for Preparation Click here

1.EXPRESSIONS OF IGNITION SWITCH

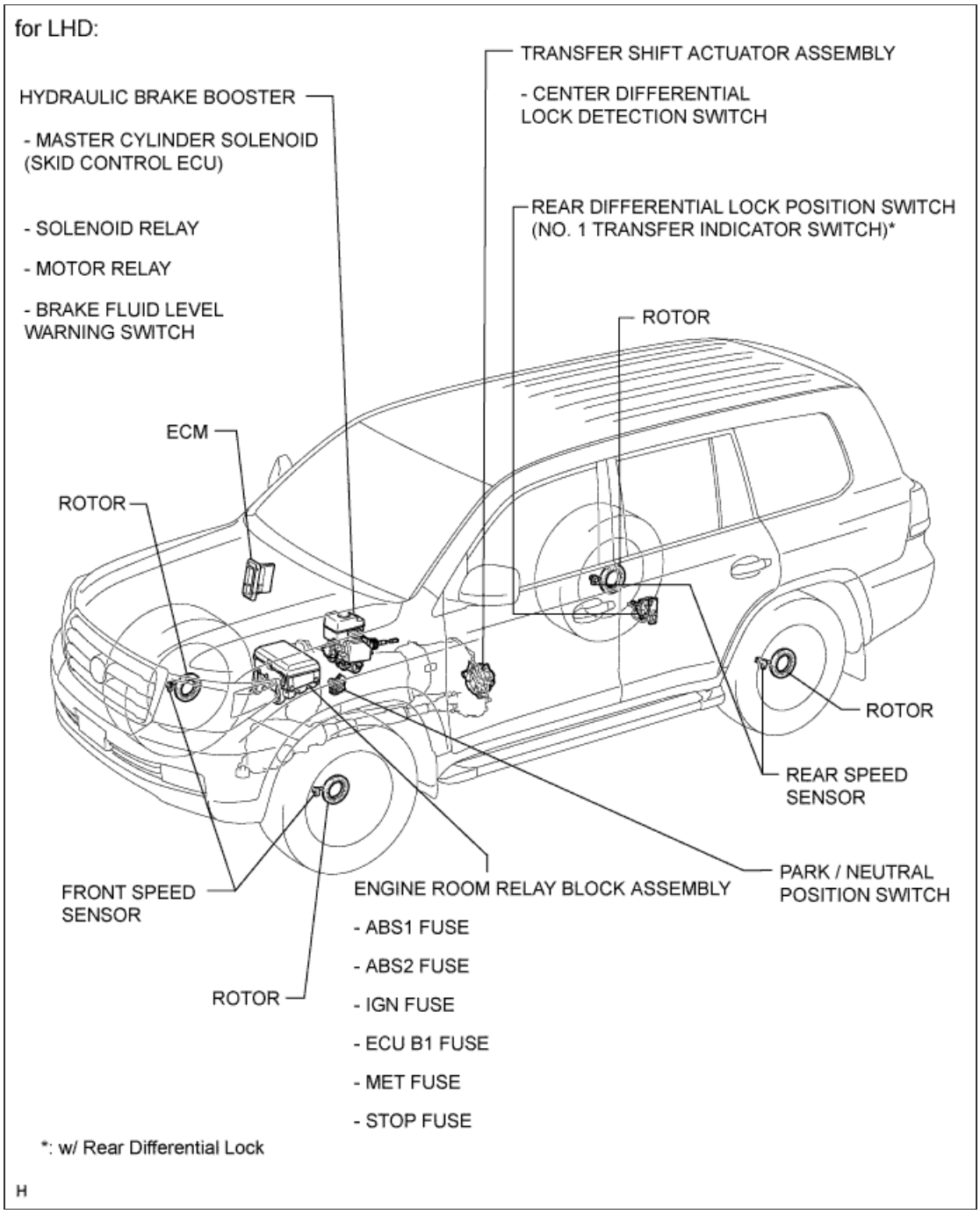
a. The type of ignition switch used on this model differs according to the specifications of the vehicle. The expressions listed in the table below are used in this section.

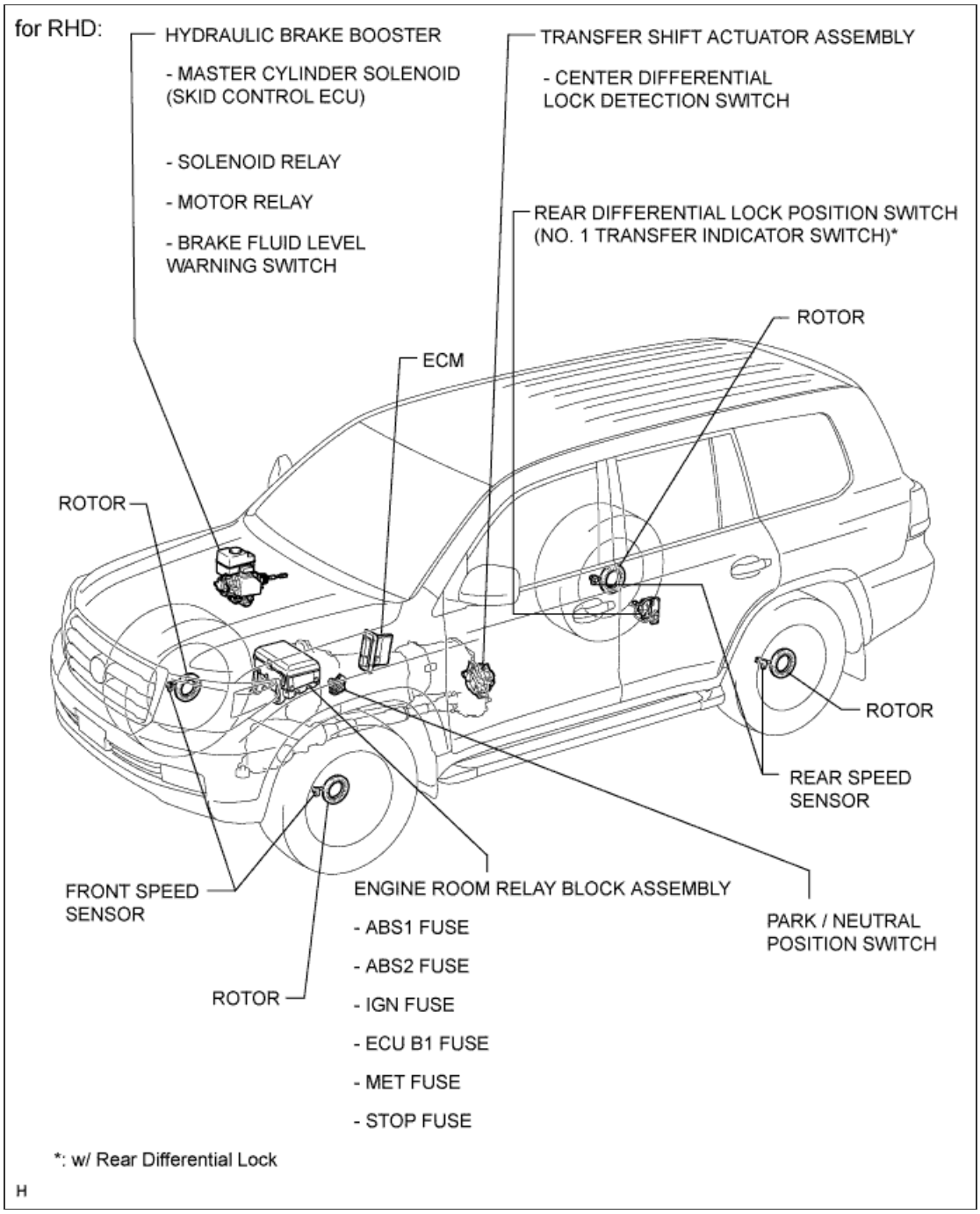
Expression	Ignition Switch (Position)	Engine Switch (Condition)
Ignition Switch off	LOCK	Off
Ignition Switch ACC	ACC	On (ACC)
Ignition Switch ON	ON	On (IG)
Engine Start	START	Start

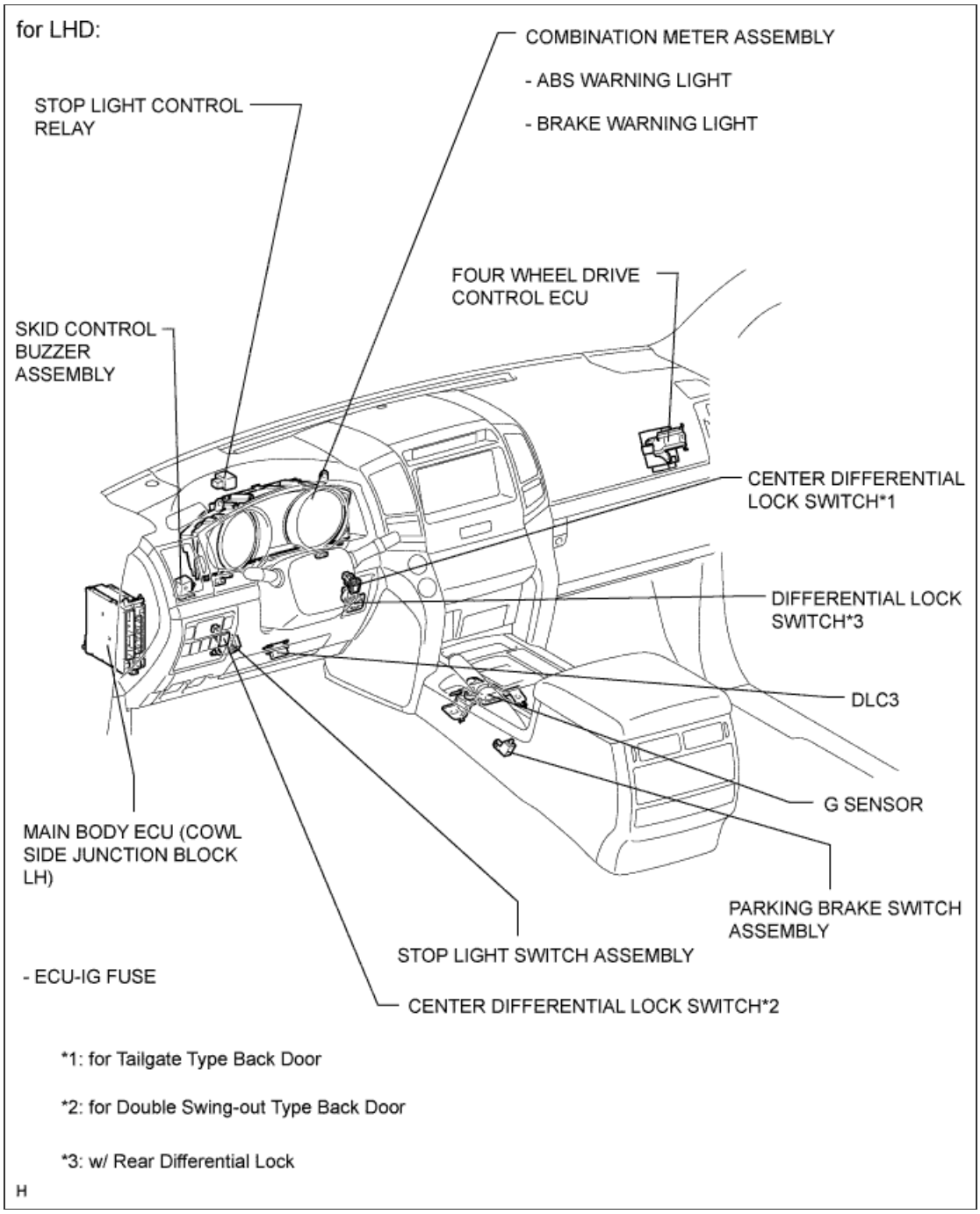
2.TROUBLESHOOTING PRECAUTION

- When there is a malfunction in the contact point of the terminals or installation problems with parts, removal and installation of the suspected problem parts may return the system to normal either completely or temporarily.
- In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as by DTC output and freeze frame data output, and record it before disconnecting each connector or removing and installing parts.
- Since the Anti-lock Brake System (ABS) may be influenced by a malfunction in the other systems, be sure to check for DTCs in the other systems.
- Be sure to remove and install the hydraulic brake booster and each sensor with the ignition switch off unless specified in the inspection procedure.
- When removing and installing the hydraulic brake booster and each sensor, be sure to check that the normal display is output in test mode inspection and in DTC output inspection after installing all the parts.
- After replacing the master cylinder solenoid and/or the G sensor, make sure to perform G sensor zero point calibration (Click here).
- The CAN communication system is used for data communication between the skid control ECU (included in the master cylinder solenoid), ECM, four wheel drive control ECU, combination meter and DLC3. If there is trouble in the CAN communication line, the DTC of the communication line is stored.
- If the DTC of the CAN communication line is stored, repair the malfunction in the communication line first and then troubleshoot the anti-lock brake system.
- Since the CAN communication line has its own length and route, it cannot be repaired temporarily with a bypass wire, etc.
- w/ Rear Differential Lock:
  When the rear differential is locked, the ABS does not operate but the EBD operates.

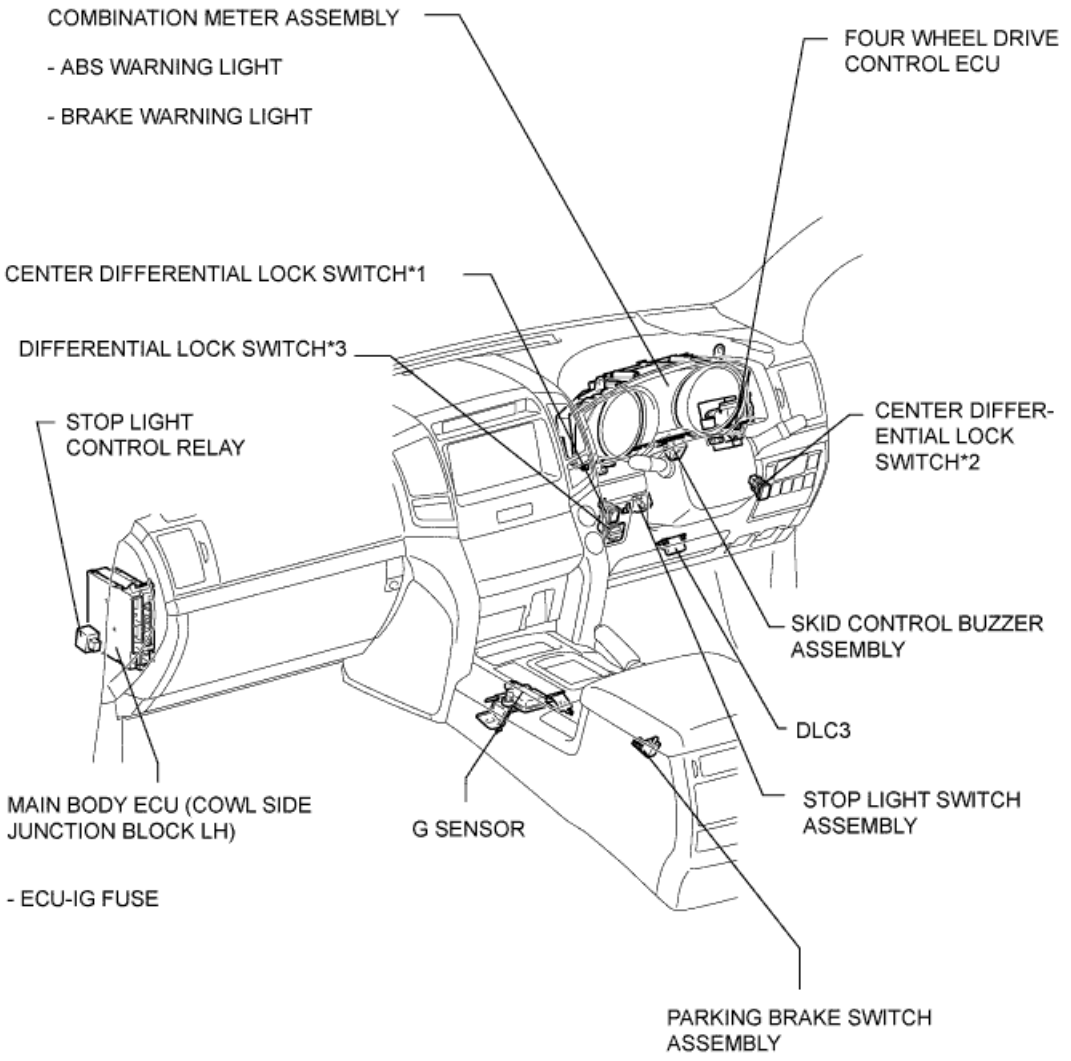
for Preparation Click here




for RHD:
HYDRAULIC BRAKE BOOSTER
- MASTER CYLINDER SOLENOID (SKID CONTROL ECU)
- SOLENOID RELAY
- MOTOR RELAY
- BRAKE FLUID LEVEL WARNING SWITCH
TRANSFER SHIFT ACTUATOR ASSEMBLY
- CENTER DIFFERENTIAL LOCK DETECTION SWITCH
REAR DIFFERENTIAL LOCK POSITION SWITCH (NO. 1 TRANSFER INDICATOR SWITCH)*
ROTOR
ECM
ROTOR
ROTOR
REAR SPEED SENSOR
FRONT SPEED SENSOR
ENGINE ROOM RELAY BLOCK ASSEMBLY
- ABS1 FUSE
- ABS2 FUSE
- IGN FUSE
- ECU B1 FUSE
- MET FUSE
- STOP FUSE
PARK / NEUTRAL POSITION SWITCH
ROTOR
*: w/ Rear Differential Lock
H


for LHD:
COMBINATION METER ASSEMBLY
- ABS WARNING LIGHT
- BRAKE WARNING LIGHT
STOP LIGHT CONTROL RELAY
FOUR WHEEL DRIVE CONTROL ECU
SKID CONTROL BUZZER ASSEMBLY
CENTER DIFFERENTIAL LOCK SWITCH*1
DIFFERENTIAL LOCK SWITCH*3
DLC3
G SENSOR
MAIN BODY ECU (COWL SIDE JUNCTION BLOCK LH)
PARKING BRAKE SWITCH ASSEMBLY
STOP LIGHT SWITCH ASSEMBLY
- ECU-IG FUSE
CENTER DIFFERENTIAL LOCK SWITCH*2
*1: for Tailgate Type Back Door
*2: for Double Swing-out Type Back Door
*3: w/ Rear Differential Lock
H

for RHD:



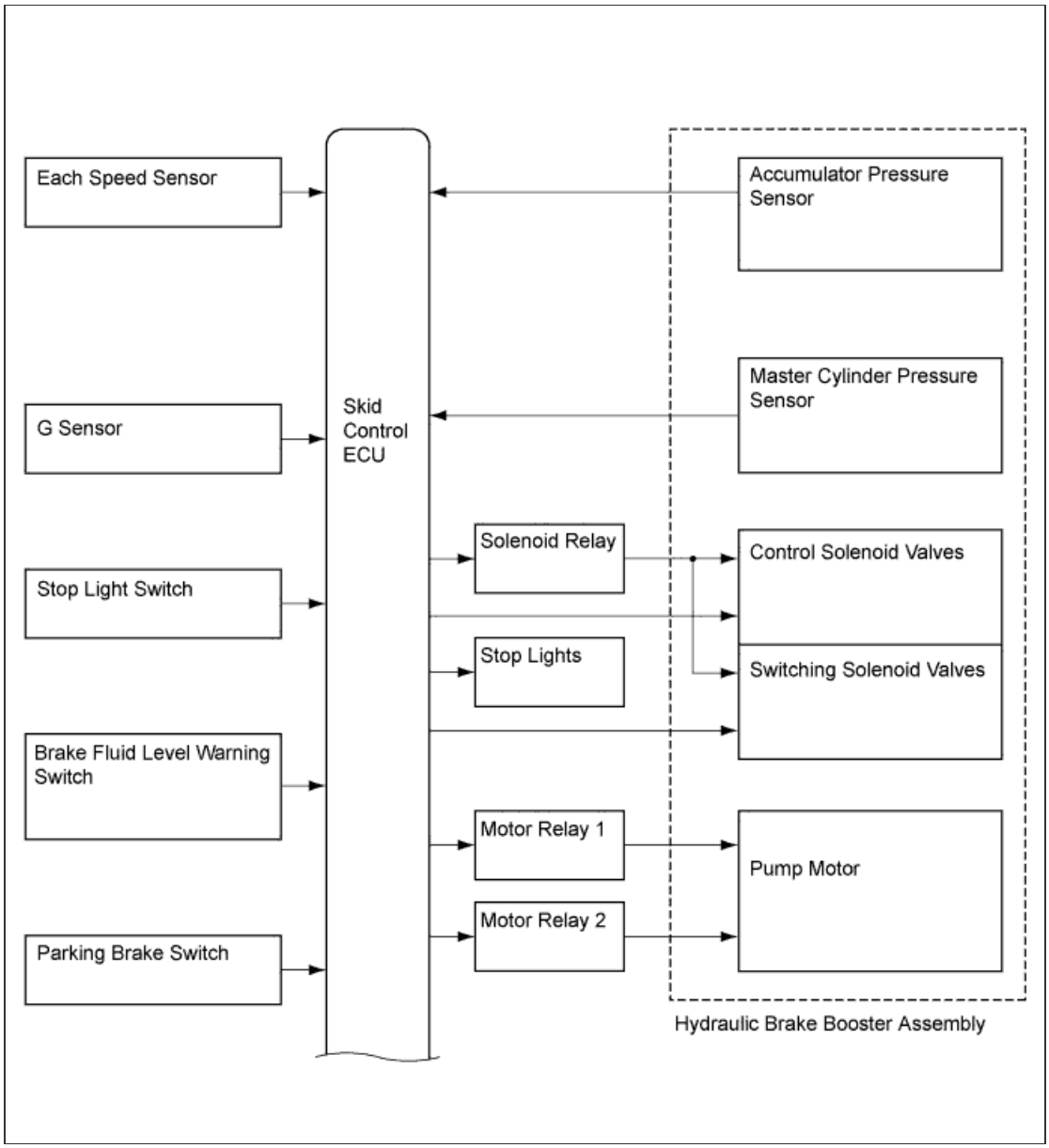
*1: for Tailgate Type Back Door

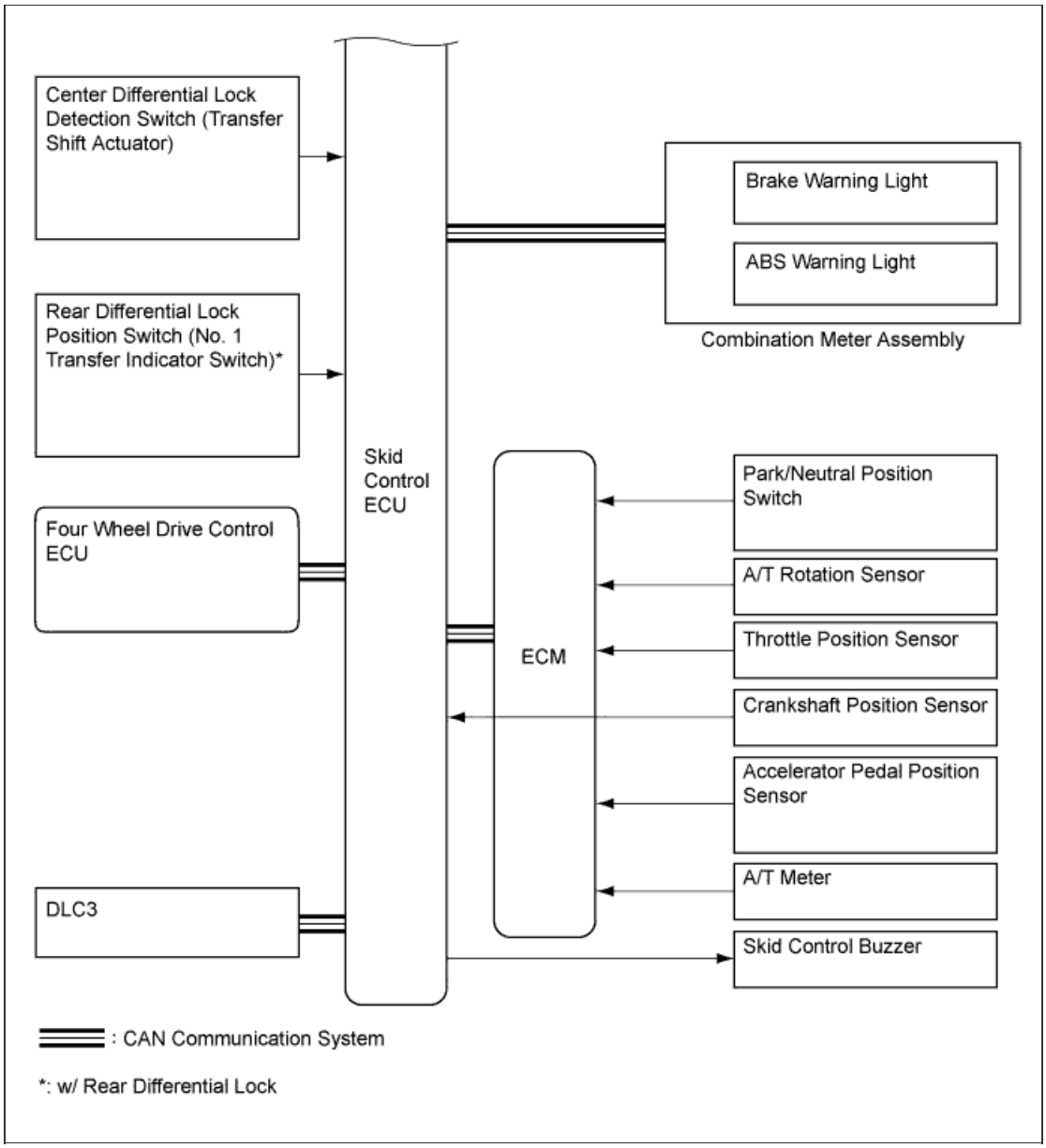
*2: for Double Swing-out Type Back Door

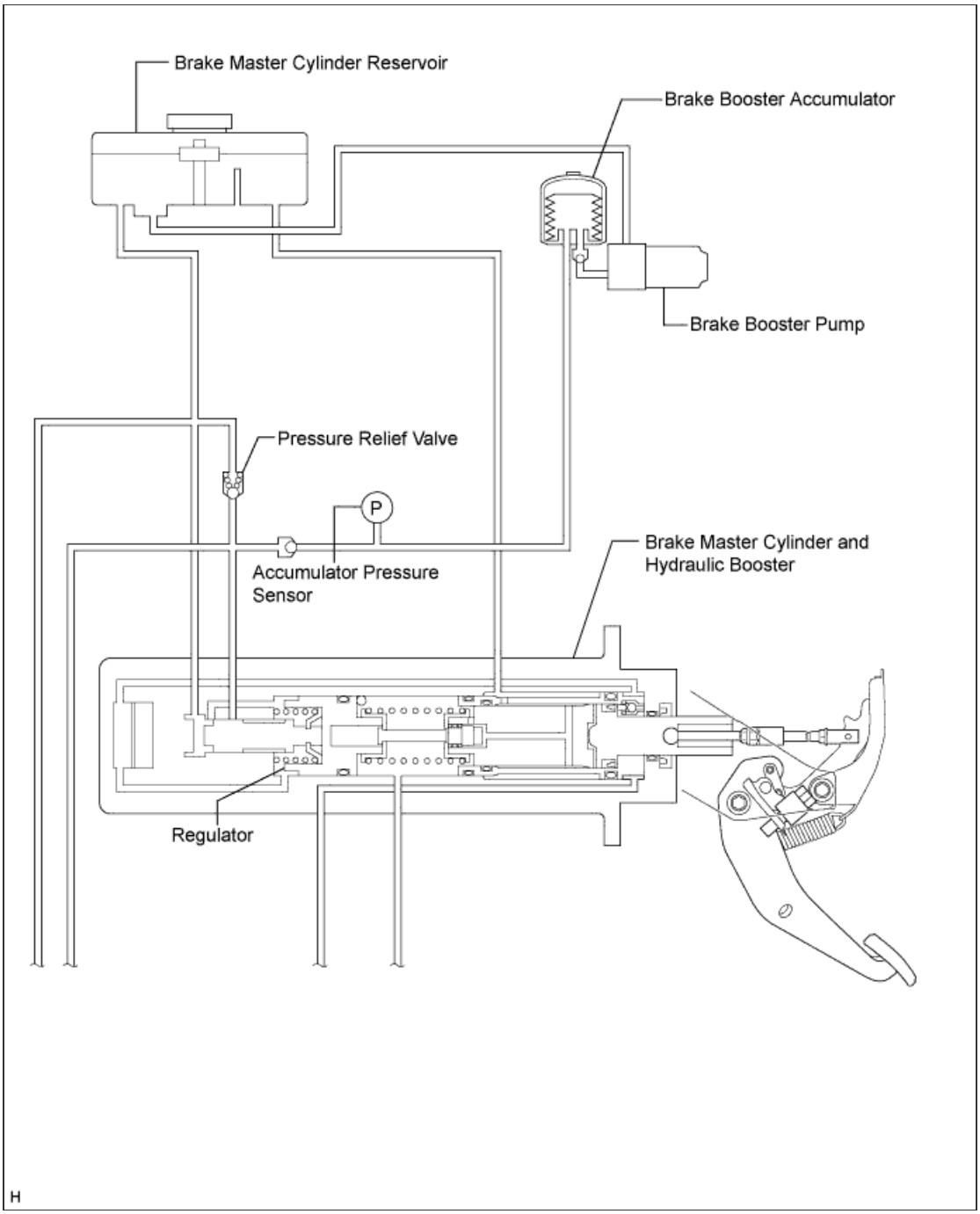
*3: w/ Rear Differential Lock

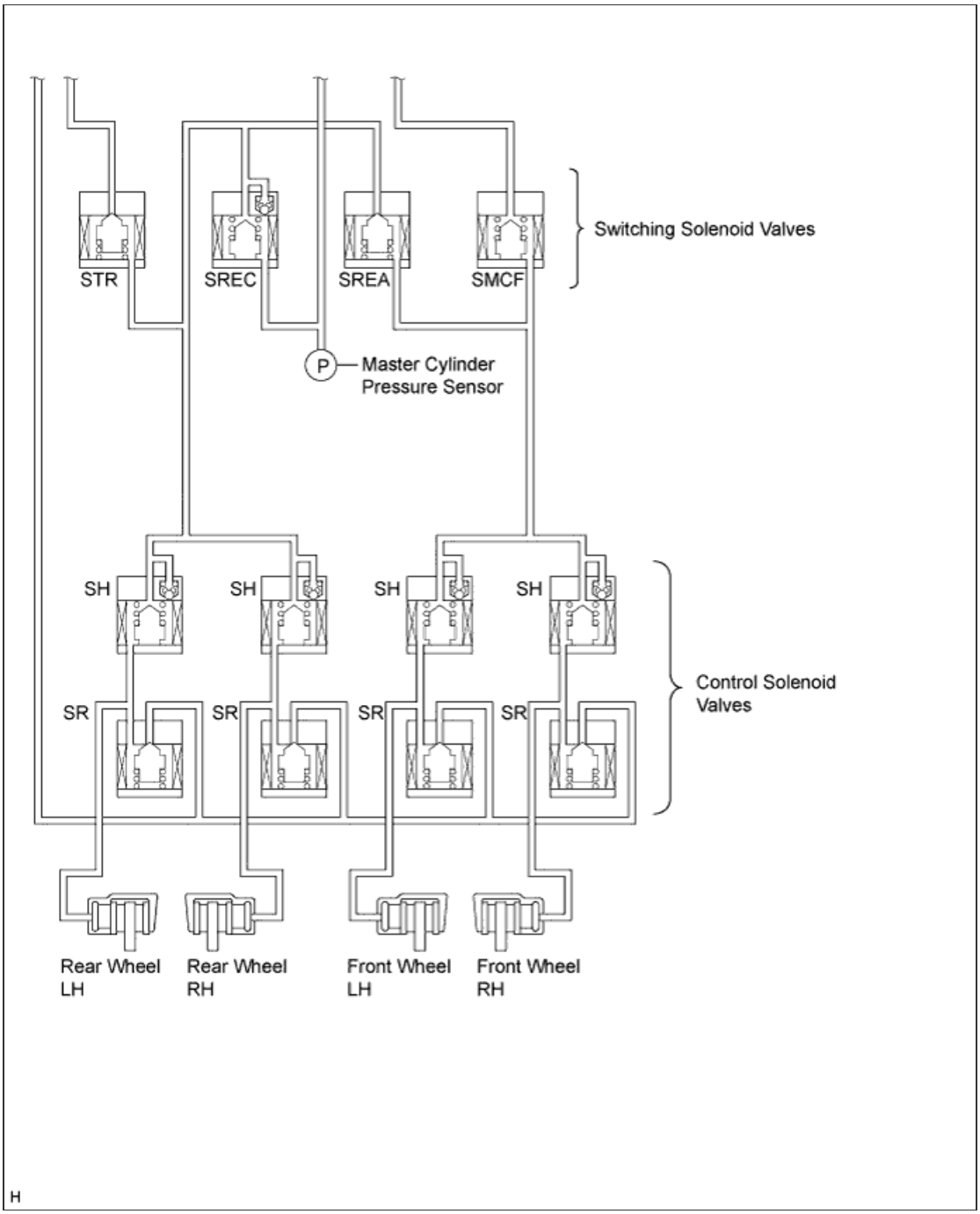
H

for Preparation Click here




Center Differential Lock Detection Switch (Transfer Shift Actuator)
Rear Differential Lock Position Switch (No. 1 Transfer Indicator Switch)*
Four Wheel Drive Control ECU
DLC3
Skid Control ECU
ECM
Brake Warning Light
ABS Warning Light
Combination Meter Assembly
Park/Neutral Position Switch
A/T Rotation Sensor
Throttle Position Sensor
Crankshaft Position Sensor
Accelerator Pedal Position Sensor
A/T Meter
Skid Control Buzzer
: CAN Communication System
*: w/ Rear Differential Lock


Brake Master Cylinder Reservoir
Brake Booster Accumulator
Brake Booster Pump
Pressure Relief Valve
P
Accumulator Pressure Sensor
Brake Master Cylinder and Hydraulic Booster
Regulator
H



Transmitting ECU (Transmitter)	Receiving ECU	Signal	Communication Method
ECM	Skid control ECU	Shift position signal	CAN communication system
ECM	Skid control ECU	A/T rotation signal	CAN communication system
ECM	Skid control ECU	Throttle position signal	CAN communication system
ECM	Skid control ECU	Engine speed signal	CAN communication system
ECM	Skid control ECU	Accelerator pedal position signal	CAN communication system
ECM	Skid control ECU	Engine torque signal	CAN communication system
Skid control ECU	ECM	G signal	CAN communication system
Skid control ECU	ECM	Engine torque request signal	CAN communication system
Four wheel drive control ECU	Skid control ECU	L4 signal	CAN communication system
Skid control ECU	Four wheel drive control ECU	G signal	CAN communication system

for Preparation Click here

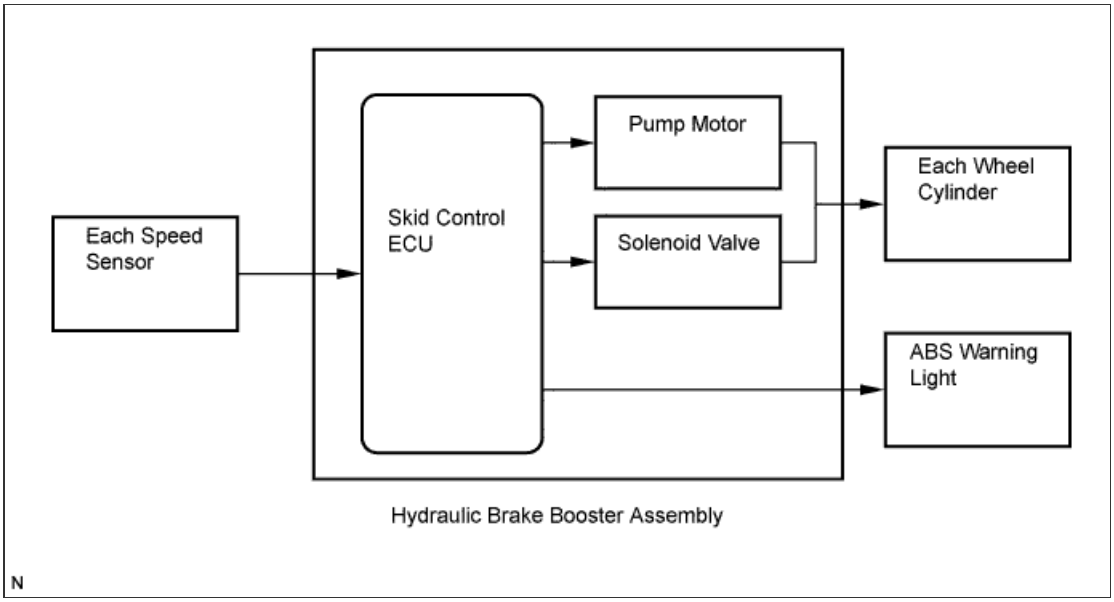
SYSTEM DESCRIPTION

HINT:

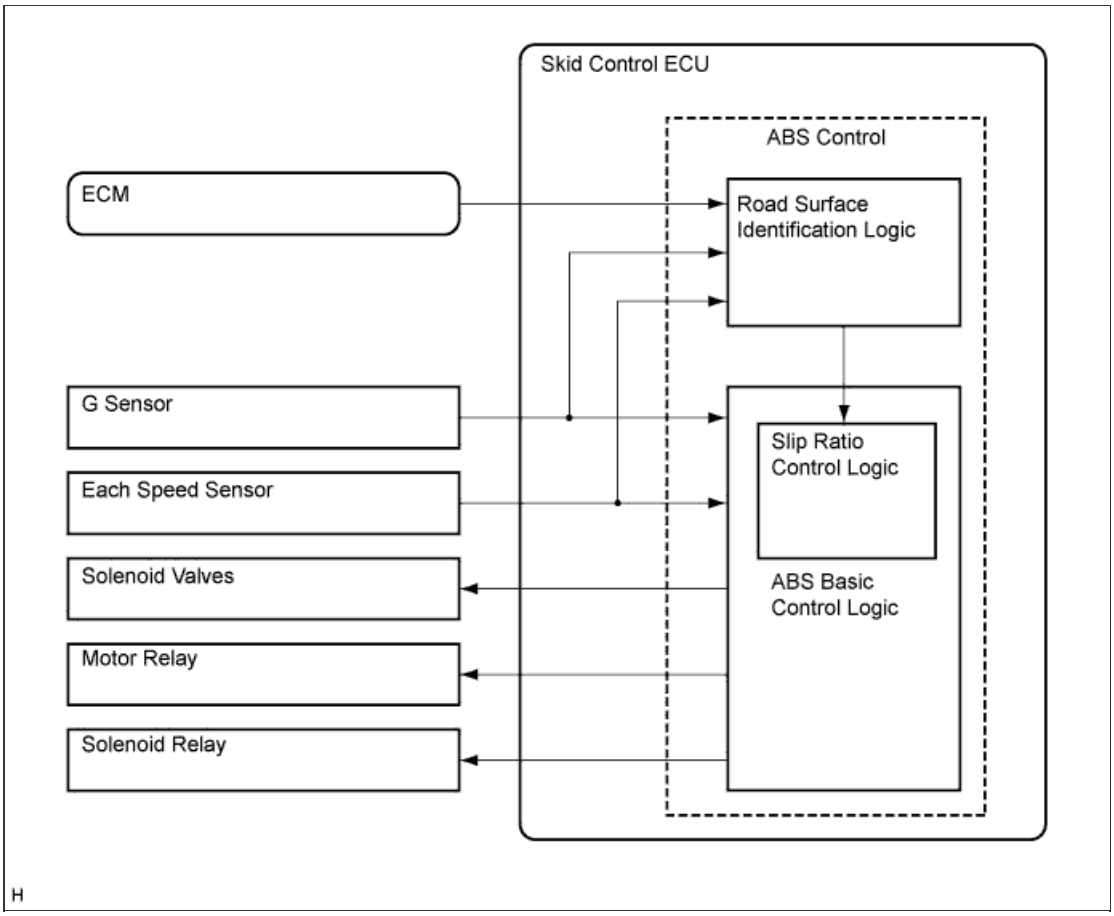
The skid control ECU is a single unit with the hydraulic brake booster.

a. Multi-terrain ABS

- The ABS helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface.
- The Multi-terrain ABS detects off-road driving on dirt, sand, etc., and improves the brake feeling during off-road driving by using a function to automatically change to optimal ABS control.



Operation description (ABS)
The skid control ECU detects wheel lock condition by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valve. The pump motor and solenoid valve avoid wheel lock by controlling the oil pressure of each wheel cylinder.
The ABS warning light comes on when the ABS system is malfunctioning.



Operation description (Multi-terrain ABS)

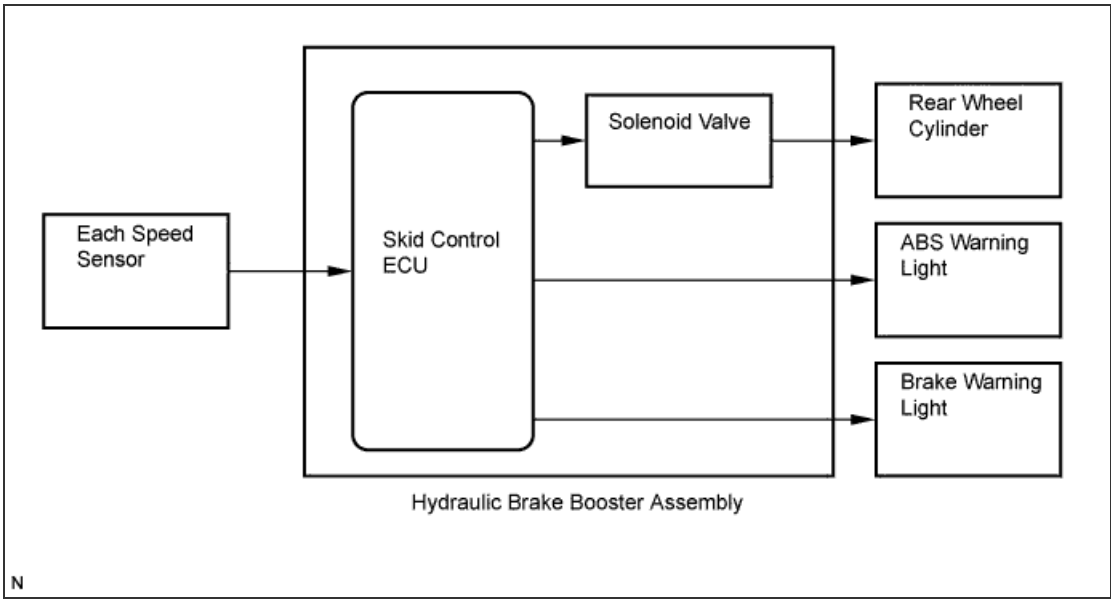
The skid control ECU detects road surface, such as dry asphalt, wet asphalt, snow, ice, sand, mud, gravel, and dirt by using engine torque information from the ECM, vehicle body acceleration information from the G sensor, and vehicle wheel speed information from each wheel speed sensor.

The skid control ECU changes the slip ratio in accordance with the detected road surface.

EBD (Electronic Brake force Distribution)

The EBD control utilizes the ABS, realizing proper brake force distribution between the front and rear wheels in accordance with driving conditions.

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



Operation description

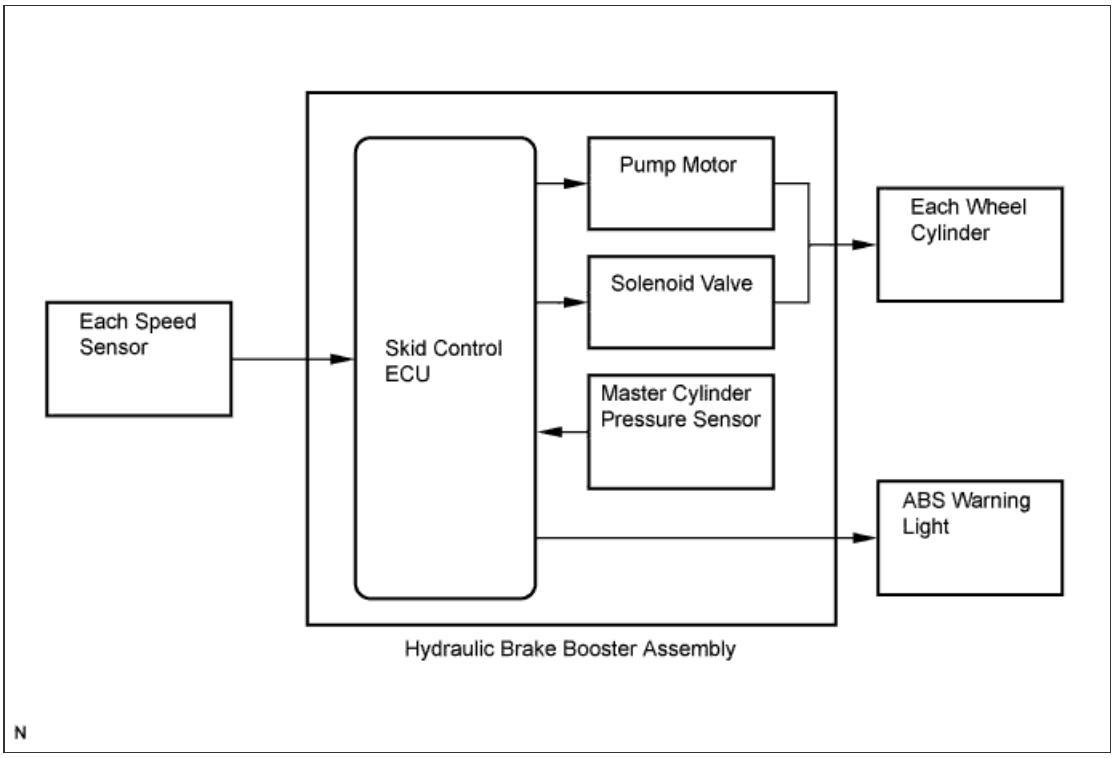
The skid control ECU receives the speed signal from each speed sensor to detect the slip condition of the wheels and sends the control signal to the solenoid.

The solenoid valve controls oil pressure of the rear wheel cylinder and splits the control power properly between the rear wheels and the right and left wheels.

Both the ABS and BRAKE warning lights come on to indicate a malfunction in the EBD system.

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 braking performance.



Operation description

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

The ABS warning light comes on to indicate a malfunction in the BA system.

for Preparation Click here

HINT:

*: Use the intelligent tester.

1.VEHICLE BROUGHT TO WORKSHOP

NEXT

2.INSPECT BATTERY VOLTAGE

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

3.INSPECT COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*

a. Using the intelligent tester, inspect the CAN communication function to ensure there are no malfunctions in the communication system.

Result

Result	Proceed to
No DTCs (CAN communication system) output	A
DTCs (CAN communication system) output	B

HINT:

The skid control ECU sends the signals of each warning light via CAN communication.

B. PROCEED TO CAN COMMUNICATION SYSTEM

A

4.CHECK DTC AND FREEZE FRAME DATA*

NEXT

5.CLEAR DTC AND FREEZE FRAME DATA*

NEXT

6.PROBLEM SYMPTOM CONFIRMATION

NEXT

7.DTC CHECK AND CLEAR*

NEXT

8.PROBLEM SYMPTOM CONFIRMATION

Result

Result	Proceed to
Symptom does not occur	A
Symptom occurs	B

B. GO TO STEP 10

A

9.SYMPTOM SIMULATION

NEXT

10.CHECK FOR DTC (OTHER THAN CAN COMMUNICATION SYSTEM DTC)*

Result

Result	Proceed to
No DTCs output	A
DTCs output	B

B. GO TO STEP 12

A

11.PROBLEM SYMPTOMS TABLE

NEXT

GO TO STEP 14

12.DIAGNOSTIC TROUBLE CODE CHART

NEXT

13.CIRCUIT INSPECTION*

NEXT

14.IDENTIFICATION OF PROBLEM

NEXT

15.REPAIR OR REPLACE

NEXT

16.CONFIRMATION TEST*

NEXT

END

for Preparation Click here

CHECK FOR INTERMITTENT PROBLEMS

HINT:

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

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the intelligent tester on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

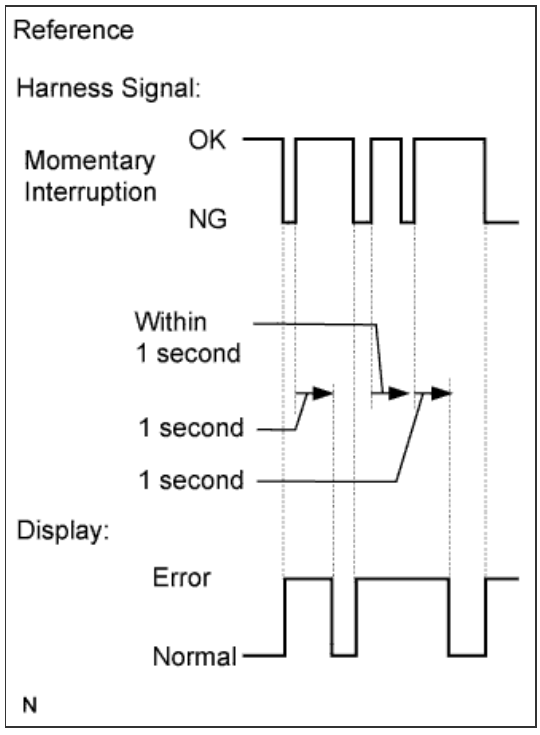
f. Select areas where momentary interruption should be monitored.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection/Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection/Error or Normal	Error: Momentary interruption Normal: Normal	-
RR Speed Open	Rear speed sensor RH open detection/Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection/Error or Normal	Error: Momentary interruption Normal: Normal	-
EFI Communication Open	ECM communication open detection/Error or Normal	Error: Momentary interruption Normal: Normal	-

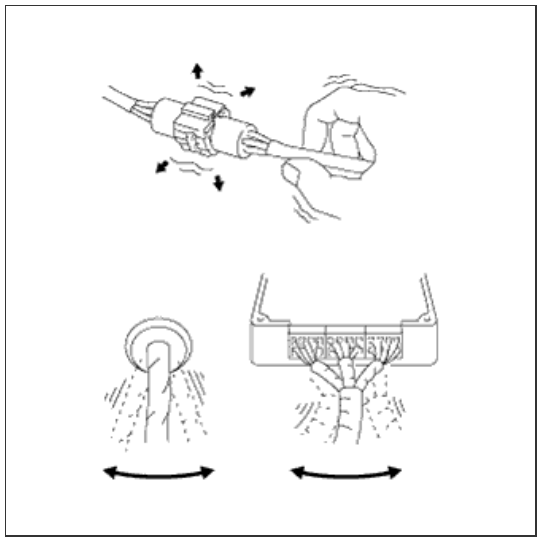
HINT:

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



g. While observing the screen, gently jiggle the connector or wire harness between

g. While observing the screen, gently jiggle the connector or wire harness between the ECU and sensors, or between ECUs. If the display changes, the connector and/or wire harness is in momentary interruption (open circuit). Repair or replace the connector and/or wire harness, as one of them is faulty.



for Preparation Click here

DESCRIPTION

After replacing the relevant ABS components, clear the sensor calibration data and then perform calibration.

Replacement/Adjustment Part	Necessary Operation
Master cylinder solenoid (Skid control ECU)	G sensor zero point calibration
G sensor	1. Clearing zero point calibration data 2. G sensor zero point calibration

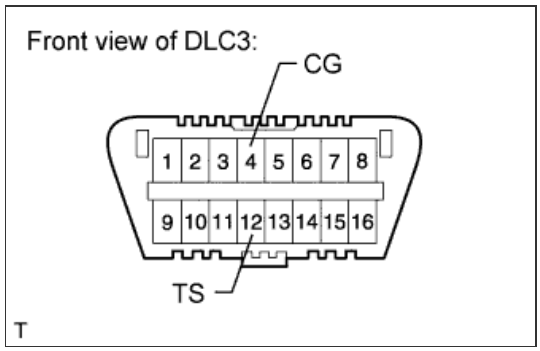
CLEAR ZERO POINT CALIBRATION (SST CHECK WIRE)

After replacing the G sensor, make sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

a. Turn the ignition switch to ON.

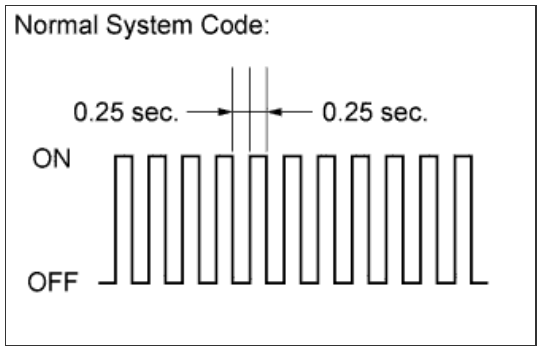
b. Using SST, connect and disconnect terminals 12 (TS) and 4 (CG) of the DLC3 4 times or more within 8 seconds.

SST
09843-18040



c. Check that the ABS warning light outputs the normal system code.

d. Using a check wire, perform zero point calibration of the G sensor.



PERFORM ZERO POINT CALIBRATION OF G SENSOR (SST CHECK WIRE)

After replacing the master cylinder solenoid and/or G sensor, make sure to perform G sensor zero point calibration.

NOTICE:

- **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it. Keep it stationary and do not start the engine.**
- **Choose a level surface with an inclination of less than 1°.**

a. Procedures for Test Mode:

i. Turn the ignition switch off.

ii. for A/T:
Move the shift lever to P.

NOTICE:

DTC C1336/98 will be stored if the shift lever is not in P (Click here).

iii. for M/T:
Pull the parking brake lever.

NOTICE:

DTC C1336/98 will be stored if the parking brake lever is not pulled (Click here).

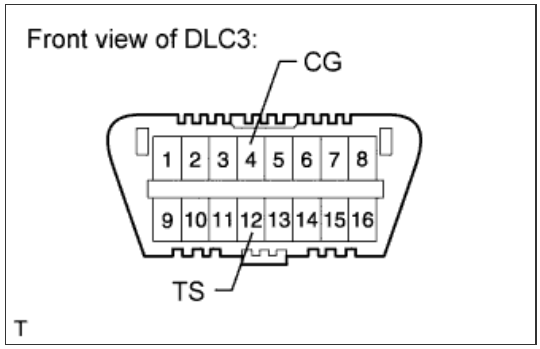
iv. Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.

SST
09843-18040

v. Check that the steering wheel is centered.

vi. Turn the ignition switch to ON.

vii. Keep the vehicle stationary on a level surface for 2 seconds or more.



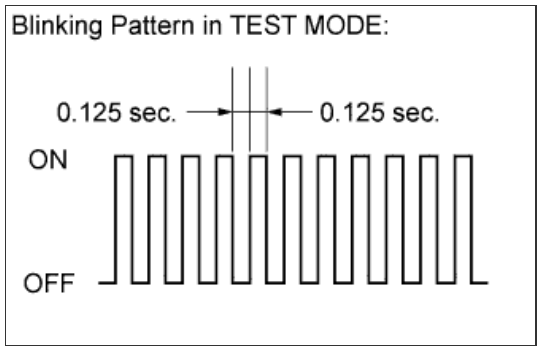
viii. Check that the ABS warning light is blinking in test mode.

NOTICE:

The ABS warning light stays on when obtaining the zero point.

HINT:

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



CLEAR ZERO POINT CALIBRATION (INTELLIGENT TESTER)

After replacing the G sensor, make sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON.

c. Turn the intelligent tester on.

d. Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Reset Memory.

e. Using the intelligent tester, perform zero point calibration of the G sensor.

PERFORM ZERO POINT CALIBRATION OF G SENSOR (INTELLIGENT TESTER)

After replacing the master cylinder solenoid and/or G sensor, make sure to perform G sensor zero point calibration.

NOTICE:

- **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it. Keep it stationary and do not start the engine.**
- **Choose a level surface with an inclination of less than 1°.**

a. Procedures for Test Mode:

i. Turn the ignition switch off.

ii. for A/T:
Move the shift lever to P.

NOTICE:

DTC C1336/98 will be stored if the shift lever is not in P (Click here).

iii. for M/T:
Pull the parking brake lever.

NOTICE:

DTC C1336/98 will be stored if the parking brake lever is not pulled (Click here).

iv. Check that the steering wheel is centered.

v. Connect the intelligent tester to the DLC3.

vi. Turn the ignition switch to ON.

vii. Turn the intelligent tester on.

viii. Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Test Mode.

ix. Keep the vehicle stationary on a level surface for 2 seconds or more.

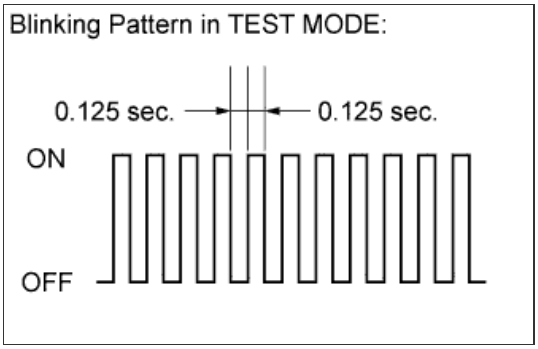
x. Check that the ABS warning light is blinking in test mode.

NOTICE:

The ABS warning light stays on when obtaining the zero point.

HINT:

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



for Preparation Click here

TEST MODE (SIGNAL CHECK) PROCEDURE (SST CHECK WIRE)

HINT:

- **After replacing the master cylinder solenoid and/or G sensor, make sure to perform G sensor zero point calibration (Click here).**
- **If the ignition switch is turned from ON to ACC or off during test mode (signal check), DTCs of the signal check function will be cleared.**
- **During test mode (signal check), the skid control ECU stores all DTCs of the test mode (signal check) function. By performing the test mode (signal check), the codes are cleared if normality is confirmed. The codes left over are the codes where an abnormality was found.**

a. Turn the ignition switch off.

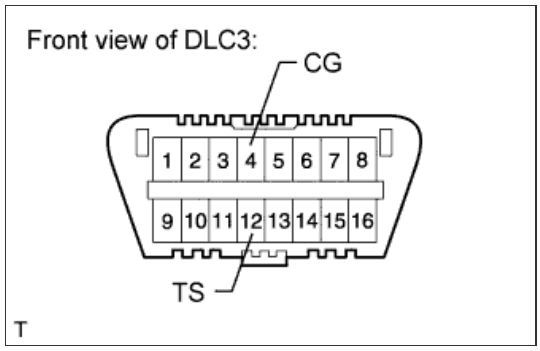
b. Check that the steering wheel is centered.

c. for A/T:
Move the shift lever to P.

d. for M/T:
Pull the parking brake lever.

e. Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.

SST
09843-18040



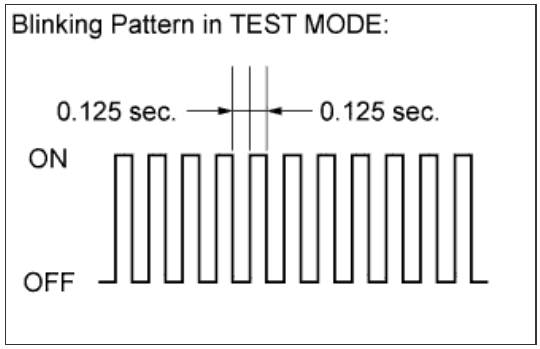
f. Turn the ignition switch to ON.

g. Check that the ABS warning light blinks in test mode.

HINT:

- **If the G sensor zero point calibration data is cleared, the ABS warning light comes on.**
- **If the G sensor zero point calibration data is not cleared and the ABS warning light does not blink, inspect the 12 (TS) and 4 (CG) terminal circuit and the ABS warning light circuit.**

Trouble Area	See Procedure
TS and CG terminal circuit	Click here
ABS warning light circuit	Click here or Click here



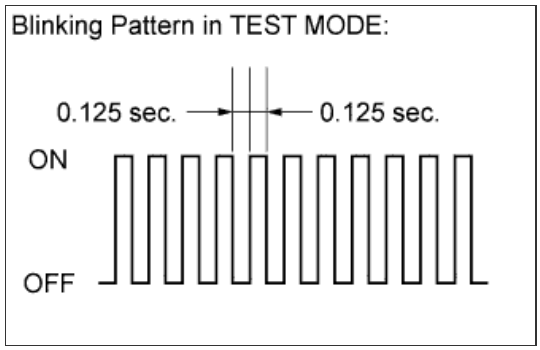
h. Start the engine.

i. Using a check wire, perform the ABS sensor (G sensor, master cylinder pressure sensor, center differential lock detection switch and speed sensor) signal checks in test mode.

G SENSOR SIGNAL CHECK (SST CHECK WIRE) (Procedure "A")

a. Check that the ABS warning light is blinking in test mode.

b. Keep the vehicle stationary on a level surface for 2 seconds or more.



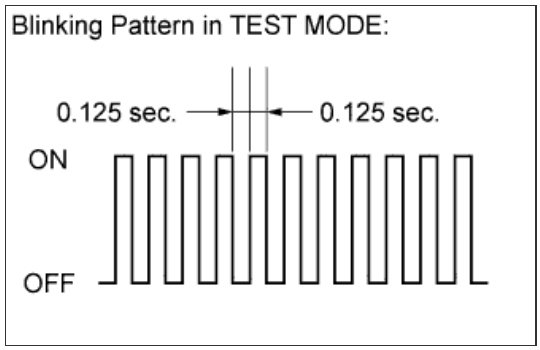
MASTER CYLINDER PRESSURE SENSOR SIGNAL CHECK (SST CHECK WIRE) (Procedure "B")

a. Check that the ABS warning light is blinking in test mode.

b. Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and then quickly depress the brake pedal with a force of 98 N (10 kgf, 22.0 lbf) or more for 1 second or more.

HINT:

- **At this time, the ABS warning light stays on for 3 seconds.**
- **The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.**



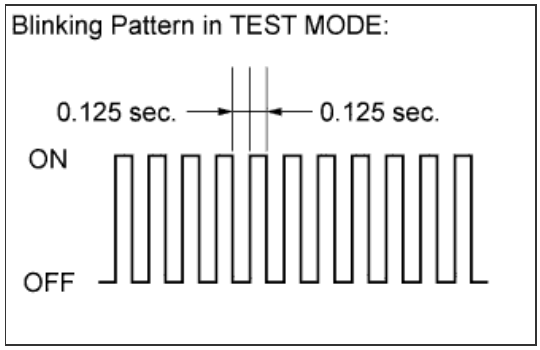
CENTER DIFFERENTIAL LOCK DETECTION SWITCH SIGNAL CHECK (SST CHECK WIRE) (Procedure "C")

a. Check that the ABS warning light is blinking in test mode.

b. Check the center differential lock switch.

i. Push the center differential lock switch on to lock the center differential.

ii. Push the center differential lock switch off to unlock the center differential.



SPEED SENSOR SIGNAL CHECK (SST CHECK WIRE) (Procedure "D")

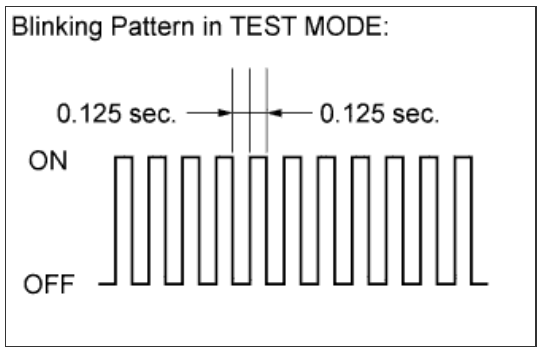
a. Check that the ABS warning light is blinking in test mode.

b. Check the reverse signal.

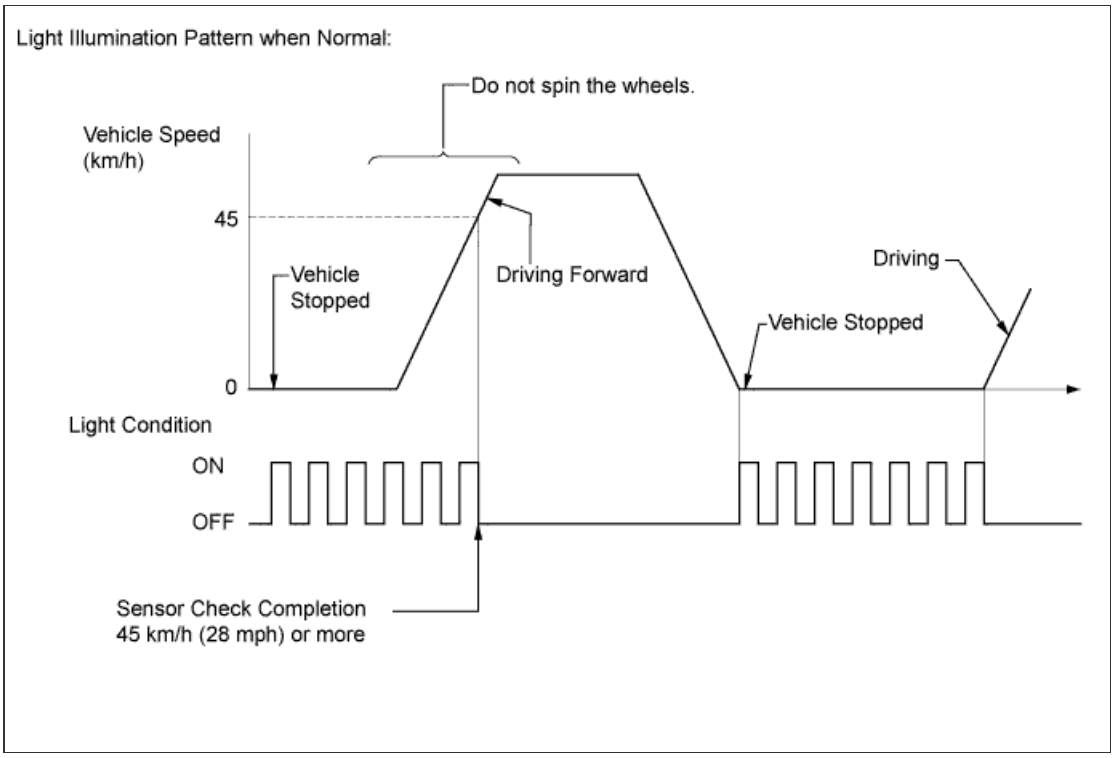
i. Drive the vehicle in reverse for more than 1 second at 3 km/h (2 mph) or more.

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 45 km/h (28 mph) or more.



c. Check the forward signal.



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

NOTICE:

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

d. Stop the vehicle.

NOTICE:

- **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.**
- **If the signal check has not been completed, the ABS warning light blinks while driving and the ABS system does not operate.**

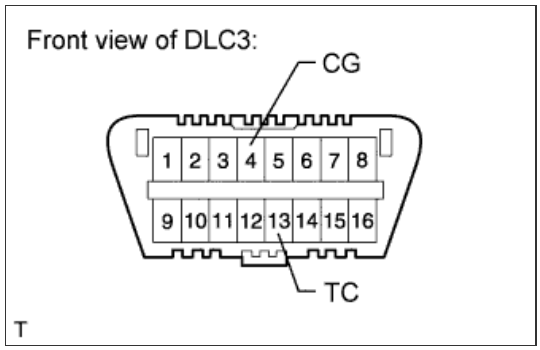
HINT:

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

READ DTC OF ABS SENSOR (SST CHECK WIRE) (Procedure "E")

a. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST
09843-18040

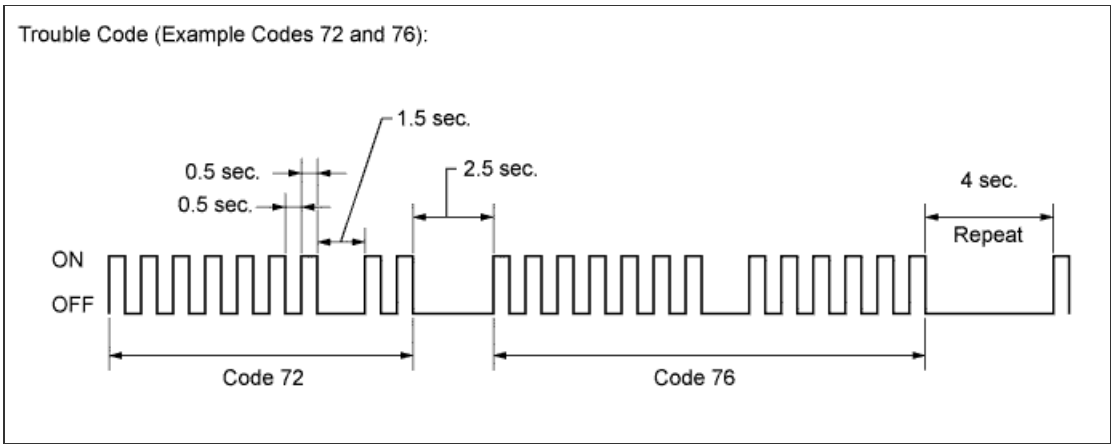


b. Read the number of blinks of the ABS warning light.

HINT:

- **See the list of DTCs (See procedure "F").**
- **If every sensor is normal, the normal system code is output (a cycle of 0.25 seconds on and 0.25 seconds off is repeated).**

- **If more than 1 malfunction is detected at the same time, the lowest numbered code will be output first.**



c. After the check, disconnect SST from terminals 13 (TC) and 4 (CG) of the DLC3.

DTC OF SIGNAL CHECK FUNCTION (SST CHECK WIRE) (Procedure "F")

DTC Code	Detection Item	Trouble Area
C1271/71	Front Speed Sensor RH Output Voltage Malfunction	• Front speed sensor RH • Sensor installation • Speed sensor rotor
C1272/72	Front Speed Sensor LH Output Voltage Malfunction	• Front speed sensor LH • Sensor installation • Speed sensor rotor
C1273/73	Rear Speed Sensor RH Output Voltage Malfunction	• Rear speed sensor RH • Sensor installation • Speed sensor rotor
C1274/74	Rear Speed Sensor LH Output Voltage Malfunction	• Rear speed sensor LH • Sensor installation • Speed sensor rotor
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH	Speed sensor rotor
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH	Speed sensor rotor
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH	Speed sensor rotor
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH	Speed sensor rotor
C1279/79	G Sensor Output Voltage Malfunction	• G sensor • Sensor installation
C1281/81	Master Cylinder Pressure Sensor Output Malfunction	• Stop light switch • Brake pedal load sensing switch • Master cylinder pressure sensor
C1282/82	Center Differential Lock Detection Switch Malfunction	Center differential lock switch

HINT:

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

TEST MODE (SIGNAL CHECK) PROCEDURE (INTELLIGENT TESTER)

HINT:

- **After replacing the master cylinder solenoid and/or G sensor, make sure to perform G sensor zero point calibration (Click here).**
- **If the ignition switch is turned from ON to ACC or off during test mode (signal check), DTCs of the signal check function will be cleared.**
- **During test mode (signal check), the skid control ECU stores all DTCs of the test mode (signal check) function. By performing the**

test mode (signal check), the codes are cleared if normality is confirmed. The codes left over are the codes where an abnormality was found.

a. Turn the ignition switch off.

b. Check that the steering wheel is centered.

c. for A/T:
Move the shift lever to P.

d. for M/T:
Pull the parking brake lever.

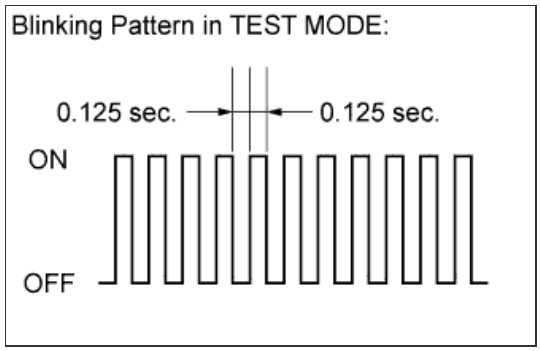
e. Connect the intelligent tester to the DLC3.

f. Turn the ignition switch to ON.

g. Turn the intelligent tester on.

h. Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

i. Check that the ABS warning light blinks in test mode.



HINT:

- **If the G sensor zero point calibration data is cleared, the ABS warning light comes on.**
- **If the G sensor zero point calibration data is not cleared and the ABS warning light does not blink, inspect the 12 (TS) and 4 (CG) terminal circuit and the ABS warning light circuit.**

Trouble Area	See Procedure
TS and CG terminal circuit	Click here
ABS warning light circuit	Click here or Click here

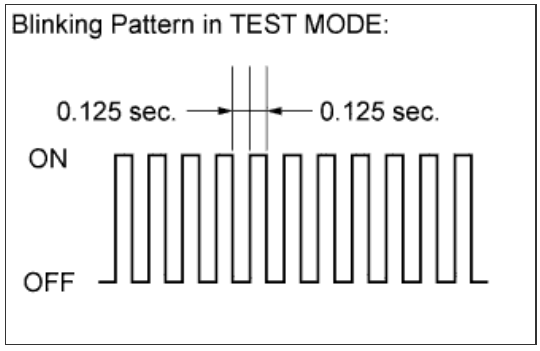
j. Start the engine.

k. Using the intelligent tester, perform the ABS sensor (G sensor, master cylinder pressure sensor, center differential lock detection switch and speed sensor) signal checks in test mode.

G SENSOR SIGNAL CHECK (INTELLIGENT TESTER) (Procedure "G")

a. Check that the ABS warning light is blinking in test mode.

b. Keep the vehicle stationary on a level surface for 2 seconds or more.



MASTER CYLINDER PRESSURE SENSOR SIGNAL CHECK (INTELLIGENT TESTER) (Procedure "H")

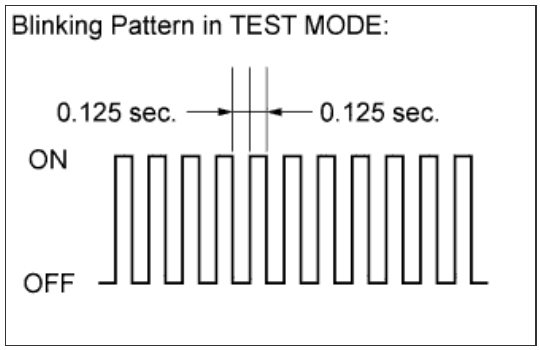
a. Check that the ABS warning light is blinking in test mode.

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

HINT:

- **At this time, the ABS warning light stays on for 3 seconds.**
- **The ABS warning light comes on for 3 seconds every time the**

brake pedal operation above is performed.



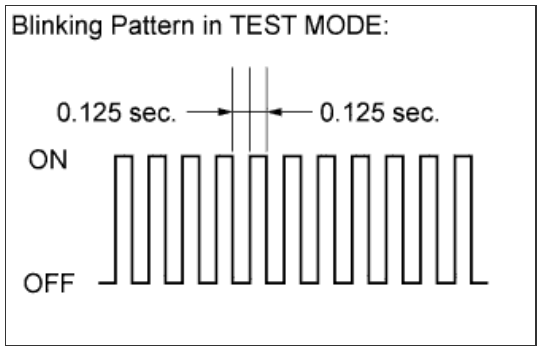
CENTER DIFFERENTIAL LOCK DETECTION SWITCH SIGNAL CHECK (INTELLIGENT TESTER) (Procedure "I")

a. Check that the ABS warning light is blinking in test mode.

b. Check the center differential lock switch.

i. Push the center differential lock switch on to lock the center differential.

ii. Push the center differential lock switch off to unlock the center differential.



SPEED SENSOR SIGNAL CHECK (INTELLIGENT TESTER) (Procedure "J")

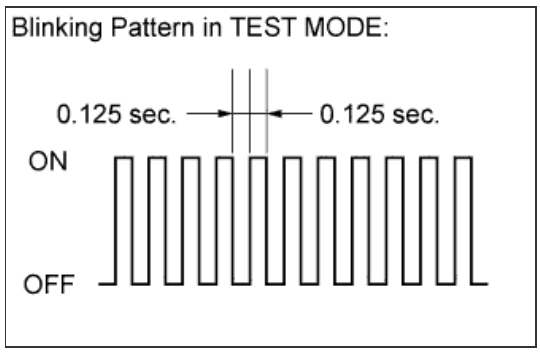
a. Check that the ABS warning light is blinking in test mode.

b. Check the reverse signal.

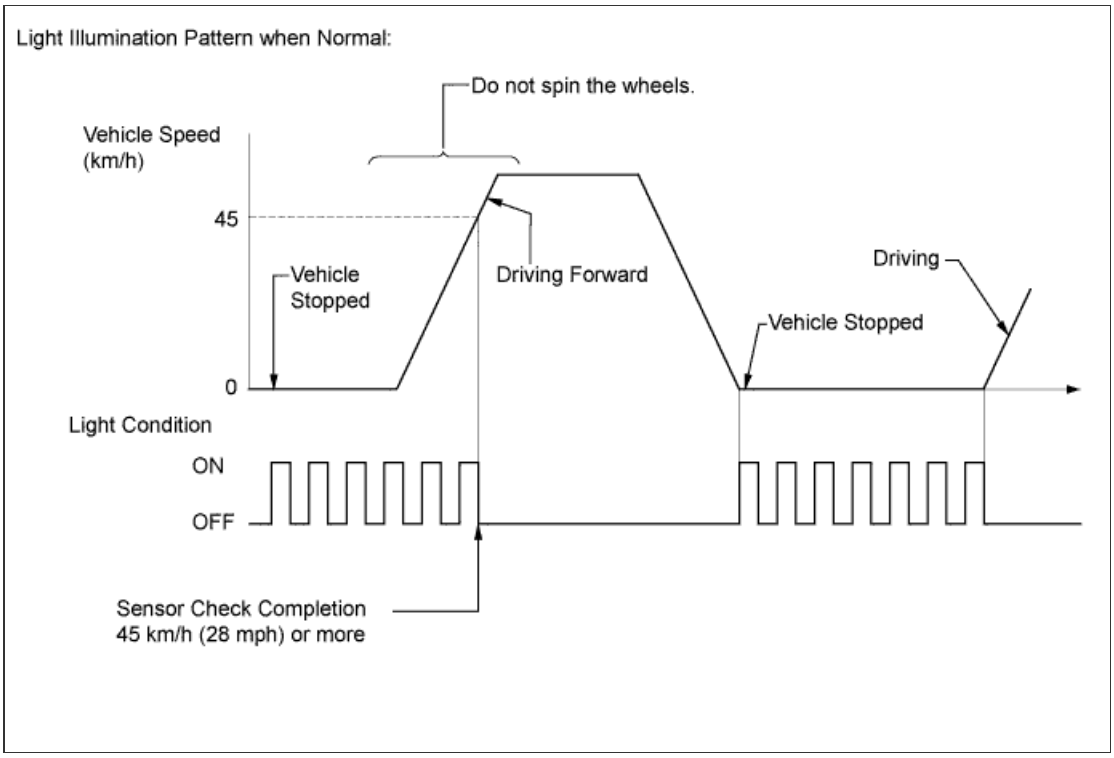
i. Drive the vehicle in reverse for more than 1 second at 3 km/h (2 mph) or more.

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 45 km/h (28 mph) or more.



c. Check the forward signal.



i. Drive the vehicle straight forward. Drive the vehicle at a speed of 45 km/h (28 mph) or more and check that the ABS warning light goes off.

NOTICE:

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

d. Stop the vehicle.

NOTICE:

- **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.**
- **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.

READ DTC OF ABS SENSOR (INTELLIGENT TESTER) (Procedure "K")

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

HINT:

- **Refer to the intelligent tester operator's manual for further details.**
- **See the list of DTCs (See procedure "L").**

DTC OF SIGNAL CHECK FUNCTION (INTELLIGENT TESTER) (Procedure "L")

DTC Code	Detection Item	Trouble Area
C1271/71	Front Speed Sensor RH Output Voltage Malfunction	• Front speed sensor RH • Sensor installation • Speed sensor rotor
C1272/72	Front Speed Sensor LH Output Voltage Malfunction	• Front speed sensor LH • Sensor installation • Speed sensor rotor
C1273/73	Rear Speed Sensor RH Output Voltage Malfunction	• Rear speed sensor RH • Sensor installation • Speed sensor rotor
		• Rear speed sensor LH

C1274/74	Rear Speed Sensor LH Output Voltage Malfunction	• Rear speed sensor LH • Sensor installation • Speed sensor rotor
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH	Speed sensor rotor
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH	Speed sensor rotor
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH	Speed sensor rotor
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH	Speed sensor rotor
C1279/79	G Sensor Output Voltage Malfunction	• G sensor • Sensor installation
C1281/81	Master Cylinder Pressure Sensor Output Malfunction	• Stop light switch • Brake pedal load sensing switch • Master cylinder pressure sensor
C1282/82	Center Differential Lock Detection Switch Malfunction	Center differential lock switch

HINT:

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

for Preparation Click here

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

NOTICE:

When replacing the master cylinder solenoid, sensor, etc., turn the ignition switch off.

HINT:

- **Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.**
- **Inspect the fuses and relays related to this system before inspecting the suspected areas below.**

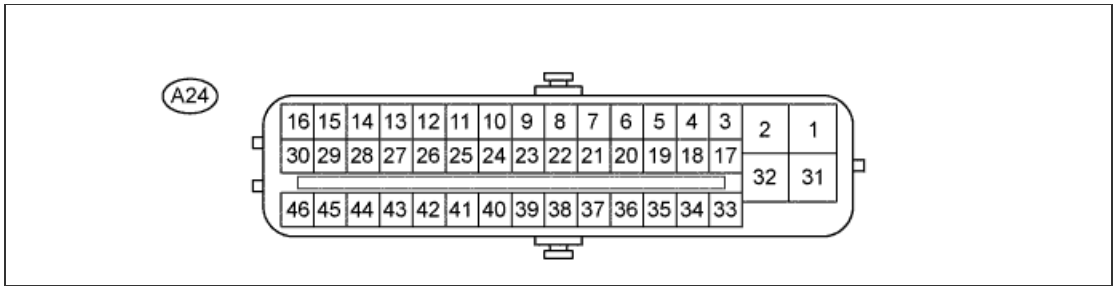
Anti-lock Brake System

Symptom	Suspected Area	See page
Multi Terrain ABS, BA and/or EBD does not Operate	Check for DTCs again and make sure that no DTC is output.	Click here
	IG power source circuit	Click here
	Front speed sensor circuit	Click here
	Rear speed sensor circuit	Click here
	G sensor circuit	Click here
	Check the hydraulic brake booster with intelligent tester. If abnormal, check the hydraulic circuit for leakage. <LHD>	Click here
	Check the hydraulic brake booster with intelligent tester. If abnormal, check the hydraulic circuit for leakage. <RHD>	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <LHD>	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <RHD>	Click here
Multi Terrain ABS, BA and/or EBD does not Operate Efficiently	Check for DTCs again and make sure that no DTC is output.	Click here
	Front speed sensor circuit	Click here
	Rear speed sensor circuit	Click here
	Stop light switch circuit	Click here
	G sensor circuit	Click here
	Check the hydraulic brake booster with intelligent tester. If abnormal, check the hydraulic circuit for leakage. <LHD>	Click here
	Check the hydraulic brake booster with intelligent tester. If abnormal, check the hydraulic circuit for leakage. <RHD>	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <LHD>	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <RHD>	Click here
Sensor and Switch Signal Check cannot be Done	TS and CG terminal circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
	Check for DTCs again and make sure that no DTC is output.	Click here

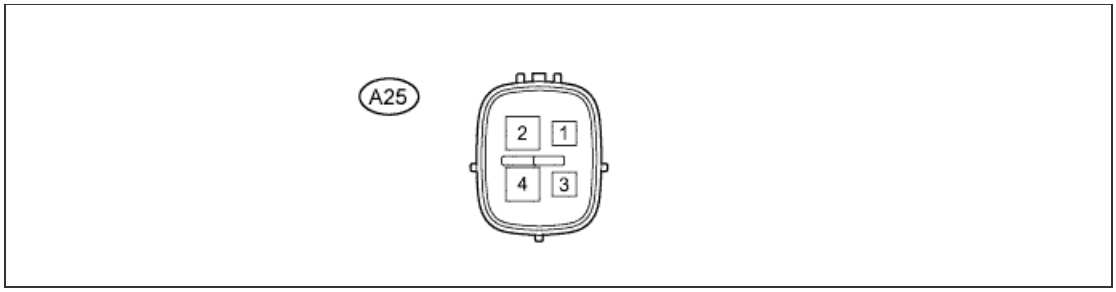
DTC Check cannot be Done	TC and CG terminal circuit	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <LHD>	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <RHD>	Click here
ABS Warning Light Abnormal (Remains On)	ABS warning light circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
ABS Warning Light Abnormal (Does not Come On)	ABS warning light circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
BRAKE Warning Light Abnormal (Remains On)	BRAKE warning light circuit	Click here
	Brake fluid level warning switch circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
BRAKE Warning Light Abnormal (Does not Come On)	BRAKE warning light circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
Skid Control Buzzer Abnormal	Skid control buzzer circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here

for Preparation Click here

TERMINALS OF ECU



Terminal No. (Symbol)	Terminal Description
A24-1 (GND1)	Skid control ECU ground
A24-2 (+BM1)	Power supply for motor
A24-3 (FR+)	Front speed sensor RH power supply output
A24-4 (FL-)	Front speed sensor LH input
A24-5 (RR+)	Rear speed sensor RH power supply output
A24-6 (RL-)	Rear speed sensor LH input
A24-7 (STP)	Stop light switch
A24-11 (CANH)	CAN communication terminal H
A24-12 (SP1)	Speedometer signal
A24-13 (D/G)	Diagnosis tester serial communication
A24-17 (FR-)	Front speed sensor RH input
A24-18 (FL+)	Front speed sensor LH power supply output
A24-19 (RR-)	Rear speed sensor RH input
A24-20 (RL+)	Rear speed sensor LH power supply output
A24-22 (VGS)	G sensor power supply output
A24-23 (GGND)	G sensor ground
A24-24 (TS)	Sensor test terminal (Signal check switch)
A24-25 (CANL)	CAN communication terminal L
A24-26 (EXI3)	Rear differential lock detection switch
A24-27 (EXI)	Center differential lock switch
A24-28 (PKB)	Parking brake input
A24-30 (BZ)	Skid control buzzer
A24-31 (+BS)	Power supply for solenoid
A24-32 (GND2)	Skid control ECU ground
A24-39 (GL1)	G sensor input
A24-41 (LBL)	Brake fluid level warning switch
A24-42 (WFSE)	Write flash enable input
A24-46 (IG1)	IG1 power supply



Terminal No. (Symbol)	Terminal Description

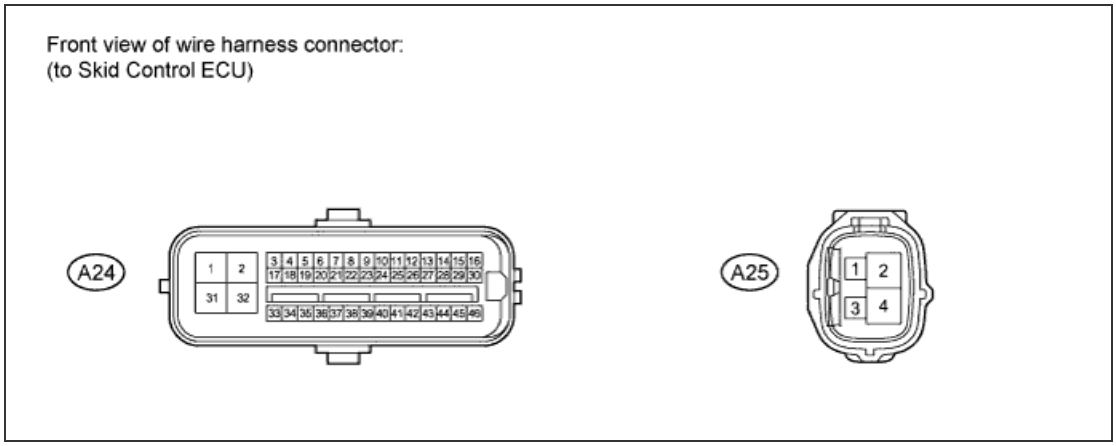
A25-1 (IG2)	IG2 power supply
A25-2 (+BM2)	Power supply for motor
A25-4 (GND3)	Skid control ECU ground

TERMINAL INSPECTION

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

INT

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



Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
A24-2 (+BM1) - Body ground	B	Power supply for motor (From battery)	Always	11 to 14 V
A24-28 (PKB) - Body ground	Y-R	Parking brake input	Parking brake switch on → off (Parking brake lever pulled → released)	Below 1 Ω → 10 kΩ or higher
A24-31 (+BS) - Body ground	W	Power supply for solenoid (From battery)	Always	11 to 14 V
A24-41 (LBL) - Body ground	BR-Y	Brake fluid level warning switch	Brake fluid level +/- 5 mm (+/- 0.197 in.) from the minimum level → maximum level	Below 1 Ω → 1.9 to 2.1 kΩ
A24-46 (IG1) - Body ground	G	IG1 power supply	Ignition switch off → ON	Below 1 V → 11 to 14 V
A25-1 (IG2) - Body ground	B	IG2 power supply	Ignition switch off → ON	Below 1 V → 11 to 14 V
A25-2 (+BM2) - Body ground	B	Power supply for motor (From battery)	Always	11 to 14 V
A24-1 (GND1) - Body ground	W-B	Ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	W-B	Ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	W-B	Ground	Always	Below 1 Ω

for Preparation Click here

DIAGNOSIS

a. If the skid control ECU detects a malfunction, the ABS/BRAKE warning lights will come on to warn the driver.
The table below indicates which lights will come on when there is a malfunction in a particular function.

Item/Trouble Area	Multi-terrain ABS	BA	EBD
ABS Warning Light	○	○	○
BRAKE Warning Light	-	-	○

HINT:

- **○: Light on**
- **-: Light off**

- The DTCs are simultaneously stored in memory. The DTCs can be read by connecting SST between terminals 13 (TC) and 4 (CG) of the DLC3 and observing the blinking of the ABS warning light, or by connecting the intelligent tester.
- This system has a signal check function (test mode).

WARNING LIGHT CHECK

a. Release the parking brake lever.

NOTICE:

When releasing the parking brake, set chocks to hold the vehicle for safety.

HINT:

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

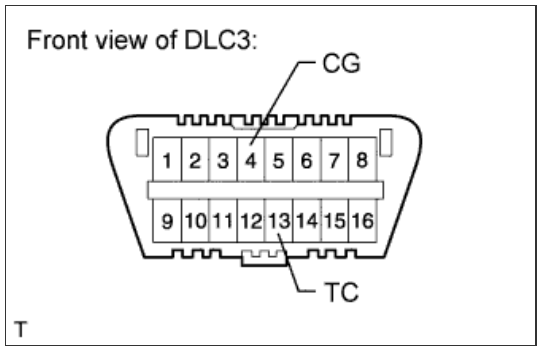
b. When the ignition switch is turned to ON, check that the ABS and BRAKE warning lights turn on and then turn off after the engine starts.
If a light remains on, proceed to troubleshooting for the light circuit below.

Trouble Area	See Procedure
ABS warning light circuit	Click here
BRAKE warning light circuit	Click here

for Preparation Click here

DTC CHECK / CLEAR (SST CHECK WIRE)

a. DTC check



i. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST
09843-18040

ii. Turn the ignition switch to ON.

iii. Read the DTCs from the ABS warning light on the combination meter.

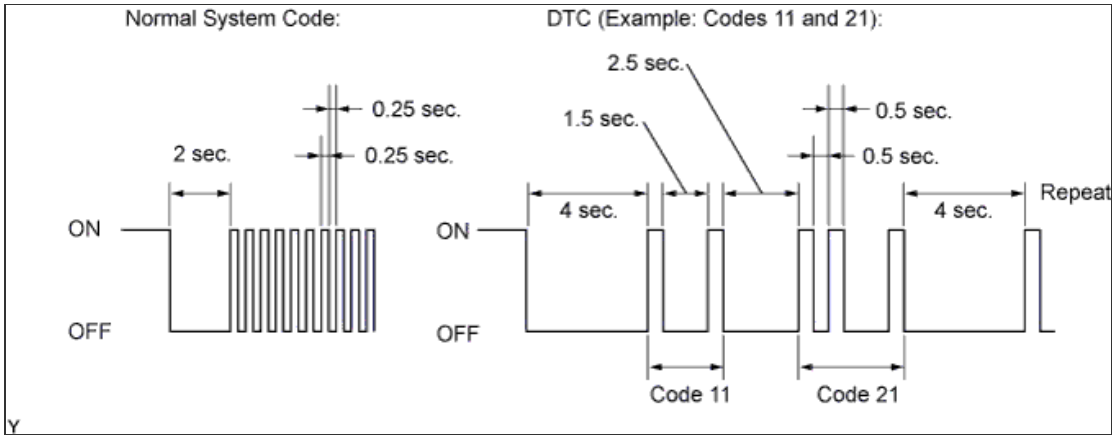
HINT:

- **If no DTC is output, inspect the TC and CG terminal circuit and the ABS warning light circuit.**

Trouble Area	See Procedure
TC and CG terminal circuit	Click here
ABS warning light circuit	Click here or Click here

- **If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC is output first.**

iv. As examples, the illustration below shows the blinking patterns of the normal system code and DTC 11 and 21.



v. Refer to the Diagnostic Trouble Code Chart (Click here) for DTC information.

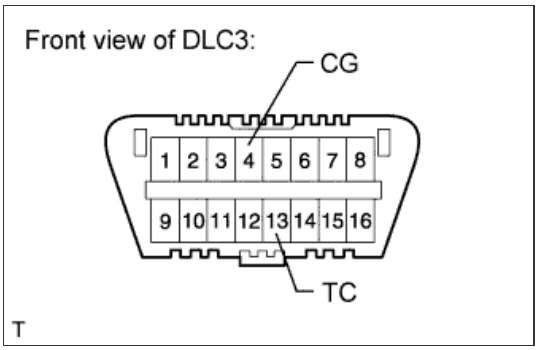
vi. After completing the check, turn the ignition switch off and remove SST from the DLC3.

b. DTC clear

i. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST
09843-18040

ii. Turn the ignition switch to ON.



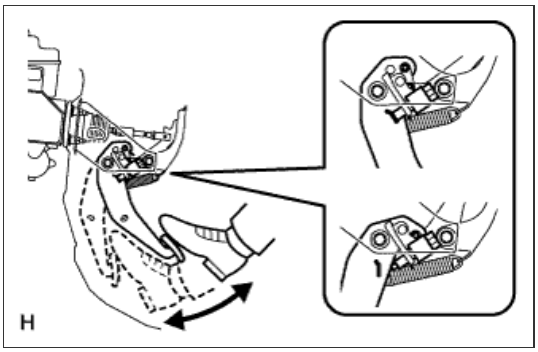
iii. Clear the DTCs stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.

iv. Check that the ABS warning light outputs a normal system code.

v. Remove SST from the terminals of the DLC3.

HINT:

Clearing the DTCs cannot be performed by disconnecting the cable from the negative (-) battery terminal or removing the ECU-IG NO. 2 fuse.



DTC CHECK / CLEAR (INTELLIGENT TESTER)

a. DTC check

i. Connect the intelligent tester to the DLC3.

ii. Turn the ignition switch to ON.

iii. Turn the intelligent tester on.

iv. Enter the following menus: Chassis / ABS/VSC/TRC / DTC.

v. Read the DTCs by following the directions on the intelligent tester screen.

b. DTC clear

i. Connect the intelligent tester to the DLC3.

ii. Turn the ignition switch to ON.

iii. Turn the intelligent tester on.

iv. Enter the following menus: Chassis / ABS/VSC/TRC / DTC.

v. Clear the DTCs by following the directions on the intelligent tester screen.

END OF DTC CHECK / CLEAR

a. Turn the ignition switch to ON.

b. Check that the ABS warning light goes off within approximately 3 seconds.

for Preparation Click here

FREEZE FRAME DATA

a. If a DTC is stored when the brake control system operates, the skid control ECU stores the current vehicle (sensor) state as freeze frame data.
The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from off to ON since the last time the brake control system was activated.

HINT:

- **The skid control ECU will not count the number of times the ignition switch is turned to ON if the vehicle does not drive at a speed of at least 7 km/h (4.3 mph) or a DTC is stored.**
- **Freeze frame data at the time the brake control system operates: The skid control ECU stores and updates the data whenever the brake control system operates. When the ECU stores data at the time a DTC is stored, the data stored when the brake control system operated may be cleared.**
- **Freeze frame data at the time a DTC is stored: When the skid control ECU stores data at the time a DTC is stored, no updates will be performed until the data is cleared.**

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the intelligent tester on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Utility / ABS History.

f. On the intelligent tester display, select the freeze frame data.

ABS History

Tester Display	Measurement Item	Reference Value
Elapsed Time after Freeze Trigger	Elapsed time after freeze trigger	Min.: 0 msec Max.: 500 msec
Number of IG ON	Number of operations of ignition switch ON after storing freeze frame data	0 to 31
Buzzer	Skid control buzzer signal	Skid control buzzer on: ON, off: OFF
Stop Light SW	Stop light switch signal	Stop light switch on: ON, off: OFF
Parking Brake SW	Parking brake switch signal	Parking brake switch on: ON, off: OFF
Reservoir Warning SW	Brake fluid level warning switch signal	Brake fluid level warning switch on: ON, off: OFF
Gear Position	Gear position information	Fail 1st 2nd 3rd 4th 5th 6th P, N R Not R
Shift Lever Position	Shift lever position information	Fail 1st 2nd 3rd 4th 5th 6th/B D/M P, N R
Operated System	Operated system status	ABS: ABS activated VSC: VSC activated TRC: A-TRC activated BA: BA activated HAB: HAB activated FAIL: Fail-safe mode activated PBA: PBA activated PB: PB activated HA-CTRL: Hill-start assist control

		activated Sys: System prohibited Non: No system activated
Master Cylinder Sensor	Master cylinder pressure sensor reading	Min.: 0.00 V Max.: 5.00 V
M/C Sensor Grade	Master cylinder pressure sensor change	Min.: -30 MPa/s., Max.: 225 MPa/s
Forward and Rearward G	Forward and rearward G	Min.: -25.10 m/s^2, Max.: 24.90 m/s^2
FR Wheel Speed	Front right wheel speed reading	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)
FL Wheel Speed	Front left wheel speed reading	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)
RR Wheel Speed	Rear right wheel speed reading	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)
RL Wheel Speed	Rear left wheel speed reading	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)
Vehicle Speed	Vehicle speed reading	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)
Vehicle Speed Grade	Vehicle acceleration reading	Min.: -14.7 m/s^2, Max.: 14.7 m/s^2
FR Wheel Direction	Front right wheel direction signal	Front right wheel direction Forward: Forward, Back: Backward
FL Wheel Direction	Front left wheel direction signal	Front left wheel direction Forward: Forward, Back: Backward
RR Wheel Direction	Rear right wheel direction signal	Rear right wheel direction Forward: Forward, Back: Backward
RL Wheel Direction	Rear left wheel direction signal	Rear left wheel direction Forward: Forward, Back: Backward
Real Engine Torque	Real engine torque	Min.: -1024.0 Nm, Max.: 1023.0 Nm
Accelerator Opening Angle %	Accelerator opening angle percentage	Min.: 0%, Max.: 100%

for Preparation Click here

FAIL-SAFE OPERATION

- If there is a problem with sensor signals or hydraulic brake booster systems, the ABS control will be prohibited, but EBD control continues as much as possible. If EBD control is impossible, the BRAKE warning light comes on to warn the driver (Click here).
- If system components have any malfunction before starting control, the fail-safe function immediately stops the operation.
  If system components have any malfunction during control, the fail-safe function gradually stops the control so as not to trigger a sudden change in vehicle conditions.
  If it is impossible to control the systems, the warning light comes on to inform the driver of termination of the systems (Click here).

HINT:

If the hydraulic brake booster encounters a malfunction, brake performance is gradually lost and ABS, BA control system control is prohibited.

a. ABS, Multi Terrain ABS, EBD and BA system:

Malfunction Area	Control Method
ABS system (Multi Terrain ABS)	ABS, BA control prohibited
BA system	ABS, BA control prohibited
EBD system	ABS, EBD, BA control prohibited

for Preparation Click here

DATA LIST

HINT:

Using the intelligent tester to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON.

c. Turn the intelligent tester on.

d. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

e. According to the display on the intelligent tester, read the Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
ABS Warning Light	ABS warning light / ON or OFF	ON: Warning light on OFF: Warning light off	-
Brake Warning Light	Brake warning light / red (malfunction) / ON or OFF	ON: Warning light on OFF: Warning light off	-
Buzzer	Skid control buzzer / ON or OFF	ON: Buzzer on OFF: Buzzer off	-
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Parking Brake SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
Reservoir Warning SW	Brake fluid level warning switch / ON or OFF	ON: Reservoir level normal OFF: Reservoir level low	-
Main Idle SW	Main idle switch / ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
Gear Position	Gear position / Fail, 1st, 2nd, 3rd, 4th, 5th, 6th, P,N, R, Not R	Actual gear position	-
Shift Lever Position	Shift lever position / Fail, 1st, 2nd, 3rd, 4th, 5th, 6th/B, D/M, P,N, R	Actual shift lever position	-
Shift Information	Shift information / OFF or ON	OFF: When not shifting ON: When shifting	-
Master Cylinder Sensor	Master cylinder pressure sensor reading / min.: 0.00 V, max.: 5.00 V	When brake pedal released: 0.3 to 0.9 V	The reading increases when the brake pedal is depressed.
Zero Point of M/C	Memorized zero value / min.: -12.50 MPa, max.: 12.40 MPa	-	-
Accumulator Sensor	Accumulator pressure sensor reading / min.: 0.00 V, max.: 5.00 V	3.58 to 5 V	If the value is constant regardless of the pump operation, an accumulator pressure sensor

			malfunction is suspected.
Deceleration Sensor	Deceleration sensor reading / min.: -18.525 m/s^2, max.: 18.387 m/s^2	Approximately -1.28 to 1.27 m/s^2 while stationary	The reading changes when the vehicle is bounced.
Zero Point of Decele	Memorized zero value / min.: -25.10 m/s^2, max.: 24.90 m/s^2	Min.: -14.7 m/s^2 Max.: 14.7 m/s^2	-
Forward and Rearward G	Forward and rearward G / min.: -25.10 m/s^2, max.: 24.90 m/s^2	Min.: -14.7 m/s^2 Max.: 14.7 m/s^2	-
FR Wheel Speed	Front wheel speed sensor RH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
FL Wheel Speed	Front wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RR Wheel Speed	Rear wheel speed sensor RH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
Vehicle Speed	Maximum wheel speed sensor reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual vehicle speed	The speed is indicated on the speedometer.
FR Wheel Acceleration	Front wheel acceleration RH / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
FL Wheel Acceleration	Front wheel acceleration LH / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
RR Wheel Acceleration	Rear wheel acceleration RH / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
RL Wheel Acceleration	Rear wheel acceleration LH / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
FR Wheel Direction	Front wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-
RR Wheel Direction	Rear wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-
FR Wheel ABS Ctrl Status	Front wheel RH ABS control status / ON or OFF	ON: During control OFF: Not during control	-
FL Wheel ABS Ctrl Status	Front wheel LH ABS control status / ON or OFF	ON: During control OFF: Not during control	-
RR Wheel ABS Ctrl Status	Rear wheel RH ABS control status / ON or OFF	ON: During control OFF: Not during control	-
RL Wheel ABS Ctrl Status	Rear wheel LH ABS control status / ON or OFF	ON: During control OFF: Not during control	-
RR Wheel EBD Ctrl Status	Rear wheel RH EBD control status / ON or OFF	ON: During control OFF: Not during control	-
RL Wheel EBD Ctrl Status	Rear wheel LH EBD control status / ON or OFF	ON: During control OFF: Not during control	-
BA Ctrl Status	BA control status / ON or OFF	ON: During control OFF: Not during control	-
Engine Revolutions	Engine speed / min.: 0 rpm, max.: 65535 rpm	Actual engine speed	-
Real Engine Torque	Real engine torque / min.: -1024.0 Nm, max.: 1023.0 Nm	Actual engine torque	-
	Percentage of accelerator pedal		

Accelerator Opening Angle %	opening angle / min.: 0.0%, max.: 128.0%	Min.: 0% Max.: 100%	-
Solenoid Relay	Solenoid relay / ON or OFF	ON: Solenoid relay on OFF: Solenoid relay off	-
Electronically Controlled Brake System Motor Relay	Electronically controlled brake system motor relay / ON or OFF	ON: Motor relay on OFF: Motor relay off	-
TR(A)C/VSC Solenoid (SRM2)	TRC/VSC solenoid (SRM2) / ON or OFF	ON: Operates OFF: Does not operate	-
TR(A)C/VSC Solenoid (SRM1)	TRC/VSC solenoid (SRM1) / ON or OFF	ON: Operates OFF: Does not operate	-
TR(A)C/VSC Solenoid (SRC2)	TRC/VSC solenoid (SRC2) / ON or OFF	ON: Operates OFF: Does not operate	-
TR(A)C/VSC Solenoid (SRC1)	TRC/VSC solenoid (SRC1) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SFRH)	ABS solenoid (SFRH) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SFRR)	ABS solenoid (SFRR) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SFLH)	ABS solenoid (SFLH) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SFLR)	ABS solenoid (SFLR) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SRRH)	ABS solenoid (SRRH) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SRRR)	ABS solenoid (SRRR) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SRLH)	ABS solenoid (SRLH) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SRLR)	ABS solenoid (SRLR) / ON or OFF	ON: Operates OFF: Does not operate	-
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
EFI Communication Open	ECM communication open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
IG1 Voltage Value	IG1 voltage value / min.: 0.00 V, max.: 20.00V	9.5 to 14 V	-
IG2 Voltage Value	IG2 voltage value / min.: 0.00 V, max.: 20.00V	9.5 to 14 V	-
Number of DTC	Number of DTCs / min.: 0, max.: 255	Min.: 0 Max.: 255	-

ACTIVE TEST

HINT:

Using the intelligent tester to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON.

c. Turn the intelligent tester on.

d. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

e. According to the display on the intelligent tester, perform the Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
ABS Warning Light	ABS warning light	Warning light ON/OFF	Observe the combination meter.
Brake Warning Light	BRAKE warning light	Warning light ON/OFF	Observe the combination meter.
Buzzer	Skid control buzzer	Buzzer ON/OFF	The buzzer can be heard.
Solenoid Relay	Solenoid relay	Relay ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
Motor Relay	Motor relay	Relay ON/OFF	An operation sound of the motor can be heard.
ABS Solenoid (SRLR)	ABS solenoid (SRLR)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRLH)	ABS solenoid (SRLH)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRRR)	ABS solenoid (SRRR)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRRH)	ABS solenoid (SRRH)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFLR)	ABS solenoid (SFLR)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFLH)	ABS solenoid (SFLH)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFRR)	ABS solenoid (SFRR)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFRH)	ABS solenoid (SFRH)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRMR)	VSC/TRC solenoid (SRMR (SMCR, STR))	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRMF)	VSC/TRC solenoid (SRMF (SMCF, SA3))	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRCR)	VSC/TRC solenoid (SRCR (SA2))	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRCF)	VSC/TRC solenoid (SRCF (SA1))	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.

for Preparation Click here

HINT:

- **If a trouble code is output during the DTC check, check the circuit indicated by the DTC. For details of each code, refer to the "See page" for the respective DTC Code in the Diagnostic Trouble Code Chart.**
- **Inspect the fuses and relays before investigating the trouble areas as shown in the table below.**

Anti-lock Brake System

DTC Code	Detection Item	See page
C0200/31	Front Speed Sensor RH Circuit	Click here
C0205/32	Front Speed Sensor LH Circuit	Click here
C0210/33	Rear Speed Sensor RH Circuit	Click here
C0215/34	Rear Speed Sensor LH Circuit	Click here
C0226/21	SFR Solenoid Circuit	Click here
C0236/22	SFL Solenoid Circuit	Click here
C0246/23	SRR Solenoid Circuit	Click here
C0256/24	SRL Solenoid Circuit	Click here
C0278/11	Open or Short Circuit in ABS Solenoid Relay Circuit	Click here
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	Click here
C1202/58	Brake Fluid Level Low / Open Circuit in Brake Fluid Level Warning Switch Circuit	Click here
C1225/25	SMC Solenoid Circuit	Click here
C1226/26	SPC Solenoid Circuit	Click here
C1227/27	SRC Solenoid Circuit	Click here
C1228/28	STR Solenoid Circuit	Click here
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	Click here
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	Click here
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	Click here
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	Click here
C1241/41	Low Battery Positive Voltage	Click here
C1242/42	IG2 Power Source Circuit	Click here
C1243/43	Acceleration Sensor Stuck Malfunction	Click here
C1244/44	Open or Short in Deceleration Sensor Circuit	Click here
C1245/45	Acceleration Sensor Output Malfunction	Click here
C1246/46	Master Cylinder Pressure Sensor Malfunction	Click here
C1248/48	Open Circuit in Rear Differential Lock	Click here
C1249/49	Open in Stop Light Switch Circuit	Click here
C1251/51	Open in Pump Motor Circuit	Click here
C1252/52	Brake Booster Pump Motor on Time Abnormally Long	Click here
C1253/53	Pump Motor Relay Malfunction	Click here
C1254/54	Pressure Switch Circuit	Click here
C1256/56	Accumulator Low Pressure	Click here
C1257/57	Power Supply Drive Circuit	Click here
C1268/68	Transfer "L4" Position Switch Circuit	Click here
C1336/98	Zero Point Calibration of Acceleration Sensor Undone	Click here
C1337/37	Diameter of the Tire is not Uniform	Click here
C1381/97	Acceleration Sensor Power Supply Voltage Malfunction	Click here
U0073/94	Control Module Communication Bus OFF	Click here
U0124/95	Lost Communication with Lateral Acceleration Sensor Module	Click here

DTC C0200/31 Front Speed Sensor RH Circuit

DTC C0205/32 Front Speed Sensor LH Circuit

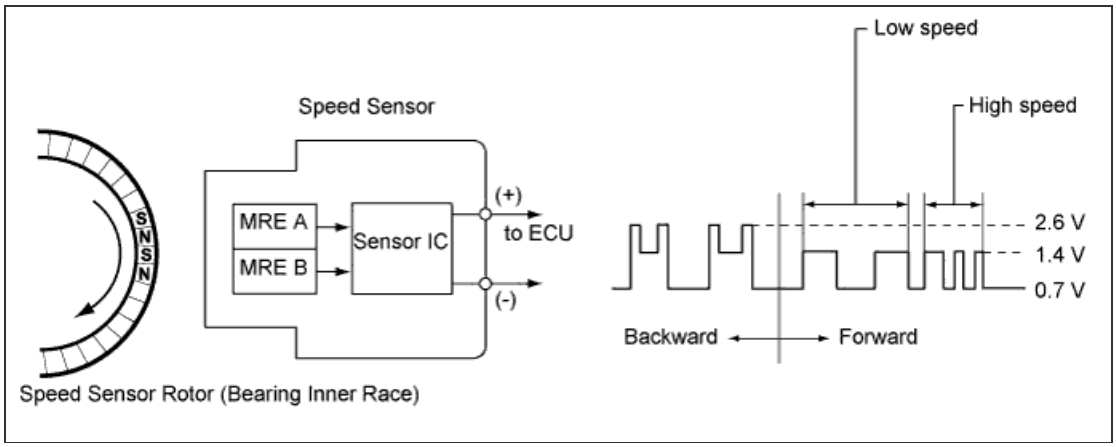
DTC C1235/35 Foreign Object is Attached on Tip of Front Speed Sensor RH

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

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD and BA systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.
To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

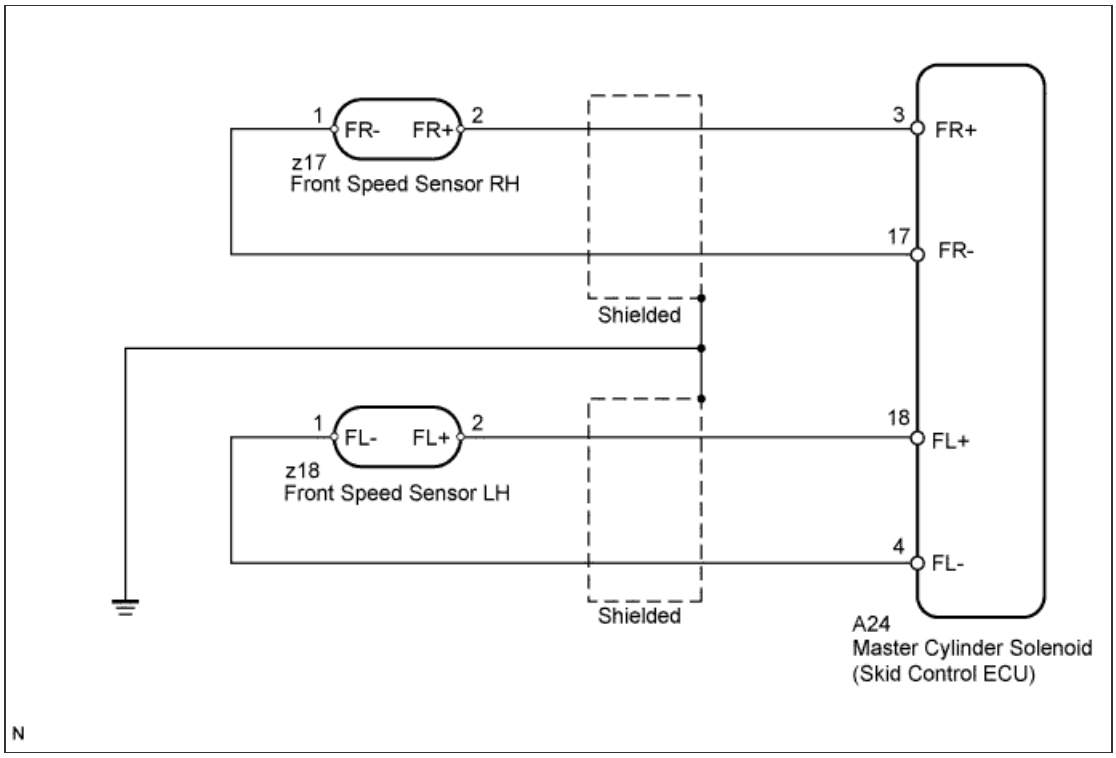


DTC Code	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Front speed sensor RH • Front speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1235/35 C1236/36	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Front speed sensor RH • Front speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0200/31 and C1235/35 are for the front speed sensor RH.**
- **DTC C0205/32 and C1236/36 are for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (FR/FL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (FR/FL WHEEL SPEED, FR/FL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel	Front wheel speed sensor RH reading / min.: 0 km/h (0 mph),	Actual wheel	A similar speed is indicated on the

Speed	max.: 326 km/h (202 mph)	speed	speedometer.
FL Wheel Speed	Front wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Direction	Front wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT FRONT SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation bolt is tightened properly.

There is no clearance between the sensor and front steering knuckle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL FRONT SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the front speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE FRONT SPEED SENSOR (Click here)

OK

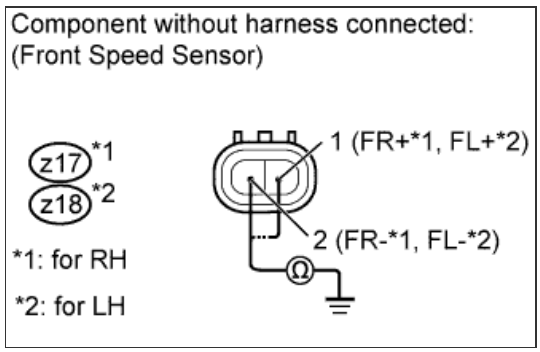
6.INSPECT FRONT SPEED SENSOR

a. Install the front speed sensor.

b. Turn the ignition switch off.

c. Disconnect the z17 and/or z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch off	10 kΩ or higher
z17-1 (FR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch off	10 kΩ or higher
z18-1 (FL-) - Body ground	Ignition switch off	10 kΩ or higher

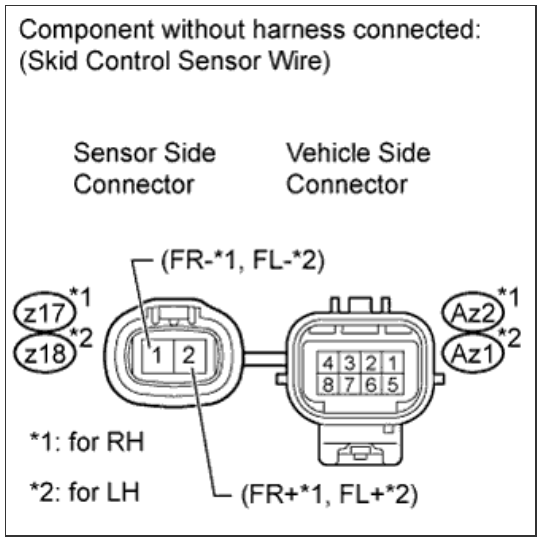
NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z17 and Az2/z18 and Az1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z17-2 (FR+) - Az2-5	Always	Below 1 Ω
z17-2 (FR+) - Az2-1	Always	10 kΩ or higher
z17-2 (FR+) - Body ground	Always	10 kΩ or higher
z17-1 (FR-) - Az2-1	Always	Below 1 Ω
z17-1 (FR-) - Az2-5	Always	10 kΩ or higher
z17-1 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z18-2 (FL+) - Az1-5	Always	Below 1 Ω
z18-2 (FL+) - Az1-1	Always	10 kΩ or higher
z18-2 (FL+) - Body ground	Always	10 kΩ or higher
z18-1 (FL-) - Az1-1	Always	Below 1 Ω
z18-1 (FL-) - Az1-5	Always	10 kΩ or higher
z18-1 (FL-) - Body ground	Always	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (Click here).

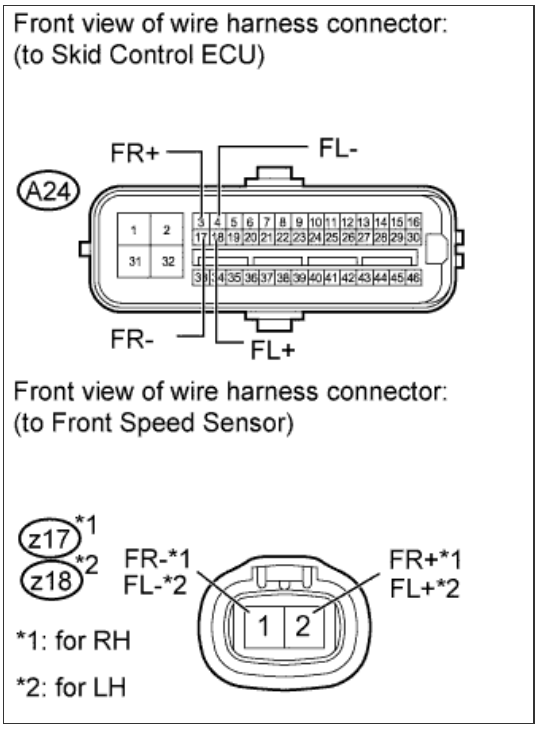
NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and z17/z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-3 (FR+) - z17-2 (FR+)	Always	Below 1 Ω
A24-3 (FR+) - Body ground	Always	10 kΩ or higher
A24-17 (FR-) - z17-1 (FR-)	Always	Below 1 Ω
A24-17 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-18 (FL+) - z18-2 (FL+)	Always	Below 1 Ω
A24-18 (FL+) - Body ground	Always	10 kΩ or higher
A24-4 (FL-) - z18-1 (FL-)	Always	Below 1 Ω
A24-4 (FL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

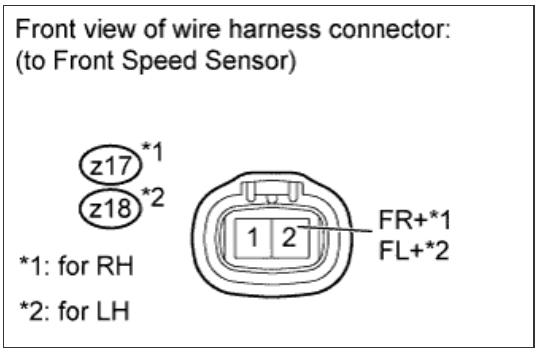
OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	7.5 to 12 V

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE FRONT SPEED SENSOR

a. Replace the front speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → **END**

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the front axle hub sub-assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

B → **REPLACE MASTER CYLINDER SOLENOID (Click here)**

C → **REPLACE MASTER CYLINDER SOLENOID (Click here)**

A

CLEAN OR REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

DTC C1242/42 IG2 Power Source Circuit

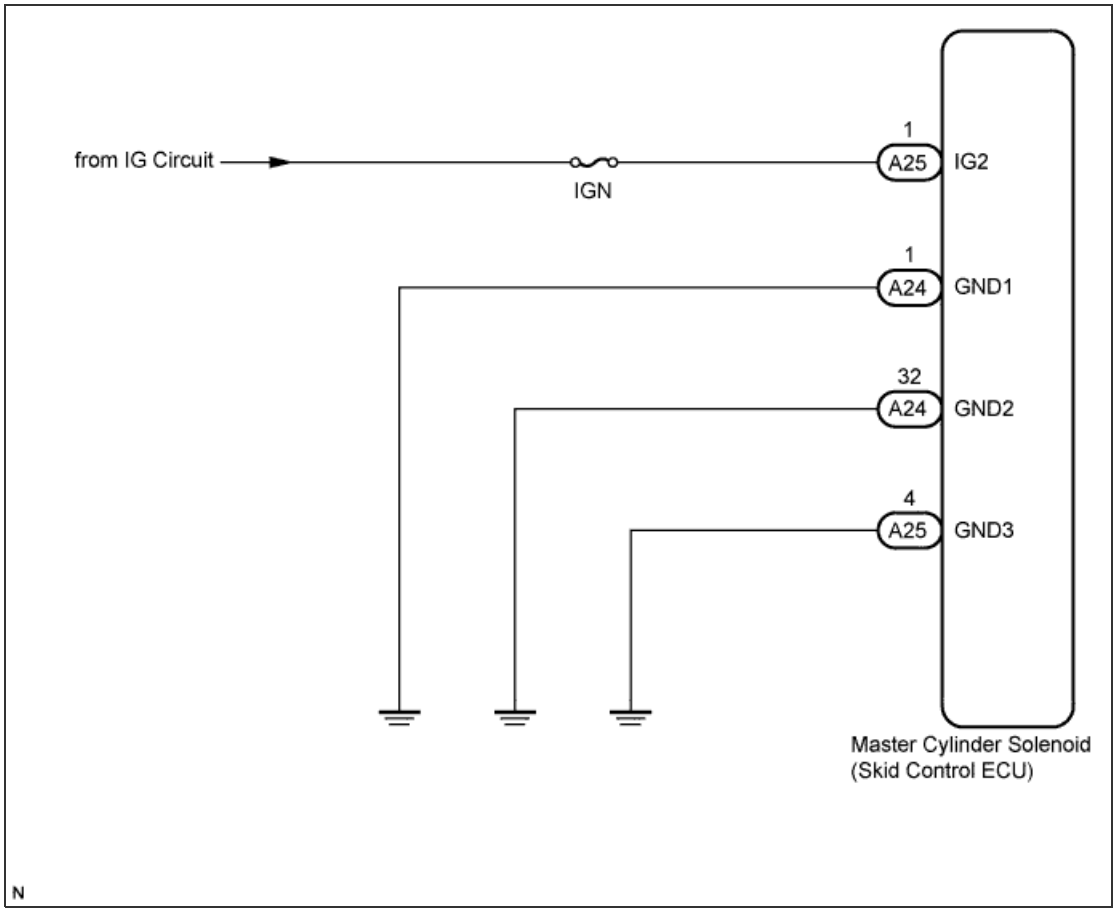
for Preparation Click here

DESCRIPTION

If there is a problem with the master cylinder solenoid (skid control ECU) power supply circuit, the skid control ECU stores DTCs and prohibits operation under the fail-safe function.
If the voltage supplied to the IG2 terminal is within the DTC detection range due to malfunctions in components such as the battery and alternator circuit, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1242/42	The vehicle speed is 3 km/h (1.9 mph) or more and the voltage of the ECU IG2 terminal remains below 6.5 V for more than 7 seconds.	• Battery • IGN fuse • Charging system • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT BATTERY

a. Check the battery voltage.

Standard voltage:
11 to 14 V

Result

Result	Proceed to
OK	A

NG	1GR-FE	B
	2UZ-FE	C
	1VD-FTV	D

B → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

C → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

D → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

A

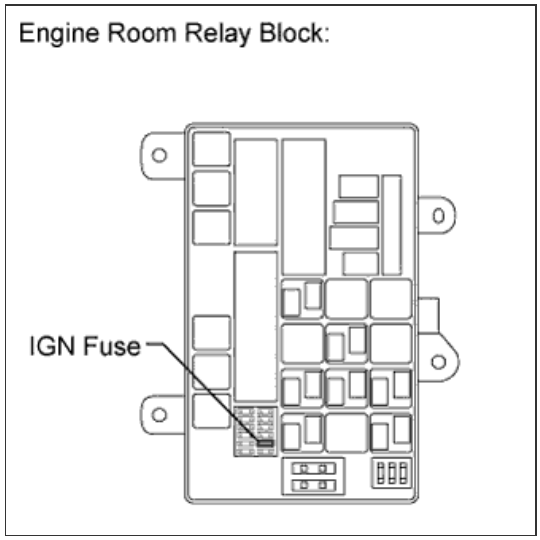
2.INSPECT IGN FUSE

a. Remove the IGN fuse from the engine room relay block.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
IGN fuse	Always	Below 1 Ω



NG → REPLACE IGN FUSE

OK

3.INSPECT SKID CONTROL ECU (IG2 TERMINAL)

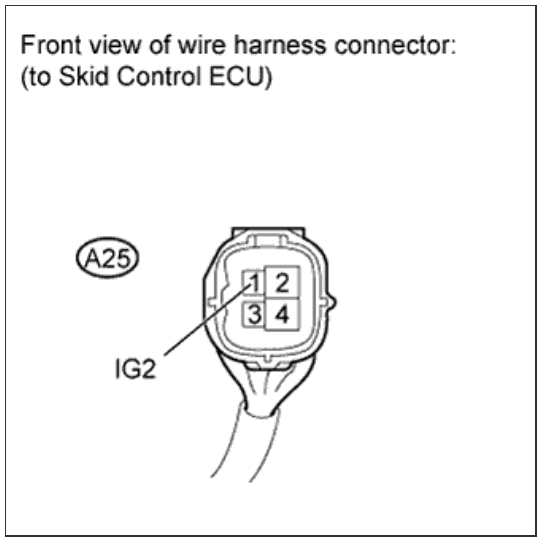
a. Install the IGN fuse.

b. Disconnect the A25 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A25-1 (IG2) - Body ground	Ignition switch ON	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

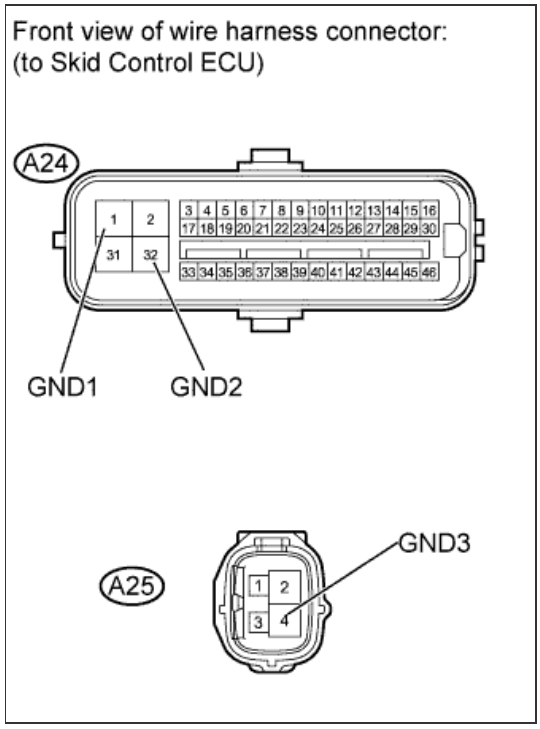
4.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to

DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0200/31 Front Speed Sensor RH Circuit

DTC C0205/32 Front Speed Sensor LH Circuit

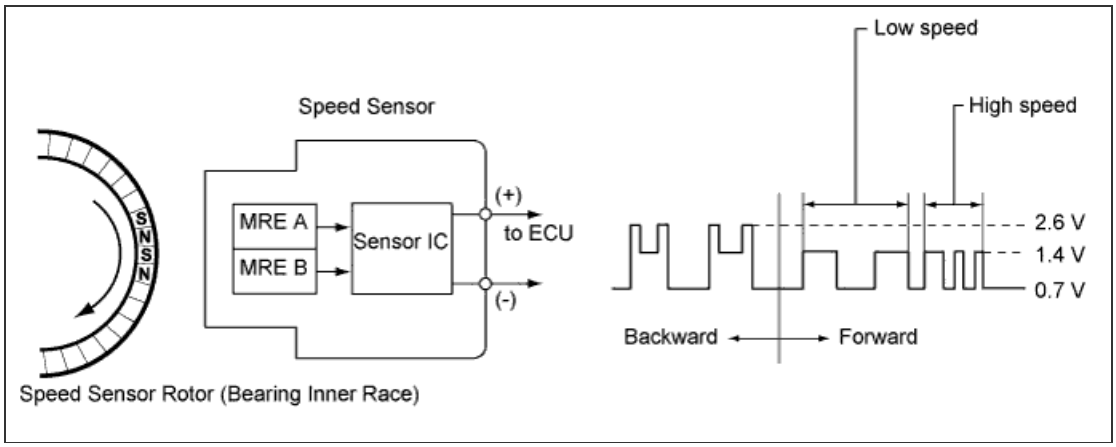
DTC C1235/35 Foreign Object is Attached on Tip of Front Speed Sensor RH

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

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD and BA systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.
To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

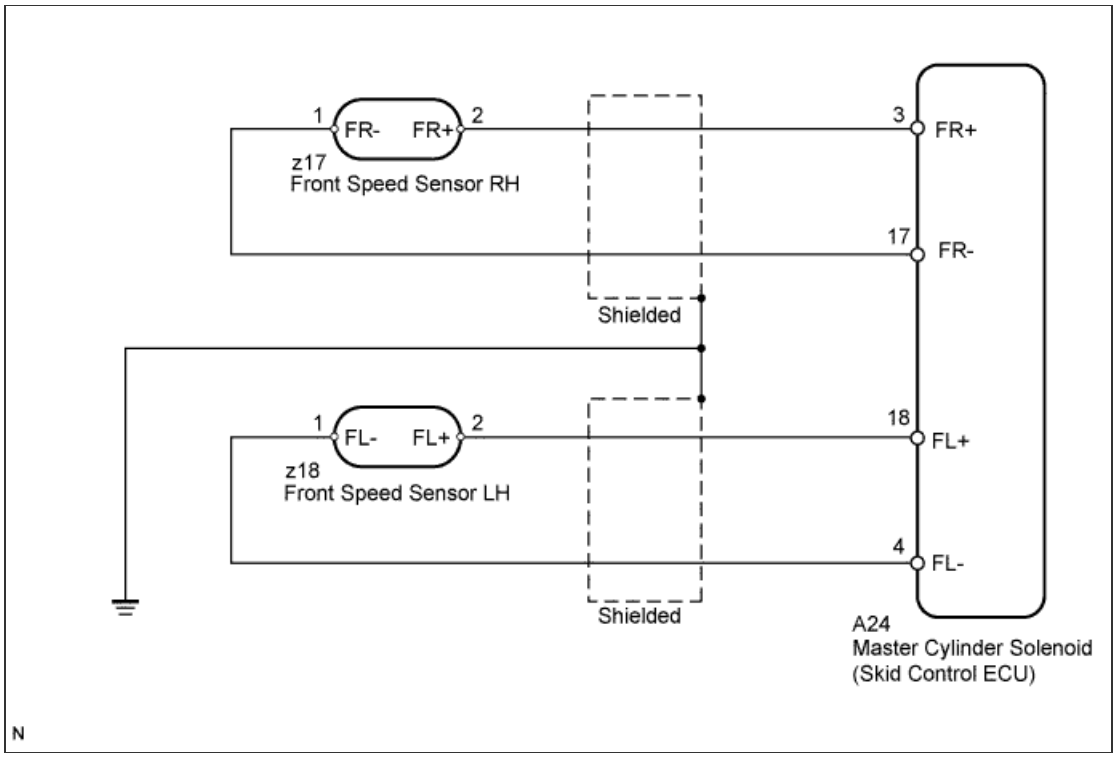


DTC Code	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Front speed sensor RH • Front speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1235/35 C1236/36	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Front speed sensor RH • Front speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0200/31 and C1235/35 are for the front speed sensor RH.**
- **DTC C0205/32 and C1236/36 are for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (FR/FL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (FR/FL WHEEL SPEED, FR/FL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel	Front wheel speed sensor RH reading / min.: 0 km/h (0 mph),	Actual wheel	A similar speed is indicated on the

Speed	max.: 326 km/h (202 mph)	speed	speedometer.
FL Wheel Speed	Front wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Direction	Front wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT FRONT SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation bolt is tightened properly.

There is no clearance between the sensor and front steering knuckle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL FRONT SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the front speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE FRONT SPEED SENSOR (Click here)

OK

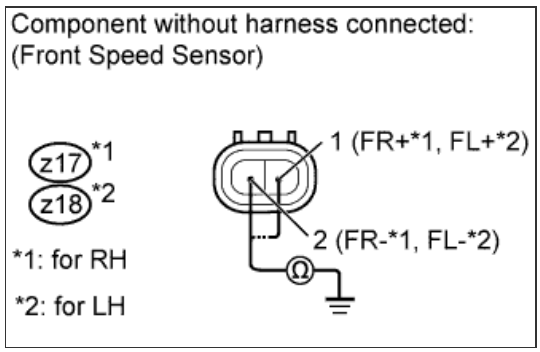
6.INSPECT FRONT SPEED SENSOR

a. Install the front speed sensor.

b. Turn the ignition switch off.

c. Disconnect the z17 and/or z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch off	10 kΩ or higher
z17-1 (FR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch off	10 kΩ or higher
z18-1 (FL-) - Body ground	Ignition switch off	10 kΩ or higher

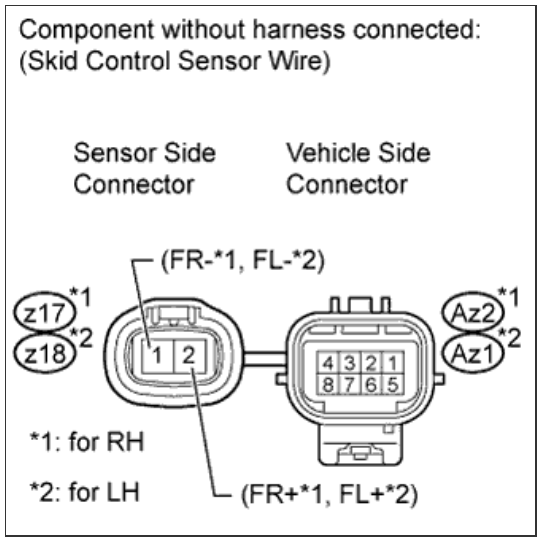
NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z17 and Az2/z18 and Az1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z17-2 (FR+) - Az2-5	Always	Below 1 Ω
z17-2 (FR+) - Az2-1	Always	10 kΩ or higher
z17-2 (FR+) - Body ground	Always	10 kΩ or higher
z17-1 (FR-) - Az2-1	Always	Below 1 Ω
z17-1 (FR-) - Az2-5	Always	10 kΩ or higher
z17-1 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z18-2 (FL+) - Az1-5	Always	Below 1 Ω
z18-2 (FL+) - Az1-1	Always	10 kΩ or higher
z18-2 (FL+) - Body ground	Always	10 kΩ or higher
z18-1 (FL-) - Az1-1	Always	Below 1 Ω
z18-1 (FL-) - Az1-5	Always	10 kΩ or higher
z18-1 (FL-) - Body ground	Always	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (Click here).

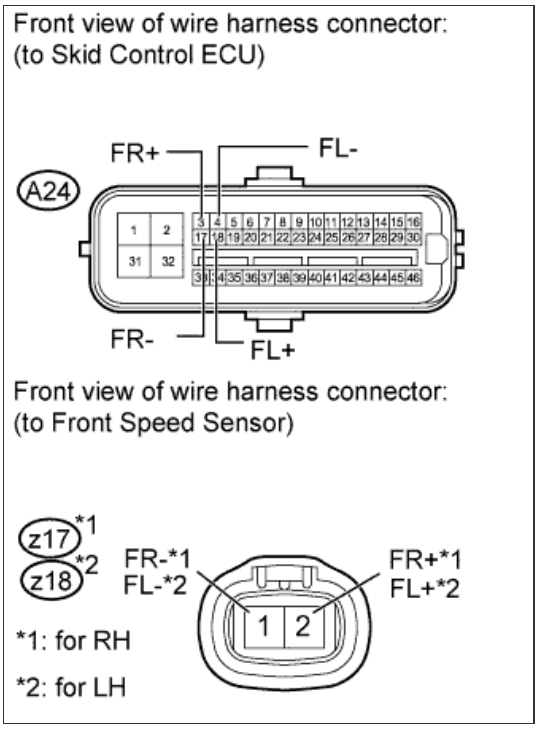
NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and z17/z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-3 (FR+) - z17-2 (FR+)	Always	Below 1 Ω
A24-3 (FR+) - Body ground	Always	10 kΩ or higher
A24-17 (FR-) - z17-1 (FR-)	Always	Below 1 Ω
A24-17 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-18 (FL+) - z18-2 (FL+)	Always	Below 1 Ω
A24-18 (FL+) - Body ground	Always	10 kΩ or higher
A24-4 (FL-) - z18-1 (FL-)	Always	Below 1 Ω
A24-4 (FL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

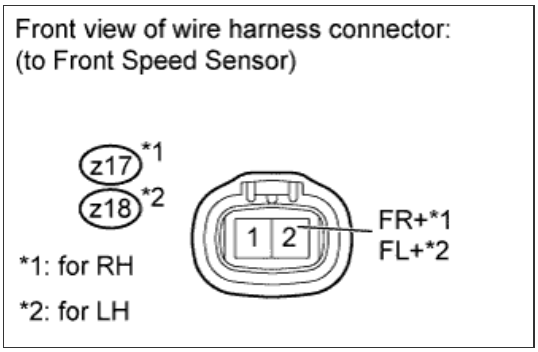
OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	7.5 to 12 V

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE FRONT SPEED SENSOR

a. Replace the front speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → **END**

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the front axle hub sub-assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

B → **REPLACE MASTER CYLINDER SOLENOID (Click here)**

C → **REPLACE MASTER CYLINDER SOLENOID (Click here)**

A

CLEAN OR REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

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 Acceleration Sensor Power Supply Voltage Malfunction

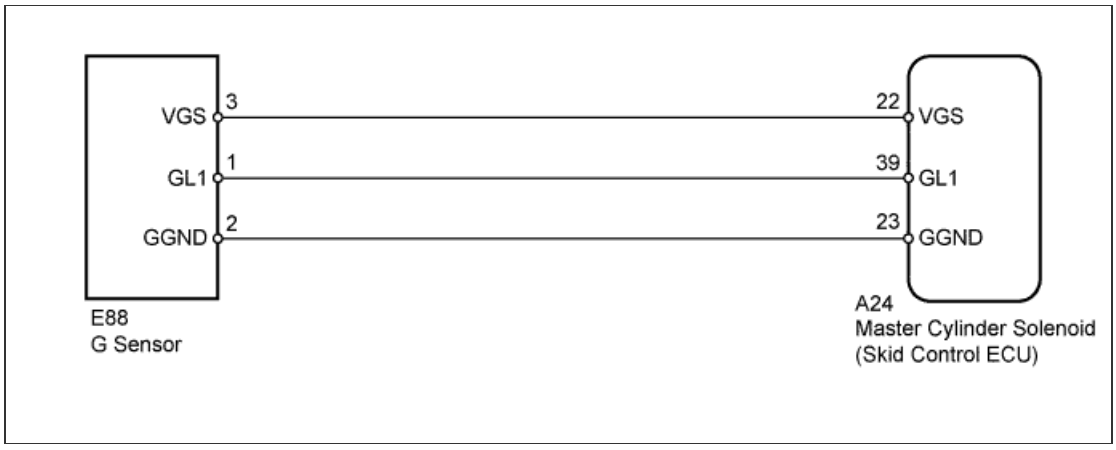
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the G sensor. If the sensor functions abnormally, the ABS warning light turns on.

DTC Code	DTC Detection Condition	Trouble Area
C1243/43	The following condition repeats 16 times. • GL1 and GL2 do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• G sensor • Harness or connector • CAN communication system
C1244/44	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 60 seconds. • The vehicle is stopped. • The difference between GL1 and GL2 does not drop to less than 0.4 G after it reaches 0.6 G or more. 2. A data malfunction signal is received from the G sensor.	• G sensor • Harness or connector • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. • The difference between the values calculated from the G sensor value and vehicle speed exceeds 0.35 G.	• G sensor • Harness or connector • CAN communication system
C1381/97	A G sensor power source malfunction signal is received for at least 10 seconds at a speed of more than 3 km/h (2 mph).	• G sensor • Harness or connector • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the G sensor, perform zero point calibration (Click here).

1.CHECK G SENSOR INSTALLATION

a. Check that the G sensor is installed properly.

Result:

Result		Proceed to
The sensor is tightened to the specified torque. The sensor is not tilted.		A
The sensor is not tightened to the specified torque. Or the sensor is tilted.	for Automatic Transmission	B
	for Manual Transmission	C

B → INSTALL G SENSOR CORRECTLY (Click here)

C → INSTALL G SENSOR CORRECTLY (Click here)

A

2.READ VALUE USING INTELLIGENT TESTER (DECELERATION SENSOR)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Deceleration Sensor	G sensor reading / min.: -18.525 m/s^2, max.: 18.387 m/s^2	Approximately -1.28 to 1.27 m/s^2 while stationary	The reading changes when the vehicle is bounced.

d. Check the Data List for proper functioning of the G sensor.

OK:
Deceleration value changes.

NG → Go to step 4

OK

3.CHECK DTC

a. Install the G sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Drive the vehicle at 6 km/h (4 mph) or more.

d. Check if the same DTCs are output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

4.INSPECT G SENSOR

a. Remove the G sensor (Click here).

b. Connect 3 dry cell batteries of 1.5 V in series.

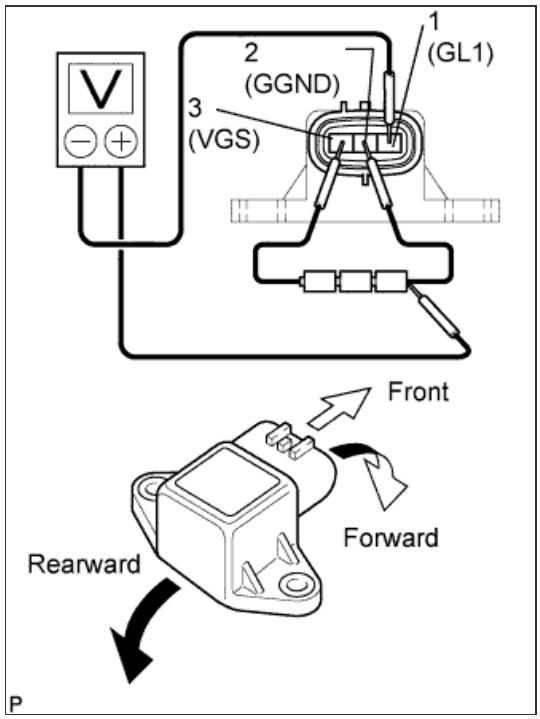
NOTICE:

Do not apply 6 V or more to terminals 3 (VGS) and 2 (GGND).

c. Check the output voltage of terminal 1 (GL1) when the sensor is tilted forward and rearward.

Standard Voltage:

Tester Connection	Condition	Specified Condition
1 (GL1) - Battery negative (-) lead	Horizontal	Approximately 2.5 V
1 (GL1) - Battery negative (-) lead	Tilted forward	Approximately 0.5 to 2.5 V
1 (GL1) - Battery negative (-) lead	Tilted rearward	Approximately 2.5 to 4.5 V



HINT:

- **If the sensor is tilted too much, it may output the wrong value.**
- **If the voltage drops, the sensor should be replaced with a new one.**
- **When replacing the sensor, it should not be placed upside down.**

NG → REPLACE DECELERATION SENSOR (Click here)

OK

5.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - G SENSOR)

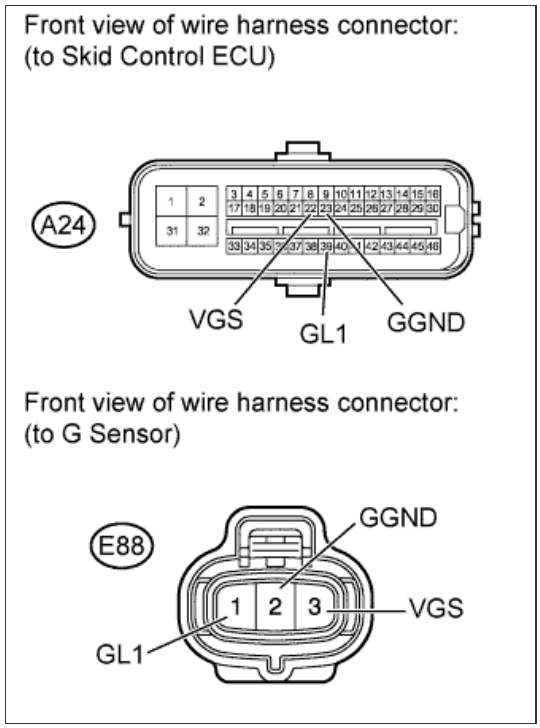
a. Disconnect the A24 skid control ECU connector.

b. Disconnect the E88 G sensor connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-39 (GL1) - E88-1 (GL1)	Always	Below 1 Ω
A24-23 (GGND) - E88-2 (GGND)	Always	Below 1 Ω
A24-22 (VGS) - E88-3 (VGS)	Always	Below 1 Ω
E88-1 (GL1) - Body ground	Always	10 kΩ or higher
E88-2 (GGND) - Body ground	Always	10 kΩ or higher
E88-3 (VGS) - Body ground	Always	10 kΩ or higher



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6.CHECK DTC

a. Install the G sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Drive the vehicle at 6 km/h (4 mph) or more.

d. Check if the same DTCs are output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0200/31 Front Speed Sensor RH Circuit

DTC C0205/32 Front Speed Sensor LH Circuit

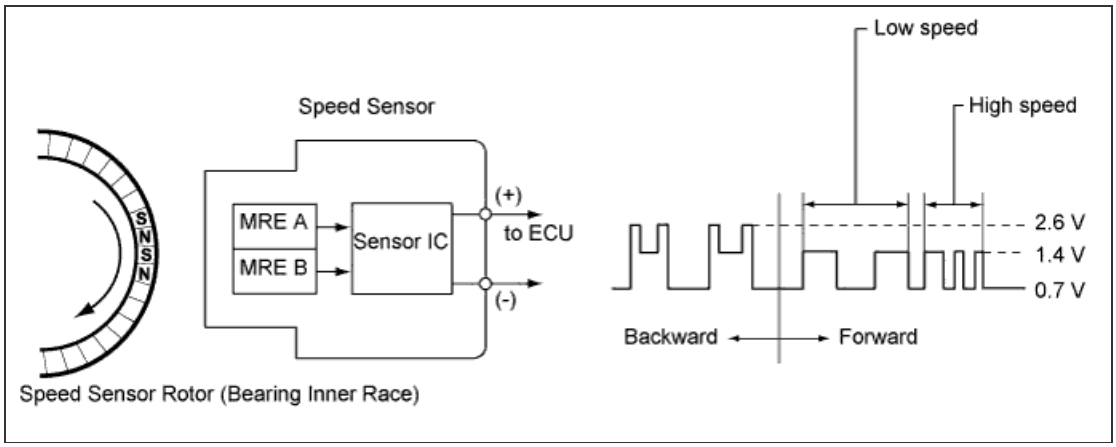
DTC C1235/35 Foreign Object is Attached on Tip of Front Speed Sensor RH

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

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD and BA systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.
To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

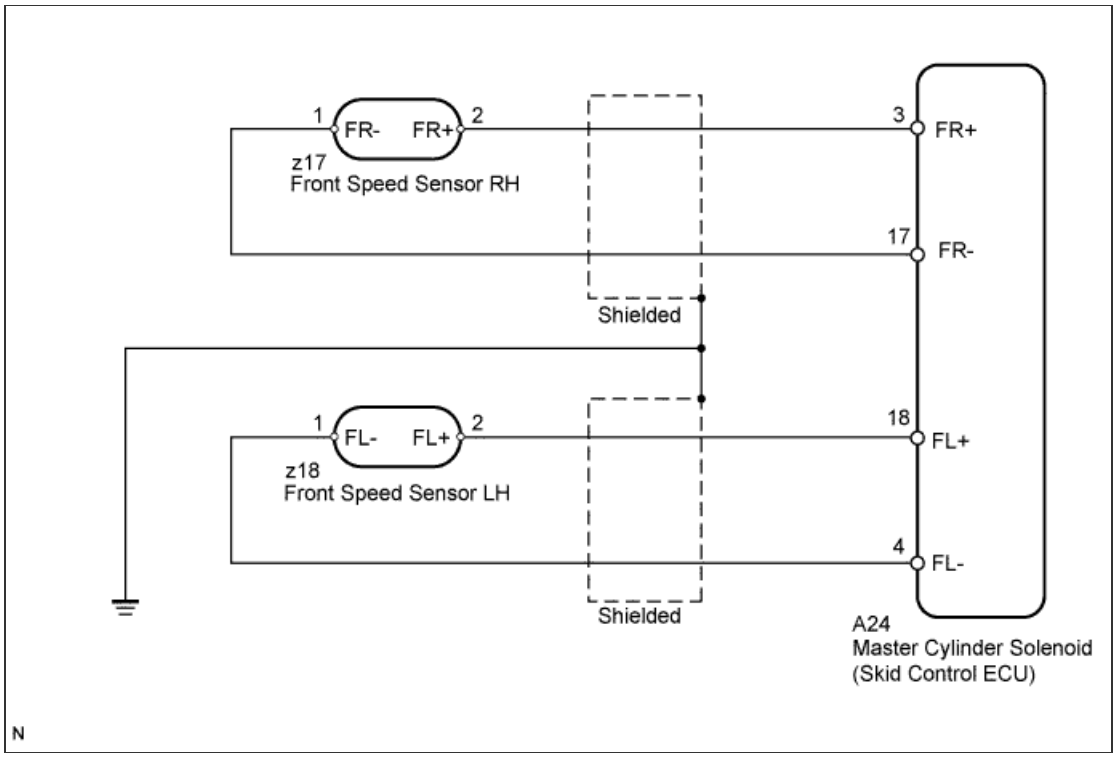


DTC Code	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Front speed sensor RH • Front speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1235/35 C1236/36	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Front speed sensor RH • Front speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0200/31 and C1235/35 are for the front speed sensor RH.**
- **DTC C0205/32 and C1236/36 are for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (FR/FL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (FR/FL WHEEL SPEED, FR/FL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel	Front wheel speed sensor RH reading / min.: 0 km/h (0 mph),	Actual wheel	A similar speed is indicated on the

Speed	max.: 326 km/h (202 mph)	speed	speedometer.
FL Wheel Speed	Front wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Direction	Front wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT FRONT SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation bolt is tightened properly.

There is no clearance between the sensor and front steering knuckle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL FRONT SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the front speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE FRONT SPEED SENSOR (Click here)

OK

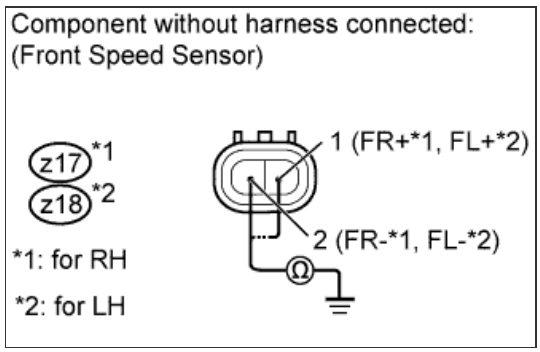
6.INSPECT FRONT SPEED SENSOR

a. Install the front speed sensor.

b. Turn the ignition switch off.

c. Disconnect the z17 and/or z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch off	10 kΩ or higher
z17-1 (FR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch off	10 kΩ or higher
z18-1 (FL-) - Body ground	Ignition switch off	10 kΩ or higher

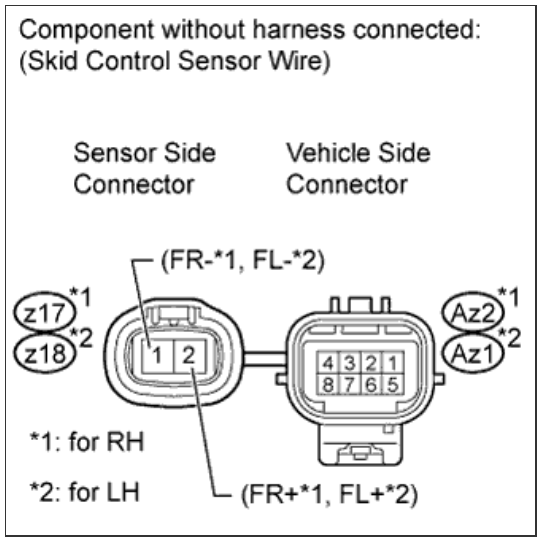
NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z17 and Az2/z18 and Az1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z17-2 (FR+) - Az2-5	Always	Below 1 Ω
z17-2 (FR+) - Az2-1	Always	10 kΩ or higher
z17-2 (FR+) - Body ground	Always	10 kΩ or higher
z17-1 (FR-) - Az2-1	Always	Below 1 Ω
z17-1 (FR-) - Az2-5	Always	10 kΩ or higher
z17-1 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z18-2 (FL+) - Az1-5	Always	Below 1 Ω
z18-2 (FL+) - Az1-1	Always	10 kΩ or higher
z18-2 (FL+) - Body ground	Always	10 kΩ or higher
z18-1 (FL-) - Az1-1	Always	Below 1 Ω
z18-1 (FL-) - Az1-5	Always	10 kΩ or higher
z18-1 (FL-) - Body ground	Always	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (Click here).

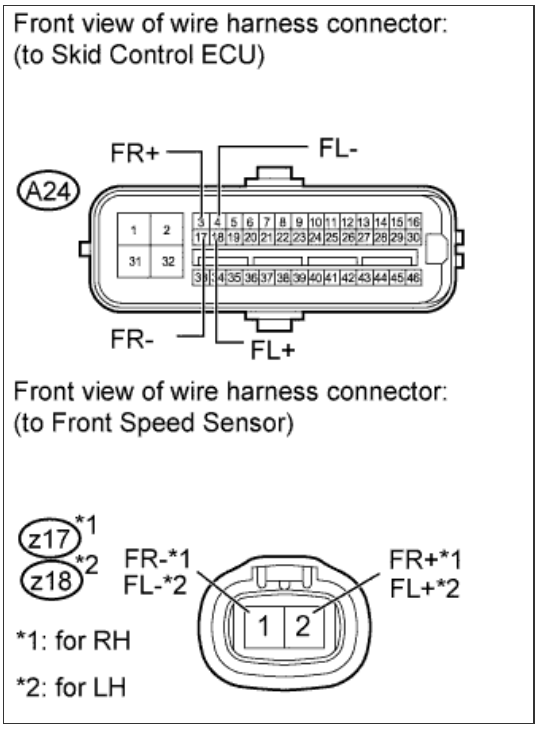
NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and z17/z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-3 (FR+) - z17-2 (FR+)	Always	Below 1 Ω
A24-3 (FR+) - Body ground	Always	10 kΩ or higher
A24-17 (FR-) - z17-1 (FR-)	Always	Below 1 Ω
A24-17 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-18 (FL+) - z18-2 (FL+)	Always	Below 1 Ω
A24-18 (FL+) - Body ground	Always	10 kΩ or higher
A24-4 (FL-) - z18-1 (FL-)	Always	Below 1 Ω
A24-4 (FL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

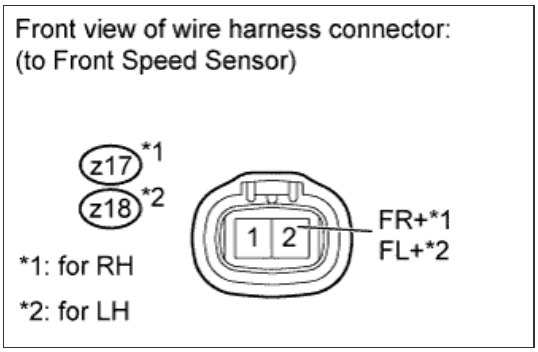
OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	7.5 to 12 V

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE FRONT SPEED SENSOR

a. Replace the front speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → **END**

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the front axle hub sub-assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

B → **REPLACE MASTER CYLINDER SOLENOID (Click here)**

C → **REPLACE MASTER CYLINDER SOLENOID (Click here)**

A

CLEAN OR REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

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 Acceleration Sensor Power Supply Voltage Malfunction

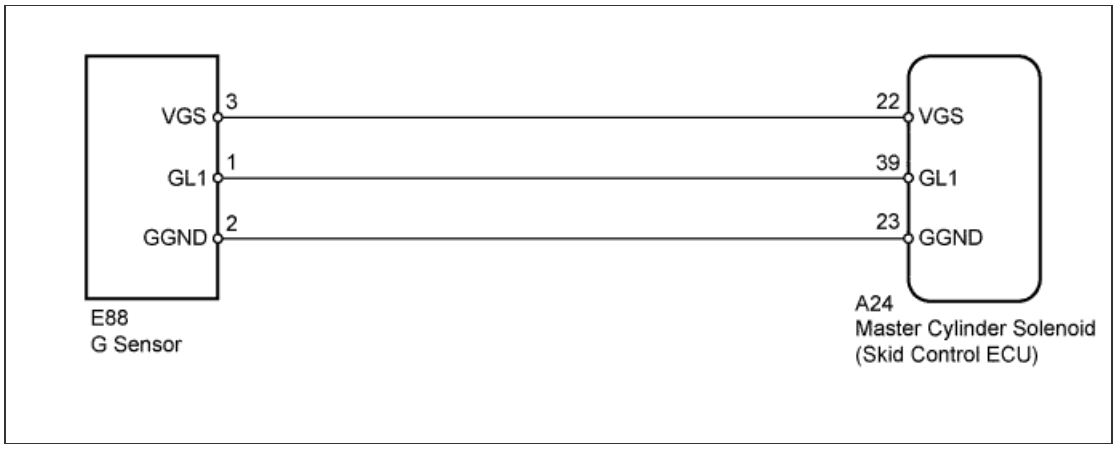
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the G sensor. If the sensor functions abnormally, the ABS warning light turns on.

DTC Code	DTC Detection Condition	Trouble Area
C1243/43	The following condition repeats 16 times. • GL1 and GL2 do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• G sensor • Harness or connector • CAN communication system
C1244/44	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 60 seconds. • The vehicle is stopped. • The difference between GL1 and GL2 does not drop to less than 0.4 G after it reaches 0.6 G or more. 2. A data malfunction signal is received from the G sensor.	• G sensor • Harness or connector • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. • The difference between the values calculated from the G sensor value and vehicle speed exceeds 0.35 G.	• G sensor • Harness or connector • CAN communication system
C1381/97	A G sensor power source malfunction signal is received for at least 10 seconds at a speed of more than 3 km/h (2 mph).	• G sensor • Harness or connector • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the G sensor, perform zero point calibration (Click here).

1.CHECK G SENSOR INSTALLATION

a. Check that the G sensor is installed properly.

Result:

Result		Proceed to
The sensor is tightened to the specified torque. The sensor is not tilted.		A
The sensor is not tightened to the specified torque. Or the sensor is tilted.	for Automatic Transmission	B
	for Manual Transmission	C

B → INSTALL G SENSOR CORRECTLY (Click here)

C → INSTALL G SENSOR CORRECTLY (Click here)

A

2.READ VALUE USING INTELLIGENT TESTER (DECELERATION SENSOR)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Deceleration Sensor	G sensor reading / min.: -18.525 m/s^2, max.: 18.387 m/s^2	Approximately -1.28 to 1.27 m/s^2 while stationary	The reading changes when the vehicle is bounced.

d. Check the Data List for proper functioning of the G sensor.

OK:
Deceleration value changes.

NG → Go to step 4

OK

3.CHECK DTC

a. Install the G sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Drive the vehicle at 6 km/h (4 mph) or more.

d. Check if the same DTCs are output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

4.INSPECT G SENSOR

a. Remove the G sensor (Click here).

b. Connect 3 dry cell batteries of 1.5 V in series.

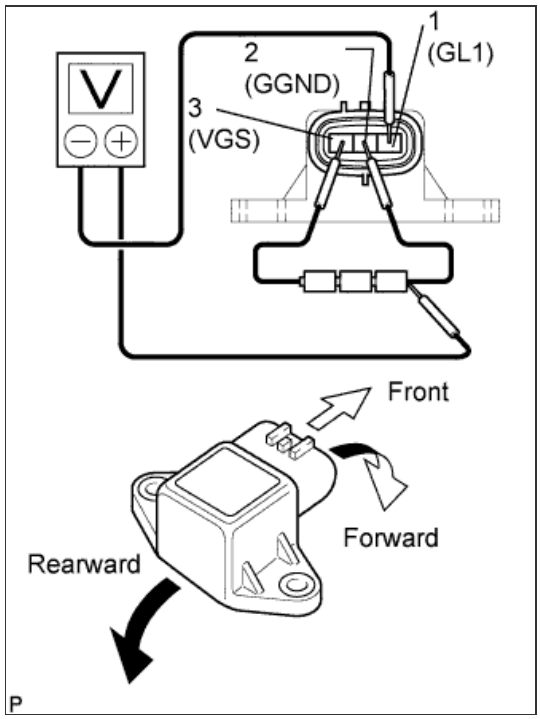
NOTICE:

Do not apply 6 V or more to terminals 3 (VGS) and 2 (GGND).

c. Check the output voltage of terminal 1 (GL1) when the sensor is tilted forward and rearward.

Standard Voltage:

Tester Connection	Condition	Specified Condition
1 (GL1) - Battery negative (-) lead	Horizontal	Approximately 2.5 V
1 (GL1) - Battery negative (-) lead	Tilted forward	Approximately 0.5 to 2.5 V
1 (GL1) - Battery negative (-) lead	Tilted rearward	Approximately 2.5 to 4.5 V



HINT:

- **If the sensor is tilted too much, it may output the wrong value.**
- **If the voltage drops, the sensor should be replaced with a new one.**
- **When replacing the sensor, it should not be placed upside down.**

NG → REPLACE DECELERATION SENSOR (Click here)

OK

5.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - G SENSOR)

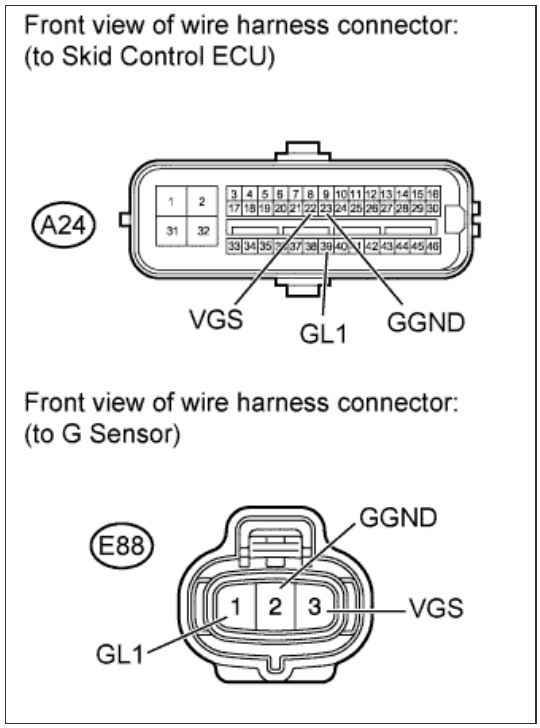
a. Disconnect the A24 skid control ECU connector.

b. Disconnect the E88 G sensor connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-39 (GL1) - E88-1 (GL1)	Always	Below 1 Ω
A24-23 (GGND) - E88-2 (GGND)	Always	Below 1 Ω
A24-22 (VGS) - E88-3 (VGS)	Always	Below 1 Ω
E88-1 (GL1) - Body ground	Always	10 kΩ or higher
E88-2 (GGND) - Body ground	Always	10 kΩ or higher
E88-3 (VGS) - Body ground	Always	10 kΩ or higher



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6.CHECK DTC

a. Install the G sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Drive the vehicle at 6 km/h (4 mph) or more.

d. Check if the same DTCs are output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0200/31 Front Speed Sensor RH Circuit

DTC C0205/32 Front Speed Sensor LH Circuit

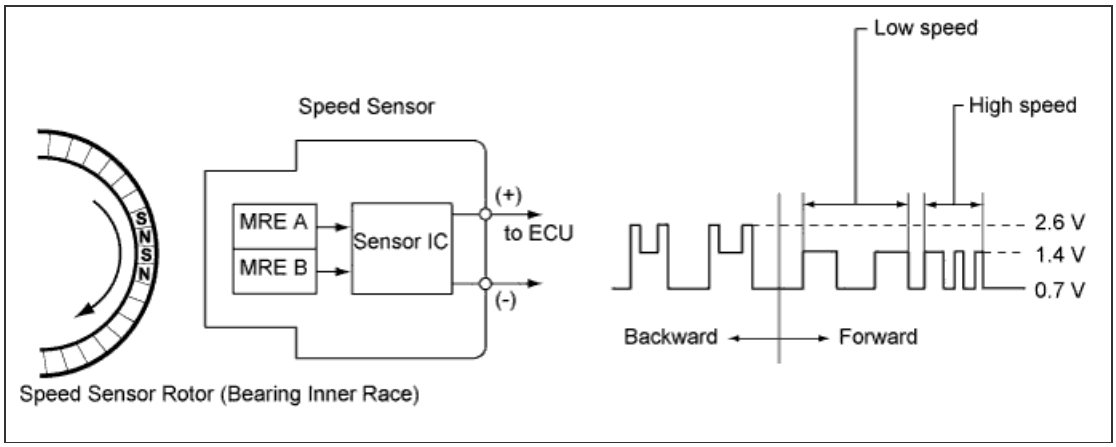
DTC C1235/35 Foreign Object is Attached on Tip of Front Speed Sensor RH

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

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD and BA systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.
To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

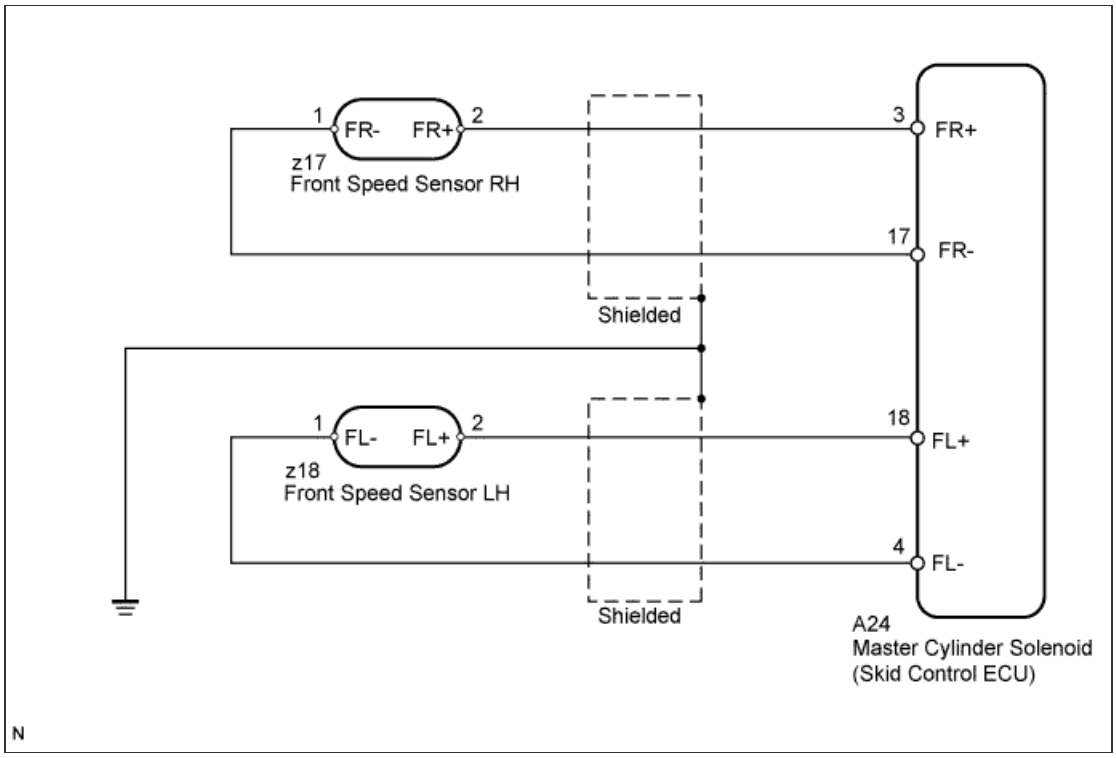


DTC Code	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Front speed sensor RH • Front speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1235/35 C1236/36	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Front speed sensor RH • Front speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0200/31 and C1235/35 are for the front speed sensor RH.**
- **DTC C0205/32 and C1236/36 are for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (FR/FL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (FR/FL WHEEL SPEED, FR/FL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel	Front wheel speed sensor RH reading / min.: 0 km/h (0 mph),	Actual wheel	A similar speed is indicated on the

Speed	max.: 326 km/h (202 mph)	speed	speedometer.
FL Wheel Speed	Front wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Direction	Front wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT FRONT SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation bolt is tightened properly.

There is no clearance between the sensor and front steering knuckle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL FRONT SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the front speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE FRONT SPEED SENSOR (Click here)

OK

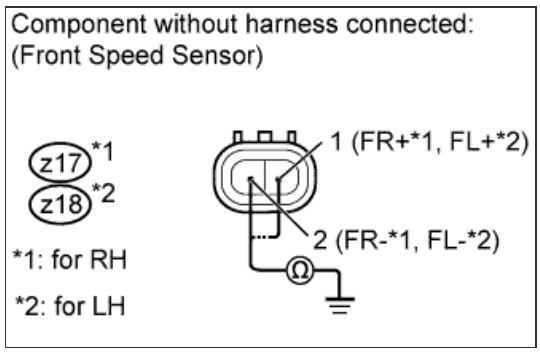
6.INSPECT FRONT SPEED SENSOR

a. Install the front speed sensor.

b. Turn the ignition switch off.

c. Disconnect the z17 and/or z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch off	10 kΩ or higher
z17-1 (FR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch off	10 kΩ or higher
z18-1 (FL-) - Body ground	Ignition switch off	10 kΩ or higher

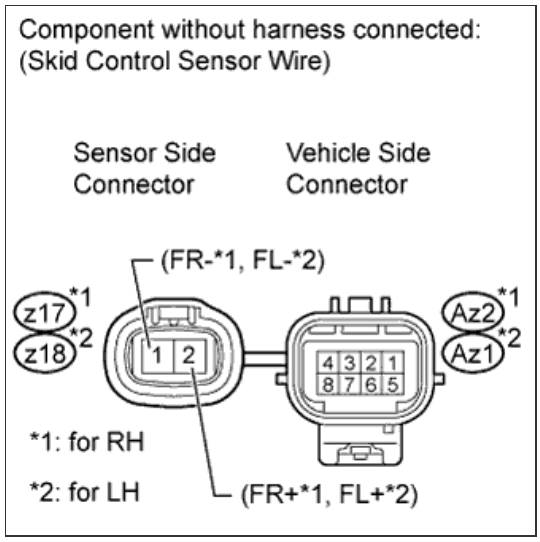
NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z17 and Az2/z18 and Az1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z17-2 (FR+) - Az2-5	Always	Below 1 Ω
z17-2 (FR+) - Az2-1	Always	10 kΩ or higher
z17-2 (FR+) - Body ground	Always	10 kΩ or higher
z17-1 (FR-) - Az2-1	Always	Below 1 Ω
z17-1 (FR-) - Az2-5	Always	10 kΩ or higher
z17-1 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z18-2 (FL+) - Az1-5	Always	Below 1 Ω
z18-2 (FL+) - Az1-1	Always	10 kΩ or higher
z18-2 (FL+) - Body ground	Always	10 kΩ or higher
z18-1 (FL-) - Az1-1	Always	Below 1 Ω
z18-1 (FL-) - Az1-5	Always	10 kΩ or higher
z18-1 (FL-) - Body ground	Always	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (Click here).

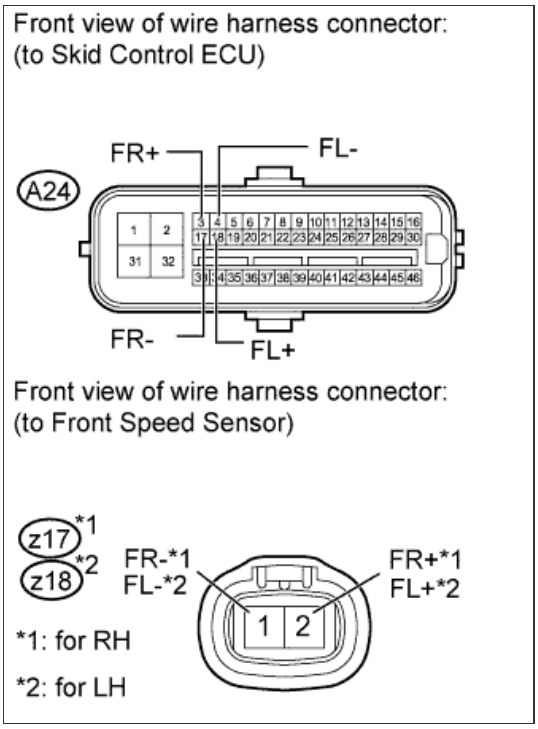
NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and z17/z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-3 (FR+) - z17-2 (FR+)	Always	Below 1 Ω
A24-3 (FR+) - Body ground	Always	10 kΩ or higher
A24-17 (FR-) - z17-1 (FR-)	Always	Below 1 Ω
A24-17 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-18 (FL+) - z18-2 (FL+)	Always	Below 1 Ω
A24-18 (FL+) - Body ground	Always	10 kΩ or higher
A24-4 (FL-) - z18-1 (FL-)	Always	Below 1 Ω
A24-4 (FL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

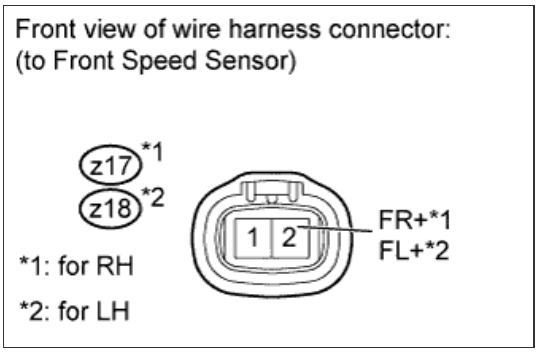
OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	7.5 to 12 V

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE FRONT SPEED SENSOR

a. Replace the front speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → **END**

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the front axle hub sub-assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

B → **REPLACE MASTER CYLINDER SOLENOID (Click here)**

C → **REPLACE MASTER CYLINDER SOLENOID (Click here)**

A

CLEAN OR REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

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 Acceleration Sensor Power Supply Voltage Malfunction

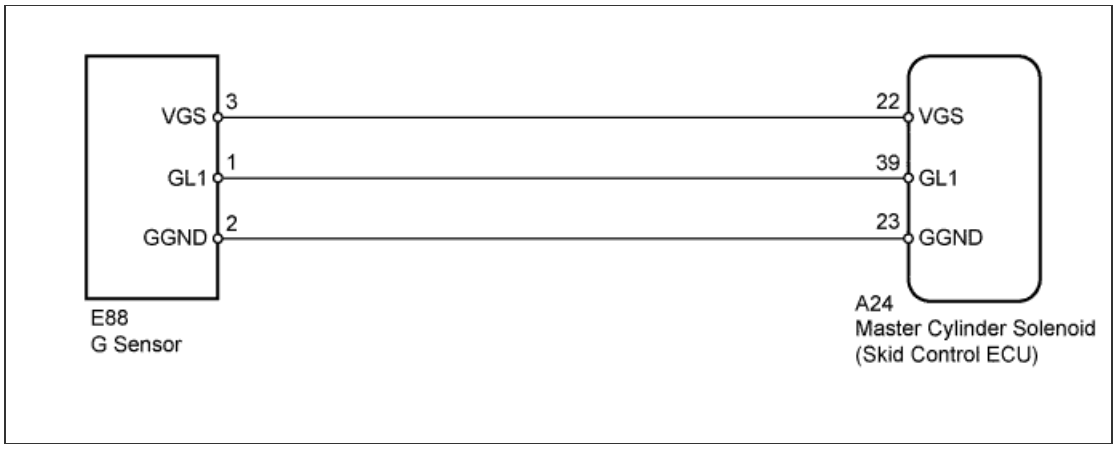
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the G sensor. If the sensor functions abnormally, the ABS warning light turns on.

DTC Code	DTC Detection Condition	Trouble Area
C1243/43	The following condition repeats 16 times. • GL1 and GL2 do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• G sensor • Harness or connector • CAN communication system
C1244/44	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 60 seconds. • The vehicle is stopped. • The difference between GL1 and GL2 does not drop to less than 0.4 G after it reaches 0.6 G or more. 2. A data malfunction signal is received from the G sensor.	• G sensor • Harness or connector • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. • The difference between the values calculated from the G sensor value and vehicle speed exceeds 0.35 G.	• G sensor • Harness or connector • CAN communication system
C1381/97	A G sensor power source malfunction signal is received for at least 10 seconds at a speed of more than 3 km/h (2 mph).	• G sensor • Harness or connector • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the G sensor, perform zero point calibration (Click here).

1.CHECK G SENSOR INSTALLATION

a. Check that the G sensor is installed properly.

Result:

Result		Proceed to
The sensor is tightened to the specified torque. The sensor is not tilted.		A
The sensor is not tightened to the specified torque. Or the sensor is tilted.	for Automatic Transmission	B
	for Manual Transmission	C

B → INSTALL G SENSOR CORRECTLY (Click here)

C → INSTALL G SENSOR CORRECTLY (Click here)

A

2.READ VALUE USING INTELLIGENT TESTER (DECELERATION SENSOR)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Deceleration Sensor	G sensor reading / min.: -18.525 m/s^2, max.: 18.387 m/s^2	Approximately -1.28 to 1.27 m/s^2 while stationary	The reading changes when the vehicle is bounced.

d. Check the Data List for proper functioning of the G sensor.

OK:
Deceleration value changes.

NG → Go to step 4

OK

3.CHECK DTC

a. Install the G sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Drive the vehicle at 6 km/h (4 mph) or more.

d. Check if the same DTCs are output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

4.INSPECT G SENSOR

a. Remove the G sensor (Click here).

b. Connect 3 dry cell batteries of 1.5 V in series.

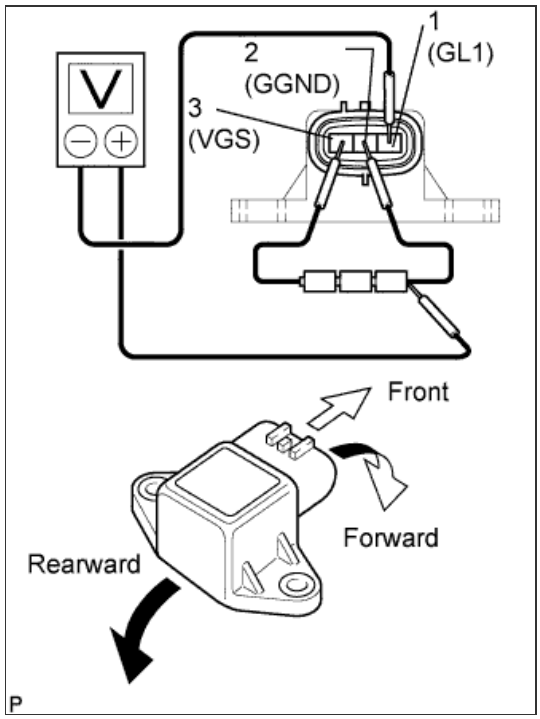
NOTICE:

Do not apply 6 V or more to terminals 3 (VGS) and 2 (GGND).

c. Check the output voltage of terminal 1 (GL1) when the sensor is tilted forward and rearward.

Standard Voltage:

Tester Connection	Condition	Specified Condition
1 (GL1) - Battery negative (-) lead	Horizontal	Approximately 2.5 V
1 (GL1) - Battery negative (-) lead	Tilted forward	Approximately 0.5 to 2.5 V
1 (GL1) - Battery negative (-) lead	Tilted rearward	Approximately 2.5 to 4.5 V



HINT:

- **If the sensor is tilted too much, it may output the wrong value.**
- **If the voltage drops, the sensor should be replaced with a new one.**
- **When replacing the sensor, it should not be placed upside down.**

NG → REPLACE DECELERATION SENSOR (Click here)

OK

5.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - G SENSOR)

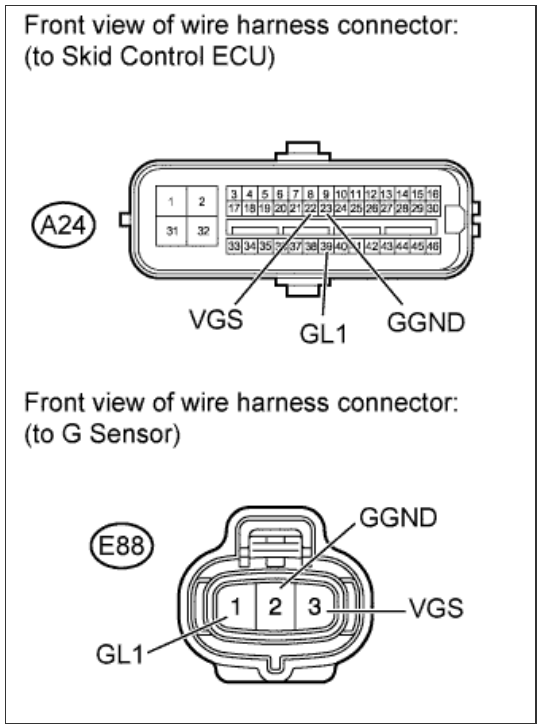
a. Disconnect the A24 skid control ECU connector.

b. Disconnect the E88 G sensor connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-39 (GL1) - E88-1 (GL1)	Always	Below 1 Ω
A24-23 (GGND) - E88-2 (GGND)	Always	Below 1 Ω
A24-22 (VGS) - E88-3 (VGS)	Always	Below 1 Ω
E88-1 (GL1) - Body ground	Always	10 kΩ or higher
E88-2 (GGND) - Body ground	Always	10 kΩ or higher
E88-3 (VGS) - Body ground	Always	10 kΩ or higher



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6.CHECK DTC

a. Install the G sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Drive the vehicle at 6 km/h (4 mph) or more.

d. Check if the same DTCs are output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0210/33 Rear Speed Sensor RH Circuit

DTC C0215/34 Rear Speed Sensor LH Circuit

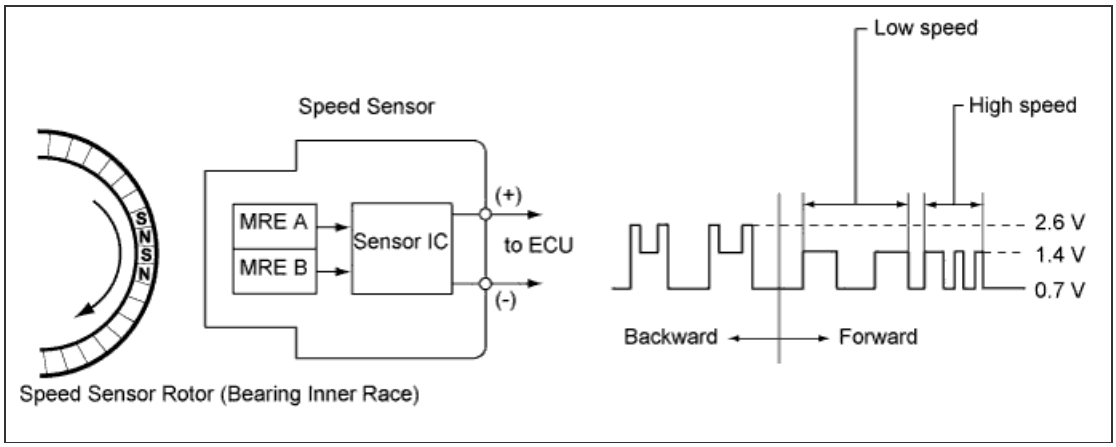
DTC C1238/38 Foreign Object is Attached on Tip of Rear Speed Sensor RH

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

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD and BA systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.
To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

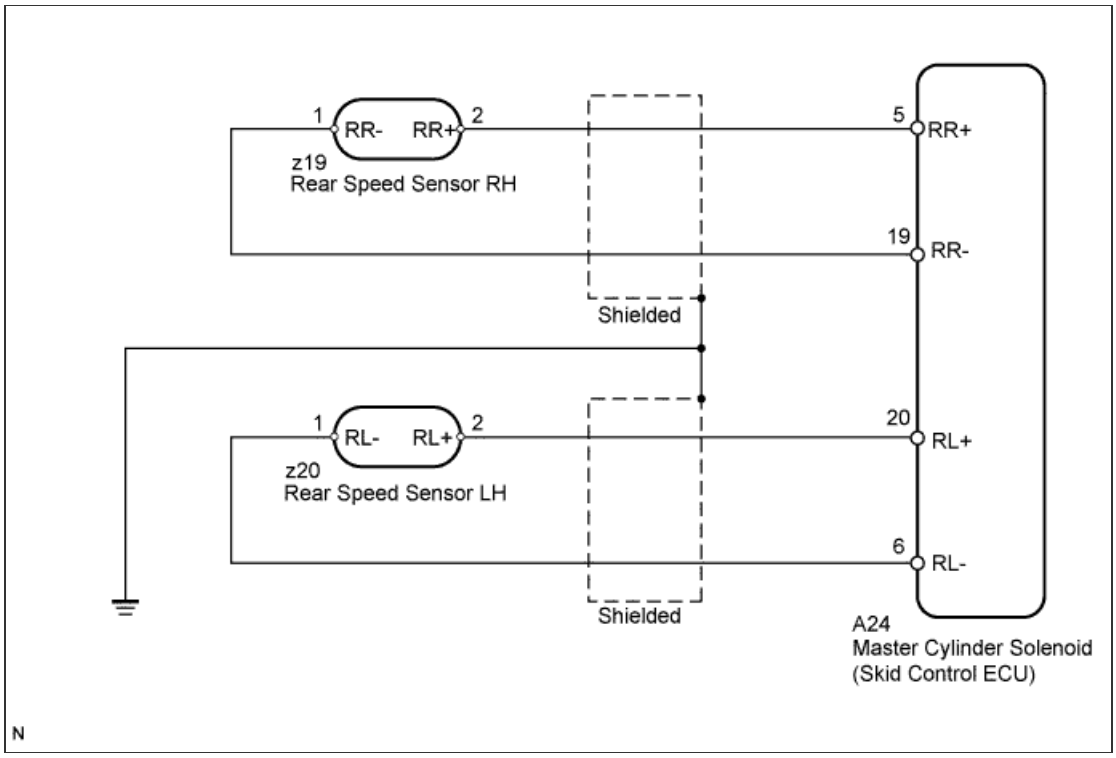


DTC Code	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Rear speed sensor RH • Rear speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1238/38 C1239/39	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Rear speed sensor RH • Rear speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0210/33 and C1238/38 are for the rear speed sensor RH.**
- **DTC C0215/34 and C1239/39 are for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (RR/RL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (RR/RL WHEEL SPEED, RR/RL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note

RR Wheel Speed	Rear wheel speed sensor RH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Direction	Rear wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT REAR SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation nut is tightened properly.

There is no clearance between the sensor and rear axle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL REAR SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the rear speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE REAR SPEED SENSOR (Click here)

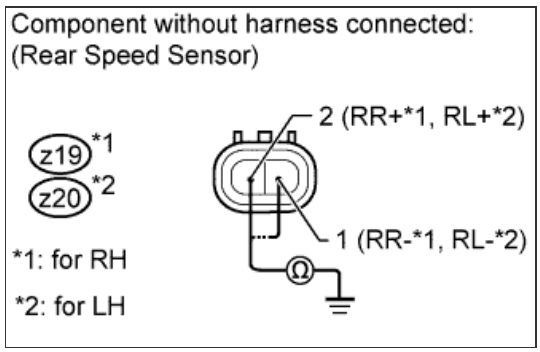
OK

6.INSPECT REAR SPEED SENSOR

a. Install the rear speed sensor.

b. Disconnect the z19 and/or z20 rear speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch off	10 kΩ or higher
z19-1 (RR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch off	10 kΩ or higher
z20-1 (RL-) - Body ground	Ignition switch off	10 kΩ or higher

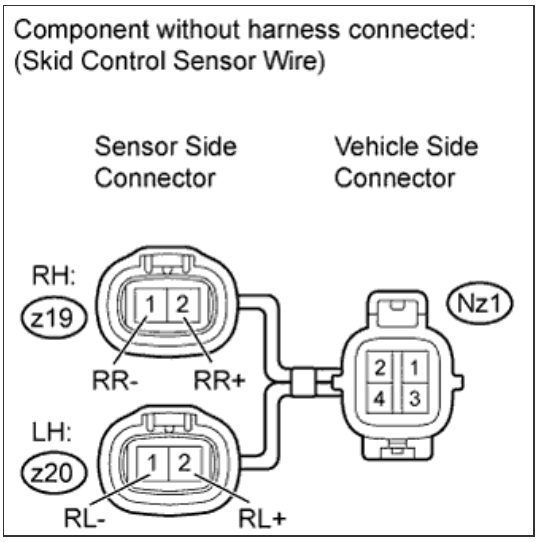
NG → REPLACE REAR SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z19/z20 and Nz1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z19-2 (RR+) - Nz1-4	Always	Below 1 Ω
z19-2 (RR+) - Nz1-3	Always	10 kΩ or higher
z19-2 (RR+) - Body ground	Always	10 kΩ or higher
z19-1 (RR-) - Nz1-3	Always	Below 1 Ω
z19-1 (RR-) - Nz1-4	Always	10 kΩ or higher
z19-1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z20-2 (RL+) - Nz1-2	Always	Below 1 Ω
z20-2 (RL+) - Nz1-1	Always	10 kΩ or higher
z20-2 (RL+) - Body ground	Always	10 kΩ or higher
z20-1 (RL-) - Nz1-1	Always	Below 1 Ω
z20-1 (RL-) - Nz1-2	Always	10 kΩ or higher
z20-1 (RL-) - Body ground	Always	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (Click here).

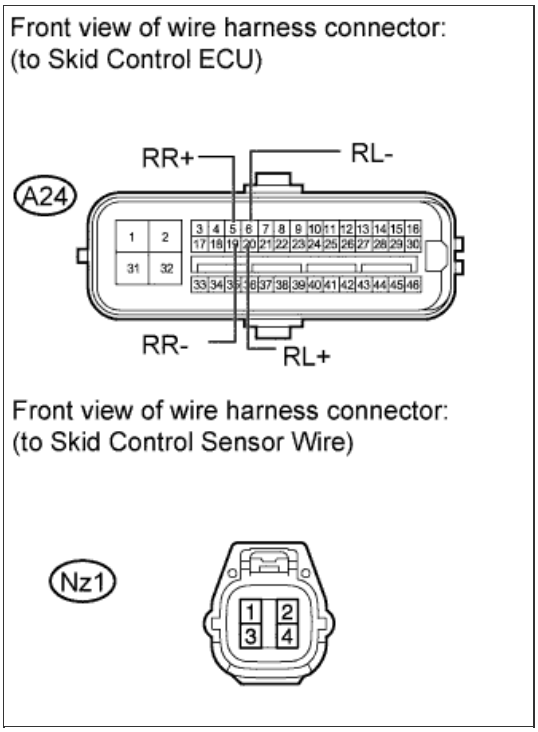
NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and Nz1 skid control sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - Nz1-4	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher
A24-19 (RR-) - Nz1-3	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - Nz1-2	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - Nz1-1	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

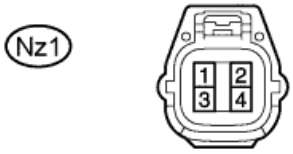
OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

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

Front view of wire harness connector:
(to Skid Control Sensor Wire)



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Nz1-4 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Nz1-2 - Body ground	Ignition switch ON	7.5 to 12 V

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE REAR SPEED SENSOR

a. Replace the rear speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the rear axle hub and bearing assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CLEAN OR REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

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 Acceleration Sensor Power Supply Voltage Malfunction

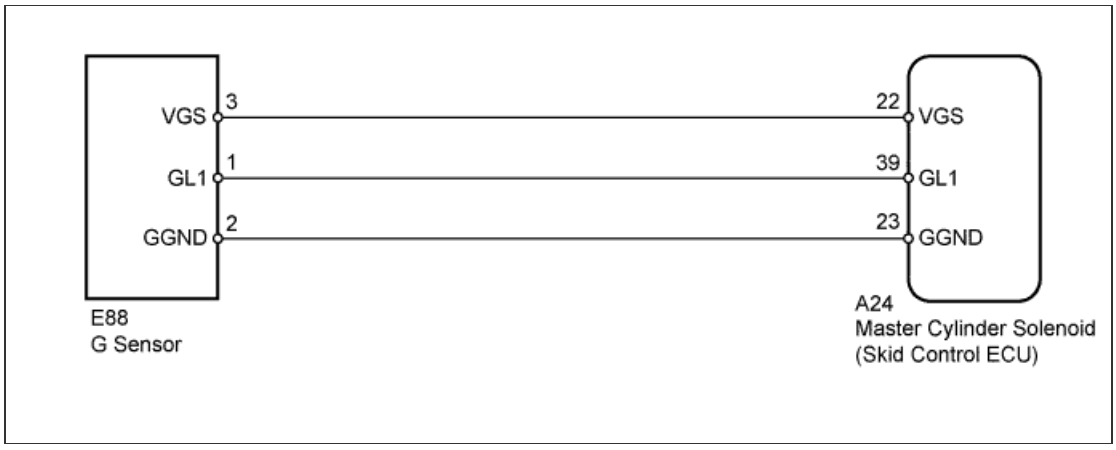
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the G sensor. If the sensor functions abnormally, the ABS warning light turns on.

DTC Code	DTC Detection Condition	Trouble Area
C1243/43	The following condition repeats 16 times. • GL1 and GL2 do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• G sensor • Harness or connector • CAN communication system
C1244/44	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 60 seconds. • The vehicle is stopped. • The difference between GL1 and GL2 does not drop to less than 0.4 G after it reaches 0.6 G or more. 2. A data malfunction signal is received from the G sensor.	• G sensor • Harness or connector • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. • The difference between the values calculated from the G sensor value and vehicle speed exceeds 0.35 G.	• G sensor • Harness or connector • CAN communication system
C1381/97	A G sensor power source malfunction signal is received for at least 10 seconds at a speed of more than 3 km/h (2 mph).	• G sensor • Harness or connector • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the G sensor, perform zero point calibration (Click here).

1.CHECK G SENSOR INSTALLATION

a. Check that the G sensor is installed properly.

Result:

Result		Proceed to
The sensor is tightened to the specified torque. The sensor is not tilted.		A
The sensor is not tightened to the specified torque. Or the sensor is tilted.	for Automatic Transmission	B
	for Manual Transmission	C

B → INSTALL G SENSOR CORRECTLY (Click here)

C → INSTALL G SENSOR CORRECTLY (Click here)

A

2.READ VALUE USING INTELLIGENT TESTER (DECELERATION SENSOR)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Deceleration Sensor	G sensor reading / min.: -18.525 m/s^2, max.: 18.387 m/s^2	Approximately -1.28 to 1.27 m/s^2 while stationary	The reading changes when the vehicle is bounced.

d. Check the Data List for proper functioning of the G sensor.

OK:
Deceleration value changes.

NG → Go to step 4

OK

3.CHECK DTC

a. Install the G sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Drive the vehicle at 6 km/h (4 mph) or more.

d. Check if the same DTCs are output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

4.INSPECT G SENSOR

a. Remove the G sensor (Click here).

b. Connect 3 dry cell batteries of 1.5 V in series.

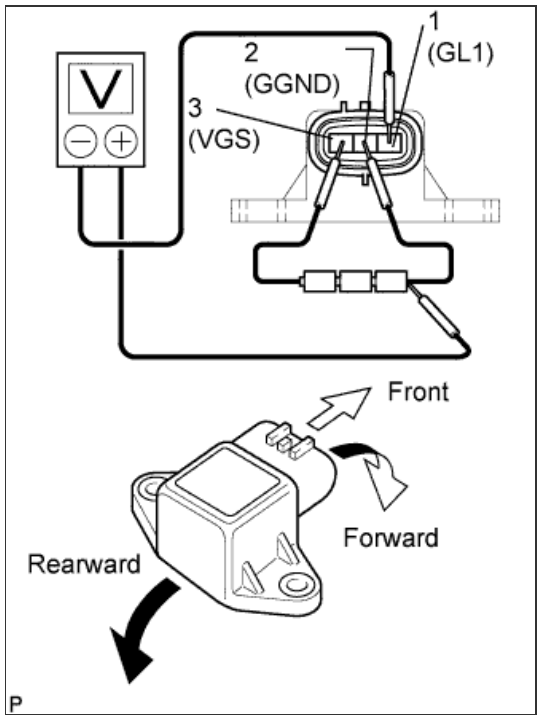
NOTICE:

Do not apply 6 V or more to terminals 3 (VGS) and 2 (GGND).

c. Check the output voltage of terminal 1 (GL1) when the sensor is tilted forward and rearward.

Standard Voltage:

Tester Connection	Condition	Specified Condition
1 (GL1) - Battery negative (-) lead	Horizontal	Approximately 2.5 V
1 (GL1) - Battery negative (-) lead	Tilted forward	Approximately 0.5 to 2.5 V
1 (GL1) - Battery negative (-) lead	Tilted rearward	Approximately 2.5 to 4.5 V



HINT:

- **If the sensor is tilted too much, it may output the wrong value.**
- **If the voltage drops, the sensor should be replaced with a new one.**
- **When replacing the sensor, it should not be placed upside down.**

NG → REPLACE DECELERATION SENSOR (Click here)

OK

5.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - G SENSOR)

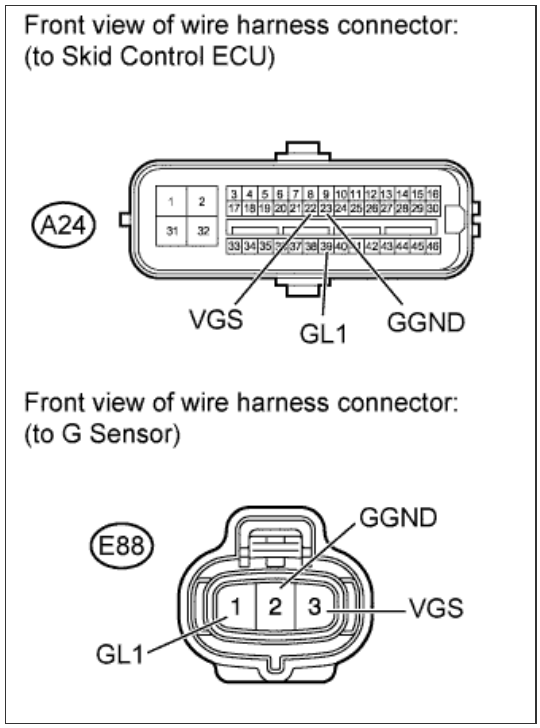
a. Disconnect the A24 skid control ECU connector.

b. Disconnect the E88 G sensor connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-39 (GL1) - E88-1 (GL1)	Always	Below 1 Ω
A24-23 (GGND) - E88-2 (GGND)	Always	Below 1 Ω
A24-22 (VGS) - E88-3 (VGS)	Always	Below 1 Ω
E88-1 (GL1) - Body ground	Always	10 kΩ or higher
E88-2 (GGND) - Body ground	Always	10 kΩ or higher
E88-3 (VGS) - Body ground	Always	10 kΩ or higher



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6.CHECK DTC

a. Install the G sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Drive the vehicle at 6 km/h (4 mph) or more.

d. Check if the same DTCs are output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0210/33 Rear Speed Sensor RH Circuit

DTC C0215/34 Rear Speed Sensor LH Circuit

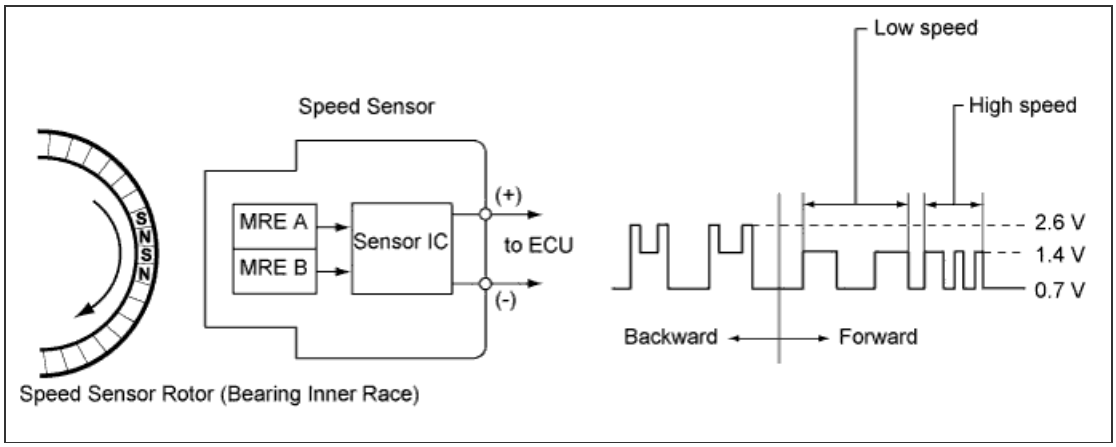
DTC C1238/38 Foreign Object is Attached on Tip of Rear Speed Sensor RH

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

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD and BA systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.
To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

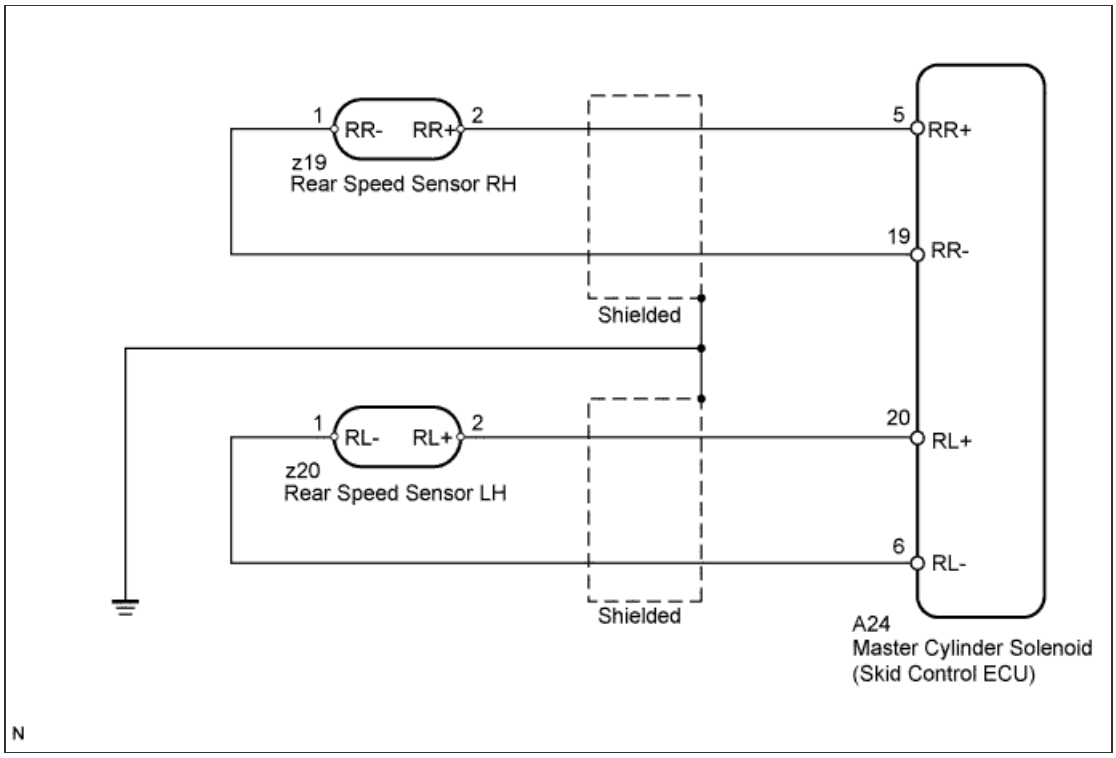


DTC Code	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Rear speed sensor RH • Rear speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1238/38 C1239/39	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Rear speed sensor RH • Rear speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0210/33 and C1238/38 are for the rear speed sensor RH.**
- **DTC C0215/34 and C1239/39 are for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (RR/RL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (RR/RL WHEEL SPEED, RR/RL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note

RR Wheel Speed	Rear wheel speed sensor RH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Direction	Rear wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT REAR SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation nut is tightened properly.

There is no clearance between the sensor and rear axle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL REAR SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the rear speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE REAR SPEED SENSOR (Click here)

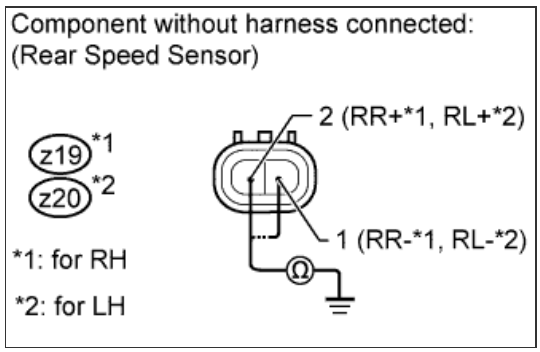
OK

6.INSPECT REAR SPEED SENSOR

a. Install the rear speed sensor.

b. Disconnect the z19 and/or z20 rear speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch off	10 kΩ or higher
z19-1 (RR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch off	10 kΩ or higher
z20-1 (RL-) - Body ground	Ignition switch off	10 kΩ or higher

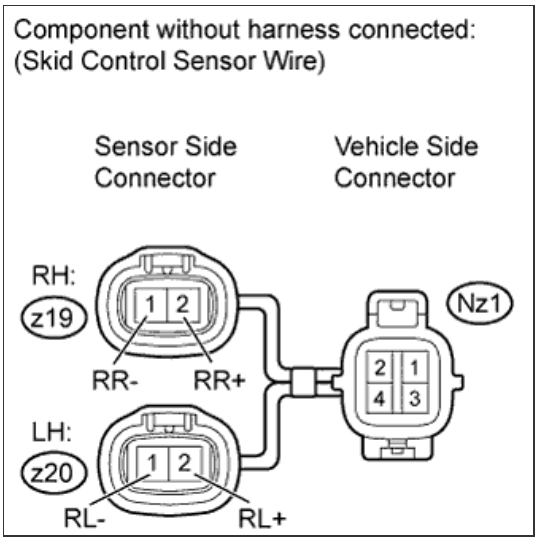
NG → REPLACE REAR SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z19/z20 and Nz1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z19-2 (RR+) - Nz1-4	Always	Below 1 Ω
z19-2 (RR+) - Nz1-3	Always	10 kΩ or higher
z19-2 (RR+) - Body ground	Always	10 kΩ or higher
z19-1 (RR-) - Nz1-3	Always	Below 1 Ω
z19-1 (RR-) - Nz1-4	Always	10 kΩ or higher
z19-1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z20-2 (RL+) - Nz1-2	Always	Below 1 Ω
z20-2 (RL+) - Nz1-1	Always	10 kΩ or higher
z20-2 (RL+) - Body ground	Always	10 kΩ or higher
z20-1 (RL-) - Nz1-1	Always	Below 1 Ω
z20-1 (RL-) - Nz1-2	Always	10 kΩ or higher
z20-1 (RL-) - Body ground	Always	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (Click here).

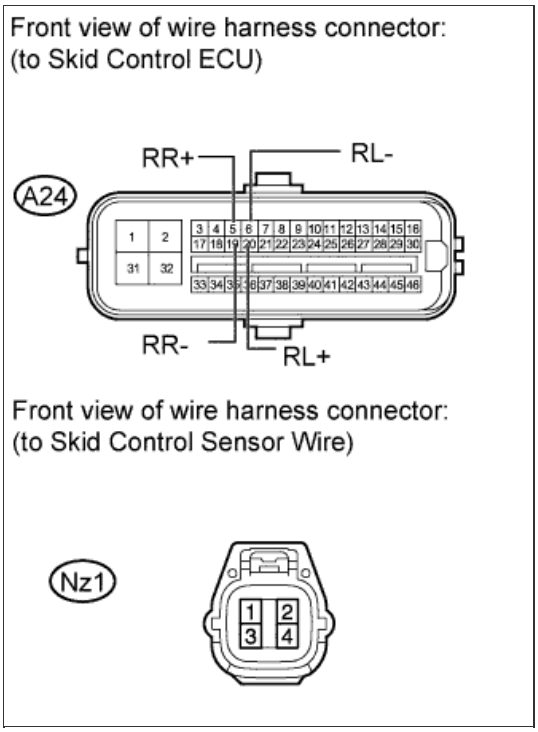
NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and Nz1 skid control sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - Nz1-4	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher
A24-19 (RR-) - Nz1-3	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - Nz1-2	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - Nz1-1	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

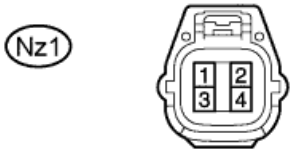
OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

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

Front view of wire harness connector:
(to Skid Control Sensor Wire)



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Nz1-4 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Nz1-2 - Body ground	Ignition switch ON	7.5 to 12 V

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE REAR SPEED SENSOR

a. Replace the rear speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the rear axle hub and bearing assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

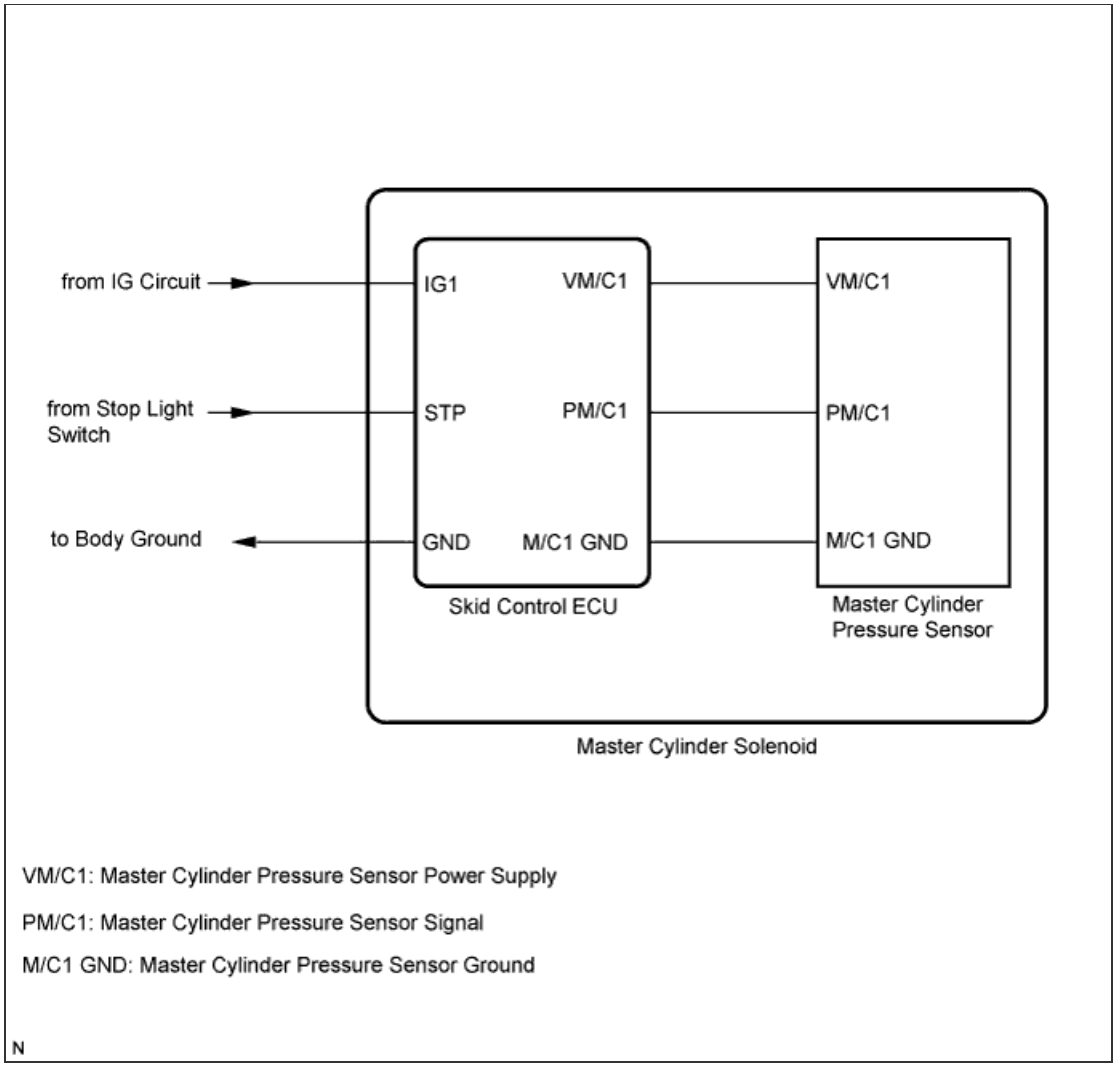
CLEAN OR REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

DTC C1246/46 Master Cylinder Pressure Sensor Malfunction

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1246/46	When any of the following conditions is detected: 1. All of the following conditions continue for at least 30 seconds. • The vehicle speed is more than 7 km/h (4 mph). • The PM/C1 terminal voltage exceeds 0.86 V. • The master cylinder pressure does not change by more than 0.048 MPa (0.5 kgf/cm^2, 7.0 psi). 2. The PM/C1 terminal receives interference at least 7 times within 5 seconds. 3. Both of the following conditions continue for at least 1.2 seconds. • The stop light switch is off. • The PM/C1 terminal voltage is higher than 0.86 V or below 0.3 V. 4. The following condition continues for at least 1.2 seconds. • The PM/C1 terminal voltage is not between 0.19 and 4.57 V.	• STOP fuse • Master cylinder pressure sensor • Stop light switch • Harness or connector • Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**
- **When replacing the master cylinder solenoid, perform zero point calibration (Click here).**

1.CHECK DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Depress the brake pedal.

e. Check for DTC (Click here).

Result

Result	Proceed to
DTC C1246/46 is output	A
DTCs C1246/46 and C1249/49 are output	B

B → GO TO DTC C1249/49 (Click here)

A

2.READ VALUE USING INTELLIGENT TESTER (MASTER CYLINDER SENSOR)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Master Cylinder Sensor	Master cylinder pressure sensor reading / min.: 0.00 V, max.: 5.00 V	When brake pedal is released: 0.3 to 0.9 V	The reading increases when the brake pedal is depressed.

d. Check that the master cylinder pressure value of the master cylinder pressure sensor displayed on the intelligent tester changes when depressing the brake pedal.

Result

Result		Proceed to
Master cylinder pressure sensor value does not change	LHD	A
	RHD	B
Master cylinder pressure sensor value changes but it is not normal		C
Master cylinder pressure sensor value changes normally		

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → Go to step 3

A

REPLACE MASTER CYLINDER SOLENOID (Click here)

3.CHECK BRAKE PEDAL AND STOP LIGHT SWITCH INSTALLATION

a. Check the brake pedal height (LHD: Click here/RHD: Click here).

b. Check the stop light switch installation (LHD: Click here/RHD: Click here).

OK:
The brake pedal and stop light switch are normal.

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → ADJUST BRAKE PEDAL AND/OR STOP LIGHT SWITCH (Click here)

C → ADJUST BRAKE PEDAL AND/OR STOP LIGHT SWITCH (Click here)

A

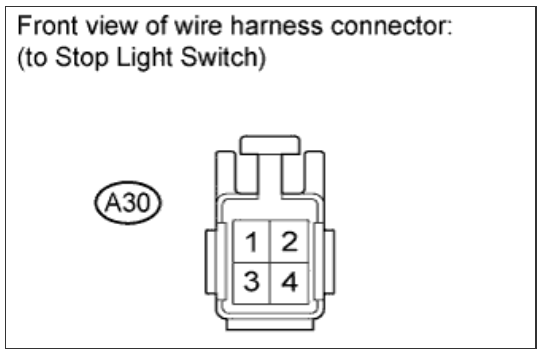
4.CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH POWER SOURCE TERMINAL)

a. Disconnect the A30 stop light switch connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A30-2 - Body ground	Always	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

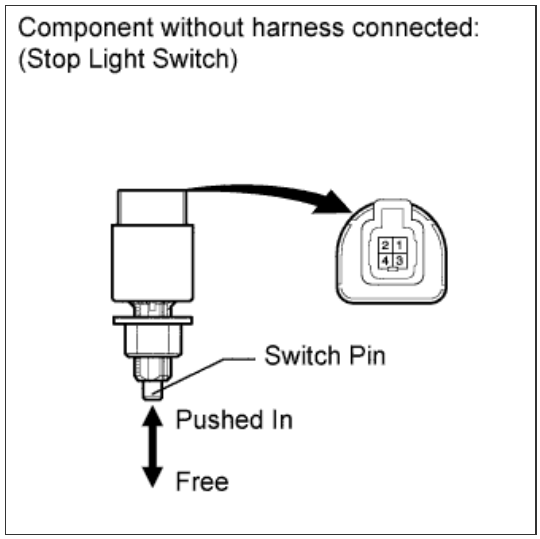
5.INSPECT STOP LIGHT SWITCH ASSEMBLY

a. Remove the stop light switch assembly.

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

Standard Resistance:

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



NG → REPLACE STOP LIGHT SWITCH ASSEMBLY

OK

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Check if the same DTC is output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (**Click here**)

C → REPLACE MASTER CYLINDER SOLENOID (**Click here**)

A

USE SIMULATION METHOD TO CHECK (**Click here**)

DTC C0210/33 Rear Speed Sensor RH Circuit

DTC C0215/34 Rear Speed Sensor LH Circuit

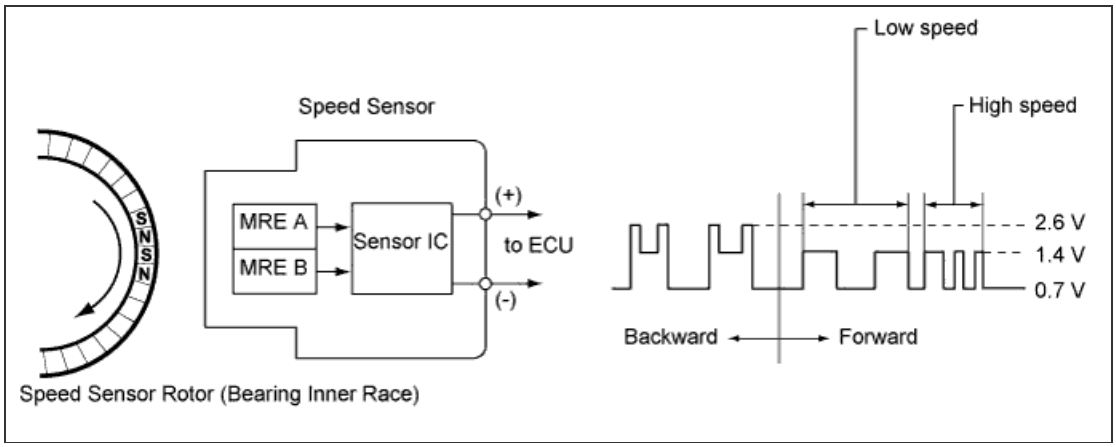
DTC C1238/38 Foreign Object is Attached on Tip of Rear Speed Sensor RH

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

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD and BA systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.
To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

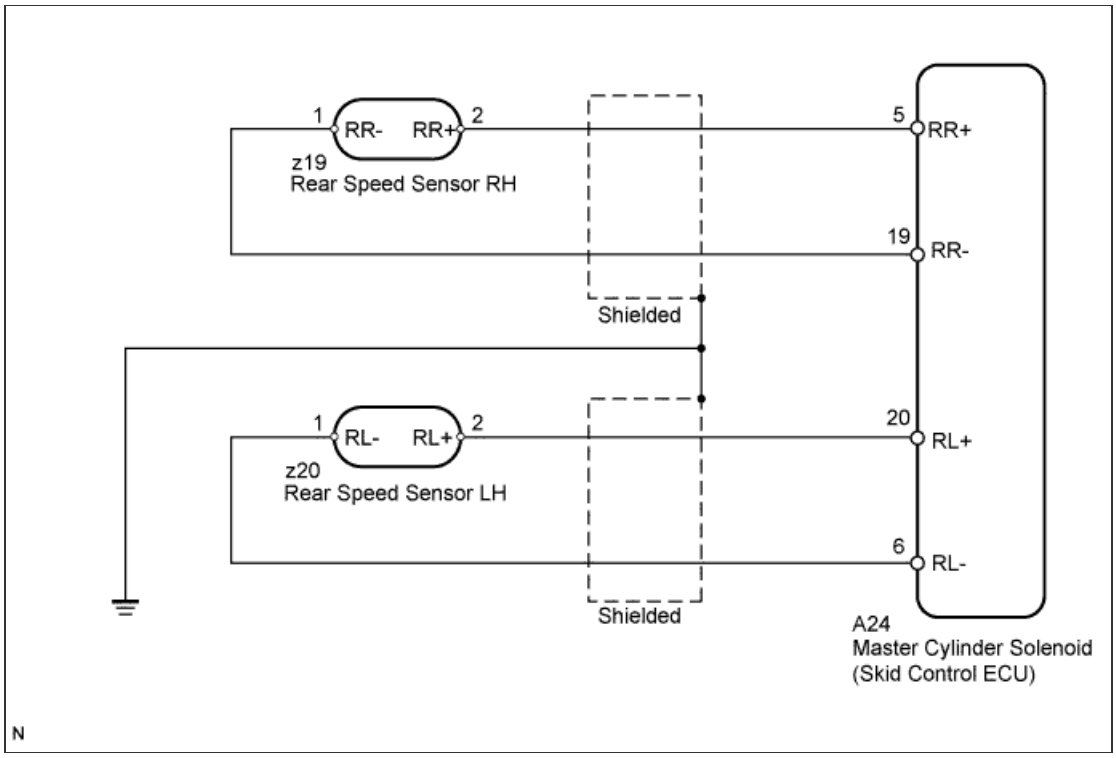


DTC Code	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Rear speed sensor RH • Rear speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1238/38 C1239/39	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Rear speed sensor RH • Rear speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0210/33 and C1238/38 are for the rear speed sensor RH.**
- **DTC C0215/34 and C1239/39 are for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (RR/RL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (RR/RL WHEEL SPEED, RR/RL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note

RR Wheel Speed	Rear wheel speed sensor RH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Direction	Rear wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT REAR SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation nut is tightened properly.

There is no clearance between the sensor and rear axle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL REAR SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the rear speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE REAR SPEED SENSOR (Click here)

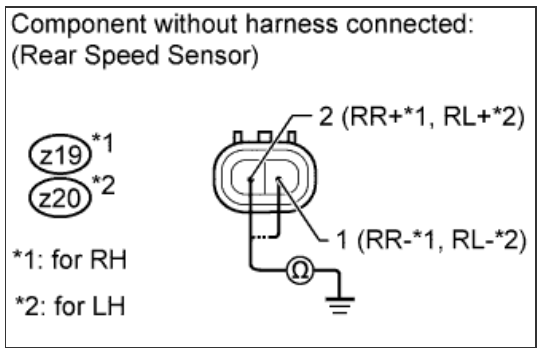
OK

6.INSPECT REAR SPEED SENSOR

a. Install the rear speed sensor.

b. Disconnect the z19 and/or z20 rear speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch off	10 kΩ or higher
z19-1 (RR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch off	10 kΩ or higher
z20-1 (RL-) - Body ground	Ignition switch off	10 kΩ or higher

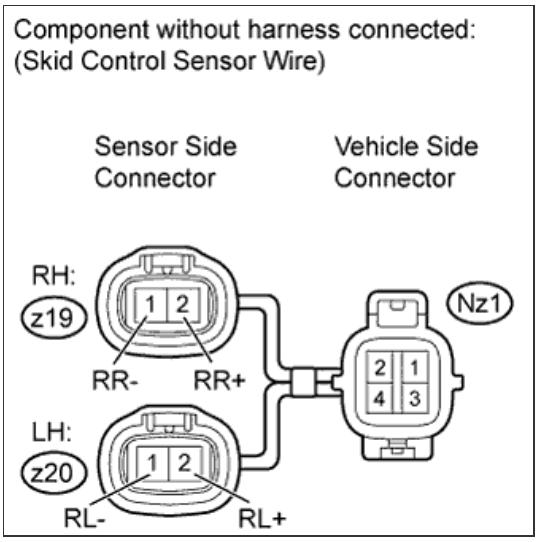
NG → REPLACE REAR SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z19/z20 and Nz1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z19-2 (RR+) - Nz1-4	Always	Below 1 Ω
z19-2 (RR+) - Nz1-3	Always	10 kΩ or higher
z19-2 (RR+) - Body ground	Always	10 kΩ or higher
z19-1 (RR-) - Nz1-3	Always	Below 1 Ω
z19-1 (RR-) - Nz1-4	Always	10 kΩ or higher
z19-1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z20-2 (RL+) - Nz1-2	Always	Below 1 Ω
z20-2 (RL+) - Nz1-1	Always	10 kΩ or higher
z20-2 (RL+) - Body ground	Always	10 kΩ or higher
z20-1 (RL-) - Nz1-1	Always	Below 1 Ω
z20-1 (RL-) - Nz1-2	Always	10 kΩ or higher
z20-1 (RL-) - Body ground	Always	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (Click here).

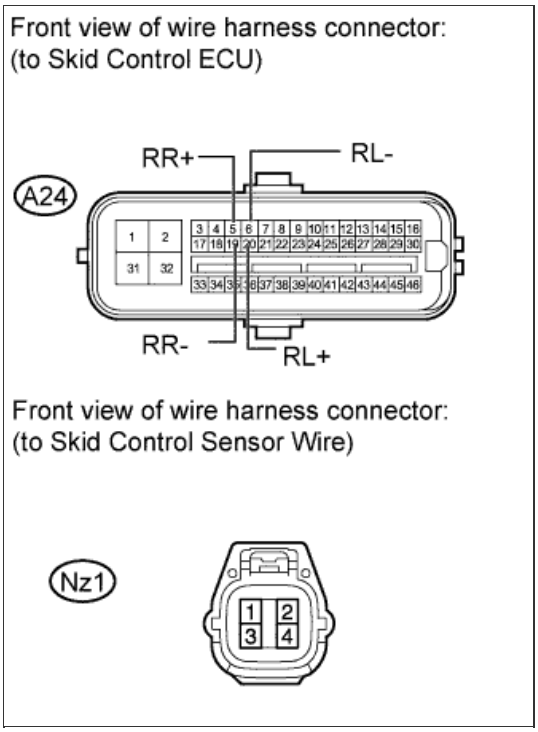
NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and Nz1 skid control sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - Nz1-4	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher
A24-19 (RR-) - Nz1-3	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - Nz1-2	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - Nz1-1	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

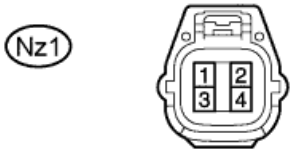
OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

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

Front view of wire harness connector:
(to Skid Control Sensor Wire)



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Nz1-4 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Nz1-2 - Body ground	Ignition switch ON	7.5 to 12 V

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE REAR SPEED SENSOR

a. Replace the rear speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the rear axle hub and bearing assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CLEAN OR REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

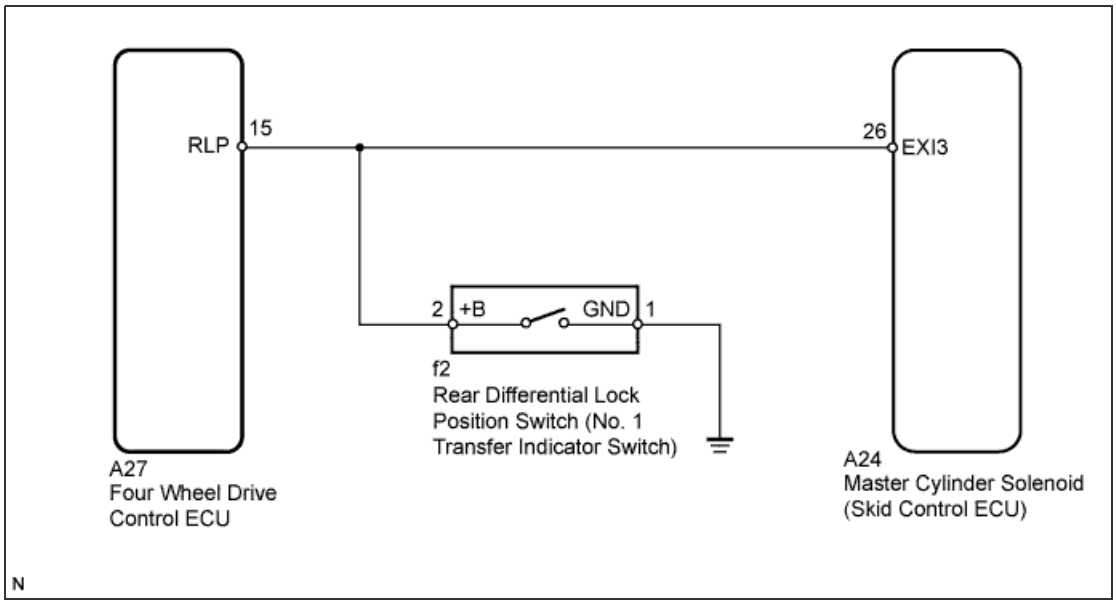
DTC C1248/48 Open Circuit in Rear Differential Lock

for Preparation Click here

DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1248/48	With the vehicle speed at 50 km/h (30 mph) or more, the rear differential lock position switch changes from off to on and 3 seconds or more elapse.	• Rear differential lock position switch (No. 1 transfer indicator switch) • Master cylinder solenoid (Skid control ECU) • Harness or connector

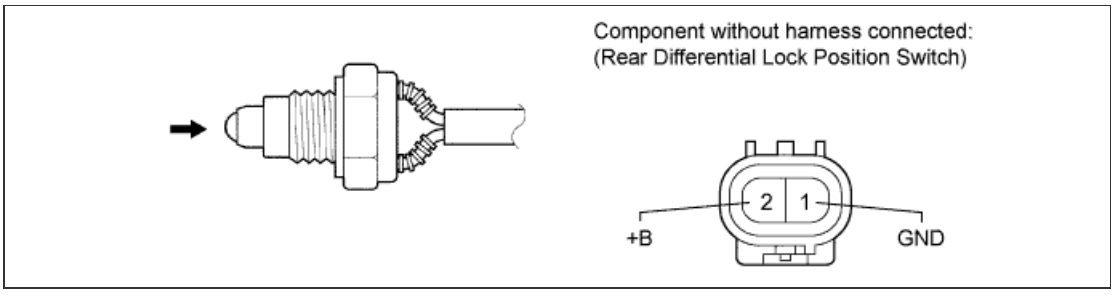
WIRING DIAGRAM



INSPECTION PROCEDURE

1.INSPECT REAR DIFFERENTIAL LOCK POSITION SWITCH (NO. 1 TRANSFER INDICATOR SWITCH)

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



Standard Resistance:

Tester Connection	Switch Condition	Specified Condition
2 (+B) - 1 (GND)	Pushed	Below 1 Ω
	Not pushed	10 kΩ or higher

NG → REPLACE NO. 1 TRANSFER INDICATOR SWITCH (Click here)

OK

2.CHECK HARNESS AND CONNECTOR (DIFFERENTIAL LOCK SWITCH - SKID CONTROL ECU AND BODY GROUND)

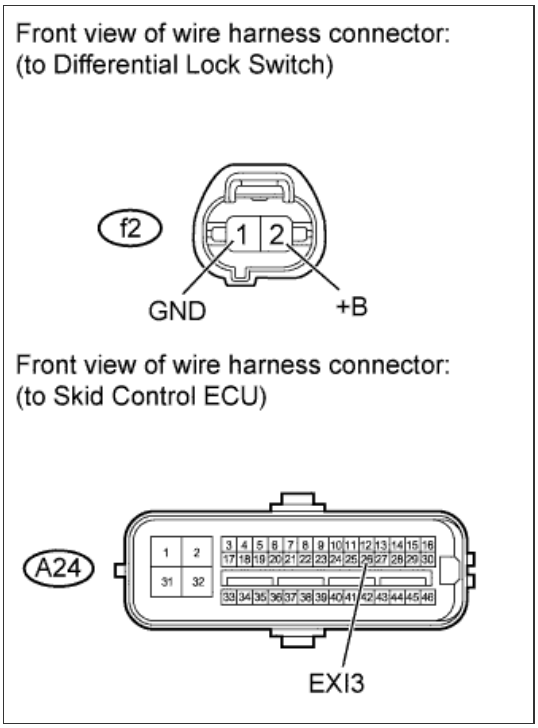
a. Disconnect the A24 skid control ECU connector.

b. Disconnect the f2 differential lock switch connector.

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

Standard Resistance:

Tester Connection	Condition	Tester Connection
f2-2 (+B) - A24-26 (EXI3)	Always	Below 1 Ω
f2-2 (+B) - Body ground	Always	10 kΩ or higher
f2-1 (GND) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.CHECK DTC

a. Clear the DTC (Click here).

b. Drive the vehicle at 50 km/h (30 mph) or more.

c. Check if the same DTC is output (Click here).

Result:

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0210/33 Rear Speed Sensor RH Circuit

DTC C0215/34 Rear Speed Sensor LH Circuit

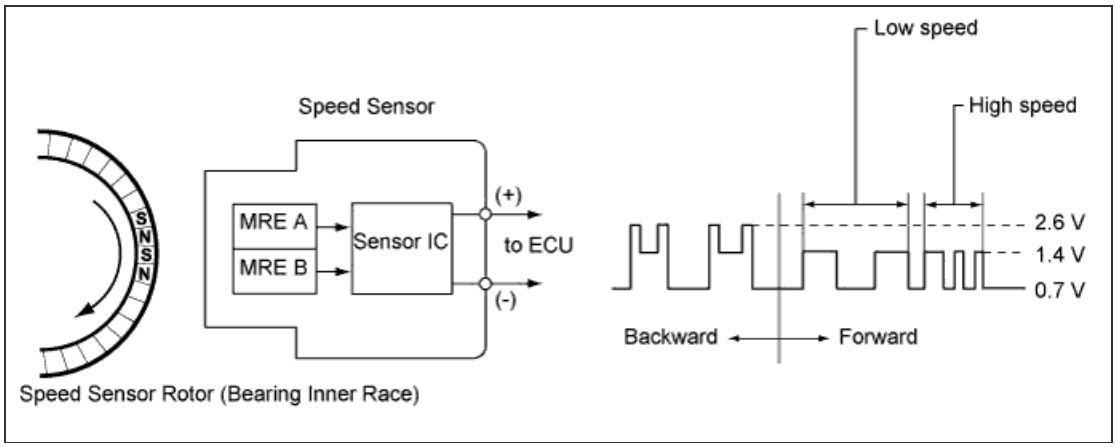
DTC C1238/38 Foreign Object is Attached on Tip of Rear Speed Sensor RH

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

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD and BA systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.
To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

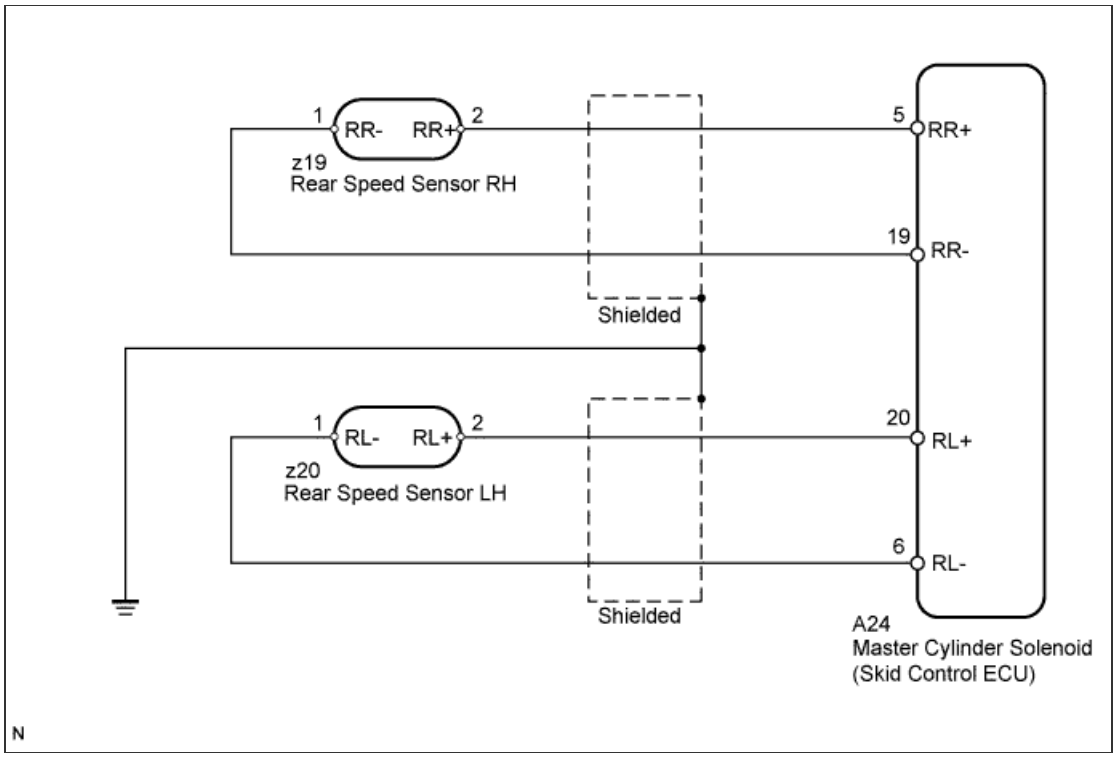


DTC Code	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Rear speed sensor RH • Rear speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1238/38 C1239/39	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Rear speed sensor RH • Rear speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0210/33 and C1238/38 are for the rear speed sensor RH.**
- **DTC C0215/34 and C1239/39 are for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (RR/RL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (RR/RL WHEEL SPEED, RR/RL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note

RR Wheel Speed	Rear wheel speed sensor RH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Direction	Rear wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT REAR SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation nut is tightened properly.

There is no clearance between the sensor and rear axle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL REAR SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the rear speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE REAR SPEED SENSOR (Click here)

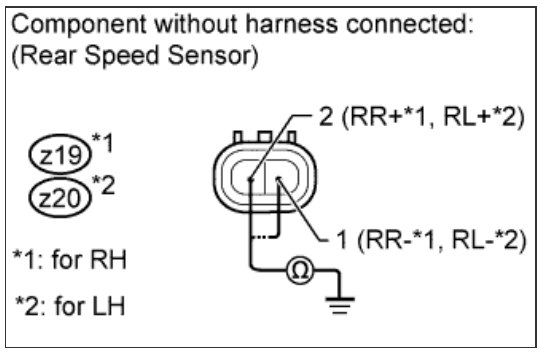
OK

6.INSPECT REAR SPEED SENSOR

a. Install the rear speed sensor.

b. Disconnect the z19 and/or z20 rear speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch off	10 kΩ or higher
z19-1 (RR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch off	10 kΩ or higher
z20-1 (RL-) - Body ground	Ignition switch off	10 kΩ or higher

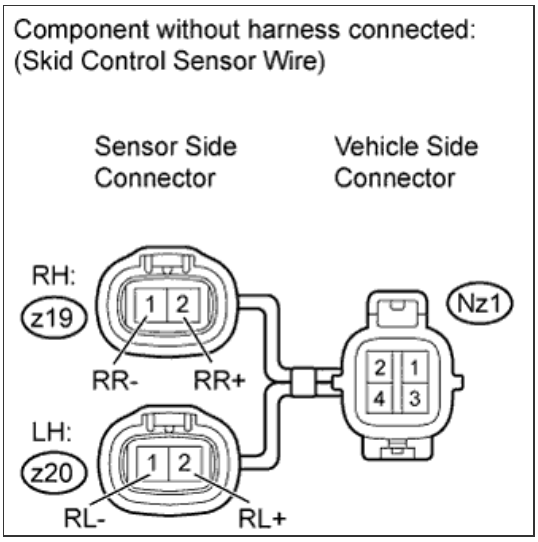
NG → REPLACE REAR SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z19/z20 and Nz1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z19-2 (RR+) - Nz1-4	Always	Below 1 Ω
z19-2 (RR+) - Nz1-3	Always	10 kΩ or higher
z19-2 (RR+) - Body ground	Always	10 kΩ or higher
z19-1 (RR-) - Nz1-3	Always	Below 1 Ω
z19-1 (RR-) - Nz1-4	Always	10 kΩ or higher
z19-1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z20-2 (RL+) - Nz1-2	Always	Below 1 Ω
z20-2 (RL+) - Nz1-1	Always	10 kΩ or higher
z20-2 (RL+) - Body ground	Always	10 kΩ or higher
z20-1 (RL-) - Nz1-1	Always	Below 1 Ω
z20-1 (RL-) - Nz1-2	Always	10 kΩ or higher
z20-1 (RL-) - Body ground	Always	10 kΩ or higher

NOTICE:

Check the speed sensor signal after replacement (Click here).

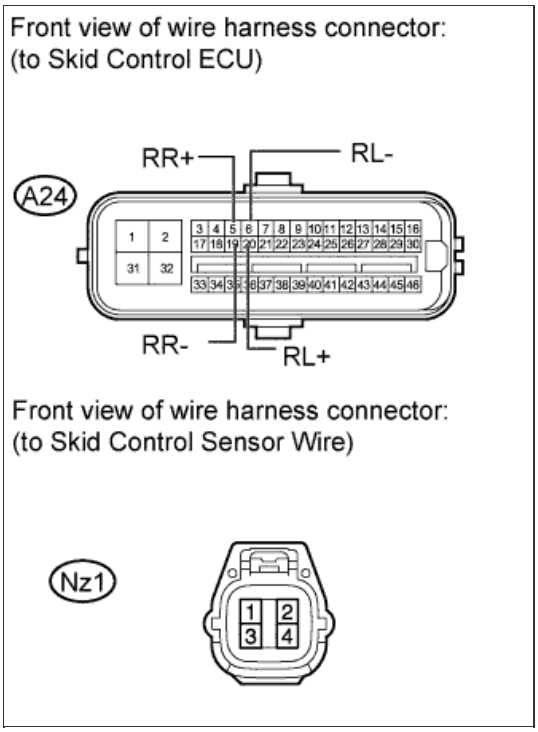
NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and Nz1 skid control sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - Nz1-4	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher
A24-19 (RR-) - Nz1-3	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - Nz1-2	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - Nz1-1	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

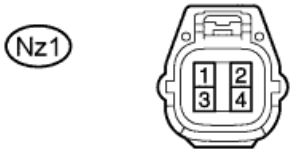
OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

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

Front view of wire harness connector:
(to Skid Control Sensor Wire)



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Nz1-4 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Nz1-2 - Body ground	Ignition switch ON	7.5 to 12 V

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE REAR SPEED SENSOR

a. Replace the rear speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the rear axle hub and bearing assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CLEAN OR REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

DTC C1249/49 Open in Stop Light Switch Circuit

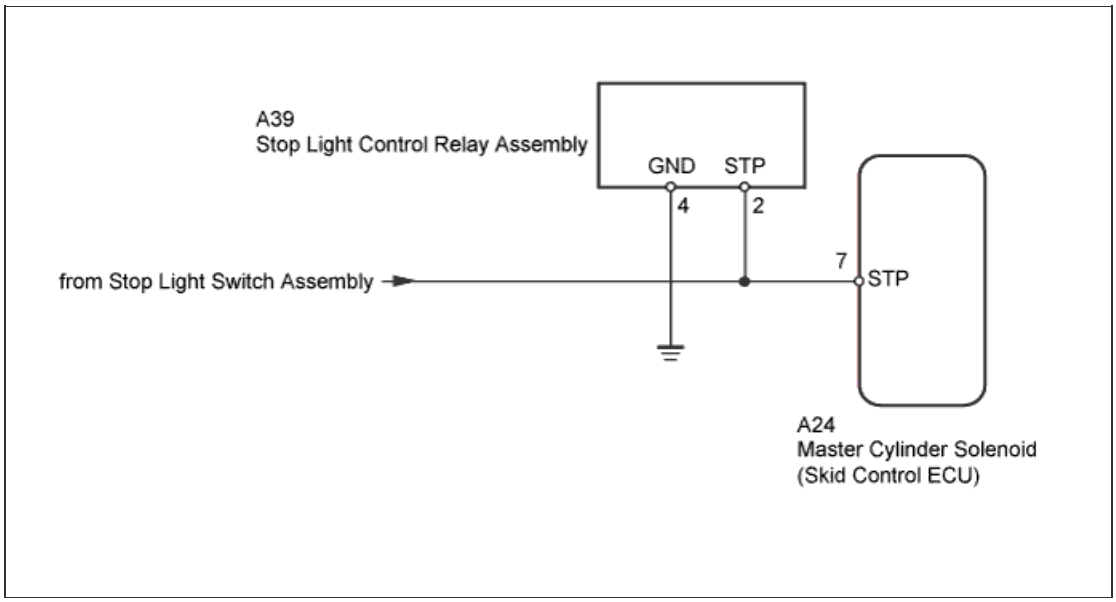
for Preparation Click here

DESCRIPTION

The stop light switch signal is input to the skid control ECU and the skid control ECU detects the status of brake operation.
The skid control ECU has an open detection circuit.
If an open in the stop light switch input line or GND side stop light circuit is detected when the stop light switch is off, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1249/49	The ECU terminal IG1 voltage is 9.5 to 17.0 V, ABS is not operating, and an open in the stop light switch circuit continues for 3 seconds or more.	• Harness or connector • Stop light control relay • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK STOP LIGHT OPERATION

a. Check that the stop light come on when the brake pedal is depressed, and go off when the brake pedal is released.

OK:

Condition	Illumination Condition
Brake pedal depressed	On
Brake pedal released	Off

NG → GO TO LIGHTING SYSTEM (STOP LIGHT CIRCUIT) (Click here)

OK

2.INSPECT SKID CONTROL ECU (STP TERMINAL)

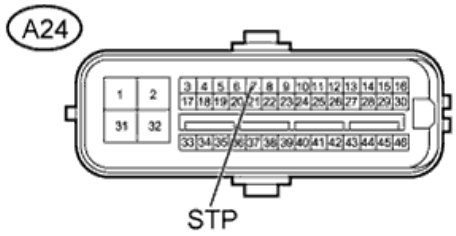
a. Disconnect the A24 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-7 (STP) - Body ground	Stop light switch on (Brake pedal depressed)	8 to 14 V
A24-7 (STP) - Body ground	Stop light switch off (Brake pedal released)	Below 1.5 V

Front view of wire harness connector:
(to Skid Control ECU)



Result

Result	Proceed to
OK (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with the Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

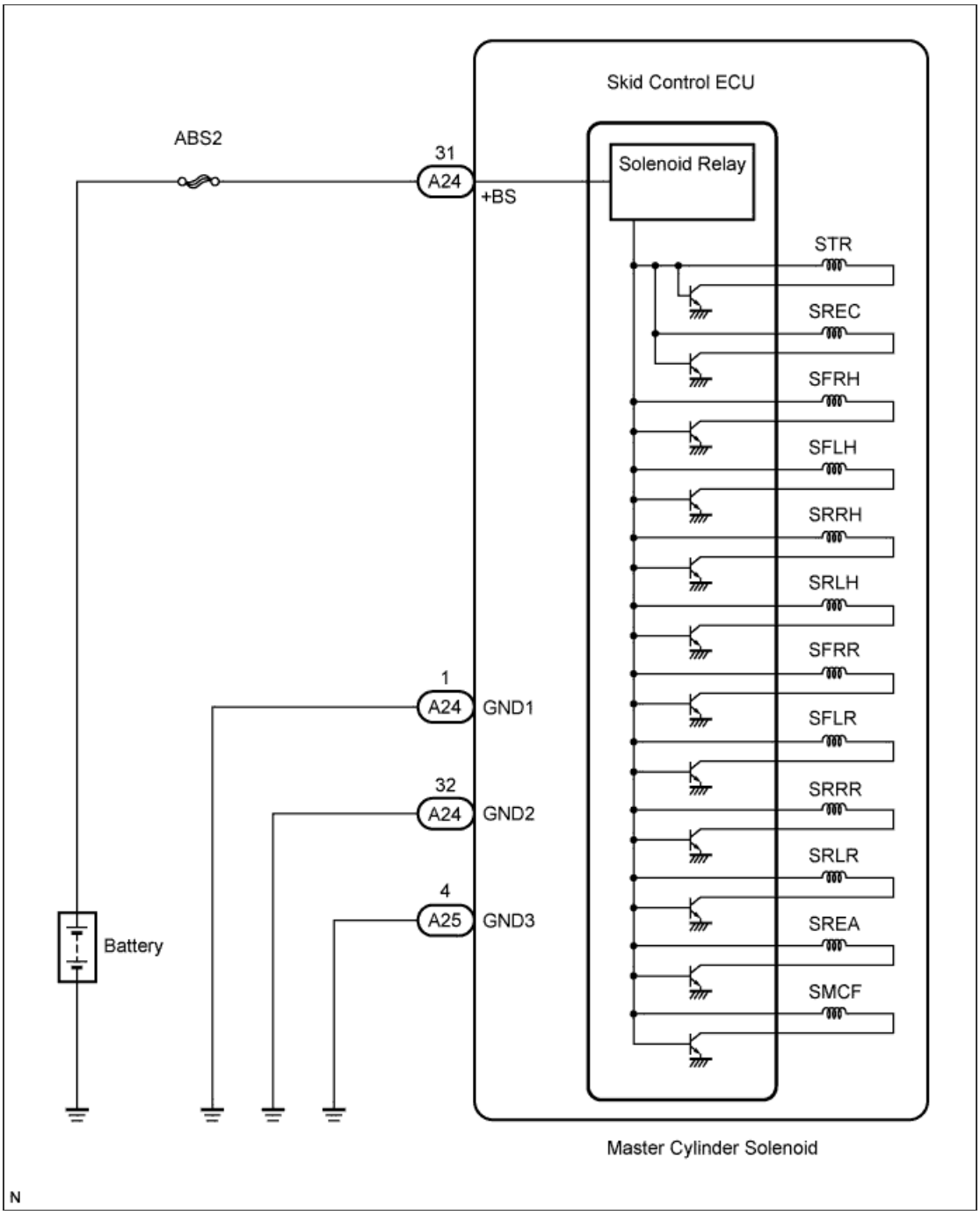
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C1251/51 Open in Pump Motor Circuit

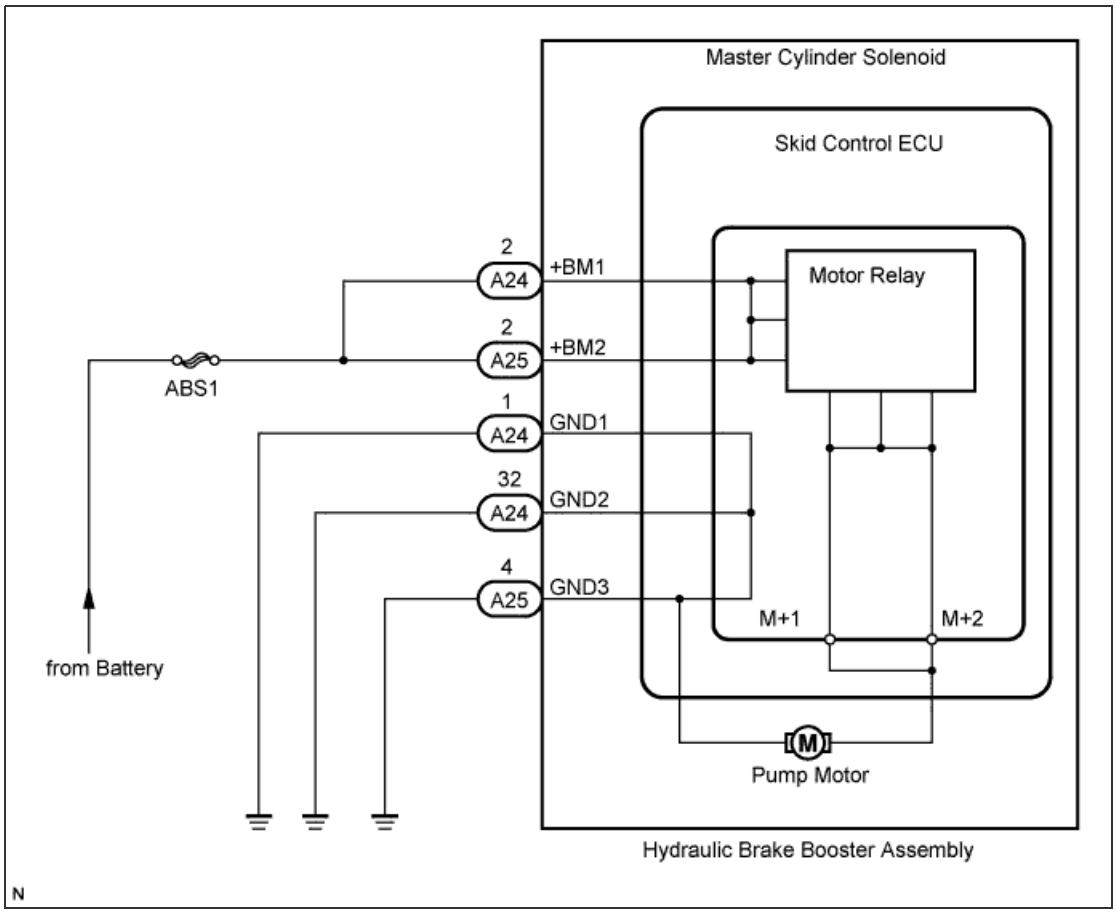
for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C1251/51	There is an open in the motor system circuit (motor input circuit).	• Pump motor wire harness connection • Brake booster with accumulator pump assembly • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

HINT:

Remove the hydraulic brake booster assembly before the inspection (LHD: Click here/RHD: Click here).

1.CHECK CONNECTION OF PUMP MOTOR WIRE HARNESS

a. Using a screwdriver, remove the 2 plugs from the hydraulic brake booster assembly (LHD: Click here/RHD: Click here).

b. Check the tightening torque of the 2 screws which tighten the wire harness connecting the hydraulic brake booster assembly and brake booster pump (LHD: Click here/RHD: Click here).

OK:

The harness is tightened to the specific torque.

Torque:

2.9 N*m{ 30 kgf*cm , 26 in.*lbf }

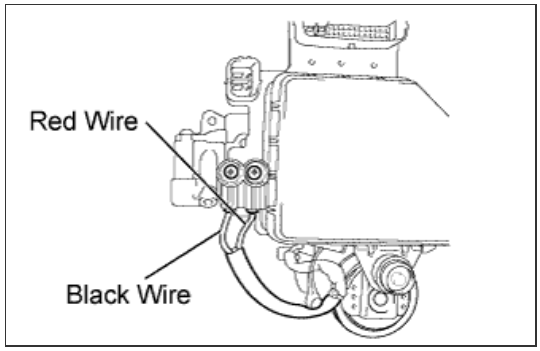
NG → RETIGHTEN SCREWS

OK

2.CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS

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

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



Standard Resistance:

Tester Connection	Condition	Specified Condition
Red wire terminal - Black wire terminal	Always	2 Ω

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY (Click here)

C → REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY (Click here)

A

3.RECONFIRM DTC

a. Reassemble the hydraulic brake booster assembly (LHD: Click here/RHD: Click here).

b. Install the hydraulic brake booster assembly (LHD: Click here/RHD: Click here).

c. Clear the DTC (Click here).

d. Check if the same DTC is output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

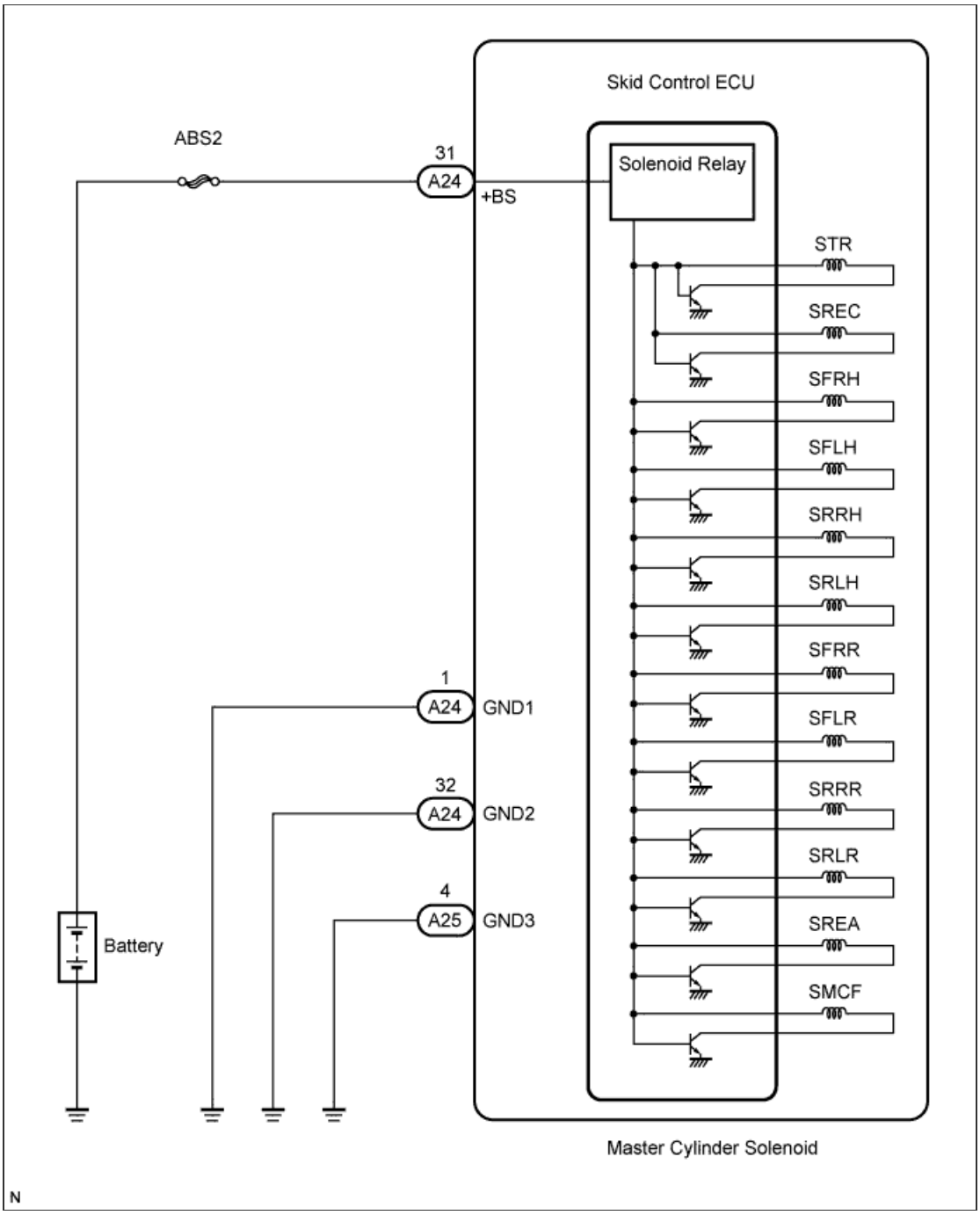
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

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

for Preparation Click here

DESCRIPTION

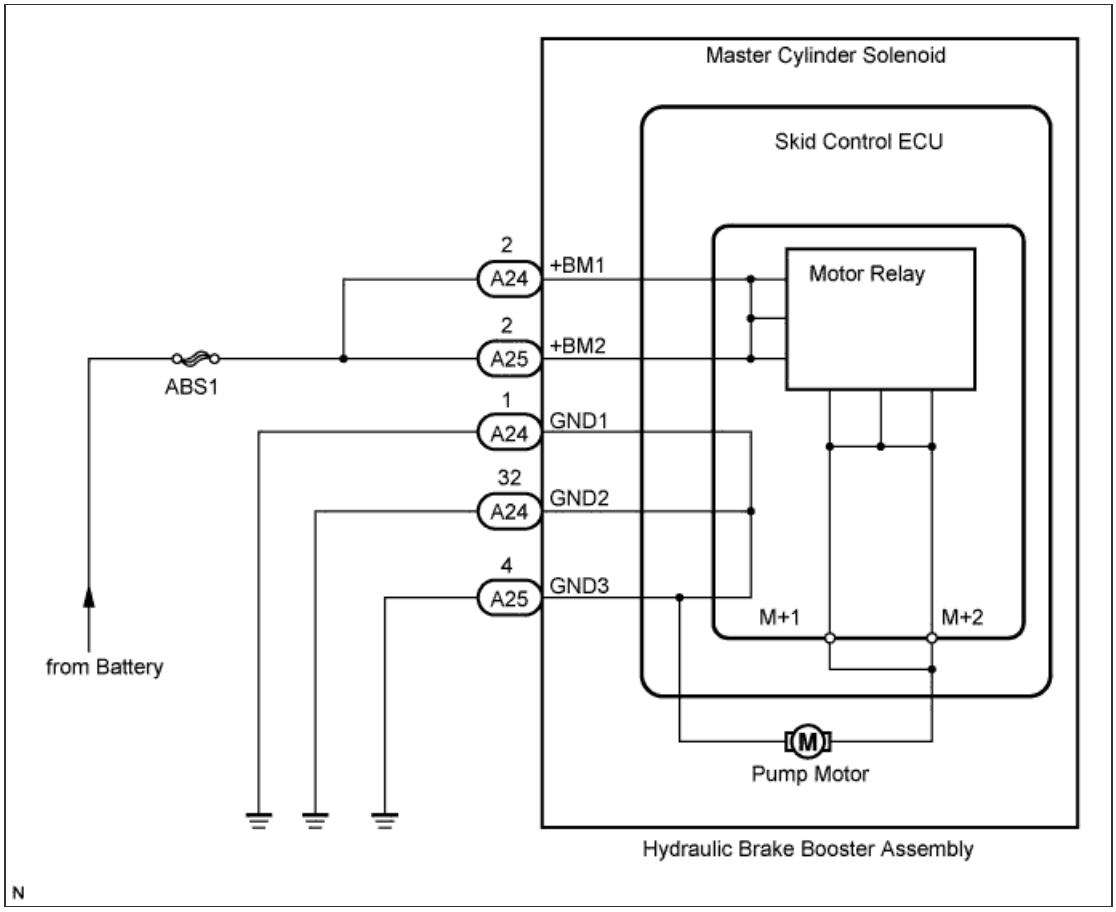
The motor relay (semiconductor relay) is built into the master cylinder solenoid and drives the pump motor based on a signal from the skid control ECU.

DTC Code	DTC Detection Condition	Trouble Area
C1252/52	The motor operates for 3 minutes or more.	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Accumulator pressure sensor

HINT:

The pump motor continues operation for the first 3 minutes, then repeats start and stop.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the hydraulic brake booster assembly (master cylinder solenoid), perform zero point calibration (Click here).

HINT:

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

1.CHECK PUMP MOTOR OPERATION

a. Turn the ignition switch off.

b. Depress the brake pedal more than 20 times.

c. Turn the ignition switch to ON.

d. Check how the pump motor operates.

Result

Result		Proceed to
Pump motor does not operate		A
Pump motor operates continuously, and does not stop	LHD	B
	RHD	C
Pump motor operates intermittently		D
Pump motor operates, then stops		E

B → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

C → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

D → Go to step 4

E → Go to step 5

A

2.CHECK CONNECTION OF PUMP MOTOR WIRE HARNESS

a. Remove the hydraulic brake booster assembly (LHD: Click here/RHD: Click here).

b. Using a screwdriver, remove the 2 plugs from the hydraulic brake booster assembly (LHD: Click here/RHD: Click here).

c. Check the tightening torque of the 2 screws which tighten the wire harness connecting the hydraulic brake booster assembly and brake booster pump (LHD: Click here/RHD: Click here).

OK:
The harness is tightened to the specific torque.

Torque:
2.9 N*m{ 30 kgf*cm , 26 in.*lbf }

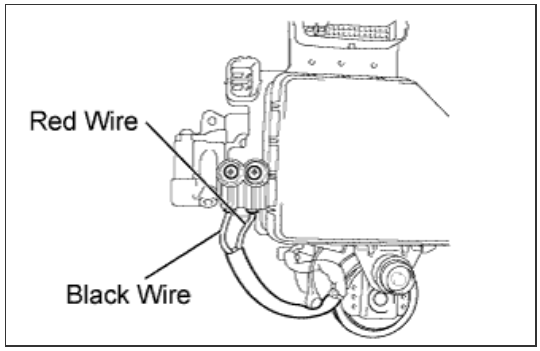
NG → RETIGHTEN SCREWS

OK

3.CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS

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

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



Standard Resistance:

Tester Connection	Condition	Specified Condition
Red wire terminal - Black wire terminal	Always	2 Ω

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY (Click here)

C → REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY (Click here)

A

4.READ VALUE USING INTELLIGENT TESTER (ACCUMULATOR SENSOR)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Accumulator Sensor	Accumulator pressure sensor reading / min.: 0.00 V, max.: 5.00 V	3.58 to 5 V	If the value is constant regardless of the pump operation, an accumulator pressure sensor malfunction is suspected.

d. Check the accumulator output value.

Result

Result		Proceed to
Output value is within the "Normal Condition" range		A
Output value is out of the "Normal Condition" range	LHD	B
	RHD	C
Output value is constant regardless of pump operation	LHD	D
	RHD	E

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

D → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

E → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

A

5.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Wait for more than 5 minutes.

e. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is output	LHD	A
	RHD	B
DTC is not output	LHD	C
	RHD	D

B

REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

C

REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY (Click here)

D

REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY (Click here)

A

REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

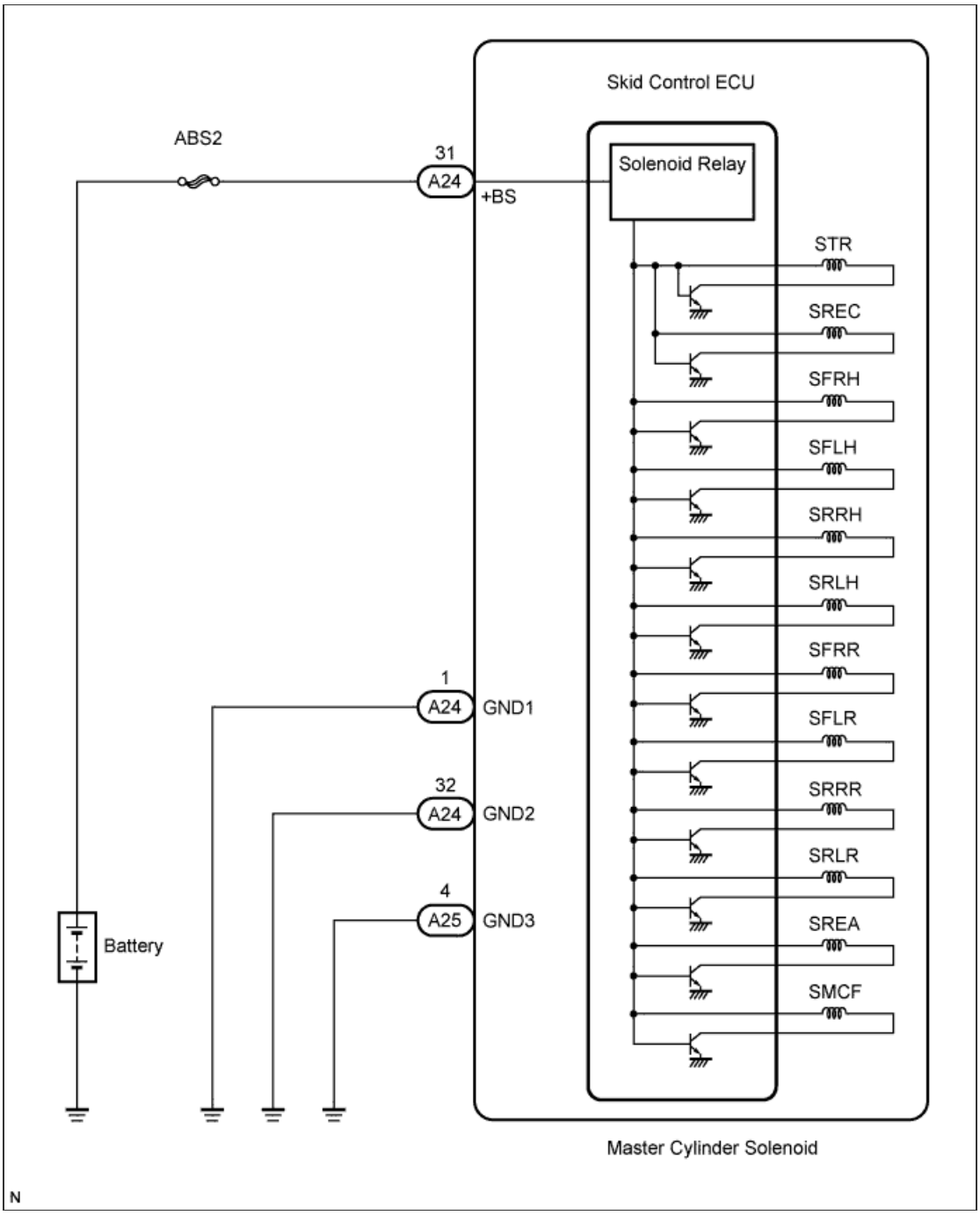
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C1253/53 Pump Motor Relay Malfunction

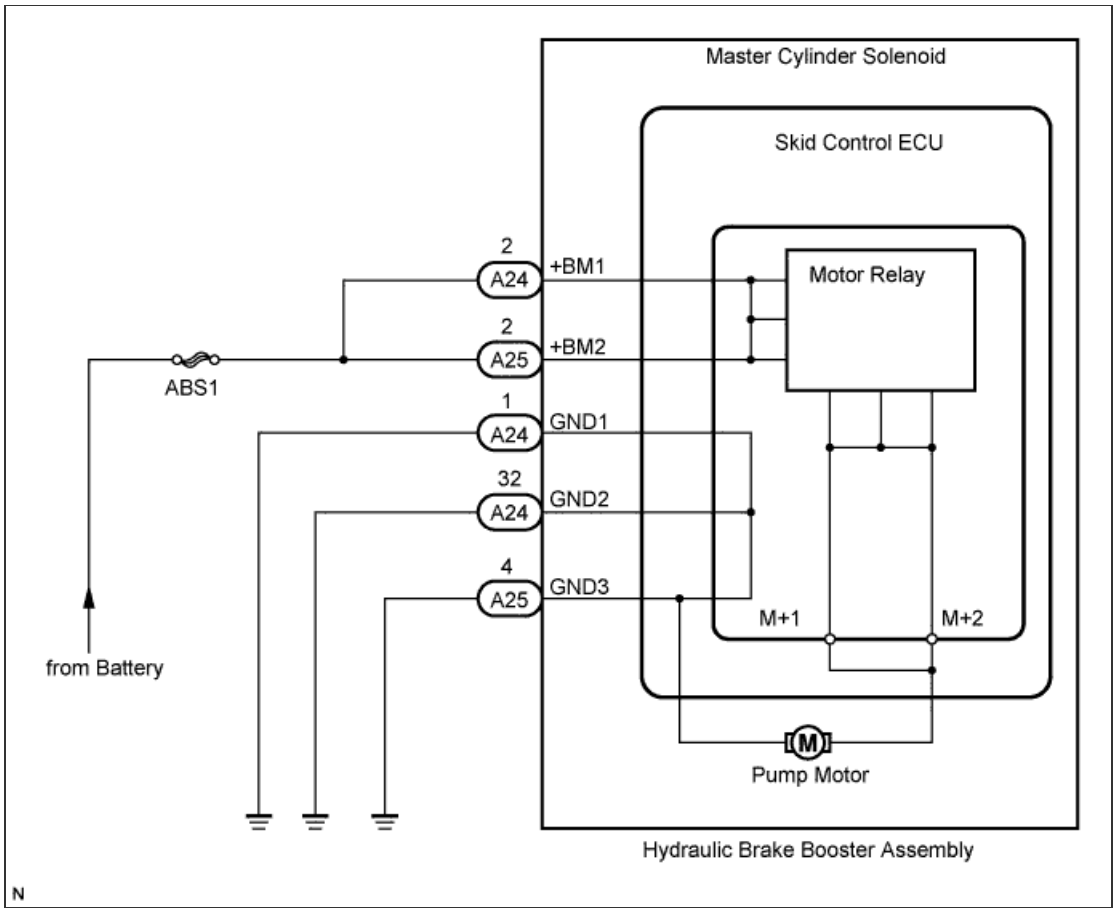
for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C1253/53	There is a motor system circuit (motor input circuit) malfunction.	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the hydraulic brake booster assembly (master cylinder solenoid), perform zero point calibration (Click here).

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

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Start the engine.

d. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Motor Relay	Motor relay	Relay ON/OFF	An operation sound of the motor can be heard.

e. Check the operation sound of the motor individually when operating it with the intelligent tester.

OK:
The operation sound of the motor can be heard.

NG → Go to step 3

OK

2.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON.

e. Wait until the pump motor stops.

f. Depress the brake pedal several times until the pump motor turns on. (Procedure A)

g. Wait until the pump stops. (Procedure B)

h. Repeat the above steps (procedure A and B) 3 more times.

i. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

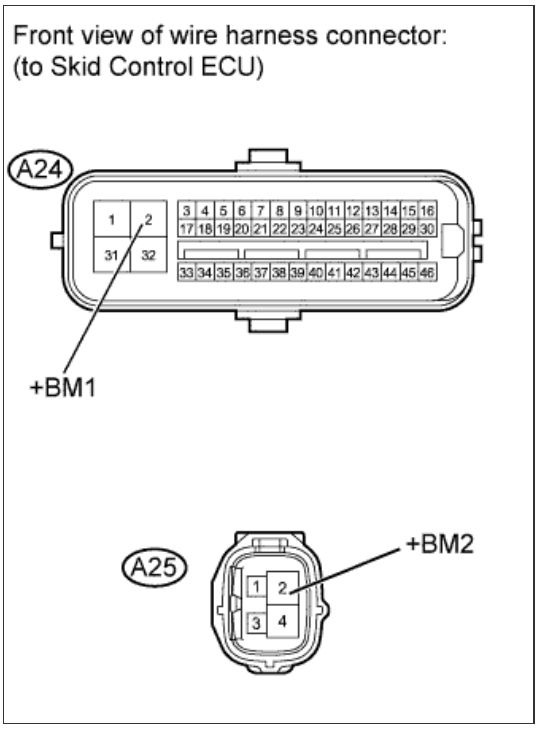
3.INSPECT SKID CONTROL ECU (+BM TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-2 (+BM1) - Body ground	Always	11 to 14 V
A25-2 (+BM2) - Body ground	Always	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

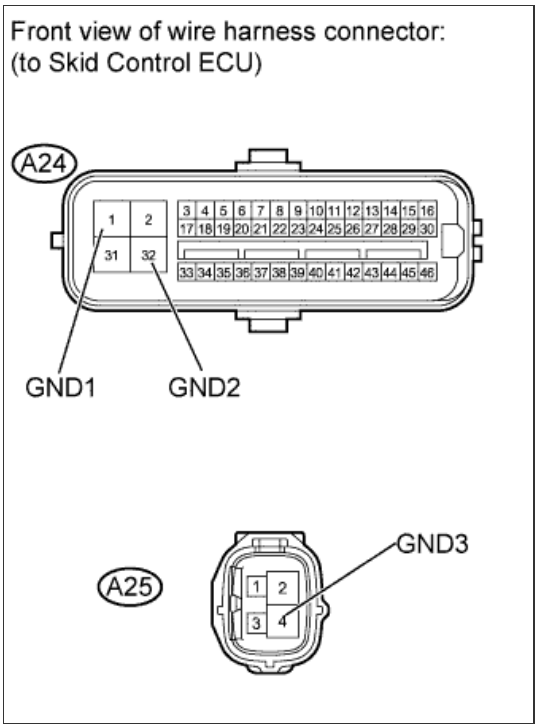
OK

4.INSPECT SKID CONTROL ECU (GND TERMINAL)

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON.

e. Wait until the pump motor stops.

f. Depress the brake pedal several times until the pump motor turns on. (Procedure A)

g. Wait until the pump stops. (Procedure B)

h. Repeat the above steps (procedure A and B) 3 more times.

i. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A → USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

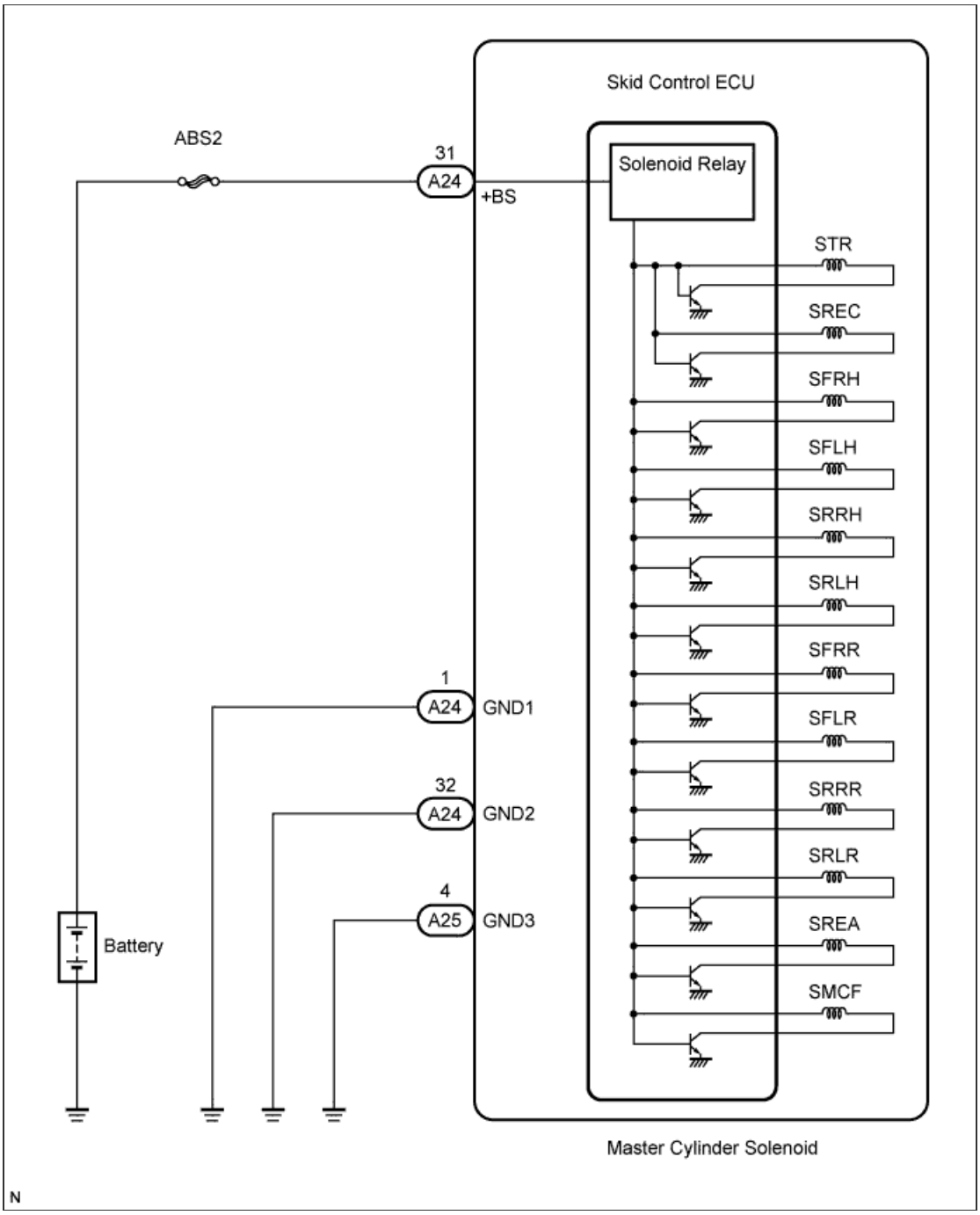
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

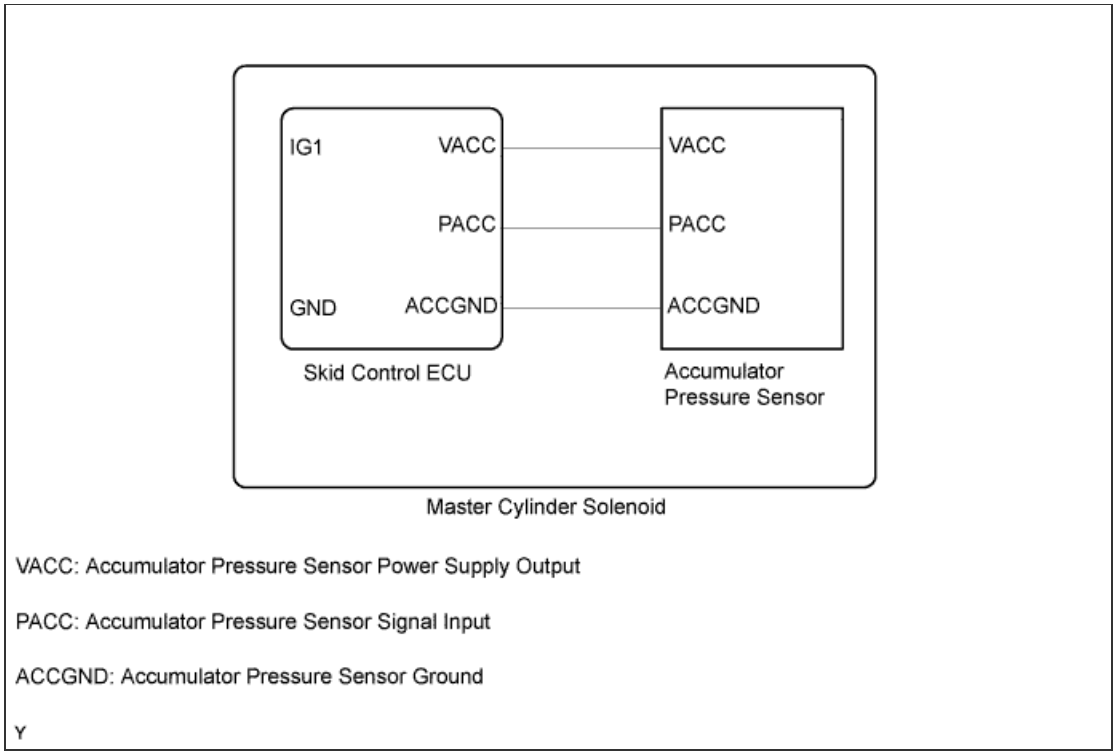
USE SIMULATION METHOD TO CHECK (Click here)

DTC C1254/54 Pressure Switch Circuit

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1254/54	There is an accumulator pressure sensor malfunction (the fluid pressure does not change when the pump operates or when the brake is applied).	• Hydraulic brake booster • Accumulator pressure sensor • Master cylinder pressure sensor

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (ACCUMULATOR SENSOR)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON and turn the intelligent tester on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Accumulator Sensor	Accumulator pressure sensor reading / min.: 0.00 V, max.: 5.00 V	3.58 to 5 V	If the value is constant regardless of the pump operation, an accumulator pressure sensor malfunction is suspected.

f. Check the accumulator output value.

Result

Result	Proceed to
Output value is within the "Normal Condition" range	A

Output value is out of the "Normal Condition" range	LHD	B
Output value is constant regardless of pump operation	LHD	
Output value is out of the "Normal Condition" range	RHD	C
Output value is constant regardless of pump operation	RHD	

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

2.READ VALUE USING INTELLIGENT TESTER (MASTER CYLINDER SENSOR)

a. Turn the ignition switch off.

b. Depress the brake pedal more than 20 times.

c. Install the brake pedal effort gauge (SST), and bleed air.

SST
09709-29018

d. Turn the ignition switch to ON and turn the intelligent tester on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Master Cylinder Sensor	Master cylinder pressure sensor reading / min.: 0.00 V, max.: 5.00 V	0.3 to 1.8 V With pedal effort of 49 N (5 kgf, 11 in.*lbf)	The front brake pressure is 930 to 2130 kPa (9.5 to 21.7 kgf/cm^2, 135 to 309 psi).

f. Check that the master cylinder pressure sensor output value is normal.

OK:
Master cylinder pressure sensor value is normal.

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON.

e. Wait until the pump motor stops.

f. Depress the brake pedal and release it.

g. Wait for 25 minutes.

h. Check if the same DTC is output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

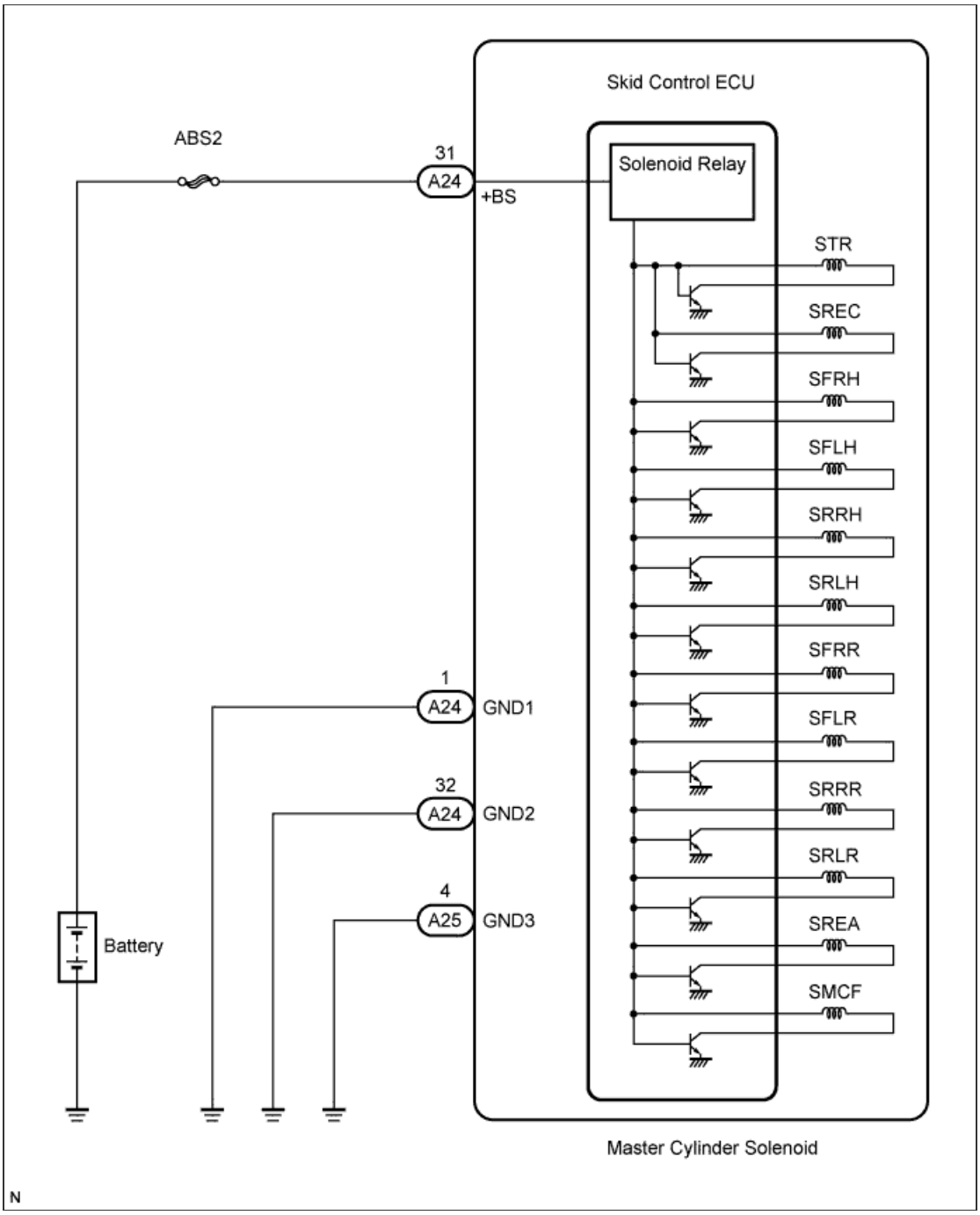
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

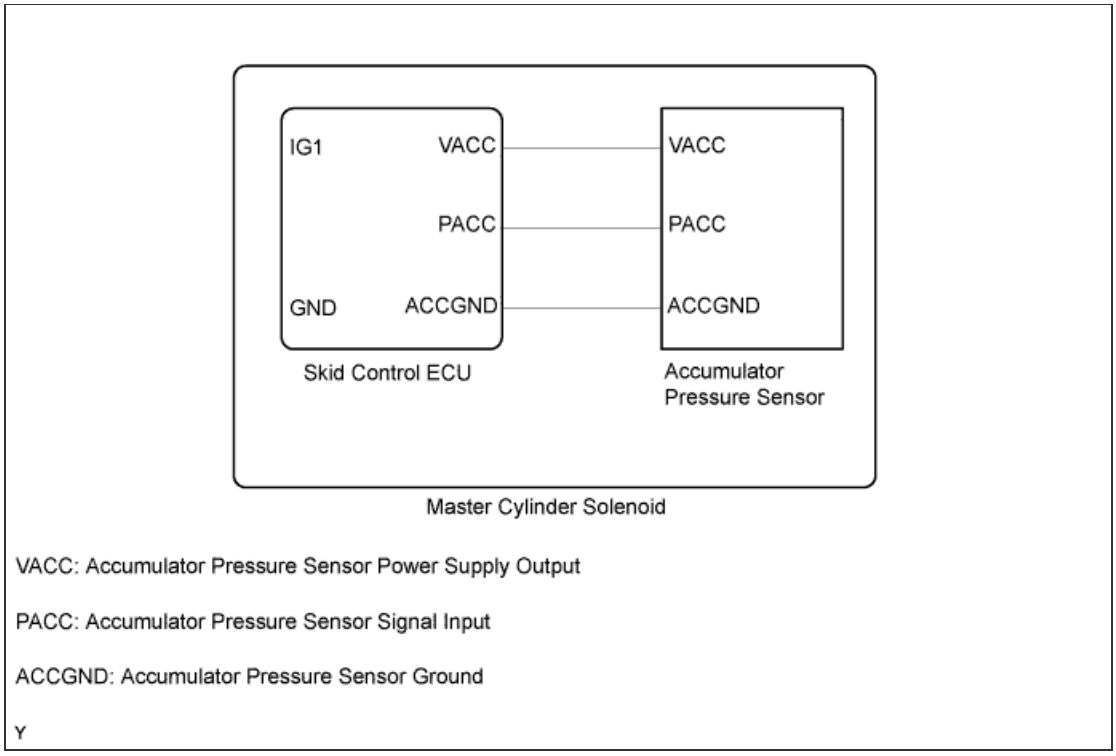
USE SIMULATION METHOD TO CHECK (Click here)

DTC C1256/56 Accumulator Low Pressure

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1256/56	The fluid pressure inside the accumulator is below the standard value.	• Hydraulic brake booster • Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Accumulator pressure sensor

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

HINT:

When C1251/51, C1253/53, or C1254/54 is output together with C1256/56, inspect and repair the trouble area indicated by C1251/51, C1253/53, or C1254/54 first.

1.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON.

e. Wait for 99 seconds.

f. Check if the same DTC is output (Click here).

Result

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

HINT:

Excessive brake pedal operation results in abnormal accumulator pressure consumption. This is normal.

B → USE SIMULATION METHOD TO CHECK (Click here)

A

2.CHECK HYDRAULIC CIRCUIT

a. Check the hydraulic circuit (Click here).

OK:
Hydraulic circuit is normal (No leakage).

NG → REPAIR HYDRAULIC CIRCUIT (Click here)

OK

3.READ VALUE USING INTELLIGENT TESTER (ACCUMULATOR SENSOR)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Accumulator Sensor	Accumulator pressure sensor reading / min.: 0.00 V, max.: 5.00 V	3.58 to 5 V	If the value is constant regardless of the pump operation, an accumulator pressure sensor malfunction is suspected.

d. Check that the accumulator output value is normal.

OK:
Accumulator pressure sensor value is normal.

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Check if the same DTC is output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

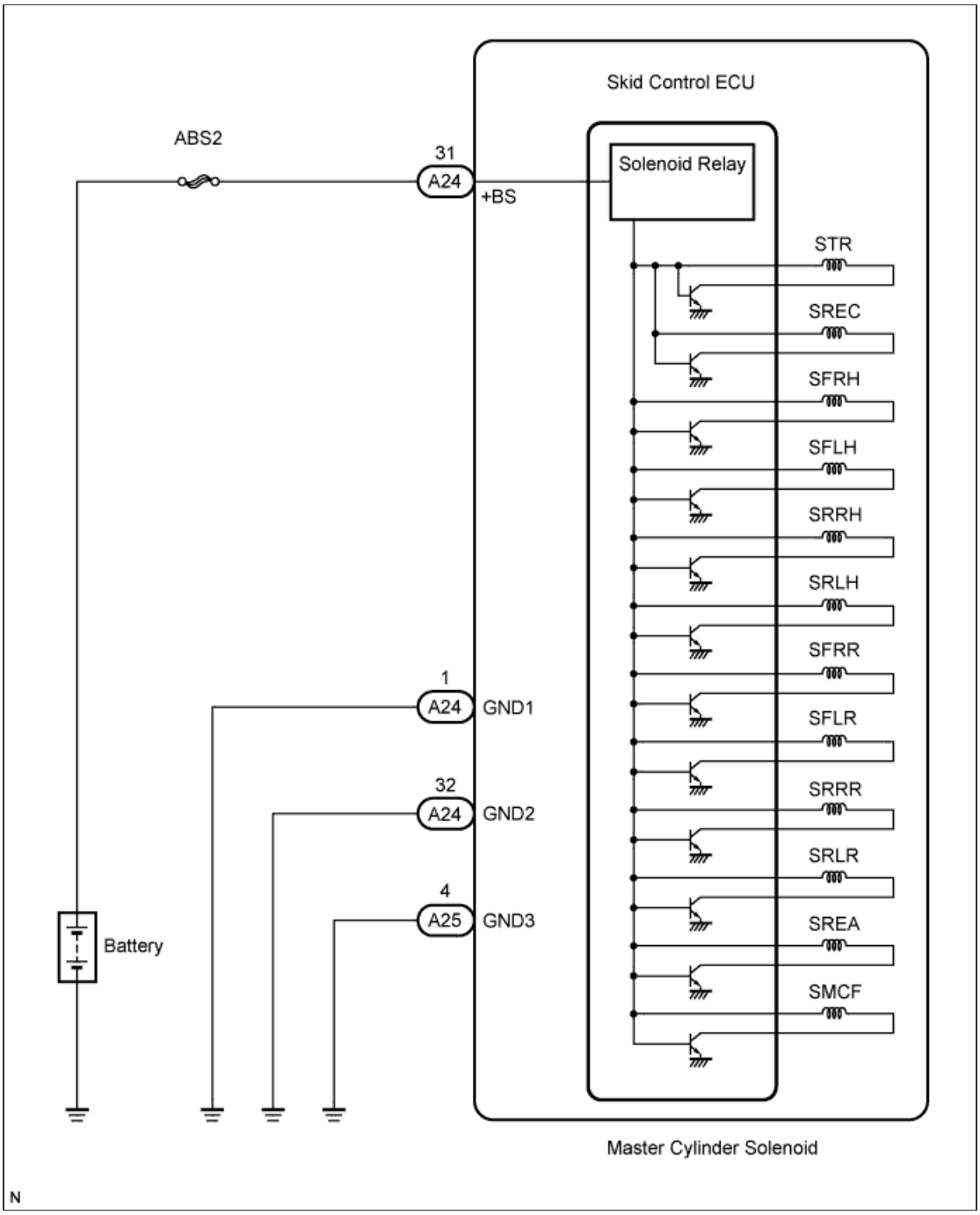
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C1257/57 Power Supply Drive Circuit

for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C1257/57	There is an open in the motor system circuit (motor input circuit).	Hydraulic brake booster pump motor circuit

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK PUMP MOTOR OPERATION

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU connector.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON.

e. Check pump motor operation.

OK:

Pump motor normally operates.

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

2.RECONFIRM DTC

a. Turn the ignition switch off.

b. Reconnect the A24 skid control ECU connector.

c. Turn the ignition switch to ON.

d. Clear the DTC (Click here).

e. Check if the same DTC is output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

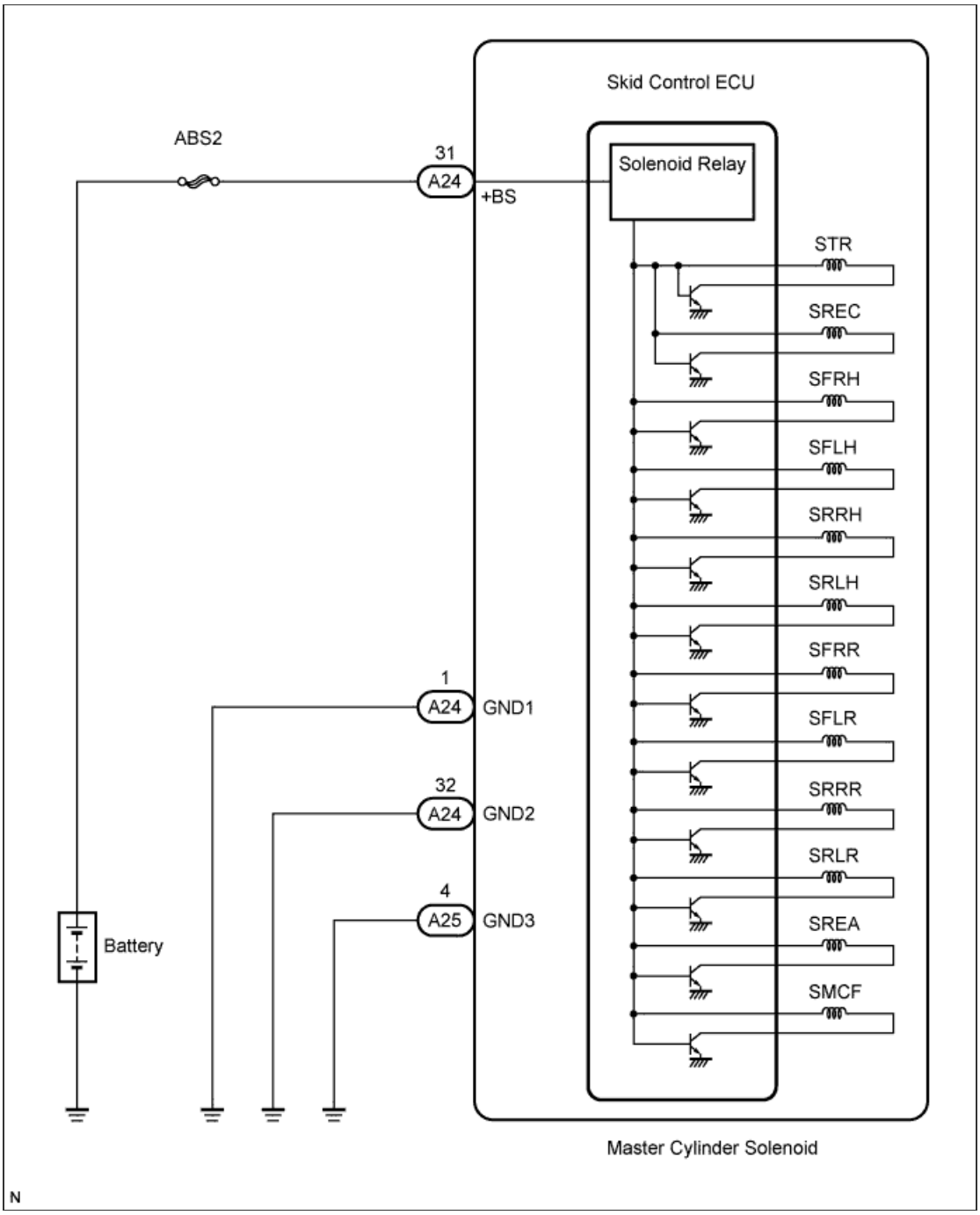
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

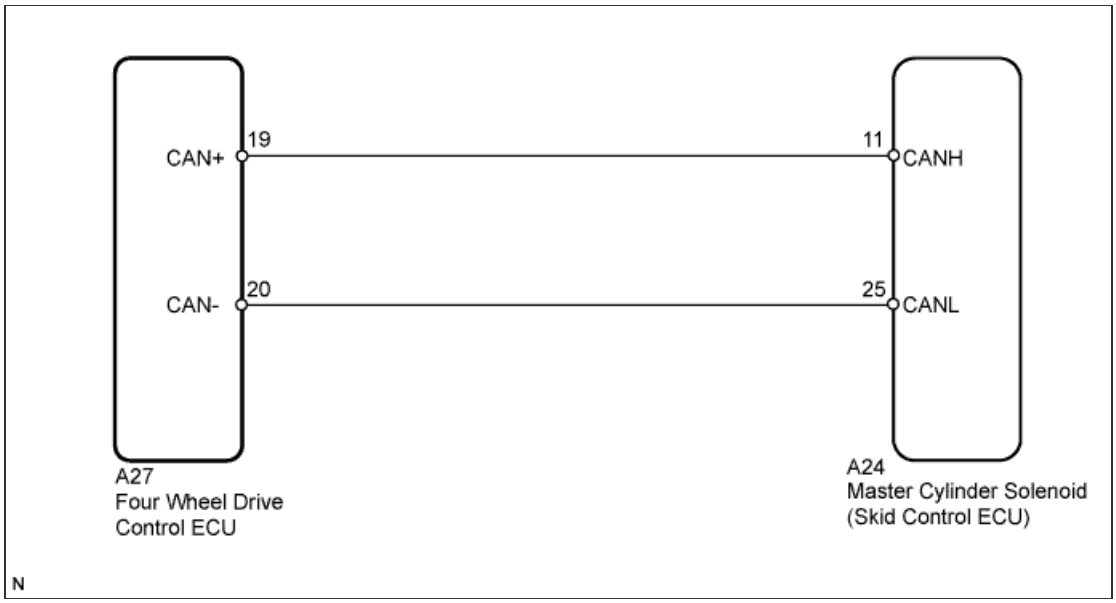
DTC C1268/68 Transfer "L4" Position Switch Circuit

for Preparation Click here

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1268/68	The skid control ECU receives an L4 abnormal status signal from the four wheel drive control ECU.	• Center differential lock detection switch • Center differential lock detection switch circuit • Four wheel drive control ECU • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication		A
"Bus Check" indicates malfunctions in CAN communication	LHD	B
	RHD	C

OK:

"Bus Check" indicates no malfunctions in CAN communication.

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

2.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

GO TO TRANSFER SYSTEM (INSPECTION) (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

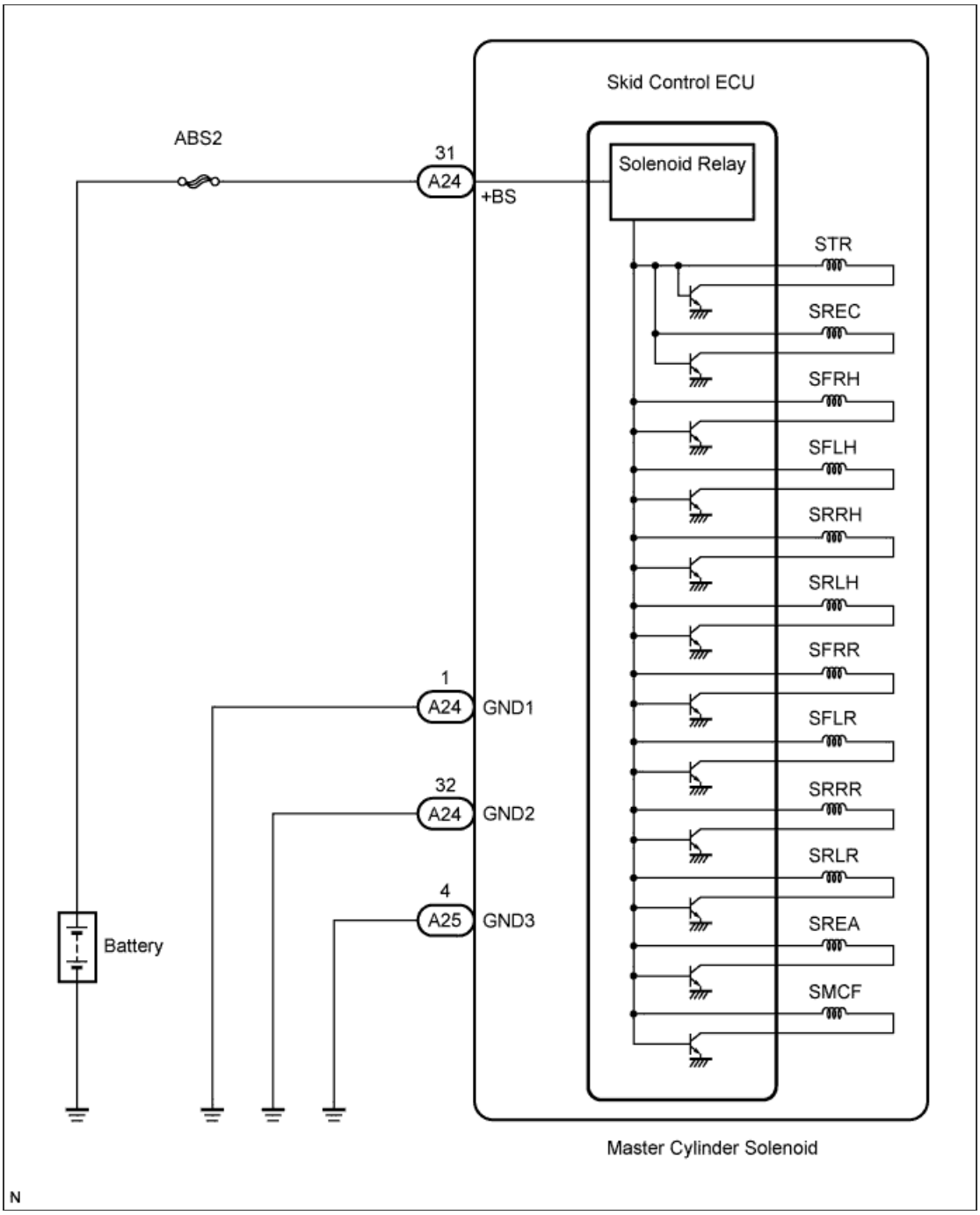
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C1336/98 Zero Point Calibration of Acceleration Sensor Undone

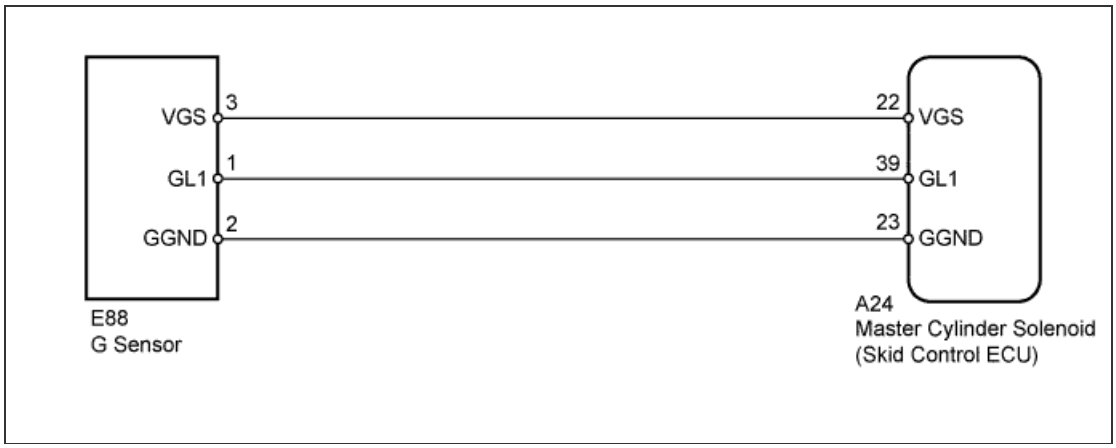
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the G sensor.

DTC Code	DTC Detection Condition	Trouble Area
C1336/98	• The G sensor zero point stored in the ECU is cleared. • Zero point calibration has not been completed.	• G sensor • Zero point calibration undone • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK SENSOR INSTALLATION

a. Check that the G sensor is installed properly.

OK:

The sensor is tightened to the specified torque.
The sensor is not tilted.

Result

Result		Proceed to
OK		A
NG	for Automatic Transmission	B
	for Manual Transmission	C

B → INSTALL G SENSOR CORRECTLY (Click here)

C → INSTALL G SENSOR CORRECTLY (Click here)

A

2.PERFORM ZERO POINT CALIBRATION OF G SENSOR

a. Perform the zero point calibration of the G sensor (Click here).

NEXT

3.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

END

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

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

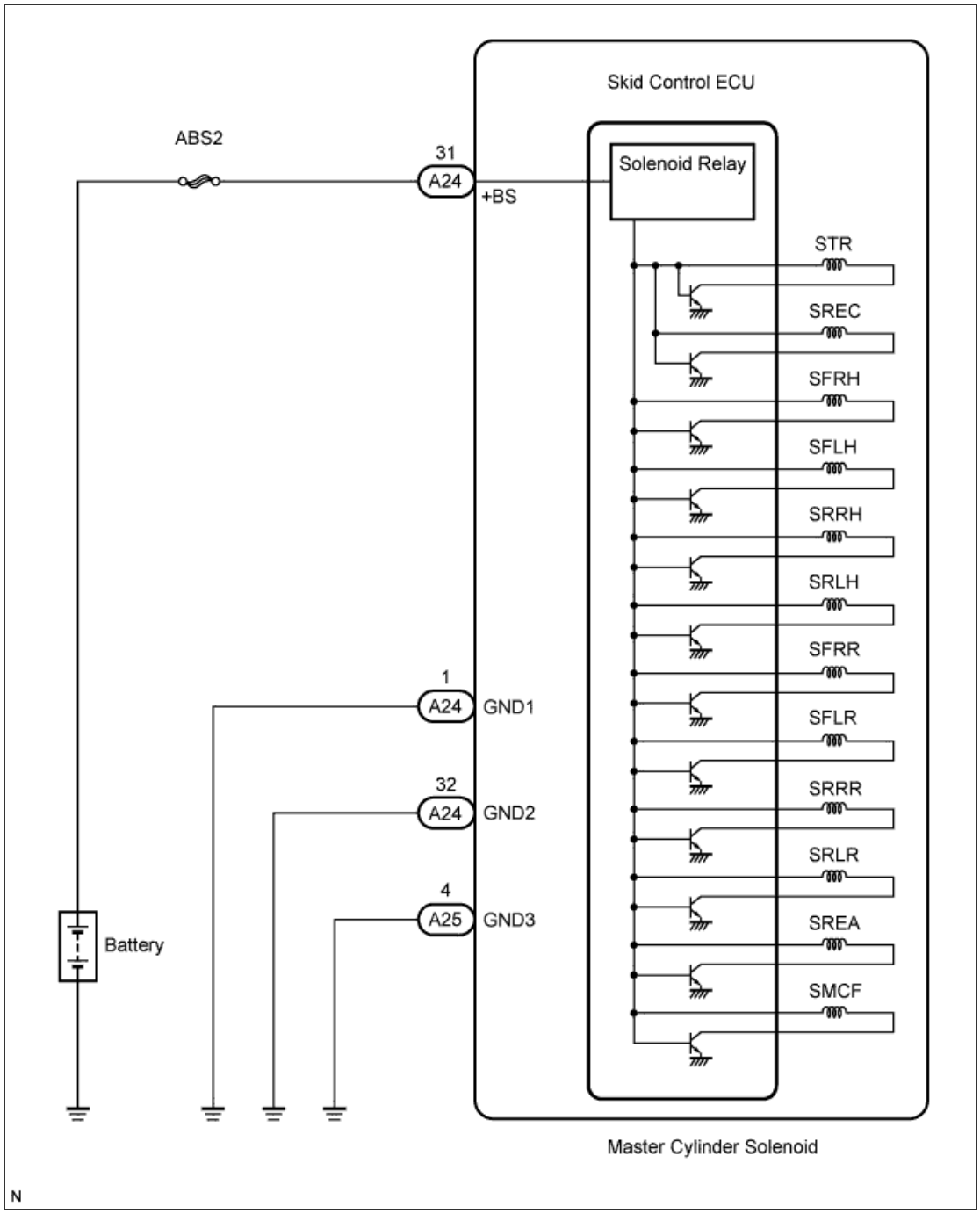
for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C0278/11	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is between 9.5 V and 17 V. 2. The relay contact is open when the relay is on. 2. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is 9.5 V or less when the relay is on. 2. The relay contact remains open.	• ABS2 fuse • Solenoid relay • Harness or connector • Master cylinder solenoid (Skid control ECU)
C0279/12	The following condition continues for at least 0.2 seconds. • The relay contact is closed immediately after turning the ignition switch to ON when the relay is off.	• ABS2 fuse • Solenoid relay • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

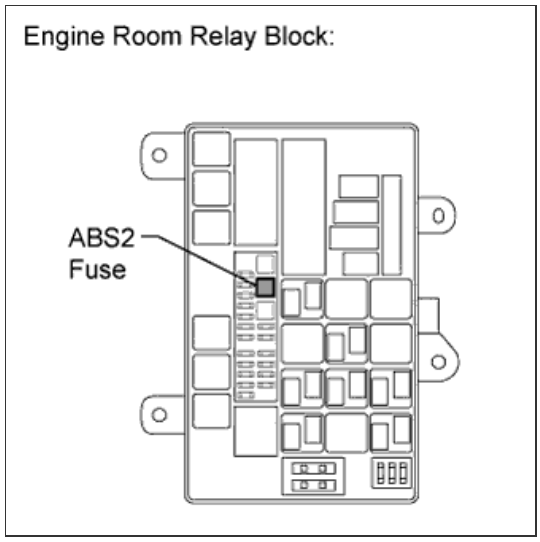
1.INSPECT ABS2 FUSE

a. Remove the ABS2 fuse from the engine room relay block.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
ABS2 fuse	Always	Below 1 Ω



NG → REPLACE ABS2 FUSE

OK

2.INSPECT SKID CONTROL ECU (+BS TERMINAL)

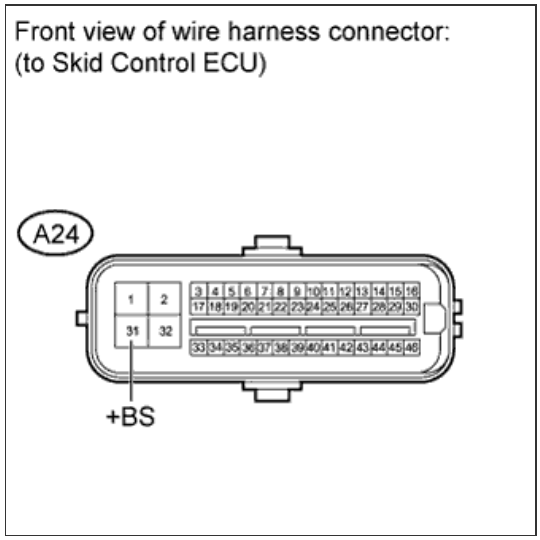
a. Install the ABS2 fuse.

b. Disconnect the A24 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-31 (+BS) - Body ground	Always	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

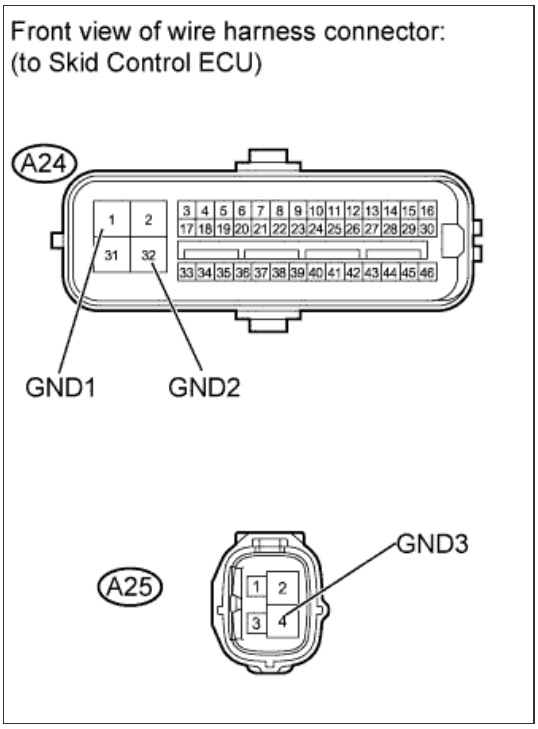
3.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The ABS solenoid relay is in the master cylinder solenoid.

Therefore, solenoid relay circuit inspection and relay unit inspection cannot be performed. Be sure to check if any DTC is output before replacing the master cylinder solenoid.

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C1337/37 Diameter of the Tire is not Uniform

for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C1337/37	When either of the following conditions is detected: • The diameter is different between the 2 front wheels and the 2 rear wheels. • There is a wheel speed sensor fault.	• Speed sensor • Speed sensor rotor • Speed sensor circuit • Tire size

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK TIRE SIZE

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

OK:
Condition of all 4 wheels is normal and tire size is same.

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

OK ↓

2.INSPECT SPEED SENSOR ROTOR

a. Check the front speed sensor rotors (Click here) and rear speed sensor rotors (Click here).

Result

Result		Proceed to
OK		A
NG	Front speed sensor	B
	Rear speed sensor	C

B → REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (SPEED SENSOR ROTOR) (**Click here**)

C → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (SPEED SENSOR ROTOR) (**Click here**)

A ↓

3.INSPECT SPEED SENSOR

a. Check the front speed sensor circuit (Click here) and rear speed sensor circuit (Click here).

Result

Result		Proceed to
OK		A
NG	Front speed sensor	B
	Rear speed sensor	C

B → REPLACE FRONT SPEED SENSOR (**Click here**)

C → REPLACE REAR SPEED SENSOR (Click here)

A

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

a. Check the front speed sensor circuit (Click here) and rear speed sensor circuit (Click here).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

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

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

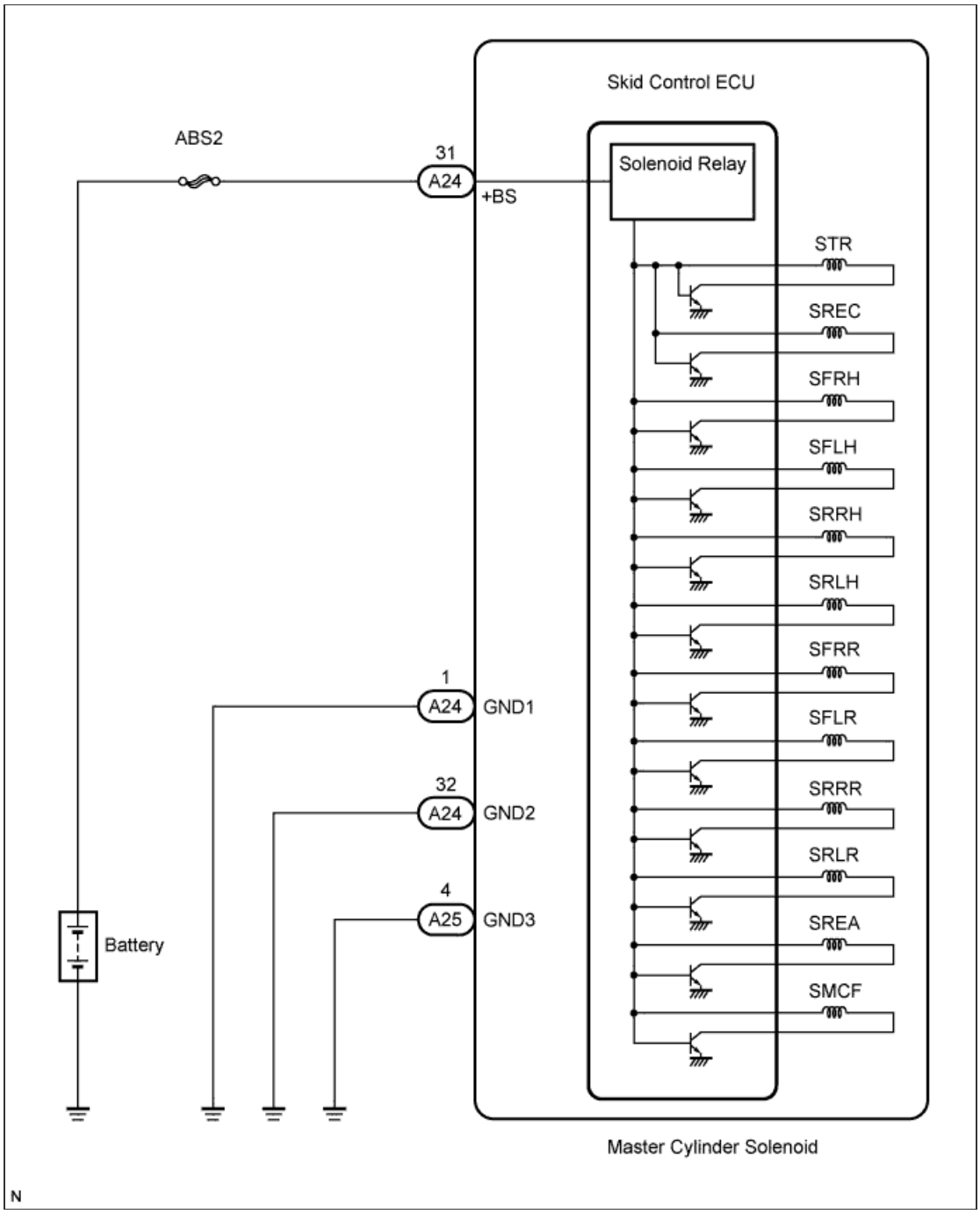
for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C0278/11	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is between 9.5 V and 17 V. 2. The relay contact is open when the relay is on. 2. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is 9.5 V or less when the relay is on. 2. The relay contact remains open.	• ABS2 fuse • Solenoid relay • Harness or connector • Master cylinder solenoid (Skid control ECU)
C0279/12	The following condition continues for at least 0.2 seconds. • The relay contact is closed immediately after turning the ignition switch to ON when the relay is off.	• ABS2 fuse • Solenoid relay • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

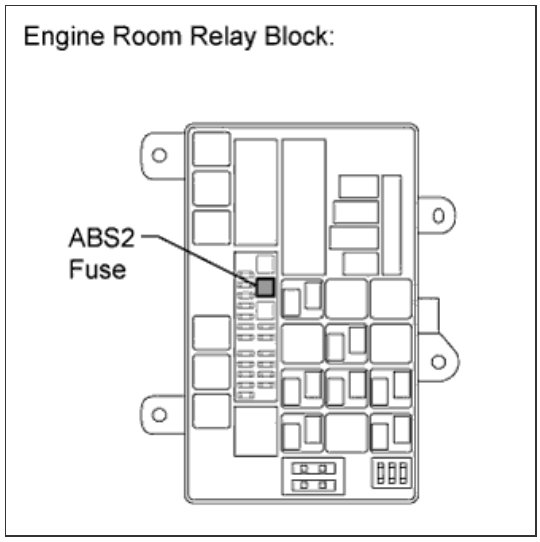
1.INSPECT ABS2 FUSE

a. Remove the ABS2 fuse from the engine room relay block.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
ABS2 fuse	Always	Below 1 Ω



NG → REPLACE ABS2 FUSE

OK

2.INSPECT SKID CONTROL ECU (+BS TERMINAL)

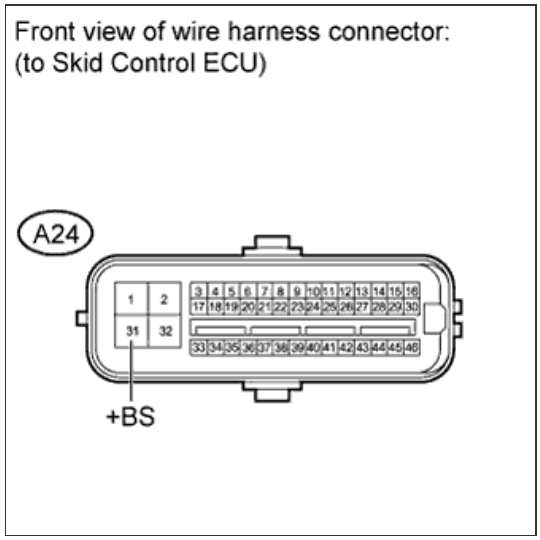
a. Install the ABS2 fuse.

b. Disconnect the A24 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-31 (+BS) - Body ground	Always	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

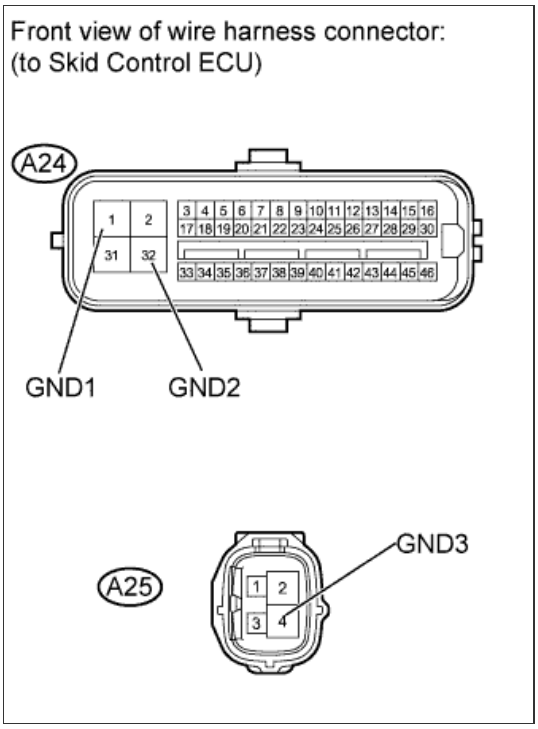
3.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The ABS solenoid relay is in the master cylinder solenoid.

Therefore, solenoid relay circuit inspection and relay unit inspection cannot be performed. Be sure to check if any DTC is output before replacing the master cylinder solenoid.

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC U0073/94 Control Module Communication Bus OFF

DTC U0124/95 Lost Communication with Lateral Acceleration Sensor Module

for Preparation **Click here**

INSPECTION PROCEDURE

Refer to CAN communication system (LHD: Click here/RHD: Click here).

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

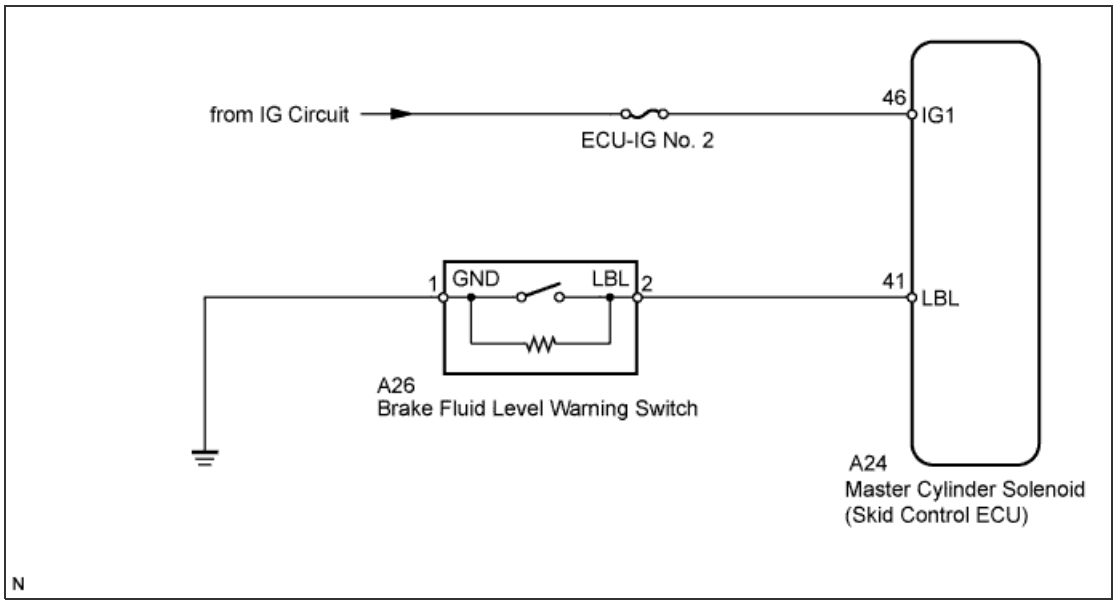
for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C1202/58	When either of the following conditions is detected: 1. The fluid level of the reservoir is LOW for 4 seconds, or 40 seconds after the ignition switch is turned to ON, or for 7 seconds during pump motor operation. 2. With the ECU terminal IG1 voltage at 9.5 V to 17.0 V, an open in the brake fluid level warning switch circuit continues for 2 seconds or more.	• Brake fluid level • Brake fluid level warning switch • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

HINT:

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

1.CHECK BRAKE FLUID LEVEL

a. Turn the ignition switch off.

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

c. Check the amount of fluid in the brake reservoir.

HINT:

When the ignition switch is turned to ON, brake fluid is sent to the accumulator and the fluid level decreases by approximately 10 mm (0.394 in.) from the level when the ignition switch is off (normal).

OK:

Brake fluid level is normal.

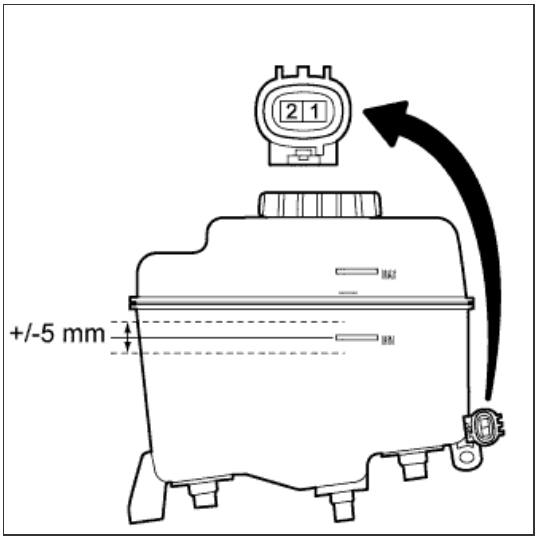
NG → CHECK AND REPAIR BRAKE FLUID LEAKAGE (Click here)

OK

2.INSPECT BRAKE FLUID LEVEL WARNING SWITCH

a. Disconnect the A26 brake fluid level warning switch connector.

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



HINT:

- **A float is placed inside the reservoir. Its position can be changed by increasing/decreasing the level of brake fluid.**
- **The warning switch is switched on/off at +/-5 mm (+/-0.197 in.) from the MIN level.**

Standard Resistance:

Tester Connection	Condition	Specified Condition
1 - 2	Float UP (Switch off)	1.9 to 2.1 kΩ
1 - 2	Float DOWN (Switch on)	Below 1 Ω

HINT:

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

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY (Click here)

C → REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY (Click here)

A

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

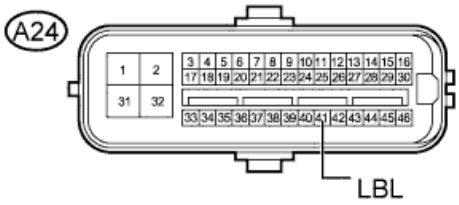
a. Disconnect the A24 skid control ECU connector and A26 brake fluid level warning switch connector.

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

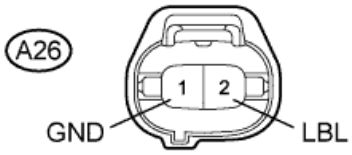
Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-41 (LBL) - A26-2 (LBL)	Always	Below 1 Ω
A24-41 (LBL) - Body ground	Always	10 kΩ or higher
A26-1 (GND) - Body ground	Always	Below 1 Ω

Front view of wire harness connector:
(to Skid Control ECU)



Front view of wire harness connector:
(to Brake Fluid Level Warning Switch)



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC U0073/94 Control Module Communication Bus OFF

DTC U0124/95 Lost Communication with Lateral Acceleration Sensor Module

for Preparation **Click here**

INSPECTION PROCEDURE

Refer to CAN communication system (LHD: Click here/RHD: Click here).

DTC C1241/41 Low Battery Positive Voltage

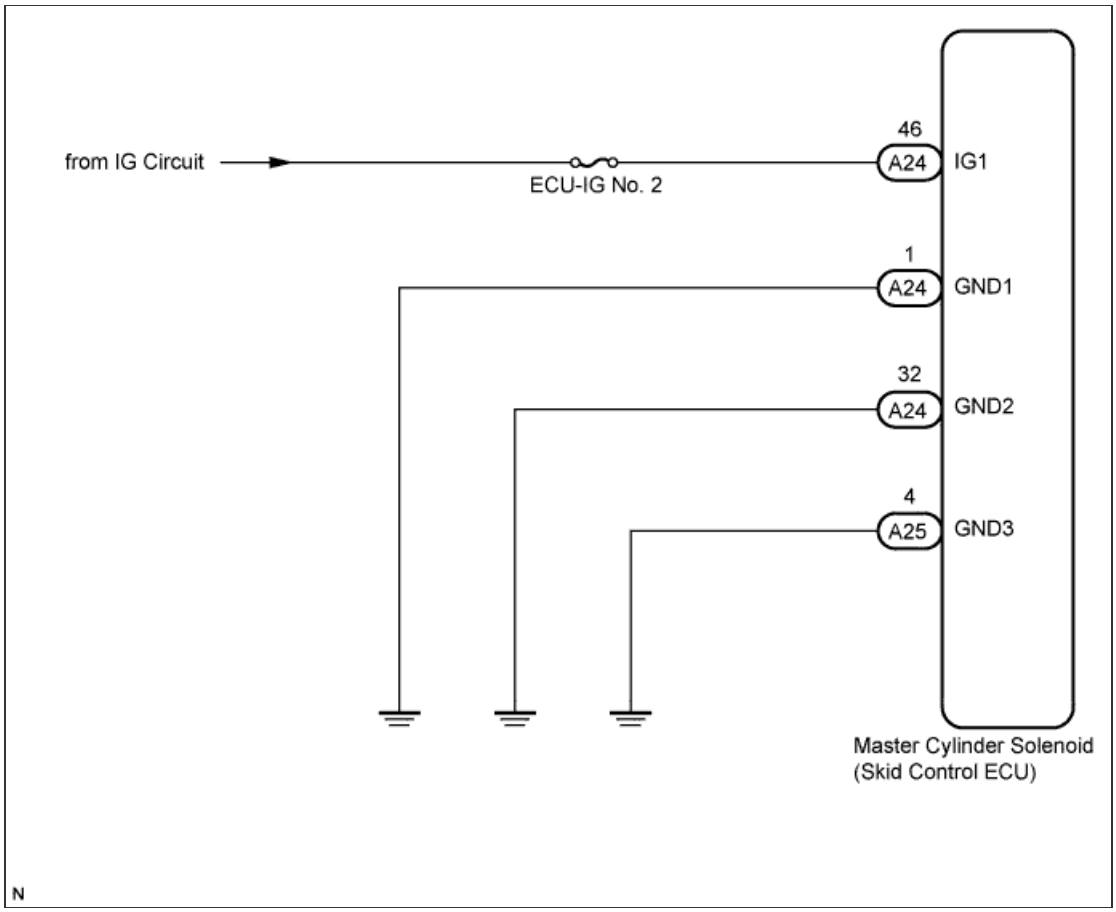
for Preparation Click here

DESCRIPTION

If the voltage supplied to the IG1 terminal is within the DTC detection range due to malfunctions in components such as the battery and alternator circuit, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1241/41	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 10 seconds. • The vehicle speed is more than 3 km/h (2 mph). • The IG1 terminal voltage is below 9.5 V. 2. All of the following conditions continue for at least 0.2 seconds. • The solenoid relay remains on. • The IG1 terminal voltage is below 9.5 V. • The relay contact is open.	• Battery • ECU-IG No. 2 fuse • Charging system • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT BATTERY

a. Check the battery voltage.

Standard voltage:

11 to 14 V

Result

Result		Proceed to
OK		A
NG	1GR-FE	B
	2UZ-FE	C
	1VD-FTV	D

B → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

C → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

D → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

A

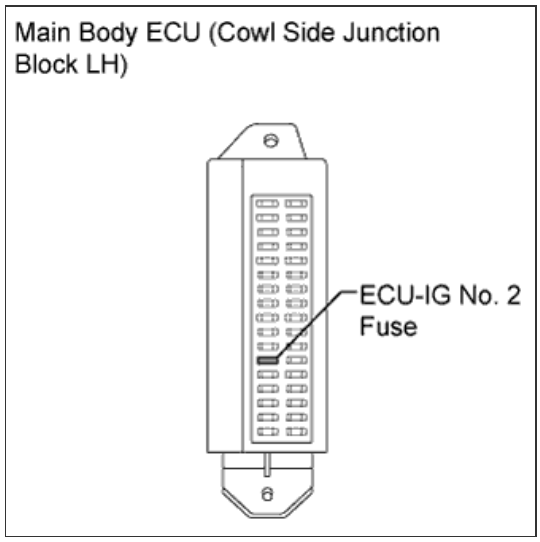
2.INSPECT ECU-IG NO. 2 FUSE

a. Remove the ECU-IG No. 2 fuse from the main body ECU (cowl side junction block LH).

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
ECU-IG No. 2 fuse	Always	Below 1 Ω



NG → REPLACE ECU-IG NO. 2 FUSE

OK

3.READ VALUE USING INTELLIGENT TESTER (IG1 VOLTAGE VALUE)

a. Install the ECU-IG No. 2 fuse.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and turn the intelligent tester on.

d. Start the engine.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
IG1 Voltage Value	IG1 voltage value/min.: 0 V, max.: 255 V	9.5 to 14.0 V	-

f. Measure the voltage output from the skid control ECU displayed on the intelligent tester.

OK:

The output voltage displayed on the intelligent tester is within 9.5 to 14.0 V.

NG → Go to step 5

OK ↓

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is output	LHD	A
	RHD	B
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)		C
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)		D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → USE SIMULATION METHOD TO CHECK (Click here)

D → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A ↓

REPLACE MASTER CYLINDER SOLENOID (Click here)

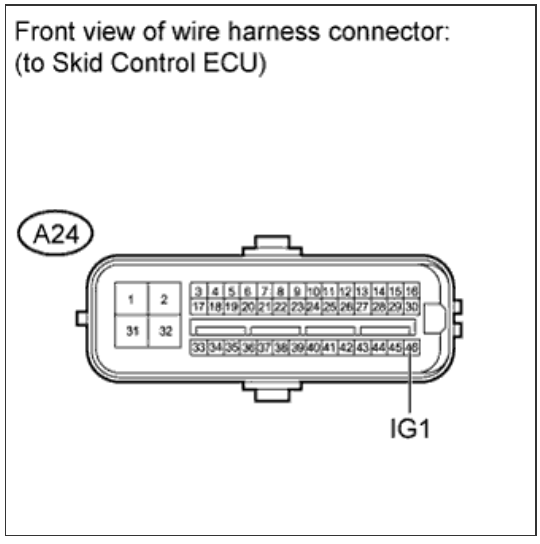
5.INSPECT SKID CONTROL ECU (IG1 TERMINAL)

a. Disconnect the A24 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ↓

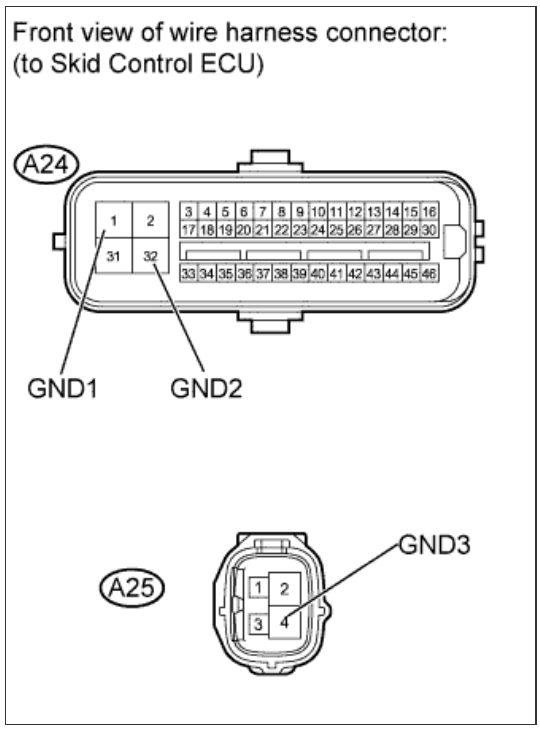
6.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is output	LHD	A
	RHD	B
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)		C
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)		D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → USE SIMULATION METHOD TO CHECK (Click here)

D → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

REPLACE MASTER CYLINDER SOLENOID (Click here)

for Preparation Click here

DESCRIPTION

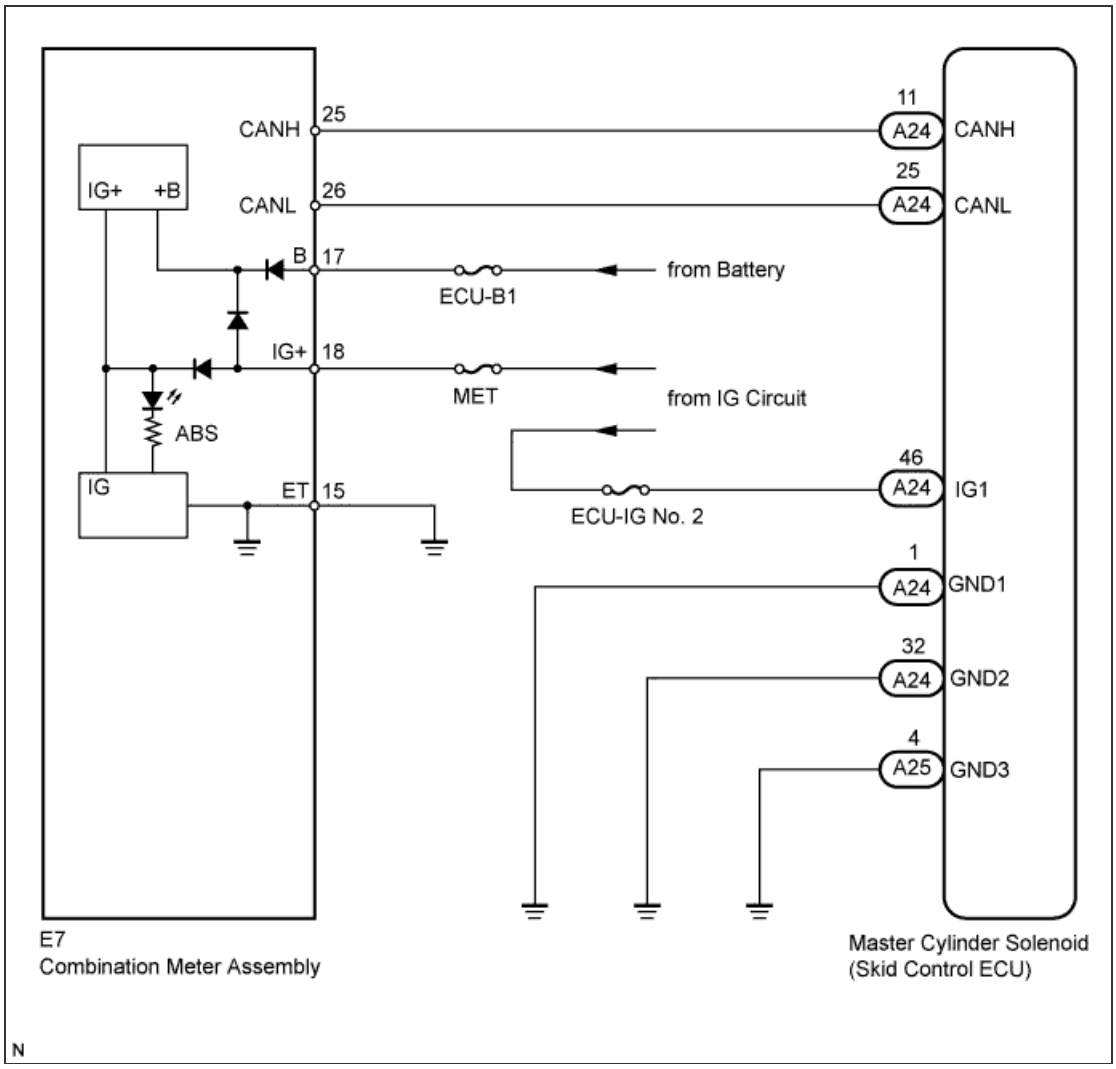
If any of the following is detected, the ABS warning light remains on.

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

HINT:

There is a case that the intelligent tester cannot be used when the skid control ECU is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU connector connection.

OK:

The connector is securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

2.INSPECT BATTERY

a. Check the battery voltage.

Standard voltage:
11 to 14 V

Result

Result		Proceed to
OK		A
NG	1GR-FE	B
	2UZ-FE	C
	1VD-FTV	D

B → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

C → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

D → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

A

3.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"Bus Check" indicates no malfunctions in CAN communication.

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

4.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

5.CHECK OPERATION OF ABS WARNING LIGHT (ACTIVE TEST)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the ABS warning light by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp ABS	ABS Warning Light	Warning light ON/OFF	-

OK:

The warning light turns on when operating the intelligent tester.

Result

Result		Proceed to
OK		A
NG	w/ Multi-information Display	B
	w/o Multi-information Display	C

B → REPLACE COMBINATION METER ASSEMBLY (Click here)

C → REPLACE COMBINATION METER ASSEMBLY (Click here)

A

6.INSPECT SKID CONTROL ECU (IG1 TERMINAL)

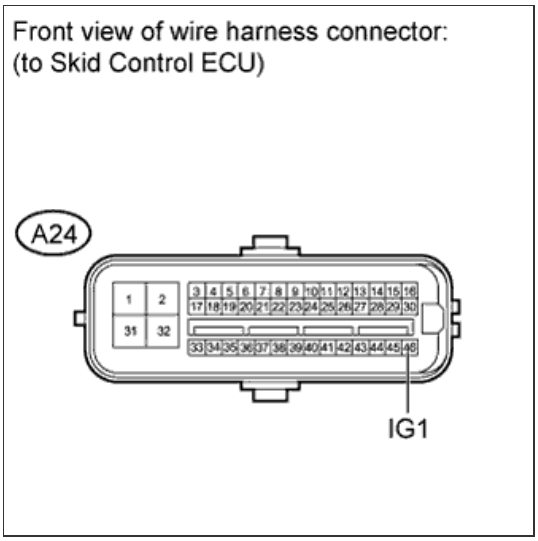
a. Disconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

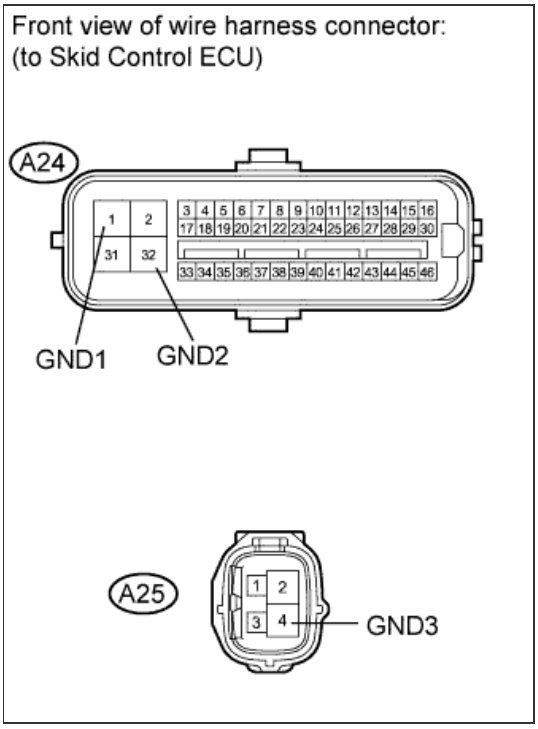
b. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C



B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPAIR OR REPLACE HARNESS OR CONNECTOR

for Preparation Click here

DESCRIPTION

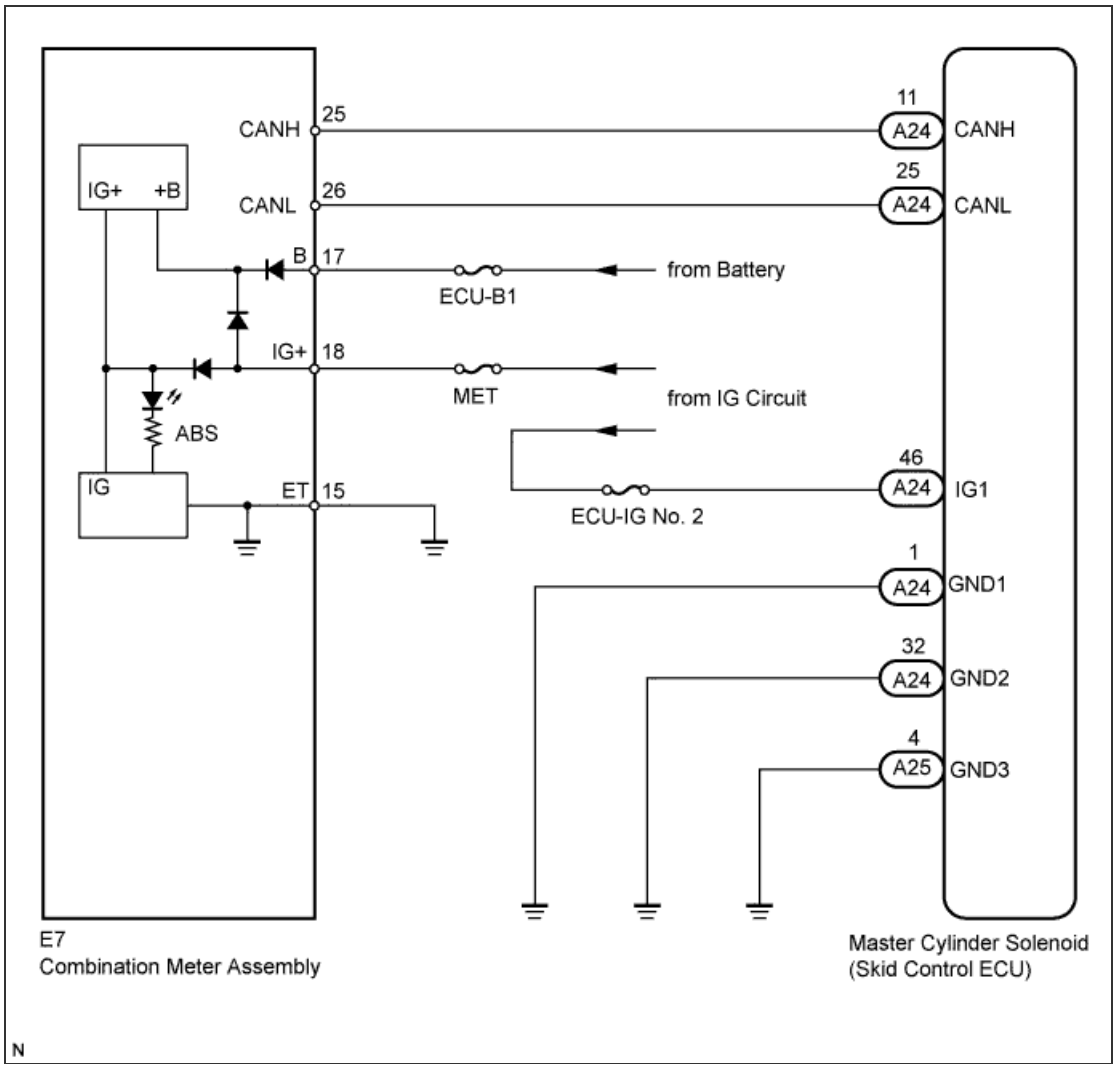
If any of the following is detected, the ABS warning light remains on.

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

HINT:

There is a case that the intelligent tester cannot be used when the skid control ECU is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT ABS WARNING LIGHT

a. Disconnect the skid control ECU connector.

b. Turn the ignition switch to ON.

c. Check that the ABS warning light comes on.

OK:

ABS warning light comes on.

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

2.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"Bus Check" indicates no malfunctions in CAN communication.

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

3.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

.CHECK OPERATION OF ABS WARNING LIGHT (ACTIVE TEST)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the ABS warning light by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp ABS	ABS Warning Light	Warning light ON/OFF	-

OK:

The warning light turns on when operating the intelligent tester.

Result

Result		Proceed to
OK		A
NG	w/ Multi-information Display	B
	w/o Multi-information Display	C

B → REPLACE COMBINATION METER ASSEMBLY (Click here)

C → REPLACE COMBINATION METER ASSEMBLY (Click here)

A

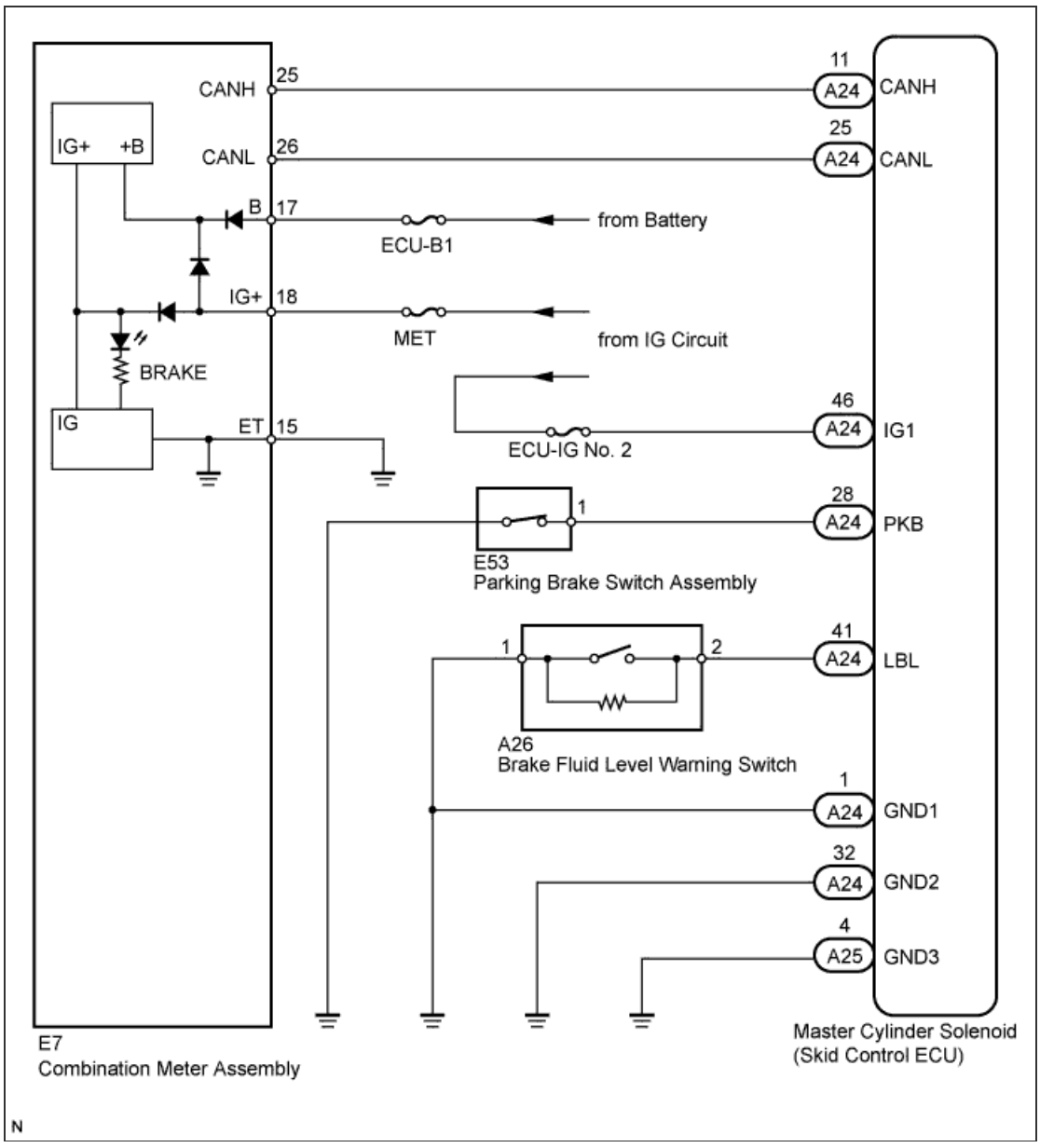
USE SIMULATION METHOD TO CHECK (Click here)

for Preparation Click here

DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK DTC

a. Check for DTCs (Click here).

Result

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

B → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (Click here)

A

2.INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU connector connection.

OK:
The connector is securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

3.INSPECT BATTERY

a. Check the battery voltage.

Standard voltage:
11 to 14 V

Result

Result		Proceed to
OK		A
NG	1GR-FE	B
	2UZ-FE	C
	1VD-FTV	D

B → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

C → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

D → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

A

4.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"Bus Check" indicates no malfunctions in CAN communication.

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

→ GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED

C → WITH TROUBLESHOOTING) (Click here)

A

5.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

6.CHECK OPERATION OF BRAKE WARNING LIGHT (ACTIVE TEST)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the brake warning light by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Brake	Brake Warning Light	Warning light ON/OFF	-

OK:

The warning light turns on when operating the intelligent tester.

Result

Result		Proceed to
OK		A
NG	w/ Multi-information Display	B
	w/o Multi-information Display	C

B → REPLACE COMBINATION METER ASSEMBLY (Click here)

C → REPLACE COMBINATION METER ASSEMBLY (Click here)

A

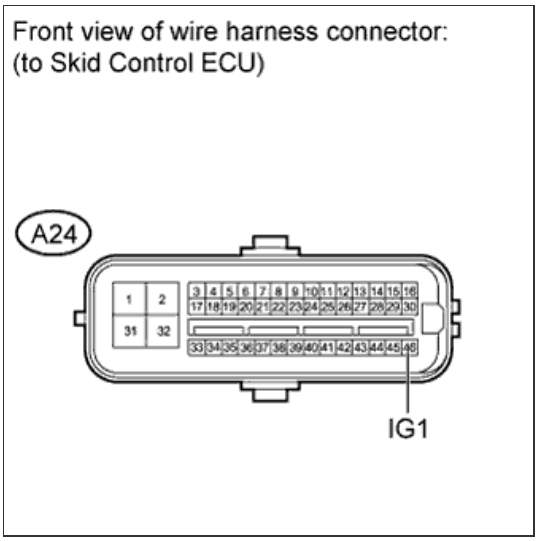
7.INSPECT SKID CONTROL ECU (IG1 TERMINAL)

a. Disconnect the A24 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

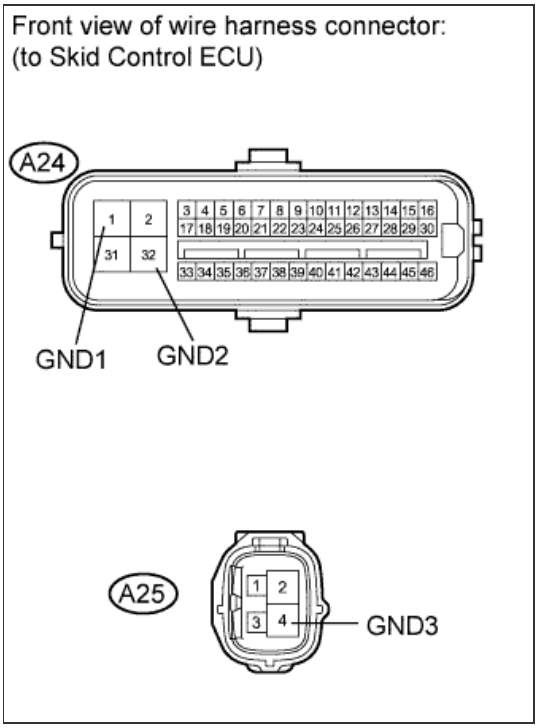
8.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9.INSPECT PARKING BRAKE SWITCH

a. Disconnect the E53 parking brake switch connector.

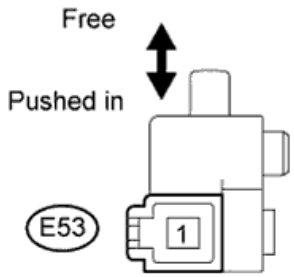
b. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Switch Condition	Specified Condition

1 - Body ground	Parking brake switch on (Switch pin free)	Below 1 Ω
1 - Body ground	Parking brake switch off (Switch pin pushed in)	10 kΩ or higher

Component without harness connected:
(Parking Brake Switch)



NG → REPLACE PARKING BRAKE SWITCH ASSEMBLY (Click here)

OK

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

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

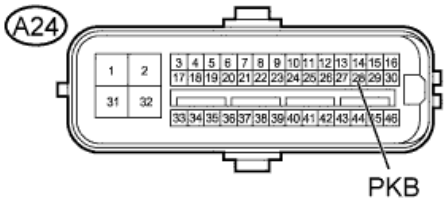
Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-28 (PKB) - E53-1	Always	Below 1 Ω
A24-28 (PKB) - Body ground	Always	10 kΩ or higher

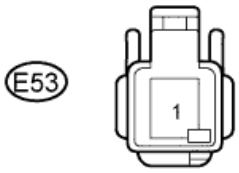
Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

Front view of wire harness connector:
(to Skid Control ECU)



Front view of wire harness connector:
(to Parking Brake Switch)



B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

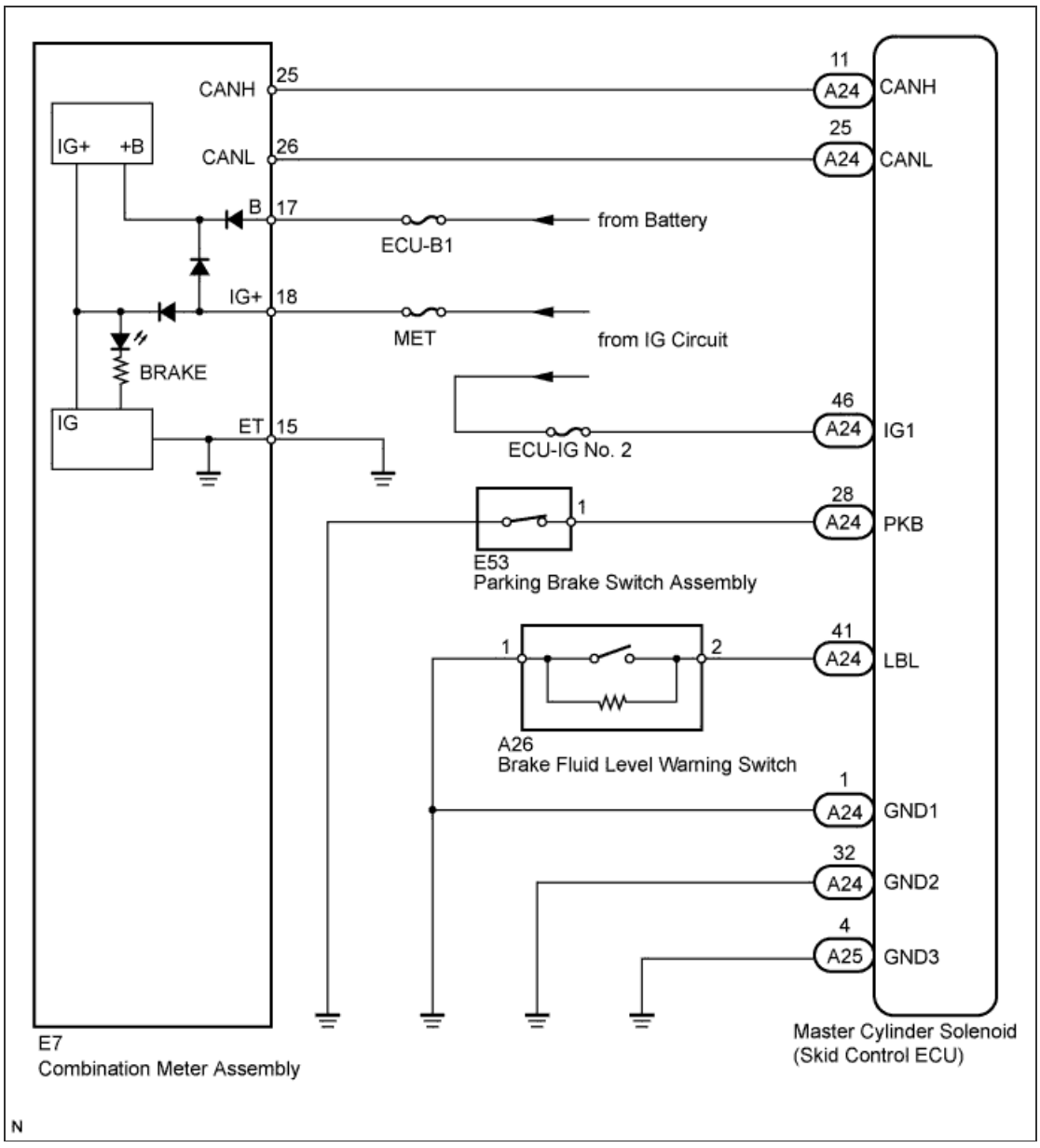
REPAIR OR REPLACE HARNESS OR CONNECTOR

for Preparation Click here

DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT BRAKE WARNING LIGHT

a. Disconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

c. Check that the BRAKE warning light comes on.

OK:

BRAKE warning light comes on.

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

2.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"Bus Check" indicates no malfunctions in CAN communication.

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

3.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

.CHECK OPERATION OF BRAKE WARNING LIGHT (ACTIVE TEST)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the brake warning light by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Brake	Brake Warning Light	Warning light ON/OFF	-

OK:

The warning light turns on when operating the intelligent tester.

Result

Result		Proceed to
OK		A
NG	w/ Multi-information Display	B
	w/o Multi-information Display	C

B → REPLACE COMBINATION METER ASSEMBLY (Click here)

C → REPLACE COMBINATION METER ASSEMBLY (Click here)

A

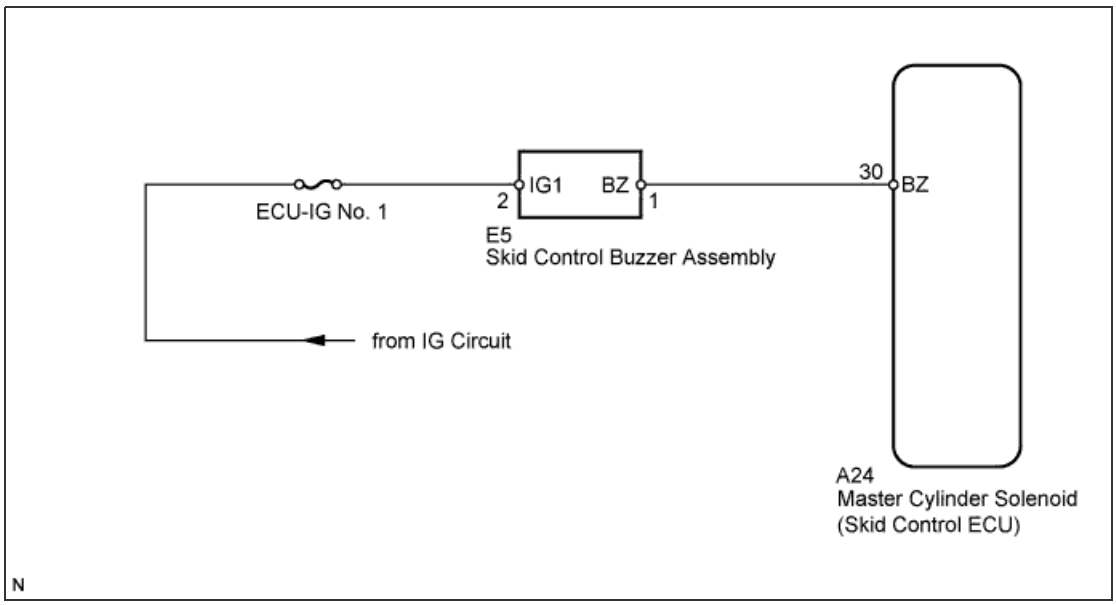
USE SIMULATION METHOD TO CHECK (Click here)

for Preparation Click here

DESCRIPTION

The skid control buzzer sounds while the accumulator pressure is abnormally low or an abnormality causing low fluid pressure occurs.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.PERFORM ACTIVE TEST USING INTELLIGENT TESTER (BUZZER)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Buzzer	Skid control buzzer	Buzzer ON/OFF	The buzzer can be heard.

d. Check that the buzzer sounds/stops when turning the skid control buzzer on/off by using the intelligent tester.

Result

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

A → USE SIMULATION METHOD TO CHECK (Click here)

B

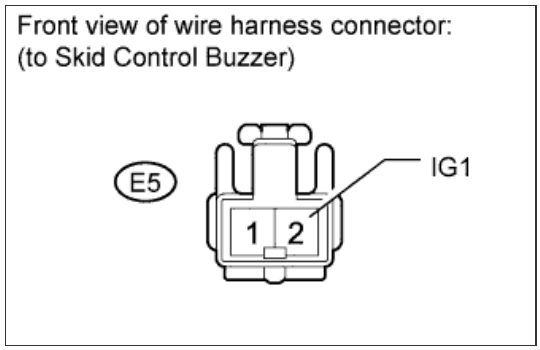
2.INSPECT SKID CONTROL BUZZER (POWER SOURCE TERMINAL)

a. Disconnect the E5 skid control buzzer connector.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
E5-2 (IG1) - Body ground	Ignition switch ON	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

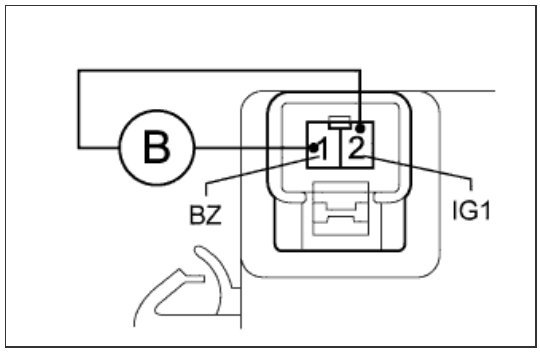
OK

3.INSPECT SKID CONTROL BUZZER

a. Apply battery voltage to the skid control buzzer, and check that the buzzer sounds.

OK:

Measurement Condition	Specified Condition
Battery positive (+) voltage - Terminal 2 (IG1)	Skid control buzzer sounds.
Battery negative (-) voltage - Terminal 1 (BZ)	



NG → REPLACE SKID CONTROL BUZZER ASSEMBLY (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector.

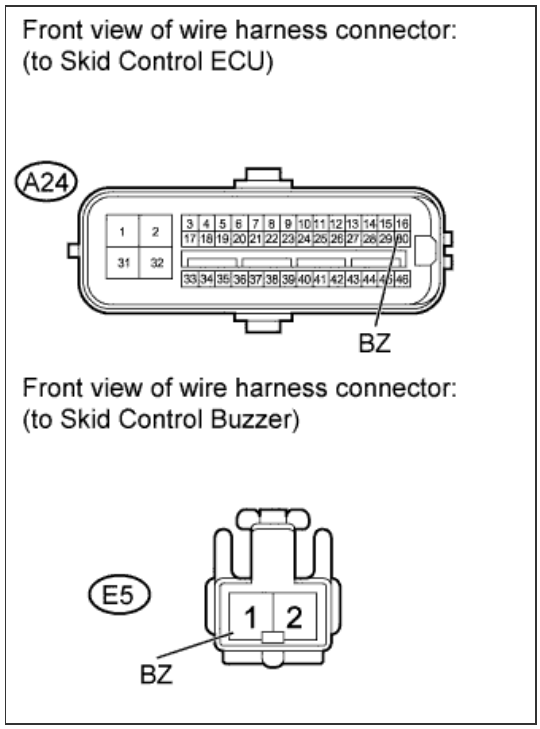
b. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-30 (BZ) - E5-1 (BZ)	Always	Below 1 Ω
A24-30 (BZ) - Body ground	Always	10 kΩ or higher

Result

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C



B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

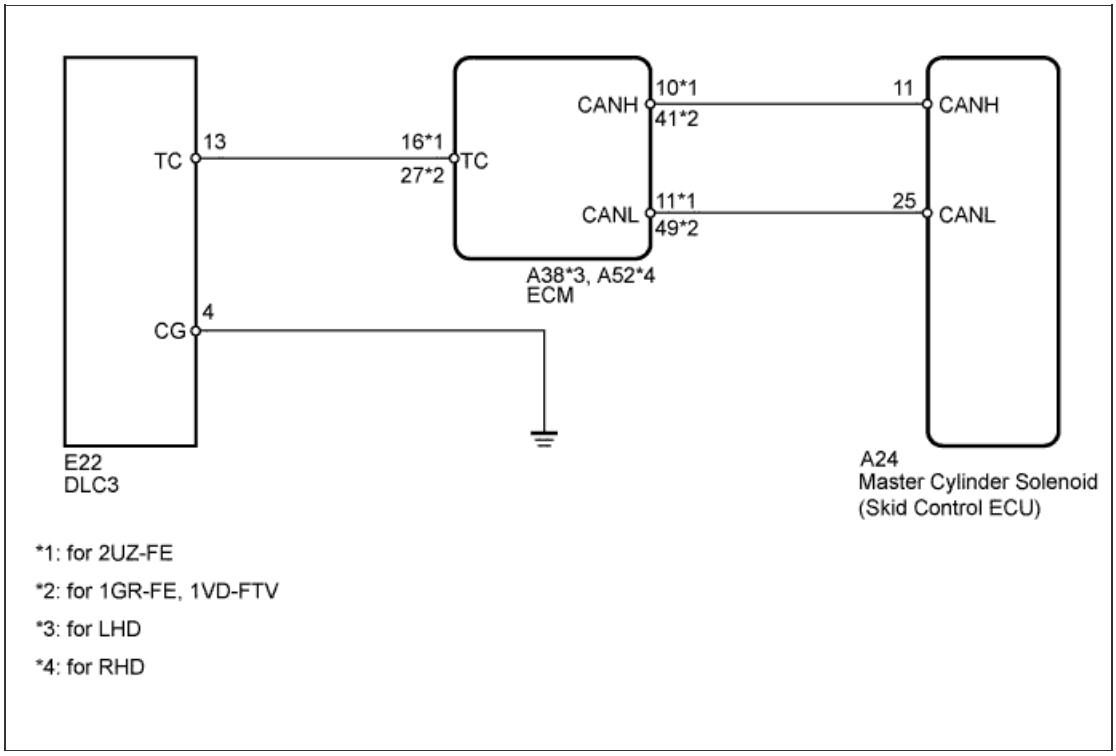
A → REPAIR OR REPLACE HARNESS OR CONNECTOR

for Preparation Click here

DESCRIPTION

DTC output mode is set by connecting terminals TC and CG of the DLC3.
The DTCs are output by the blinking of the ABS warning light.

WIRING DIAGRAM



HINT:

When each warning light stays blinking, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in each ECU is suspected.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

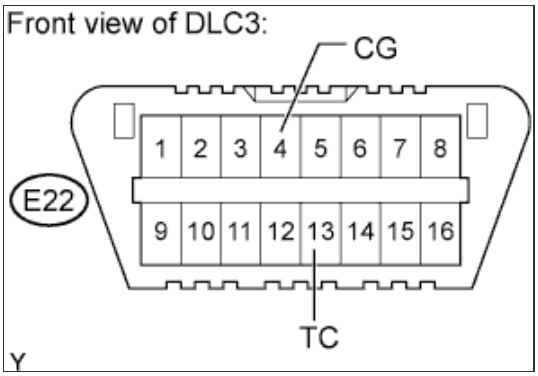
1.INSPECT DLC3 (DLC3 (TC) - DLC3 (CG))

a. Turn the ignition switch to ON.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
E22-13 (TC) - E22-4 (CG)	Ignition switch ON	11 to 14 V



NG → Go to step 4

OK

2.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"Bus Check" indicates no malfunctions in CAN communication.

Result

Result		Proceed to
OK		A
NG	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

3.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/ RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	LHD	B
	RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

4.CHECK HARNESS AND CONNECTOR (ECM - DLC3 (TC))

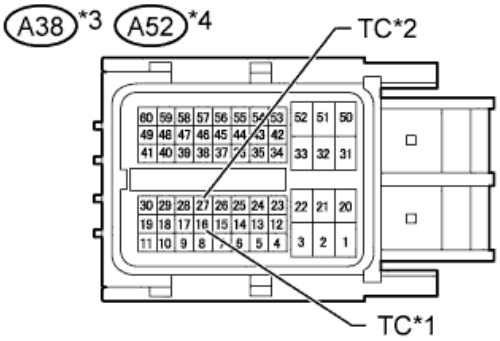
a. Turn the ignition switch off.

b. for LHD:
Disconnect the A38 ECM connector.

c. for RHD:
Disconnect the A52 ECM connector.

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

Front view of wire harness connector:
(to ECM)



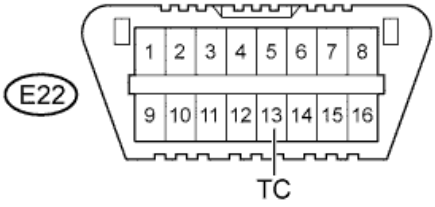
*1: for 2UZ-FE

*2: for 1GR-FE, 1VD-FTV

*3: for LHD

*4: for RHD

Front view of DLC3:



Standard Resistance:

for LHD (2UZ-FE)

Tester Connection	Condition	Specified Condition
A38-16 (TC) - E22-13 (TC)	Always	Below 1 Ω

for LHD (1GR-FE, 1VD-FTV)

Tester Connection	Condition	Specified Condition
A38-27 (TC) - E22-13 (TC)	Always	Below 1 Ω

for RHD (2UZ-FE)

Tester Connection	Condition	Specified Condition
A52-16 (TC) - E22-13 (TC)	Always	Below 1 Ω

for RHD (1GR-FE, 1VD-FTV)

Tester Connection	Condition	Specified Condition
A52-27 (TC) - E22-13 (TC)	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

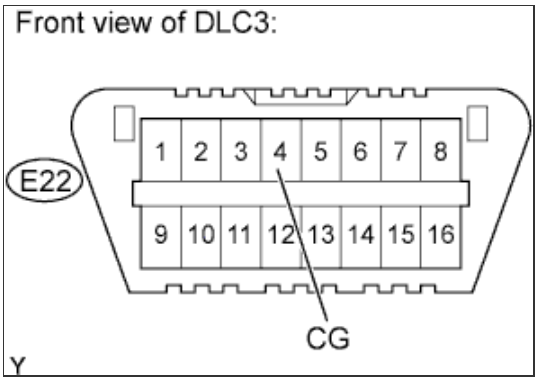
5.CHECK HARNESS AND CONNECTOR (DLC3 (CG) - BODY GROUND)

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

Standard Resistance:

		Specified

Tester Connection	Condition	Condition
E22-4 (CG) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

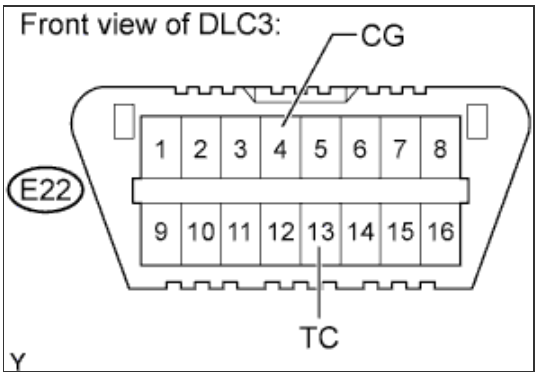
6.CHECK ECM (DLC3 (TC) INPUT)

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

b. Check that the MIL is blinking.

Result

Result	Proceed to
MIL is blinking	A
MIL is not blinking	B



B → REPAIR OR REPLACE WIRE HARNESS OR ECM

A

7.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/ RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output	LHD	A
	RHD	B
CAN system DTC is output	LHD	C
	RHD	D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

D → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

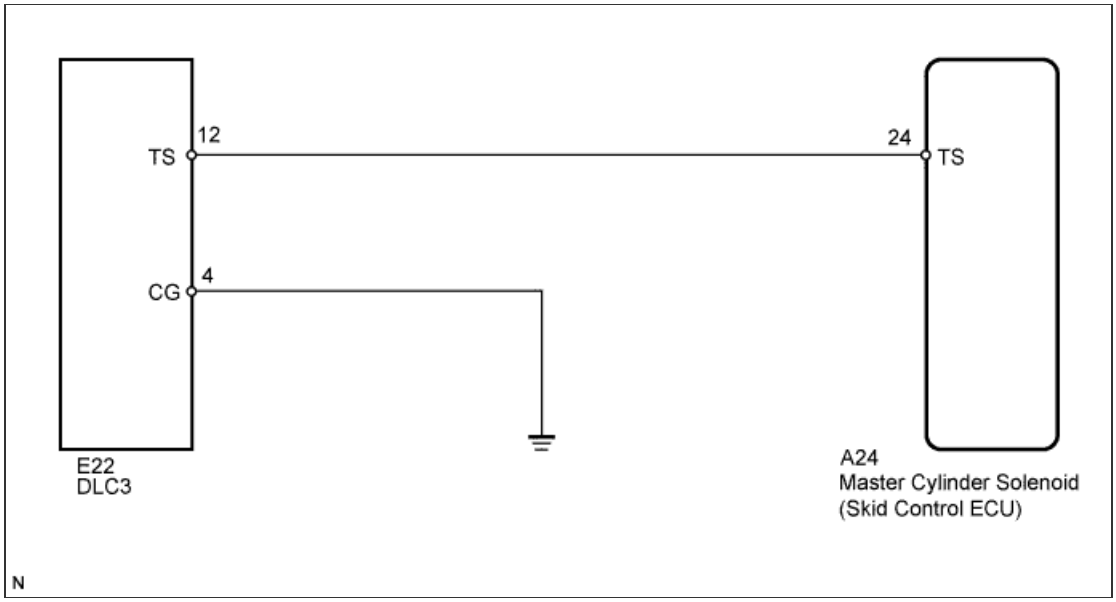
REPLACE MASTER CYLINDER SOLENOID (Click here)

for Preparation Click here

DESCRIPTION

The signal check circuit detects trouble in the sensor or switch signal which cannot be detected by the DTC check.
Connecting terminals TS and CG of the DLC3 starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

C ECK ARNESSCONNECTOR SKID CONTROL ECU - DLC TS

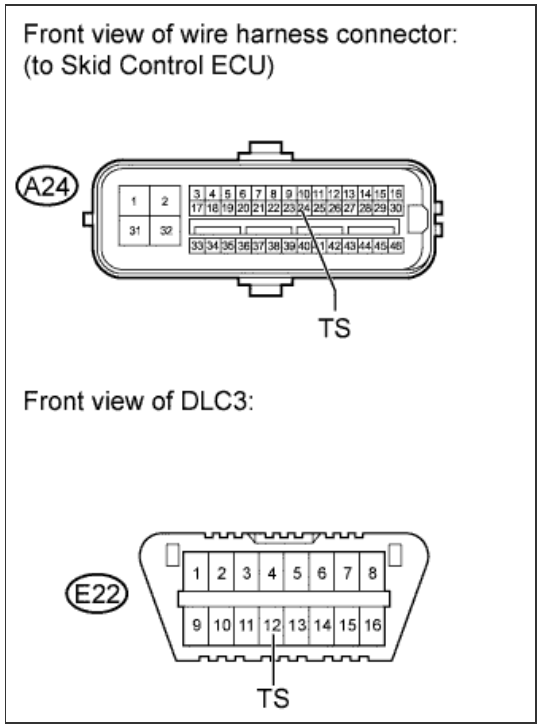
a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU connector.

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

Standard Re i tance:

Tester Connection	Condition	Specified condition
A24-24 (TS) - E22-12 (TS)	Always	Below 1 Ω



NG → REPAIR OR REPLACE ARNESS OR CONNECTOR

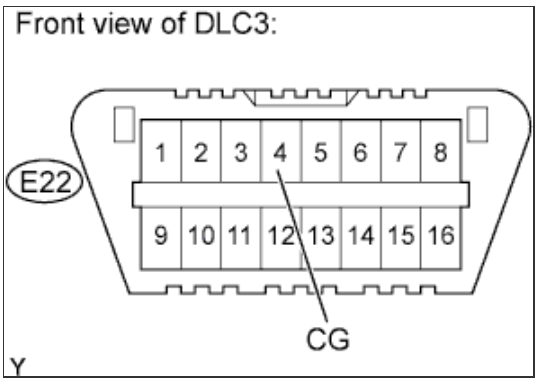
OK

C ECK ARNESS CONNECTOR DLC GC- BODY GROUND)

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

Standard Re i tance:

Tester Connection	Condition	Specified condition
E22-4 (CG) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE ARNESS OR CONNECTOR

OK

C ECK ARNESS CONNECTOR DLC TS BODY GROUND)

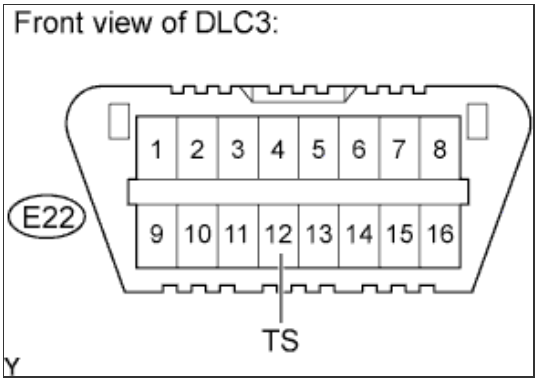
a. Measure the resistance according to the value(s) in the table below.

Standard Re i tance:

Tester Connection	Condition	Specified Condition
E22-12 (TS) - Body ground	Always	10 kΩ or higher

Re ult

Result		Proceed to
NG		A
OK	LHD	B
	RHD	C



B → REPLACE MASTER CYLINDER SOLENOID Click here)

C → REPLACE MASTER CYLINDER SOLENOID Click here)

A

REPAIR OR REPLACE ARNESS OR CONNECTOR

for Preparation Click here

1.EXPRESSIONS OF IGNITION SWITCH

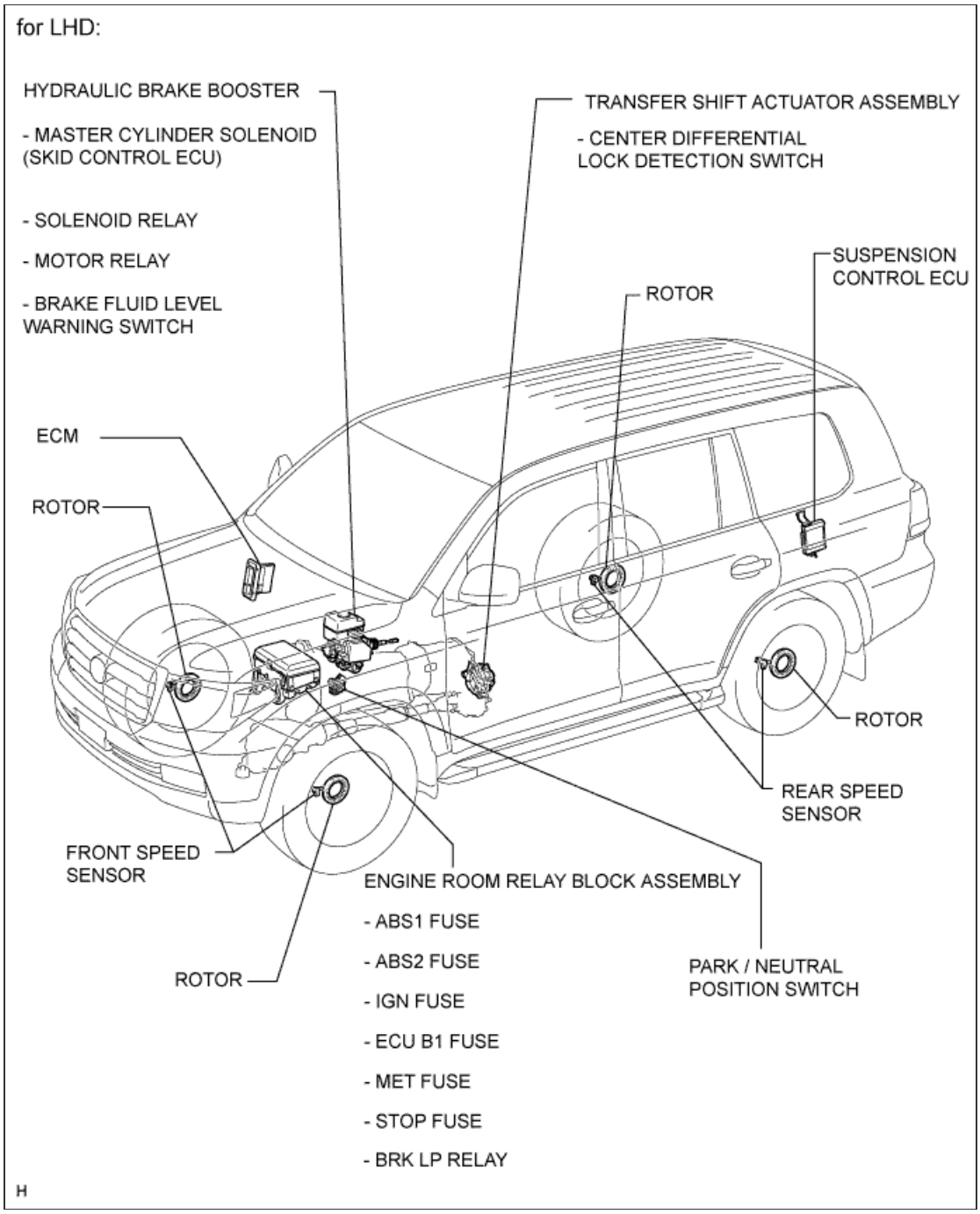
a. The type of ignition switch used on this model differs according to the specifications of the vehicle. The expressions listed in the table below are used in this section.

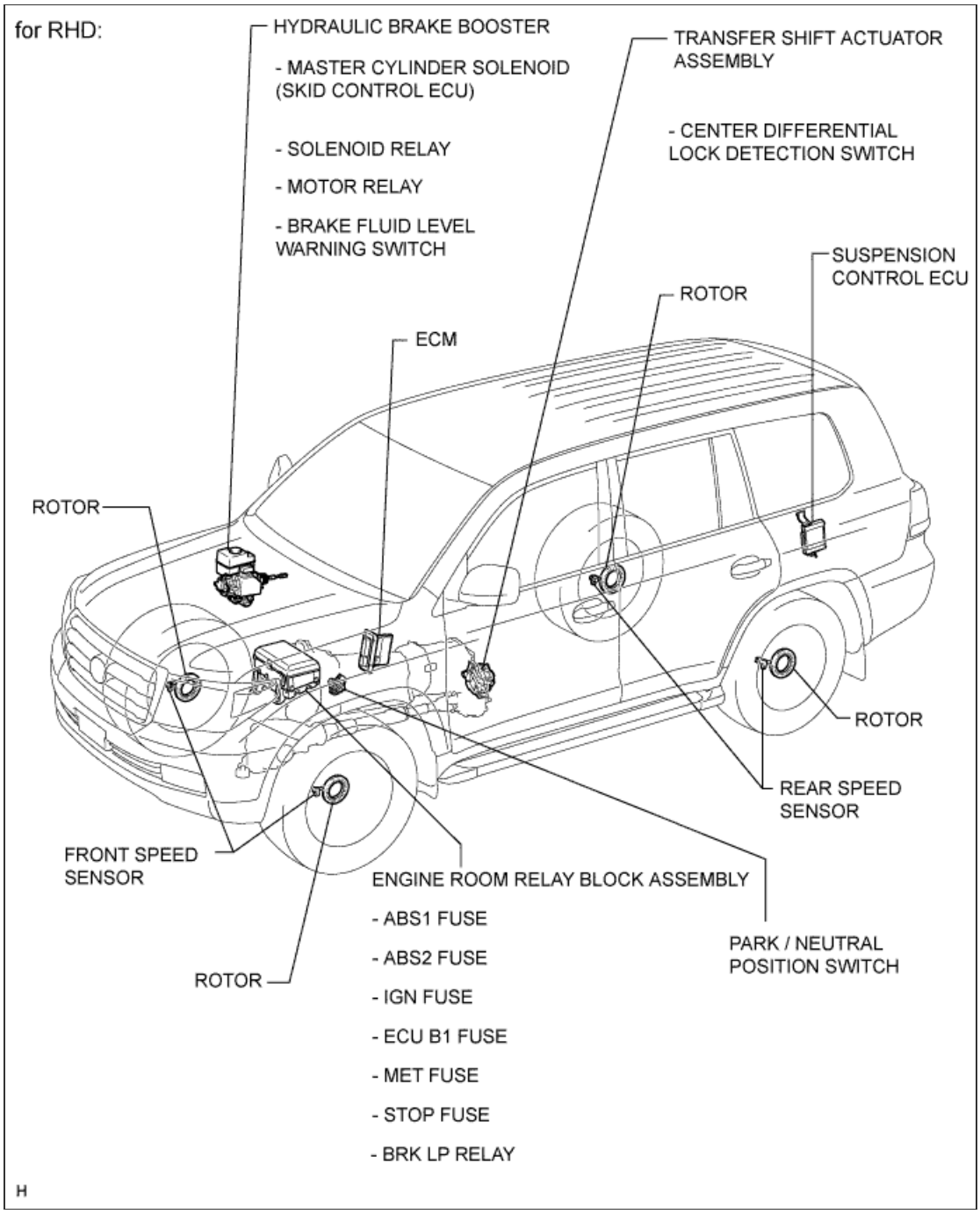
Expression	Ignition Switch (Position)	Engine Switch (Condition)
Ignition Switch off	LOCK	Off
Ignition Switch ACC	ACC	On (ACC)
Ignition Switch ON	ON	On (IG)
Engine Start	START	Start

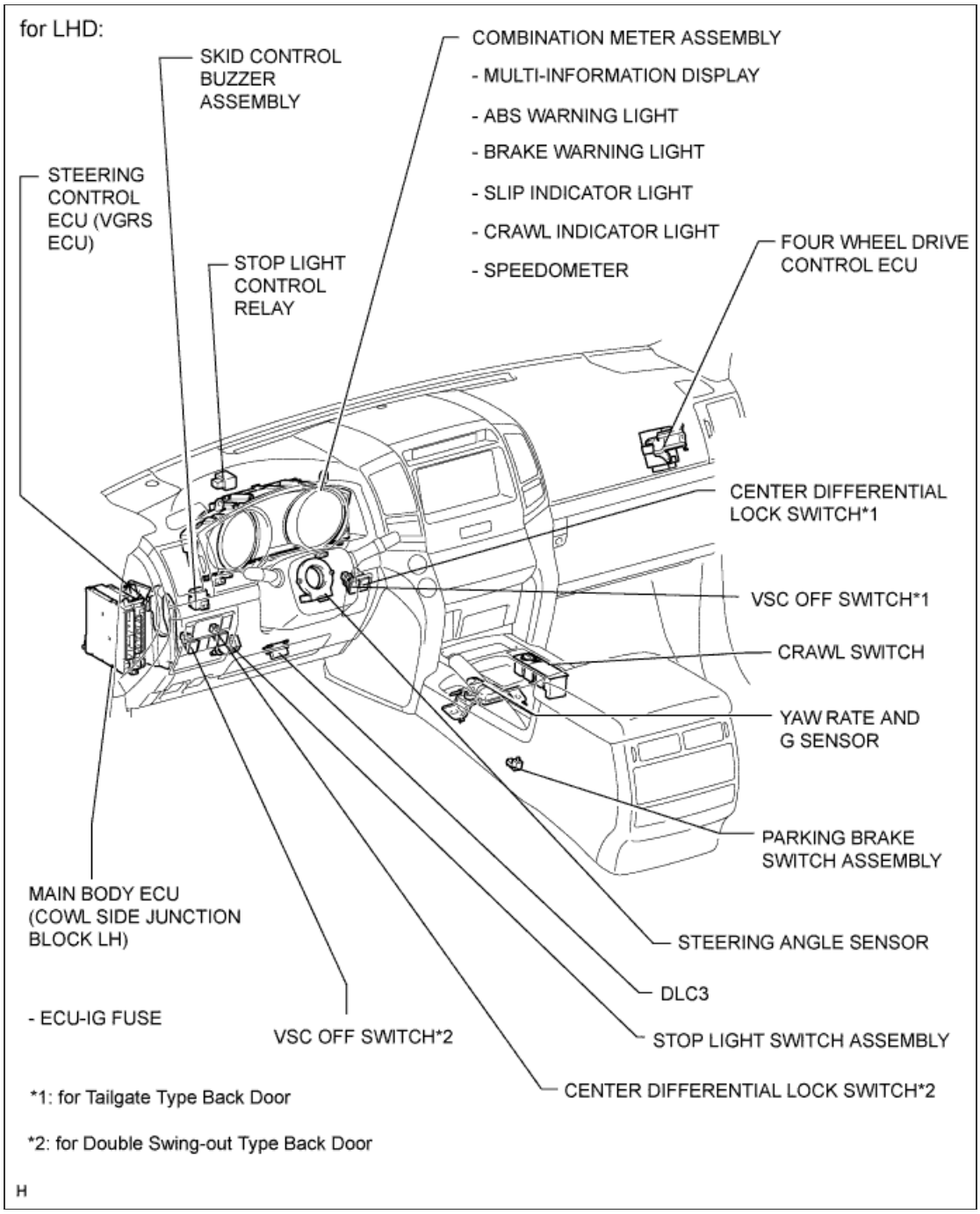
2.TROUBLESHOOTING PRECAUTION

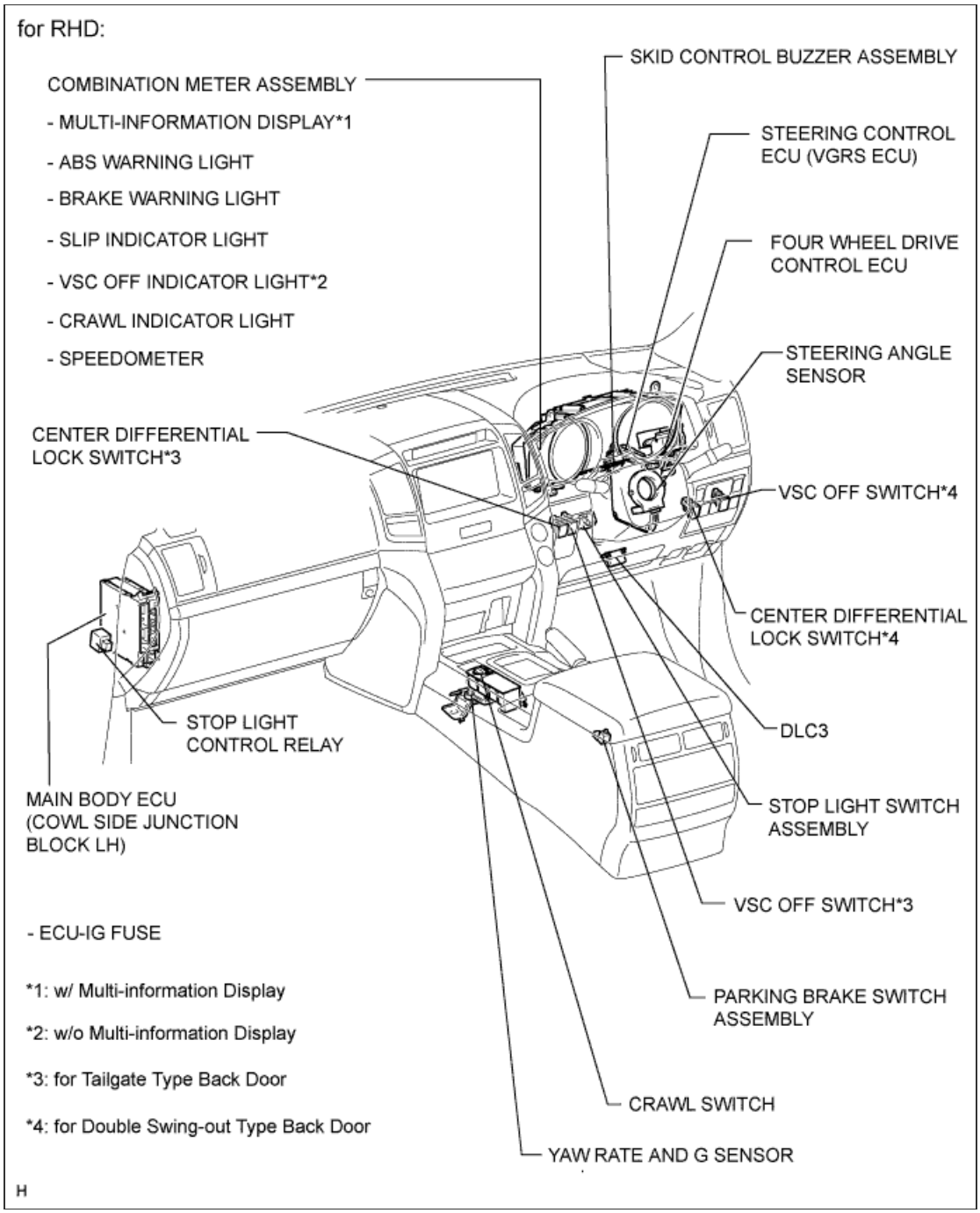
- When there is a malfunction in the contact point of the terminals or installation problems with parts, removal and installation of the suspected problem parts may return the system to normal either completely or temporarily.
- In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as by DTC output and freeze frame data output, and record it before disconnecting each connector or removing and installing parts.
- Since the vehicle stability control system may be influenced by a malfunction in the other systems, be sure to check for DTCs in the other systems.
- Be sure to remove and install the hydraulic brake booster and each sensor with the ignition switch off unless specified in the inspection procedure.
- When removing and installing the hydraulic brake booster and each sensor, be sure to check that the normal display is output in test mode inspection and in DTC output inspection after installing all the parts.
- After replacing the master cylinder solenoid and/or the yaw rate and G sensor, and after performing a vehicle height adjustment, make sure to perform yaw rate and G sensor zero point calibration (Click here).
- The CAN communication system is used for data communication between the skid control ECU (included in the master cylinder solenoid), ECM, four wheel drive control ECU, steering control ECU (VGRS ECU), combination meter, DLC3, steering angle sensor, and yaw rate sensor (the G sensor is included). If there is trouble in the CAN communication line, the DTC of the communication line is stored.
- If the DTC of the CAN communication line is stored, repair the malfunction in the communication line first and then troubleshoot the vehicle stability control system.
- Since the CAN communication line has its own length and route, it cannot be repaired temporarily with a bypass wire, etc.

for Preparation Click here

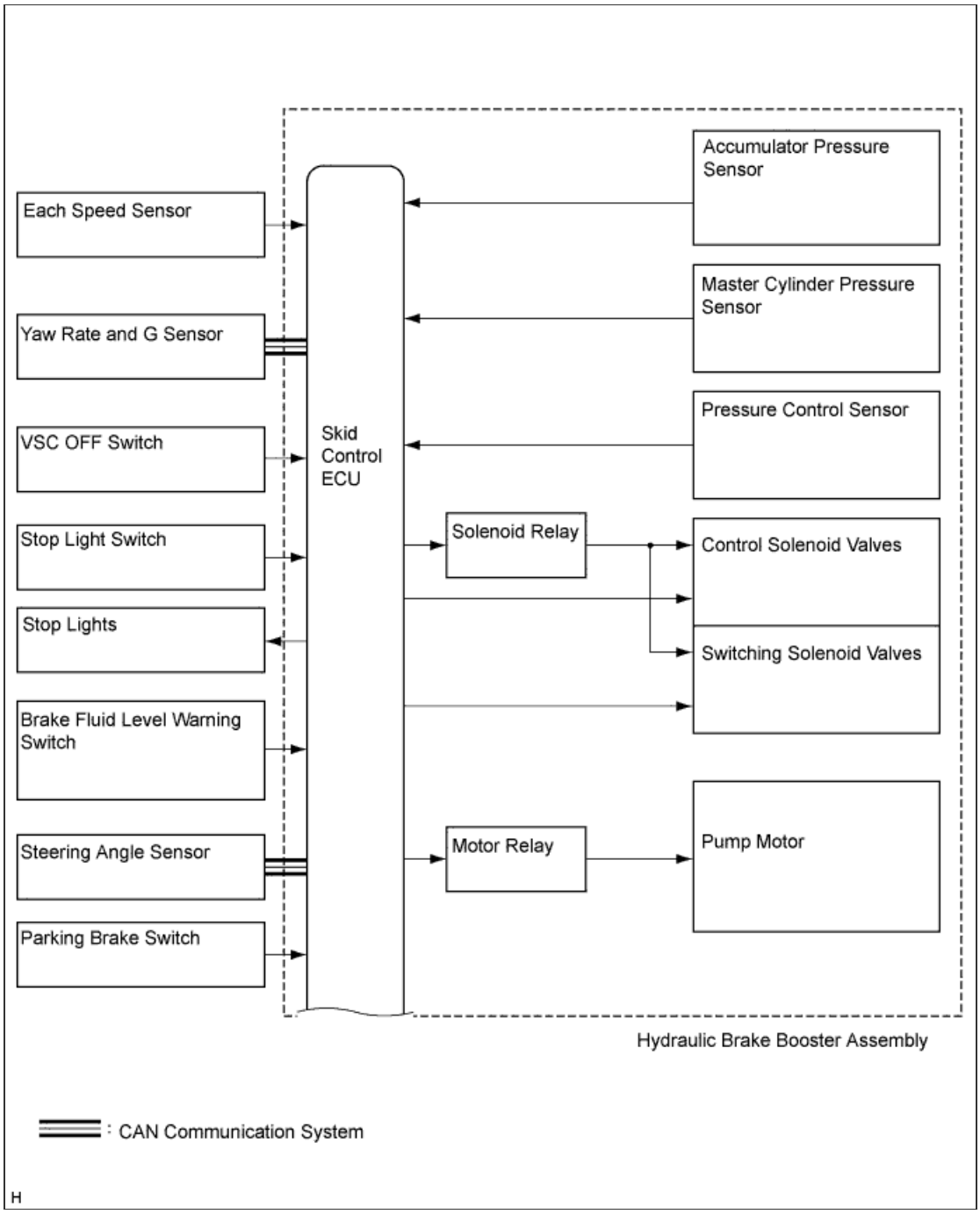


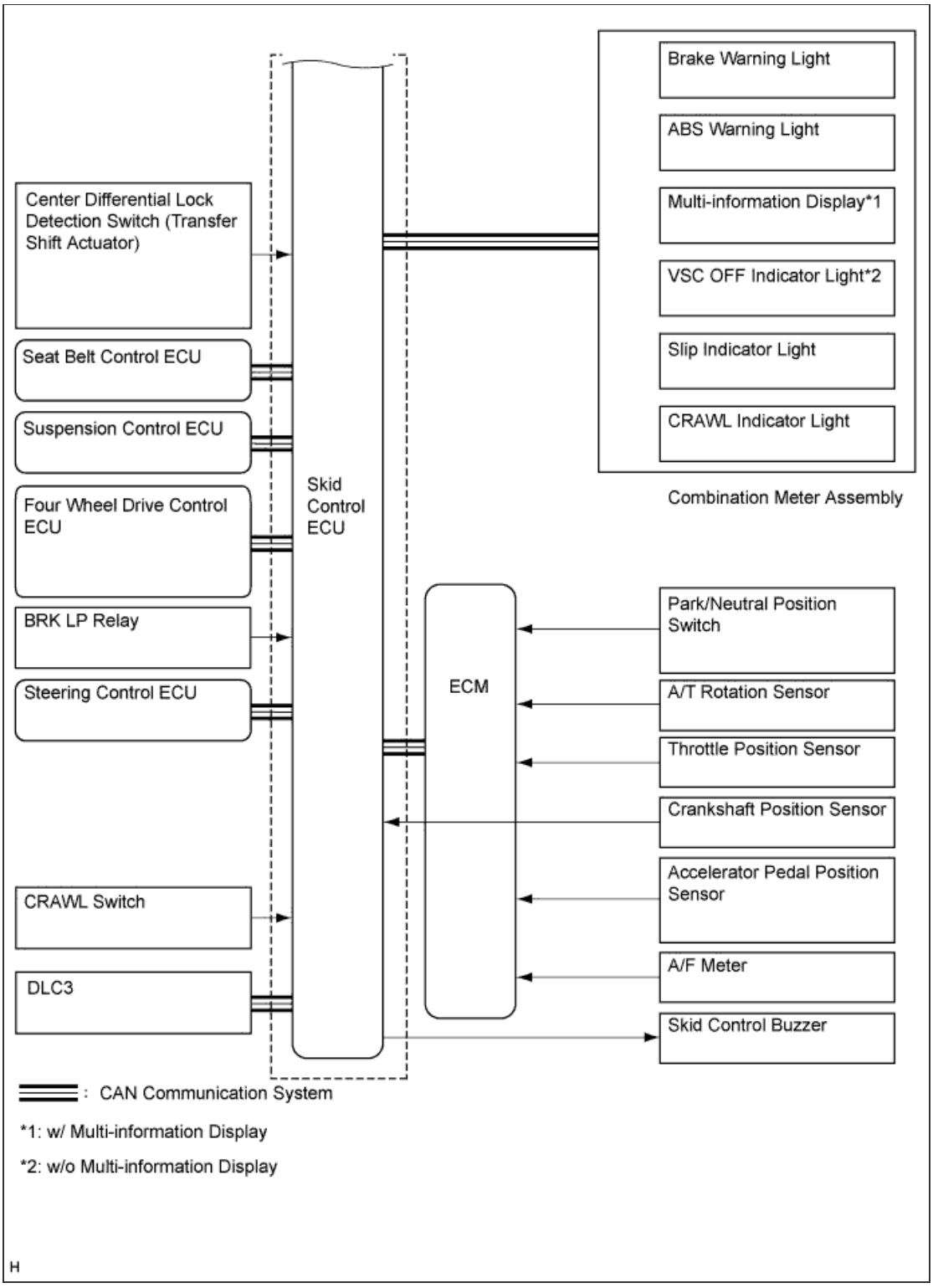

for RHD:
HYDRAULIC BRAKE BOOSTER
- MASTER CYLINDER SOLENOID (SKID CONTROL ECU)
- SOLENOID RELAY
- MOTOR RELAY
- BRAKE FLUID LEVEL WARNING SWITCH
TRANSFER SHIFT ACTUATOR ASSEMBLY
- CENTER DIFFERENTIAL LOCK DETECTION SWITCH
SUSPENSION CONTROL ECU
ROTOR
ECM
ROTOR
ROTOR
REAR SPEED SENSOR
FRONT SPEED SENSOR
ENGINE ROOM RELAY BLOCK ASSEMBLY
- ABS1 FUSE
- ABS2 FUSE
- IGN FUSE
- ECU B1 FUSE
- MET FUSE
- STOP FUSE
- BRK LP RELAY
PARK / NEUTRAL POSITION SWITCH
ROTOR
H


for LHD:
SKID CONTROL BUZZER ASSEMBLY
COMBINATION METER ASSEMBLY
- MULTI-INFORMATION DISPLAY
- ABS WARNING LIGHT
- BRAKE WARNING LIGHT
- SLIP INDICATOR LIGHT
- CRAWL INDICATOR LIGHT
- SPEEDOMETER
STEERING CONTROL ECU (VGRS ECU)
STOP LIGHT CONTROL RELAY
FOUR WHEEL DRIVE CONTROL ECU
CENTER DIFFERENTIAL LOCK SWITCH*1
VSC OFF SWITCH*1
CRAWL SWITCH
YAW RATE AND G SENSOR
PARKING BRAKE SWITCH ASSEMBLY
MAIN BODY ECU (COWL SIDE JUNCTION BLOCK LH)
- ECU-IG FUSE
STEERING ANGLE SENSOR
DLC3
STOP LIGHT SWITCH ASSEMBLY
VSC OFF SWITCH*2
CENTER DIFFERENTIAL LOCK SWITCH*2
*1: for Tailgate Type Back Door
*2: for Double Swing-out Type Back Door
H

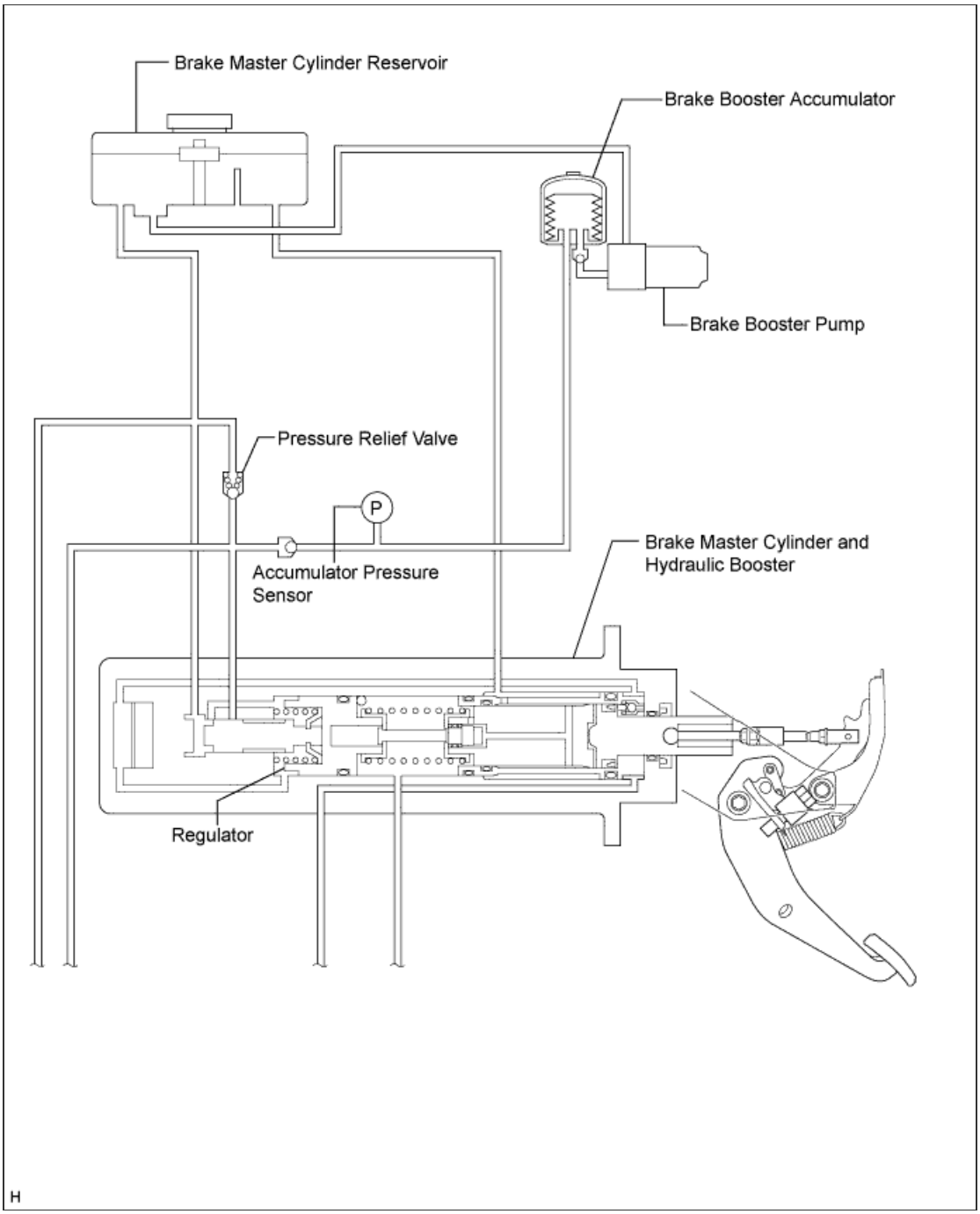

for RHD:
COMBINATION METER ASSEMBLY
- MULTI-INFORMATION DISPLAY*1
- ABS WARNING LIGHT
- BRAKE WARNING LIGHT
- SLIP INDICATOR LIGHT
- VSC OFF INDICATOR LIGHT*2
- CRAWL INDICATOR LIGHT
- SPEEDOMETER
SKID CONTROL BUZZER ASSEMBLY
STEERING CONTROL ECU (VGRS ECU)
FOUR WHEEL DRIVE CONTROL ECU
STEERING ANGLE SENSOR
CENTER DIFFERENTIAL LOCK SWITCH*3
VSC OFF SWITCH*4
CENTER DIFFERENTIAL LOCK SWITCH*4
DLC3
STOP LIGHT CONTROL RELAY
MAIN BODY ECU (COWL SIDE JUNCTION BLOCK LH)
STOP LIGHT SWITCH ASSEMBLY
VSC OFF SWITCH*3
- ECU-IG FUSE
*1: w/ Multi-information Display
*2: w/o Multi-information Display
*3: for Tailgate Type Back Door
*4: for Double Swing-out Type Back Door
PARKING BRAKE SWITCH ASSEMBLY
CRAWL SWITCH
YAW RATE AND G SENSOR
H

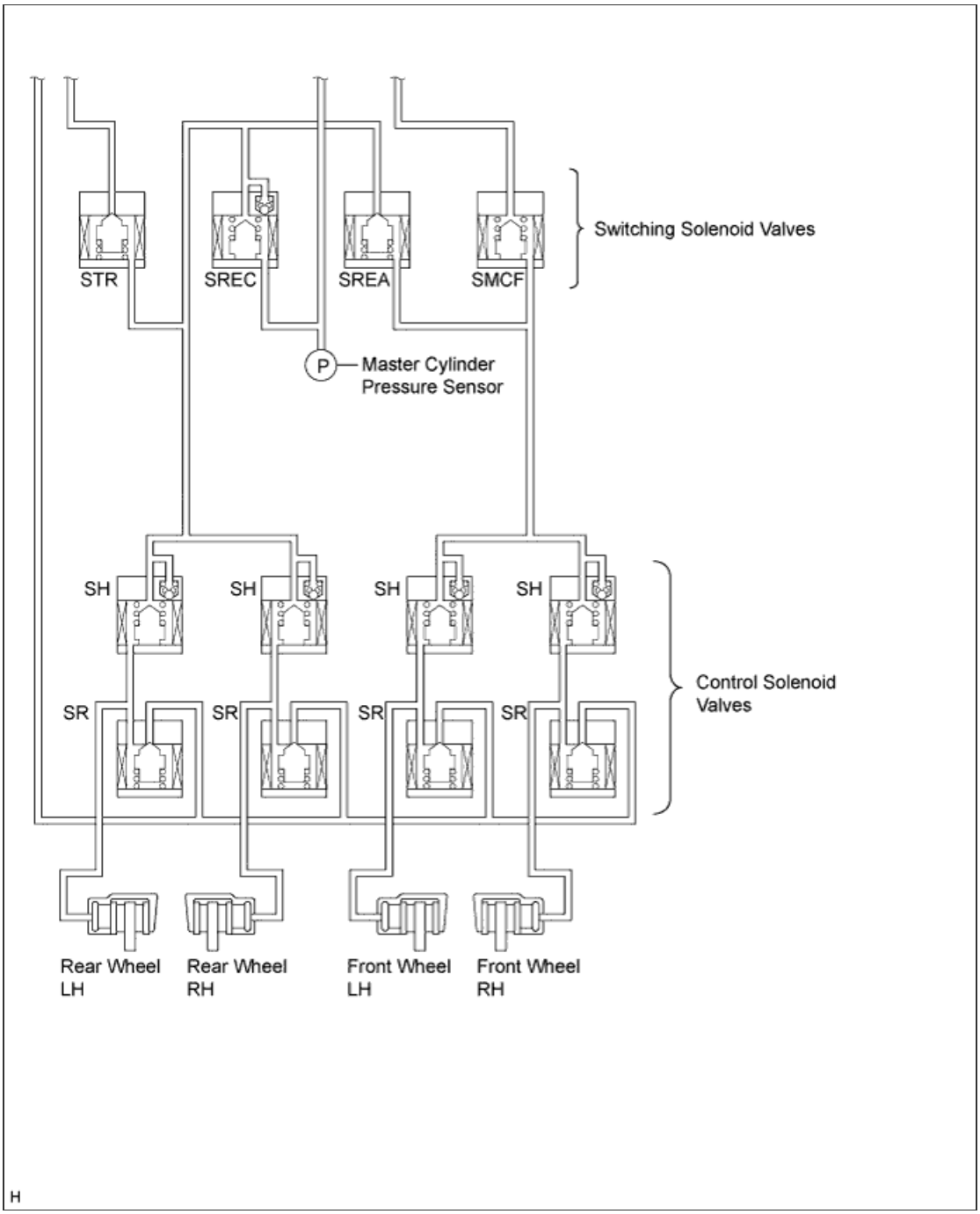
for Preparation Click here




Brake Warning Light
ABS Warning Light
Multi-information Display*1
VSC OFF Indicator Light*2
Slip Indicator Light
CRAWL Indicator Light
Combination Meter Assembly
Center Differential Lock Detection Switch (Transfer Shift Actuator)
Seat Belt Control ECU
Suspension Control ECU
Four Wheel Drive Control ECU
BRK LP Relay
Steering Control ECU
CRAWL Switch
DLC3
Skid Control ECU
ECM
Park/Neutral Position Switch
A/T Rotation Sensor
Throttle Position Sensor
Crankshaft Position Sensor
Accelerator Pedal Position Sensor
A/F Meter
Skid Control Buzzer
: CAN Communication System
*1: w/ Multi-information Display
*2: w/o Multi-information Display

H


Brake Master Cylinder Reservoir
Brake Booster Accumulator
Brake Booster Pump
Pressure Relief Valve
P
Accumulator Pressure Sensor
Brake Master Cylinder and Hydraulic Booster
Regulator
H



Transmitting ECU (Transmitter)	Receiving ECU	Signal	Communication Method
ECM	Skid control ECU	Shift position signal	CAN communication system
ECM	Skid control ECU	A/T rotation signal	CAN communication system
ECM	Skid control ECU	Throttle position signal	CAN communication system
ECM	Skid control ECU	Engine speed signal	CAN communication system
ECM	Skid control ECU	Accelerator pedal position signal	CAN communication system
ECM	Skid control ECU	Engine torque signal	CAN communication system
Skid control ECU	ECM	Yaw rate and G signal	CAN communication system
Skid control ECU	ECM	Steering angle signal	CAN communication system
Skid control ECU	ECM	Engine torque request signal	CAN communication system
Skid control ECU	Suspension control ECU	Yaw rate and G signal	CAN communication system
Skid control ECU	Suspension control ECU	Steering angle signal	CAN communication system
Skid control ECU	Seat belt control ECU	Yaw rate and G signal	CAN communication system
Skid control ECU	Seat belt control ECU	Steering angle signal	CAN communication system
Four wheel drive control ECU	Skid control ECU	L4 signal	CAN communication system
Four wheel drive control ECU	Skid control ECU	Center differential lock signal	CAN communication system
Skid control ECU	Four wheel drive control ECU	Yaw rate and G signal	CAN communication system
Skid control ECU	Four wheel drive control ECU	Steering angle signal	CAN communication system

Steering control ECU	Skid control ECU	Steering actuator angle signal	CAN communication system

for Preparation Click here

SYSTEM DESCRIPTION

HINT:

- **The skid control ECU is a single unit with the hydraulic brake booster.**
- **The yaw rate and G sensors are combined in a single unit. This unit communicates with the skid control ECU through CAN communication.**

a. Multi-terrain ABS with EBD, BA, A-TRC, Hill-start Assist Control, CRAWL and VSC operation

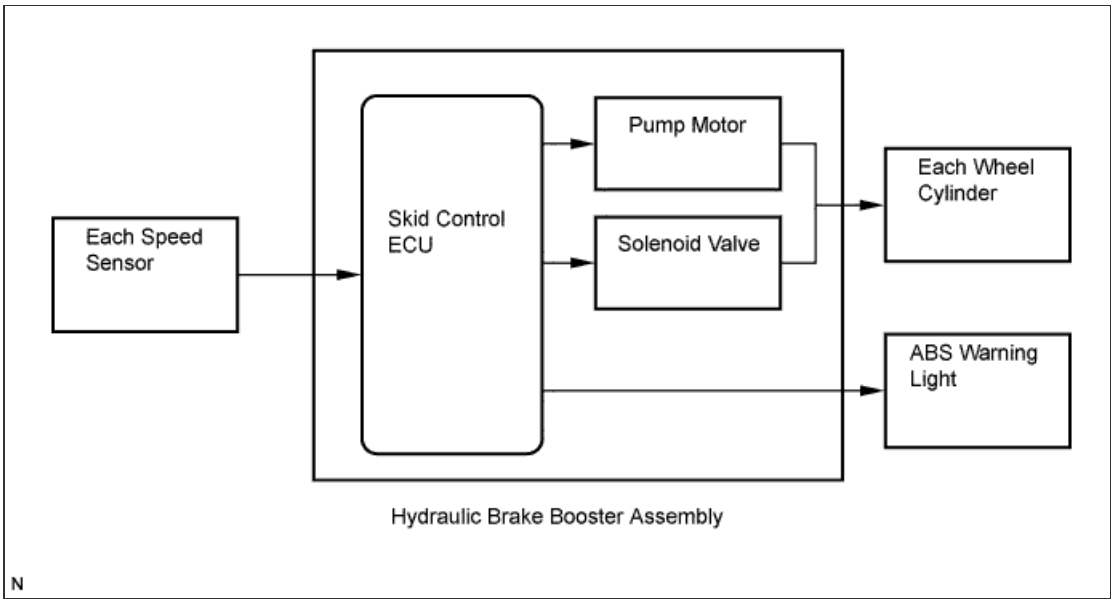
i. The skid control ECU calculates vehicle stability based on the signals from the speed sensor, yaw rate and G sensor and steering angle sensor. In addition, it evaluates the results of the calculations to determine whether any control actions (control of the engine output torque by electronic throttle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

ii. The SLIP indicator blinks and the skid control buzzer sounds intermittently to inform the driver that the VSC system is operating. The SLIP indicator also blinks when A-TRC, CRAWL or Hill-start Assist Control is operating.

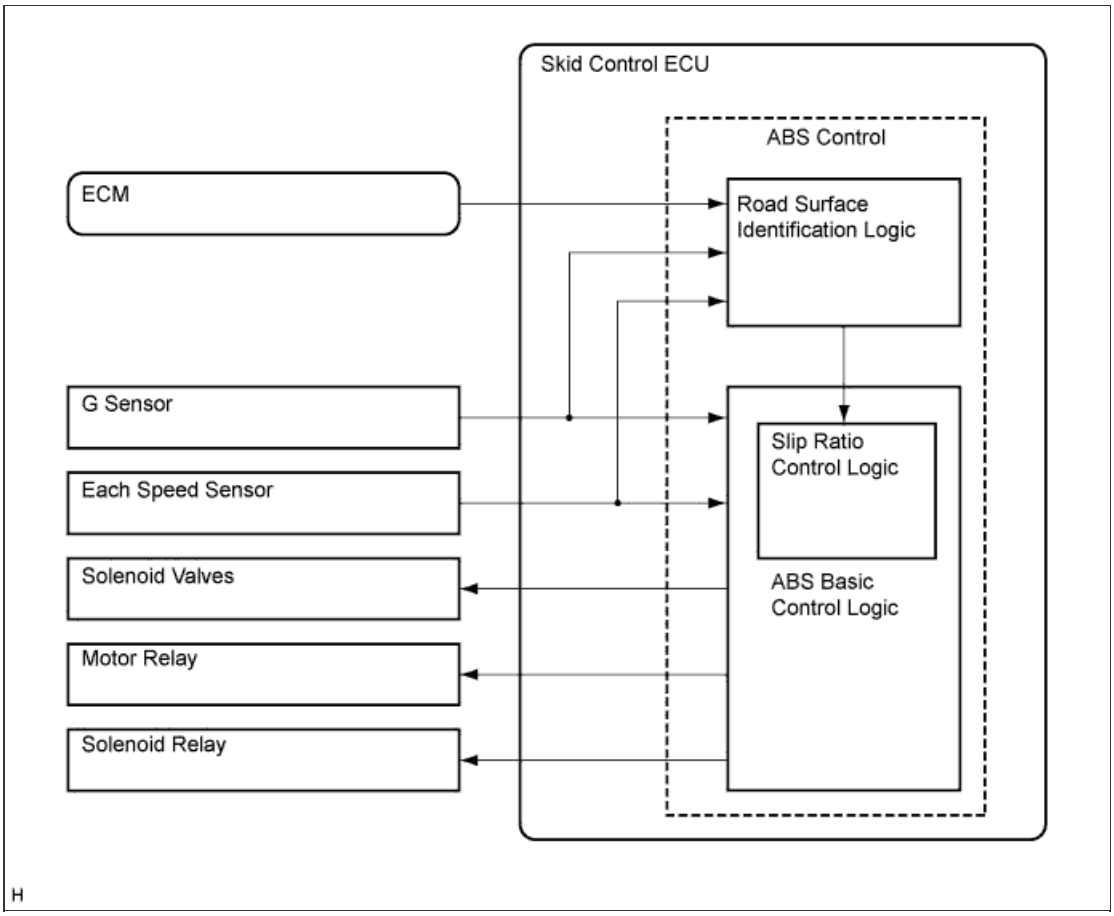
ACTIVE SAFETY

a. Multi-terrain ABS

- The ABS helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface.
- The Multi-terrain ABS detects off-road driving on dirt, sand, etc., and improves the brake feeling during off-road driving by using a function to automatically change to optimal ABS control.

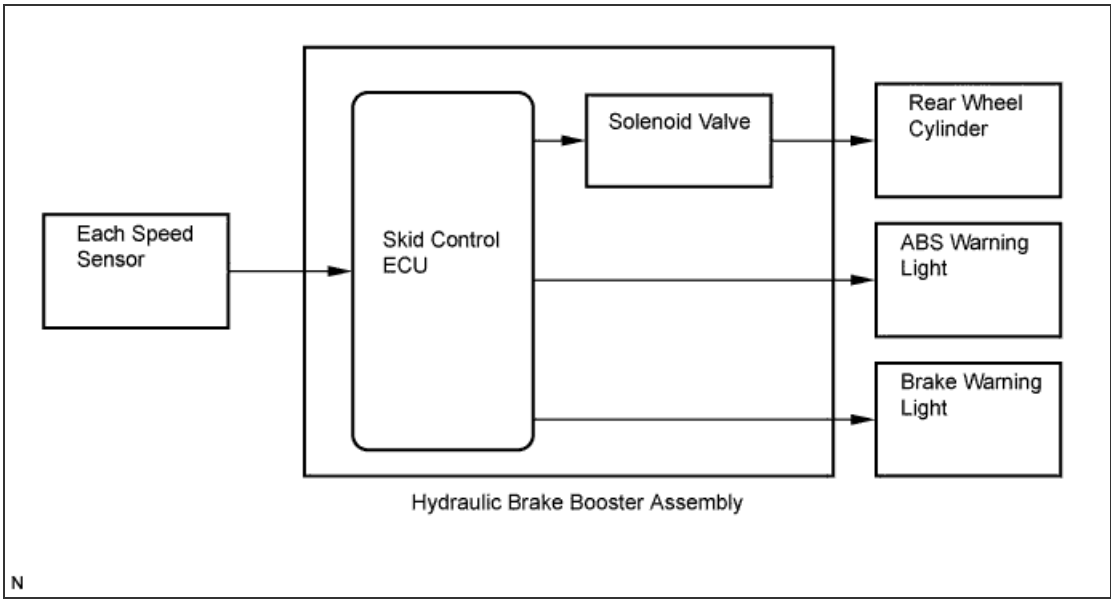


Operation description (ABS)
The skid control ECU detects wheel lock condition by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valve. The pump motor and solenoid valve avoid wheel lock by controlling the oil pressure of each wheel cylinder.
The ABS warning light comes on when the ABS system is malfunctioning.



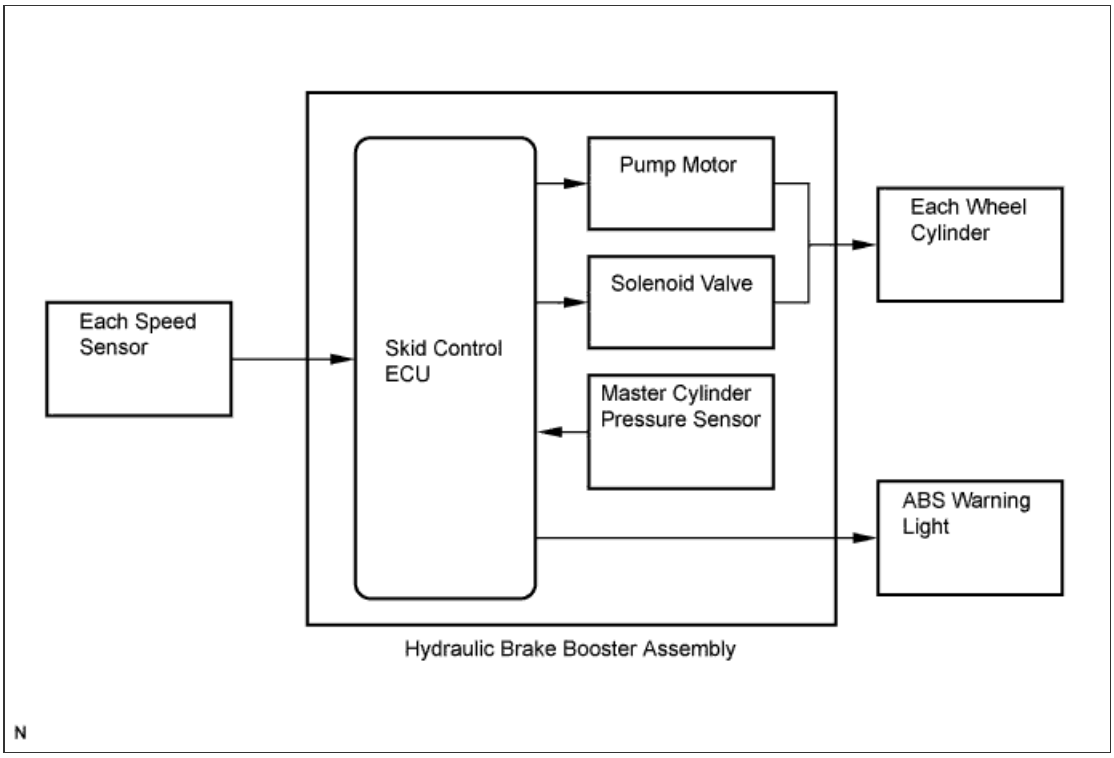
Operation description (Multi-terrain ABS)
The skid control ECU detects road surface, such as dry asphalt, wet asphalt, snow, ice, sand, mud, gravel, and dirt, by using engine torque information from the ECM, vehicle body acceleration information from the G sensor, and vehicle wheel speed information from each wheel speed sensor.
The skid control ECU changes the slip ratio in accordance with the detected road surface.

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



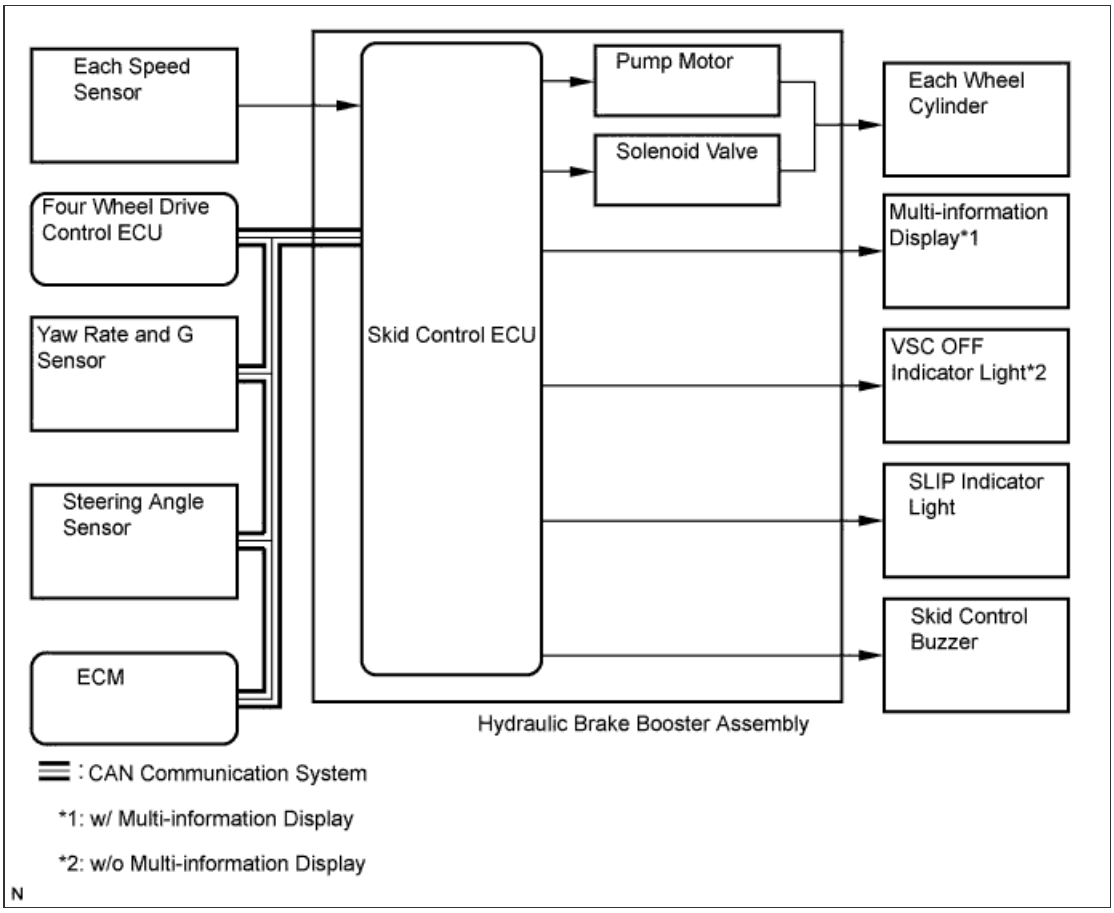
Operation description
The skid control ECU receives the speed signal from each speed sensor to detect the slip condition of the wheels and sends the control signal to the solenoid.
The solenoid valve controls oil pressure of the rear wheel cylinder and splits the control power properly between the rear wheels and the right and left wheels.
Both the ABS and BRAKE warning lights come on to indicate a malfunction in the EBD system.

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 braking performance.



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

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



Operation description

The skid control ECU determines vehicle condition by receiving signals from the speed sensors, yaw rate and G sensor and steering angle sensor. The skid control ECU controls engine torque through the ECM via CAN communication, and oil pressure through the pump and solenoid valve.

The SLIP indicator light blinks and the skid control buzzer sounds intermittently when the system is operating.

When there is a malfunction in the VSC system, the SLIP indicator light turns on and "Check VSC System" appears on the multi-information display*1 or the VSC OFF indicator light blinks*2.

HINT:

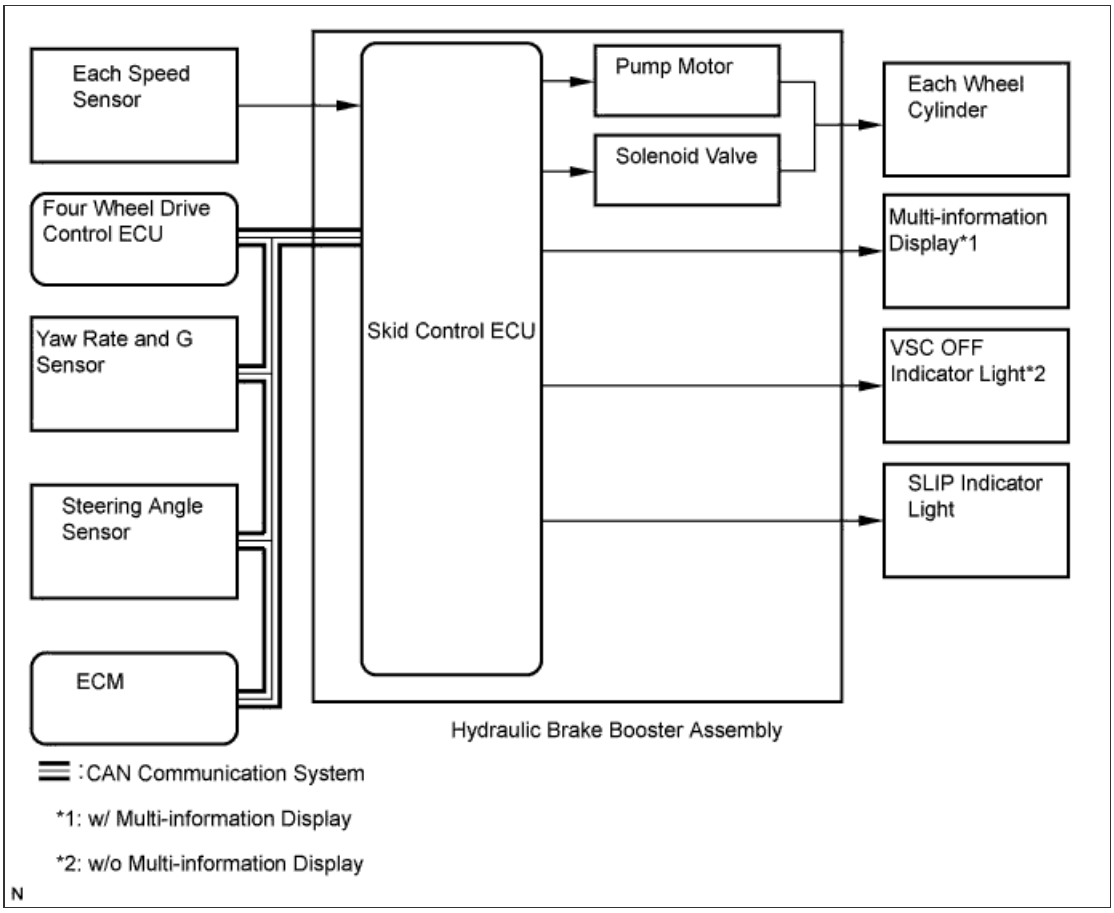
- ***1: w/ Multi-information Display**
- ***2: w/o Multi-information Display**
- **When the center differential is locked or the VSC OFF switch is operated, VSC control turns off and the VSC OFF indicator illuminates.**

DRIVING PERFORMANCE

a. A-TRC (Active Traction Control)

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

During rugged off-road driving, this function controls the engine output and the brake fluid pressure that is applied to the slipping wheel, and distributes the drive force that would have been lost through the slippage to the remaining wheels in order to achieve an LSD (Limited Slip Differential) effect.



Operation description

The skid control ECU detects the vehicle slip condition by receiving signals from the speed sensor and ECM via CAN communication. The skid control ECU controls engine torque through the ECM via CAN communication, and oil pressure through the pump and solenoid valve. The SLIP indicator light blinks when the system is operating.

When there is a malfunction in the A-TRC system, the SLIP indicator light turns on and "Check VSC System" appears on the multi-information display*1 or the VSC OFF indicator light blinks*2.

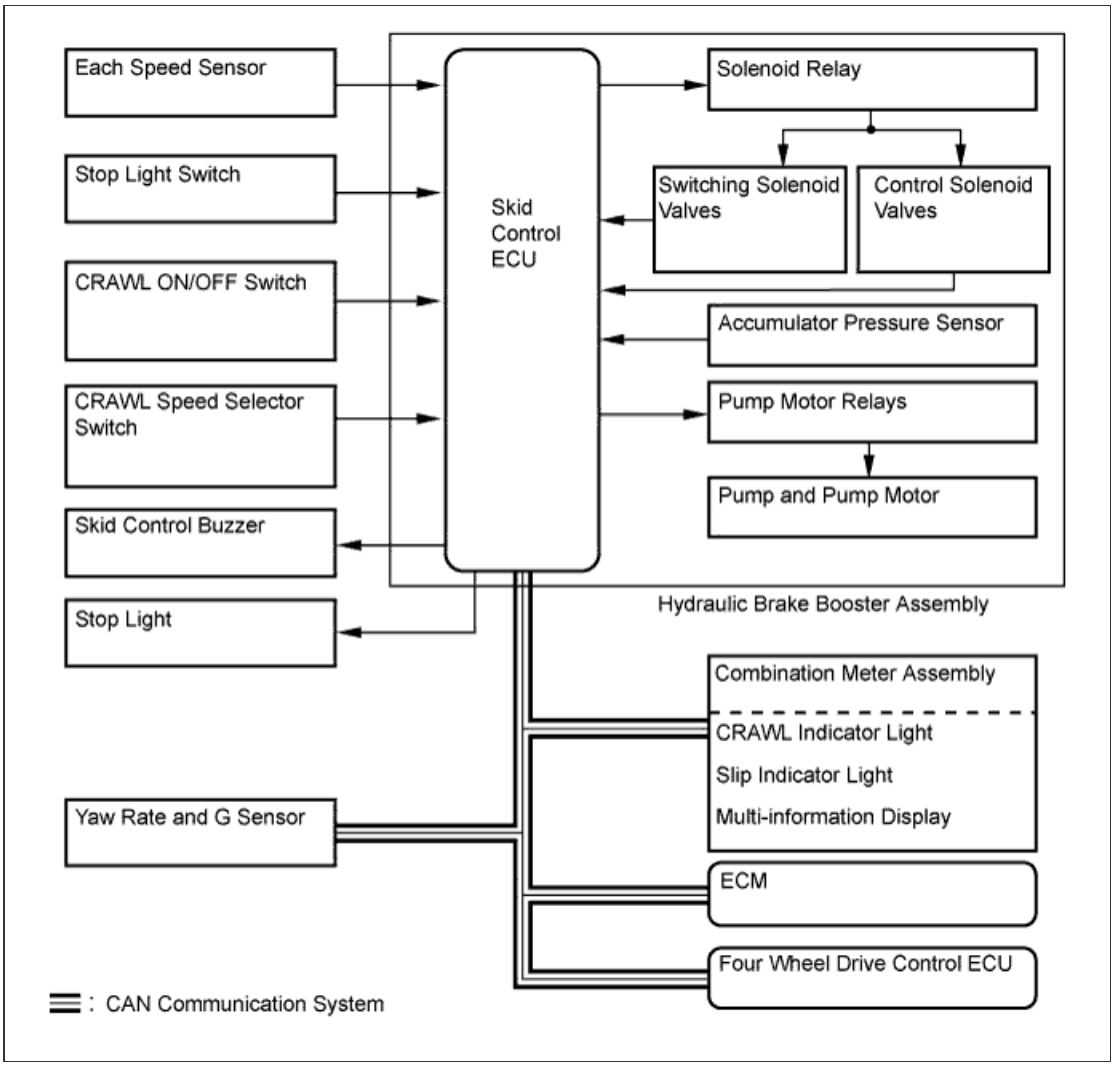
HINT:

*1: w/ Multi-information Display

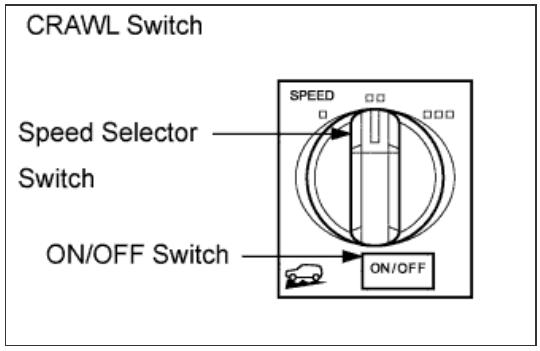
*2: w/o Multi-information Display

b. CRAWL (Crawl Control)

CRAWL is a system that provides assistance when driving on bumpy off-road surfaces, slippery road surfaces, etc. When CRAWL is operating, the engine output and braking force are controlled automatically to enable driving while maintaining a constant speed. As a result, the driver can concentrate on steering the vehicle without having to operate the accelerator and brake pedals very much.



Operation description



- Based on the information provided by various sensors, switches, and the ECM, the skid control ECU determines the conditions that enable CRAWL operation. If control is possible, the skid control ECU calculates the target vehicle speed (approximately 1 to 5 km/h (1 to 3 mph)) used for controlling the actual vehicle speed and the target wheel speed used for controlling wheel slip. Also, it is possible to change the target vehicle speed with the speed selector switch.
- The skid control ECU compensates for the difference between the target vehicle speed and actual vehicle speed by controlling the engine output. It also compensates for the difference between the target wheel speed and actual wheel speed by controlling brake fluid pressure to the wheels.

Operation condition

When the CRAWL ON/OFF switch is pressed with all of the following conditions met, CRAWL will start. When CRAWL starts, the CRAWL indicator light turns on and the SLIP indicator light blinks.

- Transfer: L4
- Shift position: other than P, N
- 2nd start switch: off*1
- Engine: running
- Driver side door: closed
- ATF temperature: no significant increase
- VSC system: normal and not in system protection state*2

HINT:

*1: If the ECT's 2nd start mode is selected, CRAWL engine control will not operate.

*2: When the hydraulic brake booster and brake temperature rise to a certain temperature.

Operation ending condition

When one of the following conditions is met, CRAWL will stop.

As CRAWL is stopping, the skid control buzzer sounds intermittently for 3 seconds and the CRAWL indicator light begins blinking.*1

When CRAWL totally stops, the CRAWL and SLIP indicator lights turn off.

- CRAWL ON/OFF switch: off
- Vehicle speed: 25 km/h (16 mph) or more*2
- Transfer: H4

- Shift position: P or N
- Driver side door: open
- 2nd start switch: on*3
- ATF temperature: increased*4
- VSC system: malfunctioning or in system protection state*5

HINT:

*1: If the CRAWL ON/OFF switch is used to stop CRAWL, the buzzer will not sound and the indicator light will not blink.

*2: If CRAWL is temporarily suspended, the CRAWL indicator light will begin blinking.

*3: If the ECT's 2nd start mode is selected, CRAWL engine control will stop, but brake control can be continued. In this case, the buzzer will not sound and the CRAWL indicator light will stay lit.

*4: When the ATF temperature increases to a certain temperature, the A/T OIL TEMP warning light turns on.

*5: When the hydraulic brake booster and brake temperature increase to a certain temperature.

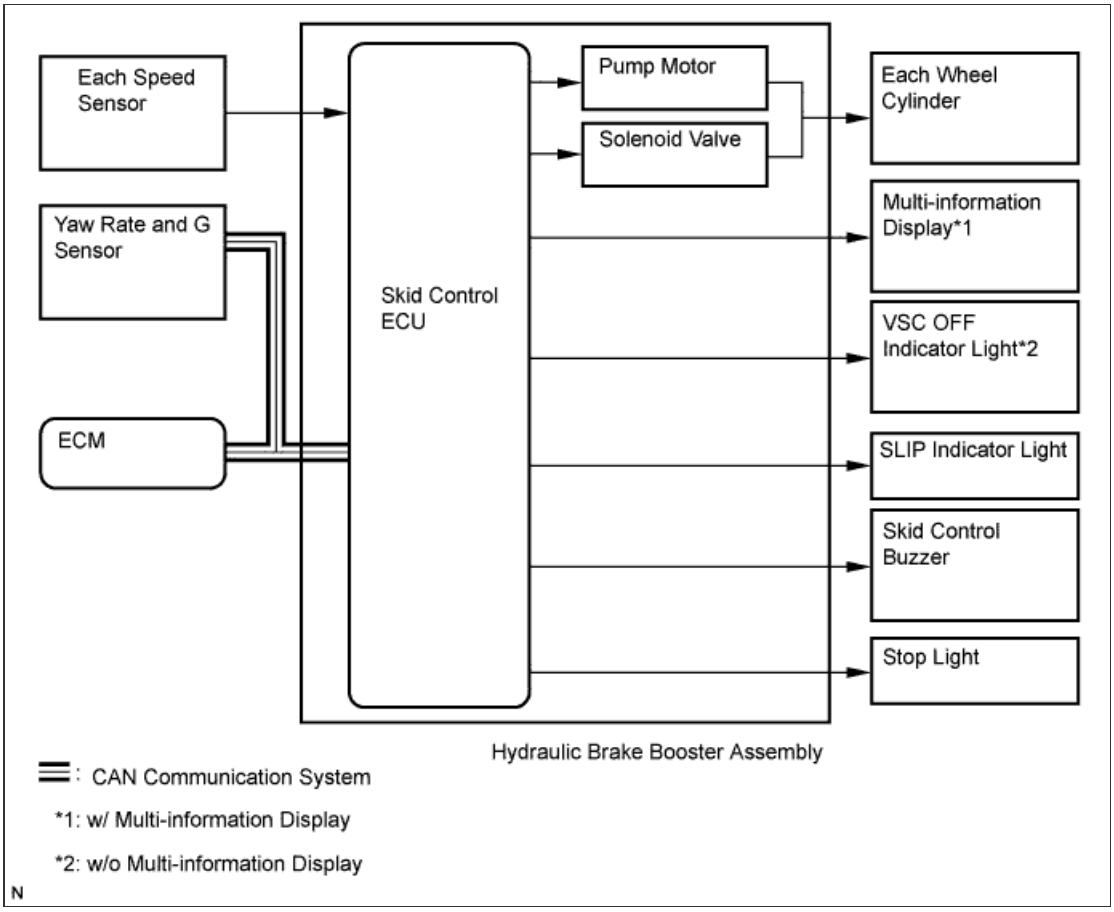
c. Hill-start Assist Control

When the vehicle starts off on a steep hill, hill-start assist control detects the backward descent of the vehicle and performs 4-wheel hydraulic pressure control to reduce the backward speed of the vehicle.
The hill-start assist control is operated for a maximum 5 seconds, then brake fluid pressure is gradually released and control completes.

HINT:

Depressing the brake pedal cancels control of the hill-start assist control system.

The system does not operate when the shift lever is in P or N, or when the vehicle is running/rolling back up a slope with the shift lever in R.



Operation description

The SLIP indicator light blinks, the stop light comes on, and the skid control buzzer sounds intermittently when the system is in operation.
When there is a malfunction in the hill-start assist system, the SLIP indicator light turns on and "Check VSC System" appears on the multi-information display*1 or the VSC OFF indicator light blinks*2.

HINT:

*1: w/ Multi-information Display

*2: w/o Multi-information Display

for Preparation Click here

HINT:

*: Use the intelligent tester.

1.VEHICLE BROUGHT TO WORKSHOP

NEXT

2.INSPECT BATTERY VOLTAGE

Standard voltage:
11 to 14 V

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT

3.INSPECT COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*

a. Using the intelligent tester, inspect the CAN communication function to ensure there are no malfunctions in the communication system.

Result

Result	Proceed to
No DTCs (CAN communication system) output	A
DTCs (CAN communication system) output	B

HINT:

The skid control ECU sends the signals of each warning light via CAN communication.

B. PROCEED TO CAN COMMUNICATION SYSTEM

A

4.CHECK DTC AND FREEZE FRAME DATA*

NEXT

5.CLEAR DTC AND FREEZE FRAME DATA*

NEXT

6.PROBLEM SYMPTOM CONFIRMATION

NEXT

7.DTC CHECK AND CLEAR*

NEXT

8.PROBLEM SYMPTOM CONFIRMATION

Result

Result	Proceed to
Symptom does not occur	A
Symptom occurs	B

B. GO TO STEP 10

A

9.SYMPTOM SIMULATION

NEXT

10.CHECK FOR DTC (OTHER THAN CAN COMMUNICATION SYSTEM DTC)*

Result

Result	Proceed to
No DTCs output	A
DTCs output	B

B. GO TO STEP 12

A

11.PROBLEM SYMPTOMS TABLE

NEXT

GO TO STEP 14

12.DIAGNOSTIC TROUBLE CODE CHART

NEXT

13.CIRCUIT INSPECTION*

NEXT

14.IDENTIFICATION OF PROBLEM

NEXT

15.REPAIR OR REPLACE

NEXT

16.CONFIRMATION TEST*

NEXT

END

for Preparation Click here

CHECK FOR INTERMITTENT PROBLEMS

HINT:

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

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the intelligent tester on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

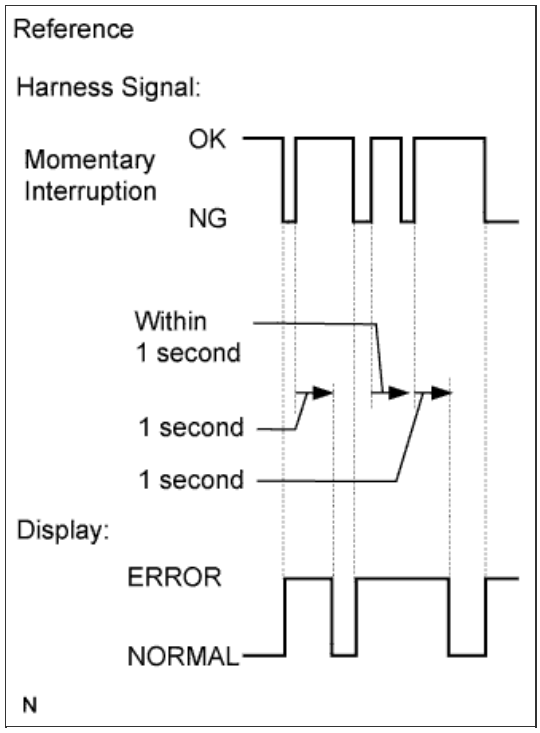
f. Select areas where momentary interruption should be monitored.

ABS/VSC/TRC

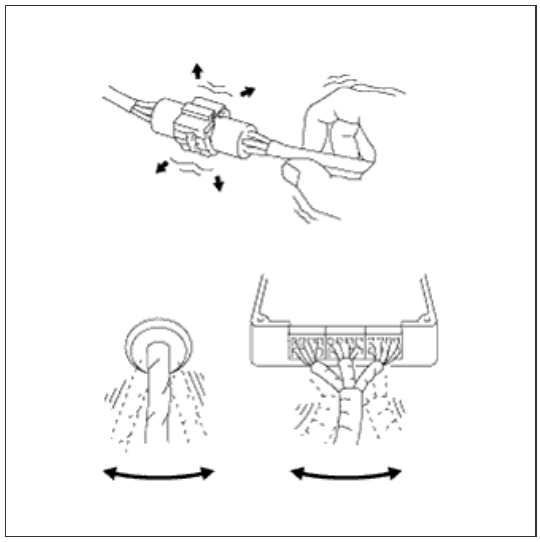
Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
EFI Communication Open	ECM communication open detection / Error or Normal	ERROR: Momentary interruption NORMAL: Normal	-
Yaw Rate Open	Yaw rate sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Deceleration Open	Deceleration sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Steering Open	Steering angle sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

HINT:

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



g. While observing the screen, gently jiggle the connector or wire harness between the ECU and sensors, or between ECUs. If the display changes, the connector and/or wire harness is in momentary interruption (open circuit). Repair or replace the connector and/or wire harness, as one of them is faulty.



for Preparation Click here

DESCRIPTION

After replacing the relevant VSC components or performing a vehicle height adjustment, clear the sensor calibration data and perform calibration.

Replacement/Adjustment Part	Necessary Operation
Master cylinder solenoid (Skid control ECU)	Yaw rate and G sensor zero point calibration
Yaw rate and G sensor	1. Clearing zero point calibration data 2. Yaw rate and G sensor zero point calibration
Vehicle height adjustment	1. Clearing zero point calibration data 2. Yaw rate and G sensor zero point calibration 3. Steering angle sensor initialization

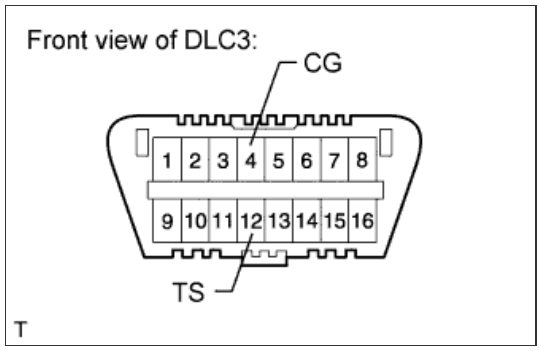
CLEAR ZERO POINT CALIBRATION (SST CHECK WIRE)

After replacing the yaw rate and G sensor or performing a vehicle height adjustment, make sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

a. Turn the ignition switch to ON.

b. Using SST, connect and disconnect terminals 12 (TS) and 4 (CG) of the DLC3 4 times or more within 8 seconds.

SST
09843-18040

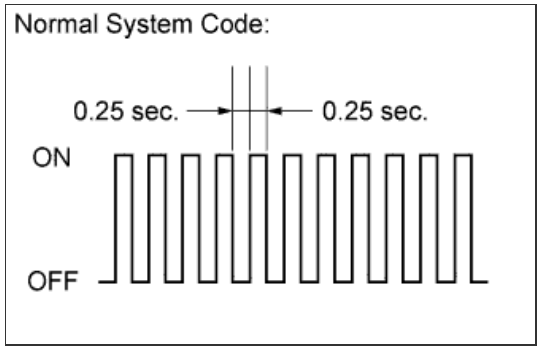


c. Check that "DIAG VSC OK" is displayed on the multi-information display*1 and check that the ABS warning light and VSC OFF indicator light*2 output the normal system code.

HINT:

*1: w/ Multi-information Display

*2: w/o Multi-information Display



d. Using a check wire, perform zero point calibration of the yaw rate and G sensor.

PERFORM ZERO POINT CALIBRATION OF YAW RATE AND G SENSOR (SST CHECK WIRE)

After replacing the master cylinder solenoid and/or yaw rate and G sensor or performing a vehicle height adjustment, make sure to perform yaw rate and G sensor zero point calibration.

NOTICE:

- **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it. Keep it stationary and do not start the engine.**
- **Choose a level surface with an inclination of less than 1°.**

a. Procedures for Test Mode:

i. Turn the ignition switch off.

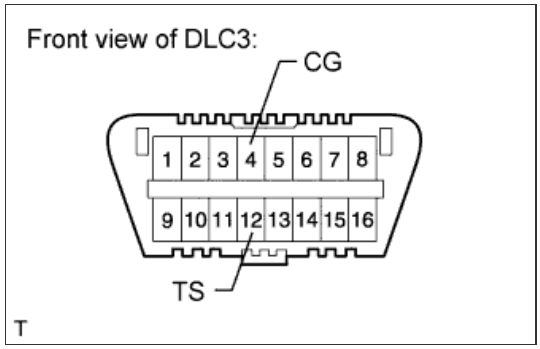
ii. Move the shift lever to P.

NOTICE:

DTC C1210/36 and C1336/98 will be stored if the shift lever is not in P (Click here).

iii. Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.

SST
09843-18040

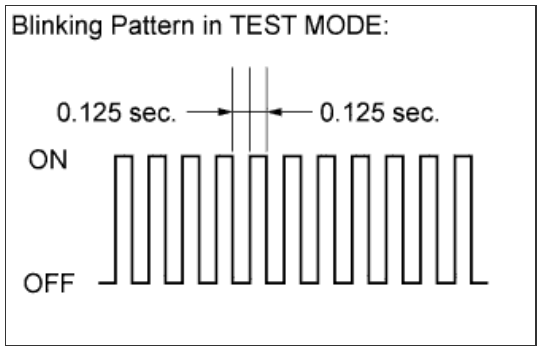


iv. Check that the steering wheel is centered.

v. Turn the ignition switch to ON.

vi. Keep the vehicle stationary on a level surface for 2 seconds or more.

vii. Check that "VSC TEST MODE" is displayed on the multi-information display*1 and check that the ABS warning light and VSC OFF indicator light*2 are blinking in test mode.



NOTICE:

The ABS warning light and VSC OFF indicator light*2 stay on when obtaining the zero point.

HINT:

- **If the ABS warning light and VSC OFF indicator light*2 do not blink, perform the zero point calibration again.**
- **The zero point calibration is performed only once after the system enters test mode.**
- **Calibration cannot be performed again until the stored data is cleared once.**
- ***1: w/ Multi-information Display**
- ***2: w/o Multi-information Display**

CLEAR ZERO POINT CALIBRATION (INTELLIGENT TESTER)

After replacing the yaw rate and G sensor or performing a vehicle height adjustment, make sure to clear the zero point calibration data in the skid control ECU and perform zero point calibration.

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON.

c. Turn the intelligent tester on.

d. Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Reset Memory.

e. Using the intelligent tester, perform zero point calibration of the yaw rate and G sensor.

PERFORM ZERO POINT CALIBRATION OF YAW RATE AND G SENSOR (INTELLIGENT TESTER)

After replacing the master cylinder solenoid and/or yaw rate and G sensor or performing a vehicle height adjustment, make sure to perform yaw rate and G sensor zero point calibration.

NOTICE:

- **While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it. Keep it stationary and do not start the engine.**
- **Choose a level surface with an inclination of less than 1°.**

a. Procedures for Test Mode:

i. Turn the ignition switch off.

ii. Move the shift lever to P.

NOTICE:

DTC C1210/36 and C1336/98 will be stored if the shift lever is not in P (Click here).

iii. Check that the steering wheel is centered.

iv. Connect the intelligent tester to the DLC3.

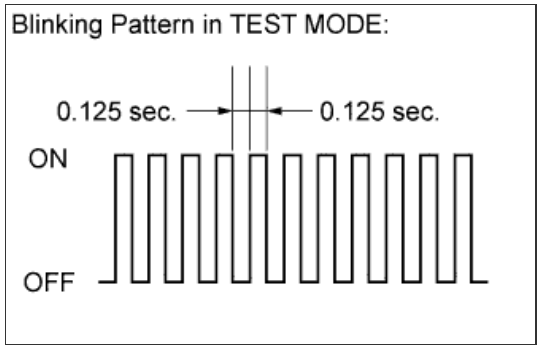
v. Turn the ignition switch to ON.

vi. Turn the intelligent tester on.

vii. Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Test Mode.

viii. Keep the vehicle stationary on a level surface for 2 seconds or more.

ix. Check that "VSC TEST MODE" is displayed on the multi-information display*1 and check that the ABS warning light and VSC OFF indicator light*2 are blinking in test mode.



NOTICE:

The ABS warning light and VSC OFF indicator light*2 stay on when obtaining the zero point.

HINT:

- **If the ABS warning light and VSC OFF indicator light*2 do not blink, perform the zero point calibration again.**
- **The zero point calibration is performed only once after the system enters test mode.**
- **Calibration cannot be performed again until the stored data is cleared once.**
- ***1: w/ Multi-information Display**
- ***2: w/o Multi-information Display**

for Preparation Click here

TEST MODE (SIGNAL CHECK) PROCEDURE (SST CHECK WIRE)

HINT:

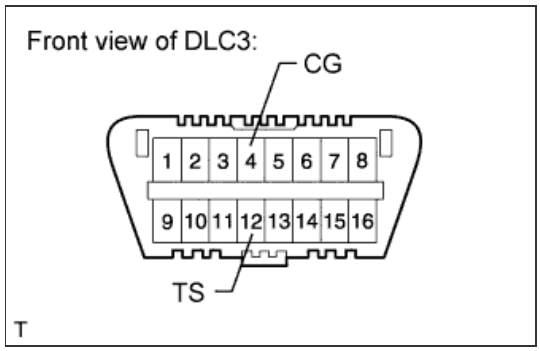
- **After replacing the master cylinder solenoid and/or yaw rate and G sensor or performing a vehicle height adjustment, make sure to perform yaw rate and G sensor zero point calibration (Click here).**
- **If the ignition switch is turned from ON to ACC or off during test mode (signal check), DTCs of the signal check function will be cleared.**
- **During test mode (signal check), the skid control ECU stores all DTCs of the test mode (signal check) function. By performing the test mode (signal check), the codes are cleared if normality is confirmed. The codes left over are the codes where an abnormality was found.**

a. Turn the ignition switch off.

b. Check that the steering wheel is centered and move the shift lever to P.

c. Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.

SST
09843-18040



d. Turn the ignition switch to ON.

e. Check that "VSC TEST MODE" is displayed on the multi-information display*1 and check that the ABS warning light and VSC OFF indicator lights*2 blink in test mode.

HINT:

- **If the G sensor zero point calibration data is cleared, the ABS warning light comes on.**
- **If the G sensor zero point calibration data is not cleared and the ABS warning light and VSC OFF indicator lights*2 do not blink, inspect the 12 (TS) and 4 (CG) terminal circuit and the ABS warning light and VSC OFF indicator light*2 circuits.**
- ***1: w/ Multi-information Display**
- ***2: w/o Multi-information Display**

Trouble Area	See Procedure
TS and CG terminal circuit	Click here
ABS warning light circuit	Click here or Click here
VSC OFF indicator light circuit	Click here or Click here

f. Start the engine.

g. Using a check wire, perform the ABS sensor (G sensor, master cylinder pressure sensor, center differential lock detection switch and speed sensor) and VSC sensor (yaw rate sensor and CRAWL switch) signal checks in test mode (ABS sensor: See procedure "A" to "E", VSC sensor: See procedure "F" to "I").

G SENSOR SIGNAL CHECK (SST CHECK WIRE) (Procedure "A")

a. Check that the ABS warning light is blinking in test mode.

b. Keep the vehicle stationary on a level surface for 2 seconds or more.

MASTER CYLINDER PRESSURE SENSOR SIGNAL CHECK (SST CHECK WIRE) (Procedure "B")

a. Check that the ABS warning light is blinking in test mode.

b. Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and then quickly depress the brake pedal with a force of 98 N (10 kgf, 22.0 lbf) or more for 1 second or more.

HINT:

- **At this time, the ABS warning light stays on for 3 seconds.**
- **The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.**

CENTER DIFFERENTIAL LOCK DETECTION SWITCH SIGNAL CHECK (SST CHECK WIRE) (Procedure "C")

a. Check that the ABS warning light is blinking in test mode.

b. Check the center differential lock switch.

i. Push the center differential lock switch on to lock the center differential.

ii. Push the center differential lock switch off to unlock the center differential.

SPEED SENSOR SIGNAL CHECK (SST CHECK WIRE) (Procedure "D")

a. Check that the ABS warning light is blinking in test mode.

b. Check the reverse signal.

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

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 45 km/h (28 mph) or more.

c. Check the forward signal.

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

NOTICE:

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

d. Stop the vehicle.

NOTICE:

- **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.**
- **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.

READ DTC OF ABS SENSOR (SST CHECK WIRE) (Procedure "E")

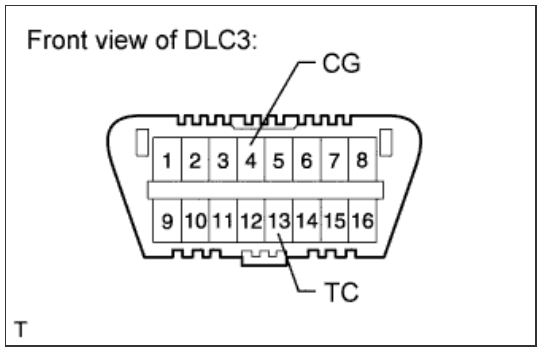
a. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST
09843-18040

b. Read the number of blinks of the ABS warning light.

HINT:

- **See the list of DTCs (See procedure "J").**
- **If every sensor is normal, the normal system code is output (a cycle of 0.25 seconds on and 0.25 seconds off is repeated).**
- **If more than 1 malfunction is detected at the same time, the lowest numbered code will be output first.**



c. After the check, disconnect SST from terminals 13 (TC) and 4 (CG) of the DLC3.

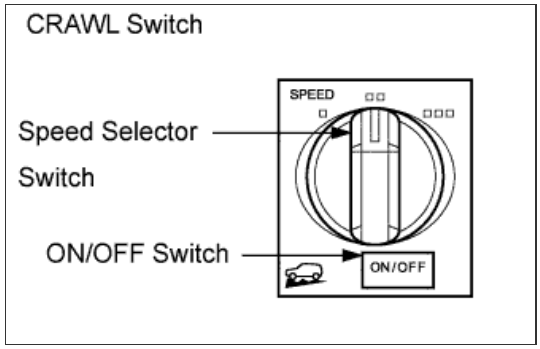
CRAWL SWITCH SIGNAL CHECK (SST CHECK WIRE) (Procedure "G")

a. Check that "VSC TEST MODE" is displayed on the multi-information display*1 or check that the VSC OFF indicator light*2 is blinking in the test mode.

HINT:

- ***1: w/ Multi-information Display**
- ***2: w/o Multi-information Display**

b. Check the CRAWL switch.



i. Turn the ON/OFF switch on.

ii. Turn the ON/OFF switch off.

iii. Turn the speed selector switch to low.

iv. Turn the speed selector switch to middle.

v. Turn the speed selector switch to high.

vi. Turn the speed selector switch to low.

YAW RATE SENSOR SIGNAL CHECK (SST CHECK WIRE) (Procedure "H")

a. Check that "VSC TEST MODE" is displayed on the multi-information display*1 or check that the VSC OFF indicator light*2 is blinking in test mode.

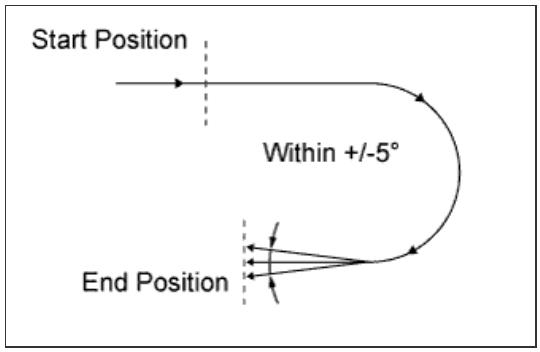
HINT:

- ***1: w/ Multi-information Display**
- ***2: w/o Multi-information Display**

b. Check the zero point voltage of the yaw rate sensor.

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

c. Check the output of the yaw rate sensor and the direction of the steering angle sensor.



i. Move the shift lever to D and drive the vehicle at a vehicle speed of 5 km/h (3 mph) or more, and then turn the steering wheel either to the left or right 90° or more until the vehicle makes a 180° turn.

ii. Stop the vehicle and move the shift lever to P. Check that the skid control buzzer sounds for 3 seconds.

HINT:

- **If the skid control buzzer sounds, the signal check has completed normally.**
- **If the skid control buzzer does not sound, check the skid control buzzer circuit (Click here), then perform the signal check again.**
- **If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check the DTC.**
- **Drive the vehicle in a 180° circle. At the end of the turn, the direction of the vehicle should be within 175 to 185° of its start position.**
- **Do not spin the wheels.**

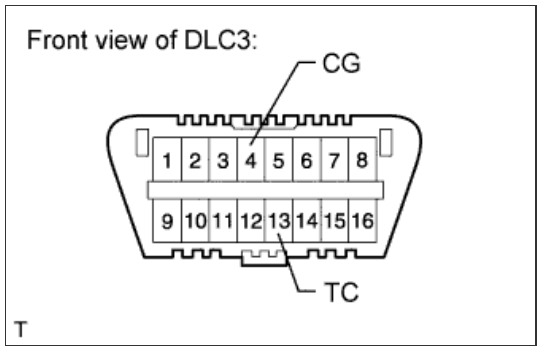
READ DTC OF VSC SENSOR (SST CHECK WIRE) (Procedure "I")

a. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST

09843-18040

b. Read the codes output on the multi-information display*1 or read the number of blinks of the VSC OFF indicator light*2.



HINT:

- **See the list of DTCs (See procedure "J").**
- **If every sensor/switch is normal, "DIAG VSC OK" is displayed on the multi-information display*1 or the normal system code is output (a cycle of 0.25 seconds ON and 0.25 seconds OFF is repeated)*2.**
- **If more than 1 malfunction is detected at the same time, the lowest numbered code will be output first.**
- ***1: w/ Multi-information Display**
- ***2: w/o Multi-information Display**

c. After performing the check, turn the ignition switch off and disconnect SST from terminals 13 (TC) and 4 (CG) of the DLC3.

d. Turn the ignition switch to ON.

DTC OF SIGNAL CHECK FUNCTION (SST CHECK WIRE) (Procedure "J")

ABS Sensor

DTC Code	Detection Item	Trouble Area
C1271/71	Front Speed Sensor RH Output Voltage Malfunction	• Front speed sensor RH • Sensor installation • Speed sensor rotor
C1272/72	Front Speed Sensor LH Output Voltage Malfunction	• Front speed sensor LH • Sensor installation • Speed sensor rotor
C1273/73	Rear Speed Sensor RH Output Voltage Malfunction	• Rear speed sensor RH • Sensor installation • Speed sensor rotor
C1274/74	Rear Speed Sensor LH Output Voltage Malfunction	• Rear speed sensor LH • Sensor installation • Speed sensor rotor
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH	Speed sensor rotor
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH	Speed sensor rotor
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH	Speed sensor rotor
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH	Speed sensor rotor
C1279/79	G Sensor Output Voltage Malfunction	• Yaw rate and G sensor • Sensor installation
C1281/81	Master Cylinder Pressure Sensor Output Malfunction	• Stop light switch • Brake pedal load sensing switch • Master cylinder pressure sensor
C1282/82	Center Differential Lock Detection Switch Malfunction	Center differential lock switch

VSC Sensor

Code Code	Detection Item	Trouble Area
C0371/71	Yaw Rate Sensor Malfunction	Yaw rate and G sensor
C1379/74	CRAWL Switch Malfunction	CRAWL switch

HINT:

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

TEST MODE (SIGNAL CHECK) PROCEDURE (INTELLIGENT TESTER)

HINT:

- **After replacing the master cylinder solenoid and/or yaw rate and G sensor or performing a vehicle height adjustment, make sure to perform yaw rate and G sensor zero point calibration (Click here).**
- **If the ignition switch is turned from ON to ACC or off during test mode (signal check), DTCs of the signal check function will be cleared.**
- **During test mode (signal check), the skid control ECU stores all DTCs of the test mode (signal check) function. By performing the**

test mode (signal check), the codes are cleared if normality is confirmed. The codes left over are the codes where an abnormality was found.

a. Turn the ignition switch off.

b. Check that the steering wheel is centered and move the shift lever to P.

c. Connect the intelligent tester to the DLC3.

d. Turn the ignition switch to ON.

e. Turn the intelligent tester on.

f. Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

g. Check that "VSC TEST MODE" is displayed on the multi-information display*1 and check that the ABS warning light and VSC OFF indicator light*2 blink in test mode.

HINT:

- **If the G sensor zero point calibration data is cleared, the ABS warning light comes on.**
- **If the G sensor zero point calibration data is not cleared and the ABS warning light and VSC OFF indicator lights*2 do not blink, inspect the 12 (TS) and 4 (CG) terminal circuit and the ABS warning light and VSC OFF indicator light*2 circuits.**
- ***1: w/ Multi-information Display**
- ***2: w/o Multi-information Display**

Trouble Area	See Procedure
TS and CG terminal circuit	Click here
ABS warning light circuit	Click here or Click here
VSC OFF indicator light circuit	Click here or Click here

h. Start the engine.

i. Using the intelligent tester, perform the ABS sensor (G sensor, master cylinder pressure sensor, center differential lock detection switch and speed sensor) and VSC sensor (yaw rate sensor and CRAWL switch) signal checks in test mode (ABS sensor: See procedure "K" to "O", VSC sensor: See procedure "P" to "S").

G SENSOR SIGNAL CHECK (INTELLIGENT TESTER) (Procedure "K")

a. Check that the ABS warning light is blinking in test mode.

b. Keep the vehicle stationary on a level surface for 2 seconds or more.

MASTER CYLINDER PRESSURE SENSOR SIGNAL CHECK (INTELLIGENT TESTER) (Procedure "L")

a. Check that the ABS warning light is blinking in test mode.

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

HINT:

- **At this time, the ABS warning light stays on for 3 seconds.**
- **The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.**

CENTER DIFFERENTIAL LOCK DETECTION SWITCH SIGNAL CHECK (INTELLIGENT TESTER) (Procedure "M")

a. Check that the ABS warning light is blinking in test mode.

b. Check the center differential lock switch.

i. Push the center differential lock switch on to lock the center differential.

ii. Push the center differential lock switch off to unlock the center differential.

SPEED SENSOR SIGNAL CHECK (INTELLIGENT TESTER) (Procedure "N")

a. Check that the ABS warning light is blinking in test mode.

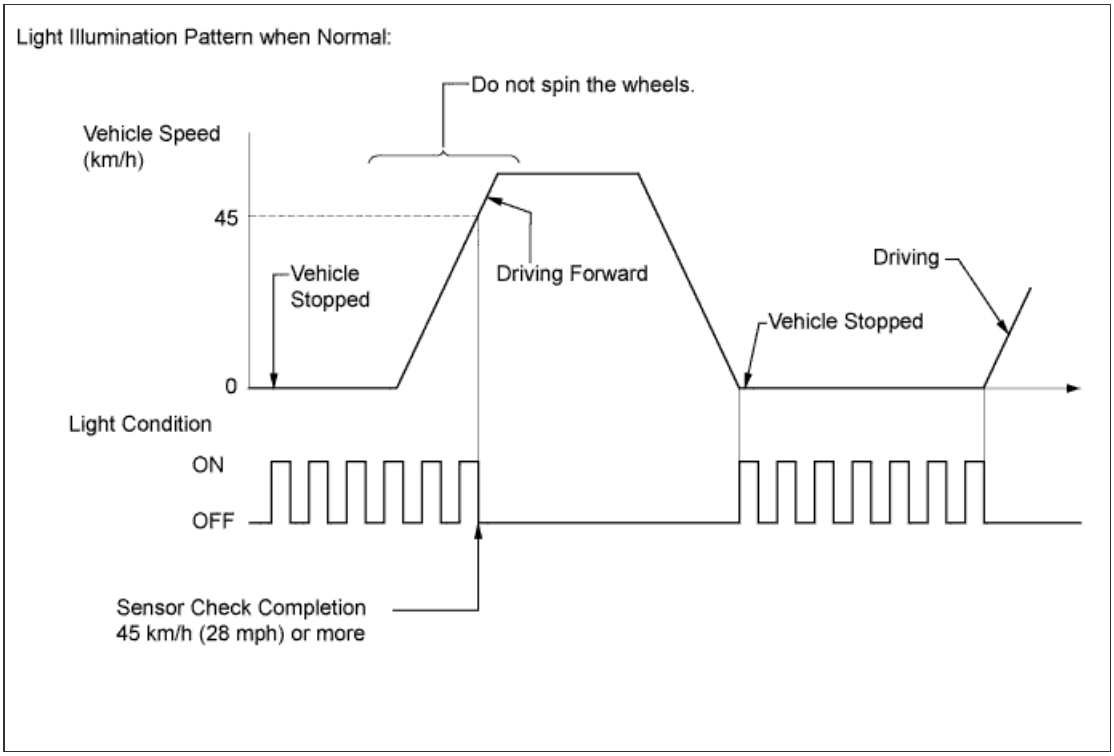
b. Check the reverse signal.

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

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 45 km/h (28 mph) or more.

c. Check the forward signal.



i. Drive the vehicle straight forward. Drive the vehicle at a speed of 45 km/h (28 mph) or more and check that the ABS warning light goes off.

NOTICE:

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

d. Stop the vehicle.

NOTICE:

- **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.**
- **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.

READ DTC OF ABS SENSOR (INTELLIGENT TESTER) (Procedure "O")

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

HINT:

- **Refer to the intelligent tester operator's manual for further details.**
- **See the list of DTCs (See procedure "T").**

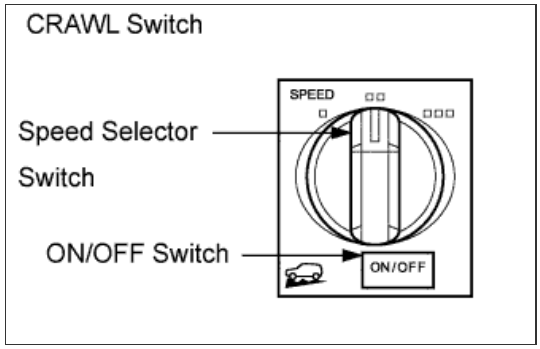
CRAWL SWITCH SIGNAL CHECK (INTELLIGENT TESTER) (Procedure "Q")

a. Check that "VSC TEST MODE" is displayed on the multi-information display*1 or check that the VSC OFF indicator light*2 is blinking in the test mode.

HINT:

- ***1: w/ Multi-information Display**
- ***2: w/o Multi-information Display**

b. Check the CRAWL switch.



i. Turn the ON/OFF switch on.

ii. Turn the ON/OFF switch off.

iii. Turn the speed selector switch to low.

iv. Turn the speed selector switch to middle.

v. Turn the speed selector switch to high.

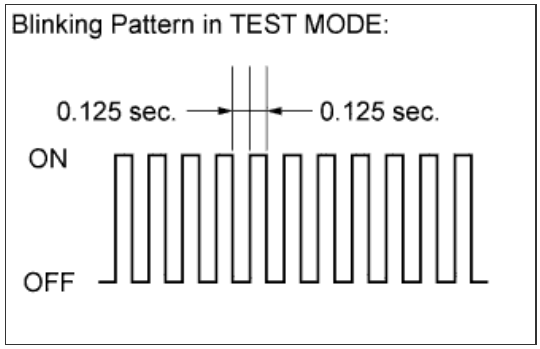
vi. Turn the speed selector switch to low.

YAW RATE SENSOR SIGNAL CHECK (INTELLIGENT TESTER) (Procedure "R")

a. Check that "VSC TEST MODE" is displayed on the multi-information display*1 or check that the VSC OFF indicator light*2 is blinking in test mode.

HINT:

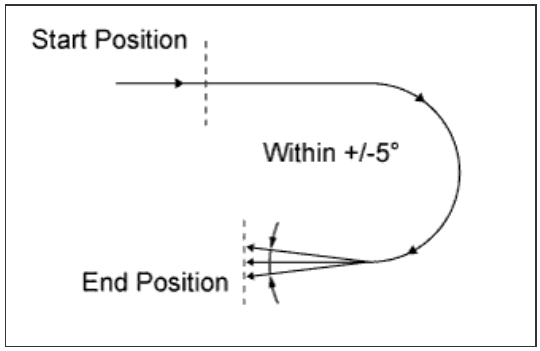
- ***1: w/ Multi-information Display**
- ***2: w/o Multi-information Display**



b. Check the zero point voltage of the yaw rate sensor.

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

c. Check the output of the yaw rate sensor and the direction of the steering angle sensor.



i. Move the shift lever to D and drive the vehicle at a vehicle speed of 5 km/h (3 mph) or more, and then turn the steering wheel either to the left or right 90° or more until the vehicle makes a 180° turn.

ii. Stop the vehicle and move the shift lever to P. Check that the skid control buzzer sounds for 3 seconds.

HINT:

- **If the skid control buzzer sounds, the signal check has completed normally.**
- **If the skid control buzzer does not sound, check the skid control buzzer circuit (Click here), then perform the signal check again.**
- **If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check the DTC.**
- **Drive the vehicle in a 180° circle. At the end of the turn, the direction of the vehicle should be within 175° to 185° of its start position.**
- **Do not spin the wheels.**

READ DTC OF VSC SENSOR (INTELLIGENT TESTER) (Procedure "S")

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

HINT:

- **Refer to the intelligent tester operator's manual for further details.**
- **See the list of DTCs (See procedure "T").**

DTC OF SIGNAL CHECK FUNCTION (INTELLIGENT TESTER) (Procedure "T")

ABS Sensor

DTC Code	Detection tem	Trouble Area
C1271/71	Front Speed Sensor RH Output Voltage Malfunction	• Front speed sensor RH • Sensor installation • Speed sensor rotor
C1272/72	Front Speed Sensor LH Output Voltage Malfunction	• Front speed sensor LH • Sensor installation • Speed sensor rotor
C1273/73	Rear Speed Sensor RH Output Voltage Malfunction	• Rear speed sensor RH • Sensor installation • Speed sensor rotor
C1274/74	Rear Speed Sensor LH Output Voltage Malfunction	• Rear speed sensor LH • Sensor installation • Speed sensor rotor
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH	Speed sensor rotor
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH	Speed sensor rotor
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH	Speed sensor rotor
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH	Speed sensor rotor
C1279/79	G Sensor Output Voltage Malfunction	• Yaw rate and G sensor • Sensor installation
C1281/81	Master Cylinder Pressure Sensor Output Malfunction	• Stop light switch • Brake pedal load sensing switch • Master cylinder pressure sensor
C1282/82	Center Differential Lock Detection Switch Malfunction	Center differential lock switch

VSC Sensor

DTC Code	Detection Item	Trouble Area
C0371/71	Yaw Rate Sensor Malfunction	Yaw rate and G sensor
C1379/74	CRAWL Switch Malfunction	CRAWL switch

HINT:

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

for Preparation Click here

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

NOTICE:

When replacing the master cylinder solenoid, sensor, etc., turn the ignition switch off.

HINT:

- **Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.**
- **Inspect the fuses and relays related to this system before inspecting the suspected areas below.**

Vehicle Stability Control System

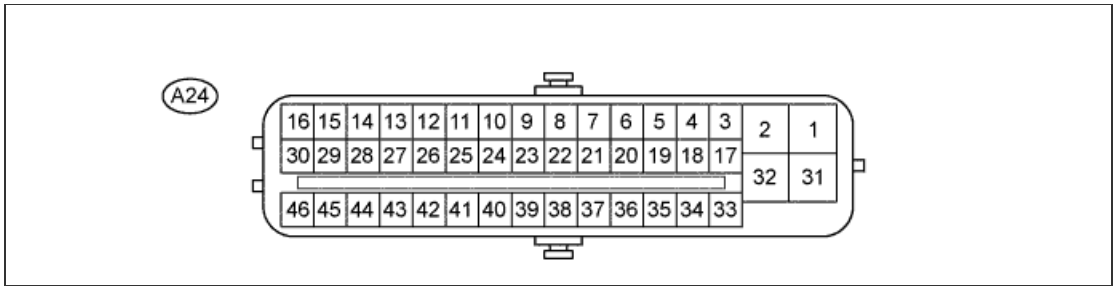
Symptom	Suspected Area	See page
Multi-terrain ABS, BA and/or EBD does not Operate	Check for DTCs again and make sure that no DTC is output.	Click here
	IG power source circuit	Click here
	Front speed sensor circuit	Click here
	Rear speed sensor circuit	Click here
	Yaw rate and G sensor circuit	Click here
	Check the hydraulic brake booster with intelligent tester. If abnormal, check the hydraulic circuit for leakage.	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <LHD>	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <RHD>	Click here
Multi-terrain ABS, BA and/or EBD does not Operate Efficiently	Check for DTCs again and make sure that no DTC is output.	Click here
	Front speed sensor circuit	Click here
	Rear speed sensor circuit	Click here
	Stop light switch circuit	Click here
	Yaw rate and G sensor circuit	Click here
	Check the hydraulic brake booster with intelligent tester. If abnormal, check the hydraulic circuit for leakage.	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <LHD>	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <RHD>	Click here
VSC, A-TRC, CRAWL and/or Hill-start Assist Control does not Operate	Check for DTCs again and make sure that no DTC is output.	Click here
	IG power source circuit	Click here
	Check the hydraulic circuit for leakage	Click here
	Front speed sensor circuit	Click here
	Rear speed sensor circuit	Click here
	Yaw rate and G sensor circuit	Click here

	Steering angle sensor circuit	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <LHD>	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <RHD>	Click here
Sensor and Switch Signal Check cannot be Done	TS and CG terminal circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
DTC Check cannot be Done	Check for DTCs again and make sure that no DTC is output.	Click here
	TC and CG terminal circuit	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <LHD>	Click here
	If the symptoms still occur even after the above circuits in suspected areas are inspected and proved to be normal, replace the master cylinder solenoid. <RHD>	Click here
ABS Warning Light Abnormal (Remains On)	ABS warning light circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
ABS Warning Light Abnormal (Does not Come On)	ABS warning light circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
BRAKE Warning Light Abnormal (Remains On)	BRAKE warning light circuit	Click here
	Brake fluid level warning switch circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
BRAKE Warning Light Abnormal (Does not Come On)	BRAKE warning light circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
VSC OFF Indicator Light Abnormal (Remains On)	Transfer indicator (L4) switch circuit	Click here
	VSC OFF indicator light circuit	Click here
	Center differential lock circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
VSC OFF Indicator Light Abnormal (Does not Come On)	Transfer indicator (L4) switch circuit	Click here
	VSC OFF indicator light circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
	CRAWL indicator light circuit	Click

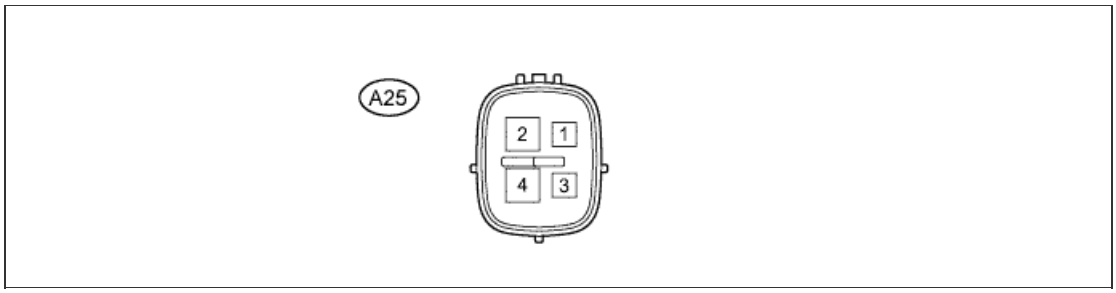
		here
CRAWL Indicator Light Abnormal (Remains On)	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
CRAWL Indicator Light Abnormal (Does not Come On)	CRAWL indicator light circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
SLIP Indicator Light Abnormal (Remains On)	SLIP indicator light circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
SLIP Indicator Light Abnormal (Does not Come On)	SLIP indicator light circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here
Skid Control Buzzer Abnormal	Skid control buzzer circuit	Click here
	Master cylinder solenoid <LHD>	Click here
	Master cylinder solenoid <RHD>	Click here

for Preparation Click here

TERMINALS OF ECU



Terminal No. (Symbol)	Terminal Description
A24-1 (GND1)	Skid control ECU ground
A24-2 (+BM1)	Power supply for motor
A24-3 (FR+)	Front speed sensor RH power supply output
A24-4 (FL-)	Front speed sensor LH input
A24-5 (RR+)	Rear speed sensor RH power supply output
A24-6 (RL-)	Rear speed sensor LH input
A24-7 (STP)	Stop light switch
A24- (TRS)	CRAWL N FF switch
A24-11 (CANH)	CAN communication terminal H
A24-12 (SP1)	Speedometer signal
A24-13 (D G)	Diagnosis tester serial communication
A24-16 (STP)	Stop light operation relay
A24-17 (FR-)	Front speed sensor RH input
A24-1 (FL+)	Front speed sensor LH power supply output
A24-1 (RR-)	Rear speed sensor RH input
A24-2 (RL+)	Rear speed sensor LH power supply output
A24-21 (TRM2)	CRAWL speed selector switch
A24-24 (TS)	Sensor test terminal (Signal check switch)
A24-25 (CANL)	CAN communication terminal L
A24-27 (E)	Center differential lock switch
A24-2 (P B)	Parking brake input
A24-3 (B)	Skid control bu er
A24-31 (+BS)	Power supply for solenoid
A24-32 (GND2)	Skid control ECU ground
A24-41 (LBL)	Brake fluid le el warning switch
A24-42 (WFSE)	Write flash enable input
A24-43 (CSW)	SC FF switch
A24-44 (TRM1)	CRAWL speed selector switch
A24-45 (STP2)	Stop light switch
A24-46 (G1)	G1 power supply



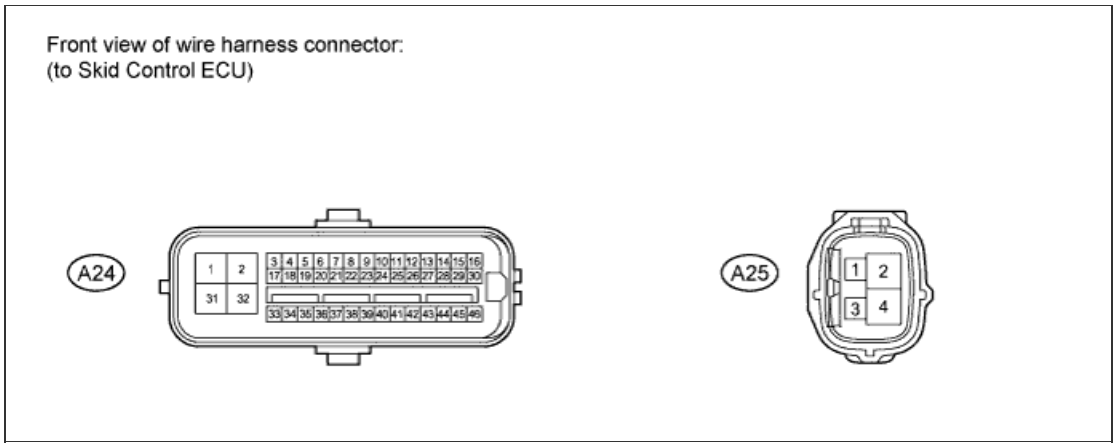
Terminal No. (Symbol)	Terminal Description
A25-1 (G2)	G2 power supply
A25-2 (+BM2)	Power supply for motor
A25-4 (GND3)	Skid control ECU ground

TERMINAL INSPECTION

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

HINT:

oltage cannot be measured with the connector connected to the skid control ECU as the connector is watertight.



Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
A24-2 (+BM1) - Body ground	B	Power supply for motor (From battery)	Always	11 to 14
A24-16 (STP) - Body ground	R-	Stop light operation relay	gnition switch off → N	Below 1 → 11 to 14
A24-2 (P B) - Body ground	-R	Parking brake input	Parking brake switch on → off (Parking brake le er pulled → released)	Below 1 Ω → 1 kΩ or higher
A24-31 (+BS) - Body ground	W	Power supply for solenoid (From battery)	Always	11 to 14
A24-41 (LBL) - Body ground	BR-	Brake fluid le el warning switch	Brake fluid le el + -5 mm (+ - .1 7 in.) from the minimum le el → ma imum le el	Below 1 Ω → 1. to 2.1 kΩ
A24-43 (CSW) - Body ground	G-W	SC FF switch input	SC FF switch off → on	1 kΩ or higher → Below 1 Ω
A24-45 (STP2) - Body ground	R	Stop light switch	Stop light switch on → off (Brake pedal depressed → released)	to 14 → Below 1.5
A24-46 (G1) - Body ground	G	G1 power supply	gnition switch off → N	Below 1 → 11 to 14
A25-1 (G2) - Body ground	B	G2 power supply	gnition switch off → N	Below 1 → 11 to 14
A25-2 (+BM2) - Body ground	B	Power supply for motor (From battery)	Always	11 to 14
A24-1 (GND1) - Body ground	W-B	Ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	W-B	Ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	W-B	Ground	Always	Below 1 Ω

for Preparation Click here

DIAGNOSIS

a. If the skid control ECU detects a malfunction, the ABS/BRAKE warning lights and VSC OFF*2/SLIP/CRAWL indicator lights and/or "Check VSC System" on the multi-information display*1 will come on to warn the driver.
The table below indicates which lights will come on when there is a malfunction in a particular function.

HINT:

*1: w/ Multi-information Display

*2: w/o Multi-information Display

Item/Trouble Area	Multi-terrain ABS	BA	EBD	VSC	A-TRC	CRAWL Control	Hill-start Assist Control
ABS Warning Light	○	○	○	-	-	-	-
BRAKE Warning Light	-	-	○	-	-	-	-
VSC OFF Indicator Light	○	○	○	○	○	○	○
SLIP Indicator Light	○	○	○	○	○	○	○
CRAWL Indicator Light	-	-	-	-	-	● (During CRAWL control operation)	-

○: Light on ●: Light on (Blinking) -: Light off

- The DTCs are simultaneously stored in memory. The DTCs can be read by connecting SST between terminals 13 (TC) and 4 (CG) of the DLC3 and observing the blinking of the ABS warning light and the VSC OFF indicator light, or by connecting the intelligent tester.
- This system has a signal check function (test mode).

WARNING LIGHT AND INDICATOR LIGHT CHEC

a Release the parking brake lever.

NOTICE:

When releasing the parking brake, set chocks to hold the vehicle for safety.

HINT:

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

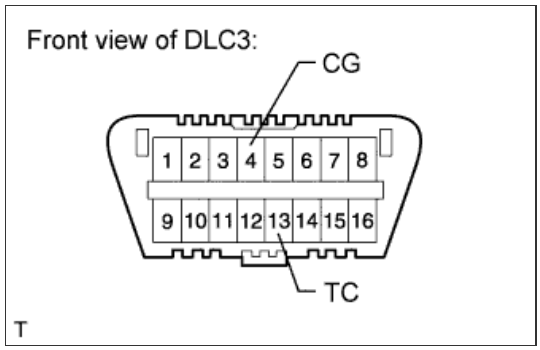
b. When the ignition switch is turned to ON, check that the ABS and BRAKE warning lights and the VSC OFF, SLIP, and CRAWL indicator lights turn on and then turn off after the engine starts.
If a light remains on, proceed to troubleshooting for the light circuit below.

Trouble Area	See Procedure
ABS warning light circuit	Click here
BRAKE warning light circuit	Click here
VSC OFF indicator light circuit	Click here
SLIP indicator light circuit	Click here

for Preparation Click here

DTC CHECK / CLEAR (SST CHECK WIRE)

a. DTC check



i. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST
09843-18040

ii. Turn the ignition switch to ON.

iii. Read the DTCs from the ABS warning light, VSC OFF indicator light*1, or multi-information display*2 on the combination meter.

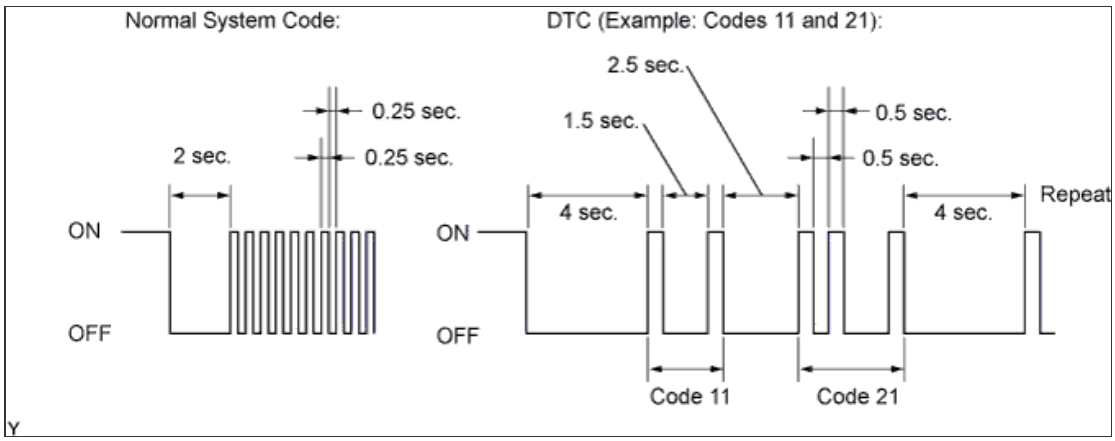
HINT:

- **If no DTC is output, inspect the TC and CG terminal circuit, and the ABS warning light and VSC OFF indicator light*1 circuits.**

Trouble Area	See Procedure
TC and CG terminal circuit	Click here
ABS warning light circuit	Click here or Click here
VSC OFF indicator light circuit*1	Click here or Click here

- **If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC is output first.**
- ***1: w/o Multi-information Display**
- ***2: w/ Multi-information Display**

iv. As examples, the illustration below shows the blinking patterns of the normal system code and DTC 11 and 21.



v. Refer to the Diagnostic Trouble Code Chart (Click here) for DTC information.

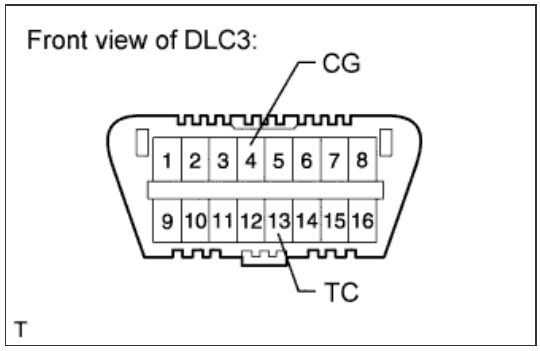
vi. After completing the check, turn the ignition switch off and remove SST from the DLC3.

b. DTC clear

i. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST
09843-18040

ii. Turn the ignition switch to ON.



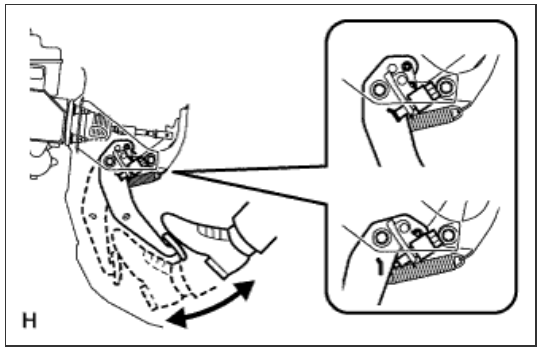
iii. Clear the DTCs stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.

iv. Check that "DIAG VSC OK" is displayed on the multi-information display*1 and check that the ABS warning light and VSC OFF indicator light*2 output a normal system code.

HINT:

*1: w/ Multi-information Display

*2: w/o Multi-information Display



v. Remove SST from the terminals of the DLC3.

HINT:

Clearing the DTCs cannot be performed by disconnecting the cable from the negative (-) battery terminal or removing the ECU-IG fuse.

DTC CHECK / CLEAR (INTELLIGENT TESTER)

a. DTC check

i. Connect the intelligent tester to the DLC3.

ii. Turn the ignition switch to ON.

iii. Turn the intelligent tester on.

iv. Enter the following menus: Chassis / ABS/VSC/TRC / DTC.

v. Read the DTCs by following the directions on the intelligent tester screen.

b. DTC clear

i. Connect the intelligent tester to the DLC3.

ii. Turn the ignition switch to ON.

iii. Turn the intelligent tester on.

iv. Enter the following menus: Chassis / ABS/VSC/TRC / DTC.

v. Clear the DTCs by following the directions on the intelligent tester screen.

END OF DTC CHECK / CLEAR

a. Turn the ignition switch to ON.

b. Check that the ABS warning light and VSC OFF indicator light* go off within approximately 3 seconds.

HINT:

*: w/o Multi-information Display

for Preparation Click here

FREEZE FRAME DATA

a. If a DTC is stored when the brake control system operates, the skid control ECU stores the current vehicle (sensor) state as freeze frame data.
The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from off to ON since the last time the brake control system was activated.

HINT:

- **The skid control ECU will not count the number of times the ignition switch is turned to ON if the vehicle does not drive at a speed of at least 7 km/h (4.3 mph) or a DTC is stored.**
- **Freeze frame data at the time the brake control system operates: The skid control ECU stores and updates the data whenever the brake control system operates. When the ECU stores data at the time a DTC is stored, the data stored when the brake control system operated may be cleared.**
- **Freeze frame data at the time a DTC is stored: When the skid control ECU stores data at the time a DTC is stored, no updates will be performed until the data is cleared.**

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the intelligent tester on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Utility / ABS History.

f. On the intelligent tester display, select the freeze frame data.

ABS History

Tester Display	Measurement Item	Reference Value
Elapsed Time after Freeze Trigger	Elapsed time after freeze trigger	Min.: 0 msec Max.: 500 msec
Number of IG ON	Number of operations of ignition switch ON after storing freeze frame data	0 to 31
Buzzer	Skid control buzzer signal	Skid control buzzer on: ON, off: OFF
Stop Light SW	Stop light switch signal	Stop light switch on: ON, off: OFF
Parking Brake SW	Parking brake switch signal	Parking brake switch on: ON, off: OFF
Reservoir Warning SW	Brake fluid level warning switch signal	Brake fluid level warning switch on: ON, off: OFF
Gear Position	Gear position information	Fail 1st 2nd 3rd 4th 5th 6th P, N R Not R
Shift Lever Position	Shift lever position information	Fail 1st 2nd 3rd 4th 5th 6th/B D/M P, N R
Operated System	Operated system status	ABS: ABS activated VSC: VSC activated TRC: TRC activated BA: BA activated HAB: HAB activated Fail: Fail-safe mode activated PBA: PBA activated PB: PB activated HA-CTRL: Hill-start assist control

		activated Sys: System prohibited Non: No system activated
Master Cylinder Sensor	Master cylinder pressure sensor reading	Min.: 0.00 V Max.: 5.00 V
M/C Sensor Grade	Master cylinder pressure sensor change	Min.: -30 MPa/s., Max.: 225 MPa/s
Yaw Rate Sensor	Yaw rate sensor reading	Min.: -128°/s, Max.: 127°/s
Lateral G	Lateral G	Min.: -25.10 m/s^2, Max.: 24.90 m/s^2
Forward and Rearward G	Forward and rearward G	Min.: -25.10 m/s^2, Max.: 24.90 m/s^2
FR Wheel Speed	Front right wheel speed reading	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)
FL Wheel Speed	Front left wheel speed reading	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)
RR Wheel Speed	Rear right wheel speed reading	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)
RL Wheel Speed	Rear left wheel speed reading	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)
Vehicle Speed	Vehicle speed reading	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)
Vehicle Speed Grade	Vehicle acceleration reading	Min.: -25.10 m/s^2, Max.: 24.90 m/s^2
FR Wheel Direction	Front right wheel direction signal	Front right wheel direction Forward: Forward, Back: Backward
FL Wheel Direction	Front left wheel direction signal	Front left wheel direction Forward: Forward, Back: Backward
RR Wheel Direction	Rear right wheel direction signal	Rear right wheel direction Forward: Forward, Back: Backward
RL Wheel Direction	Rear left wheel direction signal	Rear left wheel direction Forward: Forward, Back: Backward
Real Engine Torque	Real engine torque	Min.: -1024.0 Nm, Max.: 1023.0 Nm
Accelerator Opening Angle %	Accelerator opening angle percentage	Min.: 0%, Max.: 100%
Steering Angle Sensor	Steering angle sensor reading	Min.: -3276.8° Max.: 3276.7°
TRC/VSC Off Mode	TRC/VSC Off Mode	Normal: Normal mode TRC OFF: TRC OFF mode VSC OFF: VSC OFF mode

for Preparation Click here

FAIL-SAFE OPERATION

- If there is a problem with sensor signals or hydraulic brake booster systems, the skid control ECU prohibits power supply to the hydraulic brake booster and informs the ECM of VSC system failure.
  The hydraulic brake booster turns off each solenoid and the ECM shuts off VSC control (traction control signal) from the skid control ECU accordingly, which turns out to be as if the Multi-terrain ABS, A-TRC and VSC systems were not installed.
  The Multi-terrain ABS control will be prohibited, but EBD control continues as much as possible. If EBD control is impossible, the BRAKE warning light comes on to warn the driver (Click here).
- If system components have any malfunction before starting control, the fail-safe function immediately stops the operation.
  If system components have any malfunction during control, the fail-safe function gradually stops the control so as not to trigger a sudden change in vehicle conditions.
  If it is impossible to control the systems, the warning light comes on to inform the driver of termination of the systems (Click here).

HINT:

If the hydraulic brake booster encounters a malfunction, brake performance is gradually lost and Multi-terrain ABS, BA, A-TRC, VSC, CRAWL and hill-start assist control system control is prohibited.

a. Multi-terrain ABS, EBD and BA system:

Malfunction Area	Control Method
Multi-terrain ABS system	Multi-terrain ABS, BA, A-TRC, VSC, CRAWL and hill-start assist control control prohibited
BA system	Multi-terrain ABS, BA, A-TRC, VSC, CRAWL and hill-start assist control control prohibited
EBD system	Multi-terrain ABS, EBD, BA, A-TRC, VSC, CRAWL and hill-start assist control control prohibited

b. A-TRC, VSC, CRAWL and hill-start assist control system:

HINT:

As for the A-TRC, VSC, CRAWL and hill-start assist control systems, different systems prohibit different controls according to the malfunctioning part.

Malfunction Area	Control Method
Engine control system (A-TRC and VSC systems)	Before control: Disables control During control: Uses only brakes to perform control
Brake control system (VSC system)	Before control: Disables control During control: Uses only engine to perform control
Brake control system (A-TRC, CRAWL and hill-start assist control systems)	Before control: Disables control During control: Disables control (by gradually ending control)

SYSTEM TEMPERATURE PROTECTION OPERATION

If the A-TRC, CRAWL or hill-start assist control system has been used constantly for a long time, the temperature of the hydraulic brake booster may excessively increase. If the temperature excessively increases, the skid control buzzer will sound intermittently. If the temperature increases even more, the skid control buzzer sounds for 3 seconds and the indicator light either comes on or blinks.

System	Indicator Condition
A-TRC, and hill-start assist control systems	SLIP indicator light comes on.
CRAWL system	SLIP indicator light comes on. CRAWL indicator light blinks and then turns off.

HINT:

- **When the CRAWL indicator light turns off after blinking, CRAWL temporaril becomes nonfunctional, but after the temperature has decreased, pressing the CRAWL switch again will activate CRAWL (Even when the temperature decreases, CRAWL will not reactivate automaticall .**
- **If the Slip indicator light goes off (as for the CRAWL s te the CRAWL indicator light also comes on the s te automaticall ret rnto normal operating conditions.**
- **As this is not a malfunction, no C will be stored.**

for Preparation Click here

DATA LIST

HINT:

Using the intelligent tester to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON.

c. Turn the intelligent tester on.

d. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

e. According to the display on the intelligent tester, read the Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
ABS Warning Light	ABS warning light / ON or OFF	ON: Warning light on OFF: Warning light off	-
VSC Warning Light	w/ Multi-information Display: VSC warning indicator / ON or OFF	ON: Indicator on OFF: Indicator off	-
	w/o Multi-information Display: VSC OFF indicator light / ON or OFF	ON: Indicator light on OFF: Indicator light off	
Brake Warning Light	Brake warning light / red (malfunction) / ON or OFF	ON: Warning light on OFF: Warning light off	-
Slip Indicator Light	Slip indicator light / ON or OFF	ON: Indicator light on OFF: Indicator light off	-
Buzzer	Skid control buzzer / ON or OFF	ON: Buzzer on OFF: Buzzer off	-
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Parking Brake SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
Reservoir Warning SW	Brake fluid level warning switch / ON or OFF	ON: Reservoir level normal OFF: Reservoir level low	-
Main Idle SW	Main idle switch / ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
Gear Position	Gear position / Fail, 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, P,N, R or Not R	Actual gear position	-
Shift Lever Position	Shift lever position / Fail, 1st, 2nd, 3rd, 4th, 5th, 6th/B, D/M, P,N, R	Actual shift lever position	-

Shift Information	Shift information / OFF or ON	OFF: When not shifting ON: When shifting	-
Master Cylinder Sensor	Master cylinder pressure sensor reading / min.: 0.00 V, max.: 5.00 V	When brake pedal released: 0.3 to 0.9 V	The reading increases when the brake pedal is depressed.
Zero Point of M/C	Memorized zero value / min.: -12.50 MPa, max.: 12.40 MPa	-	-
Accumulator Sensor	Accumulator pressure sensor reading / min.: 0.00 V, max.: 5.00 V	3.58 to 5 V	If the value is constant regardless of the pump operation, an accumulator pressure sensor malfunction is suspected.
Deceleration Sensor	Deceleration sensor reading / min.: -18.525 m/s^2, max.: 18.387 m/s^2	Approximately -1.28 to 1.27 m/s^2 while stationary	The reading changes when the vehicle is bounced.
Zero Point of Decele	Memorized zero value / min.: -25.10 m/s^2, max.: 24.90 m/s^2	Min.: -14.7 m/s^2 Max.: 14.7 m/s^2	-
Deceleration Sensor2	Deceleration sensor 2 reading / min.: -18.525 m/s^2, max.: 18.387 m/s^2	Approximately -1.28 to 1.27 m/s^2 while stationary	The reading changes when the vehicle is bounced.
Zero Point of Decele2	Memorized zero value / min.: -25.10 m/s^2, max.: 24.90 m/s^2	Min.: -14.7 m/s^2 Max.: 14.7 m/s^2	-
Yaw Rate Sensor	Yaw rate sensor 1 / min.: -128°/s, max.: 127°/s	Min.: -100°/s Max.: 100°/s	-
Zero Point of Yaw Rate	Memorized zero value / min.: -128°, max.: 127°	Min.: -100° Max.: 100°	-
Yaw Rate Sensor2	Yaw rate sensor 2 / min.: -128°/s, max.: 127°/s	Min.: -100°/s Max.: 100°/s	-
Zero Point of Yaw Rate2	Memorized zero value / min.: -128°/s, max.: 127°/s	Min.: -100°/s Max.: 100°/s	-
Steering Angle Sensor	Steering angle sensor / min.: -3276.8°, max.: 3276.7°	Left turn: Increases Right turn: Decreases	-
Zero Point of Steering Angle	Memorized zero value / min.: -3276.8°, max.: 3276.7°	Min.: -3072.0° Max.: 3070.5°	-
Lateral G	Lateral G / min.: -25.10 m/s^2, max.: 24.90 m/s^2	Min.: -14.7 m/s^2 Max.: 14.7 m/s^2	-
Forward and Rearward G	Forward and rearward G / min.: -25.10 m/s^2, max.: 24.90 m/s^2	Min.: -14.7 m/s^2 Max.: 14.7 m/s^2	-
Yaw Rate Value	Yaw rate value / min.: -128°/s, max.: 127°/s	Min.: -100°/s Max.: 100°/s	-
Steering Angle Value	Steering angle value / min.: -3276.8°, max.: 3276.7°	Min.: -3072.0° Max.: 3070.5°	-
Stop Light Relay	BRK LP relay / ON or OFF	ON: Relay on OFF: Relay off	-
Crawl Control Switch	CRAWL speed selector switch status / LOW, MID, HIGH or UNKNOWN	Actual CRAWL speed selector switch position	-
Crawl Control Light	CRAWL indicator light / ON or OFF	ON: Indicator light on OFF: Indicator light off	-
FR Wheel Speed	Front wheel speed sensor RH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
FL Wheel Speed	Front wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RR Wheel Speed	Rear wheel speed sensor RH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
Vehicle Speed	Maximum wheel speed sensor reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual vehicle speed	The speed is indicated on the speedometer.

FR Wheel Acceleration	Front wheel acceleration RH / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
FL Wheel Acceleration	Front wheel acceleration LH / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
RR Wheel Acceleration	Rear wheel acceleration RH / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
RL Wheel Acceleration	Rear wheel acceleration LH / min.: -200.84 m/s^2, max.: 199.27 m/s^2	Min.: -200.84 m/s^2 Max.: 199.27 m/s^2	-
FR Wheel Direction	Front wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-
RR Wheel Direction	Rear wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-
FR Wheel ABS Ctrl Status	Front wheel RH ABS control status / ON or OFF	ON: During control OFF: Not during control	-
FL Wheel ABS Ctrl Status	Front wheel LH ABS control status / ON or OFF	ON: During control OFF: Not during control	-
RR Wheel ABS Ctrl Status	Rear wheel RH ABS control status / ON or OFF	ON: During control OFF: Not during control	-
RL Wheel ABS Ctrl Status	Rear wheel LH ABS control status / ON or OFF	ON: During control OFF: Not during control	-
RR Wheel EBD Ctrl Status	Rear wheel RH EBD control status / ON or OFF	ON: During control OFF: Not during control	-
RL Wheel EBD Ctrl Status	Rear wheel LH EBD control status / ON or OFF	ON: During control OFF: Not during control	-
BA Ctrl Status	BA control status / ON or OFF	ON: During control OFF: Not during control	-
TRC (TRAC) Ctrl Status	TRC status / ON or OFF	ON: During control OFF: Not during control	-
TRC (TRAC) Engine Ctrl Status	TRC engine control status / ON or OFF	ON: During control OFF: Not during control	-
TRC (TRAC) Brake Ctrl Status	TRC brake control status / ON or OFF	ON: During control OFF: Not during control	-
FR Wheel VSC Ctrl Status	Front wheel RH VSC control status / ON or OFF	ON: During control OFF: Not during control	-
FL Wheel VSC Ctrl Status	Front wheel LH VSC control status / ON or OFF	ON: During control OFF: Not during control	-
RR Wheel VSC Ctrl Status	Rear wheel RH VSC control status / ON or OFF	ON: During control OFF: Not during control	-
RL Wheel VSC Ctrl Status	Rear wheel LH VSC control status / ON or OFF	ON: During control OFF: Not during control	-
Engine Revolutions	Engine speed / min.: 0 rpm, max.: 65535 rpm	Actual engine speed	-
Real Engine Torque	Real engine torque / min.: -1024.0 Nm, max.: 1023.0 Nm	Actual engine torque	-
Accelerator Opening Angle %	Percentage of accelerator pedal opening angle / min.: 0.0%, max.: 128.0%	Min.: 0% Max.: 100%	-
		ON: Solenoid relay	

Solenoid Relay	Solenoid relay / ON or OFF	on OFF: Solenoid relay off	-
Electronically Controlled Brake Motor Relay	Electronically controlled brake motor relay / ON or OFF	ON: Motor relay on OFF: Motor relay off	-
TR(A)C/VSC Solenoid (SRM2)	TRC/VSC solenoid (SRM2) / ON or OFF	ON: Operates OFF: Does not operate	-
TR(A)C/VSC Solenoid (SRM1)	TRC/VSC solenoid (SRM1) / ON or OFF	ON: Operates OFF: Does not operate	-
TR(A)C/VSC Solenoid (SRC2)	TRC/VSC solenoid (SRC2) / ON or OFF	ON: Operates OFF: Does not operate	-
TR(A)C/VSC Solenoid (SRC1)	TRC/VSC solenoid (SRC1) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SFRH)	ABS solenoid (SFRH) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SFRR)	ABS solenoid (SFRR) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SFLH)	ABS solenoid (SFLH) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SFLR)	ABS solenoid (SFLR) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SRRH)	ABS solenoid (SRRH) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SRRR)	ABS solenoid (SRRR) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SRLH)	ABS solenoid (SRLH) / ON or OFF	ON: Operates OFF: Does not operate	-
ABS Solenoid (SRLR)	ABS solenoid (SRLR) / ON or OFF	ON: Operates OFF: Does not operate	-
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
EFI Communication Open	ECM communication open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Yaw Rate Open	Yaw rate sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Deceleration Open	Deceleration sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Steering Open	Steering angle sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
IG1 Voltage Value	IG1 voltage value / min.: 0.00 V, max.: 20.00 V	9.5 to 14 V	-
IG2 Voltage	IG2 voltage value / min.: 0.00 V,		

Value	max.: 20.00 V	9.5 to 14 V	-
TRC/VSC Off Mode	TRC and VSC OFF mode status / Normal, TRC OFF, VSC OFF or Unknown	Normal: Normal TRC OFF: TRC OFF mode VSC OFF: VSC OFF mode	-
Number of DTC	Number of DTCs / min.: 0, max.: 255	Min.: 0 Max.: 255	-

ACTIVE TEST

HINT:

Using the intelligent tester to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON.

c. Turn the intelligent tester on.

d. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

e. According to the display on the intelligent tester, perform the Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
ABS Warning Light	ABS warning light	Warning light ON/OFF	Observe the combination meter.
VSC Warning Light	w/ Multi-information Display: VSC warning indicator / ON or OFF	Indicator ON/OFF	Observe the combination meter.
	w/o Multi-information Display: VSC OFF indicator light / ON or OFF	Indicator light ON/OFF	
Brake Warning Light	BRAKE warning light	Warning light ON/OFF	Observe the combination meter.
Slip Indicator Light	SLIP indicator light	Indicator light ON/OFF	Observe the combination meter.
Buzzer	Skid control buzzer	Buzzer ON/OFF	The buzzer can be heard.
Solenoid Relay	Solenoid relay	Relay ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
Motor Relay	Motor relay	Relay ON/OFF	An operation sound of the motor can be heard.
Stop Light Relay	BRK LP relay	Relay ON/OFF	Observe the rear combination light (Does not come on for 5 seconds or more).
ABS Solenoid (SRLR)	ABS solenoid (SRLR)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRLH)	ABS solenoid (SRLH)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRRR)	ABS solenoid (SRRR)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRRH)	ABS solenoid (SRRH)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFLR)	ABS solenoid (SFLR)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFLH)	ABS solenoid (SFLH)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFRR)	ABS solenoid (SFRR)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFRH)	ABS solenoid (SFRH)	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRMR)	VSC/TRC solenoid (SRMR (SMCR, STR))	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRMF)	VSC/TRC solenoid (SRMF (SMCF, SA3))	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRCR)	VSC/TRC solenoid (SRCR (SA2))	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRCF)	VSC/TRC solenoid (SRCF (SA1))	Solenoid ON/OFF	An operation sound of the solenoid (clicking sound) can be heard.
Crawl Control Light	CRAWL indicator light	Indicator light ON/OFF	Observe the combination meter.

for Preparation Click here

HINT:

- **If a trouble code is output during the DTC check, check the circuit indicated by the DTC. For details of each code, refer to the "See page" for the respective DTC Code in the Diagnostic Trouble Code Chart.**
- **Inspect the fuses and relays before investigating the trouble areas as shown in the table below.**

DTC Chart of ABS

DTC Code	Detection Item	See page
C0200/31	Front Speed Sensor RH Circuit	Click here
C0205/32	Front Speed Sensor LH Circuit	Click here
C0210/33	Rear Speed Sensor RH Circuit	Click here
C0215/34	Rear Speed Sensor LH Circuit	Click here
C0226/21	SFR Solenoid Circuit	Click here
C0236/22	SFL Solenoid Circuit	Click here
C0246/23	SRR Solenoid Circuit	Click here
C0256/24	SRL Solenoid Circuit	Click here
C0278/11	Open or Short Circuit in ABS Solenoid Relay Circuit	Click here
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	Click here
C1202/58	Brake Fluid Level Low / Open Circuit in Brake Fluid Level Warning Switch Circuit	Click here
C1225/25	SMC Solenoid Circuit	Click here
C1226/26	SPC Solenoid Circuit	Click here
C1227/27	SRC Solenoid Circuit	Click here
C1228/28	STR Solenoid Circuit	Click here
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	Click here
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	Click here
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	Click here
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	Click here
C1241/41	Low Battery Positive Voltage	Click here
C1242/42	IG2 Power Source Circuit	Click here
C1243/43	Acceleration Sensor Stuck Malfunction	Click here
C1244/44	Open or Short in Deceleration Sensor Circuit	Click here
C1245/45	Acceleration Sensor Output Malfunction	Click here
C1246/46	Master Cylinder Pressure Sensor Malfunction	Click here
C1249/49	Open in Stop Light Switch Circuit	Click here
C1251/51	Open in Pump Motor Circuit	Click here
C1252/52	Brake Booster Pump Motor on Time Abnormally Long	Click here
C1253/53	Pump Motor Relay Malfunction	Click here
C1254/54	Pressure Switch Circuit	Click here
C1256/56	Accumulator Low Pressure	Click here
C1257/57	Power Supply Drive Circuit	Click here
C1268/68	Transfer "L4" Position Switch Circuit	Click here
C1336/98	Zero Point Calibration of Acceleration Sensor Undone	Click here
C1337/37	Diameter of the Tire is not Uniform	Click here
C1381/97	Acceleration Sensor Power Supply Voltage Malfunction	Click here
U0073/94	Control Module Communication Bus OFF	Click here
U0124/95	Lost Communication with Lateral Acceleration Sensor Module	Click here

DTC Chart of VSC

DTC Code	Detection Item	See page
C1201/51	ngine Control System Malfunction	Click here
C1203/53	CM Communication Circuit Malfunction	Click here
C1210/36	Zero Point Calibration of aw Rate Sensor Undone	Click here

C1223/43	ABS Control System Malfunction	Click here
C1231/31	Steering Angle Sensor Circuit Malfunction	Click here
C1232/32	Stuck in Deceleration Sensor	Click here
C1234/34	aw Rate Sensor Malfunction	Click here
C1290/66	Steering Angle Sensor Zero Point Malfunction	Click here
C1340/47	Center Differential Lock Circuit	Click here
C1380/64	Stop Light Control Relay Malfunction	Click here
U0100/65	Lost Communication with CM / PCM	Click here
U0114/38	Lost Communication with 4WD Control C	Click here
U0123/62	Lost Communication with aw Rate Sensor Module	Click here
U0126/63	Lost Communication with Steering Angle Sensor Module	Click here
U0130/68	Lost Communication with Steering ort Control Module	Click here

DTC C0200/31 Front Speed Sensor RH Circuit

DTC C0205/32 Front Speed Sensor LH Circuit

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

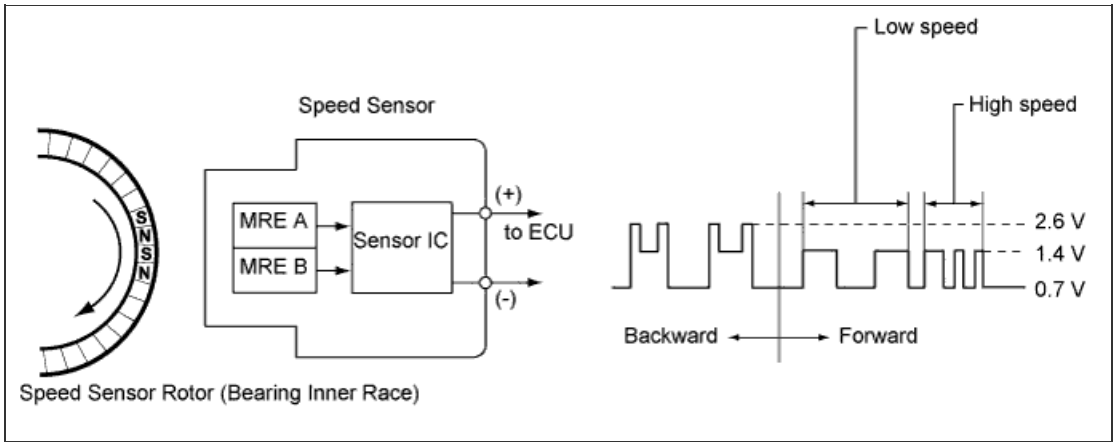
DTC C1236/36 Foreign Object is Attached on Tip of Front Speed Sensor LH

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD, BA, VSC, A-TRC, CRAWL and hill-start assist control systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.

To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

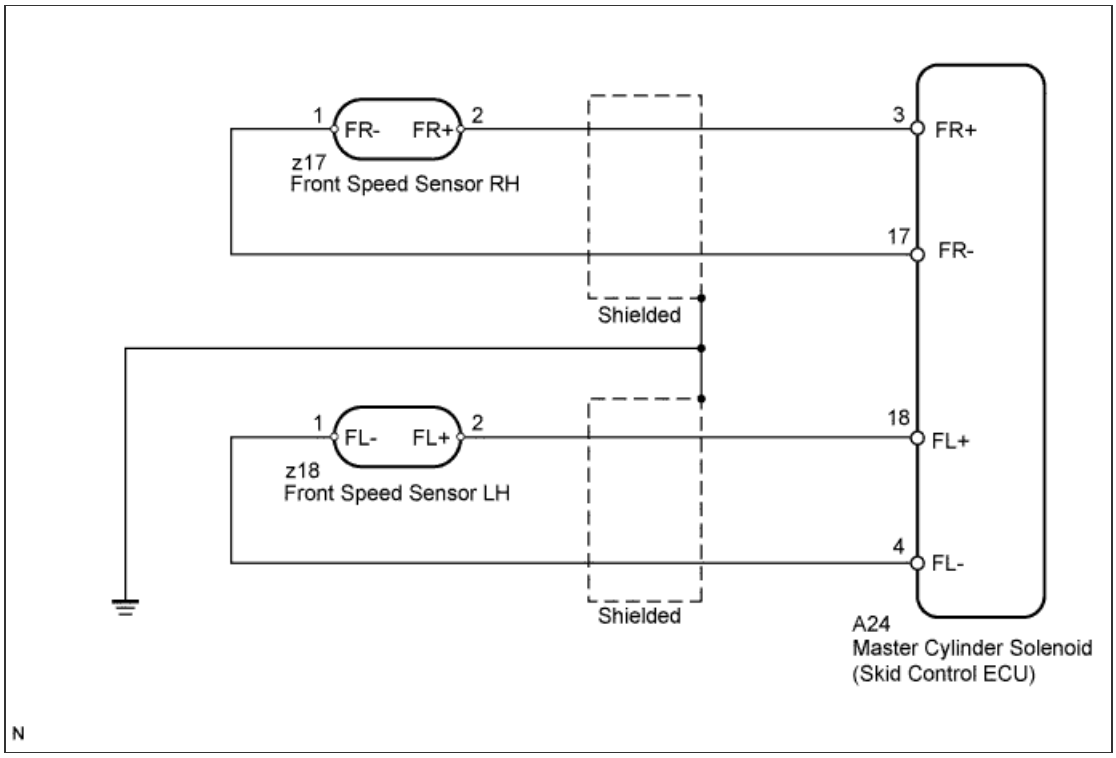


DTC Code	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Front speed sensor RH • Front speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1235/35 C1236/36	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Front speed sensor RH • Front speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0200/31 and C1235/35 are for the front speed sensor RH.**
- **DTC C0205/32 and C1236/36 are for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (FR/FL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (FR/FL WHEEL SPEED, FR/FL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel	Front wheel speed sensor RH reading /min.: 0 km/h (0 mph),	Actual wheel	A similar speed is indicated on the

Speed	max.: 326 km/h (202 mph)	speed	speedometer.
FL Wheel Speed	Front wheel speed sensor LH reading /min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Direction	Front wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT FRONT SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation bolt is tightened properly.

There is no clearance between the sensor and front steering knuckle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL FRONT SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the front speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE FRONT SPEED SENSOR (Click here)

OK

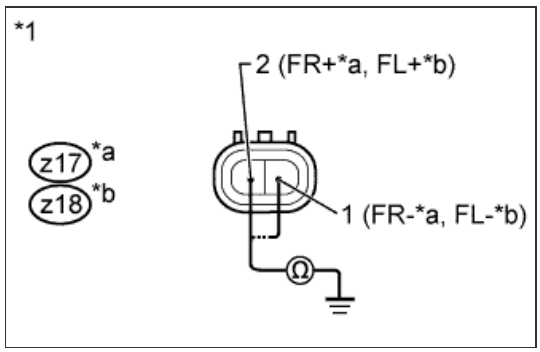
6.INSPECT FRONT SPEED SENSOR

a. Install the front speed sensor.

b. Turn the ignition switch off.

c. Disconnect the z17 and/or z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch off	10 kΩ or higher
z17-1 (FR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch off	10 kΩ or higher
z18-1 (FL-) - Body ground	Ignition switch off	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Front Speed Sensor)
*a	for RH
*b	for LH

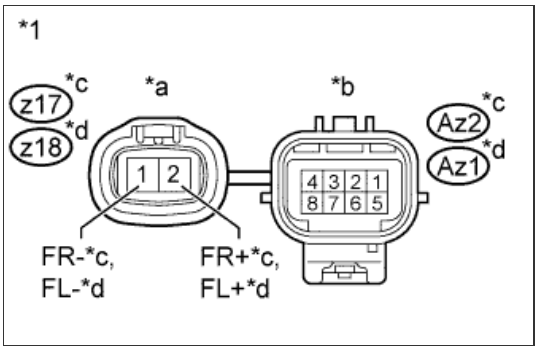
NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z17 and Az2/z18 and Az1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z17-2 (FR+) - Az2-5	Always	Below 1 Ω
z17-2 (FR+) - Az2-1	Always	10 kΩ or higher
z17-2 (FR+) - Body ground	Always	10 kΩ or higher
z17-1 (FR-) - Az2-1	Always	Below 1 Ω
z17-1 (FR-) - Az2-5	Always	10 kΩ or higher
z17-1 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z18-2 (FL+) - Az1-5	Always	Below 1 Ω
z18-2 (FL+) - Az1-1	Always	10 kΩ or higher
z18-2 (FL+) - Body ground	Always	10 kΩ or higher
z18-1 (FL-) - Az1-1	Always	Below 1 Ω
z18-1 (FL-) - Az1-5	Always	10 kΩ or higher
z18-1 (FL-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Skid Control Sensor Wire)
*a	Sensor Side Connector
*b	Vehicle Side Connector
*c	for RH
*d	for LH

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU FRONT SPEED SENSOR WIRE)

a. Disconnect the A24 skid control ECU connector and Az2/Az1 skid control sensor wire connector.

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

Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-3 (FR+) - Az2-5	Always	Below 1 Ω
A24-3 (FR+) - Body ground	Always	10 kΩ or higher
A24-17 (FR-) - Az2-1	Always	Below 1 Ω
A24-17 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-18 (FL+) - Az1-5	Always	Below 1 Ω
A24-18 (FL+) - Body ground	Always	10 kΩ or higher
A24-4 (FL-) - Az1-1	Always	Below 1 Ω
A24-4 (FL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

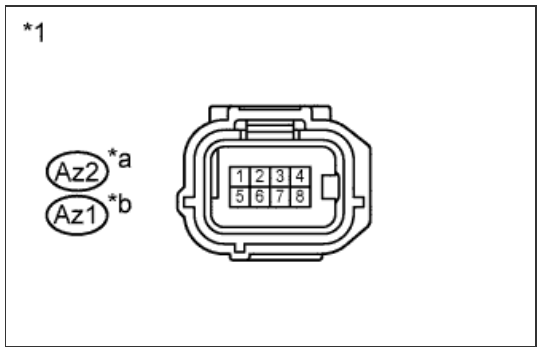
OK

.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Az2-5 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Az1-5 - Body ground	Ignition switch ON	7.5 to 12 V

Text in Illustration

*1	Front view of wire harness connector (to Front Speed Sensor Wire)
*a	for RH
*b	for LH

Result

Result	Proceed to
OK	A

NG	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE FRONT SPEED SENSOR

a. Replace the front speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the front axle hub sub-assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CLEAN OR REPLACE FRONT AXLE HUB SUB ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

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 Acceleration Sensor Power Supply Voltage Malfunction

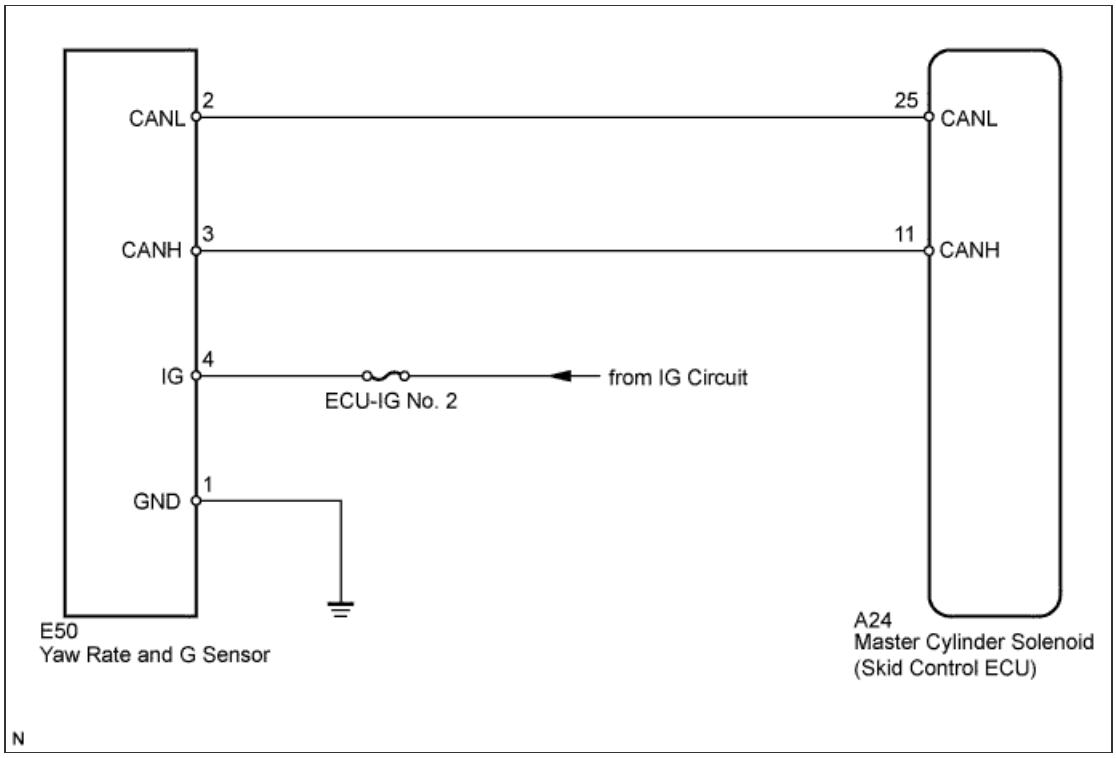
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the yaw rate and G sensor via the CAN communication system.
The yaw rate sensor has a built-in G sensor.
If there is trouble in the bus lines between the yaw rate and G sensor and the CAN communication system, the DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (G sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1232/32	At a vehicle speed of 10 km/h (6 mph) or more, the fluctuation range of the signal from one of either GL1 or GL2 is below 80 mV and the fluctuation range of the signal of the other is higher than 1.9 V for 30 seconds or more.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1234/34	A sensor malfunction signal is received from the yaw rate sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1243/43	The following condition repeats 16 times. • GL1 and GL2 do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1244/44	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 60 seconds. • The vehicle is stopped. • The difference between GL1 and GL2 does not drop less than 0.4 G after it reaches 0.6 G or more. 2. A data malfunction signal is received from the G sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. • The difference between the values calculated from the G sensor value and vehicle speed exceeds 0.35 G.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1381/97	A G sensor power source malfunction signal is received for at least 10 seconds at a speed of more than 3 km/h (2 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the yaw rate and G sensor, perform zero point calibration (Click here).

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Check if the DTCs (U0073/94, U0123/62, C1210/36 and/or C1336/98) are output (Click here).

Result

Result		Proceed to
DTC U0073/94, U0123/62, C1210/36 and/or C1336/98 are not output		A
DTC U0073/94 and/or U0123/62 are output	for LHD	B
	for RHD	C
DTC C1210/36 and/or C1336/98 are output		D

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

D → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (Click here)

A

2.CHECK YAW RATE AND G SENSOR INSTALLATION

a. Check that the yaw rate and G sensor is installed properly.

OK:

The sensor is tightened to the specified torque. The sensor is not tilted.

NG → INSTALL YAW RATE AND G SENSOR CORRECTLY (Click here)

OK

3.INSPECT YAW RATE AND G SENSOR (IG AND GND TERMINAL)

a. Disconnect the E50 yaw rate and G sensor connector.

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

Standard Voltage:

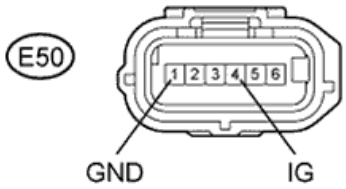
Tester Connection	Switch Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E50-1 (GND) - Body ground	Always	Below 1 Ω

Front view of wire harness connector:
(to Yaw Rate and G Sensor)



Result

Result	Proceed to
OK (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with the Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

REPLACE YAW RATE AND G SENSOR (Click here)

DTC C0200/31 Front Speed Sensor RH Circuit

DTC C0205/32 Front Speed Sensor LH Circuit

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

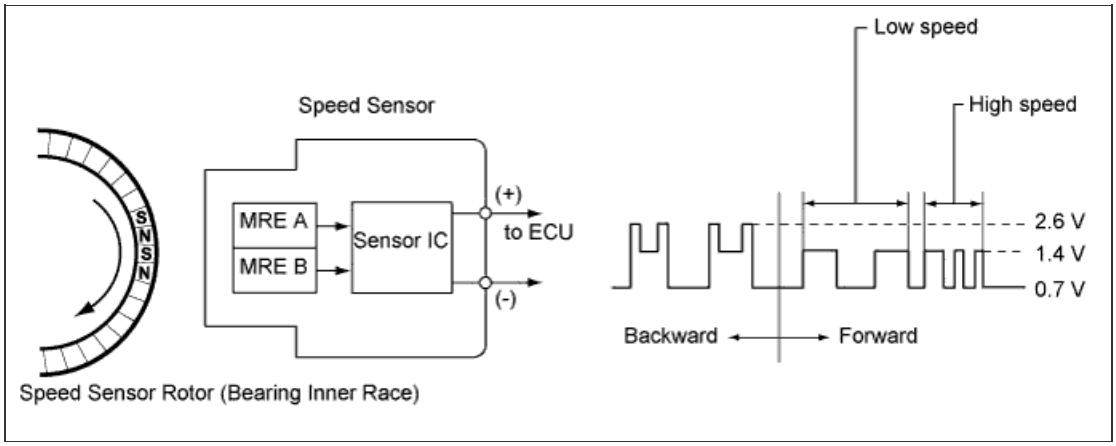
DTC C1236/36 Foreign Object is Attached on Tip of Front Speed Sensor LH

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD, BA, VSC, A-TRC, CRAWL and hill-start assist control systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.

To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

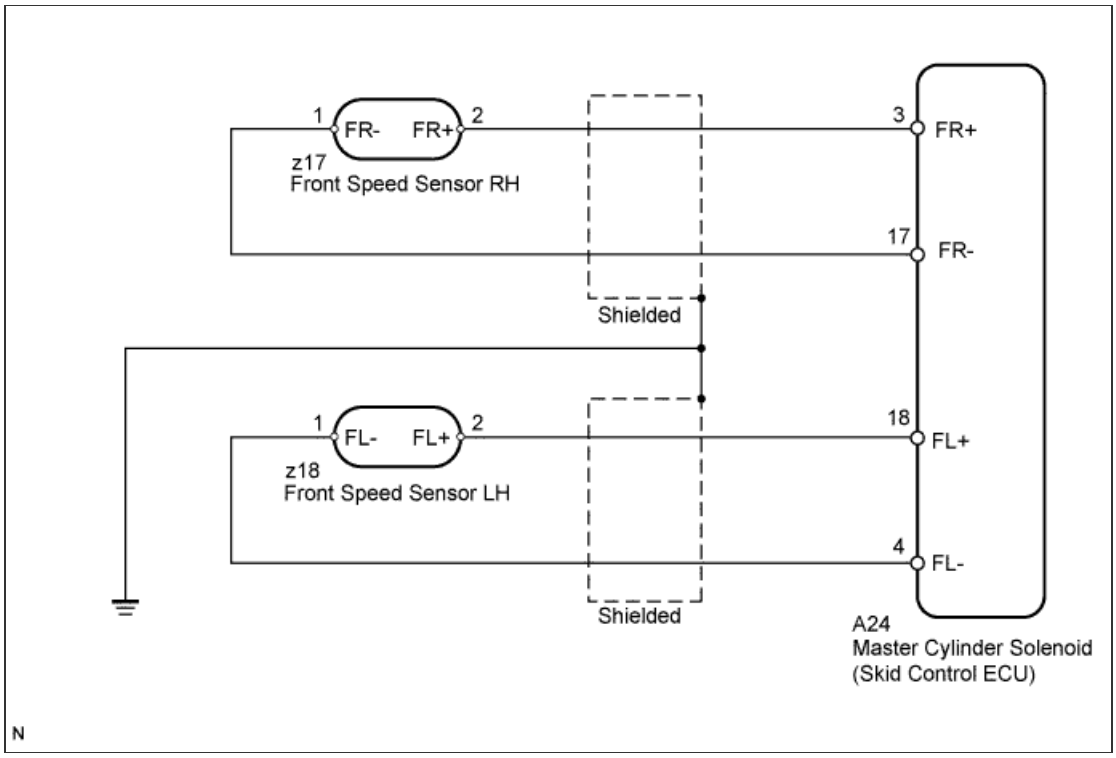


DTC Code	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Front speed sensor RH • Front speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1235/35 C1236/36	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Front speed sensor RH • Front speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0200/31 and C1235/35 are for the front speed sensor RH.**
- **DTC C0205/32 and C1236/36 are for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (FR/FL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (FR/FL WHEEL SPEED, FR/FL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel	Front wheel speed sensor RH reading /min.: 0 km/h (0 mph),	Actual wheel	A similar speed is indicated on the

Speed	max.: 326 km/h (202 mph)	speed	speedometer.
FL Wheel Speed	Front wheel speed sensor LH reading /min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Direction	Front wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT FRONT SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation bolt is tightened properly.

There is no clearance between the sensor and front steering knuckle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL FRONT SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the front speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE FRONT SPEED SENSOR (Click here)

OK

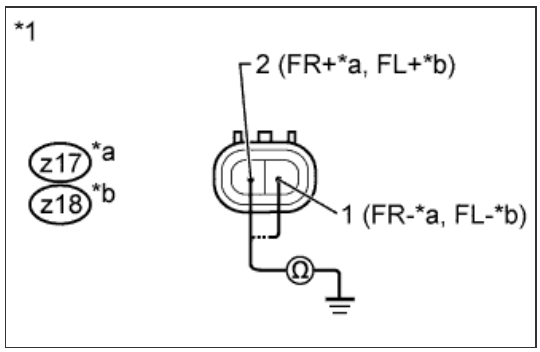
6.INSPECT FRONT SPEED SENSOR

a. Install the front speed sensor.

b. Turn the ignition switch off.

c. Disconnect the z17 and/or z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch off	10 kΩ or higher
z17-1 (FR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch off	10 kΩ or higher
z18-1 (FL-) - Body ground	Ignition switch off	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Front Speed Sensor)
*a	for RH
*b	for LH

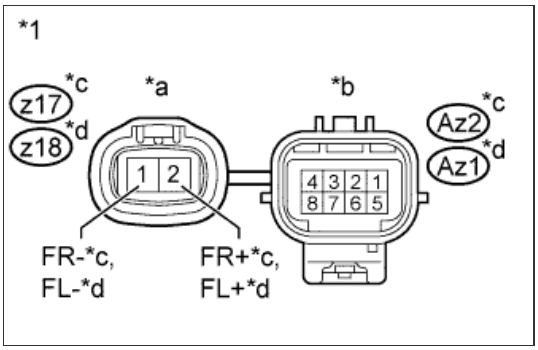
NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z17 and Az2/z18 and Az1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z17-2 (FR+) - Az2-5	Always	Below 1 Ω
z17-2 (FR+) - Az2-1	Always	10 kΩ or higher
z17-2 (FR+) - Body ground	Always	10 kΩ or higher
z17-1 (FR-) - Az2-1	Always	Below 1 Ω
z17-1 (FR-) - Az2-5	Always	10 kΩ or higher
z17-1 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z18-2 (FL+) - Az1-5	Always	Below 1 Ω
z18-2 (FL+) - Az1-1	Always	10 kΩ or higher
z18-2 (FL+) - Body ground	Always	10 kΩ or higher
z18-1 (FL-) - Az1-1	Always	Below 1 Ω
z18-1 (FL-) - Az1-5	Always	10 kΩ or higher
z18-1 (FL-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Skid Control Sensor Wire)
*a	Sensor Side Connector
*b	Vehicle Side Connector
*c	for RH
*d	for LH

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU FRONT SPEED SENSOR WIRE)

a. Disconnect the A24 skid control ECU connector and Az2/Az1 skid control sensor wire connector.

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

Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-3 (FR+) - Az2-5	Always	Below 1 Ω
A24-3 (FR+) - Body ground	Always	10 kΩ or higher
A24-17 (FR-) - Az2-1	Always	Below 1 Ω
A24-17 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-18 (FL+) - Az1-5	Always	Below 1 Ω
A24-18 (FL+) - Body ground	Always	10 kΩ or higher
A24-4 (FL-) - Az1-1	Always	Below 1 Ω
A24-4 (FL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

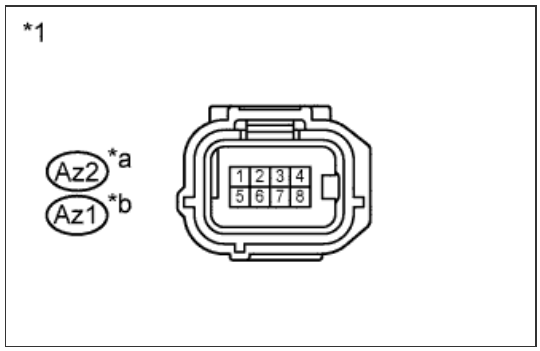
OK

.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Az2-5 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Az1-5 - Body ground	Ignition switch ON	7.5 to 12 V

Text in Illustration

*1	Front view of wire harness connector (to Front Speed Sensor Wire)
*a	for RH
*b	for LH

Result

Result	Proceed to
OK	A

NG	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE FRONT SPEED SENSOR

a. Replace the front speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the front axle hub sub-assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CLEAN OR REPLACE FRONT AXLE HUB SUB ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

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 Acceleration Sensor Power Supply Voltage Malfunction

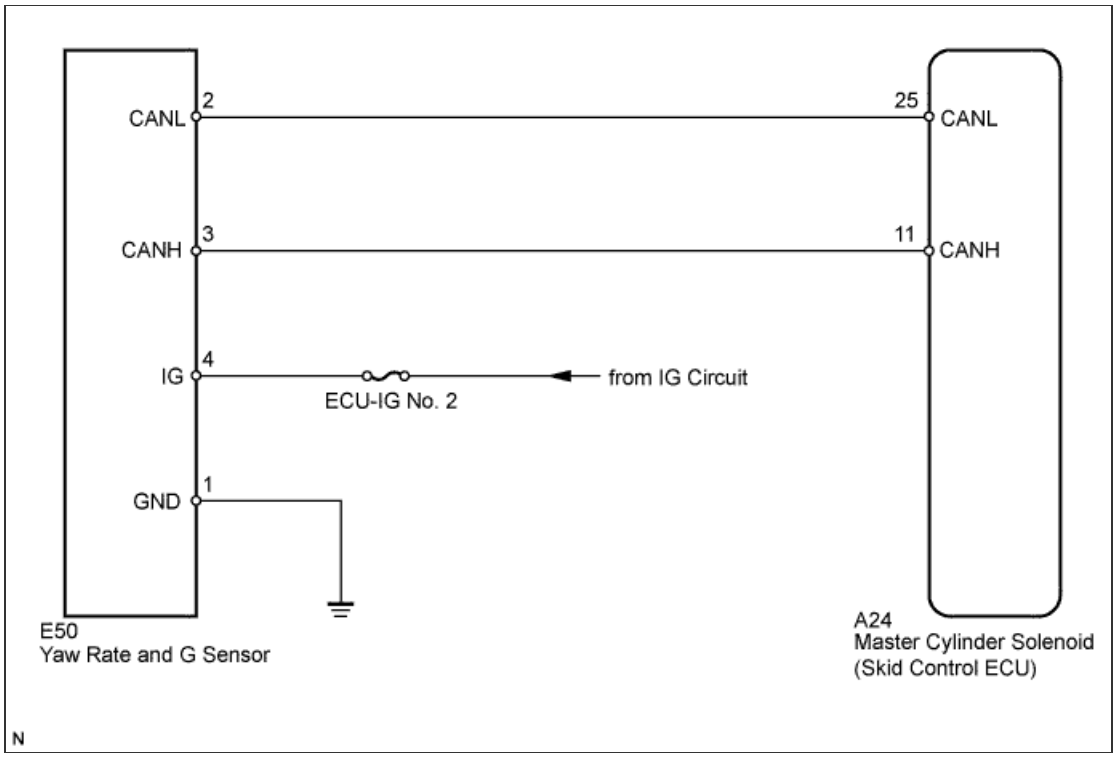
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the yaw rate and G sensor via the CAN communication system.
The yaw rate sensor has a built-in G sensor.
If there is trouble in the bus lines between the yaw rate and G sensor and the CAN communication system, the DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (G sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1232/32	At a vehicle speed of 10 km/h (6 mph) or more, the fluctuation range of the signal from one of either GL1 or GL2 is below 80 mV and the fluctuation range of the signal of the other is higher than 1.9 V for 30 seconds or more.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1234/34	A sensor malfunction signal is received from the yaw rate sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1243/43	The following condition repeats 16 times. • GL1 and GL2 do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1244/44	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 60 seconds. • The vehicle is stopped. • The difference between GL1 and GL2 does not drop less than 0.4 G after it reaches 0.6 G or more. 2. A data malfunction signal is received from the G sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. • The difference between the values calculated from the G sensor value and vehicle speed exceeds 0.35 G.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1381/97	A G sensor power source malfunction signal is received for at least 10 seconds at a speed of more than 3 km/h (2 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the yaw rate and G sensor, perform zero point calibration (Click here).

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Check if the DTCs (U0073/94, U0123/62, C1210/36 and/or C1336/98) are output (Click here).

Result

Result		Proceed to
DTC U0073/94, U0123/62, C1210/36 and/or C1336/98 are not output		A
DTC U0073/94 and/or U0123/62 are output	for LHD	B
	for RHD	C
DTC C1210/36 and/or C1336/98 are output		D

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

D → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (Click here)

A

2.CHECK YAW RATE AND G SENSOR INSTALLATION

a. Check that the yaw rate and G sensor is installed properly.

OK:

The sensor is tightened to the specified torque. The sensor is not tilted.

NG → INSTALL YAW RATE AND G SENSOR CORRECTLY (Click here)

OK

3.INSPECT YAW RATE AND G SENSOR (IG AND GND TERMINAL)

a. Disconnect the E50 yaw rate and G sensor connector.

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

Standard Voltage:

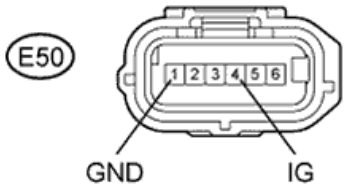
Tester Connection	Switch Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E50-1 (GND) - Body ground	Always	Below 1 Ω

Front view of wire harness connector:
(to Yaw Rate and G Sensor)



Result

Result	Proceed to
OK (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with the Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

REPLACE YAW RATE AND G SENSOR (Click here)

DTC C0200/31 Front Speed Sensor RH Circuit

DTC C0205/32 Front Speed Sensor LH Circuit

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

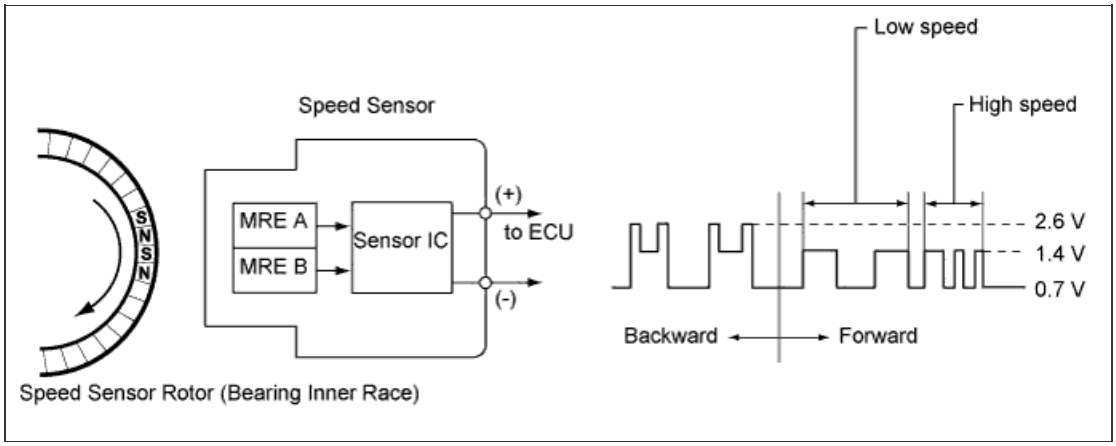
DTC C1236/36 Foreign Object is Attached on Tip of Front Speed Sensor LH

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD, BA, VSC, A-TRC, CRAWL and hill-start assist control systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.

To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

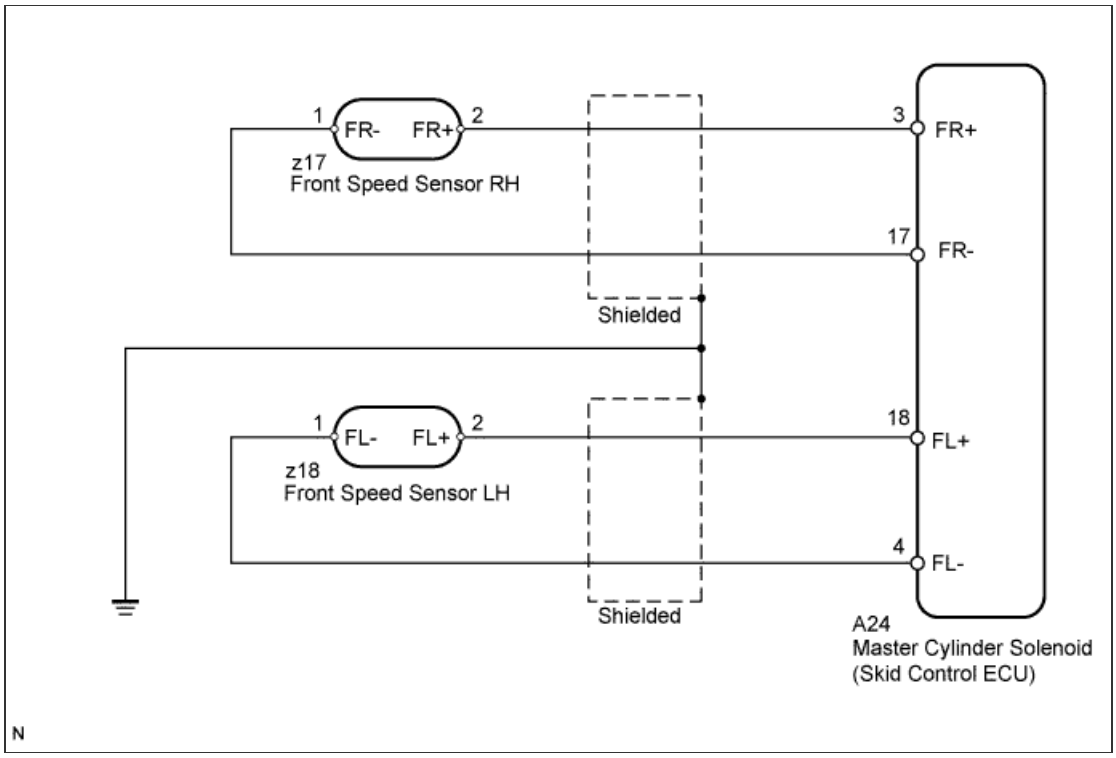


DTC Code	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Front speed sensor RH • Front speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1235/35 C1236/36	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Front speed sensor RH • Front speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0200/31 and C1235/35 are for the front speed sensor RH.**
- **DTC C0205/32 and C1236/36 are for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (FR/FL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (FR/FL WHEEL SPEED, FR/FL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel	Front wheel speed sensor RH reading /min.: 0 km/h (0 mph),	Actual wheel	A similar speed is indicated on the

Speed	max.: 326 km/h (202 mph)	speed	speedometer.
FL Wheel Speed	Front wheel speed sensor LH reading /min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Direction	Front wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT FRONT SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation bolt is tightened properly.

There is no clearance between the sensor and front steering knuckle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL FRONT SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the front speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE FRONT SPEED SENSOR (Click here)

OK

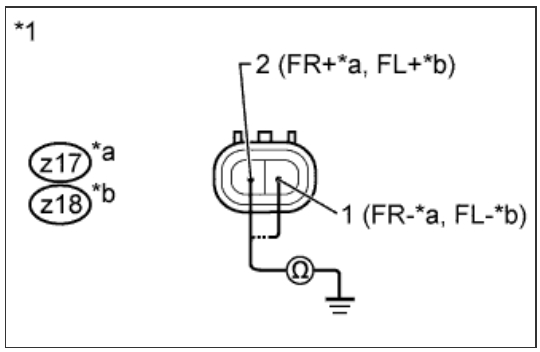
6.INSPECT FRONT SPEED SENSOR

a. Install the front speed sensor.

b. Turn the ignition switch off.

c. Disconnect the z17 and/or z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch off	10 kΩ or higher
z17-1 (FR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch off	10 kΩ or higher
z18-1 (FL-) - Body ground	Ignition switch off	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Front Speed Sensor)
*a	for RH
*b	for LH

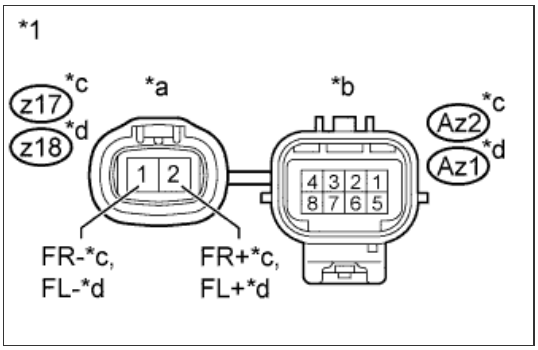
NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z17 and Az2/z18 and Az1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z17-2 (FR+) - Az2-5	Always	Below 1 Ω
z17-2 (FR+) - Az2-1	Always	10 kΩ or higher
z17-2 (FR+) - Body ground	Always	10 kΩ or higher
z17-1 (FR-) - Az2-1	Always	Below 1 Ω
z17-1 (FR-) - Az2-5	Always	10 kΩ or higher
z17-1 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z18-2 (FL+) - Az1-5	Always	Below 1 Ω
z18-2 (FL+) - Az1-1	Always	10 kΩ or higher
z18-2 (FL+) - Body ground	Always	10 kΩ or higher
z18-1 (FL-) - Az1-1	Always	Below 1 Ω
z18-1 (FL-) - Az1-5	Always	10 kΩ or higher
z18-1 (FL-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Skid Control Sensor Wire)
*a	Sensor Side Connector
*b	Vehicle Side Connector
*c	for RH
*d	for LH

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU FRONT SPEED SENSOR WIRE)

a. Disconnect the A24 skid control ECU connector and Az2/Az1 skid control sensor wire connector.

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

Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-3 (FR+) - Az2-5	Always	Below 1 Ω
A24-3 (FR+) - Body ground	Always	10 kΩ or higher
A24-17 (FR-) - Az2-1	Always	Below 1 Ω
A24-17 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-18 (FL+) - Az1-5	Always	Below 1 Ω
A24-18 (FL+) - Body ground	Always	10 kΩ or higher
A24-4 (FL-) - Az1-1	Always	Below 1 Ω
A24-4 (FL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

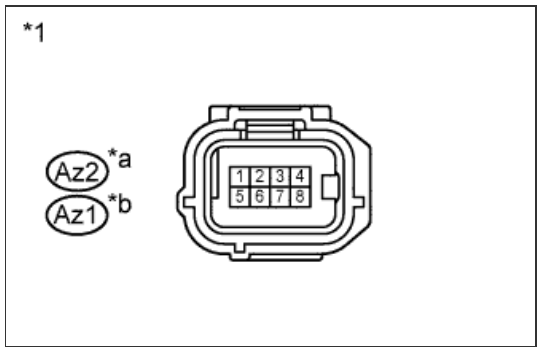
OK

.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Az2-5 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Az1-5 - Body ground	Ignition switch ON	7.5 to 12 V

Text in Illustration

*1	Front view of wire harness connector (to Front Speed Sensor Wire)
*a	for RH
*b	for LH

Result

Result	Proceed to
OK	A

NG	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE FRONT SPEED SENSOR

a. Replace the front speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the front axle hub sub-assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CLEAN OR REPLACE FRONT AXLE HUB SUB ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

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 Acceleration Sensor Power Supply Voltage Malfunction

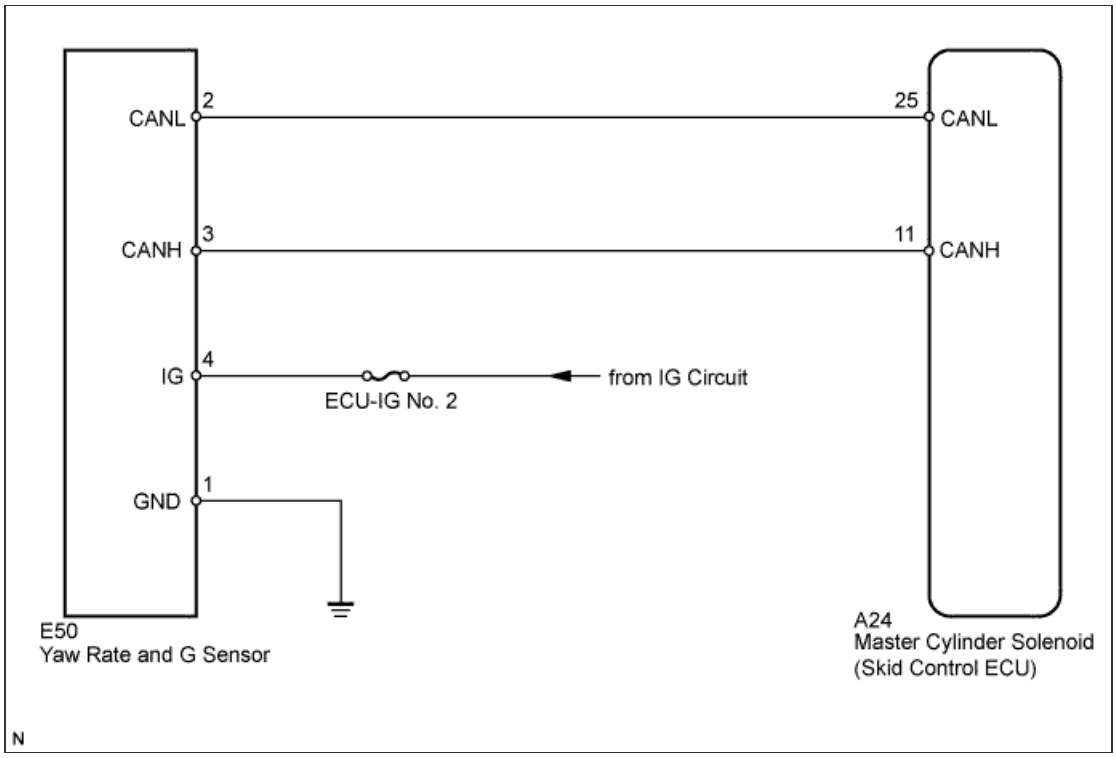
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the yaw rate and G sensor via the CAN communication system.
The yaw rate sensor has a built-in G sensor.
If there is trouble in the bus lines between the yaw rate and G sensor and the CAN communication system, the DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (G sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1232/32	At a vehicle speed of 10 km/h (6 mph) or more, the fluctuation range of the signal from one of either GL1 or GL2 is below 80 mV and the fluctuation range of the signal of the other is higher than 1.9 V for 30 seconds or more.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1234/34	A sensor malfunction signal is received from the yaw rate sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1243/43	The following condition repeats 16 times. • GL1 and GL2 do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1244/44	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 60 seconds. • The vehicle is stopped. • The difference between GL1 and GL2 does not drop less than 0.4 G after it reaches 0.6 G or more. 2. A data malfunction signal is received from the G sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. • The difference between the values calculated from the G sensor value and vehicle speed exceeds 0.35 G.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1381/97	A G sensor power source malfunction signal is received for at least 10 seconds at a speed of more than 3 km/h (2 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the yaw rate and G sensor, perform zero point calibration (Click here).

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Check if the DTCs (U0073/94, U0123/62, C1210/36 and/or C1336/98) are output (Click here).

Result

Result		Proceed to
DTC U0073/94, U0123/62, C1210/36 and/or C1336/98 are not output		A
DTC U0073/94 and/or U0123/62 are output	for LHD	B
	for RHD	C
DTC C1210/36 and/or C1336/98 are output		D

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

D → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (Click here)

A

2.CHECK YAW RATE AND G SENSOR INSTALLATION

a. Check that the yaw rate and G sensor is installed properly.

OK:

The sensor is tightened to the specified torque. The sensor is not tilted.

NG → INSTALL YAW RATE AND G SENSOR CORRECTLY (Click here)

OK

3.INSPECT YAW RATE AND G SENSOR (IG AND GND TERMINAL)

a. Disconnect the E50 yaw rate and G sensor connector.

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

Standard Voltage:

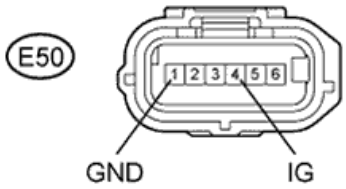
Tester Connection	Switch Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E50-1 (GND) - Body ground	Always	Below 1 Ω

Front view of wire harness connector:
(to Yaw Rate and G Sensor)



Result

Result	Proceed to
OK (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with the Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

REPLACE YAW RATE AND G SENSOR (Click here)

DTC C0200/31 Front Speed Sensor RH Circuit

DTC C0205/32 Front Speed Sensor LH Circuit

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

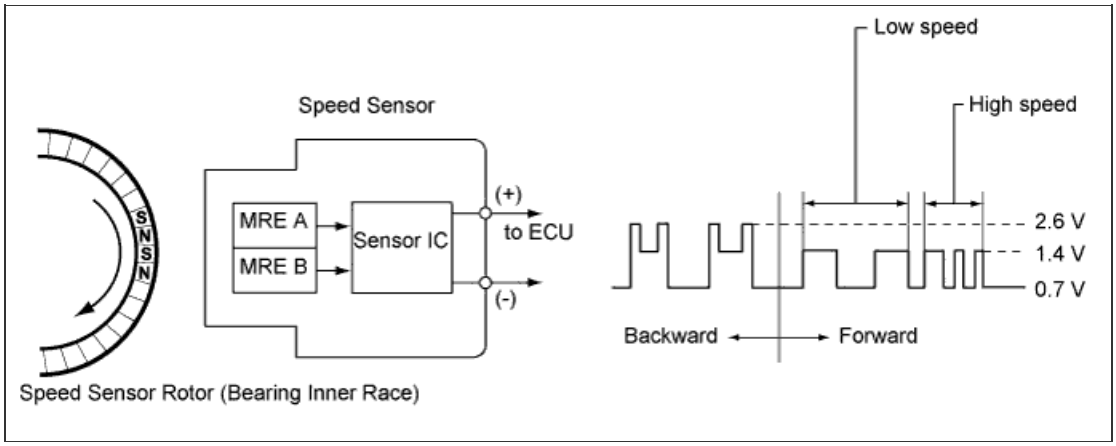
DTC C1236/36 Foreign Object is Attached on Tip of Front Speed Sensor LH

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD, BA, VSC, A-TRC, CRAWL and hill-start assist control systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.

To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

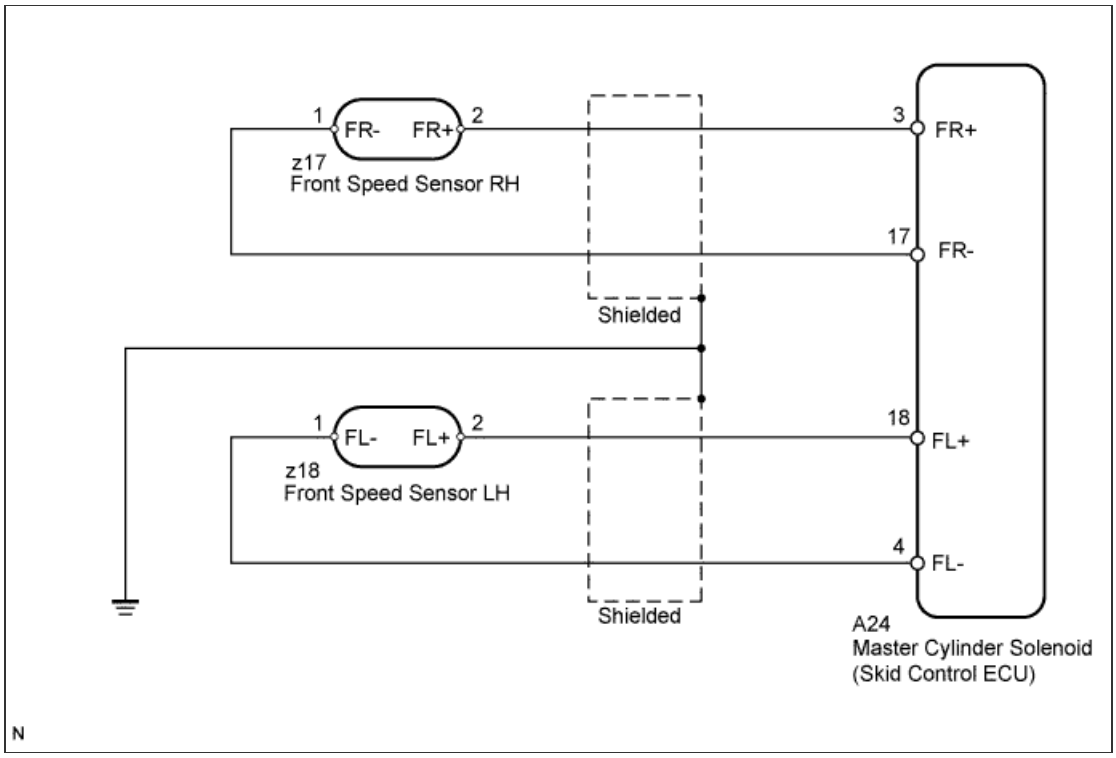


DTC Code	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Front speed sensor RH • Front speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1235/35 C1236/36	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Front speed sensor RH • Front speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0200/31 and C1235/35 are for the front speed sensor RH.**
- **DTC C0205/32 and C1236/36 are for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (FR/FL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.READ VALUE USING INTELLIGENT TESTER (FR/FL WHEEL SPEED, FR/FL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel	Front wheel speed sensor RH reading /min.: 0 km/h (0 mph),	Actual wheel	A similar speed is indicated on the

Speed	max.: 326 km/h (202 mph)	speed	speedometer.
FL Wheel Speed	Front wheel speed sensor LH reading /min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Direction	Front wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT FRONT SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation bolt is tightened properly.

There is no clearance between the sensor and front steering knuckle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL FRONT SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the front speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE FRONT SPEED SENSOR (Click here)

OK

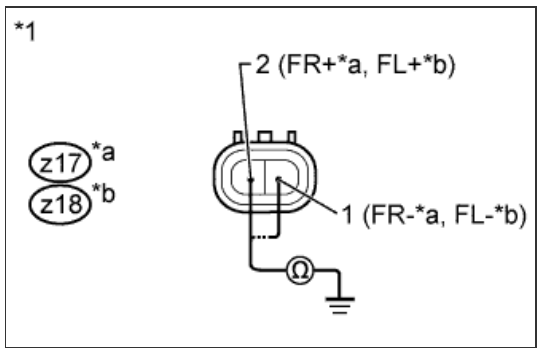
6.INSPECT FRONT SPEED SENSOR

a. Install the front speed sensor.

b. Turn the ignition switch off.

c. Disconnect the z17 and/or z18 front speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z17-2 (FR+) - Body ground	Ignition switch off	10 kΩ or higher
z17-1 (FR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch off	10 kΩ or higher
z18-1 (FL-) - Body ground	Ignition switch off	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Front Speed Sensor)
*a	for RH
*b	for LH

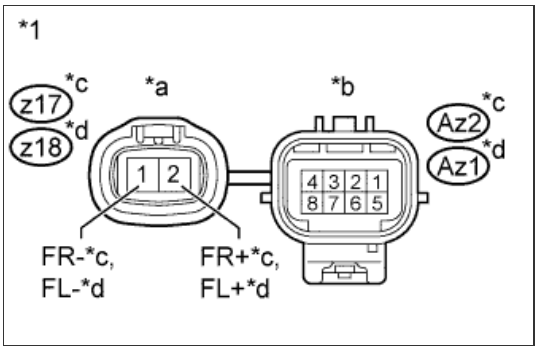
NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z17 and Az2/z18 and Az1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z17-2 (FR+) - Az2-5	Always	Below 1 Ω
z17-2 (FR+) - Az2-1	Always	10 kΩ or higher
z17-2 (FR+) - Body ground	Always	10 kΩ or higher
z17-1 (FR-) - Az2-1	Always	Below 1 Ω
z17-1 (FR-) - Az2-5	Always	10 kΩ or higher
z17-1 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z18-2 (FL+) - Az1-5	Always	Below 1 Ω
z18-2 (FL+) - Az1-1	Always	10 kΩ or higher
z18-2 (FL+) - Body ground	Always	10 kΩ or higher
z18-1 (FL-) - Az1-1	Always	Below 1 Ω
z18-1 (FL-) - Az1-5	Always	10 kΩ or higher
z18-1 (FL-) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Skid Control Sensor Wire)
*a	Sensor Side Connector
*b	Vehicle Side Connector
*c	for RH
*d	for LH

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU FRONT SPEED SENSOR WIRE)

a. Disconnect the A24 skid control ECU connector and Az2/Az1 skid control sensor wire connector.

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

Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-3 (FR+) - Az2-5	Always	Below 1 Ω
A24-3 (FR+) - Body ground	Always	10 kΩ or higher
A24-17 (FR-) - Az2-1	Always	Below 1 Ω
A24-17 (FR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-18 (FL+) - Az1-5	Always	Below 1 Ω
A24-18 (FL+) - Body ground	Always	10 kΩ or higher
A24-4 (FL-) - Az1-1	Always	Below 1 Ω
A24-4 (FL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

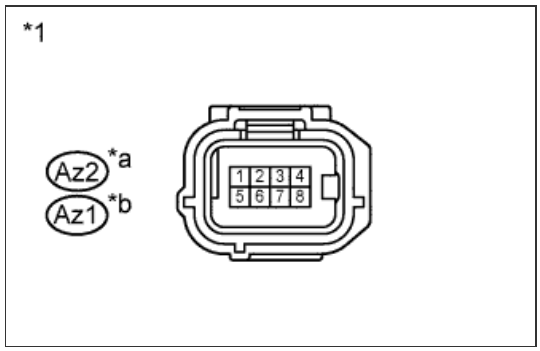
OK

.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Az2-5 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Az1-5 - Body ground	Ignition switch ON	7.5 to 12 V

Text in Illustration

*1	Front view of wire harness connector (to Front Speed Sensor Wire)
*a	for RH
*b	for LH

Result

Result	Proceed to
OK	A

NG	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B → USE SIMULATION METHOD TO CHECK (Click here)

C → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE FRONT SPEED SENSOR

a. Replace the front speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the front axle hub sub-assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CLEAN OR REPLACE FRONT AXLE HUB SUB ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

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 Acceleration Sensor Power Supply Voltage Malfunction

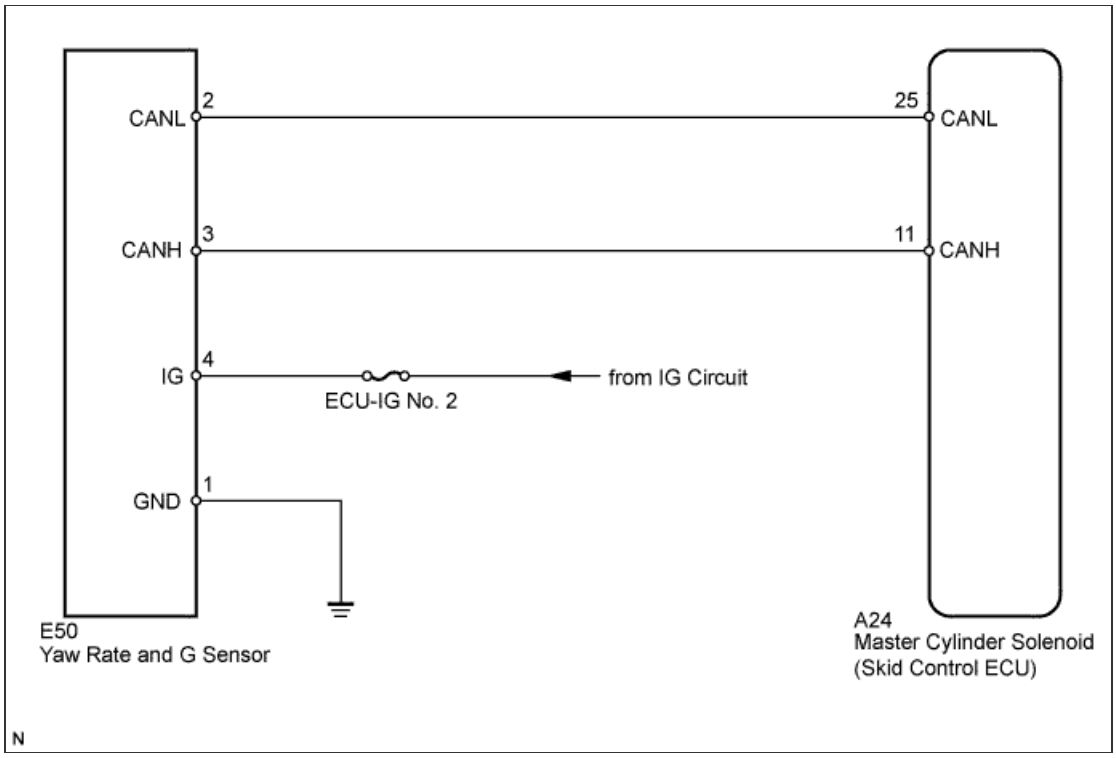
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the yaw rate and G sensor via the CAN communication system.
The yaw rate sensor has a built-in G sensor.
If there is trouble in the bus lines between the yaw rate and G sensor and the CAN communication system, the DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (G sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1232/32	At a vehicle speed of 10 km/h (6 mph) or more, the fluctuation range of the signal from one of either GL1 or GL2 is below 80 mV and the fluctuation range of the signal of the other is higher than 1.9 V for 30 seconds or more.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1234/34	A sensor malfunction signal is received from the yaw rate sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1243/43	The following condition repeats 16 times. • GL1 and GL2 do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1244/44	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 60 seconds. • The vehicle is stopped. • The difference between GL1 and GL2 does not drop less than 0.4 G after it reaches 0.6 G or more. 2. A data malfunction signal is received from the G sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. • The difference between the values calculated from the G sensor value and vehicle speed exceeds 0.35 G.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1381/97	A G sensor power source malfunction signal is received for at least 10 seconds at a speed of more than 3 km/h (2 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the yaw rate and G sensor, perform zero point calibration (Click here).

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Check if the DTCs (U0073/94, U0123/62, C1210/36 and/or C1336/98) are output (Click here).

Result

Result		Proceed to
DTC U0073/94, U0123/62, C1210/36 and/or C1336/98 are not output		A
DTC U0073/94 and/or U0123/62 are output	for LHD	B
	for RHD	C
DTC C1210/36 and/or C1336/98 are output		D

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

D → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (Click here)

A

2.CHECK YAW RATE AND G SENSOR INSTALLATION

a. Check that the yaw rate and G sensor is installed properly.

OK:

The sensor is tightened to the specified torque. The sensor is not tilted.

NG → INSTALL YAW RATE AND G SENSOR CORRECTLY (Click here)

OK

3.INSPECT YAW RATE AND G SENSOR (IG AND GND TERMINAL)

a. Disconnect the E50 yaw rate and G sensor connector.

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

Standard Voltage:

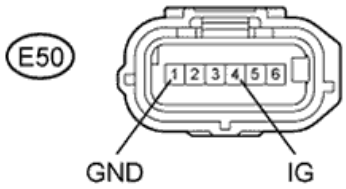
Tester Connection	Switch Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E50-1 (GND) - Body ground	Always	Below 1 Ω

Front view of wire harness connector:
(to Yaw Rate and G Sensor)



Result

Result	Proceed to
OK (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with the Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

REPLACE YAW RATE AND G SENSOR (Click here)

DTC C0210/33 Rear Speed Sensor RH Circuit

DTC C0215/34 Rear Speed Sensor LH Circuit

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

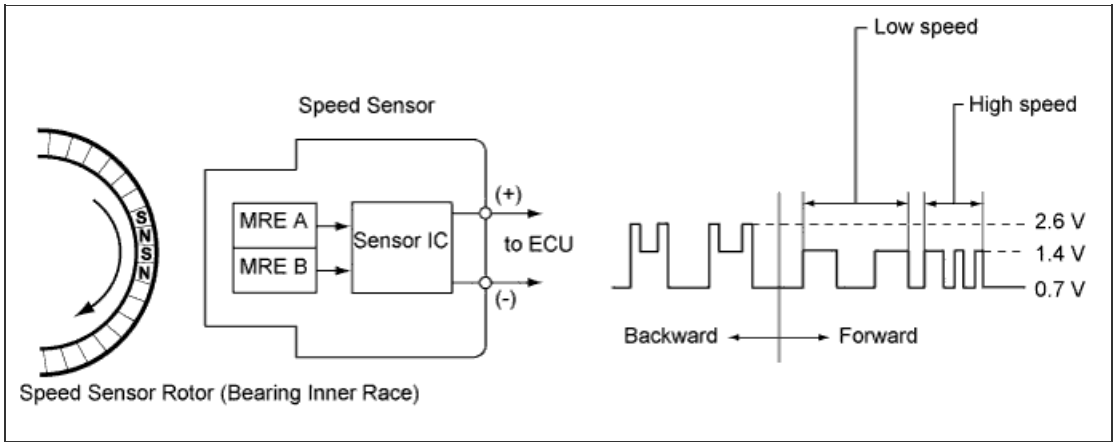
DTC C1239/39 Foreign Object is Attached on Tip of Rear Speed Sensor LH

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD, BA, VSC, A-TRC, CRAWL and hill-start assist control systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.

To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

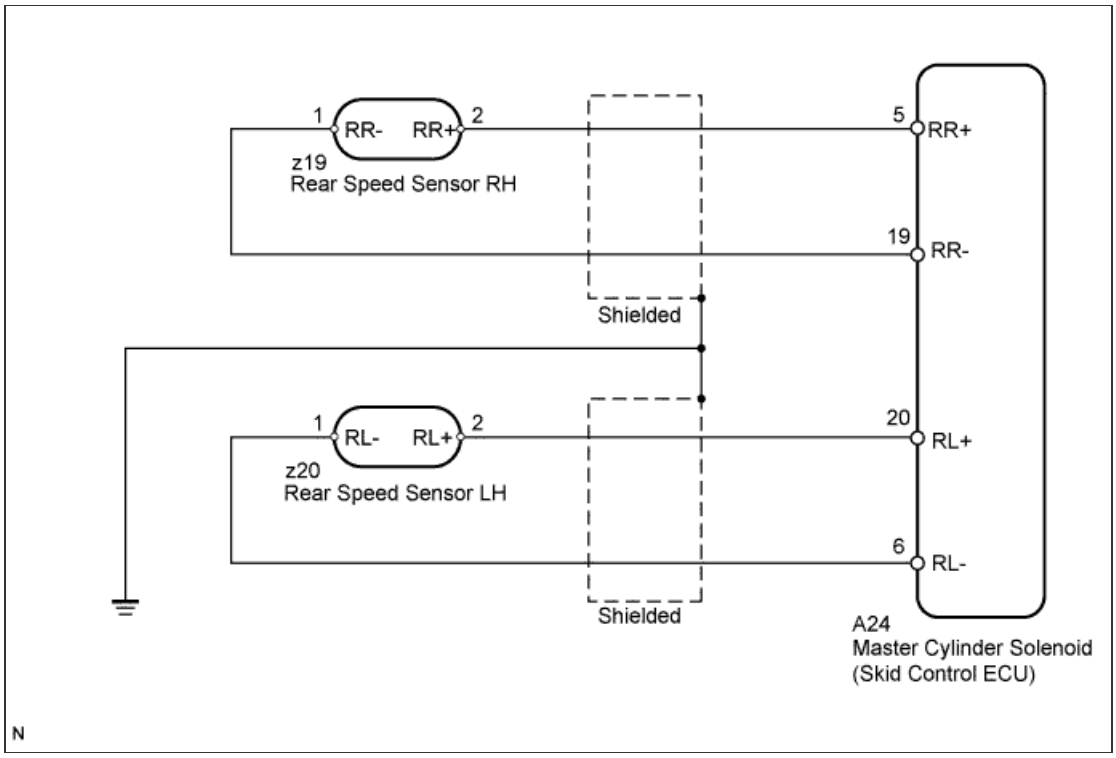


DTC Code	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Rear speed sensor RH • Rear speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1238/38 C1239/39	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Rear speed sensor RH • Rear speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0210/33 and C1238/38 are for the rear speed sensor RH.**
- **DTC C0215/34 and C1239/39 are for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (RR/RL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

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

OK

2.READ VALUE USING INTELLIGENT TESTER (RR/RL WHEEL SPEED, RR/RL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note

RR Wheel Speed	Rear wheel speed sensor R reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Direction	Rear wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT REAR SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation nut is tightened properly.

There is no clearance between the sensor and rear axle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL REAR SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the rear speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE REAR SPEED SENSOR (Click here)

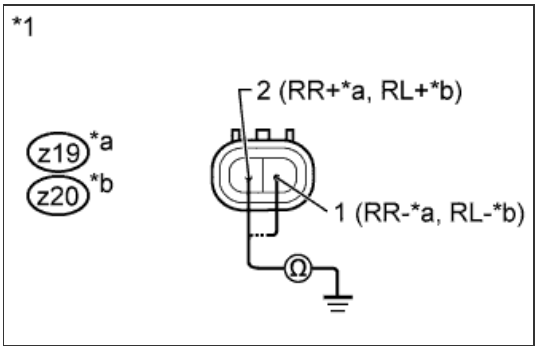
OK

6.INSPECT REAR SPEED SENSOR

a. Install the rear speed sensor.

b. Disconnect the z19 and/or z20 rear speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch off	10 kΩ or higher
z19-1 (RR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch off	10 kΩ or higher
z20-1 (RL-) - Body ground	Ignition switch off	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Rear Speed Sensor)
*a	for RH
*b	for LH

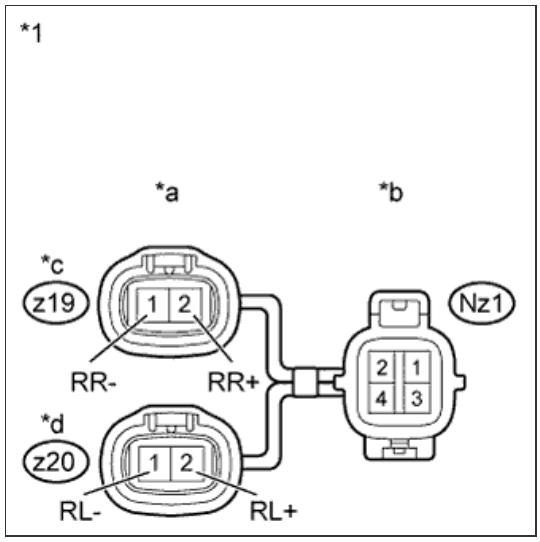
NG → REPLACE REAR SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z19/z20 and Nz1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z1 -2 (RR) - Nz1-4	Always	Below 1 Ω
z1 -2 (RR) - Nz1-3	Always	10 kΩ or higher
z1 -2 (RR) - Body ground	Always	10 kΩ or higher
z1 -1 (RR-) - Nz1-3	Always	Below 1 Ω
z1 -1 (RR-) - Nz1-4	Always	10 kΩ or higher
z1 -1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z20-2 (RL) - Nz1-2	Always	Below 1 Ω
z20-2 (RL) - Nz1-1	Always	10 kΩ or higher
z20-2 (RL) - Body ground	Always	10 kΩ or higher
z20-1 (RL-) - Nz1-1	Always	Below 1 Ω
z20-1 (RL-) - Nz1-2	Always	10 kΩ or higher
z20-1 (RL-) - Body ground	Always	10 kΩ or higher

Text in Illustration

1	Component without harness connected (Skid Control Sensor Wire)
a	Sensor Side Connector
b	Vehicle Side Connector
c	for R
d	for L

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and Nz1 skid control sensor wire connector.

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

Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-5 (RR) - Nz1-4	Always	Below 1 Ω
A24-5 (RR) - Body ground	Always	10 kΩ or higher
A24-1 (RR-) - Nz1-3	Always	Below 1 Ω
A24-1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-20 (RL) - Nz1-2	Always	Below 1 Ω
A24-20 (RL) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - Nz1-1	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

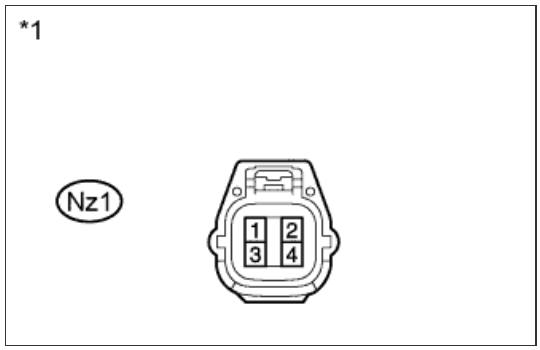
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Nz1-4 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Nz1-2 - Body ground	Ignition switch ON	7.5 to 12 V

Text in Illustration

1	ront view of wire harness connector (to Skid Control Sensor Wire)

Result

Result		Proceed to
O		A
N	for L D	B
	for R D	C

B	REPLACE MASTER CYLINDER SOLENOID (Click here)
C	REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B	USE SIMULATION METHOD TO CHECK (Click here)
C	PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE REAR SPEED SENSOR

a. Replace the rear speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the rear axle hub and bearing assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CLEAN OR REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

DTC C1241/41 Low Battery Positive Voltage

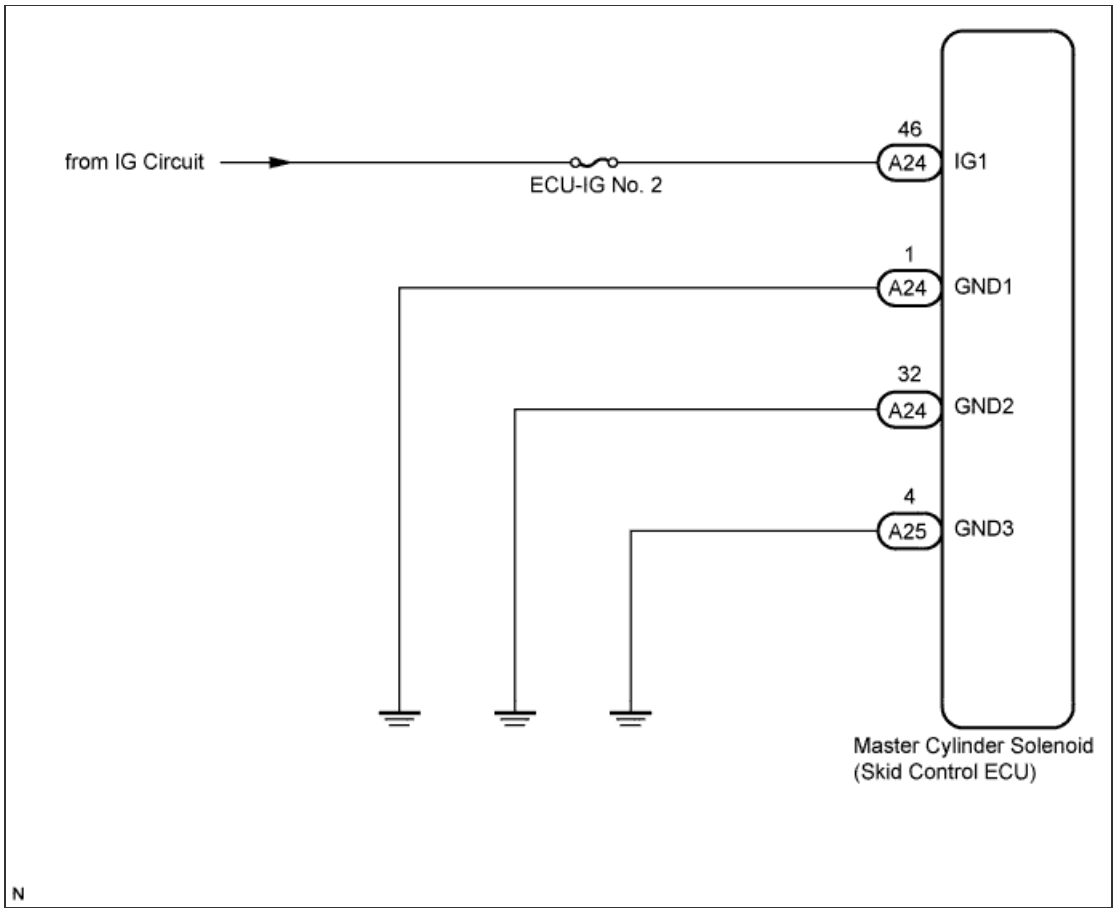
for Preparation Click here

DESCRIPTION

If the voltage supplied to the IG1 terminal is within the DTC detection range due to malfunctions in components such as the battery and alternator circuit, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1241/41	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 10 seconds. • The vehicle speed is more than 3 km/h (2 mph). • The IG1 terminal voltage is below 9.5 V. 2. All of the following conditions continue for at least 0.2 seconds. • The solenoid relay remains on. • The IG1 terminal voltage is below 9.5 V. • The relay contact is open.	• Battery • ECU-IG No. 2 fuse • Charging system • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT BATTERY

a. Check the battery voltage.

Standard voltage:

11 to 14 V

Result		Proceed to
OK		A
NG	for 2U - E	B
	for 1VD- TV	C
	for 3UR- E	D

B → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

C → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

D → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

A

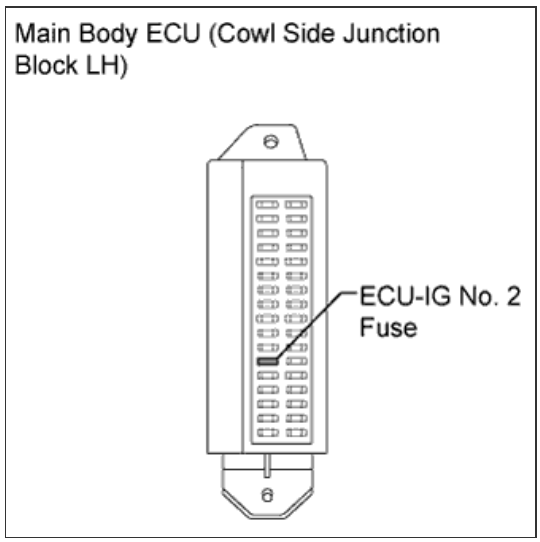
2.INSPECT ECU-IG NO. 2 FUSE

a. Remove the ECU-IG No. 2 fuse from the main body ECU (cowl side junction block LH).

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
ECU-IG No. 2 fuse	Always	Below 1 Ω



NG → REPLACE ECU-IG NO. 2 FUSE

OK

3.READ VALUE USING INTELLIGENT TESTER (IG1 VOLTAGE VALUE)

a. Install the ECU-IG No. 2 fuse.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and turn the intelligent tester on.

d. Start the engine.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
IG1 Voltage Value	IG1 voltage value/min.: 0.00 V, max.: 20.00 V	9.5 to 14 V	-

f. Measure the voltage output from the skid control ECU displayed on the intelligent tester.

OK:

The output voltage displayed on the intelligent tester is within 9.5 to 14.0 V.

NG → Go to step 5

OK

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is output	for LHD	A
	for RHD	B
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)		C
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)		D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → USE SIMULATION METHOD TO CHECK (Click here)

D → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

REPLACE MASTER CYLINDER SOLENOID (Click here)

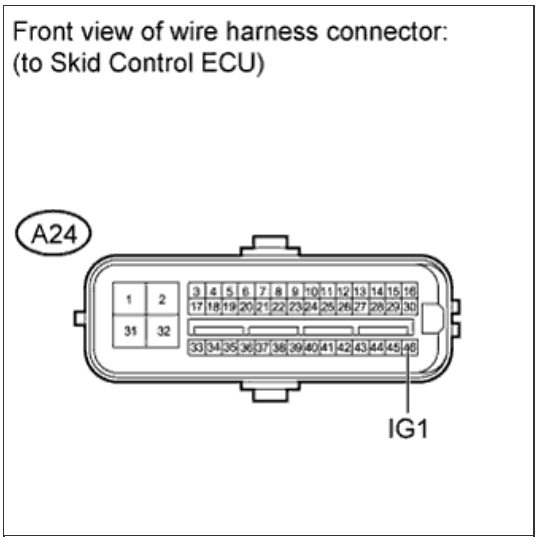
5.INSPECT SKID CONTROL ECU (IG1 TERMINAL)

a. Disconnect the A24 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

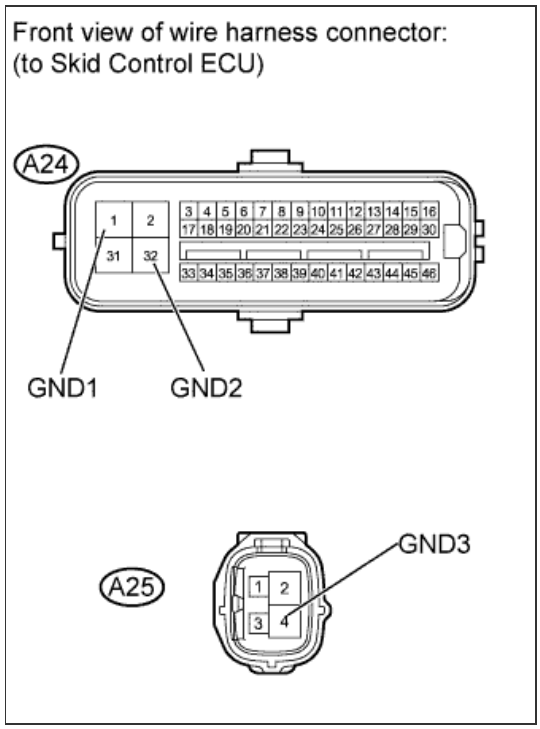
6.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is output	for LHD	A
	for RHD	B
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)		C
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)		D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → USE SIMULATION METHOD TO CHECK (Click here)

D → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

REPLACE MASTER CYLINDER SOLENOID (Click here)

DTC C0210/33 Rear Speed Sensor RH Circuit

DTC C0215/34 Rear Speed Sensor LH Circuit

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

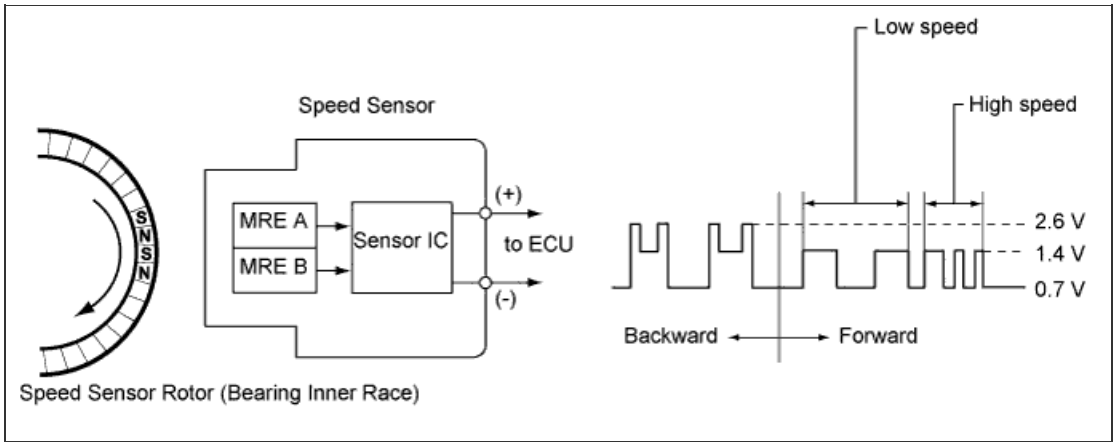
DTC C1239/39 Foreign Object is Attached on Tip of Rear Speed Sensor LH

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD, BA, VSC, A-TRC, CRAWL and hill-start assist control systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.

To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

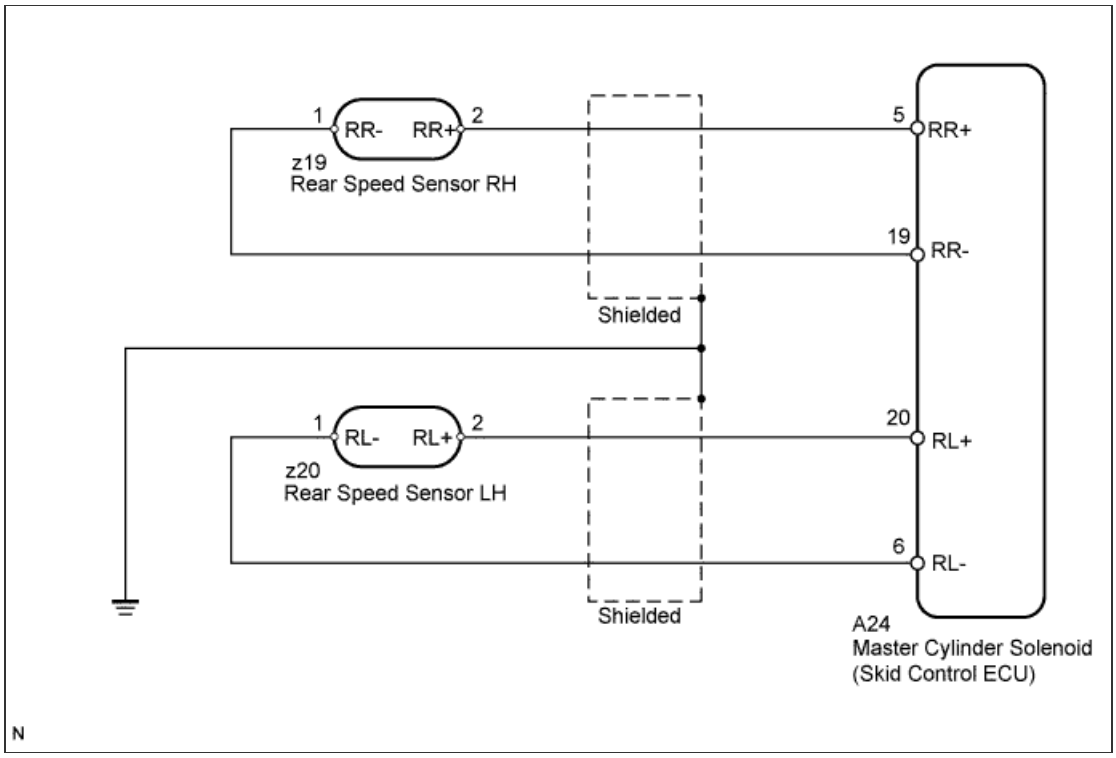


DTC Code	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Rear speed sensor RH • Rear speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1238/38 C1239/39	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Rear speed sensor RH • Rear speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0210/33 and C1238/38 are for the rear speed sensor RH.**
- **DTC C0215/34 and C1239/39 are for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (RR/RL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

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

OK

2.READ VALUE USING INTELLIGENT TESTER (RR/RL WHEEL SPEED, RR/RL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note

RR Wheel Speed	Rear wheel speed sensor R reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Direction	Rear wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT REAR SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation nut is tightened properly.

There is no clearance between the sensor and rear axle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL REAR SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the rear speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE REAR SPEED SENSOR (Click here)

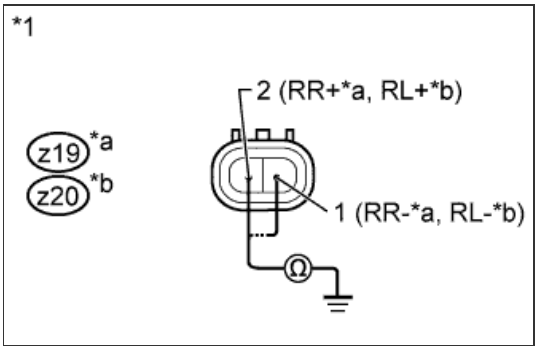
OK

6.INSPECT REAR SPEED SENSOR

a. Install the rear speed sensor.

b. Disconnect the z19 and/or z20 rear speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch off	10 kΩ or higher
z19-1 (RR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch off	10 kΩ or higher
z20-1 (RL-) - Body ground	Ignition switch off	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Rear Speed Sensor)
*a	for RH
*b	for LH

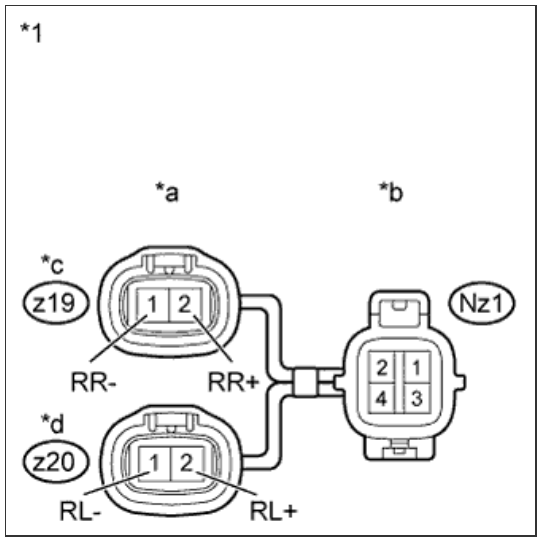
NG → REPLACE REAR SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z19/z20 and Nz1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z1 -2 (RR) - Nz1-4	Always	Below 1 Ω
z1 -2 (RR) - Nz1-3	Always	10 kΩ or higher
z1 -2 (RR) - Body ground	Always	10 kΩ or higher
z1 -1 (RR-) - Nz1-3	Always	Below 1 Ω
z1 -1 (RR-) - Nz1-4	Always	10 kΩ or higher
z1 -1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z20-2 (RL) - Nz1-2	Always	Below 1 Ω
z20-2 (RL) - Nz1-1	Always	10 kΩ or higher
z20-2 (RL) - Body ground	Always	10 kΩ or higher
z20-1 (RL-) - Nz1-1	Always	Below 1 Ω
z20-1 (RL-) - Nz1-2	Always	10 kΩ or higher
z20-1 (RL-) - Body ground	Always	10 kΩ or higher

Text in Illustration

1	Component without harness connected (Skid Control Sensor Wire)
a	Sensor Side Connector
b	Vehicle Side Connector
c	for R
d	for L

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and Nz1 skid control sensor wire connector.

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

Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-5 (RR) - Nz1-4	Always	Below 1 Ω
A24-5 (RR) - Body ground	Always	10 kΩ or higher
A24-1 (RR-) - Nz1-3	Always	Below 1 Ω
A24-1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-20 (RL) - Nz1-2	Always	Below 1 Ω
A24-20 (RL) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - Nz1-1	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

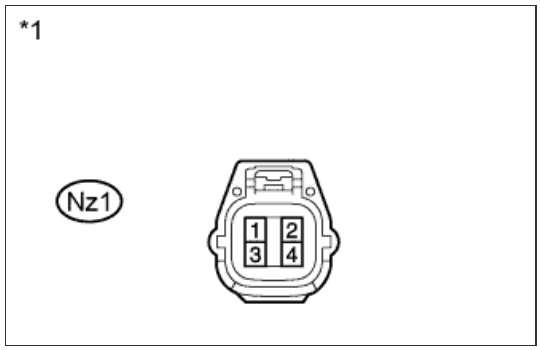
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Nz1-4 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Nz1-2 - Body ground	Ignition switch ON	7.5 to 12 V

Text in Illustration

1	ront view of wire harness connector (to Skid Control Sensor Wire)

Result

Result		Proceed to
O		A
N	for L D	B
	for R D	C

B	REPLACE MASTER CYLINDER SOLENOID (Click here)
C	REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B	USE SIMULATION METHOD TO CHECK (Click here)
C	PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE REAR SPEED SENSOR

a. Replace the rear speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the rear axle hub and bearing assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CLEAN OR REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

DTC C1242/42 IG2 Power Source Circuit

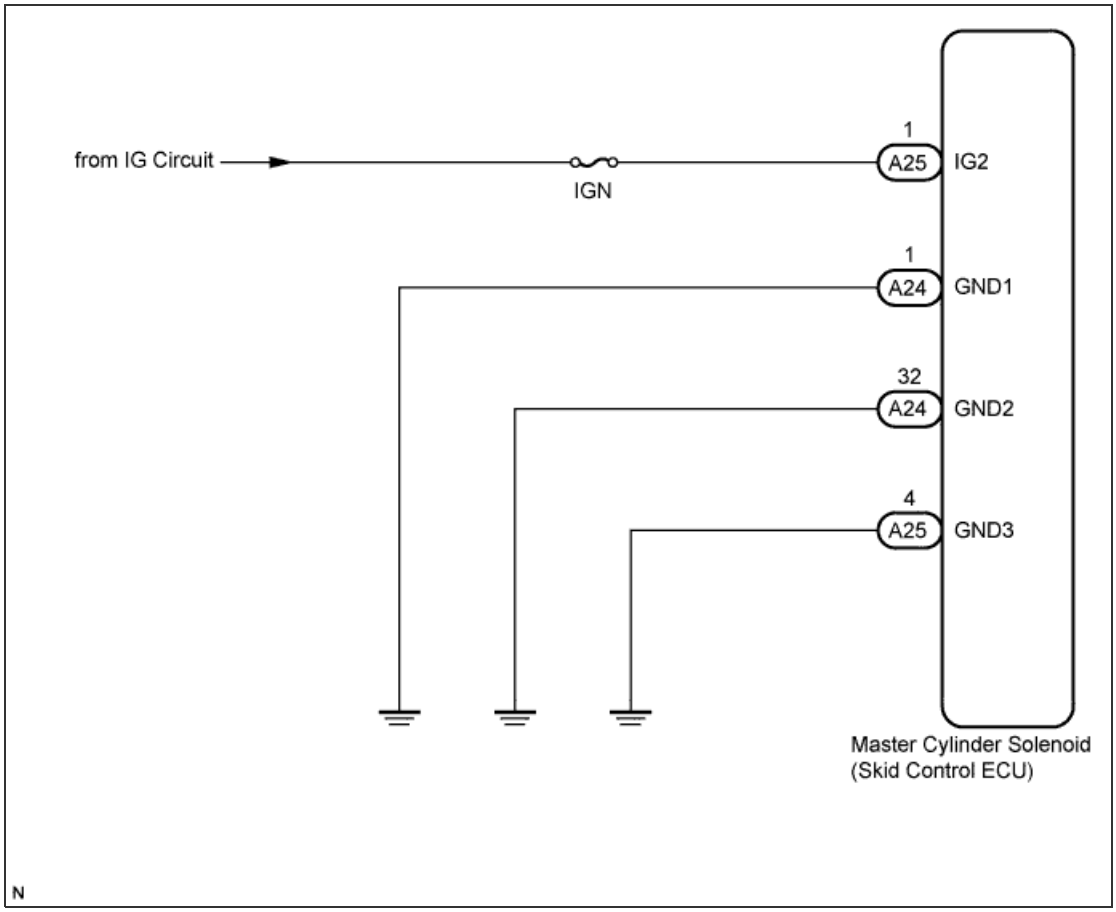
for Preparation Click here

DESCRIPTION

If there is a problem with the master cylinder solenoid (skid control ECU) power supply circuit, the skid control ECU stores DTCs and prohibits operation under the fail-safe function.
If the voltage supplied to the IG2 terminal is within the DTC detection range due to malfunctions in components such as the battery and alternator circuit, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1242/42	The vehicle speed is 3 km/h (1.9 mph) or more and the voltage of the ECU IG2 terminal remains below 6.5 V for more than 7 seconds.	• Battery • IGN fuse • Charging system • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT BATTERY

a. Check the battery voltage.

Standard voltage:
11 to 14 V

Result		Proceed to
OK		A
	for 2U - E	B

NG	for 1VD- TV	C
	for 3UR- E	D

B → GO TO C ARGING SYSTEM (ON-VE IC E INSPECTION) (Click here)

C → GO TO C ARGING SYSTEM (ON-VE IC E INSPECTION) (Click here)

D → GO TO C ARGING SYSTEM (ON-VE IC E INSPECTION) (Click here)

A

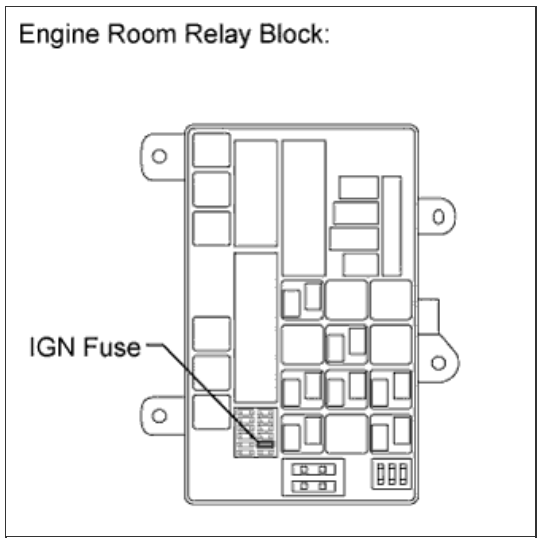
2.INSPECT IGN FUSE

a. Remove the IGN fuse from the engine room relay block.

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

Standard Re i tance:

Tester Connection	Condition	Specified Condition
IGN fuse	Always	Below 1 Ω



NG → REPLACE IGN FUSE

OK

3.INSPECT SKID CONTROL ECU (IG2 TERMINAL)

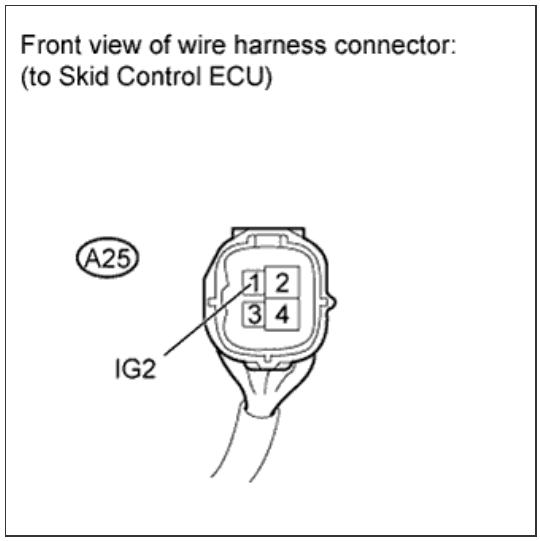
a. Install the IGN fuse.

. Disconnect the A25 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A25-1 (IG2) - Body ground	Ignition switch ON	11 to 14 V



NG → REPAIR OR REPLACE ARNESS OR CONNECTOR

OK

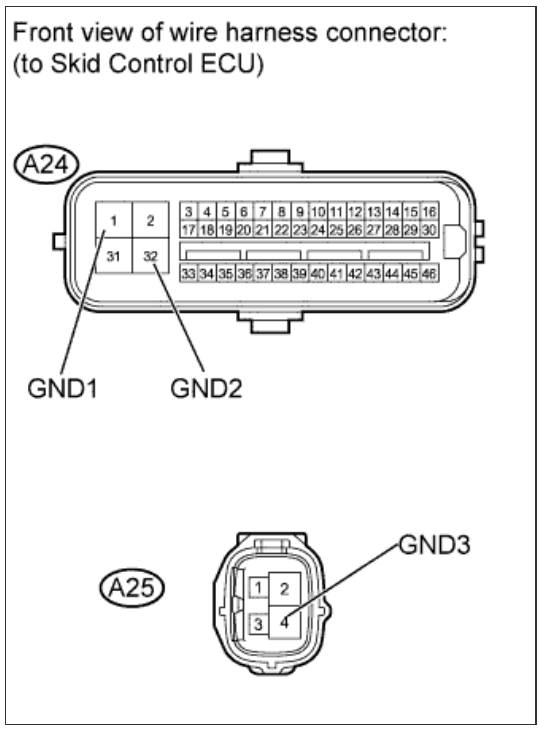
4.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Re i tance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE ARNESS OR CONNECTOR

OK

5.RECONFIRM DTC

a. Clear the DTC (Click here).

. Check if the same DTC is output (Click here).

INT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Re lt

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REP ACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION MET OD TO C ECK (Click here)

DTC C0210/33 Rear Speed Sensor RH Circuit

DTC C0215/34 Rear Speed Sensor LH Circuit

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

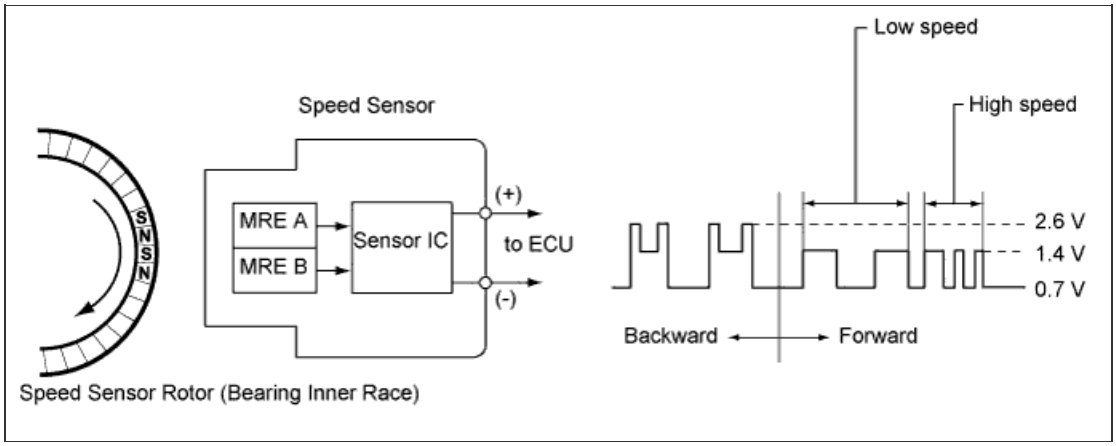
DTC C1239/39 Foreign Object is Attached on Tip of Rear Speed Sensor LH

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD, BA, VSC, A-TRC, CRAWL and hill-start assist control systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.

To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

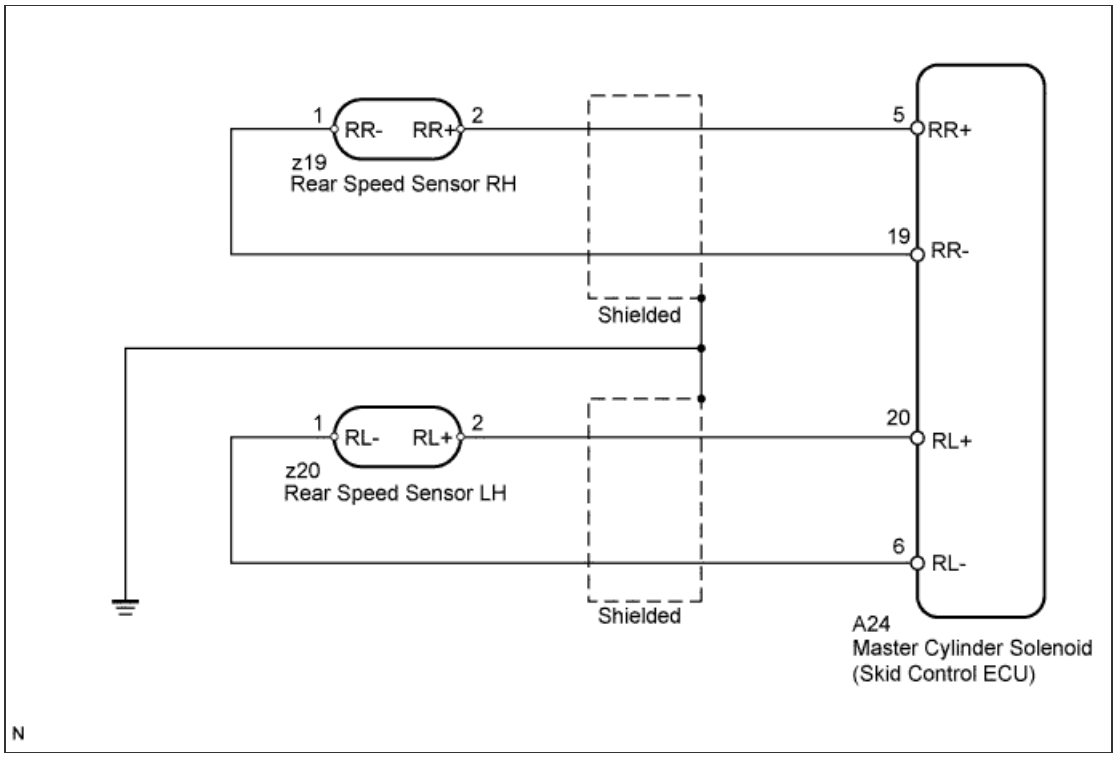


DTC Code	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Rear speed sensor RH • Rear speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1238/38 C1239/39	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Rear speed sensor RH • Rear speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0210/33 and C1238/38 are for the rear speed sensor RH.**
- **DTC C0215/34 and C1239/39 are for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (RR/RL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

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

OK

2.READ VALUE USING INTELLIGENT TESTER (RR/RL WHEEL SPEED, RR/RL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note

RR Wheel Speed	Rear wheel speed sensor R reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Direction	Rear wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT REAR SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation nut is tightened properly.

There is no clearance between the sensor and rear axle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL REAR SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the rear speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE REAR SPEED SENSOR (Click here)

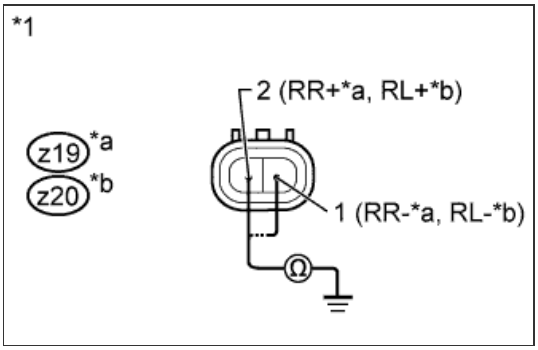
OK

6.INSPECT REAR SPEED SENSOR

a. Install the rear speed sensor.

b. Disconnect the z19 and/or z20 rear speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch off	10 kΩ or higher
z19-1 (RR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch off	10 kΩ or higher
z20-1 (RL-) - Body ground	Ignition switch off	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Rear Speed Sensor)
*a	for RH
*b	for LH

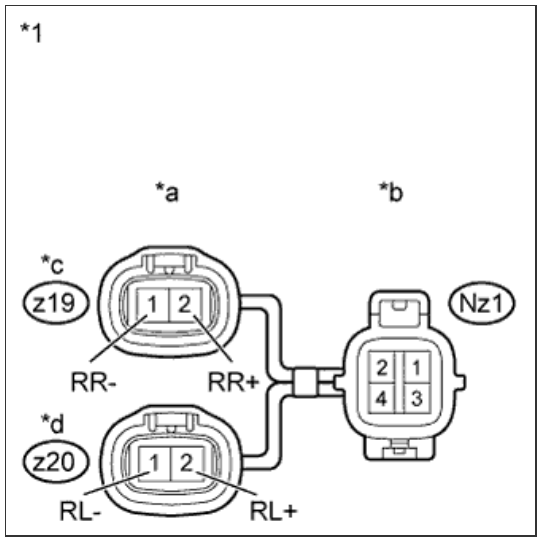
NG → REPLACE REAR SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z19/z20 and Nz1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z1 -2 (RR) - Nz1-4	Always	Below 1 Ω
z1 -2 (RR) - Nz1-3	Always	10 kΩ or higher
z1 -2 (RR) - Body ground	Always	10 kΩ or higher
z1 -1 (RR-) - Nz1-3	Always	Below 1 Ω
z1 -1 (RR-) - Nz1-4	Always	10 kΩ or higher
z1 -1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z20-2 (RL) - Nz1-2	Always	Below 1 Ω
z20-2 (RL) - Nz1-1	Always	10 kΩ or higher
z20-2 (RL) - Body ground	Always	10 kΩ or higher
z20-1 (RL-) - Nz1-1	Always	Below 1 Ω
z20-1 (RL-) - Nz1-2	Always	10 kΩ or higher
z20-1 (RL-) - Body ground	Always	10 kΩ or higher

Text in Illustration

1	Component without harness connected (Skid Control Sensor Wire)
a	Sensor Side Connector
b	Vehicle Side Connector
c	for R
d	for L

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and Nz1 skid control sensor wire connector.

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

Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-5 (RR) - Nz1-4	Always	Below 1 Ω
A24-5 (RR) - Body ground	Always	10 kΩ or higher
A24-1 (RR-) - Nz1-3	Always	Below 1 Ω
A24-1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-20 (RL) - Nz1-2	Always	Below 1 Ω
A24-20 (RL) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - Nz1-1	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

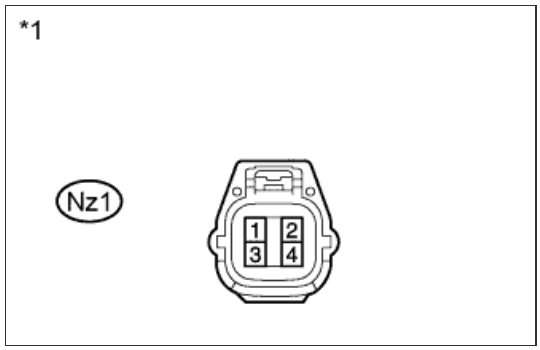
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Nz1-4 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Nz1-2 - Body ground	Ignition switch ON	7.5 to 12 V

Text in Illustration

1	ront view of wire harness connector (to Skid Control Sensor Wire)

Result

Result		Proceed to
O		A
N	for L D	B
	for R D	C

B	REPLACE MASTER CYLINDER SOLENOID (Click here)
C	REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B	USE SIMULATION METHOD TO CHECK (Click here)
C	PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE REAR SPEED SENSOR

a. Replace the rear speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the rear axle hub and bearing assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

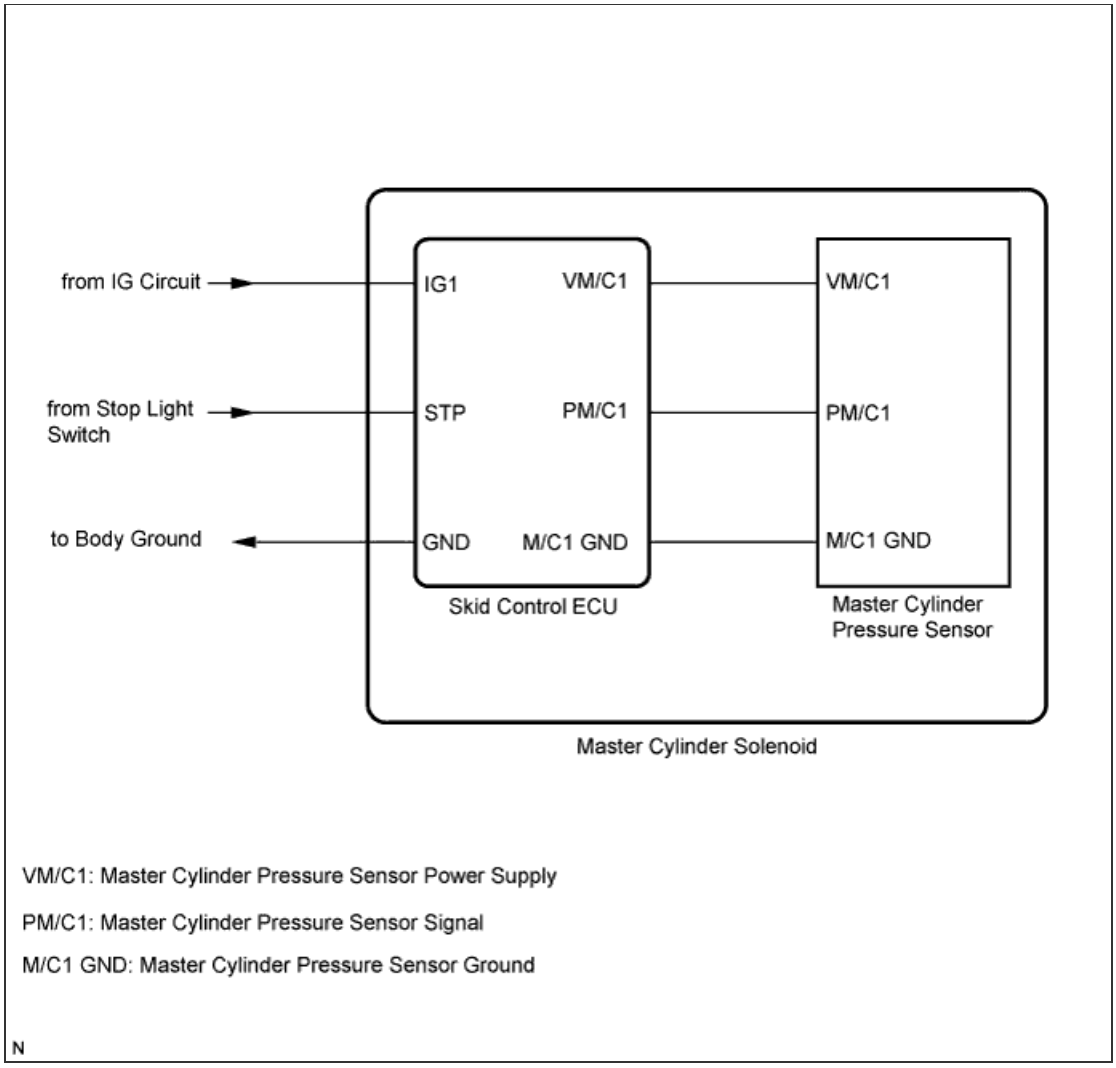
CLEAN OR REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

DTC C1246/46 Master Cylinder Pressure Sensor Malfunction

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1246/46	When any of the following conditions is detected: 1. All of the following conditions continue for at least 30 seconds. • The vehicle speed is more than 7 km/h (4 mph). • The PM/C1 terminal voltage exceeds 0.86 V. • The master cylinder pressure does not change by more than 0.048 MPa (0.5 kgf/cm^2, 7.0 psi). 2. The PM/C1 terminal receives interference at least 7 times within 5 seconds. 3. Both of the following conditions continue for at least 1.2 seconds. • The stop light switch is off. • The PM/C1 terminal voltage is higher than 0.86 V or below 0.3 V. 4. Both of the following conditions continue for at least 1.2 seconds. • The VM/C1 terminal voltage is between 4.4 and 5.6 V.	• ST P fuse • Master cylinder pressure sensor • Stop light switch • Harness or connector • Master cylinder solenoid

	• The PM/C1 terminal voltage is not between 0.1 and 4.57 V.	

INSPECTION PROCEDURE

NOTICE:

- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**
- **When replacing the master cylinder solenoid, perform zero point calibration (Click here).**

1.CHECK DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Depress the brake pedal.

e. Check for DTC (Click here).

Result

Result	Proceed to
DTC C1246/46 is output	A
DTCs C1246/46 and C1380/64 are output	B
DTCs C1246/46 and C124 /4 are output	C

B → **GO TO DTC C1380/64 (Click here)**

C → **GO TO DTC C1249/49 (Click here)**

A

2.READ VALUE USING INTELLIGENT TESTER (MASTER CYLINDER SENSOR)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/T C / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Master Cylinder Sensor	Master cylinder pressure sensor reading / min.: 0.00 V, max.: 5.00 V	When brake pedal is released: 0.3 to 0. V	The reading increases when the brake pedal is depressed.

d. Check that the master cylinder pressure value of the master cylinder pressure sensor displayed on the intelligent tester changes when depressing the brake pedal.

Result

Result		Proceed to
Master cylinder pressure sensor value does not change	for LHD	A
	for RHD	B
Master cylinder pressure sensor value changes but it is not normal		C
Master cylinder pressure sensor value changes normally		

B → **REPLACE MASTER CYLINDER SOLENOID (Click here)**

C → **Go to step 3**

A

REPLACE MASTER CYLINDER SOLENOID (Click here)

3.CHECK BRAKE PEDAL AND STOP LIGHT SWITCH INSTALLATION

a. Check the brake pedal height (for LHD: Click here/ for RHD: Click here).

b. Check the stop light switch installation (for LHD: Click here/ for RHD: Click here).

OK:
The brake pedal and stop light switch are normal.

Result		Proceed to
		A
	for LHD	B
	for RHD	C

B → ADJUST BRAKE PEDAL AND/OR STOP LIGHT SWITCH (Click here)

C → ADJUST BRAKE PEDAL AND/OR STOP LIGHT SWITCH (Click here)

A

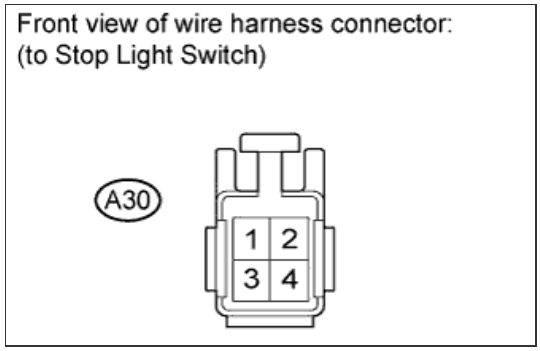
4.CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH POWER SOURCE TERMINAL)

a. Disconnect the A30 stop light switch connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A30-2 - Body ground	Always	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.INSPECT STOP LIGHT SWITCH ASSEMBLY

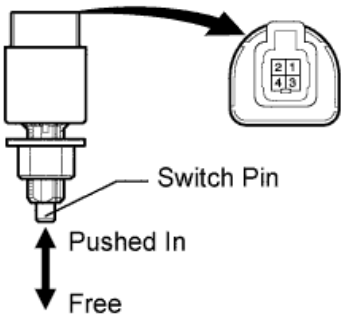
a. Remove the stop light switch assembly.

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

Standard Resistance:

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

Component without harness connected:
(Stop Light Switch)



NG → REPLACE STOP LIGHT SWITCH ASSEMBLY

OK

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0210/33 Rear Speed Sensor RH Circuit

DTC C0215/34 Rear Speed Sensor LH Circuit

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

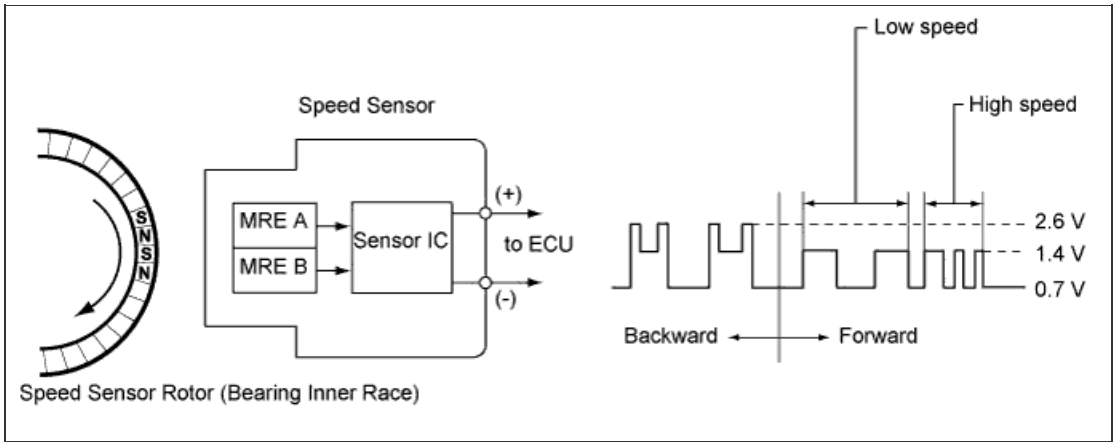
DTC C1239/39 Foreign Object is Attached on Tip of Rear Speed Sensor LH

for Preparation Click here

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the Multi-terrain ABS, EBD, BA, VSC, A-TRC, CRAWL and hill-start assist control systems. This speed sensor contains a sensor IC, which consists of 2 MREs (Magnetic Resistance Element). The speed sensor rotor, which consists of 48 sets of N and S poles that are arranged in a circle, is integrated with the inner race of the hub bearing.

To detect the rotation direction, the output waves are used to determine the relationship of the pulses that are generated by 2 MREs. Upon receiving this signal, the sensor IC outputs a forward or backward wave to the skid control ECU.

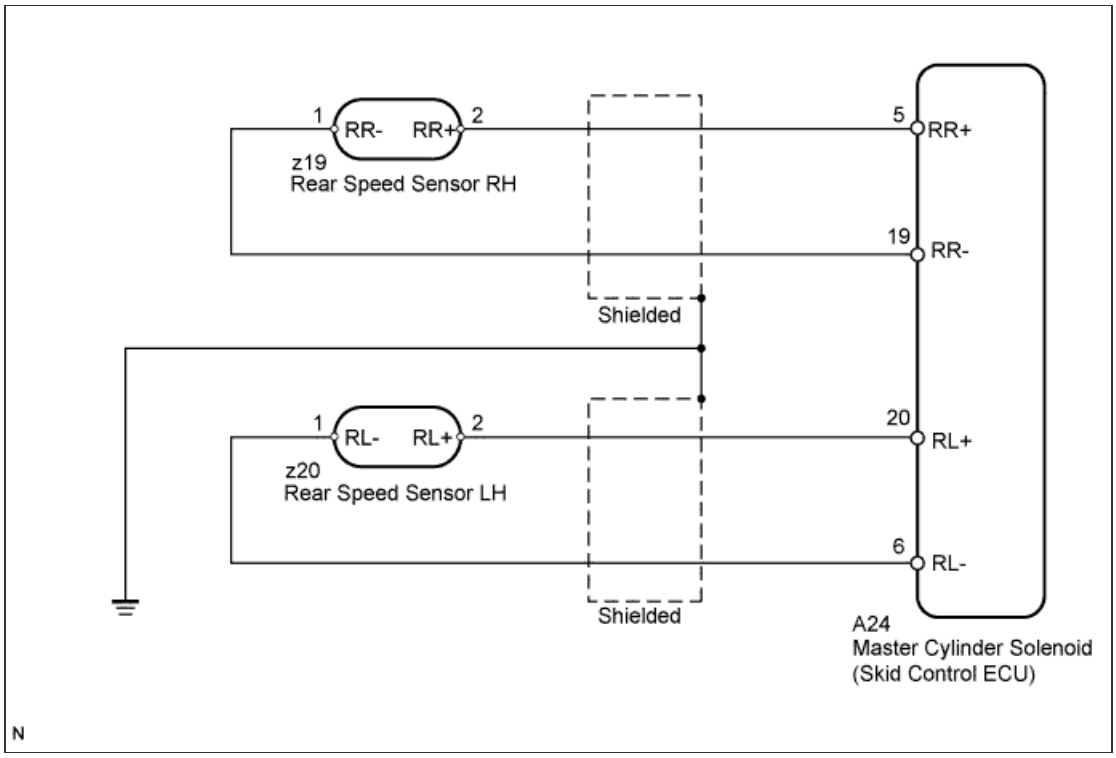


DTC Code	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When any of the following conditions is detected: 1. At a vehicle speed of 10 km/h (6 mph) or more, the pulses are not input for 1 second. 2. A momentary interruption of the speed sensor signal occurs at least 255 times when switching the ignition switch ON and off. 3. Continuous noise occurs in the speed sensor signals at a vehicle speed of 20 km/h (12 mph) or more. 4. The speed sensor signal circuit is open for 0.12 seconds or more.	• Rear speed sensor RH • Rear speed sensor LH • Harness or connector • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)
C1238/38 C1239/39	Noise in the speed sensor signals occurs 75 times or more for 5 seconds when the vehicle speed is 20 km/h (12 mph) or more.	• Rear speed sensor RH • Rear speed sensor LH • Speed sensor rotor • Sensor installation • Master cylinder solenoid (Skid control ECU)

HINT:

- **DTC C0210/33 and C1238/38 are for the rear speed sensor RH.**
- **DTC C0215/34 and C1239/39 are for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (RR/RL SPEED OPEN)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

d. Check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

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

OK

2.READ VALUE USING INTELLIGENT TESTER (RR/RL WHEEL SPEED, RR/RL WHEEL DIRECTION)

a. 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.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note

RR Wheel Speed	Rear wheel speed sensor R reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	A similar speed is indicated on the speedometer.

OK:

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

b. Check that the sensor signal conforms to the wheel direction.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Direction	Rear wheel direction RH / Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel direction LH / Forward or Back	Forward: Forward Back: Backward	-

OK:

The wheel direction is displayed correctly.

NG → **Go to step 4**

OK

3.PERFORM SIGNAL CHECK

a. Check if test mode (signal check) DTCs are output.

HINT:

Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Signal Check.

Result

Result	Proceed to
Test mode (signal check) DTC is output	A
Test mode (signal check) DTC is not output	B

B → **Go to step 10**

A

4.INSPECT REAR SPEED SENSOR INSTALLATION

a. Check the speed sensor installation (Click here).

OK:

The installation nut is tightened properly.

There is no clearance between the sensor and rear axle.

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → **INSTALL REAR SPEED SENSOR CORRECTLY (Click here)**

OK

5.INSPECT SPEED SENSOR TIP

a. Remove the rear speed sensor (Click here).

b. Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

NG → CLEAN OR REPLACE REAR SPEED SENSOR (Click here)

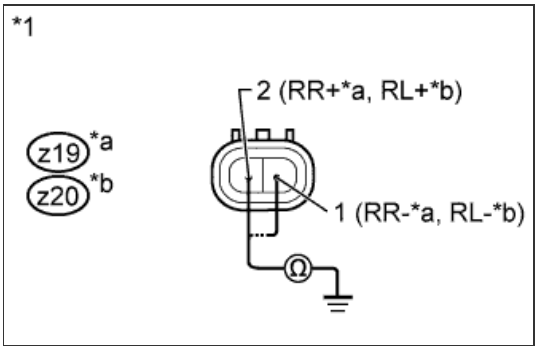
OK

6.INSPECT REAR SPEED SENSOR

a. Install the rear speed sensor.

b. Disconnect the z19 and/or z20 rear speed sensor connector.

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



Standard Resistance:

for RH:

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch off	10 kΩ or higher
z19-1 (RR-) - Body ground	Ignition switch off	10 kΩ or higher

for LH:

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch off	10 kΩ or higher
z20-1 (RL-) - Body ground	Ignition switch off	10 kΩ or higher

Text in Illustration

*1	Component without harness connected (Rear Speed Sensor)
*a	for RH
*b	for LH

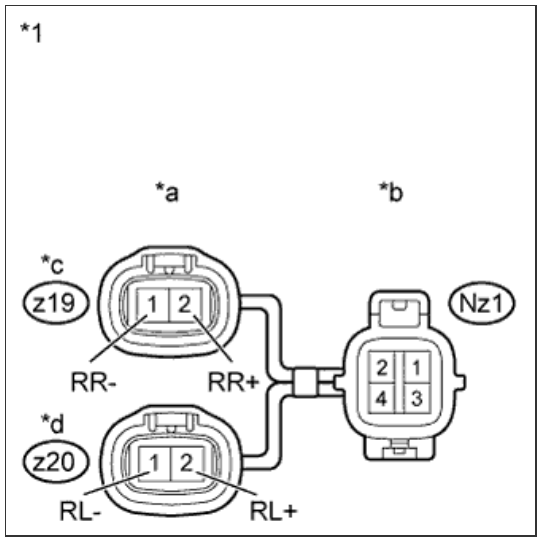
NG → REPLACE REAR SPEED SENSOR (Click here)

OK

7.INSPECT SKID CONTROL SENSOR WIRE

a. Disconnect the z19/z20 and Nz1 skid control sensor wire connectors.

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



Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
z1 -2 (RR) - Nz1-4	Always	Below 1 Ω
z1 -2 (RR) - Nz1-3	Always	10 kΩ or higher
z1 -2 (RR) - Body ground	Always	10 kΩ or higher
z1 -1 (RR-) - Nz1-3	Always	Below 1 Ω
z1 -1 (RR-) - Nz1-4	Always	10 kΩ or higher
z1 -1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
z20-2 (RL) - Nz1-2	Always	Below 1 Ω
z20-2 (RL) - Nz1-1	Always	10 kΩ or higher
z20-2 (RL) - Body ground	Always	10 kΩ or higher
z20-1 (RL-) - Nz1-1	Always	Below 1 Ω
z20-1 (RL-) - Nz1-2	Always	10 kΩ or higher
z20-1 (RL-) - Body ground	Always	10 kΩ or higher

Text in Illustration

1	Component without harness connected (Skid Control Sensor Wire)
a	Sensor Side Connector
b	Vehicle Side Connector
c	for R
d	for L

NOTICE:

Check the speed sensor signal after replacement (Click here).

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Disconnect the A24 skid control ECU connector and Nz1 skid control sensor wire connector.

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

Standard Resistance:

for RH:

Tester Connection	Condition	Specified Condition
A24-5 (RR) - Nz1-4	Always	Below 1 Ω
A24-5 (RR) - Body ground	Always	10 kΩ or higher
A24-1 (RR-) - Nz1-3	Always	Below 1 Ω
A24-1 (RR-) - Body ground	Always	10 kΩ or higher

for LH:

Tester Connection	Condition	Specified Condition
A24-20 (RL) - Nz1-2	Always	Below 1 Ω
A24-20 (RL) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - Nz1-1	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

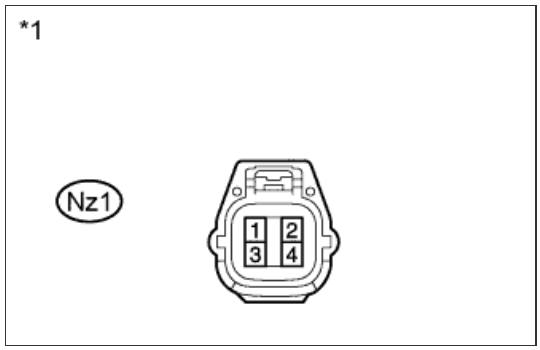
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9.INSPECT MASTER CYLINDER SOLENOID (SKID CONTROL ECU OUTPUT VOLTAGE)

a. Reconnect the A24 skid control ECU connector.

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



Standard Voltage:

for RH:

Tester Connection	Switch Condition	Specified Condition
Nz1-4 - Body ground	Ignition switch ON	7.5 to 12 V

for LH:

Tester Connection	Switch Condition	Specified Condition
Nz1-2 - Body ground	Ignition switch ON	7.5 to 12 V

Text in Illustration

1	ront view of wire harness connector (to Skid Control Sensor Wire)

Result

Result		Proceed to
O		A
N	for L D	B
	for R D	C

B	REPLACE MASTER CYLINDER SOLENOID (Click here)
C	REPLACE MASTER CYLINDER SOLENOID (Click here)

A

10.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result	Proceed to
DTC is output	A
DTC is not output (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	B
DTC is not output (When troubleshooting in accordance with the Problem Symptoms Table)	C

B	USE SIMULATION METHOD TO CHECK (Click here)
C	PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

11.REPLACE REAR SPEED SENSOR

a. Replace the rear speed sensor (Click here).

NOTICE:

Check the speed sensor signal after replacement (Click here).

NEXT

12.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

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

B → END

A

13.INSPECT SPEED SENSOR ROTOR

a. Remove the rear axle hub and bearing assembly (Click here).

b. Check the sensor rotor.

OK:

No scratches, oil, or foreign matter on the rotors.

NOTICE:

Check the speed sensor signal after cleaning/replacement (Click here).

Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CLEAN OR REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (SPEED SENSOR ROTOR) (Click here)

DTC C1249/49 Open in Stop Light Switch Circuit

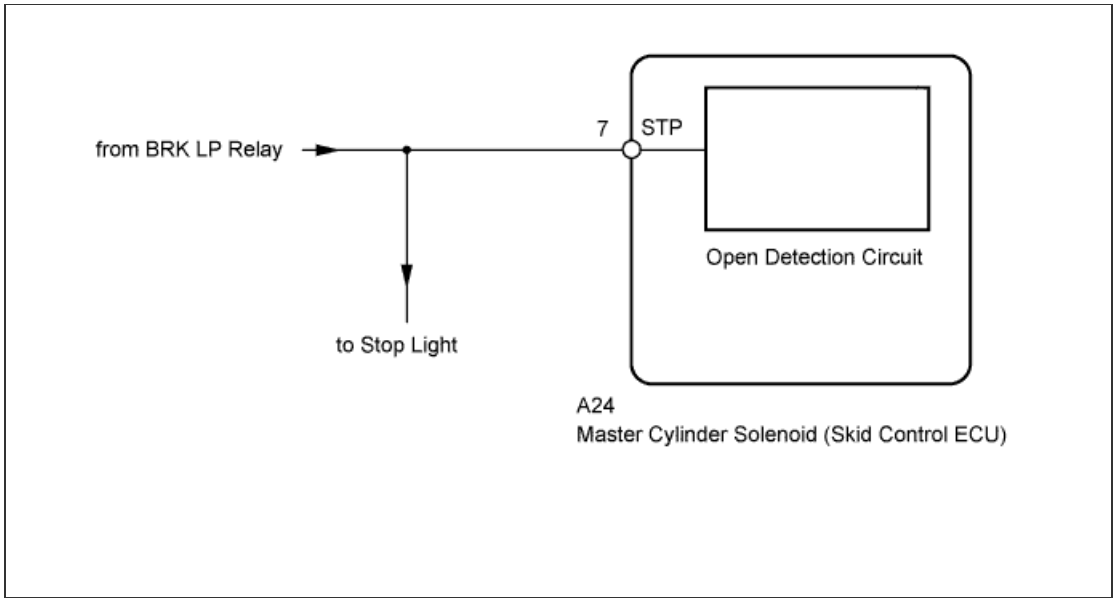
for Preparation Click here

DESCRIPTION

The stop light switch signal is input to the skid control ECU and the skid control ECU detects the status of brake operation.
The skid control ECU has an open detection circuit.
If an open in the stop light switch input line or GND side stop light circuit is detected when the stop light switch is off, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1249/49	The ECU terminal IG1 voltage is 9.5 to 17.0 V, ABS is not operating, and an open in the stop light switch circuit continues for 3 seconds or more.	• STP terminal circuit • Stop light LH and RH circuit • Master c linder solenoid Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

hen replacing the master c linder solenoid, perform ero point calibration Click here .

1.CHECK STOP LIGHT OPERATION

a. Check that the stop light come on when the brake pedal is depressed, and go off when the brake pedal is released.

OK:

Condition	Illumination Condition
Brake pedal depressed	On
Brake pedal released	Off

NG → GO TO LIGHTING SYSTEM (STOP LIGHT CIRCUIT) (Click here)

OK

2.INSPECT SKID CONTROL ECU (STP TERMINAL)

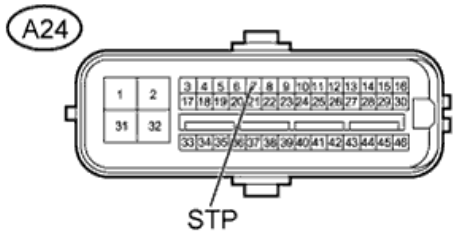
a. Disconnect the A24 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24 7 STP Bod ground	Brake pedal depressed	to 14 V
	Brake pedal released	Below 1.5 V

Front view of wire harness connector:
(to Skid Control ECU)



Result

Result	Proceed to
O hen troubleshooting in accordance with the Diagnostic Trouble Code Chart	A
O hen troubleshooting in accordance with the Problem S mptoms Table	B
NG	C

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

3.RECONFIRM DTC

a. Clear the DTC Click here .

b. Check if the same DTC is output Click here .

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

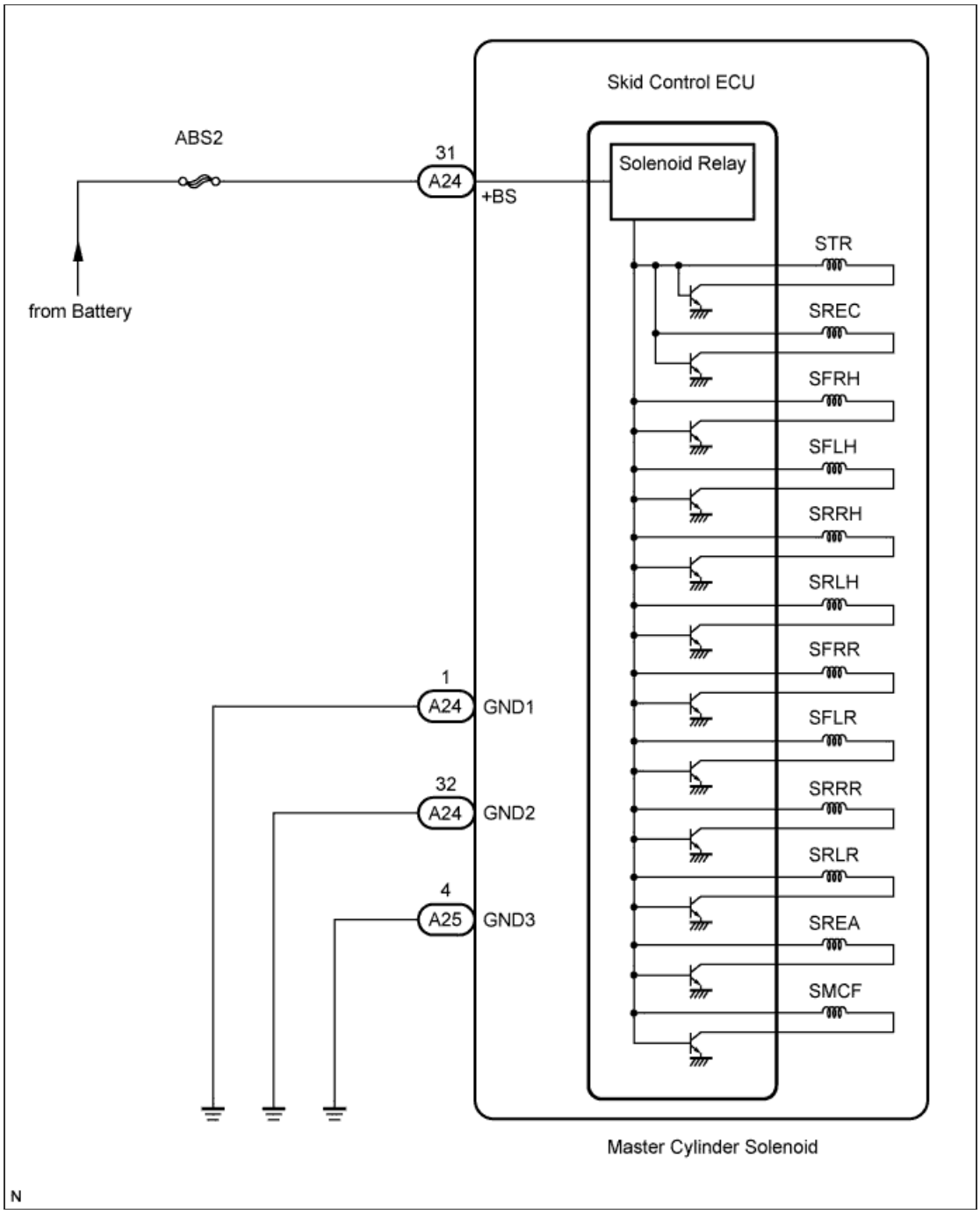
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C1251/51 Open in Pump Motor Circuit

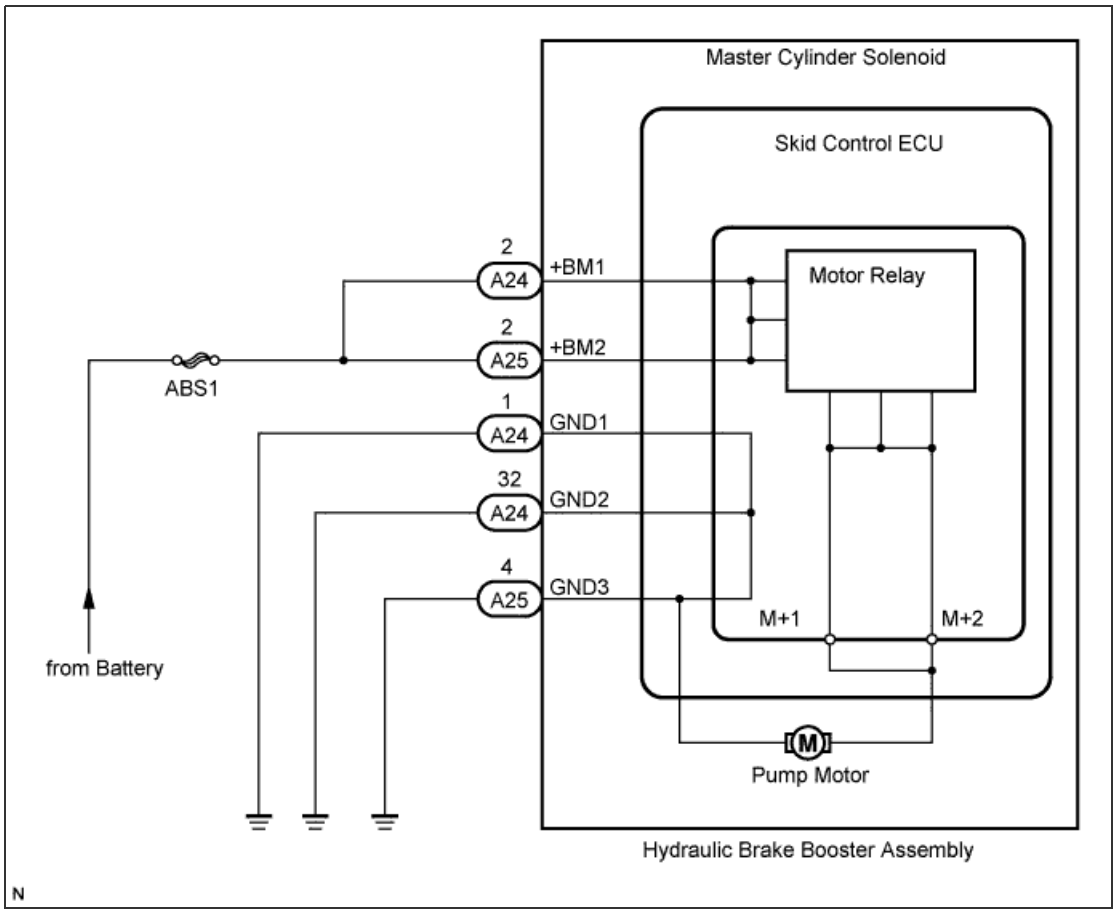
for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C1251/51	There is an open in the motor system circuit (motor input circuit).	• Pump motor wire harness connection • Brake booster with accumulator pump assembly • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

HINT:

Remove the hydraulic brake booster assembly before the inspection (for LHD: Click here/ for RHD: Click here).

1.CHECK CONNECTION OF PUMP MOTOR WIRE HARNESS

a. Using a screwdriver, remove the 2 plugs from the hydraulic brake booster assembly (for LHD: Click here/ for RHD: Click here).

b. Check the tightening torque of the 2 screws which tighten the wire harness connecting the hydraulic brake booster assembly and brake booster pump (for LHD: Click here/ for RHD: Click here).

OK:

The harness is tightened to the specific torque.

Torque:

2.9 N*m{ 30 kgf*cm , 26 in.*lbf }

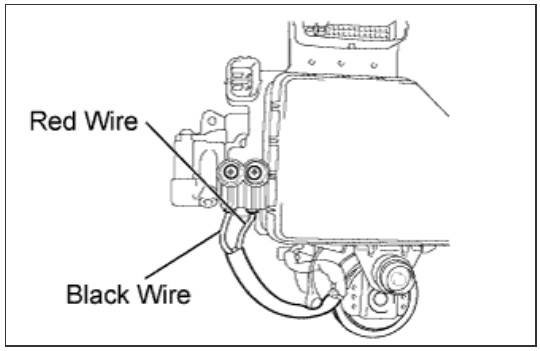
NG → RETIGHTEN SCREWS

OK

2.CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS

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

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



Standard Resistance:

Tester Connection	Condition	Specified Condition
Red wire terminal - Black wire terminal	Always	2 Ω

Result		Proceed to
OK		A
NG	for LHD	B
	for RHD	C

B → REPLACE BRAKE BOOSTER PUMP ASSEMBLY (Click here)

C → REPLACE BRAKE BOOSTER PUMP ASSEMBLY (Click here)

A

3.RECONFIRM DTC

a. Reassemble the hydraulic brake booster assembly (for LHD: Click here/ for RHD: Click here).

b. Install the hydraulic brake booster assembly (for LHD: Click here/ for RHD: Click here).

c. Clear the DTC (Click here).

d. Check if the same DTC is output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

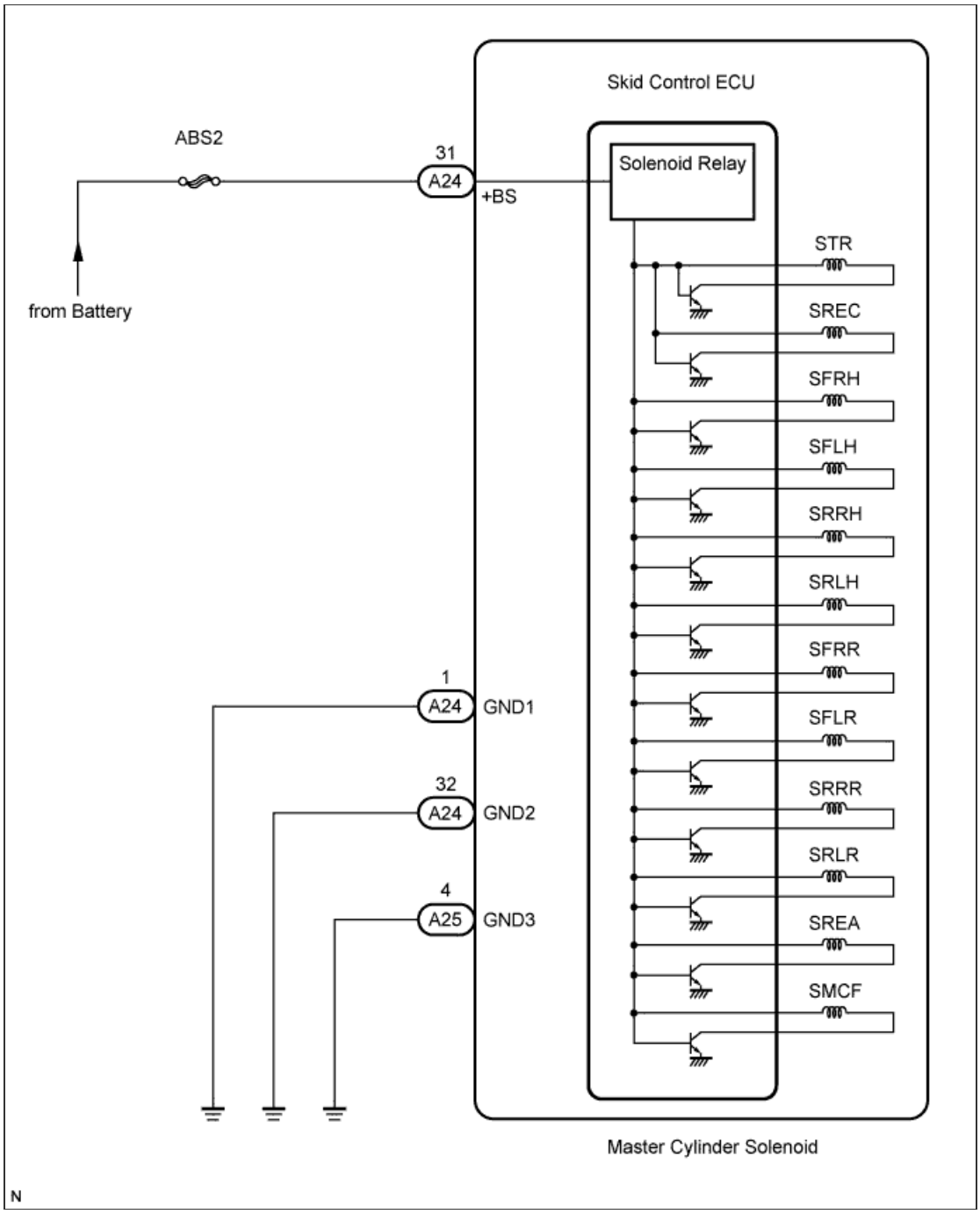
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

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

for Preparation Click here

DESCRIPTION

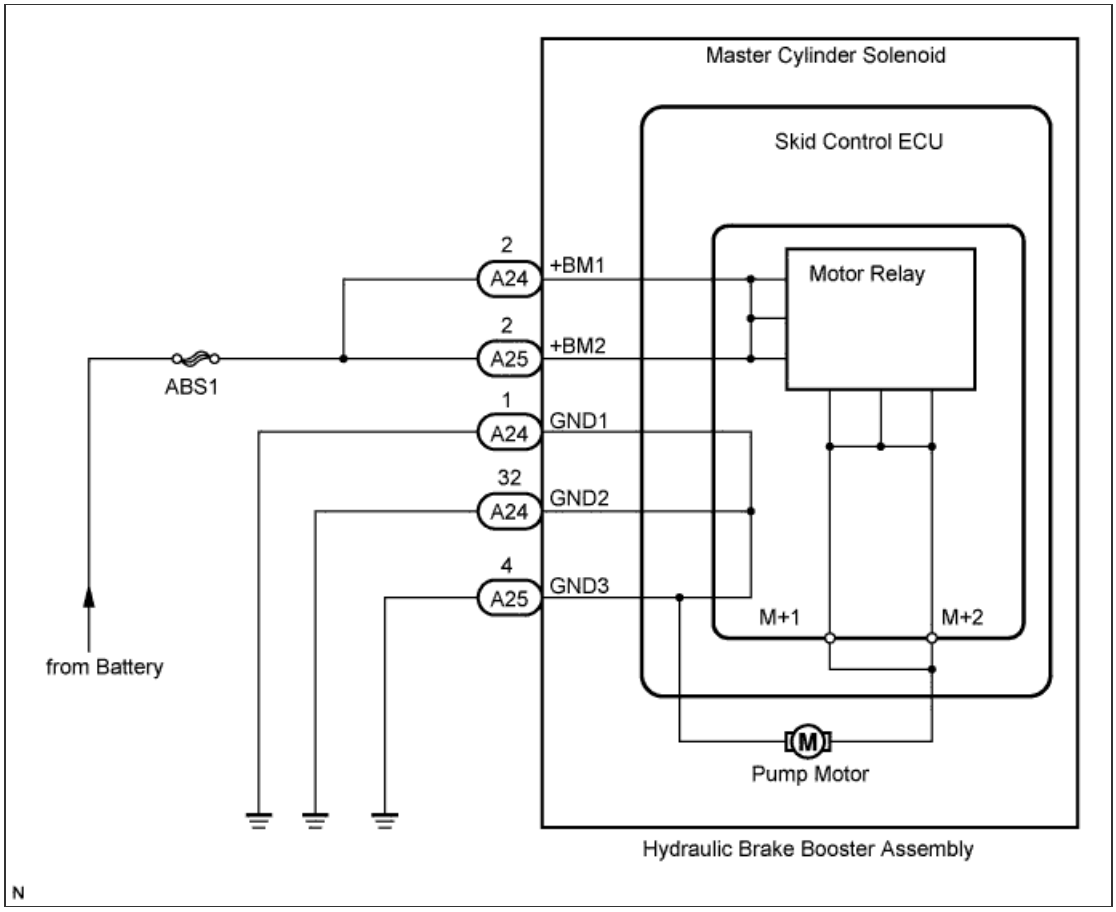
The motor relay (semiconductor relay) is built into the master cylinder solenoid and drives the pump motor based on a signal from the skid control ECU.

DTC Code	DTC Detection Condition	Trouble Area
C1252/52	The motor operates for 3 minutes or more.	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Accumulator pressure sensor

HINT:

The pump motor continues operation for the first 3 minutes, then repeats start and stop.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the hydraulic brake booster assembly (master cylinder solenoid), perform zero point calibration (Click here).

HINT:

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

1.CHECK PUMP MOTOR OPERATION

a. Turn the ignition switch off.

b. Depress the brake pedal more than 20 times.

c. Turn the ignition switch to ON.

d. Check how the pump motor operates.

Result

Result		Proceed to
Pump motor does not operate		A
Pump motor operates continuously, and does not stop	for LHD	B
	for RHD	C
Pump motor operates intermittently		D
Pump motor operates, then stops		E

B → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

C → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

D → Go to step 4

E → Go to step 5

A

2.CHECK CONNECTION OF PUMP MOTOR WIRE HARNESS

a. Remove the hydraulic brake booster assembly (for LHD: Click here/ for RHD: Click here).

b. Using a screwdriver, remove the 2 plugs from the hydraulic brake booster assembly (for LHD: Click here/ for RHD: Click here).

c. Check the tightening torque of the 2 screws which tighten the wire harness connecting the hydraulic brake booster assembly and brake booster pump (for LHD: Click here/ for RHD: Click here).

OK:
The harness is tightened to the specific torque.

Torque:
2.9 N*m{ 30 kgf*cm , 26 in.*lbf }

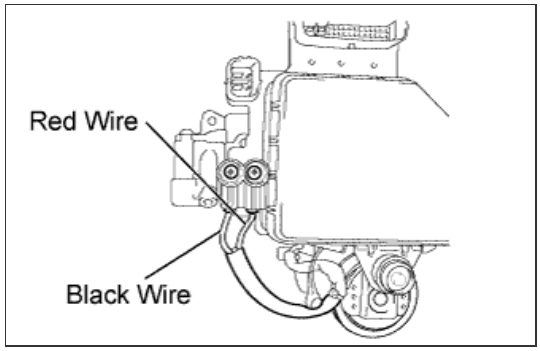
NG → RETIGHTEN SCREWS

OK

3.CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS

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

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



Standard Resistance:

Tester Connection	Condition	Specified Condition
Red wire terminal - Black wire terminal	Always	2 Ω

Result		Proceed to
OK		A
NG	for LHD	B
	for RHD	C

B → REPLACE BRAKE BOOSTER PUMP ASSEMBLY (Click here)

C → REPLACE BRAKE BOOSTER PUMP ASSEMBLY (Click here)

A

4.READ VALUE USING INTELLIGENT TESTER (ACCUMULATOR SENSOR)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Accumulator Sensor	Accumulator pressure sensor reading / min.: 0.00 V, max.: 5.00 V	3.58 to 5 V	If the value is constant regardless of the pump operation, an accumulator pressure sensor malfunction is suspected.

d. Check the accumulator output value.

Result

Result		Proceed to
Output value is within the "Normal Condition" range		A
Output value is out of the "Normal Condition" range	for LHD	B
	for RHD	C
Output value is constant regardless of pump operation	for LHD	D
	for RHD	E

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

D → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

E → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

A

5.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Wait for more than 5 minutes.

e. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is output	for LHD	A
	for RHD	B
DTC is not output	for LHD	C
	for RHD	D

B → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

C

REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY (Click here)

D

REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY (Click here)

A

REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

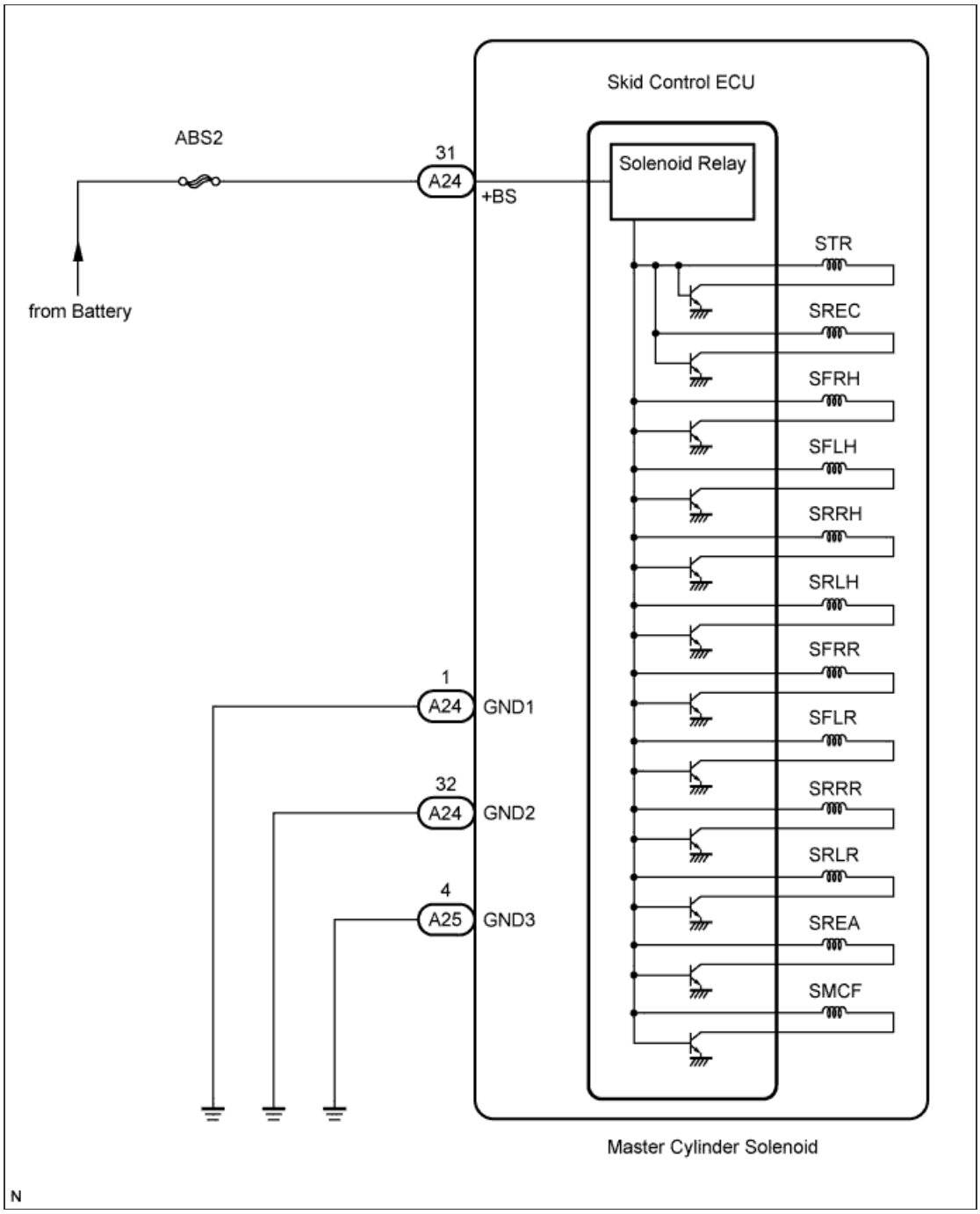
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C1253/53 Pump Motor Relay Malfunction

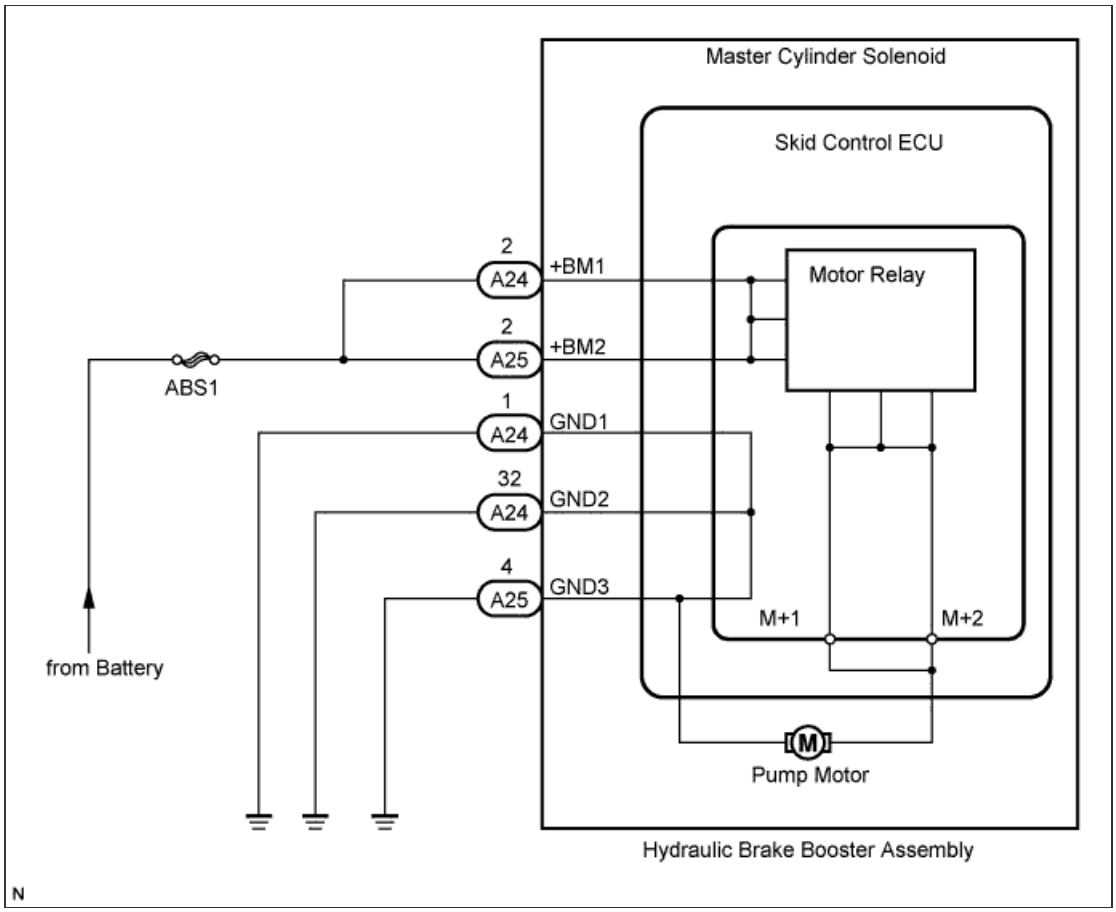
for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C1253/53	There is a motor system circuit (motor input circuit) malfunction.	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the hydraulic brake booster assembly (master cylinder solenoid), perform zero point calibration (Click here).

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

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Start the engine.

d. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Motor Relay	Motor relay	Relay ON/OFF	An operation sound of the motor can be heard.

e. Check the operation sound of the motor individually when operating it with the intelligent tester.

OK:
The operation sound of the motor can be heard.

NG → Go to step 3

OK

2.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON.

e. Wait until the pump motor stops.

f. Depress the brake pedal several times until the pump motor turns on. (Procedure A)

g. Wait until the pump stops. (Procedure B)

h. Repeat the above steps (procedure A and B) 3 more times.

i. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

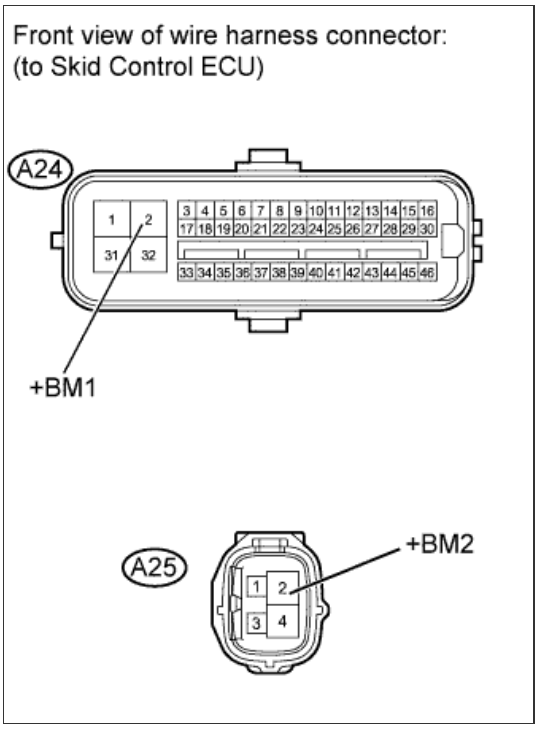
3.INSPECT SKID CONTROL ECU (+BM TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-2 (+BM1) - Body ground	Always	11 to 14 V
A25-2 (+BM2) - Body ground	Always	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

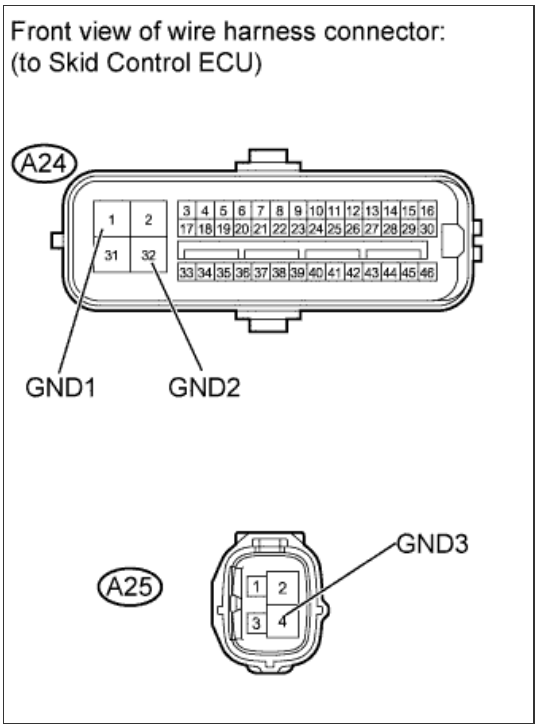
OK

4.INSPECT SKID CONTROL ECU (GND TERMINAL)

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 2 times.

d. Turn the ignition switch to ON.

e. Wait until the pump motor stops.

f. Depress the brake pedal several times until the pump motor turns on. (Procedure A)

g. Wait until the pump stops. (Procedure B)

h. Repeat the above steps (procedure A and B) 3 more times.

i. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

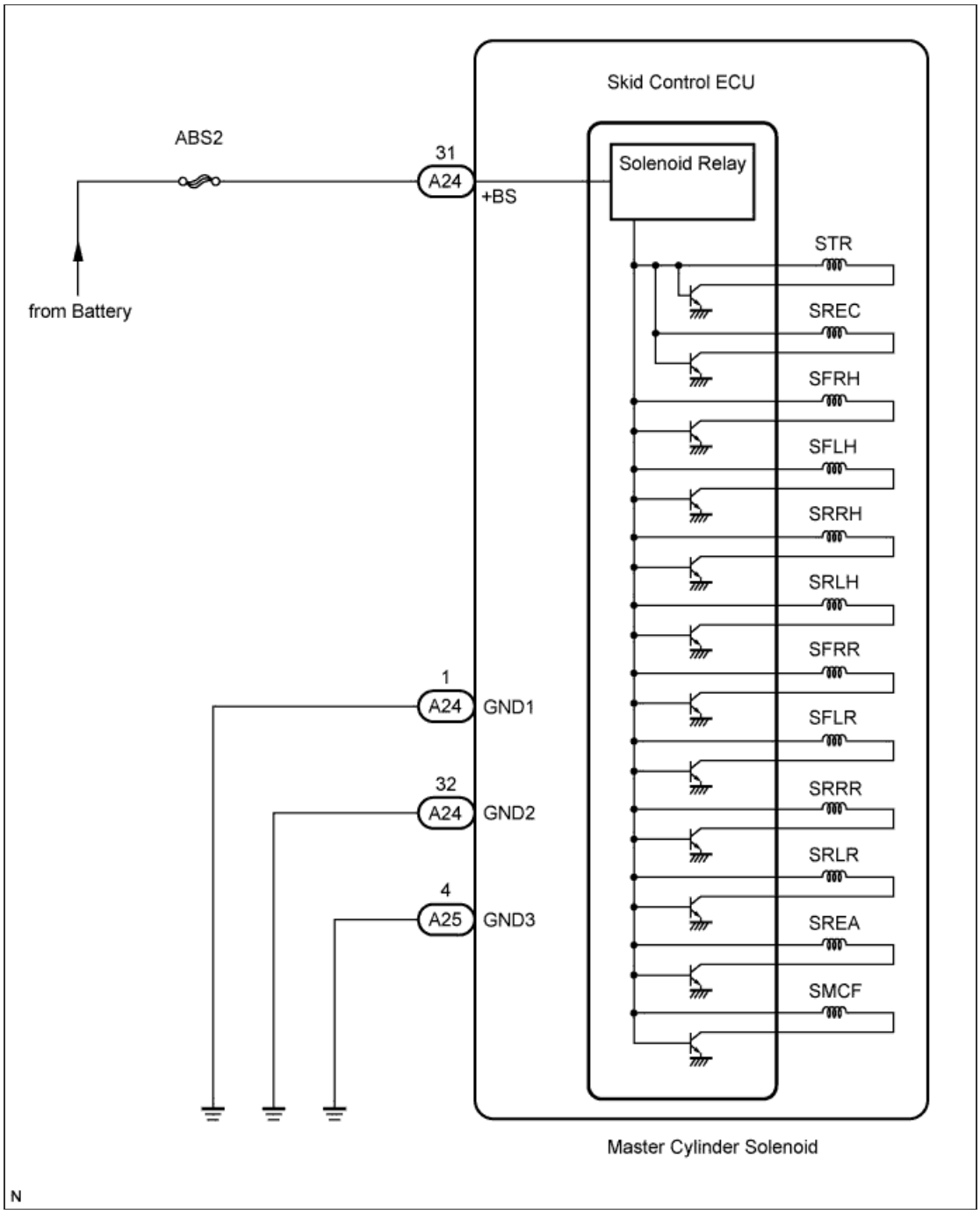
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

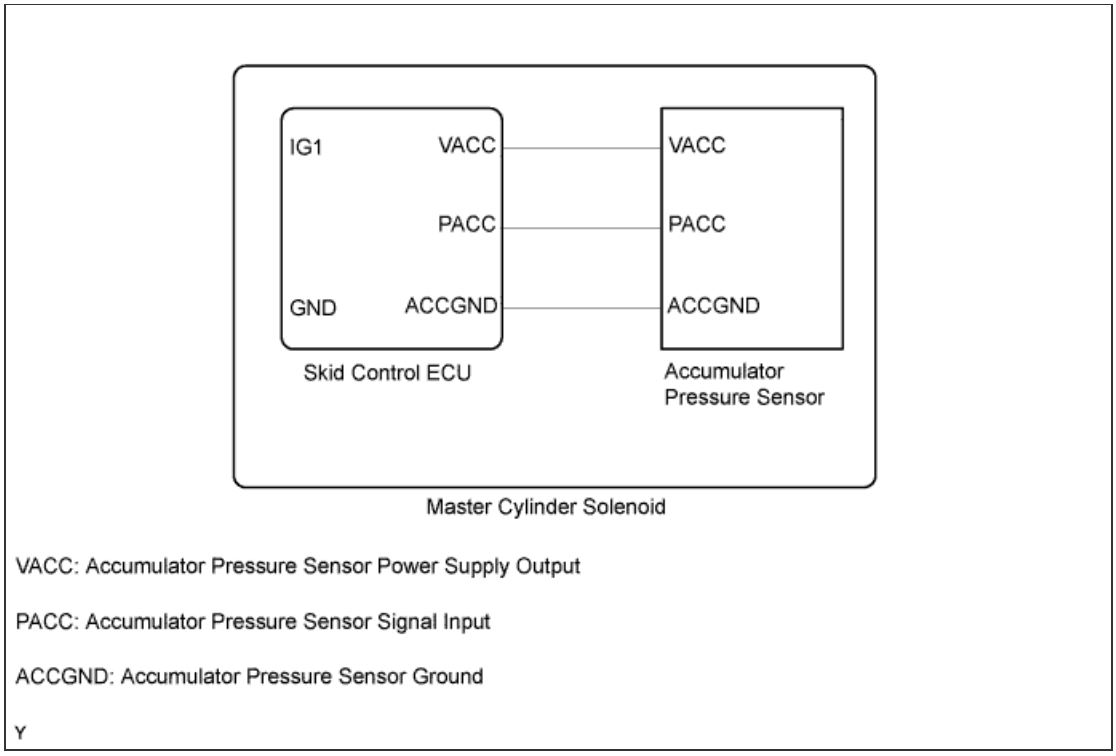
USE SIMULATION METHOD TO CHECK (Click here)

DTC C1254/54 Pressure Switch Circuit

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1254/54	There is an accumulator pressure sensor malfunction (the fluid pressure does not change when the pump operates or when the brake is applied).	• Hydraulic brake booster • Accumulator pressure sensor • Master cylinder pressure sensor

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.READ VALUE USING INTELLIGENT TESTER (ACCUMULATOR SENSOR)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON and turn the intelligent tester on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Accumulator Sensor	Accumulator pressure sensor reading / min.: 0.00 V, max.: 5.00 V	3.58 to 5 V	If the value is constant regardless of the pump operation, an accumulator pressure sensor malfunction is suspected.

f. Check the accumulator output value.

Result

Result	Proceed to
Output value is within the "Normal Condition" range	A

Output value is out of the "Normal Condition" range	for LHD	B
Output value is constant regardless of pump operation		
Output value is out of the "Normal Condition" range	for RHD	C
Output value is constant regardless of pump operation		

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

2.READ VALUE USING INTELLIGENT TESTER (MASTER CYLINDER SENSOR)

a. Turn the ignition switch off.

b. Depress the brake pedal more than 20 times.

c. Install the brake pedal effort gauge (SST), and bleed air.

SST
09709-29018

d. Turn the ignition switch to ON and turn the intelligent tester on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Master Cylinder Sensor	Master cylinder pressure sensor reading / min.: 0.00 V, max.: 5.00 V	0.3 to 1.8 V With pedal effort of 49 N (5 kgf, 11 in.*lbf)	The front brake pressure is 930 to 2130 kPa (9.5 to 21.7 kgf/cm^2, 135 to 309 psi).

f. Check that the master cylinder pressure sensor output value is normal.

OK:
Master cylinder pressure sensor value is normal.

Result		Proceed to
OK		A
NG	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON.

e. Wait until the pump motor stops.

f. Depress the brake pedal and release it.

g. Wait for 25 minutes.

h. Check if the same DTC is output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

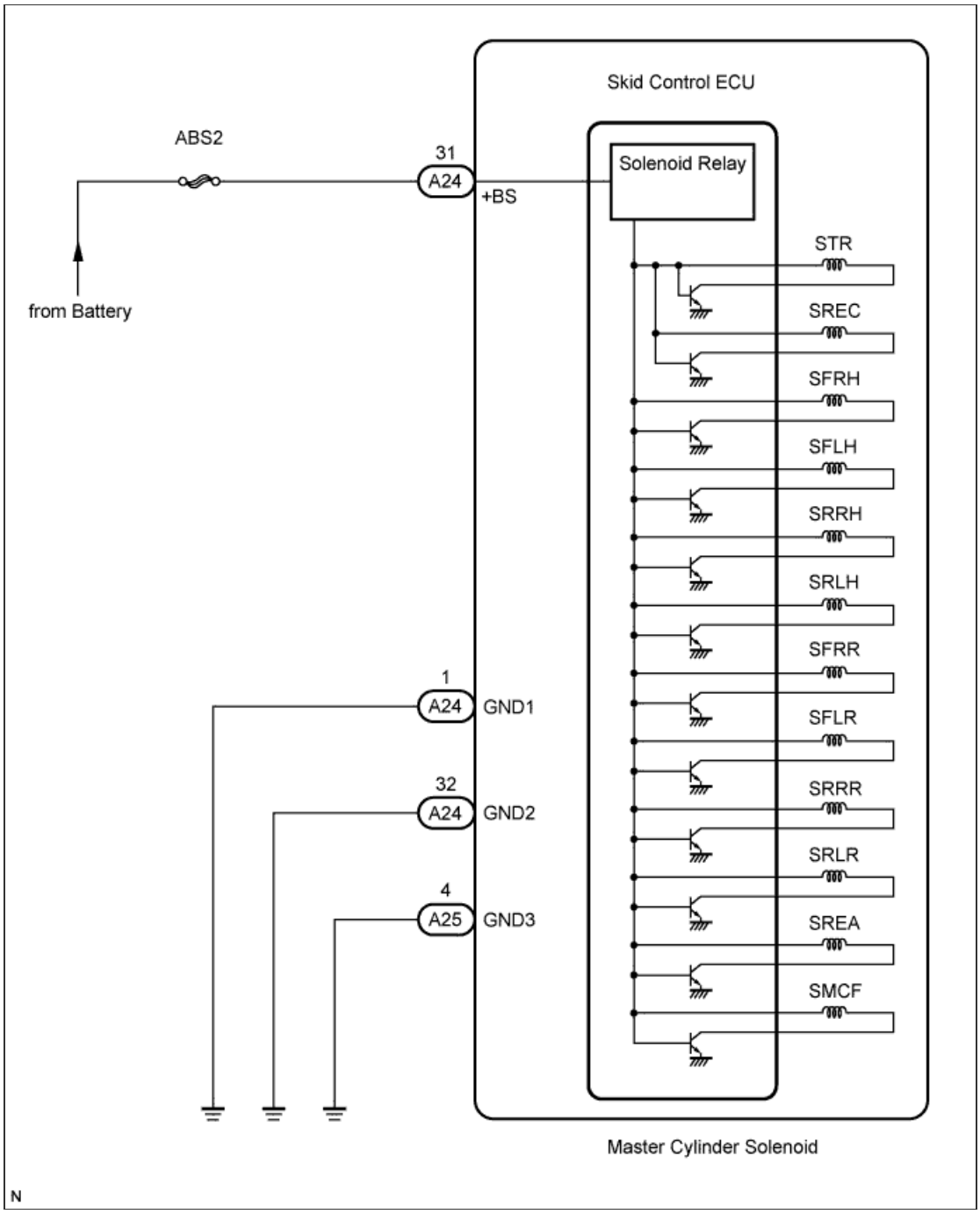
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

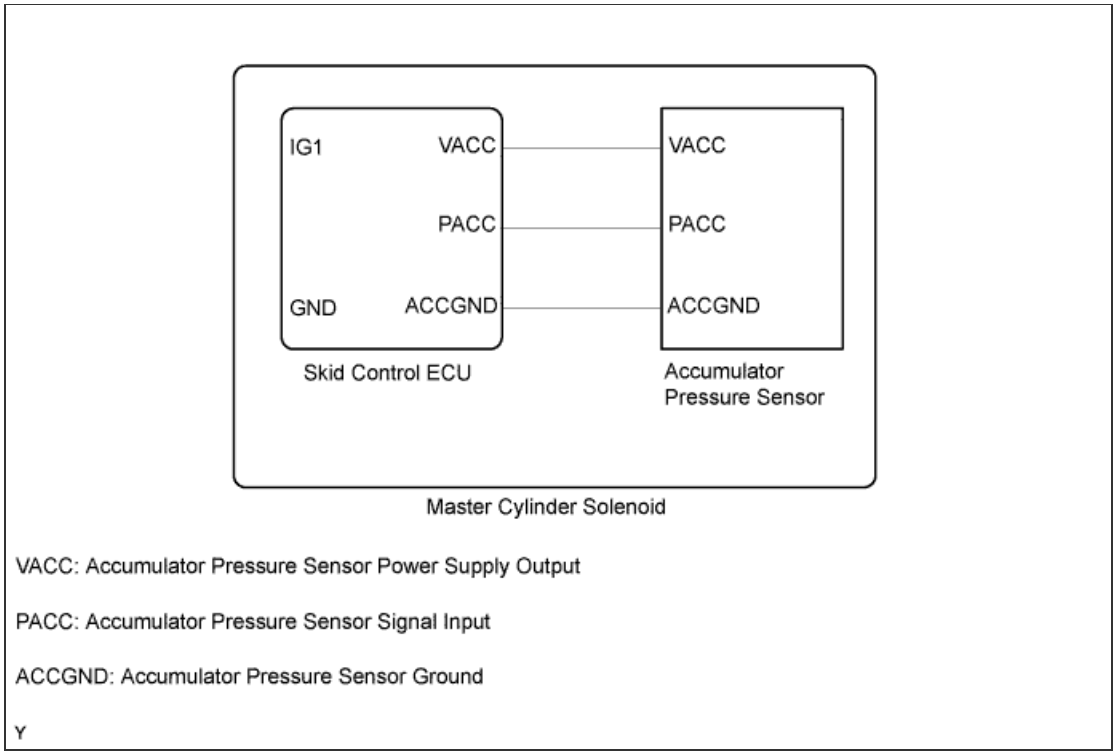
USE SIMULATION METHOD TO CHECK (Click here)

DTC C1256/56 Accumulator Low Pressure

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1256/56	The fluid pressure inside the accumulator is below the standard value.	• Hydraulic brake booster • Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Accumulator pressure sensor

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

HINT:

When C1251/51, C1253/53, or C1254/54 is output together with C1256/56, inspect and repair the trouble area indicated by C1251/51, C1253/53, or C1254/54 first.

1.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON.

e. Wait for 99 seconds.

f. Check if the same DTC is output (Click here).

Result

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

HINT:

E cessive brake pedal operation results in abnormal accumulator pressure consumption. This is normal.

B → USE SIMULATION METHOD TO CHECK (Click here)

A

2.CHECK HYDRAULIC CIRCUIT

a. Check the hydraulic circuit (Click here).

OK:
Hydraulic circuit is normal (No leakage).

NG → REPAIR HYDRAULIC CIRCUIT (Click here)

OK

3.READ VALUE USING INTELLIGENT TESTER (ACCUMULATOR SENSOR)

a. Connect the intelligent tester to the D C3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Accumulator Sensor	Accumulator pressure sensor reading / min.: 0.00 V, max.: 5.00 V	3.58 to 5 V	If the value is constant regardless of the pump operation, an accumulator pressure sensor malfunction is suspected.

d. Check that the accumulator output value is normal.

OK:
Accumulator pressure sensor value is normal.

Result		Proceed to
OK		A
NG	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Check if the same DTC is output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

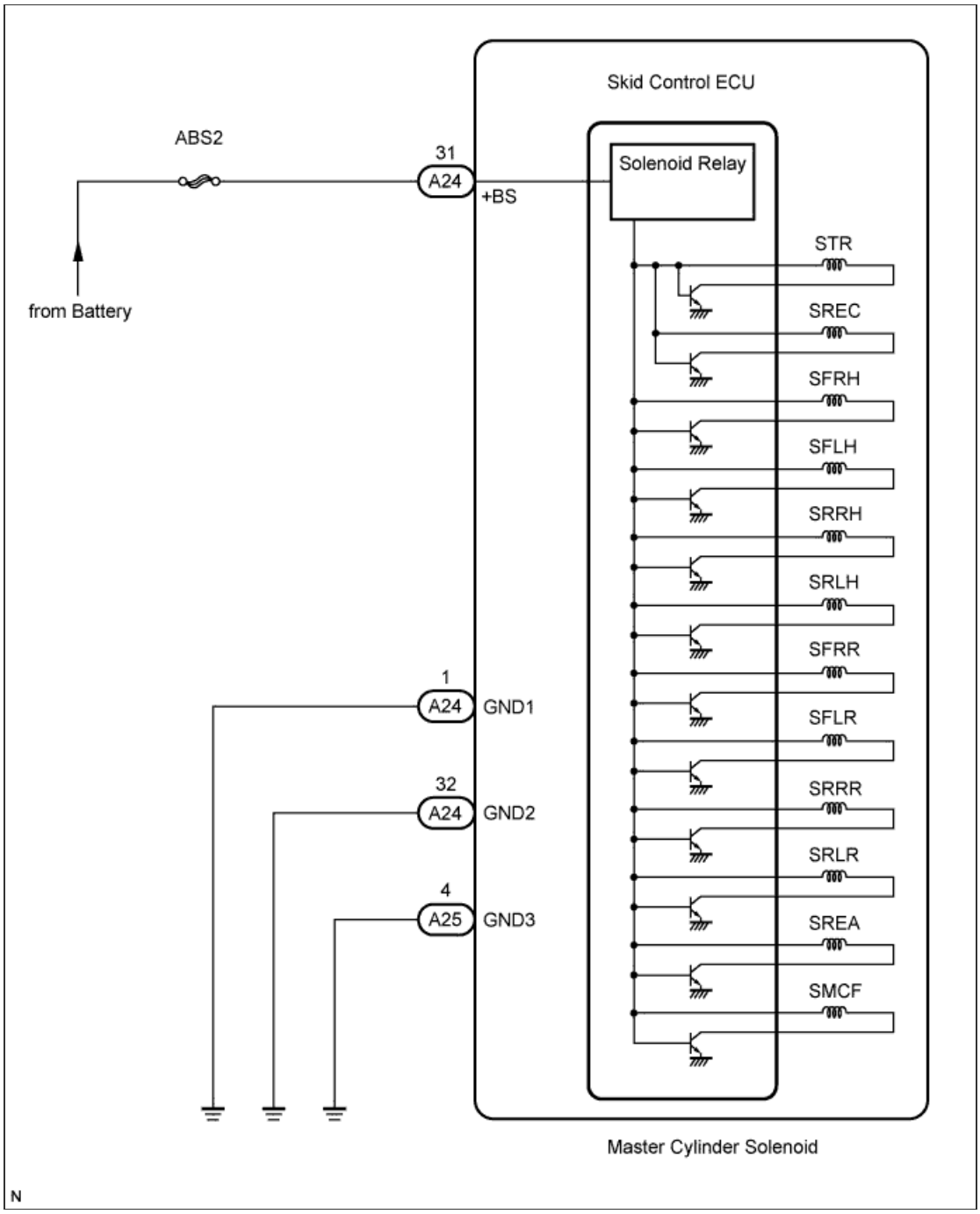
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C1257/57 Power Supply Drive Circuit

for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C1257/57	There is an open in the motor system circuit (motor input circuit).	Hydraulic brake booster pump motor circuit

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK PUMP MOTOR OPERATION

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU connector.

c. Depress the brake pedal more than 20 times.

d. Turn the ignition switch to ON.

e. Check pump motor operation.

OK:

Pump motor normally operates.

Result		Proceed to
OK		A
NG	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

2.RECONFIRM DTC

a. Turn the ignition switch off.

b. Reconnect the A24 skid control ECU connector.

c. Turn the ignition switch to ON.

d. Clear the DTC (Click here).

e. Check if the same DTC is output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

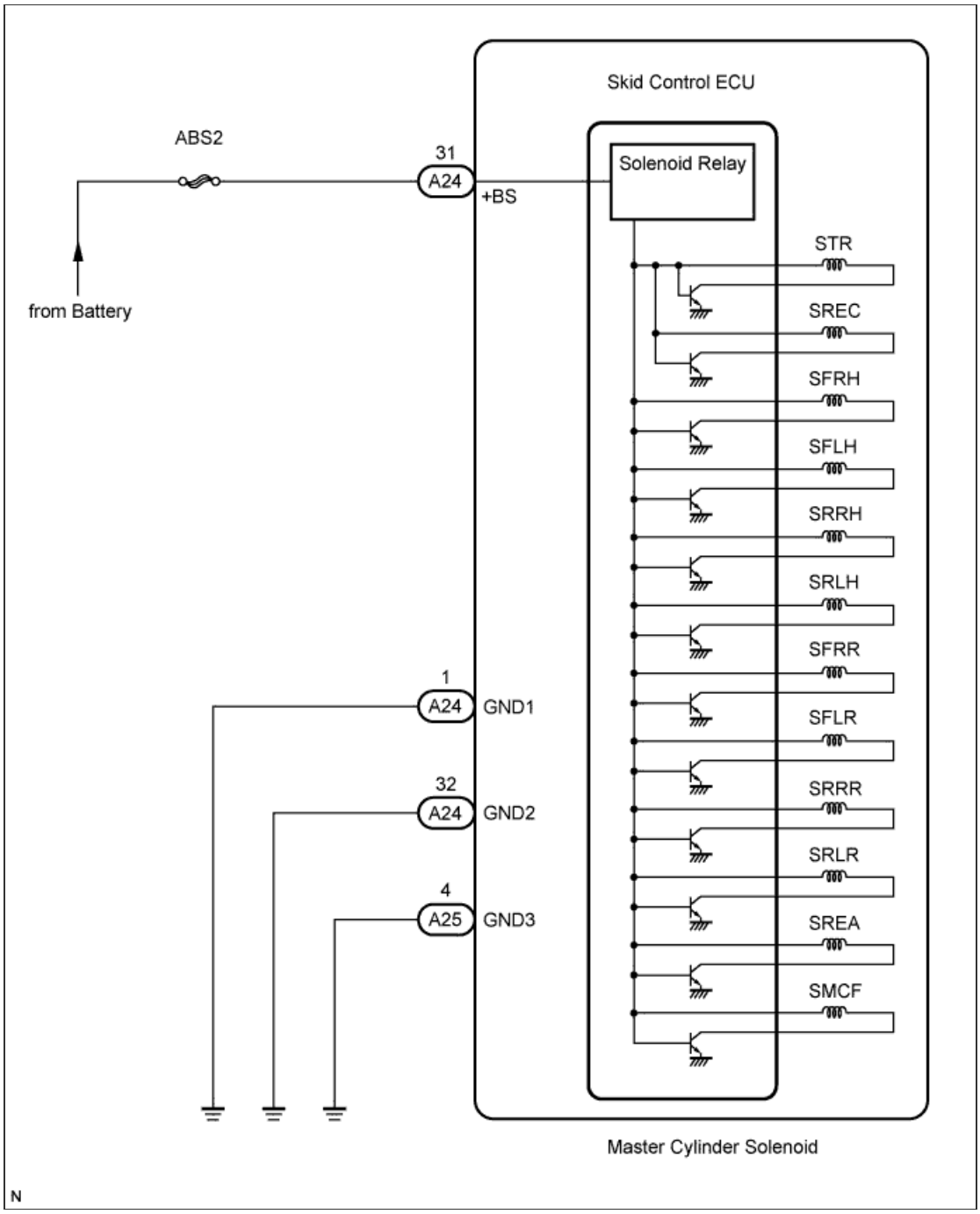
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C1268/68 Transfer "L4" Position Switch Circuit

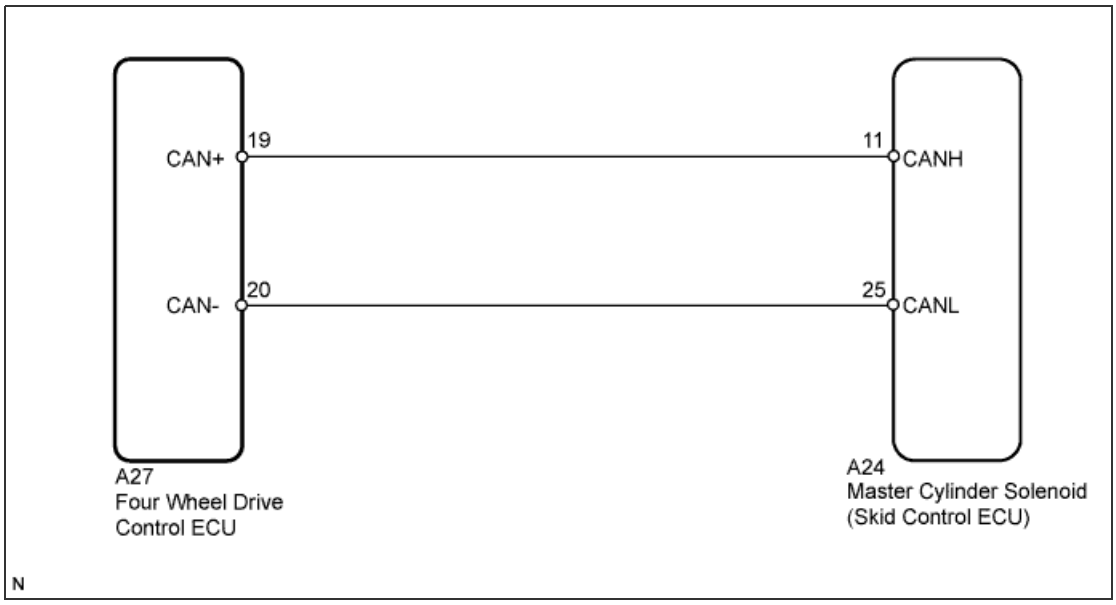
for Preparation Click here

DESCRIPTION

After confirming that the transfer is in the L4 position, CRAWL will be activated according to the vehicle conditions.

DTC Code	DTC Detection Condition	Trouble Area
C1268/68	The skid control ECU receives an L4 abnormal status signal from the four wheel drive control ECU.	• Center differential lock detection switch • Center differential lock detection switch circuit • Four wheel drive control ECU • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:

"Bus Check" indicates no malfunctions in CAN communication.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication.		A
"Bus Check" indicates malfunctions in CAN communication.	for LHD	B
	for RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

2.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (for LHD: Click here/ for RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	for LHD	B
	for RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

GO TO TRANSFER SYSTEM (INSPECTION) (Click here)

DTC C0226/21 SFR Solenoid Circuit

DTC C0236/22 SFL Solenoid Circuit

DTC C0246/23 SRR Solenoid Circuit

DTC C0256/24 SRL Solenoid Circuit

DTC C1225/25 SMC Solenoid Circuit

DTC C1226/26 SPC Solenoid Circuit

DTC C1227/27 SRC Solenoid Circuit

DTC C1228/28 STR Solenoid Circuit

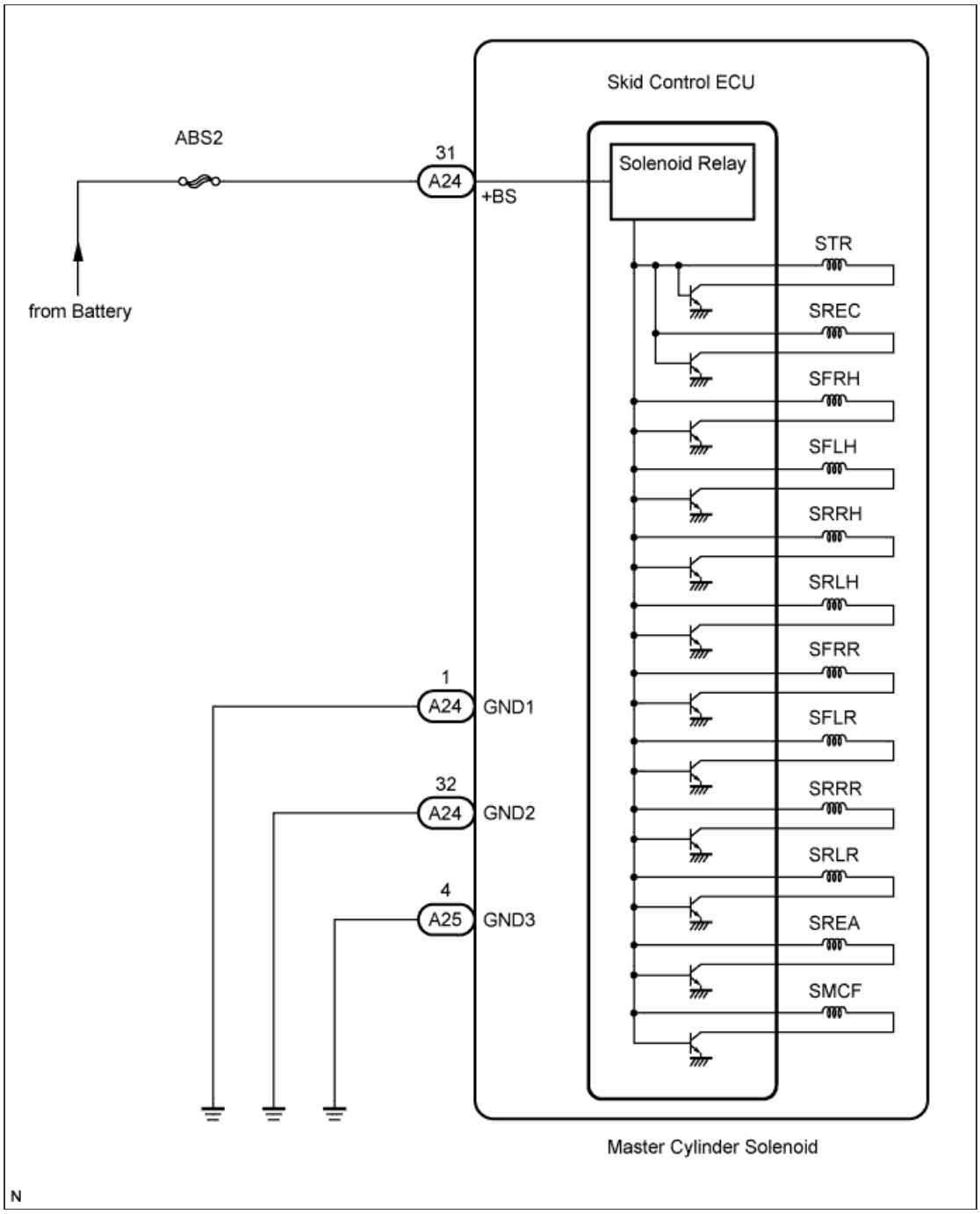
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the ECU and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	An open or short circuit in the SFRH or SFRR circuit continues for 0.05 seconds or more.	• SFRH or SFRR circuit • Master cylinder solenoid
C0236/22	An open or short circuit in the SFLH or SFLR circuit continues for 0.05 seconds or more.	• SFLH or SFLR circuit • Master cylinder solenoid
C0246/23	An open or short circuit in the SRRH or SRRR circuit continues for 0.05 seconds or more.	• SRRH or SRRR circuit • Master cylinder solenoid
C0256/24	An open or short circuit in the SRLH or SRLR circuit continues for 0.05 seconds or more.	• SRLH or SRLR circuit • Master cylinder solenoid
C1225/25	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226/26	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227/27	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228/28	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid circuit is in the master cylinder solenoid.

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

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result	Proceed to

DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

DTC C1290/66 Steering Angle Sensor Zero Point Malfunction

for Preparation Click here

DESCRIPTION

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

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

INSPECTION PROCEDURE

1.PERFORM ZERO POINT CALIBRATION OF YAW RATE AND G SENSOR

a. Perform zero point calibration of the yaw rate and G sensor (Click here).

HINT:

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

NEXT

2.CHECK STEERING ANGLE SENSOR ZERO POINT CALIBRATION

a. Drive the vehicle straight ahead at 35 km/h (22 mph) or more for at least 5 seconds.

b. Check that the centered position of the steering wheel is correctly set, while driving straight ahead.

HINT:

If front wheel alignment and steering position are adjusted as a result of abnormal centered position of the steering wheel, acquire yaw rate and G sensor zero point again after the adjustments are completed.

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

NG → **ADJUST FRONT WHEEL ALIGNMENT OR STEERING POSITION (Click here)**

OK

END

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

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

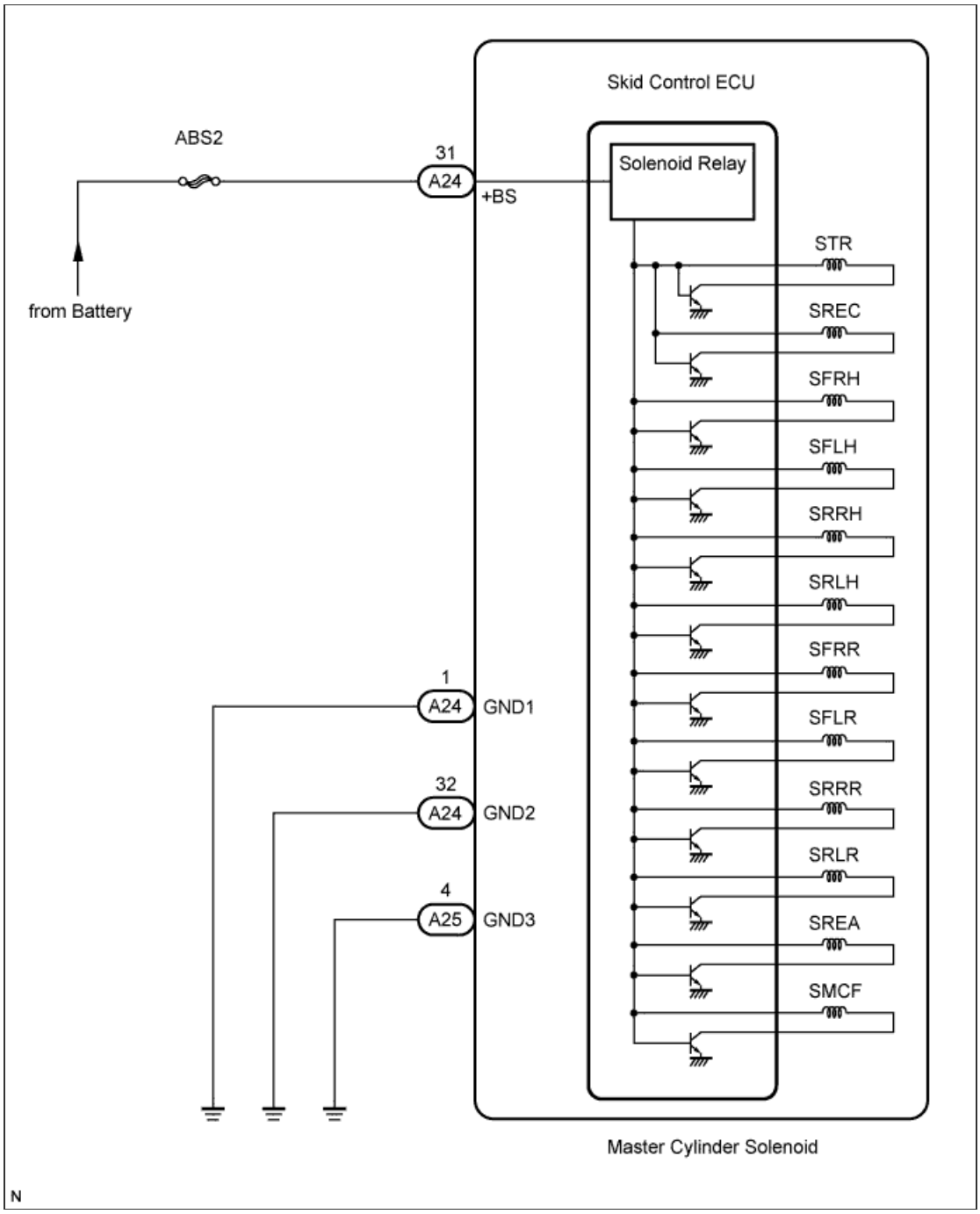
for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C0278/11	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is between 9.5 V and 17 V. 2. The relay contact is open when the relay is on. 2. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is 9.5 V or less when the relay is on. 2. The relay contact remains open.	• ABS2 fuse • Solenoid relay • Harness or connector • Master cylinder solenoid (Skid control ECU)
C0279/12	The following condition continues for at least 0.2 seconds. • The relay contact is closed immediately after turning the ignition switch to ON when the relay is off.	• ABS2 fuse • Solenoid relay • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

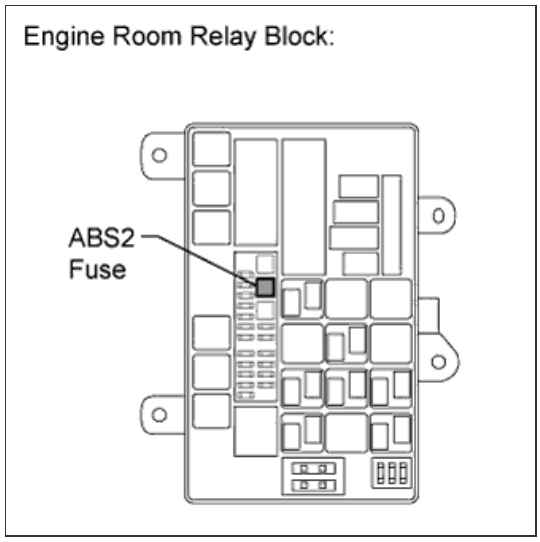
1.INSPECT ABS2 FUSE

a. Remove the ABS2 fuse from the engine room relay block.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
ABS2 fuse	Always	Below 1 Ω



NG → REPLACE ABS2 FUSE

OK

2.INSPECT SKID CONTROL ECU (+BS TERMINAL)

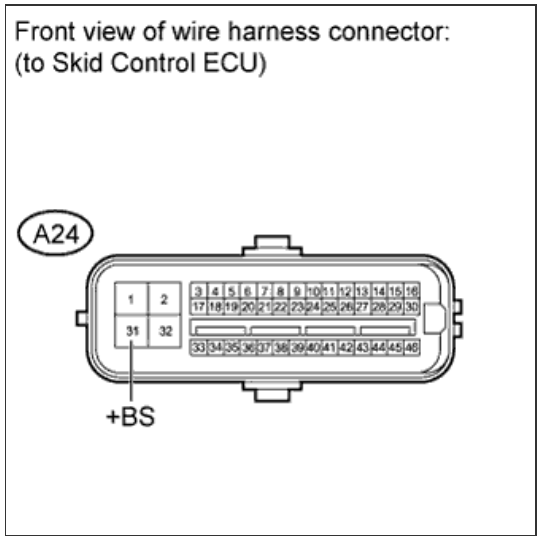
a. Install the ABS2 fuse.

b. Disconnect the A24 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-31 (+BS) - Body ground	Always	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

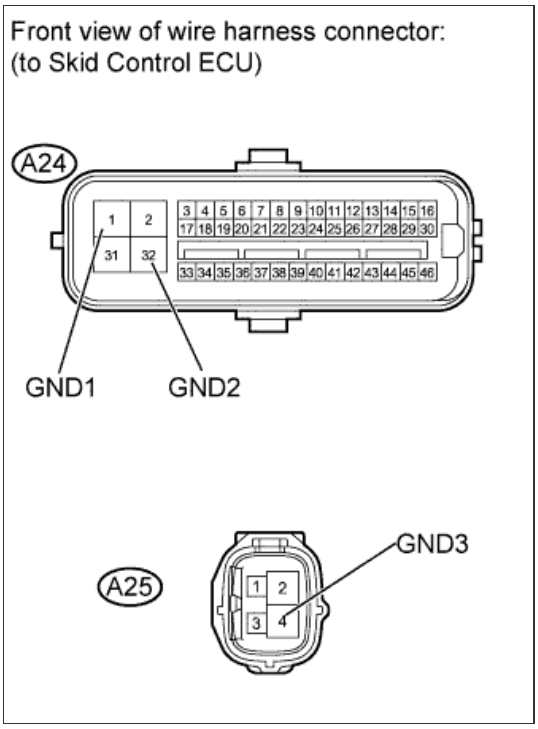
3.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The ABS solenoid relay is in the master cylinder solenoid.

Therefore, solenoid relay circuit inspection and relay unit inspection cannot be performed. Be sure to check if any DTC is output before replacing the master cylinder solenoid.

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (**Click here**)

C → REPLACE MASTER CYLINDER SOLENOID (**Click here**)

A

USE SIMULATION METHOD TO CHECK (**Click here**)

DTC C1337/37 Diameter of the Tire is not Uniform

for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C1337/37	When either of the following conditions is detected: • The diameter is different between the 2 front wheels and the 2 rear wheels. • There is a wheel speed sensor fault.	• Speed sensor • Speed sensor rotor • Speed sensor circuit • Tire size

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK TIRE SIZE

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

OK:
Condition of all 4 wheels is normal and tire size is same.

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

OK ↓

2.INSPECT SPEED SENSOR ROTOR

a. Check the front speed sensor rotors (Click here) and rear speed sensor rotors (Click here).

Result

Result		Proceed to
OK		A
NG	Front speed sensor	B
	Rear speed sensor	C

B → REPLACE FRONT AXLE HUB SUB- SSEMBLY (SPEED SENSOR ROTOR) (**Click here**)

C → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (SPEED SENSOR ROTOR) (**Click here**)

A ↓

3.INSPECT SPEED SENSOR

a. Check the front speed sensor circuit (Click here) and rear speed sensor circuit (Click here).

Result

Result		Proceed to
OK		A
NG	Front speed sensor	B
	Rear speed sensor	C

B → REPLACE FRONT SPEED SENSOR (**Click here**)

C → REPLACE REAR SPEED SENSOR (Click here)

A

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

a. Check the front speed sensor circuit (Click here) and rear speed sensor circuit (Click here).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

INT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

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

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

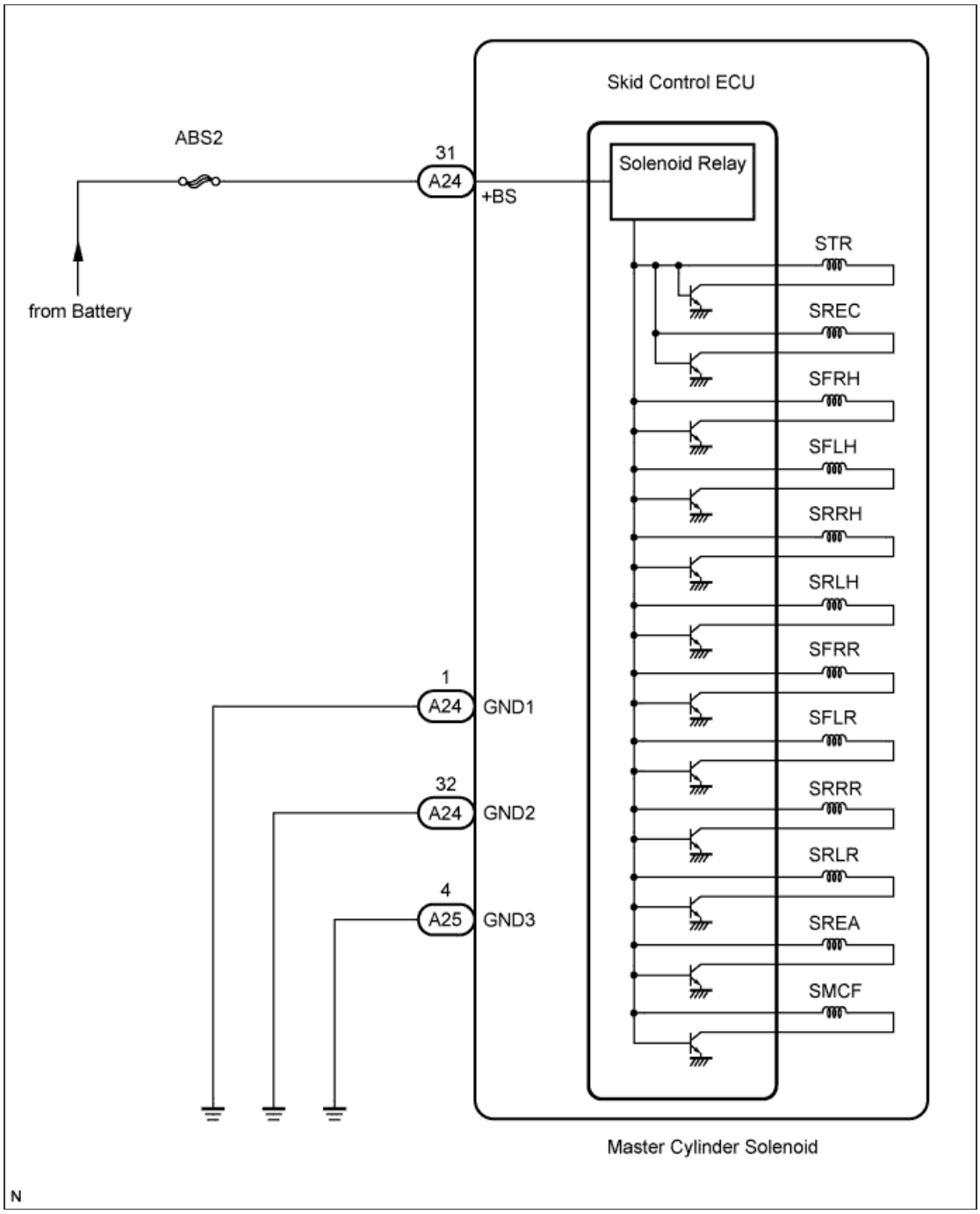
for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C0278/11	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is between 9.5 V and 17 V. 2. The relay contact is open when the relay is on. 2. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is 9.5 V or less when the relay is on. 2. The relay contact remains open.	• ABS2 fuse • Solenoid relay • Harness or connector • Master cylinder solenoid (Skid control ECU)
C0279/12	The following condition continues for at least 0.2 seconds. • The relay contact is closed immediately after turning the ignition switch to ON when the relay is off.	• ABS2 fuse • Solenoid relay • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

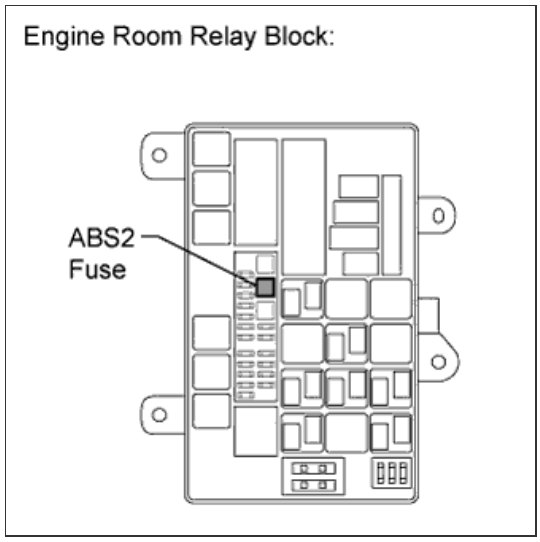
1.INSPECT ABS2 FUSE

a. Remove the ABS2 fuse from the engine room relay block.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
ABS2 fuse	Always	Below 1 Ω



NG → REPLACE ABS2 FUSE

OK

2.INSPECT SKID CONTROL ECU (+BS TERMINAL)

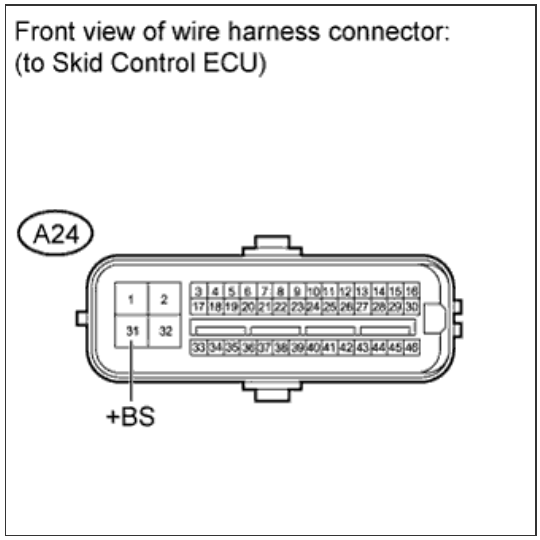
a. Install the ABS2 fuse.

b. Disconnect the A24 skid control ECU connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-31 (+BS) - Body ground	Always	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

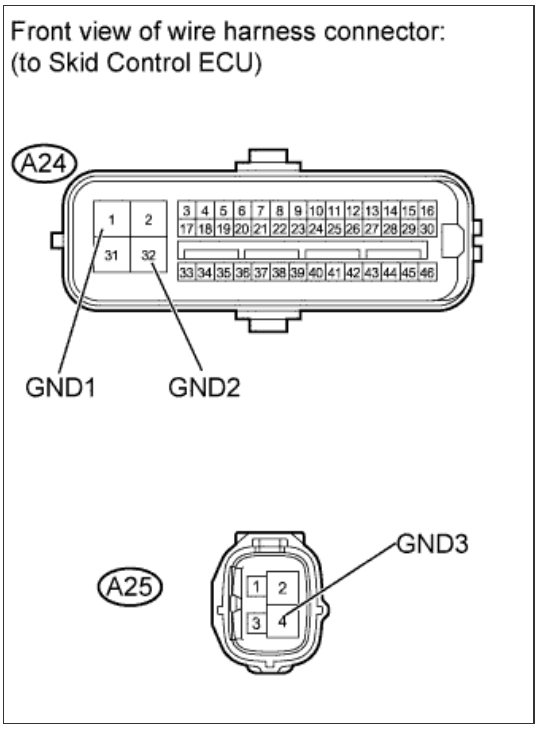
3.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A24 and A25 skid control ECU connectors.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The ABS solenoid relay is in the master cylinder solenoid.

Therefore, solenoid relay circuit inspection and relay unit inspection cannot be performed. Be sure to check if any DTC is output before replacing the master cylinder solenoid.

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (**Click here**)

C → REPLACE MASTER CYLINDER SOLENOID (**Click here**)

A

USE SIMULATION METHOD TO CHECK (**Click here**)

DTC C1340/47 Center Differential Lock Circuit

for Preparation Click here

DESCRIPTION

When the center differential is locked, VSC control turns off and "VSC OFF" appears on the multi-information display*1 or the VSC OFF indicator light*2 illuminates.

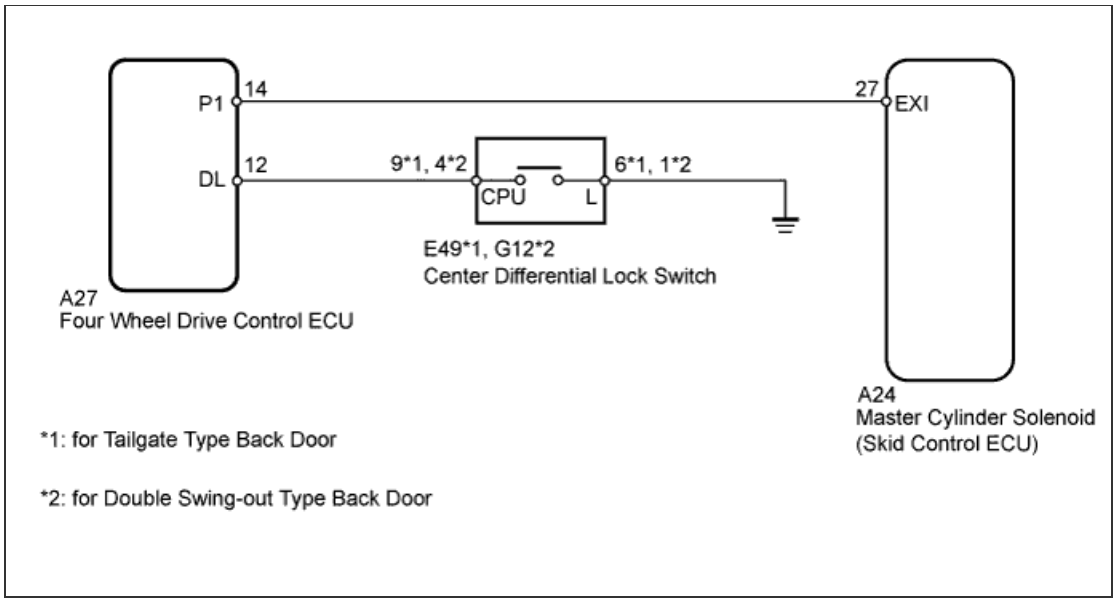
DTC Code	DTC Detection Condition	Trouble Area
C1340/47	When the terminal IG1 voltage is between 10 and 14 V and there is an open in the center differential lock circuit for 2 seconds or more.	• Center differential lock switch • Center differential lock switch circuit • Four wheel drive control ECU

HINT:

*1: w/ Multi-information Display

*2: w/o Multi-information Display

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT SKID CONTROL ECU (EXI TERMINAL)

a. Set the vehicle in the center differential locked state using the center differential lock switch.

b. Disconnect the A24 skid control ECU connector.

c. Turn the ignition switch to ON.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-27 (EXI) - Body ground	Center differential locked (Center differential lock switch on)	Below 1.5 V

e. Connect the A24 skid control ECU connector.

f. Set the vehicle in the center differential free state using the center differential lock switch.

g. Disconnect the A24 skid control ECU connector.

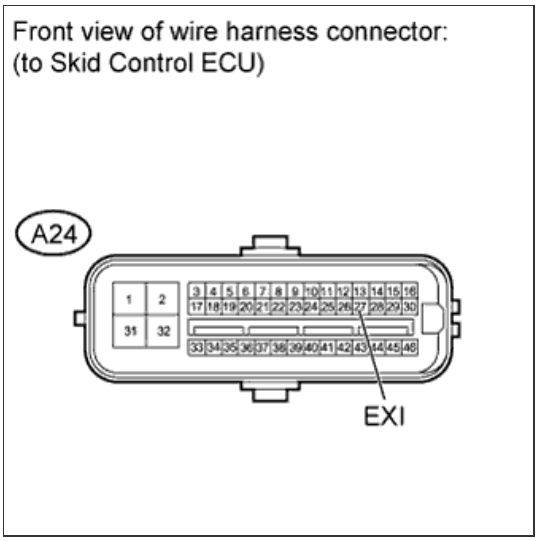
h. Turn the ignition switch to ON.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-27 (EXI) - Body ground	Center differential free (Center differential lock switch off)	11 to 14 V

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C



B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

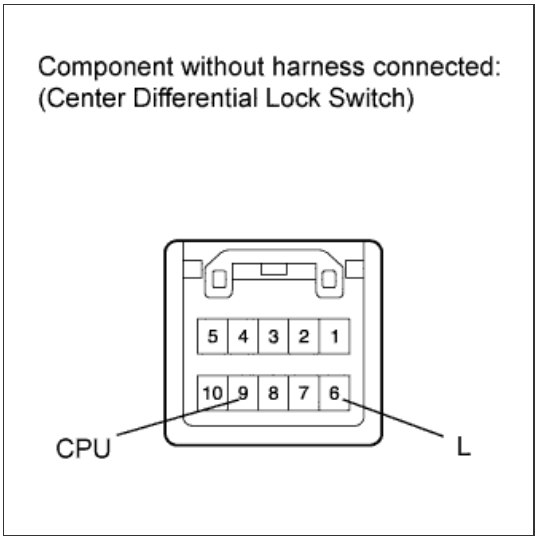
2.INSPECT CENTER DIFFERENTIAL LOCK SWITCH

a. Remove the center differential lock switch (Click here).

b. for Tailgate Type Back Door:
Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Switch Condition	Specified Condition
6 (L) - 9 (CPU)	Switch pressed and held	Below 1 Ω
	Switch not pressed	10 kΩ or higher

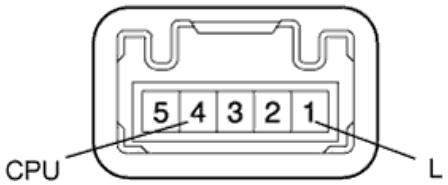


c. for Double Swing-out Type Back Door:
Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Switch Condition	Specified Condition
1 (L) - 4 (CPU)	Switch pressed and held	Below 1 Ω
	Switch not pressed	10 kΩ or higher

Component without harness connected:
(Center Differential Lock Switch)



NG → REPLACE CENTER DIFFERENTIAL LOCK SWITCH (Click here)

OK

3.INSPECT 4 WHEEL DRIVE CONTROL ECU

a. Check the center differential lock system (Click here).

NG → REPLACE 4 WHEEL DRIVE CONTROL ECU (Click here)

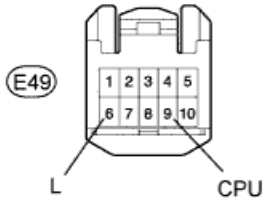
OK

4.CHECK HARNESS AND CONNECTOR (FOUR WHEEL DRIVE CONTROL ECU - CENTER DIFFERENTIAL LOCK SWITCH)

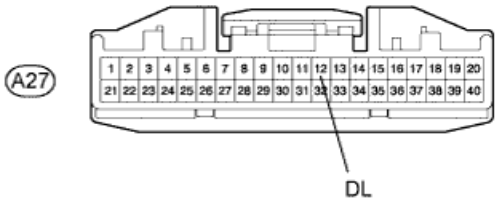
a. Disconnect the A27 four wheel drive control ECU connector.

b. for Tailgate Type Back Door:
Measure the resistance according to the value(s) in the table below.

Front view of wire harness connector:
(to Center Differential Lock Switch)



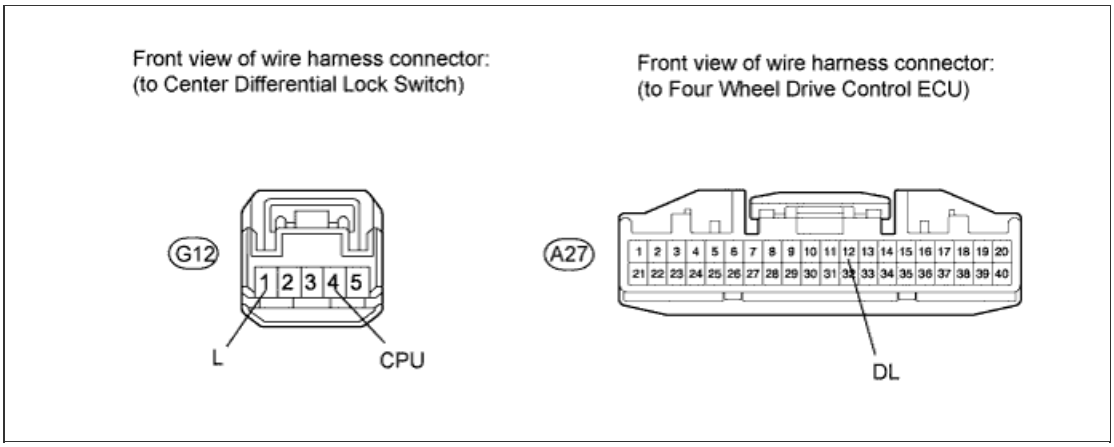
Front view of wire harness connector:
(to Four Wheel Drive Control ECU)



Standard Resistance:

Tester Connection	Condition	Specified Condition
A27-12 (DL) - E49-9 (CPU)	Always	Below 1 Ω
A27-12 (DL) - Body ground	Always	10 kΩ or higher
E49-6 (L) - Body ground	Always	Below 1 Ω

c. for Double Swing-out Type Back Door:
Measure the resistance according to the value(s) in the table below.



Standard Resistance:

Tester Connection	Condition	Specified Condition
A27-12 (DL) - G12-4 (CPU)	Always	Below 1 Ω
A27-12 (DL) - Body ground	Always	10 kΩ or higher
G12-1 (L) - Body ground	Always	Below 1 Ω

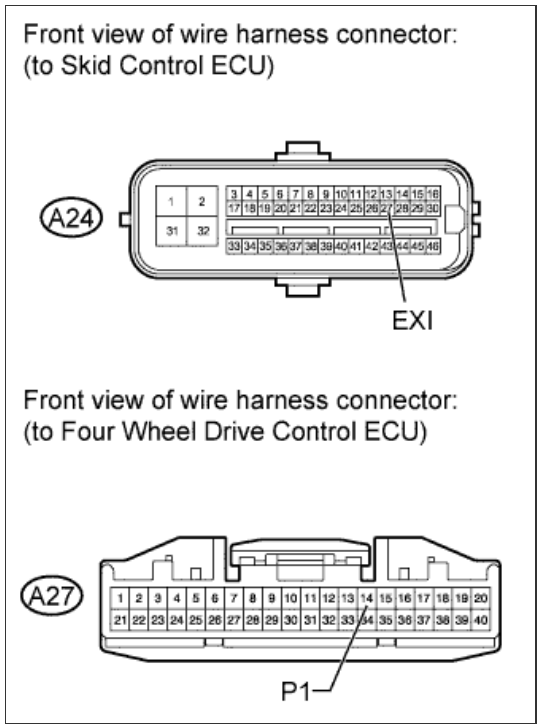
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

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

a. Disconnect the A24 skid control ECU connector.

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



Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-27 (EXI) - A24-14 (P1)	Always	Below 1 Ω
A24-27 (EXI) - Body ground	Always	10 kΩ or higher

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPAIR OR REPLACE HARNESS OR CONNECTOR

DTC C1201/51 Engine Control System Malfunction

for Preparation Click here

DESCRIPTION

If trouble occurs in the engine control system, the ECM transmits the abnormality to the skid control ECU. The skid control ECU stores this DTC and prohibits the following controls:

- VSC
- A-TRC
- CRAWL
- Hill-start Assist Control

DTC Code	DTC Detection Condition	Trouble Area
C1201/51	A malfunction signal is received from the ECM.	Engine control system

INSPECTION PROCEDURE

1.CHECK DTC (FOR ENGINE CONTROL SYSTEM)

a. Check if the engine control system DTC is output (for 2UZ-FE: Click here/ for 1VD-FTV: Click here/ for 3UR-FE: Click here).

Result

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

HINT:

- **Refer to the ECM installation procedures:**
  - **for 2UZ-FE (Click here)**
  - **for 1VD-FTV (Click here)**
  - **for 3UR-FE (Click here)**
- **Refer to Engine Control (How to Proceed with Troubleshooting):**
  - **for 2UZ-FE (Click here)**
  - **for 1VD-FTV (Click here)**
  - **for 3UR-FE (Click here)**

B → GO TO ENGINE CONTROL (HOW TO PROCEED WITH TROUBLESHOOTING)

A

REPLACE ECM

DTC C1380/64 Stop Light Control Relay Malfunction

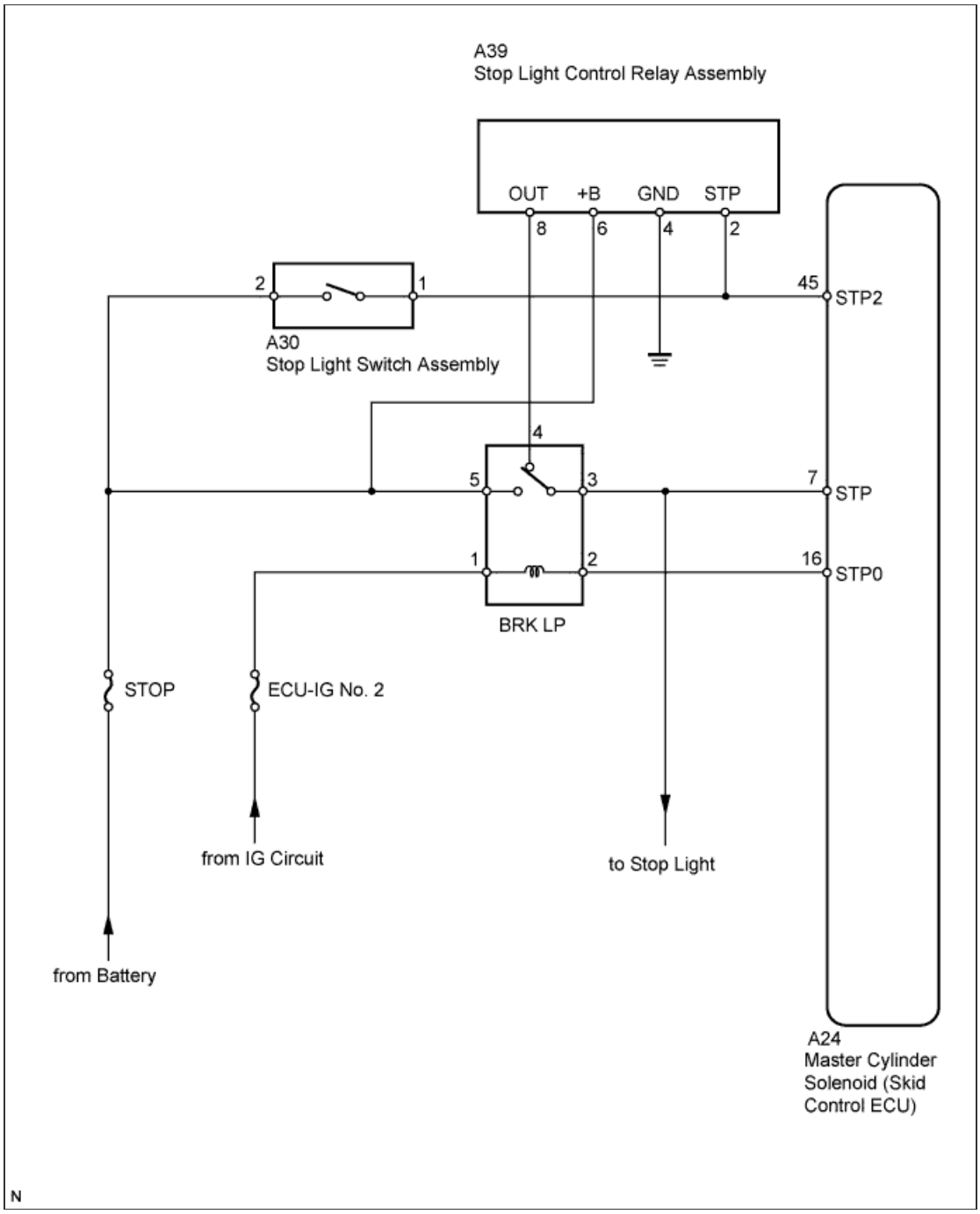
for Preparation Click here

DESCRIPTION

Upon receiving the CRAWL or hill-start assist control operating signal from the skid control ECU, the relay contact turns on and the stop light comes on.

DTC Code	DTC Detection Condition	Trouble Area
C1380/64	• When the voltage at the IG1 terminal is between 10 V and 14 V, the stop light driving output (STPO) is on, and a signal has not been input to the STP terminal for 5 seconds or more. • When the voltage at the IG1 terminal is between 10 V and 14 V, the stop light driving output (STPO) is off, and the input signal at the STP terminal is different from the input signal at the STP2 terminal for 5 seconds or more.	• STOP fuse • Stop light control relay • Stop light control relay circuit • BRK LP relay • BRK LP relay circuit • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **When replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

1.CHECK STOP LIGHT OPERATION

a. Check that the stop light come on when the brake pedal is depressed, and go off when the brake pedal is released.

OK:

Condition	Illumination Condition
Brake pedal depressed	On
Brake pedal released	Off

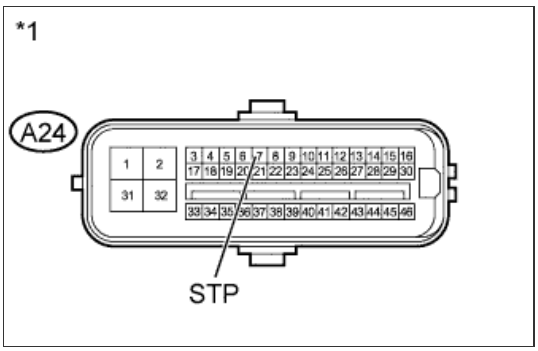
NG → GO TO LIGHTING SYSTEM (STOP LIGHT CIRCUIT) (Click here)

OK

2.INSPECT SKID CONTROL ECU (STP TERMINAL)

a. Disconnect the A24 skid control ECU connector.

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



Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-7 (STP) - Body ground	Stop light switch on (Brake pedal depressed)	8 to 14 V
A24-7 (STP) - Body ground	Stop light switch off (Brake pedal released)	Below 1.5 V

Text in Illustration

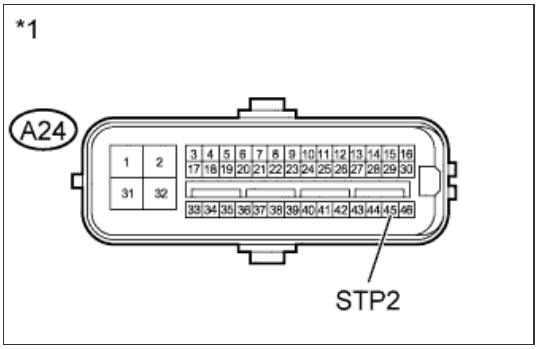
*1	Front view of wire harness connector (to Skid Control ECU)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.INSPECT SKID CONTROL ECU (STP2 TERMINAL)

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



Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-45 (STP2) - Body ground	Stop light switch on (Brake pedal depressed)	8 to 14 V
A24-45 (STP2) - Body ground	Stop light switch off (Brake pedal released)	Below 1.5 V

Text in Illustration

*1	Front view of wire harness connector (to Skid Control ECU)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

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

a. Reconnect the A24 skid control ECU connector.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and turn the intelligent tester on.

d. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

ABS/VSC/TRC

Item	Test Part	Control Range	Diagnostic Note
Stop Light Relay	BRK LP relay	Relay ON/OFF	Observe the rear combination light (Does not come on for 5 seconds or more).

e. Check that "ON" and "OFF" of the stop light can be shown on the rear combination light by the intelligent tester.

OK:

The stop light turns on or off in accordance with the intelligent tester.

NG → Go to step 6

OK ↓

5.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A ↓

USE SIMULATION METHOD TO CHECK (Click here)

6.INSPECT BRK LP RELAY (POWER SOURCE TERMINAL)

a. Remove the BRK LP relay.

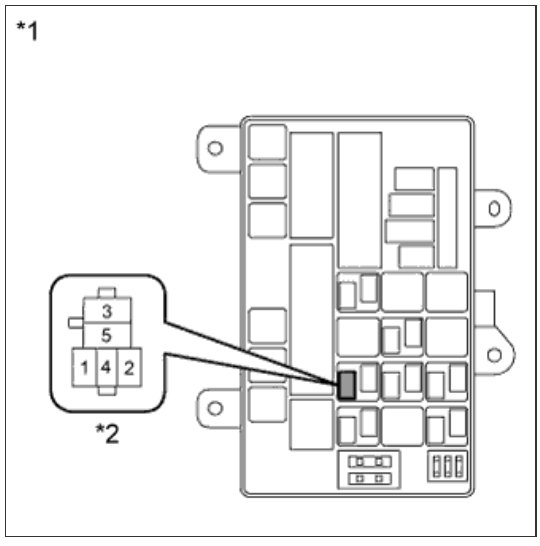
b. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Condition	Specified Condition
1 - Body ground	Ignition switch ON	8 to 14 V
5 - Body ground	Always	11 to 14 V

Text in Illustration

*1	Engine Room Relay Block
*2	BRK LP Relay

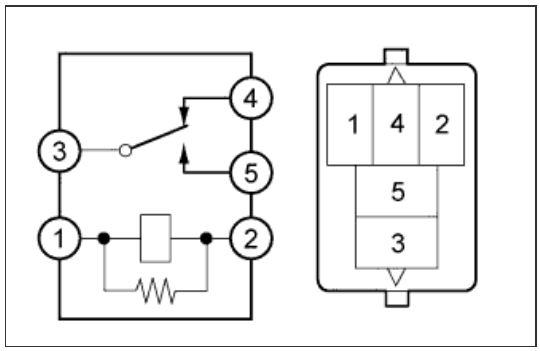


NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ↓

7.INSPECT BRK LP RELAY

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



Standard Resistance:

Tester Connection	Condition	Specified Condition
3 - 4	Battery voltage not applied	Below 1 Ω
	Battery voltage applied to terminal 1 and 2	10 kΩ or higher
3 - 5	Battery voltage not applied	10 kΩ or higher
	Battery voltage applied to terminal 1 and 2	Below 1 Ω

NG → REPLACE BRK LP RELAY

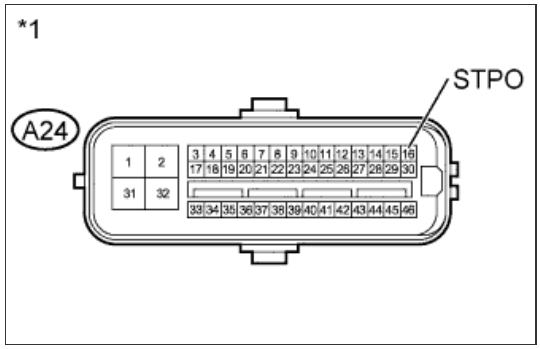
OK

8.INSPECT SKID CONTROL ECU (STPO TERMINAL)

a. Install the BRK LP relay.

b. Disconnect the A24 skid control ECU connector.

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



Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-16 (STPO) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*1	Front view of wire harness connector (to Skid Control ECU)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Check if the same DTC is output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

REPLACE MASTER CYLINDER SOLENOID (Click here)

A

USE SIMULATION METHOD TO CHECK (Click here)

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

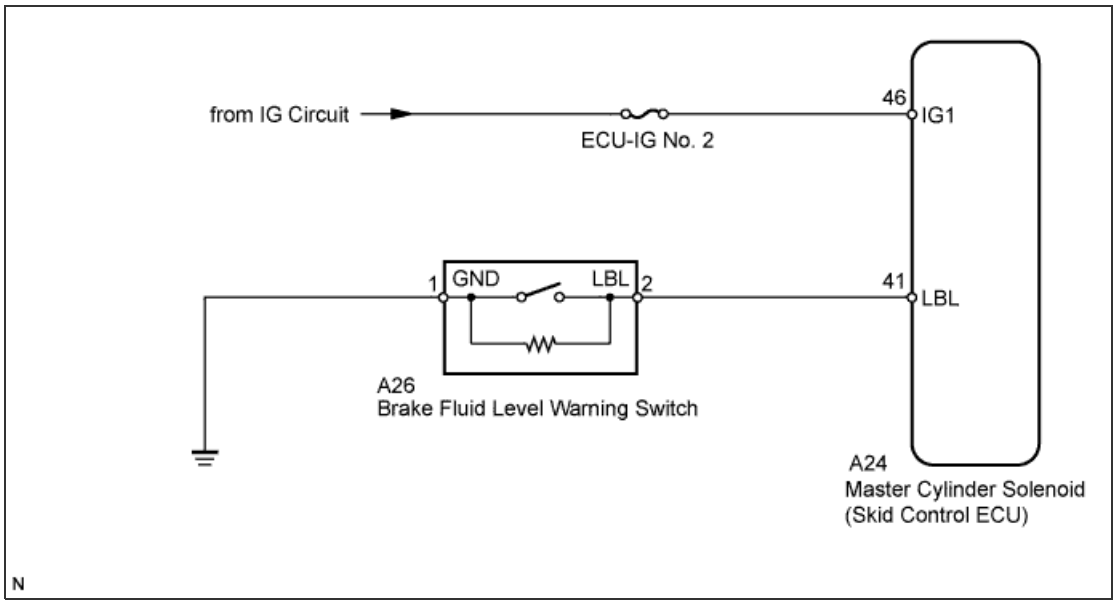
for Preparation Click here

DESCRIPTION

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

DTC Code	DTC Detection Condition	Trouble Area
C1202/58	When either of the following conditions is detected: 1. The fluid level of the reservoir is LOW for 4 seconds, or 40 seconds after the ignition switch is turned to ON, or for 7 seconds during pump motor operation. 2. With the ECU terminal IG1 voltage at 9.5 V to 17.0 V, an open in the brake fluid level warning switch circuit continues for 2 seconds or more.	• Brake fluid level • Brake fluid level warning switch • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

HINT:

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

1.CHECK BRAKE FLUID LEVEL

a. Turn the ignition switch off.

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

c. Check the amount of fluid in the brake reservoir.

HINT:

When the ignition switch is turned to ON, brake fluid is sent to the accumulator and the fluid level decreases by approximately 10 mm (0.394 in.) from the level when the ignition switch is off (normal).

OK:

Brake fluid level is normal.

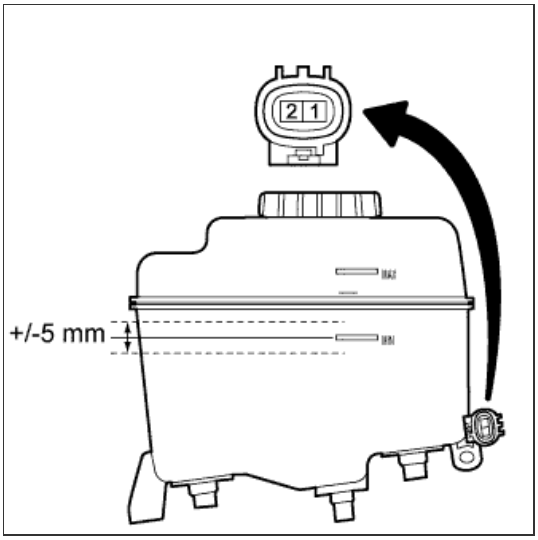
NG → CHECK AND REPAIR BRAKE FLUID LEAKAGE (Click here)

OK

2.INSPECT BRAKE FLUID LEVEL WARNING SWITCH

a. Disconnect the A26 brake fluid level warning switch connector.

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



HINT:

- **A float is placed inside the reservoir. Its position can be changed by increasing/decreasing the level of brake fluid.**
- **The warning switch is switched on/off at +/-5 mm (+/-0.197 in.) from the MIN level.**

Standard Resistance:

Tester Connection	Condition	Specified Condition
1 - 2	Float UP (Switch off)	1.9 to 2.1 kΩ
1 - 2	Float DOWN (Switch on)	Below 1 Ω

esult		Proceed to
OK		A
NG	for LHD	B
	for HD	C

HINT:

If there is no problem after finishing the above check, ad ust the brake fluid level to the MA level.

B → REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY (Click here)

C → REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY (Click here)

A

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

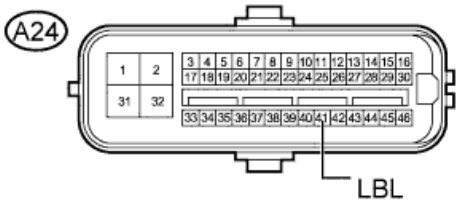
a. Disconnect the A24 skid control ECU connector and A26 brake fluid level warning switch connector.

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

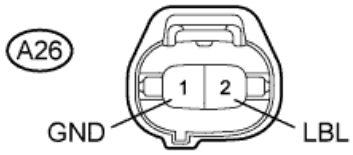
Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-41 (LBL) - A26-2 (LBL)	Always	Below 1 Ω
A24-41 (LBL) - Body ground	Always	10 kΩ or higher
A26-1 (GND) - Body ground	Always	Below 1 Ω

Front view of wire harness connector:
(to Skid Control ECU)



Front view of wire harness connector:
(to Brake Fluid Level Warning Switch)



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Drive the vehicle at a speed of approximately 32 km/h (20 mph) or more for 60 seconds or more.

c. Check if the same DTC is output (Click here).

HINT:

einstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

esult		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for HD	C

B → REPLACE MASTER CYLINDER SOLENOID (**Click here**)

C → REPLACE MASTER CYLINDER SOLENOID (**Click here**)

A

USE SIMULATION METHOD TO CHECK (**Click here**)

DTC	U0073/94	Control Module Communication Bus OFF
DTC	U0100/65	Lost Communication with ECM / PCM
DTC	U0114/38	Lost Communication with 4WD Control ECU
DTC	U0123/62	Lost Communication with Yaw Rate Sensor Module
DTC	U0124/95	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126/63	Lost Communication with Steering Angle Sensor Module
DTC	U0130/68	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to CAN communication system (for LHD: Click here/ for RHD: Click here).

DTC C1203/53 ECM Communication Circuit Malfunction

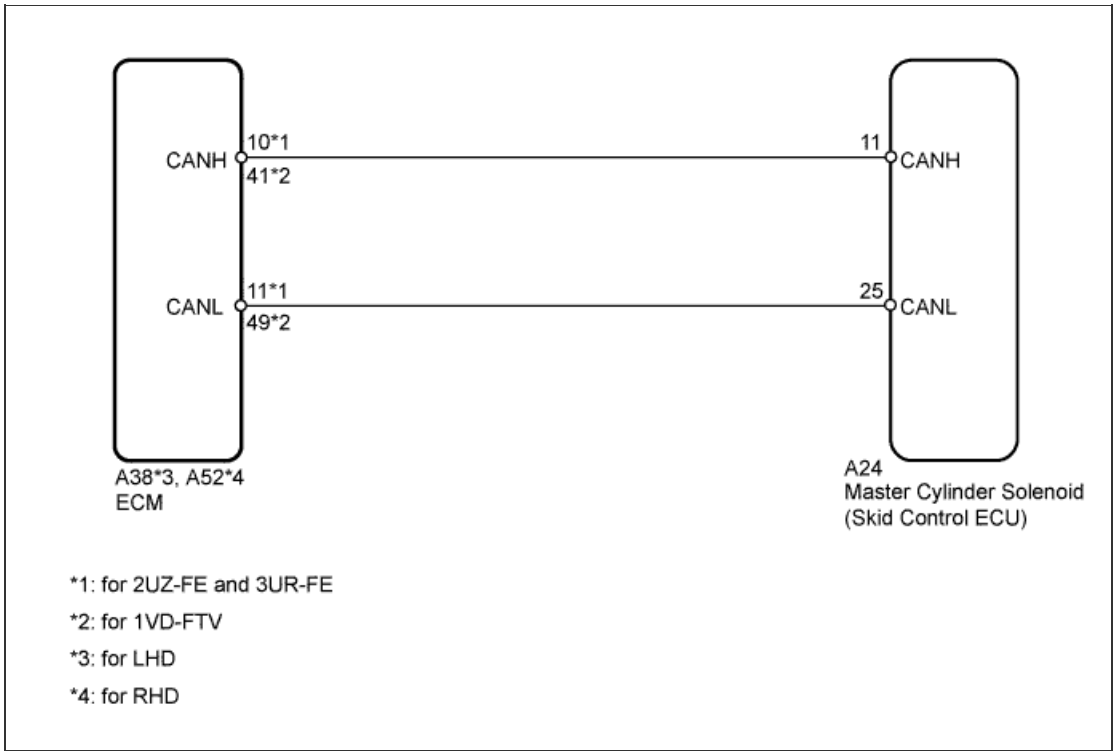
for Preparation Click here

DESCRIPTION

The circuit is used to send control information from the skid control ECU to the ECM, and engine control information from the ECM to the skid control ECU via the CAN communication system.

DTC Code	DTC Detection Condition	Trouble Area
C1203/53	The engine/drivetrain specification and/or destination information from the ECM does not match the skid control ECU data.	ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1.CHECK DTC (FOR ENGINE CONTROL SYSTEM)

a. Check if the engine control system DTC is output (for 2UZ-FE: Click here/ for 1VD-FTV: Click here/ for 3UR-FE: Click here).

Result

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

HINT:

- **Refer to the ECM installation procedures:**
  - **for 2UZ-FE (Click here)**
  - **for 1VD-FTV (Click here)**
  - **for 3UR-FE (Click here)**
- **Refer to Engine Control (How to Proceed with Troubleshooting):**
  - **for 2UZ-FE (Click here)**
  - **for 1VD-FTV (Click here)**
  - **for 3UR-FE (Click here)**

B → **GO TO ENGINE CONTROL (HOW TO PROCEED WITH TROUBLESHOOTING)**

A

REPLACE ECM

DTC	U0073/94	Control Module Communication Bus OFF
DTC	U0100/65	Lost Communication with ECM / PCM
DTC	U0114/38	Lost Communication with 4WD Control ECU
DTC	U0123/62	Lost Communication with Yaw Rate Sensor Module
DTC	U0124/95	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126/63	Lost Communication with Steering Angle Sensor Module
DTC	U0130/68	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to CAN communication system (for LHD: Click here/ for RHD: Click here).

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

DTC C1336/98 Zero Point Calibration of Acceleration Sensor Undone

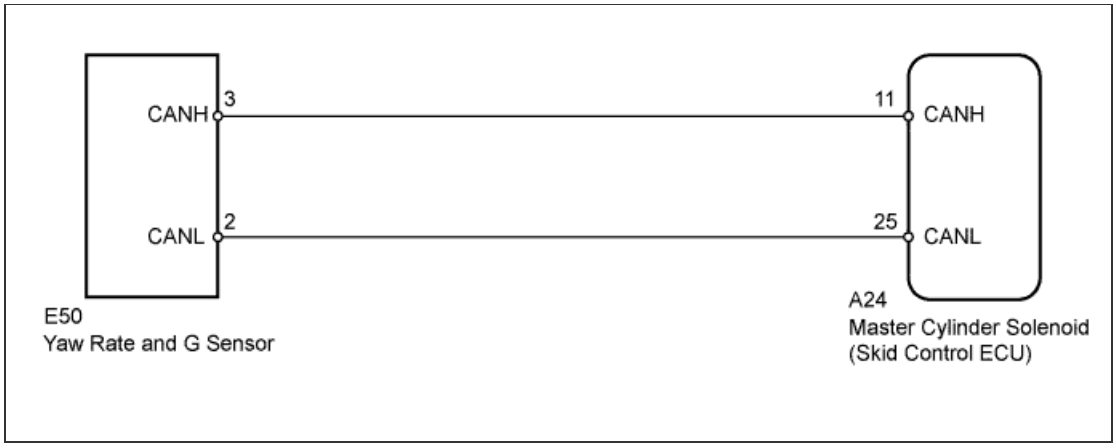
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the yaw rate and G sensor via the CAN communication system.
The yaw rate sensor has a built-in G sensor.
If there is trouble in the bus lines between the yaw rate and G sensor and the CAN communication system, the DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (G sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1210/36	• The yaw rate sensor zero point stored in the ECU is cleared. • Zero point calibration has not been completed.	• Yaw rate and G sensor • Zero point calibration undone • Harness or connector • Master cylinder solenoid (Skid control ECU)
C1336/98	• The G sensor zero point stored in the ECU is cleared. • Zero point calibration has not been completed.	• Yaw rate and G sensor • Zero point calibration undone • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

HINT:

When U0073/94, U0100/65, U0114/38, U0123/62, U0124/95, U0126/63 or U0130/68 is output together with C1210/36 or C1336/98, inspect and repair the trouble areas indicated by U0073/94, U0100/65, U0114/38, U0123/62, U0124/95, U0126/63 or U0130/68 first.

1.CHECK SENSOR INSTALLATION

a. Check that the yaw rate and G sensor is installed properly.

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

NG → INSTALL YAW RATE AND G SENSOR CORRECTLY (**Click here**)

OK

2.PERFORM ZERO POINT CALIBRATION OF YAW RATE AND G SENSOR

a. Perform the zero point calibration of the yaw rate and G sensor (Click here).

NEXT

3.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

END

DTC	U0073/94	Control Module Communication Bus OFF
DTC	U0100/65	Lost Communication with ECM / PCM
DTC	U0114/38	Lost Communication with 4WD Control ECU
DTC	U0123/62	Lost Communication with Yaw Rate Sensor Module
DTC	U0124/95	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126/63	Lost Communication with Steering Angle Sensor Module
DTC	U0130/68	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to CAN communication system (for LHD: Click here/ for RHD: Click here).

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

DTC C1336/98 Zero Point Calibration of Acceleration Sensor Undone

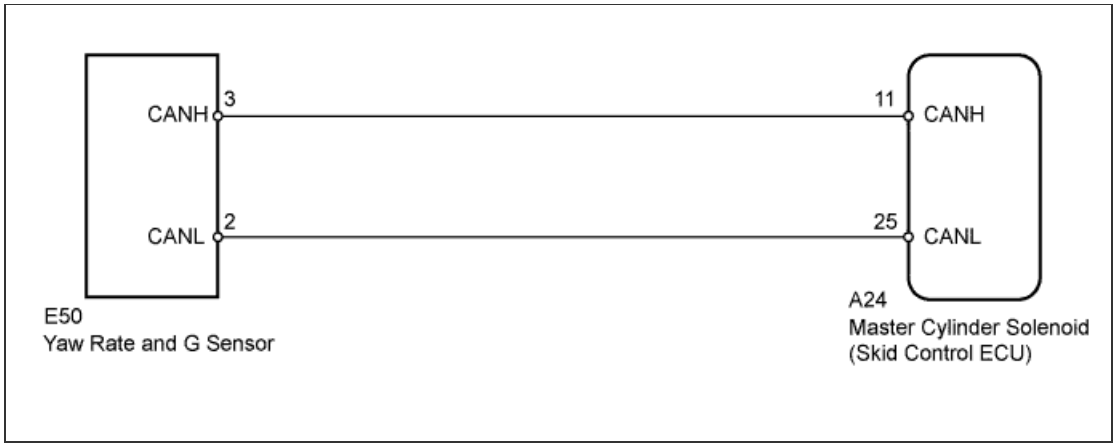
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the yaw rate and G sensor via the CAN communication system.
The yaw rate sensor has a built-in G sensor.
If there is trouble in the bus lines between the yaw rate and G sensor and the CAN communication system, the DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (G sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1210/36	• The yaw rate sensor zero point stored in the ECU is cleared. • Zero point calibration has not been completed.	• Yaw rate and G sensor • Zero point calibration undone • Harness or connector • Master cylinder solenoid (Skid control ECU)
C1336/98	• The G sensor zero point stored in the ECU is cleared. • Zero point calibration has not been completed.	• Yaw rate and G sensor • Zero point calibration undone • Harness or connector • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

HINT:

When U0073/94, U0100/65, U0114/38, U0123/62, U0124/95, U0126/63 or U0130/68 is output together with C1210/36 or C1336/98, inspect and repair the trouble areas indicated by U0073/94, U0100/65, U0114/38, U0123/62, U0124/95, U0126/63 or U0130/68 first.

1.CHECK SENSOR INSTALLATION

a. Check that the yaw rate and G sensor is installed properly.

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

NG → INSTALL YAW RATE AND G SENSOR CORRECTLY (**Click here**)

OK

2.PERFORM ZERO POINT CALIBRATION OF YAW RATE AND G SENSOR

a. Perform the zero point calibration of the yaw rate and G sensor (Click here).

NEXT

3.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Check if the same DTCs are output (Click here).

HINT:

Reinstall the sensors, connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

END

DTC	U0073/94	Control Module Communication Bus OFF
DTC	U0100/65	Lost Communication with ECM / PCM
DTC	U0114/38	Lost Communication with 4WD Control ECU
DTC	U0123/62	Lost Communication with Yaw Rate Sensor Module
DTC	U0124/95	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126/63	Lost Communication with Steering Angle Sensor Module
DTC	U0130/68	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to CAN communication system (for LHD: Click here/ for RHD: Click here).

DTC C1223/43 ABS Control System Malfunction

for Preparation Click here

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1223/43	The ABS control system is abnormal.	ABS control system

HINT:

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

INSPECTION PROCEDURE

1.CHECK DTC (FOR ABS SYSTEM)

a. Clear the DTCs (Click here).

b. Check if ABS DTCs are output (Click here).

Result

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

B → **USE SIMULATION METHOD TO CHECK (Click here)**

A → **REPAIR CIRCUIT INDICATED BY OUTPUT DTC (Click here)**

DTC	U0073/94	Control Module Communication Bus OFF
DTC	U0100/65	Lost Communication with ECM / PCM
DTC	U0114/38	Lost Communication with 4WD Control ECU
DTC	U0123/62	Lost Communication with Yaw Rate Sensor Module
DTC	U0124/95	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126/63	Lost Communication with Steering Angle Sensor Module
DTC	U0130/68	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to CAN communication system (for LHD: Click here/ for RHD: Click here).

DTC C1231/31 Steering Angle Sensor Circuit Malfunction

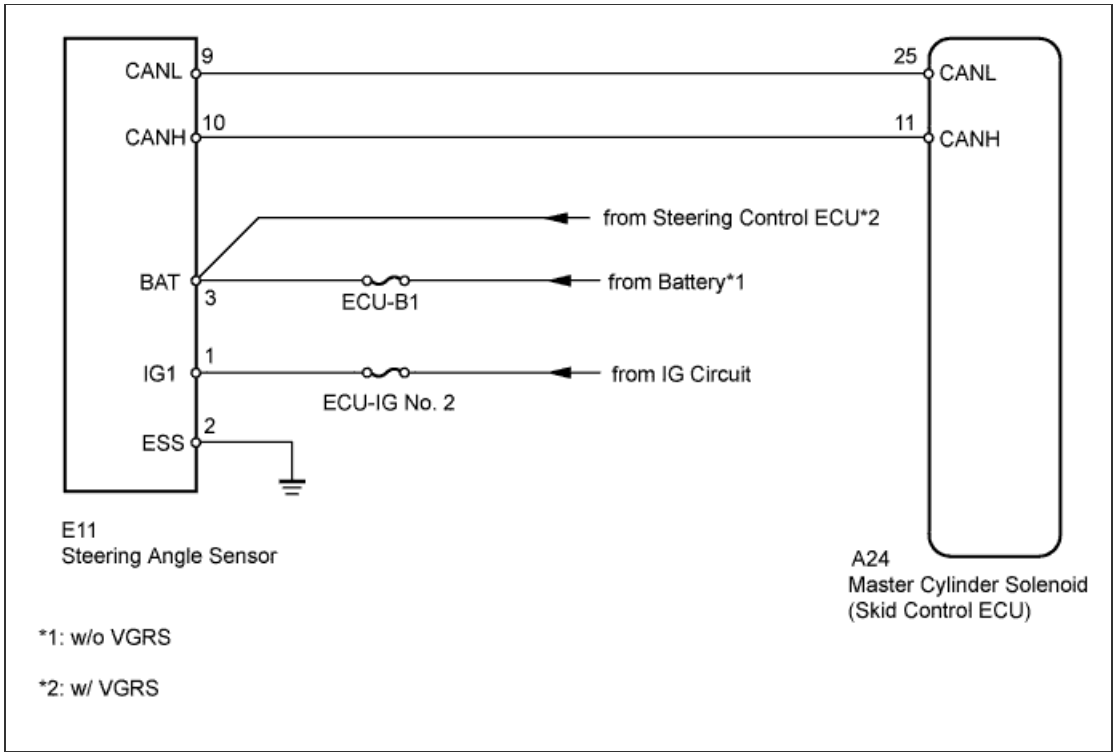
for Preparation Click here

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 system, it will be detected by the diagnosis function.

DTC Code	DTC Detection Condition	Trouble Area
C1231/31	When the ECU IG1 terminal voltage is 9.5 V or higher, the steering angle sensor malfunction signal is received.	• Steering angle sensor • Harness or connector • Steering angle sensor power supply • CAN communication system • Master cylinder solenoid (Skid control ECU)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **When replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

HINT:

- **When U0073/94, U0100/65, U0114/38, U0123/62, U0124/95, U0126/63 or U0130/68 is output together with C1231/31, inspect and repair the trouble areas indicated by U0073/94, U0100/65, U0114/38, U0123/62, U0124/95, U0126/63 or U0130/68 first.**
- **When the speed sensor or the yaw rate and G sensor has trouble, DTCs of the steering angle sensor may be stored even when the steering angle sensor is normal. When DTCs of the speed sensor (C0200/31, C0205/32, C0210/33, C0215/34, C1235/35, C1236/36, C1238/38, C1239/39) or yaw rate and G sensor (C1232/32, C1234/34, C1243/43, C1244/44, C1245/45, C1381/97) are output together with DTCs of the steering angle sensor, inspect and repair the speed sensor and yaw rate and G sensor first, and then inspect and repair the steering angle sensor.**

1.READ VALUE USING INTELLIGENT TESTER (STEERING ANGLE SENSOR)

a. Connect the intelligent tester to the DLC3.

b. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Steering Angle Sensor	Steering angle sensor / min.: -3276.8°, max.: 3276.7°	Left turn: Increase Right turn: Decrease	-

d. Check that the steering wheel turning angle value of the steering angle sensor displayed on the intelligent tester changes when turning the steering wheel.

OK:
Steering angle sensor value changes.

NG → Go to step 3

OK ↓

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Drive the vehicle at a speed of approximately 10 km/h (6 mph) or more for 10 seconds or more.

c. Check if the same DTCs are output (Click here).

Result

Result		Proceed to
DTC is not output		A
DTC is output	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A ↓

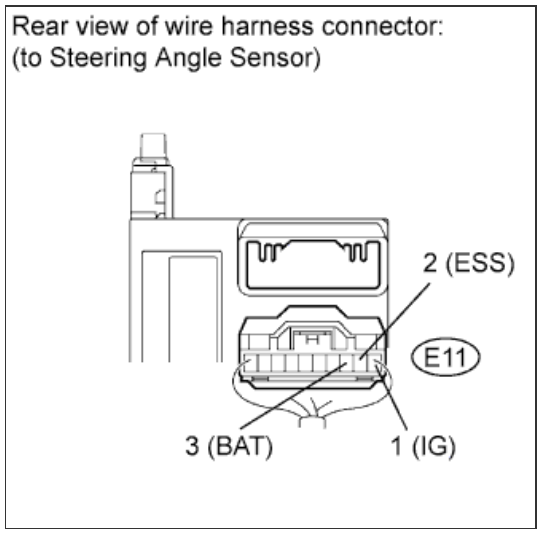
USE SIMULATION METHOD TO CHECK (Click here)

3.CHECK HARNESS AND CONNECTOR (STEERING ANGLE SENSOR - BATTERY AND BODY GROUND)

a. Remove the steering wheel and the lower steering column cover.

b. Disconnect the E11 steering angle sensor connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
E11-1 (IG1) - Body ground	Ignition switch ON	11 to 14 V
E11-3 (BAT) - Body ground	Always	11 to 14 V

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E11-2 (ESS) - Body ground	Always	Below 1 Ω

HINT:

- **When troubleshooting in accordance with the Diagnostic Trouble Code Chart, check DTCs before replacing the steering angle sensor (Click here).**
- **When troubleshooting in accordance with the Problem Symptoms Table, be sure to follow the table before replacing the**

steering angle sensor (Click here).

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE STEERING ANGLE SENSOR (Click here)

DTC	U0073/94	Control Module Communication Bus OFF
DTC	U0100/65	Lost Communication with ECM / PCM
DTC	U0114/38	Lost Communication with 4WD Control ECU
DTC	U0123/62	Lost Communication with Yaw Rate Sensor Module
DTC	U0124/95	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126/63	Lost Communication with Steering Angle Sensor Module
DTC	U0130/68	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to CAN communication system (for LHD: Click here/ for RHD: Click here).

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 Acceleration Sensor Power Supply Voltage Malfunction

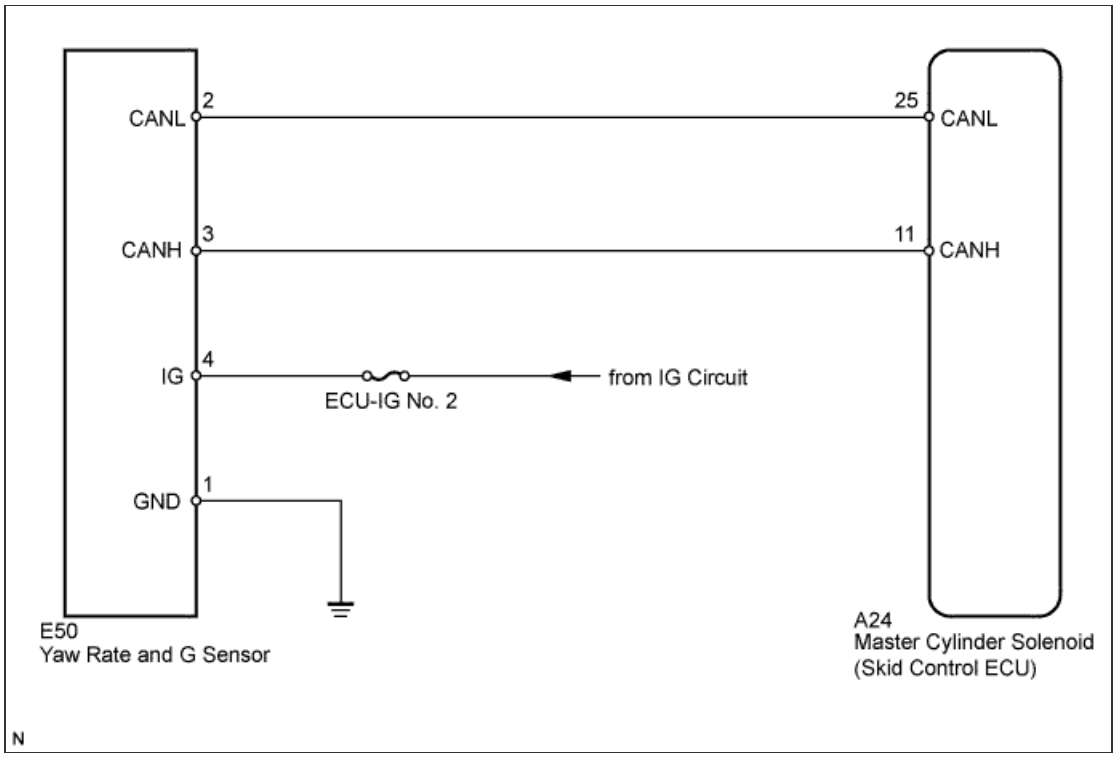
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the yaw rate and G sensor via the CAN communication system.
The yaw rate sensor has a built-in G sensor.
If there is trouble in the bus lines between the yaw rate and G sensor and the CAN communication system, the DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (G sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1232/32	At a vehicle speed of 10 km/h (6 mph) or more, the fluctuation range of the signal from one of either GL1 or GL2 is below 80 mV and the fluctuation range of the signal of the other is higher than 1.9 V for 30 seconds or more.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1234/34	A sensor malfunction signal is received from the yaw rate sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1243/43	The following condition repeats 16 times. • GL1 and GL2 do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1244/44	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 60 seconds. • The vehicle is stopped. • The difference between GL1 and GL2 does not drop less than 0.4 G after it reaches 0.6 G or more. 2. A data malfunction signal is received from the G sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. • The difference between the values calculated from the G sensor value and vehicle speed exceeds 0.35 G.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1381/97	A G sensor power source malfunction signal is received for at least 10 seconds at a speed of more than 3 km/h (2 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the yaw rate and G sensor, perform zero point calibration (Click here).

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Check if the DTCs (U0073/94, U0123/62, C1210/36 and/or C1336/98) are output (Click here).

Result

Result		Proceed to
DTC U0073/94, U0123/62, C1210/36 and/or C1336/98 are not output		A
DTC U0073/94 and/or U0123/62 are output	for LHD	B
	for RHD	C
DTC C1210/36 and/or C1336/98 are output		D

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

D → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (Click here)

A

2.CHECK YAW RATE AND G SENSOR INSTALLATION

a. Check that the yaw rate and G sensor is installed properly.

OK:

The sensor is tightened to the specified torque. The sensor is not tilted.

NG → INSTALL YAW RATE AND G SENSOR CORRECTLY (Click here)

OK

3.INSPECT YAW RATE AND G SENSOR (IG AND GND TERMINAL)

a. Disconnect the E50 yaw rate and G sensor connector.

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

Standard Voltage:

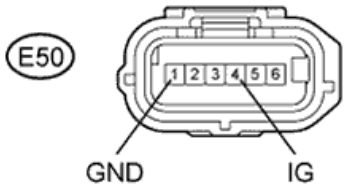
Tester Connection	Switch Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E50-1 (GND) - Body ground	Always	Below 1 Ω

Front view of wire harness connector:
(to Yaw Rate and G Sensor)



Result

Result	Proceed to
OK (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with the Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

REPLACE YAW RATE AND G SENSOR (Click here)

DTC	U0073/94	Control Module Communication Bus OFF
DTC	U0100/65	Lost Communication with ECM / PCM
DTC	U0114/38	Lost Communication with 4WD Control ECU
DTC	U0123/62	Lost Communication with Yaw Rate Sensor Module
DTC	U0124/95	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126/63	Lost Communication with Steering Angle Sensor Module
DTC	U0130/68	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to CAN communication system (for LHD: Click here/ for RHD: Click here).

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 Acceleration Sensor Power Supply Voltage Malfunction

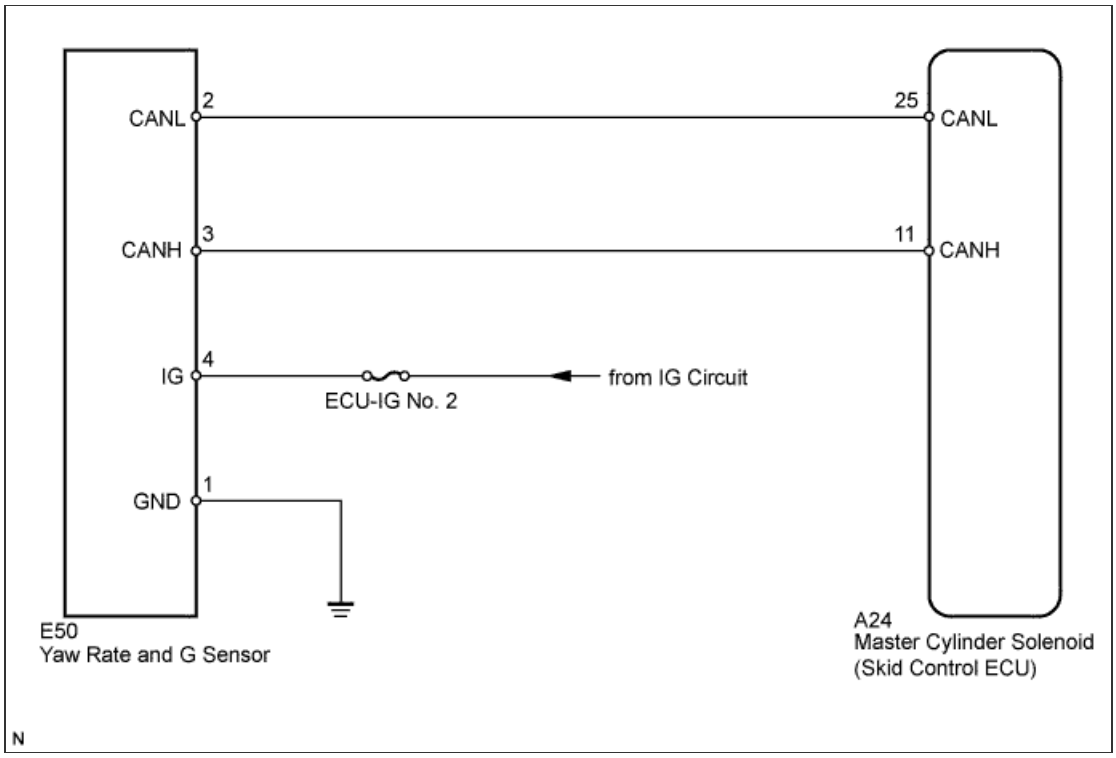
for Preparation Click here

DESCRIPTION

The skid control ECU receives signals from the yaw rate and G sensor via the CAN communication system.
The yaw rate sensor has a built-in G sensor.
If there is trouble in the bus lines between the yaw rate and G sensor and the CAN communication system, the DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (G sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1232/32	At a vehicle speed of 10 km/h (6 mph) or more, the fluctuation range of the signal from one of either GL1 or GL2 is below 80 mV and the fluctuation range of the signal of the other is higher than 1.9 V for 30 seconds or more.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1234/34	A sensor malfunction signal is received from the yaw rate sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1243/43	The following condition repeats 16 times. • GL1 and GL2 do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1244/44	When either of the following conditions is detected: 1. Both of the following conditions continue for at least 60 seconds. • The vehicle is stopped. • The difference between GL1 and GL2 does not drop less than 0.4 G after it reaches 0.6 G or more. 2. A data malfunction signal is received from the G sensor.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1245/45	The following condition continues for at least 60 seconds. • The difference between the values calculated from the G sensor value and vehicle speed exceeds 0.35 G.	• Yaw rate and G sensor • Harness or connector • CAN communication system
C1381/97	A G sensor power source malfunction signal is received for at least 10 seconds at a speed of more than 3 km/h (2 mph).	• Yaw rate and G sensor • Harness or connector • CAN communication system

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the yaw rate and G sensor, perform zero point calibration (Click here).

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Check if the DTCs (U0073/94, U0123/62, C1210/36 and/or C1336/98) are output (Click here).

Result

Result		Proceed to
DTC U0073/94, U0123/62, C1210/36 and/or C1336/98 are not output		A
DTC U0073/94 and/or U0123/62 are output	for LHD	B
	for RHD	C
DTC C1210/36 and/or C1336/98 are output		D

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

D → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (Click here)

A

2.CHECK YAW RATE AND G SENSOR INSTALLATION

a. Check that the yaw rate and G sensor is installed properly.

OK:

The sensor is tightened to the specified torque. The sensor is not tilted.

NG → INSTALL YAW RATE AND G SENSOR CORRECTLY (Click here)

OK

3.INSPECT YAW RATE AND G SENSOR (IG AND GND TERMINAL)

a. Disconnect the E50 yaw rate and G sensor connector.

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

Standard Voltage:

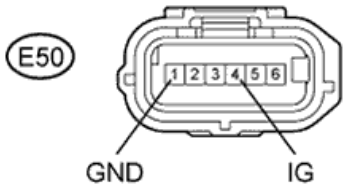
Tester Connection	Switch Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E50-1 (GND) - Body ground	Always	Below 1 Ω

Front view of wire harness connector:
(to Yaw Rate and G Sensor)



Result

Result	Proceed to
OK (When troubleshooting in accordance with the Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with the Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

REPLACE YAW RATE AND G SENSOR (Click here)

for Preparation Click here

DESCRIPTION

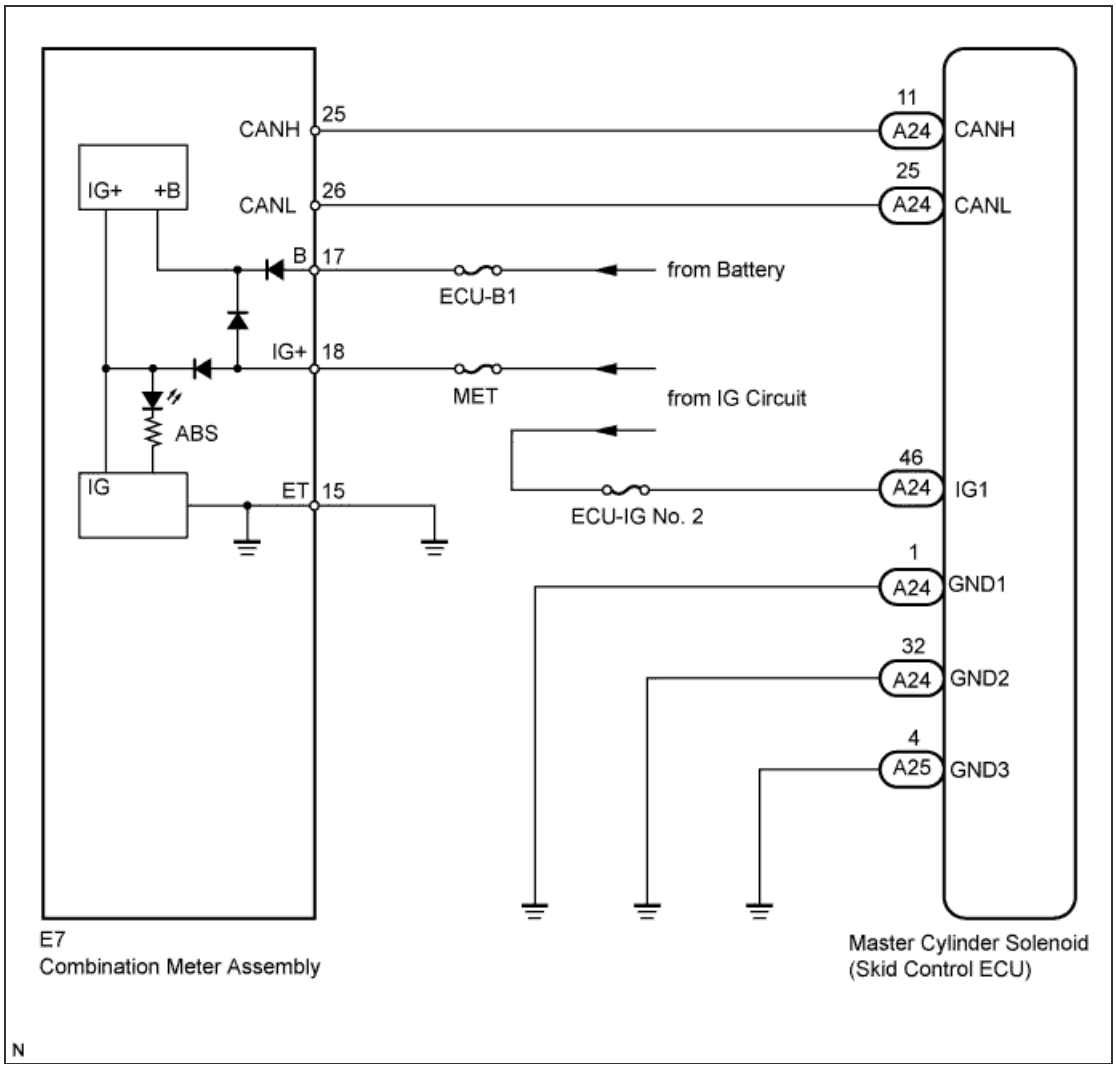
If any of the following is detected, the ABS warning light remains on.

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

HINT:

There is a case that the intelligent tester cannot be used when the skid control ECU is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU connector connection.

OK:

The connector is securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

2.INSPECT BATTERY

a. Check the battery oltage.

Standard voltage:
11 to 14 V

Result

Result		Proceed to
O		A
	for 2UZ E	B
	for 1V TV	C
	for 3UR E	

B → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

C → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

D → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

A

3.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the C3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection u screen, and follow the prompts on the screen to inspect the CAN Bus.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication		A
"Bus Check" indicates no malfunctions in CAN communication	for L	B
	for R	C

OK:
"Bus Check" indicates no malfunctions in CAN communication.

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

4.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the C3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for TCs (L Click here/R Click here).

Result

Result		Proceed to
CAN system TC is not output		A
CAN system TC is output	for L	B
	for R	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

5.CHECK OPERATION OF ABS WARNING LIGHT (ACTIVE TEST)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the C3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination ter / Acti e Test.

e. Check the condition of the ABS warning light by operating the intelligent tester.

Combination Meter

Tester isplay	Test Part	Control Range	iagnostic Note
Indicat. Lamp ABS	ABS Warning Light	Warning light ON O	

OK:

The warning light turns on when operating the intelligent tester.

Result

esult		Proceed to
O		A
	w/ ulti information isplay	B
	w/o ulti information isplay	C

B → REPLACE COMBINATION METER ASSEMBLY (Click here)

C → REPLACE COMBINATION METER ASSEMBLY (Click here)

A

6.INSPECT SKID CONTROL ECU (IG1 TERMINAL)

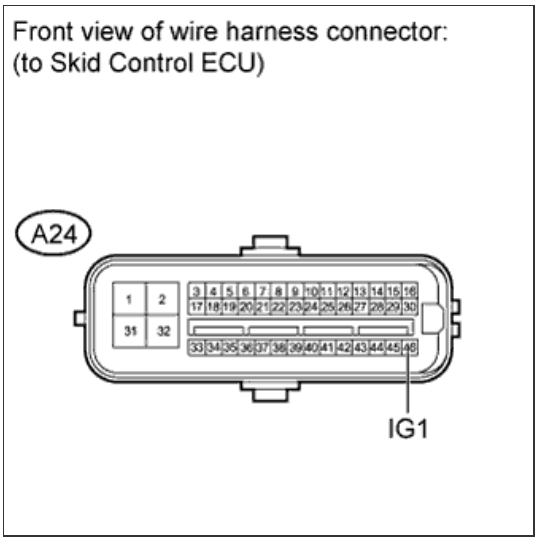
a. isconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

c. easure the oltage according to the alue(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24 (IG1) Body ground	Ignition switch ON	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. isconnect the A24 and A2 skid control ECU connectors.

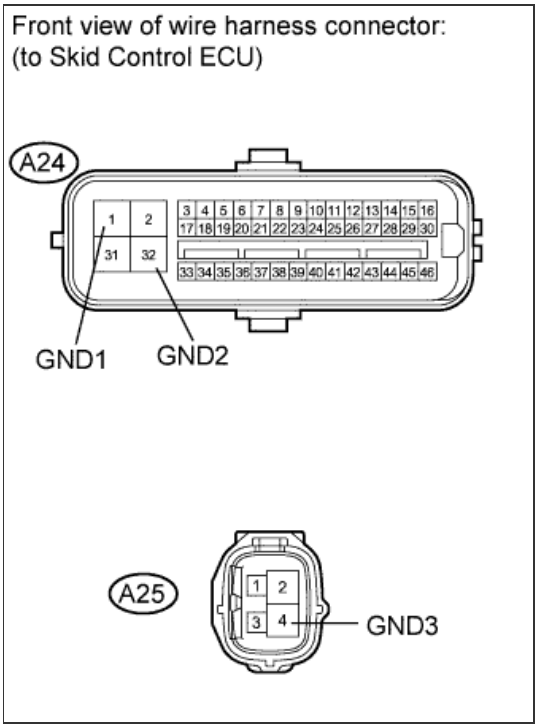
b. easure the resistance according to the alue(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24 (GN) Body ground	Always	Below 1 Ω
A24 (GN) Body ground	Always	Below 1 Ω
A2 (GN) Body ground	Always	Below 1 Ω

Result

Result		Proceed to
NG		A
O	for LH	B
	for RH	C



B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPAIR OR REPLACE HARNESS OR CONNECTOR

for Preparation Click here

DESCRIPTION

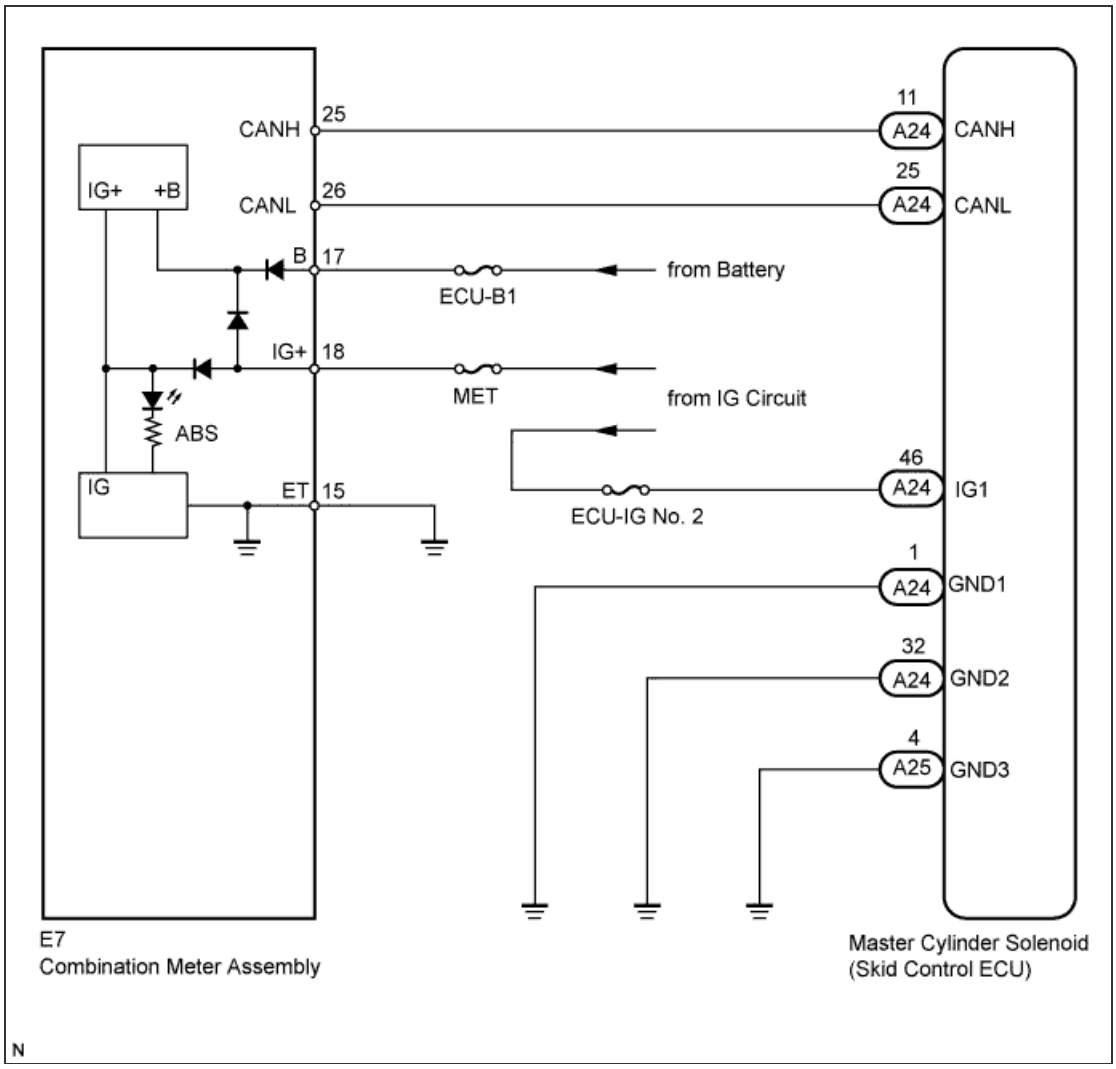
If any of the following is detected, the ABS warning light remains on.

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

HINT:

There is a case that the intelligent tester cannot be used when the skid control ECU is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT ABS WARNING LIGHT

a. Disconnect the skid control ECU connector.

b. Turn the ignition switch to ON.

c. Check that the ABS warning light comes on.

OK:

ABS warning light comes on.

Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

2.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication		A
"Bus Check" indicates malfunctions in CAN communication	for LHD	B
	for RHD	C

OK:

"Bus Check" indicates no malfunctions in CAN communication.

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

3.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	for LHD	B
	for RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

.CHECK OPERATION OF ABS WARNING LIGHT (ACTIVE TEST)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the ABS warning light by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp ABS	ABS Warning Light	Warning light ON/OFF	-

OK:

The warning light turns on when operating the intelligent tester.

Result

Result		Proceed to
OK		A
NG	w/ Multi-information Display	B
	w/o Multi-information Display	C

B → REPLACE COMBINATION METER ASSEMBLY (Click here)

C → REPLACE COMBINATION METER ASSEMBLY (Click here)

A

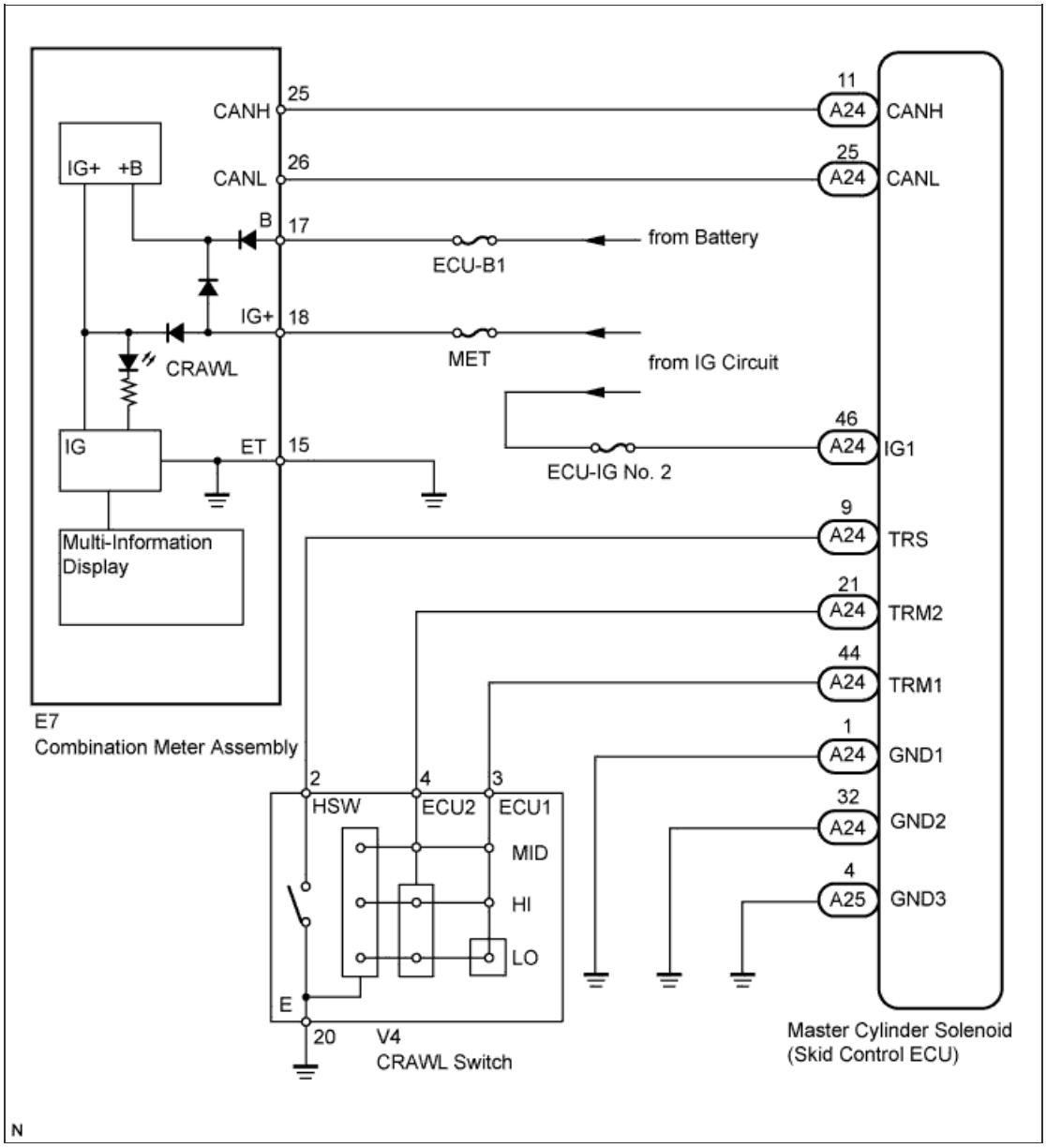
USE SIMULATION METHOD TO CHECK (Click here)

for Preparation Click here

DESCRIPTION

When CRAWL starts after operating the CRAWL switch, the CRAWL indicator light turns on. While CRAWL is in the process of stopping, the CRAWL indicator light begins blinking. When CRAWL totally stops, the CRAWL indicator light turns off.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication		A
"Bus Check" indicates malfunctions in CAN communication	for LHD	B
	for RHD	C

OK:
"Bus Check" indicates no malfunctions in CAN communication.

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

2.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (for LHD: Click here/ for RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	for LHD	B
	for RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

3.CHECK OPERATION OF CRAWL INDICATOR LIGHT (ACTIVE TEST)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the CRAWL indicator light by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp CRAWL	CRAWL Indicator Light	Indicator light ON/OFF	-

OK:
The indicator light turns on when operating the intelligent tester.

Result

Result		Proceed to
OK	for LHD	A
	for RHD	B
NG	w/ Multi-information Display	C
	w/o Multi-information Display	D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE COMBINATION METER ASSEMBLY (Click here)

D → REPLACE COMBINATION METER ASSEMBLY (Click here)

A

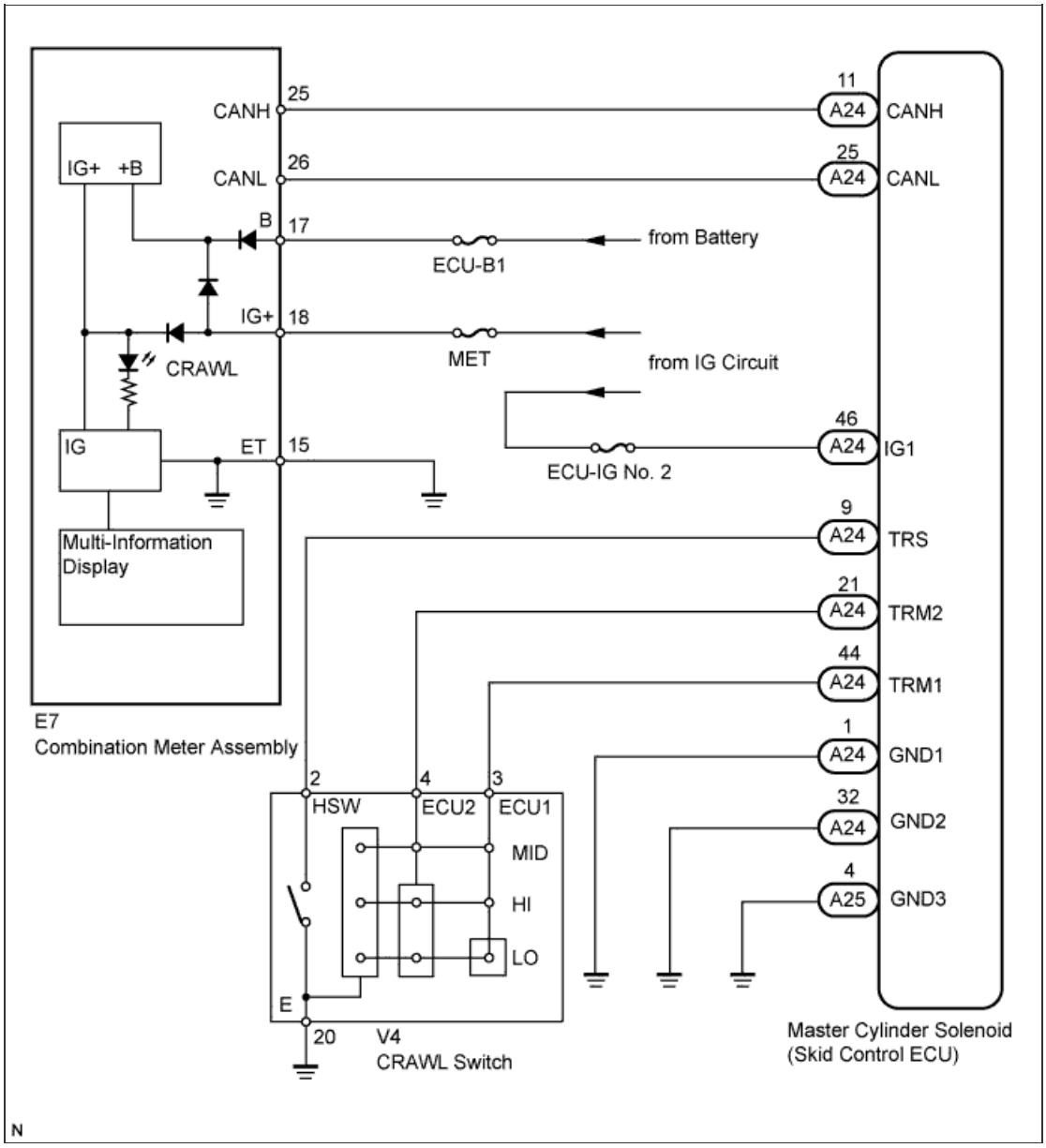
REPLACE MASTER CYLINDER SOLENOID (Click here)

for Preparation Click here

DESCRIPTION

When CRAWL starts after operating the CRAWL switch, the CRAWL indicator light turns on. While CRAWL is in the process of stopping, the CRAWL indicator light begins blinking. When CRAWL totally stops, the CRAWL indicator light turns off.

WIRING DIAGRAM



INSPECTION PROCEDURE

Refer to "CRAWL Indicator Light Remains On" (Click here).

NOTICE:

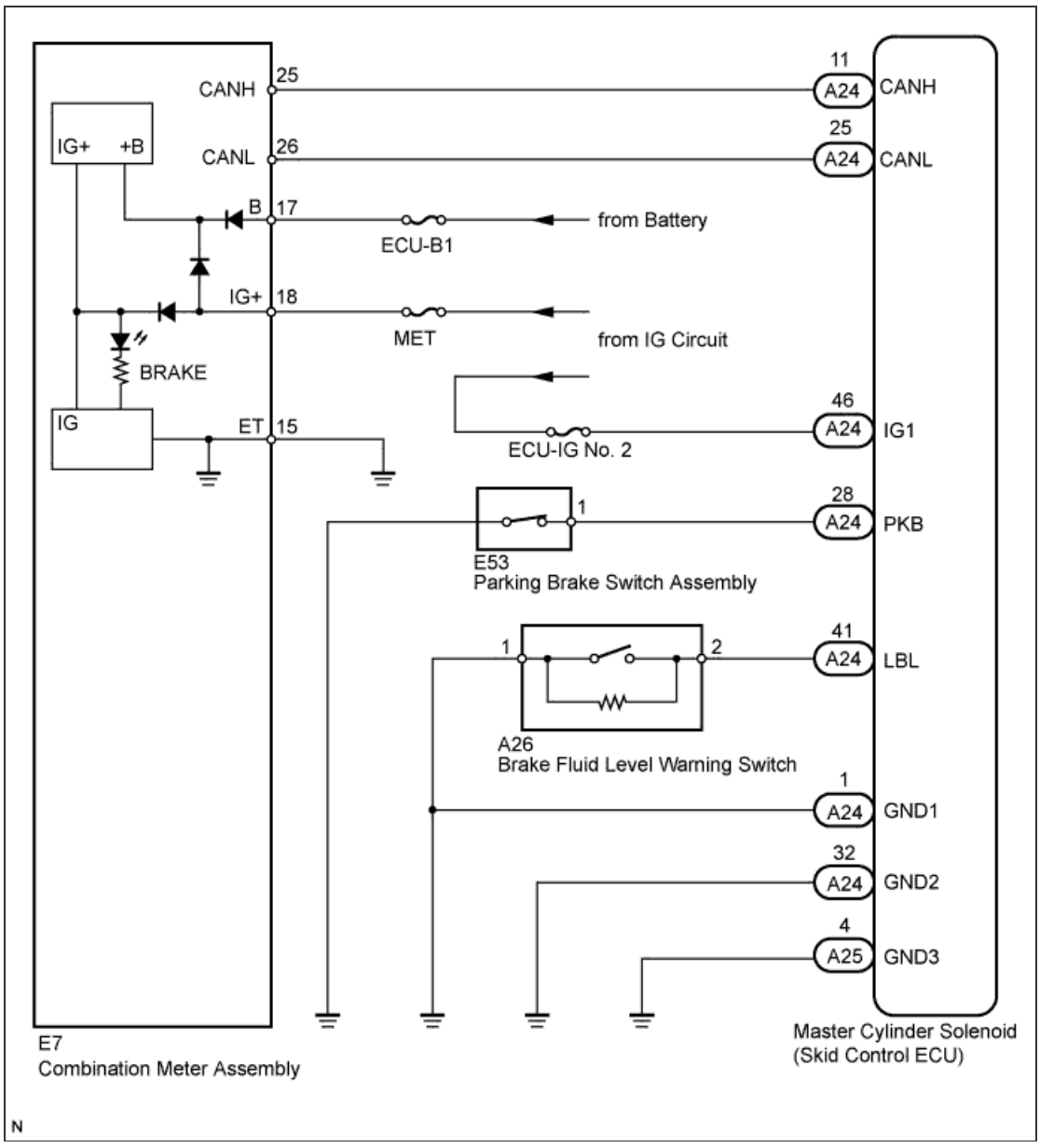
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

for Preparation Click here

DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK DTC

a. Check for DTCs (Click here).

Result

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

B → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (Click here)

A

2.INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU connector connection.

OK:
The connector is securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

3.INSPECT BATTERY

a. Check the battery voltage.

Standard voltage:
11 to 14 V

Result

Result		Proceed to
OK		A
NG	for E	B
	for 1VD-FTV	C
	for 3UR-FE	D

B → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

C → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

D → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

A

4.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication		A
"Bus Check" indicates malfunctions in CAN communication	for LHD	B
	for RHD	C

OK:
"Bus Check" indicates no malfunctions in CAN communication.

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED

WITH TROUBLESHOOTING) (Click here)

A

5.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	for LHD	B
	for RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

6.CHECK OPERATION OF BRAKE WARNING LIGHT (ACTIVE TEST)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the brake warning light by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Brake	Brake Warning Light	Warning light ON/OFF	-

OK:

The warning light turns on when operating the intelligent tester.

Result

Result		Proceed to
OK		A
NG	w/ Multi-information Display	B
	w/o Multi-information Display	C

B → REPLACE COMBINATION METER ASSEMBLY (Click here)

C → REPLACE COMBINATION METER ASSEMBLY (Click here)

A

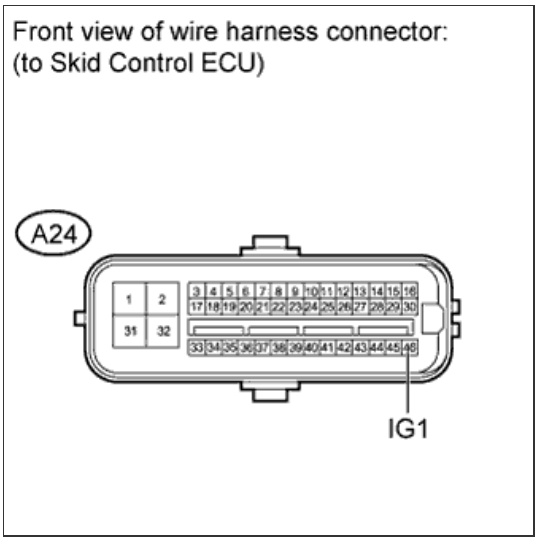
7.INSPECT SKID CONTROL ECU (IG1 TERMINAL)

a. Disconnect the A skid control ECU connector.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A (IG1) - Body ground	Ignition switch ON	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

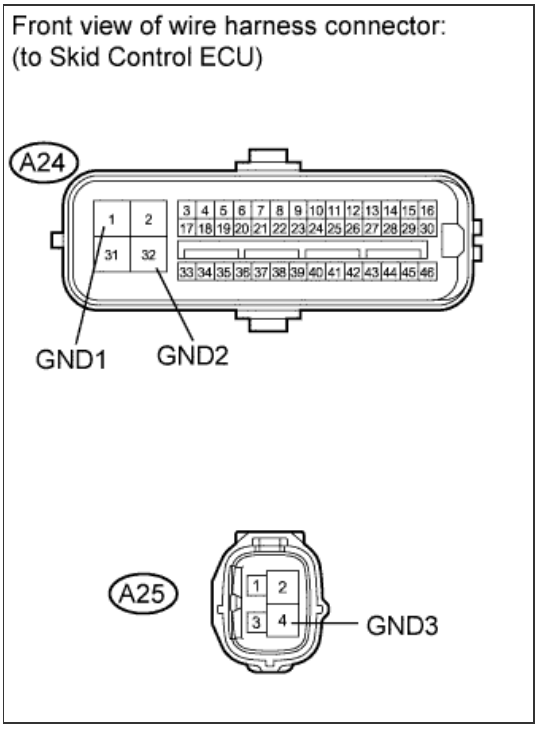
8.INSPECT SKID CONTROL ECU (GND TERMINAL)

a. Disconnect the A and A skid control ECU connectors.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A (GND1) - Body ground	Always	Below 1 Ω
A (GND Body ground	Always	Below 1 Ω
A (GND3) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

9.INSPECT PARKING BRAKE SWITCH

a. Disconnect the E53 parking brake switch connector.

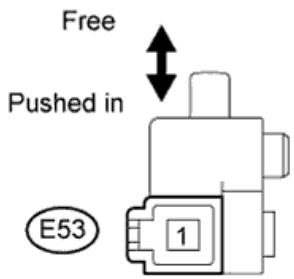
b. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Switch Condition	Specified Condition

1 - Body ground	Parking brake switch on (Switch pin free)	Below 1 Ω
1 - Body ground	Parking brake switch off (Switch pin pushed in)	1 kΩ or higher

Component without harness connected:
(Parking Brake Switch)



NG → REPLACE PARKING BRAKE SWITCH ASSEMBLY (Click here)

OK

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

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

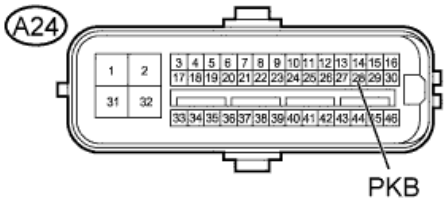
Standard Resistance:

Tester Connection	Condition	Specified Condition
A (PKB) - E53-1	Always	Below 1 Ω
A (PKB) - Body ground	Always	1 kΩ or higher

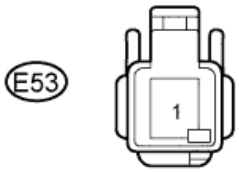
Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

Front view of wire harness connector:
(to Skid Control ECU)



Front view of wire harness connector:
(to Parking Brake Switch)



B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

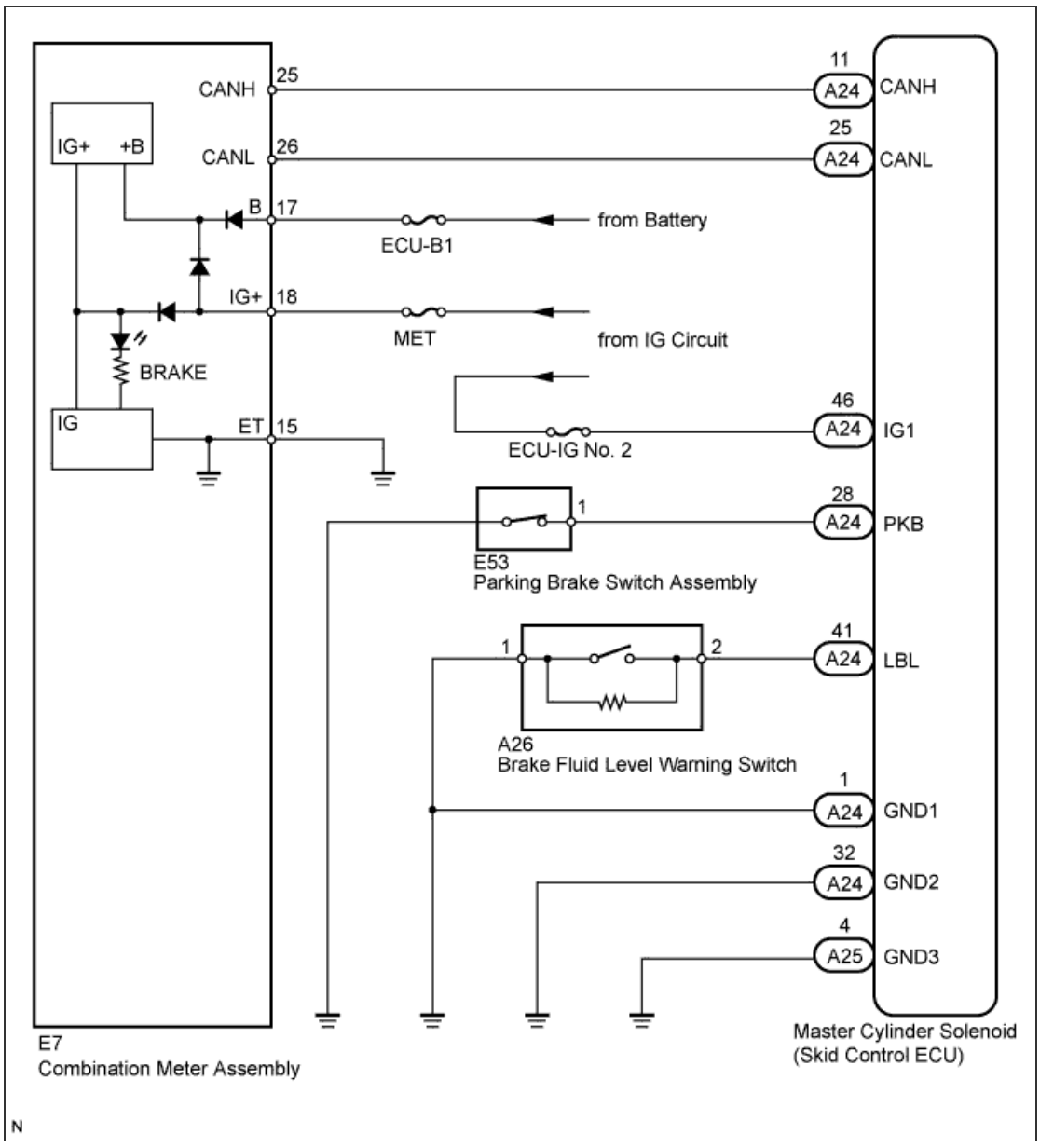
REPAIR OR REPLACE HARNESS OR CONNECTOR

for Preparation Click here

DESCRIPTION

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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.INSPECT BRAKE WARNING LIGHT

a. Disconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

c. Check that the BRAKE warning light comes on.

OK:

BRAKE warning light comes on.

Result

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication		A
"Bus Check" indicates malfunctions in CAN communication	for LHD	B
	for RHD	C

OK:
"Bus Check" indicates no malfunctions in CAN communication.

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

3.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (for LHD: Click here/ for RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	for LHD	B
	for RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

4.CHECK OPERATION O BRAKE WARNING LIGHT ACTIVE TEST

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the brake warning light by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Brake	Brake Warning Light	Warning light ON/OFF	-

OK:

The warning light turns on when operating the intelligent tester.

Result

Result		Proceed to
OK		A
NG	w/ Multi-information Display	B
	w/o Multi-information Display	C

B → REPLACE COMBINATION METER ASSEMBLY Click here)

C → REPLACE COMBINATION METER ASSEMBLY Click here)

A

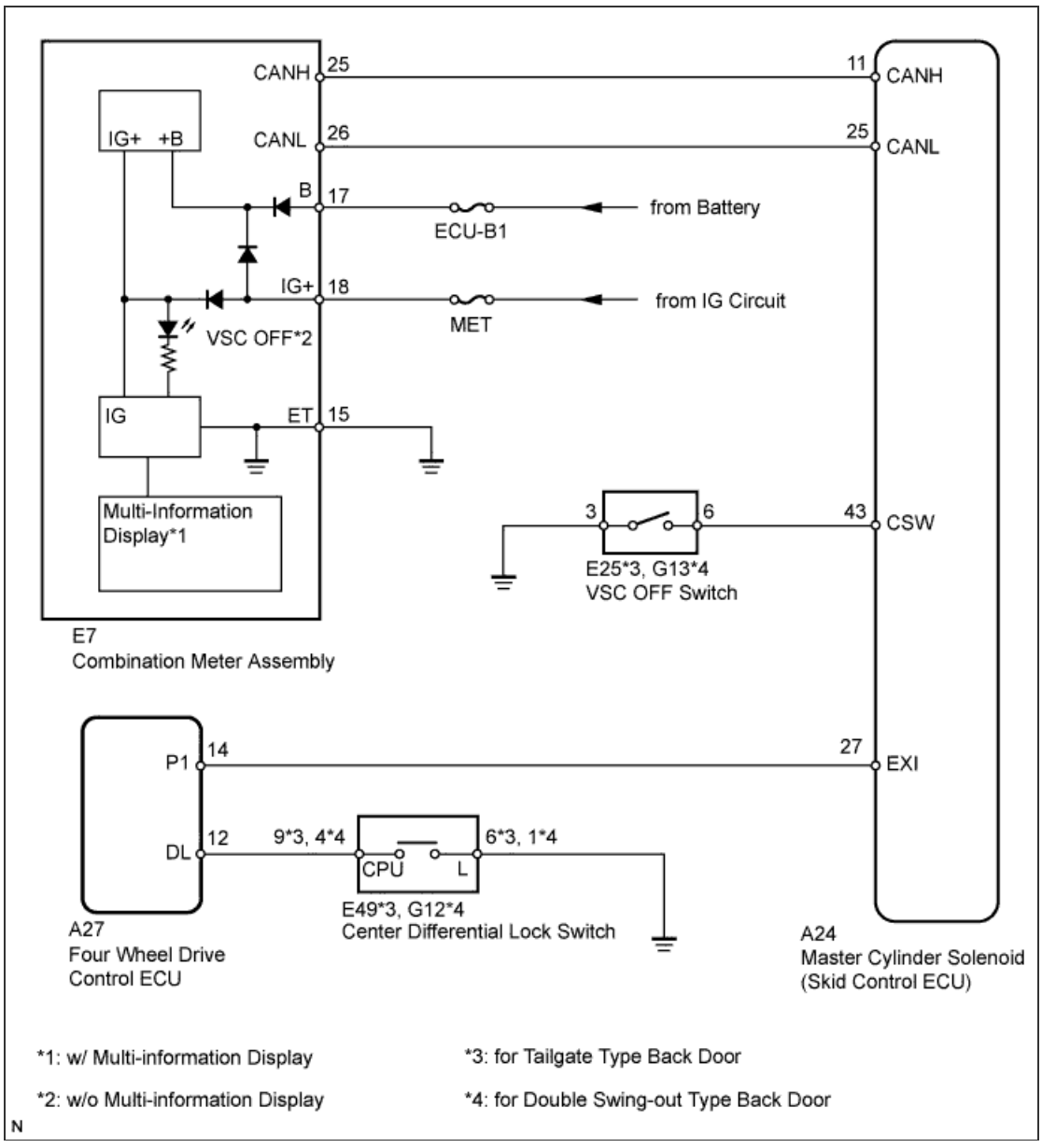
USE SIMULATION METHOD TO CHECK Click here)

for Preparation Click here

DESCRIPTION

When the center differential is locked or the VSC OFF switch is operated, VSC control turns off and the VSC OFF indicator illuminates.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK DTC

a. Check for DTCs (Click here).

Result

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

B → REPAIR CIRCUIT INDICATED BY OUTPUT DTC (Click here)

A

2.INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU connector connection.

OK:
The connector is securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

3.INSPECT BATTERY

a. Check the battery voltage.

Standard voltage:
11 to 14 V

Result

Result		Proceed to
OK		A
NG	for 2UZ-FE	B
	for 1VD-FTV	C
	for 3UR-FE	D

B → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

C → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

D → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

A

4.INSPECT SKID CONTROL ECU (EXI TERMINAL)

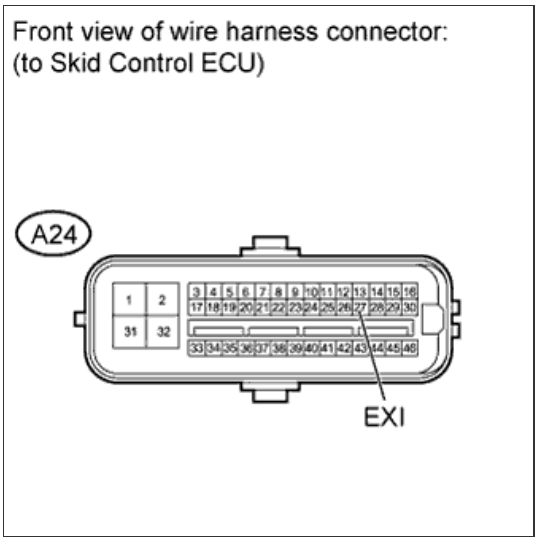
a. Disconnect the A24 skid control ECU connector.

b. Turn the ignition switch to ON.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-27 (EXI) - Body ground	Center differential free (Center differential lock switch off) (Center differential lock detection switch off)	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication		A
"Bus Check" indicates malfunctions in CAN communication	for LHD	B
	for RHD	C

OK:
"Bus Check" indicates no malfunctions in CAN communication.

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

6.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	for LHD	B
	for RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

7.CHECK OPERATION OF VSC OFF INDICATOR (ACTIVE TEST)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the VSC OFF indicator by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp VSC OFF	VSC OFF Indicator	Indicator ON/OFF	-

OK:

The indicator turns on/off when operating the intelligent tester.

Result

Result		Proceed to
OK	for LHD	A
	for RHD	B
NG	w/ Multi-information Display	C
	w/o Multi-information Display	D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE COMBINATION METER ASSEMBLY (Click here)

D → REPLACE COMBINATION METER ASSEMBLY (Click here)

A

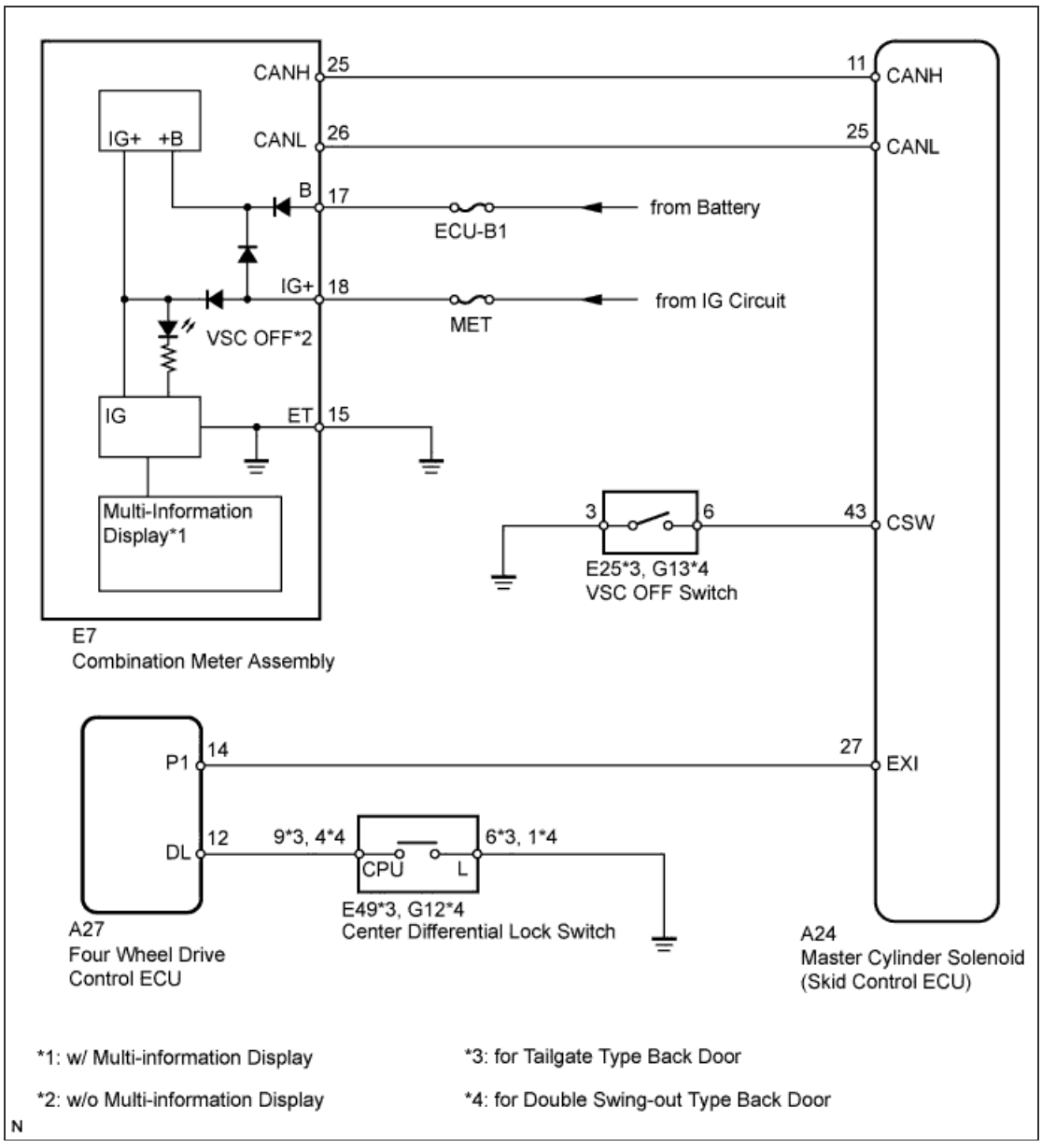
REPLACE MASTER CYLINDER SOLENOID (Click here)

for Preparation Click here

DESCRIPTION

When the center differential is locked or the VSC OFF switch is operated, VSC control turns off and the VSC OFF indicator illuminates.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication		A
"Bus Check" indicates malfunctions in CAN communication	for LHD	B
	for RHD	C

OK:

Bs Check indicates no malfunctions in CAN communication.

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING Click here

C → GO TO CAN COMMUNICATION SYSTEM HOW TOPROCEED WITH TROUBLESHOOTING Click here

A

.CHECK DTC (CAN COMMUNICATION SYSTEM

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	for LHD	B
	for RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING Click here

C → GO TO CAN COMMUNICATION SYSTEM HOW TOPROCEED WITH TROUBLESHOOTING Click here

A

.CHECK OPERATION OF VSC OFF INDICATOR (ACTIVE TEST

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the VSC OFF indicator by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp VSC OFF	VSC OFF Indicator	Indicator ON/OFF	-

OK:

The indicator turns on when operating the intelligent tester.

Result

Result		Proceed to
OK	for LHD	A
	for RHD	B
NG	w/ Multi-information Display	C
	w/o Multi-information Display	D

B → REPLACE MASTER CYLINDER SOLENOID (Click here

C → REPLACE COMBINATION METER ASSEMBLY (Click here

D → REPLACE COMBINATION METER ASSEMBLY (Click here

A

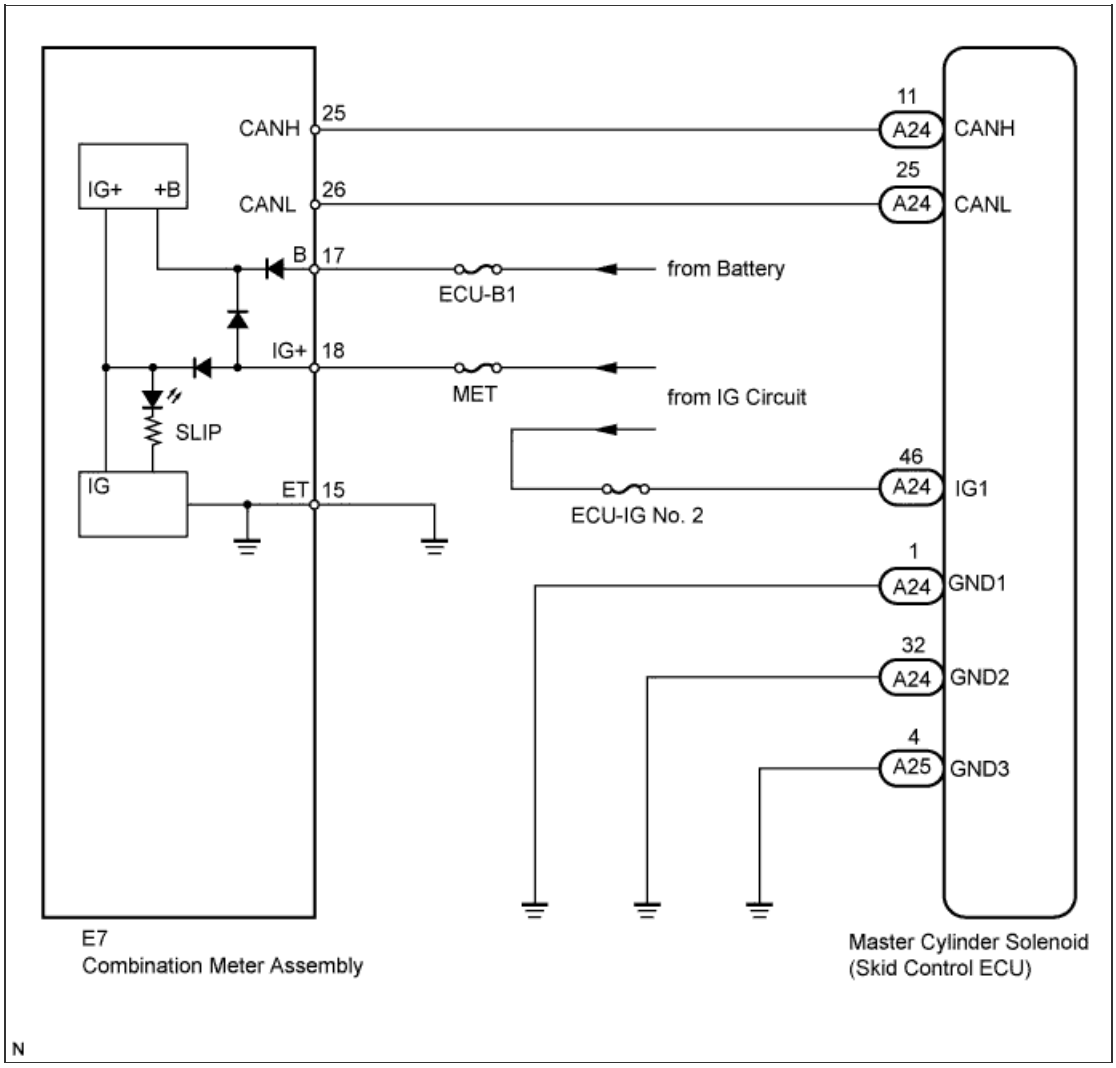
REPLACE MASTER CYLINDER SOLENOID (Click here

for Preparation Click here

DESCRIPTION

The SLIP indicator light blinks during VSC, A-TRC, CRAWL or hill-start assist control operation.
When the system fails, the SLIP indicator light comes on to warn the driver (Click here).

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **When replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

1.INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU connector connection.

OK:
The connector is securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

2.INSPECT BATTERY

a Check the battery voltage.

Standard voltage:
11 to 14 V

Result

Result		Proceed to
OK		A
NG	for 2UZ-FE	B
	for 1VD-FTV	C
	for 3UR-FE	D

B → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

C → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

D → GO TO CHARGING SYSTEM (ON-VEHICLE INSPECTION) (Click here)

A

3.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication		A
"Bus Check" indicates malfunctions in CAN communication	for LHD	B
	for RHD	C

OK:
"Bus Check" indicates no malfunctions in CAN communication.

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

4.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (LHD: Click here/RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	for LHD	B
	for RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

5.CHECK OPERATION OF SLIP INDICATOR LIGHT (ACTIVE TEST)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the slip indicator light by operating the intelligent tester.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Slip	Slip Indicator Light	Indicator light ON/OFF	-

OK:

The indicator light turns on/off when operating the intelligent tester.

Result

Result		Proceed to
OK	for LHD	A
	for RHD	B
NG	w/ Multi-information Display	C
	w/o Multi-information Display	D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE COMBINATION METER ASSEMBLY (Click here)

D → REPLACE COMBINATION METER ASSEMBLY (Click here)

A

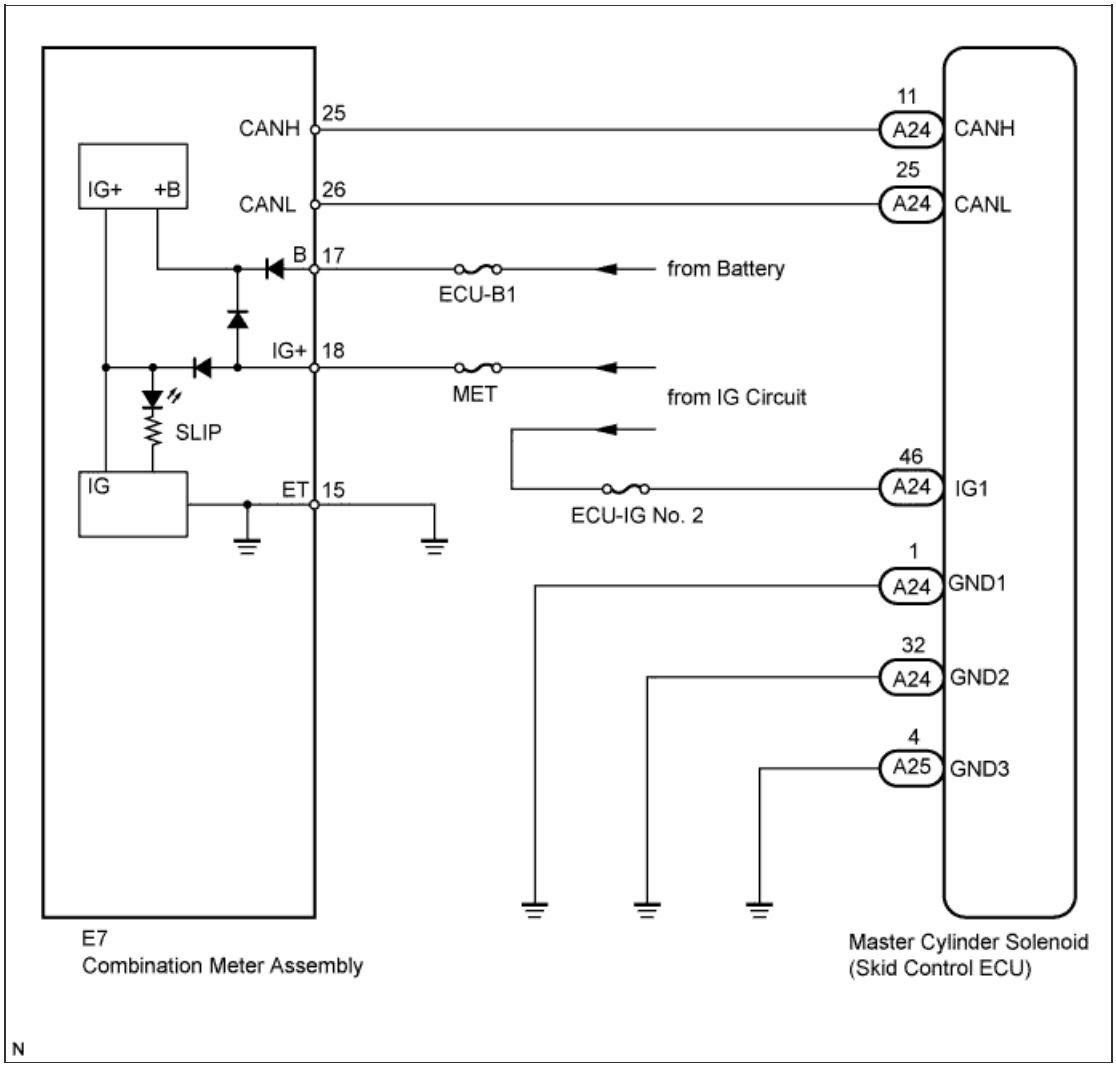
REPLACE MASTER CYLINDER SOLENOID (Click here)

for Preparation Click here

DESCRIPTION

The SLIP indicator light blinks during VSC, A-TRC, CRAWL or hill-start assist control operation.
When the system fails, the SLIP indicator light comes on to warn the driver (Click here).

WIRING DIAGRAM



INSPECTION PROCEDURE

Refer to "Slip Indicator Light Remains On" (Click here).

NOTICE:

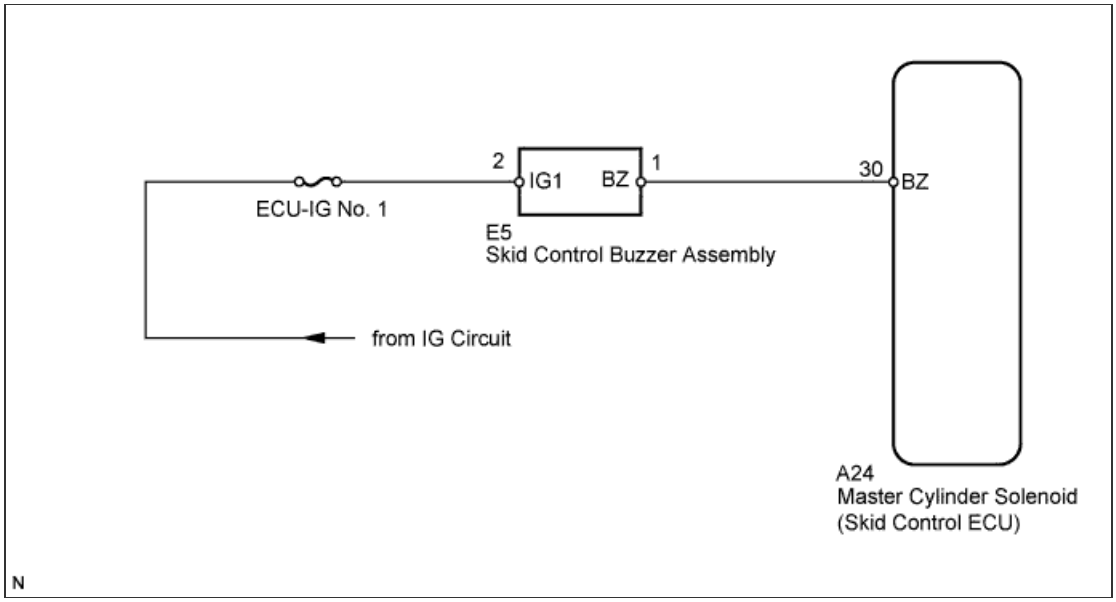
- **Inspect the fuses for circuits related to this s stem before performing the follo ing inspection procedure.**

for Preparation Click here

DESCRIPTION

The skid control buzzer sounds while the accumulator pressure is abnormally low or an abnormality causing low fluid pressure occurs, and the skid control buzzer sounds intermittently while the VSC and hill-start assist control is activated.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.PERFORM ACTIVE TEST USING INTELLIGENT TESTER (BU ER)

a. Connect the intelligent tester to the DLC3.

. Turn the ignition switch to ON and turn the intelligent tester on.

c. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Buzzer	Skid control buzzer	Buzzer ON/OFF	The buzzer can be heard.

d. Check that the buzzer sounds/stops when turning the skid control buzzer on/off by using the intelligent tester.

Re ult

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

A → USE SIMULATION METHOD TO CHEC (Click here)

B

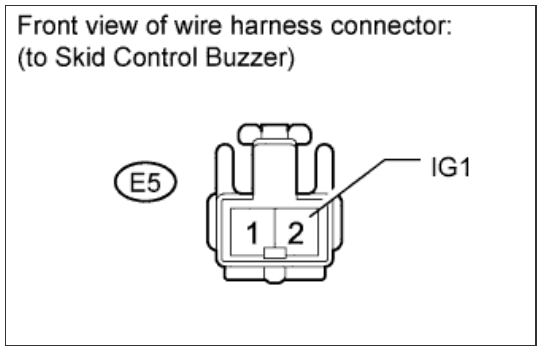
2.INSPECT S D CONTROL BU ER (POWER SOURCE TERMINAL)

a. Disconnect the E5 skid control buzzer connector.

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

Standard Volta e:

Tester Connection	Switch Condition	Specified Condition
E5-2 (IG1) - Body ground	Ignition switch ON	11 to 14 V



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

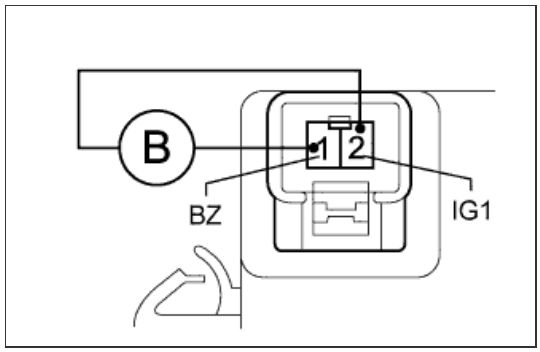
O

.INSPECT S D CONTROL BU ER

a. Apply battery voltage to the skid control buzzer, and check that the buzzer sounds.

O :

Measurement Condition	Specified Condition
Battery positive (+) voltage - Terminal 2 (IG1)	Skid control buzzer sounds.
Battery negative (-) voltage - Terminal 1 (BZ)	



NG → REPLACE S D CONTROL BU ER ASSEMBLY (Click here)

O

.CHEC HARNESS A D CONNECTOR (S D CONTROL BU ER - S D CONTROL ECU)

a. Disconnect the A24 skid control ECU connector.

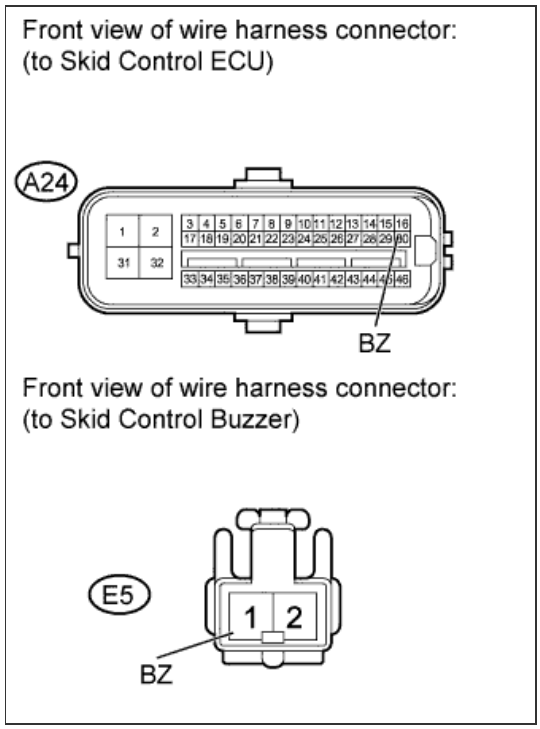
. Measure the resistance according to the value(s) in the table below.

Standard Re i tance:

Tester Connection	Condition	Specified Condition
A24-30 (BZ) - E5-1 (BZ)	Always	Below 1 Ω
A24-30 (BZ) - Body ground	Always	10 kΩ or higher

Re ult

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C



B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A → REPAIR OR REPLACE HARNESS OR CONNECTOR

for Preparation Click here

DESCRIPTION

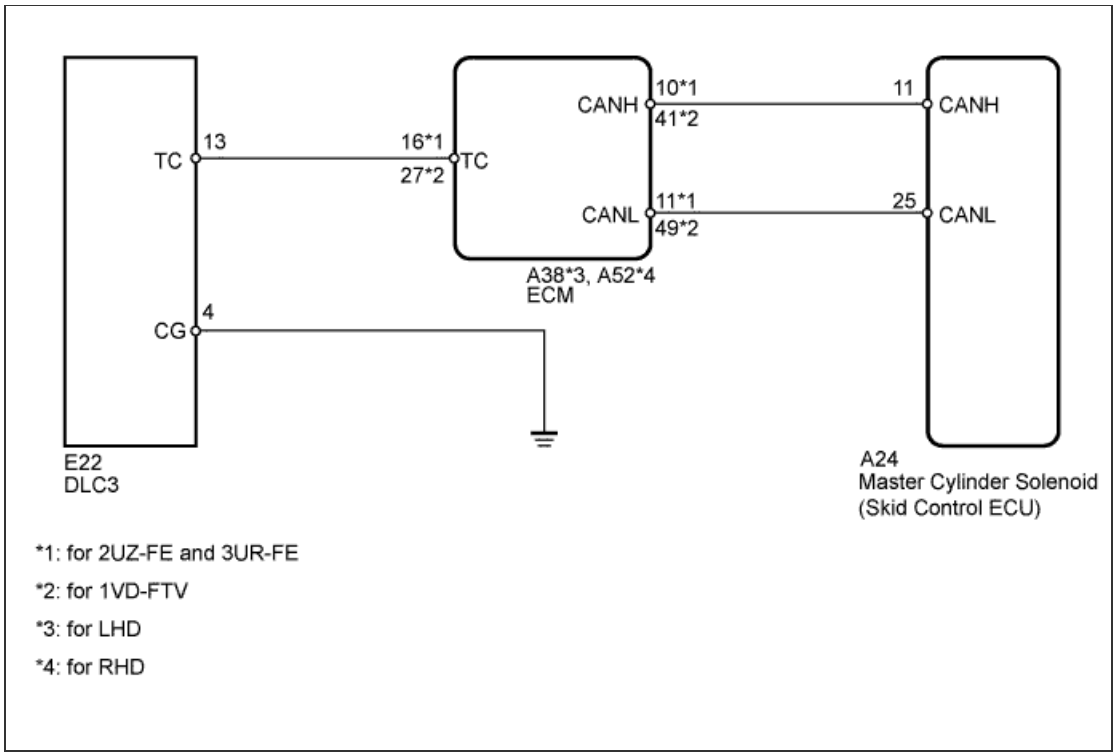
DTC output mode is set by connecting terminals TC and CG of the DLC3.
The DTCs are output to the multi-information display*1, and output by the blinking of the ABS warning light and VSC OFF indicator light*2.

HINT:

*1: w/ Multi-information Display

*2: w/o Multi-information Display

WIRING DIAGRAM



HINT:

When each warning light stays blinking, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in each ECU is suspected.

INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

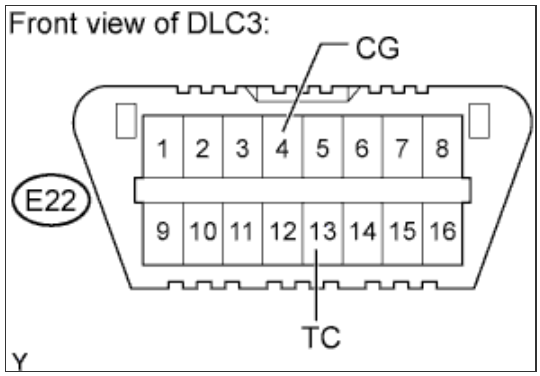
1.INSPECT DLC3 (DLC3 (TC) - DLC3 (CG))

a. Turn the ignition switch to ON.

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

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
E22-13 (TC) - E22-4 (CG)	Ignition switch ON	11 to 14 V



NG → Go to step 4

OK

2.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Select "Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

Result

Result		Proceed to
"Bus Check" indicates no malfunctions in CAN communication		A
"Bus Check" indicates malfunctions in CAN communication	for LHD	B
	for RHD	C

OK:
"Bus Check" indicates no malfunctions in CAN communication.

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

3.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (for LHD: Click here/ for RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output		A
CAN system DTC is output	for LHD	B
	for RHD	C

B → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

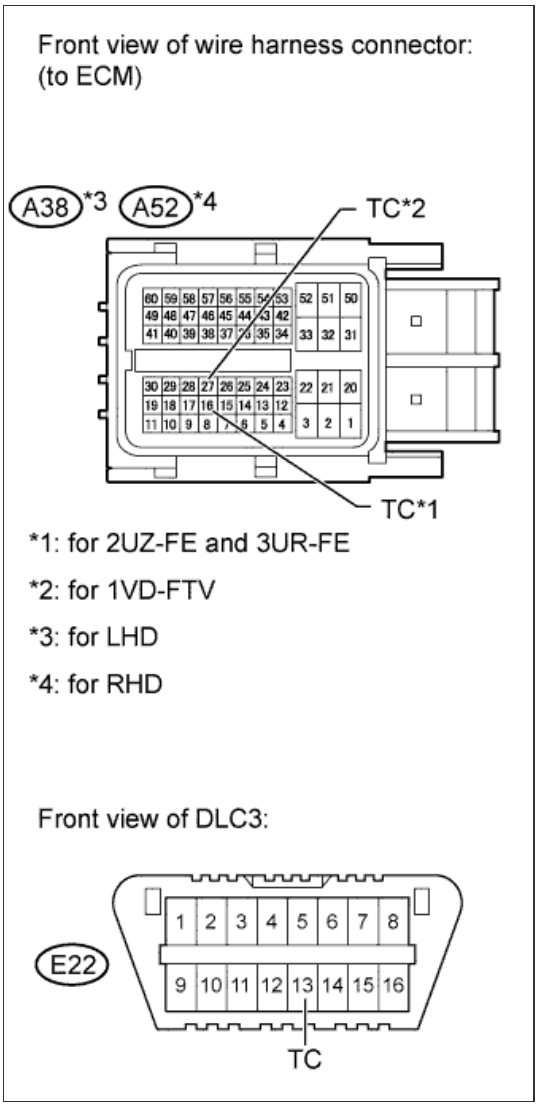
4.CHECK HARNESS AND CONNECTOR (ECM - DLC3 (TC))

a. Turn the ignition switch off.

b. for LHD:
Disconnect the A38 ECM connector.

c. for RHD:
Disconnect the A52 ECM connector.

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



Standard Resistance:

for LHD (2UZ-FE and 3UR-FE)

Tester Connection	Condition	Specified Condition
A38-16 (TC) - E22-13 (TC)	Always	Below 1 Ω

for LHD (1VD-FTV)

Tester Connection	Condition	Specified Condition
A38-27 (TC) - E22-13 (TC)	Always	Below 1 Ω

for RHD (2UZ-FE)

Tester Connection	Condition	Specified Condition
A52-16 (TC) - E22-13 (TC)	Always	Below 1 Ω

for RHD (1VD-FTV)

Tester Connection	Condition	Specified Condition
A52-27 (TC) - E22-13 (TC)	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

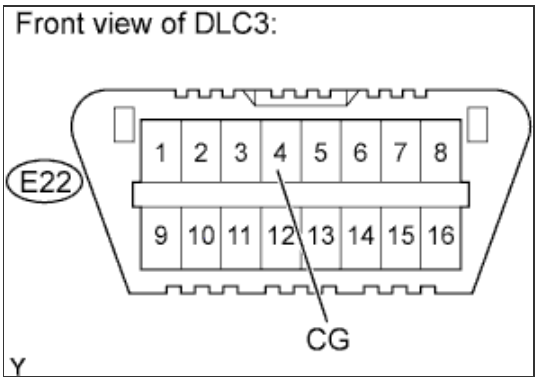
OK

5.CHECK HARNESS AND CONNECTOR (DLC3 (CG) - BODY GROUND)

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E22-4 (CG) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

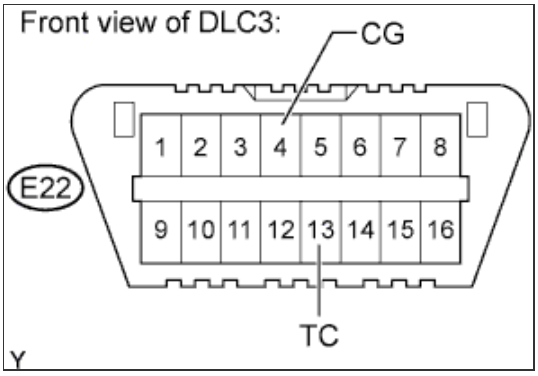
6.CHECK ECM (DLC3 (TC) INPUT)

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

b. Check that the malfunction indicator lamp is blinking.

Result

Result	Proceed to
MIL is blinking	A
MIL is not blinking	B



B → REPAIR OR REPLACE WIRE HARNESS OR ECM

A

7.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the intelligent tester to the DLC3.

c. Turn the ignition switch to ON and the intelligent tester on.

d. Check for DTCs (for LHD: Click here/ for RHD: Click here).

Result

Result		Proceed to
CAN system DTC is not output	for LHD	A
	for RHD	B
CAN system DTC is output	for LHD	C
	for RHD	D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

D → GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

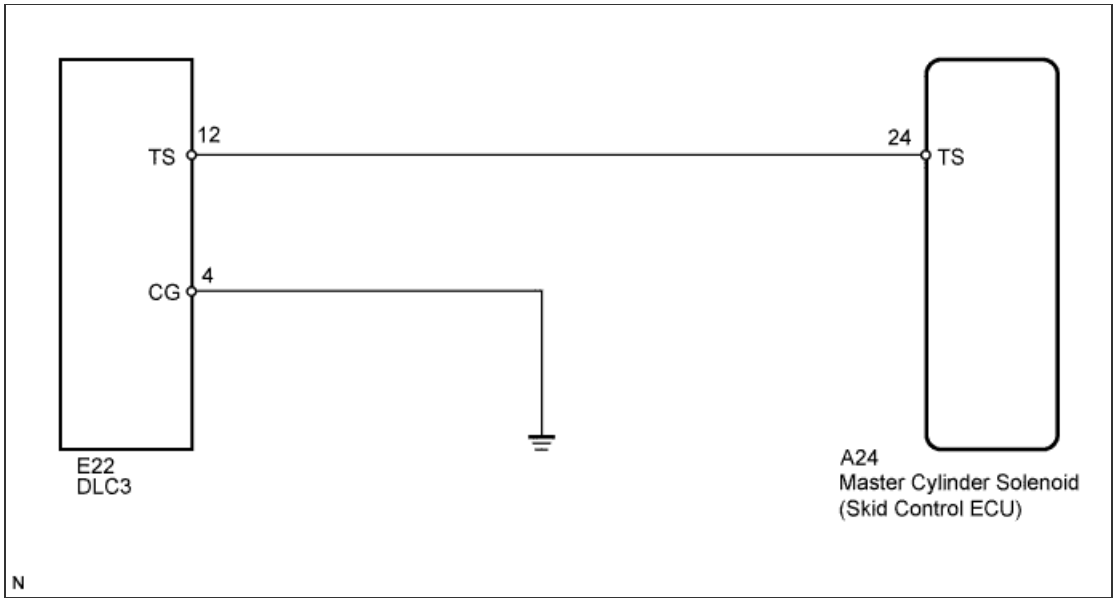
REPLACE MASTER CYLINDER SOLENOID (Click here)

for Preparation Click here

DESCRIPTION

The signal check circuit detects trouble in the sensor or switch signal which cannot be detected by the DTC check.
Connecting terminals TS and CG of the DLC3 starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the master cylinder solenoid, perform zero point calibration (Click here).

1.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU DLC (TS

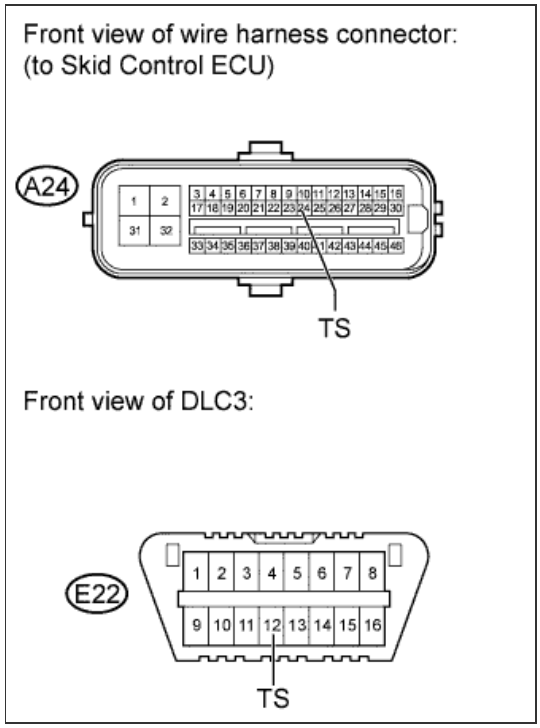
a. Turn the ignition switch off.

. Disconnect the A24 skid control ECU connector.

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

Standard Resistance:

Tester Connection	Condition	Specified condition
A24-24 (TS) - E22-12 (TS)	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

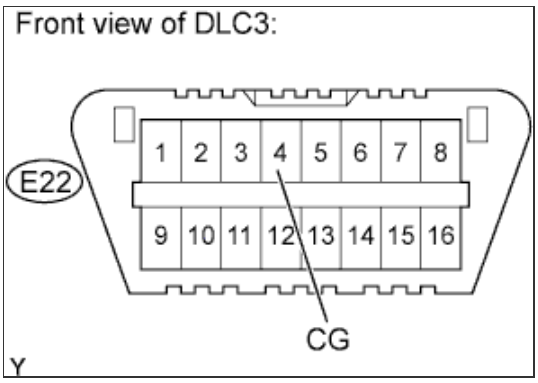
OK

.CHECK HARNESS AND CONNECTOR (DLC (CG BODY GROUND

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

Standard Resistance:

Tester Connection	Condition	Specified condition
E22-4 (CG) - Body ground	Always	Below 1 Ω



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK HARNESS AND CONNECTOR (DLC (TS BODY GROUND

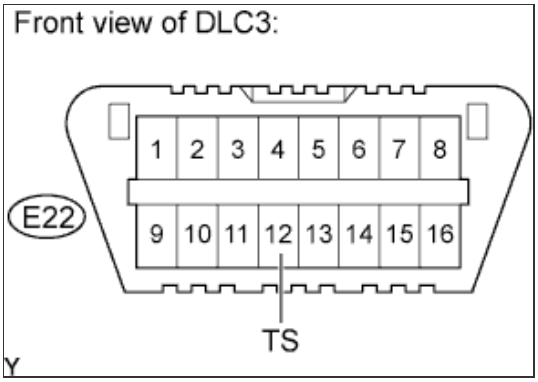
a. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
E22-12 (TS) - Body ground	Always	10 kΩ or higher

Re ult

Result		Proceed to
NG		A
OK	for LHD	B
	for RHD	C



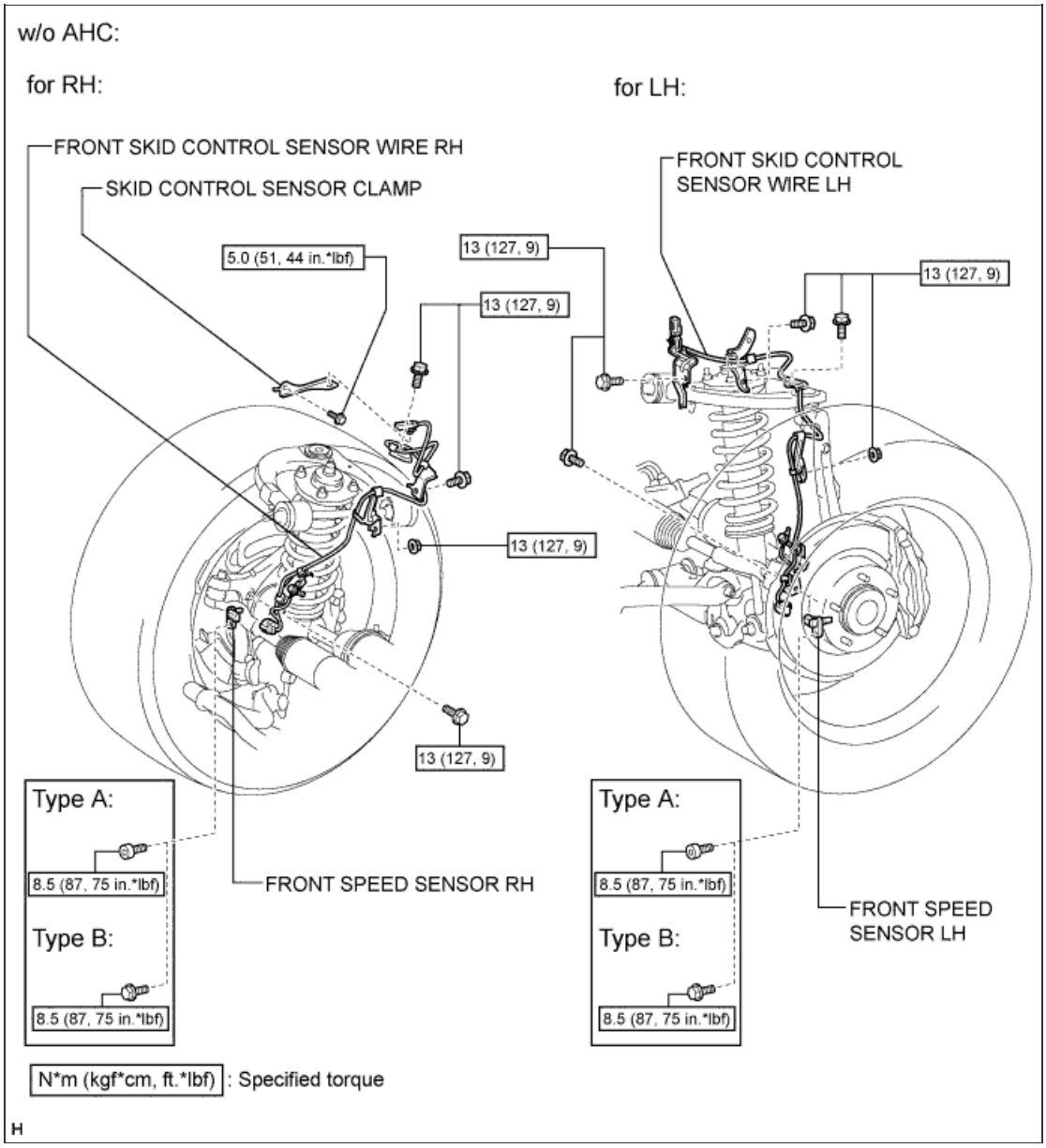
B → REPLACE MASTER CYLINDER SOLENOID (Click here

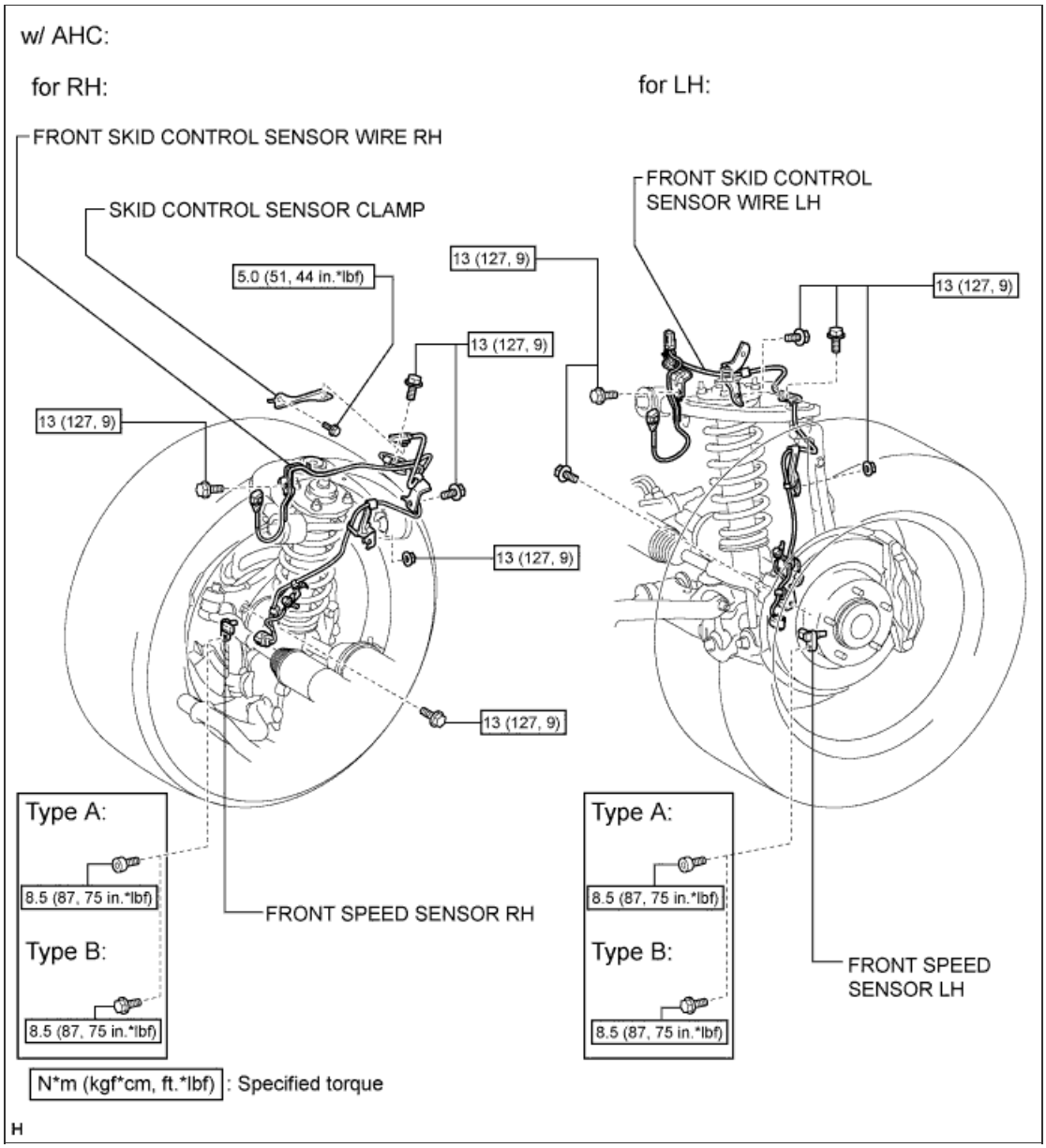
C → REPLACE MASTER CYLINDER SOLENOID (Click here

A

REPAIR OR REPLACE HARNESS OR CONNECTOR

for Preparation Click here




w/ AHC:
for RH:
for LH:
FRONT SKID CONTROL SENSOR WIRE RH
SKID CONTROL SENSOR CLAMP
FRONT SKID CONTROL SENSOR WIRE LH
5.0 (51, 44 in.*lbf)
13 (127, 9)
13 (127, 9)
13 (127, 9)
13 (127, 9)
13 (127, 9)
13 (127, 9)
13 (127, 9)
Type A:
8.5 (87, 75 in.*lbf)
Type B:
8.5 (87, 75 in.*lbf)
FRONT SPEED SENSOR RH
Type A:
8.5 (87, 75 in.*lbf)
Type B:
8.5 (87, 75 in.*lbf)
FRONT SPEED SENSOR LH
N*m (kgf*cm, ft.*lbf) : Specified torque
H

for Preparation Click here

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

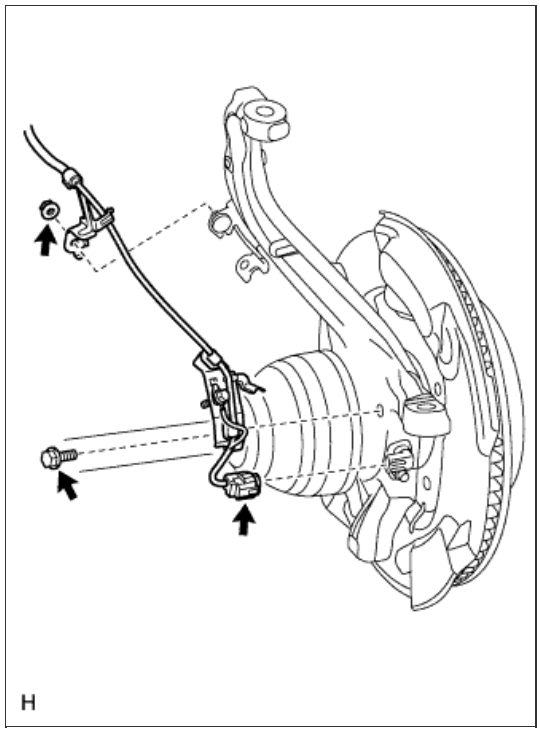
2. REMOVE FRONT WHEEL

3. REMOVE FRONT SKID CONTROL SENSOR WIRE LH

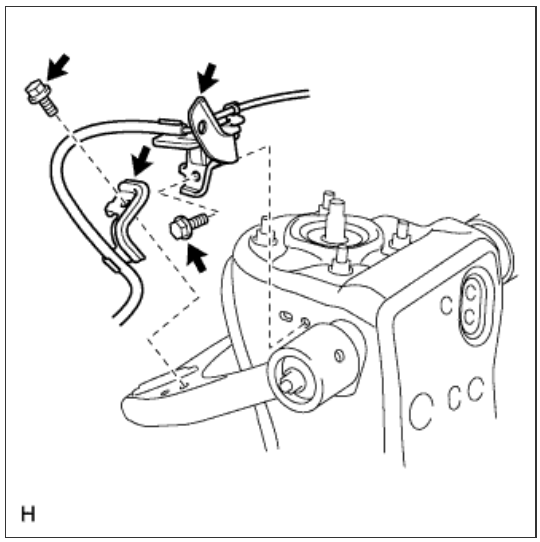
a. Disconnect the connector from the front speed sensor.

b. Remove the bolt and harness clamp.

c. Remove the nut and harness clamp.

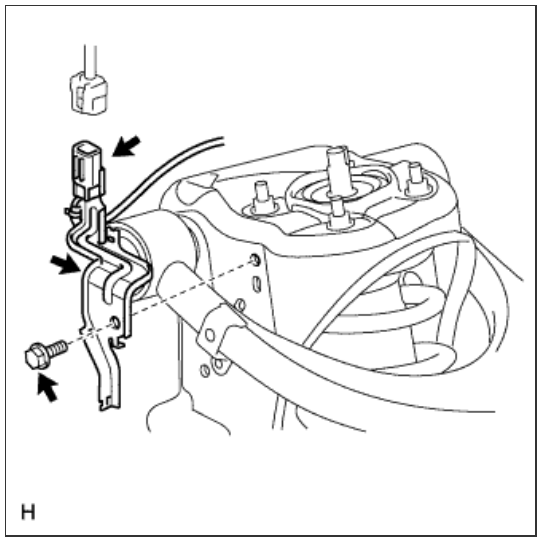


d. Remove the 2 bolts and 2 harness clamps.

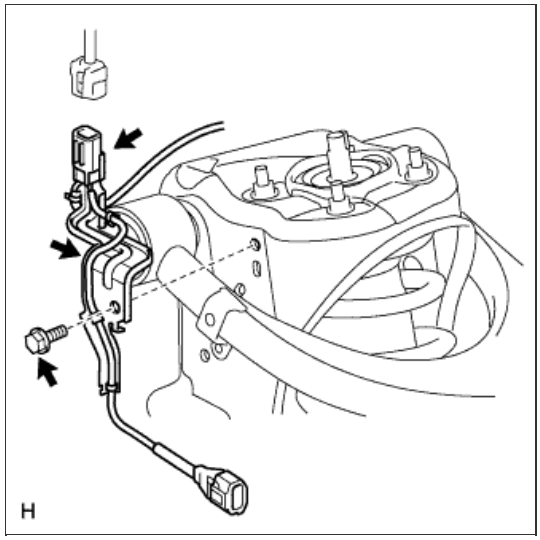


e. w/o AHC:

e. w/o AHC:
Disconnect the connector and then remove the bolt, harness clamp and sensor wire.



f. w/ AHC:
Disconnect the 2 connectors and then remove the bolt, harness clamp and sensor wire.



4. REMOVE FRONT SPEED SENSOR LH

a. Type A:

i. Using a 5 mm hexagon wrench, remove the bolt and speed sensor from the knuckle.

NOTICE:

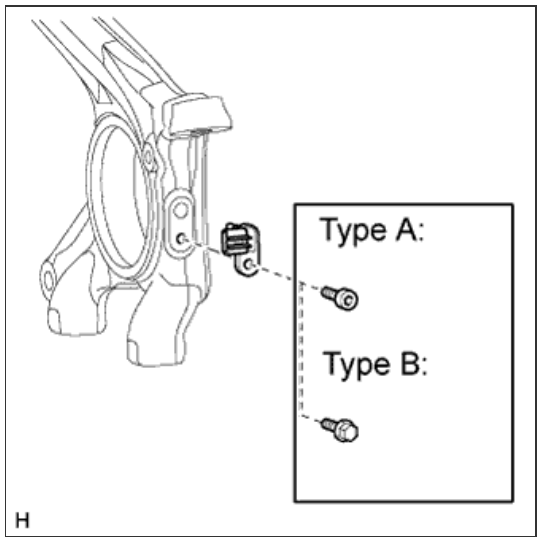
Pull out the sensor while trying as much as possible not to rotate it.

b. Type B:

i. Remove the bolt and speed sensor from the knuckle.

NOTICE:

Pull out the sensor while trying as much as possible not to rotate it.

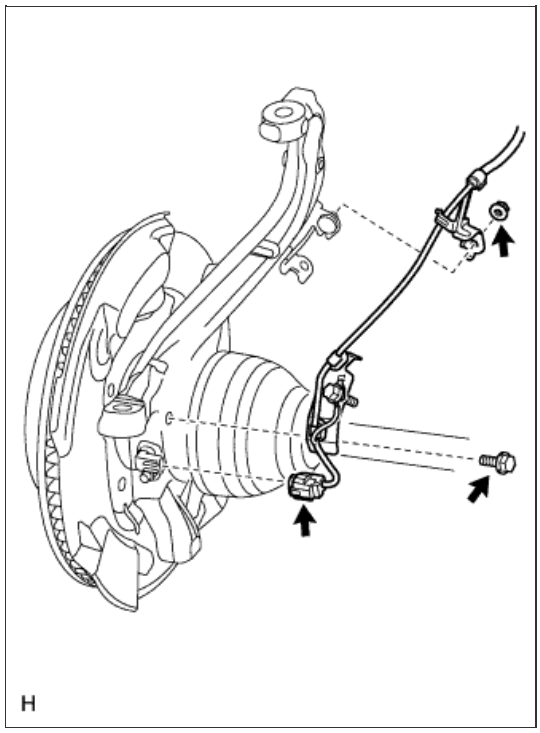


5. REMOVE FRONT SKID CONTROL SENSOR WIRE RH

a. Disconnect the connector from the front speed sensor.

b. Remove the bolt and harness clamp.

c. Remove the nut and harness clamp.



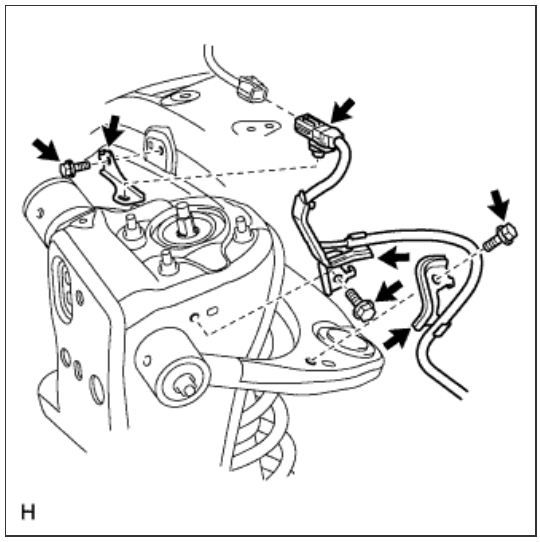
d. w/o AHC:

i. Disconnect the connector.

ii. Detach the connector from the skid control sensor clamp.

iii. Remove the bolt and skid control sensor clamp.

iv. Remove the 2 bolts, 2 harness clamps and sensor wire.



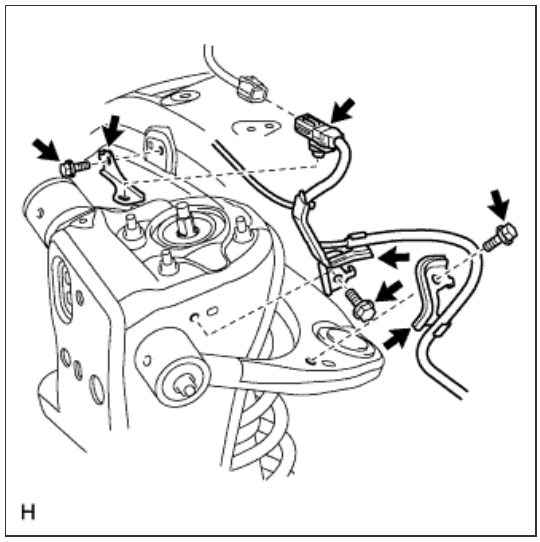
e. w/ AHC:

i. Disconnect the connector.

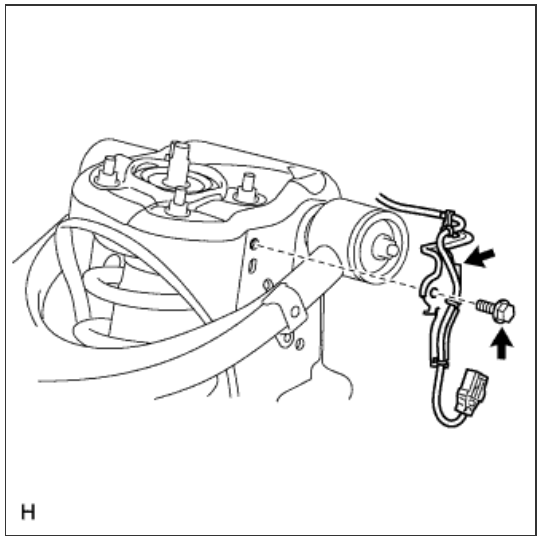
ii. Detach the connector from the skid control sensor clamp.

iii. Remove the bolt and skid control sensor clamp.

iv. Remove the 2 bolts and 2 harness clamps.



v. Disconnect the connector and then remove the bolt, harness clamp and sensor wire.



6. REMOVE FRONT SPEED SENSOR RH

a. Type A:

i. Using a 5 mm hexagon wrench, remove the bolt and speed sensor from the knuckle.

NOTICE:

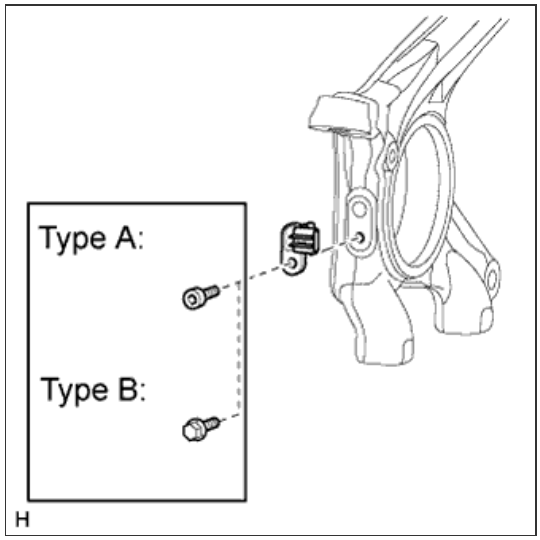
Pull out the sensor while trying as much as possible not to rotate it.

b. Type B:

i. Remove the bolt and speed sensor from the knuckle.

NOTICE:

Pull out the sensor while trying as much as possible not to rotate it.



for Preparation Click here

1. CHECK FRONT SPEED SENSOR

a. Check the sensor.
If any of the following occurs, replace the sensor with a new one:

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

for Preparation Click here

1. INSTALL FRONT SPEED SENSOR LH

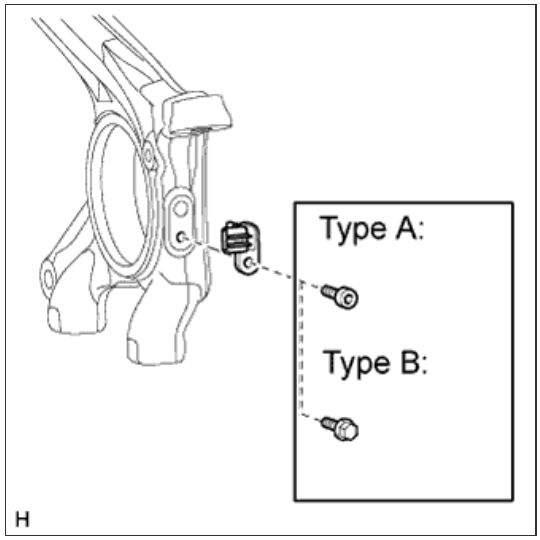
a. Type A:

i. Using a 5 mm hexagon wrench, install the speed sensor with the bolt.

Torque:
8.5 N*m{ 87 kgf*cm , 75 in.*lbf }

NOTICE:

- **Make sure there are no pieces of iron or other foreign matter attached to the sensor tip.**
- **While inserting the speed sensor into the knuckle hole, do not strike or damage the sensor tip.**
- **After installing the speed sensor, make sure there is no clearance or foreign matter between the sensor stay part and the knuckle.**
- **Make sure there is no foreign matter attached to the speed sensor rotor.**



b. Type B:

i. Install the speed sensor with the bolt.

Torque:
8.5 N*m{ 87 kgf*cm , 75 in.*lbf }

NOTICE:

- **Make sure there are no pieces of iron or other foreign matter attached to the sensor tip.**
- **While inserting the speed sensor into the knuckle hole, do not strike or damage the sensor tip.**
- **After installing the speed sensor, make sure there is no clearance or foreign matter between the sensor stay part and the knuckle.**
- **Make sure there is no foreign matter attached to the speed sensor rotor.**

2. INSTALL FRONT SKID CONTROL SENSOR WIRE LH

a. w/o AHC:

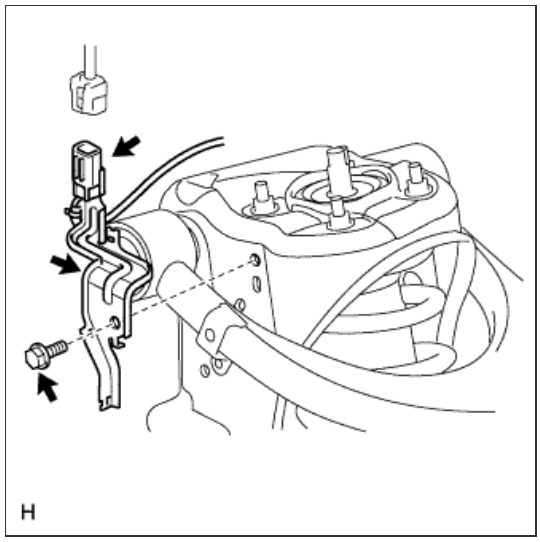
i. Connect the connector.

ii. Install the harness clamp with the bolt.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

NOTICE:

- **When installing the clamp, do not twist the wire harness.**
- **Make sure the clamp rotation stopper touches the installation position.**



b. w/ AHC:

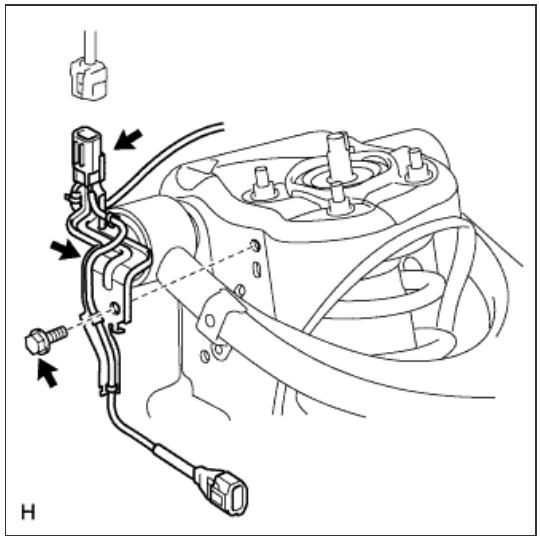
i. Connect the 2 connectors.

ii. Install the harness clamp with the bolt.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

NOTICE:

- **When installing the clamp, do not twist the wire harness.**
- **Make sure the clamp rotation stopper touches the installation position.**

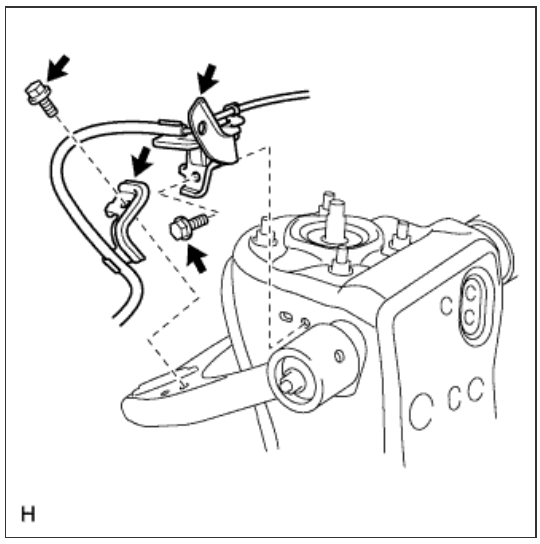


c. Install the 2 harness clamps with the 2 bolts.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

NOTICE:

- **When installing the clamps, do not twist the wire harness.**
- **Make sure the clamp rotation stopper touches the installation position.**

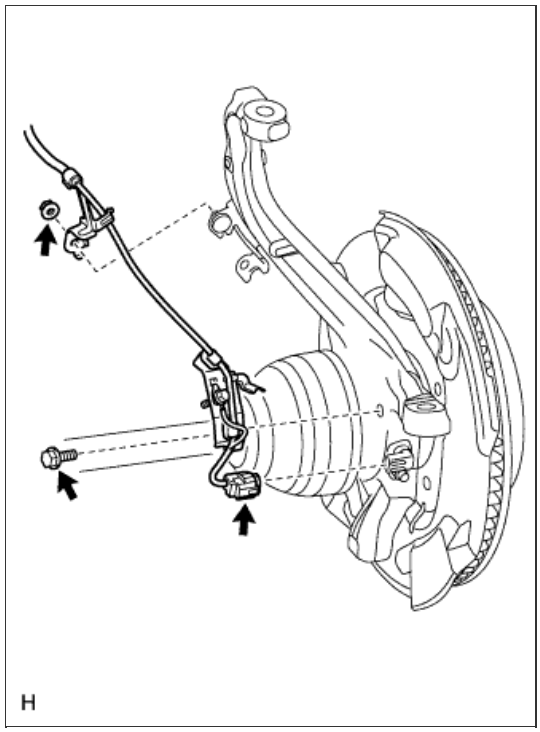


d. Install the harness clamp with the nut.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

NOTICE:

- **When installing the clamp, do not twist the wire harness.**
- **Make sure the clamp rotation stopper touches the installation position.**



e. Install the harness clamp with bolt

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

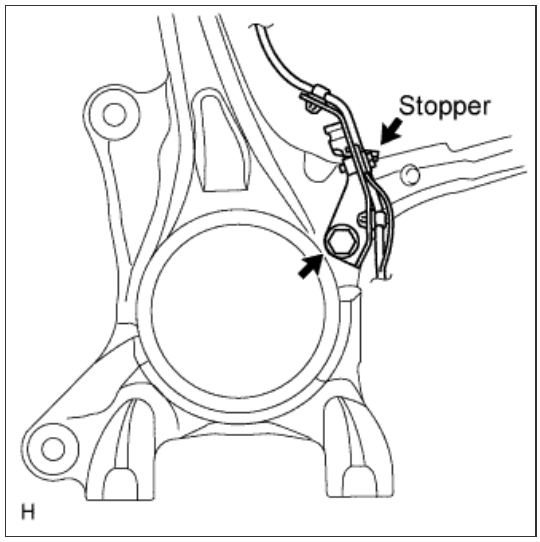
NOTICE:

Install the bracket so that the rotation stopper touches the knuckle.

f. Connect the speed sensor connector.

NOTICE:

Securely connect the connector.



3. INSTALL FRONT SPEED SENSOR RH

a. Type A:

i. Using a 5 mm hexagon wrench, install the speed sensor with the bolt.

Torque:
8.5 N*m{ 87 kgf*cm , 75 in.*lbf }

NOTICE:

- **Make sure there are no pieces of iron or other foreign matter attached to the sensor tip part.**
- **While inserting the speed sensor into the knuckle hole, do not strike or damage the sensor tip part.**
- **After installing the speed sensor, make sure there is no clearance or foreign matter between the sensor stay part and the knuckle.**
- **Make sure there is no foreign matter attached to the**

speed sensor rotor.

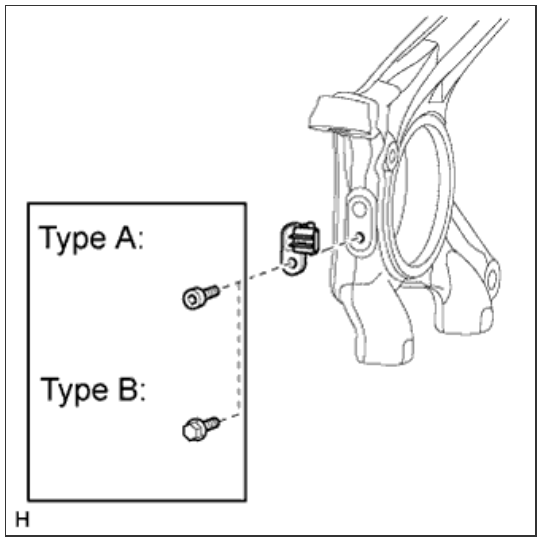
b. Type B:

i. Install the speed sensor with the bolt.

Torque:
8.5 N*m{ 87 kgf*cm , 75 in.*lbf }

NOTICE:

- **Make sure there are no pieces of iron or other foreign matter attached to the sensor tip part.**
- **While inserting the speed sensor into the knuckle hole, do not strike or damage the sensor tip part.**
- **After installing the speed sensor, make sure there is no clearance or foreign matter between the sensor stay part and the knuckle.**
- **Make sure there is no foreign matter attached to the speed sensor rotor.**



4. INSTALL FRONT SKID CONTROL SENSOR WIRE RH

a. w/o AHC:

i. Install the skid control sensor clamp with the bolt (labeled A).

Torque:
for bolt A:
5.0 N*m{ 51 kgf*cm , 44 in.*lbf }

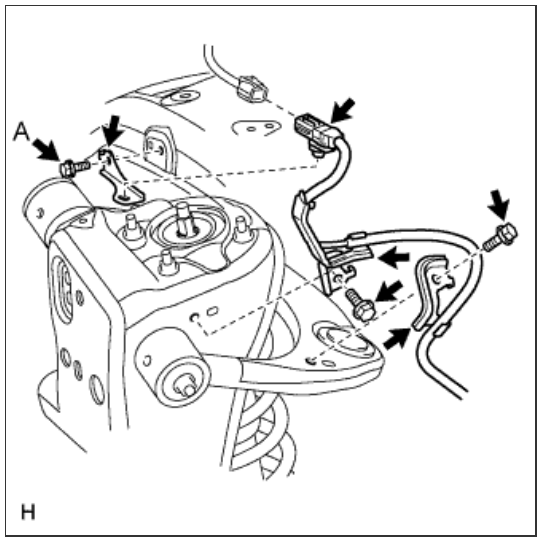
ii. Attach the connector to the skid control sensor clamp and then connect the connector.

iii. Install the 2 harness clamps with the 2 bolts.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

NOTICE:

- **When installing the clamps, do not twist the wire harness.**
- **Make sure the clamp rotation stopper touches the installation position.**



b. w/ AHC:

i. Install the skid control sensor clamp with the bolt (labeled A).

Torque:
for bolt A:
5.0 N*m{ 51 kgf*cm , 44 in.*lbf }

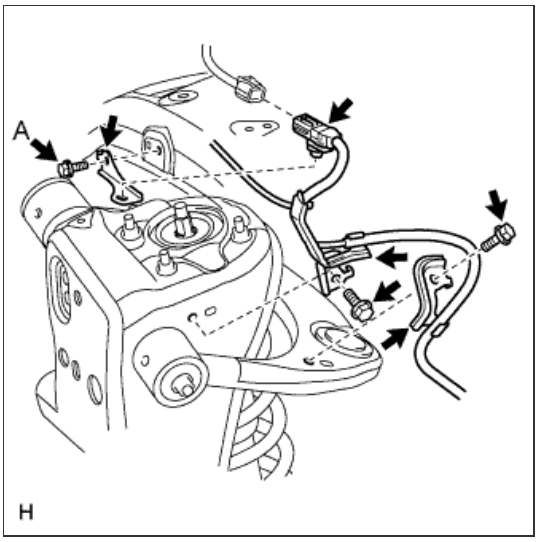
ii. Attach the connector to the skid control sensor clamp and then connect the connector.

iii. Install the 2 harness clamps with the 2 bolts.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

NOTICE:

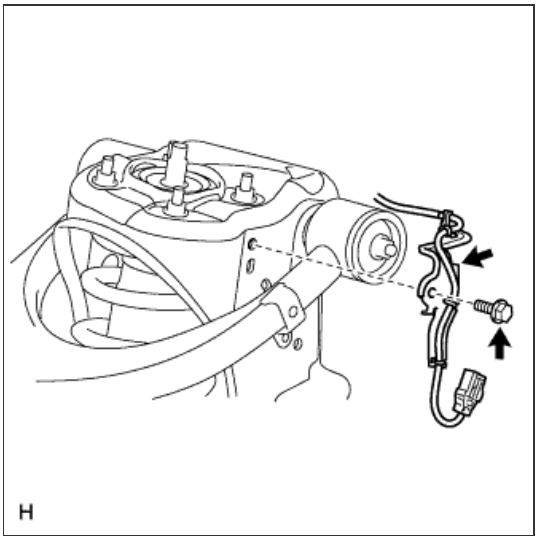
- When installing the clamps, do not twist the wire harness.
- Make sure the clamp rotation stopper touches the installation position.



iv. Install the harness clamp with the bolt.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

v. Connect the connector.

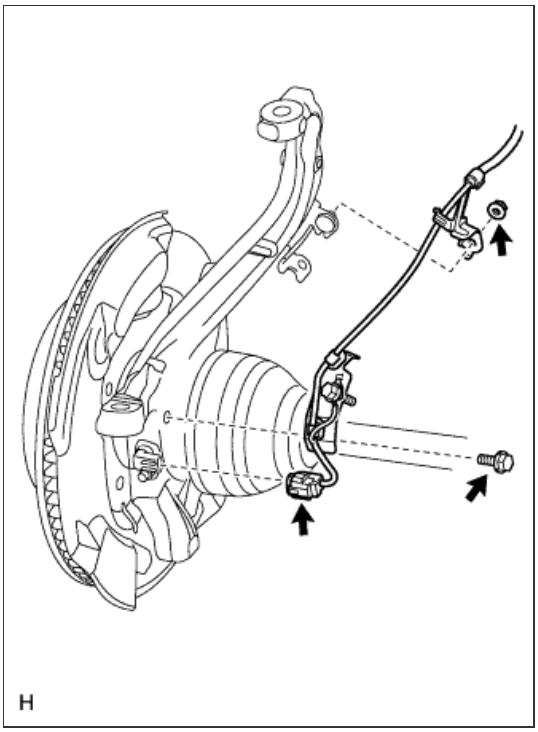


c. Install the harness clamp with the nut.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

NOTICE:

- When installing the clamp, do not twist the wire harness.
- Make sure the clamp rotation stopper touches the installation position.



d. Install the harness clamp with bolt.

Torque:

13 N*m{ 127 kgf*cm , 9 ft.*lbf }

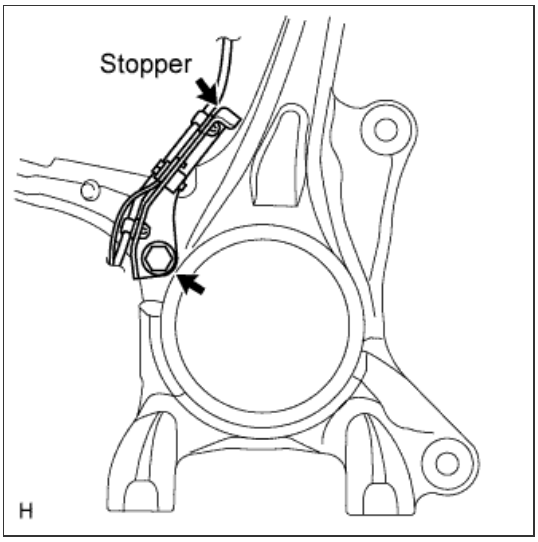
NOTICE:

Install the bracket so that the rotation stopper touches the knuckle.

e. Connect the speed sensor connector.

NOTICE:

Securely connect the connector.



5. INSTALL FRONT WHEEL

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

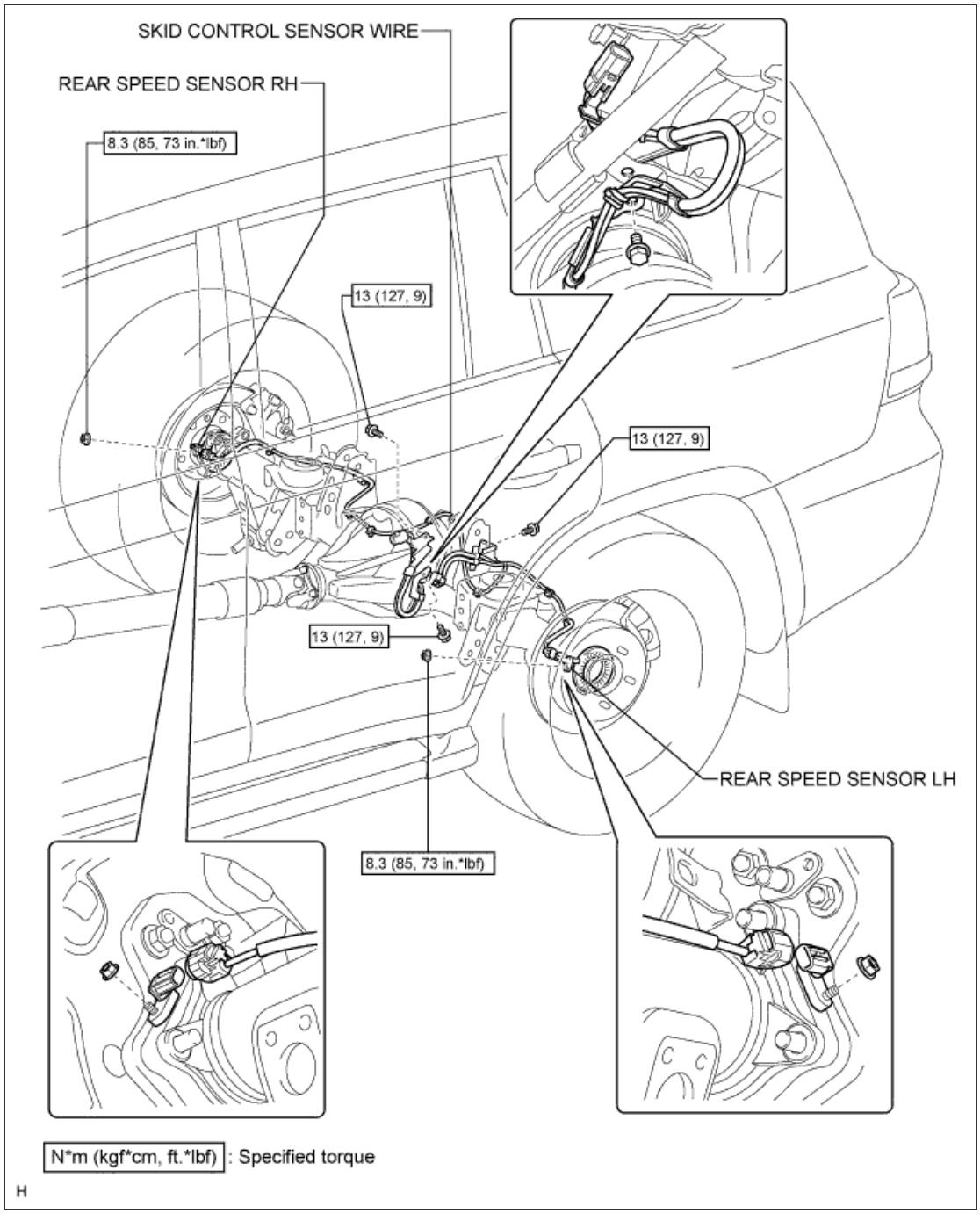
When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

7. CHECK SPEED SENSOR SIGNAL

a. w/ ABS:
Check the speed sensor signal (Click here).

b. w/ VSC:
Check the speed sensor signal (Click here).

for Preparation Click here



for Preparation Click here

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

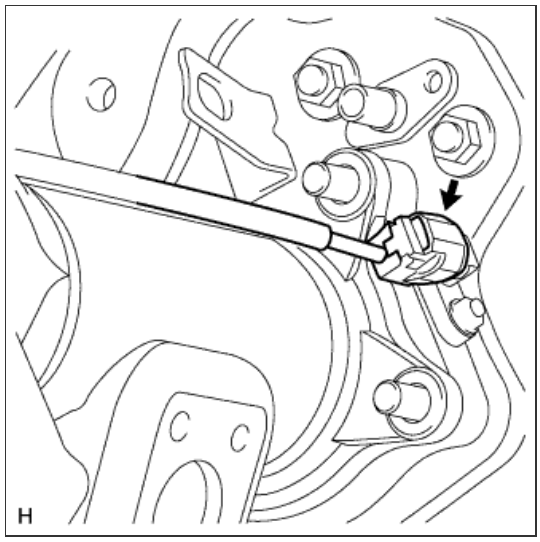
NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

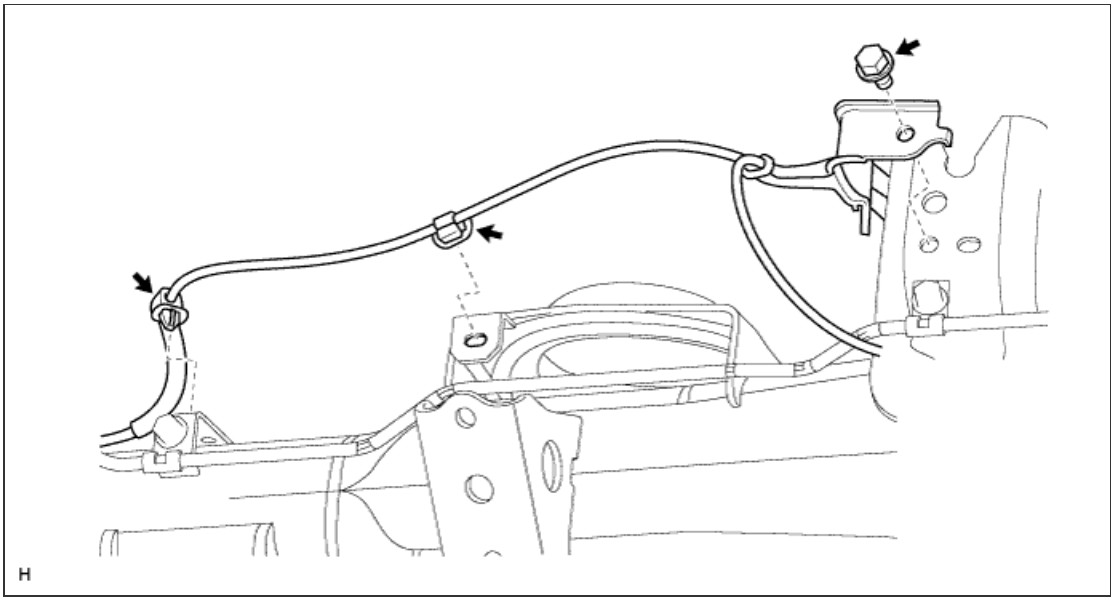
2. REMOVE REAR WHEEL

3. REMOVE SKID CONTROL SENSOR WIRE

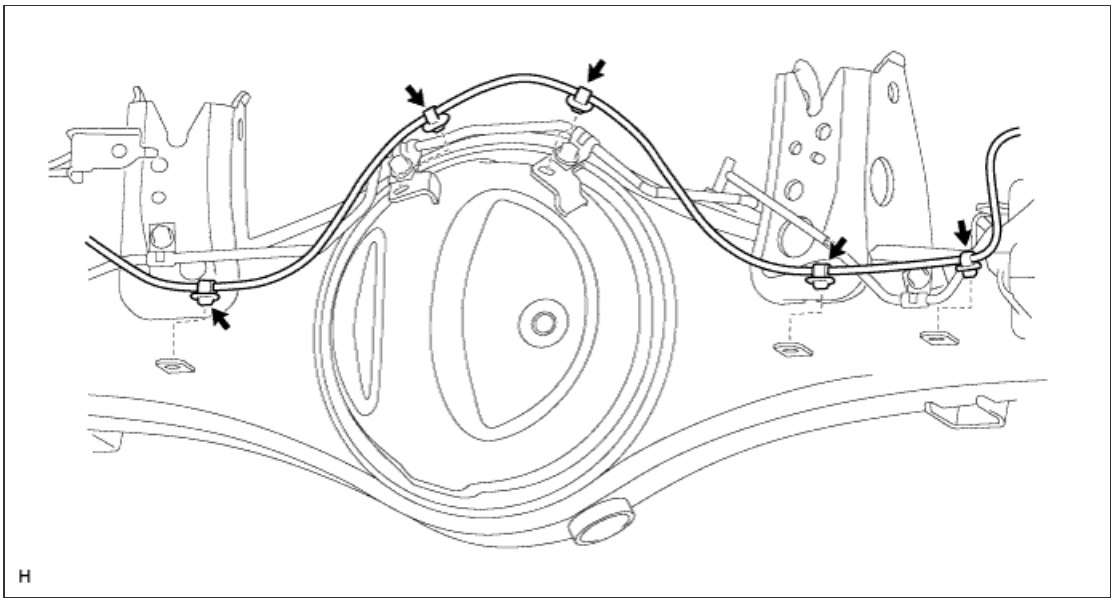
a. Disconnect the speed sensor LH connector.



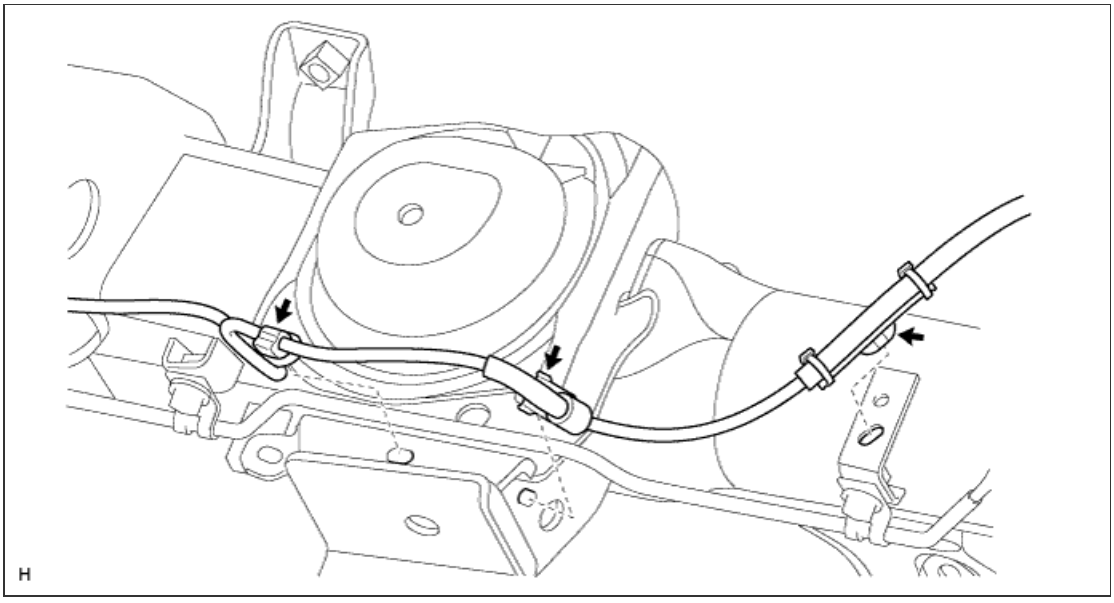
b. Detach the 2 clamps and remove the bolt and sensor clamp.



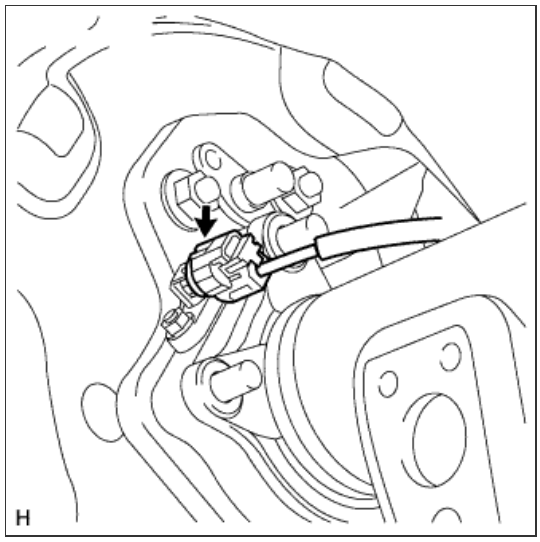
c. Detach the 5 clamps.



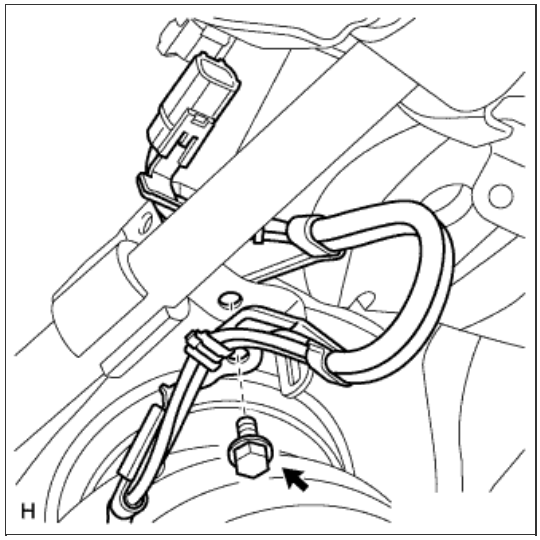
d. Detach the 3 clamps.



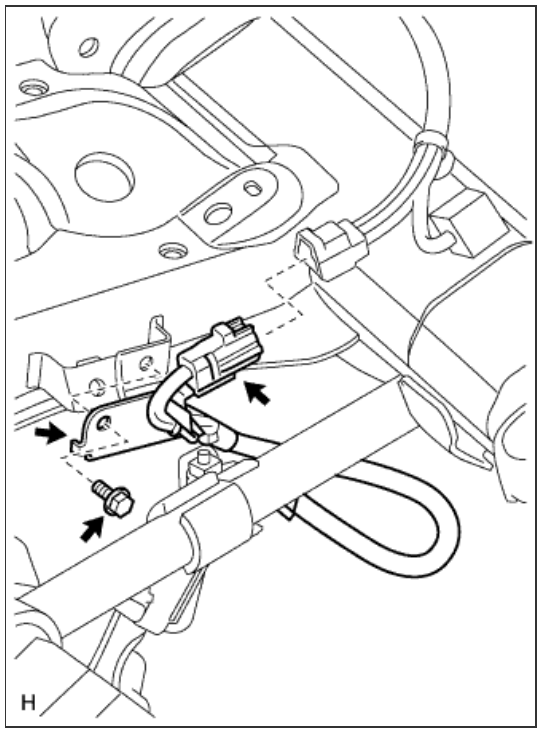
e. Disconnect the speed sensor RH connector.



f. Remove the bolt.



g. Disconnect the connector, and remove the bolt and skid control sensor wire.

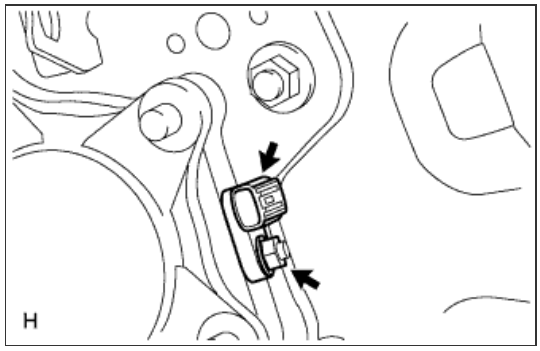


4. REMOVE REAR SPEED SENSOR LH

a. Remove the nut and speed sensor.

NOTICE:

Pull out the sensor while trying as much as possible not to rotate it.

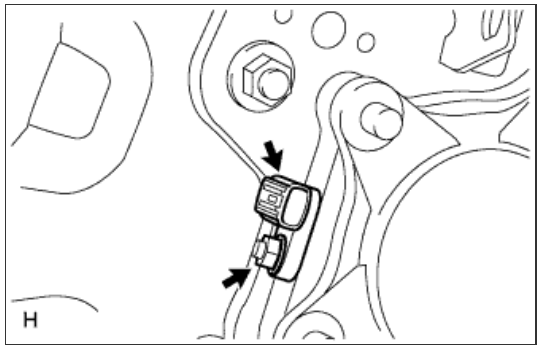


5. REMOVE REAR SPEED SENSOR RH

a. Remove the nut and speed sensor.

NOTICE:

Pull out the sensor while trying as much as possible not to rotate it.



for Preparation Click here

1. CHECK REAR SPEED SENSOR

a. Check the sensor.
If any of the following occurs, replace the sensor with a new one:

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

for Preparation Click here

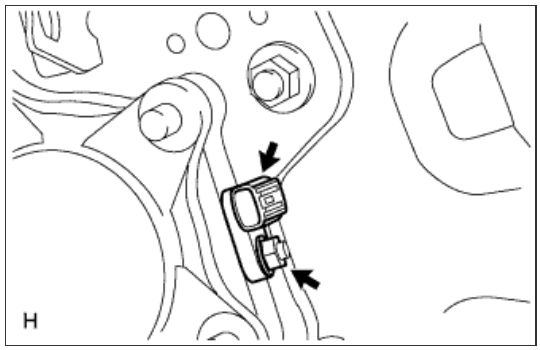
1. INSTALL REAR SPEED SENSOR LH

a. Install the speed sensor with the nut.

Torque:
8.3 N*m{ 85 kgf*cm , 73 in.*lbf }

NOTICE:

- **Make sure there are no pieces of iron or other foreign matter attached to the sensor tip.**
- **While inserting the speed sensor into the knuckle hole, do not strike or damage the sensor tip.**
- **After installing the speed sensor, make sure there is no clearance or foreign matter between the sensor stay part and the knuckle.**
- **Make sure there is no foreign matter attached to the speed sensor rotor.**



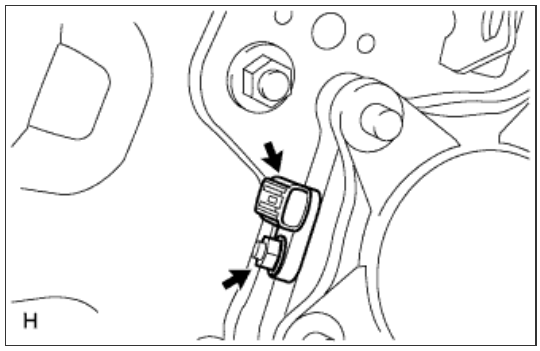
2. INSTALL REAR SPEED SENSOR RH

a. Install the speed sensor with the nut.

Torque:
8.3 N*m{ 85 kgf*cm , 73 in.*lbf }

NOTICE:

- **Make sure there are no pieces of iron or other foreign matter attached to the sensor tip.**
- **While inserting the speed sensor into the knuckle hole, do not strike or damage the sensor tip.**
- **After installing the speed sensor, make sure there is no clearance or foreign matter between the sensor stay part and the knuckle.**
- **Make sure there is no foreign matter attached to the speed sensor rotor.**



3. INSTALL SKID CONTROL SENSOR WIRE

a. Install the sensor clamp with the bolt.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

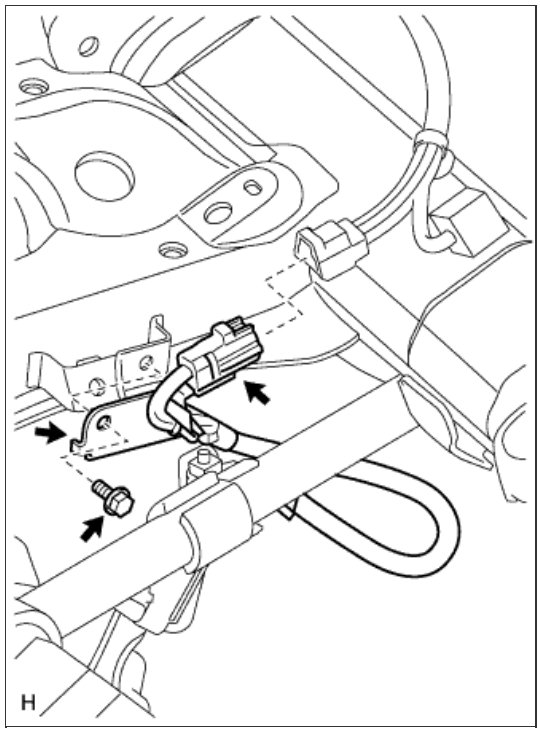
NOTICE:

Make sure the clamp rotation stopper touches the installation position.

b. Connect the connector.

NOTICE:

- **Securely insert the connector.**
- **When connecting the connector, do not twist the wire harness.**

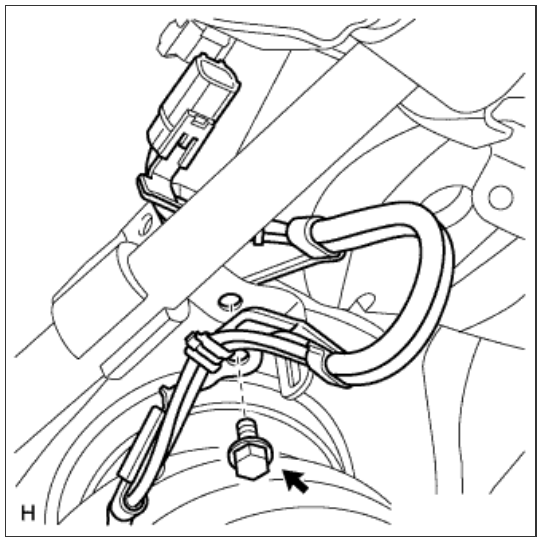


c. Install the sensor clamp with the bolt.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

NOTICE:

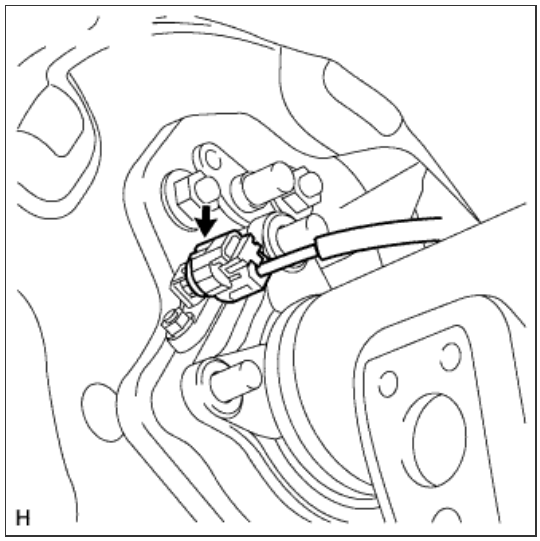
Make sure the clamp rotation stopper touches the installation position.



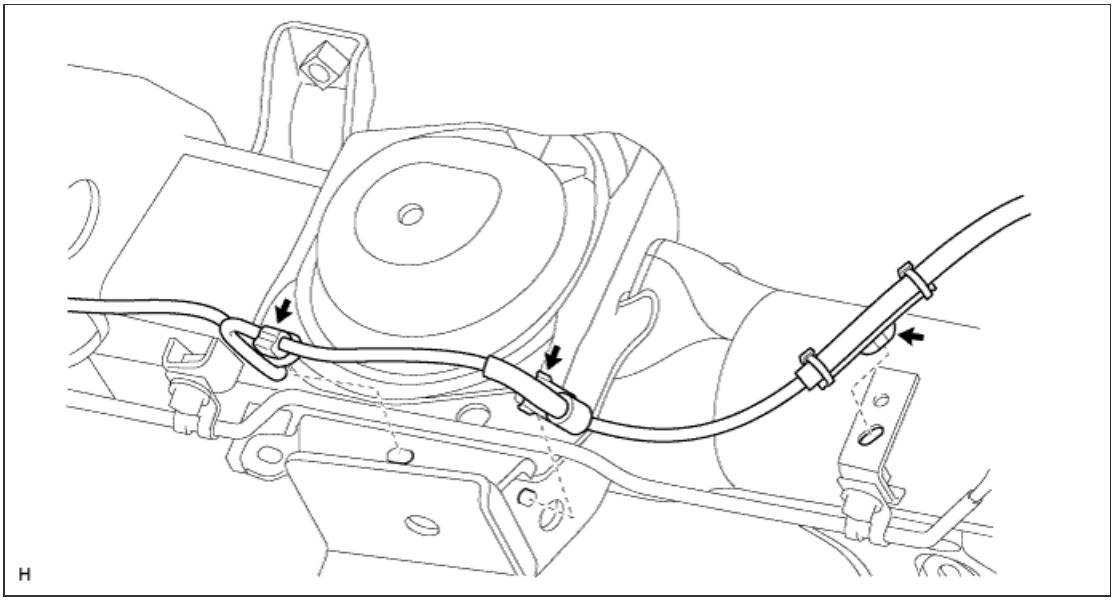
d. Connect the speed sensor RH connector.

NOTICE:

- **Securely connect the connector.**
- **When connecting the connector, do not twist the wire harness.**



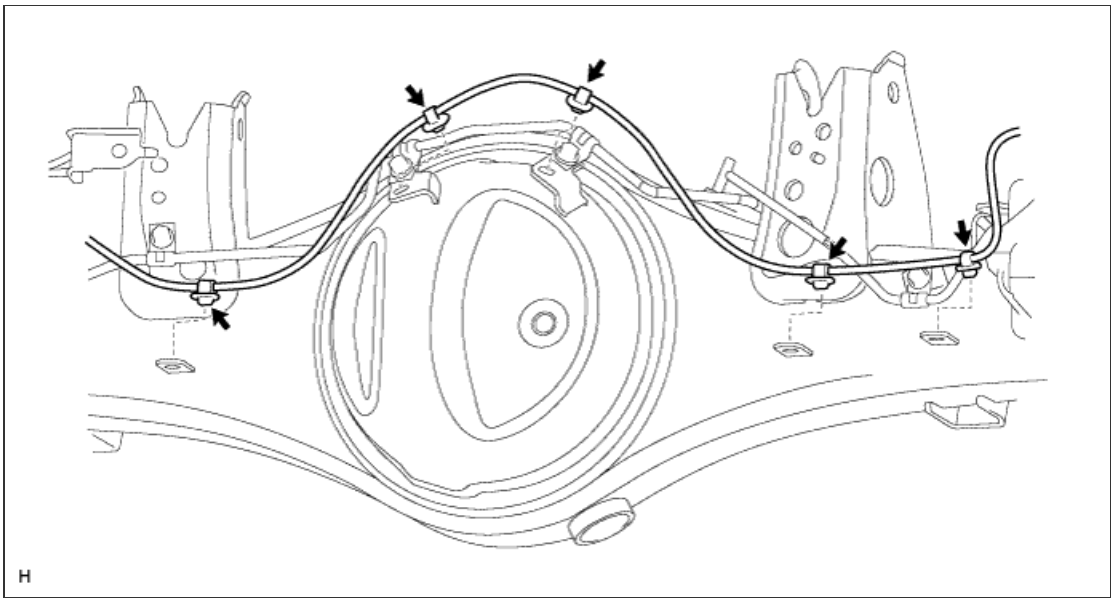
e. Attach the 3 clamps.



NOTICE:

- **When attaching the clamps, do not twist the wire harness.**
- **When attaching the clamps, securely insert them as shown in the illustration.**

f. Attach the 5 clamps.

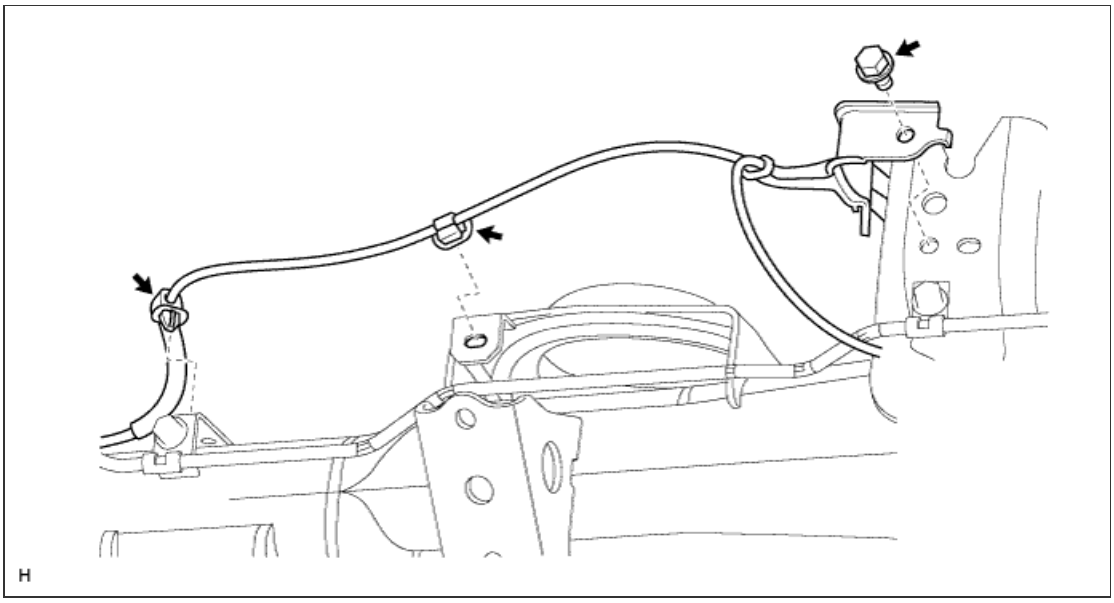


NOTICE:

- **When attaching the clamps, do not twist the wire harness.**
- **When attaching the clamps, securely insert them as shown in the illustration.**

g. Attach the 2 clamps, and install the sensor clamp with the bolt.

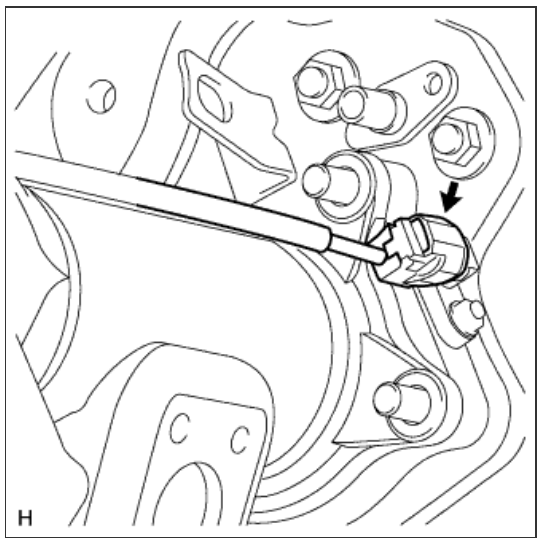
Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }



h. Connect the speed sensor LH connector.

NOTICE:

- **Securely connect the connector.**
- **When connecting the connector, do not twist the wire harness.**



4. INSTALL REAR WHEEL

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

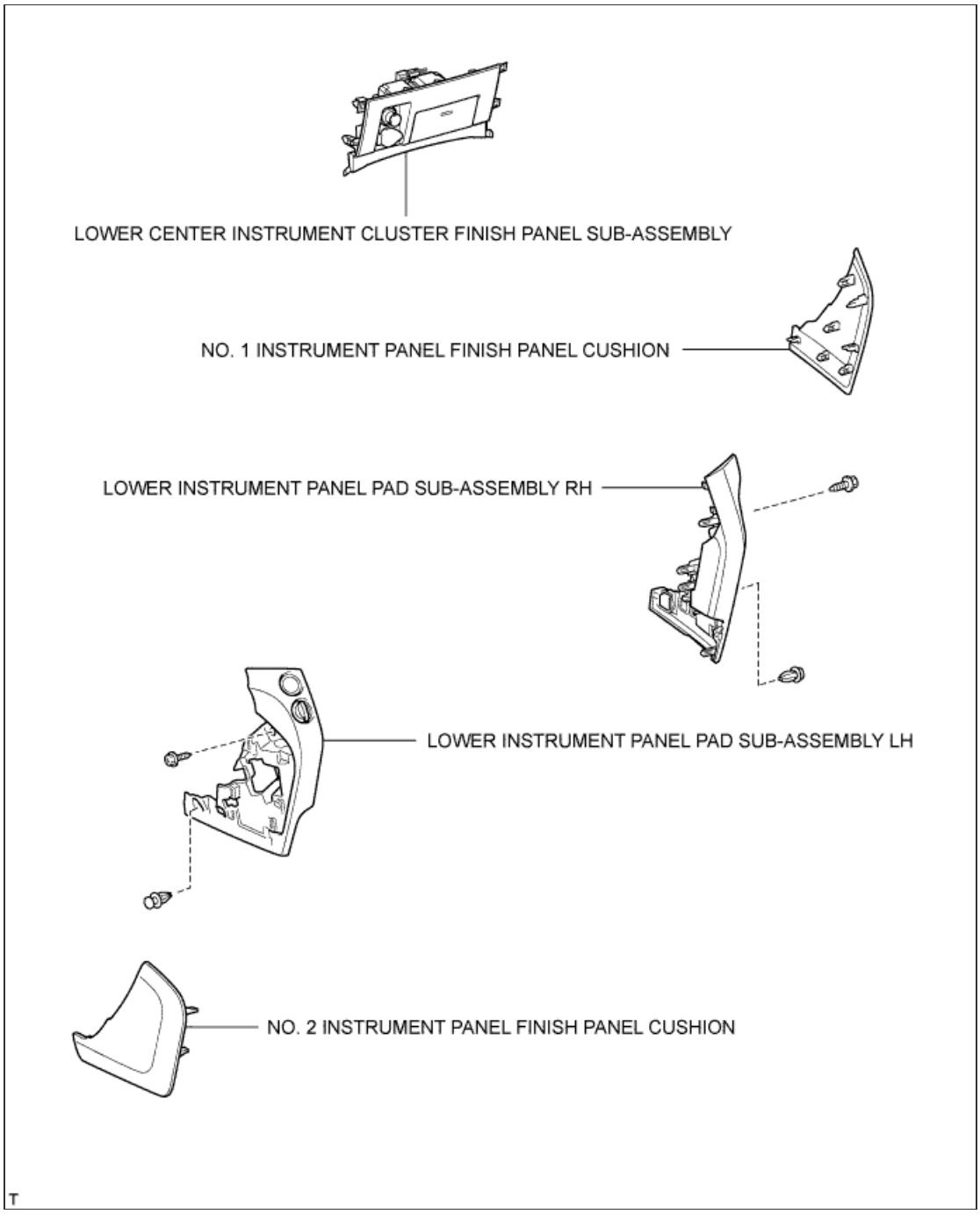
When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

6. CHECK SPEED SENSOR SIGNAL

a. w/ ABS:
Check the speed sensor signal (Click here).

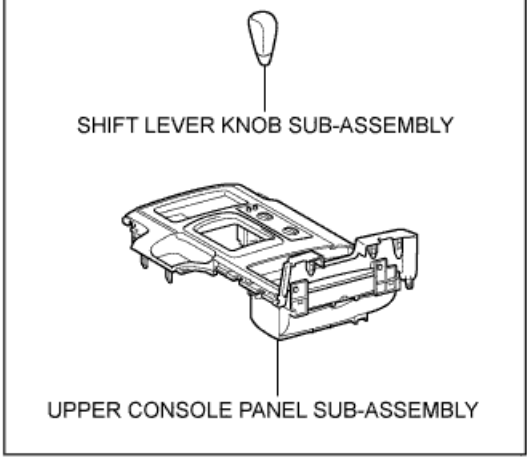
b. w/ VSC:
Check the speed sensor signal (Click here).

for Preparation Click here

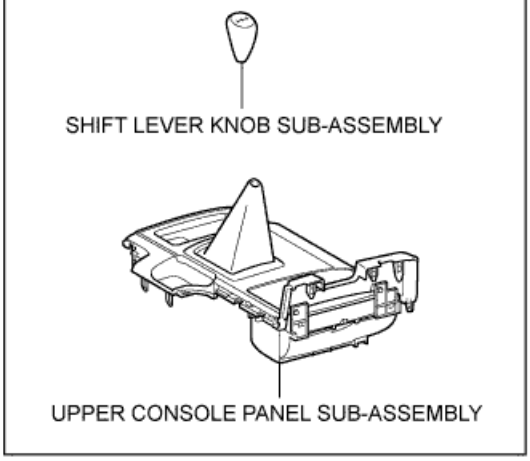


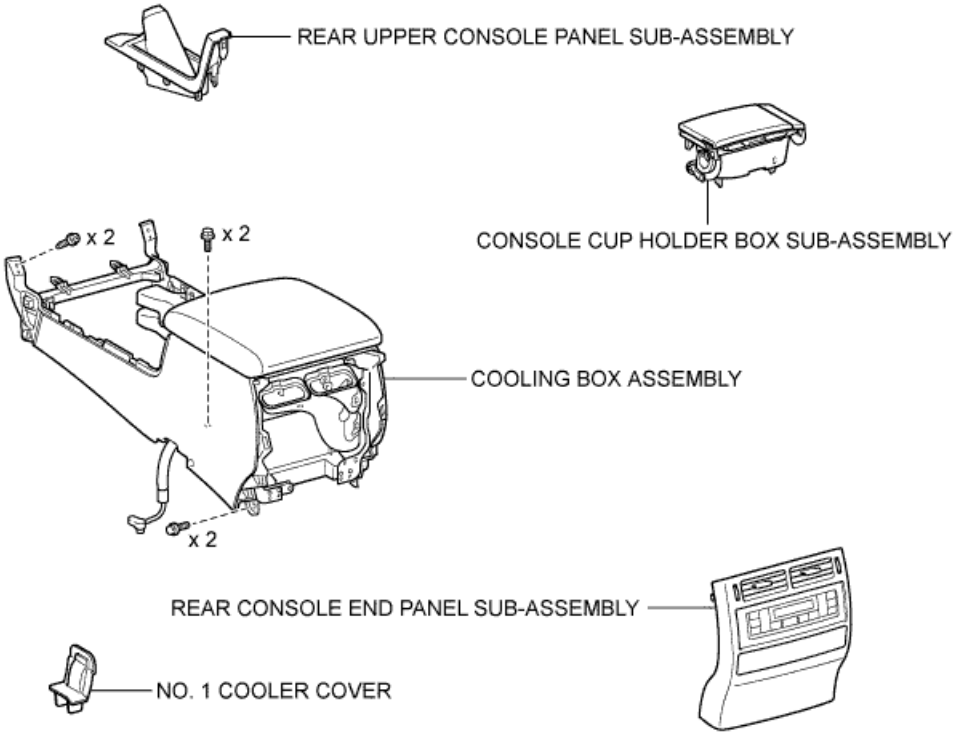
w/ Cool Box:

for Automatic Transmission:



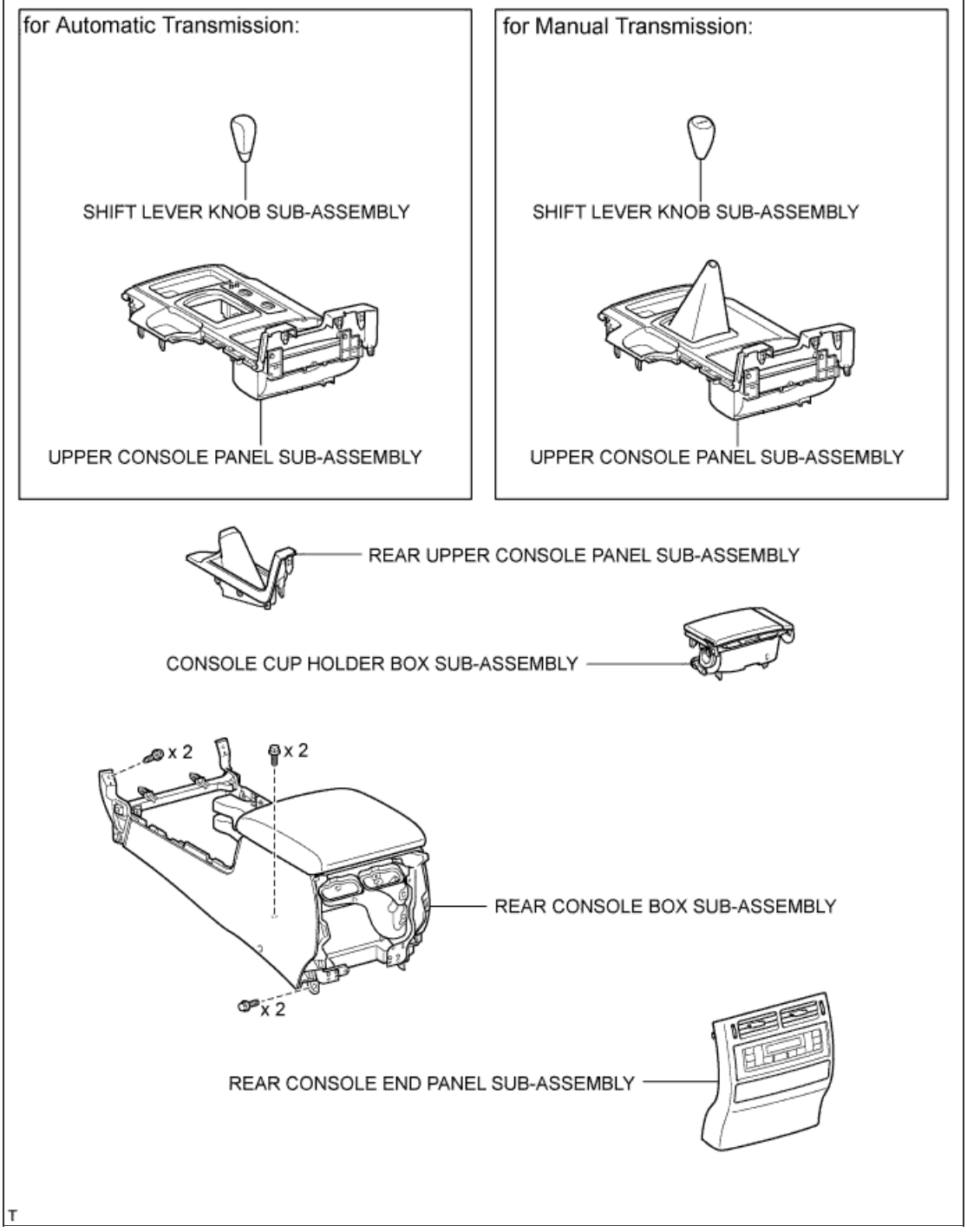
for Manual Transmission:



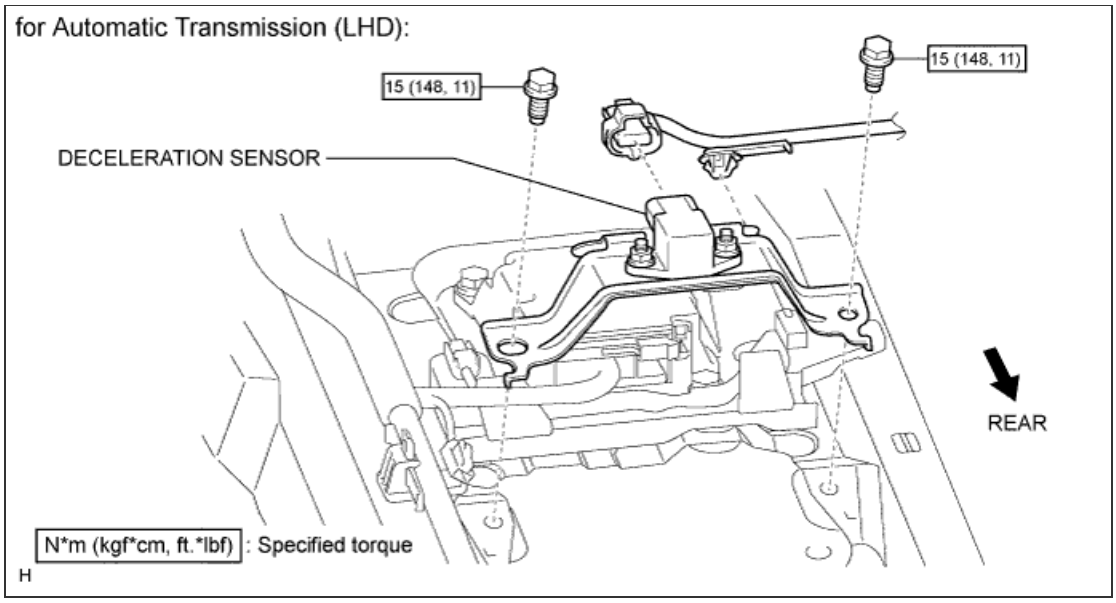


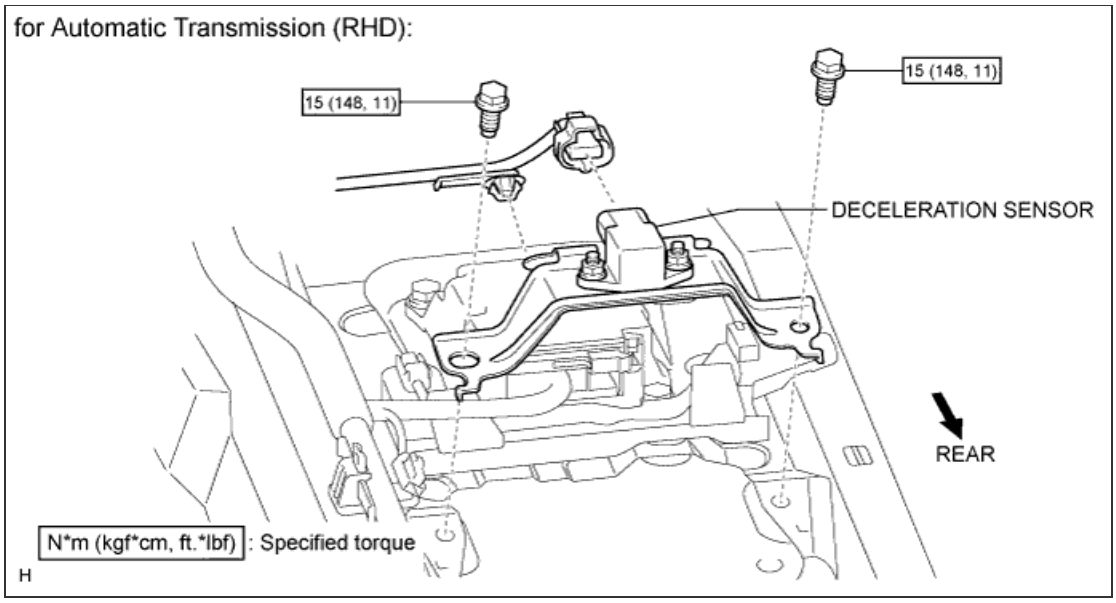
T

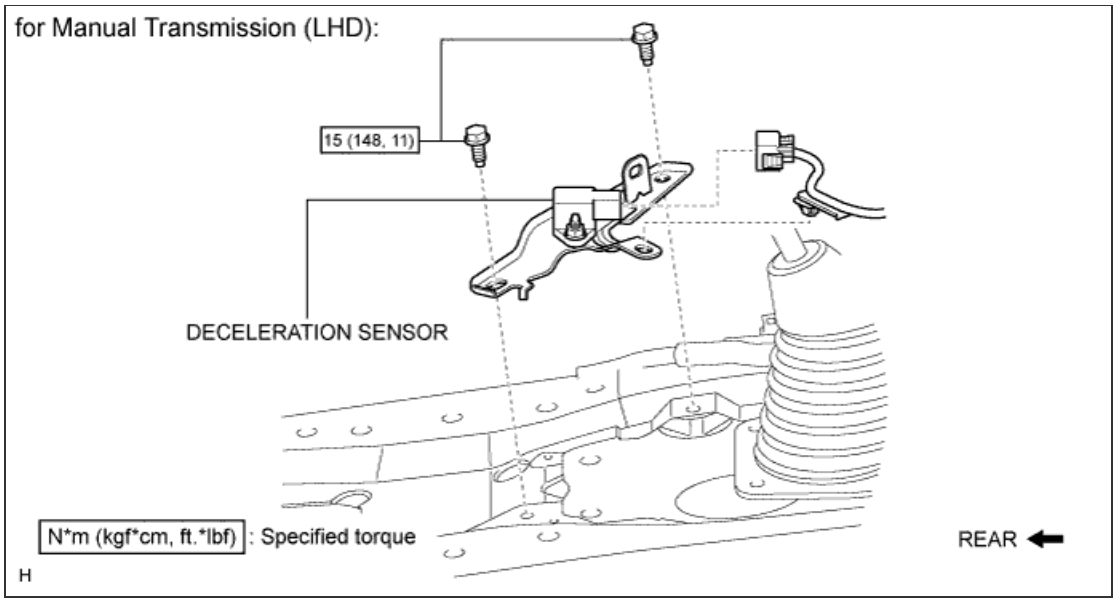
w/o Cool Box:

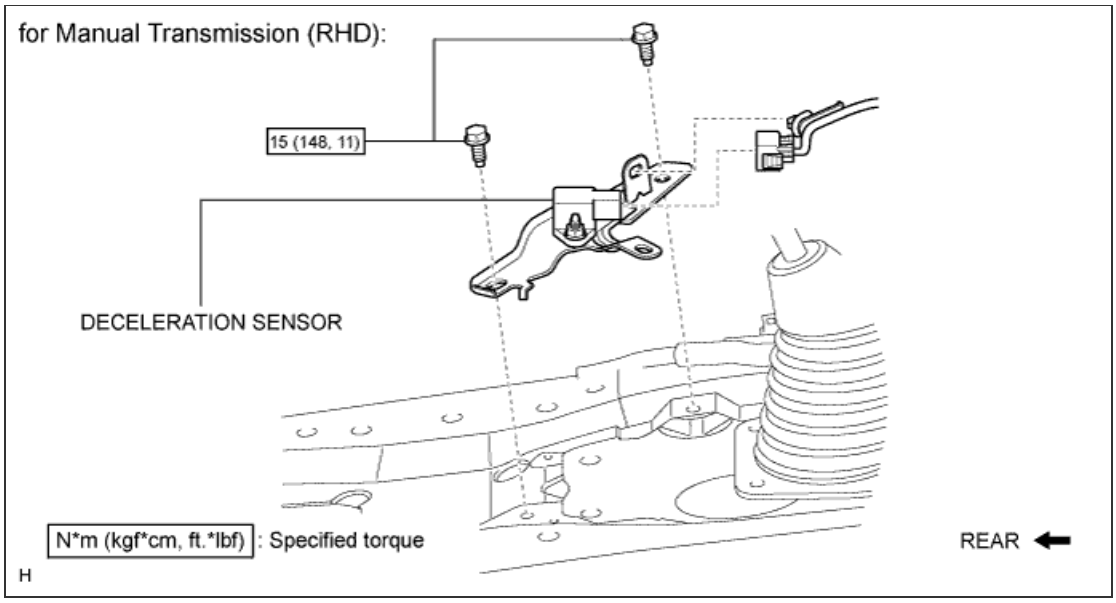

for Automatic Transmission:
SHIFT LEVER KNOB SUB-ASSEMBLY
UPPER CONSOLE PANEL SUB-ASSEMBLY
for Manual Transmission:
SHIFT LEVER KNOB SUB-ASSEMBLY
UPPER CONSOLE PANEL SUB-ASSEMBLY
REAR UPPER CONSOLE PANEL SUB-ASSEMBLY
CONSOLE CUP HOLDER BOX SUB-ASSEMBLY
x 2
x 2
x 2
REAR CONSOLE BOX SUB-ASSEMBLY
REAR CONSOLE END PANEL SUB-ASSEMBLY

T


for Automatic Transmission (LHD):
15 (148, 11)
15 (148, 11)
DECELERATION SENSOR
REAR
N*m (kgf*cm, ft.*lbf) : Specified torque
H


for Automatic Transmission (RHD):
15 (148, 11)
15 (148, 11)
DECELERATION SENSOR
REAR
N*m (kgf*cm, ft.*lbf) : Specified torque
H


for Manual Transmission (LHD):
15 (148, 11)
DECELERATION SENSOR
N*m (kgf*cm, ft.*lbf) : Specified torque
REAR
H


for Manual Transmission (RHD):
15 (148, 11)
DECELERATION SENSOR
N*m (kgf*cm, ft.*lbf) : Specified torque
REAR
H

DECELERATION SENSOR (w/ ABS) > REMOVAL

for Preparation Click here

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

2. REMOVE LOWER CONSOLE BOX (w/o Console Box Lid)

(Click here)

3. REMOVE COOLING BOX ASSEMBLY (w/ Cool Box)

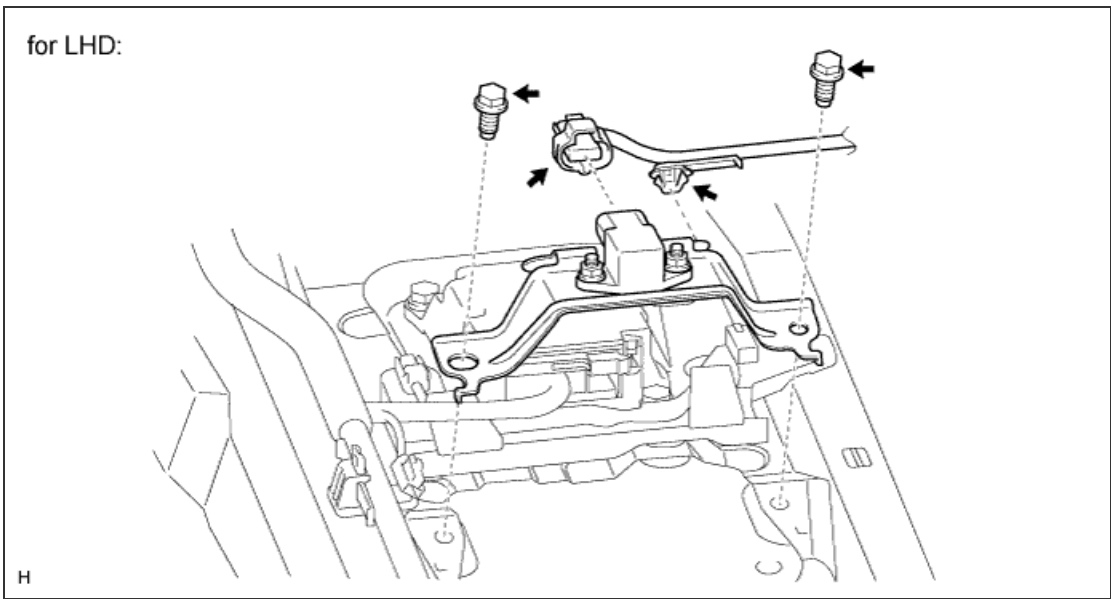
(Click here)

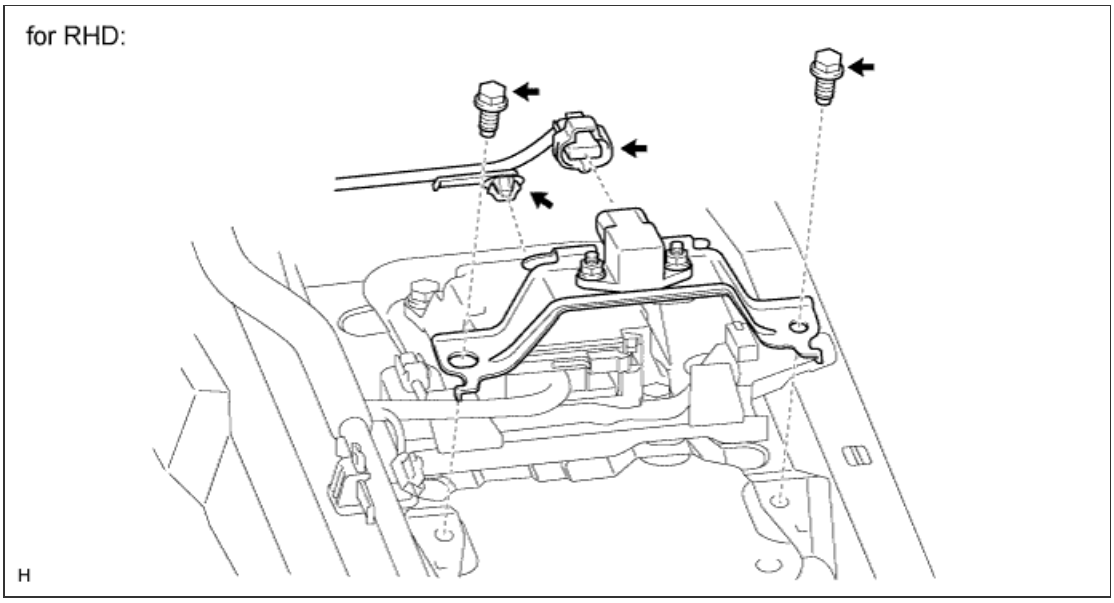
4. REMOVE REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

(Click here)

5. REMOVE DECELERATION SENSOR (for Automatic Transmission)

a. Disconnect the sensor connector, and then detach the clamp from the sensor bracket.



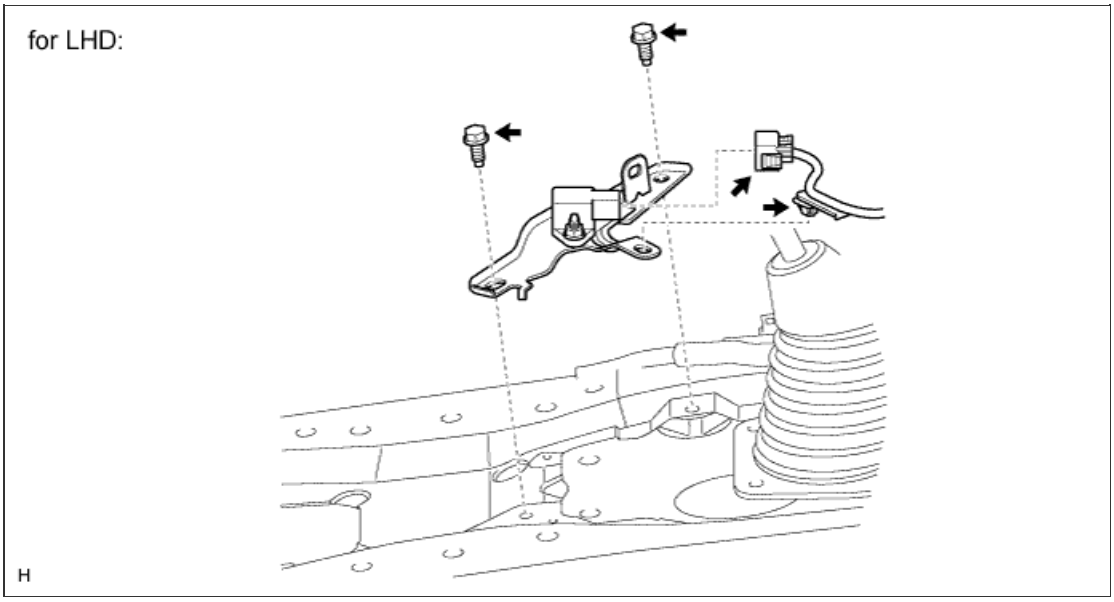


b. Remove the 2 bolts and sensor.

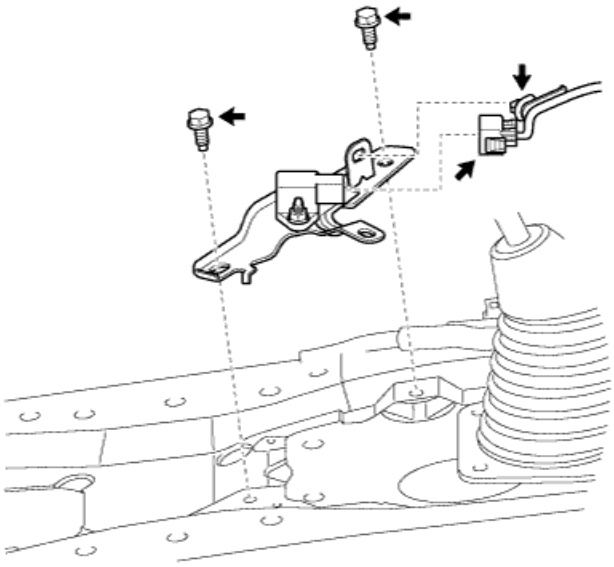
6. REMOVE DECELERATION SENSOR (for Manual Transmission)

a. Disconnect the sensor connector, and then detach the clamp from the sensor bracket.

b. Remove the 2 bolts and sensor.



for RHD:



H

for Preparation Click here

1. C EC DECELERATION SENSOR

a. Check the deceleration sensor.
If any of the following applies, replace the sensor with a new one:

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

for Preparation Click here

1. INSTALL DECELERATION SENSOR (for Automatic Transmission)

a. Connect the sensor connector, and then attach the clamp to the hole of the sensor bracket.

NOTICE:

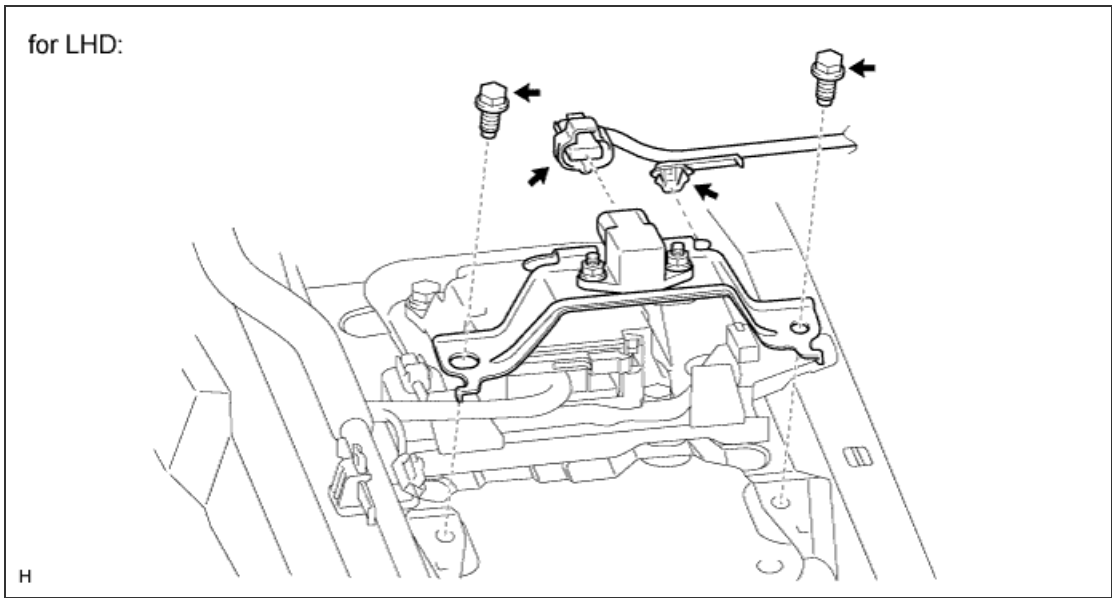
Securely connect the connector.

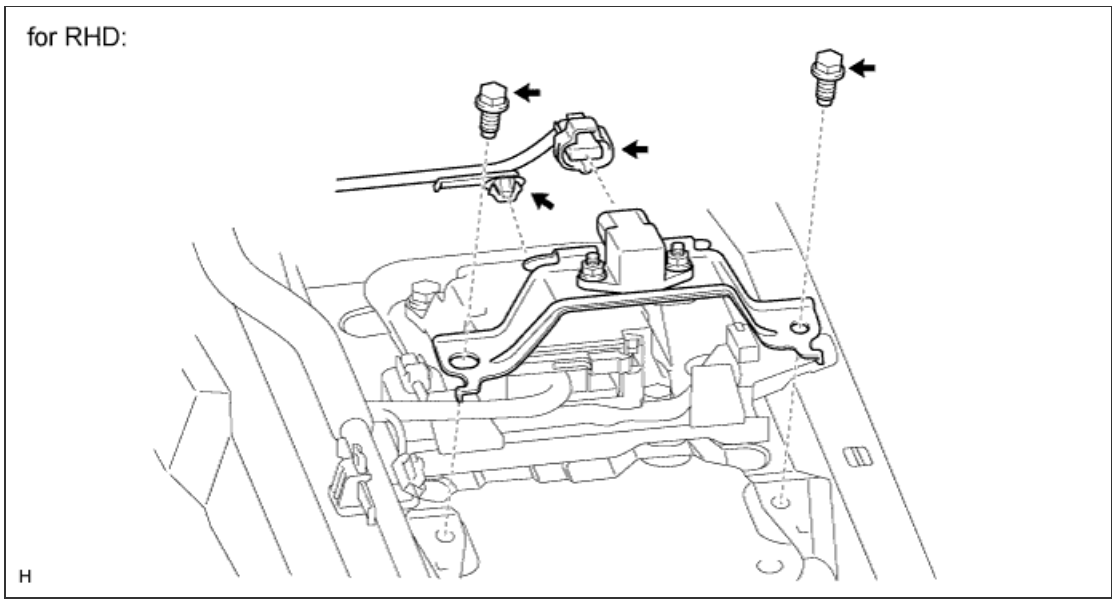
b. Install the sensor with the 2 bolts.

Torque:
15 N*m{ 148 kgf*cm , 11 ft.*lbf }

NOTICE:

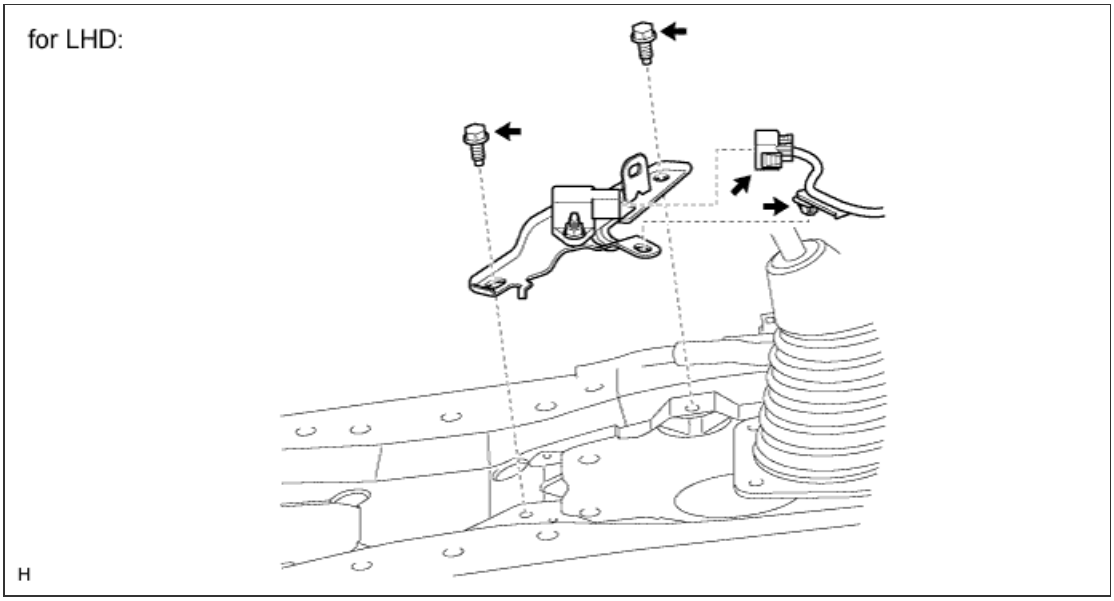
- **Make sure that the sensor is oriented correctly.**
- **If the sensor is dropped, replace it.**
- **When installing the sensor, make sure to avoid impacts to the sensor.**

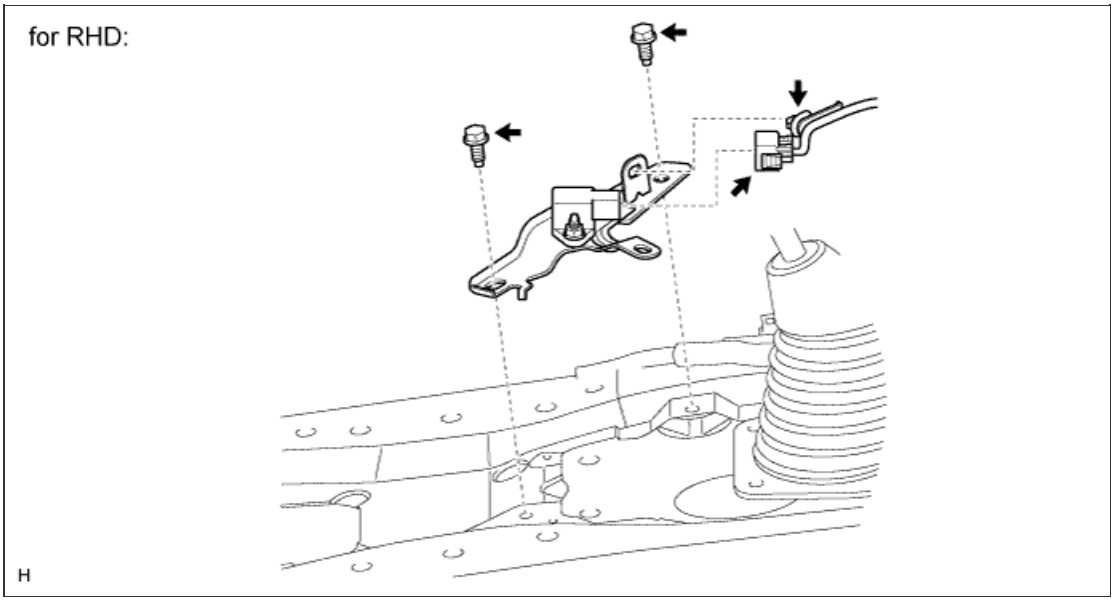




2. INSTALL DECELERATION SENSOR (for Manual Transmission)

a. Connect the sensor connector, and then attach the clamp to the hole of the sensor bracket.





b. Install the sensor with the 2 bolts.

Torque:
15 N*m{ 148 kgf*cm , 11 ft.*lbf }

NOTICE:

- **Make sure that the sensor is oriented correctly.**
- **If the sensor is dropped, replace it.**
- **Securely connect the connector.**
- **When installing the sensor, make sure to avoid impacts to the sensor.**

3. INSTALL LOWER CONSOLE BOX (w/o Console Box Lid)

(Click here)

4. INSTALL COOLING BOX ASSEMBLY (w/ Cool Box)

(Click here)

5. INSTALL REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

(Click here)

6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

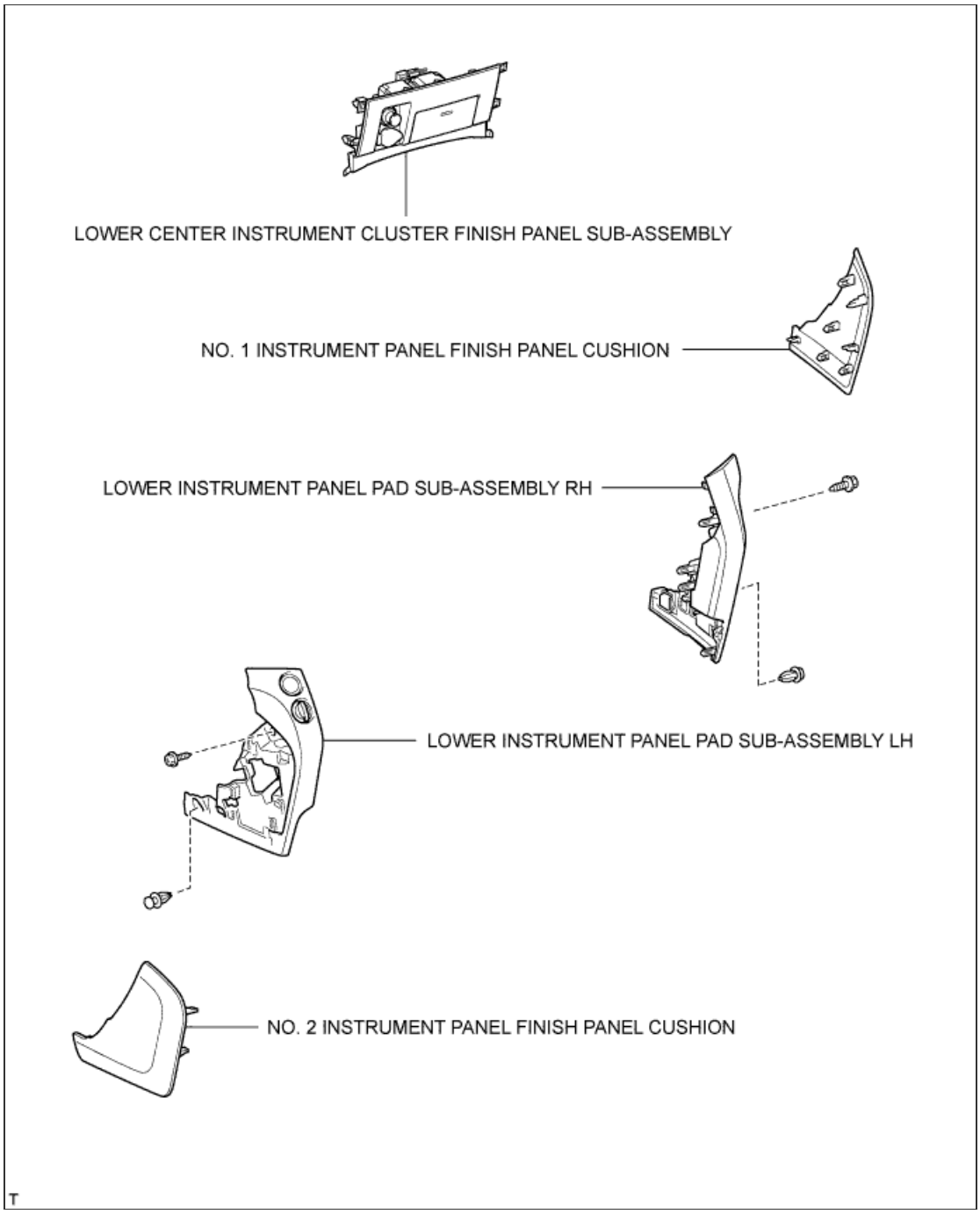
7. PERFORM G SENSOR ZERO POINT CALIBRATION

a. Perform the G sensor zero point calibration (Click here).

8. CHECK G SENSOR SIGNAL

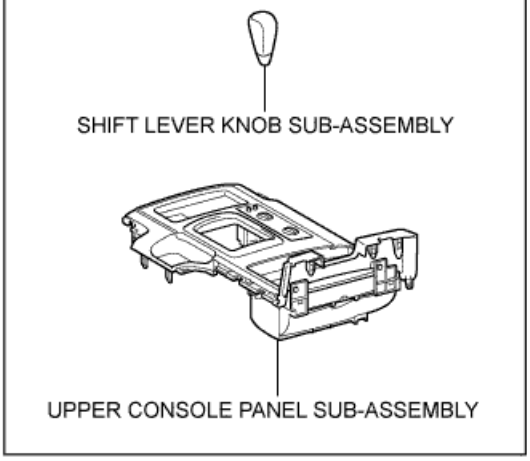
a. Check the G sensor signal (Click here).

for Preparation Click here

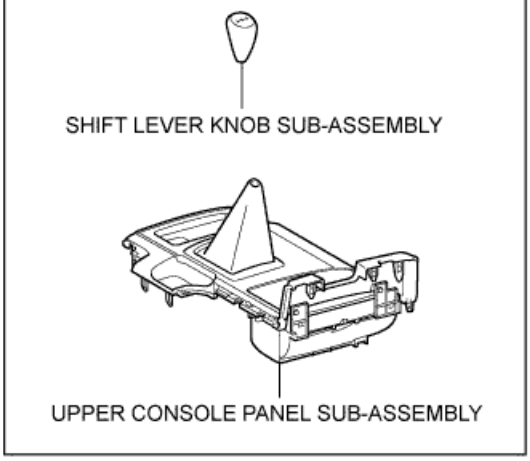


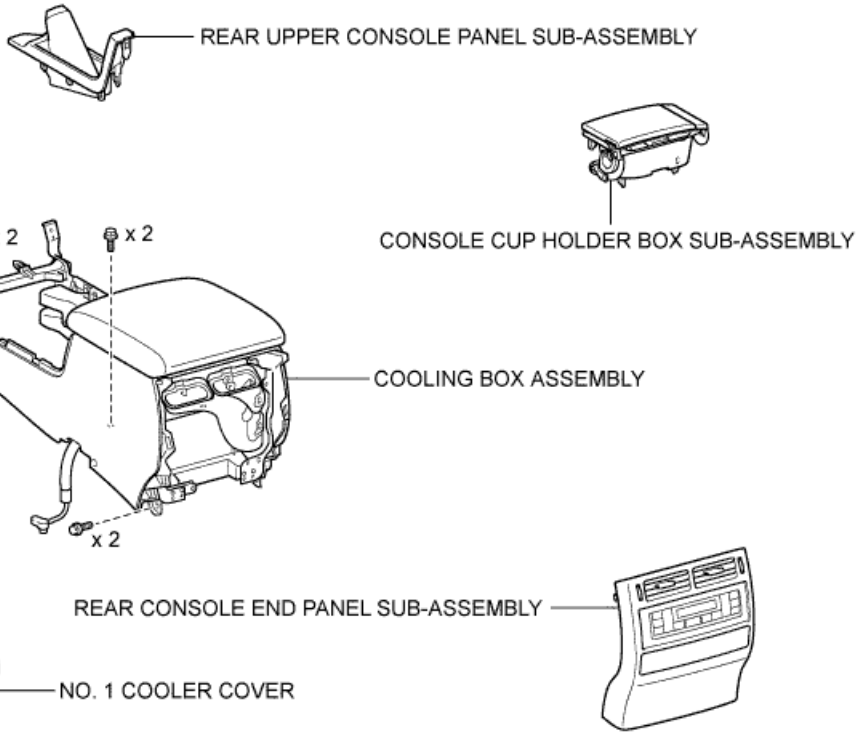
w/ Cool Box:

for Automatic Transmission:



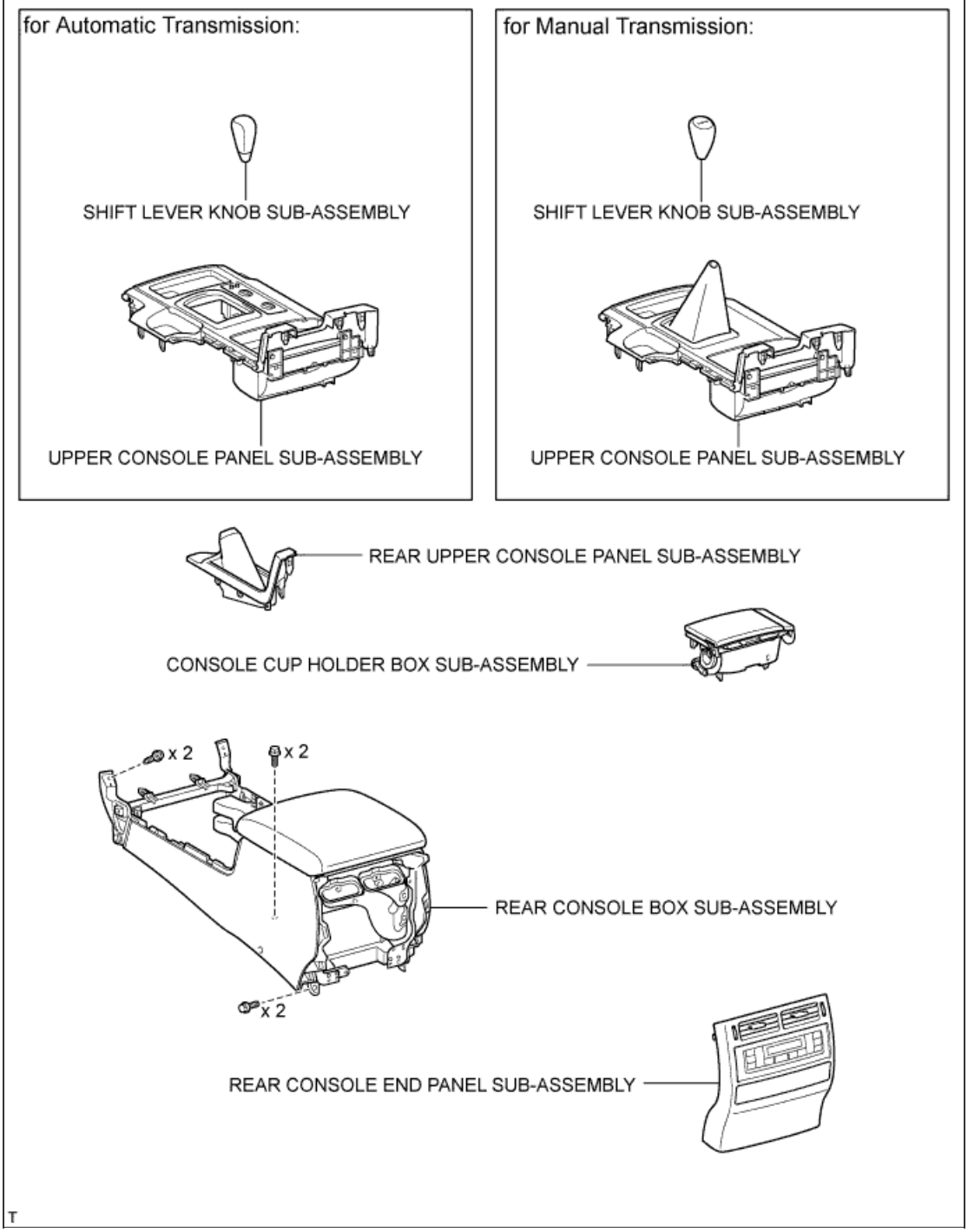
for Manual Transmission:



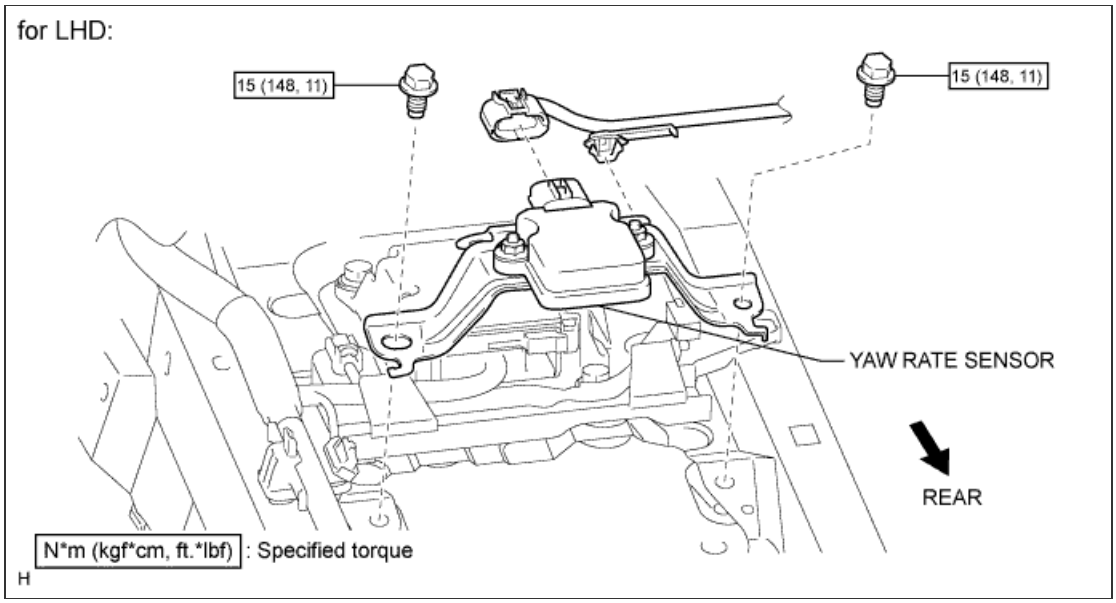


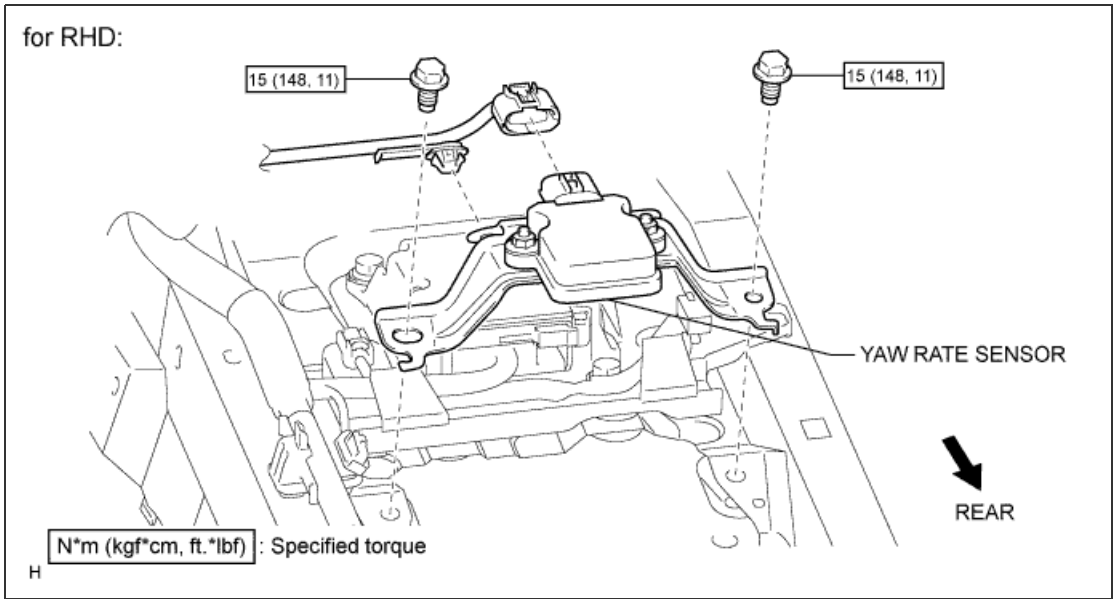
T

w/o Cool Box:


for Automatic Transmission:
SHIFT LEVER KNOB SUB-ASSEMBLY
UPPER CONSOLE PANEL SUB-ASSEMBLY
for Manual Transmission:
SHIFT LEVER KNOB SUB-ASSEMBLY
UPPER CONSOLE PANEL SUB-ASSEMBLY
REAR UPPER CONSOLE PANEL SUB-ASSEMBLY
CONSOLE CUP HOLDER BOX SUB-ASSEMBLY
x 2
x 2
x 2
REAR CONSOLE BOX SUB-ASSEMBLY
REAR CONSOLE END PANEL SUB-ASSEMBLY

T


for LHD:
15 (148, 11)
15 (148, 11)
YAW RATE SENSOR
REAR
N*m (kgf*cm, ft.*lbf) : Specified torque
H


for RHD:
15 (148, 11)
15 (148, 11)
YAW RATE SENSOR
REAR
N*m (kgf*cm, ft.*lbf) : Specified torque
H

YAW RATE AND DECELERATION SENSOR (w/ VSC) > REMOVAL

for Preparation Click here

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

2. REMOVE COOLING BOX ASSEMBLY (w/ Cool Box)

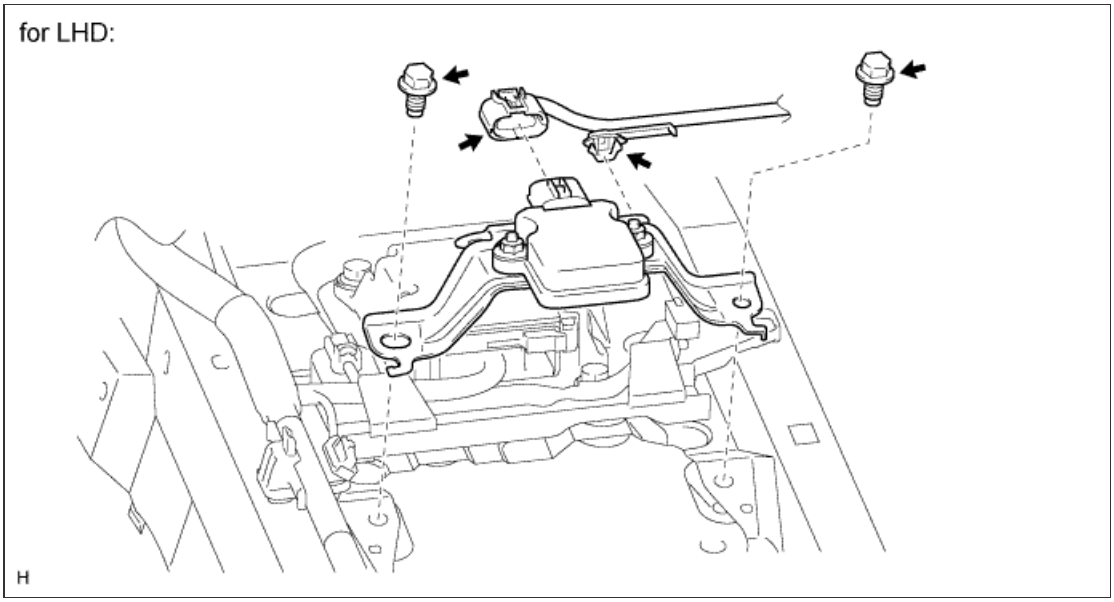
(Click here)

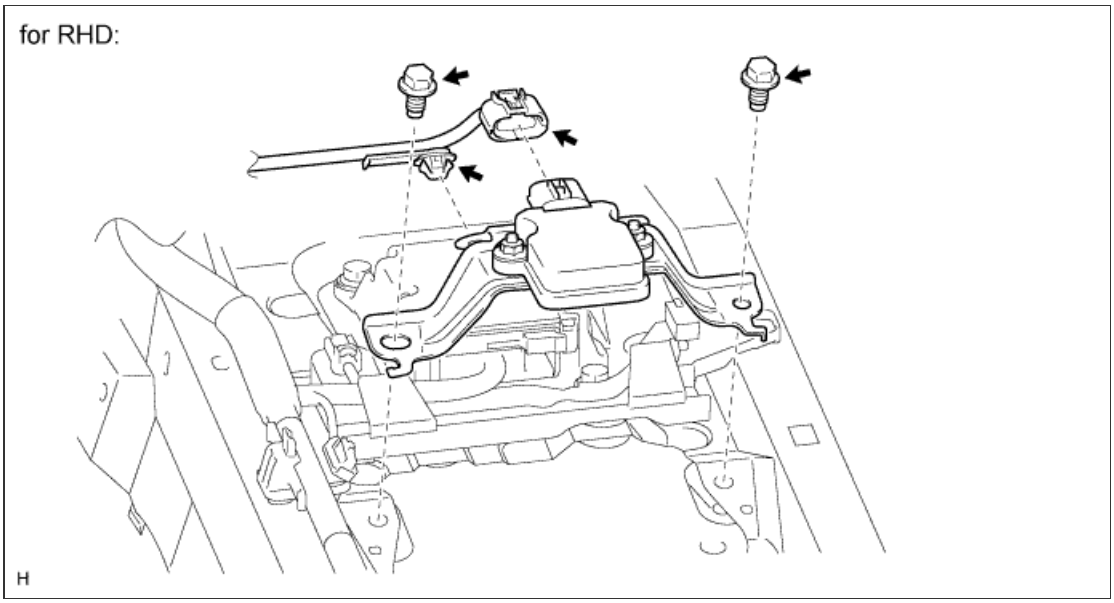
3. REMOVE REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

(Click here)

4. REMOVE YAW RATE SENSOR

a. Disconnect the sensor connector, and then detach the clamp from the sensor bracket.





- Remove the 2 bolts and sensor.

for Preparation Click here

1. CHECK YAW RATE SENSOR

a. Check the yaw rate sensor.
If any of the following applies, replace the sensor with a new one:

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

for Preparation Click here

1. INSTALL YAW RATE SENSOR

a. Connect the sensor connector, and then attach the clamp to the hole of the sensor bracket.

NOTICE:

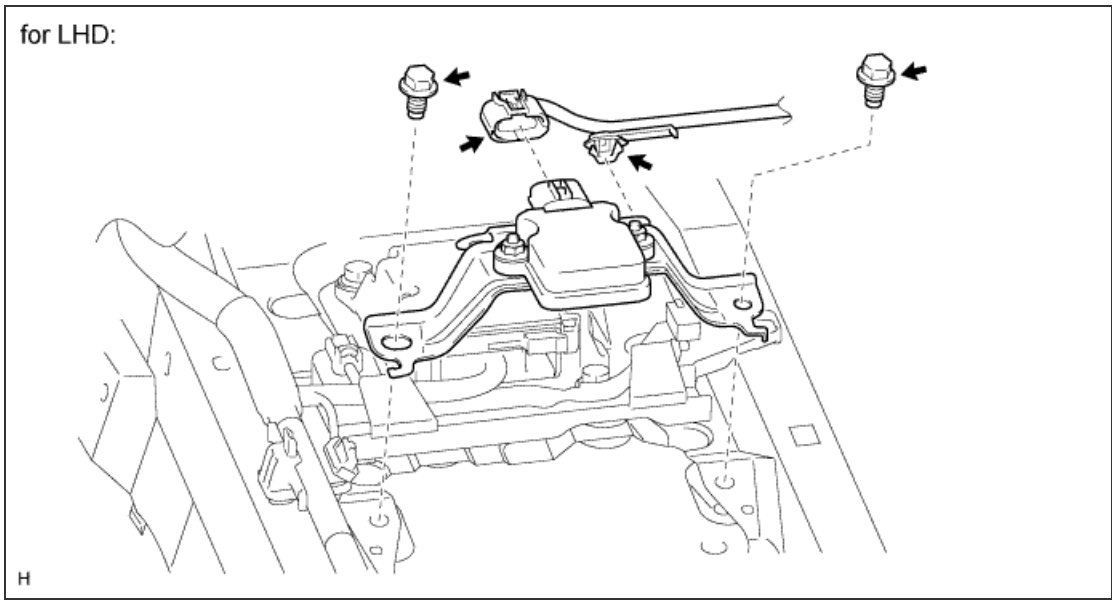
Securely connect the connector.

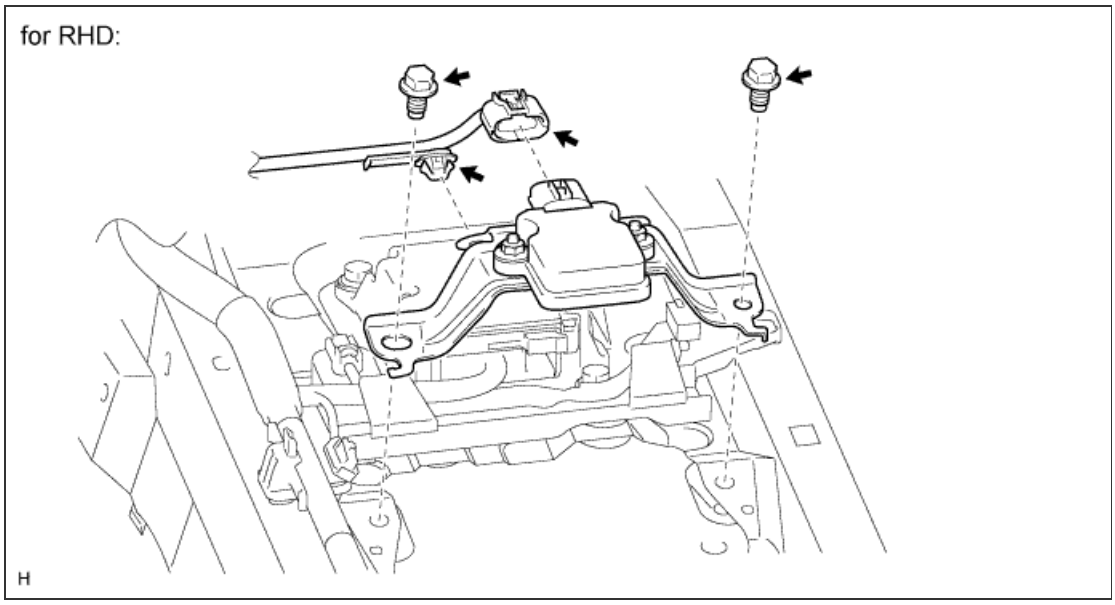
b. Install the yaw rate sensor with the 2 bolts.

Torque:
15 N*m{ 148 kgf*cm , 11 ft.*lbf }

NOTICE:

- **Make sure that the sensor is oriented correctly.**
- **If the sensor is dropped, replace it.**
- **When installing the sensor, make sure to avoid impacts to the sensor.**





2. INSTALL COOLING BOX ASSEMBLY (w/ Cool Box)

(Click here)

3. INSTALL REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

(Click here)

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

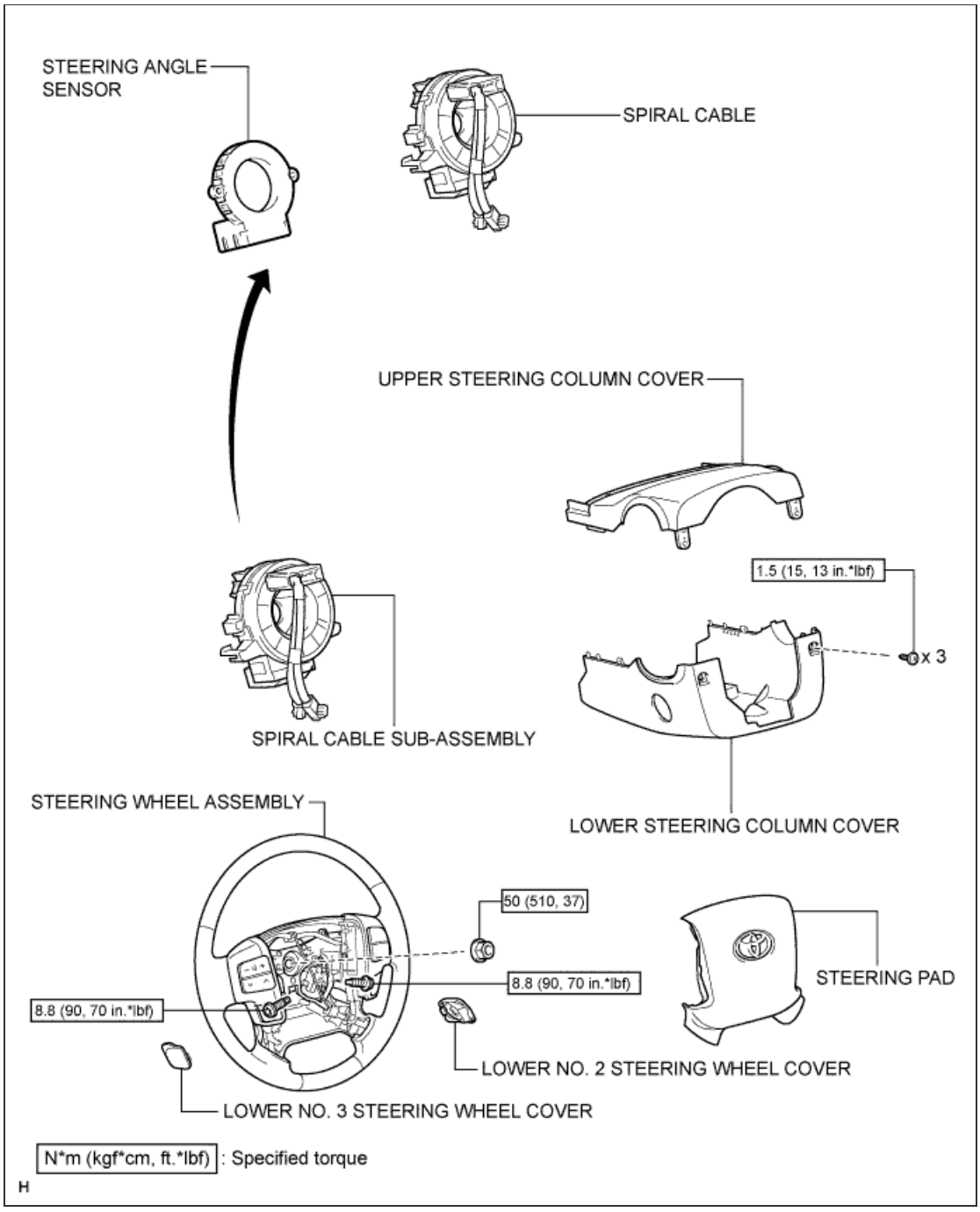
5. PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION

a. Perform the yaw rate sensor zero point calibration (Click here).

6. CHECK YAW RATE SENSOR SIGNAL

a. Check the yaw rate sensor signal (Click here).

for Preparation Click here



for Preparation Click here

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

a. Disable the Autoaway/Return function by changing the customize parameter (Click here).

NOTICE:

Record the current customize parameter setting (whether the Autoaway/Return function is enabled or disabled) in order to restore the current setting after finishing the operation.

HINT:

Performing the above operation causes the Autoaway/Return function to be disabled when the ignition switch is turned off.

b. Turn the ignition switch on. Operate the tilt and telescopic switch to fully extend and lower the steering column.

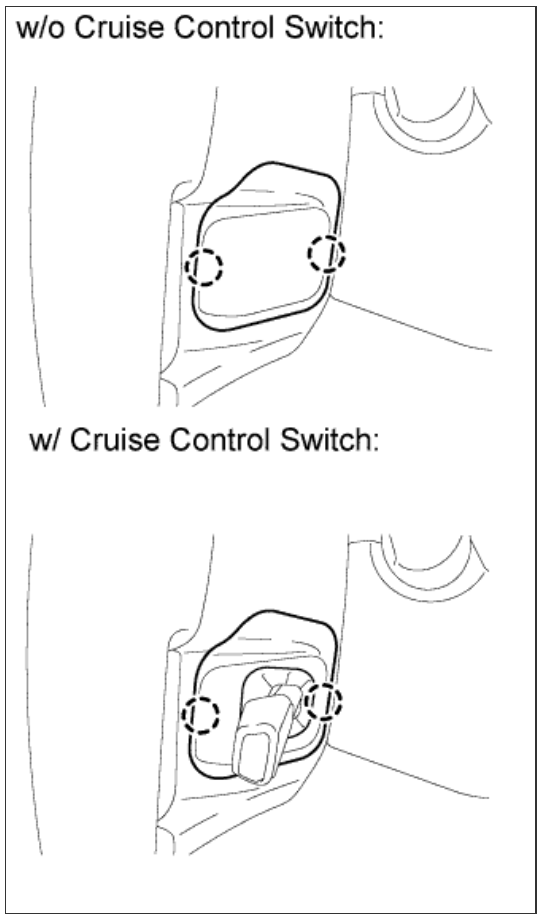
c. Turn the ignition switch off and disconnect the cable from the negative (-) battery terminal.

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

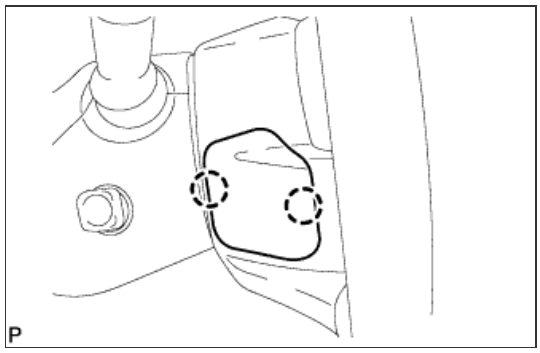
3. REMOVE LOWER NO. 2 STEERING WHEEL COVER

a. Detach the 2 claws and remove the steering wheel cover.



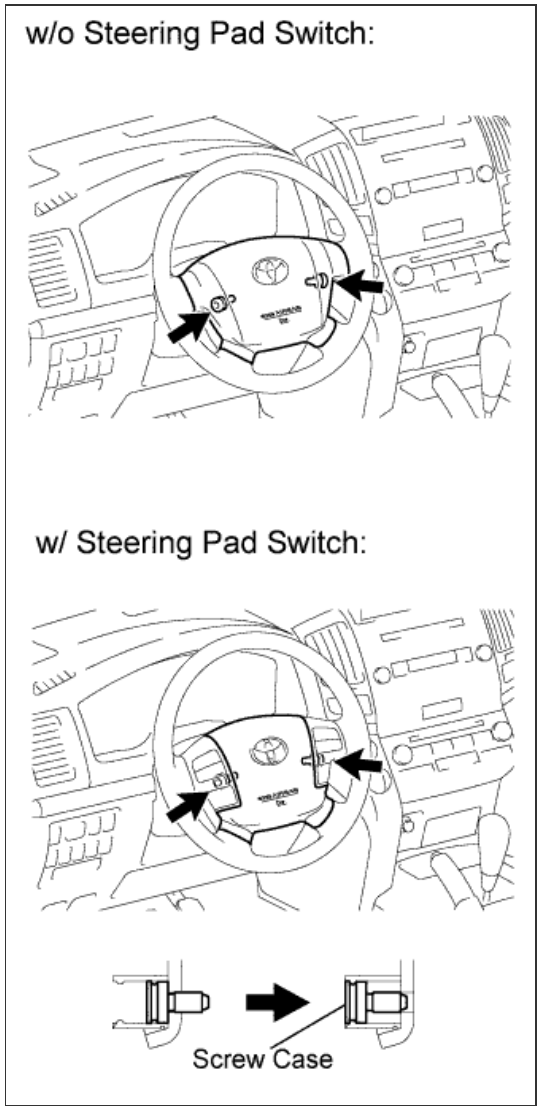
4. REMOVE LOWER NO. 3 STEERING WHEEL COVER

a. Detach the 2 claws and remove the steering wheel cover.



5. REMOVE STEERING PAD

a. Using a T30 "TORX" socket wrench, loosen the 2 screws until the groove along the screw circumference catches on the screw case.



b. Pull out the steering pad from the steering wheel, as shown in the illustration. Then support the steering pad with one hand.

NOTICE:

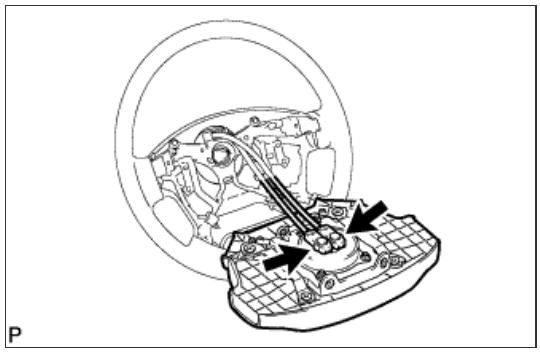
When removing the steering pad, do not pull the airbag wire harness.

c. Disconnect the horn connector.

d. Disconnect the 2 connectors and remove the steering pad.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



6. REMOVE STEERING WHEEL ASSEMBLY

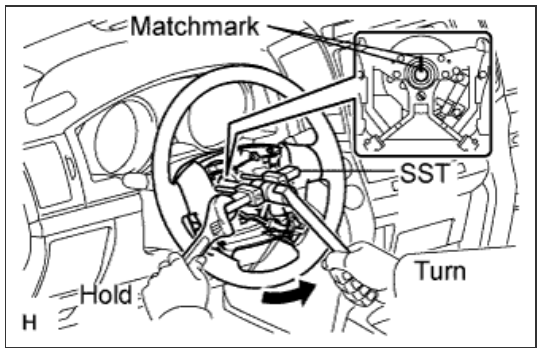
a. Remove the steering wheel set nut.

b. Put matchmarks on the steering wheel and main shaft.

c. Using SST, remove the steering wheel assembly.

SST

09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05011)



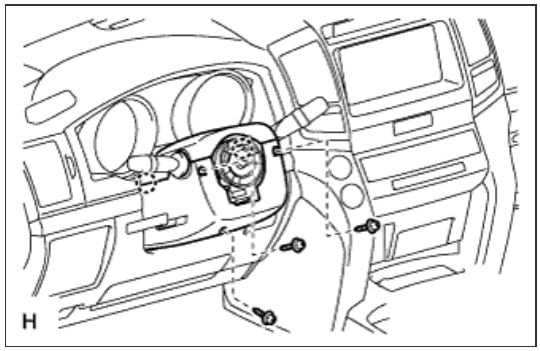
7. REMOVE LOWER STEERING COLUMN COVER

a. Remove the 3 screws.

b. Detach the 2 claws to remove the lower steering column cover.

NOTICE:

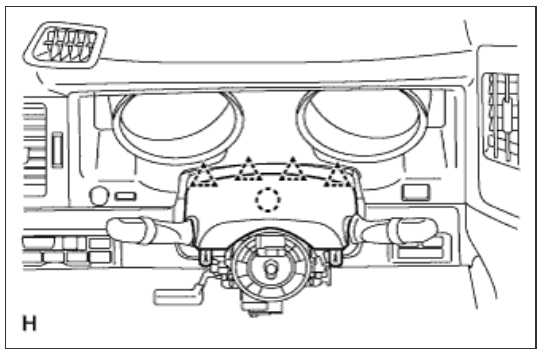
Do not damage the tilt and telescopic switch.



8. REMOVE UPPER STEERING COLUMN COVER

a. Detach the 4 clips.

b. Detach the claw to remove the upper steering column cover.



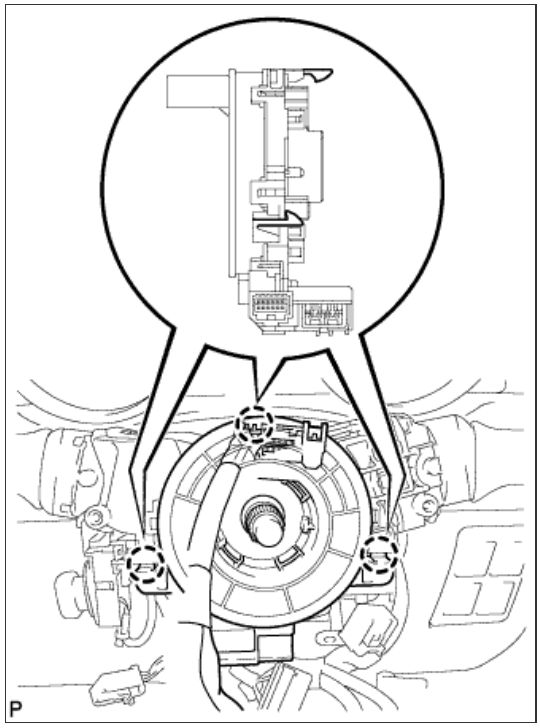
9. REMOVE SPIRAL CABLE SUB-ASSEMBLY

a. Disconnect the connectors from the spiral cable with steering sensor.

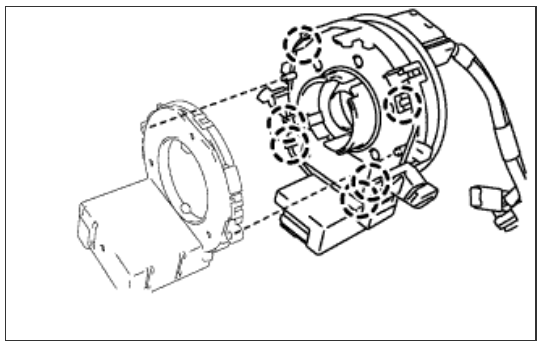
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

b. Detach the 3 claws and remove the spiral cable with steering sensor.

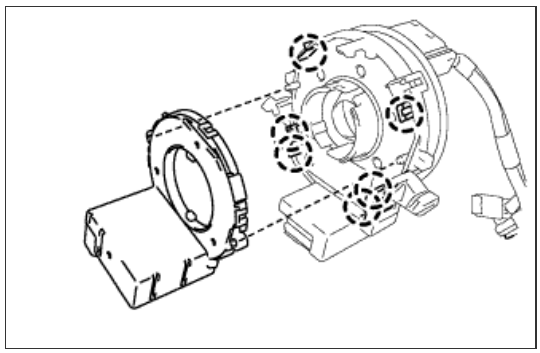


c. Detach the 6 claws and remove the spiral cable from the steering sensor.



10. REMOVE STEERING ANGLE SENSOR

a. Detach the 6 claws and remove the steering angle sensor.



for Preparation Click here

1. CHEC STEERING ANGLE SENSOR

a. Check the steering angle sensor.
If any of the following applies, replace the sensor with a new one:

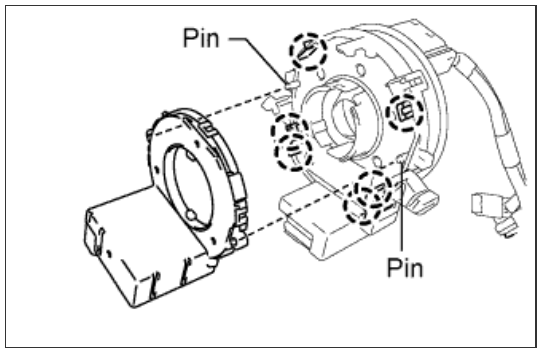
- The surface of the sensor is cracked, dented, or chipped.
- The connector is scratched, cracked, or damaged.
- The sensor has been dropped.

for Preparation Click here

1. INSTALL STEERING ANGLE SENSOR

a. Align the installation holes on the steering sensor with the pins on the spiral cable.

b. Attach the 6 claws and install the steering sensor to the spiral cable.



2. INSTALL SPIRAL CABLE SUB-ASSEMBLY

a. Align the pins on the spiral cable with the installation holes on the steering sensor.

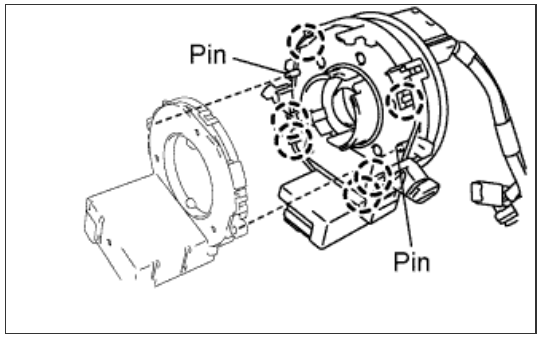
b. Attach the 6 claws and install the spiral cable to the steering sensor.

c. Check that the front wheels are facing straight ahead.

d. Set the turn signal switch to the neutral position.

CAUTION:

If it is not in the neutral position, the pin of the turn signal switch may be snapped.



e. Attach the 3 claws to install the spiral cable with steering sensor.

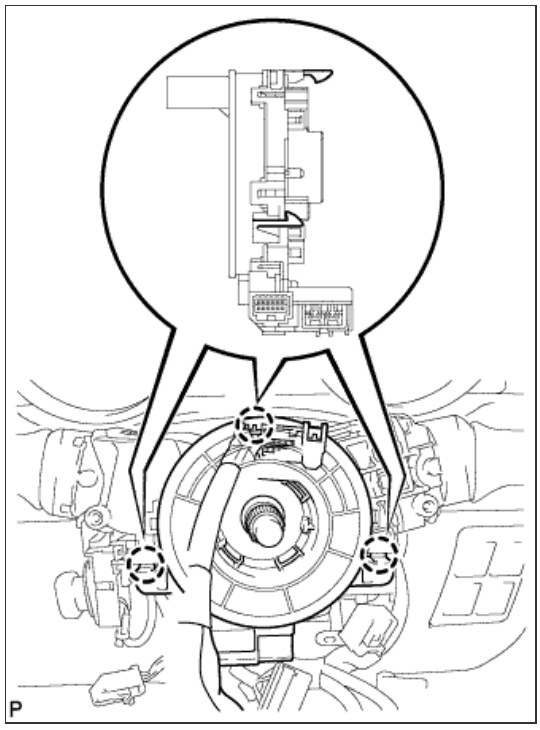
CAUTION:

When replacing the spiral cable with a new one, remove the lock pin before installing the steering wheel assembly.

f. Connect the connectors to the spiral cable with steering sensor.

NOTICE:

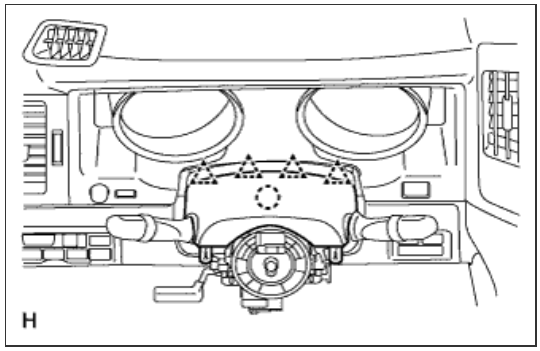
When handling the airbag connector, take care not to damage the airbag wire harness.



3. INSTALL UPPER STEERING COLUMN COVER

a. Attach the claw to install the upper steering column cover.

b. Attach the 4 clips to install the upper steering column cover onto the instrument cluster finish panel.



4. INSTALL LOWER STEERING COLUMN COVER

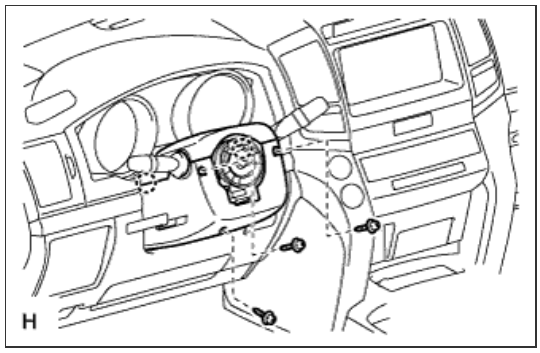
a. Attach the 2 claws to install the lower steering column cover.

NOTICE:

Do not damage the tilt and telescopic switch.

b. Install the 3 screws.

Torque:
2.0 N*m{ 20 kgf*cm , 18 in.*lbf }



5. ADJUST SPIRAL CABLE

a. Check that the ignition switch is off.

b. Check that the cable is disconnected from the battery negative (-) terminal.

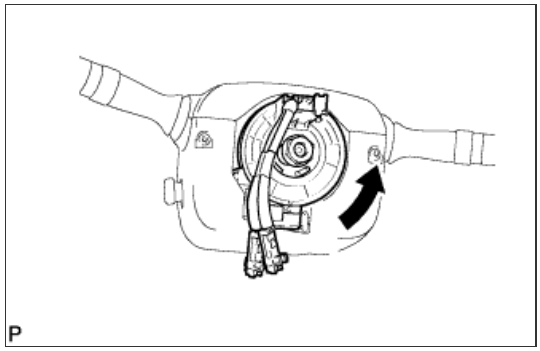
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

c. Rotate the spiral cable with steering sensor counterclockwise slowly by hand until it feels firm.

CAUTION:

Do not turn the spiral cable with steering sensor by the airbag wire harness.



d. Rotate the spiral cable with steering sensor clockwise approximately 2.5 turns to align the marks.

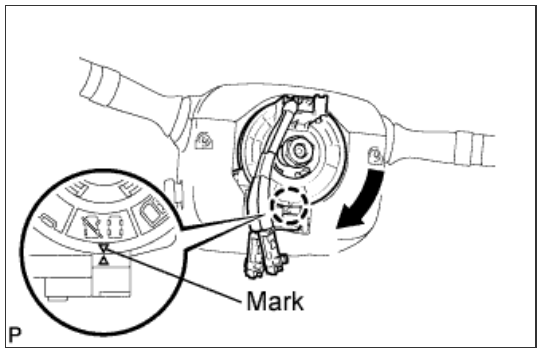
CAUTION:

Do not turn the spiral cable with spiral sensor by the airbag wire harness.

HINT:

The spiral cable with steering sensor will rotate approximately 2.5 turns to

both the left and right from the center.

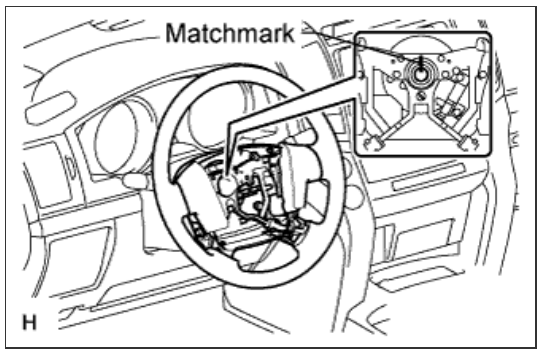


6. INSTALL STEERING WHEEL ASSEMBLY

a. Align the matchmarks on the steering wheel assembly and steering main shaft assembly.

b. Install the steering wheel assembly set nut.

Torque:
50 N*m{ 510 kgf*cm , 37 ft.*lbf }



7. INSTALL STEERING PAD

a. Support the steering pad with one hand.

b. Connect the 2 connectors to the steering pad.

NOTICE:

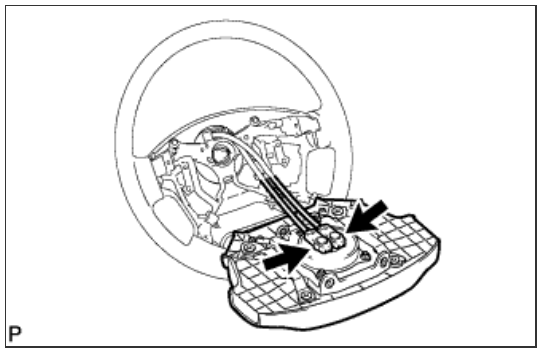
When handling the airbag connector, take care not to damage the airbag wire harness.

c. Connect the horn connector.

d. Confirm that the circumference groove of the "TORX" screw fits in the screw case, and place the steering pad onto the steering wheel.

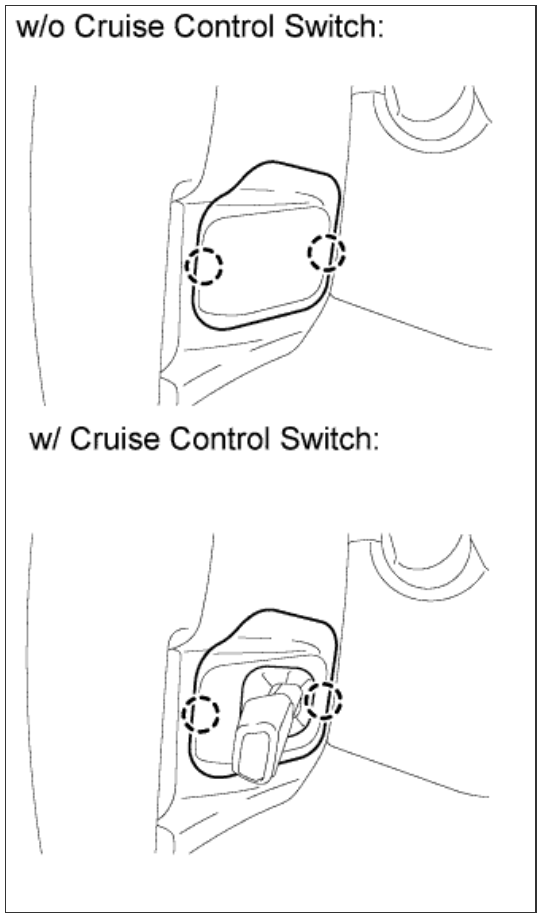
e. Using a T30 "TORX" socket wrench, tighten the 2 screws.

Torque:
8.8 N*m{ 90 kgf*cm , 78 in.*lbf }



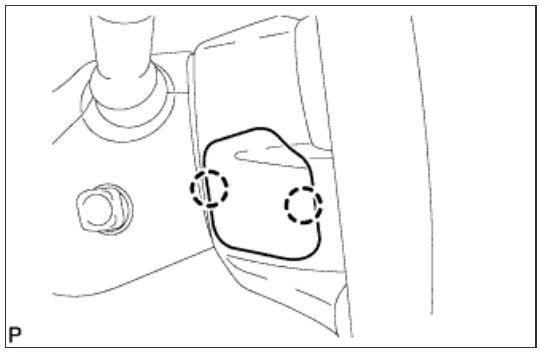
8. INSTALL LOWER NO. 2 STEERING WHEEL COVER

a. Attach the 2 claws to install the cover.



9. INSTALL LOWER NO. 3 STEERING WHEEL COVER

a. Attach the 2 claws to install the cover.



10. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

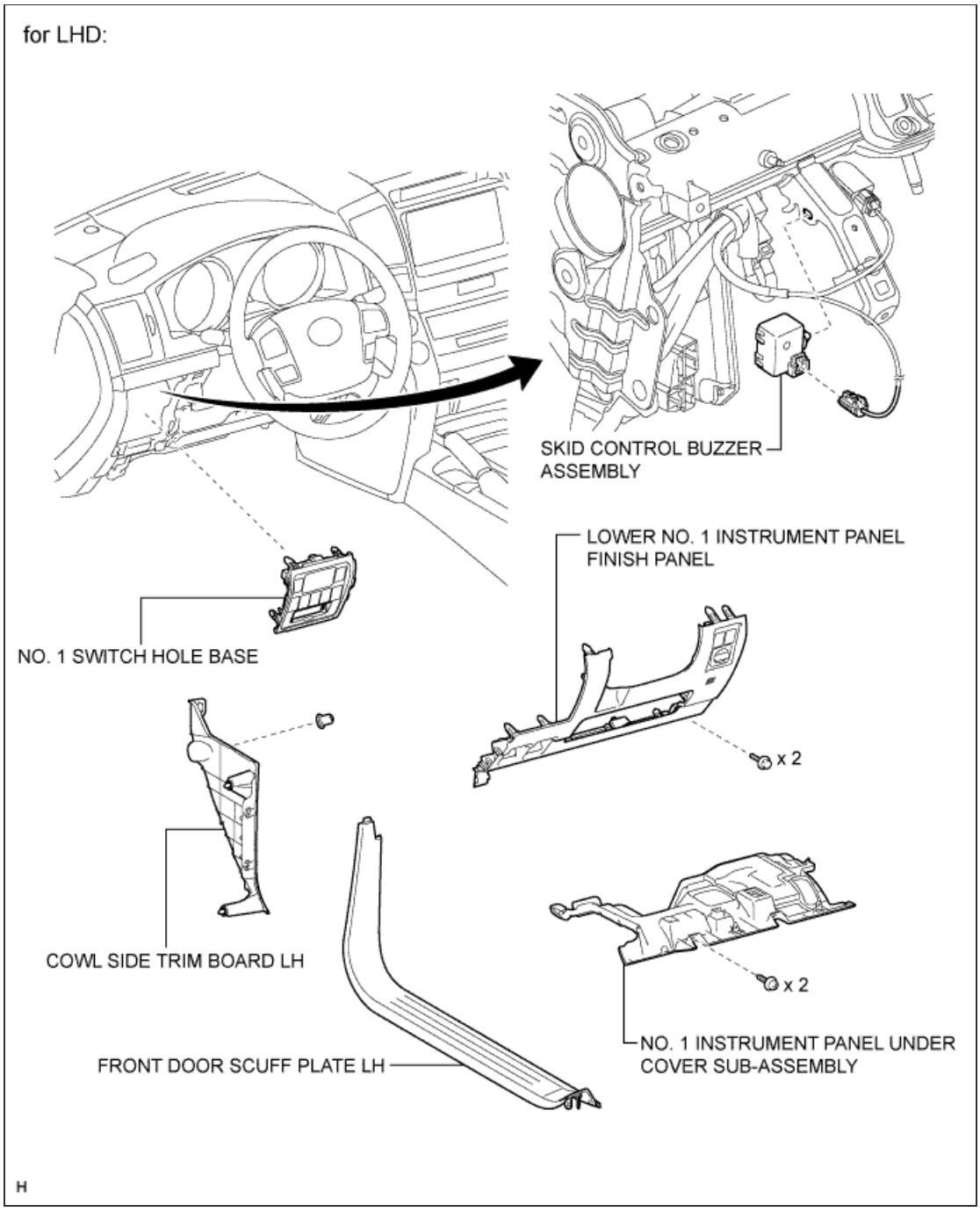
NOTICE:

- **Reset the Autoaway/Return function setting to the previous condition by changing the customize parameter (Click here).**
- **When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).**

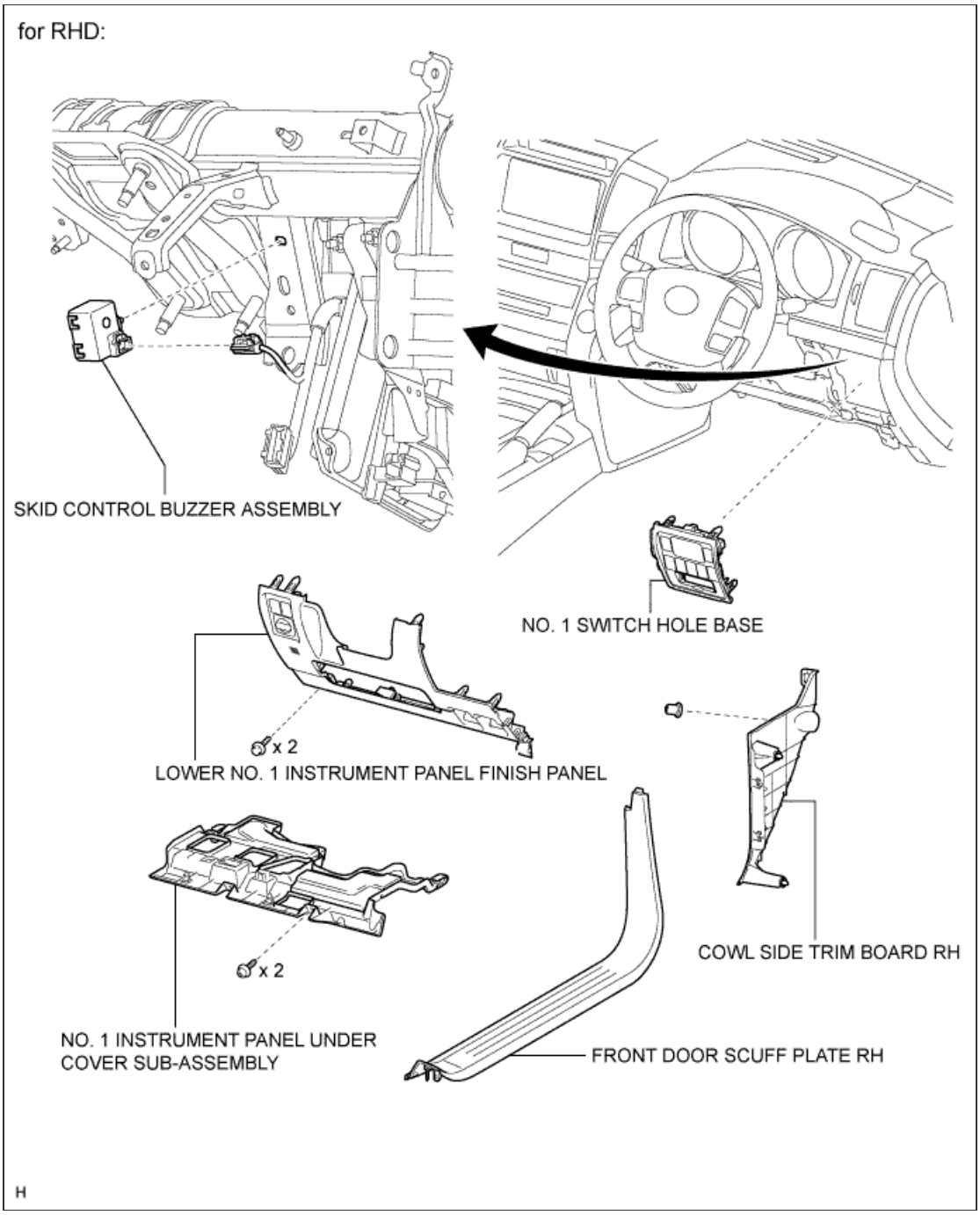
11. CHECK SRS WARNING LIGHT

a. Check the SRS warning light (Click here).

for Preparation Click here



for RHD:


SKID CONTROL BUZZER ASSEMBLY
NO. 1 SWITCH HOLE BASE
x 2
LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL
COWL SIDE TRIM BOARD RH
x 2
NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY
FRONT DOOR SCUFF PLATE RH

H

for Preparation Click here

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

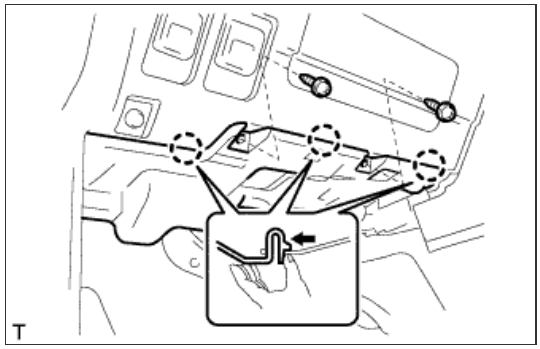
2. REMOVE FRONT DOOR SCUFF PLATE

3. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Remove the 2 scre s.

b. Detach the 3 cla s.

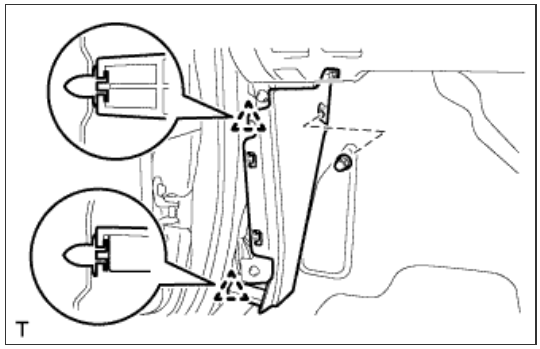
c. Disconnect the connectors and remove the No. 1 instr ment panel under cover.



4. REMOVE COWL SIDE TRIM BOARD

a. Remove the cap nut.

b. Detach the 2 clips and remove the co l side trim board.



5. REMOVE LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

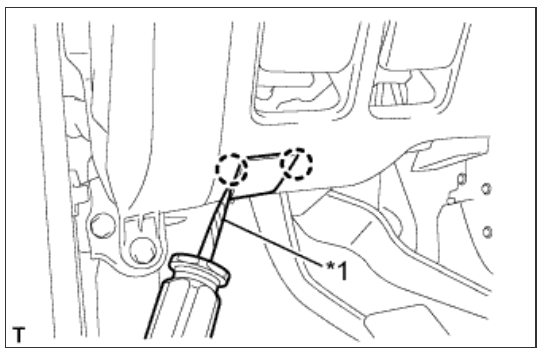
a. sing a scre driver, detach the 2 cla s and open the hole cover.

HINT:

ape the scre driver tip before se.

Text in Illustration

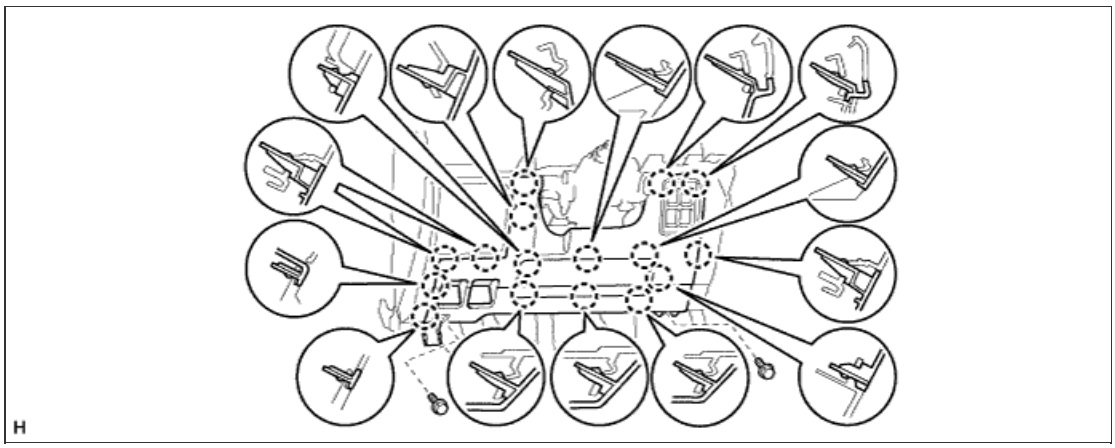
1	Protective ape



b. Driver ide Knee Airbag

i. Remove the 2 bolts.

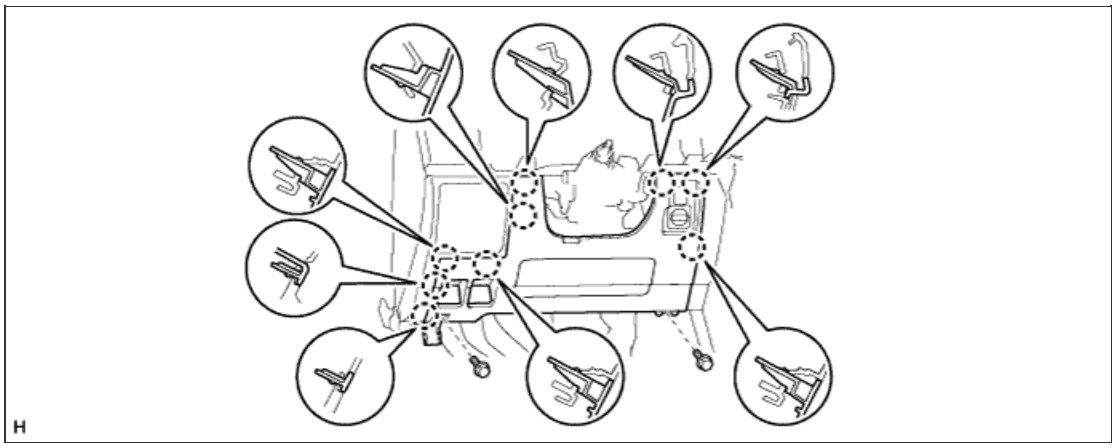
ii. Detach the 1 cla s.



c. o Driver ide Knee Airbag

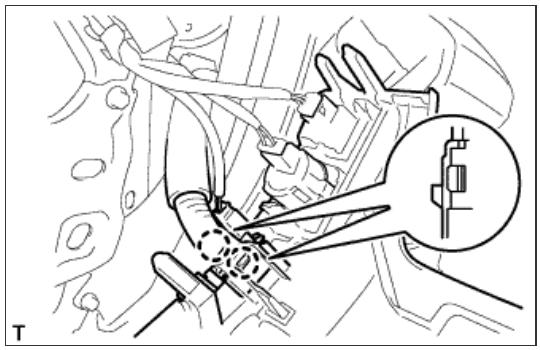
i. Remove the 2 bolts.

ii. Detach the cla s.



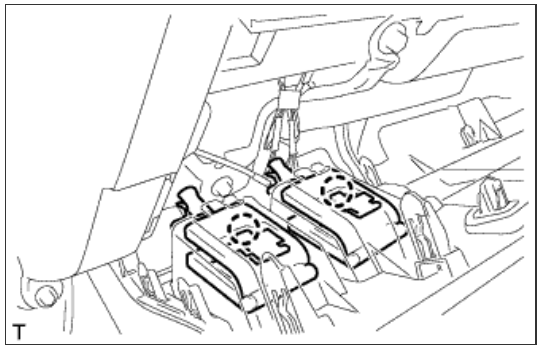
d. for ormatic ir Conditioning ystem

i. Detach the 2 cla s and remove the room temperature sensor.



e. Detach the 2 cla s and disconnect the 2 control cables.

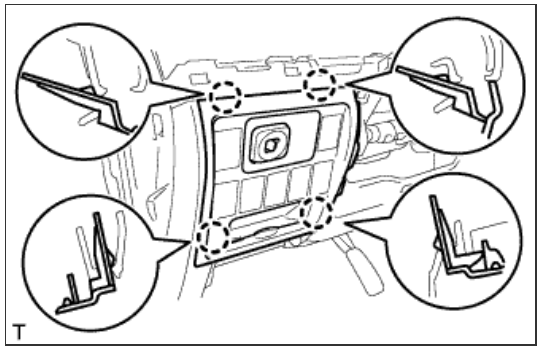
f. Disconnect the connectors and remove the lo e No. 1 instr ment panel finish panel.



6. REMOVE NO. 1 SWITCH HOLE BASE

a. Detach the cla s.

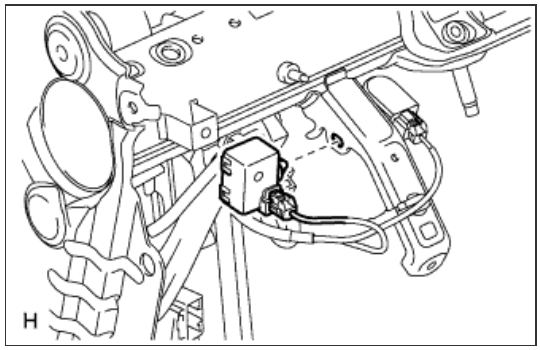
b. Disconnect the connectors and remove the No. 1 s itch hole cover.



7. REMOVE SKID CONTROL BUZZER ASSEMBLY (for LHD)

a. Detach the clamp and remove the buzzer.

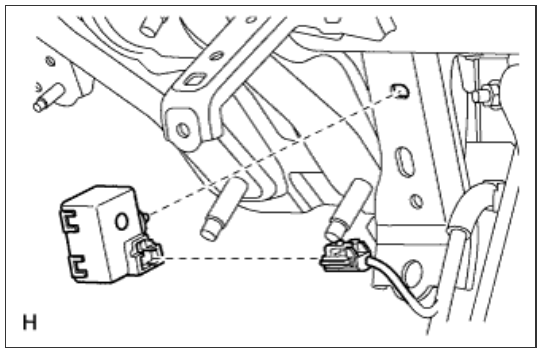
b. Disconnect the buzzer connector.



8. REMOVE SKID CONTROL BUZZER ASSEMBLY (for RHD)

a. Detach the clamp and remove the buzzer.

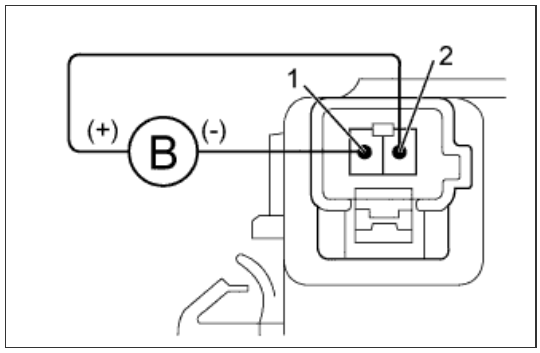
b. Disconnect the buzzer connector.


H

for Preparation Click here

1. CHECK SKID CONTROL BUZZER ASSEMBLY

a. Apply battery voltage to the skid control buzzer, and check the operation sound of the buzzer.



OK:

Measurement Condition	Specified Condition
Battery positive (+) voltage - Terminal 2	Buzzer sounds
Battery negative (-) voltage - Terminal 1	

If the result is not as specified, replace the skid control buzzer assembly.

for Preparation Click here

1. INSTALL SKID CONTROL BUZZER ASSEMBLY (for LHD)

a. Connect the buzzer connector.

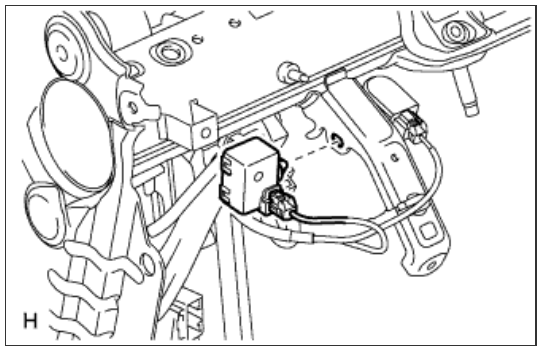
NOTICE:

Securely connect the connector.

b. Attach the clamp to install the buzzer.

NOTICE:

- **Securely insert the clamp into the bracket.**
- **If the buzzer is dropped, replace it.**



2. INSTALL SKID CONTROL BUZZER ASSEMBLY (for RHD)

a. Connect the buzzer connector.

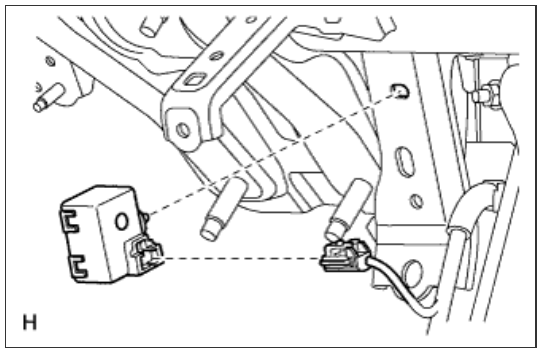
NOTICE:

Securely connect the connector.

b. Attach the clamp to install the buzzer.

NOTICE:

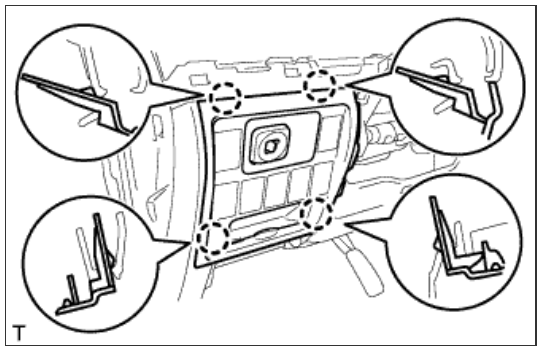
- **Securely insert the clamp into the bracket.**
- **If the buzzer is dropped, replace it.**



3. INSTALL NO. 1 SWITCH HOLE BASE

a. Connect the connectors.

b. Attach the 4 claws to install the No. 1 switch hole base.

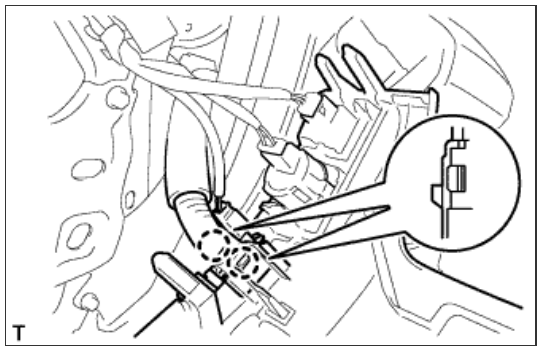


4. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

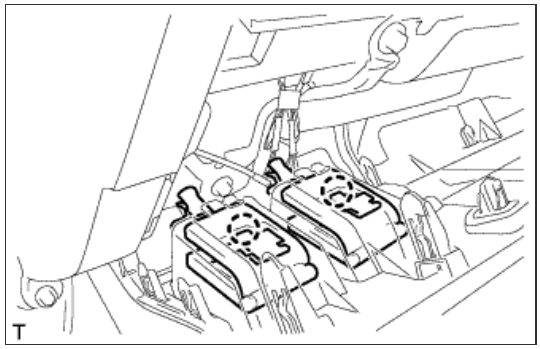
a. Connect the connectors.

b. for Automatic Air Conditioning System:

i. Attach the 2 claws to install the room temperature sensor.



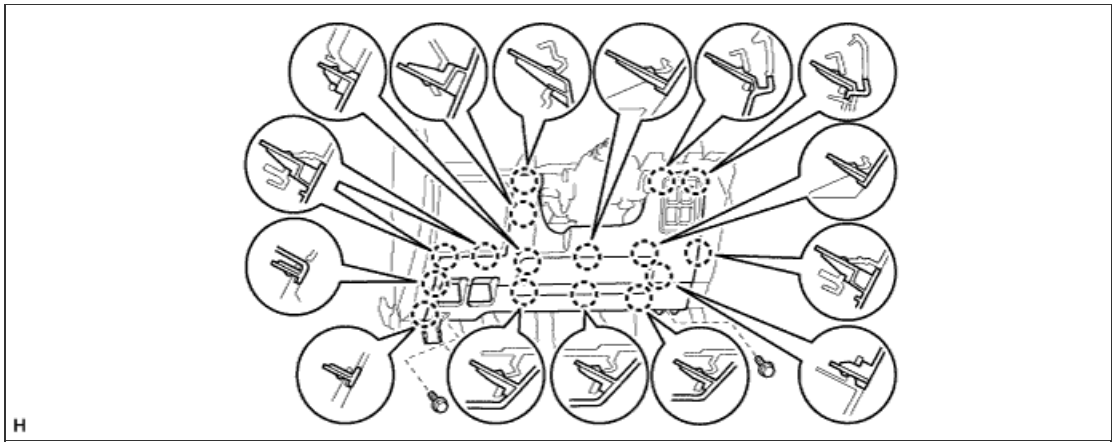
c. Attach the 2 claws to connect the 2 control cables.



d. w/ Driver Side Knee Airbag:

i. Attach the 16 claws to install the lower No. 1 instrument panel finish panel.

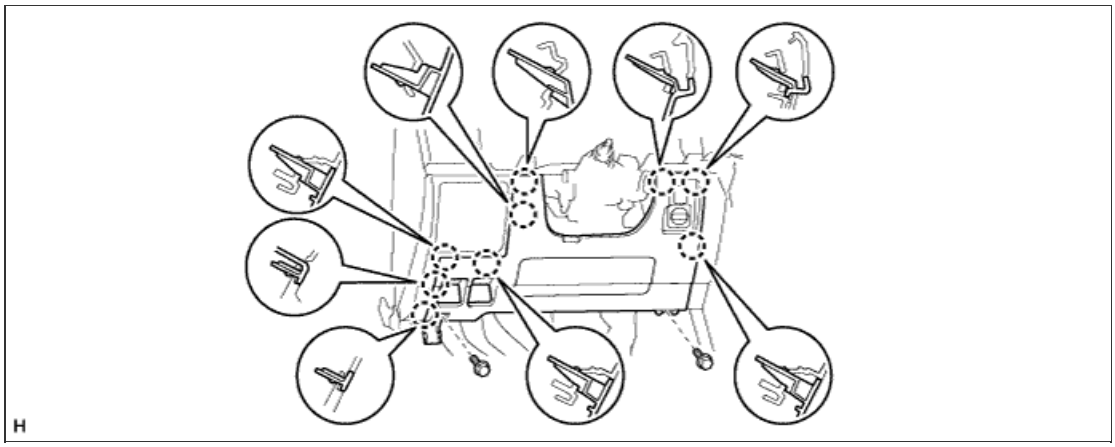
ii. Install the 2 bolts.



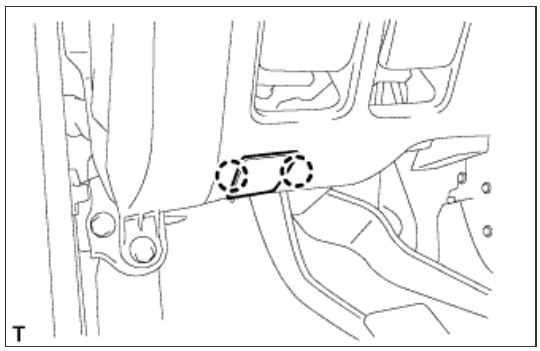
e. w/o Driver Side Knee Airbag:

i. Attach the 9 claws to install the lower No. 1 instrument panel finish panel.

ii. Install the 2 bolts.



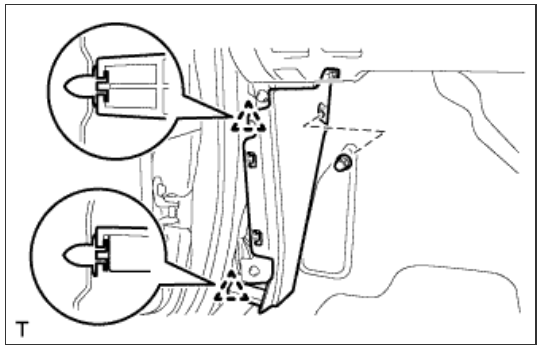
f. Attach the 2 claws to close the hole cover.



5. INSTALL COWL SIDE TRIM BOARD

a. Attach the 2 clips to install the cowl side trim board.

b. Install the cap nut.

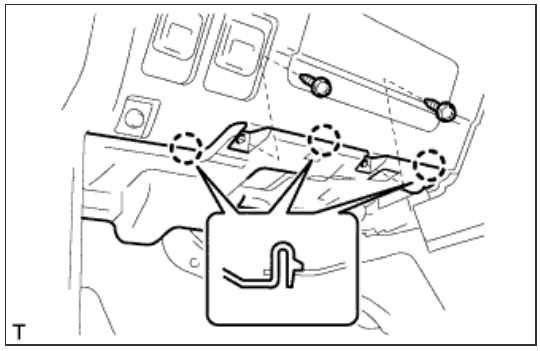


6. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Connect the connectors.

b. Attach the 3 claws to install the No. 1 instrument panel under cover.

c. Install the 2 screws.



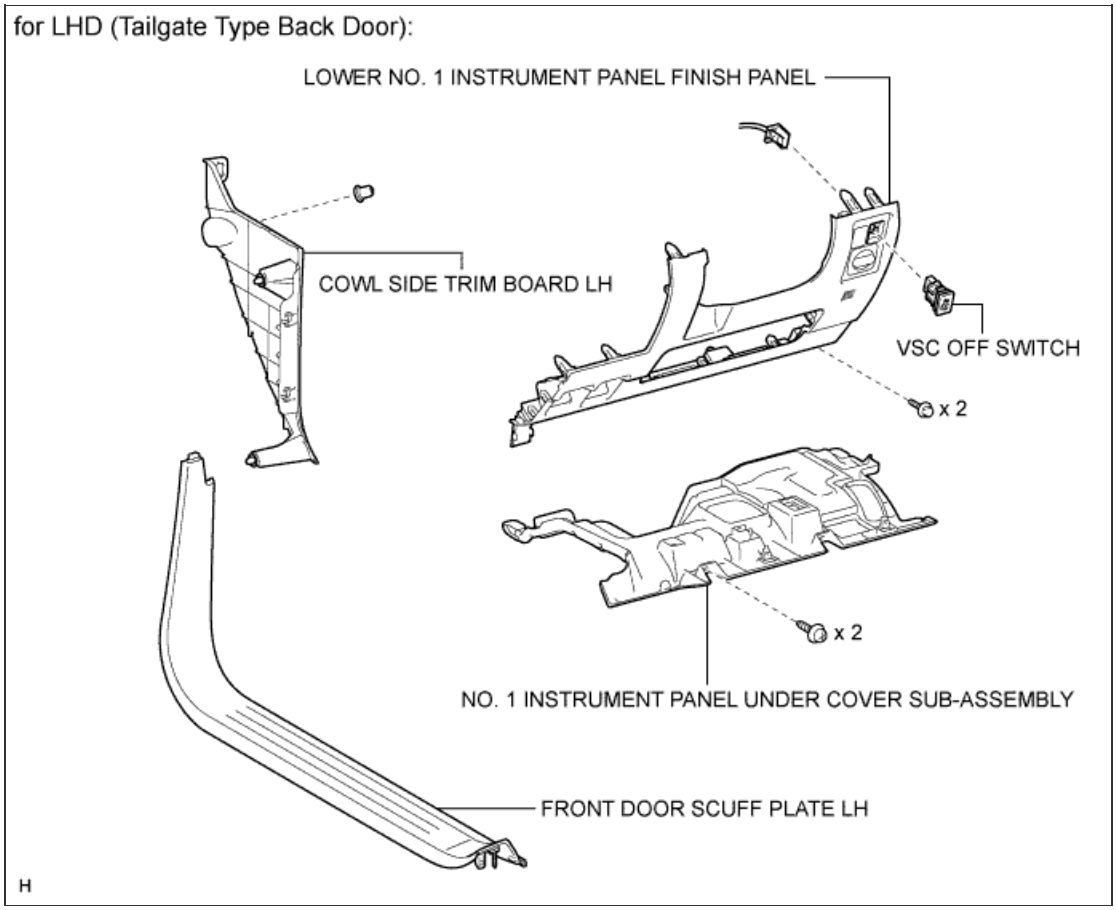
7. INSTALL FRONT DOOR SCUFF PLATE

8. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

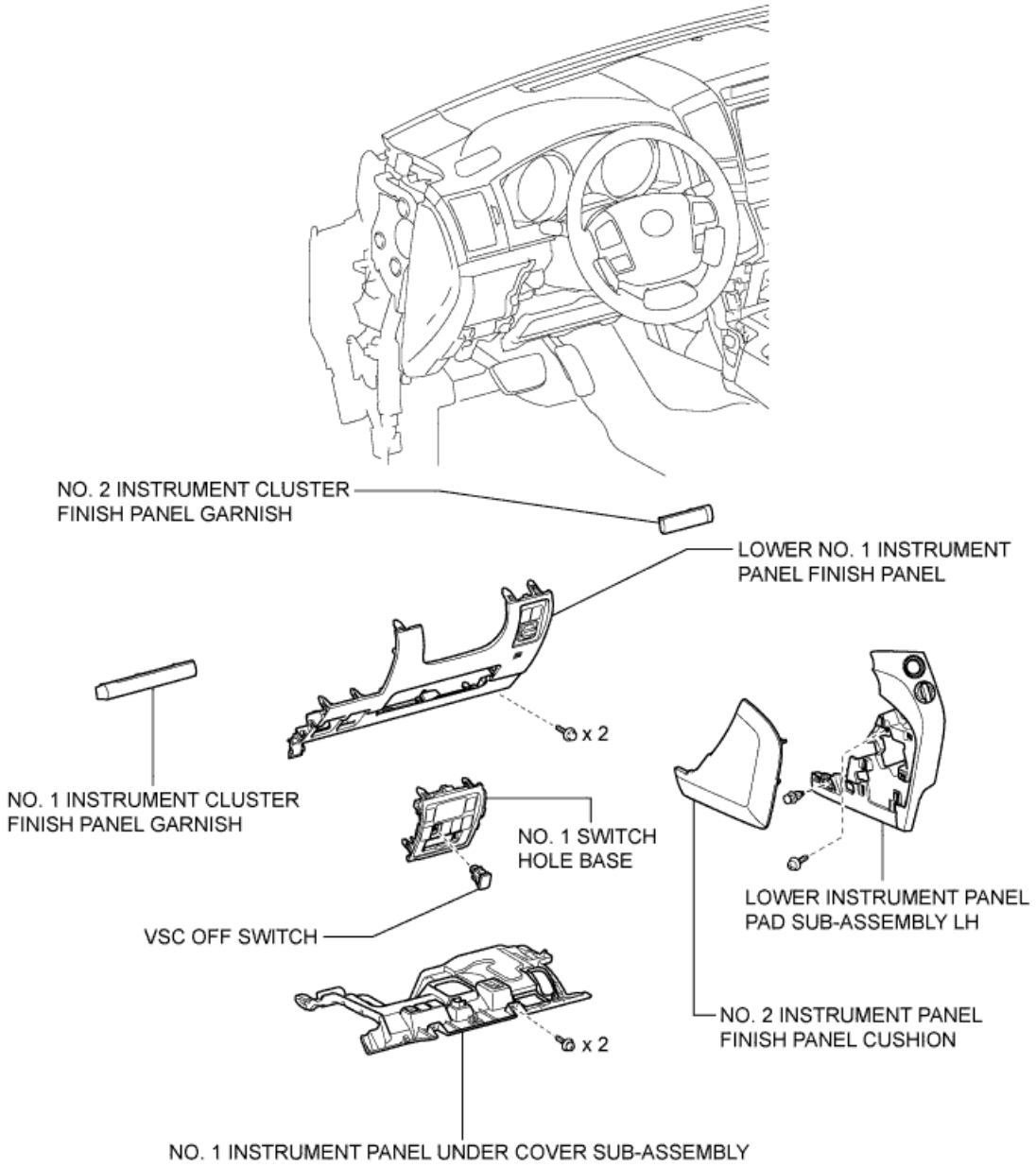
NOTICE:

hen disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

for Preparation [Click here]

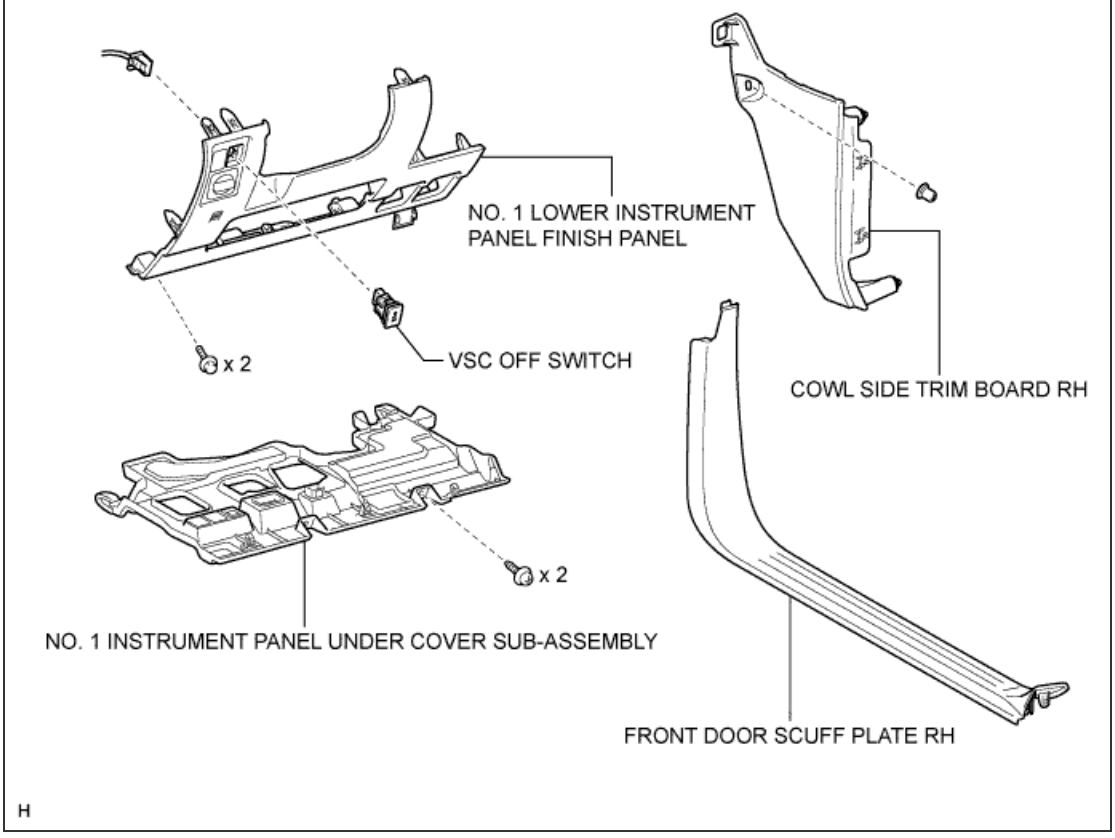


for LHD (Double Swing-out Type Back Door):



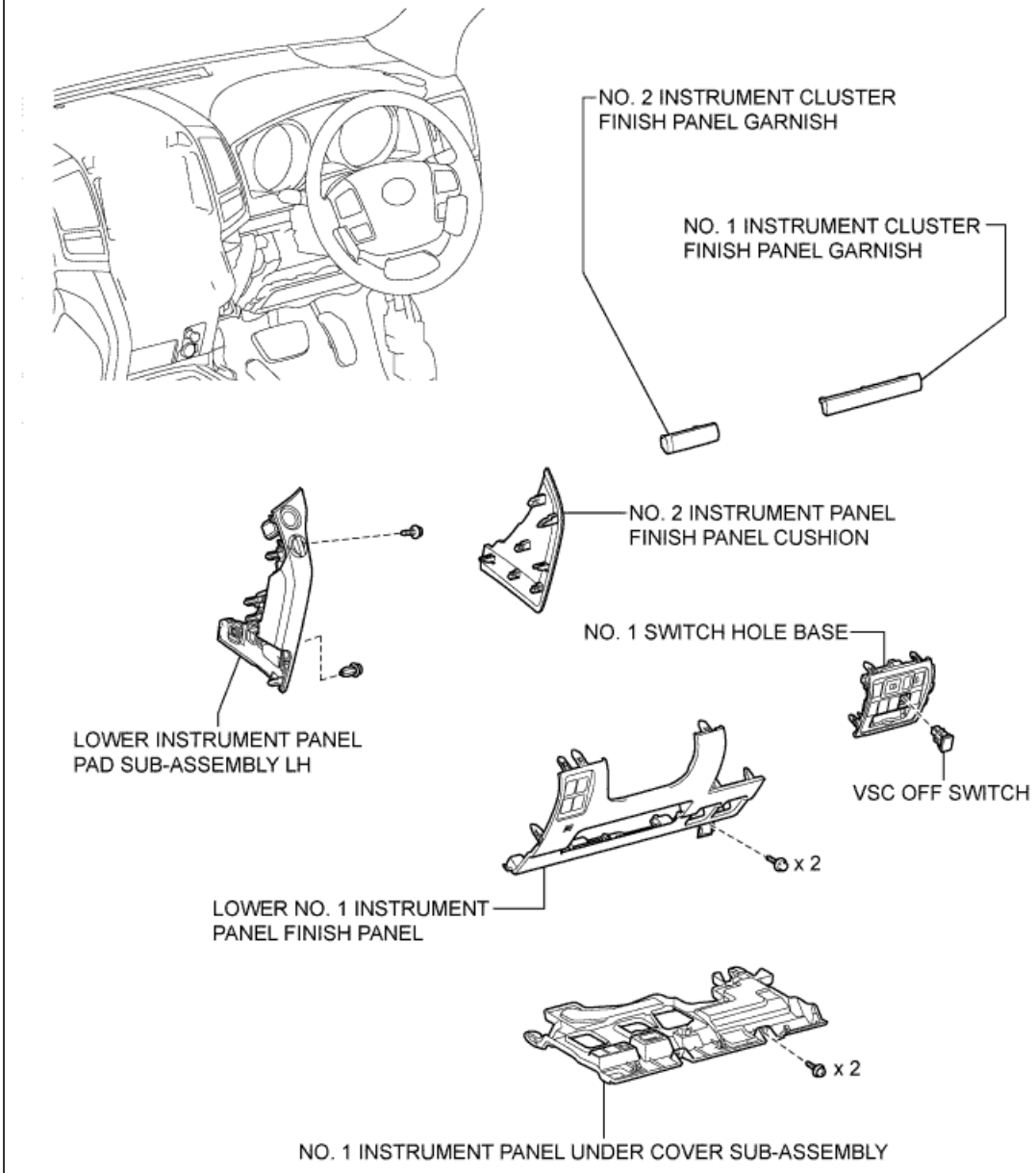
H

for RHD (Tailgate Type Back Door):



H

for RHD (Double Swing-out Type Back Door):



T

for Preparation Click here

1. REMOVE LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL (for Tailgate Type Back Door)

(Click here)

2. REMOVE NO. 1 SWITCH HOLE BASE (for Double Swing-out Type Back Door)

(Click here)

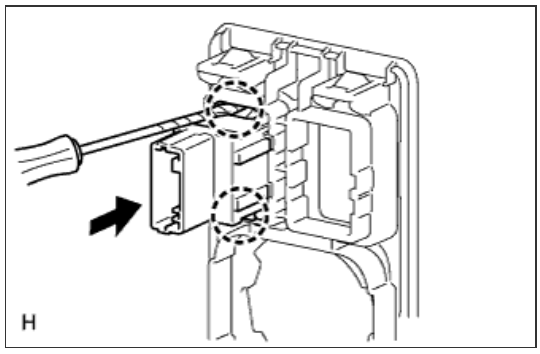
3. REMOVE VSC OFF SWITCH

a. Disconnect the VSC OFF switch connector.

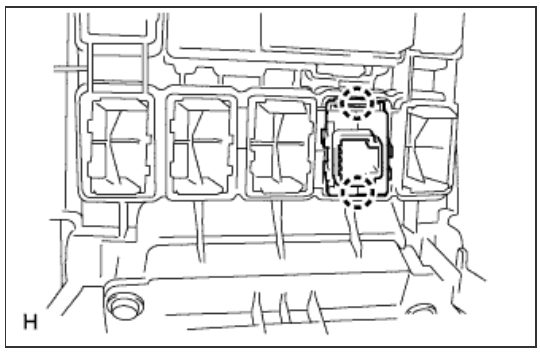
b. for Tailgate Type Back Door:
Using a screwdriver, detach the 2 claws and remove the VSC OFF switch from the lower instrument panel finish panel.

HINT:

Tape the screwdriver tip before use.



c. for Double Swing-out Type Back Door:
Detach the 2 claws and remove the VSC OFF switch form the No. 1 switch hole base.



for Preparation Click here

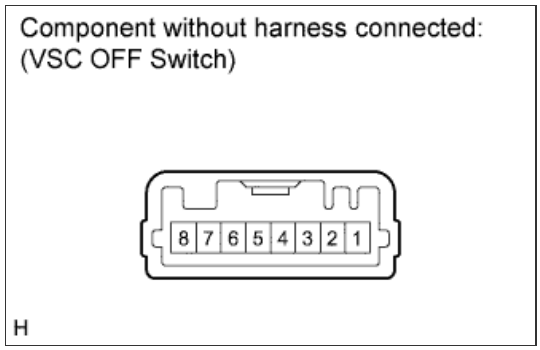
1. CHECK VSC OFF SWITCH

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

Stan ar e i tance:

Tester Connection	Switch Condition	Specified Condition
3 - 6	Pressed	Below 1 Ω
	Not pressed	10 kΩ or higher

If the result is not as specified, replace the VSC OFF switch.



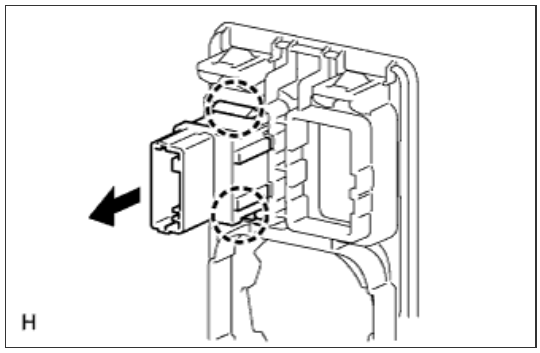
for Preparation Click here

1. INSTALL VSC OFF SWITCH

a. for Tailgate Type Back Door:
Attach the 2 claws to install the VSC OFF switch to the lower instrument panel finish panel.

b. for Double Swing-out Type Back Door:
Attach the 2 claws to install the VSC OFF switch to the No. 1 switch hole base.

c. Connect the VSC OFF switch connector.



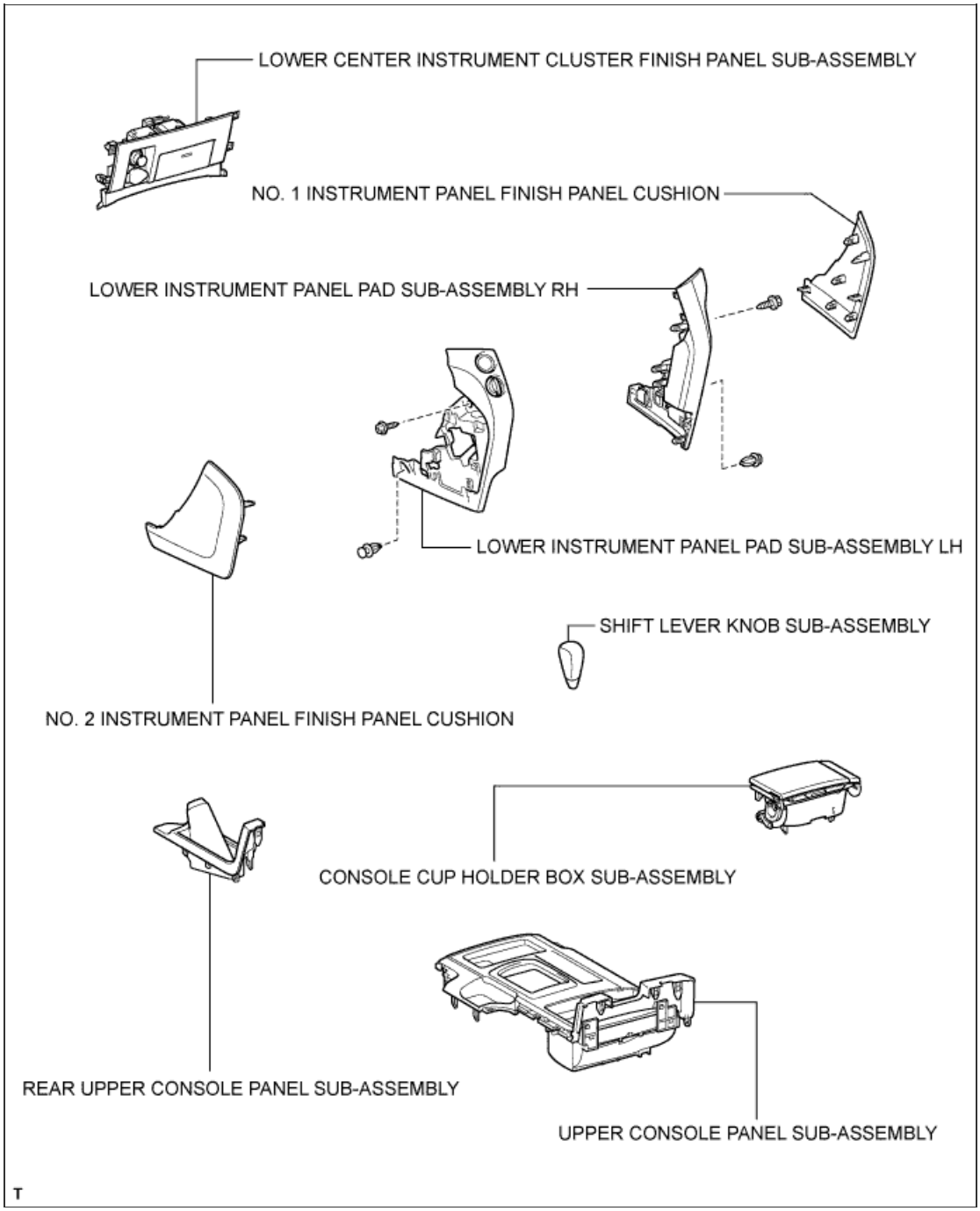
2. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL (for Tailgate Type Back Door)

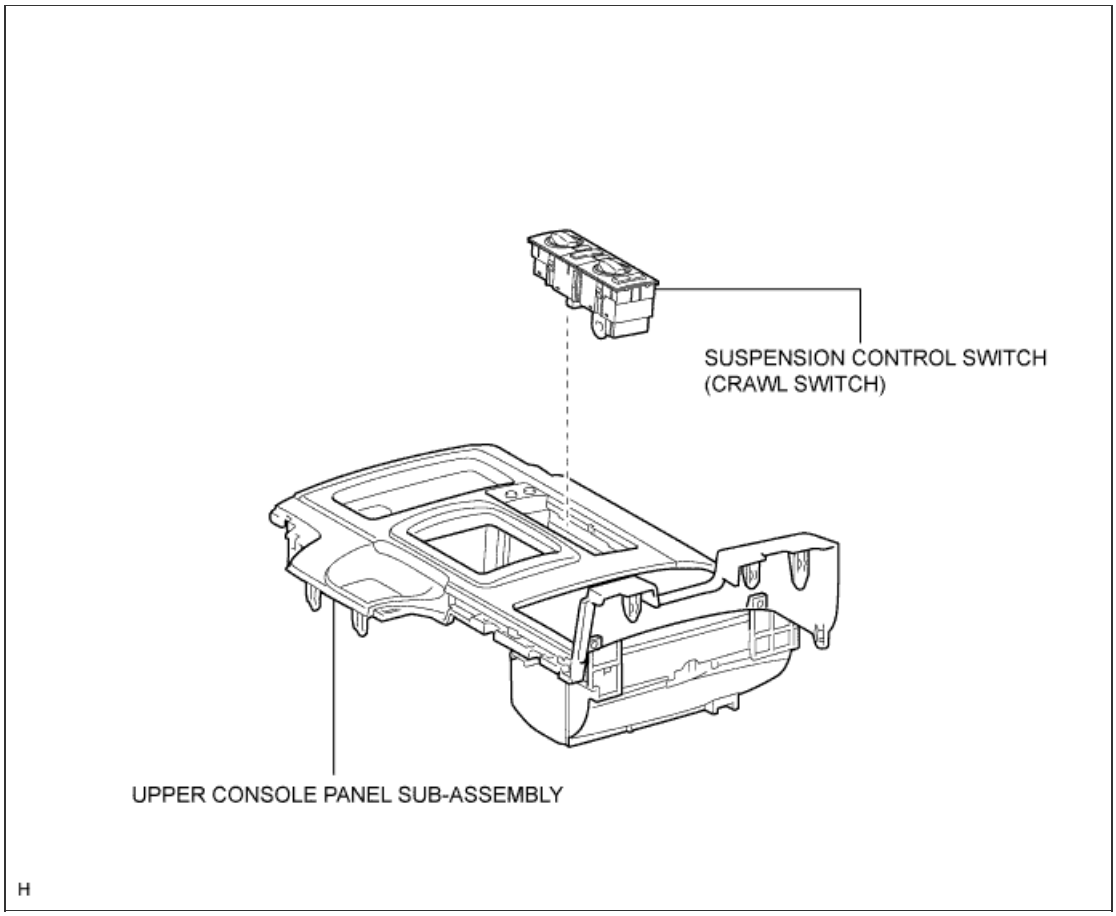
(Click here)

3. INSTALL NO. 1 SWITCH HOLE BASE (for Double Swing-out Type Back Door)

(Click here)

for Preparation Click here




SUSPENSION CONTROL SWITCH
(CRAWL SWITCH)
UPPER CONSOLE PANEL SUB-ASSEMBLY
H

for Preparation Click here

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

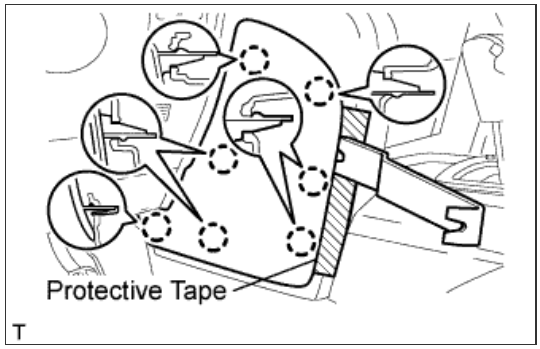
NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

2. REMOVE NO. 2 INSTRUMENT PANEL FINISH PANEL CUSHION

a. Place protective tape as shown in the illustration.

b. Using a moulding remover, detach the 7 claws and remove the panel cushion.



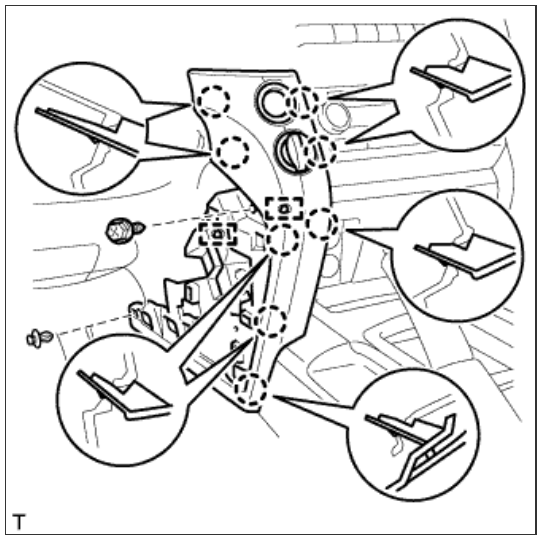
3. REMOVE LOWER INSTRUMENT PANEL PAD SUB-ASSEMBLY LH

a. Remove the clip.

b. Remove the screw.

c. Detach the 8 claws.

d. Remove the panel pad and disconnect the connectors and 2 clamps.



4. REMOVE NO. 1 INSTRUMENT PANEL FINISH PANEL CUSHION

a. Place protective tape as shown in the illustration.

b. Using a moulding remover, detach the 7 claws and remove the panel cushion.

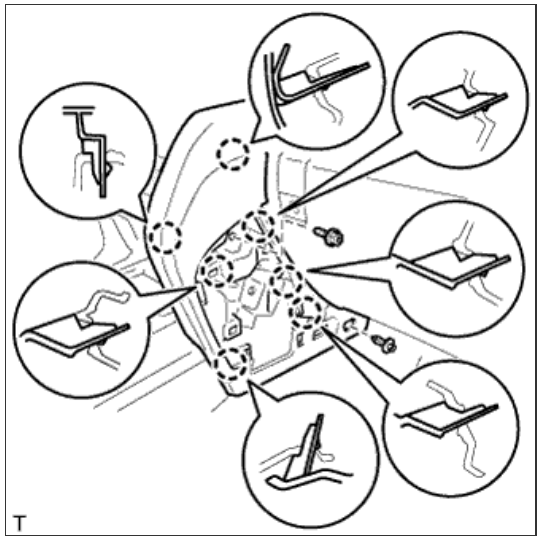


5. REMOVE LOWER INSTRUMENT PANEL PAD SUB-ASSEMBLY RH

a. Remove the clip.

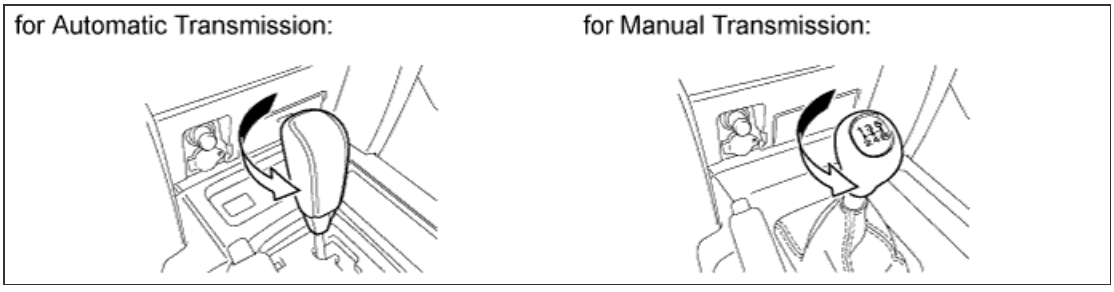
b. Remove the screw.

c. Detach the 7 claws and remove the panel.



6. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY

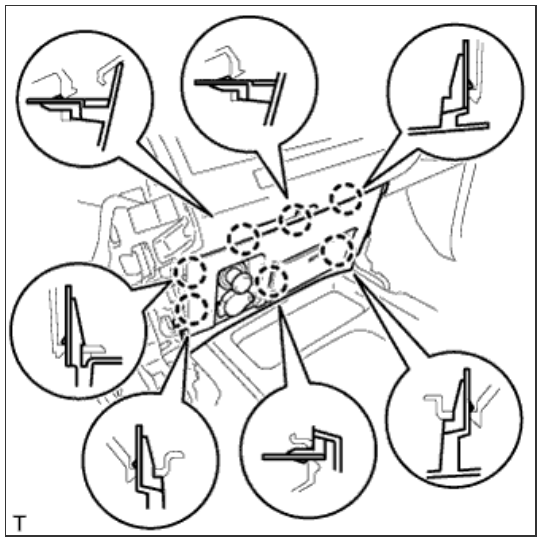
a. Twist the shift lever knob in the direction indicated by the arrow and remove it.



7. REMOVE LOWER CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY

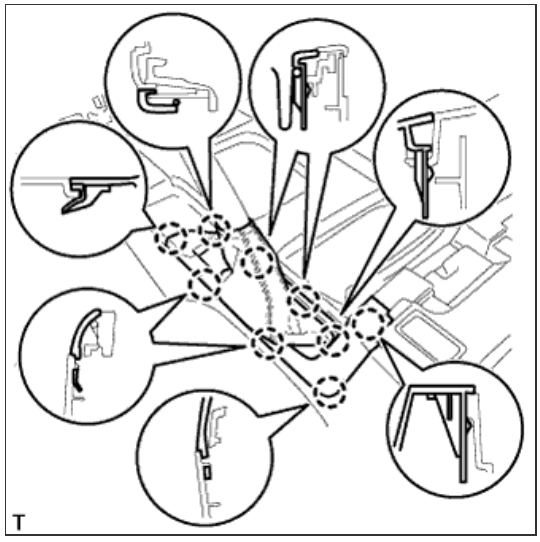
a. Detach the 7 claws.

b. Disconnect the connectors and remove the panel.



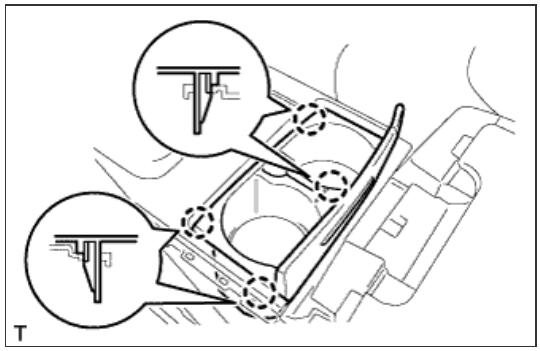
8. REMOVE REAR UPPER CONSOLE PANEL SUB-ASSEMBLY

a. Detach the 9 claws and remove the panel.



9. REMOVE CONSOLE CUP HOLDER BOX SUB-ASSEMBLY

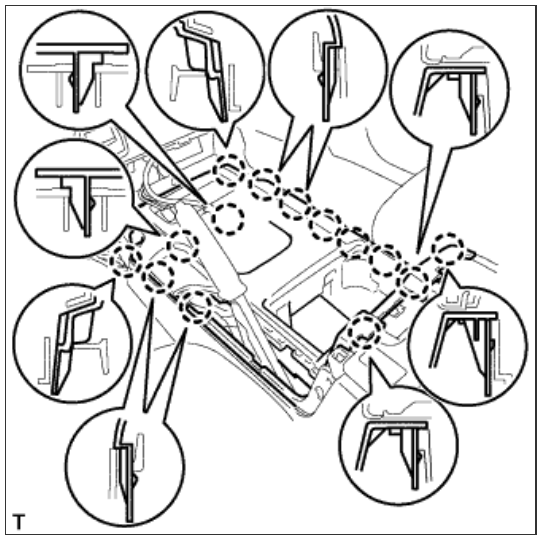
a. Detach the 4 claws and remove the box.



10. REMOVE UPPER CONSOLE PANEL SUB-ASSEMBLY

a. Detach the 14 claws.

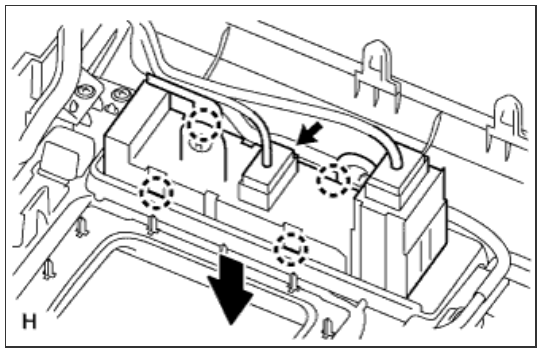
b. Disconnect the connectors and remove the console panel.



11. REMOVE SUSPENSION CONTROL SWITCH (CRAWL SWITCH)

a. Disconnect the 2 connectors.

b. Detach the 4 claws and remove the suspension control switch (CRAWL switch) from the upper console panel.



for Preparation Click here

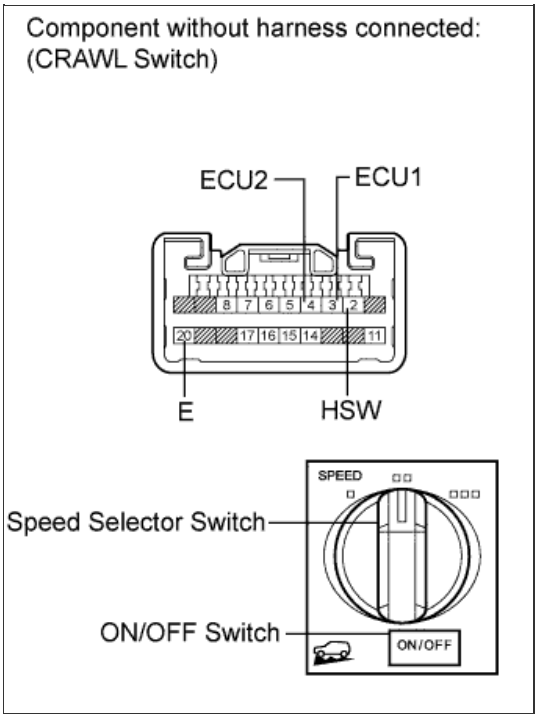
CHECK SUSPENSION CONTROL SWITCH (CRAWL SWITCH)

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

Standard Resistance:

Tester Connection	Switch Condition	Specified Condition
3 (ECU1) - 20 (E)	Speed selector switch: MID	10 kΩ or higher
	Speed selector switch: HI	
	Speed selector switch: LO	Below 1 Ω
4 (ECU2) - 20 (E)	Speed selector switch: MID	10 kΩ or higher
	Speed selector switch: HI	Below 1 Ω
	Speed selector switch: LO	
2 (HSW) - 20 (E)	ON/OFF switch: Pressed	Below 1 Ω
	ON/OFF switch: Not pressed	10 kΩ or higher

If the result is not as specified, replace the suspension control switch (CRAWL switch).

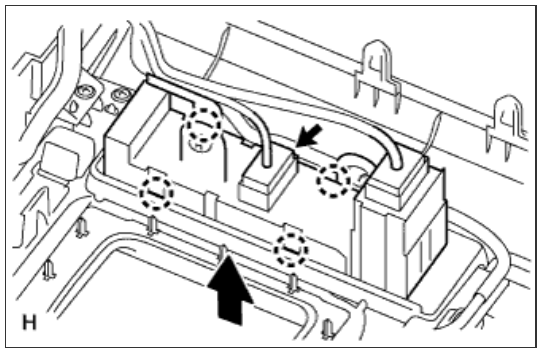


for Preparation Click here

1. INSTALL SUSPENSION CONTROL SWITCH (CRAWL SWITCH)

a. Attach the 4 claws to install the suspension control switch (CRAWL switch).

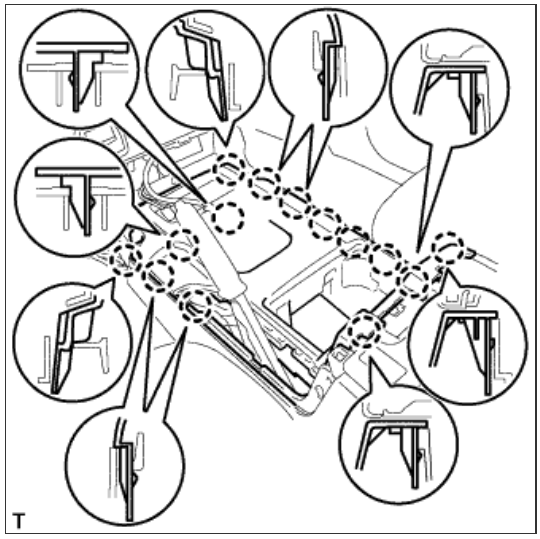
b. Connect the 2 connectors.



2. INSTALL UPPER CONSOLE PANEL SUB-ASSEMBLY

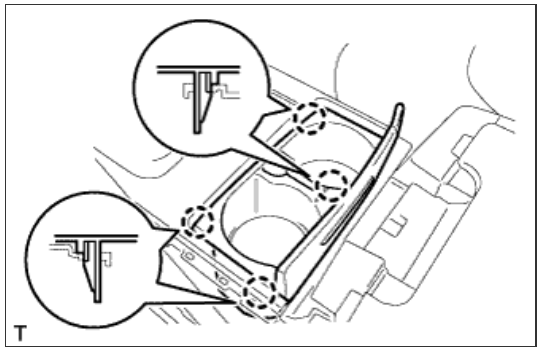
a. Connect the connectors.

b. Attach the 14 claws to install the console panel.



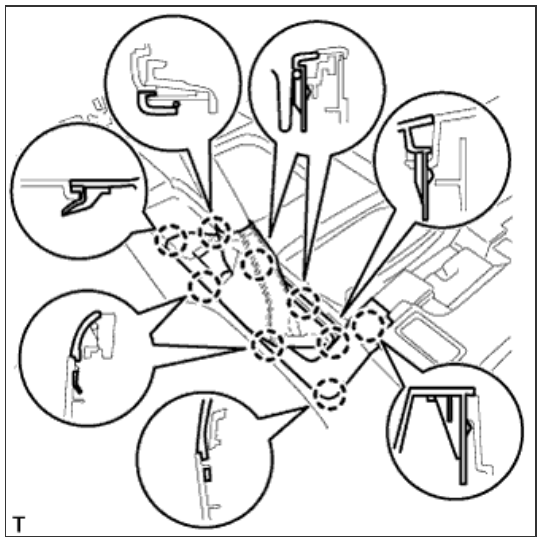
3. INSTALL CONSOLE CUP HOLDER BOX SUB-ASSEMBLY

a. Attach the 4 claws to install the box.



4. INSTALL REAR UPPER CONSOLE PANEL SUB-ASSEMBLY

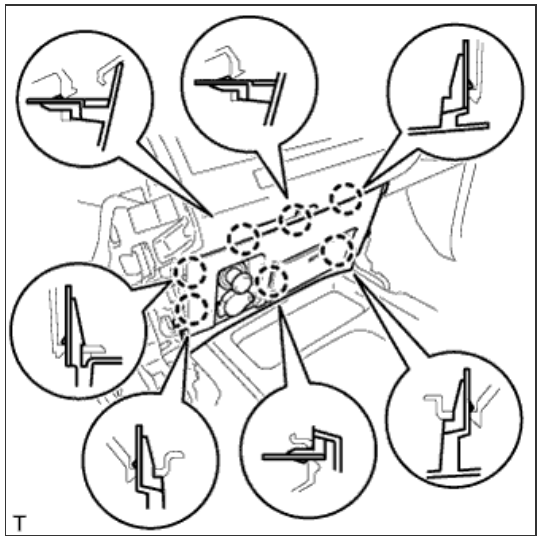
a. Attach the 9 claws to install the panel.



5. INSTALL LOWER CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY

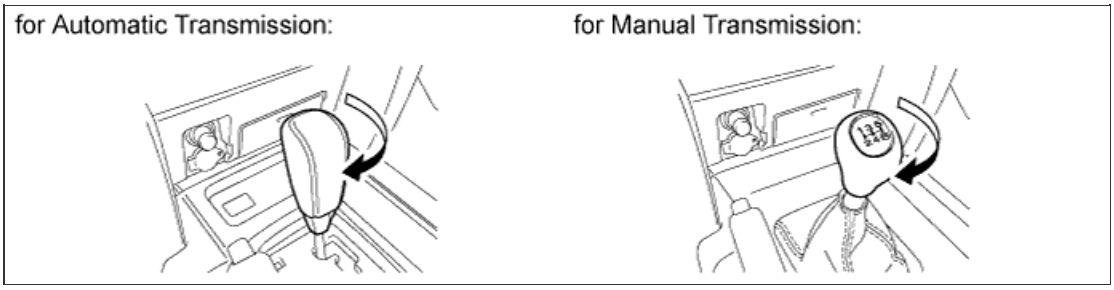
a. Connect the connectors.

b. Attach the 7 claws to install the panel.



6. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY

a. Install the shift lever knob and twist it in the direction indicated by the arrow.

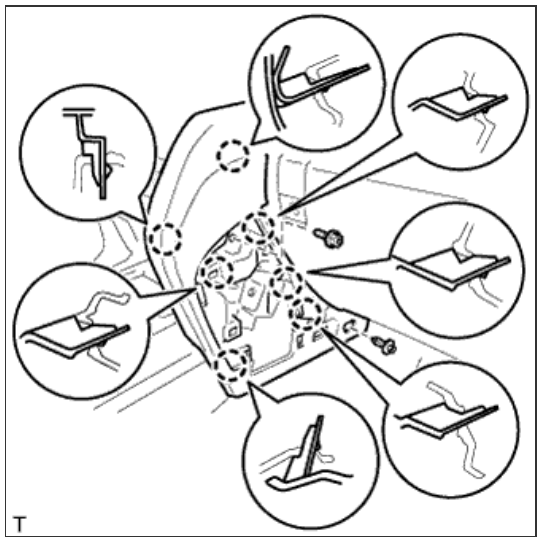


7. INSTALL LOWER INSTRUMENT PANEL PAD SUB-ASSEMBLY RH

a. Attach the 7 claws to install the panel pad.

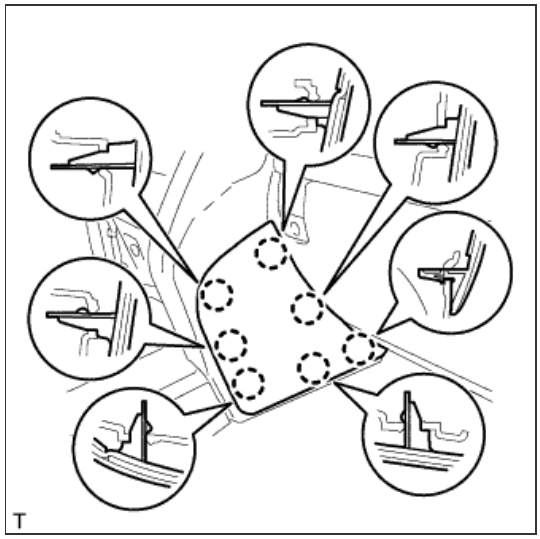
b. Install the screw.

c. Install the clip.



8. INSTALL NO. 1 INSTRUMENT PANEL FINISH PANEL CUSHION

a. Attach the 7 claws to install the panel cushion.



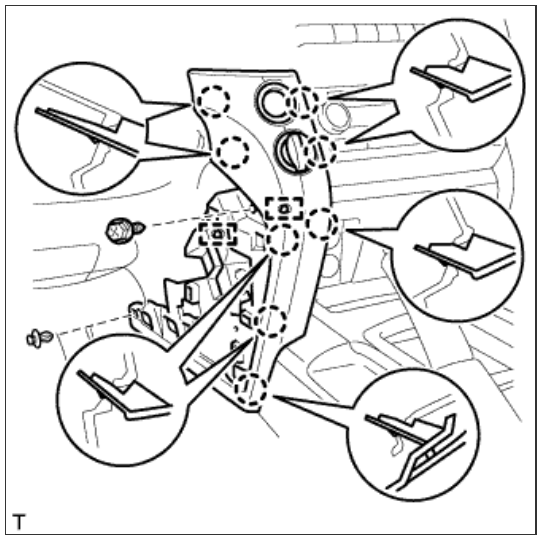
9. INSTALL LOWER INSTRUMENT PANEL PAD SUB-ASSEMBLY LH

a. Connect the connectors and 2 clamps.

b. Attach the 8 claws to install the panel pad.

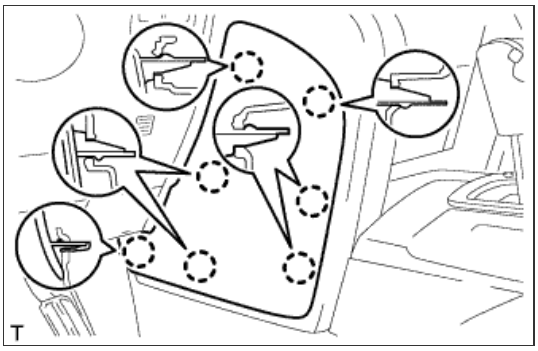
c. Install the screw.

d. Install the clip.



10. INSTALL NO. 2 INSTRUMENT PANEL FINISH PANEL CUSHION

a. Attach the 7 claws to install the panel cushion.



11. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

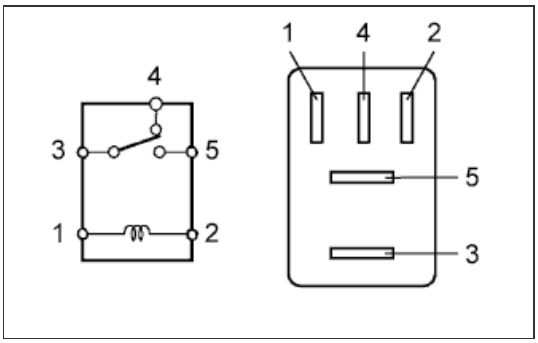
When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

for Preparation Click here

1. CHECK BRK LP RELAY

a. Remove the BRK LP relay from the engine room relay block.

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



Standard Resistance:

Tester Connection	Condition	Specified Condition
3 - 4	Battery positive voltage applied to terminal 1 and battery negative voltage to terminal 2	10 kΩ or higher
	Battery positive voltage not applied to terminal 1 and battery negative voltage applied to terminal 2	Below 1 Ω
3 - 5	Battery positive voltage applied to terminal 1 and battery negative voltage to terminal 2	Below 1 Ω
	Battery positive voltage not applied to terminal 1 and battery negative voltage applied to terminal 2	10 kΩ or higher

If the result is not as specified, replace the relay.

c. Install the BRK LP relay.

for Preparation Click here

1.EXPRESSIONS OF IGNITION SWITCH

a. The type of ignition switch used on this model differs according to the specifications of the vehicle. The expressions listed in the table below are used in this section.

Expression	Ignition Switch (Position)	Engine Switch (Condition)
Ignition Switch off	LOCK	Off
Ignition Switch ACC	ACC	On (ACC)
Ignition Switch ON	ON	On (IG)
Engine Start	START	Start

2.TROUBLESHOOTING PRECAUTION

NOTICE:

- **Be sure to read the supplemental restraint system precautions thoroughly before servicing the brake system (Click here).**
- **Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with those having the same part number or equivalent.**
- **It is very important to keep parts and the area clean when repairing the brake system.**
- **If the vehicle is equipped with a mobile communication system, refer to the Precaution in the introduction section (Click here).**
- **Care must be taken when using magnets as they could affect the performance of the**

for Preparation Click here

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Brake System

Symptom	Suspected Area	See page
Low pedal or spongy pedal	Fluid leaks in brake system	-
	Air in brake system	Click here
	Front brake piston seal (Worn or damaged)	Click here
	Rear brake piston seal (Worn or damaged)	Click here
	Hydraulic brake booster (Faulty)	Click here
Brake drag	Brake pedal free play (Minimum)	Click here
	Parking brake lever travel (Adjustment necessary)	Click here
	Parking brake cable (Stuck)	Click here
	Parking brake shoe clearance (Out of adjustment)	Click here
	Front brake pad (Cracked or distorted)	Click here
	Rear brake pad (Cracked or distorted)	Click here
	Front brake piston (Stuck)	Click here
	Rear brake piston (Stuck)	Click here
	Front brake piston (Frozen)	Click here
	Rear brake piston (Frozen)	Click here
	Parking brake tension or return spring (Faulty)	Click here
	Hydraulic brake booster (Faulty)	Click here
Brake pull	Front brake piston (Stuck)	Click here
	Rear brake piston (Stuck)	Click here
	Front brake piston (Frozen)	Click here
	Rear brake piston (Frozen)	Click here
	Front brake pad (Oily)	Click here
	Rear brake pad (Oily)	Click here
	Front brake pad (Cracked or distorted)	Click here
	Rear brake pad (Cracked or distorted)	Click here
	Front brake disc (Scored)	Click here
	Rear brake disc (Scored)	Click here
	Hydraulic brake booster (Faulty)	Click here
Brake pedal is depressed firmly but brake is insufficient	Fluid leaks in brake system	-
	Air in brake system	Click here
	Front brake pad (Worn)	Click here
	Rear brake pad (Worn)	Click here
	Front brake pad (Cracked or distorted)	Click here
	Rear brake pad (Cracked or distorted)	Click here
	Front brake pad (Oily)	Click here
	Rear brake pad (Oily)	Click here
	Front brake pad (Glazed)	Click here
	Rear brake pad (Glazed)	Click here
	Front brake disc (Scored)	Click here
	Rear brake disc (Scored)	Click here
	Hydraulic brake booster (Faulty)	Click here
	Front brake pad (Cracked or distorted)	Click here
	Rear brake pad (Cracked or distorted)	Click here
	Front brake pad (Dirty)	Click here

Noise from brakes	Rear brake pad (Dirty)	Click here
	Front brake pad (Glazed)	Click here
	Rear brake pad (Glazed)	Click here
	Front brake installation bolt (Loose)	Click here
	Rear brake installation bolt (Loose)	Click here
	Front brake disc (Scored)	Click here
	Rear brake disc (Scored)	Click here
	Rear brake pad support plate (Loose)	Click here
	Parking brake tension or return spring (Faulty)	Click here
	Front brake anti-squeal shim (Damaged)	Click here
	Rear brake anti-squeal shim (Damaged)	Click here

for Preparation Click here

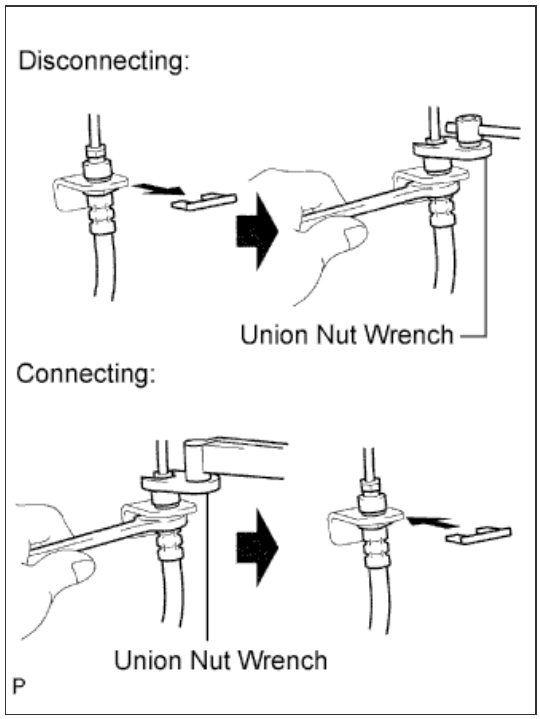
CAUTION:

Make sure to replace each part properly. Improper installation or repair could affect the performance of the brake system and cause a driving hazard.

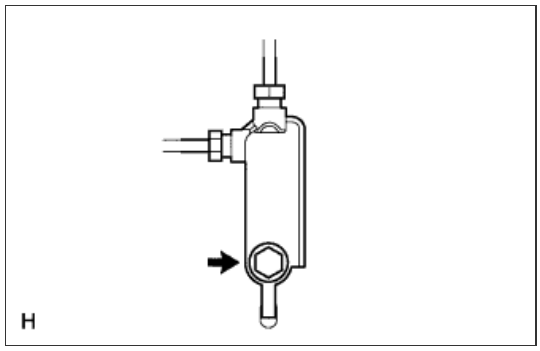
NOTICE:

- It is very important to keep the brake system parts and the work area clean when repairing the brake system.
- Since the brake line is one of the critical safety-related parts, be sure to disassemble the components if a brake fluid leak is found. If any abnormality is found, replace the component with a new one.
- When removing brake components, cover the brake tube connections to prevent foreign matter such as dust or dirt from entering the tubes.
- Do not damage or deform the brake tubes when removing or installing them.
- When installing a brake tube or flexible hose, ensure that it is not twisted or bent.
- If the fitting of the flexible hose does not match the groove on the bracket, twist the hose slightly to insert it.
- Flexible hoses must be free from absorber oil, grease, etc.
- When installing a brake tube to a plastic clamp, ensure that the brake tube is not loose or being pinched.
- Do not reuse a clip removed from a flexible hose.
- After installing a brake tube and flexible hose, ensure that they do not interfere with any other components.
- Do not allow brake fluid to adhere to any painted surface such as the vehicle body. If brake fluid leaks onto any painted surface, immediately wash it off.

- Follow these procedures when disconnecting the flexible hose and brake tube.
    1. Hold the flexible hose with a wrench. Using a union nut wrench, disconnect the brake tube without deforming the tube.
    2. Remove the clip.
- Follow these procedures when connecting the flexible hose and brake tube.
    1. Install a new clip.
    2. Hold the flexible hose with a wrench. Using a union nut wrench, connect the brake tube without deforming the tube.



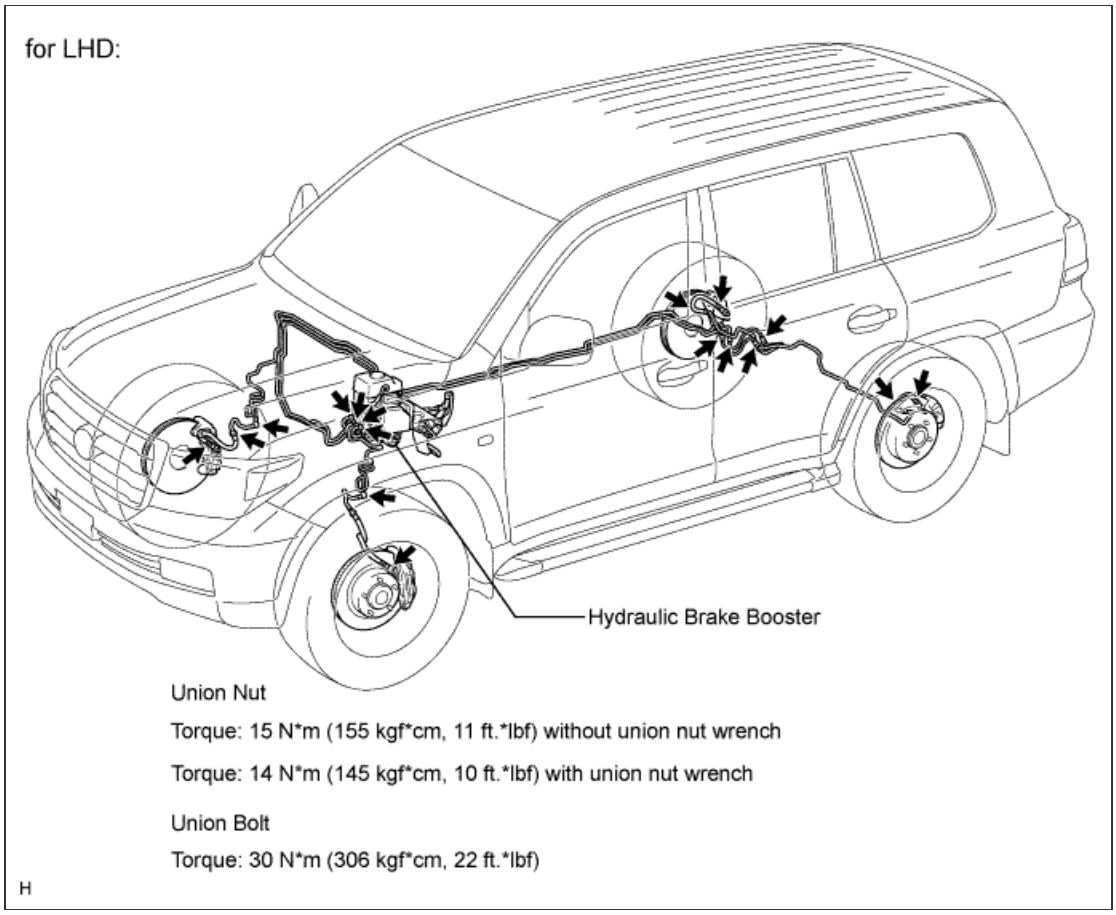
- Follow these procedures when connecting the brake tube and 2-way.
    1. Connect the brake tubes to the 2-way and temporarily tighten the flare nuts of the brake tubes.
    2. Support the 2-way to prevent deformation to the brake tubes and install the bolt to fix the 2-way to the frame.
    3. Support the 2-way to prevent deformation to the brake tubes and tighten the flare nuts of the brake tubes to the torque specification with a union nut wrench.

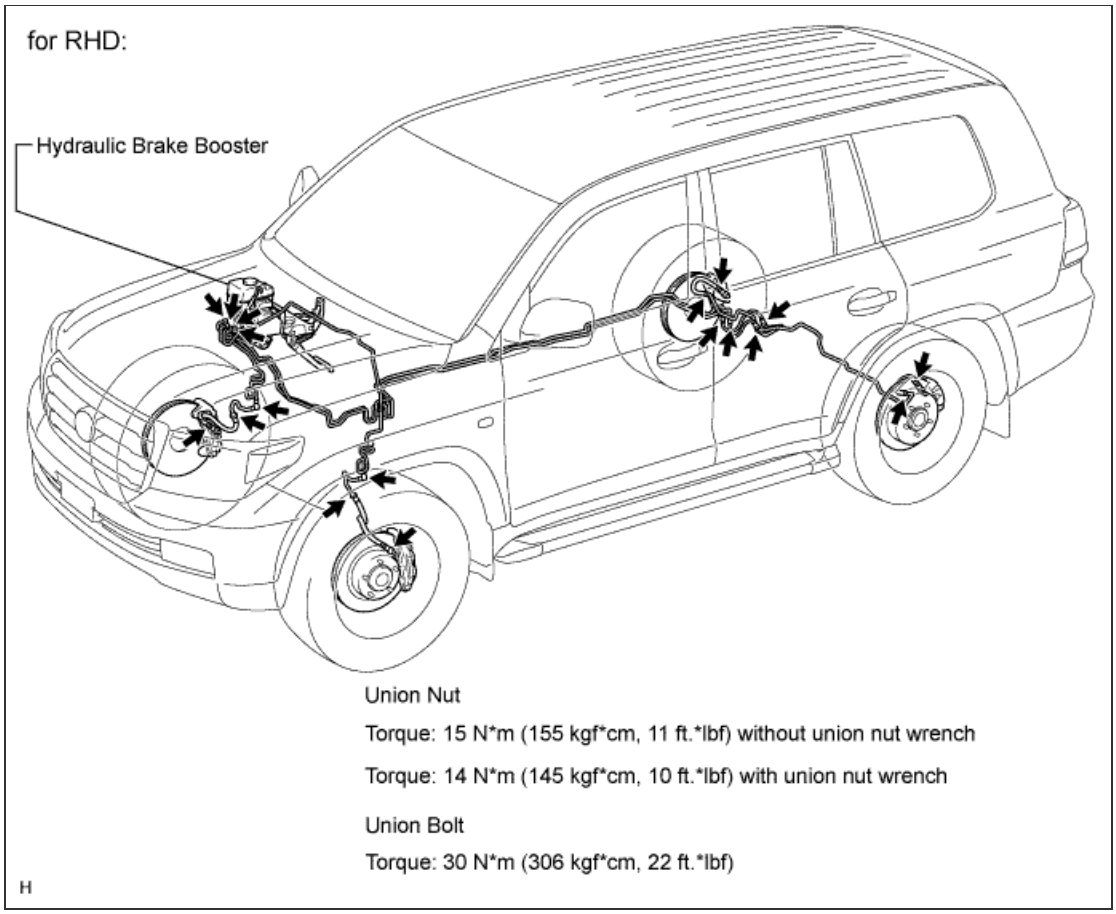


for Preparation Click here

HINT:

Refer to the diagram below to confirm the locations and tightening torque of the flexible hoses and brake tubes.




for RHD:
Hydraulic Brake Booster
Union Nut
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf) without union nut wrench
Torque: 14 N*m (145 kgf*cm, 10 ft.*lbf) with union nut wrench
Union Bolt
Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)
H

for Preparation Click here

NOTICE:

Water or deteriorated brake fluid. Sealed areas or brake fluid may deteriorate and lead to fluid leaks or decreased efficiency.

1. CHECK FLUID LEVEL IN RESERVOIR

a. Turn the ignition switch off and fully depress the brake pedal 40 times or more to release the pressure in the accumulator.

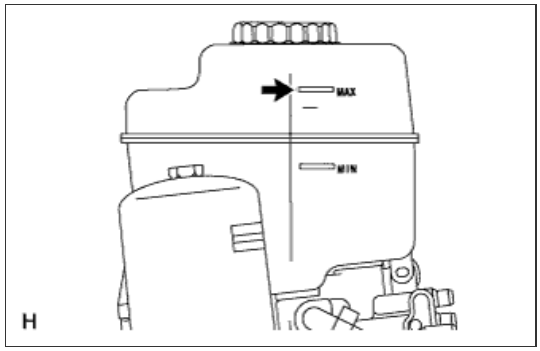
HINT:

When the pressure in the accumulator is released, the pedal stroke will lengthen.

b. Adjust the fluid level so that it is at the MAX line.

HINT:

When the ignition switch is turned on, brake fluid is sent to the accumulator and the fluid level decreases by approximately 10 mm (0.394 in.) from the MAX line.



Brake Fluid:
SAE J1703 or FMVSS No. 116 DOT3

for Preparation Click here

NOTICE:

- **Perform brake fluid replacement with the shift lever in P*1 or neutral*2 and the parking brake applied.**
  ***1: for Automatic Transmission**
  ***2: for Manual Transmission**
- **Perform brake fluid replacement while adding fluid to maintain the fluid level between the MIN and MAX lines of the reservoir.**
- **As brake fluid may overflow when fluid is released from the brake actuator, do not leave the brake fluid can in the reservoir filler opening when adding brake fluid.**
- **If the brake pedal is depressed with the reservoir cap removed, brake fluid may overflow.**
- **Do not allow brake fluid to come into contact with any painted surface. If contact occurs, wash off the fluid immediately.**
- **When the brake fluid is replaced, DTCs may be stored. Therefore, after fluid replacement, always clear the DTCs and check that a normal system code is output.**

1. REPLACE BRAKE FLUID

a. Turn the ignition switch to ON.

b. Remove the master cylinder reservoir filler cap assembly.

c. Add brake fluid until the fluid level is between the MIN and MAX lines of the reservoir.

d. While depressing the brake pedal, loosen the bleeder plug of the front disc brake cylinder RH, and then repeatedly depress the brake pedal.

e. Repeatedly depress the brake pedal until the air is completely bled, and then tighten the bleeder plug while depressing the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

f. Bleed the air from the bleeder plug of the front disc brake cylinder LH using the same procedure as for the RH side.

g. With the brake pedal depressed, loosen the bleeder plug of the rear disc brake cylinder RH, continue to hold the brake pedal and allow brake fluid to be drained from the bleeder plug while the pump motor operates.

HINT:

- **Air is bled as the pump motor operates while the brake pedal is being depressed**
- **Be sure to release the brake pedal to stop the motor after approximately 100 seconds of continuous operation.**
- **As brake fluid is continuously drained while the pump operates, it is not necessary to repeatedly depress the brake pedal.**

h. Tighten the bleeder plug , and then release the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

i. Bleed the air from the bleeder plug of the rear disc brake cylinder LH using the same procedure as for the RH side.

j. Turn the ignition switch off.

k. Inspect for brake fluid leaks.

l. Check and adjust the brake fluid level (Click here).

m. Clear the DTCs (Click here).

for Preparation Click here

NOTICE:

- **Bleed air with the shift lever in P*1 or neutral*2 and the parking brake applied.**
  ***1: for Automatic Transmission**
  ***2: for Manual Transmission**
- **Bleed air while adding fluid to maintain the fluid level between the MIN and MAX lines of the reservoir.**
- **As brake fluid may overflow when fluid is released from the brake actuator, do not leave the brake fluid can in the reservoir filler opening when adding brake fluid.**
- **If the brake pedal is depressed with the reservoir cap removed, brake fluid may overflow.**
- **Do not allow brake fluid to come into contact with any painted surface. If contact occurs, wash off the fluid immediately.**
- **When the brake fluid is bled, DTCs may be stored. Therefore, after air bleeding, always clear the DTCs and check that a normal system code is output.**
- **When bleeding air, select the suitable procedure listed below.**

Replaced/Installed Item	Work Procedure
Flexible hose (front/rear)	Bleed brake line
Disc brake cylinder assembly (front/rear)	
Brake booster with accumulator pump assembly	Bleed brake system
Brake master cylinder sub-assembly	
Brake master cylinder reservoir assembly	

1. BLEED BRAKE LINE

a. Turn the ignition switch to ON.

b. Remove the brake master cylinder reservoir filler cap assembly.

c. Add brake fluid until the fluid level is between the MIN and MAX lines of the reservoir.

d. Repeatedly depress the brake pedal and bleed air from the bleeder plug of the front disc brake cylinder RH.

e. Repeat the step above until the air is completely bled, and then tighten the bleeder plug while depressing the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

f. Bleed the air from the bleeder plug of the front disc brake cylinder LH using the same procedure as for the RH side.

g. With the brake pedal depressed, loosen the bleeder plug of the rear disc brake cylinder RH, continue to hold the brake pedal and allow brake fluid to be drained from the bleeder plug while the pump motor operates.

HINT:

- **Air is bled as the pump motor operates while the brake pedal is being depressed.**
- **Be sure to release the brake pedal to stop the motor after approximately 100 seconds of continuous operation.**
- **As brake fluid is continuously drained while the pump operates, it is not necessary to repeatedly depress the brake pedal.**

h. When there is no more air in the brake fluid, tighten the bleeder plug, and then release the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

i. Bleed the air from the bleeder plug of the rear disc brake cylinder LH using the same procedure as for the RH side.

j. Turn the ignition switch off.

k. Inspect for brake fluid leaks.

l. Check and adjust the brake fluid level (Click here).

m. Clear the DTCs (Click here).

2. BLEED BRAKE SYSTEM

CAUTION:

If air is bled without using the intelligent tester, damage or accidents may result. Therefore, always use the intelligent tester when bleeding air.

a. Turn the ignition switch to ON.

b. Remove the brake master cylinder reservoir filler cap assembly.

c. Add brake fluid until the fluid level is between the MIN and MAX lines of the reservoir.

d. Repeatedly depress the brake pedal and bleed air from the bleeder plug of the front disc brake cylinder RH.

e. Repeat the step above until the air is completely bled, and then tighten the bleeder plug while depressing the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

f. Bleed the air from the bleeder plug of the front disc brake cylinder LH using the same procedure as for the RH side.

g. With the brake pedal depressed, loosen the bleeder plug of the rear disc brake cylinder RH, continue to hold the brake pedal and allow brake fluid to be drained from the bleeder plug while the pump motor operates.

HINT:

- **Air is bled as the pump motor operates while the brake pedal is being depressed.**
- **Be sure to release the brake pedal to stop the motor after approximately 100 seconds of continuous operation.**
- **As brake fluid is continuously drained while the pump operates, it is not necessary to repeatedly depress the brake pedal.**

h. When there is no more air in the brake fluid, tighten the bleeder plug, and then release the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

i. Bleed the air from the bleeder plug of the rear disc brake cylinder LH using the same procedure as for the RH side.

j. Turn the ignition switch off and connect the intelligent tester to the DLC3.

k. Turn the ignition switch to ON.

l. Turn the intelligent tester on.

m. Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Air Bleeding.

NOTICE:

To protect the solenoid from overheating, the solenoid operation stops automatically in 4 seconds, and then the solenoid will not respond to commands for an additional 20 seconds.

n. Repeatedly depress the brake pedal several times, and then, with the brake pedal depressed, turn FR on and bleed air.

HINT:

Air returns to the brake master cylinder reservoir together with the brake fluid and is bled from the brake system.

NOTICE:

- **As it is not possible to visually confirm that air is being bled, repeat this step 10 times.**
- **Do not loosen the bleeder plug.**

o. Turn FL on and bleed air using the same procedures as for FR.

p. Turn RR on, loosen the bleeder plug of the rear disc brake cylinder RH and drain brake fluid.

HINT:

- **Do not depress the brake pedal.**
- **As brake fluid is automatically drained while the pump and solenoid operate, it is not necessary to operate the brake pedal.**

q. Repeat the step above until the air is completely bled, and then tighten the bleeder plug.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

r. Turn FL Line on and bleed the air from the bleeder plug of the front disc brake cylinder LH using the same procedure as for the RH side.

s. Turn RR Line on and loosen the bleeder plug of the rear disc brake cylinder RH.

HINT:

Be sure to bleed air with the brake pedal depressed.

t. Repeat the step above until the air is completely bled, and then tighten the bleeder plug.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

u. Turn RL Line on and bleed air from the bleeder plug of the rear disc brake cylinder LH using the same procedure as for the RH side.

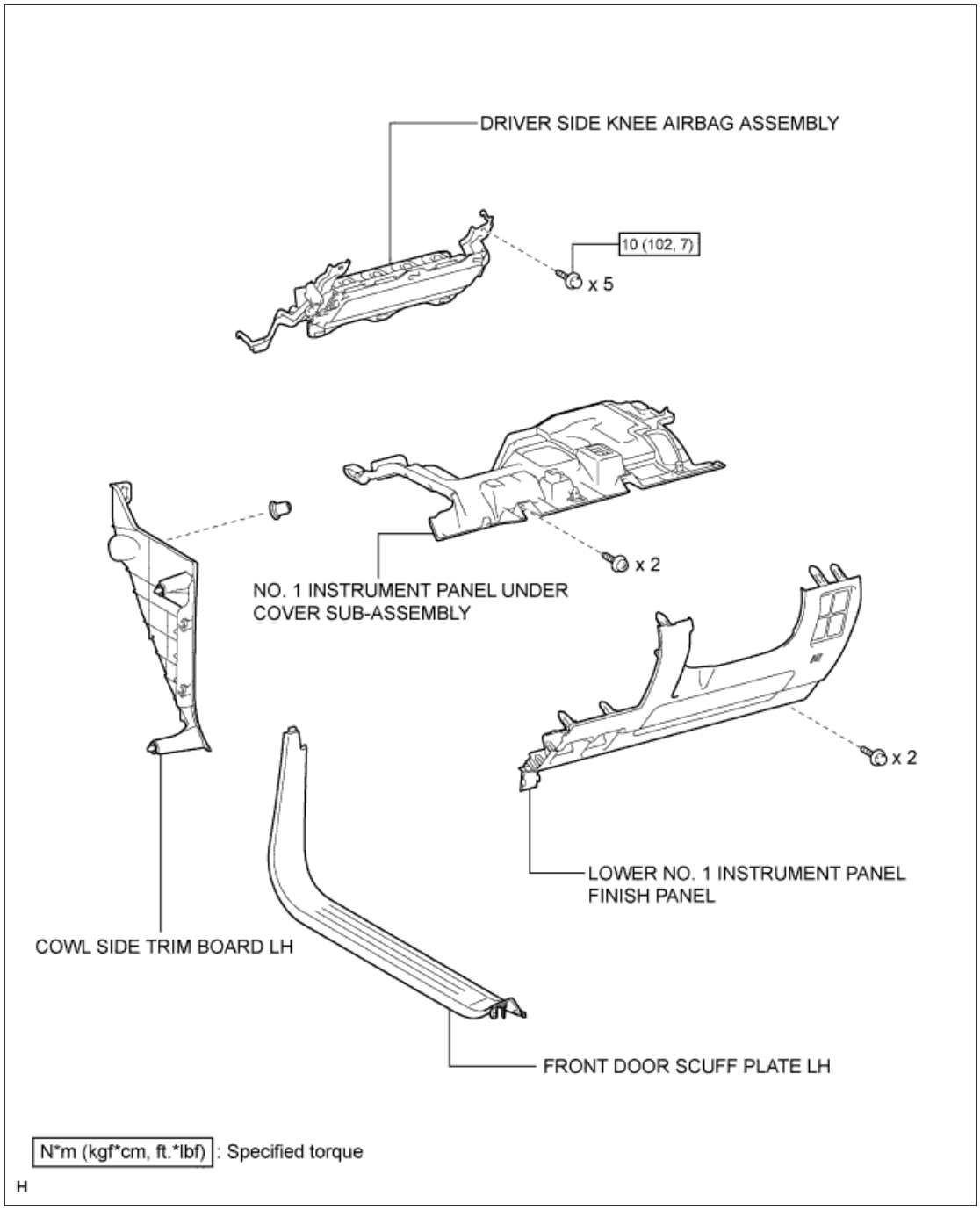
v. Turn the intelligent tester off and turn the ignition switch off.

w. Inspect for brake fluid leaks.

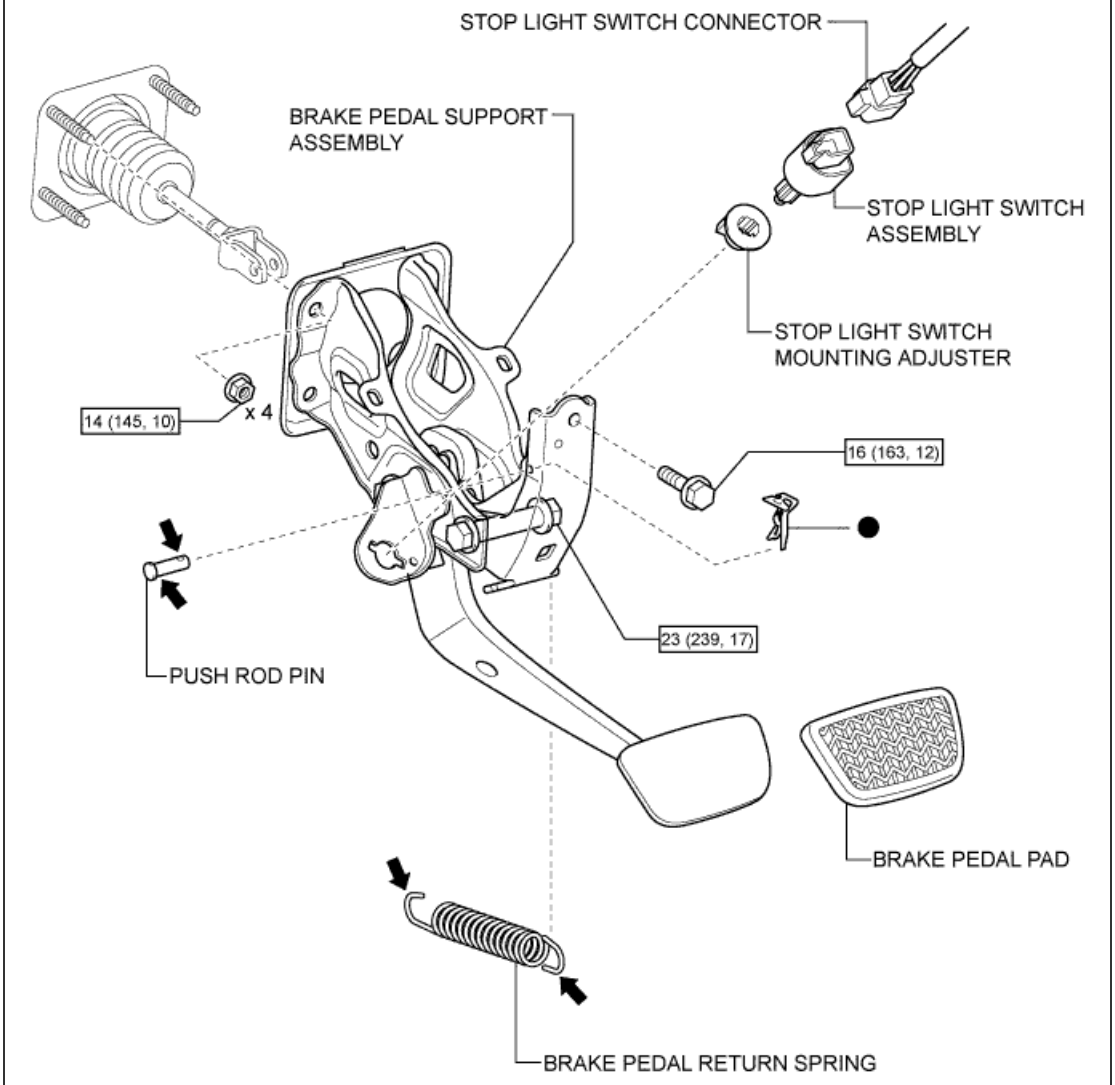
x. Check and adjust the brake fluid level (Click here).

y. Clear the DTCs (Click here).

for Preparation Click here



for Automatic Transmission:



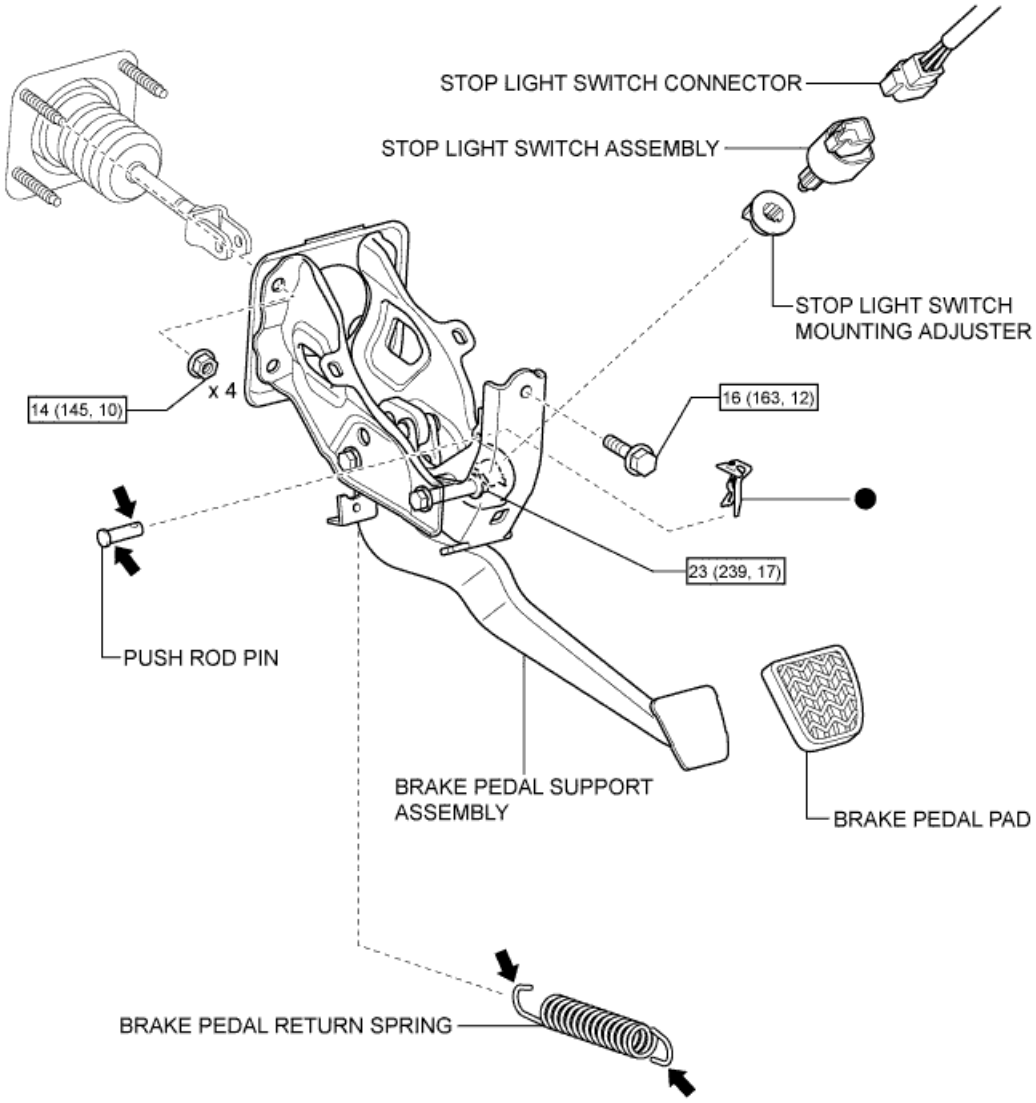
N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

⬅ Lithium soap base glycol grease

H

for Manual Transmission:



N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

⬅ Lithium sop base glycol grease

H

for Preparation Click here

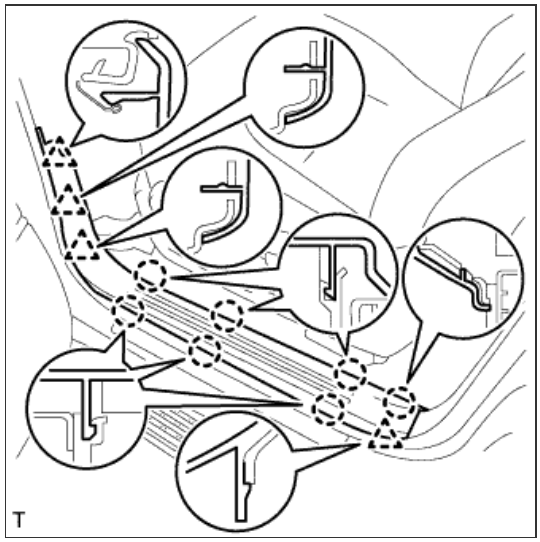
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

2. REMOVE FRONT DOOR SCUFF PLATE LH

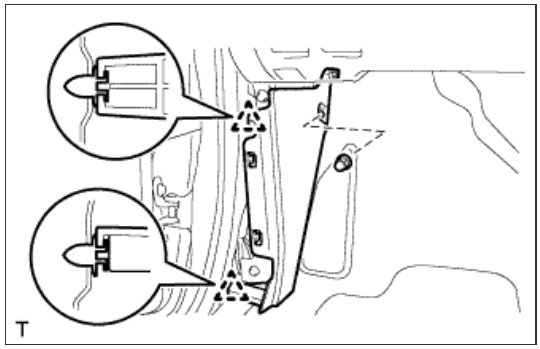
a. Detach the 7 cla s and 4 clips, and remove the sc ff te.



3. REMOVE COWL SIDE TRIM BOARD LH

a. Remove the cap n t.

b. Detach the 2 clips and remove the co side trim board.

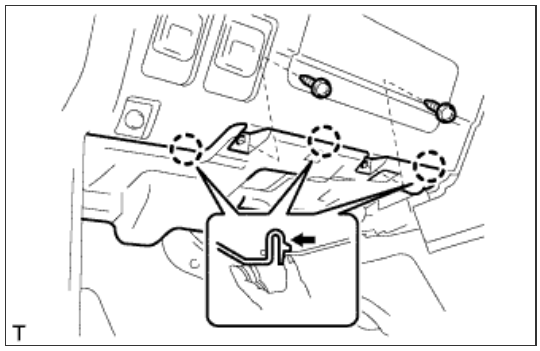


4. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Remove the 2 scre s.

b. Detach the 3 cla s.

c. Disconnect the connectors and remove the No. 1 instr me panel nder cover.

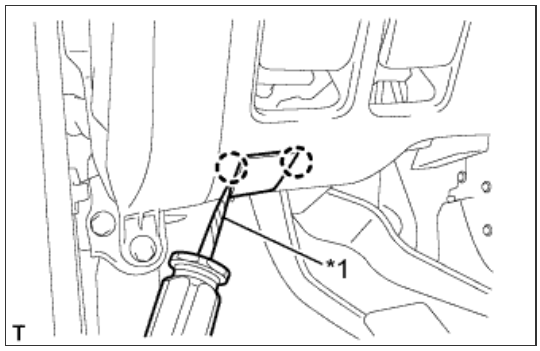


5. REMOVE LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

a. Using a scre driver, detach the 2 cla s and open the hole cover.

HINT:

Tape the scre driver tip before se.



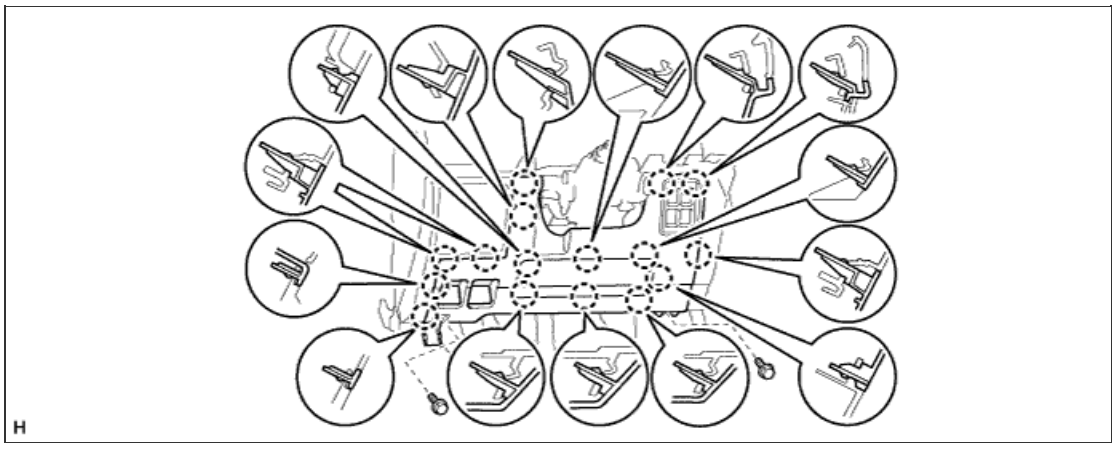
Text in Illustration

*1	Protective Tape

b. river Side nee Airbag:

i. Remove the 2 bolts.

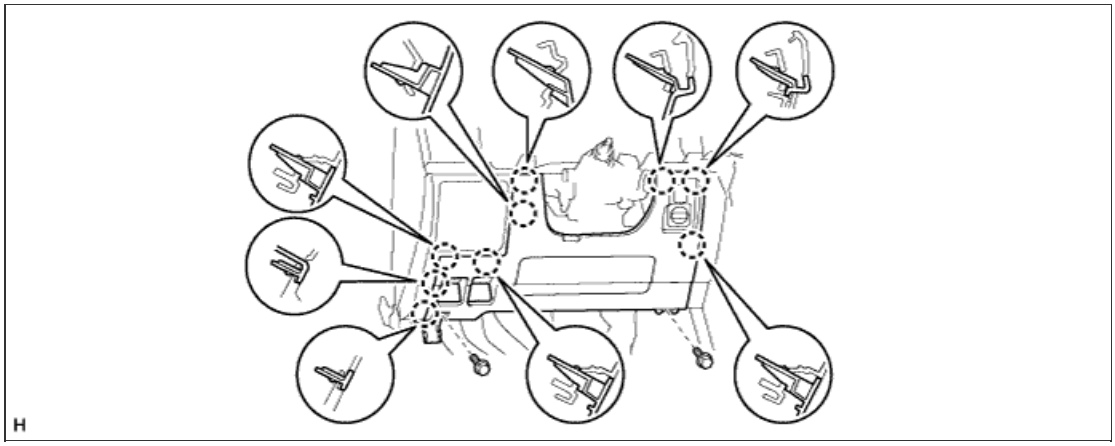
ii. Detach the 16 cla s.



c. o Driver Side nee Airbag:

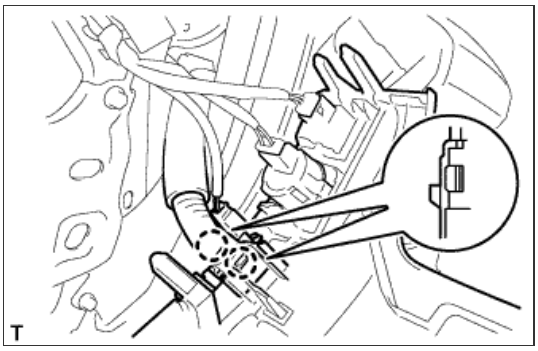
i. Remove the 2 bolts.

ii. Detach the cla s.



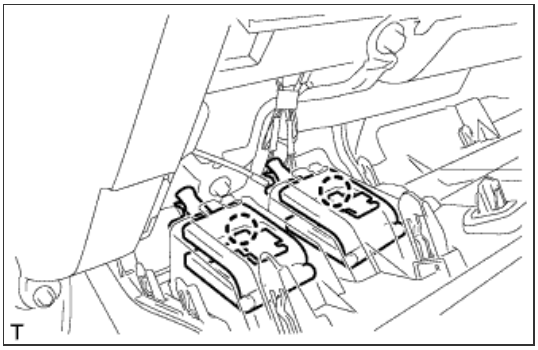
d. for A tomatic Air Conditioning System

i. tach the 2 cla s and remove the room tem eat re sensor.



e. Detach the 2 cla s and disconnect the 2 control cables.

f. Disconnect the connectors and remove the lo e No. 1 instr me t panel finish panel.



6. REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY

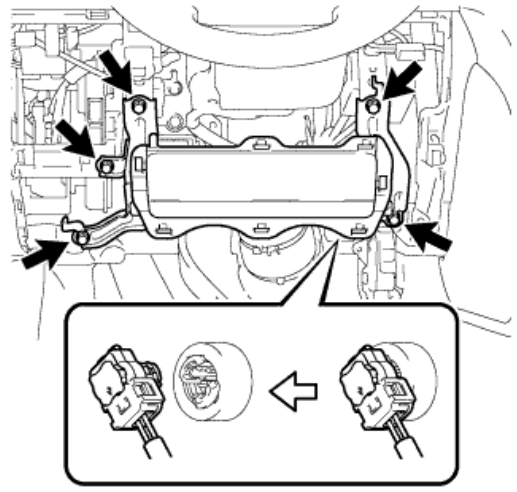
a. Remove the bolts and driver side knee airbag.

b. Disconnect the connector.

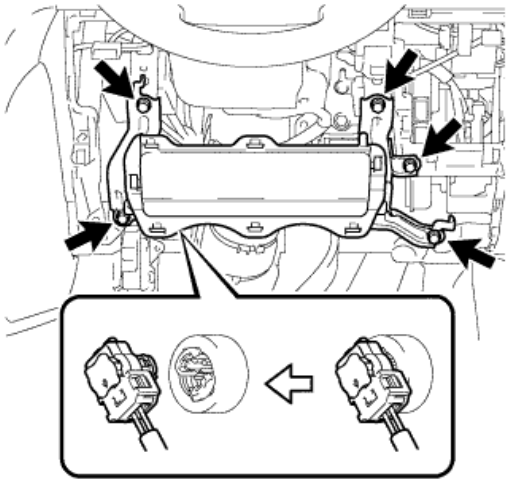
NOTICE:

When handling the airbag connector, take care not to damage the airbag ire harness.

for LHD:

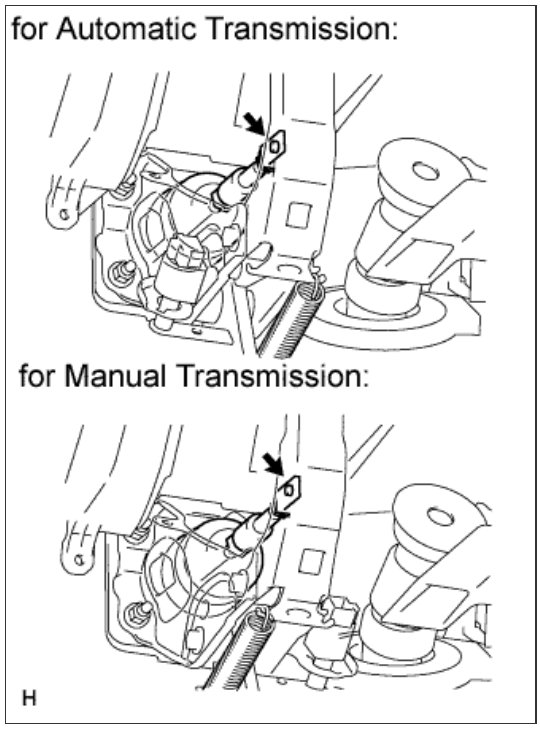


for RHD:



7. REMOVE PUSH ROD PIN

a. Remove the clip and p sh rod pin from the brake pedal lever.



8. REMOVE STOP LIGHT SWITCH ASSEMBLY

a. Disconnect the stop light s itch connector.

b. Remove the stop light s itch (Click here).

9. REMOVE BRAKE PEDAL SUPPORT ASSEMBLY

a. oosen the he agon bolt.

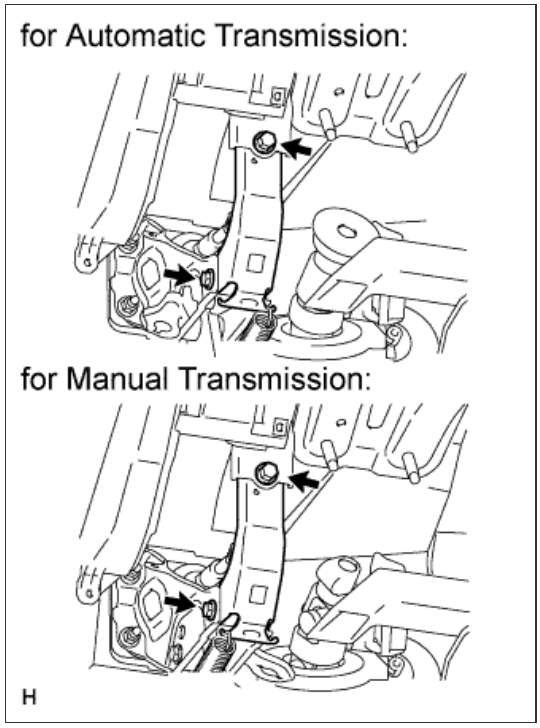
HINT:

old the bolt in place and loosen the n t.

NOTICE:

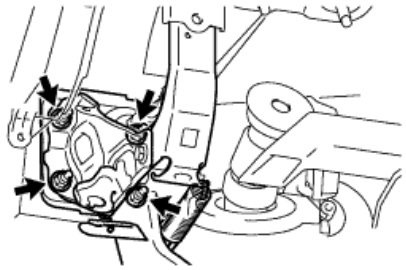
Only loosen the n t. Do not remove the bolt or n t.

b. Remove the brake pedal s ort reinforcement set bolt.

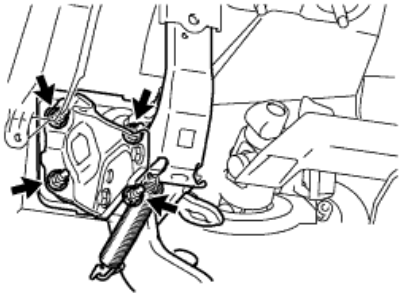


c. Remove the 4 n ts and brake pedal s ort assembly.

for Automatic Transmission:



for Manual Transmission:

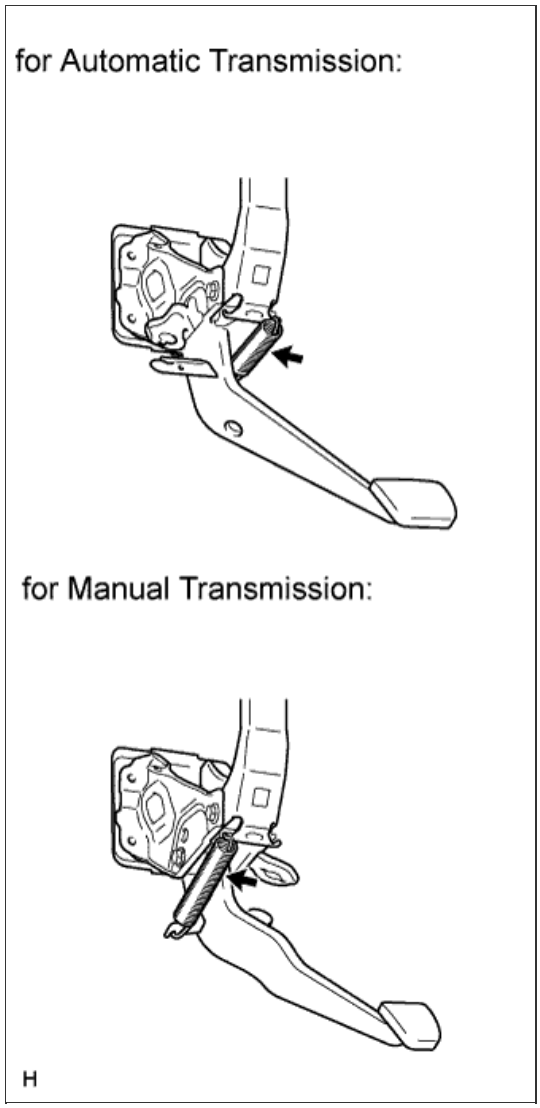


H

for Preparation Click here

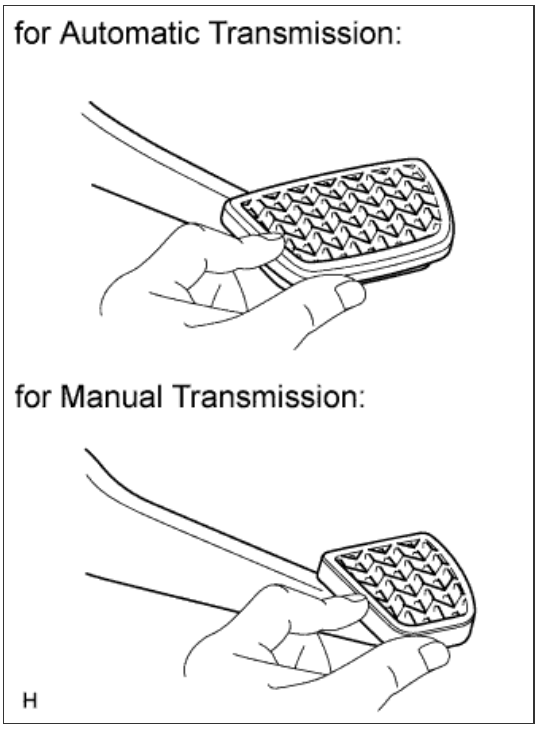
1. REMOVE BRAKE PEDAL RETURN SPRING

a. Remove the return spring.



2. REMOVE BRAKE PEDAL PAD

a. Remove the brake pedal pad from the brake pedal sub-assembly.



. REMO E S IGHL S I CH MOUNTING ADJUSTER

a. Remove the stop light s it mounting ad uster from the brake pedal support.

for Preparation Click here

1. CHECK BRAKE PEDAL HEIGHT

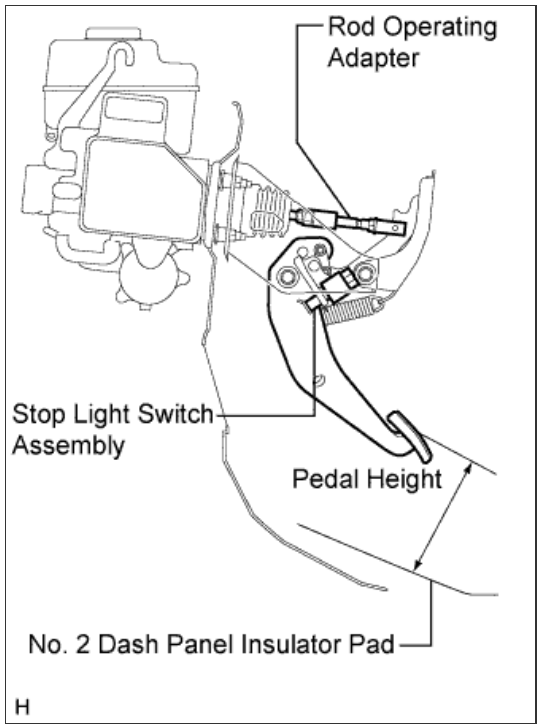
a. Check the brake pedal height.

Standard Pedal Height from No. 2 Dash Panel Insulator Pad:
147.1 to 157.1 mm (5.80 to 6.18 in.)

NOTICE:

Do not adjust the pedal height. Doing so by changing the push rod length will structurally change the pedal ratio.

the pedal height is incorrect adjust the rod operating adapter length.



b. Adjust the rod operating adapter length.

i. e ove the clip and clevis pin.

ii. Loosen the clevis lock nut.

iii. Adjust the rod operating adapter length by turning the pedal push rod clevis.

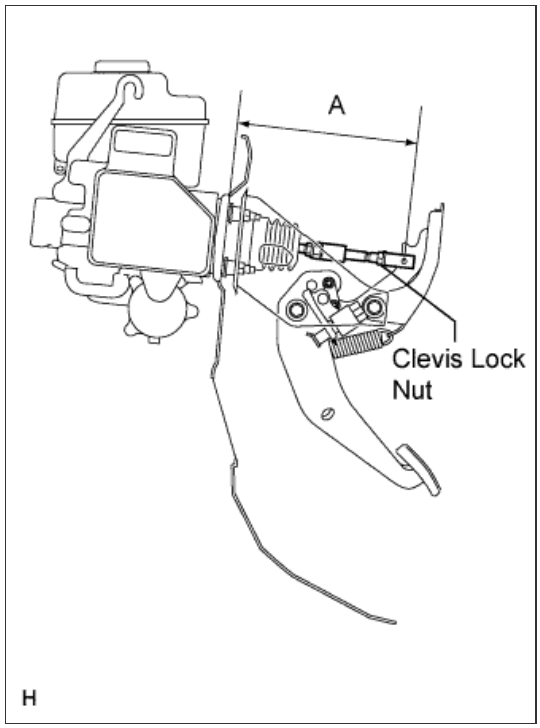
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

iv. Tighten the clevis lock nut.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }

v. Set the aster cylinder push rod clevis in place insert the push rod pin ro the outside o the vehicle and then install a new clip.
the pedal height is incorrect even i the rod operating adapter is adjusted check that there is no da age in the brake pedal brake pedal lever brake pedal support and dash panel.

- Even i there is da age there is no proble i the reserve distance is within the standard value.
- necessary replace any da aged parts.



2. CHECK AND ADJUST STOP LIGHT SWITCH ASSEMBLY

HINT:

the pedal height is incorrect check and adjust the stop light switch clearance.

a. Disconnect the stop light switch asse bly connector ro the stop light switch asse bly.

b. Turn the stop light switch asse bly counterclockwise and re ove the stop light switch asse bly.

c. nsert the stop light switch asse bly until the body hits the brake pedal bracket.

NOTICE:

When inserting the stop light switch asse bly support the pedal ro behind so that the pedal is not pushed in.

d. Turn the stop light switch asse bly a arter turn clockwise to install it.

HINT:

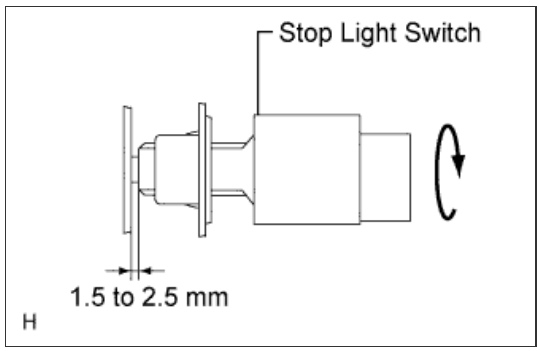
Turning the stop light switch asse bly counterclockwise loosens the switch.

e. Connect the stop light switch connector to the stop light switch asse bly.

f. Check the protrusion o the rod.

Standard Rod Protrusion:
1.5 to 2.5 mm (0.0591 to 0.0984 in.)

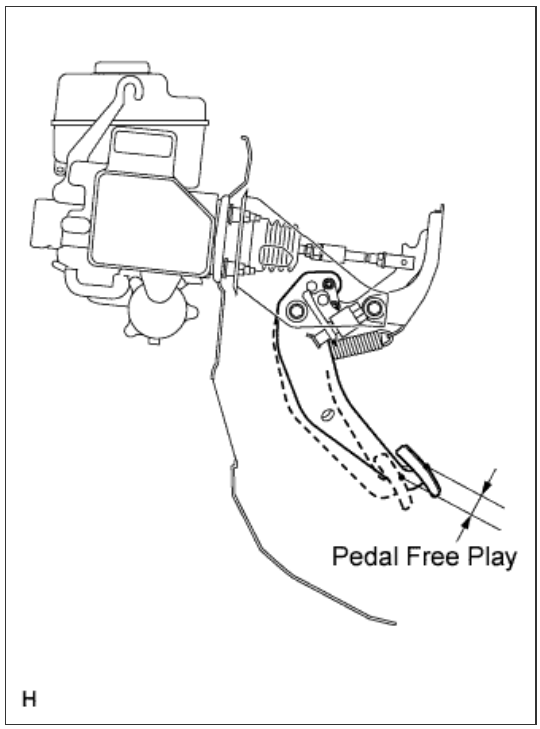
g. A ter adjusting the pedal height check the pedal ree play.



3. CHECK PEDAL FREE PLAY

a. sh in the pedal until the beginning o the resistance is t. Measure the pedal ree play.

Standard Pedal Free Play:
1 to 6 mm (0.0394 to 0.236 in.)

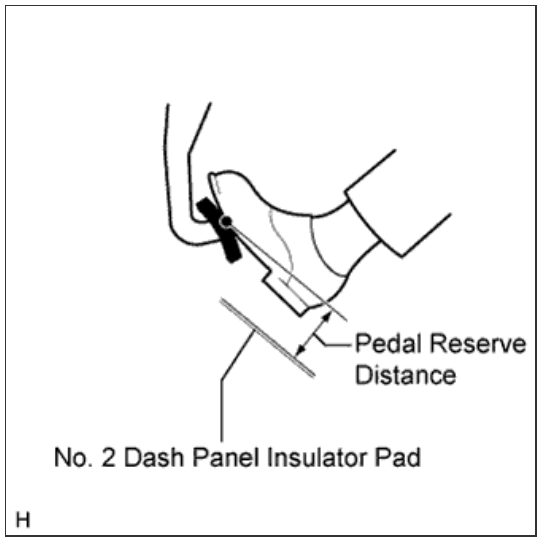


4. CHECK PEDAL RESERVE DISTANCE

a. ease the parking brake lever. With the engine running depress the pedal and asure the pedal reserve distance as shown in the illustration.

Standard Pedal Reserve Distance from No. 2 Dash Panel Insulator Pad at 490 N (50 kgf, 110.2 lbf):
More than 67 mm (2.64 in.)

incorrect troubleshoot the brake syste .


Pedal Reserve
Distance
No. 2 Dash Panel Insulator Pad
H

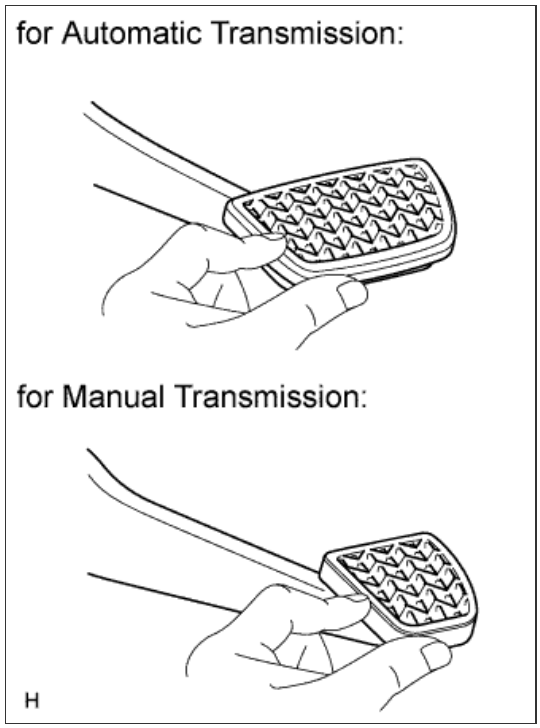
for Preparation Click here

1. INSTALL STOP LIGHT SWITCH MOUNTING ADJUSTER

a. Install the stop light switch mounting adjuster to the brake pedal support.

2. INSTALL BRAKE PEDAL PAD

a. Install the brake pedal pad onto the brake pedal.

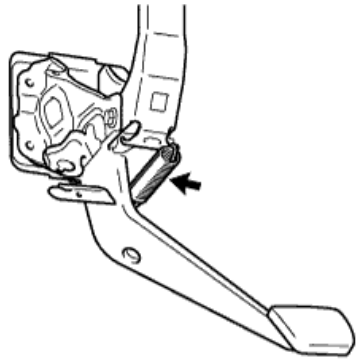


3. INSTALL BRAKE PEDAL RETURN SPRING

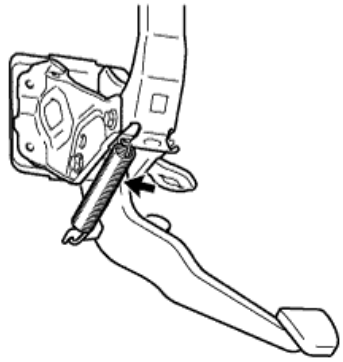
a. Apply a light coat of lithium soap base glycol grease to inner surface of the hole in the brake pedal support assembly.

b. Install the brake pedal return spring to the brake pedal support assembly.

for Automatic Transmission:



for Manual Transmission:



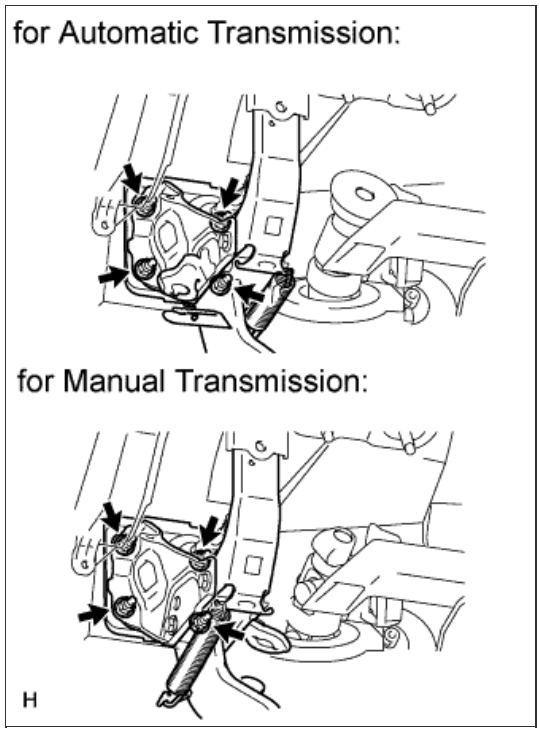
H

for Preparation Click here

1. INSTALL BRAKE PEDAL SUPPORT ASSEMBLY

a. Install the brake pedal support assembly with the 4 nuts.

Torque:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }



b. Install the brake pedal support reinforcement set bolt.

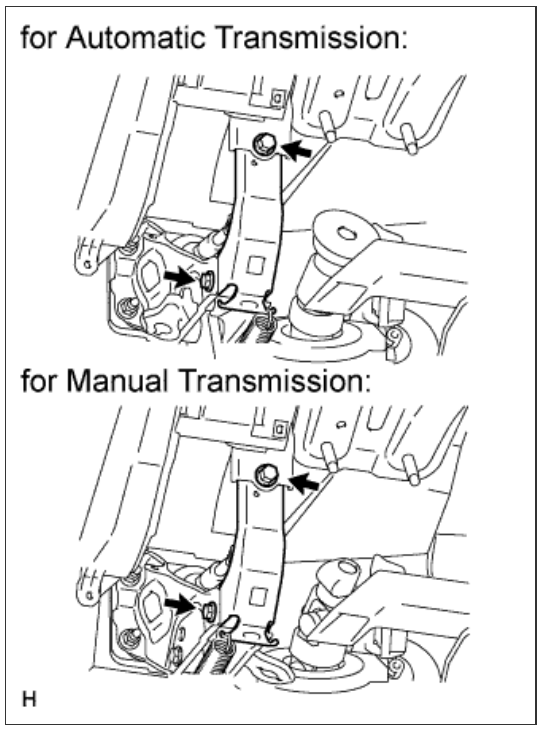
Torque:
16 N*m{ 163 kgf*cm , 12 ft.*lbf }

c. Tighten the hexagon bolt.

Torque:
23 N*m{ 239 kgf*cm , 17 ft.*lbf }

HINT:

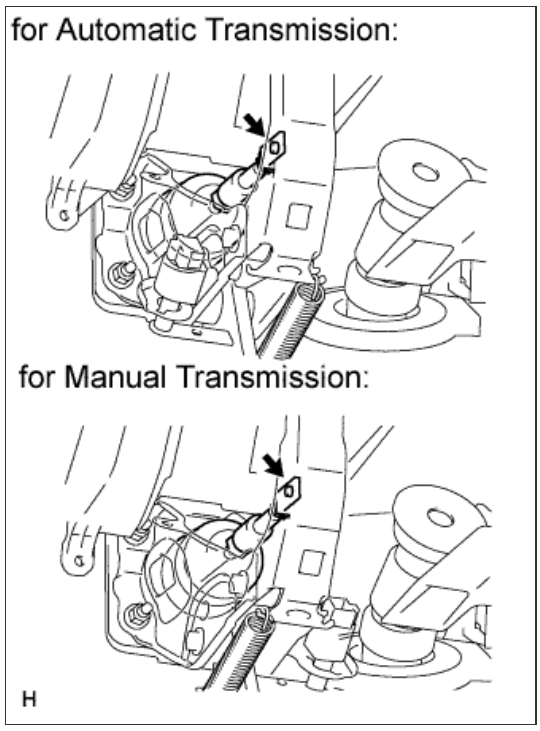
Hold the bolt in place and tighten the nut.



2. INSTALL PUSH ROD PIN

a. Apply a light coat of lithium soap base glycol grease to the inner surface of the hole on the brake pedal lever.

b. Set the master cylinder push rod clevis in place, insert the push rod pin from the outside of the vehicle and then install a new clip.



3. INSTALL STOP LIGHT SWITCH ASSEMBLY

a. Install the stop light switch (Click here).

b. Connect the stop light switch connector.

4. INSTALL DRIVER SIDE KNEE AIRBAG ASSEMBLY

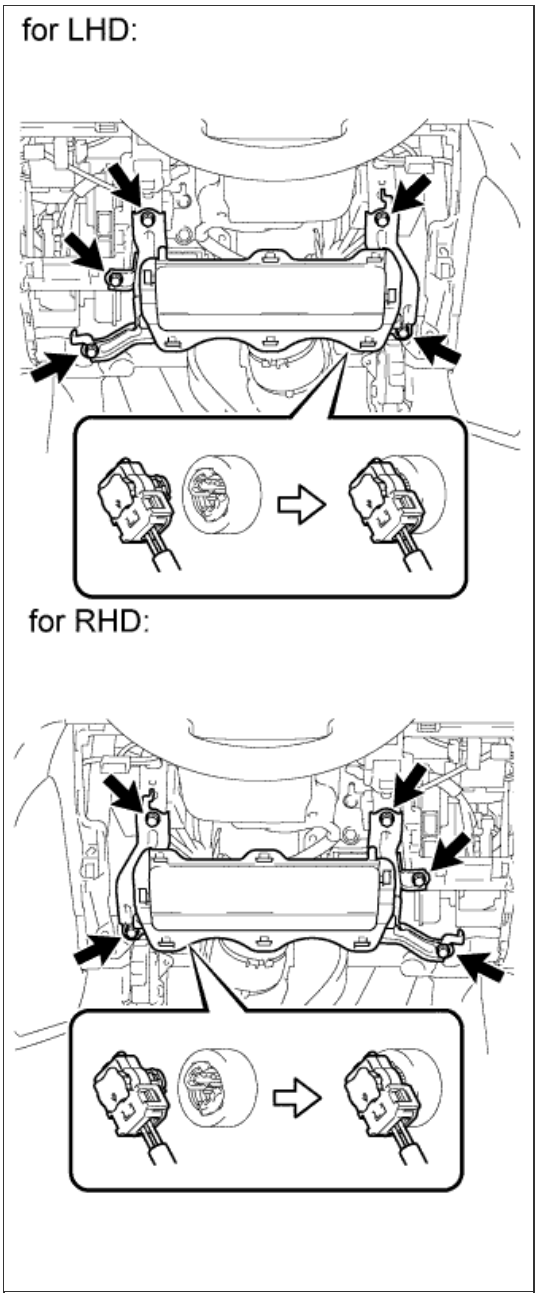
a. Connect the connector.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

b. Install the driver side knee airbag with the 5 bolts.

Torque:
10 N*m{ 102 kgf*cm , 7 ft.*lbf }

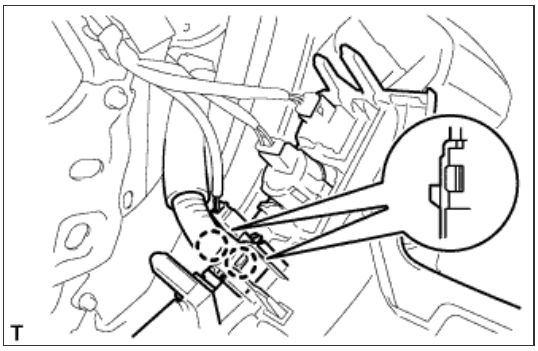


5. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

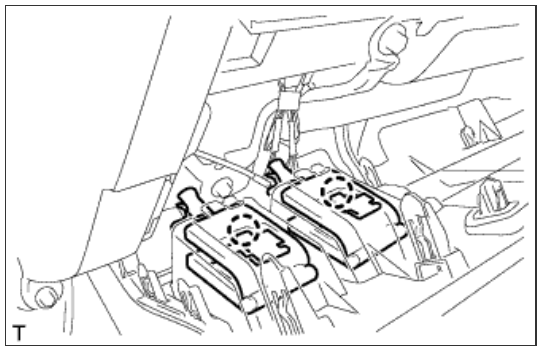
a. Connect the connectors.

b. for Automatic Air Conditioning System:

i. Attach the 2 claws to install the room temperature sensor.



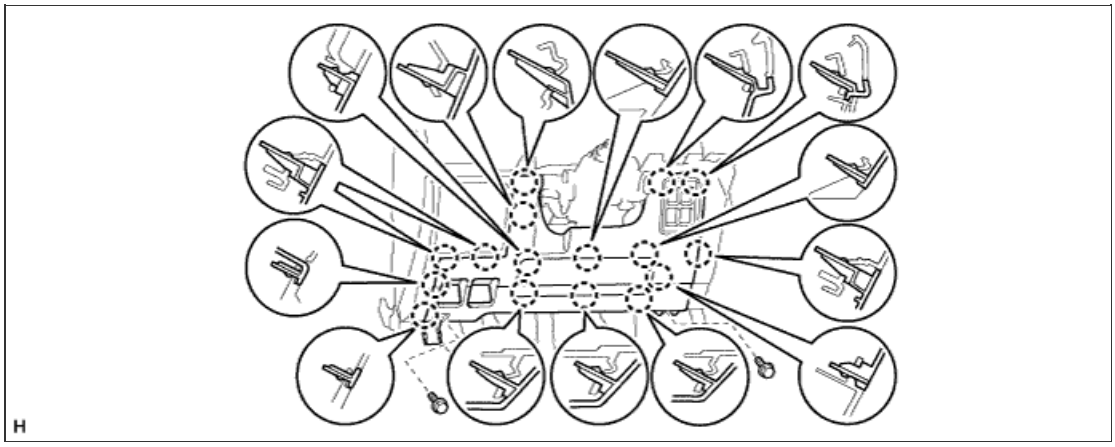
c. Attach the 2 claws to connect the 2 control cables.



. w/ Driver Side Knee Airbag:

i. Attach the 16 claws to install the lower No. 1 instrument panel finish panel.

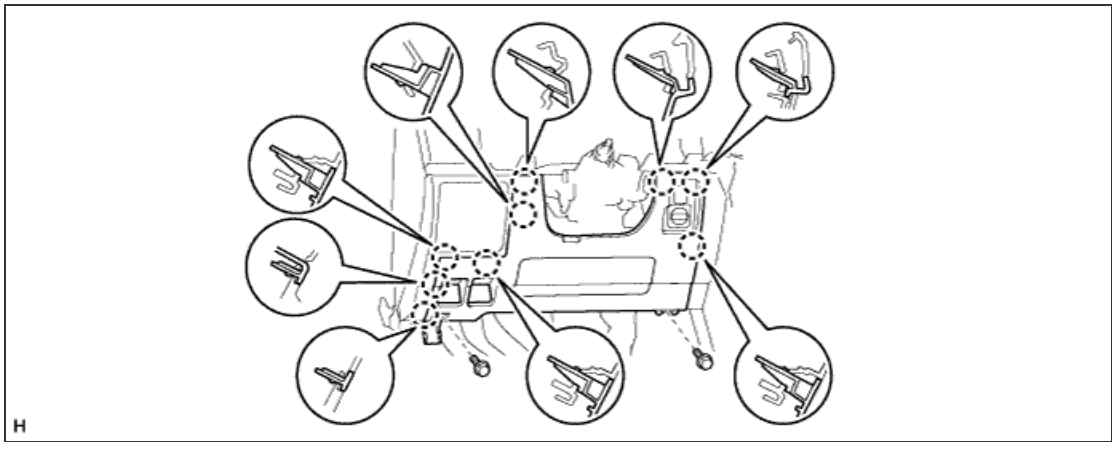
ii. Install the 2 bolts.



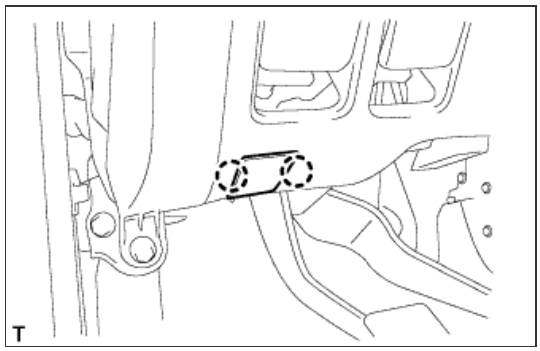
e. w/o Driver Side Knee Airbag:

i. Attach the 9 claws to install the lower No. 1 instrument panel finish panel.

ii. Install the 2 bolts.



f. Attach the 2 claws to close the hole cover.

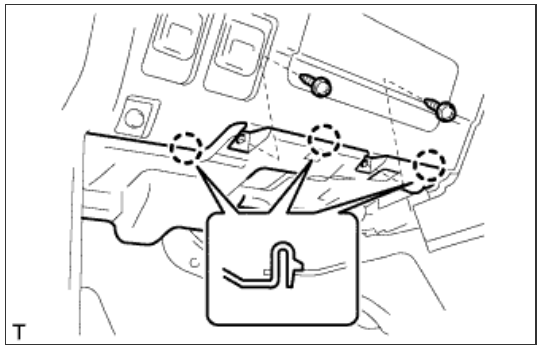


6. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Connect the connectors.

b. Attach the 3 claws to install the No. 1 instrument panel under cover.

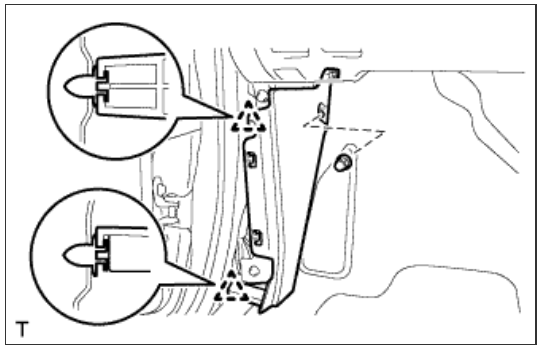
c. Install the 2 screws.



7. INSTALL COWL SIDE TRIM BOARD LH

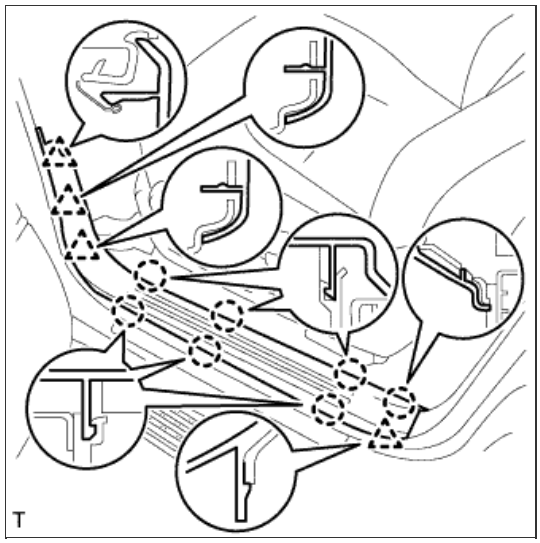
a. Attach the 2 clips to install the cowl side trim board.

b. Install the cap nut.



8. INSTALL FRONT DOOR SCUFF PLATE LH

a. Attach the 7 claws and 4 clips to install the scuff plate.



9. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

10. CHECK BRAKE PEDAL HEIGHT

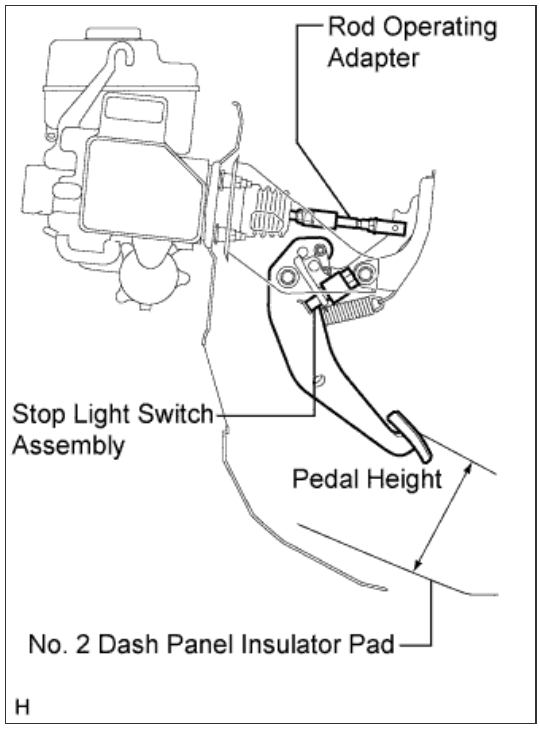
a. Check the brake pedal height.

Standard Pedal Height from No. 2 Dash Panel Insulator Pad:
147.1 to 157.1 mm (5.80 to 6.18 in.)

NOTICE:

Do not adjust the pedal height. Doing so by changing the push rod length will structurally change the pedal ratio.

If the pedal height is incorrect, adjust the rod operating adapter length.



b. Adjust the rod operating adapter length.

i. Remove the clip and clevis pin.

ii. Loosen the clevis lock nut.

iii. Adjust the rod operating adapter length by turning the pedal push rod clevis.

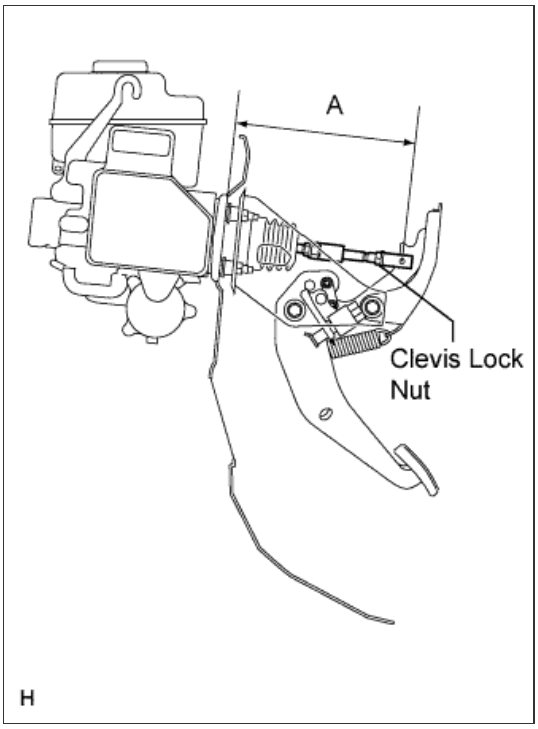
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

iv. Tighten the clevis lock nut.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }

v. Set the master cylinder push rod clevis in place, insert the push rod pin from the outside of the vehicle and then install a new clip.
If the pedal height is incorrect even if the rod operating adapter is adjusted, check that there is no damage in the brake pedal, brake pedal lever, brake pedal support and dash panel.

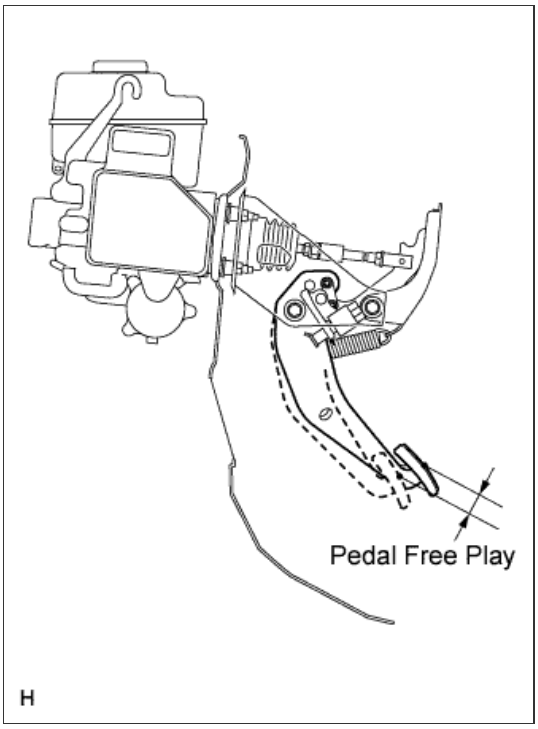
- Even if there is damage, there is no problem if the reserve distance is within the standard value.
- If necessary, replace any damaged parts.



11. CHECK PEDAL FREE PLAY

a. Push in the pedal until the beginning of the resistance is felt. Measure the pedal free play.

Standard Pedal Free Play:
1 to 6 mm (0.0394 to 0.236 in.)

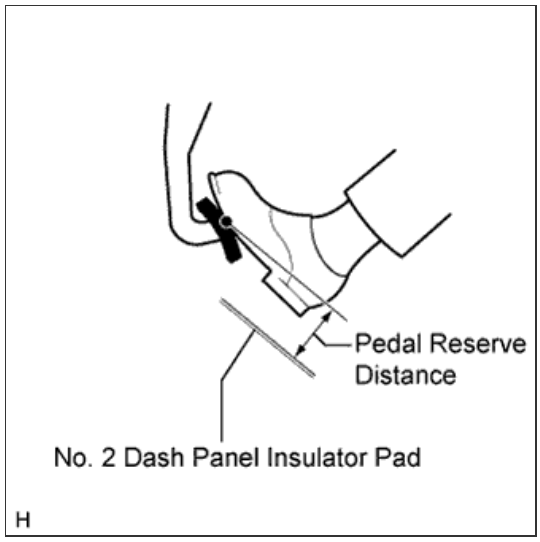


12. CHECK PEDAL RESERVE DISTANCE

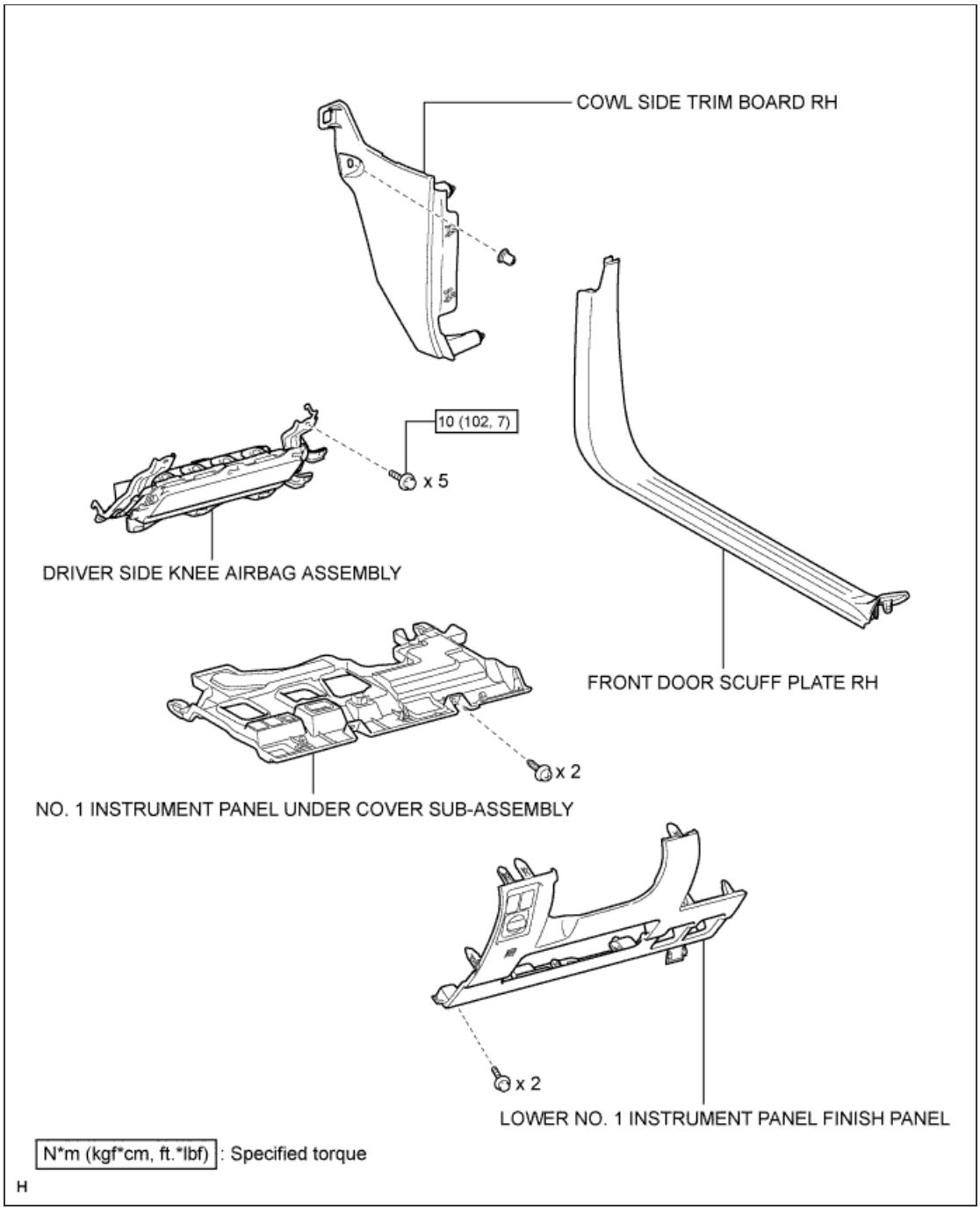
a. Release the parking brake lever. With the engine running, depress the pedal and measure the pedal reserve distance as shown in the illustration.

Standard Pedal Reserve Distance from No. 2 Dash Panel Insulator Pad at 490 N (50 kgf, 110.2 lbf):
More than 67 mm (2.64 in.)

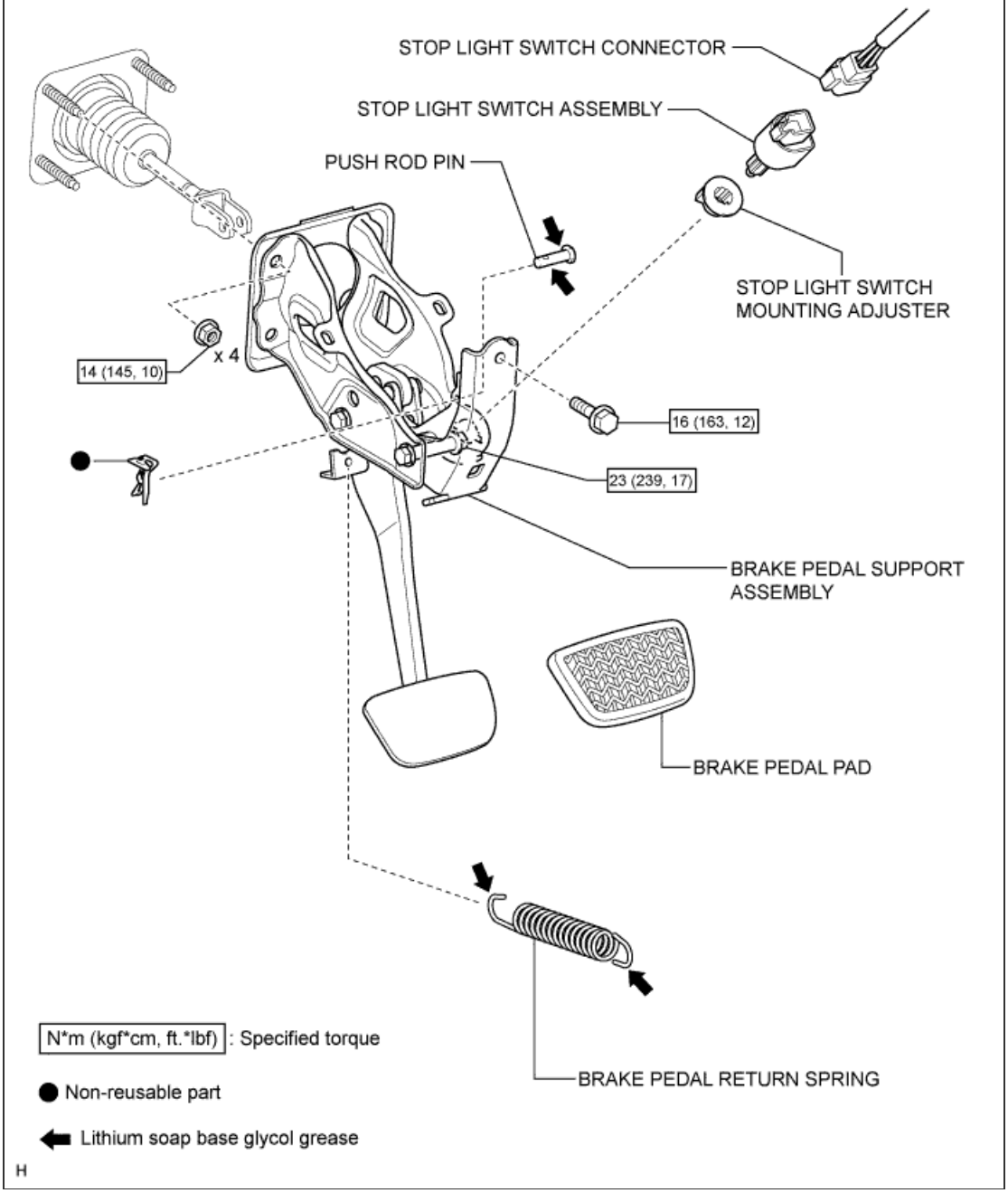
If incorrect, troubleshoot the brake system.

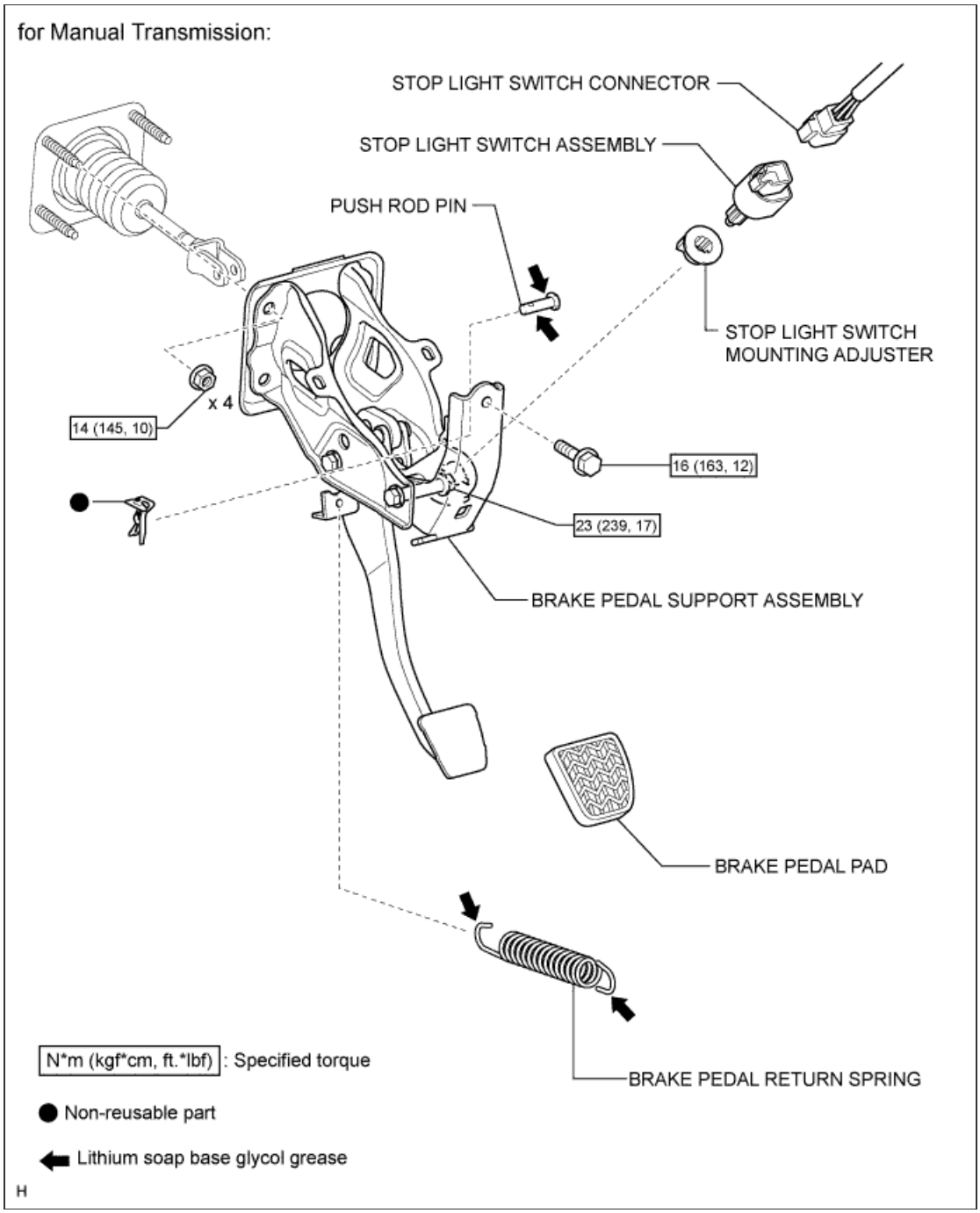

Pedal Reserve
Distance
No. 2 Dash Panel Insulator Pad
H

for Preparation Click here



for Automatic Transmission:




for Manual Transmission:
STOP LIGHT SWITCH CONNECTOR
STOP LIGHT SWITCH ASSEMBLY
PUSH ROD PIN
STOP LIGHT SWITCH MOUNTING ADJUSTER
x 4
14 (145, 10)
16 (163, 12)
23 (239, 17)
BRAKE PEDAL SUPPORT ASSEMBLY
BRAKE PEDAL PAD
BRAKE PEDAL RETURN SPRING
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
Lithium soap base glycol grease
H

for Preparation Click here

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

2. REMOVE FRONT DOOR SCUFF PLATE RH

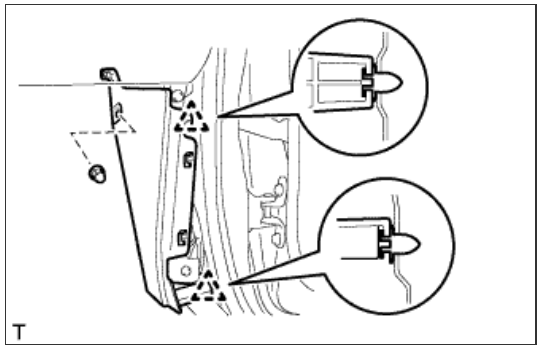
HINT:

Use the same proced res described for the L side.

3. REMOVE COWL SIDE TRIM BOARD RH

a. emove the cap n t.

b. Detach the 2 clips and remove the cowl side trim board.

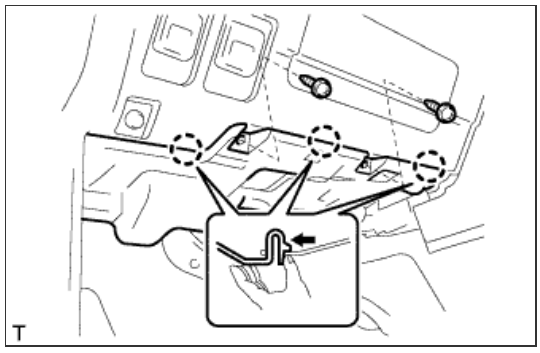


4. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. emove the 2 screws.

b. Detach the 3 claws.

c. Disconnect the connectors and remove the No. 1 instr mat panel nder cover.



5. REMOVE LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

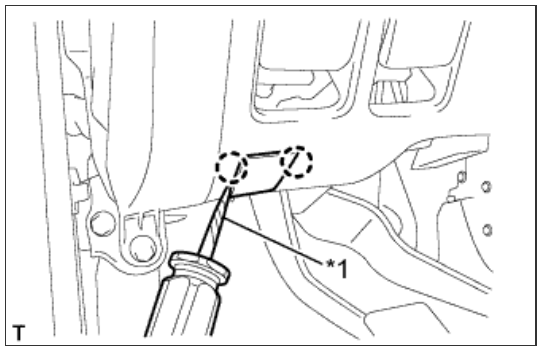
a. Using a screwdriver, detach the 2 claws and open the hole cover.

HINT:

Tape the screwdriver tip before se.

Text in Illustration

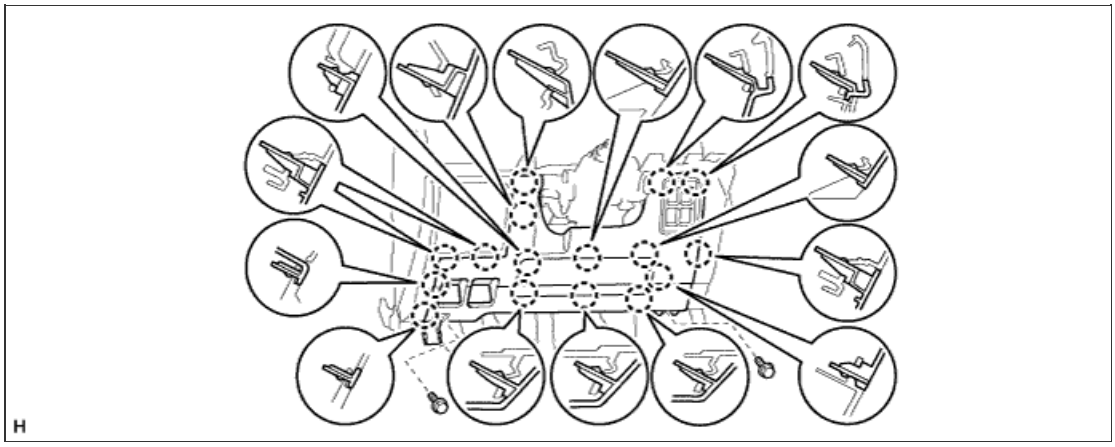
*1	Protective Tape



b. w river Side nee Airbag:

i. ernove the 2 bolts.

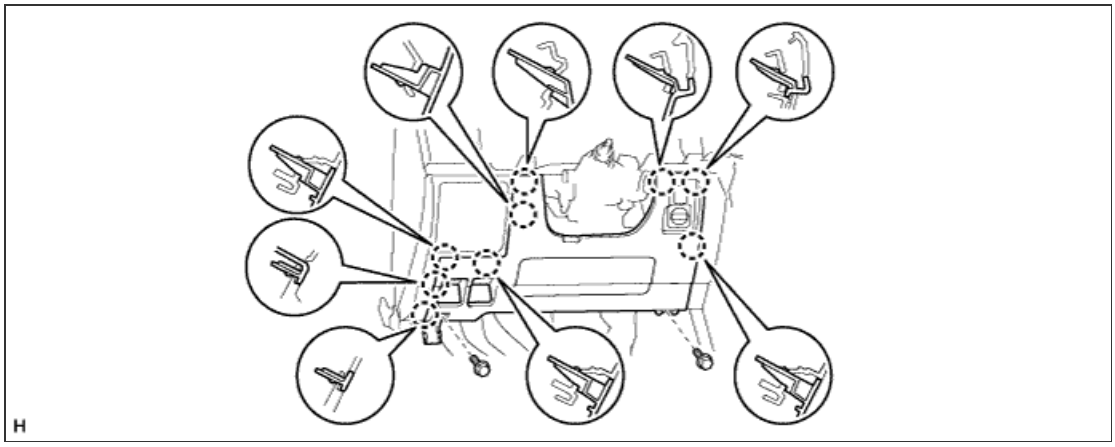
ii. Detach the 16 claws.



c. w o Driver Side nee Airbag:

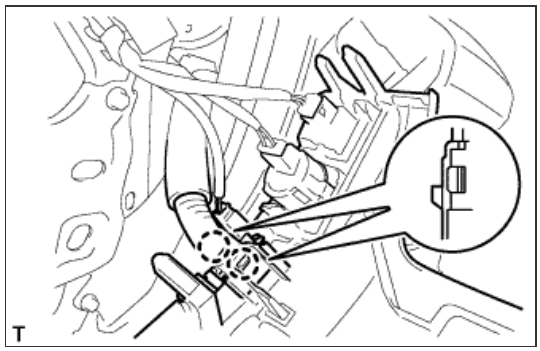
i. ernove the 2 bolts.

ii. Detach the claws.



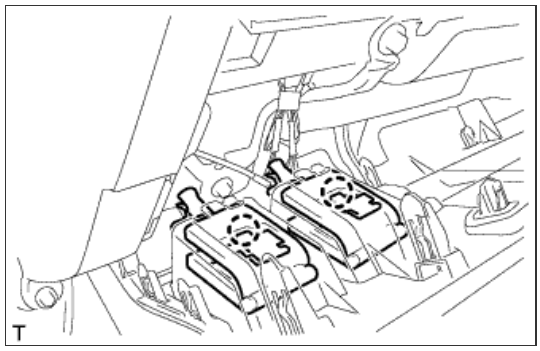
d. for A tomatic Air Conditioning System:

i. Detach the 2 claws and remove the room temperat re sensor.



e. Detach the 2 claws and disconnect the 2 control cables.

f. Disconnect the connectors and remove the lower No. 1 instr mnt panel finish panel.



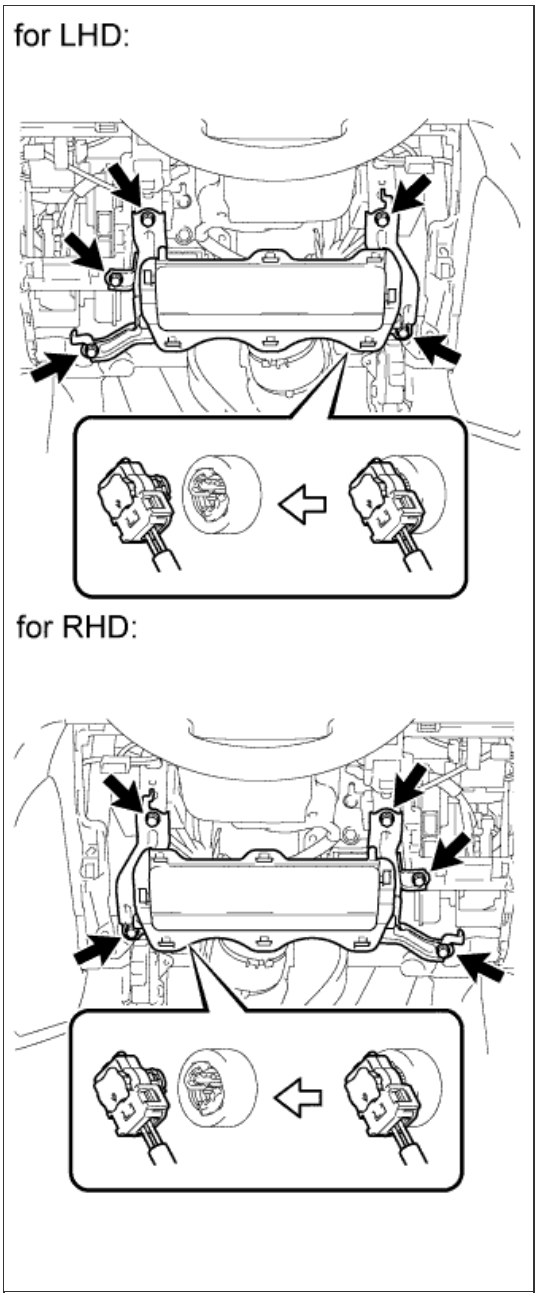
6. REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY

a. emove the bolts and driver side knee airbag.

b. Disconnect the connector.

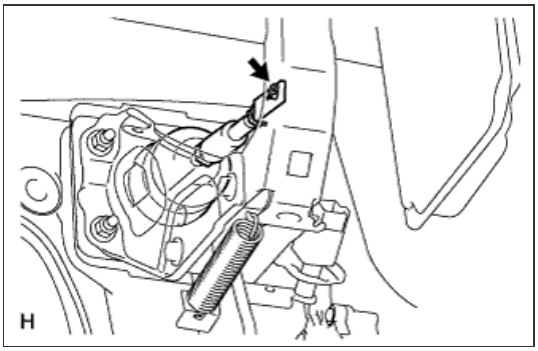
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



7. REMOVE PUSH ROD PIN

a. Remove the clip and push rod pin from the brake pedal lever.



8. REMOVE STOP LIGHT SWITCH ASSEMBLY

a. Disconnect the stop light switch connector.

b. Remove the stop light switch (Click here).

. REMOVE BRAKE PEDAL SUPPORT ASSEMBLY

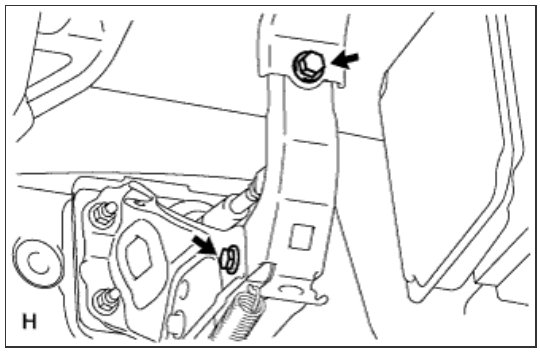
a. Loosen the he agon bolt.

HINT:

old the bolt in place and loosen the n t.

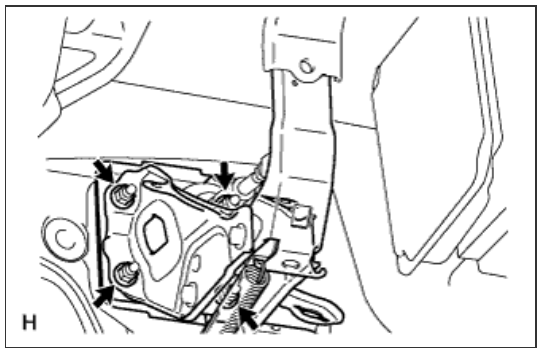
NOTICE:

nly loosen the n t. Do not remove the bolt or n t.



b. emove the bolt from the brake pedal s ort reinforcement.

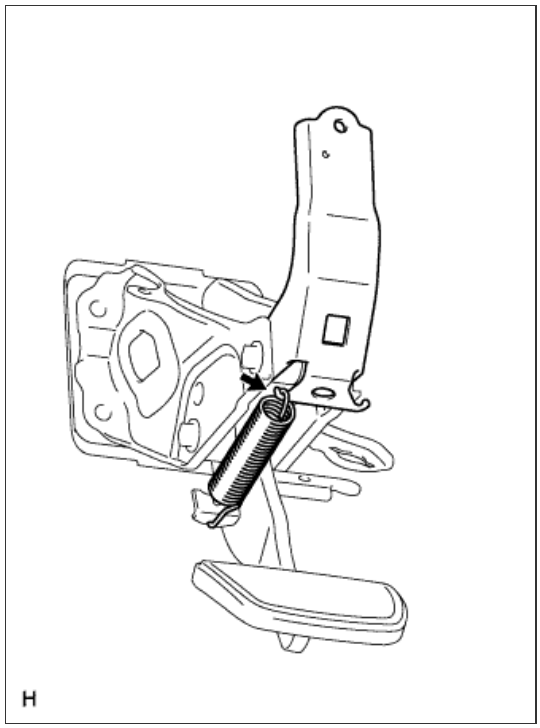
c. emove the n ts and brake pedal s ort assembly.



for Preparation Click here

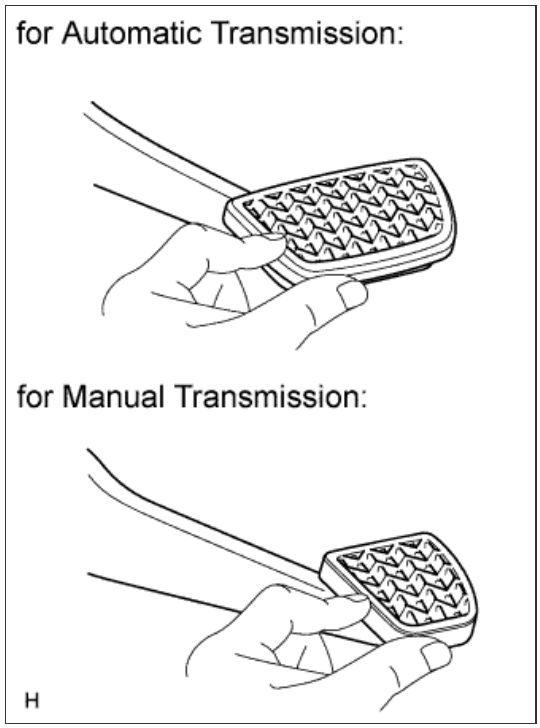
1. REMOVE BRAKE PEDAL RETURN SPRING

a. Remove the return spring.



2. REMOVE BRAKE PEDAL PAD

a. Remove the brake pedal pad from the brake pedal.



3. REMOVE STOP LIGHT SWITCH MOUNTING ADJUSTER

a. Remove the stop light switch mounting ad uster from the brake pedal support.

for Preparation Click here

1. CHECK BRAKE PEDAL HEIGHT

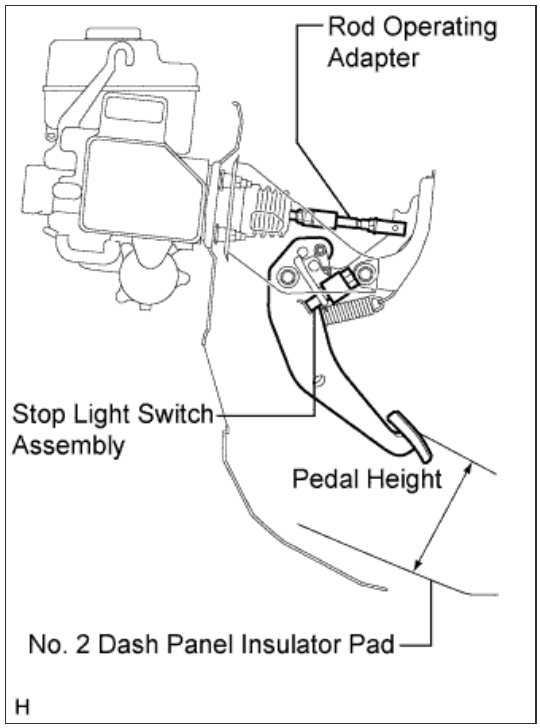
a. Check the brake pedal height.

Standard Pedal Height from No. 2 Dash Panel Insulator Pad:
149.1 to 159.1 mm (5.87 to 6.26 in.)

NOTICE:

Do not adjust the pedal height. Doing so by changing the push rod length will structurally change the pedal ratio.

the pedal height is incorrect adjust the rod operating adapter length.



b. Adjust the rod operating adapter length.

i. e ove the clip and clevis pin.

ii. Loosen the clevis lock nut.

iii. Adjust the rod operating adapter length by turning the pedal push rod clevis.

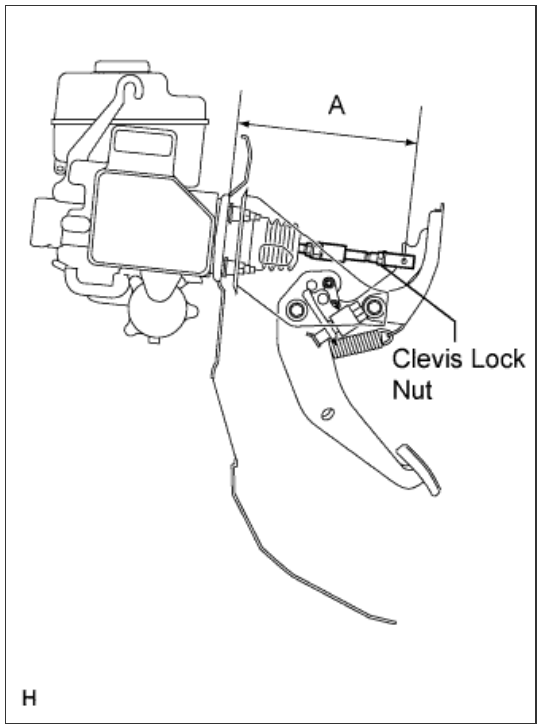
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

iv. Tighten the clevis lock nut.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf

v. Set the aster cylinder push rod clevis in place insert the push rod pin ro the outside o the vehicle and then install a new clip. the pedal height is incorrect even i the rod operating adapter is adjusted check that there is no da age in the brake pedal brake pedal lever brake pedal support and dash panel.

- Even i there is da age there is no proble i the reserve distance is within the standard value.
- necessary replace any da aged parts.



2. CHECK AND ADJUST STOP LIGHT SWITCH ASSEMBLY

HINT:

the pedal height is incorrect check and adjust the stop light switch clearance.

a. Disconnect the stop light switch asse bly connector ro the stop light switch asse bly.

b. Turn the stop light switch asse bly counterclockwise and re ove the stop light switch asse bly.

c. nsert the stop light switch asse bly until the body hits the brake pedal bracket.

NOTICE:

When inserting the stop light switch asse bly support the pedal ro behind so that the pedal is not pushed in.

d. Turn the stop light switch asse bly a arter turn clockwise to install it.

HINT:

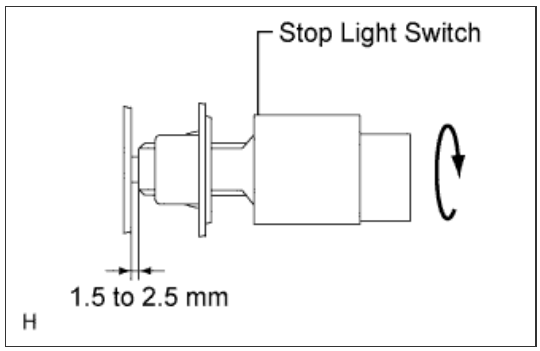
Turning the stop light switch asse bly counterclockwise loosens the switch.

e. Connect the stop light switch connector to the stop light switch.

f. Check the protrusion o the rod.

Standard Rod Protrusion:
1.5 to 2.5 mm (0.0591 to 0.0984 in.)

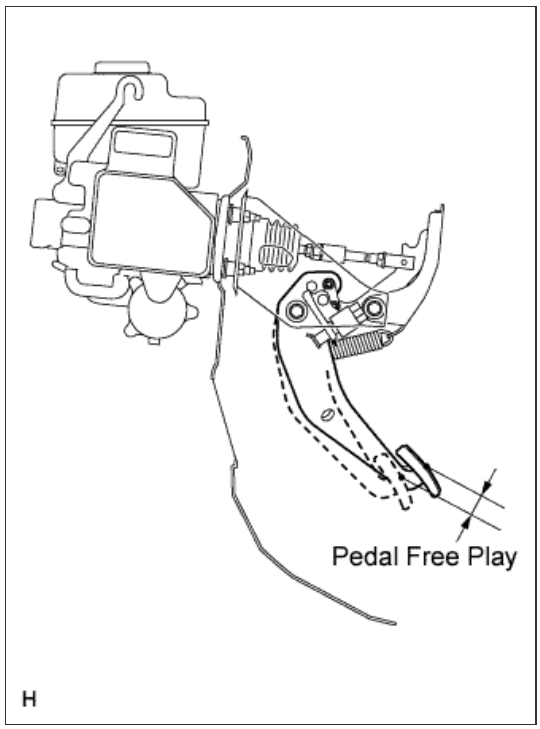
g. A ter adjusting the pedal height check the pedal ree play.



3. CHECK PEDAL FREE PLAY

a. sh in the pedal until the beginning o the resistance is t. Measure the pedal ree play.

Standard Pedal Free Play:
1 to 6 mm (0.0 94 to 0.2 6 in.)

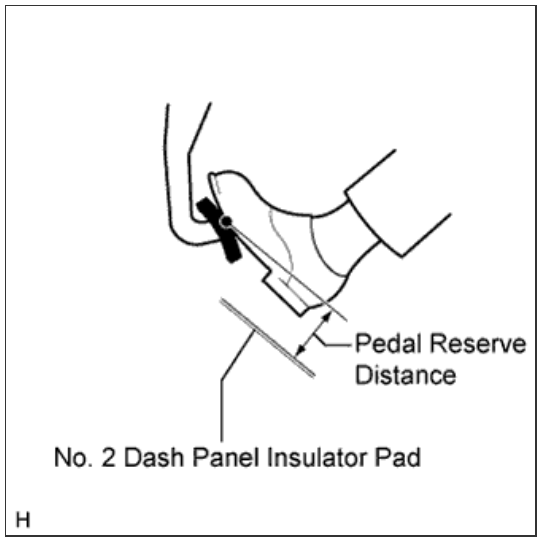


4. CHECK PEDAL RESERVE DISTANCE

a. ease the parking brake lever.
With the engine running depress the pedal and asure the pedal reserve distance as shown in the illustration.

Standard Pedal Reserve Distance from No. 2 Dash Panel Insulator Pad at 490 N (50 kgf 110.2 lbf):
More than 67.5 mm (2.66 in.)

incorrect troubleshoot the brake syste .


Pedal Reserve
Distance
No. 2 Dash Panel Insulator Pad
H

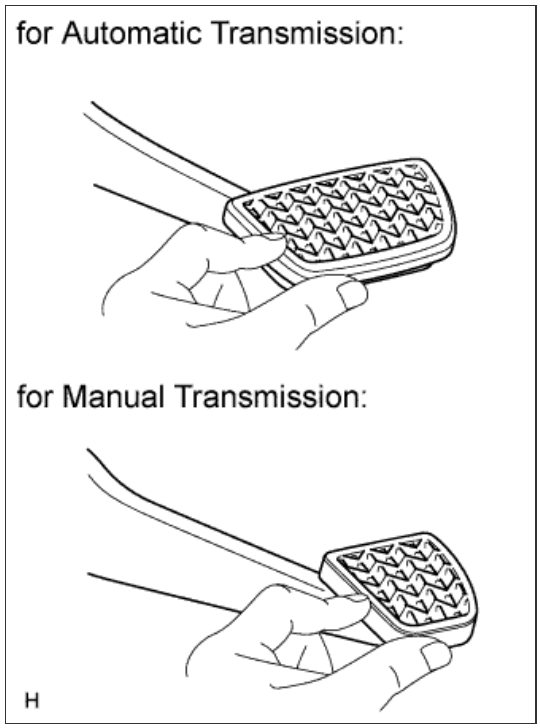
for Preparation Click here

1. INSTALL STOP LIGHT SWITCH MOUNTING ADJUSTER

a. Install the stop light switch mounting adjuster to the brake pedal support.

2. INSTALL BRAKE PEDAL PAD

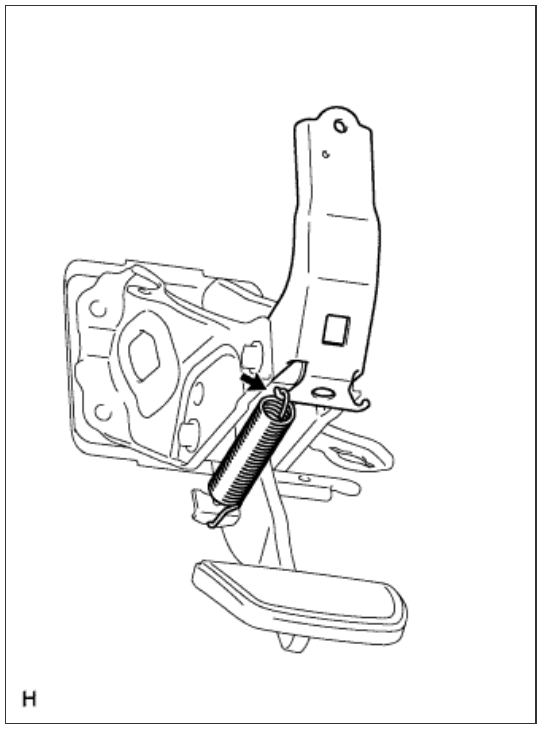
a. Install the brake pedal pad onto the brake pedal.



3. INSTALL BRAKE PEDAL RETURN SPRING

a. Apply a light coat of lithium soap base glycol grease to inner surface of the hole in the brake pedal support assembly.

b. Install the brake pedal return spring to the brake pedal support assembly.



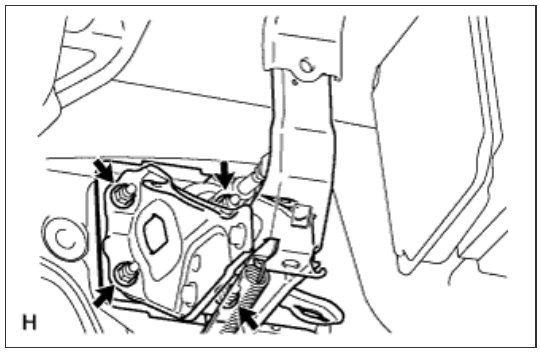
H

for Preparation Click here

1. INSTALL BRAKE PEDAL SUPPORT ASSEMBLY

a. Install the brake pedal support assembly with the 4 nuts.

Torque:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }



b. Install the brake pedal support reinforcement set bolt.

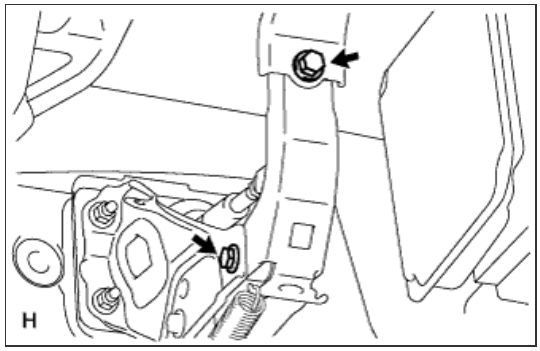
Torque:
16 N*m{ 163 kgf*cm , 12 ft.*lbf }

c. Tighten the hexagon bolt.

Torque:
23 N*m{ 239 kgf*cm , 17 ft.*lbf }

HINT:

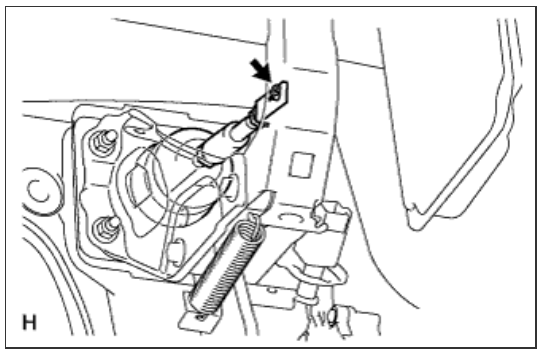
Hold the bolt in place and tighten the nut.



2. INSTALL PUSH ROD PIN

a. Apply a light coat lithium soap base glycol grease to the inner surface of the hole on the brake pedal lever.

b. Set the master cylinder push rod clevis in place, insert the push rod pin from the outside of the vehicle and then install a new clip.



3. INSTALL STOP LIGHT SWITCH ASSEMBLY

a. Install the stop light switch (Click here).

b. Connect the stop light switch connector.

4. INSTALL DRIVER SIDE KNEE AIRBAG ASSEMBLY

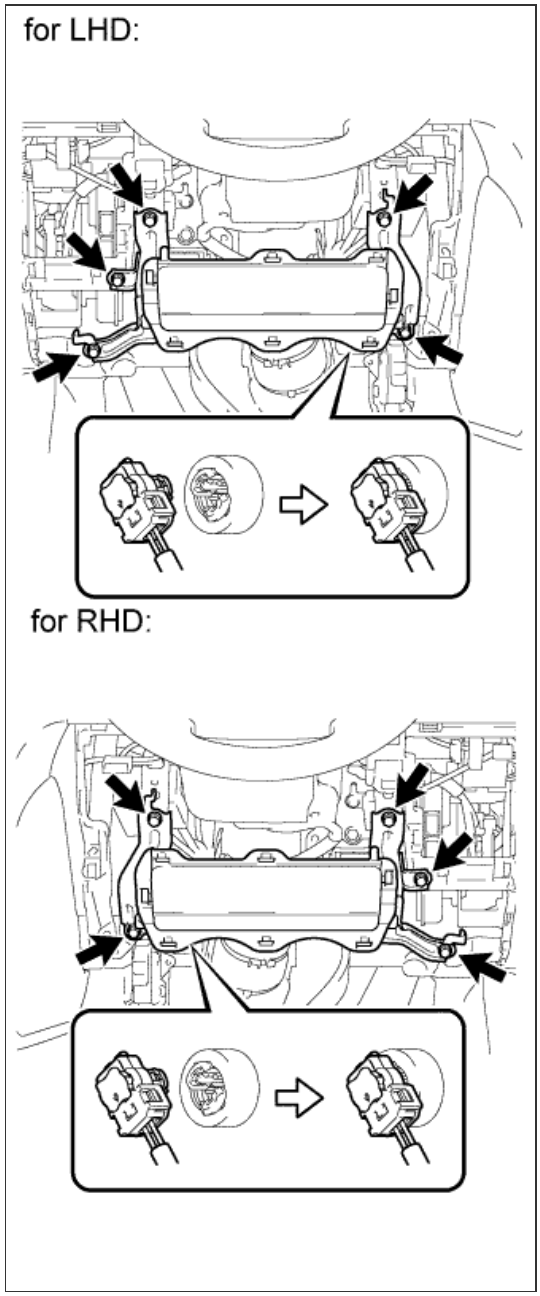
a. Connect the connector.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

b. Install the driver side knee airbag with the 5 bolts.

Torque:
10 N*m{ 102 kgf*cm , 7 ft.*lbf }

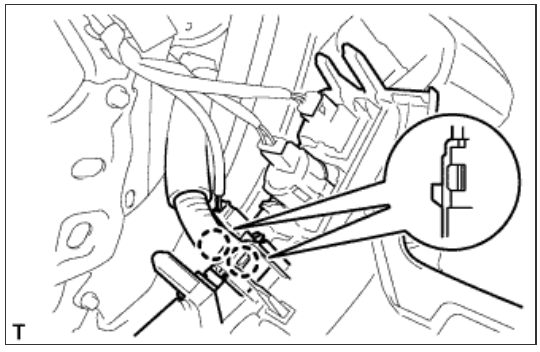


5. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

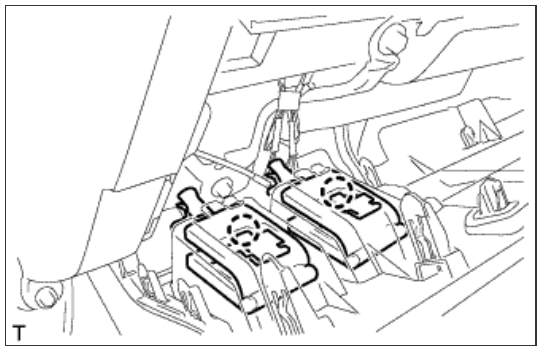
a. Connect the connectors.

b. for Automatic Air Conditioning System:

i. Attach the 2 claws to install the room temperature sensor.



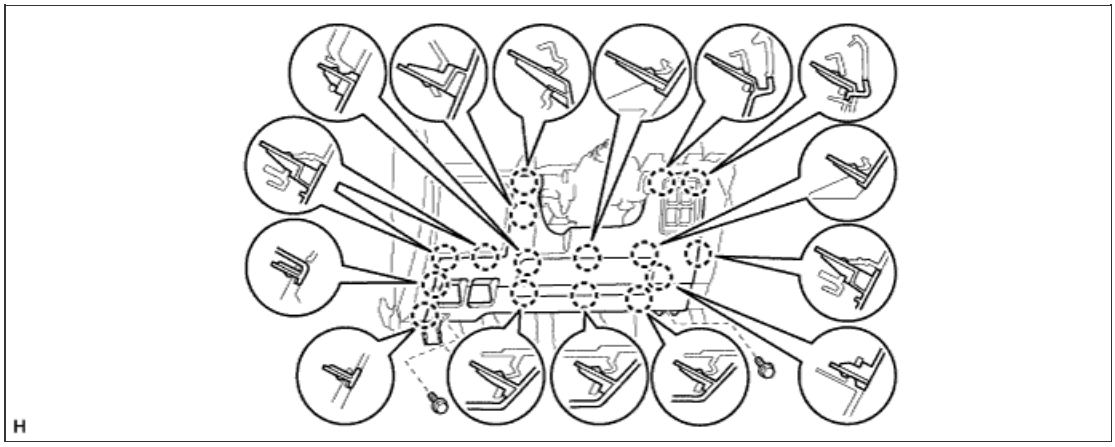
c. Attach the 2 claws to connect the 2 control cables.



d. w/ Driver Side Knee Airbag:

i. Attach the 16 claws to install the lower No. 1 instrument panel finish panel.

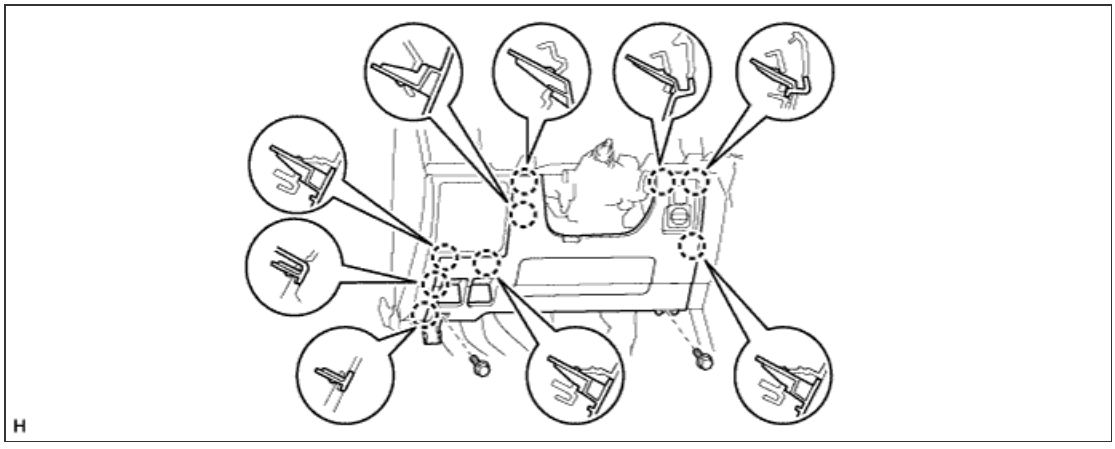
ii. Install the 2 bolts.



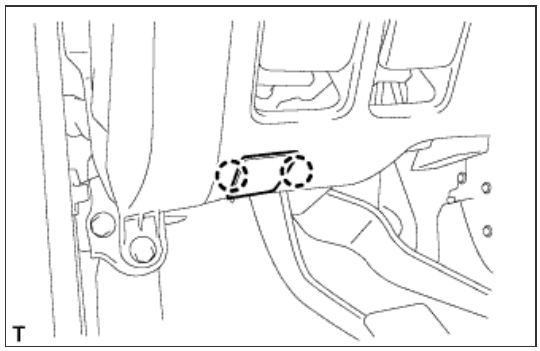
e. w/o Driver Side Knee Airbag:

i. Attach the 9 claws to install the lower No. 1 instrument panel finish panel.

ii. Install the 2 bolts.



f. Attach the 2 claws to close the hole cover.

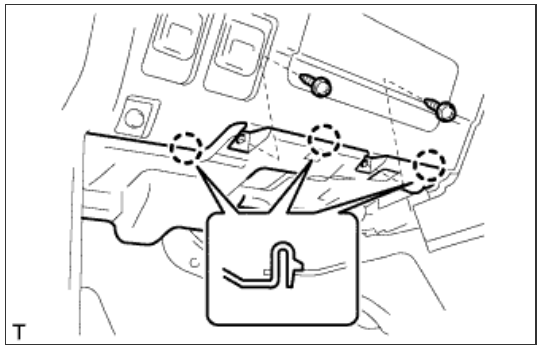


6. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Connect the connectors.

b. Attach the 3 claws to install the No. 1 instrument panel under cover.

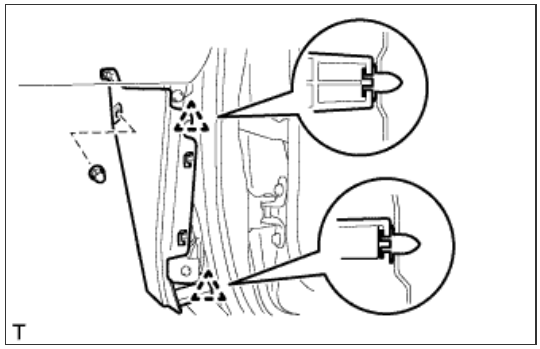
c. Install the 2 screws.



7. INSTALL COWL SIDE TRIM BOARD RH

a. Attach the 2 clips to install the cowl side trim board.

b. Install the cap nut.



8. INSTALL FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedures described for the LH side.

9. WARM UP CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initiali ed after the cable is reconnected (Click here).

10. CHECK BRAKE PEDAL HEIGHT

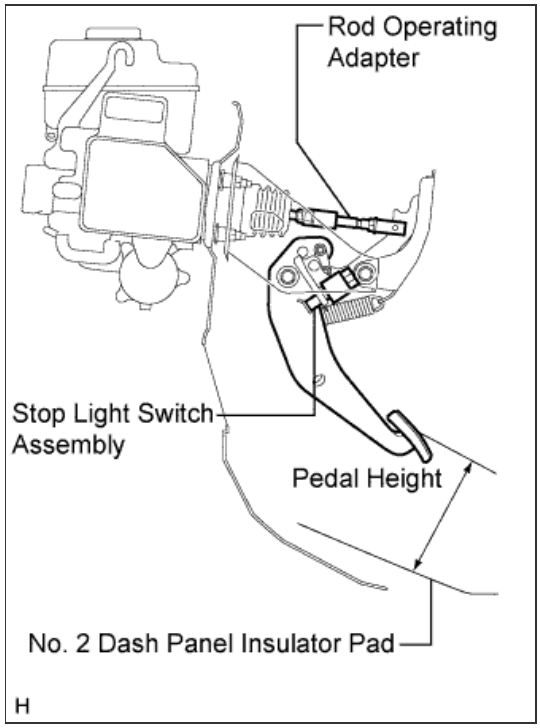
a. Check the brake pedal height.

Standard Pedal Height from No. 2 Dash Panel Insulator Pad:
149.1 to 159.1 mm (5.87 to 6.26 in.)

NOTICE:

Do not ad ust the pedal height. Doing so by changing the push rod length will structurally change the pedal ratio.

If the pedal height is incorrect, ad ust the rod operating adapter length.



b. Ad ust the rod operating adapter length.

i. emove the clip and clevis pin.

ii. Loosen the clevis lock nut.

iii. Ad ust the rod operating adapter length by turning the pedal push rod clevis.

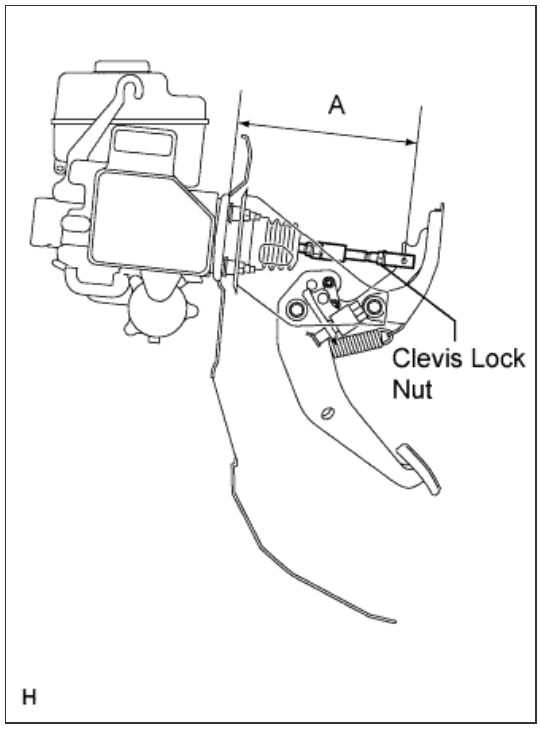
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

iv. Tighten the clevis lock nut.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }

v. Set the master cylinder push rod clevis in place, insert the push rod pin from the outside of the vehicle and then install a new clip. If the pedal height is incorrect even if the rod operating adapter is ad usted, check that there is no damage in the brake pedal, brake pedal lever, brake pedal support and dash panel.

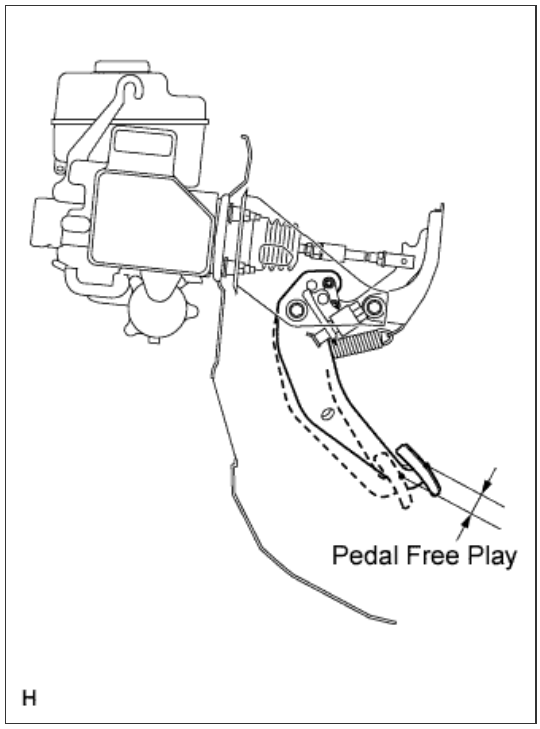
- Even if there is damage, there is no problem if the reserve distance is within the standard value.
- If necessary, replace any damaged parts.



11. CHECK PEDAL FREE PLAY

a. Push in the pedal until the beginning of the resistance is felt. Measure the pedal free play.

Standard Pedal Free Play:
1 to 6 mm (0.0394 to 0.236 in.)

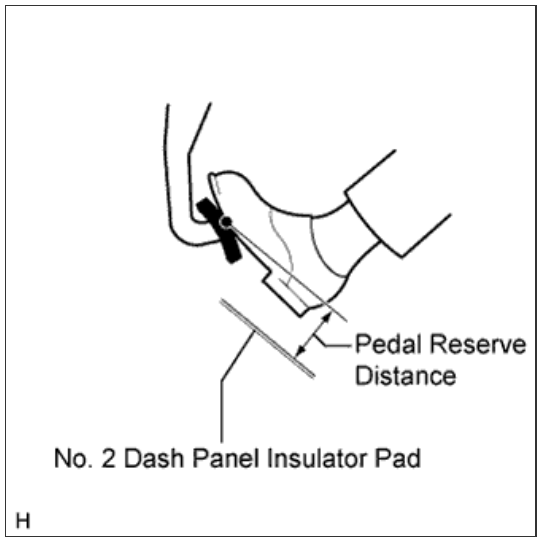


12. CHECK PEDAL RESERVE DISTANCE

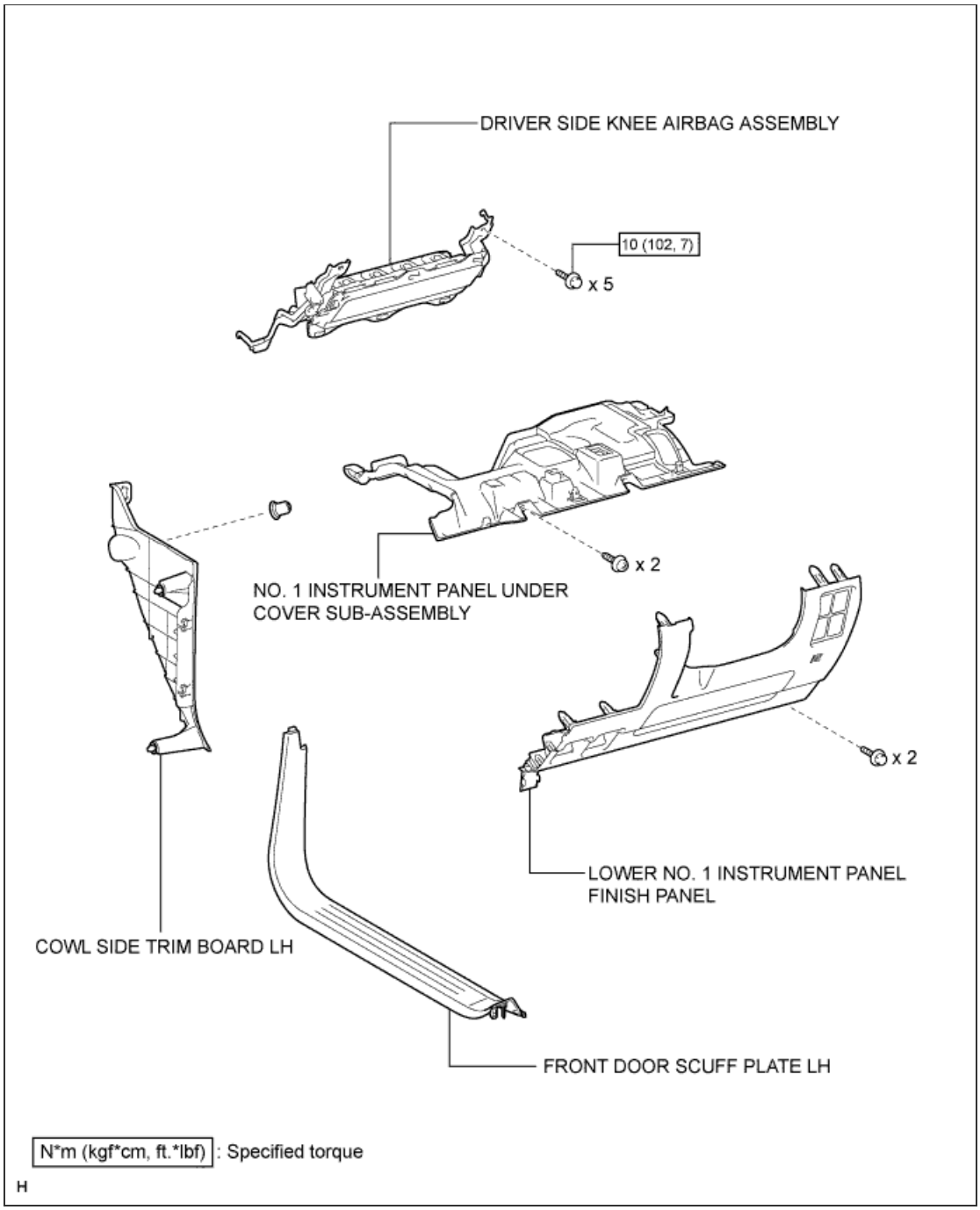
a. elease the parking brake lever.
With the engine running, depress the pedal and measure the pedal reserve distance as shown in the illustration.

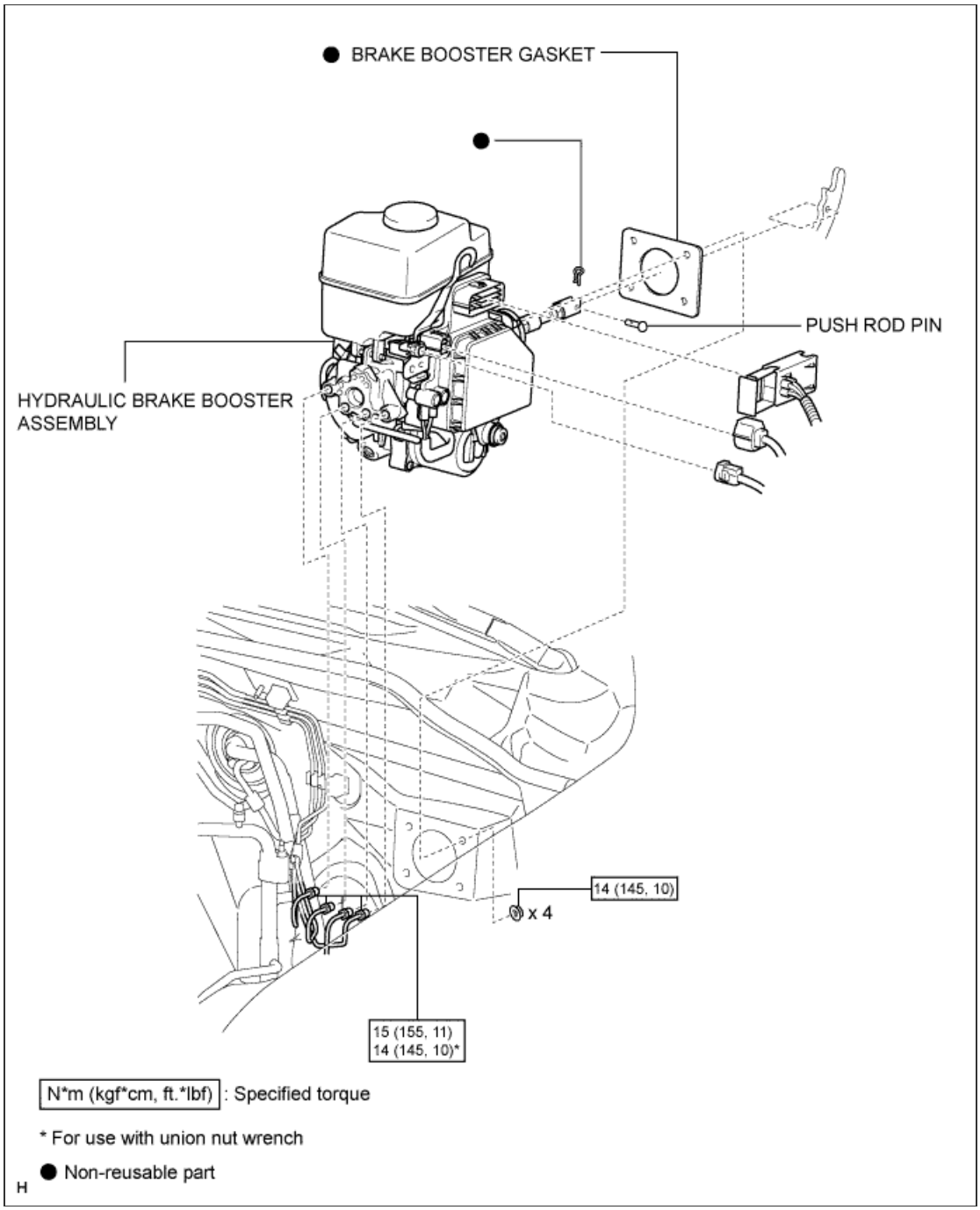
Standard Pedal Reserve Distance from No. 2 Dash Panel Insulator Pad at 490 N (50 kgf, 110.2 lbf):
More than 67.5 mm (2.66 in.)

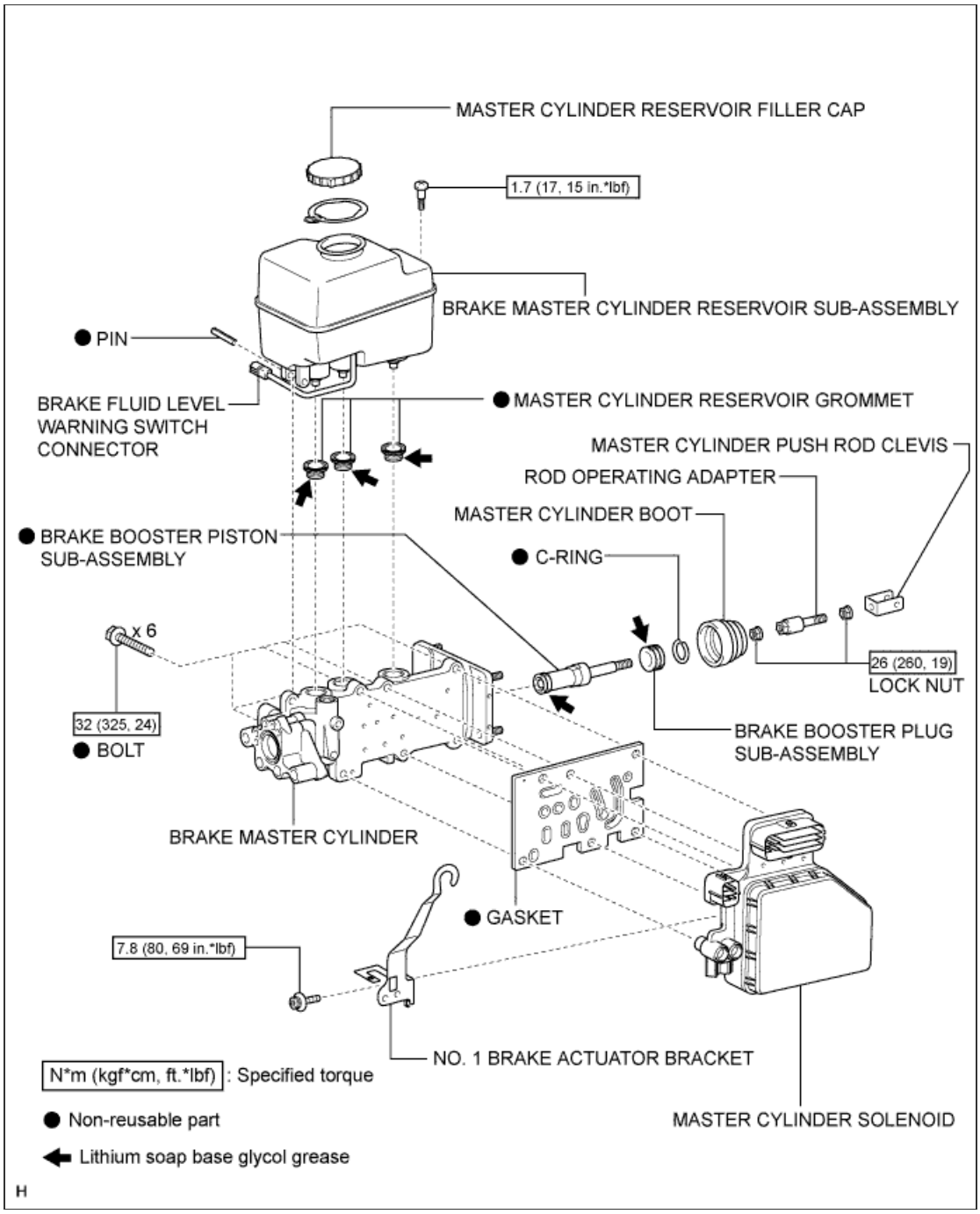
If incorrect, troubleshoot the brake system.

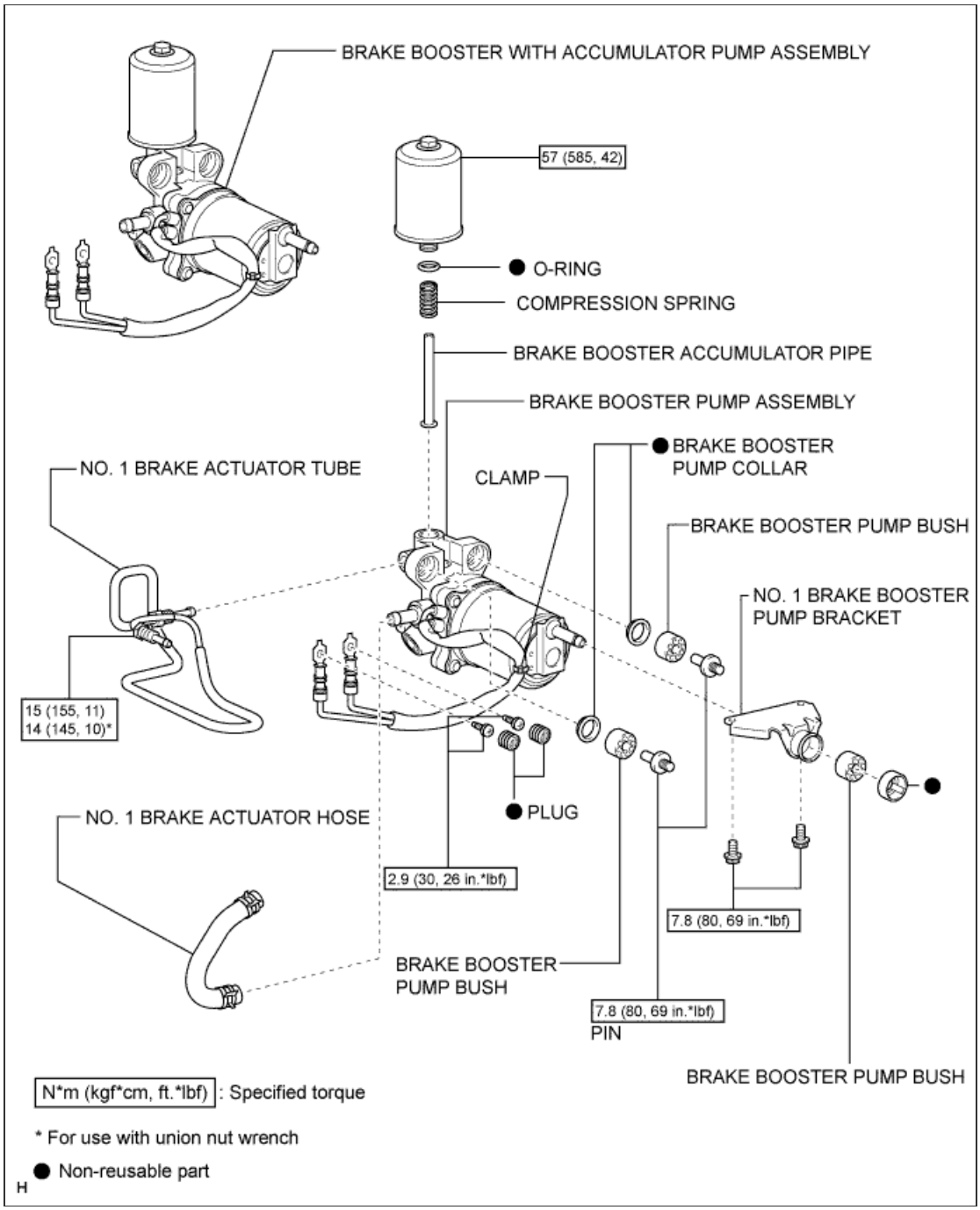


for Preparation Click here




BRAKE BOOSTER GASKET
PUSH ROD PIN
HYDRAULIC BRAKE BOOSTER ASSEMBLY
14 (145, 10)
x 4
15 (155, 11)
14 (145, 10)*
N*m (kgf*cm, ft.*lbf) : Specified torque
* For use with union nut wrench
Non-reusable part
H


MASTER CYLINDER RESERVOIR FILLER CAP
1.7 (17, 15 in.*lbf)
BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY
● PIN
BRAKE FLUID LEVEL WARNING SWITCH CONNECTOR
● MASTER CYLINDER RESERVOIR GROMMET
MASTER CYLINDER PUSH ROD CLEVIS
ROD OPERATING ADAPTER
MASTER CYLINDER BOOT
● BRAKE BOOSTER PISTON SUB-ASSEMBLY
● C-RING
x 6
26 (260, 19)
LOCK NUT
32 (325, 24)
● BOLT
BRAKE BOOSTER PLUG SUB-ASSEMBLY
BRAKE MASTER CYLINDER
● GASKET
7.8 (80, 69 in.*lbf)
NO. 1 BRAKE ACTUATOR BRACKET
N*m (kgf*cm, ft.*lbf) : Specified torque
MASTER CYLINDER SOLENOID
● Non-reusable part
Lithium soap base glycol grease
H


BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY
57 (585, 42)
O-RING
COMPRESSION SPRING
BRAKE BOOSTER ACCUMULATOR PIPE
BRAKE BOOSTER PUMP ASSEMBLY
BRAKE BOOSTER PUMP COLLAR
NO. 1 BRAKE ACTUATOR TUBE
CLAMP
BRAKE BOOSTER PUMP BUSH
NO. 1 BRAKE BOOSTER PUMP BRACKET
15 (155, 11)
14 (145, 10)*
PLUG
NO. 1 BRAKE ACTUATOR HOSE
2.9 (30, 26 in.*lbf)
7.8 (80, 69 in.*lbf)
BRAKE BOOSTER PUMP BUSH
7.8 (80, 69 in.*lbf)
PIN
BRAKE BOOSTER PUMP BUSH
N*m (kgf*cm, ft.*lbf) : Specified torque
* For use with union nut wrench
Non-reusable part
H

for Preparation Click here

1. INSPECT BRAKE MASTER CYLINDER FLUID PRESSURE CHANGE

a. Inspect the battery voltage.

Standard Voltage:
11 to 14 V

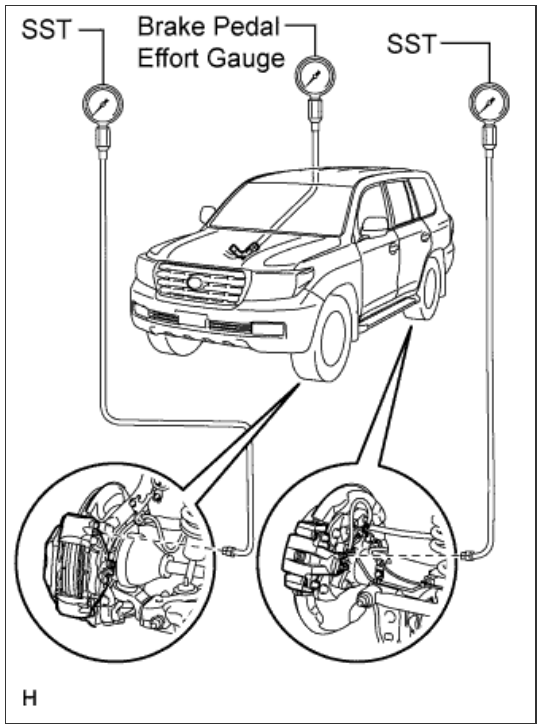
b. Turn the ignition switch off and depress the brake pedal more than 20 times.

HINT:

When pressure in the power supply system is released the reaction force becomes light and the stroke becomes longer.

c. Install the LSPV gauge (SST) and brake pedal effort gauge, and bleed air from the LSPV gauge (SST).

SST
09709-29018



d. When the booster does not operate:
Depress the brake pedal and check the fluid pressure.

Standard Fluid Pressure with Pedal Depressing Force of 245 N (25 kgf, 55 lbf):

Front Brake Pressure	Rear Brake Pressure
2350 kPa (24.0 kgf/cm^2, 341 psi) or more	0 kPa (0 kgf/cm^2, 0 psi)

Standard Fluid Pressure with Pedal Depressing Force of 343 N (35 kgf, 77 lbf):

Front Brake Pressure	Rear Brake Pressure
3550 kPa (36.2 kgf/cm^2, 515 psi) or more	0 kPa (0 kgf/cm^2, 0 psi)

e. When the booster operates:

i. Turn the ignition switch on and wait until the pump motor has stopped.

ii. Depress the brake pedal and check the fluid pressure.

Standard Fluid Pressure with Pedal Depressing Force of 49 N (5 kgf, 11 lbf):

Front Brake Pressure	Rear Brake Pressure
1620 to 2820 kPa (16.6 to 28.7 kgf/cm^2, 235 to 408 psi)	1680 to 2880 kPa (17.2 to 29.3 kgf/cm^2, 244 to 417 psi)

Standard Fluid Pressure with Pedal Depressing Force of 98 N (10 kgf, 22 lbf):

Front Brake Pressure	Rear Brake Pressure
3840 to 5040 kPa (39.2 to 51.3 kgf/cm^2, 557 to 730 psi)	4000 to 5200 kPa (40.8 to 53.0 kgf/cm^2, 580 to 754 psi)

Standard Fluid Pressure with Pedal Depressing Force of 147 N (15 kgf, 33 lbf):

Front Brake Pressure	Rear Brake Pressure
6200 to 7400 kPa (63.3 to 75.4 kgf/cm^2, 899 to 1073 psi)	6470 to 7670 kPa (66.0 to 78.2 kgf/cm^2, 939 to 1112 psi)

Standard Fluid Pressure with Pedal Depressing Force of 196 N (20 kgf, 44 lbf):

Front Brake Pressure	Rear Brake Pressure

8500 to 9700 kPa (86.7 to 98.9 kgf/cm^2, 1233 to 1406 psi)	8890 to 10090 kPa (90.7 to 102.8 kgf/cm^2, 1290 to 1463 psi)

2. INSPECT BRAKE MASTER CYLINDER OPERATION

a. Inspect the battery voltage.

Standard Voltage:
11 to 14 V

b. Turn the ignition switch off and depress the brake pedal more than 20 times.

HINT:

When pressure in the power supply system is released, the reaction force decreases and the stroke becomes longer.

c. Check that the brake pedal reaction force decreases.
If the pedal reaction force does not decrease, check and replace the brake line and brake master cylinder.

d. Turn the ignition switch on and check the pump motor operation noise. If the pump motor does not operate, check and replace the wire harness and brake booster pump assembly (Click here).

e. Connect the intelligent tester to the DLC3.

f. Turn the ignition switch on.

g. Turn the intelligent tester on.

h. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

i. Jack up and support the vehicle.

j. Release the parking brake lever.

k. Move the shift lever to N and check that the rear wheels can be rotated by hand.

l. Inspect the front VSC solenoid (SMCF) operation.

i. Select "VSC/TRC Solenoid (SRCF)" on the intelligent tester.

ii. Turn "VSC/TRC Solenoid (SRCF)" on with the intelligent tester, depress the brake pedal with a stable force and check that the pedal cannot be depressed.
If the pedal can be depressed, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.

iii. Release the brake pedal.

iv. When the solenoid is off, depress the brake pedal again and check that the brake pedal can be depressed.
If the pedal cannot be depressed, replace the brake master cylinder.

m. Inspect the front VSC solenoid (SREA) operation.

i. Select "VSC/TRC Solenoid (SRCR)" and "VSC/TRC Solenoid (SRCF)" on the intelligent tester.

ii. Turn "VSC/TRC Solenoid (SRCR)" and "VSC/TRC Solenoid (SRCF)" on simultaneously with the intelligent tester, then depress the brake pedal with a stable force.

iii. When the solenoids are on, check that the front wheels cannot be rotated by hand.
If the front wheels can be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheels quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheels as slowly as possible.**

iv. When the solenoids are off, turn "VSC/TRC Solenoid (SRCF)" on again, and then depress the brake pedal. Then check the front wheels by rotating them by hand.
If the front wheels cannot be rotated, replace the brake master cylinder.

v. When "VSC/TRC Solenoid (SRCF)" is off, depress the brake pedal again and check that the brake pedal can be depressed.
If the pedal cannot be depressed, replace the brake master cylinder.

n. Inspect the front ABS solenoid (SFRH) operation.

i. Select "ABS Solenoid (SFRH)" on the intelligent tester.

ii. Turn "ABS Solenoid (SFRH)" on with the intelligent tester, then depress the brake pedal with a stable force.

iii. When the solenoid is on, check the right front wheel by rotating it by hand.
If the right front wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoid is off, depress the brake pedal again and check that the right front wheel cannot be rotated by hand.
If the right front wheel can be rotated, replace the brake master cylinder.

HINT:

When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.

o. Inspect the front ABS solenoid (SFLH) operation.

i. Select "ABS Solenoid (SFLH)" on the intelligent tester.

ii. Turn "ABS Solenoid (SFLH)" on with the intelligent tester, then depress the brake pedal with a stable force.

iii. When the solenoid is on, check the left front wheel by rotating it by hand.
If the left front wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoid is off, depress the brake pedal again and check that the left front wheel cannot be rotated by hand.
If the left front wheel can be rotated, replace the brake master cylinder.

p. Inspect the front ABS solenoid (SFRR) operation.

i. Select "ABS Solenoid (SFRR)" and "ABS Solenoid (SFRH)" on the intelligent tester.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SFRR)" and "ABS Solenoid (SFRH)" on simultaneously with the intelligent tester.

iii. When the solenoids are on, check the right front wheel by rotating it by hand.
If the right front wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoids are off, depress the brake pedal again and check that the right front wheel cannot be rotated by hand.

If the right front wheel can be rotated, replace the brake master cylinder.

q. Inspect the front ABS solenoid (SFLR) operation.

i. Select "ABS Solenoid (SFLR)" and "ABS Solenoid (SFLH)" on the intelligent tester.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SFLR)" and "ABS Solenoid (SFLH)" on simultaneously with the intelligent tester.

iii. When the solenoids are on, check the left front wheel by rotating it by hand.
If the left front wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoids are off, depress the brake pedal again and check that the left front wheel cannot be rotated by hand.
If the left front wheel can be rotated, replace the brake master cylinder.

r. Inspect the rear VSC solenoid (SREC) operation.

i. Select "VSC/TRC Solenoid (SRMF)" on the intelligent tester.

ii. Depress the brake pedal with a stable force, then turn "VSC/TRC Solenoid (SRMF)" on with the intelligent tester.

iii. Release the brake pedal when the solenoid is on, and check that the rear wheels cannot be rotated by hand.
If the rear wheels can be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheels quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheels as slowly as possible.**

iv. When the solenoid is off, check the rear wheels by rotating them by hand.
If the rear wheels cannot be rotated, replace the brake master cylinder.

s. Inspect the rear VSC solenoid (STR) operation.

i. Select "VSC/TRC Solenoid (SRMR)" and "VSC/TRC Solenoid (SRMF)" on the intelligent tester.

ii. Turn "VSC/TRC Solenoid (SRMR)" and "VSC/TRC Solenoid (SRMF)" on simultaneously with the intelligent tester.

iii. When the solenoids are on, check that the rear wheels cannot be rotated by hand.
If the rear wheels can be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheels quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheels as slowly as possible.**

iv. When the solenoids are off, turn "VSC/TRC Solenoid (SRMF)" on again, and check the rear wheels by rotating them by hand.
If the rear wheels cannot be rotated, replace the brake master cylinder.

v. When "VSC/TRC Solenoid (SRMF)" is off, depress the brake pedal again and check that the rear wheels cannot be rotated by hand.
If the rear wheels can be rotated, replace the brake master cylinder.

t. Inspect the rear ABS solenoid (SRRH) operation.

i. Select "ABS Solenoid (SRRH)" on the intelligent tester.

ii. Turn "ABS Solenoid (SRRH)" on with the intelligent tester, then depress the brake pedal with a stable force.

iii. When the solenoid is on, check the right rear wheel by rotating it by hand.
If the right rear wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoid is off, depress the brake pedal again and check that the right rear wheel cannot be rotated by hand.
If the right rear wheel can be rotated, replace the brake master cylinder.

HINT:

When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.

u. Inspect the rear ABS solenoid (SRLH) operation.

i. Select "ABS Solenoid (SRLH)" on the intelligent tester.

ii. Turn "ABS solenoid (SRLH)" on with the intelligent tester, then depress the brake pedal with a stable force.

iii. When the solenoid is on, check the left rear wheel by rotating it by hand.
If the left rear wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoid is off, depress the brake pedal again and check that the left rear wheel cannot be rotated by hand.
If the left rear wheel can be rotated, replace the brake master cylinder.

v. Inspect the rear ABS solenoid (SRRR) operation.

i. Select "ABS Solenoid (SRRR)" and "ABS Solenoid (SRRH)" on the intelligent tester.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SRRR)" and "ABS Solenoid (SRRH)" on simultaneously with the intelligent tester.

iii. When the solenoids are on, check the right rear wheel by rotating it by hand.
If the right rear wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel too quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoids are off, depress the brake pedal again and check that the right rear wheel cannot be rotated by hand.
If the right rear wheel can be rotated, replace the brake master cylinder.

w. Inspect the rear ABS solenoid (SRLR) operation.

i. Select "ABS Solenoid (SRLR)" and "ABS Solenoid (SRLH)" on the intelligent tester.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SRLR)" and "ABS Solenoid (SRLH)" on simultaneously with the intelligent tester.

iii. When the solenoids are on, check the left rear wheel by rotating it by hand.
If the left rear wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel too quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoids are off, depress the brake pedal again and check that the left rear wheel cannot rotated by hand.
If the left rear wheel can be rotated, replace the brake master cylinder.

x. Lower the vehicle.

y. Disconnect the intelligent tester.

3. CHECK FLUID LEVEL IN RESERVOIR

a. Turn the ignition switch off and fully depress the brake pedal 40 times or more to release the pressure in the accumulator.

HINT:

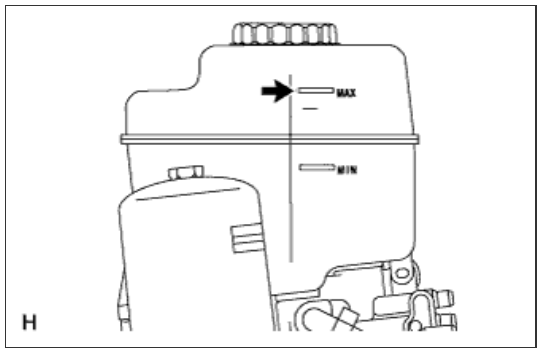
When the pressure in the accumulator is released, the pedal stroke will lengthen.

b. Adjust the fluid level so that it is at the MAX line.

HINT:

When the ignition switch is turned on, brake fluid is sent to the accumulator and the fluid level decreases by approximately 10 mm (0.394 in.) from the MAX line.

Brake Fluid:
SAE J1703 or FMVSS No. 116 DOT3



for Preparation Click here

NOTICE:

- **Be sure not to allow the pump to contact the floor; support it with the booster body. If the pump contacts the floor, the red brake tube between the pump and booster body may be deformed, the operating sound of the pump may become loud enough to hear within the cabin, and fluid may leak.**
- **When installing, coat the parts indicated by arrows with lithium soap base glycol grease (Click here).**
- **As high pressure is applied to the brake actuator tube No. 1, never deform it.**
- **Until the work is over, do not turn the ignition switch on.**
- **Before starting the work, make sure that the ignition switch is off and depress the brake pedal more than 20 times.**

HINT:

When pressure in the power supply system is released, the reaction force becomes light and the stroke becomes longer.

1. DRAIN BRAKE FLUID

NOTICE:

Wash off brake fluid immediately if it comes into contact with a painted surface.

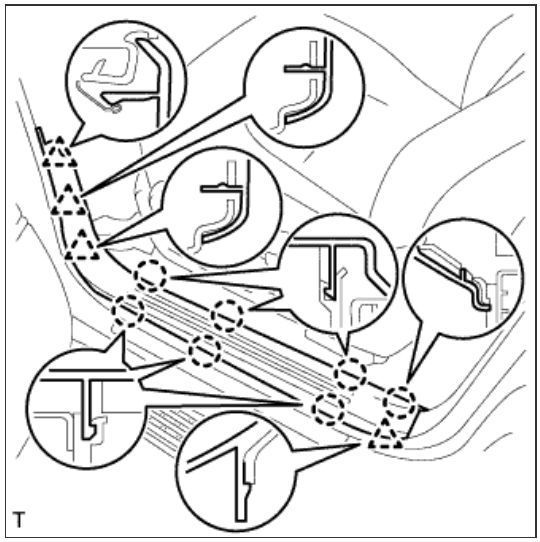
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

3. REMOVE FRONT DOOR SCUFF PLATE LH

a. Detach the 7 claws and 4 clips, and remove the scuff plate.

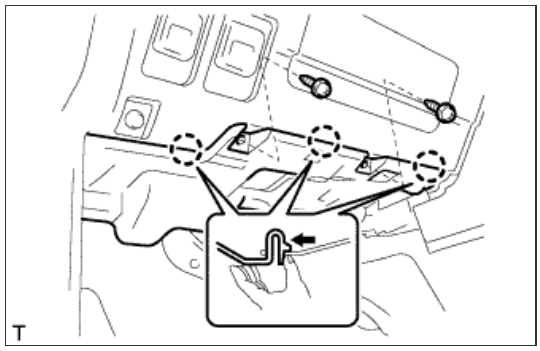


4. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Remove the 2 screws.

b. Detach the 3 claws.

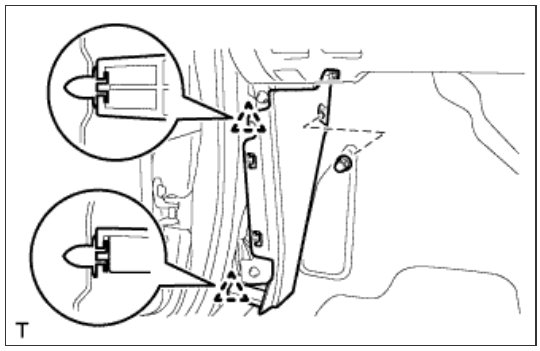
c. Disconnect the connectors and remove the No. 1 instrument panel under cover.



5. REMOVE COWL SIDE TRIM BOARD LH

a. Remove the cap nut.

b. Detach the 2 clips and remove the cowl side trim board.



6. REMOVE LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

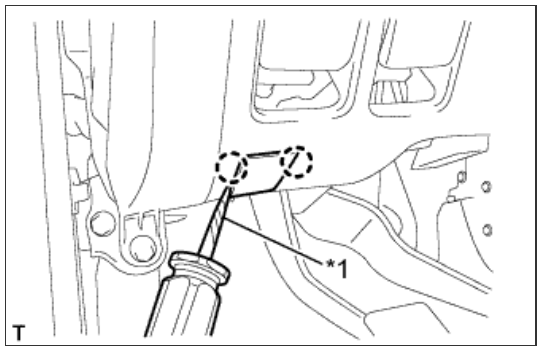
a. Using a screwdriver, detach the 2 claws and open the hole cover.

HINT:

Tape the screwdriver tip before use.

Text in Illustration

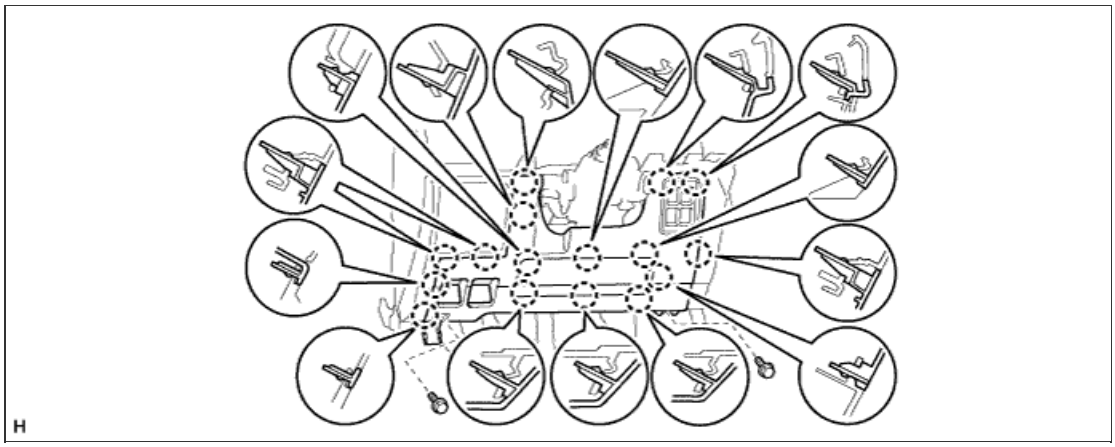
*1	Protective Tape



b. w/ Driver Side Knee Airbag:

i. Remove the 2 bolts.

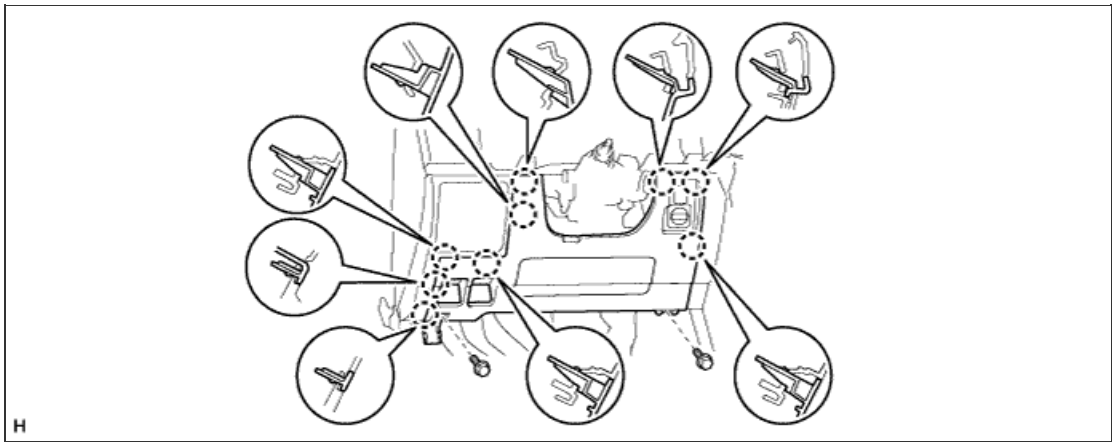
ii. Detach the 16 claws.



c. w/o Driver Side Knee Airbag:

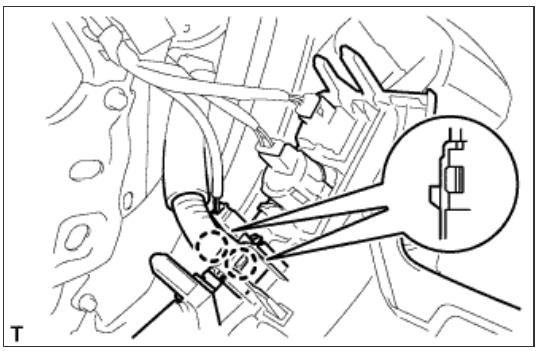
i. Remove the 2 bolts.

ii. Detach the 9 claws.



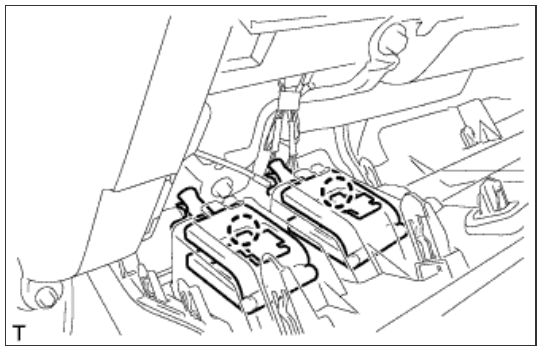
d. for Automatic Air Conditioning System:

i. Detach the 2 claws and remove the room temperature sensor.



e. Detach the 2 claws and disconnect the 2 control cables.

f. Disconnect the connectors and remove the lower No. 1 instrument panel finish panel.



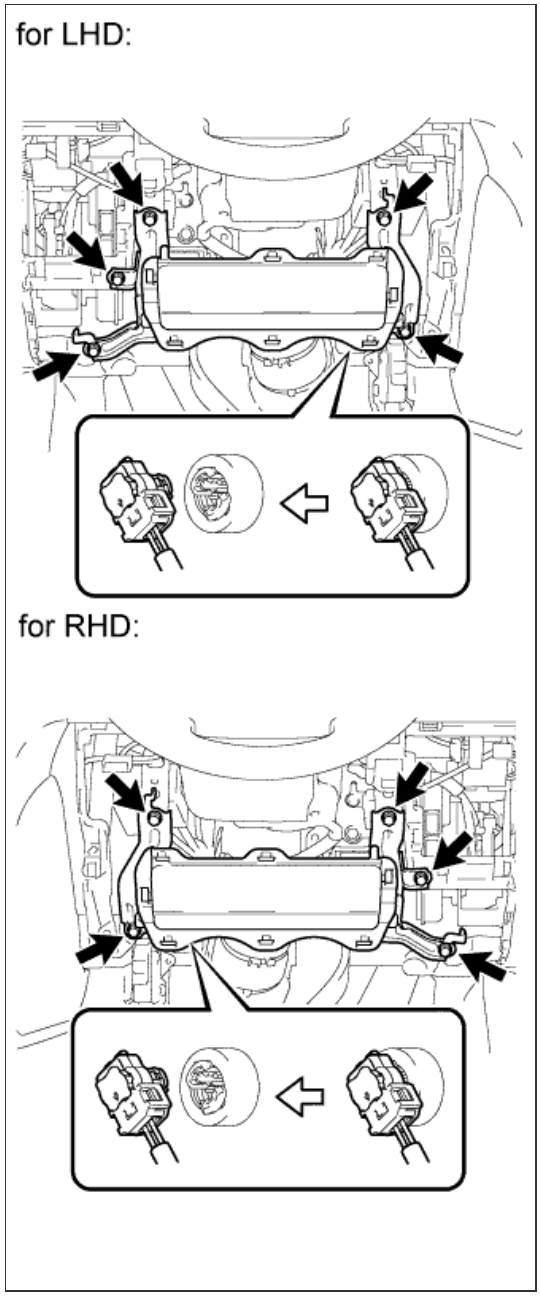
7. REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY

a. Remove the 5 bolts and driver side knee airbag.

b. Disconnect the connector.

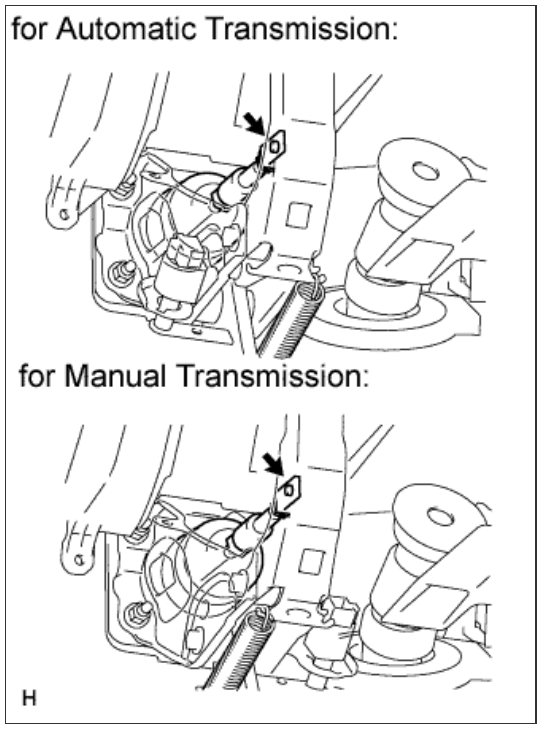
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



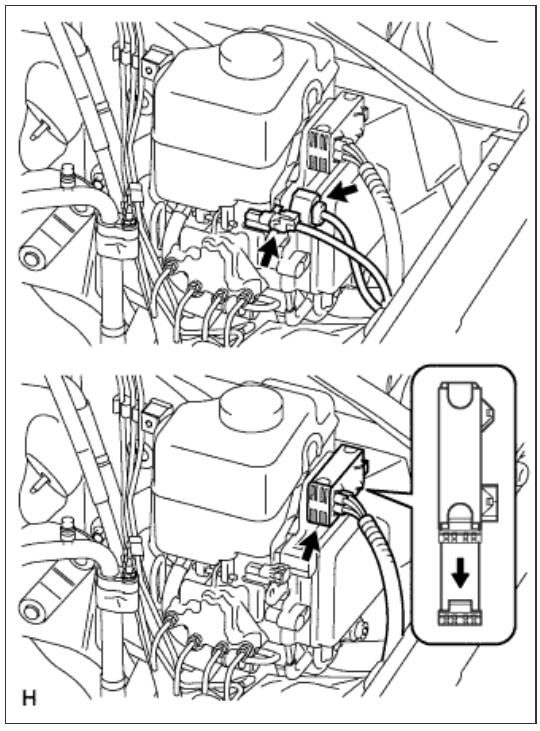
8. REMOVE PUSH ROD PIN

a. Remove the clip and push rod pin from the brake pedal lever.

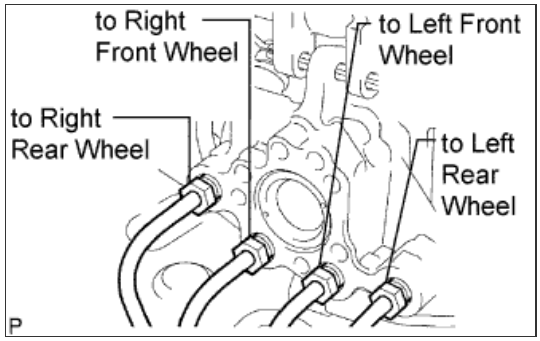


9. REMOVE HYDRAULIC BRAKE BOOSTER ASSEMBLY

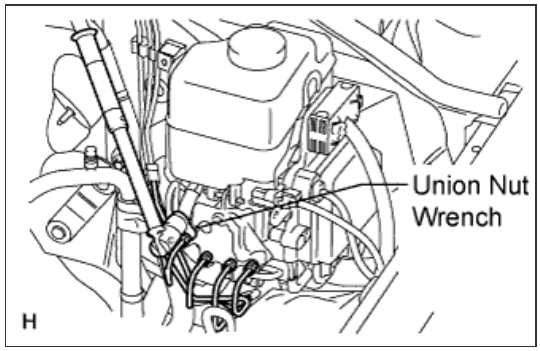
a. Disconnect the 3 connectors from the hydraulic brake booster assembly.



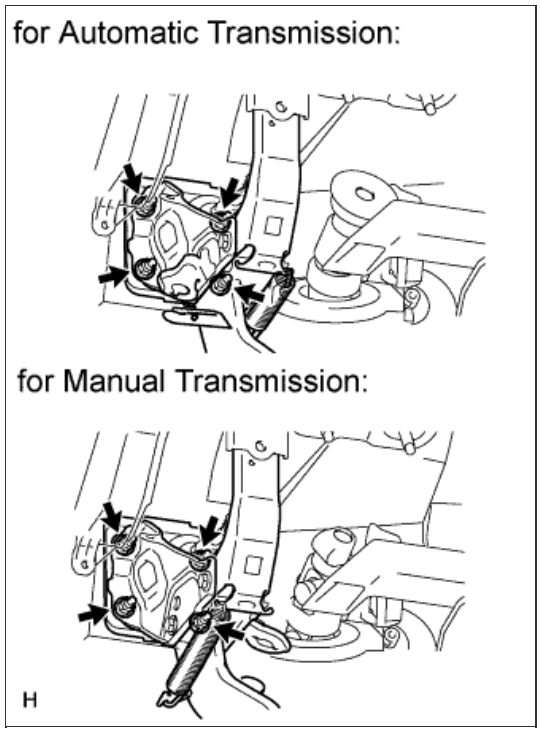
b. Use tags or make a memo to identify the place to reconnect.



c. Using a union nut wrench, disconnect the 4 brake lines from the hydraulic brake booster assembly.



d. Remove the 4 nuts and pull out the hydraulic brake booster assembly.



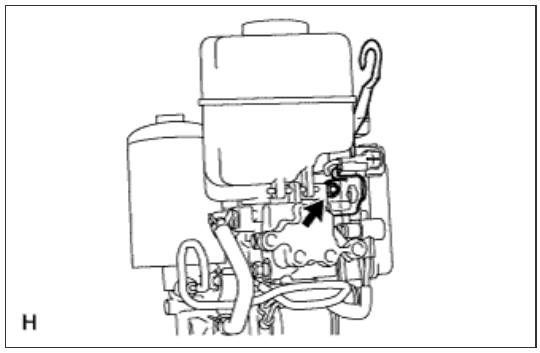
10. REMOVE BRAKE BOOSTER GASKET

a. Remove the brake booster gasket from the hydraulic brake booster assembly.

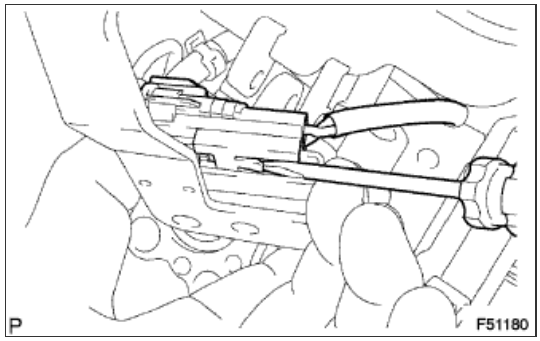
for Preparation Click here

1. REMOVE NO. 1 BRAKE ACTUATOR BRACKET

a. Using a 5 mm hexagon wrench, remove the bolt and No. 1 brake actuator bracket.

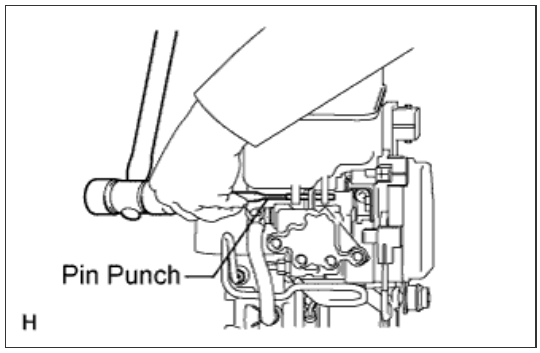


b. Using a screwdriver, disconnect the brake fluid level warning switch connector from the No. 1 brake actuator bracket.



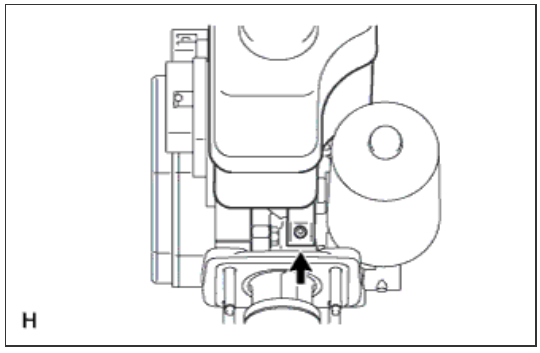
2. REMOVE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

a. Using a pin punch and hammer, remove the pin from the brake master cylinder reservoir.



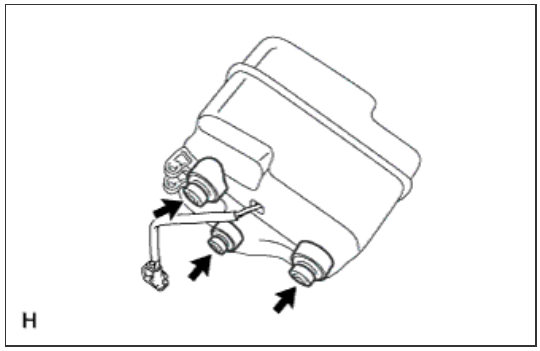
b. Remove the screw and pull out the brake master cylinder reservoir sub-assembly.

c. Remove the master cylinder reservoir filler cap.



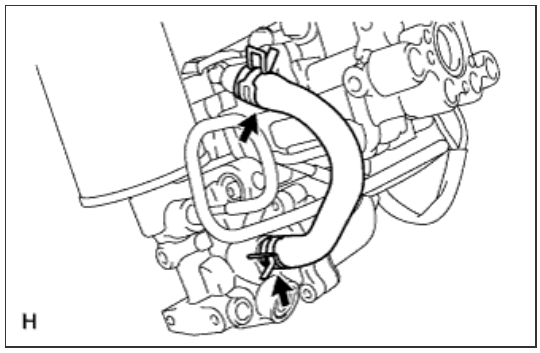
3. REMOVE MASTER CYLINDER RESERVOIR GROMMET

a. Remove the 3 reservoir grommets from the master cylinder reservoir.



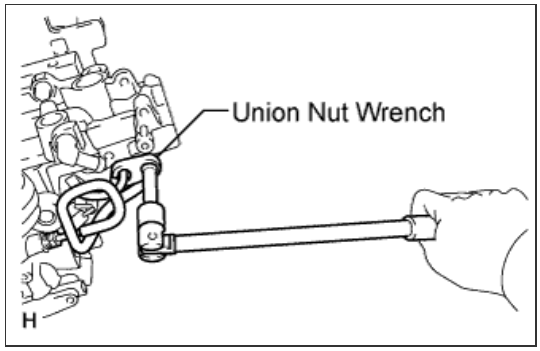
4. REMOVE NO. 1 BRAKE ACTUATOR HOSE

a. Using needle nose pliers, slide the 2 clips and remove the brake actuator hose and 2 clips.



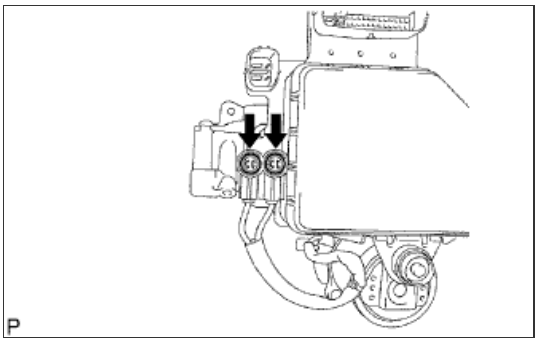
5. REMOVE NO. 1 BRAKE ACTUATOR TUBE

a. Using a union nut wrench, remove the No. 1 brake actuator tube.

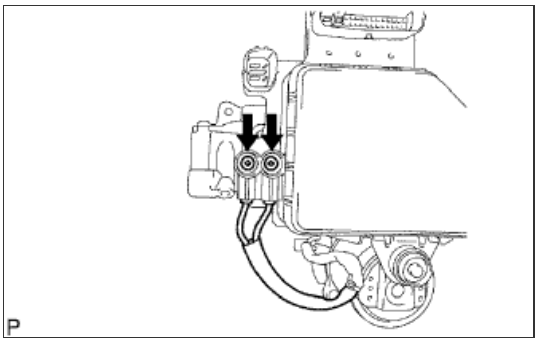


6. REMOVE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

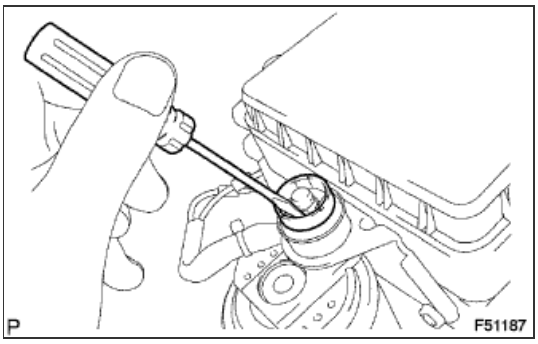
a. Using a screwdriver, remove the 2 plugs.



b. Remove the 2 screws and disconnect the wire harnesses from the master cylinder solenoid.

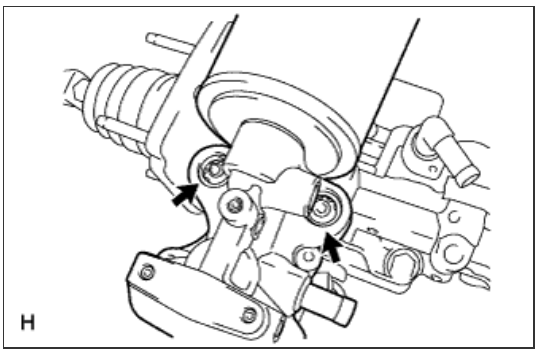


c. Using a screwdriver, remove the clip.

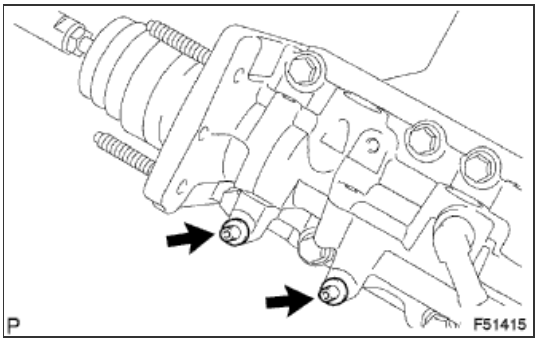


d. Remove the brake booster with accumulator pump assembly from the brake master cylinder.

e. Remove the 2 brake booster pump collars and 2 brake booster pump bushes from the brake booster with accumulator pump assembly.



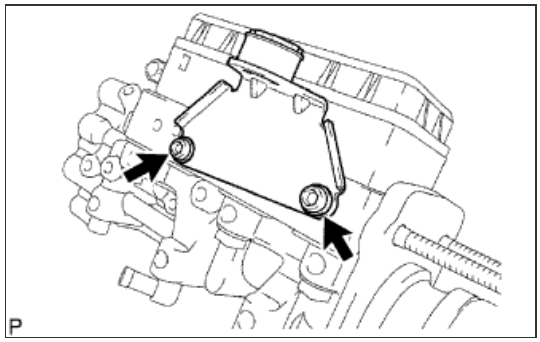
f. Using a 4 mm hexagon wrench, remove the 2 pins.



7. REMOVE NO. 1 BRAKE BOOSTER PUMP BRACKET

a. Using a 5 mm hexagon wrench, remove the 2 bolts and No. 1 brake booster pump bracket from the brake master cylinder solenoid.

b. Remove the brake booster pump bush from the No. 1 brake booster pump bracket.



8. REMOVE BRAKE BOOSTER ACCUMULATOR PIPE

a. Secure the brake booster with accumulator pump assembly in a vise.

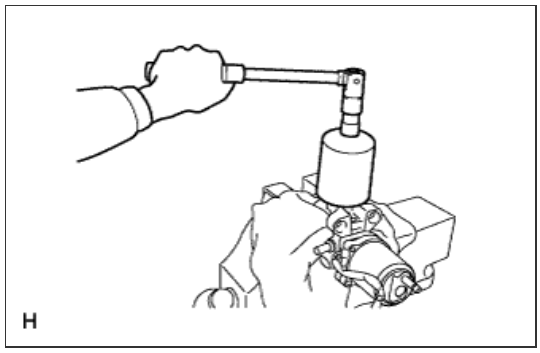
b. Remove the brake booster accumulator.

c. Remove the O-ring from the brake booster accumulator.

NOTICE:

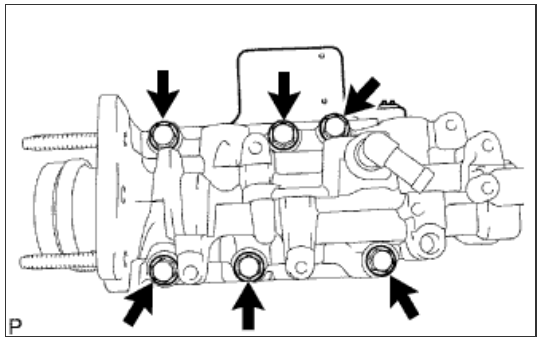
Ensure no foreign matter enters the pump.

d. Remove the brake booster accumulator pipe and compression spring.

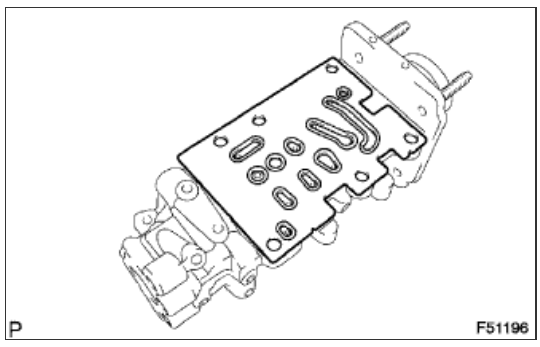


9. REMOVE MASTER CYLINDER SOLENOID

a. Remove the 6 bolts and master cylinder solenoid.



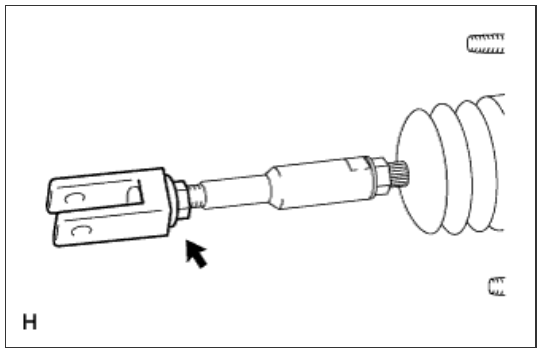
b. Remove the gasket.



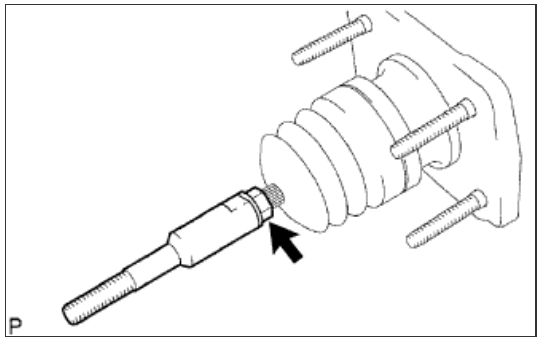
10. REMOVE MASTER CYLINDER PUSH ROD CLEVIS

a. Loosen the lock nut on the rod operating adapter, and remove the push rod

clevis and lock nut.



b. Loosen the lock nut on the brake master cylinder side, and remove the rod operating adapter and lock nut.



11. REMOVE MASTER CYLINDER BOOT

12. REMOVE BRAKE BOOSTER PISTON SUB-ASSEMBLY

a. Pressing the piston in with a screwdriver, insert a pin or equivalent from the hole in the master cylinder body to hold the C-ring, and then remove it with another screwdriver.

HINT:

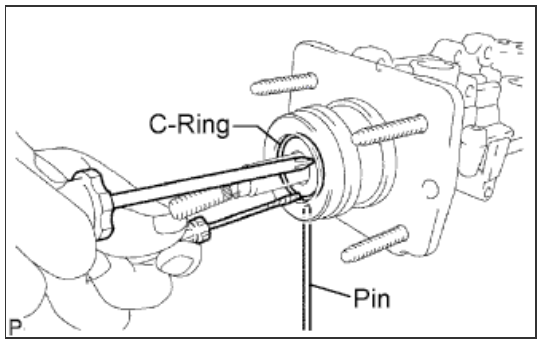
Tape the screwdriver tip before use.

b. Remove the plug from the piston.

c. Remove the piston by pulling it straight out, not at an angle.

NOTICE:

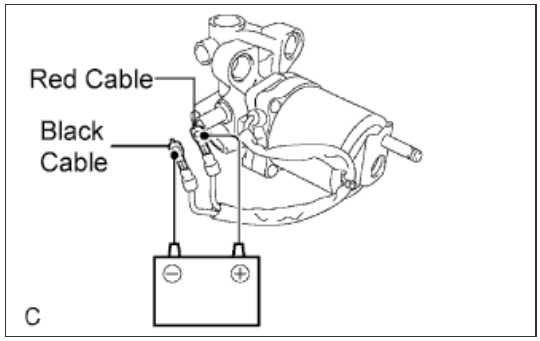
If the piston is pulled out at an angle, there is a possibility that the cylinder bore could be damaged.



for Preparation Click here

1. CHECK BRAKE BOOSTER PUMP ASSEMBLY

a. Apply battery voltage to the brake booster pump cables, and check the operation of the pump motor.



OK

Measurement Condition	Specified Condition
Battery positive (+) voltage → Red cable terminal	Pump motor operates
Battery negative (-) voltage → Black cable terminal	

If the result is not as specified, replace the brake booster pump assembly.

for Preparation Click here

1. INSTALL BRAKE BOOSTER PISTON SUB-ASSEMBLY

a. Apply lithium soap base glycol grease to a new piston.

b. Install the piston.

NOTICE:

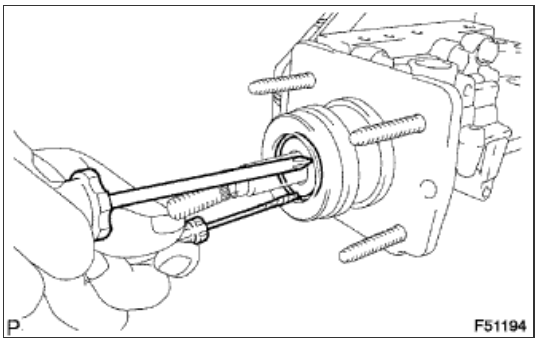
When installing, be careful not to damage the seals, etc.

c. Install the plug.

d. Using 2 screwdrivers, install a new C-ring while pressing on the piston.

HINT:

Tape the screwdriver tip before use.

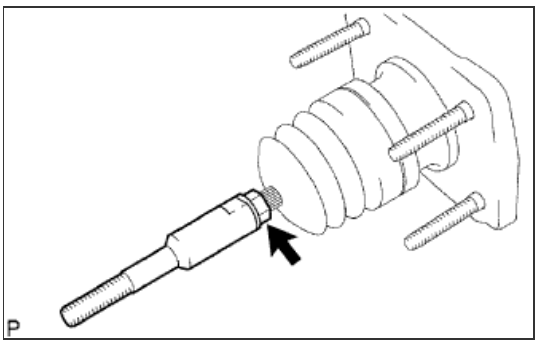


2. INSTALL MASTER CYLINDER BOOT

3. INSTALL MASTER CYLINDER PUSH ROD CLEVIS

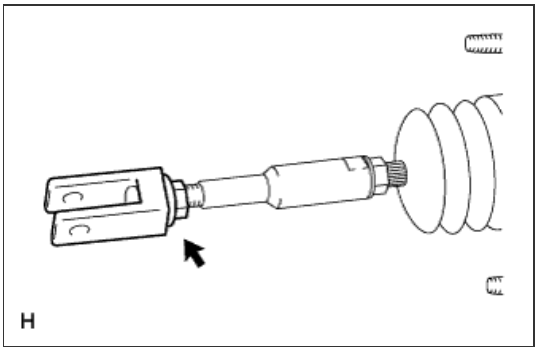
a. Install the brake master cylinder side lock nut and rod operating adapter to the brake master cylinder.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }



b. Install the lock nut and master cylinder push rod clevis to the rod operating adapter.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }

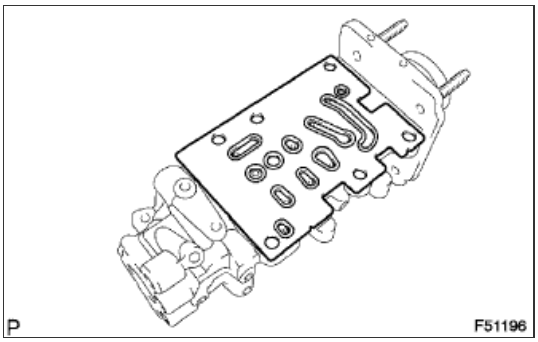


4. INSTALL MASTER CYLINDER SOLENOID

a. Install a new gasket.

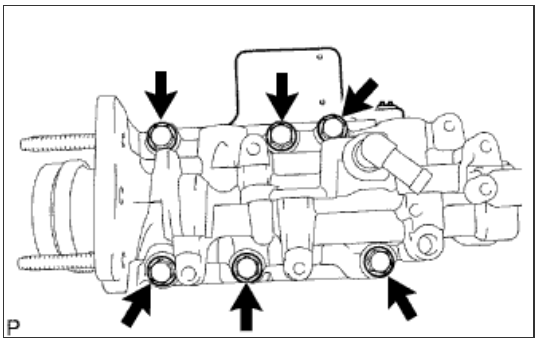
NOTICE:

Keep all surfaces of the master cylinder solenoid, master cylinder and gasket, especially contact surfaces, away from water and dust.



b. Install the master cylinder solenoid with 6 new bolts.

Torque:
32 N*m{ 325 kgf*cm , 24 ft.*lbf }



5. INSTALL BRAKE BOOSTER ACCUMULATOR PIPE

a. Install the brake booster accumulator pipe and compression spring.

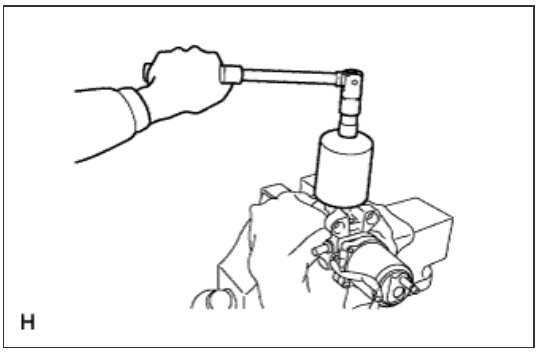
NOTICE:

Ensure that no foreign matter enters the pump.

b. Install a new O-ring to the brake booster accumulator assembly.

c. Install the brake booster accumulator assembly.

Torque:
57 N*m{ 585 kgf*cm , 42 ft.*lbf }

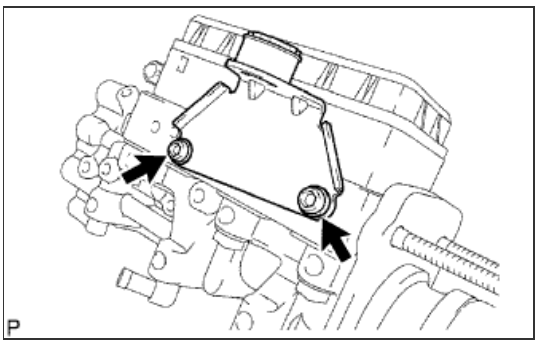


6. INSTALL NO. 1 BRAKE BOOSTER PUMP BRACKET

a. Install the brake booster pump bush to the No. 1 brake booster pump bracket.

b. Using a 5 mm hexagon wrench, install the No. 1 brake booster pump bracket with the 2 bolts.

Torque:
7.8 N*m{ 80 kgf*cm , 69 in.*lbf }

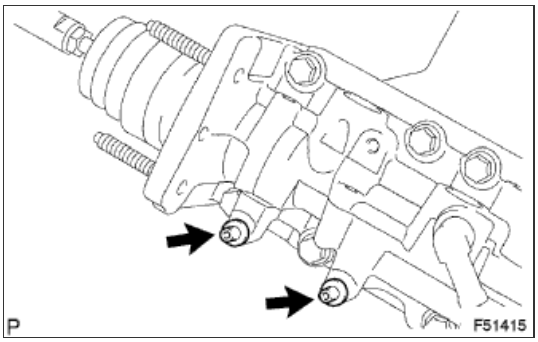


7. INSTALL BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

a. Using a 4 mm hexagon wrench, install the 2 pins to the brake master cylinder.

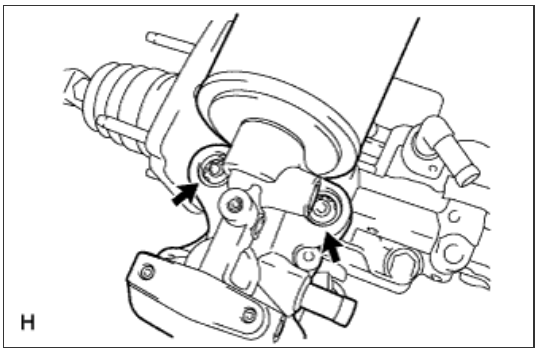
Torque:

7.8 N*m{ 80 kgf*cm , 69 in.*lbf }

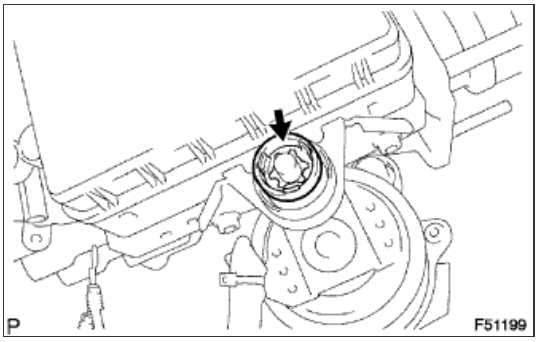


b. Install 2 new brake booster pump collars and 2 brake booster pump bushes to the brake booster with accumulator pump assembly.

c. Install the brake booster with accumulator pump assembly to the brake master cylinder.

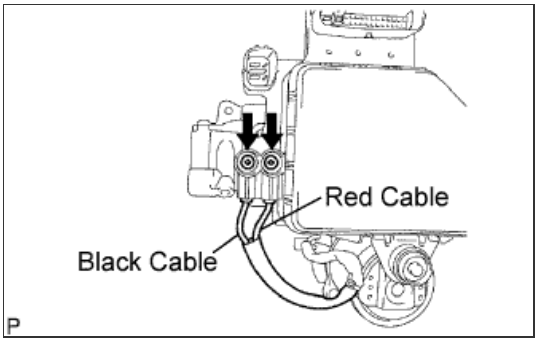


d. Install a new clip.

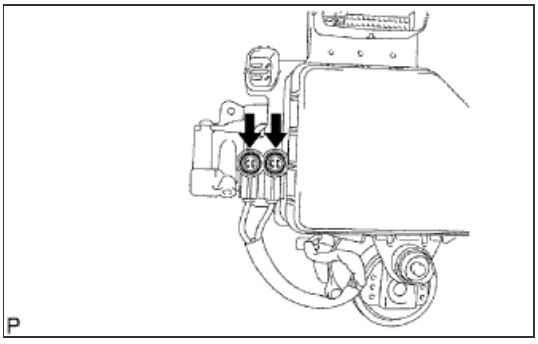


e. Connect the wire harnesses with the 2 screws.

Torque:
2.9 N*m{ 30 kgf*cm , 26 in.*lbf }



f. Install 2 new plugs.



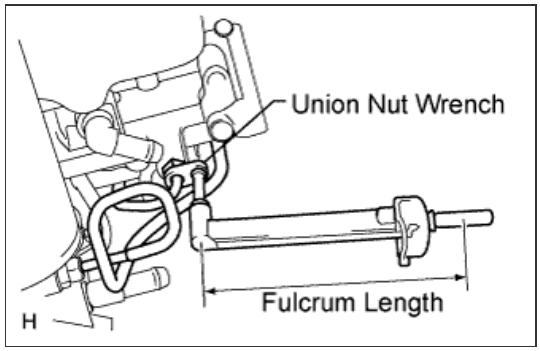
8. INSTALL NO. 1 BRAKE ACTUATOR TUBE

a. Using a union nut wrench, install the No. 1 brake actuator tube.

Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

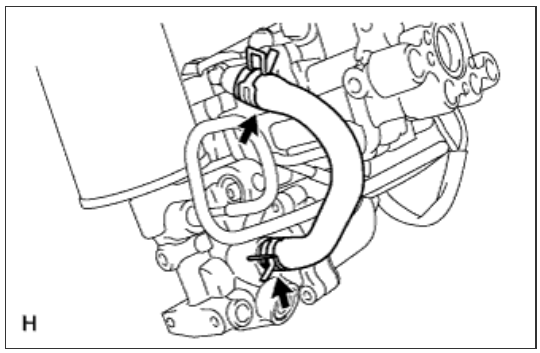
HINT:

- **Use a torque wrench with a fulcrum length of 300 mm (11.8 in.).**
- **The torque value for use with a union nut wrench is effective when the union nut wrench is parallel to the torque wrench.**



9. INSTALL NO. 1 BRAKE ACTUATOR HOSE

a. Using needle nose pliers, install the brake actuator hose with the 2 clips.



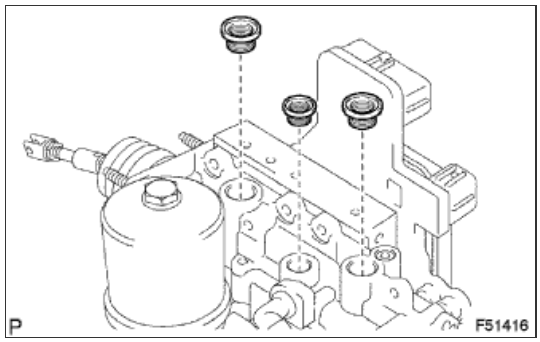
10. INSTALL MASTER CYLINDER RESERVOIR GROMMET

a. Apply lithium soap base glycol grease to 3 new reservoir grommets.

b. Install the 3 reservoir grommets to the brake master cylinder.

NOTICE:

Be careful of the size of each grommet.

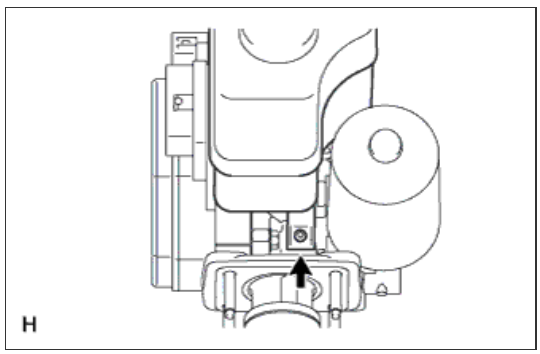


11. INSTALL BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

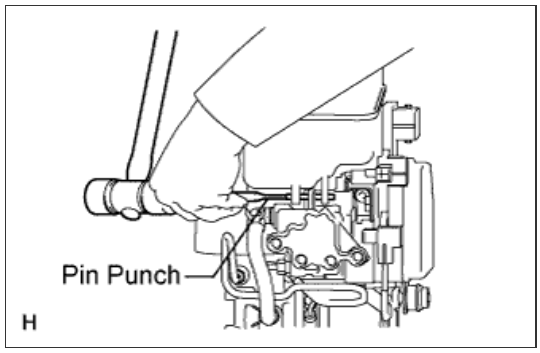
a. Install the brake master cylinder reservoir sub-assembly with the screw.

Torque:
1.7 N*m{ 17 kgf*cm , 15 in.*lbf }

b. Install the master cylinder reservoir filler cap.



c. Using a pin punch and hammer, install a new pin to the brake master cylinder reservoir.

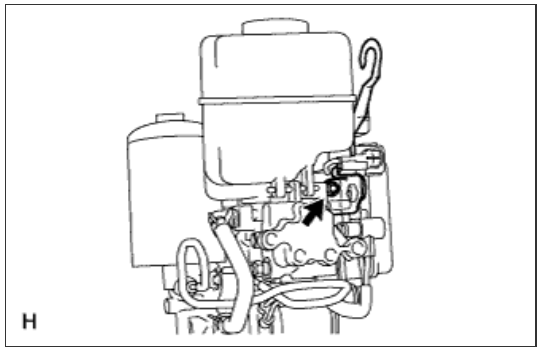


12. INSTALL NO. 1 BRAKE ACTUATOR BRACKET

a. Install the brake fluid level warning switch connector to the No. 1 brake actuator bracket.

b. Using a 5 mm hexagon wrench, install the No. 1 brake actuator bracket with the bolt.

Torque:
7.8 N*m{ 80 kgf*cm , 69 in.*lbf }



for Preparation Click here

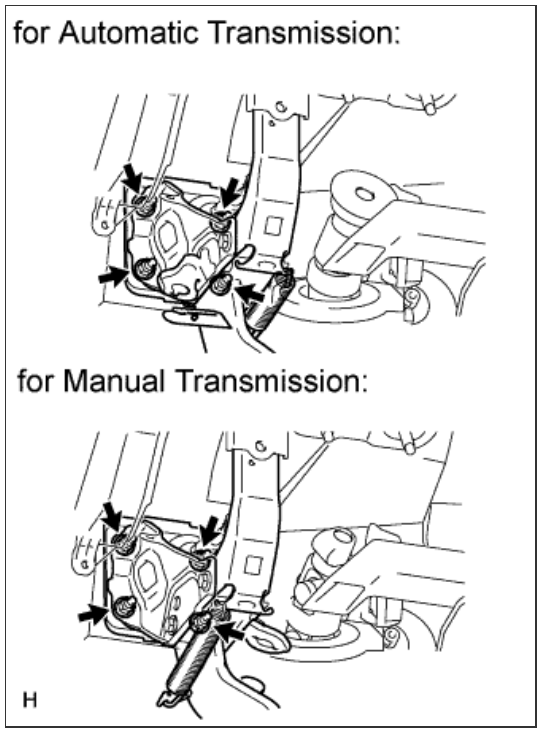
1. INSTALL BRAKE BOOSTER GASKET

a. Install a new brake booster gasket to the hydraulic brake booster.

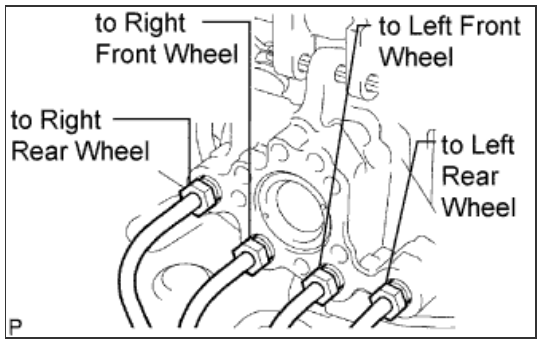
2. INSTALL HYDRAULIC BRAKE BOOSTER ASSEMBLY

a. Install the hydraulic brake booster assembly with the 4 nuts.

Torque:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }



b. Connect the 4 brake lines to the correct positions of the hydraulic brake booster assembly as shown in the illustration.

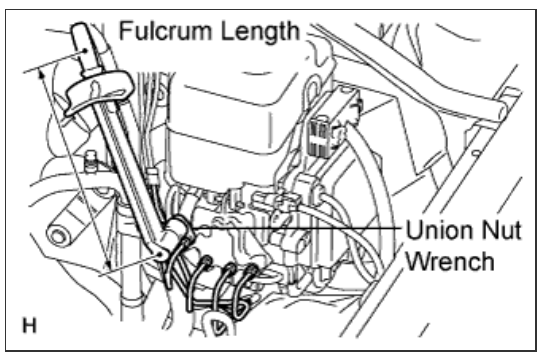


c. Using a union nut wrench, tighten the 4 brake lines.

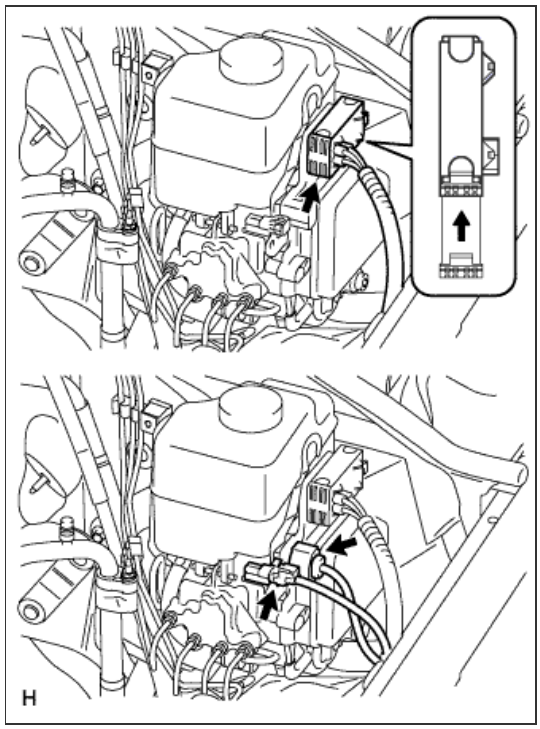
Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

HINT:

- **Use a torque wrench with a fulcrum length of 300 mm (11.8 in.).**
- **The torque value for use with a union nut wrench is effective when the union nut wrench is parallel to the torque wrench.**



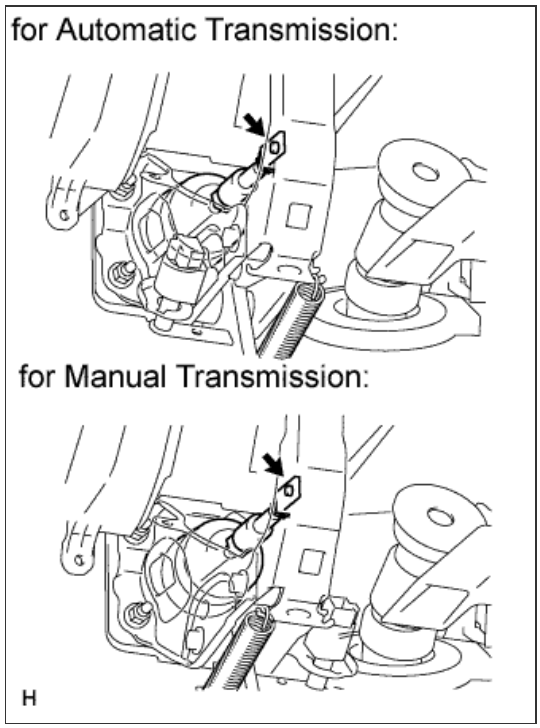
d. Connect the 3 connectors to the hydraulic brake booster.



3. INSTALL PUSH ROD PIN

a. Apply a light coat of lithium soap base glycol grease to the inner surface of the hole on the brake pedal lever.

b. Set the master cylinder push rod clevis in place, insert the push rod pin from the outside of the vehicle and then install a new clip.



4. INSTALL DRIVER SIDE KNEE AIRBAG ASSEMBLY

a. Connect the connector.

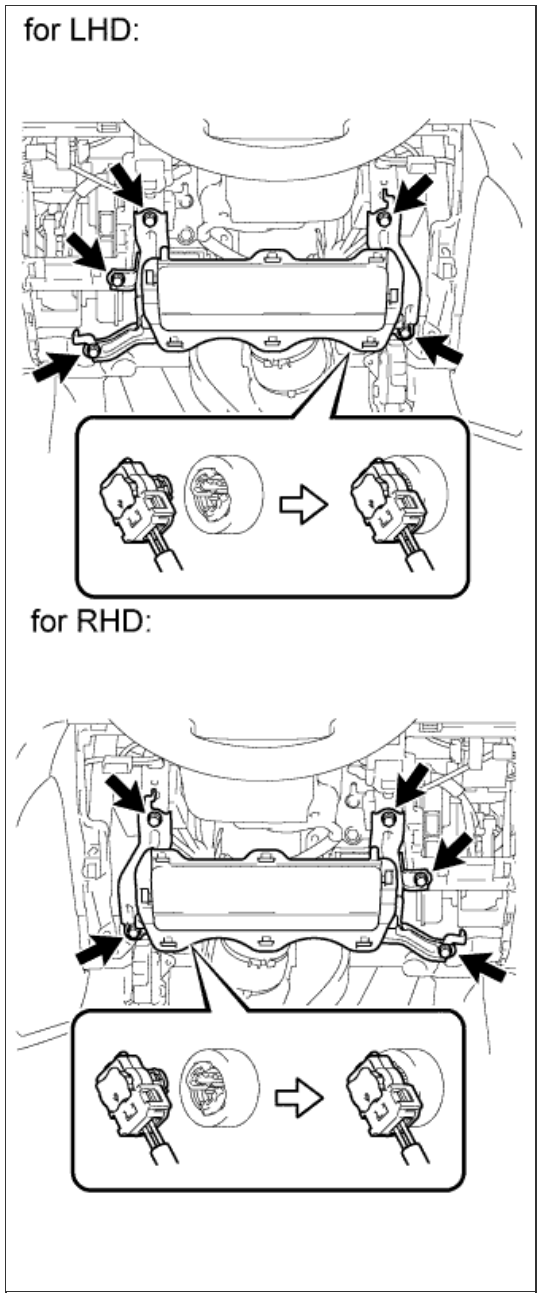
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire

harness.

b. Install the driver side knee airbag with the 5 bolts.

Torque:
10 N*m{ 102 kgf*cm , 7 ft.*lbf }

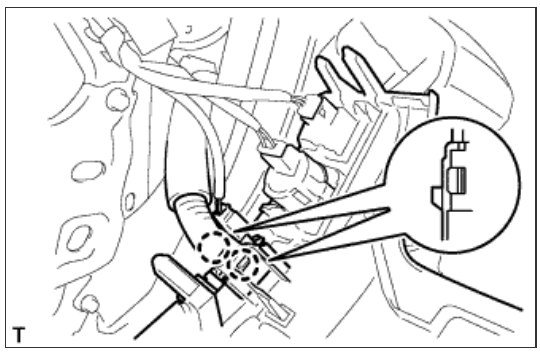


5. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

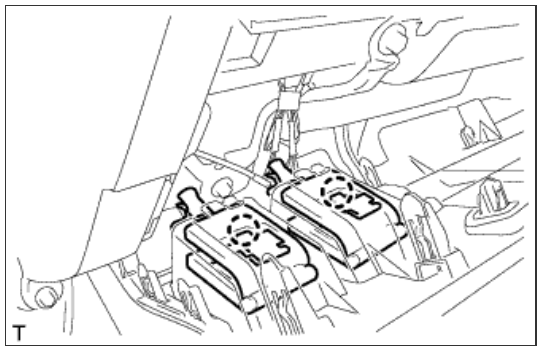
a. Connect the connectors.

b. for Automatic Air Conditioning System:

i. Attach the 2 claws to install the room temperature sensor.



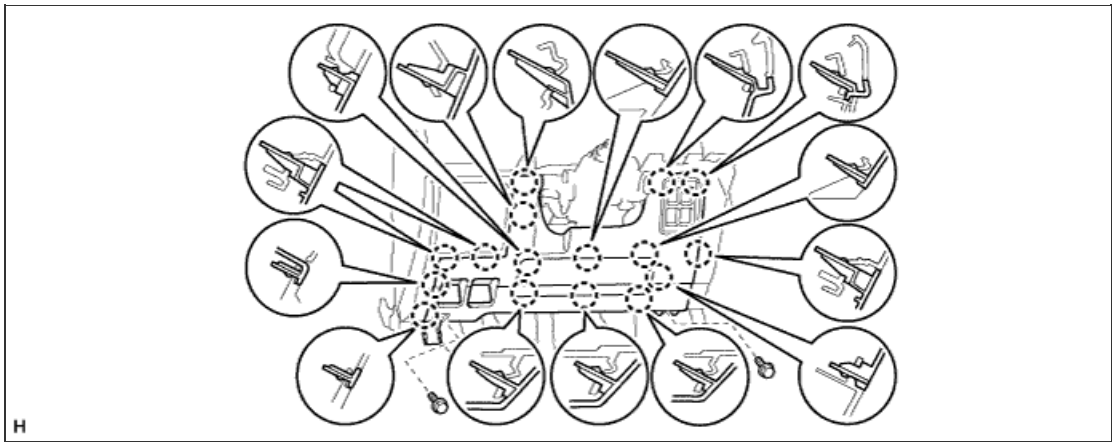
c. Attach the 2 claws to connect the 2 control cables.



d. w/ Driver Side Knee Airbag:

i. Attach the 16 claws to install the lower No. 1 instrument panel finish panel.

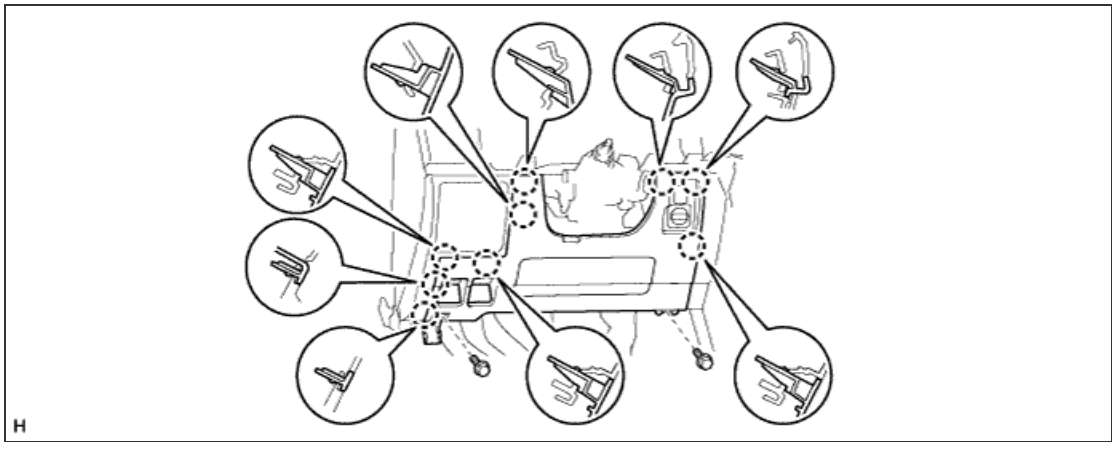
ii. Install the 2 bolts.



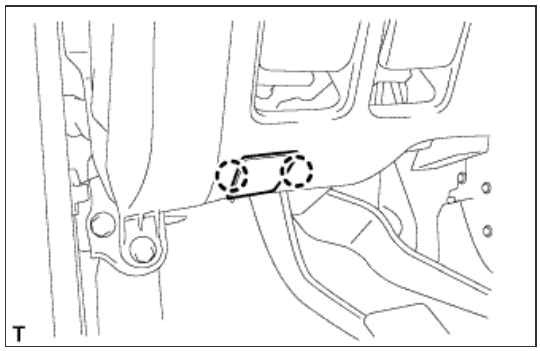
e. w/o Driver Side Knee Airbag:

i. Attach the 9 claws to install the lower No. 1 instrument panel finish panel.

ii. Install the 2 bolts.



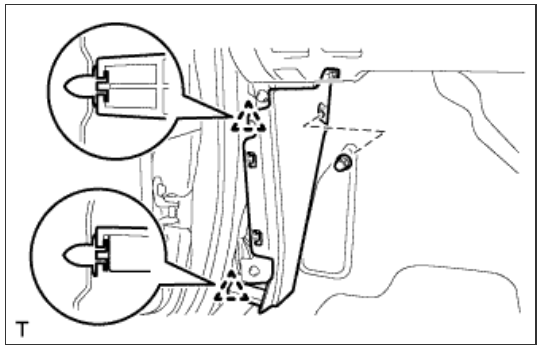
f. Attach the 2 claws to close the hole cover.



6. INSTALL COWL SIDE TRIM BOARD LH

a. Attach the 2 clips to install the cowl side trim board.

b. Install the cap nut.

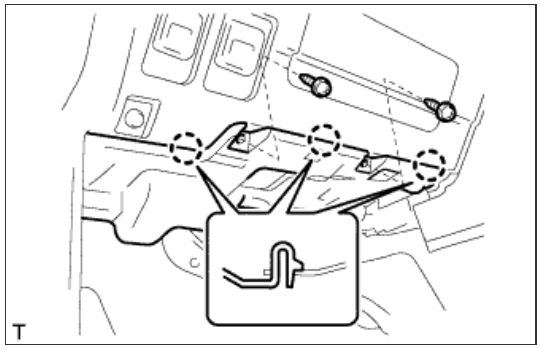


7. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Connect the connectors.

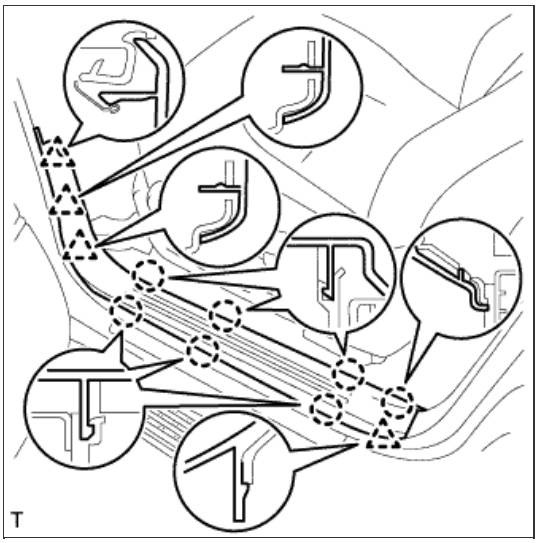
b. Attach the 3 claws to install the No. 1 instrument panel under cover.

c. Install the 2 screws.



8. INSTALL FRONT DOOR SCUFF PLATE LH

a. Attach the 7 claws and 4 clips to install the scuff plate.



9. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

10. BLEED BRAKE SYSTEM

CAUTION:

If air is bled without using the intelligent tester, damage or accidents may result. Therefore, always use the intelligent tester when bleeding air.

a. Turn the ignition switch to ON.

b. Remove the brake master cylinder reservoir filler cap assembly.

c. Add brake fluid until the fluid level is between the MIN and MAX lines of the reservoir.

d. Repeatedly depress the brake pedal and bleed air from the bleeder plug of the front disc brake cylinder RH.

e. Repeat the step above until the air is completely bled, and then tighten the bleeder plug while depressing the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

f. Bleed the air from the bleeder plug of the front disc brake cylinder LH using the same procedure as for the RH side.

g. With the brake pedal depressed, loosen the bleeder plug of the rear disc brake cylinder RH, continue to hold the brake pedal and allow brake fluid to be drained from the bleeder plug while the pump motor operates.

HINT:

- **Air is bled as the pump motor operates while the brake pedal is being depressed.**
- **Be sure to release the brake pedal to stop the motor after approximately 100 seconds of continuous operation.**
- **As brake fluid is continuously drained while the pump operates, it is not necessary to repeatedly depress the brake pedal.**

h. When there is no more air in the brake fluid, tighten the bleeder plug, and then release the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

i. Bleed the air from the bleeder plug of the rear disc brake cylinder LH using the same procedure as for the RH side.

j. Turn the ignition switch off and connect the intelligent tester to the DLC3.

k. Turn the ignition switch to ON.

l. Turn the intelligent tester on.

m. Enter the following menus: Chassis / ABS/VSC/TRC / Utility / Air Bleeding.

NOTICE:

To protect the solenoid from overheating, the solenoid operation stops automatically in 4 seconds, and then the solenoid will not respond to commands for an additional 20 seconds.

n. epeatedly depress the brake pedal several times, and then, with the brake pedal depressed, turn FR on and bleed air.

HINT:

Air returns to the brake master cylinder reservoir together with the brake fluid and is bled from the brake system.

NOTICE:

- **As it is not possible to visually confirm that air is being bled, repeat this step 10 times.**
- **Do not loosen the bleeder plug.**

o. Turn FL on and bleed air using the same procedures as for FR.

p. Turn RR on, loosen the bleeder plug of the rear disc brake cylinder RH and drain brake fluid.

HINT:

- **Do not depress the brake pedal.**
- **As brake fluid is automatically drained while the pump and solenoid operate, it is not necessary to operate the brake pedal.**

q. Repeat the step above until the air is completely bled, and then tighten the bleeder plug.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

r. Turn FL Line on and bleed the air from the bleeder plug of the front disc brake cylinder LH using the same procedure as for the RH side.

s. Turn RR Line on and loosen the bleeder plug of the rear disc brake cylinder RH.

HINT:

Be sure to bleed air with the brake pedal depressed.

t. Repeat the step above until the air is completely bled, and then tighten the bleeder plug.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

u. Turn RL Line on and bleed air from the bleeder plug of the rear disc brake cylinder LH using the same procedure as for the RH side.

v. Turn the intelligent tester off and turn the ignition switch off.

w. Inspect for brake fluid leaks.

x. Check and adjust the brake fluid level (Click here).

y. Clear the DTCs (Click here).

11. CHECK BRAKE PEDAL HEIGHT

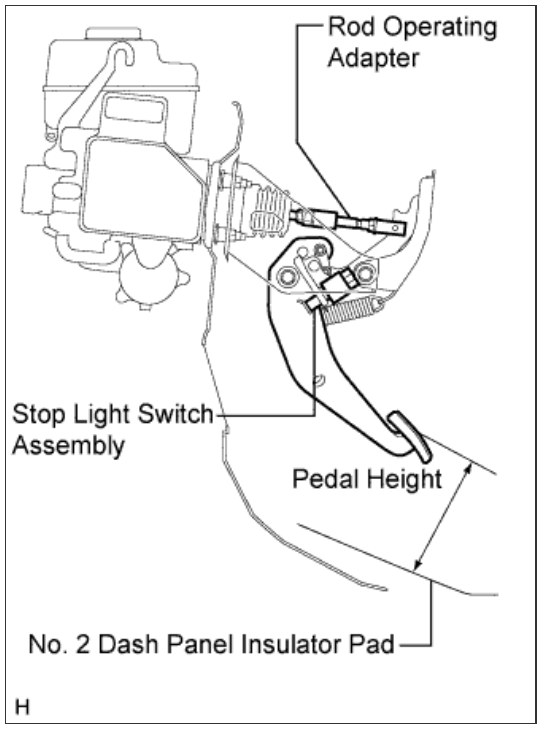
a. Check the brake pedal height.

Standard Pedal Height from No. 2 Dash Panel Insulator Pad:
147.1 to 157.1 mm (5.80 to 6.18 in.)

NOTICE:

Do not adjust the pedal height. Doing so by changing the push rod length will structurally change the pedal ratio.

If the pedal height is incorrect, adjust the rod operating adapter length.



b. Ad ust the rod operating adapter length.

i. Remove the clip and clevis pin.

ii. Loosen the clevis lock nut.

iii. Adjust the rod operating adapter length by turning the pedal push rod clevis.

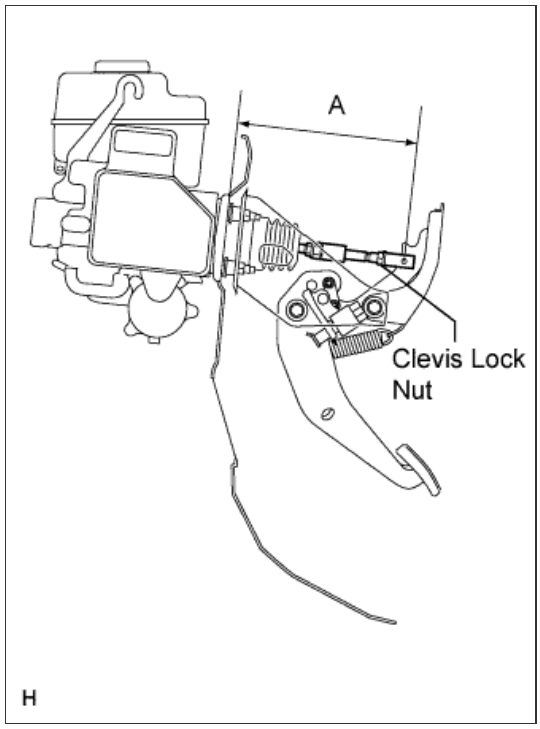
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

iv. Tighten the clevis lock nut.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }

v. Set the master cylinder push rod clevis in place, insert the push rod pin from the outside of the vehicle and then install a new clip.
If the pedal height is incorrect even if the rod operating adapter is adjusted, check that there is no damage in the brake pedal, brake pedal lever, brake pedal support and dash panel.

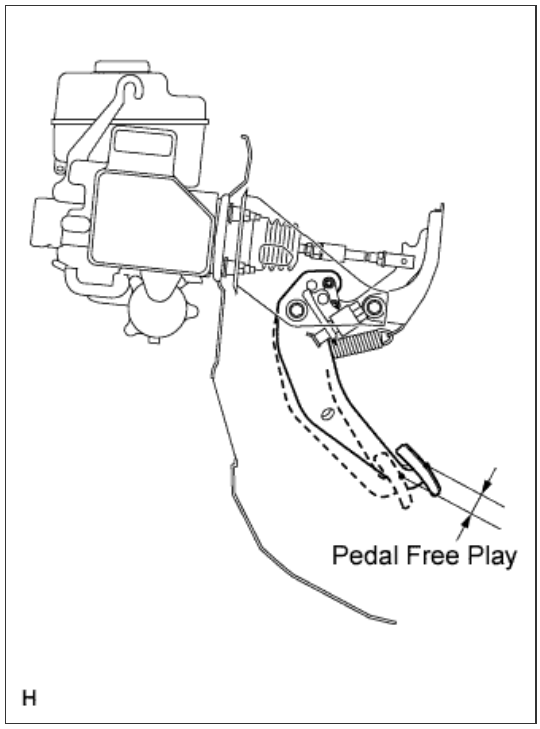
- Even if there is damage, there is no problem if the reserve distance is within the standard value.
- If necessary, replace any damaged parts.



12. CHECK PEDAL FREE PLAY

a. Push in the pedal until the beginning of the resistance is felt. Measure the pedal free play.

Standard Pedal Free Play:
1 to 6 mm (0.0394 to 0.236 in.)

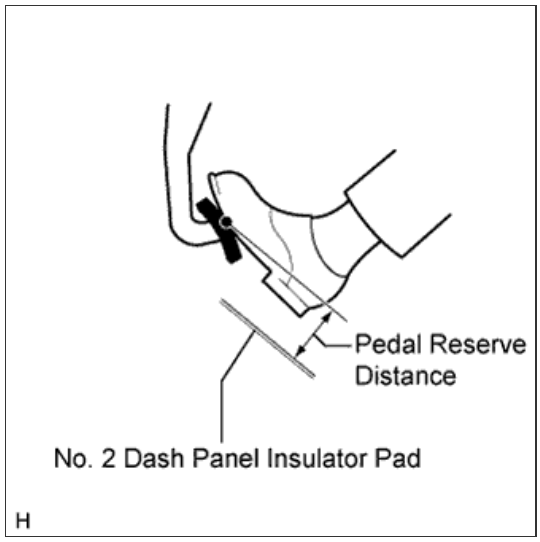


13. CHECK PEDAL RESERVE DISTANCE

a. elease the parking brake lever. With the engine running, depress the pedal and measure the pedal reserve distance as shown in the illustration.

Standard Pedal Reserve Distance from No. 2 Dash Panel Insulator Pad at 490 N (50 kgf, 110.2 lbf):
More than 67 mm (2.64 in.)

If incorrect, troubleshoot the brake system.



14. INSPECT BRAKE MASTER CYLINDER OPERATION

a. Inspect the brake master cylinder operation (Click here).

for Preparation Click here

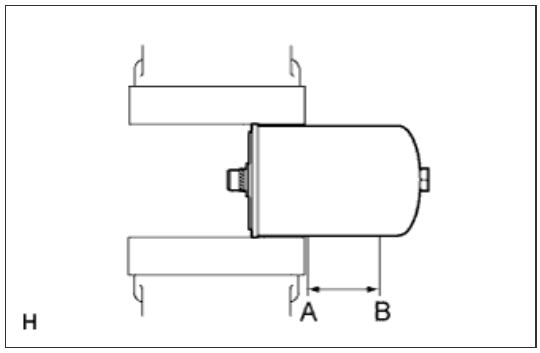
1. DISPOSE OF BRAKE BOOSTER ACCUMULATOR ASSEMBLY

a. Place the brake booster accumulator assembly in a vise and cover it with cloth.

b. Using a saw, cut the brake booster accumulator body between A and B as shown in the illustration to discharge the gas inside.

CAUTION:

- **Co e ith a piece of cloth hen orking because gas a blo out.**
- **Cut the accu tor carefull not abruptly.**
- **Wear protecti e la . e**

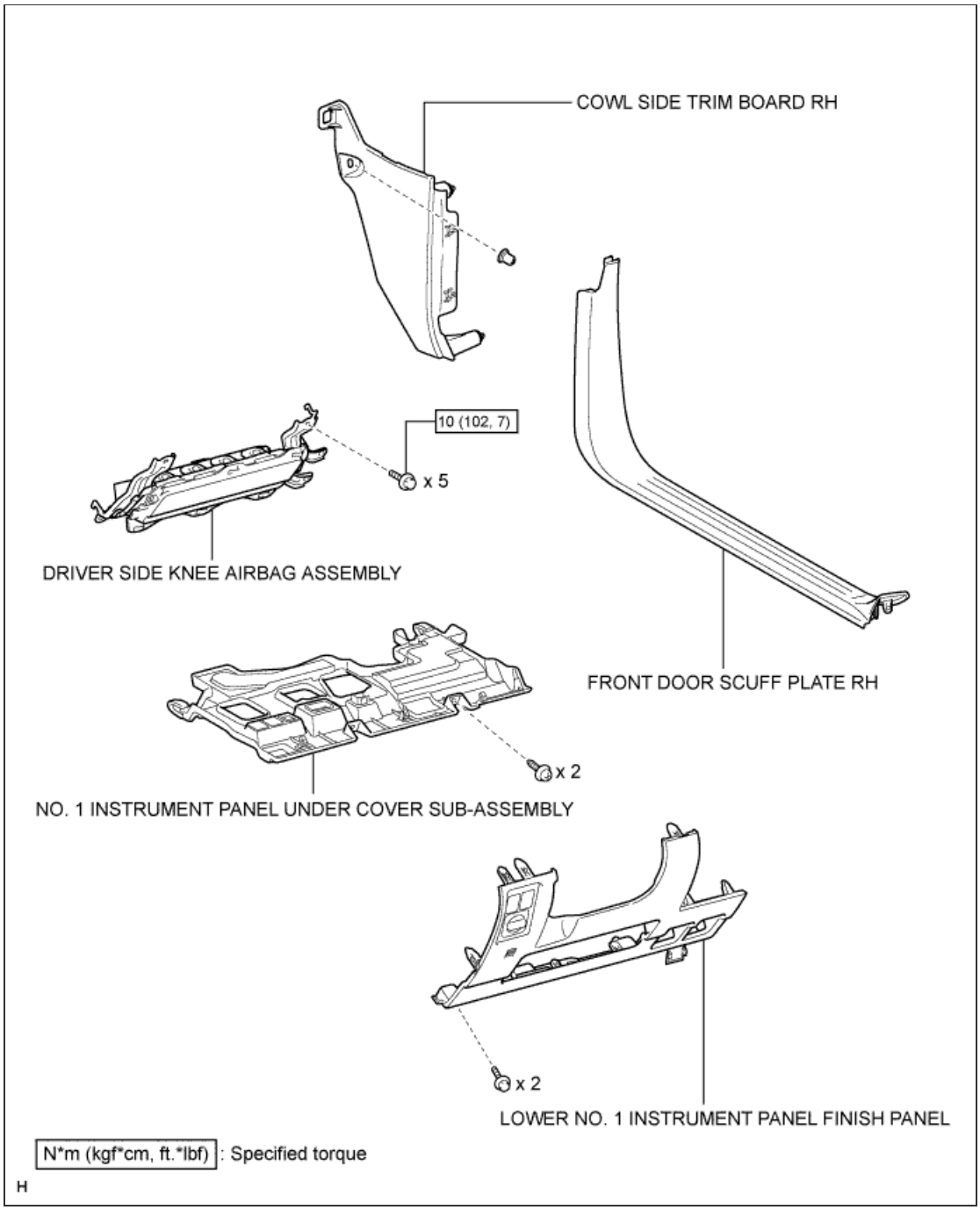


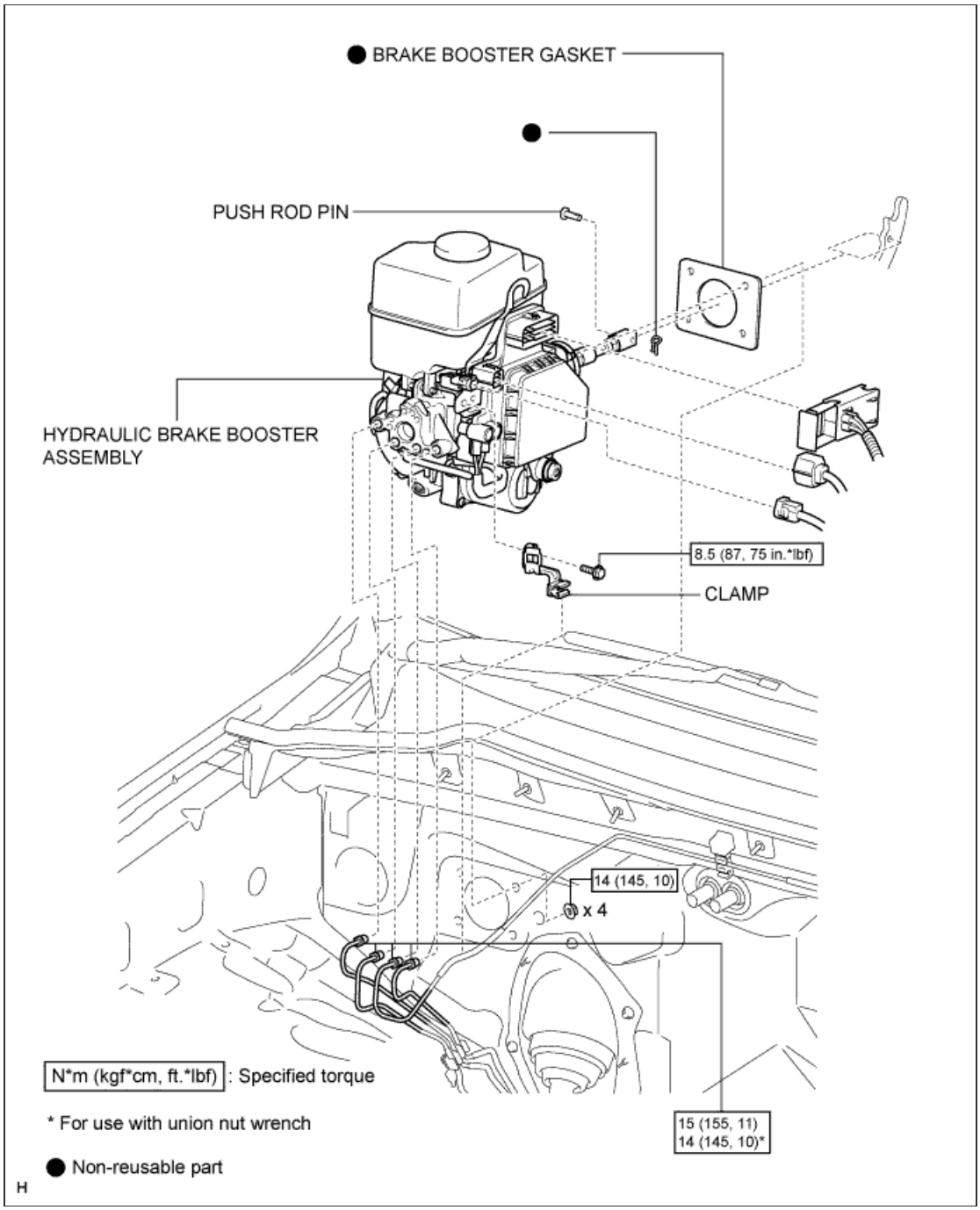
c. When the outer body of the brake booster accumulator is cut, gas and liquid discharge.

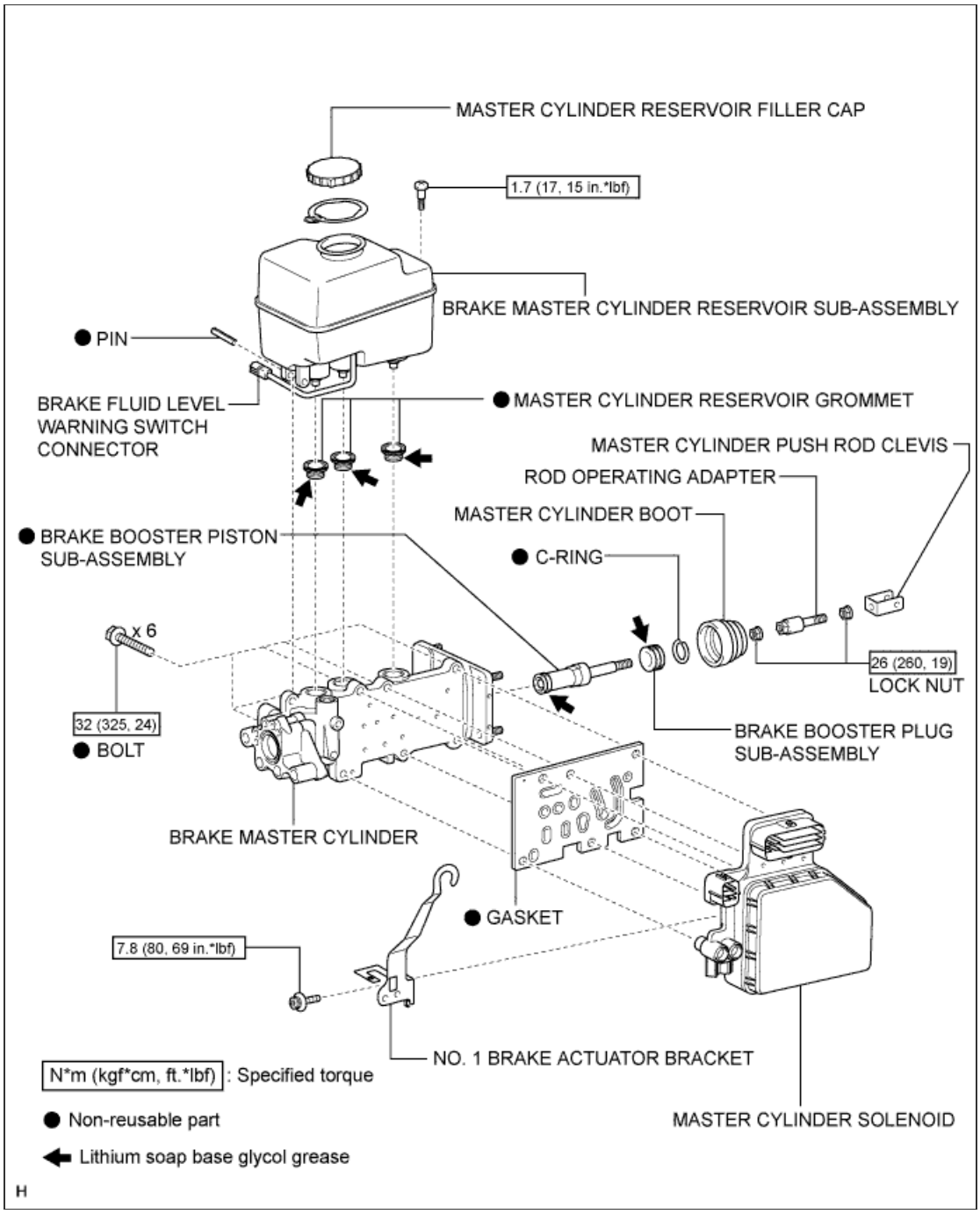
HINT:

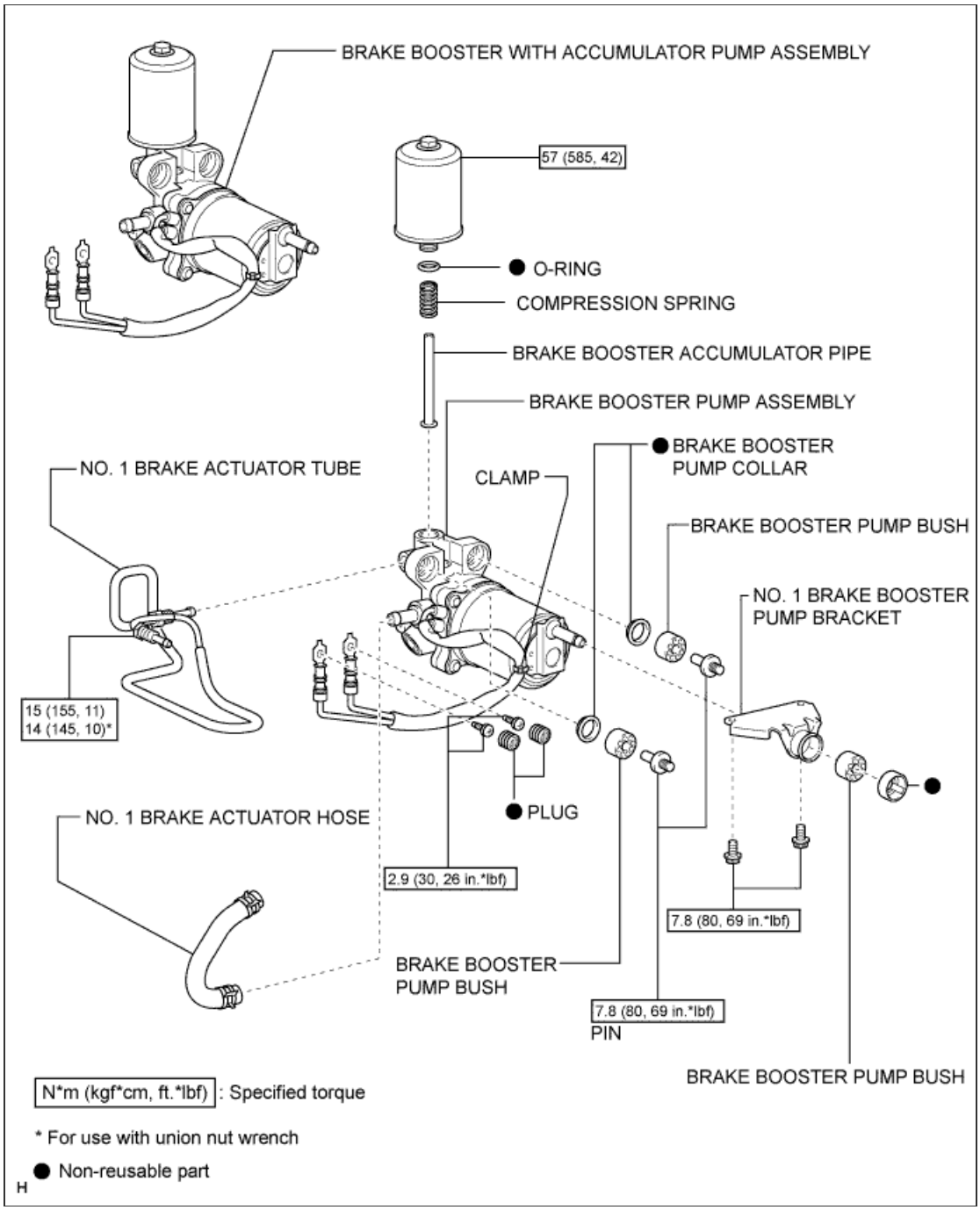
The gas is colorless, odorless and non-poisonous.

for Preparation Click here




● BRAKE BOOSTER GASKET
●
PUSH ROD PIN
HYDRAULIC BRAKE BOOSTER ASSEMBLY
8.5 (87, 75 in.*lbf)
CLAMP
14 (145, 10)
x 4
15 (155, 11)
14 (145, 10)*
N*m (kgf*cm, ft.*lbf) : Specified torque
* For use with union nut wrench
● Non-reusable part
H


MASTER CYLINDER RESERVOIR FILLER CAP
1.7 (17, 15 in.*lbf)
BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY
● PIN
BRAKE FLUID LEVEL WARNING SWITCH CONNECTOR
● MASTER CYLINDER RESERVOIR GROMMET
MASTER CYLINDER PUSH ROD CLEVIS
ROD OPERATING ADAPTER
MASTER CYLINDER BOOT
● BRAKE BOOSTER PISTON SUB-ASSEMBLY
● C-RING
x 6
26 (260, 19)
LOCK NUT
32 (325, 24)
● BOLT
BRAKE BOOSTER PLUG SUB-ASSEMBLY
BRAKE MASTER CYLINDER
● GASKET
7.8 (80, 69 in.*lbf)
NO. 1 BRAKE ACTUATOR BRACKET
N*m (kgf*cm, ft.*lbf) : Specified torque
MASTER CYLINDER SOLENOID
● Non-reusable part
Lithium soap base glycol grease
H


BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY
57 (585, 42)
O-RING
COMPRESSION SPRING
BRAKE BOOSTER ACCUMULATOR PIPE
BRAKE BOOSTER PUMP ASSEMBLY
BRAKE BOOSTER PUMP COLLAR
NO. 1 BRAKE ACTUATOR TUBE
CLAMP
BRAKE BOOSTER PUMP BUSH
NO. 1 BRAKE BOOSTER PUMP BRACKET
15 (155, 11)
14 (145, 10)*
PLUG
NO. 1 BRAKE ACTUATOR HOSE
2.9 (30, 26 in.*lbf)
7.8 (80, 69 in.*lbf)
BRAKE BOOSTER PUMP BUSH
7.8 (80, 69 in.*lbf)
PIN
BRAKE BOOSTER PUMP BUSH
N*m (kgf*cm, ft.*lbf) : Specified torque
* For use with union nut wrench
Non-reusable part
H

for Preparation Click here

1. INSPECT BRAKE MASTER CYLINDER FLUID PRESSURE CHANGE

a. Inspect the battery voltage.

Standard Voltage:
11 to 14 V

b. Turn the ignition switch off and depress the brake pedal more than 20 times.

HINT:

When pressure in the power supply system is released, the reaction force becomes light and the stroke becomes longer.

c. Install the LSPV gauge (SST) and brake pedal effort gauge, and bleed air from the LSPV gauge (SST).

SST
09709-29018

d. When the booster does not operate:
Depress the brake pedal and check the fluid pressure.

Standard Fluid Pressure with Pedal Depressing Force of 245 N (25 kgf, 55 lbf):

Front Brake Pressure	Rear Brake Pressure
2350 kPa (24.0 kgf/cm^2, 341 psi) or more	0 kPa (0 kgf/cm^2, 0 psi)

Standard Fluid Pressure with Pedal Depressing Force of 343 N (35 kgf, 77 lbf):

Front Brake Pressure	Rear Brake Pressure
3550 kPa (36.2 kgf/cm^2, 515 psi) or more	0 kPa (0 kgf/cm^2, 0 psi)

e. When the booster operates:

i. Turn the ignition switch on and wait until the pump motor has stopped.

ii. Depress the brake pedal and check the fluid pressure.

Standard Fluid Pressure with Pedal Depressing Force of 49 N (5 kgf, 11 lbf):

Front Brake Pressure	Rear Brake Pressure
1620 to 2820 kPa (16.6 to 28.7 kgf/cm^2, 235 to 408 psi)	1680 to 2880 kPa (17.2 to 29.3 kgf/cm^2, 244 to 417 psi)

Standard Fluid Pressure with Pedal Depressing Force of 98 N (10 kgf, 22 lbf):

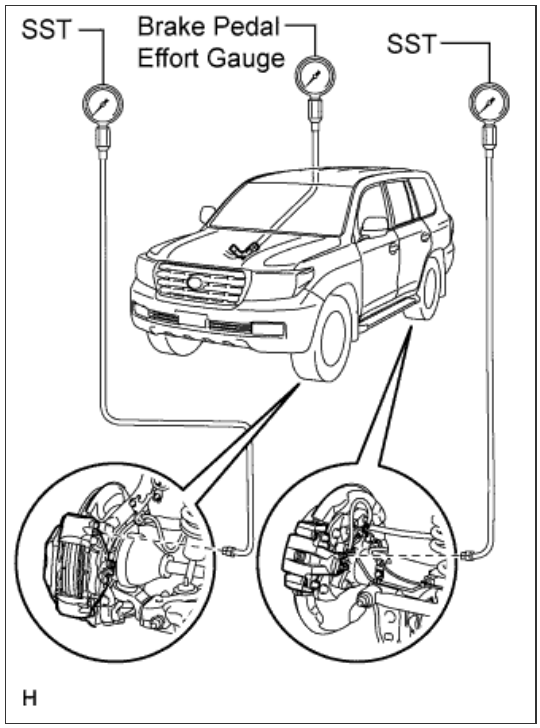
Front Brake Pressure	Rear Brake Pressure
3840 to 5040 kPa (39.2 to 51.3 kgf/cm^2, 557 to 730 psi)	4000 to 5200 kPa (40.8 to 53.0 kgf/cm^2, 580 to 754 psi)

Standard Fluid Pressure with Pedal Depressing Force of 147 N (15 kgf, 33 lbf):

Front Brake Pressure	Rear Brake Pressure
6200 to 7400 kPa (63.3 to 75.4 kgf/cm^2, 899 to 1073 psi)	6470 to 7670 kPa (66.0 to 78.2 kgf/cm^2, 939 to 1112 psi)

Standard Fluid Pressure with Pedal Depressing Force of 196 N (20 kgf, 44 lbf):

Front Brake Pressure	Rear Brake Pressure



8500 to 9700 kPa (86.7 to 98.9 kgf/cm^2, 1233 to 1406 psi)	8890 to 10090 kPa (90.7 to 102.8 kgf/cm^2, 1290 to 1463 psi)

2. INSPECT BRAKE MASTER CYLINDER OPERATION

a. Inspect the battery voltage.

Standard Voltage:
11 to 14 V

b. Turn the ignition switch off and depress the brake pedal more than 20 times.

HINT:

When pressure in the power supply system is released, the reaction force decreases and the stroke becomes longer.

c. Check that the brake pedal reaction force decreases.
If the pedal reaction force does not decrease, check and replace the brake line and brake master cylinder.

d. Turn the ignition switch on and check the pump motor operation noise. If the pump motor does not operate, check and replace the wire harness and brake booster pump assembly (Click here).

e. Connect the intelligent tester to the DLC3.

f. Turn the ignition switch on.

g. Turn the intelligent tester on.

h. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

i. Jack up and support the vehicle.

j. Release the parking brake lever.

k. Move the shift lever to N and check that the rear wheels can be rotated by hand.

l. Inspect the front VSC solenoid (SMCF) operation.

i. Select "VSC/TRC Solenoid (SRCF)" on the intelligent tester.

ii. Turn "VSC/TRC Solenoid (SRCF)" on with the intelligent tester, depress the brake pedal with a stable force and check that the pedal cannot be depressed.
If the pedal can be depressed, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.

iii. Release the brake pedal.

iv. When the solenoid is off, depress the brake pedal again and check that the brake pedal can be depressed.
If the pedal cannot be depressed, replace the brake master cylinder.

m. Inspect the front VSC solenoid (SREA) operation.

i. Select "VSC/TRC Solenoid (SRCR)" and "VSC/TRC Solenoid (SRCF)" on the intelligent tester.

ii. Turn "VSC/TRC Solenoid (SRCR)" and "VSC/TRC Solenoid (SRCF)" on simultaneously with the intelligent tester, then depress the brake pedal with a stable force.

iii. When the solenoids are on, check that the front wheels cannot be rotated by hand.
If the front wheels can be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheels quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheels as slowly as possible.**

iv. When the solenoids are off, turn "VSC/TRC Solenoid (SRCF)" on again, and then depress the brake pedal. Then check the front wheels by rotating them by hand.
If the front wheels cannot be rotated, replace the brake master cylinder.

v. When "VSC/TRC Solenoid (SRCF)" is off, depress the brake pedal again and check that the brake pedal can be depressed.
If the pedal cannot be depressed, replace the brake master cylinder.

n. Inspect the front ABS solenoid (SFRH) operation.

i. Select "ABS Solenoid (SFRH)" on the intelligent tester.

ii. Turn "ABS Solenoid (SFRH)" on with the intelligent tester, then depress the brake pedal with a stable force.

iii. When the solenoid is on, check the right front wheel by rotating it by hand.
If the right front wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoid is off, depress the brake pedal again and check that the right front wheel cannot be rotated by hand.
If the right front wheel can be rotated, replace the brake master cylinder.

HINT:

When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.

o. Inspect the front ABS solenoid (SFLH) operation.

i. Select "ABS Solenoid (SFLH)" on the intelligent tester.

ii. Turn "ABS Solenoid (SFLH)" on with the intelligent tester, then depress the brake pedal with a stable force.

iii. When the solenoid is on, check the left front wheel by rotating it by hand.
If the left front wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoid is off, depress the brake pedal again and check that the left front wheel cannot be rotated by hand.
If the left front wheel can be rotated, replace the brake master cylinder.

p. Inspect the front ABS solenoid (SFRR) operation.

i. Select "ABS Solenoid (SFRR)" and "ABS Solenoid (SFRH)" on the intelligent tester.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SFRR)" and "ABS Solenoid (SFRH)" on simultaneously with the intelligent tester.

iii. When the solenoids are on, check the right front wheel by rotating it by hand.
If the right front wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoids are off, depress the brake pedal again and check that the right front wheel cannot be rotated by hand.

If the right front wheel can be rotated, replace the brake master cylinder.

q. Inspect the front ABS solenoid (SFLR) operation.

i. Select "ABS Solenoid (SFLR)" and "ABS Solenoid (SFLH)" on the intelligent tester.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SFLR)" and "ABS Solenoid (SFLH)" on simultaneously with the intelligent tester.

iii. When the solenoids are on, check the left front wheel by rotating it by hand.
If the left front wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoids are off, depress the brake pedal again and check that the left front wheel cannot be rotated by hand.
If the left front wheel can be rotated, replace the brake master cylinder.

r. Inspect the rear VSC solenoid (SREC) operation.

i. Select "VSC/TRC Solenoid (SRMF)" on the intelligent tester.

ii. Depress the brake pedal with a stable force, then turn "VSC/TRC Solenoid (SRMF)" on with the intelligent tester.

iii. Release the brake pedal when the solenoid is on, and check that the rear wheels cannot be rotated by hand.
If the rear wheels can be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheels quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheels as slowly as possible.**

iv. When the solenoid is off, check the rear wheels by rotating them by hand.
If the rear wheels cannot be rotated, replace the brake master cylinder.

s. Inspect the rear VSC solenoid (STR) operation.

i. Select "VSC/TRC Solenoid (SRMR)" and "VSC/TRC Solenoid (SRMF)" on the intelligent tester.

ii. Turn "VSC/TRC Solenoid (SRMR)" and "VSC/TRC Solenoid (SRMF)" on simultaneously with the intelligent tester.

iii. When the solenoids are on, check that the rear wheels cannot be rotated by hand.
If the rear wheels can be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheels quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheels as slowly as possible.**

iv. When the solenoids are off, turn "VSC/TRC Solenoid (SRMF)" on again, and check the rear wheels by rotating them by hand.
If the rear wheels cannot be rotated, replace the brake master cylinder.

v. When "VSC/TRC Solenoid (SRMF)" is off, depress the brake pedal again and check that the rear wheels cannot be rotated by hand.
If the rear wheels can be rotated, replace the brake master cylinder.

t. Inspect the rear ABS solenoid (SRRH) operation.

i. Select "ABS Solenoid (SRRH)" on the intelligent tester.

ii. Turn "ABS Solenoid (SRRH)" on with the intelligent tester, then depress the brake pedal with a stable force.

iii. When the solenoid is on, check the right rear wheel by rotating it by hand.
If the right rear wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoid is off, depress the brake pedal again and check that the right rear wheel cannot be rotated by hand.
If the right rear wheel can be rotated, replace the brake master cylinder.

HINT:

When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.

u. Inspect the rear ABS solenoid (SRLH) operation.

i. Select "ABS Solenoid (SRLH)" on the intelligent tester.

ii. Turn "ABS Solenoid (SRLH)" on with the intelligent tester, then depress the brake pedal with a stable force.

iii. When the solenoid is on, check the left rear wheel by rotating it by hand.
If the left rear wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoid is off, depress the brake pedal again and check that the left rear wheel cannot be rotated by hand.
If the left rear wheel can be rotated, replace the brake master cylinder.

v. Inspect the rear ABS solenoid (SRRR) operation.

i. Select "ABS Solenoid (SRRR)" and "ABS Solenoid (SRRH)" on the intelligent tester.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SRRR)" and "ABS Solenoid (SRRH)" on simultaneously with the intelligent tester.

iii. When the solenoids are on, check the right rear wheel by rotating it by hand.
If the right rear wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel too quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoids are off, depress the brake pedal again and check that the right rear wheel cannot be rotated by hand.
If the right rear wheel can be rotated, replace the brake master cylinder.

w. Inspect the rear ABS solenoid (SRLR) operation.

i. Select "ABS Solenoid (SRLR)" and "ABS Solenoid (SRLH)" on the intelligent tester.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SRLR)" and "ABS Solenoid (SRLH)" on simultaneously with the intelligent tester.

iii. When the solenoids are on, check the left rear wheel by rotating it by hand.
If the left rear wheel cannot be rotated, replace the brake master cylinder.

NOTICE:

When operating the solenoid continuously, set the interval to more than 20 seconds.

HINT:

- **To protect the solenoids, the intelligent tester turns off automatically 2 seconds after every solenoid has been turned on.**
- **When rotating the wheel too quickly, the fail-safe function is activated and judgment cannot be made properly. Rotate the wheel as slowly as possible.**

iv. When the solenoids are off, depress the brake pedal again and check that the left rear wheel cannot be rotated by hand.
If the left rear wheel can be rotated, replace the brake master cylinder.

x. Lower the vehicle.

y. Disconnect the intelligent tester.

3. CHECK FLUID LEVEL IN RESERVOIR

a. Turn the ignition switch off and fully depress the brake pedal 40 times or more to release the pressure in the accumulator.

HINT:

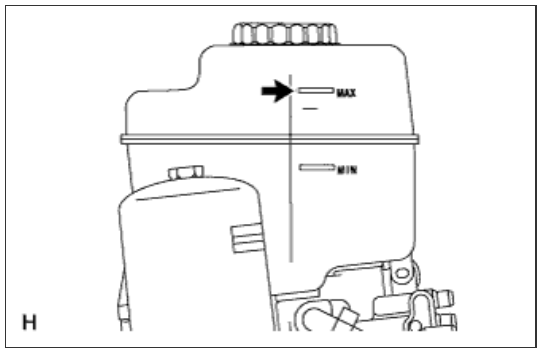
When the pressure in the accumulator is released, the pedal stroke will lengthen.

b. Adjust the fluid level so that it is at the MAX line.

HINT:

When the ignition switch is turned on, brake fluid is sent to the accumulator and the fluid level decreases by approximately 10 mm (0.394 in.) from the MAX line.

Brake Fluid:
SAE J1703 or FMVSS No. 116 DOT3



HYDRAULIC BRAKE BOOSTER (for RHD) > REMOVAL

for Preparation Click here

NOTICE:

- **Be sure not to allow the pump to contact the floor; support it with the booster body. If the pump contacts the floor, the red brake tube between the pump and booster body may be deformed, the operating sound of the pump may become loud enough to hear within the cabin, and fluid may leak.**
- **When installing, coat the parts indicated by arrows with lithium soap base glycol grease (Click here).**
- **As high pressure is applied to the brake actuator tube No. 1, never deform it.**
- **Until the work is over, do not turn the ignition switch on.**
- **Before starting the work, make sure that the ignition switch is off and depress the brake pedal more than 20 times.**

HINT:

When pressure in the power supply system is released, the reaction force becomes light and the stroke becomes longer.

1. DRAIN BRAKE FLUID

NOTICE:

Wash off brake fluid immediately if it comes into contact with a painted surface.

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

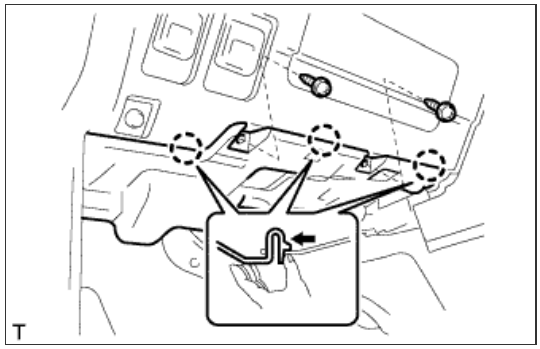
3. REMOVE FRONT DOOR SCUFF PLATE RH

4. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Remove the 2 screws.

b. Detach the claws.

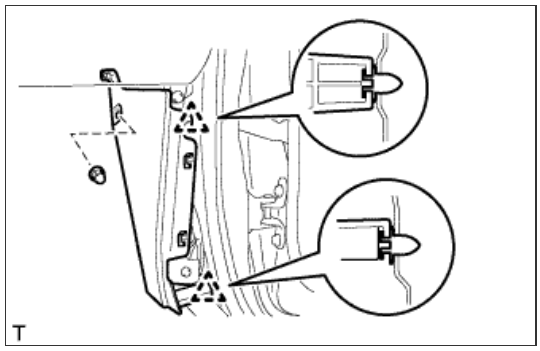
c. Disconnect the connectors and remove the No. 1 instrument panel under cover.



5. REMOVE COWL SIDE TRIM BOARD RH

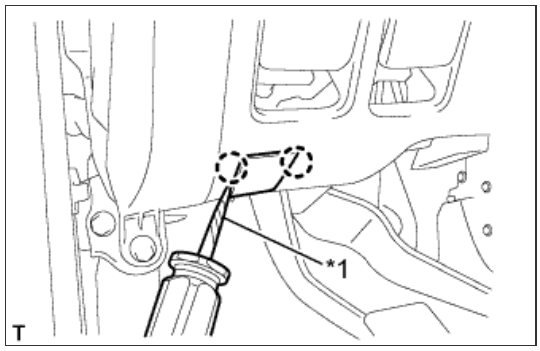
a. Remove the cap nut.

b. Detach the 2 clips and remove the cowl side trim board.



6. REMOVE LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

a. sing a screwdriver, detach the 2 claws and open the hole cover.



HINT:

ape the screwdriver tip before use.

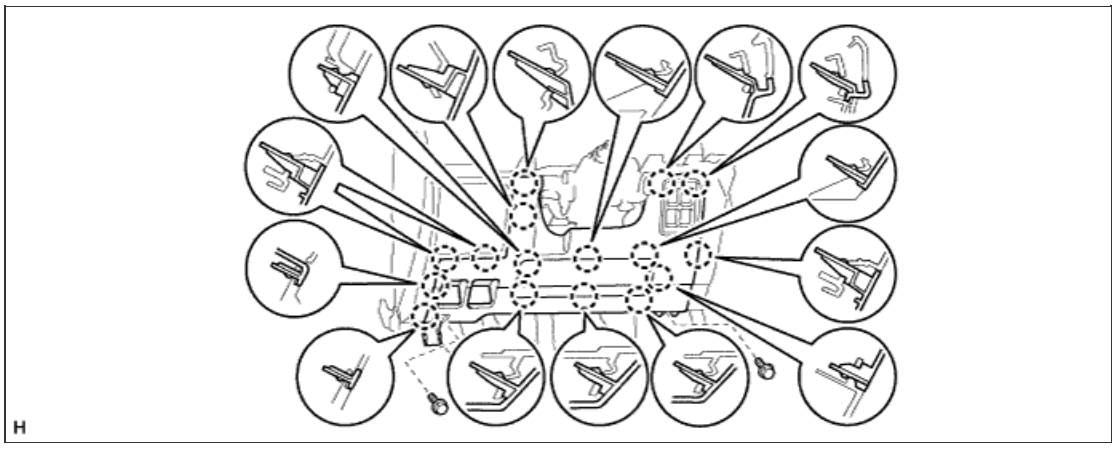
Text in Illustration

	rotective ape

b. w/ Driver Side Knee Airbag

i. Remove the 2 bolts.

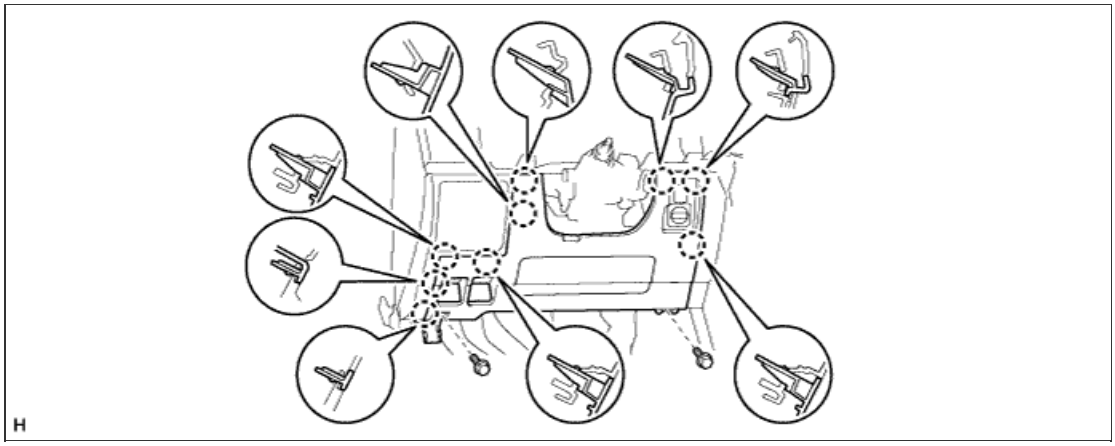
ii. Detach the 1 claws.



c. w/o Driver Side Knee Airbag

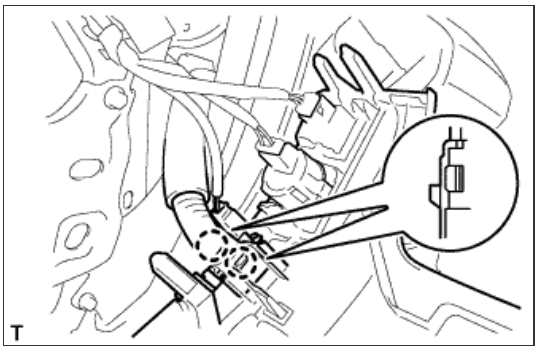
i. Remove the 2 bolts.

ii. Detach the 9 claws.



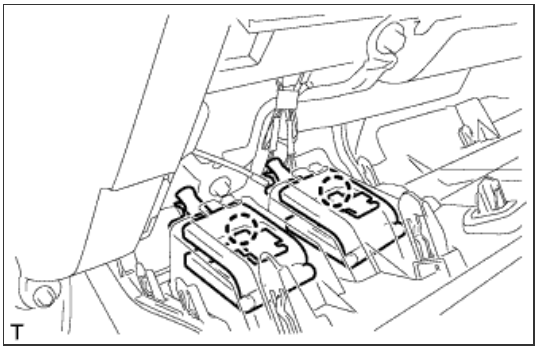
d. for Automatic Air Conditioning System

i. Detach the 2 claws and remove the room temperature sensor.



e. Detach the 2 claws and disconnect the 2 control cables.

f. Disconnect the connectors and remove the lower No. 1 instrument panel finish panel.



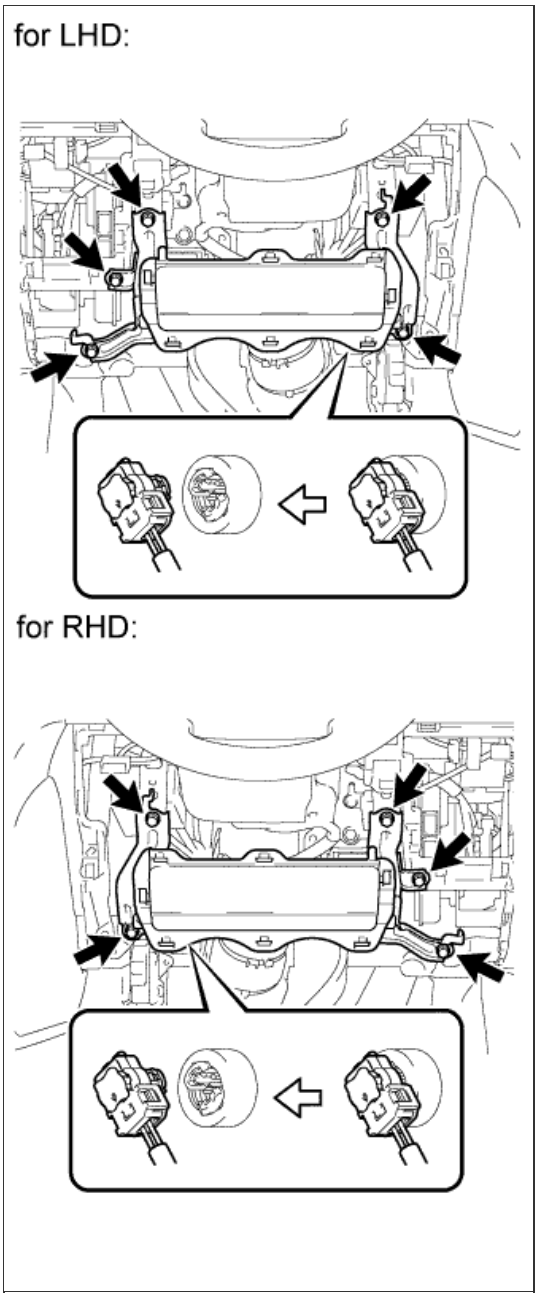
7. REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY

a. Remove the 5 bolts and driver side knee airbag.

b. Disconnect the connector.

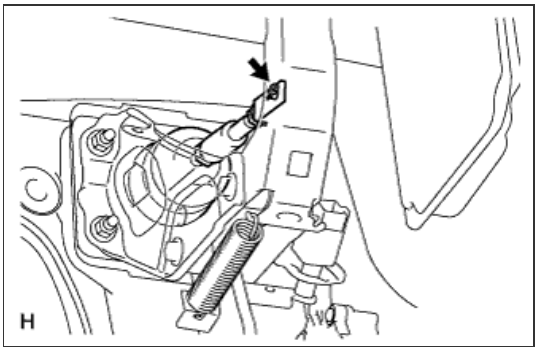
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



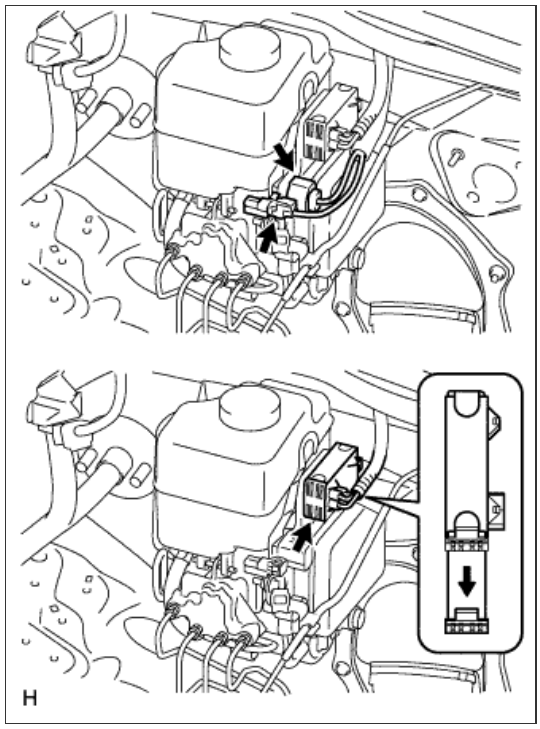
8. REMOVE PUSH ROD PIN

a. Remove the clip and push rod pin from the brake pedal lever.

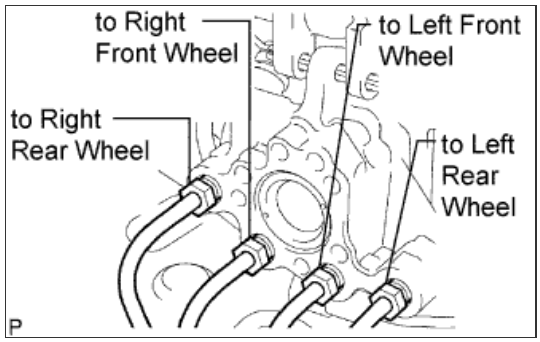


9. REMOVE HYDRAULIC BRAKE BOOSTER ASSEMBLY

a. Disconnect the connectors from the hydraulic brake booster.

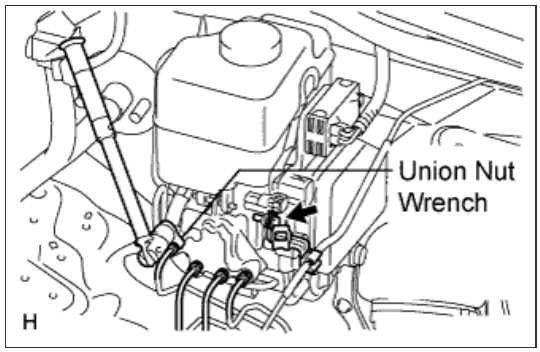


b. se tags or make a memo to identify the place to reconnect.

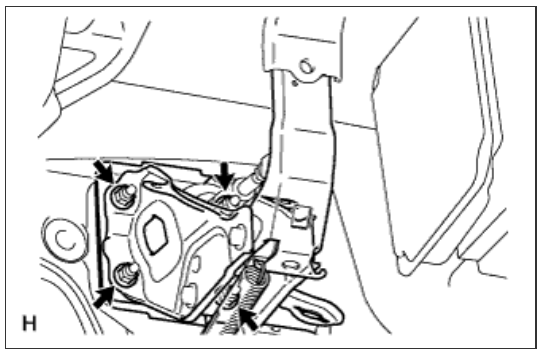


c. sing a union nut wrench, disconnect the brake lines from the hydraulic brake booster.

d. Remove the bolt and disconnect the clamp from the hydraulic brake booster assembly.



e. Remove the nuts and pull out the hydraulic brake booster assembly.



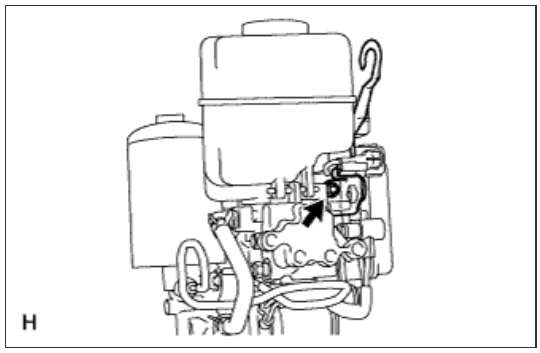
10. REMOVE BRAKE BOOSTER GASKET

a. Remove the brake booster gasket from the hydraulic brake booster assembly.

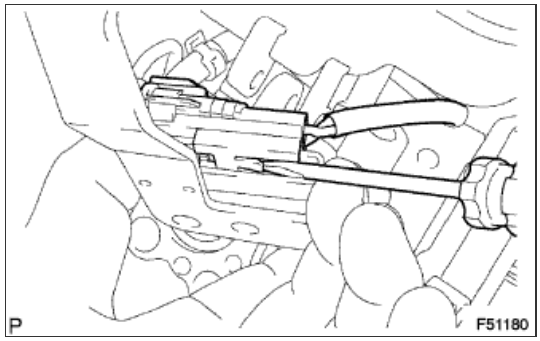
for Preparation Click here

1. REMOVE NO. 1 BRAKE ACTUATOR BRACKET

a. Using a 5 mm hexagon wrench, remove the bolt and No. 1 brake actuator bracket.

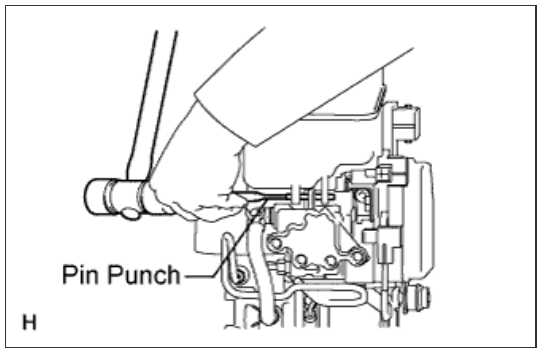


b. Using a screwdriver, disconnect the brake fluid level warning switch connector from the No. 1 brake actuator bracket.



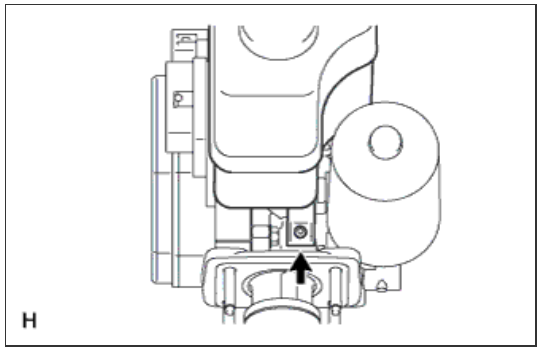
2. REMOVE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

a. Using a pin punch and hammer, remove the pin from the brake master cylinder reservoir.



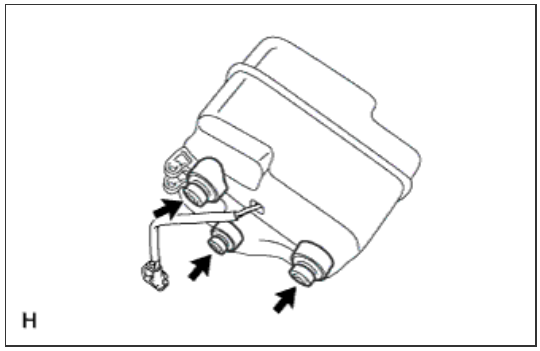
b. Remove the screw and pull out the brake master cylinder reservoir sub-assembly.

c. Remove the master cylinder reservoir filler cap.



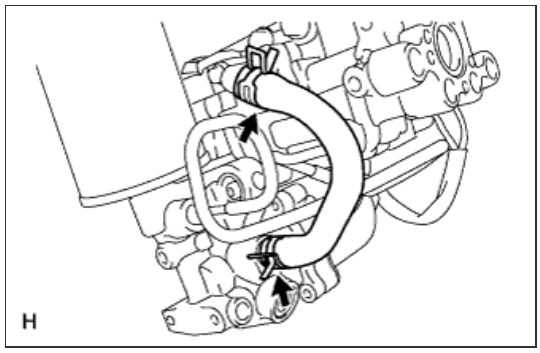
3. REMOVE MASTER CYLINDER RESERVOIR GROMMET

a. Remove the 3 reservoir grommets from the master cylinder reservoir.



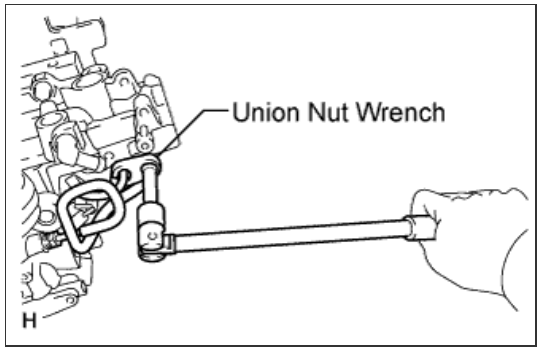
4. REMOVE NO. 1 BRAKE ACTUATOR HOSE

a. Using needle nose pliers, slide the 2 clips and remove the brake actuator hose and 2 clips.



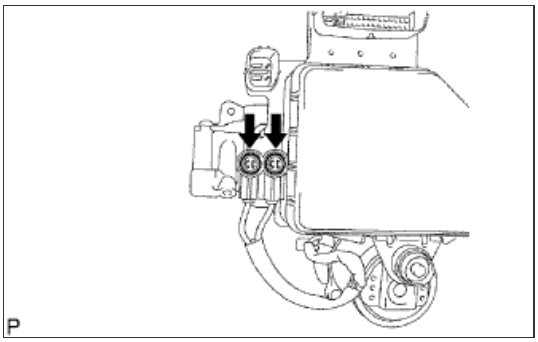
5. REMOVE NO. 1 BRAKE ACTUATOR TUBE

a. Using a union nut wrench, remove the No. 1 brake actuator tube.

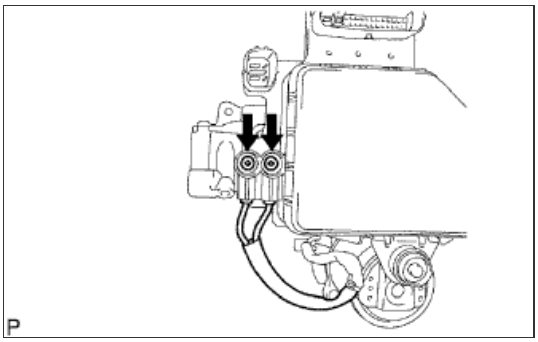


6. REMOVE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

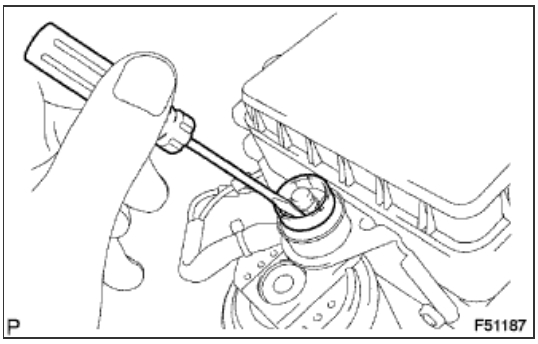
a. Using a screwdriver, remove the 2 plugs.



b. Remove the 2 screws and disconnect the wire harnesses from the master cylinder solenoid.

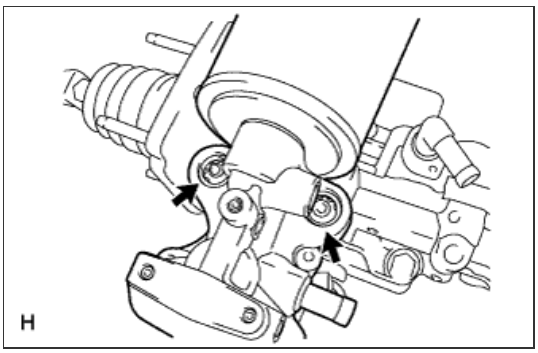


c. Using a screwdriver, remove the clip.

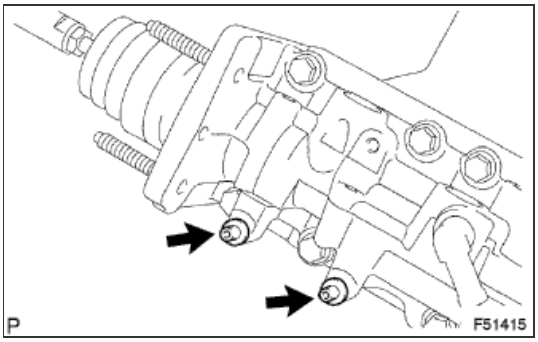


d. Remove the brake booster with accumulator pump assembly from the brake master cylinder.

e. Remove the 2 brake booster pump collars and 2 brake booster pump bushes from the brake booster with accumulator pump assembly.



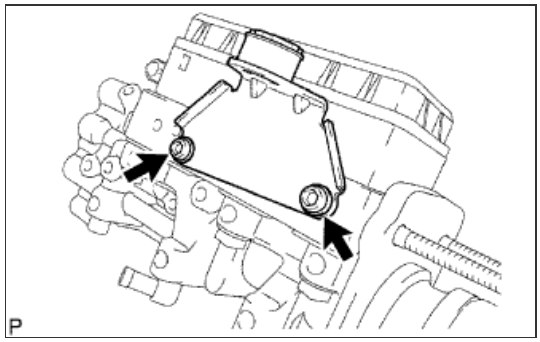
f. Using a 4 mm hexagon wrench, remove the 2 pins.



7. REMOVE NO. 1 BRAKE BOOSTER PUMP BRACKET

a. Using a 5 mm hexagon wrench, remove the 2 bolts and No. 1 brake booster pump bracket from the brake master cylinder solenoid.

b. Remove the brake booster pump bush from the No. 1 brake booster pump bracket.



8. REMOVE BRAKE BOOSTER ACCUMULATOR PIPE

a. Secure the brake booster with accumulator pump assembly in a vise.

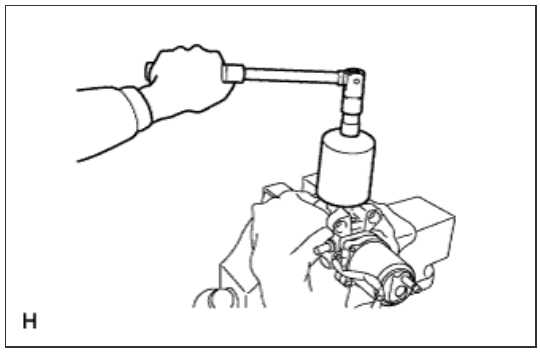
b. Remove the brake booster accumulator.

c. Remove the O-ring from the brake booster accumulator.

NOTICE:

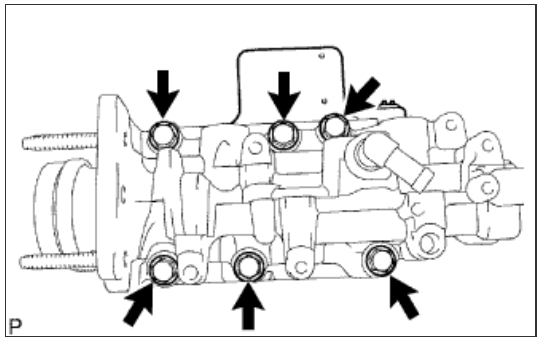
Ensure no foreign matter enters the pump.

d. Remove the brake booster accumulator pipe and compression spring.

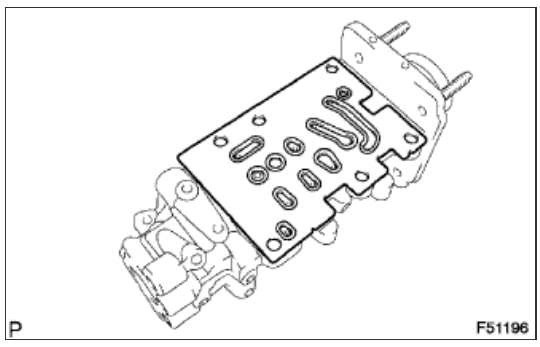


9. REMOVE MASTER CYLINDER SOLENOID

a. Remove the 6 bolts and master cylinder solenoid.



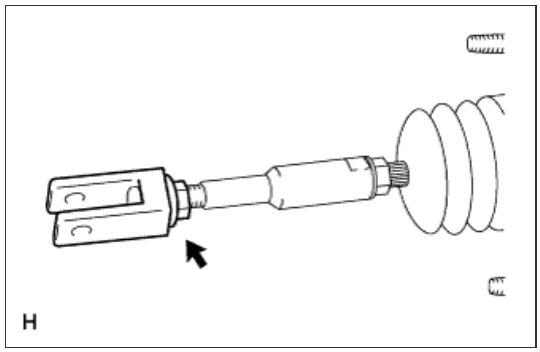
b. Remove the gasket.



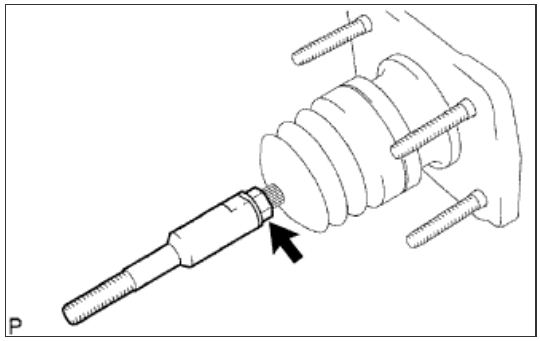
10. REMOVE MASTER CYLINDER PUSH ROD CLEVIS

a. Loosen the lock nut on the rod operating adapter, and remove the push rod

clevis and lock nut.



b. Loosen the lock nut on the brake master cylinder side, and remove the rod operating adapter and lock nut.



11. REMOVE MASTER CYLINDER BOOT

12. REMOVE BRAKE BOOSTER PISTON SUB-ASSEMBLY

a. Pressing the piston in with a screwdriver, insert a pin or equivalent from the hole in the master cylinder body to hold the C-ring, and then remove it with another screwdriver.

HINT:

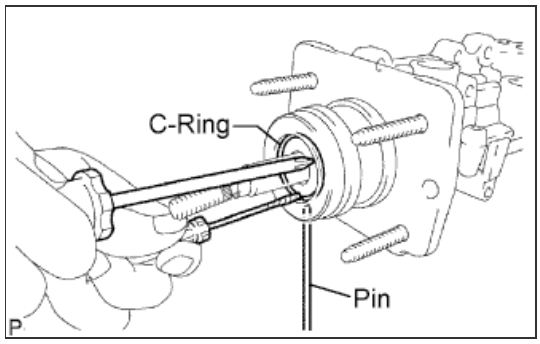
Tape the screwdriver tip before use.

b. Remove the plug from the piston.

c. Remove the piston by pulling it straight out, not at an angle.

NOTICE:

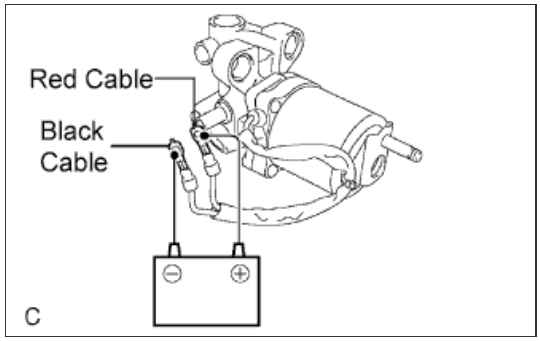
If the piston pulled out at an angle, there is a possibility that the cylinder bore could be damaged.



for Preparation Click here

1. CHECK BRAKE BOOSTER PUMP ASSEMBLY

a. Apply battery voltage to the brake booster pump cables, and check the operation of the pump motor.



OK

Measurement Condition	Specified Condition
Battery positive (+) voltage → Red cable terminal	Pump motor operates
Battery negative (-) voltage → Black cable terminal	

If the result is not as specified, replace the brake booster pump assembly.

for Preparation Click here

1. INSTALL BRAKE BOOSTER PISTON SUB-ASSEMBLY

a. Apply lithium soap base glycol grease to a new piston.

b. Install the piston.

NOTICE:

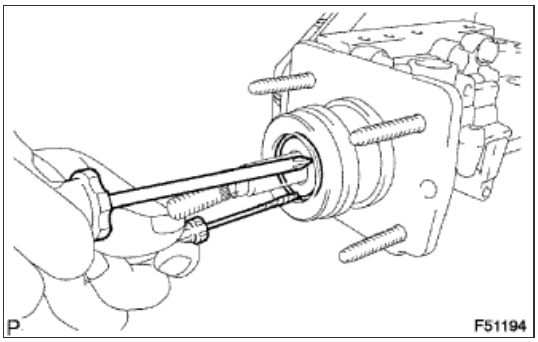
When installing, be careful not to damage the seals, etc.

c. Install the plug.

d. Using 2 screwdrivers, install a new C-ring while pressing on the piston.

HINT:

Tape the screwdriver tip before use.

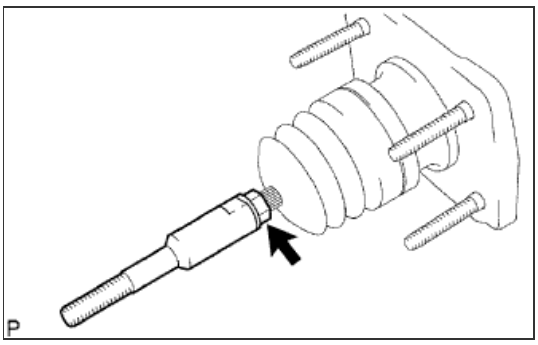


2. INSTALL MASTER CYLINDER BOOT

3. INSTALL MASTER CYLINDER PUSH ROD CLEVIS

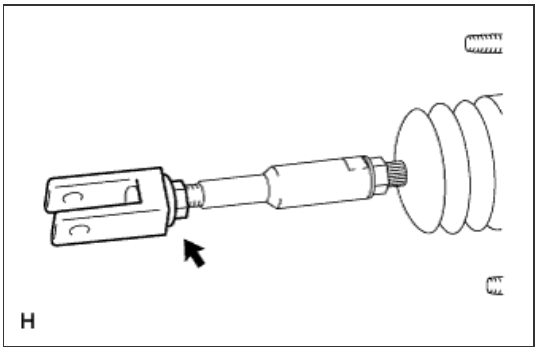
a. Install the brake master cylinder side lock nut and rod operating adapter to the brake master cylinder.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }



b. Install the lock nut and master cylinder push rod clevis to the rod operating adapter.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }

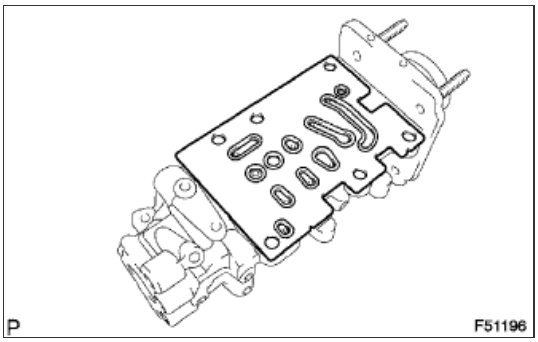


4. INSTALL MASTER CYLINDER SOLENOID

a. Install a new gasket.

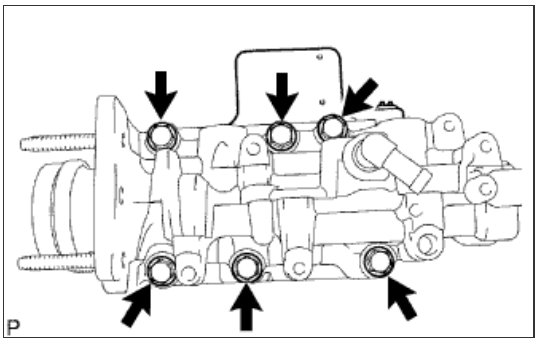
NOTICE:

eep all surfaces of the master cylinder solenoid, master cylinder and gasket, especially contact surfaces, away from water and dust.



b. Install the master cylinder solenoid with 6 new bolts.

Torque:
32 N*m{ 325 kgf*cm , 24 ft.*lbf }



5. INSTALL BRAKE BOOSTER ACCUMULATOR PIPE

a. Install the brake booster accumulator pipe and compression spring.

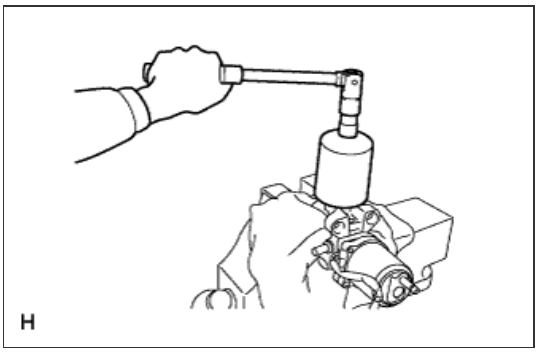
NOTICE:

Ensure that no foreign matter enters the pump.

b. Install a new O-ring to the brake booster accumulator.

c. Install the brake booster accumulator.

Torque:
57 N*m{ 585 kgf*cm , 42 ft.*lbf }

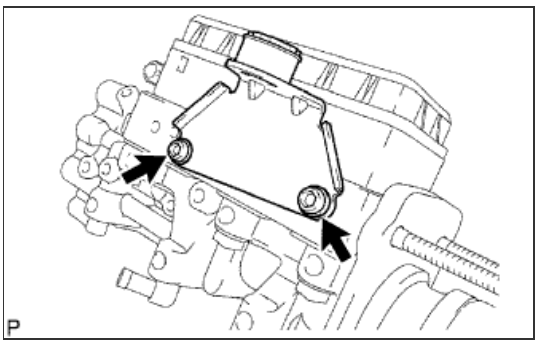


6. INSTALL NO. 1 BRAKE BOOSTER PUMP BRACKET

a. Install the brake booster pump bush to the No. 1 brake booster pump bracket.

b. Using a 5 mm hexagon wrench, install the No. 1 brake booster pump bracket with the 2 bolts.

Torque:
7.8 N*m{ 80 kgf*cm , 69 in.*lbf }



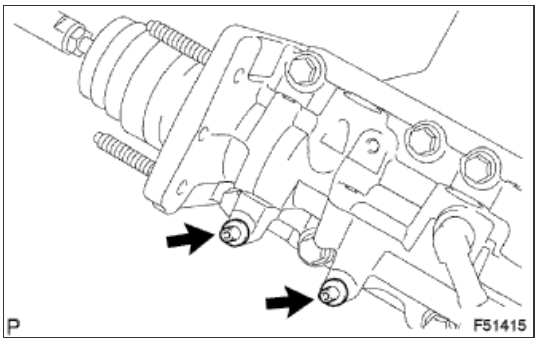
7. INSTALL BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

a. Using a 4 mm hexagon wrench, install the 2 pins to the brake master cylinder.

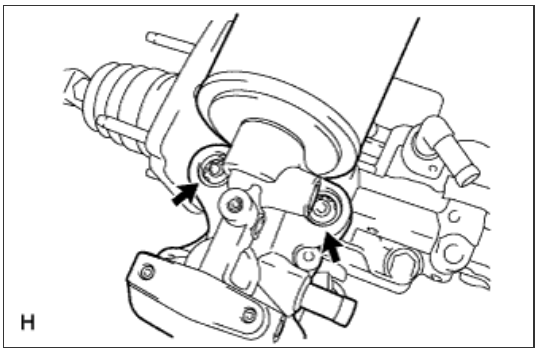
Torque:

7.8 N*m{ 80 kgf*cm , 69 in.*lbf }

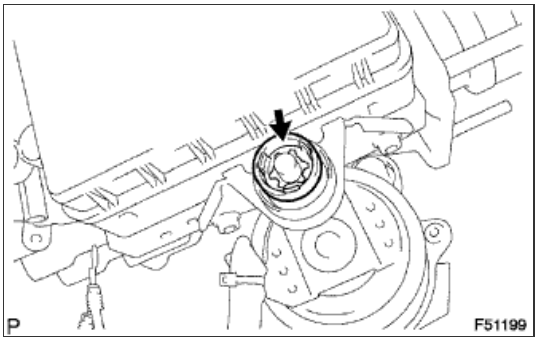
b. Install 2 new brake booster pump collars and 2 brake booster pump bushes to the brake booster with accumulator pump assembly.



c. Install the brake booster with accumulator pump assembly to the brake master cylinder.

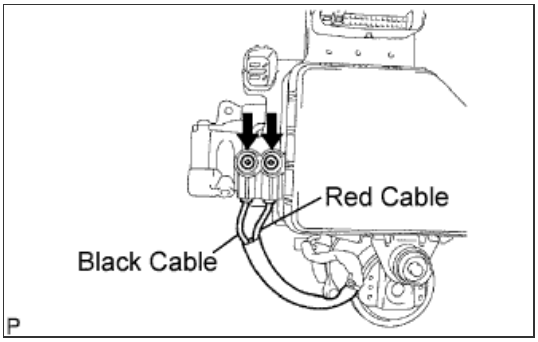


d. Install a new clip.

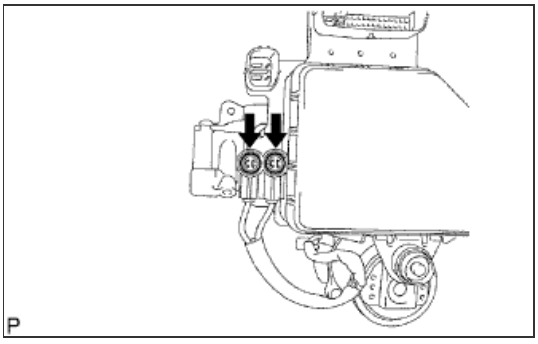


e. Connect the wire harnesses with the 2 screws.

Torque:
2.9 N*m{ 30 kgf*cm , 26 in.*lbf }



f. Install 2 new plugs.



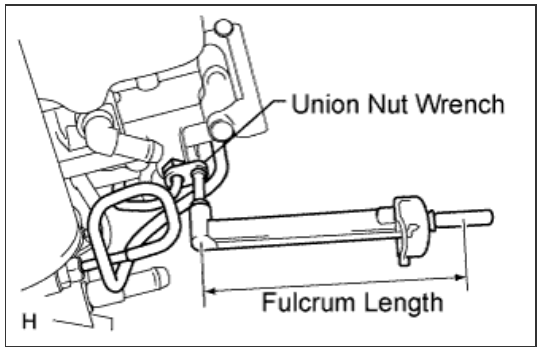
8. INSTALL NO. 1 BRAKE ACTUATOR TUBE

a. Using a union nut wrench, install the No. 1 brake actuator tube.

Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

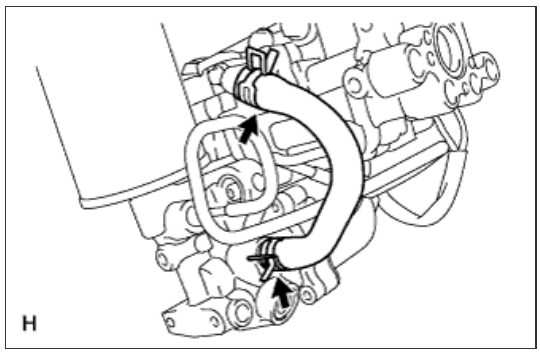
HINT:

- **Use a torque wrench with a fulcrum length of 300 mm (11.8 in.).**
- **The torque value for use with a union nut wrench is effective when the union nut wrench is parallel to the torque wrench.**



9. INSTALL NO. 1 BRAKE ACTUATOR HOSE

a. Using needle nose pliers, install the brake actuator hose with the 2 clips.



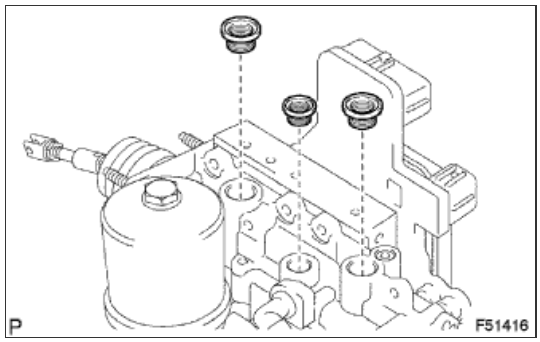
10. INSTALL MASTER CYLINDER RESERVOIR GROMMET

a. Apply lithium soap base glycol grease to 3 new reservoir grommets.

b. Install the 3 reservoir grommets to the brake master cylinder.

NOTICE:

Be careful of the size of each grommet.

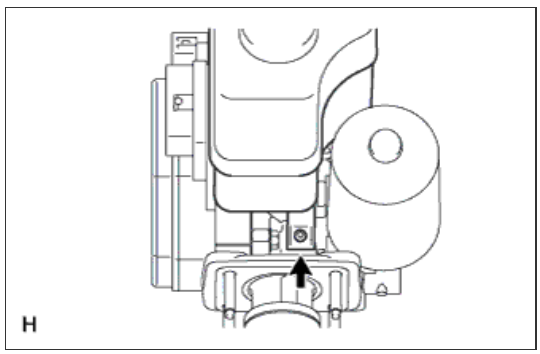


11. INSTALL BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

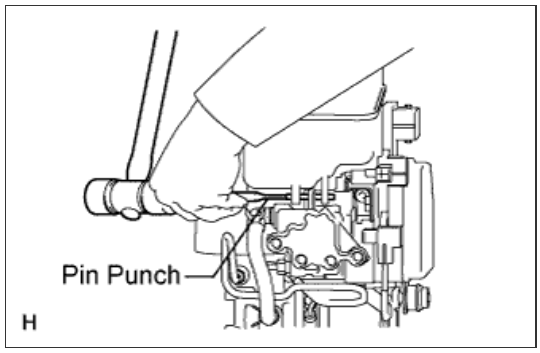
a. Install the brake master cylinder reservoir sub-assembly with the screw.

Torque:
1.7 N*m{ 17 kgf*cm , 15 in.*lbf }

b. Install the master cylinder reservoir filler cap.



c. Using a pin punch and hammer, install a new pin to the brake master cylinder reservoir.

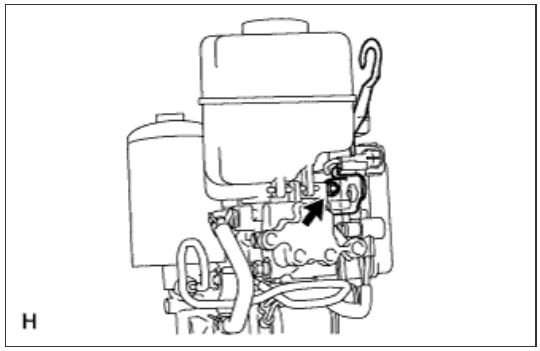


12. INSTALL NO. 1 BRAKE ACTUATOR BRACKET

a. Install the brake fluid level warning switch connector to the No. 1 brake actuator bracket.

b. Using a 5 mm hexagon wrench, install the No. 1 brake actuator bracket with the bolt.

Torque:
7.8 N*m{ 80 kgf*cm , 69 in.*lbf }



for Preparation Click here

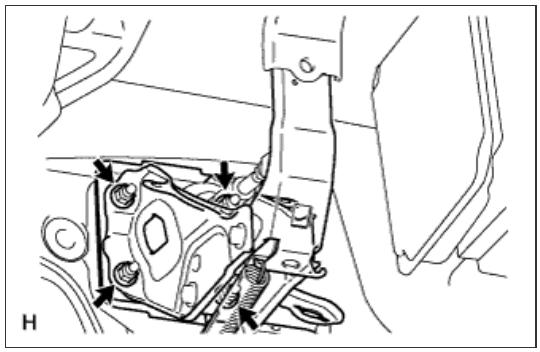
1. INSTALL BRAKE BOOSTER GASKET

a. Install a new brake booster gasket to the hydraulic brake booster.

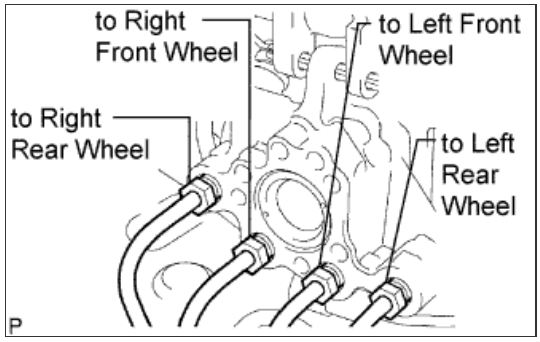
2. INSTALL HYDRAULIC BRAKE BOOSTER ASSEMBLY

a. Install the hydraulic brake booster assembly with the 4 nuts.

Torque:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }



b. Connect the 4 brake lines to the correct positions of the hydraulic brake booster assembly as shown in the illustration.

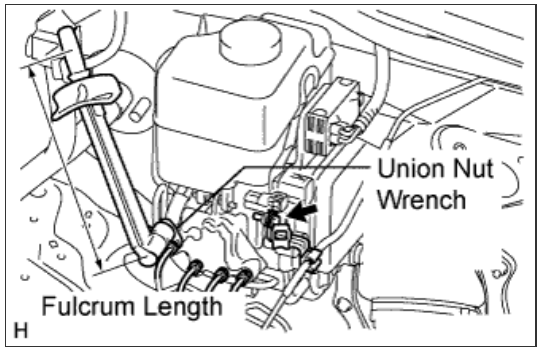


c. Install the clamp with the bolt.

Torque:
8.5 N*m{ 87 kgf*cm , 75 in.*lbf }

d. Using a union nut wrench, tighten the 4 brake lines.

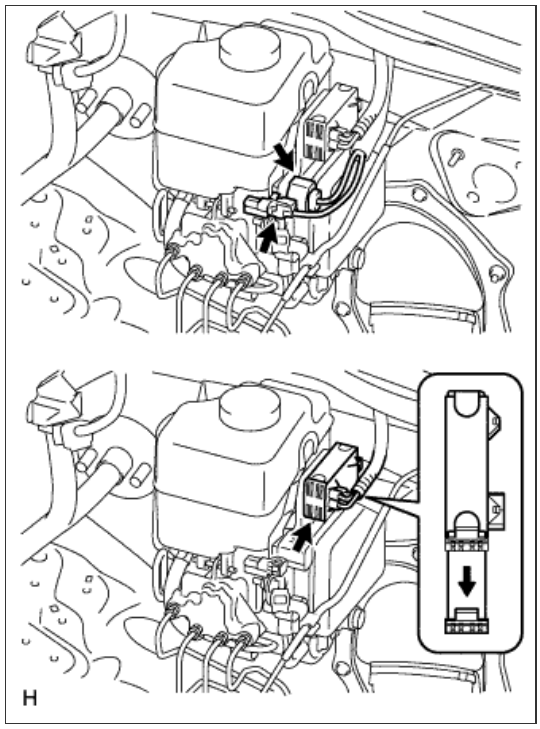
Torque:
ithout union nut rench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
ith union nut rench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }



HINT:

- **Use a torque rench ith a fulcrum length of 300 mm (11.8 in.).**
- **The torque alue for use ith a union nut rench is effecti e hen the union nut rench is parallel to the torque rench.**

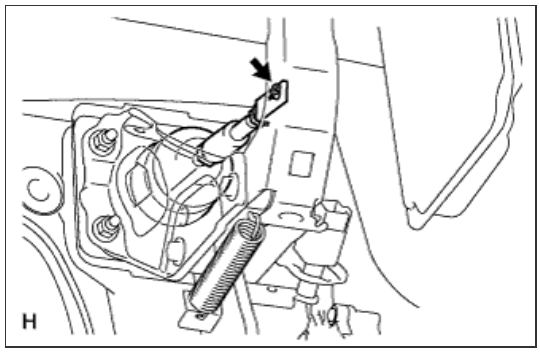
e. Connect the 3 connectors to the hydraulic brake booster.



3. INSTALL PUSH ROD PIN

a. Apply a light coat lithium soap base glycol grease to the inner surface of the hole on the brake pedal lever.

b. Set the master cylinder push rod clevis in place, insert the push rod pin from the outside of the vehicle and then install a new clip.



4. INSTALL DRI ER SIDE KNEE AIRBAG ASSEMBLY

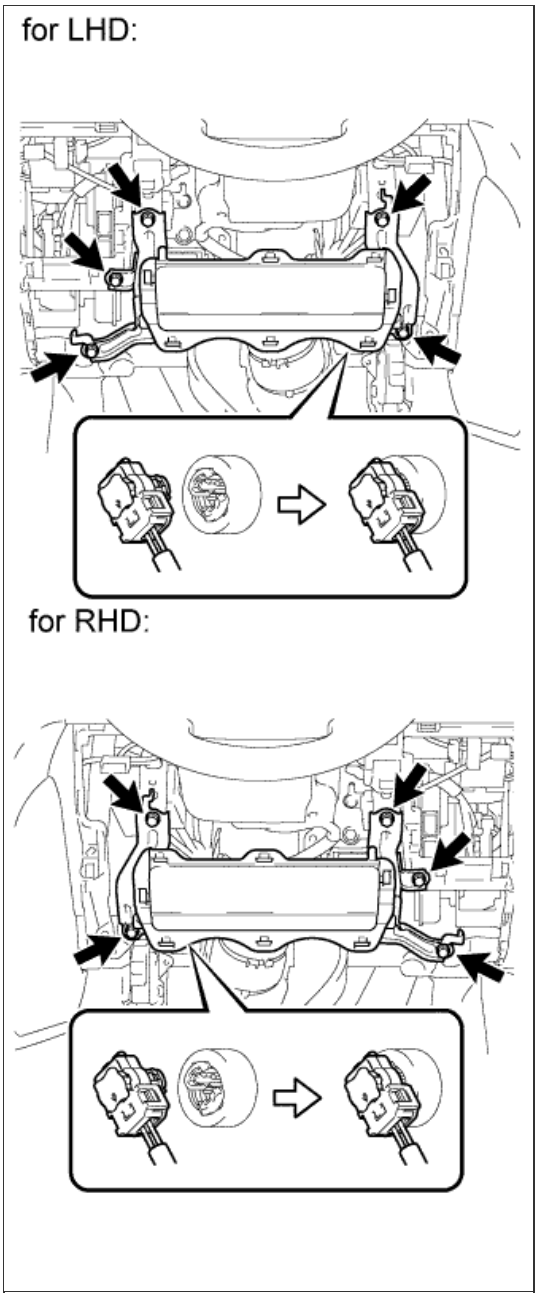
a. Connect the connector.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

b. Install the driver side knee airbag with the 5 bolts.

Torque:
10 N*m{ 102 kgf*cm , 7 ft.*lbf }

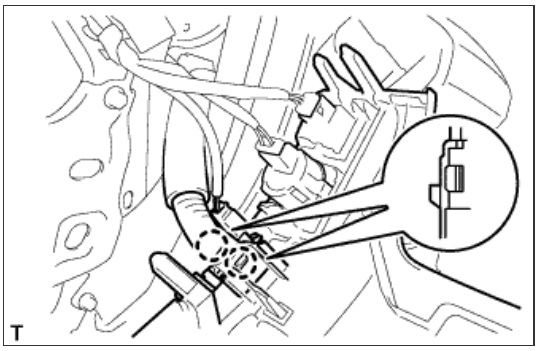


5. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

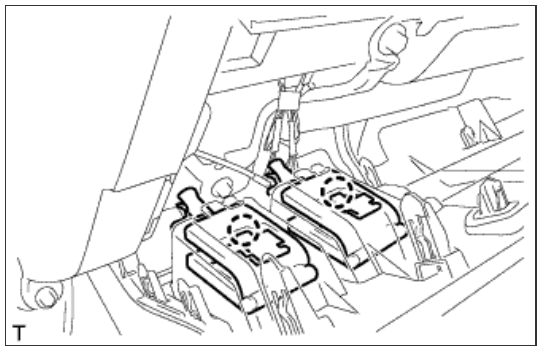
a. Connect the connectors.

b. for Automatic Air Conditioning System:

i. Attach the 2 claws to install the room temperature sensor.



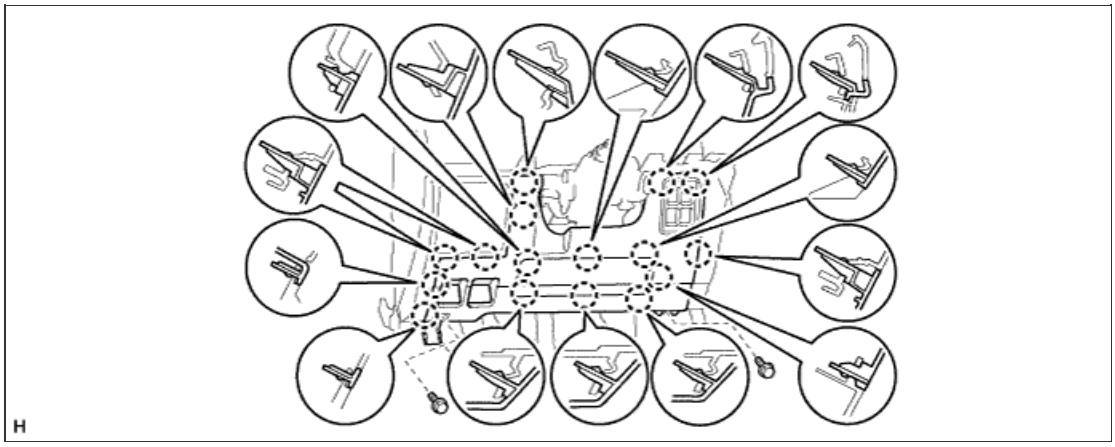
c. Attach the 2 claws to connect the 2 control cables.



d. w/ Driver Side Knee Airbag:

i. Attach the 16 claws to install the lower No. 1 instrument panel finish panel.

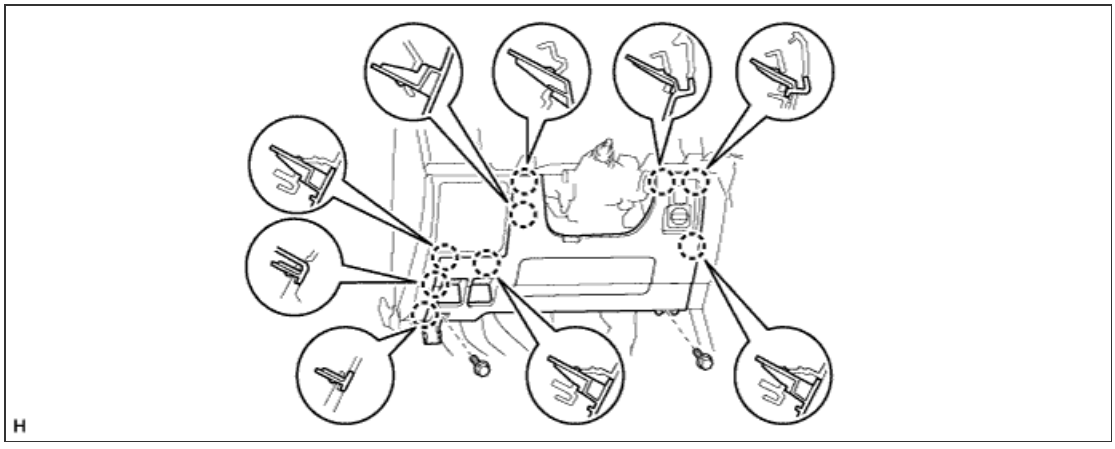
ii. Install the 2 bolts.



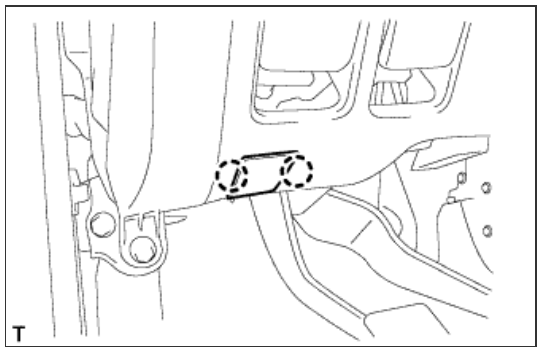
e. w/o Driver Side Knee Airbag:

i. Attach the 9 claws to install the lower No. 1 instrument panel finish panel.

ii. Install the 2 bolts.



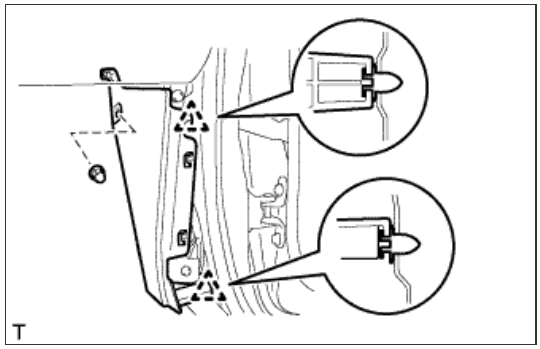
f. Attach the 2 claws to close the hole cover.



6. INSTALL COWL SIDE TRIM BOARD RH

a. Attach the 2 clips to install the cowl side trim board.

b. Install the cap nut.

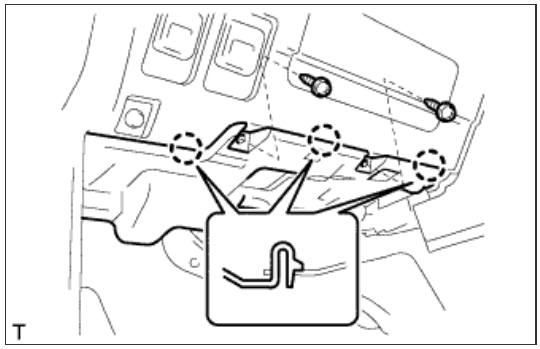


7. INSTALL NO. 1 INSTRUMENT PANEL UNDER CO ER SUB-ASSEMBLY

a. Connect the connectors.

b. Attach the 3 claws to install the No. 1 instrument panel under cover.

c. Install the 2 screws.



8. INSTALL FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedures described for the side.

9. CONNECT CABLE TO NEGATI E BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here)

10. BLEED BRAKE SYSTEM

CAUTION:

If air is bled without using the intelligent tester, damage or accidents may result. herefore, always use the intelligent tester when bleeding air.

a. urn the ignition switch to .

b. Remove the brake master cylinder reservoir filler cap assembly.

c. Add brake fluid until the fluid level is between the MI and MA lines of the reservoir.

d. Repeatedly depress the brake pedal and bleed air from the bleeder plug of the front disc brake cylinder RH.

e. Repeat the step above until the air is completely bled, and then tighten the bleeder plug while depressing the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

f. Bleed the air from the bleeder plug of the front disc brake cylinder using the same procedure as for the RH side.

g. With the brake pedal depressed, loosen the bleeder plug of the rear disc brake cylinder RH, continue to hold the brake pedal and allow brake fluid to be drained from the bleeder plug while the pump motor operates.

HINT:

- **Air is bled as the pump motor operates hile the brake pedal is being depressed.**
- **Be sure to release the brake pedal to stop the motor after approximately 100 seconds of continuous operation.**
- **As brake fluid is continuously drained hile the pump operates, it is not necessary to repeatedly depress the brake pedal.**

h. When there is no more air in the brake fluid, tighten the bleeder plug, and then release the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

i. Bleed the air from the bleeder plug of the rear disc brake cylinder using the same procedure as for the RH side.

j. urn the ignition switch off and connect the intelligent tester to the D C3.

k. urn the ignition switch to .

l. urn the intelligent tester on.

m. nter the following menus: Chassis / ABS/ SC/ C / Utility / Air Bleeding.

NOTICE:

o protect the solenoid from overheating, the solenoid operation stops automatically in 4 seconds, and then the solenoid will not respond to commands for an additional 2 seconds.

n. Repeatedly depress the brake pedal several times, and then, with the brake pedal depressed, turn FR on and bleed air.

HINT:

Air returns to the brake master cylinder reservoir together with the brake fluid and is bled from the brake system.

NOTICE:

- **As it is not possible to isually confirm that air is being bled, repeat this step 10 times.**
- **Do not loosen the bleeder plug.**

o. urn F on and bleed air using the same procedures as for FR.

p. urn RR on, loosen the bleeder plug of the rear disc brake cylinder RH and drain brake fluid.

HINT:

- **Do not depress the brake pedal.**
- **As brake fluid is automatically drained hile the pump and solenoid operate, it is not necessary to operate the brake pedal.**

q. Repeat the step above until the air is completely bled, and then tighten the bleeder plug.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

r. urn F ine on and bleed the air from the bleeder plug of the front disc brake cylinder using the same procedure as for the RH side.

s. urn RR ine on and loosen the bleeder plug of the rear disc brake cylinder RH.

HINT:

Be sure to bleed air with the brake pedal depressed.

t. Repeat the step above until the air is completely bled, and then tighten the bleeder plug.

Torque:

11 N*m{ 110 kgf*cm , 8 ft.*lbf }

u. urn R ine on and bleed air from the bleeder plug of the rear disc brake cylinder using the same procedure as for the RH side.

. urn the intelligent tester off and turn the ignition switch off.

. Inspect for brake fluid leaks.

x. Check and ad ust the brake fluid level (Click here).

y. Clear the D Cs (Click here).

11. CHECK BRAKE PEDAL HEIGHT

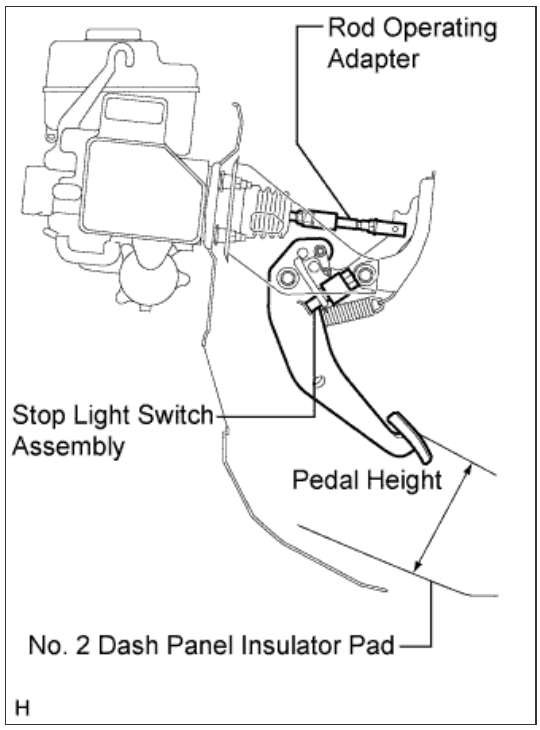
a. Check the brake pedal height.

Standard Pedal Height from No. 2 Dash Panel Insulator Pad:
149.1 to 159.1 mm (5.87 to 6.26 in.)

NOTICE:

Do not ad ust the pedal height. Doing so by changing the push rod length will structurally change the pedal ratio.

If the pedal height is incorrect, ad ust the rod operating adapter length.



b. Ad ust the rod operating adapter length.

i. Remove the clip and clevis pin.

ii. oosen the clevis lock nut.

iii. Ad ust the rod operating adapter length by turning the pedal push rod clevis.

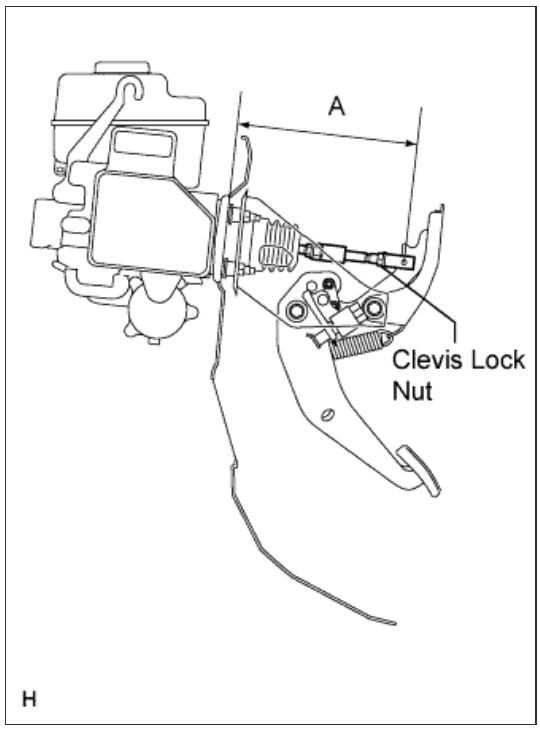
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

i . ighten the clevis lock nut.

Torque:
26 N*m{ 260 kgf*cm , 19 ft.*lbf }

. Set the master cylinder push rod clevis in place, insert the push rod pin from the outside of the vehicle and then install a new clip. If the pedal height is incorrect even if the rod operating adapter is ad usted, check that there is no damage in the brake pedal, brake pedal lever, brake pedal support and dash panel.

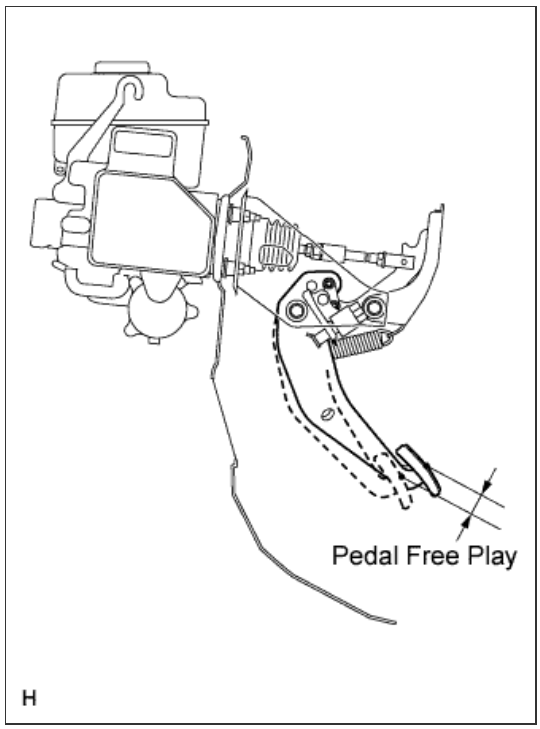
- ven if there is damage, there is no problem if the reserve distance is within the standard value.
- If necessary, replace any damaged parts.



12. CHECK PEDAL FREE PLAY

a. Push in the pedal until the beginning of the resistance is felt. Measure the pedal free play.

Standard Pedal Free Play:
1 to 6 mm (0.0394 to 0.236 in.)

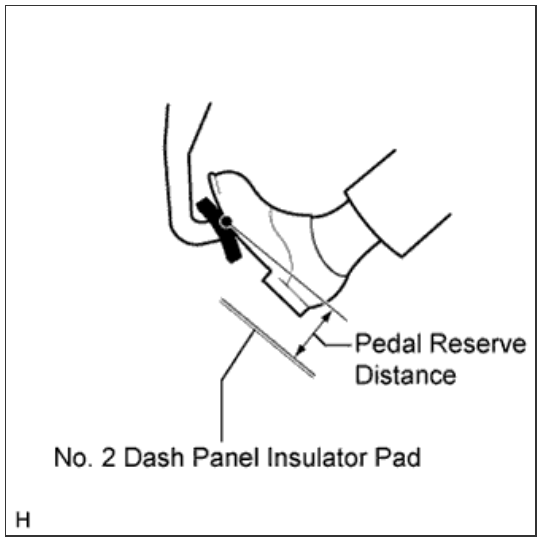


13. CHECK PEDAL RESER E DISTANCE

a. Release the parking brake lever.
With the engine running, depress the pedal and measure the pedal reserve distance as shown in the illustration.

Standard Pedal Reser e Distance from No. 2 Dash Panel Insulator Pad at 490 N (50 kgf, 110.2 lbf):
More than 67.5 mm (2.66 in.)

If incorrect, troubleshoot the brake system.



14. INSPECT BRAKE MASTER CYLINDER OPERATION

a. Inspect the brake master cylinder operation (Click here).

for Preparation Click here

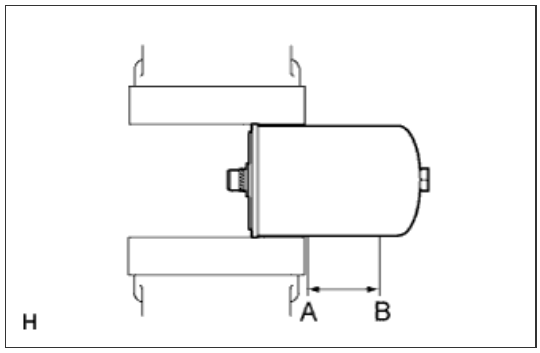
1. DISPOSE OF BRAKE BOOSTER ACCUMULATOR ASSEMBLY

a. Place the brake booster accumulator assembly in a vise and cover it with cloth.

b. Using a saw, cut the brake booster accumulator body between A and B as shown in the illustration to discharge the gas inside.

CAUTION:

- **Co e ith a piece of cloth hen orking because gas a blo out.**
- **Cut the accu tor carefull not abruptly.**
- **Wear protecti e la . e**

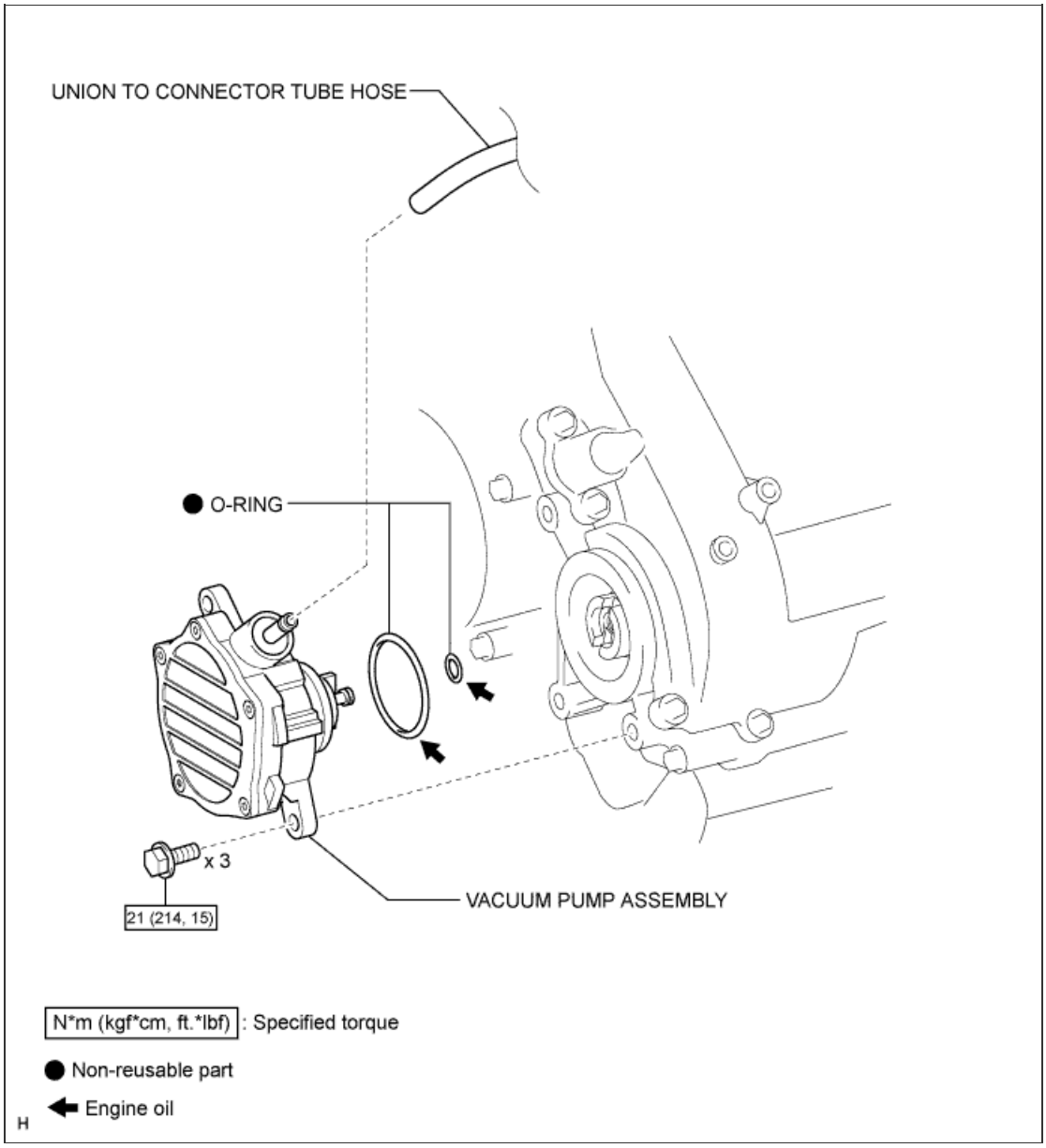


c. When the outer body of the brake booster accumulator is cut, gas and liquid discharge.

HINT:

The gas is colorless, odorless and non-poisonous.

for Preparation Click here



for Preparation Click here

1. OPERATION CHECK

a. Disconnect the union to connector tube hose from the vacuum pump.

b. Connect a vacuum gauge to the vacuum pump.

c. Start the engine and warm it up for more than 2 minutes.

d. With the engine idling, measure the negative pressure of the vacuum pump.

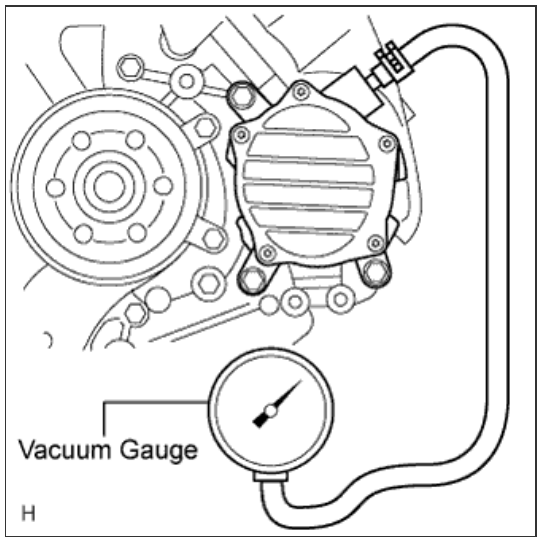
Standard Pressure:
More than 86.7 kPa (650 mmHg, 25.6 in.Hg)

HINT:

It is necessary to replace the vacuum pump assembly every 200000 km (124000 miles).

e. Remove the vacuum gauge from the vacuum pump.

f. Connect the union to connector tube hose to the vacuum pump.



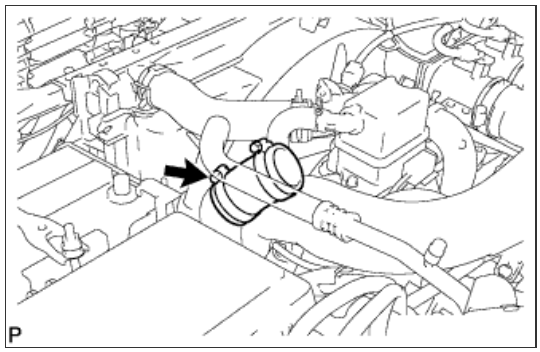
for Preparation Click here

1. REMOVE INTERCOOLER ASSEMBLY

a. Remove the intercooler assembly (Click here).

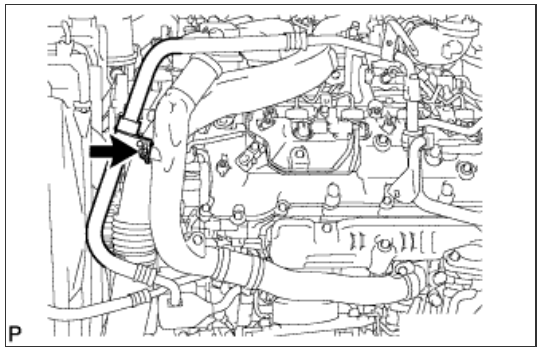
2. REMOVE NO. 2 AIR HOSE

a. Loosen the hose clamp and remove the No. 2 air hose.

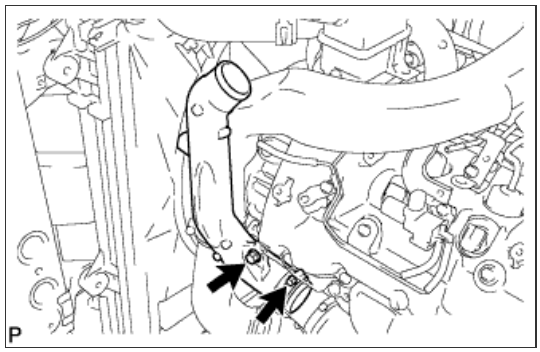


3. REMOVE NO. 4 AIR TUBE

a. Remove the bolt and disconnect the suction hose.



b. Loosen the hose clamp and remove the bolt and No. 4 air tube.

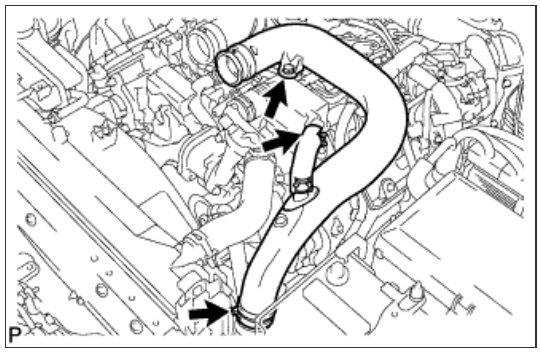


4. REMOVE NO. 2 AIR CLEANER PIPE SUB-ASSEMBLY

a. Disconnect the ventilation hose from the oil separator.

b. Loosen the hose clamp.

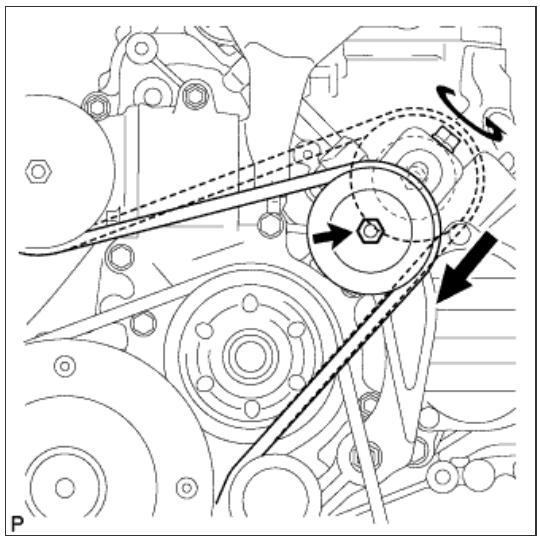
c. Remove the bolt and o. 2 air cleaner pipe.



5. REMOVE V-RIBBED BELT (w/ Viscous Heater)

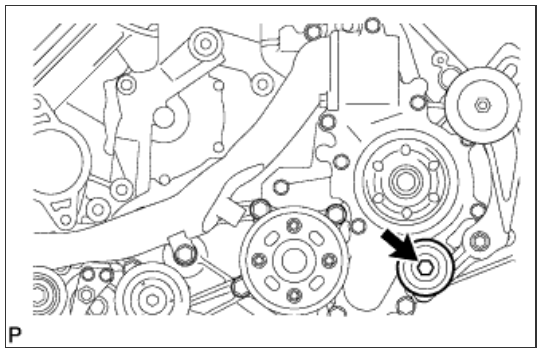
a. Loosen the lock nut and turn the bolt counterclockwise.

b. Remove the V-ribbed belt.



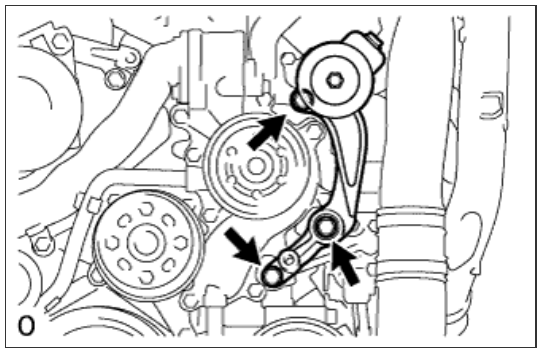
6. REMOVE NO. 2 IDLER PULLEY (w/ Viscous Heater)

a. Remove the bolt and No. 2 idler pulley.



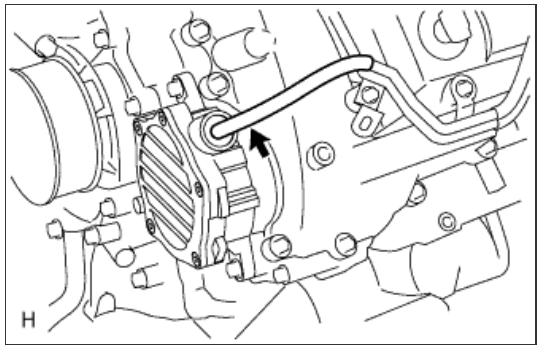
7. REMOVE NO. 2 IDLER PULLEY BRACKET (w/ Viscous Heater)

a. Remove the 3 bolts and idler pulley bracket.



8. DISCONNECT UNION TO CONNECTOR TUBE HOSE

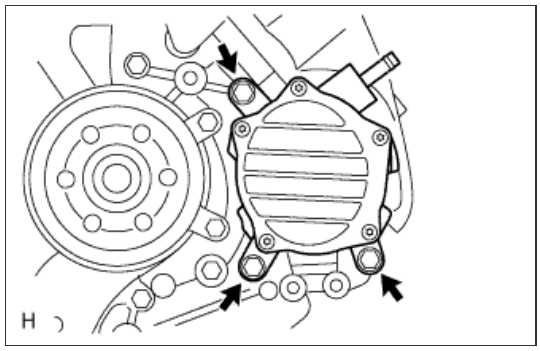
a. Disconnect the hose rom the vacuum pump.



9. REMOVE VACUUM PUMP ASSEMBLY

a. Remove the 3 bolts and vacuum pump.

b. Remove the 2 O-rings.

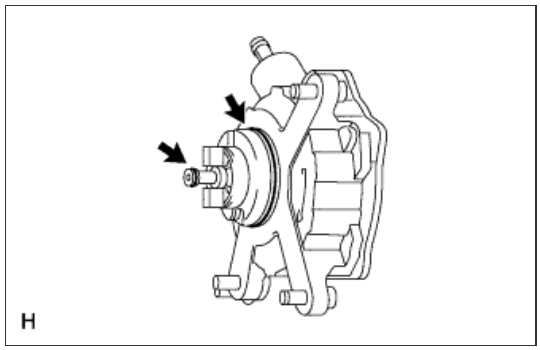


for Preparation Click here

1. INSTALL VACUUM PUMP ASSEMBLY

a. Apply engine oil to 2 new O-rings.

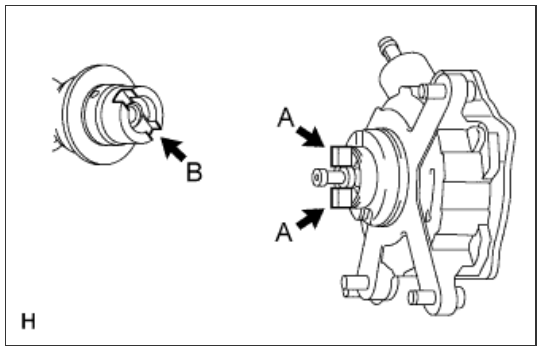
b. Install the 2 O-rings to the vacuum pump.



c. Install the vacuum pump so that the coupling teeth of the vacuum pump (labeled A) and the groove of the camshaft (labeled B) are aligned.

NOTICE:

Be careful not to damage the O-ring.

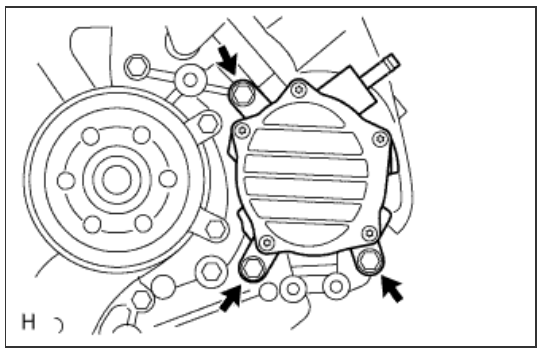


d. Install the vacuum pump with the 3 bolts.

Torque:
21 N*m{ 214 kgf*cm , 15 ft.*lbf }

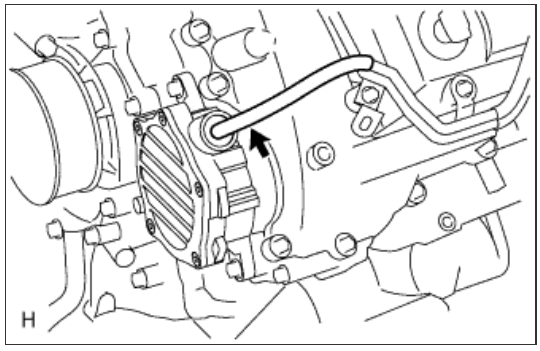
NOTICE:

Confirm that the vacuum pump is not at an angle, and that there is no clearance between the fitting surfaces.



2. CONNECT UNION TO CONNECTOR TUBE HOSE

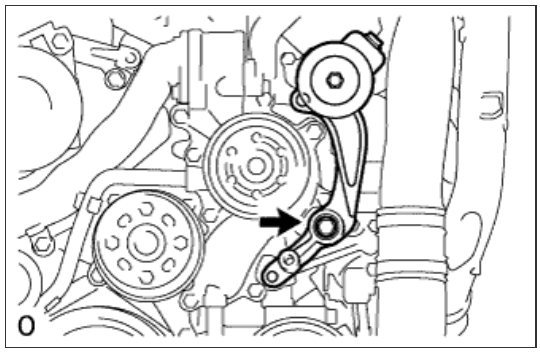
a. Connect the hose to the vacuum pump.



3. INSTALL NO. 2 IDLER PULLEY BRACKET (w/ Viscous Heater)

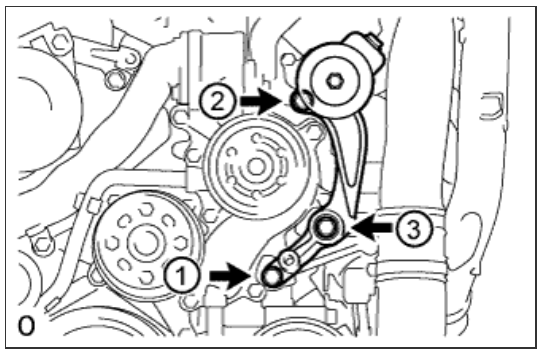
a. Temporarily install the No. 2 idler pulley bracket with the bolt.

b. Temporarily install the 2 bolts to the No. 2 idler pulley bracket bolt hole.



c. Uniformly tighten the 3 bolts of the No. 2 idler pulley bracket in the order shown in the illustration.

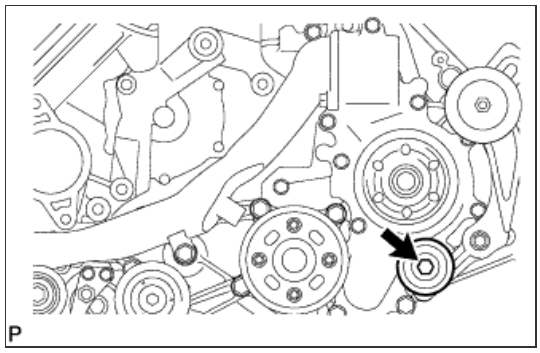
Torque:
49 N*m{ 495 kgf*cm , 36 ft.*lbf }



4. INSTALL NO. 2 IDLER PULLEY (w/ Viscous Heater)

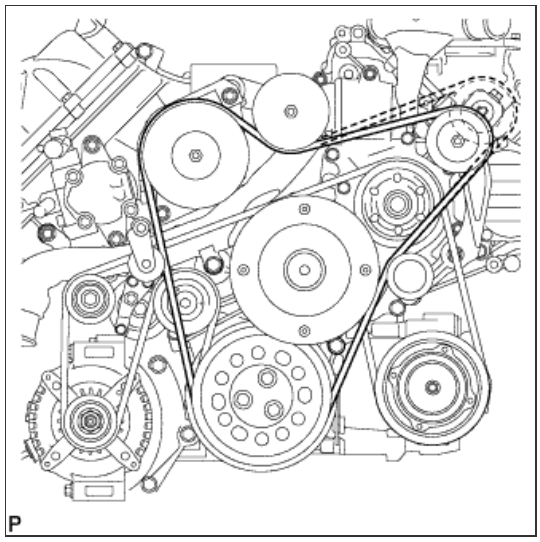
a. Install the collar, No. 2 idler pulley and cover with the bolt.

Torque:
49 N*m{ 495 kgf*cm , 36 ft.*lbf }

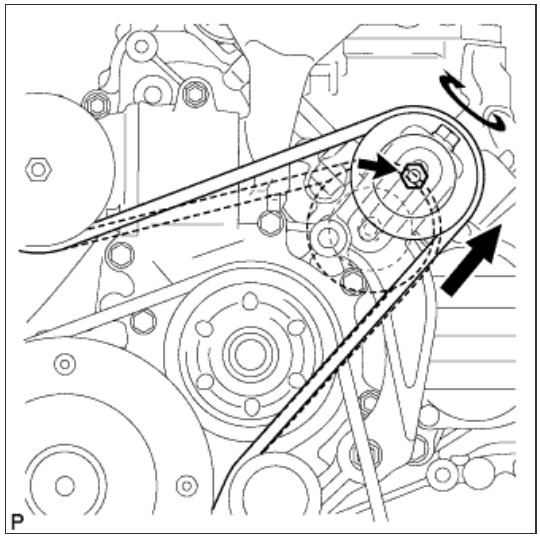


5. INSTALL V-RIBBED BELT (w/ Viscous Heater)

a. Install the V-ribbed belt as shown in the illustration.



b. Temporarily install the lock nut, and turn the bolt clockwise.



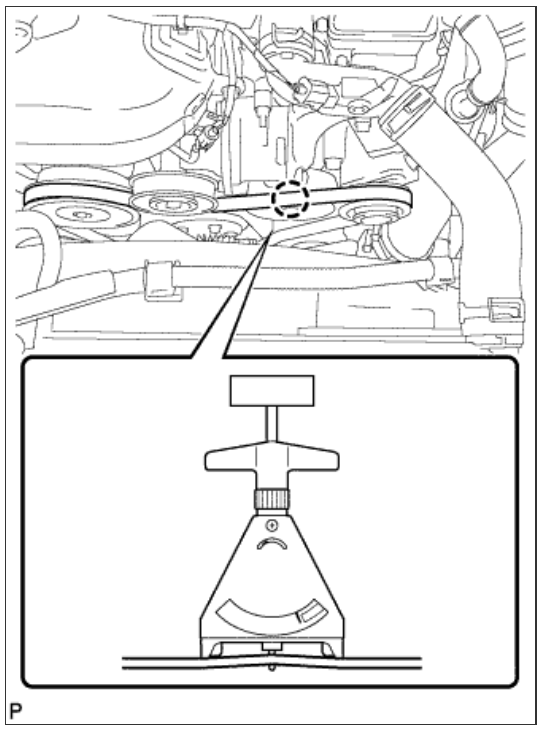
c. Using a belt tension gauge, adjust belt tension.

Standard Belt Tension:

Item	Specified Condition
New belt	400 to 650 N (41 to 66 kgf, 89.9 to 146.1 lbf)
Used belt	300 to 500 N (31 to 51 kgf, 67.4 to 112.4 lbf)

HINT:

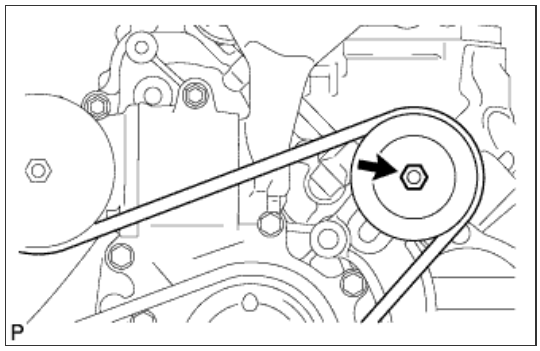
- **A "new belt" is a belt which has been used for less than 5 minutes on a running engine.**
- **A "used belt" is a belt which has been used on a running engine for 5 minutes or more.**
- **After installing a new belt, run the engine for approximately 5 minutes and then recheck the tension.**



d. Tighten the nut.

Torque:

40 N*m{ 408 kgf*cm , 30 ft.*lbf }

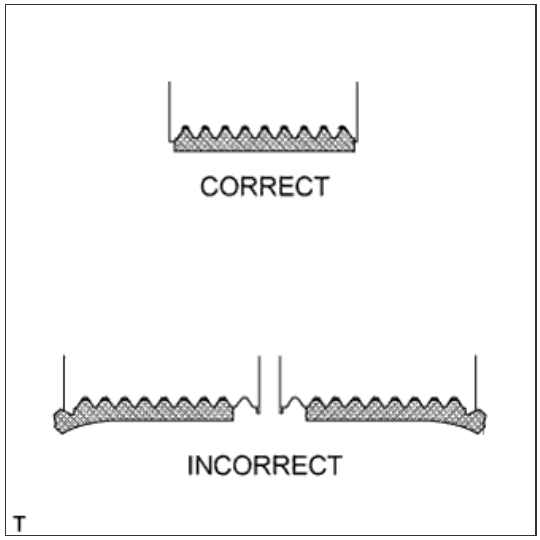


e. Check that the belt fits properly in the ribbed grooves.

HINT:

Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.

If it has slipped out, replace the V-ribbed belt. Install a new V-ribbed belt.



6. INSTALL NO. 2 AIR CLEANER PIPE SUB-ASSEMBLY

a. Connect the No. 2 air cleaner pipe to the No. 2 intake air connector pipe.

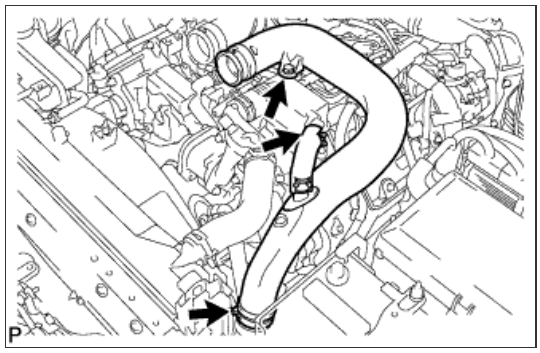
b. Connect the ventilation hose to the oil separator.

c. Install the pipe with the bolt.

Torque:
21 N*m{ 214 kgf*cm , 15 ft.*lbf }

d. Tighten the hose clamp.

Torque:
6.3 N*m{ 64 kgf*cm , 56 in.*lbf }



7. INSTALL NO. 4 AIR TUBE

a. Install the No. 4 air tube with the bolt.

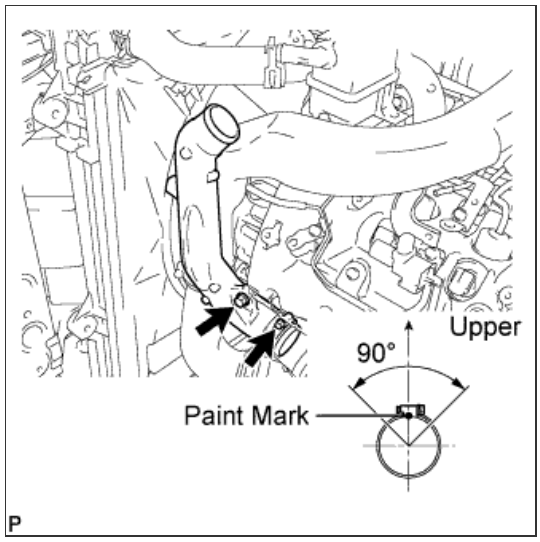
Torque:
21 N*m{ 214 kgf*cm , 15 ft.*lbf }

b. Tighten the hose clamp.

Torque:
6.3 N*m{ 64 kgf*cm , 56 in.*lbf }

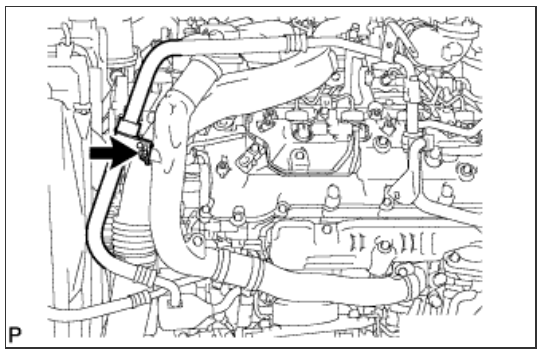
HINT:

Make sure the direction of the hose clamp is as shown in the illustration.



c. Install the suction hose with the bolt.

Torque:
9.8 N*m{ 100 kgf*cm , 87 in.*lbf }



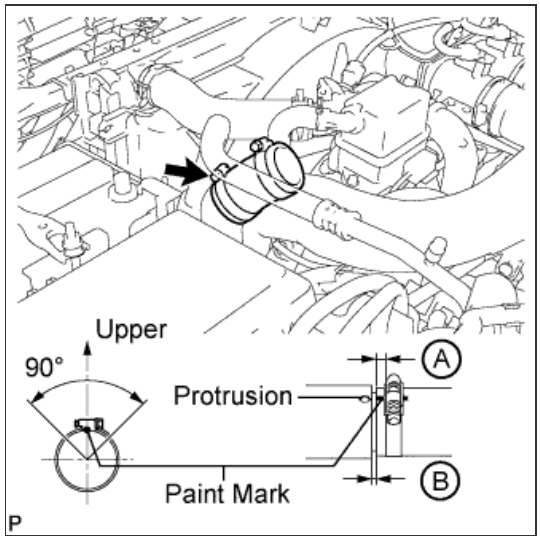
8. INSTALL NO. 2 AIR HOSE

a. Connect the No. 2 air hose with the hose clamp.

Torque:
6.3 N*m{ 64 kgf*cm , 56 in.*lbf }

HINT:

- **Align the paint mark of the air hose with the protrusion and push in the air hose so that distance B is 0 to 3 mm (0 to 0.118 in.).**
- **Position the clamp so that distance A is 2 to 6 mm (0.0787 to 0.236 in.).**
- **Make sure the direction of the hose clamp is as shown in the illustration.**



9. INSTALL INTERCOOLER ASSEMBLY

a. Install the intercooler assembly (Click here).

10. CHECK VACUUM PUMP OPERATION

a. Disconnect the union to connector tube hose from the vacuum pump.

b. Connect a vacuum gauge to the vacuum pump.

c. Start the engine and warm it up for more than 2 minutes.

d. With the engine idling, measure the negative pressure of the vacuum pump.

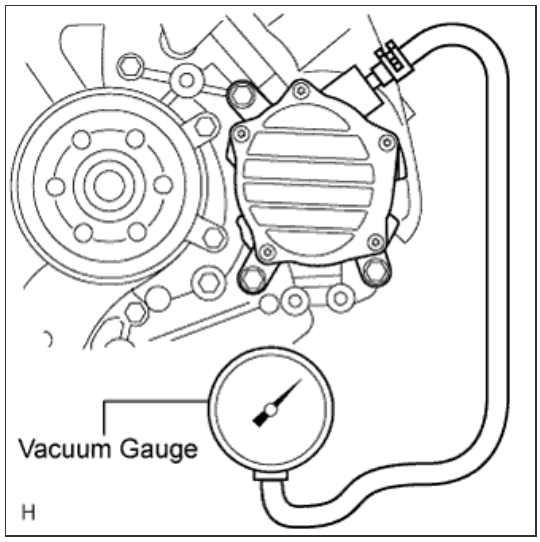
Standard Pressure:
More than 86.7 kPa (650 mmHg, 25.6 in.Hg)

HINT:

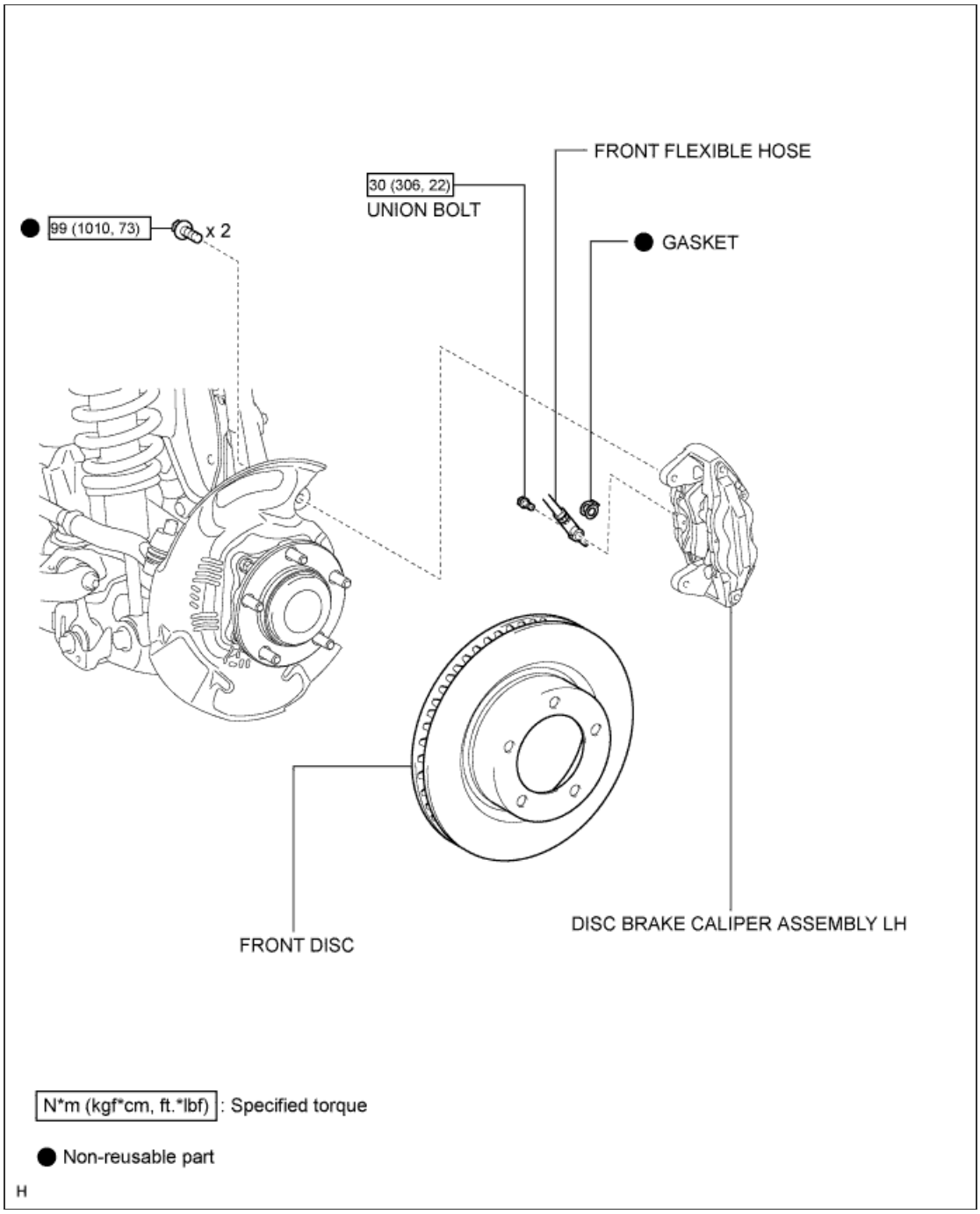
It is necessary to replace the vacuum pump assembly every 200000 km (124000 miles).

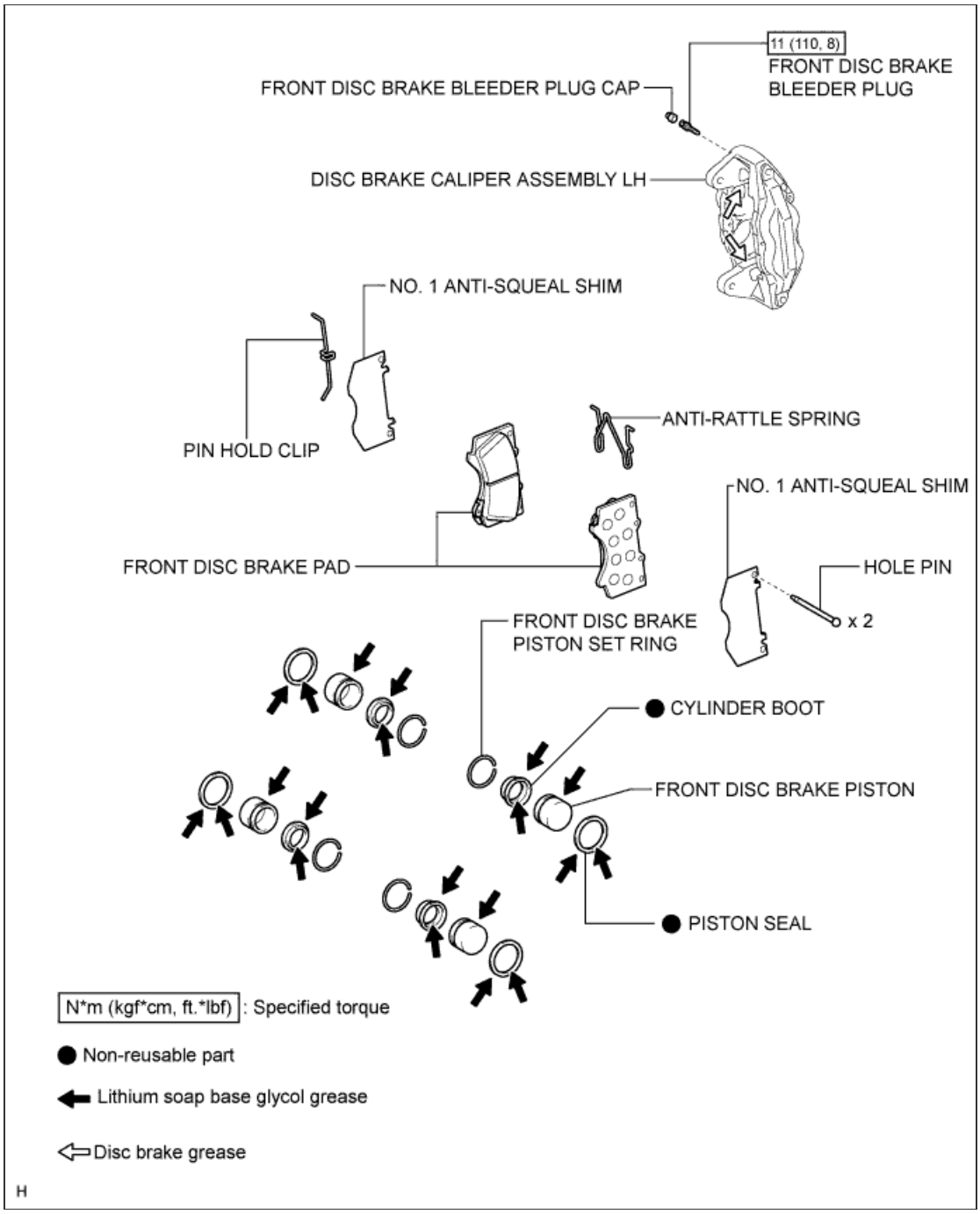
e. Remove the vacuum gauge from the vacuum pump.

f. Connect the union to connector tube hose to the vacuum pump.



for Preparation Click here




11 (110, 8)
FRONT DISC BRAKE BLEEDER PLUG
FRONT DISC BRAKE BLEEDER PLUG CAP
DISC BRAKE CALIPER ASSEMBLY LH
NO. 1 ANTI-SQUEAL SHIM
PIN HOLD CLIP
ANTI-RATTLE SPRING
NO. 1 ANTI-SQUEAL SHIM
FRONT DISC BRAKE PAD
HOLE PIN
x 2
FRONT DISC BRAKE PISTON SET RING
CYLINDER BOOT
FRONT DISC BRAKE PISTON
PISTON SEAL
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
Lithium soap base glycol grease
Disc brake grease
H

for Preparation Click here

HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. REMOVE FRONT WHEEL

2. DRAIN BRAKE FLUID

NOTICE:

Wash brake fluid off immediately if it is spilled on any painted surface.

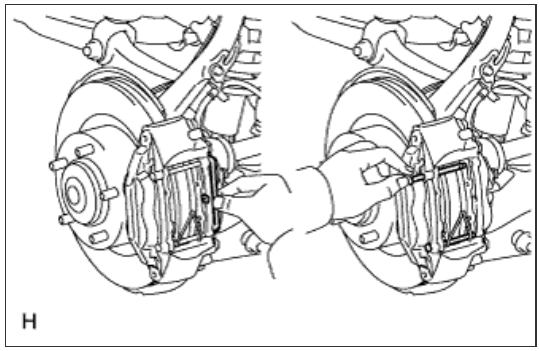
3. REMOVE FRONT DISC BRAKE PAD

a. Remove the pin hold clip.

NOTICE:

The pin hold clip can be reused if it has sufficient rebound; no deformation or wear; and has had all rust, dirt and foreign particles cleaned off.

b. Remove the 2 hole pins.



c. Remove the front disc brake anti-rattle spring.

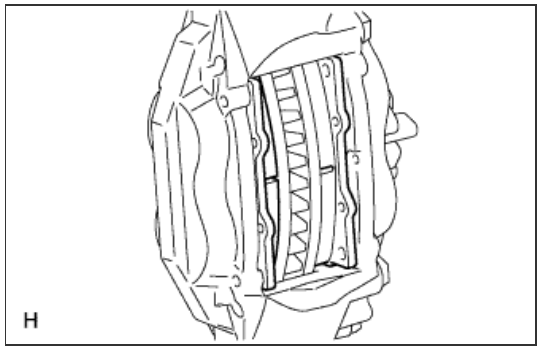
NOTICE:

The anti-rattle spring can be reused if it has sufficient rebound; no deformation, cracks or wear; and has had all rust, dirt and foreign particles cleaned off.



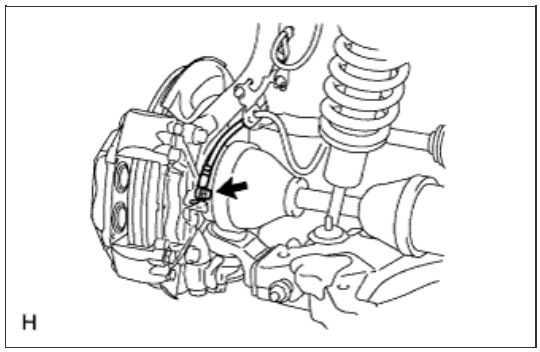
d. Remove the 2 pads from the disc brake caliper.

e. Remove the No. 1 anti-squeal shims from each pad.



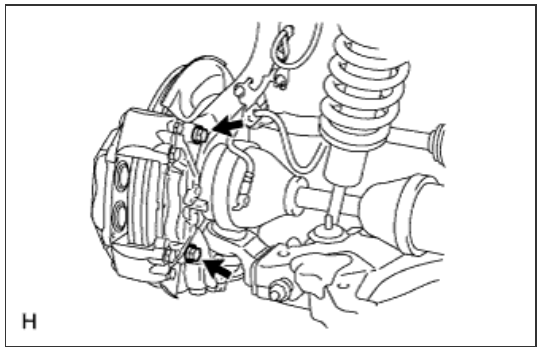
4. DISCONNECT FRONT FLEXIBLE HOSE

a. Remove the union bolt and gasket, and then disconnect the flexible hose.



5. REMOVE DISC BRAKE CALIPER ASSEMBLY LH

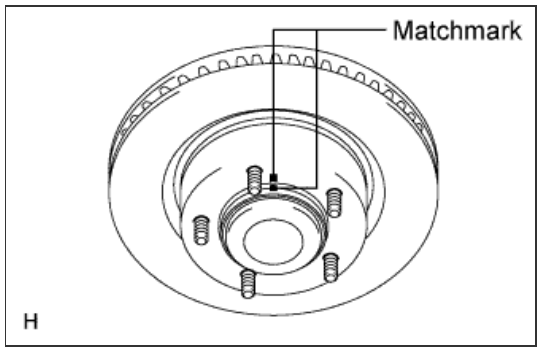
a. Remove the 2 bolts and disc brake caliper from the knuckle.



6. REMOVE FRONT DISC

a. Put matchmarks on the front disc and axle hub if planning to reuse the disc.

b. Remove the front disc.



for Preparation Click here

HINT:

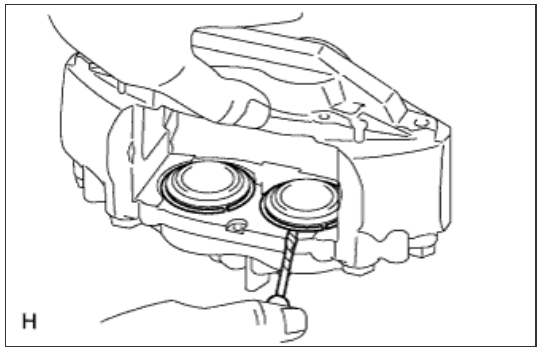
- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. REMOVE FRONT DISC BRAKE PISTON SET RING

a. Using a screwdriver, remove the 4 set rings from the 4 cylinder boots.

HINT:

Tape the screwdriver tip before use.



2. REMOVE CYLINDER BOOT

a. Using a screwdriver, remove the 4 cylinder boots from the disc brake caliper.

HINT:

Tape the screwdriver tip before use.

3. REMOVE FRONT DISC BRAKE PISTON

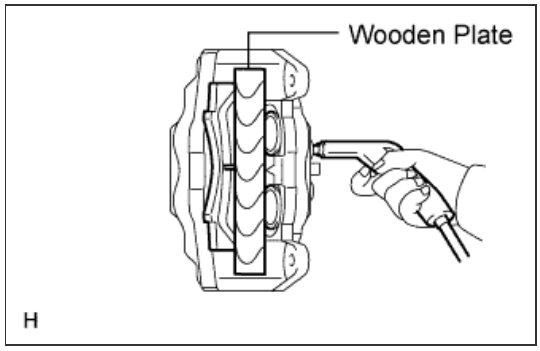
a. Install one side of the disc brake pad.

b. Install a wooden plate between the pistons of the disc brake caliper to prevent the pistons from jumping out.

c. Using an air gun, gradually apply air and remove the 2 disc brake pistons from the cylinder.

CAUTION:

Do not place your fingers in front of the pistons when using air gun.



d. Remove the brake pad and wooden plate.

e. Temporarily install the 2 disc brake pistons that were removed. Then install the disc brake pad to the side in which the 2 disc brake pistons are temporarily installed.

f. Install a wooden plate between the pistons of the disc brake caliper to prevent the pistons from jumping out.

g. Using an air gun, gradually apply air and remove the 2 disc brake pistons from the other side of the cylinder.

CAUTION:

Do not place your fingers in front of the pistons when using air gun.

4. REMOVE PISTON SEAL

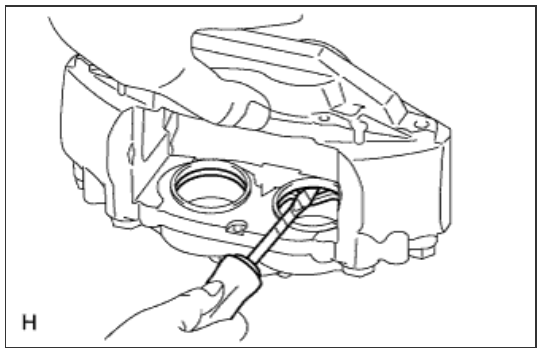
a. Using a screwdriver, remove the 4 piston seals from the disc brake caliper.

NOTICE:

Do not damage the inner cylinder and cylinder groove.

HINT:

Tape the screwdriver tip before use.



5. REMOVE FRONT DISC BRAKE BLEEDER PLUG CAP

6. REMOVE FRONT DISC BRAKE BLEEDER PLUG

for Preparation Click here

1. CHECK BRAKE CYLINDER AND PISTON

a. Check the cylinder bore and piston for rust or scoring.
If necessary, replace the disc brake caliper assembly.

2. CHECK PAD LINING THICKNESS

a. Using a ruler, measure the pad lining thickness.

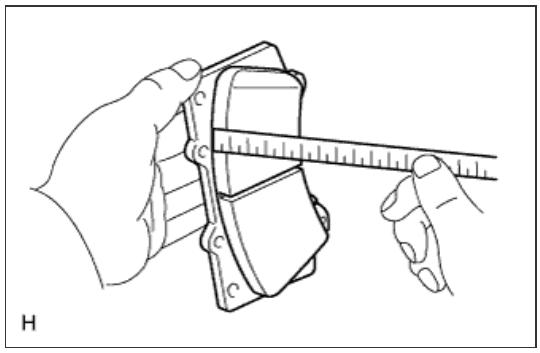
Standard Thickness:
11.9 mm (0.469 in.)

Minimum Thickness:
1.0 mm (0.0394 in.)

If the pad lining thickness is less than the minimum, replace the pad.

HINT:

Be sure to check the wear on the front disc after replacing the brake pad with a new one.



3. CHECK FRONT DISC BRAKE ANTI-RATTLE SPRING

a. Use brake cleaner to clean the front disc brake anti-rattle spring. Check for deformation and cracks.

b. When installing the front disc brake anti-rattle spring to the front disc brake caliper, check that the spring force is applied to the hole pin and brake pad.

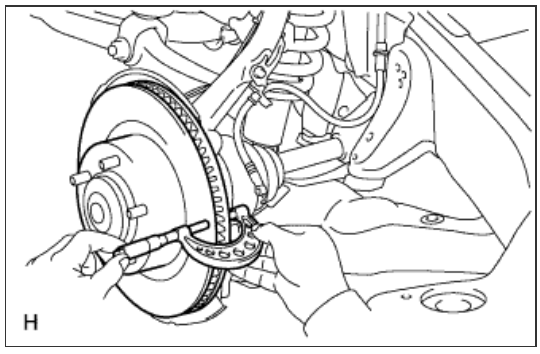
4. CHECK DISC THICKNESS

a. Using a micrometer, measure the disc thickness.

Standard Thickness:
32.0 mm (1.26 in.)

Minimum Thickness:
29.0 mm (1.15 in.)

If the disc thickness is less than the minimum, replace the disc.



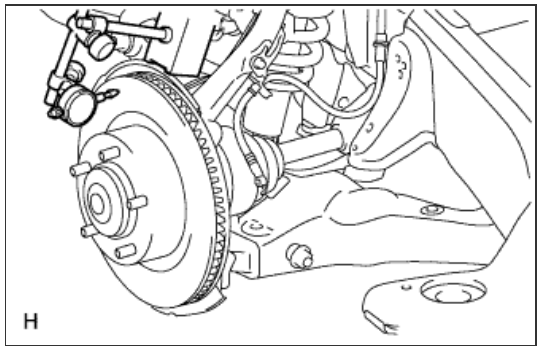
5. CHECK DISC RUNOUT

a. Fix the disc in place with the 5 hub nuts.

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

b. Using a dial indicator, measure the disc runout 10 mm (0.394 in.) from the outer edge of the disc.

Maximum Disc Runout:
0.05 mm (0.00196 in.)



c. If the runout is more than the maximum, change the installation positions of the disc and axle so that the runout will become minimal. If the runout is more than the maximum even when the installation positions are changed, check the bearing looseness in the axial direction (Click here) and the axle hub runout (Click here). If the bearing looseness and the axle hub runout are normal, and if the disc thickness is not within the specified range, grind the disc. If the disc thickness is less than the minimum, replace the disc.

d. Remove the 5 hub nuts and front disc.

for Preparation Click here

HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. TEMPORARILY INSTALL FRONT DISC BRAKE BLEEDER PLUG

a. Temporarily install the bleeder plug to the disc brake caliper.

HINT:

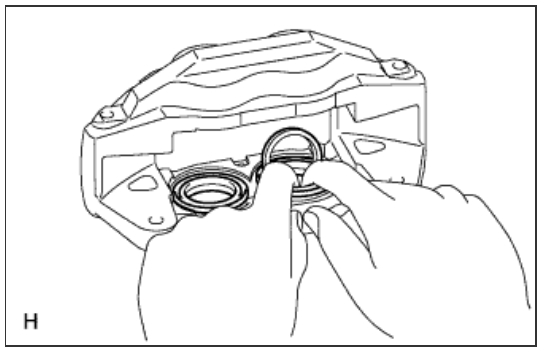
The bleeder plug will be tightened to a torque specification in the "Bleed Brake Line" procedure.

2. INSTALL FRONT DISC BRAKE BLEEDER PLUG CAP

3. INSTALL PISTON SEAL

a. Apply lithium soap base glycol grease to 4 new piston seals.

b. Install the 4 piston seals to the disc brake caliper.



4. INSTALL FRONT DISC BRAKE PISTON

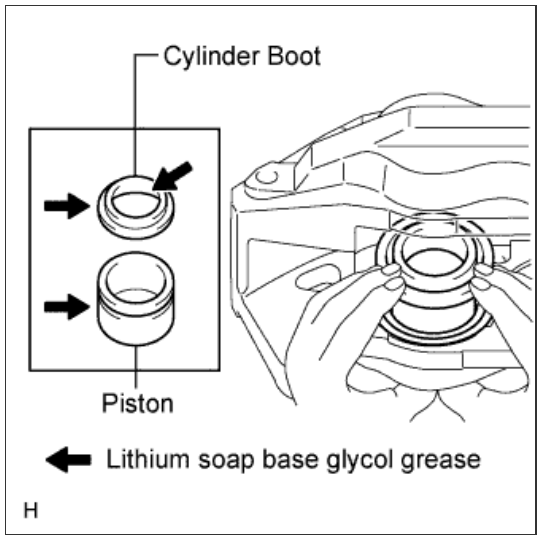
a. Apply lithium soap base glycol grease to the 4 front disc brake pistons and 4 new cylinder boots.

b. Install the 4 cylinder boots to the 4 front disc brake pistons.

c. Install the 4 pistons into the front disc brake caliper.

NOTICE:

Do not forcibly install the piston into the disc brake caliper.

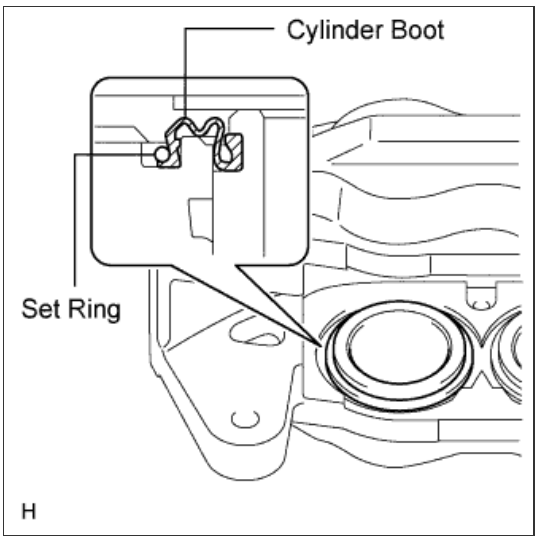


5. INSTALL CYLINDER BOOT

a. Install one side of each of the 4 cylinder boots to the front disc brake caliper.

NOTICE:

- **Install the cylinder boot securely to the grooves of the cylinder and piston.**
- **Do not damage the cylinder boot.**



6. INSTALL FRONT DISC BRAKE PISTON SET RING

a. Install the 4 set rings.

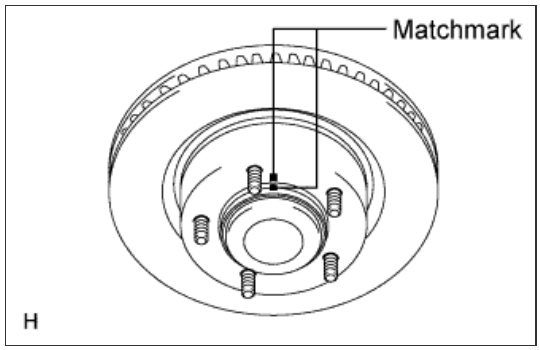
for Preparation Click here

1. INSTALL FRONT DISC

a. Align the matchmarks, and then install the front disc.

HINT:

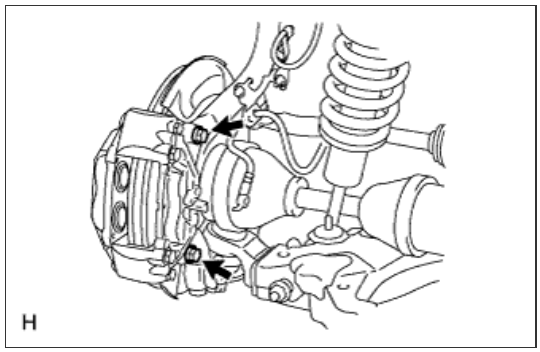
When replacing the front disc with a new one, select the installation position where the front disc has the minimum runout.



2. INSTALL DISC BRAKE CALIPER ASSEMBLY LH

a. Install the disc brake caliper with 2 new bolts.

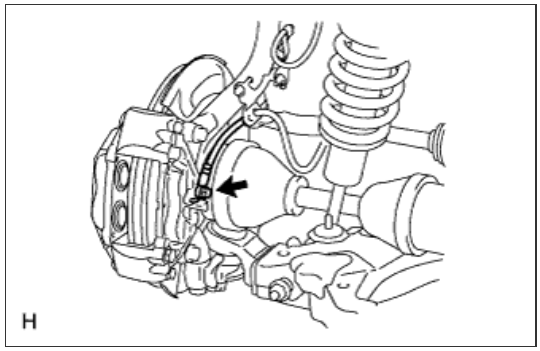
Torque:
99 N*m{ 1,010 kgf*cm , 73 ft.*lbf }



3. CONNECT FRONT FLEXIBLE HOSE

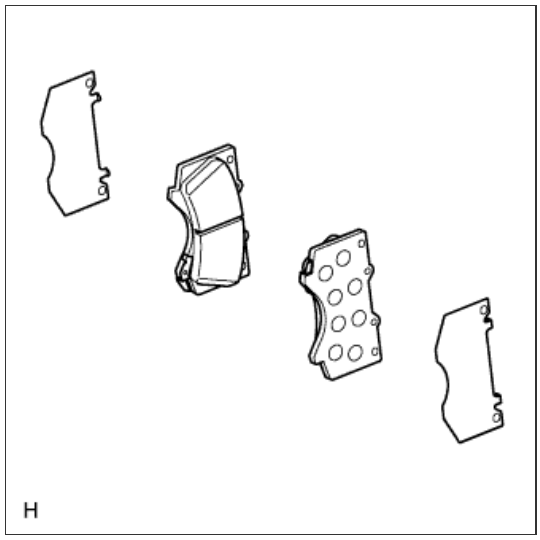
a. Install a new gasket and connect the flexible hose with the union bolt.

Torque:
30 N*m{ 306 kgf*cm , 22 ft.*lbf }

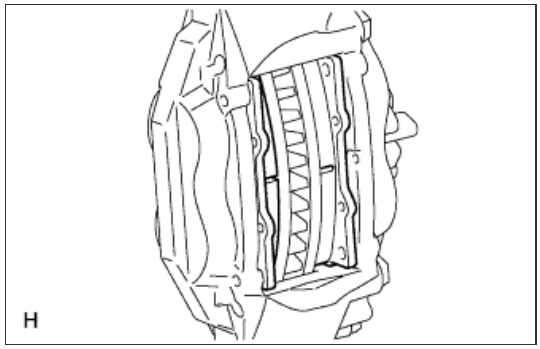


4. INSTALL FRONT DISC BRAKE PAD

a. Install the No. 1 anti-squeal shims to each pad.



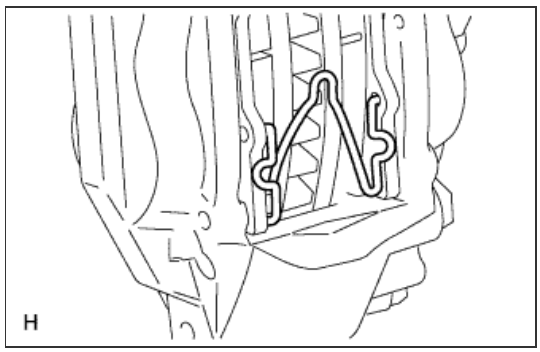
b. Install the 2 pads to the disc brake caliper.



c. Install the front disc brake anti-rattle spring between the 2 pads.

NOTICE:

The anti-rattle spring can be reused if it has sufficient rebound; no deformation, cracks or wear; and has had all rust, dirt and foreign particles cleaned off.

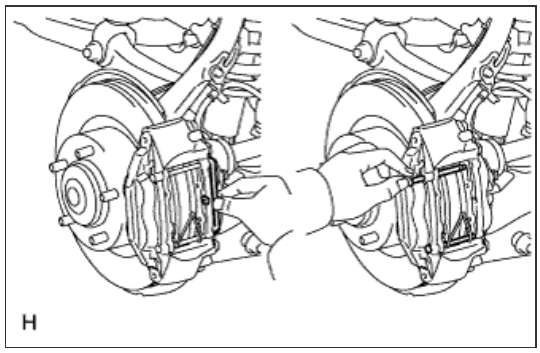


d. Install the 2 hole pins.

e. Install the pin hold clip.

NOTICE:

The pin hold clip can be reused if it has sufficient rebound; no deformation or wear; and has had all rust, dirt and foreign particles cleaned off.



5. BLEED BRAKE LINE

a. Turn the ignition switch to ON.

b. Remove the brake master cylinder reservoir filler cap assembly.

c. Add brake fluid until the fluid level is between the MIN and MAX lines of the reservoir.

d. Repeatedly depress the brake pedal and bleed air from the bleeder plug of the front disc brake cylinder RH.

e. Repeat the step above until the air is completely bled, and then tighten the bleeder plug while depressing the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

f. Bleed the air from the bleeder plug of the front disc brake cylinder LH using the same procedure as for the RH side.

g. With the brake pedal depressed, loosen the bleeder plug of the rear disc brake cylinder RH, continue to hold the brake pedal and allow brake fluid to be drained from the bleeder plug while the pump motor operates.

HINT:

- **Air is bled as the pump motor operates while the brake pedal is being depressed.**
- **Be sure to release the brake pedal to stop the motor after approximately 100 seconds of continuous operation.**
- **As brake fluid is continuously drained while the pump operates, it is not necessary to repeatedly depress the brake pedal.**

h. When there is no more air in the brake fluid, tighten the bleeder plug, and then release the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

i. Bleed the air from the bleeder plug of the rear disc brake cylinder LH using the same procedure as for the RH side.

j. Turn the ignition switch off.

k. Inspect for brake fluid leaks.

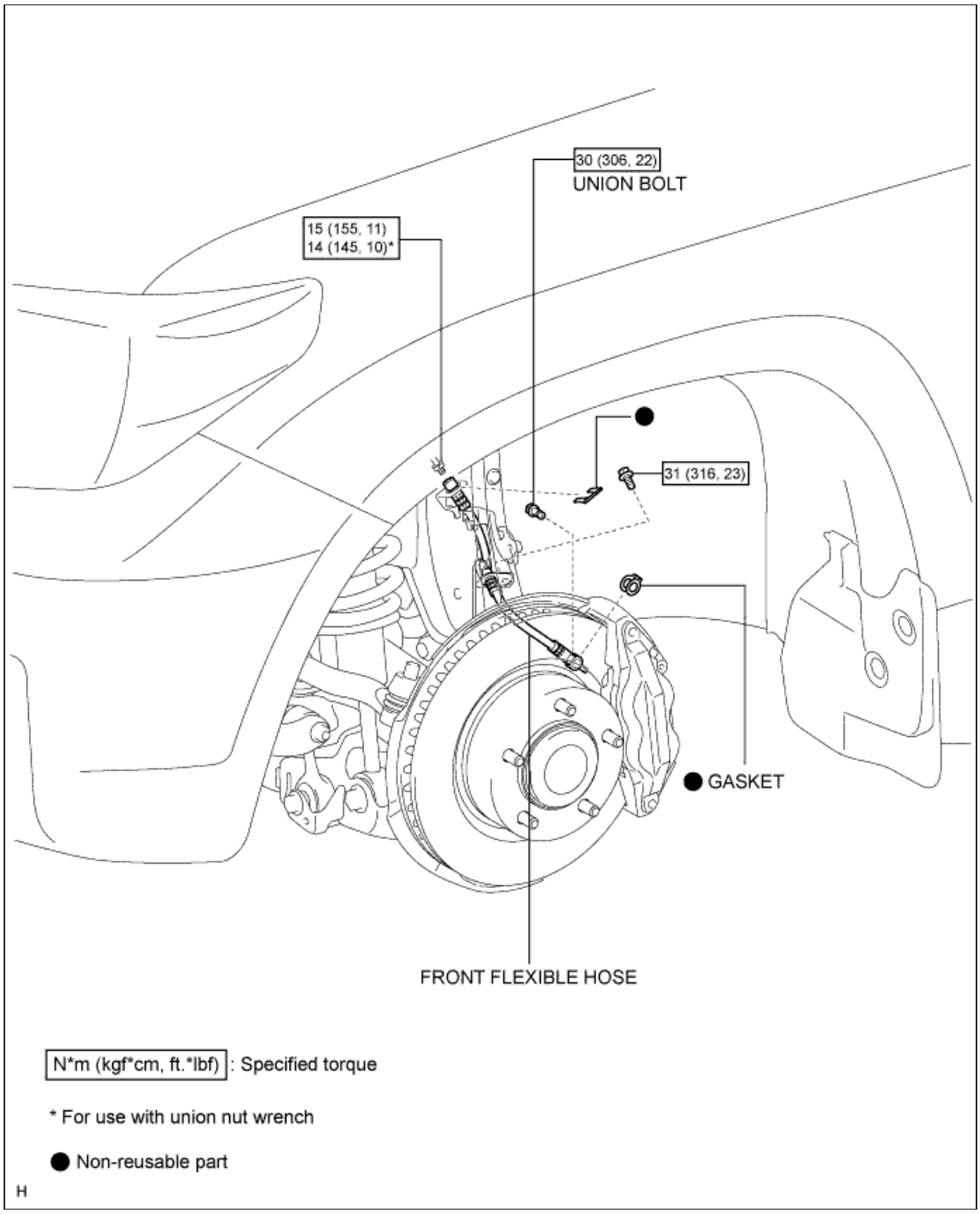
l. Check and adjust the brake fluid level (Click here).

m. Clear the DTCs (Click here).

6. INSTALL FRONT WHEEL

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

for Preparation Click here



FRONT BRAKE FLEXIBLE HOSE > REMOVAL

for Preparation Click here

HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. REMOVE FRONT WHEEL

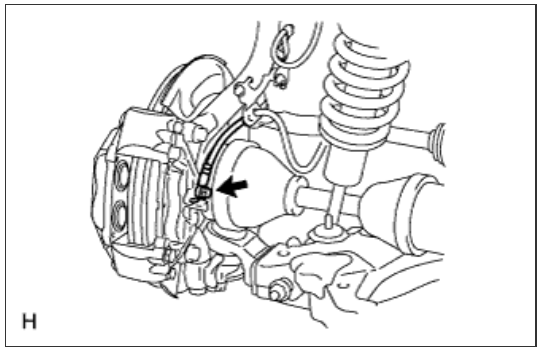
RAIN BRAKE FLUI

NOTICE:

Wash off brake fluid immediately if it comes in contact with any painted surface.

3. REMOVE FRONT FLEXIBLE HOSE

a. Remove the union bolt and gasket, and then disconnect the flexible hose.



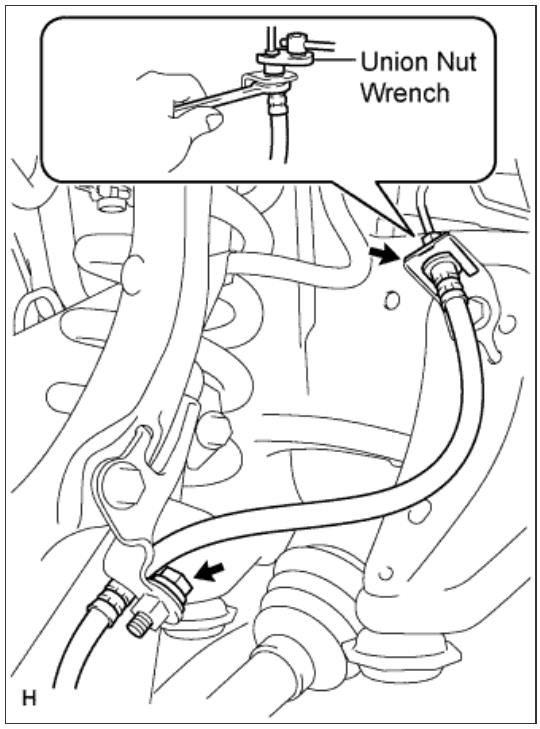
b. Remove the bolt.

c. Remove the brake tube from the flexible hose with a union nut wrench while holding the flexible hose with a wrench.

NOTICE:

- **o not bend or damage the brake tube.**
- **o not allow any foreign matter such as dirt and dust to enter the brake tube from the connecting point.**

d. Remove the clip and flexible hose.



for Preparation Click here

HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. INSTALL FRONT FLEXIBLE HOSE

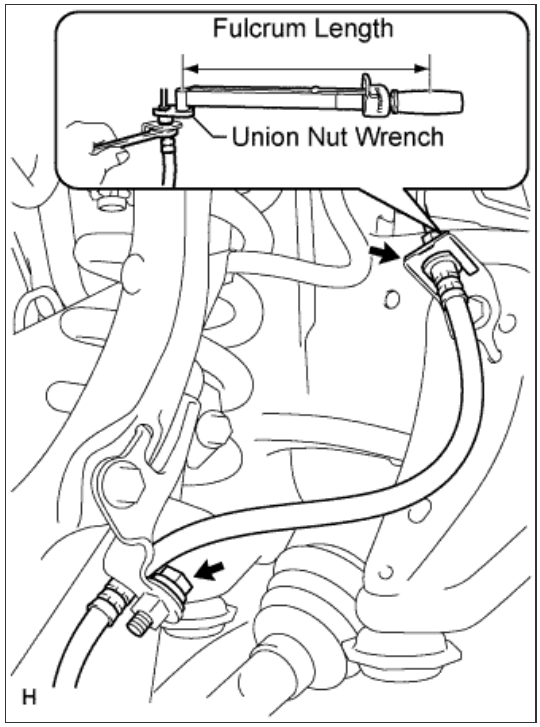
a. Install a new clip to the flexible hose.

b. Using a union nut wrench, connect the flexible hose to the brake tube while holding the flexible hose with a wrench.

Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

NOTICE:

- **Do not bend or damage the brake tube.**
- **Do not allow any foreign matter such as dirt and dust to enter the brake tube from the connecting point.**
- **Use a torque wrench with a fulcrum length of 300 mm (11.8 in.).**
- **The torque value for use with a union nut wrench is effective when the union nut wrench is parallel to the torque wrench.**

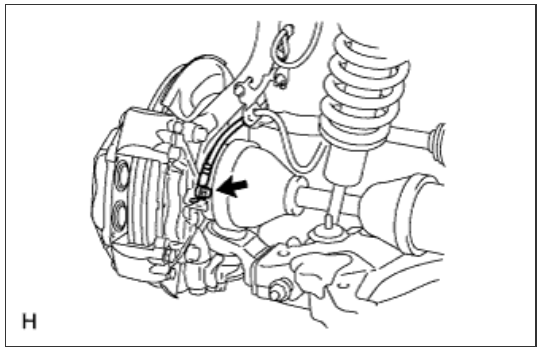


c. Install the bolt.

Torque:
31 N*m{ 316 kgf*cm , 23 ft.*lbf }

d. Install a new gasket and connect the flexible hose with the union bolt.

Torque:
30 N*m{ 306 kgf*cm , 22 ft.*lbf }



2. BLEED BRAKE LINE

a. Turn the ignition switch to ON.

b. Remove the brake master cylinder reservoir filler cap assembly.

c. Add brake fluid until the fluid level is between the MIN and MAX lines of the reservoir.

d. Repeatedly depress the brake pedal and bleed air from the bleeder plug of the front disc brake cylinder RH.

e. Repeat the step above until the air is completely bled, and then tighten the bleeder plug while depressing the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

f. Bleed the air from the bleeder plug of the front disc brake cylinder LH using the same procedure as for the RH side.

g. With the brake pedal depressed, loosen the bleeder plug of the rear disc brake cylinder RH, continue to hold the brake pedal and allow brake fluid to be drained from the bleeder plug while the pump motor operates.

HINT:

- **Air is bled as the pump motor operates while the brake pedal is being depressed.**
- **Be sure to release the brake pedal to stop the motor after approximately 100 seconds of continuous operation.**
- **As brake fluid is continuously drained while the pump operates, it is not necessary to repeatedly depress the brake pedal.**

h. When there is no more air in the brake fluid, tighten the bleeder plug, and then release the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

i. Bleed the air from the bleeder plug of the rear disc brake cylinder LH using the same procedure as for the RH side.

j. Turn the ignition switch off.

k. Inspect for brake fluid leaks.

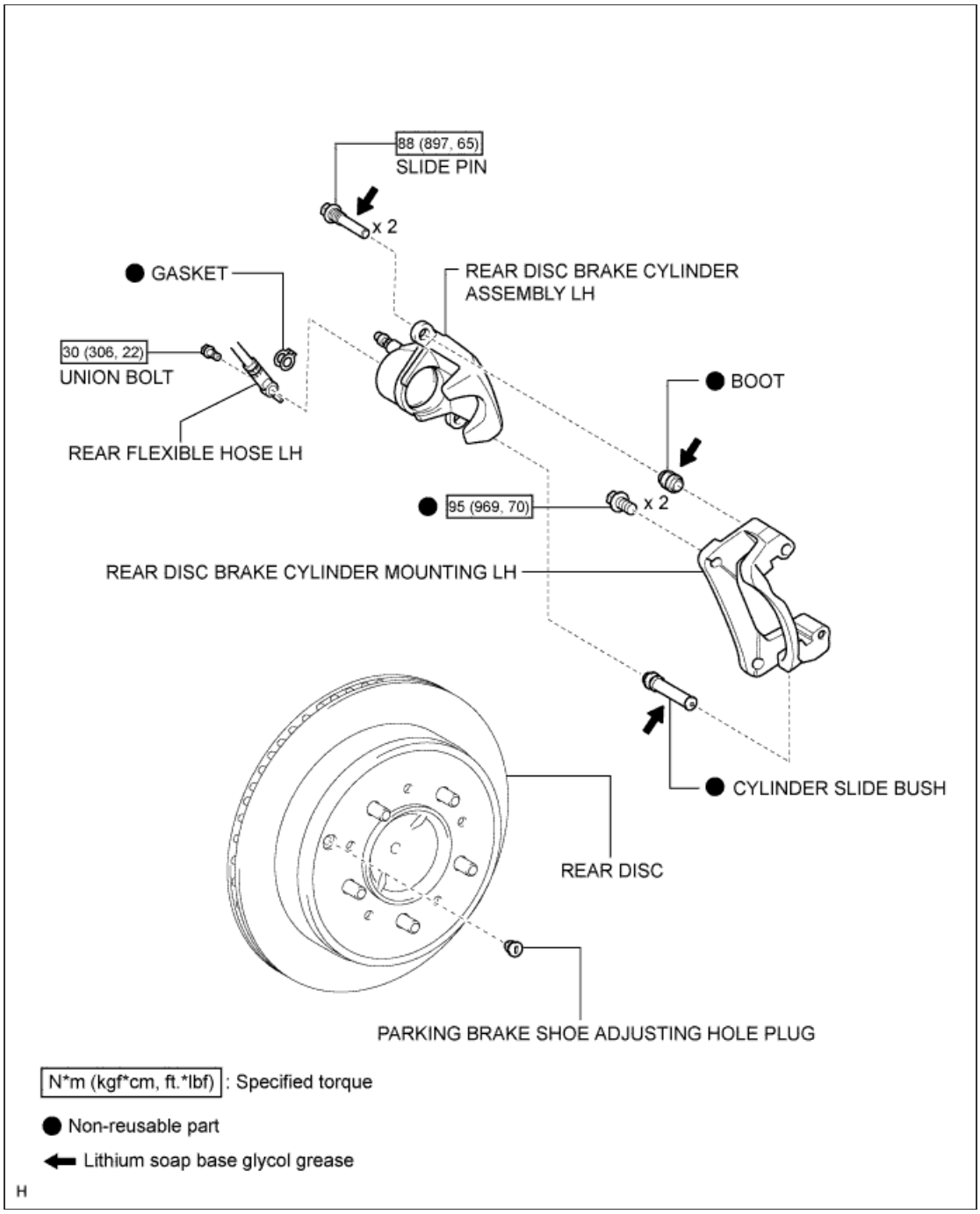
l. Check and adjust the brake fluid level (Click here).

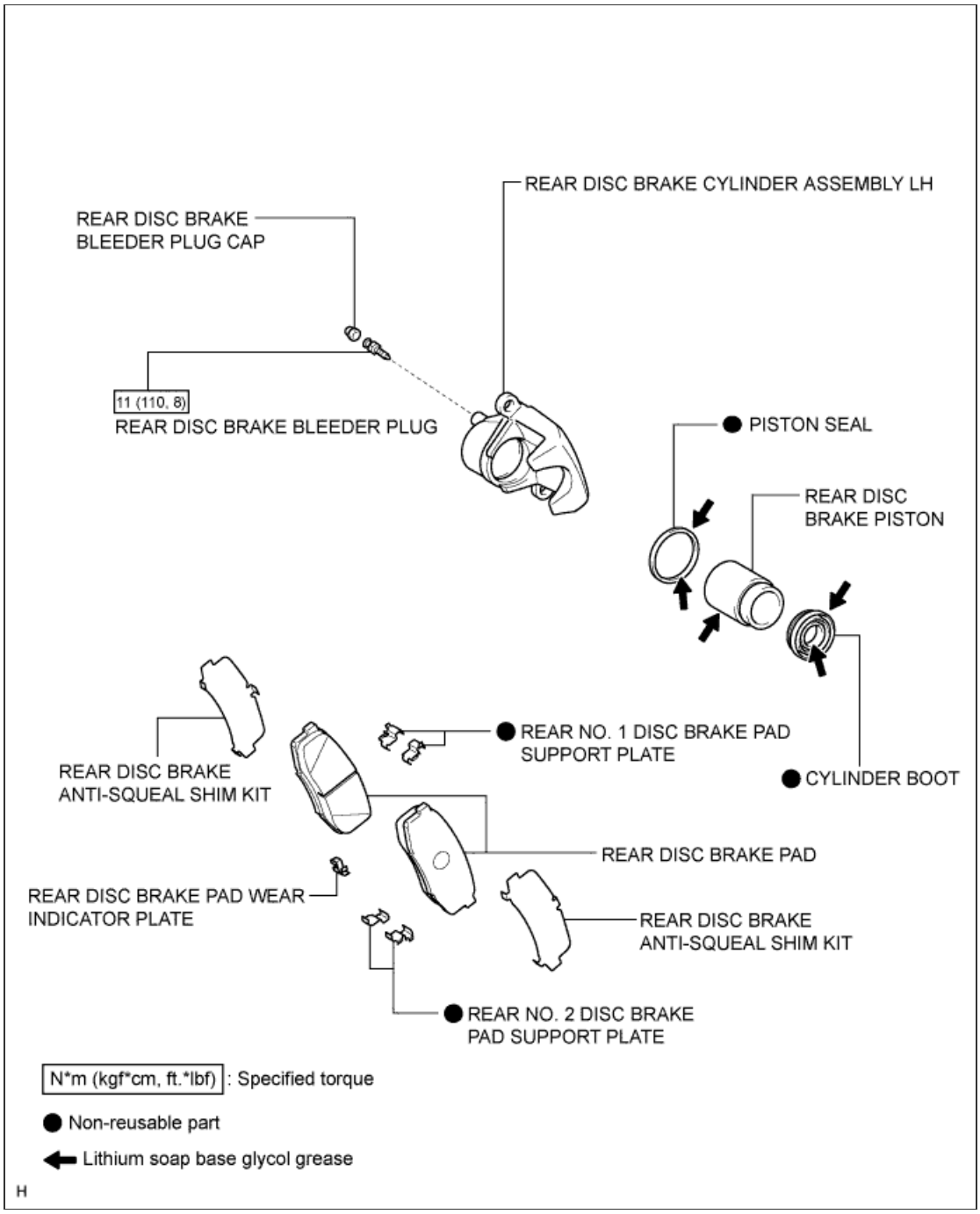
m. Clear the DTCs (Click here).

3. INSTALL FRONT WHEEL

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

for Preparation Click here




REAR DISC BRAKE CYLINDER ASSEMBLY LH
REAR DISC BRAKE
BLEEDER PLUG CAP
11 (110, 8)
REAR DISC BRAKE BLEEDER PLUG
PISTON SEAL
REAR DISC
BRAKE PISTON
REAR DISC BRAKE
ANTI-SQUEAL SHIM KIT
REAR NO. 1 DISC BRAKE PAD
SUPPORT PLATE
CYLINDER BOOT
REAR DISC BRAKE PAD
REAR DISC BRAKE PAD WEAR
INDICATOR PLATE
REAR DISC BRAKE
ANTI-SQUEAL SHIM KIT
REAR NO. 2 DISC BRAKE
PAD SUPPORT PLATE
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
Lithium soap base glycol grease
H

for Preparation Click here

HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. REMOVE REAR WHEEL

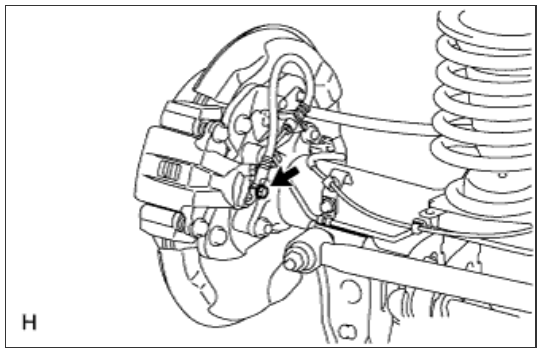
2. DRAIN BRAKE FLUID

NOTICE:

Wash brake fluid off immediately if it is spilled on any painted surface.

3. DISCONNECT REAR FLEXIBLE HOSE LH

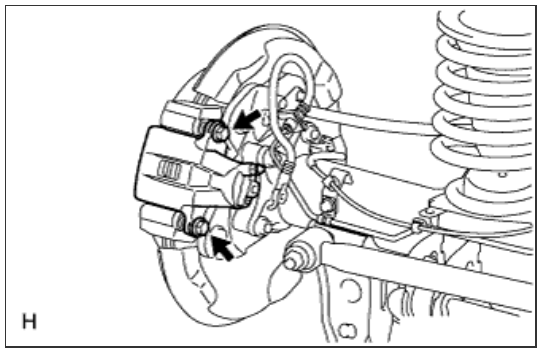
a. Remove the union bolt and asket and then disconnect the flexible hose from the rear disc brake cylinder. Use a container to catch brake fluid as it drains out.



4. REMOVE REAR DISC BRAKE CYLINDER ASSEMBLY LH

a. Remove the 2 slide pins.

b. Remove the cylinder from the rear disc brake cylinder mountin .



5. REMOVE REAR DISC BRAKE PAD

a. Remove the 2 brake pads from the rear disc brake cylinder mountin .

NOTICE:

- **When removing the pads, make sure that the No. 1 and No. 2 disc brake pad support plates remain securely attached to the cylinder mounting. The pad support plates are attached to the cylinder mounting with double-sided tape.**
- **If a pad support plate is not securely attached to the cylinder mounting, replace it with a new one.**

6. REMOVE REAR DISC BRAKE ANTI-SQUEAL SHIM KIT

a. Remove the anti sueal shims from each disc brake pad.

7. REMOVE REAR DISC BRAKE PAD WEAR INDICATOR PLATE

a. Remove the pad wear indicator plate from the inner side disc brake pad.

8. REMOVE REAR NO. 1 DISC BRAKE PAD SUPPORT PLATE

NOTICE:

- **The pad support plates can be reused if they are securely attached to the cylinder mounting. Therefore, do not remove the pad support plates from the cylinder mounting. The pad support plates are attached to the cylinder mounting with double-sided tape.**
- **If it is necessary to remove the pad support plates, replace them with new ones.**

a. Remove the 2 pad support plates from the rear disc brake cylinder mountin .

9. REMOVE REAR NO. 2 DISC BRAKE PAD SUPPORT PLATE

NOTICE:

- **The pad support plates can be reused if they are securely attached to the cylinder mounting. Therefore, do not remove the pad support plates from the cylinder mounting. The pad support plates are attached to the cylinder mounting with double-sided tape.**
- **If it is necessary to remove the pad support plates, replace them with new ones.**

a. Remove the 2 pad support plates from the rear disc brake cylinder mountin .

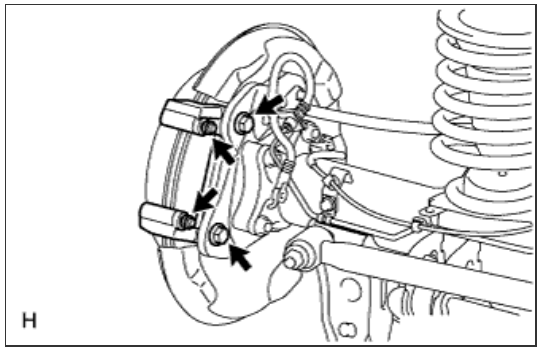
10. REMOVE REAR DISC BRAKE CYLINDER MOUNTING LH

a. Remove the 2 bolts and rear disc brake cylinder mountin .

NOTICE:

f the pad supports are removed durin maintenance of parts replace them with new ones.

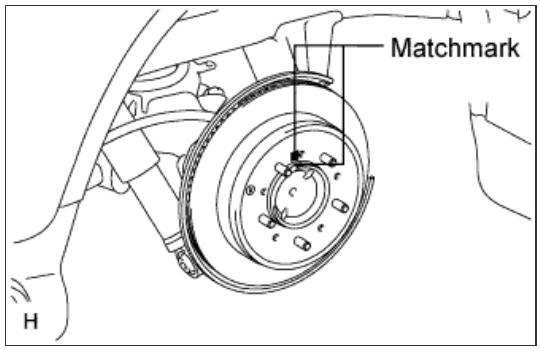
b. Remove the cylinder slide bush and boot from the rear disc brake cylinder mountin .



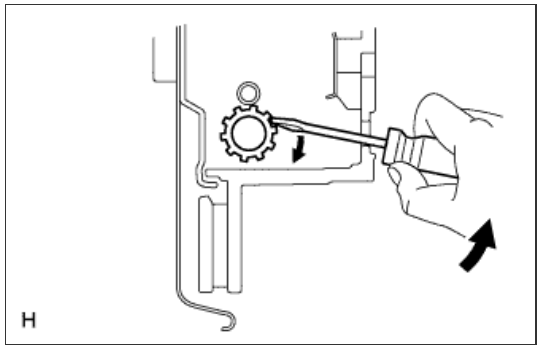
11. REMOVE PARKING BRAKE SHOE ADJUSTING HOLE PLUG

12. REMOVE REAR DISC

a. Put matchmarks on the rear disc and axle hub if plannin to reuse the disc.



b. Turn the shoe ad uster as shown in the illustration until the disc turns freely and then remove the disc.



for Preparation Click here

1. REMOVE REAR DISC BRAKE BLEEDER PLUG CAP

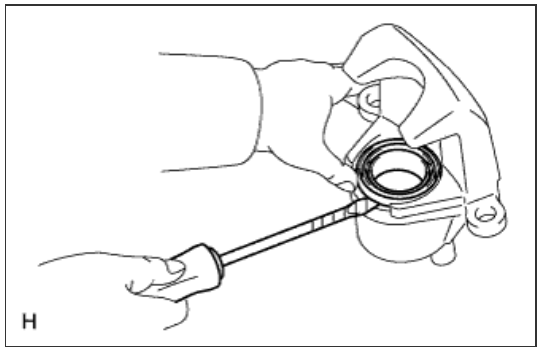
2. REMOVE REAR DISC BRAKE BLEEDER PLUG

3. REMOVE CYLINDER BOOT

a. Using a screwdriver, remove the cylinder boot from the cylinder.

HINT:

Tape the screwdriver tip before use.



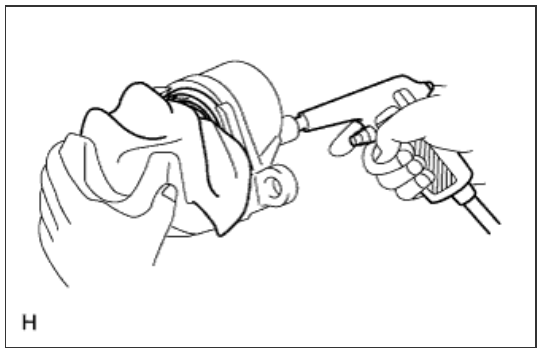
4. REMOVE REAR DISC BRAKE PISTON

a. lace a piece of cloth or a similar ob ect between the piston and cylinder.

b. Use compressed air to remove the piston from the cylinder.

CAUTION:

Do not place your fingers in front of the piston when using compressed air.



5. REMOVE PISTON SEAL

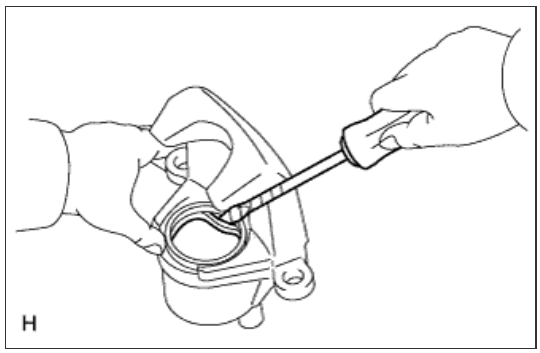
a. Using a screwdriver, remove the piston seal from the cylinder.

NOTICE:

Do not damage the inner cylinder and cylinder groove.

HINT:

Tape the screwdriver tip before use.



for Preparation Click here

1. CHECK PAD LINING THICKNESS

a. Using a ruler, measure the pad lining thickness.

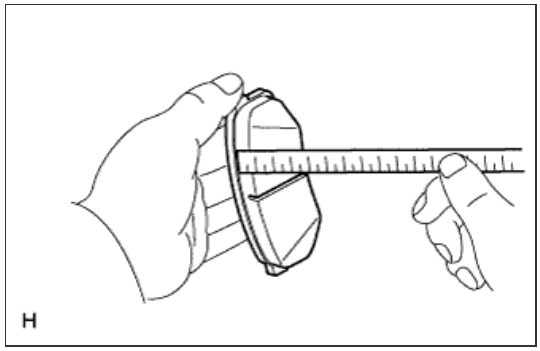
Standard Thickness:
12.0 mm (0.472 in.)

Minimum Thickness:
1.0 mm (0.0394 in.)

If the pad lining thickness is less than the minimum, replace the pad.

HINT:

Be sure to check the wear on the rear disc after replacing the brake pad with a new one.



2. CHECK DISC THICKNESS

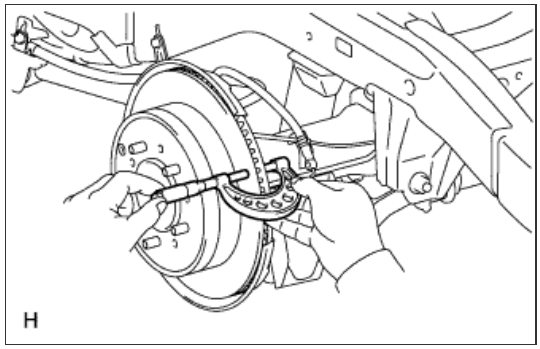
a. Temporarily install the disc with the 3 hub nuts.

b. Using a micrometer, measure the disc thickness.

Standard Thickness:
18.0 mm (0.709 in.)

Minimum Thickness:
16.0 mm (0.630 in.)

If the disc thickness is less than the minimum, replace the disc.



3. CHECK DISC RUNOUT

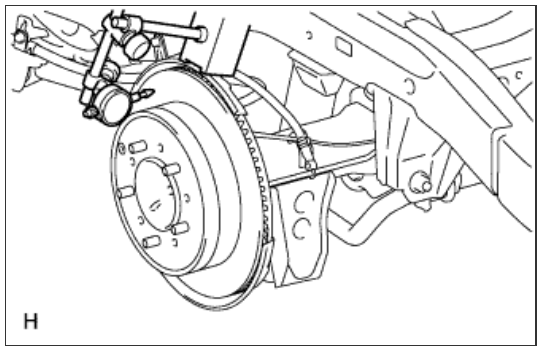
a. Fix the disc in place with the 5 hub nuts.

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

b. Using a dial indicator, measure the disc runout at a position 10 mm (0.394 in.) from the outside edge.

Maximum Disc Runout:
0.15 mm (0.00590 in.)

If the disc runout is more than the maximum, check the rear axle shaft (Click here). If the rear axle shaft is normal, adjust the disc runout or grind it on an on-vehicle brake lathe.



4. ADJUST DISC RUNOUT

a. Remove the 2 bolts and rear disc brake cylinder mounting from the backing plate.

b. Remove the hub nuts and disc. Rotate the disc 1/5 of a turn from its original position on the hub, and install the disc with the hub nuts.

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

c. Measure the disc runout. Make a note of the runout and the disc position on the hub.

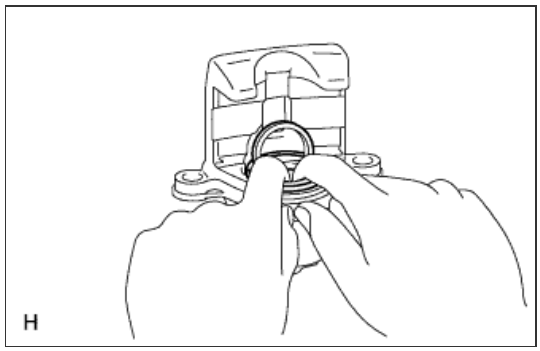
d. Repeat the 2 previous steps until the disc has been installed on the 3 remaining hub positions. If the minimum runout recorded above is less than 0.15 mm (0.00590 in.), install the disc in that position. If the minimum runout recorded above is more than 0.15 mm (0.00590 in.), replace the disc and repeat the "Check Disc Runout" procedure.

for Preparation Click here

1. INSTALL PISTON SEAL

a. Apply lithium soap base glycol grease to a new piston seal.

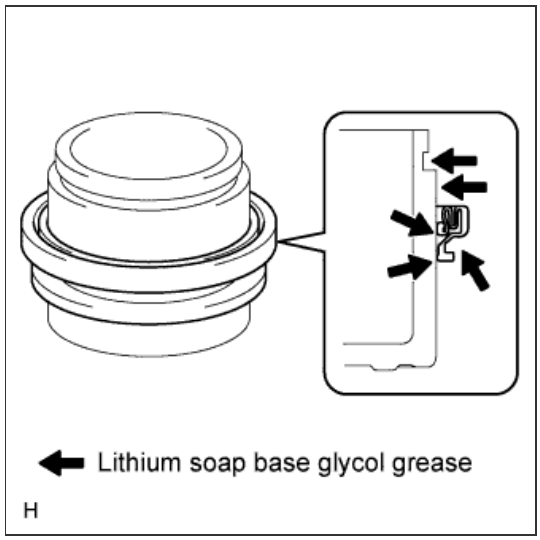
b. Install the piston seal to the disc brake cylinder.



2. INSTALL CYLINDER BOOT

a. Apply lithium soap base glycol grease to the piston and a new cylinder boot.

b. Install the cylinder boot to the piston as shown in the illustration.



3. INSTALL REAR DISC BRAKE PISTON

a. Install the cylinder boot to the disc brake cylinder.

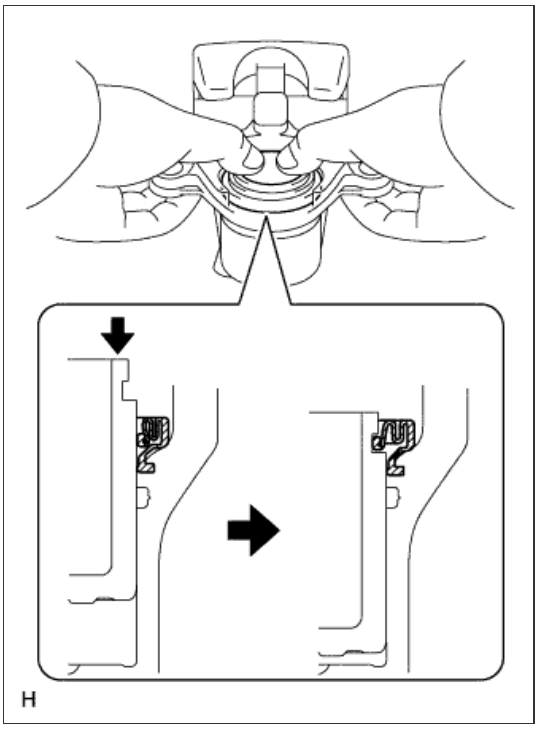
NOTICE:

Install the boot securely to the grooves of the disc brake cylinder.

b. Push in the piston by hand and install the cylinder boot onto the grooves of the piston.

NOTICE:

Install the boot securely to the grooves of the piston.



. TEMPORARILY INSTALL REAR DISC BRAKE BLEEDER PLUG

a. Temporarily install the bleeder plug to the disc brake cylinder.

HINT:

The bleeder plug will be tightened to a torque specification in the "Bleed Brake Line" procedure.

5. INSTALL REAR DISC BRAKE BLEEDER PLUG CAP

for Preparation Click here

HINT:

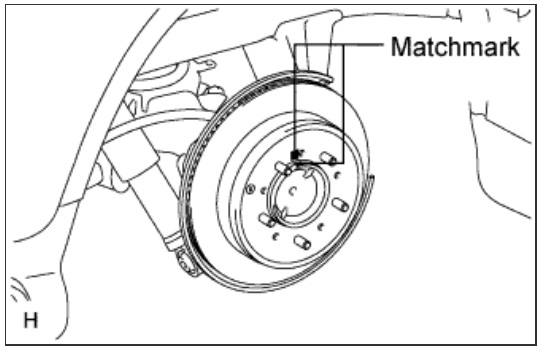
- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. INSTALL REAR DISC

a. Align the matchmarks, and then install the rear disc.

HINT:

When replacing the rear disc with a new one, select the installation position where the rear disc has the minimum runout.



2. INSTALL PARKING BRAKE SHOE ADJUSTING HOLE PLUG

3. INSTALL REAR DISC BRAKE CYLINDER MOUNTING LH

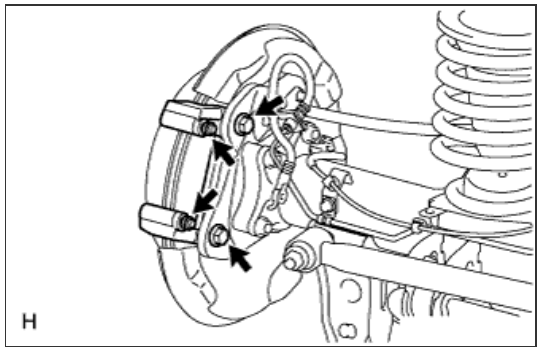
a. Install a new boot and a new cylinder slide bush to the rear disc brake cylinder mounting.

NOTICE:

Install the boot securely to the grooves of the rear disc brake cylinder mounting.

b. Install the rear disc brake cylinder mounting with 2 new bolts.

Torque:
95 N*m{ 969 kgf*cm , 70 ft.*lbf }



4. INSTALL REAR NO. 1 DISC BRAKE PAD SUPPORT PLATE

NOTICE:

- **The pad support plates can be reused if they are securely attached to the cylinder mounting. Therefore, do not remove the pad support plates from the cylinder mounting.**
- **If a pad support plate is removed, replace it with a new one that is supplied with double-sided tape already attached.**
- **Make sure to clean the cylinder mounting contact surface before attaching the pad support plates.**

a. Clean the cylinder mounting surface where the pad support plates will be attached.

b. Remove the peeling paper from the double-sided tape, and install 2 new pad support plates to the cylinder mounting.

5. INSTALL REAR NO. 2 DISK BRAKE PAD SUPPORT PLATE

NOTICE:

- **The pad support plates can be reused if they are securely attached to the cylinder mounting. Therefore, do not remove the pad support plates from the cylinder mounting.**
- **If a pad support plate is removed, replace it with a new one that is supplied with double-sided tape already attached.**
- **Make sure to clean the cylinder mounting contact surface before attaching the pad support plates.**

a. Clean the cylinder mounting surface where the pad support plates will be attached.

b. Remove the peeling paper from the double-sided tape, and install 2 new pad support plates to the cylinder mounting.

6. INSTALL REAR DISC BRAKE PAD WEAR INDICATOR PLATE

a. Install the pad wear indicator plate to the inner side disc brake pad.

7. INSTALL REAR DISC BRAKE ANTI-SQUEAL SHIM KIT

a. Install the anti-squeal shims to each brake pad.

NOTICE:

There should be no oil or grease on the friction surfaces of the brake pads and the rear disc.

8. INSTALL REAR DISC BRAKE PAD

NOTICE:

- **When installing the pads, make sure that the No. 1 and No. 2 disc brake pad support plates are securely attached to the cylinder mounting. The pad support plates are attached to the cylinder mounting with double-sided tape.**
- **If a pad support plate is not securely attached to the cylinder mounting, replace it with a new one.**

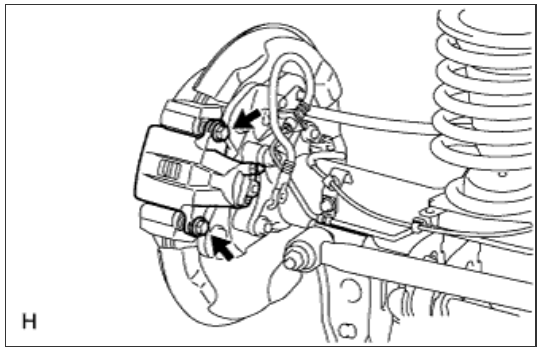
a. Install the 2 disc brake pads to the disc brake cylinder mounting.

9. INSTALL REAR DISC BRAKE CYLINDER ASSEMBLY LH

a. Apply lithium soap base glycol grease to the sliding part of the 2 cylinder slide pins.

b. Install the cylinder with the 2 cylinder slide pins.

Torque:
88 N*m{ 897 kgf*cm , 65 ft.*lbf }

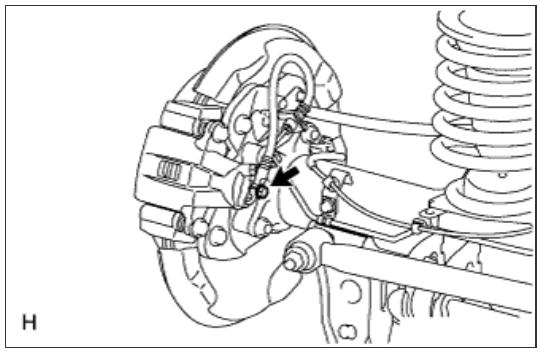


10. CONNECT REAR FLEXIBLE HOSE LH

a. Install a new gasket and connect the flexible hose with the union bolt.

Torque:

30 N*m{ 306 kgf*cm , 22 ft.*lbf }



11. BLEED BRAKE LINE

a. urn the ignition switch to ON.

b. Remove the brake master cylinder reservoir filler cap assembly.

c. Add brake fluid until the fluid level is between the MIN and MAX lines of the reservoir.

d. Repeatedly depress the brake pedal and bleed air from the bleeder plug of the front disc brake cylinder RH.

e. Repeat the step above until the air is completely bled, and then tighten the bleeder plug while depressing the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

f. Bleed the air from the bleeder plug of the front disc brake cylinder LH using the same procedure as for the RH side.

g. With the brake pedal depressed, loosen the bleeder plug of the rear disc brake cylinder RH, continue to hold the brake pedal and allow brake fluid to be drained from the bleeder plug while the pump motor operates.

HINT:

- **Air is bled as the pump motor operates while the brake pedal is being depressed.**
- **Be sure to release the brake pedal to stop the motor after approximately 100 seconds of continuous operation.**
- **As brake fluid is continuously drained while the pump operates, it is not necessary to repeatedly depress the brake pedal.**

h. When there is no more air in the brake fluid, tighten the bleeder plug, and then release the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

i. Bleed the air from the bleeder plug of the rear disc brake cylinder LH using the same procedure as for the RH side.

j. Turn the ignition switch off.

k. Inspect for brake fluid leaks.

l. Check and adjust the brake fluid level (Click here).

m. Clear the DTCs (Click here).

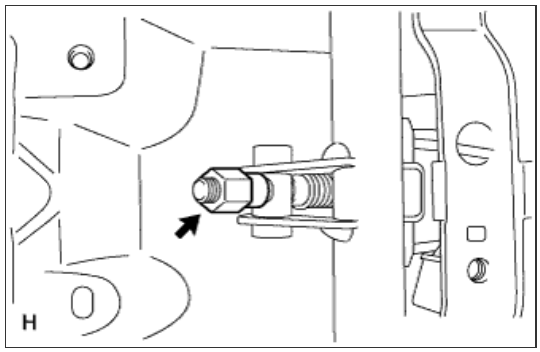
12. ADJUST PARKING BRAKE LEVER TRAVEL

a. Completely release the parking brake lever.

b. Loosen the adjusting nut to completely release the parking brake cable.

c. Temporarily install the hub nuts.

d. Remove the hole plug.

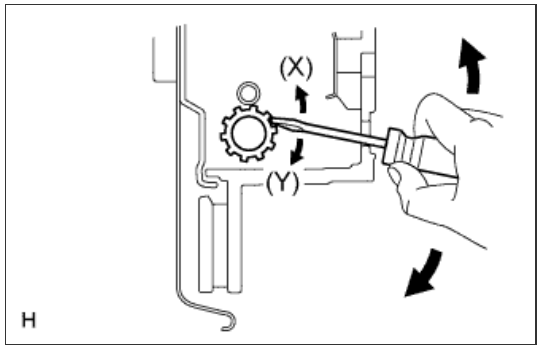


e. Insert an adjustment tool into the adjustment hole of the disc. Rotate the adjustment wheel in the "X" direction until the shoes are locked. Then rotate the adjustment wheel in the "Y" direction 8 notches.

f. Check that the disc can be rotated lightly. If not, rotate the adjustment wheel in the "Y" direction and check again.

g. Install the hole plug.

h. Remove the hub nuts.

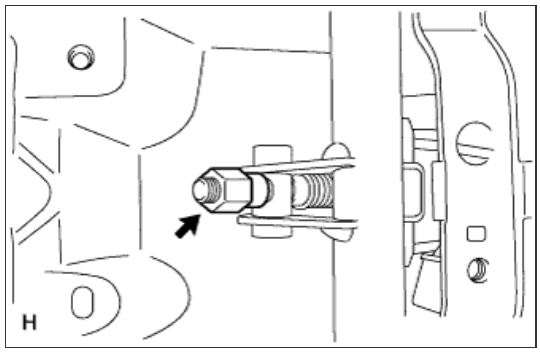


i. Turn the adjusting nut until the parking brake lever travel becomes correct.

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks

j. Operate the parking brake lever 3 to 4 times, and check the parking brake lever travel.

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks



k. Check whether the parking brake drags or not.

l. When operating the parking brake lever, check that the brake warning light comes on.

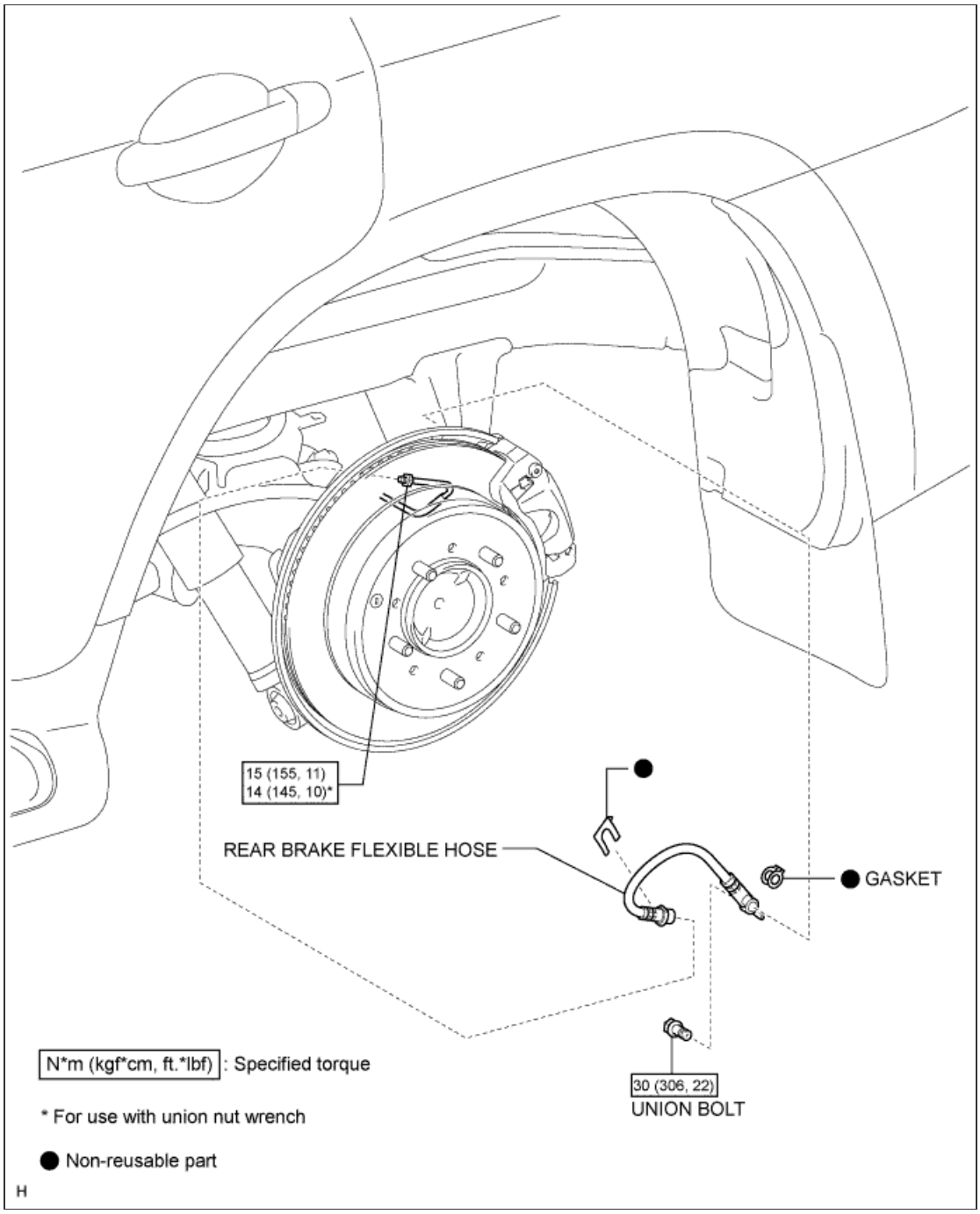
Standard Condition:
The brake warning light always illuminates at the first click.

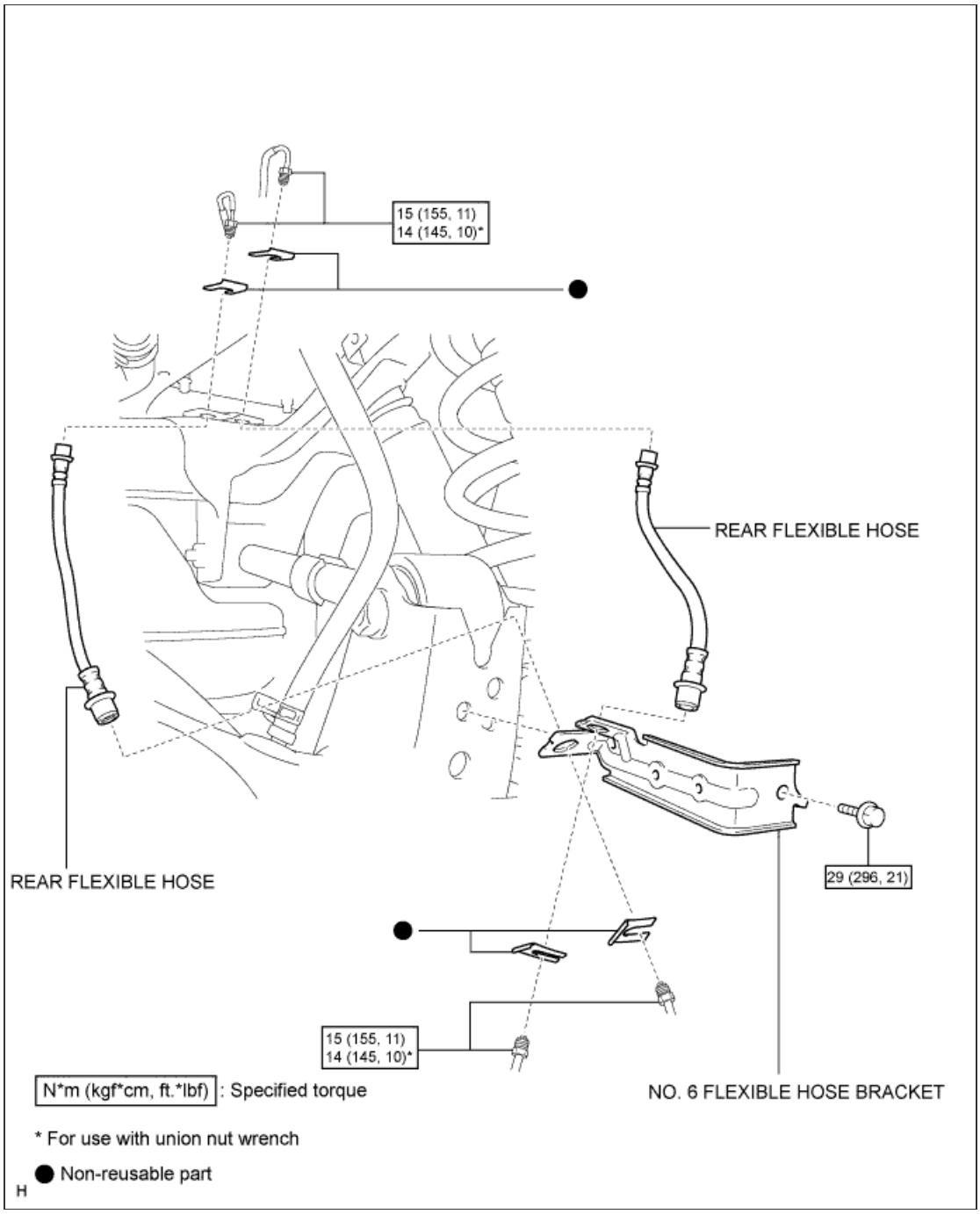
13. INSTALL PARKING BRAKE SHOE ADJUSTING HOLE PLUG

14. INSTALL REAR WHEEL

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

for Preparation Click here




15 (155, 11)
14 (145, 10)*
REAR FLEXIBLE HOSE
REAR FLEXIBLE HOSE
29 (296, 21)
15 (155, 11)
14 (145, 10)*
NO. 6 FLEXIBLE HOSE BRACKET
N*m (kgf*cm, ft.*lbf) : Specified torque
* For use with union nut wrench
Non-reusable part
H

for Preparation Click here

HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. REMOVE REAR WHEEL

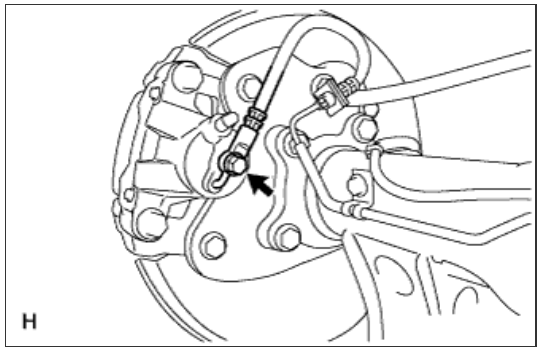
2. DRAIN BRAKE FLUID

NOTICE:

Wash off brake fluid immediately if it comes in contact with any painted surface.

3. REMOVE REAR FLEXIBLE HOSE LH

a. Remove the union bolt and gasket, and then remove the flexible hose from the disc brake cylinder.

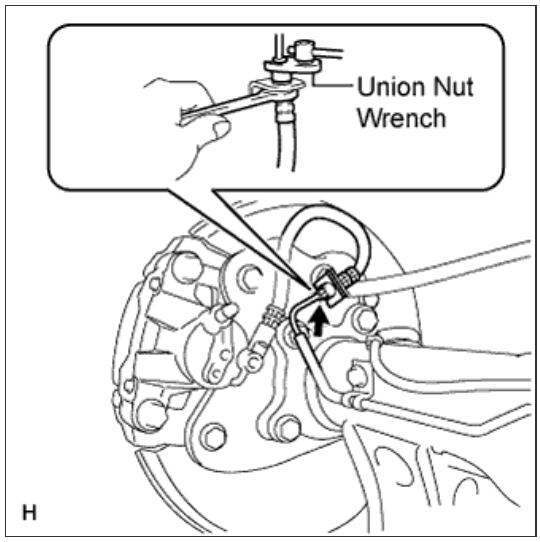


b. Disconnect the brake tube from the flexible hose with a union nut wrench while holding the flexible hose with a wrench.

NOTICE:

- **Do not bend or damage the brake tube.**
- **Do not allow any foreign matter such as dirt and dust to enter the brake tube from the connecting point.**

c. Remove the clip.

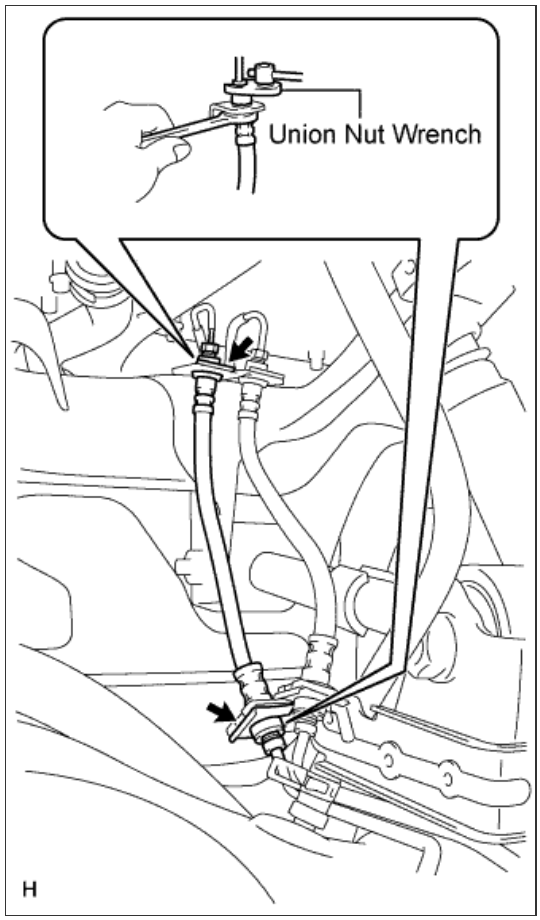


4. REMOVE REAR FLEXIBLE HOSE

a. Disconnect each brake tube from the flexible hose with a union nut wrench while holding the flexible hose with a wrench.

b. Remove the 2 clips.

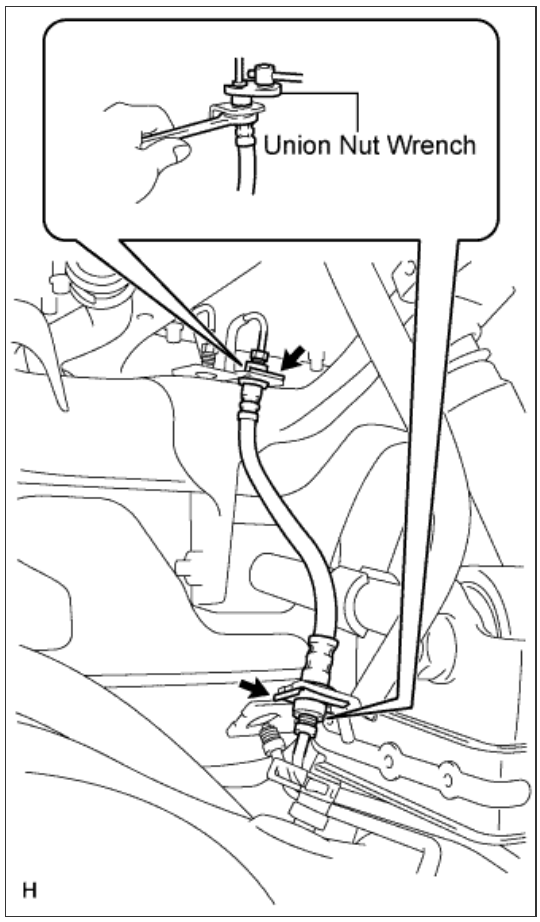
c. Remove the flexible hose.



d. Disconnect each brake tube from the flexible hose with a union nut wrench while holding the flexible hose with a wrench.

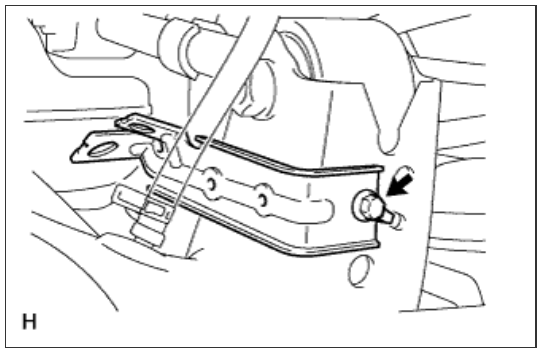
e. Remove the 2 clips.

f. Remove the flexible hose.



5. REMOVE NO. 6 FLEXIBLE HOSE BRACKET

a. Remove the bolt and bracket from the rear axle housing.



for Preparation Click here

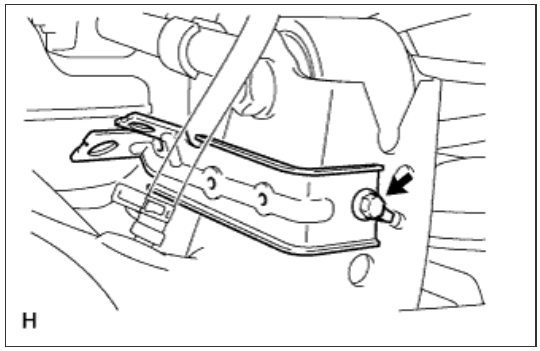
HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. INSTALL NO. 6 FLEXIBLE HOSE BRACKET

a. Install the bracket with the bolt.

Torque:
29 N*m{ 296 kgf*cm , 21 ft.*lbf }



2. INSTALL REAR FLEXIBLE HOSE

a. Connect the flexible hose to the connecting point with each brake tube, and then install 2 new clips.

b. Using a union nut wrench, connect each brake tube to the flexible hose while holding the flexible hose with a wrench.

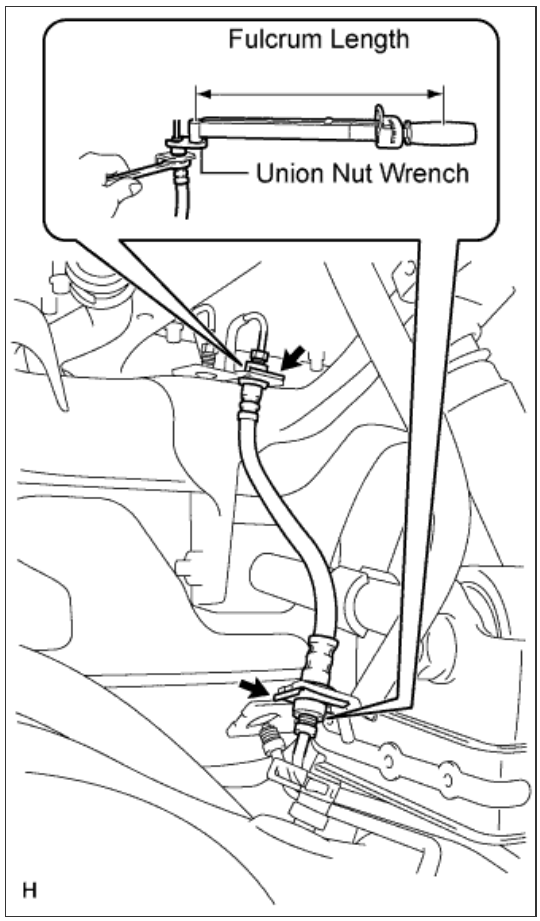
Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

NOTICE:

- **Do not bend or damage the brake tube.**
- **Do not allow any foreign matter such as dirt and dust to enter the brake tube from the connecting point.**

HINT:

- **Use a torque wrench with a fulcrum length of 300 mm (11.8 in.).**
- **The torque value for use with a union nut wrench is effective when the union nut wrench is parallel to the torque wrench.**



c. Connect the flexible hose to the connecting point with each brake tube, and then install 2 new clips.

d. Using a union nut wrench, connect each brake tube to the flexible hose while holding the flexible hose with a wrench.

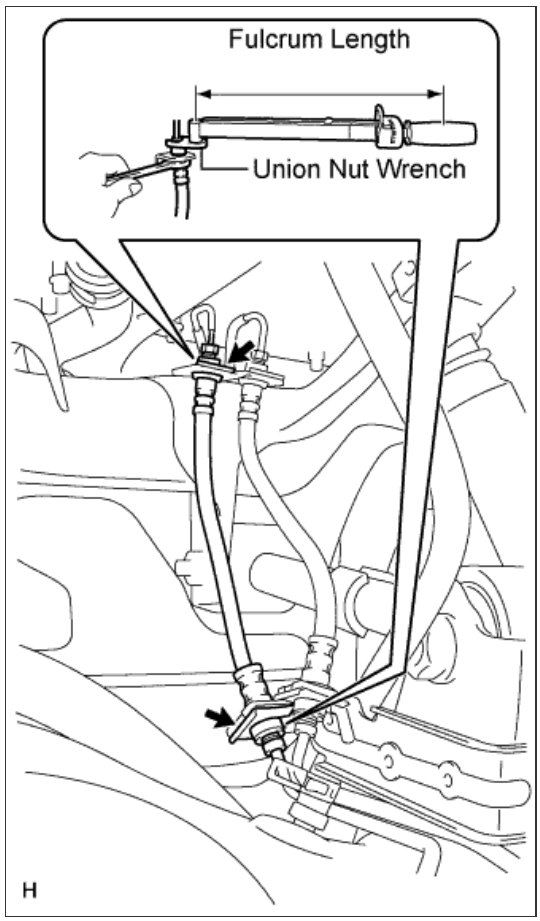
Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

NOTICE:

- **Do not bend or damage the brake tube.**
- **Do not allow any foreign matter such as dirt and dust to enter the brake tube from the connecting point.**

HINT:

- **Use a torque wrench with a fulcrum length of 300 mm (11.8 in.).**
- **The torque value for use with a union nut wrench is effective when the union nut wrench is parallel to the torque wrench.**



3. INSTALL REAR FLEXIBLE HOSE LH

a. Connect the flexible hose to the connecting point with the brake tube, and then install a new clip.

b. Using a union nut wrench, connect the brake tube to the flexible hose while holding the flexible hose with a wrench.

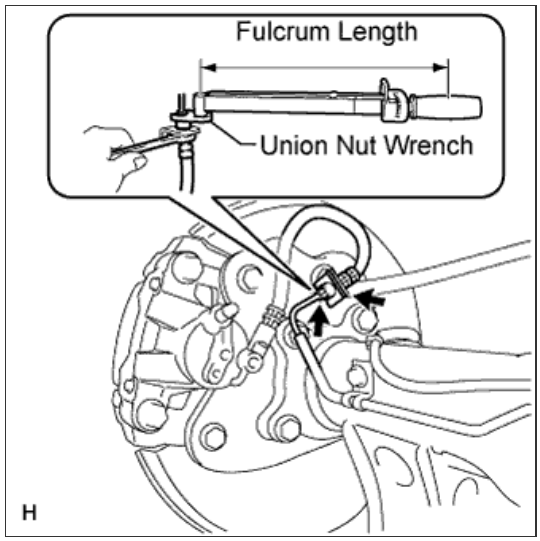
Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

NOTICE:

- **Do not bend or damage the brake tube.**
- **Do not allow any foreign matter such as dirt and dust to enter the brake tube from the connecting point.**

HINT:

- **Use a torque wrench with a fulcrum length of 300 mm (11.8 in.).**
- **The torque value for use with a union nut wrench is effective when the union nut wrench is parallel to the torque wrench.**

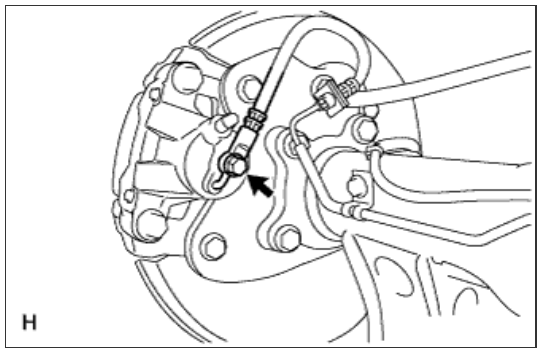


c. Install the flexible hose and a new gasket to the disc brake cylinder with the union bolt.

Torque:
30 N*m{ 306 kgf*cm , 22 ft.*lbf }

HINT:

Install the flexible hose lock securely in the lock hole in the cylinder.



4. BLEED BRAKE LINE

a. Turn the ignition switch to ON.

b. Remove the brake master cylinder reservoir filler cap assembly.

c. Add brake fluid until the fluid level is between the MIN and MAX lines of the reservoir.

d. Repeatedly depress the brake pedal and bleed air from the bleeder plug of the front disc brake cylinder RH.

e. Repeat the step above until the air is completely bled, and then tighten the bleeder plug while depressing the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

f. Bleed the air from the bleeder plug of the front disc brake cylinder LH using the same procedure as for the RH side.

g. With the brake pedal depressed, loosen the bleeder plug of the rear disc brake cylinder RH, continue to hold the brake pedal and allow brake fluid to be drained from the bleeder plug while the pump motor operates.

HINT:

- **Air is bled as the pump motor operates while the brake pedal is being depressed.**
- **Be sure to release the brake pedal to stop the motor after approximately 100 seconds of continuous operation.**
- **As brake fluid is continuously drained while the pump operates, it is not necessary to repeatedly depress the brake pedal.**

h. When there is no more air in the brake fluid, tighten the bleeder plug, and then release the brake pedal.

Torque:
11 N*m{ 110 kgf*cm , 8 ft.*lbf }

i. Bleed the air from the bleeder plug of the rear disc brake cylinder LH using the same procedure as for the RH side.

j. Turn the ignition switch off.

k. Inspect for brake fluid leaks.

l. Check and adjust the brake fluid level (Click here).

m. Clear the DTCs (Click here).

5. INSTALL REAR WHEEL

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

for Preparation Click here

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Parking Brake System

Symptom	Suspected Area	See page
Brake drag	arking brake le er tra el ut of ad ustment	Click here
	arking brake cable (Sticking	Click here
	arking brake shoe clearance (ut of ad ustment	Click here
	arking brake shoe lining (Cracked or distorted	Click here
	ension or return spring (amaged	Click here

for Preparation Click here

1. INSPECT PARKING BRAKE LEVER TRAVEL

a. Fully pull the parking brake lever to engage the parking brake.

b. Release the lever to disengage the parking brake.

c. Slowly pull the parking brake lever all the way, and count the number of clicks.

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks

If the parking brake lever travel is not as specified, adjust the parking brake shoe clearance and parking brake lever travel.

2. REMOVE REAR WHEEL

3. REMOVE UPPER CONSOLE COVER (w/o Console Box Lid)

(Click here)

4. REMOVE CONSOLE CUP HOLDER BOX SUB-ASSEMBLY (w/ Cool Box)

(Click here)

5. REMOVE CONSOLE CUP HOLDER BOX SUB-ASSEMBLY (w/o Cool Box)

(Click here)

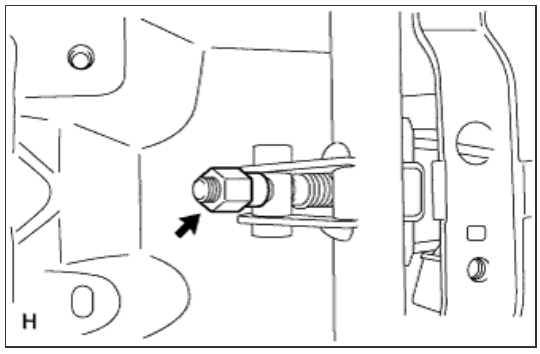
6. ADJUST PARKING BRAKE LEVER TRAVEL

a. Completely release the parking brake lever.

b. Loosen the adjusting nut to completely release the parking brake cable.

c. Temporarily install the hub nuts.

d. Remove the hole plug.

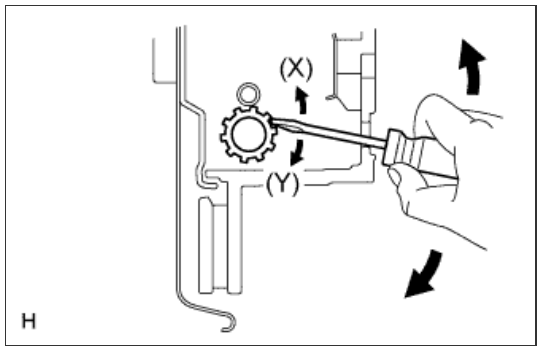


e. Insert an adjustment tool into the adjustment hole of the disc. Rotate the adjustment wheel in the "X" direction until the shoes are locked. Then rotate the adjustment wheel in the "Y" direction 8 notches.

f. Check that the disc can be rotated lightly. If not, rotate the adjustment wheel in the "Y" direction and check again.

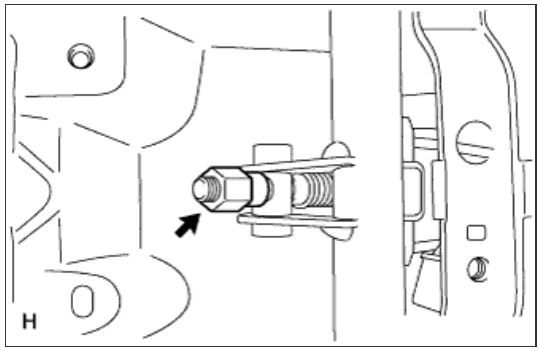
g. Install the hole plug.

h. Remove the hub nuts.



i. Turn the adjusting nut until the parking brake lever travel becomes correct.

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks



j. Operate the parking brake lever 3 to 4 times, and check the parking brake lever travel.

Standard Parking Brake Lever Travel when Pulled with a Force of 200 N (20 kgf, 45 lbf):
5 to 7 clicks

k. Check whether the parking brake drags or not.

l. When operating the parking brake lever, check that the brake warning light comes on.

Standard Condition:
The brake warning light always illuminates at the first click.

7. INSTALL UPPER CONSOLE COVER (w/o Console Box Lid)

(Click here)

8. INSTALL CONSOLE CUP HOLDER BOX SUB-ASSEMBLY (w/ Cool Box)

(Click here)

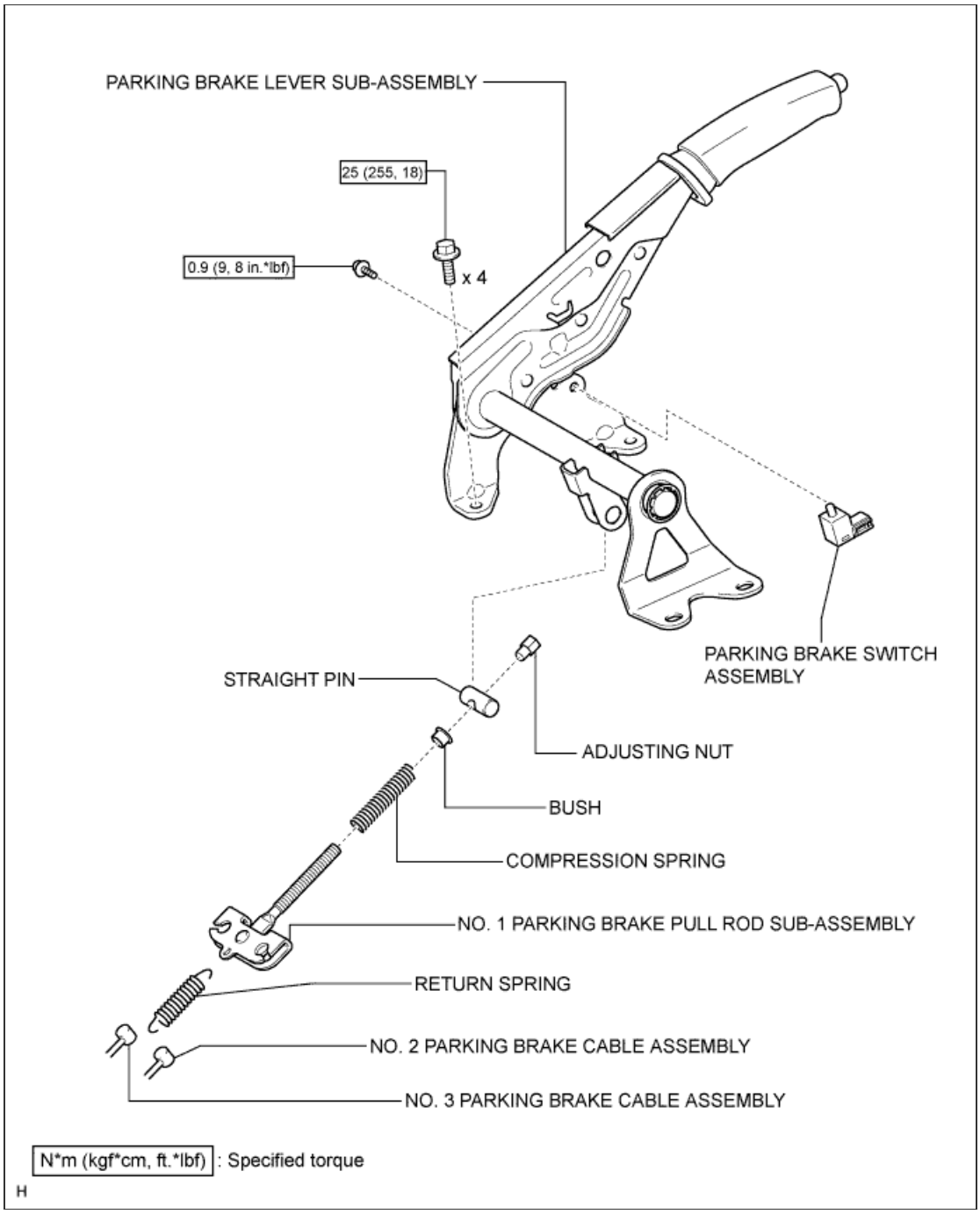
9. INSTALL CONSOLE CUP HOLDER BOX SUB-ASSEMBLY (w/o Cool Box)

(Click here)

10. INSTALL REAR WHEEL

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

for Preparation Click here



for Preparation Click here

1. RECOVER REFRIGERANT FROM REFRIGERATION SYSTEM

a. Start the engine.

b. Turn the A/C switch on.

c. Operate the cooler compressor while the engine speed is approximately 1000 rpm for 5 to 6 minutes to circulate the refrigerant and collect the compressor oil remaining in each component into the cooler compressor.

d. Stop the engine.

e. Recover the refrigerant from the A/C system using a refrigerant recovery unit.

2. REMOVE LOWER CONSOLE BOX (w/o Console Box Lid)

(Click here)

3. REMOVE COOLING BOX ASSEMBLY (w/ Cool Box)

(Click here)

4. REMOVE REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

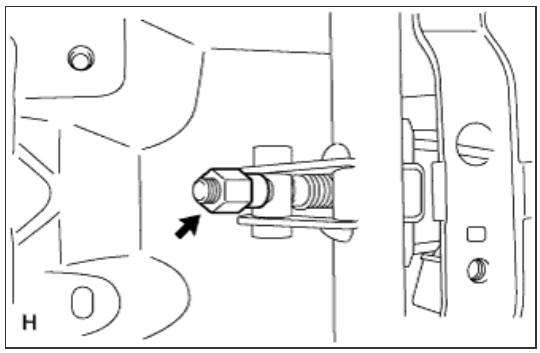
(Click here)

5. REMOVE PARKING BRAKE LEVER SUB-ASSEMBLY

a. Release the parking brake lever.

b. Disconnect the parking brake switch connector.

c. Remove the adjusting nut.

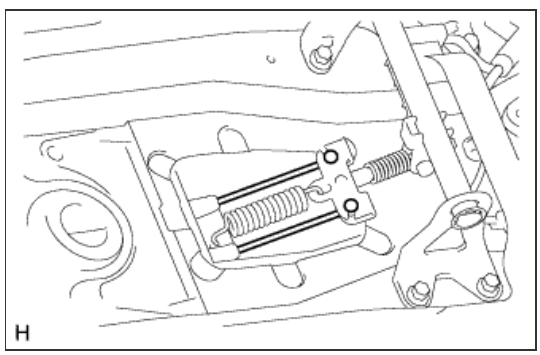


d. Remove the parking brake return spring.

e. Disconnect the No. 2 parking brake cable and No. 3 parking brake cable from the No. 1 parking brake pull rod.

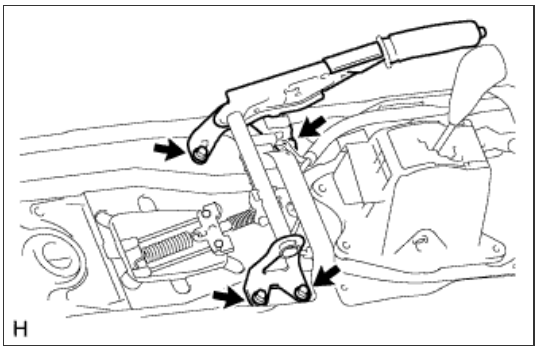
f. Remove the No. 1 parking brake pull rod, bush and compression spring from the parking brake lever.

g. Remove the straight pin from the parking brake lever.



h. Remove the 4 bolts and parking brake lever

h. Remove the 4 bolts and parking brake lever.



6. REMOVE PARKING BRAKE SWITCH ASSEMBLY

a. Remove the screw and parking brake switch.

for Preparation Click here

1. INSTALL PARKING BRAKE SWITCH ASSEMBLY

a. Install the parking brake switch with the screw.

Torque:
0.9 N*m{ 9 kgf*cm , 8 in.*lbf }

2. INSTALL PARKING BRAKE LEVER SUB-ASSEMBLY

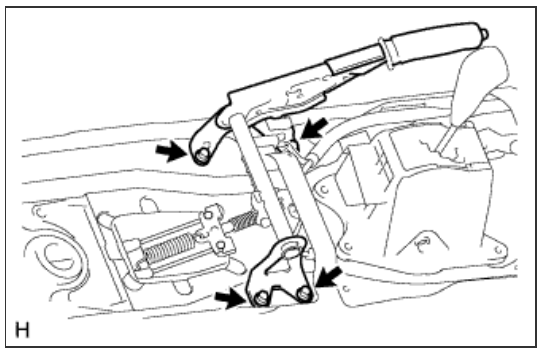
a. Install the parking brake lever with the 2 bolts.

Torque:
25 N*m{ 255 kgf*cm , 18 ft.*lbf }

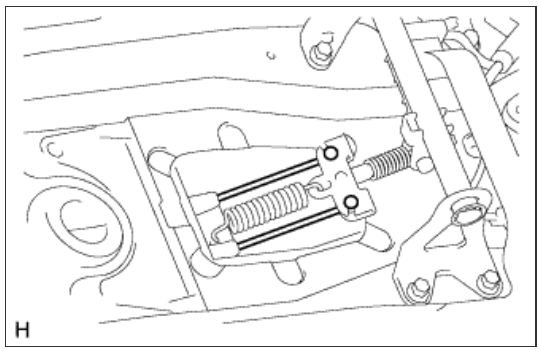
b. Install the parking brake lever support with the 2 bolts.

Torque:
25 N*m{ 255 kgf*cm , 18 ft.*lbf }

c. Install the straight pin to the parking brake lever.



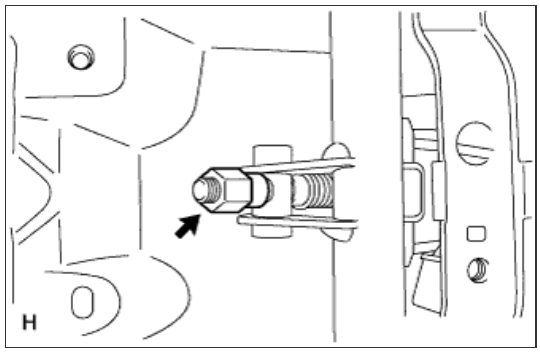
d. Connect the No. 2 parking brake cable and No. 3 parking brake cable to the No. 1 parking brake pull rod.



e. Install the bush, compression spring and No. 1 parking brake pull rod to the parking brake lever with the adjusting nut.

f. Install the parking brake return spring.

g. Connect the parking brake switch connector.



3. ADJUST PARKING BRAKE

(Click here)

4. INSTALL LOWER CONSOLE BOX (w/o Console Box Lid)

(Click here)

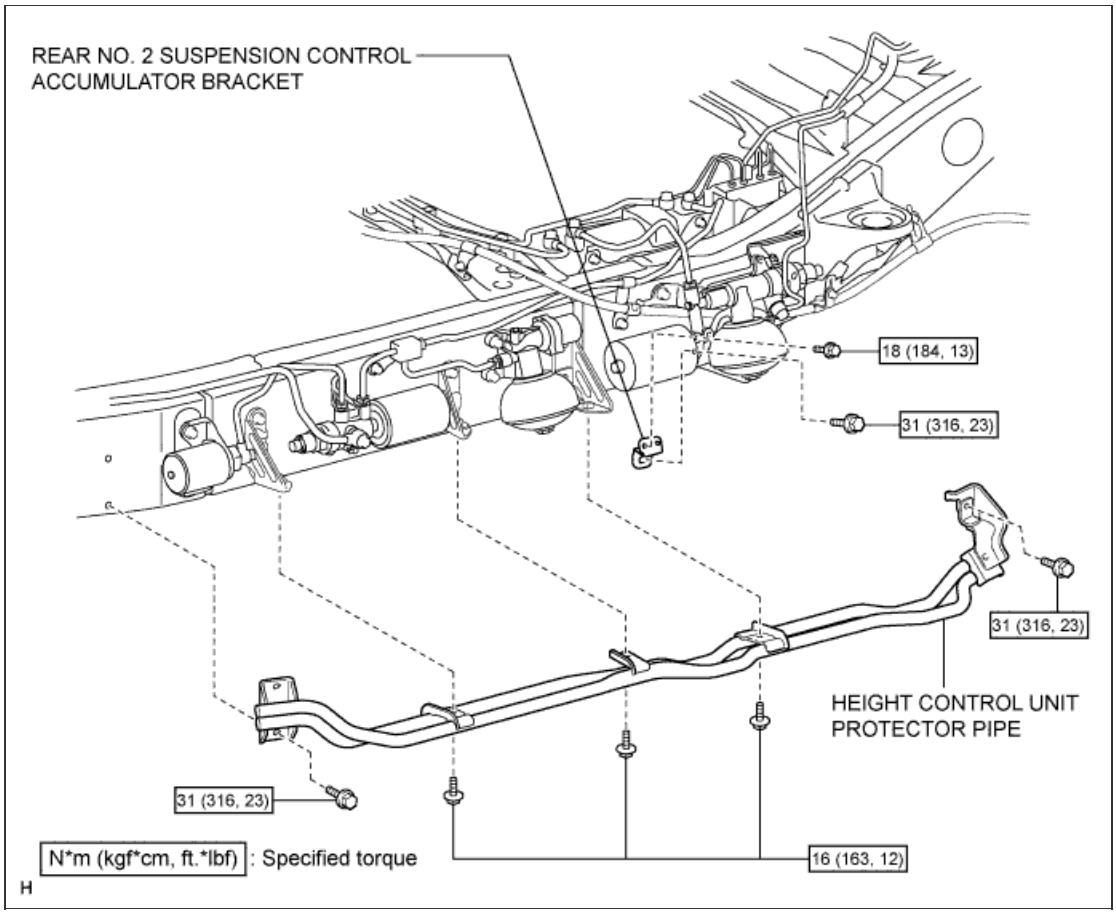
5. INSTALL COOLING BOX ASSEMBLY (w/ Cool Box)

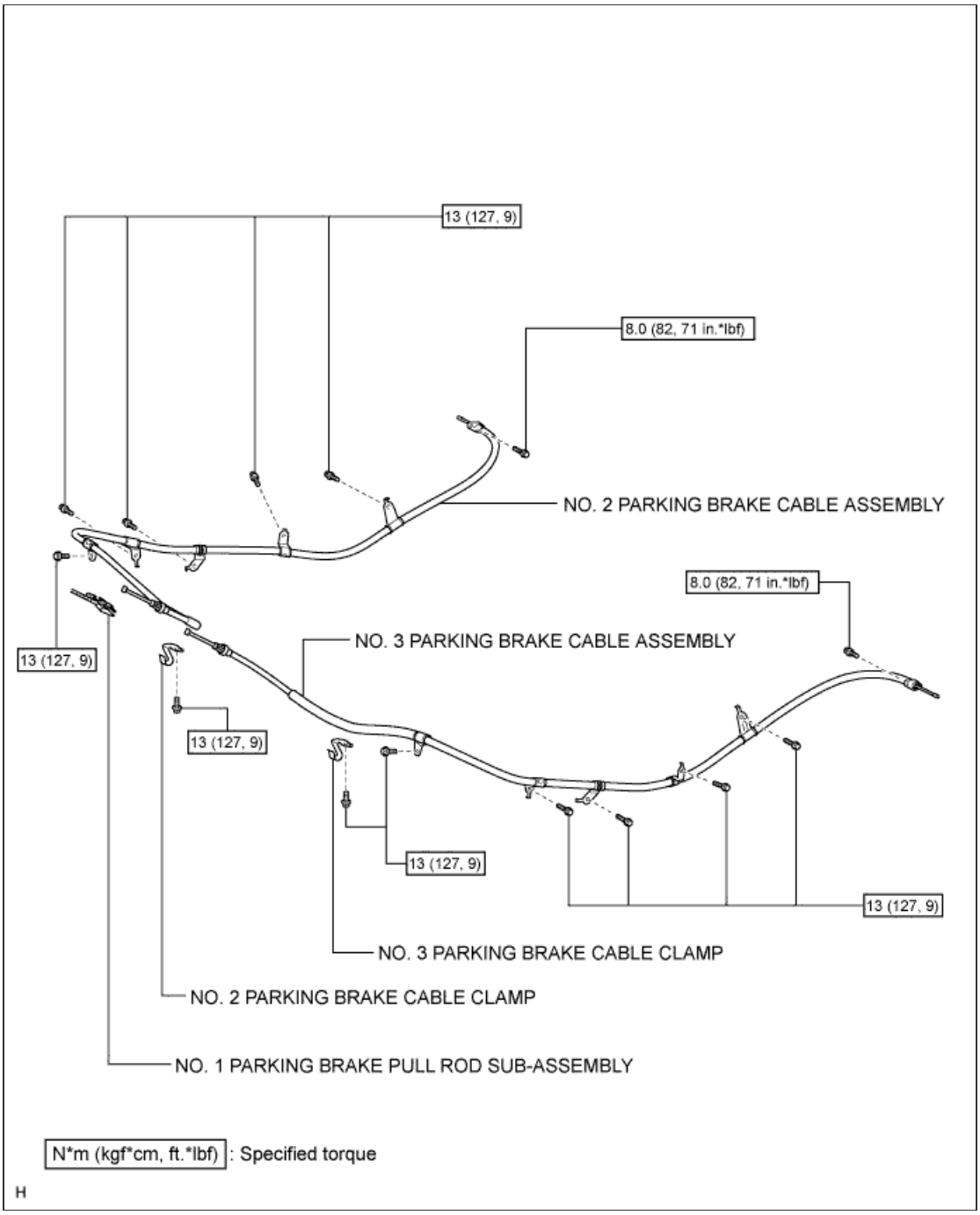
(Click here)

6. INSTALL REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

(Click here)

for Preparation Click here




13 (127, 9)
8.0 (82, 71 in.*lbf)
NO. 2 PARKING BRAKE CABLE ASSEMBLY
8.0 (82, 71 in.*lbf)
NO. 3 PARKING BRAKE CABLE ASSEMBLY
13 (127, 9)
13 (127, 9)
13 (127, 9)
13 (127, 9)
NO. 3 PARKING BRAKE CABLE CLAMP
NO. 2 PARKING BRAKE CABLE CLAMP
NO. 1 PARKING BRAKE PULL ROD SUB-ASSEMBLY
N*m (kgf*cm, ft.*lbf) : Specified torque
H

for Preparation Click here

HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. REMOVE REAR WHEEL

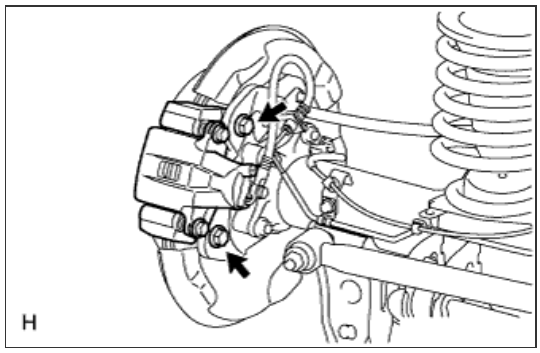
2. DISCONNECT REAR DISC BRAKE CYLINDER ASSEMBLY LH

a. Remove the 2 bolts and disconnect the rear disc brake cylinder.

NOTICE:

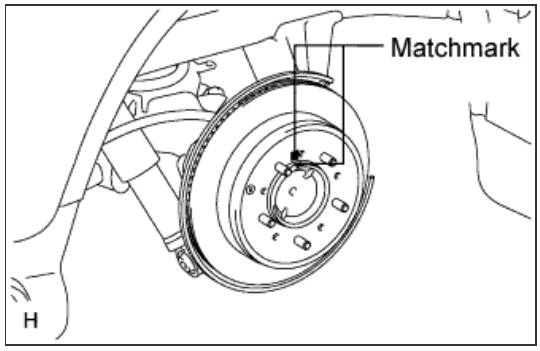
- **Do not disconnect the flexible hose from the disc brake cylinder.**
- **Do not twist or bend the flexible hose.**

b. Hang the disc brake cylinder with a piece of wire.

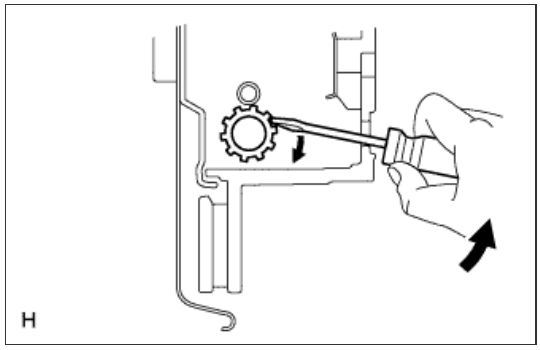


3. REMOVE REAR DISC

a. Put matchmarks on the rear disc and axle hub if planning to reuse the disc.



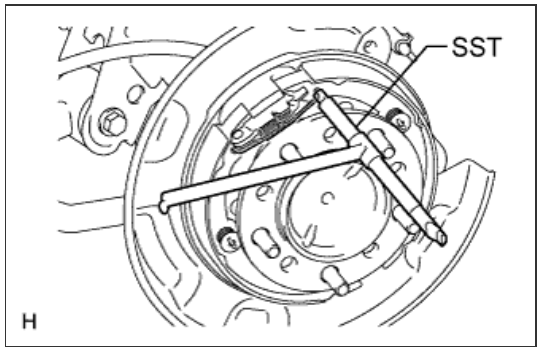
b. Turn the shoe adjuster as shown in the illustration until the disc turns freely, and then remove the disc.



4. REMOVE PARKING BRAKE SHOE RETURN SPRING

a. Using SST, remove the return spring.

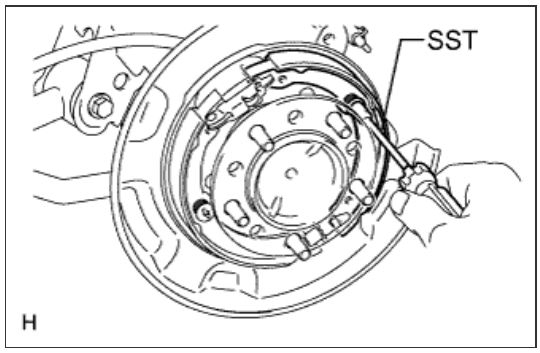
SST
09703-30011



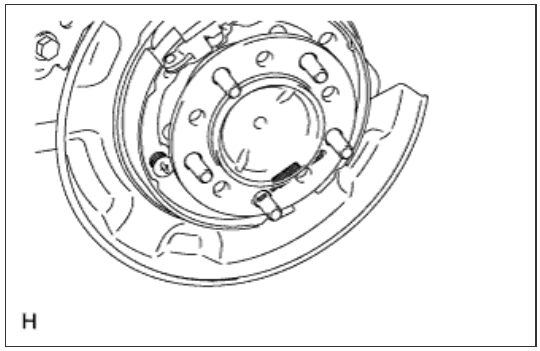
5. REMOVE NO. 1 PARKING BRAKE SHOE ASSEMBLY LH

a. sing SST, remove the shoe hold down spring cup, compression spring and shoe hold down spring pin.

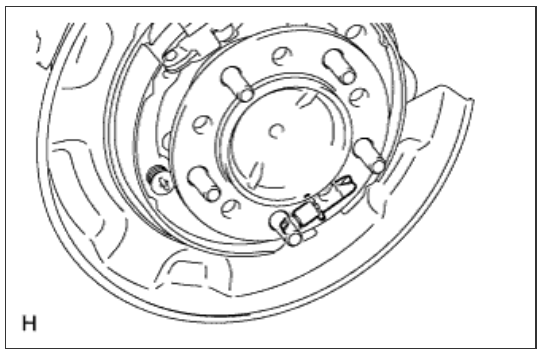
SST
09718-00011



b. isconnect the tension spring from the o. 1 parking brake shoe.



c. Remove the o. 1 parking brake shoe and shoe ad ster screw set.

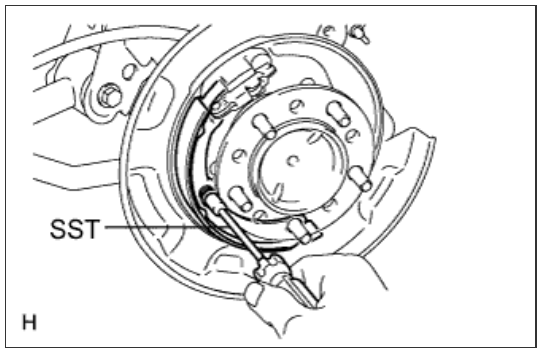


6. REMOVE NO. 2 PARKING BRAKE SHOE ASSEMBLY LH

a. sing SST, remove the shoe hold down spring cup, compression spring and shoe hold down spring pin.

SST
09718-00011

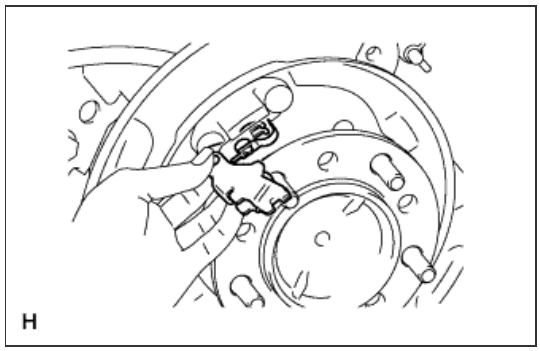
b. Remove the o. 2 parking brake shoe.



7. REMOVE PARKING BRAKE SHOE LEVER LH

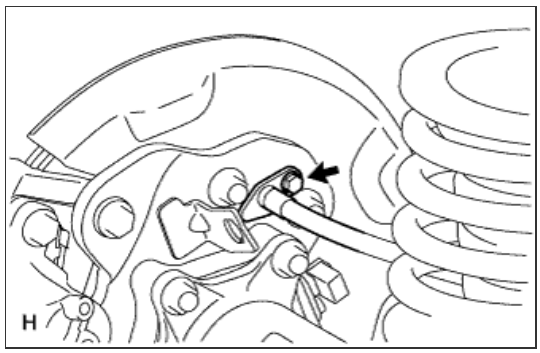
a. Disconnect the No. 3 parking brake cable from the parking brake shoe lever.

b. Remove the parking brake shoe lever.



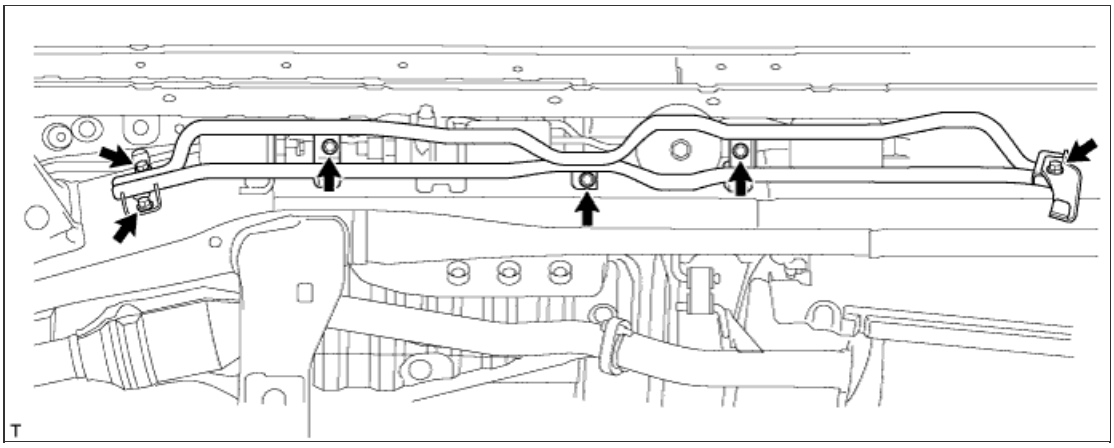
8. DISCONNECT NO. 3 PARKING BRAKE CABLE ASSEMBLY

a. Remove the bolt and No. 3 parking brake cable.



9. REMOVE HEIGHT CONTROL UNIT PROTECTOR PIPE

a. Remove the 6 bolts and protector pipe.



10. REMOVE REAR NO. 2 SUSPENSION CONTROL ACCUMULATOR BRACKET

a. Remove the bolt and bracket from the shock absorber control valve.

11. REMOVE LOWER CONSOLE BOX (w/o Console Box Lid)

lick here

12. REMOVE COOLING BOX ASSEMBLY (w/ Cool Box)

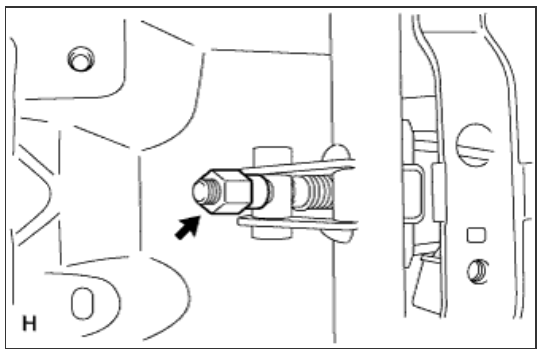
lick here

13. REMOVE REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

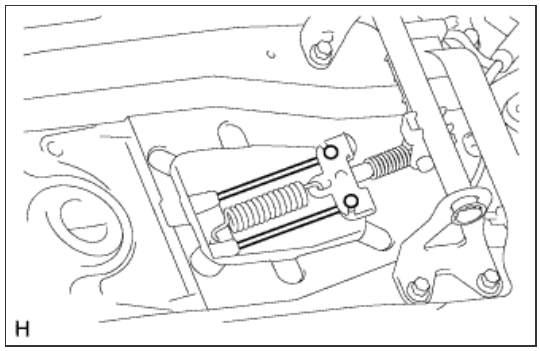
lick here

14. REMOVE NO. 2 PARKING BRAKE CABLE ASSEMBLY

a. oosen the ad sting nut.

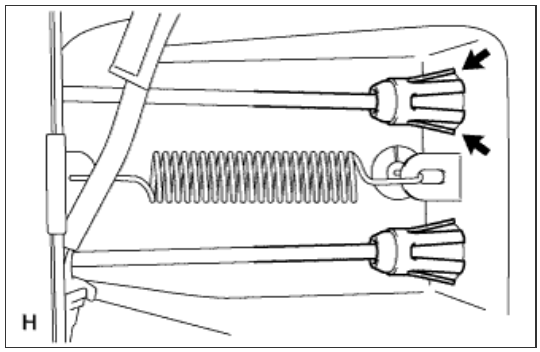


b. isconnect the o. 2 parking brake cable from the No. 1 parking brake pull rod.

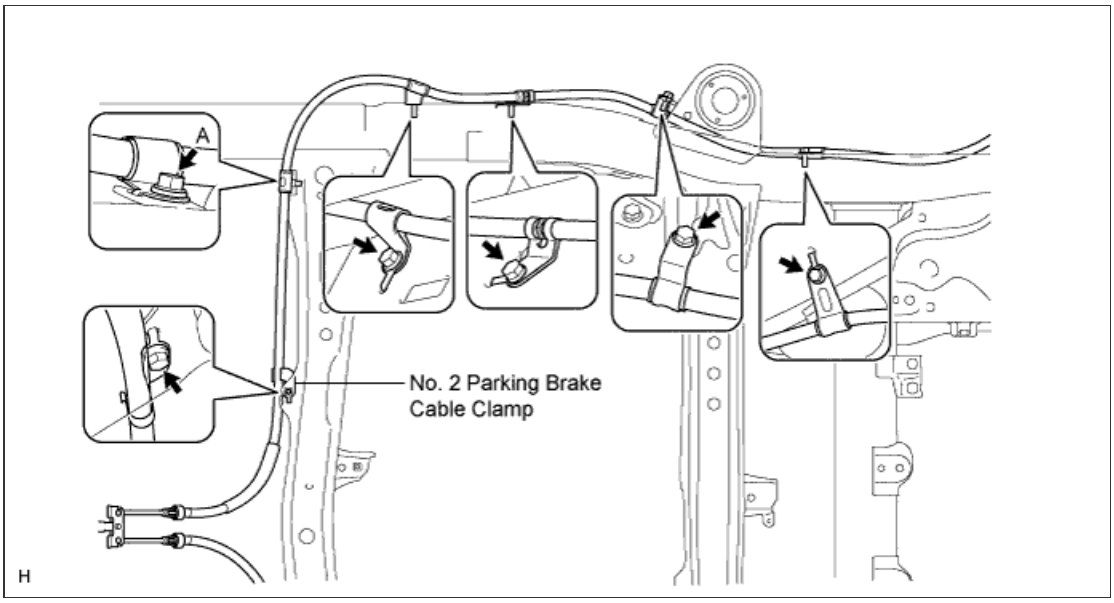


c. Pinch the claws of the No. 2 parking brake cable end push the cable outside of

c. Pinch the claws of the No. 2 parking brake cable and push the cable outside of the vehicle slightly.



d. Tilt the fuel tank (Click here) so that bolt A in the illustration can be removed.

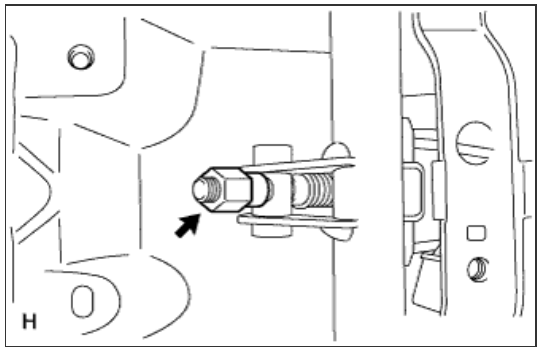


e. Remove the 6 bolts and No. 2 parking brake cable.

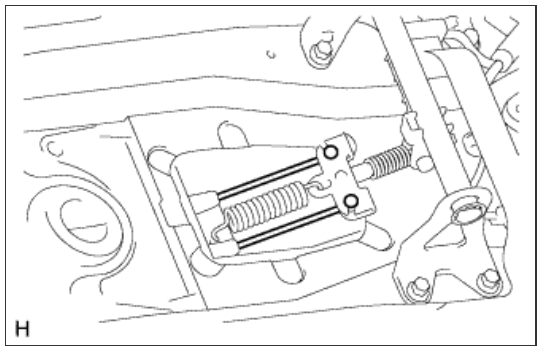
f. Remove the No. 2 parking brake cable clamp from the No. 2 parking brake cable.

15. REMOVE NO. 3 PARKING BRAKE CABLE ASSEMBLY

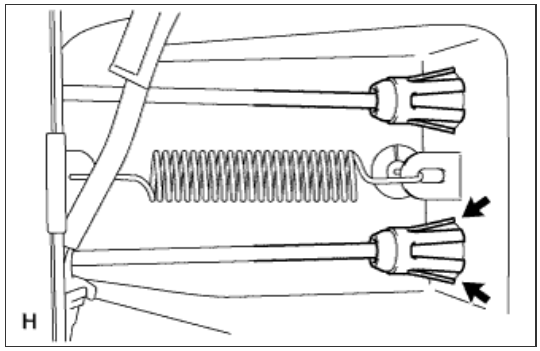
a. Loosen the adjusting nut.



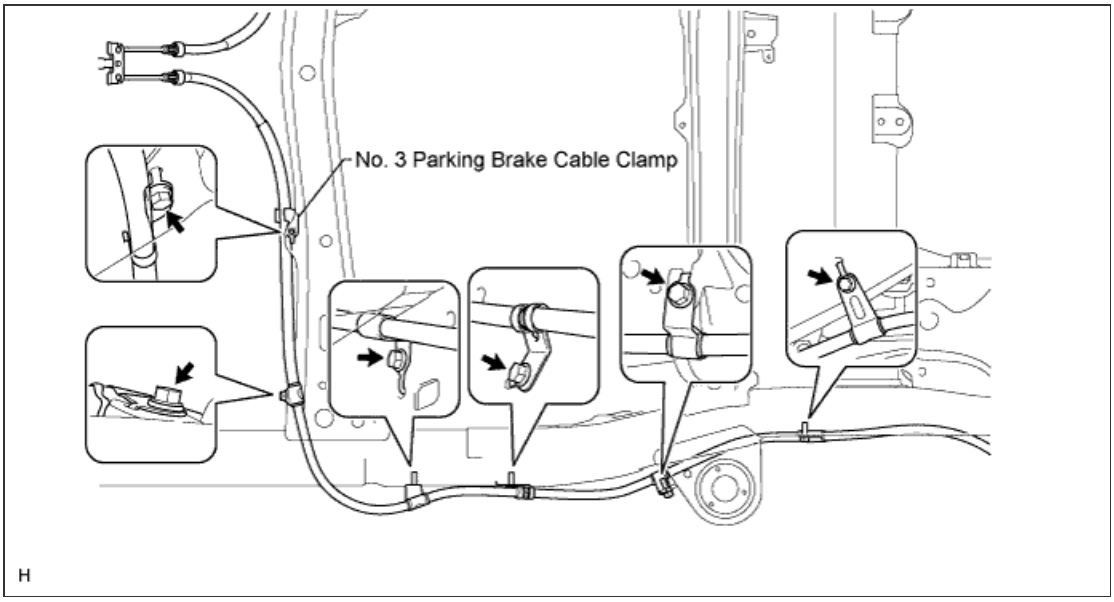
b. Disconnect the No. 3 parking brake cable from the No. 1 parking brake pull rod.



c. Pinch the claws of the o. parking brake cable and push the cable outside of the vehicle slightly.



d. Remove the 6 bolts and No. 3 parking brake cable.



e. Remove the No. 3 parking brake cable clamp from the No. 3 parking brake cable.

for Preparation Click here

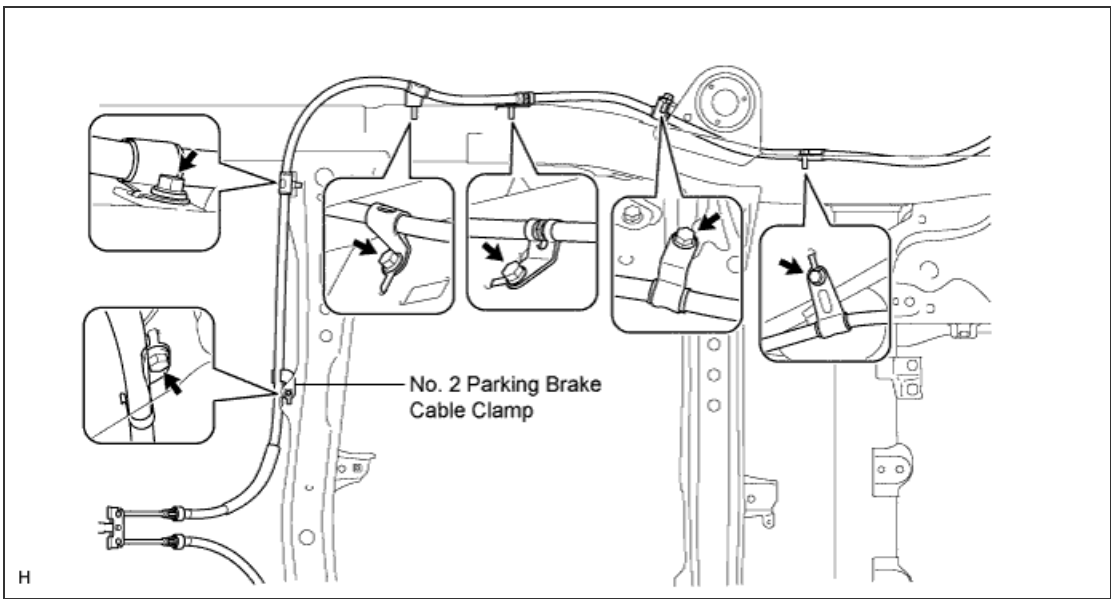
HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. INSTALL NO. 2 PARKING BRAKE CABLE ASSEMBLY

a. Install the No. 2 parking brake cable clamp.

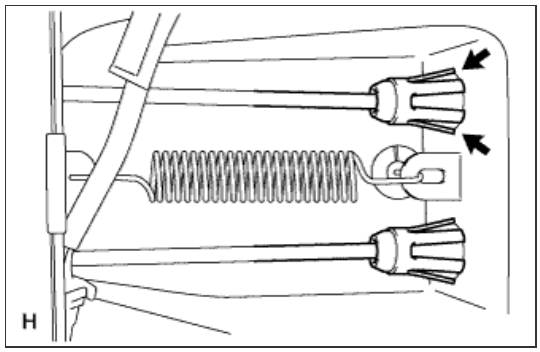
b. Install the No. 2 parking brake cable with the 6 bolts.



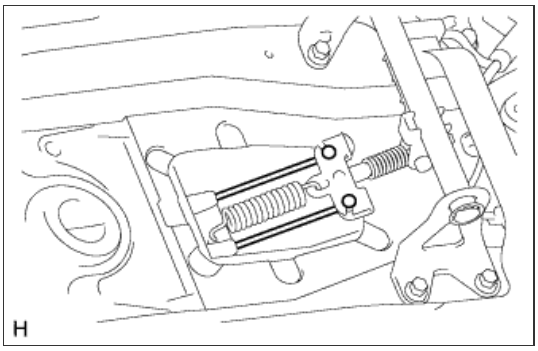
Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

c. Install the fuel tank (Click here).

d. Attach the claws of the No. 2 parking brake cable.



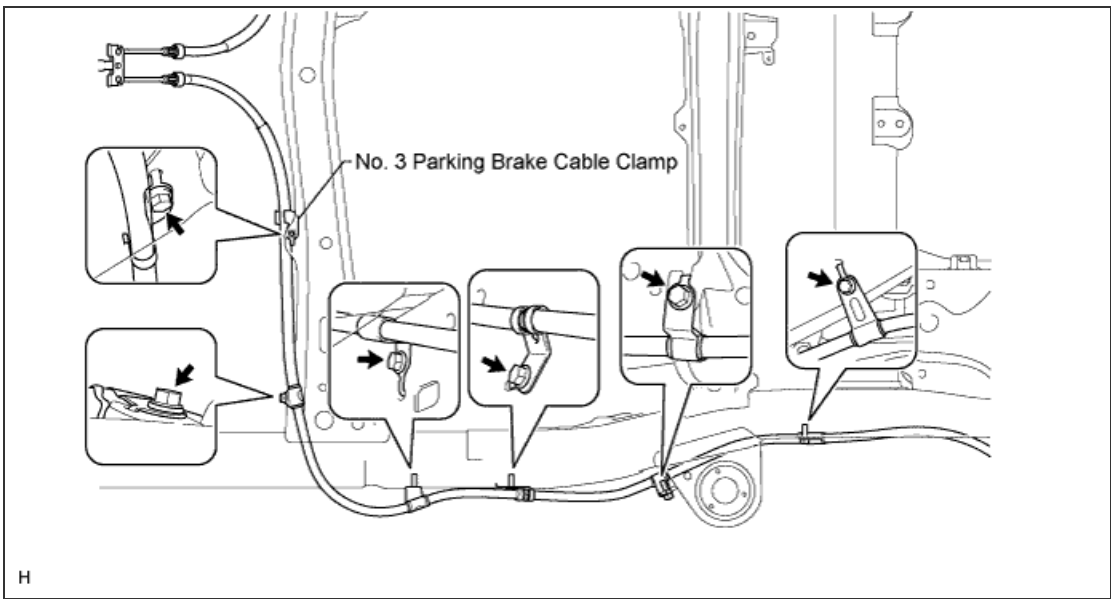
e. Connect the No. 2 parking brake cable to the No. 1 parking brake pull rod.



2. INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY

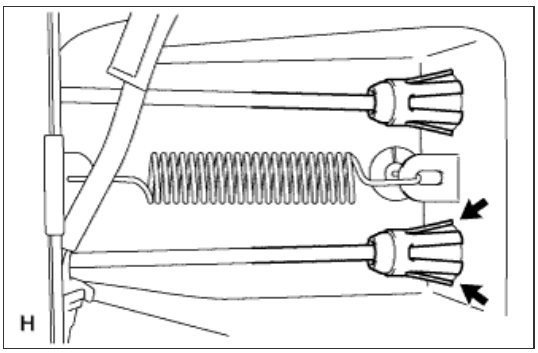
a. Install the No. 3 parking brake cable clamp.

b. Install the No. 3 parking brake cable with the 6 bolts.

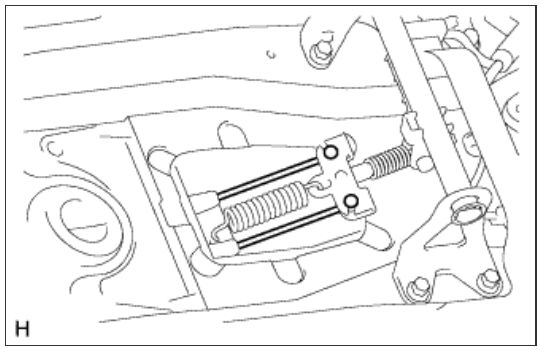


Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

c. Attach the claws of the No. 3 parking brake cable.



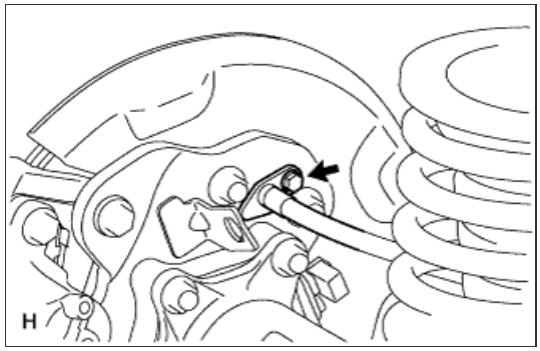
d. Connect the No. 3 parking brake cable to the No. 1 parking brake pull rod.



3. CONNECT NO. 3 PARKING BRAKE CABLE ASSEMBLY

a. Connect the No. 3 parking brake cable with the bolt.

Torque:
8.0 N*m{ 82 kgf*cm , 71 in.*lbf }



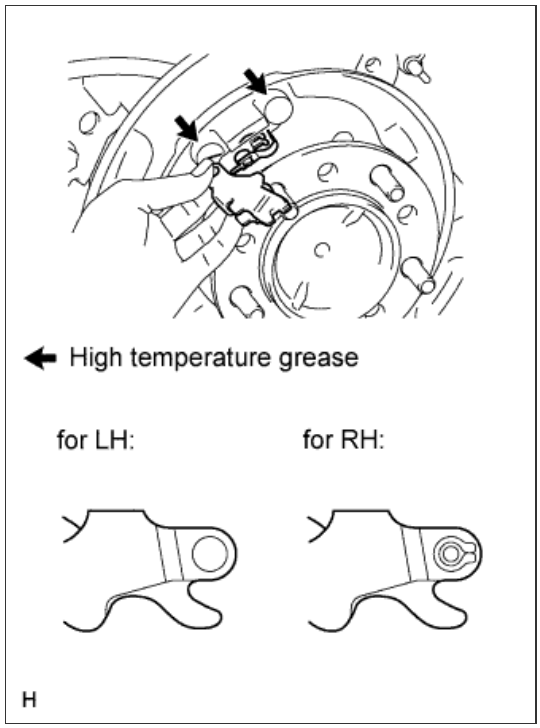
4. INSTALL PARKING BRAKE SHOE LEVER LH

a. Apply high temperature grease to the parking brake anchor block.

b. Install the parking brake shoe lever to the No. 3 parking brake cable.

NOTICE:

Be carefully to distinguish between the parking brake shoe lever RH and LH.



5. INSTALL NO. 2 PARKING BRAKE SHOE ASSEMBLY LH

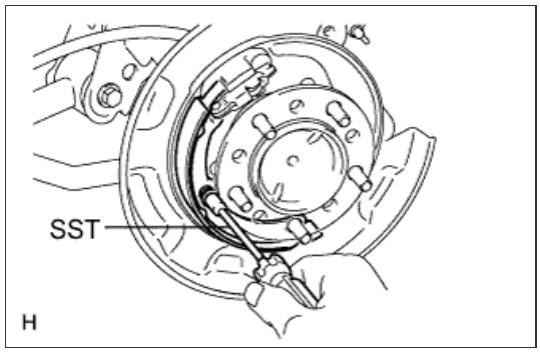
a. Apply high temperature grease to the areas of the backing plate that contact the shoe.

b. Using SST, install the No. 2 parking brake shoe with the shoe hold down spring

pin compression spring and shoe hold down spring cup.

SST

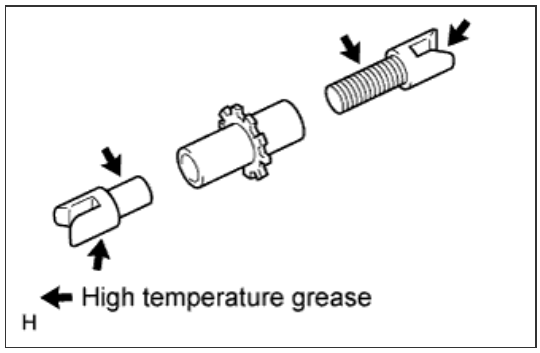
09718-00011



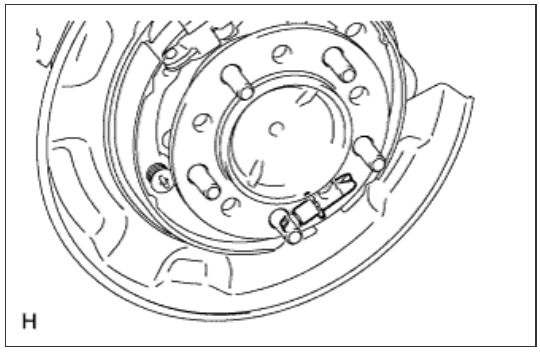
6. INSTALL NO. 1 PARKING BRAKE SHOE ASSEMBLY LH

a. Apply high temperature grease to the areas of the backing plate that contact the shoe.

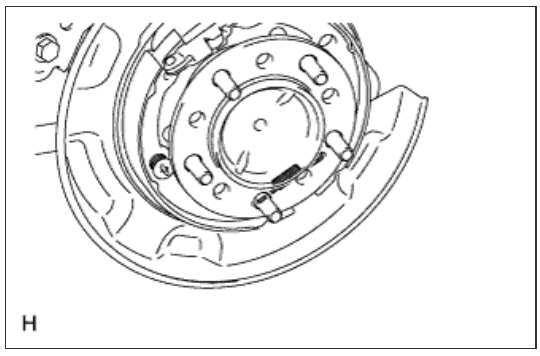
b. Apply high temperature grease to the thread and all joining areas of the parking brake shoe adjuster screw set.



c. Set the No. 1 parking brake shoe and shoe adjuster screw set in place.



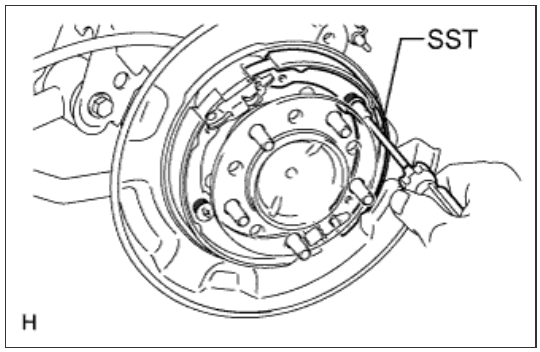
d. Connect the tension spring.



e. Using SST, install the shoe hold down spring pin, compression spring and shoe hold down spring cup.

SST

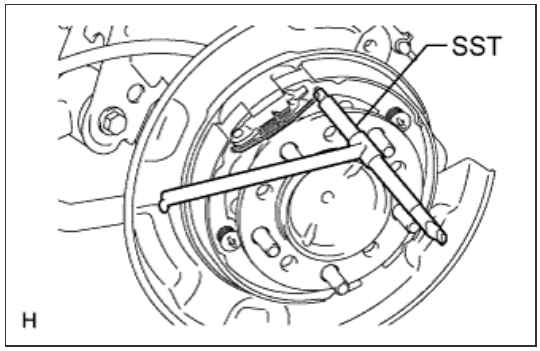
09718-00011



7. INSTALL PARKING BRAKE SHOE RETURN SPRING

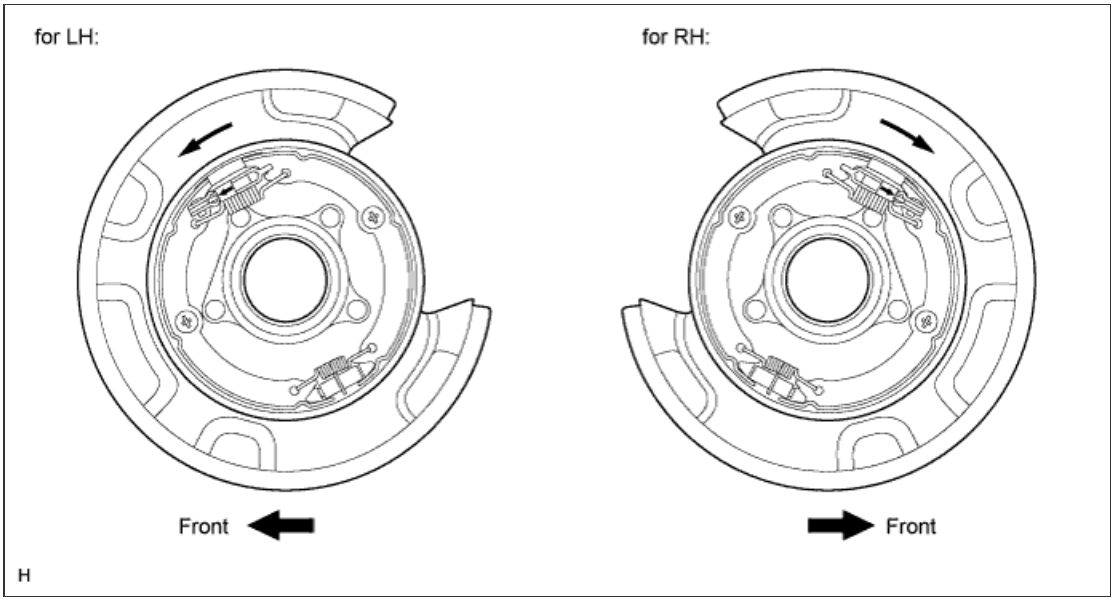
a. Using install the shoe return spring.

SST
09703-30011



8. CHECK PARKING BRAKE INSTALLATION

a. Check that each part is installed properly.

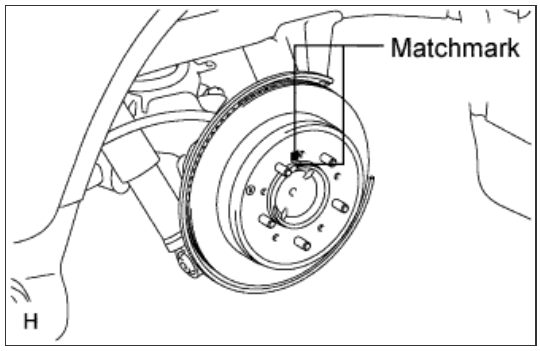


9. INSTALL REAR DISC

a. Align the matchmarks, and then install the rear disc.

HINT:

hen replacing the rear disc with a new one, select the installation position where the rear disc has the minimum runout.



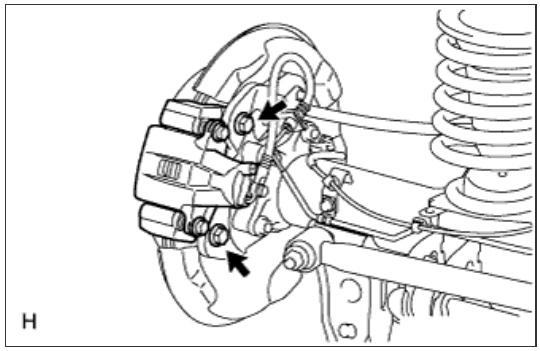
10. CONNECT REAR DISC BRAKE CYLINDER ASSEMBLY LH

a. Connect the rear disc brake cylinder with 2 new bolts.

Torque:
95 N*m{ 969 kgf*cm , 70 ft.*lbf }

NOTICE:

- **Do not twist the brake hose.**
- **Make sure that the bolts are free from damage and foreign matter.**
- **Do not overtighten the bolts.**



11. INSTALL REAR NO. 2 SUSPENSION CONTROL ACCUMULATOR BRACKET

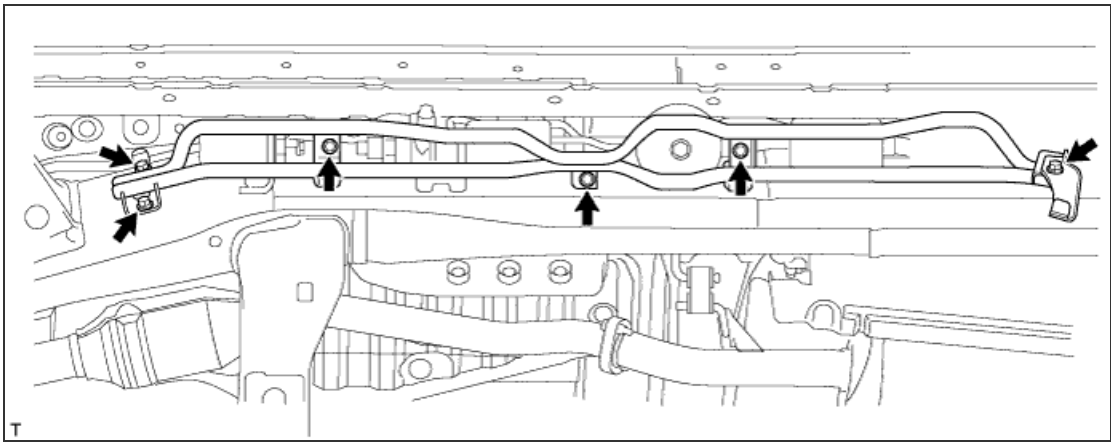
a. Install the bracket to the shock absorber control valve with the bolt.

Torque:
18 N*m{ 184 kgf*cm , 13 ft.*lbf }

12. INSTALL HEIGHT CONTROL UNIT PROTECTOR PIPE

a. Install the protector pipe with the 6 bolts.

Torque:
16 N*m{ 163 kgf*cm , 12 ft.*lbf }



13. ADJUST PARKING BRAKE

(Click here)

14. INSTALL REAR WHEEL

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:
209 N*m{ 2131 kgf*cm , 154 ft.*lbf }

15. INSTALL LOWER CONSOLE BOX (w/o Console Box Lid)

(Click here)

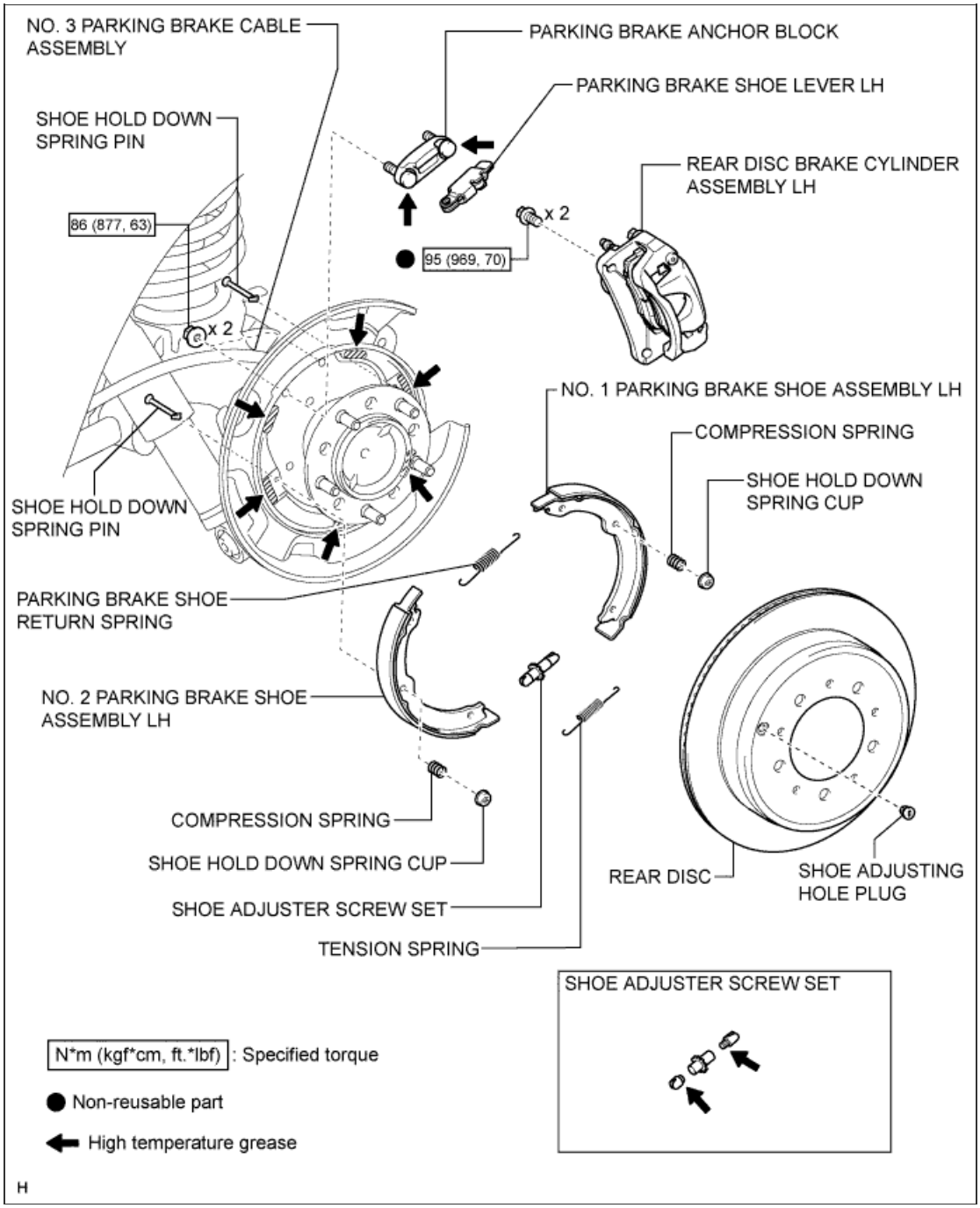
16. INSTALL COOLING BOX ASSEMBLY (w/ Cool Box)

(Click here)

17. INSTALL REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

(Click here)

for Preparation Click here



for Preparation Click here

HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. REMOVE REAR WHEEL LH

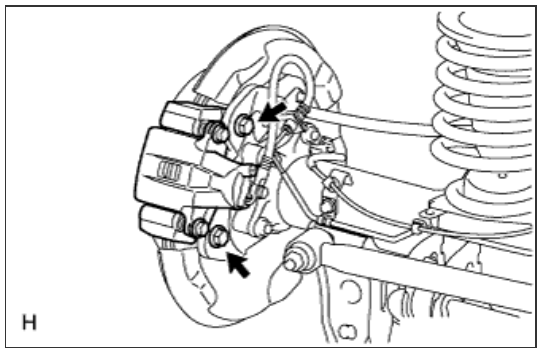
2. DISCONNECT REAR DISC BRAKE CYLINDER ASSEMBLY LH

a. Remove the 2 bolts and disconnect the rear disc brake cylinder.

NOTICE:

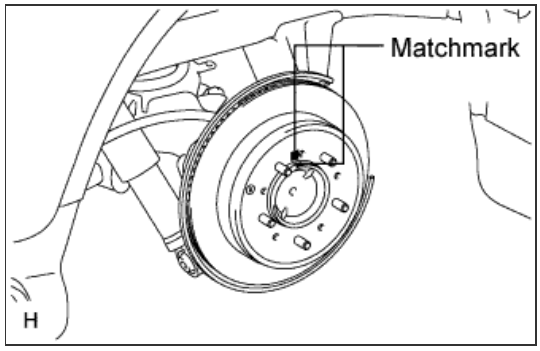
- **Do not disconnect the flexible hose from the disc brake cylinder.**
- **Do not twist or bend the flexible hose.**

b. Hang the disc brake cylinder with a piece of wire.

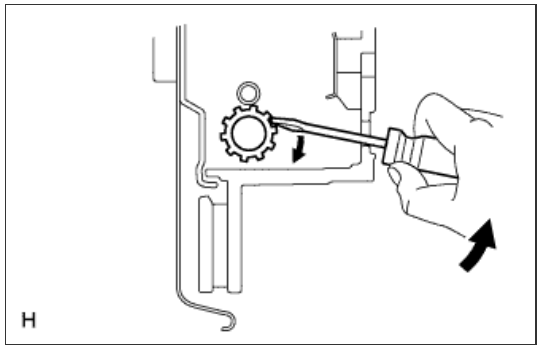


3. REMOVE REAR DISC

a. Put matchmarks on the rear disc and axle hub if planning to reuse the disc.



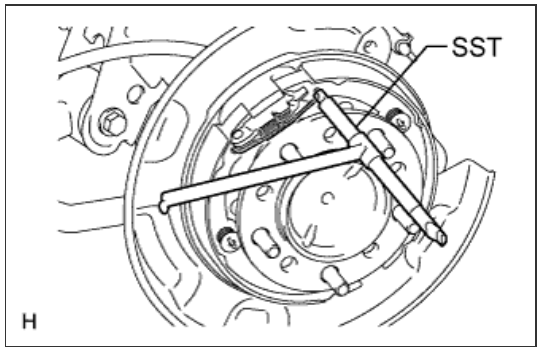
b. Turn the shoe adjuster until the disc turns freely, and then remove the disc.



4. REMOVE PARKING BRAKE SHOE RETURN SPRING

a. Using SST, remove the return spring.

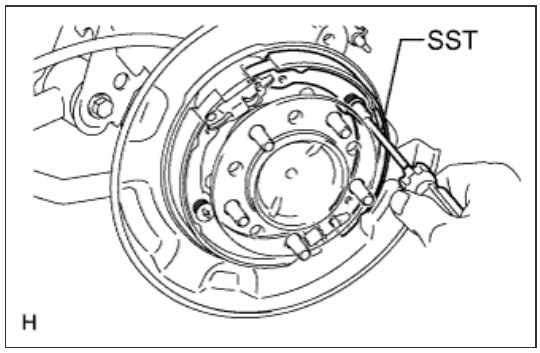
SST
09703-30011



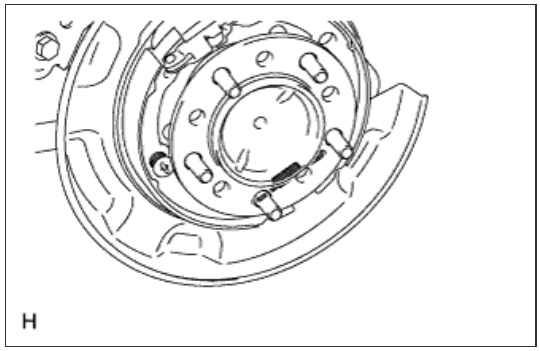
5. REMOVE NO. 1 PARKING BRAKE SHOE ASSEMBLY LH

a. sing SST, remove the shoe hold down spring cup, compression spring and shoe hold down spring pin.

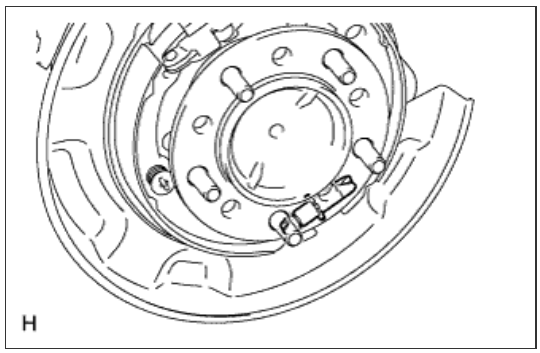
SST
09718-00011



b. isconnect the tension spring from the o. 1 parking brake shoe.



c. Remove the o. 1 parking brake shoe and shoe ad ster screw set.

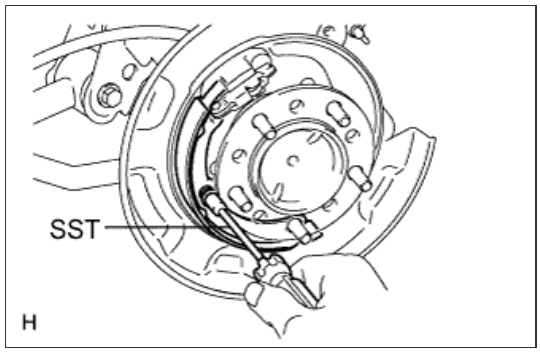


6. REMOVE NO. 2 PARKING BRAKE SHOE ASSEMBLY LH

a. sing SST, remove the shoe hold down spring cup, compression spring and shoe hold down spring pin.

SST
09718-00011

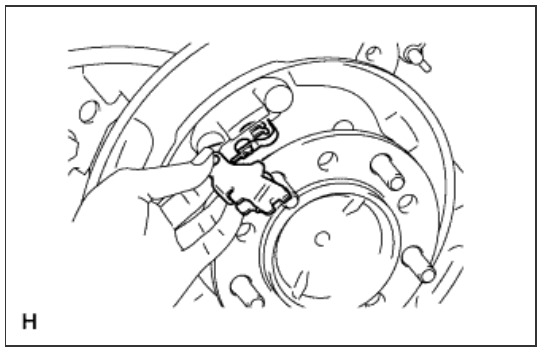
b. Remove the o. 2 parking brake shoe.



7. REMOVE PARKING BRAKE SHOE LEVER LH

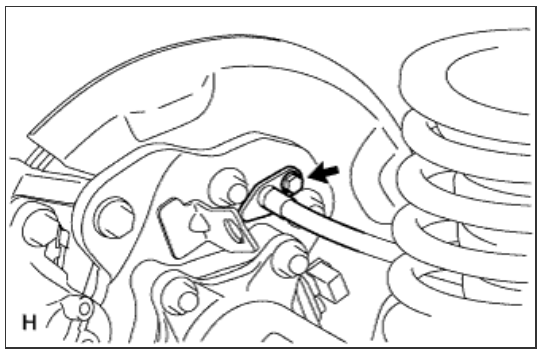
a. Disconnect the No. 3 parking brake cable from the parking brake shoe lever.

b. Remove the parking brake shoe lever.



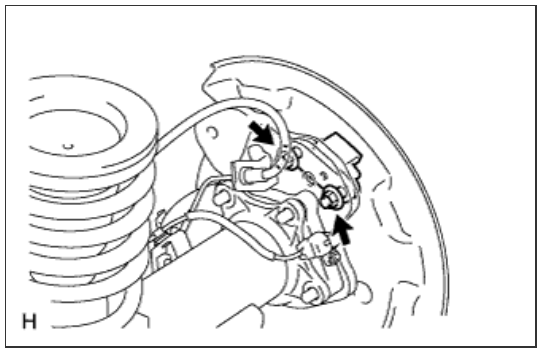
8. REMOVE NO. 3 PARKING BRAKE CABLE ASSEMBLY

a. Remove the bolt and No. 3 parking brake cable.



9. REMOVE PARKING BRAKE ANCHOR BLOCK

a. Remove the 2 nuts and anchor block.



for Preparation Click here

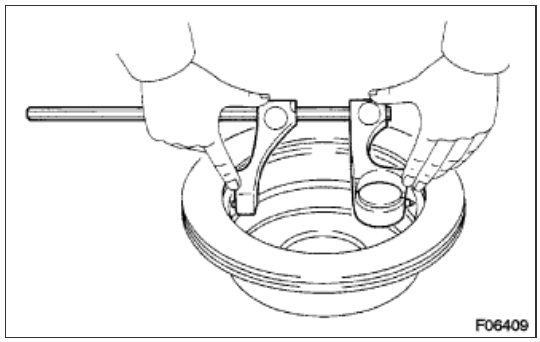
1. CHECK BRAKE DISC INSIDE DIAMETER

a. Using a drum gauge or equivalent, measure the inside diameter of the disc.

Standard Inside Diameter:
240 mm (9.45 in.)

Maximum Inside Diameter:
241 mm (9.48 in.)

If the inside diameter of the disc is more than the maximum, replace the disc.



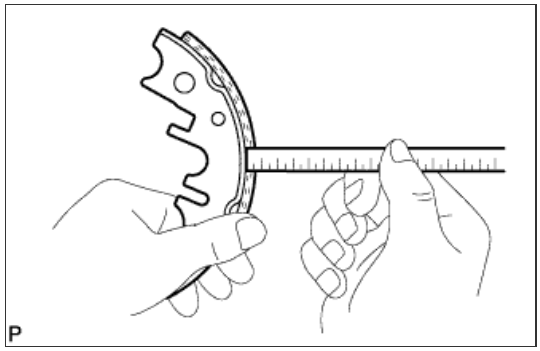
2. CHECK PARKING BRAKE SHOE LINING THICKNESS

a. Using a ruler, measure the thickness of the shoe lining.

Standard Thickness:
3.75 mm (0.148 in.)

Minimum Thickness:
1.0 mm (0.0394 in.)

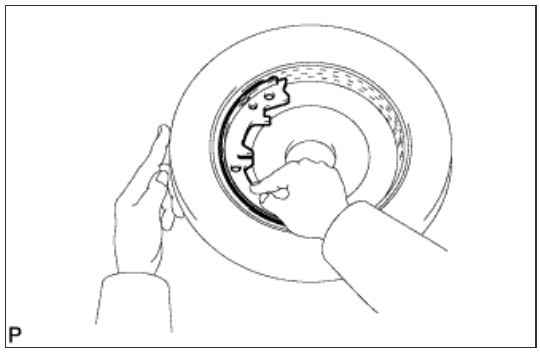
If the lining thickness is equal to or less than the minimum, or if severe or uneven wear is present, replace the shoe.



3. CHECK BRAKE DISC AND PARKING BRAKE SHOE LINING FOR PROPER CONTACT

a. Apply chalk to the inside surface of the disc. Then grind the brake shoe lining on the disc until full contact is achieved.
If the drum and brake shoe lining do not have full contact, use a brake shoe grinder or replace the brake shoe.

b. After the inspection, wipe the chalk off of the inside surface of the disc and lining surface.



for Preparation Click here

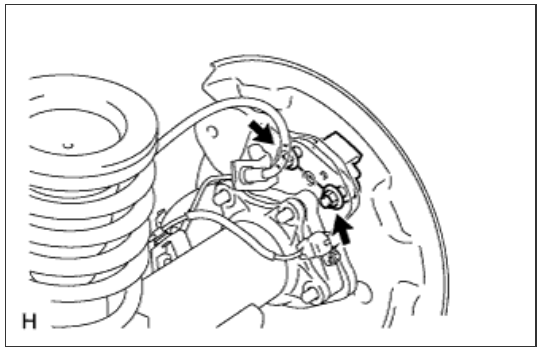
HINT:

- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

1. INSTALL PARKING BRAKE ANCHOR BLOCK

a. Install the anchor block with the 2 nuts.

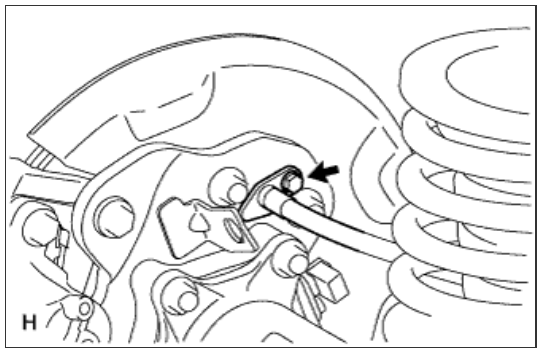
Torque:
86 N*m{ 877 kgf*cm , 63 ft.*lbf }



2. CONNECT NO. 3 PARKING BRAKE CABLE ASSEMBLY

a. Connect the No. 3 parking brake cable with the bolt.

Torque:
8.0 N*m{ 82 kgf*cm , 71 in.*lbf }



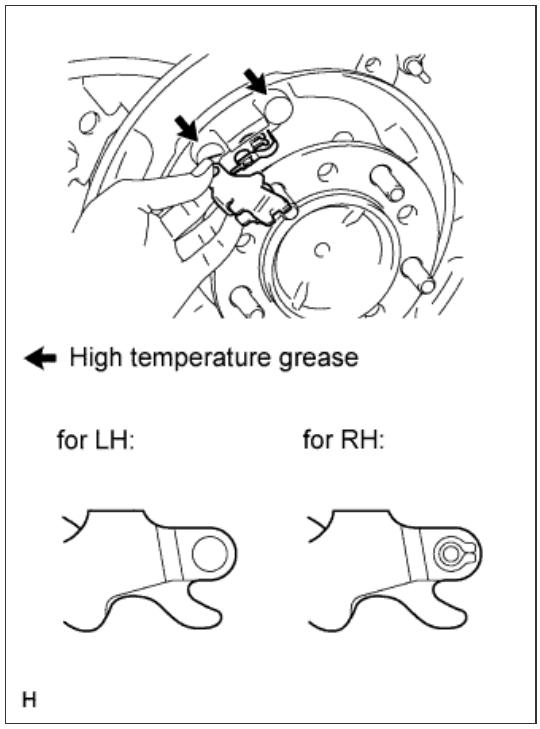
3. INSTALL PARKING BRAKE SHOE LEVER LH

a. Apply high temperature grease to the parking brake anchor block.

b. Install the parking brake shoe lever to the No. 3 parking brake cable.

NOTICE:

Be carefully to distinguish between the parking brake shoe lever RH and LH.

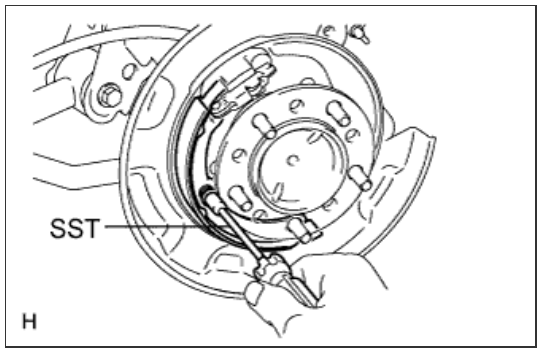


4. INSTALL NO. 2 PARKING BRAKE SHOE ASSEMBLY LH

a. Apply high temperature grease to the areas of the backing plate that contact the shoe.

b. Using SST, install the No. 2 parking brake shoe with the shoe hold down spring pin, compression spring and shoe hold down spring cup.

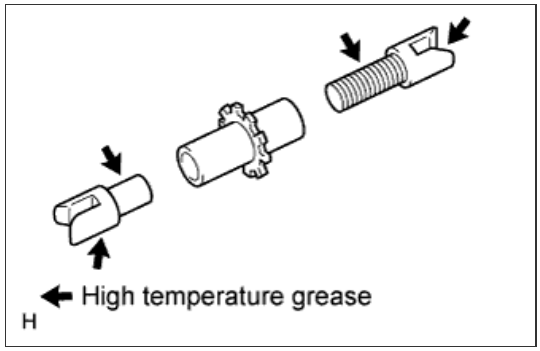
SST
09718-00011



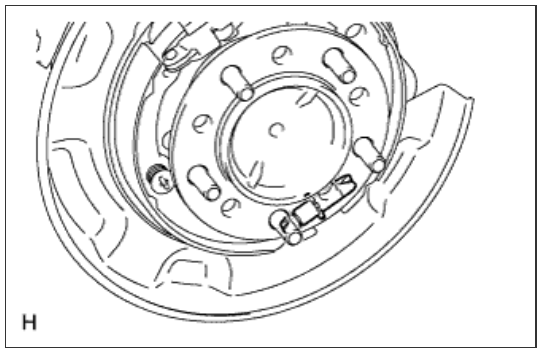
5. INSTALL NO. 1 PARKING BRAKE SHOE ASSEMBLY LH

a. Apply high temperature grease to the areas of the backing plate that contact the shoe.

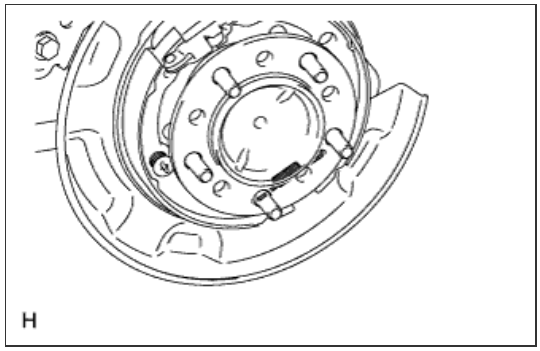
b. Apply high temperature grease to the thread and all joining areas of the parking brake shoe adjuster screw set.



c. Set the No. 1 parking brake shoe and shoe adjuster screw set in place.

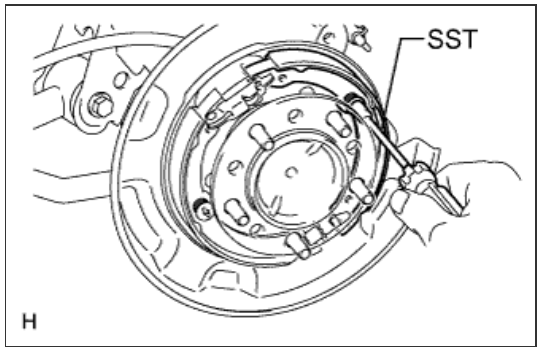


d. Connect the tension spring.



e. sing install the shoe hold down spring pin compression spring and shoe hold down spring cup.

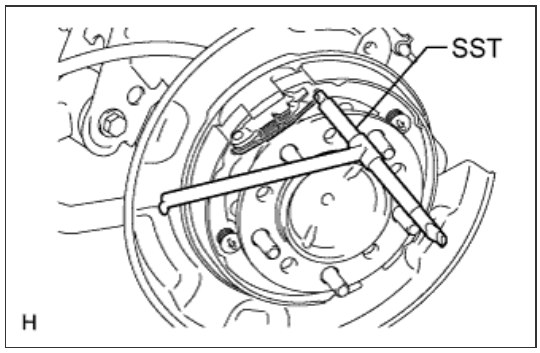
SST
09718-00011



6. INSTALL PARKING BRAKE SHOE RETURN SPRING

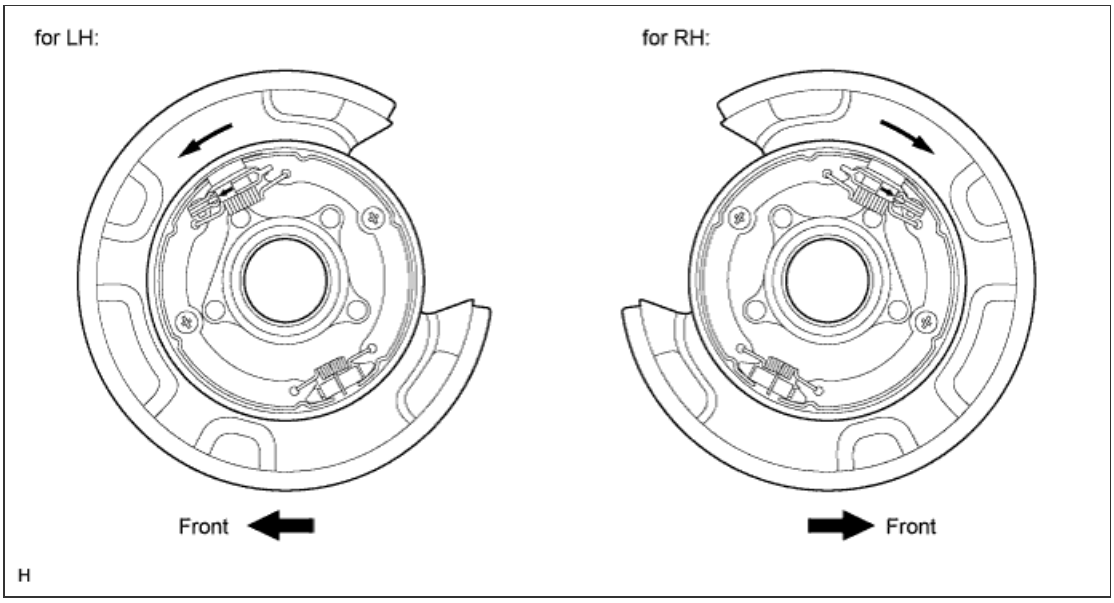
a. sing install the shoe return spring.

SST
09703-30011



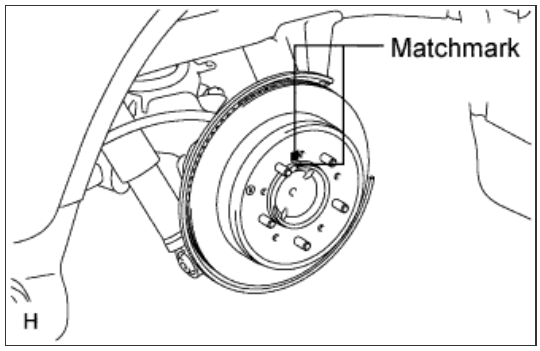
7. CHECK PARKING BRAKE INSTALLATION

a. Check that each part is installed properly.



8. INSTALL REAR DISC

a. hile aligning the matchmarks install the rear disc.



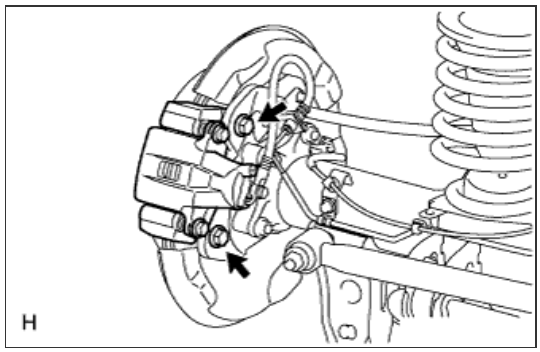
9. CONNECT REAR DISC BRAKE CYLINDER ASSEMBLY LH

a. Connect the rear disc brake cylinder with 2 new bolts.

Torque:
95 N*m{ 969 kgf*cm , 70 ft.*lbf }

NOTICE:

- **Do not twist the brake hose.**
- **Make sure that the bolts are free from damage and foreign matter.**
- **Do not overtighten the bolts.**



10. ADJUST PARKING BRAKE

(Click here)

11. INSTALL REAR WHEEL LH

Torque:
for Aluminum Wheel:
131 N*m{ 1336 kgf*cm , 97 ft.*lbf }
for Steel Wheel:

209 N*m{ 2131 kgf*cm , 154 ft.*lbf }