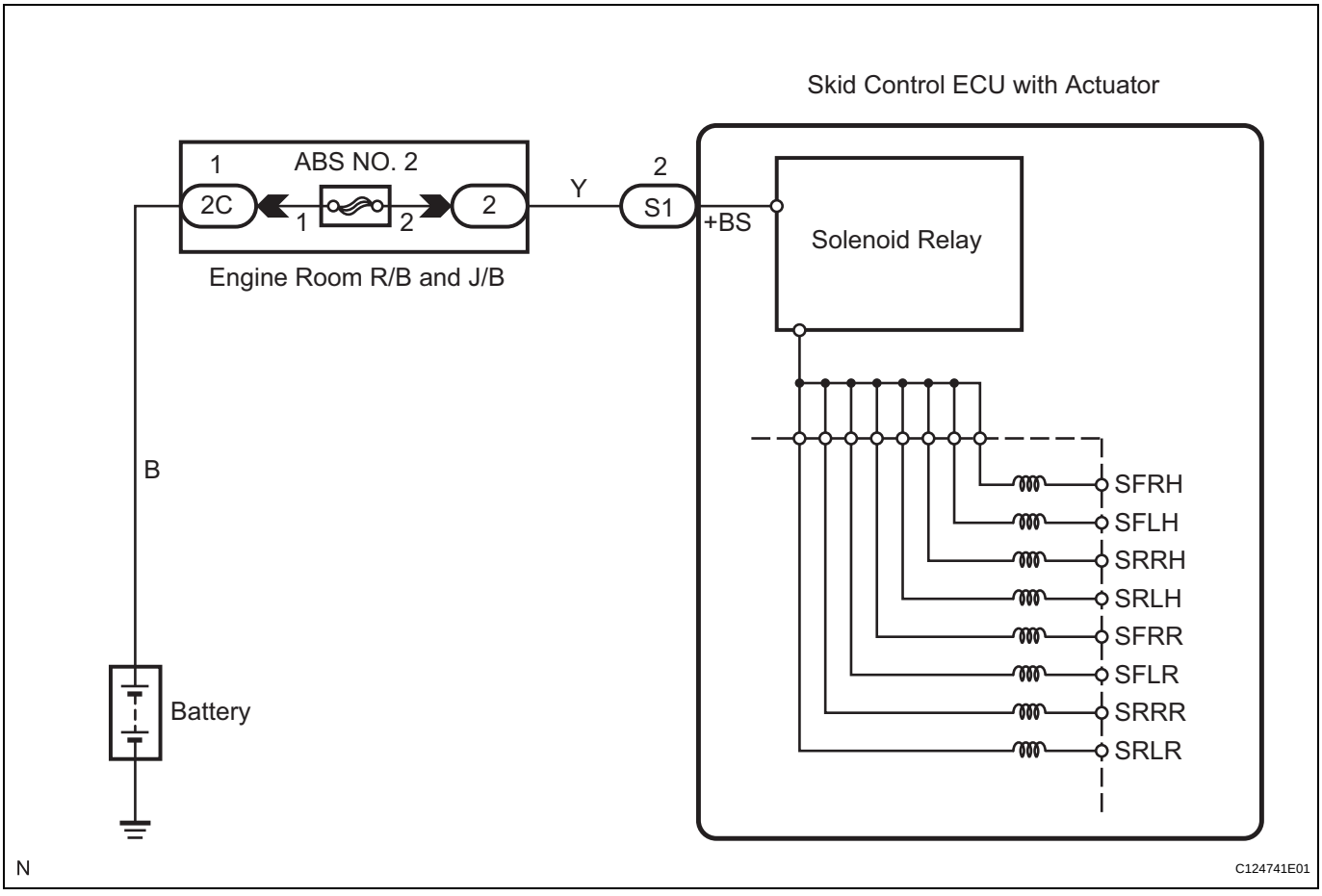
DTC	C0256/24	SRL Solenoid Circuit

DESCRIPTION

The solenoid goes on when signals are received from the 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 for 0.05 seconds or more.	• Brake actuator • SFRH or SFRR circuit
C0236/22	Open or short in SFLH or SFLR circuit for 0.05 seconds or more.	• Brake actuator • SFLH or SFLR circuit
C0246/23	Open or short in SRRH or SRRR circuit for 0.05 seconds or more.	• Brake actuator • SRRH or SRRR circuit
C0256/24	Open or short in SRLH or SRLR circuit for 0.05 seconds or more.	• Brake actuator • SRLH or SRLR circuit

WIRING DIAGRAM



1	RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Drive the vehicle at 6 mph (10 km/h) or more to activate initial check.
(c) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE BRAKE ACTUATOR

DTC	C0273/13	Open or Short Circuit in ABS Motor Relay Circuit

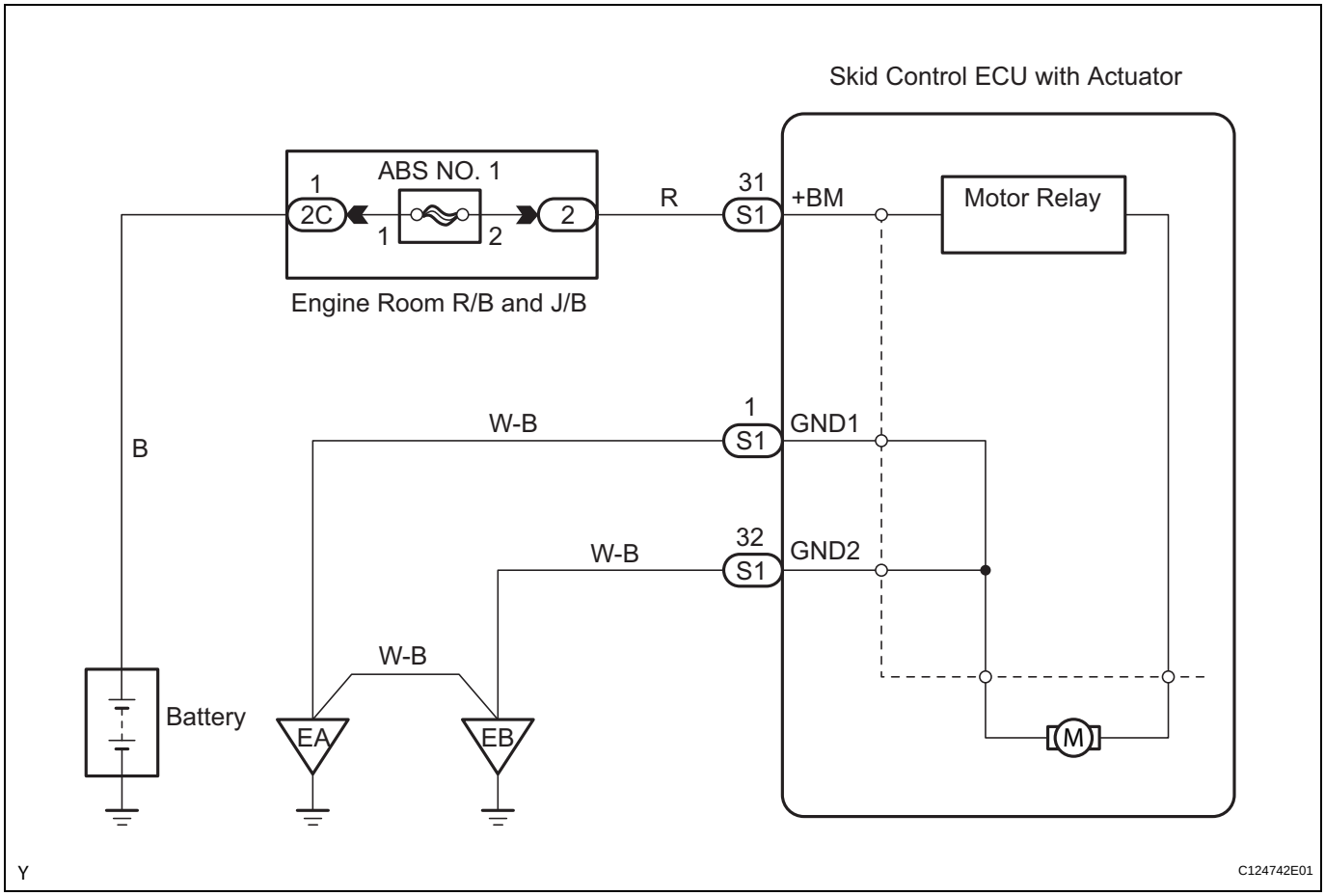
DTC	C0274/14	Short to B+ in ABS Motor Relay Circuit

DESCRIPTION

The ABS motor relay supplies power to the ABS pump motor. While the ABS is activated, the skid control ECU switches the motor relay ON and operates the ABS pump motor.

DTC No.	DTC Detecting Conditions	Trouble Areas
C0273/13	When either of following (1 or 2) detected: 1. Both of following conditions continue for at least 0.2 seconds. • IG1 voltage between 9.5 and 17.2 V. • Relay contact open when relay ON. 2. Both of following conditions continue for at least 0.2 seconds. • IG1 voltage less than 9.5 V. • Relay contact remains open when relay ON.	• ABS motor relay • ABS motor relay circuit
C0274/14	The following condition continues for at least 4 seconds. • Relay contact closed when relay OFF.	• ABS motor relay • ABS motor relay circuit

WIRING DIAGRAM



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

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the intelligent tester ON.
(d) Select the DATA LIST mode on the intelligent tester.
(e) Check the operation sound of the ABS motor when operating it with the intelligent tester.

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

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

NG → **Go to step 3**

OK

2 RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Drive the vehicle at 6mph (10 km/h) or more to activate initial check.
(c) Check if the same DTCs are detected.

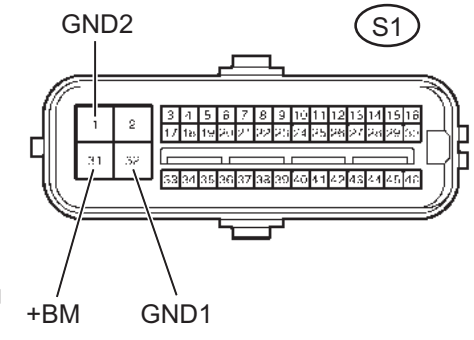
Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

3 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (BM+ - GND1, GND2)

Skid Control ECU
(harness side connector):



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

Tester Connection	Condition	Specified Condition
S1-31 (+BM) - S1-1, 32 (GND1, GND2)	Always	10 to 14 V

(c) Reconnect the skid control ECU connector.

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

BC

OK

REPLACE BRAKE ACTUATOR

DTC	C0278/11	Open or Short Circuit in ABS Solenoid Relay Circuit

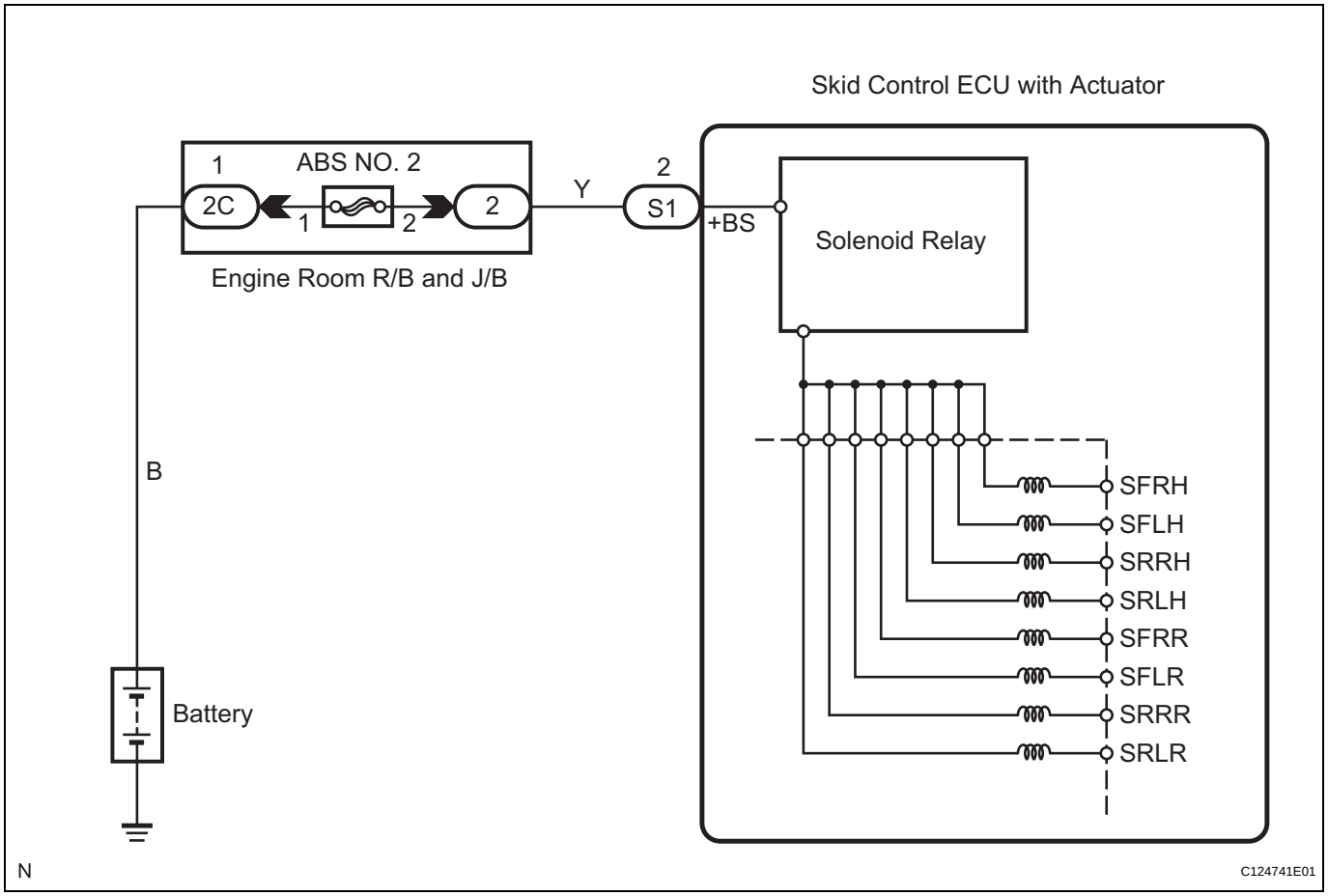
DTC	C0279/12	Short to B+ in ABS Solenoid Relay Circuit

DESCRIPTION

This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the results of initial check are normal, the relay goes on.

DTC No.	DTC Detecting Conditions	Trouble Areas
C0278/11	When either of following (1 or 2) detected: 1. Both of following conditions continue for at least 0.2 seconds. • IG voltage between 9.5 and 17.2 V. • Relay contact open when relay ON. 2. Both of following conditions continues for at least 0.2 seconds. • IG voltage 9.5 V or less when relay ON. • Relay contact remains open.	• Brake actuator (skid control ECU) • ABS solenoid relay circuit
C0279/12	The following condition continues for at least 0.2 seconds. • Relay contact closed immediately after turning ignition switch ON when relay OFF.	• Brake actuator (skid control ECU) • ABS solenoid relay circuit

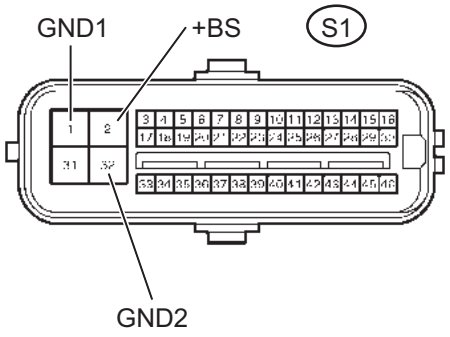
WIRING DIAGRAM



BC

1	**INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (+BS - GND1, GND2)**

Skid Control ECU
(harness side connector):



C121700E11

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

Tester Connection	Condition	Specified Condition
S1-2 (BS+) - S1-1,32 (GND1, GND2)	Always	10 to 14 V

(c) Reconnect the skid control ECU connector.

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

OK

2	**RECONFIRM DTC**

(a) Clear the DTCs (See page BC-16).
(b) Drive the vehicle at 6 mph (10 km/h) or more to activate initial check.
(c) Check if the same DTCs are detected.

BC

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE BRAKE ACTUATOR

DTC	**C1235/35**	**Foreign Object is Attached on Tip of Front Speed Sensor RH**

DTC	**C1236/36**	**Foreign Object is Attached on Tip of Front Speed Sensor LH**

DTC	**C1238/38**	**Foreign Object is Attached on Tip of Rear Speed Sensor RH**

DTC	**C1239/39**	**Foreign Object is Attached on Tip of Rear Speed Sensor LH**

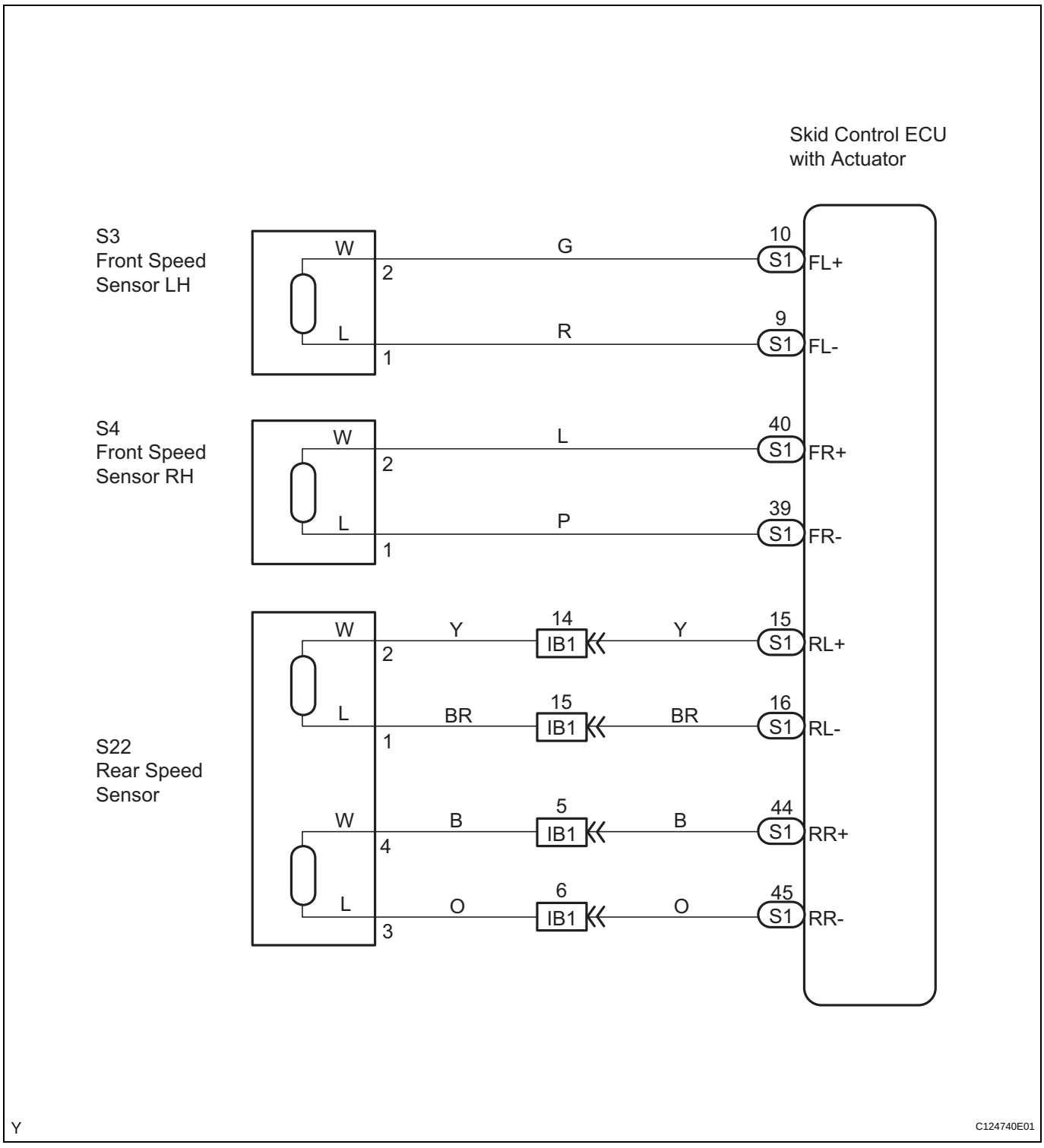
DESCRIPTION

The Skid Control ECU sets this DTC if, according to abnormal signals input by the sensor, it detects that foreign material is adhering to the speed sensor tip or the sensor rotor, or the rotor has any missing teeth. This DTC may be set if parts such as the speed sensor circuit connector or wire harness are malfunctioning.

DTC No.	DTC Detecting Conditions	Trouble Areas
C1235/35 C1236/36 C1238/38 C1239/39	• At vehicle speed of 12 mph (20 km/h) or more, noise in speed sensor signal continues for 5 seconds or more. • At vehicle speed of 6 mph (10 km/h) or more, noise detected as rotor turns, for 15 seconds or more.	• Speed sensor • Speed sensor circuit • Speed sensor rotor • Brake actuator (skid control ECU)

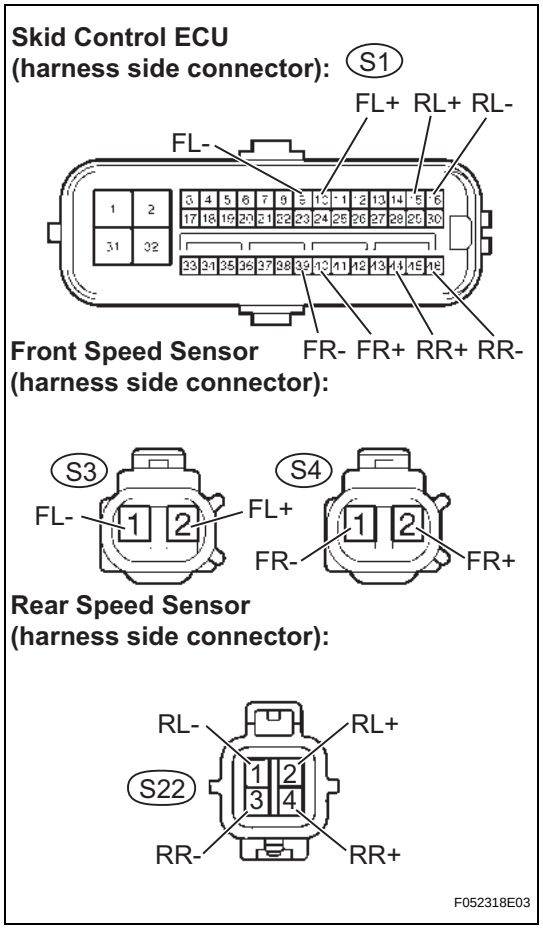
HINT:
DTC C1235/35 relates to the front right speed sensor.
DTC C1236/36 relates to the front left speed sensor.
DTC C1238/38 relates to the rear right speed sensor.
DTC C1239/39 relates to the rear left speed sensor.

WIRING DIAGRAM



BC

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



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

Standard Resistance

Tester Connection	Specified Condition
S1-10 (FL+) - S3-2 (FL+)	Below 1 Ω
S1-9 (FL-) - S3-1 (FL-)	Below 1 Ω
S1-40 (FR+) - S4-2 (FR+)	Below 1 Ω
S1-39 (FR-) - S4-1 (FR-)	Below 1 Ω
S1-15 (RL+) - S22-2 (RL+)	Below 1 Ω
S1-16(RL-) - S22-1 (RL-)	Below 1 Ω
S1-44 (RR+) - S22-4 (RR+)	Below 1 Ω
S1-45 (RR-) - S22-3 (RR-)	Below 1 Ω

(d) Measure the resistance.

Standard Resistance

Tester Connection	Specified Condition
S1-10 (FL+) - Body ground	10 kΩ or higher
S1-9 (FL-) - Body ground	10 kΩ or higher
S1-40 (FR+) - Body ground	10 kΩ or higher
S1-39 (FR-) - Body ground	10 kΩ or higher
S1-15 (RL+) - Body ground	10 kΩ or higher
S1-16(RL-) - Body ground	10 kΩ or higher
S1-44 (RR+) - Body ground	10 kΩ or higher
S1-45 (RR-) - Body ground	10 kΩ or higher

(e) Reconnect speed sensor connectors.
(f) Reconnect the skid control ECU connector.

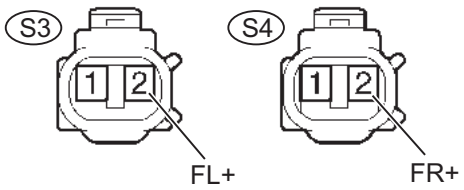
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

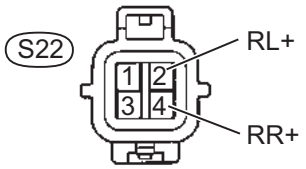
BC

2 INSPECT BRAKE ACTUATOR (TERMINAL VOLTAGE)

Front Speed Sensor (harness side connector):



Rear Speed Sensor (harness side connector):



F052319E02

(a) Disconnect the speed sensor connectors.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage.
Standard Voltage

Tester Connection	Specified Condition
S3-2 (FL+) - Body ground	7.5 to 12 V
S4-2 (FR+) - Body ground	7.5 to 12 V
S22-2 (RL+) - Body ground	7.5 to 12 V
S22-4 (RR-) - Body ground	7.5 to 12 V

(d) Turn the ignition switch to OFF.
(e) Reconnect the speed sensor connectors.

NG → **REPLACE BRAKE ACTUATOR**

OK

BC

3 RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Drive the vehicle at 6 mph (10 km/h) or more to activate initial check.
(c) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → **CHECK FOR INTERMITTENT PROBLEMS**

A

4 INSPECT SPEED SENSOR

(a) Remove the speed sensor (See page BC-303 or BC-304).
(b) Check the sensor tip.
OK:
No scratches or foreign matter on the sensor tip.

NG → **CLEAN OR REPLACE SPEED SENSOR**

OK

CLEAN OR REPLACE SPEED SENSOR

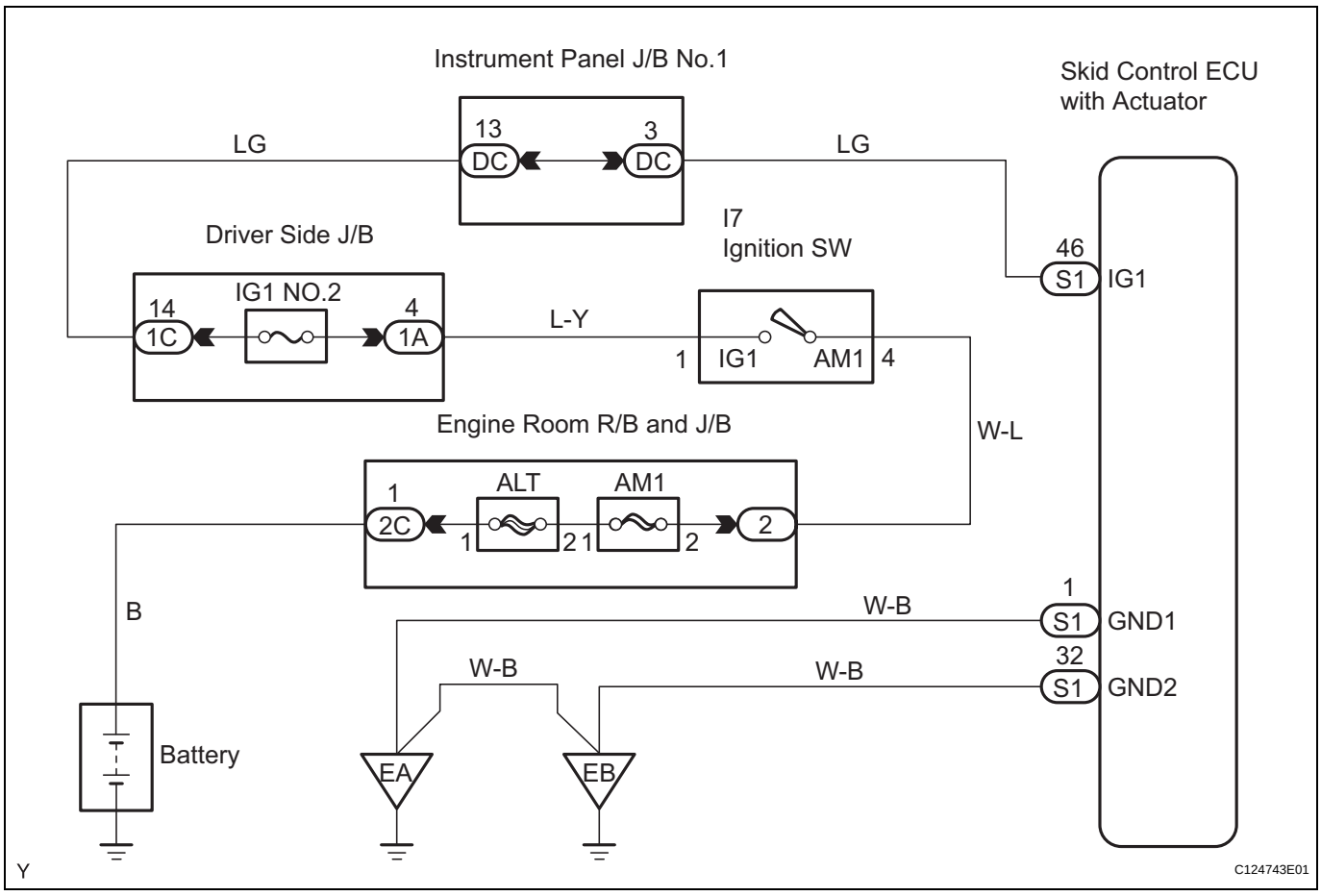
DTC	C1241/41	Low Battery Positive Voltage

DESCRIPTION

If there is a problem with the brake actuator (skid control ECU) power supply circuit, the skid control ECU outputs a DTC and prohibits operation under the fail safe function.
If the voltage supplied to the IG1 terminal is not within the DTC detection threshold due to malfunctions in parts such as the battery or alternator circuit, this DTC is stored.

DTC No.	DTC Detecting Conditions	Trouble Areas
C1241/41	• At vehicle speed of 2 mph (3 km/h) or more, voltage at IG1 terminal remains at 9.5 V or less for 10 seconds or more. • When solenoid relay ON, voltage at IG1 terminal 0.5 V or less, and contact of relay OFF for 0.2 seconds or more. • When voltage at IG1 terminal 9.5 V or less, voltage of speed sensor power supply decreases for 60 seconds or more.	• Battery • Charging system • Power source circuit

WIRING DIAGRAM



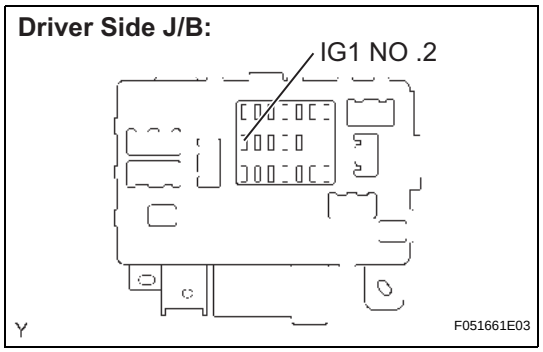
1	INSPECT BATTERY

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

NG → INSPECT CHARGING SYSTEM

OK

2 INSPECT FUSE (IG1 NO. 2)



(a) Remove the IG1 NO . 2 fuse from the driver side J/B.
(b) Measure the resistance of the IG1 NO. 2 fuse.
Standard Resistance:
Below 1 Ω
(c) Reinstall the IG1 NO. 2 fuse.

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

OK

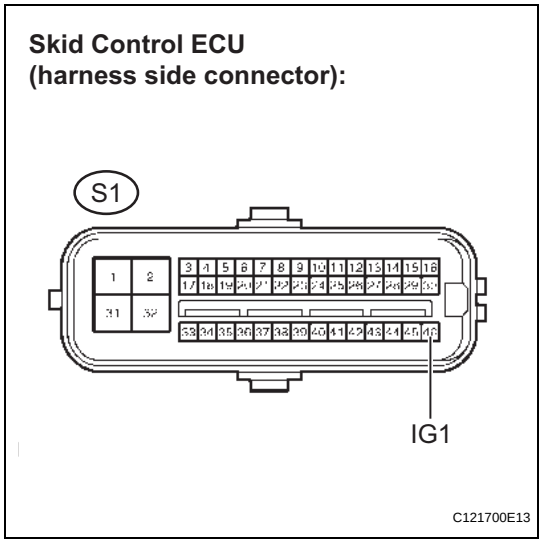
3 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (IG1 TERMINAL)

(a) When using intelligent tester:
(1) Start the engine.
(2) Connect the intelligent tester to the DLC3.
(3) Turn the intelligent tester ON.
(4) Select the DATA LIST mode on the intelligent tester.
(5) Measure the voltage condition output from the ECU displayed on the intelligent tester.

BC

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

OK:
"Normal" is displayed.



(b) When not using intelligent tester:
(1) Disconnect the skid control ECU connector.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage.
Standard Voltage

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

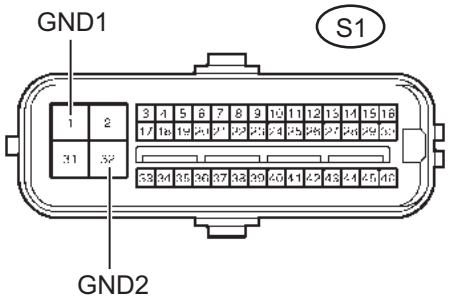
(4) Turn the ignition switch to OFF.
(5) Reconnect the skid control ECU connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4 CHECK HARNESS AND CONNECTOR (GND TERMINAL CONTINUITY)

Skid Control ECU (harness side connector):



C121700E06

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

Standard Resistance

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

(c) Reconnect the skid control ECU connector.

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

OK

5 RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Drive the vehicle at 1.9 mph (3 km/h) or more for 10 seconds or more.
(c) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

NG → **END**

A

REPLACE BRAKE ACTUATOR

BC

DTC	C1243/43	Acceleration Sensor Stuck Malfunction

DTC	C1244/44	Open or Short in Deceleration Sensor Circuit

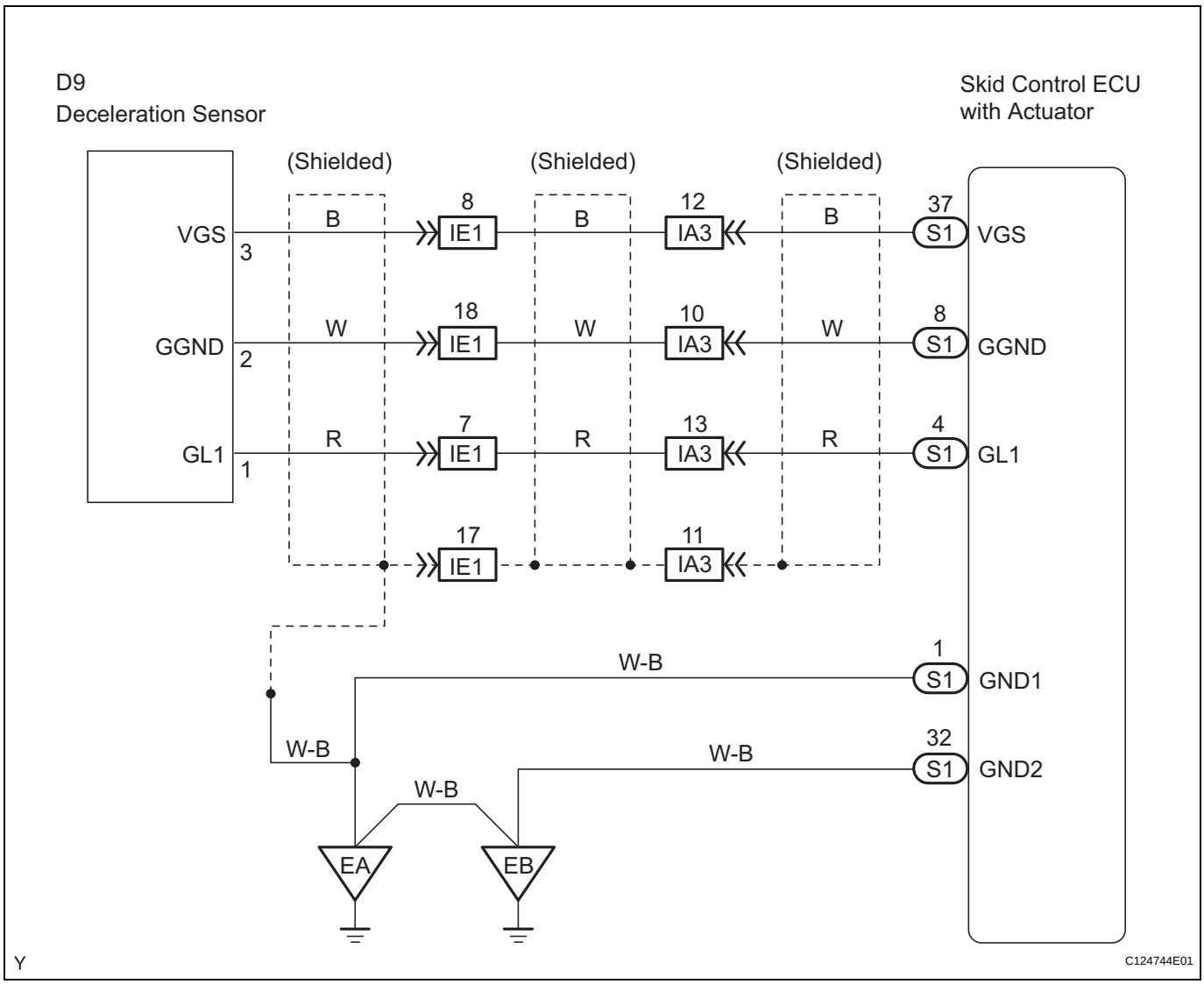
DTC	C1245/45	Acceleration Sensor Output Malfunction

DESCRIPTION

This sensor detects deceleration of the vehicle speed. The sensor signal is used in ABS control. If the sensor functions abnormally, the ABS warning light turns on.

DTC No.	DTC Detecting Conditions	Trouble Areas
C1243/43	While vehicle speed decreases from 18 mph (30 km/h) to 0 mph (0 km/h), sensor signal does not change 16 times or more.	• Deceleration sensor • Deceleration sensor circuit • Brake actuator (skid control ECU)
C1244/44	When any of following 1 through 3 detected: 1. ECU terminal GL1 value of -1.5 G or less or 1.5 G or more continues for 1.2 seconds or more. 2. Deceleration sensor terminal VGS voltage of 4.4 V or less or 5.6 V or more continues for 1.2 seconds or more. 3. Deceleration sensor signal momentary open occurs 7 times or more.	• Deceleration sensor • Deceleration sensor circuit • Brake actuator (skid control ECU)
C1245/45	At vehicle speed of 18 mph (30 km/h) or more, difference between back and forth G value calculated using G sensor signals and back and forth G value calculated using vehicle speed, exceeds 0.35 G for 60 seconds or more.	• Deceleration sensor • Deceleration sensor circuit • Brake actuator (skid control ECU)

WIRING DIAGRAM



BC

1	READ VALUE OF DATA LIST (DECELERATION SENSOR)

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

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
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

(e) Check that the deceleration value of the deceleration sensor displayed on the intelligent tester changes when the vehicle is tilted.
OK:
Deceleration value must change.

NG	Go to step 3

OK

2 RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Check if the same DTCs are detected.

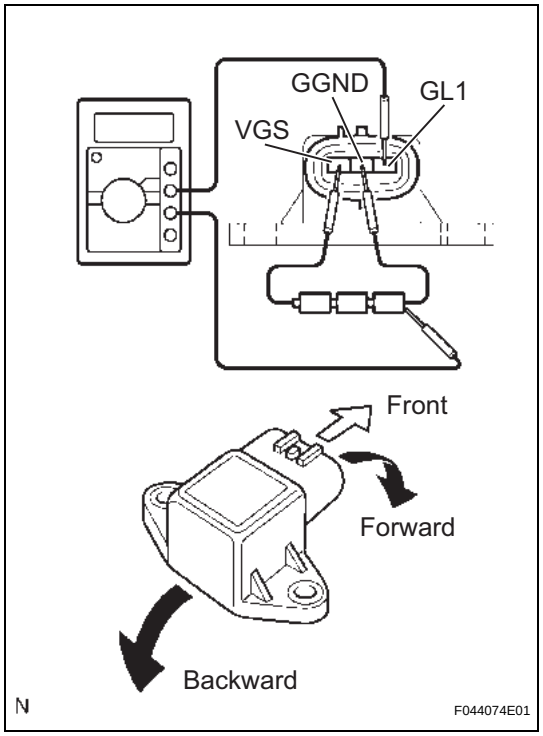
Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE BRAKE ACTUATOR

3 INSPECT DECELERATION SENSOR



(a) Remove the deceleration sensor.
(b) Connect the 3 dry batteries of 1.5 V in series.
(c) Connect the VGS terminal to the batteries' positive (+) terminal and the GGND terminal to the batteries' negative (-) terminal.
(d) Apply about 4.5 V between the VGS and GGND terminals.
NOTICE:
Do not apply voltage of 6 V or more to terminals VGS and GGND.
(e) Check the output voltage of the GL1 terminal when the sensor is tilted forward and backward.
Standard Voltage

Sensor Condition	Specified Condition
Horizontal	About 2.3 V
Lean forward	0.4 to 2.3 V
Lean backward	2.3 to 4.0 V

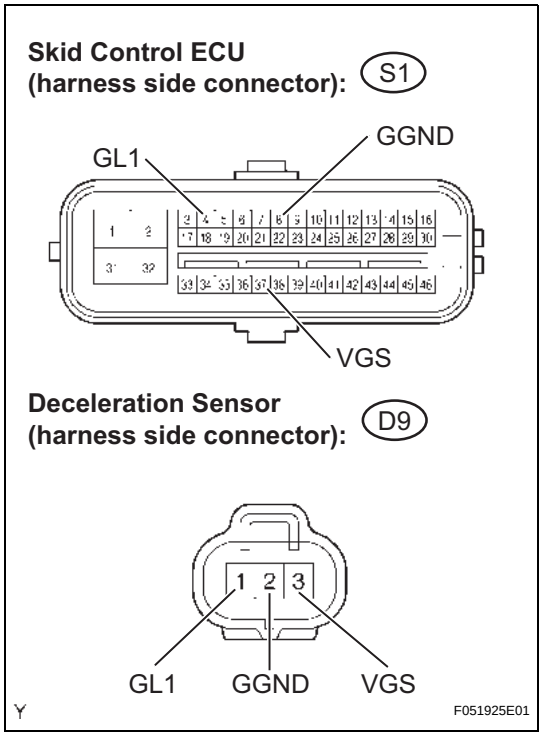
HINT:
- If the sensor is tilted too much it may show the wrong value.
- If dropped, the sensor should be replaced with a new one.
- Check and ensure the correct installation direction of the deceleration sensor.

NG → **REPLACE DECELERATION SENSOR**

OK

BC

4	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DECELERATION SENSOR)



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

Standard Resistance

Tester Connection	Specified Condition
S1-37 (VGS) - D9-3 (VGS)	Below 1 Ω
S1-8 (GGND) - D9-2 (GGND)	Below 1 Ω
S1-4 (GL1) - D9-1 (GL1)	Below 1 Ω

(d) Measure the resistance.

Standard Resistance

Tester Connection	Specified Condition
S1-37 (VGS) - Body ground	10 kΩ or higher
S1-8 (GGND) - Body ground	10 kΩ or higher
S1-4 (GL1) - Body ground	10 kΩ or higher

(e) Reconnect the deceleration sensor connector.
(f) Reconnect the skid control ECU connector.

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

OK

REPLACE BRAKE ACTUATOR

BC

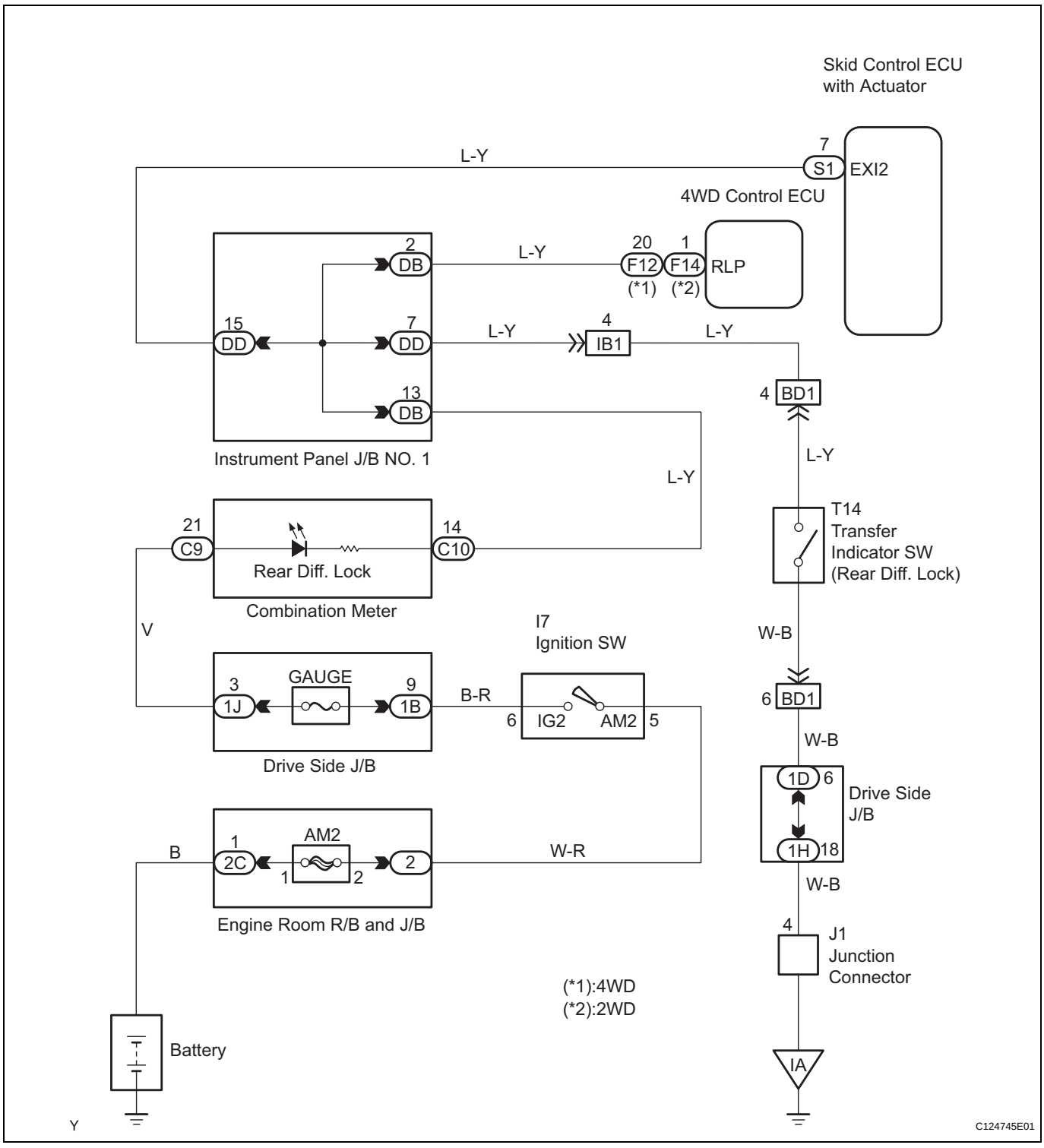
DTC	C1248/48	Open Circuit in Rear Differential Lock

DESCRIPTION

The 4WD control ECU stimulates the actuator to lock the rear differential in accordance with the rear diff. lock switch. The skid control ECU monitors the transfer indicator switch (rear diff. lock) and if the rear differential is locked, at which time the rear diff. lock indicator light is illuminated, prohibits ABS control. At the same time, the skid control ECU illuminates the ABS warning 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.	• Transfer indicator switch (rear diff. lock) • Rear differential lock circuit • Brake actuator (skid control ECU) • 4WD control ECU

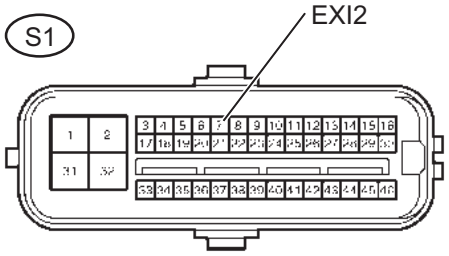
WIRING DIAGRAM



BC

1 INSPECT SKID CONTROL ECU (EXI2 TERMINAL VOLTAGE)

Skid Control ECU (harness side connector):



C121700E05

(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage.
(d) Check the rear diff. lock indicator light.

Standard

Terminal Connection	Vehicle Condition	Specified Condition	Rear Diff. Indicator Light
S1-7 (EXI2) - Body ground	Rear Differential free	8 to 14 V	OFF
S1-7 (EXI2) - Body ground	Rear Differential locked	1.5 V	ON

(e) Turn the ignition switch to OFF.
(f) Reconnect the skid control ECU connector.

NG → Go to step 3

OK

2 RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Drive the vehicle at a speed of 31 mph (50 km/h) or more for 3 seconds or more with the rear differential free.
(c) Check if the same DTCs are detected.

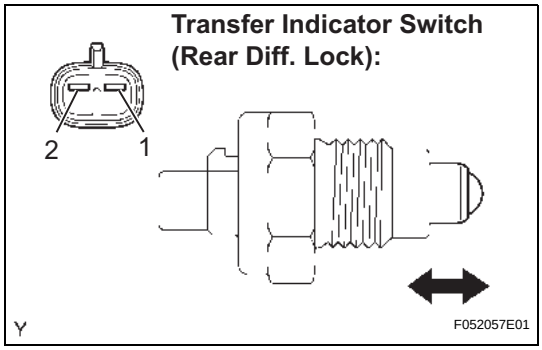
Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE BRAKE ACTUATOR

3 INSPECT TRANSFER INDICATOR SWITCH (REAR DIFF. LOCK)



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

Standard Resistance

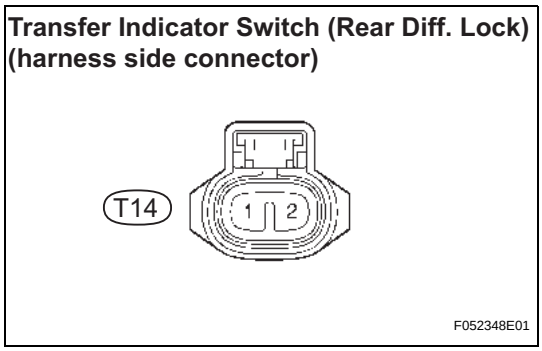
Tester Connection	Switch Position	Specified Condition
1 - 2	Push	Below 1 Ω
1 - 2	Free	10 kΩ or higher

(d) Reinstall the transfer indicator switch.
(e) Reconnect the transfer indicator switch connector.

NG → **REPLACE TRANSFER INDICATOR SWITCH**

OK

4 CHECK HARNESS AND CONNECTOR



(a) Disconnect the skid control ECU connector.
(b) Disconnect the 4WD control ECU connector.
(c) Disconnect the transfer indicator switch connector.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage.

Standard Voltage

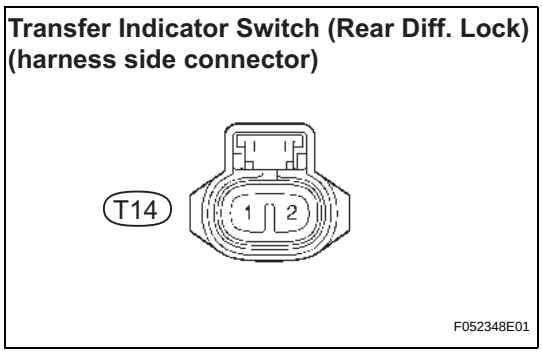
Tester Connection	Specified Condition
T14-2 - Body ground	8 to 14 V

(f) Turn the ignition switch to OFF.
(g) Reconnect the transfer indicator switch connector.
(h) Reconnect the 4WD control ECU connector.
(i) Reconnect the skid control ECU connector.

OK → **REPLACE 4WD CONTROL ECU**

NG

5 CHECK HARNESS AND CONNECTOR



(a) Disconnect the skid control ECU connector.
(b) Disconnect the 4WD control ECU connector.
(c) Disconnect the transfer indicator switch connector.
(d) Disconnect the combination meter connector.
(e) Measure the resistance.

Standard Resistance

Tester Connection	Specified Condition
T14-2 - Body ground	10 kΩ or higher

(f) Reconnect the combination meter connector.
(g) Reconnect the transfer indicator switch connector.
(h) Reconnect the 4WD control ECU connector.
(i) Reconnect the skid control ECU connector.

BC

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

OK

REPLACE COMBINATION METER

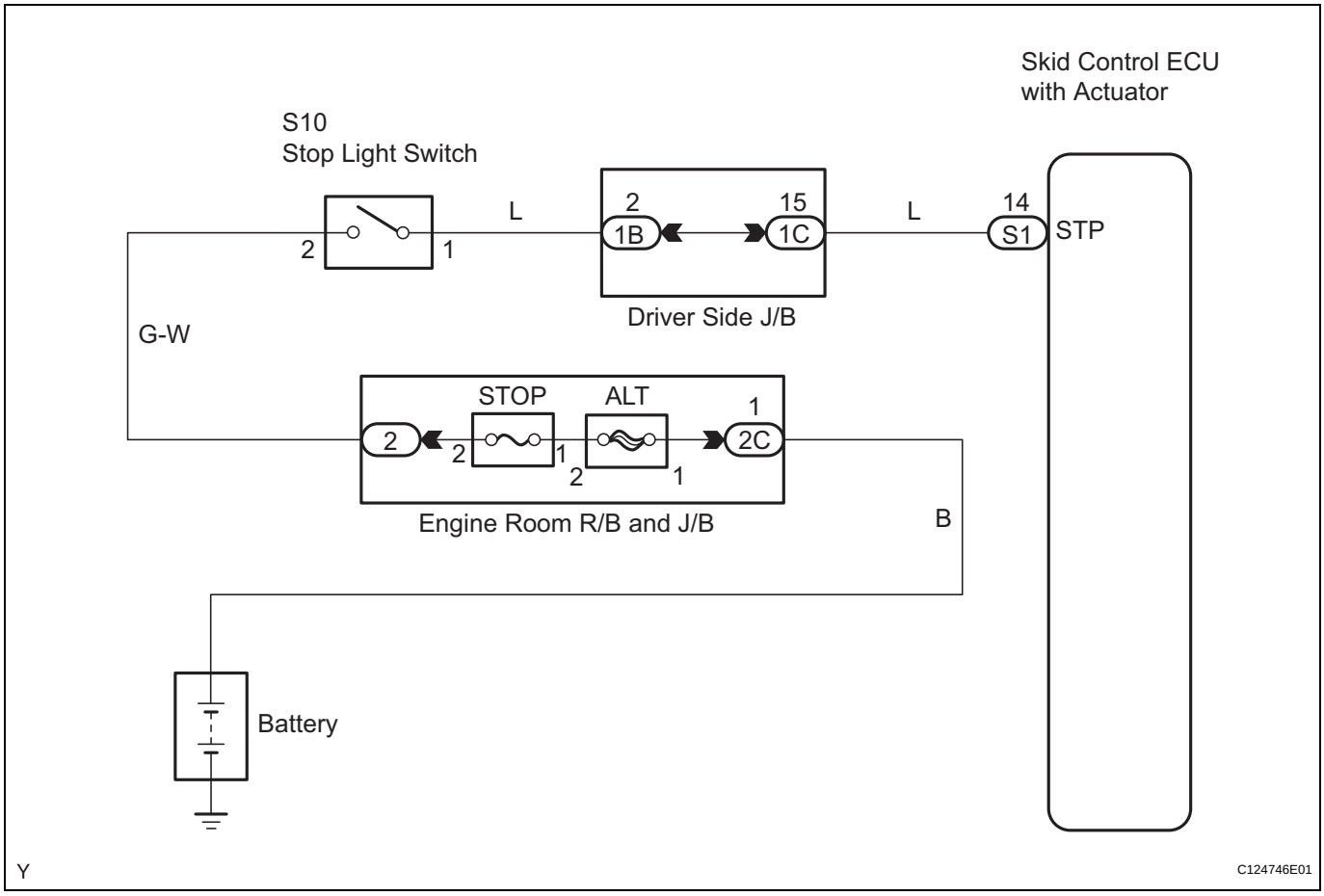
DTC	C1249/49	Open in Stop Light Switch Circuit

DESCRIPTION

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

DTC No.	DTC Detecting Condition	Trouble Areas
C1249/49	ECU terminal IG1 voltage 9.5 V to 17.2 V and open in stop light switch circuit for 0.3 seconds or more.	• Stop light assembly • Stop light switch circuit

WIRING DIAGRAM



BC

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

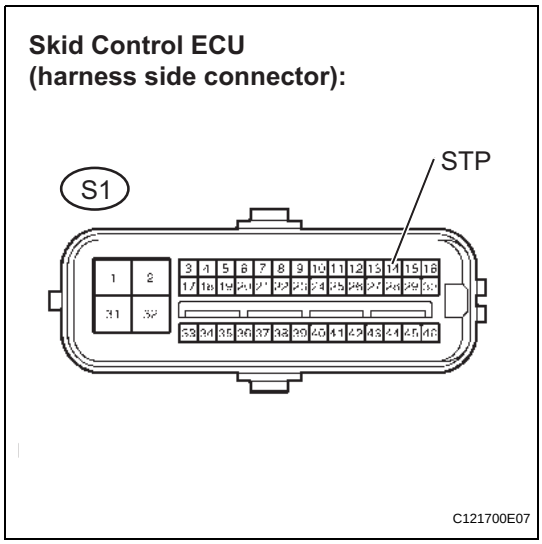
Pedal Condition	Illumination condition
Brake pedal depressed	ON
Brake pedal released	OFF

HINT:
Check the stop light bulb as it may have burnt out.

NG → Go to step 4

OK

2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (STP TERMINAL)



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

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
S1-14 (STP) - Body ground	Brake pedal depressed	8 to 16 V
S1-14 (STP) - Body ground	Brake pedal pressed	Below 1.5 V

(c) Reconnect the skid control ECU connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Check if the same DTCs are detected.

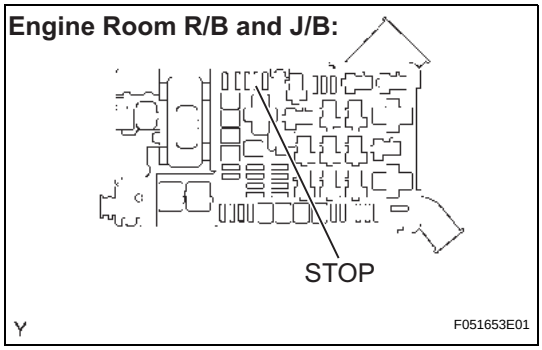
Result	Proceed to
DTC output	A
DTC not output	B

NG → END

A

REPLACE BRAKE ACTUATOR

4	INSPECT FUSE (STOP)

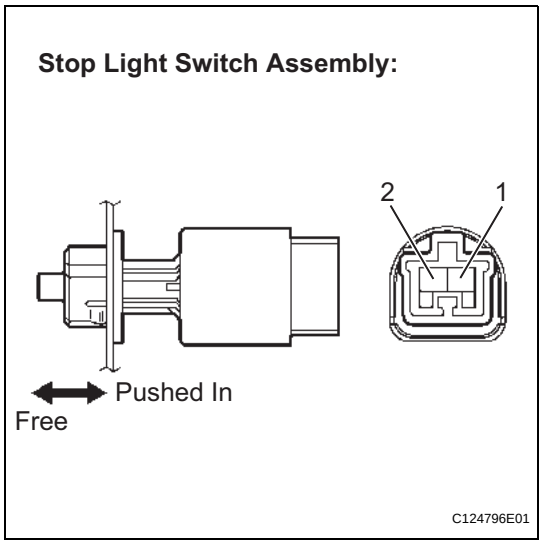


(a) Remove the STOP fuse from the engine room R/B and J/B.
(b) Measure the resistance of the STOP fuse.
Standard Resistance:
Below 1 Ω
(c) Reinstall the STOP fuse.

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

OK

5	INSPECT STOP LIGHT SWITCH ASSEMBLY



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

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

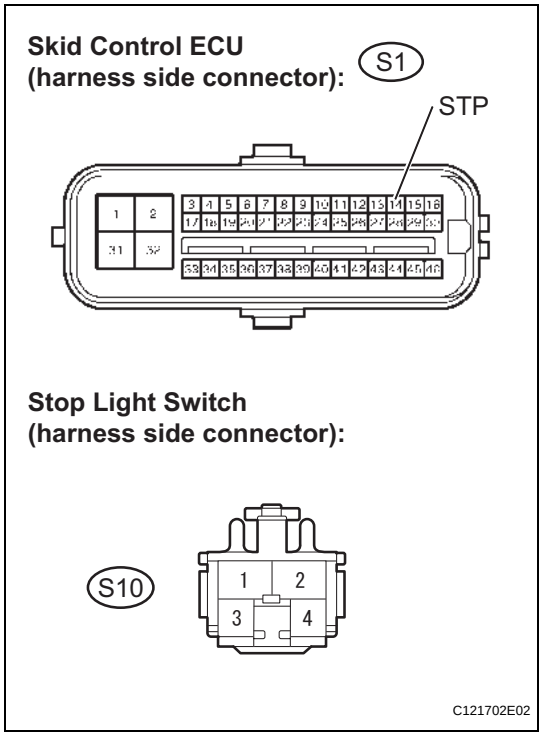
(c) Reconnect the stop light switch connector.

NG → **REPLACE STOP LIGHT SWITCH ASSEMBLY**

OK

BC

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



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

Standard Resistance

Tester Connection	Specified Condition
S1-14 (STP) - S10-1 (STP)	Below 1 Ω

(d) Reconnect the stop light switch connector.
(e) Reconnect the skid control ECU connector.

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

OK

7	RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

NG → **END**

A

REPLACE BRAKE ACTUATOR

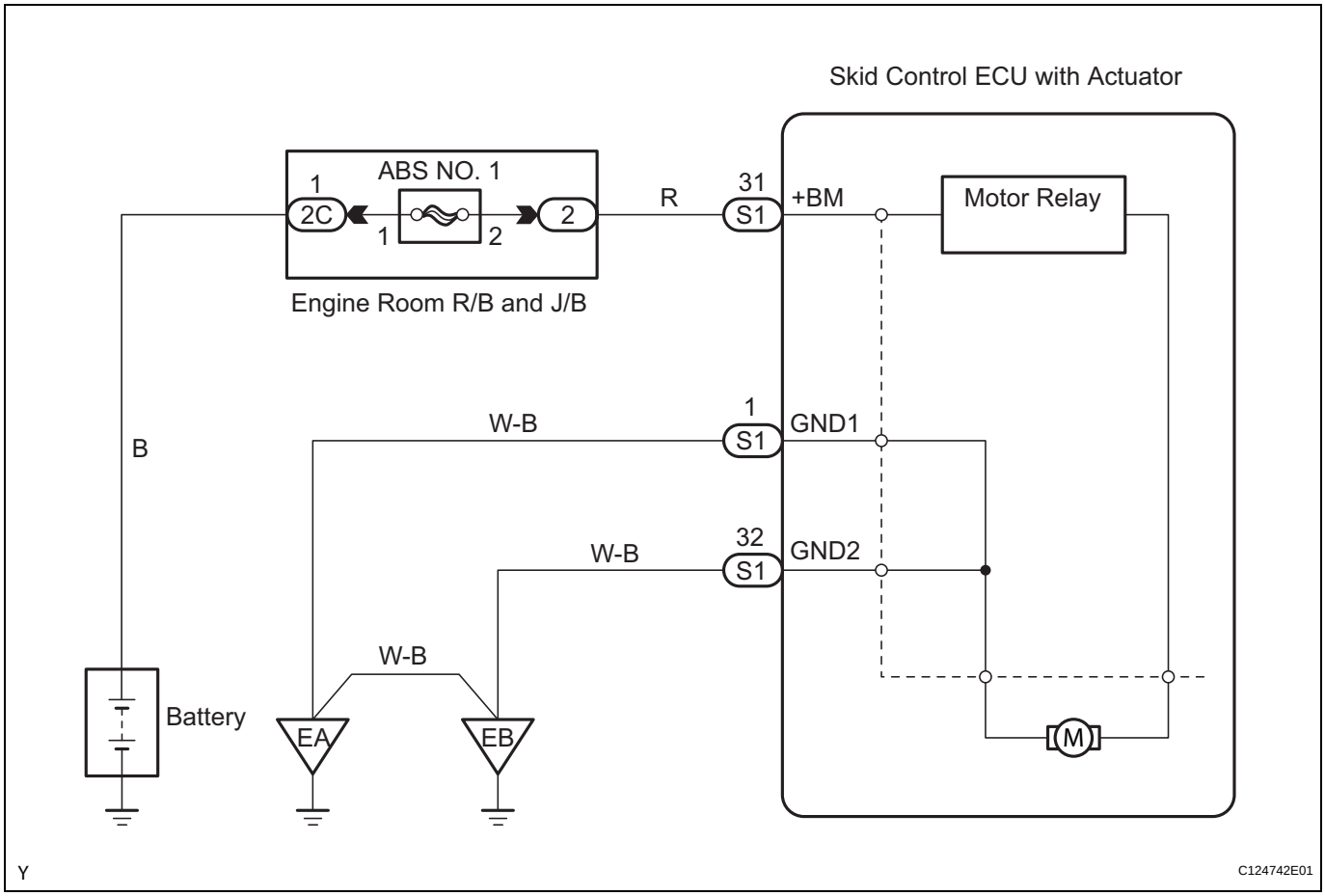
BC

DTC	C1251/51	Open in Pump Motor Circuit

DESCRIPTION

DTC No.	DTC Detecting Conditions	Trouble Areas
C1251/51	• Actuator pump motor does not operate properly. • Open in actuator pump motor circuit continues for at least 2 seconds.	• Brake actuator • Brake actuator circuit

WIRING DIAGRAM



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

1	PERFORM ACTIVE TEST BY INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine.
(c) Turn the intelligent tester ON.
(d) Select the ACTIVE TEST mode on the intelligent tester.
(e) Check the operation sound of the ABS motor individually when operating it with the intelligent tester.

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

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

NG → **Go to step 3**

OK ↓

2 RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Check if the same DTCs are detected.

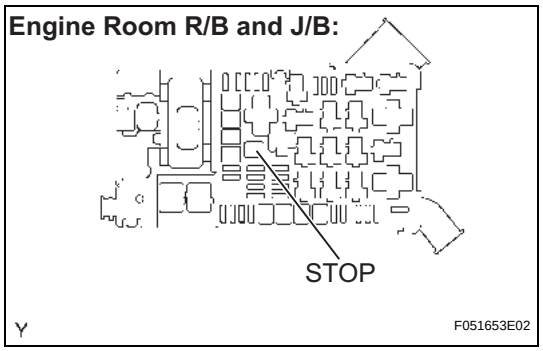
Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A ↓

REPLACE BRAKE ACTUATOR

3 INSPECT FUSE (ABS NO. 1)



(a) Remove the ABS NO. 1 fuse from the engine room R/B and J/B.
(b) Measure the resistance of the ABS NO. 1 fuse.
Standard Resistance:
Below 1 Ω
(c) Reinstall the ABS NO. 1 fuse.

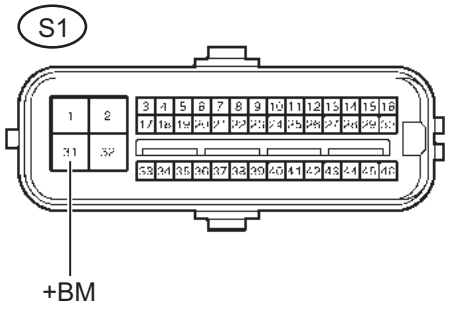
NG → **CHECK FOR SHORTS IN ALL HARNESSES AND CONNECTORS CONNECTED TO FUSE AND REPLACE FUSE**

OK ↓

BC

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

Skid Control ECU
(harness side connector):



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

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

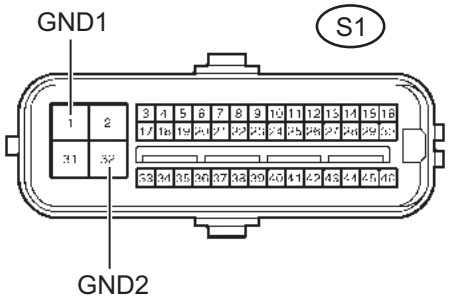
(c) Reconnect the skid control ECU connector.

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

OK

5	CHECK HARNESS AND CONNECTOR (GND1, GND2 - BODY GROUND)

Skid Control ECU
(harness side connector):



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

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

(c) Reconnect the skid control ECU connector.

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

OK

REPLACE BRAKE ACTUATOR

BC

DTC	C1337/37	Different Diameter Tire Malfunction

DESCRIPTION

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

DTC No.	DTC Detecting Condition	Trouble Areas
C1337/37	At vehicle speed of 18 mph (30 km/h) or more, difference of wheel speeds between front 2 wheels and rear 2 wheels, or front left and right wheels 20 % or more for 60 seconds or more.	• Speed sensor • Speed sensor rotor • Speed sensor circuit • Tire size • Brake actuator (skid control ECU)

1 CHECK TIRES

(a) Check tire size and condition of all 4 wheels.
OK:
All 4 wheels are in same condition.

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

OK ↓

2 CHECK SPEED SENSOR ROTOR

(a) Remove the drive shaft, and check around the speed sensor rotor.
OK:
No scratches or foreign matter on the sensor tip.

NG → **REPLACE SPEED SENSOR ROTOR**

OK ↓

3 CHECK SPEED SENSOR

NG → **REPLACE SPEED SENSOR**

OK ↓

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

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

OK ↓

BC

5	RECONFIRM DTC

(a) Clear the DTCs (See page BC-16).
(b) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A → REPLACE BRAKE ACTUATOR

ABS Warning Light Remains ON

DESCRIPTION

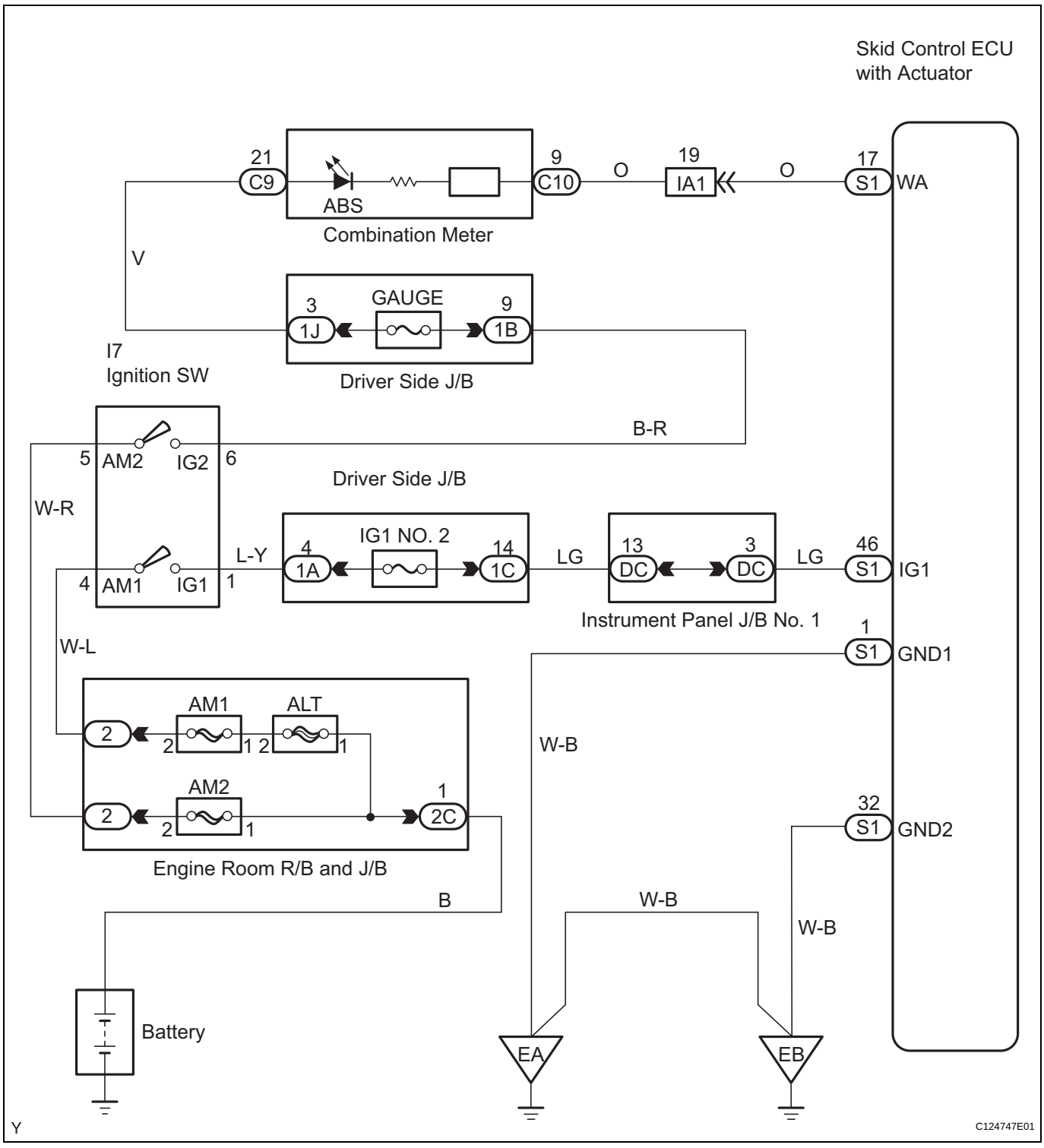
If any of the following is detected, the ABS warning light remains ON.

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.

HINT:

- When reading DTCs by SST (CHECK WIRE), if the ABS warning light remains on, troubleshoot by following the inspection flow.
- The intelligent tester may not be usable when there is a malfunction in the skid control ECU.

WIRING DIAGRAM



1	CHECK DTC

(a) Check if DTCs for ABS are recorded.

Result	Proceed to
Normal system code output	A
DTC output	B

Result	Proceed to
Other than above	C

B → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

C → Go to step 4

A

2 CHECK REAR DIFFERENTIAL LOCK SWITCH CONDITION

HINT:
Only for vehicles with rear differential locks.

(a) Check the rear diff. lock switch condition.

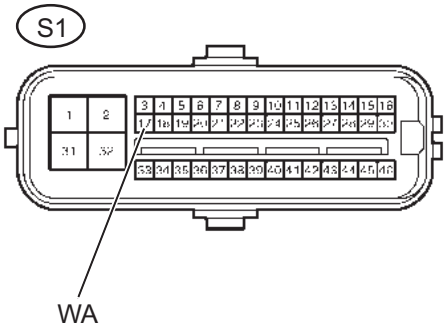
Result	Proceed to
Rear diff. lock switch OFF	A
Rear diff. lock switch ON	B

NG → SWITCH REAR DIFFERENTIAL LOCK SWITCH TO OFF (AFTER THIS FOLLOW TO STEP 3)

OK

3 CHECK ABS WARNING LIGHT

Skid Control ECU (harness side connector):



(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Ground terminal WA of the skid control ECU.
(d) Check ABS warning light.

OK

WA - GND Condition	Illumination Condition
Connecting	OFF
Disconnecting	ON

(e) Turn the ignition switch to OFF.
(f) Reconnect the skid control ECU connector.

NG → REPAIR COMBINATION METER SYSTEM

OK

REPLACE BRAKE ACTUATOR

4 INSPECT SKID CONTROL ECU (IG1 TERMINAL VOLTAGE)

(a) When using intelligent tester:

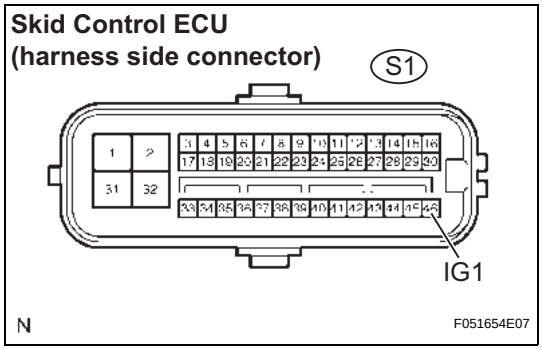
BC

(1) Connect the intelligent tester to the DLC3.
(2) Start the engine.
(3) Turn the intelligent tester ON.
(4) Select the DATA LIST mode on the intelligent tester.
(5) Measure the voltage output from the ECU displayed on the intelligent tester.

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

OK:

"Normal" is displayed.



(b) When not using intelligent tester:
(1) Disconnect the skid control ECU connector.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage.

Standard Voltage

Tester Connection	Specified Condition
A9-46 (IG1) - Body ground	11 to 14 V

(4) Turn the ignition switch to OFF.
(5) Reconnect the skid control ECU connector.

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

OK ↓

REPLACE BRAKE ACTUATOR

BC

ABS Warning Light does not Come ON

DESCRIPTION

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

WIRING DIAGRAM

See page BC-26.

1	CHECK ABS WARNING LIGHT

(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Check that the ABS warning light comes on.
OK:
ABS warning light comes on.
(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control ECU connector.

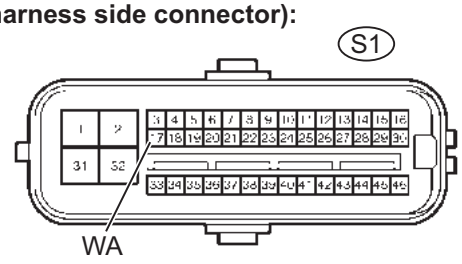
OK → **REPLACE BRAKE ACTUATOR**

NG

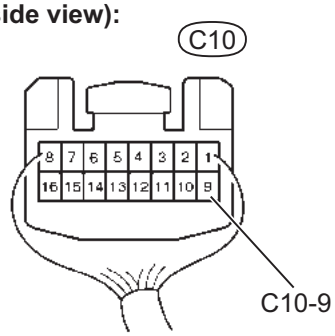
2	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - COMBINATION METER)

BC

Skid Cotrol ECU (harness side connector):



Combination Meter (harness side view):



F049387E05

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

Tester Connection	Specified Condition
S1-17 (WA) - C10-9	Below 1 Ω
S1-17 (WA) - Body ground	10 kΩ or higher

(d) Reconnect the combination meter connector.
(e) Reconnect the skid control ECU connector.

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

OK

3	INSPECT COMBINATION METER

(a) Check the combination meter system (See page ME-7).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER**

OK

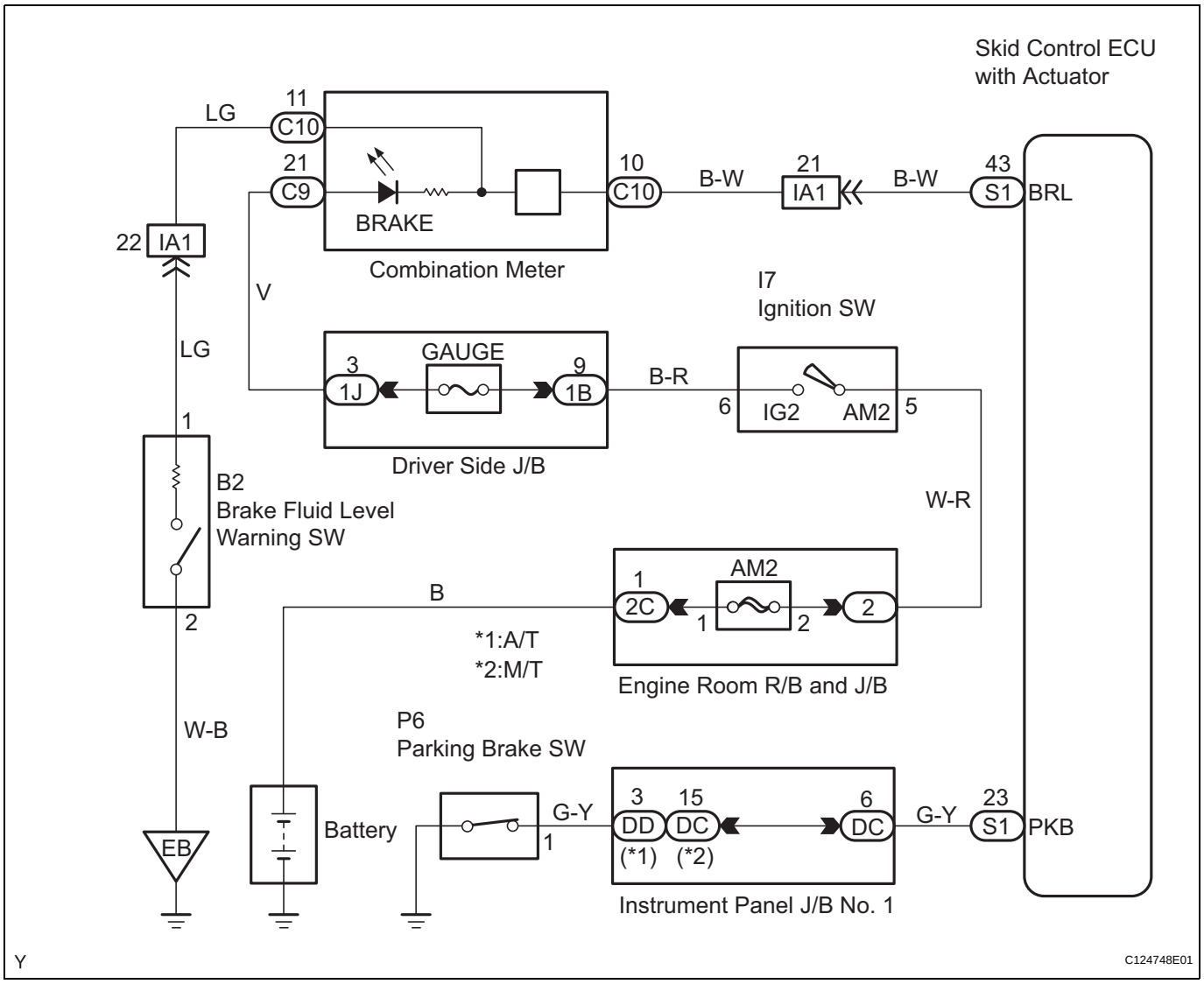
CHECK FOR INTERMITTENT PROBLEMS

Brake Warning Light Circuit

DESCRIPTION

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

WIRING DIAGRAM



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

1	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

BC

OK

2	INSPECT BRAKE WARNING LIGHT

(a) When using intelligent tester:
(1) Connect the intelligent tester to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Turn the intelligent tester ON.
(4) Select the item "BRAKE WARN LIGHT" in the ACTIVE TEST and operate the BRAKE warning light on the intelligent tester.

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

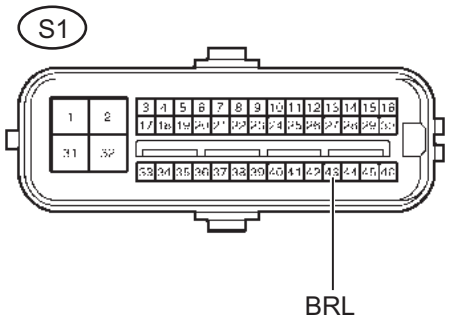
(5) Check that "ON" and "OFF" of the BRAKE warning light are indicated on the combination meter when using the intelligent tester.
OK:
The BRAKE warning light comes on or goes off according to the intelligent tester operations.

(b) When not using intelligent tester:
(1) Disconnect the skid control ECU connector.
(2) Turn the ignition switch to the ON position.
(3) Ground terminal BRL of the skid control ECU.
(4) Check the BRAKE warning light.
OK

BRL - GND Condition	Illumination Condition
Connecting	OFF
Disconnecting	ON

(5) Turn the ignition switch to OFF.
(6) Reconnect the skid control ECU connector.

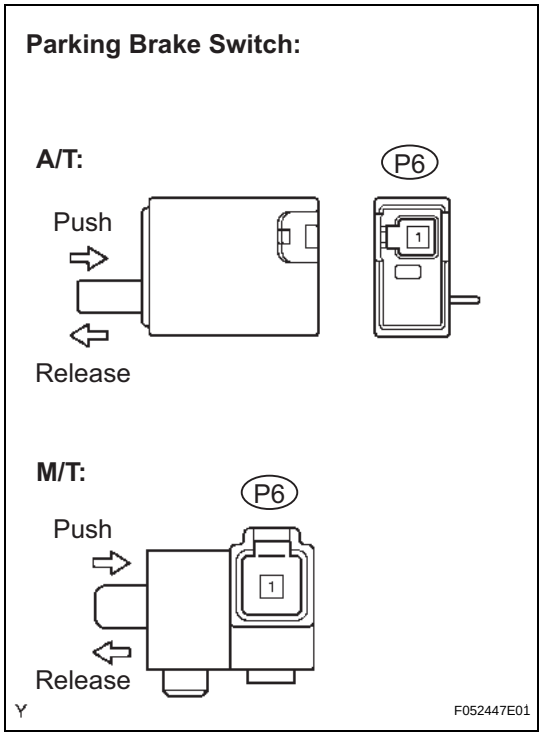
Skid Control ECU (harness side connector):



OK → REPLACE BRAKE ACTUATOR

NG

3 INSPECT PARKING BRAKE SWITCH ASSEMBLY



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

Standard Resistance

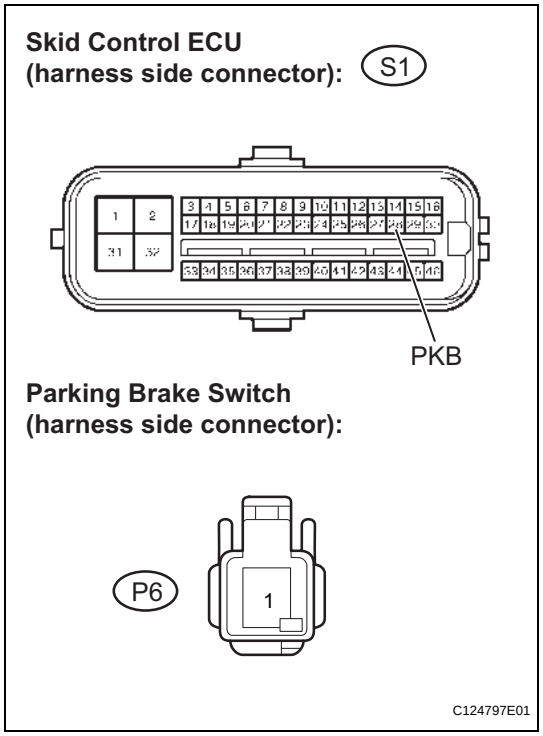
Tester Connection	Condition	Specified Condition
P6-1 Body ground	Released	Below 1 Ω
P6-1 Body ground	Pushed in	10 kΩ or higher

(c) Reconnect the parking brake switch connector.

NG → **REPLACE PARKING BRAKE SWITCH ASSEMBLY**

OK

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



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

Standard Resistance

Tester Connection	Specified Condition
S1-23 (PKB) - P6-1	Below 1 Ω
S1-23 (PKB) - Body ground	10 kΩ or higher

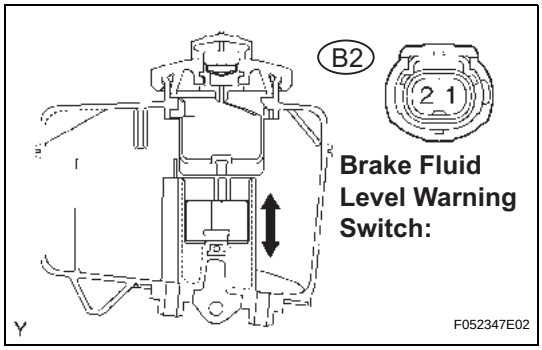
(d) Reconnect the parking brake switch connector.
(e) Reconnect the skid control ECU connector.

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

OK

BC

5 INSPECT BRAKE FLUID LEVEL WARNING SWITCH CIRCUIT



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

Tester Connection	Condition	Specified Condition
B2-1 - B2-2	Float UP	10 kΩ or higher
B2-1 - B2-2	Float DOWN	Below 1 Ω

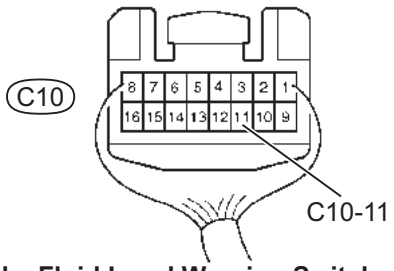
(c) Reconnect the brake fluid level warning switch connector.

NG → **REPLACE BRAKE FLUID RESERVOIR**

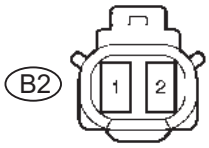
OK

6 CHECK HARNESS AND CONNECTOR (COMBINATION METER - BRAKE FLUID LEVEL WARNING SWITCH)

Combination Meter (harness side view):



Brake Fluid Level Warning Switch (harness side connector):



F052161E02

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

Tester Connection	Specified Condition
C10-11 - B2-1	Below 1 Ω
C10-11 - Body ground	10 kΩ or higher

(d) Reconnect the brake fluid level warning switch connector.
(e) Reconnect the combination meter connector.

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

OK

7 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-7).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER**

OK

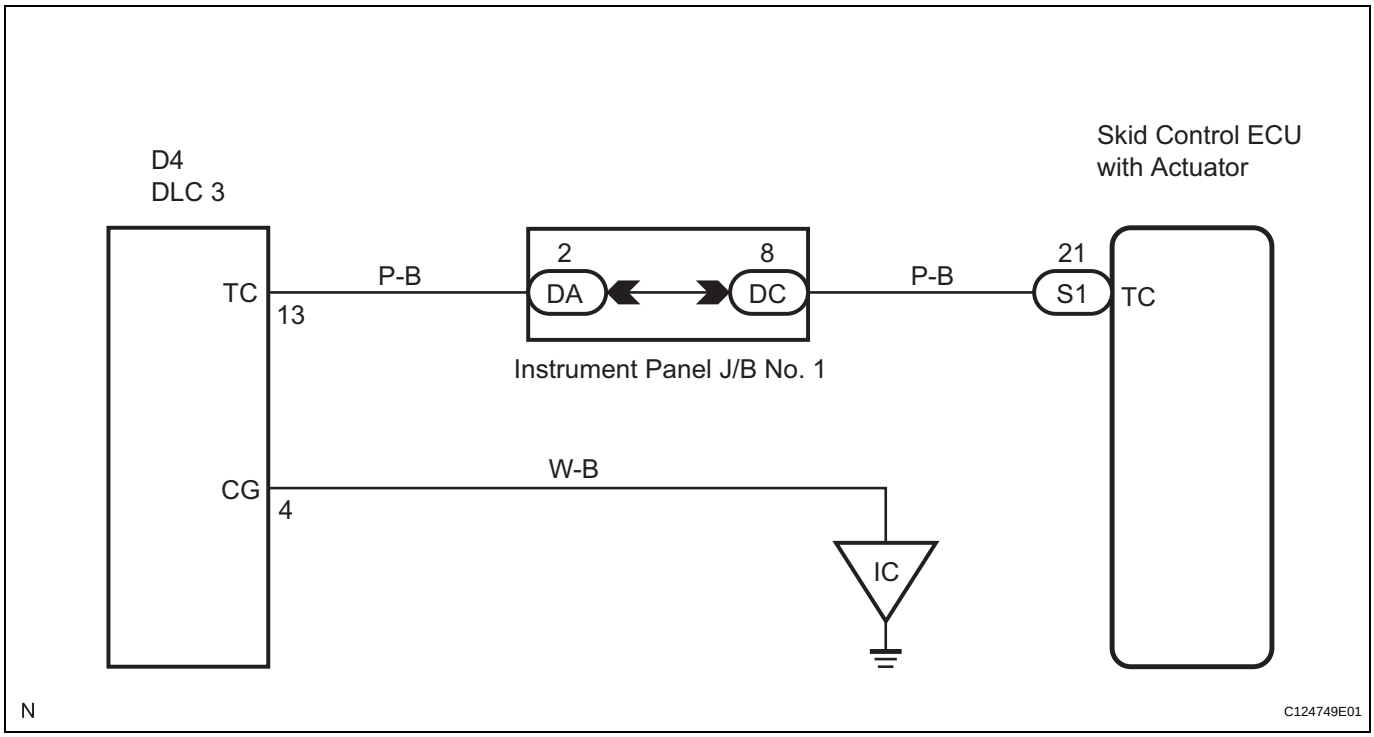
CHECK FOR INTERMITTENT PROBLEMS

TC and CG Terminal Circuit

DESCRIPTION

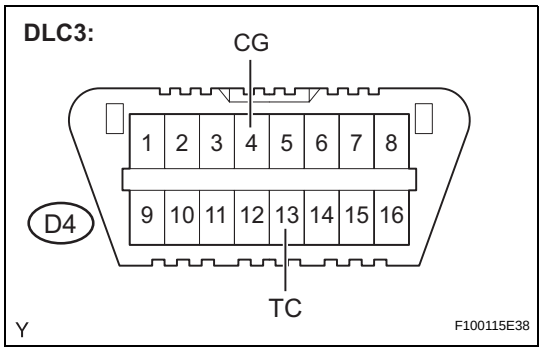
Connecting terminals TC and CG of the DLC3 causes the ECU to display 2-digit DTCs by flashing the ABS warning light.

WIRING DIAGRAM



BC

1	INSPECT DLC3 TERMINAL VOLTAGE (TC TERMINAL)



(a) Turn the ignition switch to the ON position.
(b) Measure the voltage.

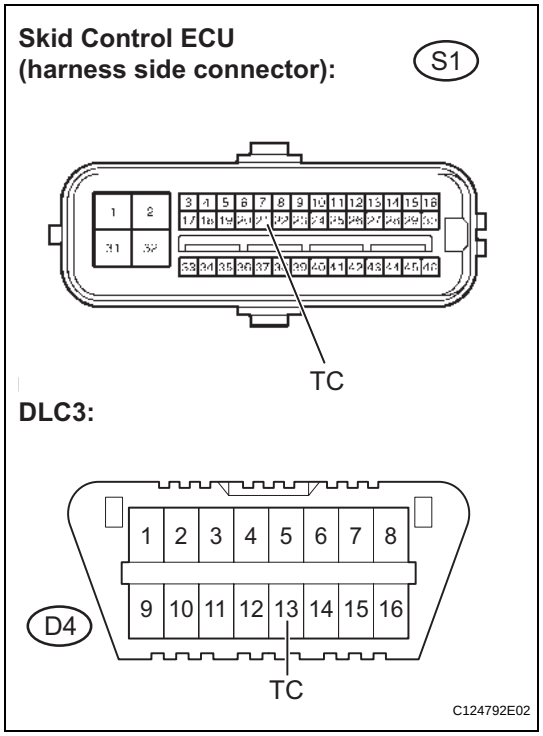
Standard Voltage

Tester Connection	Specified Condition
D4-13 (TC) - D4-4 (CG)	10 to 14 V

NG → **Go to step 3**

OK

2 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DLC3)



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

Tester Connection	Specified Condition
S1-21 (TC) - D4-13 (TC)	Below 1 Ω
S1-21 (TC) - Body ground	10 kΩ or higher

(c) Reconnect the skid control ECU connector.

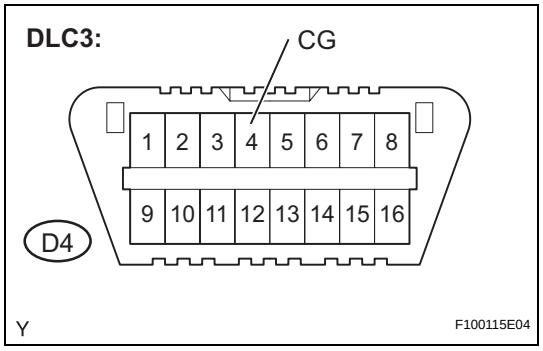
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE BRAKE ACTUATOR

BC

3 CHECK HARNESS AND CONNECTOR (DLC3 - BODY GROUND)



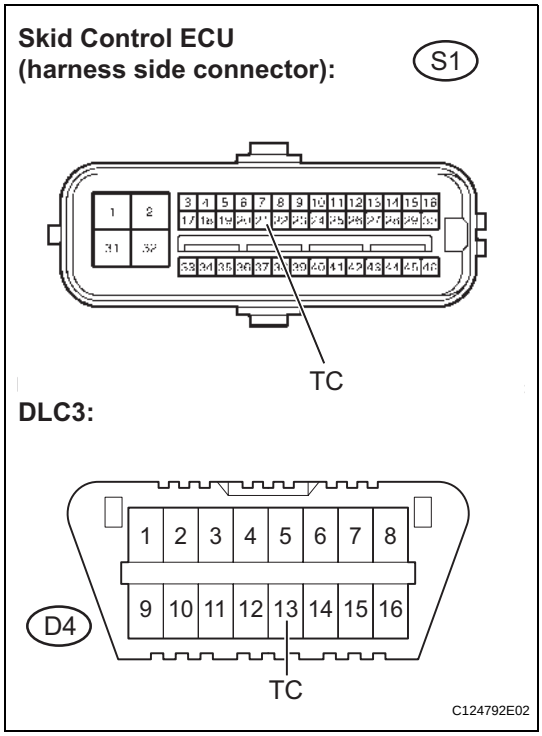
(a) Measure the resistance.
Standard Resistance

Tester Connection	Specified Condition
D4-4 (CG) - Body ground	Below 1 Ω

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

OK

4	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DLC3)



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

Tester Connection	Specified Condition
S1-21 (TC) - D4-13 (TC)	Below 1 Ω
S1-21 (TC) - Body ground	10 kΩ or higher

(c) Reconnect the skid control ECU connector.

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

OK

REPLACE BRAKE ACTUATOR

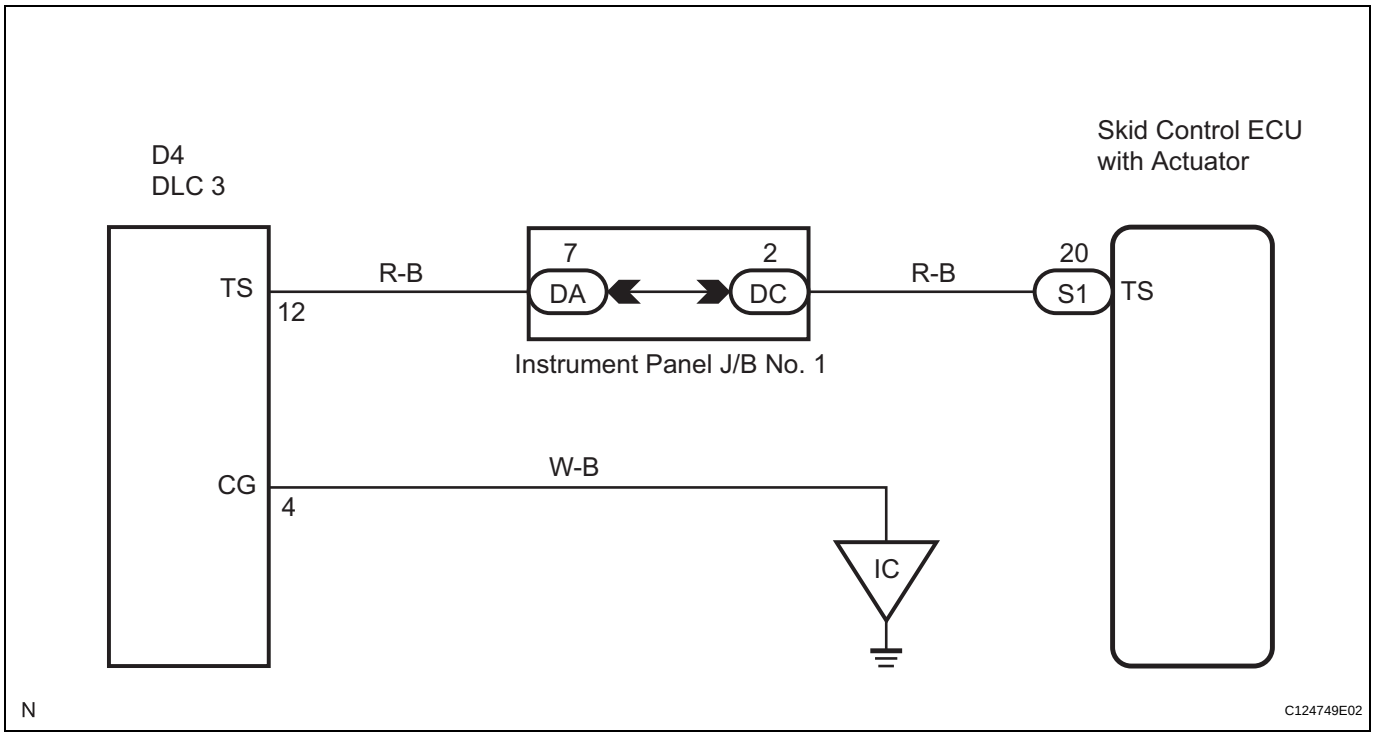
BC

TS and CG Terminal Circuit

DESCRIPTION

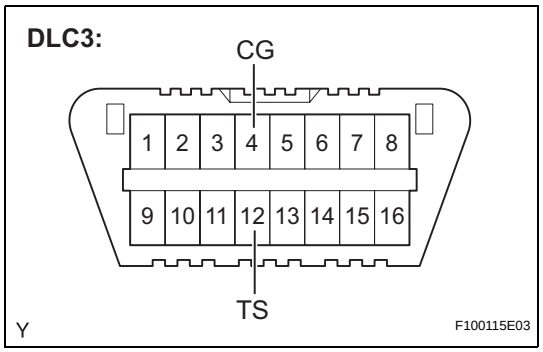
In sensor check mode, malfunctions of the speed sensor that cannot be detected when the vehicle is stopped are detected while driving.
Transition to the sensor check mode can be performed by connecting terminals TS and CG of the DLC3 and turning the ignition switch from OFF to the ON position.

WIRING DIAGRAM



BC

1	INSPECT DLC3 TERMINAL VOLTAGE (TS TERMINAL)



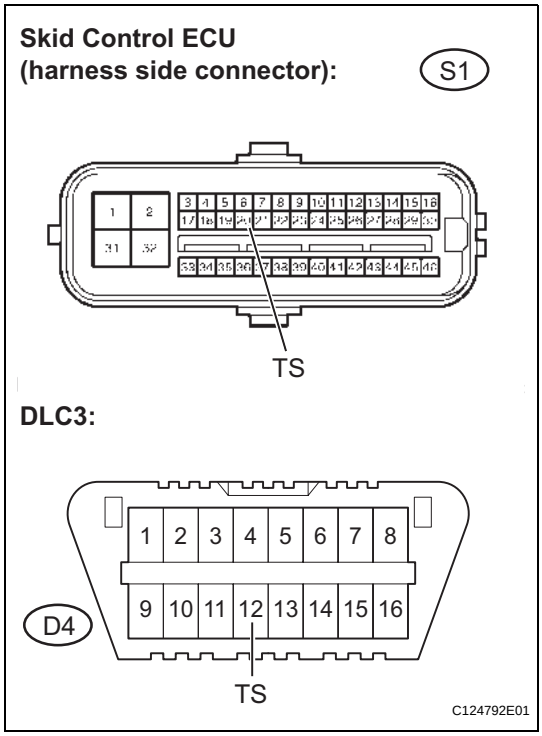
(a) Turn the ignition switch to the ON position.
(b) Measure the voltage.
Standard Voltage

Tester Connection	Specified Condition
D4-12 (TS) - D4-4 (CG)	10 to 14 V

NG → **Go to step 3**

OK

2	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DLC3)



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

Tester Connection	Specified Condition
S1-20 (TS) - D4-12 (TS)	Below 1 Ω
S1-20 (TS) - Body ground	10 kΩ or higher

(c) Reconnect the skid control ECU connector.

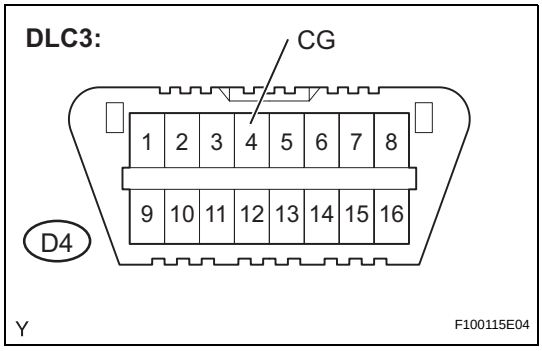
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

BC

REPLACE BRAKE ACTUATOR

3	CHECK HARNESS AND CONNECTOR (BODY GROUND - DLC3)



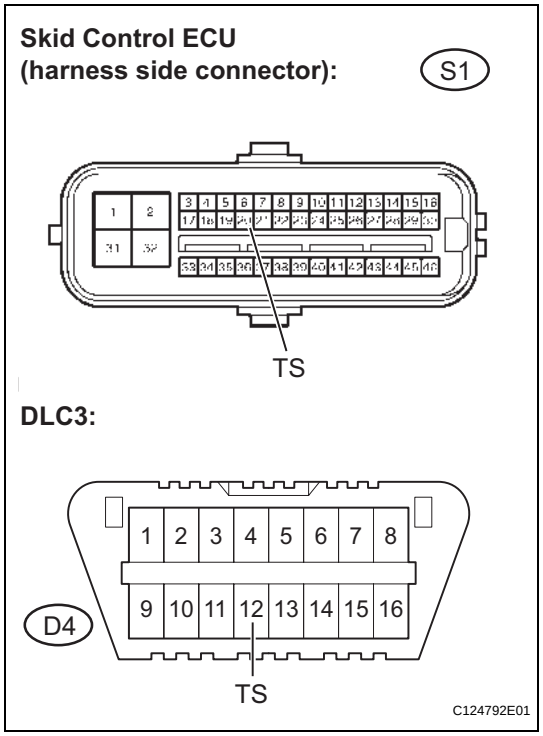
(a) Measure the resistance.
Standard Resistance

Tester Connection	Specified Condition
D4-4 (CG) - Body ground	Below 1 Ω

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

OK

4	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DLC3)



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

Tester Connection	Specified Condition
S1-20 (TS) - D4-12 (TS)	Below 1 Ω
S1-20 (TS) - Body ground	10 kΩ or higher

(c) Reconnect the skid control ECU connector.

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

OK

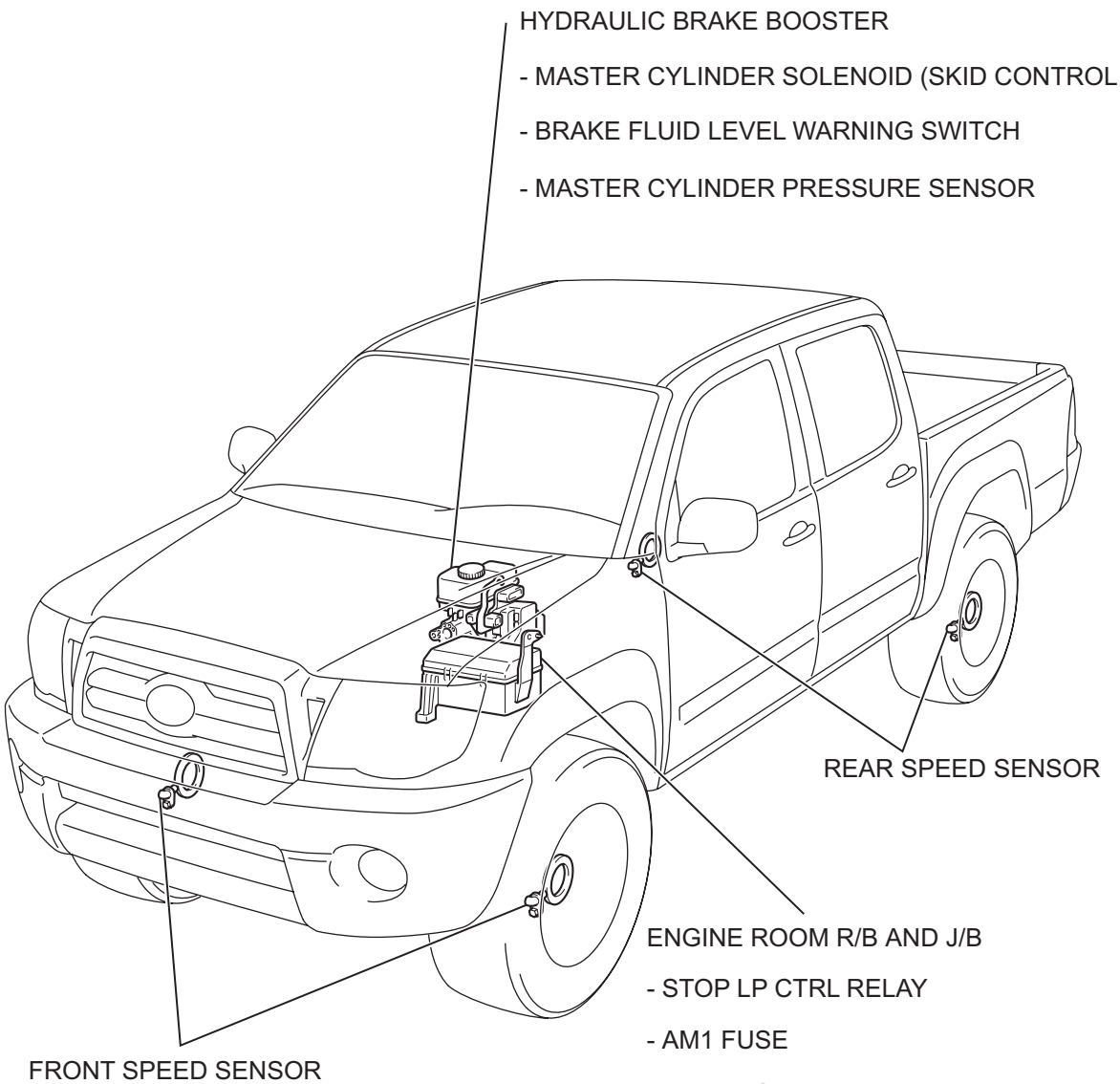
REPLACE BRAKE ACTUATOR

VEHICLE STABILITY CONTROL SYSTEM

PRECAUTION

- When there is a malfunction in the contact point 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-99).
- 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.

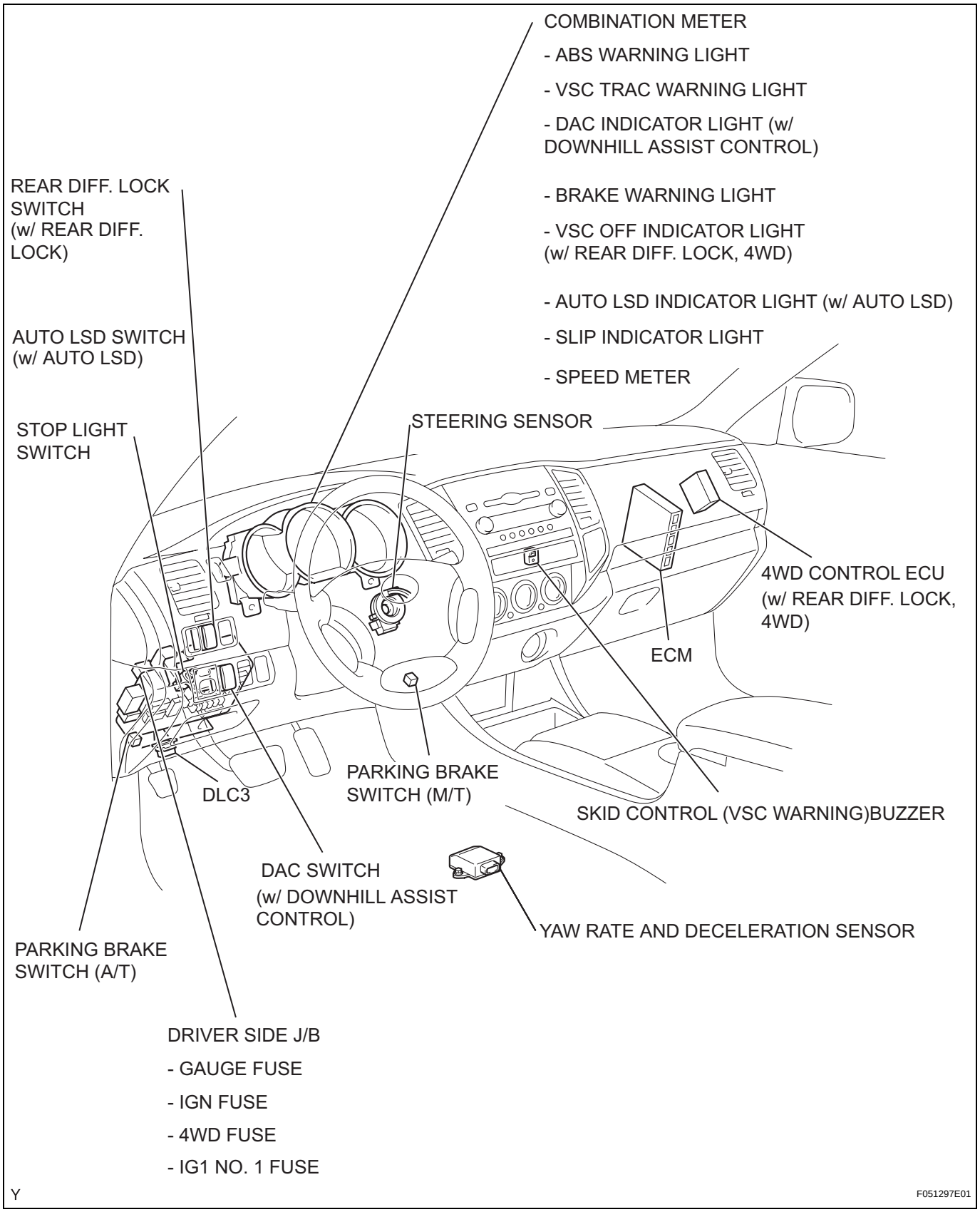
PARTS LOCATION



BC

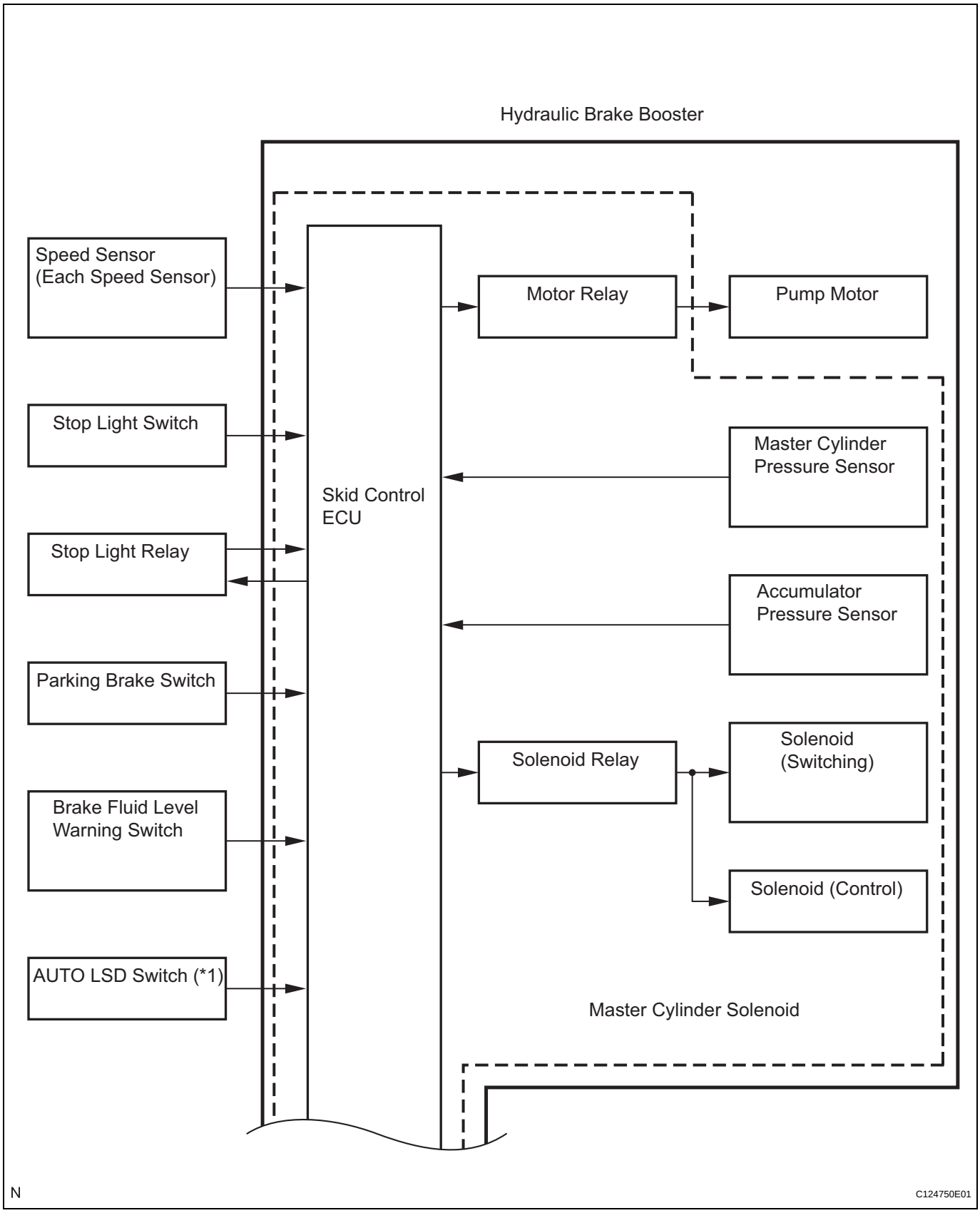
Y

F051296E01

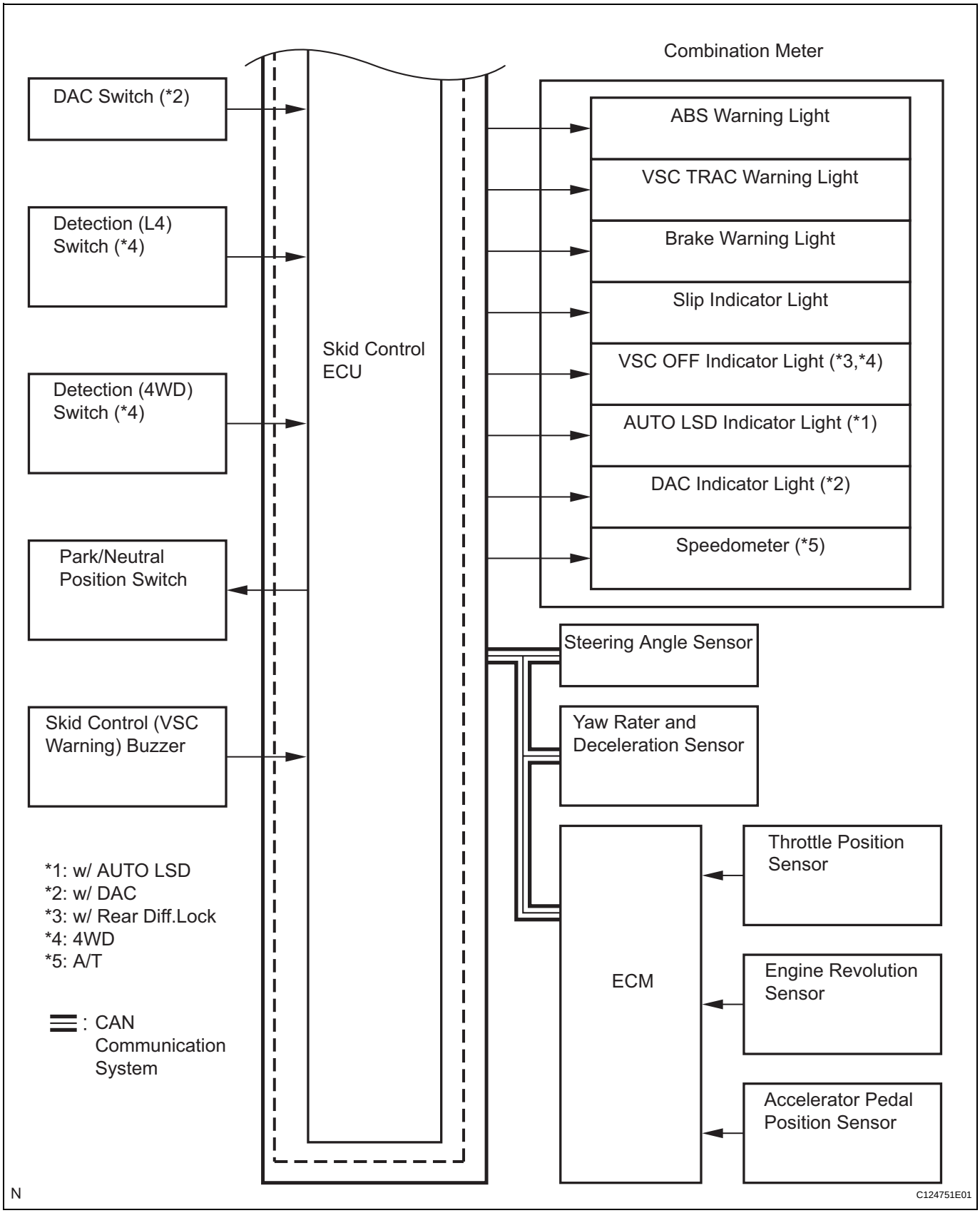

COMBINATION METER
- ABS WARNING LIGHT
- VSC TRAC WARNING LIGHT
- DAC INDICATOR LIGHT (w/ DOWNHILL ASSIST CONTROL)
- BRAKE WARNING LIGHT
- VSC OFF INDICATOR LIGHT (w/ REAR DIFF. LOCK, 4WD)
- AUTO LSD INDICATOR LIGHT (w/ AUTO LSD)
- SLIP INDICATOR LIGHT
- SPEED METER
REAR DIFF. LOCK SWITCH (w/ REAR DIFF. LOCK)
AUTO LSD SWITCH (w/ AUTO LSD)
STOP LIGHT SWITCH
STEERING SENSOR
4WD CONTROL ECU (w/ REAR DIFF. LOCK, 4WD)
ECM
DLC3
PARKING BRAKE SWITCH (M/T)
SKID CONTROL (VSC WARNING)BUZZER
DAC SWITCH (w/ DOWNHILL ASSIST CONTROL)
YAW RATE AND DECELERATION SENSOR
PARKING BRAKE SWITCH (A/T)
DRIVER SIDE J/B
- GAUGE FUSE
- IGN FUSE
- 4WD FUSE
- IG1 NO. 1 FUSE
Y
F051297E01

BC

SYSTEM DIAGRAM



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

BC

Transmitting ECU (Transmitter)	Receiving ECU	Signals	Communication Method
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.
- The yaw rate sensor and deceleration sensor are combined in a single unit. This unit communicates with the skid control ECU through CAN communication.

(a) ABS with EBD & BA & TRAC & VSC operation

(1) The skid control ECU determines the wheel slipping conditions by receiving signals from each speed sensor, the yaw rate and deceleration sensor and the steering angle sensor. The ECU controls the engine output torque using electronic throttle control, and the wheel brake pressure using the brake actuator, according to these signals.

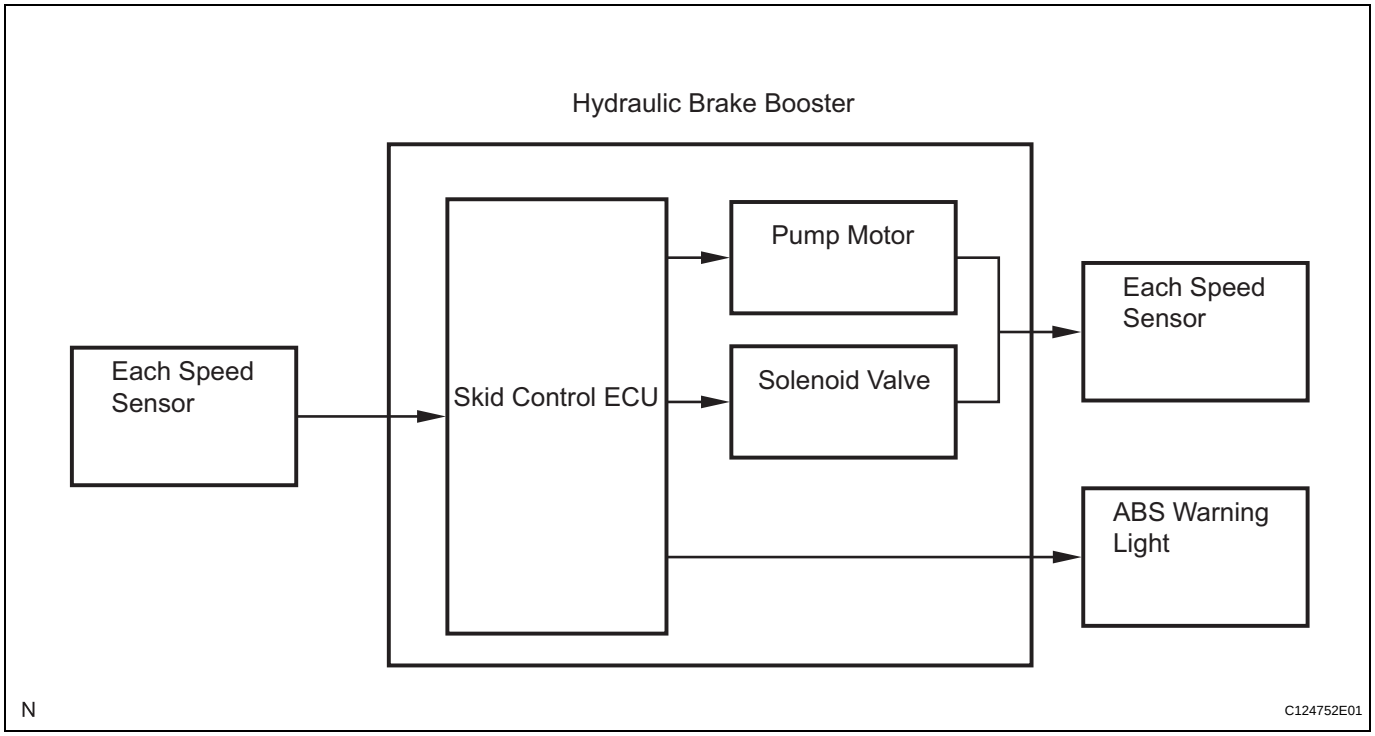
(2) The SLIP indicator blinks and the skid control buzzer sounds to inform the driver that the VSC system is operating. The SLIP indicator also blinks when TRAC is operating, and the operation being performed is displayed.

2. ACTIVE SAFETY

(a) ABS (Anti-lock Brake System)

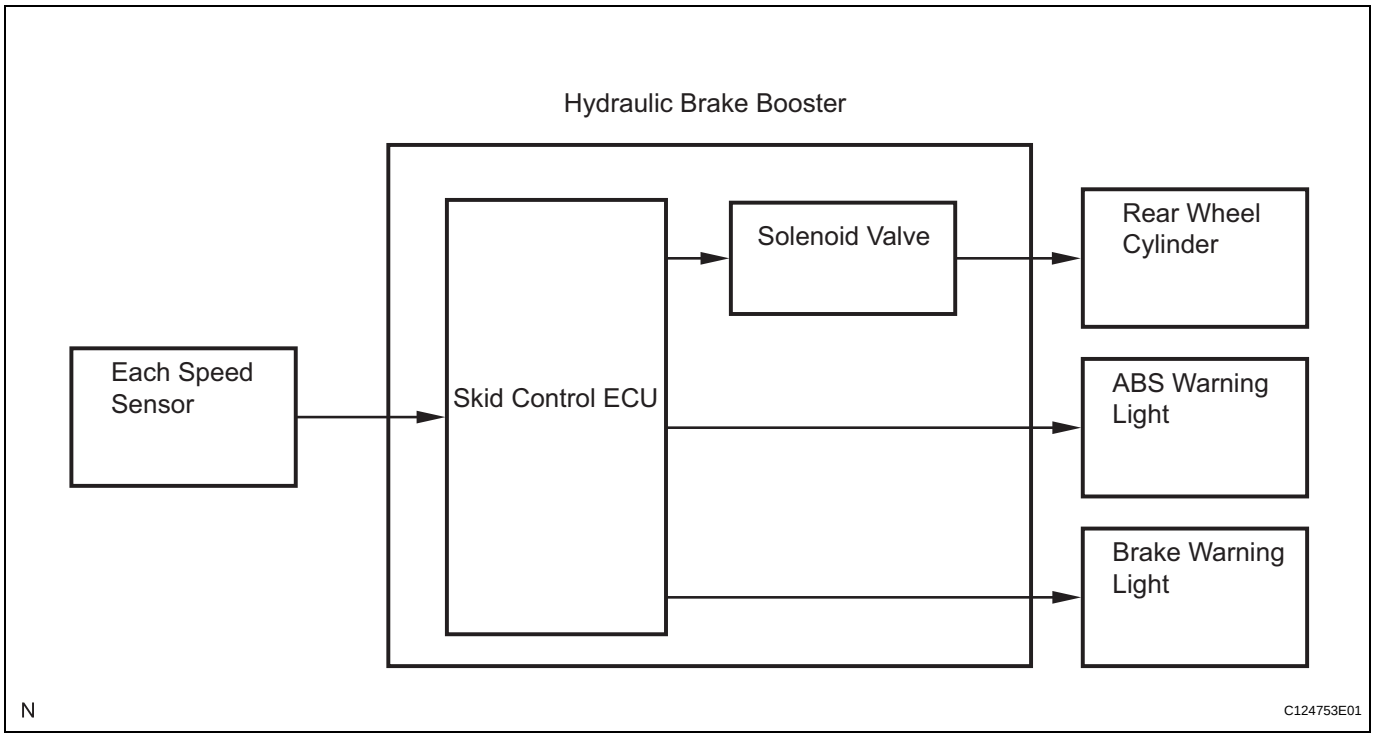
The ABS helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface.

BC



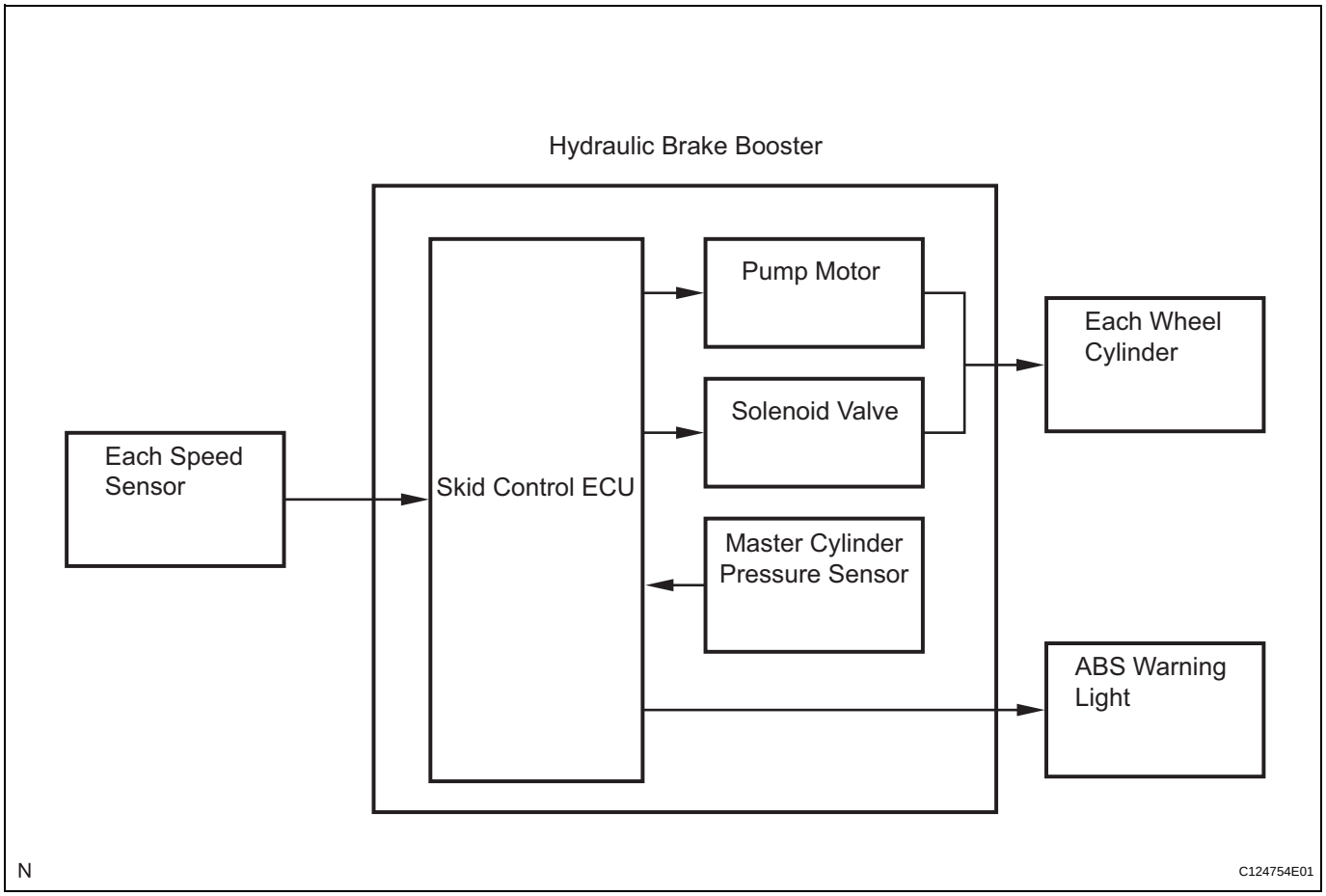
Operation description
The skid control ECU detects the wheel lock condition by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valve. The pump motor and solenoid valve prevent the wheels from locking by controlling the oil pressure of each 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. In addition, when braking while cornering, it also controls the brake forces of the right and left wheels, helping to control the vehicle behavior.



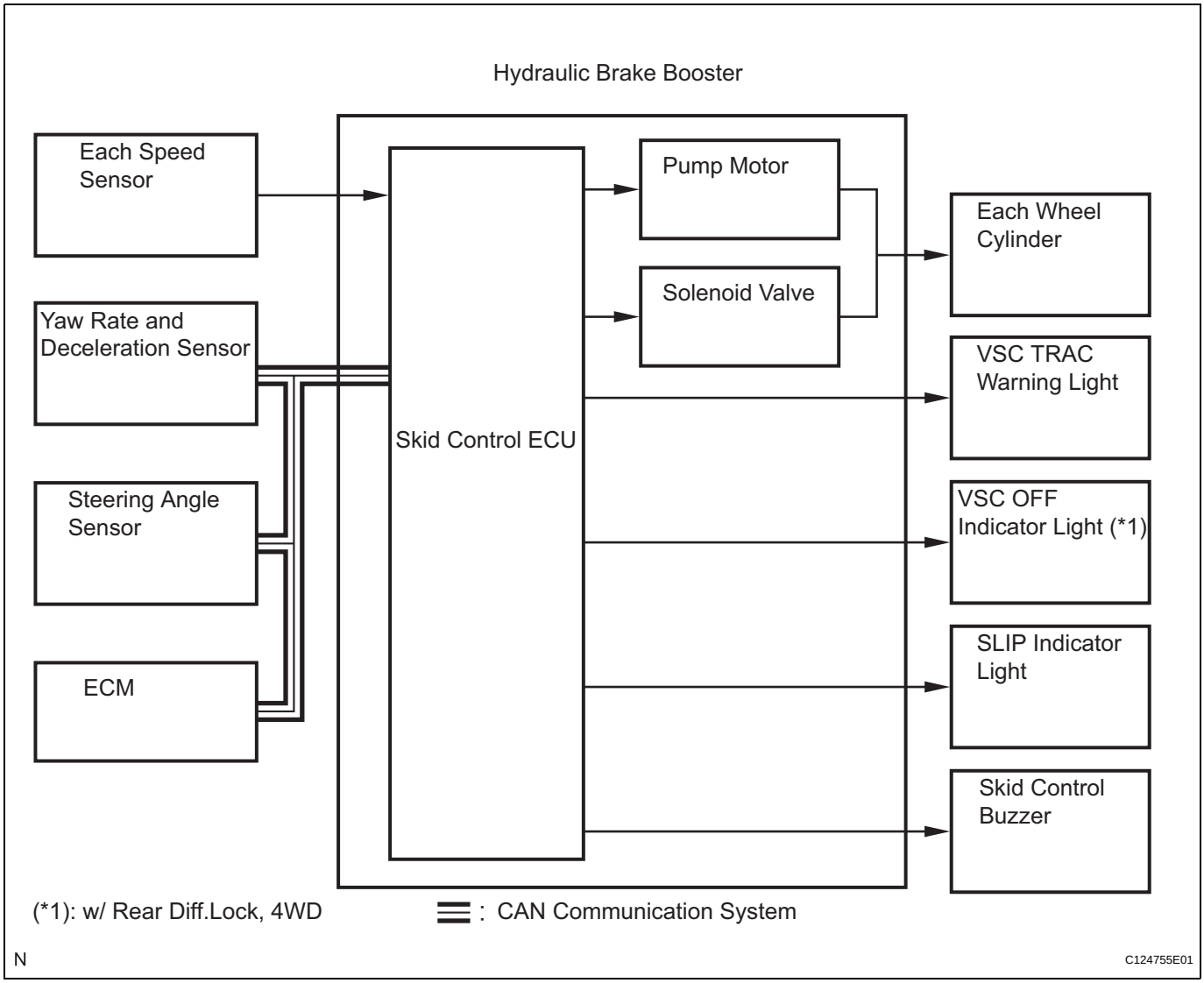
Operation description
The skid control ECU receives the speed signals from each speed sensor to detect the slip condition of the wheels and sends the control signal to the solenoid.
The solenoid valve controls the oil pressure of the rear wheel cylinder and divides the control power appropriately between 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.



Operation description
The skid control ECU receives the speed signal from each speed sensor and the oil pressure signal from the master cylinder pressure sensor to determine whether brake assist is necessary or not. If brake assist is necessary, the skid control ECU sends control signals to the pump motor and solenoid. The pump and the solenoid valve then control the pressure applied to each wheel cylinder. The ABS warning light comes on 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.



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 the oil pressure through the pump and solenoid valve.
The SLIP indicator light blinks and the skid control buzzer sounds when the system is operating. Both the VSC TRAC warning light and the VSC OFF indicator light (w/ rear diff. lock, 4WD) come on when the VSC system malfunctions.

BC

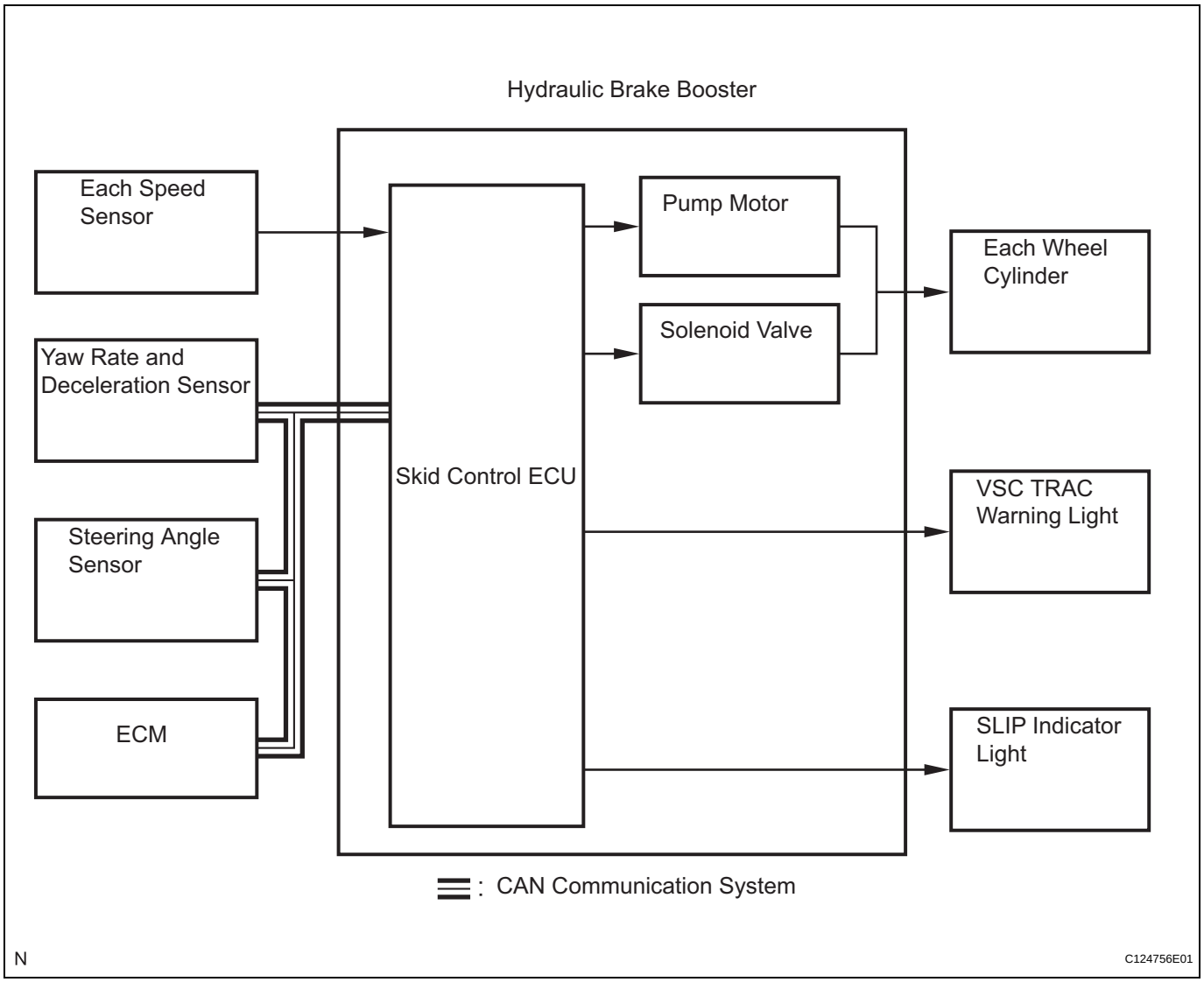
3. DRIVING PERFORMANCE

(a) 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.

HINT:

The TRAC system operates when 2WD mode is selected (4WD vehicles only).

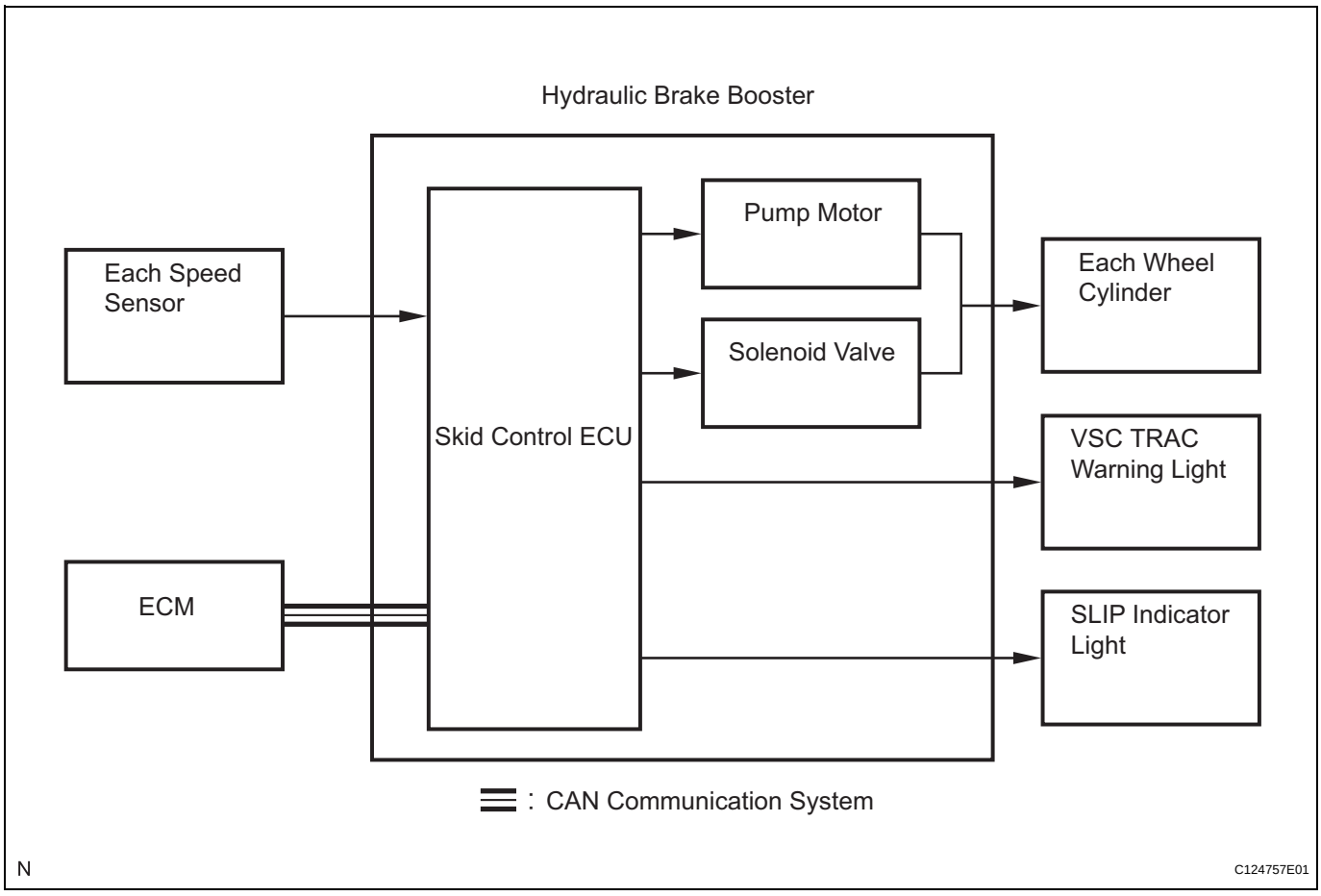


Operation description

The skid control ECU detects the vehicle's slip condition by receiving signals from the speed sensors and ECM via CAN communication. The skid control ECU controls the engine torque through the ECM via CAN communication, and the oil pressure through the pump and solenoid valve. The SLIP indicator light blinks when the system is operating. Both the VSC TRAC warning light and SLIP indicator light come on when the TRAC system malfunctions.

BC

(b) A-TRAC (Active Traction Control) (4WD)
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).



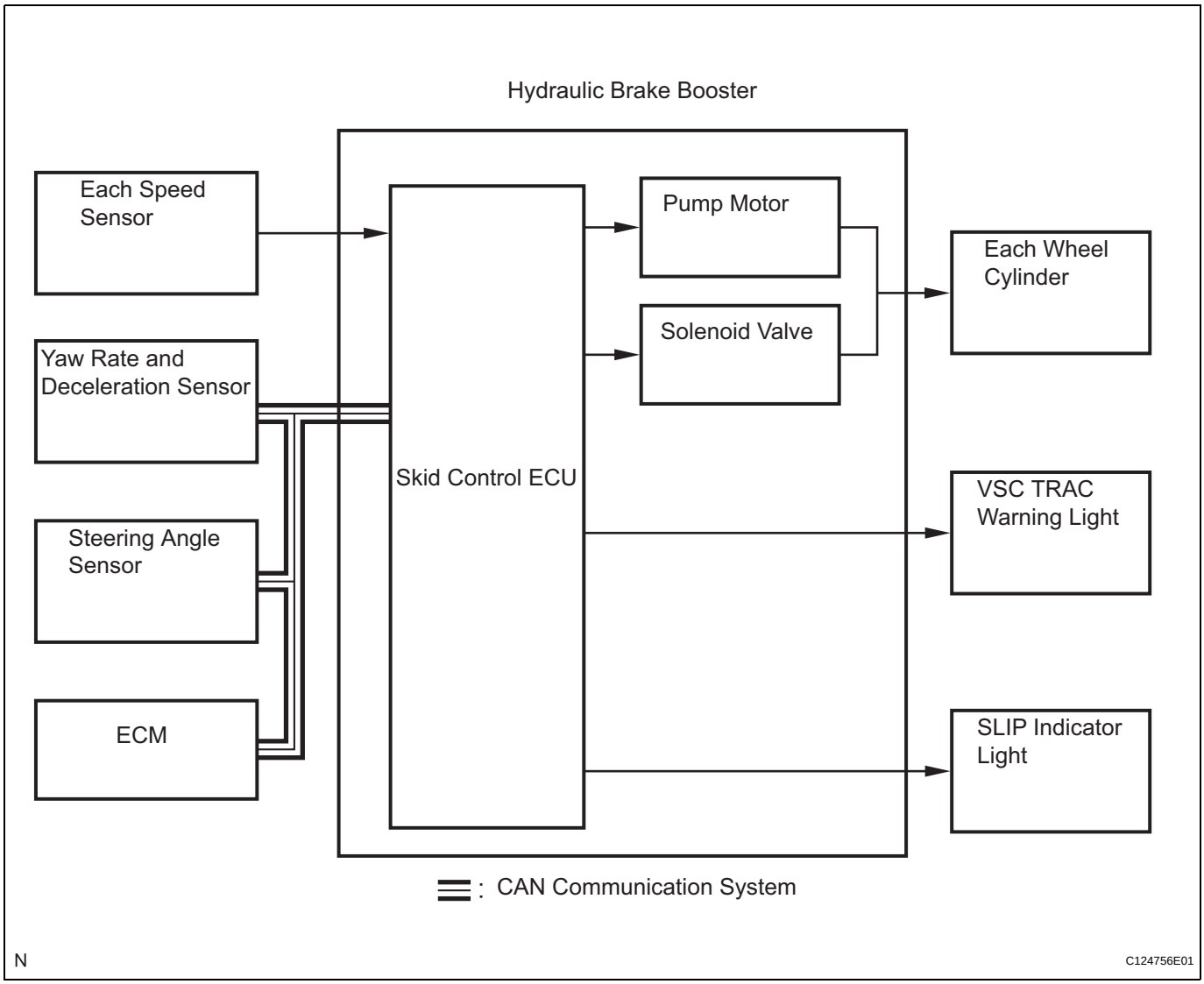
Operation description
The SLIP indicator light blinks when the system is operating. Both the VSC TRAC warning light and SLIP indicator light come on when the A-TRAC system malfunctions.

(c) AUTO-LSD (Auto Limited Slip Differential)
When the vehicle enters 2WD mode, 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.

BC

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

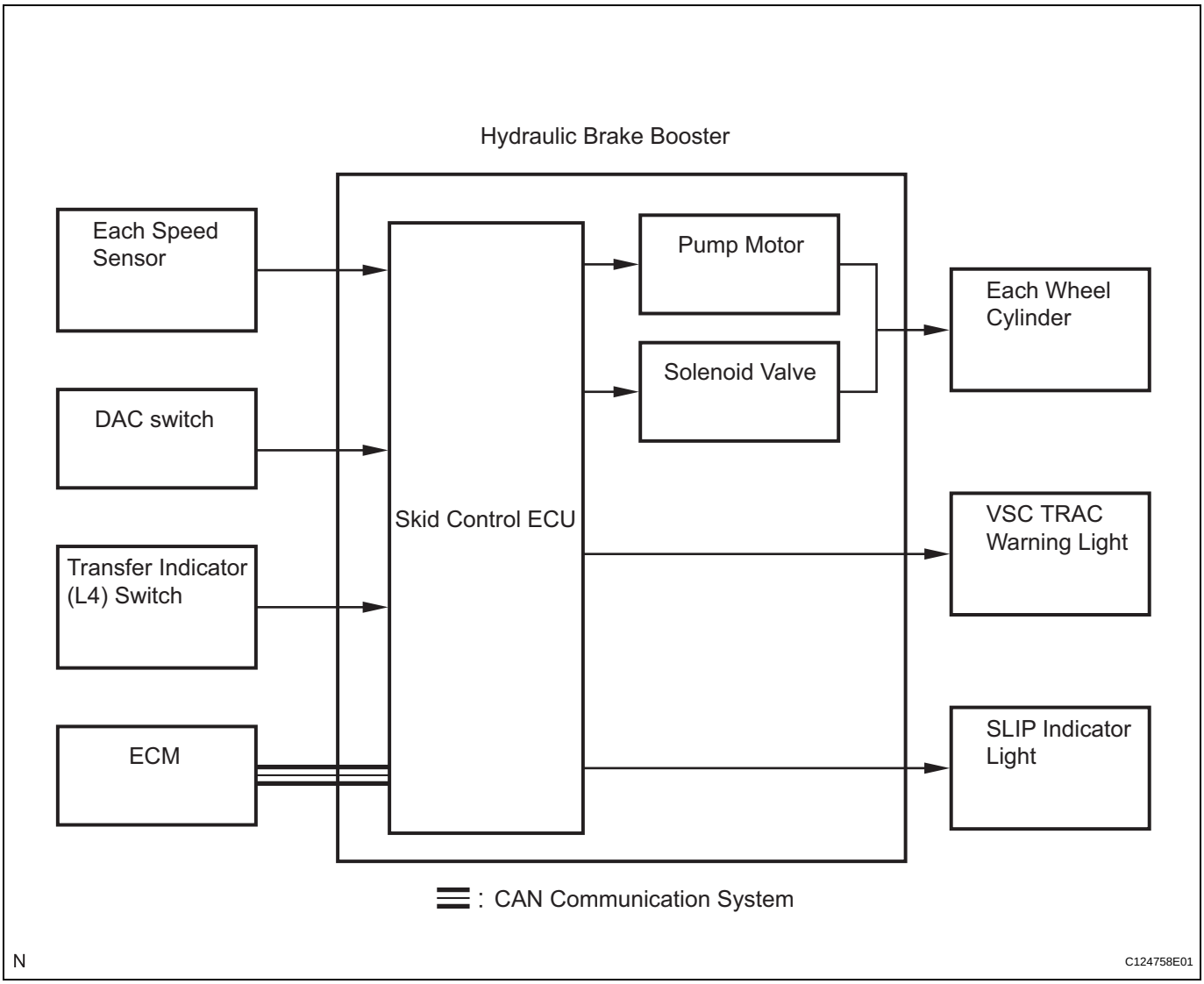
HINT:
Depressing the brake pedal cancels control of the AUTO LSD system.
The AUTO LSD system operates when 2WD mode is selected (4WD vehicles only).



Operation description
The SLIP indicator light blinks and the AUTO LSD indicator light comes on when the system is operating.
Both the VSC TRAC warning light and SLIP indicator light come on when the AUTO LSD system malfunctions.

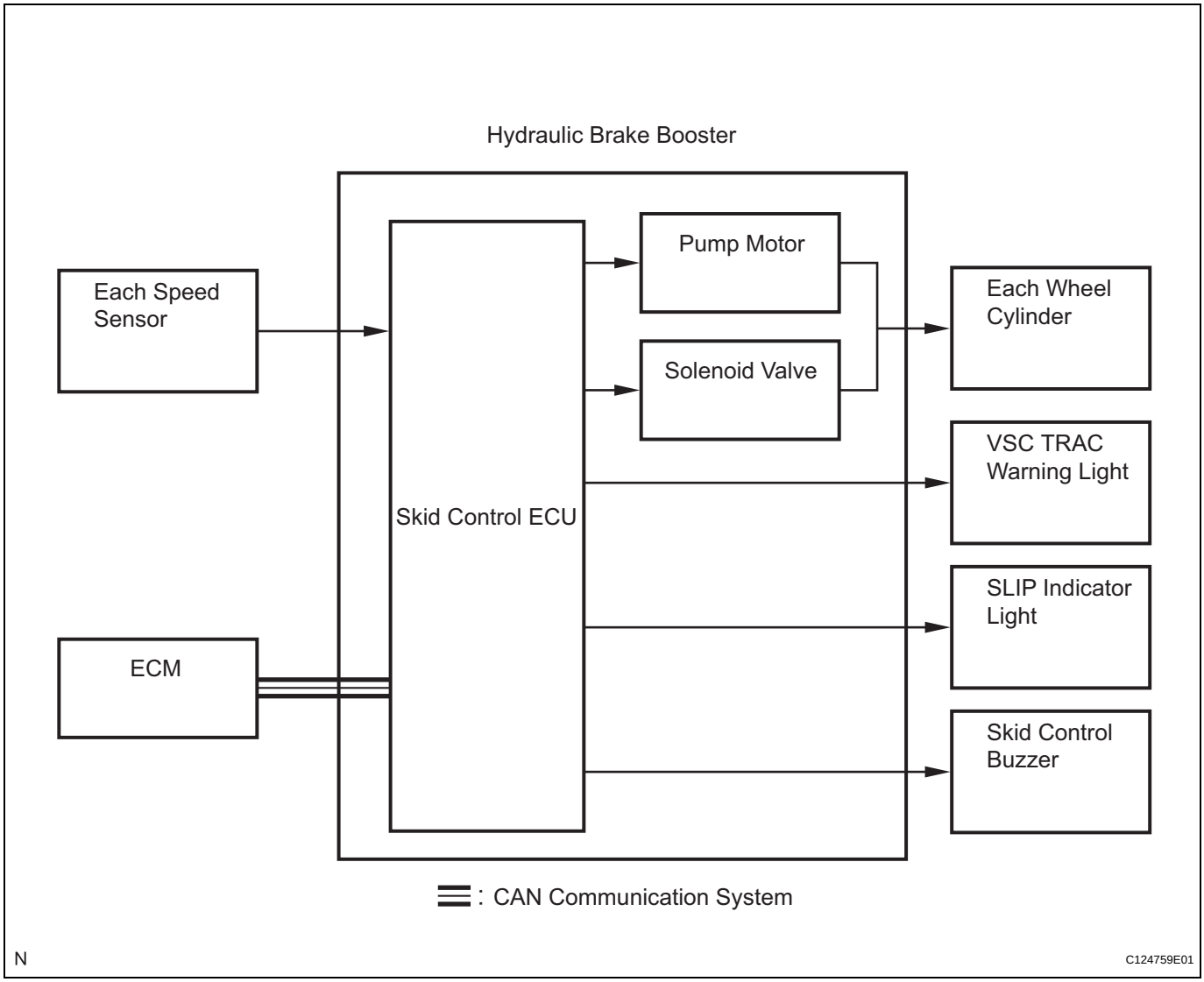
BC

(d) DAC (Downhill Assist Control) (4WD)
When the DAC switch is pressed with the transfer in low (L4) range and without the accelerator and brake pedals in operation, the DAC activates 4-wheel hydraulic pressure control, in order to maintain a constant low vehicle speed without causing the wheels to become locked. Thus, the vehicle can descend steep hills in a stable manner.
HINT:
Depressing the accelerator and brake pedals cancels control of the DAC system.
Begins operating when driving down slopes at a speed of 16 mph (25 km/h) or less with the engine brake applied.



Operation description
The SLIP indicator light blinks and the DAC indicator light and BRAKE warning light come on when the system is operating.
The VSC TRAC warning light comes on and the DAC indicator light blinks when the DAC system malfunctions.

(e) HAC (Hill-start Assist Control)
When the vehicle starts off on a steep hill, HAC detects the backward descent of the vehicle and effects 4-wheel hydraulic pressure control to reduce the speed of the vehicle.
For a Maximum of 5 seconds after the control starts, fluid pressure is gradually released and the control is complete.
HINT:
Depressing the brake pedal cancels control of the HAC system.
Does not operate when the shift lever is in the P position or N position, or when the vehicle is running/rolling back up a slope with the shift lever in the R position.



Operation description
The SLIP indicator light blinks, the BRAKE warning light comes on, and the skid control buzzer sounds when the system is operating.
The VSC TRAC warning light comes on when the HAC system malfunctions.

4. FUNCTION OF COMPONENTS

Components	Function
Speed sensor	Detects wheel speed of each wheel.
Hydraulic brake booster	Upon receiving brake control signal from skid control ECU, controls hydraulic circuit and sends hydraulic pressure to each wheel. Master cylinder solenoid (skid control ECU) removable.
Master cylinder solenoid Skid control ECU	Detects vehicle condition based on signals from sensors and sends brake control signal to hydraulic brake booster.
Motor relay	Supplies power source to pump motor.
Solenoid relay	Supplies power source to each solenoid.
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 TRAC or VSC in operation.
Yaw rate and deceleration sensor	Detects vehicle's yaw rate and deceleration and sends signal to skid control ECU.
Master cylinder pressure sensor	Built into hydraulic brake booster. Detects pressure inside master cylinder.
Steering angle sensor	Detects steering wheel's steering angle and amount of movement, then sends signal to skid control ECU.
ECM	• Sends sensor signals (throttle opening angle, engine rpm) to skid control ECU. • Engine controlled based on traction control signal from skid control ECU.

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester can be used in steps 3, 6, 9 and 12.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS

NEXT

3 CHECK AND CLEAR DTCS AND FREEZE FRAME DATA

NEXT

4 PROBLEM SYMPTOM CONFIRMATION

NEXT

5 CHECK CAN COMMUNICATION SYSTEM

BC

(a) Check for output DTCs.
HINT:
The ECM 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	Proceed to
CAN communication system DTC not output	A
CAN communication system DTC output	B

B → CAN COMMUNICATION SYSTEM

A

6 CHECK AND CLEAR DTCS

NEXT

7	PROBLEM SYMPTOM SIMULATION

Result	Proceed to
Symptom does not occur	A
Symptom occurs	B

B → GO TO STEP 9

A

8	SYMPTOM SIMULATION

NEXT

9	CHECK DTCS (OTHER THAN CAN SYSTEM DTCS)

Result	Proceed to
DTC not output	A
DTC output	B

B → GO TO STEP 11

A

10	PROBLEM SYMPTOMS TABLE

NEXT

GO TO STEP 12

11	DTC CHART

NEXT

12	**CIRCUIT INSPECTION**

NEXT

13	**PROBLEM IDENTIFICATION**

NEXT

14	**REPAIR OR REPLACE**

NEXT

15	**CONFIRMATION TEST**

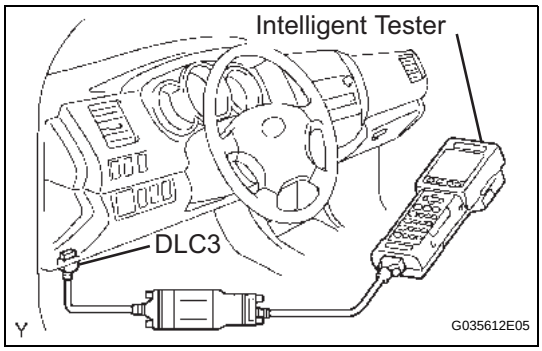
NEXT

END

CHECK FOR INTERMITTENT PROBLEMS

1. DESCRIPTION

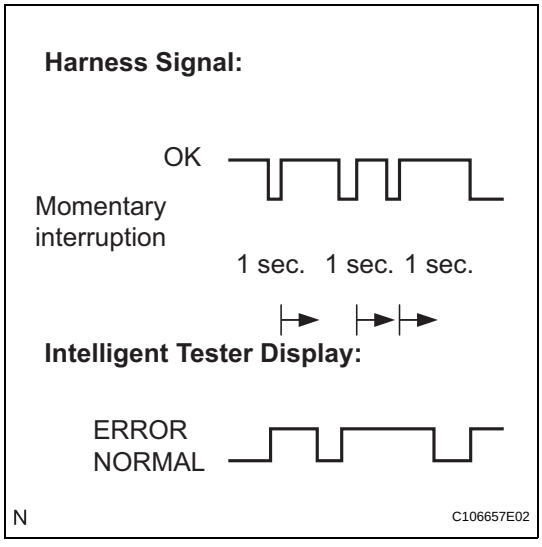
HINT:
A momentary interruption (open circuit) in the connectors and/ or wire harness between the sensors and ECUs can be detected through the ECU data monitor function of the intelligent tester.



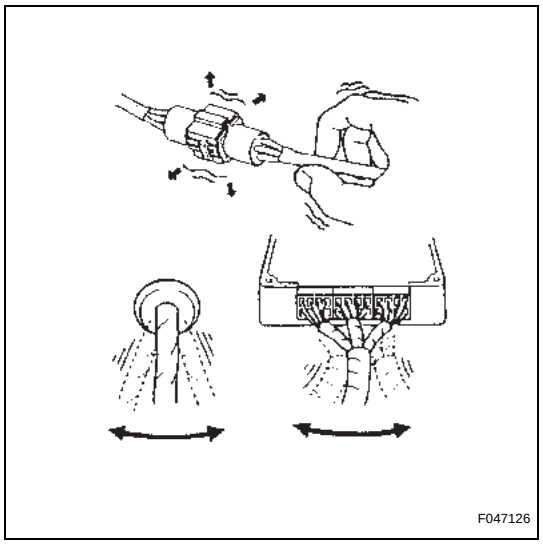
(a) Turn the ignition switch off and connect the intelligent tester to the DLC3.
(b) Turn the ignition switch on. Follow the on-screen directions on the intelligent tester to display the DATA LIST and select areas which should be monitored for momentary interruptions.
HINT:
A momentary interruption (open 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 / OPEN or NORMAL	OPEN : momentary interruption	-
SPD SEN FL	FL speed sensor open detection / OPEN or NORMAL	OPEN : momentary interruption	-
SPD SEN RR	RR speed sensor open detection / OPEN or NORMAL	OPEN : momentary interruption	-
SPD SEN RL	RL speed sensor open detection / OPEN or NORMAL	OPEN : momentary interruption	-

BC



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.

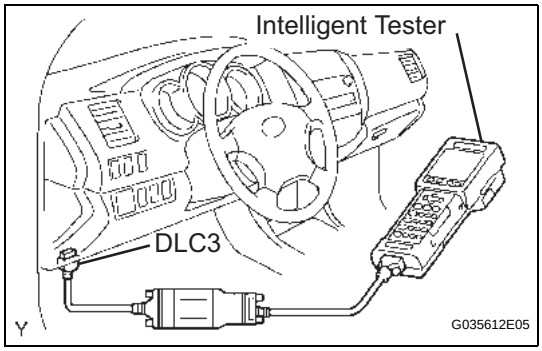
(b) Follow the chart to perform calibration.

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:

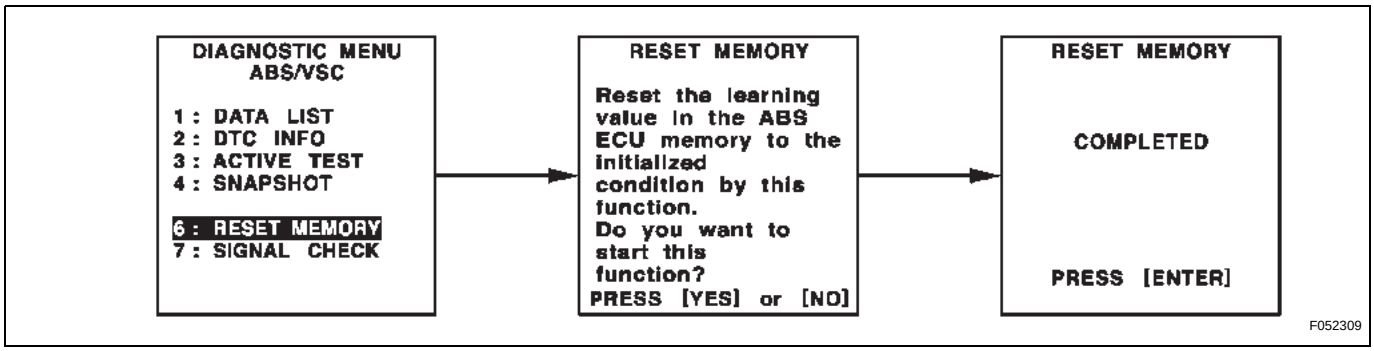
After replacing the yaw rate and deceleration sensor, be sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.



(a) Connect the intelligent tester to the DLC3.

(b) Turn the ignition switch to the ON position.

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



(d) Perform zero point calibration of the yaw rate and deceleration sensor using the intelligent tester.

3. PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND DECELERATION SENSOR (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.

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.

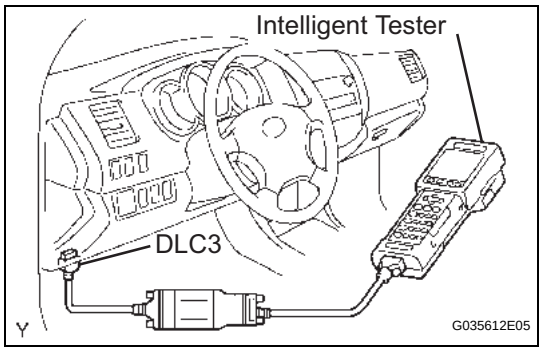
(1) Turn the ignition switch to OFF.

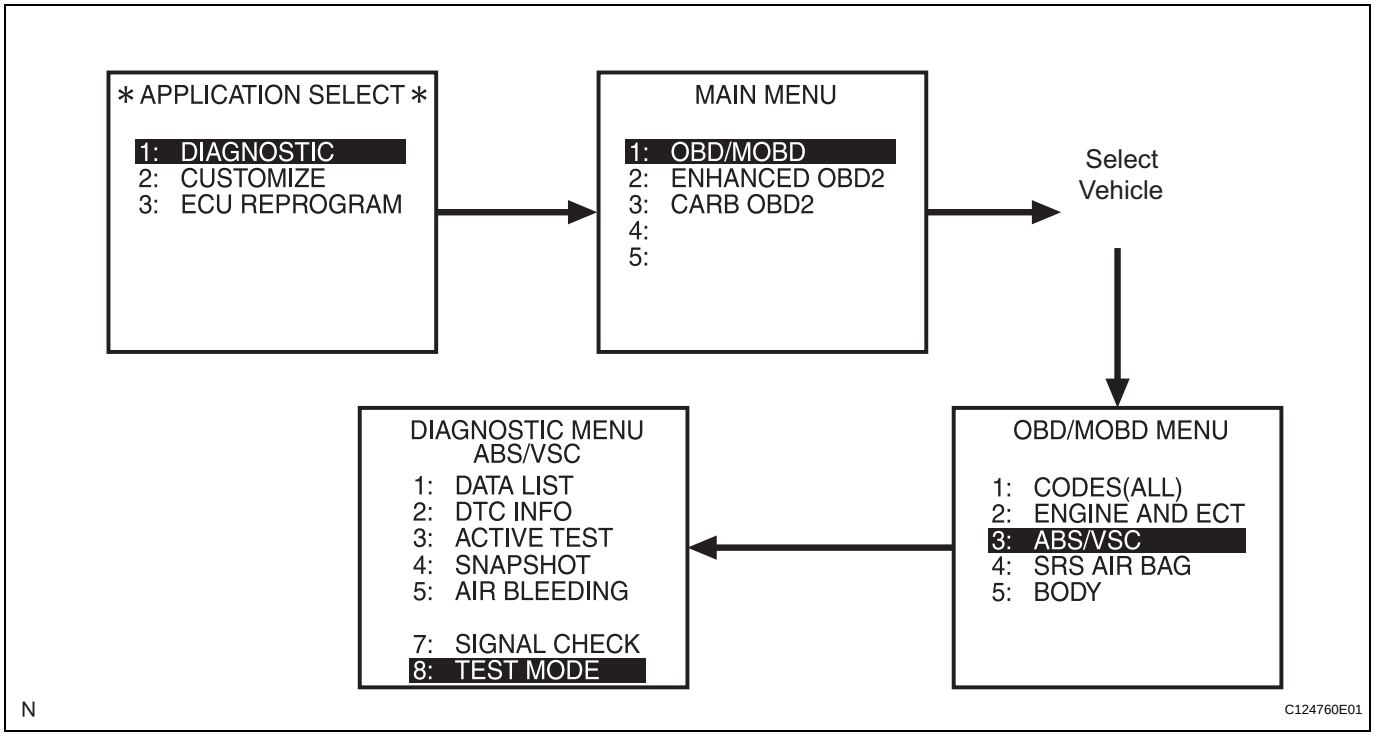
(2) Check that the steering wheel is in the straight-ahead position.

(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.

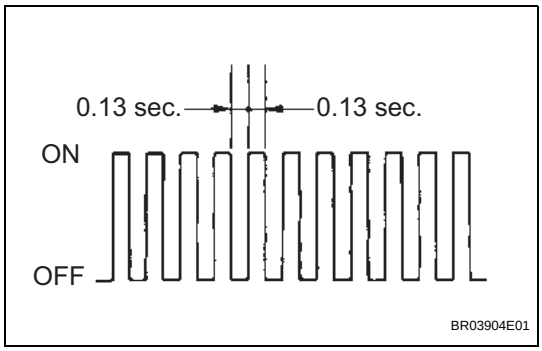
(5) Turn the ignition switch to the ON position.





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.



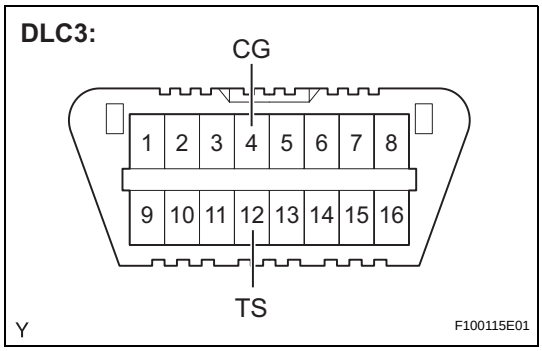
(8) Check that the VSC TRAC warning light blinks as shown in the illustration.
NOTICE:
The VSC TRAC warning light (and VSC OFF indicator light (4WD, with rear differential lock)) stay ON when obtaining the zero point.
HINT:
- If the VSC TRAC warning light does not blink, perform the zero point calibration 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.

(9) Turn the ignition switch to OFF.

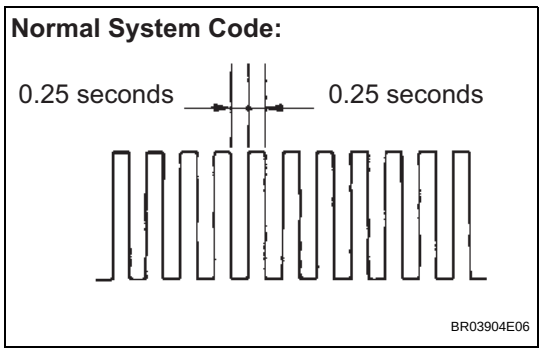
4. CLEAR ZERO POINT CALIBRATION (for Using a Intelligent Tester)

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.

(a) Turn the ignition switch to the ON position.



(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.
(d) Remove the SST from the terminals of the DLC3.
(e) Perform zero point calibration of the yaw rate and deceleration sensor using a check wire.

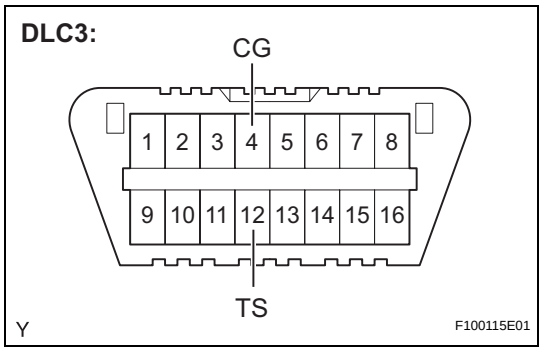
5. PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR AND DECELERATION SENSOR (for Using a SST Check Wire)

HINT:
After replacing the skid control ECU and/or yaw rate and deceleration sensor, 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 less than 1 degree).**

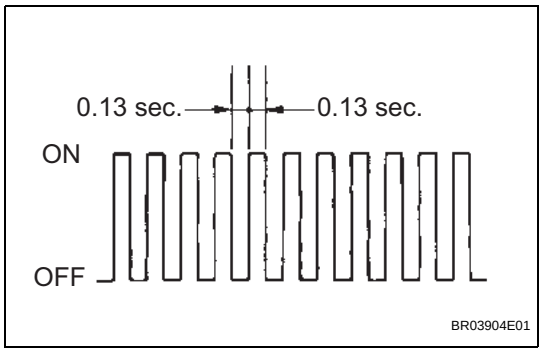
(a) Procedures for test mode:
(1) Turn the ignition switch to OFF.

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 to the ON position.
(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, with rear differential lock)) stay ON when obtaining the zero point.
HINT:
- If the VSC 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.

BC

TEST MODE PROCEDURE

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

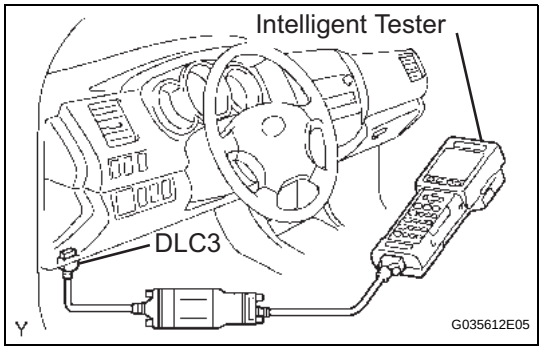
HINT:

- 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 to 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.

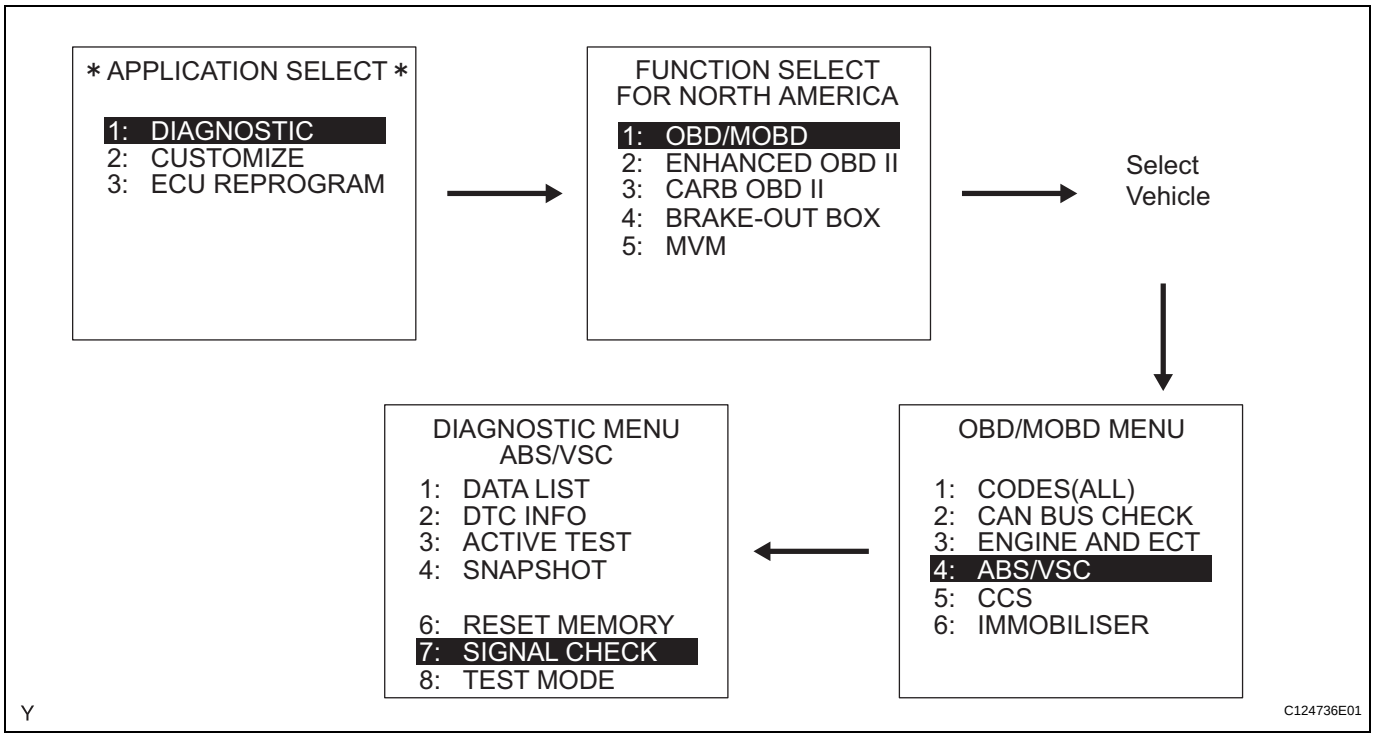


(d) Connect the intelligent tester to the DLC3.

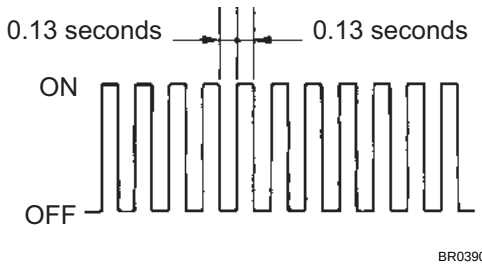
(e) Turn the ignition switch to the ON position.

(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.

BC



Blinking pattern in TEST MODE:



(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 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-233 BC-239
VSC TRAC warning light circuit	BC-241 BC-246
TS and CG terminal circuit	BC-296

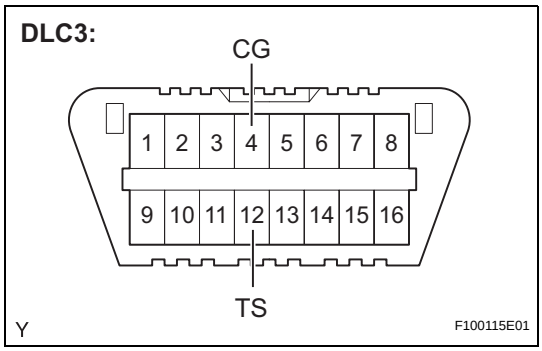
(h) Start the engine.
(i) Activate the ABS sensor (deceleration sensor, master cylinder pressure sensor, 4WD detection switch, L4 detection switch and speed sensor) and VSC sensor (yaw rate and deceleration sensor) in test mode (SIGNAL CHECK) using a intelligent tester.

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

HINT:

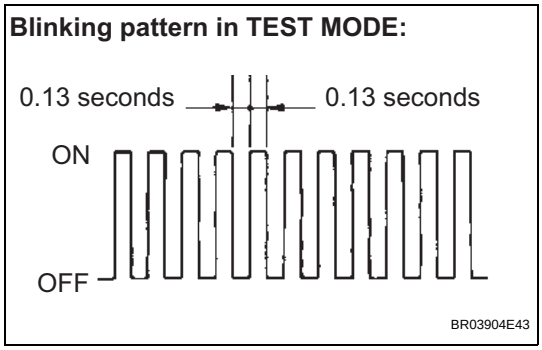
- After replacing the yaw rate and deceleration sensor, be sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.
- If the ignition switch is turned from the ON to the ACC or LOCK position during test mode, DTCs relating to the signal check function 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 to 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) Turn the ignition switch to the ON position.



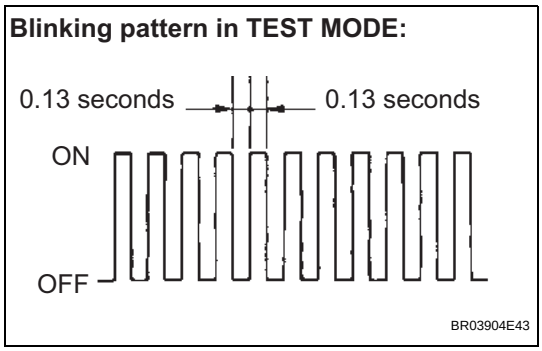
(f) Check that the ABS and VSC TRAC warning lights blink as shown in the illustration.
HINT:
If the ABS warning light and VSC TRAC warning light do not blink, inspect the TS and CG terminal circuit, the ABS warning light circuit and VSC TRAC warning light circuit.

Trouble area	See page
ABS warning light circuit	BC-233 BC-239
VSC TRAC warning light circuit	BC-241 BC-246
TS and CG terminal circuit	BC-296

BC

(g) Start the engine.

(h) Activate the ABS sensor (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.

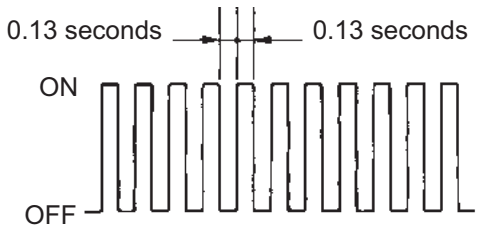


3. DECELERATION SENSOR SIGNAL CHECK

(a) Check that the ABS warning light is blinking as shown in the illustration.

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

Blinking pattern in TEST MODE:



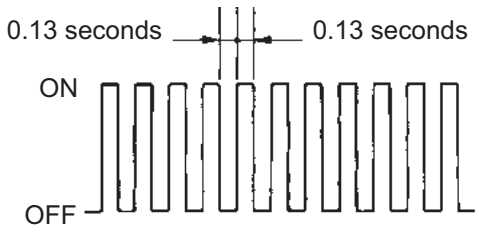
4. MASTER CYLINDER PRESSURE SENSOR CHECK

(a) Check that the ABS warning light is blinking as shown in the illustration.

(b) 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.

- 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.
- 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.

Blinking pattern in TEST MODE:



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

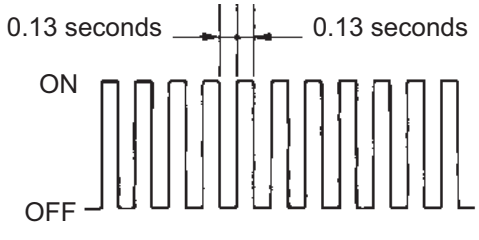
(a) Check that the ABS warning light is blinking as shown in the illustration.

(b) Check the transfer indicator switch (4WD position).

(1) Push the 4 wheel drive control switch on to put the vehicle in 4WD mode.

(2) Push the 4 wheel drive control switch off to put the vehicle in 2WD mode.

Blinking pattern in TEST MODE:



6. L4 DETECTION SWITCH SIGNAL CHECK (for 4WD)

(a) Check that the ABS warning light is blinking as shown in the illustration.

(b) Check the transfer indicator switch (L4 position).

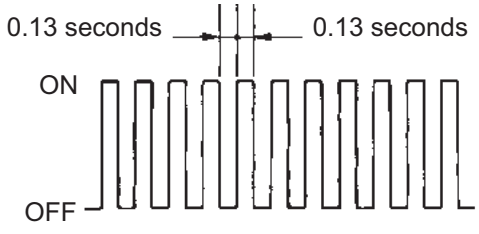
(1) Turn the 4 wheel drive control switch to the L position to put the vehicle in L4 mode.

(2) Turn the 4 wheel drive control switch to the H position to put the vehicle in H4 mode.

HINT:

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

Blinking pattern in TEST MODE:



7. SPEED SENSOR CHECK

(a) Check that the ABS warning light is blinking as shown in the illustration.

(b) Check the speed sensor signal

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

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

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

HINT:

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

BC

(4) Stop the vehicle.

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.**

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.

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

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

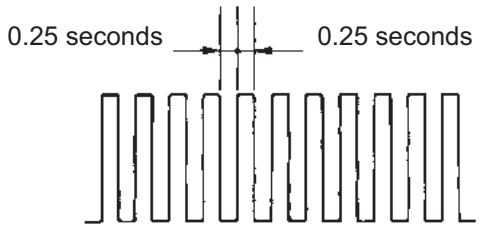
SST 09843-18040

(b) Turn the ignition switch to the ON position.

(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).

Normal System Code:

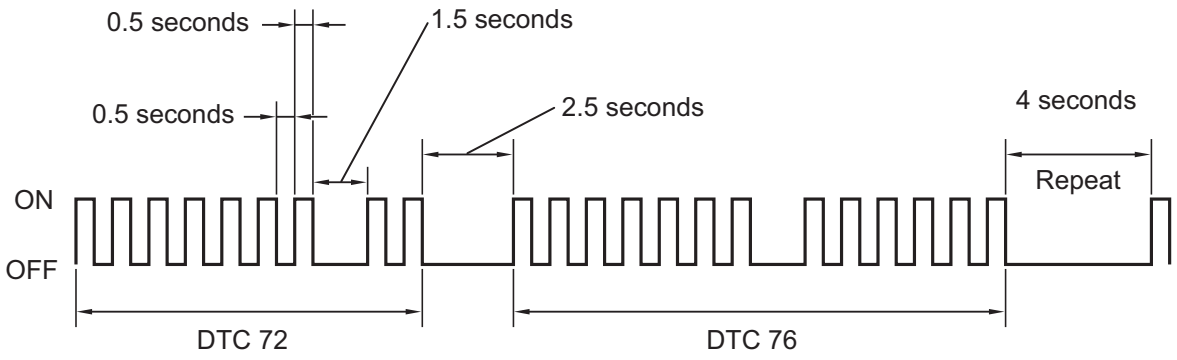


BR03904E06

BC

- 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

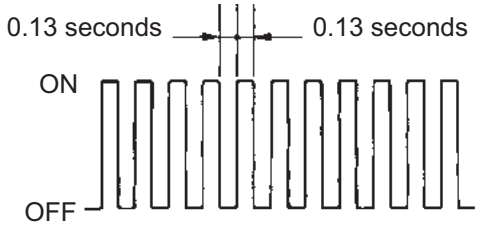


N

C124737E01

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

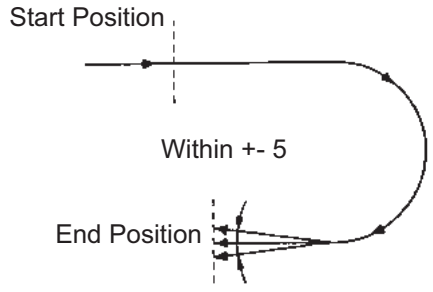
Blinking pattern in TEST MODE:



BR03904E43

10. YAW RATE SENSOR CHECK

(a) Check that the VSC TRAC warning light is blinking as shown in the illustration.
(b) Keep the vehicle stationary on a level surface for 1 second or more.



F002135E02

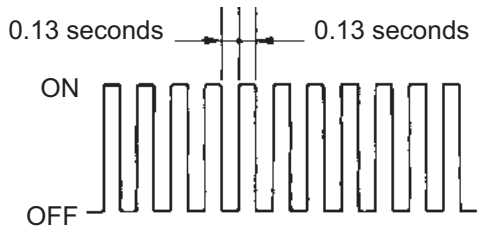
(c) Shift the shift lever to the D position (A/T) and drive the vehicle at a speed of approximately 3 mph (5 km/h), turn the steering wheel either to the left or right 90°or more, and turn the vehicle through 180 degrees.
(d) A/T: Stop the vehicle, check that the shift lever is in the P position, and then apply the parking brake.
M/T: Stop the vehicle, check that the shift lever is in neutral, and then apply the parking brake.
(e) 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.

BC

- If the skid control (VSC warning) buzzer does not sound, check the skid control buzzer circuit (See page BC-288), 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.

Blinking pattern in TEST MODE:



11. DAC OPERATION SWITCH SIGNAL CHECK (for 4WD)

(a) Check that the VSC TRAC warning light is blinking as shown in the illustration.

(b) Check the DAC switch.

(1) Push the DAC switch on.

(2) Push the DAC switch off.

12. 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.

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

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

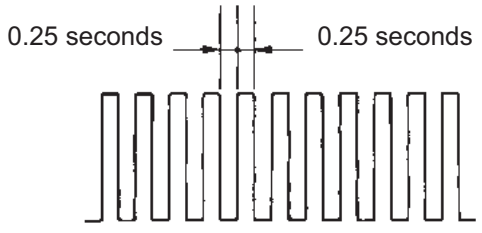
SST 09843-18040

(b) Turn the ignition switch to the ON position.

(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).

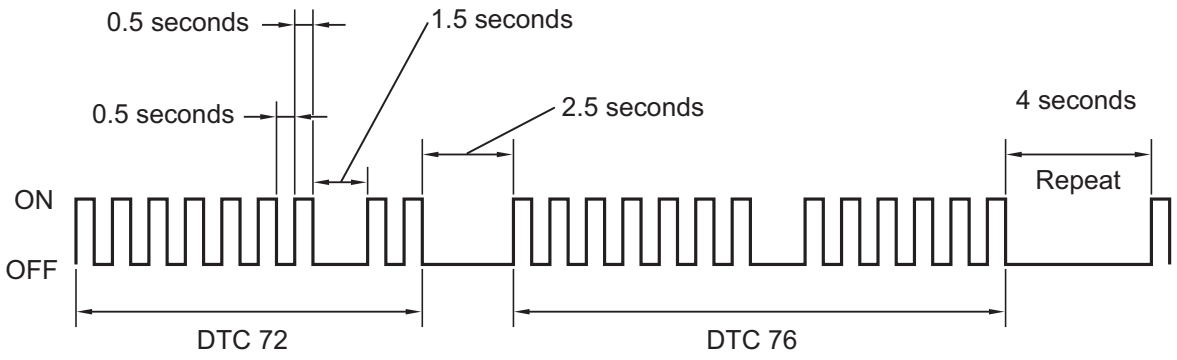
Normal System Code:



BC

- 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



N

C124737E01

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

(e) Turn the ignition switch to OFF.

14. DTC OF SIGNAL CHECK FUNCTION

BC

ABS sensor

DTC No.	Diagnosis	Trouble Areas
C1271/71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Speed sensor rotor
C1272/72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Speed sensor rotor
C1273/73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Speed sensor rotor
C1274/74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Speed sensor rotor
C1275/75	Abnormal change in output voltage of right front speed sensor	Right front speed sensor rotor
C1276/76	Abnormal change in output voltage of left front speed sensor	Left front speed sensor rotor
C1277/77	Abnormal change in output voltage of right rear speed sensor	Right rear speed sensor rotor
C1278/78	Abnormal change in output voltage of left rear speed sensor	Left rear speed sensor rotor
C1279/79 (*1), (*2)	Deceleration sensor faulty	• Deceleration sensor • Sensor installation
C1282/82 (*2)	Center differential lock position switch malfunction	Transfer indicator switch (4WD position)

DTC No.	Diagnosis	Trouble Areas
C1283/83 (*2)	L4 detection switch malfunction	Transfer indicator switch (L4 position)

HINT:
(*1): 4WD

VSC sensor

DTC No.	Diagnosis	Trouble Areas
C0371/71	Yaw rate sensor output signal malfunction	Yaw rate and deceleration sensor
C1379/74	Malfunction in DAC operation switch	DAC switch

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

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 to OFF.

VEHICLE STABILITY CONTROL SYSTEM

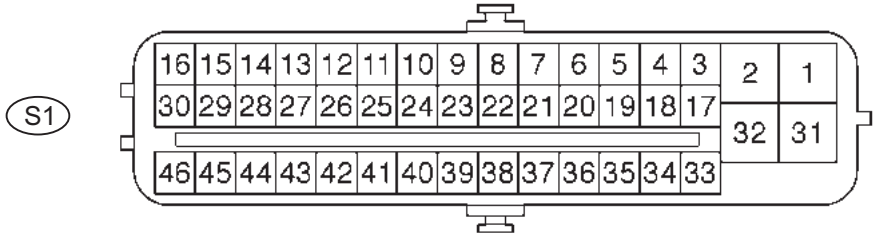
Symptom	Suspected area	See page
ABS, BA and/or EBD does not operate	1. Check for DTCs again and make sure that normal system code displayed.	BC-118
	2. IG power source circuit	BC-169
	3. Speed sensor circuit	BC-130
	4. Check hydraulic brake booster using intelligent tester (Check hydraulic brake booster operation using active test function) If abnormal, check hydraulic circuit for leakage	BC-299
	5. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
ABS, BA and/or EBD does not operate efficiently	1. Check for DTCs again and make sure that normal system code displayed.	BC-118
	2. Speed sensor circuit	BC-130
	3. Stop light switch circuit	BC-186
	4. Check hydraulic brake booster using intelligent tester (Check hydraulic brake booster operation using active test function) If abnormal, check hydraulic circuit for leakage	-
	5. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
VSC and/or TRC does not operate	1. Check for DTCs again and make sure that normal system code displayed.	BC-118
	2. IG power source circuit	BC-169
	3. Check hydraulic circuit for leakage	-
	4. Speed sensor circuit	BC-130
	5. Yaw rate and deceleration sensor circuit	BC-161
	6. Steering sensor circuit	BC-157
	7. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
AUTO LSD does not operate	1. Check for DTCs again and make sure that normal system code displayed.	BC-118
	2. AUTO LSD switch circuit	-
	3. 4WD switch circuit	-
	4. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
DAC does not operate	1. Check for DTCs again and make sure that normal system code displayed.	BC-118
	2. DAC switch circuit	-
	3. Transfer indicator switch (4WD position) circuit	BC-210
	4. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
Sensor signal check cannot be performed	1. TS and CG terminal circuit	BC-296
	2. Master cylinder solenoid	-

Symptom	Suspected area	See page
DTC check cannot be performed	1. Check for DTCs again and make sure that normal system code displayed.	BC-118
	2. TC terminal circuit	BC-291
	3. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
ABS warning light abnormal (Remains on)	1. ABS warning light circuit	BC-233
	2. Master cylinder solenoid	-
ABS warning light abnormal (Does not come on)	1. ABS warning light circuit	BC-239
	2. Master cylinder solenoid	-
VSC TRAC warning light abnormal (Remains on)	1. VSC TRAC warning light circuit	BC-241
	2. Master cylinder solenoid	-
VSC TRAC warning light abnormal (Does not come on)	1. VSC TRAC warning light circuit	BC-246
	2. Master cylinder solenoid	-
BRAKE warning light abnormal (Remains on)	1. BRAKE warning light circuit	BC-248
	2. Master cylinder solenoid	-
BRAKE warning light abnormal (Does not come on)	1. BRAKE warning light circuit	BC-254
	2. Master cylinder solenoid	-
VSC OFF indicator abnormal (Remains on)	1. VSC OFF indicator circuit	BC-256
	2. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
VSC OFF indicator abnormal (Does not come on)	1. VSC OFF indicator circuit	BC-264
	2. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
AUTO LSD indicator abnormal (Remains on)	1. AUTO LSD indicator circuit	BC-278
	2. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
AUTO LSD indicator abnormal (Does not come on)	1. AUTO LSD indicator circuit	BC-283
	2. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
DAC indicator abnormal (Remains on)	1. DAC indicator circuit	BC-270
	2. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
DAC indicator abnormal (Does not come on)	1. DAC indicator circuit	BC-275
	2. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace master cylinder solenoid.	-
SLIP indicator light abnormal (Remains on)	1. SLIP indicator light circuit	BC-266
	2. Master cylinder solenoid	-
SLIP indicator light abnormal (Does not come on)	1. SLIP indicator light circuit	BC-268
	2. Master cylinder solenoid	-
Skid control buzzer abnormal	1. Skid control buzzer circuit	BC-288
	2. Master cylinder solenoid	-

TERMINALS OF ECU

1. TERMINALS OF ECU

Skid control ECU:

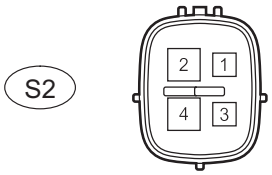


Symbols (Terminal No.)	Terminal Description
GND (1)	Skid control ECU ground
+BM1 (2)	Power supply for motor
FR+ (3)	Front RH wheel speed sensor power supply
FL- (4)	Front LH wheel speed signal input
RR+ (5)	Rear RH wheel speed sensor power supply
RL- (6)	Rear LH wheel speed signal input
STP (7)	Stop light switch input
CANH (11)	CAN communication line H
SP1 (12)	Speed signal output for combination meter
D/G (13)	Diagnosis tester communication line
P/R (14)	Shift position indicator P signal input
INFR (15) (*1)	AUTO LSD indicator light output
STPO (16)	Stop light operated relay output
FR- (17)	Front RH wheel speed sensor input
FL+ (18)	Front LH wheel speed sensor power supply output
RR- (19)	Rear RH wheel speed sensor input
RL+ (20)	Rear LH wheel speed sensor power supply output
EXI4 (21) (*2)	Detection (L4) switch input
TS (24)	Sensor test terminal (Sensor check switch) input
CANL (25)	CAN communication line L
EXI3 (26)	Rear differential lock detection switch input
EXI (27)	4WD switch input
PKB (28)	Parking brake switch input
WA (29)	ABS warning light input
BZ (30)	Buzzer output
+BS (31)	Power supply for solenoid
GND2 (32)	Skid control ECU ground
HDCW (33) (*3)	DAC operation indicator light output
IND (34)	SLIP indicator light output
WT (35)	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
HDCS (44) (*3)	DAC operation switch input
STP2 (45)	Stop light switch input

BC

Symbols (Terminal No.)	Terminal Description
IG1 (46)	IG1 power supply

Skid Control ECU:



H

C124763E01

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): with AUTO LSD

(*2): 4WD

(*3): with Downhill assist control

2. TERMINAL INSPECTION

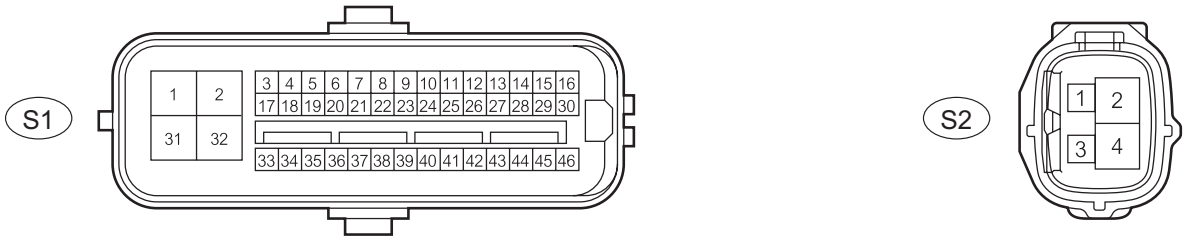
Disconnect the connector and measure the voltage or resistance on the wire harness side.

HINT:

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

BC

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



H

C124764E01

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+BM1 (S1-2) - GND (S1-1, 32)	B - W-B	Power supply for motor From battery	Always	10 to 14 V
IG1 (S1-46) - GND (S1-1, 32)	LG - W-B	IG1 power supply	IG switch OFF	Below 1 V
IG1 (S1-46) - GND (S1-1, 32)	LG- B-W	IG1 power supply	IG switch ON	10 to 14 V
STP (S1-7) - GND (S1-1, 32)	G-W - W-B	Stop light switch input	Stop light switch OFF (Brake pedal released)	Below 1.5 V

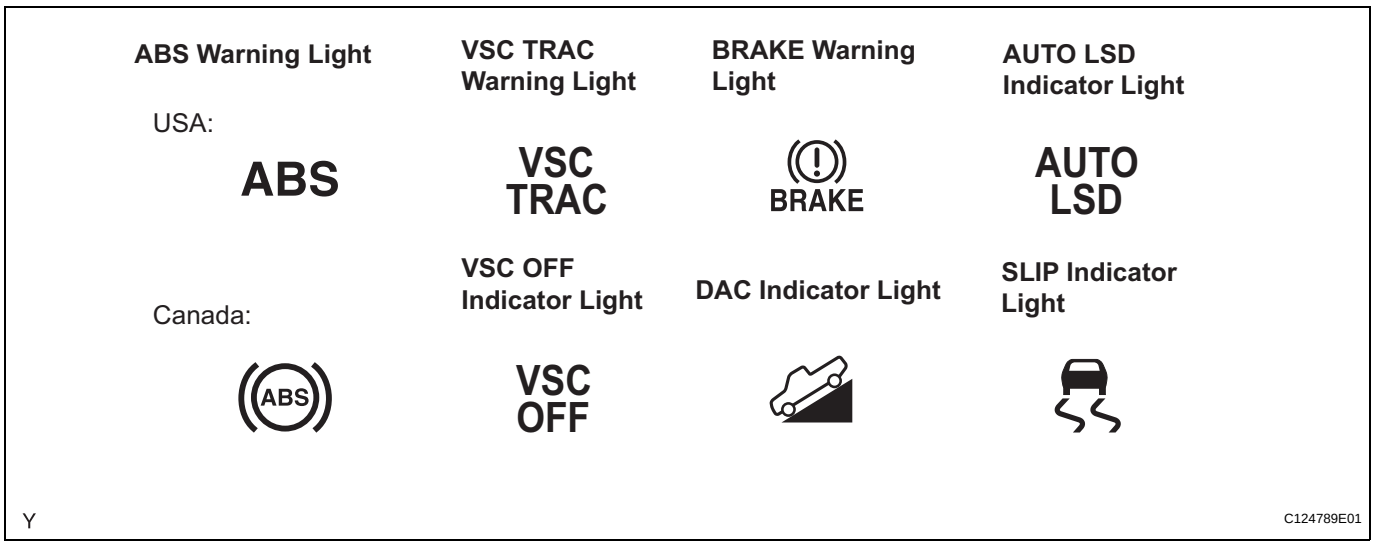
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
STP (S1-7) - GND (S1-1, 32)	G-W - W-B	Stop light switch input	Stop light switch ON (Brake pedal released)	8 to 14 V
P/R (S1-14) - GND (S1-1, 32) (*1)	BR-W - W-B	Shift position indicator P signal input	IG switch ON, shift P position	8 to 14 V
P/R (S1-14) - GND (S1-1, 32) (*1)	BR-W - W-B	Shift position indicator P signal input	IG switch ON, any shift position except P	Below 1 V
PKB (S1-28) - GND (S1-1, 32)	G-Y - W-B	Parking brake switch input	IG switch ON, parking brake switch ON	Below 1.5 V
PKB (S1-28) - GND (S1-1, 32)	G-Y - W-B	Parking brake switch input	IG switch ON, parking brake switch OFF	10 to 14 V
+BS (S1-31) - GND (S1-1, 32)	R - W-B	Power supply for solenoid Form battery	Always	10 to 14 V
LBL (S1-41) - GND (S1-1, 32)	V-W - W-B	Brake fluid level warning switch input	Brake fluid level min. -5mm	Below 1 Ω
LBL (S1-41) - GND (S1-1, 32)	V-W - W-B	Brake fluid level warning switch input	Brake fluid level max.	1.9 to 2.1 Ω
STP2 (S1-45) - GND (S1-1, 32)	L - W-B	Stop light switch input	Stop light switch OFF (Brake pedal released)	Below 1.5 V
STP2 (S1-45) - GND (S1-1, 32)	L - W-B	Stop light switch input	Stop light switch ON (Brake pedal released)	8 to 14 V
IG2 (S2-1) - GND (S2-4)	O - W-B	IG2 power supply	IG switch OFF	Below 1 V
IG2 (S2-1) - GND (S2-4)	O - W-B	IG2 power supply	IG switch ON	10 to 14 V
+BM2 (S2-2) - GND (S2-4)	B - W-B	Power supply for motor From battery	Always	10 to 14 V

(*1): A/T

DIAGNOSIS SYSTEM

1. DIAGNOSIS

(a) If the skid control ECU detects a malfunction, the ABS, BRAKE, VSC TRAC warning, VSC OFF and/or SLIP indicator lights 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	DAC	HAC
ABS Warning Light	○	○	○	-	-	-	-	-	-
Brake Warning Light	-	○	-	-	-	-	-	-	-
VSC TARC Warning Light	○	○	○	○	○	○	○	○	○
VSC OFF Indicator Light	○	○	○	○	○	○	○	○	○
Slip Indicator Light	○	○	○	○	○	○	○	○	○
AUTO LSD Indicator Light	-	-	-	-	-	-	-	-	-
DAC Indicator Light	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)	● (DAC switch ON)

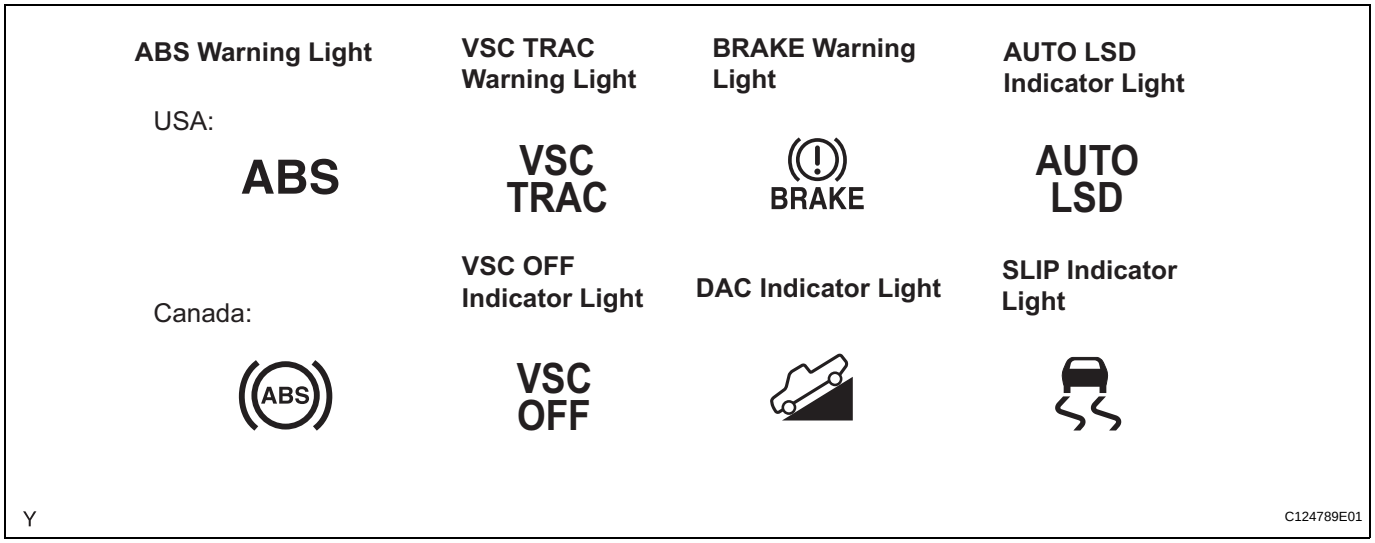
○: Light ON ●: Light ON (Blinking) -: Light OFF

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-103). The DTCs can be read by connecting SST (09843-18040) between terminals TS and CG of DLC3 and observing the blinking of the ABS warning light and VSC TRAC warning light, or by connecting the intelligent tester.

2. WARNING LIGHT AND INDICATOR LIGHT CHECK



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 OFF indicator light, VSC TRAC warning light, BRAKE warning light, DAC 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.

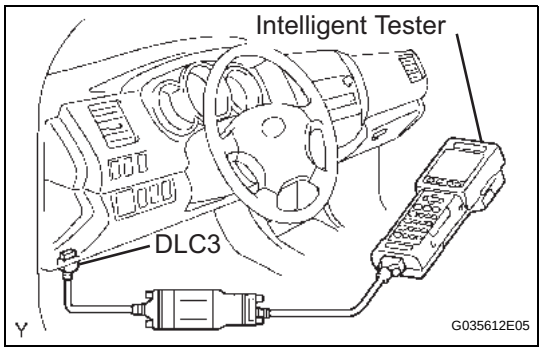
HINT:

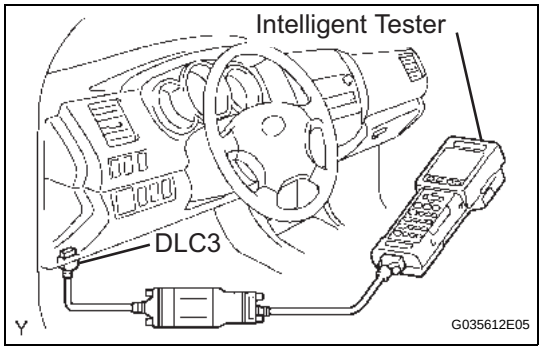
If the lights do not illuminate, confirm whether the bulbs have burned out, and also check the wire harness between the skid control ECU and the combination meter.

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-233
BRAKE warning light circuit	BC-248
VSC TRAC warning light circuit	BC-241
DAC indicator light circuit	BC-270
VSC OFF indicator light circuit	BC-256
SLIP indicator light circuit	BC-266
AUTO LSD indicator light circuit	BC-278

BC





DTC CHECK / CLEAR

1. DTC CHECK/CLEAR (for Using a Intelligent Tester)

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

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

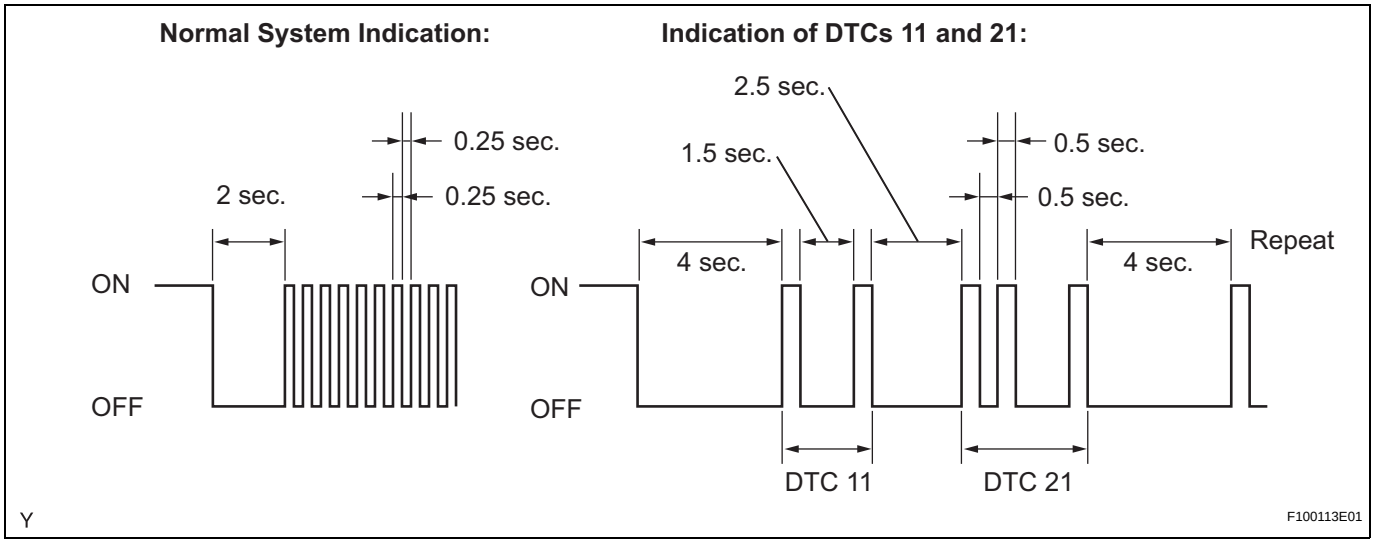
2. DTC CHECK/CLEAR (for Using a SST Check Wire)

(a) Check DTCs.
- (1) Using SST, connect terminals TC and CG of the DLC3.
  SST 09843-18040
- (2) Turn the ignition switch to the ON position.
- (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-233 BC-239
VSC TRAC warning light circuit	BC-241 BC-246
TC and CG terminal circuit	BC-291

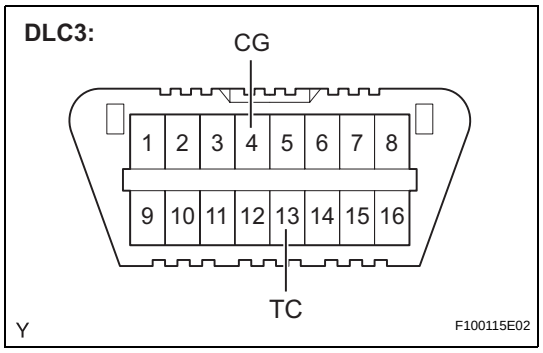
BC

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

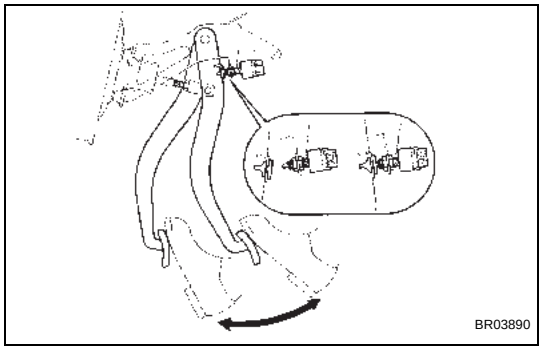


- DTCs are explained in DTC chart (See page BC-126).

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



(b) Clear DTCs.
(1) Using SST, connect terminals TC and CG of the DLC3.
(2) Turn the ignition switch to the ON position.
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 warning light blinks in the normal system indication pattern.
(5) Remove SST from the terminals of the DLC3.
(6) Turn the ignition switch to OFF.
HINT:
Clearing the DTCs cannot be performed by removing the battery cable.

3. 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 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 to the ON position.
(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 after strong freeze frame data	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
MAS CYL PRESS	Master cylinder pressure sensor reading	Brake pedal release: 0.3 to 0.9 V Brake pedal depress: 0.8 to 4.5 V
MAS PRESS GRADE	Master cylinder pressure sensor change	-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

Intelligent Tester	Measurement Item	Reference Value
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

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 each solenoid and the ECM shuts off the VSC control (traction control signal) from the skid control ECU accordingly, which turns out to be as if the ABS, TRAC and VSC systems were not installed.
  The ABS control 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-116).
- If system components have any malfunctions before starting control, immediately stop the operation.
  If system components have any malfunctions during control, gradually stop the control so as not to trigger a sudden change in vehicle conditions.
  If it is impossible to control the systems, the warning light comes on to inform the driver of the termination of the systems (See page BC-116).

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, gradual loss of brake performance is expected, and ABS, BA, TRAC, A-TRAC, VSC and AUTO LSD system controls are prohibited.

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

Malfunction Area	Control Method
ABS system	Prohibit ABS, BA, TRAC, A-TRAC, VSC and AUTO LSD control
BA system	Prohibit ABS, BA, TRAC, A-TRAC, VSC and AUTO LSD control
EBD system	Prohibit ABS, BA, EBD, TRAC, A-TRAC, VSC and EBD control

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

Malfunction Area	Control Method
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	Control Method
Brake control system (TRAC, A-TRAC and AUTO LSD system)	Brake control: Disables control During control: Disables control (by gradually ending control)

2. SYSTEM TEMPERATURE PROTECTION OPERATION

If TRAC, A-TRAC, AUTO LSD, or HAC 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 (VSC warning) buzzer sounds intermittently. If the temperature increases more, the skid control (VSC warning) 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

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

With the intelligent tester connected to the DLC3 and the ignition switch in the ON position, the ABS, TRAC and VSC data list can be displayed. Follow the prompts on the tester screen to access the 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	-
ABS MOT RELAY	ABS motor relay / ON or OFF	ON : Motor relay ON OFF : Motor relay OFF	-
SOL RELAY	Solenoid relay / ON or OFF	ON : Solenoid relay ON OFF : Solenoid relay OFF	-
VSC/TRAC OFF SW	TRAC control switch / ON or OFF	ON : TRAC control switch ON	-
IDLE SW	Main idle switch / ON or OFF	ON : Accelerator pedal released OFF : Accelerator pedal depressed	-
STOP LIGHT SW	Stop lamp 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 is still condition	Reading changes when vehicle bounced
DECELERAT SEN2	Deceleration sensor 2 reading / min.: -1.869 G, max.: 1.869 G	Approximately 0 +- 0.13G is 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	-

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
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	-
ENGINE SPD	Engine Speed/ Min.: 0 rpm, Max.: 6000 rpm	Actual engine speed	-
VEHICLE SPD	Maximum wheel speed sensor reading / min.: 0 MPH (0 km/h), max.: 202 MPH (326 km/h)	Actual engine speed	Speed indicated on speedometer
YAW RATE	Yaw rate sensor/ Min.: -128 deg/s, Max.: 127 deg/s	Min: -128 deg/s Max: 127 deg/s	-
YAW ZERO VALUE	Memorized zero value/ Min.: -128 deg/s, Max.: 127 deg/s	Min: -128 deg/s Max: 127 deg/s	-
STEERING ANG	Steering sensor/ Min.: -1152 deg, Max.: 1150.875 deg	Left turn: Increase Right turn: Decrease	-
MAS CYL PRS 1	Master cylinder pressure sensor 1 reading / min.: 0V, max.: 5V	When brake pedal is released : 0.3 V to 0.9 V	Reading increases when brake pedal depressed
ACC PRESS SENS	Accumulator pressure sensor reading / min.: 0V, max.: 5V	min.: 3V max.: 5V	If value constant regardless of pump operation, accumulator pressure sensor malfunction suspected.
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 / OPEN or NORMAL	OPEN: momentary interruption	-
SPD SEN FL	FL speed sensor open detection / OPEN or NORMAL	OPEN: momentary interruption	-
SPD SEN RR	RR speed sensor open detection / OPEN or NORMAL	OPEN: momentary interruption	-
SPD SEN RL	RL speed sensor open detection / OPEN or NORMAL	OPEN: momentary interruption	-

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
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
#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 to the ON position.
(c) Turn the tester ON.
(d) According to the display on the tester, perform the ACTIVE TEST.

HINT:

The ignition switch must be turned to the ON position to proceed to the Active Test using the intelligent tester.

BC

Item	Vehicle Condition / Test Details	Diagnostic Note
SFRR	Turns ABS solenoid (SFRR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH	Turns ABS solenoid (SFRH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLR	Turns ABS solenoid (SFLR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLH	Turns ABS solenoid (SFLH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRR	Turns ABS solenoid (SrRR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRH	Turns ABS solenoid (SRRH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLR	Turns ABS solenoid (SRLR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLH	Turns ABS solenoid (SFLH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRCF (SA1)	Turns TRAC solenoid SRCF (SMCF) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRCR (SA2)	Turns TRAC solenoid SRCR (SREA) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRMF (SMCF, SA3)	Turns TRAC solenoid SRCR (SREA) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRMR (SMCR, STR)	Turns TRAC solenoid SRMF (SMEC) ON / OFF	Operation of solenoid (clicking sound) can be heard

Item	Vehicle Condition / Test Details	Diagnostic Note
SFLR & SFLH	Turns ABS solenoid SFLR & SFLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SRH & SRR	Turns ABS solenoid SRH & SRR ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLR & SRLH	Turns ABS solenoid SRLR & SRLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH & SFLH	Turns ABS solenoid SFRH & SFLH ON / OFF	Operation of solenoid (clicking sound) can be heard
SRCF & SRCR	Turns ABS solenoid SRCF & SRCR ON / OFF	Operation of solenoid (clicking sound) can be heard
SRMF & SRMR	Turns ABS solenoid SRMF & SRMR ON / OFF	Operation of solenoid (clicking sound) can be heard
SOL RELAY	Turns ABS solenoid relay ON / OFF	Operation of solenoid (clicking sound) can be heard
ABS MOT RELAY	Turns ABS motor relay ON / OFF	Operation of motor can be heard
TRAC MOT RELAY	Turns TRAC motor relay ON / OFF	Operation of motor can be heard
ABS WARN LIGHT	Turns ABS warning light ON / OFF	Operation of motor can be heard
VSC WARN LIGHT	Turns VSC TRAC warning light ON / OFF	Operation of motor can be heard
VSC / TRC OFF IND	Turns VSC OFF indicator ON / OFF	Operation of motor can be heard
SLIP INDI LIGHT	Turn SLIP indicator light ON / OFF	Operation of motor can be heard
BRAKE WRN LIGHT	Turns BRAKE warning light ON / OFF	Operation of motor can be heard
VSC / BR WARN BUZ	Turns VSC / BRAKE warning buzzer ON / OFF	Buzzer can be heard
H/B MOT RELAY	Turns H/B motor relay ON / OFF	Operation of motor can be heard
STP LIGHT RELAY	Turns stop light relay ON / OFF	Observe stop light

DIAGNOSTIC TROUBLE CODE CHART

DTC Chart of ABS:

DTC No.	Detection Item	Trouble Areas	See page
C0200/31 (*1)	Right Front Wheel Speed Sensor Signal Malfunction	1. Right front speed sensor 2. Speed sensor circuit 3. Speed sensor rotor 4. Sensor installation 5. Master cylinder solenoid (skid control ECU)	BC-130
C0205/32 (*1)	Left Front Wheel Speed Sensor Signal Malfunction	1. Left front speed sensor 2. Speed sensor circuit 3. Speed sensor rotor 4. Sensor installation 5. Master cylinder solenoid (skid control ECU)	BC-130
C0210/33 (*1)	Right Rear Wheel Speed Sensor Signal Malfunction	1. Right rear speed sensor 2. Speed sensor circuit 3. Speed sensor rotor 4. Sensor installation 5. Master cylinder solenoid (skid control ECU)	BC-130
C0215/34 (*1)	Left Rear Wheel Speed Sensor Signal Malfunction	1. Left rear speed sensor 2. Speed sensor circuit 3. Speed sensor rotor 4. Sensor installation 5. Master cylinder solenoid (skid control ECU)	BC-130
C0226/21	SFR Solenoid Circuit	1. Master cylinder solenoid (skid control ECU) 2. SFRH or SFRR circuit	BC-137
C0236/22	SFL Solenoid Circuit	1. Master cylinder solenoid (skid control ECU) 2. SFLH or SFLR circuit	BC-137
C0246/23	SRR Solenoid Circuit	1. Master cylinder solenoid (skid control ECU) 2. SRRH or SRRR circuit	BC-137
C0256/24	SRL Solenoid Circuit	1. Master cylinder solenoid (skid control ECU) 2. SRRH or SRLR circuit	BC-137
C0278/11	Open or Short Circuit in ABS Solenoid Relay Circuit	1. ABS NO. 2 fuse 2. ABS solenoid relay 3. ABS solenoid relay circuit 4. Master cylinder solenoid (skid control ECU)	BC-140
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	1. ABS NO. 2 fuse 2. ABS solenoid relay 3. ABS solenoid relay circuit 4. Master cylinder solenoid (skid control ECU)	BC-140
C1225/25	SMC Solenoid Circuit	1. Master cylinder solenoid (skid control ECU) 2. SMCR circuit	BC-137
C1226/26	SPC Solenoid Circuit	1. Master cylinder solenoid 2. SREA circuit	BC-137
C1227/27	SRC Solenoid Circuit	1. Master cylinder solenoid 2. SREC circuit	BC-137
C1228/28	STR Solenoid Circuit	1. Master cylinder solenoid 2. STR circuit	BC-137
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	1. Master cylinder solenoid (skid control ECU) 2. Speed sensor 3. Speed sensor rotor	BC-164

DTC No.	Detection Item	Trouble Areas	See page
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	1. Master cylinder solenoid (skid control ECU) 2. Speed sensor 3. Speed sensor rotor	BC-164
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	1. Master cylinder solenoid (skid control ECU) 2. Speed sensor 3. Speed sensor rotor	BC-164
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	1. Master cylinder solenoid (skid control ECU) 2. Speed sensor 3. Speed sensor rotor	BC-164
C1241/41	Low Battery Positive Voltage	1. Battery 2. IG NO. 2 fuse 3. Charging system 4. Power source circuit	BC-169
C1242/42	IG2 Power Source Circuit	1. Battery 2. IC regulator 3. Power source circuit 4. Master cylinder solenoid (skid control ECU)	BC-174
C1243/43 (*1)	Acceleration Sensor Stuck Malfunction	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-161
C1244/44	Open or Short in Deceleration Sensor Circuit	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-161
C1245/45 (*1)	Acceleration Sensor Output Malfunction	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-161
C1246/46	Master Cylinder Pressure Sensor Malfunction	1. Master cylinder pressure sensor 2. Master cylinder pressure sensor circuit 3. Master cylinder solenoid (skid control ECU) 4. Stop light circuit	BC-177
C1248/48	Open Circuit in Rear Differential Lock	1. Transfer indicator switch (rear diff. lock) 2. Rear differential lock circuit 3. Master cylinder solenoid (skid control ECU)	BC-181
C1249/49	Open in Stop Light Switch Circuit	1. Stop light switch assembly 2. Stop light switch circuit 3. Master cylinder solenoid (skid control ECU)	BC-186
C1251/51 (*4)	Open in Pump Motor Circuit	Hydraulic brake booster pump motor circuit	BC-192
C1252/52 (*2) (*4)	Brake Booster Pump Motor on Time Abnormally Long	1. Hydraulic brake booster pump motor 2. Hydraulic brake booster pump motor circuit 3. Accumulator pressure	BC-194
C1253/53 (*2)	Hydro Booster Pump Motor Relay Malfunction	1. Hydraulic brake booster pump motor 2. Hydraulic brake booster pump motor circuit	BC-198

DTC No.	Detection Item	Trouble Areas	See page
C1254/54	Pressure Switch Circuit	1. Hydraulic brake booster 2. Accumulator pressure sensor 3. Master cylinder pressure sensor	BC-203
C1256/56 (*2) (*4)	Accumulator Low Pressure	1. Hydraulic brake booster 2. Hydraulic brake booster pump motor 3. Hydraulic brake booster pump motor circuit 4. Accumulator pressure sensor	BC-206
C1257/57	IG Power Source	Hydraulic brake booster pump motor circuit	BC-209
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-217
C1337/37	Different Diameter Tire Malfunction	1. Speed sensor 2. Speed sensor rotor 3. Speed sensor circuit 4. Tire sizes	BC-222
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-161

(*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

(*4): Skid control (VSC control) buzzer sounds.
HINT:
In some cases, the intelligent tester cannot be used when the ABS warning light remains on.

DTC Chart of VSC:

DTC No.	Detection Item	Trouble Areas	See page
C1201/51	Engine Control System Malfunction	Engine control system	BC-144
C1202/52	Brake Fluid Level Low / Open Circuit in Brake Fluid Level Warning Switch Circuit	1. Brake fluid level 2. Brake fluid level warning switch 3. Brake fluid level warning switch circuit 4. Master cylinder solenoid (skid control ECU)	BC-145

DTC No.	Detection Item	Trouble Areas	See page
C1202/58	Brake Fluid Level Low / Open Circuit in Brake Fluid Level Warning Switch Circuit	1. Brake fluid level 2. Brake fluid level warning switch 3. Brake fluid level warning switch circuit 4. Master cylinder solenoid (skid control ECU)	BC-145
C1203/53	ECM Communication Circuit Malfunction	1. CAN communication system 2. ECM	BC-149
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)	BC-150
C1223/43	ABS Control System Malfunction	ABS control system	BC-156
C1231/31	Steering Angle Sensor Circuit Malfunction	1. Master cylinder solenoid (skid control ECU) 2. Steering angle sensor 3. Steering angle sensor circuit 4. CAN communication system	BC-157
C1232/32	Stuck in Deceleration Sensor	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-161
C1234/34	Yaw Rate Sensor Malfunction	1. Yaw rate and deceleration sensor 2. Yaw rate and deceleration sensor circuit	BC-161
C1258/58	Transfer 4WD Position Switch Circuit	1. Transfer indicator switch (4WD position) 2. Transfer indicator switch (4WD position) circuit 3. Master cylinder solenoid (skid control ECU)	BC-210
C1290/66	Steering Angle Sensor Zero Point Malfunction	Steering angle sensor	BC-157
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)	BC-150
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-224

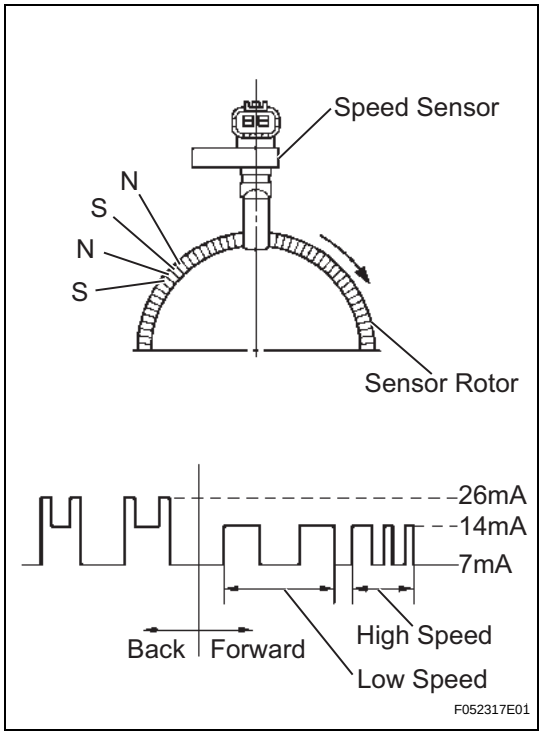
HINT:
In some cases, the intelligent tester cannot be used when the VSC TRAC warning light remains on.

DTC	C0200/31	Right Front Wheel Speed Sensor Signal Malfunction
DTC	C0205/32	Left Front Wheel Speed Sensor Signal Malfunction
DTC	C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction
DTC	C0215/34	Left Rear Wheel Speed Sensor Signal Malfunction

DESCRIPTION

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

Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU. The ECU monitors the wheel speeds according to the speed signals to control the ABS, BA, TRAC, A-TRAC, VSC, AUTO LSD, DAC and HAC systems.

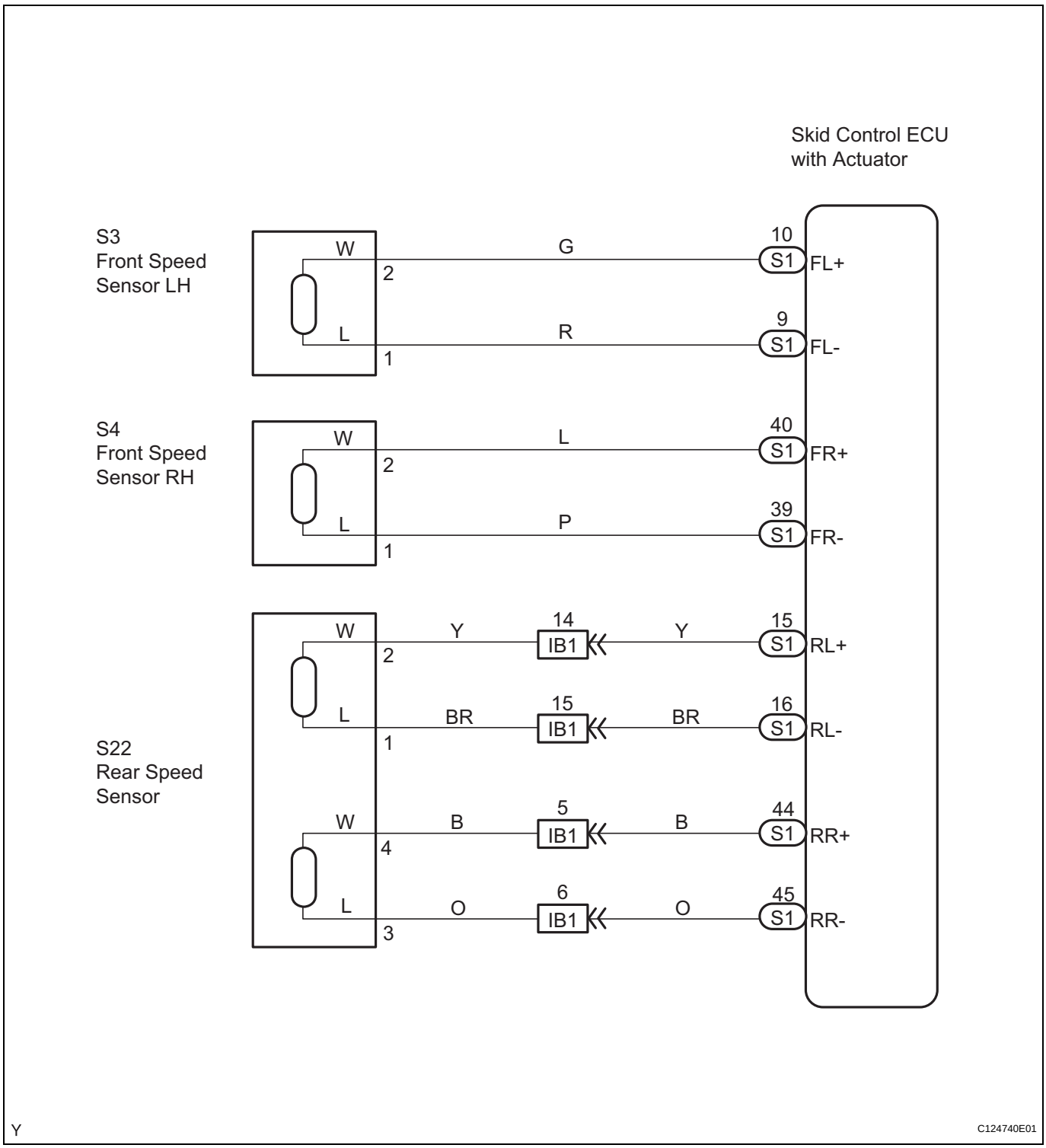


BC

DTC No.	DTC Detecting Conditions	Trouble Areas
C0200/31 C0205/32 C0210/33 C0215/34	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 (3km/h) or more, 3 wheels output reverse rotation signal 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 occur 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.	• Speed sensor • Speed sensor circuit • Master cylinder solenoid (skid control ECU)

HINT:
DTC C0200/31 relates to the front right speed sensor.
DTC C0205/32 relates to the front left speed sensor.
DTC C0210/33 relates to the rear right speed sensor.
DTC C0215/34 relates to the rear left speed sensor.

WIRING DIAGRAM



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

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

(a) Using a intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (See page BC-98).

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
SPD SEN FR	FR speed sensor open detection / OPEN or NORMAL	OPEN: momentary interruption	-
SPD SEN FL	FL speed sensor open detection / OPEN or NORMAL	OPEN: momentary interruption	-
SPD SEN RR	RR speed sensor open detection / OPEN or NORMAL	OPEN: momentary interruption	-
SPD SEN RL	RL speed sensor open detection / OPEN or NORMAL	OPEN: momentary interruption	-

OK:
There are no momentary interruptions.

NG → **Go to step 7**

OK

2 READ VALUE OF DATA LIST (SPEED SENSOR)

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

BC

Item	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 speed to that indicated on speedometer
WHEEL SPD FL	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 RR	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 RL	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

(d) Check that there is no difference between the speed value output from the speed sensor displayed on the intelligent tester and the speed value displayed on the speedometer when driving the vehicle.
OK:
There is almost no difference with the displayed speed value.
HINT:
There is tolerance of +-10% in the speedometer indication.

NG → **Go to step 5**

OK

3 PERFORM TEST MODE INSPECTION (SIGNAL CHECK)

(a) Check if test mode DTCs are detected (See page BC-103).

Result	Proceed to
Test mode DTC output	A
Test mode DTC not output	B

NG → **Go to step 5**

OK

4 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

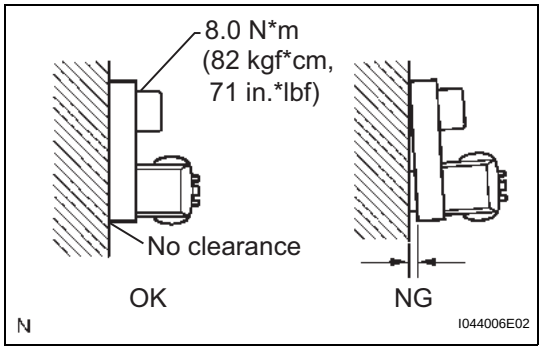
Result	Proceed to
DTC output	A
DTC not output	B

B → **CHECK FOR INTERMITTENT PROBLEMS**

A

BC

5 CHECK SPEED SENSOR INSTALLATION



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

NG → **TIGHTEN BOLT PROPERLY**

OK

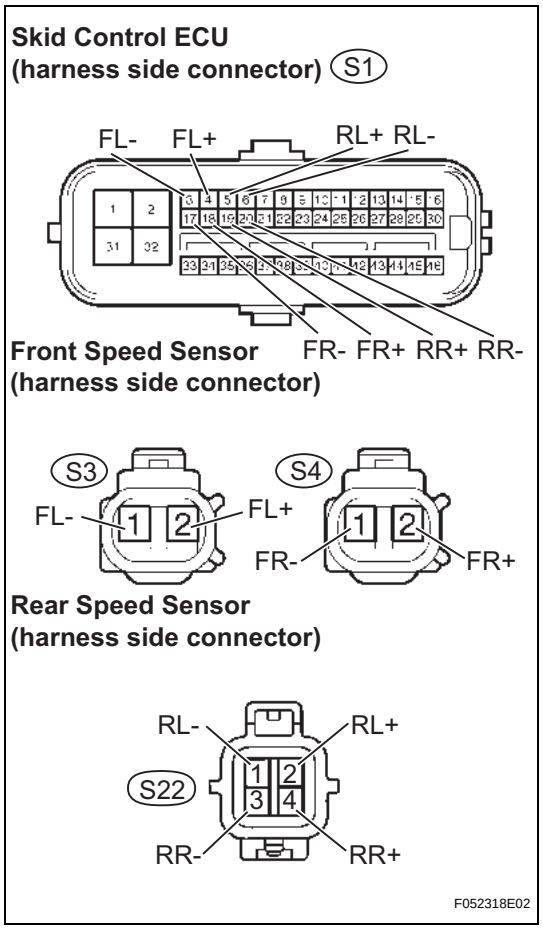
6 CHECK SPEED SENSOR

(a) Remove the speed sensor (See page BC-303 or BC-304).
(b) Check the sensor tip.
OK:
No scratches or foreign matter on the sensor tip.

NG → **CLEAN OR REPLACE SPEED SENSOR**

OK

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



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

Standard Resistance

Tester Connection	Specified Condition
S1-18 (FL+) - S3-2 (FL+)	Below 1 Ω
S1-4 (FL-) - S3-1 (FL-)	Below 1 Ω
S1-3 (FR+) - S4-2 (FR+)	Below 1 Ω
S1-17 (FR-) - S4-1 (FR-)	Below 1 Ω
S1-20 (RL+) - S22-2 (RL+)	Below 1 Ω
S1-6 (RL-) - S22-1 (RL-)	Below 1 Ω
S1-5 (RR+) - S22-4 (RR+)	Below 1 Ω
S1-19 (RR-) - S22-3 (RR-)	Below 1 Ω

(d) Measure the resistance.

Standard Resistance

Tester Connection	Specified Condition
S1-18 (FL+) - Body ground	10 kΩ or higher
S1-4 (FL-) - Body ground	10 kΩ or higher
S1-3 (FR+) - Body ground	10 kΩ or higher
S1-17 (FR-) - Body ground	10 kΩ or higher
S1-20 (RL+) - Body ground	10 kΩ or higher
S1-6 (RL-) - Body ground	10 kΩ or higher
S1-5 (RR+) - Body ground	10 kΩ or higher
S1-19 (RR-) - Body ground	10 kΩ or higher

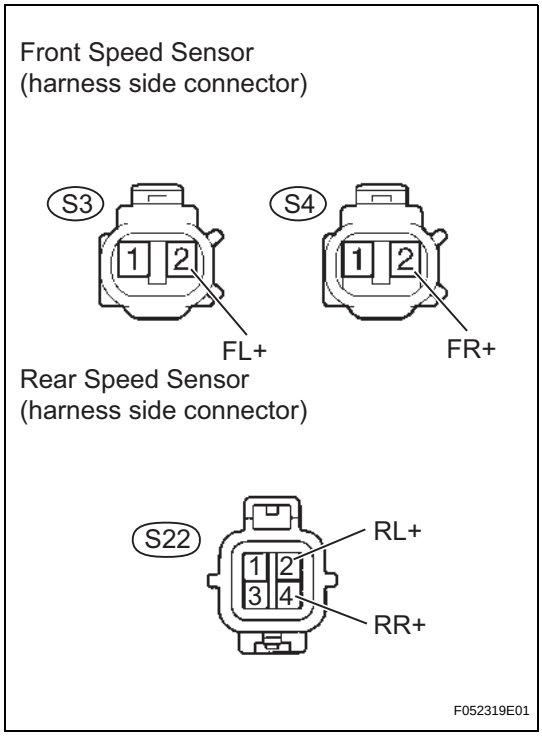
(e) Reconnect the speed sensor connectors.
(f) Reconnect the skid control ECU connector.

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

OK

BC

8 INSPECT MASTER CYLINDER SOLENOID (TERMINAL VOLTAGE)



(a) Disconnect the speed sensor connectors.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage.

Standard Voltage

Tester Connection	Specified Condition
S3-2 (FL+) - Body ground	7.5 to 12 V
S4-2(FR+) - Body ground	7.5 to 12 V
S22-2 (RL+) - Body ground	7.5 to 12 V
S22-4 (RR+) - Body ground	7.5 to 12 V

(d) Turn the ignition switch to OFF.
(e) Reconnect the speed sensor connectors.

NG → **REPLACE MASTER CYLINDER SOLENOID**

OK

BC

9 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → **CHECK FOR INTERMITTENT PROBLEMS**

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

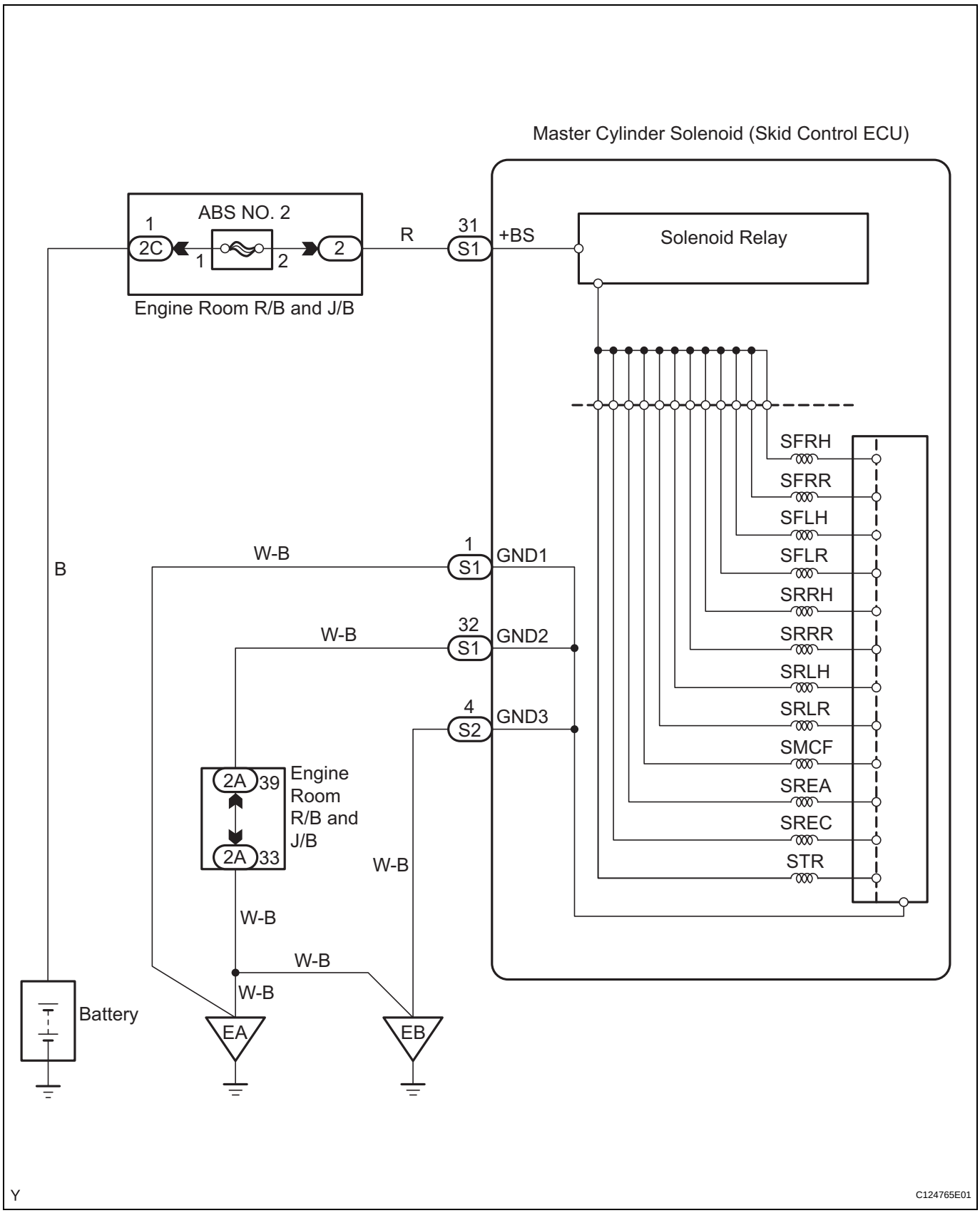
DTC	C1228/28	STR Solenoid Circuit

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 (skid control ECU) • SFRH or SFRR circuit
C0226/21	Open or short in SFLH or SFLR circuit continues for 0.05 seconds or more.	• Master cylinder solenoid (skid control ECU) • SFLH or SFLR circuit
C0226/21	Open or short in SRRH or SRRR circuit continues for 0.05 seconds or more.	• Master cylinder solenoid (skid control ECU) • SRRH or SRRR circuit
C0226/21	Open or short in SRLH or SRLR circuit continues for 0.05 seconds or more.	• Master cylinder solenoid (skid control ECU) • SRLH or SRLR circuit
C0226/21	Open or short in SMCR circuit continues for 0.05 seconds or more.	• Master cylinder solenoid (skid control ECU) • SMCR circuit
C0226/21	Open or short in SREA circuit continues for 0.05 seconds or more.	• Master cylinder solenoid (skid control ECU) • SREA circuit
C0226/21	Open or short in SREC circuit continues for 0.05 seconds or more.	• Master cylinder solenoid (skid control ECU) • SREC circuit
C0226/21	Open or short in STR circuit continues for 0.05 seconds or more.	• Master cylinder solenoid (skid control ECU) • STR circuit

WIRING DIAGRAM



BC

1	**RECONFIRM DTC**

HINT:
This DTCs are set when a problem is identified in the master cylinder solenoid (skid control ECU).
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-118).
(b) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

DTC	C0278/11	Open or Short Circuit in ABS Solenoid Relay Circuit

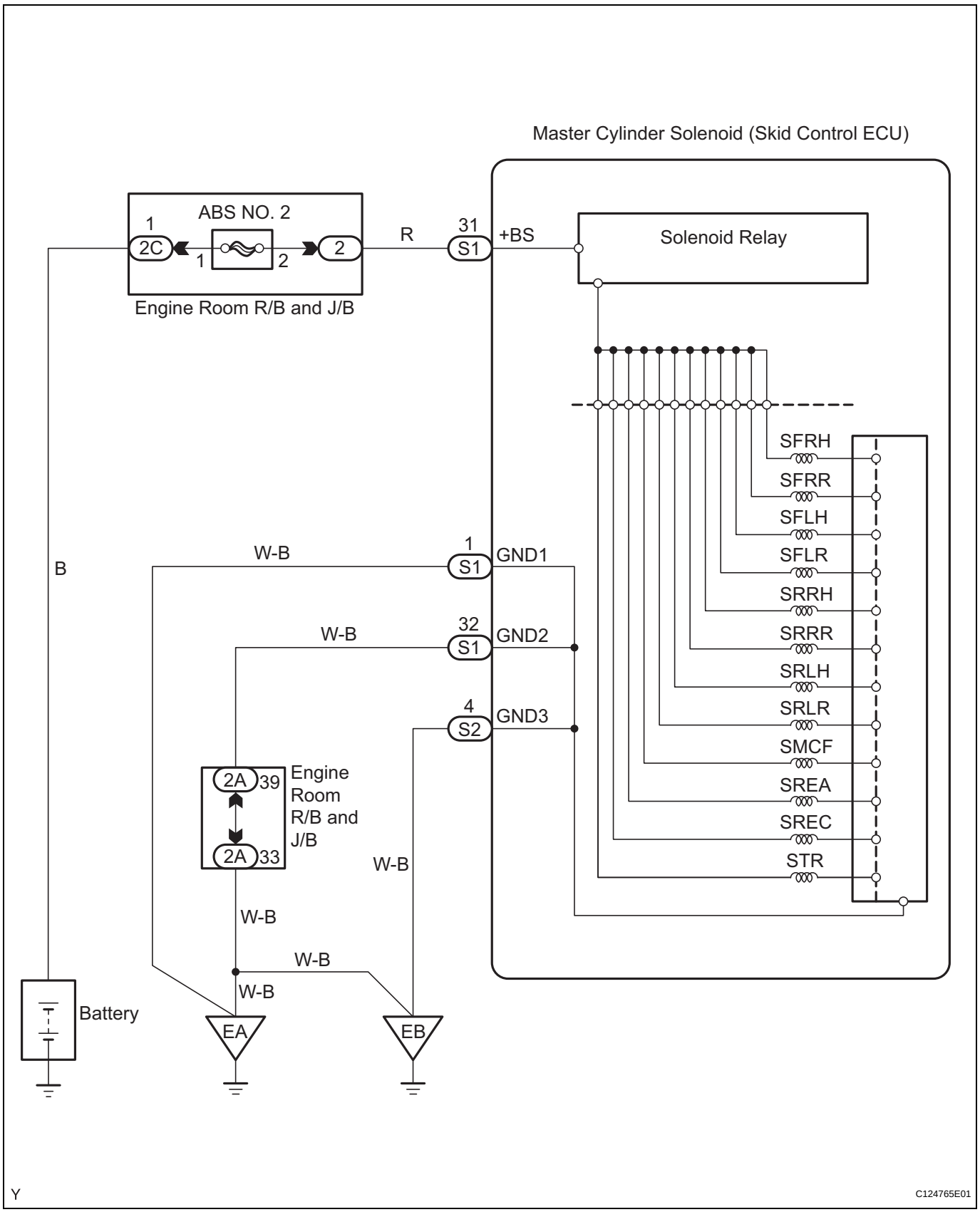
DTC	C0279/12	Short to B+ in ABS Solenoid Relay Circuit

DESCRIPTION

The ABS solenoid relay is built into the master cylinder solenoid.
This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay turns on.

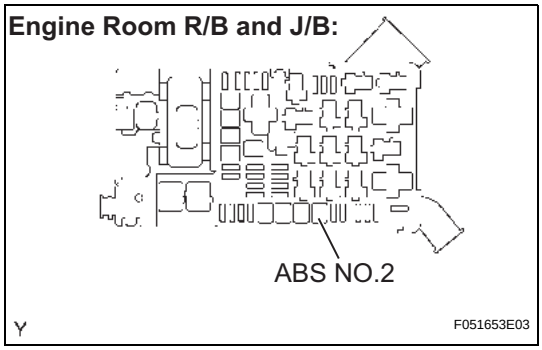
DTC No.	DTC Detecting Conditions	Trouble Areas
C0278/11	When either of following condition detected: 1. Both of following conditions continue for at least 0.2 seconds. (a) IG voltage between 9.5 V and 17 V. (b) Relay contact open when relay ON 2. Both of the following conditions continue for at least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

WIRING DIAGRAM



BC

1	INSPECT FUSE (ABS NO. 2)

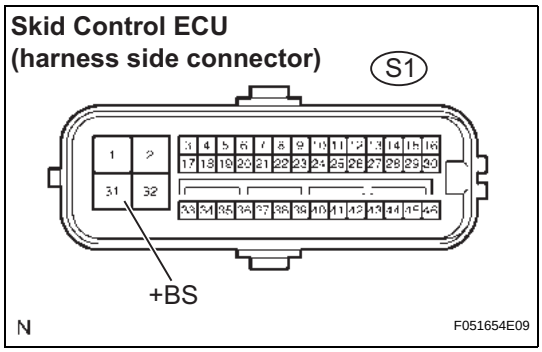


(a) Remove the ABS NO. 2 fuse from the engine room R/B and J/B.
(b) Measure the resistance of the ABS NO. 2 fuse.
Standard Resistance:
Below 1 Ω
(c) Reinstall the ABS NO. 2 fuse.

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

OK

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



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

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

(c) Reconnect the skid control ECU connector.

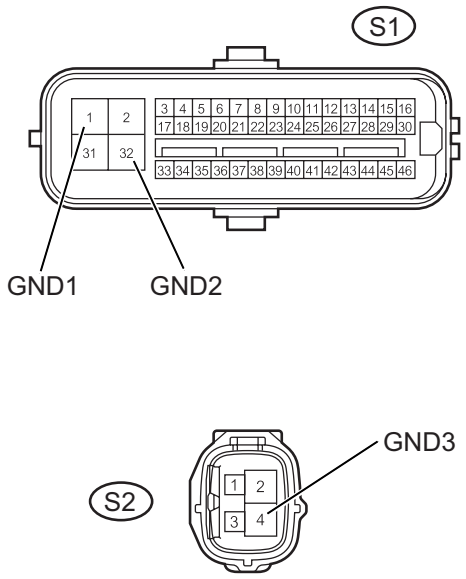
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

BC

3	CHECK HARNESS OR CONNECTOR (GND - BODY GROUND)

Skid Control ECU
(harness side connector):



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

Standard Resistance

Tester Connection	Specified Condition
S1-1, 32 (GND1, GND2) - Body ground	Below 1 Ω
S2-4 (GND3) - Body ground	Below 1 Ω

(c) Reconnect the skid control connectors.

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

OK

4	RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

BC

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

1	CHECK DTC (ENGINE CONTROL SYSTEM)

(a) Check if any DTC is recorded for the engine control system (See page ES-40 or ES-38).

Result	Proceed to
DTC not output	A
DTC output	B

B → REPAIR ENGINE CONTROL SYSTEM

A

REPLACE ECM

DTC	C1202/52	Brake Fluid Level Low / Open Circuit in Brake Fluid Level Warning Switch Circuit

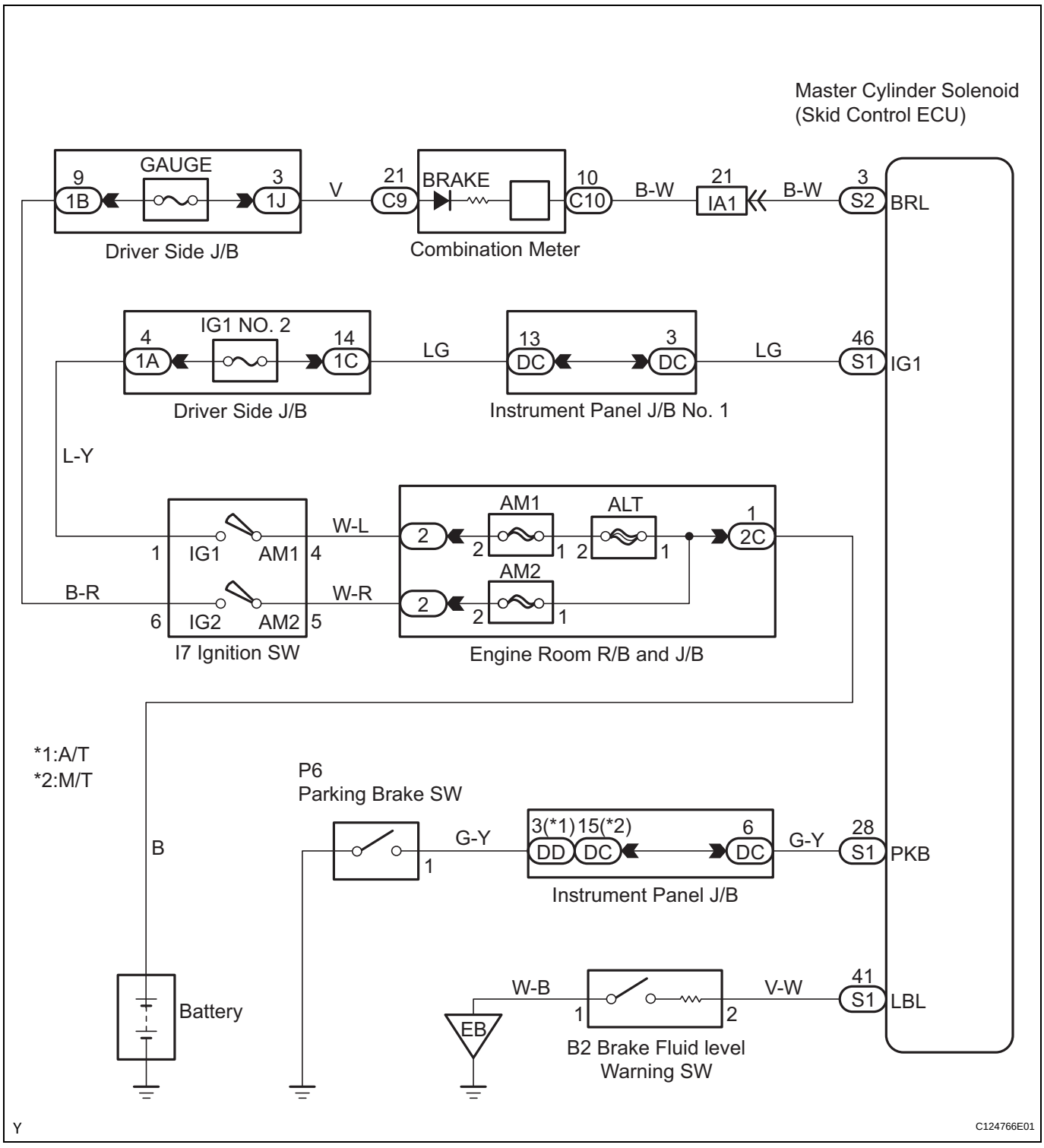
DTC	C1202/58	Brake Fluid Level Low / Open Circuit in Brake Fluid Level Warning Switch Circuit

DESCRIPTION

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
C1202/52 C1202/58	When any of the 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, an 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, of for 7 seconds during pump motor operation.	• Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



HINT:
When C1241/41 is output together with C1202/52 or C1202/58, inspect and repair the trouble areas indicated by C1241/41 first.

1	CHECK BRAKE FLUID LEVEL

(a) Turn the ignition switch to OFF.

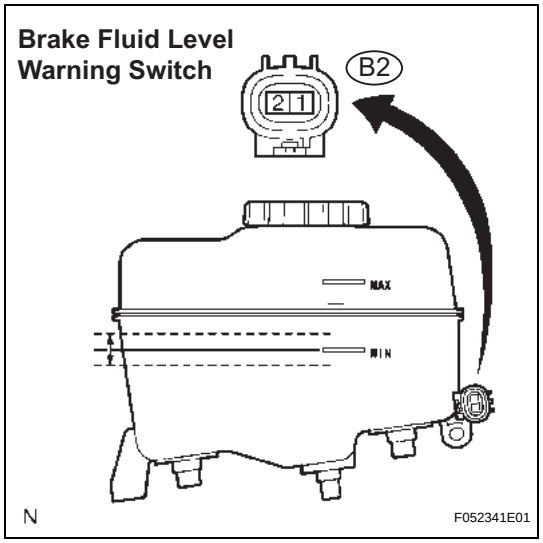
(b) Depress the brake pedal 20 times or more (until the pedal reaction feels light and pedal stroke becomes longer).

(c) Check the amount of fluid in the brake reservoir.
HINT:
When the ignition switch is turned to the ON position, 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
B2-1 - B2-2	Float UP (Switch OFF)	1.9 to 2.1 kΩ
B2-1 - B2-2	Float DOWN (Switch ON)	Below 1 Ω

(c) Reconnect the brake fluid level warning switch connector.
HINT:
If there is no problem after finishing the above check, adjust the brake fluid level to the maximum level.

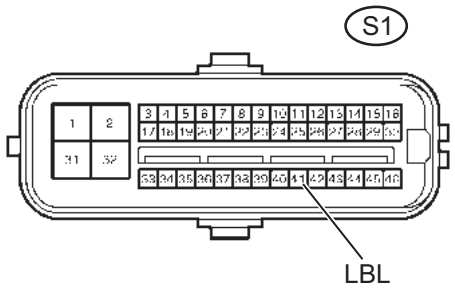
NG → **REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY**

OK

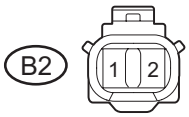
BC

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

Skid Control ECU (harness side connector):



Brake Fluid Level Warning Switch (harness side connector)



C124798E01

(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
S1-41 (LBL) - B2-2	Below 1 Ω

(d) Reconnect the brake fluid level warning switch connector.
(e) Reconnect the skid control ECU connector.

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

OK

BC

4	RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

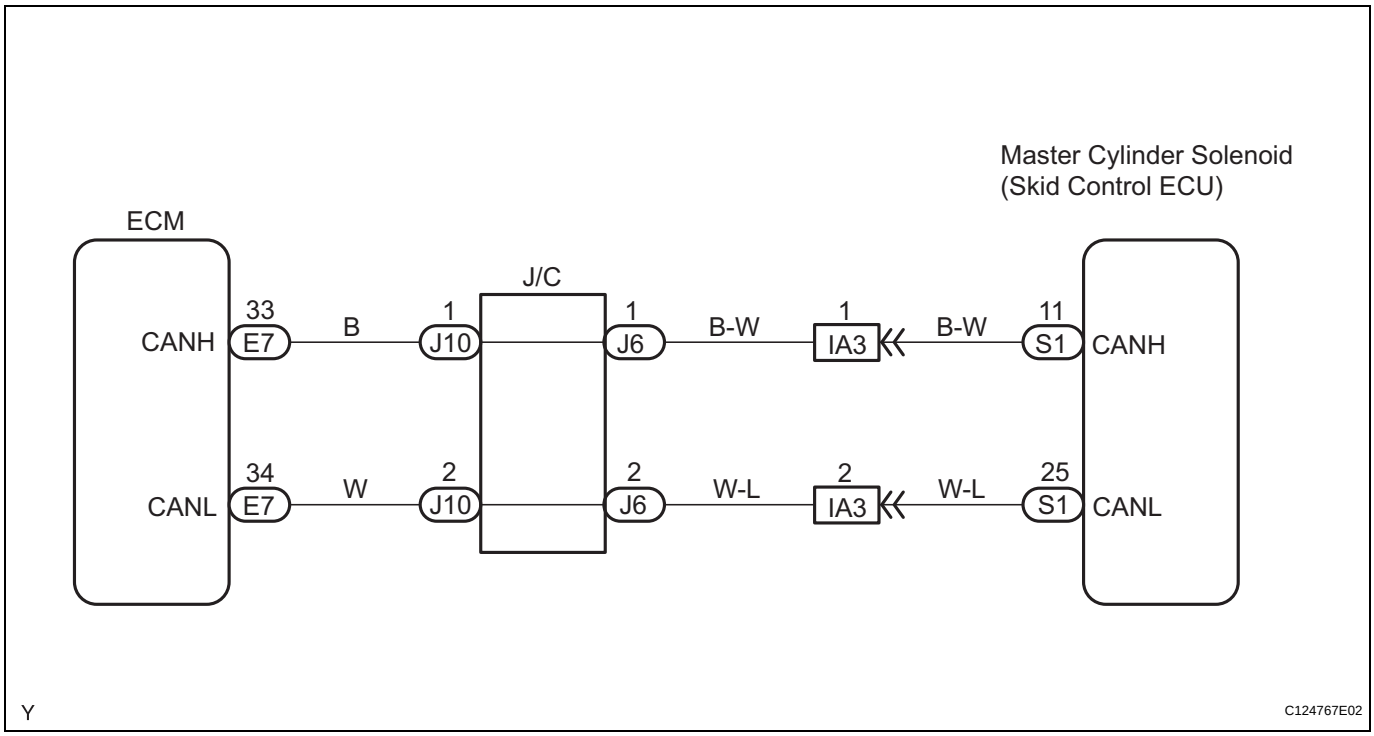
DTC	C1203/53	ECM Communication Circuit Malfunction

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

WIRING DIAGRAM



BC

1	CHECK DTC (ENGINE CONTROL SYSTEM)

(a) Check if any DTC is recorded for the engine control system (See page ES-40 or ES-38).

Result	Proceed to
DTC not output	A
DTC output	B

B → REPAIR ENGINE CONTROL SYSTEM

A

REPLACE ECM

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

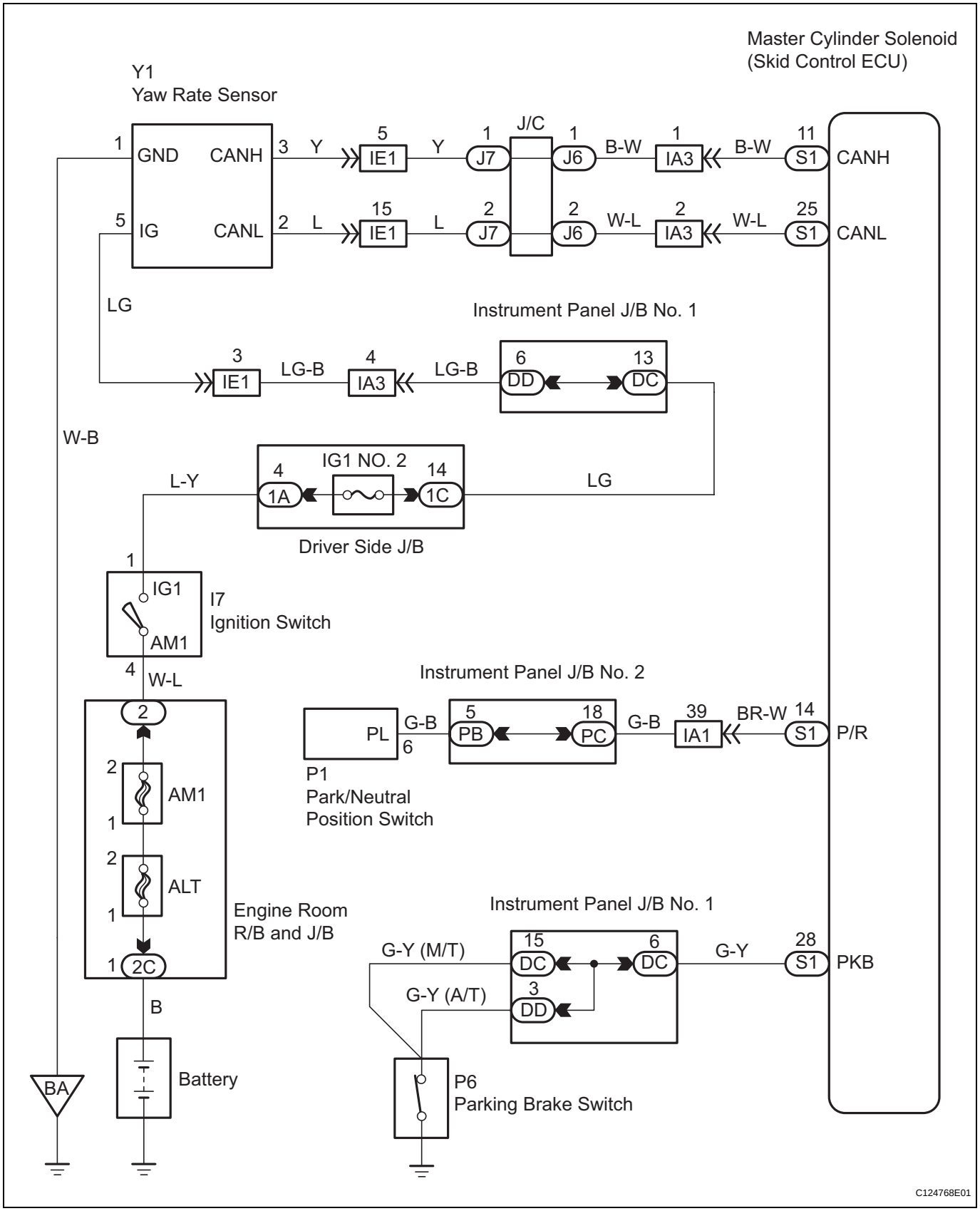
DTC	C1336/39	Zero Point Calibration of Acceleration Sensor Undone

DESCRIPTION

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), 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)
C1336/39	When either of following 1 or 2 detected: 1. In TEST mode, shift lever shifted to non-P position (A/T), 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)

WIRING DIAGRAM



BC

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-99).

NEXT

2	RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

3	CHECK YAW RATE AND DECELERATION SENSOR INSTALLATION

BC

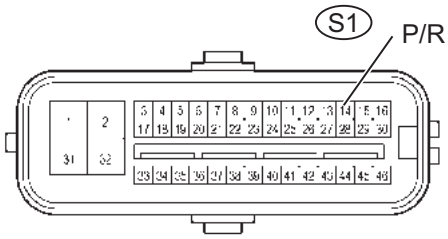
(a) Check that the yaw rate and deceleration sensor has been installed properly (See page BC-309).
OK:
The sensor is tightened to the specified torque.
The sensor is not tilted.

NG → INSTALL YAW RATE SENSOR CORRECTLY

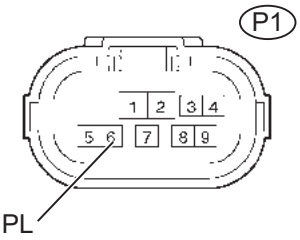
OK

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

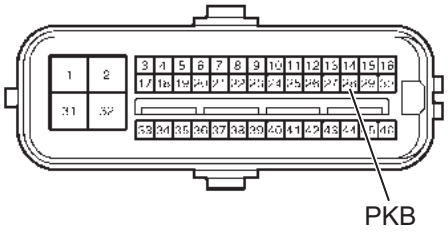
F052381E01

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

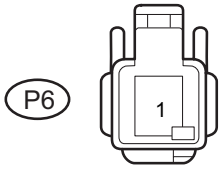
Tester Connection	Specified Condition
S1-14 (P/R) - P1-6 (RL)	Below 1 Ω

(4) Reconnect the Park/Neutral position switch connector.
(5) Reconnect the skid control ECU connector.

Skid Control ECU (harness side connector): S1



Parking Brake Switch (harness side connector):



C124797E01

(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
S1-28 (PKB) - P6-1	Below 1 Ω

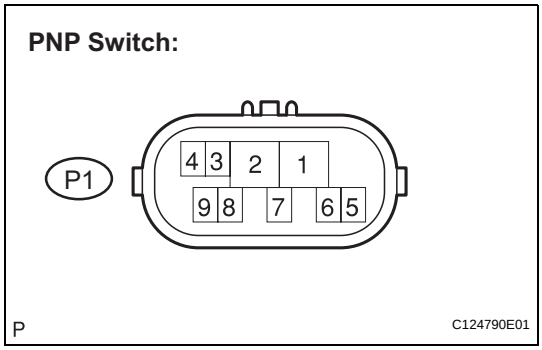
(4) Reconnect the parking brake switch connector.
(5) Reconnect the skid control ECU connector.

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

OK

BC

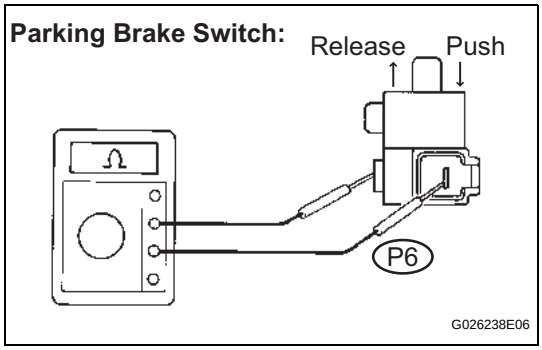
5	INSPECT PARK/NEUTRAL POSITION SWITCH OR PARKING BRAKE SWITCH



(a) Inspect the Park/Neutral Position (PNP) switch (for A/T models).
(1) Disconnect the P1 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

(3) Reconnect the PNP switch connector.



(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
P6-1 Ground part	Released	Below 1 Ω
P6-1 Ground part	Pushed in	Below 1 Ω

(3) Reconnect the parking brake switch connector.

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

OK

6	REPLACE YAW RATE AND DECELERATION SENSOR

(a) Replace the yaw rate and deceleration sensor (See page BC-308).

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-99).

NEXT

8	RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).

BC

(b) Check if the same DTCs are recorded.

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

1	CHECK DTC (ABS)

(a) Clear the DTC (See page BC-118).
(b) Check if the same DTC is recorded.

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

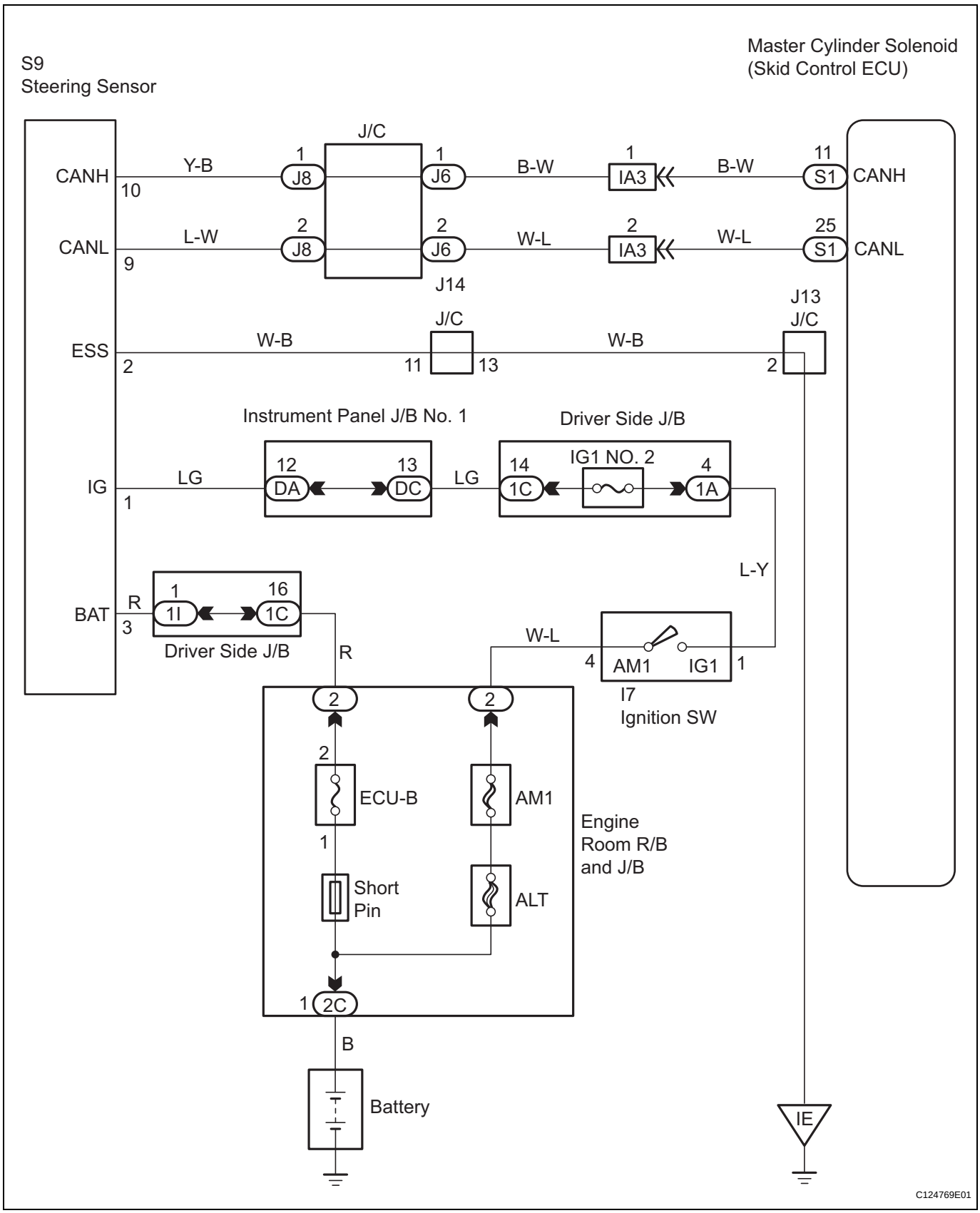
DTC	C1290/66	Steering Angle Sensor Zero Point Malfunction

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.	• Master cylinder solenoid (skid control ECU) • Steering angle sensor • Steering angle sensor circuit • CAN communication system
C1290/66	Steering angle sensor zero point calibration position significantly differs from recorded value.	Steering angle sensor

WIRING DIAGRAM



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 CAN communication system DTC (See page CA-7).

Result	Proceed to
DTC not output	A
DTC output	B

NG → **REPAIR CAN COMMUNICATION SYSTEM**

OK

2 READ VALUE OF DATA LIST (STEERING ANGLE SENSOR)

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

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
STEERING ANG	Steering sensor/ Min.: -1152 deg, Max.: 1150.875 deg	Left turn: Increase Right turn: Decrease	-

(e) Check that the steering angle sensor value displayed on the intelligent tester changes when turning the steering wheel.
OK:
Steering angle sensor value changes.

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

(a) Clear the DTCs (See page BC-118).

BC

(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

4 CHECK TERMINAL VOLTAGE (STEERING ANGLE SENSOR)

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

Standard Voltage

Tester Connection	Specified Condition
S9-1 (IG1) - S9-2 (ESS)	10 to 14 V
S9-3 (BAT) - S9-2 (ESS)	10 to 14 V

(e) Turn the ignition switch to OFF.
(f) Reconnect the steering angle sensor connector.
(g) Reinstall the steering wheel and the column lower cover.

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

OK

5 REPLACE STEERING ANGLE SENSOR

(a) Replace the steering angle sensor (See page BC-311).

NEXT

6 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

DTC	C1232/32	Stuck in Deceleration Sensor

DTC	C1234/34	Yaw Rate Sensor Malfunction

DTC	C1243/43	Acceleration Sensor Stuck Malfunction

DTC	C1244/44	Open or Short in Deceleration Sensor Circuit

DTC	C1245/45	Acceleration Sensor Output Malfunction

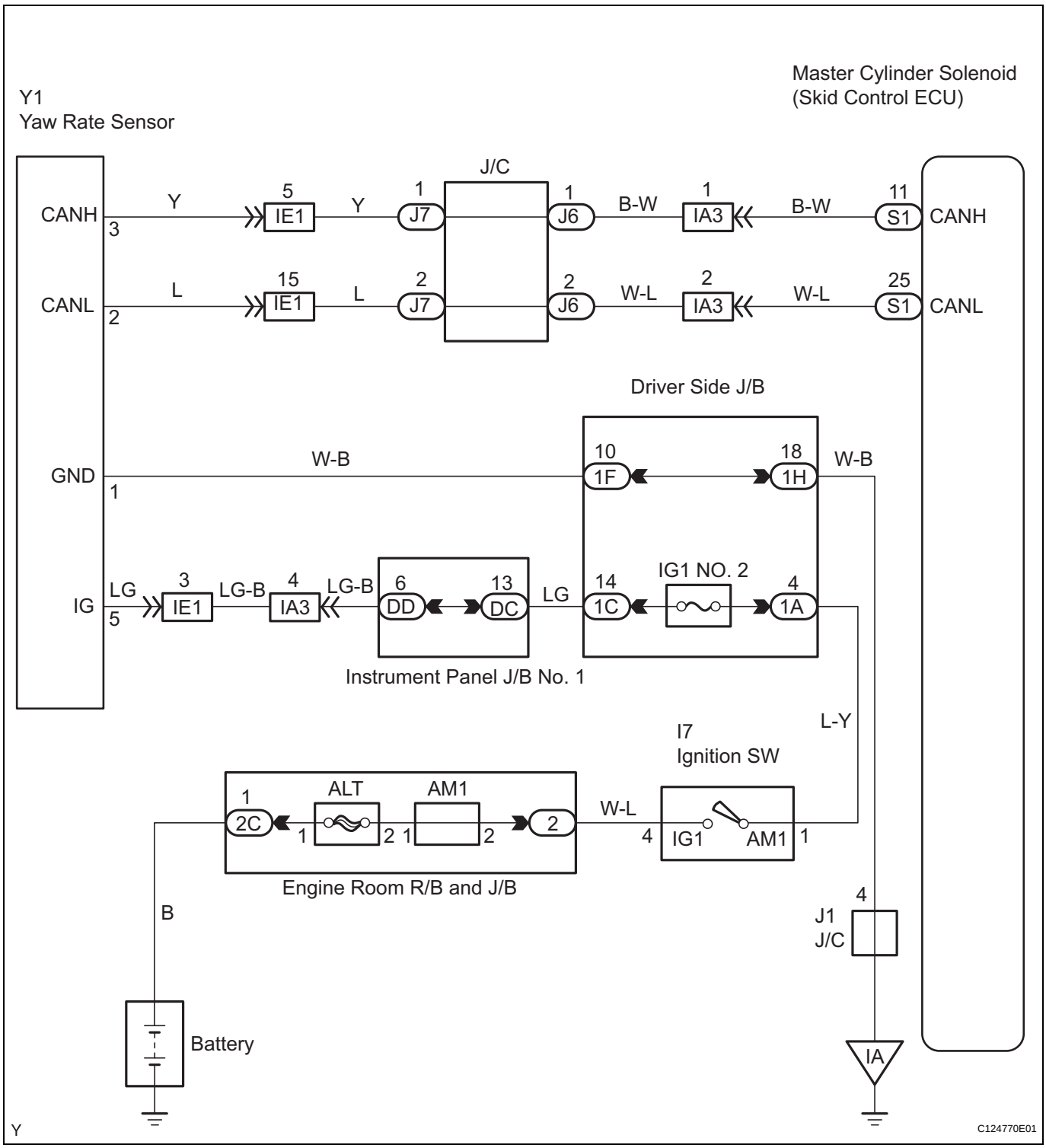
DTC	C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction

DESCRIPTION

The skid control ECU receives signals from the yaw rate sensor and deceleration sensor via 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 (G sensor communication trouble) are output.

DTC No.	DTC Detecting Conditions	Trouble Areas
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
C1234/34	Sensor malfunction signal received from yaw rater sensor.	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit
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
C1244/44	When either of following (1 or 2) detected: 1. Both of following conditions continue for at least 60 seconds. • Vehicle stopped. • 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
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
C1381/97	Deceleration sensor power source malfunction signal received for at least 10 seconds at a speed of more than 2 mph (3 km/h).	• Yaw rate and deceleration sensor • Yaw rate and deceleration sensor circuit

WIRING DIAGRAM



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 DTCs (See page BC-118).

(b) Check if the DTCs U073/94, U0123/62, C1210/36 and/or C1336/39 are detected.

Result	Proceed to
DTC U073/94, U0123/62, U1210/36 and/or C1336/39 not output	A
DTC U073/94 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**

A

2 INSPECT YAW RATE AND DECELERATION SENSOR (TERMINAL VOLTAGE AND CONTINUITY)

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

(b) Measure the voltage.

Standard Voltage

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

(c) Measure the resistance.

Standard Resistance

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

(d) Reconnect the yaw rate and deceleration sensor connector.

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

BC

DTC	**C1235/35**	**Foreign Object is Attached on Tip of Front Speed Sensor RH**

DTC	**C1236/36**	**Foreign Object is Attached on Tip of Front Speed Sensor LH**

DTC	**C1238/38**	**Foreign Object is Attached on Tip of Rear Speed Sensor RH**

DTC	**C1239/39**	**Foreign Object is Attached on Tip of Rear Speed Sensor LH**

DESCRIPTION

The Skid Control ECU sets this DTC if, according to abnormal signals input by the sensor, it detects that foreign material is adhering to the speed sensor tip or the sensor rotor, or the rotor has any missing teeth. This DTC may be set if parts such as the speed sensor circuit connector or wire harness are malfunctioning.

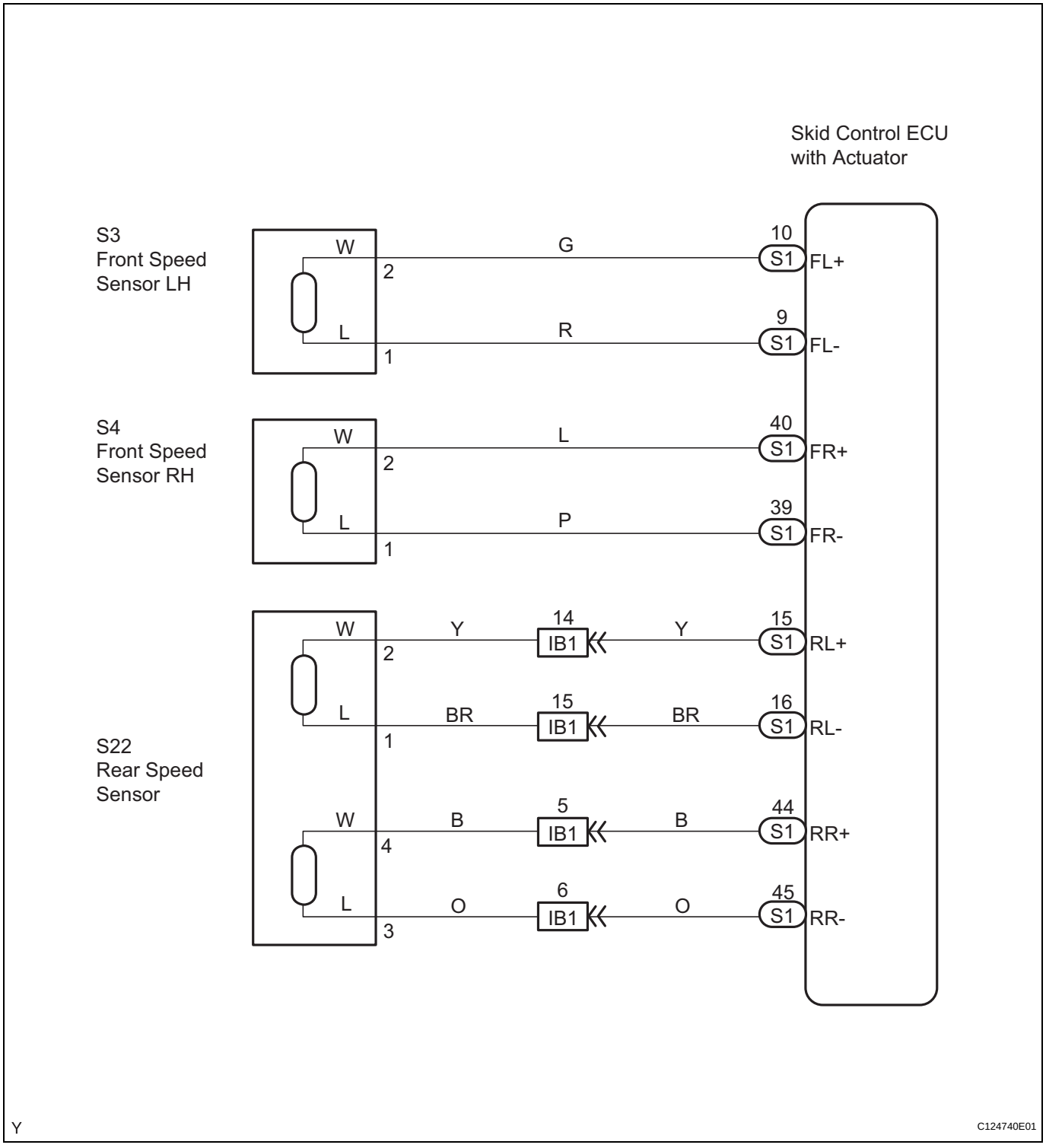
DTC No.	DTC Detecting Conditions	Trouble Areas
C1235/35 C1236/36 C1238/38 C1239/39	• At vehicle speed of 12 mph (20 km/h) or more, noise in speed sensor signal continues for 5 seconds or more. • At vehicle speed of 6 mph (10 km/h) or more, noise detected as rotor turns, for 15 seconds or more.	• Master cylinder solenoid (skid control ECU) • Speed sensor • Speed sensor rotor

HINT:

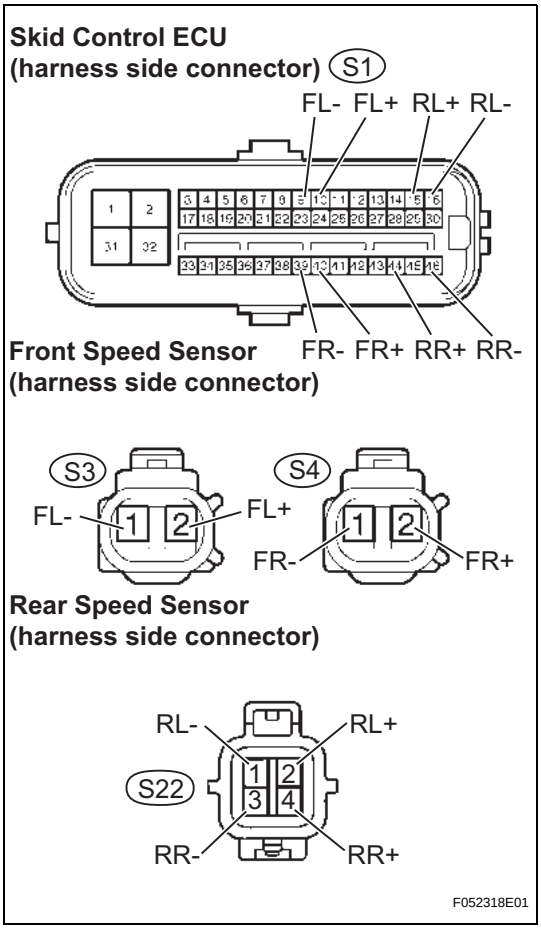
BC

DTC C1235/35 relates to the front right speed sensor.
DTC C1236/36 relates to the front left speed sensor.
DTC C1238/38 relates to the rear right speed sensor.
DTC C1239/39 relates to the rear left speed sensor.

WIRING DIAGRAM



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



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

Standard Resistance

Tester Connection	Specified Condition
S1-10 (FL+) - S3-2 (FL+)	Below 1 Ω
S1-9 (FL-) - S3-1 (FL-)	Below 1 Ω
S1-40 (FR+) - S4-2 (FR+)	Below 1 Ω
S1-39 (FR-) - S4-1 (FR-)	Below 1 Ω
S1-15 (RL+) - S22-2 (RL+)	Below 1 Ω
S1-16 (RL-) - S22-1 (RL-)	Below 1 Ω
S1-44 (RR+) - S22-4 (RR+)	Below 1 Ω
S1-45 (RR-) - S22-3 (RR-)	Below 1 Ω

(d) Measure the resistance.

Standard Resistance

Tester Connection	Specified Condition
S1-10 (FL+) - Body ground	10 kΩ or higher
S1-9 (FL-) - Body ground	10 kΩ or higher
S1-40 (FR+) - Body ground	10 kΩ or higher
S1-39 (FR-) - Body ground	10 kΩ or higher
S1-15 (RL+) - Body ground	10 kΩ or higher
S1-16 (RL-) - Body ground	10 kΩ or higher
S1-44 (RR+) - Body ground	10 kΩ or higher
S1-45 (RR-) - Body ground	10 kΩ or higher

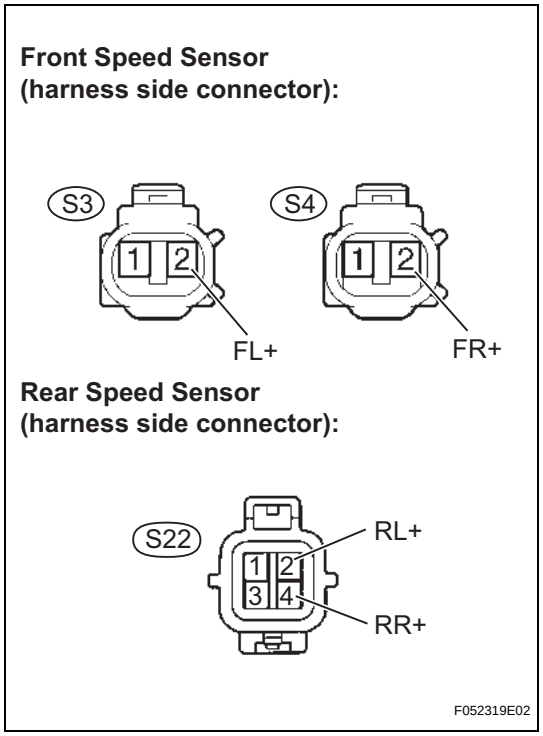
(e) Reconnect the speed sensor connectors.
(f) Reconnect the skid control ECU connector.

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

OK

BC

2 INSPECT MASTER CYLINDER SOLENOID (TERMINAL VOLTAGE)



(a) Disconnect the speed sensor connectors.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage.

Standard Voltage

Tester Connection	Specified Condition
S3-2 (FL+) - Body ground	7.5 to 12 V
S4-2 (FR+) - Body ground	7.5 to 12 V
S22-2 (RL+) - Body ground	7.5 to 12 V
S22-4 (RR+) - Body ground	7.5 to 12 V

(d) Turn the ignition switch to OFF.
(e) Reconnect the speed sensor connectors.

NG → **REPLACE MASTER CYLINDER SOLENOID**

OK

3 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

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

A

4 INSPECT SPEED SENSOR

(a) Remove the speed sensor (See page BC-303 or BC-304).
(b) Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NG → **CLEAN OR REPLACE SPEED SENSOR**

BC

OK

CLEAN OR REPLACE SPEED SENSOR

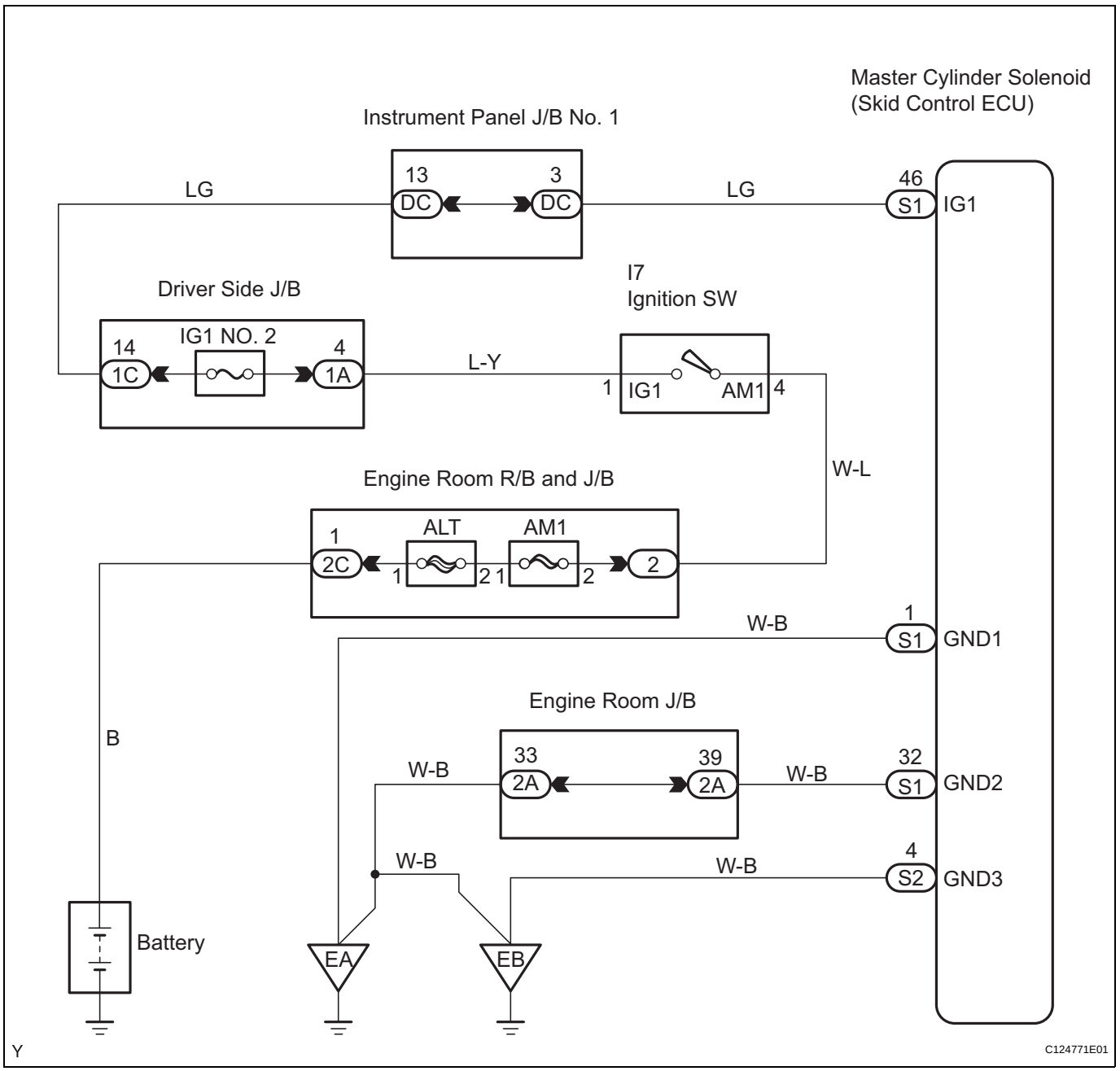
DTC	C1241/41	Low Battery Positive Voltage

DESCRIPTION

If the voltage supplied to the IG1 terminal is not within the DTC detection threshold due to malfunctions in parts such as the battery and alternator 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 • IG1 NO. 2 fuse • Charging system • Power source circuit

WIRING DIAGRAM



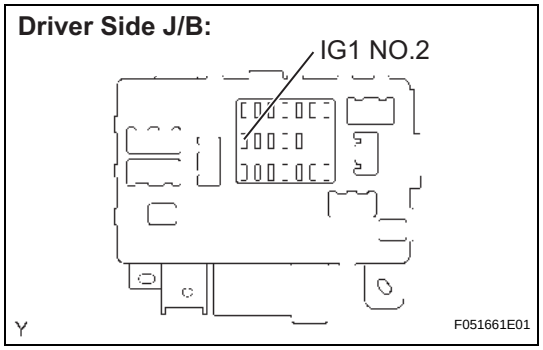
1	INSPECT BATTERY

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

NG → **INSPECT CHARGING SYSTEM**

OK

2	**INSPECT FUSE (IG1 NO. 2)**



(a) Remove the IG1 NO. 2 fuse from the driver side J/B.
(b) Measure the resistance of the IG1 NO. 2 fuse.
Standard Resistance:
Below 1 Ω
(c) Reinstall the IG1 NO. 2 fuse.

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

OK

3	**READ VALUE OF DATA LIST (IG VOLTAGE)**

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

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
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.

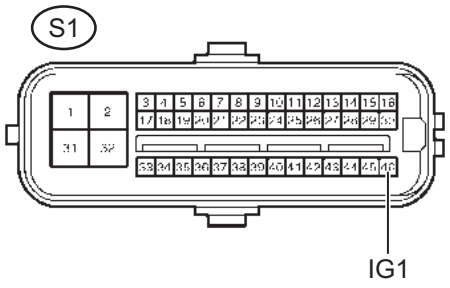
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

BC

4 INSPECT SKID CONTROL ECU (IG1 TERMINAL VOLTAGE)

Skid Control ECU (harness side connector):



C121700E13

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

Standard Voltage

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

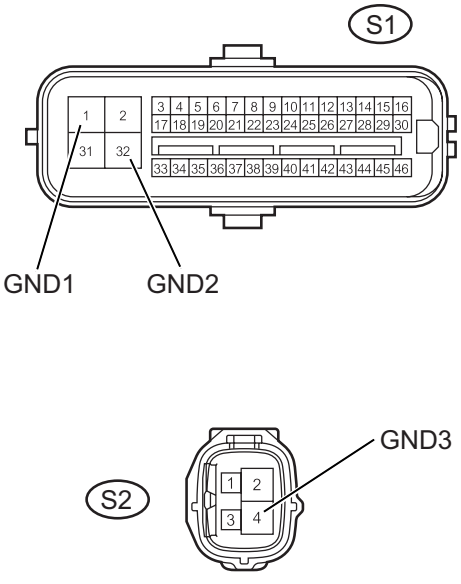
(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control ECU connector.

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

OK

5 CHECK HARNESS AND CONNECTOR (GND TERMINAL CONTINUITY)

Skid Control ECU (harness side connector):



C124799E01

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

Standard Resistance

Tester Connection	Specified Condition
S1-1 (GND1) - Body ground	Below 1 Ω
S1-32 (GND2) - Body ground	Below 1 Ω
S1-4 (GND3) - Body ground	Below 1 Ω

(c) Reconnect the skid control ECU connectors.

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

OK

6 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Drive the vehicle at a speed of 1.9 mph (3 km/h) or more for 10 seconds or more.

(c) Check if the same DTCs are detected.
HINT:
Reinstall the sensors, connectors, etc. and restore the vehicle to its previous condition, before rechecking for DTCs.

Result	Proceed to
DTC output	A
DTC not output (When troubleshooting in accordance with DTC CHART)	B
DTC not output (When troubleshooting in accordance with PROBLEM SYMPTOMS TABLE)	C

B → **END**

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

A

REPLACE MASTER CYLINDER SOLENOID

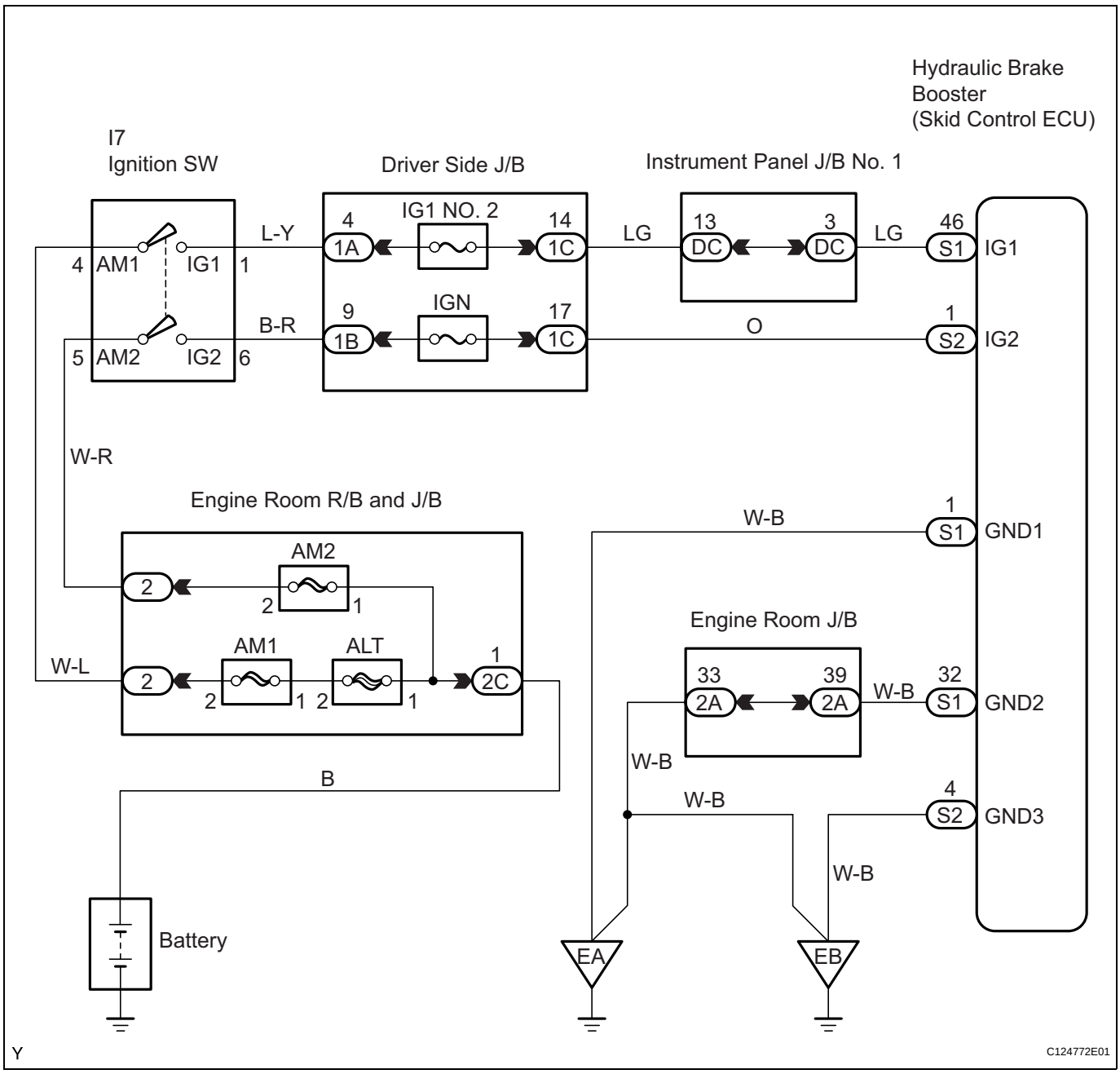
DTC	C1242/42	IG2 Power Source Circuit

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 IG1 and/or IG2 is not within the DTC detection threshold due to malfunctions in parts such as the battery or alternator circuit, this DTC is stored.

DTC No.	DTC Detecting Condition	Trouble Areas
C1242/42	Vehicle speed 1.9 mph (3 km/h) or more and voltage of skid control ECU terminal IG1 and/or IG2 remains at below 6.5 V for more than 7 seconds.	• Battery • IC regulator • Power source circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



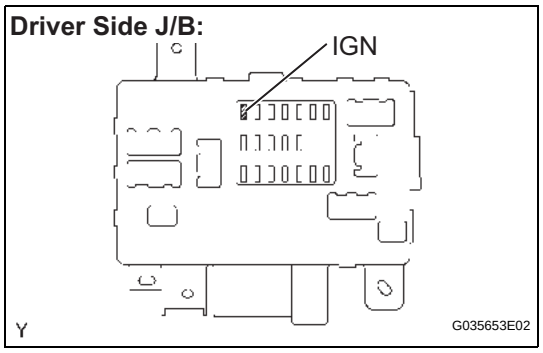
1	**INSPECT BATTERY**

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

NG → **INSPECT CHARGING SYSTEM**

OK

2	**INSPECT FUSE (IGN FUSE)**

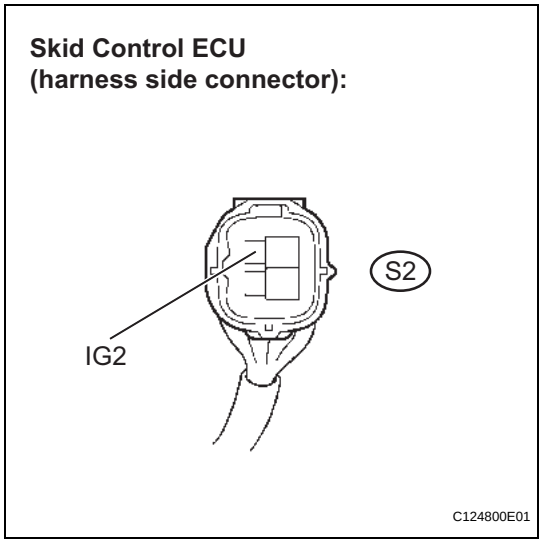


(a) Remove the IGN fuse from the driver side J/B.
(b) Measure the resistance of the IGN fuse.
Standard Voltage:
Below 1 Ω
(c) Reinstall the IGN fuse.

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

OK

3	**INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (IG2 TERMINAL)**



(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage.
Standard Voltage

Tester Connection	Specified Condition
S2-1 (IG2) - Body ground	10 to 14 V

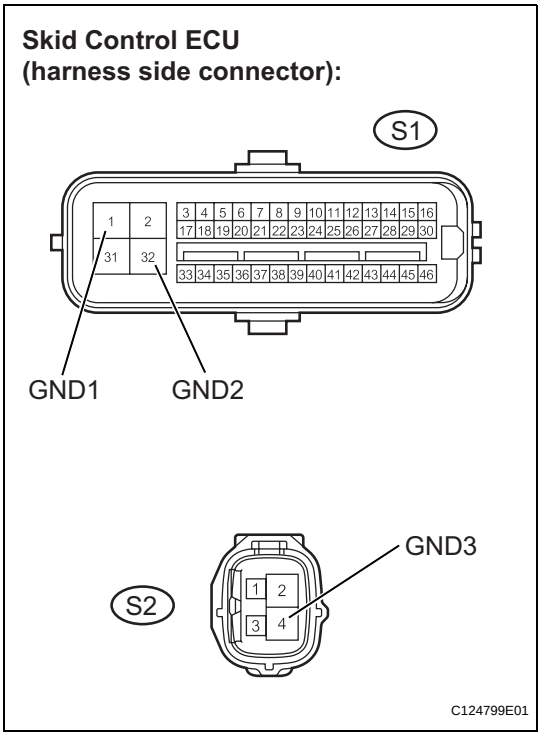
(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control ECU connector.

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

OK

BC

4 INSPECT SKID CONTROL ECU CONNECTOR (GND TERMINAL)



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

Standard Resistance

Tester Connection	Specified Condition
S1-1 (GND1) - Body ground	Below 1 Ω
S1-32 (GND2) - Body ground	Below 1 Ω
S2-4 (GND3) - Body ground	Below 1 Ω

(c) Reconnect the skid control ECU connectors.

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

OK

BC

5 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Drive the vehicle at a speed of 1.9 mph (3 km/h) or more for 7 seconds or more.
(c) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

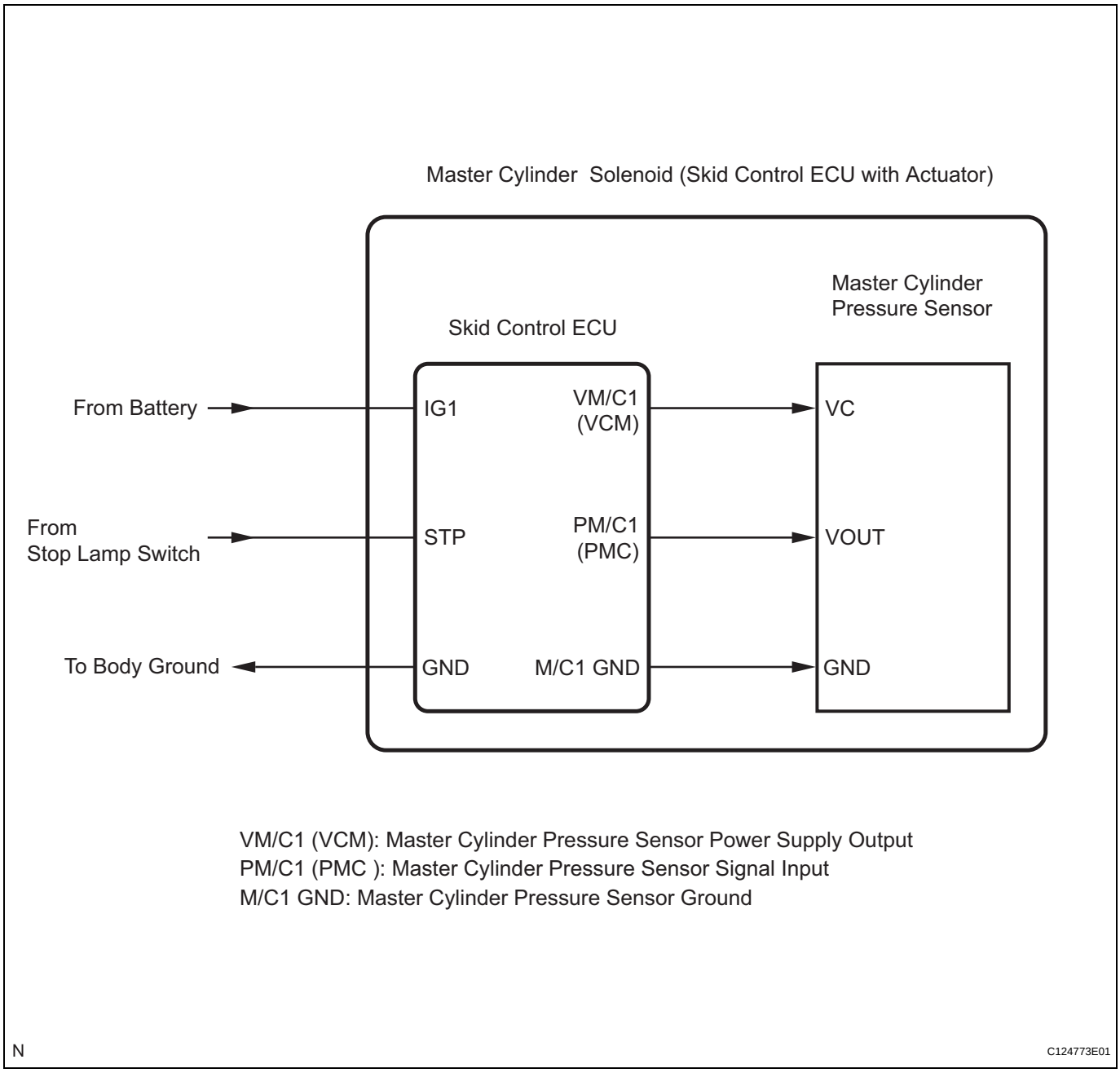
A

REPLACE MASTER CYLINDER SOLENOID

DTC	C1246/46	Master Cylinder Pressure Sensor Malfunction

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

DTC No.	DTC Detecting Conditions	Trouble Areas
C1246/46	When either of following conditions detected: 1. All of the 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. All 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. All 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. All 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.	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit • Master cylinder solenoid (skid control ECU) • Stop light circuit

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

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

BC

(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.

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 lamps turned on: 0.3 to 0.9 V	Reading increases when brake pedal depressed

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

Result	Proceed to
Master cylinder pressure sensor value becomes 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 MASTER CYLINDER SOLENOID**

A

2 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

3 CHECK BRAKE PEDAL HEIGHT

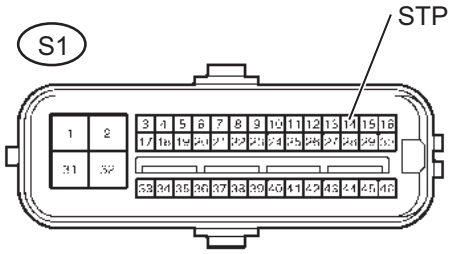
(a) Check the brake pedal height.
(b) Check the stop lamp switch installation.
OK:
The brake pedal and stop lamp switch are normal.

NG → **ADJUST BRAKE PEDAL HEIGHT**

OK

4 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (STP TERMINAL)

Skid Control ECU (harness side connector):



C121700E07

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

Tester Connection	Condition	Specified Condition
S1-7 (STP) - Body ground	Brake pedal depressed	8 to 16 V
S1-7 (STP) - Body ground	Brake pedal released	Below 1.5 V

(c) Reconnect the skid control ECU connector.

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

OK

5 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).

BC

(b) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

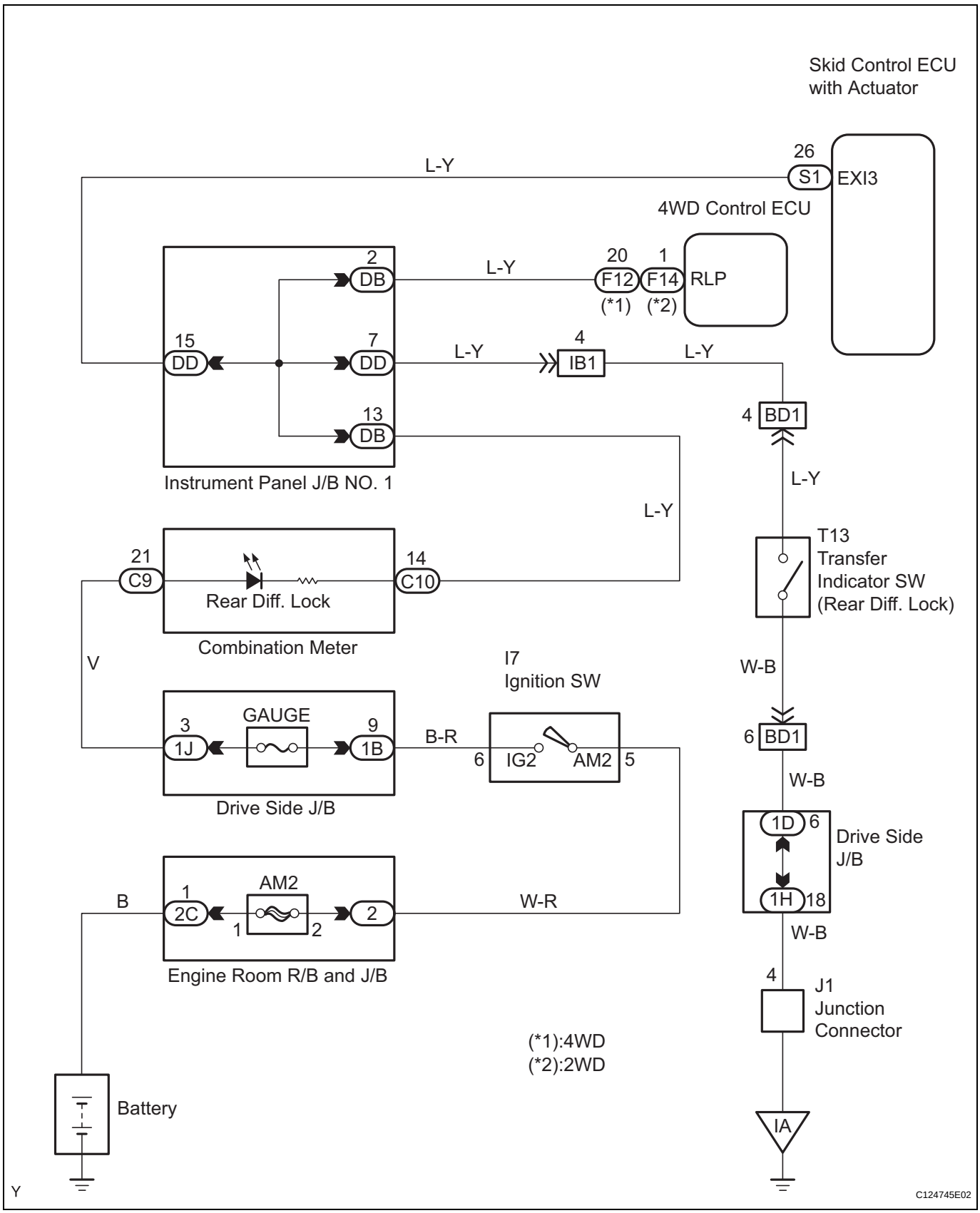
DTC	C1248/48	Open Circuit in Rear Differential Lock

DESCRIPTION

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

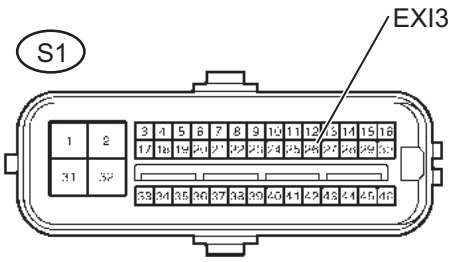
WIRING DIAGRAM



BC

1	INSPECT SKID CONTROL ECU (EXI3 TERMINAL VOLTAGE)

Skid Control ECU
(harness side connector):



C121700E14

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

Standard Voltage

Tester Connection	Vehicle Condition	Specified Condition	Rear Diff. Lock Indicator Light
S1-26 (EXI3) - Body ground	Rear Differential free	8 to 14 V	OFF
S1-26 (EXI3) - Body ground	Rear Differential locked	1.5 V	ON

(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control ECU connector.

NG → Go to step 3

OK

2	RECONFIRM DTC

(a) Clear the DTC (See page BC-118).
(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 DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

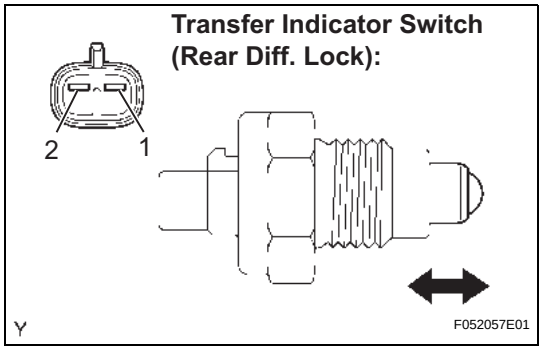
B → END

A

REPLACE MASTER CYLINDER SOLENOID

BC

3 INSPECT TRANSFER INDICATOR SWITCH (REAR DIFF. LOCK)



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

Standard Resistance

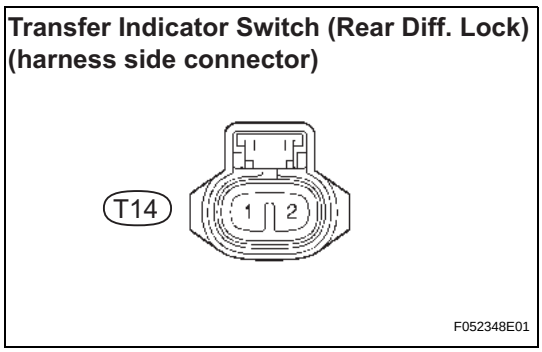
Tester Connection	Condition	Specified Condition
1 - 2	Pushed	Below 1 Ω
1 - 2	Free	10 kΩ or higher

(d) Reinstall the transfer indicator switch.
(e) Reconnect the transfer indicator switch connector.

NG → **REPLACE TRANSFER INDICATOR SWITCH (REAR DIFF. LOCK)**

OK

4 CHECK HARNESS AND CONNECTOR



(a) Disconnect the skid control ECU connector.
(b) Disconnect the 4WD control ECU connector.
(c) Disconnect the transfer indicator switch connector.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage.

Standard Voltage

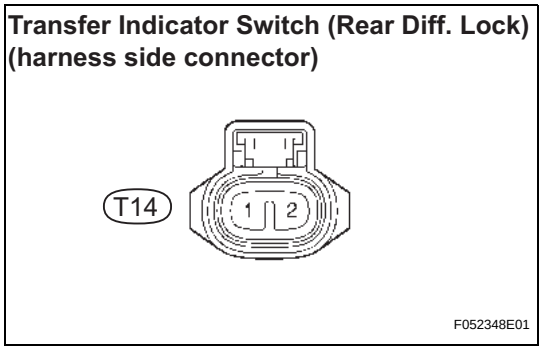
Tester Connection	Specified Condition
T14-2 - Body ground	8 to 14 V

(f) Turn the ignition switch to OFF.
(g) Reconnect the transfer indicator switch connector.
(h) Reconnect the 4WD control ECU connector.
(i) Reconnect the skid control ECU connector.

OK → **REPLACE 4WD CONTROL ECU**

NG

5 CHECK HARNESS AND CONNECTOR



(a) Disconnect the skid control ECU connector.
(b) Disconnect the 4WD control ECU connector.
(c) Disconnect the transfer indicator switch connector.
(d) Disconnect the combination meter connector.
(e) Measure the resistance.

Standard Resistance

Tester Connection	Specified Condition
T14-2 - Body ground	10 kΩ or higher

(f) Reconnect the combination meter connector.
(g) Reconnect the transfer indicator switch connector.
(h) Reconnect the 4WD control ECU connector.
(i) Reconnect the skid control ECU connector.

BC

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

OK

REPLACE COMBINATION METER ASSEMBLY

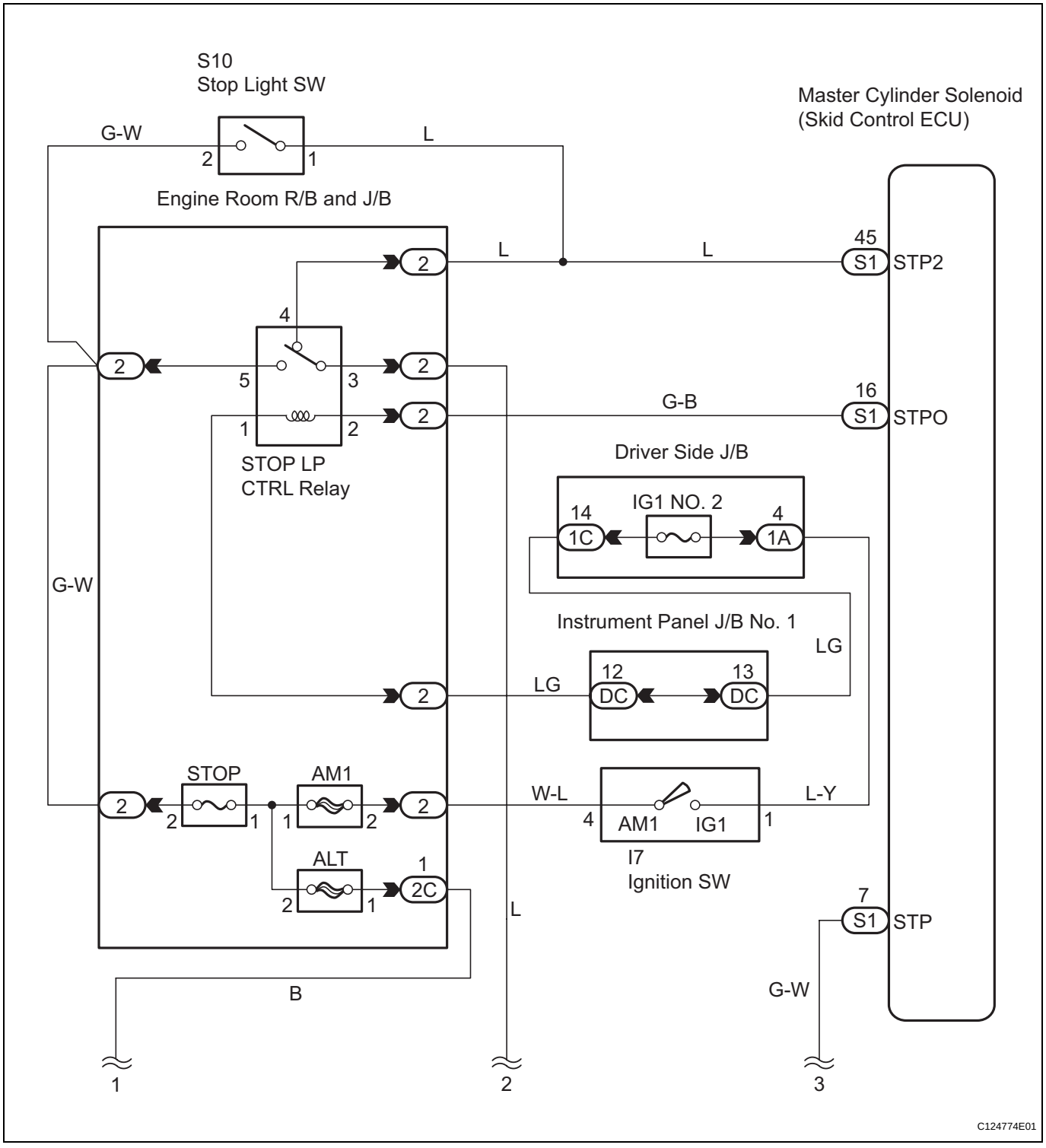
DTC	C1249/49	Open in Stop Light Switch Circuit

DESCRIPTION

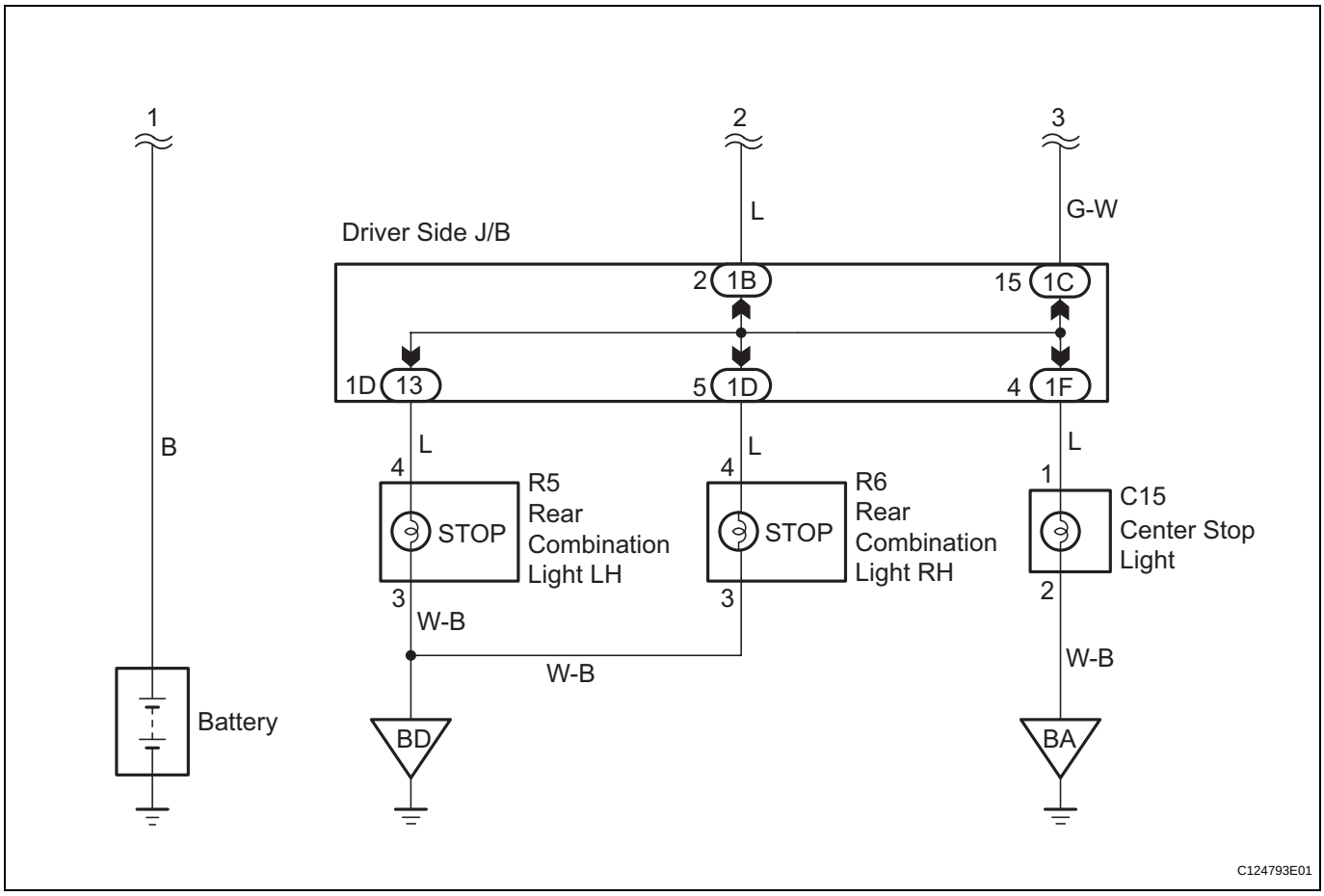
The skid control ECU inputs the stop light switch signal and detects the status of the brake operation.

DTC No.	DTC Detecting Condition	Trouble Areas
C1249/49	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 assembly • Stop light switch circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



BC



BC

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

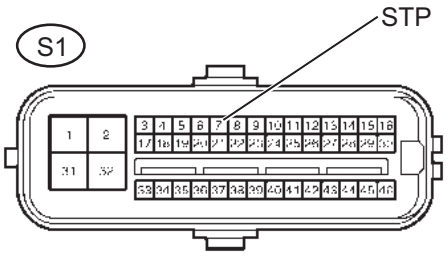
HINT:
Check the stop light bulbs as they may have burnt out.

NG → **Go to step 4**

OK

2 INSPECT SKID CONTROL ECU (STP TERMINAL VOLTAGE)

Skid Control ECU (harness side connector):



C121700E15

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

Standard Voltage

Tester Connection	Condition	Specified Condition
S1-7 (STP) - Body ground	Stop light switch ON (Brake pedal depressed)	8 to 14 V
S1-7 (STP) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

(c) Reconnect the skid control ECU connector.

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 DTCs (See page BC-118).
(b) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

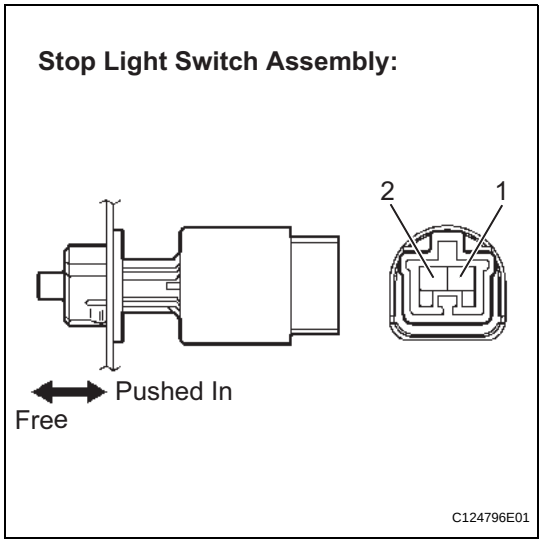
B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

BC

4	INSPECT STOP LIGHT SWITCH ASSEMBLY



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

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

(c) Reconnect the stop light switch connector.

NG → REPLACE STOP LIGHT SWITCH ASSEMBLY

OK

5	INSPECT STOP LIGHT CONTROL RELAY

(a) Remove the STOP LP CTRL relay from the engine room R/B and J/B.
(b) Measure the resistance.
Standard Resistance

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

(c) Apply the battery voltage between terminals 1 (+) and 2 (-).
(d) Measure the resistance.
Standard Resistance

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

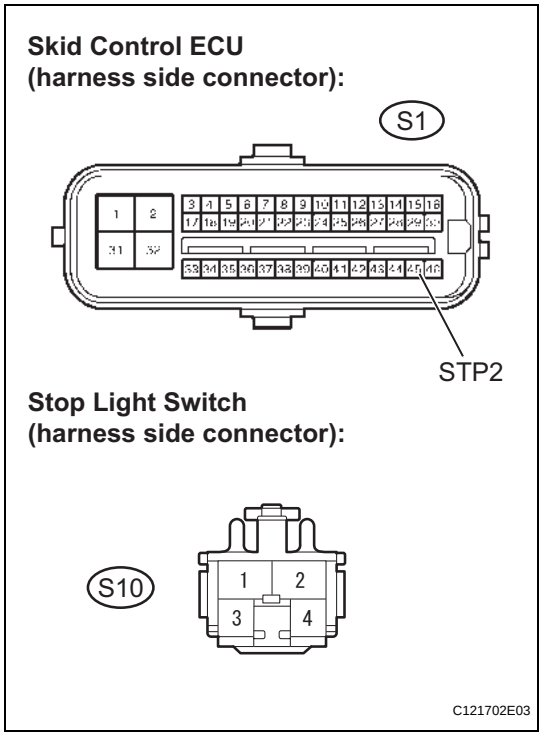
(e) Reinstall the STOP LP CTRL relay.

NG → REPLACE STOP LIGHT CONTROL RELAY

OK

BC

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



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

Standard Resistance

Tester Connection	Specified Condition
S1-45 (STP2) - S10-1 (STP)	Below 1 Ω

(d) Reconnect the stop light switch connector.
(e) Reconnect the skid control ECU connector.

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

OK

7 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

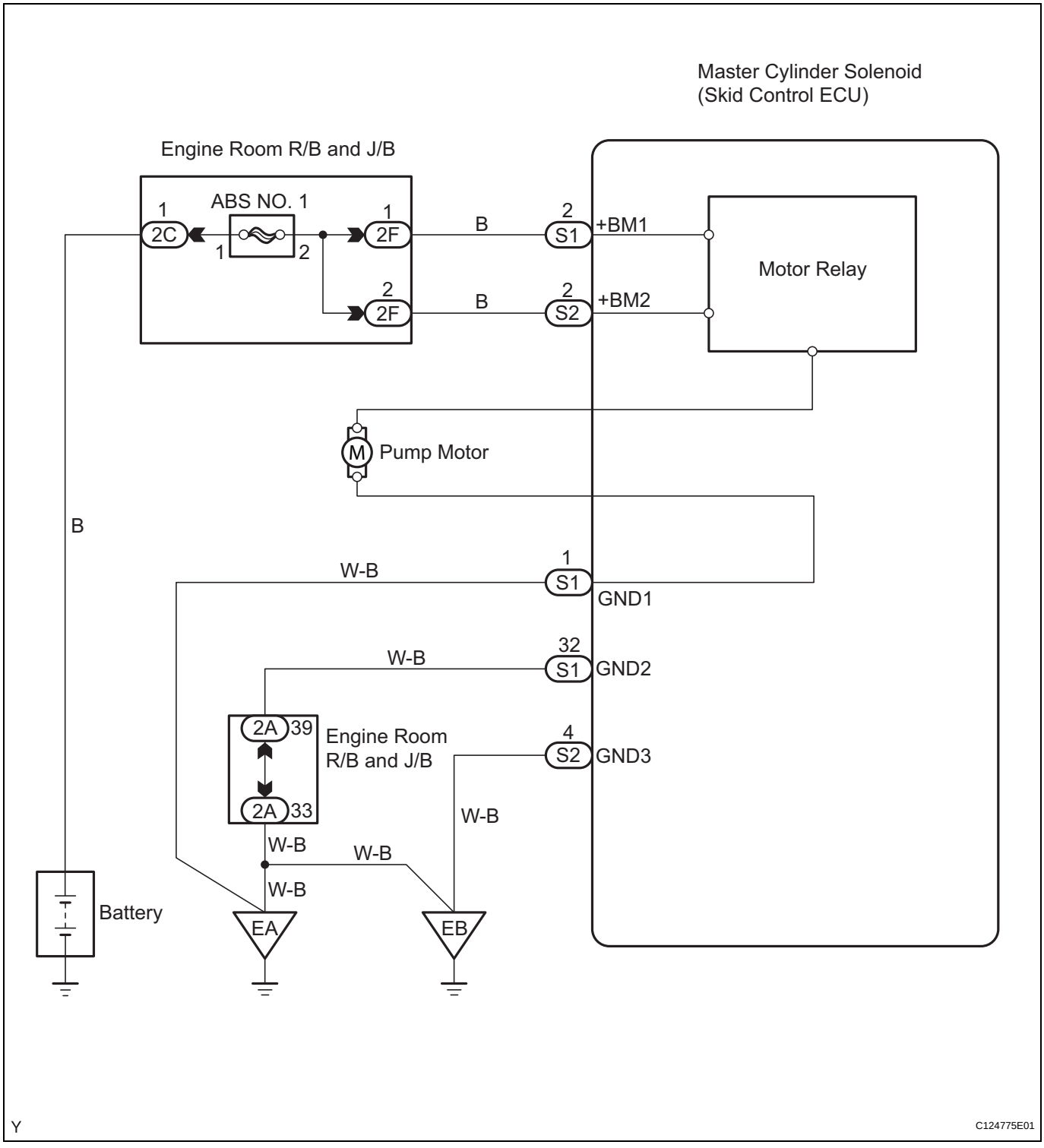
DTC	C1251/51	Open in Pump Motor Circuit

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.

DTC No.	DTC Detecting Condition	Trouble Areas
C1251/51	Open in motor system circuit (motor input circuit)	Hydraulic brake booster pump motor circuit

WIRING DIAGRAM



HINT:
Remove the hydraulic brake booster before the inspection (See page BR-42).

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

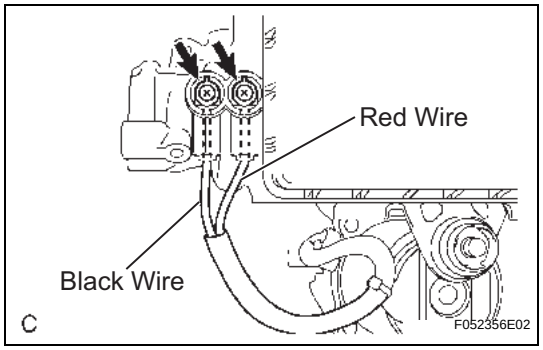
(a) Using a screwdriver, remove the 2 plugs from the hydraulic brake booster (See page BR-45).
(b) Check the tightening torque of 2 screws which fasten the wire harness connecting hydraulic brake booster and brake booster pump (See page BR-49).

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-).

Resistance:
2 Ω

NG → **REPLACE HYDRAULIC BRAKE BOOSTER**

OK

3	RECONFIRM DTC

(a) Reassemble the hydraulic brake booster, then reinstall the hydraulic brake booster.
(b) Clear the DTCs (See page BC-118).
(c) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

BC

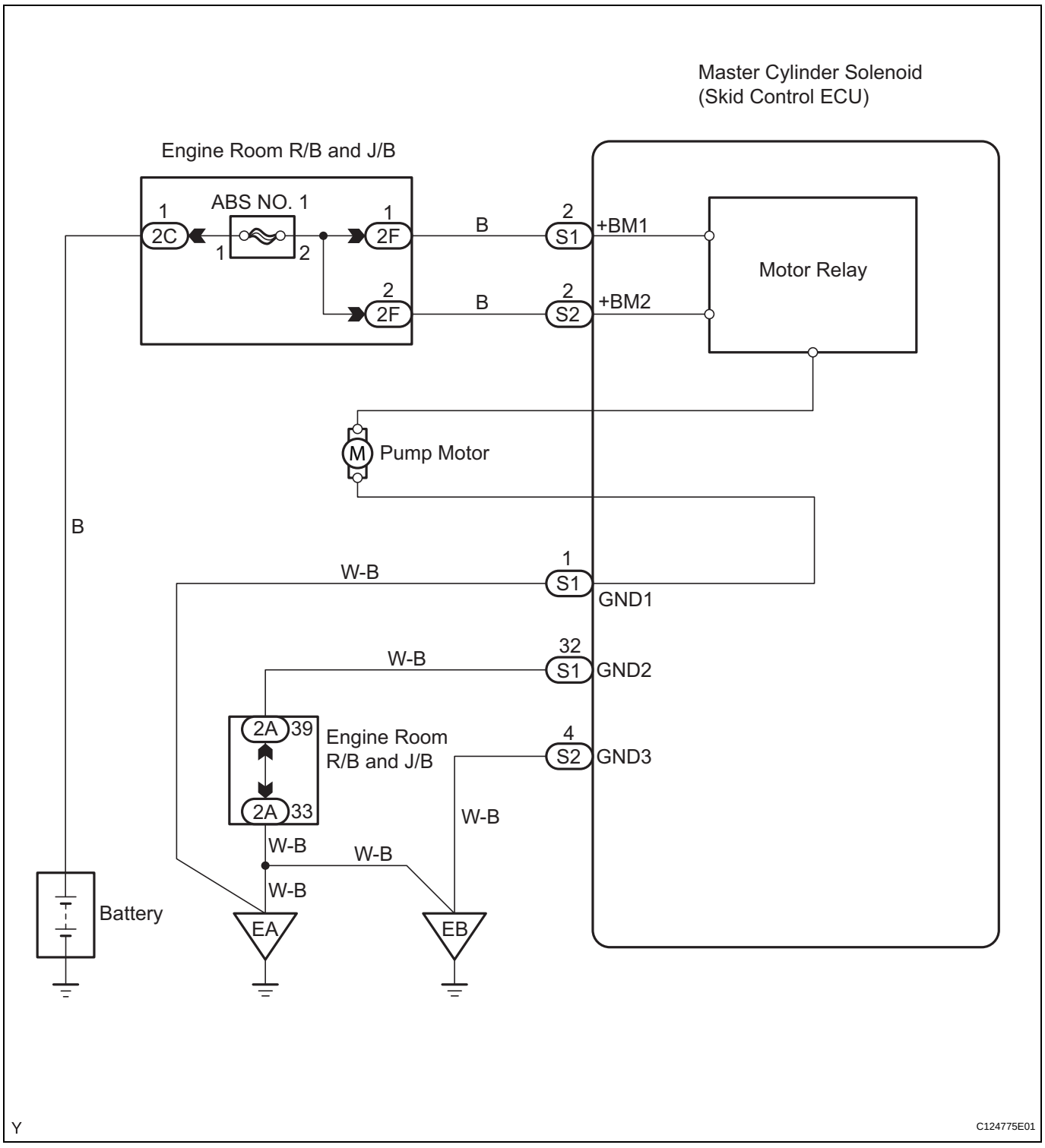
DTC	C1252/52	Brake Booster Pump Motor on Time Abnormally Long

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
C1252/52	Motor operates for 5 minutes or more.	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Accumulator pressure

WIRING DIAGRAM



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 to OFF.
(b) Depress the brake pedal more than 20 times.

BC

(c) Turn the ignition switch to the ON position.
(d) Check how the hydraulic brake booster pump motor operates.

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 HYDRAULIC BRAKE BOOSTER**

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-45).
(b) Check the tightening torque of 2 screws which fasten the wire harness connecting hydraulic brake booster and brake booster pump (See page BR-49).

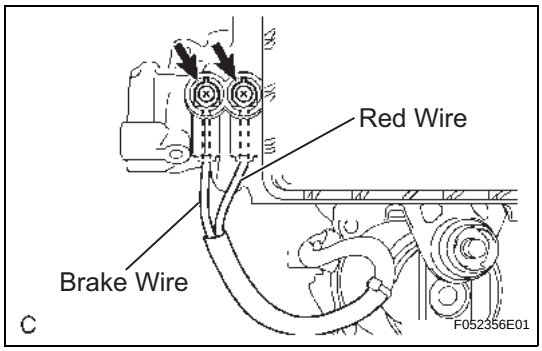
Torque: 2.9 N*m (30 kgf*cm, 26 in.*lbf)

NG → **RETIGHTEN SCREWS**

BC

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-).

Resistance:
2 Ω

NG → **REPLACE HYDRAULIC BRAKE BOOSTER**

OK

4 READ VALUE OF DATA LIST (ACCUMULATOR PRESSURE SENSOR)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the intelligent tester ON.

(d) Select the DATA LIST mode on the intelligent tester.

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	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 MASTER CYLINDER SOLENOID**

C → **REPLACE HYDRAULIC BRAKE BOOSTER**

A

5 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Turn the ignition switch to OFF.
(c) Turn the ignition switch to the ON position.
(d) Wait for more than 5 minutes.
(e) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → **REPLACE HYDRAULIC BRAKE BOOSTER**

A

REPLACE MASTER CYLINDER SOLENOID

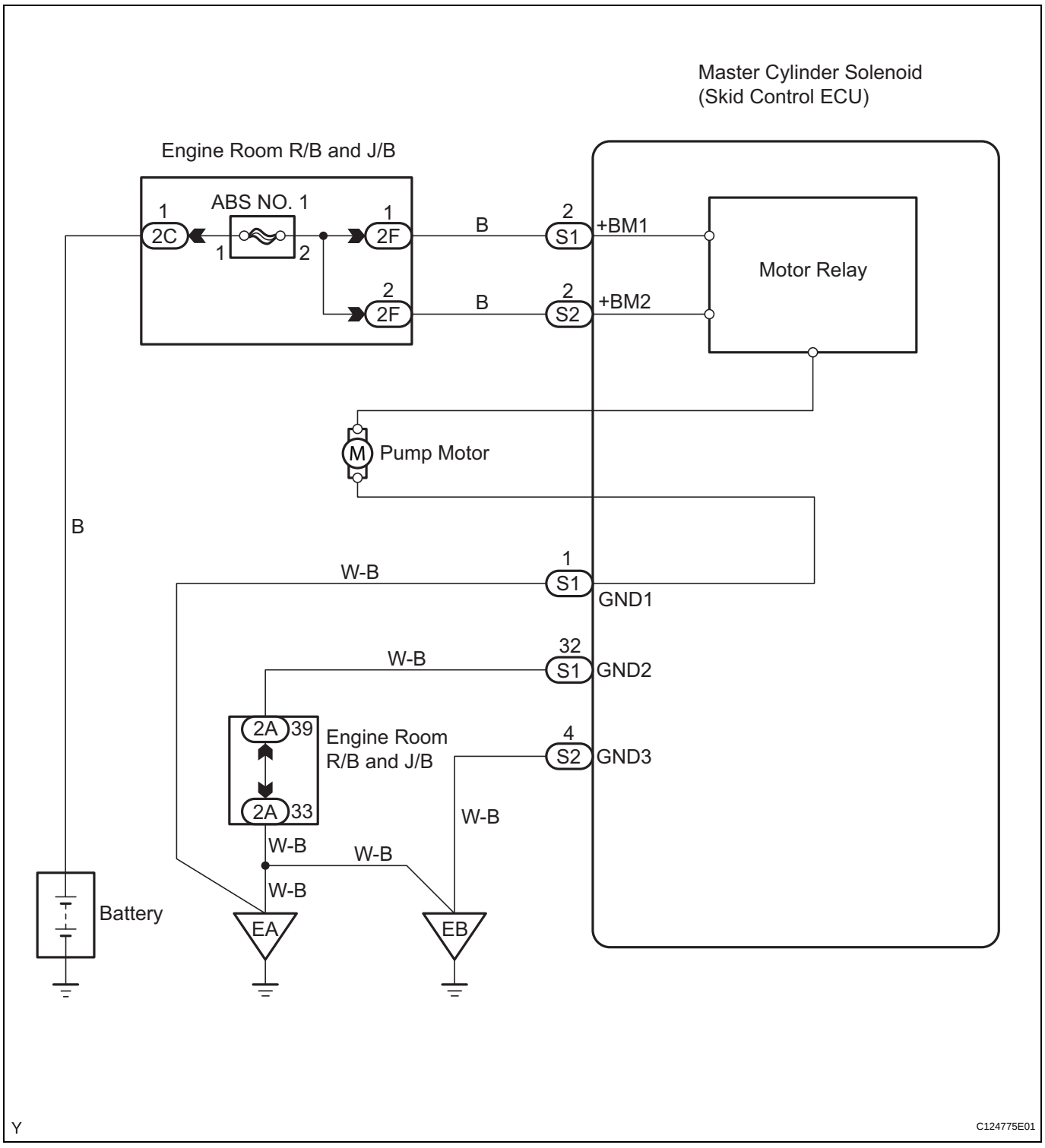
DTC	C1253/53	Hydro Booster Pump Motor Relay Malfunction

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)	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit

WIRING DIAGRAM



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

1	PERFORM ACTIVE TEST BY INTELLIGENT TESTER (H/B MOTOR RELAY)

(a) Connect a intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.

BC

(c) Turn the intelligent tester ON.
(d) Select the ACTIVE TEST mode on the intelligent tester.

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

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

NG → **Go to step 3**

OK

2 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Turn the ignition switch to OFF.
(c) Depress the brake pedal more than 20 times.
(d) Turn the ignition switch to the ON position.
(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 DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

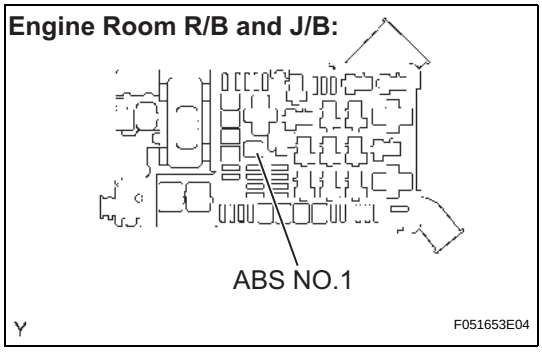
BC

B → **END**

A

REPLACE HYDRAULIC BRAKE BOOSTER

3 INSPECT FUSE (ABS NO. 1)



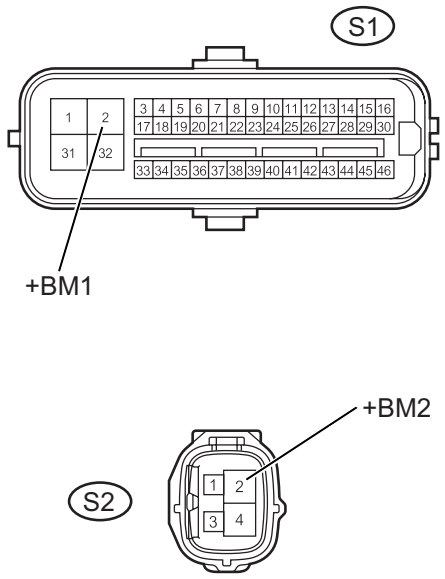
(a) Remove the ABS NO. 1 fuse from the engine room R/B and J/B.
(b) Measure the resistance of the ABS NO. 1 fuse.
Standard:
Below 1 Ω
(c) Reinstall the ABS NO. 1.

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
S1-2 (+BM1) - Body ground	10 to 14 V
S2-2 (+BM2) - Body ground	10 to 14 V

(c) Reconnect the skid control ECU connectors.

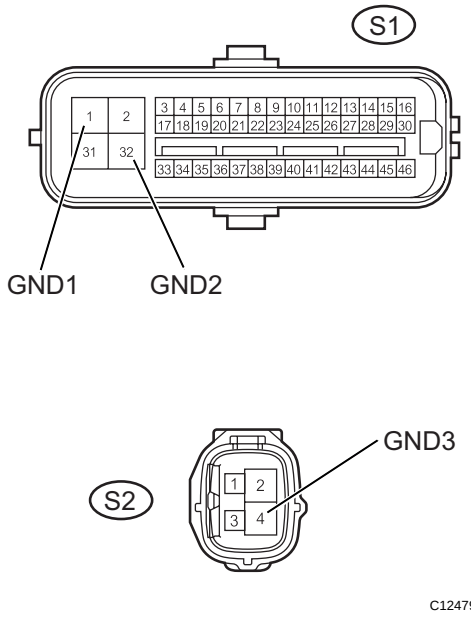
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (+BM1 AND +BM2 CIRCUIT)**

OK

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

BC

Skid Control ECU (harness side connector):



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

Tester Connection	Specified Condition
S1-1 (GND1) - Body ground	Below 1 Ω
S1-32 (GND2) - Body ground	Below 1 Ω
S2-4 (GND3) - Body ground	Below 1 Ω

(c) Reconnect the skid control ECU connectors.

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

OK

6	RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Turn the ignition switch to OFF.
(c) Depress the brake pedal more than 20 times.
(d) Turn the ignition switch to the ON position.
(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 DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

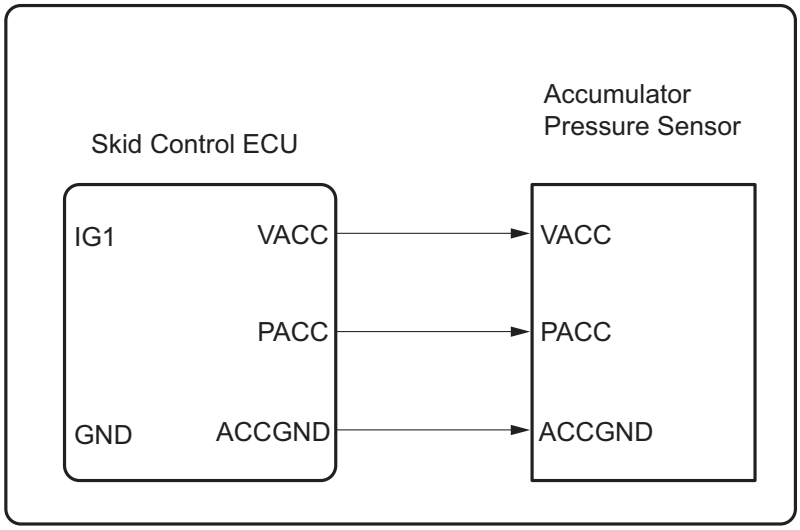
B → END

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).	• Hydraulic brake booster • Accumulator pressure sensor • Master cylinder pressure sensor

1	READ VALUE OF DATA LIST (ACCUMULATOR)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to OFF.

BC

(c) Depress the brake pedal more than 20 times.
(d) Turn the ignition switch to the ON position.
(e) Select the DATA LIST mode on the intelligent tester.

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	-

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

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

B → **REPLACE MASTER CYLINDER SOLENOID**

A

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

(a) Turn the ignition switch to 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 to the ON position.
(f) Select the DATA LIST mode on the intelligent tester.

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)

BC

(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 MASTER CYLINDER SOLENOID**

OK

3 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Turn the ignition switch to OFF.
(c) Depress the brake pedal more than 20 times.
(d) Turn the ignition switch to the ON position.
(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 DTCs are recorded.

Result	Proceed to
DTC output	A

Result	Proceed to
DTC not output	B

B → **END**

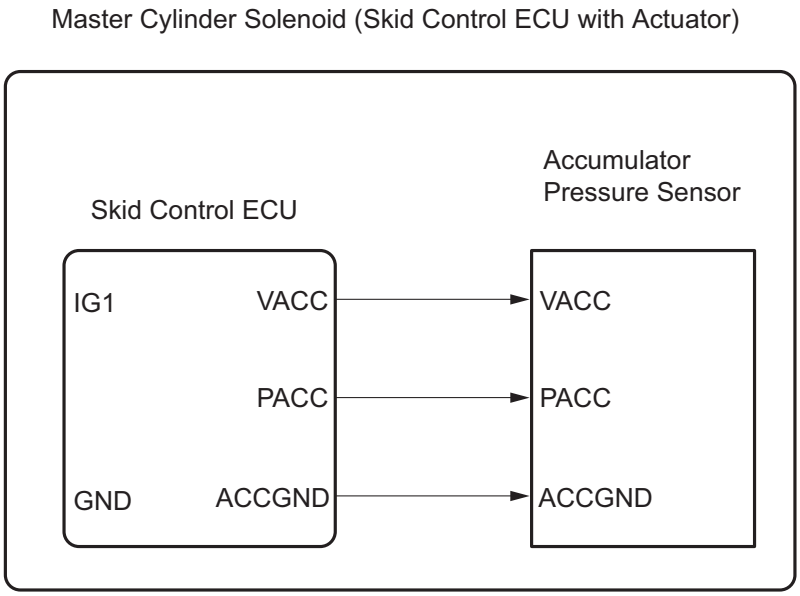
A

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.



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 brake booster • Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Accumulator pressure sensor

1	RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).

(b) Turn the ignition switch to OFF.
(c) Depress the brake pedal more than 20 times.
(d) Turn the ignition switch to the ON position.
(e) Wait for 99 seconds.
(f) Check if the same DTCs are recorded.

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-32).
OK:
Hydraulic circuit is normal (No leakage).

NG → **CHECK AND REPLACE 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 to the ON position.
(c) Turn the intelligent tester ON.
(d) Select the "DATA LIST" mode on the intelligent tester.

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 MASTER CYLINDER SOLENOID**

OK

4 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A

BC

Result	Proceed to
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	Hydraulic brake booster pump motor circuit

1 CHECK HYDRAULIC BRAKE BOOSTER PUMP MOTOR OPERATION

(a) Turn the ignition switch to OFF.
(b) Disconnect the actuator connector (S1).
(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 MASTER CYLINDER SOLENOID**

OK ↓

2 RECONFIRM DTC

(a) Turn the ignition switch to OFF.
(b) Reconnect the actuator connector (S1).
(c) Turn the ignition switch to the ON position.
(d) Clear the DTCs (See page BC-118).
(e) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A ↓

REPLACE MASTER CYLINDER SOLENOID

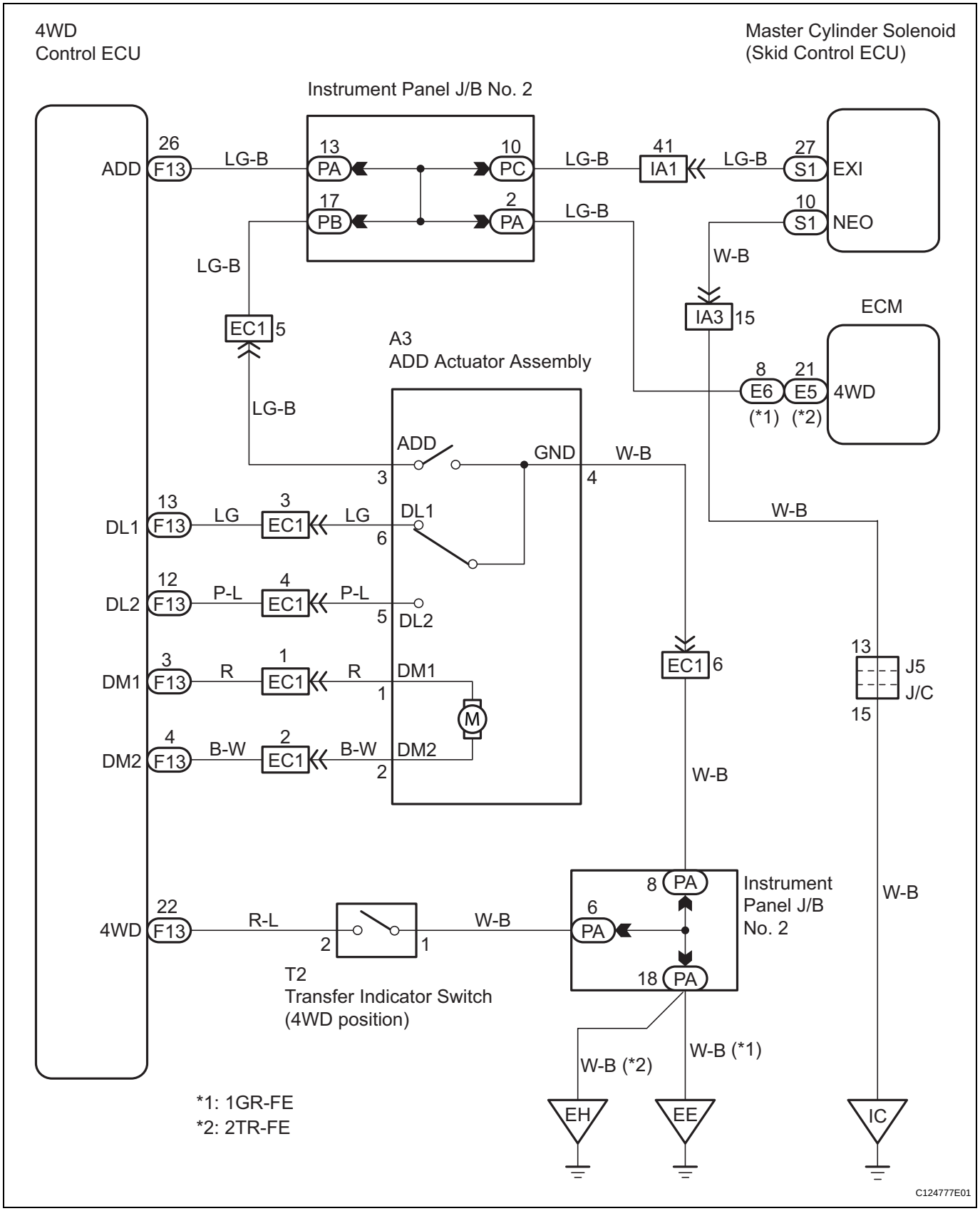
DTC	C1258/58	Transfer 4WD Position Switch Circuit

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) • Transfer indicator switch (4WD position) circuit • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

1	CONFIRM VEHICLE TYPE

(a) Confirm the vehicle drive train.

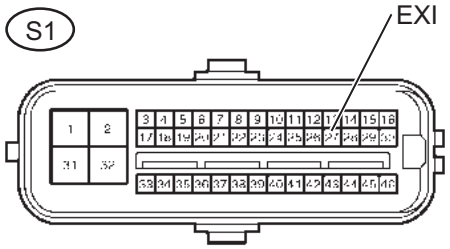
Drive Train	Proceed to
4WD	A
2WD, Pre-Runner	B

B → Go to step 7

A

2	INSPECT SKID CONTROL ECU (EXI TERMINAL VOLTAGE)

Skid Control ECU (harness side connector):



C121700E16

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

Standard

Tester Connection	Transfer Condition	Specified Condition
S1-27 (EXI) - Body ground	2WD	8 to 16 V
S1-27 (EXI) - Body ground	4WD	Below 1.5 V

(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control ECU connector.

NG → Go to step 4

OK

3	RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

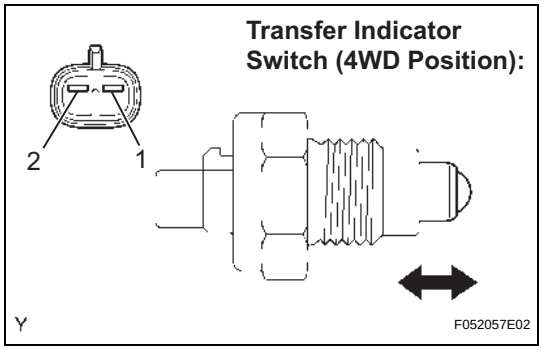
NG → END

A

REPLACE MASTER CYLINDER SOLENOID

BC

4	INSPECT TRANSFER INDICATOR SWITCH (4WD POSITION)



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

Standard

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

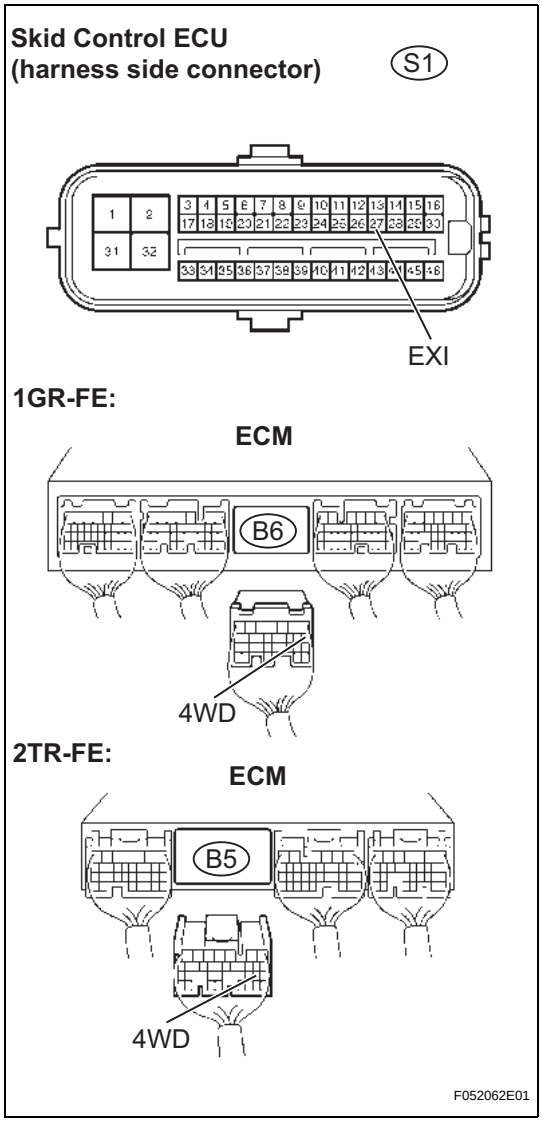
(d) Reinstall the transfer indicator switch (4WD position).
(e) Reconnect the transfer indicator switch (4WD position) connector.

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

OK

BC

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



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

Standard (1GR-FE)

Tester Connection	Specified Condition
S1-27 (EXI) - B6-8 (4WD)	Below 1 Ω

Standard (2TR-FE)

Tester Connection	Specified Condition
S1-27 (EXI) - B5-21 (4WD)	Below 1 Ω

(d) Reconnect the ECM connector.
(e) Reconnect the skid control ECU connector.

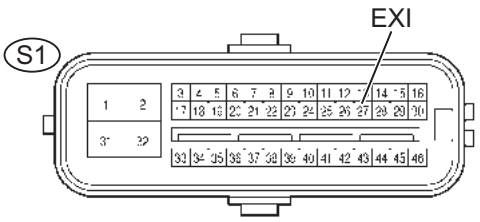
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

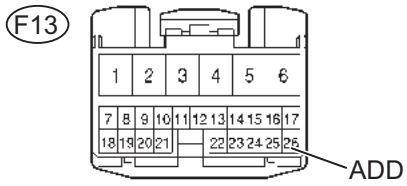
BC

6 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - 4WD CONTROL ECU)

Skid Control ECU
(harness side connector)



4WD Control ECU
(herness side connector)



F052382E01

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

Standard

Tester Connection	Specified Condition
S1-27 (EXI) - F13-26 (ADD)	Below 1 Ω

(d) Reconnect the 4WD control ECU connector.
(e) Reconnect the skid control ECU connector.

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

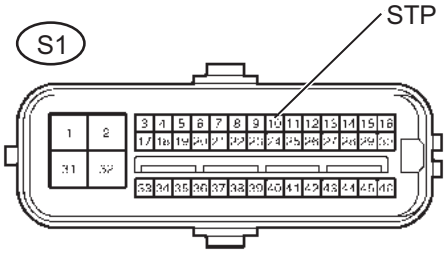
OK

END

BC

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

Skid Control ECU
(harness side connector):



C121700E17

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

Standard

Tester Connection	Vehicle Drive Train	Specified Condition
S1-10 (NEO) - Body ground	2WD, Pre-runner	10 kΩ or higher
S1-10 (NEO) - Body ground	4WD	Below 1 Ω

(c) Reconnect the skid control ECU connector.

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

OK

8	RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

B → END

A

REPLACE MASTER CYLINDER SOLENOID

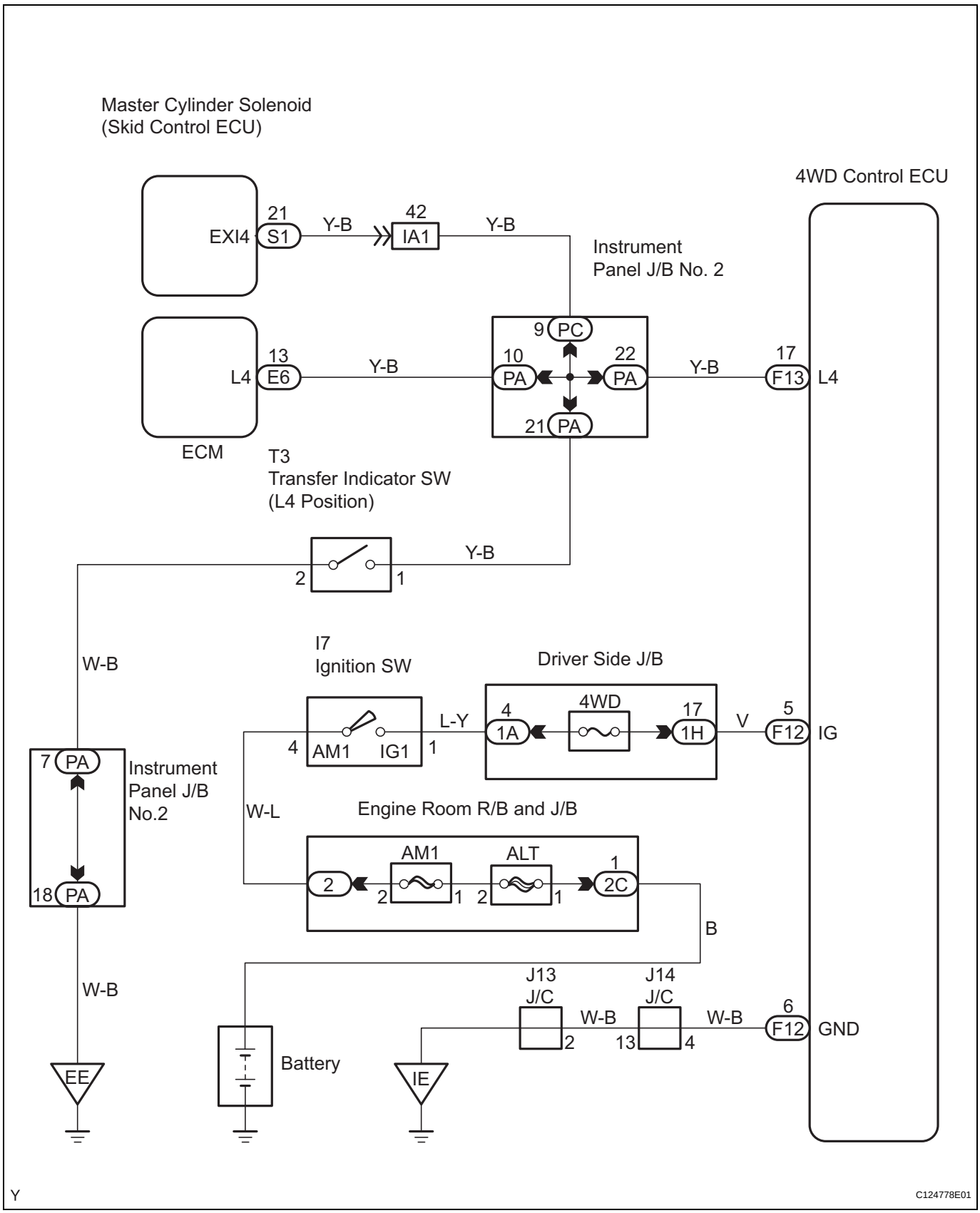
DTC	C1268/68	Transfer "L4" Position Switch Circuit

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)

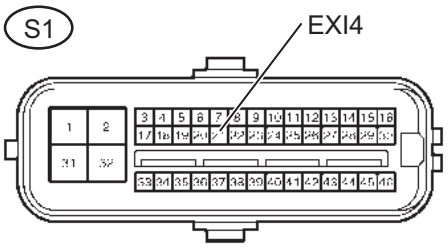
WIRING DIAGRAM



NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

1 INSPECT SKID CONTROL ECU (EXI4 TERMINAL VOLTAGE)

Skid Control ECU (harness side connector):



C121700E18

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

Standard

Tester Connection	Transfer Condition	Specified Condition
S1-21 (EXI4) - Body ground	L4	Below 1.5 V
S1-21 (EXI4) - Body ground	Other than above	8 to 14 V

(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control ECU connector.

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	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 DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

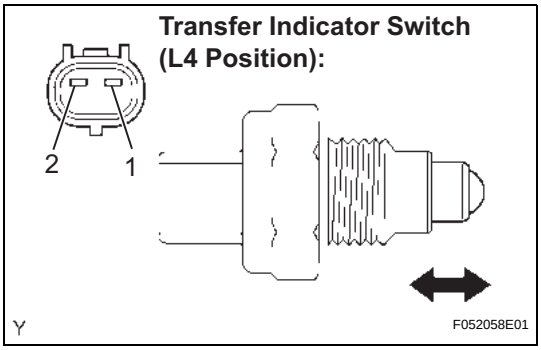
B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

BC

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 voltage.

Standard

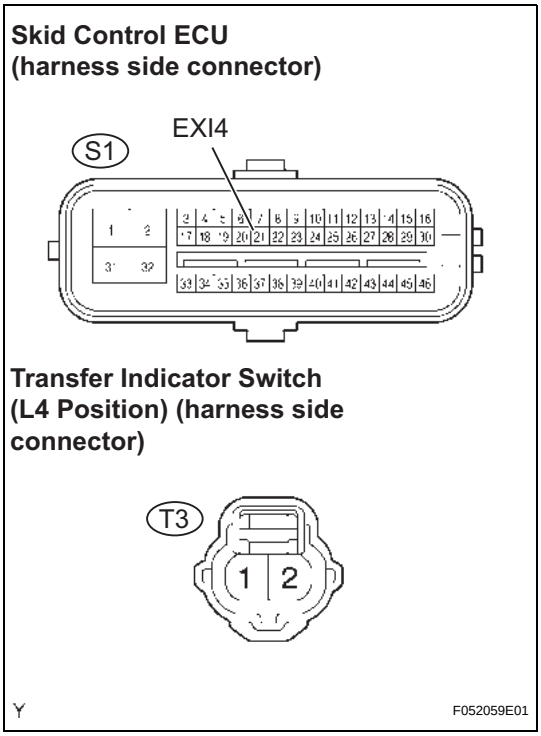
Tester Connection	Switch Position	Specified Condition
1 - 2	Pushed	Below 1 Ω
1 - 2	Free	10 kΩ or higher

(d) Reinstall the transfer indicator switch (L4 position).
(e) Reconnect the transfer indicator switch (L4 position) connector.

NG → **REPLACE TRANSFER INDICATOR SWITCH**

OK

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



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

Standard

Tester Connection	Specified Condition
S1-21 (EXI4) - T3-1	Below 1 Ω
S1-21 (EXI4) - Body ground	10 kΩ or higher

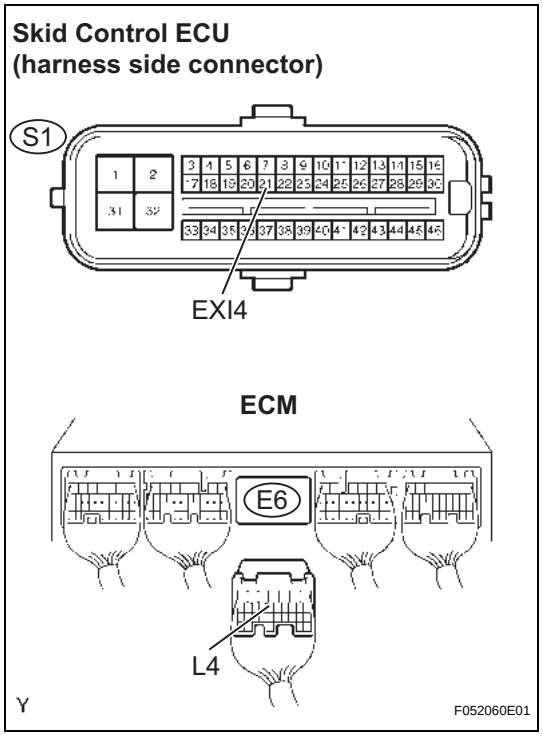
(d) Reconnect the transfer indicator switch (L4 position) connector.
(e) Reconnect the skid control ECU connector.

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

OK

BC

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



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

Tester Connection	Specified Condition
S1-21 (EXI4) - E6-13 (L4)	Below 1 Ω

(d) Measure the resistance.
Standard

Tester Connection	Specified Condition
S1-21 (EXI4) - Body ground	10 kΩ or higher
E6-13 (L4) - Body ground	10 kΩ or higher

(e) Reconnect the ECM connector.
(f) Reconnect the skid control ECU connector.

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 one of following condition detected: • Diameters different of 2 front wheels and 2 rear wheels. • Wheel speed sensor fault	• Speed sensor • Speed sensor rotor • Speed sensor circuit • Tire sizes

NOTICE:
Check the speed sensor signal after replacement (See page BC-103).

1	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 ↓

BC

2	CHECK SPEED SENSOR ROTOR

BC-130

(a) Remove the drive shaft, and check around the speed sensor rotor.
OK:
No scratches or foreign matter on the sensor tip.

NG → **REPLACE SPEED SENSOR ROTOR**

OK ↓

3	CHECK SPEED SENSOR

(a) Check the speed sensor circuit (See page BC-130).

NG → **REPLACE SPEED SENSOR**

OK ↓

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

(a) Check the speed sensor circuit (See page BC-130).

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

OK

5	**RECONFIRM DTC**

(a) Clear the DTCs (See page BC-118).
(b) Drive the vehicle at more than 13 mph (20 km/h) for more than 60 seconds.
(c) Check if the same DTCs are detected.

Result	Proceed to
DTC output	A
DTC not output	B

B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

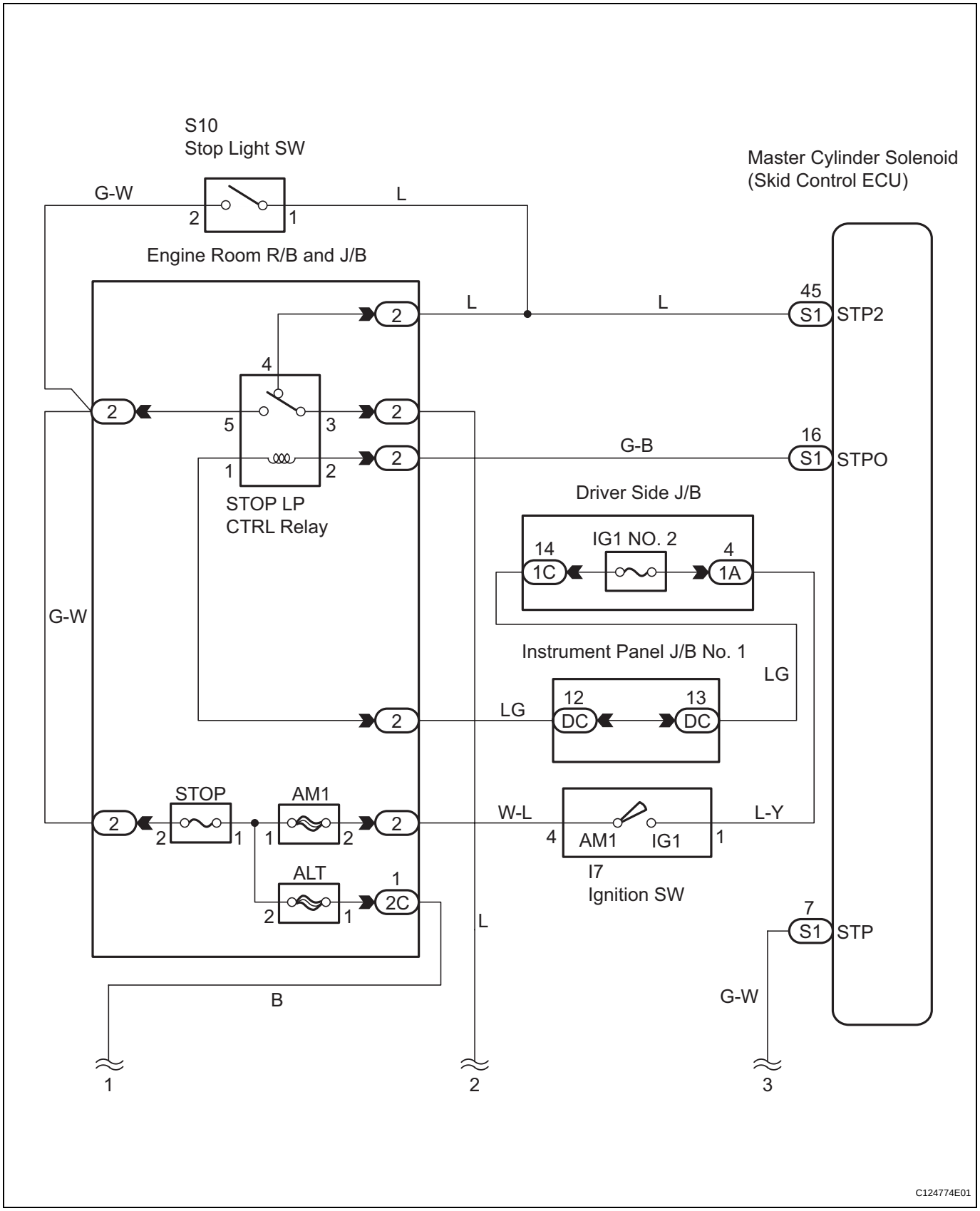
DTC	C1380/64	Stop Light Control Relay Malfunction

DESCRIPTION

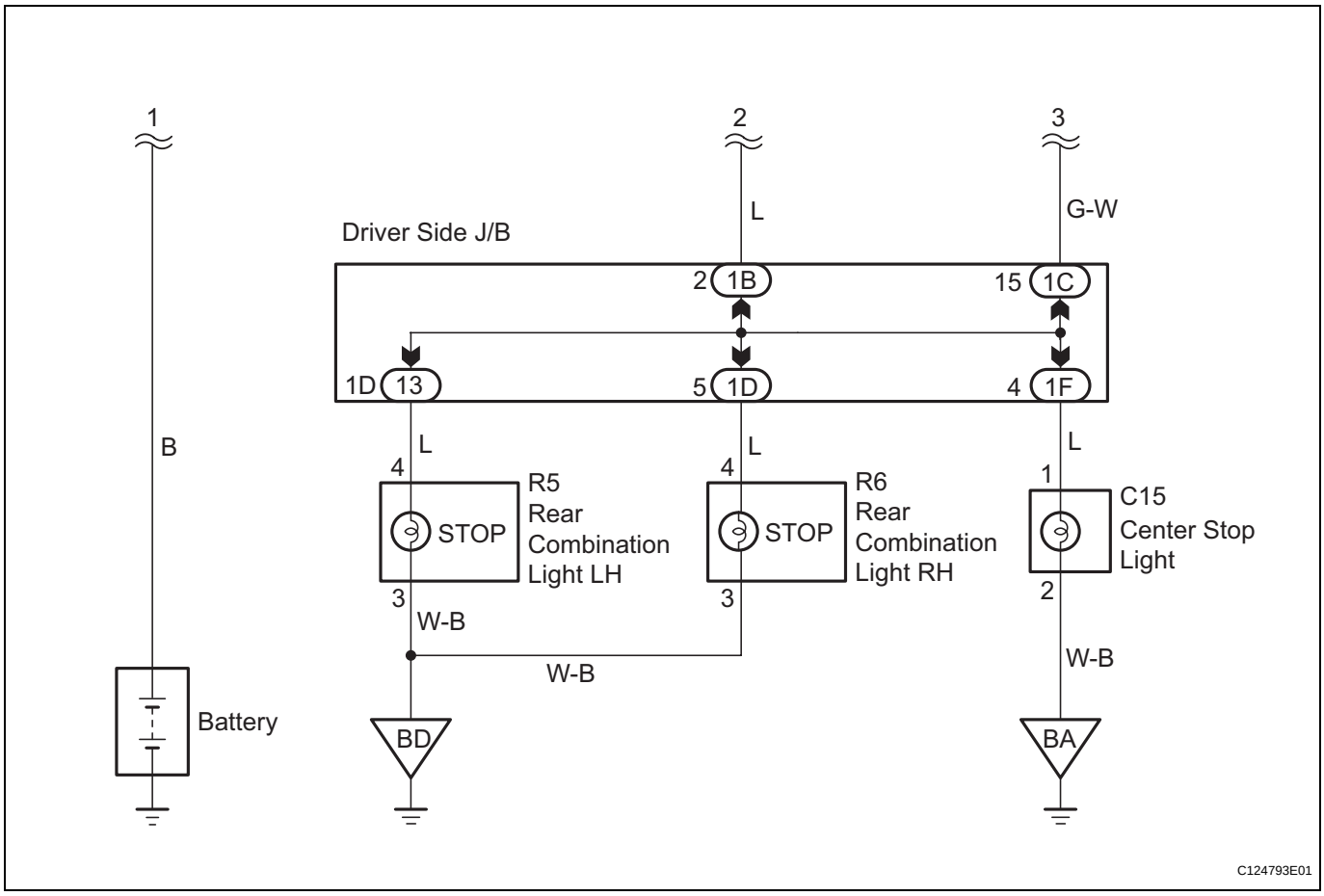
The skid control ECU inputs the stop light switch signal and detects the status of the brake operation.

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 • Stop light switch circuit • STOP LP CTRL relay • Master cylinder solenoid (skid control ECU)

WIRING DIAGRAM



BC



BC

NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

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

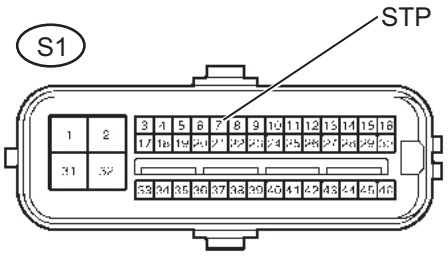
HINT:
Check the stop light bulbs as they may have burnt out.

NG → **Go to step 10**

OK

2 INSPECT SKID CONTROL ECU (STP TERMINAL VOLTAGE)

Skid Control ECU (harness side connector):



C121700E15

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

Tester Connection	Switch condition	Specified Condition
S1-7 (STP) - Body ground	Brake pedal depressed	8 to 16 V
S1-7 (STP) - Body ground	Brake pedal released	Below 1.5 V

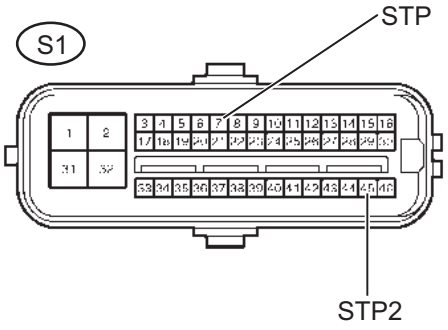
(c) Reconnect the skid control ECU connector.

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

OK

3 INSPECT SKID CONTROL ECU (STP2 TERMINAL VOLTAGE)

Skid Control ECU (harness side connector):



C121700E19

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

Tester Connection	Specified Condition
S1-7 (STP) - S1-45 (STP2)	Below 1 Ω

(c) Reconnect the skid control ECU connector.

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

OK

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

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

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

BC

(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 DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

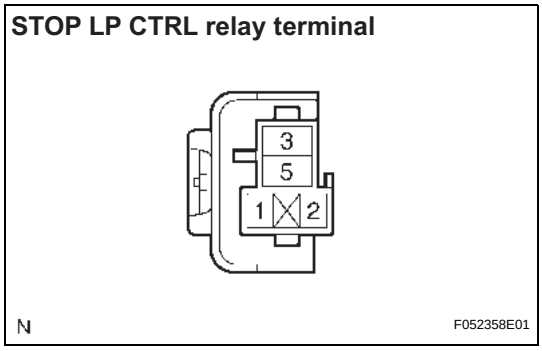
B → **END**

A

REPLACE MASTER CYLINDER SOLENOID

6 CHECK STOP LIGHT CONTROL RELAY

BC



(a) Disconnect the STOP LP CTRL relay.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage.

Standard Voltage

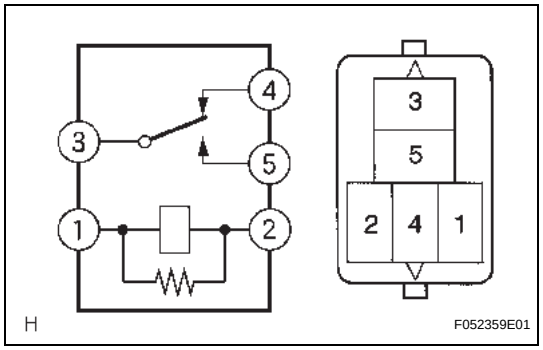
Tester Connection	Condition	Specified Condition
Terminal 5 - Body ground	Always	8 to 16 V
Terminal 1 - Body ground	Always	8 to 16 V

(d) Turn the ignition switch to OFF.
(e) Reconnect the STOP LP CTRL relay.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LP CTRL RELAY)**

OK

7 INSPECT STOP LIGHT CONTROL RELAY



(a) Remove the STOP LP CTRL relay from the engine room R/B and J/B.
(b) Measure the resistance.
Standard Resistance

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

(c) Apply the battery voltage between terminals 1 (+) and 2 (-).
(d) Measure the resistance.
Standard Resistance

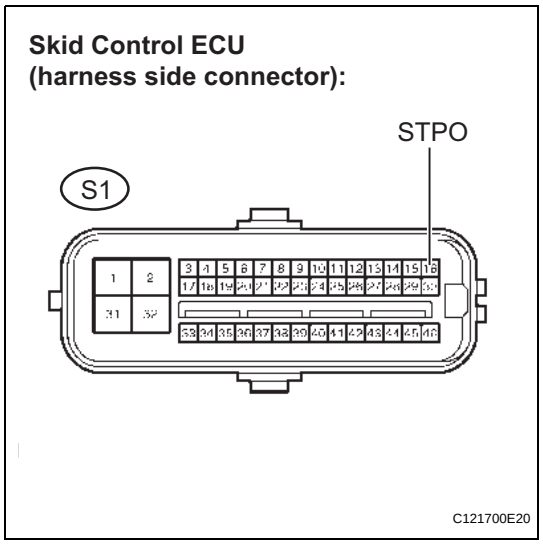
Tester Connection	Specified Condition
3 - 4	10 kΩ or higher
3 - 5	Below 1 Ω

(e) Reinstall the STOP LP CTRL relay.

NG → **REPLACE STOP LIGHT CONTROL RELAY**

OK

8 INSPECT MASTER CYLINDER SOLENOID (STPO TERMINAL VOLTAGE)



(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage.
Standard Voltage

Tester Connection	Condition	Specified Condition
S1-16 (STPO) - Body ground	Brake pedal depressed	10 to 14 V

(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control ECU connector.

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

OK

9 RECONFIRM DTC

(a) Clear the DTCs (See page BC-118).
(b) Check if the same DTCs are recorded.

Result	Proceed to
DTC output	A
DTC not output	B

BC

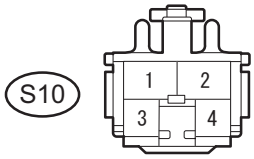
B → END

A

REPLACE MASTER CYLINDER SOLENOID

10 CHECK STOP LIGHT SWITCH ASSEMBLY (STOP LIGHT SWITCH POWER SOURCE TERMINAL VOLTAGE)

Stop Light Switch (harness side connector):



C124801E01

(a) Disconnect the stop light switch connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage.

Standard Voltage

Tester Connection	Specified Condition
S10-2 Body ground	10 to 14 V

(d) Turn the ignition switch to OFF.
(e) Reconnect the stop light switch connector.

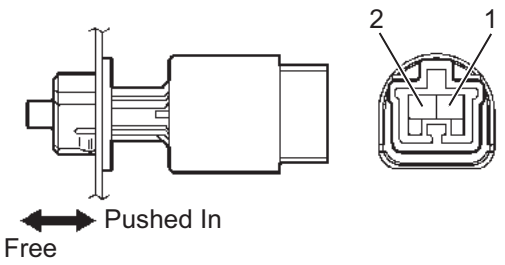
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR (STOP LIGHT POWER SOURCE CIRCUIT)**

OK

11 INSPECT STOP LIGHT SWITCH ASSEMBLY

BC

Stop Light Switch Assembly:



C124796E01

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

Standard Resistance

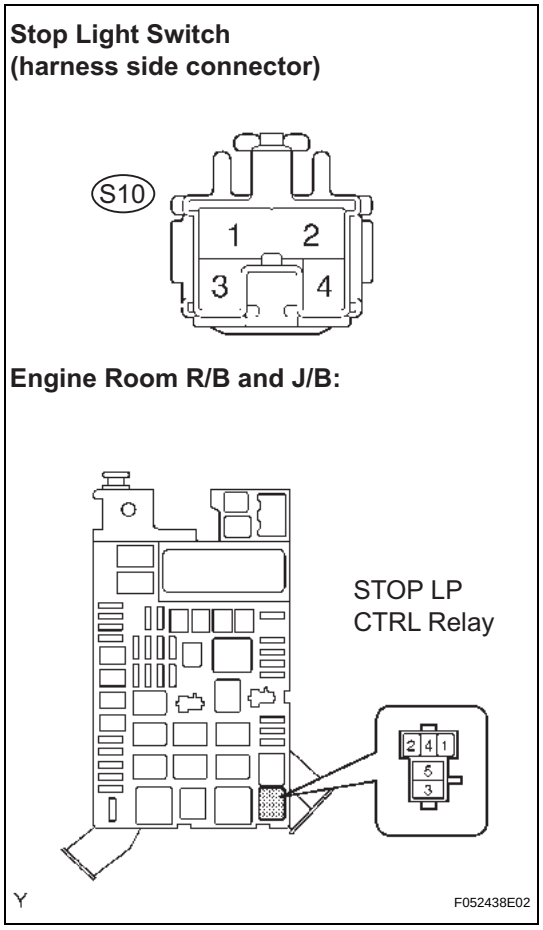
Switch condition	Tester connection	Specified condition
Switch pin free	1 - 2	Below 1 Ω
Switch pin pushed in	1 - 2	10 kΩ or higher

(c) Reconnect the stop light switch connector.

NG → **REPLACE STOP LIGHT SWITCH ASSEMBLY**

OK

12 CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH - STOP LP CTRL RELAY)



(a) Remove the STOP LP CTRL relay.
(b) Measure the resistance.
Standard Resistance

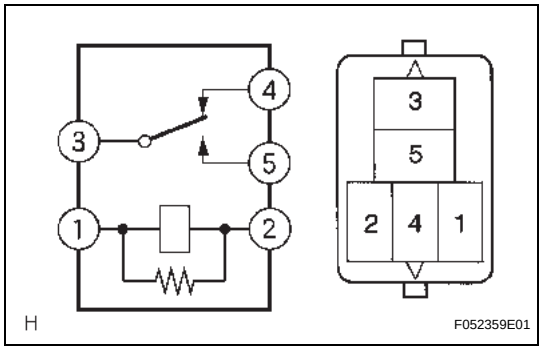
Tester Connection	Specified Condition
S10-2 - STOP LP CTRL relay (5)	Below 1 Ω
S10-2 - Body ground	10 kΩ or higher

(c) Reinstall the STOP LP CTRL relay.

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

OK

13 INSPECT STOP LIGHT CONTROL RELAY



(a) Remove the STOP LP CTRL relay from the engine room R/B and J/B.
(b) Measure the resistance.
Standard Resistance

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

(c) Apply the battery voltage between terminals 1 (+) and 2 (-).
(d) Measure the resistance.
Standard Resistance

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

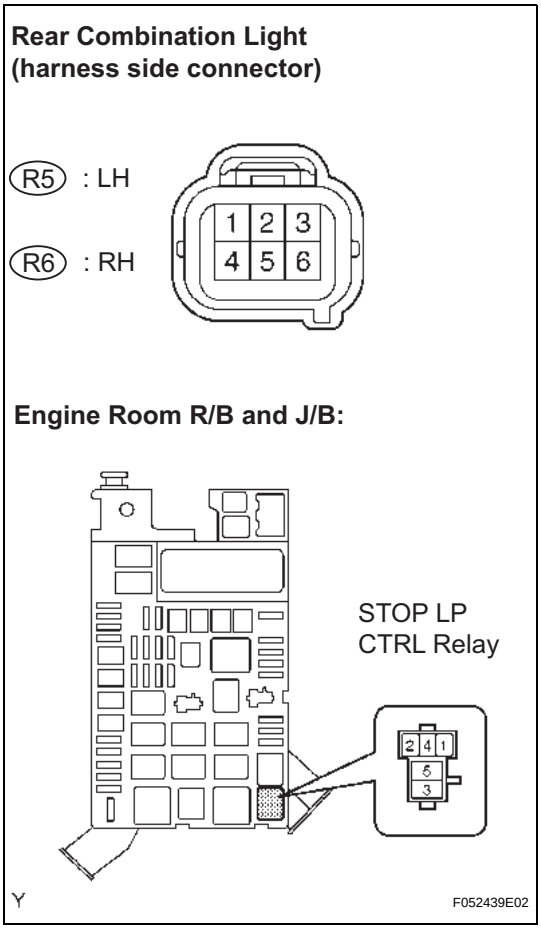
(e) Reinstall the STOP LP CTRL relay.

BC

NG → REPLACE STOP LIGHT CONTROL RELAY

OK

14	CHECK HARNESS AND CONNECTOR (REAR COMBINATION LIGHT - STOP LP CTRL RELAY)



(a) Disconnect the rear combination light connector.
(b) Remove the STOP LP CTRL relay.
(c) Measure the resistance.

Standard Resistance (LH)

Tester Connection	Specified Condition
R5-1 - STOP LP CTRL (4)	Below 1 Ω
R5-1 - Body ground	10 kΩ or higher
R5-6 - Body ground	Below 1 Ω

Standard Resistance (RH)

Tester Connection	Specified Condition
R6-1 - STOP LP CTRL (4)	Below 1 Ω
R6-1 - Body ground	10 kΩ or higher
R6-6 - Body ground	Below 1 Ω

(d) Reinstall the STOP LP CTRL relay.
(e) Reconnect the rear combination light connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

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

BC

ABS Warning Light Remains ON

DESCRIPTION

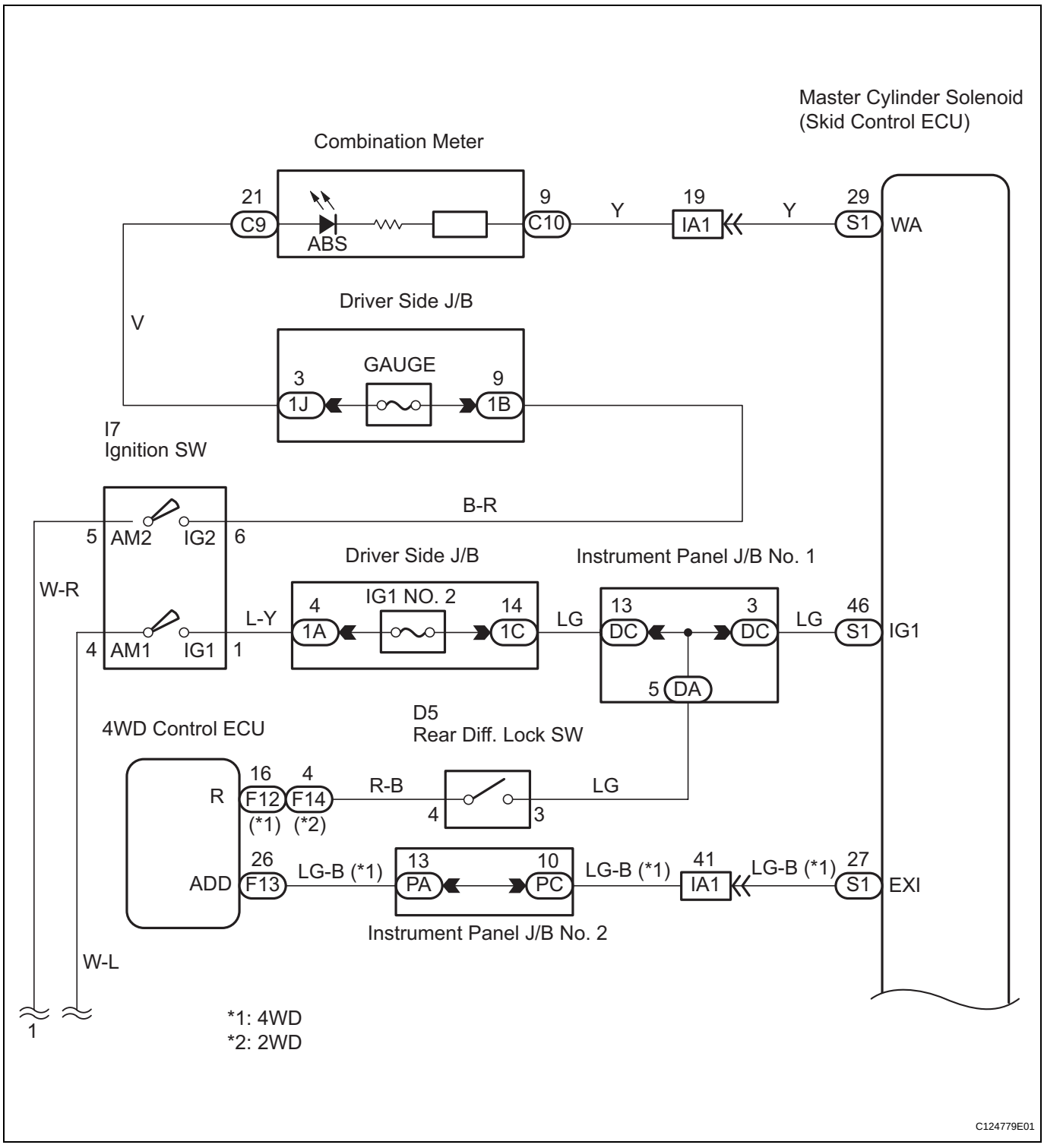
If any of the following is detected, the ABS warning light remains ON.

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.

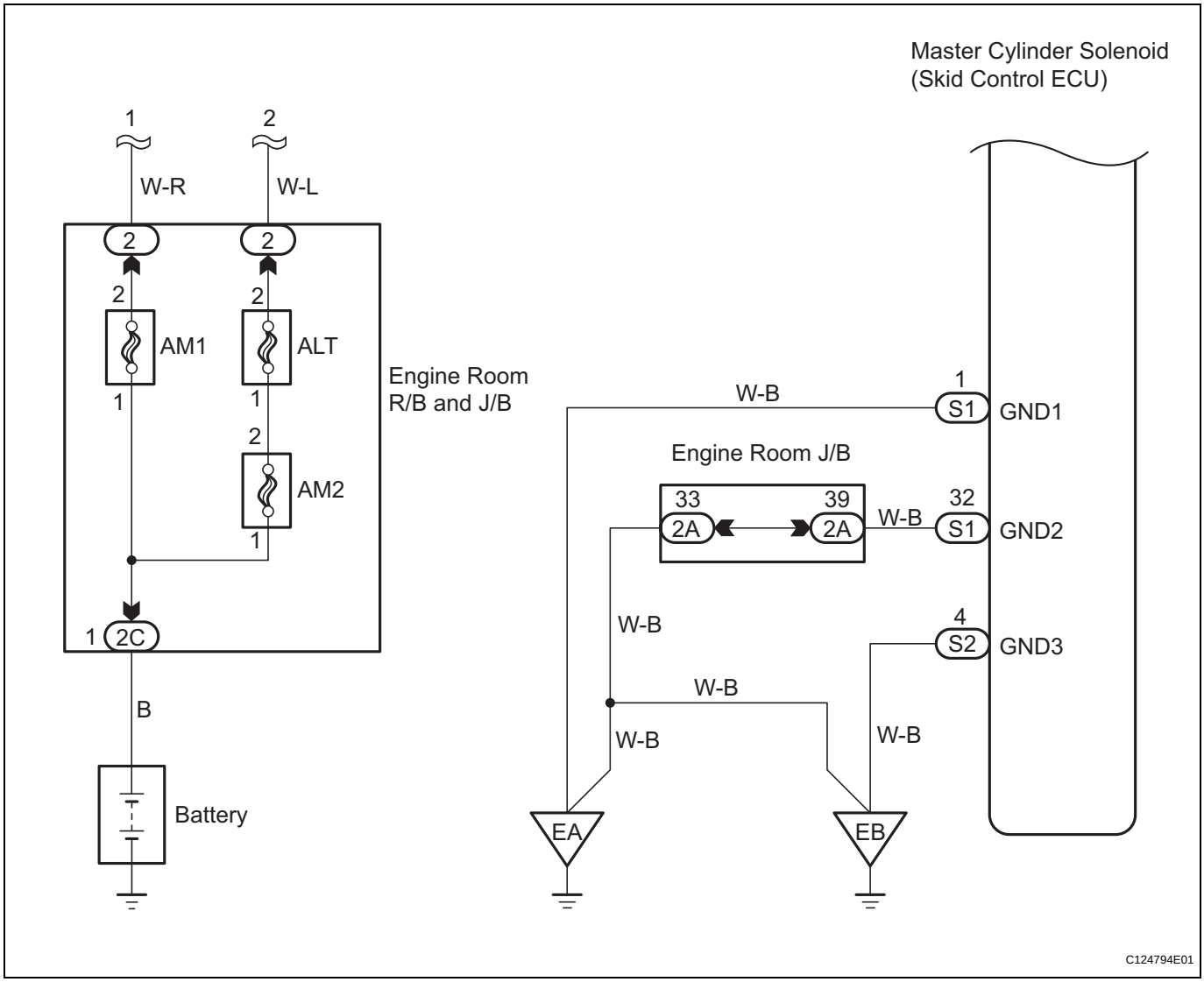
HINT:

Use of the intelligent tester may not be possible when there is a malfunction in the skid control ECU.

WIRING DIAGRAM



BC



BC

NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

1	CHECK DTC

(a) Check if DTCs for ABS are recorded.

Result	Proceed to
DTC not output	A
DTC output	B

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

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 INSPECT SKID CONTROL ECU (IG1 TERMINAL VOLTAGE)

(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.
(e) Measure the voltage output from the ECU displayed on the intelligent tester.

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

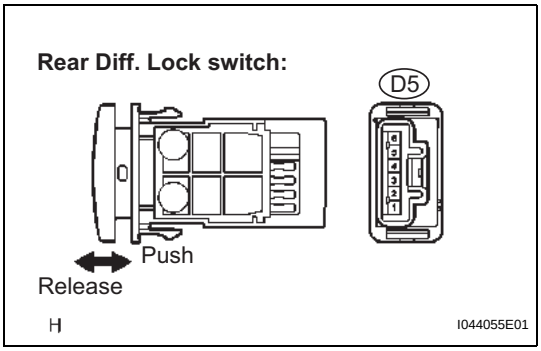
B → **Go to step 6**

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

A

BC

4 INSPECT REAR DIFFERENTIAL LOCK SWITCH



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

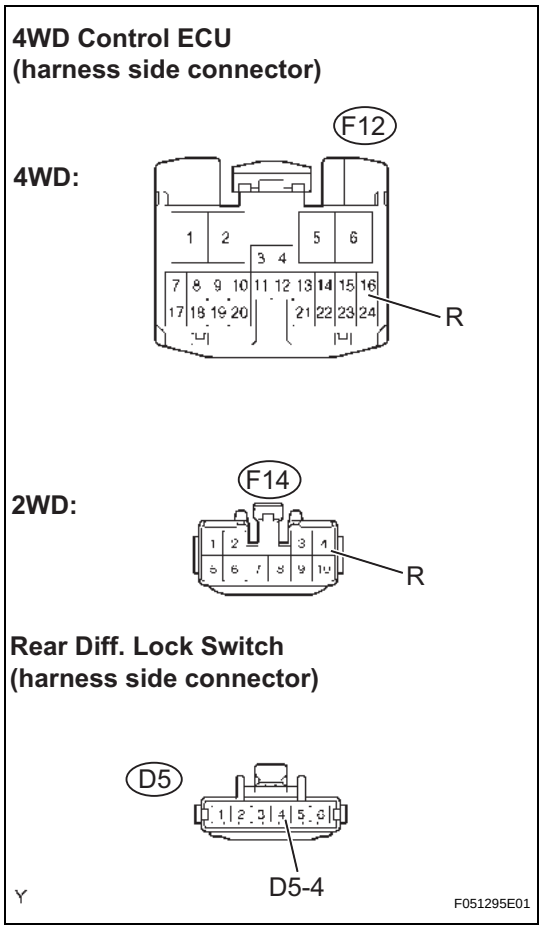
Tester Connection	Switch Condition	Specified Condition
D5-3 - D5-4	Released	10 kΩ or higher
D5-3 - D5-4	Pushed in	Below 1 Ω

(d) Reinstall the rear diff. lock switch.
(e) Reconnect the rear diff. lock switch connector.

NG → **REPLACE REAR DIFFERENTIAL LOCK SWITCH**

OK

5	CHECK HARNESS AND CONNECTOR (4WD CONTROL ECU - REAR DIFFERENTIAL LOCK SWITCH)



(a) Disconnect the 4WD control ECU connector.
(b) Disconnect the rear diff. lock connector.
(c) Measure the resistance.

Standard (4WD)

Tester Connection	Specified Condition
F12-16 (R) - D5-4	Below 1 Ω
F12-16 (R) - Body ground	10 kΩ or higher

Standard (2WD)

Tester Connection	Specified Condition
F14-4 (R) - D5-4	Below 1 Ω
F14-4 (R) - Body ground	10 kΩ or higher

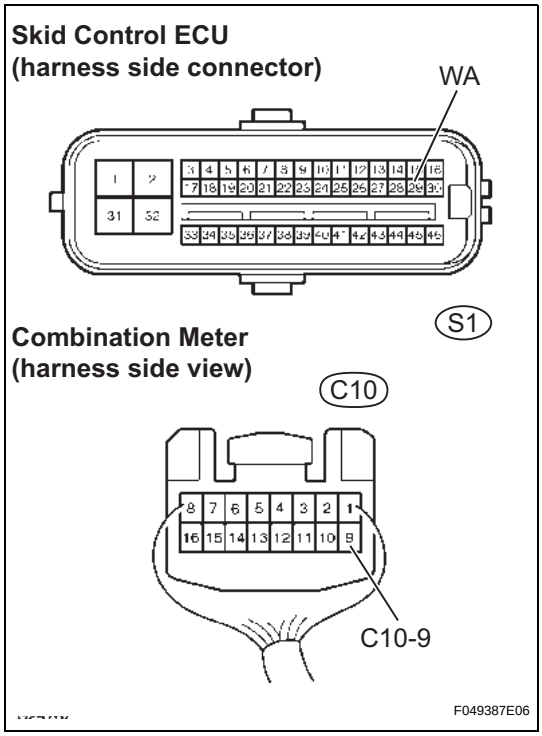
(d) Reconnect the rear diff. lock connector.
(e) Reconnect the 4WD control ECU connector.

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

OK

BC

6	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

Tester Connection	Specified Condition
S1-29 (WA) - C10-9	Below 1 Ω

(d) Measure the resistance.
Standard

Tester Connection	Specified Condition
S1-29 (WA) - Body ground	10 kΩ or higher

(e) Reconnect the combination meter connector.
(f) Reconnect the skid control ECU connector.

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

OK

BC

7	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

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-234.

NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

1	CHECK ABS WARNING LIGHT

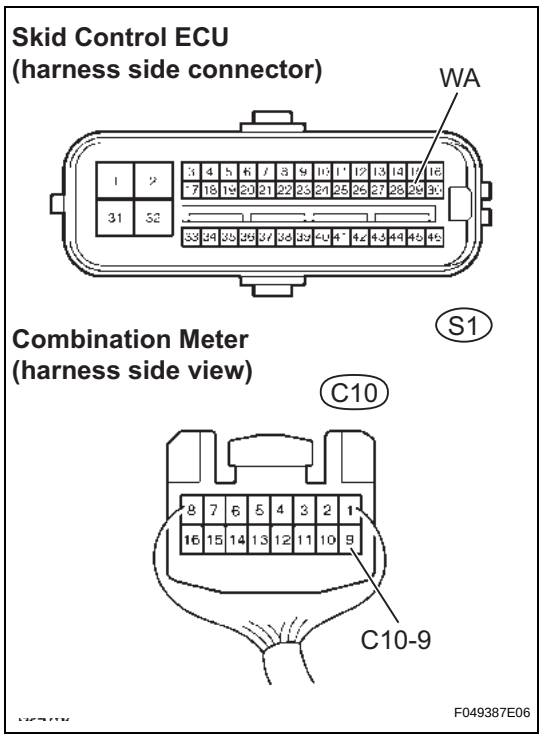
(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Check that the ABS warning light comes on.
OK:
ABS warning light comes on.
(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control ECU connector.

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

Tester Connection	Specified Condition
S1-29 (WA) - C10-9	Below 1 Ω
S1-29 (WA) - Body ground	10 kΩ or higher

(d) Reconnect the combination meter connector.
(e) Reconnect the skid control ECU connector.

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

OK

3	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

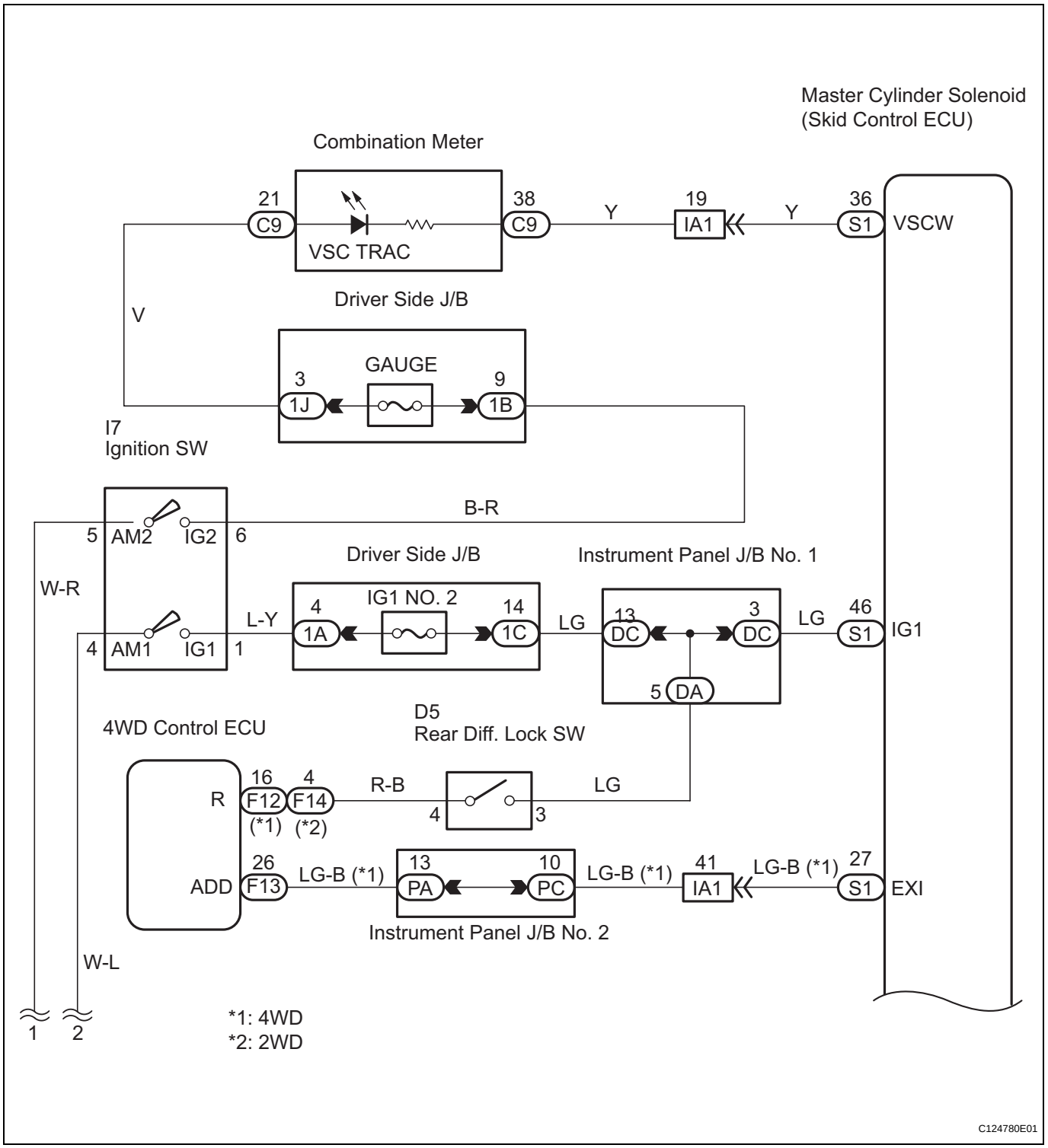
CHECK FOR INTERMITTENT PROBLEMS

VSC TRAC Warning Light Remains ON

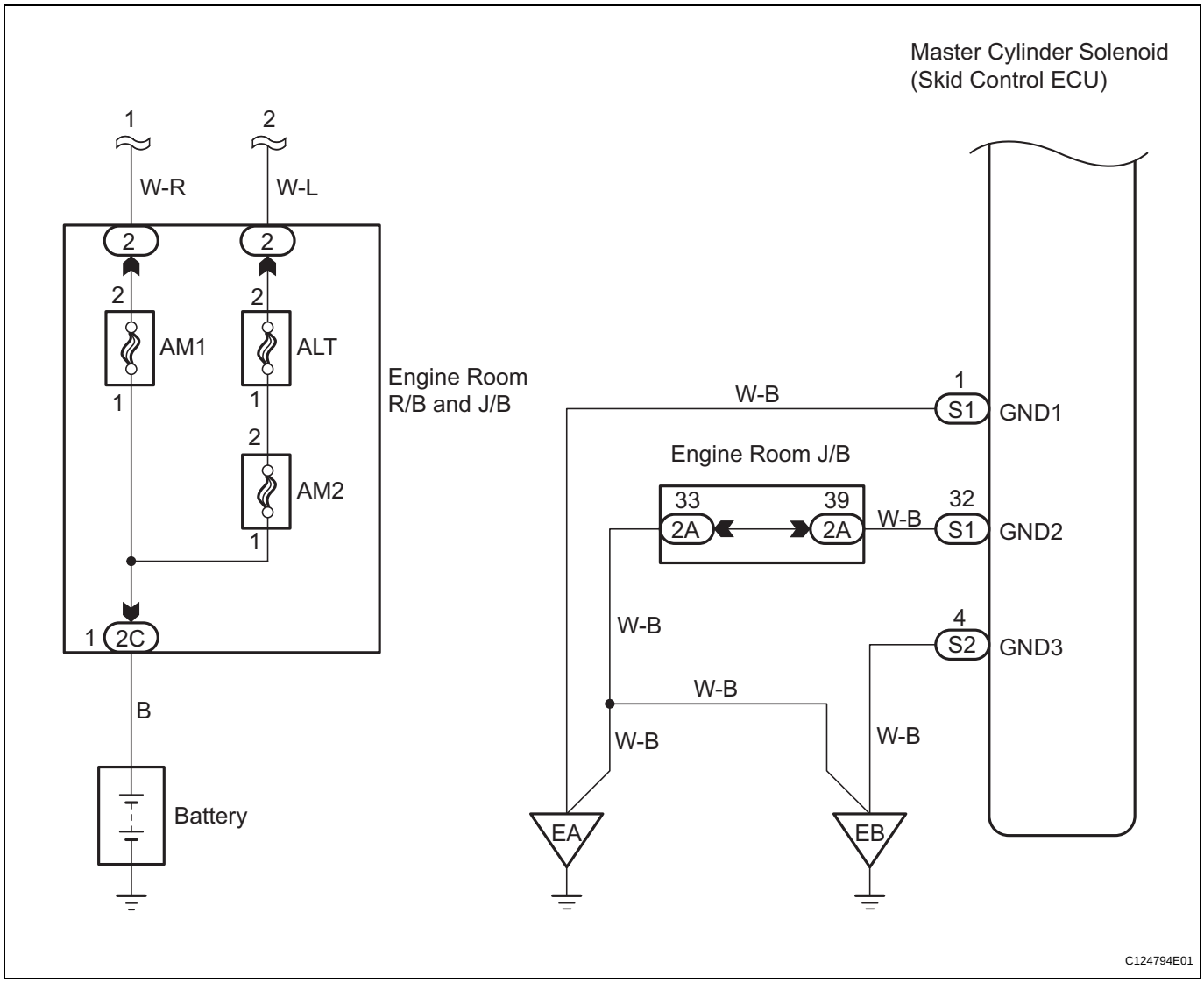
DESCRIPTION

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

WIRING DIAGRAM



BC



NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

1	CHECK DTC

(a) Check if DTCs for VSC are recorded.

Result	Proceed to
DTC not output	A
DTC output	B

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

A

2	INSPECT SKID CONTROL ECU CONNECTOR

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

BC

OK:
The connector is securely connected.

NG → **CONNECT CONNECTOR CORRECTLY**

OK

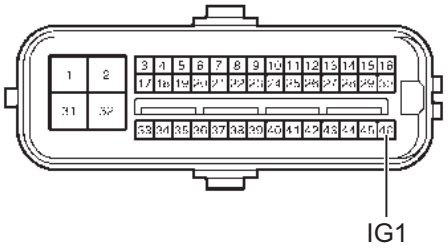
3 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (IG1 TERMINAL)

(a) When using intelligent tester:
(1) Connect the intelligent tester to the DLC3.
(2) Start the engine.
(3) Select the DATA LIST mode on the intelligent tester.
(4) Measure the voltage output from the ECU displayed on the intelligent tester.

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

OK:
"Normal" is displayed.

Skid Control ECU (harness side connector):



(b) When not using intelligent tester:
(1) Disconnect the skid control ECU connector.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage.
Standard

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

(4) Turn the ignition switch to OFF.
(5) Reconnect the skid control ECU connector.

BC

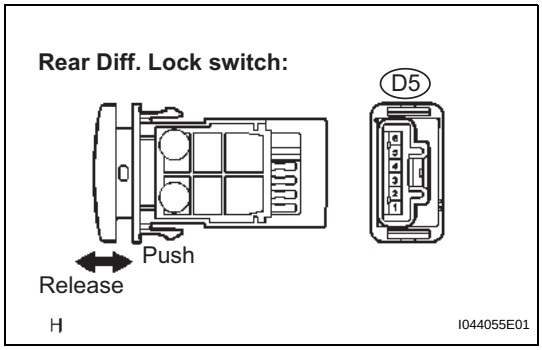
Result	Proceed to
OK (models with rear diff. lock)	A
OK (models without rear diff. lock)	B
NG	C

B → **Go to step 6**

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

A

4 INSPECT REAR DIFFERENTIAL LOCK SWITCH



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

Standard

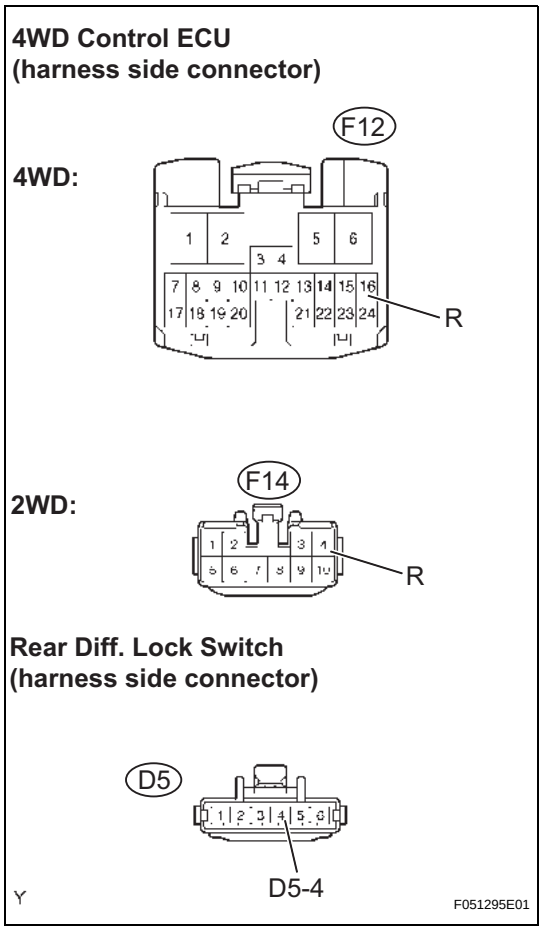
Tester Connection	Switch Condition	Specified Condition
D5-3 - D5-4	Released	10 kΩ or higher
D5-3 - D5-4	Pushed in	Below 1 Ω

(d) Reconnect the rear diff. lock switch connector.
(e) Reinstall the rear diff. lock switch.

NG → **REPLACE REAR DIFFERENTIAL LOCK SWITCH**

OK

5 CHECK HARNESS AND CONNECTOR (4WD CONTROL ECU - REAR DIFFERENTIAL LOCK SWITCH)



(a) Disconnect the 4WD control ECU connector.
(b) Disconnect the rear diff. lock connector
(c) Measure the resistance.

Standard (4WD)

Tester Connection	Specified Condition
F12-16 (R) - D5-4	Below 1 Ω
F12-16 (R) - Body ground	10 kΩ or higher

Standard (2WD)

Tester Connection	Specified Condition
F14-4 (R) - D5-4	Below 1 Ω
F14-4 (R) - Body ground	10 kΩ or higher

(d) Reconnect the rear diff. lock connector.
(e) Reconnect the 4WD control ECU connector.

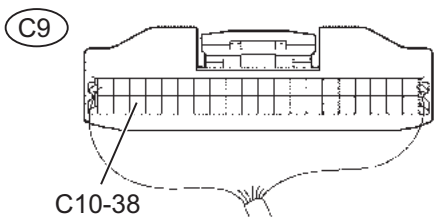
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

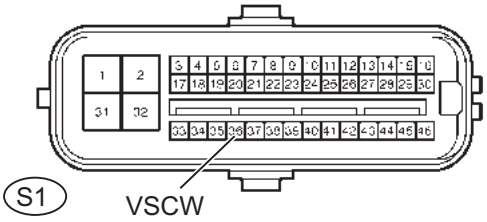
BC

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

Combination Meter (harness side view)



Skid Control ECU (harness side connector)



F049577E03

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

Tester Connection	Specified Condition
C9-38 - S1-36 (VSCW)	Below 1 Ω

(d) Measure the resistance.
Standard

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

(e) Reconnect the combination meter connector.
(f) Reconnect the skid control ECU connector.

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

OK

7 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

BC

VSC TRAC Warning Light does not Come ON

DESCRIPTION

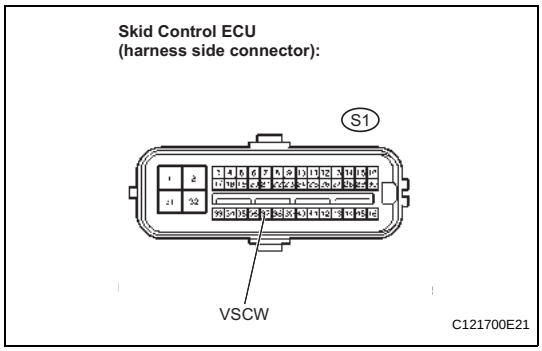
When the ECU stores DTC, the VSC warning light illuminates on the combination meter.

WIRING DIAGRAM

See page BC-241.

NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

1 CHECK VSC TRAC WARNING LIGHT



(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Ground terminal VSCW of the skid control ECU.
(d) Check VSC TRAC warning light.
OK

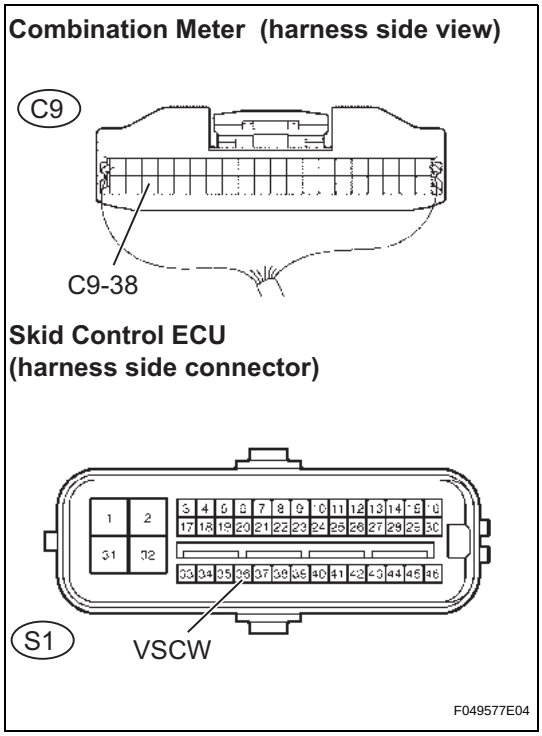
VSCW -GND Condition	Illumination Condition
Connecting	OFF
Disconnecting	ON

(e) Turn the ignition switch to OFF.
(f) Reconnect the skid control ECU connector.

OK → **REPLACE MASTER CYLINDER SOLENOID**

NG

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

Tester Connection	Specified Condition
C9-38 - S1-36 (VSCW)	Below 1 Ω

(d) Measure the resistance.
Standard

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

(e) Reconnect the combination meter connector.
(f) Reconnect the skid control ECU connector.

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

OK

3	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

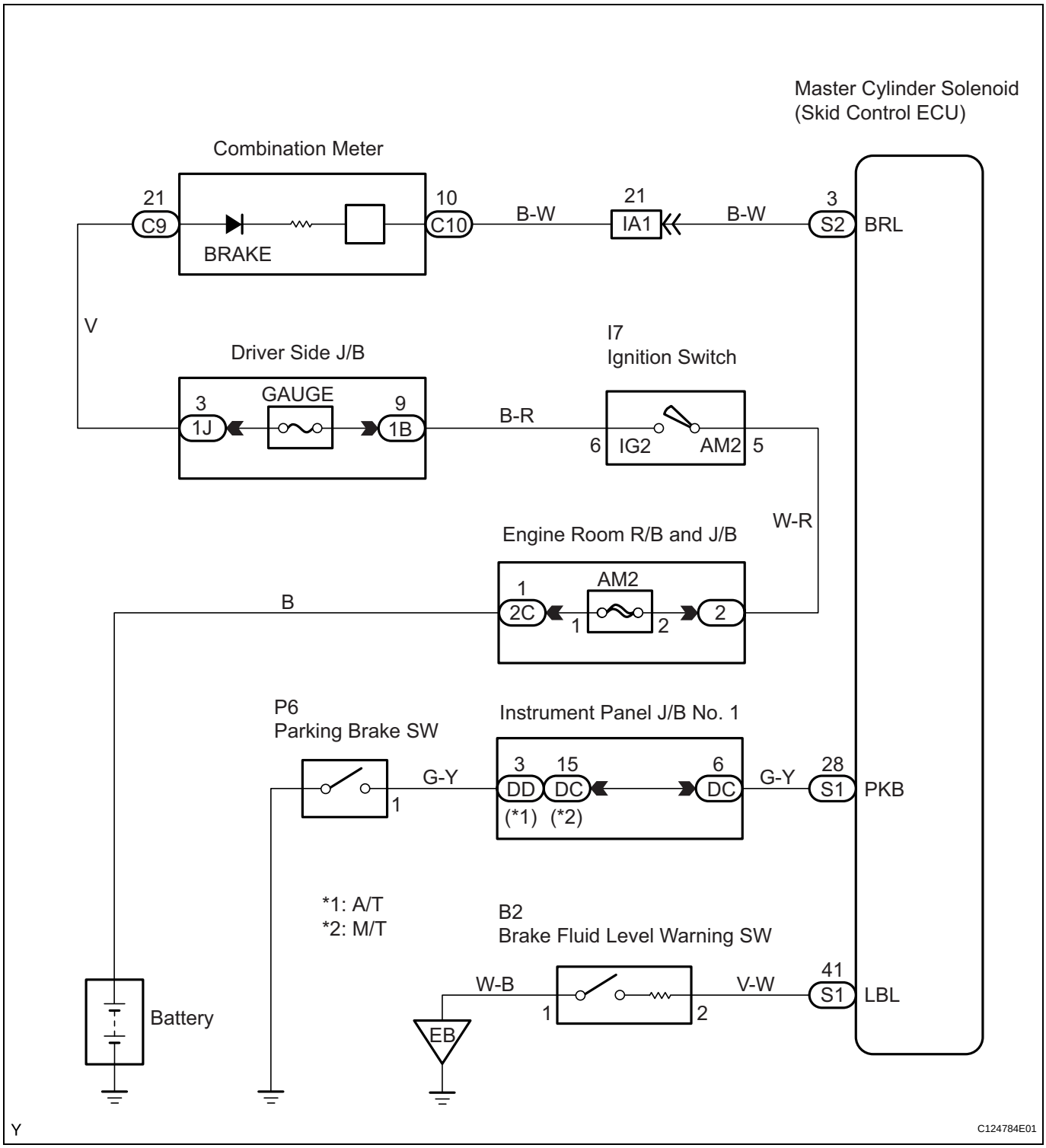
CHECK FOR INTERMITTENT PROBLEMS

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.

WIRING DIAGRAM



NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

1 CHECK DTC

(a) Check the DTCs (See page BC-118).

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 skid control ECU connector is connected securely.
OK:
The skid control ECU connector is connected securely.

NG → **CONNECT CONNECTOR CORRECTLY**

OK

4 INSPECT BATTERY

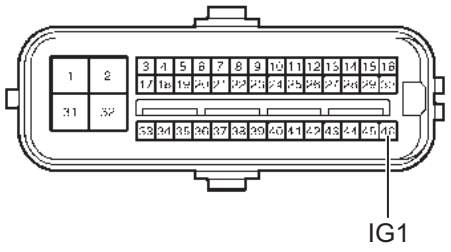
(a) Check the battery voltage.
Standard:
11 to 14 V

NG → **INSPECT CHARGING SYSTEM**

OK

5 INSPECT SKID CONTROL ECU (IG1 TERMINAL VOLTAGE)

Skid Control ECU (harness side connector):



C121700E02

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

Standard

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

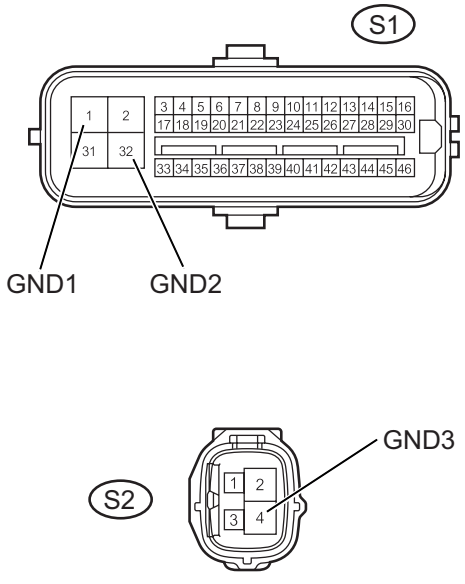
(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control ECU connector.

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

OK

6 CHECK HARNESS AND CONNECTOR (GND TERMINAL CONTINUITY)

Skid Control ECU (harness side connector):



C124799E01

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

Standard

Tester Connection	Specified Condition
S1-1 (GND1) - Body ground	Below 1 Ω
S1-32 (GND2) - Body ground	Below 1 Ω
S2-4 (GND3) - Body ground	Below 1 Ω

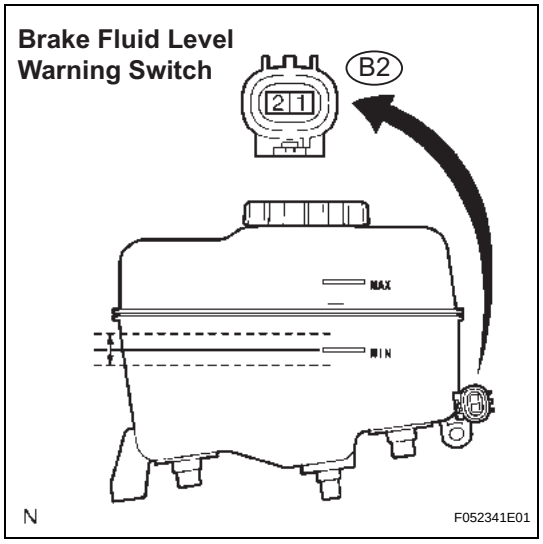
(c) Reconnect the skid control ECU connectors.

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

OK

BC

7 INSPECT BRAKE FLUID LEVEL WARNING SWITCH



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

Tester Connection	Condition	Specified Condition
B2-1 - B2-2	Float UP	10 kΩ or higher
B2-1 - B2-2	Float DOWN	Below 1 Ω

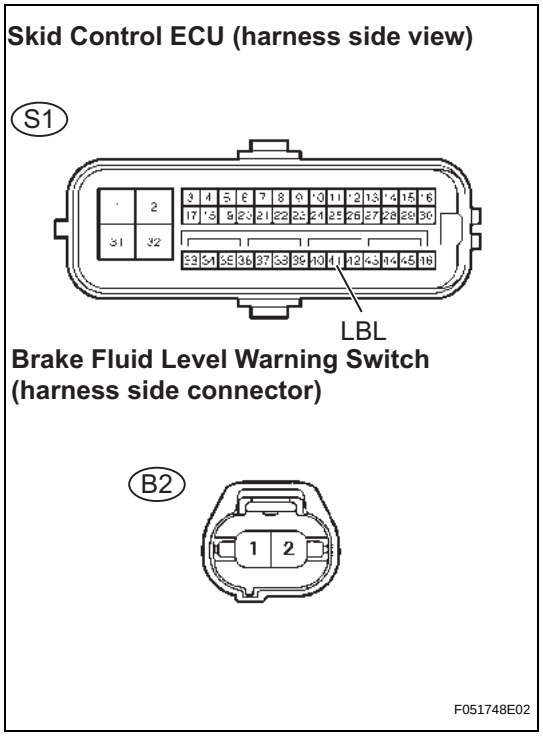
(c) Reconnect the brake fluid level warning switch connector.

HINT:
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

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



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

Tester Connection	Specified Condition
S1-41 (LBL) - B2-2	Below 1 Ω

(d) Measure the resistance.
Standard

Tester Connection	Specified Condition
S1-41 - Body ground	10 kΩ or higher

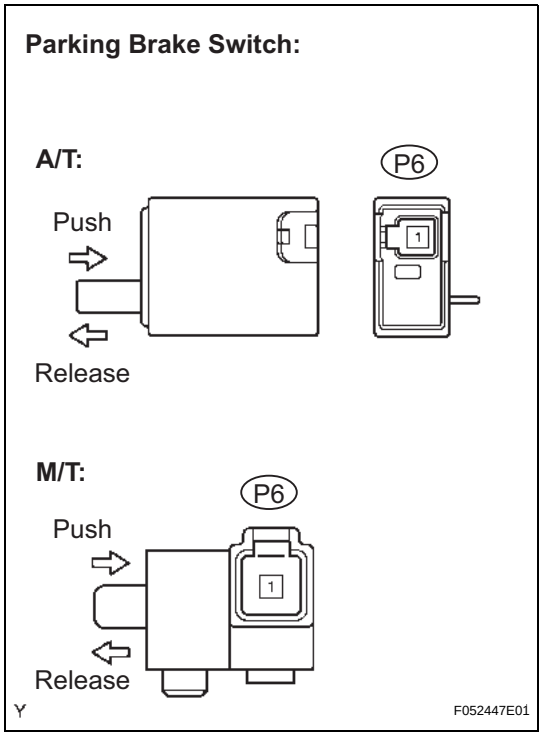
(e) Reconnect the brake fluid level warning switch connector.
(f) Reconnect the skid control ECU connector.

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

OK

BC

9 INSPECT PARKING BRAKE SWITCH ASSEMBLY



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

Tester Connection	Switch Condition	Specified Condition
P6-1 - Body ground	Released	Below 1 Ω
P6-1 - Body ground	Pushed in	10 kΩ or higher

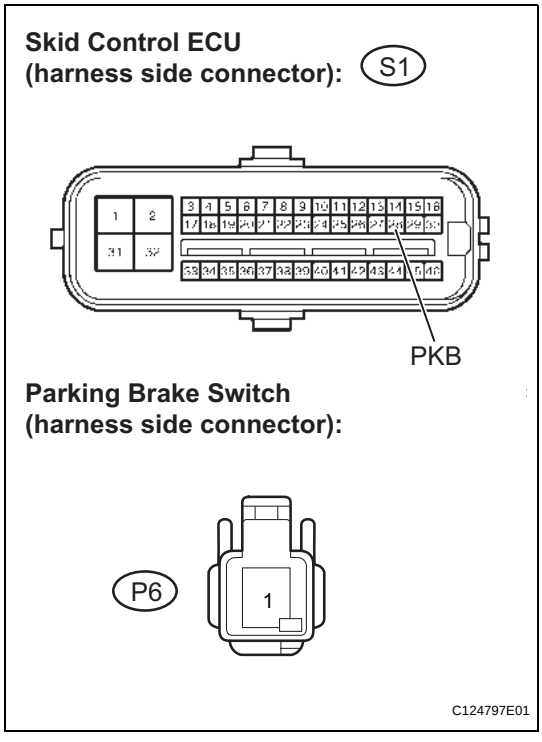
(c) Reconnect the parking brake switch connector.

NG → **REPLACE PARKING BRAKE SWITCH ASSEMBLY**

OK

BC

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



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

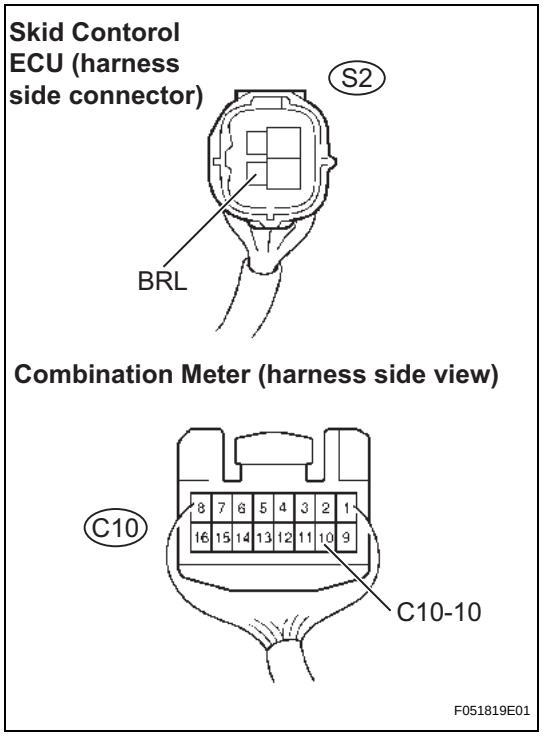
Tester Connection	Specified Condition
S1-28 (PKB) - P6-1	Below 1 Ω
S1-28 (PKB) - Body ground	10 kΩ or higher

(d) Reconnect the parking brake switch connector.
(e) Reconnect the skid control ECU.

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

OK

11 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

Tester Connection	Specified Condition
S2-3 (BRL) - C10-10	Below 1 Ω

(d) Measure the resistance.
Standard

Tester Connection	Specified Condition
S2-3 (BRL) - Body ground	10 kΩ or higher

(e) Reconnect the combination meter connector.
(f) Reconnect the skid control ECU connector.

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

OK

12 INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

BC

Brake Warning Light does not Come ON

WIRING DIAGRAM

See page BC-248.

NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

1	CHECK BRAKE WARNING LIGHT

(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Check that the BRAKE warning light comes on.
OK:
BRAKE warning light comes on.
(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control ECU connector.

OK → **REPLACE MASTER CYLINDER SOLENOID**

NG

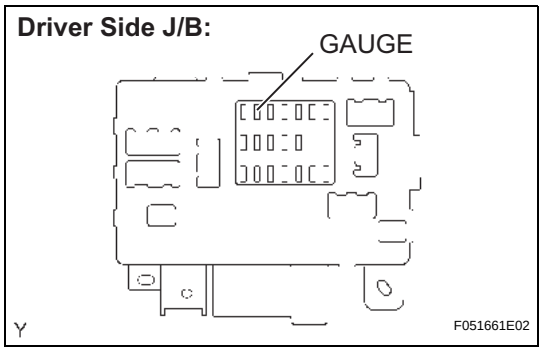
2	INSPECT BATTERY

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

NG → **INSPECT CHARGING SYSTEM**

OK

3	INSPECT FUSE (GAUGE)

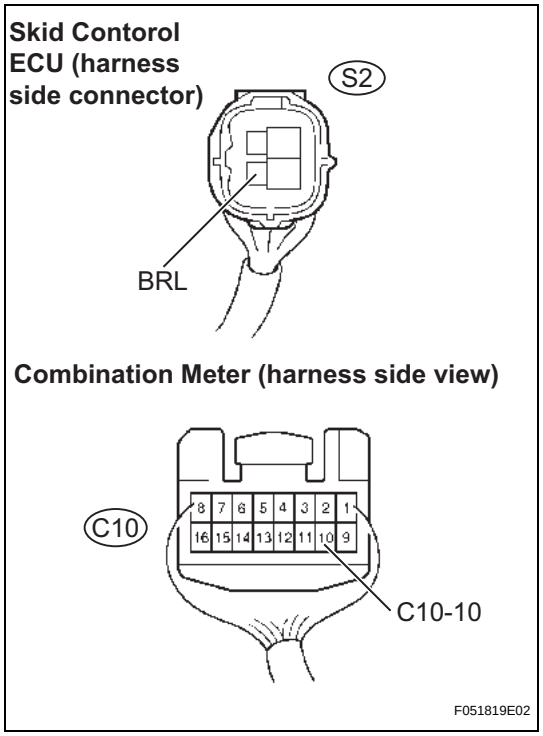


(a) Remove the GAUGE fuse from the driver side J/B.
(b) Measure the resistance of the GAUGE fuse.
Standard:
Below 1 Ω
(c) Reinstall the GAUGE fuse.

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

OK

4 **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

Tester Connection	Specified Condition
S2-3 (BRL) - C10-10	Below 1 Ω

(d) Measure the resistance.
Standard

Tester Connection	Specified Condition
S2-3 (BRL) - Body ground	10 kΩ or higher

(e) Reconnect the combination meter connector.
(f) Reconnect the skid control ECU connector.

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

OK

5 **INSPECT COMBINATION METER ASSEMBLY**

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

CHECK FOR INTERMITTENT PROBLEMS

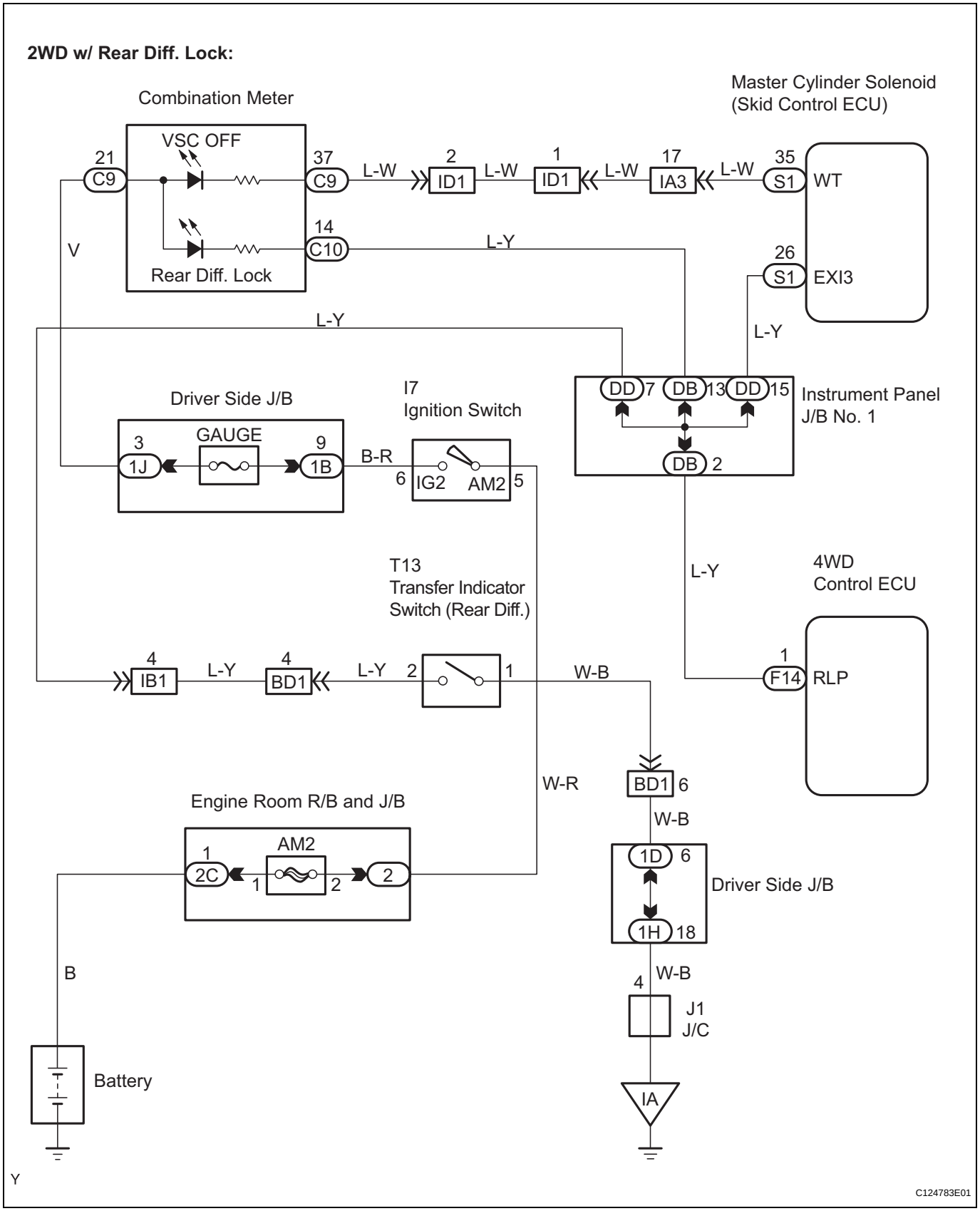
BC

VSC OFF Indicator Light Remains ON

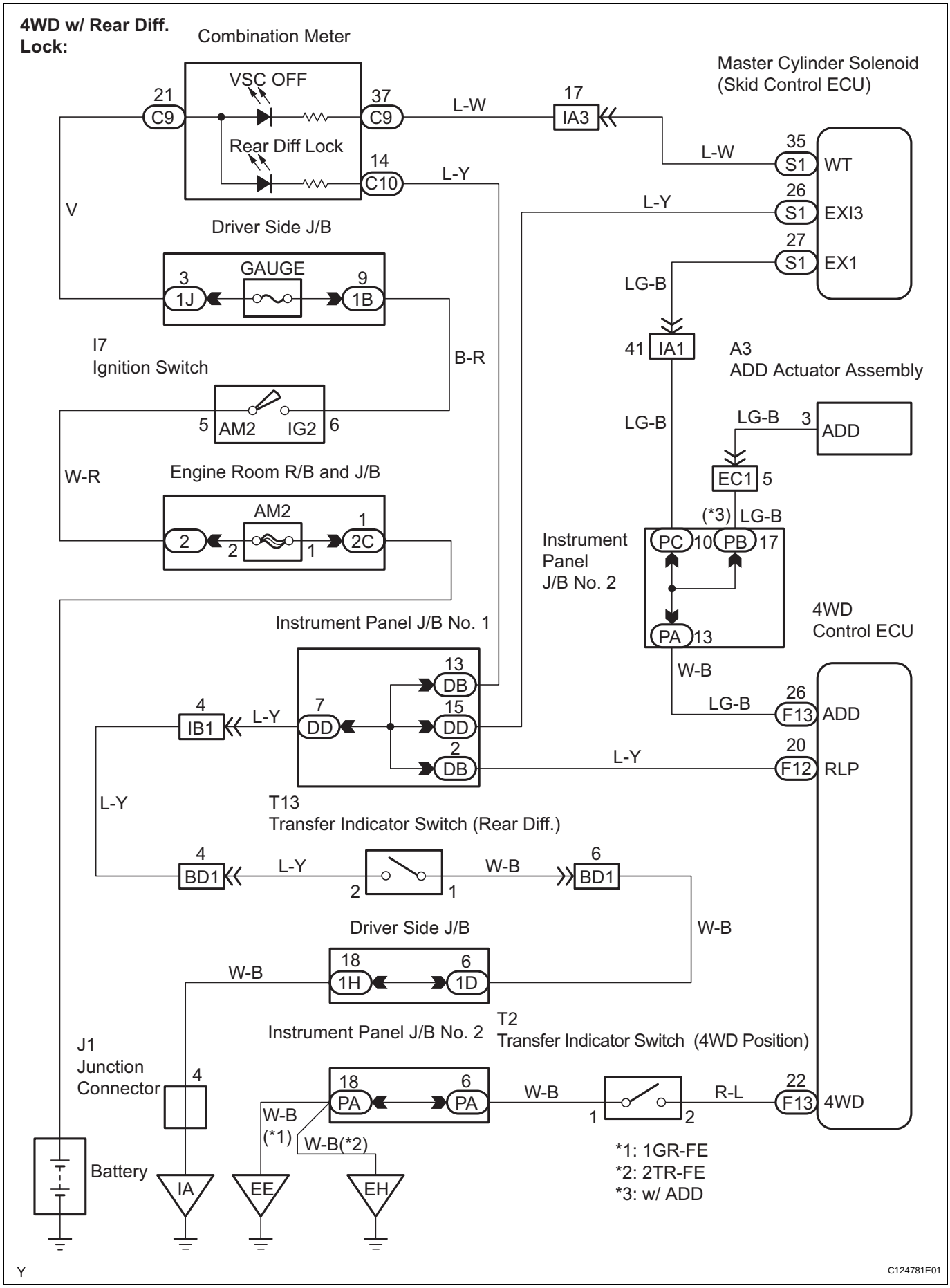
DESCRIPTION

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.

WIRING DIAGRAM



BC

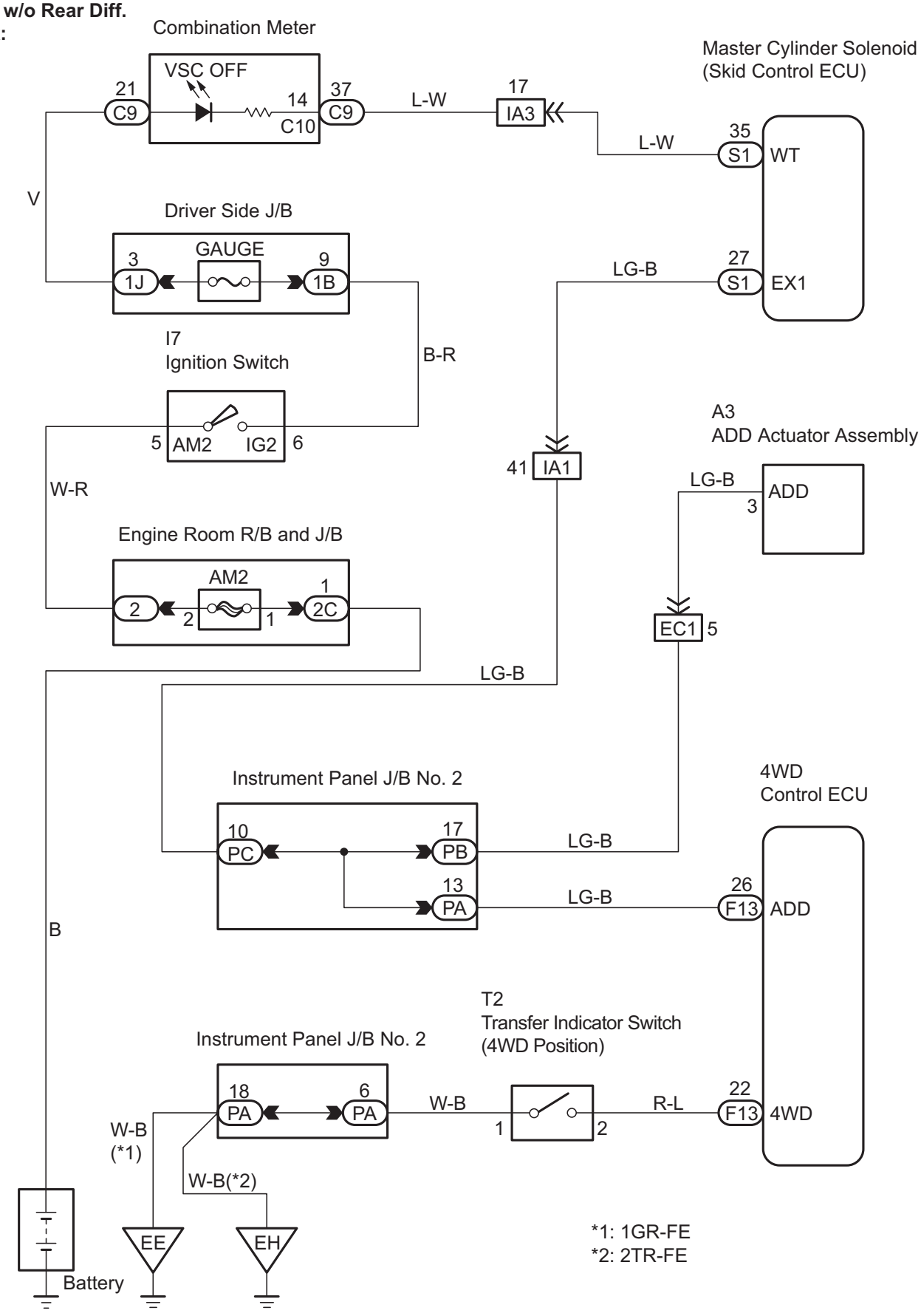


BC

Y

C124781E01

4WD w/o Rear Diff. Lock:



Y

C124782E01

BC

NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

1 CHECK DTC

(a) Check if DTCs for VSC are recorded.

Result	Proceed to
DTC not output	A
DTC output	B

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

A

2 CHECK SKID CONTROL ECU CONNECTOR

(a) Check the ECU connector's connecting condition.
OK:
The connector is securely connected.

NG → **CONNECT CONNECTOR CORRECTLY**

OK

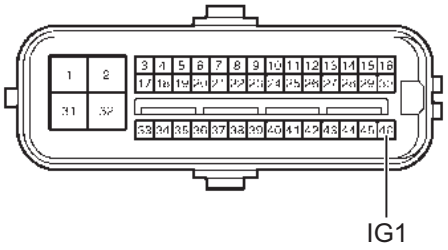
3 INSPECT SKID CONTROL ECU (IG1 TERMINAL VOLTAGE)

(a) When using intelligent tester:
(1) Connect the intelligent tester to the DLC3.
(2) Start the engine.
(3) Turn the intelligent tester ON.
(4) Select the DATA LIST mode on the intelligent tester.
(5) Measure the voltage output from the ECU displayed on the intelligent tester.

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

OK:
"Normal" is displayed.

Skid Control ECU
(harness side connector):



C121700E02

(b) When not using intelligent tester:
(1) Disconnect the skid control ECU connector.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage.

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

(4) Turn the ignition switch to OFF.
(5) Reconnect the skid control ECU connector.

Result	Proceed to
OK (models with rear diff. lock)	A
OK (models without rear diff. lock)	B
NG	C

B → **Go to step 6**

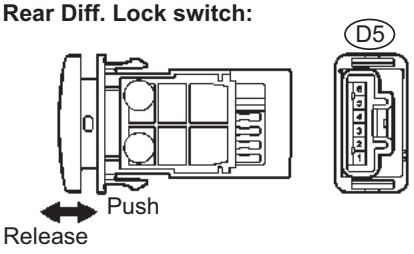
C → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

A

BC

4 INSPECT REAR DIFFERENTIAL LOCK SWITCH

Rear Diff. Lock switch:



H

I044055E01

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

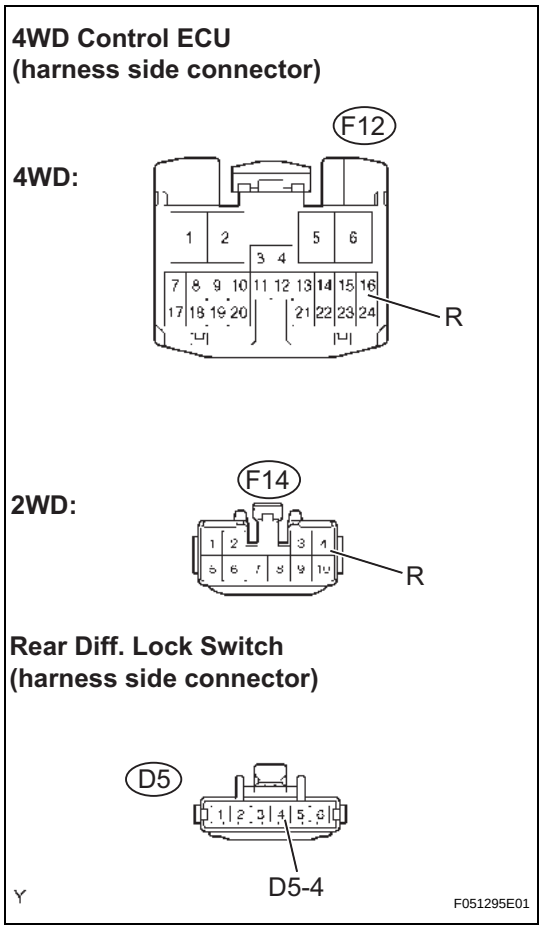
Tester Connection	Switch Condition	Specified Condition
D5-3 - D5-4	Released	10 kΩ or higher
D5-3 - D5-4	Pushed in	Below 1 Ω

(d) Reinstall the rear diff. lock switch.
(e) Reconnect the rear diff. lock switch connector.

NG → **REPLACE REAR DIFFERENTIAL LOCK SWITCH**

OK

5	CHECK HARNESS AND CONNECTOR (4WD CONTROL ECU - REAR DIFFERENTIAL LOCK SWITCH)



(a) Disconnect the 4WD control ECU connector.
(b) Disconnect the rear diff. lock connector.
(c) Measure the resistance.

Standard (4WD)

Tester Connection	Specified Condition
F12-16 (R) - D5-4	Below 1 Ω
F12-16 (R) - Body ground	10 kΩ or higher

Standard (2WD)

Tester Connection	Specified Condition
F14-4 (R) - D5-4	Below 1 Ω
F14-4 (R) - Body ground	10 kΩ or higher

(d) Reconnect the rear diff. lock connector.
(e) Reconnect the 4WD control ECU connector.

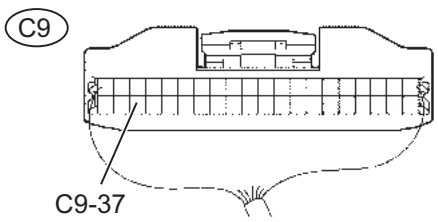
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

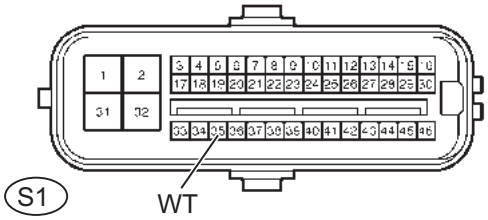
BC

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

Combination Meter (harness side view)



Skid Control ECU (harness side connector)



F049577E05

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

Tester Connection	Specified Condition
S1-35 (WT) - C9-37	Below 1 Ω

(d) Measure the resistance.
Standard

Tester Connection	Specified Condition
S1-35 (WT) - Body ground	10 kΩ or higher

(e) Reconnect the combination meter connector.
(f) Reconnect the skid control ECU connector.

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

OK

7	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
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

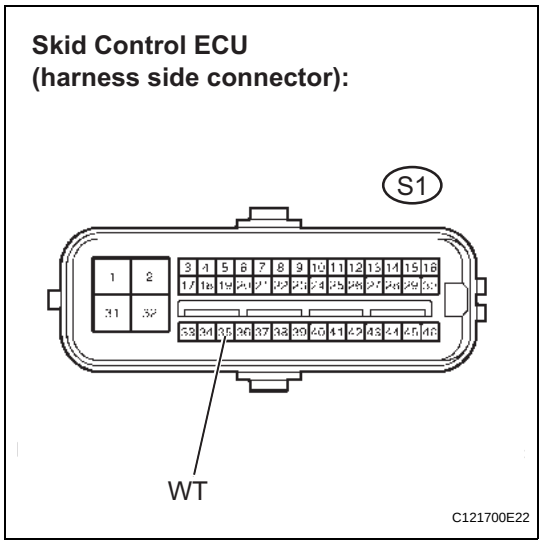
See page BC-256.

WIRING DIAGRAM

See page BC-257.

NOTICE:
When replacing the master cylinder solenoid, perform zero point calibration (See page BC-99).

1	PERFORM ACTIVE TEST BY INTELLIGENT TESTER



(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Ground terminal WT of the skid control ECU.
(d) Check the VSC OFF indicator light.
OK

IND - GND Condition	Illumination Condition
Connecting	ON
Disconnecting	OFF

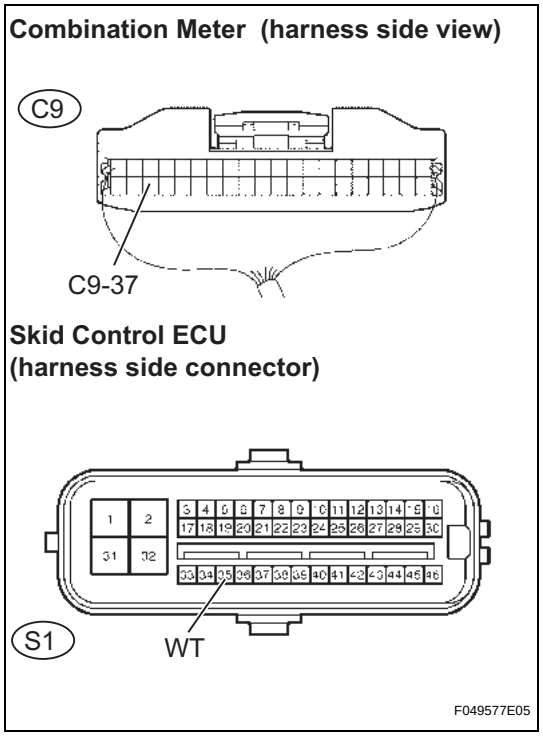
(e) Turn the ignition switch to OFF.
(f) Reconnect the skid control ECU connector.

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

Tester Connection	Specified Condition
S1-35 (WT) - C9-37	Below 1 Ω
S1-35 (WT) - Body ground	10 kΩ or higher

(d) Reconnect the combination meter connector.
(e) Reconnect the skid control ECU connector.

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

OK

3	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).

OK:

Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

CHECK FOR INTERMITTENT PROBLEMS

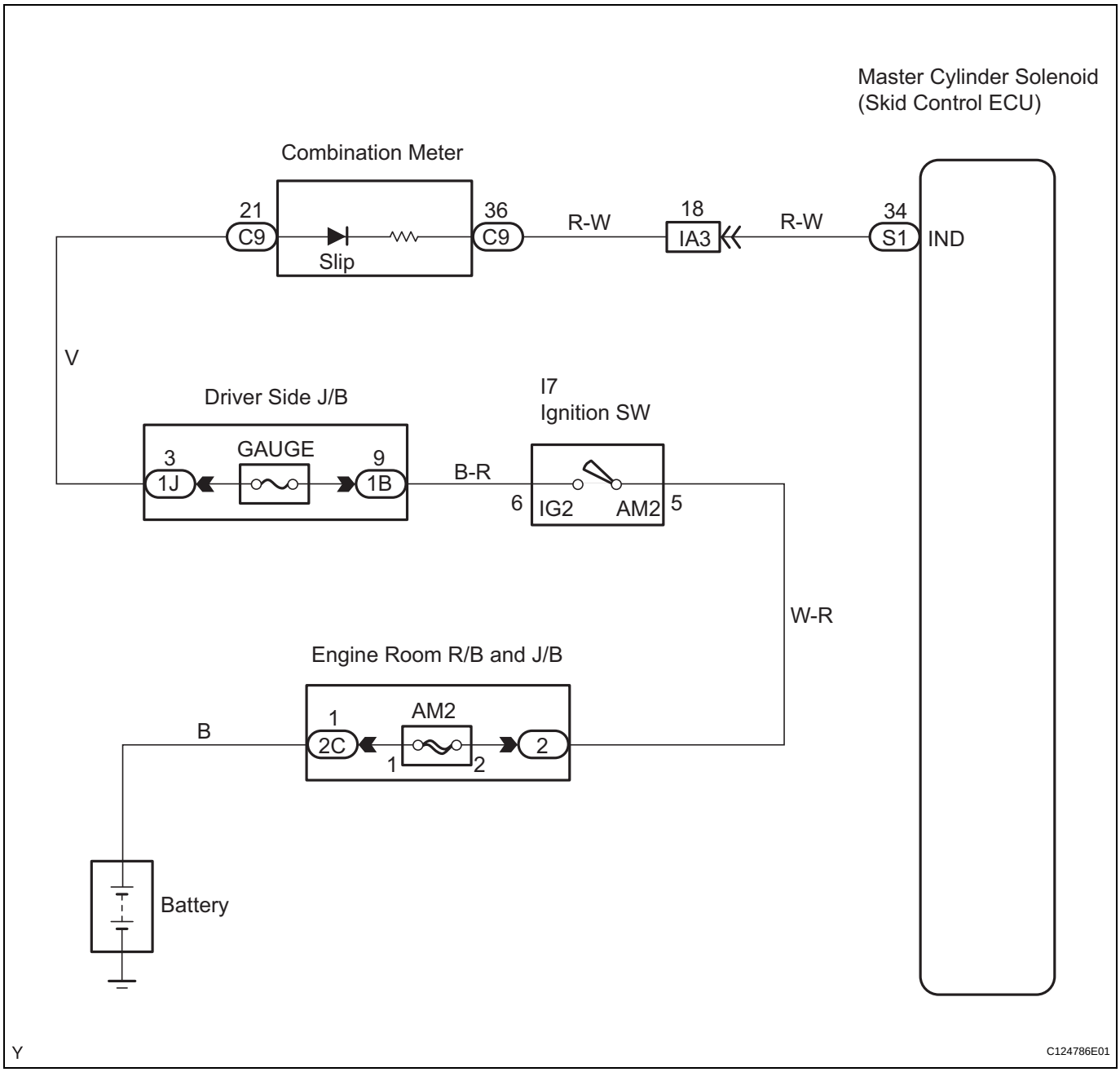
BC

Slip Indicator Light Remains ON

DESCRIPTION

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

WIRING DIAGRAM



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

1	CHECK DTC

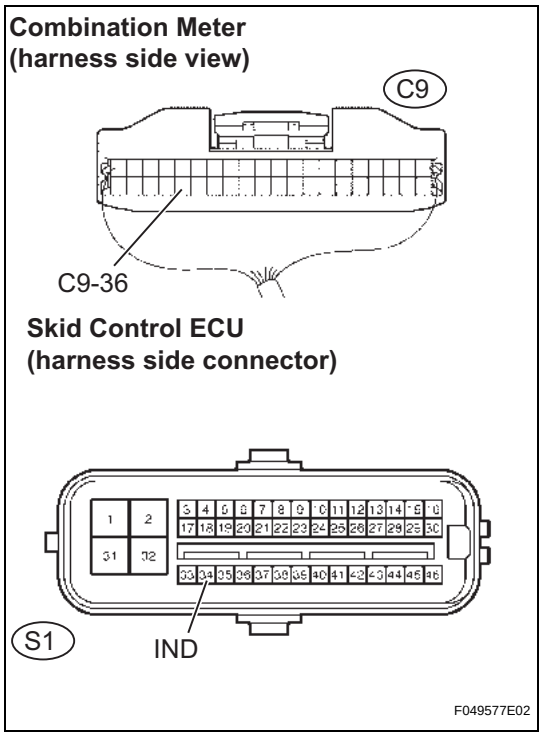
(a) Check the DTCs.

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

Tester Connection	Specified Condition
S1-34 (IND) - C9-36	Below 1 Ω

(d) Measure the resistance.
Standard

Tester Connection	Specified Condition
S1-34 (IND) - Body ground	10 kΩ or higher

(e) Reconnect the combination meter connector.
(f) Reconnect the skid control ECU connector.

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

OK

3	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE MASTER CYLINDER SOLENOID

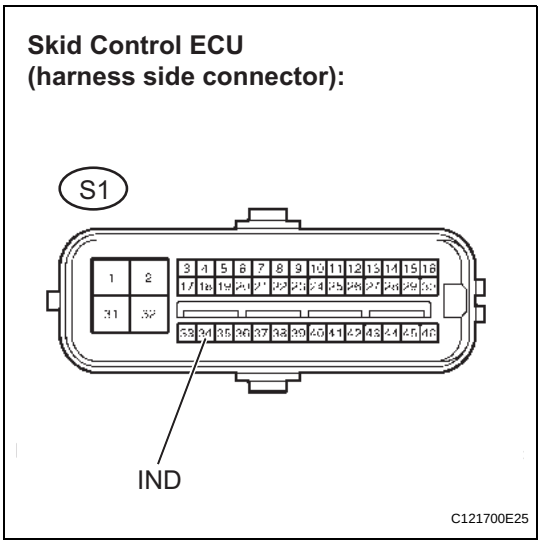
BC

Slip Indicator Light does not Come ON

WIRING DIAGRAM

See page BC-118

1 CHECK SLIP INDICATOR LIGHT



(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Ground terminal IND of the skid control ECU.
(d) Check the SLIP indicator light.

OK

IND - GND Condition	Illumination Condition
Connecting	ON
Disconnecting	OFF

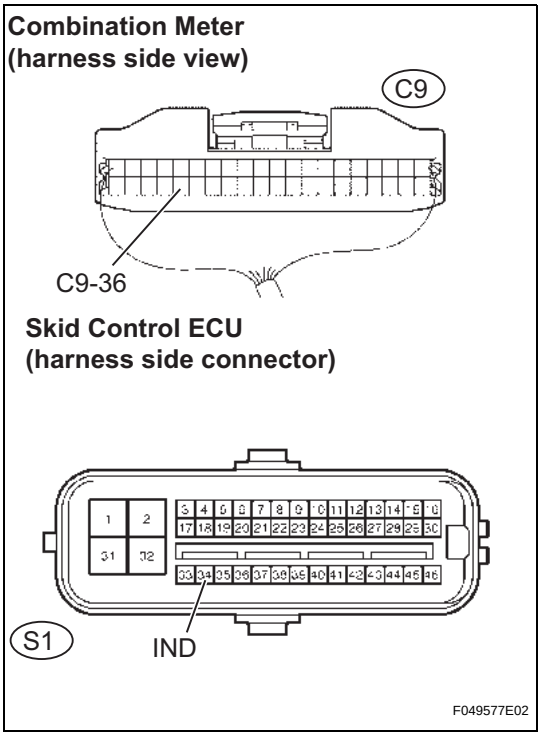
(e) Turn the ignition switch to OFF.
(f) Reconnect the skid control ECU connector.

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

Tester Connection	Specified Condition
S1-34 (IND) - C9-36	Below 1 Ω
S1-34 (IND) - Body ground	10 kΩ or higher

(d) Reconnect the combination meter connector.
(e) Reconnect the skid control ECU connector.

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

OK

3	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

CHECK FOR INTERMITTENT PROBLEMS

DAC Indicator Light Remains ON

DESCRIPTION

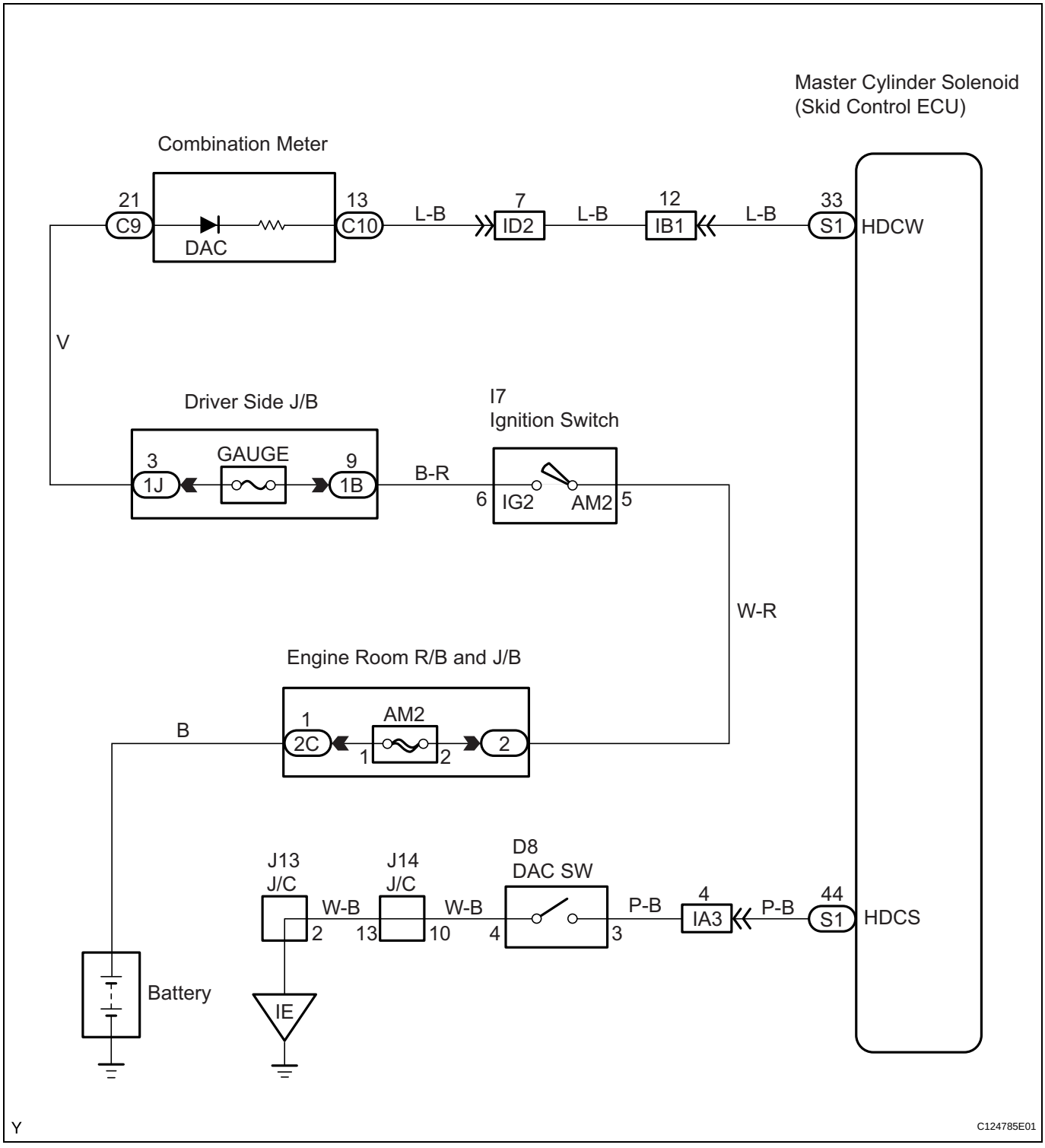
When the Downhill Assist Control (DAC) switch is pushed on, the DAC function is available and the DAC indicator light illuminates.

HINT:

Even if the DAC switch is pressed, the DAC indicator light blinks and DAC does not activate under the following conditions:

- Transfer is in 2WD or H4 mode.
- ABS system is malfunctioning.
- Temperature of the hydraulic brake booster increases and DAC is temporarily canceled.

WIRING DIAGRAM



1	CHECK SKID CONTROL ECU CONNECTOR

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

NG	CONNECT CONNECTOR CORRECTLY

BC

OK

2	INSPECT BATTERY

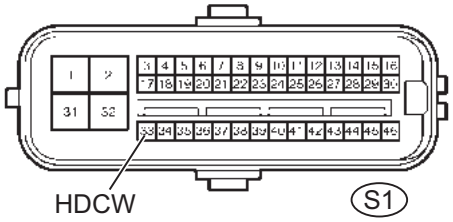
(a) Check the battery voltage.
Standard:
11 to 14 V

NG → **INSPECT CHARGING SYSTEM**

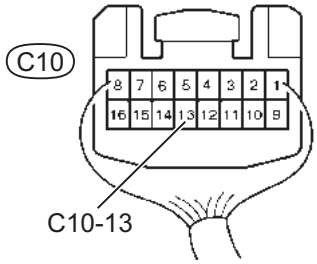
OK

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

Skid Control ECU
(harness side connector)



Combination Meter
(harness side view)



F049387E07

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

Tester Connection	Specified Condition
S1-33 (HDCW) - C10-13	Below 1 Ω
S1-33 (HDCW) - Body ground	10 kΩ or higher

(d) Reconnect the combination meter connector.
(e) Reconnect the skid control ECU connector.

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

OK

4	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

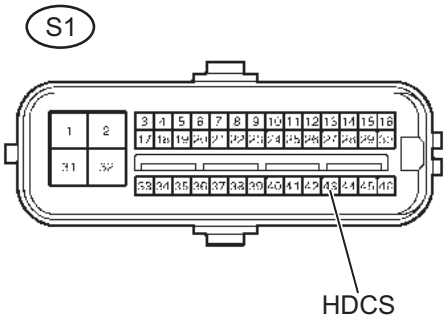
NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

BC

5 INSPECT SKID CONTROL ECU (HDCS TERMINAL)

Skid Control ECU (harness side connector):



C121700E23

(a) Disconnect the skid control ECU connector.
(b) Ground terminal HDCS of the skid control ECU.
Standard

Tester Connection	Condition	Specified Condition
S1-44 (HDCS) - Body ground	DAC switch not pushed in	10 kΩ or higher

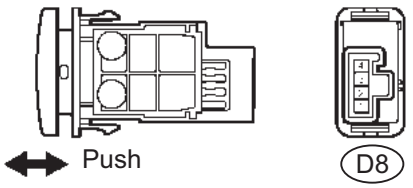
(c) Reconnect the skid control ECU connector.

OK → **REPLACE MASTER CYLINDER SOLENOID**

NG

6 INSPECT DAC SWITCH

DAC Switch:



I044044E02

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

Tester Connection	Switch Condition	Specified Condition
D8-3 - D8-4	Released	10 kΩ or higher
D8-3 - D8-4	Pushed in	Below 1 Ω

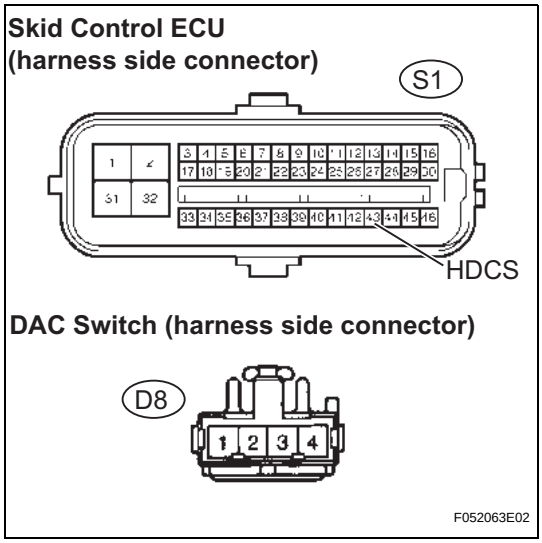
(d) Reconnect the DAC switch connector.
(e) Reinstall the DAC switch connector.

NG → **REPLACE DAC SWITCH**

OK

BC

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



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

Standard

Tester Connection	Specified Condition
S1-44 (HDCS) - D8-3	Below 1 Ω
S1-44 (HDCS) - Body ground	10 kΩ or higher
D8-4 - Body ground	Below 1 Ω

(d) Reconnect the DAC switch connector.
(e) Reconnect the skid control ECU connector.

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

OK

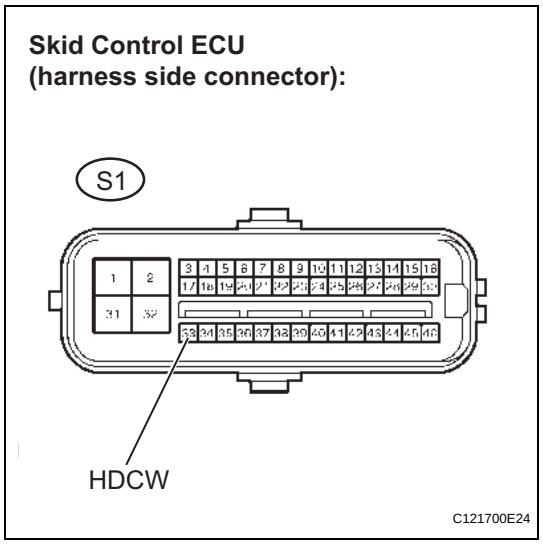
REPLACE MASTER CYLINDER SOLENOID

DAC Indicator Light does not Come ON

WIRING DIAGRAM

See page BC-271.

1 CHECK DAC INDICATOR LIGHT



(a) Disconnect the skid control ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Ground terminal HDCW of the skid control ECU.
(d) Check DAC indicator light.

OK

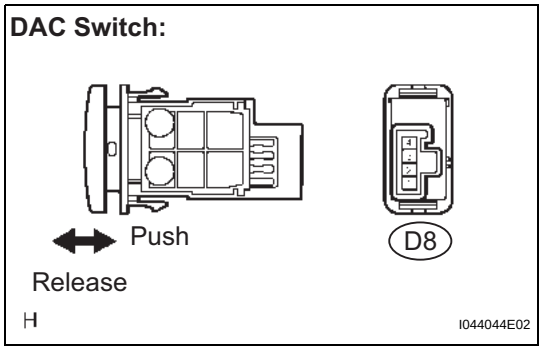
HDCW - GND Condition	Illumination Condition
Connecting	OFF
Disconnecting	ON

(e) Turn the ignition switch to OFF.
(f) Reconnect the skid control ECU connector.

NG → **Go to step 3**

OK

2 INSPECT DAC SWITCH



(a) Remove the DAC switch.
(b) Disconnect the DAC switch connector.
(c) Measure the resistance.

Standard

Tester Connection	Switch Condition	Specified Condition
D8-3 - D8-4	Released	10 kΩ or higher
D8-3 - D8-4	Pushed in	Below 1 Ω

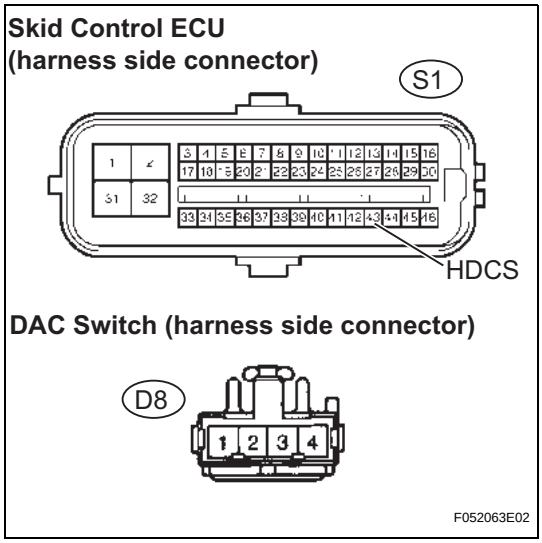
(d) Reconnect the DAC switch connector.
(e) Reinstall the DAC switch connector.

NG → **REPLACE DAC SWITCH**

OK

BC

3 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DAC SWITCH)



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

Standard

Tester Connection	Specified Condition
S1-44 (HDCS) - D8-3	Below 1 Ω
S1-44 (HDCS) - Body ground	10 kΩ or higher
D8-4 - Body ground	Below 1 Ω

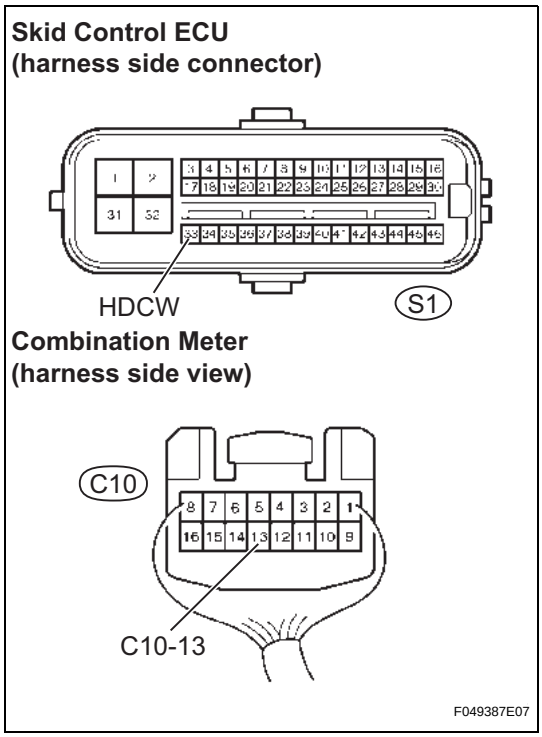
(d) Reconnect the DAC switch connector.
(e) Reconnect the skid control ECU connector.

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

OK

REPLACE MASTER CYLINDER SOLENOID

4 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

Tester Connection	Specified Condition
S1-33 (HDCW) - C10-13	Below 1 Ω
S1-33 (HDCW) - Body ground	10 kΩ or higher

(d) Reconnect the combination meter connector.
(e) Reconnect the skid control ECU connector.

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

OK

BC

5	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK ↓

CHECK FOR INTERMITTENT PROBLEMS

AUTO LSD Indicator Light Remains ON

DESCRIPTION

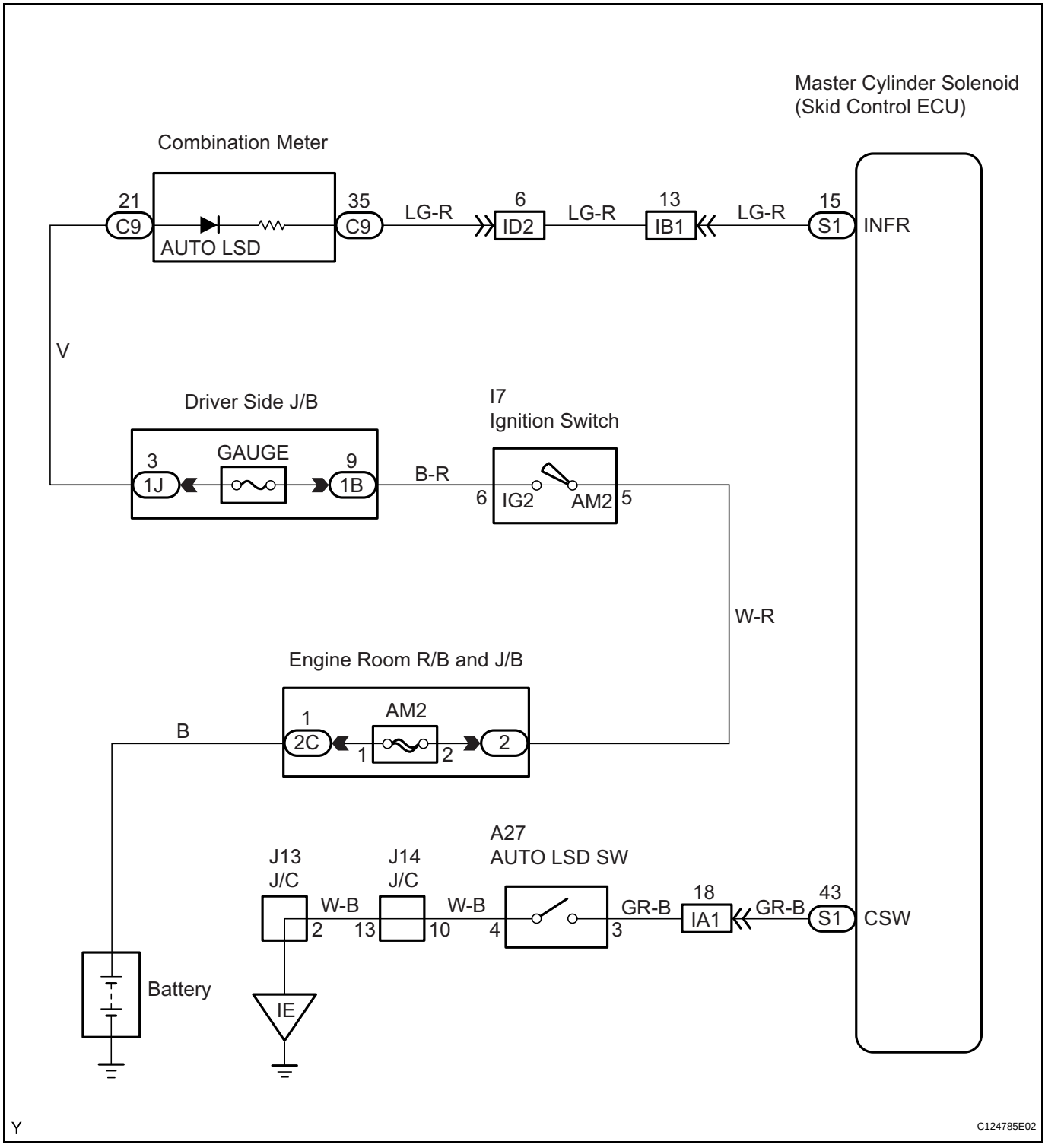
This is the AUTO LSD main switch. When the AUTO LSD switch is pushed on, the AUTO LSD function is available and the AUTO LSD indicator light illuminates.

HINT:

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

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

WIRING DIAGRAM



1	CHECK SKID CONTROL ECU CONNECTOR

(a) Check the ECU Connector's connecting condition.
OK:
The connector is securely connected.

NG	CONNECT CONNECTOR CORRECTLY

BC

OK

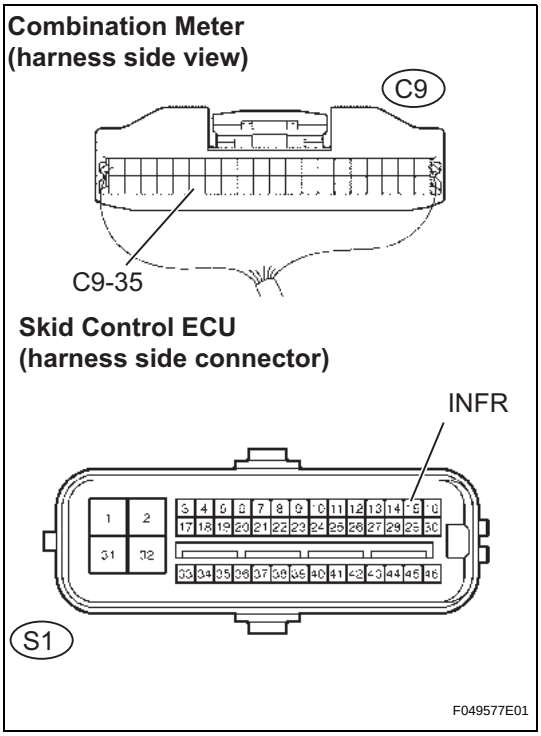
2	INSPECT BATTERY

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

NG → **INSPECT CHARGING SYSTEM**

OK

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

Tester Connection	Specified Condition
S1-15 (INFR) - C9-35	Below 1 Ω
S1-15 (INFR) - Body ground	10 kΩ or higher

(d) Reconnect the combination meter connector.
(e) Reconnect the skid control ECU connector.

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

OK

4	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).
OK:
Combination meter is normal.

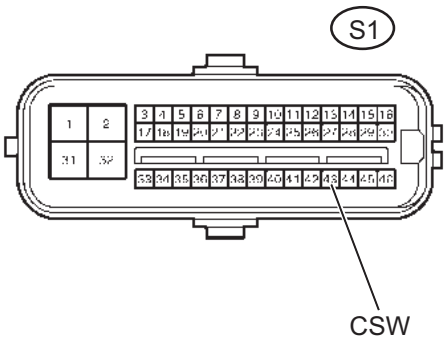
NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

BC

5 INSPECT SKID CONTROL ECU (CSW TERMINAL)

Skid Control ECU (harness side connector):



C121700E26

(a) Disconnect the skid control ECU connector.
(b) Ground terminal CSW of the skid control ECU.
Standard

Tester Connection	Condition	Specified Condition
S1-43 (CSW) - Body ground	AUTO LSD switch not pushed in	10 kΩ or higher

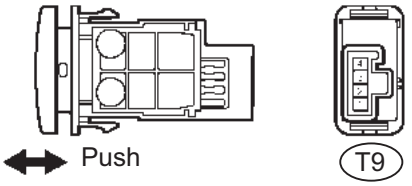
(c) Reconnect the skid control ECU connector.

OK → **REPLACE MASTER CYLINDER SOLENOID**

NG

6 INSPECT AUTO LSD SWITCH

AUTO LSD Switch:



I044044E01

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

Tester Connection	Switch Condition	Specified Condition
T9-3 - T9-4	Released	10 kΩ or higher
T9-3 - T9-4	Released	Below 1 Ω

(d) Reconnect the AUTO LSD switch connector.
(e) Reinstall the AUTO LSD switch.

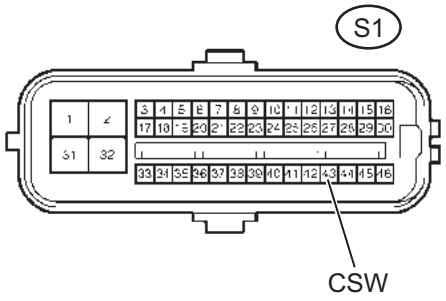
NG → **REPLACE AUTO LSD SWITCH**

OK

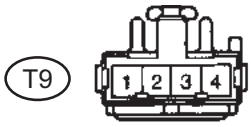
BC

7	CHECK HARNESS AND CONNECTOR (AUTO LSD SWITCH CIRCUIT)

Skid Control ECU (harness side connector):



AUTO LSD switch (harness side connector):



C124802E01

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

Standard

Tester Connection	Specified Condition
S1-43 (CSW) - T9-3	Below 1 Ω
S1-43 (CSW) - Body ground	10 kΩ or higher
T9-3 - Body ground	Below 1 Ω

(d) Reconnect the AUTO LSD connector.
(e) Reconnect the skid control ECU connector.

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

OK

BC **REPLACE MASTER CYLINDER SOLENOID**

AUTO LSD Indicator Light does not Come ON

DESCRIPTION

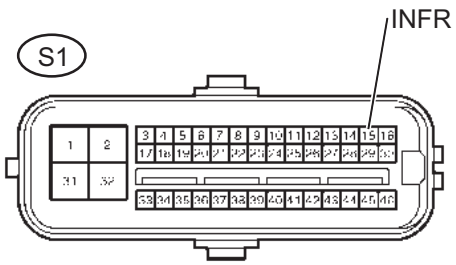
See page BC-278.

WIRING DIAGRAM

See page BC-279.

1	CHECK AUTO LSD INDICATOR LIGHT

Skid Control ECU
(harness side connector):



C121700E27

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

INFR - GND Condition	Illumination Condition
Connecting	OFF
Disconnecting	ON

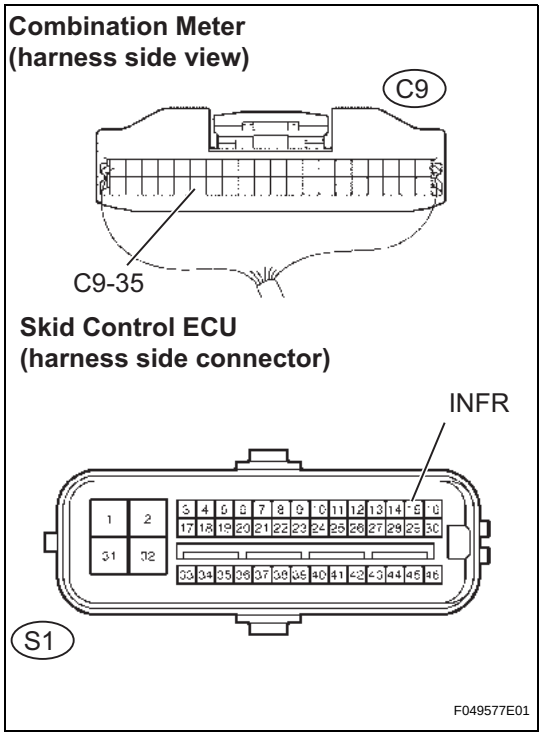
(e) Turn the ignition switch to OFF.
(f) Reconnect the skid control ECU connector.

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

Tester Connection	Specified Condition
S1-15 (INFR) - C9?35	Below 1 Ω
S1-15 (INFR) - Body ground	10 kΩ or higher

(d) Reconnect the combination meter connector.
(e) Reconnect the skid control ECU connector.

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

OK

BC

3	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (see page 05-1917).

OK:

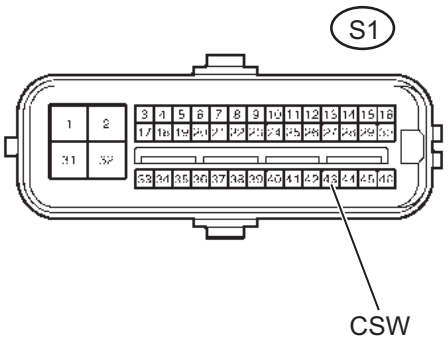
Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

4 INSPECT SKID CONTROL ECU (CSW TERMINAL)

Skid Control ECU (harness side connector):



C121700E26

(a) Disconnect the skid control ECU connector.
(b) Ground terminal CSW of the skid control ECU.
Standard

Tester connection	Condition	Specified Condition
S1-43 (CSW) - Body ground	Auto LSd switch not pushed in	10 kΩ or higher

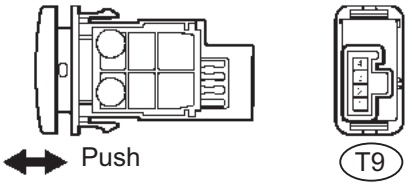
(c) Reconnect the skid control ECU connector.

OK → **REPLACE MASTER CYLINDER SOLENOID**

NG

5 INSPECT AUTO LSD SWITCH

AUTO LSD Switch:



I044044E01

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

Tester Connection	Switch Condition	Specified Condition
T9-3 - T9-4	Released	10 kΩ or higher
T9-3 - T9-4	Pushed in	Below 1 Ω

(d) Reconnect the AUTO LSD switch connector.
(e) Reinstall the AUTO LSD switch.

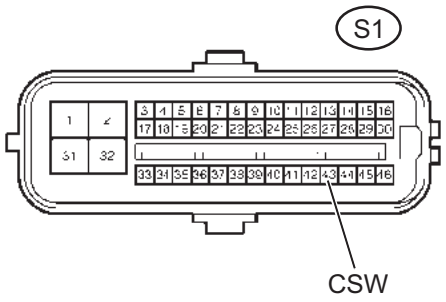
NG → **REPLACE AUTO LSD SWITCH**

OK

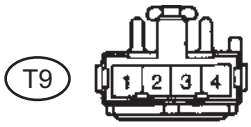
BC

6	CHECK HARNESS AND CONNECTOR (AUTO LSD SWITCH CIRCUIT)

Skid Control ECU (harness side connector):



AUTO LSD switch (harness side connector):



C124802E01

(a) Disconnect the skid control ECU connector and the AUTO LSD switch connector.

(b) Measure the resistance.

Standard

Tester Connection	Specified Condition
S1-43 (CSW) - T9-3	Below 1 Ω
S1-43 (CSW) - Body ground	10 kΩ or higher
T9-4 - Body ground	Below 1 Ω

(c) Reconnect the skid control ECU connector and the AUTO LSD switch connector.

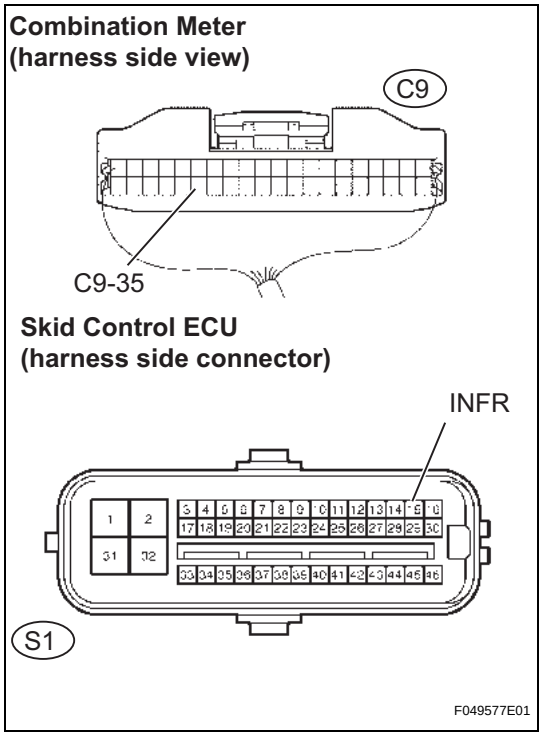
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

BC

REPLACE MASTER CYLINDER SOLENOID

7	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

Tester Connection	Specified Condition
S1-15 (INFR) - C9-35	Below 1 Ω
S1-15 (INFR) - Body ground	10 kΩ or higher

(d) Reconnect the combination meter connector.
(e) Reconnect the skid control ECU connector.

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

OK

8	INSPECT COMBINATION METER ASSEMBLY

(a) Check the combination meter system (See page ME-8).

OK:

Combination meter is normal.

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

CHECK FOR INTERMITTENT PROBLEMS

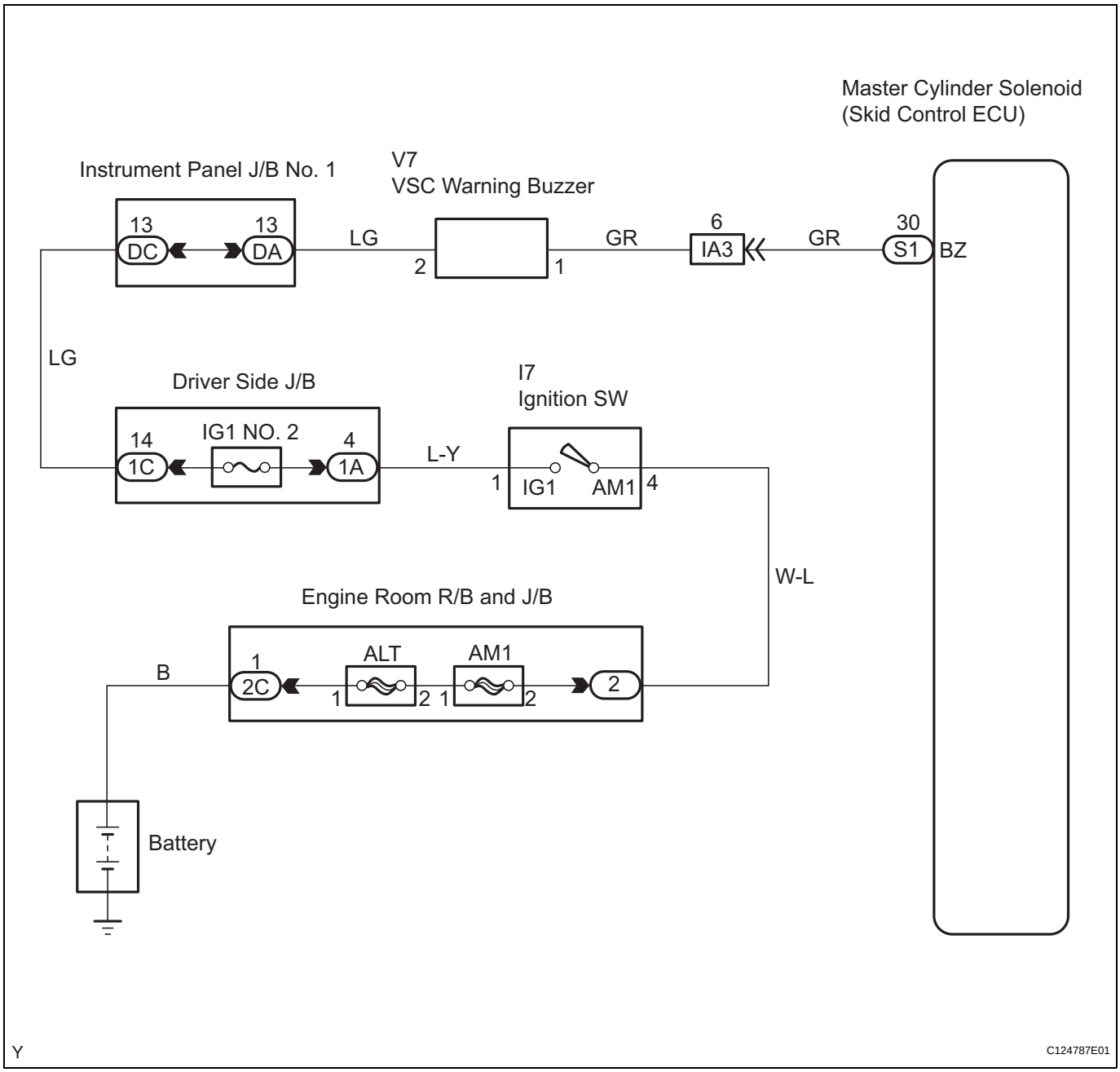
BC

Skid Control Buzzer Circuit

DESCRIPTION

The skid control buzzer sounds when the VSV or Hill-start Assist Control (HAC) operates.

WIRING DIAGRAM



HINT:
Start the inspection from step 1 when using a intelligent tester and start from step2 when not using a intelligent tester.

1	PERFORM ACTIVE TEST BY 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.

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

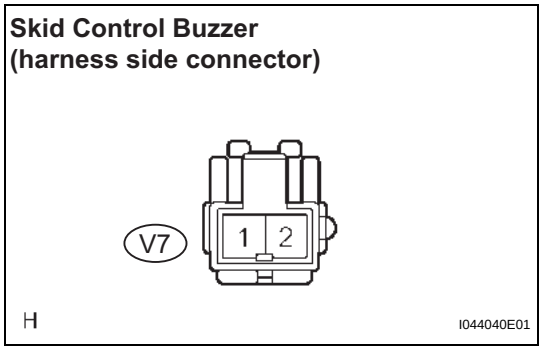
(d) Check that the buzzer sounds/stops when the skid control buzzer is turned on/off by using the intelligent tester.

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

A → **CHECK FOR INTERMITTENT PROBLEMS**

B

2 INSPECT SKID CONTROL BUZZER (POWER SOURCE CIRCUIT)



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

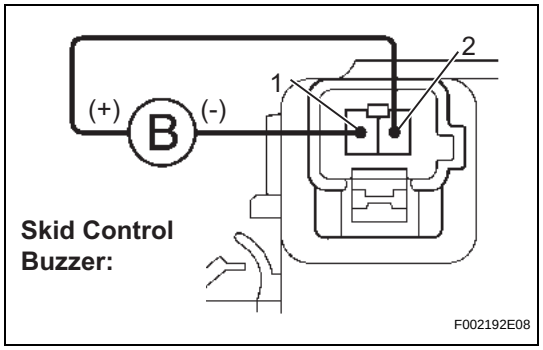
Tester Connection	Specified Condition
V7-2 - Body ground	10 to 14 V

(d) Turn the ignition switch to OFF.
(e) Reconnect the skid control buzzer connector.

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

OK

3 INSPECT SKID CONTROL BUZZER ASSEMBLY



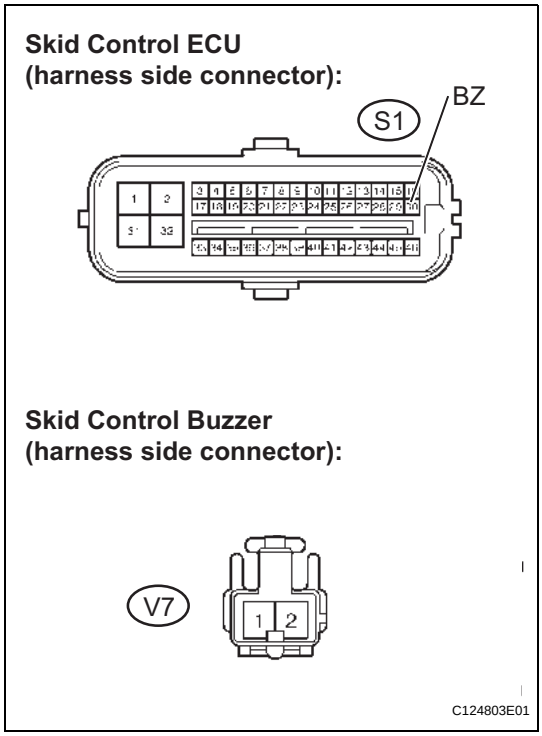
(a) Disconnect the skid control buzzer connector.
(b) Apply battery voltage to terminals 1 and 2 of the skid control buzzer connector, and check that the buzzer sounds.
OK:
The skid control buzzer sound should be heard.
(c) Reconnect the skid control buzzer connector.

NG → **REPLACE SKID CONTROL BUZZER ASSEMBLY**

OK

BC

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

Tester Connection	Specified Condition
S1-30 (BZ) - V7-1	Below 1 Ω
S1-30 (BZ) - Body ground	10 kΩ or higher

(d) Reconnect the skid control buzzer connector.
(e) Reconnect the skid control ECU connector.

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

OK

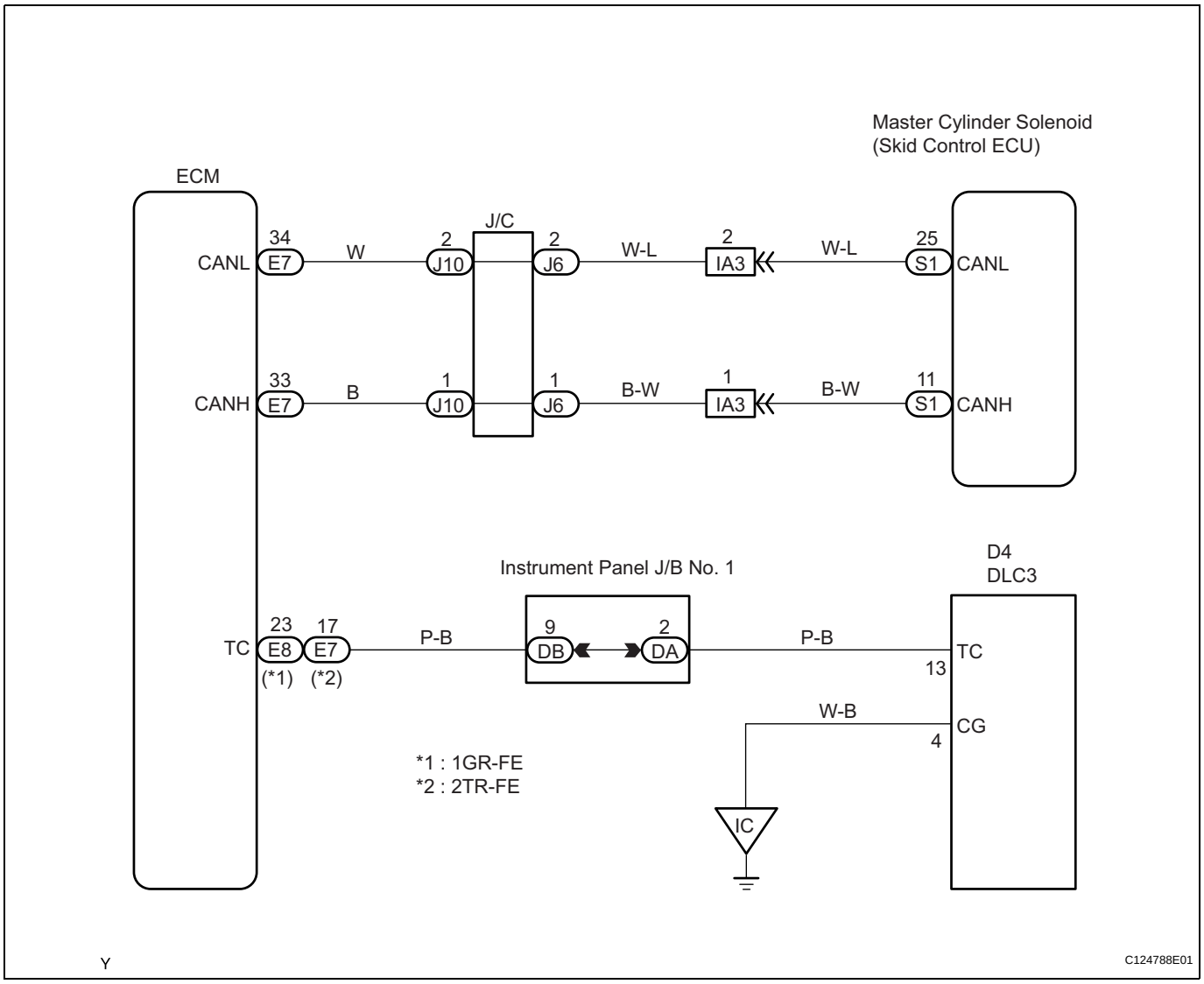
BC **REPLACE MASTER CYLINDER SOLENOID**

TC and CG Terminal Circuit

DESCRIPTION

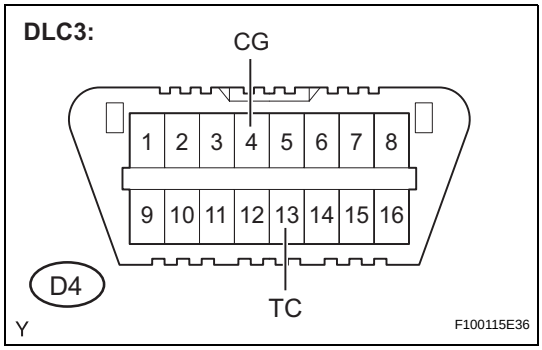
Connecting terminals TC and CG of the DLC3 causes the ECU to display 2-digit DTCs by blinking the ABS and VSC TRAC warning lights.

WIRING DIAGRAM



BC

1	INSPECT DLC3 (TC TERMINAL VOLTAGE)



(a) Turn the ignition switch to the ON position.
(b) Measure the voltage.
Standard

Tester Connection	Specified Condition
D4-13 (TC) - D4-4 (CG)	10 to 14 V

(c) Turn the ignition switch to OFF.

NG → **Go to step 3**

OK

2	CHECK CAN COMMUNICATION SYSTEM

(a) Check whether CAN system DTCs are recorded (See page CA-14).

Result	Proceed to
DTC not output	A
DTC output	B

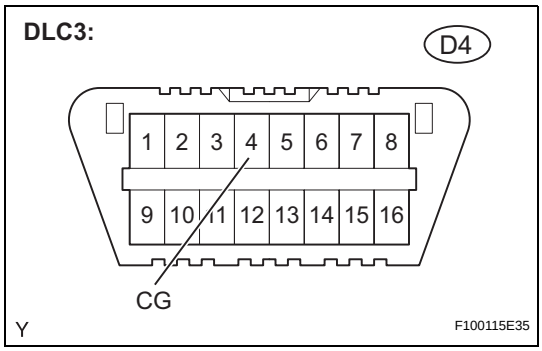
B → **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS**

BC

A

REPLACE MASTER CYLINDER SOLENOID

3	CHECK HARNESS AND CONNECTOR (DLC3 - BODY GROUND)



(a) Measure the resistance.
Standard

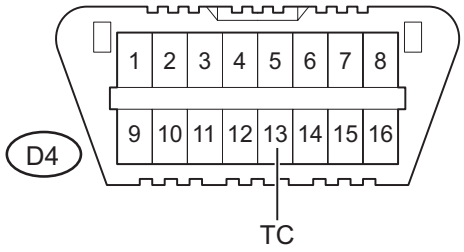
Tester Connection	Specified Condition
D4-4 (CG) - Body ground	Below 1 Ω

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

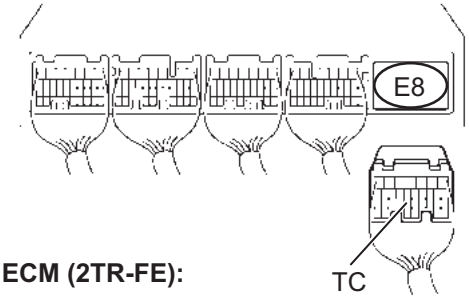
OK

4	CHECK HARNESS AND CONNECTOR (ECM - DLC3)

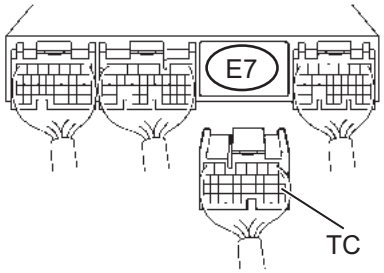
DLC3:



ECM (1GR-FE):



ECM (2TR-FE):



C124791E01

(a) Disconnect the ECM connector.
(b) Measure the resistance.
Standard (1GR-FE)

Tester Connection	Specified Condition
D4-13 (TC) - E8-23 (TC)	Below 1 Ω

Standard (2TR-FE)

Tester Connection	Specified Condition
D4-13 (TC) - E7-17 (TC)	Below 1 Ω

(c) Measure the resistance.
Standard

Tester Connection	Specified Condition
D4-13 (TC) - Body ground	10 kΩ or higher

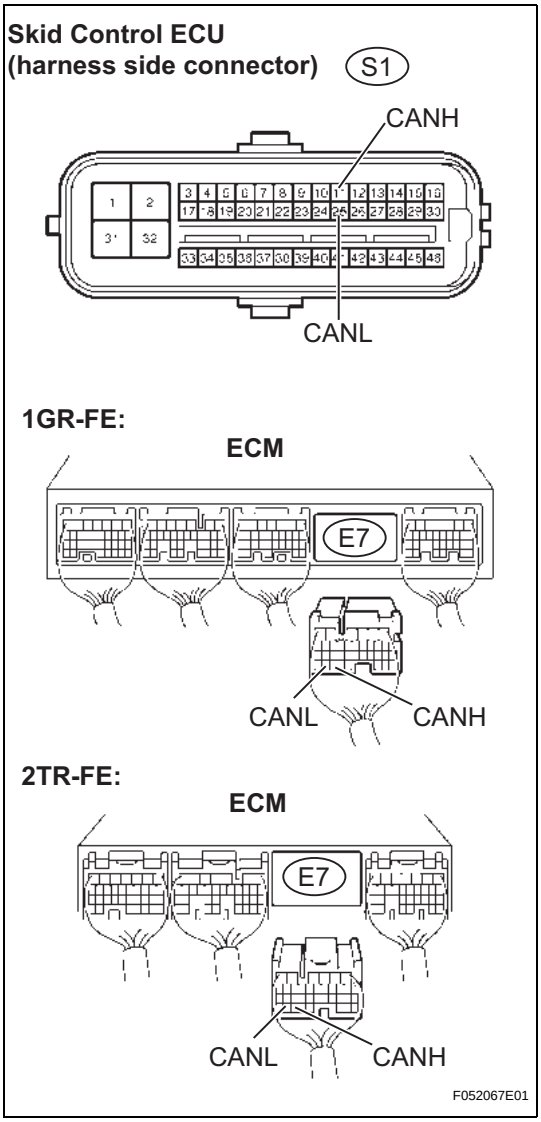
(d) Reconnect the ECM connector.

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

OK

BC

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



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

Standard

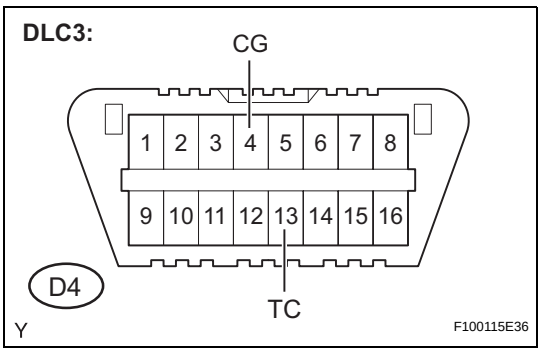
Tester Connection	Specified Condition
S1-25 (CANL) - E7-33 (CANL)	Below 1 Ω
S1-11 (CANH) - E7-34 (CANH)	Below 1 Ω

(d) Reconnect the ECM connector.
(e) Reconnect the skid control ECU connector.

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

OK

6 CHECK ECM (DLC3 (TC) INPUT)



(a) Connect terminals TC and CG of DLC3.
(b) Turn the ignition switch to the ON position.
(c) Check if the ECM warning light is blinking.

OK:

ECM warning light is blinking.

(d) Turn the ignition switch to OFF.
(e) Disconnect the TC and CG terminals of DLC3.

NG → **REPLACE ECM**

BC

OK

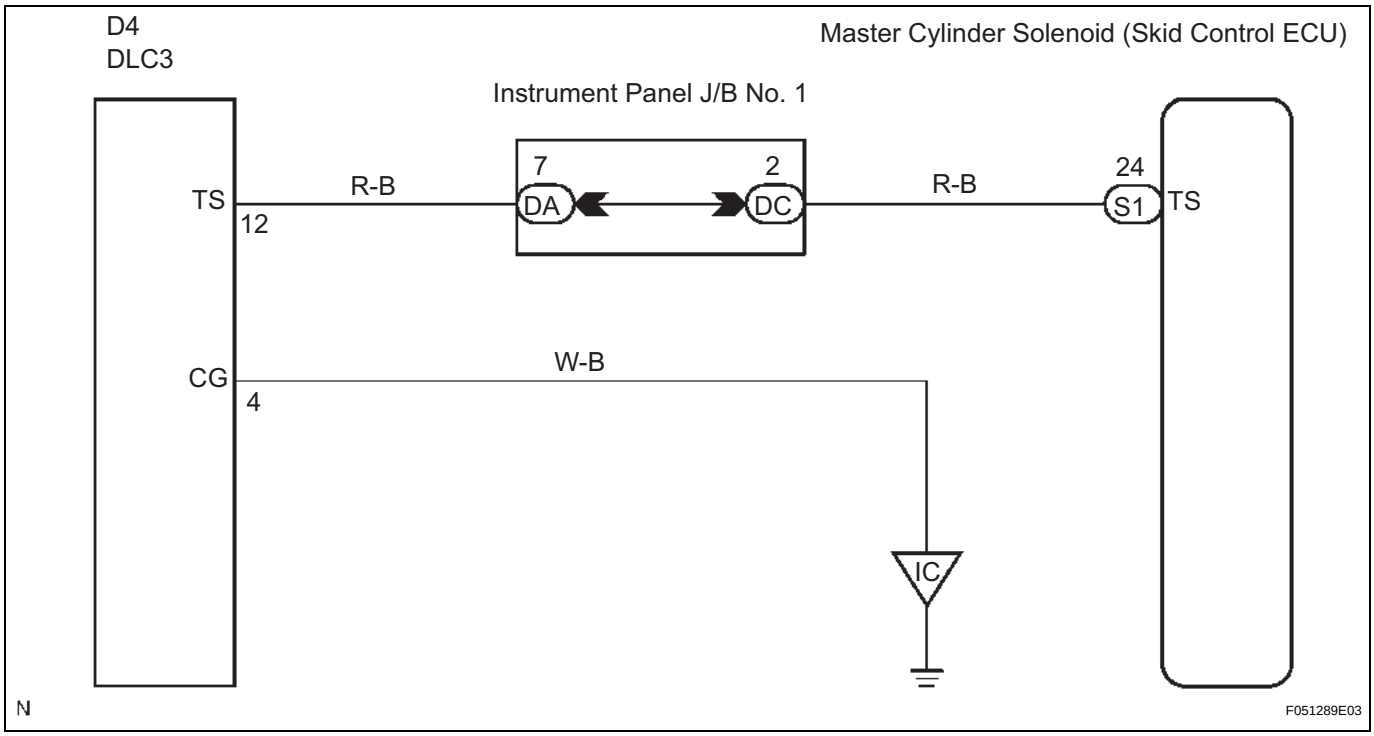
REPLACE MASTER CYLINDER SOLENOID

TS and CG Terminal Circuit

DESCRIPTION

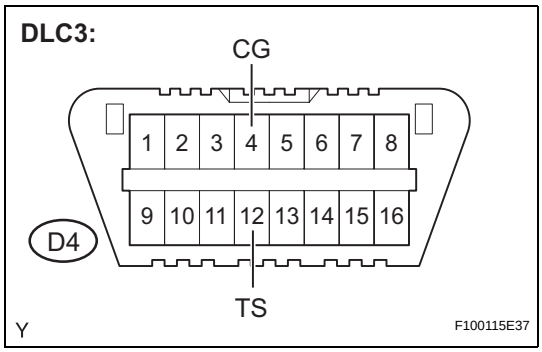
In sensor check mode, malfunctions of the speed sensor that cannot be detected when the vehicle is stopped are detected while driving.
Transition to the sensor check mode can be performed by connecting terminals TS and CG of the DLC3 and turning the ignition switch from OFF to the ON position.

WIRING DIAGRAM



BC

1	INSPECT DLC3 (TS TERMINAL VOLTAGE)



(a) Turn the ignition switch to the ON position.
(b) Measure the voltage.
Standard

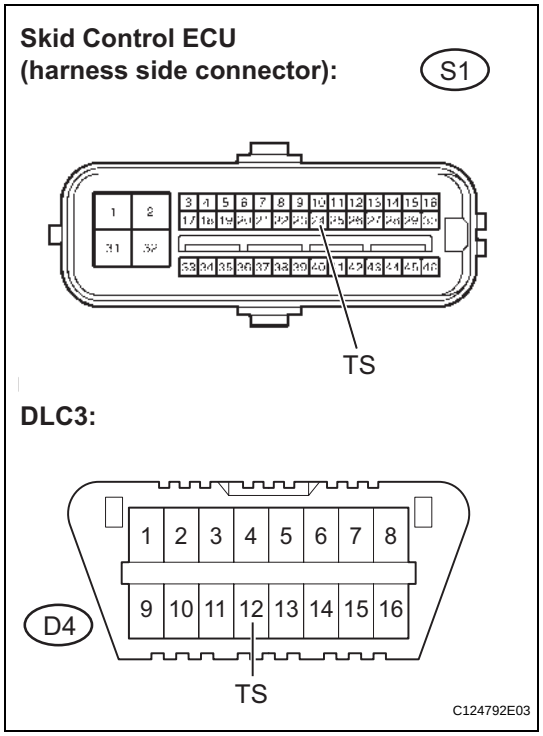
Tester Connection	Specified Condition
D4-12 (TS) - D4-4 (CG)	10 to 14 V

(c) Turn the ignition switch to OFF.

NG → **Go to step 3**

OK

2 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DLC3)



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

Tester Connection	Specified condition
S1-24 (TS) - D4-12 (TS)	Below 1 Ω

(c) Measure the resistance.
Standard

Tester Connection	Specified Condition
S1-24 (TS) - Body ground	10 kΩ or higher

(d) Reconnect the skid control ECU connector.

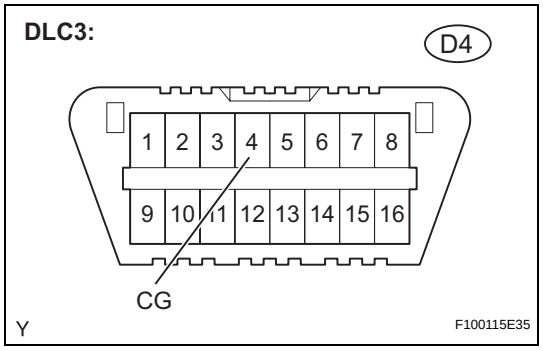
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASTER CYLINDER SOLENOID

BC

3 CHECK HARNESS AND CONNECTOR (BODY GROUND - DLC3)



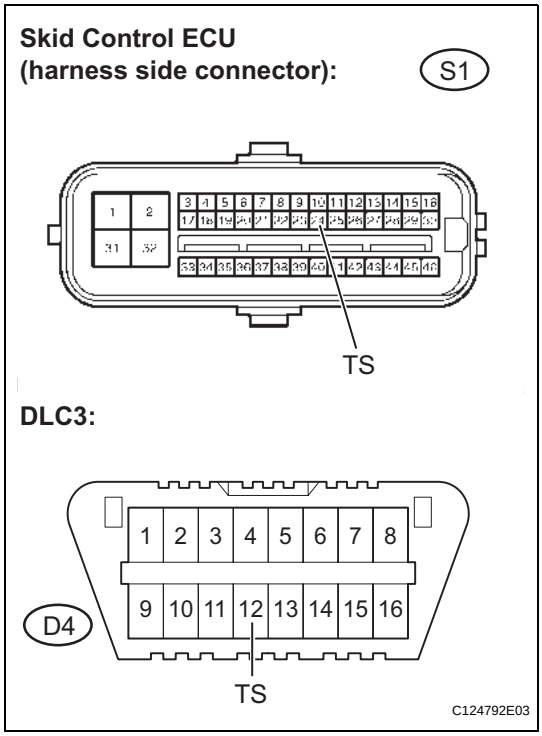
(a) Measure the resistance.
Standard

Tester Connection	Specified condition
D4 (CG) - Body ground	Below 1 Ω

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

OK

4	CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DLC3)



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

Tester Connection	Specified condition
S1-24 (TS) - D4-12 (TS)	Below 1 Ω

(c) Measure the resistance.
Standard

Tester Connection	Specified Condition
S1-24 (TS) - Body ground	10 kΩ or higher

(d) Reconnect the skid control ECU connector.

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

OK

BC

REPLACE MASTER CYLINDER SOLENOID

BRAKE ACTUATOR (w/o VSC)

ON-VEHICLE INSPECTION

1. CONNECT INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine and allow it to idle.
(c) Select ACTIVE TEST mode on the intelligent tester.
HINT:
Refer to the intelligent tester operator manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

(a) With the motor relay ON, check the actuator motor operation noise.
(b) Turn the motor relay OFF.
(c) Depress the brake pedal and hold it for about 15 seconds. Check that the brake pedal cannot be depressed.
(d) With the motor relay ON, check that the pedal does not pulsate.
NOTICE:
Do not keep the motor relay ON for more than 5 seconds continuously. When operating it continuously, allow intervals of more than 20 seconds.
(e) Turn the motor relay OFF and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

NOTICE:
Never turn ON any solenoids other than those described below.

(a) With the brake pedal depressed, perform the following operations.
(b) Turn SFRH and SFRR solenoids ON simultaneously, and check that the pedal cannot be depressed.
NOTICE:
Do not keep the solenoids ON for more than 2 seconds continuously. When operating them continuously, allow intervals of more than 20 seconds.
(c) Turn SFRH and SFRR solenoids OFF simultaneously, and check that the pedal can be depressed.
(d) Turn the motor relay ON, and check that the pedal returns.
NOTICE:
Do not keep the motor relay ON for more than 5 seconds continuously. When operating it continuously, allow intervals of more than 20 seconds.
(e) Turn the motor relay OFF and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

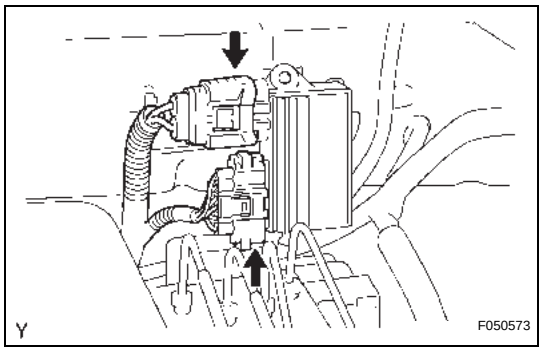
(a) Check the solenoids of the other wheels using the same procedures as above.
HINT:
Left front wheel: SFLH, SFLR
Right rear wheel: SRRH, SRRR
Left rear wheel: SRLH, SRLR

REMOVAL

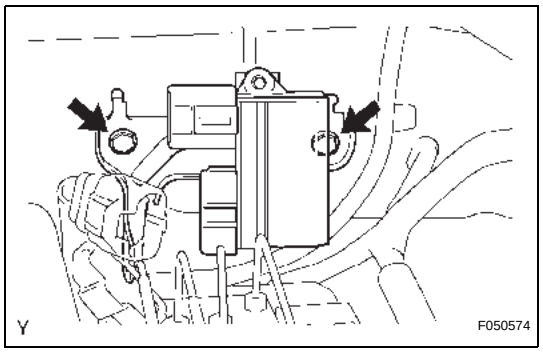
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

2. DRAIN BRAKE FLUID
NOTICE:
Immediately wash off any brake fluid that comes into contact with any painted surfaces.

3. REMOVE AIR INJECTION CONTROL DRIVER (for 2TR-FE)

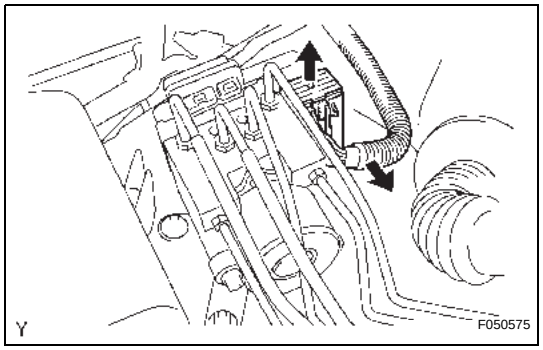


(a) Disconnect the 2 connectors.

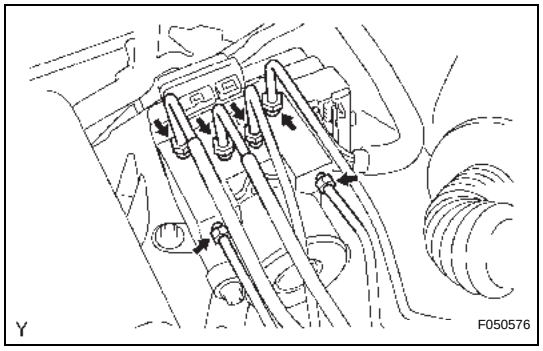


(b) Remove the 2 bolts and air injection control driver.

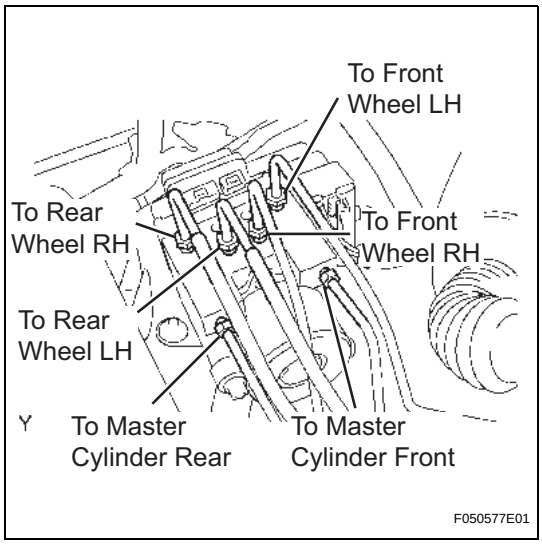
4. REMOVE BRAKE ACTUATOR



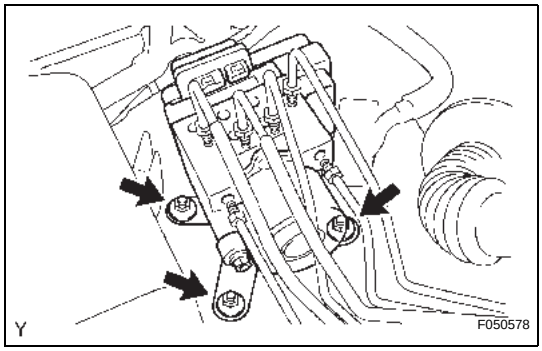
(a) Release the connector lock lever.
(b) Disconnect the brake actuator connector.



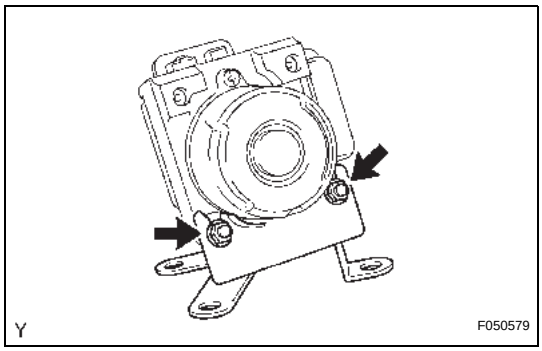
(c) Using SST, disconnect the brake tubes from the brake actuator.
SST 09023-00101



(d) Use tags or labels to identify the place to reconnect each line.



(e) Remove the 3 nuts and brake actuator with bracket.



5. REMOVE BRAKE ACTUATOR BRACKET ASSEMBLY

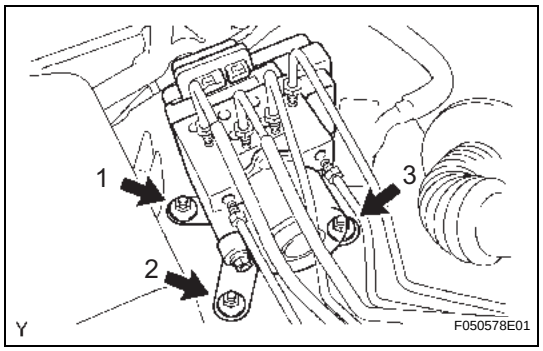
(a) Remove the 2 nuts and bracket.

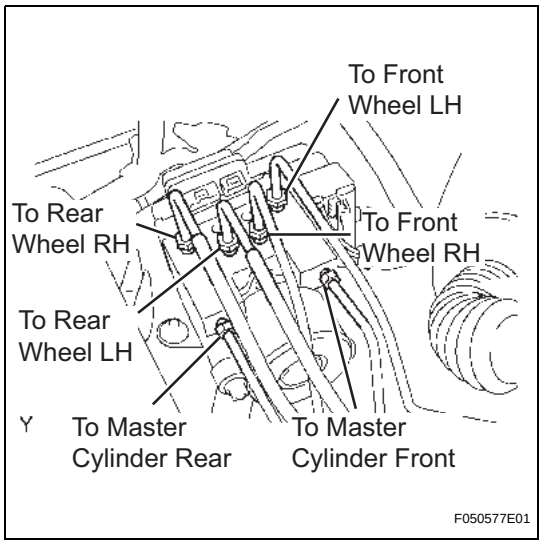
BC

INSTALLATION

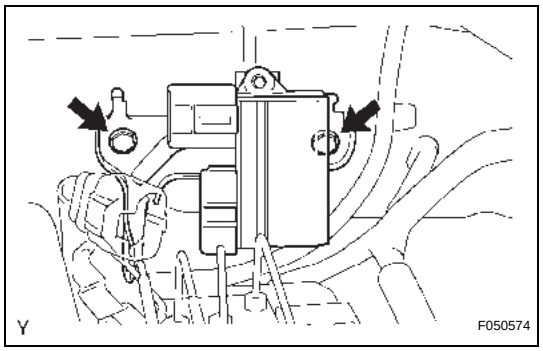
1. **INSTALL BRAKE ACTUATOR BRACKET ASSEMBLY**
   (a) Install the bracket with the 2 nuts.
   Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

2. **INSTALL BRAKE ACTUATOR**
   (a) Install the actuator with bracket with the 3 nuts.
   Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)
   NOTICE:
   - **Be careful not to damage the brake tubes and wire harness.**
   - **Tighten the bolts in order, from 1 to 3 as shown.**





   (b) Using SST, connect each brake line to the correct position of the brake actuator, as shown in the illustration.
   SST 09023-00101
   Torque: 15.2 N*m (155 kgf*cm, 11 ft.*lbf)
   (c) Connect the brake actuator connector.
   (d) Lock the connector lock lever.
   NOTICE:
   Make sure that the lever is locked securely.



3. **INSTALL AIR INJECTION CONTROL DRIVER (for 2TR-FE)**
   (a) Install the air injection control driver with the 2 bolts.
   Torque: 10 N*m (102 kgf*cm, 7 ft.*lbf)
   (b) Connect the 2 connectors.

4. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-7)**

5. **BLEED MASTER CYLINDER (See page BR-7)**

6. **BLEED BRAKE LINE (See page BR-7)**

7. **CHECK FLUID LEVEL IN RESERVOIR (See page BR-8)**

8. **CHECK FOR BRAKE FLUID LEAKAGE**

9. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
   Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)
   (See page IN-5)

10. **CHECK BRAKE ACTUATOR WITH INTELLIGENT TESTER**
    (See page BC-299)

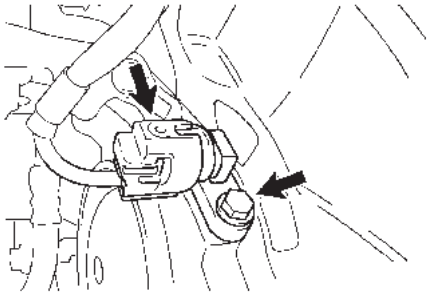
BC

FRONT SPEED SENSOR

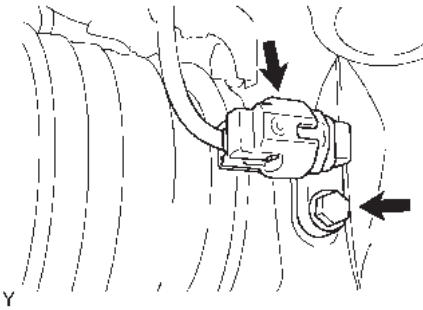
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE FRONT WHEEL**
3. **REMOVE FRONT SPEED SENSOR**
   (a) Disconnect the speed sensor connector.
   (b) Remove the bolt and front speed sensor.
   NOTICE:
   - **Do not attach any foreign matter to the sensor tip.**
   - **Ensure that no foreign matter enters the sensor installation part.**

for 2WD:



for 4WD and Pre-Runner:

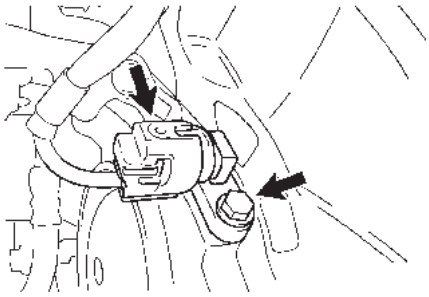


Y C114967E02

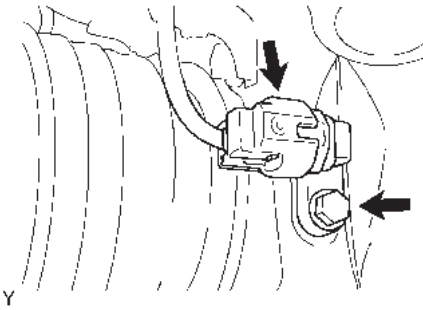
INSTALLATION

1. **INSTALL FRONT SPEED SENSOR**
   (a) 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 speed sensor connector.
2. **INSTALL FRONT WHEEL**
   Torque: 113 N*m (1,152 kgf*cm, 83 ft.*lbf)
3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
   Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)
   (See page IN-5)
4. **CHECK VSC SENSOR SIGNAL (w/ VSC)**
   (See page BC-103)
5. **CHECK ABS SENSOR SIGNAL (w/o VSC)**
   (See page BC-7)

for 2WD:



for 4WD and Pre-Runner:



Y C114967E02

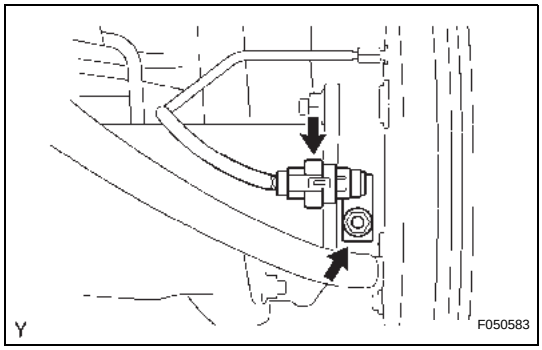
BC

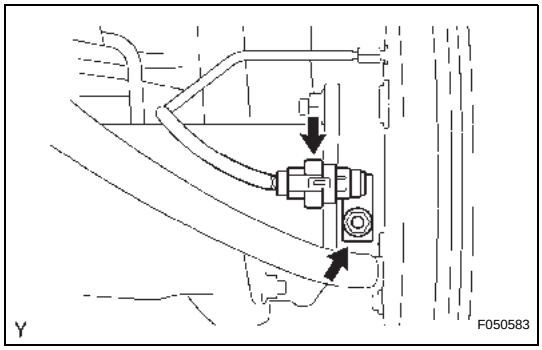
REAR SPEED SENSOR

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**

2. **REMOVE REAR SPEED SENSOR**
   (a) Disconnect the speed sensor connector.
   (b) Remove the nut and speed sensor rear.
   NOTICE:
   - **Do not attach any foreign matter to the sensor tip.**
   - **Ensure that no foreign matter enters the sensor installation hole.**





INSTALLATION

1. **INSTALL REAR SPEED SENSOR**
   (a) Install the rear speed sensor with the nut.
   Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
   NOTICE:
   Make sure that the sensor tip is clean.
   (b) Connect the speed sensor connector.

2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
   Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)
   (See page IN-5)

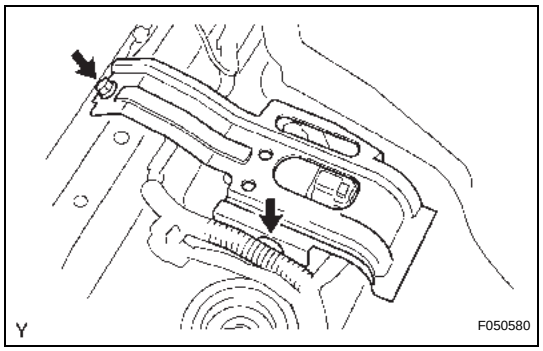
3. **CHECK VSC SENSOR SIGNAL (w/ VSC)**
   (See page BC-103)

4. **CHECK ABS SENSOR SIGNAL (w/o VSC)**
   (See page BC-7)

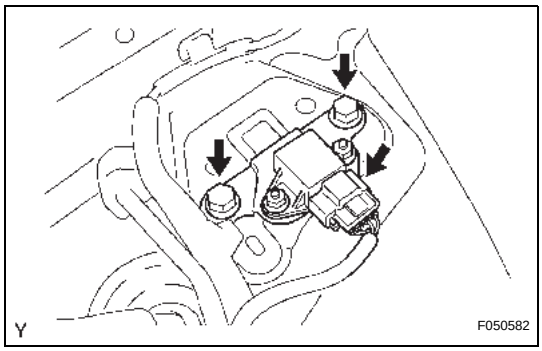
DECELERATION SENSOR (for 4WD and Pre-Runner without VSC)

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE FRONT SEAT INNER BELT ASSEMBLY LH (for Bench Seat Type) (See page SB-12)**
3. **REMOVE FRONT SEAT INNER BELT ASSEMBLY RH (for Bench Seat Type) (See page SB-12)**
4. **REMOVE FRONT SEAT HEADREST ASSEMBLY (for Bench Seat Type) (See page SE-53)**
5. **REMOVE FRONT SEAT ASSEMBLY (for Bench Seat Type) (See page SE-53)**
6. **REMOVE SEAT TRACK COVER (for Separate Seat Type) (See page SE-23)**
7. **REMOVE FRONT SEAT ASSEMBLY (for Separate Seat Type) (See page SE-23)**
8. **REMOVE FRONT FLOOR FOOTREST (See page IR-1)**
9. **REMOVE FRONT DOOR SCUFF PLATE (for Regular Cab) (See page IR-40)**
10. **REMOVE FRONT DOOR SCUFF PLATE (for Access Cab) (See page IR-40)**
11. **REMOVE FRONT DOOR SCUFF PLATE (for Double Cab) (See page IR-12)**
12. **REMOVE COWL SIDE TRIM BOARD (for Regular Cab) (See page IR-40)**
13. **REMOVE COWL SIDE TRIM BOARD (for Access Cab) (See page IR-40)**
14. **REMOVE COWL SIDE TRIM BOARD (for Double Cab) (See page IR-12)**
15. **REMOVE SENSOR BRACKET**
    (a) Turn up the floor carpet.
    (b) Remove the wire harness clamp.
    (c) Remove the bolt and bracket.



BC

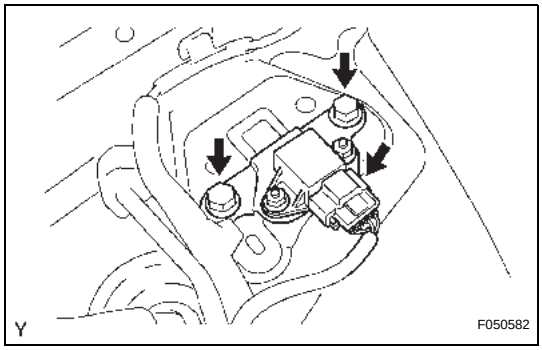


16. REMOVE DECELERATION SENSOR

(a) Disconnect the deceleration sensor connector.

(b) Remove the 2 bolts and deceleration sensor.

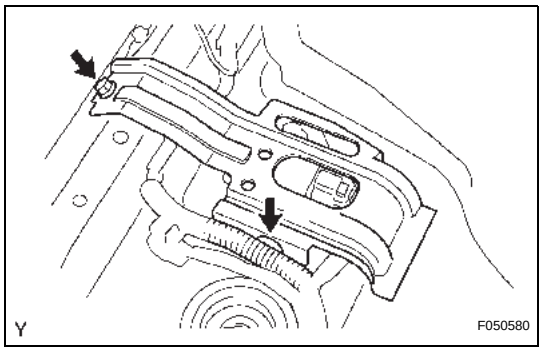
INSTALLATION



1. INSTALL DECELERATION SENSOR

(a) Install the deceleration sensor with the 2 bolts.
Torque: 12.5 N*m (127 kgf*cm, 9 ft.*lbf)
NOTICE:
Make sure the sensor is at the correct angle when installing.

(b) Connect the deceleration sensor connector.



2. INSTALL SENSOR BRACKET

(a) Install the bracket with the bolt.
Torque: 12.5 N*m (127 kgf*cm, 9 ft.*lbf)

(b) Install the wire harness clamp.

3. INSTALL COWL SIDE TRIM BOARD (for Regular Cab) (See page IR-52)

4. INSTALL COWL SIDE TRIM BOARD (for Access Cab) (See page IR-75)

5. INSTALL COWL SIDE TRIM BOARD (for Double Cab) (See page IR-29)

6. INSTALL FRONT DOOR SCUFF PLATE (for Regular Cab) (See page IR-52)

7. INSTALL FRONT DOOR SCUFF PLATE (for Access Cab) (See page IR-75)

8. INSTALL FRONT DOOR SCUFF PLATE (for Double Cab) (See page IR-29)

9. INSTALL FRONT FLOOR FOOTREST (See page IR-1)

10. INSTALL FRONT SEAT ASSEMBLY (for Bench Seat Type) (See page SE-67)

11. INSTALL FRONT SEAT HEADREST ASSEMBLY (for Bench Seat Type) (See page SE-68)

12. INSTALL FRONT SEAT INNER BELT ASSEMBLY LH (for Bench Seat Type) (See page SB-13)

13. INSTALL FRONT SEAT INNER BELT ASSEMBLY RH (for Bench Seat Type) (See page SB-14)

14. INSTALL FRONT SEAT ASSEMBLY (for Separate Seat Type) (See page SE-34)

15. **INSTALL SEAT TRACK COVER (for Separate Seat Type) (See page SE-34)**

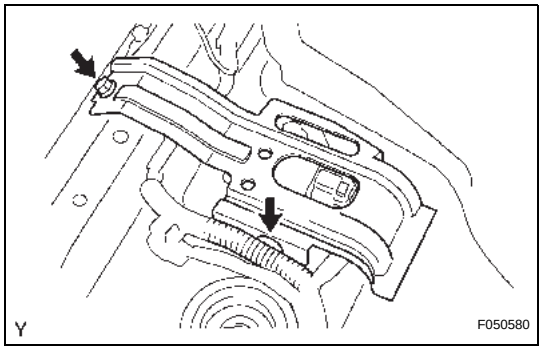
16. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)
(See page IN-5)

17. **CHECK ABS SENSOR SIGNAL**
(See page BC-7)

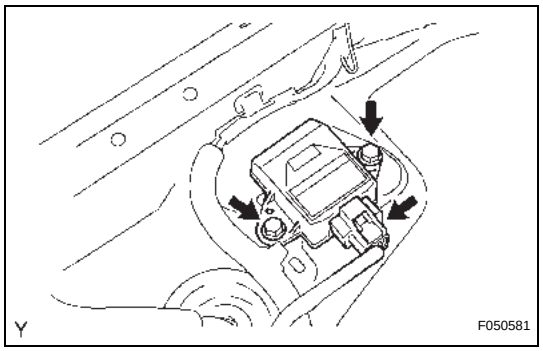
YAW RATE AND DECELERATION SENSOR (w/ VSC)

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE FRONT SEAT INNER BELT ASSEMBLY LH (for Bench Seat Type) (See page SB-12)**
3. **REMOVE FRONT SEAT INNER BELT ASSEMBLY RH (for Bench Seat Type) (See page SB-12)**
4. **REMOVE FRONT SEAT HEADREST ASSEMBLY (for Bench Seat Type) (See page SE-53)**
5. **REMOVE FRONT SEAT ASSEMBLY (for Bench Seat Type) (See page SE-53)**
6. **REMOVE SEAT TRACK COVER (for Separate Seat Type) (See page SE-23)**
7. **REMOVE FRONT SEAT ASSEMBLY (for Separate Seat Type) (See page SE-23)**
8. **REMOVE FRONT FLOOR FOOTREST (See page IR-1)**
9. **REMOVE FRONT DOOR SCUFF PLATE (for Regular Cab) (See page IR-40)**
10. **REMOVE FRONT DOOR SCUFF PLATE (for Access Cab) (See page IR-61)**
11. **REMOVE FRONT DOOR SCUFF PLATE (for Double Cab) (See page IR-12)**
12. **REMOVE COWL SIDE TRIM BOARD (for Regular Cab) (See page IR-40)**
13. **REMOVE COWL SIDE TRIM BOARD (for Access Cab) (See page IR-61)**
14. **REMOVE COWL SIDE TRIM BOARD (for Double Cab) (See page IR-12)**
15. **REMOVE SENSOR BRACKET**
    (a) Turn up the floor carpet.
    (b) Remove the wire harness clamp.
    (c) Remove the bolt and bracket.

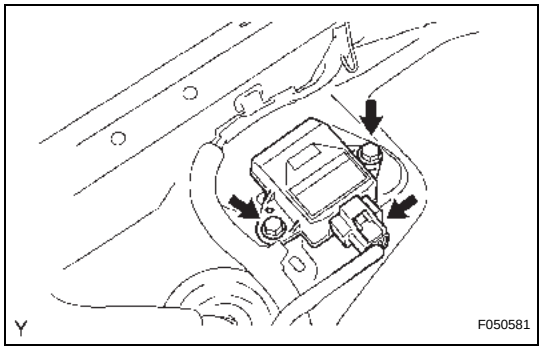


BC

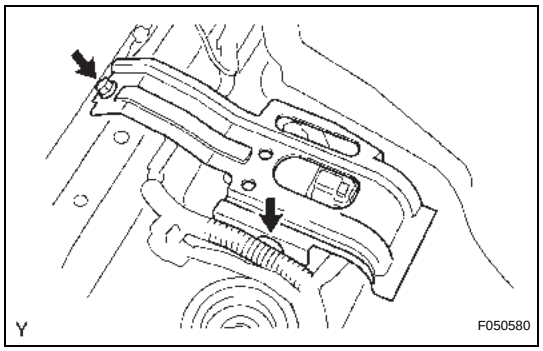


16. **REMOVE YAW RATE SENSOR**
    (a) Disconnect the yaw rate sensor connector.
    (b) Remove the 2 bolts and yaw rate sensor.

INSTALLATION



1. **INSTALL YAW RATE SENSOR**
    (a) Install the yaw rate sensor with the 2 bolts.
    Torque: 12.5 N*m (127 kgf*cm, 9 ft.*lbf)
    NOTICE:
    Make sure that the sensor is at the correct angle when installing.
    (b) Connect the yaw rate sensor connector.



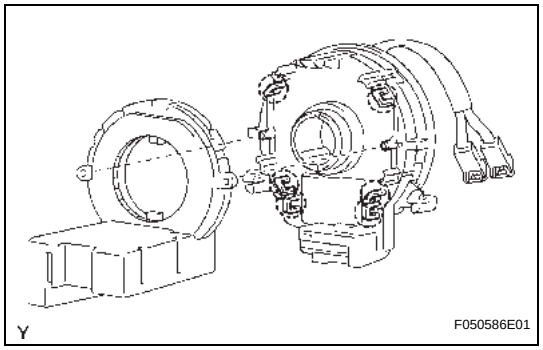
2. **INSTALL SENSOR BRACKET**
    (a) Install the bracket with the bolt.
    Torque: 12.5 N*m (127 kgf*cm, 9 ft.*lbf)
    (b) Install the wire harness clamp.
3. **INSTALL COWL SIDE TRIM BOARD (for Regular Cab) (See page IR-52)**
4. **INSTALL COWL SIDE TRIM BOARD (for Access Cab) (See page IR-75)**
5. **INSTALL COWL SIDE TRIM BOARD (for Double Cab) (See page IR-29)**
6. **INSTALL FRONT DOOR SCUFF PLATE (for Regular Cab) (See page IR-52)**
7. **INSTALL FRONT DOOR SCUFF PLATE (for Access Cab) (See page IR-75)**
8. **INSTALL FRONT DOOR SCUFF PLATE (for Double Cab) (See page IR-29)**
9. **INSTALL FRONT FLOOR FOOTREST (See page IR-1)**
10. **INSTALL FRONT SEAT ASSEMBLY (for Bench Seat Type) (See page SE-67)**
11. **INSTALL FRONT SEAT HEADREST ASSEMBLY (for Bench Seat Type) (See page SE-68)**
12. **INSTALL FRONT SEAT INNER BELT ASSEMBLY LH (for Bench Seat Type) (See page SB-13)**
13. **INSTALL FRONT SEAT INNER BELT ASSEMBLY RH (for Bench Seat Type) (See page SB-14)**
14. **INSTALL FRONT SEAT ASSEMBLY (for Separate Seat Type) (See page SE-34)**

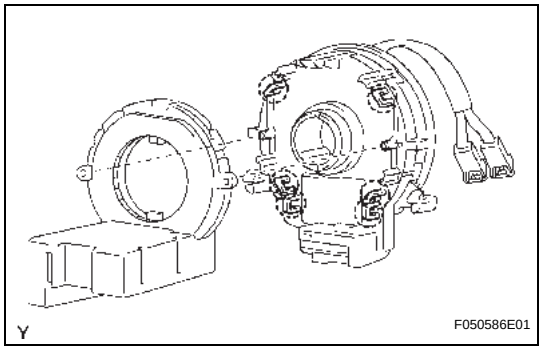
15. **INSTALL SEAT TRACK COVER (for Separate Seat Type) (See page SE-34)**
16. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
    Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)
    (See page IN-5)
17. **PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION**
    (See page BC-99)
18. **CHECK VSC SENSOR SIGNAL**
    (See page BC-103)

STEERING ANGLE SENSOR (w/ VSC)

REMOVAL

1. **PRECAUTION**
   (See page RS-1)
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   (a) Wait for at least 90 seconds after disconnecting the cable to prevent the airbag from working.
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
4. **REMOVE STEERING WHEEL COVER LOWER NO. 2 (See page SR-9)**
5. **REMOVE STEERING WHEEL COVER LOWER NO. 3 (See page SR-9)**
6. **REMOVE STEERING PAD ASSEMBLY (See page RS-558)**
7. **REMOVE STEERING WHEEL ASSEMBLY (See page SR-9)**
8. **REMOVE STEERING COLUMN COVER LOWER (See page RS-566)**
9. **REMOVE STEERING COLUMN COVER UPPER (See page RS-566)**
10. **REMOVE SPIRAL CABLE (See page RS-566)**
11. **REMOVE STEERING SENSOR**
    (a) Release 6 claw fittings and remove the steering sensor from the spiral cable.





INSTALLATION

1. **INSTALL STEERING SENSOR**
   (a) Install the steering sensor onto the spiral cable.
   NOTICE:
   - **Engage the claws securely.**
   - **Be careful not to damage the claws.**
2. **REMOVE PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
3. **INSTALL SPIRAL CABLE (See page RS-567)**
4. **CENTER SPIRAL CABLE (See page RS-567)**

BC

5. **INSTALL STEERING COLUMN COVER UPPER (See page RS-568)**
6. **INSTALL STEERING COLUMN COVER LOWER (See page RS-568)**
7. **INSTALL STEERING WHEEL ASSEMBLY (See page SR-18)**
8. **INSTALL STEERING PAD ASSEMBLY (See page RS-558)**
9. **INSTALL STEERING WHEEL COVER LOWER NO. 3 (See page SR-18)**
10. **INSTALL STEERING WHEEL COVER LOWER NO. 2 (See page SR-18)**
11. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
    Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)
    (See page IN-5)
12. **INSPECT STEERING PAD ASSEMBLY**
13. **INSPECT SRS WARNING LIGHT**
    (See page RS-28)