

ABS & TRC & VSC & BA SYSTEM WITH EBD

PRECAUTIONS

1. TROUBLESHOOTING PRECAUTION

- (a) When there is a malfunction in the contact point of the terminals or a problem with the installation of parts, removal or installation of the parts suspected to have a problem may return the system to the normal condition either completely or temporarily.
- (b) In order to determine which sections are malfunctioning, be sure to check the working conditions at the time the malfunction occurred, such as the DTC output, and write it down before disconnecting the connectors or removing and installing the parts.
- (c) Since the system may be influenced by a malfunction in a system other than the brake control system, be sure to check for DTCs in other systems.

2. HANDLING AND OPERATING PRECAUTIONS

- (a) Unless otherwise noted in the inspection method, always perform the removal and installation of the actuator and other sensors with the ignition switch OFF.
- (b) If the actuator and other sensors have been removed and installed, perform the test mode inspections, check for DTCs, and confirm that the normal code is output after installing all the removed parts.
- (c) Do not unnecessarily install or remove parts. Doing so, may the adjustment of VSC related parts.
- (d) When performing operations related to VSC, be sure to follow the instructions for work preparation in this manual and final confirmation of the VSC system.

3. FAIL-SAFE FUNCTION

- (a) If a malfunction occurs in the ABS, TRC, VSC, or BA system, each warning light (ABS, VSC, slip, brake) will come on, and ABS, TRC, VSC, and BA operation will be stopped.

HINT:

EBD control continues as much as possible even if the ABS control is prohibited. If EBD cannot be controlled, the warning light comes on.

4. PRECAUTIONS ON DTCs

- (a) For some of the DTCs, the warning may not be cancelled by repairing only the faulty areas.
- (b) To cancel the warning (light), clear the DTCs or perform the following procedures.

DIAGNOSTIC TROUBLE CODE	OPERATION PROCEDURE
C0273/13 C1235/25 C1236/26 C1238/27 C1239/28 C1245/31 C1251/51	1. Replace with new parts or repair 2. IG ON 3. Run the vehicle (at 20 km/h or higher for 30 seconds) → The warning light goes off.



DIAGNOSTIC TROUBLE CODE	OPERATION PROCEDURE
C1246/43	1. Replace with new parts or repair 2. Turn the ignition switch to the ON position, leave the vehicle stationary for at least 5 seconds, and operate the brake pedal 2 or 3 times 3. Strongly depress the brake pedal when the vehicle speed is 50 km/h or higher → The warning light goes off.

NOTICE:

- **As the system does not operate due to the fail-safe function while the warning is being output (light on), be careful when driving the vehicle and braking.**
- **The current DTC will be recorded again.**

5. PRECAUTIONS FOR USING CHASSIS DYNAMOMETER

- (a) When using the chassis dynamometer, be sure to push the differential lock switch and disable the TRC and VSC functions.

CAUTION:

The TRAC and VSC functions must be disabled because they may cause the vehicle to move unexpectedly out of the dynamometer.

- (b) When using the DS-II, use the TEST MODE to disable TRC and VSC.

(1) With the ignition switch off, connect the DS-II to the DLC.

(2) Turn the ignition switch to the ON position and turn the DS-II on. Following the prompts on the DS-II screen, enter the test mode.

NOTICE:

- **Check that the VSC warning light is blinking. (This indicates that the test mode is entered).**
- **Secure the vehicle with a lock chain for safety.**

- (c) After the operation is completed, enter the normal mode.

6. PRECAUTIONS FOR CAN COMMUNICATION

- (a) Can communication is adapted for data communication for the skid control computer (built into the actuator), steering sensor, yaw rate sensor (G sensor included), engine control computer, and transmission control computer. If any there are any problems with CAN communication line, DTCs indicating communication line errors will be output.
- (b) If a CAN communication DTC is output, repair the malfunction in the communication line and troubleshoot the VSC system while data communication is normal.
- (c) A specific type of wiring is used for the CAN communication lines. A bypass wire cannot be used for repairing CAN communication lines.

OPERATION CHECK**1. INITIAL CHECK OF BRAKE SYSTEM INDICATOR LIGHTS**

- (a) Turn the ignition switch to the ON position.
- (b) Check that the ABS, VSC, and brake warning lights, VSC OFF light, and slip indicator light come on and go off after approximately 3 seconds.

HINT:

If the lights do not come on, check for valve breakage or a DTC relating to the CAN communication system.

2. INSPECT BRAKE ACTUATOR OPERATION**(a) PREPARE FOR INSPECTION**

- (1) Turn the ignition switch off, connect the DS-II to the DLC, and start the engine.
- (2) Turn the DS-II on and select the following items:
DIAGNOSIS / VSC / ACTIVE TEST.

(b) INSPECTION ACTUATOR MOTOR START OPERATION**NOTICE:**

- **To protect the motor and solenoid, do not operate them for more than 5 seconds. If it is necessary to operate the motor and solenoid repeatedly, leave at least a 20 second interval between each operation.**
- **The operation time of the active test for each solenoid is approximately 2 seconds. The active test turns off automatically.**
- **Do not drive multiple solenoids concurrently.**

- (1) Depress the brake pedal and hold it in that position.
- (2) Turn on the left rear valve motor, and inspect the brake pedal.

Standard:

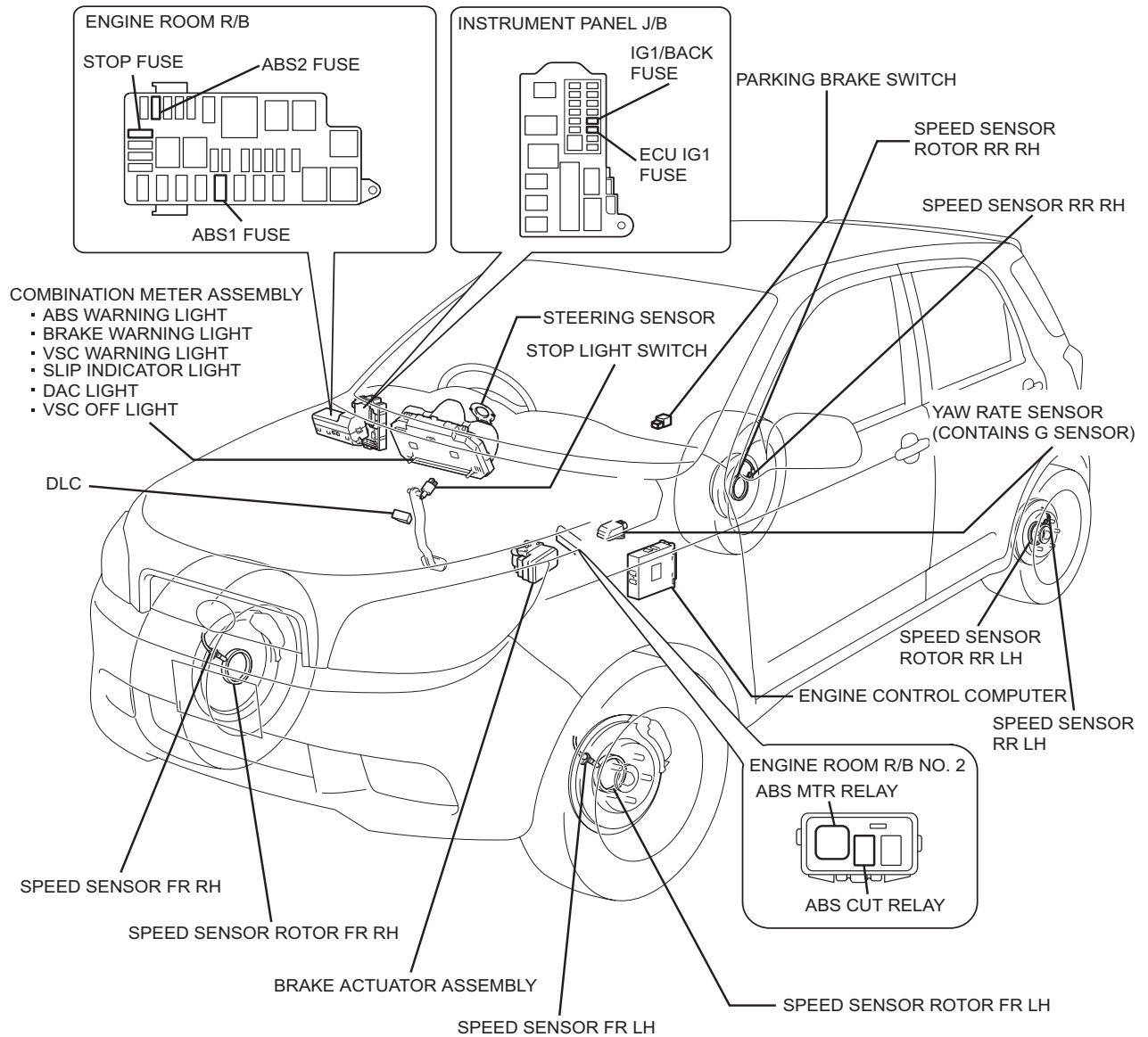
The pedal should return.

- (3) Inspect the other valve motors in the same manner.

HINT:

Rear right, front left and front right valve motors.

LOCATION



DIAGNOSTIC TROUBLE CODE CHART

ABS Diagnosis Codes

DTC No.	Diagnostic Item	Code Memory	See Page
C0200/21	OPEN OR SHORT CIRCUIT IN FR WHEEL	○	BC-76
C0205/22	OPEN OR SHORT CIRCUIT IN FL WHEEL	○	BC-76
C0210/23	OPEN OR SHORT CIRCUIT IN RR WHEEL	○	BC-76
C0215/24	OPEN OR SHORT CIRCUIT IN RL WHEEL	○	BC-76
C0226/52	OPEN OR SHORT CIRCUIT IN FR PRESSURE RETENTION AND REDUCTION SOLENOID	○	BC-81
C0236/54	OPEN OR SHORT CIRCUIT IN FL PRESSURE RETENTION AND REDUCTION SOLENOID	○	BC-81
C0246/56	OPEN OR SHORT CIRCUIT RR PRESSURE RETENTION AND REDUCTION SOLENOID	○	BC-81
C0256/58	OPEN OR SHORT CIRCUIT IN RL PRESSURE RETENTION AND REDUCTION SOLENOID	○	BC-81
C0273/13	MOTOR RELAY OPEN CIRCUIT	○	BC-83
C0274/14	MOTOR RELAY SHORT CIRCUIT	○	BC-83
C0278/11	SOLENOID RELAY OPEN CIRCUIT	○	BC-88
C0279/12	SOLENOID RELAY SHORT CIRCUIT	○	BC-88
C1235/25	FR WHEEL CYCLE ERROR	○	BC-99
C1236/26	FL WHEEL CYCLE ERROR	○	BC-99
C1238/27	RR WHEEL CYCLE ERROR	○	BC-99
C1239/28	RL WHEEL CYCLE ERROR	○	BC-99
C1241/15	LOW OR EXCESSIVE POWER SUPPLY VOLTAGE	○	BC-103
C1244/32	OPEN OR SHORT CIRCUIT IN FRONT AND REAR G SENSOR OR SIDE SENSOR	○	BC-105
C1245/31	FRONT AND REAR G SENSOR OR SENSOR SIGNAL ERROR	○	BC-105
C1249/39	STOP LIGHT SW ERROR	○	BC-109
C1251/51	PUMP MOTOR SYSTEM/ RESERVOIR SYSTEM	○	BC-112

VSC Diagnosis Codes

DTC No.	Diagnostic Item	Code Memory	See Page
C0371/35	YAW RATE SENSOR SIGNAL ERROR	○	BC-105
C1203/78	Identification signal error to EFI ECU	○	BC-91
C1207/73	Shift signal (reverse) error	○	BC-92
C1208/37	STEERING ANGLE SENSOR ERROR	○	BC-94
C1225/61	OPEN OR SHORT CIRCUIT IN MASTER CUT SOLENOID 1	○	BC-81

DTC No.	Diagnostic Item	Code Memory	See Page
C1231/19	Open or short circuit, or communication lost in steering angle sensor	○	BC-96
C1233/36	Open or short circuit in yaw rate sensor	○	BC-96
C1246/43	OPEN OR SHORT CIRCUIT IN MASTER FLUID PRESSURE SENSOR	○	BC-107
C1301/79	CAN communication error	○	BC-96
C1361/18	SHORT IN MOTOR FAIL-SAFE RELAY	○	BC-83
C1380/66	STOP LIGHT DRIVING RELAY SYSTEM MALFUNCTION	○	BC-114
C1381/38	YAW AND G SENSOR POWER SOURCE VOLTAGE MALFUNCTION	○	BC-118
U0100/49	EFI communication error	○	BC-96

PROBLEM SYMPTOMS TABLE

1. If a malfunction occurs even though the normal code is output, check each circuit for each problem symptom according to the following table.

NOTICE:

Turn the ignition switch off before removing and installing the actuator assemblies and sensors.

HINT:

See the flowchart in order to determine which parts to inspect.

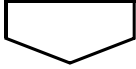
PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See Page
ABS WARNING LIGHT REMAINS ON	See the flow chart, ABS WARNING LIGHT REMAINS ON	BC-120
BRAKE WARNING LIGHT REMAINS ON	See the flow chart, BRAKE WARNING LIGHT REMAINS ON	BC-123
SLIP INDICATOR LIGHT SYSTEM	See the flow chart, SLIP INDICATOR LIGHT SYSTEM	BC-127
SKID CONTROL BUZZER (VSC BUZZER) DOES NOT SOUND	See the flow chart, SKID CONTROL BUZZER (VSC BUZZER) DOES NOT SOUND	BC-129
ABS ACTIVATION TIMING IS EARLY (ABS ACTIVATES BEFORE THE WHEELS LOCK)	See the flowchart, ABS ACTIVATION IS EARLY (ABS ACTIVATES BEFORE WHEELS LOCK)	BC-130
VSC DOES NOT OPERATE (DIFFICULT TO OPERATE)	See the flow chart, VSC DOES NOT OPERATE (DIFFICULT TO OPERATE)	BC-131
BRAKE PEDAL LOW (FLUID LEAKS OR AIR IN SYSTEM)	See the flow chart, BRAKE PEDAL IS LOW (FLUID LEAK OR AIR IN SYSTEM)	BC-133
VSC WARNING IS DISPLAYED BUT DTC IS NOT OUTPUT	See the flow chart, VSC WARNING DISPLAYED BUT NO DTC OUTPUT	BC-135
NOISE DURING INITIAL CHECK OF ACTUATOR TOO LOUD	See the flow chart, NOISE DURING INITIAL CHECK OF ACTUATOR TOO LOUD	BC-138

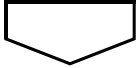
HOW TO PROCEED WITH TROUBLESHOOTING

1

VEHICLE BROUGHT TO WORKSHOP

**2**

CONDUCT CUSTOMER PROBLEM ANALYSIS AND CHECK SYMPTOMS

**3**

CHECK DIAGNOSTIC TROUBLE CODE (SEE PAGE BC-64)

- (a) CHECK AND RECORD DTCs
- (b) Delete the DTCs.
- (c) Recheck for DTCs.
- (1) Based on the DTCs recorded, reproduce the symptoms that caused the problem and recheck for the DTCs.

HINT:

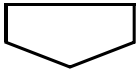
- When DTCs are output, see DIAGNOSTIC TROUBLE CODE CHART (BC-59).
- If a CAN communication DTC is output, troubleshoot and repair the CAN communication system first.
- If the skid control computer (built into the actuator) does not provide output via the DS-II or the ABS warning light, check the IG circuit of the actuator.



DTC IS OUTPUT (SEE DIAGNOSTIC TROUBLE CODE CHART [BC-59] AND TROUBLESHOOT BY DTCs, THEN GO TO STEP 7)



NORMAL CODE IS OUTPUT AND SYMPTOMS CANNOT BE CONFIRMED AND REPRODUCED (GO TO MALFUNCTION REPRODUCTION)

**BC**

NORMAL CODE IS OUTPUT AND SYMPTOMS CAN BE CONFIRMED AND REPRODUCED (GO TO STEP 4)

4

SEE PROBLEM SYMPTOMS TABLE (SEE PAGE BC-60)

A	Symptom is not listed in problem symptoms table
B	Symptom is listed in problem symptoms table

B**TROUBLESHOOT ACCORDING TO
PROBLEM SYMPTOM TABLE AND GO TO
STEP 7****A****5****PERFORM TROUBLESHOOTING BASED ON PROBLEM SYMPTOM**

- (a) DATA LIST (See page BC-72)
- (b) Active test (See page BC-72)
- (c) Actuator operation check (See page BC-56)

6**ADJUST, REPAIR OR REPLACE****7****CONFIRMATION TEST****END**

CUSTOMER PROBLEM ANALYSIS CHECK

Customer's Name		License Plate No.
		Registration Year
		VIN
Date Vehicle Brought In		Odometer Reading km
Customer Comments		
Date Problem First Occurred		
Frequency Problem Occurs	Constant Occasional (__ times per day)	
IG per day	__ times	
Weather	Clear Cloudy Rainy Snowy Others	
Temperature	Approximately	
Road Conditions		
Symptoms	ABS does not operate	
	VSC does not operate (vehicle slides during sharp turning)	
	TRC does not operate (Wheels spin during sudden start off)	
	Others:	
	ABS warning light condition	On Off
	Brake fluid within standard level PKB released	On Off
	VSC warning light condition	Displays Does not display
	Slip indicator light condition	Displays Does not display
	Abnormal actuator sounds	During initial check Other than when performing initial check (Time speed km/h) Type of sound () example: squeeking sounds

C100542

Check for DTCs.

ABS and VSC System	Output Code
1st time	
2nd time	
times	
DTCs other than those related to the ABS and VSC systems	

CHECK / CLEAR DTCs

1. CHECK FOR OUTPUT DTCs

(a) Read the DTCs using the DS-II.

- (1) Turn the ignition switch off and connect the DS-II to the DLC.
- (2) Turn the ignition switch to the ON position and read the DTCs by following the prompts on the DS-II screen.

NOTICE:

If any errors are found, clear the DTCs after repair.

(b) Read the DTCs using the warning light.

- (1) Turn the ignition switch off.
- (2) Open the circuit between terminals 13 (ECUT) and 4 (E) of the DLC.

NOTICE:

- Do not connect the SST to the wrong terminals. Doing so may cause malfunctions.
- Perform this procedure when the vehicle is stopped.

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

(4) Read the DTCs by counting the number of times that the ABS warning light blinks.

HINT:

- If the system is normal, the warning lights blink steadily in the following pattern: on for 0.25 seconds and off for 0.25 seconds.
- When there is only one DTC, the code will be indicated in 4 second intervals. When there are 2 or more DTCs, the different codes will be displayed in series at an interval of 2.5 seconds. When all the codes have been displayed, the series will return to the beginning and, after a four second pause, the codes will be output again.
- Multiple codes are output from lowest to highest code number.

(5) Open the circuit between terminals 13 (ECUT) and 4 (E) of the DLC.

NOTICE:

If any errors are found, clear the DTCs after repair.

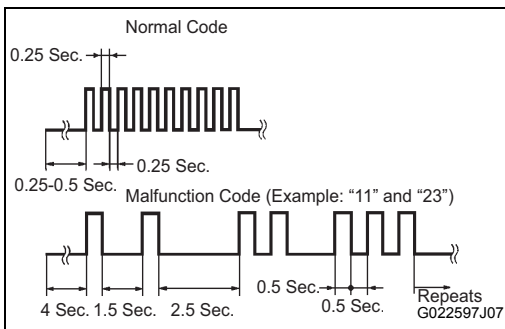
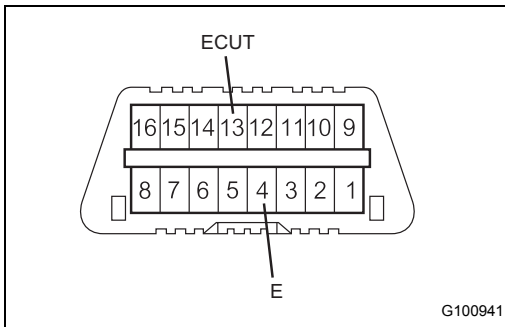
2. DELETE THE DTCs.

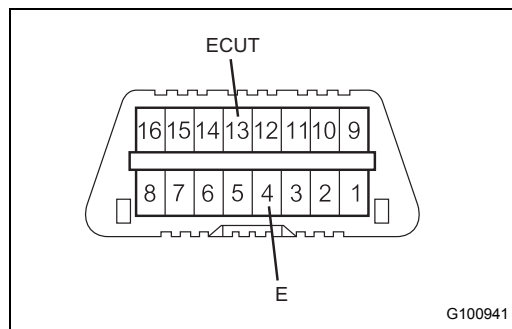
(a) DELETING DIAGNOSTIC TROUBLE CODES (DS-II)

- (1) Turn the ignition switch off and connect the DS-II to the DLC.
- (2) Turn the ignition switch to ON position and clear the DTC by following the prompts on the DS-II screen.

HINT:

When clearing the DTCs, the system will automatically enter the test mode and the ABS and VSC warning lights will blink. In this case, continue the test mode function, and check that none of the sensors is malfunctioning.





- (b) Procedure for clearing DTCs (by shorting the DLC terminals)
- (1) Turn the ignition switch off.
 - (2) Open the circuit between terminals 13 (ECUT) and 4 (E) of the DLC.

NOTICE:

Do not connect the SST to the wrong terminals. Doing so may cause malfunctions.

- (3) Turn the ignition switch to the ON position, and depress the brake pedal 8 times or more within 5 seconds.
- (4) Check that the normal code is output.

HINT:

If the malfunction is still present, the DTCs will be stored again. The ABS warning light will turn off for 4 seconds and then output the DTCs and the test mode codes.

- (5) Open the circuit between terminals 13 (ECUT) and 4 (E) of the DLC.

HINT:

If there is no malfunction when the circuit is opened between terminals 13 (ECUT) and 4 (E) of the DLC, the ABS and VSC warning lights will blink (in the test mode). Release the short circuit, turn the ignition switch from off to the ON position, and drive the vehicle in order to check each sensor.

TEST MODE

1. TEST MODE INSPECTION

HINT:

- In the test mode, the VSC does not operate regardless of the results of the sensor check.
- If the ignition switch is turned off during the test mode, the items that have been completed are recorded as complete items.
- If a failure is detected during the test mode, the fail-safe functions will operate as usual.

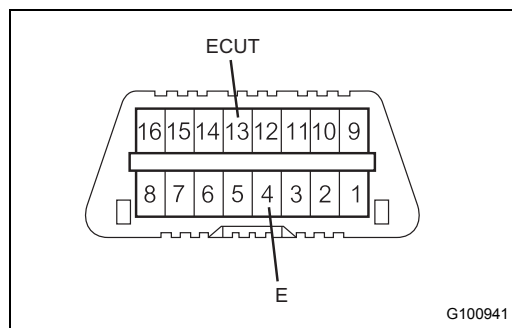
- (a) Procedure for entering test mode (DS-II)
- (1) Turn the ignition switch off and connect the DS-II to the DLC.
 - (2) For A/T vehicles, change the shift lever to the P range. For M/T vehicles, pull the parking brake lever.
 - (3) Turn the ignition switch to the ON position, and following the prompts on the DS-II, enter the test mode.

- (b) Procedure for entering the test mode (by shorting the DLC terminals)

HINT:

When clearing the memory using the stop light switch, the system will automatically enter the test mode, and the ABS and VSC warning lights will blink. In this case, continue the test mode function, and check that each sensor has no malfunctions.

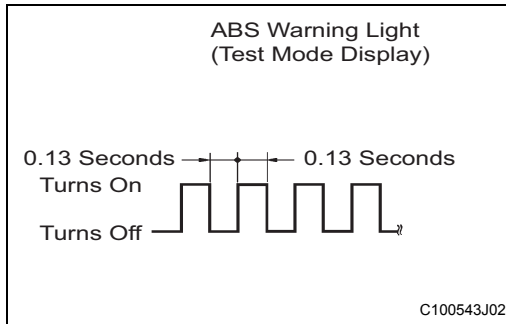
- (1) After clearing the memory using the stop light switch, turn the ignition switch to the ON position with the circuit open between terminals 13 (ECUT) and 4 (E) of the DLC. Then



check that the ABS and VSC warning lights blink in the test mode.

NOTICE:

If the ABS and VSC warning lights remain on, check for DTCs, as this may indicate that there are system errors.



- (c) Check the test mode display
- (1) Check that the test mode is entered by confirming that the ABS warning light comes on for several seconds and starts blinking.

Conditions for Continuing Test Mode Codes

DLC	IG ON	IG OFF	Ignition switch OFF → ON
Short circuit between terminals ECUT and E	Memory is retained	Memory is retained	Memory is retained
Open circuit between terminals ECUT and E	Memory is retained	Memory is retained	Memory is cleared

- (d) Check the R signal (M/T vehicles)
- (1) Turn the ignition switch to the ON position.
- (2) Check for the R signal when moving the shift lever from N to R and then back to N.
- (e) ACTIVATE SENSOR ZERO POINT ACQUISITION MODE
- (1) Stop the vehicle on a level surface.
- (2) Turn the ignition switch to the ON position, and press the TRC OFF switch to activate the sensor zero point acquisition mode.
- HINT:
- The slip indicator turns on and a buzzer will sound at the same time.
- (f) ACQUIRE ZERO POINT OF YAW RATE SENSOR AND G SENSOR AND MASTER CYLINDER PRESSURE SENSOR
- (1) Leave the vehicle stationary and release the brake pedal for 1 second or more.
- HINT:
- When the zero point of the master cylinder pressure sensor is successfully acquired, only the buzzer will turn off.
- (g) Check the master cylinder pressure sensor.
- (1) Depress the brake pedal with a fluid pressure of 1 MPa or more.
- HINT:
- When the master cylinder pressure sensor output check is complete, a buzzer will sound for 1 second.
- (h) END SENSOR ZERO POINT ACQUISITION MODE
- (1) When the zero point of each sensor is acquired, the zero point acquisition mode ends and the slip indicator turns off.
- HINT:
- If wheel speed is detected, the acquire zero point mode will be canceled and the slip indicator light will go out.

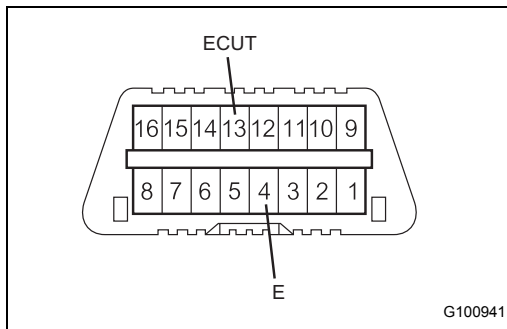
- If the TRC OFF switch is handled during the acquire zero point mode the slip indicator light will go out and the acquire zero point mode will be cancelled. (Turning OFF the ignition switch (IG) will cancel the acquire zero point mode as well)
 - Pressing the TRC OFF switch again will restart the acquire zero point mode. However, the zero point acquisition mode will not be performed for the items which have been completed.
 - If malfunction items are detected, the acquire zero point mode is terminated due to handling of the TRC OFF switch, and the applicable items cannot be reexamined without restarting the acquire zero point mode.
- (i) Check the DAC switch and stop the light relay (A/T vehicles)
 - (1) Turn the ignition switch to the ON position.
 - (2) With the brake pedal released, turn the DAC switch on.
 - (3) Check that the stop light relay is turned on and the DAC indicator blinks.
 - (4) Turn the DAC switch off.
 - (j) Check the differential lock switch.
 - (1) Turn the ignition switch to the ON position.
 - (2) Turn the differential lock switch on and check that the slip indicator and VSC OFF indicator are illuminated.
 - (3) Turn the differential lock switch off.
 - (k) Check yaw rate sensor runout
 - (1) Turn left or right at a low speed.

NOTICE:

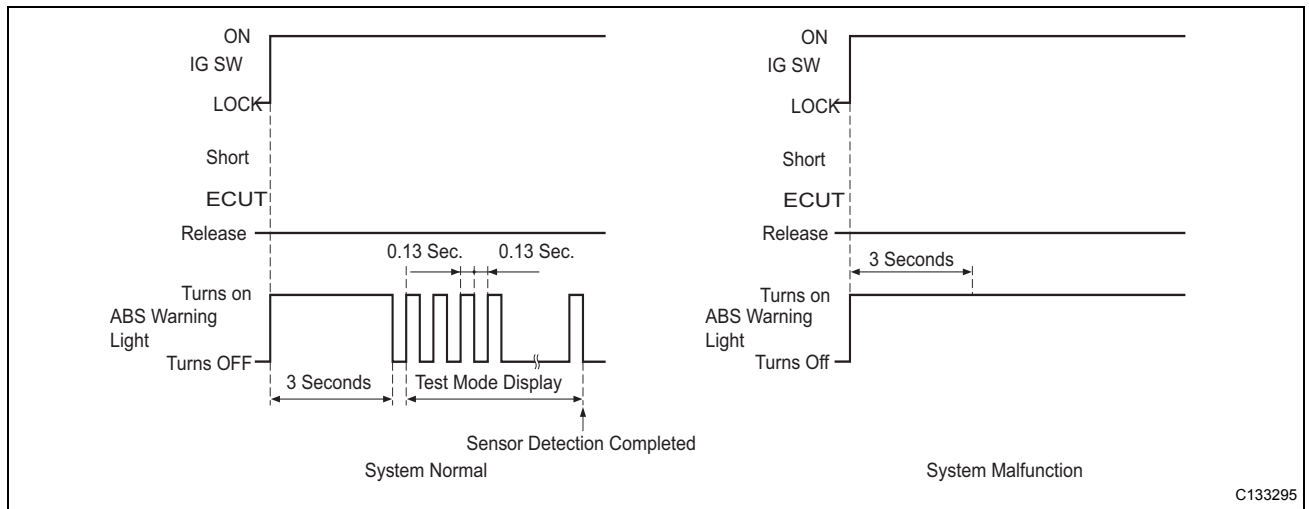
Do not move the shift lever to the P position when turning. In addition, do not turn the ignition switch off.
 - (l) Check the speed sensor.
 - (1) With the steering wheel centered, startoff without allowing the wheels to spin, accelerate the vehicle to at least 20 km/h, and check that the warning light goes off.
 - (m) End the sensor check.
 - (1) When every inspection item produces a normal result, the test mode DTCs will automatically be cleared and the ABS and VSC warning lights will go off.

NOTICE:

If the vehicle does not run or the test mode inspection conditions are not met, the stored DTCs will not be cleared and the ABS warning light will continue to blink in the test mode.
 - (n) Read the test mode DTCs (using the DS-II).
 - (1) In the test mode, follow the prompts on the DS-II screen in order to read the test mode DTCs.



- (o) Read the test mode DTCs (by shorting the DLC terminals).
- (1) Count the number of times that the ABS warning light blinks.



- (p) Procedure for ending the test mode (DS-II)
- (1) Switch the system from the test mode to the normal mode by following the prompts on the DS-II.
- (2) Turn the ignition switch off and disconnect the DS-II.
- (q) Procedure for ending the test mode (by shorting the DLC terminals)
- (1) Confirm that the sensor check produces a normal result, then end the test mode.
- (2) Open the circuit between terminals 13 (ECUT) and 4 (E) of the DLC.

2. TEST MODE DTC LIST

HINT:

The test mode code, SAE, indicates the output code shown when using a diagnostic tool (DS-II). The light code on the right shows the output code indicated by blinks of the ABS warning light. (SAE: Society of Automotive Engineers)

ABS Test Mode Code List

DTC No. (SAE/Light)	Description	Content to Judge	Inspection Item
C1271/81	FR wheel output voltage error	Judge if foreign matter is attached, and check the clearance between the sensor and the rotor.	• Open or short circuit in the speed sensors • Open or short circuit in the speed sensor wire harnesses • Poor contact pressure of the connector terminals, wiring resistance • Improper speed sensor installation • Speed sensor rotor malfunction
C1272/82	FL wheel output voltage error	Judge if foreign matter is attached, and check the clearance between the sensor and the rotor.	• Open or short circuit in the speed sensors • Open or short circuit in the speed sensor wire harnesses • Poor contact pressure of the connector terminals, wiring resistance • Improper speed sensor installation • Speed sensor rotor malfunction
C1273/83	RR wheel output voltage error	Judge if foreign matter is attached, and check the clearance between the sensor and the rotor.	• Open or short circuit in the speed sensors • Open or short circuit in the speed sensor wire harnesses • Poor contact pressure of the connector terminals, wiring resistance • Improper speed sensor installation • Speed sensor rotor malfunction
C1274/84	RL wheel output voltage error	Judge if foreign matter is attached, and check the clearance between the sensor and the rotor.	• Open or short circuit in the speed sensors • Open or short circuit in the speed sensor wire harnesses • Poor contact pressure of the connector terminals, wiring resistance • Improper speed sensor installation • Speed sensor rotor malfunction
C1275/85	FR WHEEL CYCLE ERROR	Judge the stability of the waveforms from the sensors	• Speed sensor rotor malfunction • Foreign matter attached to the speed sensor
C1276/86	FL WHEEL CYCLE ERROR	Judge the stability of the waveforms from the sensors	• Speed sensor rotor malfunction • Foreign matter attached to the speed sensor
C1277/87	RR WHEEL CYCLE ERROR	Judge the stability of the waveforms from the sensors	• Speed sensor rotor malfunction • Foreign matter attached to the speed sensor

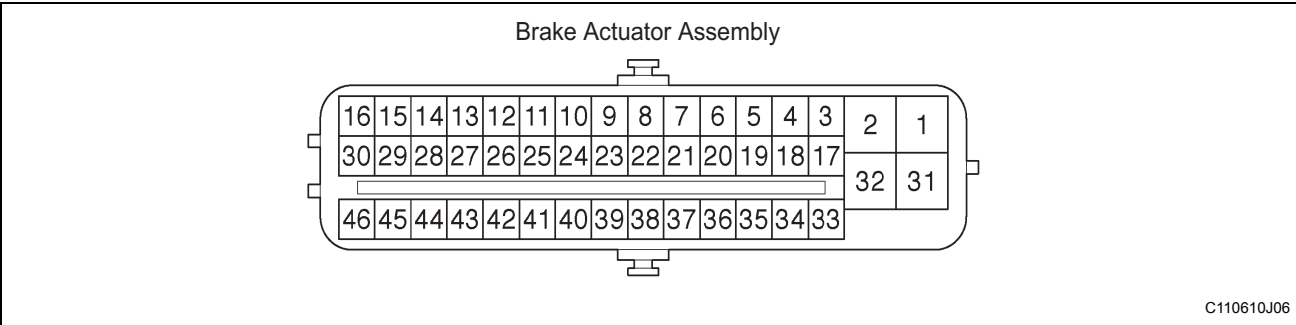
DTC No. (SAE/Light)	Description	Content to Judge	Inspection Item
C1278/88	RL WHEEL CYCLE ERROR	Judge the stability of the waveforms from the sensors	- Speed sensor rotor malfunction - Foreign matter attached to the speed sensor

VSC Test Mode Code List

DTC No. (SAE) (SAE/Light)	Description	Content to Judge	Inspection Item
C1210/95	Yaw rate sensor middle point not acquired	Judge the zero point voltage level of the yaw rate sensor	- Improper connection of the yaw rate sensor wire harness - Improper installation of the yaw rate sensor - P range signal line malfunction
C1281/95	Stop light switch, fluid pressure switch, fluid pressure sensor	- Judge the stored zero point of the master pressure sensor - Judge that the sensitivity of the master pressure sensor is normal	- Improper engagement of the master cylinder pressure sensor - Improper engagement of the stop light switch circuit connector - Stop light switch stuck off
C1336/92	G sensor middle point not acquired	Judge the stored middle point of the G sensor	- Improper storing of the yaw rate sensor (G sensor) zero point - Improper connection of the yaw rate sensor connector - Yaw rate sensor stick - Improper installation of the yaw rate sensor
C1379/99	DAC operation SW malfunction	Judge ON/OFF signals of the DAC operation switch	- DAC operation switch - Open or short circuit in the DAC operation switch wire harness
C1393/93	Abnormal yaw rate sensor output	Judge the output voltage of the yaw rate sensor	- Improper connection of the yaw rate sensor wire harness - Improper installation of the yaw rate sensor - P range signal line malfunction
C1396/96	Shift (reverse) signal	R signal	Reverse switch assembly

ECU TERMINALS**1. BRAKE ACTUATOR ASSEMBLY (WITH A BUILT-IN SKID CONTROL COMPUTER) TERMINALS****HINT:**

- As the skid control computer is included in the actuator and the connectors are watertight, the voltage of each terminal cannot be measured and the waveform cannot be checked using an oscilloscope with the skid control computer installed in the vehicle.
- Use the data list and active test functions of the DS-II to check the operation and communication of the actuator. (See page BC-72)

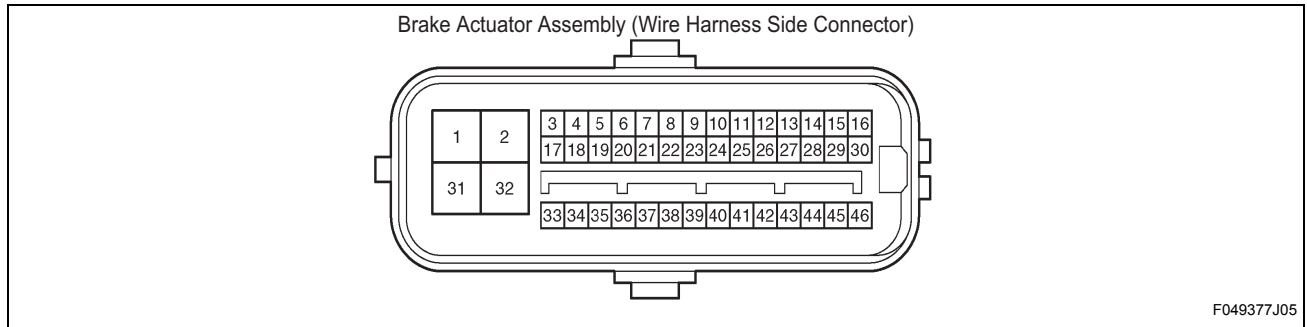


BRAKE ACTUATOR ASSEMBLY TERMINALS

Terminal No.	Terminal Symbol	Terminal Name
1	GND2	Actuator pump motor GND
2	+BM	Motor relay input
3	FR+	Right front wheel speed sensor power source output
4	FL-	Left front wheel speed sensor input
5	RR+	Right rear wheel speed sensor power source output
6	RL-	Left rear wheel speed sensor input
11	CANH	CAN communication input and output
13	SIO	DS-II communication line
14	MRF	ABS MTR CUT relay output
15	MR	ABS MTR relay output
16	STP0	Stop light relay output
17	FR-	Right front wheel speed sensor input
18	FL+	Left front wheel speed sensor power source output
19	RR-	Right rear wheel speed sensor input
20	RL+	Left rear wheel speed sensor power source output
21	STP2	Stop light relay input
25	CANL	CAN communication input and output
27	STP1	Stop light switch input
28	R	Reverse switch output
29	WA	ABS warning light output
31	+BS	Solenoid relay input
32	GND1	Skid control computer GND
41	C/D	Differential lock switch input
45	R+	Motor relay power source
46	+IG	IG power source (ECU power source) input

2. INSPECT BRAKE ACTUATOR ASSEMBLY WIRE HARNESS SIDE CONNECTOR
- (a) Disconnect the brake actuator assembly connector.

- (b) Using the tester, inspect the voltage and continuity between each terminal of the wire harness side connector of the actuator assembly and the body ground.



Standard

Terminal No.	Terminal Symbol	Input / Output	Tester Item	Measurement Condition	Standard
1	GND2 (Actuator pump motor GND) ↔ Body ground	Input	Continuity	IG OFF	Continuity
27	STP (Stop light switch input) ↔ Body ground	Input	Voltage	IG ON, brake pedal depressed ↔ Released	8 to 16 V ↔ 1.5 V or less
28	R (Reverse switch input) ↔ Body ground	Input	Voltage	In reverse	8 to 16 V
29	WA (ABS warning light output) ↔ Body ground	Output	Voltage	ABS warning light is on	5 to 14 V
31	+BS (Power source for solenoid drive) ↔ Body ground	Input	Voltage	Always	10 to 14 V
32	GND1 (ECU GND) ↔ Body ground	Input	Continuity	Always	Continuity
46	+IG IG1 power supply ↔ Body ground	Input	Voltage	IG ON	10 to 14 V

ECU DATA LIST / ACTIVE TEST

1. ECU DATA LIST

- (a) Turn the ignition switch off and connect the DS-II to the DLC.
 (b) Turn the ignition switch to the ON position and follow the prompts on the DS-II screen to check the ECU data.

NOTICE:

As the computer data values may vary widely depending on slight measurement errors, the measurement environment, and the state of the vehicle due to wear and tear, it is very difficult to indicate a specific standard value (reference value). Therefore, in some cases, an error may occur within the range of reference values.

ECU DATA LIST

Item (DS-II Display)	Item Description	Inspection Condition	Reference value	Problem Area
Retention solenoid FR	Indicates the front right retention solenoid condition	ABS not activated ↔ Activated	OFF ↔ ON	- Actuator systems - Solenoid relay
Pressure reduction solenoid FR	Indicates the condition of the front right pressure reduction solenoid	ABS not activated ↔ Activated	OFF ↔ ON	- Actuator systems - Solenoid relay
Retention solenoid FL	Indicates the front left retention solenoid condition	ABS not activated ↔ Activated	OFF ↔ ON	- Actuator systems - Solenoid relay
Pressure reduction solenoid FL	Indicates the front left pressure reduction solenoid condition	ABS not activated ↔ Activated	OFF ↔ ON	- Actuator systems - Solenoid relay
Retention solenoid RR	Indicates the rear right retention solenoid condition	ABS not activated ↔ Activated	OFF ↔ ON	- Actuator systems - Solenoid relay
Pressure reduction solenoid RR	Indicates the rear right pressure reduction solenoid condition	ABS not activated ↔ Activated	OFF ↔ ON	- Actuator systems - Solenoid relay
Retention solenoid RL	Indicates the rear left retention solenoid condition	ABS not activated ↔ Activated	OFF ↔ ON	- Actuator systems - Solenoid relay
Pressure reduction solenoid RL	Indicates the condition of the rear left pressure reduction solenoid	ABS not activated ↔ Activated	OFF ↔ ON	- Actuator systems - Solenoid relay
Solenoid relay	Indicates the activation of the solenoid relay	When the ignition is ON	OFF ↔ ON	Solenoid relay system
ABS motor relay 1	Indicates the activation of the ABS motor relay	Motor not activated ↔ Motor activated	OFF ↔ ON	ABS MTR relay system
STOP SW	Indicates activation of the stop light switch	Brake pedal depressed ↔ Not depressed	ON ↔ OFF	- Stop light switch - Stop light system
PKB	Indicates activation of the parking brake	Parking brake engaged ↔ Released	ON ↔ OFF	Parking brake switch system
Idle SW	Indicates that the throttle valve is fully closed	Accelerator pedal depressed ↔ Not depressed	OFF ↔ ON	Throttle position sensor system
FR control	Indicates the ABS control status of the FR wheel	FR wheel ABS controlled ↔ Not controlled	Controlled ↔ Not controlled	-
FL control	Indicates the ABS control status of the FL wheel	FL wheel ABS controlled ↔ Not controlled	Controlled ↔ Not controlled	-
RR control	Indicates the ABS control status of the RR wheel	RR wheel ABS controlled ↔ Not controlled	Controlled ↔ Not controlled	-
RL control	Indicates the ABS control status of the RL wheel	FL wheel ABS controlled ↔ Not controlled	Controlled ↔ Not controlled	-
Wheel speed FR	Indicates the wheel speed	1. When the vehicle is stopped 2. When driving at a constant speed	1. 0 km/h 2. No significant fluctuation	Wheel speed sensor signal system
Wheel speed FL	Indicates the wheel speed	1. When the vehicle is stopped 2. When driving at a constant speed	1. 0 km/h 2. No significant fluctuation	Wheel speed sensor signal system
Wheel speed RR	Indicates the wheel speed	1. When the vehicle is stopped 2. When driving at a constant speed	1. 0 km/h 2. No significant fluctuation	Wheel speed sensor signal system
Wheel speed RL	Indicates the wheel speed	1. When the vehicle is stopped 2. When driving at a constant speed	1. 0 km/h 2. No significant fluctuation	Wheel speed sensor signal system

Item (DS-II Display)	Item Description	Inspection Condition	Reference value	Problem Area
GL1	Indicates GL1	During turning / during acceleration and deceleration	Proportional to generated gravity	Yaw rate sensor system
GL2	Indicates GL2	During turning / during acceleration and deceleration	Proportional to generated gravity	Yaw rate sensor system
Master pressure sensor 1	Indicates the master pressure sensor output value (voltage)	1. Brake pedal depressed 2. Brake pedal not depressed	1. Proportion to the pedaling force 2. Approx. 0.5 V	Actuator systems
Yaw rate sensor 1	Indicates the yaw rate value	1. When the vehicle is stopped 2. When turning right 3. When turning left	1. 0m/s 2. -128 to 0m/s 3. 0 to 127m/s	Yaw rate sensor system
Steering angle sensor	Indicates the steering angle (left turn is indicated by positive values)	When the steering is operated	Continuously changes	Steering sensor system
Stored zero point value	Indicates the yaw rate value when the yaw rate sensor zero point is acquired	After the yaw rate sensor zero point is acquired	0m/s	- ACQUIRE YAW RATE SENSOR ZERO POINT - Yaw rate sensor system
Air bleeding condition	Indicates whether bleeding is possible	1.Possible 2.Not possible	1.O 2.×	-
TRC OFF SW	Indicates the input state of the traction control switch (TRC OFF SW)	When the TRC is prohibited	ON ↔ OFF	Traction control switch (TCS OFF switch) system
ECU code	Displays VSC ECU part number code	-	-	-
During the test mode	Indicates the state (normal mode or test mode)	1.Normal mode 2.Test mode	1.Normal mode 2.Test mode	-
Meter vehicle speed Vout	Indicates the vehicle speed output to the meter from the system	1.When the vehicle is stopped 2.When driving at a constant speed	1.0 km/h 2.No significant fluctuation	Wheel speed sensor signal system
ECU power source voltage	Indicates the status of the ECU power source voltage	1.Under normal condition 2.Under high voltage 3.Under low voltage	1.Normal 2.High voltage 3.Low voltage	Power supply voltage system
Number of DTCs	Indicates the number of DTCs	-	0 to 255	-

2. ACTIVE TEST INSPECTION

- Turn the ignition switch off and connect the DS-II to the DLC.
- Turn the ignition switch to the ON position and select the following items: VSC / ACTIVE TEST.
- Select the data list items to be checked during the active test, then press the ENTER key.
- Select the active test items to be performed and press the ENTER key. Operate the keys on the screen display to switch each test ON/OFF.

NOTICE:

- Although the motor automatically stops in approximately 5 seconds in order to protect the motor, do not run the motor repeatedly.
- The drive of each solenoid is automatically shut down in approximately 2 seconds in order to protect the

solenoid. But the solenoid can be operated again after an interval.

- Do not depress the brake pedal when only the pressure reduction valve is turned on.
- Do not drive 2 or more solenoids simultaneously except when the retention valves and pressure reduction valves of each wheel are operated.

ACTIVE TEST

Item	Test Contents	Restraint Condition
Brake Warning Light	The brake warning light can be turned on and off	Available at SPD = 0 km/h
Slip indicator	The slip indicator light can be turned on and off	Available at SPD = 0 km/h
TRC OFF light	TRC OFF light can be turned on and off	Available at SPD = 0 km/h
VSC light	VSC warning can be turned on and off	Available at SPD = 0 km/h
ABS warning light	ABS warning can be turned on and off	Available at SPD = 0 km/h
VSC buzzer	Skid control buzzer can be sounded and stopped	Available at SPD = 0 km/h
Secondary repair air	ON/OFF for secondary solenoid, pump motor driving (used to bleed air from the actuator)	Available at SPD = 0 km/h
Tertiary repair air	ON/OFF for tertiary solenoid, pump motor driving (used to bleed air from the actuator)	Available at SPD = 0 km/h
Valve motor rear left	Rear left wheel pressure reduction and retention solenoids ON ←→ OFF, pump motor driving	Available at SPD = 0 km/h
Valve motor rear right	Rear right wheel pressure reduction and retention solenoids ON ←→ OFF, pump motor driving	Available at SPD = 0 km/h
Valve motor front left	Front left wheel pressure reduction and retention solenoids ON ←→ OFF, pump motor driving	Available at SPD = 0 km/h
Valve motor front right	Front right wheel pressure reduction and retention solenoids ON ←→ OFF, pump motor driving	Available at SPD = 0 km/h

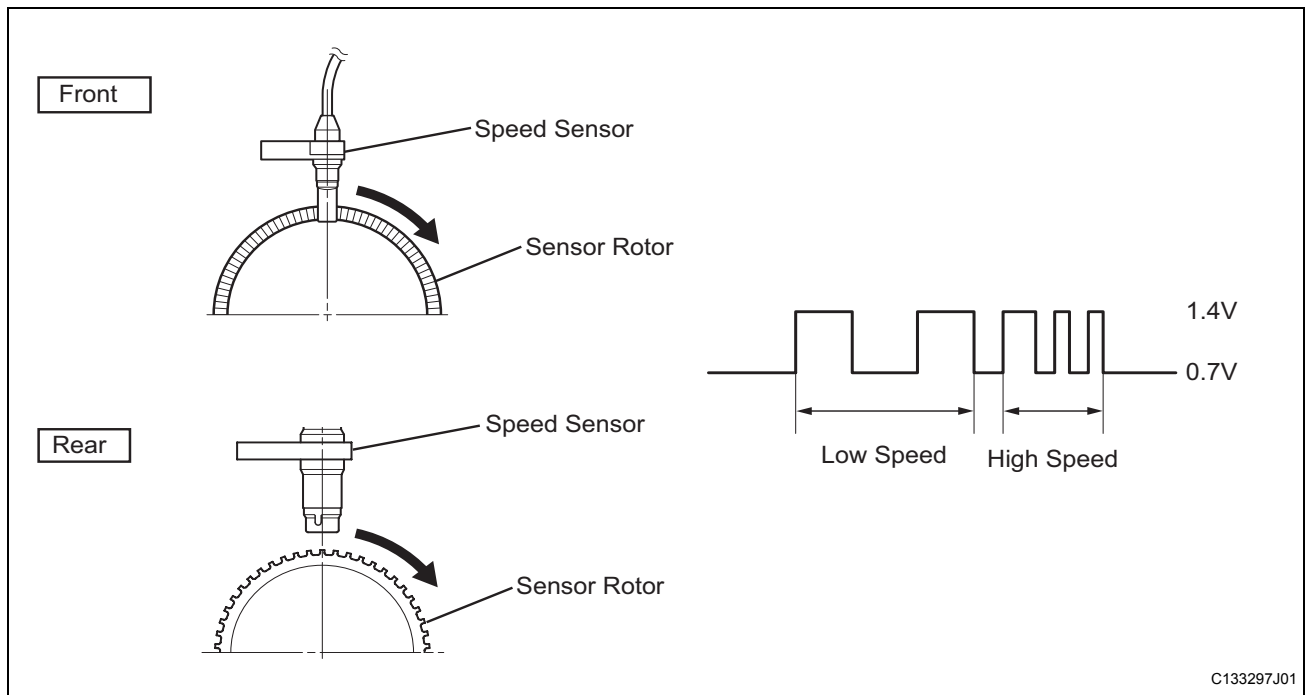
DTC	C0200/21	OPEN OR SHORT CIRCUIT IN FR WHEEL
DTC	C0205/22	OPEN OR SHORT CIRCUIT IN FL WHEEL
DTC	C0210/23	OPEN OR SHORT CIRCUIT IN RR WHEEL
DTC	C0215/24	OPEN OR SHORT CIRCUIT IN RL WHEEL

DESCRIPTION

The speed sensors detect the wheel speed and send the signals to the skid control computer. These signals are used for the ABS control.

The speed sensors detect changes in the magnetic field of the magnetic rotor, which has the north and south poles evenly allocated in the circumferential direction, and generate the vehicle speed pulse.

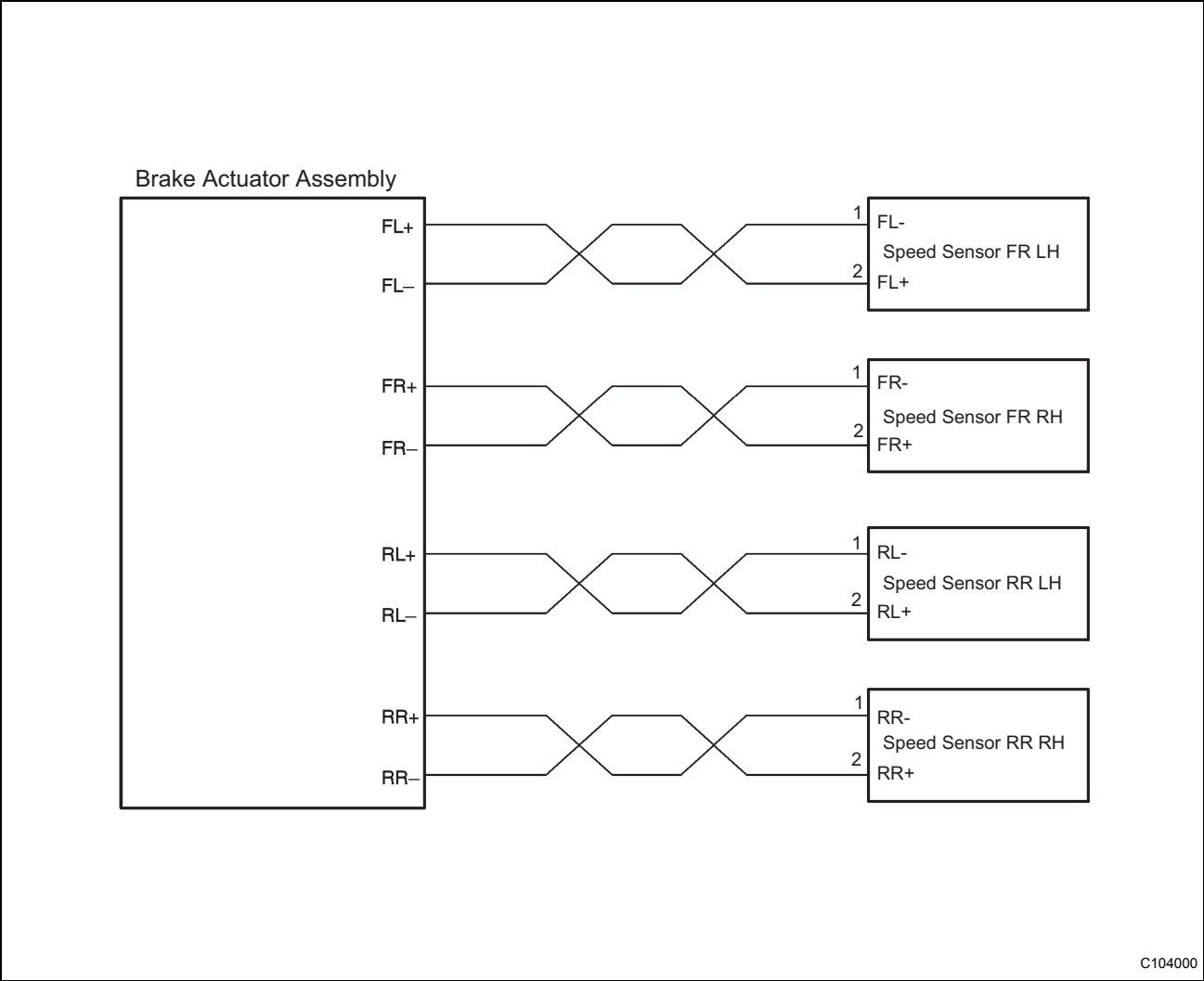
Using this vehicle speed pulse, the skid control computer detects the speed of each wheel.



C133297J01

DTC No.	DTC Detection Condition	Trouble Area
C0200/21 C0205/22 C0210/23 C0215/24	- An open circuit in the speed sensor signal circuit continues for 0.5 seconds or more. - With the +IG terminal voltage 9.5 V or more, the sensor power supply voltage decreases for 0.5 seconds or more.	- Open or short circuit in the speed sensor - Improper speed sensor installation or improper clearance between the sensor rotor - Open or short circuit in the wire harness - Improper connector contact pressure, deformation and corrosion of terminals - Foreign matter attached to the speed sensor - Sensor rotor malfunction (foreign matter attached, damaged) - Speed sensor circuit wiring resistance - Actuator assembly

CIRCUIT DIAGRAM



INSPECTION PROCEDURE

1	DATA LIST (SPEED SENSOR)
---	--------------------------

- (a) Using the DS-II, check the output values of the speed sensor corresponding to the DTC. (See page BC-72)

ECU DATA LIST

Item	Item Description	Inspection Condition	Standard
Wheel speed FR	Indicates the wheel speed	1. When the vehicle is stopped 2. When driving at a constant speed	1. 0 km/h 2. No significant fluctuation
Wheel speed FL	Indicates the wheel speed	1. When the vehicle is stopped 2. When driving at a constant speed	1. 0 km/h 2. No significant fluctuation
Wheel speed RR	Indicates the wheel speed	1. When the vehicle is stopped 2. When driving at a constant speed	1. 0 km/h 2. No significant fluctuation

Item	Item Description	Inspection Condition	Standard
Wheel speed RL	Indicates the wheel speed	1. When the vehicle is stopped 2. When driving at a constant speed	1. 0 km/h 2. No significant fluctuation

NG

GO TO STEP 3

OK

2

CHECK THE TEST MODE (WHEEL SPEED)

- (a) Perform the test mode inspection and check for the test mode code and DTC. (See page BC-65)

Standard:

The normal code is output.

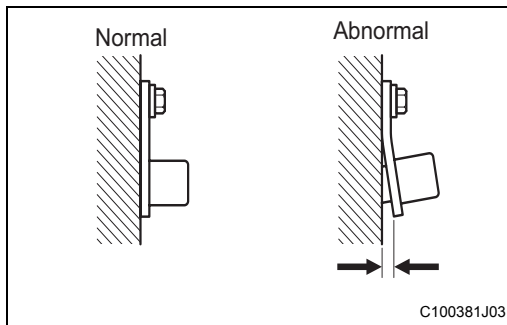
OK

GO TO STEP 7

NG

3

INSPECT SPEED SENSOR INSTALLATION



- (a) Check the speed sensor installation.

Standard:

The yaw rate sensor is installed properly.

NG

REPAIR OR SPEED SENSOR INSTALLATION
OR REPLACE

OK

4

INSPECT SPEED SENSOR

- (a) Remove the speed sensor of the corresponding wheel, and check if the sensor tip has any foreign matter attached and is not damaged.

Standard:

No foreign matter or damage on the sensor tip

NG

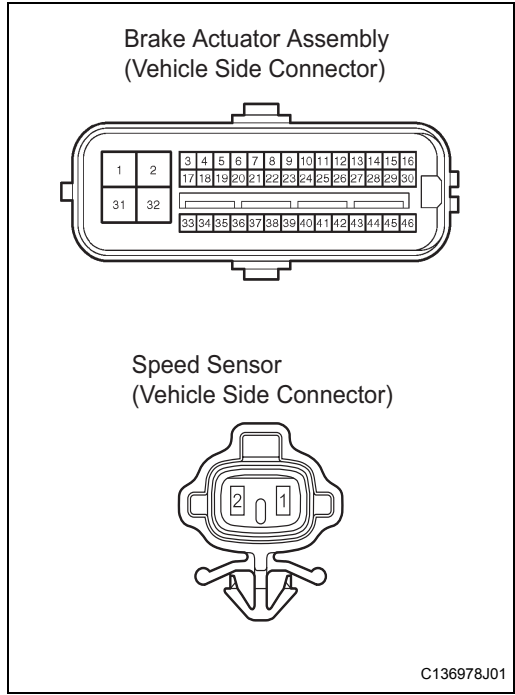
CLEAN OR REPLACE SPEED SENSOR

OK

5

INSPECT WIRE HARNESS AND CONNECTOR (BETWEEN SPEED SENSOR AND ACTUATOR ASSEMBLY)

- (a) Check if the actuator assembly and speed sensor connectors are engaged properly.
(b) Turn the ignition switch off, disconnect the connectors of the actuator assembly and speed sensor.



- (c) Check that the connector case and terminals are not deformed or corroded.
- Standard:**
- There should be no deformation or corrosion.**
- (d) Using the tester, inspect the continuity of the wire harness between the actuator assembly and the speed sensor. Also check the insulation between the actuator assembly and the body ground.

Continuity check

Inspection Terminal (Actuator assembly ↔ Speed sensor)	Standard
3 (FR+) ↔ 1 (FR-)	Continuity
17 (FR-) ↔ 2 (FR+)	Continuity
18 (FL+) ↔ 1 (FL-)	Continuity
4 (FL-) ↔ 2 (FL+)	Continuity
5 (RR+) ↔ 1 (RR-)	Continuity
19 (RR-) ↔ 2 (RR+)	Continuity
20 (RL+) ↔ 2 (RL-)	Continuity
6 (RL-) ↔ 1 (RL+)	Continuity

Insulation Check

Inspection Terminal (Actuator Assembly)	Standard
3 (FR+) ↔ Body ground	No continuity
17 (FR-) ↔ Body ground	No continuity
18 (FL+) ↔ Body ground	No continuity
4 (FL-) ↔ Body ground	No continuity
5 (RR+) ↔ Body ground	No continuity
19 (RR-) ↔ Body ground	No continuity
20 (RL+) ↔ Body ground	No continuity
6 (RL-) ↔ Body ground	No continuity

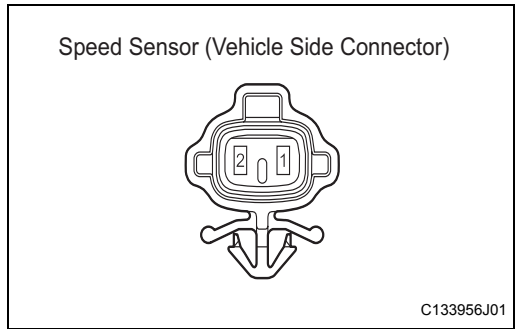
NG

**REPAIR OR REPLACE WIRE HARNESS OR
CONNECTOR**

OK

6

INSPECT BRAKE ACTUATOR ASSEMBLY



- (a) Disconnect the speed sensor connector.
- (b) Turn the ignition switch to the ON position.
- (c) Using the tester, measure the voltage between the 2 (FR+), 2 (FL+), 2 (RR+), and 2 (RL+) terminals of the wire harness side connector of the speed sensor and the body ground.

Standard:

5.7 to 17.3 V

NG

REPLACE BRAKE ACTUATOR ASSEMBLY

OK

7**RECHECK FOR DTCS.**

- (a) Clear the DTCs. (See page BC-64)
- (b) Perform a road test, then recheck for the DTCs. (See page BC-64)

Standard:

The normal code is output.

OK**SYSTEM RETURNS TO NORMAL (DTC IS STORED DUE TO POOR CONNECTION OF CONNECTOR TERMINALS, BUT RECONNECTING CONNECTOR RETURNS SYSTEM TO NORMAL)****NG****8****REPLACE SPEED SENSOR**

- (a) Replace the speed sensor that corresponds to a DTC.

9**RECHECK FOR DTCS.**

- (a) Clear the DTCs. (See page BC-64)
- (b) Perform a road test, then recheck for the DTCs. (See page BC-64)

Standard:

The normal code is output.

NG**REPLACE BRAKE ACTUATOR ASSEMBLY****OK****END**

DTC	C0226/52	OPEN OR SHORT CIRCUIT IN FR PRESSURE RETENTION AND REDUCTION SOLENOID
DTC	C0236/54	OPEN OR SHORT CIRCUIT IN FL PRESSURE RETENTION AND REDUCTION SOLENOID
DTC	C0246/56	OPEN OR SHORT CIRCUIT RR PRESSURE RETENTION AND REDUCTION SOLENOID
DTC	C0256/58	OPEN OR SHORT CIRCUIT IN RL PRESSURE RETENTION AND REDUCTION SOLENOID
DTC	C1225/61	OPEN OR SHORT CIRCUIT IN MASTER CUT SOLENOID 1

DESCRIPTION

Each solenoid adjusts the pressure acting on each wheel cylinder in order to control the vehicle.

As the solenoid is forcibly turned off by the fail-safe function during DTC output, the solenoid will not turn on.

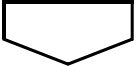
The solenoid and solenoid relay are built into the brake actuator.

DTC No.	DTC Detection Condition	Trouble Area
C0226/52 C0236/54 C0246/56 C0256/58	Open or short circuit in the solenoid continues for 0.05 seconds or more	Brake actuator assembly internal malfunction
C1225/61	- An open circuit continues for 0.05 seconds or more when the switching solenoid (SM1 or SM2) OFF is output. - When the switching solenoid (SM1 or SM2) is ON and 0.348 A or more is output, the output duty ratio of SM1 and SM2 is 2.08 or more, or it is less than 0.48 for 0.2 seconds or more. - Current continues to be applied for 0.05 seconds or more when the switching solenoid (SM1 or SM2) OFF is output. - When the switching solenoid (SM1 or SM2) is ON and 0.348 A or more is output, the ratio of the current monitor and target value is more than 2 for 0.1 second, or the ratio is less than 0.15 for 0.05 seconds or more.	Brake actuator assembly internal malfunction

HINT:

DTC No.	Corresponding Solenoid
C0226/52	SFRH, SFRR
C0236/54	SFLH, SFLR
C0246/56	SRRH, SRRR
C0256/58	SRLH, SRLR
C1225/61	SM1, SM2

INSPECTION PROCEDURE

1**REPLACE BRAKE ACTUATOR ASSEMBLY****PERFORM YAW RATE AND G SENSOR ZERO POINT AND TEST MODE INSPECTION**

DTC	C0273/13	MOTOR RELAY OPEN CIRCUIT
DTC	C0274/14	MOTOR RELAY SHORT CIRCUIT
DTC	C1361/18	SHORT IN MOTOR FAIL-SAFE RELAY

DESCRIPTION

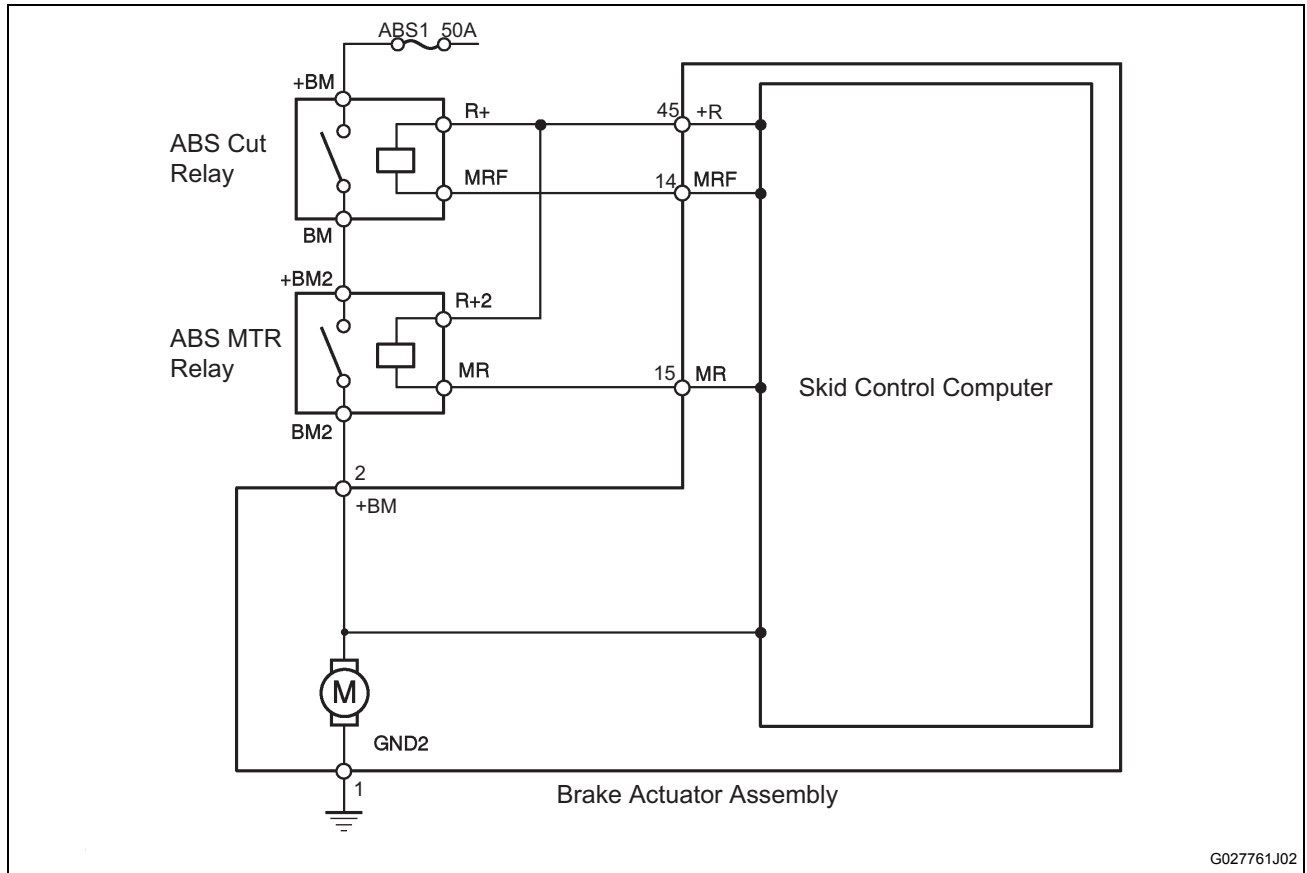
The ABS CUT relay turns on several seconds after the ignition switch is turned to the ON position. If motor system DTCs are recorded, power supply to the ABS MTR relay is cut off to perform the fail-safe function.

While the ABS, TRC, or VSC brake assist is operating, the skid control computer (built into the actuator assembly) turns the ABS MTR relay on and activates the pump motor in the actuator assembly.

These codes may be recorded when the voltage applied to the motor relay (+BM) falls below DTC detection condition due to insufficient output from the battery or alternator.

DTC No.	DTC Detection Condition	Trouble Area
C0273/13	- With the IG terminal voltage 10-16 V during the initial check, or when the controlled relay is ON, the relay contact is OFF for 0.12 seconds or more - With the IG terminal voltage 10 V or less, the relay contact is not ON when requested for 0.12 seconds or more.	- Malfunction in the ABS CUT or ABS MTR relay - Lowered voltage to the motor relay power source (+BM) - Open in wire harnesses - Improper connector contact pressure, deformation and corrosion of terminals
C0274/14	When the motor relay is OFF, the motor relay contact is ON for 4 seconds or more	- Malfunction in the ABS CUT or ABS MTR relay - Short in the motor relay monitor circuit (in the actuator) - Short circuit in the wire harness - Brake actuator assembly
C1361/18	Immediately after the IG switch is turned to the ON position, when the motor relay is OFF, the fail-safe motor relay (ABS CUT) internal contact is ON for 4 seconds or more	- Malfunction in the ABS CUT or ABS MTR relay - Short in the motor relay monitor circuit in the actuator - Short circuit in the wire harness - Brake actuator assembly

CIRCUIT DIAGRAM



INSPECTION PROCEDURE

1

INSPECT FUSE (ABS1 50A)

(a) Inspect the fuse (STOP 50A).

Standard:

DTC is not output

NG

REPLACE FUSES

OK

2

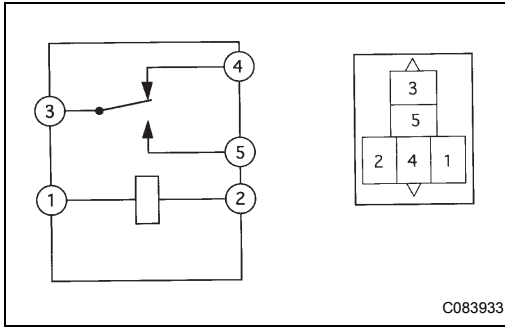
INSPECT ABS MOTOR RELAY (ABS CUT RELAY AND ABS MTR RELAY)

- (a) Check the installation condition of the ABS CUT relay and ABS MTR relay.
- (b) Turn the ignition switch off, and remove the ABS CUT relay and ABS MTR relay from the engine room relay block No. 2.
- (c) Check that the relay case and the terminals are not deformed or corroded.

Standard:

There should be no deformation or corrosion.

BC



- (d) Check the resistance and the continuity of the ABS CUT relay.
- (1) Using tester, measure the resistance between the terminals.

Standard:

Between terminals 1 (R+) and 2 (MRF): Approx. 100 Ω

Between terminals 3 (BM) and 4 (NC): 0 Ω

Between terminals 3 (BM) and 5 (+BM): 10 M Ω

- (2) When applying battery voltage between terminals 1 (R+2) and 2 (MR), inspect the continuity between the terminals using the tester.

Standard:

There is no continuity between terminals 3 (BM) and 4 (NC).

There is continuity between terminals 3 (BM) and 5 (+BM).

- (e) Check the resistance and the continuity of the ABS MTR relay.

- (1) Using tester, measure the resistance between the terminals.

Standard:

Between terminals 1 (R+2) and 2 (MRF): Approx. 80 Ω

Between terminals 3 (BM2) and 5 (+BM2): 10 M or more

- (2) When applying battery voltage between terminals 1 (R+) and 2 (MRF), inspect the continuity between terminals 3 (BM) and 5 (+BM) using the tester.

Standard:

Continuity

NG

REPLACE ABS MOTOR RELAY

OK

3

INSPECT WIRE HARNESS AND CONNECTOR (RELAY POWER SOURCE SYSTEM)

- (a) Turn the ignition switch off, and remove the ABS CUT relay and ABS MTR relay from the engine room relay block No. 2.
- (b) Turn the ignition switch to the ON position.
- (c) Using the tester, inspect the voltage between terminals 5 (+BM) of the ABS CUT relay (relay block side) and the body ground.

Standard:

10 to 14 V

- (d) Turn the ignition switch off and install the ABS CUT relay to the engine room relay block No. 2.
- (e) Turn the ignition switch to the ON position.
- (f) Using the tester, inspect the voltage between terminals 5 (+BM2) of the ABS MTR relay (relay block side) and the body ground.

Standard:

10 to 14 V

NG

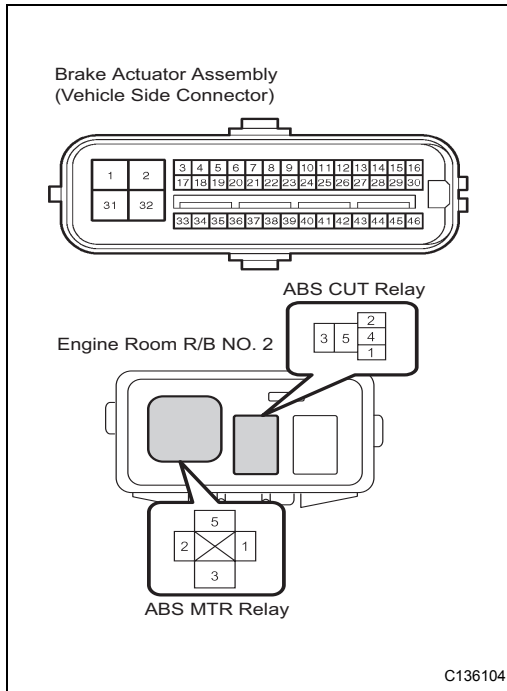
REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

BC

4

INSPECT WIRE HARNESS AND CONNECTOR (BETWEEN ENGINE ROOM RELAY BLOCK AND ACTUATOR ASSEMBLY)



- Turn the ignition switch off, and disconnect the actuator assembly connector.
- Remove the ABS CUT relay and the ABS MTR relay from the engine room relay block No. 2.
- Check that the connector case and terminals are not deformed or corroded.

Standard:

There should be no deformation or corrosion.

- Using the tester, inspect the continuity of the wire harness between the actuator assembly and engine room relay block No. 2. Also check the insulation between the the actuator assembly and the body ground.

Continuity check

Inspection Terminal (Actuator Assembly ↔ Engine Room Relay Block No. 2)	Standard
14 (MRF) ↔ ABS CUT relay 2 (MRF)	Continuity
15 (MR) ↔ ABS MTR relay 2 (MR)	Continuity
45 (R+) ↔ ABS CUT relay 1 (R+)	Continuity
45 (R+) ↔ ABS MTR relay 1 (R+2)	Continuity

Insulation Check

Inspection Terminal (Actuator Assembly)	Standard
14 (MRF) ↔ Body ground	No continuity
15 (MR) ↔ Body ground	No continuity
45 (R+) ↔ Body ground	No continuity

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

5

RECHECK FOR DTCs.

- Clear the DTCs. (See page BC-64)
- Turn the ignition switch from the OFF to the ON position and drive the vehicle at 6 km/h or more.
- If the ABS warning light comes on, check for DTCs. (See page BC-64)

Warning light goes off (normal code is output)	A
A motor relay DTC is output again	B

BC

HINT:

- if the vehicle speed signal of 6 km/h or more is input with the stop light switch OFF after the ignition switch is turned to the ON position, the skid control computer performs self-diagnosis for the motor relay circuit.
- If the normal code is output, jiggle the connector, wire harness, and fuse of the actuator assembly, and check for DTCs.

- If a DTC is output due to vibration, check and repair the corresponding connector or wire harness.

B**REPLACE BRAKE ACTUATOR ASSEMBLY****A**

SYSTEM RETURNS TO NORMAL (DTC IS STORED DUE TO POOR CONNECTION OF CONNECTOR TERMINALS, BUT RECONNECTING CONNECTOR RETURNS SYSTEM TO NORMAL)

DTC	C0278/11	SOLENOID RELAY OPEN CIRCUIT
DTC	C0279/12	SOLENOID RELAY SHORT CIRCUIT

DESCRIPTION

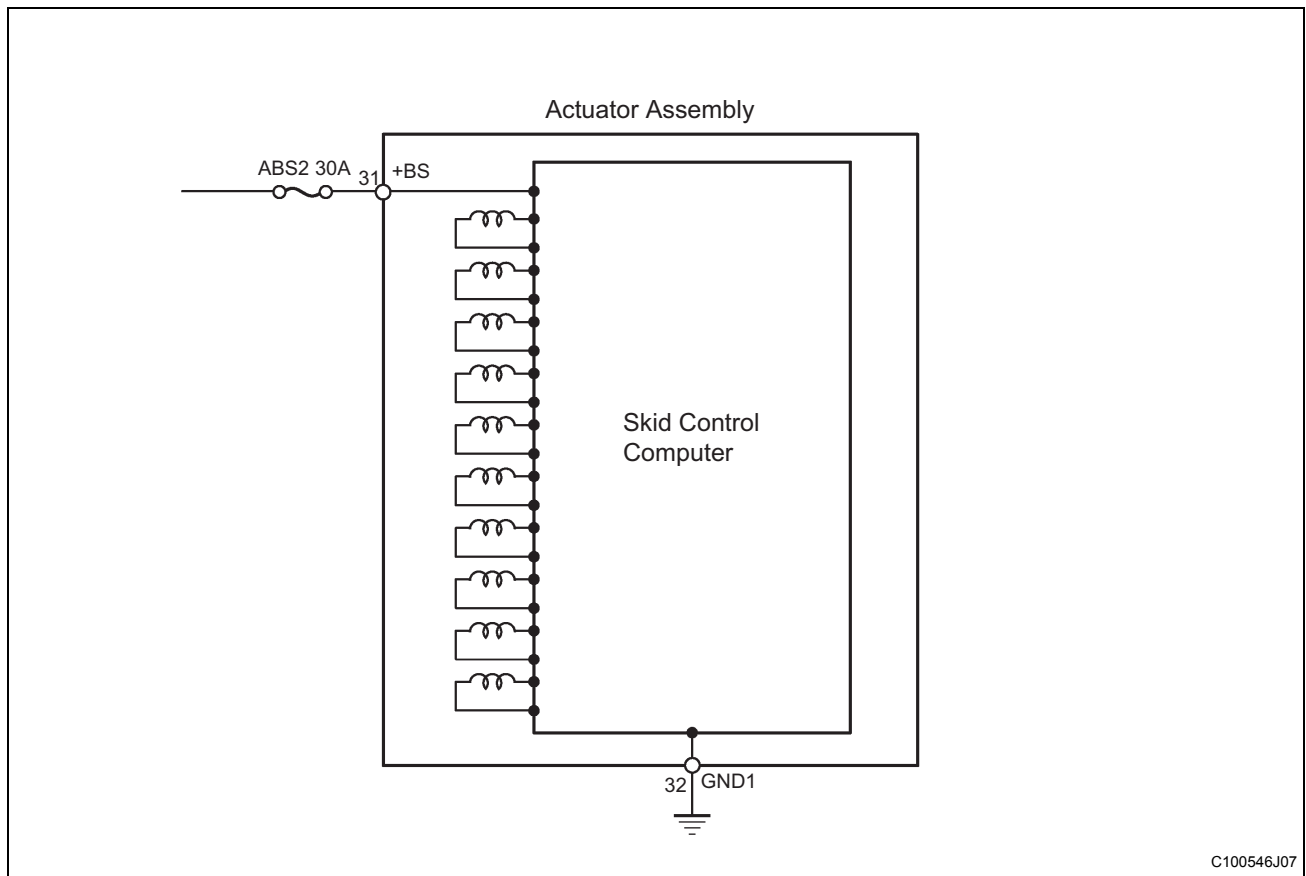
The solenoid relay supplies power to the ABS solenoid and TRC solenoid.

The relay turns on approximately 1.5 seconds after the ignition switch is turned to the ON position. The relay will turn off if an open or short circuit in the solenoid is detected by the self diagnosis when the vehicle starts to drive.

The solenoid relay is built into the skid control computer in the actuator assembly.

DTC No.	DTC Detection Condition	Trouble Area
C0278/11	- When the IG terminal voltage is 10 to 16 V and the solenoid relay is ON, the solenoid relay contact is OFF for 0.2 seconds or more. - When the IG1 terminal voltage is 10 V or less due to the relay ON drive, the relay contact is not ON for 0.2 seconds or more.	- Lowered voltage to the motor relay power source (+BS) - Open in wire harnesses - Improper connector contact pressure, deformation and corrosion of the terminals - Open circuit in the solenoid relay in the actuator assembly
C0279/12	Immediately after the ignition is turned to the ON position, the solenoid relay internal contact is ON for 0.2 seconds or more when the solenoid relay is OFF.	Actuator assembly

CIRCUIT DIAGRAM



INSPECTION PROCEDURE

1

INSPECT FUSE (ABS2 30A)

- (a) Check the fuse (ABS2 30A).

Standard:

The fuse is normal.

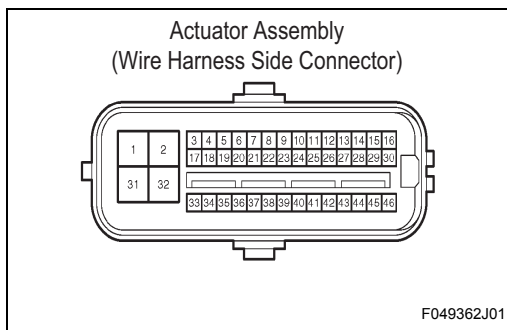
NG

REPLACE FUSES

OK

2

INSPECT WIRE HARNESS AND CONNECTOR (SOLENOID RELAY POWER SOURCE SYSTEM)



- (a) Turn the ignition switch off, and disconnect the actuator assembly connector.
- (b) Using the tester, inspect the voltage between the 31 (+BS) terminal of the wire harness side connector of the actuator assembly and the body ground.

Standard:

10 to 14 V

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

3

RECHECK FOR DTCS.

- (a) Clear the DTCS. (See page BC-64)
- (b) Turn the ignition switch from the OFF to the ON position and drive the vehicle at 6 km/h or more.
- (c) If the ABS warning light comes on, check for DTCS. (See page BC-64)

ABS warning light goes off (normal code is output)	A
A solenoid relay DTC is output again	B

HINT:

- If the vehicle speed signal of 6 km/h or more is input with the stop light switch OFF after the ignition switch is turned to the ON position, the skid control computer performs self-diagnosis for the solenoid relay circuit.
- If the normal code is output, jiggle the connector, wire harness, and fuse of the actuator assembly, and check for DTCS.
- If a DTC is output due to vibration, check and repair the corresponding connector or wire harness.

B

REPLACE BRAKE ACTUATOR ASSEMBLY

A

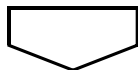
SYSTEM RETURNS TO NORMAL (DTC IS STORED DUE TO POOR CONNECTION OF CONNECTOR TERMINALS, BUT RECONNECTING CONNECTOR RETURNS SYSTEM TO NORMAL)

DTC**C1203/78****IDENTIFICATION SIGNAL ERROR TO EFI ECU****DESCRIPTION**

DTC No.	DTC Detection Condition	Trouble Area
C1203/78	Information variation and destination of the engine and driving system received from the engine control computer does not match the information stored in the skid control computer.	EFI ECU or actuator (with a built in skid control ECU) with an incorrect part number is assembled.

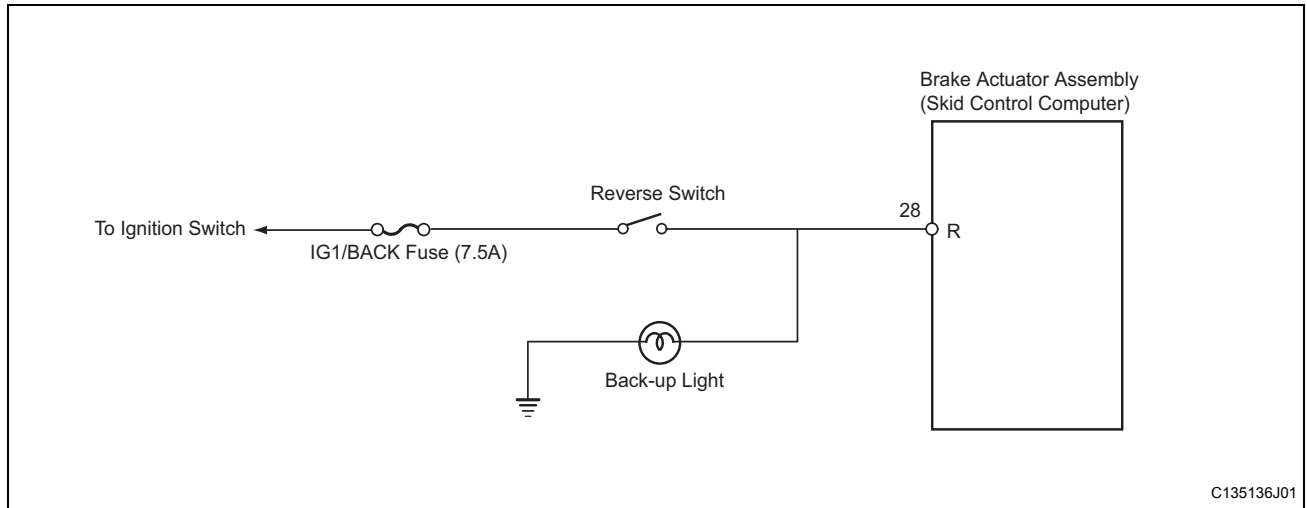
INSPECTION PROCEDURE**1****REPLACE ENGINE CONTROL COMPUTER OR SKID CONTROL COMPUTER**

- (a) Replace the part (ECU) that resulted in a DTC being output when it was replaced. Use a replacement part with the correct part number.

**END**

DTC**C1207/73****SHIFT SIGNAL (REVERSE) ERROR****DESCRIPTION**

DTC No.	DTC Detection Condition	Trouble Area
C1207/73	At a vehicle speed of 50 km/h or more, a reverse signal is input for 10 seconds or more.	- Fuse (IG1/BACK) - Wire harness or connector - Reverse switch - Back light circuit

CIRCUIT DIAGRAM**INSPECTION PROCEDURE****1****CHECK BACK LIGHT**

- (a) When the shift lever is moved to the R position, check if the back light comes on.

NG**INSPECT REVERSE SWITCH****OK****2****INSPECT FUSE (IG1/BACK FUSE)**

- (a) Remove the IG1/BACK fuse from the instrument panel J/B.
 (b) Using tester, check the fuse for continuity.

Standard:**There is continuity.****NG****REPLACE FUSES****OK****BC**

3**INSPECT WIRE HARNESS OR CONNECTOR (BETWEEN IG1 / BACK FUSE AND REVERSE SWITCH)**

- (a) Remove the IG/BACK fuse.
- (b) Disconnect the reverse switch connector.
- (c) Using a tester, check the continuity between the terminals.

Standard

Terminal No. (Terminal Symbols) IG/BACK fuse ↔ Reverse switch	Standard
2 ↔ 1	Continuity

NG**REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR****OK****4****INSPECT REVERSE SWITCH**

- (a) Disconnect the reverse switch connector.
- (b) Using a tester, check the continuity between the terminals.

Standard

Terminal No. (Terminal Symbols)	Standard
1 ↔ 2	Continuity

NG**REPLACE REVERSE SWITCH****OK****5****CHECK WIRE HARNESS OR CONNECTOR (REVERSE SWITCH ↔ SKID CONTROL COMPUTER)**

- (a) Disconnect the reverse switch connector.
- (b) Disconnect the connector of the brake actuator.
- (c) Using a tester, check the continuity between the terminals.

Standard

Terminal No. (Terminal Symbols) Reverse switch ↔ Brake actuator	Standard
2 (R) ↔ 28 (R)	Continuity

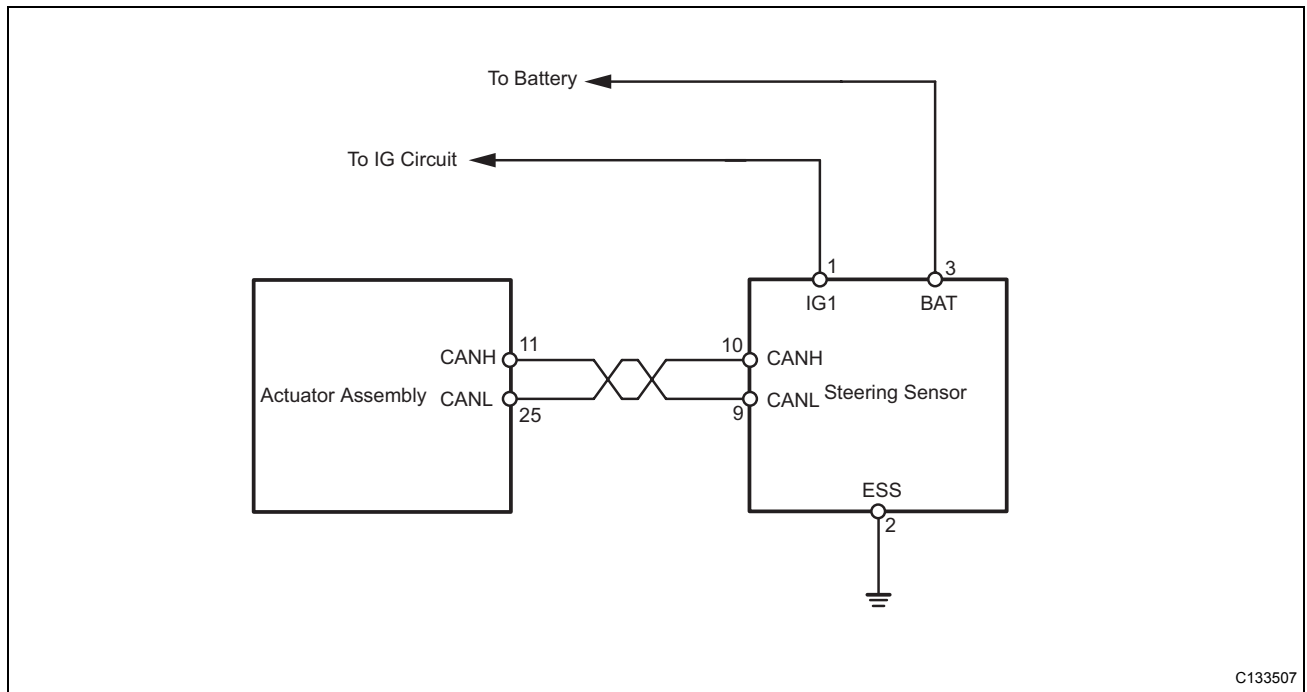
NG**REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR****OK****BC****CHECK AND REPLACE SKID CONTROL COMPUTER**

DTC**C1208/37****STEERING ANGLE SENSOR ERROR****DESCRIPTION**

The skid control computer (built into the actuator) receives signals from the steering sensor via CAN communication .

If there is a malfunction in the communication line between the skid control computer and the steering sensor, the skid control computer will output DTC C1231/19 (steering angle sensor communication error).

DTC No.	DTC Detection Condition	Trouble Area
C1208/37	With an IG1 terminal voltage 9.5 V or more, an error signal is received from the steering sensor.	• Open or short in the steering sensor power source circuit • Steering sensor • Actuator assembly

CIRCUIT DIAGRAM**INSPECTION PROCEDURE****1****CHECK FOR DTCs.**

- Clear the DTCs. (See page BC-64)
- Turn the ignition switch off.
- Turn the ignition switch to the ON position again and check for a CAN communication DTC. (See page BC-64)
- Drive the vehicle at 35 km/h or more, turn the steering wheel to the right and left, and check for speed sensor and yaw rate sensor DTCs. (See page BC-64)

Standard:

A	CAN communication, speed sensor, and yaw rate sensor DTCs are not output
B	CAN communication DTC is output

C

Speed sensor or yaw rate sensor DTC is output

HINT:

- If there is a malfunction in the speed sensor or the yaw rate sensor, an abnormal value may be output although the steering sensor is normal.
- If DTCs for the speed sensor or yaw rate sensor are output at the same time, repair them and check the steering sensor.

B

GO TO TROUBLESHOOTING FOR CAN COMMUNICATION SYSTEM

C

GO TO CORRESPONDING DTCs

A

2

INSPECT WIRE HARNESS (STEERING SOURCE POWER SOURCE SYSTEM)

- Check the steering sensor connector for looseness or poor connection.
- Disconnect the steering sensor connector.
- Check that the connector case and terminals are not deformed or corroded.

Standard:**There should be no deformation or corrosion.**

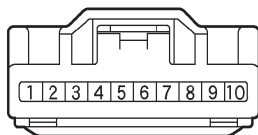
HINT:

If the steering sensor connector has a malfunction, replace the sensor.

- Using the tester, inspect the voltage and continuity between each terminal of the wire harness side connector of the steering sensor and the body ground.

Standard:

Steering Sensor
(Wire Harness Side Connector)



G027019

Inspection Terminal	Measurement Condition	Standard
1 (IG1) ↔ Body ground	IG ON	10 to 14 V
2 (ESS) ↔ Body ground	Always	Continuity
3 (BAT) ↔ Body ground	Always	10 to 14 V

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

REPLACE STEERING SENSOR

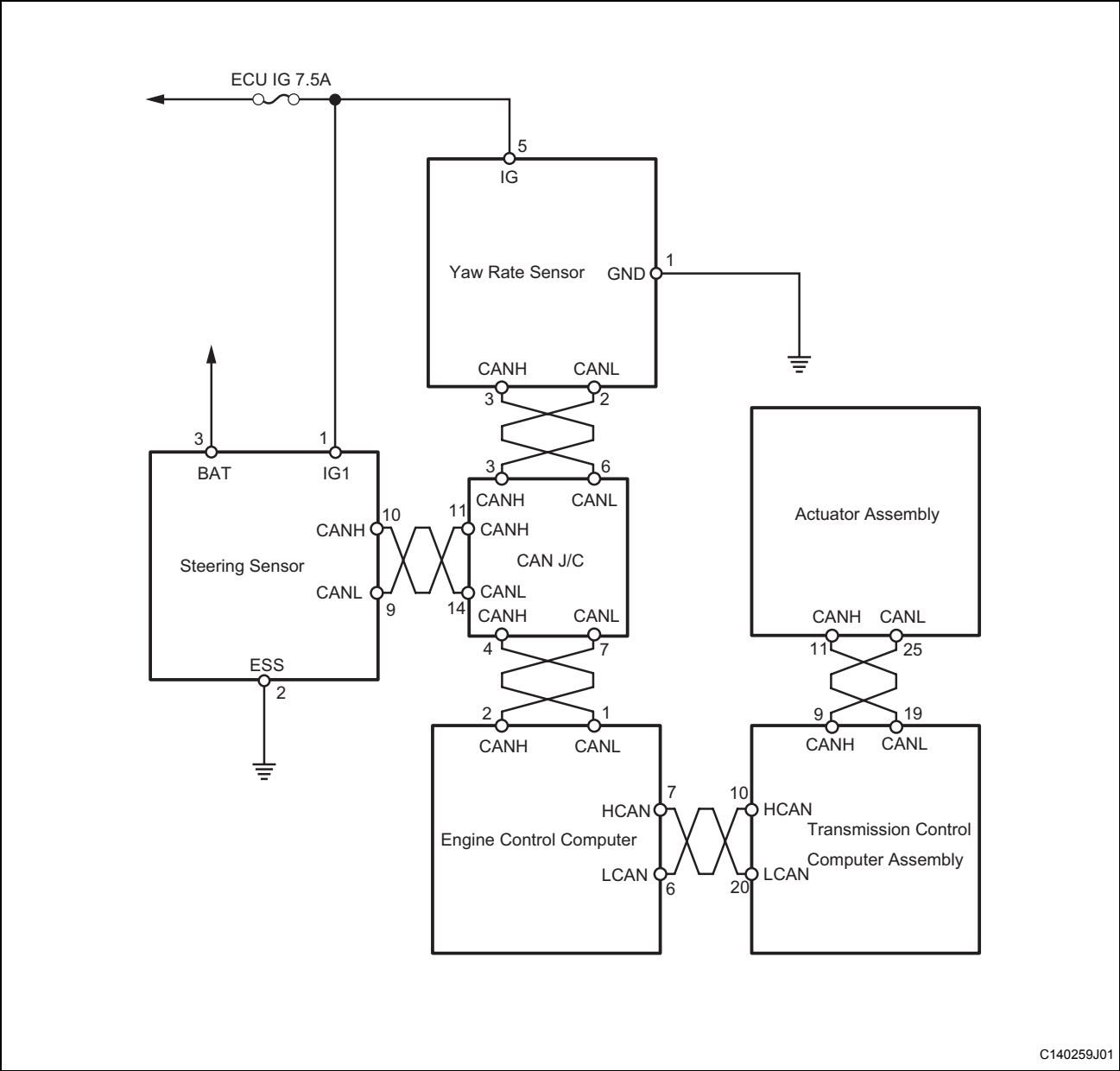
DTC	C1231/19	OPEN OR SHORT CIRCUIT, OR COMMUNICATION LOST IN STEERING ANGLE SENSOR
DTC	C1233/36	OPEN OR SHORT CIRCUIT IN YAW RATE SENSOR
DTC	C1301/79	CAN COMMUNICATION ERROR
DTC	U0100/49	EFI COMMUNICATION ERROR

DESCRIPTION

The skid control computer (built into the actuator) receives signals from the engine control computer, steering sensor, and yaw rate sensor via CAN communication .

DTC No.	DTC Detection Condition	Trouble Area
C1231/19	With the IG1 terminal voltage 10 V or more, data cannot be received from the steering sensor for 1 second or more.	Communication line between the skid control computer and steering sensor (CAN communication line)
C1233/36	With an IG1 terminal voltage of 10 V or more, data cannot be received from the yaw rate sensor for 1 second or more	Communication line between the skid control computer and yaw rate sensor (CAN communication line)
C1301/79	A condition in which the bus off state occurs once every 100 ms occurs 10 times in succession	The skid control computer CAN communication line
U0100/49	With an IG1 terminal voltage of 10 V or more and a vehicle speed of 60 km/h (37.28 mi/h) or more, data cannot be sent to the engine control computer for 2 seconds or more.	Communication line between the skid control computer and engine control computer (CAN communication line)

CIRCUIT DIAGRAM



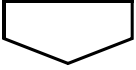
C140259J01

INSPECTION PROCEDURE

1	READ DTCS
---	-----------

BC

- (a) Record the DTCs.
- HINT:
- When a CAN communication DTC and a DTC for the sensor corresponding to the CAN communication malfunction are output at the same time, troubleshoot the sensor DTC after the CAN communication error has returned to normal.



GO TO TROUBLESHOOTING FOR CAN COMMUNICATION SYSTEM

DTC	C1235/25	FR WHEEL CYCLE ERROR
DTC	C1236/26	FL WHEEL CYCLE ERROR
DTC	C1238/27	RR WHEEL CYCLE ERROR
DTC	C1239/28	RL WHEEL CYCLE ERROR

DESCRIPTION

These DTCs are output if foreign matter attached to the speed sensor tip and sensor rotor is detected.

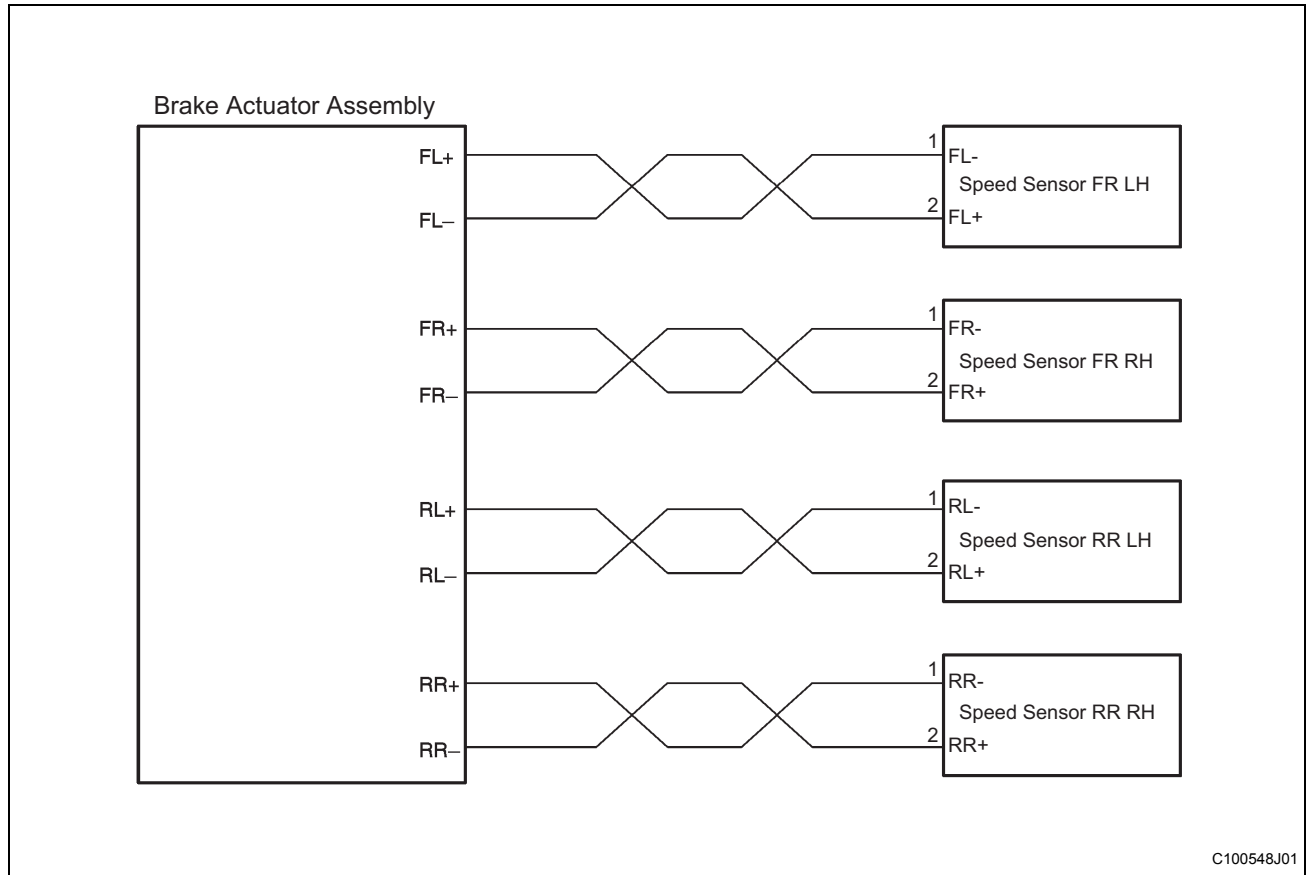
The skid control computer determines that foreign matter is attached based on errors in the waveforms input from the sensor.

These DTCs may output due to a malfunction in the speed sensor circuit connector terminals or wire harness.

If a DTC that is set due to an iron chip attachment and speed sensor system DTCs (C0200/21, C0205/22, C0210/23, C0215/24) are output simultaneously, troubleshoot the speed sensor system first. (See page BC-76)

DTC No.	DTC Detection Condition	Trouble Area
C1235/25 C1236/26 C1238/27 C1239/28	- At a vehicle speed of 10 km/h or more, the wheel speed sensor pulses are not input for 30 seconds or more. - At a vehicle speed of 10 km/h or more, with only one wheel speed 0 km/h, difference in the other three wheel speeds is 2 km/h for 0.35 seconds or more. - When the change in wheel speed exceeds 51.2 G, the condition that no pulses are input from the wheel speed sensors is detected 7 times.	- Sensor rotor malfunction (foreign matter attached, damaged) - Foreign matter attached to the speed sensor - Open or short circuit in the speed sensor - Open or short circuit in the wire harness - Improper connector contact pressure, deformation and corrosion of terminals - Speed sensor circuit wiring resistance - Actuator assembly

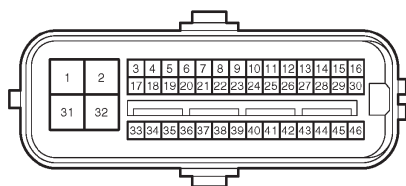
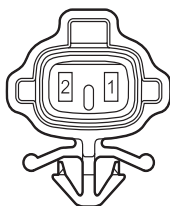
CIRCUIT DIAGRAM



INSPECTION PROCEDURE

1

INSPECT WIRE HARNESS AND CONNECTOR (BETWEEN SPEED SENSOR AND ACTUATOR ASSEMBLY)

Brake Actuator Assembly
(Vehicle Side Connector)Speed Sensor
(Vehicle Side Connector)

C136978J01

- (a) Check if the actuator assembly and speed sensor connectors are engaged properly.
- (b) Turn the ignition switch off, disconnect the connectors of the actuator assembly and speed sensor.
- (c) Check that the connector case and terminals are not deformed or corroded.

Standard:**There should be no deformation or corrosion.**

- (d) Using the tester, inspect the continuity of the wire harness between the actuator assembly and the speed sensor. Also check the insulation between the actuator assembly and the body ground.

Continuity check

Inspection Terminal (Actuator assembly ↔ Speed sensor)	Standard
3 (FR+) ↔ 1 (FR-)	Continuity
17 (FR-) ↔ 2 (FR+)	Continuity
18 (FL+) ↔ 1 (FL-)	Continuity
4 (FL-) ↔ 2 (FL+)	Continuity
5 (RR+) ↔ 1 (RR-)	Continuity
19 (RR-) ↔ 2 (RR+)	Continuity
20 (RL+) ↔ 1 (RL-)	Continuity
6 (RL-) ↔ 2 (RL+)	Continuity

Insulation Check

Inspection Terminal (Actuator Assembly)	Standard
3 (FR+) ↔ Body ground	No continuity
17 (FR-) ↔ Body ground	No continuity
18 (FL+) ↔ Body ground	No continuity
4 (FL-) ↔ Body ground	No continuity
5 (RR+) ↔ Body ground	No continuity
19 (RR-) ↔ Body ground	No continuity
20 (RL+) ↔ Body ground	No continuity
6 (RL-) ↔ Body ground	No continuity

NG

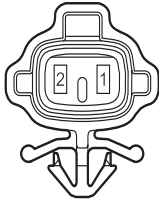
REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

BC

OK

2**INSPECT BRAKE ACTUATOR ASSEMBLY**

Speed Sensor (Vehicle Side Connector)



C133956J01

- (a) Disconnect the speed sensor connector.
- (b) Turn the ignition switch to the ON position.
- (c) Using the tester, inspect the voltage between terminal 2 of the wire harness side connector of the speed sensor and the body ground.

Standard:**6.7 to 16 V****NG****REPLACE BRAKE ACTUATOR ASSEMBLY****OK****3****RECHECK FOR DTCS.**

- (a) Perform a road test after clearing the DTCs, then recheck for DTCs. (See page BC-64)

Standard:**The normal code is output.****OK****SYSTEM RETURNS TO NORMAL (DTC IS STORED DUE TO POOR CONNECTION OF CONNECTOR TERMINALS, BUT RECONNECTING CONNECTOR RETURNS SYSTEM TO NORMAL)****NG****4****INSPECT SPEED SENSOR**

- (a) Remove the speed sensor of the corresponding wheel, and check if the sensor tip and rotor have any foreign matter attached and are not damaged.

Standard:**No foreign matter and damage on the sensor tip****NOTICE:****In the event that the speed sensor must be replaced, clean the sensor installation hole before installing the replacement part.****OK****CLEAN OR REPLACE SENSOR ROTOR****NG****BC****CLEAN OR REPLACE SPEED SENSOR**

DTC

C1241/15

LOW OR EXCESSIVE POWER SUPPLY VOLTAGE

DESCRIPTION

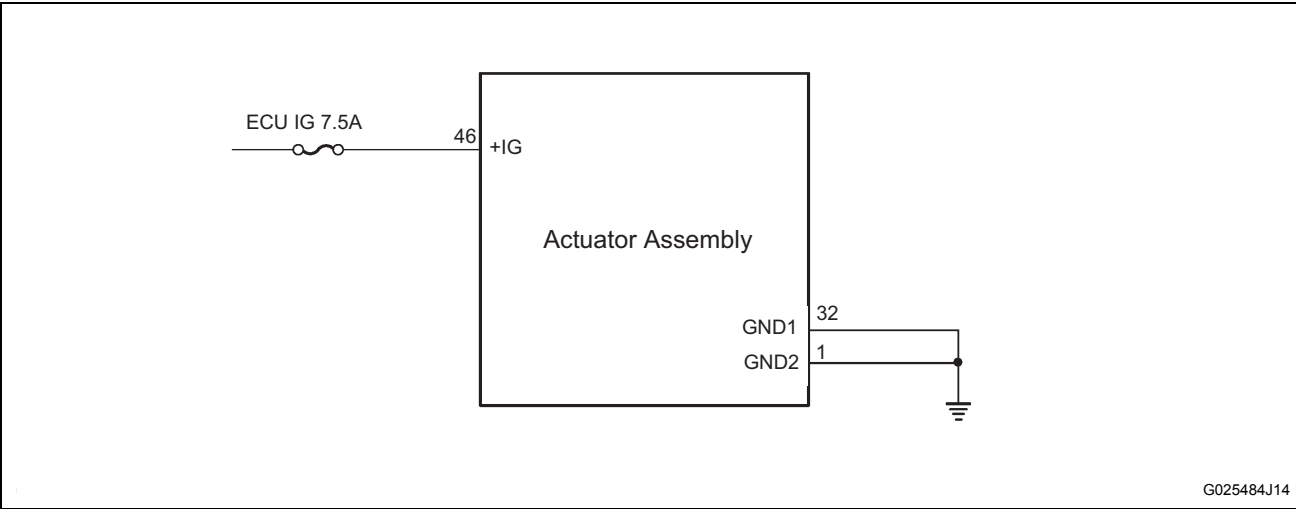
If a malfunction is detected in the power source circuit, the skid control computer (built into the actuator) will output this DTC and will prohibit operation using a fail-safe function.

This DTC is stored when the +G1 terminal voltage deviates from the DTC detection condition due to a malfunction in the power source or charging circuit such as the battery or alternator circuit.

The DTC will be released when the voltage to the +IG terminal returns to normal.

DTC No.	DTC Detection Condition	Trouble Area
C1241/15	- With the vehicle speed 3 km/h or more, the +IG terminal voltage is 10 V or less for 10 seconds or more - IG terminal voltage becomes 10 V or less while the solenoid or motor relay is ON, and the relay contact is OFF for 0.2 seconds or more - With the IG terminal voltage 10 V or less, the power source voltage for the vehicle speed sensor decreases for 60 seconds or more	- Alternator (regulator) - Open in wire harness - Improper connector contact pressure, deformation and corrosion of terminals - The power source circuit in the skid control computer

CIRCUIT DIAGRAM



INSPECTION PROCEDURE

1	INSPECT FUSE (ECU IG 10A)
---	---------------------------

- (a) Using the tester, check the continuity of the fuse (ECU IG 10A).
- Standard:
- There is continuity.

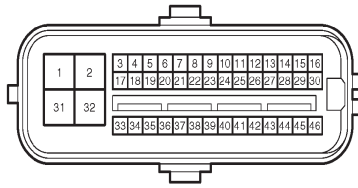
BC

OK

NG → REPLACE FUSES

2**INSPECT WIRE HARNESS (+IG, GND1, GND2)**

Actuator Assembly
(Wire Harness Side Connector)



F049362J01

- (a) Turn the ignition switch off, and disconnect the actuator assembly connector.
- (b) Check that the connector case and terminals are not deformed or corroded.

Standard:**There should be no deformation or corrosion.**

- (c) Using the tester, check the continuity between terminal 32 (GND1) of the wire harness side connector of the actuator assembly and the body ground. Also check the continuity between terminal 1 (GND2) and the body ground.

Standard:**Continuity****HINT:**

If there is a malfunction, check the ground point for looseness.

- (d) Turn the ignition switch to the ON position and inspect the voltage between terminal 46 (+IG) of the wire harness side connector of the actuator assembly and the body ground.

Standard:**10 to 14 V****NG****REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR****OK****3****RECHECK FOR DTCS.**

- (a) Recheck for DTCs. (See page BC-64)

Standard:**Normal code is output.****NG****REPLACE BRAKE ACTUATOR ASSEMBLY****OK**

SYSTEM RETURNS TO NORMAL (DTC IS STORED DUE TO POOR CONNECTION OF CONNECTOR TERMINALS, BUT RECONNECTING CONNECTOR RETURNS SYSTEM TO NORMAL)

DTC	C1244/32	OPEN OR SHORT CIRCUIT IN FRONT AND REAR G SENSOR OR SIDE SENSOR
DTC	C0371/35	YAW RATE SENSOR SIGNAL ERROR
DTC	C1245/31	FRONT AND REAR G SENSOR OR SENSOR SIGNAL ERROR

DESCRIPTION

The skid control computer (built into the actuator) receives signals from the yaw rate sensor via CAN communication .

If there is a malfunction in the communication line between the skid control computer and the yaw rate sensor, DTC C1233/36 (open or short in yaw rate sensor) will be output.

The yaw rate sensor has a built-in G sensor.

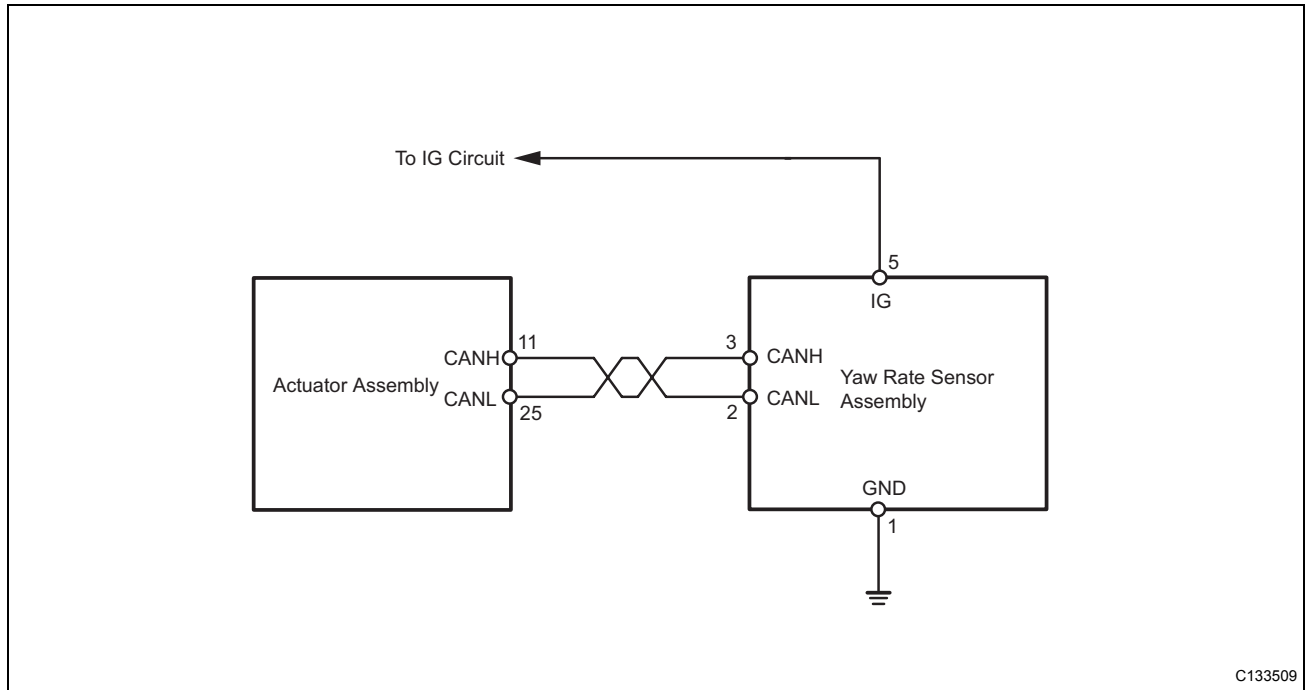
If a CAN communication DTC is output, troubleshoot the CAN communication system first.

DTC No.	DTC Detection Condition	Trouble Area
C1244/32	G sensor signal cannot be received for 1 second or more.	Yaw rate sensor (G sensor)
C0371/35	- A sensor error signal is received from the yaw rate sensor - At a vehicle speed of 15 km/h or more, the yaw rate that is calculated using the side G and wheel speed difference and the raw rate sensor value do not match for 10 seconds or more.	- Improper installation of the yaw rate sensor - Yaw rate sensor
C1245/31	- At a vehicle speed of 30 km/h or more, the difference between the forward and backward G calculated from the acceleration sensor value and that calculated from the vehicle speed sensor exceeds 0.35 G for 60 seconds or more. - A data error signal is received from the G sensor - After the difference between GL1 and GL2 becomes 0.6 G or more with the vehicle stationary, the difference remains 0.4 G or more for 60 seconds or more.	- Improper installation of the yaw rate sensor - Yaw rate sensor

DTC List

SAE DTC	ABS Light Display DTC	VSC Light Display DTC
C1244	32	32
C0371	-	35
C1245	31	31

CIRCUIT DIAGRAM



INSPECTION PROCEDURE

1

INSPECT YAW RATE SENSOR ASSEMBLY (INSTALLATION CONDITION)

- (a) Check the yaw rate sensor installation condition, and check for inclination of the sensor, deformation of the bracket, and looseness of the sensor.

Standard:

The yaw rate sensor is installed properly.

NG

INSTALL YAW RATE SENSOR CORRECTLY

OK

2

REPLACE YAW RATE SENSOR ASSEMBLY

- (a) Replace the yaw rate sensor. (See page BC-157 for removal procedure, and BC-157 for installation procedure)

NOTICE:

If the yaw rate sensor has been replaced, initialize the yaw rate and G sensors in the test mode. (See page BC-65)

BC

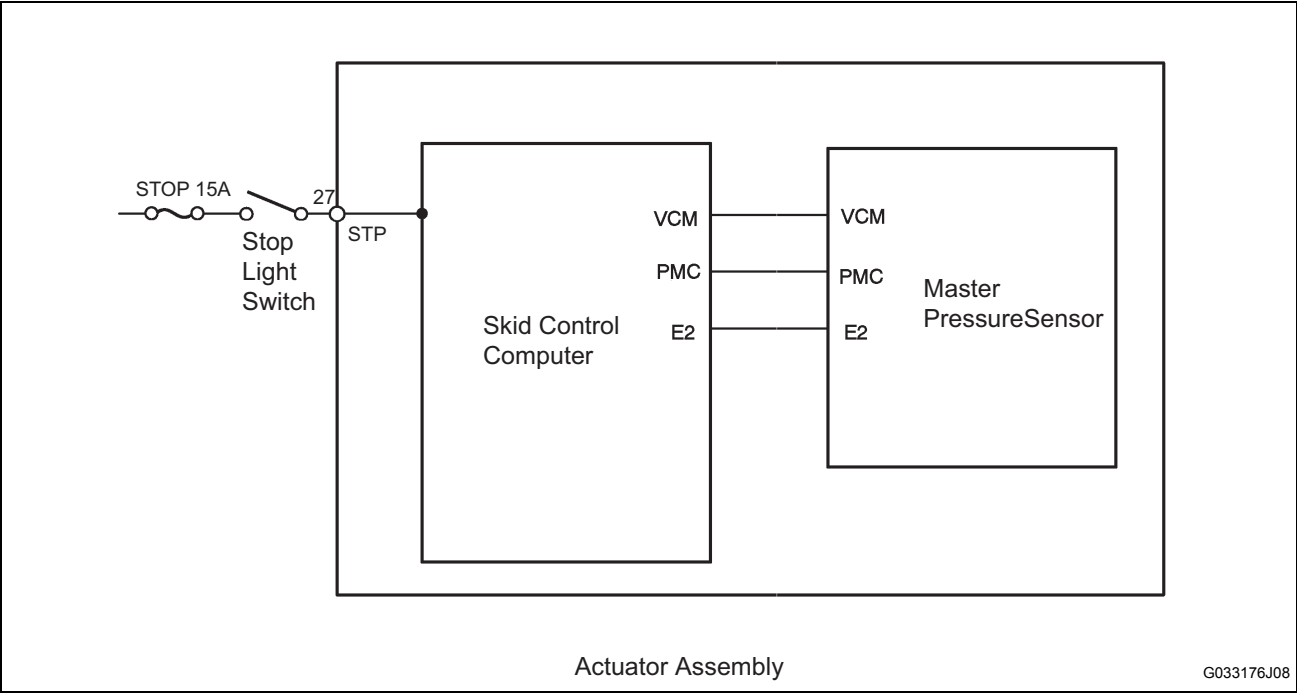
ACQUIRE YAW RATE SENSOR ZERO POINT

DTC	C1246/43	OPEN OR SHORT CIRCUIT IN MASTER FLUID PRESSURE SENSOR
-----	----------	---

DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1246/43	- With the vehicle speed 7 km/h or more and the PMC terminal voltage more than 0.86 V, the voltage does not change by 0.005 V or more for 30 seconds - Noise occurs in the PMC terminal 7 times or more for 5 seconds - When the stop light switch is OFF, the PMC terminal voltage exceeds 0.86 V or is less than 0.3 V for 6 seconds or more - With the IG1 terminal voltage between 10 and 16 V, the VCM terminal voltage deviates from the range of 4.4 to 5.6 V for 1.2 seconds or more - With the VCM terminal voltage between 4.4 and 5.6 V, the PCM terminal voltage deviates from the range of 0.19 to 4.57 V for 1.2 seconds or more	- Malfunction in the master pressure sensor in the actuator - Stop light circuit - Stop light switch - Open or short circuit in the wire harness - Improper connector contact pressure, deformation and corrosion of the terminals - Actuator assembly

CIRCUIT DIAGRAM



G033176J08

BC INSPECTION PROCEDURE

1	INSPECT STOP LIGHT OPERATION
---	------------------------------

- (a) Turn the ignition switch to the ON position, depress the brake pedal, and check that the stop light comes on.
- Standard:**
The illumination comes on.

NG

INSPECT STOP LIGHT CIRCUIT

OK

2

DATA LIST (STOP SWITCH, MASTER PRESSURE SENSOR 1)

- (a) Using the DS-II, inspect the data list of the stop light switch and master pressure sensor. (See page BC-72)

ECU DATA LIST

Item	Item Description	Inspection Condition	Standard
STOP SW	Indicates activation of the stop light switch	Brake pedal depressed $\leftrightarrow$ Not depressed	ON $\leftrightarrow$ OFF
Master pressure sensor 1	Indicates the master pressure sensor output value Displayed range: 0 to 5 V	The brake pedal is operated	Proportional to the pedaling force

NG

REPLACE BRAKE ACTUATOR ASSEMBLY

OK

3

RECHECK FOR DTCS.

- (a) Perform a road test after clearing the DTCs, then recheck for DTCs. (See page BC-64)

DTC is not output	A
Master pressure sensor DTC is output again	B

B

REPLACE BRAKE ACTUATOR ASSEMBLY

A

SYSTEM RETURNS TO NORMAL (DTC IS STORED DUE TO POOR CONNECTION OF CONNECTOR TERMINALS, BUT RECONNECTING CONNECTOR RETURNS SYSTEM TO NORMAL)

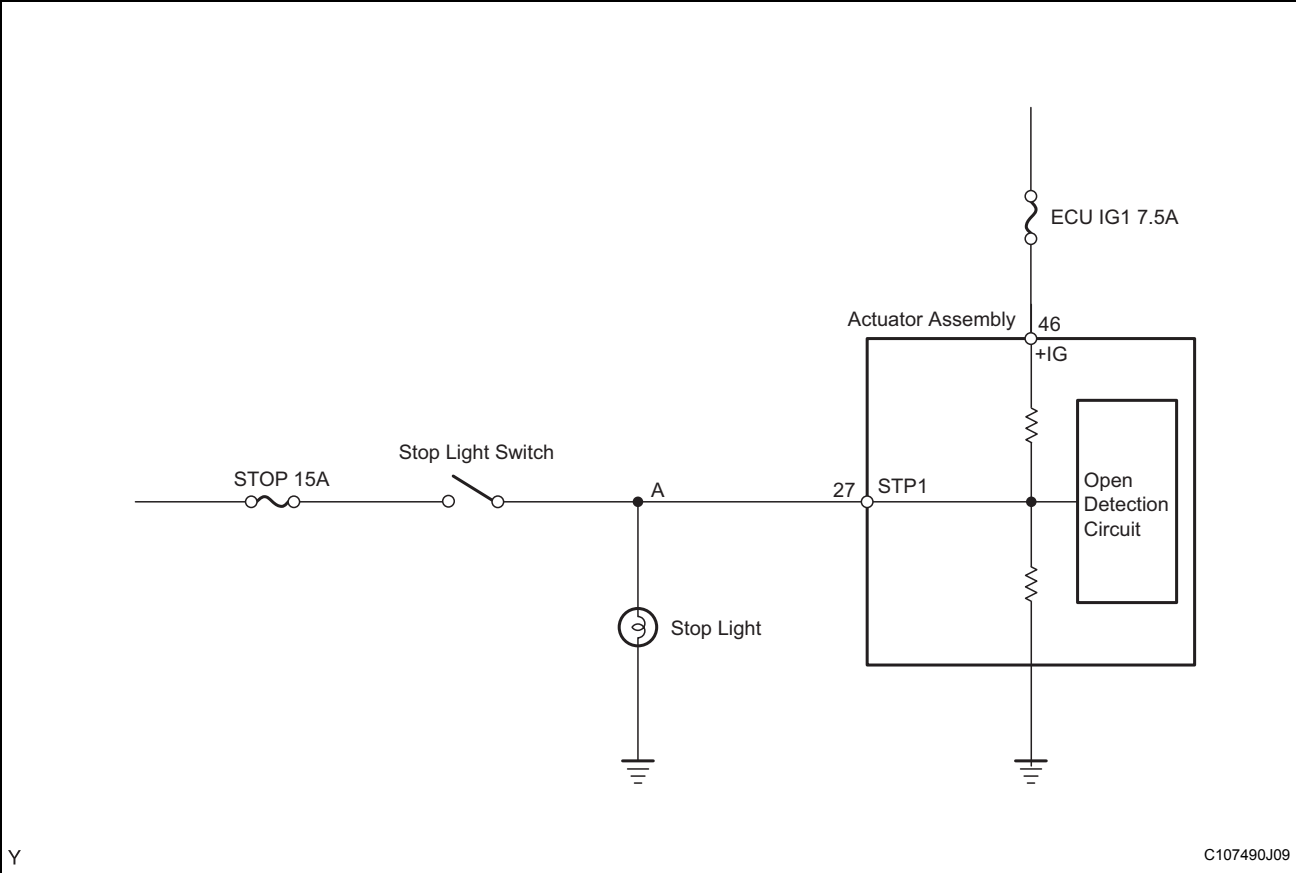
DTC	C1249/39	STOP LIGHT SW ERROR
-----	----------	---------------------

DESCRIPTION

The skid control computer (built into the actuator) receives stop light switch signals and detects the status of braking operation. The skid control computer has an internal open detection circuit and outputs this code when an open in the stop light signal input line is detected.

DTC No.	DTC Detection Condition	Trouble Area
C1249/39	With the IG terminal voltage 10 to 16 V, an open in the stop light switch circuit (between A and B, or between A and body ground) continues for 0.3 seconds or more.	• STOP fuse • Open in the stop light switch wire harness • STOP LIGHT SWITCH ASSEMBLY • Improper connector contact pressure, deformation and corrosion of terminals • Open in the actuator ground • Actuator assembly • Stop light bulb burnt out

CIRCUIT DIAGRAM



BC INSPECTION PROCEDURE

1	INSPECT FUSE (STOP 15A)
---	-------------------------

- (a) Inspect the fuse (STOP 15A).
Standard:
The fuse is normal.

NG

REPLACE FUSES

OK

2

INSPECT STOP LIGHT OPERATION

- (a) Depress the brake pedal and check that the stop light comes on.

Standard:

The illumination comes on.

NG

INSPECT STOP LIGHT CIRCUIT

OK

3

INSPECT WIRE HARNESS AND CONNECTOR (BETWEEN ACTUATOR ASSEMBLY AND SPEED SENSOR)

- (a) Turn the ignition switch off and disconnect the brake actuator and stop light switch connectors.
- (b) Check that the connector case and terminals are not deformed or corroded.

Standard:

There should be no deformation or corrosion.

- (c) Using the tester, inspect the continuity of the wire harness between terminal 27 (STP1) of the brake actuator assembly and terminal 1 of the stop light switch assembly. Also check the insulation between the brake actuator assembly terminal and the body ground.

Standard:

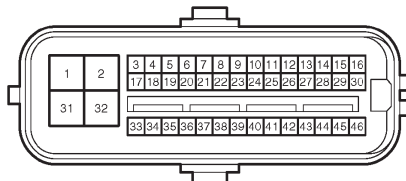
There should be continuity between the terminals.

There should be no continuity between the terminals and the body ground.

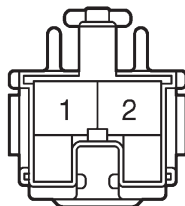
NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

Actuator Assembly
(Wire Harness Side Connector)



Stop Lamp Switch Assembly
(Wire Harness Side Connector)



C110615J07

OK

4

INSPECT STOP LIGHT SWITCH ASSEMBLY

- (a) Using the tester, check the continuity between terminals 1 and 2 of the stop light switch assembly.

BC

Standard:
When the shaft is depressed, there should be no continuity.
When the shaft is not depressed, there should be continuity.

NG

REPLACE STOP LIGHT SWITCH ASSEMBLY

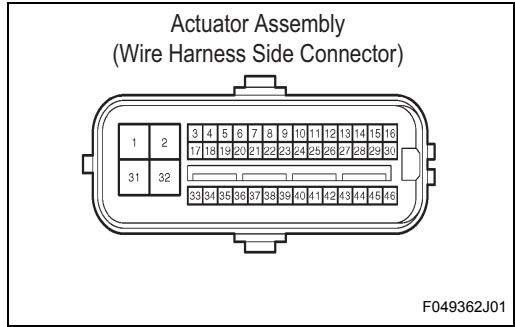
OK

5

INSPECT WIRE HARNESS AND CONNECTOR (GND1, GND2)

- (a) Turn the ignition switch off, and disconnect the brake actuator assembly connector.
- (b) Using the tester, check the continuity between terminals 1 (GND2) and 32 (GND1) of the brake actuator assembly wire harness side connector and the body ground.

Standard:
Continuity
HINT:
If there is a malfunction, check the bolt of the ground point for looseness.



NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

6

RECHECK FOR DTCS.

- (a) Perform a road test after clearing the DTCs, then recheck for DTCs. (See page BC-64)

DTC is not output	A
DTC is output	B

B

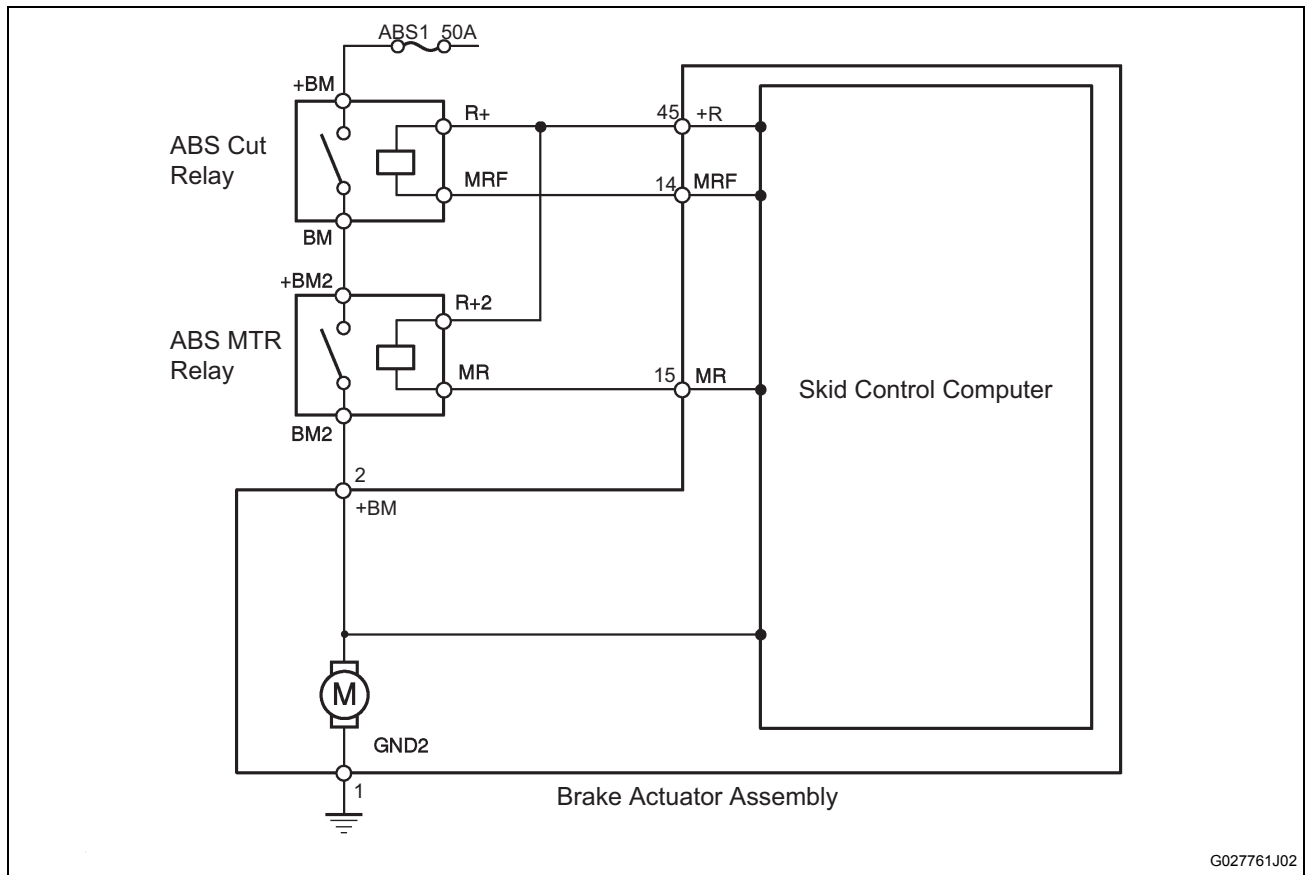
REPLACE BRAKE ACTUATOR ASSEMBLY

A

SYSTEM RETURNS TO NORMAL (DTC IS STORED DUE TO POOR CONNECTION OF CONNECTOR TERMINALS, BUT RECONNECTING CONNECTOR RETURNS SYSTEM TO NORMAL)

DTC**C1251/51****PUMP MOTOR SYSTEM/RESERVOIR SYSTEM****DESCRIPTION**

DTC No.	DTC Detection Condition	Trouble Area
C1251/51	- The actuator pump drive motor is not rotating properly - Open circuit in the actuator pump drive motor continues for 2 seconds or more	- Open in wire harness - Improper connector contact pressure, deformation and corrosion of the terminals - Actuator assembly ground malfunction - Open in the motor in the actuator assembly

CIRCUIT DIAGRAM**INSPECTION PROCEDURE****1****DTC CHECK**

(a) Check for DTCs.

A	C0273/13 and C0274/14 are not output.
B	C0273/13 and C0274/14 are output.

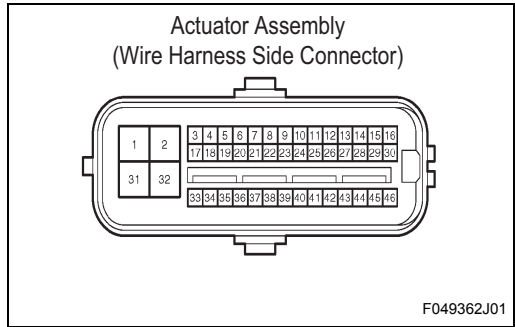
B**GO TO RELEVANT FLOW CHART****A****BC**

2

INSPECT WIRE HARNESS AND CONNECTOR (BETWEEN ACTUATOR ASSEMBLY AND BODY GROUND)

- (a) Check that the speed sensor connector is connected.
- (b) Turn the ignition switch off, and disconnect the actuator assembly connector.
- (c) Check that the connector case and terminals are not deformed or corroded.
- Standard:
There should be no deformation or corrosion.
- (d) Using the tester, inspect the continuity between the 1 (GND2) terminal of the wire harness side connector of the brake actuator assembly and the body ground.

Standard:
Continuity



NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

3

RECHECK FOR DTCs.

- (a) After clearing the DTCs, recheck for DTCs. (See page BC-64)

DTC is not output	A
A motor system DTC is output again	B

B

REPLACE BRAKE ACTUATOR ASSEMBLY

A

SYSTEM RETURNS TO NORMAL (DTC IS STORED DUE TO POOR CONNECTION OF CONNECTOR TERMINALS, BUT RECONNECTING CONNECTOR RETURNS SYSTEM TO NORMAL)

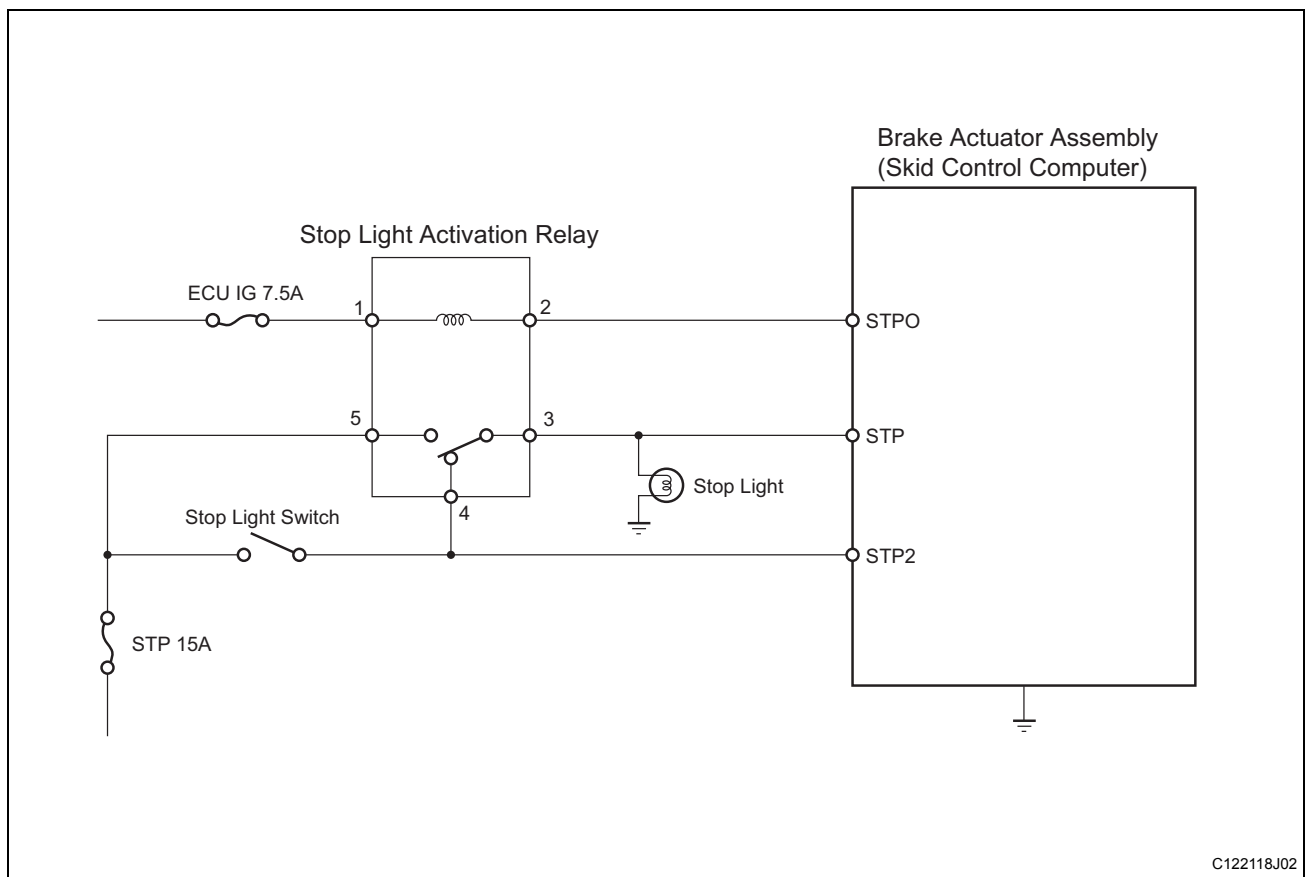
DTC	C1380/66	STOP LIGHT DRIVING RELAY SYSTEM MALFUNCTION
-----	----------	---

DESCRIPTION

With the Downhill Assist Control System (DAC) and the Hill Assist Control (HAC) activated, the stop light drive relay is turned on to illuminate the stop light.

DTC No.	DTC Detection Condition	Trouble area
C1380/66	- With the +IG terminal voltage between 10 and 14 V, when the stop light drive output (STOP0) is ON, no signals are input in the STP1 terminal for 5 seconds or more - With the +IG terminal voltage between 10 and 14 V, when the stop light drive output (STOP0) is OFF, signals input in STP1 and STP2 terminals are different for 5 seconds or more	- Stop light drive relay - Wire harness - Stop light drive relay circuit

CIRCUIT DIAGRAM



INSPECTION PROCEDURE

1	INSPECT STOP LIGHT OPERATION
---	------------------------------

- (a) Turn the ignition switch to the ON position, depress the brake pedal, and check that the stop light comes on.

Standard:
The stop light comes on.

NG

INSPECT STOP LIGHT CIRCUIT

OK

2

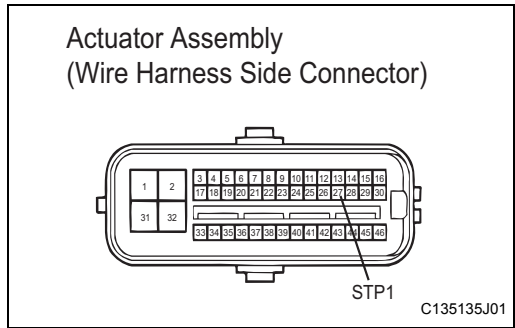
INSPECT BRAKE ACTUATOR ASSEMBLY (STP1 TERMINAL)

- (a) Disconnect the brake actuator assembly connector.
- (b) Check that the connector case and terminals are not deformed or corroded.

Standard:
There should be no deformation or corrosion.

- (c) Using the tester, measure the voltage between the brake actuator assembly and the body ground.

Standard



Inspection Terminal (Brake Actuator Assembly)	Inspection Condition	Standard
27 (STP1) ↔ Body ground	Stop light switch ON	8 to 14 V
27 (STP1) ↔ Body ground	Stop light switch OFF	1.5 V or less

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

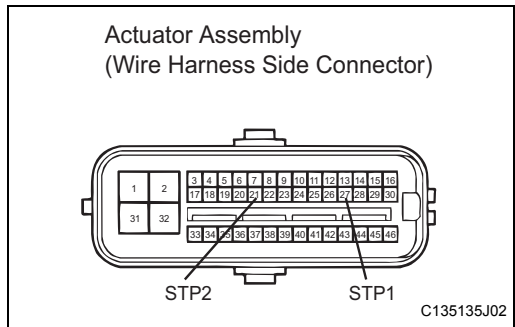
OK

3

INSPECT BRAKE ACTUATOR ASSEMBLY (STP2 TERMINAL)

- (a) Turn the ignition switch off, and disconnect the brake actuator assembly connector.
- (b) Using the tester, inspect the continuity of the wire harness side connector of the brake actuator assembly.

Standard



Inspection Terminal (Brake Actuator Assembly)	Standard
27 (STP1) ↔ 21 (STP2)	Continuity

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

BC

OK

4

INSPECT STOP LIGHT DRIVE RELAY (POWER SOURCE SYSTEM)

- (a) Remove the stop light drive relay.
- (b) Turn the ignition switch to the ON position.
- (c) Using the tester, inspect the voltage between the stop light drive relay and body ground.

Standard

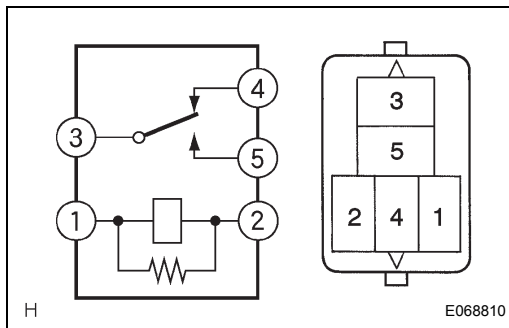
Inspection Terminal (Stop Light Drive Relay)	Inspection Condition	Standard
1 ↔ The body ground	IG ON	8 to 14 V
5 ↔ The body ground	IG ON	8 to 14 V

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

5 INSPECT STOP LIGHT DRIVE RELAY



- (a) Using the tester, check the continuity of the stop light drive relay.

Standard

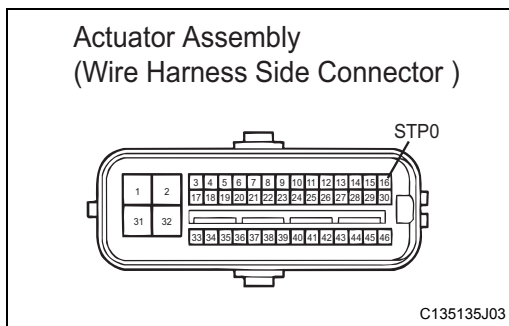
Inspection Terminal (Stop Light Drive Relay)	Standard
3-4	Continuity
3-5	No continuity
3-4	No continuity (Battery (+) is connected to terminal 1, battery (-) is connected to terminal 2)
3-5	Continuity (Battery (+) is connected to terminal 1, battery (-) is connected to terminal 2)

NG

REPLACE STOP LIGHT DRIVE RELAY

OK

6 INSPECT BRAKE ACTUATOR ASSEMBLY (STP0 TERMINAL)



- (a) Disconnect the brake actuator assembly connector.
 (b) Using the tester, measure the voltage between the brake actuator assembly and the body ground.

Standard

Inspection Terminal (Brake Actuator Assembly)	Inspection Condition	Standard
16 (STP0) - Body ground	IG ON	10 to 14 V

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

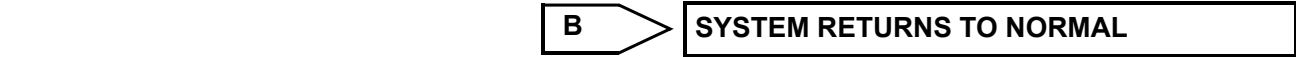
7 RECHECK FOR DTCs.

- (a) Recheck for DTCs. (See page BC-64)

BC

Standard

A	DTC is output
B	DTC is not output



REPLACE BRAKE MASTER CYLINDER SOLENOID

DTC	C1381/38	YAW AND G SENSOR POWER SOURCE VOLTAGE MALFUNCTION
-----	----------	---

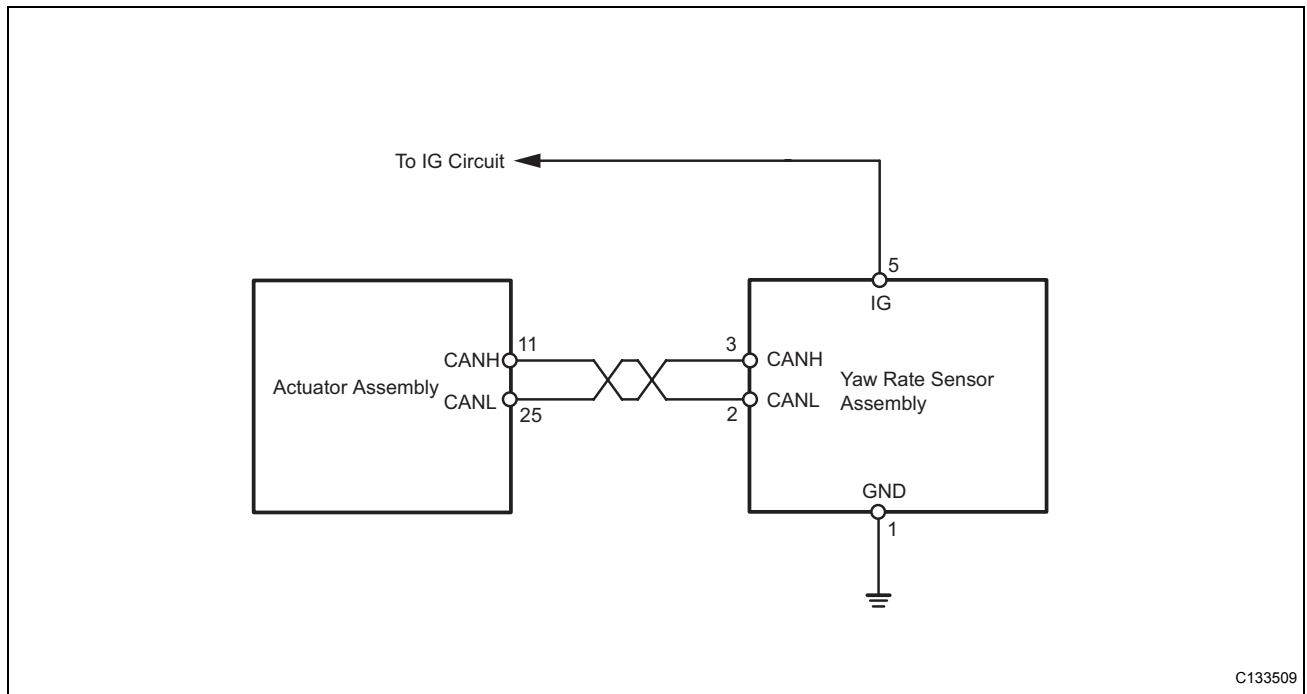
DESCRIPTION

This code is output when there is a malfunction in the power source system of the yaw rate sensor assembly (with a built-in G sensor).

This code may be recorded due to a temporary reduction in the power source voltage.

DTC No.	DTC Detection Condition	Trouble Area
C1381/38	With the vehicle speed 3 km/h or more, a signal that indicates a G sensor power source malfunction is received for 10 seconds or more	- Improper contact pressure, deformation and corrosion (IG terminal) of the yaw rate sensor assembly - Power source circuit for the yaw rate sensor assembly (with a built-in G sensor)

CIRCUIT DIAGRAM



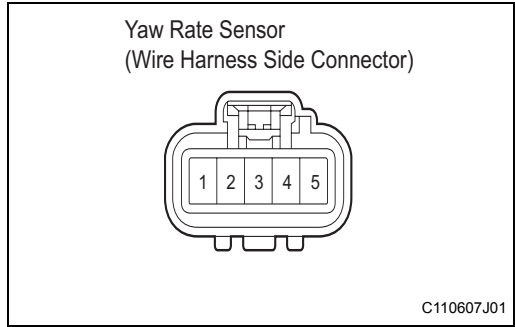
INSPECTION PROCEDURE

1	CHECK WIRE HARNESS
----------	---------------------------

- Check the yaw rate sensor connector for looseness or poor connection.
- Disconnect the yaw rate sensor assembly connector.
- Check that the connector case and terminals are not deformed or corroded.

Standard:

There should be no deformation or corrosion.



- (d) Using the tester, inspect the voltage between each terminal of the wire harness side connector of the yaw rate sensor assembly and the body ground.

Standard:

Inspection Terminal	Measurement Condition	Standard
5 (IG) ↔ Body ground	IG ON	10 to 14 V
1 (GND) ↔ Body ground	Always	Continuity

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

OK

2 **Recheck for DTCs.**

- (a) Perform a road test after clearing the DTCs, then recheck for DTCs.
(See page BC-64)

Standard

A	DTC is not output
B	The sensor power source DTC is output again

B → **REPLACE YAW RATE SENSOR ASSEMBLY**

A

SYSTEM RETURNS TO NORMAL (DTC IS STORED DUE TO POOR CONNECTION OF CONNECTOR TERMINALS, BUT RECONNECTING CONNECTOR RETURNS SYSTEM TO NORMAL)

ABS WARNING LIGHT REMAINS ON

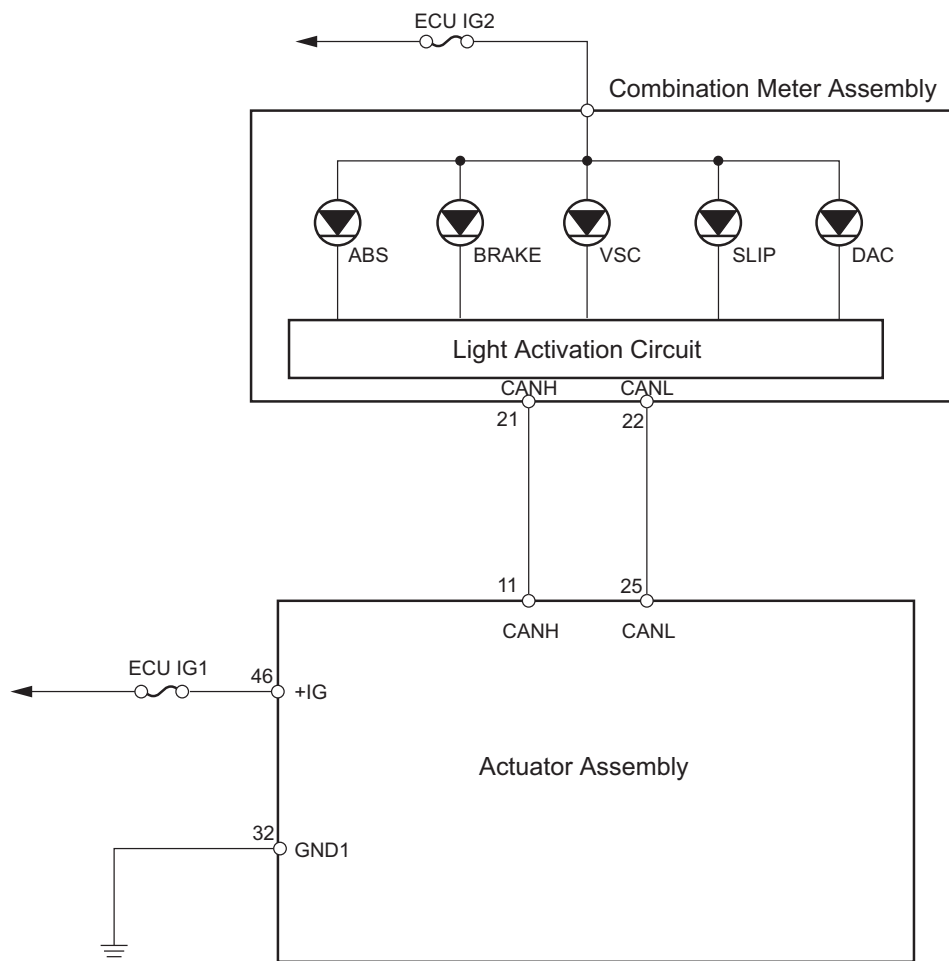
DESCRIPTION

This section indicates the troubleshooting when DTC output is normal but the ABS warning light remains on.

If the power source voltage of the skid control computer (built into the brake actuator assembly) is abnormally high, the skid control computer will illuminate the ABS warning light and stop the operation and response as a fail-safe function.

When the power source voltage input (+IG) circuit of the skid control computer is opened and disconnected, the ABS warning light will remain on.

CIRCUIT DIAGRAM



INSPECTION PROCEDURE

1

CONNECTION CONDITION OF EACH PART

- (a) Slightly jiggle the connector and wire harness of the actuator assembly vertically and horizontally and check the condition of the ABS warning light.

Standard:

There should be no change in the warning light.

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

2

INSPECT CAN COMMUNICATION SYSTEM FOR CONTROL

- (a) Using the DS-II, check for DTCs and confirm that there are no problems with the CAN communication system. (See page CA-10)

Standard:

DTC is normal.

B

GO TO CAN COMMUNICATION SYSTEM FOR CONTROL

A

3

INSPECT BRAKE ACTUATOR ASSEMBLY (+IG, GND1, GND2)

- (a) Check that the connector case and terminals are not deformed or corroded.

Standard:

There should be no deformation or corrosion.

- (b) Using the tester, check the continuity between terminals 32 (GND1) and 1 (GND2) of the wire harness side connector of the actuator assembly and the body ground.

Standard:**Continuity****HINT:**

If there is a malfunction, check the ground point for looseness.

- (c) Turn the ignition switch to the ON position. Using the tester, inspect the voltage between terminals 46 (+IG) and 32 (GND1), 1 (GND2) of the wire harness side connector of the actuator assembly.

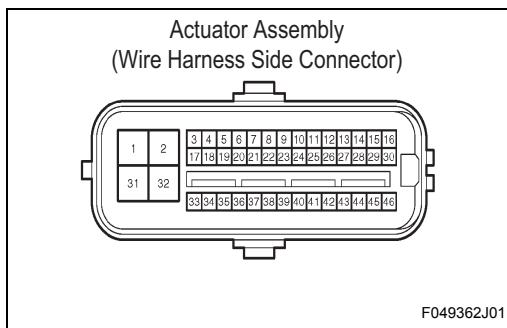
Standard:

10 to 14 V

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK



BC

4**PERFORM ACTIVE TEST (ABS WARNING LIGHT)**

- (a) Using the DS-II, perform an active test of the ABS warning light. (See page BC-72)

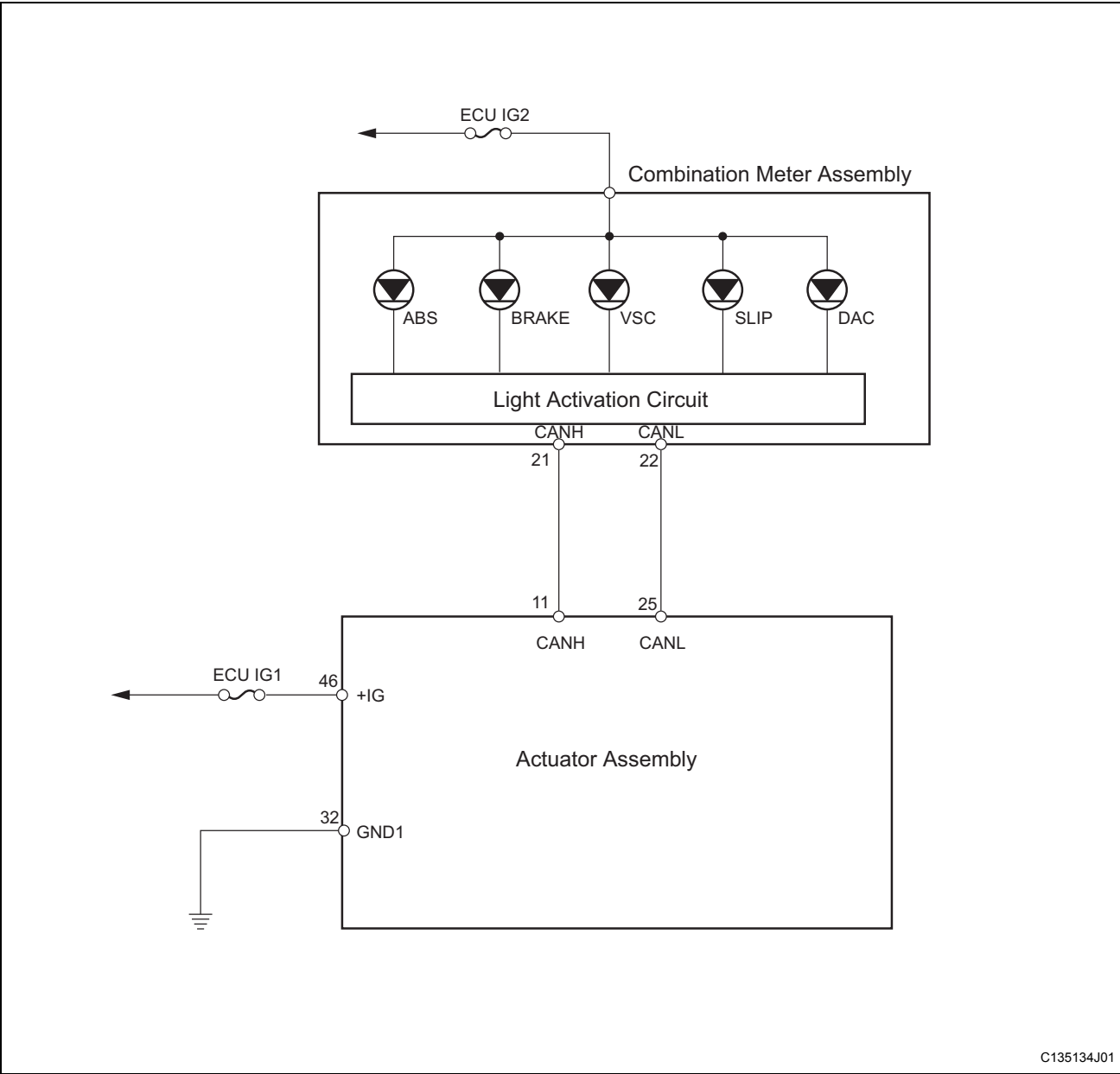
Standard:

The brake warning light goes off.

NG**GO TO METER AND GAUGE SYSTEM****OK****REPLACE BRAKE ACTUATOR ASSEMBLY**

BRAKE WARNING LIGHT REMAINS ON

CIRCUIT DIAGRAM



C135134J01

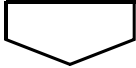
INSPECTION PROCEDURE

BC

1	PRE-CHECK
---	-----------

- (a) Check that the following conditions are satisfied:
- (1) The ABS warning light is turned off.
HINT:
If the ABS warning light remains on, release it first.
 - (2) The brake fluid level in the brake master cylinder reservoir is sufficient.

(3) The parking brake is completely released.

**2****CONNECTION CONDITION OF EACH PART**

- (a) Slightly jiggle each connector and wire harness vertically and horizontally, and check the condition of the brake warning light.

Standard:

There should be no change in the warning light.

HINT:

If the lighting condition of the warning light is changed due to vibration of the connector and wire harness of the actuator assembly, check for a malfunction in the contact point of terminals +IG and PKB.

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

3**INSPECT CAN COMMUNICATION SYSTEM FOR CONTROL**

- (a) Using the DS-II, check for DTCs and confirm that there are no problems with the CAN communication system. (See page CA-10)

Standard:

DTC is normal.

NG

GO TO CAN COMMUNICATION SYSTEM FOR CONTROL

OK

4**DATA LIST (PKB)**

- (a) Using the DS-II, inspect the data list of the parking brake switch. (See page BC-72)

ECU DATA LIST

Item (Symbol)	Item Description	Inspection Condition	Standard	Problem Area
PKB	Indicates activation of the parking brake	Parking brake Engaged ↔ Released	ON ↔ OFF	Parking brake switch system

NG

GO TO STEP 9

OK

5**INSPECT BRAKE MASTER CYLINDER RESERVOIR (FLUID LEVEL WARNING SWITCH)**

- (a) Disconnect the brake fluid level warning switch connector with the fluid level sufficient, and check the display of the brake warning light.

Standard:

The brake warning light should not go off.

HINT:
If the light goes off, there is a short circuit in the level warning switch.

NG

REPLACE BRAKE MASTER CYLINDER RESERVOIR

OK

6

INSPECT WIRE HARNESS AND CONNECTOR (BETWEEN COMBINATION METER ASSEMBLY AND FLUID LEVEL WARNING SWITCH)

- (a) Turn the ignition switch off and disconnect the fluid level warning switch connector.
- (b) Using the tester, check the insulation between terminals of the fluid level warning switch connector.

Standard:
There is no continuity.

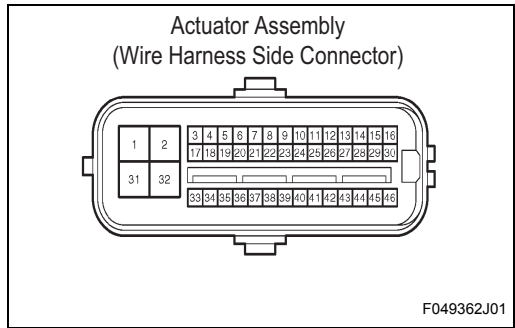
NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

7

INSPECT BRAKE ACTUATOR ASSEMBLY (+IG, GND1, GND2)



- (a) Check that the connector case and terminals are not deformed or corroded.

Standard:
There should be no deformation or corrosion.

- (b) Using the tester, check the continuity between terminals 32 (GND1) of the wire harness side connector of the actuator assembly and the body ground.

Standard:
Continuity

HINT:
If there is a malfunction, check the ground point for looseness.

- (c) Turn the ignition switch to the ON position. Using the tester, inspect the voltage between terminals 46 (+IG) and 32 (GND1) of the wire harness side connector of the actuator assembly.

Standard:
10 to 14 V

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

BC

8

PERFORM ACTIVE TEST (BRAKE WARNING LIGHT)

- (a) Using the DS-II, perform an active test of the brake warning light. (See page BC-72)

Standard:
The brake warning light goes off.

NG

GO TO METER AND GAUGE SYSTEM

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

9

INSPECT PARKING BRAKE SWITCH ASSEMBLY

- (a) Using the tester, check the continuity between the parking brake switch assembly and the body ground when the switch is operated.

Standard:

There should be continuity when the switch shaft is not pushed in.

When the shaft is depressed, there should be no continuity.

NG

REPLACE PARKING BRAKE SWITCH ASSEMBLY

OK

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

SLIP INDICATOR LIGHT SYSTEM

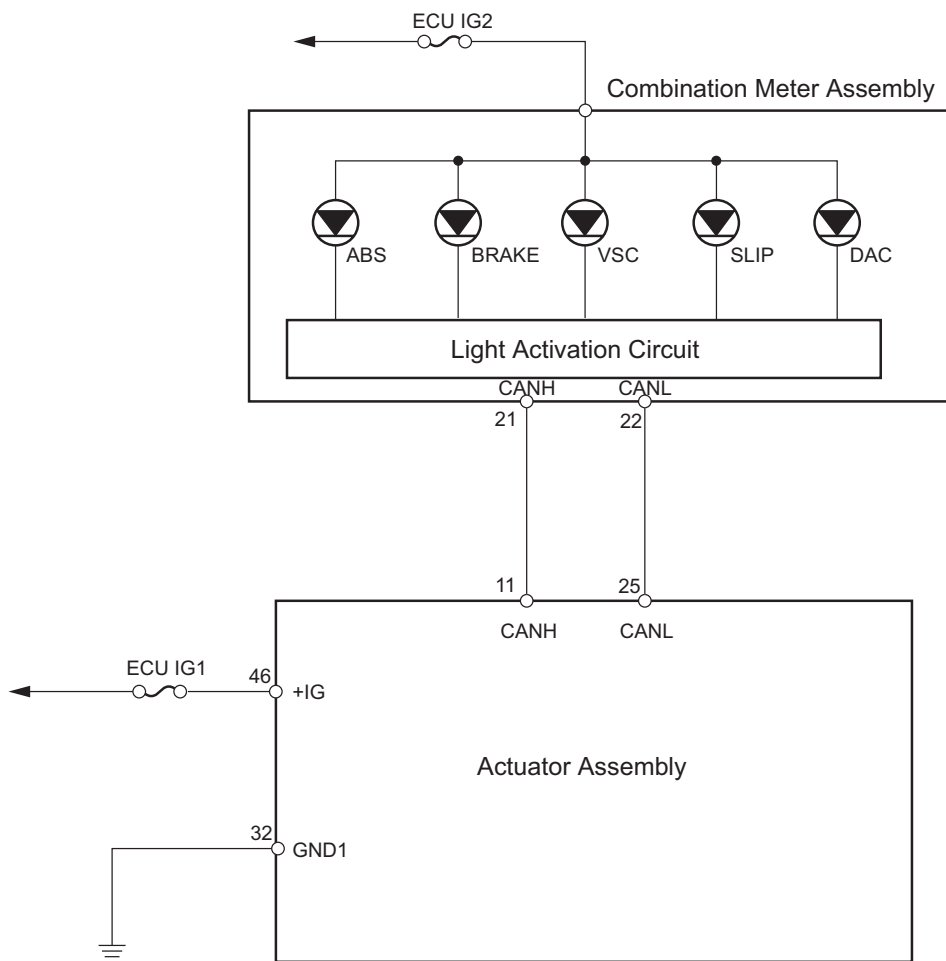
DESCRIPTION

When slip control is activated, the slip indicator light blinks to inform the driver that slip is occurring and that the system is activating.

While the TRC and VSC are prohibited due to a malfunction in the ABS and VSC systems, the slip indicator light will come on together with each warning light.

The slip indicator light comes on when the TRC OFF switch is pushed and the TRC function is prohibited.

CIRCUIT DIAGRAM



INSPECTION PROCEDURE**1****INSPECT CAN COMMUNICATION SYSTEM FOR CONTROL**

- (a) Using the DS-II, check for DTCs and confirm that there are no problems with the CAN communication system. (See page CA-10)

Standard:**DTC is normal.****NG****GO TO CAN COMMUNICATION SYSTEM
FOR CONTROL****OK****2****PERFORM ACTIVE TEST (SLIP INDICATOR)**

- (a) Using the DS-II, perform an active test of the slip indicator light. (See page BC-72)

Standard:**The light blinks or or goes out in accordance with DS-II operation.****NG****GO TO METER AND GAUGE SYSTEM****OK****REPLACE BRAKE ACTUATOR ASSEMBLY**

SKID CONTROL BUZZER (VSC BUZZER) DOES NOT SOUND

INSPECTION PROCEDURE

1	PERFORM ACTIVE TEST (VSC BUZZER)
---	----------------------------------

- (a) Using the DS-II, perform an active test of the skid control buzzer (VSC buzzer). (See page BC-72)

Standard:

The buzzer should sound.

OK	NO PLOBLEM
----	------------

NG

GO TO METER AND GAUGE SYSTEM

ABS ACTIVATION TIMING IS EARLY (ABS ACTIVATES BEFORE THE WHEELS LOCK)

DESCRIPTION

Noise mixed in with the signals output from the wheel speed sensors may cause ABS to activate early. Troubleshoot the problem using the procedure below.

INSPECTION PROCEDURE

1**TEST MODE INSPECTION (SPEED SENSOR)**

- (a) Enter the test mode and check the speed sensors, then check for test mode codes and DTCs. (See page BC-65)

Standard:

Test mode codes should be cleared normally and the normal code should be output.

NG**INSPECT AND REPAIR CORRESPONDING SPEED SENSORS****OK****CLEAN SPEED SENSORS AND ROTORS OF FOUR WHEELS**

VSC DOES NOT OPERATE (DIFFICULT TO OPERATE)

INSPECTION PROCEDURE

1

CUSTOMER PROBLEM ANALYSIS

- (a) Interview the customer to confirm the condition of the VSC warning light when the VSC system did not operate.

Standard:

The light should have come on.

HINT:

When the VSC warning light is on (a DTC is output), the VSC will not operate due to a fail-safe function.

- (b) Interview the customer to confirm if the vehicle speed was 15 km/h or less when the VSC system did not operate.

Standard:

The vehicle speed was 15 km/h or less.

HINT:

The VSC does not operate when the vehicle speed is 15 km/h or less.

OK

NO PROBLEM

NG

2

CHECK FOR DTCS.

- (a) Check that the VSC warning light is on.
(b) Check for DTCS using the DS-II. (See page BC-64)

Standard:

The normal code is output.

NG

GO TO CORRESPONDING DTCS

OK

3

CHECK TIRE SIZE

- (a) Check if tires of the specified size are installed.

Standard:

Tires of the specified size should be installed.

NG

RETURN TO THE SPECIFIED SIZE

OK

4

INSPECT YAW RATE SENSOR

- (a) Check the yaw rate sensor installation.

Standard:

The yaw rate sensor is installed properly.

NG

INSTALL PROPERLY

OK

ACQUIRE YAW RATE SENSOR AND G SENSOR ZERO POINT AGAIN

BRAKE PEDAL LOW (FLUID LEAKS OR AIR IN SYSTEM)

INSPECTION PROCEDURE

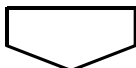
1

PRE-CHECK

- (a) Inspect the brake pedal.
 - (1) Operate the brake pedal and check for mechanical problems.
 - (2) Inspect the height, free play and pedal reserve distance of the brake pedal. (See page BR-12)

HINT:

To determine the location of problems, adjust the pedal height after each inspection.
- (b) Inspect the wheel brake.
 - (1) Check that the pads of the disc brake of each wheel brake are installed properly.
 - (2) Check for looseness of the bleeder plug and union bolt, damage to the gasket, and fluid leaks from the wheel cylinder.
- (c) CHECK FOR BRAKE FLUID LEAKS AND AIR IN SYSTEM
 - (1) Check the fluid level in the brake master cylinder reservoir.
 - (2) Operate the brake pedal repeatedly, and check that the pedal can be operated smoothly (there is no air in the system).
 - (3) Check for changes in the fluid level in the brake master cylinder reservoir.
 - (4) If the fluid level decreases, check for fluid leaks caused by damage to the flexible hoses and brake tubes, looseness of the union nut, or due to improper seal of the master cylinder.
- (d) Bleed air from the brake system.
 - (1) Bleed air from the brake pipe line and the actuator assembly. (See page BR-5)



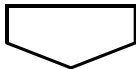
2

PERFORM ACTIVE TEST (VALVE MOTOR)

- (a) Using the DS-II, activate the valve motor using the active test function. Inspect the brake pedal during actuator motor operation. (See page BC-57)

Standard:

The pedal should return.



BC

3

INSPECT BRAKE MASTER CYLINDER ASSEMBLY

- (a) Remove the brake master cylinder assembly and check for fluid leaks. Also check that the pedal does not stay in the depressed position.

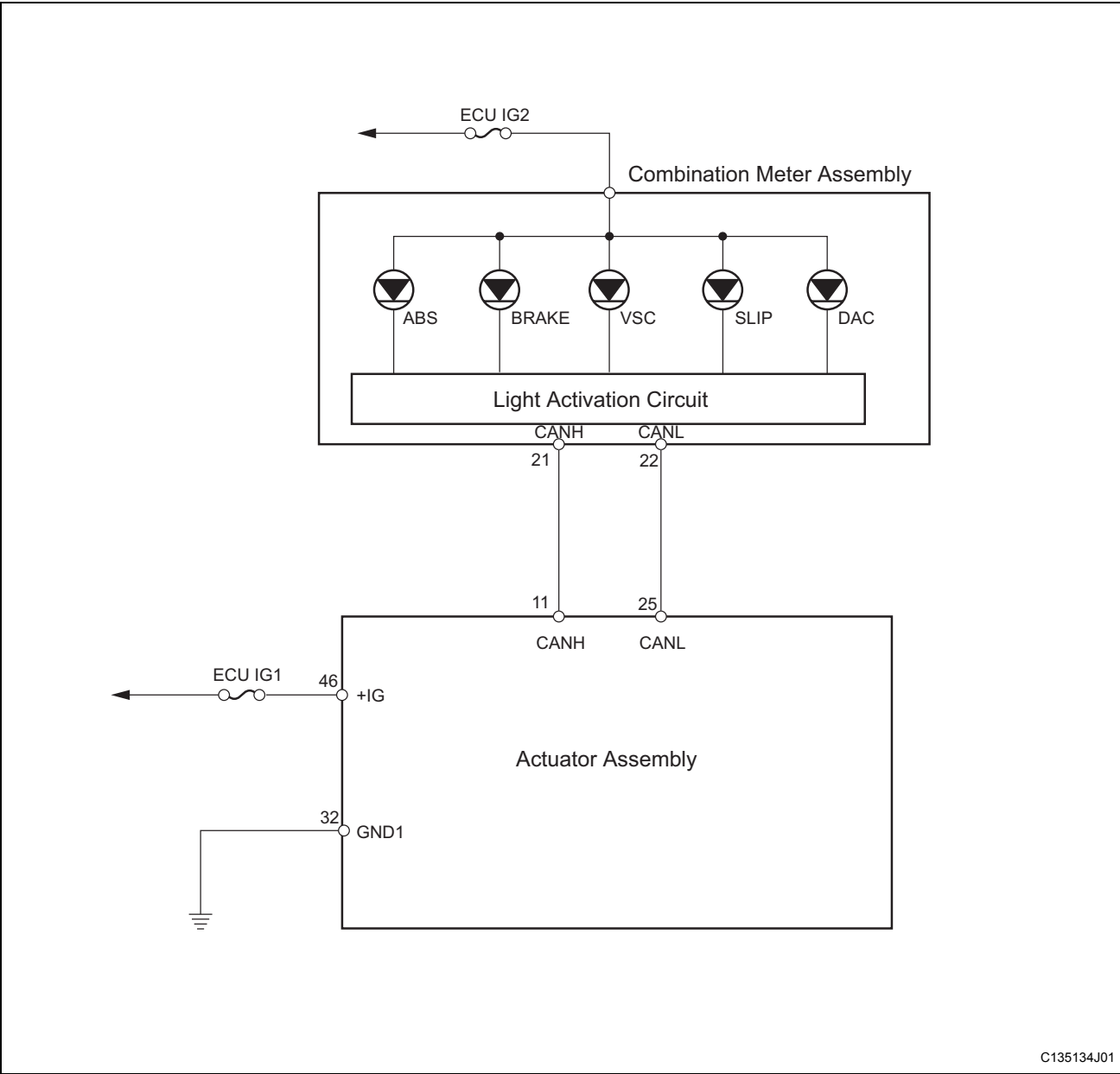
Standard:

There are no fluid leaks and the brake pedal is not low or soft.

NGREPAIR OR REPLACE BRAKE MASTER
CYLINDER ASSEMBLYOKREPLACE BRAKE BOOSTER ASSEMBLY

VSC WARNING IS DISPLAYED BUT DTC IS NOT OUTPUT

CIRCUIT DIAGRAM



C135134J01

INSPECTION PROCEDURE

BC

1	CONNECTION CONDITION OF EACH PART
---	-----------------------------------

- (a) Slightly jiggle the connector and wire harness of the actuator assembly vertically and horizontally and check the condition of the VSC warning light.

Standard:

There should be no change in the VSC warning light.

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

2

INSPECT CAN COMMUNICATION SYSTEM FOR CONTROL

- (a) Using the DS-II, check for DTCs and confirm that there are no problems with the CAN communication system. (See page CA-10)

Standard:

DTC is normal.

NG

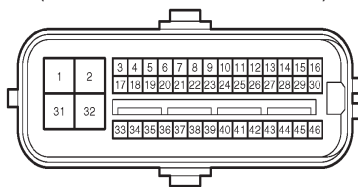
GO TO CAN COMMUNICATION SYSTEM FOR CONTROL

OK

3

INSPECT BRAKE ACTUATOR ASSEMBLY

Actuator Assembly
(Wire Harness Side Connector)



F049362J01

- (a) Check that the connector case and terminals are not deformed or corroded.

Standard:

There should be no deformation or corrosion.

- (b) Using the tester, check the continuity between terminal 32 (GND1) of the wire harness side connector of the actuator and the body ground.

Standard:

Continuity

HINT:

If there is a malfunction, check the ground point for looseness.

- (c) Turn the ignition switch to the ON position. Using the tester, inspect the voltage between terminals 46 (+IG) and 32 (GND1) of the wire harness side connector of the actuator assembly.

Standard:

10 to 14 V

NG

REPAIR OR REPLACE WIRE HARNESS OR CONNECTOR

OK

4

PERFORM ACTIVE TEST (VSC WARNING LIGHT)

- (a) Using the DS-II, perform an active test of the VSC warning light. (See page BC-72)

Standard:

The light blinks or or goes off in accordance with DS-II operation.

NG

GO TO METER AND GAUGE SYSTEM

BC

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

NOISE DURING INITIAL CHECK OF ACTUATOR TOO LOUD**INSPECTION PROCEDURE****1****ROAD TEST**

- (a) After the ignition is turned to the ON position, compare the noise level that occurs when the vehicle speed reaches 10 km/h with the noise produced by similar vehicles.

Standard:

The noise level should be equivalent or lower.

HINT:

When the vehicle speed reaches 6 km/h, the operation sound of the solenoid and motor is generated due to the start of the initial check of the actuator.

OK**NO PROBLEM****NG****2****ADJUST ACTUATOR ASSEMBLY INSTALLATION**

- (a) Drain the brake fluid.
(b) Disconnect all brake tubes from the brake actuator assembly.
(c) Connect the brake tubes so that the tensions to the rubber mounting part of the actuator assembly become even.

NOTICE:

Add the brake fluid after connecting the brake tubes, and be sure to bleed air. (See page BR-5)

HINT:

The operation sound may be reduced by absorbing the tension to the brake tubes and rubber mounting parts.

- (d) Check for interference between the brake tubes and the body or other parts.

3**RECHECK SYMPTOMS**

- (a) Perform a road test and recheck the operation noise level.

Standard:

The noise level should be equivalent or lower.

OK**NO PROBLEM****NG****BC****REPLACE BRAKE ACTUATOR ASSEMBLY**