

VEHICLE STABILITY CONTROL SYSTEM

PRECAUTION

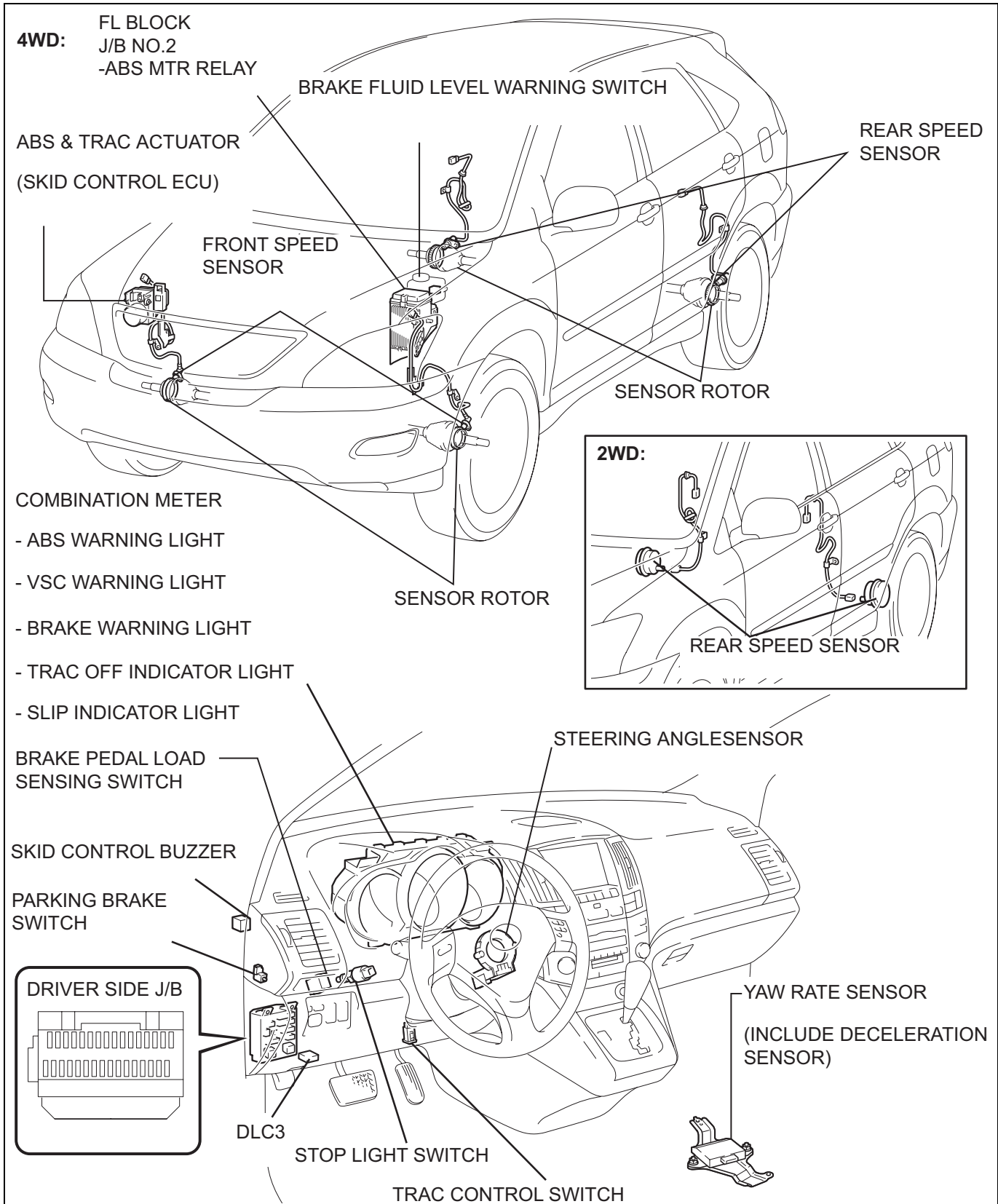
- When there is a malfunction in the contact point of the terminals or installation problems with part, removal and installation of the suspected problem parts may return the system to the normal condition either completely or temporarily.
- In order to determine the malfunction area, be sure to check the conditions at the time the malfunction occurred, such as by DTC output and the freeze frame data output, and record it before disconnecting each connector or removing and installing parts.
- Be sure to remove and install the skid control ECU, ABS & TRAC actuator and each sensor with the IG switch OFF unless specified in the inspection procedure.
- When removing and installing the skid control ECU, ABS & TRAC actuator and each sensor, be sure to check that the normal display is output in test mode inspection and in DTC output inspection after installing all the parts.
- After replacing the yaw rate sensor and / or the brake actuator assembly, make sure to perform yaw rate sensor and deceleration sensor zero point calibration (See page [BC-5](#)).
- CAN communication system is used for the data communication between the skid control ECU (included in the actuator), the steering angle sensor, and the yaw rate sensor (the deceleration sensor is included). If there is trouble in the CAN communication line, the DTC in the communication line is output.
- If the DTC in the CAN communication line is output, repair the malfunction in the communication line and troubleshoot the ABS with EBD & BA & TRAC & VSC systems under the condition that data communication is normal.
- Since the CAN communication line has its own length and route, it can not be repaired temporarily with the bypass wire, etc.

NOTICE:

When disconnecting the negative (-) battery terminal, initialize the following systems after the terminal is reconnected.

System Name	See procedure
Power Window Control System	WS-12
Sliding Roof System	RF-22 and RF-4
lighting System (Adaptive Front-lighting System)	LI-17
Power Back Door System	ED-33

PARTS LOCATION



SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

(a) ABS

(Anti-lock Brake System)

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

(b) EBD

(Electronic Brake force Distribution)

The EBD control utilizes ABS, realizing proper brake force distribution between front and rear wheels in accordance with driving conditions. In addition, during cornering braking, it also controls the brake force of the right and left wheels, helping to maintain vehicle behavior.

(c) BA

(Brake Assist)

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

(d) TRAC

(Traction Control)

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

(e) VSC

(Vehicle Stability Control)

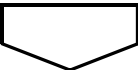
The VSC system helps prevent the vehicle from slipping sideways as a result of strong front wheel skid or strong rear wheel skid during cornering.

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester can be used at step 2, 5, 8, 11.

1

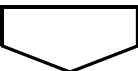
Vehicle Brought to Workshop



2

Check and Clear DTCs and Freeze Frame Data

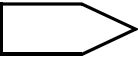
HINT:
See page [BC-16](#) and [BC-17](#).



3

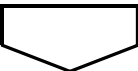
Problem Symptom Confirmation

 Symptom does not occur: Go to step 5

 Symptom occurs: Go to step 6

4

Symptom Simulation



5

DTC Check

HINT:
See page [BC-16](#).

 There is no output: Go to step 7

 There is output: Go to step 8

6

Problem Symptoms Table

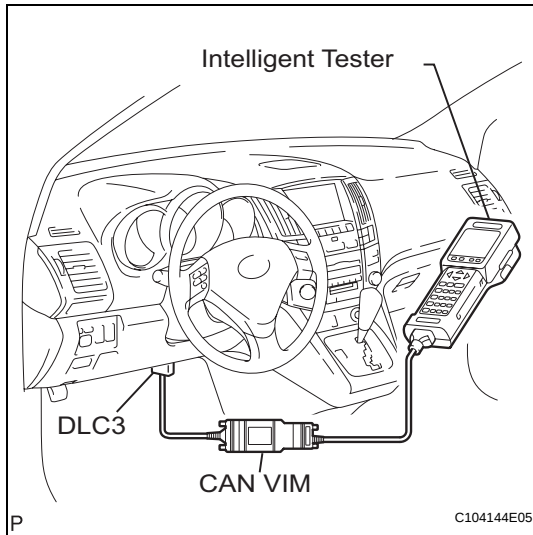
HINT:
See page [BC-13](#).

 Check for fluid leakage and Go to step 10

7

DTC Chart

HINT:
See page [BC-21](#).

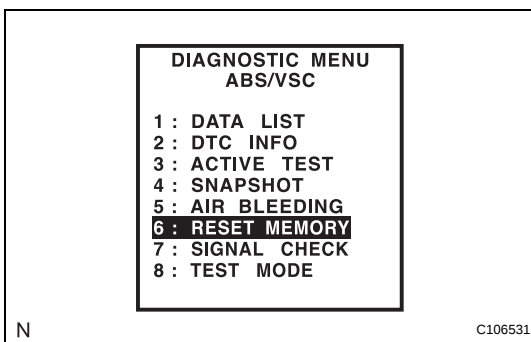
8**Circuit Inspection****9****Identification of Problem****10****Repair****11****Confirmation Test****End**

CALIBRATION

1. CLEAR ZERO POINT CALIBRATION (WHEN USING INTELLIGENT TESTER):

- Connect the intelligent tester to the DLC3.
- Turn the ignition switch on.

- Operate the intelligent tester to erase the codes (select "RESET MEMORY").
HINT:
Refer to the intelligent tester operator's manual for further details.
- Using the intelligent tester, perform zero point calibration of the yaw rate and deceleration sensor.



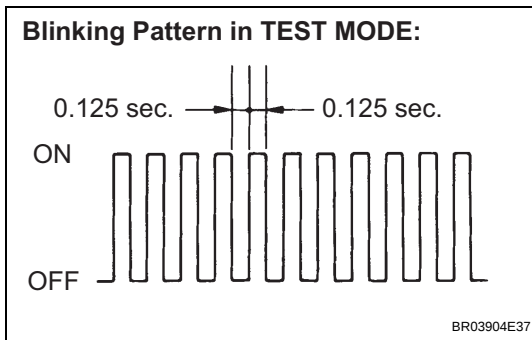
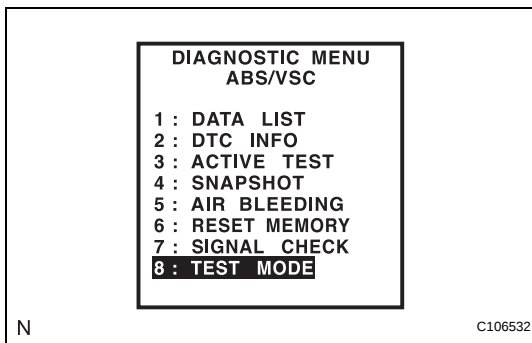
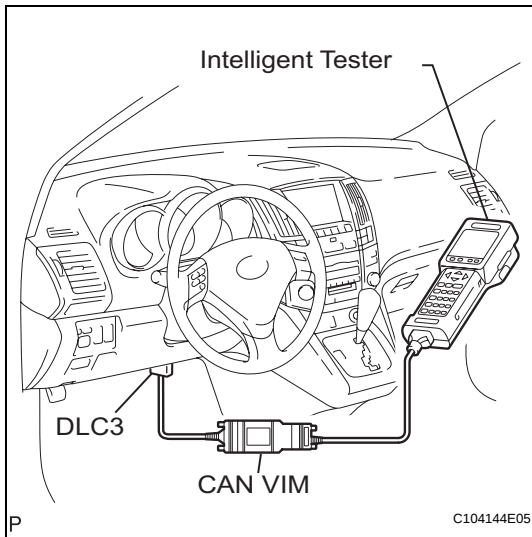
2. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSOR (WHEN USING INTELLIGENT TESTER):

NOTICE:

- While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not turn the ignition switch on.)
- Be sure to do this on a level surface (with an inclination of less than 1 %).

(a) Procedures for test mode.

- (1) Check that the steering wheel is in the straightahead position and move the shift lever to the P position and apply the parking brake.
- (2) Connect the intelligent tester to the DLC3.
- (3) Turn the ignition switch on.



- (4) Set the intelligent tester to test mode (select "TEST MODE").

HINT:

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

- (b) Obtain the zero point of the yaw rate and deceleration sensor.

- (1) Keep the vehicle in the stationary condition on a level surface for 2 seconds or more.

- (2) Check that the ABS warning light and VSC warning light blink.

HINT:

- If the ABS warning light and VSC warning light do not blink perform zero point calibration again.
- The zero point calibration is performed only once after the system enters the test mode.
- Calibration cannot be performed again until the stored data is cleared once.

- (c) Turn the ignition switch off and disconnect the intelligent tester.

3. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSOR (WHEN USING SST CHECK WIRE):

NOTICE:

- While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not turn the ignition switch on.)
- Be sure to do this on a level surface (with an inclination of less than 1 %).

(a) Clear the zero point calibration.

(1) Turn the ignition switch on.

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

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(b) Procedures for test mode.

(1) Turn the ignition switch off.

(2) Using SST, connect terminals TS and CG of the DLC3.

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

(c) Obtain the zero point of the yaw rate and deceleration sensor.

(1) Turn the ignition switch on.

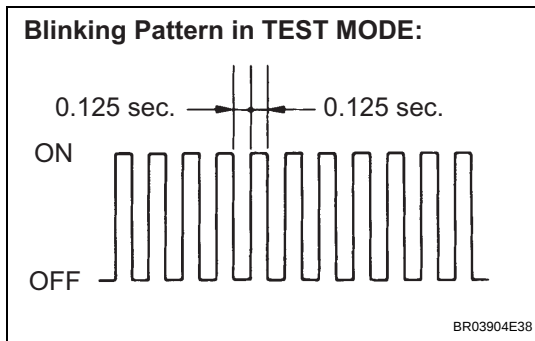
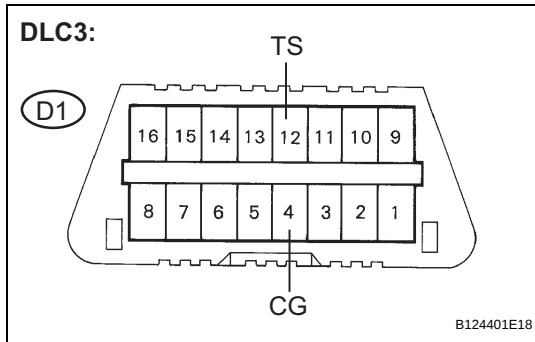
(2) Keep the vehicle in a stationary condition on a level surface for 2 seconds or more.

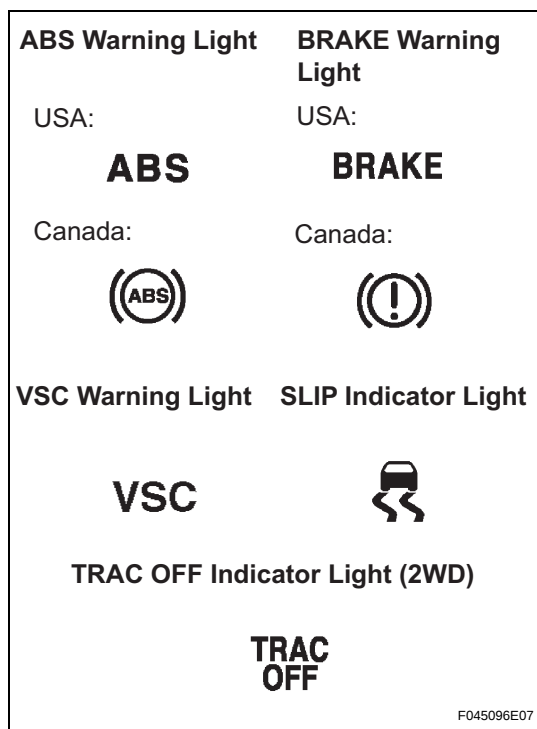
(3) Check that the ABS warning light and VSC light blink (test mode).

HINT:

- If the ABS warning light and VSC warning light do not blink perform zero point calibration again.
- The zero point calibration is performed only once after the system enters the test mode.
- Calibration cannot be performed again until the stored data is cleared once.

(d) Turn the ignition switch off and disconnect the SST from the DLC3.





TEST MODE PROCEDURE

1. WARNING LIGHT AND INDICATOR LIGHT BULB CHECK

- (a) Check the warning lights.
 - (1) Release parking brake pedal.
 - (2) When the ignition switch is turned to the ON position, check that the ABS warning light, BRAKE warning light, VSC warning light, TRAC OFF indicator light (2WD) and SLIP indicator light stay on for approx. 3 seconds.

HINT:

- When the parking brake is applied or the level of brake fluid is low, the BRAKE warning light comes on.
- If the ECU has any stored DTCs, the ABS warning light, VSC warning light and TRAC OFF indicator light (2WD) comes on.
- If the indicator does not come on, inspect it the bulb is blown out, and also the wire harness between the skid control ECU and the combination meter.
- If the indicator remains on, proceed to troubleshooting for the light circuit below.

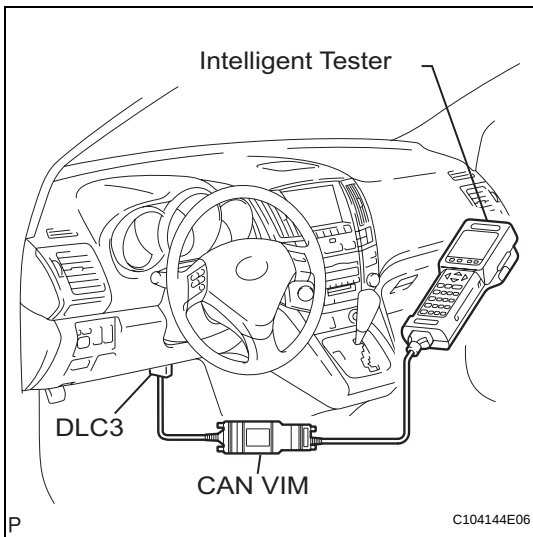
Trouble Area	See procedure
ABS warning light circuit	BC-79
VSC warning light circuit	BC-83
BRAKE warning light circuit	BC-87
TRAC OFF indicator light circuit (2WD)	BC-91
SLIP indicator light circuit	BC-96

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

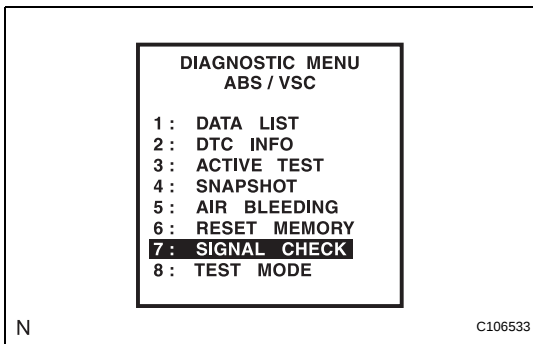
- (a) When having replaced the skid control ECU and / or yaw rate and deceleration sensor, perform zero point calibration of the yaw rate and deceleration sensor.

HINT:

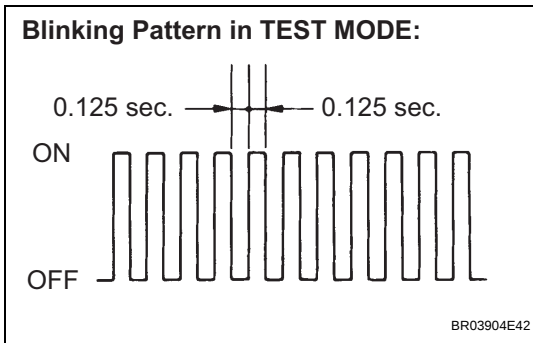
- If the ignition switch is turned from the ON position to the ACC or off during test mode (signal check), DTCs of the signal check function will be erased.
- During test mode (signal check), the skid control ECU records all DTCs of the signal check function. By performing the test mode (signal check),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



- (b) Procedures for test mode.
 - (1) Turn the ignition switch off.
 - (2) Connect the intelligent tester to the DLC3.
 - (3) Check that the steering wheel is in the straightahead position and move the shift lever to the P position.
 - (4) Turn the ignition switch on.



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



- (6) Check that the ABS warning light and VSC warning light blink and "CHECK VSC SYSTEM" is displayed on the multi information display (test mode).
HINT:
If the ABS warning light and VSC warning light do not blink, inspect the ABS warning light circuit and / or VSC warning light circuit.

Trouble Area	See procedure
ABS warning light	BC-79
VSC warning light	BC-83

3. MASTER CYLINDER PRESSURE SENSOR CHECK (WHEN USING INTELLIGENT TESTER):

- (a) Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second or more.
- (b) Check the ABS warning light stays on for 3 seconds.

HINT:

- Ensure that the ABS warning light comes on.
- While the ABS warning light stays on, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.

- The ABS warning light comes on for 3 seconds every time brake pedal operation above is performed.

4. SPEED SENSOR CHECK (WHEN USING INTELLIGENT TESTER):

(a) Check the backward signal.

- (1) Drive the vehicle in reverse for more than 1 second at 2 mph (3 km/h) or higher.

HINT:

Drive the vehicle in reverse and check the speed sensor signal. Note that the signal check cannot be completed if the vehicle speed is 28 mph (45 km/h) or more.

(b) Check the forward signal.

- (1) Drive the vehicle straight forward. Drive the vehicle at a speed of 28 mph (45 km/h) or higher for several seconds and check that the ABS warning light goes off.

HINT:

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

(c) Stop the vehicle.

5. YAW RATE SENSOR CHECK (WHEN USING INTELLIGENT TESTER):

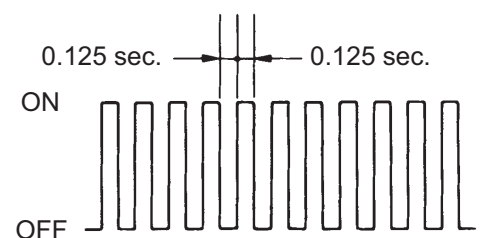
(a) Check the output of the yaw rate sensor.

- (1) Move the shift lever to the D position, drive the vehicle at a speed of approximately 3 mph (5 km/h), and turn the steering wheel either to the left or right 90° or more until the vehicle makes a 180° turn.
- (2) Stop the vehicle and move the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.

HINT:

- If the skid control buzzer sounds, the signal check is completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit, then perform the signal check again.
- If the skid control buzzer does not sound yet, there is a malfunction in the VSC sensor, so check the DTC.
- Make 180° turn. At the end of the turn, the direction of the vehicle should be within 180° $\pm$ 5° of its start position.
- Do not spin the wheels.

Blinking Pattern in TEST MODE:



BR03904E40

6. SENSOR SIGNAL CHECK BY TEST MODE (SIGNAL CHECK) (WHEN USING SST CHECK WIRE):

- (a) When having replaced the skid control ECU and / or yaw rate and deceleration sensor, perform zero point calibration of the yaw rate and deceleration sensor.

HINT:

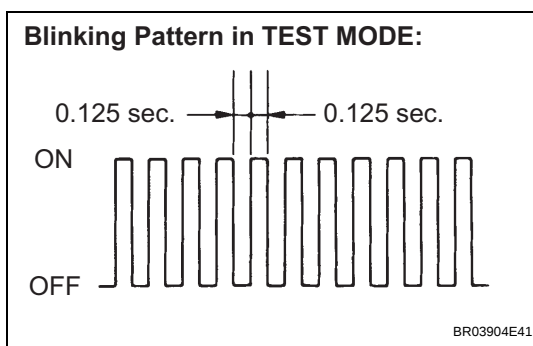
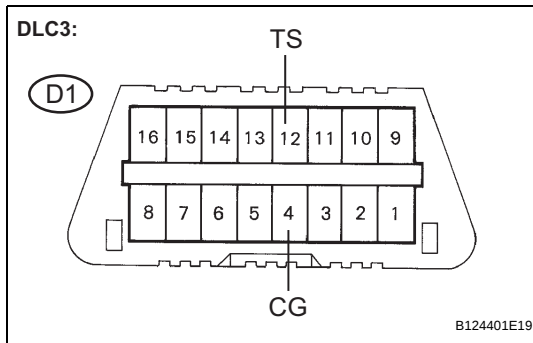
- If the ignition switch is turned from the ON position to the ACC or off during test mode (signal check), DTCs of the signal check function will be erased.
- During test mode (signal check), the skid control ECU records all DTCs of the signal check function. By performing the test mode (signal check),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

- (b) Procedures for test mode.

- (1) Turn the ignition switch off.
- (2) Check that the steering wheel is in the straightahead position and move the shift lever to the P position.
- (3) Using STT, connect terminals TS and CG of the DLC3.

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- (4) Turn the ignition switch on.



- (5) Check that the ABS warning light and VSC warning light blink (test mode).

HINT:

If the ABS warning light and VSC warning light do not blink, inspect the TS and CG terminal circuit, ABS warning light circuit and / or warning light circuit.

Trouble Area	See procedure
TS and CG terminal circuit	BC-103
ABS warning light circuit	BC-79
VSC warning light circuit	BC-83

7. MASTER CYLINDER PRESSURE SENSOR CHECK (WHEN USING SST CHECK WIRE):

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

- (b) Check the ABS warning light stays on for 3 seconds.

HINT:

- At this time, the ABS warning light stays on for 3 seconds.
- While the ABS warning light stays on, continue to depress the brake pedal with a force of 98N (10 kgf) or more.
- The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.
- If master cylinder pressure sensor check can not be completed, do not depress the brake pedal frequently. It may further reduce negative pressure and make the sensor check difficult to complete.
- If the negative pressure is insufficient, master cylinder pressure sensor check may not be completed. In this case, idle the engine to get enough negative pressure.
- If the brake pedal is depressed during engine stop, negative pressure may become insufficient and the BRL may come on. (It runs the motor and performs incorrect control.)

8. SPEED SENSOR CHECK (WHEN USING SST CHECK WIRE):

- (a) Check the speed sensor signal.

- (1) Drive the vehicle straight forward. Drive the vehicle at a speed of 28 mph (45 km/h) or higher for several seconds and check that the ABS warning light goes off.

HINT:

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

- (b) Stop the vehicle.

NOTICE:

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

HINT:

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

9. YAW RATE SENSOR CHECK (WHEN USING SST CHECK WIRE):

- (a) Check the zero point voltage of the yaw rate sensor.
 - (1) Keep the vehicle in a stationary condition on a level surface for 1 second or more.
- (b) Check the output of the yaw rate sensor.
 - (1) Move the shift lever to the D position, drive the vehicle at a speed of approximately 3 mph (5 km/h), and turn the steering wheel either to the left or right 90° or more until the vehicle makes 180° turn.
 - (2) Stop the vehicle and move the shift lever to the position. Check that the skid control buzzer sounds for 3 seconds.

HINT:

- If the skid control buzzer sounds, the signal check is completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit, then perform the signal check again.
- If the skid control buzzer does not sound yet, there is a malfunction in the yaw rate sensor, so check the DTC.
- Make a 180° turn. At the end of the turn, the direction of the vehicle should be within 180 ± 5° of its start position.
- Do not spin the wheels.

PROBLEM SYMPTOMS TABLE

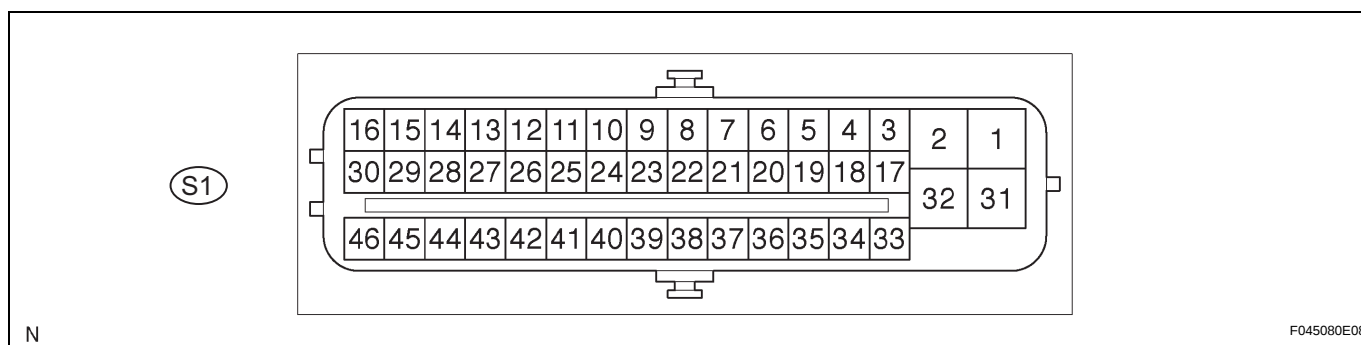
ABS WITH EBD & BA & TRAC & VSC SYSTEM

Symptom	Suspected area	See page
ABS does not operate	1. Check the DTC again and make sure that the normal code is output.	BC-16
	2. IG power source circuit and ground circuit.	BC-65
	3. Speed sensor circuit (Front)	BC-24
	4. Speed sensor circuit (Rear)	BC-30
	5. Check the ABS &TRAC actuator with a intelligent tester.	BC-108
	6. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the skid control ECU.	-
ABS does not operate efficiently	1. Check the DTC again and make sure that the normal code is output.	BC-16
	2. Speed sensor circuit (Front)	BC-24
	3. Speed sensor circuit (Rear)	BC-30
	4. Stop light switch circuit	BC-70
	5. Check the ABS &TRAC actuator with a intelligent tester.	BC-108
	6. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the skid control ECU.	-
ABS warning light abnormal (Remain ON)	1. ABS warning light remains on circuit	-
	2. Skid control ECU	-
DTC of ABS check cannot be done	1. Check the DTC again and make sure that the normal code is output.	BC-16
	2. TC and CG terminal circuit	BC-103
	3. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the skid control ECU.	-
Sensor signal check cannot be done	1. TS and CG terminal circuit	BC-105
	2. Skid control ECU	-
VSC and/or TRAC does not operate	1. Check the DTC again and make sure that the normal code is output.	BC-16
	2. IG power source circuit and ground circuit.	BC-65
	3. Check the hydraulic circuit for leakage.	-
	4. Speed sensor circuit (Front)	BC-24
	5. Speed sensor circuit (Rear)	BC-30
	6. Deceleration sensor circuit (Calibration)	BC-5
	7. Deceleration sensor circuit (Malfunction)	BC-62
	8. Yaw rate sensor circuit	BC-62
	9. Steering sensor circuit	BC-59
	10. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the skid control ECU.	-
SLIP indicator light abnormal	1. SLIP indicator light circuit	BC-96
	2. Skid control ECU	-
TRAC OFF indicator abnormal	1. Check the DTC again and make sure that the normal code is output.	BC-16
	2. TRAC control switch circuit	BC-91
	3. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the skid control ECU.	-

Symptom	Suspected area	See page
DTC of VSC check cannot be done	1. Check the DTC again and make sure that the normal code is output.	BC-16
	2. TC and CG terminal circuit	BC-103
	3. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the skid control ECU.	-
VSC warning light abnormal (Remain ON)	1. Check the DTC again and make sure that the normal code is output.	BC-16
	2. VSC warning light remains on circuit	BC-83
	3. If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the skid control ECU.	-

TERMINALS OF ECU

1. SKID CONTROL ECU



Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
BM (S1-2) - GND1 (S1-32), GND2 (S1-1)	B-W - W-L, W-B	Motor relay test input	IG switch ON, pump motor running	10 to 14 V
FR+ (S1-3) - FR- (S1-17)	V - R	Front RH wheel speed signal input	IG switch ON, slowly turn right front wheel	Pulse generation
RR+ (S1-5) - RR- (S1-19)	L-B - BR	Rear RH wheel speed signal input	IG switch ON, slowly turn right front wheel	Pulse generation
FSW+ (S1-7) - GND1 (S1-32), GND2 (S1-1)	LG - W-L, W-B	FSW switch input	IG switch ON, brake pedal released	2 to 4 V
TRC+ (S1-8) - TRC- (S1-22)	BR - P	ECM communication output	IG switch ON	Pulse generation
ENG+ (S1-9) - ENG- (S1-23)	G - LB	ECM communication input	IG switch ON	Pulse generation
NEO (S1-10) - GND1 (S1-32), GND2 (S1-1)	V - W-L, W-B	Engine revolution signal input	Engine idling	Pulse generation
CANH (S1-11) - CANL (S1-25)	L - W	CAN communication line	IG switch OFF	54 to 67 Ω
SP1 (S1-12) - GND1 (S1-32), GND2 (S1-1)	BR - W-L, W-B	Speed signal output	Vehicle drives at about 12 mph (20 km/h)	Pulse generation
D/G (S1-13) - GND1 (S1-32), GND2 (S1-1)	L-B - W-L, W-B	Diagnosis tester communication line	IG switch ON	10 to 14 V
MRF (S1-14) - R+ (S1-45)	R - Y	Fail safe motor relay output	IG switch ON	10 to 14 V
MR (S1-15) - R+ (S1-45)	L - Y	Motor relay output	IG switch ON, pump motor running	10 to 14 V
STPO* ¹ (S1-16) - GND1 (S1-32), GND2 (S1-1)	G - W-L, W-B	Stop light relay output	IG switch ON	10 to 14 V
FL+ (S1-18) - FL- (S1-4)	G - B	Front LH wheel speed signal input	IG switch ON, slowly turn left front wheel	Pulse generation
RL+ (S1-20) - RL- (S1-6)	O -W	Rear LH wheel speed signal input	IG switch ON, slowly turn left rear wheel	Pulse generation
STP2* ¹ (S1-27) - GND1 (S1-32), GND2 (S1-1)	GR - W-L, W-B	Stop light relay input	Stop light switch ON (Brake pedal depressed)	8 to 14 V
STP2* ¹ (S1-27) - GND1 (S1-32), GND2 (S1-1)	GR - W-L, W-B	Stop light relay input	Stop light switch OFF (Brake pedal released)	Below 1.5 V
TS (S1-24) - GND1 (S1-32), GND2 (S1-1)	LG-B - W-B, W-B	Sensor check input	IG switch ON	10 to 14 V
STP1* ¹ (S1-27) - GND1 (S1-32), GND2 (S1-1)	W - W-L, W-B	Stop light switch input	Stop light switch ON (Brake pedal pushed)	8 to 14 V
STP1* ¹ (S1-27) - GND1 (S1-32), GND2 (S1-1)	W - W-L, W-B	Stop light switch input	Stop light switch OFF (Brake pedal released)	Below 1.5 V
PKB (S1-28) - GND1 (S1-32), GND2 (S1-1)	LG - W-L, W-B	Parking brake switch input	IG switch ON, parking brake switch ON	Below 1.5 V

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
PKB (S1-28) - GND1 (S1-32), GND2 (S1-1)	LG - W-L, W-B	Parking brake switch input	IG switch ON, parking brake switch OFF	10 to 14 V
WA (S1-29) - GND1 (S1-32), GND2 (S1-1)	V - W-L, W-B	ABS warning light output	IG switch ON, ABS warning light ON	6 to 11 V
WA (S1-29) - GND1 (S1-32), GND2 (S1-1)	V - W-L, W-B	ABS warning light output	IG switch ON, ABS warning light OFF	Below 2.0 V
BZ (S1-30) - GND1 (S1-32), GND2 (S1-1)	O - W-L, W-B	Buzzer output	IG switch ON, VSC buzzer sounds	Below 1.0 $\longleftrightarrow$ 10 to 14 V
BZ (S1-30) - GND1 (S1-32), GND2 (S1-1)	O - W-L, W-B	Buzzer output	IG switch ON, VSC buzzer does not sound	10 to 14 V
+BS (S1-31) - GND1 (S1-32), GND2 (S1-1)	L - W-L, W-B	Solenoid relay power supply	Always	10 to 14 V
VSCW (S1-36) - GND1 (S1-32), GND2 (S1-1)	R - W-L, W-B	VSC warning light output	IG switch ON, VSC warning light ON	Below 2.0 V
RRO* ³ , * ⁴ (S1-39) - GND1 (S1-32), GND2 (S1-1)	O - W-L, W-B	Rear RH wheel speed signal output	Vehicle drives at about 20 km/h (12mph)	Plus generation
RRO* ³ , * ⁴ (S1-40) - GND1 (S1-32), GND2 (S1-1)	P - W-L, W-B	Rear LH wheel speed signal output	Vehicle drives at about 20 km/h (12mph)	Plus generation
WFSE (S1-42) - GND1 (S1-32), GND2 (S1-1)	G - W-L, W-B	WFSE input	IG switch ON	10 to 14 V
CSW (S1-43) - GND1 (S1-32), GND2 (S1-1)	B - W-L, W-B	TRAC OFF switch input	TRAC OFF switch OFF	10 to 14 V
BRL (S1-44) - GND1 (S1-32), GND2 (S1-1)	GR - W-L, W-B	Brake warning light output	IG switch ON, BRAKE warning light ON	6 to 11 V
BRL (S1-44) - GND1 (S1-32), GND2 (S1-1)	GR - W-L, W-B	Brake warning light output	IG switch ON, BRAKE warning light OFF	Below 2.0 V
R+ (S1-45) - GND1 (S1-32), GND2 (S1-1)	Y - W-L, W-B	Power supply for motor relay	IG switch ON	10 to 14 V
IG1 (S1-46) - GND1 (S1-32), GND2 (S1-1)	P - W-L, W-B	IG1 power supply	IG switch ON	10 to 14 V

*1: w/ Dynamic Laser Cruise Control

*2: w/o Dynamic Laser Cruise Control

*3: w/ Air Suspension System

*4: w/o Air Suspension System

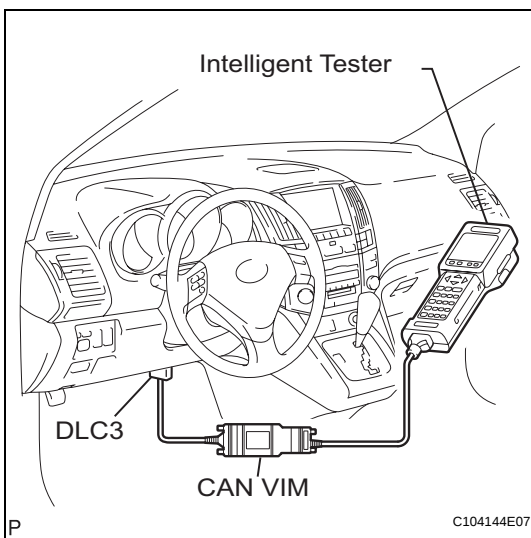
DTC CHECK / CLEAR

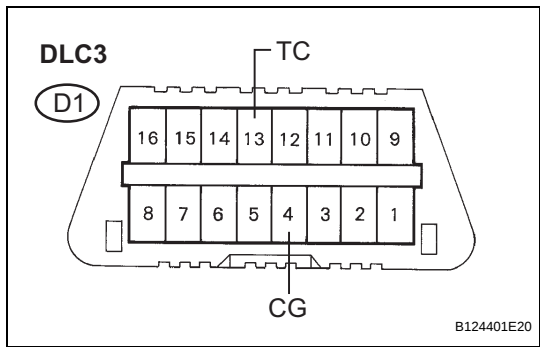
1. DTC CHECK/CLEAR (WHEN USING INTELLIGENT TESTER):

- (a) DTC check
 - (1) Connect the intelligent tester to the DLC3.
 - (2) Turn the ignition switch on.
 - (3) Read the DTCs following the prompts on the tester screen.
- (b) DTC clear
 - (1) Connect the intelligent tester to the DLC3.
 - (2) Turn the ignition switch on.
 - (3) Operate the intelligent tester to clear the codes.

HINT:

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



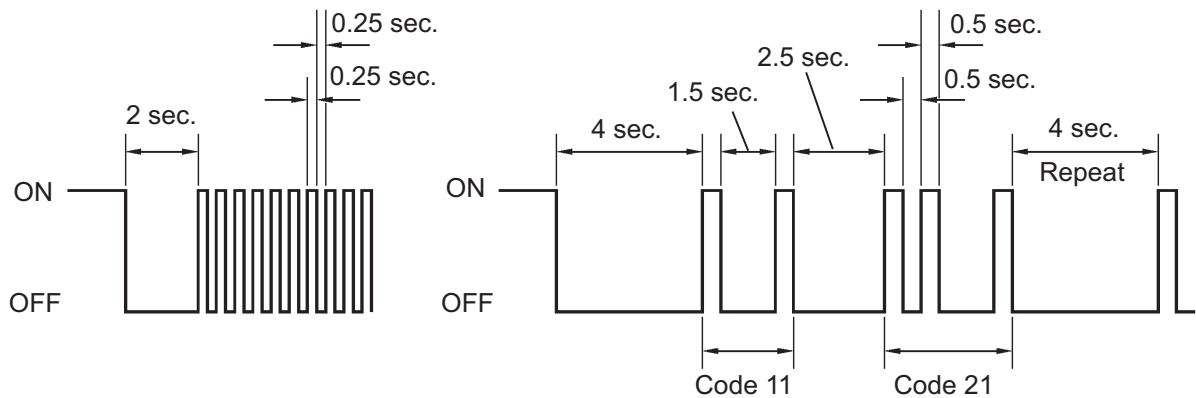


2. DTC CHECK/CLEAR (WHEN USING SST CHECK WIRE):

- (a) DTC check
 - (1) Using SST, connect terminals TC and CG of the DLC3.
SST 09843-18040
 - (2) Turn the ignition switch on.
 - (3) Read DTC from the ABS and VSC control warning lights on the combination meter.

Normal System Code:

Trouble Code (Example Codes 11 and 21):

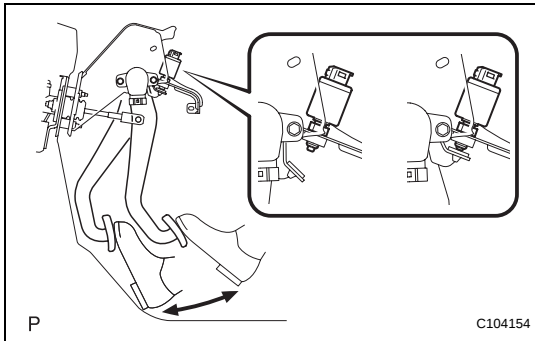
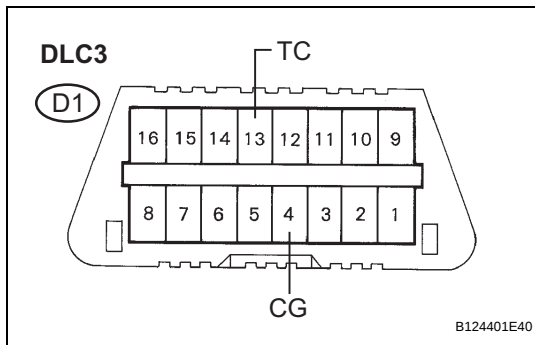


HINT:

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

Trouble Area	See Procedure
TC and CG terminal circuit	BC-103
ABS warning light circuit	BC-79
VSC warning light circuit	BC-83

- As an example, the illustration below shows the blinking patterns of the normal system code and trouble codes 31 and 43, and display of the normal system code.
- (4) Codes are explained in the code table (See page [BC-21](#)).
 - (5) After completing the check, disconnect terminals TC and CG of the DLC3, and turn off the display. If 2 or more DTCs are detected at the same time, the DTCs will be displayed in ascending order.



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

- (3) Clear the DTCs stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.
- (4) Check that the ABS warning and brake control lights and multi information display indicate the normal system code.
- (5) Remove the SST from the terminals of the DLC3.

HINT:

Clearing the DTCs cannot be performed by removing the battery cable or the ECU-IG NO.1 fuse.

3. END OF DTC CHECK/CLEAR (WHEN USING SST CHECK WIRE):

- (a) Turn the ignition switch on.
- (b) Check that the ABS and brake control warning lights go off within approximately 3 seconds.

FREEZE FRAME DATA

1. FREEZE FRAME DATA

- (a) The vehicle (sensor) status, stored during ABS and / or VSC operation or at the time of an error code detection, can be displayed by the intelligent tester.
- (b) Only one record of freeze frame data is stored and the freeze frame data generated during ABS and / or VSC operation are updated whenever the vehicle status is changed. Also, the number of the ignition switch is ON after the freeze frame data is stored can be stored up to 31 and it can be displayed. After storing the DTC, the freeze frame data is not updated.

HINT:

If the ignition switch "ON" operation exceeds 31 times, "31" appears on the display.

- (c) If a malfunction occurs, the freeze frame data is stored but the ABS actuation data is deleted.

Intelligent tester display	Measurement Item	Reference Value
VEHICLE SPD	Wheel speed sensor reading	Speed indicated on speedometer
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
# IG ON	Number of operations of ignition switch ON after memorizing freeze frame data	0 to 31
MAS CYL PRESS	Master cylinder pressure sensor reading	Brake pedal release : 0.3 to 0.9 V Brake pedal depress: 0.8 to 4.5 V
MASS PRESS GRADE	Master cylinder pressure sensor change	-30 to 200 MPa/s
SYSTEM	System status	ABS activated: ABS VSC/TRC activated: VSC/TRC BA activated: BA Fail safe mode activated: FAIL SF No system activated: NO SYS
YAW RATE	Yaw rate angle sensor reading	-100 to 100
STEERING ANG	Steering sensor reading	Left turn: Increase Right turn: Drop
THROTTLE	Throttle position sensor reading	Release accelerator pedal: Approx. 0 deg. Depress accelerator pedal: Approx. 90 deg.
G (RIGHT & LEFT)	Right and left G	-1.869 to 1.869
G (BACK & FORTH)	Back and forth G	-1.869 to 1.869
VSC (TRC) OFF SW*	VSC OFF switch signal	TRAC OFF SW ON: ON OFF: OFF
SHIFT POSITION	Shift lever position	FAIL P,N R D 4 3 2 L

*: 2WD

DATA LIST / ACTIVE TEST

HINT:

With the intelligent tester connected to the DLC3 and the ignition switch in the ON position, the ABS, TRAC and VSC data list can be displayed. Follow the prompts on the tester screen to access the DATA LIST.

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
ABS MOT RELAY	ABS motor relay / ON or OFF	ON : Motor relay ON	-
SOL RELAY	Solenoid relay / ON or OFF	ON : Solenoid relay ON	-
VSC / TRC OFF SW*	TRAC control switch / ON or OFF	ON : TRAC control switch ON	-
IDLE SW	Main idle switch / ON or OFF	ON : Accelerator pedal released OFF : Accelerator pedal depressed	-
STOP LIGHT SW	Stop light switch / ON or OFF	ON : Brake pedal depressed OFF : Brake pedal released	-
PKB SW	Parking brake switch / ON or OFF	ON : Parking brake applied OFF : Parking brake released	-
ABS OPERT FR	ABS operation (FR) / BEFORE or OPERATE	BEFORE : No ABS operation (FR) OPERATE : During ABS operation (FR)	-
ABS OPERT FL	ABS operation (FL) / BEFORE or OPERATE	BEFORE : No ABS operation (FL) OPERATE : During ABS operation (FL)	-
ABS OPERT RR	ABS operation (RR) / BEFORE or OPERATE	BEFORE : No ABS operation (RR) OPERATE : During ABS operation (RR)	-
ABS OPERT RL	ABS operation (RL) / BEFORE or OPERATE	BEFORE : No ABS operation (RL) OPERATE : During ABS operation (RL)	-
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Similar speed as indicated on speed meter
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Similar speed as indicated on speed meter
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Similar speed as indicated on speed meter
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed	Similar speed as indicated on speed meter
DECELERAT SENS	Deceleration sensor 1 reading / min.: -1.869 G, max.: 1.869 G	Approximately 0 +- 0.13G at still condition	Reading changes when vehicle is bounced
DECELERAT SENS2	Deceleration sensor 2 reading / min.: -1.869 G, max.: 1.869 G	Approximately 0 +- 0.13G at still condition	Reading changes when vehicle is bounced
IG VOLTAGE	ECU power supply voltage / UNDER / NORMAL	NORMAL: 9.5 V or over UNDER: Below 9.5 V	-
SFRR	ABS solenoid (SFRR) / ON or OFF	ON : Operate	-
SFRH	ABS solenoid (SFRH) / ON or OFF	ON : Operate	-
SFLR	ABS solenoid (SFLR) / ON or OFF	ON : Operate	-
SFLH	ABS solenoid (SFLH) / ON or OFF	ON : Operate	-

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
SRRR (SRR)	ABS solenoid (SRRR (SRR)) / ON or OFF	ON : Operate	-
SRRH (SRH)	ABS solenoid (SRRH (SRH)) / ON or OFF	ON : Operate	-
SRLR	ABS solenoid (SRLR) / ON or OFF	ON : Operate	-
SRLH	ABS solenoid (SRLH) / ON or OFF	ON : Operate	-
SMF (BA-SOL)	TRAC solenoid (SMF) / ON or OFF	ON : Operate	-
SMR	TRAC solenoid (SMR) / ON or OFF	ON : Operate	-
THROTTLE	Throttle position sensor/ Min.: 0 deg, Max.: 125 deg	Release accelerator pedal: Approx. 0 deg. Depress accelerator pedal: Approx. 90 deg.	-
ENGINE SPD	Engine Speed/ Min.: 0 rpm, Max.: 6000 rpm	Actual engine speed	-
VEHICLE SPD	Maximum wheel speed sensor reading / min.: 0 km/h (0 MPH), max.: 326 km/h (202 MPH)	Actual vehicle speed	Speed indicated on speedometer
YAW RATE	Yaw rate sensor/ Min.: -128 deg/s, Max.: 128 deg/s	Min.: -128 deg/s Max.: 128 deg/s	-
YAW ZERO VALUE	Memorized zero value/ Min.: -128 deg/s, Max.: 128 deg/s	Min.: -128 deg/s Max.: 128 deg/s	-
STEERING ANG	Steering sensor/ Min.: -1152 deg, Max.: 1150.875 deg	Left turn: Increase Right turn: Decrease	-
MAS CYL PRS 1	Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V	When brake pedal is released : 0.3 to 0.9 V	Reading increases when brake pedal is depressed
TEST MODE	Test mode / NORMAL or TEST	NORMAL : Normal mode TEST : During test mode	-
#CODES	Number of DTC recorded / min.: 0, max.: 255	Min.: 0, max.: 39	-

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1. ACTIVE TEST

HINT:

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

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

- Connect the intelligent tester to the DLC3.
- Turn the ignition switch to the ON position.
- According to the display on the tester, perform the "ACTIVE TEST".

HINT:

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

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

Item	Vehicle Condition / Test Details	Diagnostic Note
SFRH	Turns ABS solenoid (SFRH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLR	Turns ABS solenoid (SFLR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLH	Turns ABS solenoid (SFLH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRR	Turns ABS solenoid (SRRR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRH	Turns ABS solenoid (SRRH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLR	Turns ABS solenoid (SRLR) ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLH	Turns ABS solenoid (SRLH) ON / OFF	Operation of solenoid (clicking sound) can be heard
SMF (BA-SOL)	Turns TRAC solenoid SMF (BA-SOL) ON / OFF	Operation of solenoid (clicking sound) can be heard
SMR	Turns TRAC solenoid SMR ON / OFF	Operation of solenoid (clicking sound) can be heard
SOL RELAY	Turns ABS solenoid relay ON / OFF	Operation of solenoid (clicking sound) can be heard
ABS MOT RELAY	Turns ABS motor relay ON / OFF	Operation of solenoid (clicking sound) can be heard
ABS WARN LIGHT	Turns ABS warning light ON / OFF	Observe combination meter
VSC WARN LIGHT	Turns VSC warning light ON / OFF	Observe combination meter
VSC / TRAC OFF IND*	Turns VSC / TRAC OFF indicator ON / OFF	Observe combination meter
SLIP INDI LIGHT	Turns SLIP indicator light ON / OFF	Observe combination meter
BRAKE WARN LIGHT	Turns BRAKE warning light ON / OFF	Observe combination meter
VSC / BR WARN BUZ	Turns VSC / BRAKE warning buzzer ON / OFF	Buzzer can be heard

*: 2WD

DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a malfunction code is displayed during the DTC check, check the circuit indicated by the DTC. For details of each code, turn to the page for the respective "DTC No." in the DTC chart.

VEHICLE STABILITY CONTROL SYSTEM

DTC No.	Detection Item	Trouble Area	See page
C0200/31* ¹	Right Front Wheel Speed Sensor Signal	1. Right front speed sensor 2. Each speed sensor circuit 3. Sensor rotor 4. Sensor installation	BC-24
C0205/32* ¹	Front Speed Sensor LH Circuit	1. Left front speed sensor 2. Each speed sensor circuit 3. Sensor rotor 4. Sensor installation	BC-24
C0210/33* ¹	Right Rear Wheel Speed Sensor Signal	1. Right rear speed sensor 2. Each speed sensor circuit 3. Sensor rotor 4. Sensor installation	BC-30
C0215/34* ¹	Rear Speed Sensor LH Circuit	1. Left rear speed sensor 2. Each speed sensor circuit 3. Sensor rotor 4. Sensor installation	BC-30
C0226/21	SFR Solenoid Circuit	1. ABS & TRAC actuator 2. SFRH or SFRR circuit	BC-37
C0236/22	SFL Solenoid Circuit	1. ABS & TRAC actuator 2. SFLH or SFLR circuit	BC-37
C0246/23	SRR Solenoid Circuit	1. ABS & TRAC actuator 2. SRRH or SRRR circuit	BC-37
C0256/24	SRL Solenoid Circuit	1. ABS & TRAC actuator 2. SRLH or SRLR circuit	BC-37
C0273/13* ¹	Open or Short Circuit in ABS Motor Relay Circuit	1. ABS No.2 fuse 2. ABS MTR relay 3. ABS MTR relay circuit 4. J/B No.2	BC-39
C0274/14	Short to B+ in ABS Motor Relay Circuit	1. ABS No.2 fuse 2. ABS MTR relay 3. ABS MTR relay circuit 4. J/B No.2	BC-39
C0278/11	Open or Short Circuit in ABS Solenoid Relay Circuit	1. ABS No.1 fuse 2. ABS SOL relay 3. ABS SOL relay circuit 4. ABS & TRAC actuator	BC-45
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	1. ABS No.1 fuse 2. ABS SOL relay 3. ABS SOL relay circuit 4. ABS & TRAC actuator	BC-45
C1201/51	Engine Control System Malfunction	1. Engine control	BC-49
C1203/53	ECM Communication Circuit Malfunction	1. TRC+ or TRC- circuit 2. ENG+ or ENG- circuit 3. ECM	BC-50
C1210/36	Zero Point Calibration of Yaw Rate Sensor Undone	1. Yaw rate sensor (Deceleration sensor) 2. Zero point calibration undone	BC-52
C1223/43	ABS Control System Malfunction	1. ABS control system	BC-55
C1224/44	NE Signal Circuit	1. NEO circuit 2. ECM 3. Skid control ECU	BC-56

DTC No.	Detection Item	Trouble Area	See page
C1225/25	SM Solenoid Circuit	1. SMF or SMR circuit 2. ABS & TRAC actuator	BC-37
C1231/31	Steering Angle Sensor Circuit Malfunction	1. Steering angle sensor 2. Steering angle sensor circuit 3. +B circuit	BC-59
C1232/32	Stuck in Deceleration Sensor	1. Yaw rate sensor (Deceleration sensor)	BC-62
C1234/34	Yaw Rate Sensor Malfunction	1. Yaw rate sensor (Deceleration sensor)	BC-62
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	1. Right front speed sensor 2. Sensor installation	BC-24
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	1. Left front speed sensor 2. Sensor installation	BC-24
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	1. Right rear speed sensor 2. Sensor installation	BC-30
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	1. Left rear speed sensor 2. Sensor installation	BC-30
C1241/41	Low Battery Positive Voltage	1. Battery 2. Charging system 3. Power source circuit	BC-65
C1243/43* ¹	Acceleration Sensor Stuck Malfunction	1. Yaw rate sensor (Deceleration sensor) 2. Yaw rate sensor circuit (Deceleration sensor circuit)	BC-62
C1244/44	Open or Short in Deceleration Sensor Circuit	1. Yaw rate sensor (Deceleration sensor) 2. Yaw rate sensor circuit (Deceleration sensor circuit)	BC-62
C1245/45* ¹	Acceleration Sensor Output Malfunction	1. Yaw rate sensor (Deceleration sensor) 2. Yaw rate sensor circuit (Deceleration sensor circuit)	BC-62
C1246/46* ²	Master Cylinder Pressure Sensor Malfunction	1. Master cylinder pressure sensor 2. Master cylinder pressure sensor circuit	BC-68
C1249/49	Open in Stop Light Switch Circuit	1. Stop light assembly 2. Stop light switch circuit	BC-70
C1251/51* ¹	Open in Pump Motor Circuit	1. ABS & TRAC actuator 2. ABS & TRAC actuator circuit	BC-74
C1267/67	Brake Pedal Load Sensing Switch	1. Brake pedal load sensing switch 2. Brake pedal load sensing switch circuit	BC-76
C1336/39	Zero Point Calibration of Deceleration Sensor Undone	1. Yaw rate sensor (Deceleration sensor) 2. Zero point calibration not done	BC-52
C1361/91	Short Circuit in ABS Motor Fail Safe Relay Circuit	1. ABS No.21 fuse 2. ABS cut relay 3. ABS cut relay circuit 4. J/B No.2	BC-39
C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction	1. Yaw rate sensor 2. Yaw rate sensor power source circuit	BC-62

*1, *2:

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

- *1:

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

(b) Clear the DTC.

- *2:

(a) Keep the vehicle in a stationary condition for 5 seconds or more and depress the brake pedal lightly 2 or 3 times.

(b) Drive the vehicle at a speed of 31 mph (50 km/h). Then depress the brake pedal strongly for about 3 seconds.

(c) Repeat the above operation 3 times or more and check that the ABS warning light goes off.

(d) Clear the DTC.

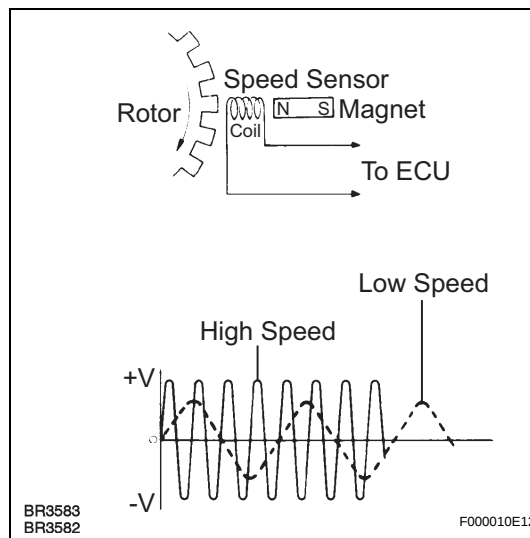
HINT:

- In some cases, the intelligent tester cannot be used when ABS warning light remains on.
- In some cases, the intelligent tester cannot be used when the VSC warning light remains on.
- If any of U0121/94, U0123/62, U0124/95 and U0126/63 are displayed, inspect the CAN communication system.

DTC	C0200/31	Right Front Wheel Speed Sensor Signal
DTC	C0205/32	Front Speed Sensor LH Circuit
DTC	C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH
DTC	C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the ABS control system. The front and rear rotors have 48 serrations each.



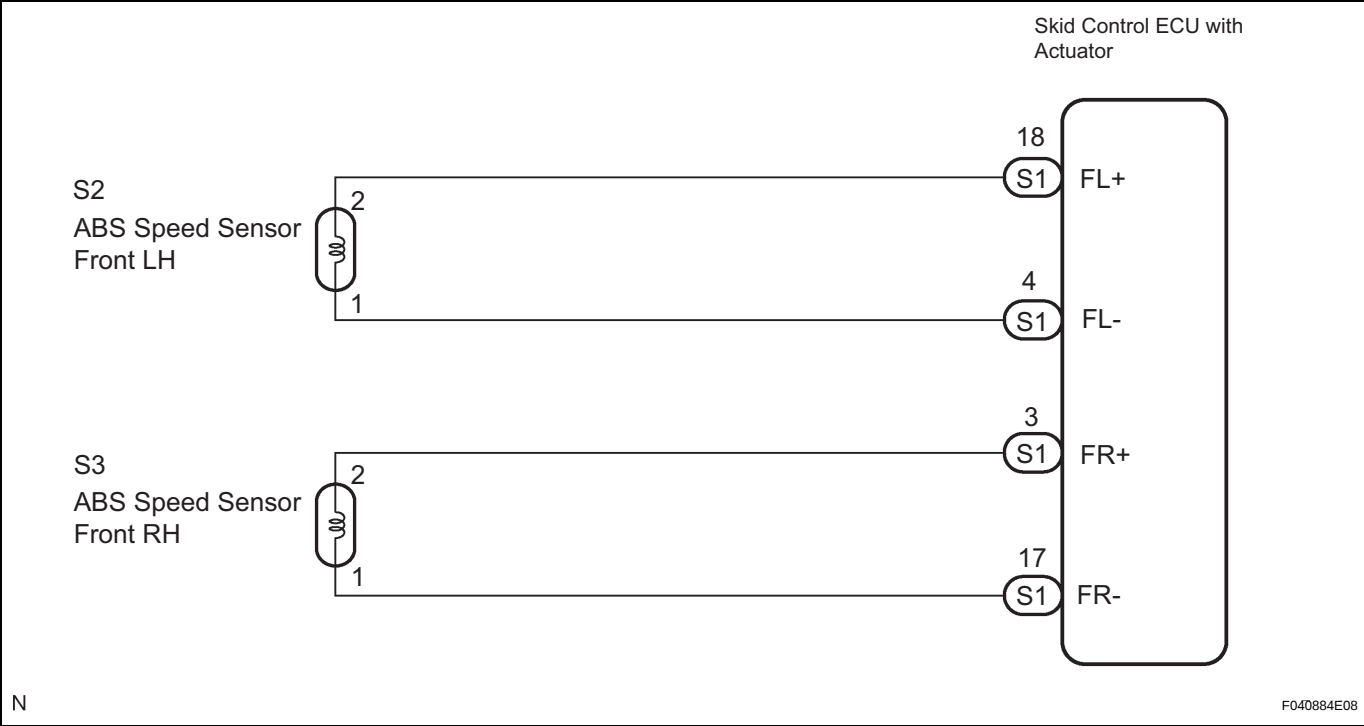
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	- All the following conditions continues for at least 1 second. - Vehicle speed is more than 6 mph (10 km/h). - Open or short in vehicle speed sensor signal circuit. - Momentary interruption of the sensor signal of faulty wheel has occurred 7 times or more. - Sensor signal circuit is open for 0.5 seconds.	- Right front and left front speed sensor - Each speed sensor circuit - Sensor rotor - Sensor installation
C1235/35 C1236/36	All the following conditions for at least 5 seconds. - Vehicle speed is more than 12 mph (20 km/h). - Vehicle speed sensor signal receives interference.	- Right front and left front speed sensor - Sensor installation

HINT:

- DTC C0200/31 and C1235/35 are for the right front speed sensor.
- DTC C0205/32 and C1236/36 are for the left front speed sensor.

WIRING DIAGRAM



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

1

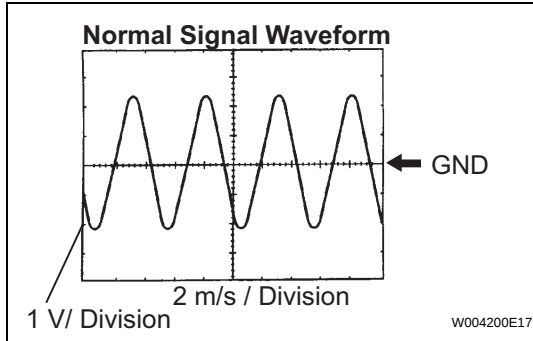
READ VALUE OF INTELLIGENT TESTER (FRONT SPEED SENSOR)

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

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

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

2 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



(a) INSPECTION USING OSCILLOSCOPE

- (1) Connect the oscilloscope to terminal FR+ - FR- or FL+ - FL- of the skid control ECU.
- (2) Drive the vehicle at about 19 mph (30 km/h), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

HINT:

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

NOTICE:

When replacing the ABS actuator assembly, perform zero point calibration (See page BC-5).

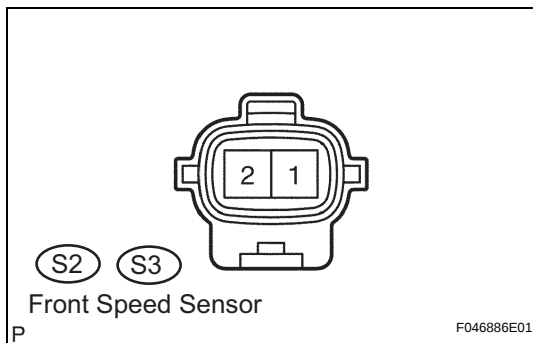
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Go to step 6

OK

REPLACE ABS AND TRACTION ACTUATOR

3 INSPECT FRONT SPEED SENSOR



- (a) Make sure that there is no looseness at the connectors' locking part and connecting part of connector.
- (b) Disconnect the speed sensor connector.
- (c) Measure the resistance according to the value(s) in the table below.

Resistance:

LH

Tester Connection	Specified Condition
S2-2 (FL+) - S2-1 (FL-)	0.6 to 2.5 kΩ

RH

Tester Connection	Specified Condition
S3-2 (FR+) - S3-1 (FR-)	0.6 to 2.5 kΩ

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

Resistance:

LH

Tester Connection	Specified Condition
S2-2 (FL+) - Body ground	10 kΩ or higher

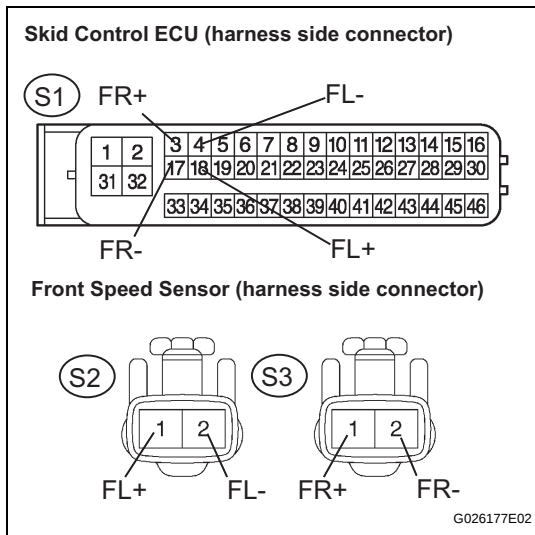
Tester Connection	Specified Condition
S2-1 (FL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
S3-2 (FR+) - Body ground	10 kΩ or higher
S3-1 (FR-) - Body ground	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement
(See page [BC-16](#)).

NG**REPLACE FRONT SPEED SENSOR****OK****4****CHECK HARNESS AND CONNECTOR (FRONT SPEED SENSOR - SKID CONTROL ECU)**

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

Resistance:**LH**

Tester Connection	Specified Condition
S1-18 (FL+) - S2-2 (FL+)	Below 1 Ω
S1-4 (FL-) - S2-1 (FL-)	Below 1 Ω

RH

Tester Connection	Specified Condition
S1-3 (FL+) - S3-2 (FL+)	Below 1 Ω
S1-17 (FL-) - S3-1 (FL-)	Below 1 Ω

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

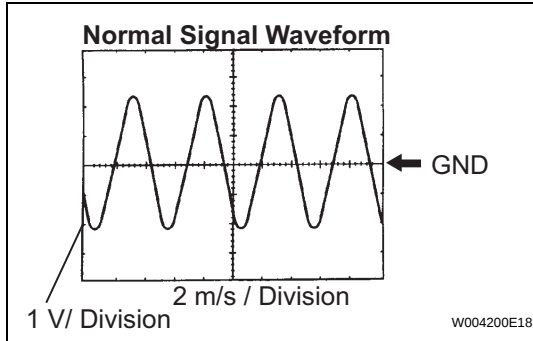
Resistance:**LH**

Tester Connection	Specified Condition
S1-18 (FL+) - Body ground	10 kΩ or higher
S1-4 (FL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
S1-3 (FL+) - Body ground	10 kΩ or higher
S1-17 (FL-) - Body ground	10 kΩ or higher

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR**

5 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS**(a) INSPECTION USING OSCILLOSCOPE**

- (1) Connect the oscilloscope to terminal FR+ - FR- or FL+ - FL- of the skid control ECU.
- (2) Drive the vehicle at about 19 mph (30 km/h), and check the signal waveform.

OK:

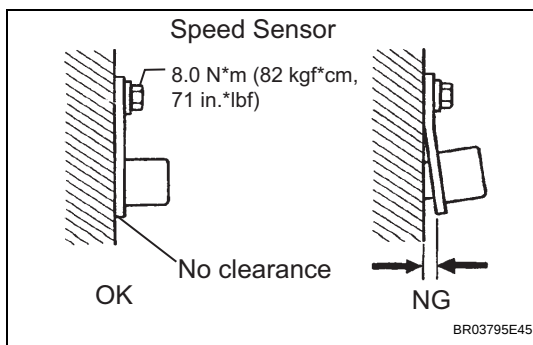
A waveform as shown in a figure should be output.

HINT:

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

NOTICE:

When replacing the ABS actuator assembly, perform zero point calibration (See page BC-5).

NG**Go to step 6****OK****REPLACE ABS AND TRACTION ACTUATOR****6 INSPECT FRONT SPEED SENSOR INSTALLATION****(a) Check the speed sensor installation.****OK:**

The installation bolt is tightened properly. There is no clearance between the sensor and the front steering knuckle.

Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

NOTICE:

Check the speed sensor signal after the replacement (See page BC-16).

NG**REPLACE FRONT SPEED SENSOR****OK****7 INSPECT SPEED SENSOR TIP**

- (a) Remove the front speed sensor (See page BC-113).
- (b) Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

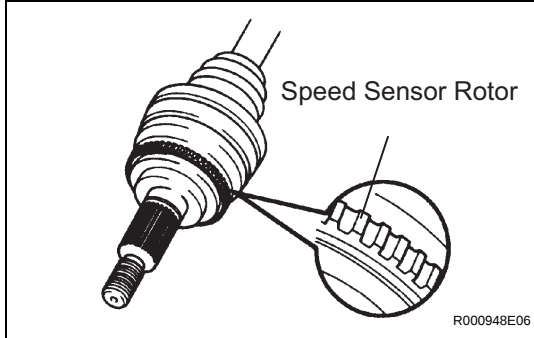
Check the speed sensor signal after the replacement
(See page [BC-16](#)).

NG

CLEAN OR REPLACE SPEED SENSOR

OK

8

INSPECT SPEED SENSOR ROTOR

(a) Remove the front speed sensor rotor.

(b) Check the sensor rotor serrations.

OK:

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

HINT:

If there is foreign matter in the rotor, remove it and check the output waveform after reassembly.

NOTICE:

Check the speed sensor signal after the replacement
(See page [BC-16](#)).

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-5](#)).

NG

REPLACE FRONT DRIVE SHAFT ASSEMBLY

OK

REPLACE ABS AND TRACTION ACTUATOR

DTC	C0210/33	Right Rear Wheel Speed Sensor Signal
DTC	C0215/34	Rear Speed Sensor LH Circuit
DTC	C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH
DTC	C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH

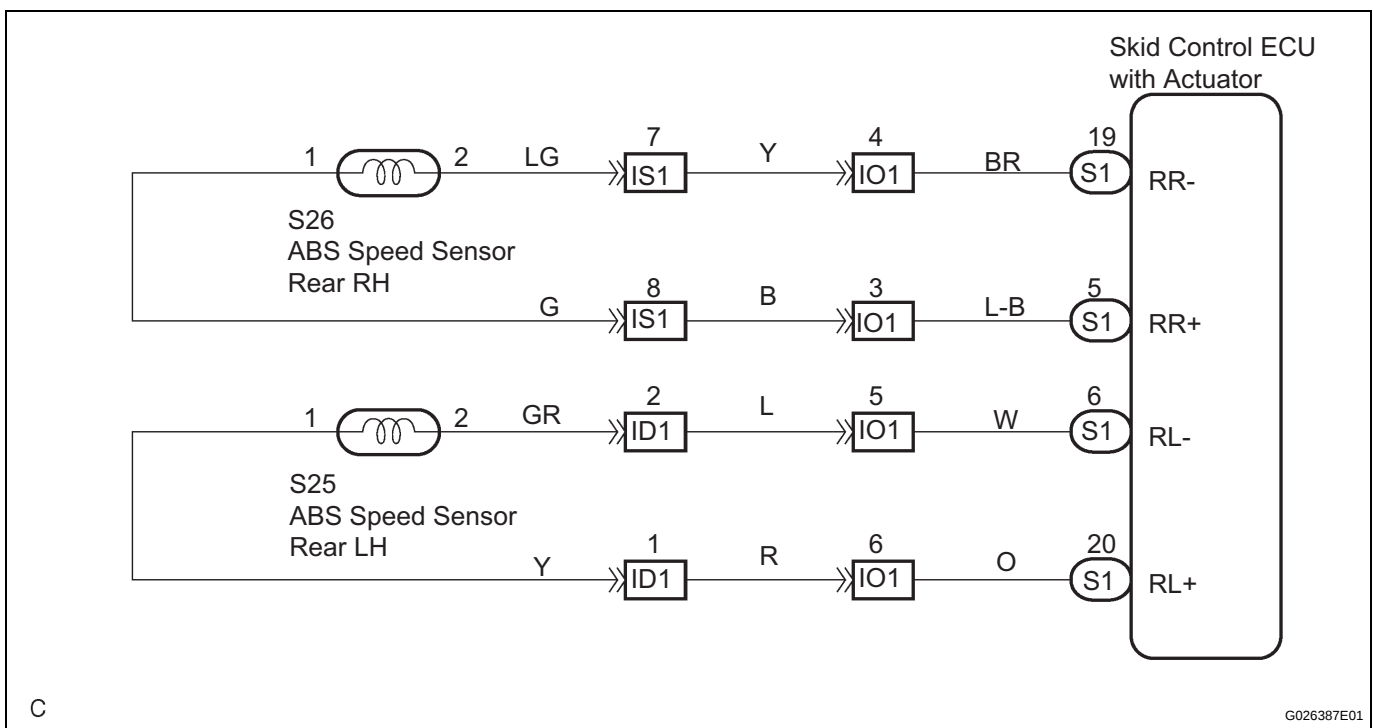
DESCRIPTION

Refer to DTC C0200/31, C0205/32, C1235/35, C1236/36 (See page [BC-24](#)).

DTC No.	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	- All the following conditions continues for at least 1 second. - Vehicle speed is more than 6 mph (10 km/h). - Open or short in vehicle speed sensor signal circuit. - Momentary interruption of the sensor signal of faulty wheel has occurred 7 times or more. - Sensor signal circuit is open for 0.5 seconds.	- Right rear and left rear speed sensor - Each speed sensor circuit - Sensor rotor - Sensor installation
C1238/38 C1239/39	All the following conditions for at least 5 seconds. - Vehicle speed is more than 12 mph (20 km/h). - Vehicle speed sensor signal receives interference.	- Right rear and left rear speed sensor - Sensor installation

HINT:

- DTC C0210/33 and C1238/38 are for the right rear speed sensor.
- DTC C0215/34 and C1239/39 are for the left rear speed sensor.

WIRING DIAGRAM

HINT:

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

1 READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

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

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

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

OK:

There is almost no difference in the displayed speed value.

HINT:

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

NG

Go to step 3

OK

2 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS

- (a) INSPECTION USING OSCILLOSCOPE:
 - (1) Connect the oscilloscope to terminals RR+ - RR- or RL+ - RL- of the skid control ECU.
 - (2) Drive the vehicle at approximately 19 mph (30 km/h), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

HINT:

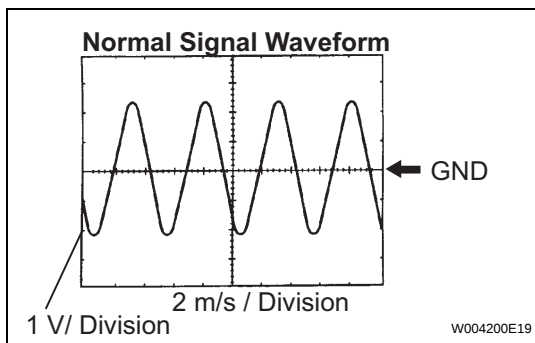
- As vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign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

NOTICE:

When replacing the ABS actuator assembly, perform zero point calibration (See page BC-5).

NG

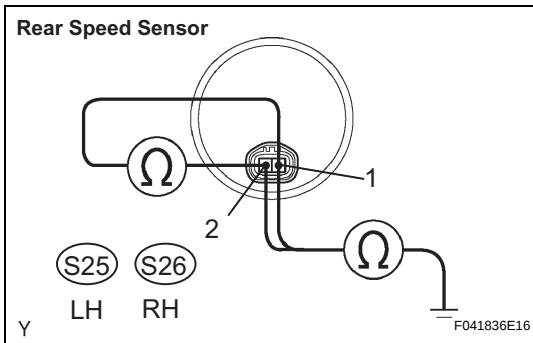
Go to step 6



OK

REPLACE ABS AND TRACTION ACTUATOR

3 INSPECT REAR SPEED SENSOR



(a) 2WD

- (1) Disconnect the skid control sensor connector.
- (2) Measure the resistance according to the value(s) in the table below.

Resistance:**LH**

Tester Connection	Specified Condition
(S25-1) - (S25-2)	0.9 to 2.1 kΩ

RH

Tester Connection	Specified Condition
(S26-1) - (S26-2)	0.9 to 2.1 kΩ

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

Resistance:**LH**

Tester Connection	Specified Condition
(S25-1) - Body ground	10 kΩ or higher
(S25-2) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
(S26-1) - Body ground	10 kΩ or higher
(S26-2) - Body ground	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (See page BC-16).

(b) 4WD

- (1) Remove the seat cushion seatback.
- (2) Disconnect the speed sensor connector S25 or S26.
- (3) Measure the resistance according to the value(s) in the table below.

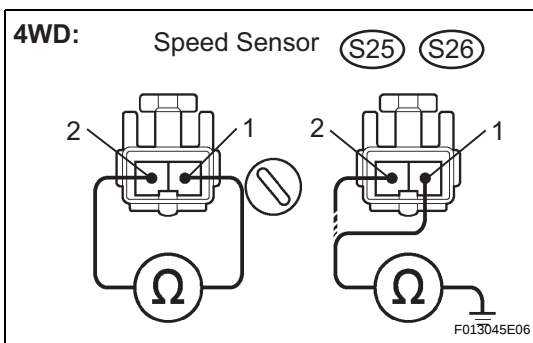
Resistance:**LH**

Tester Connection	Specified Condition
S25-1 (RL+) - S25-2 (RL-)	0.9 to 1.3 Ω

RH

Tester Connection	Specified Condition
S26-1 (RR+) - S26-2 (RR-)	0.9 to 1.3 Ω

- (4) Measure the resistance according to the value(s) in the table below



Resistance:**LH**

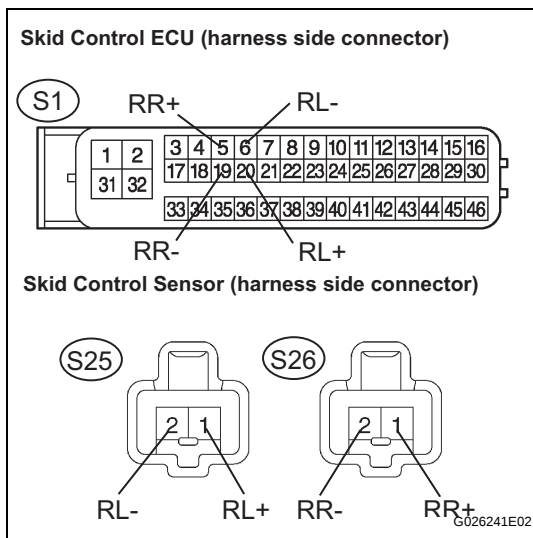
Tester Connection	Specified Condition
S25-1 (RL+) - Body ground	1 MΩ or higher
S25-2 (RL-) - Body ground	1 MΩ or higher

RH

Tester Connection	Specified Condition
S26-1 (RR+) - Body ground	1 MΩ or higher
S26-2 (RR-) - Body ground	1 MΩ or higher

NOTICE:

Check the speed sensor signal after the replacement. (See page [BC-16](#))

NG**REPLACE REAR SPEED SENSOR****OK****4 CHECK HARNESS AND CONNECTOR (REAR SPEED SENSOR - SKID CONTROL ECU)**

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

Resistance:**LH**

Tester Connection	Specified Condition
S1-20 (RL+) - S25-1 (RL+)	Below 1 Ω
S1-6 (RL-) - S25-2 (RL-)	Below 1 Ω

RH

Tester Connection	Specified Condition
S1-5 (RR+) - S26-1 (RR+)	Below 1 Ω
S1-6 (RR-) - S26-2 (RR-)	Below 1 Ω

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

Resistance:**LH**

Tester Connection	Specified Condition
S1-20 (RL+) - Body ground	10 kΩ or higher
S1-6 (RL-) - Body ground	10 kΩ or higher

RH

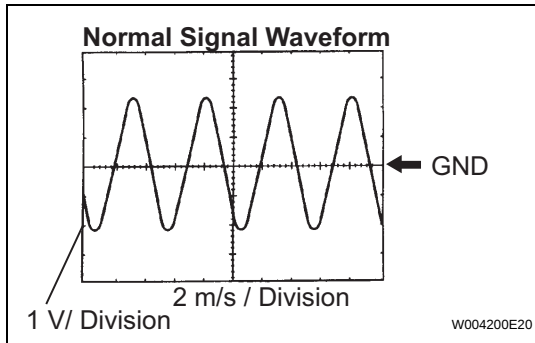
Tester Connection	Specified Condition
S1-5 (RR+) - Body ground	10 kΩ or higher
S1-19 (RR-) - Body ground	10 kΩ or higher

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5

INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



(a) INSPECTION USING OSCILLOSCOPE:

- (1) Connect the oscilloscope to terminals RR+ - RR- or RL+ - RL- of the skid control ECU.
- (2) Drive the vehicle at approximately 19 mph (30 km/h), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

HINT:

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

NOTICE:

When replacing the ABS actuator assembly, perform zero point calibration (See page BC-5).

NG

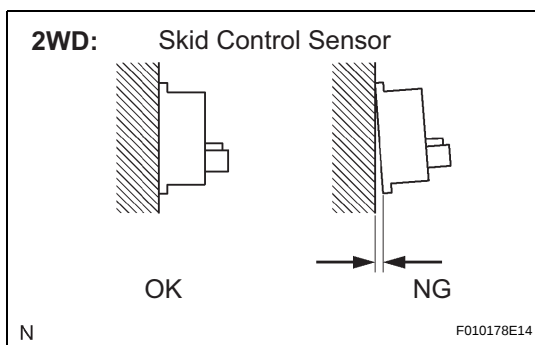
Go to step 6

OK

REPLACE ABS AND TRACTION ACTUATOR

6

INSPECT REAR SPEED SENSOR INSTALLATION

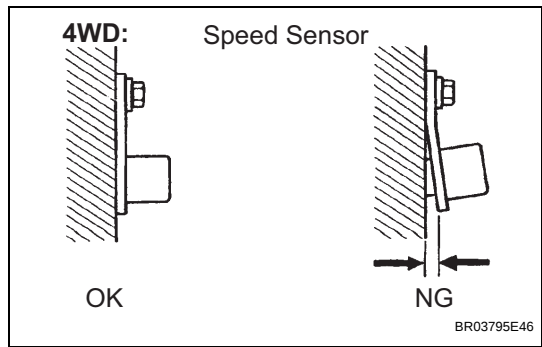


(a) 2WD

- (1) Check the sensor installation.

OK:

There is no clearance between the sensor and rear axle carrier.

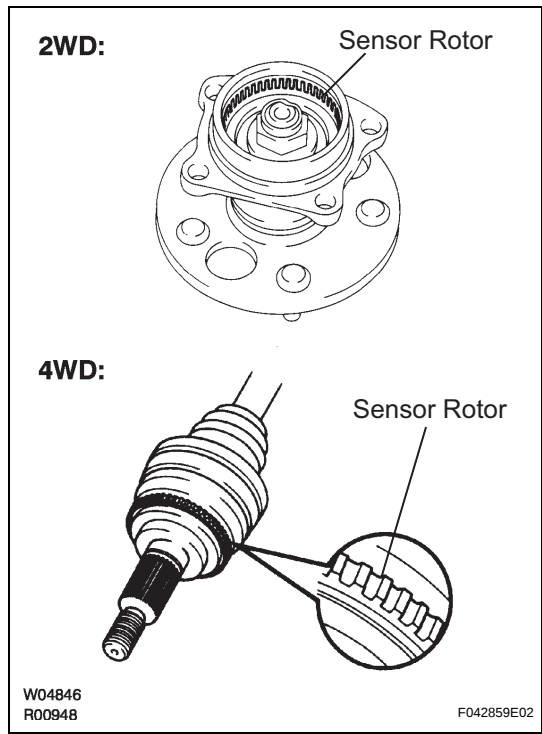


- (b) 4WD
- (1) Check the sensor installation.
- OK:**
- There is no clearance between the sensor and rear axle carrier.
- The installation bolt is tightened properly.
- Torque:** 8.0 N*m (82 kgf*cm, 71 in.*lbf)
- NOTICE:**
- Check the speed sensor signal after the replacement (See page [BC-16](#)).

NG → **REPLACE REAR SPEED SENSOR**

OK

7 INSPECT SENSOR ROTOR



- (a) Check the sensor rotor serrations.
- OK:**
- No scratches, missing teeth or foreign objects.

Result

Result	See Procedure
OK	A
NG (for 2WD)	B
NG (for 4WD)	C

NOTICE:

Check the speed sensor signal after the replacement (See page [BC-16](#)).

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

C → **REPLACE REAR DRIVE SHAFT ASSEMBLY**

A

8

INSPECT REAR SPEED SENSOR TIP

- (a) Remove the rear speed sensor (See page [BC-116](#)).
- (b) Check the sensor tip.

OK:**No scratches or foreign matter on the sensor tip.****NOTICE:****Check the speed sensor signal after the replacement (See page [BC-16](#)).****NOTICE:****When replacing the ABS actuator assembly, perform zero point calibration (See page [BC-5](#)).**NG

CLEAN OR REPLACE SPEED SENSOR

OK

DTC	C0226/21	SFR Solenoid Circuit
DTC	C0236/22	SFL Solenoid Circuit
DTC	C0246/23	SRR Solenoid Circuit
DTC	C0256/24	SRL Solenoid Circuit
DTC	C1225/25	SM Solenoid Circuit

DESCRIPTION

This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders to control the braking force.

DTC No.	DTC Detection Condition	Trouble Area
C0226/21	Open or short circuit in front right solenoid circuit (SFRR or SFRH) continues for 0.05 sec. or more.	• ABS & TRAC actuator • Each solenoid circuit
C0236/22	Open or short circuit in front left solenoid circuit (SFLR or SFLH) continues for 0.05 sec. or more.	• ABS & TRAC actuator • Each solenoid circuit
C0246/23	Open or short circuit in rear right solenoid circuit (SRRR or SRRH) continues for 0.05 sec. or more.	• ABS & TRAC actuator • Each solenoid circuit
C0256/24	Open or short circuit in rear left solenoid circuit (SRLR or SRLH) continues for 0.05 sec. or more.	• ABS & TRAC actuator • Each solenoid circuit
C1225/25	When any of the following (1 to 5) is detected: - All the following conditions continues for at least 0.05 seconds. – When switching solenoid (SM1 or SM2) outputs ON signal. – Over current. - All the following conditions continues for at least 0.05 seconds. – When switching solenoid (SM1 or SM2) outputs OFF signal. – Open circuit. - All the following conditions continue for at least 0.05 seconds. – When switching solenoid (SM1 or SM2) outputs OFF signal. – Output current monitor is more than 0.15 A. - All the following conditions continues for at least 0.05 seconds. – When switching solenoid (SM1 or SM2) outputs ON signal. – Output current is more than 0.348 A. – Difference between current monitor and target value exceeds 2, continues for between 0.1 sec. and 0.15 sec. - All the following conditions continue for at least 0.2 seconds. – When switching solenoid (SM1 or SM2) outputs ON signal. – Output current is more than 0.348 A. – Switching solenoid (SM1 or SM2) duty ratio: (1) More than 2.08 (2) Less than 0.48	• ABS & TRAC actuator • Each solenoid circuit

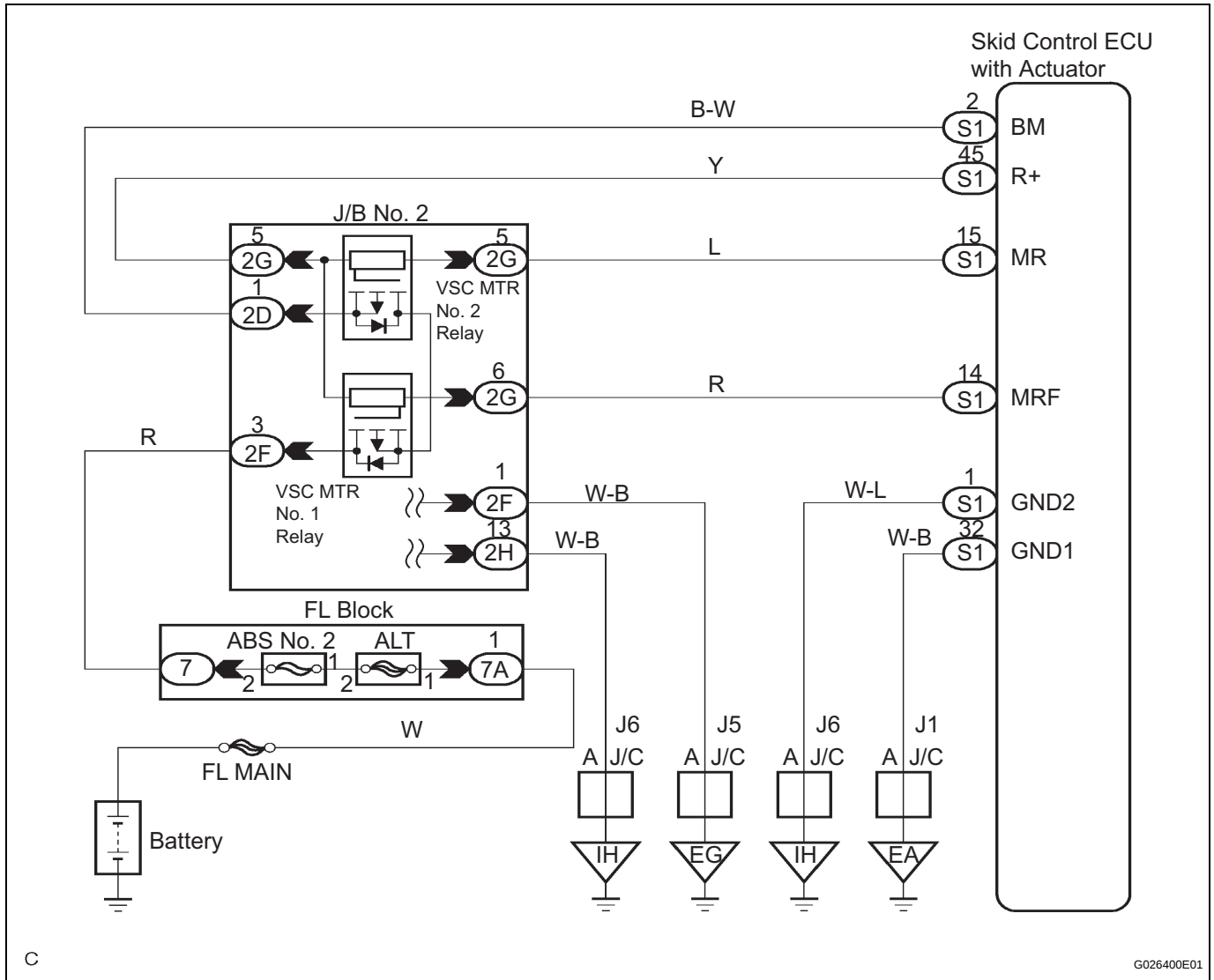
DTC	C0273/13	Open or Short Circuit in ABS Motor Relay Circuit
DTC	C0274/14	Short to B+ in ABS Motor Relay Circuit
DTC	C1361/91	Short Circuit in ABS Motor Fail Safe Relay Circuit

DESCRIPTION

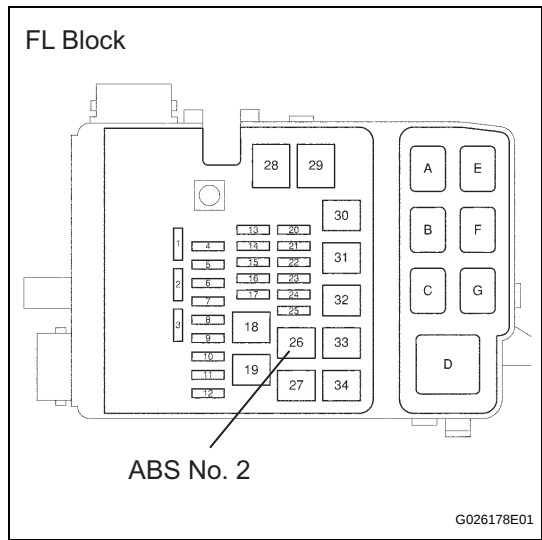
- The ABS motor relays consist of the 2 semiconductor relays and are included in the J/B No. 2.
- The ABS motor relay 1 is turned on after turning the ignition switch to the ON position. If the DTCs in the ABS pump motor circuit are memorized, the ABS motor relay 1 cuts off the power supply to the ABS motor relay 2 and performs the fail safe.
- While any of the ABS, BA, TRAC and VSC is operating, the skid control ECU (included in the actuator) turns the ABS motor relay 2 on to operate the actuator pump motor.
- If the voltage applied to the ABS motor relays (+BM) drops below the condition that detects the DTCs due to the shortage of the battery or alternator output, the DTCs may be memorized.

DTC No.	DTC Detection Condition	Trouble Area
C0273/13	• With IG1 terminal voltage at 9.5 to 17.2 V, during initial check, ABS control, TRAC control, VSC control and BA control, when ABS motor relay is turned on and the relay contact is "OFF" for 0.12 sec. or more. • With IG1 terminal voltage at 9.5 V or less, when ABS motor relay is turned on and the relay contact is not "ON" for 0.12 sec. or more.	• ABS No. 2 fuse • ABS MTR relay • ABS MTR relay circuit • J/B No. 2
C0274/14	when ABS motor relay is turned off, contact is "ON" for 4 sec. or more.	
C1361/91	Immediately after IG1 terminal is turned on, when ABS motor fail safe relay is turned off and the relay contact is "ON" for 4 sec. or more.	

WIRING DIAGRAM


1 INSPECT FUSE

(a) Remove the ABS No. 2 fuse from the FL block.



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

Resistance

Tester Connection	Specified Condition
ABS No. 2 fuse	Below 1 Ω

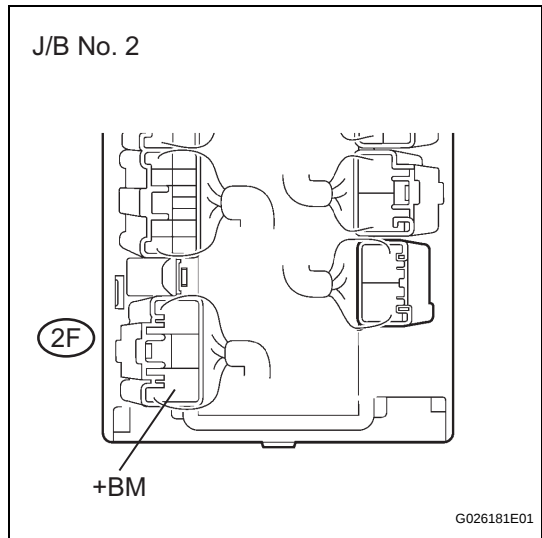
NG

REPLACE FUSE

OK

2

CHECK ENGINE ROOM JUNCTION BLOCK



- (a) With the ignition switch OFF, remove the J/B No. 2 with the wire harness still connected.
- (b) Measure the voltage according to the value(s) in the table below.

Voltage

Tester Connection	Specified Condition
2F-3 (+BM) - Body ground	10 to 14 V

NG

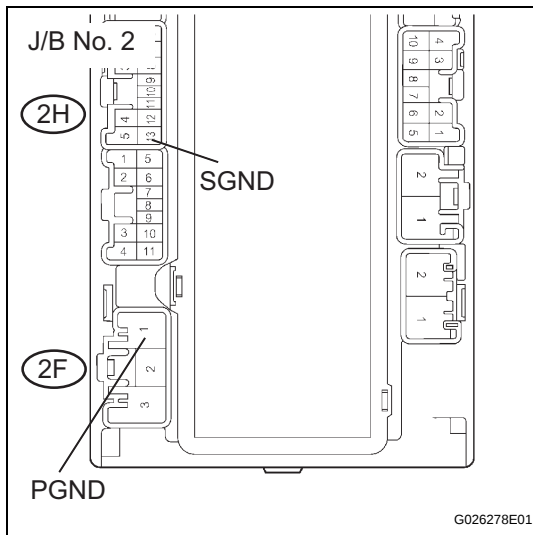
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

CHECK ENGINE ROOM JUNCTION BLOCK

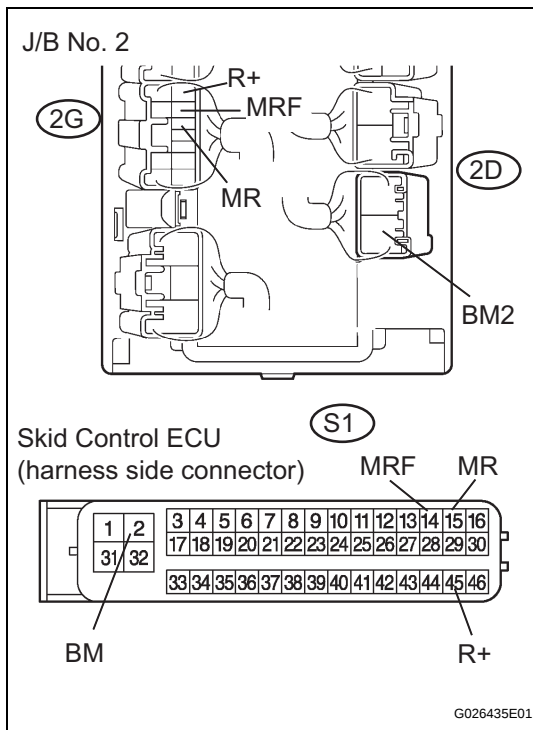
- (a) With the ignition switch off, remove the J/B No. 2 with the wire harness still connected.



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

Resistance

Tester Connection	Specified Condition
2F-1 (PGND) - Body ground	Below 1 Ω
2H-13 (SGND) - Body ground	

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****4 CHECK WIRE HARNESS**

- (a) With the ignition switch OFF, disconnect the skid control ECU connector S1 and the J/B No. 2 connectors.

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

Resistance

Tester Connection	Specified Condition
S1-45 (R+) - 2G-5 (R+)	Below 1 Ω
S1-14 (MRF) - 2G-6 (MRF)	
S1-15 (MR) - 2G-7 (R+)	
S1-2 (BM) - 2D-1 (BM2)	

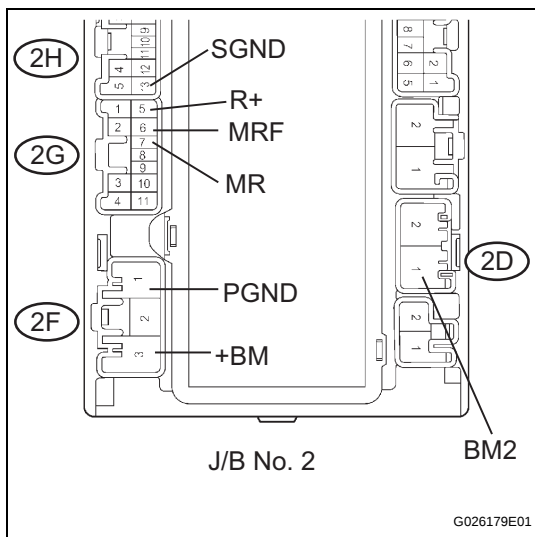
- (c) Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Specified Condition
S1-45 (R+) - Body ground	10 k Ω or higher
S1-14 (MRF) - Body ground	
S1-15 (MR) - Body ground	
S1-2 (BM) - Body ground	

NG**REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****5 CHECK JUNCTION BLOCK NO.2**

- (a) With the ignition switch off, remove the J/B No. 2.



- (b) Connect the battery positive lead to terminal +BM of the J/B No. 2 and the negative lead to terminal SGND, PGND, MRF and MR.

Battery lead Connection	Specified Condition
2F-3 (+BM)	Positive
2H-13 (SGND)	Negative
2F-1 (PGND)	Negative
2G-6 (MRF)	Negative
2G-7 (MR)	Negative

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

Voltage

Tester Connection	Specified Condition
2D-1 (BM2) - Battery negative terminal	0 V

- (d) Connect the battery positive lead to terminal R+ of the J/B No. 2 in addition to terminal +BM.

Battery lead Connection	Specified Condition
2G-5 (R+)	Positive

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

Voltage

Tester Connection	Specified Condition
2D-1 (BM2) - Battery negative terminal	10 to 14 V

NG

REPLACE JUNCTION BLOCK NO.2

OK

6

RECONFIRM DTC

- (a) Clear the DTCs.
 (b) Drive the vehicle at a speed of 6 km/h (4 mph) or more.
 (c) Check if the same DTCs are recorded. (See page [BC-21](#))

Result

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

HINT:

- The skid control ECU inspects the motor relay circuit when the stop light switch is turned off and the vehicle is running at a speed of 6 km/h (4mph) or more.
- It is suspect that the DTCs output was caused by the poor connection of the connector terminal.

B

END

A

REPLACE JUNCTION BLOCK NO.2

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

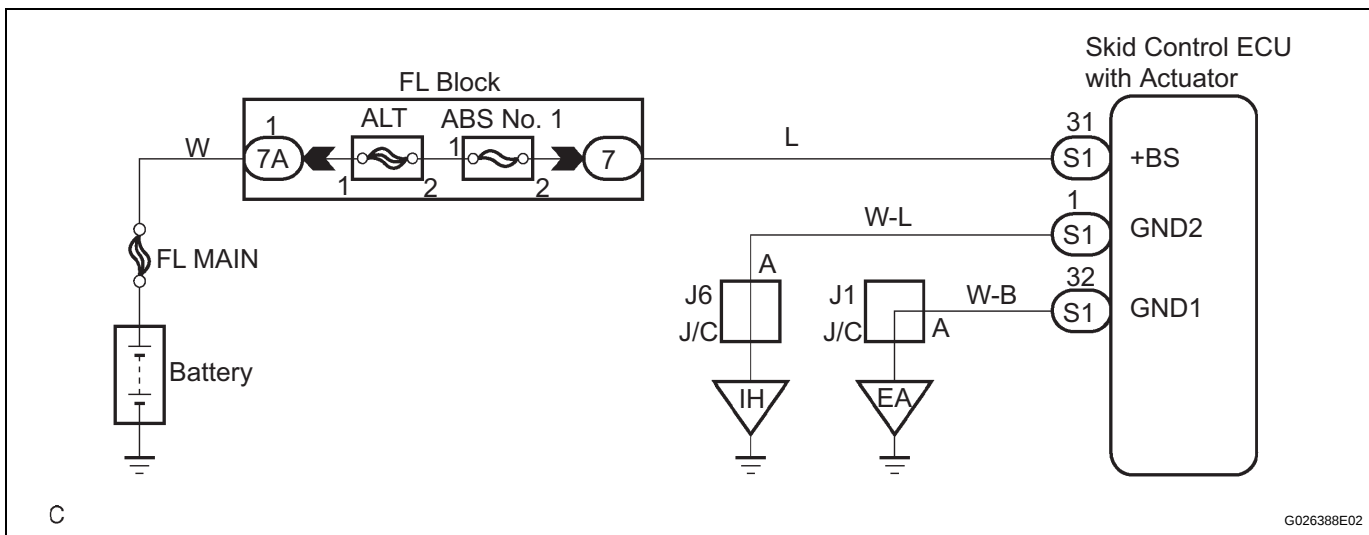
DTC	C0279/12	Short to B+ in ABS Solenoid Relay Circuit
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DESCRIPTION

The ABS solenoid relay is built in the ABS & TRACTION Actuator assembly. This relay supplies power to each ABS solenoid. If the initial check is OK, after the ignition switch is turned to the ON position, the relay goes on.

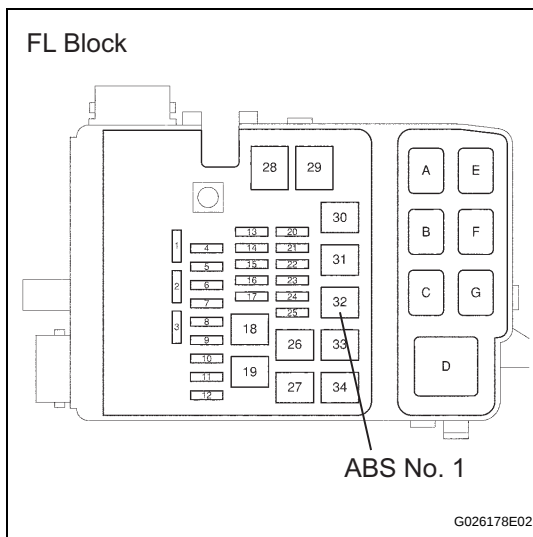
DTC No.	DTC Detection Condition	Trouble Area
C0278/11	When any of the following (1 to 2) is detected: All the following conditions continue for at least 0.2 seconds. - IG voltage is between 9.5 and 17.2 V. - Relay contact is open when the relay is ON. All the following conditions continue for at least 0.2 seconds. ? IG voltage is 9.5 V or less when the relay is ON. - Relay contact remains open.	ABS No. 1 fuse ABS SOL relay ABS SOL relay circuit ABS & TRAC actuator
C0279/12	The following condition continue for at least 0.2 seconds. Relay contact is closed immediately after turning IG switch to the ON position when the relay is OFF.	ABS No. 1 fuse ABS SOL relay ABS SOL relay circuit ABS & TRAC actuator

WIRING DIAGRAM



1	INSPECT ABS NO. 1 FUSE
----------	-------------------------------

(a) Remove the ABS No.1 fuse from the FL block.



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

Resistance

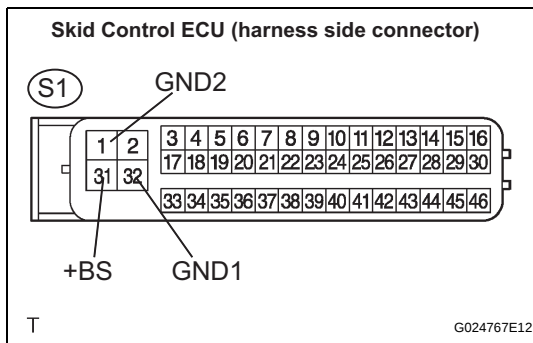
Item	Specified condition
ABS No. 1 fuse	Below 1 Ω (Continuity)

NG

REPLACE FUSE

OK

2 INSPECT SKID CONTROL ECU CONNECTOR



- (a) Disconnect the skid control ECU connector.
 (b) Turn the ignition switch to the ON position.
 (c) Measure the voltage according to the value(s) in the table below.

Voltage

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

NG

Go to step 4

OK

3 RECONFIRM DTC

HINT:

This code is detected when a problem is determined in the ABS & TRACTION actuator assembly.

The ABS solenoid relay is in the ABS & TRACTION actuator assembly.

Therefore, solenoid relay circuit inspection relay unit inspection cannot be performed. Be sure to check if the DTC code is output before replacing the ABS & TRACTION actuator assembly.

- (a) Clear the DTCs (See page [BC-21](#)).
 (b) Turn the ignition switch to the ON position.
 (c) Are the same DTCs recorded.

Result

Result	Proceed to
DTC is output	A

Result	Proceed to
DTC is not output	B

NOTICE:

When replacing ABS & TRACTION ACTUATOR ASSEMBLY, perform zero point calibration (See page [BC-5](#)).

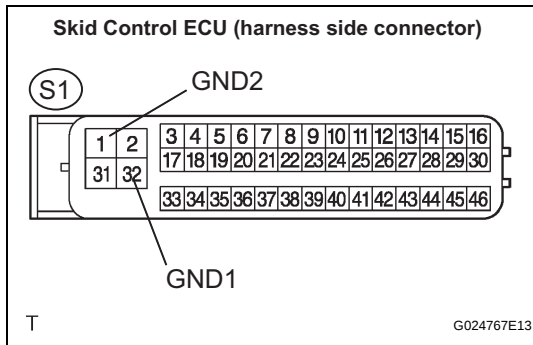
B

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

A

REPLACE ABS AND TRACTION ACTUATOR

4 INSPECT SKID CONTROL ECU CONNECTOR



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

Resistance

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

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 RECONFIRM DTC

HINT:

This code is detected when a problem is determined in the ABS & TRACTION actuator assembly. The ABS solenoid relay is in the ABS & TRACTION actuator assembly.

Therefore, solenoid relay circuit inspection relay unit inspection cannot be performed. Be sure to check if the DTC code is output before replacing the ABS & TRACTION actuator assembly.

- Clear the DTCs (See page [BC-21](#)).
- Turn the ignition switch to the ON position.
- Are the same DTCs recorded.

Result

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

HINT:

It is suspected that the DTCs output was caused by the poor connection of the connector terminal.

NOTICE:

When replacing ABS & TRACTION ACTUATOR ASSEMBLY, perform zero point calibration (See page [BC-5](#)).

B

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

A

REPLACE ABS AND TRACTION ACTUATOR

DTC**C1201/51****Engine Control System Malfunction****DESCRIPTION**

If trouble occurs the engine control system, the ECM transmits the abnormality to the skid control ECU. The skid control ECU set this DTC and the skid control ECU prohibits TRAC and VSC control.

DTC No.	DTC Detection Condition	Trouble Area
C1201/51	At the engine speed of 500 rpm, a trouble signal in the engine control system continues for 5 secs. or more.	Engine control system

1**CHECK DTC FOR ENGINE**

(a) Check if the normal code is recorded for EFI system.

Result

Result	Proceed to
Normal System Code	A
Trouble Code	B

B

**REPAIR ENGINE CONTROL SYSTEM
ACCORDING TO DTC OUTPUT**

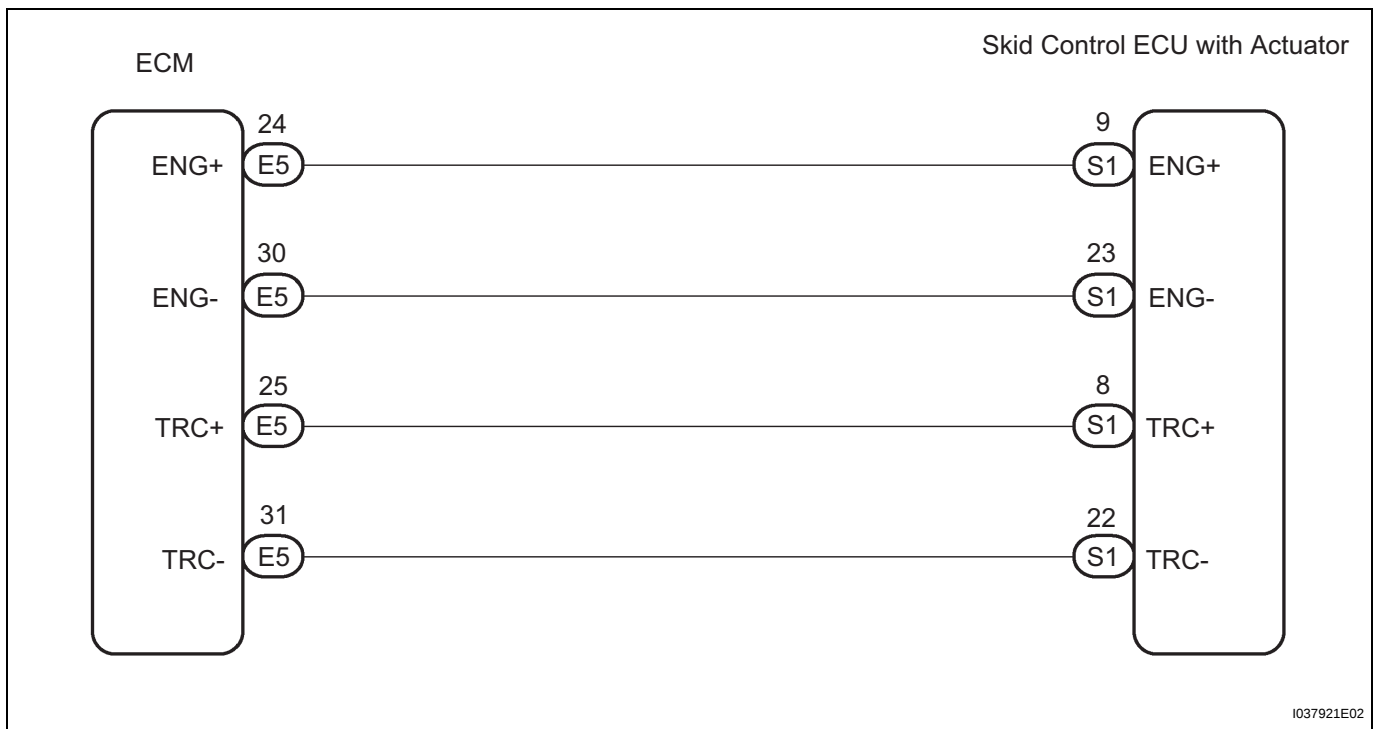
A

REPLACE ECM

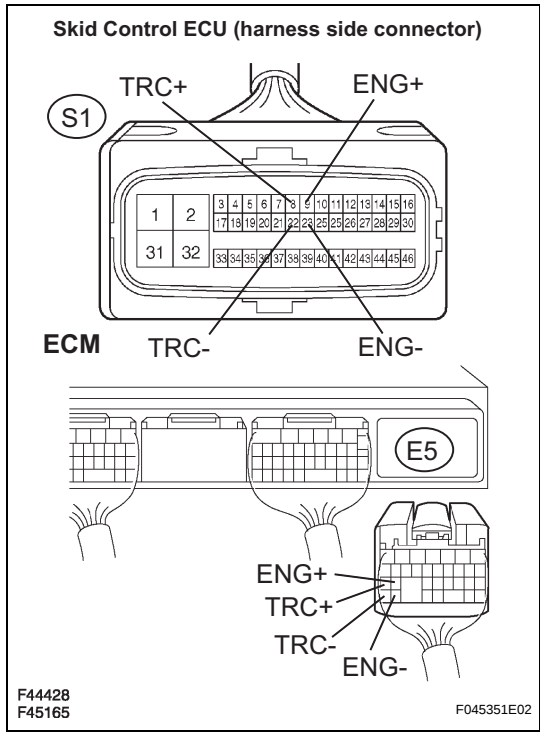
DTC**C1203/53****ECM Communication Circuit Malfunction****DESCRIPTION**

The circuit is used to send TRAC control information (engine revolution signal) from the skid control ECU to the ECM (TRC+, TRC-), and engine control information from the ECM to the skid control ECU (ENG+, ENG-).

DTC No.	DTC Detection Condition	Trouble Area
C1203/53	When any of the following (1 to 3) is detected: - All the following conditions continue for at least 5 seconds. - IG1 terminal voltage is 9.5 V or more. - Cannot send data to ECM. - All the following conditions continue for at least 5 seconds. - IG1 terminal voltage is more than 9.5 V. - Engine speed is 500 rpm or more. - Cannot receive data from ECM. - All the following conditions repeat 10 times in a series. - Cannot send data to ECM. - Cannot receive data from ECM. - Both of the above occur at least once within 5 seconds.	- TRC+ or TRC- circuit - ENG+ or ENG- circuit - ECM

WIRING DIAGRAM**1****CHECK HARNESS AND CONNECTOR**

- (a) Disconnect the skid control ECU connector and ECM connector.



OK

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

Resistance

Tester Connection	Specified Condition
S1-8 (TRC+) - E5-25 (TRC+)	Below 1 Ω
S1-22 (TRC-) - E5-31 (TRC-)	Below 1 Ω
S1-9 (ENG+) - E5-24 (ENG+)	Below 1 Ω
S1-23 (ENG-) - E5-30 (ENG-)	Below 1 Ω

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

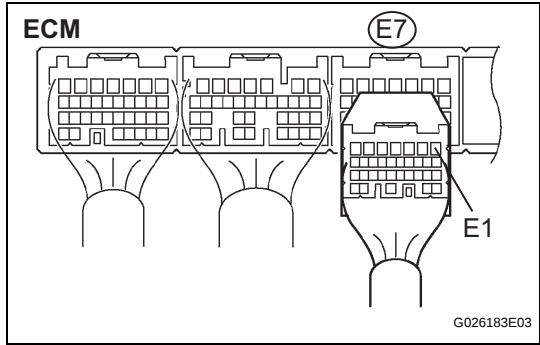
Resistance

Tester Connection	Specified Condition
S1-8 (TRC+) - Body ground	10 kΩ or higher
S1-22 (TRC-) - Body ground	10 kΩ or higher
S1-9 (ENG+) - Body ground	10 kΩ or higher
S1-23 (ENG-) - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

2 CHECK HARNESS AND CONNECTOR



OK

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

Resistance

Tester Connection	Specified Condition
E7-1 (E1) - Body ground	Below 1 Ω

NOTICE:
When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-5](#)).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

REPLACE ABS AND TRACTION ACTUATOR

DTC	C1210/36	Zero Point Calibration of Yaw Rate Sensor Undone
DTC	C1336/39	Zero Point Calibration of Acceleration Sensor Undone

DESCRIPTION

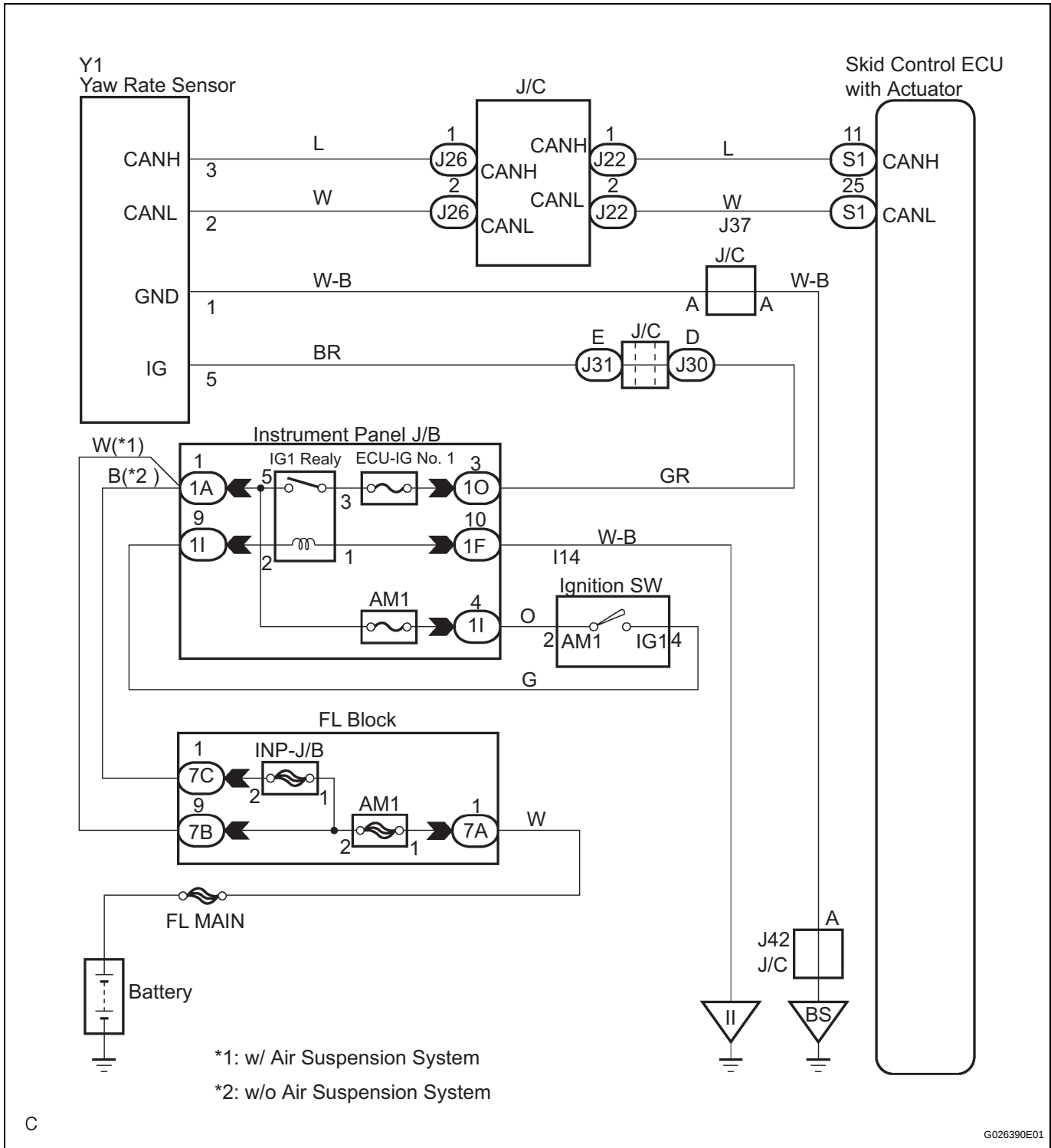
ABS & TRACTION actuator receives signals from the yaw rate sensor via CAN communication system. Yaw rate sensor has the built-in G sensor.

If there is trouble in the bus lines between the yaw rate sensor (deceleration sensor) and CAN communication system, the DTC U0123/62 (yaw rate sensor communication trouble) and U0124/95 (G sensor communication trouble) are output.

The DTC is also output when the calibration has not been completed.

DTC No.	DTC Detection Condition	Trouble Area
C1210/36	Zero point calibration of yaw rate sensor undone	- Yaw rate sensor (Deceleration sensor) - Zero point calibration undone (Perform zero point calibration and DTC. If DTC is not output again, the sensor is normal)
C1336/39	Zero point calibration of deceleration sensor undone	- Deceleration sensor - Zero point calibration undone (Perform zero point calibration and DTC. If DTC is not output again, the sensor is normal)

WIRING DIAGRAM



1

PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION

- (a) Perform the zero point calibration of the yaw rate sensor and deceleration sensor (See page [BC-5](#)).

NEXT

2 RECONFIRM DTC

- (a) Clear the DTCs (See page [BC-21](#)).
- (b) Turn the ignition switch to the ON position.
- (c) Are the same DTCs recorded (See page [BC-21](#)).

Result

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

B**PROCEED TO NEXT CIRCUIT INSPECTION
SHOWN IN PROBLEM SYMPTOMS TABLE****A****3 CHECK SENSOR INSTALLATION**

- (a) Check that the yaw rate sensor has been installed properly (See page [BC-126](#)).
- NOTICE:**
When replacing the yaw rate sensor, perform zero point calibration (See page [BC-5](#)).

NG**INSTALL YAWRATE SENSOR****OK****REPLACE YAWRATE SENSOR**

DTC**C1223/43****ABS Control System Malfunction****HINT:**

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

DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1223/43	Malfunction in ABS control system	ABS control system

1**CHECK DTC OUTPUT (FOR ABS SYSTEM)**

- Clear the DTCs (See page [BC-21](#)).
- Turn the ignition switch to the ON position.
- Are the same DTCs recorded (See page [BC-21](#)).

Result

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

B

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

A**REPAIR CIRCUITS INDICATED BY OUTPUT DTCS**

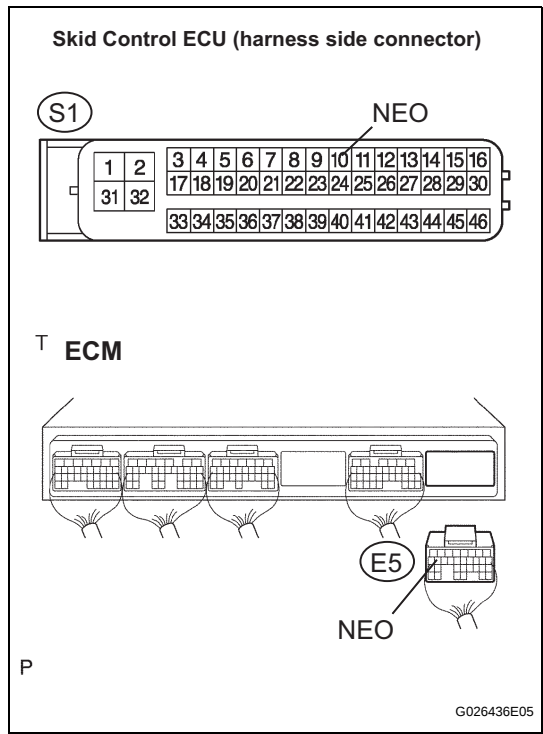
DTC**C1224/44****NE Signal Circuit****DESCRIPTION**

The skid control ECU receives engine revolution speed signals (NE signals) from the ECM.

DTC No.	DTC Detection Condition	Trouble Area
C1224/44	When any of the following (1 to 2) is detected: - All the following conditions continue for at least 10 seconds. - Data can be received properly from ECM at a speed of more than 19 mph (30 km/h). - Open or short in engine rpm signal circuit. - All the following conditions continue for at least 0.24 seconds. - TRAC is in operation. - Open or short in engine rpm signal circuit.	- NEO circuit - ECM - Skid control ECU

WIRING DIAGRAM**1****CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - ECM)**

- (a) Disconnect the skid control ECU connector and the ECM connector.



OK

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

Resistance

Tester Connection	Specified Condition
S1-10 (NEO) - E5-17 (NEO)	Below 1 Ω

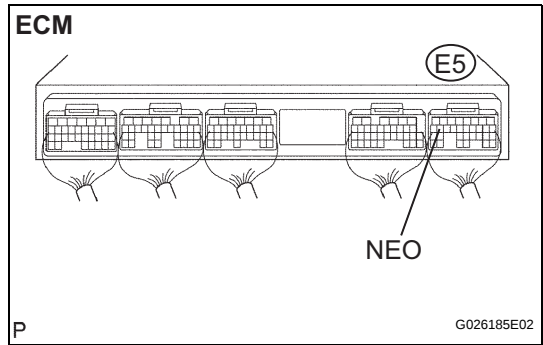
- (c) Measure the resistance according to the value(s) in the table below.

Resistance

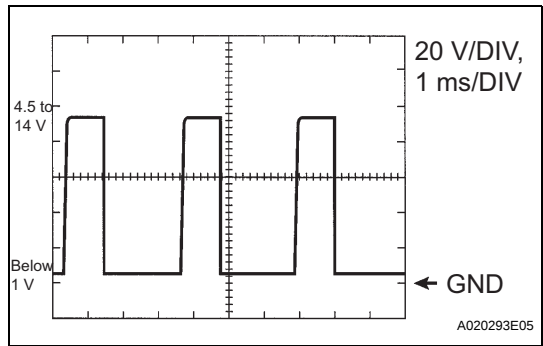
Tester Connection	Specified Condition
S1-10 (NEO) - Body ground	10 k Ω or higher

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

2 INSPECT ECM TERMINAL VOLTAGE (NEO TERMINAL)



- (a) Reconnect the ECM connector and the skid control ECU connector.



- (b) Check the signal waveform between terminal NEO (E5-17) of the ECM and body ground for the engine conditions below.

OK

Tester Connection	Engine Condition	Specified condition
E5-17 (NEO) - Body ground	OFF (Ignition switch ON)	4.5 to 14 V or below 1 V
E5-17 (NEO) - Body ground	ON (Idling)	Pulse generation (4.5 to 14 V $\longleftrightarrow$ below 1 V)

NG REPLACE ECM

OK

3 INSPECT SKID CONTROL ECU CONNECTOR

- (a) Check if the connector is connected.

OK:

The connector should be securely connected.

NG

CONNECT CONNECTOR CORRECTLY

OK

4 RECONFIRM DTC

- (a) Clear the DTCs (See page [BC-21](#)).
(b) Turn the ignition switch to the ON position.
(c) Are the same DTCs recorded.

Result

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

NOTICE:

When replacing the ABS & TRACTION; actuator assembly, perform zero point calibration (See page [BC-5](#)).

B

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

A

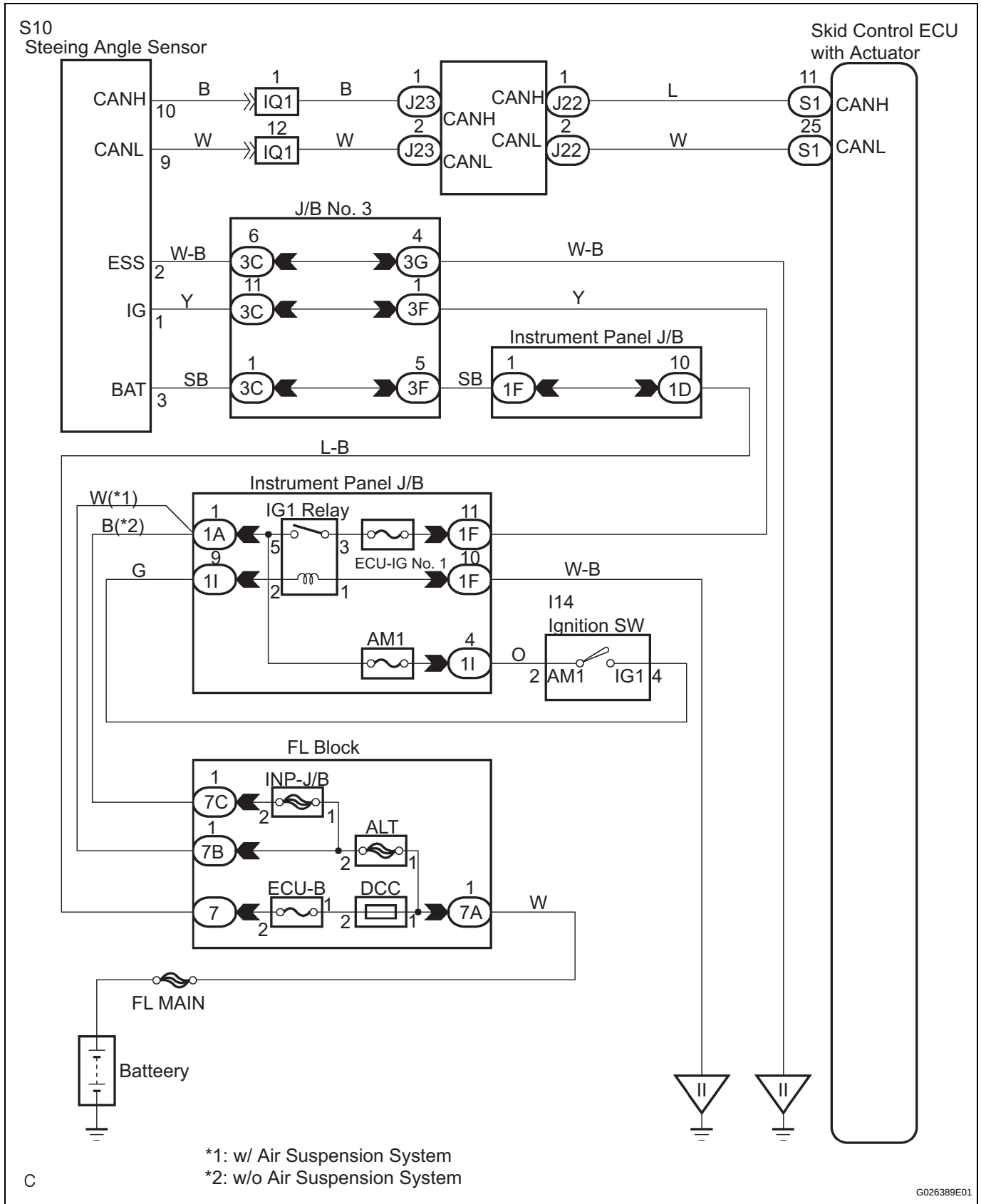
REPLACE ABS AND TRACTION ACTUATOR

DTC**C1231/31****Steering Angle Sensor Circuit Malfunction****DESCRIPTION**

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

DTC No.	DTC Detection Condition	Trouble Area
C1231/31	When ECU IG1 terminal voltage is 9.5 V or more, the steering angle sensor malfunction signal is received.	• Steering angle sensor • Steering angle sensor circuit • +B circuit

WIRING DIAGRAM



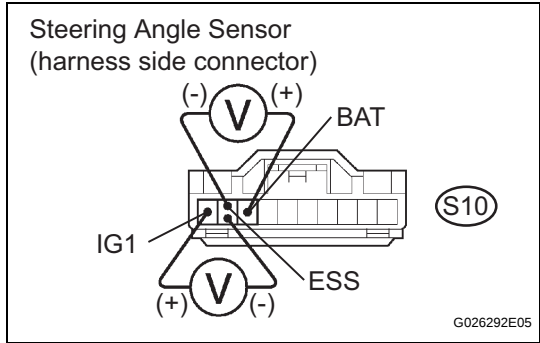
C

G026389E01

BC

1

CHECK TERMINAL VOLTAGE (STEERING ANGLE SENSOR CONNECTOR)



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

Voltage

Tester Connection	Specified Condition
S10-1 (IG) - S10-2 (ESS)	10 to 14 V

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

Voltage

Tester Connection	Specified Condition
S10-9 (IG) - S10-2 (ESS)	10 to 14 V

OK

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

REPLACE STEERING ANGLE SENSOR

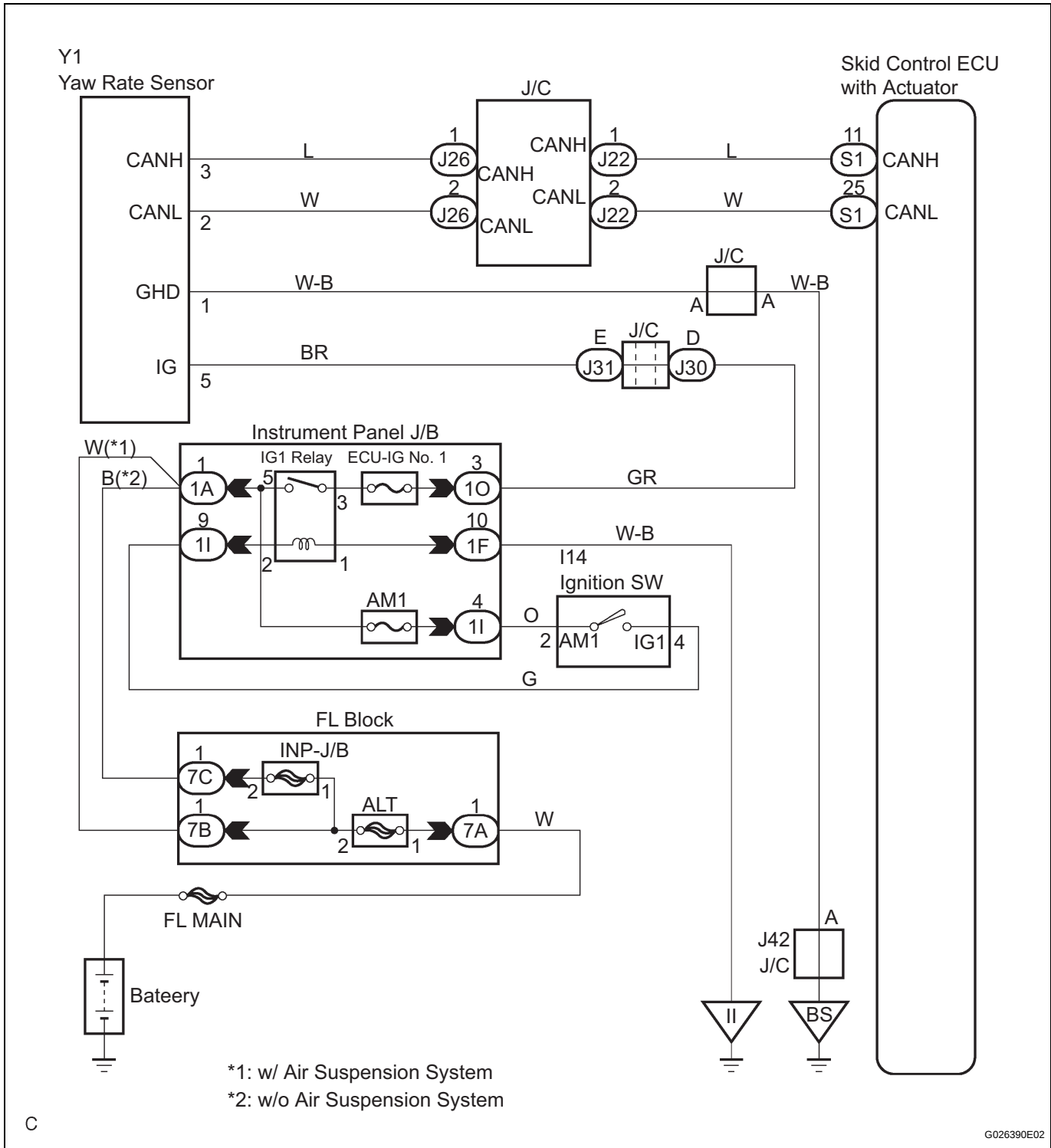
DTC	C1232/32	Stuck in Deceleration Sensor
DTC	C1234/34	Yaw Rate Sensor Malfunction
DTC	C1243/43	Acceleration Sensor Stuck Malfunction
DTC	C1244/44	Open or Short in Deceleration Sensor Circuit
DTC	C1245/45	Acceleration Sensor Output Malfunction
DTC	C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction

DESCRIPTION

The yaw rate sensor and deceleration sensor signal is sent to the skid control ECU through the CAN communication system. When there is a malfunction in the communication, it will be detected by the diagnosis function.

DTC No.	DTC Detection Condition	Trouble Area
C1232/32	While the vehicle is at a speed of 6 mph (10 km/h) or more, the condition that the fluctuation range of the signal from either GL1 or GL2 is under 80 mV and the other is above 1.9 V continues for 30 seconds or more.	- Yaw rate (deceleration) sensor - Yaw rate (deceleration) sensor circuit - CAN communication circuit
C1234/34	Sensor malfunction signal is received from yaw rate sensor.	- Yaw rate (deceleration) sensor - Yaw rate (deceleration) sensor circuit - CAN communication circuit
C1243/43	The following condition repeats 16 times. GL1 and GL2 do not change by more than 2LSB when the vehicle decelerates from 19 mph (30 km/h) to 0 mph (0 km/h).	- Yaw rate (deceleration) sensor - Yaw rate (deceleration) sensor circuit - CAN communication circuit
C1244/44	When any of the following (1 to 2) is detected: - All the following conditions continue for at least 60 seconds. - Vehicle is stopped. - Difference between GL1 and GL2 does not drop below 0.4 G once it reaches 0.6 G or more. - Data malfunction signal is received from G sensor.	- Yaw rate (deceleration) sensor - Yaw rate (deceleration) sensor circuit - CAN communication circuit
C1245/45	The following condition continue for at least 60 seconds. Difference between the values calculated from G sensor value and vehicle speed exceeds 0.35 G.	- Yaw rate (deceleration) sensor - Yaw rate (deceleration) sensor circuit - CAN communication circuit
C1381/97	G sensor power source malfunction signal is received for at least 10 sec. at a speed of more than 2 mph (3 km/h).	- Yaw rate (deceleration) sensor - Yaw rate (deceleration) sensor circuit - CAN communication circuit

WIRING DIAGRAM



1

CHECK SENSOR

- (a) Check that the yaw rate and deceleration sensor has been installed properly (See page [BC-126](#)).

OK:

The sensor should be tightened to the specified torque.

The sensor should not be tilted.

NG

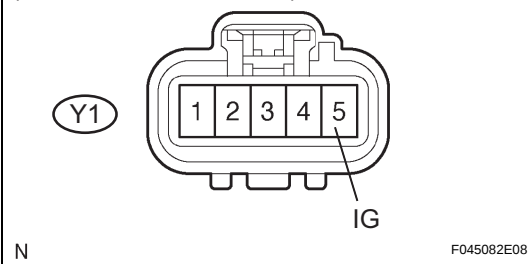
INSTALL YAWRATE SENSOR

OK

2

CHECK HARNESS AND CONNECTOR

Yaw Rate and Deceleration Sensor
(harness side connector)



- (a) Disconnect the yaw rate and deceleration sensor connector.
- (b) Turn the ignition switch to the ON position.
- (c) Measure the voltage according to the value(s) in the table below.

Voltage

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

NG

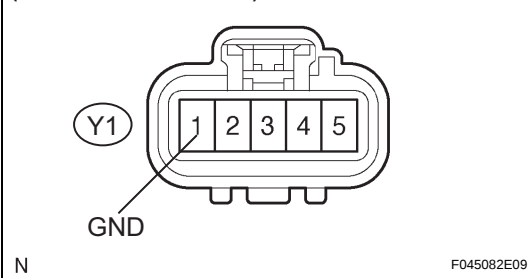
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

CHECK HARNESS AND CONNECTOR

Yaw Rate and Deceleration Sensor
(harness side connector)



- (a) Disconnect the yaw rate and deceleration sensor connector.
- (b) Measure the resistance according to the value(s) in the table below.

Resistance

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

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

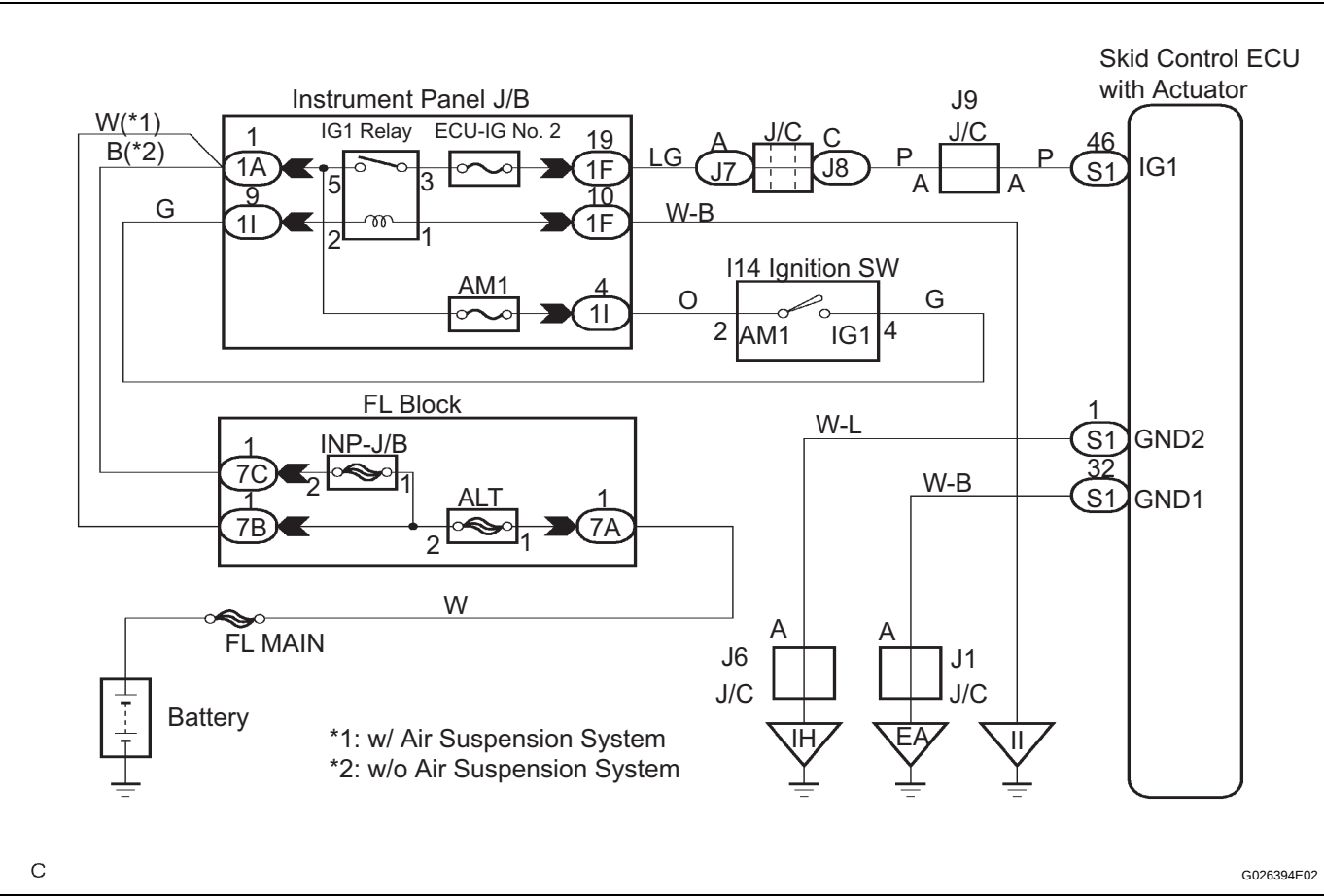
REPLACE YAWRATE SENSOR

DTC	C1241/41	Low Battery Positive Voltage
-----	----------	------------------------------

DESCRIPTION

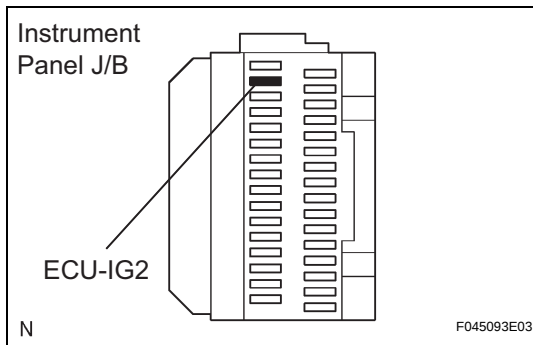
DTC No.	DTC Detection Condition	Trouble Area
C1241/41	When any of the following (1 to 2) is detected: 1. All the following conditions continue for at least 10 seconds. - Vehicle speed is more than 3 km/h (2 mph). - IG1 terminal voltage is less than 9.5 V. 2. All the following conditions continue for at least 0.2 seconds. - Solenoid relay remains ON. - IG1 terminal voltage is less than 9.5 V. - Relay contact is open.	- Battery - Charging system - Power source circuit

WIRING DIAGRAM



1	INSPECT ECU-IG FUSE
---	---------------------

(a) Remove the ECU-IG fuse from the instrument panel J/B.



(b) Check continuity of the ECU-IG fuse.

Resistance

Item	Specified condition
ECU-IG 2 Fuse	Below 1 Ω (Continuity)

NG

REPLACE ECU-IG FUSE

OK

2 INSPECT BATTERY

(a) Check the positive battery voltage.

Voltage:

11 to 14 V

NG

INSPECT CHARGING SYSTEM

OK

3 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (IG1 TERMINAL)

(a) WHEN USING INTELLIGENT TESTER:

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

Item	Measurement Item / Range (Display)	Normal Condition
IG VOLTAGE	ECU power supply voltage / UNDER / NORMAL	NORMAL: 9.5 V or over UNDER: Below 9.5 V

OK:

"Normal" is displayed.

(b) WHEN NOT USING INTELLIGENT TESTER:

- (1) Disconnect the skid control ECU connector S1.
- (2) Turn the ignition switch to the ON position.
- (3) Measure the voltage according to the value(s) in the table below.

Voltage

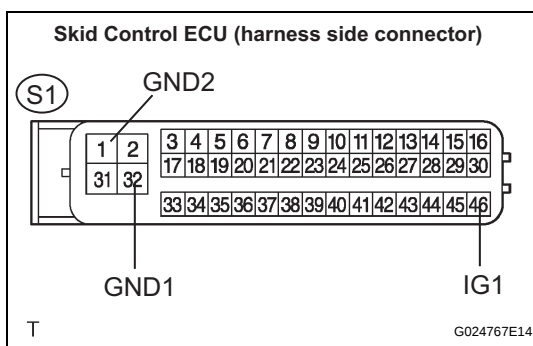
Tester Connection	Specified Condition
S1-46 (IG1) - S1-32 (GND1)	10 to 14 V
S1-46 (IG1) - S1-1 (GND2)	10 to 14 V

NOTICE:

When replacing the ABS actuator assembly, perform zero point calibration (See page [BC-5](#)).

NG

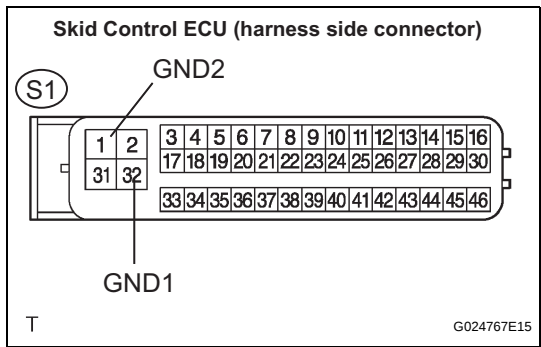
Go to step 4



OK

REPLACE ABS AND TRACTION ACTUATOR

4 INSPECT SKID CONTROL ECU CONNECTOR (GND TERMINAL CONTINUITY)



- (a) Disconnect the skid control ECU connector S1.
- (b) Measure the resistance according to the value(s) in the table below.

Resistance

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

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (GND TERMINAL - BODY GROUND)

OK

CHECK HARNESS AND CONNECTOR

DTC**C1246/46****Master Cylinder Pressure Sensor Malfunction****DESCRIPTION**

Master cylinder pressure sensor is connected to the skid control ECU in the actuator.

DTC No.	DTC Detection Condition	Trouble Area
C1246/46	- When the vehicle speed is 4 mph(7 km/h) or more and PMC terminal voltage of skid control ECU exceeds 0.86 V, the condition that the voltage does not change by 0.005 V or more continues for 30 sec. - Noise in terminal PMC of skid control ECU occurs 7 times or more within 5 sec. - When the stop light switch is off, the condition that PMC terminal voltage of skid control ECU is 0.86 V or more, or less than 0.3 V continues for 5 sec. or more. - When IG1 terminal voltage is between 9.5 and 17.2 V, the condition that the VCM terminal voltage of skid control ECU is out of the range from 4.4 to 5.6 V continues for 1.2 sec. or more. - When VCM terminal voltage of skid control ECU is between 4.4 and 5.6 V, the condition that the PMC terminal voltage of skid control ECU is out of the range from 0.14 to 4.85 V continues for 1.2 sec. or more.	- Master cylinder pressure sensor - Master cylinder pressure sensor circuit

HINT:

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

1**READ VALUE OF INTELLIGENT TESTER (MASTER CYLINDER PRESSURE SENSOR)**

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

Item	Measurement Item / Range (Display)	Normal Condition
MAS CYL PRS 1	Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V	When brake pedal is released : 0.3 to 0.9 V

- (d) Check that the brake fluid pressure value of the master cylinder pressure sensor indicated on the intelligent tester, changes when the brake pedal is depressed.

OK:

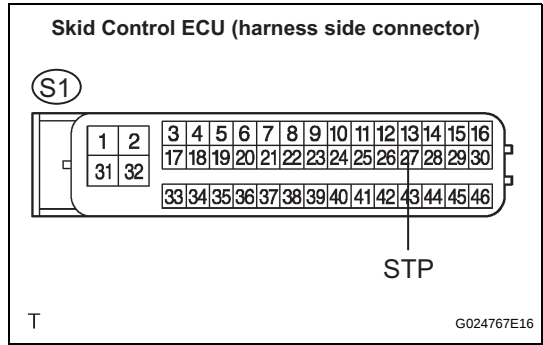
Brake fluid pressure value should change.

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-5).

NG**Go to step 2****OK****REPLACE ABS AND TRACTION ACTUATOR****BC**

2INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (STP TERMINAL)



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

Voltage

Tester Connection	Switch condition	Specified Condition
S1-27 (STP) - Body ground	Brake pedal depressed	8 to 14 V
S1-27 (STP) - Body ground	Brake pedal depressed	Below 1 V

NOTICE:
When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-5](#)).

NG

REPAIR OR REPLACE STOP LIGHT SWITCH CIRCUIT

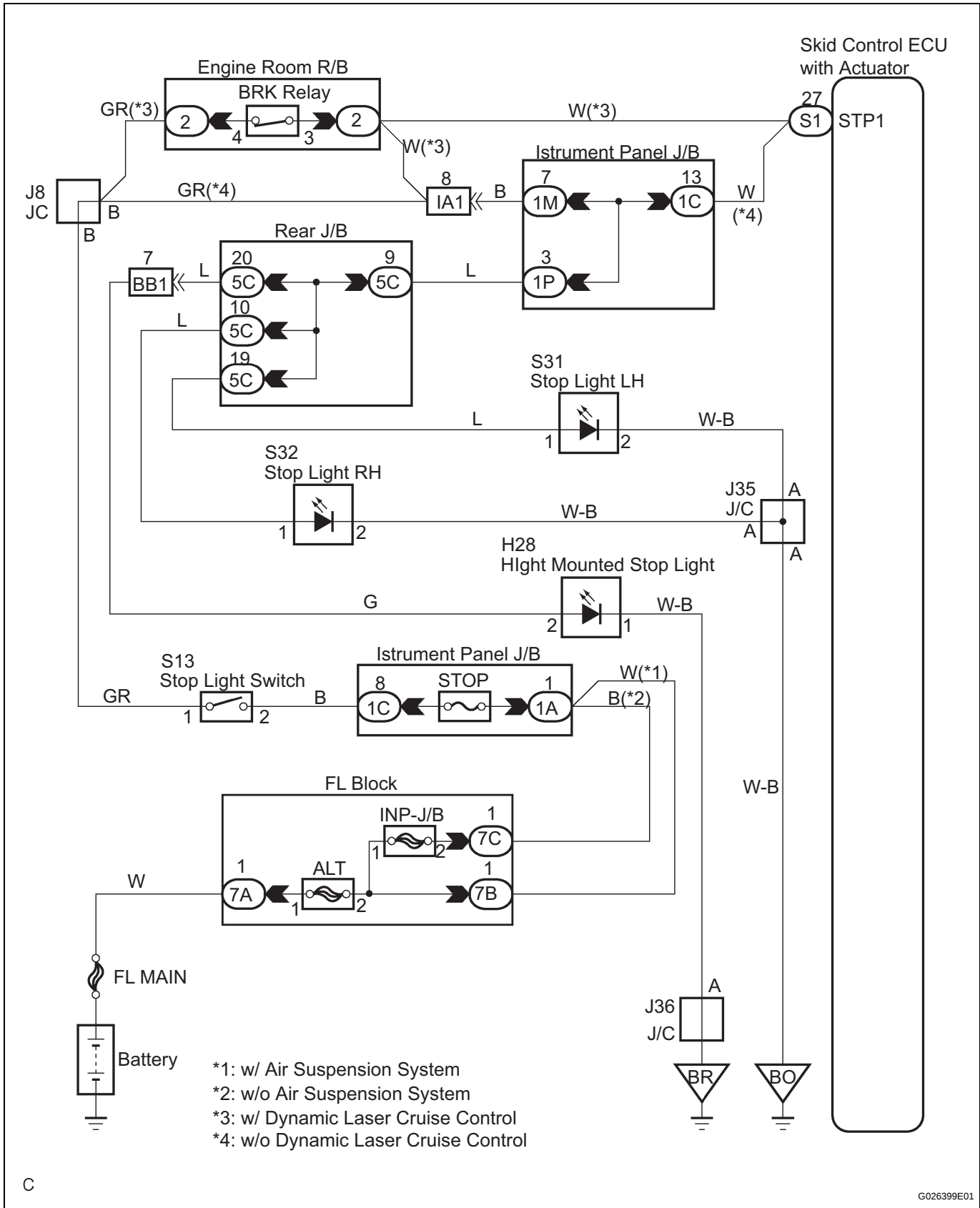
OK

REPLACE ABS AND TRACTION ACTUATOR

DTC**C1249/49****Open in Stop Light Switch Circuit****DESCRIPTION**

DTC No.	DTC Detection Condition	Trouble Area
C1249/49	- When IG1 terminal voltage is 9.5 to 17.2 V, an open circuit of the stop light switch continues for 0.3 sec. or more. - When the brake pedal load sensing switch is on, the master cylinder pressure is 2 Mpa or more and the deceleration calculated from the vehicle speed is 0.2G or more, the stop light switch is off for 2 sec. or more.	- Stop light assembly - Stop light switch circuit

WIRING DIAGRAM



1 CHECK STOP LIGHT SWITCH OPERATION

- (a) Check that the stop light comes on when the brake pedal is depressed and goes off when the brake pedal is released.

OK

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

HINT:

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

NG

Go to step 4

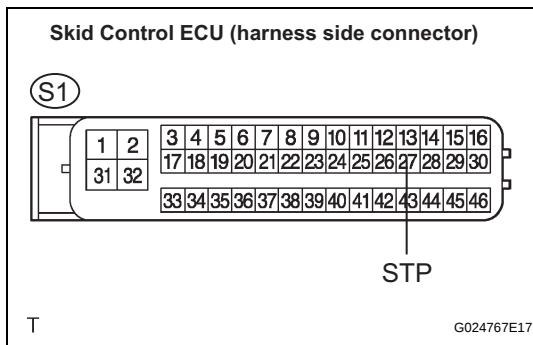
OK

2 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (STP TERMINAL)

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

Voltage

Tester Connection	Switch condition	Specified Condition
S1-27 (STP) - Body ground	Brake pedal depressed	8 to 14 V
S1-27 (STP) - Body ground	Brake pedal released	Below 1 V



NG

Go to step 5

OK

3 RECONFIRM DTC

- (a) Clear the DTCs (See page [BC-21](#)).
 (b) Turn the ignition switch to the ON position.
 (c) Are the same DTCs detected.

Result

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

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-5](#)).

B

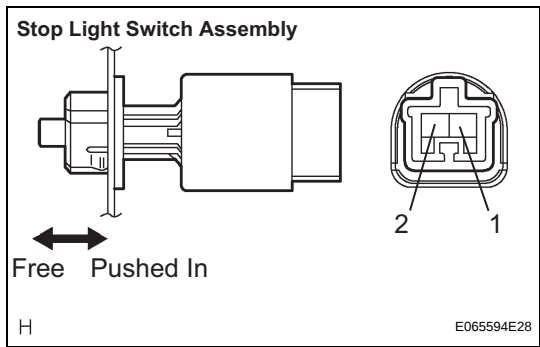
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

BC

A

REPLACE ABS AND TRACTION ACTUATOR

4 INSPECT STOP LIGHT SWITCH ASSEMBLY



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

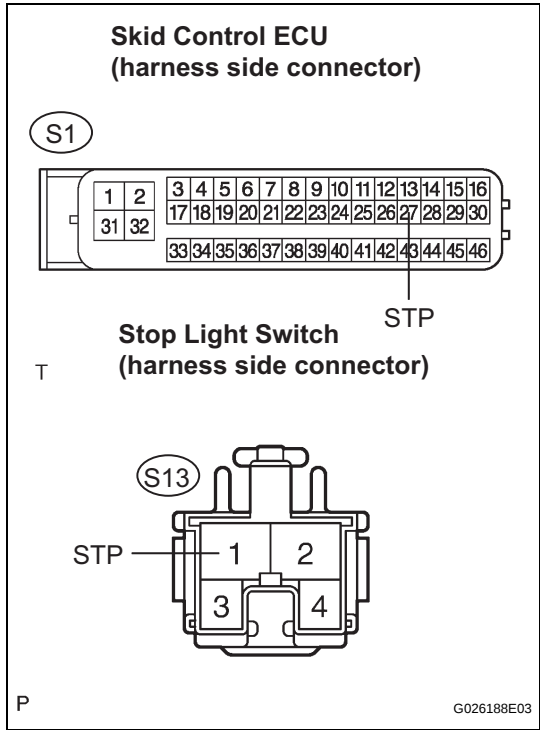
Resistance

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

NG REPLACE STOP LIGHT SWITCH ASSEMBLY

OK

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



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

Resistance

Tester Connection	Specified Condition
S1-27 (STP) - S13-1 (STP)	Below 1 Ω

NOTICE:
When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-5).

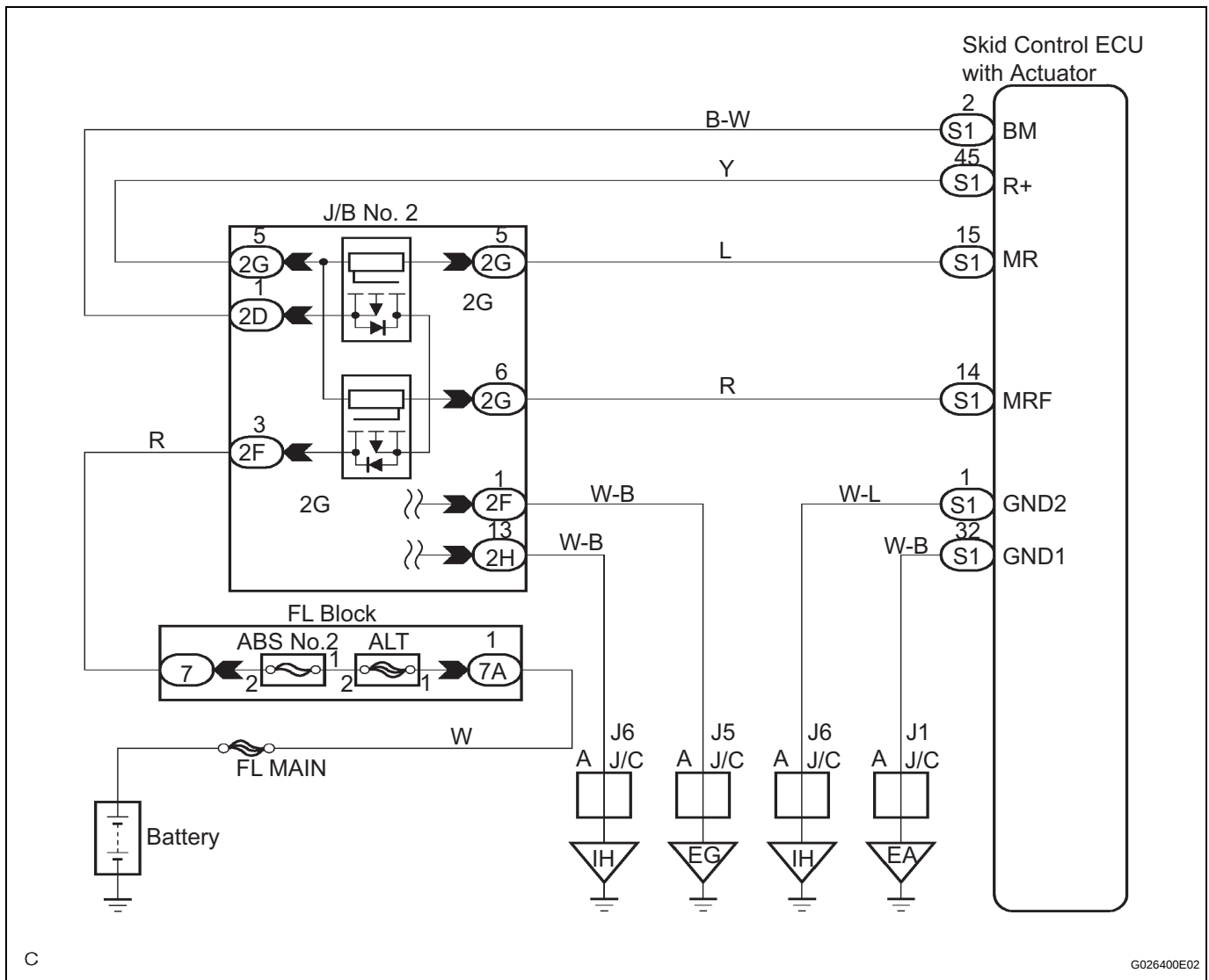
NG REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ABS AND TRACTION ACTUATOR

DTC**C1251/51****Open in Pump Motor Circuit****DESCRIPTION**

DTC No.	DTC Detection Condition	Trouble Area
C1251/51	ABS pump motor is not operating normally.	- ABS & TRAC actuator - ABS & TRAC actuator circuit

WIRING DIAGRAM**HINT:**

Start the inspection from step 1 in case of using the intelligent tester and start from step 2 in case of not using the intelligent tester.

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

- Connect the intelligent tester to the DLC3.
- Start the engine.
- Select the ACTIVE TEST mode on the intelligent tester.

BC

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

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

OK:

The operation sound of the ABS motor should be heard.

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-5](#)).

NG

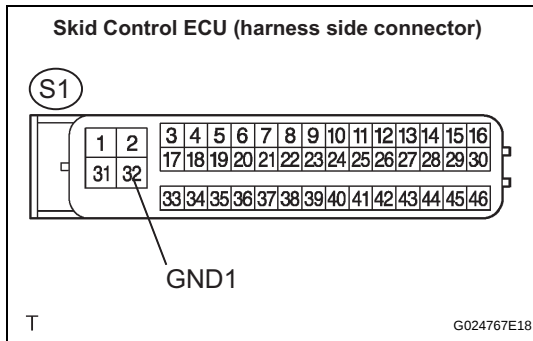
Go to step 2

OK

REPLACE ABS AND TRACTION ACTUATOR

2

INSPECT HARNESS AND CONNECTOR (GND1 OF SKID CONTROL ECU AND BODY)



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

Resistance

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

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-5](#)).

NG

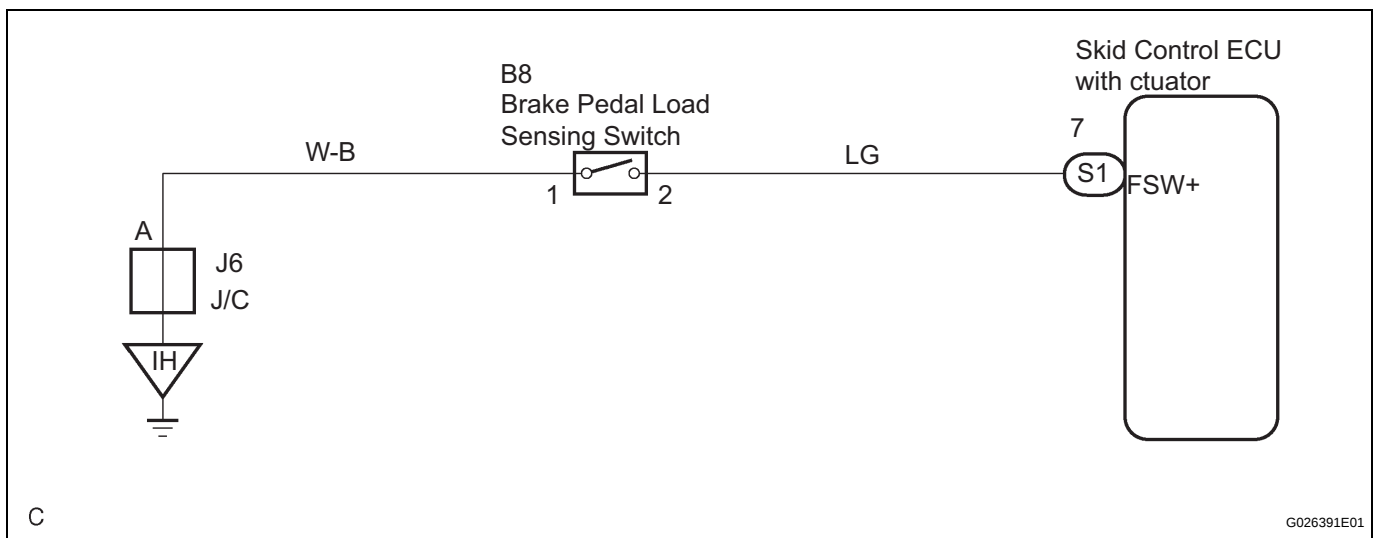
REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ABS AND TRACTION ACTUATOR

DTC**C1267/67****Brake Pedal Load Sensing Switch****DESCRIPTION**

DTC No.	DTC Detection Condition	Trouble Area
C1267/67	- Open or short circuit in brake pedal load sensing switch continues for 0.3 sec. or more. - Immediately after IG1 is turned to the ON position, the condition that brake pedal load sensing switch is ON and stop light switch is off continues for 10 sec. or more. - While vehicle speed changes from 0 km/h (0 mph) to 30 km/h (19 mph), the condition that the brake pedal load sensing switch is on repeatedly occurs 5 times.	- Brake pedal load sensing switch - Brake pedal load sensing switch circuit

WIRING DIAGRAM**HINT:**

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

1**READ VALUE OF INTELLIGENT TESTER**

- Connect the intelligent tester to the DLC3.
- Start the engine.
- Select the DATA LIST mode on the intelligent tester.
- Read the value of the brake pedal load sensing switch displayed on the intelligent tester when depressing and releasing the brake pedal.

Item	Vehicle Condition / Test Details	Diagnostic Note
BRAKE WRN LIGHT	Brake load sensing switch / ON or OFF	ON : Depressed brake pedal OFF : Released brake pedal

OK

Condition	Display
Depress the brake pedal	ON
Release the brake pedal	OFF

BC

NG

Go to step 3

OK

2

RECONFIRM DTC OUTPUT

(a) Check if other DTCs are recorded. (See page [BC-21](#))

Result

Result	Proceed to
DTCs are output	A
DTCs are not output	B

B

Go to step 3

A

REPAIR CIRCUITS INDICATED BY OUTPUT DTCS

3

INSPECT BRAKE PEDAL SUB-ASSEMBLY

NOTICE:
Do not disassemble the brake pedal sub-assembly.

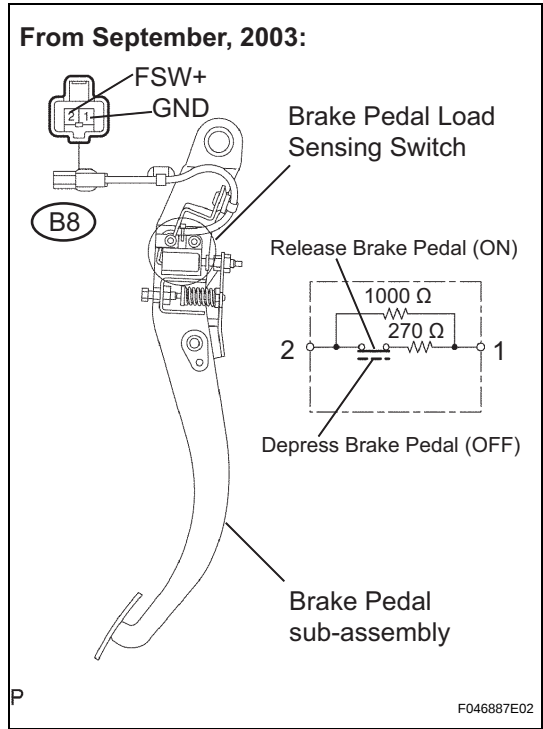
HINT:
Replace the brake pedal sub-assembly when there is a malfunction in the brake pedal load sensing switch.
(a) Disconnect the brake pedal load sensing switch connector B8.
(b) Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Condition	Specified Condition
B8-2 (FSW+) - B8-1 (GND)	Depress brake pedal	Approx. 1000 Ω
	Release brake pedal	Approx. 213 Ω

NG

REPAIR OR REPLACE BRAKE PEDAL SUB-ASSEMBLY

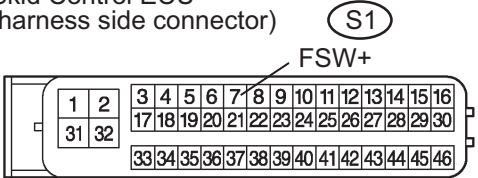


OK

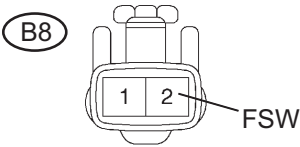
4

CHECK HARNESS OR CONNECTOR (SKID CONTROL ECU - BRAKE PEDAL LOAD SENSING SWITCH)

Skid Control ECU
(harness side connector)



Brake Pedal Load Sensing Switch
(harness side connector)



G026242E02

- (a) Disconnect the skid control ECU connector S1 and the brake pedal load sensing switch connector B8.
 (b) Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Specified Condition
S1-7 (FSW+) - B8-2 (FSW)	Below 1 Ω

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

Resistance

Tester Connection	Specified Condition
S1-7 (FSW+) - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ABS AND TRACTION ACTUATOR

Wiring Diagram for Skid Control ECU with Actuator

Legend:

- Blue: ABS
- Green: GAUGE No.2
- Yellow: IG1

Components and Connections:

- Battery:** Connected to FL MAIN.
- FL MAIN:** Connected to FL Block (7A) and J6 J/C (A).
- FL Block:** Contains AM2, ALT, and INP-J/B. Connected to FL MAIN (7A) and J6 J/C (A).
- Instrument Panel J/B:** Contains IG1 Relay, ECU-IG No.2, and AM1. Connected to FL Block (7A) and J6 J/C (A).
- IG1 Relay:** Connected to FL Block (7A) and J6 J/C (A).
- I14 Ignition SW:** Connected to FL Block (7A) and J6 J/C (A).
- Skid Control ECU with Actuator:** Contains terminals for WA, IG1, GND2, and GND1. Connected to FL Block (7A) and J6 J/C (A).
- Skid Control ECU with Actuator:** Contains terminals for WA, IG1, GND2, and GND1. Connected to FL Block (7A) and J6 J/C (A).

Notes:

- *1: w/ Air Suspension System
- *2: w/o Air Suspension System

1 CHECK DTC OUTPUT

(a) Is DTC output for ABS.

Result

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

B**REPAIR CIRCUITS INDICATED BY OUTPUT DTCS****A****2 INSPECT SKID CONTROL ECU CONNECTOR**

(a) Check the ECU connector's connecting condition.

OK:**The connector should be securely connected.****NG****CONNECT CONNECTOR CORRECTLY****OK****3 INSPECT BATTERY**

(a) Check the battery voltage.

Voltage:**11 to 14 V****NG****INSPECT CHARGING SYSTEM****OK****4 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (IG1 TERMINAL)**

(a) WHEN USING INTELLIGENT TESTER:

- (1) Connect the intelligent tester to the DLC3.
- (2) Start the engine.
- (3) Select the DATA LIST mode on the intelligent tester.

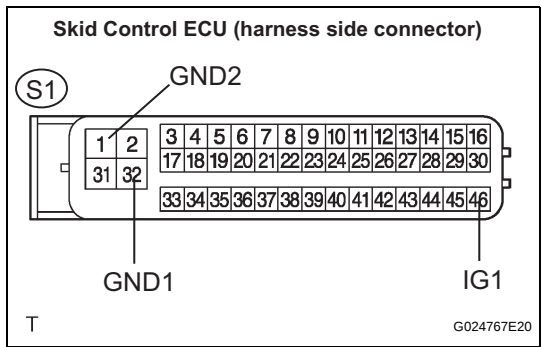
Item	Measurement Item / Range (Display)	Normal Condition
IG VOLTAGE	ECU power supply voltage / UNDER / NORMAL	NORMAL: 9.5 V or over UNDER: Below 9.5 V

(4) Read the voltage condition output from the ECU displayed on the intelligent tester.

OK:**"Normal" is displayed.**

(b) WHEN NOT USING INTELLIGENT TESTER:

- (1) Disconnect the skid control ECU connector.
- (2) Turn the ignition switch ON position.



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

Voltage

Tester Connection	Specified Condition
S1-46 (IG1) - S1-32 (GND1)	10 to 14 V
S1-46 (IG1) - S1-1 (GND2)	10 to 14 V

NG

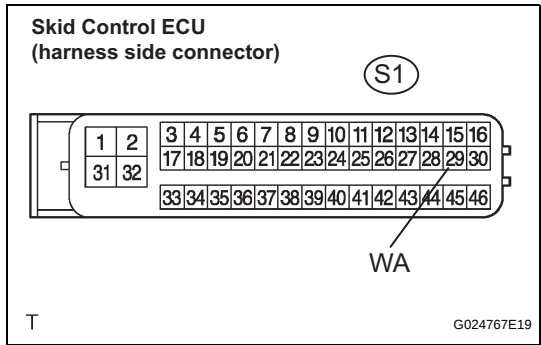
Go to step 6

OK

5

INSPECT ABS WARNING LIGHT

- (a) WHEN USING INTELLIGENT TESTER:
- (1) Connect the intelligent tester to the DLC3 and start the engine.
 - (2) Select the item "ABS WARN LIGHT" in the ACTIVE TEST and operate the ABS warning light on the intelligent tester.
 - (3) Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter by the intelligent tester.
- (b) WHEN NOT USING INTELLIGENT TESTER:
- (1) Turn the ignition switch off and disconnect the connector S1 from the skid control ECU.
 - (2) Ground the terminal WA of the skid control ECU.
 - (3) Turn the ignition switch to the ON position.
 - (4) Check that the ABS warning light goes off.



OK

REPAIR OR REPLACE ABS WARNING LIGHT CIRCUIT

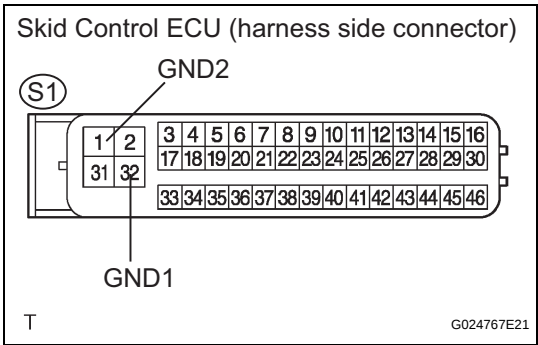
NG

REPLACE ABS AND TRACTION ACTUATOR

6

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

- (a) Disconnect the skid control ECU connector.



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

Resistance

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

NOTICE:

When replacing ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-5](#)).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

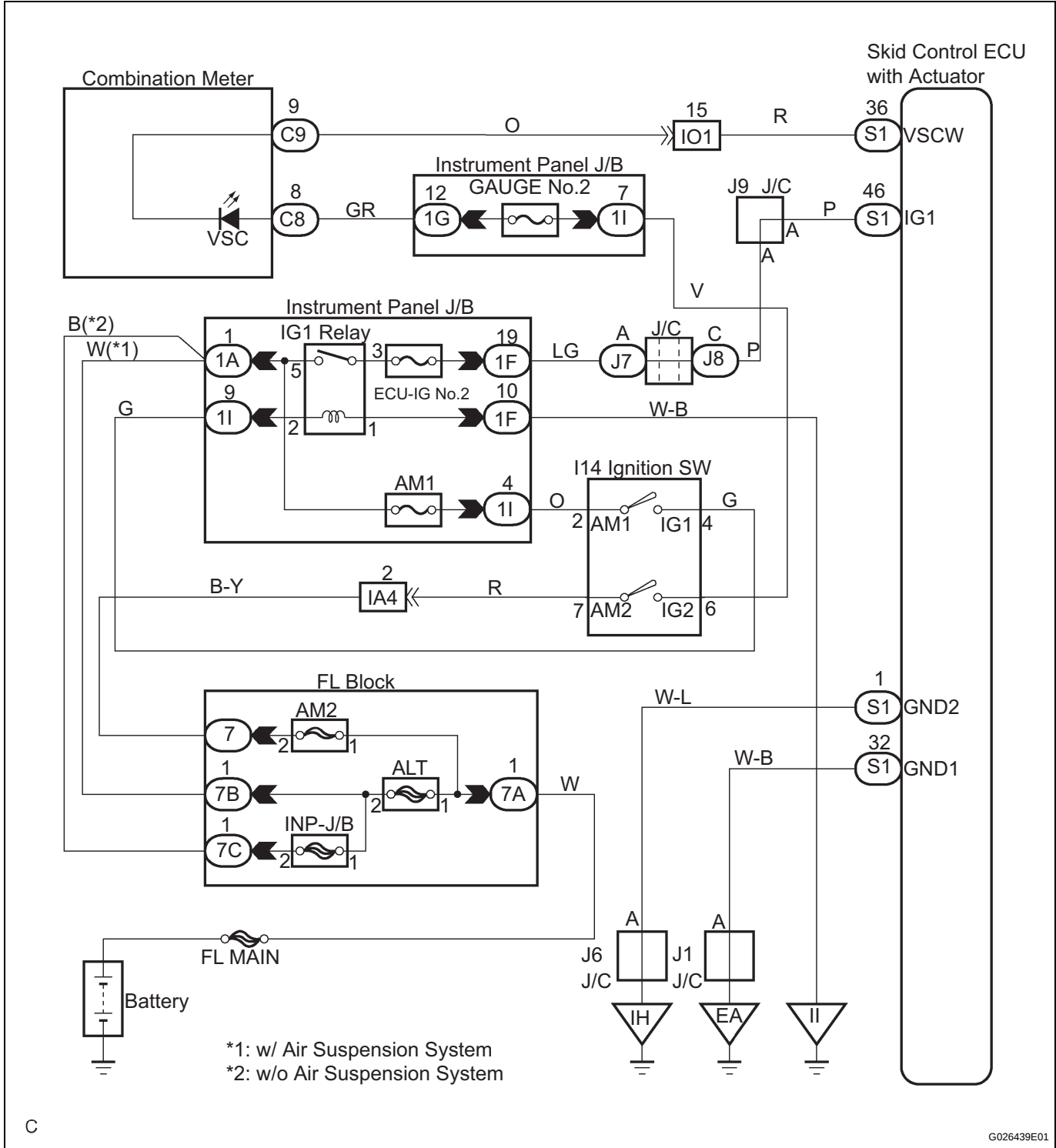
REPLACE ABS AND TRACTION ACTUATOR

VSC Warning Light Remains ON

DESCRIPTION

If the ECU stores DTC, the VSC warning light comes on in the combination meter.

WIRING DIAGRAM



1 CHECK DTC OUTPUT

(a) Is DTC output for ABS and VSC?

Result

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

B**REPAIR CIRCUITS INDICATED BY OUTPUT DTCS****A****2 INSPECT SKID CONTROL ECU CONNECTOR**

(a) Check the ECU connector's connecting condition.

OK:**The connector should be securely connected.****NG****CONNECT CONNECTOR CORRECTLY****OK****3 INSPECT BATTERY**

(a) Check the battery voltage.

Voltage:**11 to 14 V****NG****INSPECT CHARGING SYSTEM****OK****4 INSPECT SKID CONTROL ECU TERMINAL VOLTAGE (IG1 TERMINAL)**

(a) WHEN USING INTELLIGENT TESTER:

- (1) Connect the intelligent tester to the DLC3.
- (2) Start the engine.
- (3) Select the DATA LIST mode on the intelligent tester.

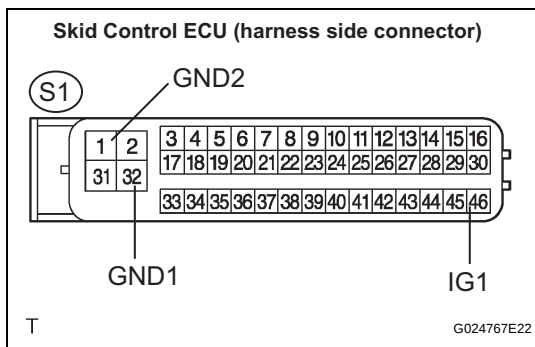
Item	Measurement Item /Range (Display)	Normal Condition
IG VOLTAGE	ECU power supply voltage / UNDER / NORMAL	NORMAL: 9.5 V or over UNDER: Below 9.5 V

(4) Check the voltage condition output from the ECU displayed on the intelligent tester.

OK:**"Normal" is displayed.**

(b) WHEN NOT USING INTELLIGENT TESTER:

- (1) Disconnect the skid control ECU connector.
- (2) Turn the ignition switch to the ON position.



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

Voltage

Tester Connection	Specified Condition
S1-46 (IG1) - S1-32 (GND1)	10 to 14 V
S1-46 (IG1) - S1-1 (GND2)	10 to 14 V

NG

Go to step 6

OK

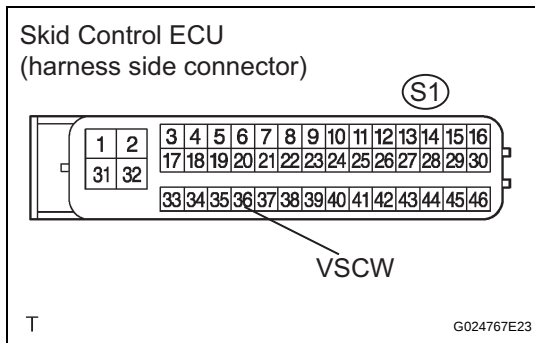
5 CHECK VSC WARNING LIGHT

- (a) WHEN USING INTELLIGENT TESTER:

- (1) Connect the intelligent tester to the DLC3 and start the engine.
- (2) Select the item "VSC WARN LIGHT" in the ACTIVE TEST and operate the VSC warning light on the intelligent tester.
- (3) Check that "ON" and "OFF" of the VSC warning light can be shown on the combination meter by the intelligent tester.

- (b) WHEN NOT USING INTELLIGENT TESTER:

- (1) Turn the ignition switch off and disconnect the connector S1 from the skid control ECU.
- (2) Turn the ignition switch to the ON position.
- (3) Check that the VSC warning light goes off.



NG

REPAIR OR REPLACE ABS WARNING LIGHT CIRCUIT

OK

REPLACE ABS AND TRACTION ACTUATOR

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

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

Resistance

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

NOTICE:

When replacing ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-5).

NG

REPAIR OR REPLACE HARNESS OR
CONNECTOR

OK

REPLACE ABS AND TRACTION ACTUATOR

HINT:

When releasing the parking brake, move the shift lever into the P position in an AT vehicle, and choke in an MT vehicle to hold the vehicle for safety.

1 CHECK BRAKE FLUID

- (a) Check that the brake fluid level is proper.

NG

ADD BRAKE FLUID

OK

2 CHECK DTC FOR ABS

- (a) Are the DTC recorded (See page [BC-21](#)).

Result

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

B

Go to step 3

A

REPAIR CIRCUITS INDICATED BY OUTPUT DTCS**3 INSPECT BRAKE WARNING LIGHT**

- (a) WHEN USING INTELLIGENT TESTER:
- (1) Connect the intelligent tester to the DLC3.
 - (2) Start the engine.
 - (3) Select the item "BRAKE WARN LIGHT" in the ACTIVE TEST and operate the BRAKE warning light on the intelligent tester.

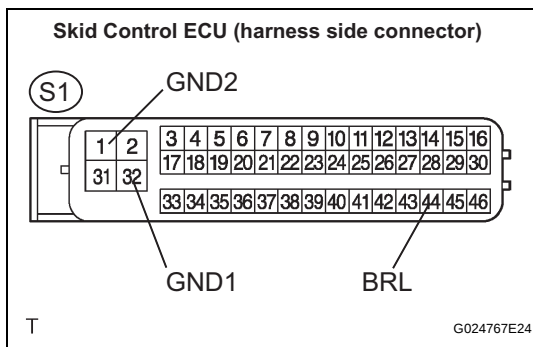
Item	Vehicle Condition / Test Details	Diagnostic Note
BRAKE WRN LIGHT	Turns BRAKE warning light ON / OFF	Observe combination meter

- (4) Check that "ON" and "OFF" of the BRAKE warning light are indicated on the combination meter when using the intelligent tester.

OK:

Turn the BRAKE warning light on or off in accordance with the intelligent tester.

- (b) WHEN NOT USING INTELLIGENT TESTER:
- (1) Turn the ignition switch off and disconnect the connector from the skid control ECU.



- (2) Ground terminal BRL of the skid control ECU.
- (3) Turn the ignition switch to the ON position.
- (4) Check that the brake warning light.

OK:

Turn the light on or off in accordance with the connection of terminal GND and BRL.

NOTICE:

When replacing the ABS actuator assembly, perform zero point calibration (See page BC-5).

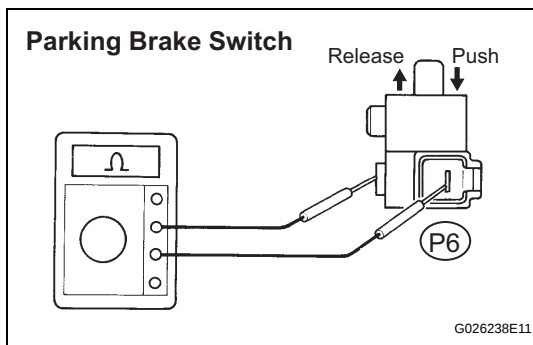
NG

Go to step 4

OK

REPLACE ABS AND TRACTION ACTUATOR

4 INSPECT PARKING BRAKE SWITCH ASSEMBLY



- (a) Remove the parking brake switch connector.
- (b) Measure the resistance according to the value(s) in the table below.

Resistance

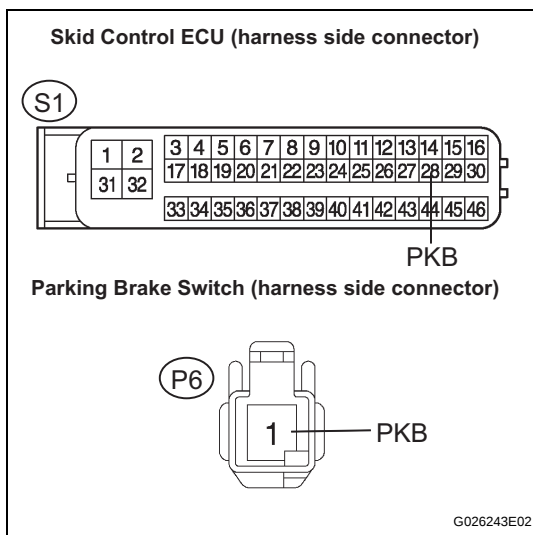
Tester Connection	Switch Condition	Specified Condition
P6-1 - Ground part	Released	Below 1 Ω
P6-1 - Ground part	Pushed in	10 k Ω or higher

NG

REPLACE PARKING BRAKE SWITCH ASSEMBLY

OK

5 CHECK HARNESS AND CONNECTOR (SKI CONTROL ECU - PARKING BRAKE SWITCH)



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

Resistance

Tester Connection	Specified Condition
S1-28 (PKB) - P6-1 (PKB)	Below 1 Ω

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

Resistance

Tester Connection	Specified Condition
S1-28 (PKB) - Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6 INSPECT BRAKE FLUID LEVEL WARNING SWITCH

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

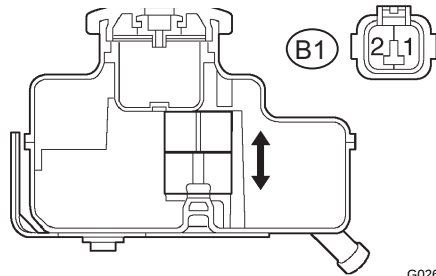
Resistance

Tester Connection	Switch Condition	Specified Condition
(B1-1) - (B1-2)	Float UP	10 k Ω or higher
(B1-1) - (B1-2)	Float DOWN	Below 1 Ω

NG

REPLACE BRAKE FLUID LEVEL WARNING SWITCH

Brake Fluid Level Warning Switch



OK

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

- Disconnect the combination meter connector and the brake fluid level warning switch connector.
- Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Specified Condition
(C8-16) - (B1-1)	Below 1 Ω

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

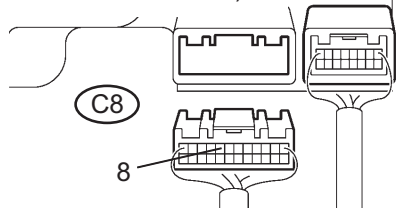
Resistance

Tester Connection	Specified Condition
(C8-16) - Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

Combination Meter
(harness side connector)



Brake Fluid Level Warning Switch
(harness side connector)

OK

REPAIR OR REPLACE COMBINATION METER ASSEMBLY

TRAC OFF Indicator Light, TRAC OFF Switch Circuit**DESCRIPTION**

The skid control ECU detects the TRAC control main switch ON/OFF signal and turns the TRAC OFF light on/off. When the TRAC control switch is pressed, the TRAC control does not operate and the TRAC OFF light comes on.

[illegible]

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

1 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (TRAC OFF INDICATOR LIGHT)

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select the item "TRAC OFF LIGHT" in the ACTIVE TEST and operate the TRAC OFF indicator light on the intelligent tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
VSC / TRAC OFF IND	Turns VSC / TRAC OFF indicator ON / OFF	Observe combination meter

- (d) Check that "ON" and "OFF" of the TRAC OFF indicator light are indicated on the combination meter when using the intelligent tester.

OK:

Turn the TRAC OFF indicator light on or off in accordance with the intelligent tester.

NG**Go to step 4****OK****2 INSPECT TRACTION CONTROL SWITCH**

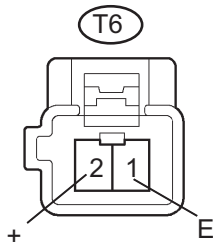
- (a) Remove the TRAC control switch.
- (b) Disconnect the TRAC control switch connector.
- (c) Measure the resistance according to the value(s) in the table below.

Resistance

Tester Connection	Switch Condition	Specified Condition
T6-2 (+) - T6-1 (E)	Pushed in (ON)	Below 1 Ω
T6-2 (+) - T6-1 (E)	Released (OFF)	10 k Ω or higher

NG**REPLACE TRACTION CONTROL SWITCH**

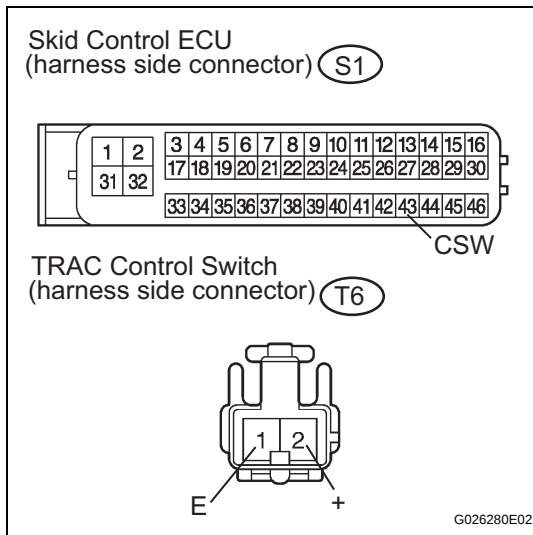
TRAC Control Switch



G026279E01

OK**3 CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - TRAC OFF SWITCH)**

- (a) Disconnect the skid control ECU connector and the TRAC control switch connector.



OK

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

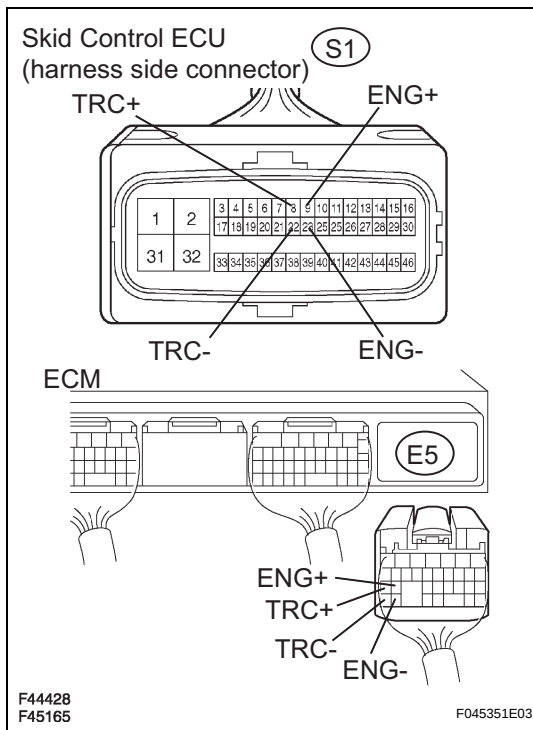
Resistance

Tester Connection	Specified Condition
S1-43 (CSW) - T6-2 (+)	Below 1 Ω
S1-43 (CSW) - Body ground	10 k Ω or higher
T6-1 (E) - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

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



OK

- (a) Disconnect the skid control ECU connector S1 and ECM connector E5.

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

Resistance

Tester Connection	Specified Condition
S1-8 (TRC+) - E5-25 (TRC+)	Below 1 Ω
S1-22 (TRC-) - E5-31 (TRC-)	Below 1 Ω
S1-9 (ENG+) - E5-24 (ENG+)	Below 1 Ω
S1-23 (ENG-) - E5-30 (ENG-)	Below 1 Ω

- (c) Measure the resistance according to the value(s) in the table below

Resistance

Tester Connection	Specified Condition
S1-8 (TRC+) - Body ground	10 k Ω or higher
S1-22 (TRC-) - Body ground	10 k Ω or higher
S1-9 (ENG+) - Body ground	10 k Ω or higher
S1-23 (ENG-) - Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

5 INSPECT COMBINATION METER ASSEMBLY

- (a) Check if the indicators (fuel, turn signal) other than TRAC OFF indicator operate normally.

Result

Result	Proceed to
Indicators OK	A
Indicators NG	B

B

CHECK COMBINATION METER ASSEMBLY
(COMBINATION METER POWER SOURCE
CIRCUIT)

A

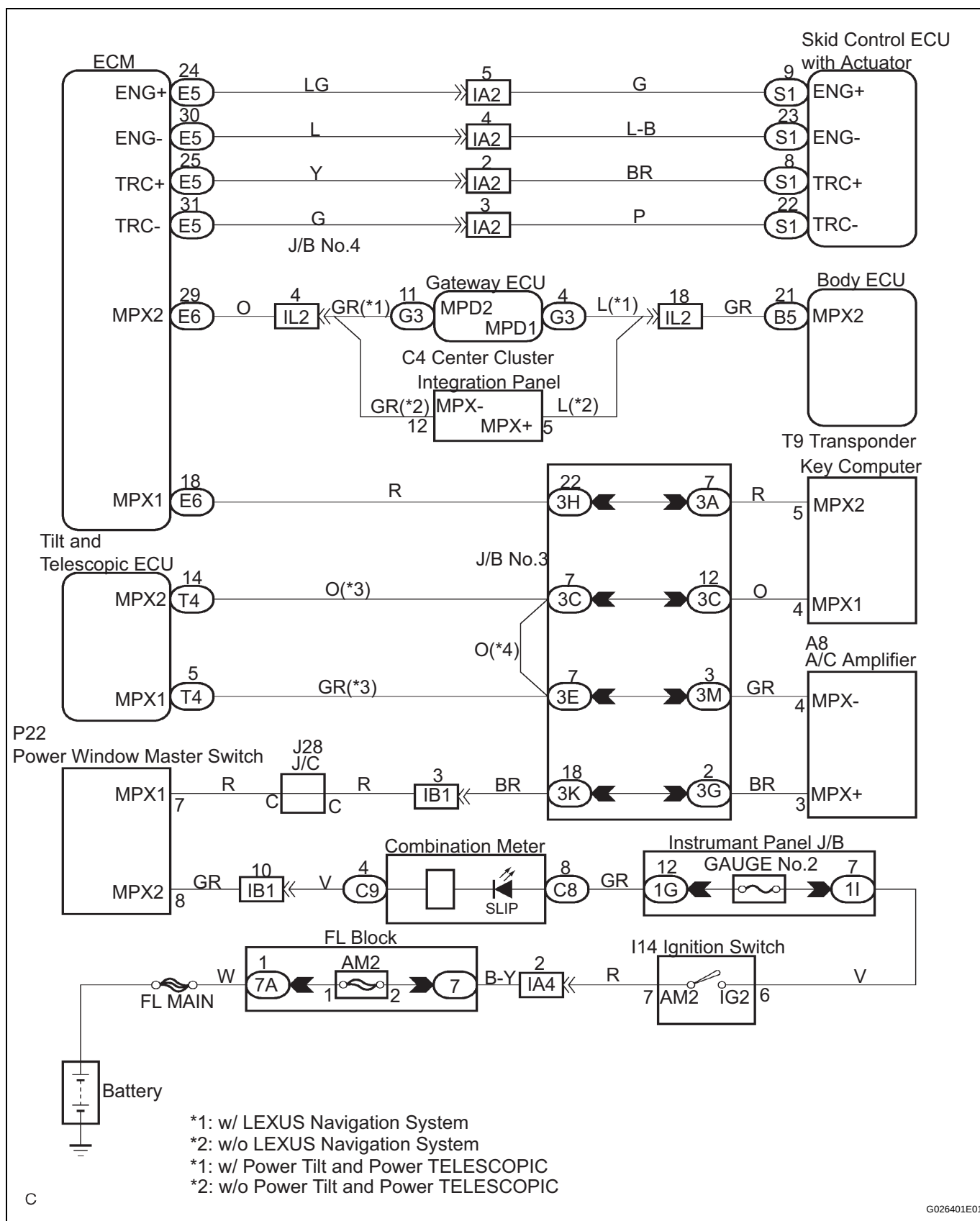
REPAIR OR REPLACE COMBINATION METER ASSEMBLY

Slip Indicator Light Circuit

DESCRIPTION

The SLIP indicator blinks during TRAC & VSC operation.

WIRING DIAGRAM



HINT:

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

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

- (a) Connect the intelligent tester to the DLC3.
- (b) Start the engine.
- (c) Select the item "SLIP INDI LIGHT" in the ACTIVE TEST and operate the SLIP indicator light on the intelligent tester.

Item	Vehicle Condition / Test Details	Diagnostic Note
SLIP INDI LIGHT	Turns SLIP indicator light ON / OFF	Observe combination meter

- (d) Check that "ON" and "OFF" of the SLIP indicator light are indicated on the combination meter when using the intelligent tester.

OK:

Turn the SLIP indicator light on or off in accordance with the intelligent tester.

NOTICE:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page [BC-21](#)).

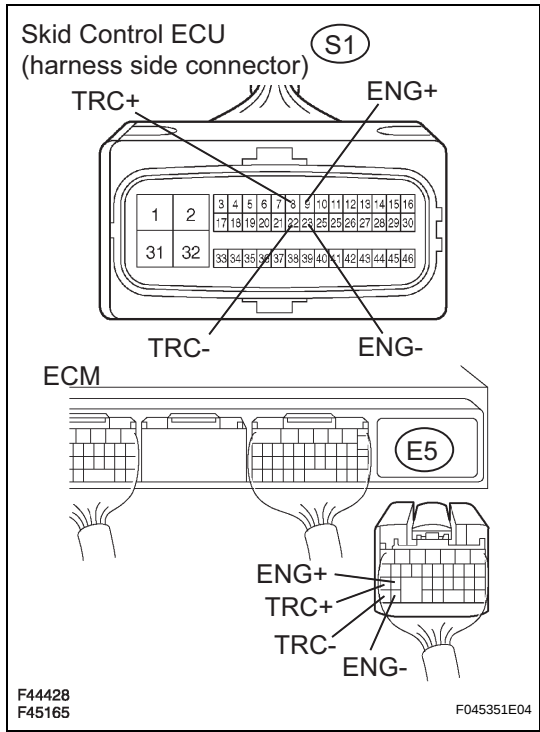
NG

Go to step 2

OK

REPLACE ABS AND TRACTION ACTUATOR**2 CHECK HARNESS AND CONNECTOR**

- (a) Disconnect the skid control ECU connector S1 and ECM connector E5.



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

Resistance

Tester Connection	Specified Condition
S1-8 (TRC+) - E5-25 (TRC+)	Below 1 Ω
S1-22 (TRC-) - E5-31 (TRC-)	Below 1 Ω
S1-9 (ENG+) - E5-24 (ENG+)	Below 1 Ω
S1-23 (ENG-) - E5-25 (ENG-)	Below 1 Ω

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

Resistance

Tester Connection	Specified Condition
S1-8 (TRC+) - Body ground	10 kΩ or higher
S1-22 (TRC-) - Body ground	10 kΩ or higher
S1-9 (ENG+) - Body ground	10 kΩ or higher
S1-23 (ENG-) - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3

INSPECT COMBINATION METER ASSEMBLY

(a) Check if the indicators (fuel, turn signal) other than SLIP indicator operate normally.

Result

Result	Proceed to
Indicators OK	A
Indicators NG	B

B

CHECK COMBINATION METER ASSEMBLY
(COMBINATION METER POWER SOURCE CIRCUIT)

A

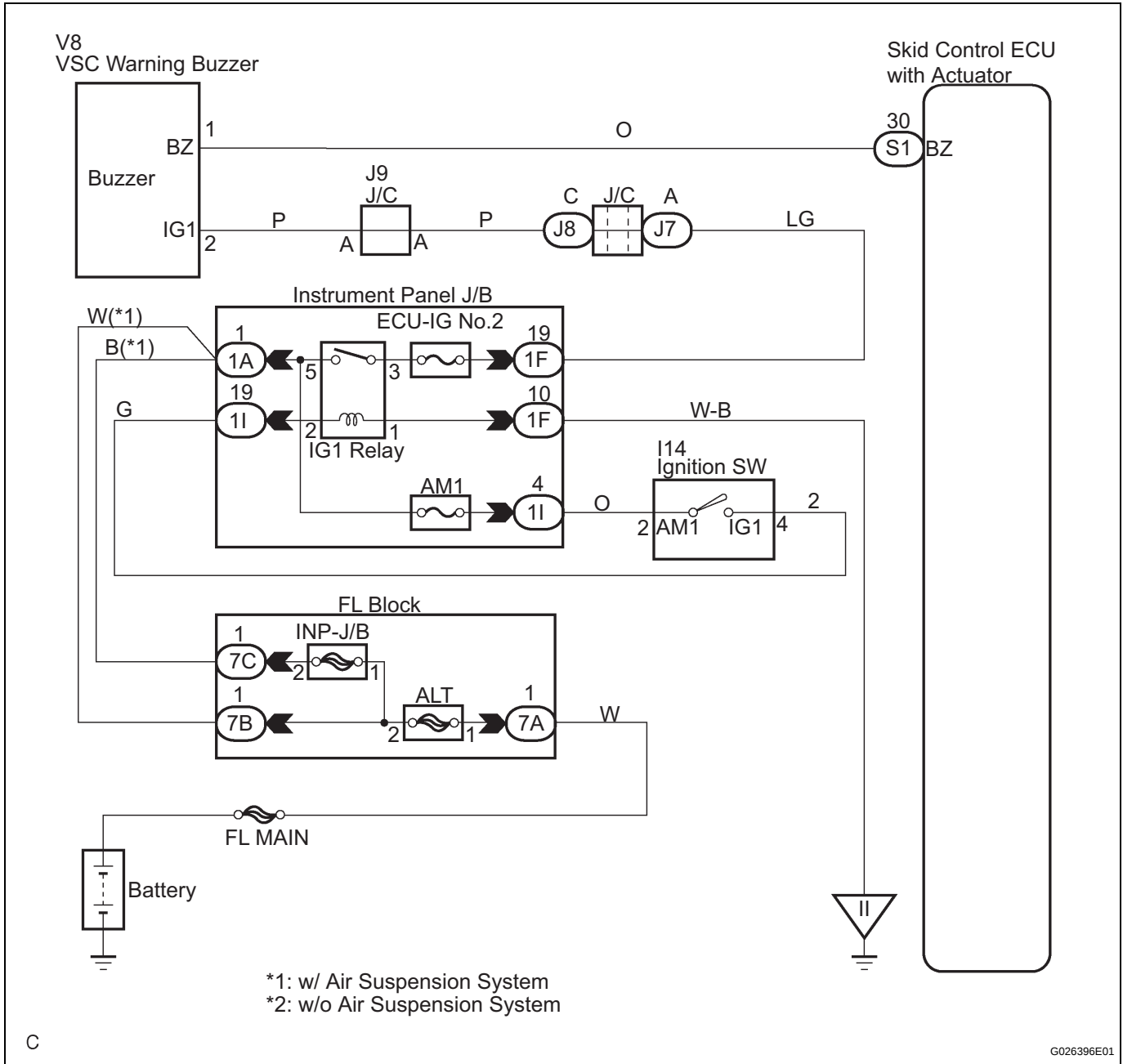
REPAIR OR REPLACE COMBINATION METER ASSEMBLY

Skid Control Buzzer Circuit

DESCRIPTION

The skid control buzzer sounds and SLIP indicator blinking during VSC operation.

WIRING DIAGRAM



HINT:

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

1

PERFORM ACTIVE TEST BY INTELLIGENT TESTER (SKID CONTROL BUZZER)

(a) Connect the intelligent tester to the DLC3.

- (b) Start the engine.
- (c) Select the item "VSC/BR WARN BUZ" in the ACTIVE TEST and operate the skid control buzzer on the intelligent tester.

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

- (d) Check that skid control buzzer sounds by operating with the intelligent tester.
- OK:**
The skid control buzzer sounds in accordance with operation of the intelligent tester.

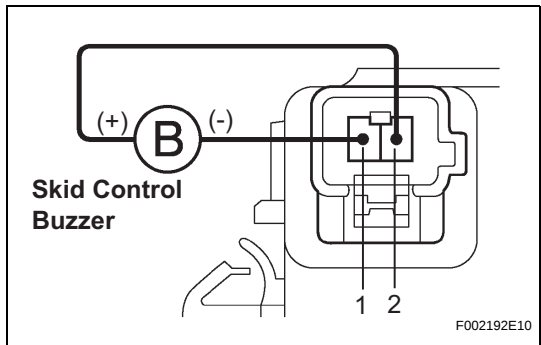
OK

NG

Go to step 2

REPLACE ABS AND TRACTION ACTUATOR

2INSPECT SKID CONTROL BUZZER ASSEMBLY



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

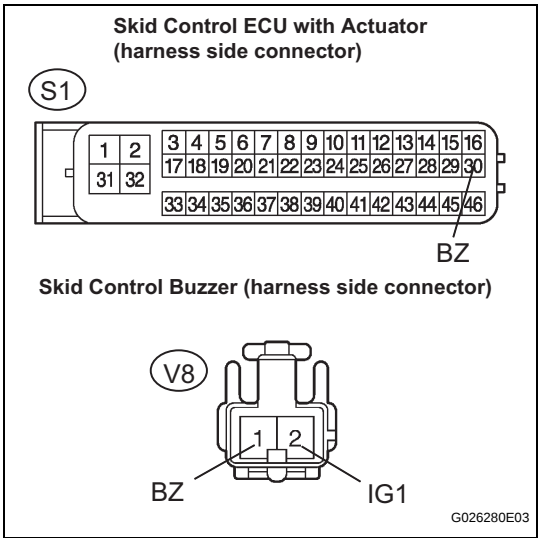
OK

NG

REPLACE SKID CONTROL BUZZER ASSEMBLY

3CHECK HARNESS AND CONNECTOR (SKID CONTROL BUZZER - SKID CONTROL ECU)

- (a) Disconnect the skid control buzzer connector and the skid control ECU connector.



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

Resistance

Tester Connection	Specified Condition
S1-30 (BZ) - V8-1 (BZ)	Below 1 Ω

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

Resistance

Tester Connection	Specified Condition
S1-30 (BZ) - Body ground	10 k Ω or higher

CAUTION:

When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-5).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

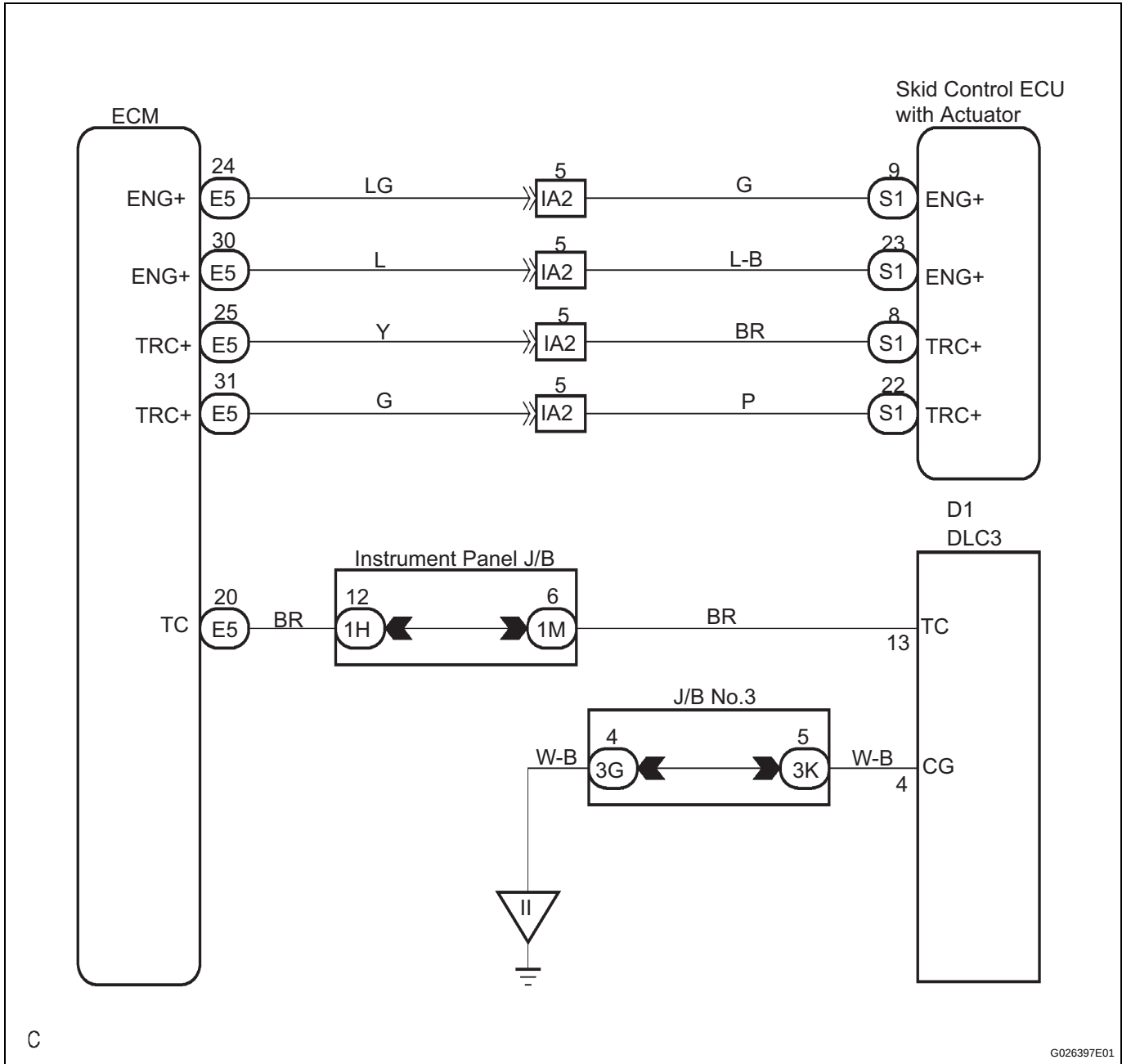
REPLACE ABS AND TRACTION ACTUATOR

TC and CG Terminal Circuit

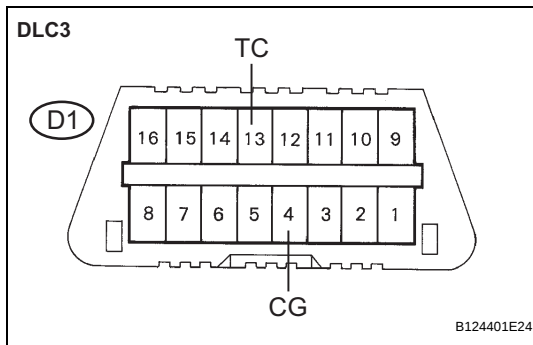
DESCRIPTION

Connecting terminals Tc and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



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



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

Voltage

Tester Connection	Specified Condition
D1-13 (TC) - D1-4 (CG)	10 to 14 V

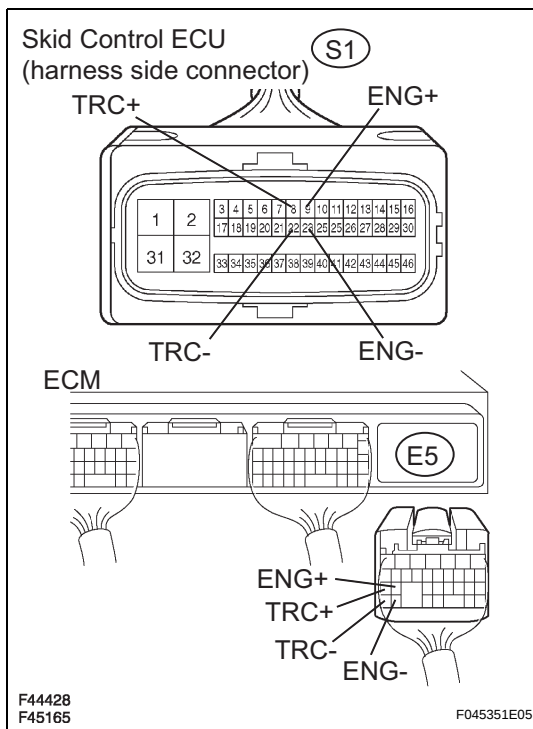
NG

CHECK HARNESS AND CONNECTOR (DLC3 - ECM)

OK

2

CHECK HARNESS AND CONNECTOR (ECM - SKID CONTROL ECU)



- (a) Disconnect the skid control ECU connector S1 and ECM connector E5.

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

Resistance

Tester Connection	Specified Condition
S1-8 (TRC+) - E5-25 (TRC+)	Below 1 Ω
S1-22 (TRC-) - E5-31 (TRC-)	Below 1 Ω
S1-9 (ENG+) - E5-24 (ENG+)	Below 1 Ω
S1-23 (ENG-) - E5-30 (ENG-)	Below 1 Ω

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

Resistance

Tester Connection	Specified Condition
S1-8 (TRC+) - Body ground	10 k Ω or higher
S1-22 (TRC-) - Body ground	10 k Ω or higher
S1-9 (ENG+) - Body ground	10 k Ω or higher
S1-23 (ENG-) - Body ground	10 k Ω or higher

NOTICE:

When replacing the ABS & TRACTION actuator assembly, preform zero point calibration (See page [BC-5](#)).

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

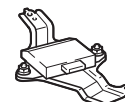
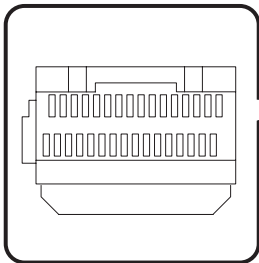
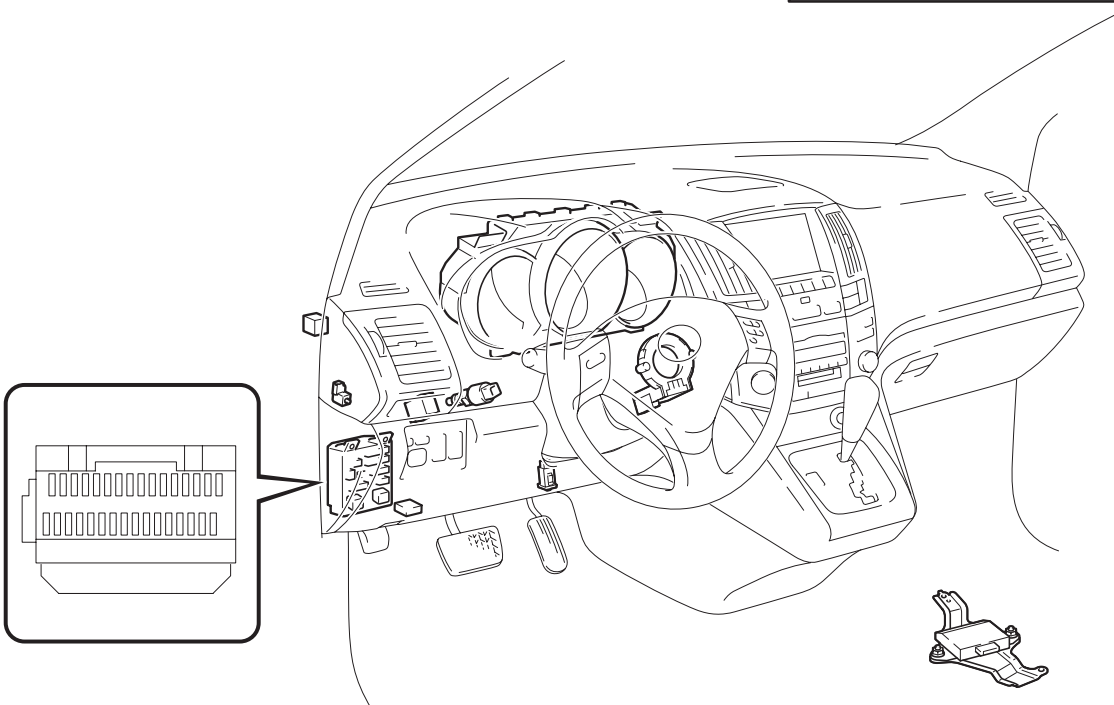
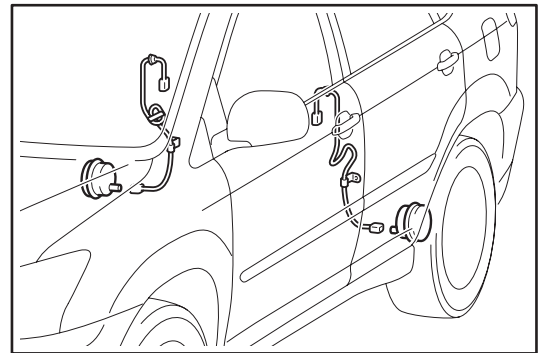
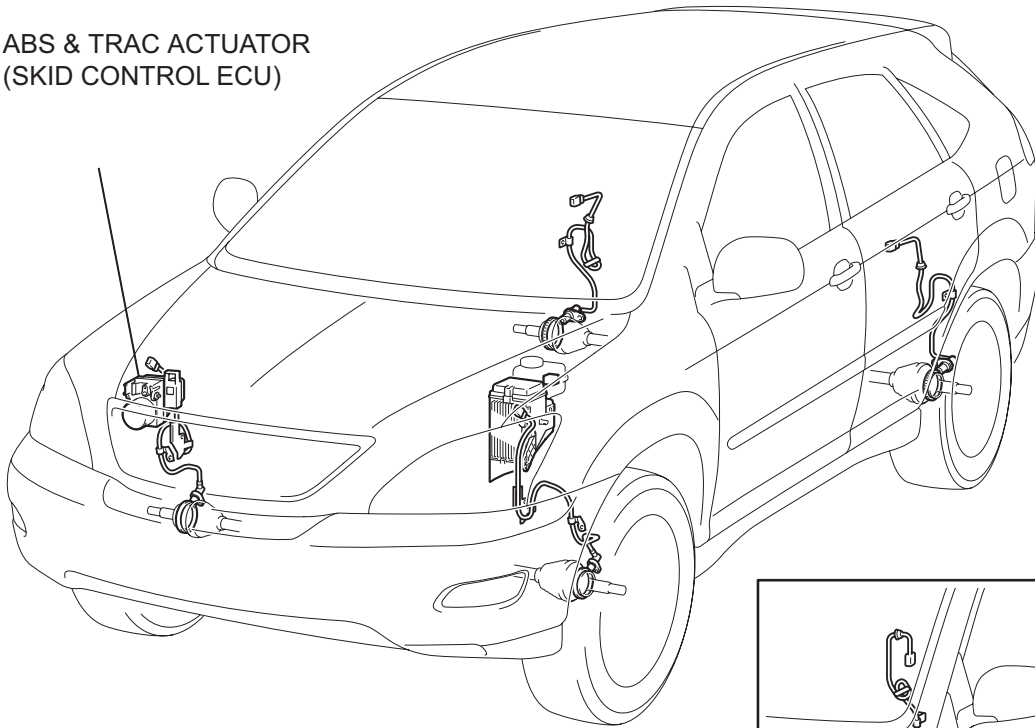
OK

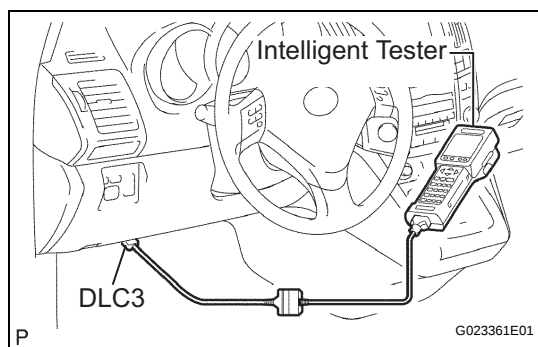
REPLACE ABS AND TRACTION ACTUATOR

BRAKE ACTUATOR

COMPONENTS

ABS & TRAC ACTUATOR
 (SKID CONTROL ECU)





ON-VEHICLE INSPECTION

1. CONNECT INTELLIGENT TESTER

- Connect the intelligent tester to the DLC3.
- Start the engine and run at idle.
- Select the ACTIVE TEST mode on the intelligent tester.

HINT:

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

2. INSPECT ACTUATOR MOTOR OPERATION

- With the motor relay on, check the actuator motor operation noise.
- Turn the motor relay off.
- Depress the brake pedal and hold it for approximately 15 seconds. Check that the brake pedal cannot be depressed.
- With the motor relay on, check that the pedal does not pulsate.

NOTICE:

Do not keep the motor relay turned on for more than 5 seconds continuously. When operating it continuously, set an interval of more than 20 seconds.

- Turn the motor relay off and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

NOTICE:

Never turn on the solenoids in a manner different to those described below.

- With the brake pedal depressed, perform the following operations.
- Turn the SFRH and SFRR solenoids on simultaneously, and check that the pedal cannot be depressed.

NOTICE:

Do not keep the solenoid turned on for more than 10 seconds continuously. When operating it continuously, set an interval of more than 20 seconds.

- Turn the SFRH and SFRR solenoids off simultaneously, and check that the pedal can be depressed.
- Turn the motor relay on, and check that the pedal returns.

NOTICE:

Do not keep the motor relay turned on for more than 5 seconds continuously. When operating it continuously, set an interval of more than 20 seconds.

- Turn the motor relay off and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

- (a) Using the same procedure, check the solenoids of the other wheels.

HINT:

Left front wheel:

SFLH, SFLR

Right rear wheel:

SRRH, SRRR

Left rear wheel:

SRLH, SRLR

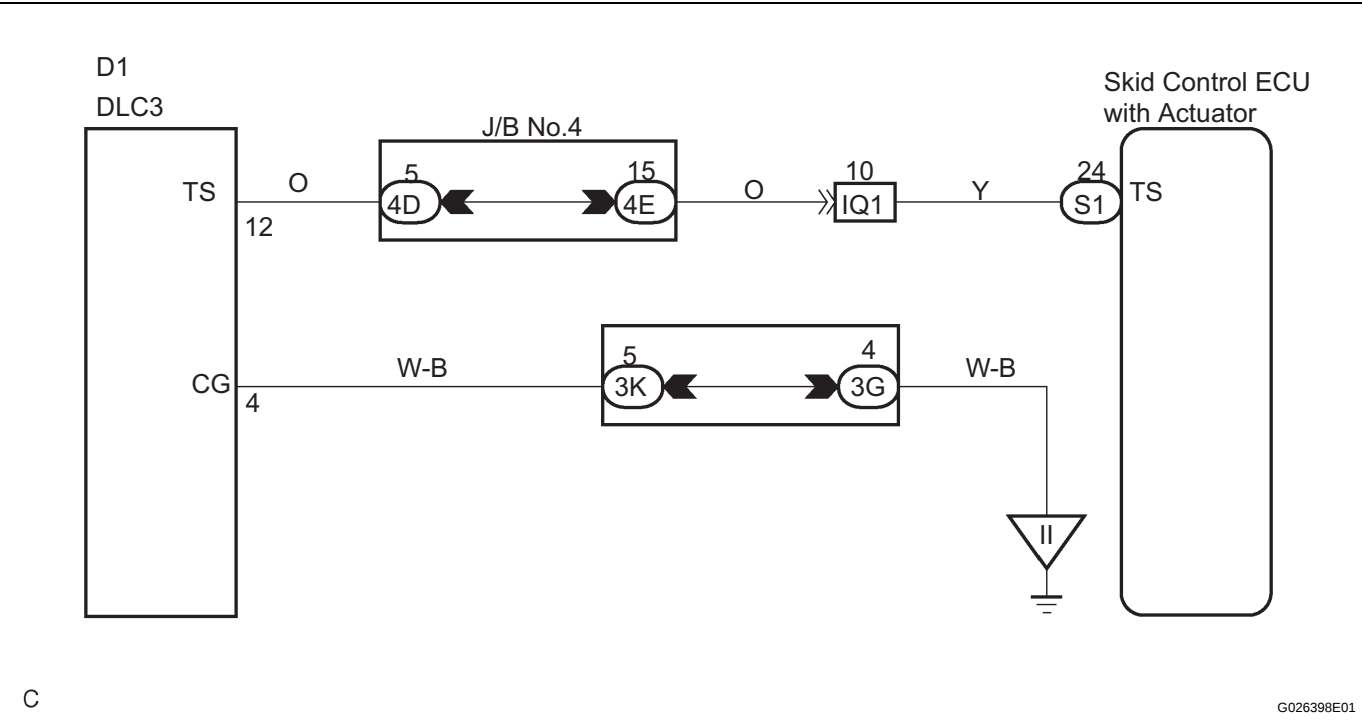
TS and CG Terminal Circuit

DESCRIPTION

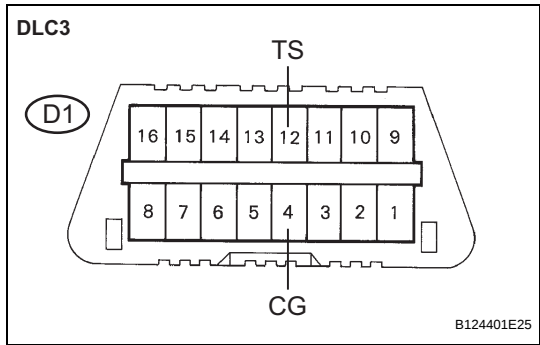
In the sensor check mode, a malfunction of the speed sensor that cannot be detected when the vehicle is stopped is detected while driving.

Transition to the sensor check mode can be performed by connecting terminals TS and CG of the DLC3 and turning the ignition switch from off to the ON position.

WIRING DIAGRAM



1 INSPECT DLC3 TERMINAL VOLTAGE (TS TERMINAL)



- (a) Turn the ignition switch to the ON position.
- (b) Measure the voltage according to the value(s) in the table below.

Voltage

Tester Connection	Specified Condition
D1-12 (TS) - D1-4 (CG)	10 to 14 V

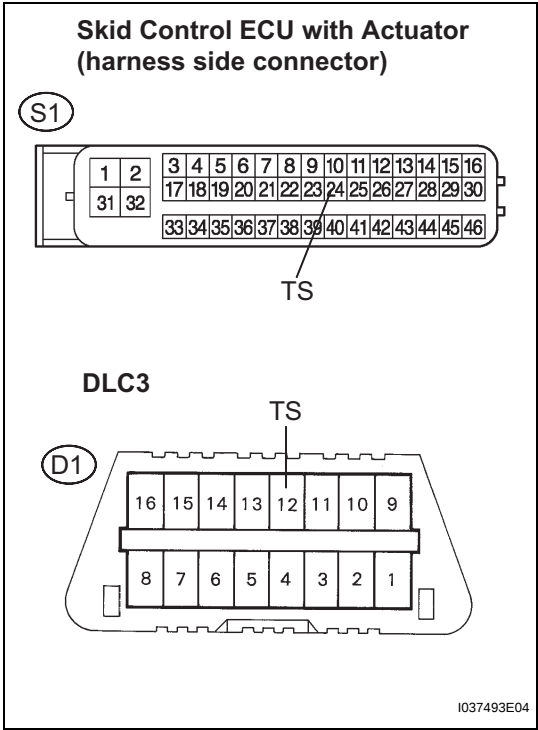
NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2 CHECK HARNESS AND CONNECTOR (DLC3 - BODY GROUND)

- (a) Disconnect the skid control ECU connector.



OK

REPLACE ABS AND TRACTION ACTUATOR

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

Resistance

Tester Connection	Specified Condition
S1-24 (TS) - D1-12 (TS)	Below 1 Ω

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

Resistance

Tester Connection	Specified Condition
S1-24 (TS) - Body ground	10 kΩ or higher

NOTICE:
 When replacing the ABS & TRACTION actuator assembly, perform zero point calibration (See page BC-5).

NG REPAIR OR REPLACE HARNESS OR CONNECTOR

REMOVAL

1. DRAIN BRAKE FLUID

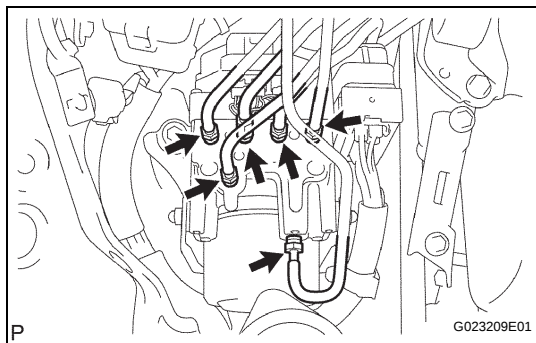
NOTICE:

Wash brake fluid off immediately if it adheres to any painted surface.

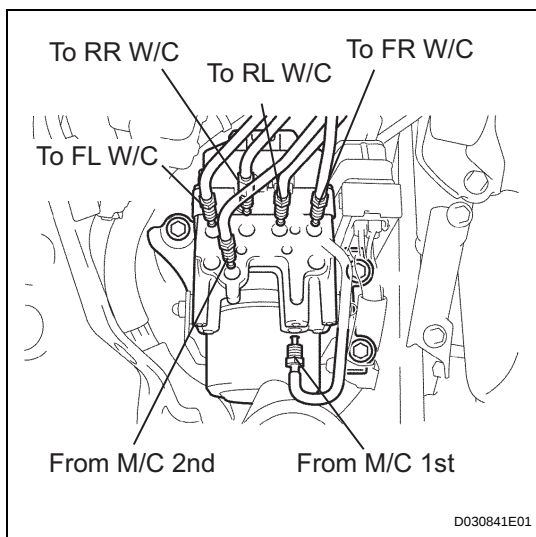
2. DISCONNECT BATTERY NEGATIVE TERMINAL

3. REMOVE BRAKE ACTUATOR WITH BRACKET

(a) Using SST, disconnect the 6 brake tubes from the actuator with bracket.

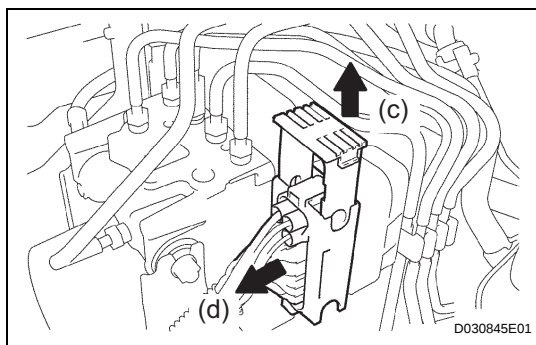


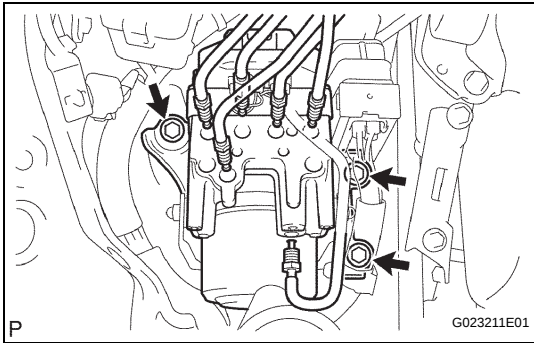
(b) Use tags or make a memo to identify the reconnection points.



(c) Pull the lock lever upward.

(d) Disconnect the actuator connector.





- (e) Remove the 2 bolts, the nut and the actuator with bracket.

NOTICE:

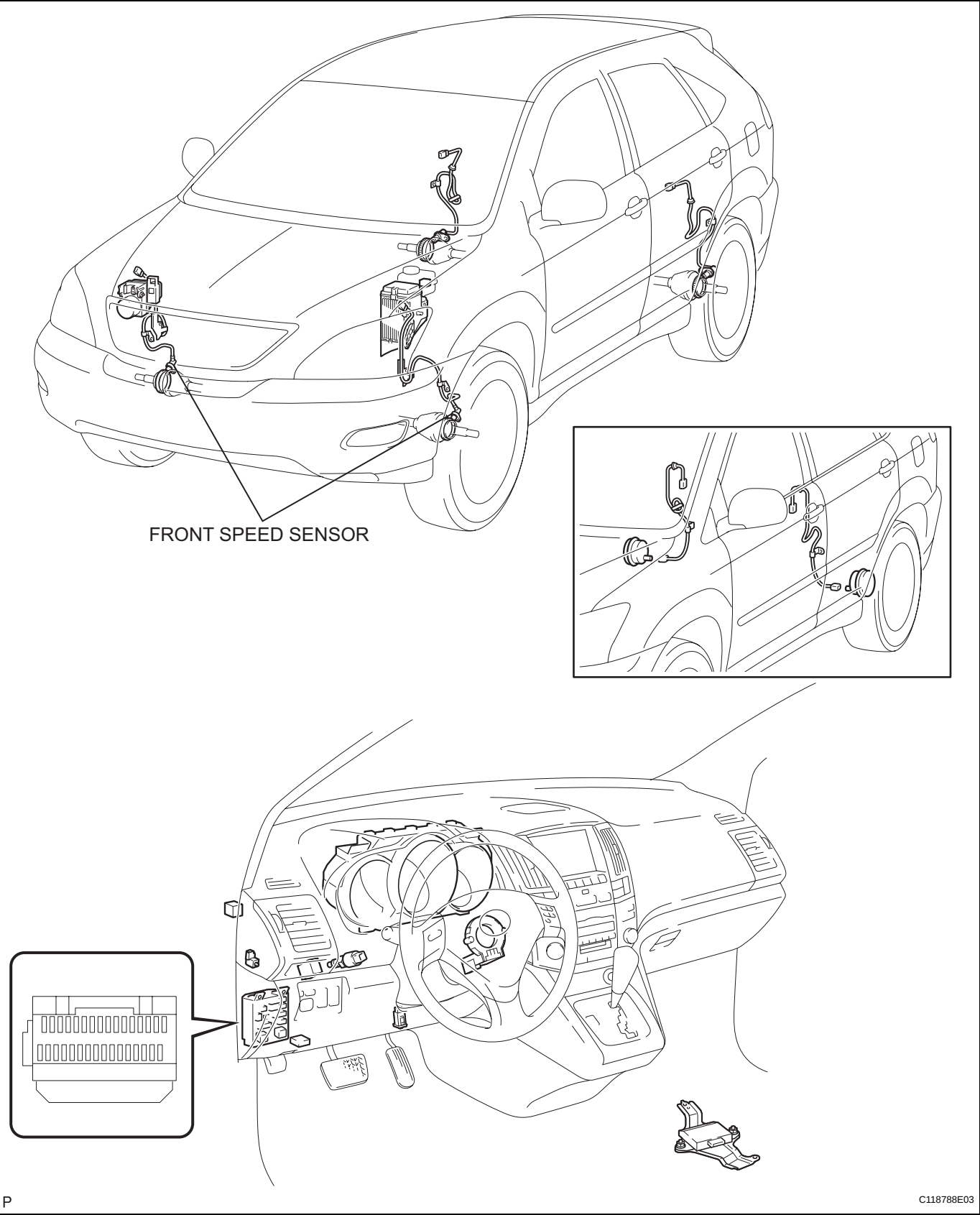
Be careful not to damage the brake tubes and wire harness.

4. REMOVE BRAKE ACTUATOR

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

FRONT SPEED SENSOR

COMPONENTS

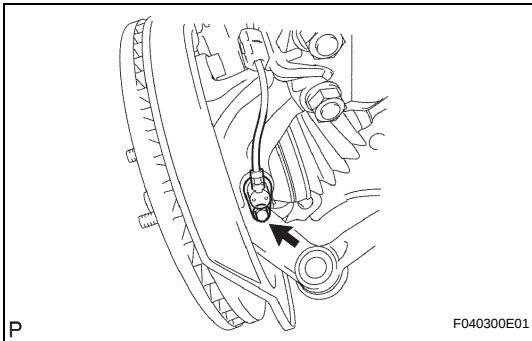
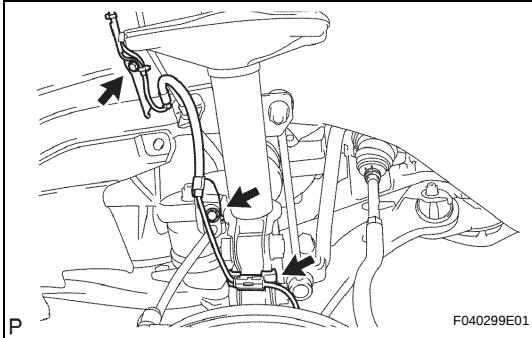


REMOVAL

HINT:

Replace the RH side by using the same procedures as those as those for the LH side.

1. **REMOVE FRONT WHEEL**
2. **REMOVE FRONT FENDER SPLASH SHIELD SUB-ASSEMBLY LH**
3. **REMOVE SPEED SENSOR FRONT LH**
 - (a) Disconnect the speed sensor connector.
 - (b) Remove the 2 bolts and the clamp from the body and the shock absorber assembly.



- (c) Remove the bolt and the speed sensor front.

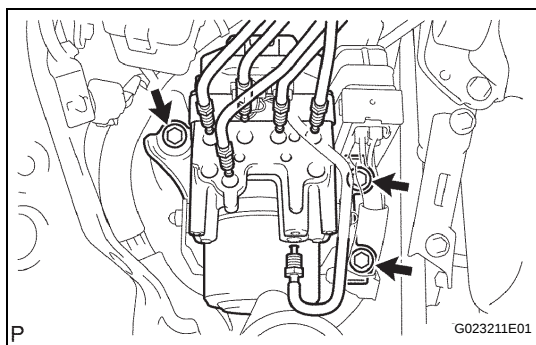
NOTICE:

Prevent foreign matter from attaching to the sensor tip.

INSTALLATION

1. INSTALL BRAKE ACTUATOR

- (a) Install the brake actuator assembly with the 2 nuts.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)



2. INSTALL BRAKE ACTUATOR WITH BRACKET

- (a) Install the actuator with bracket with the 3 bolts.

Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)

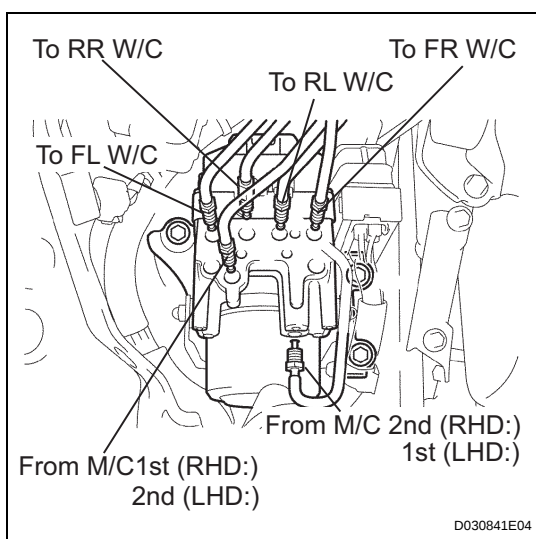
NOTICE:

Be careful not to damage the brake tubes and wire harness.

- (b) Connect the actuator connector.

- (c) Using SST, connect each brake tube to correct positions of the actuator with bracket, as shown in the illustration.

Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf)



3. FILL RESERVOIR WITH BRAKE FLUID

HINT:

See page [BR-3](#).

4. BLEED BRAKE MASTER CYLINDER SUB-ASSEMBLY

SST 09023-00101

HINT:

See page [BR-3](#).

5. BLEED BRAKE LINE

HINT:

See page [BR-3](#).

6. CHECK BRAKE FLUID LEAKAGE

7. CHECK FLUID LEVEL IN RESERVOIR

HINT:

See page [BR-3](#).

8. CONNECT BATTERY NEGATIVE TERMINAL

9. PERFORM INITIALIZATION

HINT:

See page [BC-1](#).

10. PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION

HINT:

See page [BC-5](#).

11. CHECK BRAKE ACTUATOR WITH INTELLIGENT TESTER

HINT:

See page [BC-108](#).

INSPECTION

1. INSPECT FRONT SPEED SENSOR

- (a) Make sure that there is no looseness at the connectors' locking part and connecting part of connector.
- (b) Disconnect the speed sensor connector.
- (c) Measure the resistance according to the value(s) in the table below.

Resistance:

LH

Tester Connection	Specified Condition
S2-2 (FL+) - S2-1 (FL-)	0.6 to 2.5 kΩ

RH

Tester Connection	Specified Condition
S3-2 (FR+) - S3-1 (FR-)	0.6 to 2.5 kΩ

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

Resistance:

LH

Tester Connection	Specified Condition
S2-2 (FL+) - Body ground	10 kΩ or higher
S2-1 (FL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
S3-2 (FR+) - Body ground	10 kΩ or higher
S3-1 (FR-) - Body ground	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (See page BC-16).

INSTALLATION

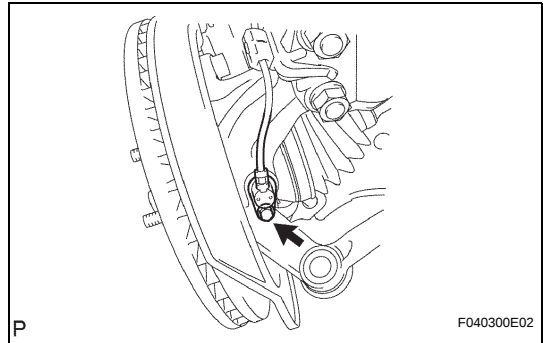
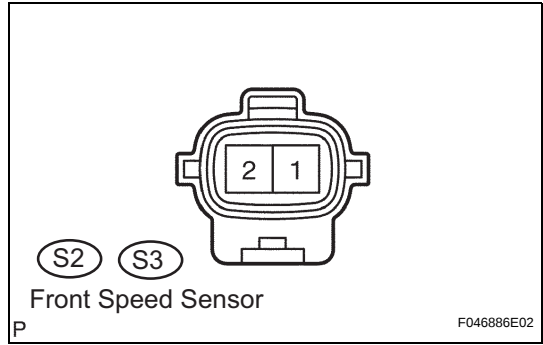
1. INSTALL SPEED SENSOR FRONT LH

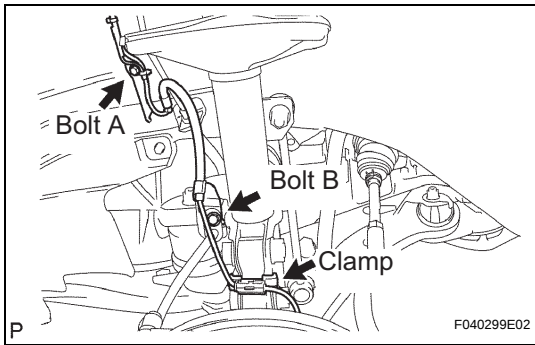
- (a) Install the speed sensor front with the bolt.

Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

NOTICE:

Prevent foreign matter from attaching to the sensor tip.





- (b) Install the speed sensor front with the 2 bolts and the clamp.

Torque: Bolt A

5.0 N*m (51 kgf*cm, 44 in.*lbf)

Bolt B

29 N*m (296 kgf*cm, 21 ft.*lbf)

NOTICE:

Do not twist the sensor wire when installing the sensor.

- (c) Connect the speed sensor connector.

2. INSTALL FRONT FENDER SPLASH SHIELD SUB-ASSEMBLY LH

3. INSTALL FRONT WHEEL

Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

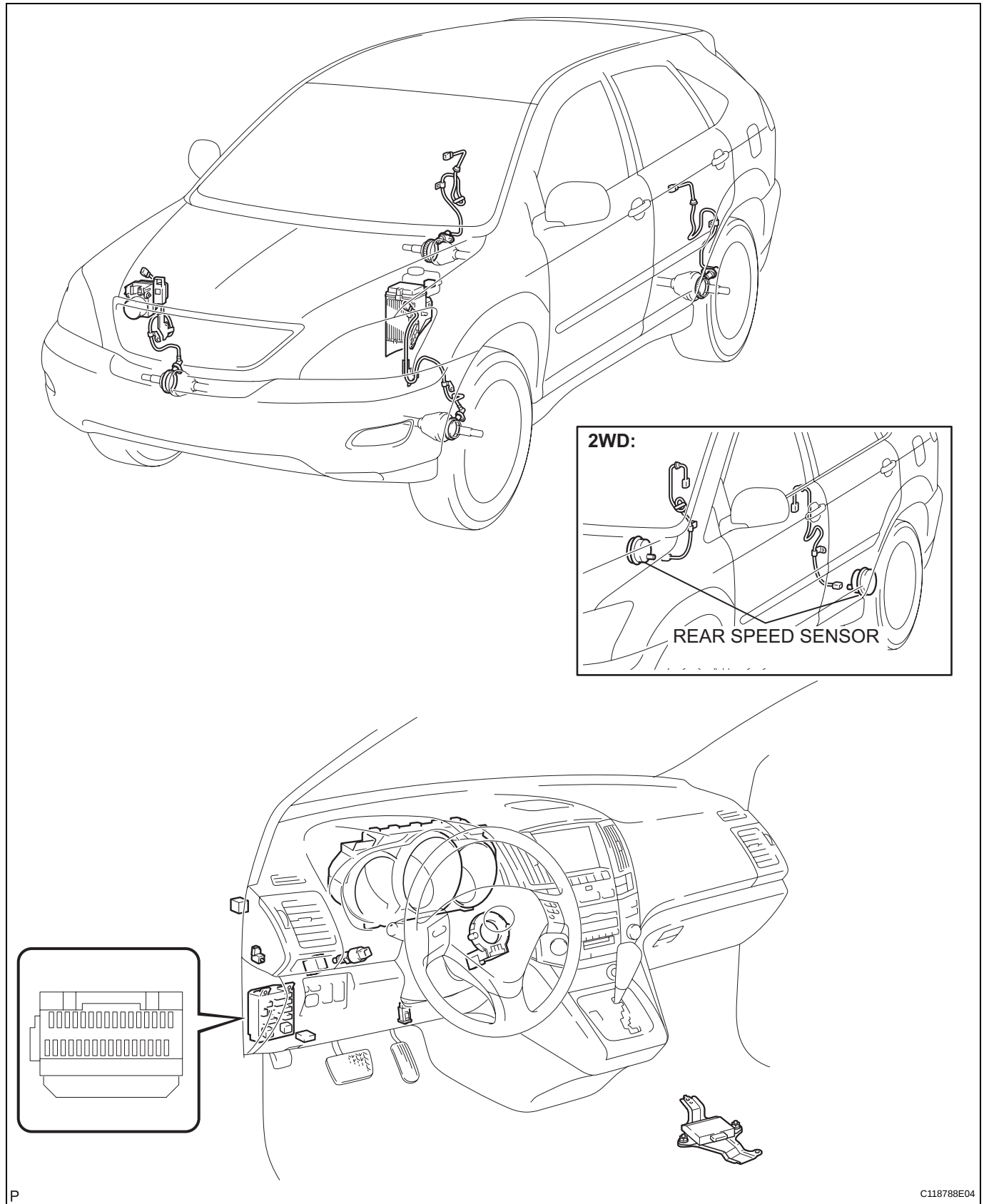
4. CHECK ABS SPEED SENSOR SIGNAL

HINT:

(See page [BC-21](#)).

REAR SPEED SENSOR (for 2WD)

COMPONENTS



REMOVAL

HINT:

Replace the RH side by using the same procedures as those for the LH side.

1. REMOVE REAR WHEEL
2. DISCONNECT SKID CONTROL SENSOR WIRE
 - (a) Disconnect the connector from the skid control sensor.
3. SEPARATE REAR DISC BRAKE CALIPER ASSEMBLY LH (See page [PB-20](#))
4. REMOVE REAR DISC (See page [PB-20](#))
5. REMOVE REAR AXLE HUB & BEARING ASSEMBLY LH (See page [AH-22](#))
6. REMOVE SKID CONTROL SENSOR

- (a) Mount the hub & bearing assembly on a soft jaw vise.

NOTICE:

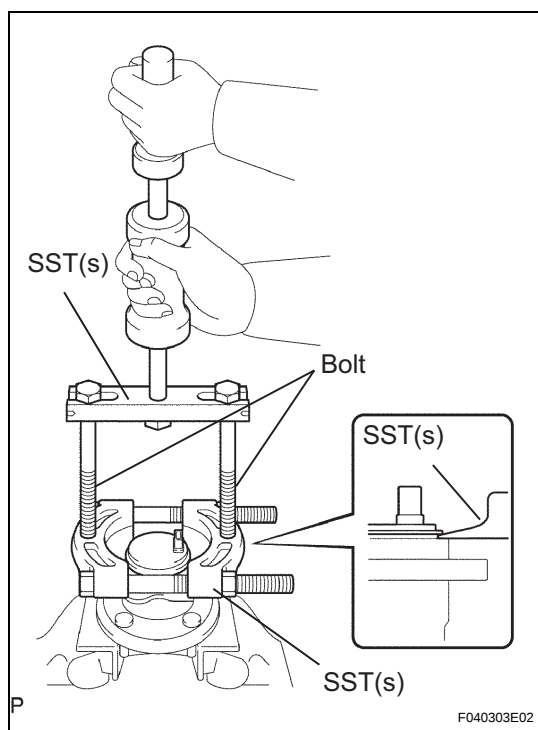
Replace the hub & bearing assembly if it is dropped or receives a strong shock.

- (b) Using a pin punch and hammer, drive out the 2 pins and remove the 2 attachments from SST(s).
- (c) Using SST(s) and 2 bolts (Diameter: 12 mm, pitch: 1.5 mm), remove the skid control sensor from the hub & bearing assembly.

SST 09520-00031 (09520-00040), 09521-00020, 09950-00020

NOTICE:

- If the sensor rotor is damaged, replace the hub & bearing assembly.
- Do not scratch the contacting surface of the hub & bearing assembly and the skid control sensor.



INSPECTION

1. INSPECT REAR SPEED SENSOR

- Disconnect the skid control sensor connector.
- Measure the resistance according to the value(s) in the table below.

Resistance:

LH

Tester Connection	Specified Condition
(S25-1) - (S25-2)	0.9 to 2.1 Ω

RH

Tester Connection	Specified Condition
(S26-1) - (S26-2)	0.9 to 2.1 Ω

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

Resistance:

LH

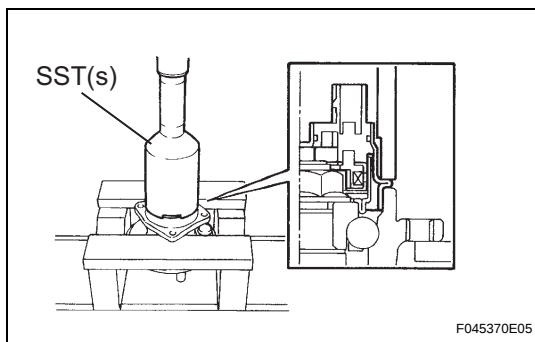
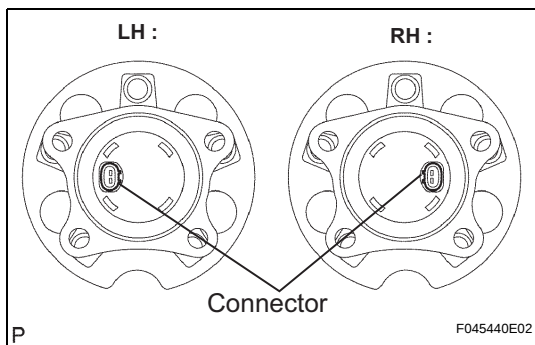
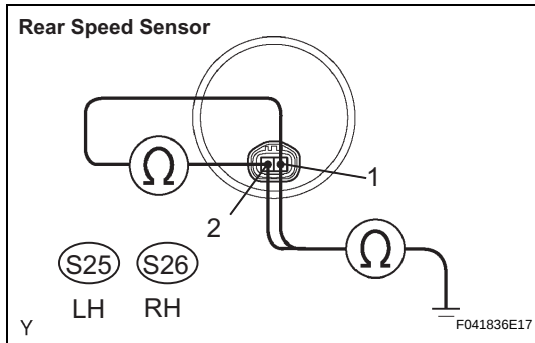
Tester Connection	Specified Condition
(S25-1) - Body ground	10 k Ω or higher
(S25-2) - Body ground	10 k Ω or higher

RH

Tester Connection	Specified Condition
(S25-1) - Body ground	10 k Ω or higher
(S25-2) - Body ground	10 k Ω or higher

NOTICE:

Check the speed sensor signal after replacement (See page [BC-16](#)).



INSTALLATION

1. INSTALL SKID CONTROL SENSOR

- Clean the contacting surface of the rear axle hub and a assembly and a new skid control sensor.

NOTICE:

Make sure the sensor rotor is clean.

- Place the skid control sensor on the rear axle hub so that the connector makes the lowest position under the on vehicle condition.

- Using SST(s) and a press, install the skid control sensor onto the hub & bearing assembly.

SST 09214-76011

NOTICE:

- Do not tap the skid control sensor directly with a hammer.
- Check that the skid control sensor detection part is clean.
- Press in the skid control sensor straight and slowly.

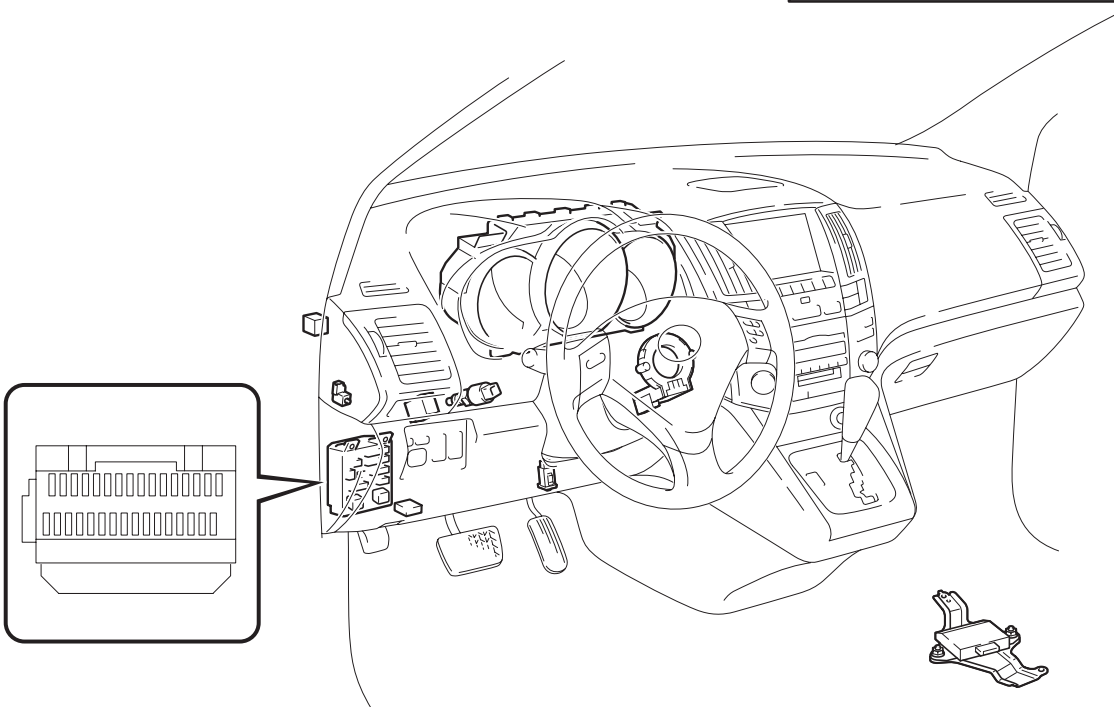
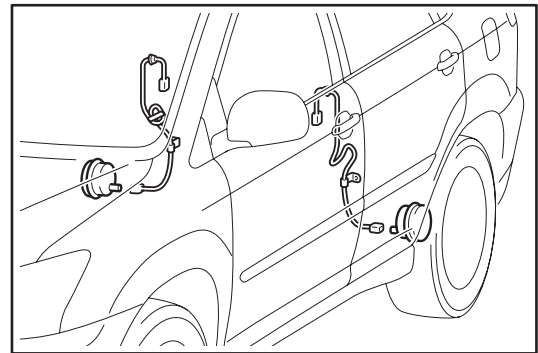
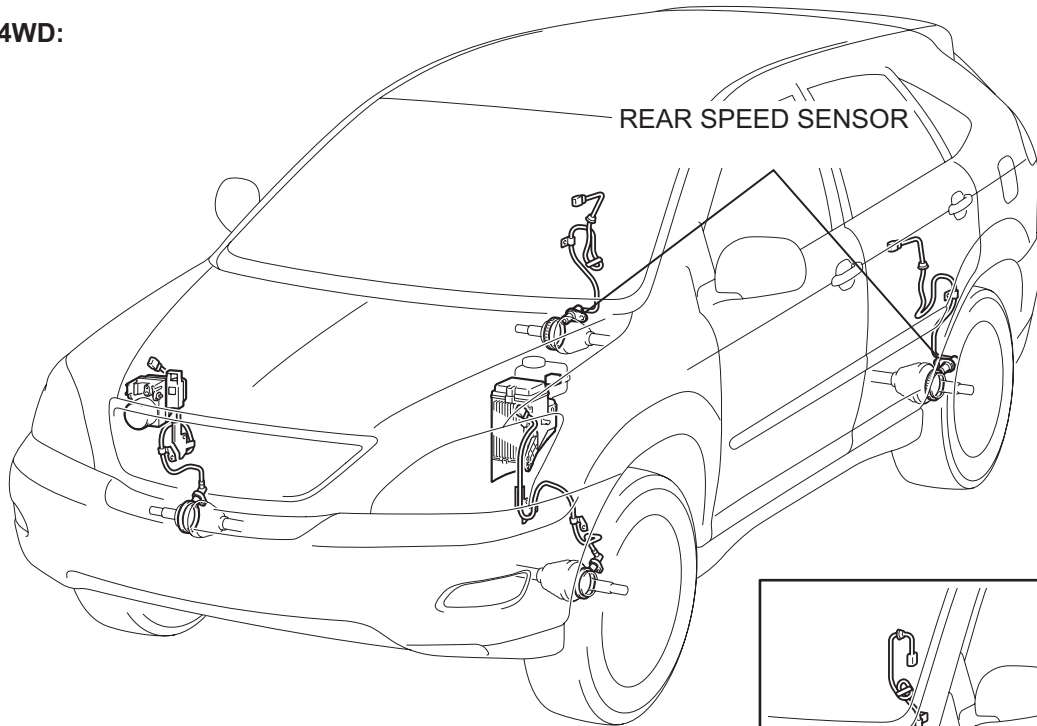
2. INSTALL REAR AXLE HUB & BEARING ASSEMBLY LH

3. **INSPECT BEARING BACKLASH** (See page [AH-15](#))
4. **INSPECT AXLE HUB DEVIATION** (See page [AH-15](#))
5. **INSTALL REAR DISC**
 - (a) Aligning the matchmarks, install the rear disc.
HINT:
When replacing the rear disc with new one, select the installation position where the rear disc has the minimum runout.
6. **INSTALL REAR DISC BRAKE CYLINDER ASSEMBLY LH**
HINT:
See page [BR-36](#)
7. **CONNECT SKID CONTROL SENSOR WIRE**
 - (a) Connect the connector to the skid control sensor.
8. **INSTALL FRONT WHEEL**
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
9. **INSPECT AND ADJUST REAR WHEEL ALIGNMENT**
HINT:
See page [SP-7](#)
10. **CHECK ABS SPEED SENSOR SIGNAL**
HINT:
See page [BC-21](#)

REAR SPEED SENSOR (for 4WD)

COMPONENTS

4WD:

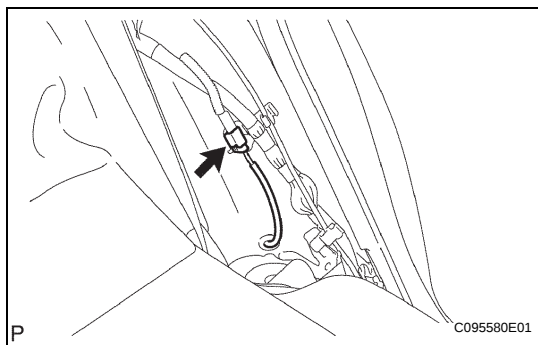


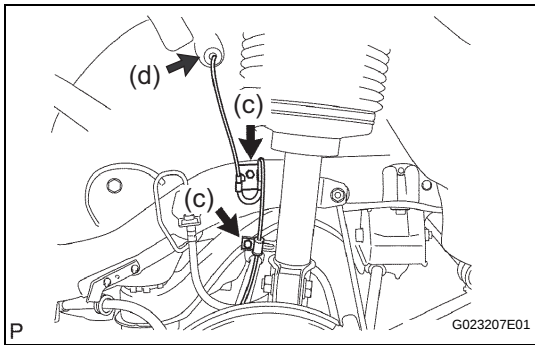
REMOVAL

HINT:

Replace the RH side by using the same procedures as those for the LH side.

1. REMOVE REAR DOOR SCUFF PLATE LH
HINT:
See page [SE-50](#)
2. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP LH
3. REMOVE DECK BOARD SUB-ASSEMBLY (See page [IR-7](#))
4. REMOVE REAR SEAT ASSEMBLY LH
HINT:
See page [IR-7](#)
5. REMOVE TONNEAU COVER ASSEMBLY
6. REMOVE DECK FLOOR BOX FRONT (See page [IR-8](#))
7. REMOVE DECK FLOOR BOX REAR (See page [IR-8](#))
8. REMOVE DECK BOARD SUB-ASSEMBLY NO.2 (See page [IR-8](#))
9. REMOVE DECK BOARD SUB-ASSEMBLY NO.3 (See page [IR-8](#))
10. REMOVE BACK DOOR WEATHERSTRIP
11. REMOVE DECK SIDE TRIM BOX LH (See page [IR-8](#))
12. REMOVE REAR FLOOR FINISH PLATE (See page [IR-8](#))
13. REMOVE REAR FLOOR FINISH SIDE PLATE LH (See page [IR-8](#))
14. REMOVE DECK SIDE TRIM COVER LH (See page [IR-8](#))
15. REMOVE REAR SEAT SIDE COVER LH (See page [IR-9](#))
16. REMOVE ROPE HOOK (See page [IR-9](#))
17. REMOVE DECK TRIM SIDE PANEL ASSEMBLY LH (See page [IR-9](#))
18. REMOVE REAR WHEEL
19. REMOVE SPEED SENSOR REAR LH
 - (a) Disconnect the speed sensor connector.**NOTICE:**
Be careful not to damage the wire harness.



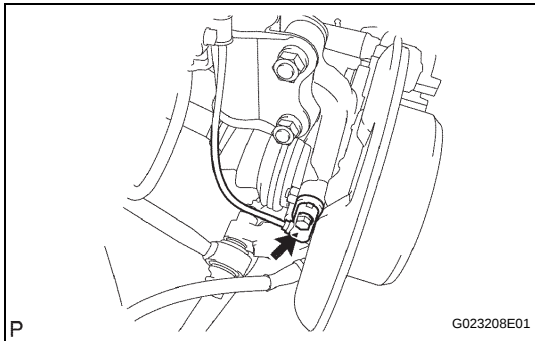


- (b) Pull out the sensor wire harness with the with grommet.

NOTICE:

Do not pull sensor wire.

- (c) Remove the 2 bolts holding the sensor harness from the body and the shock absorber assembly.



- (d) Remove the bolt and the speed sensor rear.

NOTICE:

Prevent foreign matter from attaching to the sensor tip.

INSPECTION

1. INSPECT REAR SPEED SENSOR

- (a) Remove the seat cushion and seatback .
- (b) Disconnect the speed sensor connector S25 or S26.
- (c) Measure the resistance according to the value(s) in the table below.

Resistance:

LH

Tester Connection	Specified Condition
S25-1 (RL+) - S25-2 (RL-)	0.9 to 1.3 Ω

RH

Tester Connection	Specified Condition
S26-1 (RR+) - S26-2 (RR-)	0.9 to 1.3 Ω

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

Resistance:

LH

Tester Connection	Specified Condition
S25-1 (RL+) - Body ground	1 MΩ or higher
S25-2 (RL-) - Body ground	

RH

Tester Connection	Specified Condition
S26-1 (RR+) - Body ground	1 MΩ or higher
S26-2 (RR-) - Body ground	

NOTICE:

Check the speed sensor signal after the replacement. (See page BC-16)

INSTALLATION

1. INSTALL SPEED SENSOR REAR LH

- (a) Install the speed sensor rear with the bolt.

Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

NOTICE:

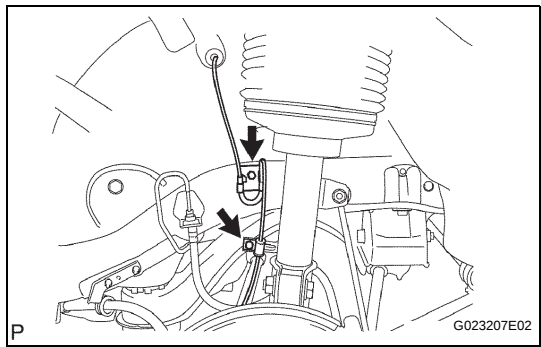
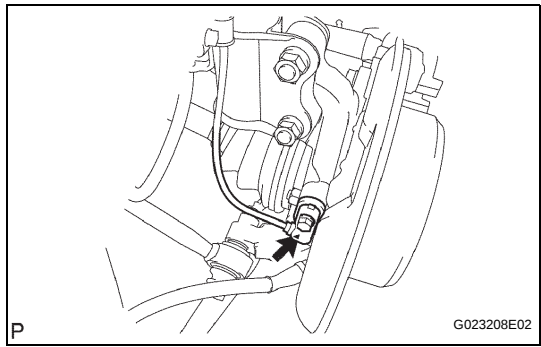
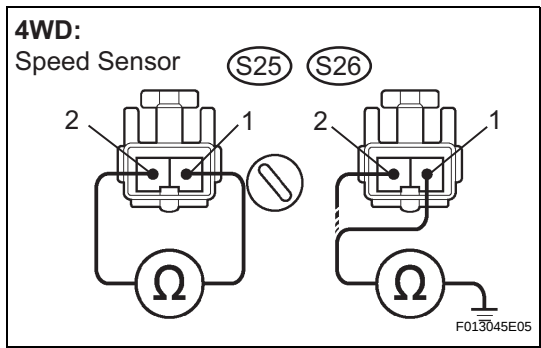
Prevent foreign matter from attaching to the sensor tip.

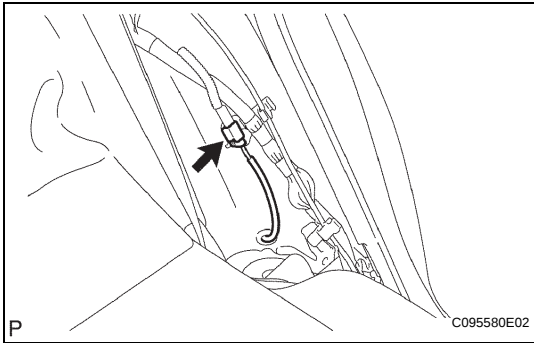
- (b) Install the sensor harness clamps with the 2 bolts to the body and the shock absorber assembly.

Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)

NOTICE:

Do not twist the sensor wire when installing the sensor.





(c) Push in the sensor wire harness with grommet.

NOTICE:

When grommet is set to body, pull the grommet do not pull sensor wire.

(d) Connect the speed sensor connector.

2. INSTALL REAR WHEEL

Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

3. INSTALL DECK TRIM SIDE PANEL ASSEMBLY LH

4. INSTALL ROPE HOOK

5. INSTALL REAR SEAT SIDE COVER LH

6. INSTALL DECK SIDE TRIM COVER LH

7. INSTALL REAR FLOOR FINISH SIDE PLATE LH

8. INSTALL REAR FLOOR FINISH PLATE

9. INSTALL DECK SIDE TRIM BOX LH

10. INSTALL BACK DOOR WEATHERSTRIP

11. INSTALL DECK BOARD SUB-ASSEMBLY NO.3

12. INSTALL DECK BOARD SUB-ASSEMBLY NO.2

13. INSTALL DECK FLOOR BOX REAR

14. INSTALL DECK FLOOR BOX FRONT

15. INSTALL TONNEAU COVER ASSEMBLY

16. INSTALL REAR SEAT ASSEMBLY LH

HINT:

See page [SE-55](#)

17. INSTALL DECK BOARD SUB-ASSEMBLY

18. INSTALL REAR DOOR OPENING TRIM WEATHERSTRIP LH

19. INSTALL REAR DOOR SCUFF PLATE LH

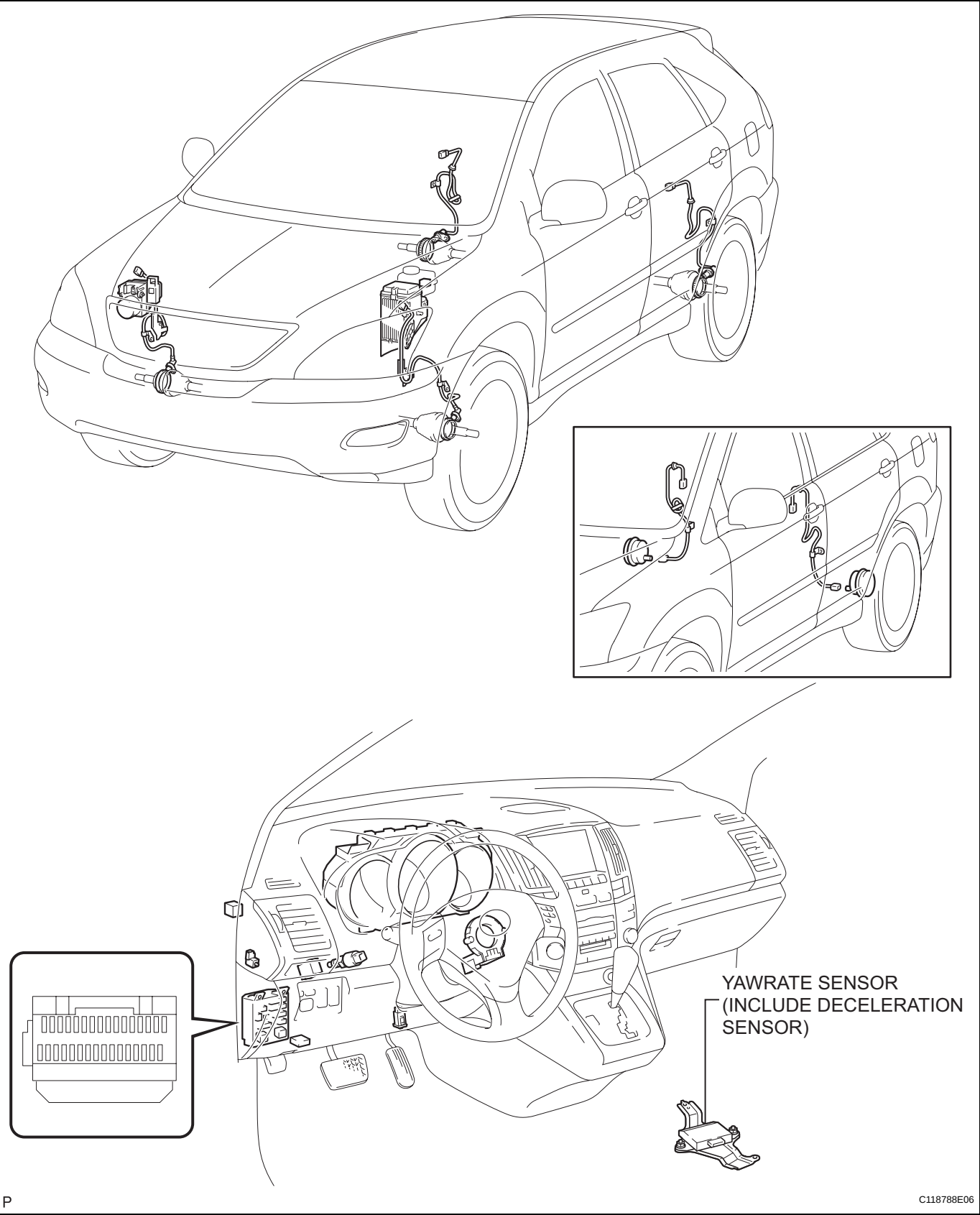
20. CHECK ABS SPEED SENSOR SIGNAL

HINT:

See page [BC-21](#)

YAW RATE AND ACCELERATION SENSOR

COMPONENTS



REMOVAL

NOTICE:

- Don't use the dropped or damaged yawrate sensor.
- Free from the foreign matters between yawrate sensor bracket and body.
- Make sure the sensor direction.

1. REMOVE FRONT SEAT ASSEMBLY RH

HINT:

See page [SE-38](#)

2. REMOVE FRONT DOOR SCUFF PLATE RH (See page [IR-6](#))

3. REMOVE REAR DOOR SCUFF PLATE RH

HINT:

See page [SE-62](#)

4. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH

5. REMOVE REAR DOOR OPENING TRIM WEATHERSTRIP RH

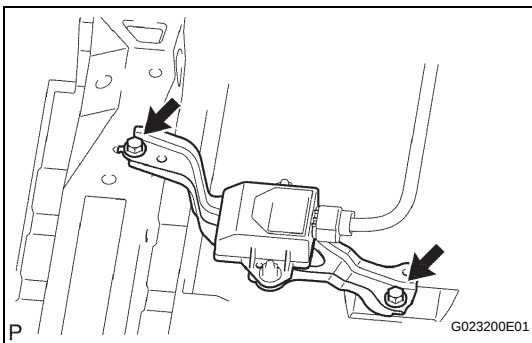
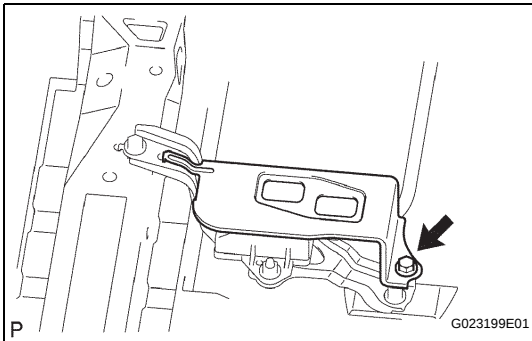
6. REMOVE CENTER PILLAR GARNISH LOWER RH (See page [IR-7](#))

7. REMOVE YAWRATE SENSOR PROTECTOR

- (a) Remove the bolt and the sensor protector.

8. REMOVE YAWRATE SENSOR

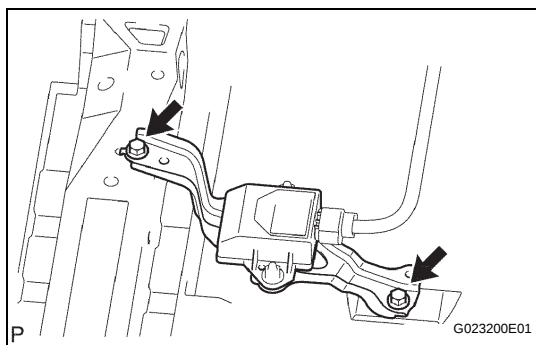
- (a) Disconnect the connector.



- (b) Remove the 2 bolts and the yawrate sensor.

NOTICE:

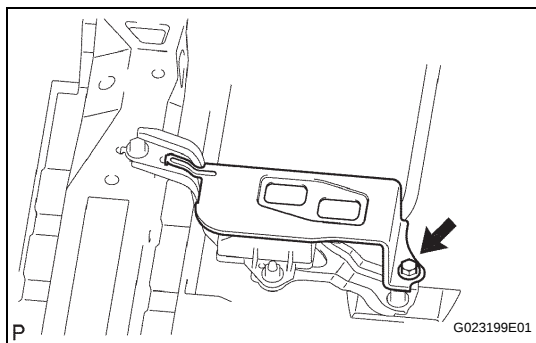
Do not remove the yawrate sensor from the yawrate sensor bracket.



INSTALLATION

1. INSTALL YAWRATE SENSOR

- (a) Install the yawrate sensor with the 2 bolts.
Torque: 14 N*m (143 kgf*cm, 10 ft.*lbf)
- (b) Connect the connector.



2. INSTALL YAWRATE SENSOR PROTECTOR

- (a) Install the sensor protector with the bolt.

3. INSTALL CENTER PILLAR GARNISH LOWER RH

4. INSTALL REAR DOOR OPENING TRIM WEATHERSTRIP RH

5. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH

6. INSTALL REAR DOOR SCUFF PLATE RH

7. INSTALL FRONT DOOR SCUFF PLATE RH

8. INSTALL FRONT SEAT ASSEMBLY RH

HINT:

See page [SE-45](#)

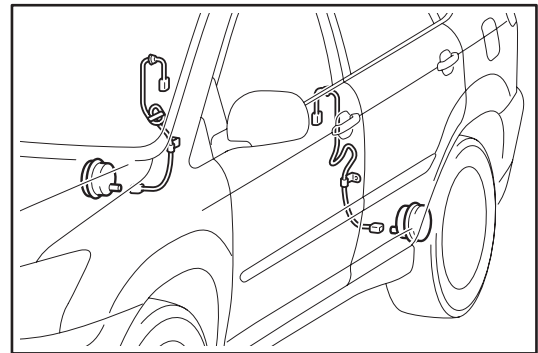
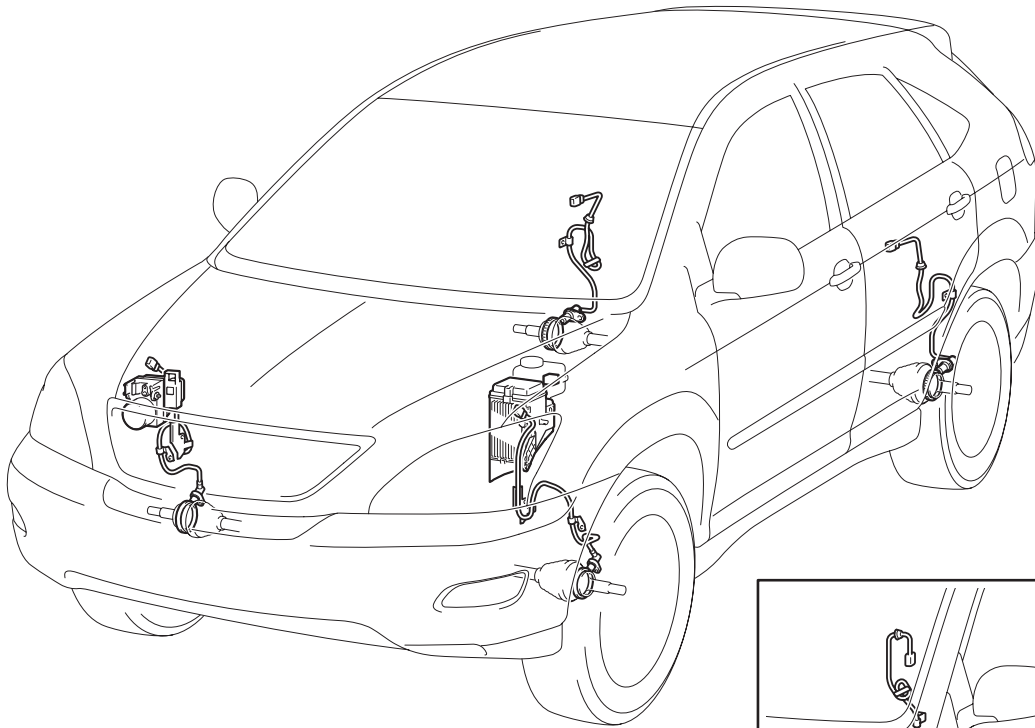
9. PERFORM YAWRATE SENSOR ZERO POINT CALIBRATION

HINT:

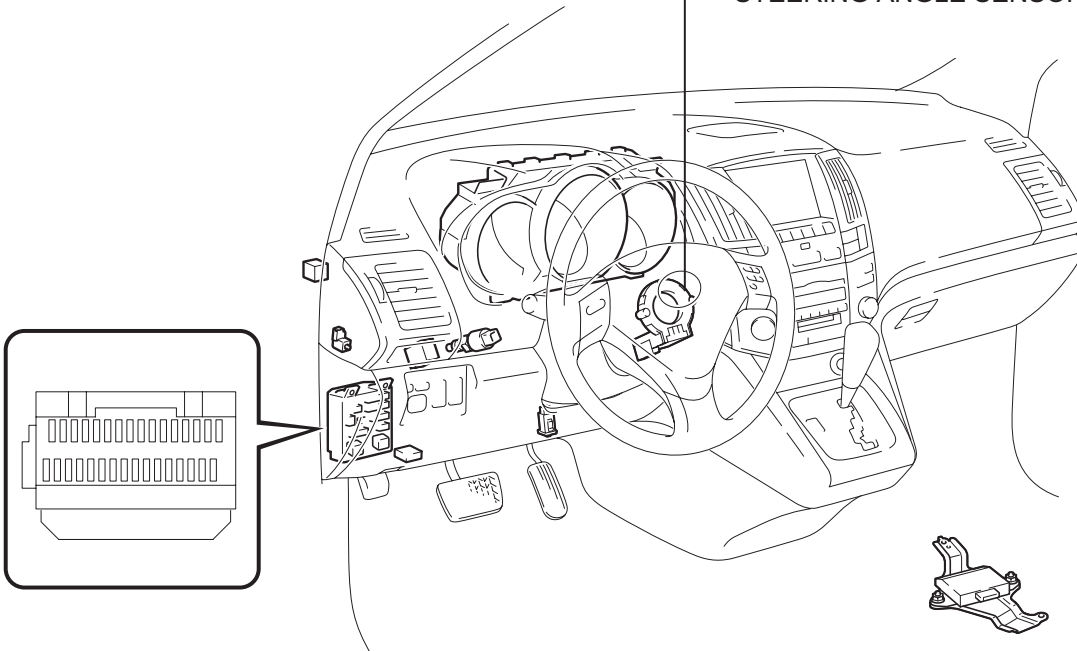
See page [BC-5](#)

STEERING ANGLE SENSOR

COMPONENTS



STEERING ANGLE SENSOR



REMOVAL

1. PRECAUTION

HINT:

See page [RS-1](#)

2. SEPARATE BATTERY NEGATIVE TERMINAL

HINT:

See page [RS-1](#)

3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

4. REMOVE STEERING PAD ASSEMBLY (See page [RS-388](#))

5. REMOVE STEERING WHEEL ASSEMBLY (for Manual Tilt) (See page [SR-40](#))

6. REMOVE STEERING WHEEL ASSEMBLY (for Power Tilt and Power Telescopic) (See page [SR-50](#))

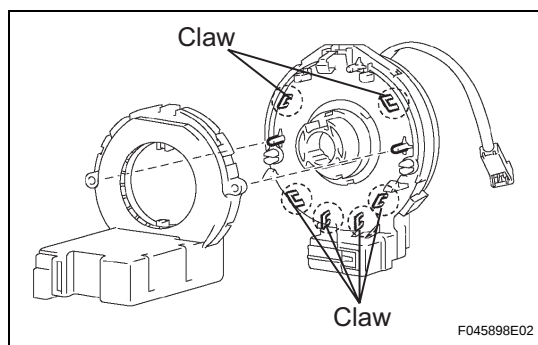
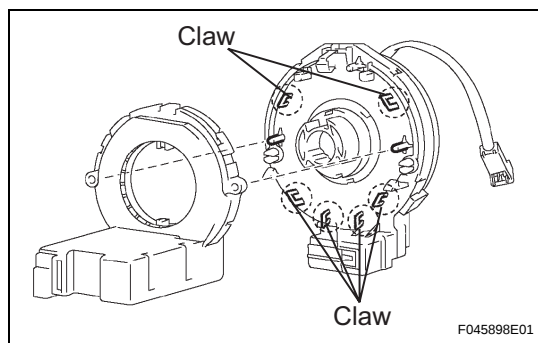
7. REMOVE STEERING COLUMN COVER (for Manual Tilt) (See page [SR-40](#))

8. REMOVE STEERING COLUMN COVER (for Power Tilt and Power Telescopic) (See page [SR-51](#))

9. REMOVE SPIRAL CABLE (See page [RS-399](#))

10. REMOVE STEERING SENSOR

- (a) Release 6 claw fittings and remove the steering sensor from the spiral cable.



INSTALLATION

1. INSTALL STEERING SENSOR

- (a) Install the steering sensor to the spiral cable.

NOTICE:

- Install the claw securely.
- Do not damage the claw.

2. ADJUST CENTER FRONT WHEEL

3. INSTALL SPIRAL CABLE (See page [RS-399](#))

4. ADJUST SPIRAL CABLE

5. INSTALL STEERING WHEEL ASSEMBLY (for Manual Tilt) (See page [SR-45](#))

6. INSTALL STEERING WHEEL ASSEMBLY (for Power Tilt and Power Telescopic) (See page [SR-57](#))

7. INSTALL STEERING PAD ASSEMBLY (See page [RS-388](#))

8. INSPECT STEERING WHEEL CENTER POINT

9. INSPECT STEERING PAD ASSEMBLY**10. INSPECT SRS WARNING LIGHT**

HINT:

See page [RS-25](#)**11. INSPECT ABS WARNING LIGHT AND VSC WARNING LIGHT**

HINT:

See page [BC-21](#)