for Preparation Click here

1.EXPRESSIONS OF IGNITION SWITCH

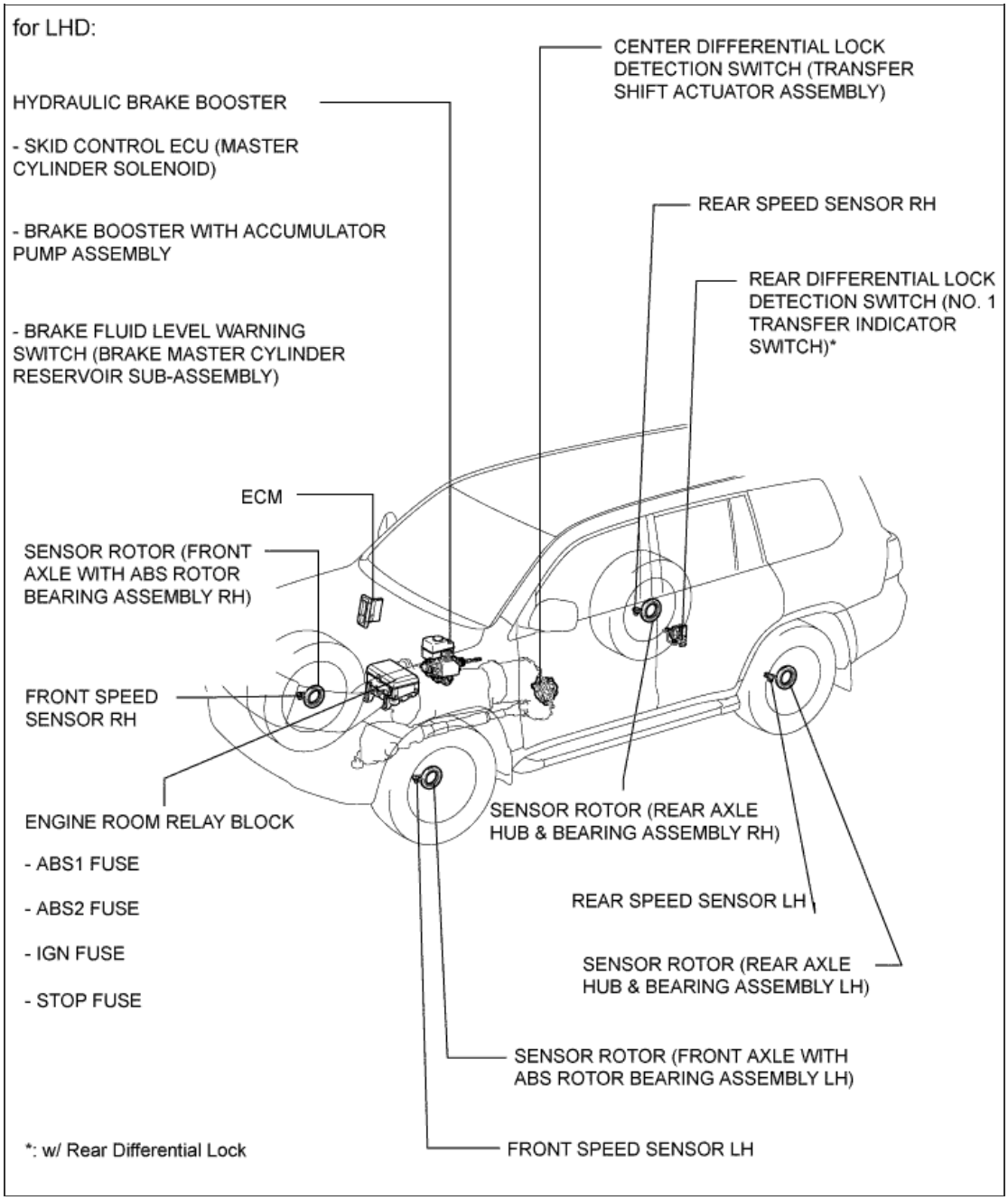
a. The type of ignition switch used on this model differs according to the specifications of the vehicle. The expressions listed in the table below are used in this section.

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

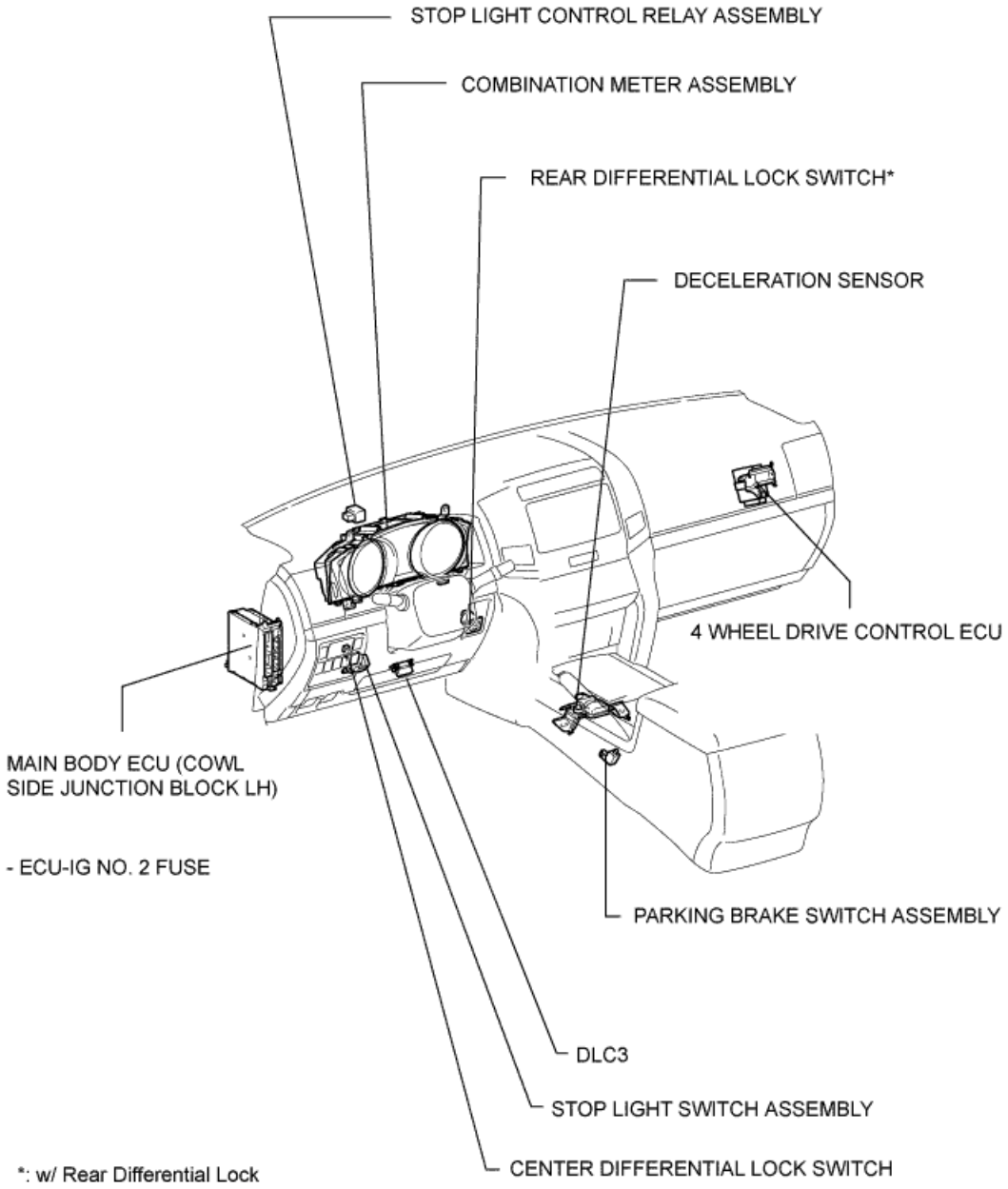
2.TROUBLESHOOTING PRECAUTION

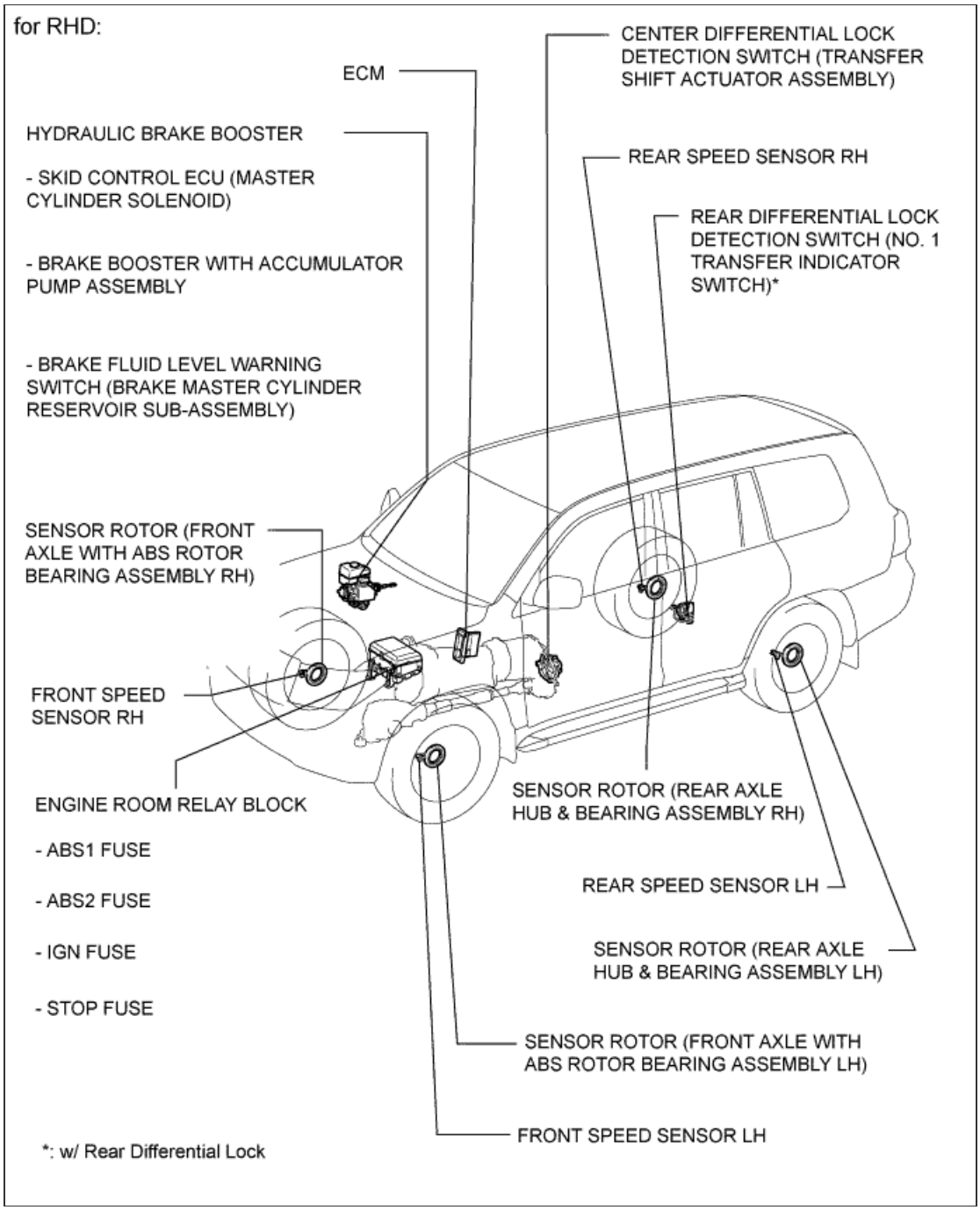
- When there is a malfunction in the contact point of the terminals or installation problems with parts, removal and installation of the suspected problem parts may return the system to normal either completely or temporarily.
- In order to determine the malfunctioning area, be sure to check the conditions 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 deceleration sensor, make sure to perform deceleration 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

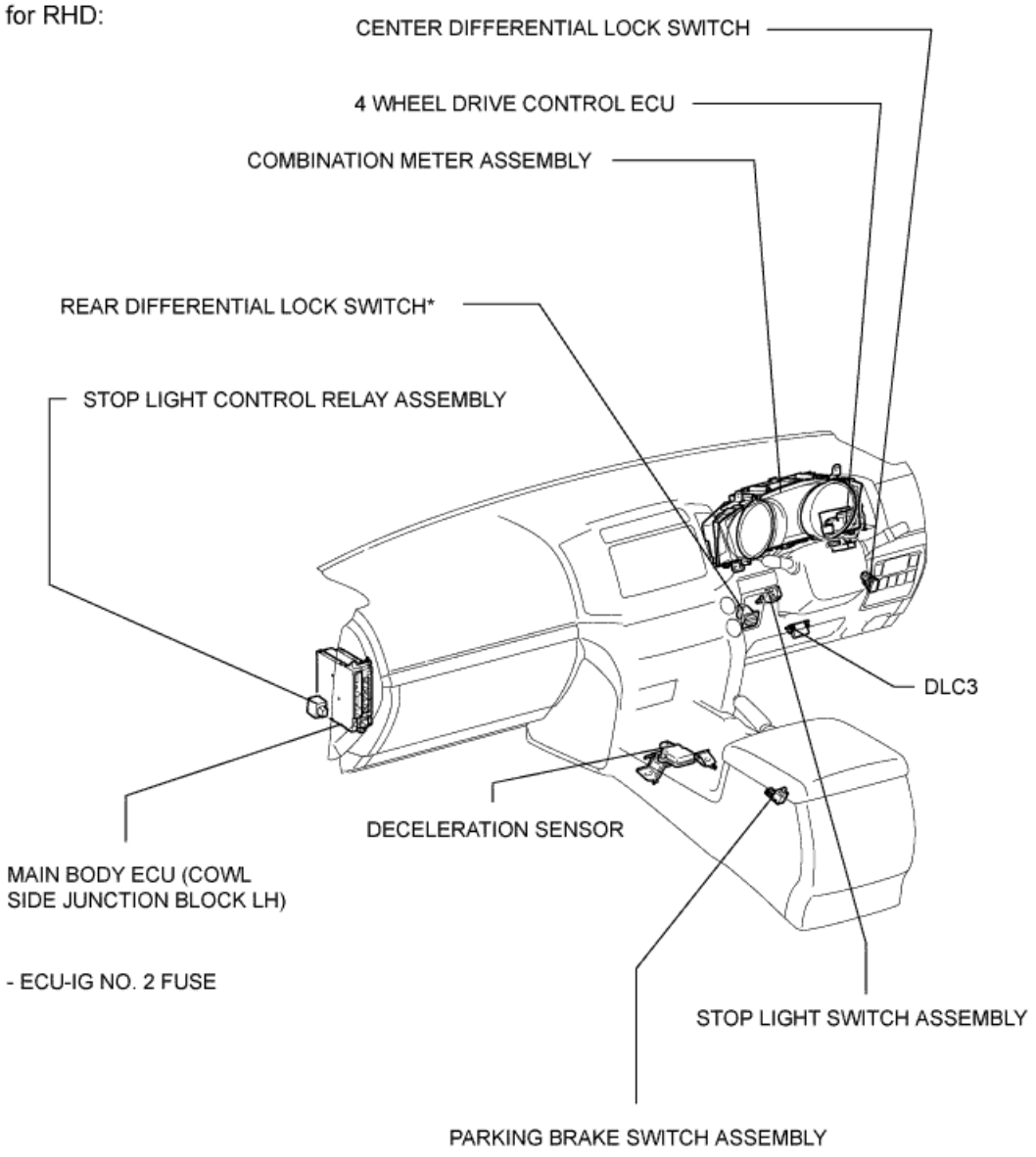


for LHD:


STOP LIGHT CONTROL RELAY ASSEMBLY
COMBINATION METER ASSEMBLY
REAR DIFFERENTIAL LOCK SWITCH*
DECELERATION SENSOR
4 WHEEL DRIVE CONTROL ECU
MAIN BODY ECU (COWL SIDE JUNCTION BLOCK LH)
- ECU-IG NO. 2 FUSE
PARKING BRAKE SWITCH ASSEMBLY
DLC3
STOP LIGHT SWITCH ASSEMBLY
CENTER DIFFERENTIAL LOCK SWITCH
*: w/ Rear Differential Lock

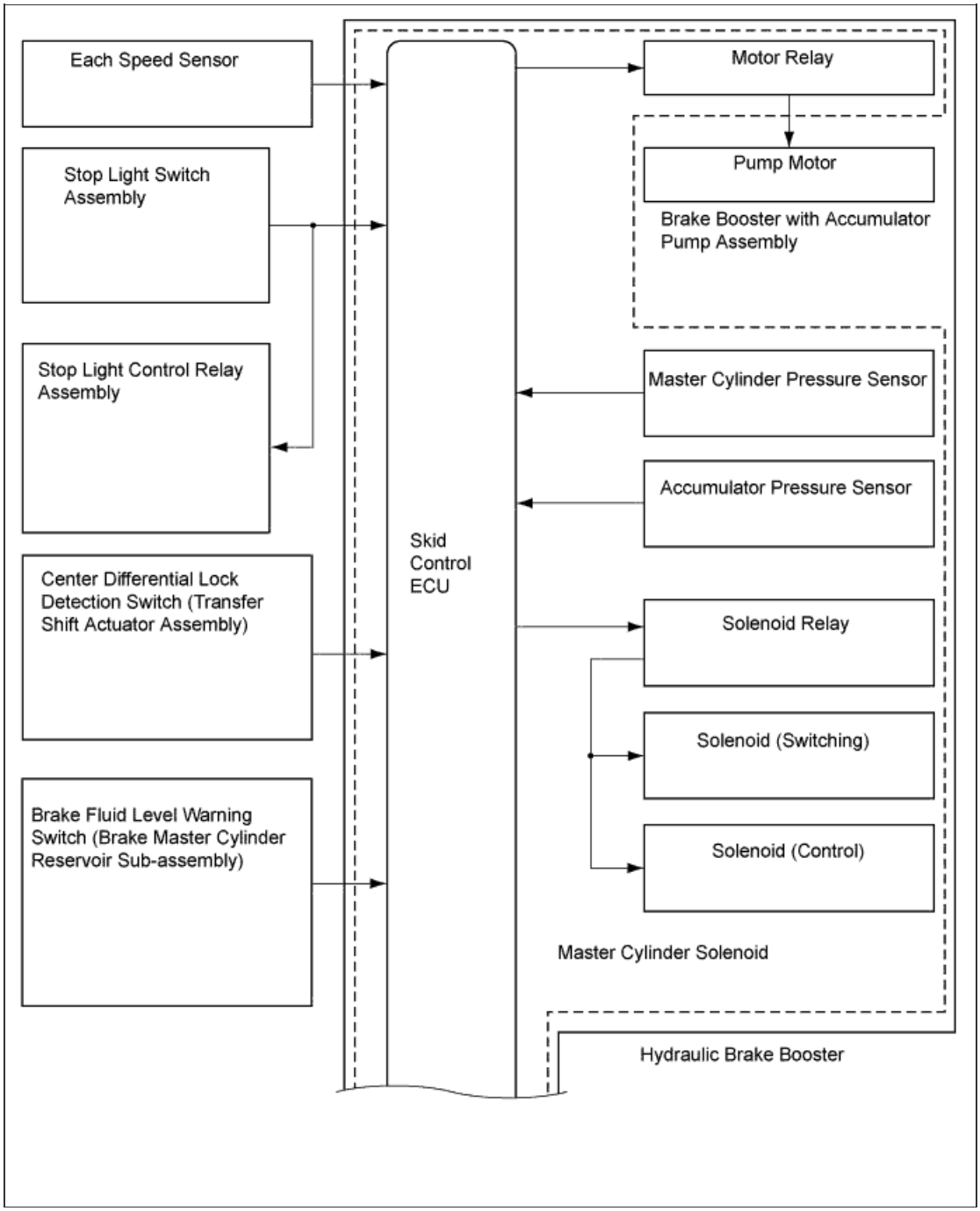

for RHD:
ECM
CENTER DIFFERENTIAL LOCK DETECTION SWITCH (TRANSFER SHIFT ACTUATOR ASSEMBLY)
HYDRAULIC BRAKE BOOSTER
- SKID CONTROL ECU (MASTER CYLINDER SOLENOID)
- BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY
- BRAKE FLUID LEVEL WARNING SWITCH (BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY)
REAR SPEED SENSOR RH
REAR DIFFERENTIAL LOCK DETECTION SWITCH (NO. 1 TRANSFER INDICATOR SWITCH)*
SENSOR ROTOR (FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY RH)
FRONT SPEED SENSOR RH
ENGINE ROOM RELAY BLOCK
- ABS1 FUSE
- ABS2 FUSE
- IGN FUSE
- STOP FUSE
SENSOR ROTOR (REAR AXLE HUB & BEARING ASSEMBLY RH)
REAR SPEED SENSOR LH
SENSOR ROTOR (REAR AXLE HUB & BEARING ASSEMBLY LH)
SENSOR ROTOR (FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY LH)
FRONT SPEED SENSOR LH
*: w/ Rear Differential Lock

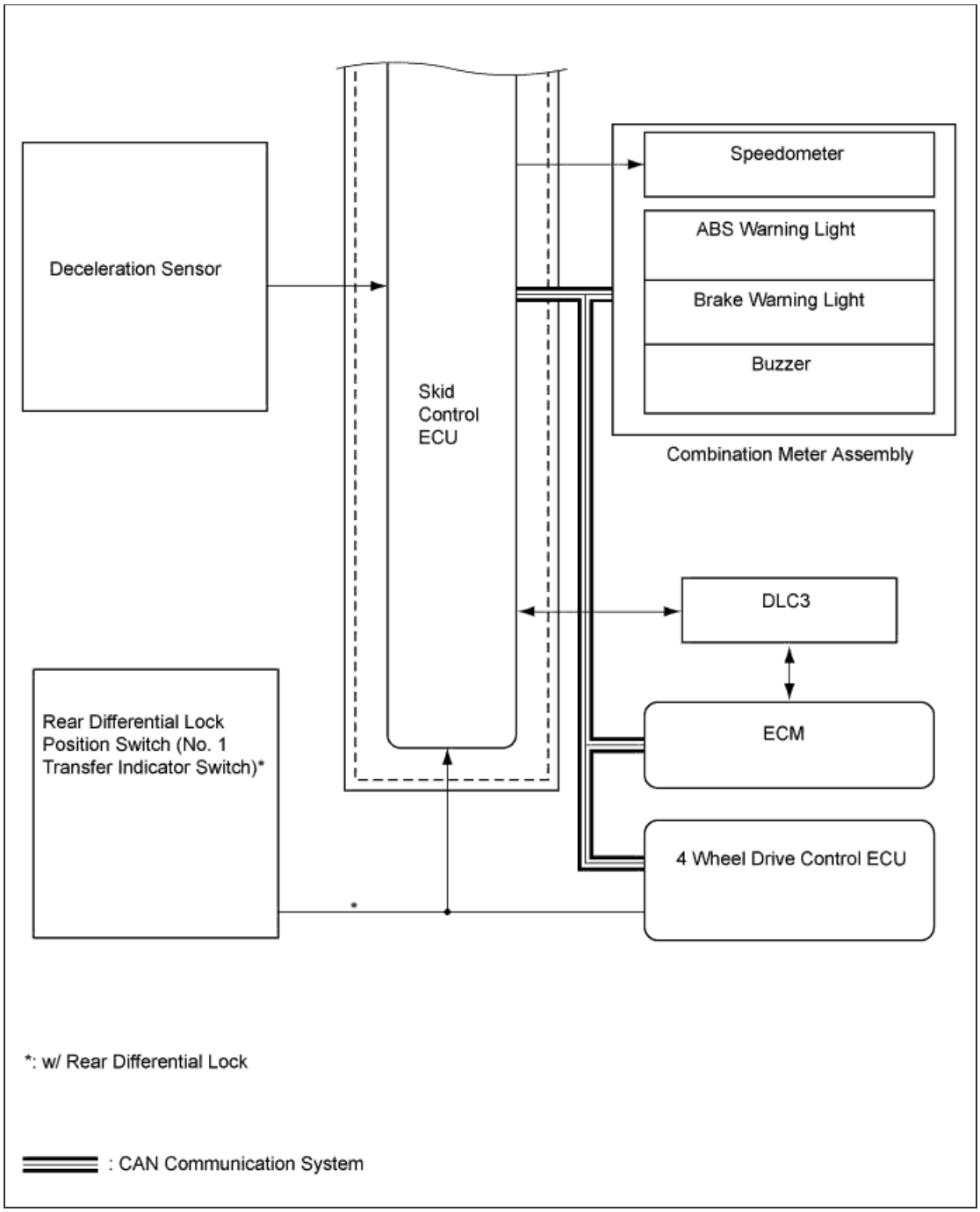
for RHD:



*: w/ Rear Differential Lock

for Preparation Click here





Communication Table

Sender	Receiver	Signal	Line
ECM	Skid control ECU	• Engine speed signal • Accelerator pedal position signal • Intake air temperature signal • TC terminal status	CAN communication
4 wheel drive control ECU	Skid control ECU	• Center differential lock status signal • L4 status signal • Rear differential lock status signal	CAN communication

for Preparation Click here

SYSTEM DESCRIPTION

HINT:

The skid control ECU is built into the hydraulic brake booster.

a. Multi-terrain Anti-lock Brake System (Multi-terrain ABS)
The multi-terrain ABS detects off-road driving in sand, mud, gravel, dirt and so on based on signals from the yaw rate and acceleration sensor, the speed sensor and the ECM, and then automatically switches to the ABS control most appropriate for the current road conditions.

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

c. EBD (Electronic Brake Force Distribution)
EBD control utilizes the ABS and performs proper brake force distribution between the front and rear wheels in accordance with the driving conditions. When the brakes are applied while cornering, it also controls the braking forces of the right and left wheels, helping to maintain vehicle stability.

FUNCTION OF COMPONENTS

Components	Functions
Speed sensor	Detects the wheel speed of each wheel.
Hydraulic brake booster	Upon receiving a brake control signal from the skid control ECU, the hydraulic brake booster controls the hydraulic circuit and sends hydraulic pressure to each wheel. The master cylinder solenoid is removable.
Skid control ECU (Master cylinder solenoid)	Detects the vehicle condition based on signals from the sensors and sends a brake control signal to the hydraulic brake booster.
Motor relay	Supplies power to the pump motor.
Solenoid relay	Supplies power to each solenoid.
Deceleration sensor	Detects the vehicle's deceleration and sends a signal to the skid control ECU.
Master cylinder pressure sensor	Built into the master cylinder solenoid. Detects the pressure inside the master cylinder.
Accumulator pressure sensor	Built into the master cylinder solenoid. Detects the accumulator pressure.
ABS warning light	Illuminates to inform the driver that a malfunction in the ABS has occurred.
Brake warning light	• Illuminates to inform the driver that the parking brake is applied when the system is normal, and when the amount of brake fluid has decreased. • Illuminates to inform the driver that a malfunction in the EBD has occurred.
Buzzer	• Built into the combination meter. • Intermittently sounds to inform the driver that the accumulator has a malfunction.

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

DESCRIPTION

HINT:

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

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

f. Select areas where momentary interruptions should be monitored.

HINT:

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open circuit detection/ Error or Normal	Normal	-
FL Speed Open	Front speed sensor LH open circuit detection/ Error or Normal	Normal	-
RR Speed Open	Rear speed sensor RH open circuit detection/ Error or Normal	Normal	-
RL Speed Open	Rear speed sensor LH open circuit detection/ Error or Normal	Normal	-
EFI Communication Open	ECM communication open circuit detection/ Error or Normal	Normal	-
Deceleration Open	Acceleration sensor open circuit detection/ Error or Normal	Normal	-
Master Cylinder Open	Master cylinder pressure sensor open circuit detection/ Error or Normal	Normal	-
IG Voltage Value Decreased	IG voltage value decreased detection/ Error or Normal	Normal	-
IG Voltage Value Increased	IG voltage value increased detection/ Error or Normal	Normal	-
FR Speed Sensor Voltage Open	Front speed sensor RH voltage open circuit detection/ Error or Normal	Normal	-
FL Speed Sensor Voltage Open	Front speed sensor LH voltage open circuit detection/ Error or Normal	Normal	-
RR Speed Sensor Voltage Open	Rear speed sensor RH voltage open circuit detection/ Error or Normal	Normal	-
RL Speed Sensor Voltage Open	Rear speed sensor LH voltage open circuit detection/ Error or Normal	Normal	-
M/C Pressure Sensor Noise	Master cylinder pressure sensor noise detection/ Error or Normal	Normal	-
EFI Communication Invalid	ECM communication invalid detection/ Error or Normal	Normal	-

g. While observing the screen, gently jiggle the connectors or wire harnesses between the ECUs and sensors or between ECUs.

OK:

Normal display appears.

NOTICE:

The connector and/or wire harness has a momentary interruption (open circuit) if the display changes. Repair or replace the connectors and/or wire harnesses 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
Skid control ECU (Master cylinder solenoid)	Deceleration sensor zero point calibration
Deceleration sensor	• Clearing zero point calibration data • Deceleration sensor zero point calibration

CLEAR ZERO POINT CALIBRATION (SST CHECK WIRE)

After replacing the deceleration sensor, make sure to clear the zero point calibration data in the skid control ECU (master cylinder solenoid) and perform zero point calibration.

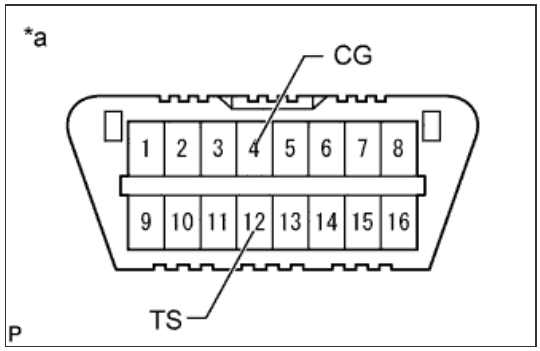
a. Turn the ignition switch to ON.

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

Text in Illustration

*a	Front view of DLC3



c. Check that the ABS warning light comes on.

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

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

After replacing the master cylinder solenoid and/or deceleration sensor, make sure to perform deceleration 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 98 will be stored if the shift lever is not in P.

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

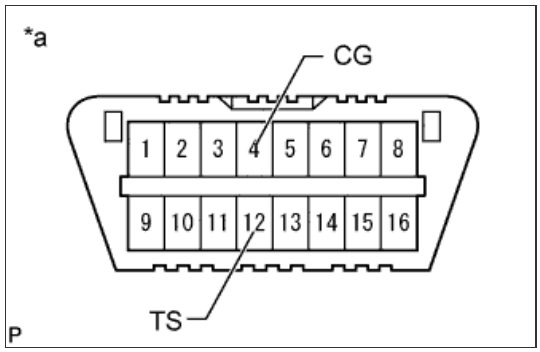
NOTICE:

DTC 98 will be stored if the parking brake lever is not pulled.

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

SST

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Text in Illustration

*a	Front view of DLC3

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 pattern (0.125 seconds on and 0.125 seconds off).

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 (GTS)

After replacing the deceleration sensor, make sure to clear the zero point calibration data in the skid control ECU (master cylinder solenoid) and perform zero point calibration.

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

f. Using the GTS, perform zero point calibration of the deceleration sensor.

PERFORM ZERO POINT CALIBRATION OF DECELERATION SENSOR (GTS)

After replacing the master cylinder solenoid and/or deceleration sensor, make sure to perform deceleration 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 will be stored if the shift lever is not in P.

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

NOTICE:

DTC C1336 will be stored if the parking brake lever is not pulled.

iv. Check that the steering wheel is centered.

v. Connect the GTS to the DLC3.

vi. Turn the ignition switch to ON.

vii. Turn the GTS 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 pattern (0.125 seconds on and 0.125 seconds off).

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

NOTICE:

After replacing the master cylinder solenoid and/or deceleration sensor, perform calibration.

HINT:

- **By switching the skid control ECU (master cylinder solenoid) from normal mode to test mode, abnormality detection sensitivity is enhanced and troubleshooting can be conducted efficiently.**
- **Perform a sensor check in test mode after the speed sensor or sensor rotor has been repaired or replaced.**
- **If the ignition switch is turned from ON to ACC or off during test mode, DTCs related to the signal check function are not cleared. During test mode, do not change to normal mode.**
- **During test mode, the skid control ECU (master cylinder solenoid) stores all DTCs related to the signal check function, and the DTCs are cleared if normality is confirmed. Any remaining DTCs indicate abnormalities that were found.**

TEST MODE (SIGNAL CHECK) PROCEDURE

a. When using the GTS:

i. Place the vehicle on a level surface with an inclination of less than 1%.

ii. Turn the ignition switch off.

iii. Check that the shift lever is in P.

CAUTION:

Apply the parking brake for safety.

iv. Connect the GTS to the DLC3.

v. Turn the ignition switch to ON.

vi. Turn the GTS on.

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

viii. Check that the ABS warning light blinks at 0.125 second intervals (0.125 seconds on and 0.125 seconds off).

ix. Start the engine.

b. When using SST check wire:

i. Place the vehicle on a level surface with an inclination of less than 1%.

ii. Turn the ignition switch off.

iii. Check that the shift lever is in P.

CAUTION:

Apply the parking brake for safety.

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

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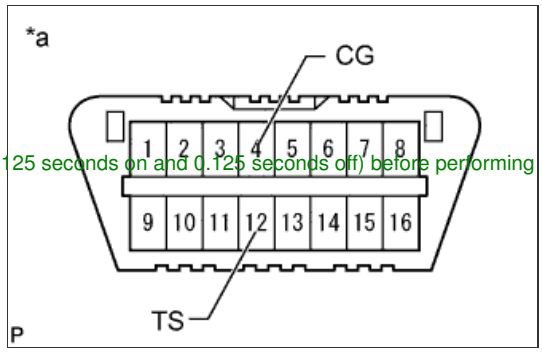
Text in Illustration

*a	Front view of DLC3

v. Turn the ignition switch to ON.

vi. Check that the ABS warning light blinks at 0.125 second intervals (0.125 seconds on and 0.125 seconds off).

vii. Start the engine.



c. ABS Signal Check

HINT:

Check that the ABS warning light is blinking in the test mode blinking pattern (0.125 seconds on and 0.125 seconds off) before performing the ABS signal check.

d. Master Cylinder Pressure Sensor and Deceleration Sensor Check

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

ii. With the vehicle stationary, 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.

iii. Check that the ABS warning light comes on for 3 seconds.

HINT:

During test mode, the ABS warning light turns on for 3 seconds every time the above operation is performed.

e. Center Differential Lock Detection Switch Check

i. Press the center differential lock switch to lock the center differential.

HINT:

Move the vehicle either forward or backward a little to engage the center differential lock.

ii. Press the center differential lock switch to unlock the center differential.

f. Speed Sensor Check

NOTICE:

- **Before performing the speed sensor signal check, complete the master cylinder pressure sensor check.**
- **The signal check may not be completed if the wheels of the vehicle spin or the steering wheel is turned during this check.**

i. Drive the vehicle straight forward at a speed of 45 km/h (28 mph) or more for several seconds (forward signal check).

ii. Check that the ABS warning light goes off.

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

iv. Check that the ABS warning light goes off.

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.

NOTICE:

- **The sensor check may not be completed if wheelspin occurs.**
- **The ABS warning light blinks when the sensor check is completed and the brake pedal is depressed.**
- **The ABS warning light comes on immediately after a malfunction has been detected during the speed sensor check.**

v. 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 is not completed, the ABS warning light blinks while driving and the ABS does not operate.**

HINT:

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

g. End of Signal Check

i. If the signal check is completed, the ABS warning light blinks (0.125 seconds on and 0.125 seconds off) when the vehicle is stopped and goes off while driving the vehicle.

NOTICE:

If the signal check is not completed, the ABS warning light blinks while driving and the ABS does not operate.

h. Read test mode (signal check) DTCs (when using the GTS).

i. Read the DTC(s) by following the GTS screen.

NOTICE:

- **If only DTCs other than test mode signal check DTCs are output, repair the malfunctions and clear the DTCs.**
- **If test mode signal check DTCs and other DTCs are output or if only test mode sensor check DTCs are output, repair the malfunctions, clear the DTCs, and perform the test mode inspection again.**

HINT:

Refer to Signal Check DTCs.

ii. Turn the ignition switch off and disconnect the GTS.

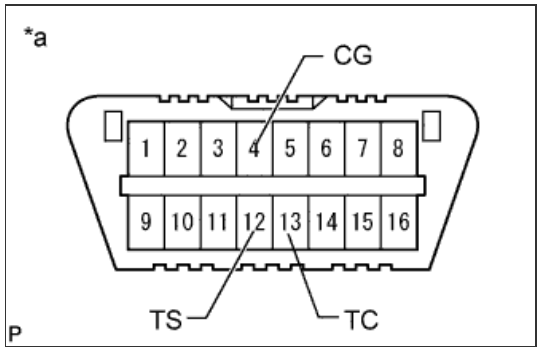
i. Read test mode (signal check) DTCs (when using SST check wire).

i. Using SST, connect terminals 13 (TC), 12 (TS) and 4 (CG) of the DLC3.

SST
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Text in Illustration

*a	Front view of DLC3



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

HINT:

- **If every sensor is normal, the normal code is output (a cycle of 0.25 seconds on and 0.25 seconds off is repeated).**
- **If 2 or more malfunctions are detected at the same time, the lowest numbered DTC is output first.**

iii. Disconnect SST from terminals 13 (TC), 12 (TS) and 4 (CG) of the DLC3.

LIST OF TEST MODE (SIGNAL CHECK) DTC

Test Mode DTC

DTC Code		Detection Item	Trouble Area
GTS Display	ABS Warning Light Display		
C1271	71	Front Speed Sensor RH Output Voltage Malfunction	• Front speed sensor RH • Sensor installation • Speed sensor rotor (Front axle with ABS rotor bearing assembly RH)
C1272	72	Front Speed Sensor LH Output Voltage Malfunction	• Front speed sensor LH • Sensor installation • Speed sensor rotor (Front axle with ABS rotor bearing assembly LH)
C1273	73	Rear Speed Sensor RH Output Voltage Malfunction	• Rear speed sensor RH • Sensor installation • Speed sensor rotor (Rear axle hub & bearing assembly RH)
C1274	74	Rear Speed Sensor LH Output Voltage Malfunction	• Rear speed sensor LH • Sensor installation • Speed sensor rotor (Rear axle hub & bearing assembly LH)
C1275	75	Abnormal Change in Output Signal of Front Speed Sensor RH	• Front speed sensor RH • Speed sensor rotor (Front axle with ABS rotor bearing assembly RH)

C1276	76	Abnormal Change in Output Signal of Front Speed Sensor LH	• Front speed sensor LH • Speed sensor rotor (Front axle with ABS rotor bearing assembly LH)
C1277	77	Abnormal Change in Output Signal of Rear Speed Sensor RH	• Rear speed sensor RH • Speed sensor rotor (Rear axle hub & bearing assembly RH)
C1278	78	Abnormal Change in Output Signal of Rear Speed Sensor LH	• Rear speed sensor LH • Speed sensor rotor (Rear axle hub & bearing assembly LH)
C1279	79	Deceleration sensor Output Voltage Malfunction	• Sensor installation • Harness or connector • Deceleration sensor
C1281	81	Master Cylinder Pressure Sensor Output Malfunction	Master cylinder solenoid (Master cylinder pressure sensor)
C1282	82	Center Differential Lock Position Switch Malfunction	• Harness or connector • Transfer system

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.**

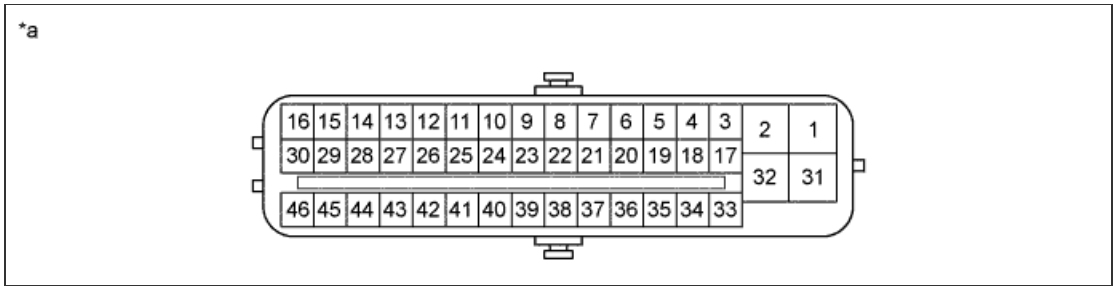
Anti-lock Brake System

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
	Deceleration 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
	Deceleration 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

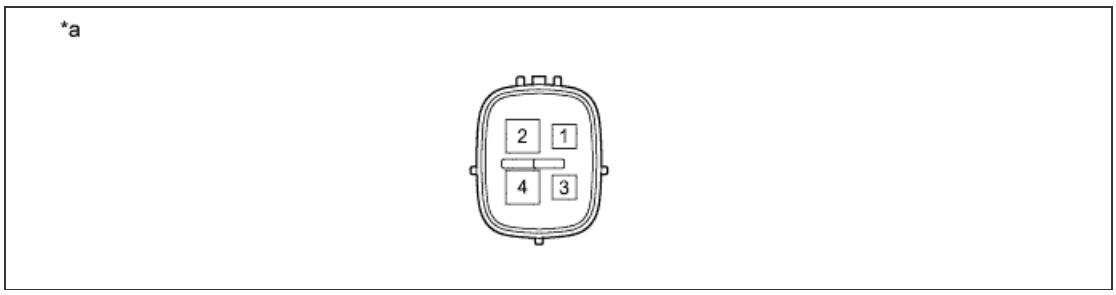
TERMINALS OF ECU



Text in Illustration

*a	Component without harness connected (Skid Control ECU [Master Cylinder Solenoid])	-	-

Terminal No. (Symbol)	Terminal Description
1 (GND1)	Skid control ECU (Master cylinder solenoid) ground
2 (+BM1)	Power supply for motor
3 (FR+)	Front speed sensor RH power supply output
4 (FL-)	Front speed sensor LH input
5 (RR+)	Rear speed sensor RH power supply output
6 (RL-)	Rear speed sensor LH input
7 (STP)	Stop light switch
11 (CANH)	CAN communication terminal H
12 (SP1)	Speedometer signal
14 (P)	Rear differential lock detection switch
17 (FR-)	Front speed sensor RH input
18 (FL+)	Front speed sensor LH power supply output
19 (RR-)	Rear speed sensor RH input
20 (RL+)	Rear speed sensor LH power supply output
22 (VGS)	Deceleration sensor power supply output
23 (GGND)	Deceleration sensor ground
24 (TS)	Sensor test terminal (Signal check switch)
25 (CANL)	CAN communication terminal L
27 (EXI)	Center differential lock switch
31 (+BS)	Power supply for solenoid
32 (GND2)	Skid control ECU (Master cylinder solenoid) ground
39 (GL1)	Deceleration sensor input
41 (LBL)	Brake fluid level warning switch
46 (IG1)	IG1 power supply



Text in Illustration

*a	Component without harness connected (Skid Control ECU [Master Cylinder Solenoid])	-	-

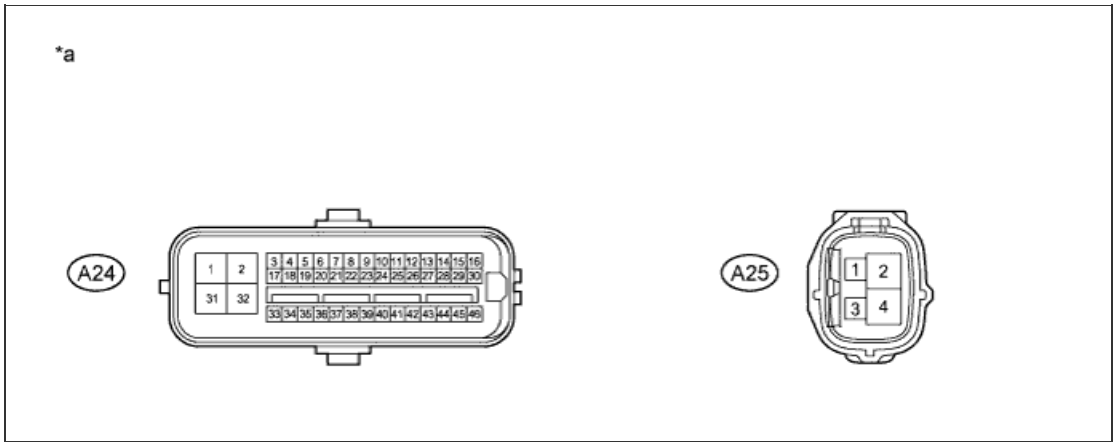
Terminal No. (Symbol)	Terminal Description
1 (IG2)	IG2 power supply
2 (+BM2)	Power supply for motor
4 (GND3)	Skid control ECU (Master cylinder solenoid) ground

TERMINAL INSPECTION

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

HINT:

Voltage cannot be measured with the connector connected to the skid control ECU (master cylinder solenoid) as the connector is watertight.



Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])	-	-

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
A24-7 (STP) - Body ground	R	Stop light switch	Brake pedal depressed → released	8 to 14 V → Below 1.5 V
A24-31 (+BS) - Body ground	W	Power supply for solenoid (From battery)	Always	11 to 14 V
A24-41 (LBL) - Body ground	P BR-Y*	Brake fluid level warning switch (Brake master cylinder reservoir sub-assembly)	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

*: GRJ200L-GNANKC

for Preparation Click here

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 (When Using GTS)

a. Check for DTCs.

i. Turn the ignition switch off.

ii. Connect the GTS to the DLC3.

iii. Turn the ignition switch to ON.

iv. Turn the GTS on.

v. Enter the following menus: Chassis / ABS/VSC/TRC / Trouble Codes.

vi. Read the DTCs by following the prompts on the GTS screen.

b. Clear the DTCs.

i. Turn the ignition switch off.

ii. Connect the GTS to the DLC3.

iii. Turn the ignition switch to ON.

iv. Turn the GTS on.

v. Enter the following menus: Chassis / ABS/VSC/TRC / Trouble Codes.

vi. Operate the GTS to clear the codes.

HINT:

Refer to the GTS operator's manual for further details.

DTC CHECK/CLEAR (When Using SST Check Wire)

a. Check for DTCs.

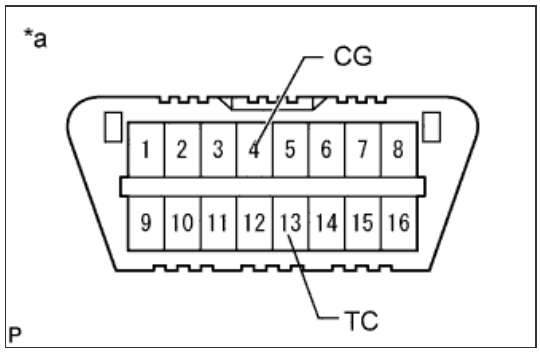
i. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST

09843-18040

Text in Illustration

*a	Front view of DLC3



ii. Turn the ignition switch to ON.

iii. Read the DTCs output from the ABS warning light in the combination meter.

HINT:

- **When the system is normal, the ABS warning light blinks at 0.25 second intervals (0.25 seconds on and 0.25 seconds off).**
- **When only 1 DTC is stored, the light outputs the same code after an interval of 4 seconds. Example: When DTC 21 is stored, the light blinks twice, turns off for 1.5 seconds, blinks once, turns off for 4 seconds, and then repeats this output pattern.**
- **When 2 or more DTCs are stored, the light outputs the codes with an interval of 2.5 seconds between each different code, and the output of all codes repeats after an interval of 4 seconds.**
- **If no code is output, inspect the TC and CG terminal circuit and the ABS warning light circuits.**

Trouble Area	See Procedure
TC and CG terminal circuit	Click here
ABS warning light circuit (Remains on)	Click here
ABS warning light circuit (Does not come on)	Click here

iv. The codes are explained in the code table.

ABS DTC

ABS Warning Light Display	GTS Display
11	C146E
12	C146F
21	C1468
22	C1469
23	C146A
24	C146B
25	C1225
26	C1226
27	C1227
28	C1228
31	C1401
	C1405
	C1409
32	C1402
	C1406
	C1410
33	C1403
	C1407
	C1411
34	C1404
	C1408
	C1412
35	C1413
36	C1414
37	C1337
38	C1415
39	C1416
41	C1241
	C1417
42	C1242
43	C1243
44	C1418
45	C1245
46	C1421
	C1422
	C1423
	C1424
49	C1425
51	C1251
52	C1252
53	C1253
54	C1254
56	C1256
	C1452
57	C1257
58	C1453
	C1454

68 94	C1268 U0073
97	C1381
98	C1336
A1*	U0114

*: The light blinks 10 times, turns off for 1.5 seconds, and then blinks once.

v. Disconnect terminals 13 (TC) and 4 (CG) of the DLC3.
If 2 or more DTCs are output at the same time, the DTCs are output in ascending order.

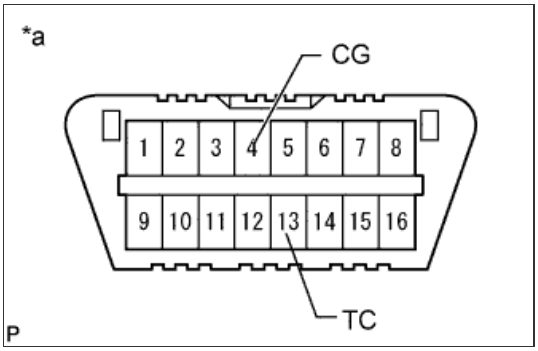
b. Clear the DTCs.

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

SST
09843-18040

Text in Illustration

*a	Front view of DLC3



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 blinks at 0.25 second intervals (0.25 seconds on and 0.25 seconds off).

v. Remove SST from the terminals of the DLC3.

END OF DTC CHECK/CLEAR

a. Turn the ignition switch to ON.

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

for Preparation Click here

FREEZE FRAME DATA

a. Whenever a DTC is stored, the skid control ECU (master cylinder solenoid) stores the current vehicle (sensor) state as freeze frame data.

b. The skid control ECU (master cylinder solenoid) stores the number of times (maximum: 31) the ignition switch has been turned from off to ON since the last time the ABS was activated.

HINT:

- **If the vehicle is stopped or at a low speed (7 km/h (4 mph) or less), or if a DTC is stored, the skid control ECU (master cylinder solenoid) will stop counting the number of times the ignition switch has been turned from off to ON.**
- **Freeze frame data at the time the ABS operates:**
  The skid control ECU (master cylinder solenoid) stores and updates data whenever the ABS operates.
  When the ECU stores data at the time a DTC is stored, the data stored during ABS operation is cleared.
- **Freeze frame data at the time a DTC is stored:**
  When the skid control ECU (master cylinder solenoid) stores data at the time a DTC is stored, no updates will be performed until the data is cleared.

CHECK FREEZE FRAME DATA

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Trouble Codes.

f. According to the display on the GTS, select the trouble code data display with freeze frame data.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Elapsed Time after Freeze Trigger	Elapsed time after freeze trigger/ Min.: 0 msec, Max.: 500 msec	-	-
Number of IG ON	Number of times ignition switch turned to ON after storing freeze frame data/ 0 to 31	-	-
Buzzer	Buzzer/ ON or OFF	ON: Buzzer on OFF: Buzzer off	The combination meter has a built-in buzzer.
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	OFF	-
Operated System	Operated system status/ ABS, VSC, TRC, BA, HAB, PBA, PB, HA-CTRL, Fail, TSC, Sys or Non	-	ABS: ABS is activated. BA: BA is activated. Fail: Fail safe mode is activated. Non: No operation is activated.
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 value increases when the brake pedal is depressed.
M/C Sensor Grade	Master cylinder pressure sensor change/ Min.: -30 MPa/s, Max.: 225 MPa/s	When brake pedal released or pedal held at constant position: 0 MPa/s	Changes in proportion with the pedal movement speed when the brake pedal is being operated.
Forward and Rearward G	Forward and backward G/ Min.: - 25.10 m/s^2, Max.: 24.90 m/s^2	-	Changes in proportion with acceleration during acceleration/deceleration.
FR Wheel Speed	Front wheel speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	No large fluctuations when driving at a constant speed.

FL Wheel Speed	Front wheel speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	No large fluctuations when driving at a constant speed.
RR Wheel Speed	Rear wheel speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear wheel speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	No large fluctuations when driving at a constant speed.
Vehicle Speed	Maximum wheel speed sensor reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
Vehicle Speed Grade	Vehicle acceleration/ Min.: -25.10 m/s^2, Max.: 24.90 m/s^2	Vehicle stopped: 0 m/s^2	Changes in proportion with the vehicle acceleration/deceleration during driving.
FR Wheel Direction	Front wheel RH direction signal/ Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel LH direction signal/ Forward or Back	Forward: Forward Back: Backward	-
RR Wheel Direction	Rear wheel RH direction signal/ Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel LH direction signal/ Forward or Back	Forward: Forward Back: Backward	-
Real Engine Torque	Actual engine torque/ Min.: -1024.0 Nm, Max.: 1023.0 Nm	-	-
Accelerator Opening Angle %	Throttle valve opening amount/ Min.: 0.0%, Max.: 128.0%	When accelerator pedal released: 0%	Changes in proportion with the movement of the pedal during accelerator pedal operation.

CLEAR FREEZE FRAME DATA

NOTICE:

Clearing the DTCs will also clear the freeze frame data.

a. Connect the GTS to the DLC3.

b. Turn the ignition switch to ON.

c. Clear the DTCs and freeze frame data (Click here).

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.
- 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 GTS 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. Warm up the engine.

b. Turn the ignition switch off.

c. Connect the GTS to the DLC3.

d. Turn the ignition switch to ON.

e. Turn the GTS on.

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

g. According to the display on the GTS, 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/ ON or OFF	ON: Warning light on OFF: Warning light off	-
Buzzer	Buzzer/ ON or OFF	ON: Buzzer on OFF: Buzzer off	The combination meter has a built-in buzzer.
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	OFF	-
Main Idle SW	Main idle switch/ ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
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 value 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	-	Changes continuously during acceleration/deceleration.
Zero Point of Decele	Memorized zero value/ 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	-	Changes in proportion with acceleration during acceleration/deceleration.
Rear Diff Lock Switch	Rear differential lock detection switch/ ON or OFF	ON: Rear differential lock detection switch on OFF: Rear differential lock detection switch off	-
L4 Switch	Transfer L4 detection switch/ ON or OFF	ON: L4 OFF: except L4	-
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
Vehicle Speed	Maximum wheel speed sensor reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual vehicle speed	No large fluctuations when driving at a constant speed.
FR Wheel Acceleration	Front wheel acceleration RH/ Min.: -200.84 m/s^2, Max.: 199.27 m/s^2	-	Changes continuously during acceleration/deceleration.
FL Wheel Acceleration	Front wheel acceleration LH/ Min.: -200.84 m/s^2, Max.: 199.27 m/s^2	-	Changes continuously during acceleration/deceleration.
RR Wheel Acceleration	Rear wheel acceleration RH/ Min.: -200.84 m/s^2, Max.: 199.27 m/s^2	-	Changes continuously during acceleration/deceleration.
RL Wheel Acceleration	Rear wheel acceleration LH/ Min.: -200.84 m/s^2, Max.: 199.27 m/s^2	-	Changes continuously during acceleration/deceleration.
FR Wheel Direction	Front wheel direction RH/ Forward or Back	Forward: Forward Back: Back	-
FL Wheel Direction	Front wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-
RR Wheel Direction	Rear wheel direction RH/ Forward or Back	Forward: Forward Back: Back	-
RL Wheel Direction	Rear wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-
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	Actual engine torque/ Min.: -1024.0 Nm, Max.: 1023.0 Nm	-	-
Accelerator	Percentage of accelerator pedal		

Opening Angle %	opening angle/ Min.: 0.0%, Max.: 128.0%	When accelerator pedal released: 0%	Changes in proportion with the movement of the pedal during accelerator pedal operation.
Solenoid Relay	Solenoid relay/ ON or OFF	ON: Solenoid relay on OFF: Solenoid relay off	-
ECB* Motor Relay	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: Operating OFF: Not operating	-
TR(A)C/VSC Solenoid (SRM1)	TRC/VSC solenoid (SRM1)/ ON or OFF	ON: Operating OFF: Not operating	-
TR(A)C/VSC Solenoid (SRC2)	TRC/VSC solenoid (SRC2)/ ON or OFF	ON: Operating OFF: Not operating	-
TR(A)C/VSC Solenoid (SRC1)	TRC/VSC solenoid (SRC1)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SFRH)	ABS solenoid (SFRH)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SFRR)	ABS solenoid (SFRR)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SFLH)	ABS solenoid (SFLH)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SFLR)	ABS solenoid (SFLR)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SRRH)	ABS solenoid (SRRH)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SRRR)	ABS solenoid (SRRR)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SRLH)	ABS solenoid (SRLH)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SRLR)	ABS solenoid (SRLR)/ ON or OFF	ON: Operating OFF: Not operating	-
FR Speed Open	Front speed sensor RH open circuit detection/ Error or Normal	Normal	-
FL Speed Open	Front speed sensor LH open circuit detection/ Error or Normal	Normal	-
RR Speed Open	Rear speed sensor RH open circuit detection/ Error or Normal	Normal	-
RL Speed Open	Rear speed sensor LH open circuit detection/ Error or Normal	Normal	-
EFI Communication Open	ECM communication open circuit detection/ Error or Normal	Normal	-
Deceleration Open	Deceleration sensor open circuit detection/ Error or Normal	Normal	-
Master Cylinder Open	Master cylinder pressure sensor open circuit detection/ Error or Normal	Normal	-
IG1 Voltage Value	IG1 voltage value/ Min.: 0.00 V, Max.: 20.00 V	Ignition switch ON: 11 to 14 V	-
IG2 Voltage Value	IG2 voltage value/ Min.: 0.00 V, Max.: 20.00 V	Ignition switch ON: 11 to 14 V	-
Number of DTC	Number of DTCs/ Min.: 0, Max.: 255	0	-
IG Voltage Value Decreased	IG voltage value decreased detection/ Error or Normal	Normal	-
IG Voltage Value Increased	IG voltage value increased detection/ Error or Normal	Normal	-
FR Speed Sensor Voltage Open	Front speed sensor RH voltage open circuit detection/ Error or Normal	Normal	-

FL Speed Sensor Voltage Open	Front speed sensor LH voltage open circuit detection/ Error or Normal	Normal	-
RR Speed Sensor Voltage Open	Rear speed sensor RH voltage open circuit detection/ Error or Normal	Normal	-
RL Speed Sensor Voltage Open	Rear speed sensor LH voltage open circuit detection/ Error or Normal	Normal	-
M/C Pressure Sensor Noise	Master cylinder pressure sensor noise detection/ Error or Normal	Normal	-
EFI Communication Invalid	ECM communication invalid detection/ Error or Normal	Normal	-

*: Electronically Controlled Brake

ACTIVE TEST

HINT:

Using the GTS 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. Warm up the engine.

b. Turn the ignition switch off.

c. Connect the GTS to the DLC3.

d. Turn the ignition switch to ON.

e. Turn the GTS on.

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

g. According to the display on the GTS, 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	Buzzer	Buzzer ON/OFF	The buzzer can be heard.
Solenoid Relay	Solenoid relay	Relay ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
Motor Relay	Motor relay	Relay ON/OFF	An operating sound of the solenoid of the motor can be heard.
ABS Solenoid (SRLR)	ABS solenoid (SRLR)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRLH)	ABS solenoid (SRLH)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRRR)	ABS solenoid (SRRR)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRRH)	ABS solenoid (SRRH)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFLR)	ABS solenoid (SFLR)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFLH)	ABS solenoid (SFLH)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFRR)	ABS solenoid (SFRR)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid	ABS solenoid (SFRH)	Solenoid	An operating sound of the solenoid

(SFRH)		ON/OFF	(clicking sound) can be heard.
VSC/TRC Solenoid (SRMR)	VSC/TRC solenoid (SRM2)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRMF)	VSC/TRC solenoid (SRM1)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRCR)	VSC/TRC solenoid (SRC2)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRCF)	VSC/TRC solenoid (SRC1)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid	Selection of multiple holding solenoids (SFRH, SFLH, SRRH and SRLH) and pressure reduction solenoids (SFRR, SFLR, SRRR and SRLR) possible	Start/Stop	-
VSC/TRC Solenoid	Selection of multiple VSC/TRC solenoids [SRMR (SRM2), SRMF (SRM1), SRCR (SRC2) and SRCF (SRC1)] possible	Start/Stop	-

for Preparation Click here

NOTICE:

Turn the ignition switch off before removing any parts.

HINT:

- **If no abnormality is found when inspecting parts, inspect the skid control ECU (master cylinder solenoid) and ground points for poor connections.**
- **If a trouble code is output during the DTC check, check the trouble areas indicated by the DTC. For details of each code, refer to the "See page" for the respective "DTC Code" in the DTC chart.**
- **When 2 or more DTCs are output, perform circuit inspections one by one until the problem is identified.**
- **For DTCs output by the warning light, refer to the DTC charts in DTC Check/Clear.**
- **Inspect the fuses and relays before inspecting the trouble areas shown in the table below.**

DTC

DTC Code	Detection Item	See page
C1225	SM Solenoid Circuit	Click here
C1226	SA2 Solenoid Circuit	Click here
C1227	SA3 Solenoid Circuit	Click here
C1228	STR Solenoid Circuit	Click here
C1241	Low Power Supply Voltage Malfunction	Click here
C1242	Open Circuit in IG1/IG2 Power Source Circuit	Click here
C1243	Acceleration Sensor Stuck Malfunction	Click here
C1245	Acceleration Sensor Output Malfunction	Click here
C1251	Open in Pump Motor Circuit	Click here
C1252	Brake Booster Pump Motor on Time Abnormally Long	Click here
C1253	Pump Motor Relay	Click here
C1254	Pressure Sensor or Switch	Click here
C1256	Accumulator Low Pressure	Click here
C1257	Power Supply Drive Circuit	Click here
C1268	Transfer L4 Position Switch Circuit	Click here
C1336	Zero Point Calibration of Acceleration Sensor Undone	Click here
C1337	Diameter of the Tire is not Uniform	Click here
C1381	Acceleration Sensor Power Supply Voltage Malfunction	Click here
C1401	Front Speed Sensor RH Malfunction	Click here
C1402	Front Speed Sensor LH Malfunction	Click here
C1403	Rear Speed Sensor RH Malfunction	Click here
C1404	Rear Speed Sensor LH Malfunction	Click here
C1405	Open or Short in Front Speed Sensor RH Circuit	Click here
C1406	Open or Short in Front Speed Sensor LH Circuit	Click here
C1407	Open or Short in Rear Speed Sensor RH Circuit	Click here
C1408	Open or Short in Rear Speed Sensor LH Circuit	Click here
C1409	Front Speed Sensor RH Performance	Click here
C1410	Front Speed Sensor LH Performance	Click here
C1411	Rear Speed Sensor RH Performance	Click here
C1412	Rear Speed Sensor LH Performance	Click here
C1413	Front Speed Sensor RH Output Malfunction	Click here
C1414	Front Speed Sensor LH Output Malfunction	Click here
C1415	Rear Speed Sensor RH Output Malfunction	Click here
C1416	Rear Speed Sensor LH Output Malfunction	Click here
C1417	High Power Supply Voltage Malfunction	Click here
C1418	Open or Short in Acceleration Sensor Circuit	Click here
C1421	Open or Short in Master Cylinder Pressure Sensor	Click here
C1422	Master Cylinder Pressure Sensor Zero Point High Malfunction	Click here

C1423	Master Cylinder Pressure Sensor Zero Point Low Malfunction	Click here
C1424	Master Cylinder Pressure Sensor Output Malfunction	Click here
C1425	Open in Stop Light Switch Circuit	Click here
C1452	Accumulator Low Pressure	Click here
C1453	Reservoir Level Switch Disconnected	Click here
C1454	Reservoir Level Low	Click here
C1468	SFR Solenoid Circuit	Click here
C1469	SFL Solenoid Circuit	Click here
C146A	SRR Solenoid Circuit	Click here
C146B	SRL Solenoid Circuit	Click here
C146E	Open in ABS Solenoid Relay Circuit	Click here
C146F	Short in ABS Solenoid Relay Circuit	Click here
U0073	Control Module Communication Bus OFF	Click here
U0114	Lost Communication with 4WD Control ECU	Click here

Test Mode DTC

DTC Code	Detection Item	See page
C1271	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	Click here
C1272	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	Click here
C1273	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	Click here
C1274	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	Click here
C1275	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	Click here
C1276	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	Click here
C1277	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	Click here
C1278	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	Click here
C1279	Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)	Click here
C1281	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)	Click here
C1282	Center Differential Lock Position Switch	Click here

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

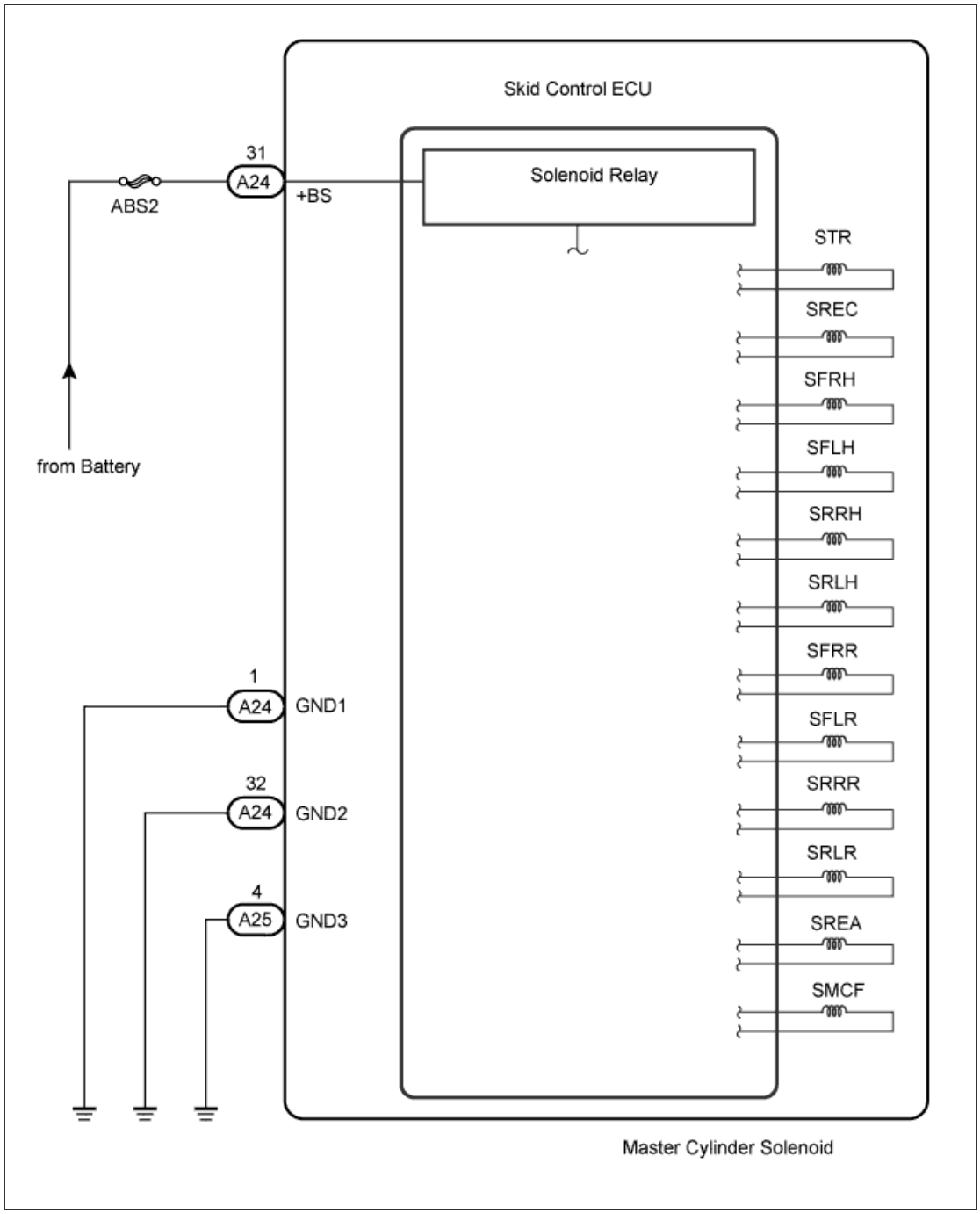
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After 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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1403 Rear Speed Sensor RH Malfunction

DTC C1273 Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1274 Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1404 Rear Speed Sensor LH Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1403 C1404	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed less than 10 km/h (6 mph), outputs from both rear speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation
C1273 C1274	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1403 and C1273 are for the rear speed sensor RH.**
- **DTCs C1404 and C1274 are for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

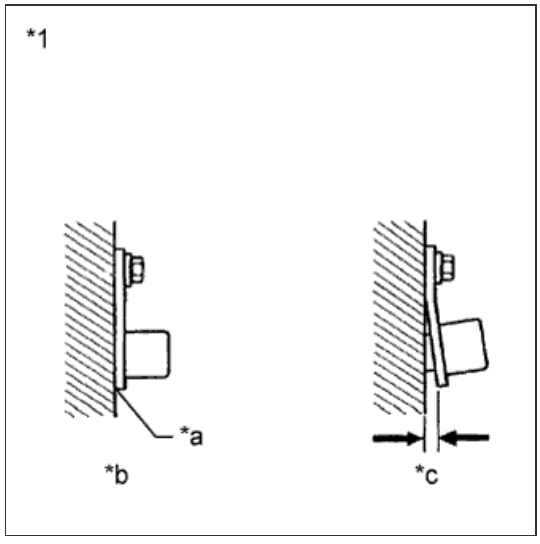
1.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

2.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:
No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

3.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

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

HINT:

The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:
The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK

CHECK FOR INTERMITTENT PROBLEMS (Click here)

5.REPLACE REAR SPEED SENSOR

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

NEXT

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more or at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

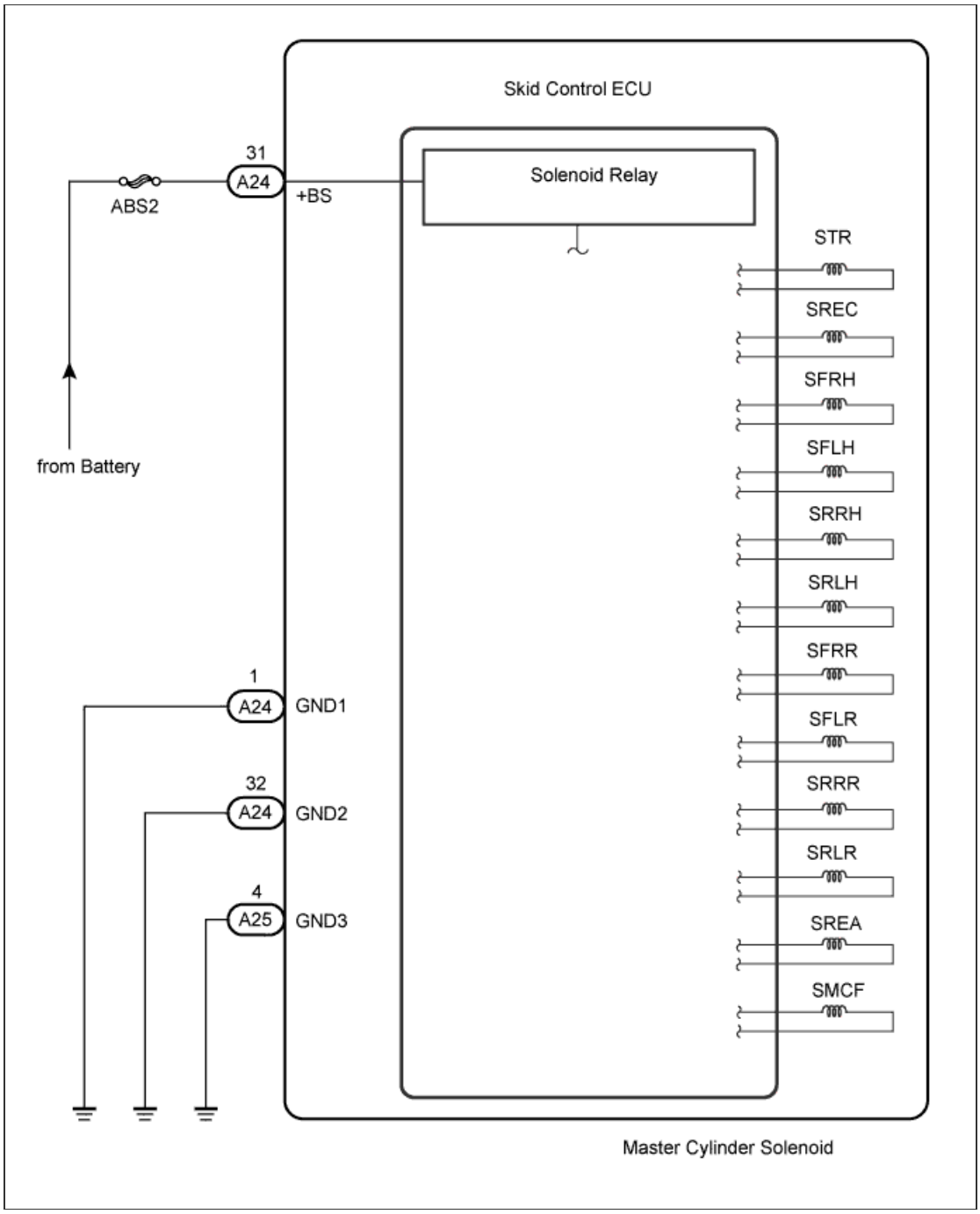
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After 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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1405 Open or Short in Front Speed Sensor RH Circuit

DTC C1406 Open or Short in Front Speed Sensor LH Circuit

for Preparation Click here

DESCRIPTION

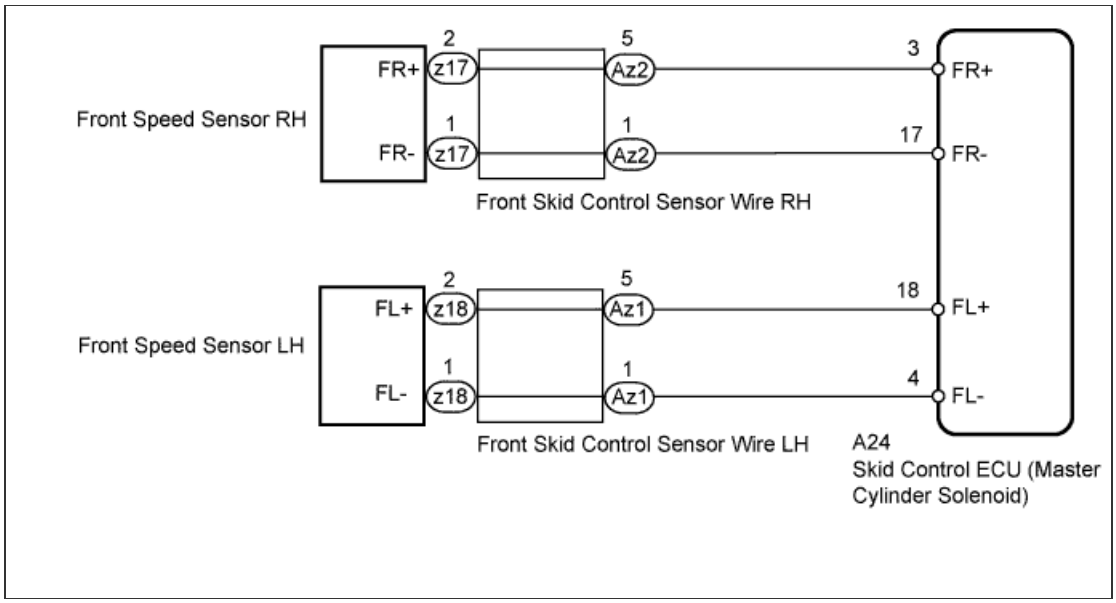
Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1405 C1406	Either condition is met: 1. An open in the speed sensor signal circuit continues for 0.5 seconds or more. 2. With the IG1 terminal voltage at 9.5 V or higher, the sensor power supply voltage decreases for 0.5 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Skid control ECU (Master cylinder solenoid)

HINT:

- **DTC C1405 is for the front speed sensor RH.**
- **DTC C1406 is for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 4

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 4

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

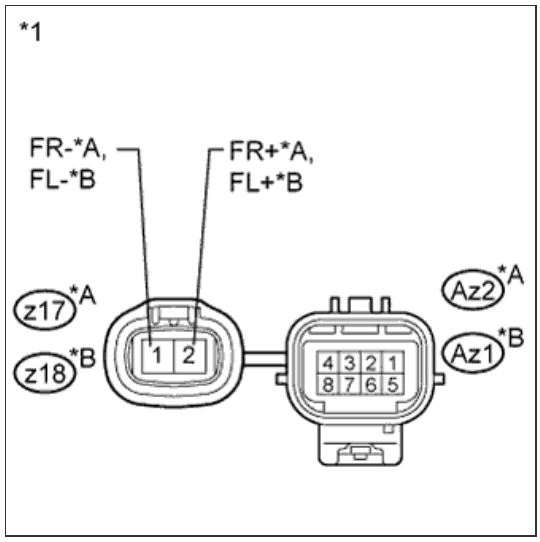
A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

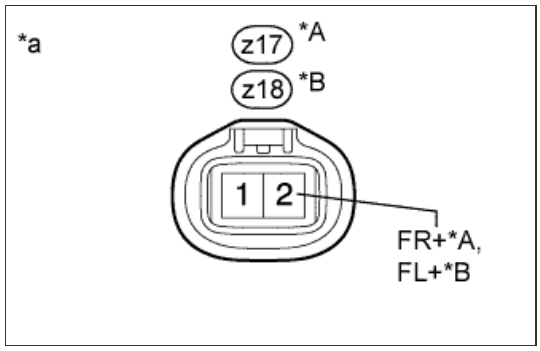
OK

6.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE FRONT SPEED SENSOR (Click here)

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

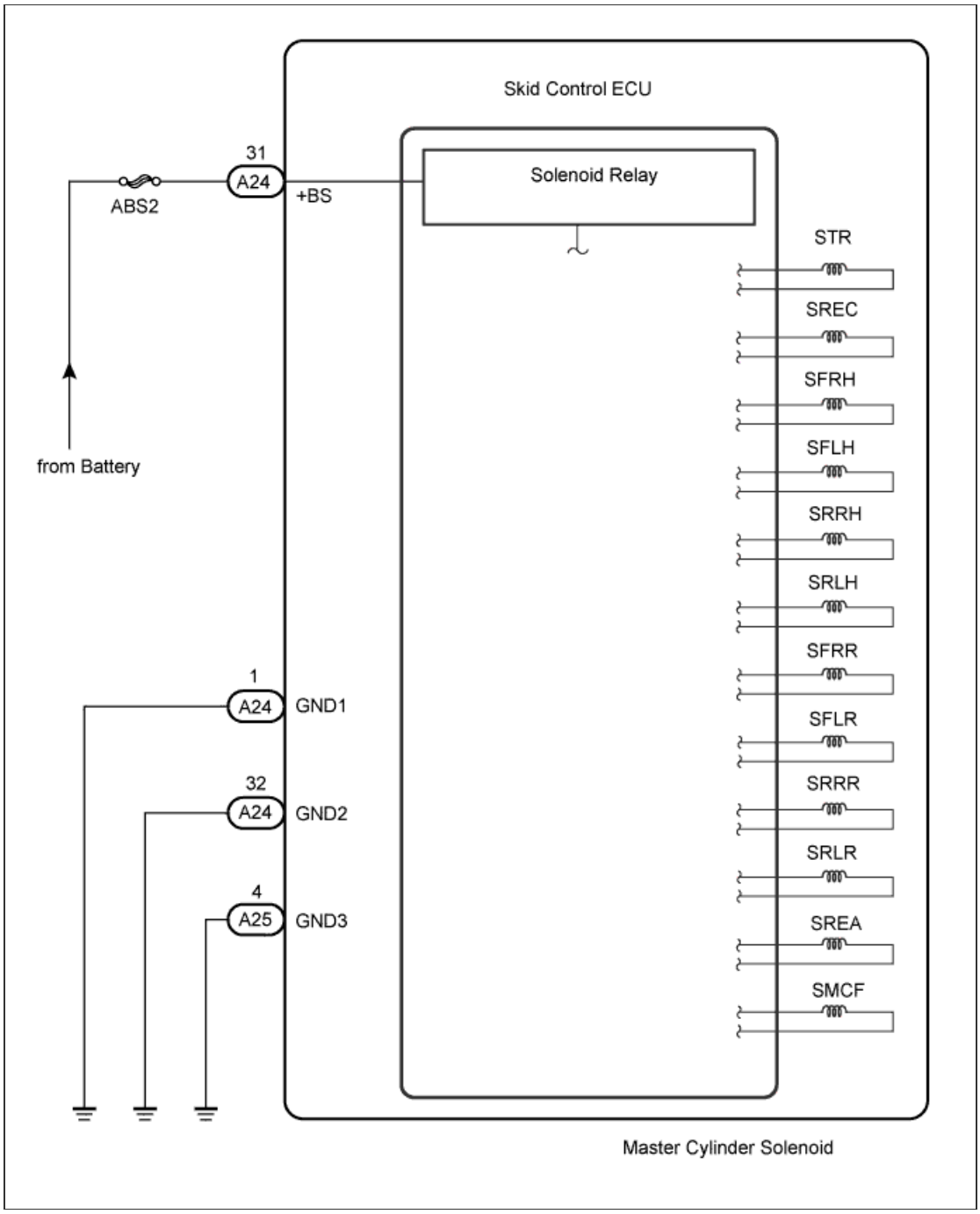
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After 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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1405 Open or Short in Front Speed Sensor RH Circuit

DTC C1406 Open or Short in Front Speed Sensor LH Circuit

for Preparation Click here

DESCRIPTION

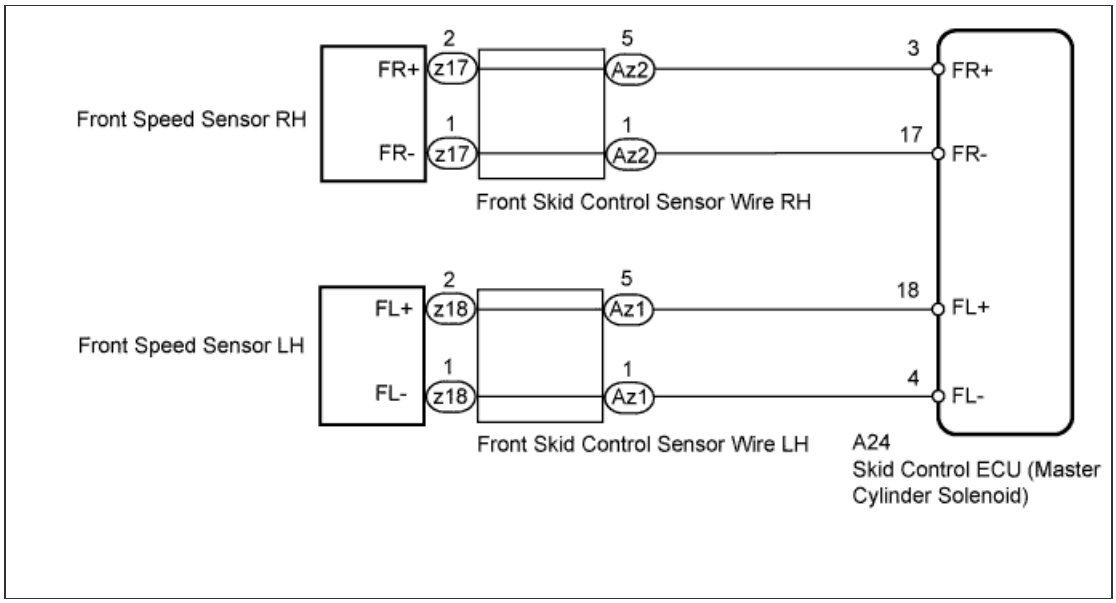
Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1405 C1406	Either condition is met: 1. An open in the speed sensor signal circuit continues for 0.5 seconds or more. 2. With the IG1 terminal voltage at 9.5 V or higher, the sensor power supply voltage decreases for 0.5 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Skid control ECU (Master cylinder solenoid)

HINT:

- **DTC C1405 is for the front speed sensor RH.**
- **DTC C1406 is for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 4

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 4

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

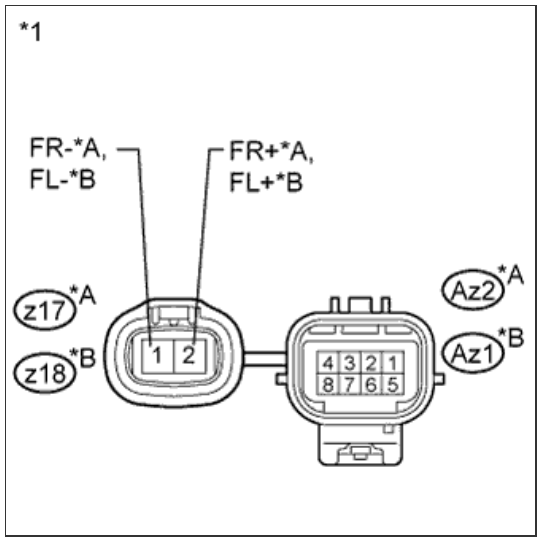
A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

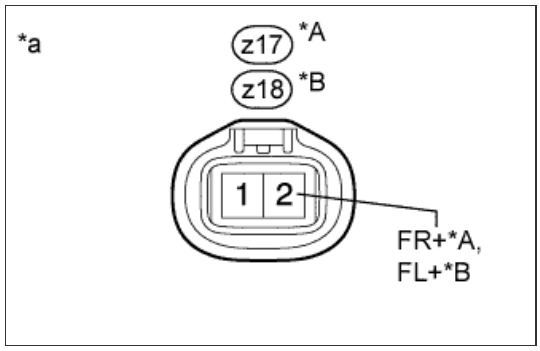
OK

6.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE FRONT SPEED SENSOR (Click here)

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

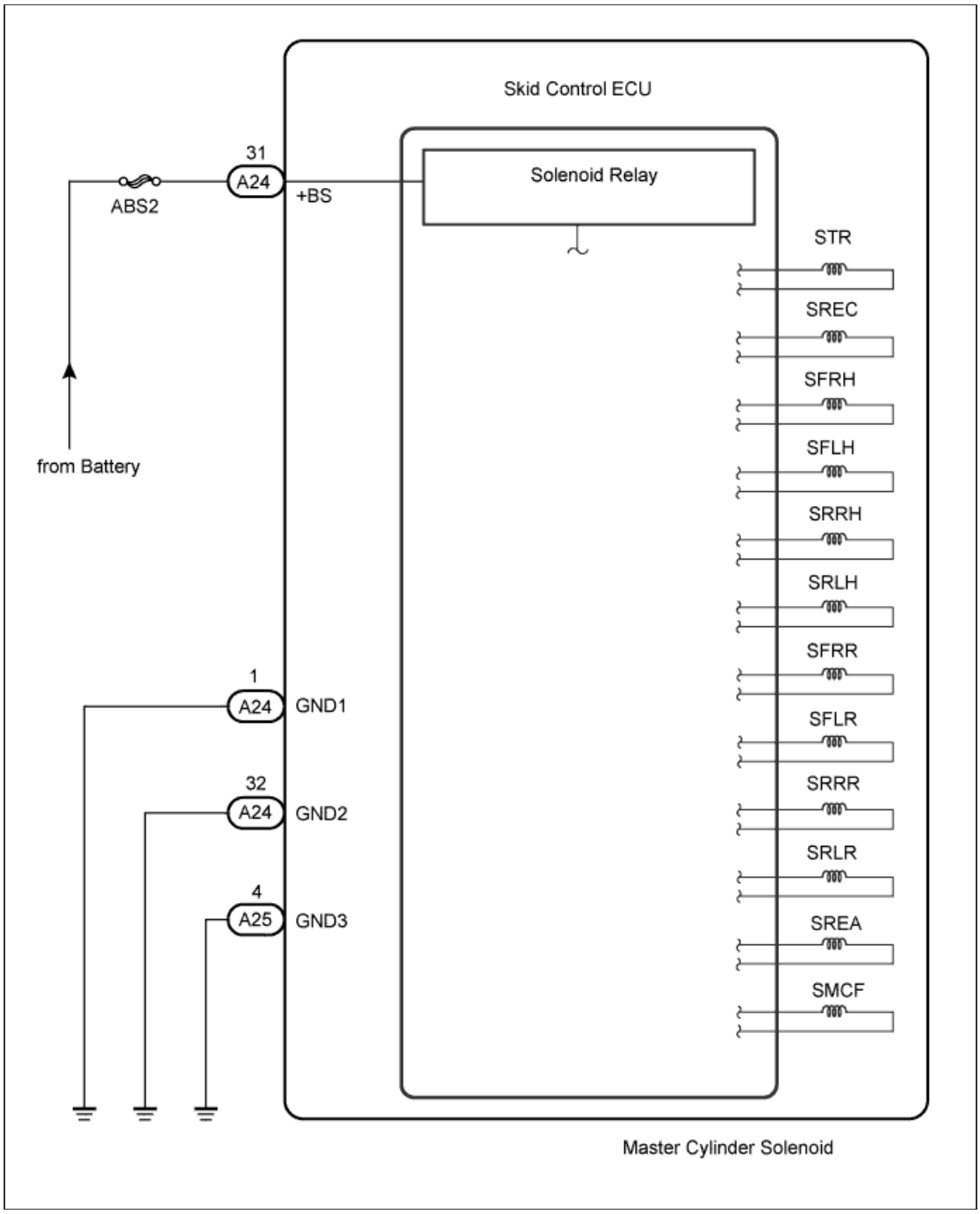
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After 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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1407 Open or Short in Rear Speed Sensor RH Circuit

DTC C1408 Open or Short in Rear Speed Sensor LH Circuit

for Preparation Click here

DESCRIPTION

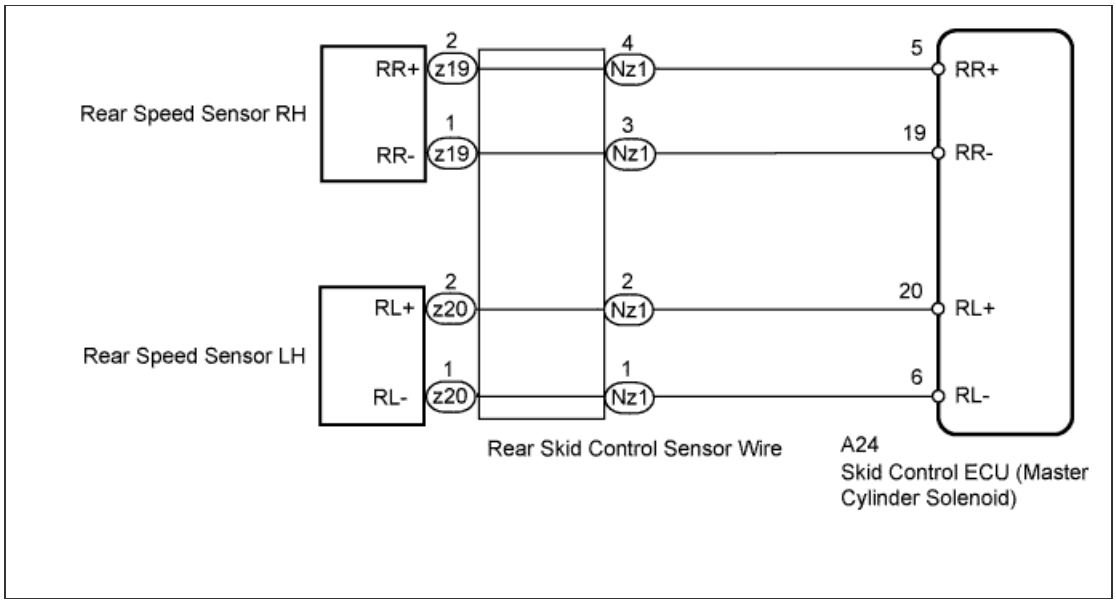
Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1407 C1408	Either condition is met: 1. An open in the speed sensor signal circuit continues for 0.5 seconds or more. 2. With the IG1 terminal voltage at 9.5 V or higher, the sensor power supply voltage decreases for 0.5 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Skid control ECU (Master cylinder solenoid)

HINT:

- **DTC C1407 is for the rear speed sensor RH.**
- **DTC C1408 is for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 4

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 4

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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
DTC is output (for RHD)	C

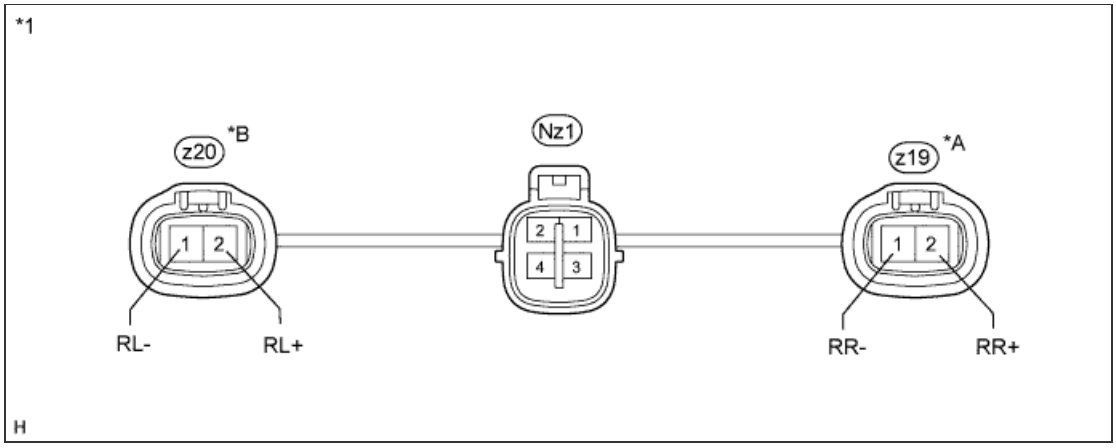
B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher
A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

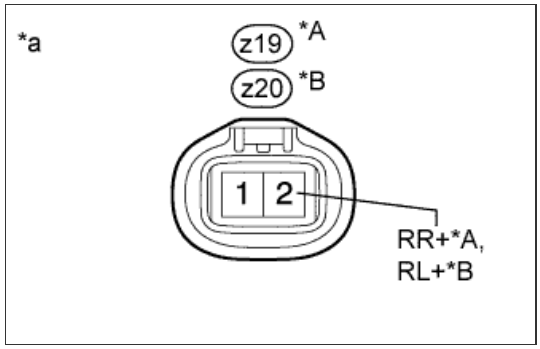
OK

6.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE REAR SPEED SENSOR (Click here)

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

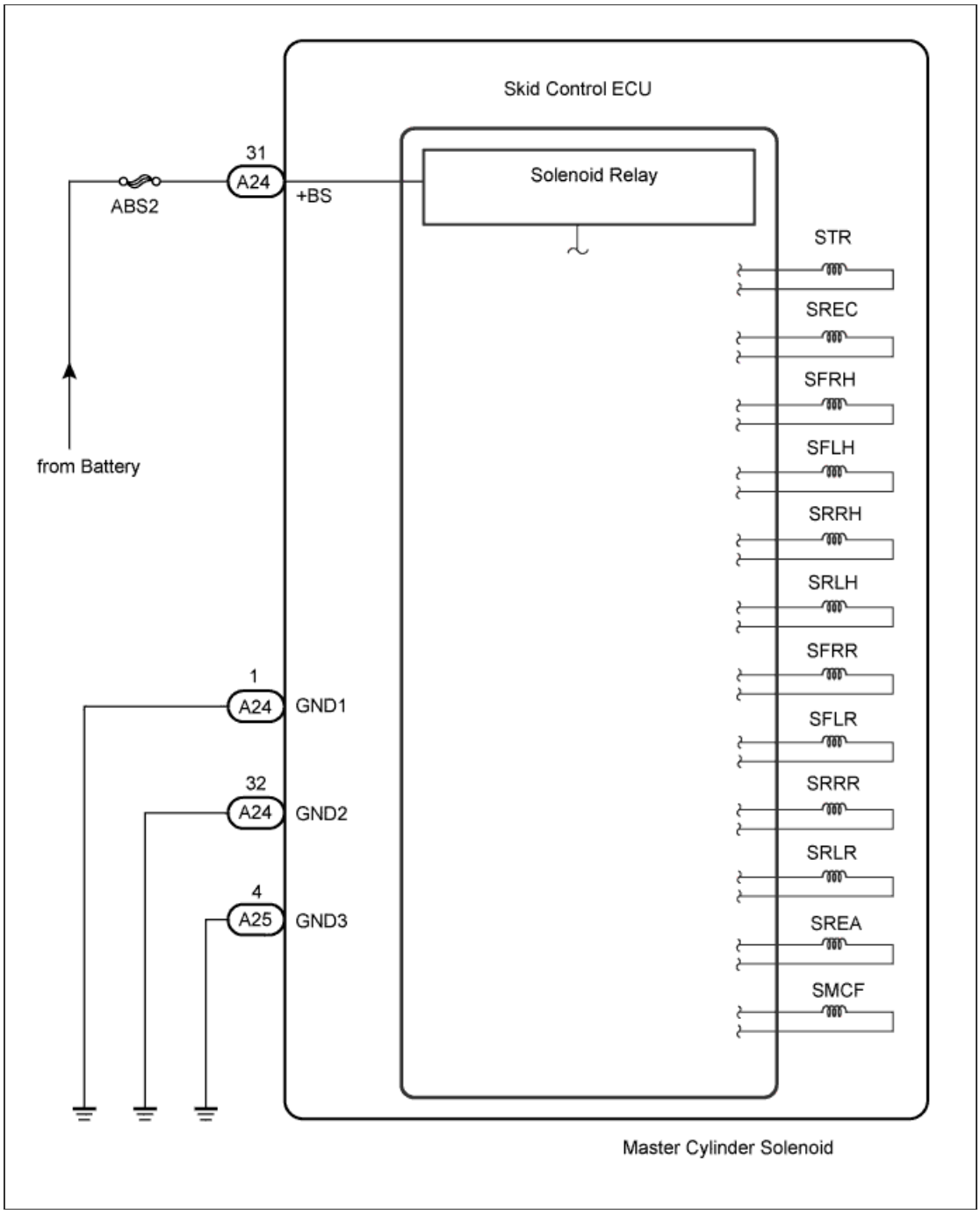
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After 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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1407 Open or Short in Rear Speed Sensor RH Circuit

DTC C1408 Open or Short in Rear Speed Sensor LH Circuit

for Preparation Click here

DESCRIPTION

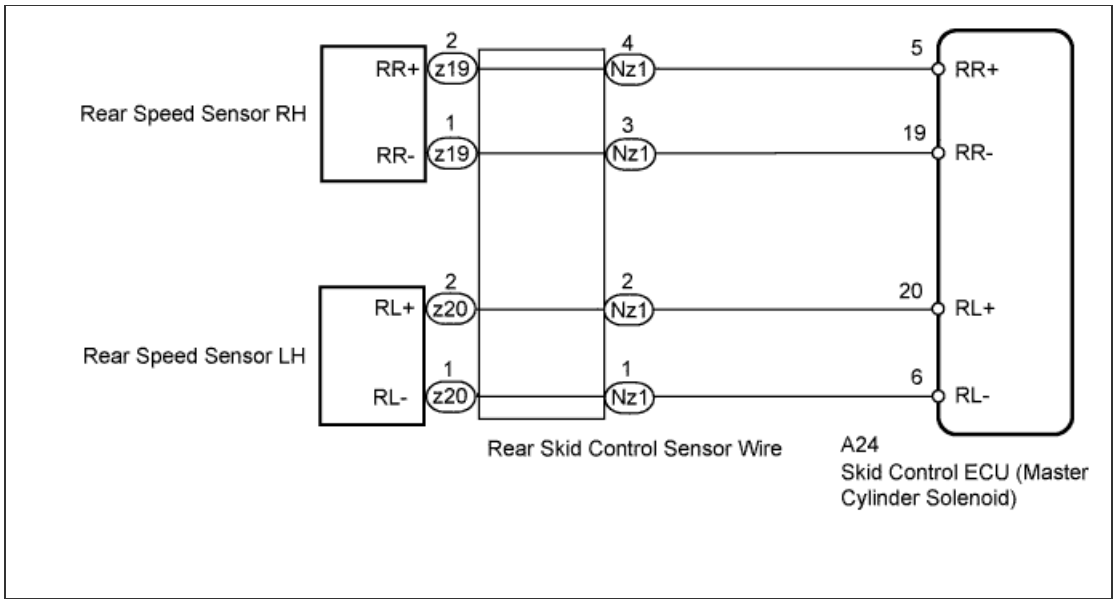
Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1407 C1408	Either condition is met: 1. An open in the speed sensor signal circuit continues for 0.5 seconds or more. 2. With the IG1 terminal voltage at 9.5 V or higher, the sensor power supply voltage decreases for 0.5 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Skid control ECU (Master cylinder solenoid)

HINT:

- **DTC C1407 is for the rear speed sensor RH.**
- **DTC C1408 is for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 4

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 4

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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
DTC is output (for RHD)	C

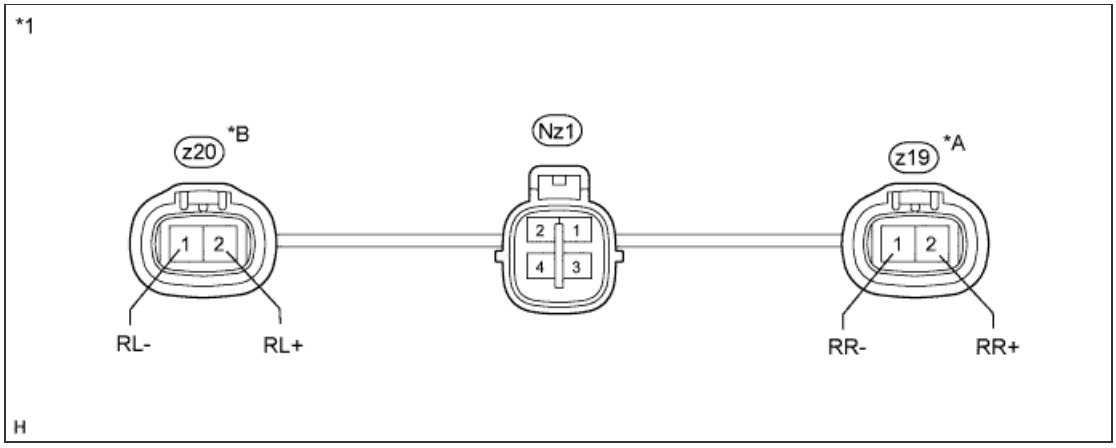
B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher
A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

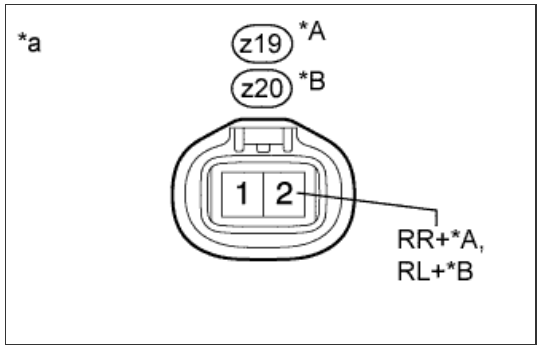
OK

6.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE REAR SPEED SENSOR (Click here)

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

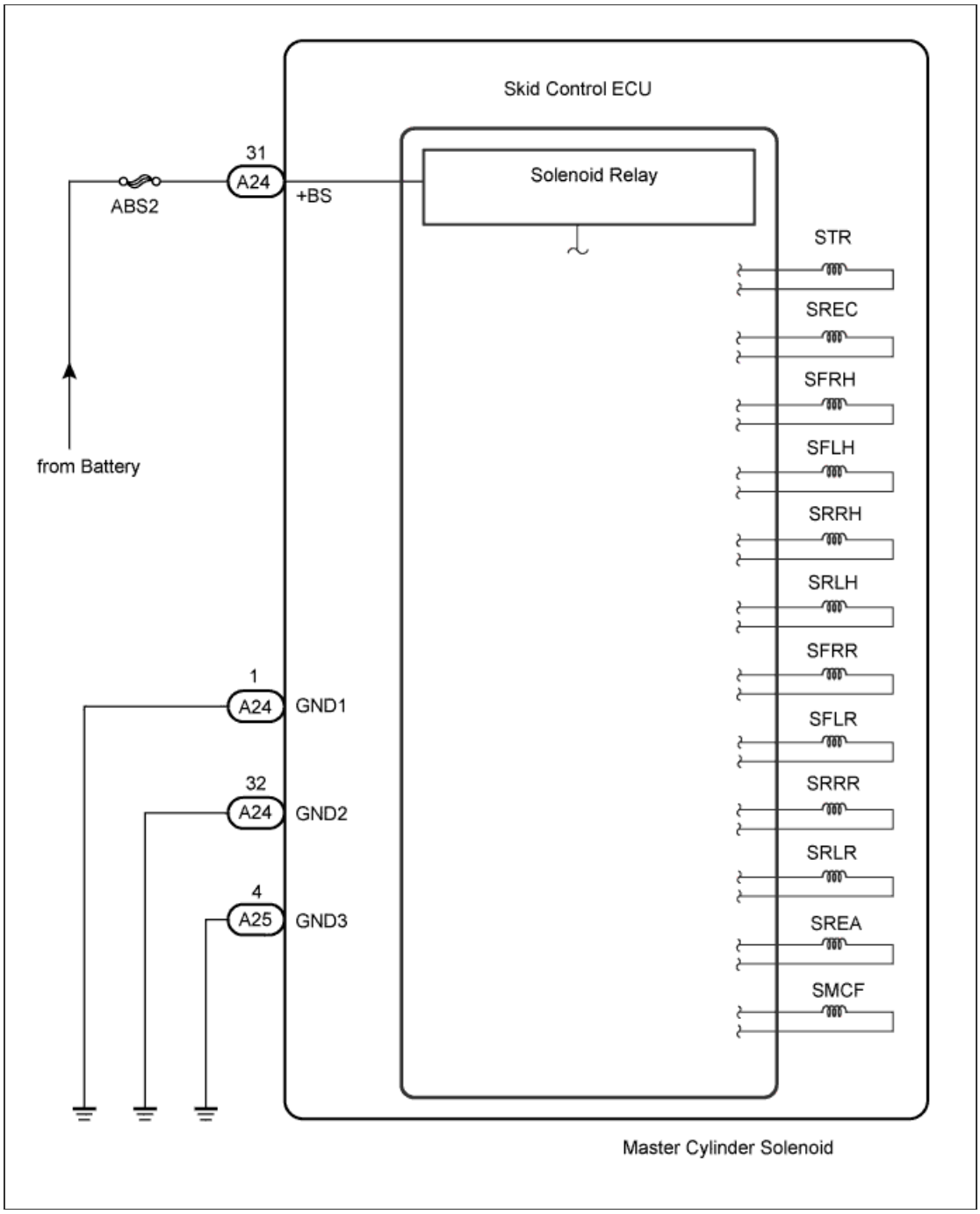
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After 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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1409 Front Speed Sensor RH Performance

DTC C1410 Front Speed Sensor LH Performance

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1409 C1410	One of the following conditions is met: 1. When the vehicle is driven in reverse at a speed of 3 km/h (2 mph) or more and 3 of the wheel sensors detect the reverse signal, the other sensor detects a high frequency pulse 75 times while the ignition switch is ON. 2. At a vehicle speed of 10 km/h (6 mph) or more, the vehicle speed sensor output drops by 50% for 5 seconds. 3. The lowest wheel speed is 10 km/h (6 mph) or more and the difference between the highest and lowest wheel speed values is 2 km/h (1 mph) or less for 15 seconds. 4. At a vehicle speed of 30 km/h (19 mph) or more, one wheel direction is different from the other 3 wheels for 1 second. 5. At a vehicle speed of 100 km/h (62 mph), a reverse signal is output for 1 second or more. 6. At a vehicle speed of 30 km/h (19 mph) or more, the rotation direction of the one of the wheels is not detected normally and the rotation direction of the other 3 wheels is not the same for 1 second.	Front speed sensor RH/LH

HINT:

- **DTC C1409 is for the front speed sensor RH.**
- **DTC C1410 is for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

2.READ VALUE USING GTS (FR/FL WHEEL DIRECTION)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

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: Back	-
FL Wheel Direction	Front wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-

f. Check the "FR/FL Wheel Direction" in the Data List both when the vehicle is being driven straight forward at a speed of 30 km/h (19 mph) or more and when the vehicle is being driven in reverse at a speed of 3 km/h (2 mph) or more.

OK:
The sensor signal matches wheel direction.

NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Perform a road test.

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

Result

Result	Proceed to
DTC C1409 or C1410 is output	A
DTC is not output	B

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

REPLACE FRONT SPEED SENSOR (Click here)

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

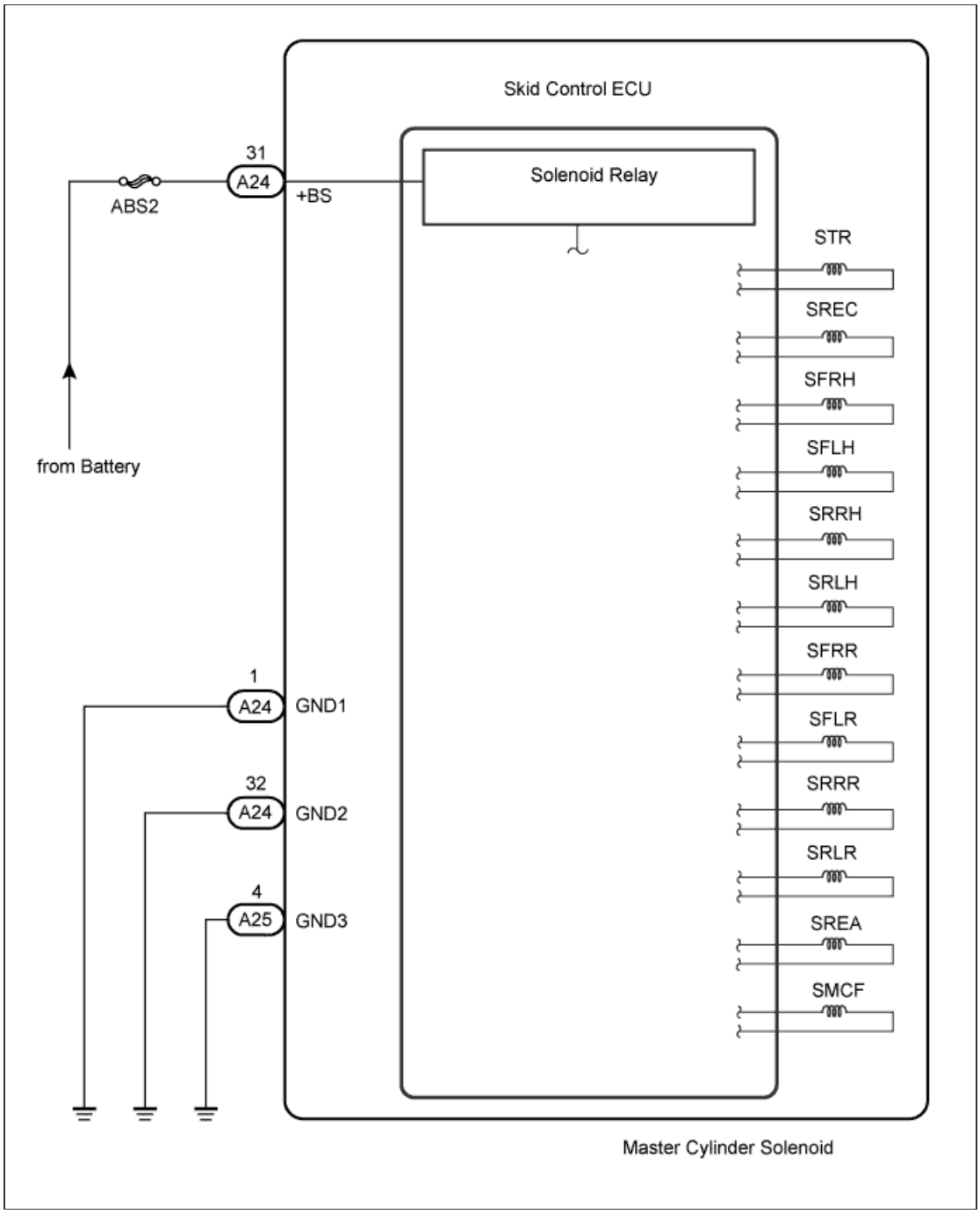
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After 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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1409 Front Speed Sensor RH Performance

DTC C1410 Front Speed Sensor LH Performance

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1409 C1410	One of the following conditions is met: 1. When the vehicle is driven in reverse at a speed of 3 km/h (2 mph) or more and 3 of the wheel sensors detect the reverse signal, the other sensor detects a high frequency pulse 75 times while the ignition switch is ON. 2. At a vehicle speed of 10 km/h (6 mph) or more, the vehicle speed sensor output drops by 50% for 5 seconds. 3. The lowest wheel speed is 10 km/h (6 mph) or more and the difference between the highest and lowest wheel speed values is 2 km/h (1 mph) or less for 15 seconds. 4. At a vehicle speed of 30 km/h (19 mph) or more, one wheel direction is different from the other 3 wheels for 1 second. 5. At a vehicle speed of 100 km/h (62 mph), a reverse signal is output for 1 second or more. 6. At a vehicle speed of 30 km/h (19 mph) or more, the rotation direction of the one of the wheels is not detected normally and the rotation direction of the other 3 wheels is not the same for 1 second.	Front speed sensor RH/LH

HINT:

- **DTC C1409 is for the front speed sensor RH.**
- **DTC C1410 is for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

2.READ VALUE USING GTS (FR/FL WHEEL DIRECTION)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

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: Back	-
FL Wheel Direction	Front wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-

f. Check the "FR/FL Wheel Direction" in the Data List both when the vehicle is being driven straight forward at a speed of 30 km/h (19 mph) or more and when the vehicle is being driven in reverse at a speed of 3 km/h (2 mph) or more.

OK:
The sensor signal matches wheel direction.

NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Perform a road test.

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

Result

Result	Proceed to
DTC C1409 or C1410 is output	A
DTC is not output	B

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

REPLACE FRONT SPEED SENSOR (Click here)

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

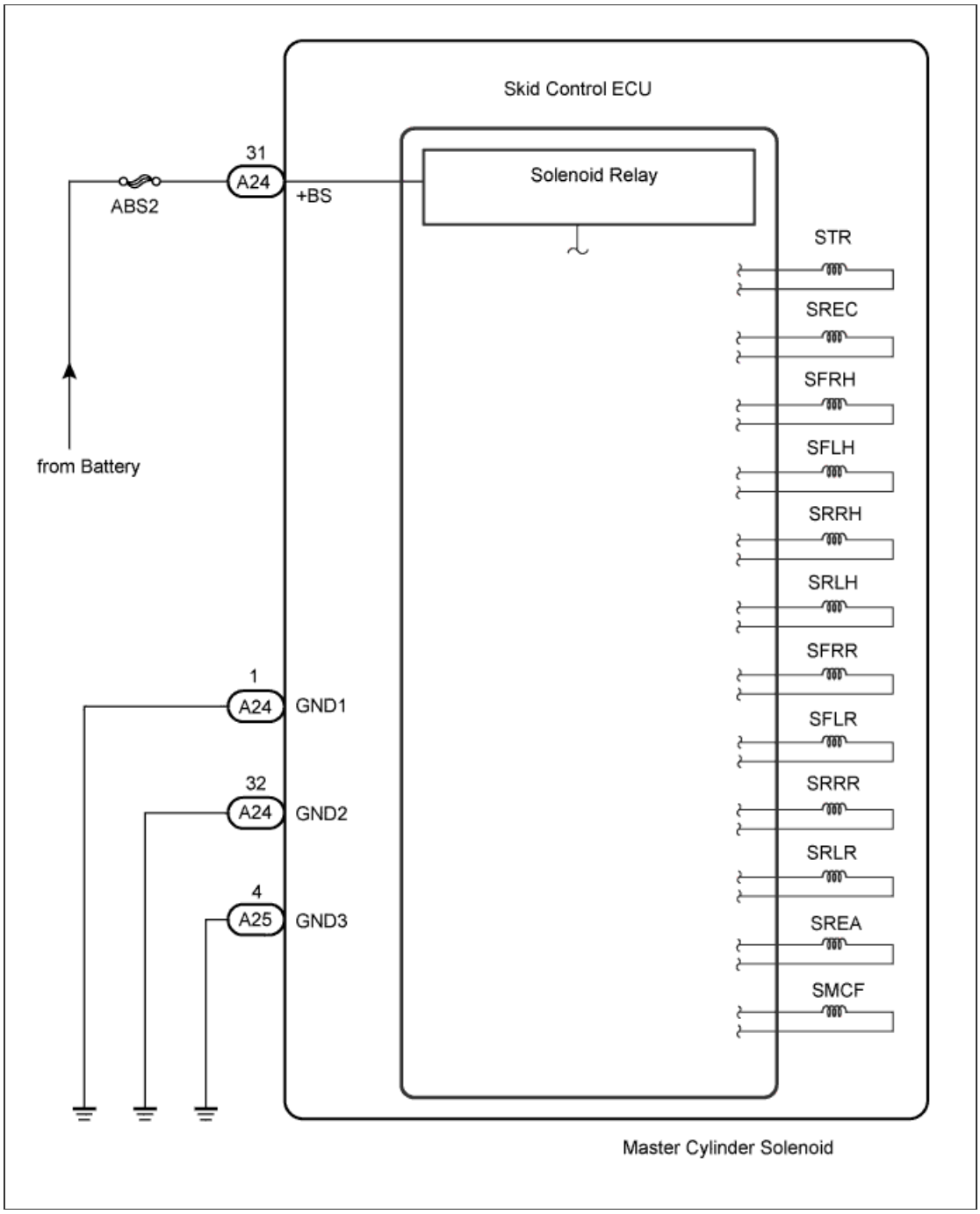
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After 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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1411 Rear Speed Sensor RH Performance

DTC C1412 Rear Speed Sensor LH Performance

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1411 C1412	One of the following conditions is met: 1. When the vehicle is driven in reverse at a speed of 3 km/h (2 mph) or more and 3 of the wheel sensors detect the reverse signal, the other sensor detects a high frequency pulse 75 times while the ignition switch is ON. 2. At a vehicle speed of 10 km/h (6 mph) or more, the vehicle speed sensor output drops by 50% for 5 seconds. 3. The lowest wheel speed is 10 km/h (6 mph) or more and the difference between the highest and lowest wheel speed values is 2 km/h (1 mph) or less for 15 seconds. 4. At a vehicle speed of 30 km/h (19 mph) or more, one wheel direction is different from the other 3 wheels for 1 second. 5. At a vehicle speed of 100 km/h (62 mph), a reverse signal is output for 1 second or more. 6. At a vehicle speed of 30 km/h (19 mph) or more, the rotation direction of the one of the wheels is not detected normally and the rotation direction of the other 3 wheels is not the same for 1 second.	Rear speed sensor RH/LH

HINT:

- **DTC C1411 is for the rear speed sensor RH.**
- **DTC C1412 is for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → REPLACE REAR SPEED SENSOR (Click here)

OK

2.READ VALUE USING GTS (RR/RL WHEEL DIRECTION)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

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: Back	-
RL Wheel Direction	Rear wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-

f. Check the "RR/RL Wheel Direction" in the Data List both when the vehicle is being driven straight forward at a speed of 30 km/h (19 mph) or more and when the vehicle is being driven in reverse at a speed of 3 km/h (2 mph) or more.

OK:

The sensor signal matches wheel direction.

NG → REPLACE REAR SPEED SENSOR (Click here)

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Perform a road test.

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

Result

Result	Proceed to
DTC C1411 or C1412 is output	A
DTC is not output	B

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

REPLACE REAR SPEED SENSOR (Click here)

DTC C1241 Low Power Supply Voltage Malfunction

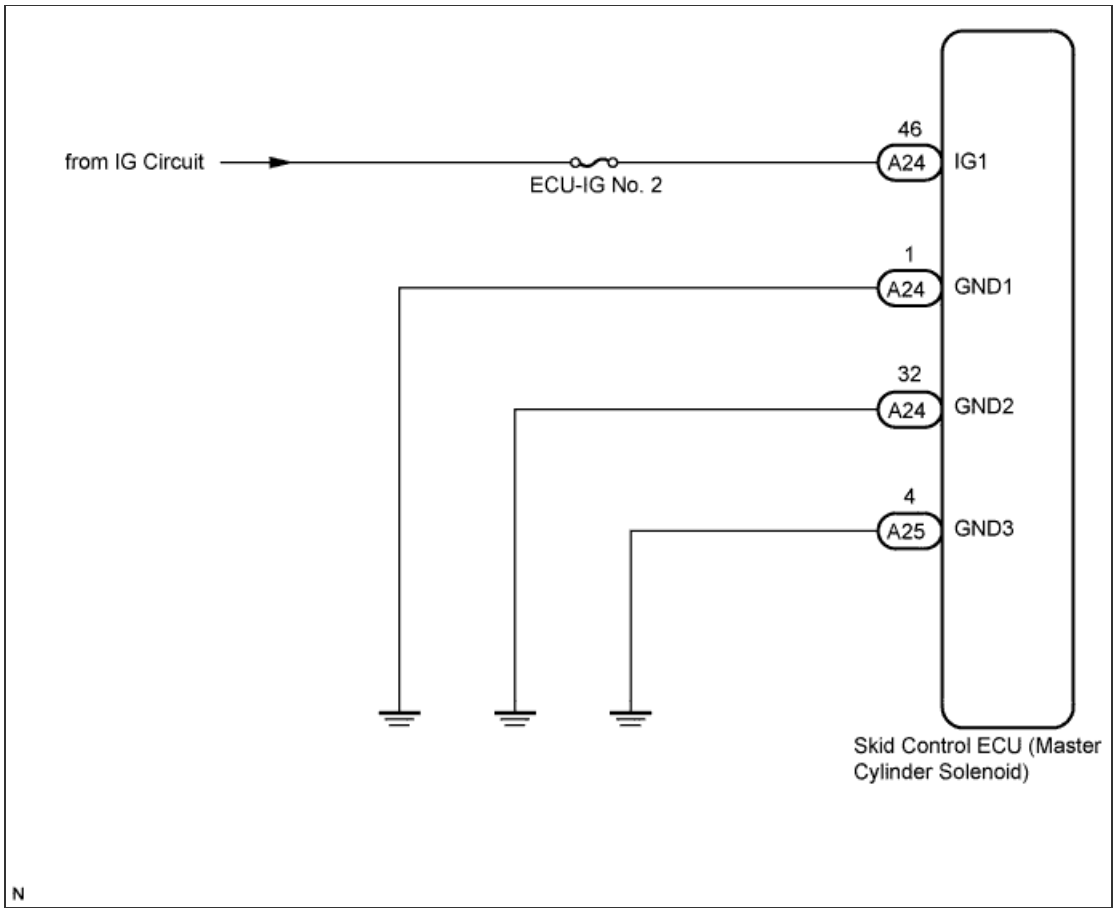
for Preparation Click here

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 generator circuit, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1241	Either condition is met: 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 • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After 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.READ VALUE USING GTS (IG1 VOLTAGE VALUE)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Start the engine.

f. 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	Ignition switch ON: 11 to 14 V	-

g. Check the voltage output from the skid control ECU (master cylinder solenoid) displayed on the GTS.

OK:

The output voltage displayed on the GTS is within 11 to 14 V.

NG → Go to step 3

OK ↓

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

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 (for LHD)	A
DTC is output (for RHD)	B
DTC is not output (When troubleshooting in accordance with Diagnostic Trouble Code Chart)	C
DTC is not output (When troubleshooting in accordance with Problem Symptoms Table)	D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → CHECK FOR INTERMITTENT PROBLEMS (Click here)

D → PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A ↓

REPLACE MASTER CYLINDER SOLENOID (Click here)

3.CHECK HARNESS AND CONNECTOR (IG1 TERMINAL)

a. Disconnect the skid control ECU (master cylinder solenoid) connector.

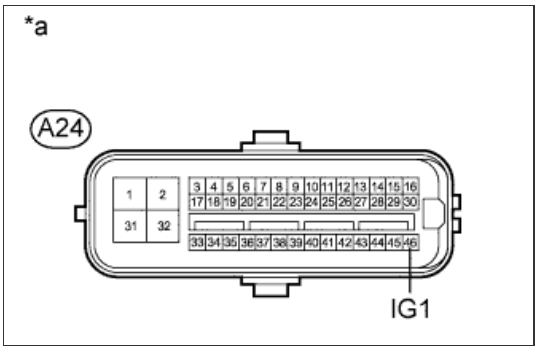
b. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Master Cylinder Solenoid))



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

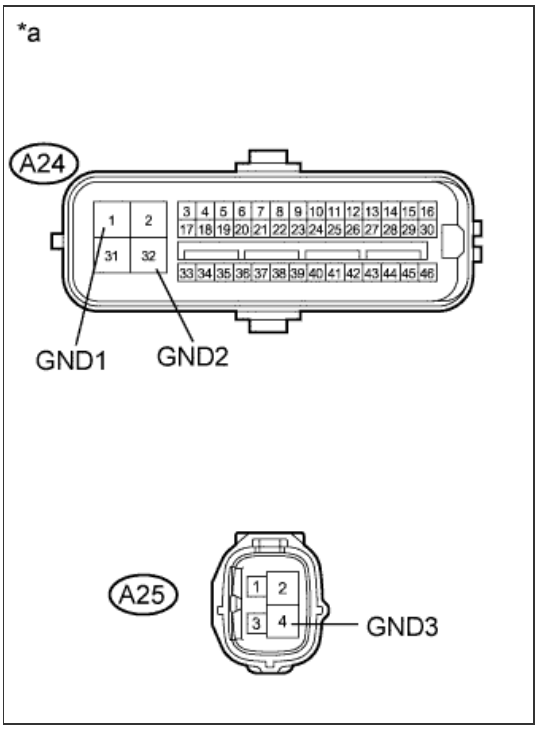
c. Measure the resistance according to the value(s) in the table below.

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.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
DTC is output (for RHD)	B
DTC is not output (When troubleshooting in accordance with Diagnostic Trouble Code Chart)	C
DTC is not output (When troubleshooting in accordance with Problem Symptoms Table)	D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

CHECK FOR INTERMITTENT PROBLEMS (Click here)

D

PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

REPLACE MASTER CYLINDER SOLENOID (Click here)

DTC C1411 Rear Speed Sensor RH Performance

DTC C1412 Rear Speed Sensor LH Performance

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1411 C1412	One of the following conditions is met: 1. When the vehicle is driven in reverse at a speed of 3 km/h (2 mph) or more and 3 of the wheel sensors detect the reverse signal, the other sensor detects a high frequency pulse 75 times while the ignition switch is ON. 2. At a vehicle speed of 10 km/h (6 mph) or more, the vehicle speed sensor output drops by 50% for 5 seconds. 3. The lowest wheel speed is 10 km/h (6 mph) or more and the difference between the highest and lowest wheel speed values is 2 km/h (1 mph) or less for 15 seconds. 4. At a vehicle speed of 30 km/h (19 mph) or more, one wheel direction is different from the other 3 wheels for 1 second. 5. At a vehicle speed of 100 km/h (62 mph), a reverse signal is output for 1 second or more. 6. At a vehicle speed of 30 km/h (19 mph) or more, the rotation direction of the one of the wheels is not detected normally and the rotation direction of the other 3 wheels is not the same for 1 second.	Rear speed sensor RH/LH

HINT:

- **DTC C1411 is for the rear speed sensor RH.**
- **DTC C1412 is for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → REPLACE REAR SPEED SENSOR (Click here)

OK

2.READ VALUE USING GTS (RR/RL WHEEL DIRECTION)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

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: Back	-
RL Wheel Direction	Rear wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-

f. Check the "RR/RL Wheel Direction" in the Data List both when the vehicle is being driven straight forward at a speed of 30 km/h (19 mph) or more and when the vehicle is being driven in reverse at a speed of 3 km/h (2 mph) or more.

OK:

The sensor signal matches wheel direction.

NG → REPLACE REAR SPEED SENSOR (Click here)

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Perform a road test.

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

Result

Result	Proceed to
DTC C1411 or C1412 is output	A
DTC is not output	B

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

REPLACE REAR SPEED SENSOR (Click here)

DTC C1242 Open Circuit in IG1/IG2 Power Source Circuit

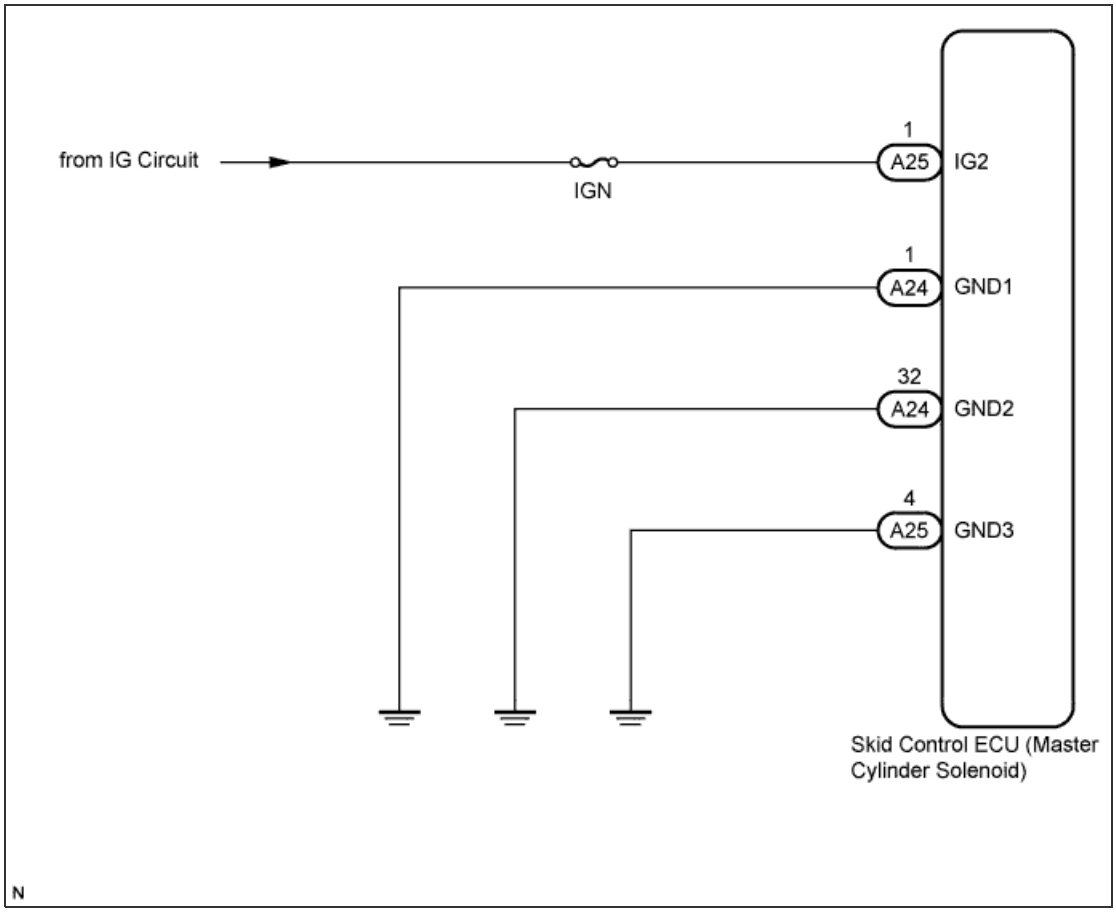
for Preparation Click here

DESCRIPTION

If there is a problem with the skid control ECU (master cylinder solenoid) power supply circuit, the skid control ECU (master cylinder solenoid) 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 generator circuit, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1242	The vehicle speed is 3 km/h (2 mph) or more and the voltage at the ECU IG2 terminal remains below 6.5 V for more than 7 seconds.	• Battery • IGN fuse • Charging system • Harness or connector • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After 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 HARNESS AND CONNECTOR (IG2 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

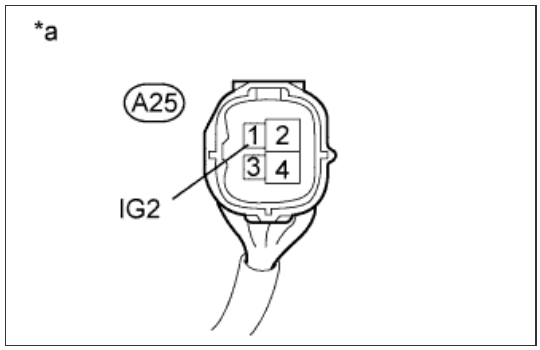
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

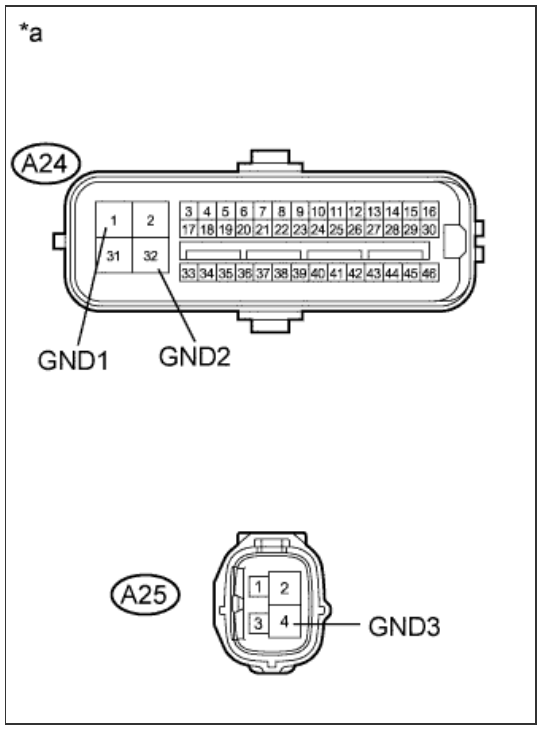
c. Measure the resistance according to the value(s) in the table below.

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

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 (for LHD)	B
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1413 Front Speed Sensor RH Output Malfunction

DTC C1275 Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1276 Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1414 Front Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1413 C1414	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1275 C1276	Stored only during test mode.	• Front speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1413 and C1275 are for the front speed sensor RH.**
- **DTCs C1414 and C1276 are for the front speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1405 and C1406 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 9

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK ↓

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK ↓

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

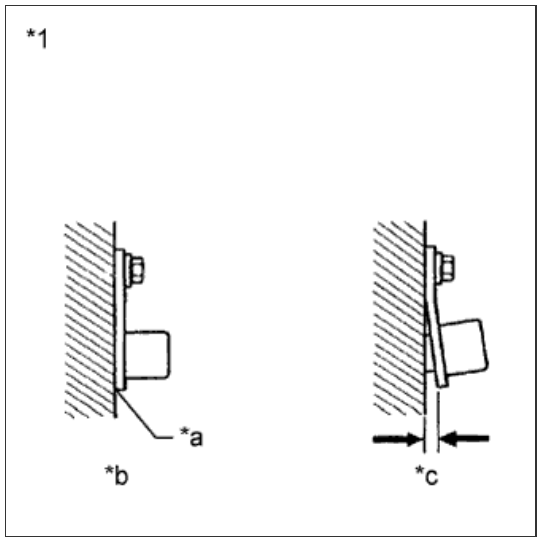
5.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

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



Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

6.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

7.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

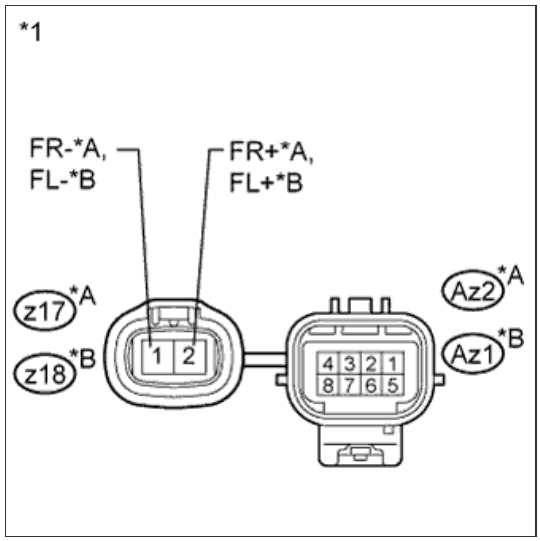
NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

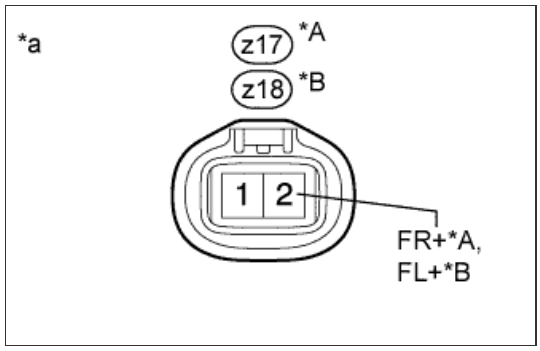
OK

10.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE FRONT SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (Click here)**

A

END

DTC C1243 Acceleration Sensor Stuck Malfunction

DTC C1245 Acceleration Sensor Output Malfunction

DTC C1279 Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)

DTC C1381 Acceleration Sensor Power Supply Voltage Malfunction

DTC C1418 Open or Short in Acceleration Sensor Circuit

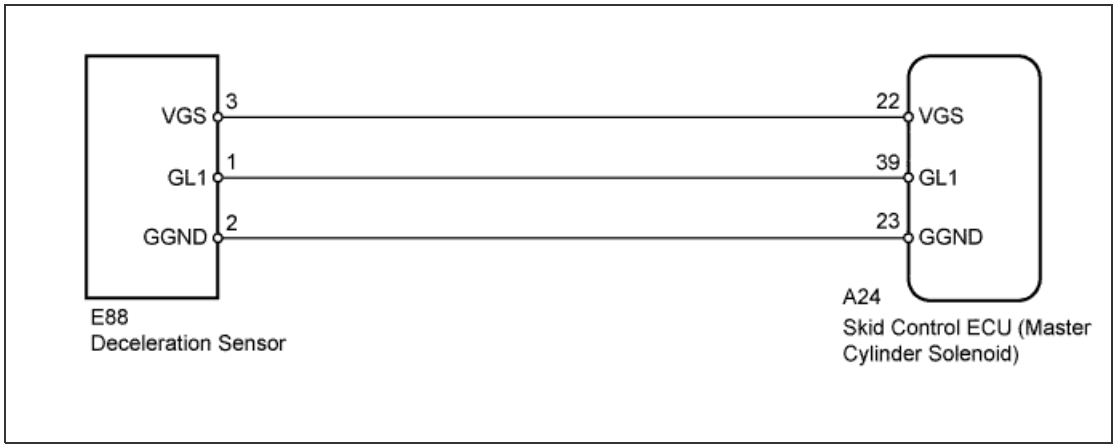
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the deceleration sensor. If the sensor functions abnormally, the ABS warning light turns on.

DTC Code	DTC Detection Condition	Trouble Area
C1243	The following condition repeats 16 times. • Sensor signal do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Deceleration sensor • Harness or connector • Skid control ECU (Master cylinder solenoid)
C1245	The following condition continues for at least 60 seconds. • The difference between the values calculated from the deceleration sensor value and vehicle speed exceeds 0.35 G.	
C1381	At a vehicle speed of more than 3 km/h (2 mph), the deceleration sensor power source malfunction signal is received for 10 seconds or more.	
C1418	One of the following conditions is met when the voltage at terminal IG1 is 9.5 V or higher: • The power supply voltage of the deceleration sensor is outside the range of 4.4 to 5.6 V for 1.2 seconds or more. • The value of GL1 is outside the range of -1.5 to 1.5 G for 1.2 seconds or more. • A deceleration sensor open circuit occurs 7 times or more.	
C1279	Stored during test mode.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the deceleration sensor, perform zero point calibration (Click here).

1.CHECK DECELERATION SENSOR INSTALLATION

a. Check that the deceleration 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.	B

B → INSTALL DECELERATION SENSOR CORRECTLY (Click here)

A

2.READ VALUE USING GTS (DECELERATION SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
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.

f. Check the Data List for proper functioning of the deceleration sensor.

OK:
Deceleration value changes.

NG → Go to step 4

OK

3.CHECK DTC

a. Install the deceleration sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

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

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

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT DECELERATION SENSOR

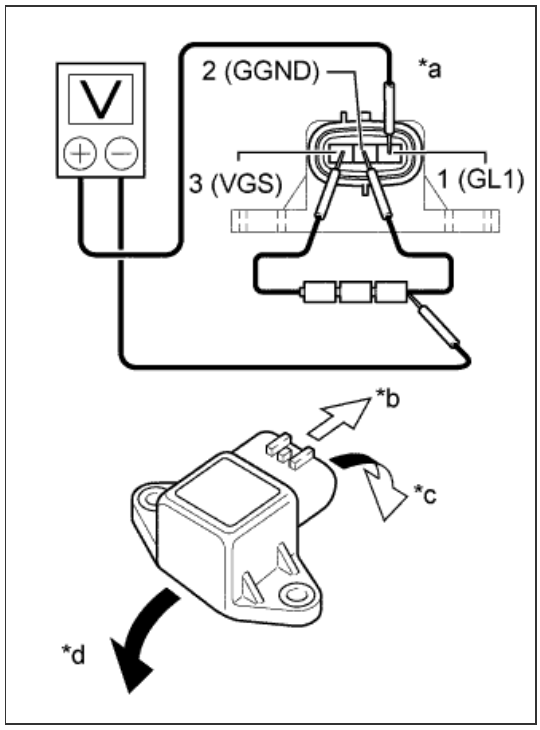
a. Remove the deceleration sensor (Click here).

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
	Tilted forward	Approximately 0.5 to 2.5 V
	Tilted rearward	Approximately 2.5 to 4.5 V

Text in Illustration

*a	Component without harness connected (Deceleration Sensor)
*b	Front
*c	Tilted forward
*d	Tilted rearward

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 - DECELERATION SENSOR)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the E88 deceleration 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 deceleration sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

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

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

Result

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

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

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

A

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

DTC C1413 Front Speed Sensor RH Output Malfunction

DTC C1275 Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1276 Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1414 Front Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1413 C1414	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1275 C1276	Stored only during test mode.	• Front speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1413 and C1275 are for the front speed sensor RH.**
- **DTCs C1414 and C1276 are for the front speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1405 and C1406 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 9

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK ↓

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK ↓

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

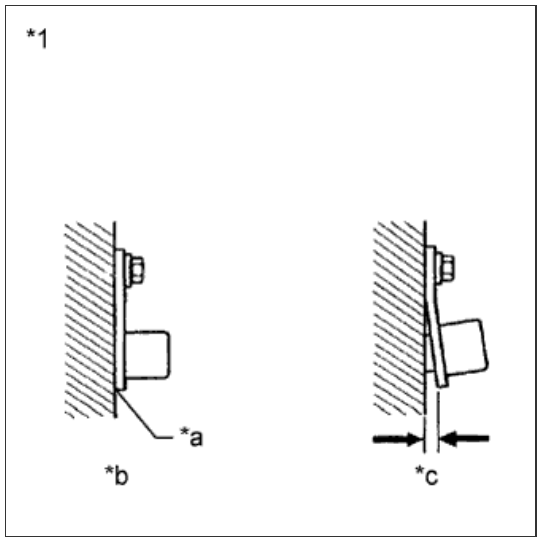
5.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

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



Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

6.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

7.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

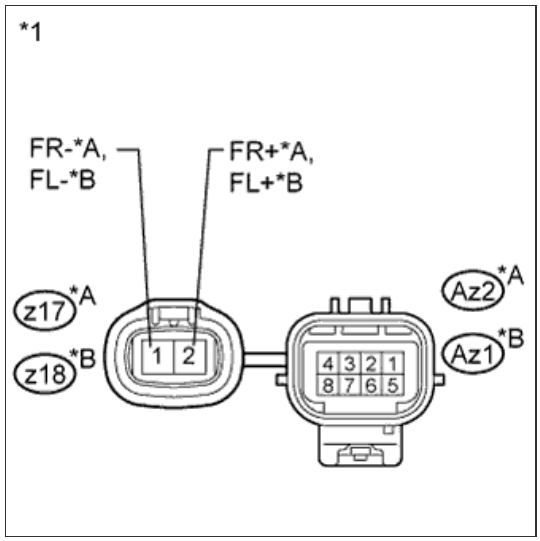
NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

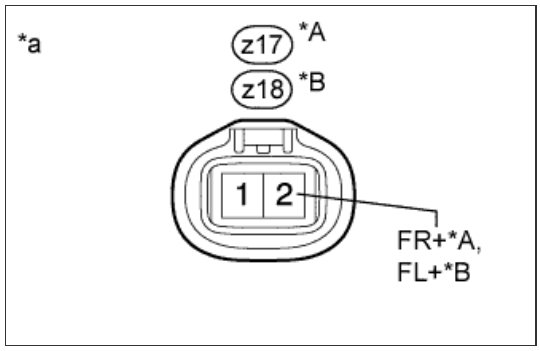
OK

10.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE FRONT SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (Click here)**

A

END

DTC C1243 Acceleration Sensor Stuck Malfunction

DTC C1245 Acceleration Sensor Output Malfunction

DTC C1279 Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)

DTC C1381 Acceleration Sensor Power Supply Voltage Malfunction

DTC C1418 Open or Short in Acceleration Sensor Circuit

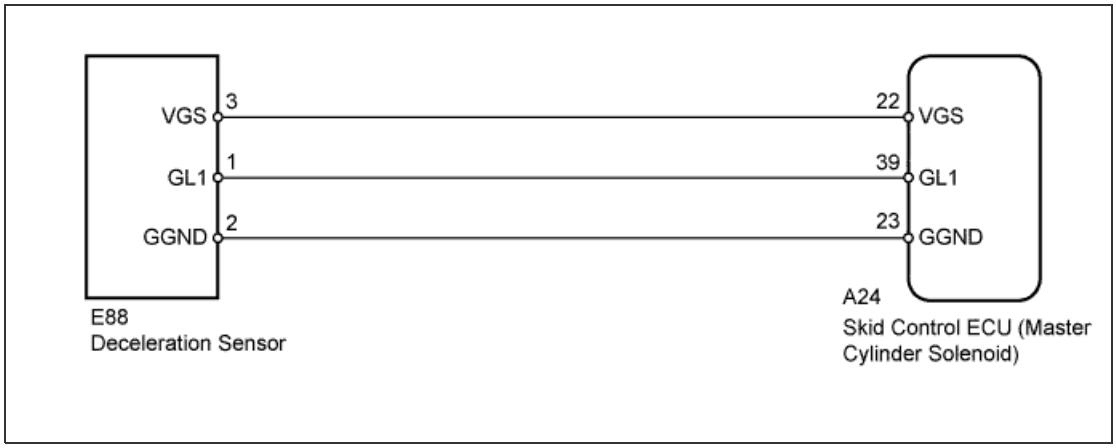
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the deceleration sensor. If the sensor functions abnormally, the ABS warning light turns on.

DTC Code	DTC Detection Condition	Trouble Area
C1243	The following condition repeats 16 times. • Sensor signal do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Deceleration sensor • Harness or connector • Skid control ECU (Master cylinder solenoid)
C1245	The following condition continues for at least 60 seconds. • The difference between the values calculated from the deceleration sensor value and vehicle speed exceeds 0.35 G.	
C1381	At a vehicle speed of more than 3 km/h (2 mph), the deceleration sensor power source malfunction signal is received for 10 seconds or more.	
C1418	One of the following conditions is met when the voltage at terminal IG1 is 9.5 V or higher: • The power supply voltage of the deceleration sensor is outside the range of 4.4 to 5.6 V for 1.2 seconds or more. • The value of GL1 is outside the range of -1.5 to 1.5 G for 1.2 seconds or more. • A deceleration sensor open circuit occurs 7 times or more.	
C1279	Stored during test mode.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the deceleration sensor, perform zero point calibration (Click here).

1.CHECK DECELERATION SENSOR INSTALLATION

a. Check that the deceleration 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.	B

B → INSTALL DECELERATION SENSOR CORRECTLY (Click here)

A

2.READ VALUE USING GTS (DECELERATION SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
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.

f. Check the Data List for proper functioning of the deceleration sensor.

OK:
Deceleration value changes.

NG → Go to step 4

OK

3.CHECK DTC

a. Install the deceleration sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

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

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

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT DECELERATION SENSOR

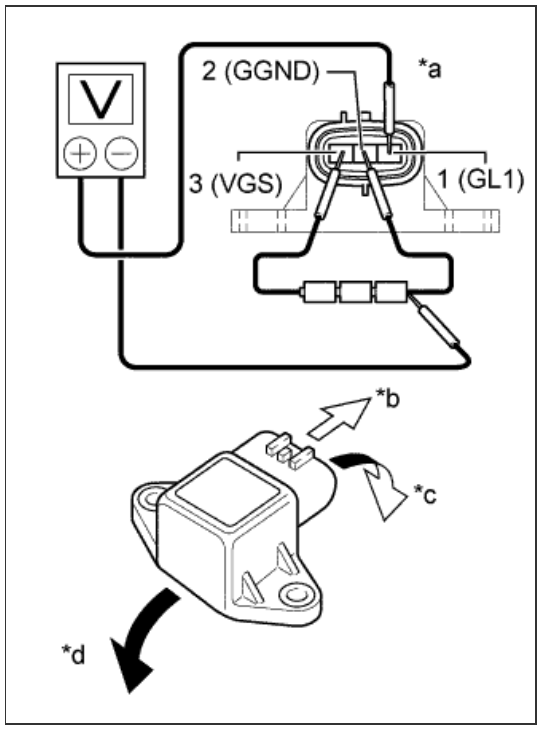
a. Remove the deceleration sensor (Click here).

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
	Tilted forward	Approximately 0.5 to 2.5 V
	Tilted rearward	Approximately 2.5 to 4.5 V

Text in Illustration

*a	Component without harness connected (Deceleration Sensor)
*b	Front
*c	Tilted forward
*d	Tilted rearward

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 - DECELERATION SENSOR)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the E88 deceleration 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 deceleration sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

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

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

Result

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

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

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

A

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

DTC C1413 Front Speed Sensor RH Output Malfunction

DTC C1275 Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1276 Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1414 Front Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1413 C1414	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1275 C1276	Stored only during test mode.	• Front speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1413 and C1275 are for the front speed sensor RH.**
- **DTCs C1414 and C1276 are for the front speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1405 and C1406 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 9

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK ↓

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK ↓

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

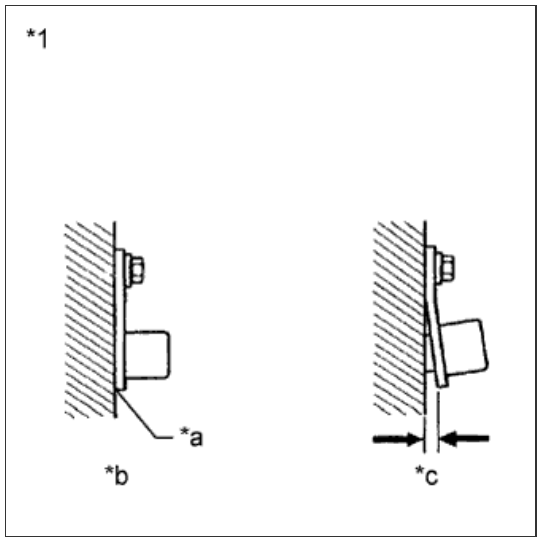
5.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

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



Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

6.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

7.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

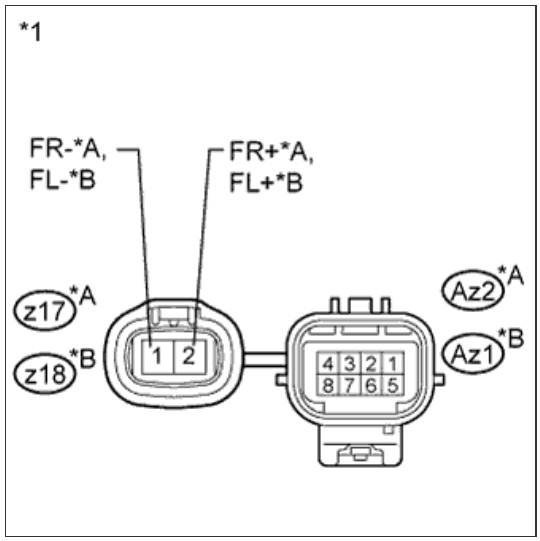
NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

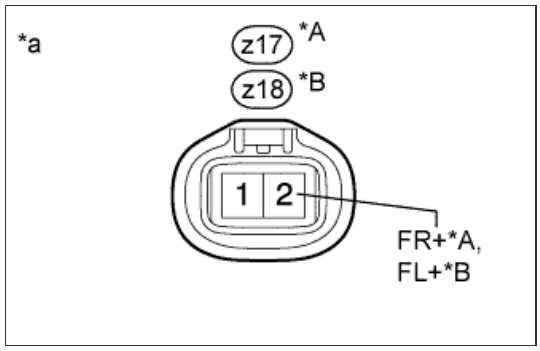
OK

10.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE FRONT SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (Click here)**

A

END

DTC C1243 Acceleration Sensor Stuck Malfunction

DTC C1245 Acceleration Sensor Output Malfunction

DTC C1279 Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)

DTC C1381 Acceleration Sensor Power Supply Voltage Malfunction

DTC C1418 Open or Short in Acceleration Sensor Circuit

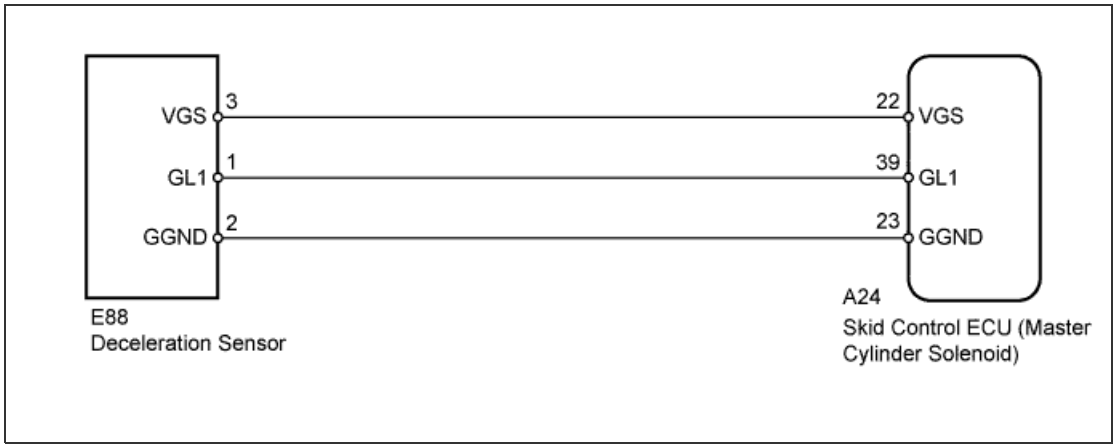
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the deceleration sensor. If the sensor functions abnormally, the ABS warning light turns on.

DTC Code	DTC Detection Condition	Trouble Area
C1243	The following condition repeats 16 times. • Sensor signal do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Deceleration sensor • Harness or connector • Skid control ECU (Master cylinder solenoid)
C1245	The following condition continues for at least 60 seconds. • The difference between the values calculated from the deceleration sensor value and vehicle speed exceeds 0.35 G.	
C1381	At a vehicle speed of more than 3 km/h (2 mph), the deceleration sensor power source malfunction signal is received for 10 seconds or more.	
C1418	One of the following conditions is met when the voltage at terminal IG1 is 9.5 V or higher: • The power supply voltage of the deceleration sensor is outside the range of 4.4 to 5.6 V for 1.2 seconds or more. • The value of GL1 is outside the range of -1.5 to 1.5 G for 1.2 seconds or more. • A deceleration sensor open circuit occurs 7 times or more.	
C1279	Stored during test mode.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the deceleration sensor, perform zero point calibration (Click here).

1.CHECK DECELERATION SENSOR INSTALLATION

a. Check that the deceleration 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.	B

B → INSTALL DECELERATION SENSOR CORRECTLY (Click here)

A

2.READ VALUE USING GTS (DECELERATION SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
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.

f. Check the Data List for proper functioning of the deceleration sensor.

OK:
Deceleration value changes.

NG → Go to step 4

OK

3.CHECK DTC

a. Install the deceleration sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

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

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

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT DECELERATION SENSOR

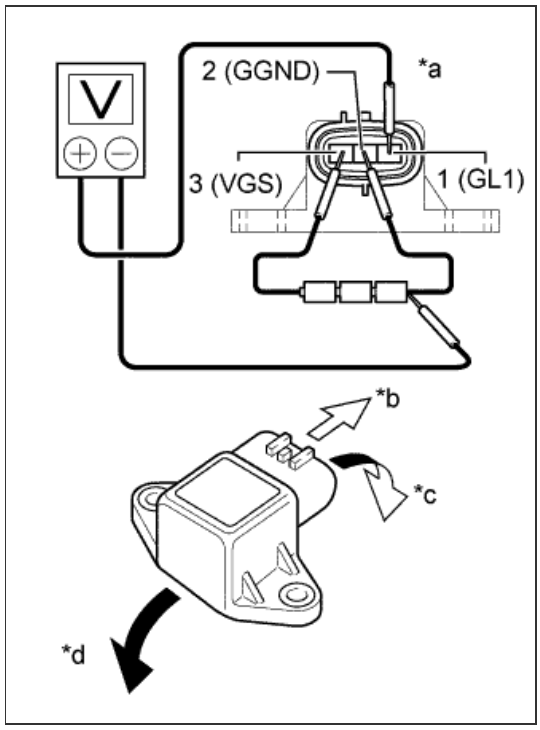
a. Remove the deceleration sensor (Click here).

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
	Tilted forward	Approximately 0.5 to 2.5 V
	Tilted rearward	Approximately 2.5 to 4.5 V

Text in Illustration

*a	Component without harness connected (Deceleration Sensor)
*b	Front
*c	Tilted forward
*d	Tilted rearward

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 - DECELERATION SENSOR)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the E88 deceleration 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 deceleration sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

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

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

Result

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

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

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

A

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

DTC C1413 Front Speed Sensor RH Output Malfunction

DTC C1275 Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1276 Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1414 Front Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1413 C1414	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1275 C1276	Stored only during test mode.	• Front speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1413 and C1275 are for the front speed sensor RH.**
- **DTCs C1414 and C1276 are for the front speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1405 and C1406 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 9

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK ↓

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK ↓

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

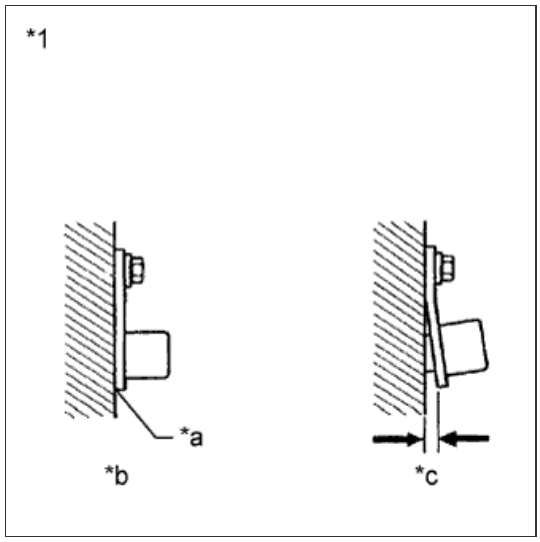
5.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

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



Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

6.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

7.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

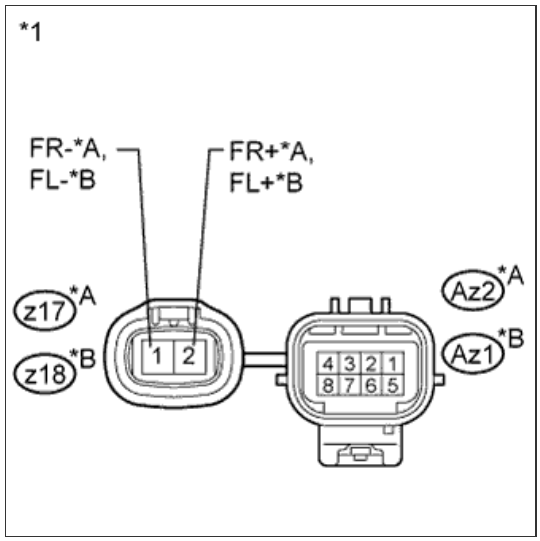
NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

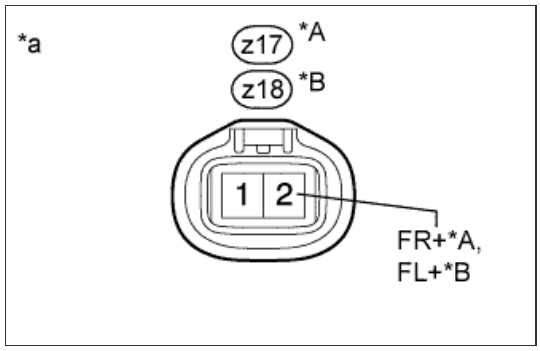
OK

10.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE FRONT SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (Click here)**

A

END

DTC C1243 Acceleration Sensor Stuck Malfunction

DTC C1245 Acceleration Sensor Output Malfunction

DTC C1279 Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)

DTC C1381 Acceleration Sensor Power Supply Voltage Malfunction

DTC C1418 Open or Short in Acceleration Sensor Circuit

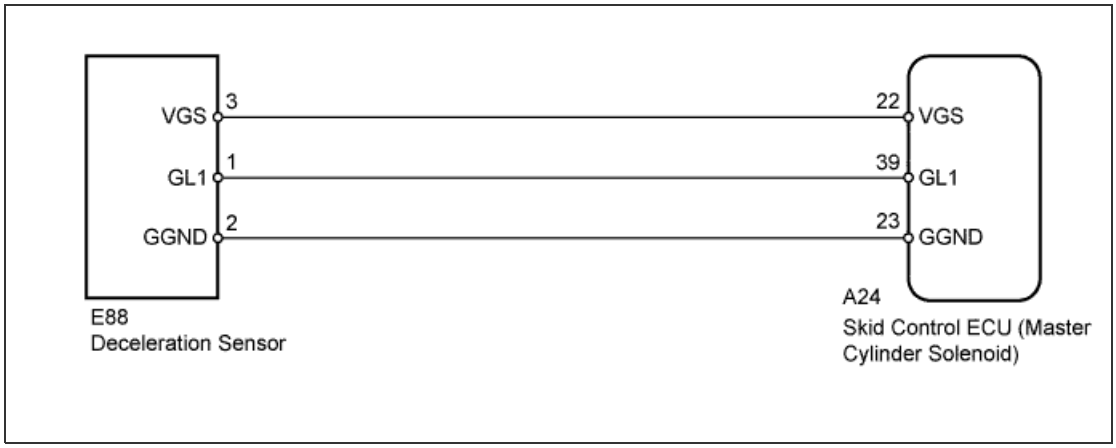
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the deceleration sensor. If the sensor functions abnormally, the ABS warning light turns on.

DTC Code	DTC Detection Condition	Trouble Area
C1243	The following condition repeats 16 times. • Sensor signal do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Deceleration sensor • Harness or connector • Skid control ECU (Master cylinder solenoid)
C1245	The following condition continues for at least 60 seconds. • The difference between the values calculated from the deceleration sensor value and vehicle speed exceeds 0.35 G.	
C1381	At a vehicle speed of more than 3 km/h (2 mph), the deceleration sensor power source malfunction signal is received for 10 seconds or more.	
C1418	One of the following conditions is met when the voltage at terminal IG1 is 9.5 V or higher: • The power supply voltage of the deceleration sensor is outside the range of 4.4 to 5.6 V for 1.2 seconds or more. • The value of GL1 is outside the range of -1.5 to 1.5 G for 1.2 seconds or more. • A deceleration sensor open circuit occurs 7 times or more.	
C1279	Stored during test mode.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the deceleration sensor, perform zero point calibration (Click here).

1.CHECK DECELERATION SENSOR INSTALLATION

a. Check that the deceleration 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.	B

B → INSTALL DECELERATION SENSOR CORRECTLY (Click here)

A

2.READ VALUE USING GTS (DECELERATION SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
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.

f. Check the Data List for proper functioning of the deceleration sensor.

OK:
Deceleration value changes.

NG → Go to step 4

OK

3.CHECK DTC

a. Install the deceleration sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

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

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

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT DECELERATION SENSOR

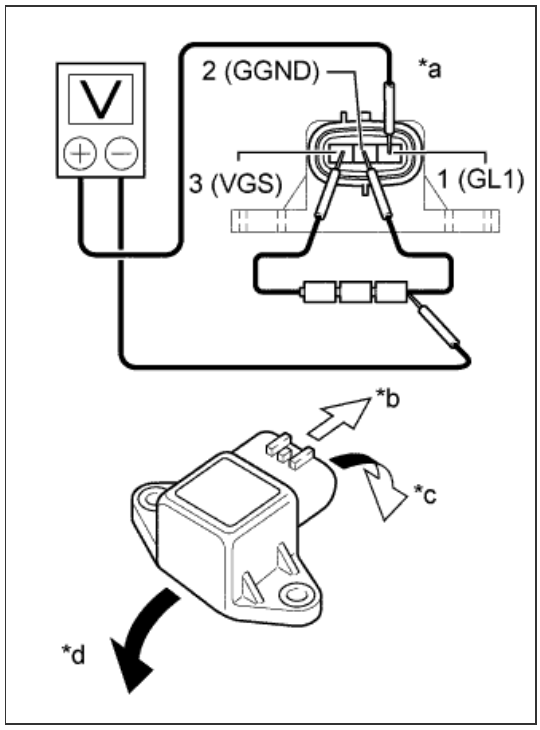
a. Remove the deceleration sensor (Click here).

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
	Tilted forward	Approximately 0.5 to 2.5 V
	Tilted rearward	Approximately 2.5 to 4.5 V

Text in Illustration

*a	Component without harness connected (Deceleration Sensor)
*b	Front
*c	Tilted forward
*d	Tilted rearward

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 - DECELERATION SENSOR)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the E88 deceleration 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 deceleration sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

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

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

Result

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

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

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

A

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

DTC C1415 Rear Speed Sensor RH Output Malfunction

DTC C1277 Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1278 Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1416 Rear Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1415 C1416	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1277 C1278	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1415 and C1277 are for the rear speed sensor RH.**
- **DTCs C1416 and C1278 are for the rear speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1407 and C1408 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 9

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

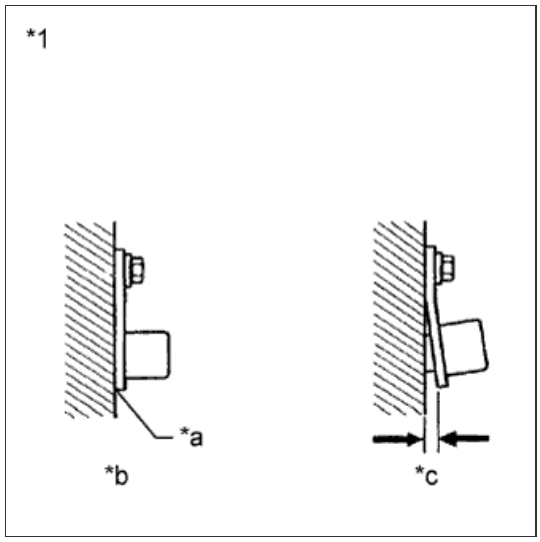
5.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

6.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

7.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

OK:

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

HINT:

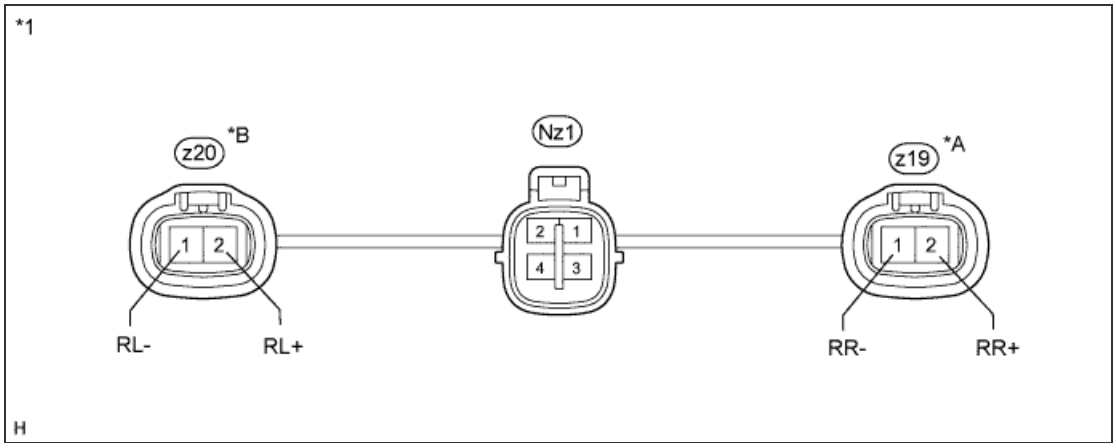
The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

9.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher

A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

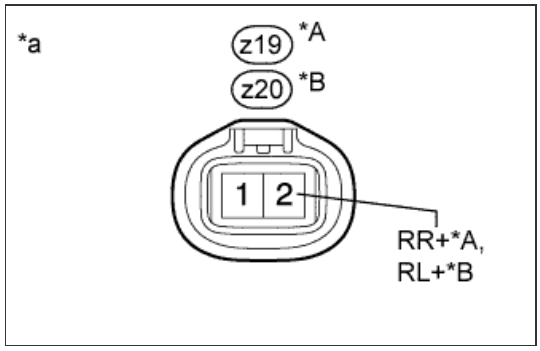
OK

10.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → Go to step 12

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE REAR SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C1243 Acceleration Sensor Stuck Malfunction

DTC C1245 Acceleration Sensor Output Malfunction

DTC C1279 Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)

DTC C1381 Acceleration Sensor Power Supply Voltage Malfunction

DTC C1418 Open or Short in Acceleration Sensor Circuit

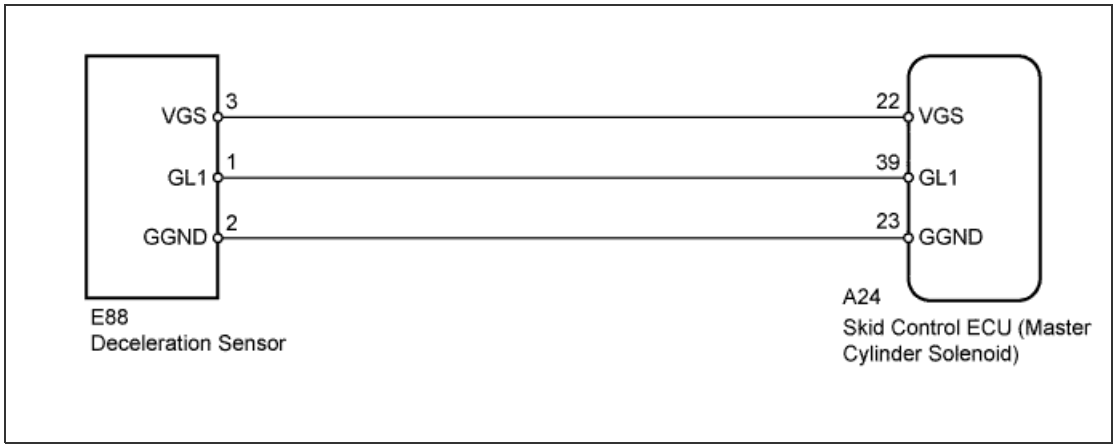
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the deceleration sensor. If the sensor functions abnormally, the ABS warning light turns on.

DTC Code	DTC Detection Condition	Trouble Area
C1243	The following condition repeats 16 times. • Sensor signal do not change when the vehicle decelerates from 30 km/h (19 mph) to 0 km/h (0 mph).	• Deceleration sensor • Harness or connector • Skid control ECU (Master cylinder solenoid)
C1245	The following condition continues for at least 60 seconds. • The difference between the values calculated from the deceleration sensor value and vehicle speed exceeds 0.35 G.	
C1381	At a vehicle speed of more than 3 km/h (2 mph), the deceleration sensor power source malfunction signal is received for 10 seconds or more.	
C1418	One of the following conditions is met when the voltage at terminal IG1 is 9.5 V or higher: • The power supply voltage of the deceleration sensor is outside the range of 4.4 to 5.6 V for 1.2 seconds or more. • The value of GL1 is outside the range of -1.5 to 1.5 G for 1.2 seconds or more. • A deceleration sensor open circuit occurs 7 times or more.	
C1279	Stored during test mode.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the deceleration sensor, perform zero point calibration (Click here).

1.CHECK DECELERATION SENSOR INSTALLATION

a. Check that the deceleration 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.	B

B → INSTALL DECELERATION SENSOR CORRECTLY (Click here)

A

2.READ VALUE USING GTS (DECELERATION SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
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.

f. Check the Data List for proper functioning of the deceleration sensor.

OK:
Deceleration value changes.

NG → Go to step 4

OK

3.CHECK DTC

a. Install the deceleration sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

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

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

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT DECELERATION SENSOR

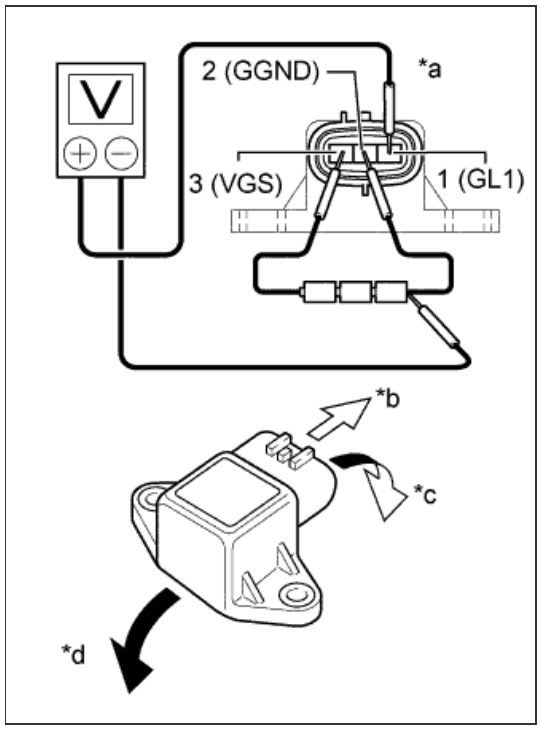
a. Remove the deceleration sensor (Click here).

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
	Tilted forward	Approximately 0.5 to 2.5 V
	Tilted rearward	Approximately 2.5 to 4.5 V

Text in Illustration

*a	Component without harness connected (Deceleration Sensor)
*b	Front
*c	Tilted forward
*d	Tilted rearward

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 - DECELERATION SENSOR)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the E88 deceleration 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 deceleration sensor to the vehicle.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

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

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

Result

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

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

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

A

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

DTC C1415 Rear Speed Sensor RH Output Malfunction

DTC C1277 Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1278 Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1416 Rear Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1415 C1416	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1277 C1278	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1415 and C1277 are for the rear speed sensor RH.**
- **DTCs C1416 and C1278 are for the rear speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1407 and C1408 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 9

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

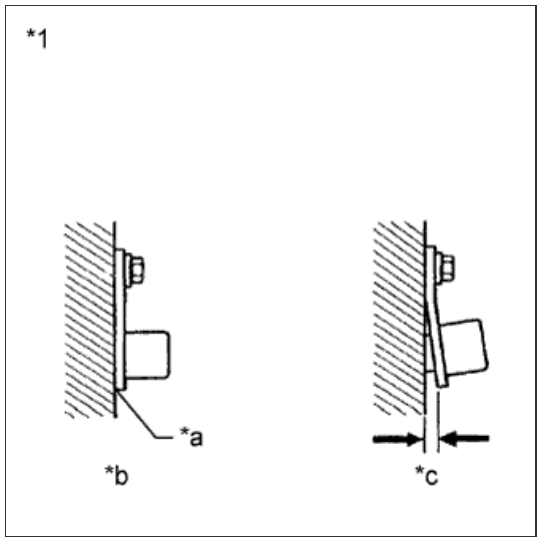
5.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

6.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

7.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

OK:

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

HINT:

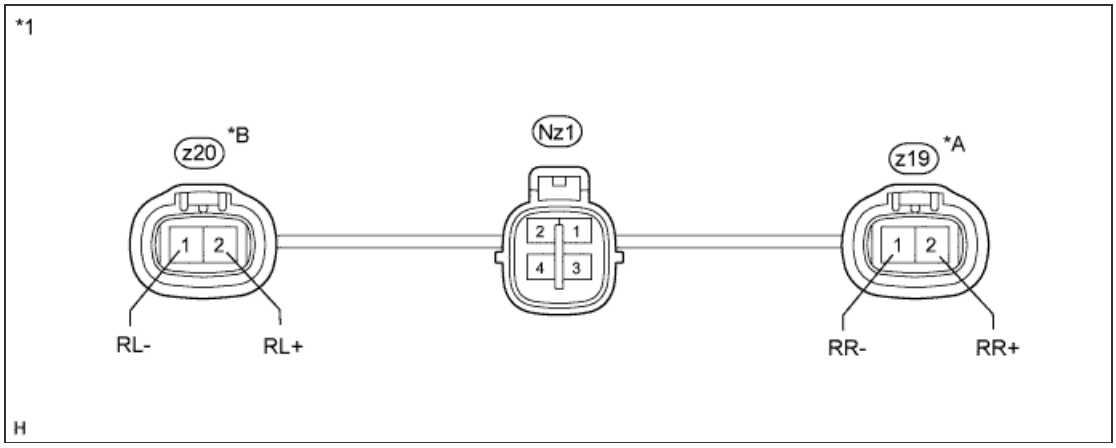
The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

9.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher

A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

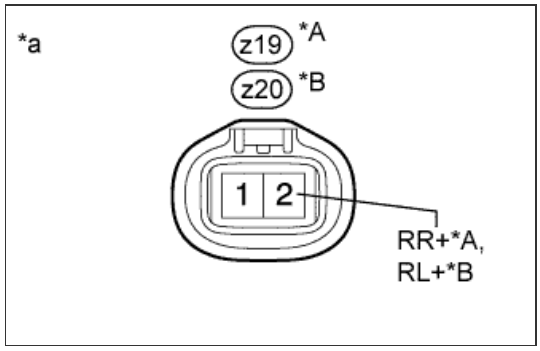
OK

10.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → Go to step 12

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE REAR SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C1251 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 (master cylinder solenoid).

DTC Code	DTC Detection Condition	Trouble Area
C1251	There is an open in the motor system circuit (motor input circuit).	• Pump motor wire harness connection • Brake booster with accumulator pump assembly • Skid control ECU (Master cylinder solenoid)

INSPECTION PROCEDURE

NOTICE:

After 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. Remove the hydraulic brake booster assembly (for LHD: Click here, for RHD: Click here).

b. Check the tightening torque of the 2 screws which secure the wire harness connecting the master cylinder solenoid and brake booster with accumulator pump assembly (for LHD: Click here, for RHD: Click here).

OK:
The harness is tightened to the specified torque.

NG → RETIGHTEN SCREWS

OK

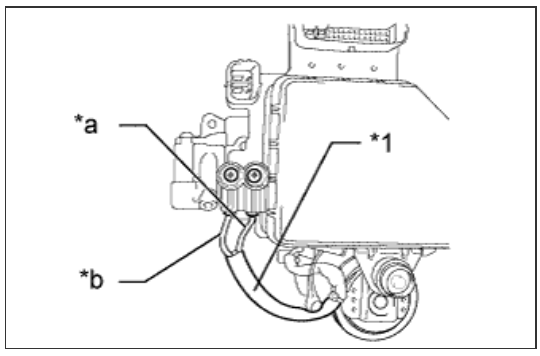
2.CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS

a. Using a screwdriver, remove the 2 screws and pull out the wire harness from the master cylinder solenoid.

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	Below 2 Ω



Text in Illustration

*1	Pump motor wire harness
*a	Red wire
*b	Black wire

HINT:

Refer to the brake booster with accumulator pump assembly installation procedures:

- **for LHD (Click here)**
- **for RHD (Click here)**

NG → REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

OK

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 DTCs (Click here).

d. Turn the ignition switch off.

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
DTC is output (for RHD)	C

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

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

A

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

DTC C1415 Rear Speed Sensor RH Output Malfunction

DTC C1277 Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1278 Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1416 Rear Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1415 C1416	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1277 C1278	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1415 and C1277 are for the rear speed sensor RH.**
- **DTCs C1416 and C1278 are for the rear speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1407 and C1408 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 9

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

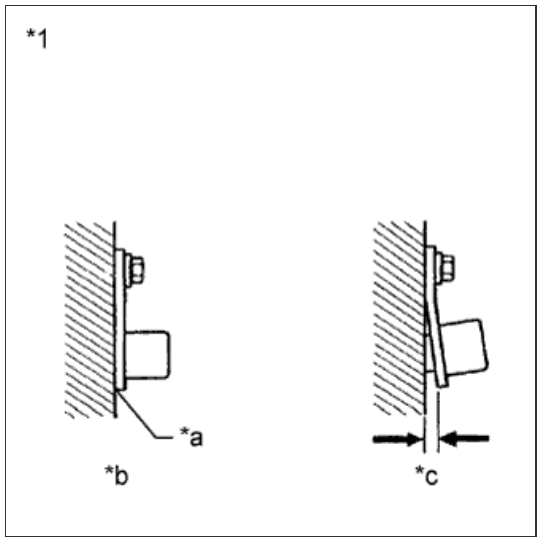
5.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

6.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

7.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

OK:

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

HINT:

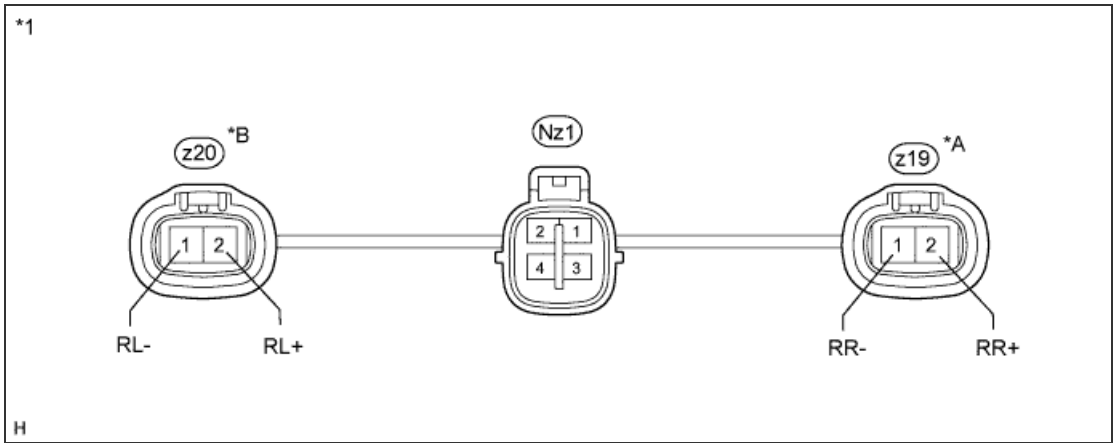
The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

9.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher

A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

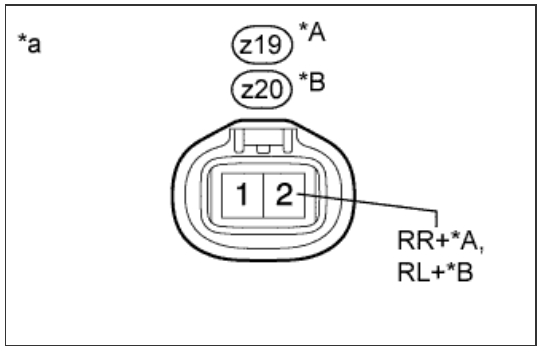
OK

10.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → Go to step 12

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE REAR SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C1252 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 (master cylinder solenoid).

DTC Code	DTC Detection Condition	Trouble Area
C1252	The motor operates for 3 minutes or more.	• Brake booster with accumulator pump assembly • Pump motor wire harness condition • Skid control ECU (Master cylinder solenoid) • Hydraulic brake booster assembly

HINT:

The pump motor continues operation for the first 3 minutes, and then starts and stops repeatedly.

INSPECTION PROCEDURE

NOTICE:

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

HINT:

When DTC C1253, C1254, C1256 or C1452 is output together with DTC C1252, inspect and repair the trouble area indicated by DTC C1253, C1254, C1256 or C1452 first.

1.CHECK PUMP MOTOR OPERATION

a. Turn the ignition switch off.

b. Depress the brake pedal more than 40 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	B
Pump motor operates intermittently	C
Pump motor operates, and then stops	D

HINT:

Refer to the hydraulic brake booster assembly installation procedures:

for LHD (Click here)
for RHD (Click here)

B → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY

C → Go to step 4

D → 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. Check the tightening torque of the 2 screws which secure the wire harness connecting the master cylinder solenoid and brake booster with accumulator pump assembly (for LHD: Click here, for RHD: Click here).

OK:
The harness is tightened to the specified torque.

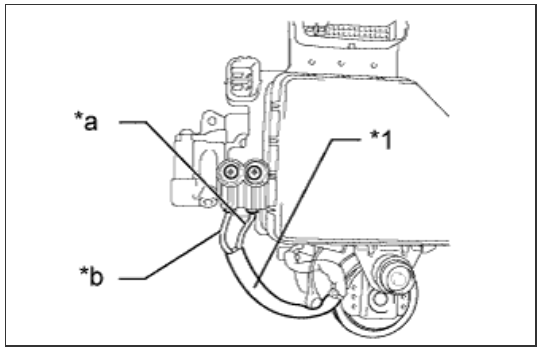
NG → RETIGHTEN SCREWS

OK

3.CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS

a. Using a screwdriver, remove the 2 screws and pull out the wire harness from the master cylinder solenoid.

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	Below 2 Ω

Text in Illustration

*1	Pump motor wire harness
*a	Red wire
*b	Black wire

HINT:

Refer to the brake booster with accumulator pump assembly installation procedures:

- **for LHD (Click here)**
- **for RHD (Click here)**

NG → REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

OK

4.READ VALUE USING GTS (ACCUMULATOR SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS 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 "Normal Condition" range	A
Output value is out of "Normal Condition" range	B
Output value is constant regardless of pump operation	C

HINT:

- **Refer to the hydraulic brake booster assembly installation procedures:**
  for LHD (Click here)
  for RHD (Click here)
- **Refer to the master cylinder solenoid installation procedures:**
  for LHD (Click here)
  for RHD (Click here)

B	REPLACE MASTER CYLINDER SOLENOID
C	REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY

A

5.RECONFIRM DTC

a. Clear the DTCs (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).

Result

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

HINT:

- **Reinstall the sensors, reconnect the connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.**
- **Refer to the hydraulic brake booster assembly installation procedures:**
  for LHD (Click here)
  for RHD (Click here)
- **Refer to the brake booster with accumulator pump assembly installation procedures:**
  for LHD (Click here)
  for RHD (Click here)

B	REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

A

REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY

DTC C1415 Rear Speed Sensor RH Output Malfunction

DTC C1277 Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1278 Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1416 Rear Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1415 C1416	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1277 C1278	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1415 and C1277 are for the rear speed sensor RH.**
- **DTCs C1416 and C1278 are for the rear speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1407 and C1408 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 9

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

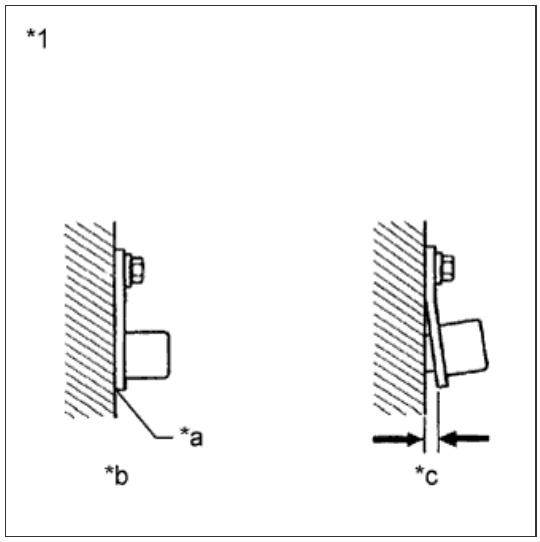
5.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

6.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

7.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

OK:

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

HINT:

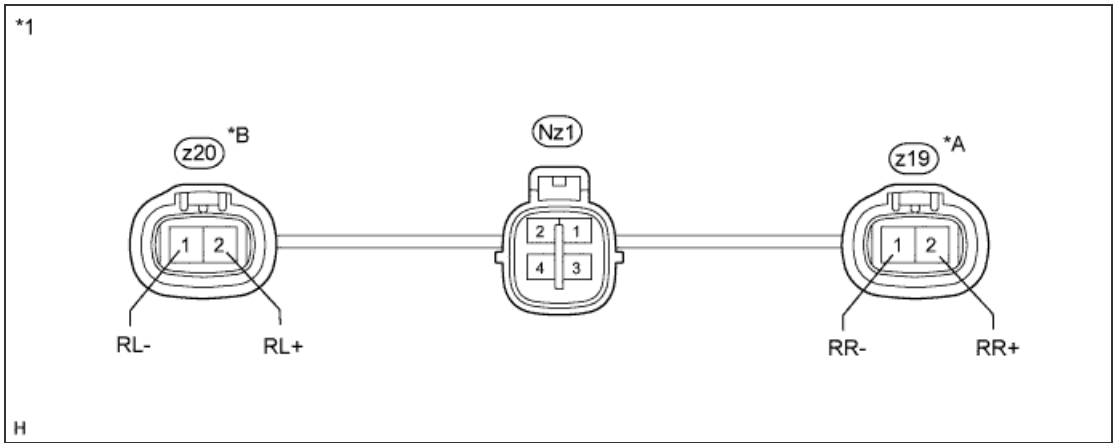
The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

9.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)

a. Install the skid control sensor wire.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher

A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

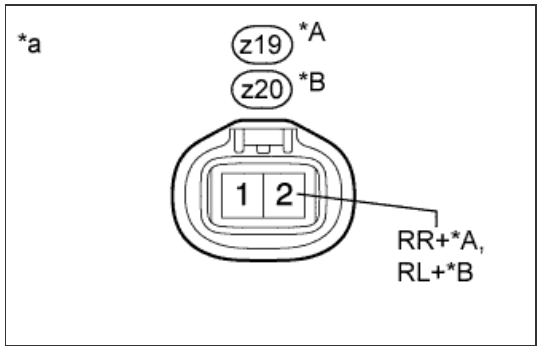
OK

10.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → Go to step 12

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE REAR SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C1253 Pump Motor Relay

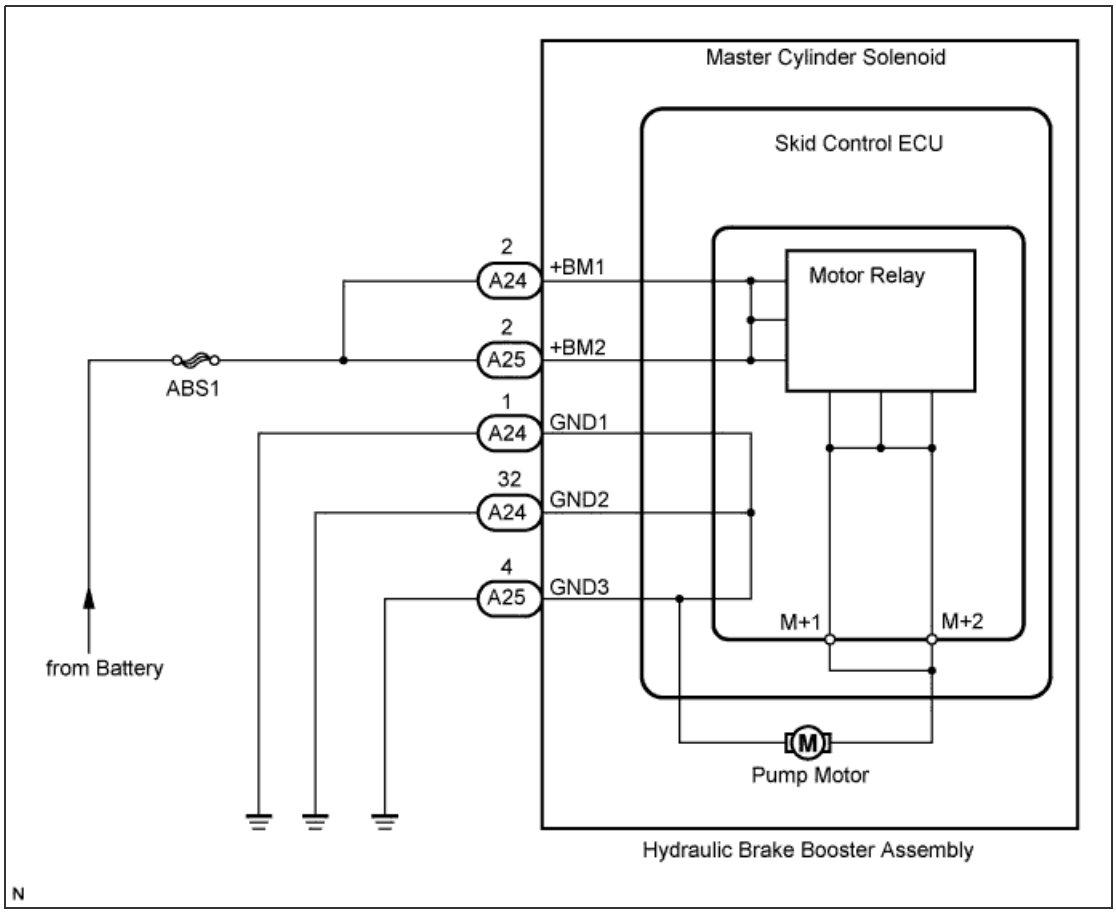
for Preparation Click here

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 (master cylinder solenoid).

DTC Code	DTC Detection Condition	Trouble Area
C1253	There is a motor system circuit (motor input circuit) malfunction.	• ABS1 fuse • Motor relay circuit • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After 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.PERFORM ACTIVE TEST USING GTS (MOTOR RELAY)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Start the engine.

f. 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 operating sound of the motor can be heard.

g. Check the operating sound of the motor individually when operating it with the GTS.

OK:

An operating sound of the motor can be heard.

NG → Go to step 3

OK ↓

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 40 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

3.CHECK HARNESS AND CONNECTOR (+BM1/+BM2 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

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

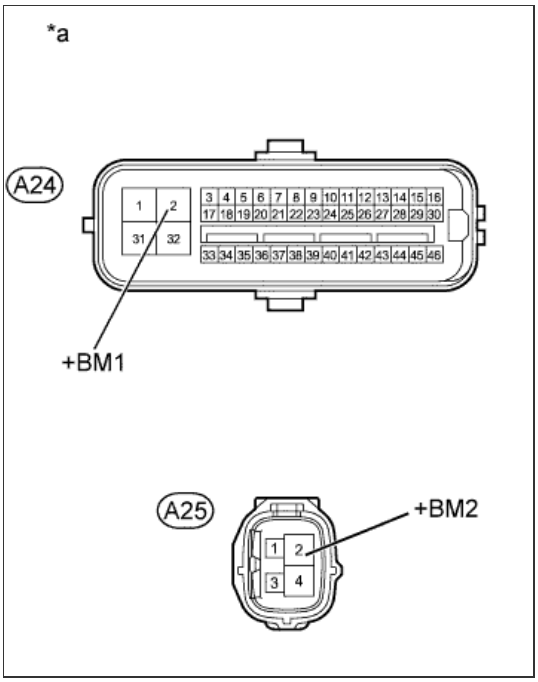
Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-2 (+BM1) - Body ground	Always	11 to 14 V
A25-2 (+BM2) -	Always	11 to 14 V

Body ground

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

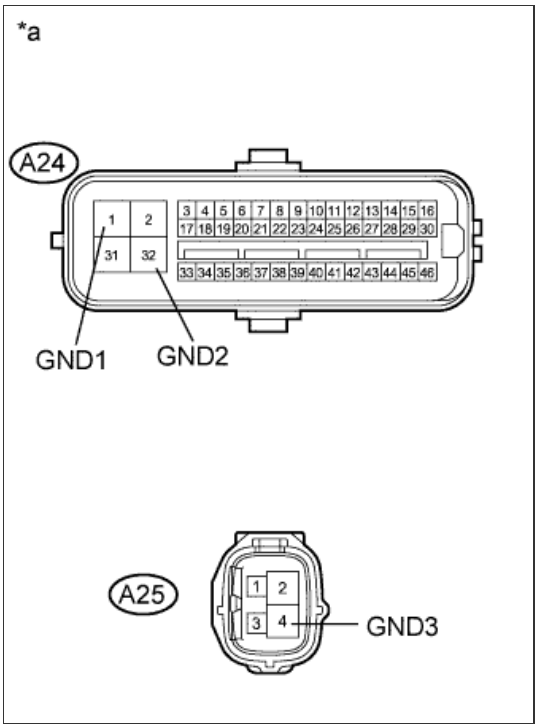
c. Measure the resistance according to the value(s) in the table below.

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 40 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1417 High Power Supply Voltage Malfunction

for Preparation Click here

DESCRIPTION

If a malfunction is detected in the power supply circuit, the skid control ECU (master cylinder solenoid) stores this DTC and the fail-safe function prohibits ABS/VSC/TRC operation.
This DTC is stored when the IG1 terminal voltage deviates from the DTC detection condition due to a malfunction in the power supply or charging circuit such as the battery or generator circuit, etc.
This DTC is cleared when the IG1 terminal voltage returns to normal.

DTC Code	DTC Detection Condition	Trouble Area
C1417	The IG1 terminal voltage is 17.4 V or higher for 0.8 seconds or more.	• Charging system • Power source circuit • Internal power supply circuit of the skid control ECU (master cylinder solenoid)

WIRING DIAGRAM

Refer to DTC C1241 (Click here).

INSPECTION PROCEDURE

NOTICE:

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

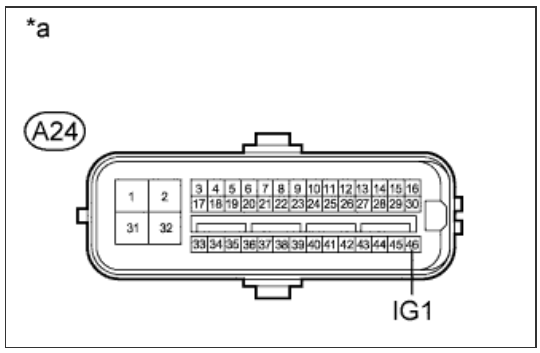
1.CHECK HARNESS AND CONNECTOR (IG1 TERMINAL)

a. Disconnect the skid control ECU (master cylinder solenoid) connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON (Engine running)	11 to 14 V



Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

Result

Result	Proceed to
OK	A
NG (for 1VD-FTV)	B
NG (for 1UR-FE)	C
NG (for 1GR-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

2.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

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

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

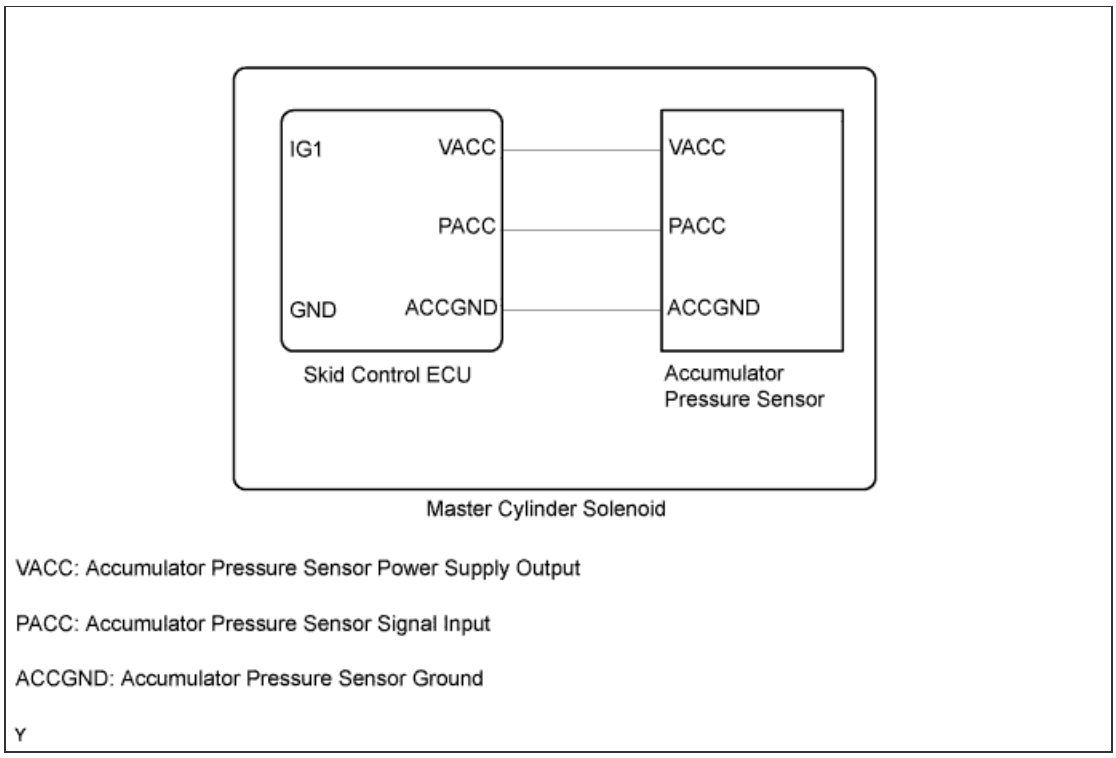
CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1254 Pressure Sensor or Switch

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	There is an accumulator pressure sensor malfunction (the fluid pressure does not change when the pump operates or when the brake is applied).	Master cylinder solenoid (Accumulator pressure sensor)

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (ACCUMULATOR SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Depress the brake pedal more than 40 times.

d. Turn the ignition switch to ON.

e. Turn the GTS on.

f. 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.

g. Check the accumulator output value.

Result

Result	Proceed to

Output value is within "Normal Condition" range	A
Output value is out of "Normal Condition" range (for LHD)	B
Output value is constant regardless of pump operation (for LHD)	
Output value is out of "Normal Condition" range (for RHD)	C
Output value is constant regardless of pump operation (for RHD)	

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 40 times.

d. Turn the ignition switch to ON.

e. Wait until the pump motor stops.

f. Wait for 15 minutes.

g. Depress the brake pedal and release it.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1421 Open or Short in Master Cylinder Pressure Sensor

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

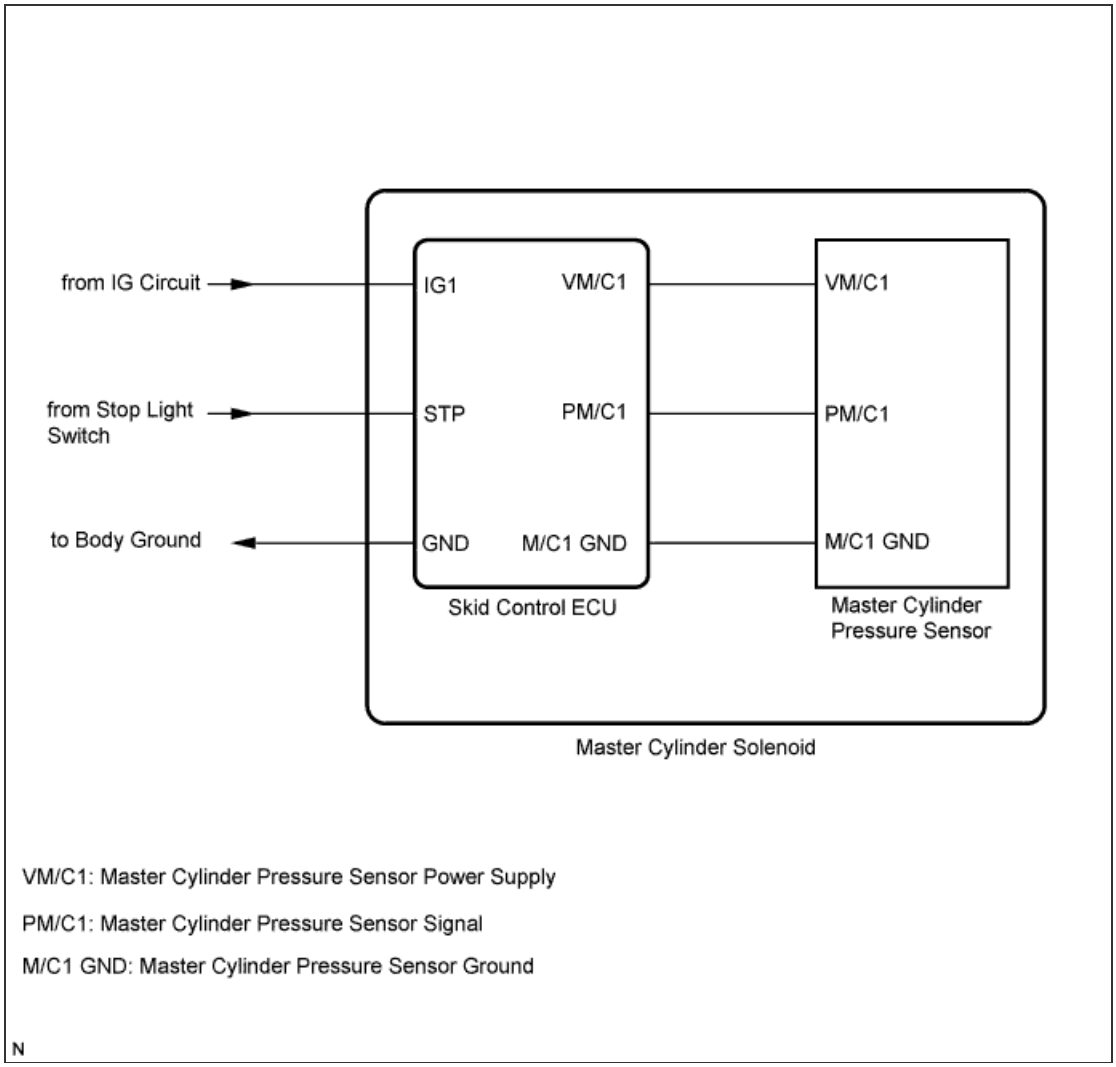
DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2 seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	Master cylinder solenoid

C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

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

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

END

DTC C1256 Accumulator Low Pressure

for Preparation Click here

DESCRIPTION

Refer to DTC C1254 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1256	The fluid pressure inside the accumulator is below the standard value.	• Brake booster with accumulator pump assembly • Master cylinder solenoid (Accumulator pressure sensor) • Hydraulic brake booster assembly

INSPECTION PROCEDURE

NOTICE:

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

HINT:

When DTC C1251, C1253 or C1254 is output together with DTC C1256 inspect and repair the trouble area indicated by DTC C1251, C1253 or C1254 first.

1.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal 20 times or more.

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 → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

2.INSPECT HYDRAULIC BRAKE BOOSTER ASSEMBLY FUNCTION

a. Inspect brake booster pump power supply system function.

i. Turn the ignition switch off.

ii. Depress the brake pedal 20 times or more to release the pressure in the accumulator.

HINT:

When the pressure is released, the brake pedal stroke becomes longer.

iii. Check that the brake fluid level is at the MAX level.

iv. Chock the 4 wheels and release the parking brake.

v. Turn the ignition switch to ON and measure the brake booster pump operating time (the time from when the brake booster pump starts operating until it stops).

OK:
20 to 80 seconds

vi. Start the engine after the brake boost pump stops.

vii. Check that the ABS warning light and slip indicator light are not illuminated.

viii. Turn off the engine, and then turn the ignition switch to ON.

ix. Check that the brake boost pump operates and then stops when the brake pedal is depressed 4 or 5 times.

x. Depress the brake pedal 4 or 5 times and measure the brake booster pump operating time (the time from when the brake booster pump starts operating until it stops).

OK:
2 to 11 seconds

xi. Check that the brake warning light illuminates and the buzzer sounds when the brake pedal is fully depressed continuously 15 to 20 times.

NOTICE:

Wait 120 seconds or more after turning the ignition switch to ON before performing this inspection.

b. Check brake booster operation.

i. Turn the ignition switch off.

ii. Depress the brake pedal 20 times or more to release the pressure in the accumulator.

HINT:

When the pressure is released, the brake pedal stroke becomes longer.

iii. Depress the brake pedal, start the engine, and check the change in the brake pedal height.

OK:
The brake pedal moves slightly inward.

c. Inspect brake master cylinder fluid pressure change (for LHD: Click here, for RHD: Click here).

NG → **Go to step 5**

OK

3.READ VALUE USING GTS (ACCUMULATOR SENSOR)

a. Connect the GTS to the DLC3.

b. Turn the ignition switch to ON.

c. Turn the GTS on.

d. 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.

e. Check that the accumulator output value is normal.

OK:
Accumulator pressure sensor value is normal.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

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

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

4.RECONFIRM DTC

a. Clear the DTCs (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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

5.INSPECT BRAKE BOOSTER PUMP ASSEMBLY

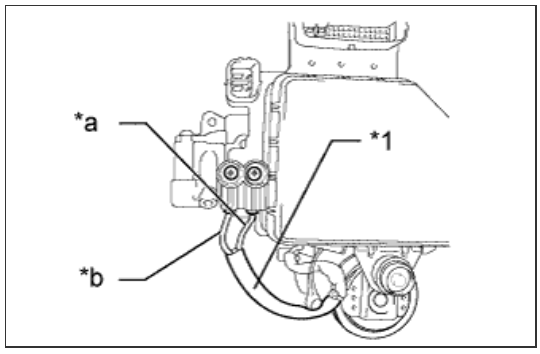
a. Remove the hydraulic brake booster assembly (for LHD: Click here, for RHD: Click here).

b. Using a screwdriver, remove the 2 screws and pull out the wire harness from the master cylinder solenoid.

c. 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	Below 2 Ω



Text in Illustration

*1	Pump motor wire harness
*a	Red wire
*b	Black wire

d. Install the pump motor wire harness to the master cylinder solenoid with the 2 screws (for LHD: Click here, for RHD: Click here).

Result

Result	Proceed to
OK (for LHD)	A
OK (for RHD)	B
NG (for LHD)	C
NG (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 C1421 Open or Short in Master Cylinder Pressure Sensor

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

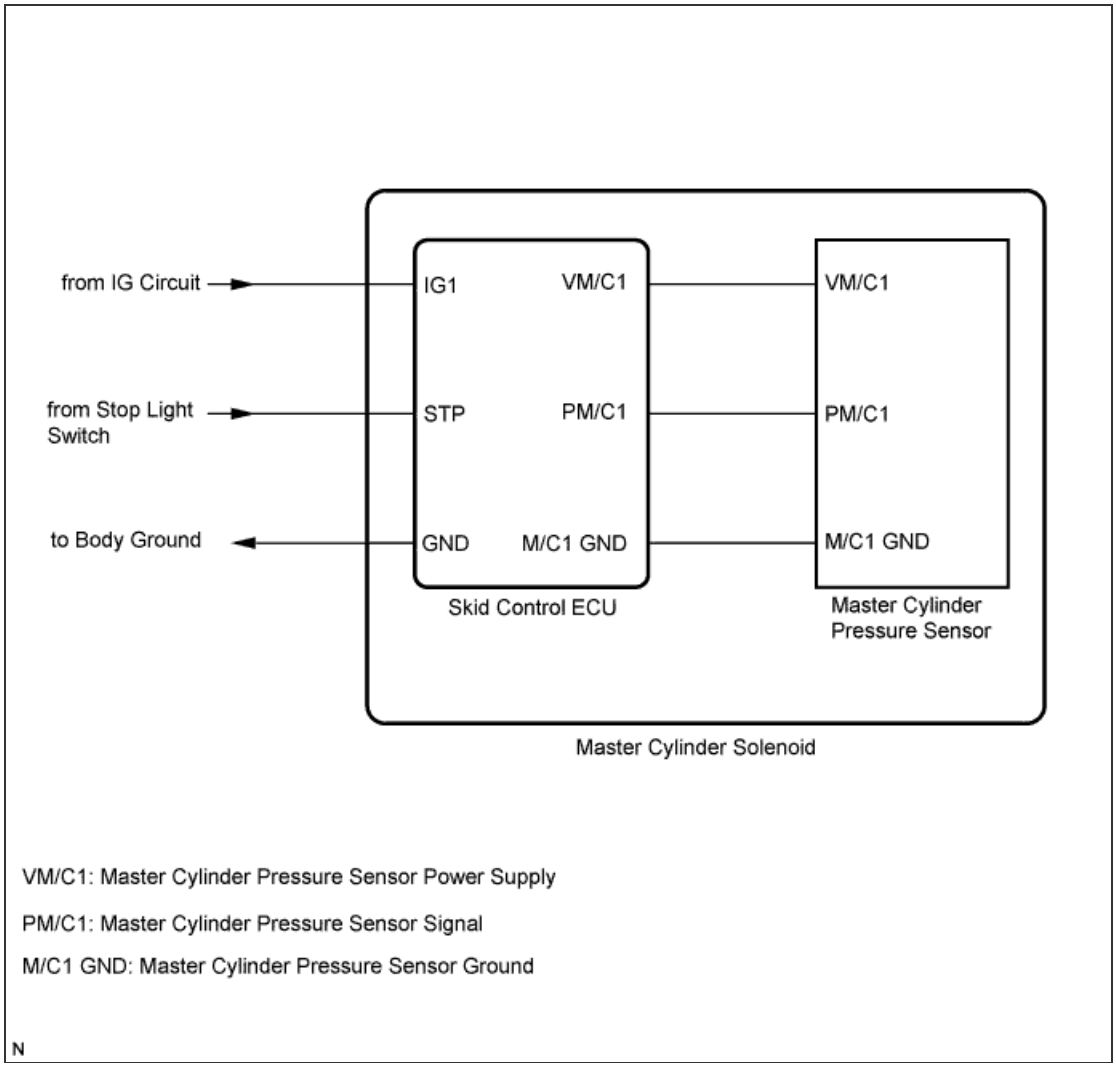
DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2 seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	Master cylinder solenoid

C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

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

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

END

DTC C1257 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 (master cylinder solenoid).

DTC Code	DTC Detection Condition	Trouble Area
C1257	There is an open in the motor system circuit (motor input circuit).	Skid control ECU (Master cylinder solenoid)

INSPECTION PROCEDURE

NOTICE:

After 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 (master cylinder solenoid) connector.

c. Depress the brake pedal more than 40 times.

d. Turn the ignition switch to ON.

e. Check pump motor operation.

OK:

Pump motor operates normally.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 (master cylinder solenoid) connector.

c. Turn the ignition switch to ON.

d. Clear the DTCs (Click here).

e. Turn the ignition switch off.

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

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1421 Open or Short in Master Cylinder Pressure Sensor

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

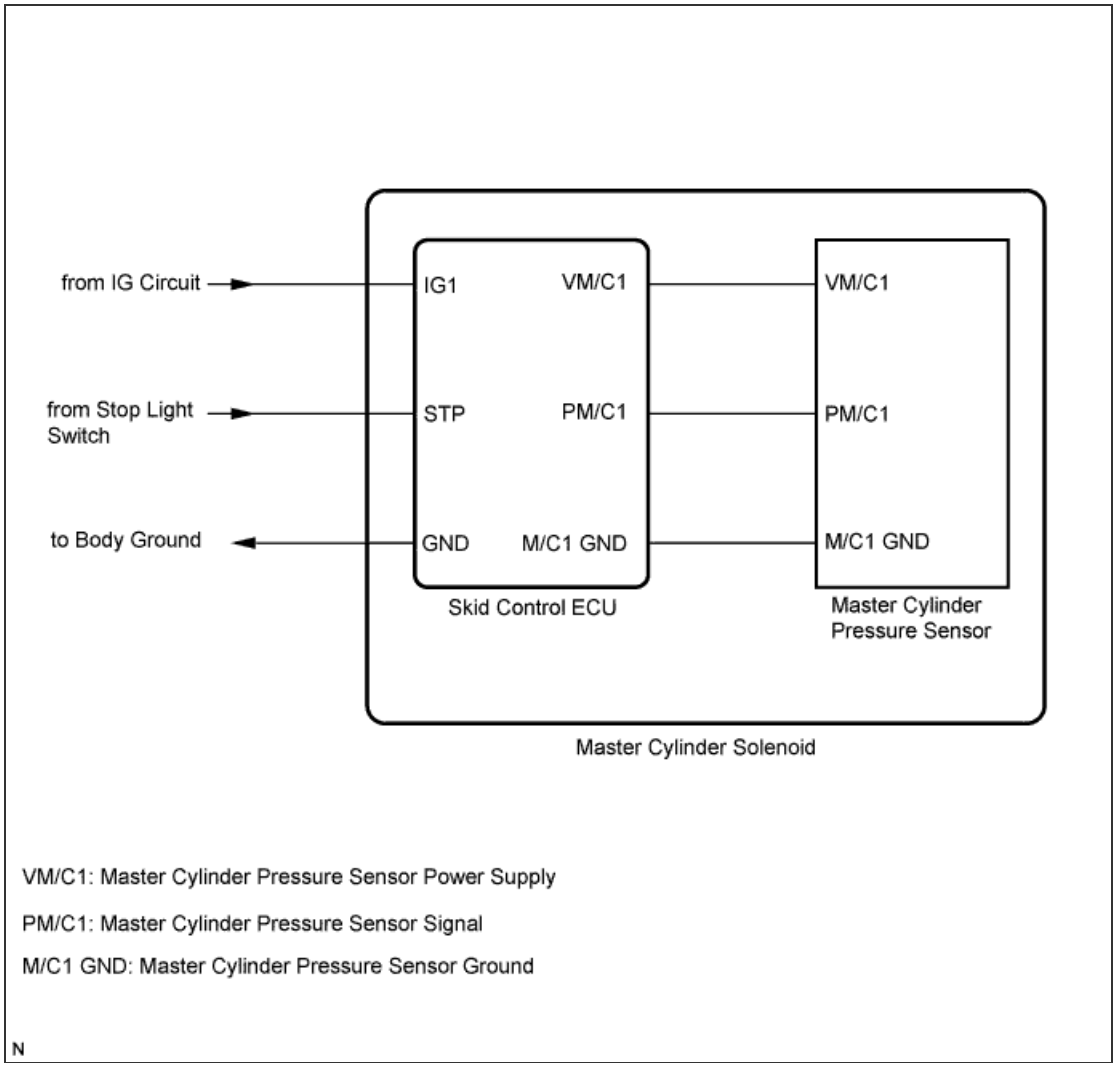
DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2 seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	Master cylinder solenoid

C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

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

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

END

DTC C1268 Transfer L4 Position Switch Circuit

for Preparation Click here

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1268	The skid control ECU receives an L4 abnormal status signal from the four wheel drive control ECU via CAN communication for 2 seconds or more.	• Transfer system • Skid control ECU (Master cylinder solenoid)

INSPECTION PROCEDURE

NOTICE:

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

1.INSPECT TRANSFER L4 SHIFT

a. Shift the transfer to L4, and then drive the vehicle and check that there are no problems with the transfer system.

OK:
There are no problems with the transfer system.

NG → GO TO TRANSFER SYSTEM (PROBLEM SYMPTOMS TABLE) (Click here)

OK ↓

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Shift the transfer to L4, drive the vehicle, and then check for DTCs (Click here).

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1421 Open or Short in Master Cylinder Pressure Sensor

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

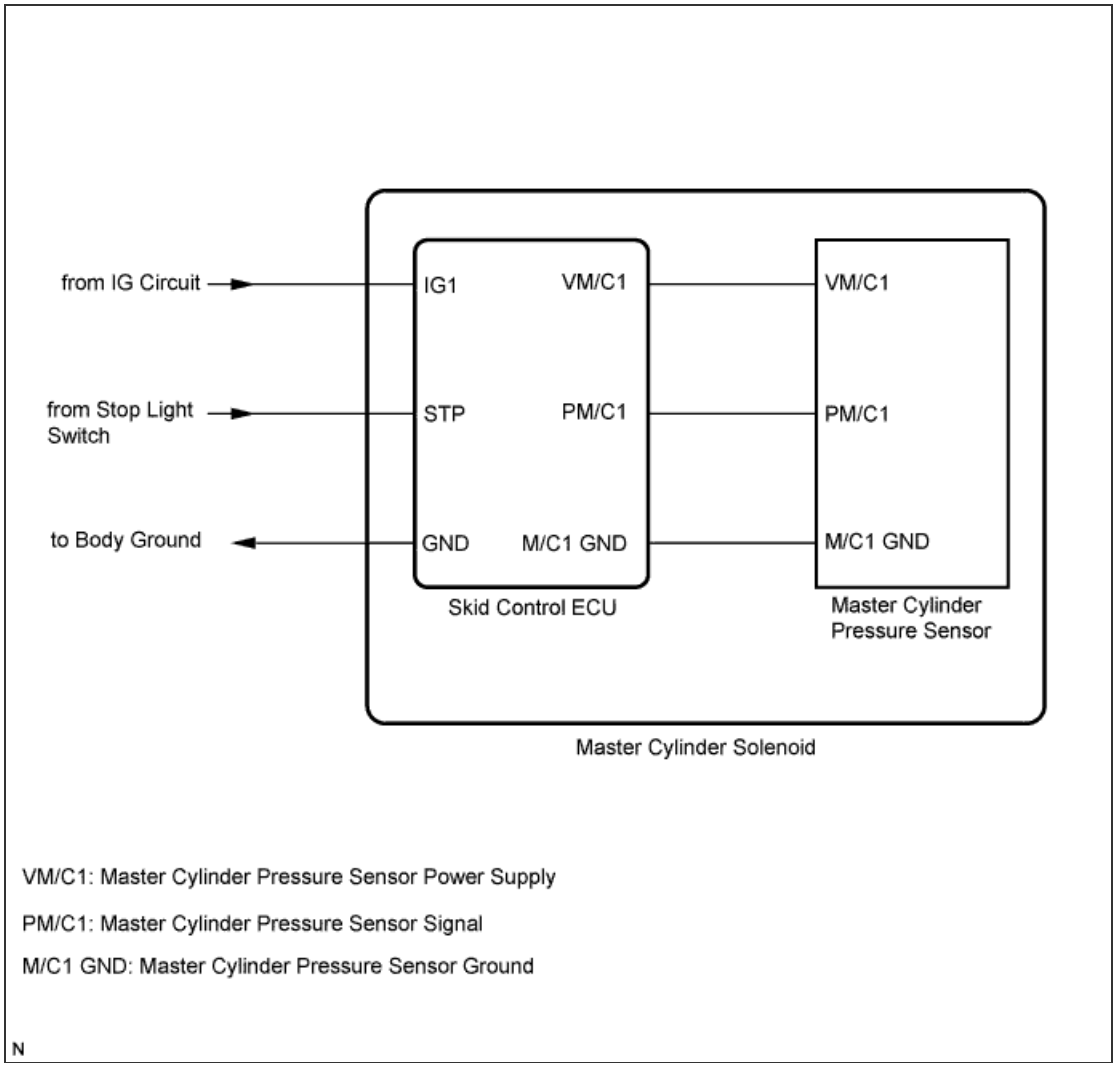
DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2 seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	Master cylinder solenoid

C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

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

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

END

DTC C1282 Center Differential Lock Position Switch

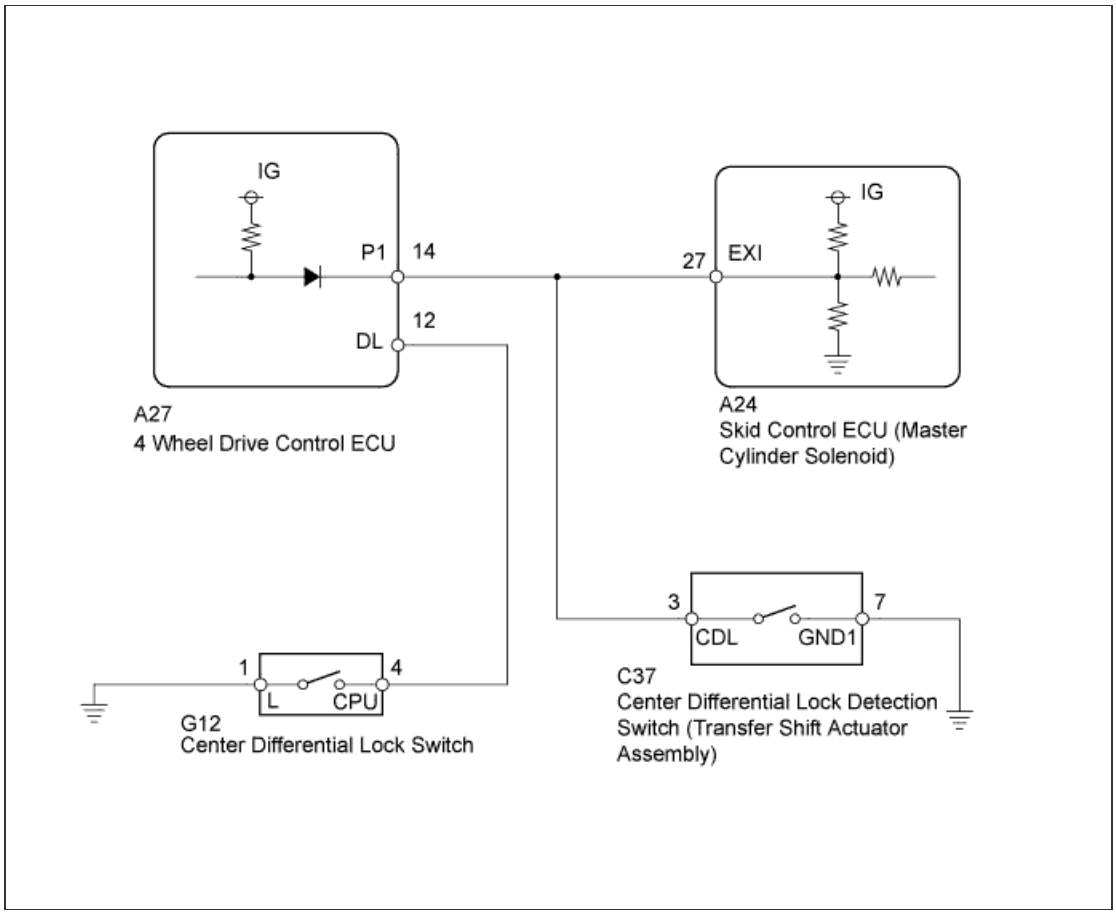
for Preparation Click here

DESCRIPTION

DTC C1282 is stored only in test mode.

DTC Code	DTC Detection Condition	Trouble Area
C1282	Stored during test mode.	• Harness or connector • Transfer system

WIRING DIAGRAM



INSPECTION PROCEDURE

1.CHECK TEST MODE DTC

a. Switch the vehicle to test mode, perform the center differential lock signal check, and then check that the Test Mode (Signal Check) DTC C1282 is cleared (Click here).

Result

Result	Proceed to
Test Mode DTC C1282 is cleared	A
Test Mode DTC C1282 is not cleared	B

B → Go to step 2

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

2.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - 4 WHEEL DRIVE CONTROL ECU/TRANSFER SHIFT ACTUATOR)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the A27 4 wheel drive control ECU connector.

c. Disconnect the C37 transfer shift actuator assembly connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-27 (EXI) - A27-14 (P1)	Always	Below 1 Ω
A24-27 (EXI) - C37-3 (CDL)	Always	Below 1 Ω
A24-27 (EXI) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

GO TO TRANSFER SYSTEM (PROBLEM SYMPTOMS TABLE) (Click here)

DTC C1422 Master Cylinder Pressure Sensor Zero Point High Malfunction

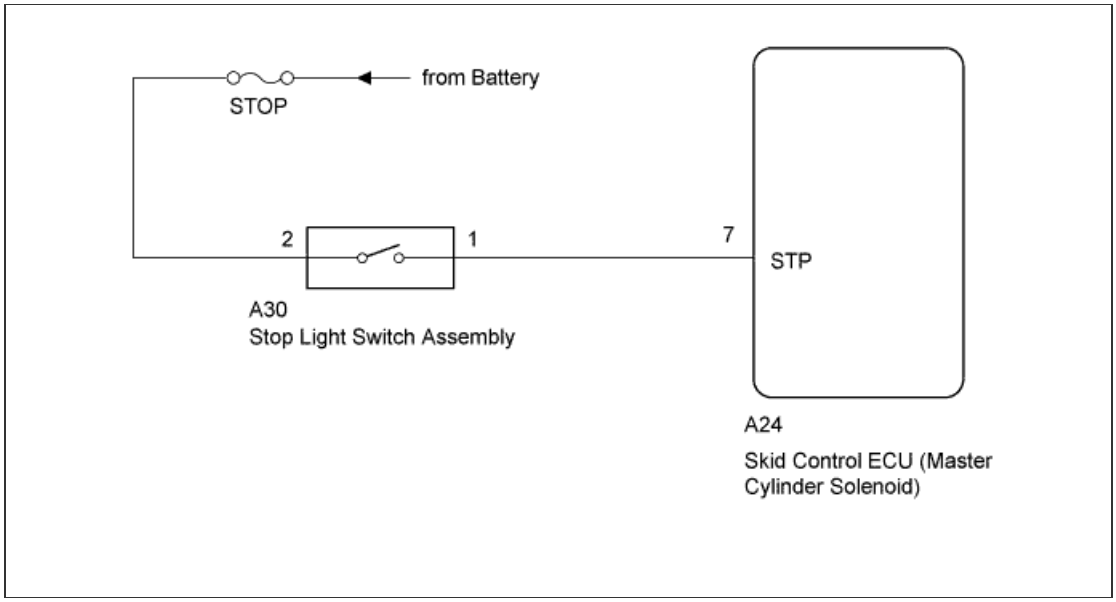
for Preparation Click here

DESCRIPTION

Refer to DTCs C1421, C1423 and C1424 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1422	When the stop light switch is off, the PM/C1 terminal voltage is 0.86 V or higher for 5 seconds or more.	• STOP fuse • Stop light switch assembly • Stop light switch circuit • Master cylinder pressure sensor circuit • Master cylinder solenoid (Master cylinder pressure sensor)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After 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.READ VALUE USING GTS (STOP LIGHT SW)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

f. Check that the stop light switch condition observed on the GTS changes according to brake pedal operation.

OK:

The GTS displays ON and OFF according to brake pedal operation.

NG → Go to step 4

OK

2.CHECK BRAKE PEDAL AND STOP LIGHT SWITCH INSTALLATION

a. Turn the ignition switch off.

b. Check the brake pedal height and stop light switch installation (for LHD: Click here, for RHD: Click here).

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

NG → ADJUST BRAKE PEDAL OR STOP LIGHT SWITCH

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more and perform a braking test (decelerate the vehicle by depressing the brake pedal).

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

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

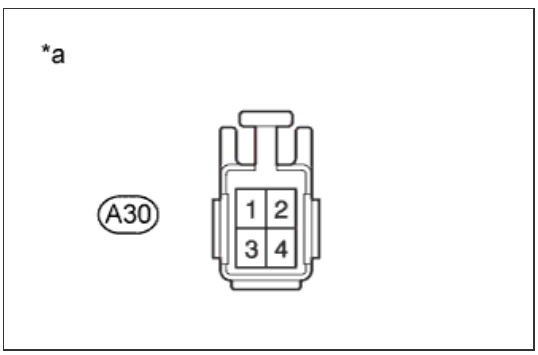
a. Make sure that there is no looseness in the locking part and connecting part of the connectors.

b. Disconnect the stop light switch assembly connector.

c. 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



Text in Illustration

*a	Front view of wire harness connector (to Stop Light Switch Assembly)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

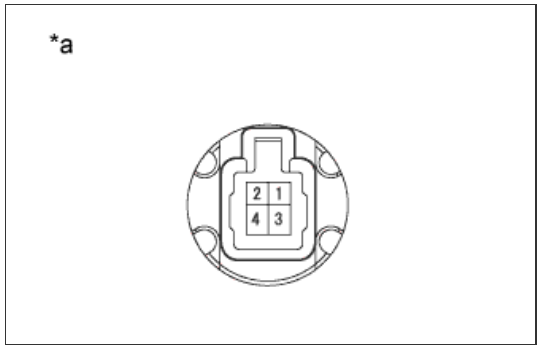
5.INSPECT STOP LIGHT SWITCH

a. Remove the stop light switch assembly (Click here).

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
1 - 2	Switch pin not pushed in	Below 1 Ω
	Switch pin pushed in	10 kΩ or higher



Text in Illustration

*a	Component without harness connected (Stop Light Switch Assembly)

NG → REPLACE STOP LIGHT SWITCH ASSEMBLY (Click here)

OK

6.CHECK HARNESS AND CONNECTOR (STP TERMINAL)

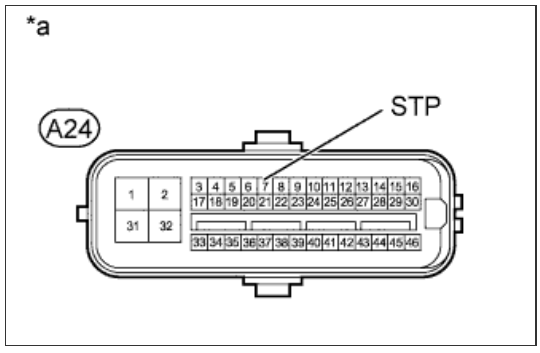
a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

c. 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	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V



Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (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 C1336 Zero Point Calibration of Acceleration Sensor Undone

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the deceleration sensor.
The DTCs are also stored when the calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1336	Zero point calibration of the deceleration sensor is incomplete.	• Zero point calibration incomplete • Sensor installation • Deceleration sensor • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM

Refer to DTCs C1243, C1245, C1381 and C1418 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration (Click here).**
- **After replacing the deceleration sensor, perform zero point calibration (Click here).**

1.PERFORM ZERO POINT CALIBRATION OF DECELERATION SENSOR

a. Perform zero point calibration of the deceleration sensor (Click here).

NEXT

2.PERFORM TEST MODE (SIGNAL CHECK)

a. Turn the ignition switch off.

b. Perform the signal check in the Test Mode Procedure (Click here).

OK:
All test mode DTCs are cleared.

NG → **Go to step 3**

OK

END

3.CHECK DECELERATION SENSOR INSTALLATION

a. Turn the ignition switch off.

b. Check that the deceleration sensor has been installed properly (Click here).

OK:
The sensor is tightened to the specified torque.
The sensor is not installed at an angle.

NG → **INSTALL DECELERATION SENSOR CORRECTLY (Click here)**

OK

4.READ VALUE USING GTS (DECELERATION SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Deceleration Sensor	Deceleration sensor/ Min.: -18.525 m/s^2, Max.: 18.387 m/s^2	-	Changes continuously during acceleration/deceleration.

f. Check that the deceleration sensor output value is displayed on the GTS.

OK:

Deceleration value changes.

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE DECELERATION SENSOR (Click here)

DTC C1425 Open in Stop Light Switch Circuit

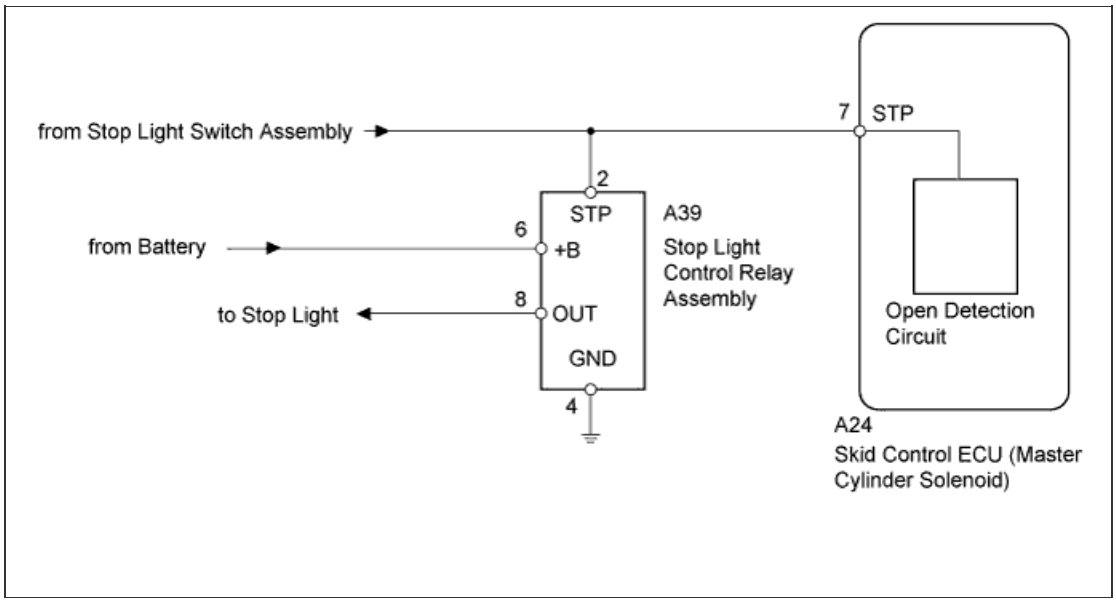
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) has an open detection circuit, which stores this DTC when detecting an open in the stop light switch input line or the ground line of the stop light switch circuit with the stop light switch off (brake pedal not depressed).

DTC Code	DTC Detection Condition	Trouble Area
C1425	When the IG1 terminal voltage is between 9.5 and 17.4 V, an open in the STP terminal circuit continues for 3 seconds or more.	• Stop light switch circuit • Stop light control relay assembly • Stop light control relay circuit • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (STOP LIGHT SW)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

f. Check that the stop light switch condition observed on the GTS changes according to brake pedal operation.

OK:

The GTS displays ON and OFF according to brake pedal operation.

NG	Go to step 3

OK

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Depress the brake pedal several times to test the stop light circuit.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

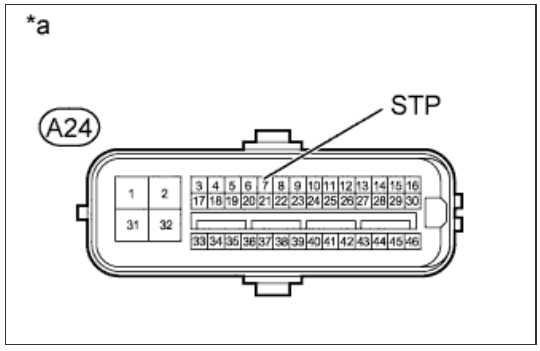
CHECK FOR INTERMITTENT PROBLEMS (Click here)

3.CHECK HARNESS AND CONNECTOR (STP TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-7 (STP) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.CHECK HARNESS AND CONNECTOR (+B/GND TERMINAL)

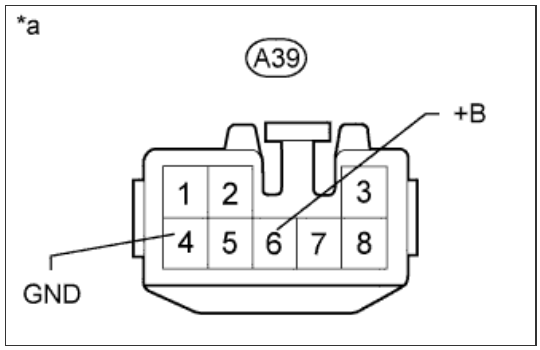
a. Turn the ignition switch off.

b. Disconnect the stop light control relay assembly connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A39-6 (+B) - 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
A39-4 (GND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Stop Light Control Relay Assembly)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

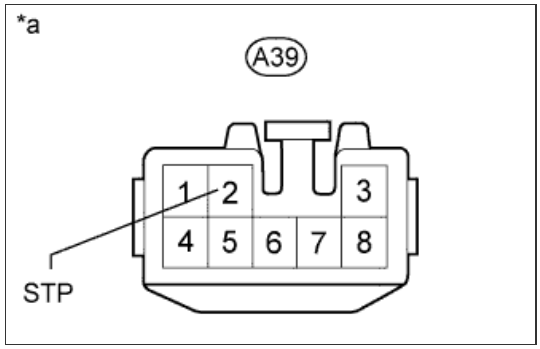
OK

5.CHECK HARNESS AND CONNECTOR (STP TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the stop light control relay assembly connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
A39-2 (STP) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V

Text in Illustration

*a	Front view of wire harness connector (to Stop Light Control Relay Assembly)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6.CHECK HARNESS AND CONNECTOR (OUT TERMINAL)

a. Reconnect the stop light control relay assembly connector.

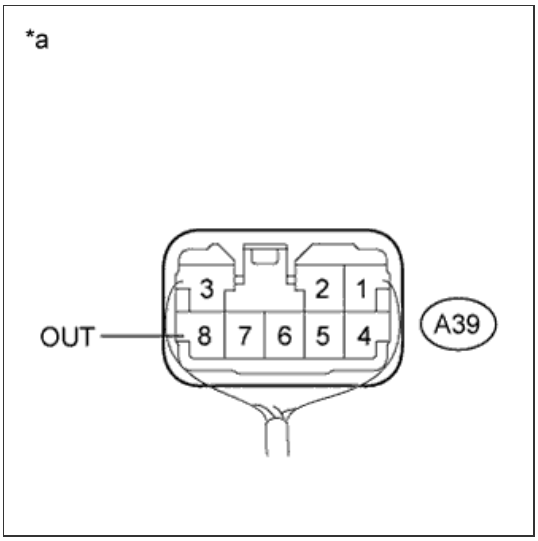
b. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Condition	Specified Condition
A39-8 (OUT) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V

Text in Illustration

*a	Component with harness connected (Stop Light Control Relay Assembly)



NG → REPLACE STOP LIGHT CONTROL RELAY ASSEMBLY

OK

7.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Depress the brake pedal several times to test the stop light circuit.

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
DTC is output (for RHD)	C

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

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

A

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

DTC C1337 Diameter of the Tire is not Uniform

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) 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	Either condition is met: • The diameter of the 2 front wheels and 2 rear wheels is different. • There is a wheel speed sensor fault.	• Speed sensor • Speed sensor rotor • Speed sensor circuit • Tire size

INSPECTION PROCEDURE

NOTICE:

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

HINT:

When DTCs C1401 to C1416 are output with DTC C1337, inspect and repair the trouble areas indicated by DTCs C1401 to C1416 first (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.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

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

d. 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1452 Accumulator Low Pressure

for Preparation Click here

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1452	After braking, the fluid pressure inside the accumulator is less than the threshold within 3.2 seconds.	• Hydraulic circuit • Master cylinder solenoid (Accumulator pressure sensor)

INSPECTION PROCEDURE

NOTICE:

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

1.CUSTOMER PROBLEM ANALYSIS

a. Check with the customer to determine if frequent braking has been performed.

NEXT

2.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 40 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
Frequent braking was not performed and DTC is not output	B
Frequent braking was performed and DTC is not output	C

HINT:

Excessive brake pedal operation results in abnormal accumulator pressure consumption. This is normal.

B → CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

C → END

A

3.CHECK HYDRAULIC CIRCUIT

a. Check the hydraulic circuit (Click here).

OK:
Hydraulic circuit is normal (no leakage).

NG → REPAIR HYDRAULIC CIRCUIT

OK

4.READ VALUE USING GTS (ACCUMULATOR SENSOR)

a. Connect the GTS to the DLC3.

b. Turn the ignition switch to ON.

c. Turn the GTS on.

d. 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.

e. Check that the accumulator output value is normal.

OK:

Accumulator pressure sensor value is normal.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

5.RECONFIRM DTC

a. Clear the DTCs (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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1401 Front Speed Sensor RH Malfunction

DTC C1271 Low Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1272 Low Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1402 Front Speed Sensor LH Malfunction

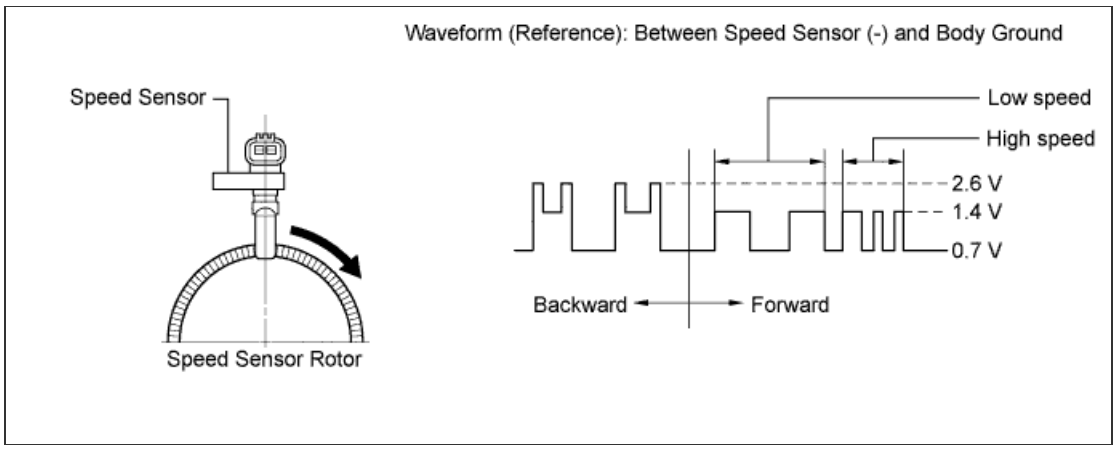
for Preparation Click here

DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU (master cylinder solenoid). These signals are used for brake control.

HINT:

When the connectors between the speed sensor and skid control ECU (master cylinder solenoid) are connected, the following waveform is output.



DTC Code	DTC Detection Condition	Trouble Area
C1401 C1402	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed of 10 km/h (6 mph) or more, the outputs from both front speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation
C1271 C1272	Stored only during test mode.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1401 and C1271 are for the front speed sensor RH.**
- **DTCs C1402 and C1272 are for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

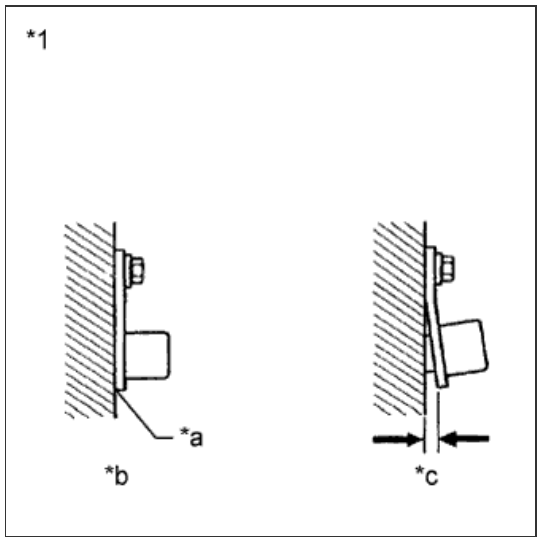
b. Check the speed sensor installation (Click here).

OK:

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

Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG



NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

2.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

3.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK ↓

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

5.REPLACE FRONT SPEED SENSOR

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

NEXT ↓

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (**Click here**)

A ↓

END

DTC C1453 Reservoir Level Switch Disconnected

DTC C1454 Reservoir Level Low

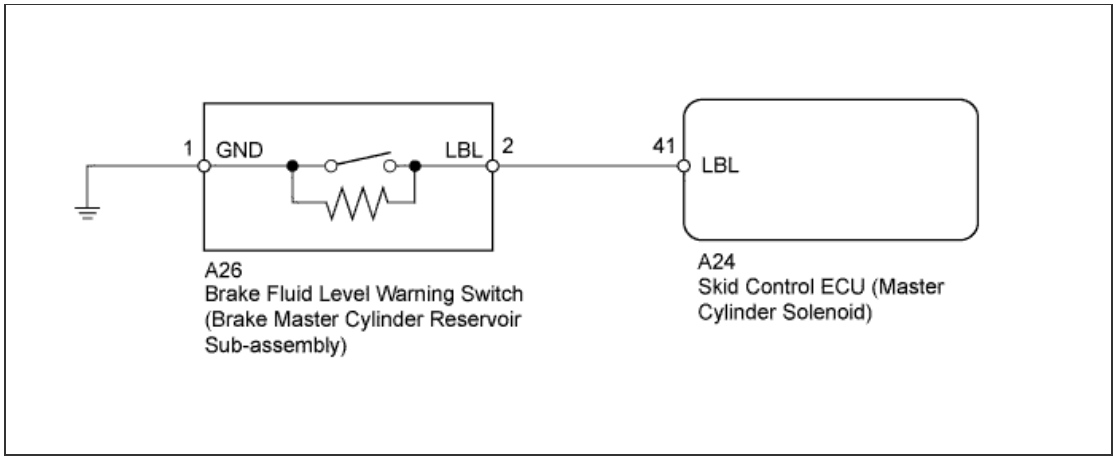
for Preparation Click here

DESCRIPTION

The brake fluid level warning switch (brake master cylinder reservoir sub-assembly) sends the appropriate signal to the skid control ECU (master cylinder solenoid) when the brake fluid level drops.

DTC Code	DTC Detection Condition	Trouble Area
C1453	With the ECU terminal IG1 voltage at 10 to 14 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 (Brake master cylinder reservoir sub-assembly) • Harness or connector • Skid control ECU (Master cylinder solenoid)
C1454	The fluid level of the reservoir is below the LOW level for 40 seconds after the ignition switch is turned to ON, or for 7 seconds during pump motor operation.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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

1.CHECK BRAKE FLUID LEVEL

a. Turn the ignition switch off.

b. Depress the brake pedal 40 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 5 mm (0.197 in.) from the level when the ignition switch is off (normal).

OK:

Brake fluid level is normal.

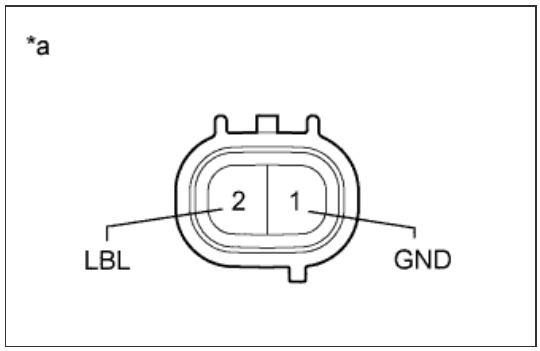
NG → CHECK AND REPAIR BRAKE FLUID LEAK

OK

2.INSPECT BRAKE FLUID LEVEL WARNING SWITCH

a. Disconnect the A26 brake fluid level warning switch (brake master cylinder reservoir sub-assembly) 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.

Standard Resistance:

Tester Connection	Switch Condition	Specified Condition
1 (GND) - 2 (LBL)	Float UP (Switch off)	1.9 to 2.1 kΩ
	Float DOWN (Switch on)	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Brake Fluid Level Warning Switch [Brake Master Cylinder Reservoir Sub-assembly])

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 (for LHD)	B
NG (for 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 (SKID CONTROL ECU - BRAKE FLUID LEVEL WARNING SWITCH)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the A26 brake fluid level warning switch (brake master cylinder reservoir sub-assembly) connector.

c. 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

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine and idle it for approximately 40 seconds.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1401 Front Speed Sensor RH Malfunction

DTC C1271 Low Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1272 Low Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1402 Front Speed Sensor LH Malfunction

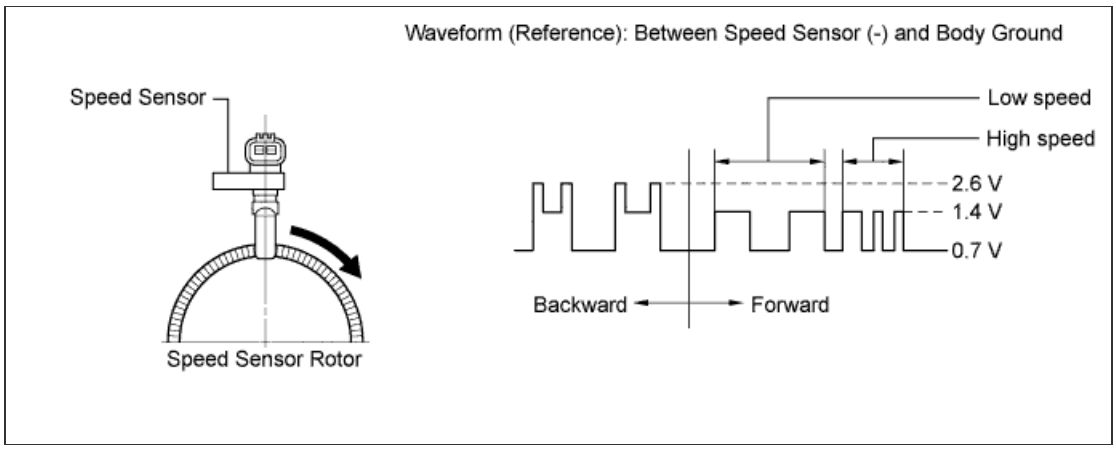
for Preparation Click here

DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU (master cylinder solenoid). These signals are used for brake control.

HINT:

When the connectors between the speed sensor and skid control ECU (master cylinder solenoid) are connected, the following waveform is output.



DTC Code	DTC Detection Condition	Trouble Area
C1401 C1402	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed of 10 km/h (6 mph) or more, the outputs from both front speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation
C1271 C1272	Stored only during test mode.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1401 and C1271 are for the front speed sensor RH.**
- **DTCs C1402 and C1272 are for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

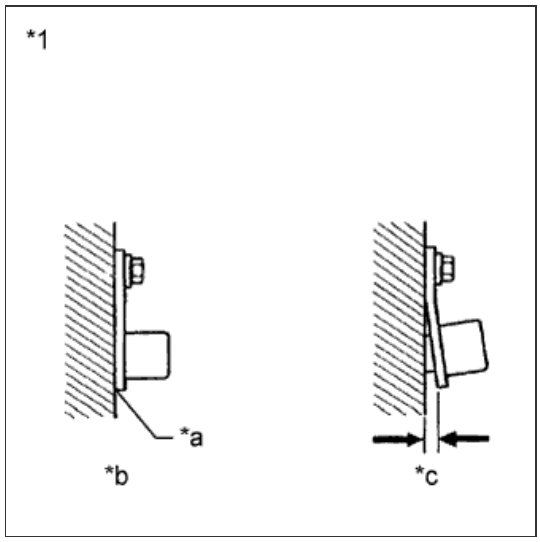
b. Check the speed sensor installation (Click here).

OK:

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

Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG



NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

2.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

3.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK ↓

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

5.REPLACE FRONT SPEED SENSOR

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

NEXT ↓

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (**Click here**)

A ↓

END

DTC C1453 Reservoir Level Switch Disconnected

DTC C1454 Reservoir Level Low

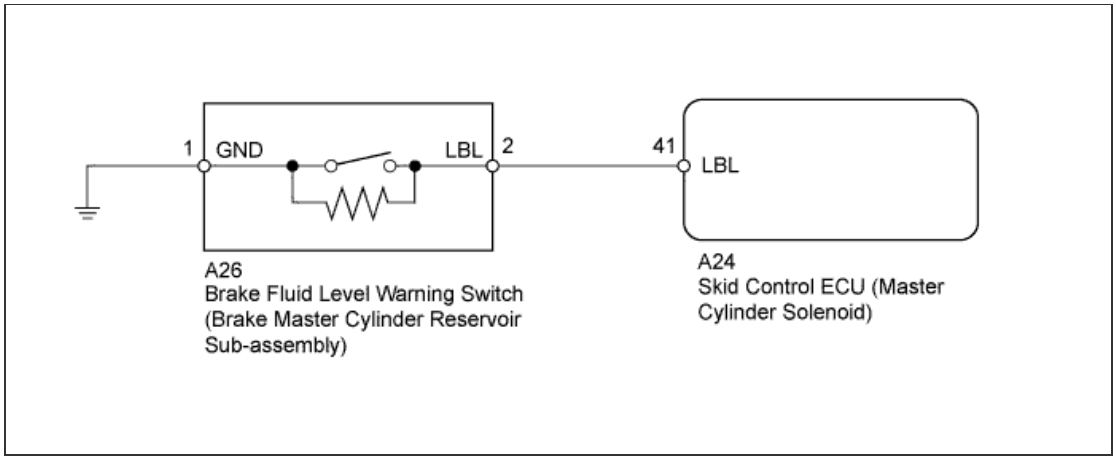
for Preparation Click here

DESCRIPTION

The brake fluid level warning switch (brake master cylinder reservoir sub-assembly) sends the appropriate signal to the skid control ECU (master cylinder solenoid) when the brake fluid level drops.

DTC Code	DTC Detection Condition	Trouble Area
C1453	With the ECU terminal IG1 voltage at 10 to 14 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 (Brake master cylinder reservoir sub-assembly) • Harness or connector • Skid control ECU (Master cylinder solenoid)
C1454	The fluid level of the reservoir is below the LOW level for 40 seconds after the ignition switch is turned to ON, or for 7 seconds during pump motor operation.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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

1.CHECK BRAKE FLUID LEVEL

a. Turn the ignition switch off.

b. Depress the brake pedal 40 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 5 mm (0.197 in.) from the level when the ignition switch is off (normal).

OK:

Brake fluid level is normal.

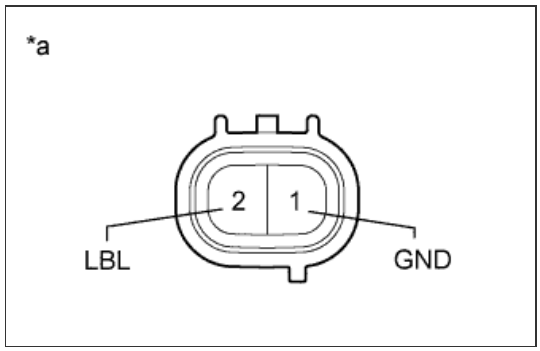
NG → CHECK AND REPAIR BRAKE FLUID LEAK

OK

2.INSPECT BRAKE FLUID LEVEL WARNING SWITCH

a. Disconnect the A26 brake fluid level warning switch (brake master cylinder reservoir sub-assembly) 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.

Standard Resistance:

Tester Connection	Switch Condition	Specified Condition
1 (GND) - 2 (LBL)	Float UP (Switch off)	1.9 to 2.1 kΩ
	Float DOWN (Switch on)	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Brake Fluid Level Warning Switch [Brake Master Cylinder Reservoir Sub-assembly])

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 (for LHD)	B
NG (for 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 (SKID CONTROL ECU - BRAKE FLUID LEVEL WARNING SWITCH)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the A26 brake fluid level warning switch (brake master cylinder reservoir sub-assembly) connector.

c. 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

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine and idle it for approximately 40 seconds.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1401 Front Speed Sensor RH Malfunction

DTC C1271 Low Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1272 Low Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1402 Front Speed Sensor LH Malfunction

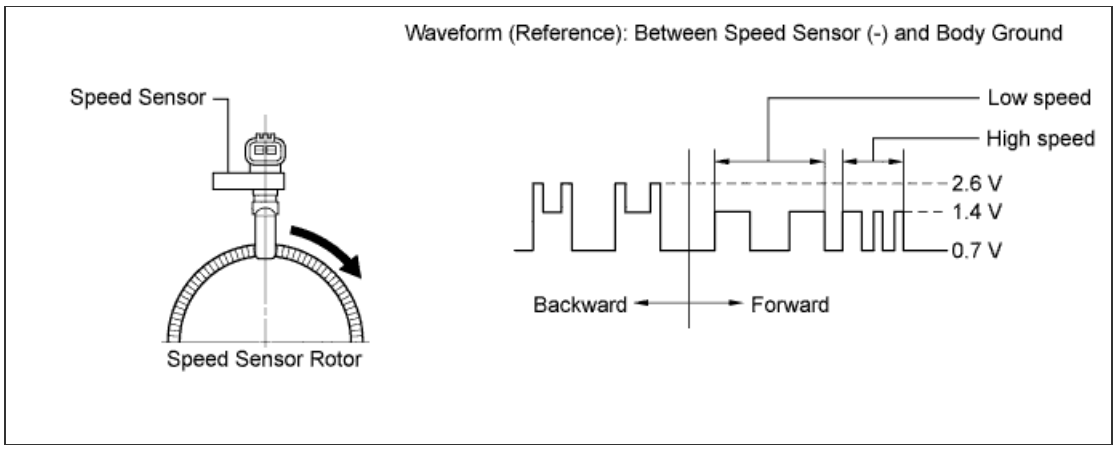
for Preparation Click here

DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU (master cylinder solenoid). These signals are used for brake control.

HINT:

When the connectors between the speed sensor and skid control ECU (master cylinder solenoid) are connected, the following waveform is output.



DTC Code	DTC Detection Condition	Trouble Area
C1401 C1402	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed of 10 km/h (6 mph) or more, the outputs from both front speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation
C1271 C1272	Stored only during test mode.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1401 and C1271 are for the front speed sensor RH.**
- **DTCs C1402 and C1272 are for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

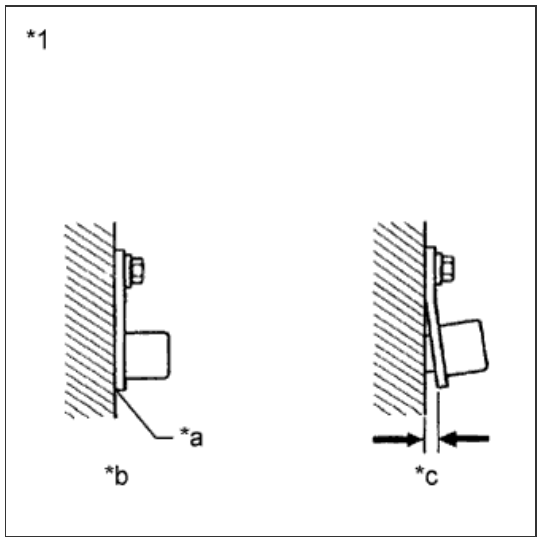
b. Check the speed sensor installation (Click here).

OK:

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

Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG



NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

2.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

3.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK ↓

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

5.REPLACE FRONT SPEED SENSOR

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

NEXT ↓

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (**Click here**)

A ↓

END

DTC C146E Open in ABS Solenoid Relay Circuit

DTC C146F Short 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
C146E	Either condition is met: 1. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is between 9.5 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 circuit • Master cylinder solenoid
C146F	The following condition continues for at least 0.2 seconds. • The relay contact is closed immediately after turning the ignition switch ON when the relay is off.	

WIRING DIAGRAM

Refer to DTCs C1225, C1226, C1227, C1228, C1468, C1469, C146A and C146B (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After 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 HARNESS AND CONNECTOR (+BS TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

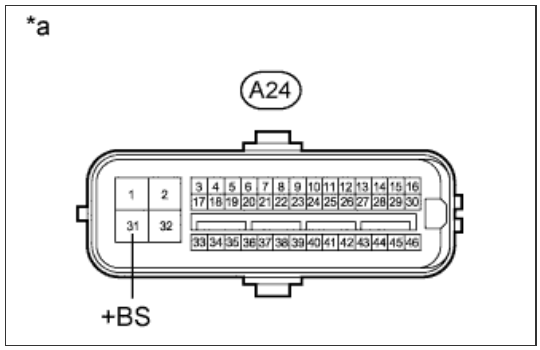
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-31 (+BS) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

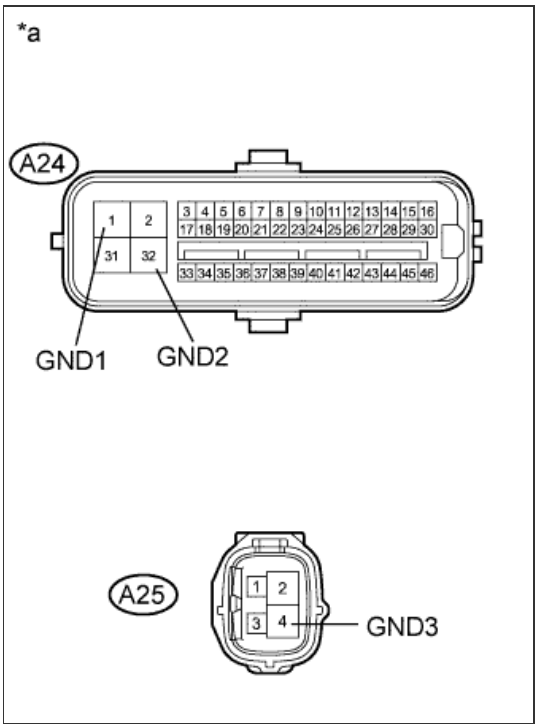
c. Measure the resistance according to the value(s) in the table below.

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid relay is in the master cylinder solenoid.

Therefore, solenoid relay circuit inspections and relay unit inspections 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. Turn the ignition switch off.

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

d. 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1401 Front Speed Sensor RH Malfunction

DTC C1271 Low Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1272 Low Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1402 Front Speed Sensor LH Malfunction

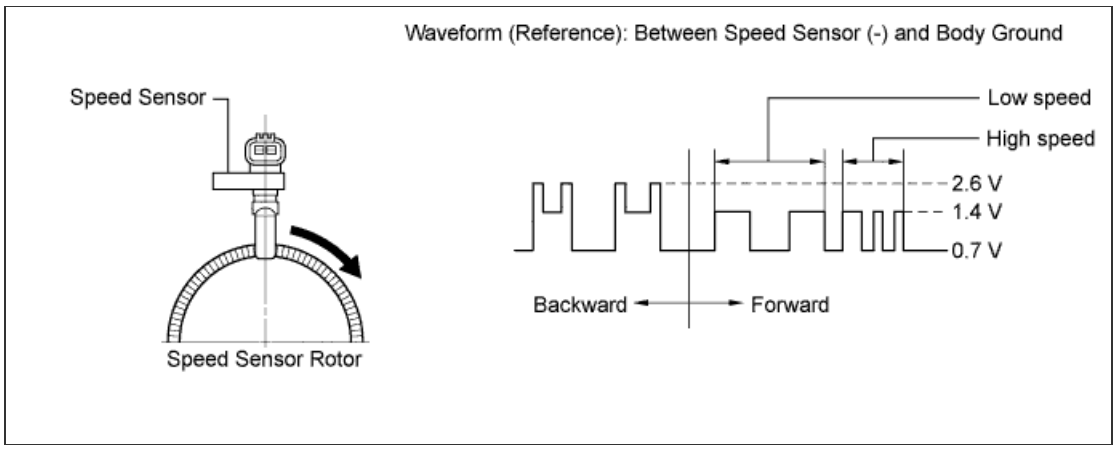
for Preparation Click here

DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU (master cylinder solenoid). These signals are used for brake control.

HINT:

When the connectors between the speed sensor and skid control ECU (master cylinder solenoid) are connected, the following waveform is output.



DTC Code	DTC Detection Condition	Trouble Area
C1401 C1402	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed of 10 km/h (6 mph) or more, the outputs from both front speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation
C1271 C1272	Stored only during test mode.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1401 and C1271 are for the front speed sensor RH.**
- **DTCs C1402 and C1272 are for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

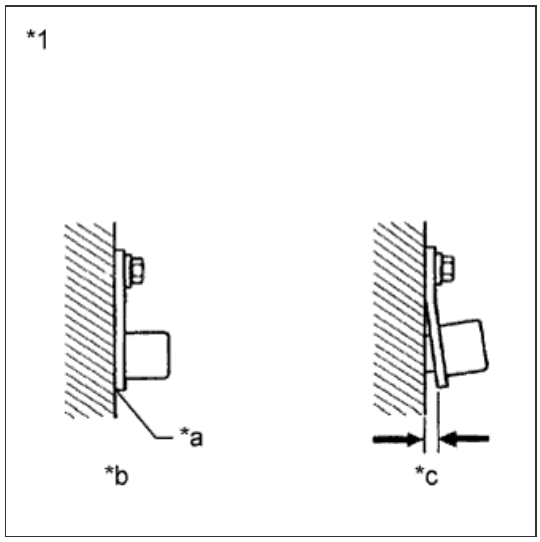
b. Check the speed sensor installation (Click here).

OK:

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

Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG



NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

2.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

3.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK ↓

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

5.REPLACE FRONT SPEED SENSOR

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

NEXT ↓

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (**Click here**)

A ↓

END

DTC C146E Open in ABS Solenoid Relay Circuit

DTC C146F Short 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
C146E	Either condition is met: 1. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is between 9.5 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 circuit • Master cylinder solenoid
C146F	The following condition continues for at least 0.2 seconds. • The relay contact is closed immediately after turning the ignition switch ON when the relay is off.	

WIRING DIAGRAM

Refer to DTCs C1225, C1226, C1227, C1228, C1468, C1469, C146A and C146B (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After 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 HARNESS AND CONNECTOR (+BS TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

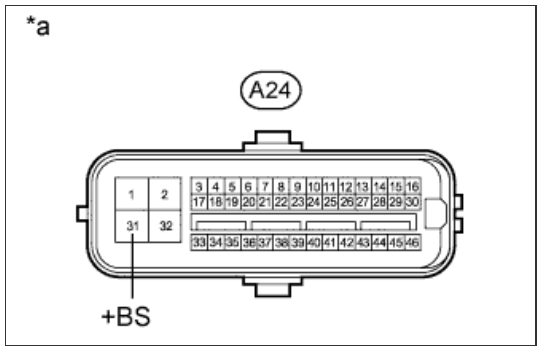
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-31 (+BS) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

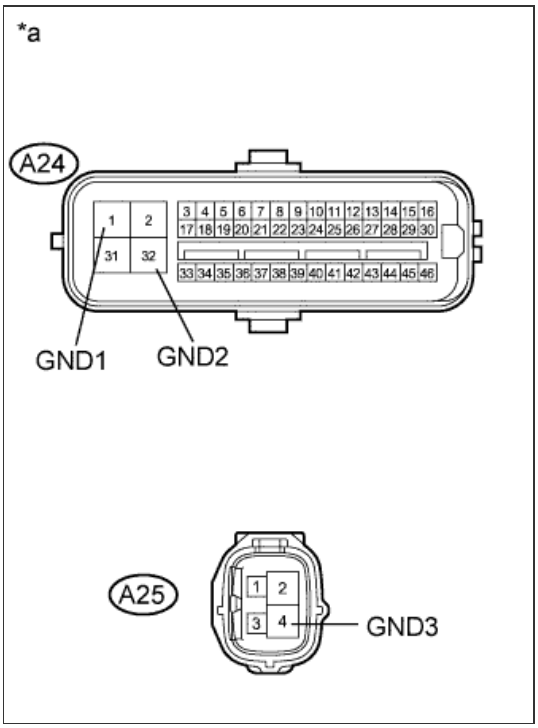
c. Measure the resistance according to the value(s) in the table below.

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid relay is in the master cylinder solenoid.

Therefore, solenoid relay circuit inspections and relay unit inspections 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. Turn the ignition switch off.

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

d. 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1403 Rear Speed Sensor RH Malfunction

DTC C1273 Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1274 Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1404 Rear Speed Sensor LH Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1403 C1404	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed less than 10 km/h (6 mph), outputs from both rear speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation
C1273 C1274	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1403 and C1273 are for the rear speed sensor RH.**
- **DTCs C1404 and C1274 are for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

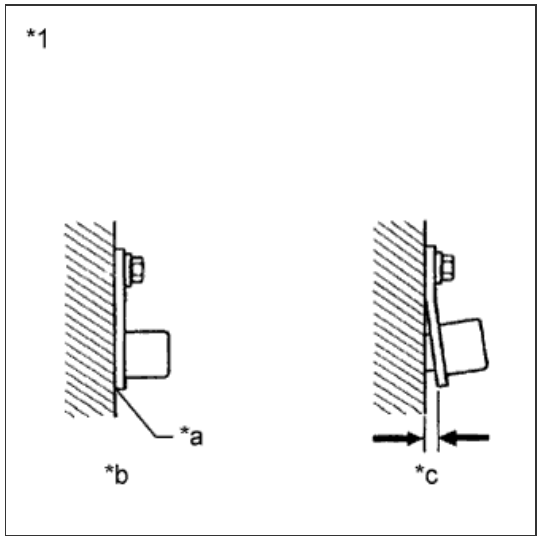
1.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

2.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:
No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

3.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

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

HINT:

The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:
The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK

CHECK FOR INTERMITTENT PROBLEMS (Click here)

5.REPLACE REAR SPEED SENSOR

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

NEXT

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more or at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC U0073 Control Module Communication Bus OFF

DTC U0114 Lost Communication with 4WD Control ECU

for Preparation Click here

INSPECTION PROCEDURE

Refer to the CAN communication system (for LHD: Click here, for RHD: Click here).

DTC C1403 Rear Speed Sensor RH Malfunction

DTC C1273 Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1274 Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1404 Rear Speed Sensor LH Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1403 C1404	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed less than 10 km/h (6 mph), outputs from both rear speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation
C1273 C1274	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1403 and C1273 are for the rear speed sensor RH.**
- **DTCs C1404 and C1274 are for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

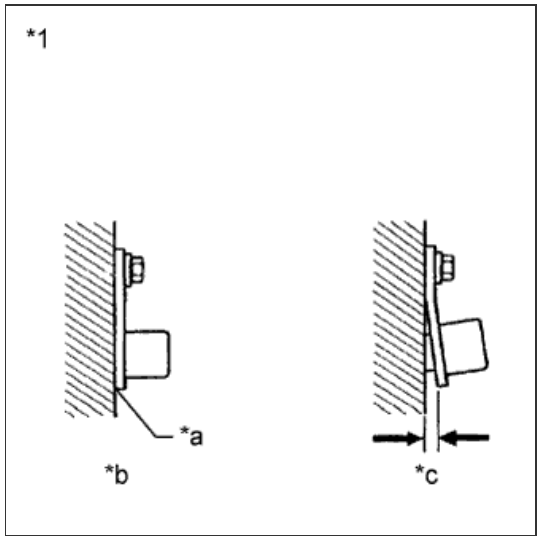
1.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

2.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:
No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

3.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

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

HINT:

The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:
The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK

CHECK FOR INTERMITTENT PROBLEMS (Click here)

5.REPLACE REAR SPEED SENSOR

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

NEXT

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more or at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC U0073 Control Module Communication Bus OFF

DTC U0114 Lost Communication with 4WD Control ECU

for Preparation Click here

INSPECTION PROCEDURE

Refer to the CAN communication system (for LHD: Click here, for RHD: Click here).

DTC C1403 Rear Speed Sensor RH Malfunction

DTC C1273 Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1274 Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1404 Rear Speed Sensor LH Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1403 C1404	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed less than 10 km/h (6 mph), outputs from both rear speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation
C1273 C1274	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1403 and C1273 are for the rear speed sensor RH.**
- **DTCs C1404 and C1274 are for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

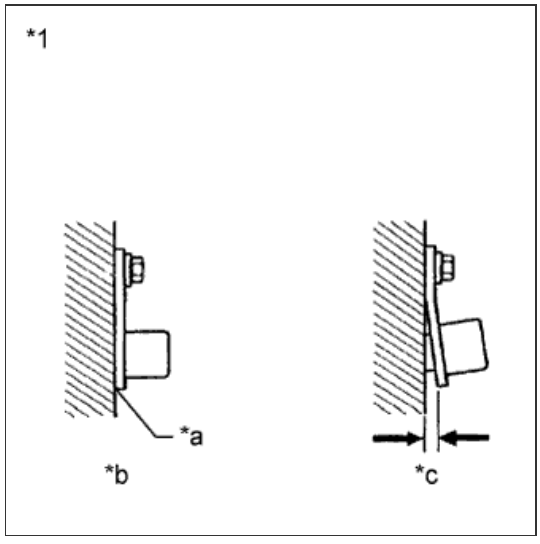
1.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

2.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:
No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

3.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

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

HINT:

The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:
The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK

CHECK FOR INTERMITTENT PROBLEMS (Click here)

5.REPLACE REAR SPEED SENSOR

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

NEXT

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more or at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

for Preparation Click here

DESCRIPTION

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

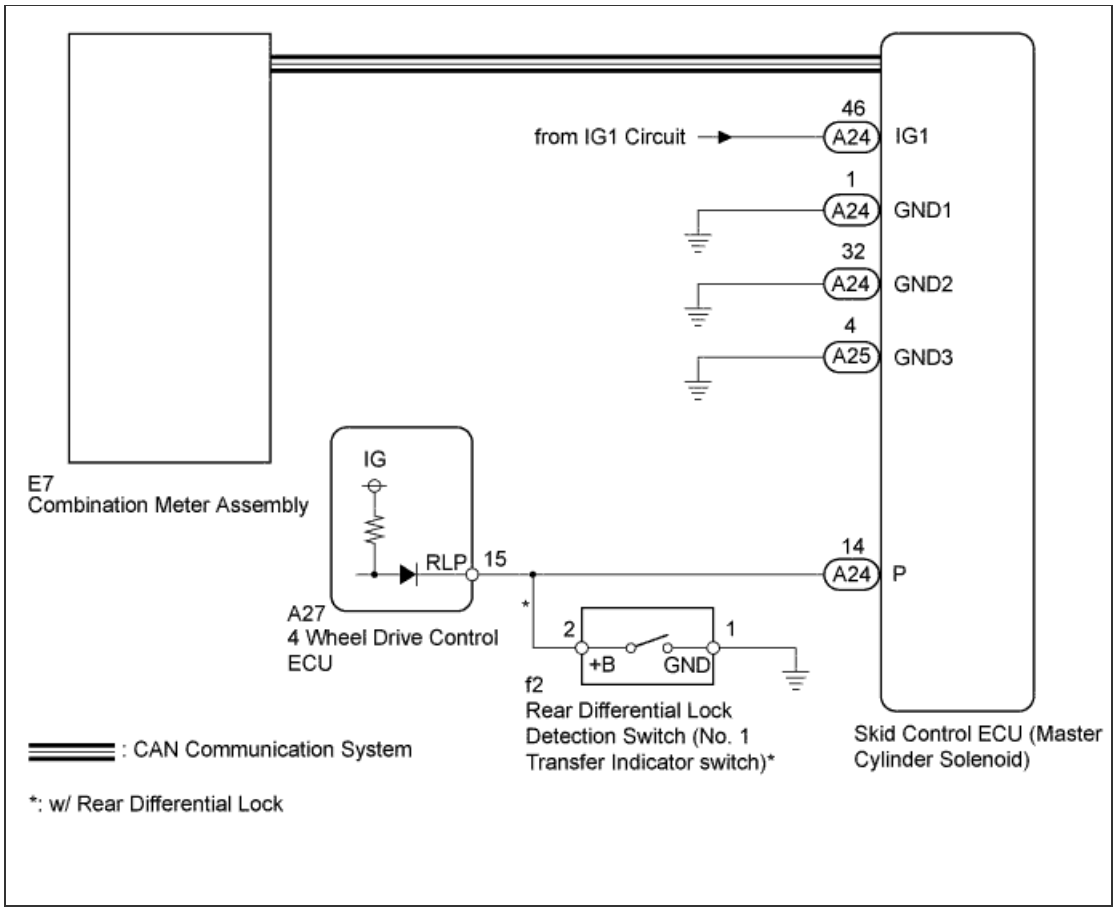
- The skid control ECU (master cylinder solenoid) connector is disconnected from the skid control ECU (master cylinder solenoid).
- There is a malfunction in the skid control ECU (master cylinder solenoid) internal circuit.
- There is an open in the harness between the combination meter and skid control ECU (master cylinder solenoid).
- The anti-lock brake system is defective.
- The voltage at terminal IG1 is high.
- The rear differential is locked.*

*: w/ Rear Differential Lock

HINT:

It may not be possible to use the GTS when the skid control ECU (master cylinder solenoid) is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform calibration (Click here).

1.CHECK THAT SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU (master cylinder solenoid) connector connection.

OK:

The 2 connectors are securely connected.

NG	CONNECT CONNECTOR TO ECU CORRECTLY

OK

2.CHECK DTC

a. Check for DTCs (Click here).

Result

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

B → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS (Click here)

A

3.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Select CAN Bus Check from the System Selection Menu screen and follow the prompts on the screen to inspect the CAN bus.

OK:
CAN Bus Check indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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.READ VALUE USING GTS (IG1 VOLTAGE VALUE)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Start the engine.

f. 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	Ignition switch ON: 11 to 14 V	-

g. Check the voltage output from the skid control ECU (master cylinder solenoid) displayed on the GTS.

OK:

The output voltage displayed on the GTS is within 11 to 14 V.

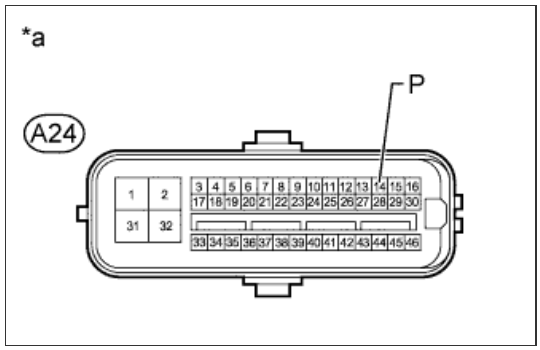
NG → Go to step 7

OK ↓

5.CHECK HARNESS AND CONNECTOR (P TERMINAL)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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



Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-14 (P) - Body ground	Ignition switch ON w/ Rear Differential Lock: Rear differential free	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

NG → Go to step 9

OK ↓

6.PERFORM ACTIVE TEST USING GTS (ABS WARNING LIGHT)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

f. When performing the ABS Warning Light Active Test, check ABS Warning Light in the Data List (Click here).

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	-

Result

Result		Proceed to
Data List Display	Data List Display when Performing Active Test ON/OFF Operation	
ON	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C
OFF	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

7.CHECK HARNESS AND CONNECTOR (IG1 TERMINAL)

a. Disconnect the skid control ECU (master cylinder solenoid) connector.

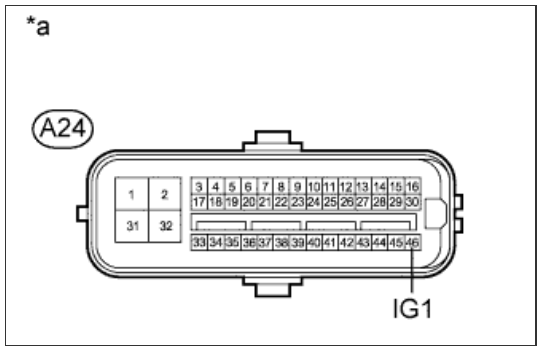
b. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Master Cylinder Solenoid))



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

8.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the A24 and A25 skid control ECU (master cylinder solenoid) connectors.

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

Standard Resistance:

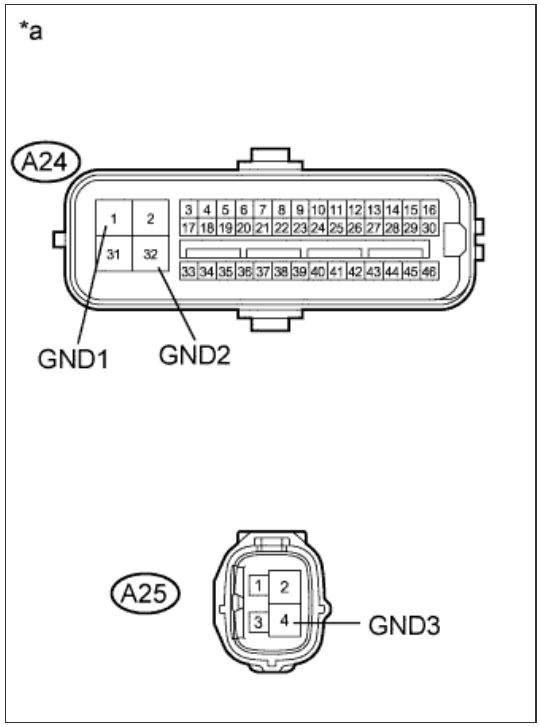
Tester Connection	Condition	Specified Condition
A24-1 (GND1) - Body ground	Always	Below 1 Ω
A24-32 (GND2) - Body ground	Always	Below 1 Ω
A25-4 (GND3) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C



B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPAIR OR REPLACE HARNESS OR CONNECTOR

9.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU P CIRCUIT)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the A27 4 wheel drive control ECU connector.

c. w/ Rear Differential Lock:
Disconnect the f2 rear differential lock detection switch (No. 1 transfer indicator switch) connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-14 (P) - Body ground	Always	10 kΩ or higher

Result

Result	Proceed to
OK (w/o Rear Differential Lock)	A
OK (w/ Rear Differential Lock)	B
NG	C

B → Go to step 11

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

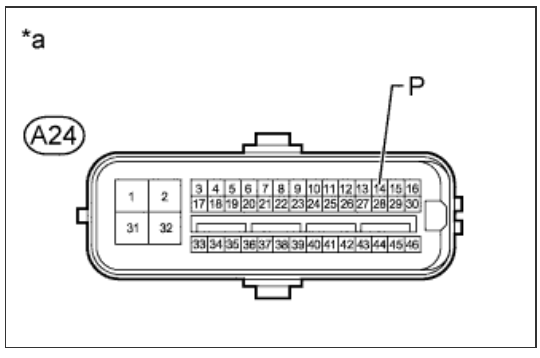
A

10.CHECK HARNESS AND CONNECTOR (P TERMINAL)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Connect the A27 4 wheel drive control ECU connector.

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



Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-14 (P) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE 4 WHEEL DRIVE CONTROL ECU (Click here)

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

a. Remove the rear differential lock detection switch (No. 1 transfer indicator switch) (Click here).

b. Inspect the rear differential lock detection switch (No. 1 transfer indicator switch) (Click here).

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

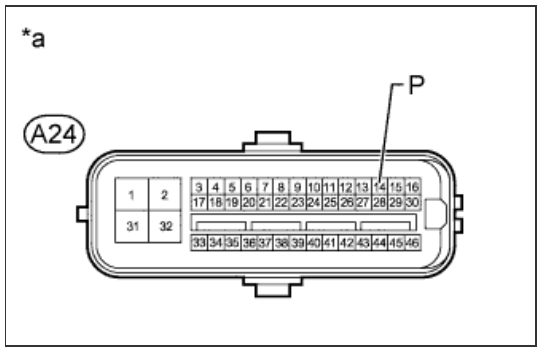
OK

12.CHECK HARNESS AND CONNECTOR (P TERMINAL)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Connect the A27 4 wheel drive control ECU connector.

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



Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-14 (P) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE 4 WHEEL DRIVE CONTROL ECU (Click here)

for Preparation Click here

DESCRIPTION

Refer to ABS Warning Light Remains ON (Click here).

WIRING DIAGRAM

Refer to ABS Warning Light Remains ON (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform calibration (Click here).

1.INSPECT ABS WARNING LIGHT

a. Disconnect the 2 skid control ECU (master cylinder solenoid) connectors.

b. Turn the engine switch on (IG).

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
OK (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 GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Select CAN Bus Check from the System Selection Menu screen and follow the prompts on the screen to inspect the CAN bus.

OK:
CAN Bus Check indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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.PERFORM ACTIVE TEST USING GTS (ABS WARNING LIGHT)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

f. When performing the ABS Warning Light Active Test, check ABS Warning Light in the Data List (Click here).

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	-

Result

Result		Proceed to
Data List Display	Data List Display when Performing Active Test ON/OFF Operation	
ON	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C
OFF	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

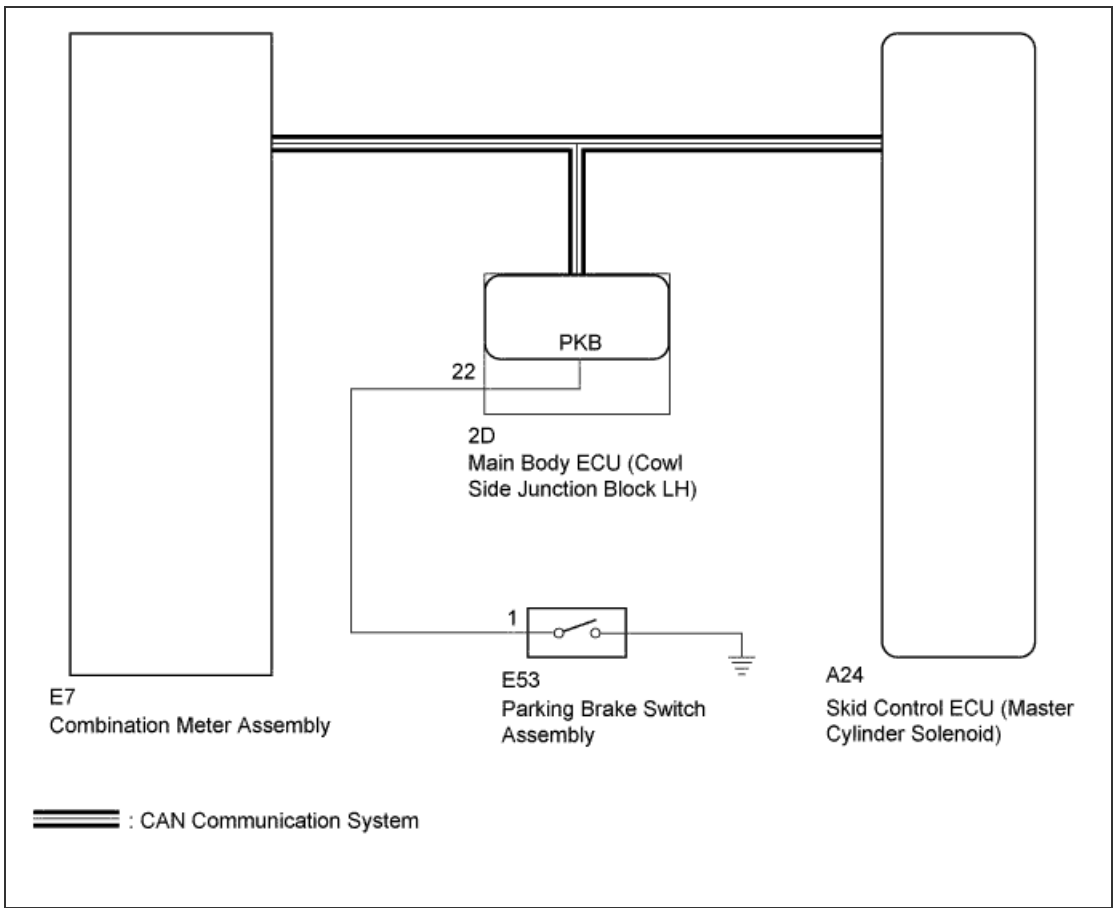
GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

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:

After replacing the master cylinder solenoid, perform 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 CIRCUITS INDICATED BY OUTPUT DTCS (Click here)

A

2.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Select CAN Bus Check from the System Selection Menu screen and follow the prompts on the screen to inspect the CAN bus.

OK:
CAN Bus Check indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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.READ VALUE USING GTS (PARKING BRAKE SW)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Parking Brake SW	Parking brake switch/ ON or OFF	ON: Parking brake applied OFF: Parking brake released	-

f. Using the GTS, check the input of the switch operation when the parking brake pedal is operated.

OK:
When the parking brake is operated, the display changes as shown above.

NG → Go to step 5

OK

4.PERFORM ACTIVE TEST USING GTS (BRAKE WARNING LIGHT)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Brake Warning Light	Brake warning light	Warning light ON/OFF	Observe the combination meter.

f. When performing the Brake Warning Light Active Test, check Brake Warning Light in the Data.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Brake Warning Light	Brake warning light/ ON or OFF	ON: Warning light on OFF: Warning light off	-

Result

Result		Proceed to
Data List Display	Data List Display when Performing Active Test ON/OFF Operation	
ON	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C
OFF	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

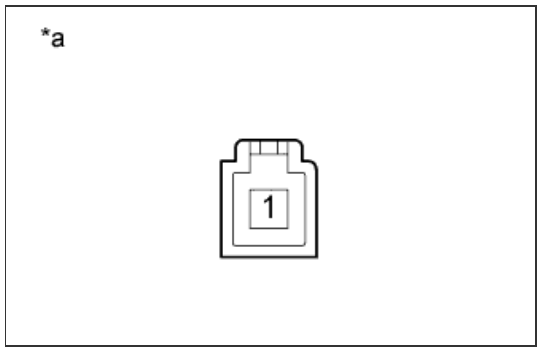
A

GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

5.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 applied (Switch pin not pushed in)	Below 1 Ω
	Parking brake released (Switch pin pushed in)	10 kΩ or higher

Text in Illustration

*a	Component without harness connected (Parking Brake Switch)

NG → REPLACE PARKING BRAKE SWITCH ASSEMBLY (Click here)

OK

6.CHECK HARNESS AND CONNECTOR (PARKING BRAKE SWITCH - MAIN BODY ECU)

a. Disconnect the E53 parking brake switch connector.

b. Disconnect the 2D main body ECU (cowl side junction block LH).

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E53-1 - 2D-22	Always	Below 1 Ω
E53-1 - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE MAIN BODY ECU (COWL SIDE JUNCTION BLOCK LH)

for Preparation Click here

DESCRIPTION

Refer to Brake Warning Light Remains ON (Click here).

WIRING DIAGRAM

Refer to Brake Warning Light Remains ON (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform calibration (Click here).

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Select CAN Bus Check from the System Selection Menu screen and follow the prompts on the screen to inspect the CAN bus.

OK:

CAN Bus Check indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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.PERFORM ACTIVE TEST USING GTS (BRAKE WARNING LIGHT)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Brake Warning Light	Brake warning light	Warning light ON/OFF	Observe the combination meter.

f. When performing the Brake Warning Light Active Test, check Brake Warning Light in the Data.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
		ON: Warning light on	

Brake Warning Light	Brake warning light/ ON or OFF	OFF: Warning light off	-

Result

Result		Proceed to
Data List Display	Data List Display when Performing Active Test ON/OFF Operation	
ON	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C
OFF	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

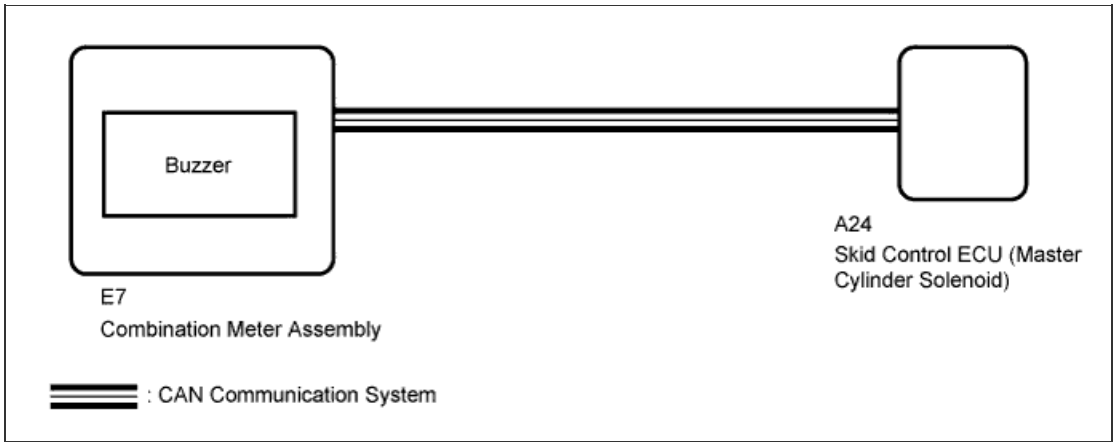
GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) is connected to the combination meter via CAN communication.
The combination meter has a built-in buzzer.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After 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 GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Select CAN Bus Check from the System Selection Menu screen and follow the prompts on the screen to inspect the CAN bus.

OK:
CAN Bus Check indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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.PERFORM ACTIVE TEST USING GTS (BUZZER)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Buzzer	Buzzer	Buzzer ON/OFF	The buzzer can be heard.

f. When performing the Buzzer Active Test, check Buzzer in the Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Buzzer	Buzzer/ ON or OFF	ON: Buzzer on OFF: Buzzer off	The combination meter has a built-in buzzer.

Result

Result		Proceed to
Data List Display	Data List Display when Performing Active Test ON/OFF Operation	
ON	Changes between ON and OFF	A
	Does not change between ON and OFF	B
OFF	Changes between ON and OFF	A
	Does not change between ON and OFF	B

B → Go to step 3

A

GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

3.INSPECT COMBINATION METER ASSEMBLY

a. Inspect the combination meter (Click here).

Result

Result	Proceed to
NG (w/ Multi-information Display)	A
NG (w/o Multi-information Display)	B
OK (for LHD)	C
OK (for RHD)	D

B → REPLACE COMBINATION METER ASSEMBLY (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

D → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

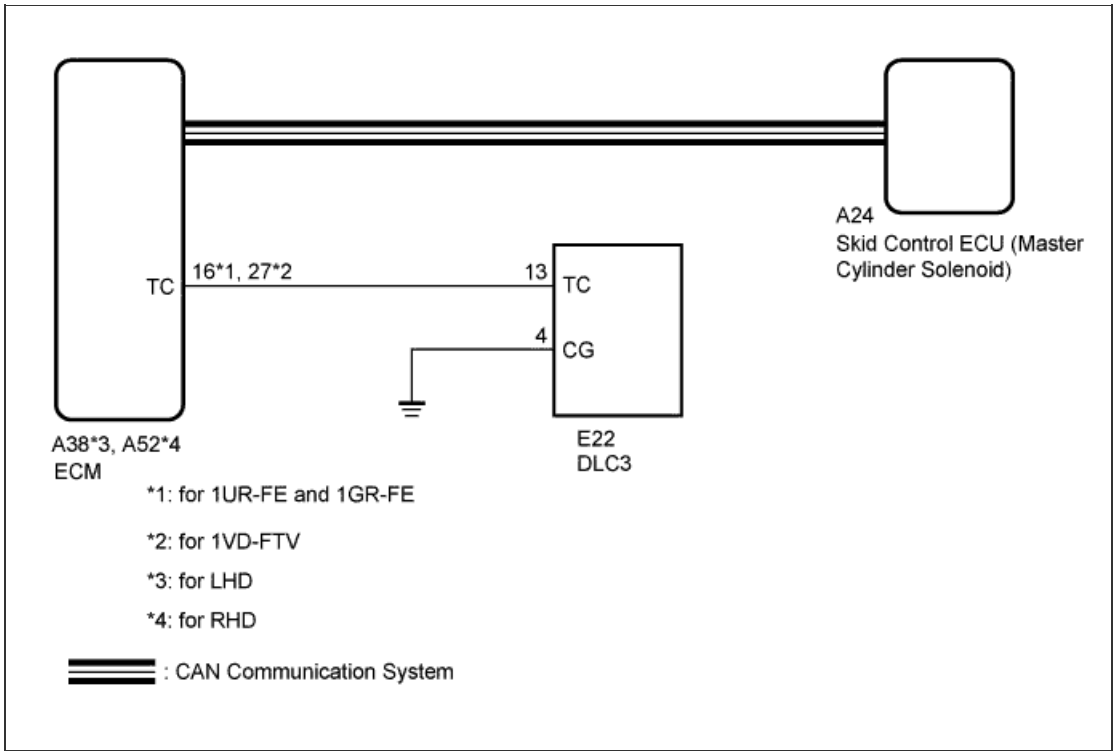
REPLACE COMBINATION METER ASSEMBLY (Click here)

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:

After 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.

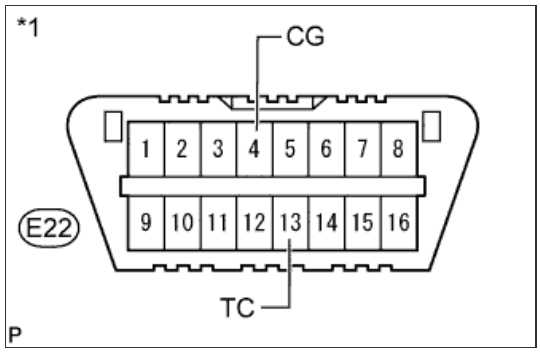
b. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
E22-13 (TC) - E22-4 (CG)	Ignition switch ON	11 to 14 V

Text in Illustration

*1	DLC3



NG → Go to step 4

OK

2.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Select CAN Bus Check from the System Selection Menu screen and follow the prompts on the screen to inspect the CAN bus.

OK:
CAN Bus Check indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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 (1UR-FE and 1GR-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 (1UR-FE and 1GR-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)

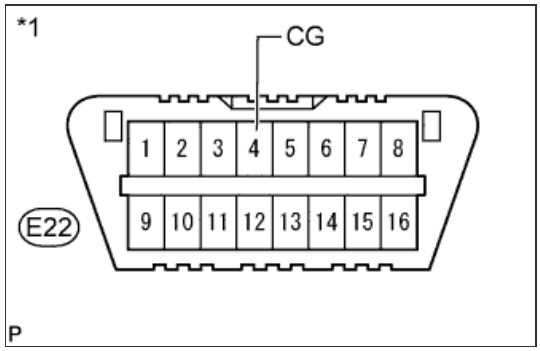
a. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
E22-4 (CG) - Body ground	Always	Below 1 Ω

Text in Illustration

*1	DLC3



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.

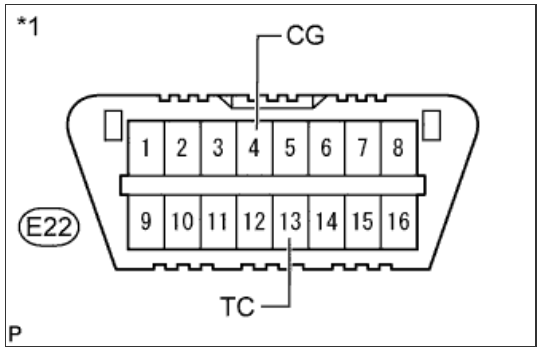
b. Check that the MIL is blinking.

Result

Result	Proceed to
MIL is blinking	A
MIL is not blinking	B

Text in Illustration

*1	DLC3



B → REPAIR OR REPLACE WIRE HARNESS OR ECM

A

7.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is not output (for RHD)	B
CAN system DTC is output (for LHD)	C
CAN system DTC is output (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

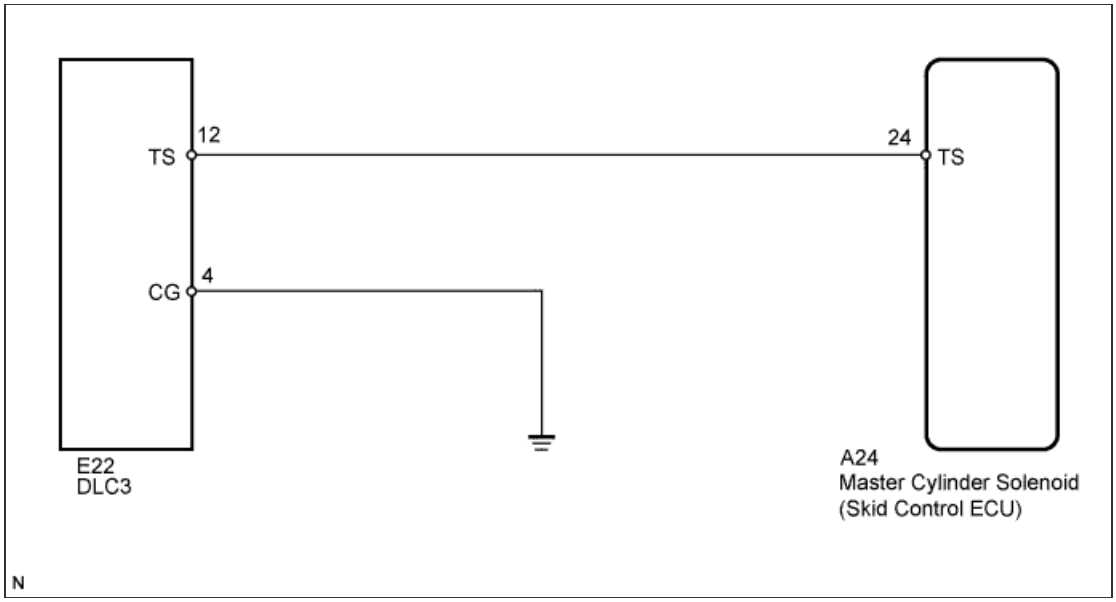
REPLACE MASTER CYLINDER SOLENOID (Click here)

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:

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

1.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DLC3 (TS))

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) 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

2.CHECK HARNESS AND CONNECTOR (DLC3 (CG) - BODY GROUND)

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

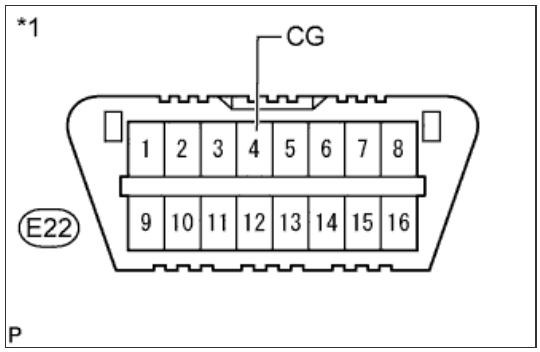
Standard Resistance:

Tester Connection	Condition	Specified Condition
E22-4 (CG) - Body	Always	Below 1 Ω

ground		

Text in Illustration

*1	DLC3



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.CHECK HARNESS AND CONNECTOR (DLC3 (TS) - BODY GROUND)

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

Standard Resistance:

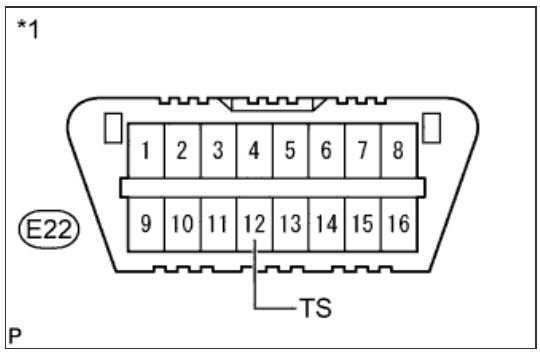
Tester Connection	Condition	Specified Condition
E22-12 (TS) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	DLC3

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (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

1.EXPRESSIONS OF IGNITION SWITCH

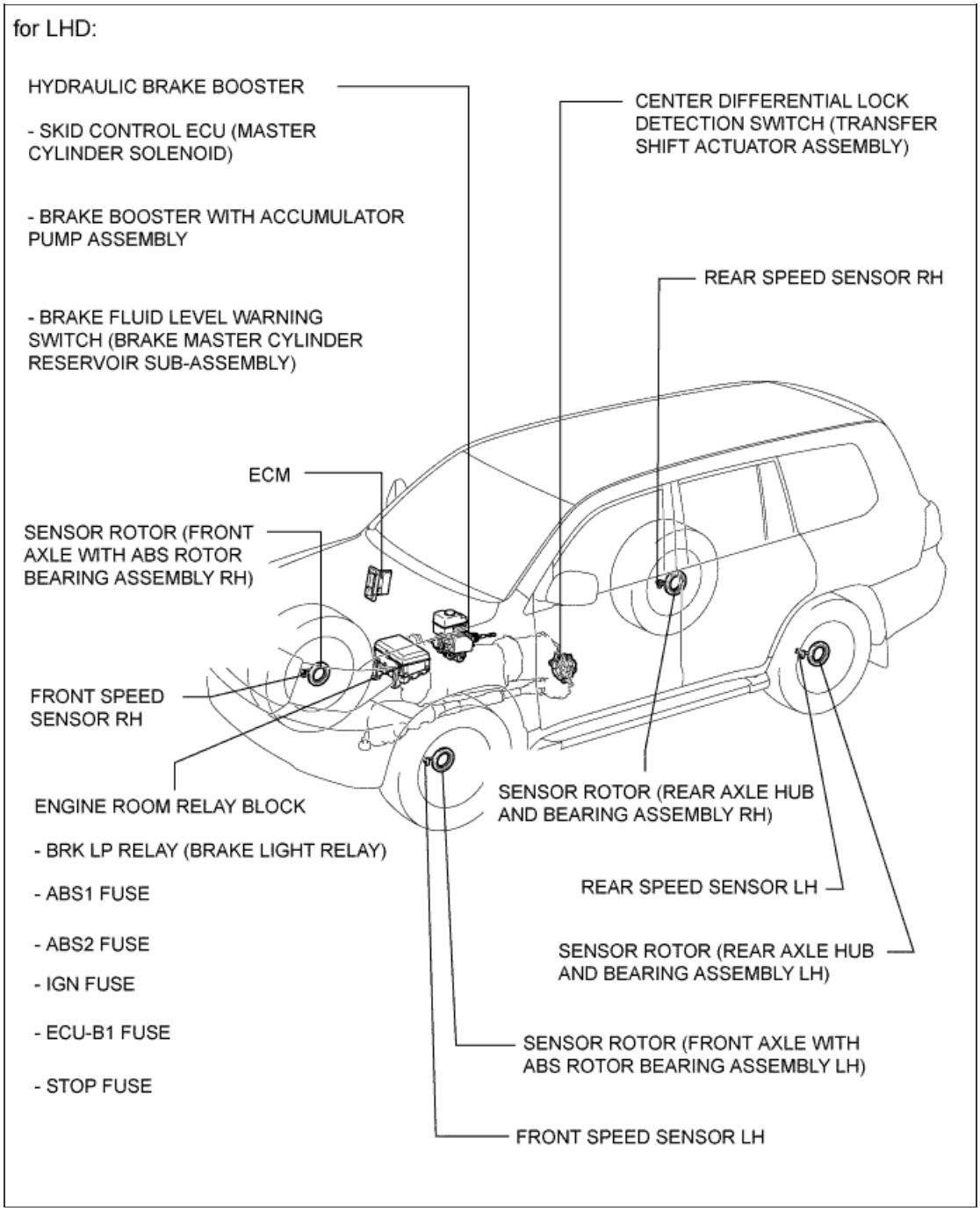
a. The type of ignition switch used on this model differs according to the specifications of the vehicle. The expressions listed in the table below are used in this section.

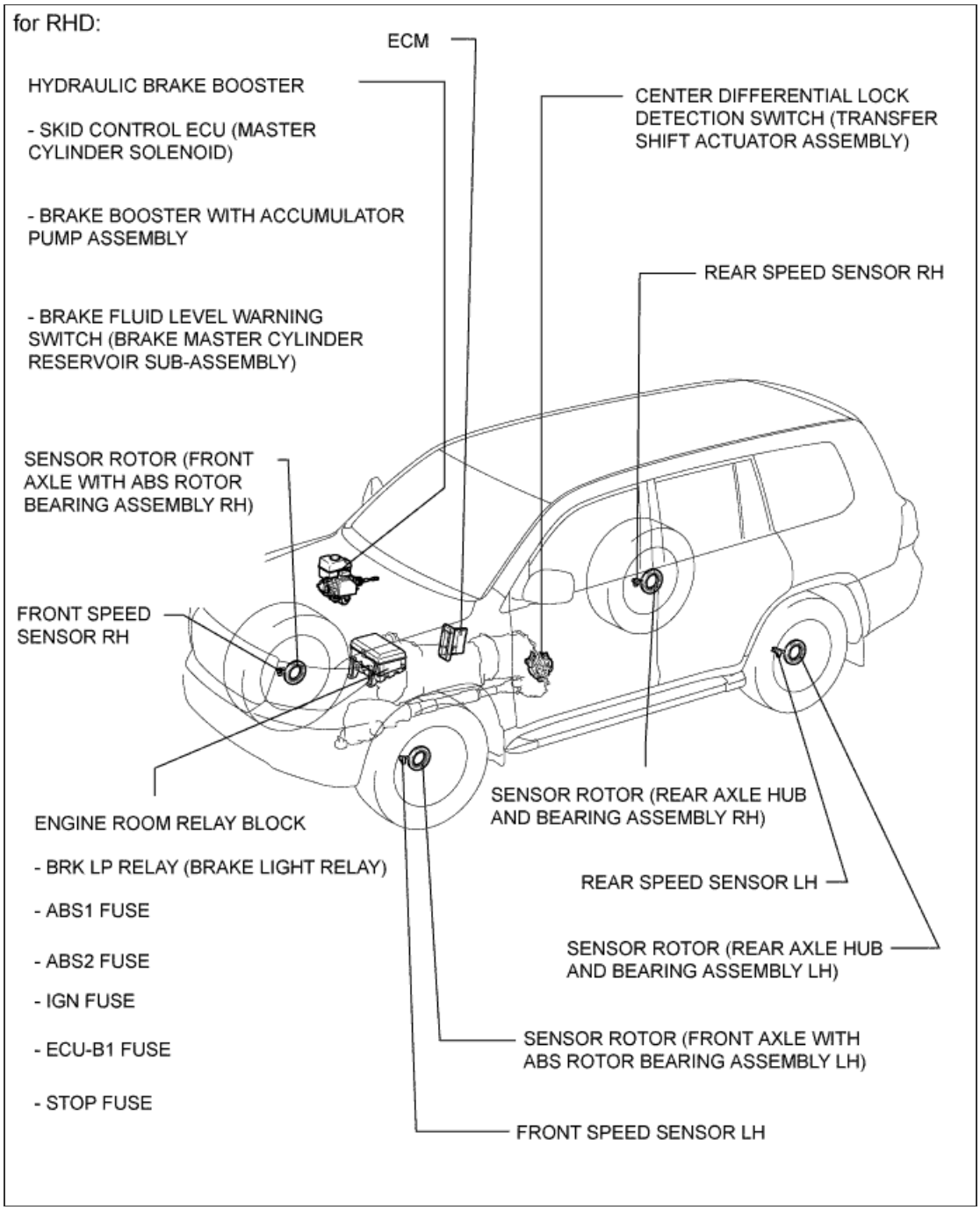
Expression	Ignition Switch (Position)	Engine Switch (Condition)
Ignition Switch off	LOCK	Off
Ignition Switch ACC	ACC	On (ACC)
Ignition Switch ON	ON	On (IG)
Engine Start	START	Start

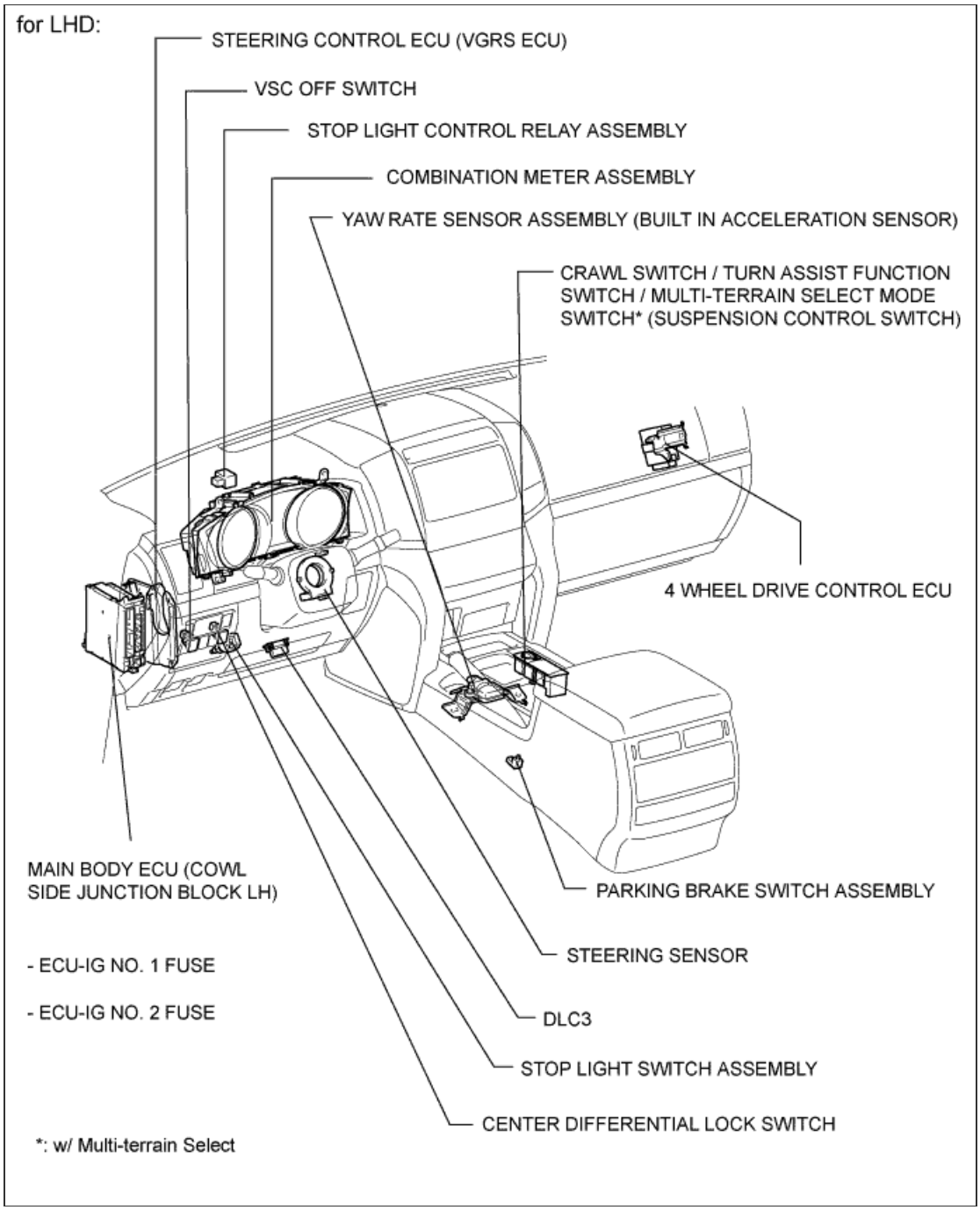
2.TROUBLESHOOTING PRECAUTION

- 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 sensor assembly, and after performing a vehicle height adjustment, make sure to perform yaw rate and acceleration sensor zero point calibration and store the system information (Click here).
- The CAN communication system is used for data communication between the skid control ECU (included in the master cylinder solenoid), ECM, 4 wheel drive control ECU, steering control ECU (VGRS ECU), combination meter assembly, DLC3, steering sensor, and yaw rate sensor assembly (the acceleration 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.

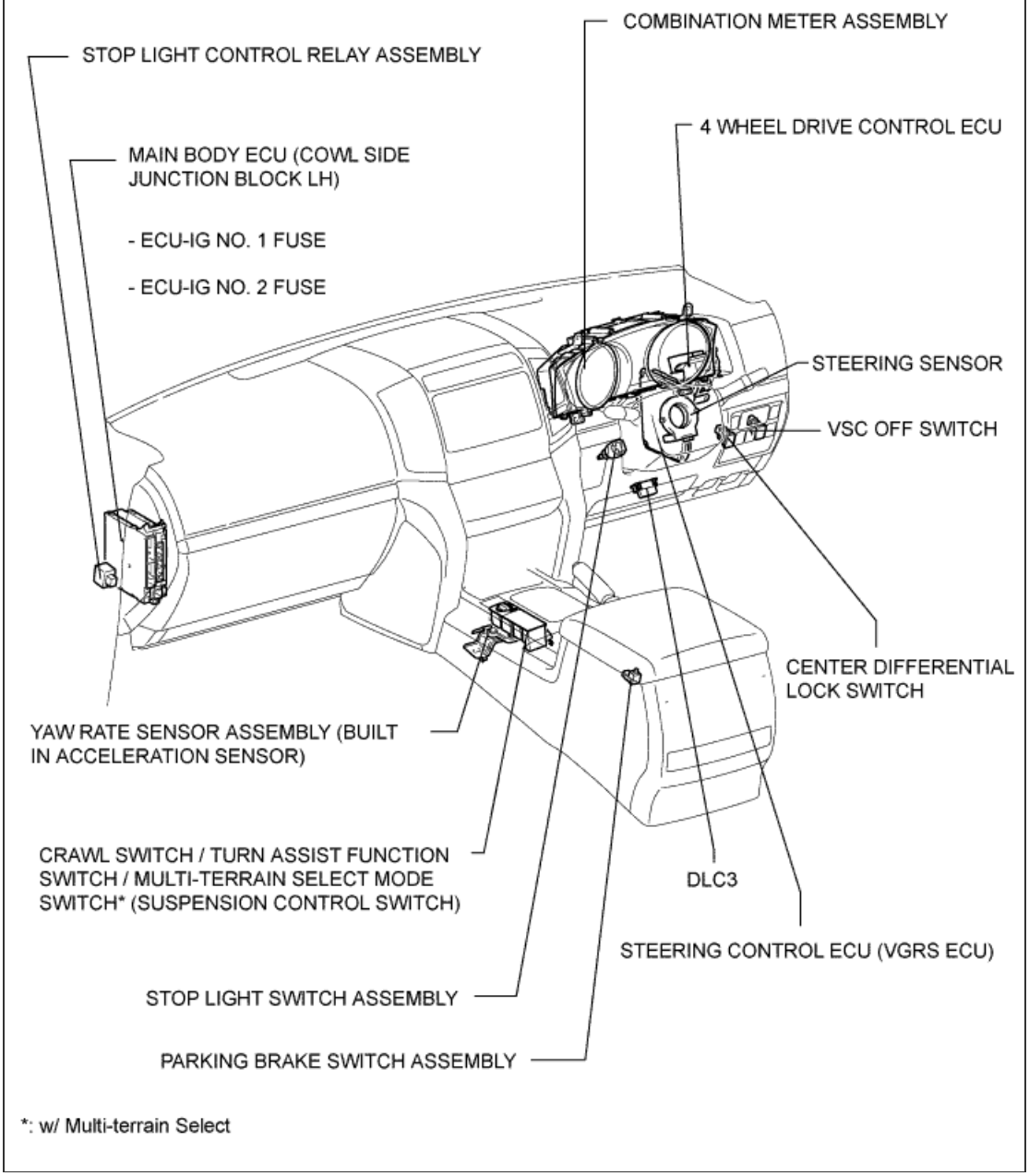
for Preparation Click here




for RHD:
ECM
HYDRAULIC BRAKE BOOSTER
- SKID CONTROL ECU (MASTER CYLINDER SOLENOID)
- BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY
- BRAKE FLUID LEVEL WARNING SWITCH (BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY)
CENTER DIFFERENTIAL LOCK DETECTION SWITCH (TRANSFER SHIFT ACTUATOR ASSEMBLY)
REAR SPEED SENSOR RH
SENSOR ROTOR (FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY RH)
FRONT SPEED SENSOR RH
ENGINE ROOM RELAY BLOCK
- BRK LP RELAY (BRAKE LIGHT RELAY)
- ABS1 FUSE
- ABS2 FUSE
- IGN FUSE
- ECU-B1 FUSE
- STOP FUSE
SENSOR ROTOR (REAR AXLE HUB AND BEARING ASSEMBLY RH)
REAR SPEED SENSOR LH
SENSOR ROTOR (REAR AXLE HUB AND BEARING ASSEMBLY LH)
SENSOR ROTOR (FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY LH)
FRONT SPEED SENSOR LH

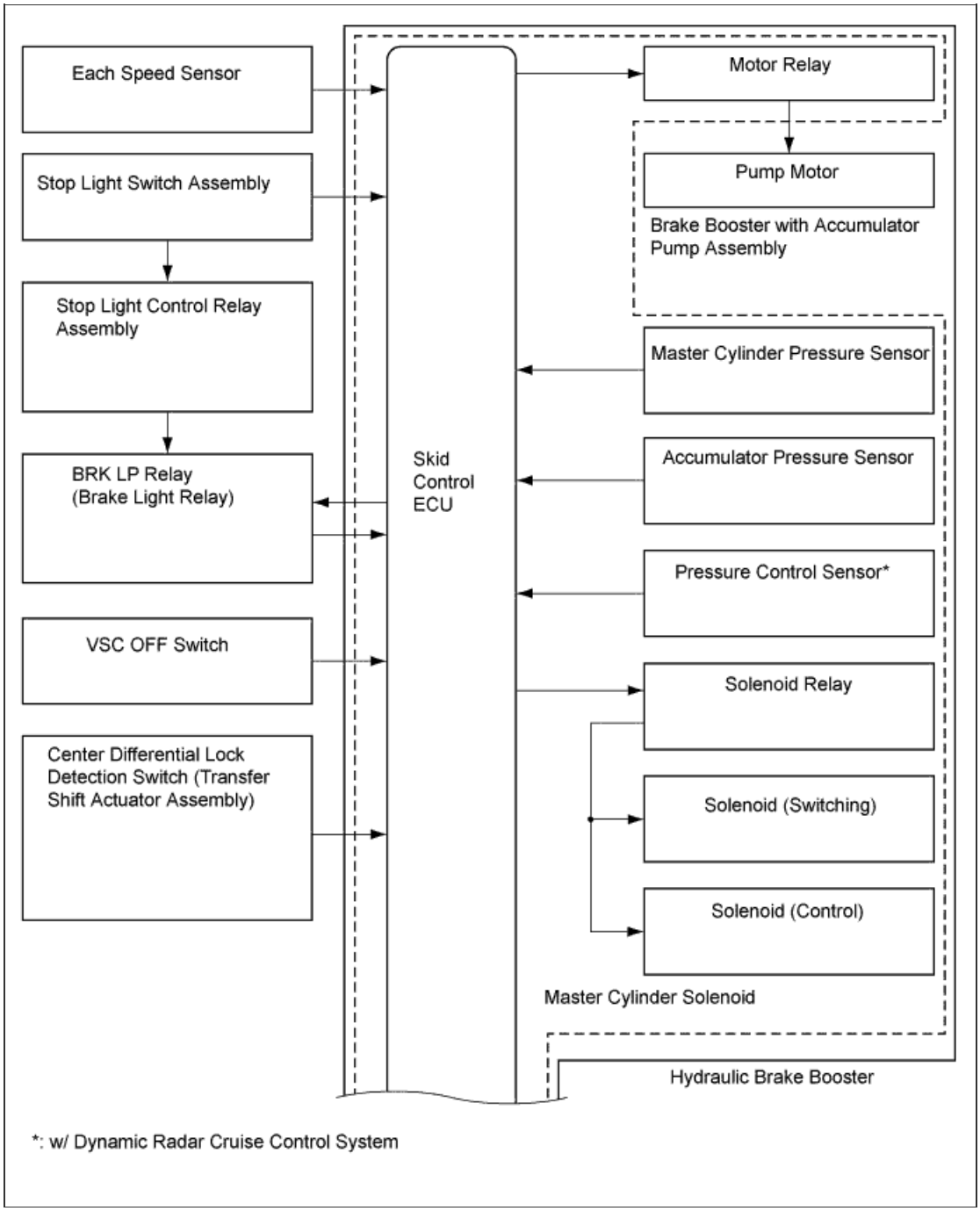

for LHD:
STEERING CONTROL ECU (VGRS ECU)
VSC OFF SWITCH
STOP LIGHT CONTROL RELAY ASSEMBLY
COMBINATION METER ASSEMBLY
YAW RATE SENSOR ASSEMBLY (BUILT IN ACCELERATION SENSOR)
CRAWL SWITCH / TURN ASSIST FUNCTION SWITCH / MULTI-TERRAIN SELECT MODE SWITCH* (SUSPENSION CONTROL SWITCH)
4 WHEEL DRIVE CONTROL ECU
MAIN BODY ECU (COWL SIDE JUNCTION BLOCK LH)
- ECU-IG NO. 1 FUSE
- ECU-IG NO. 2 FUSE
PARKING BRAKE SWITCH ASSEMBLY
STEERING SENSOR
DLC3
STOP LIGHT SWITCH ASSEMBLY
CENTER DIFFERENTIAL LOCK SWITCH
*: w/ Multi-terrain Select

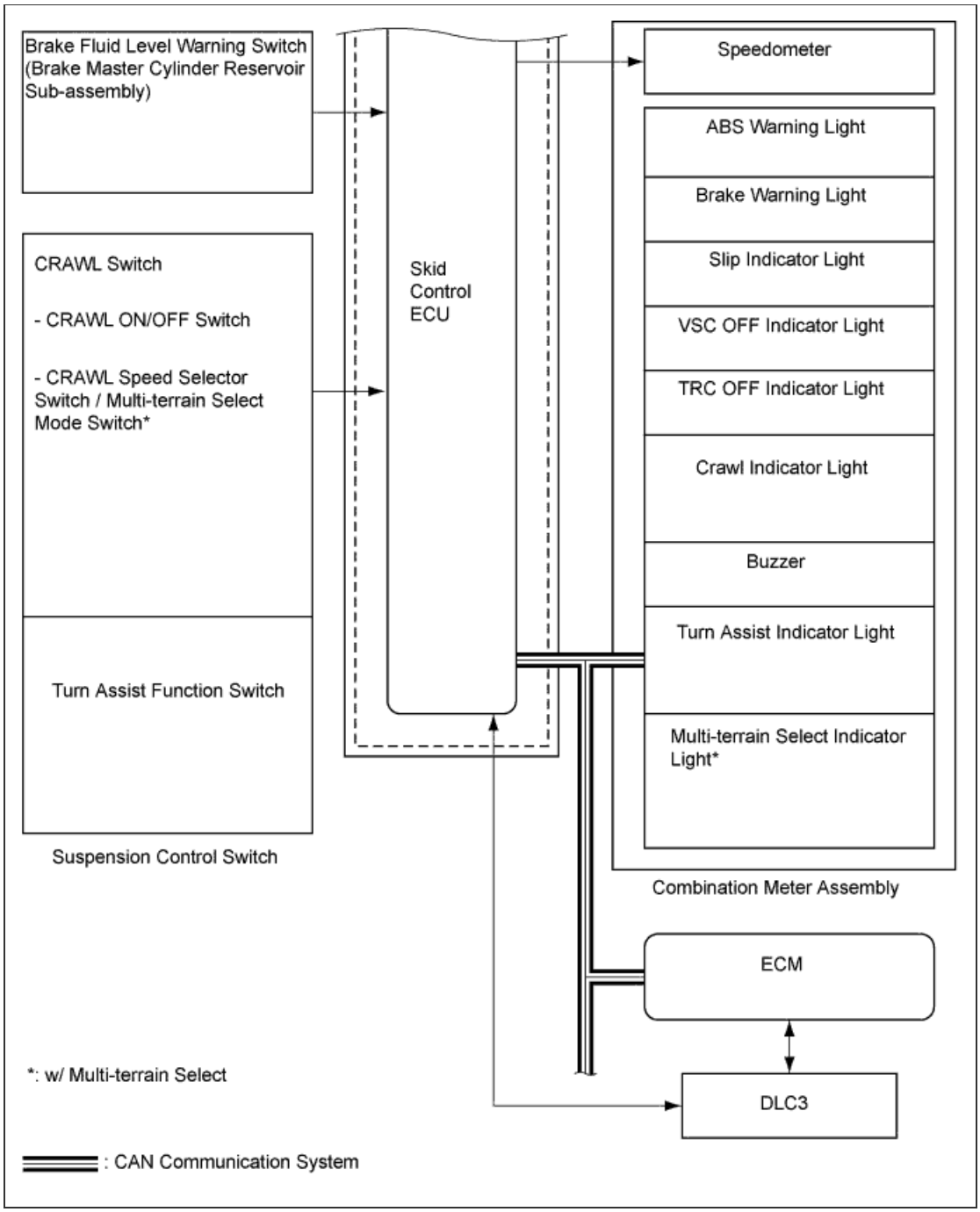
for RHD:

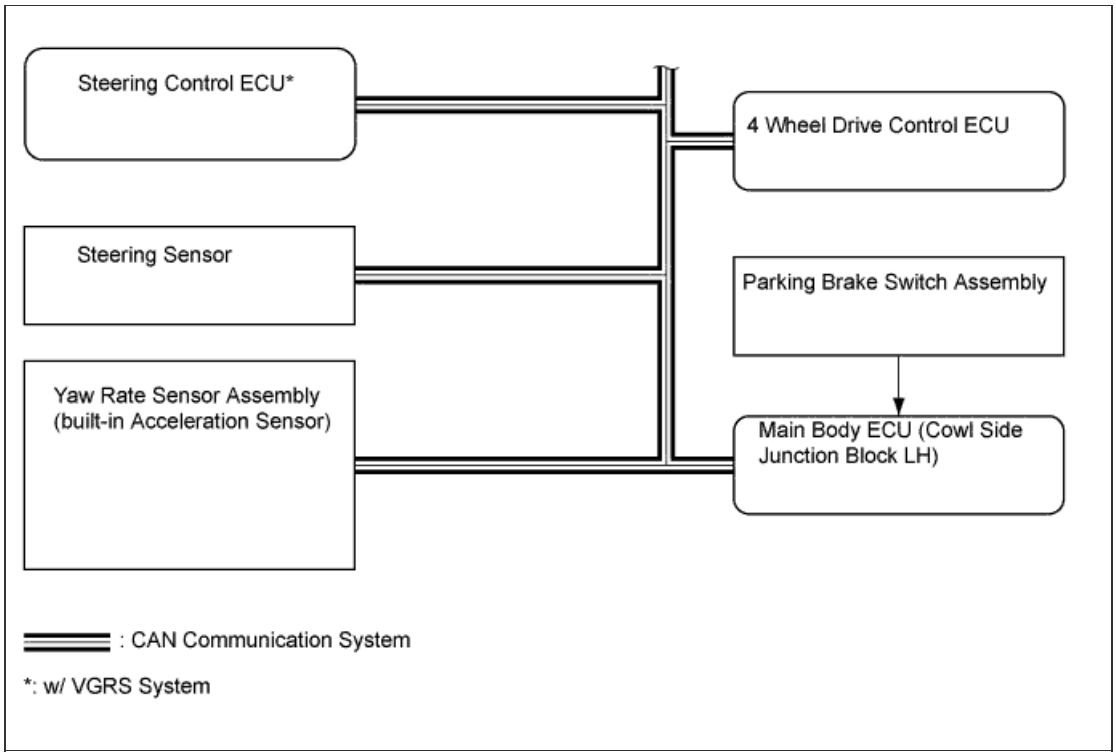


*: w/ Multi-terrain Select

for Preparation Click here




Brake Fluid Level Warning Switch (Brake Master Cylinder Reservoir Sub-assembly)
CRAWL Switch
- CRAWL ON/OFF Switch
- CRAWL Speed Selector Switch / Multi-terrain Select Mode Switch*
Turn Assist Function Switch
Suspension Control Switch
Skid Control ECU
Speedometer
ABS Warning Light
Brake Warning Light
Slip Indicator Light
VSC OFF Indicator Light
TRC OFF Indicator Light
Crawl Indicator Light
Buzzer
Turn Assist Indicator Light
Multi-terrain Select Indicator Light*
Combination Meter Assembly
ECM
DLC3
*: w/ Multi-terrain Select
: CAN Communication System



Communication Table

Sender	Receiver	Signal	Line
ECM	Skid control ECU	• Engine speed signal • Accelerator pedal position signal • Intake air temperature signal • Shift position signal • TC terminal status	CAN communication
Skid control ECU	ECM	• Yaw rate and acceleration signal • VSC data signal • Wheel speed signal	CAN communication
Skid control ECU	Combination meter	• Warning/indicator light signal • Vehicle speed signal • Meter buzzer signal	CAN communication
4 wheel drive control ECU	Skid control ECU	L4 status signal	CAN communication
Steering sensor	Skid control ECU	Steering angle signal	CAN communication
Steering control ECU (*)	Skid control ECU	Variable gear ratio signal	CAN communication

*: w/ VGRS System

for Preparation Click here

SYSTEM DESCRIPTION

HINT:

The skid control ECU is built into the hydraulic brake booster.

a. Multi-terrain Anti-lock Brake System (Multi-terrain ABS)
This function detects off-road driving in sand, mud, gravel, dirt and so on based on signals from the yaw rate and acceleration sensor, the speed sensor and the ECM, and then automatically switches to the ABS control most appropriate for the current road conditions.

b. EBD (Electronic Brake Force Distribution)
EBD control utilizes the ABS and performs proper brake force distribution between the front and rear wheels in accordance with the driving conditions. When the brakes are applied while cornering, it also controls the braking forces of the right and left wheels, helping to maintain vehicle stability.

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

d. VSC (Vehicle Stability Control)
The VSC system helps prevent the vehicle from slipping sideways when front or rear wheel skidding occurs while cornering.

e. A-TRC (Active Traction Control)
During rugged off-road driving, this system 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.

f. 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 speed of the vehicle.

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 being driven/rolling back up a slope with the shift lever in R.**

g. CRAWL (Crawl Control)
Crawl Control is a system that provides assistance when driving on bumpy off-road surfaces, slippery road surfaces, etc. When Crawl Control 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.

h. Turn Assist Control
When the driver is attempting to go around a tight corner and the steering wheel needs to be turned quickly in the opposite direction, the turn assist function recognizes the intent of the driver using the value from the steering angle sensor and raises the brake fluid pressure applied to the brake of the rear inner wheel to increase the turning ability of the vehicle and help reduce the number of times the steering wheel has to be turned.
Turn assist control can operate during automatic driving under Crawl Control.

i. Multi-terrain Select Control (w/ Multi-terrain Select)
When multi-terrain select control is active, A-TRC brake control most appropriate for the selected road mode are performed automatically. In this way, superior off-road driveability is achieved.

j. Trailer Sway Control (except URJ202L-GNTEKC)
If the vehicle is towing a trailer with an inappropriate hitch load, trailer sway could be caused by crosswinds, imbalance caused by load, or the driver's steering. Trailer sway control reduces trailer sway by controlling the engine output and the braking of each wheel.

FUNCTION OF COMPONENTS

Components	Functions
Speed sensor	Detects the wheel speed of each wheel.
Hydraulic brake booster	Upon receiving a brake control signal from the skid control ECU, the hydraulic brake booster controls the hydraulic circuit and sends hydraulic pressure to each wheel. The master cylinder solenoid is removable.
Skid control ECU (Master cylinder solenoid)	Detects the vehicle condition based on signals from the sensors and sends a brake control signal to the hydraulic brake booster.
Motor relay	Supplies power to the pump motor.
Solenoid relay	Supplies power to each solenoid.

Steering sensor	Detects the steering angle and amount of movement of the steering wheel, and then sends signals to the skid control ECU.
Yaw rate sensor assembly	Detects the vehicle's yaw rate and acceleration and sends a signal to the skid control ECU.
Master cylinder pressure sensor	Built into the master cylinder solenoid. Detects the pressure inside the master cylinder.
Accumulator pressure sensor	Built into the master cylinder solenoid. Detects the accumulator pressure.
Pressure control sensor*1	• Built into the master cylinder solenoid. • Detects the controlled fluid pressure.
ECM	• Sends sensor signals (throttle opening angle, engine speed) to the skid control ECU. • Controls the engine based on a traction control signal from the skid control ECU.
VSC OFF switch	Enables the driver to select Normal Mode, TRC OFF Mode or VSC OFF Mode.
CRAWL ON/OFF switch (Suspension control switch)	The ON/OFF switch of the CRAWL switch turns Crawl Control on and off and the speed selector switch of the Crawl Control switch changes the control mode.
Turn assist function switch (Suspension control switch)	During CRAWL control, turn assist operation can be selected by pressing the turn assist switch.
CRAWL speed selector switch (Suspension control switch)	Changes the CRAWL speed among 5 levels.
Multi-terrain select mode switch*2 (Suspension control switch)	Selects from 5 different road surface modes.
ABS warning light	Illuminates to inform the driver that a malfunction in the ABS has occurred.
Brake warning light	• Illuminates to inform the driver that the parking brake is applied when the system is normal, and when the amount of brake fluid has decreased. • Illuminates to inform the driver that a malfunction in the EBD has occurred.
Slip indicator light	• Illuminates to inform the driver that a malfunction has occurred in the TRC or VSC system. • Blinks to inform the driver that TRC or VSC is operating.
TRC OFF indicator light	Informs the driver that TRC OFF mode has been entered using the VSC OFF switch.
VSC OFF indicator light	Illuminates to inform the driver that VSC OFF mode has been entered using the VSC OFF switch.
CRAWL indicator light	Illuminates to inform the driver that Crawl Control is ready to operate.
Turn assist indicator light	Illuminates to inform the driver that turn assist control is ready to operate.
Multi-terrain select indicator light*2	Illuminates to inform the driver that multi-terrain select control is ready to operate.
Multi-information display	• Informs the driver of the status of the Crawl Control operation. • Displays multi-terrain select operation assist messages.*2
Buzzer	• Built into the combination meter. • Intermittently sounds to inform the driver that the accumulator has a malfunction.

- *1: w/ Dynamic Radar Cruise Control System
- *2: w/ Multi-terrain Select

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

DESCRIPTION

HINT:

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

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

f. Select areas where momentary interruptions should be monitored.

HINT:

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open circuit detection/ Error or Normal	Normal	-
FL Speed Open	Front speed sensor LH open circuit detection/ Error or Normal	Normal	-
RR Speed Open	Rear speed sensor RH open circuit detection/ Error or Normal	Normal	-
RL Speed Open	Rear speed sensor LH open circuit detection/ Error or Normal	Normal	-
EFI Communication Open	ECM communication open circuit detection/ Error or Normal	Normal	-
Yaw Rate Open	Yaw rate sensor open circuit detection/ Error or Normal	Normal	-
Deceleration Open	Acceleration sensor open circuit detection/ Error or Normal	Normal	-
Steering Open	Steering sensor open circuit detection/ Error or Normal	Normal	-
Master Cylinder Open	Master cylinder pressure sensor open circuit detection/ Error or Normal	Normal	-
IG Voltage Value Decreased	IG voltage value decreased detection/ Error or Normal	Normal	-
IG Voltage Value Increased	IG voltage value increased detection/ Error or Normal	Normal	-
FR Speed Sensor Voltage Open	Front speed sensor RH voltage open circuit detection/ Error or Normal	Normal	-
FL Speed Sensor Voltage Open	Front speed sensor LH voltage open circuit detection/ Error or Normal	Normal	-
RR Speed Sensor Voltage Open	Rear speed sensor RH voltage open circuit detection/ Error or Normal	Normal	-
RL Speed Sensor Voltage Open	Rear speed sensor LH voltage open circuit detection/ Error or Normal	Normal	-
M/C Pressure Sensor Noise	Master cylinder pressure sensor noise detection/ Error or Normal	Normal	-
Yaw Rate Sensor Voltage Open	Yaw rate sensor voltage open circuit detection/ Error or Normal	Normal	-

EFI Communication Invalid	ECM communication invalid detection/ Error or Normal	Normal	-

g. While observing the screen, gently jiggle the connectors or wire harnesses between the ECUs and sensors or between ECUs.

OK:

Normal display appears.

NOTICE:

The connector and/or wire harness has a momentary interruption (open circuit) if the display changes. Repair or replace the connectors and/or wire harnesses as one of them is faulty.

for Preparation Click here

DESCRIPTION

a. After replacing VSC-related components, clearing and reading the sensor calibration data and system information is necessary.

b. Follow the chart to perform calibration.

Replacement/Adjustment Part	Necessary Operation
Skid Control ECU (Master Cylinder Solenoid)	1. Clearing zero point calibration data 2. Yaw rate and acceleration sensor zero point calibration
Yaw Rate Sensor Assembly	1. Clearing zero point calibration data 2. Yaw rate and acceleration sensor zero point calibration
Vehicle height adjustment	1. Clearing zero point calibration data 2. Yaw rate and acceleration sensor zero point calibration 3. Steering sensor initialization

PERFORM YAW RATE AND ACCELERATION SENSOR ZERO POINT CALIBRATION AND SYSTEM INFORMATION (WHETHER VGRS IS EQUIPPED) (When Using GTS)

NOTICE:

- **While obtaining the zero points, keep the vehicle stationary and do not vibrate, tilt, move, or shake it (do not start the engine).**
- **Be sure to perform this procedure on a level surface (with an inclination of less than 1%).**

a. Clear the zero point calibration and system information data.

i. Turn the ignition switch off.

ii. Check that the steering wheel is centered.

iii. Check that the shift lever is in P.

iv. Connect the GTS to the DLC3.

v. Turn the ignition switch to ON.

vi. Turn the GTS on.

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

viii. Select the skid control ECU (master cylinder solenoid) to clear the zero point calibration data using the GTS.

ix. Turn the ignition switch off.

b. Perform zero point calibration of the yaw rate and acceleration sensor and store the system information.

i. Turn the ignition switch off.

ii. Check that the steering wheel is centered.

iii. Check that the shift lever is in P.

NOTICE:

- **DTCs C1210 (Zero Point Calibration of Yaw Rate Sensor Undone) and C1336 (Zero Point Calibration of Acceleration Sensor Undone) are stored if the shift lever is not in P.**
- **If a DTC is output that indicates zero point calibration is incomplete, repeat the procedure starting at the step for clearing the zero point calibration data and system information.**

iv. Connect the GTS to the DLC3.

v. Turn the ignition switch to ON.

vi. Turn the GTS on.

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

viii. Keep the vehicle stationary on a level surface for 5 seconds or more.

ix. Check that the slip indicator light comes on for several seconds and then blinks in the test mode pattern (0.125 seconds on and 0.125 seconds off).

HINT:

- **If the slip indicator light does not blink, perform 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.**

x. Turn the ignition switch off and disconnect the GTS.

c. Check if DTC C120A (ECU Initial Setting Incomplete) is output.

HINT:

If DTC C120A is not output, calibration was performed successfully.

PERFORM YAW RATE AND ACCELERATION SENSOR ZERO POINT CALIBRATION AND SYSTEM INFORMATION (WHETHER VGRS IS EQUIPPED) (When Using SST Check Wire)

NOTICE:

- **While obtaining the zero points, keep the vehicle stationary and do not vibrate, tilt, move, or shake it (do not start the engine).**
- **Be sure to perform this procedure on a level surface (with an inclination of less than 1%).**

a. Clear the zero point calibration and system information data.

i. Turn the ignition switch off.

ii. Check that the steering wheel is centered.

iii. Check that the shift lever is in P.

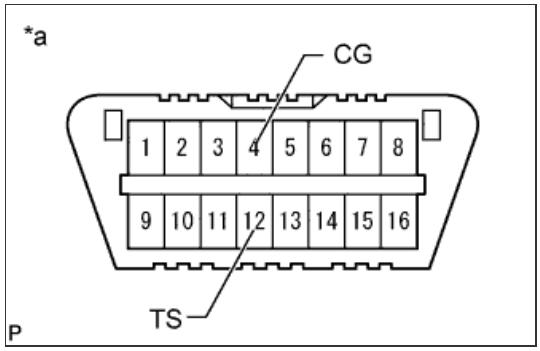
iv. Turn the ignition switch to ON.

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

SST
09843-18040

Text in Illustration

*a	Front view of DLC3



vi. Check that the slip indicator light comes on.

b. Perform zero point calibration of the yaw rate and acceleration sensor and store the system information.

i. Turn the ignition switch off.

ii. Check that the steering wheel is centered.

iii. Check that the shift lever is in P.

NOTICE:

- **DTCs 36 (Zero Point Calibration of Yaw Rate Sensor Undone) and 98 (Zero Point Calibration of Acceleration Sensor Undone) are stored if the shift lever is not in P.**
- **If a DTC is output that indicates zero point calibration is incomplete, repeat the procedure starting at the step for clearing the zero point calibration data and system information.**

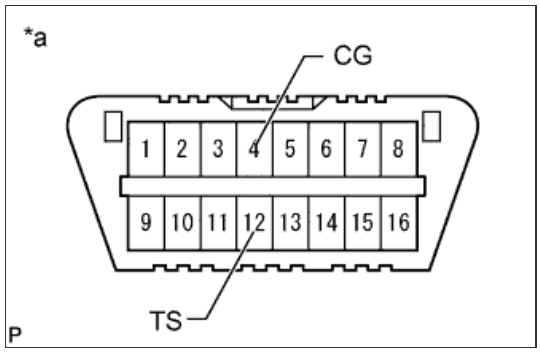
iv. Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.

SST

09843-18040

Text in Illustration

*a	Front view of DLC3



v. Turn the ignition switch to ON.

vi. Keep the vehicle stationary on a level surface for 5 seconds or more.

vii. Check that the slip indicator light comes on for several seconds and then blinks in the test mode pattern (0.125 seconds on and 0.125 seconds off).

HINT:

- **If the slip indicator light does not blink, perform 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.**

viii. Turn the ignition switch off and disconnect SST from the DLC3.

c. Check if DTC 13 (ECU Initial Setting Incomplete) is output.

HINT:

If DTC 13 is not output, calibration was performed successfully.

for Preparation Click here

NOTICE:

- **After replacing the master cylinder solenoid and/or yaw rate sensor assembly, perform calibration.**
- **VSC is prohibited during test mode.**

HINT:

- **By switching the skid control ECU (master cylinder solenoid) from normal mode to test mode, abnormality detection sensitivity is enhanced and troubleshooting can be conducted efficiently.**
- **Perform a sensor check in test mode after the speed sensor or sensor rotor has been repaired or replaced.**
- **If the ignition switch is turned from ON to ACC or off during test mode, DTCs related to the signal check function are not cleared. During test mode, do not change to normal mode.**
- **During test mode, the skid control ECU (master cylinder solenoid) stores all DTCs related to the signal check function, and the DTCs are cleared if normality is confirmed. Any remaining DTCs indicate abnormalities that were found.**

TEST MODE (SIGNAL CHECK) PROCEDURE

a. When using the GTS:

i. Place the vehicle on a level surface with an inclination of less than 1%.

ii. Turn the ignition switch off.

iii. Check that the shift lever is in P.

CAUTION:

Apply the parking brake for safety.

iv. Connect the GTS to the DLC3.

v. Turn the ignition switch to ON.

vi. Turn the GTS on.

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

viii. Check that the ABS warning light and slip indicator light blink at 0.125 second intervals (0.125 seconds on and 0.125 seconds off).

ix. Start the engine.

b. When using SST check wire:

i. Place the vehicle on a level surface with an inclination of less than 1%.

ii. Turn the ignition switch off.

iii. Check that the shift lever is in P.

CAUTION:

Apply the parking brake for safety.

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

SST

09843-18040

Text in Illustration

*a	Front view of DLC3

v. Turn the ignition switch to ON.

vi. Check that the ABS warning light and slip indicator light blink at 0.125

second intervals (0.125 seconds on and 0.125 seconds off).

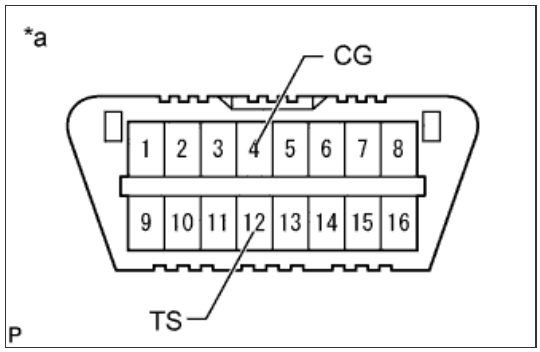
vii. Start the engine.

c. ABS Signal Check

HINT:

Check that the ABS warning light is blinking in the test mode blinking pattern (0.125 seconds on and 0.125 seconds off) before performing the ABS signal check.

d. Master Cylinder Pressure Sensor and Acceleration Sensor Check



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

ii. With the vehicle stationary, 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.

iii. Check that the ABS warning light comes on for 3 seconds.

HINT:

During test mode, the ABS warning light turns on for 3 seconds every time the above operation is performed.

e. Center Differential Lock Detection Switch Check

i. Press the center differential lock switch to lock the center differential.

HINT:

Move the vehicle either forward or backward a little to engage the center differential lock.

ii. Press the center differential lock switch to unlock the center differential.

f. Speed Sensor Check

NOTICE:

- **Before performing the speed sensor signal check, complete the master cylinder pressure sensor check.**
- **The signal check may not be completed if the wheels of the vehicle spin or the steering wheel is turned during this check.**

i. Drive the vehicle straight forward at a speed of 45 km/h (28 mph) or more for several seconds (forward signal check).

ii. Check that the ABS warning light goes off.

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

iv. Check that the ABS warning light goes off.

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.

NOTICE:

- **The sensor check may not be completed if wheelspin occurs.**
- **The ABS warning light blinks when the sensor check is completed and the brake pedal is depressed.**
- **The ABS warning light comes on immediately after a malfunction has been detected during the speed sensor check.**

v. 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 is not completed, the ABS warning light blinks while driving and the ABS does not operate.**

HINT:

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

g. VSC Signal Check

HINT:

Check that the slip indicator light is blinking in the test mode blinking pattern (0.125 seconds on and 0.125 seconds off) before performing

the VSC signal check.

h. Stop light Switch Check (w/ Dynamic Radar Cruise Control System)

i. Check that the shift lever is in P.

ii. Release the brake pedal for 1 second or more with the vehicle stopped, and then depress the brake pedal with a force of 50 N (5 kgf, 11 lbf) or more.

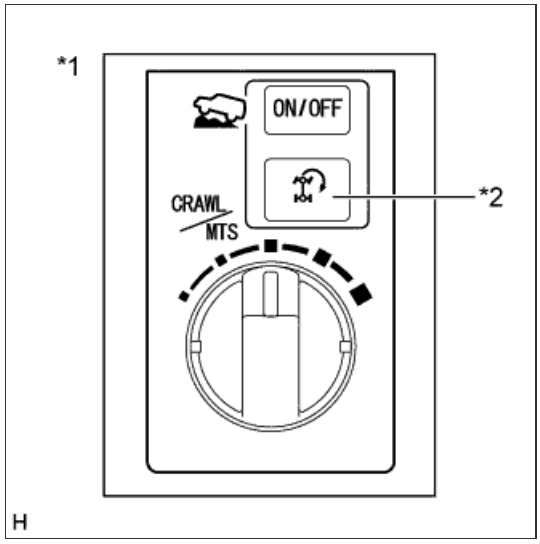
iii. Check that a buzzer sounds for 3 seconds.

i. Turn Assist Function Switch Check

i. Push and hold the turn assist function switch.

Text in Illustration

*1	Suspension Control Switch
*2	Turn Assist Function Switch



ii. Check that the turn assist indicator light comes on.

iii. Release the turn assist function switch to turn the turn assist indicator light off.

j. CRAWL Switch Check

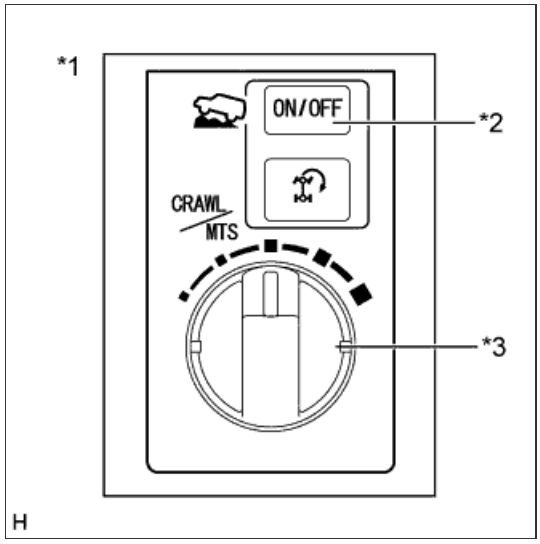
i. Push the CRAWL ON/OFF switch.

HINT:

The CRAWL indicator light illuminates while the CRAWL ON/OFF switch is pushed.

Text in Illustration

*1	Suspension Control Switch
*2	CRAWL ON/OFF Switch
*3	CRAWL Speed Selector Switch



ii. Turn the speed selector switch to low.

Text in Illustration

*a	Low
*b	Medium-low
*c	Medium

*d	Medium-high
*e	High

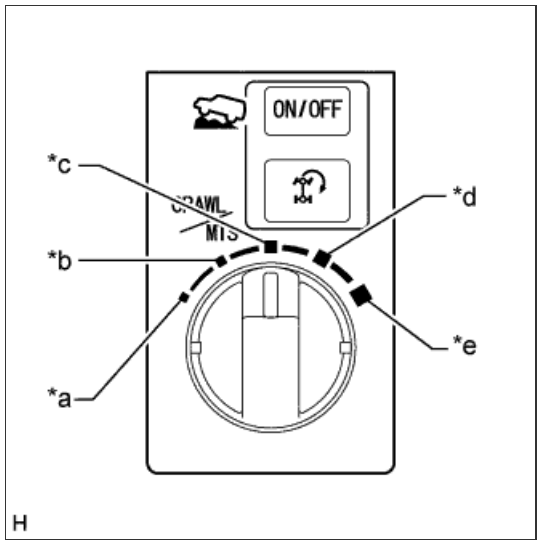
iii. Turn the speed selector switch to medium-low.

iv. Turn the speed selector switch to medium.

v. Turn the speed selector switch to medium-high.

vi. Turn the speed selector switch to high.

vii. Turn the speed selector switch to low.



k. VSC OFF Switch Check

i. Press the VSC OFF switch.

ii. Check that the VSC OFF indicator light comes on.

iii. Press the VSC OFF switch again to turn the VSC OFF indicator light off.

l. End of Signal Check

i. If the signal check is completed, the ABS warning light and slip indicator light blink (0.125 seconds on and 0.125 seconds off) when the vehicle is stopped and goes off while driving the vehicle.

NOTICE:

If the signal check is not completed, the ABS warning light blinks while driving and the ABS does not operate.

m. Read test mode (signal check) DTCs (when using the GTS).

i. Read the DTC(s) by following the GTS screen.

NOTICE:

- **If only DTCs other than test mode signal check DTCs are output, repair the malfunctions and clear the DTCs.**
- **If test mode signal check DTCs and other DTCs are output or if only test mode sensor check DTCs are output, repair the malfunctions, clear the DTCs, and perform the test mode inspection again.**

HINT:

Refer to Signal Check DTCs.

ii. Turn the ignition switch off and disconnect the GTS.

n. Read test mode (signal check) DTCs (when using SST check wire).

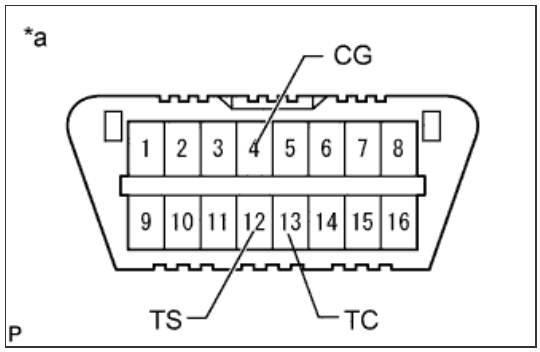
i. Using SST, connect terminals 13 (TC), 12 (TS) and 4 (CG) of the DLC3.

SST

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Text in Illustration

*a	Front view of DLC3



ii. Read the number of blinks of the ABS warning light and slip indicator light.

HINT:

- **If every sensor is normal, the normal code is output (a cycle of 0.25 seconds on and 0.25 seconds off is repeated).**
- **If 2 or more malfunctions are detected at the same time, the lowest numbered DTC is output first.**

iii. Disconnect SST from terminals 13 (TC), 12 (TS) and 4 (CG) of the DLC3.

LIST OF TEST MODE (SIGNAL CHECK) DTC

ABS

DTC Code		Detection Item	Trouble Area
GTS Display	ABS Warning Light Display		
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	• Front speed sensor RH • Speed sensor rotor
C1276	76	Abnormal Change in Output Signal of Front Speed Sensor LH	• Front speed sensor LH • Speed sensor rotor
C1277	77	Abnormal Change in Output Signal of Rear Speed Sensor RH	• Rear speed sensor RH • Speed sensor rotor
C1278	78	Abnormal Change in Output Signal of Rear Speed Sensor LH	• Rear speed sensor LH • Speed sensor rotor
C1279	79	G Sensor Output Voltage Malfunction	• ECU-IG No. 2 fuse • Sensor installation • Harness or connector • Acceleration sensor (Yaw rate sensor assembly) • CAN communication system
C1281	81	Master Cylinder Pressure Sensor Output Malfunction	Master cylinder solenoid (Master cylinder pressure sensor)
C1282	82	Center Differential Lock Position Switch Malfunction	• Harness or connector • Transfer system

VSC

DTC Code		Detection Item	Trouble Area
GTS Display	Slip Indicator Light Display		
C1379	74	Malfunction in CRAWL switch	• CRAWL switch (Suspension control switch) • Harness or connector • Skid control ECU (Master cylinder solenoid)

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.**
- **Inspect the fuses and relays related to this system before inspecting the suspected areas below.**

NOTICE:

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

Vehicle Stability Control System

Symptom	Suspected Area	See page
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
	Master cylinder pressure sensor (check master cylinder pressure sensor by performing test mode inspection)	Click here
	for LHD: Check hydraulic brake booster with GTS. If abnormal, check hydraulic circuit for leakage.	Click here
	for RHD: Check hydraulic brake booster with GTS. If abnormal, check hydraulic circuit for leakage.	Click here
	for LHD: If symptoms still occur even after above circuits in suspected areas are inspected and proved to be normal, replace master cylinder solenoid	Click here
	for RHD: If symptoms still occur even after above circuits in suspected areas are inspected and proved to be normal, replace master cylinder solenoid	Click here
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
	Master cylinder pressure sensor (check master cylinder pressure sensor by performing test mode inspection)	Click here
	for LHD: Check hydraulic brake booster with GTS. If abnormal, check hydraulic circuit for leakage.	Click here
	for RHD: Check hydraulic brake booster with GTS. If abnormal, check hydraulic circuit for leakage.	Click here
	for LHD: If symptoms still occur even after above circuits in suspected areas are inspected and proved to be normal, replace master cylinder solenoid	Click here
	for RHD: If symptoms still occur even after above circuits in suspected areas are inspected and proved to be normal, replace master cylinder solenoid	Click here
VSC and/or TRC 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 sensor circuit	Click here

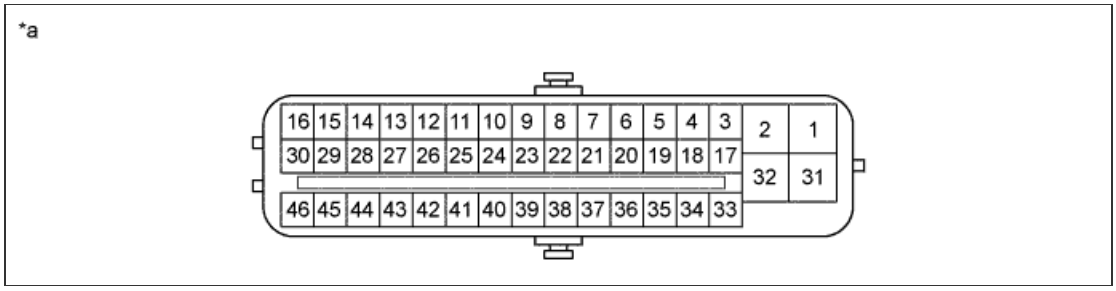
	Steering sensor circuit	Click here
	for LHD: If symptoms still occur even after above circuits in suspected areas are inspected and proved to be normal, replace master cylinder solenoid	Click here
	for RHD: If symptoms still occur even after above circuits in suspected areas are inspected and proved to be normal, replace master cylinder solenoid	Click here
Sensor and switch signal check cannot be performed	TS and CG terminal circuit	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
DTC check cannot be performed	Check for DTCs again and make sure that no DTC is output	Click here
	TC and CG terminal circuit	Click here
	IG power source circuit (high power supply voltage malfunction)	Click here
	for LHD: 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	Click here
	for RHD: 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	Click here
ABS warning light abnormal (Remains on)	ABS warning light circuit	Click here
	IG power source circuit (high power supply voltage malfunction)	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
ABS warning light abnormal (Does not come on)	ABS warning light circuit	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
Brake warning light abnormal (Remains on)	Brake warning light circuit	Click here
	IG power source circuit (high power supply voltage malfunction)	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
Brake warning light abnormal (Does not come on)	Brake warning light circuit	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
Slip indicator light abnormal (Remains on)	Slip indicator light circuit	Click here
	IG power source circuit (high power supply voltage malfunction)	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
Slip indicator light abnormal (Does not come on)	Slip indicator light circuit	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
		Click

VSC OFF indicator light abnormal (Remains on)	VSC OFF indicator light circuit	here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
VSC OFF indicator light abnormal (Does not come on)	VSC OFF indicator light circuit	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
Skid control buzzer abnormal*1	Skid control buzzer circuit	Click here
Buzzer abnormal	VSC buzzer circuit	Click here
TRC OFF indicator light abnormal (Remains on)	TRC OFF indicator light circuit	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
TRC OFF indicator light abnormal (Does not come on)	TRC OFF indicator light circuit	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
CRAWL indicator light abnormal (Remains on)	CRAWL indicator light circuit	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
CRAWL indicator light abnormal (Does not come on)	CRAWL indicator light circuit	Click here
	for LHD: Skid control ECU (Master cylinder solenoid)	Click here
	for RHD: Skid control ECU (Master cylinder solenoid)	Click here
Turn assist indicator light abnormal	Turn assist indicator light circuit	Click here
Multi-terrain select indicator light abnormal (Remains on)*2	Multi-terrain select indicator light circuit	Click here
Multi-terrain select indicator light abnormal (Does not come on)*2	Multi-terrain select indicator light circuit	Click here

- *1: w/ Dynamic Radar Cruise Control System
- *2: w/ Multi-terrain Select

for Preparation Click here

TERMINALS OF ECU

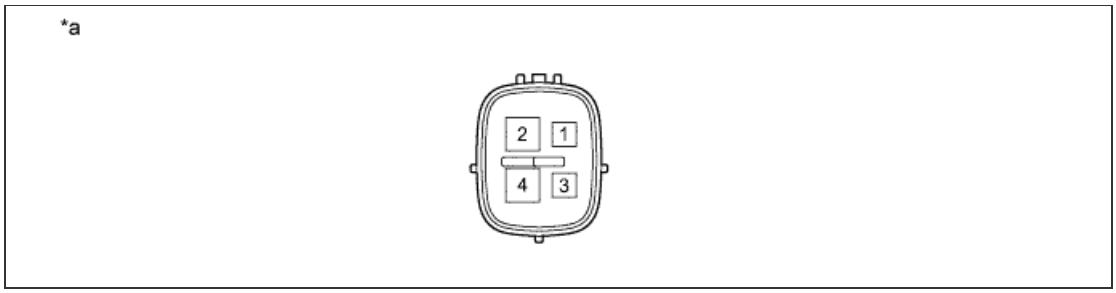


Text in Illustration

*a	Component without harness connected (Skid Control ECU [Master Cylinder Solenoid])	-	-

Terminal No. (Symbol)	Terminal Description
1 (GND1)	Skid control ECU (Master cylinder solenoid) ground
2 (+BM1)	Power supply for motor
3 (FR+)	Front speed sensor RH power supply output
4 (FL-)	Front speed sensor LH input
5 (RR+)	Rear speed sensor RH power supply output
6 (RL-)	Rear speed sensor LH input
7 (STP)	Stop light switch
9 (CSW)	VSC OFF switch
11 (CANH)	CAN communication terminal H
12 (SP1)	Speedometer signal
13 (ATRC)	CRAWL speed selector switch
16 (STPO)	BRK LP relay (Brake light relay)
17 (FR-)	Front speed sensor RH input
18 (FL+)	Front speed sensor LH power supply output
19 (RR-)	Rear speed sensor RH input
20 (RL+)	Rear speed sensor LH power supply output
21 (TRM2)	CRAWL speed selector switch
24 (TS)	Sensor test terminal (Signal check switch)
25 (CANL)	CAN communication terminal L
27 (EXI)	Center differential lock switch
29 (EXI4)	Turn assist function switch signal
30 (BZ)*	Skid control buzzer
31 (+BS)	Power supply for solenoid
32 (GND2)	Skid control ECU (Master cylinder solenoid) ground
41 (LBL)	Brake fluid level warning switch
43 (TRS)	CRAWL ON/OFF switch
44 (TRM1)	CRAWL speed selector switch
45 (STP2)	BRK LP relay (Brake light relay)
46 (IG1)	IG1 power supply

*: w/ Dynamic Radar Cruise Control System



Text in Illustration

*a	Component without harness connected (Skid Control ECU [Master Cylinder Solenoid])	-	-

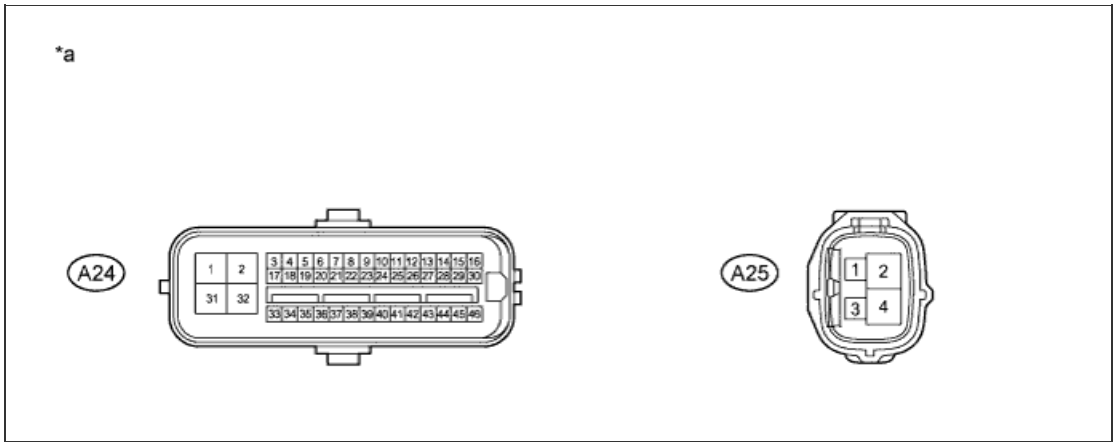
Terminal No. (Symbol)	Terminal Description
1 (IG2)	IG2 power supply
2 (+BM2)	Power supply for motor
4 (GND3)	Skid control ECU (Master cylinder solenoid) ground

TERMINAL INSPECTION

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

HINT:

Voltage cannot be measured with the connector connected to the skid control ECU (master cylinder solenoid) as the connector is watertight.



Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])	-	-

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
A24-7 (STP) - Body ground	R	Stop light switch	Brake pedal depressed → released	8 to 14 V → Below 1.5 V
A24-9 (CSW) - Body ground	G G-W*	VSC OFF switch input	VSC OFF switch off → on	10 kΩ or higher → Below 1 Ω
A24-16 (STPO) - Body ground	SB R-Y*	BRK LP relay (Brake light relay)	Ignition switch off → ON	Below 1 V → 11 to 14 V
A24-31 (+BS) - Body ground	W	Power supply for solenoid (From battery)	Always	11 to 14 V
A24-41 (LBL) - Body ground	P BR-Y*	Brake fluid level warning switch (Brake master cylinder reservoir sub-assembly)	Brake fluid level +/-5 mm (+/-0.197 in.) from the minimum level → maximum level	Below 1 Ω → 1.9 to 2.1 kΩ
A24-45 (STP2) - Body ground	R	BRK LP relay (Brake light relay)	Brake pedal depressed → released	8 to 14 V → Below 1.5 V
				Below 1 V → 11 to

A24-46 (IG1) - Body ground	G	IG1 power supply	Ignition switch off → ON	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

*: URJ202L-GNTEKC

for Preparation Click here

DIAGNOSIS

a. If the skid control ECU (master cylinder solenoid) detects a malfunction, the ABS warning light and/or brake warning light and the slip indicator light come on in accordance with the trouble area to warn the driver.

HINT:

- **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 pattern of the ABS warning light and slip indicator light, or by connecting the GTS.**
- **This system has a Test Mode sensor signal check function. The test mode DTCs can be read by connecting the GTS and observing the blinking pattern of the ABS warning light and slip indicator light.**

NOTICE:

If parts connected to the IG terminal circuit are damaged due to high voltage, DTCs may not be able to be output from the ABS warning light and slip indicator light by connecting SST to the DLC3. In this case, inspect the IG power source circuit.

WARNING LIGHT AND INDICATOR LIGHT CHECK

a. Release the parking brake.

CAUTION:

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

HINT:

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

b. Check that the ABS warning light, brake warning light and slip indicator light come on when the ignition switch is turned to ON, and go off in approximately 3 seconds.

HINT:

If the indicator remains on or does not come on, proceed to troubleshooting for the light circuit below.

Trouble Area	See Procedure
ABS warning light circuit (Remains on)	Click here
ABS warning light circuit (Does not come on)	Click here
Brake warning light circuit (Remains on)	Click here
Brake warning light circuit (Does not come on)	Click here
Slip indicator light circuit (Remains on)	Click here
Slip indicator light circuit (Does not come on)	Click here

for Preparation Click here

DTC CHECK/CLEAR (When Using GTS)

a. Check for DTCs.

i. Turn the ignition switch off.

ii. Connect the GTS to the DLC3.

iii. Turn the ignition switch to ON.

iv. Turn the GTS on.

v. Enter the following menus: Chassis / ABS/VSC/TRC / Trouble Codes.

vi. Read the DTCs by following the prompts on the GTS screen.

b. Clear the DTCs.

i. Turn the ignition switch off.

ii. Connect the GTS to the DLC3.

iii. Turn the ignition switch to ON.

iv. Turn the GTS on.

v. Enter the following menus: Chassis / ABS/VSC/TRC / Trouble Codes.

vi. Operate the GTS to clear the codes.

HINT:

Refer to the GTS operator's manual for further details.

DTC CHECK/CLEAR (When Using SST Check Wire)

a. Check for DTCs.

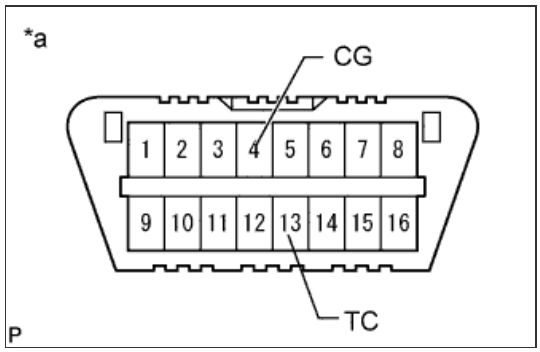
i. Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST

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Text in Illustration

*a	Front view of DLC3



ii. Turn the ignition switch to ON.

iii. Read the DTCs output from the ABS warning light and slip indicator light in the combination meter.

HINT:

- **When the system is normal, the ABS warning light and slip indicator light blink at 0.25 second intervals (0.25 seconds on and 0.25 seconds off).**
- **When only 1 DTC is stored, the light outputs the same code after an interval of 4 seconds. Example: When DTC 21 is stored, the light blinks twice, turns off for 1.5 seconds, blinks once, turns off for 4 seconds, and then repeats this output pattern.**
- **When 2 or more DTCs are stored, the light outputs the codes with an interval of 2.5 seconds between each different code, and the output of all codes repeats after an interval of 4 seconds.**
- **If no code is output, inspect the TC and CG terminal circuit and the ABS warning light and slip indicator light**

circuits.

Trouble Area	See Procedure
TC and CG terminal circuit	Click here
ABS warning light circuit (Remains on)	Click here
ABS warning light circuit (Does not come on)	Click here
Slip indicator light circuit (Remains on)	Click here
Slip indicator light circuit (Does not come on)	Click here

iv. The codes are explained in the code table.

ABS DTC

ABS Warning Light Display	GTS Display
11	C146E
12	C146F
21	C1468
22	C1469
23	C146A
24	C146B
25	C1225
26	C1226
27	C1227
28	C1228
31	C1401
	C1405
	C1409
32	C1402
	C1406
	C1410
33	C1403
	C1407
	C1411
34	C1404
	C1408
	C1412
35	C1413
36	C1414
37	C1337
38	C1415
39	C1416
41	C1241
	C1417
42	C1242
43	C1243
44	C1419
	C1420
	C1442
45	C1245
46	C1421
	C1422
	C1423
	C1424
	C1455
	C1456
	C1457
	C1458
49	C1425
51	C1251

52	C1252
53	C1253
54	C1254
56	C1256
	C1452
57	C1257
58	C1453
	C1454
68	C1268
94	U0073
95	U0124
97	C1381
98	C1336
A1*	U0114

*: The light blinks 10 times, turns off for 1.5 seconds, and then blinks once.

VSC DTC

Slip Indicator Light Display	GTS Display
13	C120A
31	C1432
	C1433
	C1434
32	C1232
34	C1435
	C1436
	C1443
36	C1210
39	C1336
43*	-
47	C1340
51	C1201
53	C1203
62	U0123
63	U0126
64	C1380
65	C1437
	U0100
66	C1290
	C1439
	C1445
68	U0130
98	C1440

*: This DTC is output when the VSC system detects a malfunction in the ABS.

v. Disconnect terminals 13 (TC) and 4 (CG) of the DLC3.
If 2 or more DTCs are output at the same time, the DTCs are output in ascending order.

b. Clear the DTCs.

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

SST

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Text in Illustration

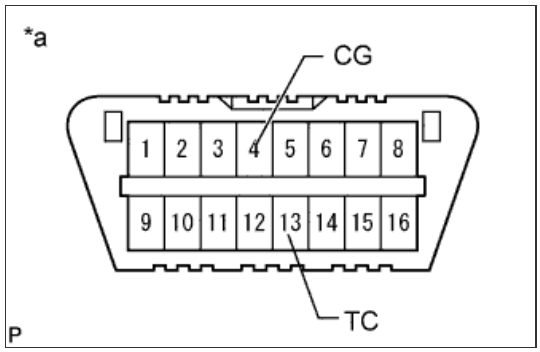
*a	Front view of DLC3

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 and slip indicator light blink at 0.25 second intervals (0.25 seconds on and 0.25 seconds off).

v. Remove SST from the terminals of the DLC3.



END OF DTC CHECK/CLEAR

a. Turn the ignition switch to ON.

b. Check that the ABS warning light and slip indicator light go off within approximately 3 seconds.

for Preparation Click here

FREEZE FRAME DATA

a. Whenever a DTC is stored, the skid control ECU (master cylinder solenoid) stores the current vehicle (sensor) state as freeze frame data.

b. The skid control ECU (master cylinder solenoid) stores the number of times (maximum: 31) the ignition switch has been turned from off to ON since the last time the ABS/VSC was activated.

HINT:

- **If the vehicle is stopped or at a low speed (7 km/h (4 mph) or less), or if a DTC is stored, the skid control ECU (master cylinder solenoid) will stop counting the number of times the ignition switch has been turned from off to ON.**
- **Freeze frame data at the time the ABS/VSC operates:**
  The skid control ECU (master cylinder solenoid) stores and updates data whenever the ABS/VSC operates.
  When the ECU stores data at the time a DTC is stored, the data stored during ABS/VSC operation is cleared.
- **Freeze frame data at the time a DTC is stored:**
  When the skid control ECU (master cylinder solenoid) stores data at the time a DTC is stored, no updates will be performed until the data is cleared.

CHECK FREEZE FRAME DATA

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Trouble Codes.

f. According to the display on the GTS, select the trouble code data display with freeze frame data.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Elapsed Time after Freeze Trigger	Elapsed time after freeze trigger/ Min.: 0 msec, Max.: 500 msec	-	-
Number of IG ON	Number of times ignition switch turned to ON after storing freeze frame data/ 0 to 31	-	-
Buzzer	Buzzer/ ON or OFF	ON: Buzzer on OFF: Buzzer off	The combination meter has a built-in buzzer.
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	OFF	-
Gear Position	Gear position information/ P,N, R, 1st-8th, Fail or Not R	Actual gear position	-
Shift Lever Position	Shift lever position information/ P,N, R, D/M, 1st-6th/B or Fail	Actual shift lever position	-
Operated System	Operated system status/ ABS, VSC, TRC, BA, HAB, PBA, PB, HA-CTRL, Fail, TSC, Sys or Non	-	ABS: ABS is activated. VSC: VSC is activated. TRC: TRC is activated. BA: BA is activated. PBA: PBA is activated. PB: PB is activated. HA-CTRL: Hill-start assist control is activated. Fail: Fail safe mode is activated. Non: No operation is activated.
Master Cylinder	Master cylinder pressure sensor reading/	When brake pedal released:	The value increases when the brake

Sensor	Min.: 0.00 V, Max.: 5.00 V	0.3 to 0.9 V	pedal is depressed.
M/C Sensor Grade	Master cylinder pressure sensor change/ Min.: -30 MPa/s, Max.: 225 MPa/s	When brake pedal released or pedal held at constant position: 0 MPa/s	Changes in proportion with the pedal movement speed when the brake pedal is being operated.
Yaw Rate Sensor	Yaw rate sensor/ Min.: -128°/s, Max.: 127°/s	Vehicle stopped: 0°/s Turning right: -128 to 0°/s Turning left: 0 to 127°/s	-
Lateral G	Lateral G/ Min.: -25.10 m/s^2, Max.: 24.90 m/s^2	-	Changes in proportion with the pedal movement speed when the brake pedal is being operated.
Forward and Rearward G	Forward and backward G/ Min.: - 25.10 m/s^2, Max.: 24.90 m/s^2	-	Changes in proportion with acceleration during acceleration/deceleration.
FR Wheel Speed	Front wheel speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front wheel speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	No large fluctuations when driving at a constant speed.
RR Wheel Speed	Rear wheel speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear wheel speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	No large fluctuations when driving at a constant speed.
Vehicle Speed	Maximum wheel speed sensor reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
Vehicle Speed Grade	Vehicle acceleration/ Min.: -25.10 m/s^2, Max.: 24.90 m/s^2	Vehicle stopped: 0 m/s^2	Changes in proportion with the vehicle acceleration/deceleration during driving.
FR Wheel Direction	Front wheel RH direction signal/ Forward or Back	Forward: Forward Back: Backward	-
FL Wheel Direction	Front wheel LH direction signal/ Forward or Back	Forward: Forward Back: Backward	-
RR Wheel Direction	Rear wheel RH direction signal/ Forward or Back	Forward: Forward Back: Backward	-
RL Wheel Direction	Rear wheel LH direction signal/ Forward or Back	Forward: Forward Back: Backward	-
Real Engine Torque	Actual engine torque/ Min.: -1024.0 Nm, Max.: 1023.0 Nm	-	-
Accelerator Opening Angle %	Throttle valve opening amount/ Min.: 0.0%, Max.: 128.0%	When accelerator pedal released: 0%	Changes in proportion with the movement of the pedal during accelerator pedal operation.
Steering Angle Sensor	Steering sensor/ Min.: - 3276.8°, Max.: 3276.7°	Left turn: Increase Right turn: Decrease	-
Pre Crash Brake OFF Switch*	Pre-crash system cancel switch/ ON or OFF	-	-
TRC/VSC Off Mode	TRC/VSC off mode/ Normal, TRC OFF or VSC OFF	Normal: Normal mode TRC OFF: TRC off mode VSC OFF: VSC off mode	-

*: w/ Dynamic Radar Cruise Control System

CLEAR FREEZE FRAME DATA

NOTICE:

Clearing the DTCs will also clear the freeze frame data.

a. Connect the GTS to the DLC3.

b. Turn the ignition switch to ON.

c. Clear the DTCs and freeze frame data (Click here).

for Preparation Click here

FAIL-SAFE OPERATION

- If there is a problem with sensor signals or hydraulic brake booster systems, the skid control ECU (master cylinder solenoid) prohibits power from being supplied to the hydraulic brake booster and informs the ECM of VSC system failure.
  The hydraulic brake booster turns off each solenoid and the ECM stops its VSC (traction control signal), which is based on signals from the skid control ECU (master cylinder solenoid). As a result, the vehicle is controlled as if the ABS, TRC and VSC systems were not installed in the vehicle.
  ABS control is prohibited, but EBD control continues to the extent that it is possible. If EBD control is impossible, the brake warning light comes on to warn the driver (Click here).
- If a system component has any malfunction before control begins, operation is prohibited. If a system component has any malfunction during control, the system will gradually stop operating so as not to trigger a sudden change in vehicle conditions.
  If it is impossible to control the systems, the indicator lights come on or blink to inform the driver of termination of control of the systems (Click here).

HINT:

If the hydraulic brake booster encounters a malfunction, brake performance is gradually lost and ABS, BA, A-TRC, VSC, hill-start assist control, Crawl Control and multi-terrain select controls are prohibited.

a. ABS, EBD and BA system:

Area of Malfunction	Control Method
ABS	ABS, BA, A-TRC, VSC, hill-start assist, CRAWL and multi-terrain select control are prohibited.
BA system	ABS, BA, TRC, VSC, hill-start assist, CRAWL and multi-terrain select control are prohibited.
EBD system	ABS, BA, EBD, A-TRC, VSC, hill-start assist, CRAWL and multi-terrain select control are prohibited.

b. A-TRC, VSC, hill-start assist control and Crawl Control system:

HINT:

The A-TRC, VSC, hill-start assist control and Crawl Control systems each prohibit different controls depending on the malfunctioning part.

Area of Malfunction	Control Method
Engine control system (A-TRC and VSC systems)	Before control starts: Disables control During control: Uses only brakes to perform control
Brake control system (VSC system)	Before control starts: Disables control During control: Disables control
Brake control system (A-TRC, hill-start assist control and Crawl Control systems)	Before control starts: Disables control During control: Disables control (by gradually ending control)

SYSTEM TEMPERATURE PROTECTION OPERATION

If the A-TRC, hill-start assist control or Crawl Control system has been used constantly for a long time, the temperature of the hydraulic brake booster may increase excessively. If the temperature increases excessively, the buzzer sounds intermittently. If the temperature increases even more, the buzzer sounds for 3 seconds and the TRC OFF indicator light comes on.

System	Indicator Condition
A-TRC or hill-start assist control	The TRC OFF indicator light comes on.
Crawl Control	The TRC OFF indicator light comes on. The CRAWL indicator light blinks, and then turns off.

HINT:

If the systems automatically return to normal operating conditions, the TRC OFF indicator light goes off. As this is not a malfunction, no DTC is stored.

for Preparation Click here

DATA LIST

HINT:

Using the GTS 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. Warm up the engine.

b. Turn the ignition switch off.

c. Connect the GTS to the DLC3.

d. Turn the ignition switch to ON.

e. Turn the GTS on.

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

g. According to the display on the GTS, 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/ ON or OFF	ON: Warning light on OFF: Warning light off	-
Buzzer	Buzzer/ ON or OFF	ON: Buzzer on OFF: Buzzer off	The combination meter has a built-in buzzer.
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	OFF	-
Main Idle SW	Main idle switch/ ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
Gear Position	Gear position/ Fail, 1st-8th, P,N, R, Not R	Actual gear position	-
Shift Lever Position	Shift lever position/ Fail, 1st-6th/B, D/M, P,N, R	Actual shift lever position	-
Shift Information	Shift information/ ON or OFF	ON: During gear change OFF: Not during gear change	-
Pre Crash Brake OFF Switch*1	Pre-crash system cancel switch/ ON or OFF	-	-
Master Cylinder	Master cylinder pressure sensor	When brake pedal released: 0.3 to 0.9	The value increases when the brake pedal is

Sensor	reading/ Min.: 0.00 V, Max.: 5.00 V	V	depressed.
Zero Point of M/C	Memorized zero value/ Min.: -12.50 MPa, Max.: 12.40 MPa	-	-
Master Cylinder Sensor2*1	Master cylinder pressure sensor 2 reading/ Min.: 0.00 V, Max.: 5.00 V	-	-
Zero Point of M/C 2*1	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	Acceleration sensor reading/ Min.: -18.525 m/s^2, Max.: 18.387 m/s^2	-	Changes continuously during acceleration/deceleration.
Zero Point of Decele	Memorized zero value/ Min.: -25.10 m/s^2, Max.: 24.90 m/s^2	-	-
Deceleration Sensor2	Acceleration sensor 2 reading/ Min.: -18.525 m/s^2, Max.: 18.387 m/s^2	-	Changes continuously during acceleration/deceleration.
Zero Point of Decele2	Memorized zero value/ Min.: -25.10 m/s^2, Max.: 24.90 m/s^2	-	-
Yaw Rate Sensor	Yaw rate sensor/ Min.: -128°/s, Max.: 127°/s	Vehicle stationary: 0°/s Right turn: -128 to 0°/s Left turn: 0 to 127°/s	-
Zero Point of Yaw Rate	Memorized zero value/ Min.: -128°, Max.: 127°	-	-
Yaw Rate Sensor2	Yaw rate sensor 2/ Min.: -128°/s, Max.: 127°/s	Vehicle stationary: 0°/s Right turn: -128 to 0°/s Left turn: 0 to 127°/s	-
Zero Point of Yaw Rate2	Memorized zero value/ Min.: -128°/s, Max.: 127°/s	-	-
Steering Angle Sensor	Steering 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°	-	-
Lateral G	Lateral G/ Min.: -25.10 m/s^2, Max.: 24.90 m/s^2	-	Changes in proportion with acceleration during turning.
Forward and Rearward G	Forward and rearward G/ Min.: -25.10 m/s^2, Max.: 24.90 m/s^2	-	Changes in proportion with acceleration during acceleration/deceleration.
Yaw Rate Value	Yaw rate value/ Min.: -128°/s, Max.: 127°/s	-	Changes in proportion with yaw during turning.
Steering Angle Value	Steering angle value/ Min.: -3276.8°, Max.: 3276.7°	-	Changes in proportion with the amount of steering wheel rotation during steering operation.
Stop Light Relay	BRK LP relay (Brake light relay)/ ON or OFF	ON: Relay on (Stop light on) OFF: Relay off (Stop light off)	-
Crawl Control Light	CRAWL indicator light/ ON or OFF	ON: Indicator light on OFF: Indicator light off	-
Slip Indicator Light	Slip indicator light/ ON or OFF	ON: Indicator light on OFF: Indicator light off	-
L4 Switch	Transfer L4 detection switch/ ON or OFF	ON: L4 OFF: except L4	-
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202	Actual wheel speed	No large fluctuations when driving at a constant speed.

	mph)		
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
Vehicle Speed	Maximum wheel speed sensor reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual vehicle speed	No large fluctuations when driving at a constant speed.
FR Wheel Acceleration	Front wheel acceleration RH/ Min.: -200.84 m/s^2, Max.: 199.27 m/s^2	-	Changes continuously during acceleration/deceleration.
FL Wheel Acceleration	Front wheel acceleration LH/ Min.: -200.84 m/s^2, Max.: 199.27 m/s^2	-	Changes continuously during acceleration/deceleration.
RR Wheel Acceleration	Rear wheel acceleration RH/ Min.: -200.84 m/s^2, Max.: 199.27 m/s^2	-	Changes continuously during acceleration/deceleration.
RL Wheel Acceleration	Rear wheel acceleration LH/ Min.: -200.84 m/s^2, Max.: 199.27 m/s^2	-	Changes continuously during acceleration/deceleration.
FR Wheel Direction	Front wheel direction RH/ Forward or Back	Forward: Forward Back: Back	-
FL Wheel Direction	Front wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-
RR Wheel Direction	Rear wheel direction RH/ Forward or Back	Forward: Forward Back: Back	-
RL Wheel Direction	Rear wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-
Stop Switch History*1	Stop light switch history/ OFF, ON, WITHOUT or UNKNOWN	-	-
Stop Light Relay Output	BRK LP relay (Brake light relay) output/ ON or OFF	ON: Relay output on (Stop light on) OFF: Relay output off (Stop light off)	-
EBS Relay	-	-	-
Crawl Control Switch	CRAWL speed selector switch status/ LOW, MIDLOW, MID, MIDHIGH or HIGH	Actual CRAWL speed selector switch position	-
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	-
PBA Ctrl Status*1	Pre-crash brake assist control status/ ON or OFF	ON: During control OFF: Not during control	-
TRC (TRAC) Ctrl Status	Traction control status/ ON or OFF	ON: During control OFF: Not during control	-
TRC (TRAC) Engine Ctrl Status	Traction control (engine control) status/ ON or OFF	ON: During control OFF: Not during control	-

TRC (TRAC) Brake Ctrl Status	Traction control (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	Actual engine torque/ Min.: -1024.0 Nm, Max.: 1023.0 Nm	-	-
Accelerator Opening Angle %	Percentage of accelerator pedal opening angle/ Min.: 0.0%, Max.: 128.0%	When accelerator pedal released: 0%	Changes in proportion with the movement of the pedal during accelerator pedal operation.
Solenoid Relay	Solenoid relay/ ON or OFF	ON: Solenoid relay on OFF: Solenoid relay off	-
ECB*2 Motor Relay	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: Operating OFF: Not operating	-
TR(A)C/VSC Solenoid (SRM1)	TRC/VSC solenoid (SRM1)/ ON or OFF	ON: Operating OFF: Not operating	-
TR(A)C/VSC Solenoid (SRC2)	TRC/VSC solenoid (SRC2)/ ON or OFF	ON: Operating OFF: Not operating	-
TR(A)C/VSC Solenoid (SRC1)	TRC/VSC solenoid (SRC1)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SFRH)	ABS solenoid (SFRH)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SFRR)	ABS solenoid (SFRR)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SFLH)	ABS solenoid (SFLH)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SFLR)	ABS solenoid (SFLR)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SRRH)	ABS solenoid (SRRH)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SRRR)	ABS solenoid (SRRR)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SRLH)	ABS solenoid (SRLH)/ ON or OFF	ON: Operating OFF: Not operating	-
ABS Solenoid (SRLR)	ABS solenoid (SRLR)/ ON or OFF	ON: Operating OFF: Not operating	-
FR Speed Open	Front speed sensor RH open circuit detection/ Error or Normal	Normal	-
FL Speed Open	Front speed sensor LH open circuit detection/ Error or Normal	Normal	-
RR Speed Open	Rear speed sensor RH open circuit detection/ Error or Normal	Normal	-
RL Speed Open	Rear speed sensor LH open circuit detection/ Error or Normal	Normal	-
EFI Communication Open	ECM communication open circuit detection/ Error or Normal	Normal	-

Yaw Rate Open	Yaw rate sensor open circuit detection/ Error or Normal	Normal	-
Deceleration Open	Acceleration sensor open circuit detection/ Error or Normal	Normal	-
Steering Open	Steering sensor open circuit detection/ Error or Normal	Normal	-
Master Cylinder Open	Master cylinder pressure sensor open circuit detection/ Error or Normal	Normal	-
VGRS Information	VGRS information / With, Without or Unknown	With: With VGRS Without: Without VGRS	-
IG1 Voltage Value	IG1 voltage value/ Min.: 0.00 V, Max.: 20.00 V	Ignition switch ON: 11 to 14 V	-
IG2 Voltage Value	IG2 voltage value/ Min.: 0.00 V, Max.: 20.00 V	Ignition switch ON: 11 to 14 V	-
TRC/VSC Off Mode	TRC/VSC off mode/ Normal, TRC OFF, Unknown or VSC OFF	Normal: Normal mode TRC OFF: TRC OFF mode VSC OFF: VSC OFF mode	-
Number of DTC	Number of DTCs/ Min.: 0, Max.: 255	0	-
IG Voltage Value Decreased	IG voltage value decreased detection/ Error or Normal	Normal	-
IG Voltage Value Increased	IG voltage value increased detection/ Error or Normal	Normal	-
FR Speed Sensor Voltage Open	Front speed sensor RH voltage open circuit detection/ Error or Normal	Normal	-
FL Speed Sensor Voltage Open	Front speed sensor LH voltage open circuit detection/ Error or Normal	Normal	-
RR Speed Sensor Voltage Open	Rear speed sensor RH voltage open circuit detection/ Error or Normal	Normal	-
RL Speed Sensor Voltage Open	Rear speed sensor LH voltage open circuit detection/ Error or Normal	Normal	-
M/C Pressure Sensor Noise	Master cylinder pressure sensor noise detection/ Error or Normal	Normal	-
Yaw Rate Sensor Voltage Open	Yaw rate sensor voltage open circuit detection/ Error or Normal	Normal	-
EFI Communication Invalid	ECM communication invalid detection/ Error or Normal	Normal	-
Hazard Switch History	Hazard warning switch history/ Incomplete or Complete	-	-
Turn Assist Function Switch History	Turn assist function switch history/ Incomplete or Complete	-	-
DSS Signal Buzzer*1	Skid control buzzer/ ON or OFF	ON: Buzzer on OFF: Buzzer off	-

*1: w/ Dynamic Radar Cruise Control System
*2: Electronically Controlled Brake

ACTIVE TEST

HINT:

Using the GTS 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. Warm up the engine.

b. Turn the ignition switch off.

c. Connect the GTS to the DLC3.

d. Turn the ignition switch to ON.

e. Turn the GTS on.

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

g. According to the display on the GTS, 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	Buzzer	Buzzer ON/OFF	The buzzer can be heard.
Solenoid Relay	Solenoid relay	Relay ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
Motor Relay	Motor relay	Relay ON/OFF	An operating sound of the solenoid of the motor can be heard.
Stop Light Relay	BRK LP relay (Brake light relay)	Relay ON/OFF	Observe the stop light (the stop lights do not come on for 2 to 5 seconds).
ABS Solenoid (SRLR)	ABS solenoid (SRLR)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRLH)	ABS solenoid (SRLH)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRRR)	ABS solenoid (SRRR)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SRRH)	ABS solenoid (SRRH)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFLR)	ABS solenoid (SFLR)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFLH)	ABS solenoid (SFLH)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFRR)	ABS solenoid (SFRR)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
ABS Solenoid (SFRH)	ABS solenoid (SFRH)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRMR)	VSC/TRC solenoid (SRM2)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRMF)	VSC/TRC solenoid (SRM1)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRCR)	VSC/TRC solenoid (SRC2)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
VSC/TRC Solenoid (SRCF)	VSC/TRC solenoid (SRC1)	Solenoid ON/OFF	An operating sound of the solenoid (clicking sound) can be heard.
Crawl Control Light	CRAWL indicator light	Indicator light ON/OFF	Observe the combination meter.
TRC(TRAC) OFF Indicator Light	TRC OFF indicator light	Indicator light ON/OFF	Observe the combination meter.
VSC OFF Indicator Light	VSC OFF indicator light	Indicator light ON/OFF	Observe the combination meter.

Slip Indicator Light	Slip indicator light	Indicator light ON/OFF	Observe the combination meter.
EBS Relay	-	-	-
ABS Solenoid	Selection of multiple holding solenoids (SFRH, SFLH, SRRH and SRLH) and pressure reduction solenoids (SFRR, SFLR, SRRR and SRLR) possible	Start/Stop	-
VSC/TRC Solenoid	Selection of multiple VSC/TRC solenoids [SRMR (SRM2), SRMF (SRM1), SRCR (SRC2) and SRCF (SRC1)] possible	Start/Stop	-
DSS Signal Buzzer*	Skid control buzzer	Buzzer ON/OFF	The buzzer can be heard.

*: w/ Dynamic Radar Cruise Control System

for Preparation Click here

NOTICE:

Turn the ignition switch off before removing any parts.

HINT:

- **If no abnormality is found when inspecting parts, inspect the skid control ECU (master cylinder solenoid) and ground points for poor connections.**
- **If a trouble code is output during the DTC check, check the trouble areas indicated by the DTC. For details of each code, refer to the "See page" for the respective "DTC Code" in the DTC chart.**
- **When 2 or more DTCs are output, perform circuit inspections one by one until the problem is identified.**
- **For DTCs output by the warning light or indicator light, refer to the DTC charts in DTC Check/Clear.**
- **Inspect the fuses and relays before inspecting the trouble areas shown in the table below.**

DTC

DTC Code	Detection Item	See page
C1201	Engine Control System Malfunction	Click here
C1203	ECM Communication Circuit Malfunction	Click here
C120A	ECU Initial Setting Incomplete	Click here
C1210	Zero Point Calibration of Yaw Rate Sensor Undone	Click here
C1225	SM Solenoid Circuit	Click here
C1226	SA2 Solenoid Circuit	Click here
C1227	SA3 Solenoid Circuit	Click here
C1228	STR Solenoid Circuit	Click here
C1232	Acceleration Sensor Stuck Malfunction	Click here
C1241	Low Power Supply Voltage Malfunction	Click here
C1242	Open Circuit in IG1/IG2 Power Source Circuit	Click here
C1243	Acceleration Sensor Stuck Malfunction	Click here
C1245	Acceleration Sensor Output Malfunction	Click here
C1251	Open in Pump Motor Circuit	Click here
C1252	Brake Booster Pump Motor on Time Abnormally Long	Click here
C1253	Pump Motor Relay	Click here
C1254	Pressure Sensor or Switch	Click here
C1256	Accumulator Low Pressure	Click here
C1257	Power Supply Drive Circuit	Click here
C1268	Transfer L4 Position Switch Circuit	Click here
C1289	VGRS Control System Malfunction	Click here
C1290	Steering Angle Sensor Zero Point Malfunction	Click here
C1336	Zero Point Calibration of Acceleration Sensor Undone	Click here
C1337	Diameter of the Tire is not Uniform	Click here
C1340	Center Differential Lock Circuit	Click here
C1380	Stop Light Control Relay Malfunction	Click here
C1381	Acceleration Sensor Power Supply Voltage Malfunction	Click here
C1401	Front Speed Sensor RH Malfunction	Click here
C1402	Front Speed Sensor LH Malfunction	Click here
C1403	Rear Speed Sensor RH Malfunction	Click here
C1404	Rear Speed Sensor LH Malfunction	Click here
C1405	Open or Short in Front Speed Sensor RH Circuit	Click here
C1406	Open or Short in Front Speed Sensor LH Circuit	Click here
C1407	Open or Short in Rear Speed Sensor RH Circuit	Click here
C1408	Open or Short in Rear Speed Sensor LH Circuit	Click here
C1409	Front Speed Sensor RH Performance	Click here
C1410	Front Speed Sensor LH Performance	Click here
C1411	Rear Speed Sensor RH Performance	Click here

C1412	Rear Speed Sensor LH Performance	Click here
C1413	Front Speed Sensor RH Output Malfunction	Click here
C1414	Front Speed Sensor LH Output Malfunction	Click here
C1415	Rear Speed Sensor RH Output Malfunction	Click here
C1416	Rear Speed Sensor LH Output Malfunction	Click here
C1417	High Power Supply Voltage Malfunction	Click here
C1419	Acceleration Sensor Internal Circuit	Click here
C1420	Acceleration Sensor Malfunction	Click here
C1421	Open or Short in Master Cylinder Pressure Sensor	Click here
C1422	Master Cylinder Pressure Sensor Zero Point High Malfunction	Click here
C1423	Master Cylinder Pressure Sensor Zero Point Low Malfunction	Click here
C1424	Master Cylinder Pressure Sensor Output Malfunction	Click here
C1425	Open in Stop Light Switch Circuit	Click here
C1432	Steering Angle Sensor Power Source Voltage Malfunction	Click here
C1433	Steering Angle Sensor Internal Circuit	Click here
C1434	Steering Angle Sensor Output Malfunction	Click here
C1435	Yaw Rate Sensor Internal Circuit	Click here
C1436	Yaw Rate Sensor Malfunction	Click here
C1437	Lost Communication with ECM	Click here
C1439	Steering Angle Sensor Initialization Incomplete	Click here
C1440	Steering Angle Sensor Unusual Bank Angle Detected	Click here
C1442	Invalid Data Received from Acceleration Sensor	Click here
C1443	Invalid Data Received from Yaw Rate Sensor	Click here
C1445	Vehicle Driven with Steering Angle Sensor not Initialized	Click here
C1452	Accumulator Low Pressure	Click here
C1453	Reservoir Level Switch Disconnected	Click here
C1454	Reservoir Level Low	Click here
C1455*	Open or Short in Control Pressure Sensor	Click here
C1456*	Control Pressure Sensor Zero Point High	Click here
C1457*	Control Pressure Sensor Zero Point Low	Click here
C1458*	Control Pressure Sensor Zero Point Output	Click here
C1468	SFR Solenoid Circuit	Click here
C1469	SFL Solenoid Circuit	Click here
C146A	SRR Solenoid Circuit	Click here
C146B	SRL Solenoid Circuit	Click here
C146E	Open in ABS Solenoid Relay Circuit	Click here
C146F	Short in ABS Solenoid Relay Circuit	Click here
U0073	Control Module Communication Bus OFF	Click here
U0100	Lost Communication with ECM / PCM	Click here
U0114	Lost Communication with 4WD Control ECU	Click here
U0123	Lost Communication with Yaw Rate Sensor Module	Click here
U0124	Lost Communication with Lateral Acceleration Sensor Module	Click here
U0126	Lost Communication with Steering Angle Sensor Module	Click here
U0130	Lost Communication with Steering Effort Control Module	Click here

*: w/ Dynamic Radar Cruise Control System

Test Mode

DTC Code	Detection Item	See page
C1271	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	Click here
C1272	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	Click here
C1273	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	Click here
C1274	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	Click here
C1275	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	Click here
C1276	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	Click here
C1277	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	Click here
C1278	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	Click here

C1279	Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)	Click here
C1281	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)	Click here
C1282	Center Differential Lock Position Switch	Click here
C1379	Downhill Assist Control Switch Malfunction (Test Mode DTC)	Click here

DTC C1201 Engine Control System Malfunction

for Preparation Click here

DESCRIPTION

If a malfunction is detected in the engine control system, the ECM sends a malfunction signal to the skid control ECU (master cylinder solenoid). The skid control ECU (master cylinder solenoid) stores this DTC and prohibits the following controls:

- VSC
- TRC
- Crawl Control
- Multi-terrain select control

DTC Code	DTC Detection Condition	Trouble Area
C1201	An engine control system malfunction signal continues for 1 second or more.	Engine control system

INSPECTION PROCEDURE

1.CHECK ENGINE TYPE

a. Check the engine type.

Result

Result	Proceed to
1VD-FTV	A
1UR-FE	B
3UR-FE	C

B → Go to step 3

C → Go to step 4

A

2.CHECK FOR DTC (ENGINE CONTROL SYSTEM)

a. Check if any engine control system DTC is output (w/o DPF: Click here, w/ DPF: Click here).

Result

Result	Proceed to
DTC is not output	A
DTC is output (w/o DPF)	B
DTC is output (w/ DPF)	C

B → GO TO ENGINE CONTROL (DIAGNOSTIC TROUBLE CODE CHART) (Click here)

C → GO TO ENGINE CONTROL (DIAGNOSTIC TROUBLE CODE CHART) (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

3.CHECK FOR DTC (ENGINE CONTROL SYSTEM)

a. Check if any engine control system DTC is output (Click here).

Result

Result	Proceed to

DTC is not output	A
DTC is output	B

B → GO TO ENGINE CONTROL (DIAGNOSTIC TROUBLE CODE CHART) (Click here)

A → CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.CHECK FOR DTC (ENGINE CONTROL SYSTEM)

a. Check if any engine control system DTC is output (Click here).

Result

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

B → GO TO ENGINE CONTROL (DIAGNOSTIC TROUBLE CODE CHART) (Click here)

A → CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1409 Front Speed Sensor RH Performance

DTC C1410 Front Speed Sensor LH Performance

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1409 C1410	One of the following conditions is met: 1. When the vehicle is driven in reverse at a speed of 3 km/h (2 mph) or more and 3 of the wheel sensors detect the reverse signal, the other sensor detects a high frequency pulse 75 times while the ignition switch is ON. 2. At a vehicle speed of 10 km/h (6 mph) or more, the vehicle speed sensor output drops by 50% for 5 seconds. 3. The lowest wheel speed is 10 km/h (6 mph) or more and the difference between the highest and lowest wheel speed values is 2 km/h (1 mph) or less for 15 seconds. 4. At a vehicle speed of 30 km/h (19 mph) or more, one wheel direction is different from the other 3 wheels for 1 second. 5. At a vehicle speed of 100 km/h (62 mph), a reverse signal is output for 1 second or more. 6. At a vehicle speed of 30 km/h (19 mph) or more, the rotation direction of the one of the wheels is not detected normally and the rotation direction of the other 3 wheels is not the same for 1 second.	Front speed sensor RH/LH

HINT:

- **DTC C1409 is for the front speed sensor RH.**
- **DTC C1410 is for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

2.READ VALUE USING GTS (FR/FL WHEEL DIRECTION)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

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: Back	-
FL Wheel Direction	Front wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-

f. Check the "FR/FL Wheel Direction" in the Data List both when the vehicle is being driven straight forward at a speed of 30 km/h (19 mph) or more and when the vehicle is being driven in reverse at a speed of 3 km/h (2 mph) or more.

OK:
The sensor signal matches wheel direction.

NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Perform a road test.

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

Result

Result	Proceed to
DTC C1409 or C1410 is output	A
DTC is not output	B

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

REPLACE FRONT SPEED SENSOR (Click here)

DTC C1203 ECM Communication Circuit Malfunction

for Preparation Click here

DESCRIPTION

The circuit is used to send control information from the skid control ECU (master cylinder solenoid) to the ECM, and engine control information from the ECM to the skid control ECU (master cylinder solenoid) via the CAN communication system.

DTC Code	DTC Detection Condition	Trouble Area
C1203	The engine/drivetrain specification and/or destination information from the ECM does not match the skid control ECU data.	ECM

INSPECTION PROCEDURE

1.CHECK ENGINE TYPE

a. Check the engine type.

Result

Result	Proceed to
1VD-FTV	A
1UR-FE	B
3UR-FE	C

B → Go to step 3

C → Go to step 4

A

2.CHECK DTC (FOR ENGINE CONTROL SYSTEM)

a. Check if the engine control system DTC is output (w/o DPF: Click here, w/ DPF: Click here).

Result

Result	Proceed to
DTC is output	A
DTC is not output (w/o DPF)	B
DTC is not output (w/ DPF)	C

B → GO TO ENGINE CONTROL SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

C → GO TO ENGINE CONTROL SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

REPLACE ECM (Click here)

3.CHECK DTC (FOR ENGINE CONTROL SYSTEM)

a. Check if the engine control system DTC is output (Click here).

Result

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

B → GO TO ENGINE CONTROL SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

REPLACE ECM (Click here)

4.CHECK DTC (FOR ENGINE CONTROL SYSTEM)

a. Check if the engine control system DTC is output (Click here).

Result

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

B → GO TO ENGINE CONTROL SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

REPLACE ECM (Click here)

DTC C1411 Rear Speed Sensor RH Performance

DTC C1412 Rear Speed Sensor LH Performance

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1411 C1412	One of the following conditions is met: 1. When the vehicle is driven in reverse at a speed of 3 km/h (2 mph) or more and 3 of the wheel sensors detect the reverse signal, the other sensor detects a high frequency pulse 75 times while the ignition switch is ON. 2. At a vehicle speed of 10 km/h (6 mph) or more, the vehicle speed sensor output drops by 50% for 5 seconds. 3. The lowest wheel speed is 10 km/h (6 mph) or more and the difference between the highest and lowest wheel speed values is 2 km/h (1 mph) or less for 15 seconds. 4. At a vehicle speed of 30 km/h (19 mph) or more, one wheel direction is different from the other 3 wheels for 1 second. 5. At a vehicle speed of 100 km/h (62 mph), a reverse signal is output for 1 second or more. 6. At a vehicle speed of 30 km/h (19 mph) or more, the rotation direction of the one of the wheels is not detected normally and the rotation direction of the other 3 wheels is not the same for 1 second.	Rear speed sensor RH/LH

HINT:

- **DTC C1411 is for the rear speed sensor RH.**
- **DTC C1412 is for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → REPLACE REAR SPEED SENSOR (Click here)

OK

2.READ VALUE USING GTS (RR/RL WHEEL DIRECTION)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

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: Back	-
RL Wheel Direction	Rear wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-

f. Check the "RR/RL Wheel Direction" in the Data List both when the vehicle is being driven straight forward at a speed of 30 km/h (19 mph) or more and when the vehicle is being driven in reverse at a speed of 3 km/h (2 mph) or more.

OK:

The sensor signal matches wheel direction.

NG → REPLACE REAR SPEED SENSOR (Click here)

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Perform a road test.

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

Result

Result	Proceed to
DTC C1411 or C1412 is output	A
DTC is not output	B

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

REPLACE REAR SPEED SENSOR (Click here)

DTC C120A ECU Initial Setting Incomplete

for Preparation Click here

DESCRIPTION

After replacing the skid control ECU (master cylinder solenoid) or clearing the system information stored in the skid control ECU (master cylinder solenoid), the system information must be stored in the skid control ECU (master cylinder solenoid) again. The system information is automatically stored in the skid control ECU (master cylinder solenoid) when the system enters test mode. If the system information is not stored in the skid control ECU (master cylinder solenoid), DTC C120A is stored.

DTC Code	DTC Detection Condition	Trouble Area
C120A	The system information is not stored in the skid control ECU.	• Calibration not performed • Skid control ECU (Master cylinder solenoid)

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.PERFORM CALIBRATION

a. Perform calibration (Click here).

NOTICE:

If a DTC is output after replacing the master cylinder solenoid, it is possible that calibration has not been performed or the zero point calibration data was not cleared when calibration was performed.

NEXT

2.CHECK DTC

a. Check for DTCs (Click here).

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1411 Rear Speed Sensor RH Performance

DTC C1412 Rear Speed Sensor LH Performance

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1411 C1412	One of the following conditions is met: 1. When the vehicle is driven in reverse at a speed of 3 km/h (2 mph) or more and 3 of the wheel sensors detect the reverse signal, the other sensor detects a high frequency pulse 75 times while the ignition switch is ON. 2. At a vehicle speed of 10 km/h (6 mph) or more, the vehicle speed sensor output drops by 50% for 5 seconds. 3. The lowest wheel speed is 10 km/h (6 mph) or more and the difference between the highest and lowest wheel speed values is 2 km/h (1 mph) or less for 15 seconds. 4. At a vehicle speed of 30 km/h (19 mph) or more, one wheel direction is different from the other 3 wheels for 1 second. 5. At a vehicle speed of 100 km/h (62 mph), a reverse signal is output for 1 second or more. 6. At a vehicle speed of 30 km/h (19 mph) or more, the rotation direction of the one of the wheels is not detected normally and the rotation direction of the other 3 wheels is not the same for 1 second.	Rear speed sensor RH/LH

HINT:

- **DTC C1411 is for the rear speed sensor RH.**
- **DTC C1412 is for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → REPLACE REAR SPEED SENSOR (Click here)

OK

2.READ VALUE USING GTS (RR/RL WHEEL DIRECTION)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

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: Back	-
RL Wheel Direction	Rear wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-

f. Check the "RR/RL Wheel Direction" in the Data List both when the vehicle is being driven straight forward at a speed of 30 km/h (19 mph) or more and when the vehicle is being driven in reverse at a speed of 3 km/h (2 mph) or more.

OK:

The sensor signal matches wheel direction.

NG → REPLACE REAR SPEED SENSOR (Click here)

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Perform a road test.

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

Result

Result	Proceed to
DTC C1411 or C1412 is output	A
DTC is not output	B

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

REPLACE REAR SPEED SENSOR (Click here)

DTC C1210 Zero Point Calibration of Yaw Rate Sensor Undone

DTC C1336 Zero Point Calibration of Acceleration Sensor Undone

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2). If there is trouble in the bus lines between the yaw rate sensor assembly and the CAN communication system, DTCs U0123 (yaw rate sensor communication trouble) and U0124 (acceleration sensor communication trouble) are stored.
The DTCs are also stored when the calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1210	Zero point calibration of the yaw rate sensor is incomplete.	• Zero point calibration incomplete • Sensor installation • Yaw rate sensor assembly • Skid control ECU (Master cylinder solenoid)
C1336	Zero point calibration of the acceleration sensor is incomplete.	

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **After replacing the yaw rate sensor assembly, perform zero point calibration (Click here).**

1.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Check for DTCs (Click here).

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output (for LHD)	B
CAN DTC is output (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.PERFORM ZERO POINT CALIBRATION OF YAW RATE AND ACCELERATION SENSOR

a. Perform zero point calibration of the yaw rate and acceleration sensor (Click here).

NEXT

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Turn the ignition switch off.

b. Perform the signal check in the Test Mode Procedure (Click here).

OK:
All test mode DTCs are cleared.

NG → Go to step 4

OK

END

4.CHECK YAW RATE SENSOR ASSEMBLY INSTALLATION

a. Turn the ignition switch off.

b. Check that the yaw rate sensor assembly has been installed properly (Click here).

OK:
The sensor is tightened to the specified torque.
The sensor is not installed at an angle.

NG → INSTALL YAW RATE SENSOR ASSEMBLY CORRECTLY (Click here)

OK

5.READ VALUE USING GTS (YAW RATE AND ACCELERATION SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Deceleration Sensor	Acceleration sensor reading/ Min.: -18.525 m/s^2, Max.: 18.387 m/s^2	-	Changes continuously during acceleration/deceleration.
Deceleration Sensor2	Acceleration sensor 2 reading/ Min.: -18.525 m/s^2, Max.: 18.387 m/s^2	-	Changes continuously during acceleration/deceleration.
Yaw Rate Sensor	Yaw rate sensor/ Min.: -128°/s, Max.: 127°/s	Vehicle stationary: 0°/s Right turn: -128 to 0°/s Left turn: 0 to 127°/s	-

f. Check that the yaw rate and acceleration sensor output value is displayed on the GTS.

OK:
The yaw rate and acceleration sensor output value is normal.

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1413 Front Speed Sensor RH Output Malfunction

DTC C1275 Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1276 Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1414 Front Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1413 C1414	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1275 C1276	Stored only during test mode.	• Front speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1413 and C1275 are for the front speed sensor RH.**
- **DTCs C1414 and C1276 are for the front speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1405 and C1406 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 8

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK ↓

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK ↓

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

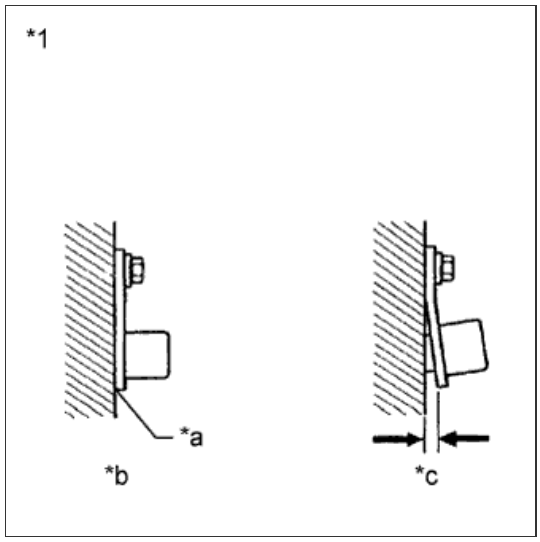
5.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

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



Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

6.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

7.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

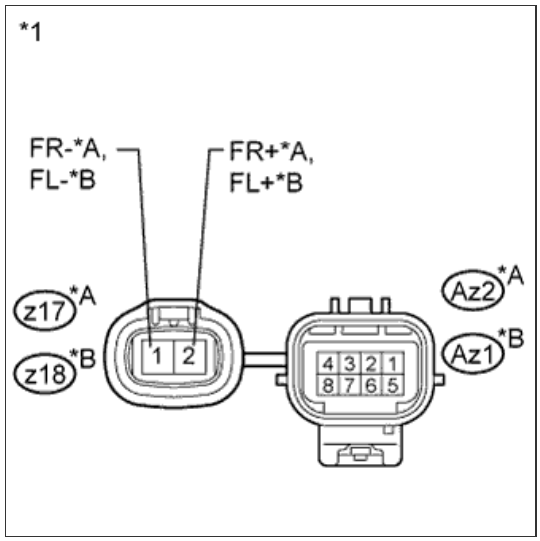
NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

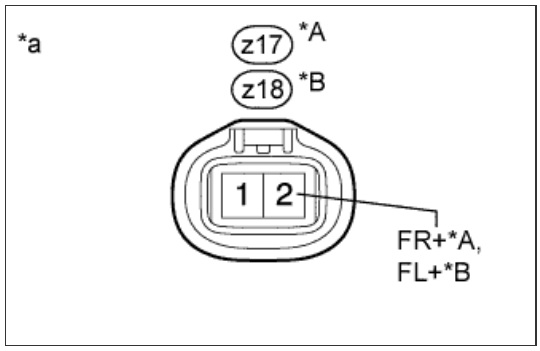
OK

10.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE FRONT SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (Click here)**

A

END

DTC C1210 Zero Point Calibration of Yaw Rate Sensor Undone

DTC C1336 Zero Point Calibration of Acceleration Sensor Undone

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2). If there is trouble in the bus lines between the yaw rate sensor assembly and the CAN communication system, DTCs U0123 (yaw rate sensor communication trouble) and U0124 (acceleration sensor communication trouble) are stored.
The DTCs are also stored when the calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1210	Zero point calibration of the yaw rate sensor is incomplete.	• Zero point calibration incomplete • Sensor installation • Yaw rate sensor assembly • Skid control ECU (Master cylinder solenoid)
C1336	Zero point calibration of the acceleration sensor is incomplete.	

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **After replacing the yaw rate sensor assembly, perform zero point calibration (Click here).**

1.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Check for DTCs (Click here).

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output (for LHD)	B
CAN DTC is output (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.PERFORM ZERO POINT CALIBRATION OF YAW RATE AND ACCELERATION SENSOR

a. Perform zero point calibration of the yaw rate and acceleration sensor (Click here).

NEXT

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Turn the ignition switch off.

b. Perform the signal check in the Test Mode Procedure (Click here).

OK:
All test mode DTCs are cleared.

NG → Go to step 4

OK

END

4.CHECK YAW RATE SENSOR ASSEMBLY INSTALLATION

a. Turn the ignition switch off.

b. Check that the yaw rate sensor assembly has been installed properly (Click here).

OK:
The sensor is tightened to the specified torque.
The sensor is not installed at an angle.

NG → INSTALL YAW RATE SENSOR ASSEMBLY CORRECTLY (Click here)

OK

5.READ VALUE USING GTS (YAW RATE AND ACCELERATION SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Deceleration Sensor	Acceleration sensor reading/ Min.: -18.525 m/s^2, Max.: 18.387 m/s^2	-	Changes continuously during acceleration/deceleration.
Deceleration Sensor2	Acceleration sensor 2 reading/ Min.: -18.525 m/s^2, Max.: 18.387 m/s^2	-	Changes continuously during acceleration/deceleration.
Yaw Rate Sensor	Yaw rate sensor/ Min.: -128°/s, Max.: 127°/s	Vehicle stationary: 0°/s Right turn: -128 to 0°/s Left turn: 0 to 127°/s	-

f. Check that the yaw rate and acceleration sensor output value is displayed on the GTS.

OK:
The yaw rate and acceleration sensor output value is normal.

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1413 Front Speed Sensor RH Output Malfunction

DTC C1275 Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1276 Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1414 Front Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1413 C1414	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1275 C1276	Stored only during test mode.	• Front speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1413 and C1275 are for the front speed sensor RH.**
- **DTCs C1414 and C1276 are for the front speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1405 and C1406 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 8

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK ↓

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK ↓

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

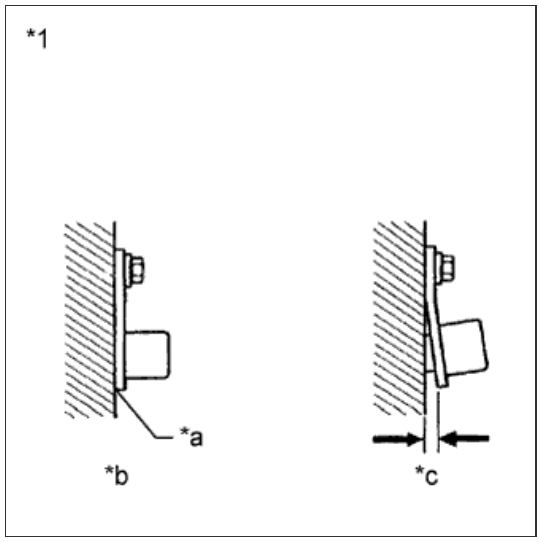
5.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

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



Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

6.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

7.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

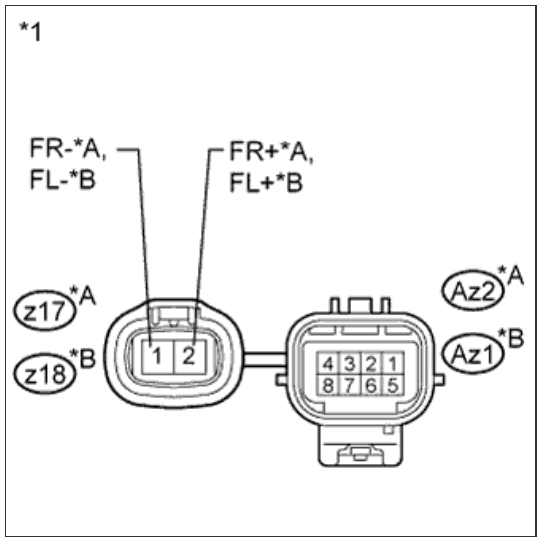
NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

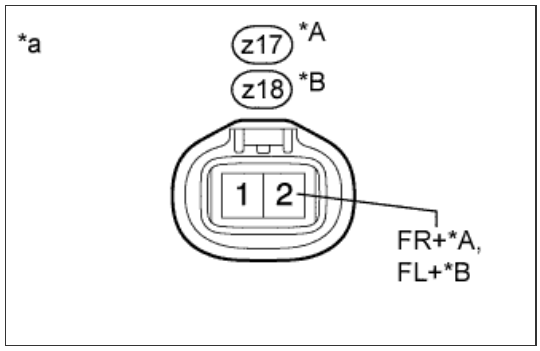
OK

10.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE FRONT SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (Click here)**

A

END

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

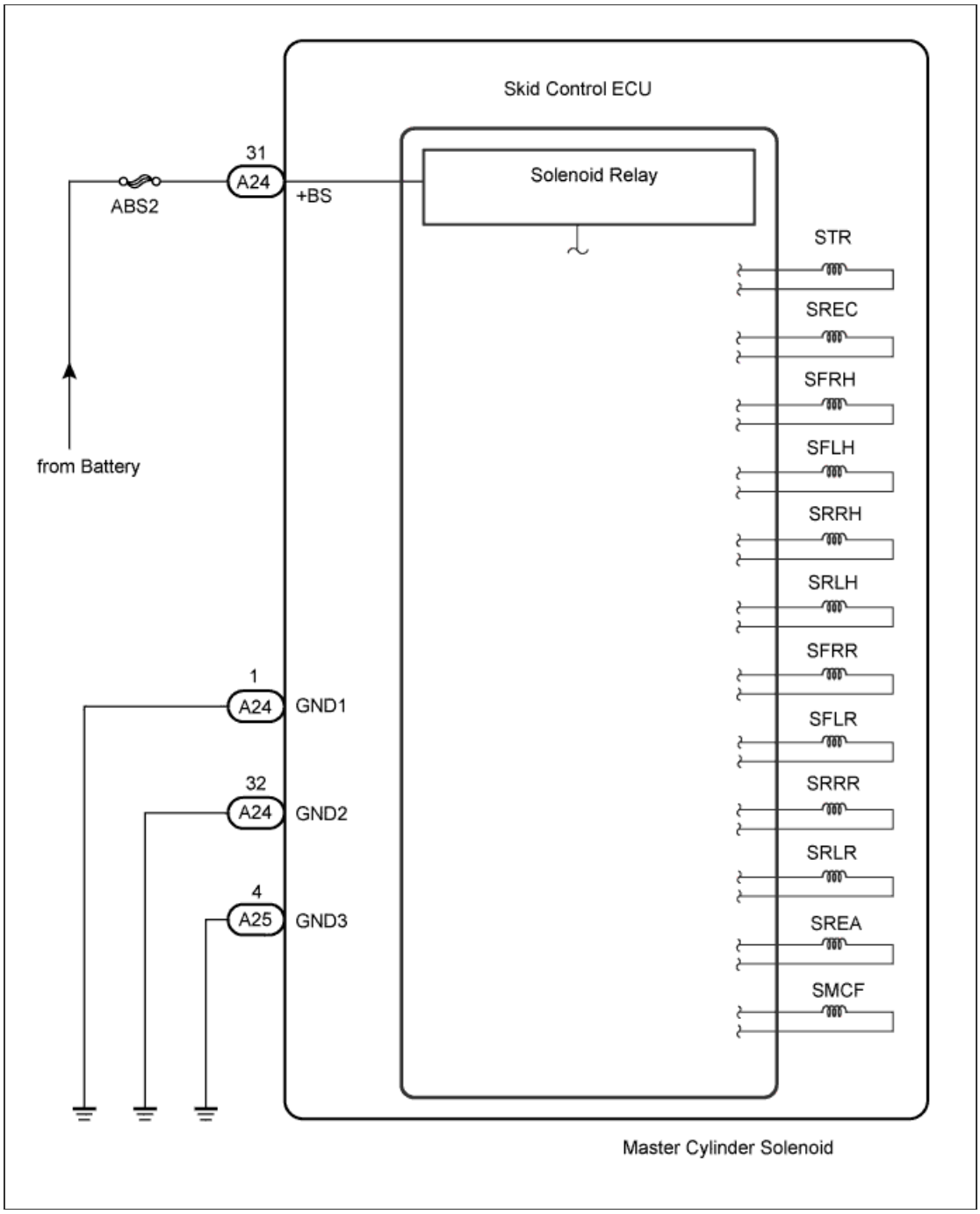
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1413 Front Speed Sensor RH Output Malfunction

DTC C1275 Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1276 Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1414 Front Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1413 C1414	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1275 C1276	Stored only during test mode.	• Front speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1413 and C1275 are for the front speed sensor RH.**
- **DTCs C1414 and C1276 are for the front speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1405 and C1406 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 8

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK ↓

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK ↓

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

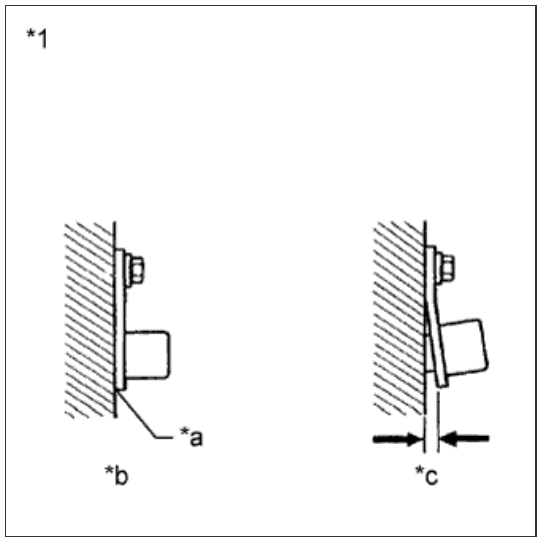
5.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

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



Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

6.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

7.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

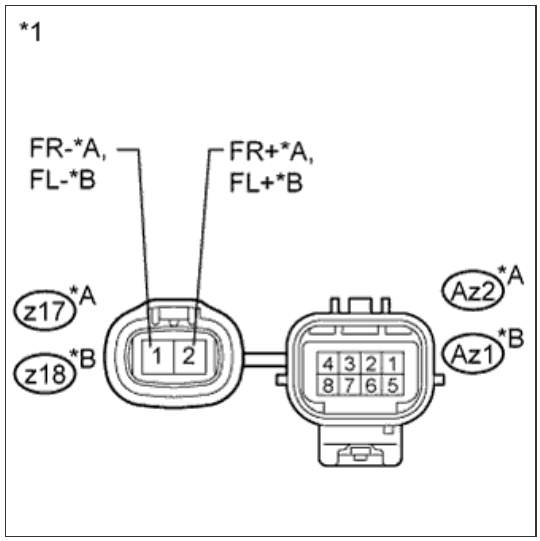
NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

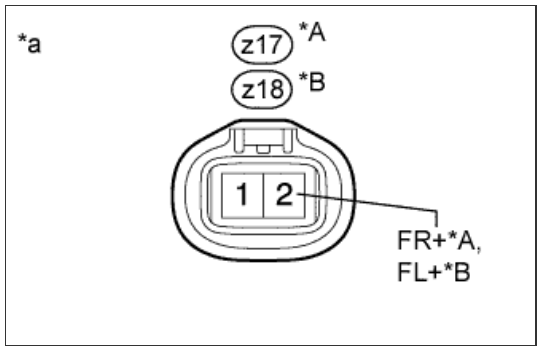
OK

10.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE FRONT SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (Click here)**

A

END

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

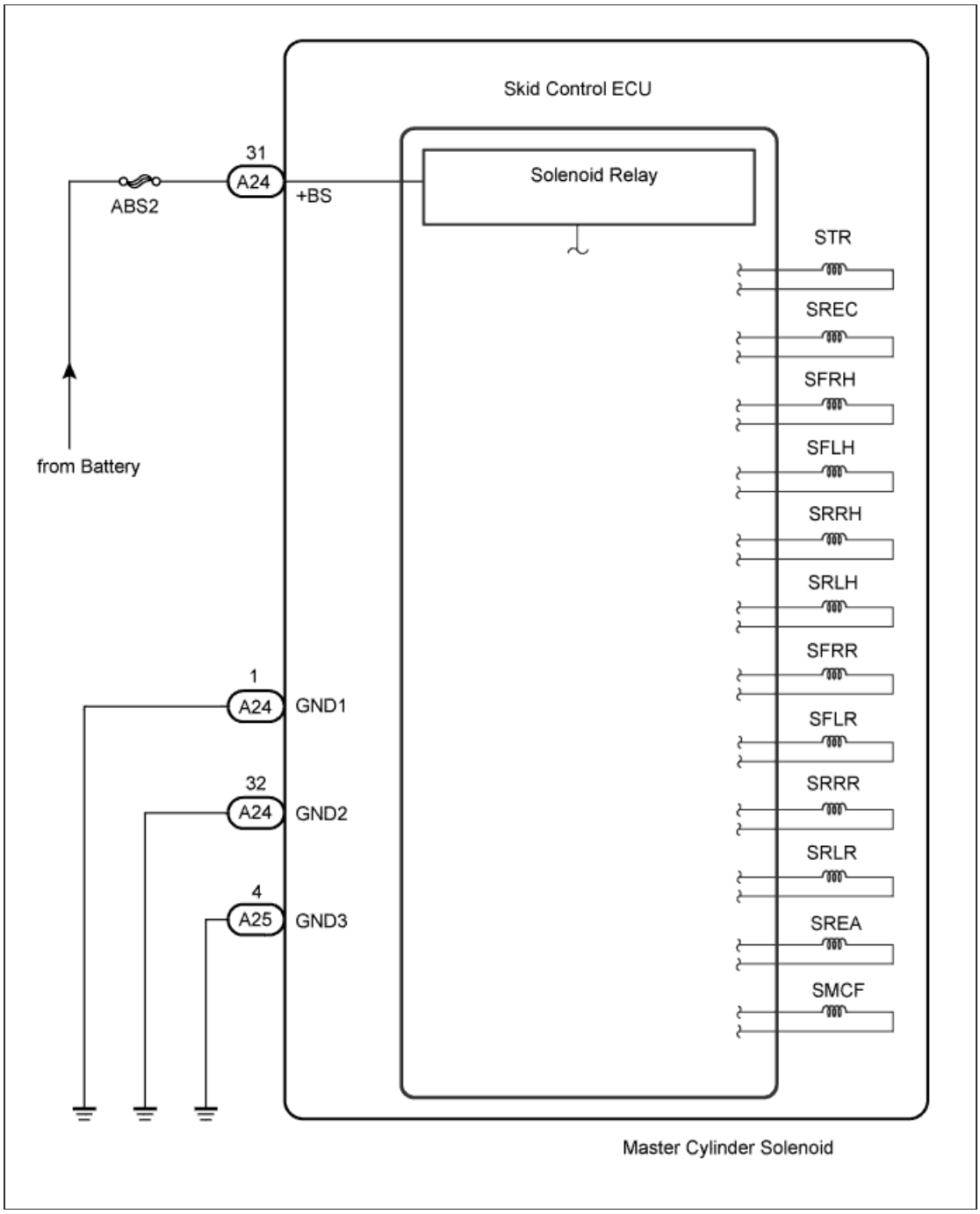
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1413 Front Speed Sensor RH Output Malfunction

DTC C1275 Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1276 Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1414 Front Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1413 C1414	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1275 C1276	Stored only during test mode.	• Front speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1413 and C1275 are for the front speed sensor RH.**
- **DTCs C1414 and C1276 are for the front speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1405 and C1406 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 8

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK ↓

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK ↓

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

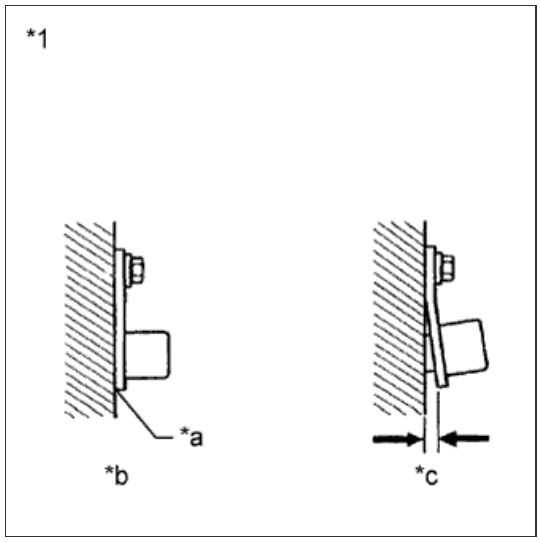
5.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

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



Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

6.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

7.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

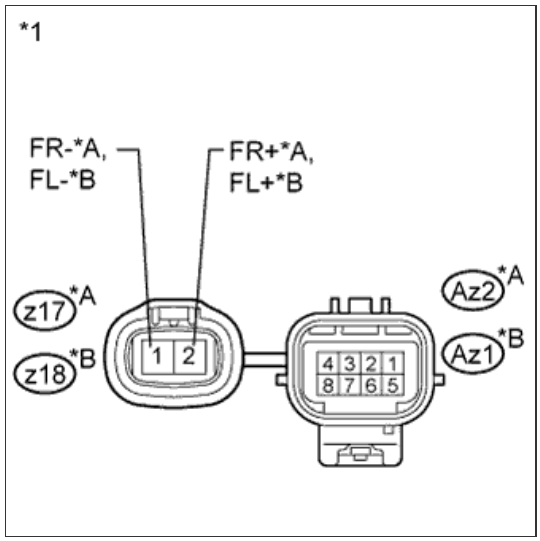
NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

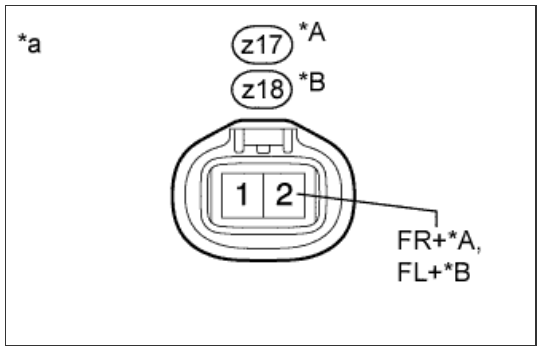
OK

10.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE FRONT SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (Click here)**

A

END

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

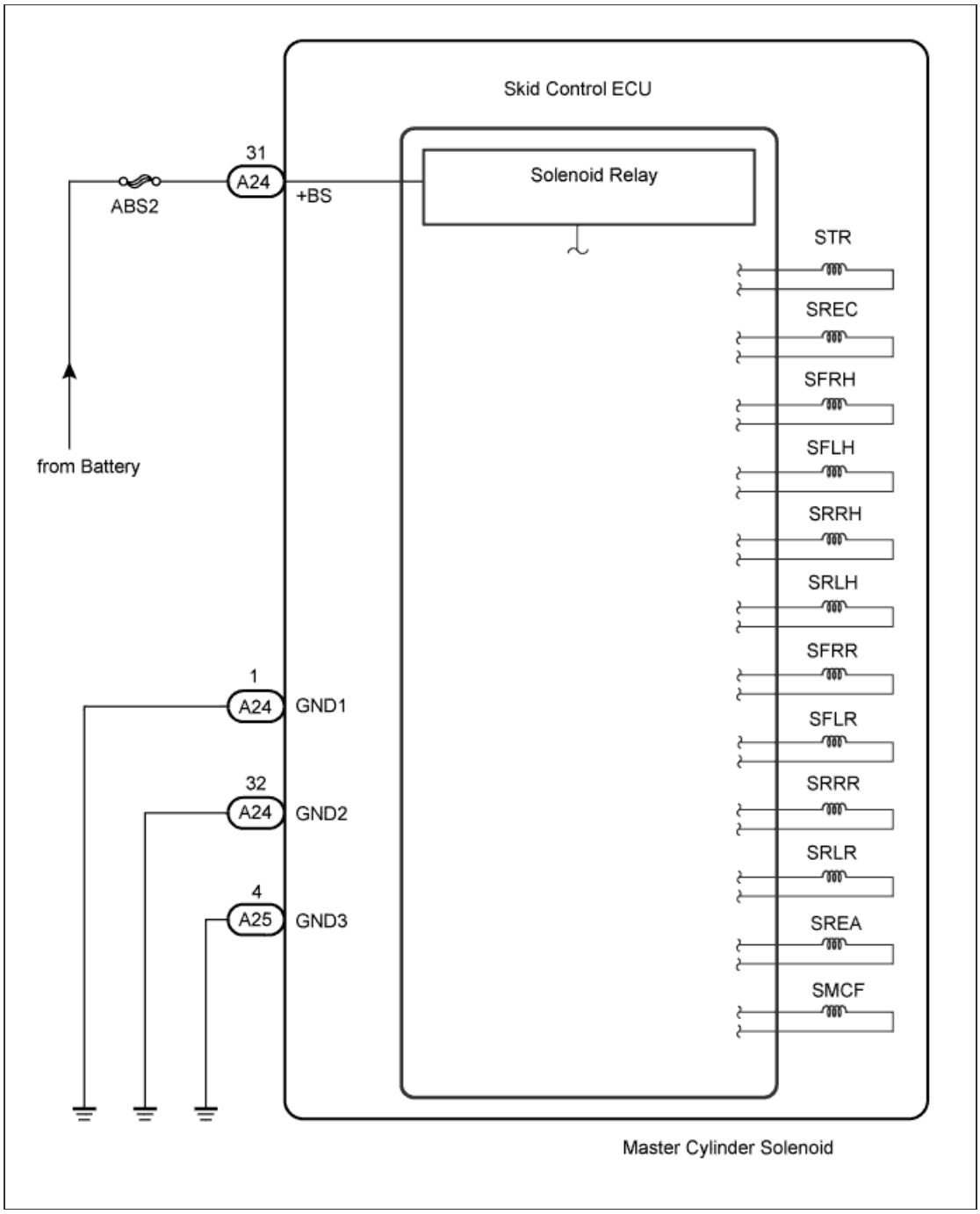
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1415 Rear Speed Sensor RH Output Malfunction

DTC C1277 Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1278 Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1416 Rear Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1415 C1416	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1277 C1278	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1415 and C1277 are for the rear speed sensor RH.**
- **DTCs C1416 and C1278 are for the rear speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1407 and C1408 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 8

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

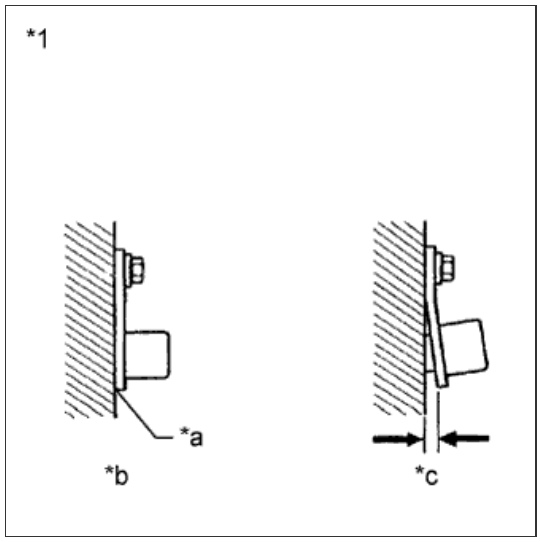
5.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

6.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

7.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

OK:

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

HINT:

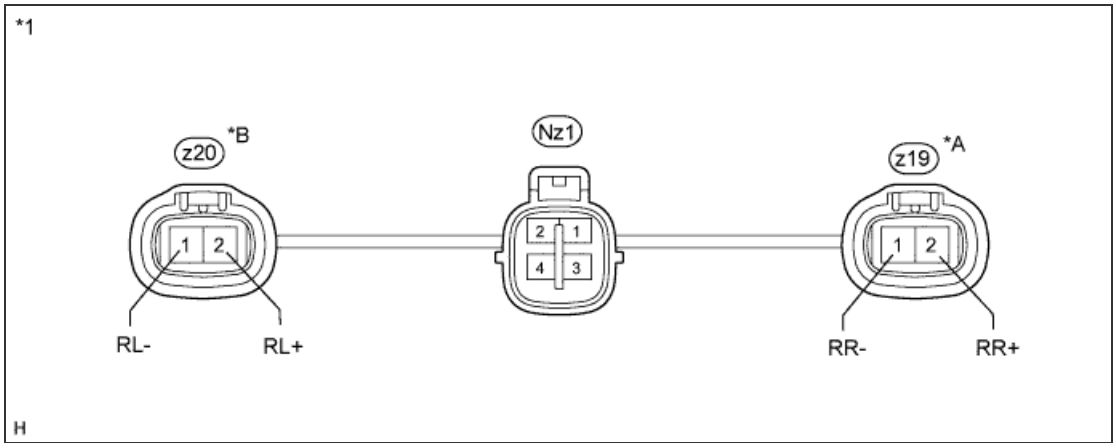
The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

9.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher

A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

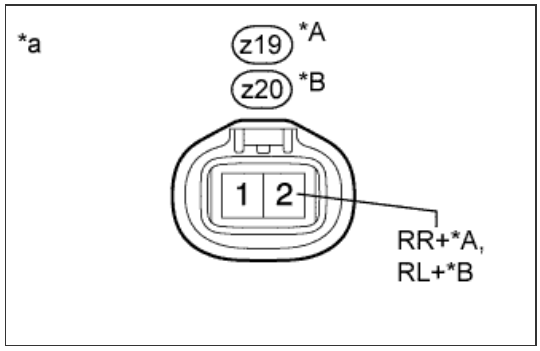
OK

10.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → Go to step 12

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE REAR SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

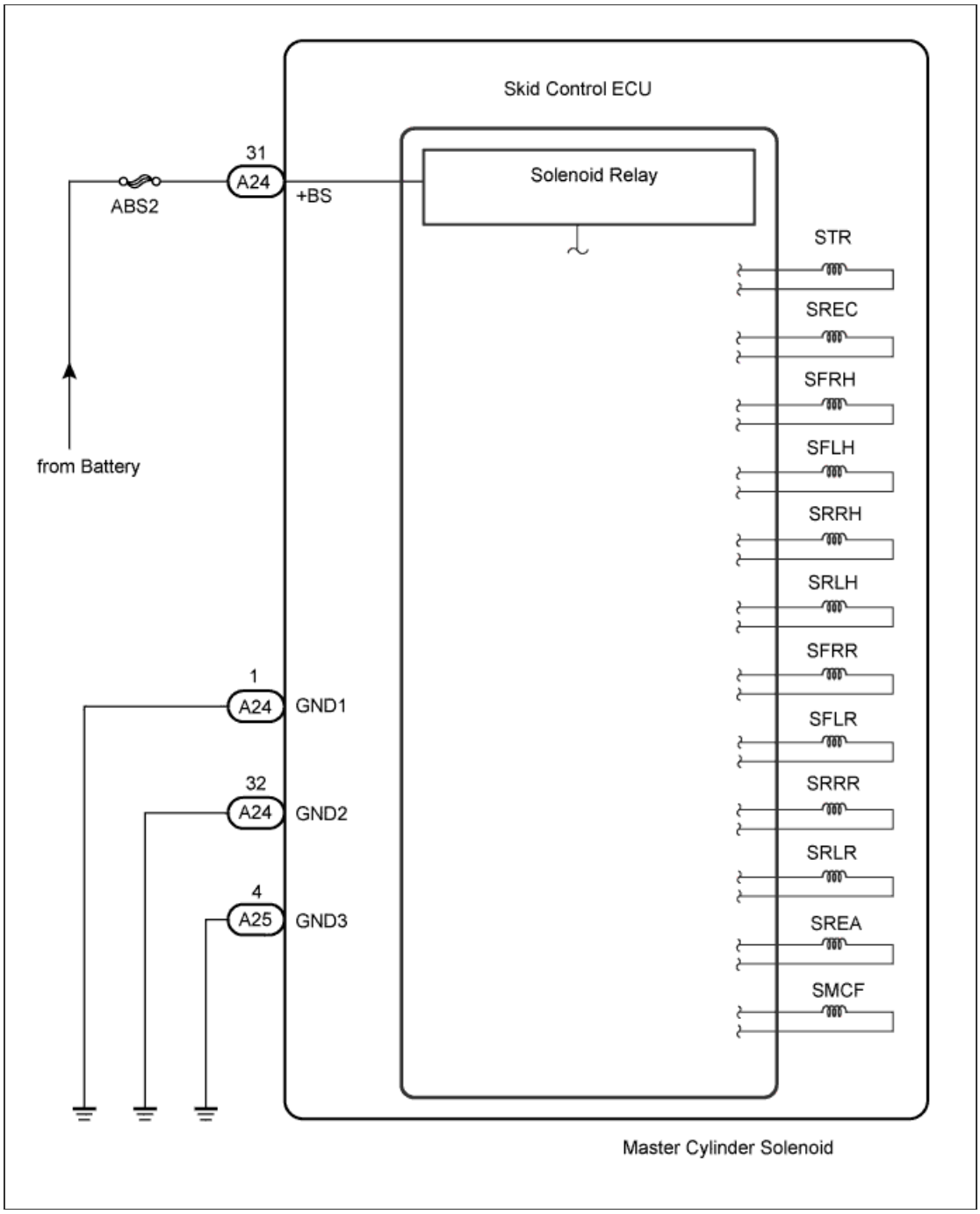
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1415 Rear Speed Sensor RH Output Malfunction

DTC C1277 Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1278 Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1416 Rear Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1415 C1416	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1277 C1278	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1415 and C1277 are for the rear speed sensor RH.**
- **DTCs C1416 and C1278 are for the rear speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1407 and C1408 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 8

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

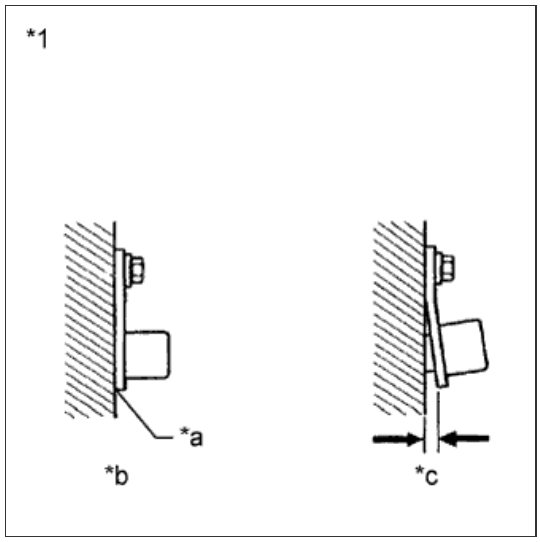
5.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

6.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

7.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

OK:

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

HINT:

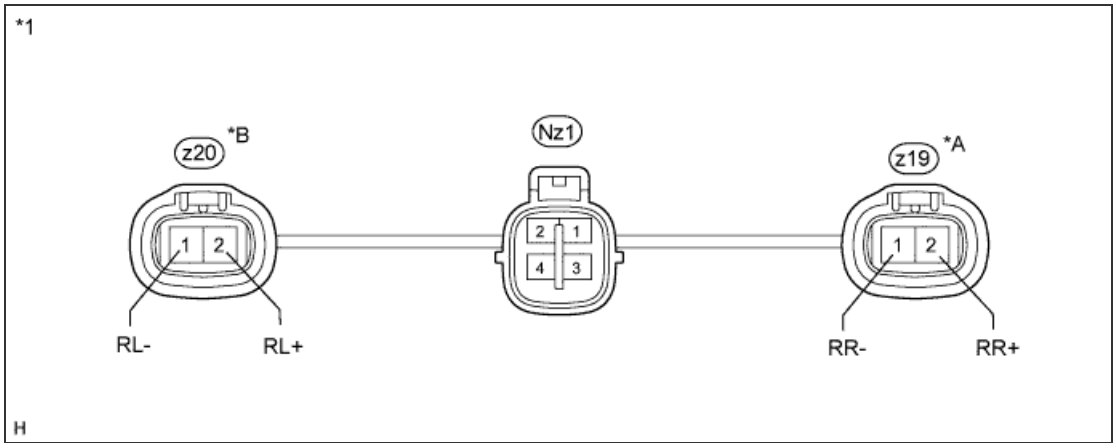
The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

9.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher

A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

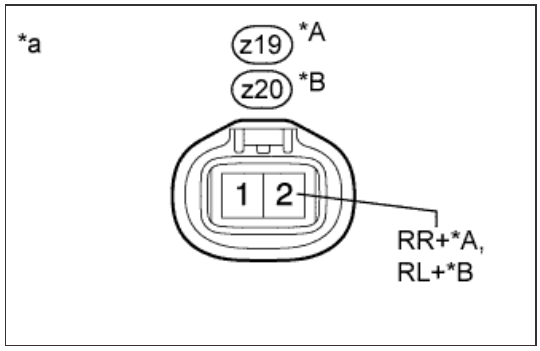
OK

10.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → Go to step 12

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE REAR SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

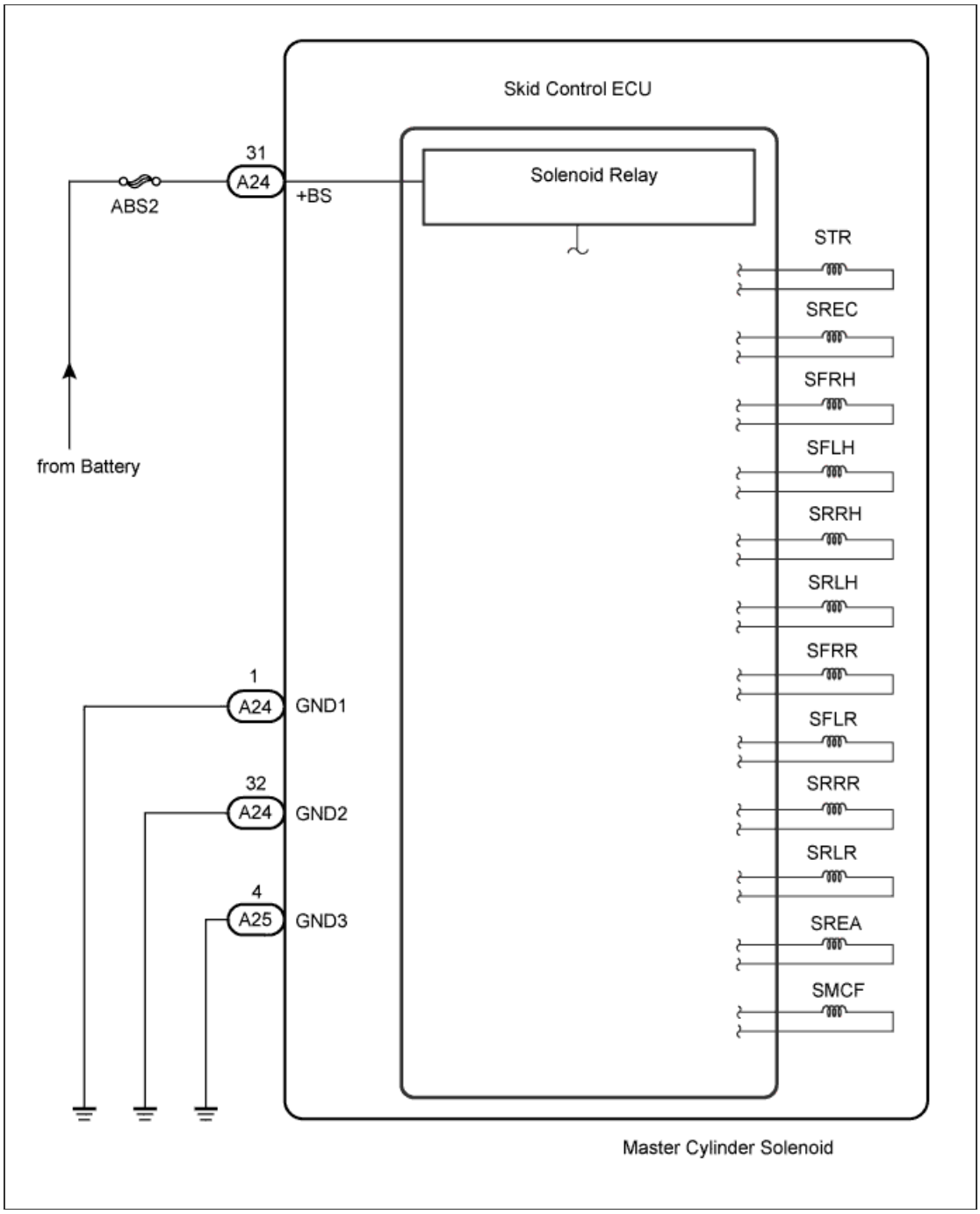
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1415 Rear Speed Sensor RH Output Malfunction

DTC C1277 Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1278 Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1416 Rear Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1415 C1416	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1277 C1278	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1415 and C1277 are for the rear speed sensor RH.**
- **DTCs C1416 and C1278 are for the rear speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1407 and C1408 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 8

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

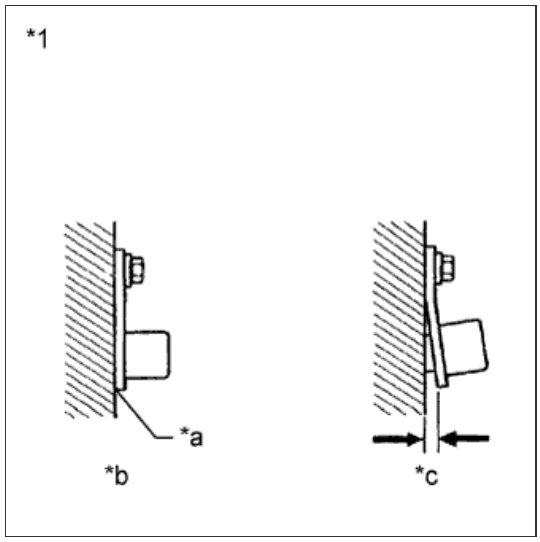
5.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

6.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

7.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

OK:

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

HINT:

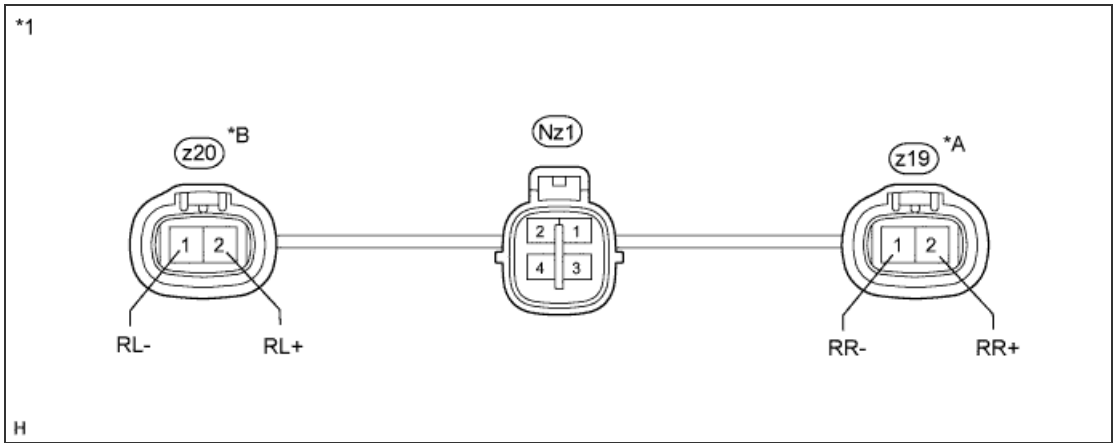
The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

9.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher

A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

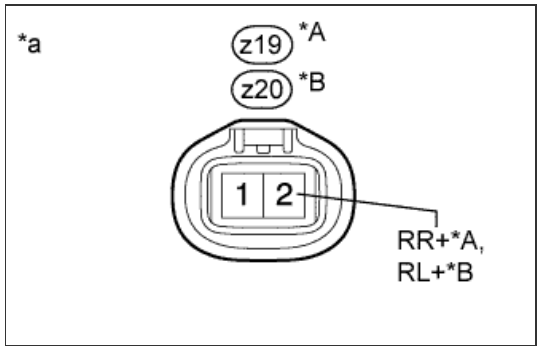
OK

10.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → Go to step 12

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE REAR SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

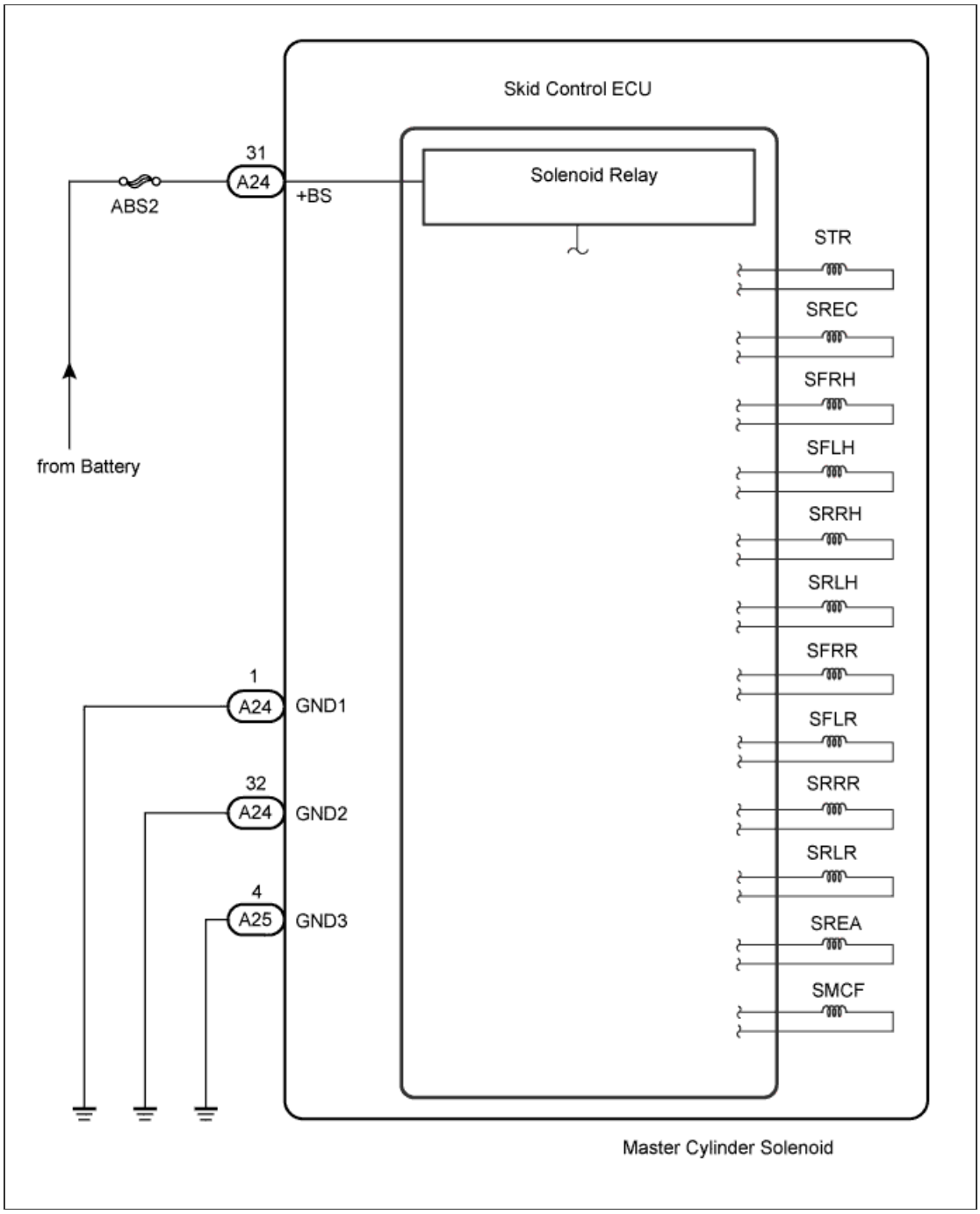
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1415 Rear Speed Sensor RH Output Malfunction

DTC C1277 Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1278 Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1416 Rear Speed Sensor LH Output Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1415 C1416	One of the following conditions is met: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed of 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed of 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Speed sensor rotor • Skid control ECU (Master cylinder solenoid)
C1277 C1278	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor

HINT:

- **DTCs C1415 and C1277 are for the rear speed sensor RH.**
- **DTCs C1416 and C1278 are for the rear speed sensor LH.**

WIRING DIAGRAM

Refer to DTCs C1407 and C1408 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after cleaning or replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 8

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → **Go to step 5**

OK

3.PERFORM TEST MODE (SIGNAL CHECK)

a. Perform the sensor check in the Test Mode Procedure (Click here).

OK:

All test mode DTCs are cleared.

NG → **Go to step 5**

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → **Go to step 12**

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

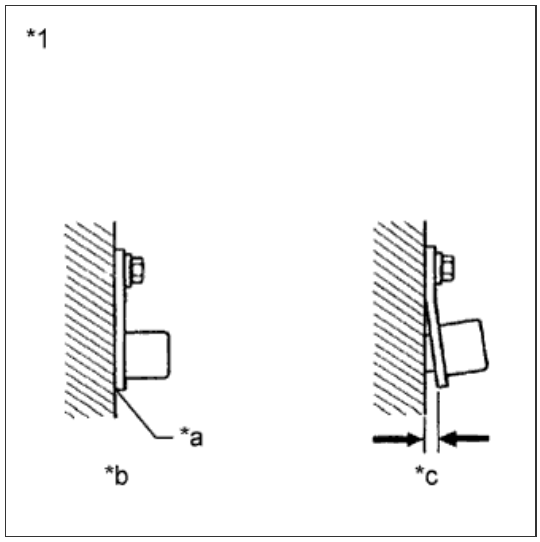
5.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

6.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

7.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

OK:

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

HINT:

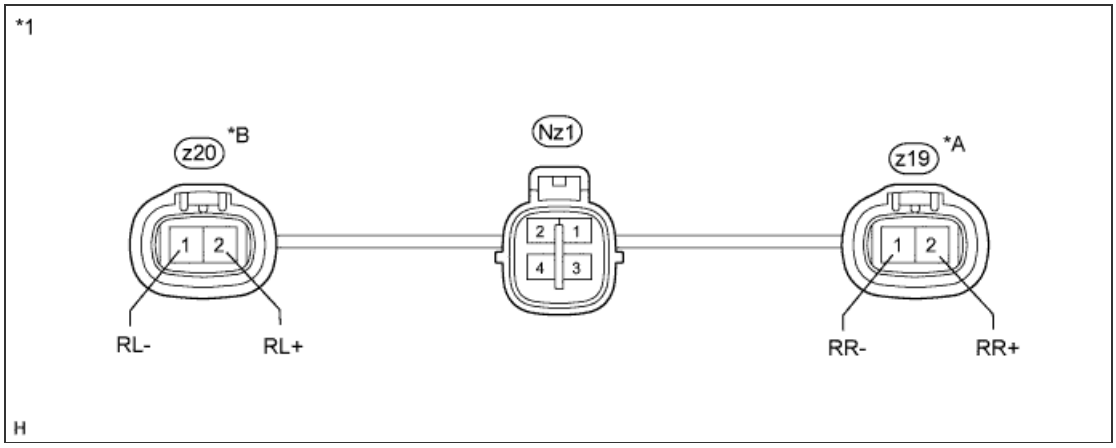
The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

8.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

9.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher

A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

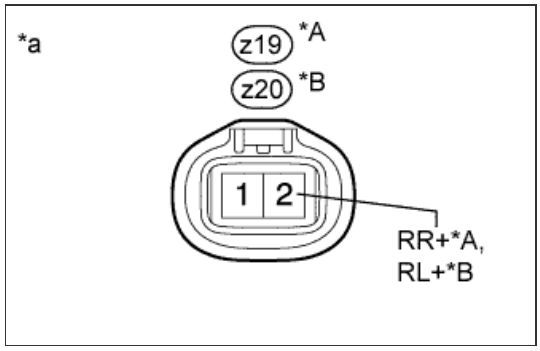
OK

10.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

11.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → Go to step 12

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

12.REPLACE REAR SPEED SENSOR

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

NEXT

13.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

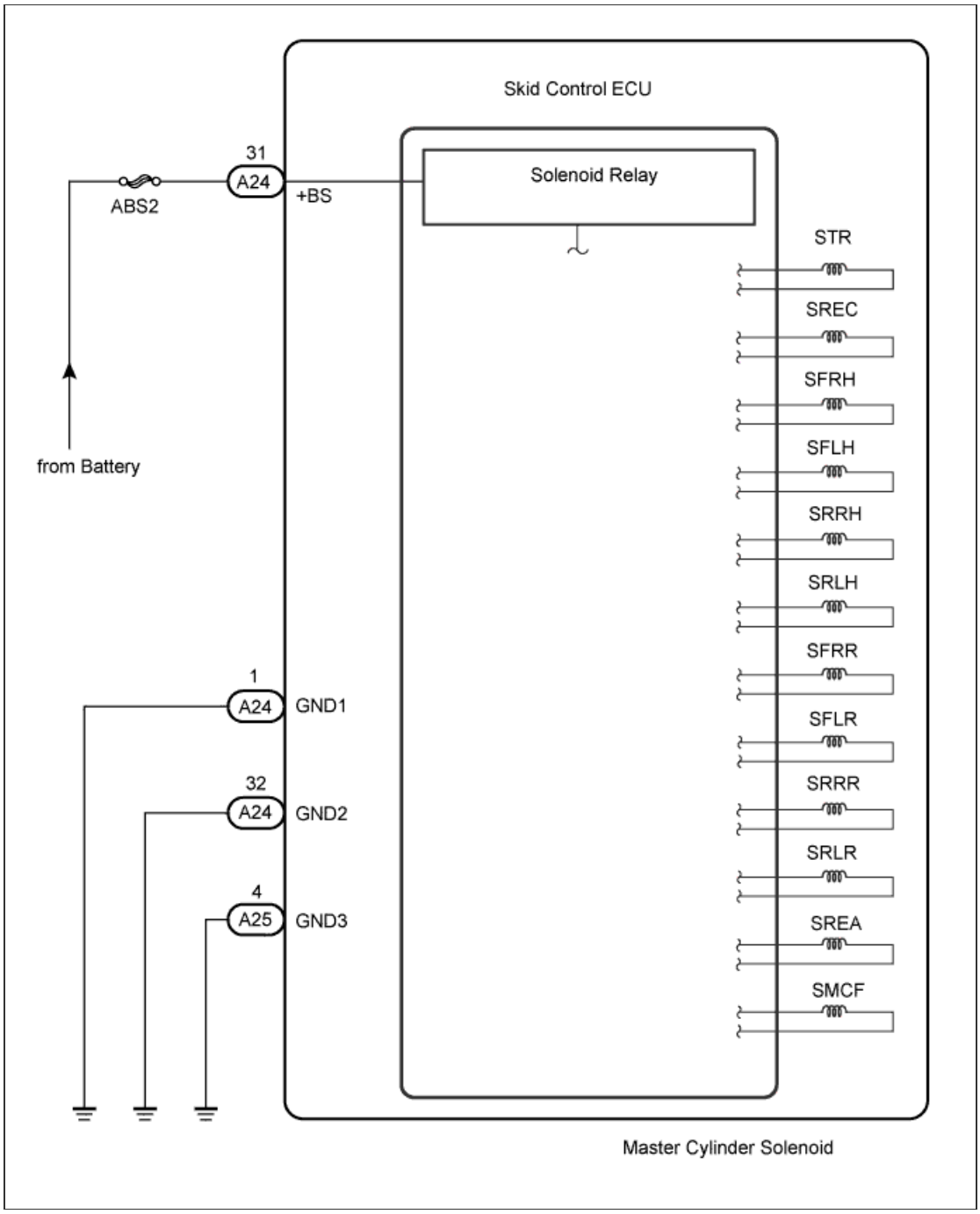
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1417 High Power Supply Voltage Malfunction

for Preparation Click here

DESCRIPTION

If a malfunction is detected in the power supply circuit, the skid control ECU (master cylinder solenoid) stores this DTC and the fail-safe function prohibits ABS/VSC/TRC operation.
This DTC is stored when the IG1 terminal voltage deviates from the DTC detection condition due to a malfunction in the power supply or charging circuit such as the battery or generator circuit, etc.
This DTC is cleared when the IG1 terminal voltage returns to normal.

DTC Code	DTC Detection Condition	Trouble Area
C1417	The IG1 terminal voltage is 17.4 V or higher for 0.8 seconds or more.	• Charging system • Power source circuit • Internal power supply circuit of the skid control ECU (master cylinder solenoid)

WIRING DIAGRAM

Refer to DTC C1241 (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK HARNESS AND CONNECTOR (IG1 TERMINAL)

a. Disconnect the skid control ECU (master cylinder solenoid) connector.

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

Standard Voltage:

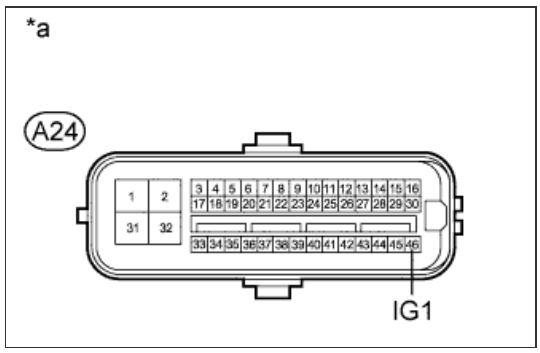
Tester Connection	Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON (Engine running)	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

Result

Result	Proceed to
OK	A
NG (for 1VD-FTV)	B
NG (for 1UR-FE)	C
NG (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

2.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

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

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1225 SM Solenoid Circuit

DTC C1226 SA2 Solenoid Circuit

DTC C1227 SA3 Solenoid Circuit

DTC C1228 STR Solenoid Circuit

DTC C1468 SFR Solenoid Circuit

DTC C1469 SFL Solenoid Circuit

DTC C146A SRR Solenoid Circuit

DTC C146B SRL Solenoid Circuit

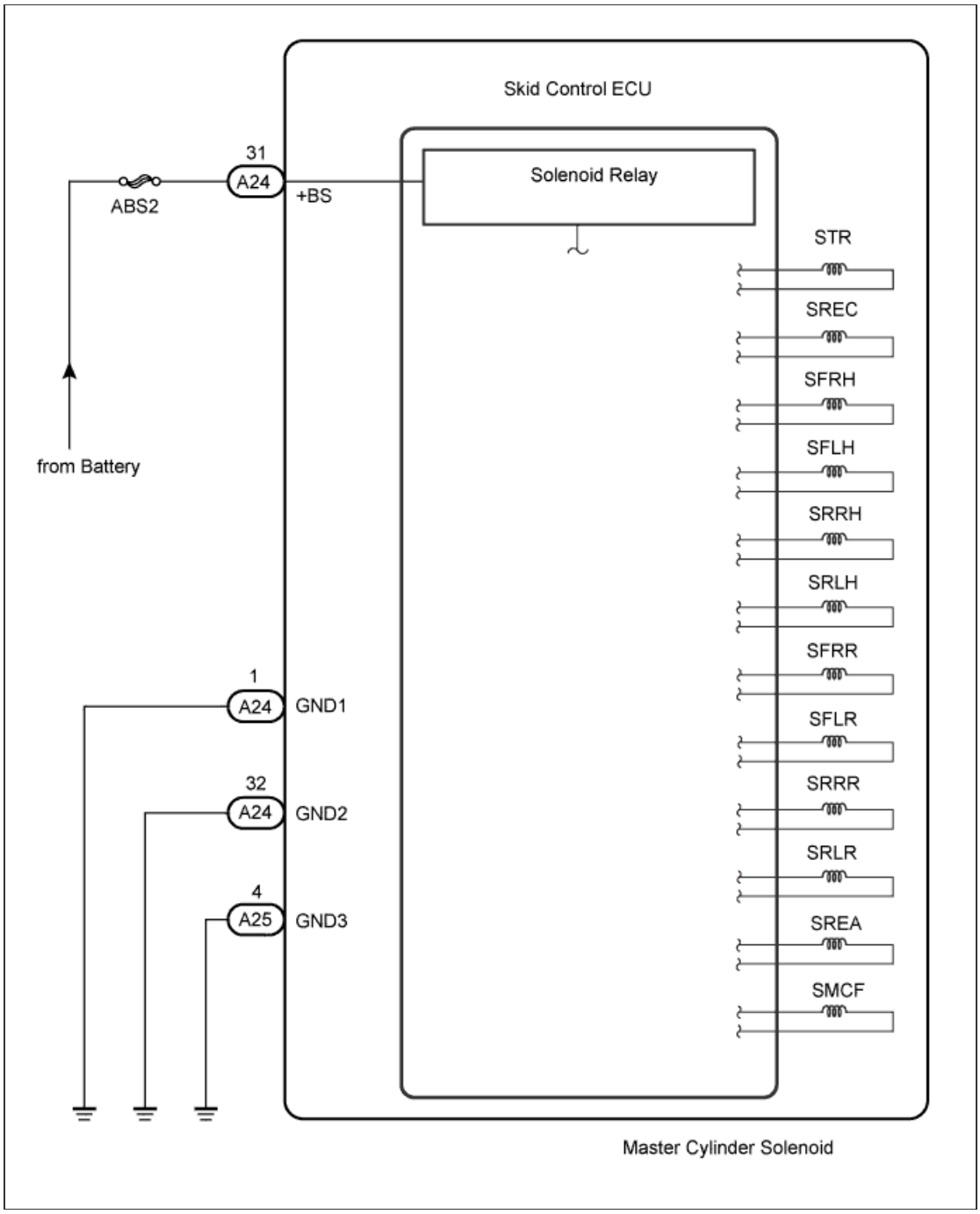
for Preparation Click here

DESCRIPTION

The solenoid turns on when signals are received from the skid control ECU (master cylinder solenoid) and controls the pressure acting on the wheel cylinders, thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C1225	An open or short circuit in the SMCF circuit continues for 0.05 seconds or more.	• SMCF circuit • Master cylinder solenoid
C1226	An open or short circuit in the SREA circuit continues for 0.05 seconds or more.	• SREA circuit • Master cylinder solenoid
C1227	An open or short circuit in the SREC circuit continues for 0.05 seconds or more.	• SREC circuit • Master cylinder solenoid
C1228	An open or short circuit in the STR circuit continues for 0.05 seconds or more.	• STR circuit • Master cylinder solenoid
C1468	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
C1469	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
C146A	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
C146B	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

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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 inspections and solenoid unit inspections 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1419 Acceleration Sensor Internal Circuit

DTC C1435 Yaw Rate Sensor Internal Circuit

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor and detects the vehicle condition using 2 circuits (GL1, GL2).
If there is trouble in the bus lines between the yaw rate sensor assembly and the CAN communication system, DTCs U0123 (malfunction in CAN communication with the yaw rate and acceleration sensor) and U0124 (malfunction in CAN communication with the acceleration sensor) are stored.
These DTCs are also stored when calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1419	A data malfunction signal is received from the acceleration sensor.	Acceleration sensor (Yaw rate sensor assembly)
C1435	A data malfunction signal is received from the yaw rate sensor.	Yaw rate sensor assembly

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245 (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the yaw rate sensor assembly, perform calibration (Click here).

1.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Check for DTCs (Click here).

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output (for LHD)	B
CAN DTC is output (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

REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1232 Acceleration Sensor Stuck Malfunction

DTC C1243 Acceleration Sensor Stuck Malfunction

DTC C1245 Acceleration Sensor Output Malfunction

DTC C1279 Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)

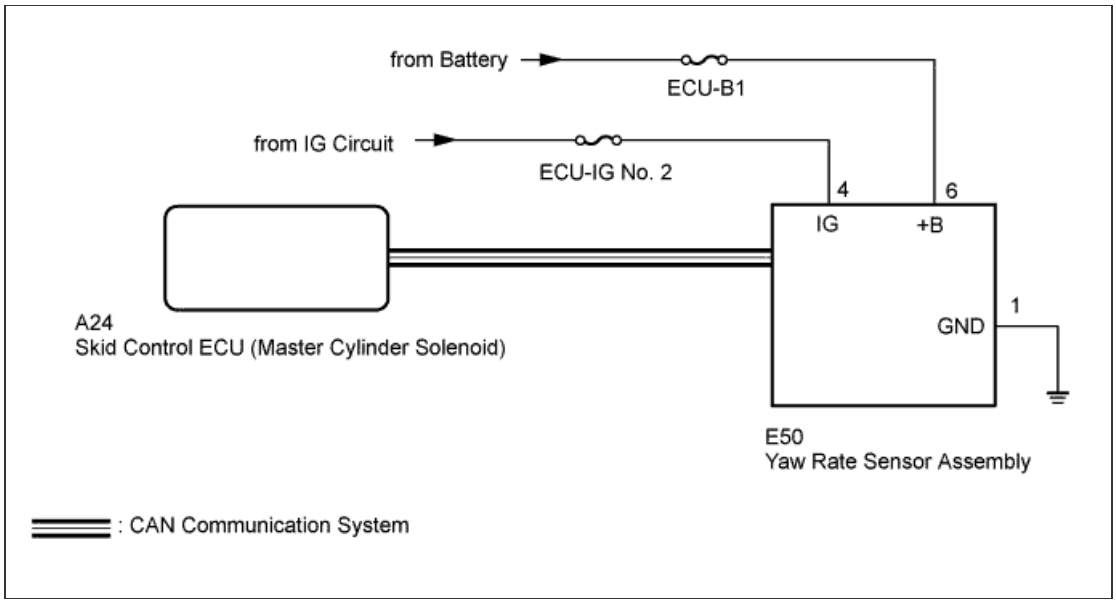
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2). If there is trouble in the bus lines between the yaw rate sensor assembly and the CAN communication system, DTCs U0123 (yaw rate sensor communication trouble) and U0124 (acceleration sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1232	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.	• ECU-IG No. 2 fuse • ECU-B1 fuse • Sensor installation • Harness or connector • Yaw rate sensor assembly • CAN communication system
C1243	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).	
C1245	The following condition continues for at least 60 seconds. • The difference between the values calculated from the acceleration sensor value and vehicle speed exceeds 0.35 G.	
C1279	Stored during test mode.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the yaw rate sensor assembly, perform calibration (Click here).**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

1.CHECK FOR DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Check if DTCs U0073, U0123, C1210 and/or C1336 are output (Click here).

Result

Result	Proceed to
DTC U0073, U0123, C1210 and/or C1336 are not output	A
DTC U0073 and/or U0123 are output (for LHD)	B
DTC U0073 and/or U0123 are output (for RHD)	C
DTC C1210 and/or C1336 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 SENSOR ASSEMBLY INSTALLATION

a. Check that the yaw rate sensor assembly is installed properly (Click here).

OK:

The sensor is tightened to the specified torque. The sensor is not tilted.

NG → INSTALL YAW RATE SENSOR ASSEMBLY CORRECTLY (Click here)

OK

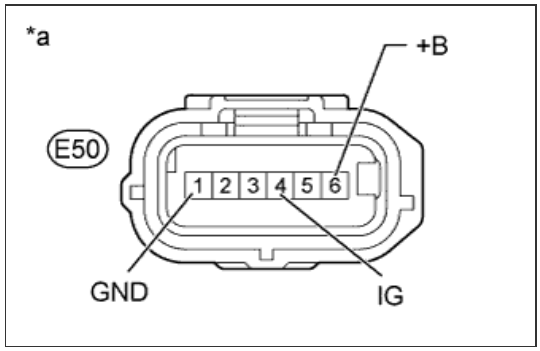
3.CHECK HARNESS AND CONNECTOR (IG/+B/GND TERMINAL)

a. Disconnect the yaw rate sensor assembly connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
E50-6 (+B) - Body ground	Always	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

Text in Illustration

*a	Front view of wire harness connector (to Yaw Rate Sensor Assembly)

Result

Result	Proceed to
OK (When troubleshooting in accordance with Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A → REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1419 Acceleration Sensor Internal Circuit

DTC C1435 Yaw Rate Sensor Internal Circuit

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor and detects the vehicle condition using 2 circuits (GL1, GL2).
If there is trouble in the bus lines between the yaw rate sensor assembly and the CAN communication system, DTCs U0123 (malfunction in CAN communication with the yaw rate and acceleration sensor) and U0124 (malfunction in CAN communication with the acceleration sensor) are stored.
These DTCs are also stored when calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1419	A data malfunction signal is received from the acceleration sensor.	Acceleration sensor (Yaw rate sensor assembly)
C1435	A data malfunction signal is received from the yaw rate sensor.	Yaw rate sensor assembly

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245 (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the yaw rate sensor assembly, perform calibration (Click here).

1.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Check for DTCs (Click here).

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output (for LHD)	B
CAN DTC is output (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

REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1232 Acceleration Sensor Stuck Malfunction

DTC C1243 Acceleration Sensor Stuck Malfunction

DTC C1245 Acceleration Sensor Output Malfunction

DTC C1279 Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)

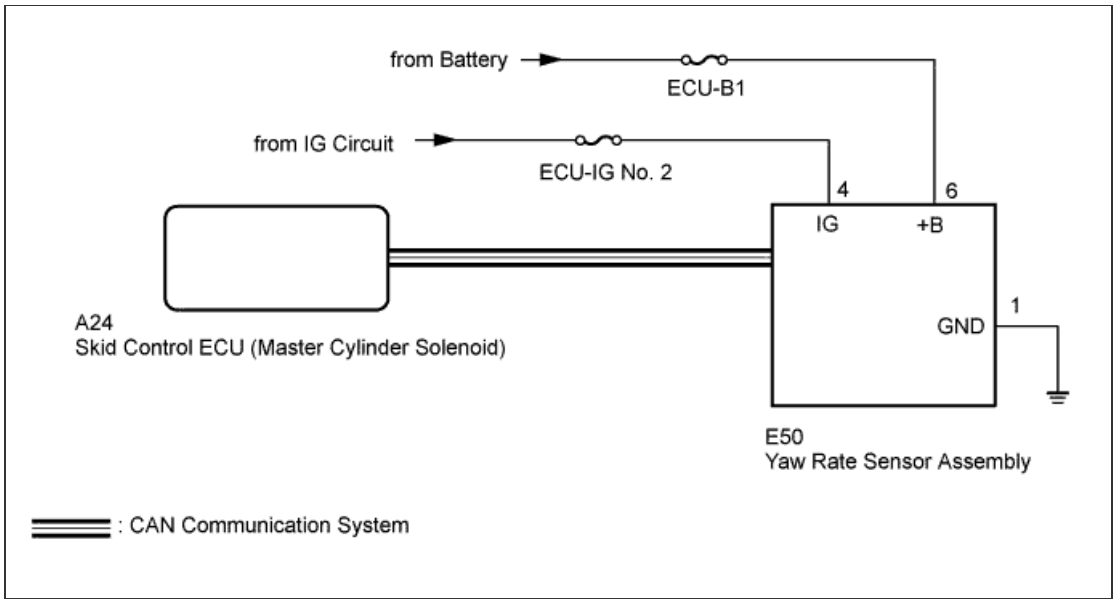
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2). If there is trouble in the bus lines between the yaw rate sensor assembly and the CAN communication system, DTCs U0123 (yaw rate sensor communication trouble) and U0124 (acceleration sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1232	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.	• ECU-IG No. 2 fuse • ECU-B1 fuse • Sensor installation • Harness or connector • Yaw rate sensor assembly • CAN communication system
C1243	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).	
C1245	The following condition continues for at least 60 seconds. • The difference between the values calculated from the acceleration sensor value and vehicle speed exceeds 0.35 G.	
C1279	Stored during test mode.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the yaw rate sensor assembly, perform calibration (Click here).**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

1.CHECK FOR DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Check if DTCs U0073, U0123, C1210 and/or C1336 are output (Click here).

Result

Result	Proceed to
DTC U0073, U0123, C1210 and/or C1336 are not output	A
DTC U0073 and/or U0123 are output (for LHD)	B
DTC U0073 and/or U0123 are output (for RHD)	C
DTC C1210 and/or C1336 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 SENSOR ASSEMBLY INSTALLATION

a. Check that the yaw rate sensor assembly is installed properly (Click here).

OK:

The sensor is tightened to the specified torque. The sensor is not tilted.

NG → INSTALL YAW RATE SENSOR ASSEMBLY CORRECTLY (Click here)

OK

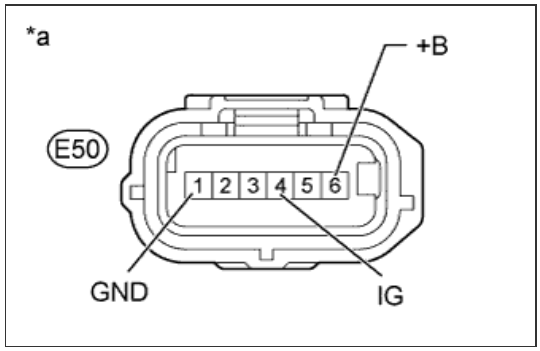
3.CHECK HARNESS AND CONNECTOR (IG/+B/GND TERMINAL)

a. Disconnect the yaw rate sensor assembly connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
E50-6 (+B) - Body ground	Always	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

Text in Illustration

*a	Front view of wire harness connector (to Yaw Rate Sensor Assembly)

Result

Result	Proceed to
OK (When troubleshooting in accordance with Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A → REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1420 Acceleration Sensor Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1419 and C1435 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1420	After the difference between GL1 and GL2 becomes 0.6 G or more with the vehicle stationary, the difference remains 0.4 G or more for 60 seconds or more.	• Sensor installation • Acceleration sensor (Yaw rate sensor assembly)

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245 (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the yaw rate sensor assembly, perform calibration (Click here).

1.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Check for DTCs (Click here).

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output (for LHD)	B
CAN DTC is output (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 YAW RATE SENSOR ASSEMBLY INSTALLATION

a. Check that the yaw rate sensor assembly is installed properly (Click here).

OK:
The sensor is tightened to the specified torque.
The sensor is not installed at an angle.

NG → INSTALL YAW RATE SENSOR ASSEMBLY CORRECTLY (Click here)

OK

REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1232 Acceleration Sensor Stuck Malfunction

DTC C1243 Acceleration Sensor Stuck Malfunction

DTC C1245 Acceleration Sensor Output Malfunction

DTC C1279 Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)

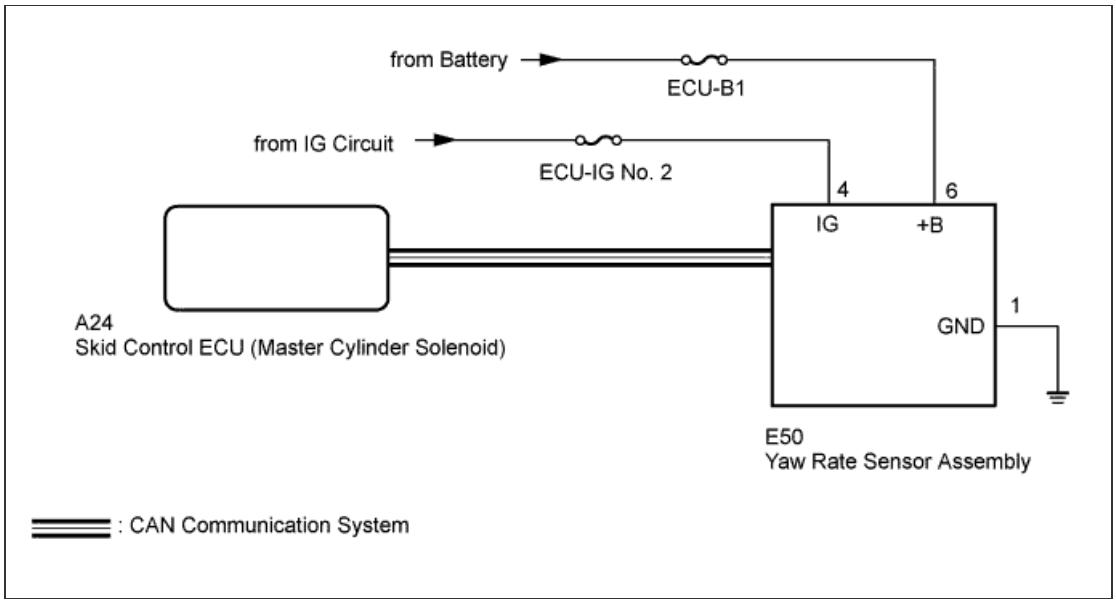
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2). If there is trouble in the bus lines between the yaw rate sensor assembly and the CAN communication system, DTCs U0123 (yaw rate sensor communication trouble) and U0124 (acceleration sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1232	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.	• ECU-IG No. 2 fuse • ECU-B1 fuse • Sensor installation • Harness or connector • Yaw rate sensor assembly • CAN communication system
C1243	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).	
C1245	The following condition continues for at least 60 seconds. • The difference between the values calculated from the acceleration sensor value and vehicle speed exceeds 0.35 G.	
C1279	Stored during test mode.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the yaw rate sensor assembly, perform calibration (Click here).**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

1.CHECK FOR DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Check if DTCs U0073, U0123, C1210 and/or C1336 are output (Click here).

Result

Result	Proceed to
DTC U0073, U0123, C1210 and/or C1336 are not output	A
DTC U0073 and/or U0123 are output (for LHD)	B
DTC U0073 and/or U0123 are output (for RHD)	C
DTC C1210 and/or C1336 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 SENSOR ASSEMBLY INSTALLATION

a. Check that the yaw rate sensor assembly is installed properly (Click here).

OK:

The sensor is tightened to the specified torque. The sensor is not tilted.

NG → INSTALL YAW RATE SENSOR ASSEMBLY CORRECTLY (Click here)

OK

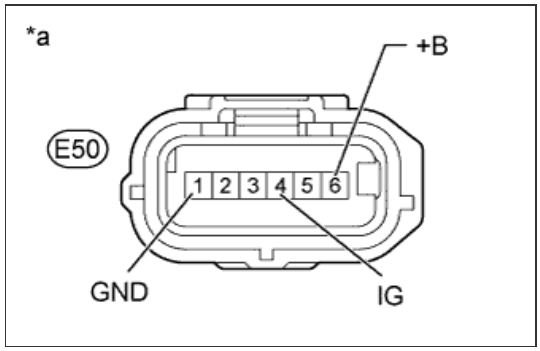
3.CHECK HARNESS AND CONNECTOR (IG/+B/GND TERMINAL)

a. Disconnect the yaw rate sensor assembly connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
E50-6 (+B) - Body ground	Always	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

Text in Illustration

*a	Front view of wire harness connector (to Yaw Rate Sensor Assembly)

Result

Result	Proceed to
OK (When troubleshooting in accordance with Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A → REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1421 Open or Short in Master Cylinder Pressure Sensor

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

DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

DTC C1455 Open or Short in Control Pressure Sensor

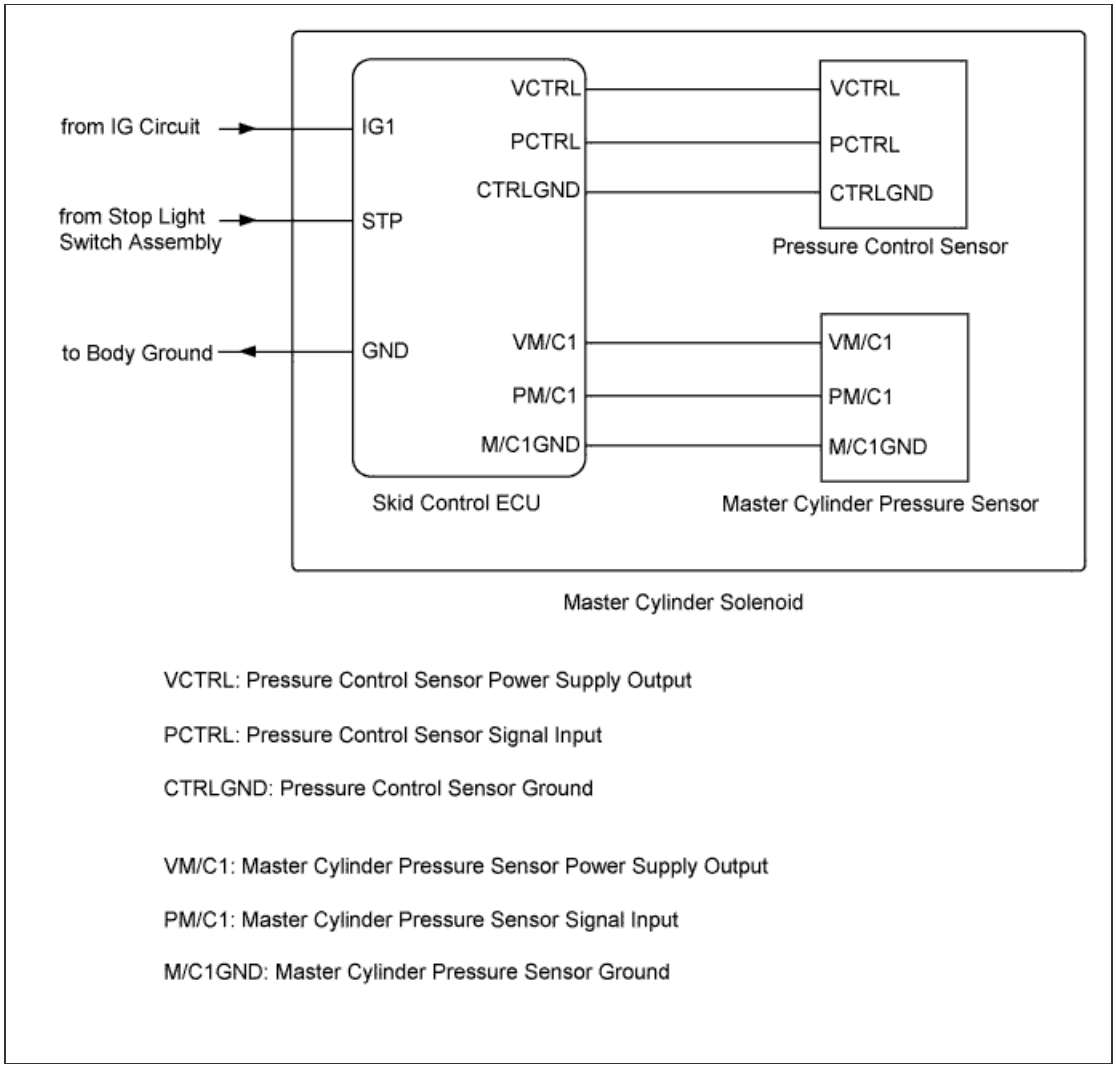
DTC C1457 Control Pressure Sensor Zero Point Low

DTC C1458 Control Pressure Sensor Zero Point Output

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2	Master cylinder solenoid

	seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	
C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid
C1455	The IG1 terminal voltage is 9.5 V or higher and the PCTRL terminal voltage is outside the range of 0.19 to 4.57 V for 1.2 seconds.	Master cylinder solenoid
C1457	The PCTRL terminal voltage is below 0.3 V for 5 seconds.	Master cylinder solenoid
C1458	One of the following conditions is met: • When the vehicle speed is 10 km/h (6 mph) or more, noise occurs in the signal from the PCTRL terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 0 km/h (0 mph), the control pressure does not change by at least 0.048 MPa, and this occurs 5 times. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is between 0.86 and 1.0 V and control pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is 1.0 V or higher and control pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure control sensor input value is sufficiently higher than the estimated control pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

END

DTC C1232 Acceleration Sensor Stuck Malfunction

DTC C1243 Acceleration Sensor Stuck Malfunction

DTC C1245 Acceleration Sensor Output Malfunction

DTC C1279 Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)

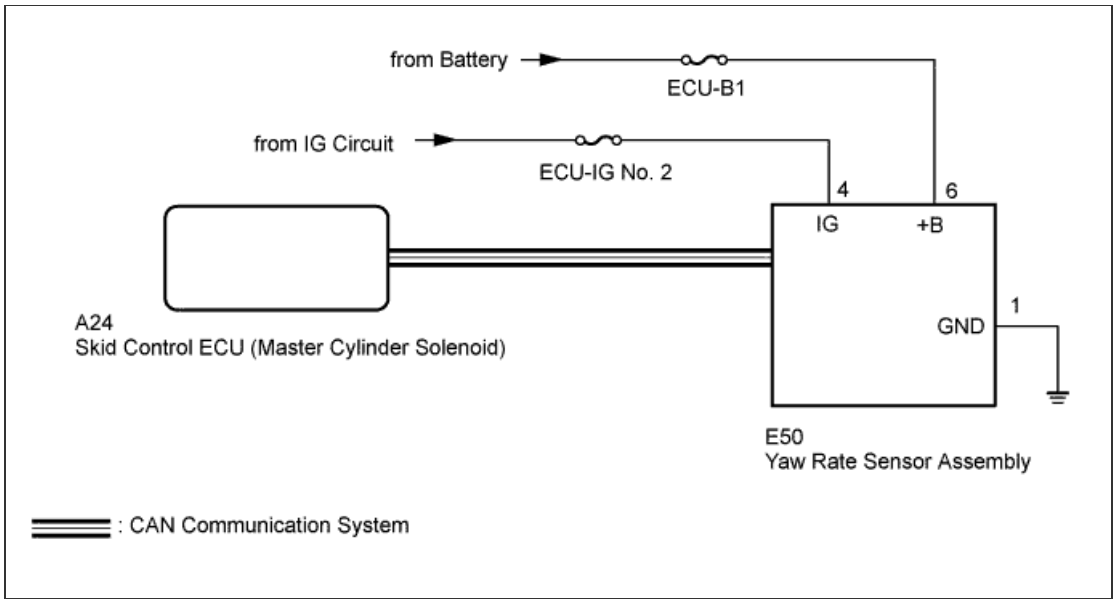
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2). If there is trouble in the bus lines between the yaw rate sensor assembly and the CAN communication system, DTCs U0123 (yaw rate sensor communication trouble) and U0124 (acceleration sensor communication trouble) are stored.

DTC Code	DTC Detection Condition	Trouble Area
C1232	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.	• ECU-IG No. 2 fuse • ECU-B1 fuse • Sensor installation • Harness or connector • Yaw rate sensor assembly • CAN communication system
C1243	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).	
C1245	The following condition continues for at least 60 seconds. • The difference between the values calculated from the acceleration sensor value and vehicle speed exceeds 0.35 G.	
C1279	Stored during test mode.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the yaw rate sensor assembly, perform calibration (Click here).**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

1.CHECK FOR DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON.

d. Check if DTCs U0073, U0123, C1210 and/or C1336 are output (Click here).

Result

Result	Proceed to
DTC U0073, U0123, C1210 and/or C1336 are not output	A
DTC U0073 and/or U0123 are output (for LHD)	B
DTC U0073 and/or U0123 are output (for RHD)	C
DTC C1210 and/or C1336 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 SENSOR ASSEMBLY INSTALLATION

a. Check that the yaw rate sensor assembly is installed properly (Click here).

OK:

The sensor is tightened to the specified torque. The sensor is not tilted.

NG → INSTALL YAW RATE SENSOR ASSEMBLY CORRECTLY (Click here)

OK

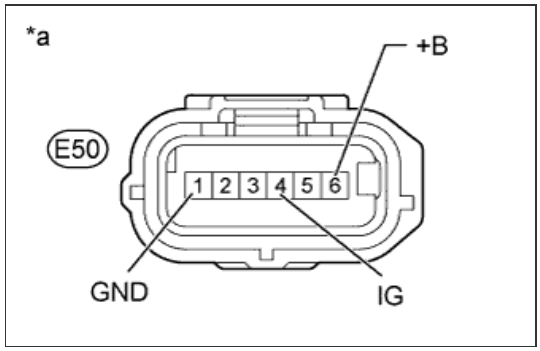
3.CHECK HARNESS AND CONNECTOR (IG/+B/GND TERMINAL)

a. Disconnect the yaw rate sensor assembly connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
E50-6 (+B) - Body ground	Always	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

Text in Illustration

*a	Front view of wire harness connector (to Yaw Rate Sensor Assembly)

Result

Result	Proceed to
OK (When troubleshooting in accordance with Diagnostic Trouble Code Chart)	A
OK (When troubleshooting in accordance with Problem Symptoms Table)	B
NG	C

B → PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A → REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1421 Open or Short in Master Cylinder Pressure Sensor

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

DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

DTC C1455 Open or Short in Control Pressure Sensor

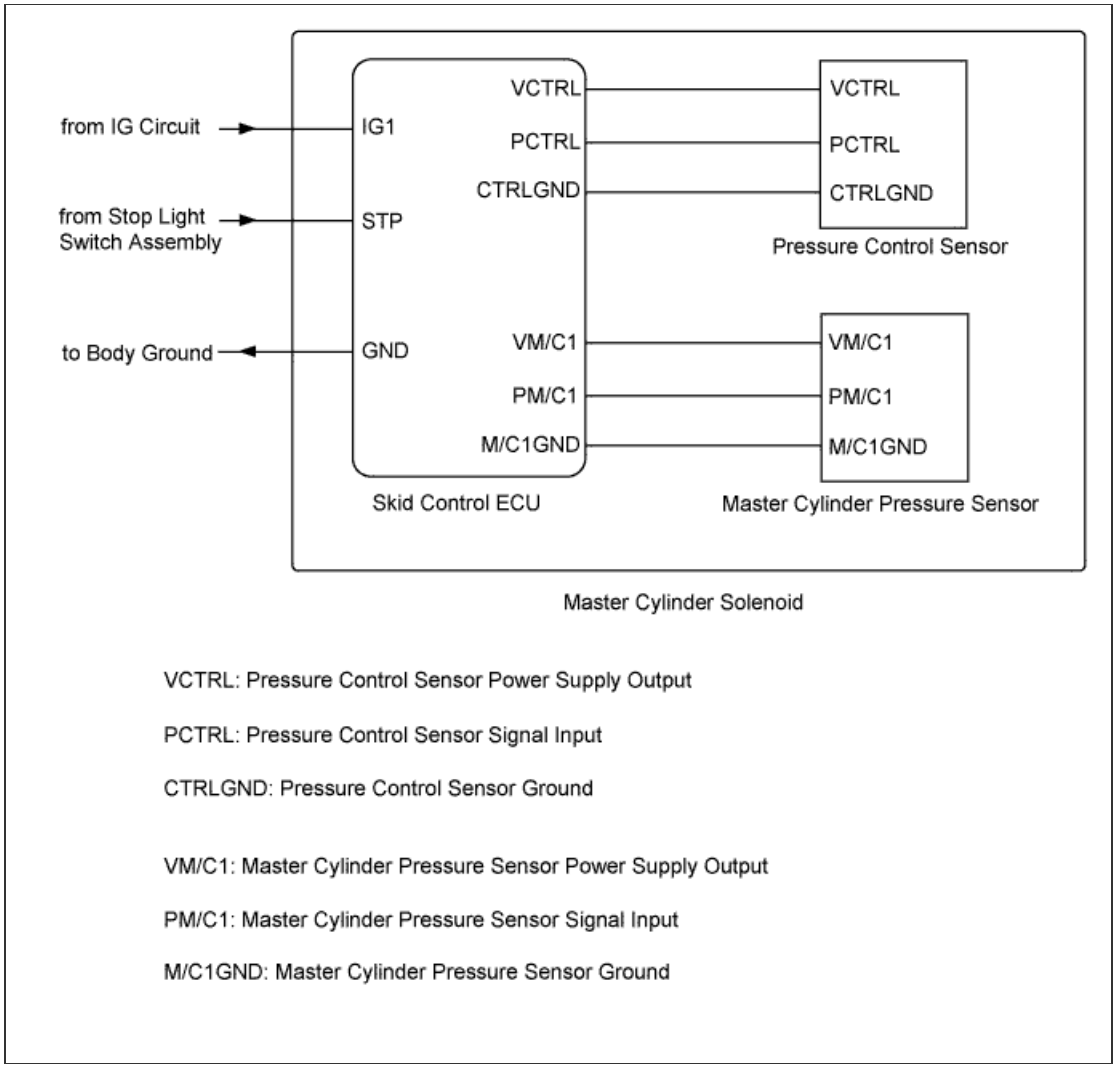
DTC C1457 Control Pressure Sensor Zero Point Low

DTC C1458 Control Pressure Sensor Zero Point Output

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2	Master cylinder solenoid

	seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	
C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid
C1455	The IG1 terminal voltage is 9.5 V or higher and the PCTRL terminal voltage is outside the range of 0.19 to 4.57 V for 1.2 seconds.	Master cylinder solenoid
C1457	The PCTRL terminal voltage is below 0.3 V for 5 seconds.	Master cylinder solenoid
C1458	One of the following conditions is met: • When the vehicle speed is 10 km/h (6 mph) or more, noise occurs in the signal from the PCTRL terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 0 km/h (0 mph), the control pressure does not change by at least 0.048 MPa, and this occurs 5 times. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is between 0.86 and 1.0 V and control pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is 1.0 V or higher and control pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure control sensor input value is sufficiently higher than the estimated control pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

END

DTC C1241 Low Power Supply Voltage Malfunction

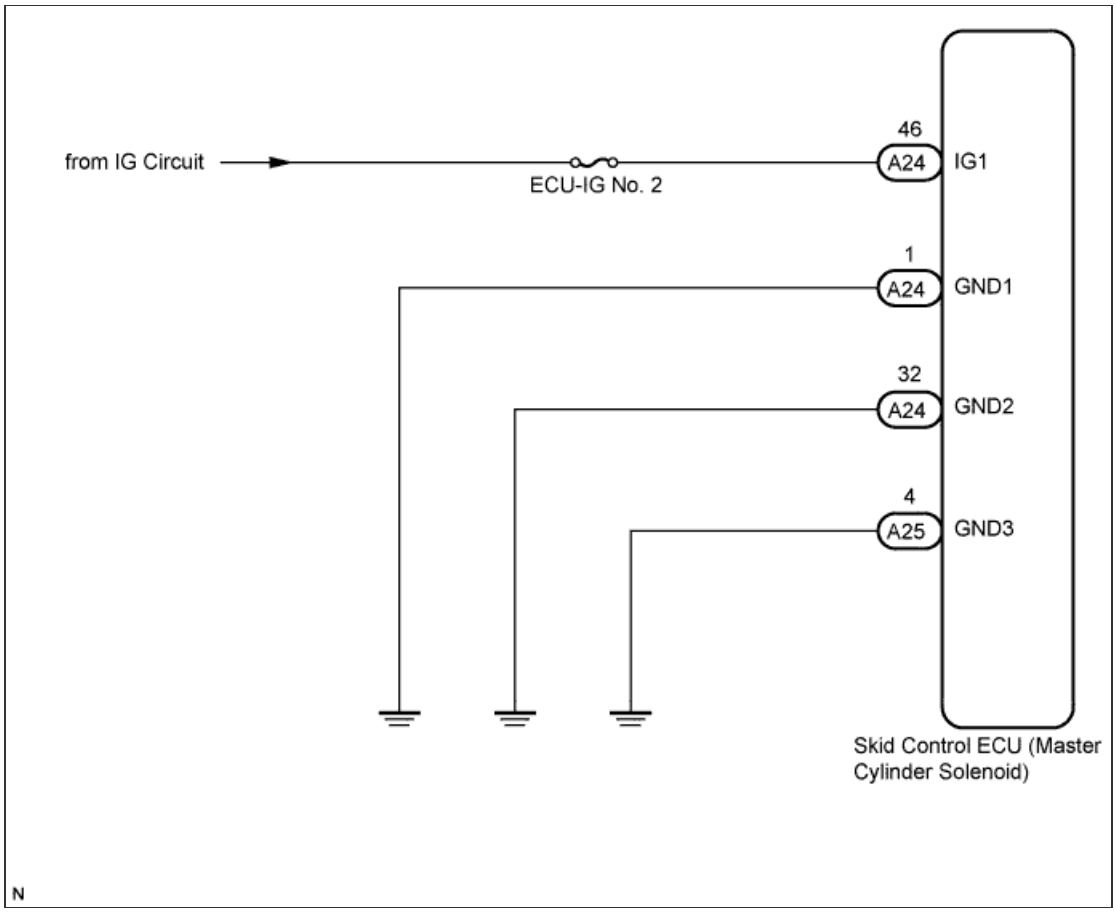
for Preparation Click here

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 generator circuit, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1241	Either condition is met: 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 • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (IG1 VOLTAGE VALUE)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Start the engine.

f. 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	Ignition switch ON: 11 to 14 V	-

g. Check the voltage output from the skid control ECU (master cylinder solenoid) displayed on the GTS.

OK:

The output voltage displayed on the GTS is within 11 to 14 V.

NG → Go to step 3

OK ↓

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

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 (for LHD)	A
DTC is output (for RHD)	B
DTC is not output (When troubleshooting in accordance with Diagnostic Trouble Code Chart)	C
DTC is not output (When troubleshooting in accordance with Problem Symptoms Table)	D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → CHECK FOR INTERMITTENT PROBLEMS (Click here)

D → PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A ↓

REPLACE MASTER CYLINDER SOLENOID (Click here)

3.CHECK HARNESS AND CONNECTOR (IG1 TERMINAL)

a. Disconnect the skid control ECU (master cylinder solenoid) connector.

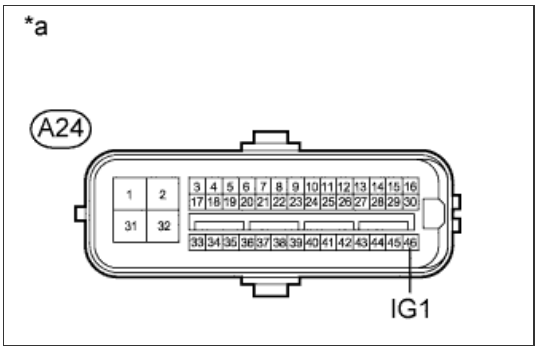
b. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Master Cylinder Solenoid))



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

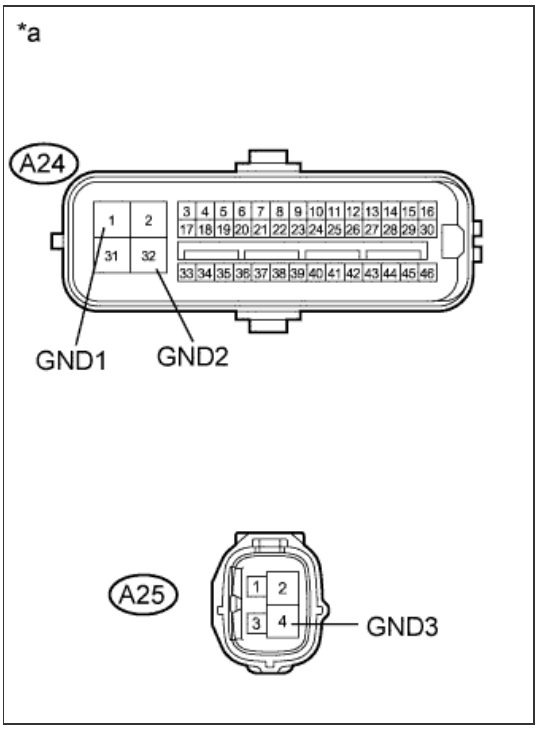
c. Measure the resistance according to the value(s) in the table below.

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.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
DTC is output (for RHD)	B
DTC is not output (When troubleshooting in accordance with Diagnostic Trouble Code Chart)	C
DTC is not output (When troubleshooting in accordance with Problem Symptoms Table)	D

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

CHECK FOR INTERMITTENT PROBLEMS (Click here)

D

PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE (Click here)

A

REPLACE MASTER CYLINDER SOLENOID (Click here)

DTC C1421 Open or Short in Master Cylinder Pressure Sensor

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

DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

DTC C1455 Open or Short in Control Pressure Sensor

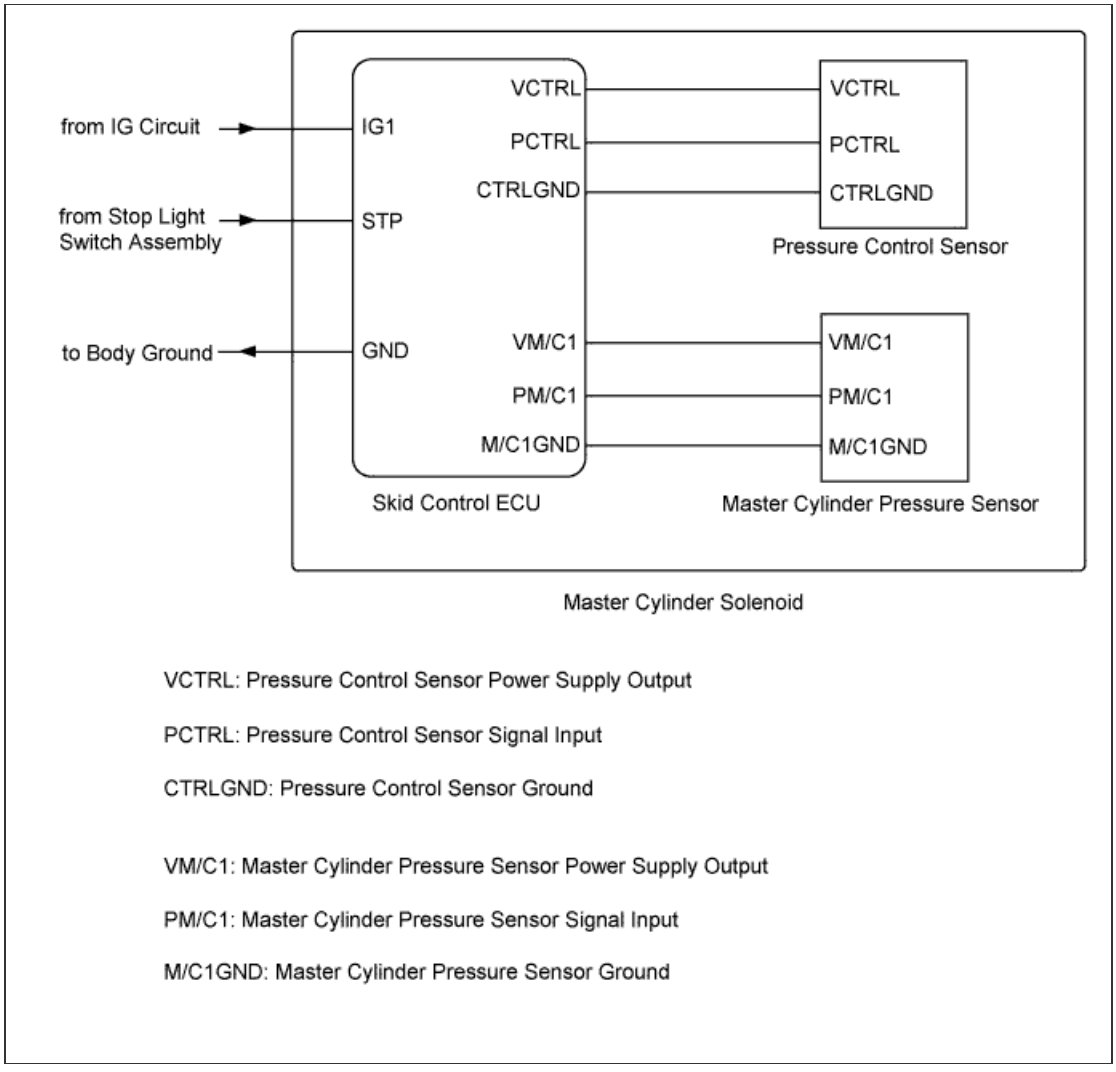
DTC C1457 Control Pressure Sensor Zero Point Low

DTC C1458 Control Pressure Sensor Zero Point Output

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2	Master cylinder solenoid

	seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	
C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid
C1455	The IG1 terminal voltage is 9.5 V or higher and the PCTRL terminal voltage is outside the range of 0.19 to 4.57 V for 1.2 seconds.	Master cylinder solenoid
C1457	The PCTRL terminal voltage is below 0.3 V for 5 seconds.	Master cylinder solenoid
C1458	One of the following conditions is met: • When the vehicle speed is 10 km/h (6 mph) or more, noise occurs in the signal from the PCTRL terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 0 km/h (0 mph), the control pressure does not change by at least 0.048 MPa, and this occurs 5 times. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is between 0.86 and 1.0 V and control pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is 1.0 V or higher and control pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure control sensor input value is sufficiently higher than the estimated control pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

END

DTC C1242 Open Circuit in IG1/IG2 Power Source Circuit

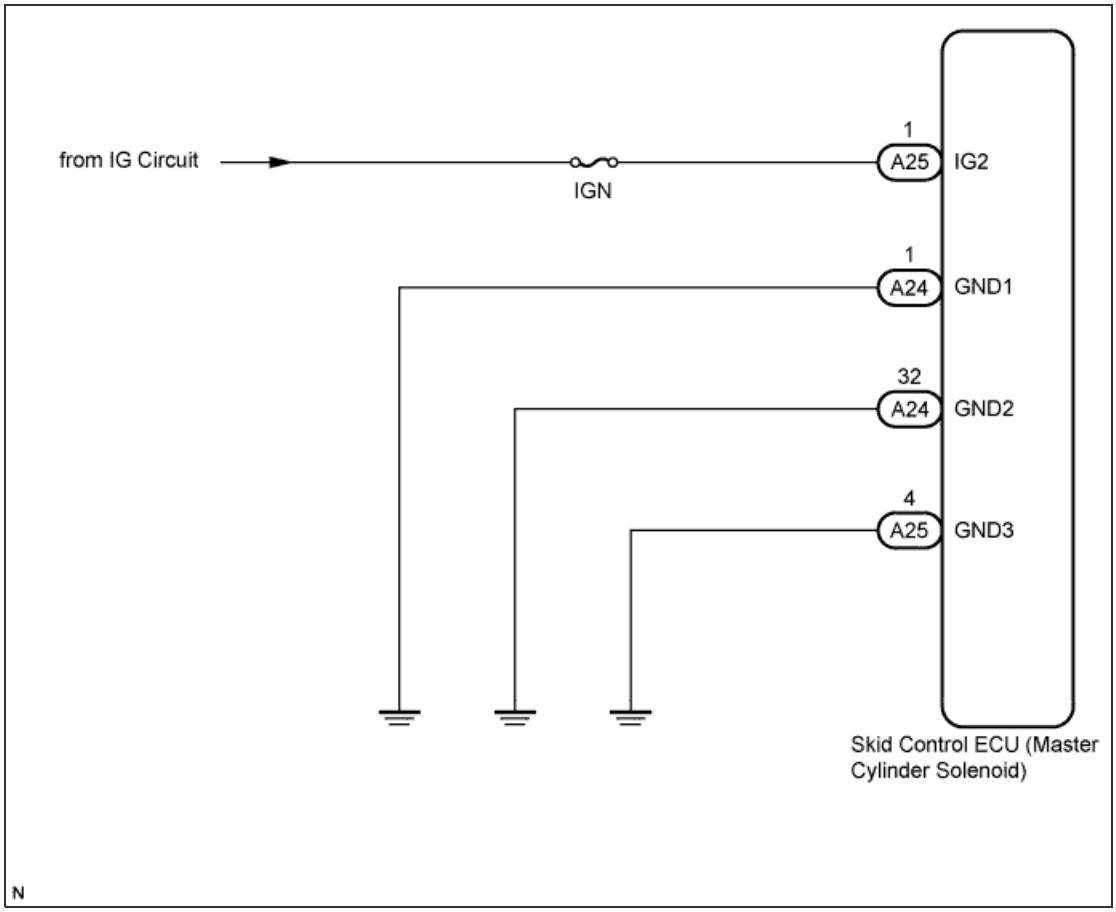
for Preparation Click here

DESCRIPTION

If there is a problem with the skid control ECU (master cylinder solenoid) power supply circuit, the skid control ECU (master cylinder solenoid) 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 generator circuit, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1242	The vehicle speed is 3 km/h (2 mph) or more and the voltage at the ECU IG2 terminal remains below 6.5 V for more than 7 seconds.	• Battery • IGN fuse • Charging system • Harness or connector • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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

1.CHECK HARNESS AND CONNECTOR (IG2 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

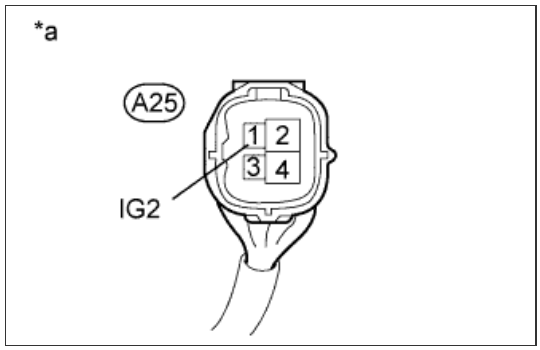
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

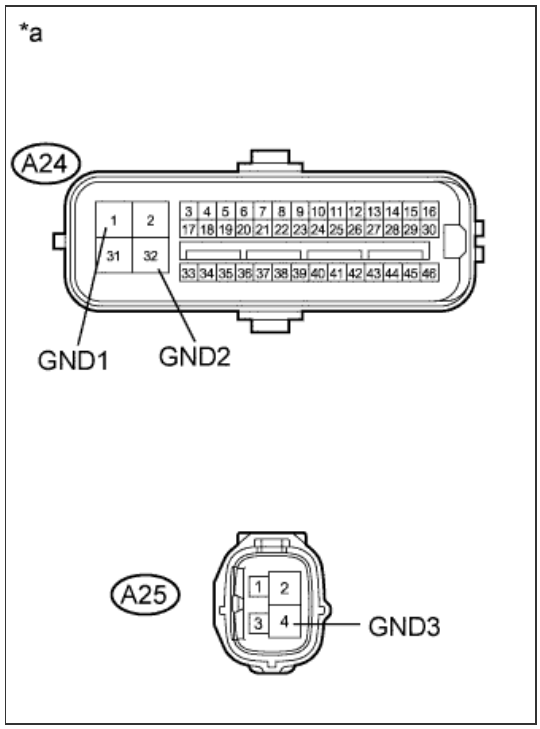
c. Measure the resistance according to the value(s) in the table below.

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

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 (for LHD)	B
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1421 Open or Short in Master Cylinder Pressure Sensor

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

DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

DTC C1455 Open or Short in Control Pressure Sensor

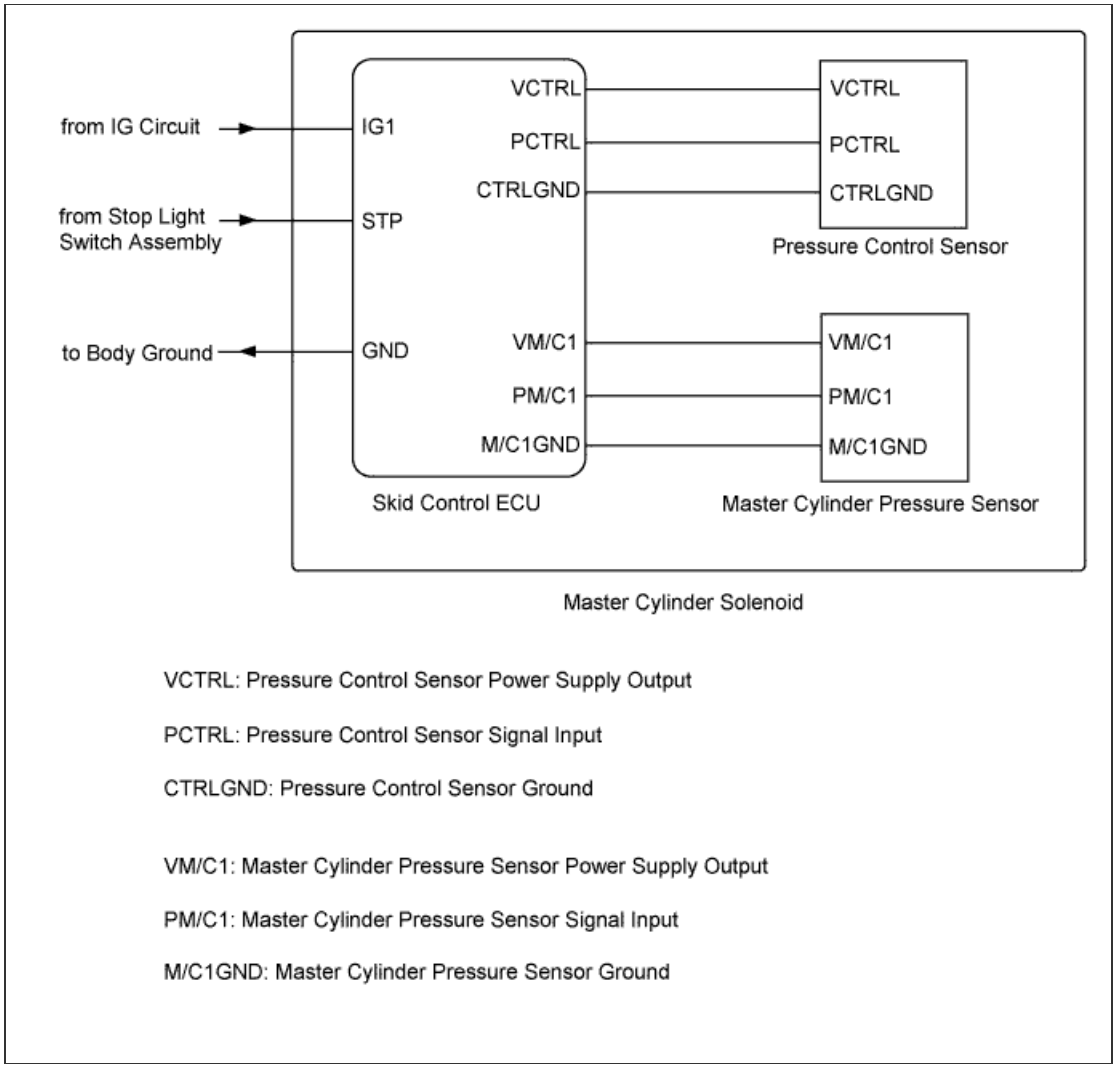
DTC C1457 Control Pressure Sensor Zero Point Low

DTC C1458 Control Pressure Sensor Zero Point Output

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2	Master cylinder solenoid

	seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	
C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid
C1455	The IG1 terminal voltage is 9.5 V or higher and the PCTRL terminal voltage is outside the range of 0.19 to 4.57 V for 1.2 seconds.	Master cylinder solenoid
C1457	The PCTRL terminal voltage is below 0.3 V for 5 seconds.	Master cylinder solenoid
C1458	One of the following conditions is met: • When the vehicle speed is 10 km/h (6 mph) or more, noise occurs in the signal from the PCTRL terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 0 km/h (0 mph), the control pressure does not change by at least 0.048 MPa, and this occurs 5 times. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is between 0.86 and 1.0 V and control pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is 1.0 V or higher and control pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure control sensor input value is sufficiently higher than the estimated control pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

END

DTC C1251 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 (master cylinder solenoid).

DTC Code	DTC Detection Condition	Trouble Area
C1251	There is an open in the motor system circuit (motor input circuit).	• Pump motor wire harness connection • Brake booster with accumulator pump assembly • Skid control ECU (Master cylinder solenoid)

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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. Remove the hydraulic brake booster assembly (for LHD: Click here, for RHD: Click here).

b. Check the tightening torque of the 2 screws which secure the wire harness connecting the master cylinder solenoid and brake booster with accumulator pump assembly (for LHD: Click here, for RHD: Click here).

OK:
The harness is tightened to the specified torque.

NG → RETIGHTEN SCREWS

OK

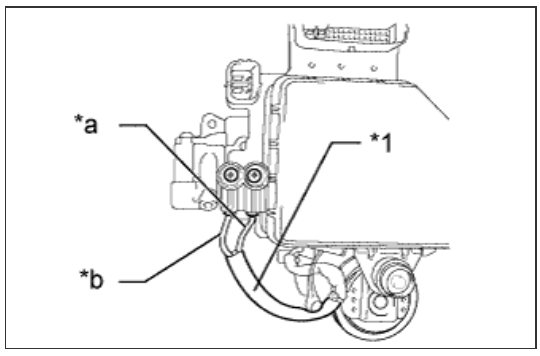
2.CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS

a. Using a screwdriver, remove the 2 screws and pull out the wire harness from the master cylinder solenoid.

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	Below 2 Ω



Text in Illustration

*1	Pump motor wire harness
*a	Red wire
*b	Black wire

HINT:

Refer to the brake booster with accumulator pump assembly installation procedures:

- **for LHD (Click here)**
- **for RHD (Click here)**

NG → REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

OK

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 DTCs (Click here).

d. Turn the ignition switch off.

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
DTC is output (for RHD)	C

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

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

A

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

DTC C1421 Open or Short in Master Cylinder Pressure Sensor

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

DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

DTC C1455 Open or Short in Control Pressure Sensor

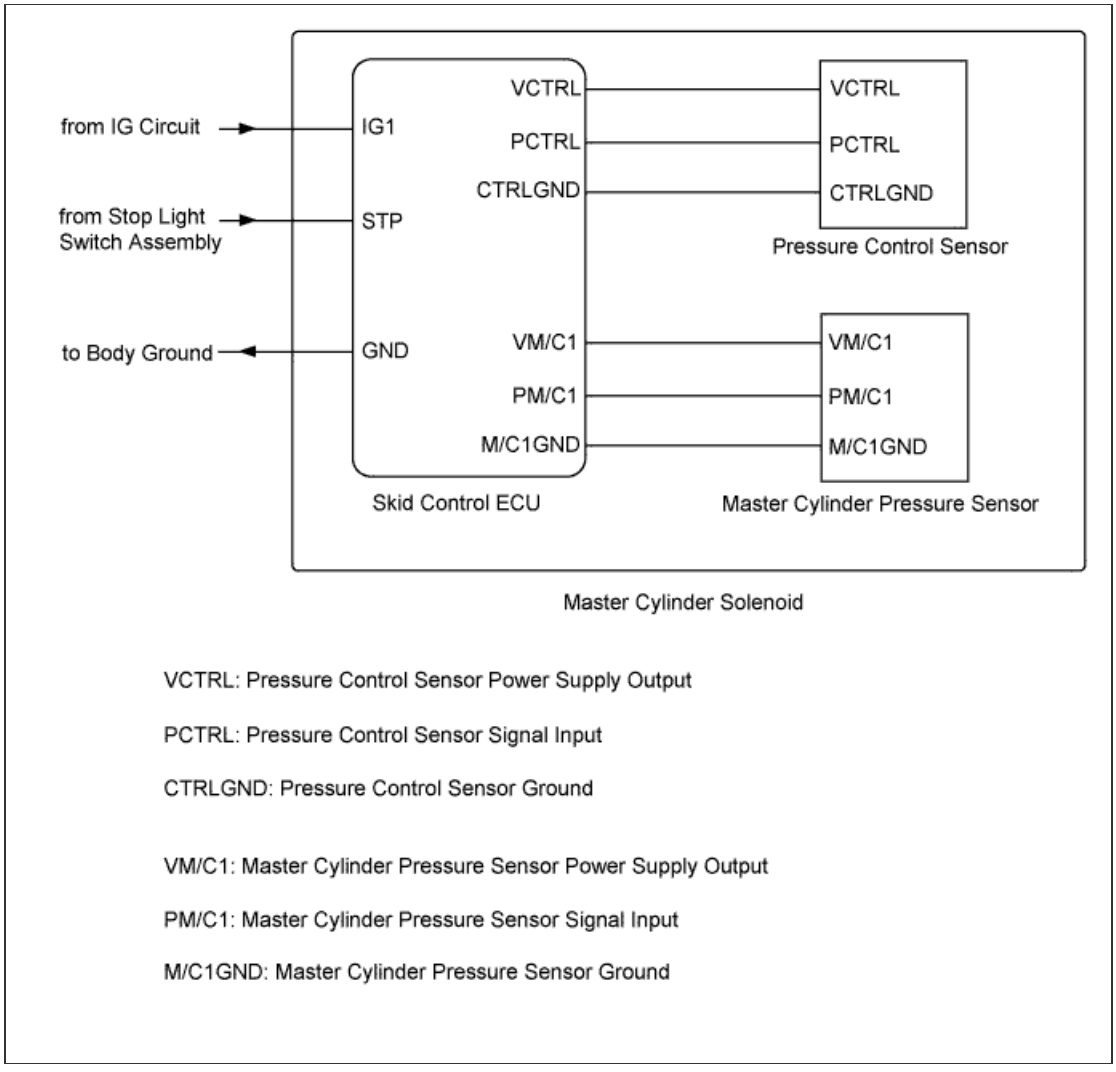
DTC C1457 Control Pressure Sensor Zero Point Low

DTC C1458 Control Pressure Sensor Zero Point Output

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2	Master cylinder solenoid

	seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	
C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid
C1455	The IG1 terminal voltage is 9.5 V or higher and the PCTRL terminal voltage is outside the range of 0.19 to 4.57 V for 1.2 seconds.	Master cylinder solenoid
C1457	The PCTRL terminal voltage is below 0.3 V for 5 seconds.	Master cylinder solenoid
C1458	One of the following conditions is met: • When the vehicle speed is 10 km/h (6 mph) or more, noise occurs in the signal from the PCTRL terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 0 km/h (0 mph), the control pressure does not change by at least 0.048 MPa, and this occurs 5 times. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is between 0.86 and 1.0 V and control pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is 1.0 V or higher and control pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure control sensor input value is sufficiently higher than the estimated control pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

END

DTC C1252 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 (master cylinder solenoid).

DTC Code	DTC Detection Condition	Trouble Area
C1252	The motor operates for 3 minutes or more.	• Brake booster with accumulator pump assembly • Pump motor wire harness condition • Skid control ECU (Master cylinder solenoid) • Hydraulic brake booster assembly

HINT:

The pump motor continues operation for the first 3 minutes, and then starts and stops repeatedly.

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

HINT:

When DTC C1253, C1254, C1256 or C1452 is output together with DTC C1252, inspect and repair the trouble area indicated by DTC C1253, C1254, C1256 or C1452 first.

1.CHECK PUMP MOTOR OPERATION

a. Turn the ignition switch off.

b. Depress the brake pedal more than 40 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	B
Pump motor operates intermittently	C
Pump motor operates, and then stops	D

HINT:

Refer to the hydraulic brake booster assembly installation procedures:

for LHD (Click here)
for RHD (Click here)

B → REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY

C → Go to step 4

D → 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. Check the tightening torque of the 2 screws which secure the wire harness connecting the master cylinder solenoid and brake booster with accumulator pump assembly (for LHD: Click here, for RHD: Click here).

OK:
The harness is tightened to the specified torque.

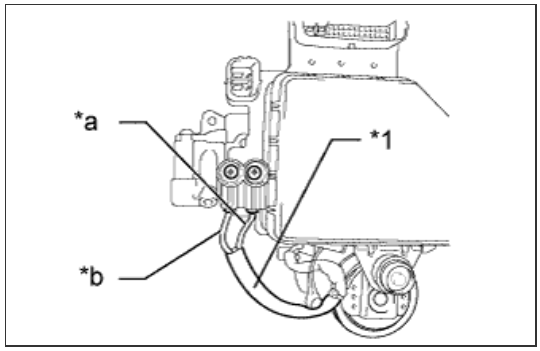
NG → RETIGHTEN SCREWS

OK

3.CHECK RESISTANCE OF PUMP MOTOR WIRE HARNESS

a. Using a screwdriver, remove the 2 screws and pull out the wire harness from the master cylinder solenoid.

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	Below 2 Ω

Text in Illustration

*1	Pump motor wire harness
*a	Red wire
*b	Black wire

HINT:

Refer to the brake booster with accumulator pump assembly installation procedures:

- **for LHD (Click here)**
- **for RHD (Click here)**

NG → REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

OK

4.READ VALUE USING GTS (ACCUMULATOR SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS 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 "Normal Condition" range	A
Output value is out of "Normal Condition" range	B
Output value is constant regardless of pump operation	C

HINT:

- **Refer to the hydraulic brake booster assembly installation procedures:**
  for LHD (Click here)
  for RHD (Click here)
- **Refer to the master cylinder solenoid installation procedures:**
  for LHD (Click here)
  for RHD (Click here)

B	REPLACE MASTER CYLINDER SOLENOID
C	REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY

A

5.RECONFIRM DTC

a. Clear the DTCs (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).

Result

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

HINT:

- **Reinstall the sensors, reconnect the connectors, etc. and restore the previous vehicle conditions before rechecking for DTCs.**
- **Refer to the hydraulic brake booster assembly installation procedures:**
  for LHD (Click here)
  for RHD (Click here)
- **Refer to the brake booster with accumulator pump assembly installation procedures:**
  for LHD (Click here)
  for RHD (Click here)

B	REPLACE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

A

REPLACE HYDRAULIC BRAKE BOOSTER ASSEMBLY

DTC C1421 Open or Short in Master Cylinder Pressure Sensor

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

DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

DTC C1455 Open or Short in Control Pressure Sensor

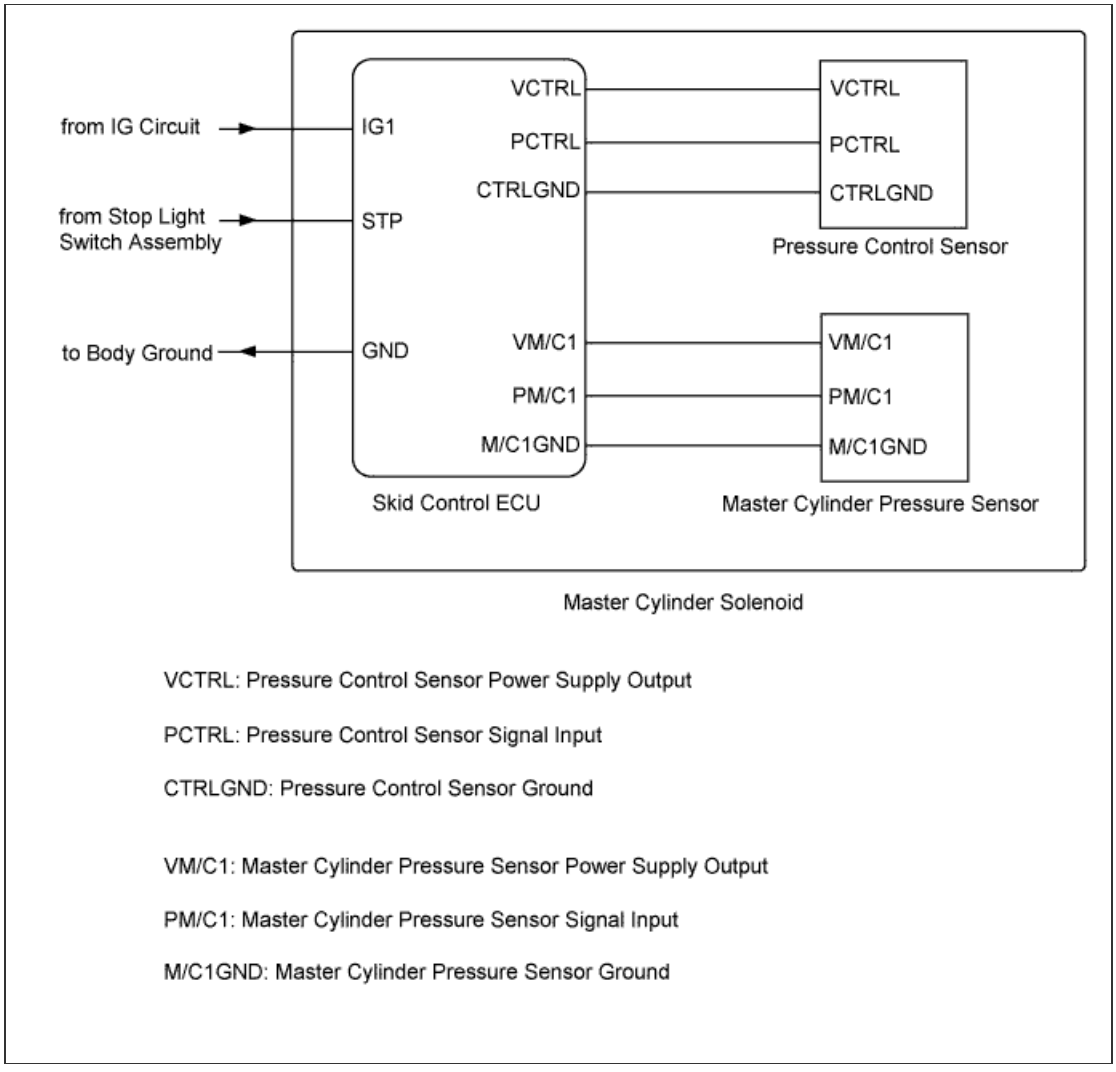
DTC C1457 Control Pressure Sensor Zero Point Low

DTC C1458 Control Pressure Sensor Zero Point Output

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2	Master cylinder solenoid

	seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	
C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid
C1455	The IG1 terminal voltage is 9.5 V or higher and the PCTRL terminal voltage is outside the range of 0.19 to 4.57 V for 1.2 seconds.	Master cylinder solenoid
C1457	The PCTRL terminal voltage is below 0.3 V for 5 seconds.	Master cylinder solenoid
C1458	One of the following conditions is met: • When the vehicle speed is 10 km/h (6 mph) or more, noise occurs in the signal from the PCTRL terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 0 km/h (0 mph), the control pressure does not change by at least 0.048 MPa, and this occurs 5 times. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is between 0.86 and 1.0 V and control pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is 1.0 V or higher and control pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure control sensor input value is sufficiently higher than the estimated control pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

END

DTC C1253 Pump Motor Relay

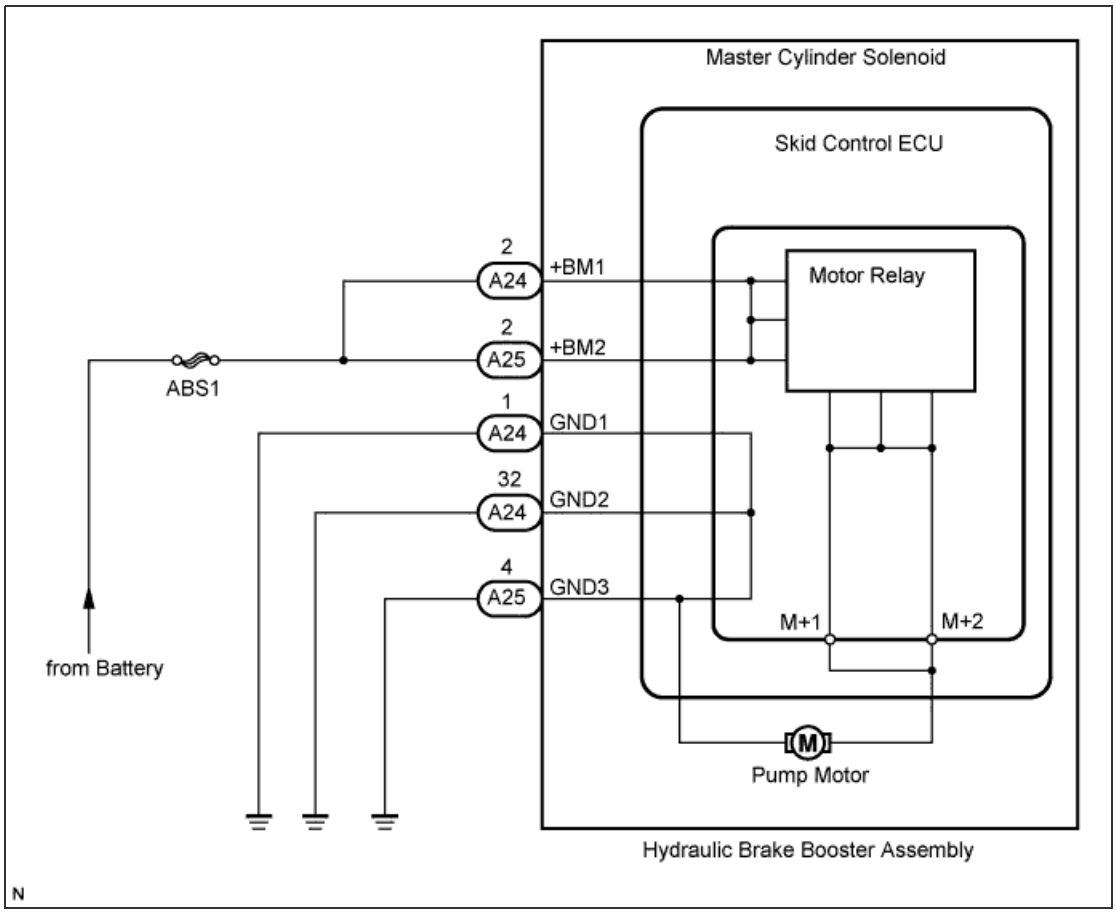
for Preparation Click here

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 (master cylinder solenoid).

DTC Code	DTC Detection Condition	Trouble Area
C1253	There is a motor system circuit (motor input circuit) malfunction.	• ABS1 fuse • Motor relay circuit • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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

1.PERFORM ACTIVE TEST USING GTS (MOTOR RELAY)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Start the engine.

f. 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 operating sound of the motor can be heard.

g. Check the operating sound of the motor individually when operating it with the GTS.

OK:

An operating sound of the motor can be heard.

NG → Go to step 3

OK ↓

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 40 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

3.CHECK HARNESS AND CONNECTOR (+BM1/+BM2 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

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

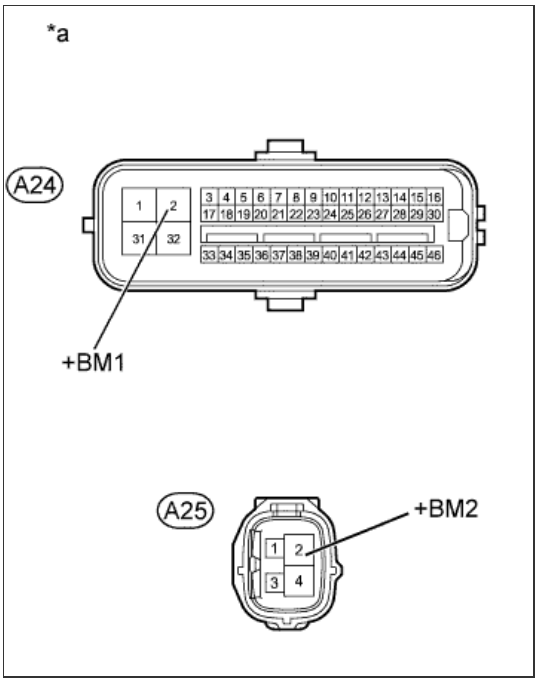
Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-2 (+BM1) - Body ground	Always	11 to 14 V
A25-2 (+BM2) -	Always	11 to 14 V

Body ground

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

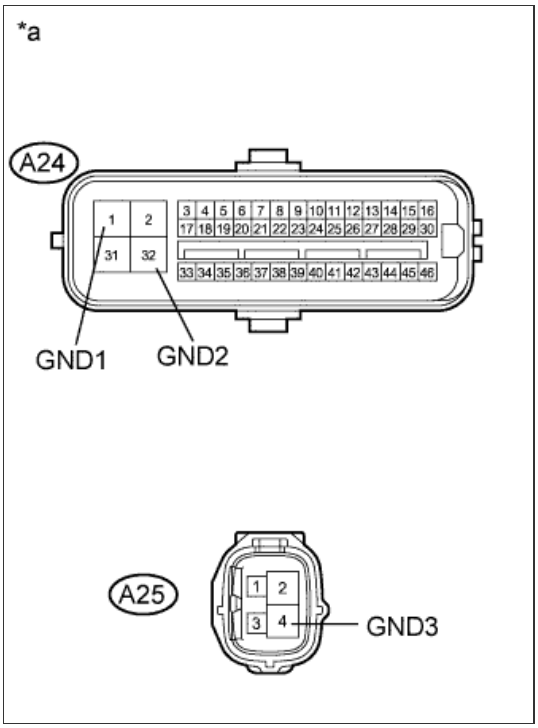
c. Measure the resistance according to the value(s) in the table below.

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 40 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1421 Open or Short in Master Cylinder Pressure Sensor

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

DTC C1423 Master Cylinder Pressure Sensor Zero Point Low Malfunction

DTC C1424 Master Cylinder Pressure Sensor Output Malfunction

DTC C1455 Open or Short in Control Pressure Sensor

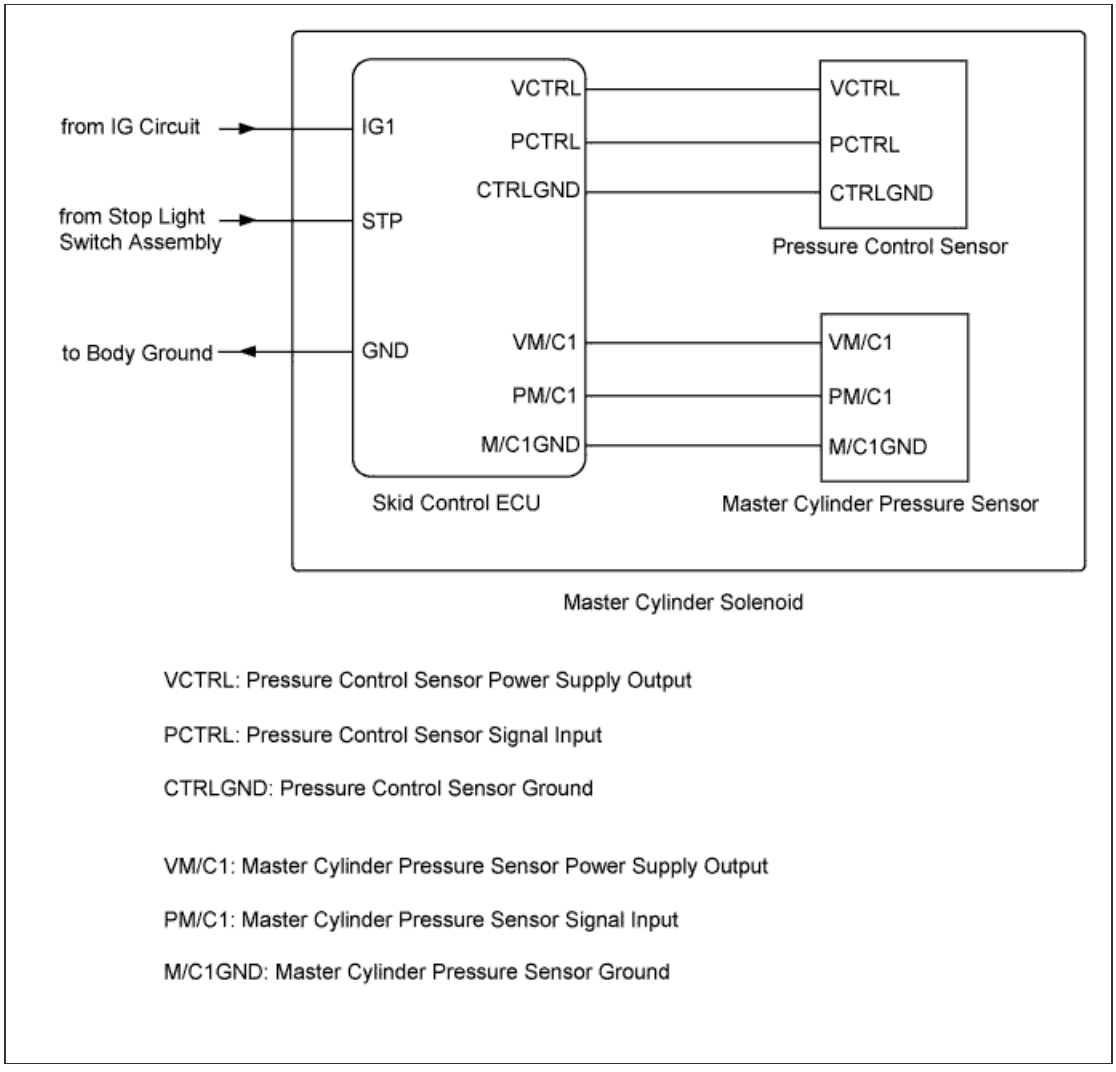
DTC C1457 Control Pressure Sensor Zero Point Low

DTC C1458 Control Pressure Sensor Zero Point Output

for Preparation Click here

DESCRIPTION

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



DTC Code	DTC Detection Condition	Trouble Area
C1421	Either condition is met: Both of the following conditions continue for at least 1.2 seconds. • The IG1 terminal voltage is between 9.5 V and 17.0 V. • The VM/C1 terminal voltage is not within 4.4 V and 5.6 V. Both of the following conditions continue for at least 1.2	Master cylinder solenoid

	seconds. • The VM/C1 terminal voltage is between 4.4 V and 5.6 V. • The PM/C1 terminal voltage is not within 0.19 V and 4.57 V.	
C1423	Both of the following conditions continue for at least 5 seconds • The stop light switch is off. • The PM/C1 terminal voltage is below 0.3 V.	Master cylinder solenoid
C1424	One of the following conditions is met: • Noise occurs in the signal from the PM/C1 terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is between 0.86 and 1.0 V and master cylinder pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PM/C1 terminal voltage is 1.0 V or more and master cylinder pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure sensor input value is sufficiently higher than the estimated master pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid
C1281	Detected only during Test Mode	Master cylinder solenoid
C1455	The IG1 terminal voltage is 9.5 V or higher and the PCTRL terminal voltage is outside the range of 0.19 to 4.57 V for 1.2 seconds.	Master cylinder solenoid
C1457	The PCTRL terminal voltage is below 0.3 V for 5 seconds.	Master cylinder solenoid
C1458	One of the following conditions is met: • When the vehicle speed is 10 km/h (6 mph) or more, noise occurs in the signal from the PCTRL terminal 7 times or more within 5 seconds. • When the vehicle speed drops from 40 km/h (25 mph) to 0 km/h (0 mph), the control pressure does not change by at least 0.048 MPa, and this occurs 5 times. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is between 0.86 and 1.0 V and control pressure does not change by at least 0.048 MPa for 60 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more, the PCTRL terminal voltage is 1.0 V or higher and control pressure does not change by at least 0.048 MPa for 30 seconds or more. • At a vehicle speed of 7 km/h (4 mph) or more with the stop light switch ON, a state in which the pressure control sensor input value is sufficiently higher than the estimated control pressure continues for 1 second or more and this state occurs 5 or more times each time the ignition switch is turned to ON, and this occurs 8 or more times consecutively.	Master cylinder solenoid

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.REPLACE MASTER CYLINDER SOLENOID

a. Replace the master cylinder solenoid (for LHD: Click here, for RHD: Click here).

NEXT

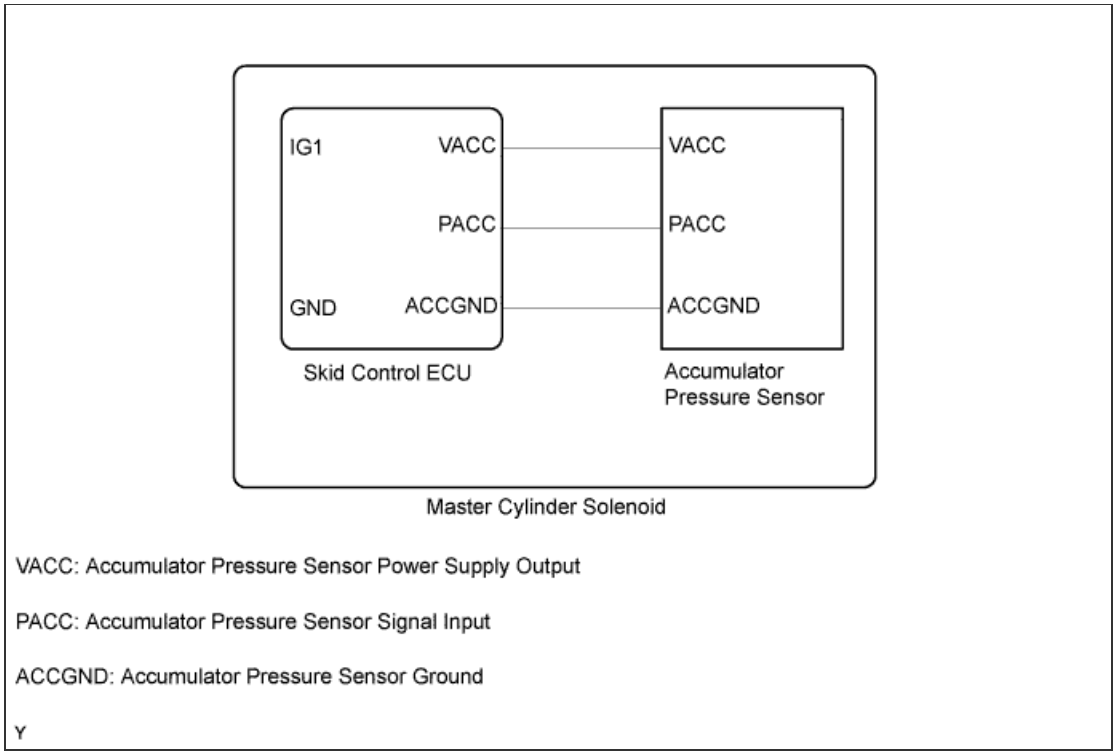
END

DTC C1254 Pressure Sensor or Switch

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	There is an accumulator pressure sensor malfunction (the fluid pressure does not change when the pump operates or when the brake is applied).	Master cylinder solenoid (Accumulator pressure sensor)

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.READ VALUE USING GTS (ACCUMULATOR SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Depress the brake pedal more than 40 times.

d. Turn the ignition switch to ON.

e. Turn the GTS on.

f. 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.

g. Check the accumulator output value.

Result

Result	Proceed to

Output value is within "Normal Condition" range	A
Output value is out of "Normal Condition" range (for LHD)	B
Output value is constant regardless of pump operation (for LHD)	
Output value is out of "Normal Condition" range (for RHD)	C
Output value is constant regardless of pump operation (for RHD)	

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 40 times.

d. Turn the ignition switch to ON.

e. Wait until the pump motor stops.

f. Wait for 15 minutes.

g. Depress the brake pedal and release it.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1422 Master Cylinder Pressure Sensor Zero Point High Malfunction

DTC C1456 Control Pressure Sensor Zero Point High

for Preparation Click here

DESCRIPTION

Refer to DTCs C1421, C1423, C1424, C1455, C1457 and C1458 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1422	When the stop light switch is off, the PM/C1 terminal voltage is 0.86 V or higher for 5 seconds or more.	• STOP fuse • Stop light switch assembly • Stop light switch circuit • Master cylinder pressure sensor circuit • Master cylinder solenoid (Master cylinder pressure sensor)
C1456	When the stop light switch is off, the PCTRL terminal voltage is 0.86 V or higher for 5 seconds or more.	• STOP fuse • Stop light switch • Stop light switch circuit • Pressure control sensor circuit • Master cylinder solenoid (Pressure control sensor)

WIRING DIAGRAM

Refer to DTC C1380 (Click here).

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (STOP LIGHT SW)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

f. Check that the stop light switch condition observed on the GTS changes according to brake pedal operation.

OK:

The GTS displays ON and OFF according to brake pedal operation.

NG → **Go to step 4**

OK

2.CHECK BRAKE PEDAL AND STOP LIGHT SWITCH INSTALLATION

a. Turn the ignition switch off.

b. Check the brake pedal height and stop light switch installation (for LHD: Click here, for RHD: Click here).

OK:

The brake pedal height and stop light switch installation are normal.

NG → ADJUST BRAKE PEDAL OR STOP LIGHT SWITCH

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more and perform a braking test (decelerate the vehicle by depressing the brake pedal).

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

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

a. Make sure that there is no looseness in the locking part and connecting part of the connectors.

b. Disconnect the stop light switch assembly connector.

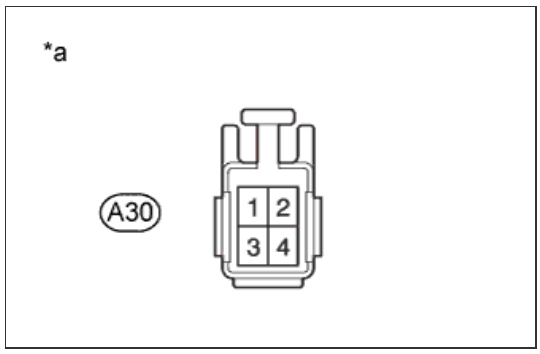
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

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

Text in Illustration

*a	Front view of wire harness connector (to Stop Light Switch Assembly)



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.INSPECT STOP LIGHT SWITCH

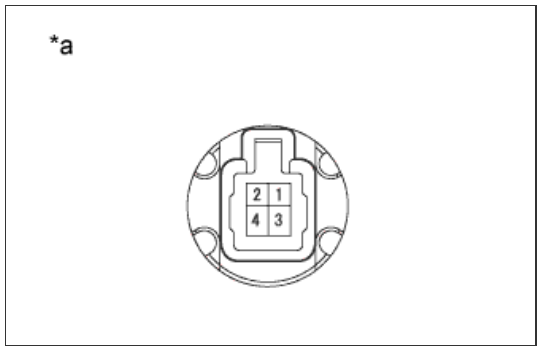
a. Remove the stop light switch assembly (Click here).

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 not pushed in	Below 1 Ω
	Switch pin pushed in	10 kΩ or higher



Text in Illustration

*a	Component without harness connected (Stop Light Switch Assembly)

NG → REPLACE STOP LIGHT SWITCH ASSEMBLY (Click here)

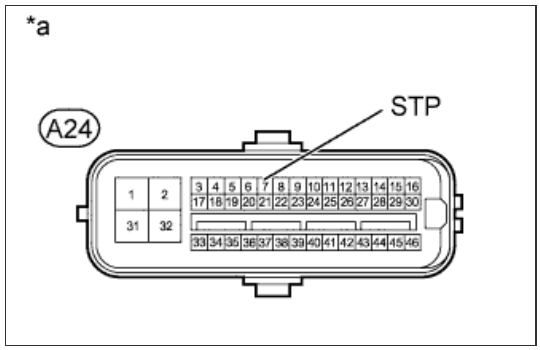
OK

6.CHECK HARNESS AND CONNECTOR (STP TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-7 (STP) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (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 C1256 Accumulator Low Pressure

for Preparation Click here

DESCRIPTION

Refer to DTC C1254 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1256	The fluid pressure inside the accumulator is below the standard value.	• Brake booster with accumulator pump assembly • Master cylinder solenoid (Accumulator pressure sensor) • Hydraulic brake booster assembly

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

HINT:

When DTC C1251, C1253 or C1254 is output together with DTC C1256 inspect and repair the trouble area indicated by DTC C1251, C1253 or C1254 first.

1.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal 20 times or more.

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 → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

2.INSPECT HYDRAULIC BRAKE BOOSTER ASSEMBLY FUNCTION

a. Inspect brake booster pump power supply system function.

i. Turn the ignition switch off.

ii. Depress the brake pedal 20 times or more to release the pressure in the accumulator.

HINT:

When the pressure is released, the brake pedal stroke becomes longer.

iii. Check that the brake fluid level is at the MAX level.

iv. Chock the 4 wheels and release the parking brake.

v. Turn the ignition switch to ON and measure the brake booster pump operating time (the time from when the brake booster pump starts operating until it stops).

OK:
20 to 80 seconds

vi. Start the engine after the brake boost pump stops.

vii. Check that the ABS warning light and slip indicator light are not illuminated.

viii. Turn off the engine, and then turn the ignition switch to ON.

ix. Check that the brake boost pump operates and then stops when the brake pedal is depressed 4 or 5 times.

x. Depress the brake pedal 4 or 5 times and measure the brake booster pump operating time (the time from when the brake booster pump starts operating until it stops).

OK:
2 to 11 seconds

xi. Check that the brake warning light illuminates and the buzzer sounds when the brake pedal is fully depressed continuously 15 to 20 times.

NOTICE:

Wait 120 seconds or more after turning the ignition switch to ON before performing this inspection.

b. Check brake booster operation.

i. Turn the ignition switch off.

ii. Depress the brake pedal 20 times or more to release the pressure in the accumulator.

HINT:

When the pressure is released, the brake pedal stroke becomes longer.

iii. Depress the brake pedal, start the engine, and check the change in the brake pedal height.

OK:
The brake pedal moves slightly inward.

c. Inspect brake master cylinder fluid pressure change (for LHD: Click here, for RHD: Click here).

NG → **Go to step 5**

OK

3.READ VALUE USING GTS (ACCUMULATOR SENSOR)

a. Connect the GTS to the DLC3.

b. Turn the ignition switch to ON.

c. Turn the GTS on.

d. 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.

e. Check that the accumulator output value is normal.

OK:
Accumulator pressure sensor value is normal.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

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

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

4.RECONFIRM DTC

a. Clear the DTCs (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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

5.INSPECT BRAKE BOOSTER PUMP ASSEMBLY

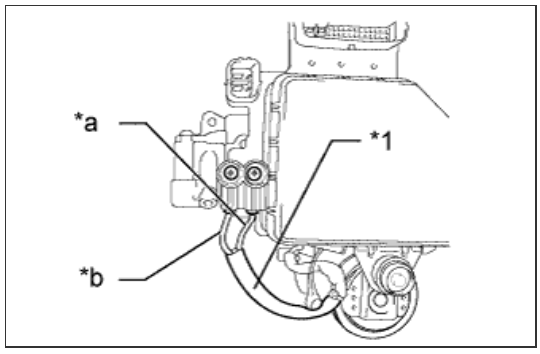
a. Remove the hydraulic brake booster assembly (for LHD: Click here, for RHD: Click here).

b. Using a screwdriver, remove the 2 screws and pull out the wire harness from the master cylinder solenoid.

c. 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	Below 2 Ω



Text in Illustration

*1	Pump motor wire harness
*a	Red wire
*b	Black wire

d. Install the pump motor wire harness to the master cylinder solenoid with the 2 screws (for LHD: Click here, for RHD: Click here).

Result

Result	Proceed to
OK (for LHD)	A
OK (for RHD)	B
NG (for LHD)	C
NG (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 C1422 Master Cylinder Pressure Sensor Zero Point High Malfunction

DTC C1456 Control Pressure Sensor Zero Point High

for Preparation Click here

DESCRIPTION

Refer to DTCs C1421, C1423, C1424, C1455, C1457 and C1458 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1422	When the stop light switch is off, the PM/C1 terminal voltage is 0.86 V or higher for 5 seconds or more.	• STOP fuse • Stop light switch assembly • Stop light switch circuit • Master cylinder pressure sensor circuit • Master cylinder solenoid (Master cylinder pressure sensor)
C1456	When the stop light switch is off, the PCTRL terminal voltage is 0.86 V or higher for 5 seconds or more.	• STOP fuse • Stop light switch • Stop light switch circuit • Pressure control sensor circuit • Master cylinder solenoid (Pressure control sensor)

WIRING DIAGRAM

Refer to DTC C1380 (Click here).

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (STOP LIGHT SW)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

f. Check that the stop light switch condition observed on the GTS changes according to brake pedal operation.

OK:

The GTS displays ON and OFF according to brake pedal operation.

NG → **Go to step 4**

OK

2.CHECK BRAKE PEDAL AND STOP LIGHT SWITCH INSTALLATION

a. Turn the ignition switch off.

b. Check the brake pedal height and stop light switch installation (for LHD: Click here, for RHD: Click here).

OK:

The brake pedal height and stop light switch installation are normal.

NG → ADJUST BRAKE PEDAL OR STOP LIGHT SWITCH

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more and perform a braking test (decelerate the vehicle by depressing the brake pedal).

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

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

a. Make sure that there is no looseness in the locking part and connecting part of the connectors.

b. Disconnect the stop light switch assembly connector.

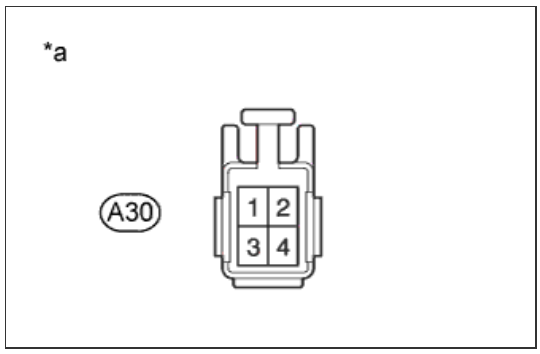
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

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

Text in Illustration

*a	Front view of wire harness connector (to Stop Light Switch Assembly)



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.INSPECT STOP LIGHT SWITCH

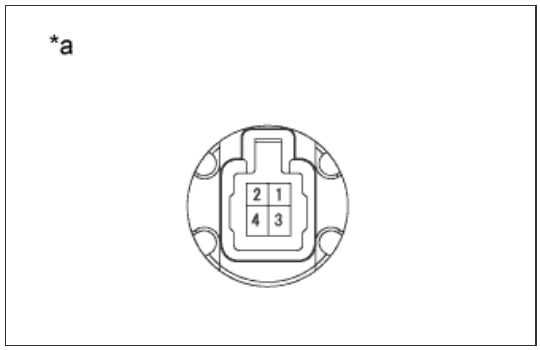
a. Remove the stop light switch assembly (Click here).

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 not pushed in	Below 1 Ω
	Switch pin pushed in	10 kΩ or higher



Text in Illustration

*a	Component without harness connected (Stop Light Switch Assembly)

NG → REPLACE STOP LIGHT SWITCH ASSEMBLY (Click here)

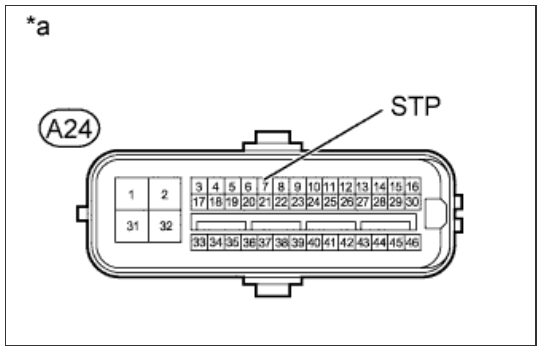
OK

6.CHECK HARNESS AND CONNECTOR (STP TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-7 (STP) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (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 C1257 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 (master cylinder solenoid).

DTC Code	DTC Detection Condition	Trouble Area
C1257	There is an open in the motor system circuit (motor input circuit).	Skid control ECU (Master cylinder solenoid)

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK PUMP MOTOR OPERATION

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Depress the brake pedal more than 40 times.

d. Turn the ignition switch to ON.

e. Check pump motor operation.

OK:

Pump motor operates normally.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 (master cylinder solenoid) connector.

c. Turn the ignition switch to ON.

d. Clear the DTCs (Click here).

e. Turn the ignition switch off.

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

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1425 Open in Stop Light Switch Circuit

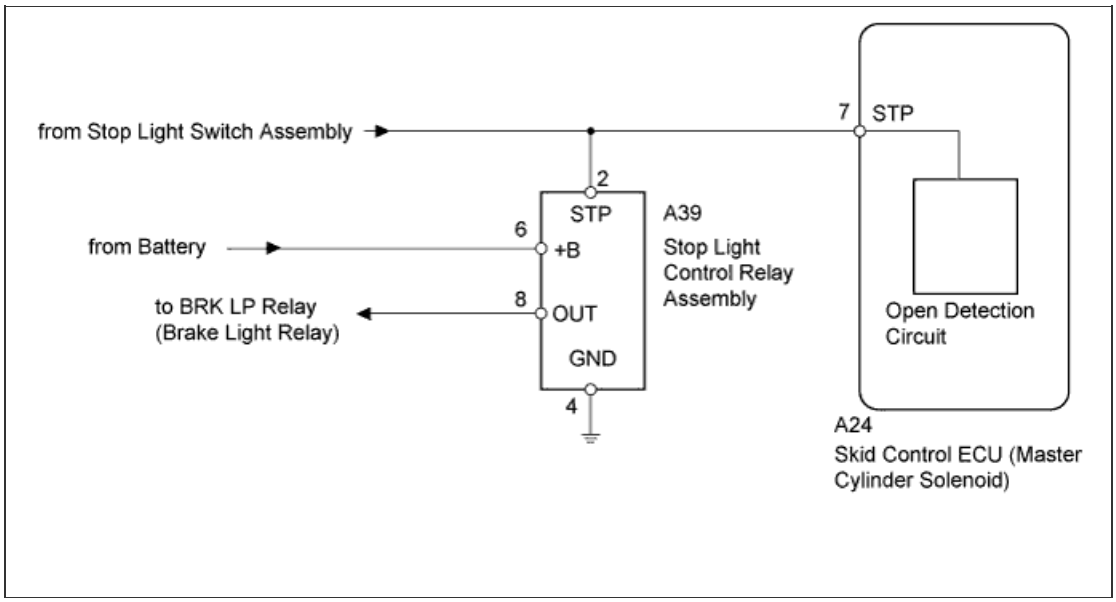
for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) has an open detection circuit, which stores this DTC when detecting an open in the stop light switch input line or the ground line of the stop light switch circuit with the stop light switch off (brake pedal not depressed).

DTC Code	DTC Detection Condition	Trouble Area
C1425	When the IG1 terminal voltage is between 9.5 and 17.4 V and the skid control ECU STPO terminal output is off, an open in the stop light switch circuit continues for 3 seconds or more.	• Stop light switch circuit • Stop light control relay assembly • Stop light control relay circuit • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.READ VALUE USING GTS (STOP LIGHT SW)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

f. Check that the stop light switch condition observed on the GTS changes according to brake pedal operation.

OK:

The GTS displays ON and OFF according to brake pedal operation.

NG	Go to step 3

OK

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Depress the brake pedal several times to test the stop light circuit.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

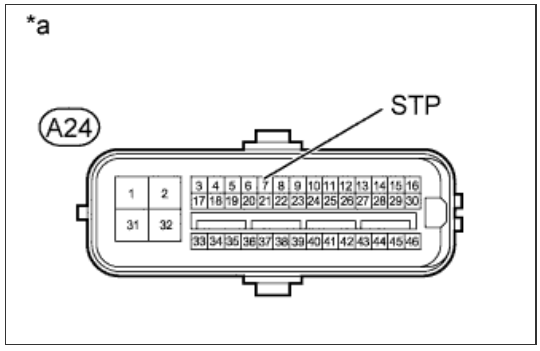
CHECK FOR INTERMITTENT PROBLEMS (Click here)

3.CHECK HARNESS AND CONNECTOR (STP TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-7 (STP) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.CHECK HARNESS AND CONNECTOR (+B/GND TERMINAL)

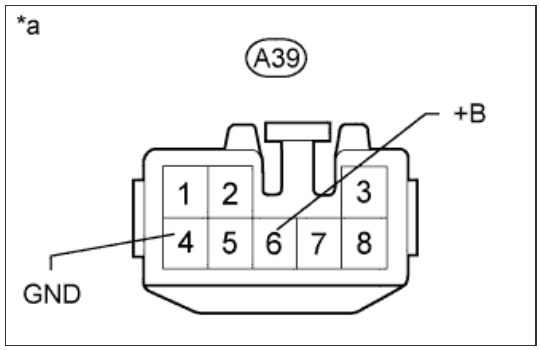
a. Turn the ignition switch off.

b. Disconnect the stop light control relay assembly connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A39-6 (+B) - 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
A39-4 (GND) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Stop Light Control Relay Assembly)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

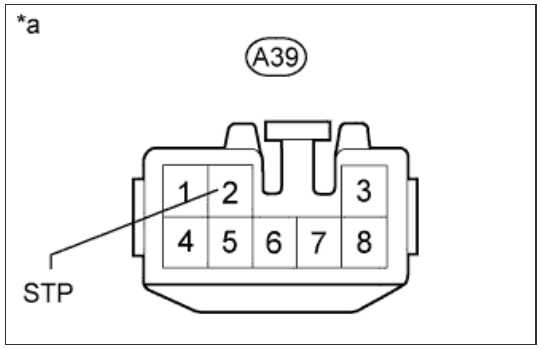
OK

5.CHECK HARNESS AND CONNECTOR (STP TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the stop light control relay assembly connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
A39-2 (STP) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V

Text in Illustration

*a	Front view of wire harness connector (to Stop Light Control Relay Assembly)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6.CHECK HARNESS AND CONNECTOR (OUT TERMINAL)

a. Reconnect the stop light control relay assembly connector.

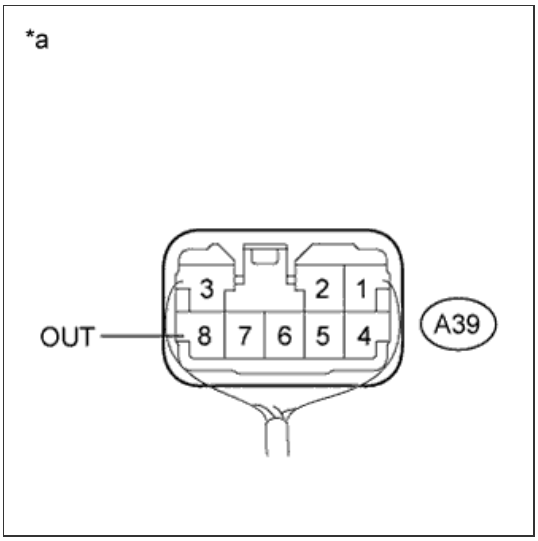
b. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Condition	Specified Condition
A39-8 (OUT) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V

Text in Illustration

*a	Component with harness connected (Stop Light Control Relay Assembly)



NG → REPLACE STOP LIGHT CONTROL RELAY ASSEMBLY

OK

7.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Depress the brake pedal several times to test the stop light circuit.

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
DTC is output (for RHD)	C

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

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

A

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

DTC C1268 Transfer L4 Position Switch Circuit

for Preparation Click here

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1268	The skid control ECU receives an L4 abnormal status signal from the four wheel drive control ECU via CAN communication for 2 seconds or more.	• Transfer system • Skid control ECU (Master cylinder solenoid)

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.INSPECT TRANSFER L4 SHIFT

a. Shift the transfer to L4, and then drive the vehicle and check that there are no problems with the transfer system.

OK:
There are no problems with the transfer system.

NG → GO TO TRANSFER SYSTEM (PROBLEM SYMPTOMS TABLE) (Click here)

OK ↓

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Shift the transfer to L4, drive the vehicle, and then check for DTCs (Click here).

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1432 Steering Angle Sensor Power Source Voltage Malfunction

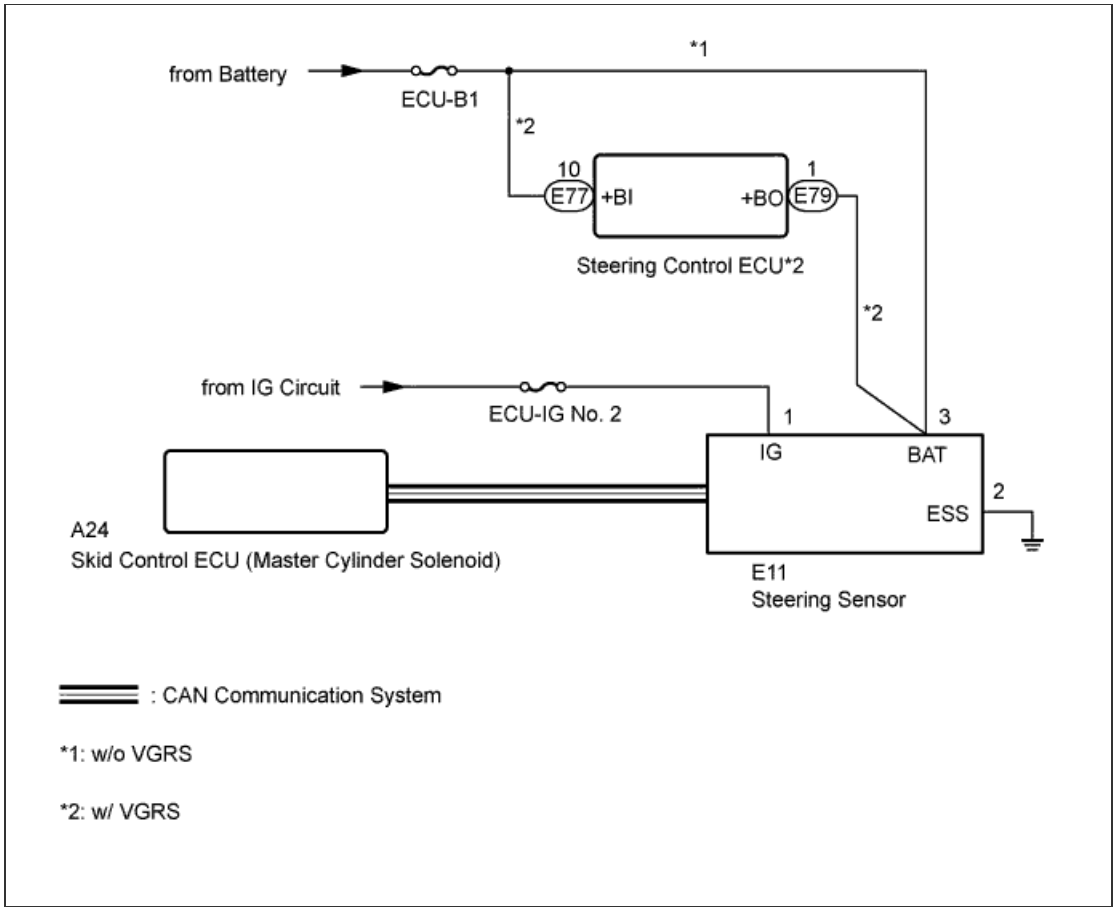
for Preparation Click here

DESCRIPTION

Steering sensor signals are sent to the skid control ECU (master cylinder solenoid) via the CAN communication system. When there is a malfunction in the CAN communication system, it is detected by the steering angle sensor zero point malfunction diagnostic function.

DTC Code	DTC Detection Condition	Trouble Area
C1432	A steering sensor power supply malfunction signal is received from the steering sensor.	• ECU-B1 fuse • ECU-IG No. 2 fuse • Steering sensor power supply • Steering sensor • Steering control ECU (w/ VGRS)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **When replacing the steering sensor, confirm that the replacement part is of the correct specification.**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

HINT:

When the speed sensor or the yaw rate sensor assembly has trouble, DTCs for the steering sensor may be stored even when the steering sensor is normal. When DTCs for the speed sensor or yaw rate sensor assembly are output together with DTCs for the steering sensor, inspect and repair the speed sensor and yaw rate sensor assembly first, and then inspect and repair the steering sensor.

1.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Check for DTCs (Click here).

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output (for LHD)	B
CAN DTC is output (for LHD)	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 HARNESS AND CONNECTOR (IG/ESS TERMINAL)

a. Turn the ignition switch off.

b. Make sure that there is no looseness in the locking part and connecting part of the connectors.

c. Disconnect the steering sensor connector.

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

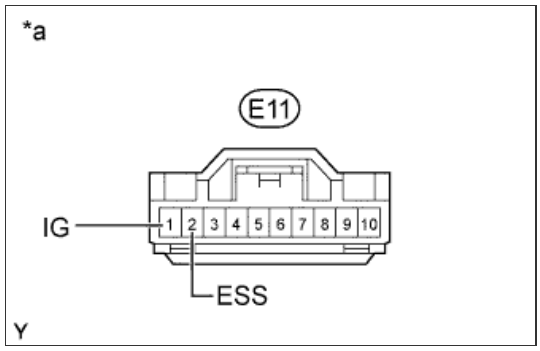
Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
E11-1 (IG) - Body ground	Ignition switch ON	11 to 14 V

e. 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



Text in Illustration

*a	Front view of wire harness connector (to Steering Sensor)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.CHECK HARNESS AND CONNECTOR (BAT TERMINAL)

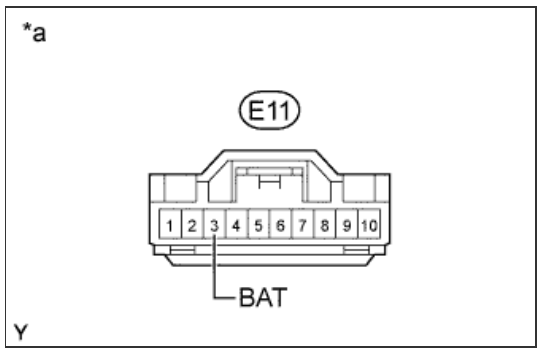
a. Turn the ignition switch off.

b. Disconnect the steering sensor connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
E11-3 (BAT) - Body ground	Always	11 to 14 V



Text in Illustration

*a	Front view of wire harness connector (to Steering Sensor)

Result

Result	Proceed to
OK	A

NG (w/ VGRS)	B
NG (w/o VGRS)	C

B → Go to step 4

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

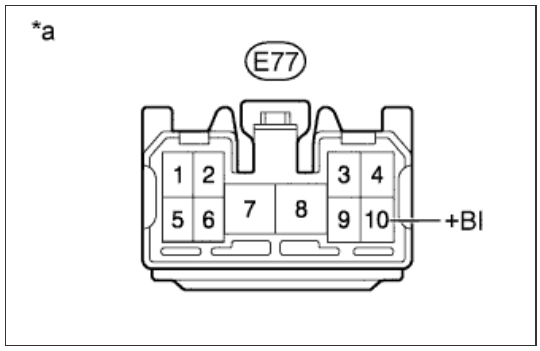
REPLACE STEERING SENSOR (Click here)

4.CHECK HARNESS AND CONNECTOR (+BI TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the steering control ECU connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
E77-10 (+BI) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Steering Control ECU)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

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

a. Turn the ignition switch off.

b. Disconnect the E11 steering sensor connector.

c. Disconnect the E79 steering control ECU connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E11-3 (BAT) - E79-1 (+BO)	Always	Below 1 Ω
E11-3 (BAT) - Body ground	Always	10 kΩ or higher

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

B → REPLACE STEERING CONTROL ECU (Click here)

C → REPLACE STEERING CONTROL ECU (Click here)

A

REPAIR OR REPLACE HARNESS OR CONNECTOR

DTC C1282 Center Differential Lock Position Switch

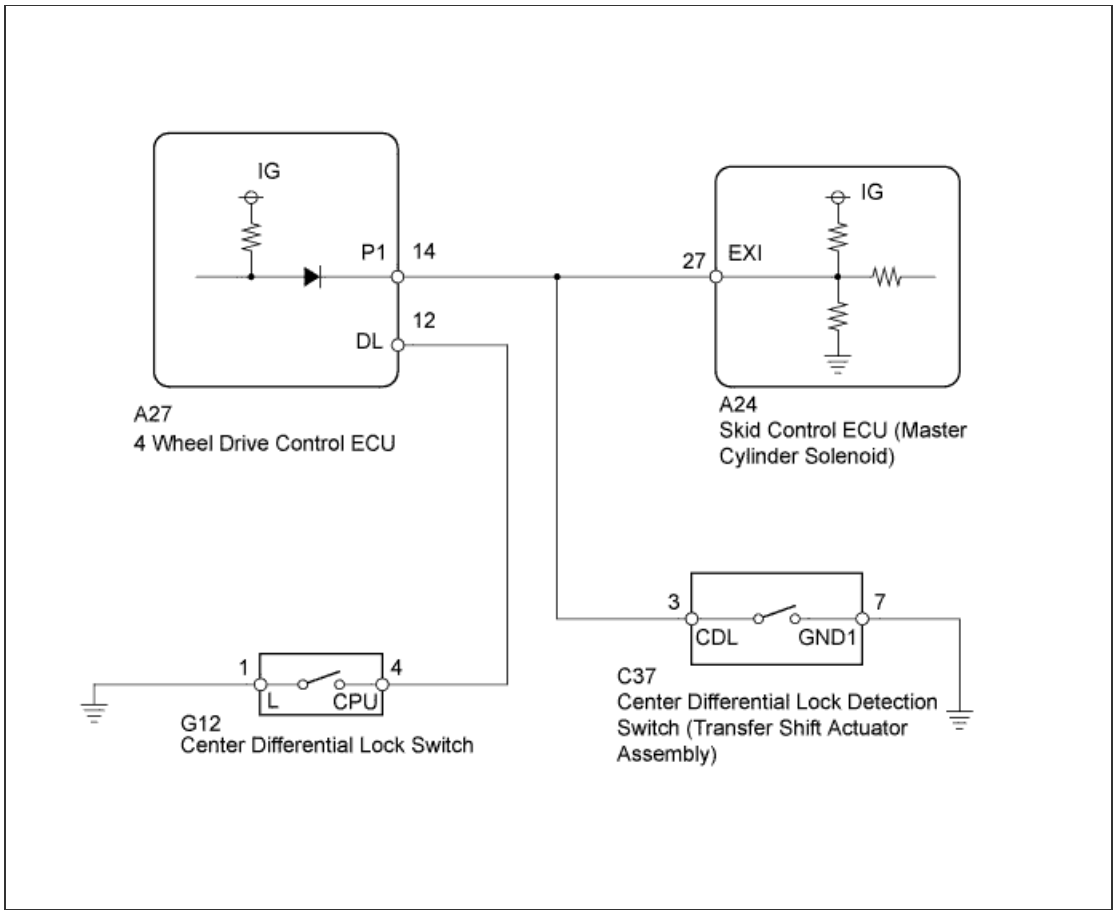
for Preparation Click here

DESCRIPTION

DTC C1282 is stored only in test mode.

DTC Code	DTC Detection Condition	Trouble Area
C1282	Stored during test mode.	• Harness or connector • Transfer system

WIRING DIAGRAM



INSPECTION PROCEDURE

1.CHECK DTC

a. Check for DTCs (Click here).

Result

Result	Proceed to
DTC C1340 is not output	A
DTC C1340 is output	B

B → GO TO DTC C1340 (Click here)

A

2.CHECK TEST MODE DTC

a. Switch the vehicle to test mode, perform the center differential lock signal check, and then check that the Test Mode (Signal Check) DTC C1282 is cleared (Click here).

Result

Result	Proceed to
Test Mode DTC C1282 is cleared	A
Test Mode DTC C1282 is not cleared	B

B → Go to step 3

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

3.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - 4 WHEEL DRIVE CONTROL ECU/TRANSFER SHIFT ACTUATOR)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the A27 4 wheel drive control ECU connector.

c. Disconnect the C37 transfer shift actuator assembly connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-27 (EXI) - A27-14 (P1)	Always	Below 1 Ω
A24-27 (EXI) - C37-3 (CDL)	Always	Below 1 Ω
A24-27 (EXI) - Body ground	Always	10 kΩ or higher
C37-7 (GND1) - Body ground	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

GO TO TRANSFER SYSTEM (PROBLEM SYMPTOMS TABLE) (Click here)

DTC C1433 Steering Angle Sensor Internal Circuit

for Preparation Click here

DESCRIPTION

Steering angle sensor signals are sent to the skid control ECU (master cylinder solenoid) via the CAN communication system. When there is a malfunction in the CAN communication system, it is detected by the steering angle sensor zero point malfunction diagnostic function.

DTC Code	DTC Detection Condition	Trouble Area
C1433	Either condition is met: 1. With the IG1 terminal voltage 9.5 to 17.4 V, the skid control ECU receives an error signal from the steering sensor for 0.012 seconds. 2. An open in the sensor power supply circuit for 1 second or more.	Steering sensor

WIRING DIAGRAM

Refer to DTC C1432 (Click here).

INSPECTION PROCEDURE

HINT:

When any of the speed sensors or the yaw rate sensor assembly has trouble, DTCs for the steering sensor may be stored even when the steering sensor is normal. When DTCs for the speed sensors or yaw rate sensor assembly are output together with DTCs for the steering sensor, inspect and repair the speed sensor and yaw rate sensor assembly first, and then inspect and repair the steering sensor.

1.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Check for DTCs (Click here).

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output (for LHD)	B
CAN DTC is output (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.REPLACE STEERING SENSOR

a. Replace the steering sensor (Click here).

NOTICE:

When replacing the steering sensor, confirm that the replacement part is of the correct specification.

NEXT

END

DTC C1289 VGRS Control System Malfunction

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) communicates with the steering control ECU via CAN communication.
If a malfunction in the VGRS system is detected, cooperative control of the steering is prohibited by the fail-safe function.

DTC Code	DTC Detection Condition	Trouble Area
C1289	The VGRS system fail signal continues to be output for 1 second or more.	VGRS system

INSPECTION PROCEDURE

1.CHECK DTC FOR VGRS SYSTEM

a. Clear the DTCs (Click here).

b. Check for DTCs (Click here).

Result

Result	Proceed to
DTC (VGRS system) is not output	A
DTC (VGRS system) is output	B

B → GO TO VGRS SYSTEM (DIAGNOSTIC TROUBLE CODE CHART) (Click here)

A → CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1434 Steering Angle Sensor Output Malfunction

for Preparation Click here

DESCRIPTION

Steering sensor signals are sent to the skid control ECU (master cylinder solenoid) via the CAN communication system. When there is a malfunction in the CAN communication system, it is detected by the steering sensor zero point malfunction diagnostic function.

DTC Code	DTC Detection Condition	Trouble Area
C1434	An error in communication between the skid control ECU and the steering sensor, or an abnormal steering sensor zero point.	• ECU-B1 fuse • ECU-IG No. 2 fuse • Steering sensor power supply • Steering sensor • Steering control ECU (w/ VGRS)

WIRING DIAGRAM

Refer to DTC C1432 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **When replacing the steering sensor, confirm that the replacement part is of the correct specification.**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

HINT:

When any of the speed sensors or the yaw rate sensor assembly has trouble, DTCs for the steering sensor may be stored even when the steering sensor is normal. When DTCs for the speed sensors or yaw rate sensor assembly are output together with DTCs for the steering sensor, inspect and repair the speed sensor and yaw rate sensor assembly first, and then inspect and repair the steering sensor.

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON again and check that no CAN communication system DTC is output (Click here).

d. Start the engine.

e. Drive the vehicle at a speed of 35 km/h (22 mph) and turn the steering wheel to the right and left, and then check that no speed sensor or yaw rate sensor assembly DTCs are output (Click here).

Result

Result	Proceed to
No CAN communication system, speed sensor, or yaw rate sensor assembly DTCs are output	A
CAN communication system DTC is output (for LHD)	B
CAN communication system DTC is output (for RHD)	C
Speed sensor or yaw rate sensor assembly DTC is output	D

HINT:

- **If there is a malfunction in any of the speed sensors or the yaw rate sensor assembly, an abnormal value may be output although the steering sensor is normal.**
- **If speed sensor and yaw rate sensor assembly DTCs are output simultaneously, repair these two sensors first, and then inspect the steering sensor.**

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 HARNESS AND CONNECTOR (IG/ESS TERMINAL)

a. Turn the ignition switch off.

b. Make sure that there is no looseness in the locking part and connecting part of the connectors.

c. Disconnect the steering sensor connector.

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

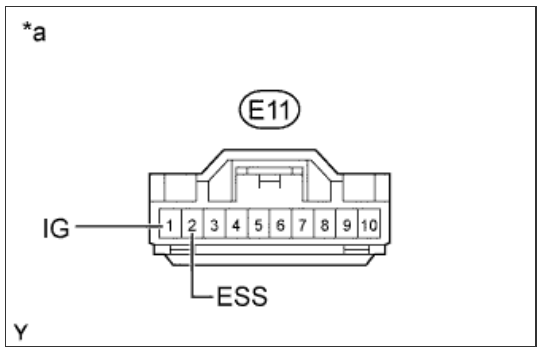
Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
E11-1 (IG) - Body ground	Ignition switch ON	11 to 14 V

e. 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



Text in Illustration

*a	Front view of wire harness connector (to Steering Sensor)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.CHECK HARNESS AND CONNECTOR (BAT TERMINAL)

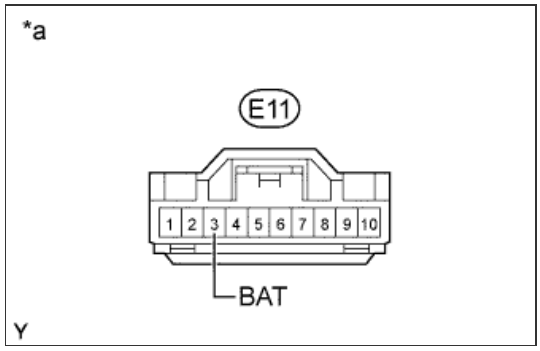
a. Turn the ignition switch off.

b. Disconnect the steering sensor connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
E11-3 (BAT) - Body ground	Always	11 to 14 V



Text in Illustration

*a	Front view of wire harness connector (to Steering Sensor)

Result

Result	Proceed to
OK	A
NG (w/ VGRS)	B
NG (w/o VGRS)	C

B → Go to step 4

C → REPAIR OR REPLACE HARNESS OR CONNECTOR

A

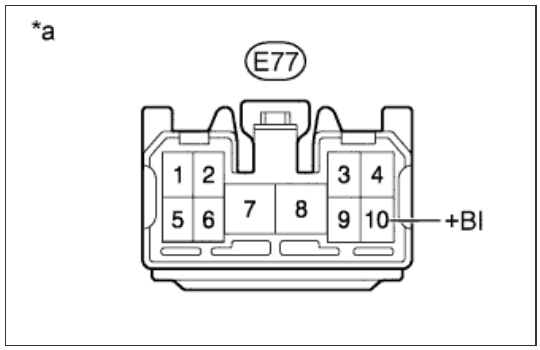
REPLACE STEERING SENSOR (Click here)

4.CHECK HARNESS AND CONNECTOR (+BI TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the steering control ECU connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
E77-10 (+BI) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Steering Control ECU)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

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

a. Turn the ignition switch off.

b. Disconnect the E11 steering sensor connector.

c. Disconnect the E79 steering control ECU connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
E11-3 (BAT) - E79-1 (+BO)	Always	Below 1 Ω
E11-3 (BAT) - Body ground	Always	10 kΩ or higher

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

B → REPLACE STEERING CONTROL ECU (Click here)

C → REPLACE STEERING CONTROL ECU (Click here)

A

REPAIR OR REPLACE HARNESS OR CONNECTOR

DTC C1290 Steering Angle Sensor Zero Point Malfunction

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) 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 skid control ECU (master cylinder solenoid) also stores the previous zero point. If the front wheel alignment or steering wheel position is adjusted without disconnecting the cable from the negative (-) battery terminal, or if the yaw rate and acceleration sensor zero point is not acquired after the adjustments have been completed, the skid control ECU (master cylinder solenoid) detects the difference between the previous zero point and newly acquired zero point and stores this DTC to indicate poor adjustment.
The steering angle sensor zero point malfunction warning is canceled by turning the ignition switch off.

DTC Code	DTC Detection Condition	Trouble Area
C1290	The steering angle sensor zero point calibration position vastly differs from the recorded value.	• Yaw rate and acceleration 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 ACCELERATION SENSOR

a. Perform zero point calibration of the yaw rate and acceleration sensor (Click here).

HINT:

- **When the stored zero point of the yaw rate and acceleration sensor is cleared, steering angle sensor zero point is also cleared.**
- **If the zero point and output value of the yaw rate and acceleration 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 the front wheel alignment and steering position are adjusted as a result of an abnormal centered position of the steering wheel, acquire the yaw rate and acceleration 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 C1436 Yaw Rate Sensor Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTC C1419 and C1435 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1436	Either condition is met: 1. With the vehicle stationary, the yaw rate sensor assembly output value is not 0°/s. 2. An abnormal comparison value.	Yaw rate sensor assembly

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245 (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the yaw rate sensor assembly, perform calibration (Click here).

1.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Check for DTCs (Click here).

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output (for LHD)	B
CAN DTC is output (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.READ VALUE USING GTS (YAW RATE SENSOR)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Yaw Rate Sensor	Yaw rate sensor/ Min.: -128°/s, Max.: 127°/s	Vehicle stationary: 0°/s Right turn: -128 to 0°/s Left turn: 0 to 127°/s	-

f. Check that the yaw rate sensor assembly output value is displayed on the GTS.

Result

Result	Proceed to
Yaw rate sensor assembly output value is 0°/s when vehicle is stationary, but value fluctuates when	

NG	turning	A
	Yaw rate sensor assembly output value is not 0°/s when vehicle is stationary	B
OK		C

B → REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

C → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

3.CHECK YAW RATE SENSOR ASSEMBLY INSTALLATION

a. Turn the ignition switch off.

b. Check that the yaw rate sensor assembly is installed properly (Click here).

OK:
The sensor is tightened to the specified torque.
The sensor is not installed at an angle.

NG → INSTALL YAW RATE SENSOR ASSEMBLY CORRECTLY (Click here)

OK

REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1337 Diameter of the Tire is not Uniform

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) 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	Either condition is met: • The diameter of the 2 front wheels and 2 rear wheels is different. • There is a wheel speed sensor fault.	• Speed sensor • Speed sensor rotor • Speed sensor circuit • Tire size

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

HINT:

When DTCs C1401 to C1416 are output with DTC C1337, inspect and repair the trouble areas indicated by DTCs C1401 to C1416 first (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.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

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

d. 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1437 Lost Communication with ECM

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the ECM via the CAN communication system.

DTC Code	DTC Detection Condition	Trouble Area
C1437	When the IG1 terminal voltage is 10 V or higher and the vehicle speed is 15 km/h (9 mph) or more, data cannot be sent from the ECM for 2 seconds or more.	• Engine control system • CAN communication system • Skid control ECU (Master cylinder solenoid)

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
EFI Communication Open	EFI communication open circuit detection/ Error or Normal	Normal	-

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → **Go to step 3**

OK

2.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 15 km/h (9 mph) or more for 10 seconds or more.

e. Check that no CAN communication system DTC is output (Click here).

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

Result

Result	Proceed to
DTC C1437 is not output	A
DTC C1437 is output	B
CAN communication system DTC is output	C

HINT:

Refer to the Engine Control System (How to Proceed with Troubleshooting) procedures:

- **for 1VD-FTV, w/o DPF (Click here)**
- **for 1VD-FTV, w/ DPF (Click here)**
- **for 1UR-FE (Click here)**
- **for 3UR-FE (Click here)**

HINT:

Refer to the CAN Communication System (How to Proceed with Troubleshooting) procedures:

- **for LHD (Click here)**
- **for RHD (Click here)**

B	GO TO ENGINE CONTROL SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING)
C	GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

3.REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU - ECM)

a. Turn the ignition switch off.

b. Repair or replace the harness or connector.

c. Check for any momentary interruption between the skid control ECU (master cylinder solenoid) and ECM (Click here).

d. Check that there is no momentary interruption.

NEXT

4.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 15 km/h (9 mph) or more for 10 seconds or more.

e. Check that no CAN communication system DTC is output (Click here).

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

Result

Result	Proceed to
DTC C1437 is not output	A
DTC C1437 is output (for LHD)	B
DTC C1437 is output (for RHD)	C
CAN communication system DTC is output (for LHD)	D
CAN communication system DTC is output (for RHD)	E

B	REPLACE MASTER CYLINDER SOLENOID (Click here)
C	REPLACE MASTER CYLINDER SOLENOID (Click here)
D	GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)
E	GO TO CAN COMMUNICATION SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

A

END

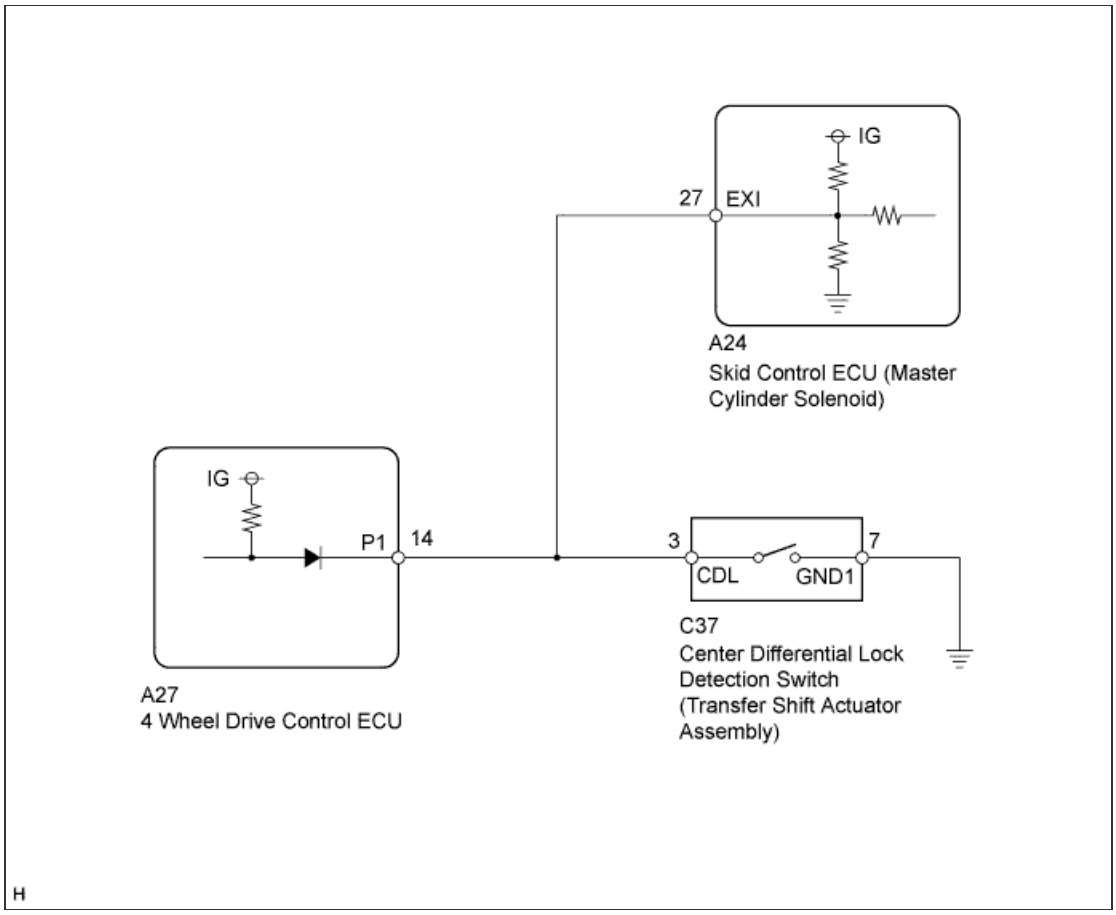
DTC C1340 Center Differential Lock Circuit

for Preparation Click here

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1340	An open circuit is detected in the EXI circuit of the skid control ECU.	• Harness or connector • Transfer system • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK HARNESS AND CONNECTOR (EXI TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

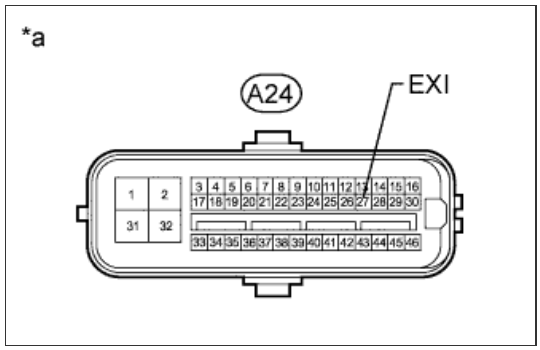
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-27 (EXI) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → Go to step 3

OK ↓

2.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Check for DTCs (Click here).

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A ↓

CHECK FOR INTERMITTENT PROBLEMS (Click here)

3.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - 4 WHEEL DRIVE CONTROL ECU/TRANSFER SHIFT ACTUATOR)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the A27 4 wheel drive control ECU connector.

c. Disconnect the C37 transfer shift actuator assembly connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-27 (EXI) - A27-14 (P1)	Always	Below 1 Ω
A24-27 (EXI) - C37-3 (CDL)	Always	Below 1 Ω
A24-27 (EXI) - Body ground	Always	10 kΩ or higher
C37-7 (GND1) - Body ground	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK ↓

GO TO TRANSFER SYSTEM (PROBLEM SYMPTOMS TABLE) (Click here)

DTC C1439 Steering Angle Sensor Initialization Incomplete

DTC C1445 Vehicle Driven with Steering Angle Sensor not Initialized

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) acquires steering 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.
The steering sensor zero point malfunction warning is canceled by turning the ignition switch off.

DTC Code	DTC Detection Condition	Trouble Area
C1439	After the steering sensor zero point calibration is cleared due to, for example, fluctuations in the power source, the steering zero point calibration cannot be obtained for 60 seconds of continuous driving.	• Steering sensor • Yaw rate sensor assembly • Skid control ECU (Master cylinder solenoid)
C1445	Steering sensor zero point calibration cannot be obtained when the vehicle is driven without a record of steering sensor zero point calibration at a speed of 35 km/h (22 mph) or more for 30 seconds or more without the brake pedal being depressed.	

INSPECTION PROCEDURE

NOTICE:

- **Before proceeding with the inspection, explain to the customer that the output DTC is related to temporary loss of the steering sensor zero point calibration, such as when the power voltage drops when the battery is removed, and confirm that this condition occurred.**
- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**

HINT:

When the speed sensor or the yaw rate sensor assembly has trouble, DTCs for the steering sensor may be stored even when the steering sensor is normal. When DTCs for the speed sensor or yaw rate sensor assembly are output together with other DTCs for the steering sensor, inspect and repair the speed sensor and yaw rate sensor assembly first, and then inspect and repair the steering sensor.

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON again and check that no CAN communication system DTC is output.

d. Drive the vehicle at a speed of 35 km/h (22 mph) and turn the steering wheel to the right and left, and then check that no speed sensor and yaw rate sensor assembly DTCs are output (Click here).

Result

Result		Proceed to
DTC is output	C1439 and/or C1445	A
	Relating to CAN communication system (for LHD)	B
	Relating to CAN communication system (for RHD)	C
	Relating to speed sensor or yaw rate sensor assembly	D
DTC is not output		E

HINT:

- **If there is a malfunction in the speed sensor or the yaw rate sensor assembly, an abnormal value may be output although the steering sensor is normal.**
- **If the speed sensor and the yaw rate sensor assembly DTCs are output simultaneously, repair the sensors and inspect the steering sensor.**
- **If DTC C1439 and/or C1445 is not output again, the DTC may have been stored due to a temporary loss of the steering sensor zero point calibration, such as when the power voltage drops.**

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 CIRCUITS INDICATED BY OUTPUT DTCS (Click here)

E → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

2.PERFORM STEERING 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 the front wheel alignment and steering position are adjusted as a result of an abnormal centered position of the steering wheel, acquire the yaw rate and acceleration 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

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 35 km/h (22 mph) or more and turn the steering wheel to the right and left.

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

Result

Result	Proceed to
DTCs C1439 and C1445 are not output	A
Yaw rate sensor assembly and/or steering sensor DTC is output	B

HINT:

If the same DTC C1439 and/or C1445 is not output again, the DTC may have been stored due to a temporary loss of the steering angle zero point calibration, such as when the power voltage drops.

B → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS (Click here)

A

END

DTC C1379 Downhill Assist Control Switch Malfunction (Test Mode DTC)

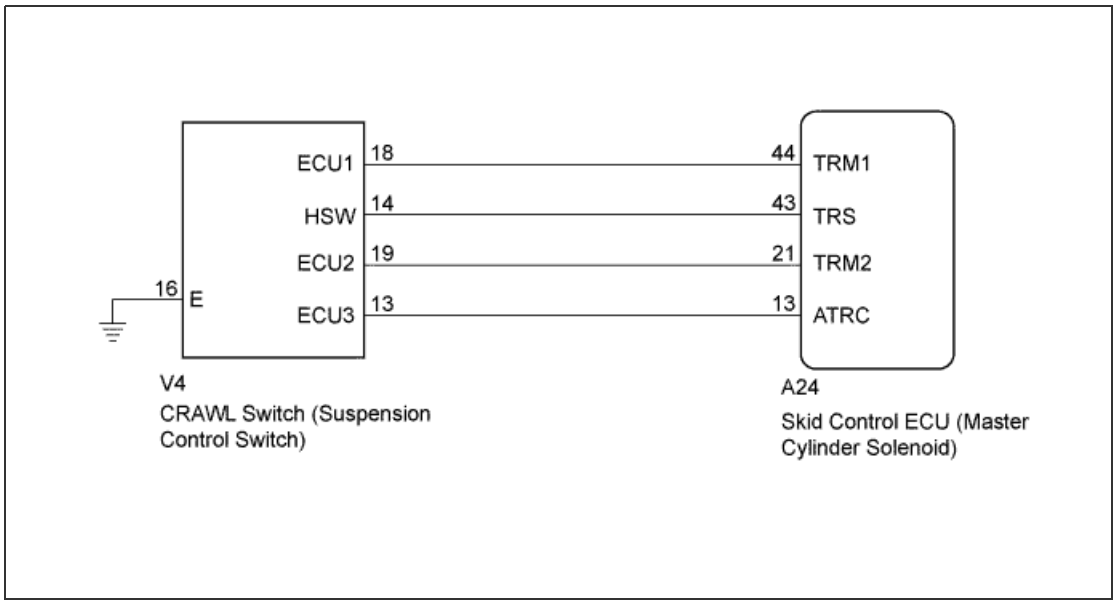
for Preparation Click here

DESCRIPTION

DTC C1379 is cleared when the CRAWL switch (suspension control switch) sends a CRAWL switch (suspension control switch) operation signal or when test mode ends.

DTC Code	DTC Detection Condition	Trouble Area
C1379	Stored only during test mode.	• CRAWL switch (Suspension control switch) • Harness or connector • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.INSPECT CRAWL SWITCH

a. Remove the CRAWL switch (suspension control switch) (Click here).

b. Inspect the CRAWL switch (suspension control switch) (Click here).

NG → REPLACE SUSPENSION CONTROL SWITCH (Click here)

OK

2.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - CRAWL SWITCH)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the V4 CRAWL switch (suspension control switch) connector.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-44 (TRM1) - V4-18 (ECU1)	Always	Below 1 Ω

A24-44 (TRM1) - Body ground	Always	10 kΩ or higher
A24-43 (TRS) - V4-14 (HSW)	Always	Below 1 Ω
A24-43 (TRS) - Body ground	Always	10 kΩ or higher
A24-21 (TRM2) - V4-19 (ECU2)	Always	Below 1 Ω
A24-21 (TRM2) - Body ground	Always	10 kΩ or higher
A24-13 (ATRC) - V4-13 (ECU3)	Always	Below 1 Ω
A24-13 (ATRC) - Body ground	Always	10 kΩ or higher
V4-16 (E) - Body ground	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.CHECK TEST MODE DTC

a. Perform the CRAWL switch check in the Test Mode procedure (Click here).

OK:

Test mode DTC C1379 is cleared.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1439 Steering Angle Sensor Initialization Incomplete

DTC C1445 Vehicle Driven with Steering Angle Sensor not Initialized

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) acquires steering 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.
The steering sensor zero point malfunction warning is canceled by turning the ignition switch off.

DTC Code	DTC Detection Condition	Trouble Area
C1439	After the steering sensor zero point calibration is cleared due to, for example, fluctuations in the power source, the steering zero point calibration cannot be obtained for 60 seconds of continuous driving.	• Steering sensor • Yaw rate sensor assembly • Skid control ECU (Master cylinder solenoid)
C1445	Steering sensor zero point calibration cannot be obtained when the vehicle is driven without a record of steering sensor zero point calibration at a speed of 35 km/h (22 mph) or more for 30 seconds or more without the brake pedal being depressed.	

INSPECTION PROCEDURE

NOTICE:

- **Before proceeding with the inspection, explain to the customer that the output DTC is related to temporary loss of the steering sensor zero point calibration, such as when the power voltage drops when the battery is removed, and confirm that this condition occurred.**
- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**

HINT:

When the speed sensor or the yaw rate sensor assembly has trouble, DTCs for the steering sensor may be stored even when the steering sensor is normal. When DTCs for the speed sensor or yaw rate sensor assembly are output together with other DTCs for the steering sensor, inspect and repair the speed sensor and yaw rate sensor assembly first, and then inspect and repair the steering sensor.

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Turn the ignition switch to ON again and check that no CAN communication system DTC is output.

d. Drive the vehicle at a speed of 35 km/h (22 mph) and turn the steering wheel to the right and left, and then check that no speed sensor and yaw rate sensor assembly DTCs are output (Click here).

Result

Result		Proceed to
DTC is output	C1439 and/or C1445	A
	Relating to CAN communication system (for LHD)	B
	Relating to CAN communication system (for RHD)	C
	Relating to speed sensor or yaw rate sensor assembly	D
DTC is not output		E

HINT:

- **If there is a malfunction in the speed sensor or the yaw rate sensor assembly, an abnormal value may be output although the steering sensor is normal.**
- **If the speed sensor and the yaw rate sensor assembly DTCs are output simultaneously, repair the sensors and inspect the steering sensor.**
- **If DTC C1439 and/or C1445 is not output again, the DTC may have been stored due to a temporary loss of the steering sensor zero point calibration, such as when the power voltage drops.**

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 CIRCUITS INDICATED BY OUTPUT DTCS (Click here)

E → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

2.PERFORM STEERING 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 the front wheel alignment and steering position are adjusted as a result of an abnormal centered position of the steering wheel, acquire the yaw rate and acceleration 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

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 35 km/h (22 mph) or more and turn the steering wheel to the right and left.

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

Result

Result	Proceed to
DTCs C1439 and C1445 are not output	A
Yaw rate sensor assembly and/or steering sensor DTC is output	B

HINT:

If the same DTC C1439 and/or C1445 is not output again, the DTC may have been stored due to a temporary loss of the steering angle zero point calibration, such as when the power voltage drops.

B → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS (Click here)

A

END

DTC C1380 Stop Light Control Relay Malfunction

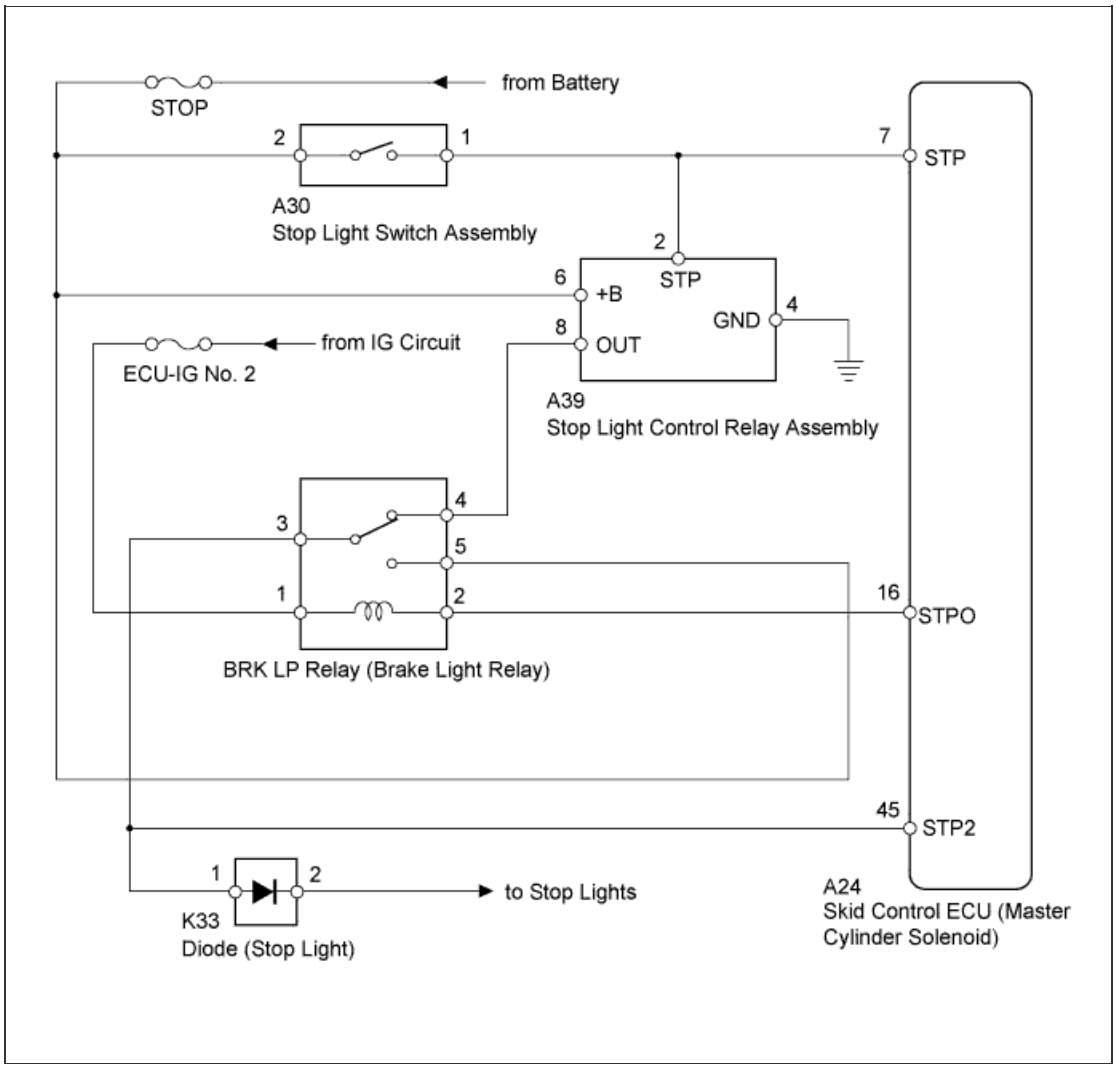
for Preparation Click here

DESCRIPTION

Upon receiving the hill-start assist control operating signal from the skid control ECU (master cylinder solenoid), the relay contact turns on and the stop light comes on.

DTC Code	DTC Detection Condition	Trouble Area
C1380	Either condition is met: 1. When the voltage at the IG1 terminal is between 11 and 14 V and the stop light control relay drive output (STPO) is on, a signal is not input to the STP2 terminal for 5 seconds or more. 2. When the voltage at the IG1 terminal is between 11 and 14 V and the stop light control relay drive output (STPO) is off, the signal at the STP terminal is different from the input signal at the STP2 terminal for 5 seconds or more.	• STOP fuse • Harness or connector • BRK LP relay (Brake light relay) • Stop light control relay assembly • Skid control ECU (Master cylinder solenoid)

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

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

HINT:

When DTC C1425 is output together with DTC C1380, inspect and repair the trouble areas indicated by DTC C1425 first (Click here).

1.CHECK STOP LIGHT OPERATION

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

OK:

Condition	Illumination Condition
Brake pedal depressed	On
Brake pedal released	Off

NG → Go to step 6

OK

2.READ VALUE USING GTS (STOP LIGHT SW)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

f. Check that the stop light switch condition observed on the GTS changes according to brake pedal operation.

OK:

The GTS displays ON and OFF according to brake pedal operation.

NG → Go to step 11

OK

3.PERFORM ACTIVE TEST USING GTS (STOP LIGHT RELAY)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Stop Light Relay	BRK LP relay (Brake light relay)	Relay ON/OFF	Observe the stop lights (the stop lights do not come on for 2 to 5 seconds).

f. While performing the Active Test, check the illumination condition of the stop lights and "Stop Light Relay Output" in the Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
		ON: Relay output on (Stop lights on)	

Stop Light Relay Output	BRK LP relay (Brake light relay) output / ON or OFF	OFF: Relay output off (Stop lights off)	-

Result

Result	Proceed to
When Active Test performed, Data List item changes between ON and OFF and stop lights turn on and off	A
When Active Test performed, Data List item changes between ON and OFF, but stop lights do not turn on	B

B → Go to step 12

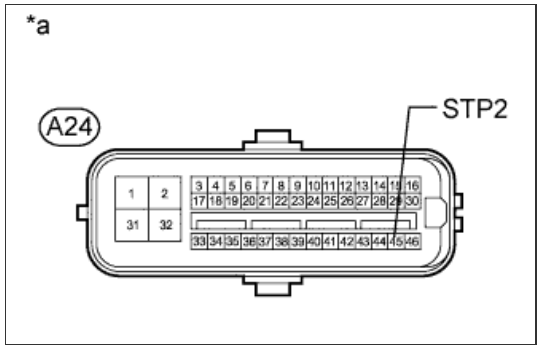
A

4.CHECK HARNESS AND CONNECTOR (STP2 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-45 (STP2) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Perform a road test.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

6.CHECK HARNESS AND CONNECTOR (+B/GND TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the stop light control relay assembly connector.

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

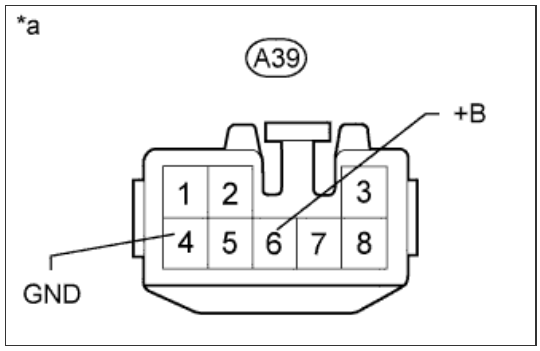
Standard Voltage:

Tester Connection	Condition	Specified Condition
A39-6 (+B) - 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
A39-4 (GND) - Body ground	Always	Below 1 Ω



Text in Illustration

*a	Front view of wire harness connector (to Stop Light Control Relay Assembly)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7.CHECK HARNESS AND CONNECTOR (STP TERMINAL)

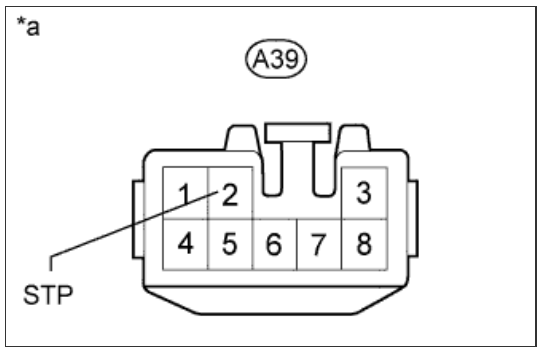
a. Turn the ignition switch off.

b. Disconnect the stop light control relay assembly connector.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
A39-2 (STP) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V



Text in Illustration

*a	Front view of wire harness connector (to Stop Light Control Relay Assembly)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

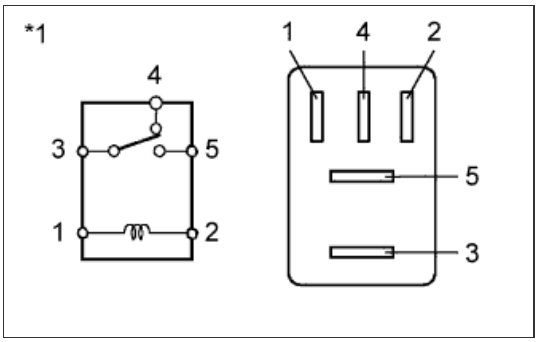
OK

8.INSPECT BRK LP RELAY

a. Remove the BRK LP relay (brake light relay) from the engine room relay block.

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

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 is applied to terminal 1 and battery negative voltage is applied to terminal 2	10 kΩ or higher
	Battery positive voltage is not applied to terminal 1 and battery negative voltage is not applied to terminal 2	Below 1 Ω
3 - 5	Battery positive voltage is applied to terminal 1 and battery negative voltage is applied to terminal 2	Below 1 Ω
	Battery positive voltage is not applied to terminal 1 and battery negative voltage is not applied to terminal 2	10 kΩ or higher

Text in Illustration

*1	BRK LP Relay (Brake Light Relay)

NG → REPLACE BRAKE LIGHT RELAY

OK

9.CHECK HARNESS AND CONNECTOR (STOP LIGHT CONTROL RELAY - BRK LP RELAY)

a. Turn the ignition switch off.

b. Disconnect the A39 stop light control relay assembly connector.

c. Remove the BRK LP relay (brake light relay) from the engine room relay block.

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

Standard Resistance:

Tester Connection	Condition	Specified Condition
A39-8 (OUT) - Engine room relay block BRK LP relay (brake light relay) terminal 4	Always	Below 1 Ω
A39-8 (OUT) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

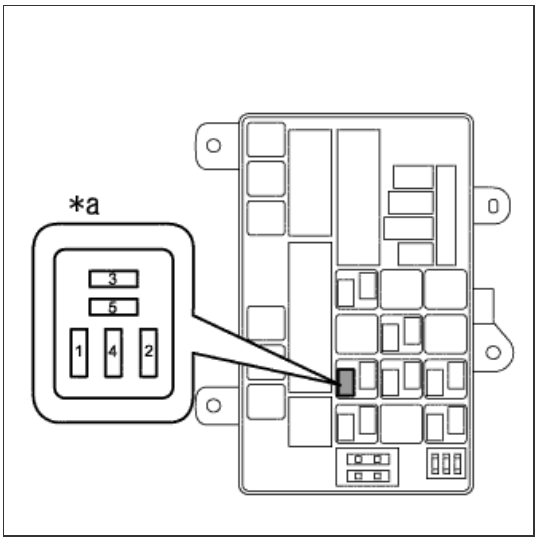
10.CHECK HARNESS AND CONNECTOR (STOP LIGHT POWER SOURCE TERMINAL)

a. Remove the BRK LP relay (brake light relay) from the engine room relay block.

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

Standard Voltage:

Tester Connection	Condition	Specified Condition
4 - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V



Text in Illustration

*a	Component without BRK LP Relay (Brake Light Relay) (Engine Room Relay Block)

NG → REPLACE STOP LIGHT CONTROL RELAY ASSEMBLY

OK →

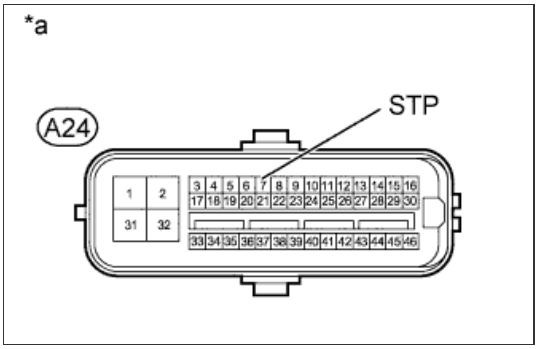
REPAIR OR REPLACE HARNESS OR CONNECTOR (ENGINE ROOM RELAY BLOCK BRK LP RELAY TERMINAL 3 CIRCUIT)

11.CHECK HARNESS AND CONNECTOR (STP TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

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



Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-7 (STP) - Body ground	Brake pedal depressed	8 to 14 V
	Brake pedal released	Below 1.5 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

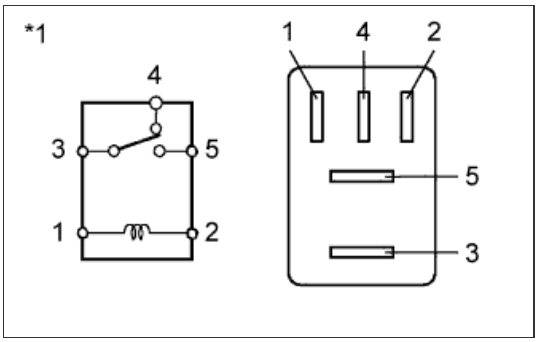
A →

REPAIR OR REPLACE HARNESS OR CONNECTOR

12.INSPECT BRK LP RELAY

a. Remove the BRK LP relay (brake light 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 is applied to terminal 1 and battery negative voltage is applied to terminal 2	10 kΩ or higher
	Battery positive voltage is not applied to terminal 1 and battery negative voltage is not applied to terminal 2	Below 1 Ω
3 - 5	Battery positive voltage is applied to terminal 1 and battery negative voltage is applied to terminal 2	Below 1 Ω
	Battery positive voltage is not applied to terminal 1 and battery negative voltage is not applied to terminal 2	10 kΩ or higher

Text in Illustration

*1	BRK LP Relay (Brake Light Relay)

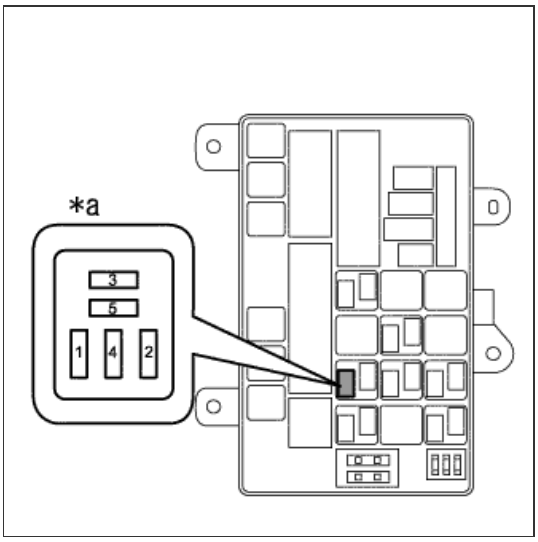
NG → REPLACE BRAKE LIGHT RELAY

OK

13.CHECK HARNESS AND CONNECTOR (BRK LP RELAY POWER SOURCE TERMINAL)

a. Remove the BRK LP relay (brake light relay) from the engine room relay block.

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

*a	Component without BRK LP relay (Brake Light Relay) (Engine Room Relay Block)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

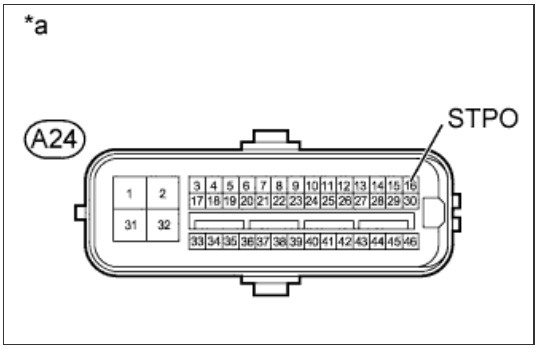
OK

14.CHECK HARNESS AND CONNECTOR (STPO TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) 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

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

15.RECONFIRM DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

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

Result

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

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1440 Steering Angle Sensor Unusual Bank Angle Detected

for Preparation Click here

DESCRIPTION

If the skid control ECU (master cylinder solenoid) determines that the vehicle is being driven at a steep bank angle, the skid control ECU (master cylinder solenoid) stores DTC C1440 while VSC operation is temporarily disabled.
It is not a malfunction if the system and sensor circuits are normal and if the normal VSC operation resumes, which automatically clears DTC C1440, after the vehicle is returned to a normal position.

HINT:

DTC C1440 and the yaw rate sensor assembly DTC are stored when the skid control ECU (master cylinder solenoid) determines that the vehicle is being driven at a steep bank angle and either of the following conditions is met:

- **The yaw rate sensor assembly is installed at an angle.**
- **The yaw rate sensor assembly signal output is stuck.**

DTC Code	DTC Detection Condition	Trouble Area
C1440	Driving at a steep bank angle	Yaw rate sensor assembly

INSPECTION PROCEDURE

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Perform a road test.

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

Result

Result	Proceed to
DTC C1440 is output	A
DTC C1440 is not output	B
Yaw rate sensor assembly DTC is output	C

B → END

C → REPAIR CIRCUITS INDICATED BY OUTPUT DTCS (**Click here**)

A

2.CLEAR DTC

a. Clear the DTC (Click here).

HINT:

- **If the skid control ECU (master cylinder solenoid) determines that the vehicle is being driven at a steep bank angle, the skid control ECU (master cylinder solenoid) stores DTC C1440 while VSC operation is temporarily disabled.**
- **It is not a malfunction if the system and sensor circuits are normal and if the normal VSC operation resumes, which automatically clears DTC C1440, after the vehicle is returned to a normal position.**

NEXT

END

DTC C1381 Acceleration Sensor Power Supply Voltage Malfunction

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2).
If there is trouble in the bus lines between the yaw rate sensor assembly and the CAN communication system, DTCs U0123 (malfunction in CAN communication with the yaw rate sensor) and U0124 (malfunction in CAN communication with the acceleration sensor) are stored.
These DTCs are also stored when calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1381	At a vehicle speed of more than 3 km/h (2 mph), the acceleration sensor power source malfunction signal is received for 10 seconds or more.	• ECU-IG No. 2 fuse • ECU-B1 fuse • Yaw rate sensor assembly • Yaw rate sensor assembly power source circuit

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245 (Click here).

INSPECTION PROCEDURE

NOTICE:

- **After replacing the yaw rate sensor assembly, perform calibration (Click here).**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

1.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Check for DTCs (Click here).

Result

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output (for LHD)	B
CAN DTC is output (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 HARNESS AND CONNECTOR (IG/+B TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the yaw rate sensor assembly connector.

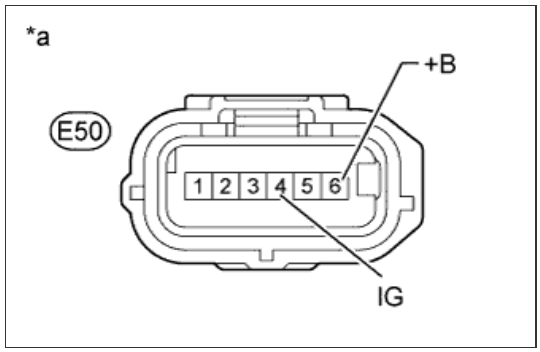
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Condition	Specified Condition
E50-4 (IG) - Body ground	Ignition switch ON	11 to 14 V
E50-6 (+B) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Yaw Rate Sensor Assembly)



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.CHECK HARNESS AND CONNECTOR (GND TERMINAL)

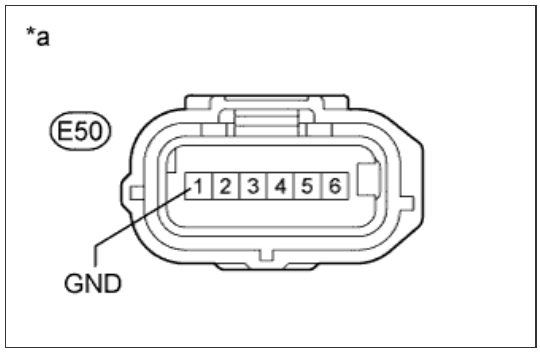
a. Turn the ignition switch off.

b. Disconnect the yaw rate sensor assembly connector.

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



Text in Illustration

*a	Front view of wire harness connector (to Yaw Rate Sensor Assembly)

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

a. Reconnect the yaw rate sensor assembly connector.

b. Clear the DTCs (Click here).

c. Turn the ignition switch off.

d. Start the engine.

e. Perform a road test.

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

Result

Result	Proceed to
DTC C1381 is not output	A
DTC C1381 is output	B

B → REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1442 Invalid Data Received from Acceleration Sensor

DTC C1443 Invalid Data Received from Yaw Rate Sensor

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor.

DTC Code	DTC Detection Condition	Trouble Area
C1442	An invalid data signal is transmitted continuously from the acceleration sensor for 10 seconds or more.	Yaw rate sensor assembly
C1443	An invalid data signal is transmitted continuously from the yaw rate sensor for 10 seconds or more.	Yaw rate sensor assembly

INSPECTION PROCEDURE

NOTICE:

After replacing the yaw rate sensor assembly, perform calibration (Click here).

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine and idle it for 60 seconds, and then stop the engine.

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

Result

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

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A → REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1401 Front Speed Sensor RH Malfunction

DTC C1271 Low Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1272 Low Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1402 Front Speed Sensor LH Malfunction

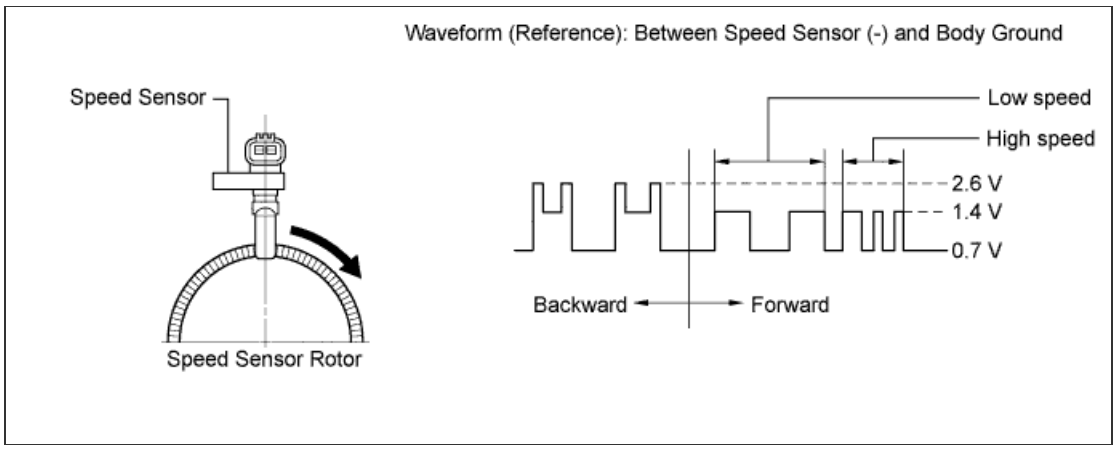
for Preparation Click here

DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU (master cylinder solenoid). These signals are used for brake control.

HINT:

When the connectors between the speed sensor and skid control ECU (master cylinder solenoid) are connected, the following waveform is output.



DTC Code	DTC Detection Condition	Trouble Area
C1401 C1402	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed of 10 km/h (6 mph) or more, the outputs from both front speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation
C1271 C1272	Stored only during test mode.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1401 and C1271 are for the front speed sensor RH.**
- **DTCs C1402 and C1272 are for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

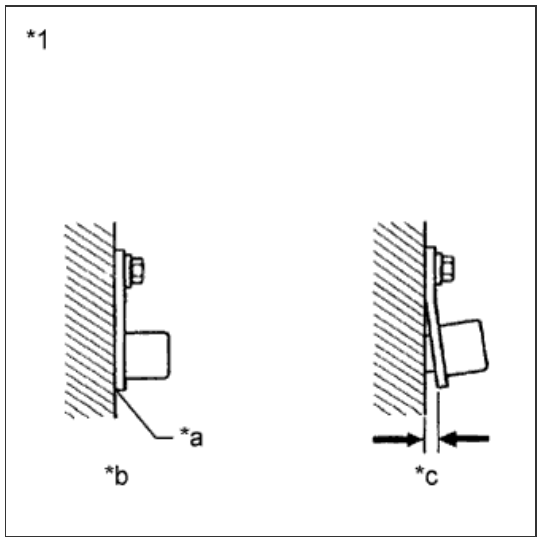
b. Check the speed sensor installation (Click here).

OK:

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

Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG



NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

2.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

3.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK ↓

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

5.REPLACE FRONT SPEED SENSOR

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

NEXT ↓

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (**Click here**)

A ↓

END

DTC C1442 Invalid Data Received from Acceleration Sensor

DTC C1443 Invalid Data Received from Yaw Rate Sensor

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) receives signals from the yaw rate sensor assembly via the CAN communication system.
The yaw rate sensor assembly has a built-in acceleration sensor.

DTC Code	DTC Detection Condition	Trouble Area
C1442	An invalid data signal is transmitted continuously from the acceleration sensor for 10 seconds or more.	Yaw rate sensor assembly
C1443	An invalid data signal is transmitted continuously from the yaw rate sensor for 10 seconds or more.	Yaw rate sensor assembly

INSPECTION PROCEDURE

NOTICE:

After replacing the yaw rate sensor assembly, perform calibration (Click here).

1.CHECK DTC

a. Clear the DTCs (Click here).

b. Turn the ignition switch off.

c. Start the engine and idle it for 60 seconds, and then stop the engine.

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

Result

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

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A → REPLACE YAW RATE SENSOR ASSEMBLY (Click here)

DTC C1401 Front Speed Sensor RH Malfunction

DTC C1271 Low Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1272 Low Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1402 Front Speed Sensor LH Malfunction

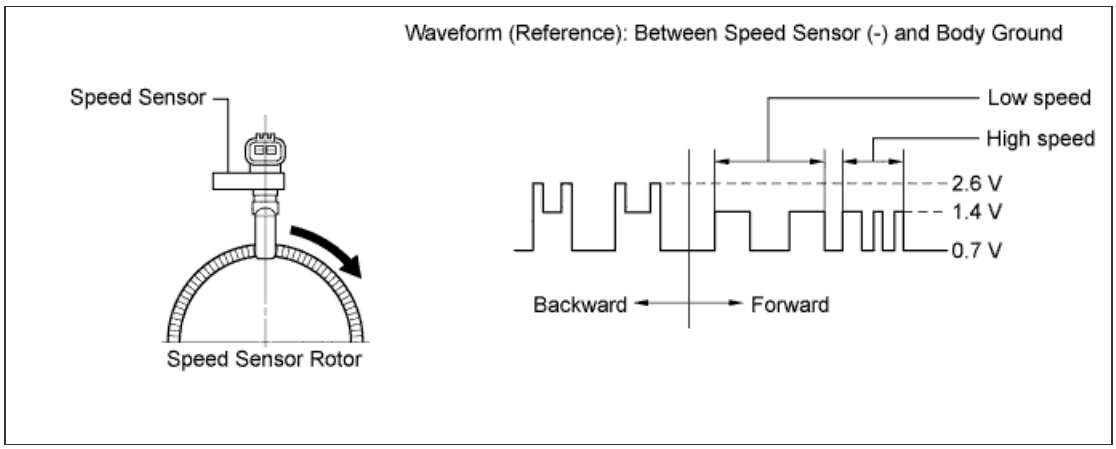
for Preparation Click here

DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU (master cylinder solenoid). These signals are used for brake control.

HINT:

When the connectors between the speed sensor and skid control ECU (master cylinder solenoid) are connected, the following waveform is output.



DTC Code	DTC Detection Condition	Trouble Area
C1401 C1402	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed of 10 km/h (6 mph) or more, the outputs from both front speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation
C1271 C1272	Stored only during test mode.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1401 and C1271 are for the front speed sensor RH.**
- **DTCs C1402 and C1272 are for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

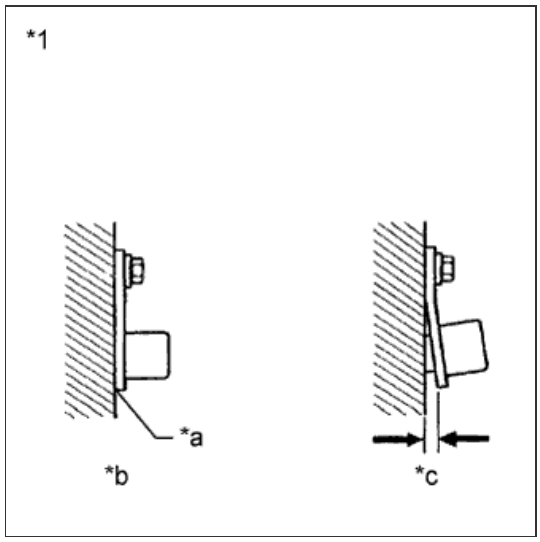
b. Check the speed sensor installation (Click here).

OK:

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

Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG



NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

2.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

3.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK ↓

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

5.REPLACE FRONT SPEED SENSOR

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

NEXT ↓

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (**Click here**)

A ↓

END

DTC C1452 Accumulator Low Pressure

for Preparation Click here

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1452	After braking, the fluid pressure inside the accumulator is less than the threshold within 3.2 seconds.	• Hydraulic circuit • Master cylinder solenoid (Accumulator pressure sensor)

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CUSTOMER PROBLEM ANALYSIS

a. Check with the customer to determine if frequent braking has been performed.

NEXT

2.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Depress the brake pedal more than 40 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
Frequent braking was not performed and DTC is not output	B
Frequent braking was performed and DTC is not output	C

HINT:

Excessive brake pedal operation results in abnormal accumulator pressure consumption. This is normal.

B → CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

C → END

A

3.CHECK HYDRAULIC CIRCUIT

a. Check the hydraulic circuit (Click here).

OK:
Hydraulic circuit is normal (no leakage).

NG → REPAIR HYDRAULIC CIRCUIT

OK

4.READ VALUE USING GTS (ACCUMULATOR SENSOR)

a. Connect the GTS to the DLC3.

b. Turn the ignition switch to ON.

c. Turn the GTS on.

d. 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.

e. Check that the accumulator output value is normal.

OK:

Accumulator pressure sensor value is normal.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

5.RECONFIRM DTC

a. Clear the DTCs (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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1401 Front Speed Sensor RH Malfunction

DTC C1271 Low Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1272 Low Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1402 Front Speed Sensor LH Malfunction

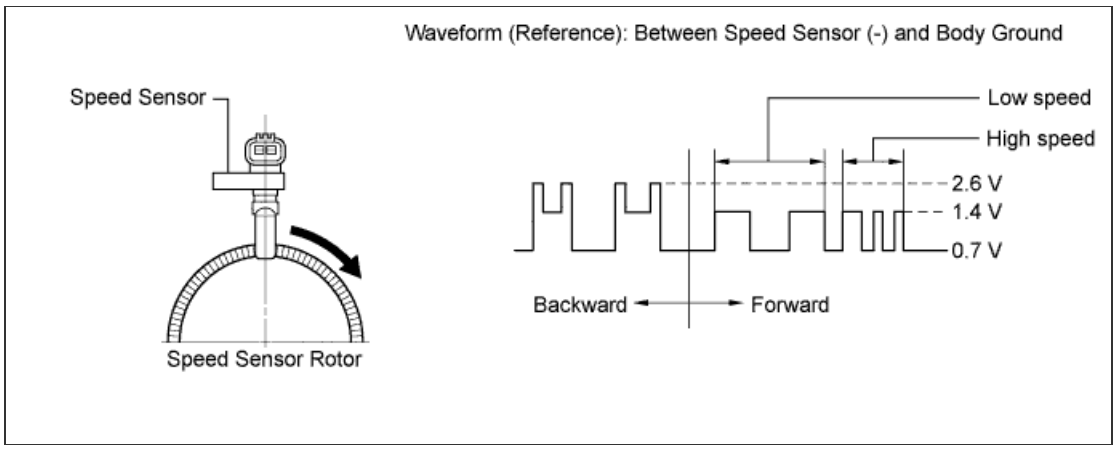
for Preparation Click here

DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU (master cylinder solenoid). These signals are used for brake control.

HINT:

When the connectors between the speed sensor and skid control ECU (master cylinder solenoid) are connected, the following waveform is output.



DTC Code	DTC Detection Condition	Trouble Area
C1401 C1402	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed of 10 km/h (6 mph) or more, the outputs from both front speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation
C1271 C1272	Stored only during test mode.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1401 and C1271 are for the front speed sensor RH.**
- **DTCs C1402 and C1272 are for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

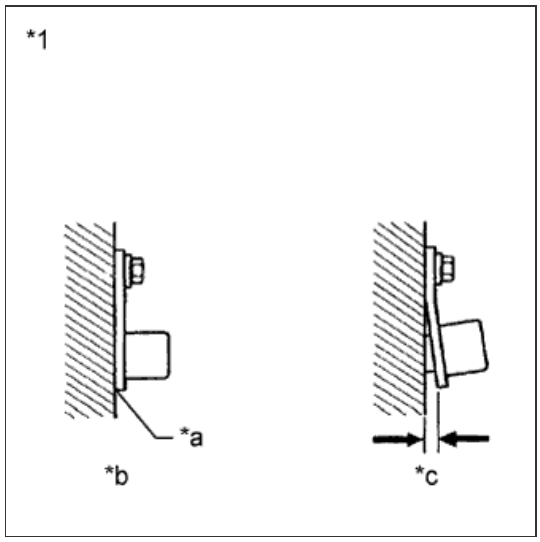
b. Check the speed sensor installation (Click here).

OK:

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

Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG



NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

2.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

3.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK ↓

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

5.REPLACE FRONT SPEED SENSOR

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

NEXT ↓

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (**Click here**)

A ↓

END

DTC C1453 Reservoir Level Switch Disconnected

DTC C1454 Reservoir Level Low

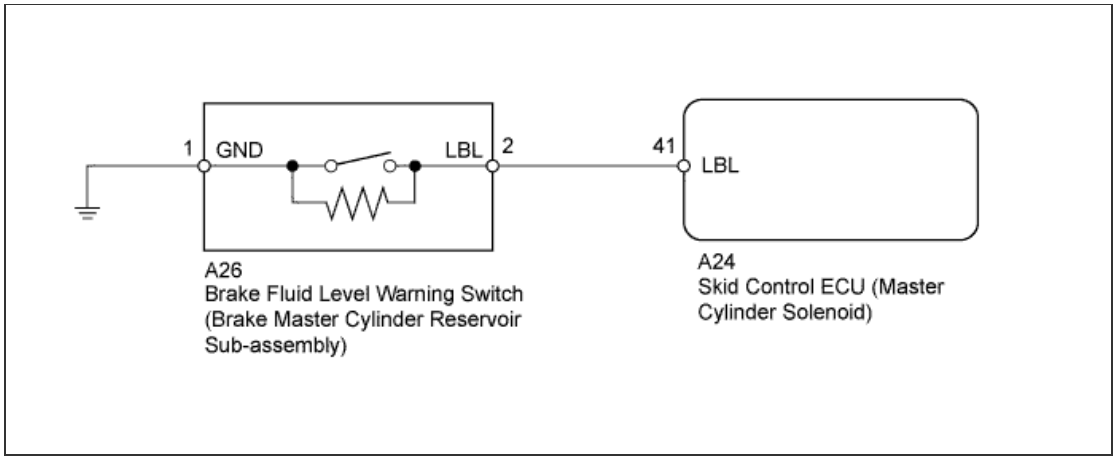
for Preparation Click here

DESCRIPTION

The brake fluid level warning switch (brake master cylinder reservoir sub-assembly) sends the appropriate signal to the skid control ECU (master cylinder solenoid) when the brake fluid level drops.

DTC Code	DTC Detection Condition	Trouble Area
C1453	With the ECU terminal IG1 voltage at 10 to 14 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 (Brake master cylinder reservoir sub-assembly) • Harness or connector • Skid control ECU (Master cylinder solenoid)
C1454	The fluid level of the reservoir is below the LOW level for 40 seconds after the ignition switch is turned to ON, or for 7 seconds during pump motor operation.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK BRAKE FLUID LEVEL

a. Turn the ignition switch off.

b. Depress the brake pedal 40 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 5 mm (0.197 in.) from the level when the ignition switch is off (normal).

OK:

Brake fluid level is normal.

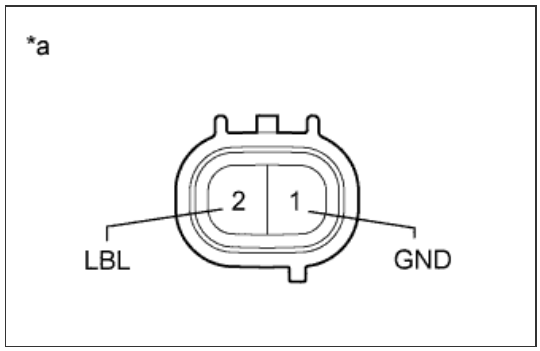
NG → CHECK AND REPAIR BRAKE FLUID LEAK

OK

2.INSPECT BRAKE FLUID LEVEL WARNING SWITCH

a. Disconnect the A26 brake fluid level warning switch (brake master cylinder reservoir sub-assembly) 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.

Standard Resistance:

Tester Connection	Switch Condition	Specified Condition
1 (GND) - 2 (LBL)	Float UP (Switch off)	1.9 to 2.1 kΩ
	Float DOWN (Switch on)	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Brake Fluid Level Warning Switch [Brake Master Cylinder Reservoir Sub-assembly])

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 (for LHD)	B
NG (for 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 (SKID CONTROL ECU - BRAKE FLUID LEVEL WARNING SWITCH)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the A26 brake fluid level warning switch (brake master cylinder reservoir sub-assembly) connector.

c. 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

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine and idle it for approximately 40 seconds.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1401 Front Speed Sensor RH Malfunction

DTC C1271 Low Output Signal of Front Speed Sensor RH (Test Mode DTC)

DTC C1272 Low Output Signal of Front Speed Sensor LH (Test Mode DTC)

DTC C1402 Front Speed Sensor LH Malfunction

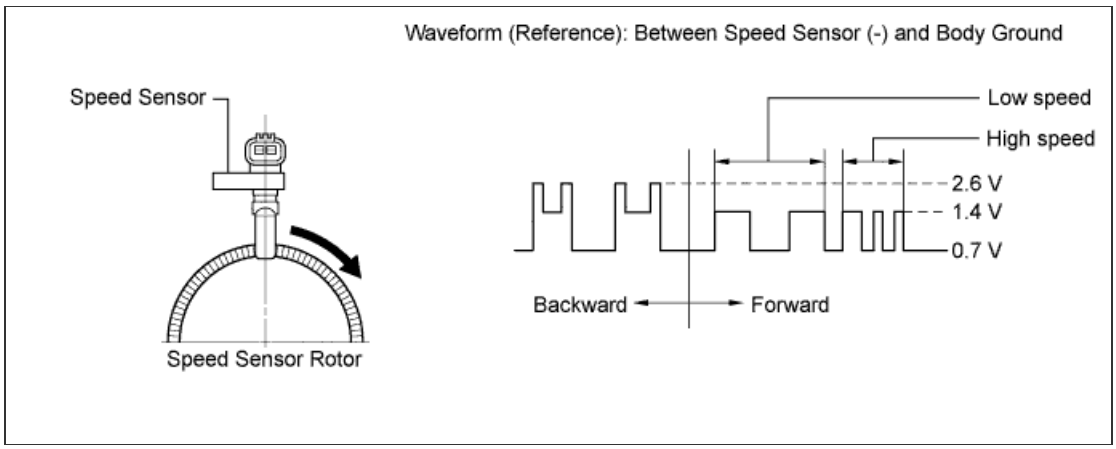
for Preparation Click here

DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU (master cylinder solenoid). These signals are used for brake control.

HINT:

When the connectors between the speed sensor and skid control ECU (master cylinder solenoid) are connected, the following waveform is output.



DTC Code	DTC Detection Condition	Trouble Area
C1401 C1402	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed of 10 km/h (6 mph) or more, the outputs from both front speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation
C1271 C1272	Stored only during test mode.	• Front speed sensor RH/LH • Front speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1401 and C1271 are for the front speed sensor RH.**
- **DTCs C1402 and C1272 are for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK FRONT SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

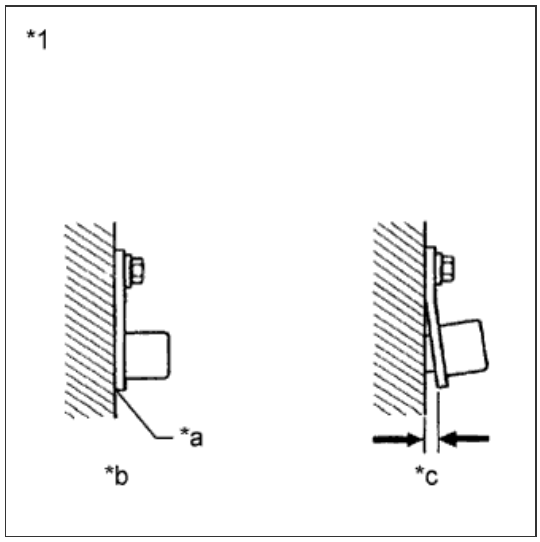
b. Check the speed sensor installation (Click here).

OK:

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

Text in Illustration

*1	Front Speed Sensor
*a	No clearance
*b	OK
*c	NG



NG → INSTALL FRONT SPEED SENSOR CORRECTLY

OK

2.INSPECT FRONT SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:

No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR

OK

3.INSPECT FRONT SPEED SENSOR ROTOR

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

b. Check the speed sensor rotor.

OK:

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

HINT:

The front speed sensor rotor is incorporated into the front axle with ABS rotor bearing assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle with ABS rotor bearing assembly.

NG → CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK ↓

CHECK FOR INTERMITTENT PROBLEMS (**Click here**)

5.REPLACE FRONT SPEED SENSOR

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

NEXT ↓

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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

Result

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

B → REPLACE FRONT AXLE WITH ABS ROTOR BEARING ASSEMBLY (**Click here**)

A ↓

END

DTC C1453 Reservoir Level Switch Disconnected

DTC C1454 Reservoir Level Low

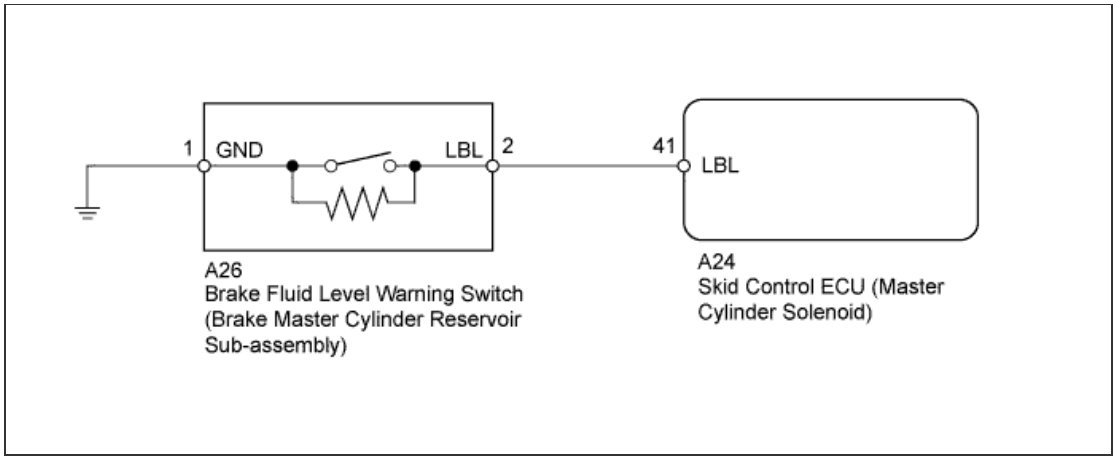
for Preparation Click here

DESCRIPTION

The brake fluid level warning switch (brake master cylinder reservoir sub-assembly) sends the appropriate signal to the skid control ECU (master cylinder solenoid) when the brake fluid level drops.

DTC Code	DTC Detection Condition	Trouble Area
C1453	With the ECU terminal IG1 voltage at 10 to 14 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 (Brake master cylinder reservoir sub-assembly) • Harness or connector • Skid control ECU (Master cylinder solenoid)
C1454	The fluid level of the reservoir is below the LOW level for 40 seconds after the ignition switch is turned to ON, or for 7 seconds during pump motor operation.	

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK BRAKE FLUID LEVEL

a. Turn the ignition switch off.

b. Depress the brake pedal 40 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 5 mm (0.197 in.) from the level when the ignition switch is off (normal).

OK:

Brake fluid level is normal.

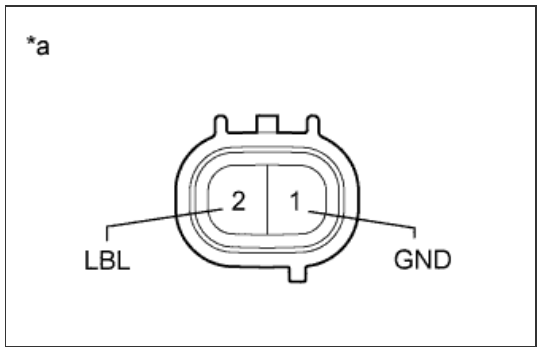
NG → CHECK AND REPAIR BRAKE FLUID LEAK

OK

2.INSPECT BRAKE FLUID LEVEL WARNING SWITCH

a. Disconnect the A26 brake fluid level warning switch (brake master cylinder reservoir sub-assembly) 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.

Standard Resistance:

Tester Connection	Switch Condition	Specified Condition
1 (GND) - 2 (LBL)	Float UP (Switch off)	1.9 to 2.1 kΩ
	Float DOWN (Switch on)	Below 1 Ω

Text in Illustration

*a	Component without harness connected (Brake Fluid Level Warning Switch [Brake Master Cylinder Reservoir Sub-assembly])

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 (for LHD)	B
NG (for 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 (SKID CONTROL ECU - BRAKE FLUID LEVEL WARNING SWITCH)

a. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

b. Disconnect the A26 brake fluid level warning switch (brake master cylinder reservoir sub-assembly) connector.

c. 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

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

4.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine and idle it for approximately 40 seconds.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1403 Rear Speed Sensor RH Malfunction

DTC C1273 Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1274 Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1404 Rear Speed Sensor LH Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1403 C1404	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed less than 10 km/h (6 mph), outputs from both rear speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation
C1273 C1274	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1403 and C1273 are for the rear speed sensor RH.**
- **DTCs C1404 and C1274 are for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

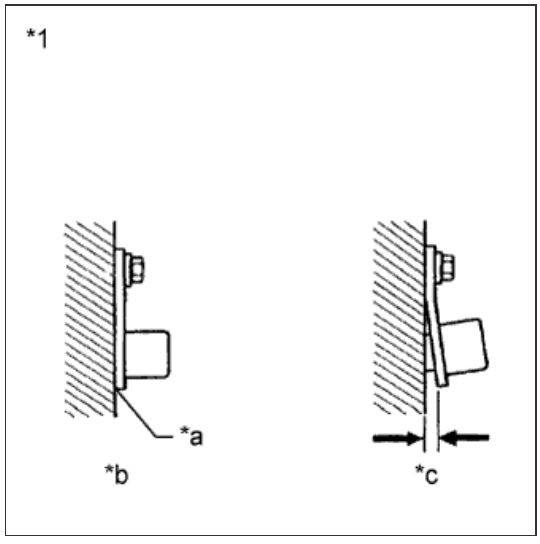
1.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

2.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:
No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

3.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

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

HINT:

The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:
The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK

CHECK FOR INTERMITTENT PROBLEMS (Click here)

5.REPLACE REAR SPEED SENSOR

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

NEXT

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more or at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C146E Open in ABS Solenoid Relay Circuit

DTC C146F Short 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
C146E	Either condition is met: 1. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is between 9.5 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 circuit • Master cylinder solenoid
C146F	The following condition continues for at least 0.2 seconds. • The relay contact is closed immediately after turning the ignition switch ON when the relay is off.	

WIRING DIAGRAM

Refer to DTCs C1225, C1226, C1227, C1228, C1468, C1469, C146A and C146B (Click here).

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK HARNESS AND CONNECTOR (+BS TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

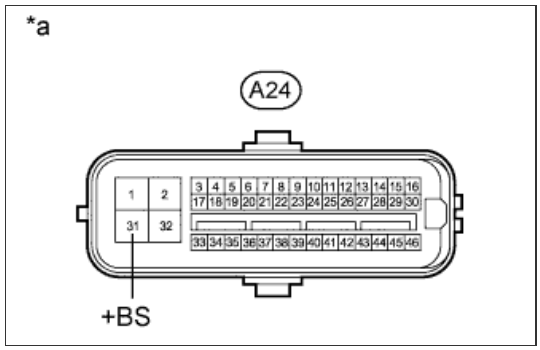
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-31 (+BS) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

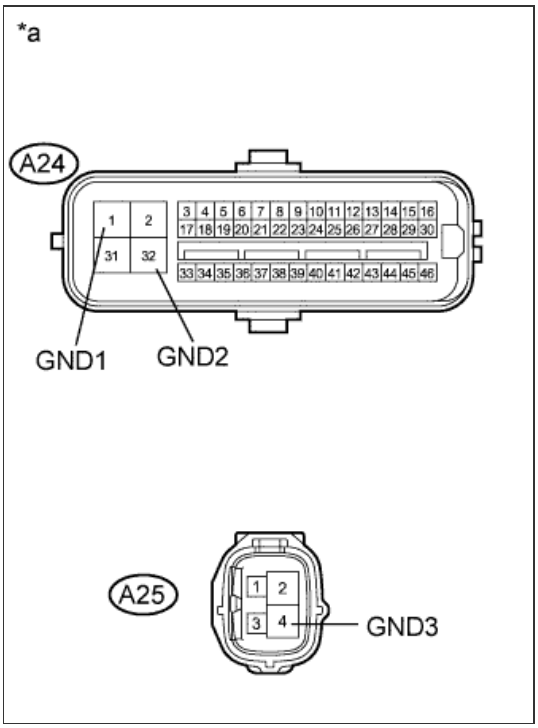
c. Measure the resistance according to the value(s) in the table below.

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid relay is in the master cylinder solenoid.

Therefore, solenoid relay circuit inspections and relay unit inspections 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. Turn the ignition switch off.

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

d. 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1403 Rear Speed Sensor RH Malfunction

DTC C1273 Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1274 Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1404 Rear Speed Sensor LH Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1403 C1404	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed less than 10 km/h (6 mph), outputs from both rear speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation
C1273 C1274	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1403 and C1273 are for the rear speed sensor RH.**
- **DTCs C1404 and C1274 are for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

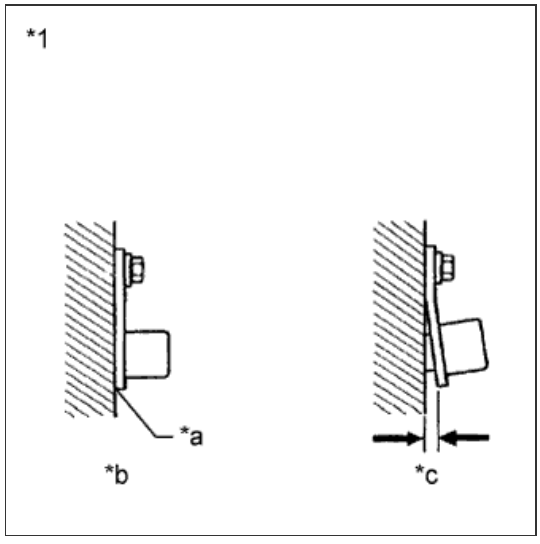
1.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

2.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:
No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

3.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

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

HINT:

The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:
The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK

CHECK FOR INTERMITTENT PROBLEMS (Click here)

5.REPLACE REAR SPEED SENSOR

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

NEXT

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more or at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC C146E Open in ABS Solenoid Relay Circuit

DTC C146F Short 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
C146E	Either condition is met: 1. Both of the following conditions continue for at least 0.2 seconds. 1. IG voltage is between 9.5 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 circuit • Master cylinder solenoid
C146F	The following condition continues for at least 0.2 seconds. • The relay contact is closed immediately after turning the ignition switch ON when the relay is off.	

WIRING DIAGRAM

Refer to DTCs C1225, C1226, C1227, C1228, C1468, C1469, C146A and C146B (Click here).

INSPECTION PROCEDURE

NOTICE:

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

1.CHECK HARNESS AND CONNECTOR (+BS TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connector.

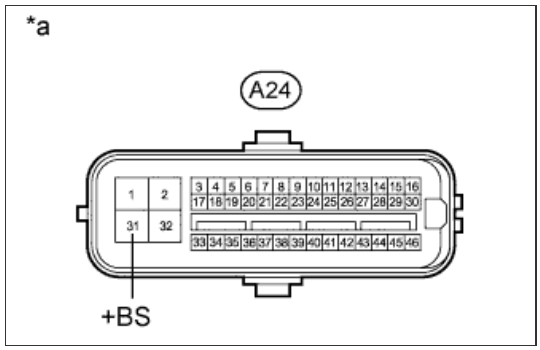
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Condition	Specified Condition
A24-31 (+BS) - Body ground	Always	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

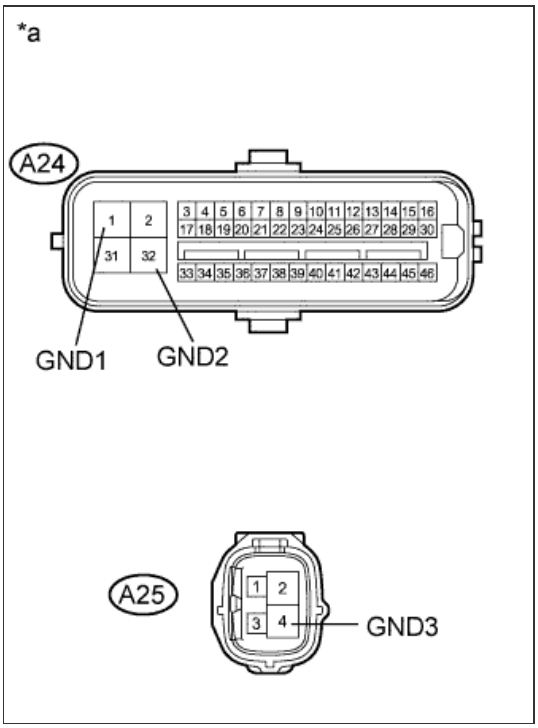
c. Measure the resistance according to the value(s) in the table below.

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

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.RECONFIRM DTC

HINT:

These codes are stored when a problem is detected in the master cylinder solenoid.

The solenoid relay is in the master cylinder solenoid.

Therefore, solenoid relay circuit inspections and relay unit inspections 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. Turn the ignition switch off.

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

d. 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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

DTC C1403 Rear Speed Sensor RH Malfunction

DTC C1273 Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1274 Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1404 Rear Speed Sensor LH Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1403 C1404	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed less than 10 km/h (6 mph), outputs from both rear speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation
C1273 C1274	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1403 and C1273 are for the rear speed sensor RH.**
- **DTCs C1404 and C1274 are for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

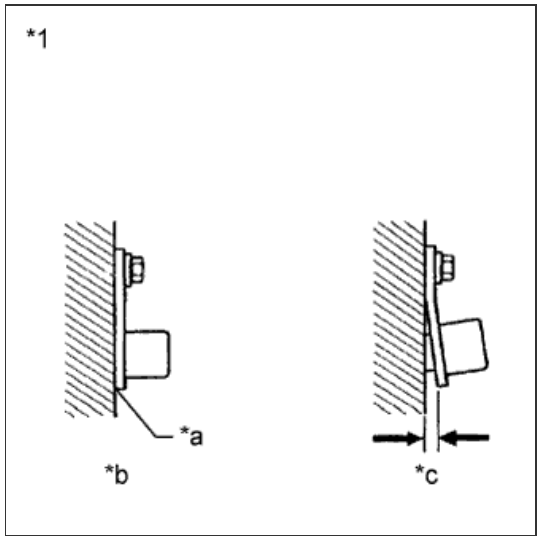
1.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

2.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:
No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

3.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

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

HINT:

The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:
The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK

CHECK FOR INTERMITTENT PROBLEMS (Click here)

5.REPLACE REAR SPEED SENSOR

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

NEXT

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more or at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC	U0073	Control Module Communication Bus OFF
DTC	U0100	Lost Communication with ECM / PCM
DTC	U0114	Lost Communication with 4WD Control ECU
DTC	U0123	Lost Communication with Yaw Rate Sensor Module
DTC	U0124	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126	Lost Communication with Steering Angle Sensor Module
DTC	U0130	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to the CAN communication system (for LHD: Click here, for RHD: Click here).

DTC C1403 Rear Speed Sensor RH Malfunction

DTC C1273 Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)

DTC C1274 Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DTC C1404 Rear Speed Sensor LH Malfunction

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1403 C1404	One of the following conditions is met: 1. At a vehicle speed of 10 km/h (6 mph) or more, the output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more. 2. At a vehicle speed of less than 10 km/h (6 mph), the output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed less than 10 km/h (6 mph), outputs from both rear speed sensors are 0 km/h (0 mph) for 15 seconds or more.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation
C1273 C1274	Stored only during test mode.	• Rear speed sensor RH/LH • Speed sensor rotor RH/LH • Sensor installation

HINT:

- **DTCs C1403 and C1273 are for the rear speed sensor RH.**
- **DTCs C1404 and C1274 are for the rear speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

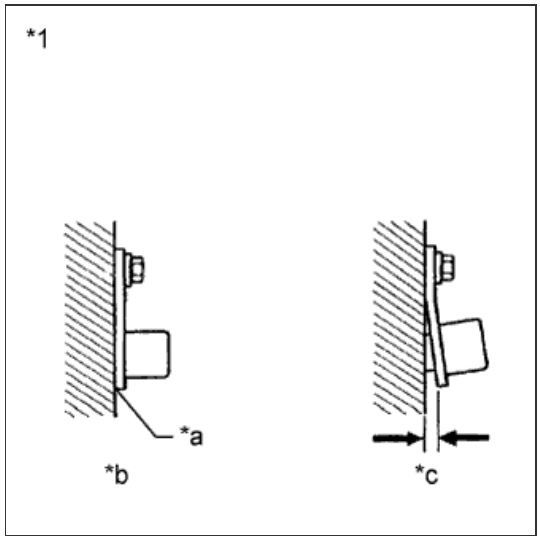
1.CHECK REAR SPEED SENSOR INSTALLATION

a. Turn the ignition switch off.

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

OK:

There is no clearance between the sensor and the rear axle.
The installation nut is tightened properly.



Text in Illustration

*1	Rear Speed Sensor
*a	No clearance
*b	OK
*c	NG

NG → INSTALL REAR SPEED SENSOR CORRECTLY

OK

2.INSPECT REAR SPEED SENSOR TIP

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

b. Check the speed sensor tip.

OK:
No scratches, oil, or foreign matter on the sensor tip.

NOTICE:

If no damage to the speed sensor tip is found during this inspection, do not replace the speed sensor.

NG → CLEAN OR REPLACE REAR SPEED SENSOR

OK

3.INSPECT REAR SPEED SENSOR ROTOR

a. Remove the rear axle shaft together with the parking brake plate (Click here).

b. Check the speed sensor rotor.

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

HINT:

The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly.

NG → CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

OK

4.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:
The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a

speedometer tester (calibrated chassis dynamometer).

NG → Go to step 5

OK

CHECK FOR INTERMITTENT PROBLEMS (Click here)

5.REPLACE REAR SPEED SENSOR

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

NEXT

6.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more or at least 60 seconds.

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

Result

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

B → REPLACE REAR AXLE HUB AND BEARING ASSEMBLY (Click here)

A

END

DTC	U0073	Control Module Communication Bus OFF
DTC	U0100	Lost Communication with ECM / PCM
DTC	U0114	Lost Communication with 4WD Control ECU
DTC	U0123	Lost Communication with Yaw Rate Sensor Module
DTC	U0124	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126	Lost Communication with Steering Angle Sensor Module
DTC	U0130	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to the CAN communication system (for LHD: Click here, for RHD: Click here).

DTC C1405 Open or Short in Front Speed Sensor RH Circuit

DTC C1406 Open or Short in Front Speed Sensor LH Circuit

for Preparation Click here

DESCRIPTION

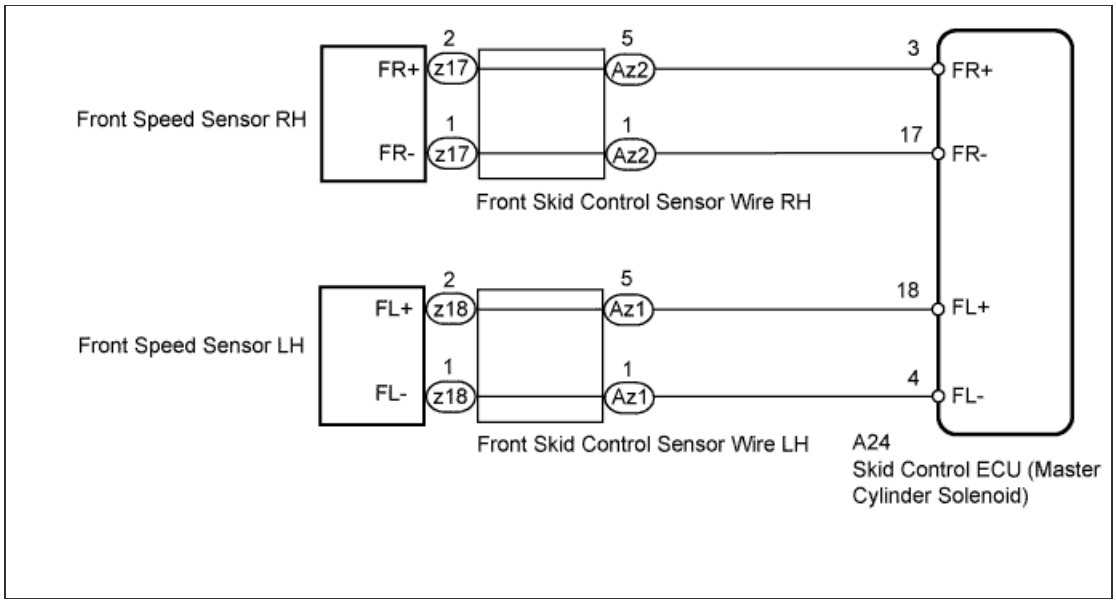
Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1405 C1406	Either condition is met: 1. An open in the speed sensor signal circuit continues for 0.5 seconds or more. 2. With the IG1 terminal voltage at 9.5 V or higher, the sensor power supply voltage decreases for 0.5 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Skid control ECU (Master cylinder solenoid)

HINT:

- **DTC C1405 is for the front speed sensor RH.**
- **DTC C1406 is for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 4

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 4

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

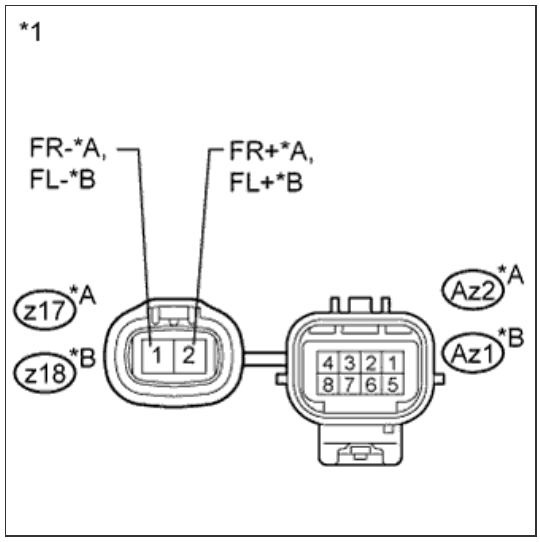
A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

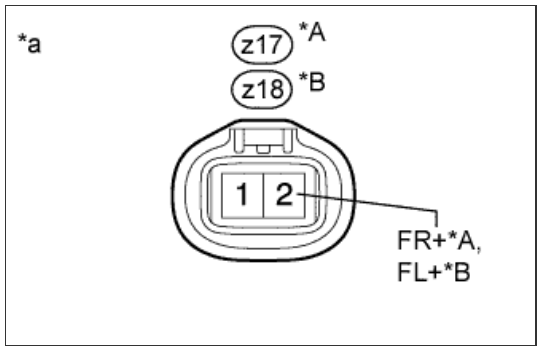
OK

6.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE FRONT SPEED SENSOR (Click here)

DTC	U0073	Control Module Communication Bus OFF
DTC	U0100	Lost Communication with ECM / PCM
DTC	U0114	Lost Communication with 4WD Control ECU
DTC	U0123	Lost Communication with Yaw Rate Sensor Module
DTC	U0124	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126	Lost Communication with Steering Angle Sensor Module
DTC	U0130	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to the CAN communication system (for LHD: Click here, for RHD: Click here).

DTC C1405 Open or Short in Front Speed Sensor RH Circuit

DTC C1406 Open or Short in Front Speed Sensor LH Circuit

for Preparation Click here

DESCRIPTION

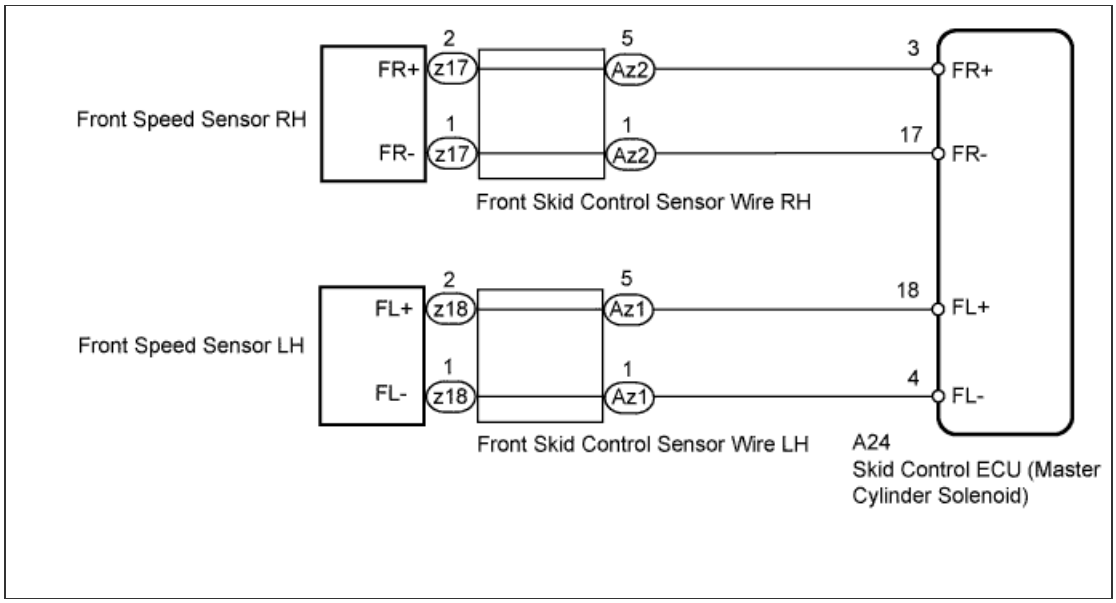
Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1405 C1406	Either condition is met: 1. An open in the speed sensor signal circuit continues for 0.5 seconds or more. 2. With the IG1 terminal voltage at 9.5 V or higher, the sensor power supply voltage decreases for 0.5 seconds or more.	• Front speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Skid control ECU (Master cylinder solenoid)

HINT:

- **DTC C1405 is for the front speed sensor RH.**
- **DTC C1406 is for the front speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 4

OK

2.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 4

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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
DTC is output (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

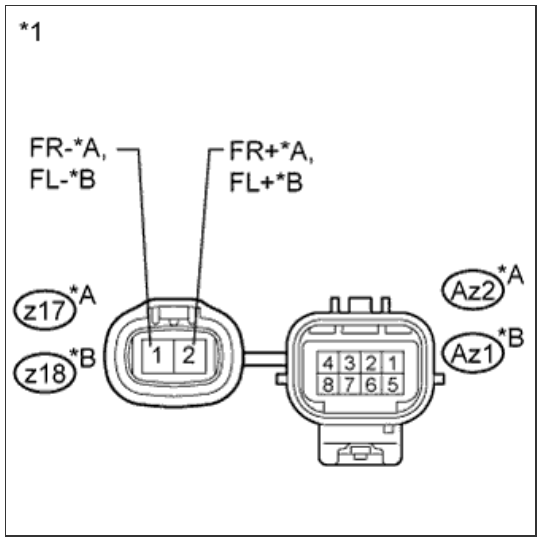
A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT SKID CONTROL SENSOR WIRE

a. Remove the skid control sensor wire (Click here).

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



Standard Resistance:

for RH

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

for LH

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

Text in Illustration

*A	for RH
*B	for LH
*1	Skid Control Sensor Wire

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

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

d. 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

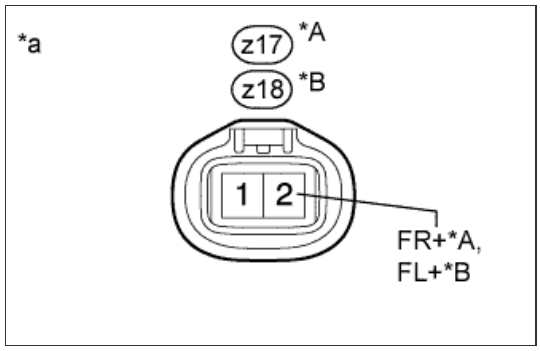
OK

6.CHECK HARNESS AND CONNECTOR (FR+/FL+ TERMINAL)

a. Disconnect the speed sensor connector.

b. Connect the A24 skid control ECU (master cylinder solenoid) connector.

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	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z18-2 (FL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Front Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C

REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE FRONT SPEED SENSOR (Click here)

DTC	U0073	Control Module Communication Bus OFF
DTC	U0100	Lost Communication with ECM / PCM
DTC	U0114	Lost Communication with 4WD Control ECU
DTC	U0123	Lost Communication with Yaw Rate Sensor Module
DTC	U0124	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126	Lost Communication with Steering Angle Sensor Module
DTC	U0130	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to the CAN communication system (for LHD: Click here, for RHD: Click here).

DTC C1407 Open or Short in Rear Speed Sensor RH Circuit

DTC C1408 Open or Short in Rear Speed Sensor LH Circuit

for Preparation Click here

DESCRIPTION

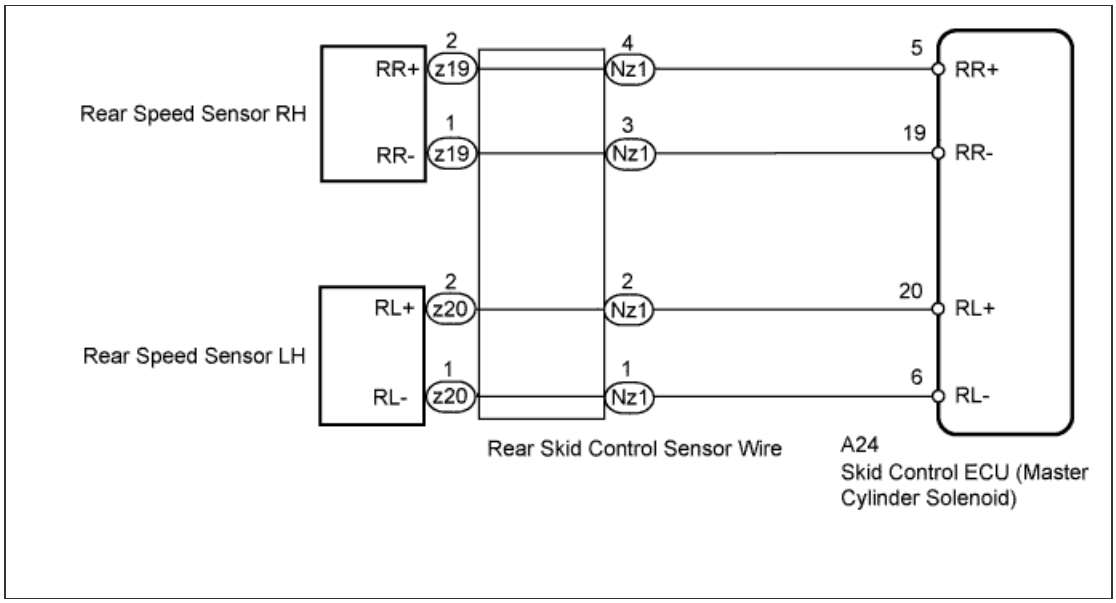
Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1407 C1408	Either condition is met: 1. An open in the speed sensor signal circuit continues for 0.5 seconds or more. 2. With the IG1 terminal voltage at 9.5 V or higher, the sensor power supply voltage decreases for 0.5 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Skid control ECU (Master cylinder solenoid)

HINT:

- **DTC C1407 is for the rear speed sensor RH.**
- **DTC C1408 is for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 4

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 4

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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
DTC is output (for RHD)	C

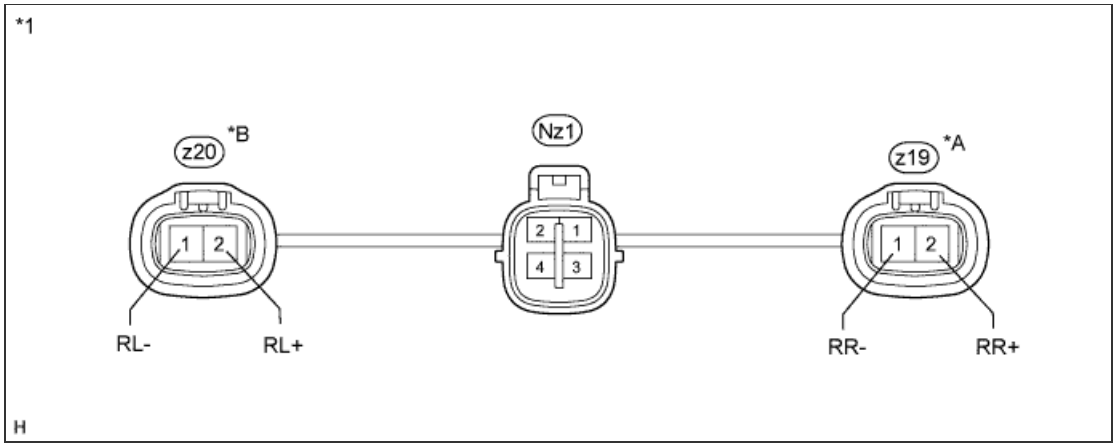
B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher
A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

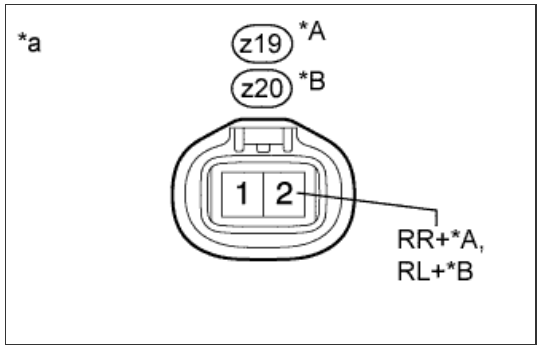
OK

6.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE REAR SPEED SENSOR (Click here)

DTC	U0073	Control Module Communication Bus OFF
DTC	U0100	Lost Communication with ECM / PCM
DTC	U0114	Lost Communication with 4WD Control ECU
DTC	U0123	Lost Communication with Yaw Rate Sensor Module
DTC	U0124	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126	Lost Communication with Steering Angle Sensor Module
DTC	U0130	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to the CAN communication system (for LHD: Click here, for RHD: Click here).

DTC C1407 Open or Short in Rear Speed Sensor RH Circuit

DTC C1408 Open or Short in Rear Speed Sensor LH Circuit

for Preparation Click here

DESCRIPTION

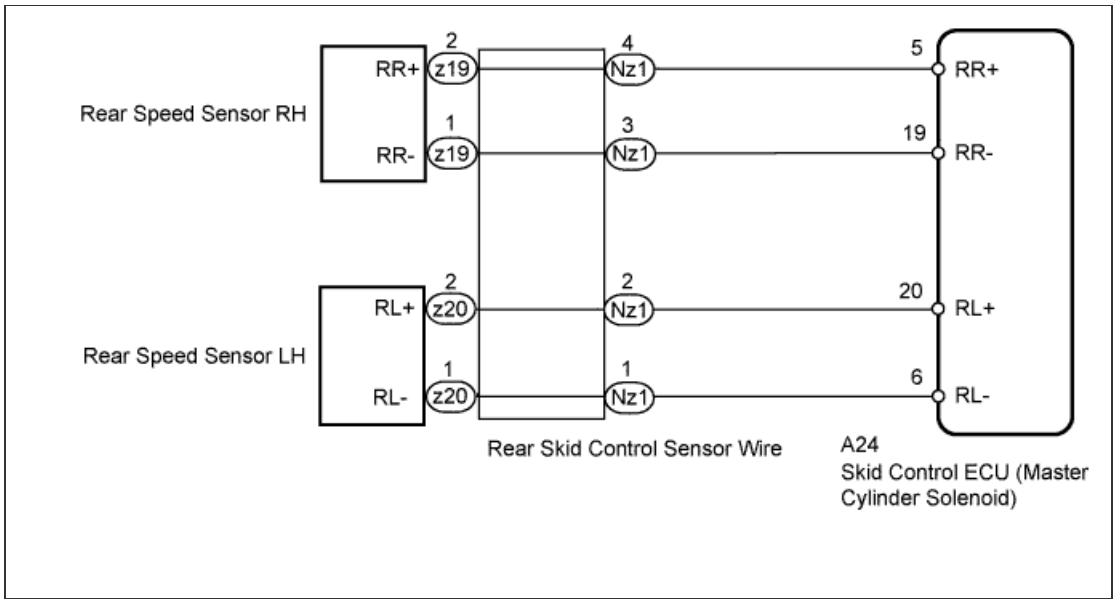
Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1407 C1408	Either condition is met: 1. An open in the speed sensor signal circuit continues for 0.5 seconds or more. 2. With the IG1 terminal voltage at 9.5 V or higher, the sensor power supply voltage decreases for 0.5 seconds or more.	• Rear speed sensor RH/LH • Skid control sensor wire • Speed sensor circuit • Skid control ECU (Master cylinder solenoid)

HINT:

- **DTC C1407 is for the rear speed sensor RH.**
- **DTC C1408 is for the rear speed sensor LH.**

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Check the speed sensor signal after replacement (Click here).**

1.CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

a. Using the GTS, check for any momentary interruption in the wire harness and connector corresponding to the DTC (Click here).

ABS/VSC/TRC

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

OK:

Normal (there are no momentary interruptions).

HINT:

Perform the above inspection before removing the sensor and connector.

NG → Go to step 4

OK

2.READ VALUE USING GTS (RR/RL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
RL Wheel Speed	Rear speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → Go to step 4

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.

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
DTC is output (for RHD)	C

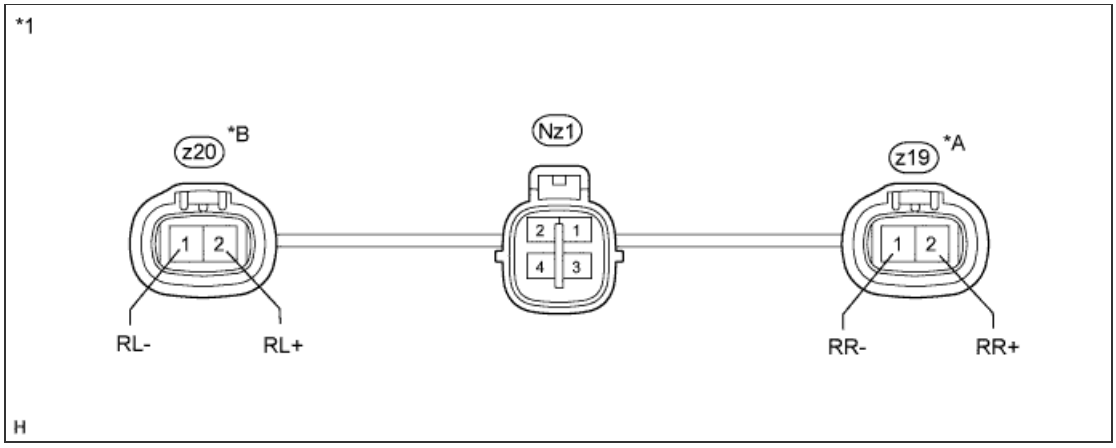
B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

CHECK FOR INTERMITTENT PROBLEMS (Click here)

4.INSPECT SKID CONTROL SENSOR WIRE



Text in Illustration

*A	for RH	*B	for LH
*1	Skid Control Sensor Wire	-	-

a. Remove the skid control sensor wire (Click here).

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

Standard Resistance:

for RH

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

for LH

Tester Connection	Condition	Specified Condition
Nz1-2 - z20-2 (RL+)	Always	Below 1 Ω
Nz1-1 - z20-1 (RL-)	Always	Below 1 Ω
Nz1-2 - Nz1-1	Always	10 kΩ or higher
Nz1-2 - Nz1-3	Always	10 kΩ or higher
Nz1-2 - Nz1-4	Always	10 kΩ or higher

NG → REPLACE SKID CONTROL SENSOR WIRE (Click here)

OK

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

a. Install the skid control sensor wire (Click here).

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the z19 and/or z20 speed sensor connector.

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

Standard Resistance:

for RH

Tester Connection	Condition	Specified Condition
A24-5 (RR+) - z19-2 (RR+)	Always	Below 1 Ω
A24-5 (RR+) - Body ground	Always	10 kΩ or higher
A24-19 (RR-) - z19-1 (RR-)	Always	Below 1 Ω
A24-19 (RR-) - Body ground	Always	10 kΩ or higher

for LH

Tester Connection	Condition	Specified Condition
A24-20 (RL+) - z20-2 (RL+)	Always	Below 1 Ω
A24-20 (RL+) - Body ground	Always	10 kΩ or higher
A24-6 (RL-) - z20-1 (RL-)	Always	Below 1 Ω
A24-6 (RL-) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

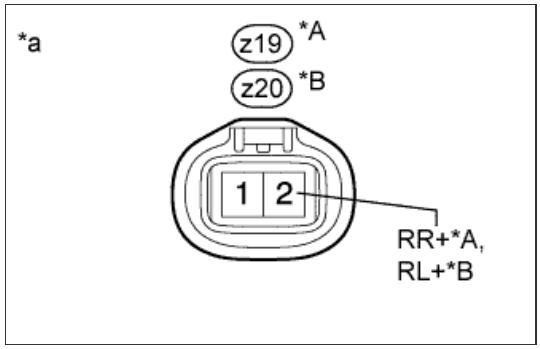
OK

6.CHECK HARNESS AND CONNECTOR (RR+/RL+ TERMINAL)

a. Connect the skid control ECU (master cylinder solenoid) connector.

b. Disconnect the speed sensor connector.

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



Standard Voltage:

for RH

Tester Connection	Switch Condition	Specified Condition
z19-2 (RR+) - Body ground	Ignition switch ON	11 to 14 V

for LH

Tester Connection	Switch Condition	Specified Condition
z20-2 (RL+) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*A	for RH
*B	for LH
*a	Front view of wire harness connector (to Rear Speed Sensor)

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE REAR SPEED SENSOR (Click here)

DTC	U0073	Control Module Communication Bus OFF
DTC	U0100	Lost Communication with ECM / PCM
DTC	U0114	Lost Communication with 4WD Control ECU
DTC	U0123	Lost Communication with Yaw Rate Sensor Module
DTC	U0124	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126	Lost Communication with Steering Angle Sensor Module
DTC	U0130	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to the CAN communication system (for LHD: Click here, for RHD: Click here).

DTC C1409 Front Speed Sensor RH Performance

DTC C1410 Front Speed Sensor LH Performance

for Preparation Click here

DESCRIPTION

Refer to DTCs C1401 and C1402 (Click here).

DTC Code	DTC Detection Condition	Trouble Area
C1409 C1410	One of the following conditions is met: 1. When the vehicle is driven in reverse at a speed of 3 km/h (2 mph) or more and 3 of the wheel sensors detect the reverse signal, the other sensor detects a high frequency pulse 75 times while the ignition switch is ON. 2. At a vehicle speed of 10 km/h (6 mph) or more, the vehicle speed sensor output drops by 50% for 5 seconds. 3. The lowest wheel speed is 10 km/h (6 mph) or more and the difference between the highest and lowest wheel speed values is 2 km/h (1 mph) or less for 15 seconds. 4. At a vehicle speed of 30 km/h (19 mph) or more, one wheel direction is different from the other 3 wheels for 1 second. 5. At a vehicle speed of 100 km/h (62 mph), a reverse signal is output for 1 second or more. 6. At a vehicle speed of 30 km/h (19 mph) or more, the rotation direction of the one of the wheels is not detected normally and the rotation direction of the other 3 wheels is not the same for 1 second.	Front speed sensor RH/LH

HINT:

- **DTC C1409 is for the front speed sensor RH.**
- **DTC C1410 is for the front speed sensor LH.**

INSPECTION PROCEDURE

NOTICE:

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

1.READ VALUE USING GTS (FR/FL WHEEL SPEED)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front speed sensor RH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.
FL Wheel Speed	Front speed sensor LH reading/ Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Actual wheel speed	No large fluctuations when driving at a constant speed.

f. Check that there is no difference between the speed value output from the speed sensor displayed on the GTS and the speed value displayed on the speedometer when driving the vehicle.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, refer to the reference chart (Click here).

OK:

The speed value output from the speed sensor displayed on the GTS is the same as the actual vehicle speed measured using a speedometer tester (calibrated chassis dynamometer).

NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

2.READ VALUE USING GTS (FR/FL WHEEL DIRECTION)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Start the engine.

d. Turn the GTS on.

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

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: Back	-
FL Wheel Direction	Front wheel direction LH/ Forward or Back	Forward: Forward Back: Back	-

f. Check the "FR/FL Wheel Direction" in the Data List both when the vehicle is being driven straight forward at a speed of 30 km/h (19 mph) or more and when the vehicle is being driven in reverse at a speed of 3 km/h (2 mph) or more.

OK:
The sensor signal matches wheel direction.

NG → REPLACE FRONT SPEED SENSOR (Click here)

OK

3.RECONFIRM DTC

a. Clear the DTC (Click here).

b. Turn the ignition switch off.

c. Start the engine.

d. Perform a road test.

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

Result

Result	Proceed to
DTC C1409 or C1410 is output	A
DTC is not output	B

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

REPLACE FRONT SPEED SENSOR (Click here)

DTC	U0073	Control Module Communication Bus OFF
DTC	U0100	Lost Communication with ECM / PCM
DTC	U0114	Lost Communication with 4WD Control ECU
DTC	U0123	Lost Communication with Yaw Rate Sensor Module
DTC	U0124	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126	Lost Communication with Steering Angle Sensor Module
DTC	U0130	Lost Communication with Steering Effort Control Module

for Preparation Click here

INSPECTION PROCEDURE

Refer to the CAN communication system (for LHD: Click here, for RHD: Click here).

for Preparation Click here

DESCRIPTION

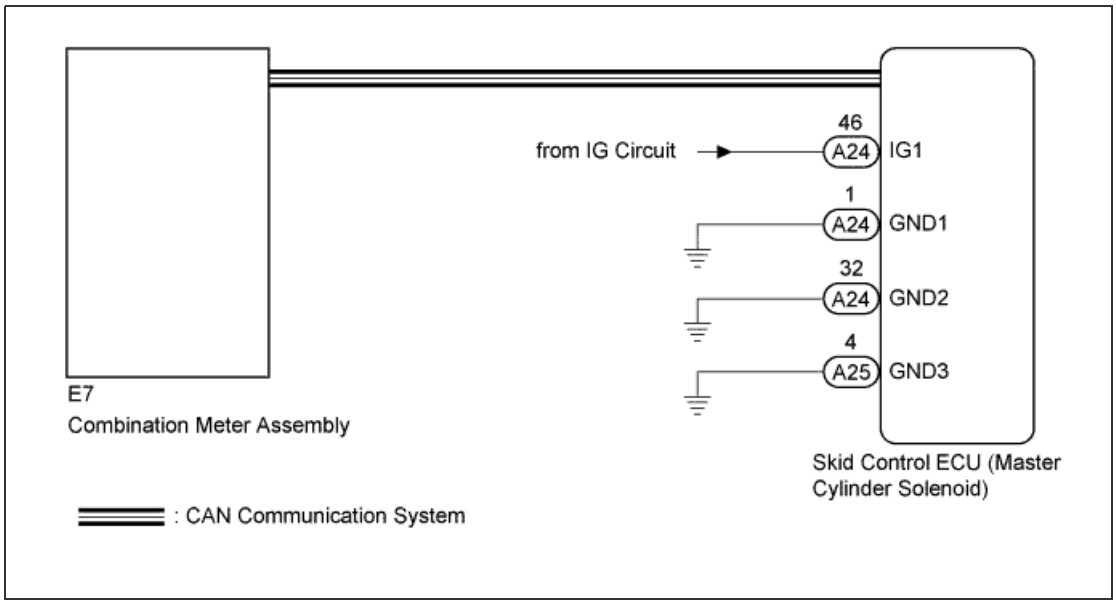
If any of the following is detected, the ABS warning light remains on.

- The skid control ECU (master cylinder solenoid) connectors are disconnected from the skid control ECU (master cylinder solenoid).
- There is a malfunction in the skid control ECU (master cylinder solenoid) internal circuit.
- There is an open in the harness between the combination meter and skid control ECU (master cylinder solenoid).

HINT:

There is a case that the GTS cannot be used when the skid control ECU (master cylinder solenoid) is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU (master cylinder solenoid) 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 1VD-FTV)	B
NG (for 1UR-FE)	C
NG (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.PERFORM ACTIVE TEST USING GTS (INDICAT. LAMP ABS)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the ABS warning light by operating the GTS.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp ABS	ABS Warning Light	ON or OFF	Perform the test with the vehicle stopped and engine idling.

OK:

The warning light turns on when operating the GTS.

NG → GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

OK

6.CHECK HARNESS AND CONNECTOR (IG1 TERMINAL)

a. Disconnect the skid control ECU (master cylinder solenoid) connector.

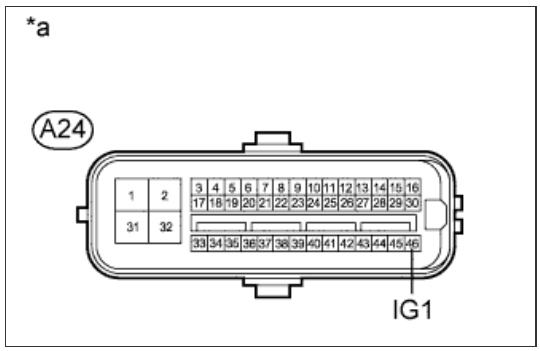
b. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Master Cylinder Solenoid))



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

7.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

c. 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) -	Always	Below 1 Ω

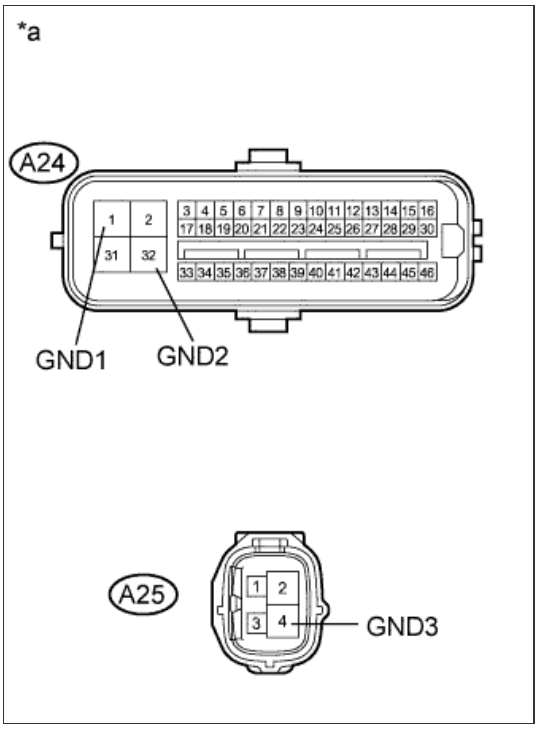
Body ground		
A25-4 (GND3) - Body ground	Always	Below 1 Ω

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (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

Refer to ABS Warning Light Remains ON (Click here).

WIRING DIAGRAM

Refer to ABS Warning Light Remains ON (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.INSPECT ABS WARNING LIGHT

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Turn the ignition switch to ON.

d. Check that the ABS warning light comes on.

OK:

ABS warning light comes on.

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:

"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.PERFORM ACTIVE TEST USING GTS (INDICAT. LAMP ABS)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the ABS warning light by operating the GTS.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp ABS	ABS Warning Light	ON or OFF	Perform the test with the vehicle stopped and engine idling.

OK:

The warning light turns on when operating the GTS.

NG → GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

OK

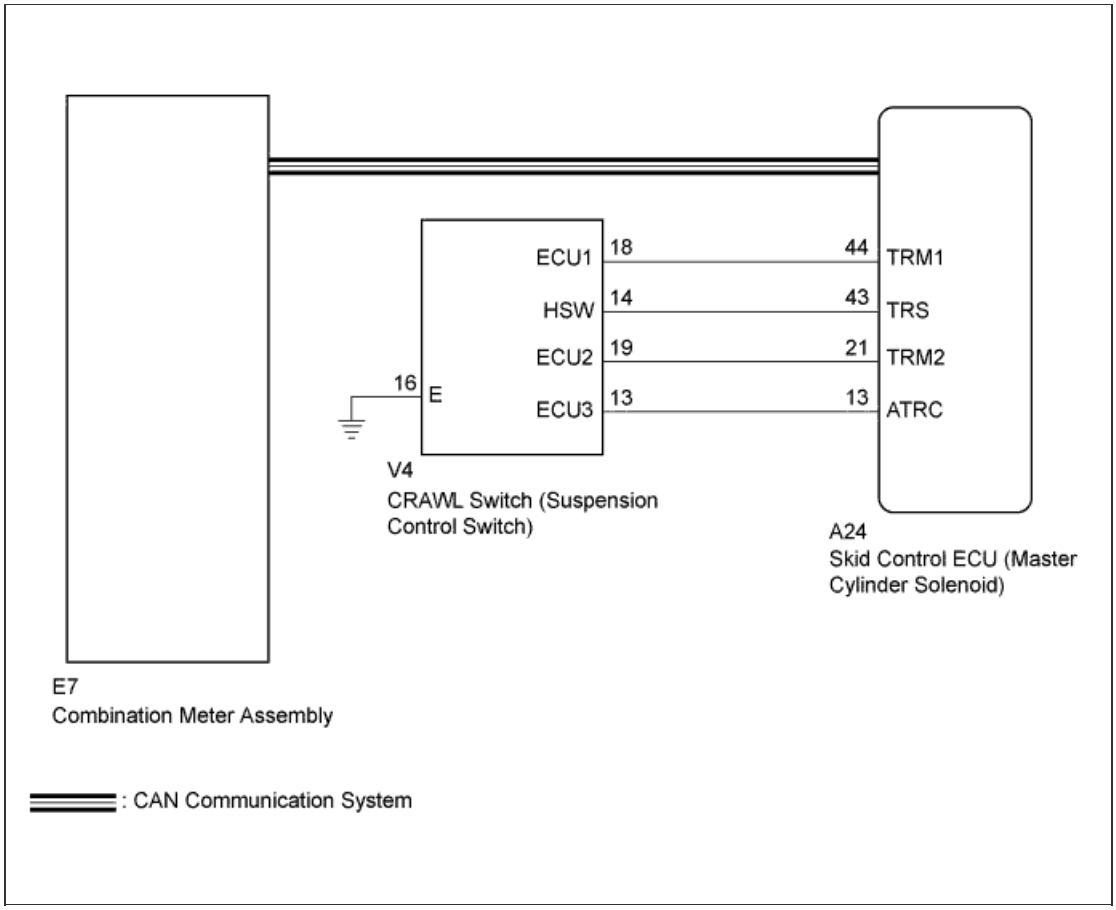
CHECK FOR INTERMITTENT PROBLEMS (Click here)

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:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.PERFORM ACTIVE TEST USING GTS (CRAWL CONTROL LIGHT)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Crawl Control Light	CRAWL indicator light	Indicator light ON/OFF	Observe the combination meter.

f. When performing the Crawl Control Light Active Test, check Crawl Control Light in the Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Crawl Control Light	CRAWL indicator light/ ON or OFF	ON: Indicator light on OFF: Indicator light off	-

Result

Result		Proceed to
Data List Display	Data List Display when Performing Active Test ON/OFF Operation	
ON	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C
OFF	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

for Preparation **Click here**

DESCRIPTION

Refer to Crawl Indicator Light Remains ON (Click here).

WIRING DIAGRAM

Refer to Crawl Indicator Light Remains ON (Click here).

INSPECTION PROCEDURE

Refer to Crawl Indicator Light Remains ON (Click here).

for Preparation Click here

DESCRIPTION

Refer to Multi-terrain Select Indicator Light does not Come ON (Click here).

INSPECTION PROCEDURE

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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 METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

for Preparation Click here

DESCRIPTION

When the transfer gear position is L4, the multi-terrain select indicator light illuminates and control begins.
Under any of the following conditions, the multi-terrain select system does not begin control and the multi-terrain select indicator light does not illuminate.

- The vehicle is in the VSC/TRC OFF state.
- Crawl Control is operating.
- There is a malfunction in the VSC system.

INSPECTION PROCEDURE

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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

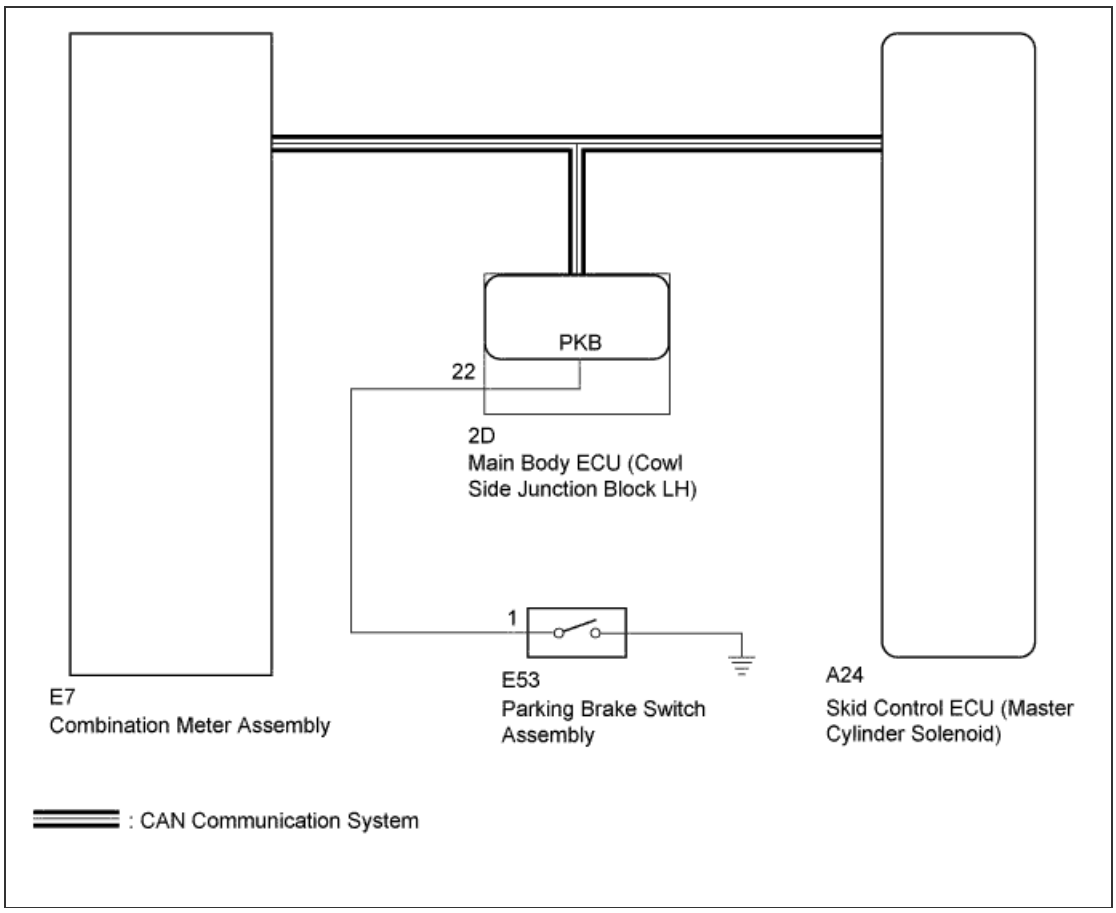
GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

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:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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 (master cylinder solenoid) 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 1VD-FTV)	B
NG (for 1UR-FE)	C
NG (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.PERFORM ACTIVE TEST USING GTS (INDICAT. LAMP BRAKE)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the brake warning light by operating the GTS.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Brake	Brake Warning Light	ON or OFF	Perform the test with the vehicle stopped and engine idling.

OK:
The warning light turns on when operating the GTS.

NG → GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

OK

7.CHECK HARNESS AND CONNECTOR (IG1 TERMINAL)

a. Disconnect the skid control ECU (master cylinder solenoid) connector.

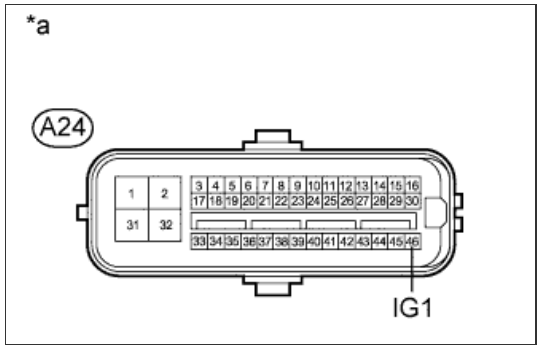
b. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A24-46 (IG1) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU (Master Cylinder Solenoid))



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

8.CHECK HARNESS AND CONNECTOR (GND1, GND2 AND GND3 TERMINAL)

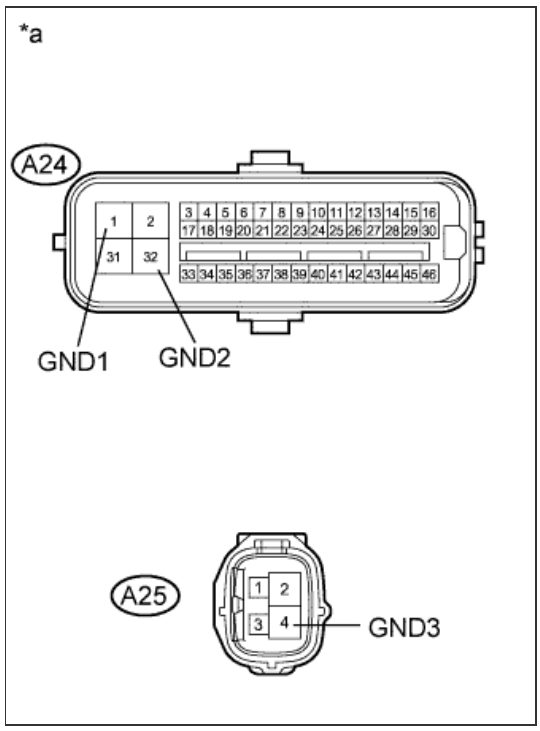
a. Turn the ignition switch off.

b. Disconnect the skid control ECU (master cylinder solenoid) connectors.

c. 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



Text in Illustration

*a	Front view of wire harness connector (to Skid Control ECU [Master Cylinder Solenoid])

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

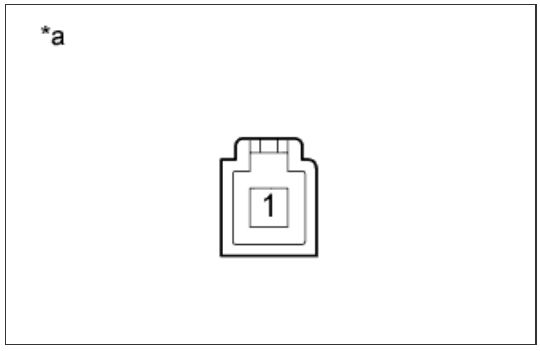
9.INSPECT PARKING BRAKE SWITCH

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 applied (Switch pin free)	Below 1 Ω
	Parking brake released (Switch pin pushed in)	10 kΩ or higher



Text in Illustration

*a	Component without harness connected (Parking Brake Switch Assembly)

NG → REPLACE PARKING BRAKE SWITCH ASSEMBLY (Click here)

OK

10.CHECK HARNESS AND CONNECTOR (MAIN BODY ECU - PARKING BRAKE SWITCH)

a. Turn the ignition switch off.

b. Disconnect the E53 parking brake switch connector.

c. Disconnect the 2D main body ECU (cowl side junction block LH) connector.

d. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
2D-22 - E53-1	Always	Below 1 Ω
2D-22 - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

11.PERFORM ACTIVE TEST USING GTS (BRAKE WARNING LIGHT)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Brake Warning Light	Brake warning light	Warning light ON/OFF	Observe the combination meter.

f. When performing the Brake Warning Light Active Test, check Brake Warning Light in the Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Brake Warning Light	Brake warning light/ ON or OFF	ON: Warning light on OFF: Warning light off	-

Result

Result		Proceed to
Data List Display	Data List Display when Performing Active Test ON/OFF Operation	
ON	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C
OFF	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPLACE MAIN BODY ECU (COWL SIDE JUNCTION BLOCK LH)

for Preparation Click here

DESCRIPTION

Refer to Brake Warning Light Remains ON (Click here).

WIRING DIAGRAM

Refer to Brake Warning Light Remains ON (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.INSPECT BRAKE WARNING LIGHT

a. Disconnect the A24 skid control ECU (master cylinder solenoid) 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
OK (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.PERFORM ACTIVE TEST USING GTS (INDICAT. LAMP BRAKE)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Enter the following menus: Body Electrical / Combination Meter / Active Test.

e. Check the condition of the brake warning light by operating the GTS.

Combination Meter

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Brake	Brake Warning Light	ON or OFF	Perform the test with the vehicle stopped and engine idling.

OK:
The warning light turns on when operating the GTS.

NG → GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

OK

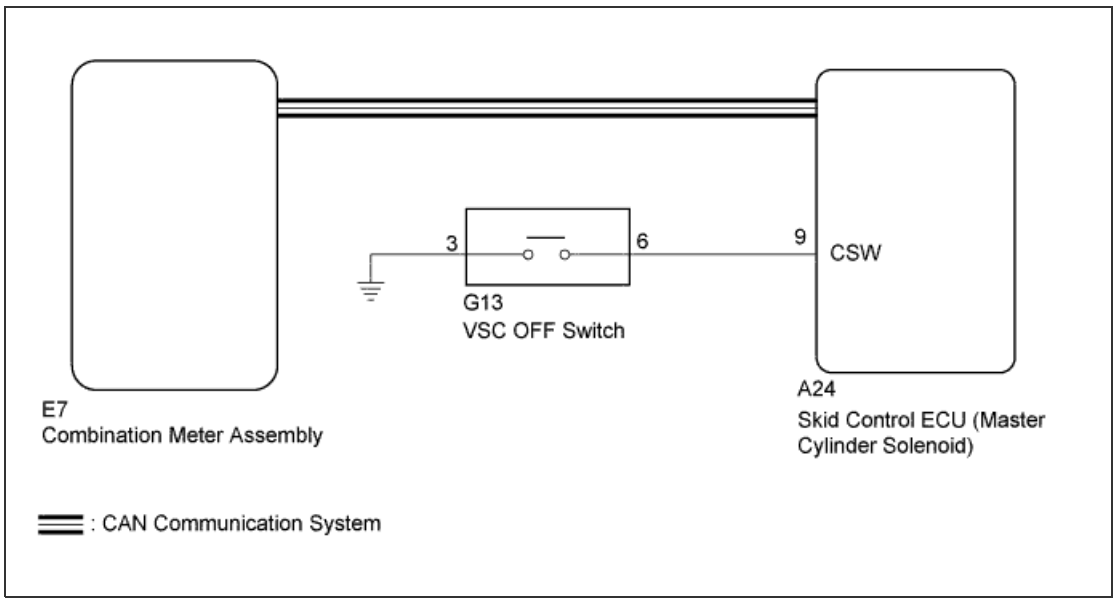
CHECK FOR INTERMITTENT PROBLEMS (Click here)

for Preparation Click here

DESCRIPTION

The TRC OFF indicator light comes on when the VSC OFF switch is operated.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU (master cylinder solenoid) connector connection.

OK:

The connector is securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

2.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:

"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.READ VALUE USING GTS (TRC/VSC OFF MODE)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TRC/VSC Off Mode	TRC/VSC off mode/ Normal, TRC OFF, Unknown or VSC OFF	Normal: Normal mode TRC OFF: TRC OFF mode VSC OFF: VSC OFF mode	-

f. Check that the mode display changes according to VSC OFF switch operation.

OK:
Display changes according to switch operation.

NG → Go to step 5

OK

GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

5.INSPECT VSC OFF SWITCH

a. Remove the VSC OFF switch (Click here).

b. Inspect the VSC OFF switch (Click here).

NG → REPLACE VSC OFF SWITCH (Click here)

OK

6.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - VSC OFF SWITCH)

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the G13 VSC OFF switch connector.

d. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-9 (CSW) - G13-6	Always	Below 1 Ω
A24-9 (CSW) - Body ground	Always	10 kΩ or higher
G13-3 - Body ground	Always	Below 1 Ω

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (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

The skid control ECU (master cylinder solenoid) is connected to the combination meter via the CAN communication system.

WIRING DIAGRAM

Refer to TRC OFF Indicator Light Remains ON (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.READ VALUE USING GTS (TRC/VSC OFF MODE)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TRC/VSC Off Mode	TRC/VSC off mode/ Normal, TRC OFF, Unknown or VSC OFF	Normal: Normal mode TRC OFF: TRC OFF mode VSC OFF: VSC OFF mode	-

f. Check that the mode display changes according to VSC OFF switch operation.

OK:
Display changes according to switch operation.

NG → Go to step 4

OK

GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

4.INSPECT VSC OFF SWITCH

a. Remove the VSC OFF switch (Click here).

b. Inspect the VSC OFF switch (Click here).

NG → REPLACE VSC OFF SWITCH (Click here)

OK

5.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - VSC OFF SWITCH)

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the G13 VSC OFF switch connector.

d. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-9 (CSW) - G13-6	Always	Below 1 Ω
A24-9 (CSW) - Body ground	Always	10 kΩ or higher
G13-3 - Body ground	Always	Below 1 Ω

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

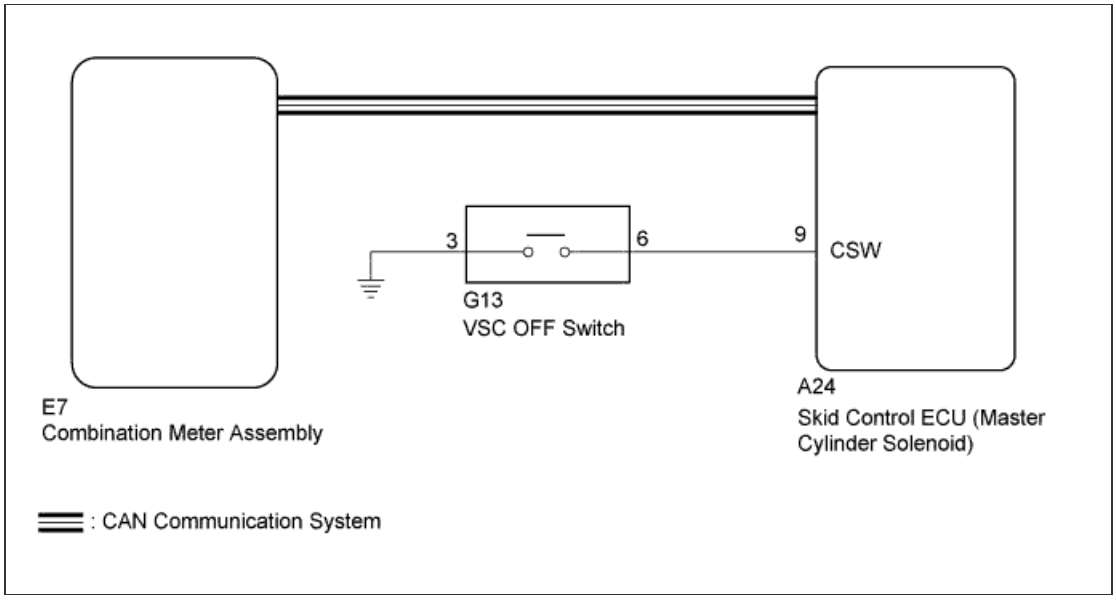
REPAIR OR REPLACE HARNESS OR CONNECTOR

for Preparation Click here

DESCRIPTION

Operation of the VSC OFF switch changes the vehicle between normal mode, TRC OFF mode and VSC OFF mode. During normal mode, pressing the VSC OFF switch for a short amount of time changes vehicle to TRC OFF mode. When the vehicle is stopped, pressing the VSC OFF switch for 3 seconds or more changes the vehicle to VSC OFF mode.
When the transfer is in L4, the VSC OFF indicator light turns on.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **As there may be malfunctions in the transfer system related to when the transfer operates in L4, check the transfer system first (Click here).**

1.INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU (master cylinder solenoid) connector connection.

OK:
The connector is securely connected.

NG → CONNECT CONNECTOR TO ECU CORRECTLY

OK

2.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.READ VALUE USING GTS (TRC/VSC OFF MODE)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TRC/VSC Off Mode	TRC/VSC off mode/ Normal, TRC OFF, Unknown or VSC OFF	Normal: Normal mode TRC OFF: TRC OFF mode VSC OFF: VSC OFF mode	-

f. Check that the mode display changes according to VSC OFF switch operation.

OK:
Display changes according to switch operation.

NG → Go to step 5

OK

GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

5.INSPECT VSC OFF SWITCH

a. Remove the VSC OFF switch (Click here).

b. Inspect the VSC OFF switch (Click here).

NG → REPLACE VSC OFF SWITCH (Click here)

OK

6.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - VSC OFF SWITCH)

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the G13 VSC OFF switch connector.

d. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-9 (CSW) - G13-6	Always	Below 1 Ω
A24-9 (CSW) - Body ground	Always	10 kΩ or higher
G13-3 - Body ground	Always	Below 1 Ω

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (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

Refer to VSC OFF Indicator Light Remains ON (Click here).

WIRING DIAGRAM

Refer to VSC OFF Indicator Light Remains ON (Click here).

INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.READ VALUE USING GTS (TRC/VSC OFF MODE)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Data List.

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TRC/VSC Off Mode	TRC/VSC off mode/ Normal, TRC OFF, Unknown or VSC OFF	Normal: Normal mode TRC OFF: TRC OFF mode VSC OFF: VSC OFF mode	-

f. Check that the mode display changes according to VSC OFF switch operation.

OK:
Display changes according to switch operation.

NG → Go to step 4

OK

GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

4.INSPECT VSC OFF SWITCH

a. Remove the VSC OFF switch (Click here).

b. Inspect the VSC OFF switch (Click here).

NG → REPLACE VSC OFF SWITCH (Click here)

OK

5.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - VSC OFF SWITCH)

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the G13 VSC OFF switch connector.

d. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-9 (CSW) - G13-6	Always	Below 1 Ω
A24-9 (CSW) - Body ground	Always	10 kΩ or higher
G13-3 - Body ground	Always	Below 1 Ω

Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

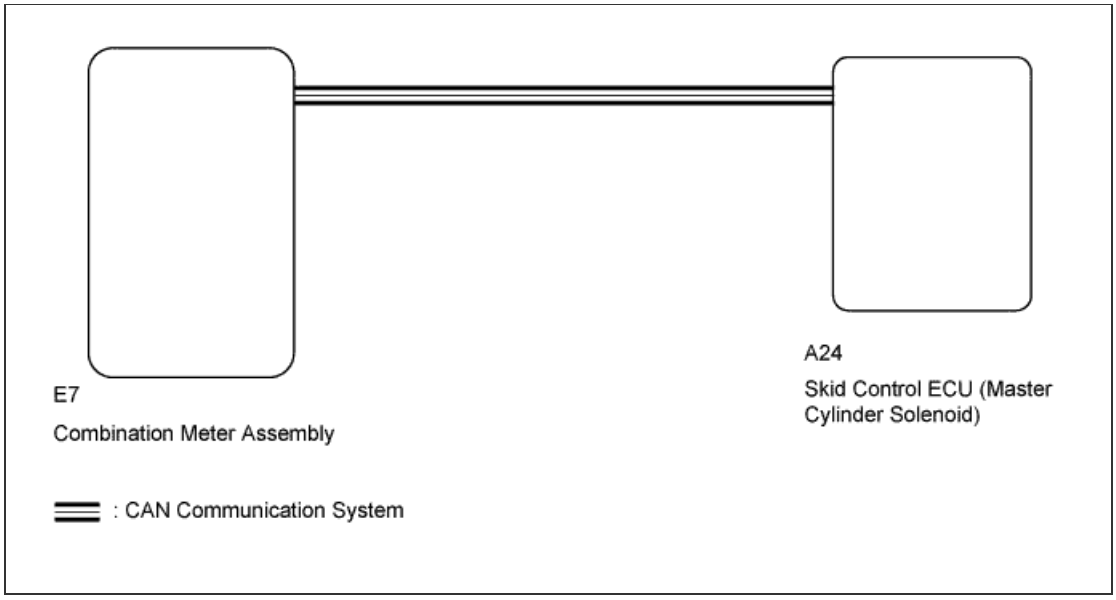
REPAIR OR REPLACE HARNESS OR CONNECTOR

for Preparation Click here

DESCRIPTION

The slip indicator light blinks during VSC, A-TRC, Crawl Control and hill-start assist control operation.
When the system fails, the slip indicator light comes on to warn the driver.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (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 CIRCUITS INDICATED BY OUTPUT DTC (Click here)

A

2.INSPECT IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED

a. Check the skid control ECU (master cylinder solenoid) 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 1VD-FTV)	B
NG (for 1UR-FE)	C
NG (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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

CAN system DTC is output (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.PERFORM ACTIVE TEST USING GTS (SLIP INDICATOR LIGHT)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Slip Indicator Light	Slip indicator light	Indicator light ON/OFF	Observe the combination meter.

f. When performing the Slip Indicator Light Active Test, check Slip Indicator Light in the Data List.

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Slip Indicator Light	Slip indicator light/ ON or OFF	ON: Indicator light on OFF: Indicator light off	-

Result

Result		Proceed to
Data List Display	Data List Display when Performing Active Test ON/OFF Operation	
ON	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C
OFF	Changes between ON and OFF	A
	Does not change between ON and OFF (for LHD)	B
	Does not change between ON and OFF (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

for Preparation **Click here**

DESCRIPTION

Refer to Slip Indicator Light Remains ON (Click here).

WIRING DIAGRAM

Refer to Slip Indicator Light Remains ON (Click here).

INSPECTION PROCEDURE

Refer to Slip Indicator Light Remains ON (Click here).

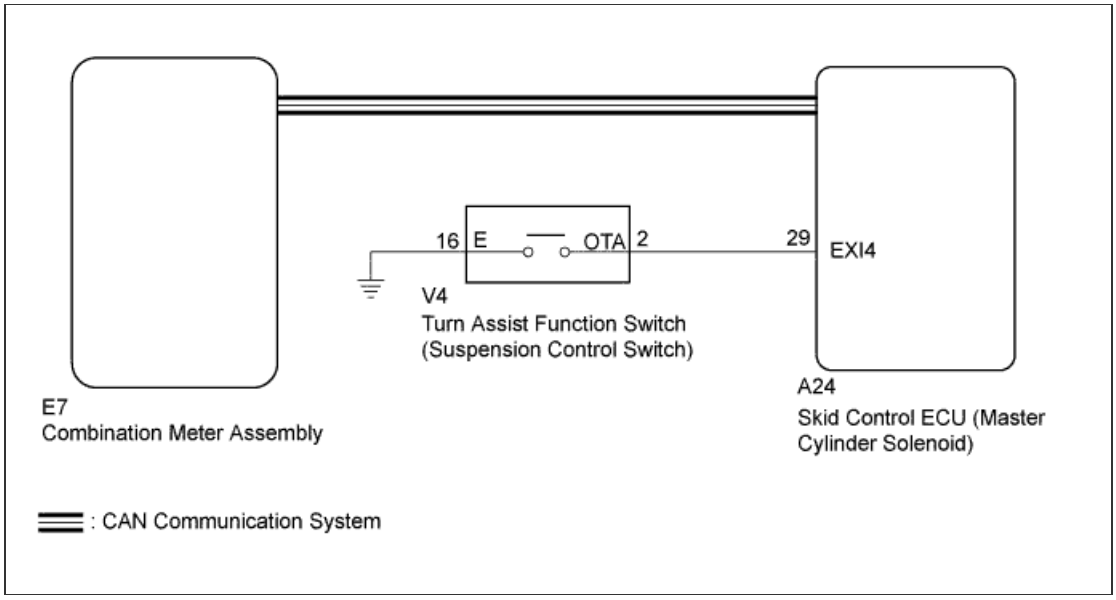
for Preparation Click here

DESCRIPTION

When any of the following conditions are met, the turn assist system becomes operable and the turn assist indicator light illuminates.

- Crawl Control is operating.
- The turn assist function switch (suspension control switch) is on.
- The center differential is "free".
- The vehicle is moving at a speed of 10 km/h (6 mph) or less.
- The shift lever is not in P, R or N.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.INSPECT TURN ASSIST FUNCTION SWITCH

a. Remove the turn assist function switch (suspension control switch) (Click here).

b. Inspect the turn assist function switch (suspension control switch) (Click here).

NG → REPLACE SUSPENSION CONTROL SWITCH (**Click here**)

OK

4.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - TURN ASSIST FUNCTION SWITCH)

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the V4 turn assist function switch (suspension control switch) connector.

d. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
A24-29 (EXI4) - V4-2 (OTA)	Always	Below 1 Ω
A24-29 (EXI4) - Body ground	Always	10 kΩ or higher
V4-16 (E) - Body ground	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

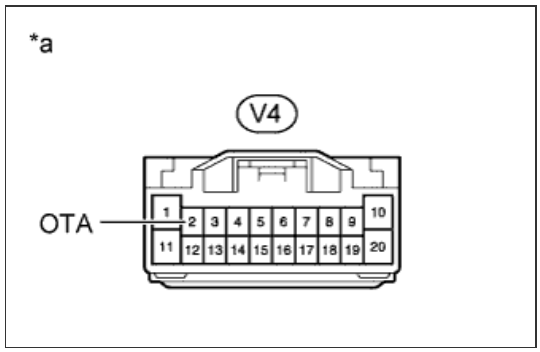
5.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU EXI4 CIRCUIT)

a. Turn the ignition switch off.

b. Connect the skid control ECU (master cylinder solenoid) connector.

c. Disconnect the turn assist function switch (suspension control switch) connector.

d. Measure the voltage according to the value(s) in the table below.



Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
V4-2 (OTA) - Body ground	Ignition switch ON	11 to 14 V

*a	Front view of wire harness connector (to Turn Assist Function Switch [Suspension Control Switch])

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

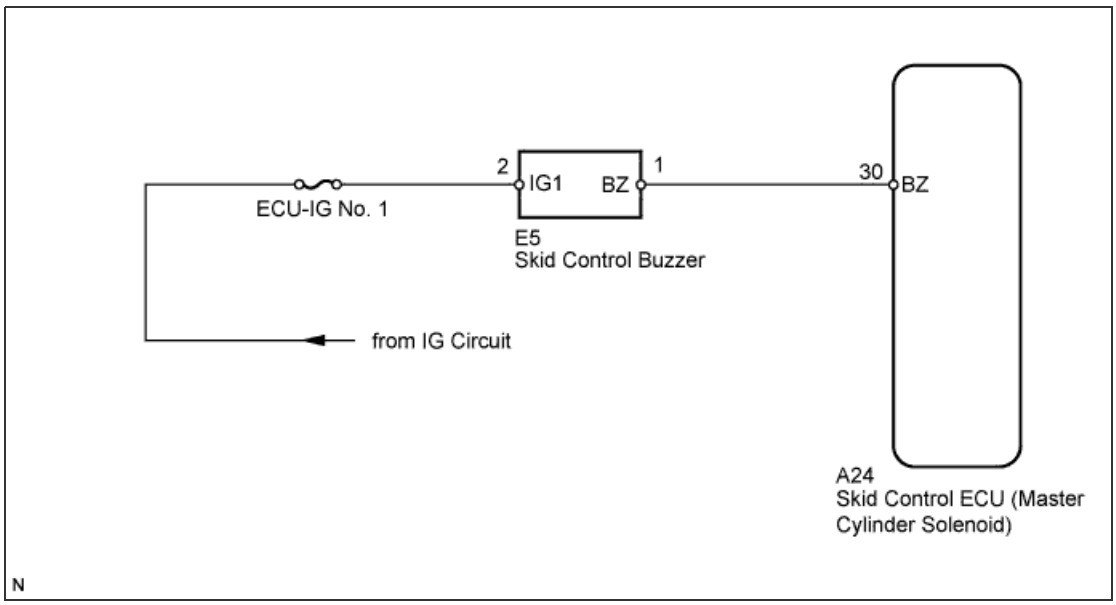
GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

for Preparation Click here

DESCRIPTION

The skid control buzzer sounds upon receiving a signal from the skid control ECU (master cylinder solenoid).

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

1.PERFORM ACTIVE TEST USING GTS (DSS SIGNAL BUZZER)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
DSS Signal Buzzer	Skid control buzzer	Buzzer ON/OFF	The buzzer can be heard.

f. Check that the skid control buzzer sounds/stops when turning the skid control buzzer on/off by using the GTS.

Result

Result	Proceed to
Buzzer does not sound or sounds constantly	A
Buzzer sounds/stops	B

B → CHECK FOR INTERMITTENT PROBLEMS (Click here)

A

2.CHECK TERMINAL VOLTAGE (IG1)

a. Turn the ignition switch off.

b. Disconnect the skid control buzzer assembly connector.

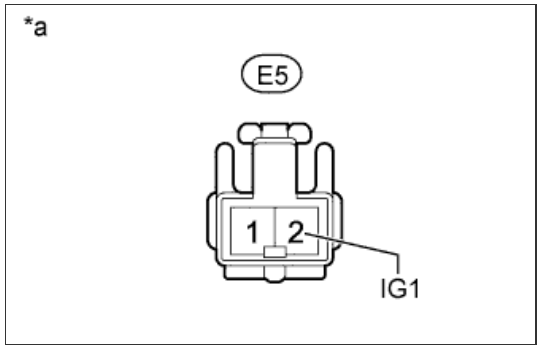
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
E5-2 (IG1) - Body ground	Ignition switch ON	11 to 14 V

Text in Illustration

*a	Front view of wire harness connector (to Skid Control Buzzer Assembly)



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.INSPECT SKID CONTROL BUZZER

a. Remove the skid control buzzer assembly (Click here).

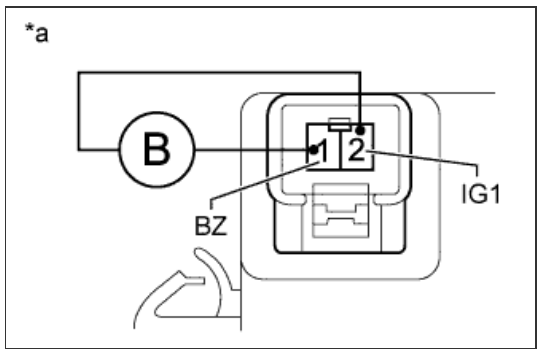
b. Apply battery voltage to the skid control buzzer, and check that the buzzer sounds.

OK:

Measurement Condition	Specified Condition
Battery positive (+) voltage - Terminal 2 (IG1)	Skid control buzzer sounds
Battery negative (-) voltage - Terminal 1 (BZ)	

Text in Illustration

*a	Component without harness connected (Skid Control Buzzer Assembly)



NG → REPLACE SKID CONTROL BUZZER ASSEMBLY (Click here)

OK

4.CHECK HARNESS AND CONNECTOR (SKID CONTROL BUZZER - SKID CONTROL ECU)

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) connector.

c. Disconnect the E5 skid control buzzer assembly connector.

d. 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 (for LHD)	B
OK (for RHD)	C

B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

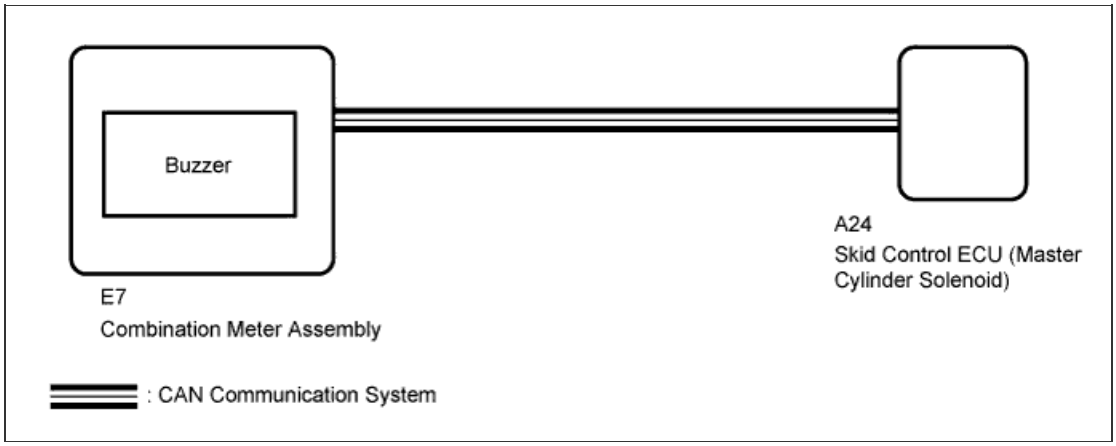
REPAIR OR REPLACE HARNESS OR CONNECTOR

for Preparation Click here

DESCRIPTION

The skid control ECU (master cylinder solenoid) is connected to the combination meter via CAN communication.
The combination meter has a built-in buzzer.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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.PERFORM ACTIVE TEST USING GTS (BUZZER)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON.

d. Turn the GTS on.

e. Enter the following menus: Chassis / ABS/VSC/TRC / Active Test.

ABS/VSC/TRC

Tester Display	Test Part	Control Range	Diagnostic Note
Buzzer	Buzzer	Buzzer ON/OFF	The buzzer can be heard.

f. When performing the Buzzer Active Test, check Buzzer in the Data List (Click here).

ABS/VSC/TRC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Buzzer	Buzzer/ ON or OFF	ON: Buzzer on OFF: Buzzer off	The combination meter has a built-in buzzer.

Result

Result		Proceed to
Data List Display	Data List Display when Performing Active Test ON/OFF Operation	
ON	Changes between ON and OFF	A
	Does not change between ON and OFF	B
OFF	Changes between ON and OFF	A
	Does not change between ON and OFF	B

B → Go to step 4

A → GO TO METER / GAUGE SYSTEM (HOW TO PROCEED WITH TROUBLESHOOTING) (Click here)

4.INSPECT COMBINATION METER ASSEMBLY

a. Inspect the combination meter (Click here).

Result

Result	Proceed to
NG (w/ Multi-information Display)	A
NG (w/o Multi-information Display)	B
OK (for LHD)	C
OK (for RHD)	D

B → REPLACE COMBINATION METER ASSEMBLY (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

D → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

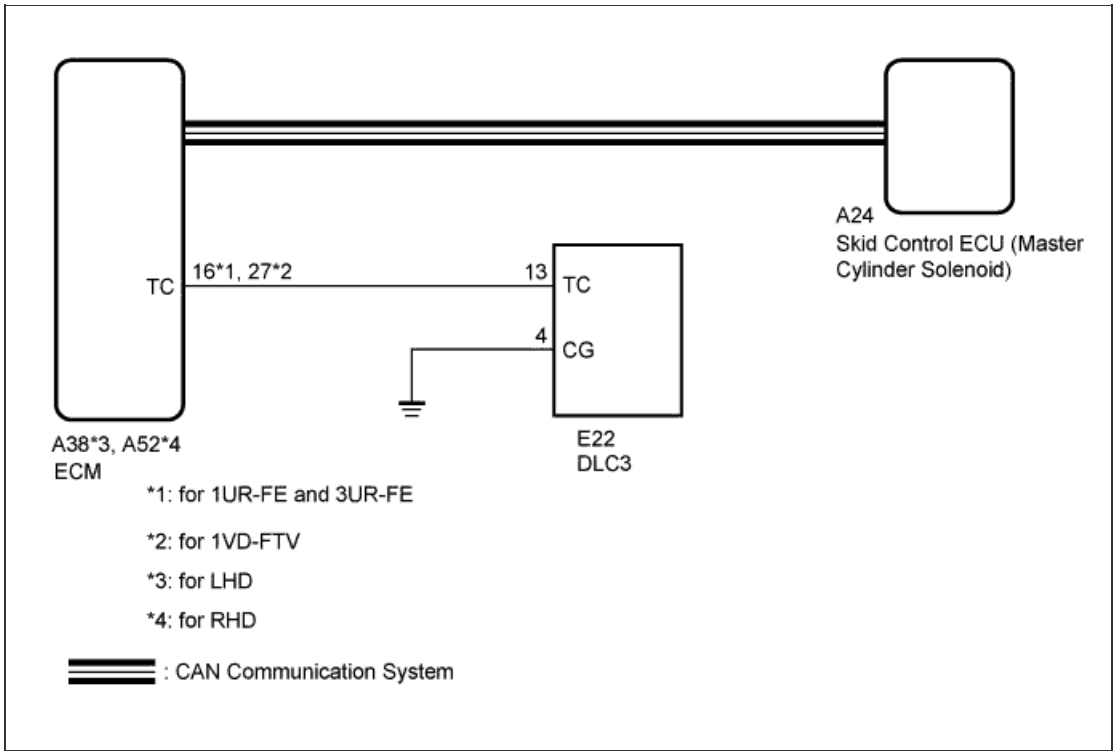
REPLACE COMBINATION METER ASSEMBLY (Click here)

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 and slip indicator 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:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.INSPECT DLC3 (DLC3 (TC) - DLC3 (CG))

a. Turn the ignition switch to ON.

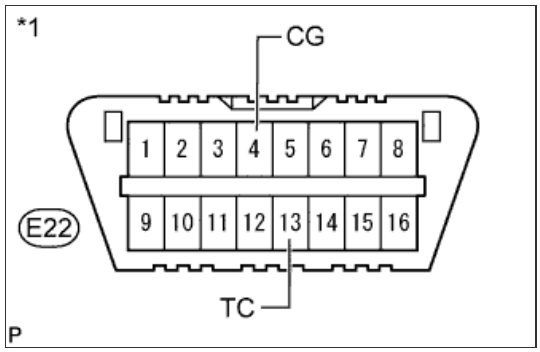
b. Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
E22-13 (TC) - E22-4 (CG)	Ignition switch ON	11 to 14 V

Text in Illustration

*1	DLC3



NG → Go to step 4

OK

2.CHECK CAN COMMUNICATION LINE

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS on.

d. Select "CAN Bus Check" from the System Selection Menu screen, and follow the prompts on the screen to inspect the CAN Bus.

OK:
"CAN Bus Check" indicates no malfunctions in CAN communication.

Result

Result	Proceed to
OK	A
NG (for LHD)	B
NG (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 DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is output (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:

i. Disconnect the A38 ECM connector.

c. for RHD:

i. Disconnect the A52 ECM connector.

d. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

for LHD (1UR-FE and 3UR-FE):

Tester Connection	Condition	Specified Condition
A38-16 (TC) - E22-13 (TC)	Always	Below 1 Ω

for RHD (1UR-FE):

Tester Connection	Condition	Specified Condition
A52-16 (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 (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)

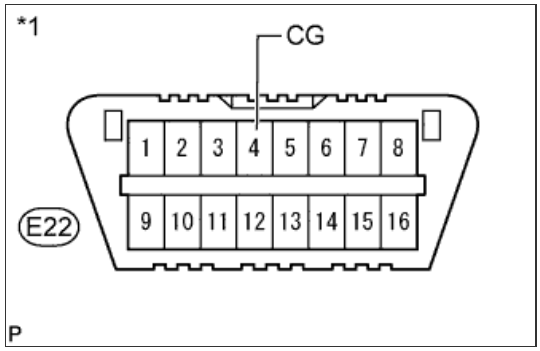
a. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
E22-4 (CG) - Body ground	Always	Below 1 Ω

Text in Illustration

*1	DLC3



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.

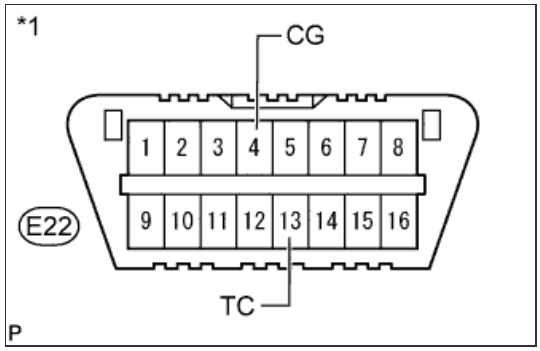
b. Check that the malfunction indicator lamp is blinking.

Result

Result	Proceed to
MIL is blinking	A
MIL is not blinking	B

Text in Illustration

*1	DLC3



B → REPAIR OR REPLACE WIRE HARNESS OR ECM

A

7.CHECK DTC (CAN COMMUNICATION SYSTEM)

a. Turn the ignition switch off.

b. Connect the GTS to the DLC3.

c. Turn the ignition switch to ON and the GTS 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
CAN system DTC is not output (for RHD)	B
CAN system DTC is output (for LHD)	C
CAN system DTC is output (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

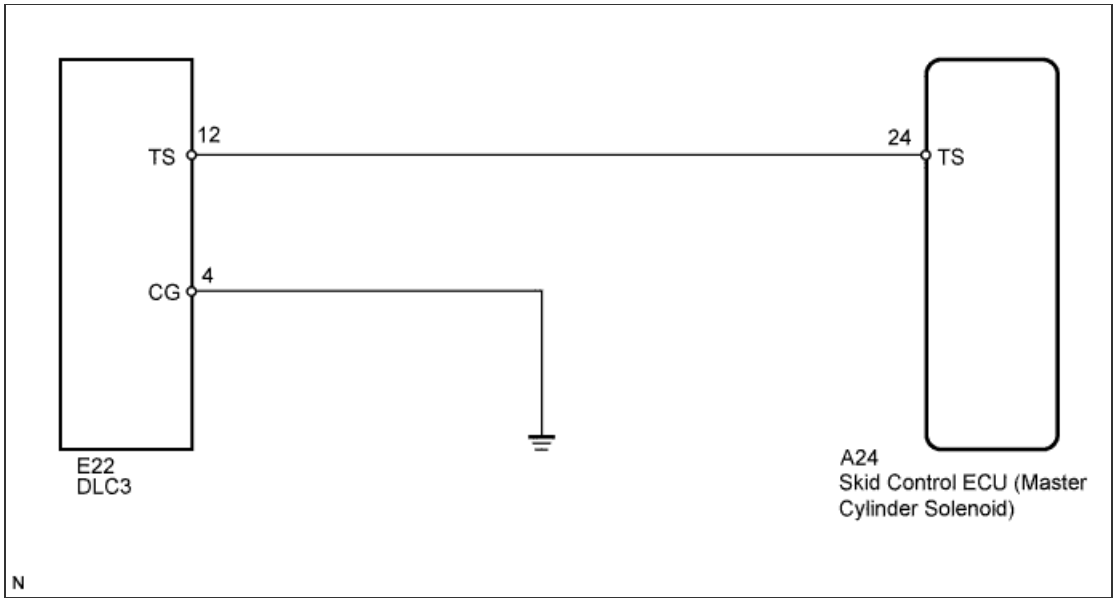
REPLACE MASTER CYLINDER SOLENOID (**Click here**)

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:

After replacing the master cylinder solenoid, perform zero point calibration and store the system information (Click here).

1.CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - DLC3 (TS))

a. Turn the ignition switch off.

b. Disconnect the A24 skid control ECU (master cylinder solenoid) 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

2.CHECK HARNESS AND CONNECTOR (DLC3 (CG) - BODY GROUND)

a. Measure the resistance according to the value(s) in the table below.

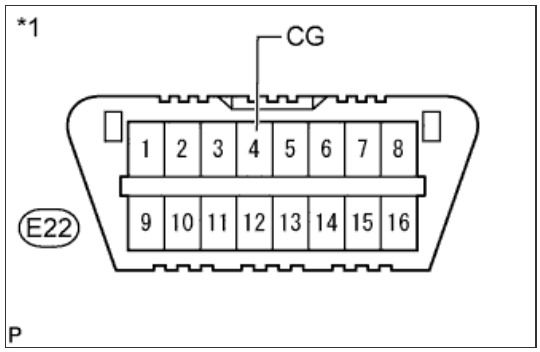
Standard Resistance:

Tester Connection	Condition	Specified Condition
E22-4 (CG) - Body	Always	Below 1 Ω

ground		

Text in Illustration

*1	DLC3



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3.CHECK HARNESS AND CONNECTOR (DLC3 (TS) - BODY GROUND)

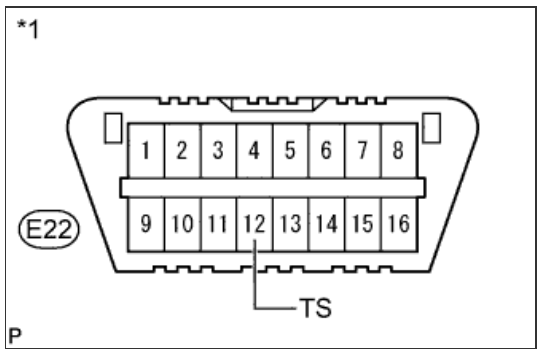
a. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
E22-12 (TS) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	DLC3



Result

Result	Proceed to
NG	A
OK (for LHD)	B
OK (for RHD)	C

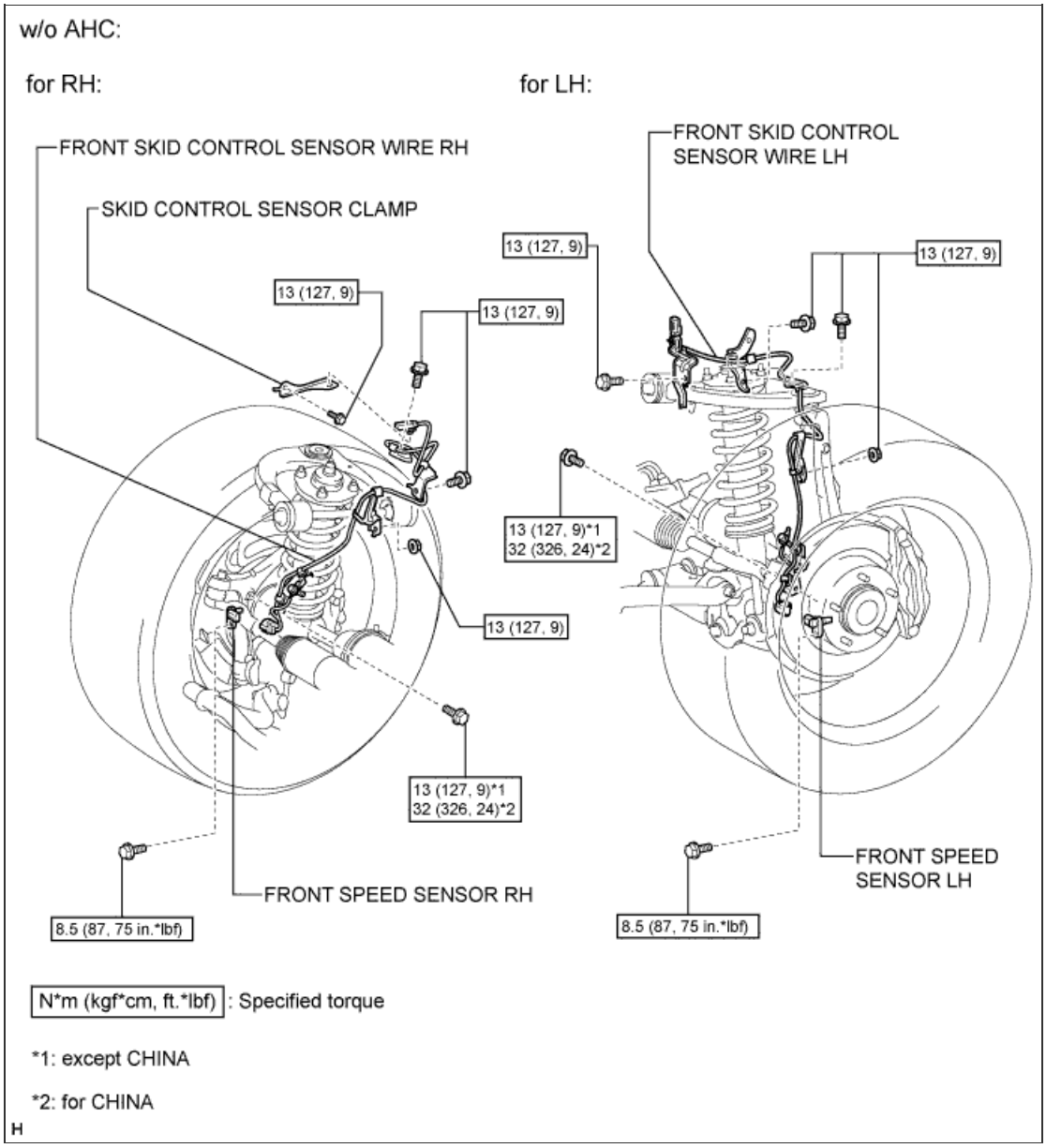
B → REPLACE MASTER CYLINDER SOLENOID (Click here)

C → REPLACE MASTER CYLINDER SOLENOID (Click here)

A

REPAIR OR REPLACE HARNESS OR CONNECTOR

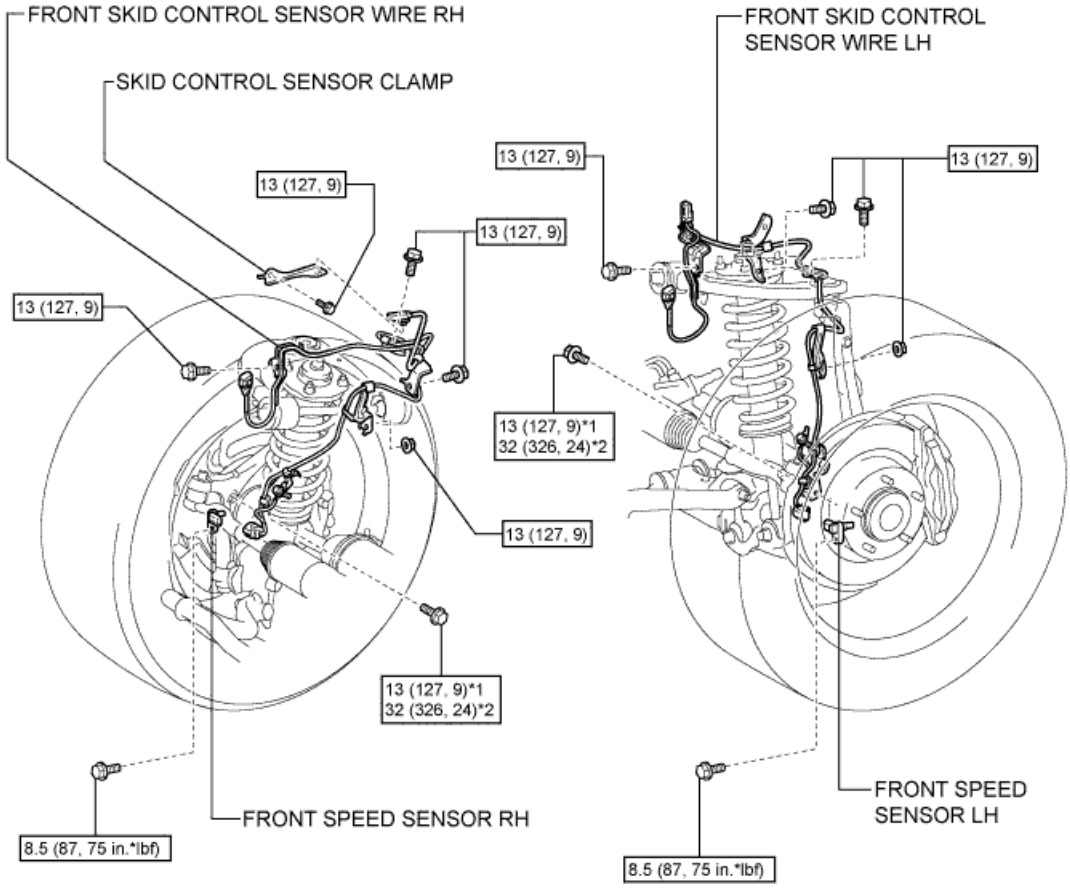
for Preparation Click here



w/ AHC:

for RH:

for LH:



N*m (kgf*cm, ft.*lbf) : Specified torque

*1: except CHINA

*2: for CHINA

H

for Preparation Click here

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here).

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).

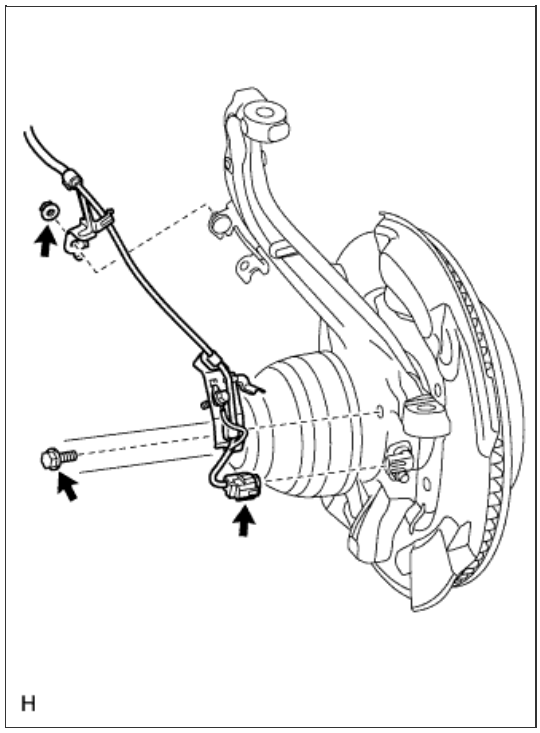
3. REMOVE FRONT WHEEL

4. REMOVE FRONT SKID CONTROL SENSOR WIRE LH

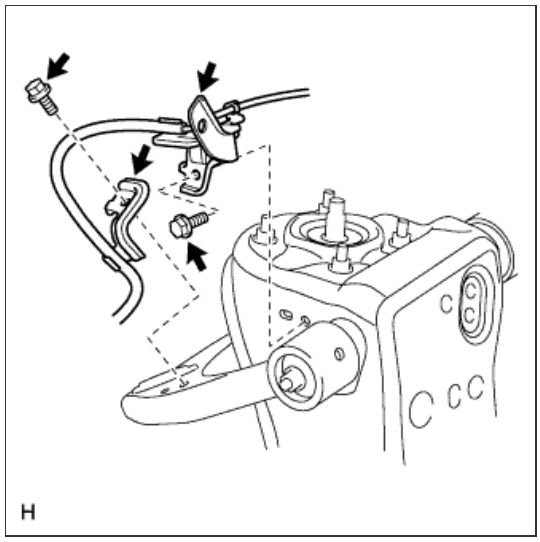
a. Disconnect the connector from the front speed sensor.

b. Remove the bolt and harness clamp.

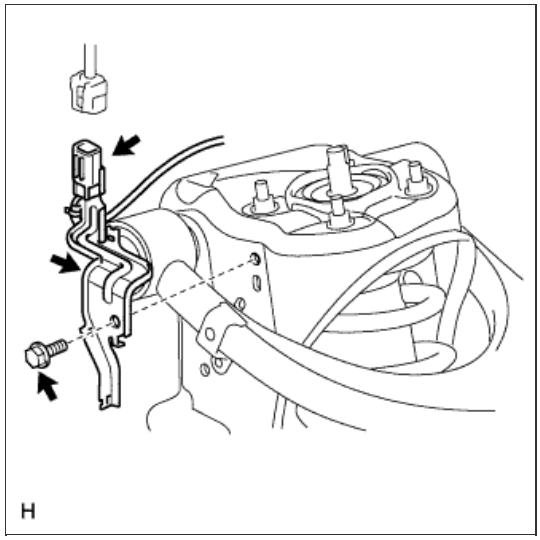
c. Remove the nut and harness clamp.



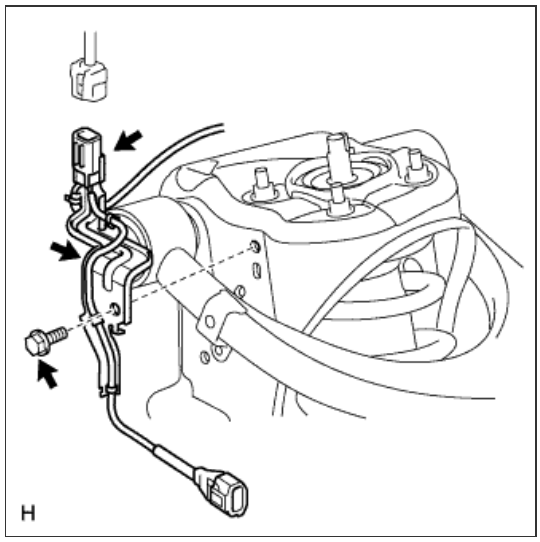
d. Remove the 2 bolts and 2 harness clamps.



e. w/o AHC:
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.

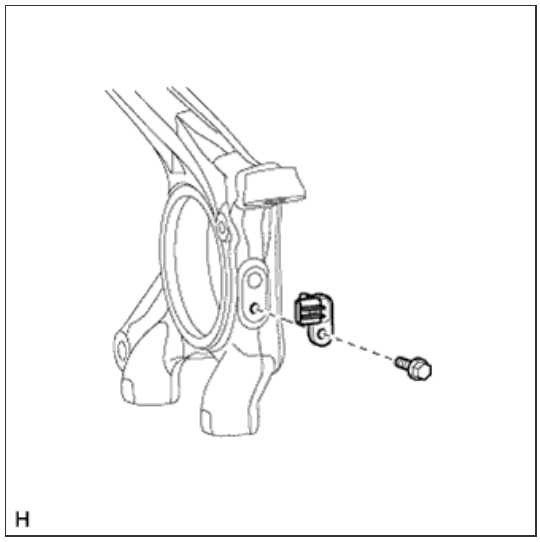


5. REMOVE FRONT SPEED SENSOR LH

a. Remove the bolt and speed sensor from the knuckle.

NOTICE:

Pull out the sensor while trying as much as possible not to rotate it.

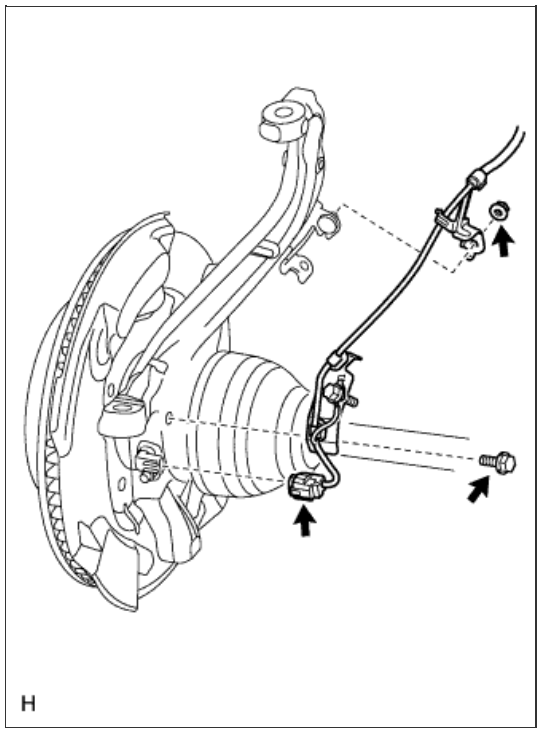


6. REMOVE FRONT SKID CONTROL SENSOR WIRE RH

a. Disconnect the connector from the front speed sensor.

b. Remove the bolt and harness clamp.

c. Remove the nut and harness clamp.



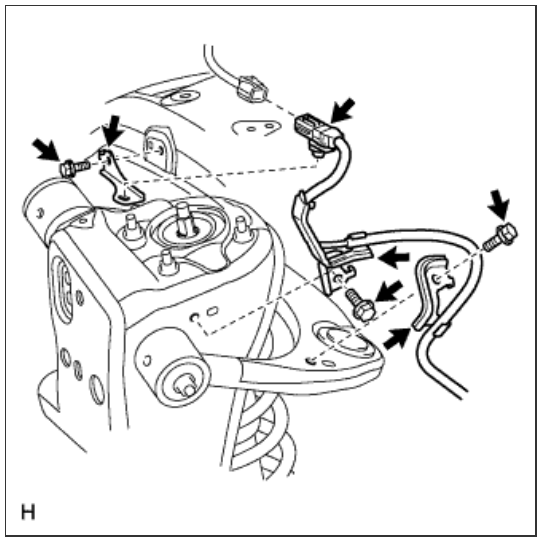
d. w/o AHC:

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.



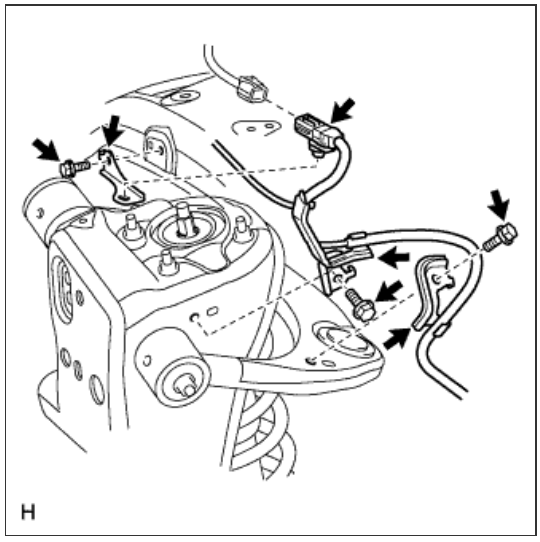
e. w/ AHC:

i. Disconnect the connector.

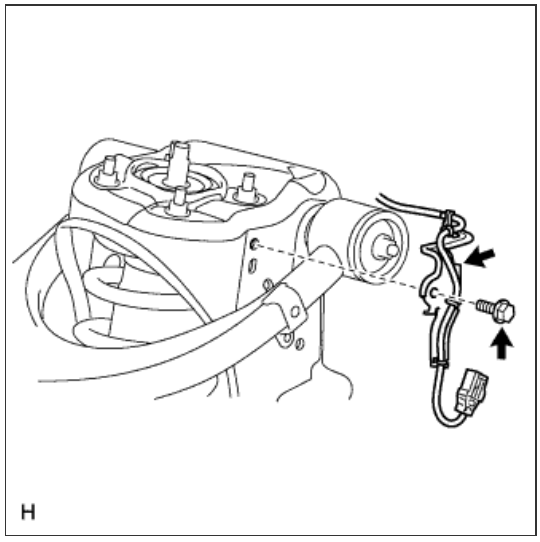
ii. Detach the connector from the skid control sensor clamp.

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.

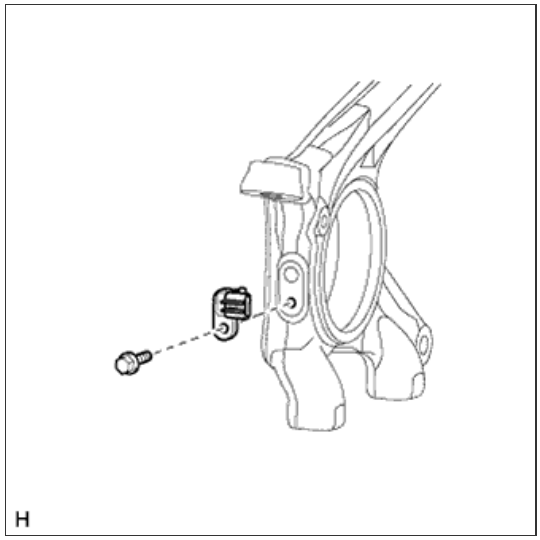


7. REMOVE FRONT SPEED SENSOR RH

a. 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

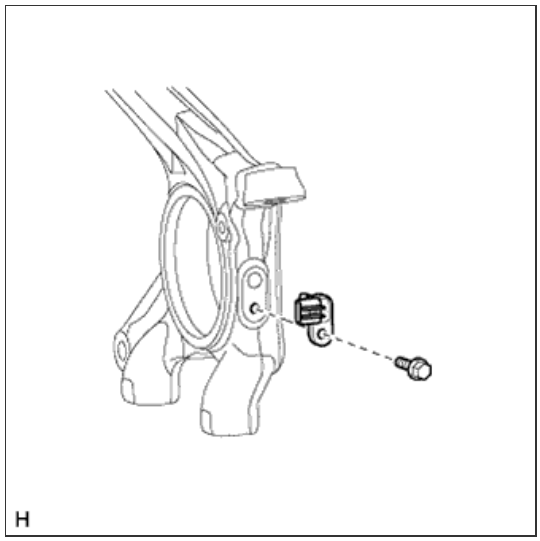
1. INSTALL FRONT SPEED SENSOR LH

a. 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:

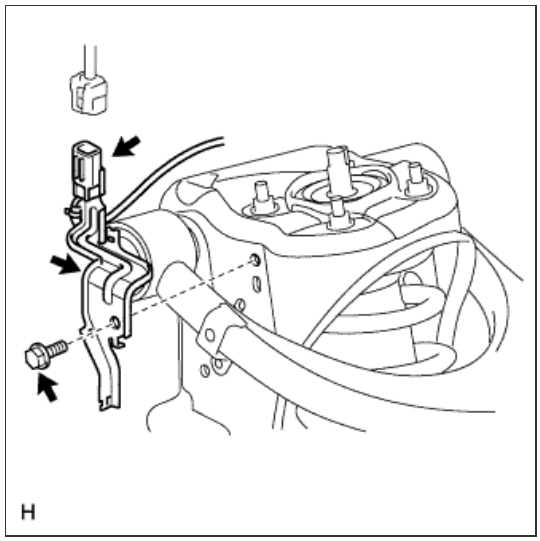
i. Connect the connector.

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:

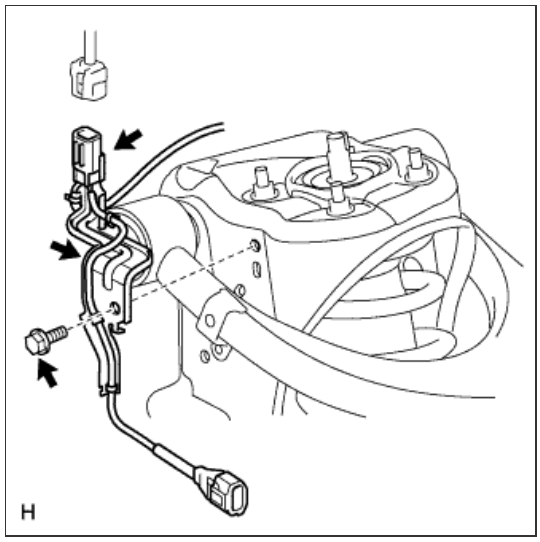
i. Connect the 2 connectors.

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.**

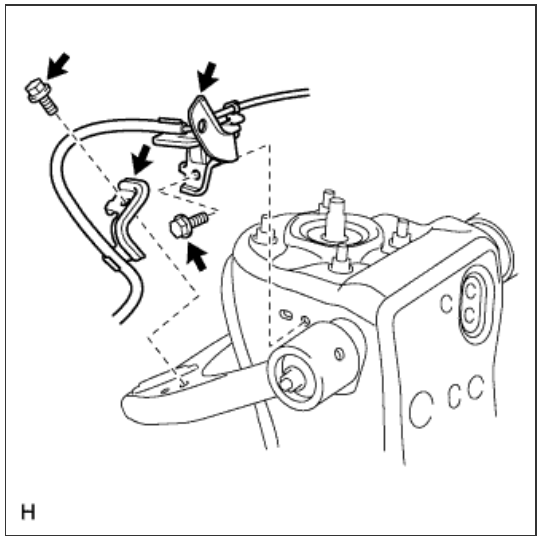


c. Install the 2 harness clamps with the 2 bolts.

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.**

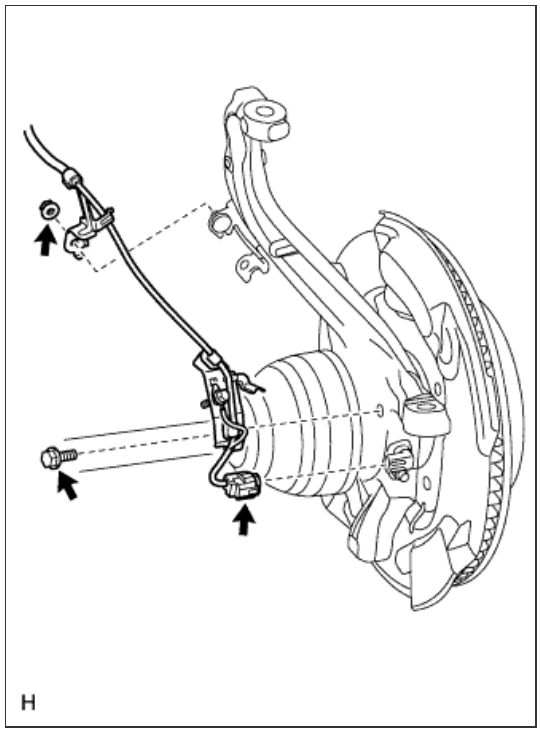


d. Install the harness clamp with the nut.

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:

except China:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }
for China:
32 N*m{ 326 kgf*cm , 24 ft.*lbf }

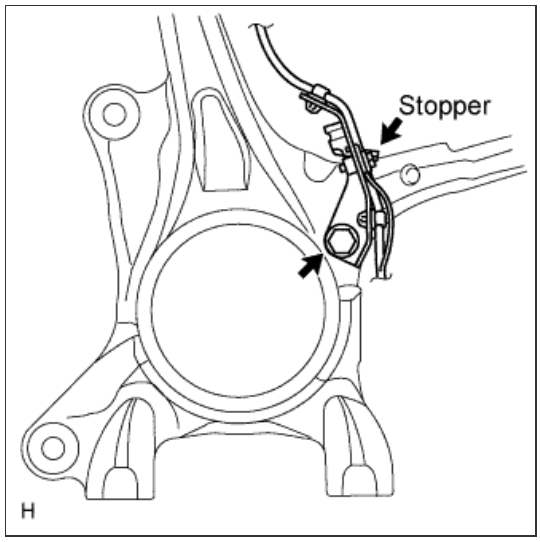
NOTICE:

Install the bracket so that the rotation stopper touches the knuckle.

f. Connect the speed sensor connector.

NOTICE:

Securely connect the connector.



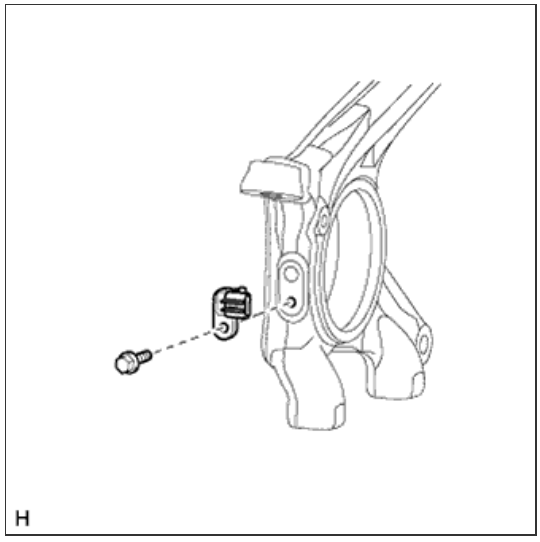
3. INSTALL FRONT SPEED SENSOR RH

a. 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:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

ii. Attach the connector to the skid control sensor clamp and then connect the connector.

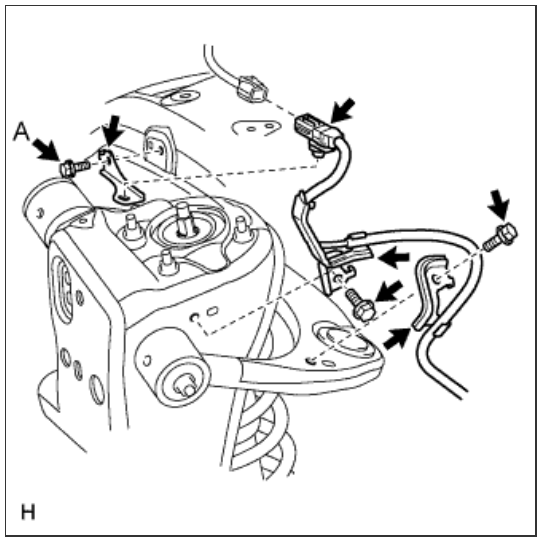
iii. Install the 2 harness clamps with the 2 bolts.

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:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

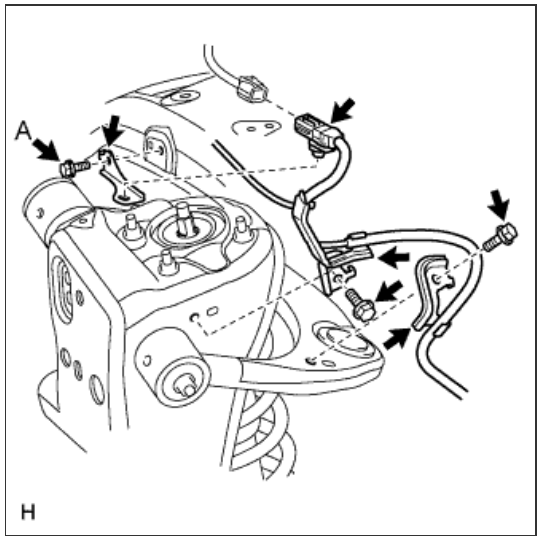
ii. Attach the connector to the skid control sensor clamp and then connect the connector.

iii. Install the 2 harness clamps with the 2 bolts.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

NOTICE:

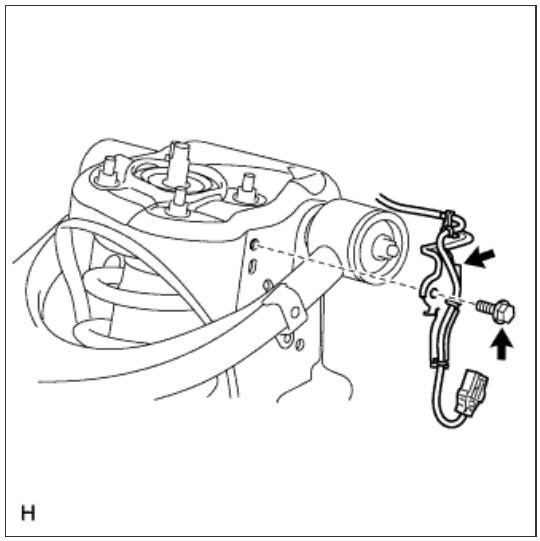
- **When installing the clamps, do not twist the wire harness.**
- **Make sure the clamp rotation stopper touches the installation position.**



iv. Install the harness clamp with the bolt.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

v. Connect the connector.



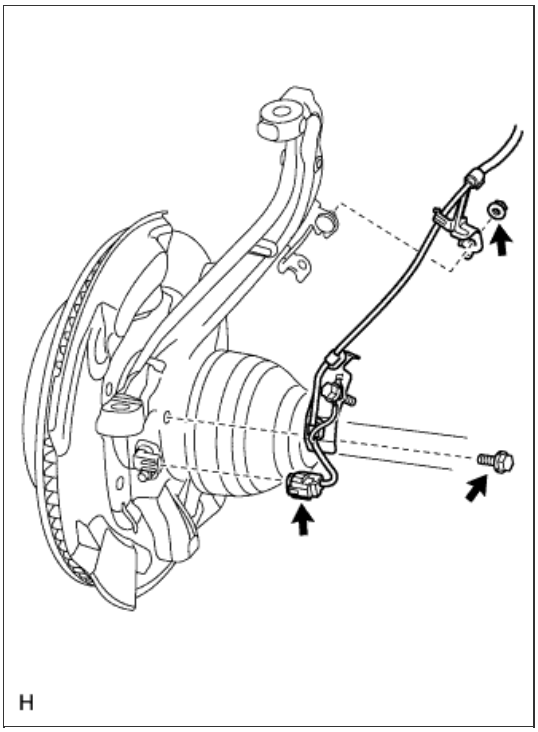
c. Install the harness clamp with the nut.

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.**

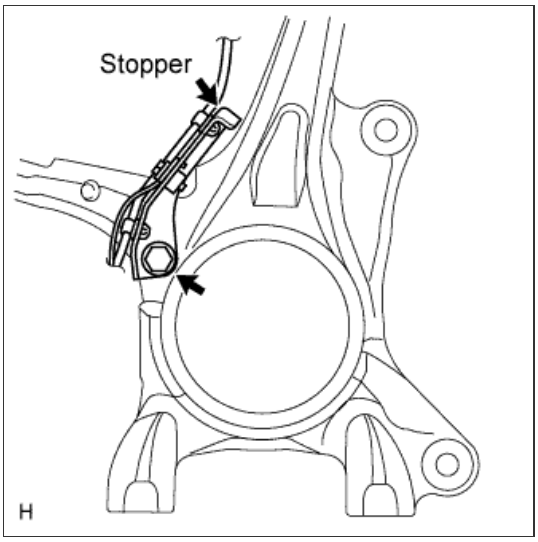


d. Install the harness clamp with bolt.

Torque:
except China:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }
for China:
32 N*m{ 326 kgf*cm , 24 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:

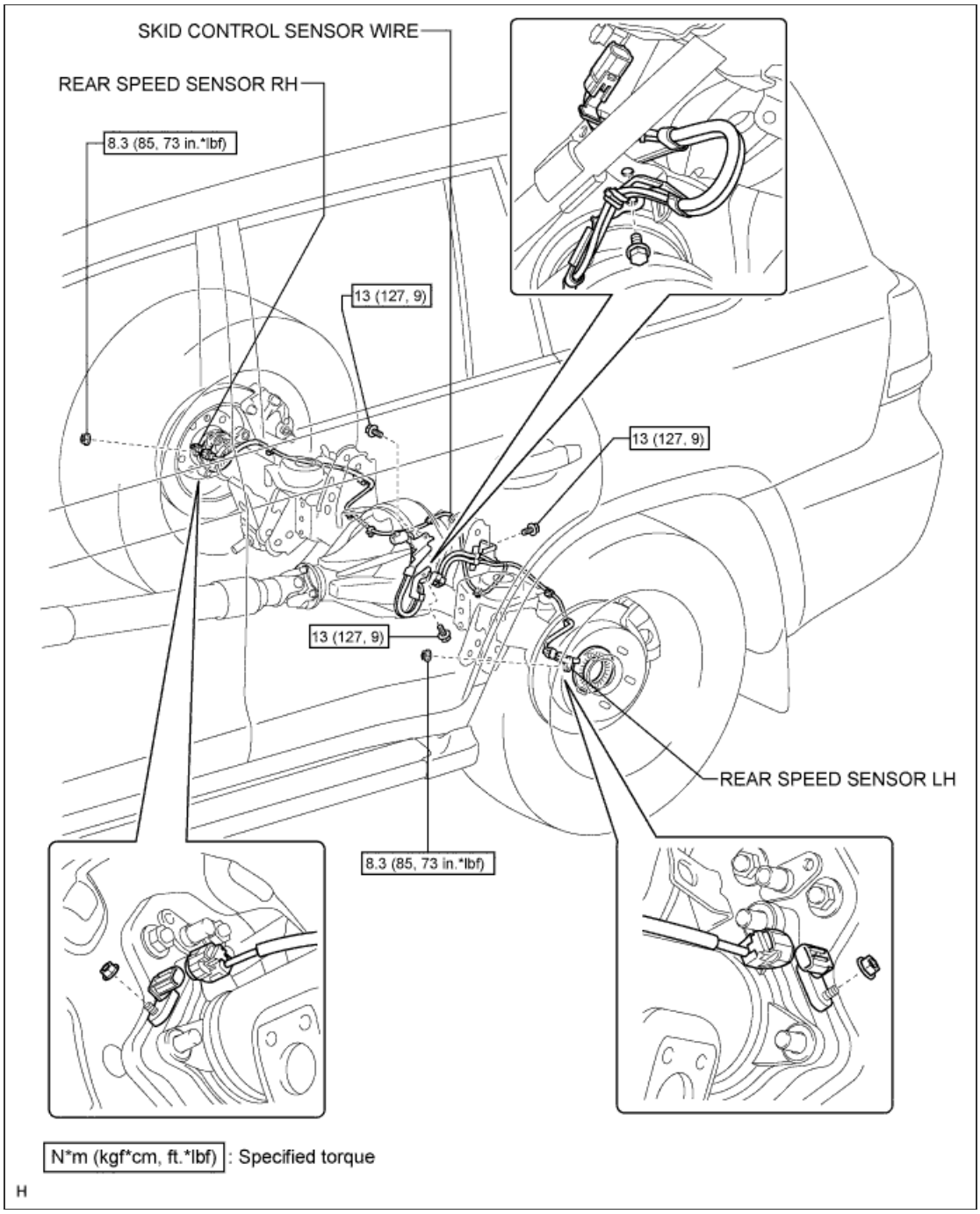
When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

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. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here).

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

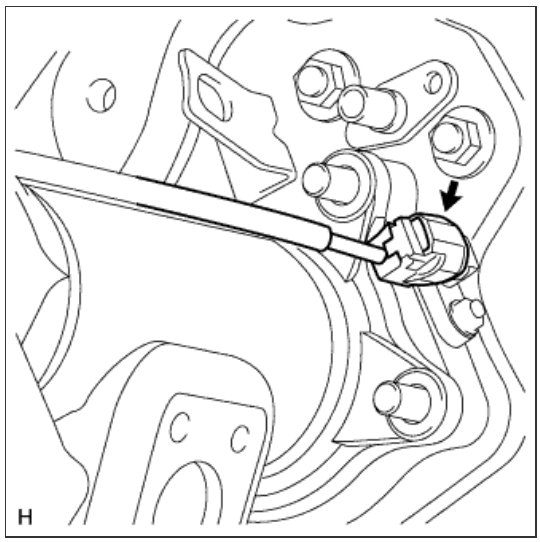
NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

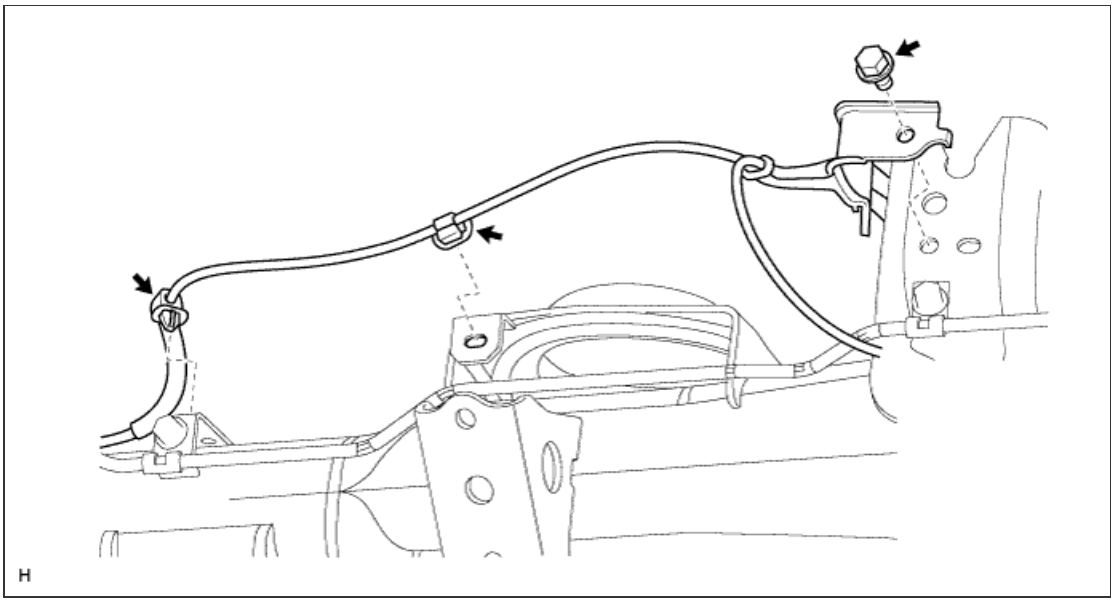
3. REMOVE REAR WHEEL

4. REMOVE SKID CONTROL SENSOR WIRE

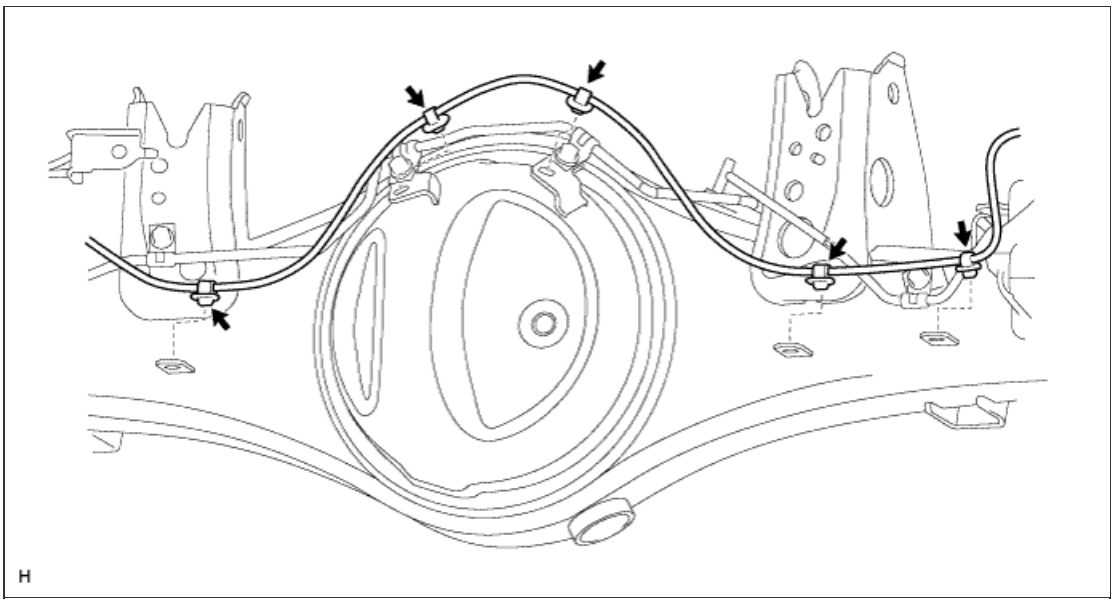
a. Disconnect the speed sensor LH connector.



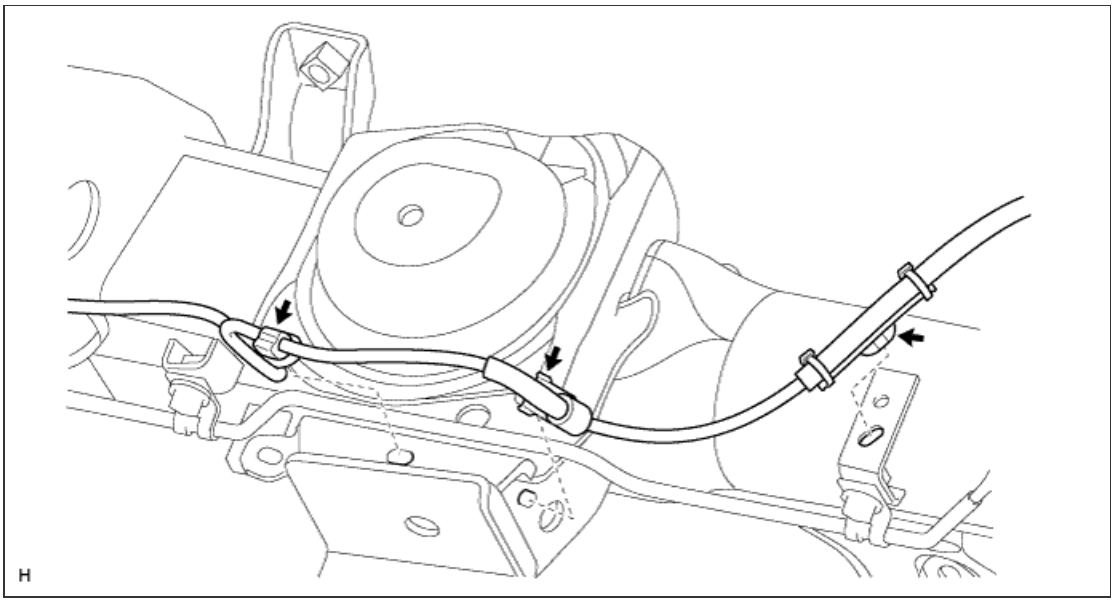
b. Detach the 2 clamps and remove the bolt and sensor clamp.



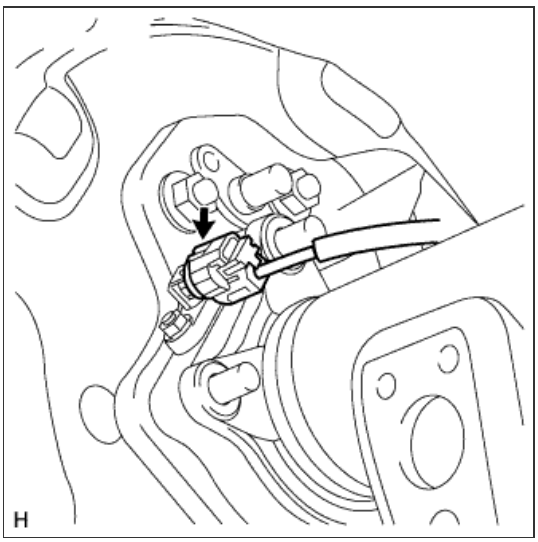
c. Detach the 5 clamps.



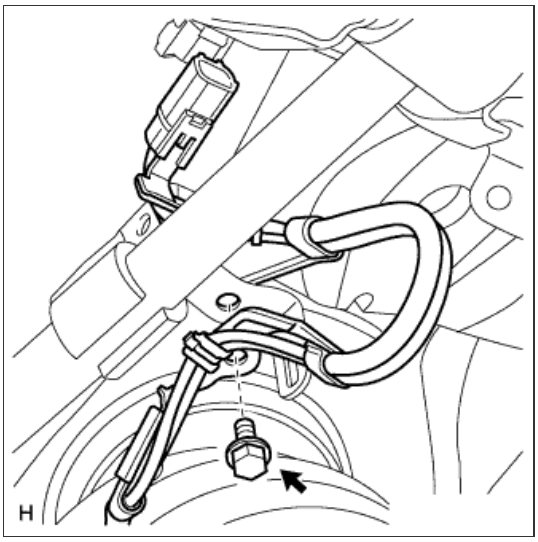
d. Detach the 3 clamps.



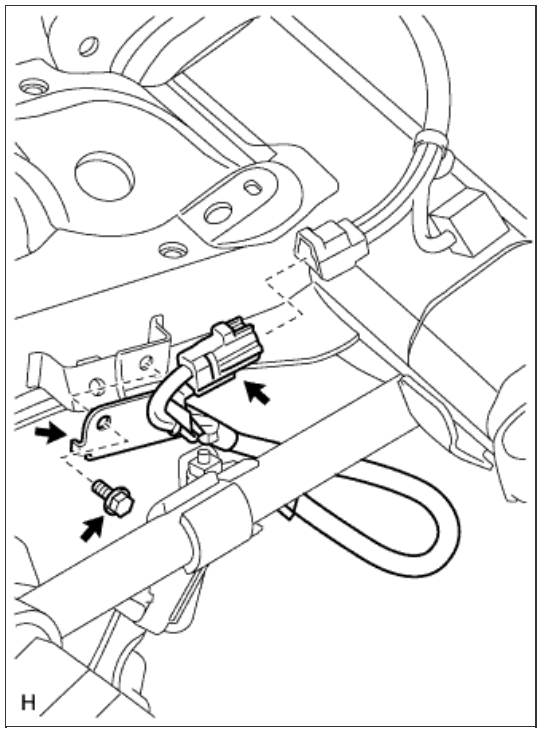
e. Disconnect the speed sensor RH connector.



f. Remove the bolt.



g. Disconnect the connector, and remove the bolt and skid control sensor wire.

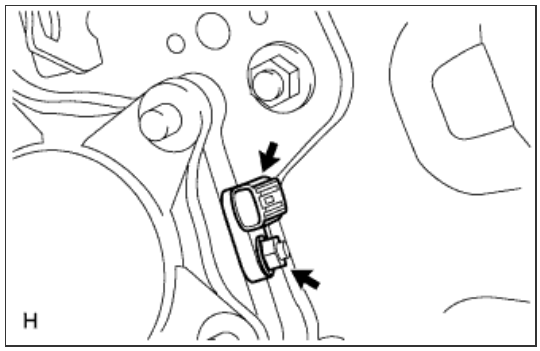


5. REMOVE REAR SPEED SENSOR LH

a. Remove the nut and speed sensor.

NOTICE:

Pull out the sensor while trying as much as possible not to rotate it.

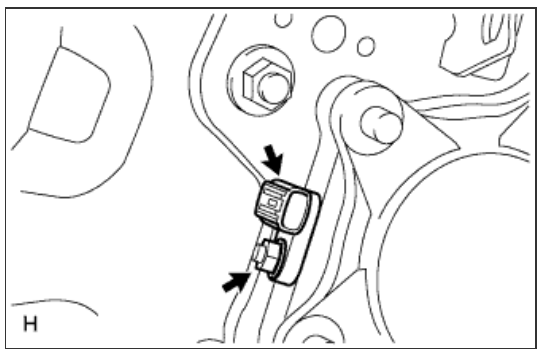


6. REMOVE REAR SPEED SENSOR RH

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:

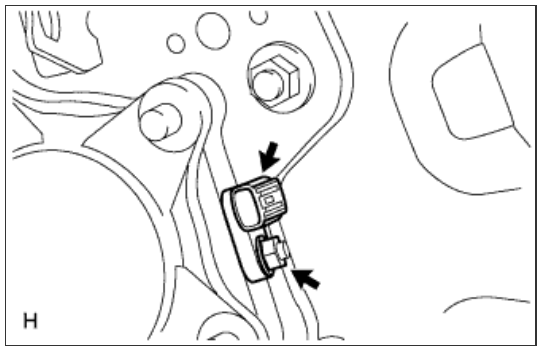
- The surface of the sensor is cracked, dented, or chipped.
- The connector is scratched, cracked, or damaged.
- The sensor has been dropped.

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 }



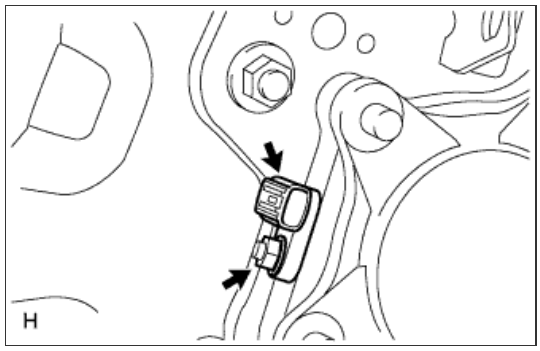
NOTICE:

- **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 }

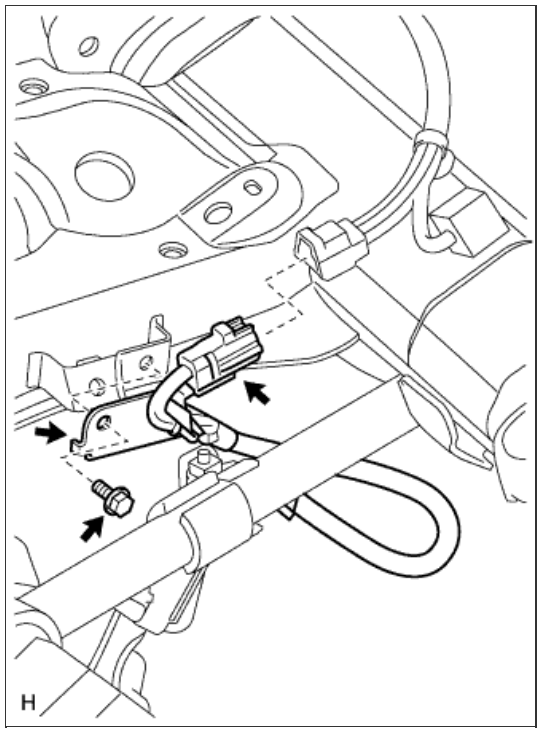
NOTICE:

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.**

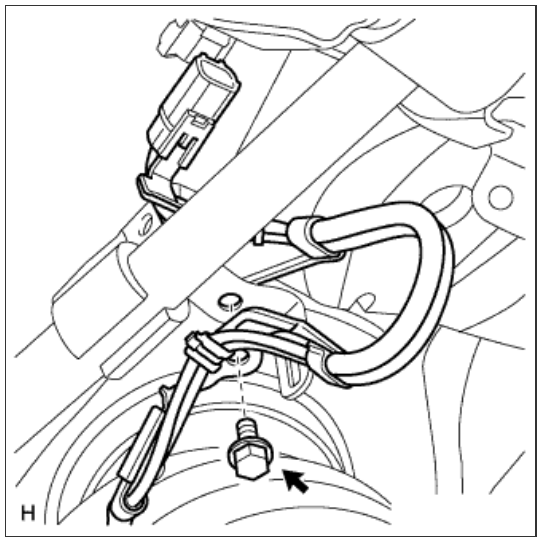


c. Install the sensor clamp with the bolt.

Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

NOTICE:

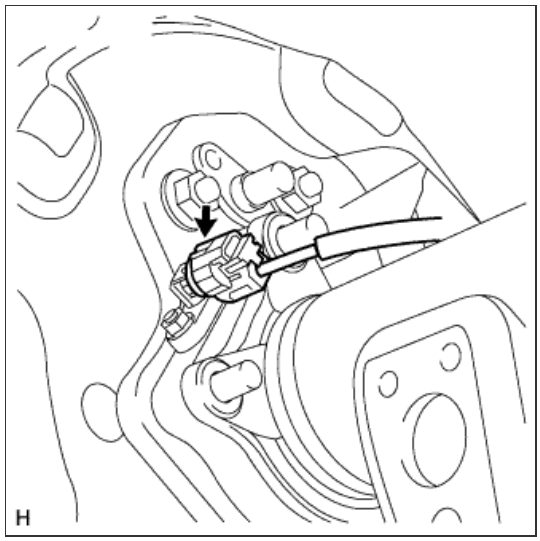
Make sure the clamp rotation stopper touches the installation position.



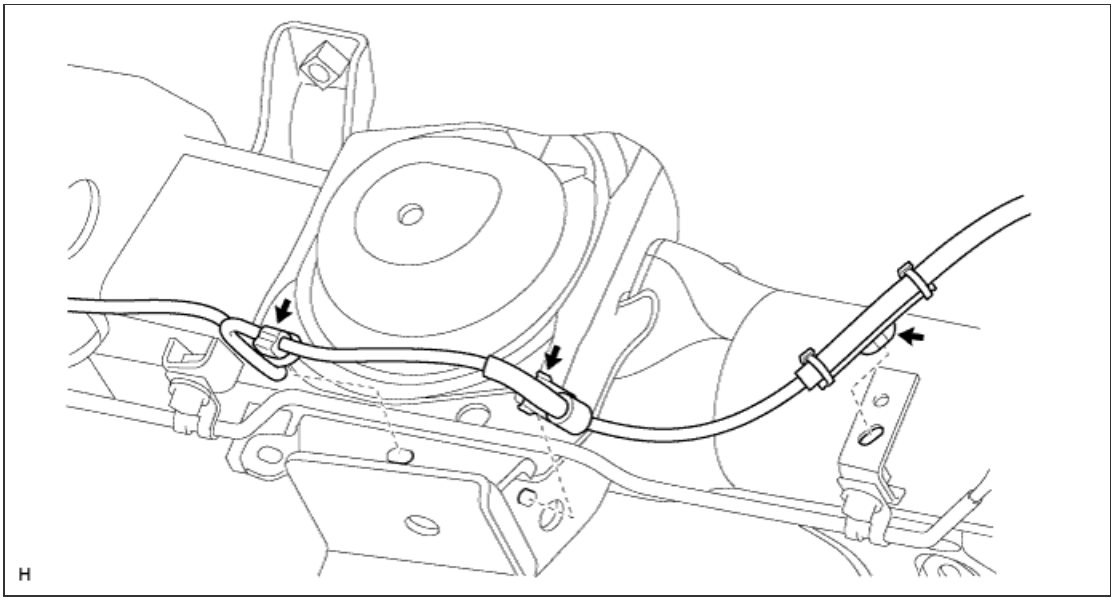
d. Connect the speed sensor RH connector.

NOTICE:

- **Securely connect the connector.**
- **When connecting the connector, do not twist the wire harness.**



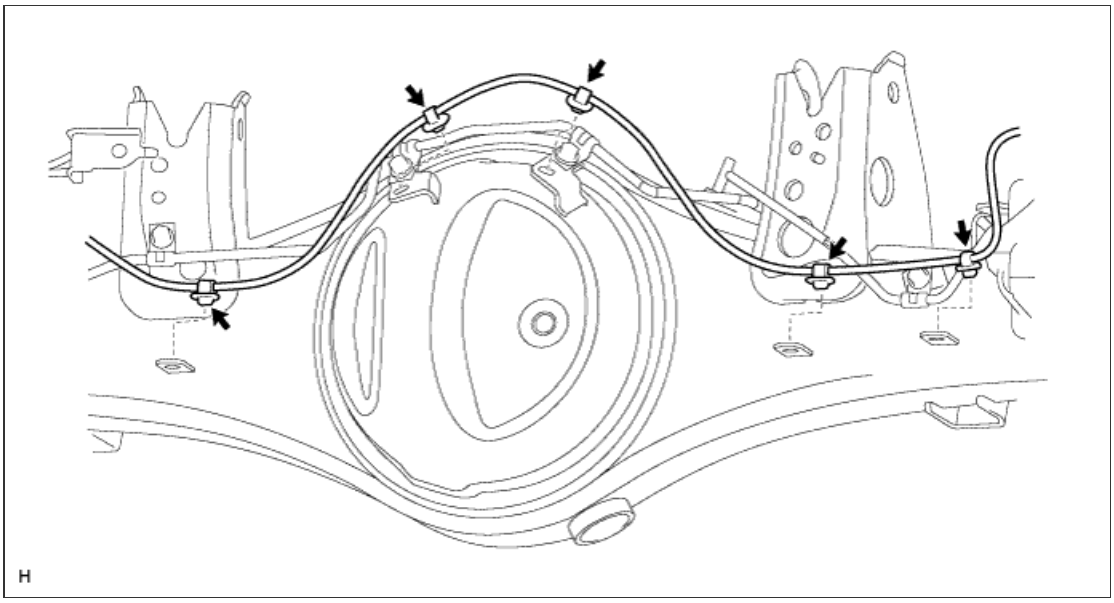
e. Attach the 3 clamps.



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.

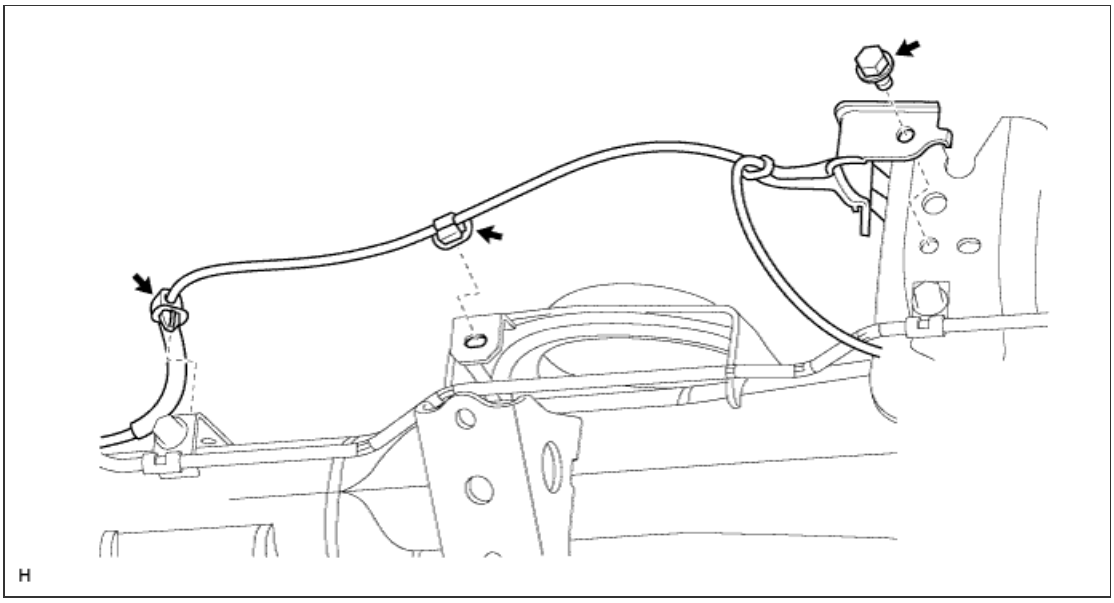


NOTICE:

- **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.

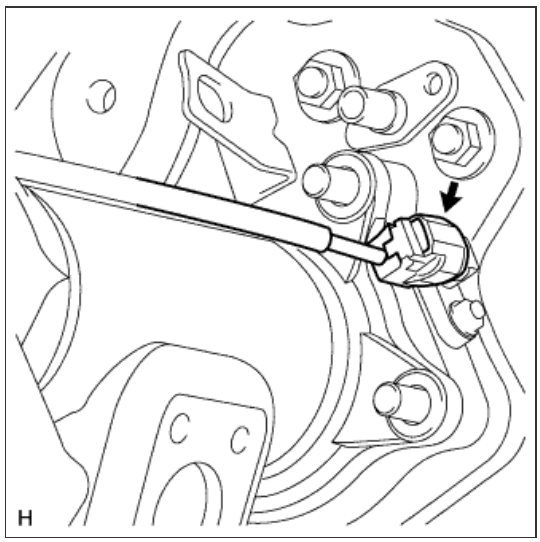
Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }



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:

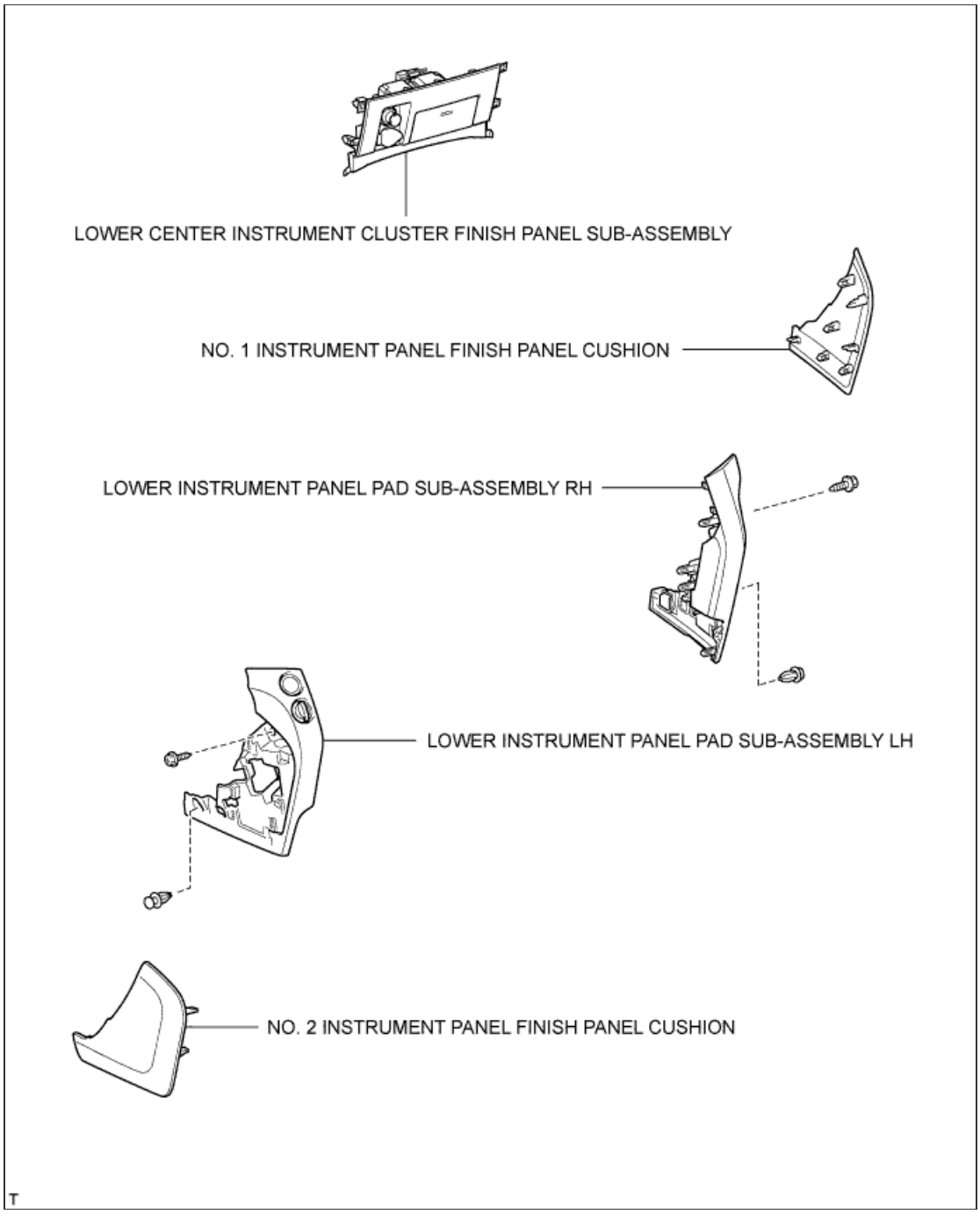
When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

6. CHECK SPEED SENSOR SIGNAL

a. w/ ABS:
Check the speed sensor signal (Click here).

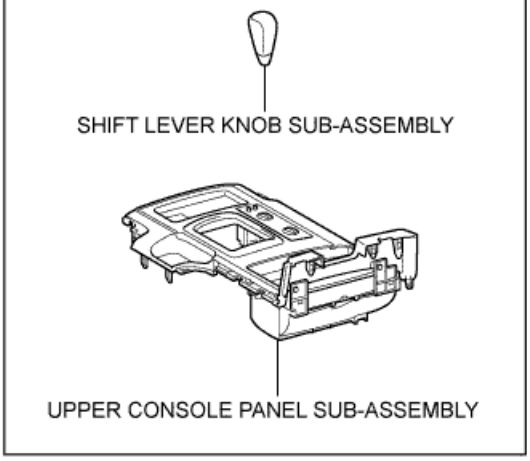
b. w/ VSC:
Check the speed sensor signal (Click here).

for Preparation [Click here]

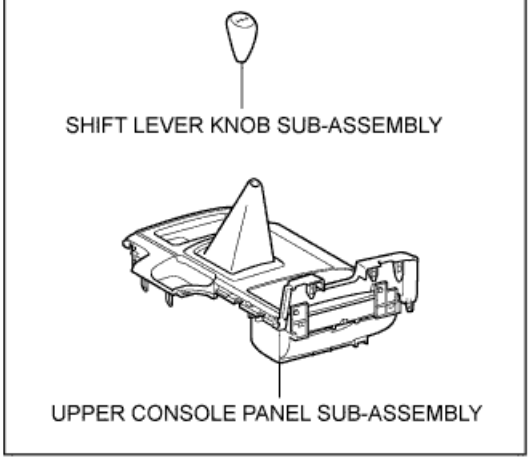


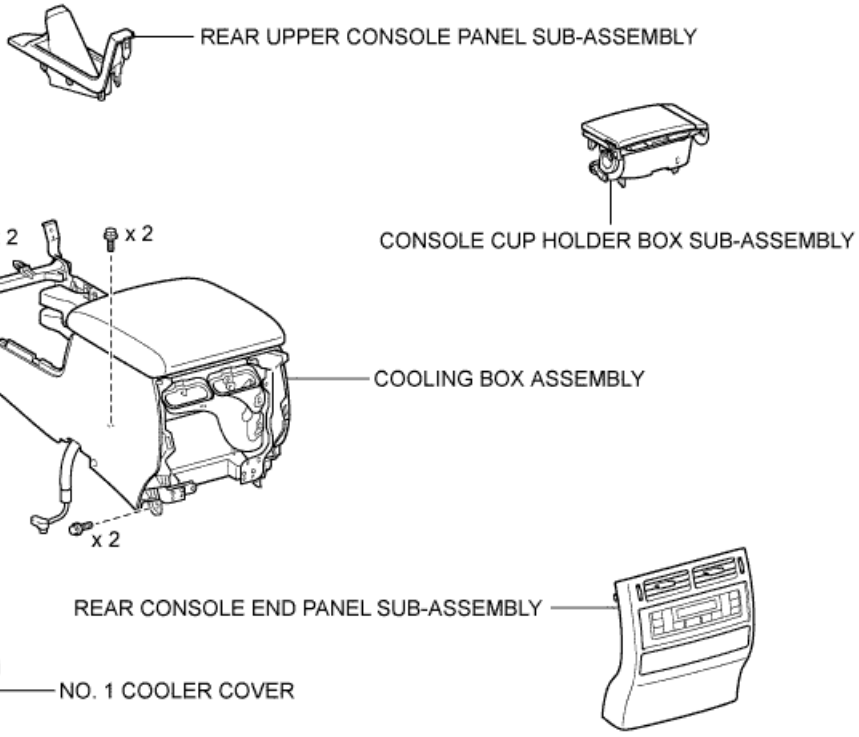
w/ Cool Box:

for Automatic Transmission:



for Manual Transmission:

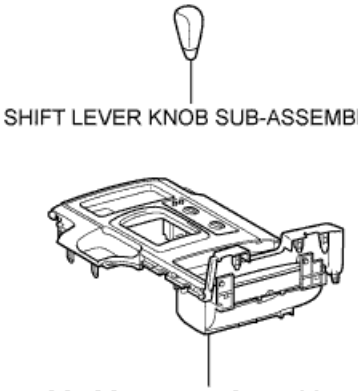




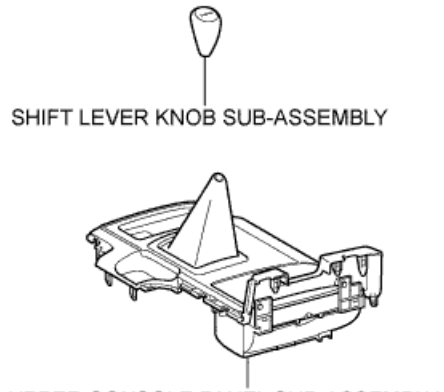
T

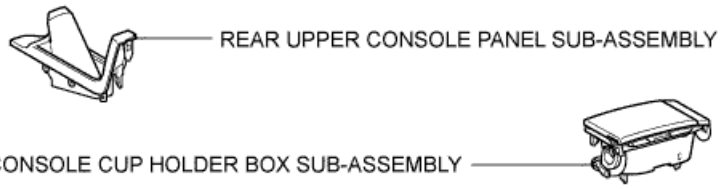
w/o Cool Box:

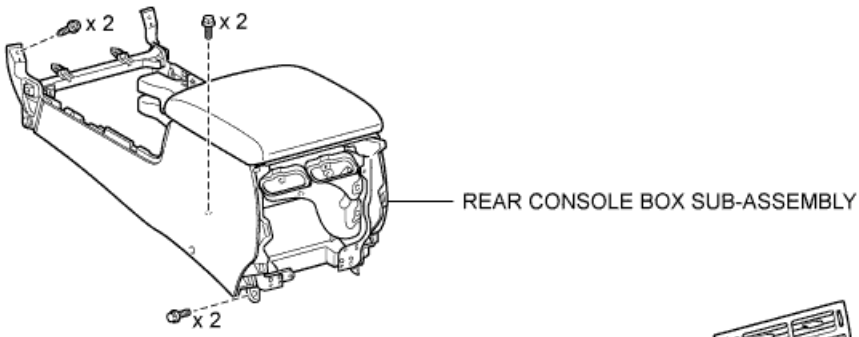
for Automatic Transmission:

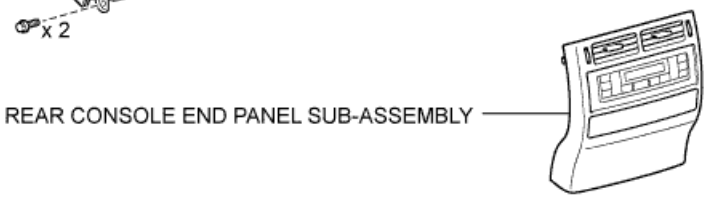


for Manual Transmission:

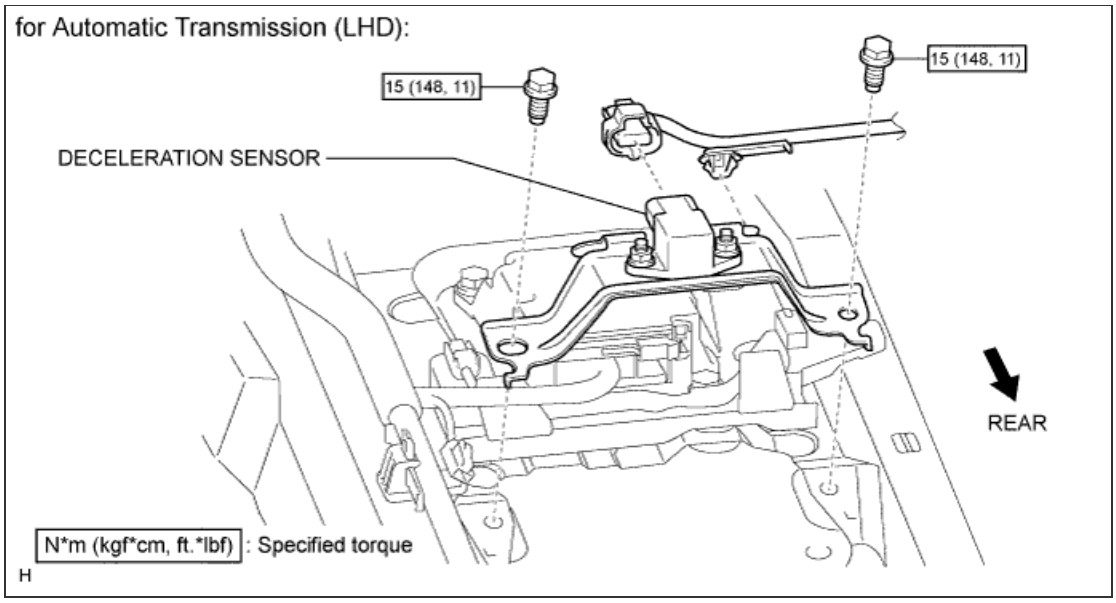


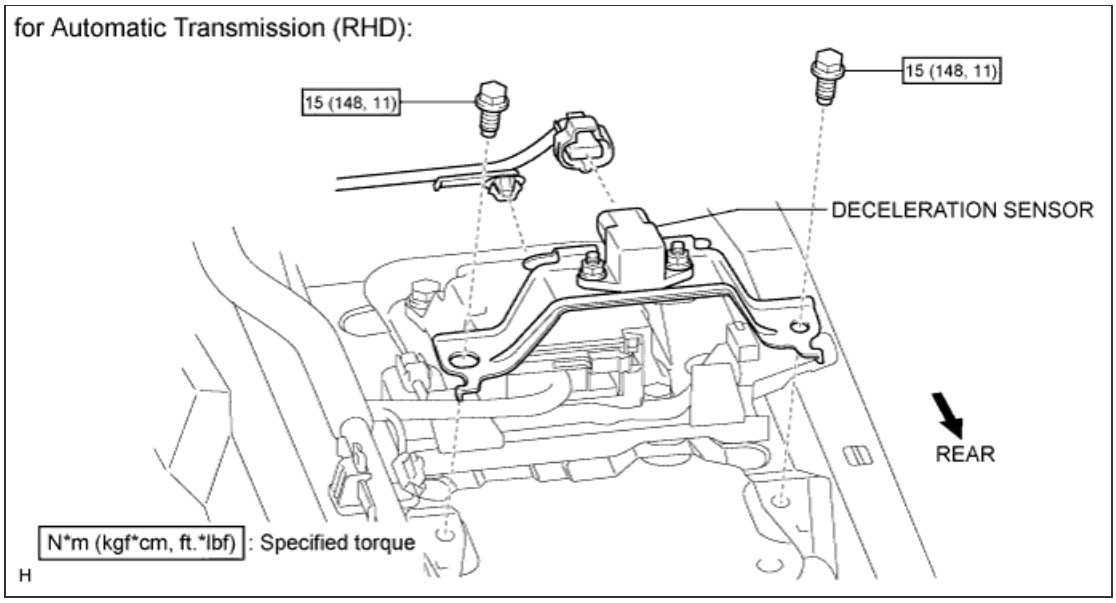


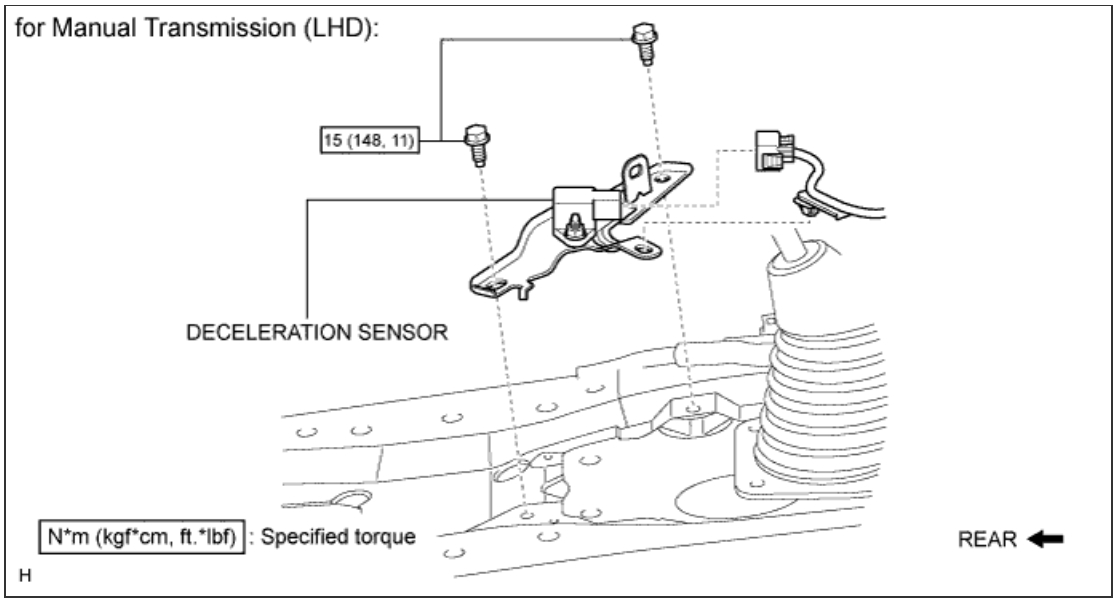


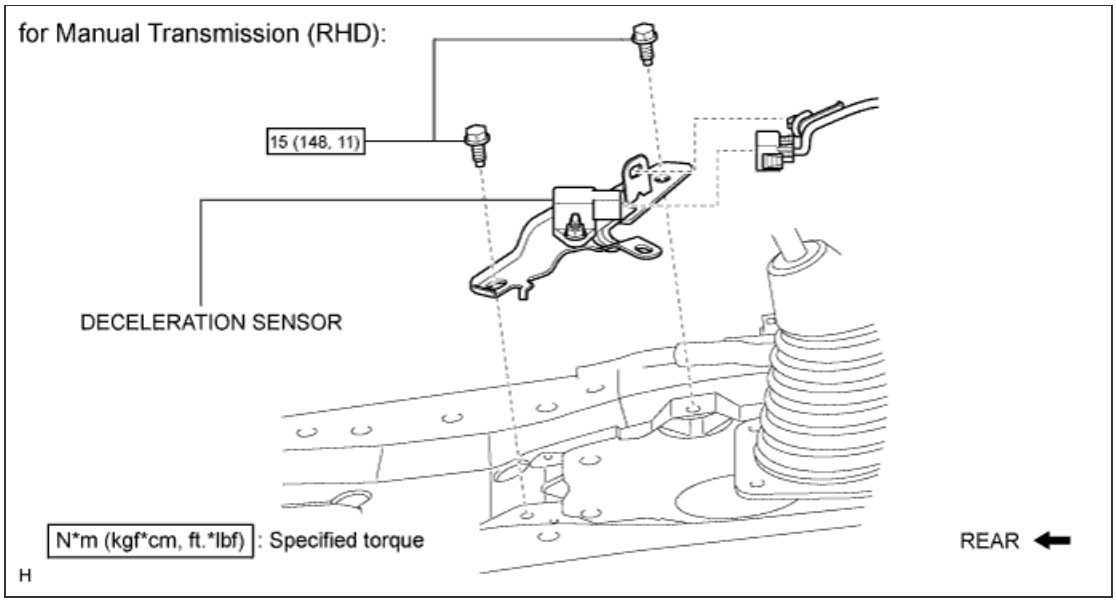


T


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. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here).

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 LOWER CONSOLE BOX (w/o Console Box Lid)

(Click here)

4. REMOVE COOLING BOX ASSEMBLY (w/ Cool Box)

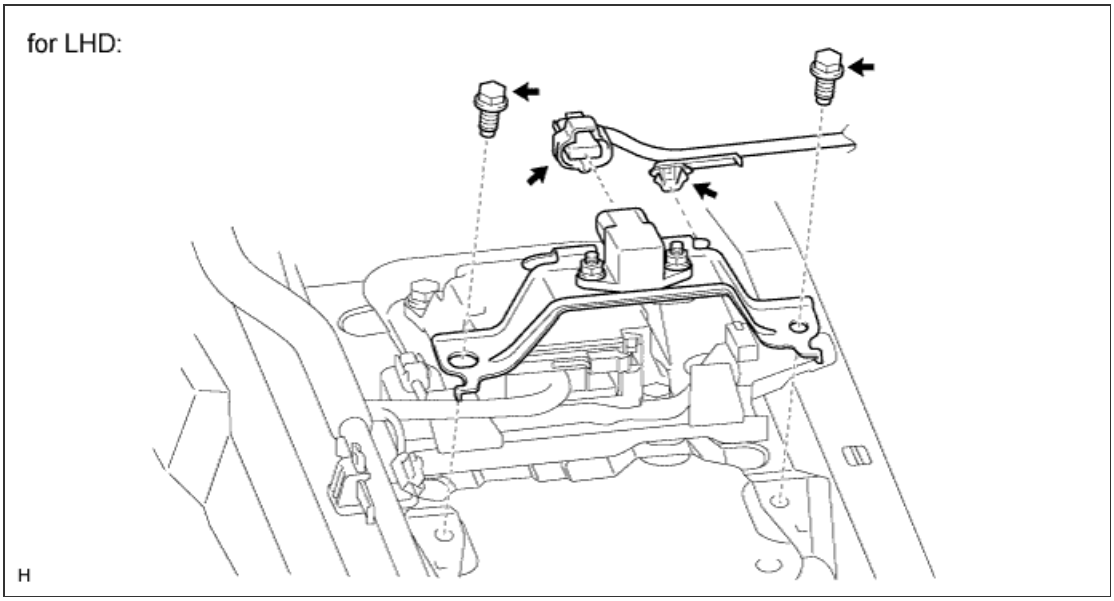
(Click here)

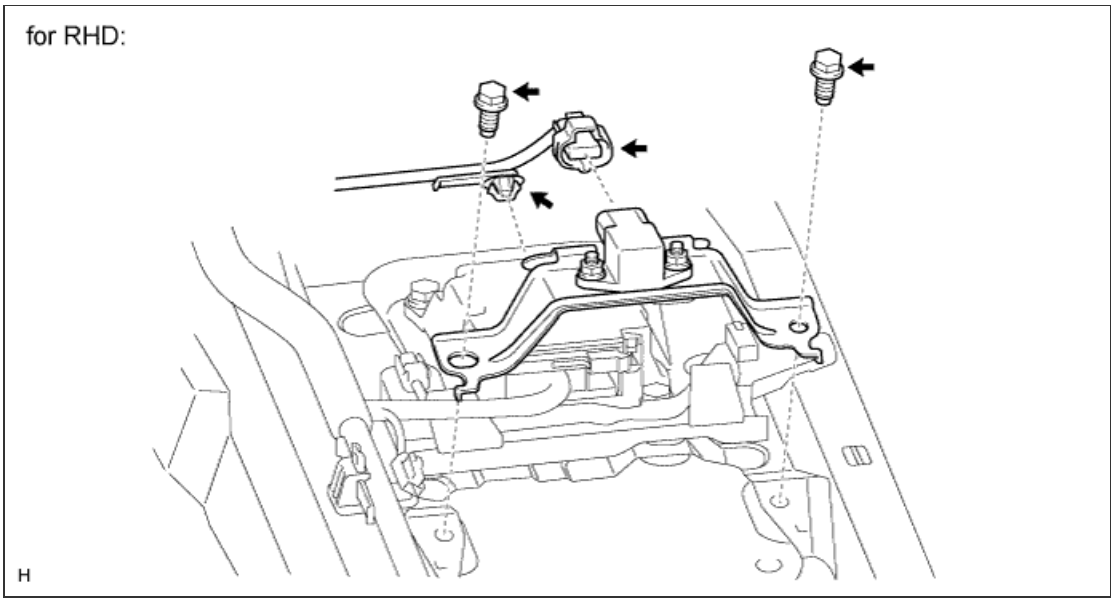
5. REMOVE REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

(Click here)

6. REMOVE DECELERATION SENSOR (for Automatic Transmission)

a. Disconnect the sensor connector, and then detach the clamp from the sensor bracket.



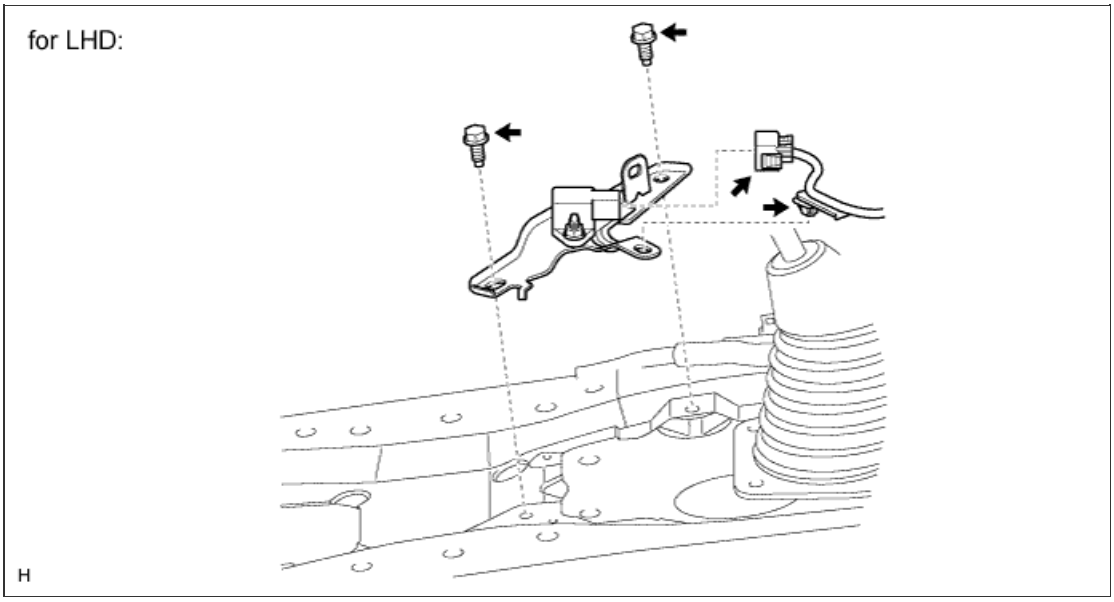


b. Remove the 2 bolts and sensor.

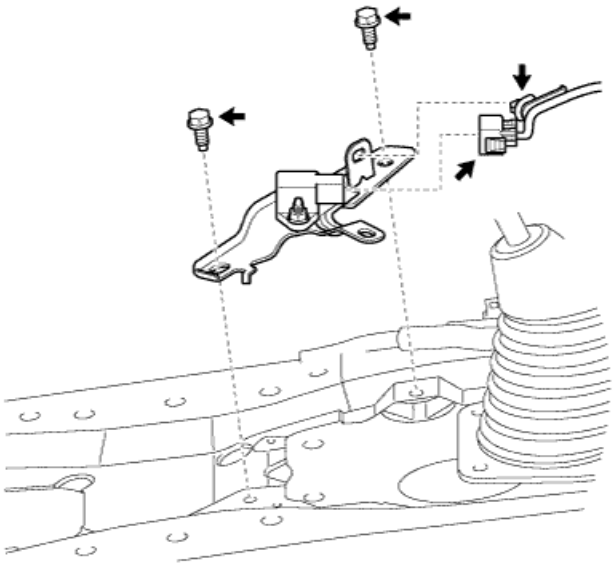
7. REMOVE DECELERATION SENSOR (for Manual Transmission)

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. CHECK 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:

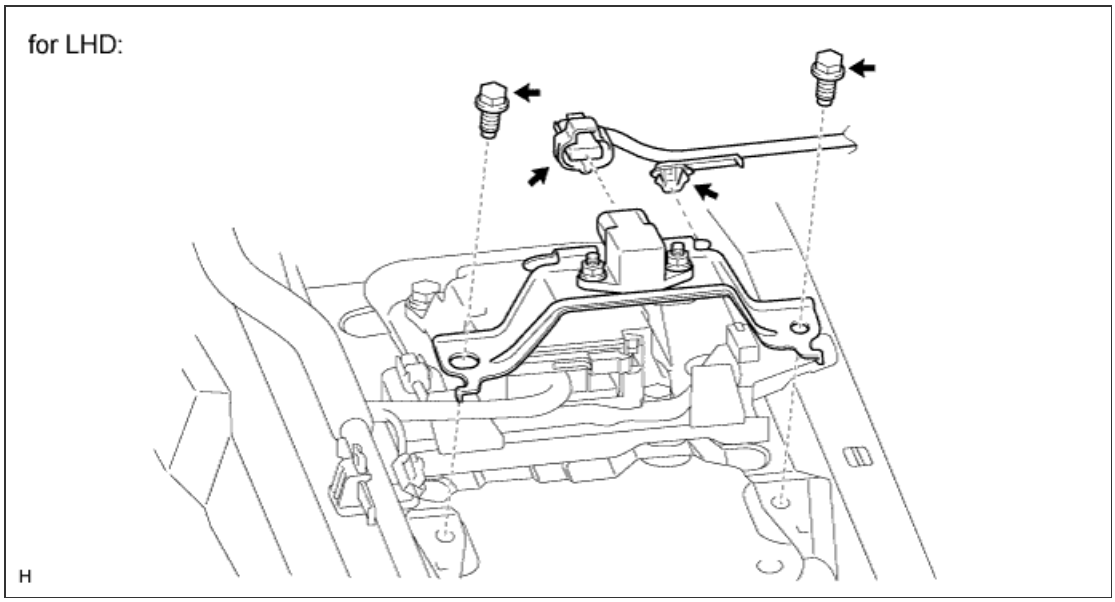
Securely connect the connector.

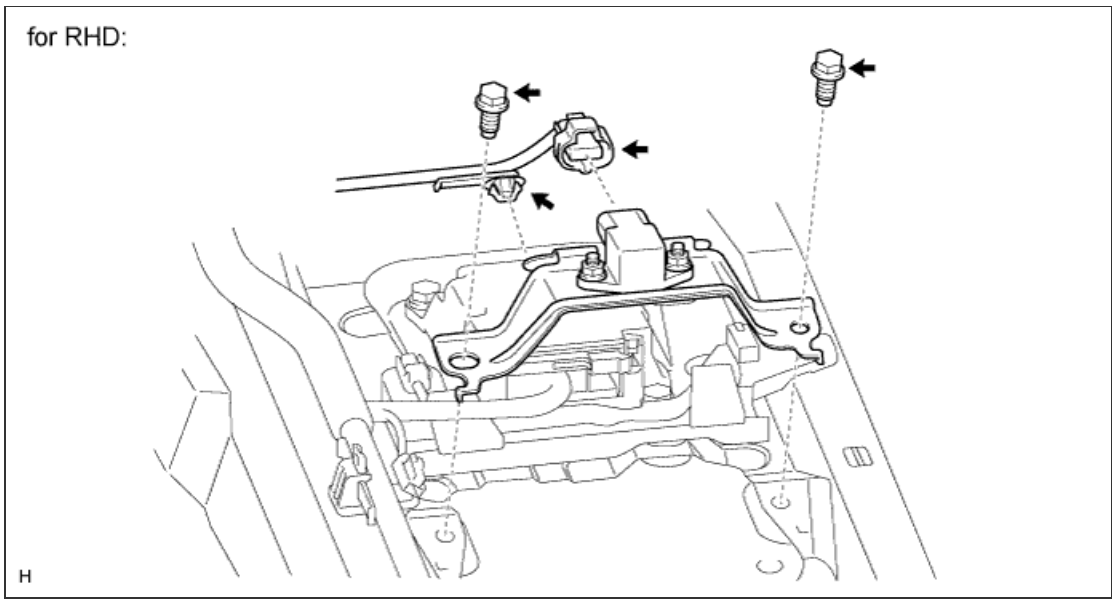
b. Install the sensor with the 2 bolts.

Torque:
15 N*m{ 148 kgf*cm , 11 ft.*lbf }

NOTICE:

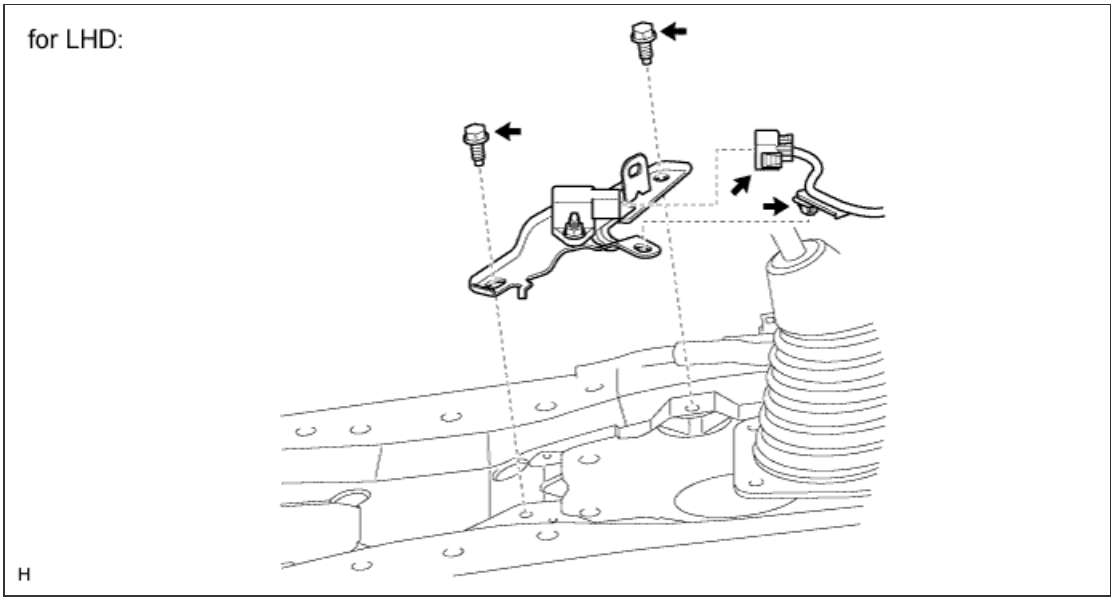
- **Make sure that the sensor is oriented correctly.**
- **If the sensor is dropped, replace it.**
- **When installing the sensor, make sure to avoid impacts to the sensor.**

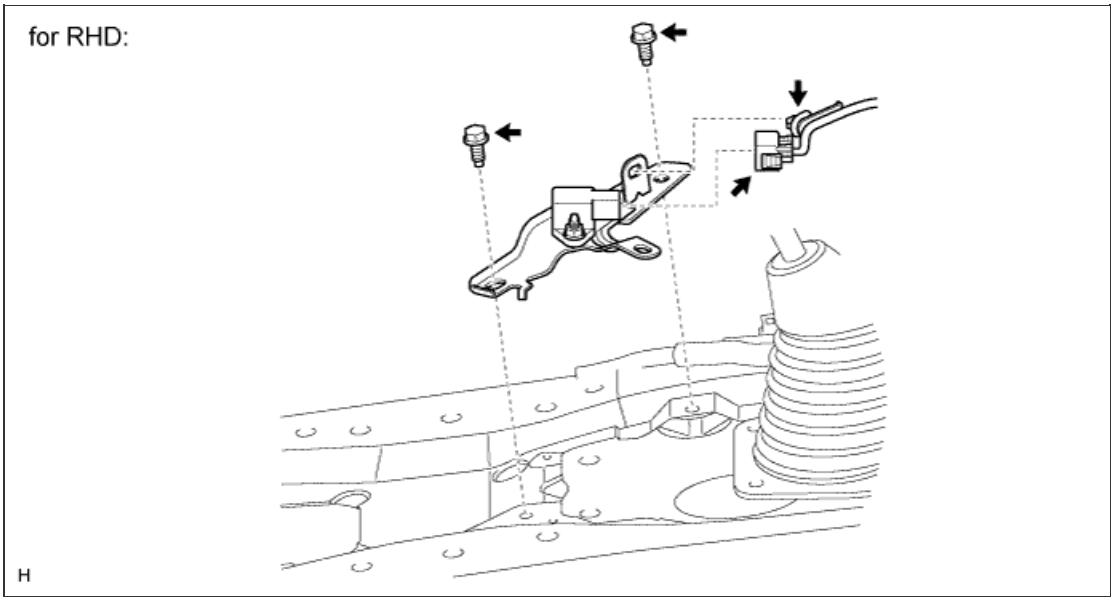




2. INSTALL DECELERATION SENSOR (for Manual Transmission)

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).

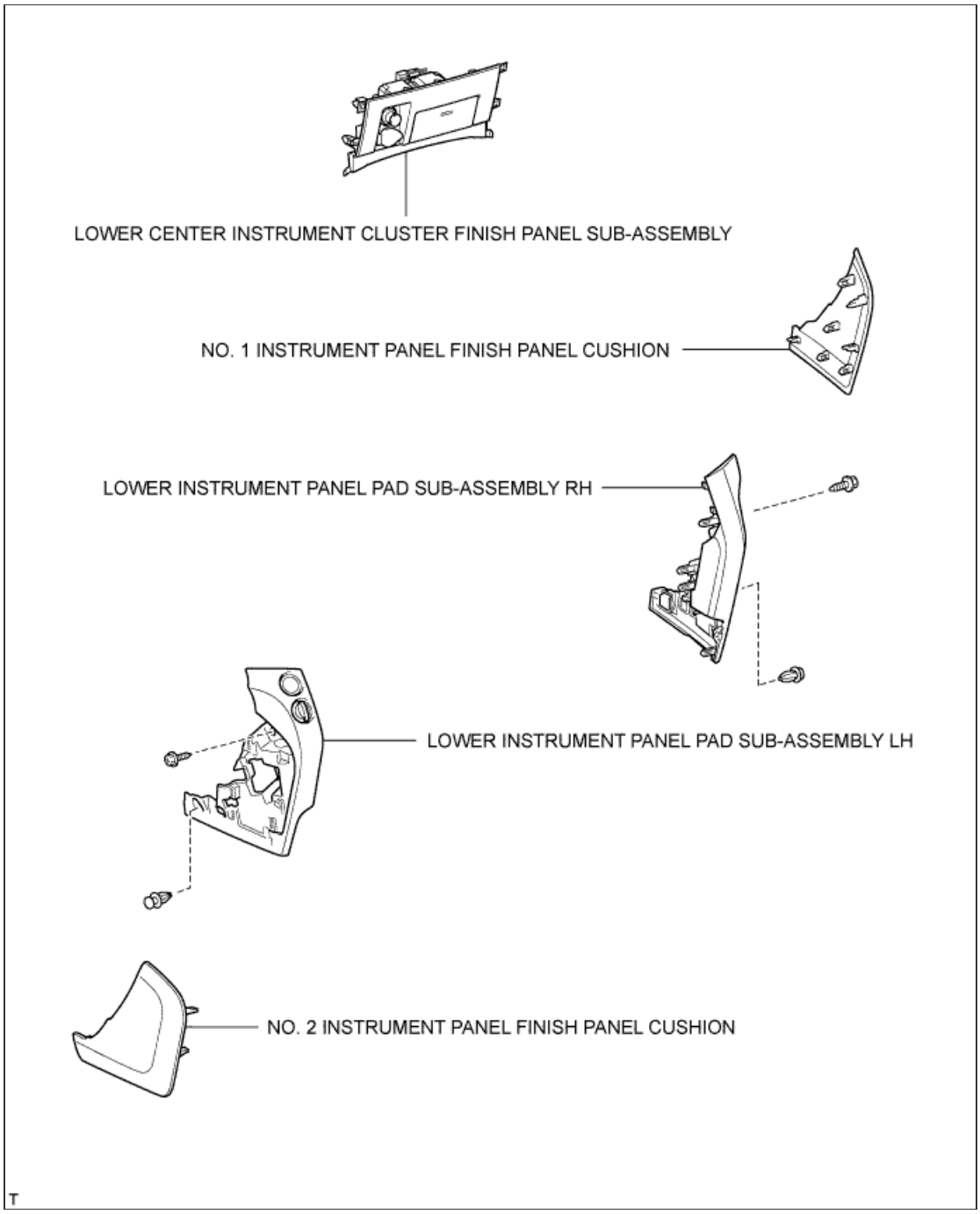
7. PERFORM G SENSOR ZERO POINT CALIBRATION

a. Perform the G sensor zero point calibration (Click here).

8. CHECK G SENSOR SIGNAL

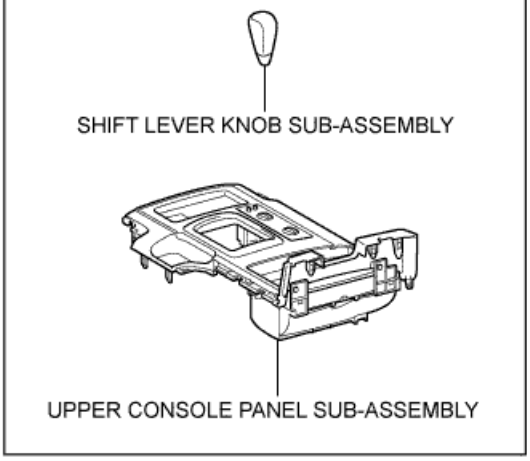
a. Check the G sensor signal (Click here).

for Preparation Click here

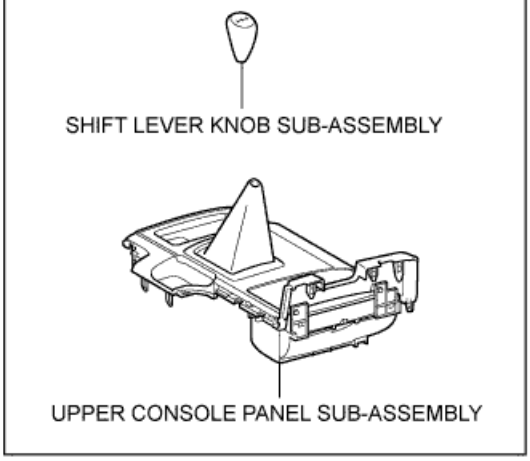


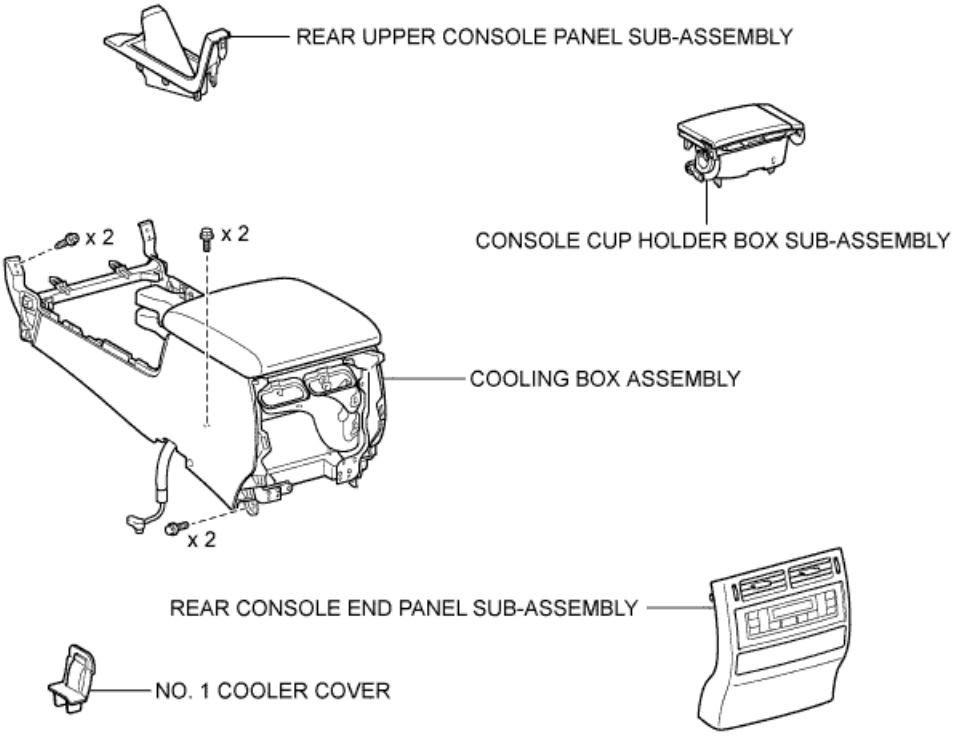
w/ Cool Box:

for Automatic Transmission:



for Manual Transmission:

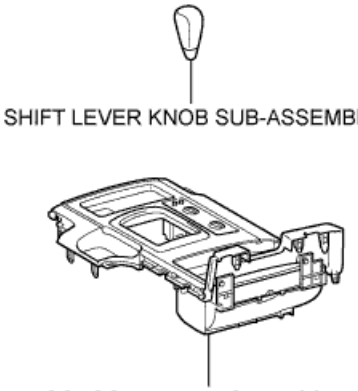




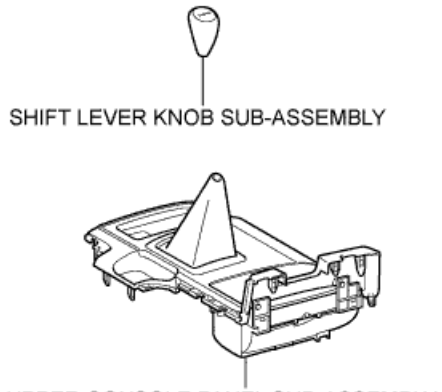
T

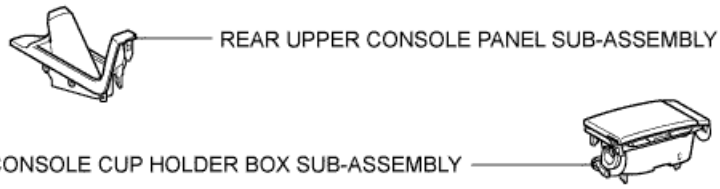
w/o Cool Box:

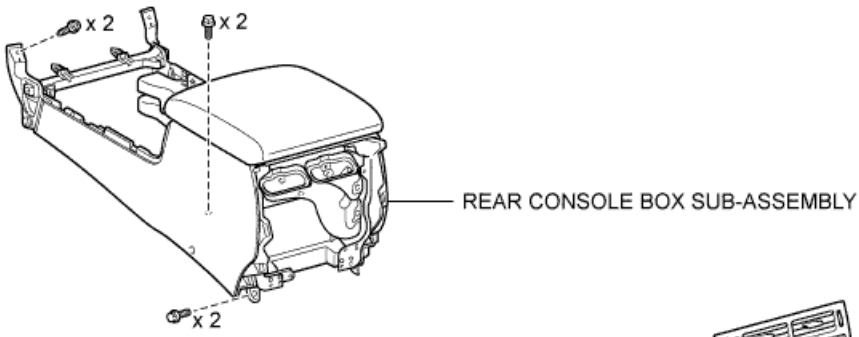
for Automatic Transmission:

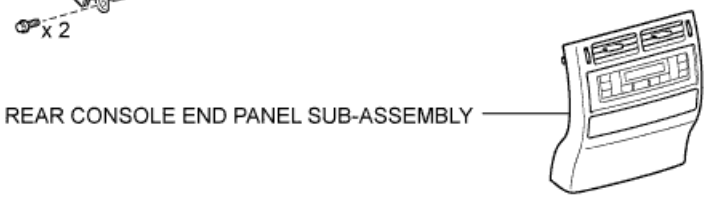


for Manual Transmission:

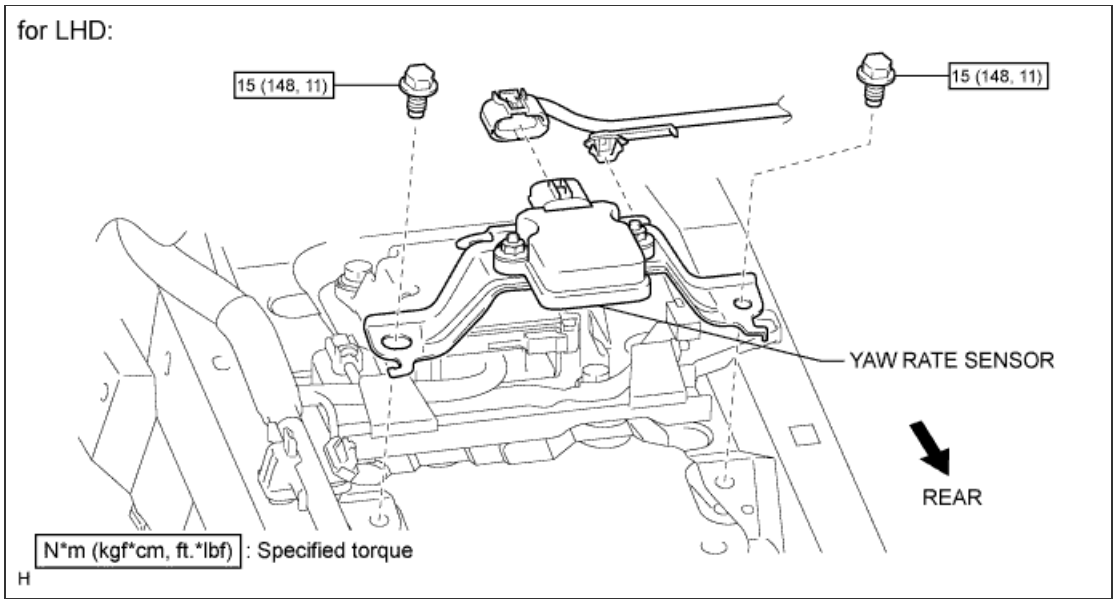


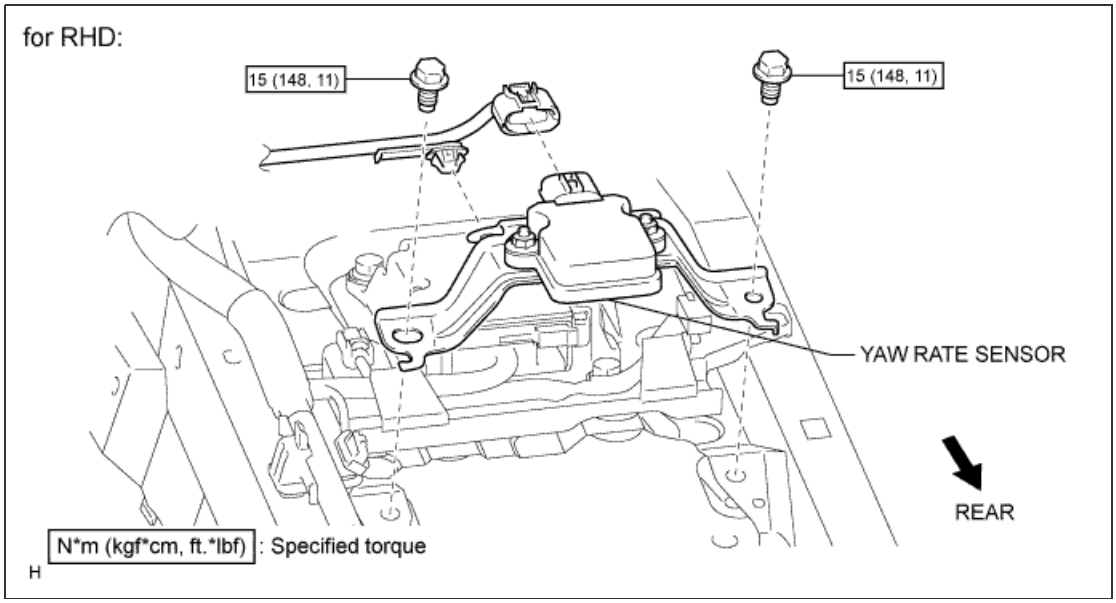






T


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. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here).

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 COOLING BOX ASSEMBLY (w/ Cool Box)

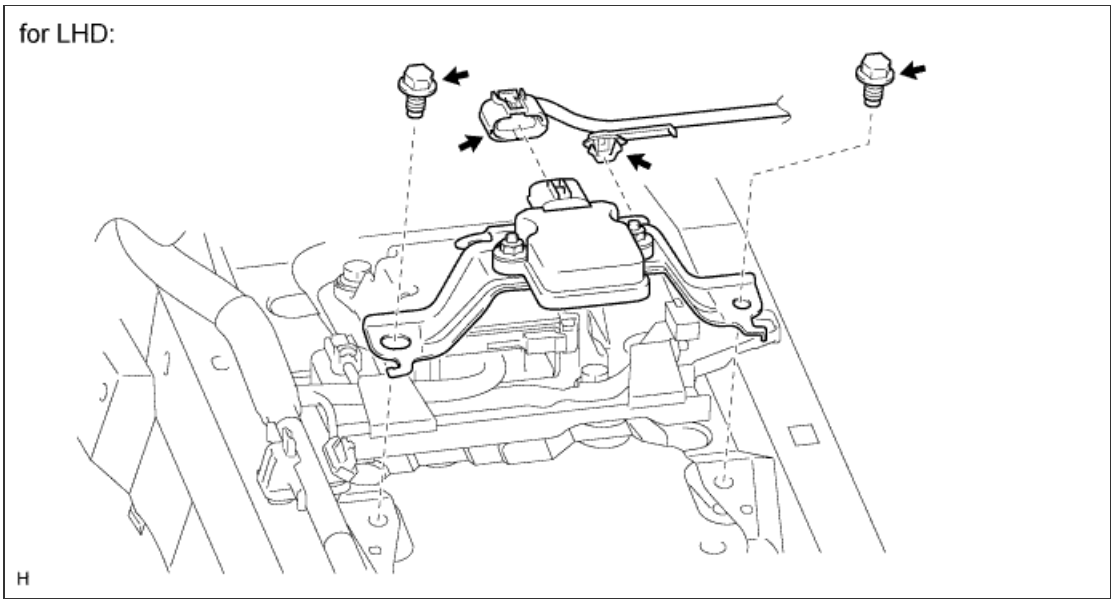
(Click here)

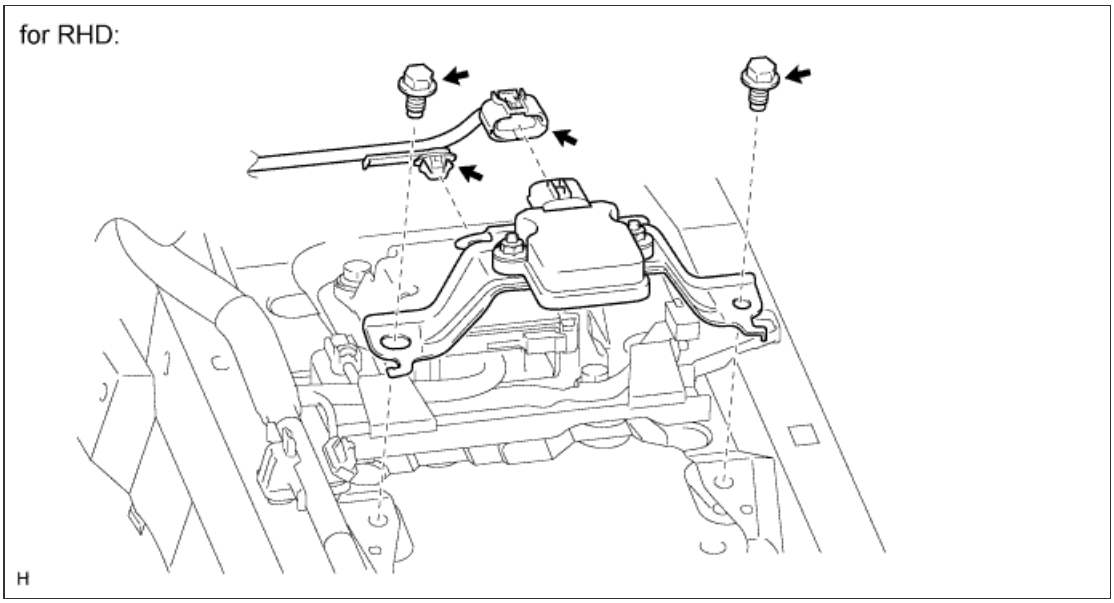
4. REMOVE REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

(Click here)

5. REMOVE YAW RATE SENSOR

a. Disconnect the sensor connector, and then detach the clamp from the sensor bracket.





b. 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:

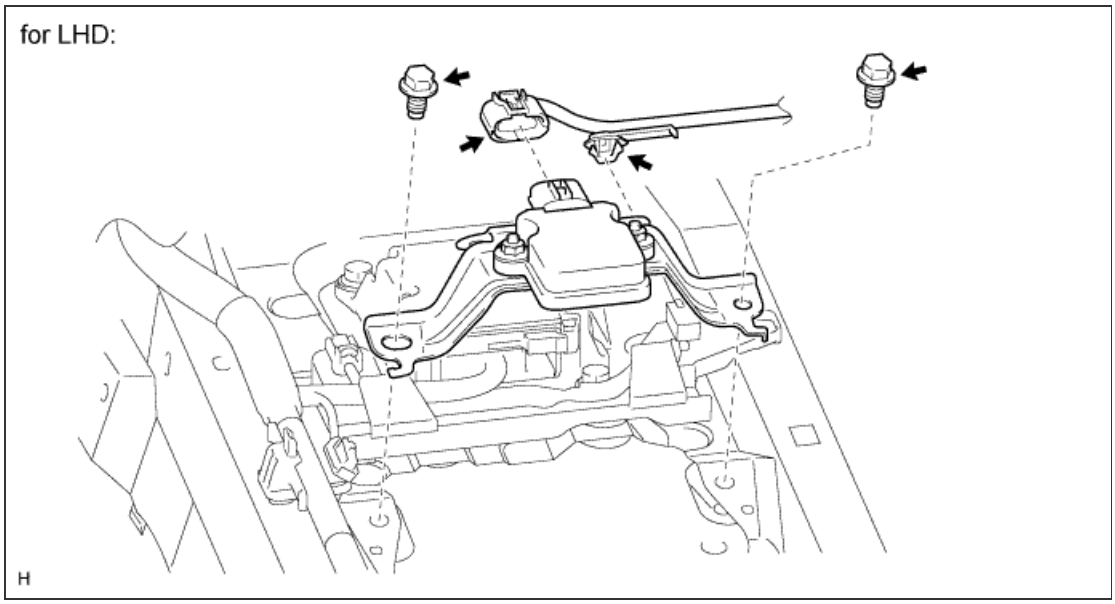
Securely connect the connector.

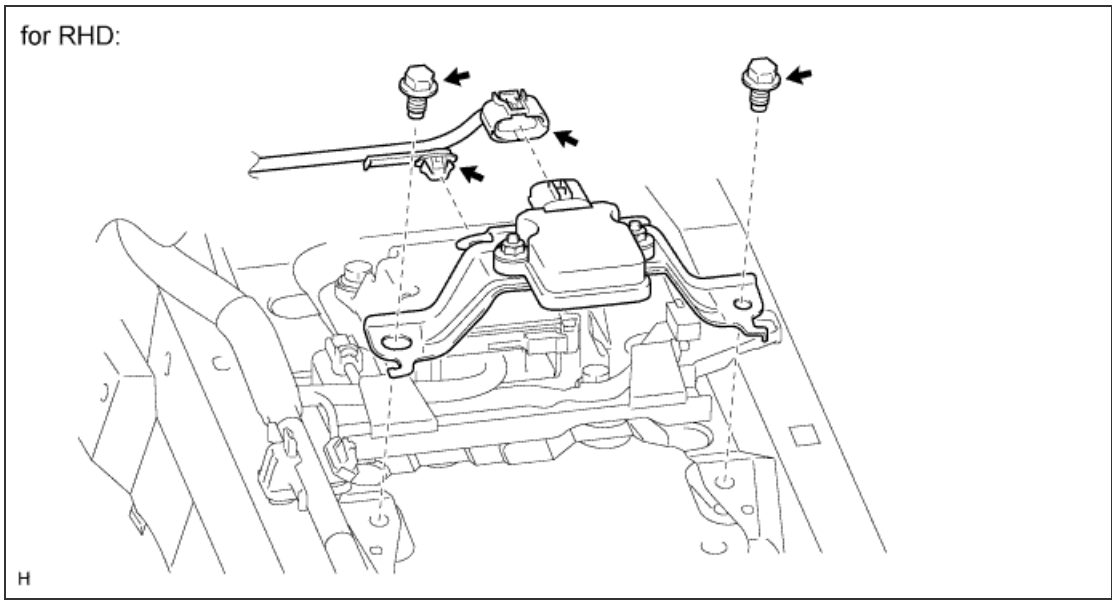
b. Install the yaw rate sensor with the 2 bolts.

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).

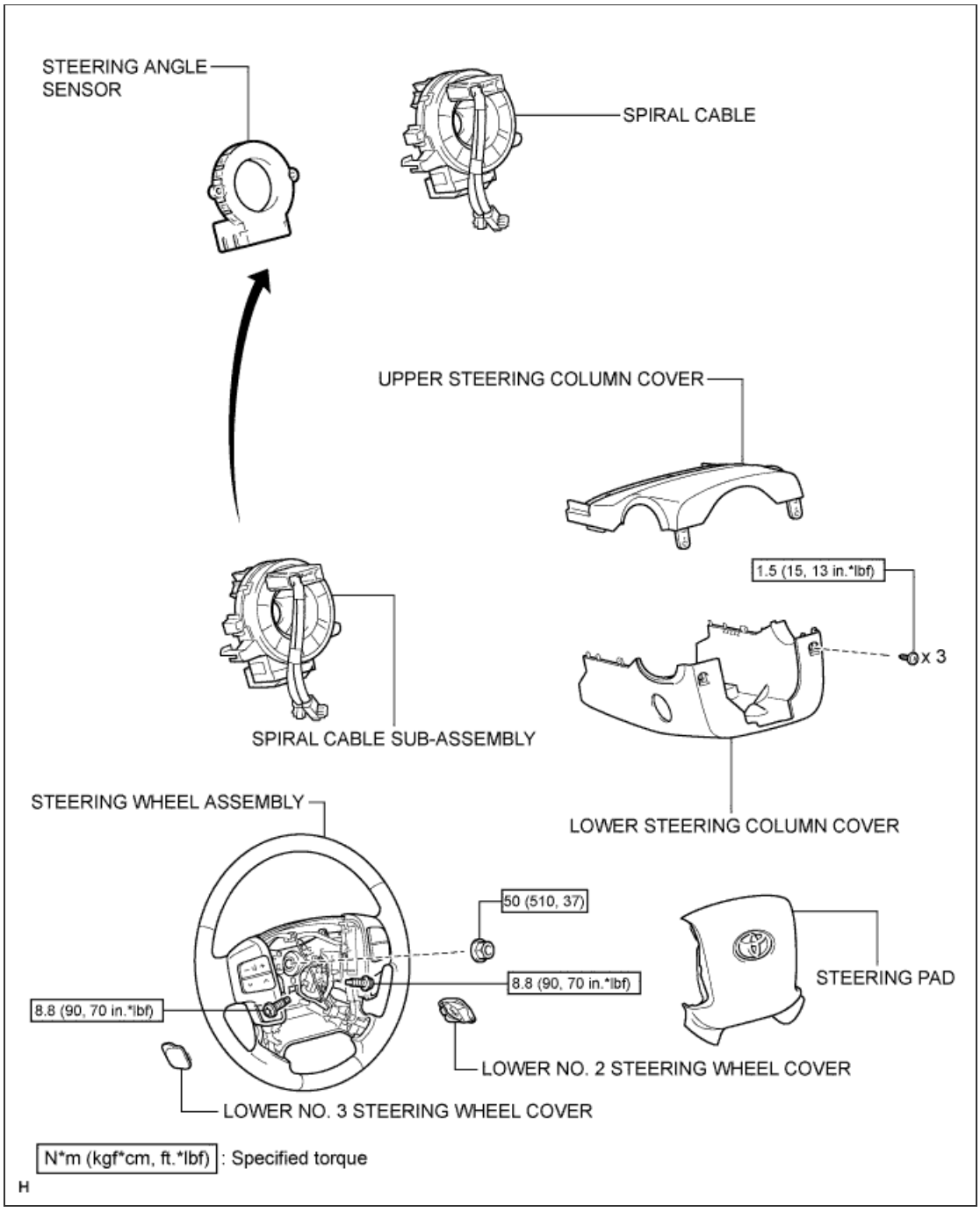
5. PERFORM YAW RATE SENSOR ZERO POINT CALIBRATION

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. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here).

3. 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.

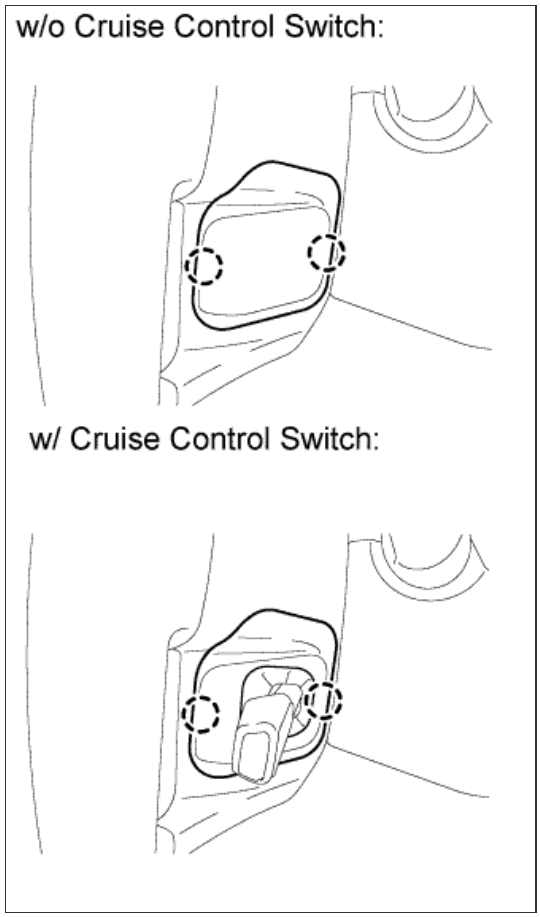
c. Turn the ignition switch off and disconnect the cable from the negative (-) battery terminal.

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

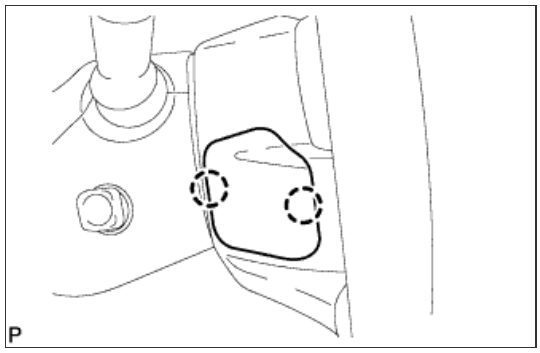
4. REMOVE LOWER NO. 2 STEERING WHEEL COVER

a. Detach the 2 claws and remove the steering wheel cover.



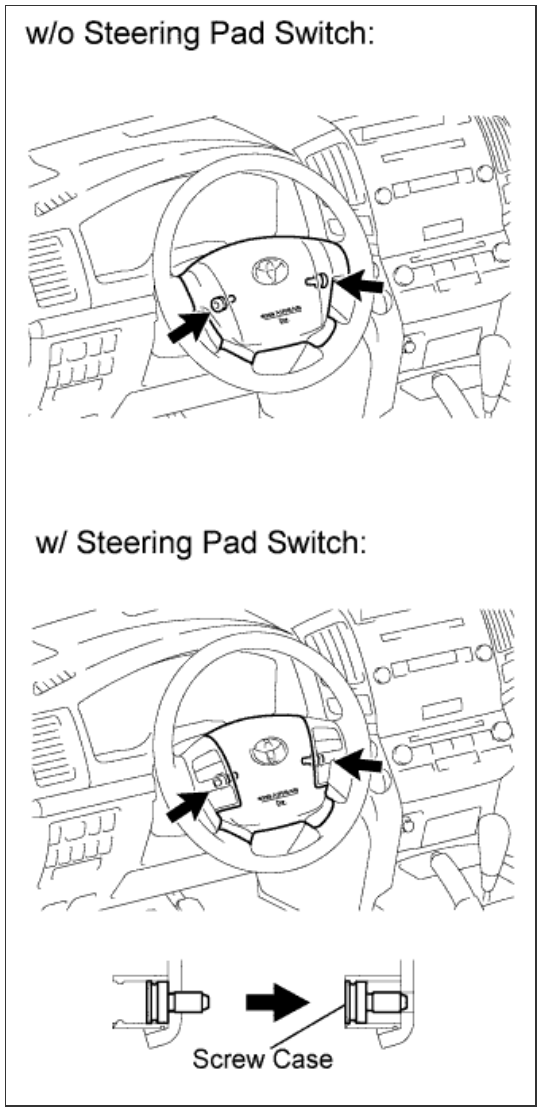
5. REMOVE LOWER NO. 3 STEERING WHEEL COVER

a. Detach the 2 claws and remove the steering wheel cover.



6. 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:

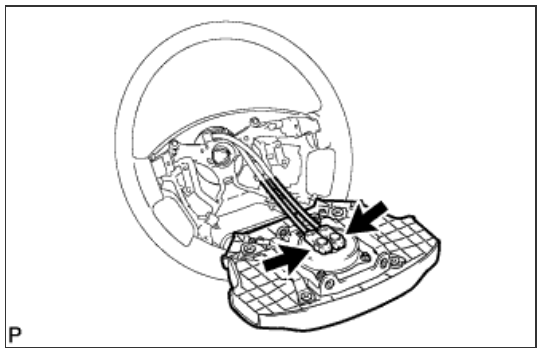
When removing the steering pad, do not pull the airbag wire harness.

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.



7. REMOVE STEERING WHEEL ASSEMBLY

a. Remove the steering wheel set nut.

b. Put matchmarks on the steering wheel and main shaft.

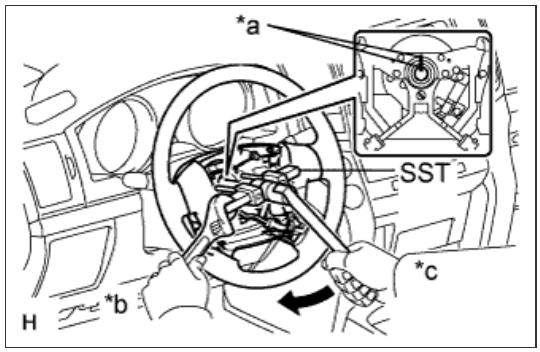
Text in Illustration

*a	Matchmark
*b	Hold
*c	Turn

c. Using SST, remove the steering wheel assembly.

SST

09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05011)



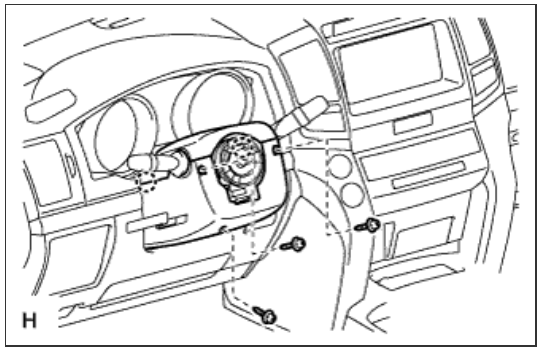
8. REMOVE LOWER STEERING COLUMN COVER

a. Remove the 3 screws.

b. Detach the 2 claws to remove the lower steering column cover.

NOTICE:

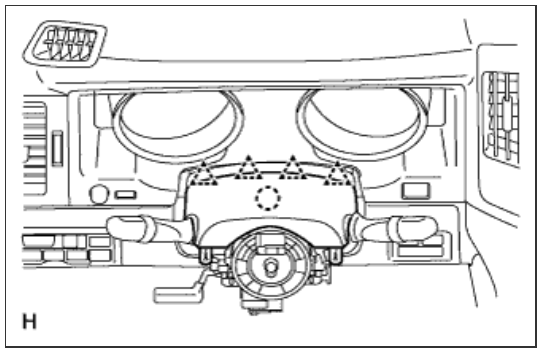
Do not damage the tilt and telescopic switch.



9. REMOVE UPPER STEERING COLUMN COVER

a. Detach the 4 clips.

b. Detach the claw to remove the upper steering column cover.



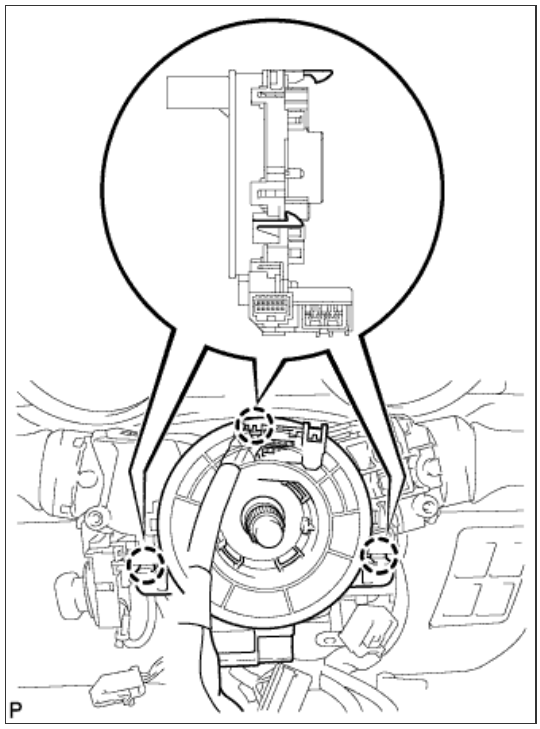
10. REMOVE SPIRAL CABLE SUB-ASSEMBLY

a. Disconnect the connectors from the spiral cable with steering sensor.

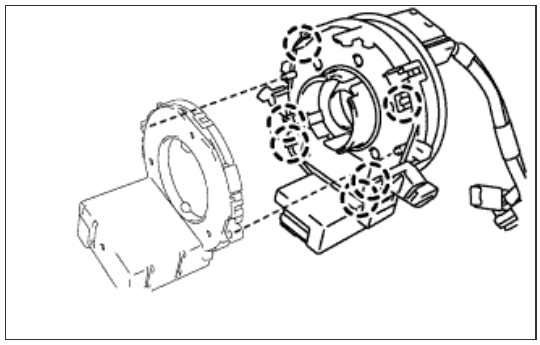
NOTICE:

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.

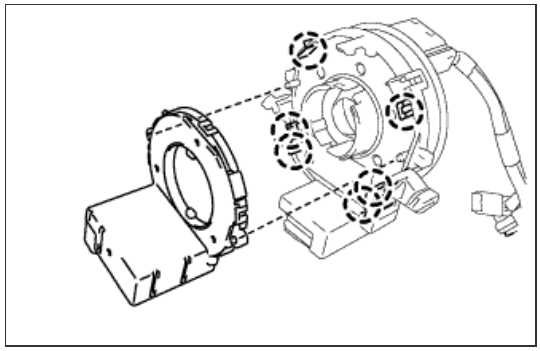


c. Detach the 6 claws and remove the spiral cable from the steering sensor.



11. REMOVE STEERING ANGLE SENSOR

a. Detach the 6 claws and remove the steering angle sensor.



for Preparation Click here

1. CHECK STEERING ANGLE SENSOR

a. Check the steering angle sensor.
If any of the following applies, replace the sensor with a new one:

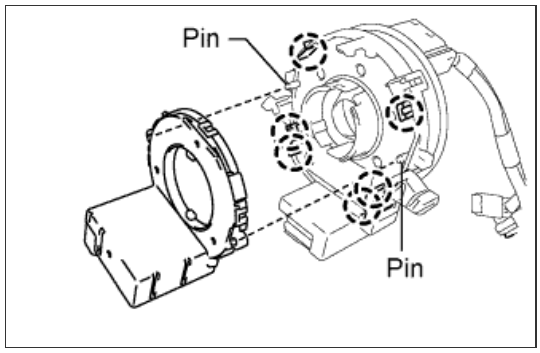
- The surface of the sensor is cracked, dented, or chipped.
- The connector is scratched, cracked, or damaged.
- The sensor has been dropped.

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.

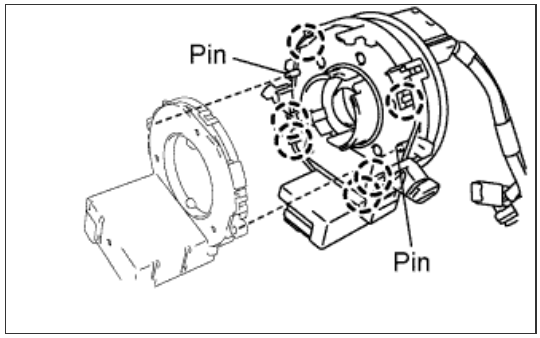
b. Attach the 6 claws and install the spiral cable to the steering sensor.

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.

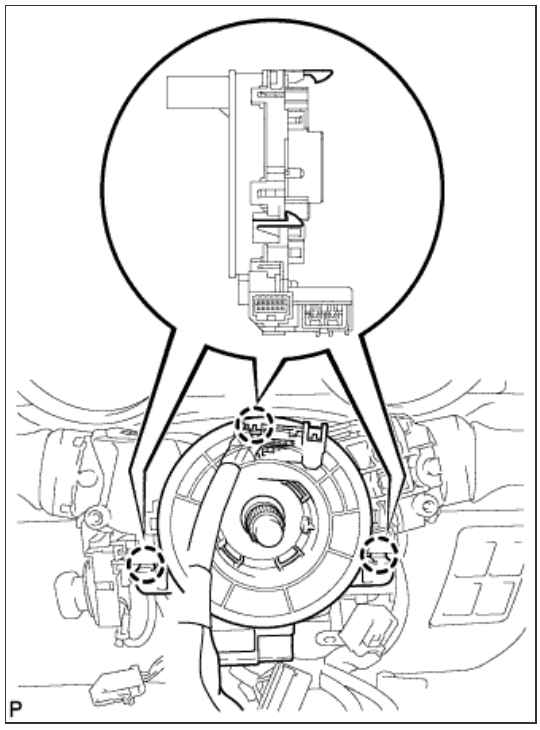
CAUTION:

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:

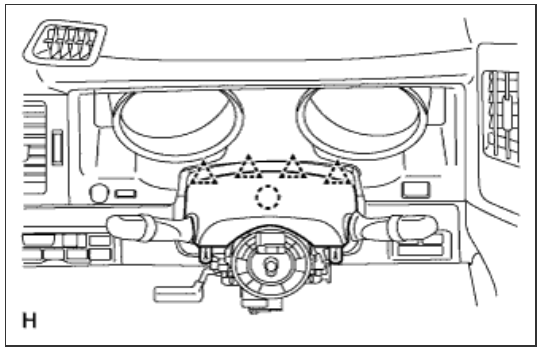
When handling the airbag connector, take care not to damage the airbag wire harness.



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

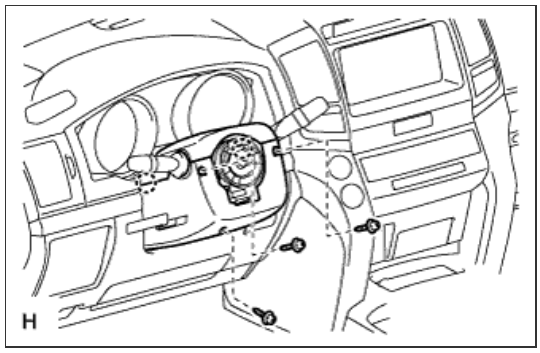
a. Attach the 2 claws to install the lower steering column cover.

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.

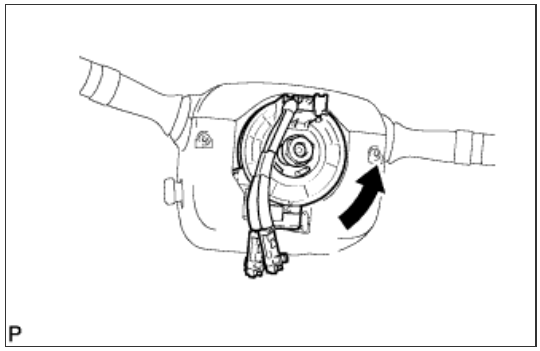
CAUTION:

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.

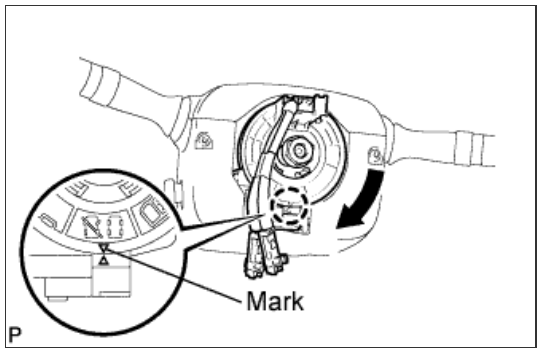
CAUTION:

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

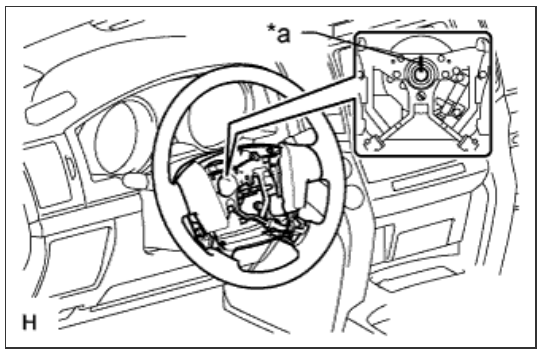
a. Align the matchmarks on the steering wheel assembly and steering main shaft assembly.

Text in Illustration

*a	Matchmark

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:

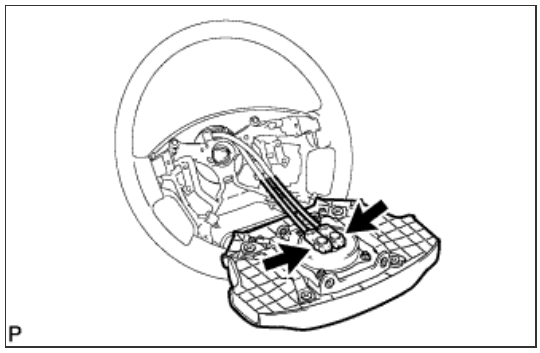
When handling the airbag connector, take care not to damage the airbag wire harness.

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.

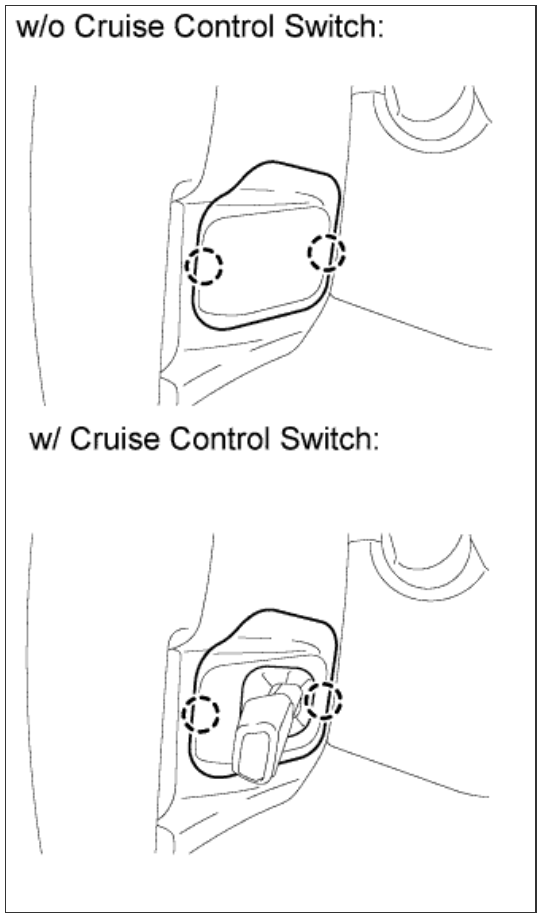
e. Using a T30 "TORX" socket wrench, tighten the 2 screws.

Torque:
8.8 N*m{ 90 kgf*cm , 78 in.*lbf }



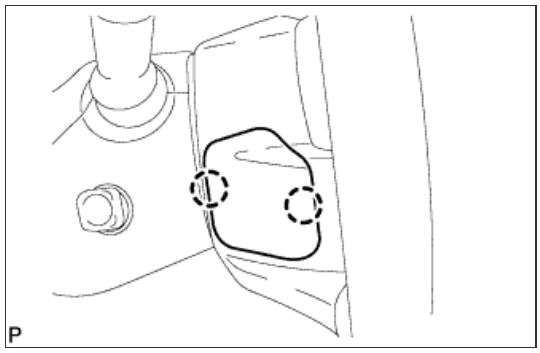
8. INSTALL LOWER NO. 2 STEERING WHEEL COVER

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

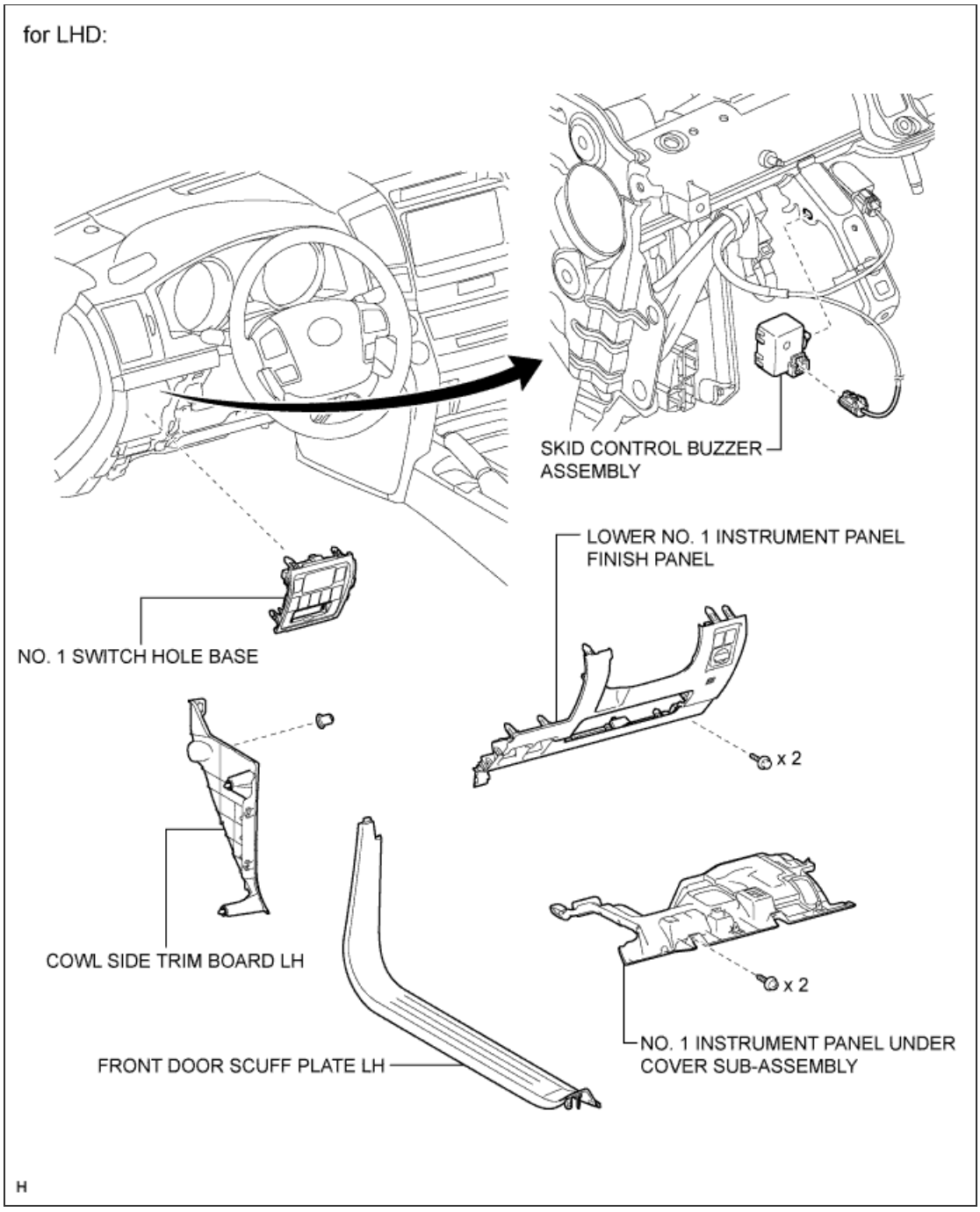
NOTICE:

- **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).**

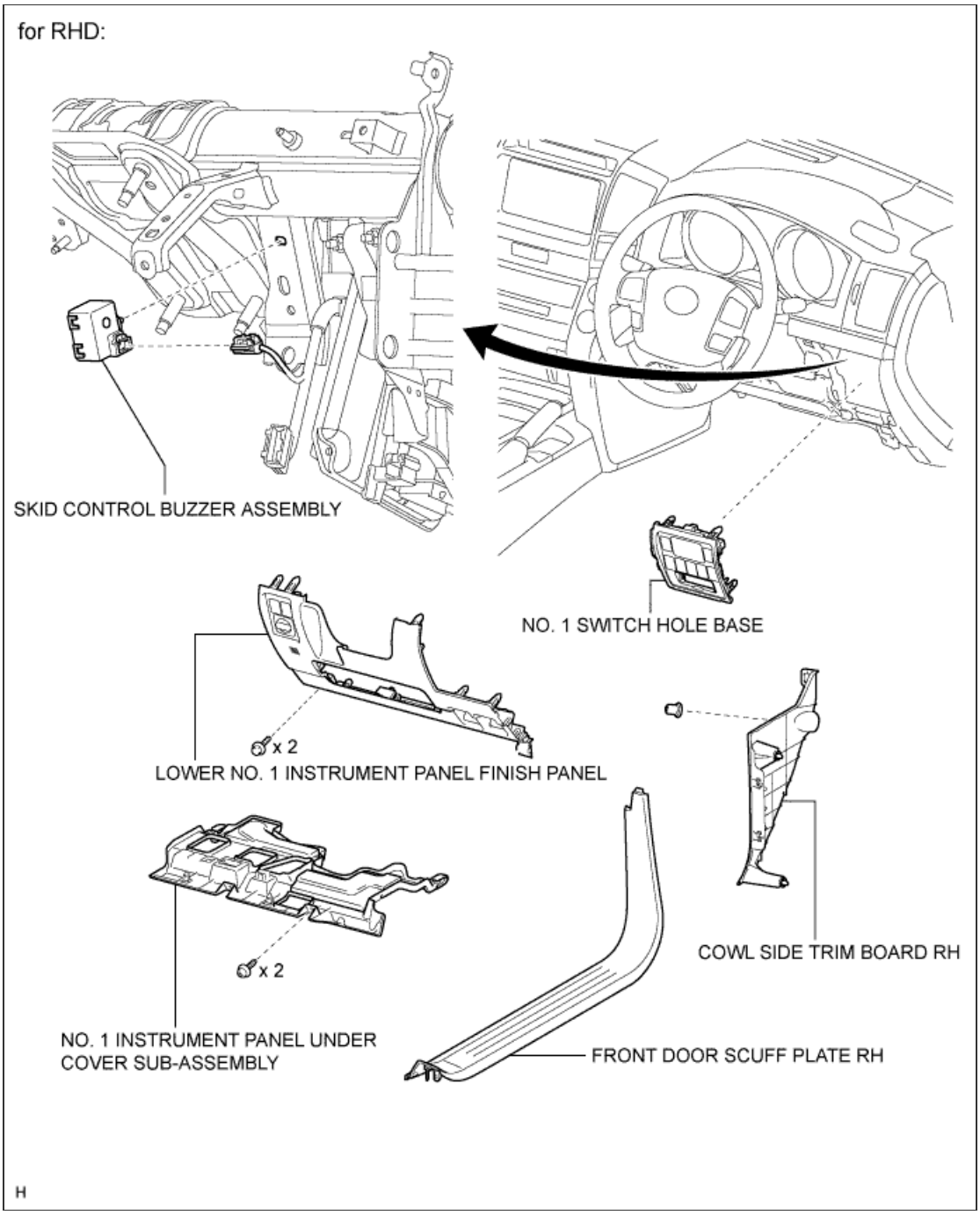
11. CHECK SRS WARNING LIGHT

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. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here).

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).

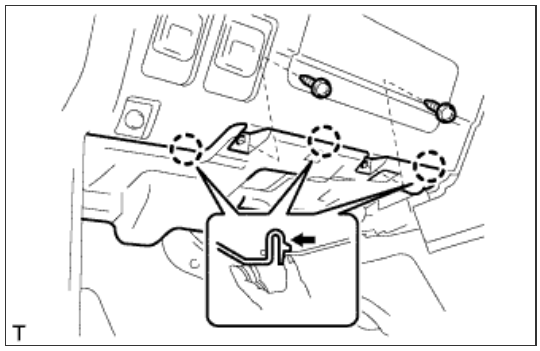
3. REMOVE FRONT DOOR SCUFF PLATE

4. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Remove the 2 screws.

b. Detach the 3 claws.

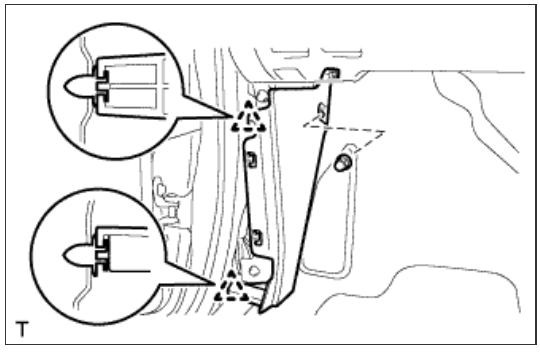
c. Disconnect the connectors and remove the No. 1 instrument panel under cover.



5. REMOVE COWL SIDE TRIM BOARD

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

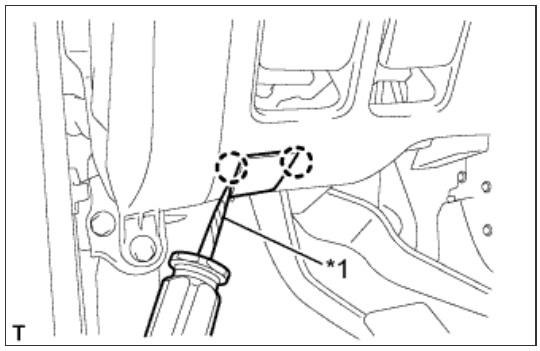
a. Using a screwdriver, detach the 2 claws and open the hole cover.

HINT:

Tape the screwdriver tip before use.

Text in Illustration

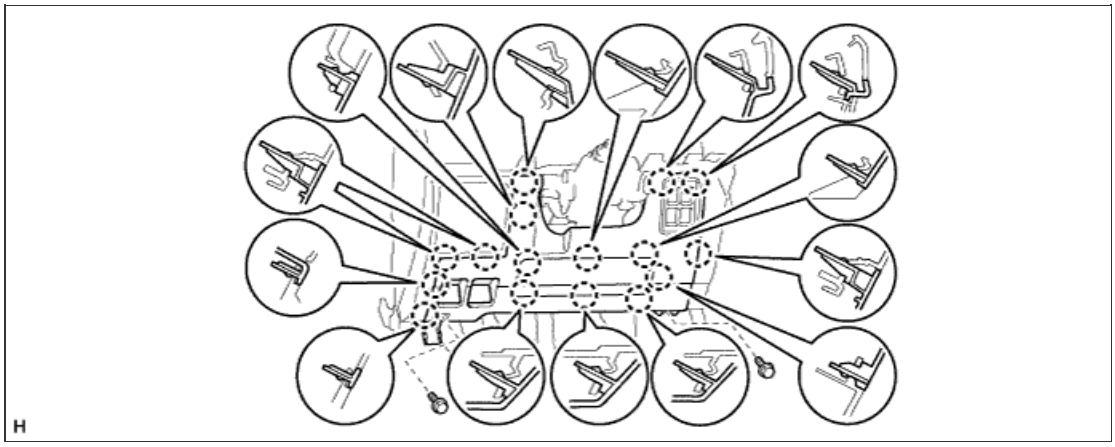
*1	Protective Tape



b. w/ Driver Side Knee Airbag:

i. Remove the 2 bolts.

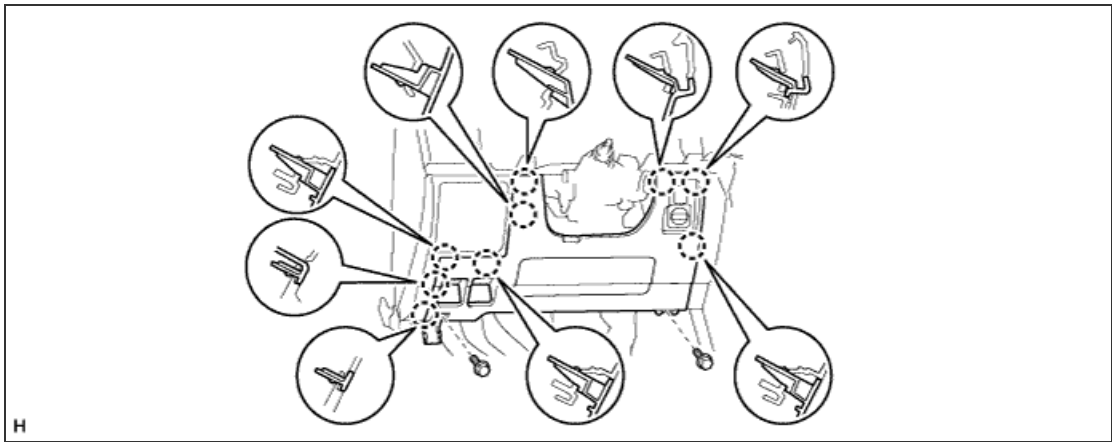
ii. Detach the 16 claws.



c. w/o Driver Side Knee Airbag:

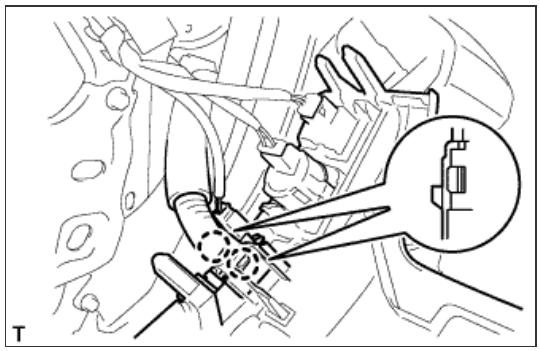
i. Remove the 2 bolts.

ii. Detach the 9 claws.



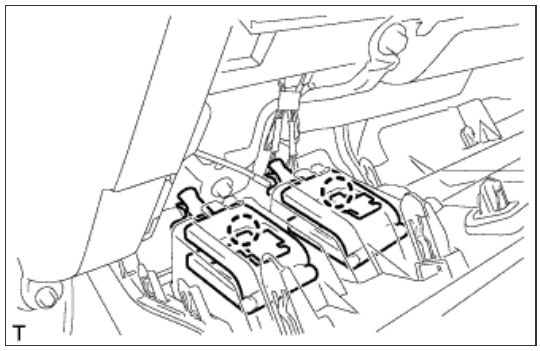
d. for Automatic Air Conditioning System:

i. Detach the 2 claws and remove the room temperature sensor.



e. Detach the 2 claws and disconnect the 2 control cables.

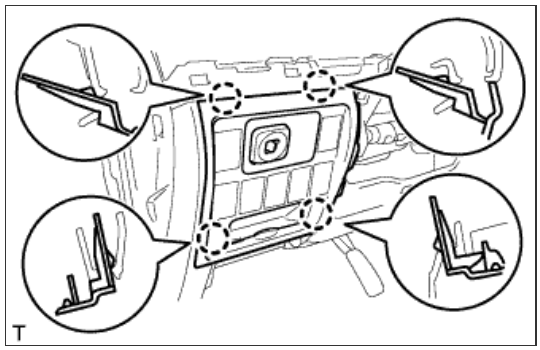
f. Disconnect the connectors and remove the lower No. 1 instrument panel finish panel.



7. REMOVE NO. 1 SWITCH HOLE BASE

a. Detach the 4 claws.

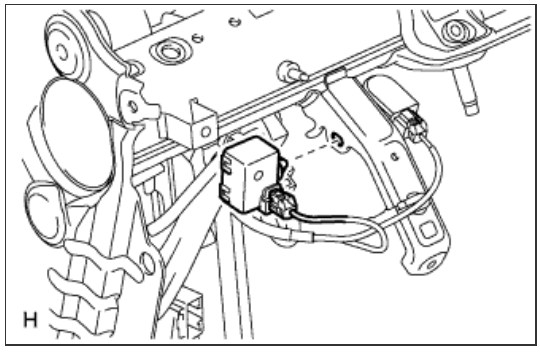
b. Disconnect the connectors and remove the No. 1 switch hole cover.



8. REMOVE SKID CONTROL BUZZER ASSEMBLY (for LHD)

a. Detach the clamp and remove the buzzer.

b. Disconnect the buzzer connector.

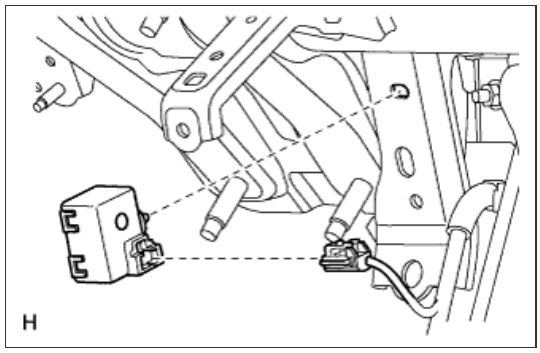


9. REMOVE SKID CONTROL BUZZER ASSEMBLY (for RHD)

a. Detach the clamp and remove the buzzer.

a. Detach the clamp and remove the buzzer.

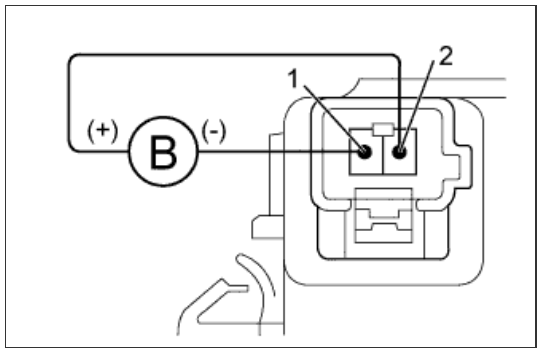
b. Disconnect the buzzer connector.



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.

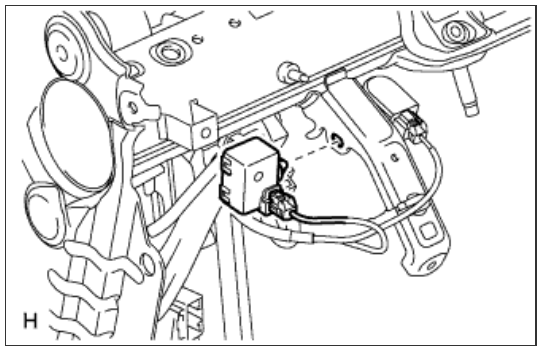
NOTICE:

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.

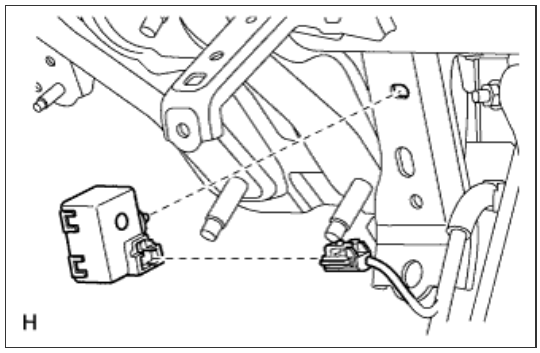
NOTICE:

Securely connect the connector.

b. Attach the clamp to install the buzzer.

NOTICE:

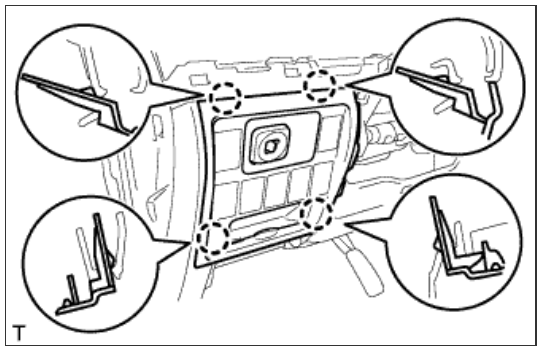
- **Securely insert the clamp into the bracket.**
- **If the buzzer is dropped, replace it.**



3. INSTALL NO. 1 SWITCH HOLE BASE

a. Connect the connectors.

b. Attach the 4 claws to install the No. 1 switch hole base.

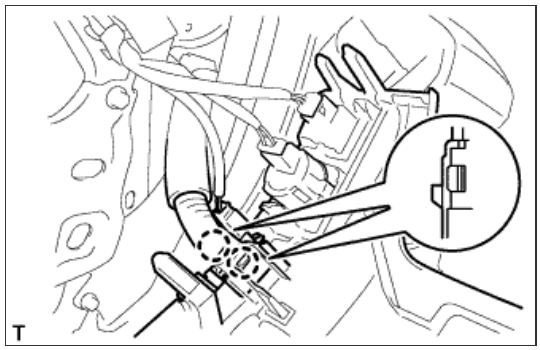


4. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

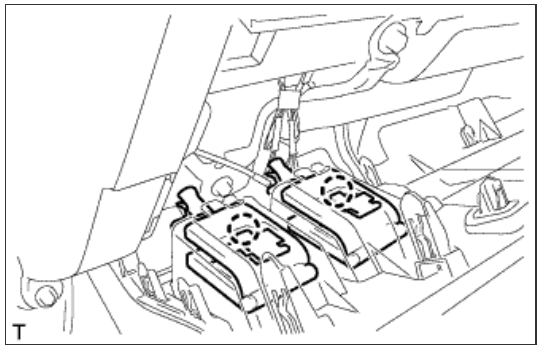
a. Connect the connectors.

b. for Automatic Air Conditioning System:

i. Attach the 2 claws to install the room temperature sensor.



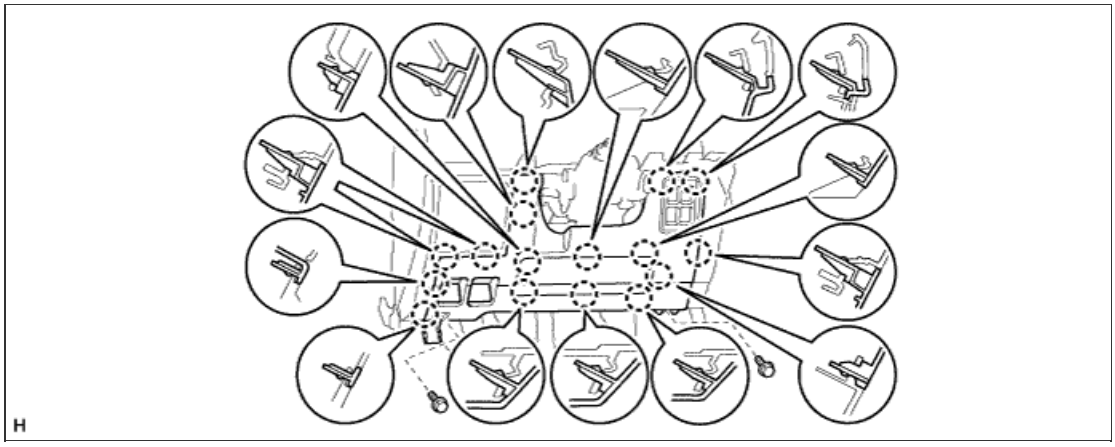
c. Attach the 2 claws to connect the 2 control cables.



d. w/ Driver Side Knee Airbag:

i. Attach the 16 claws to install the lower No. 1 instrument panel finish panel.

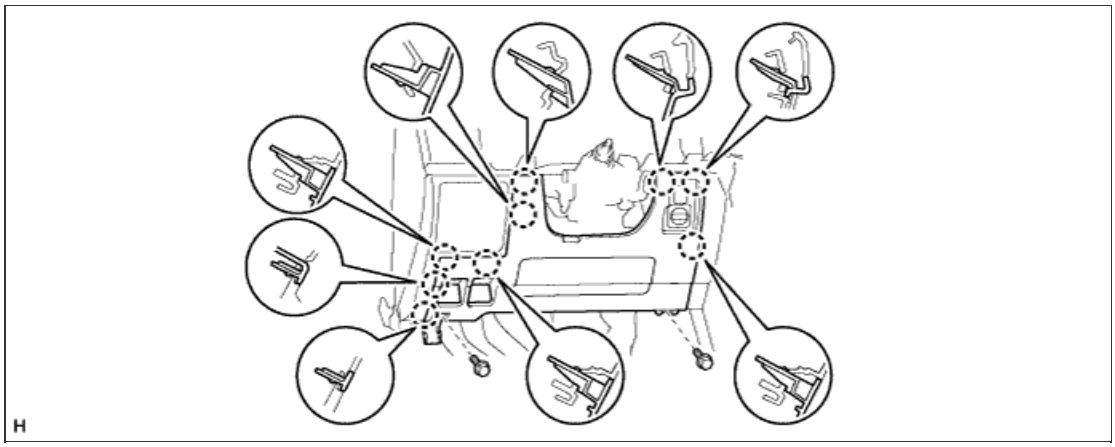
ii. Install the 2 bolts.



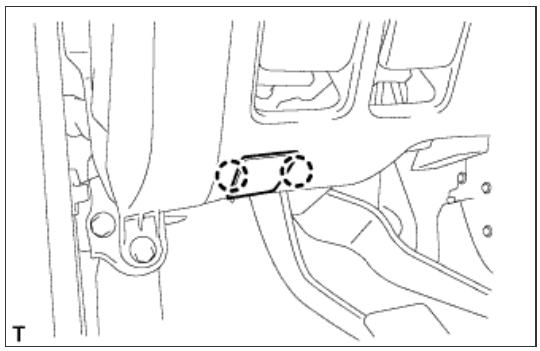
e. w/o Driver Side Knee Airbag:

i. Attach the 9 claws to install the lower No. 1 instrument panel finish panel.

ii. Install the 2 bolts.



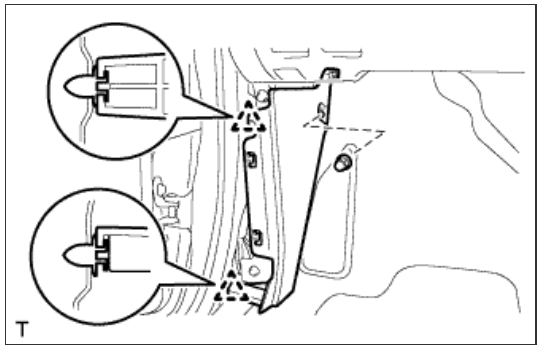
f. Attach the 2 claws to close the hole cover.



5. INSTALL COWL SIDE TRIM BOARD

a. Attach the 2 clips to install the cowl side trim board.

b. Install the cap nut.

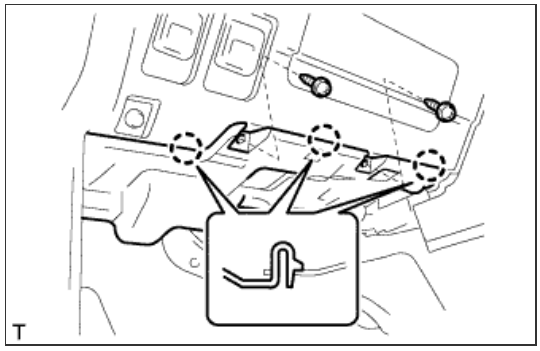


6. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Connect the connectors.

b. Attach the 3 claws to install the No. 1 instrument panel under cover.

c. Install the 2 screws.



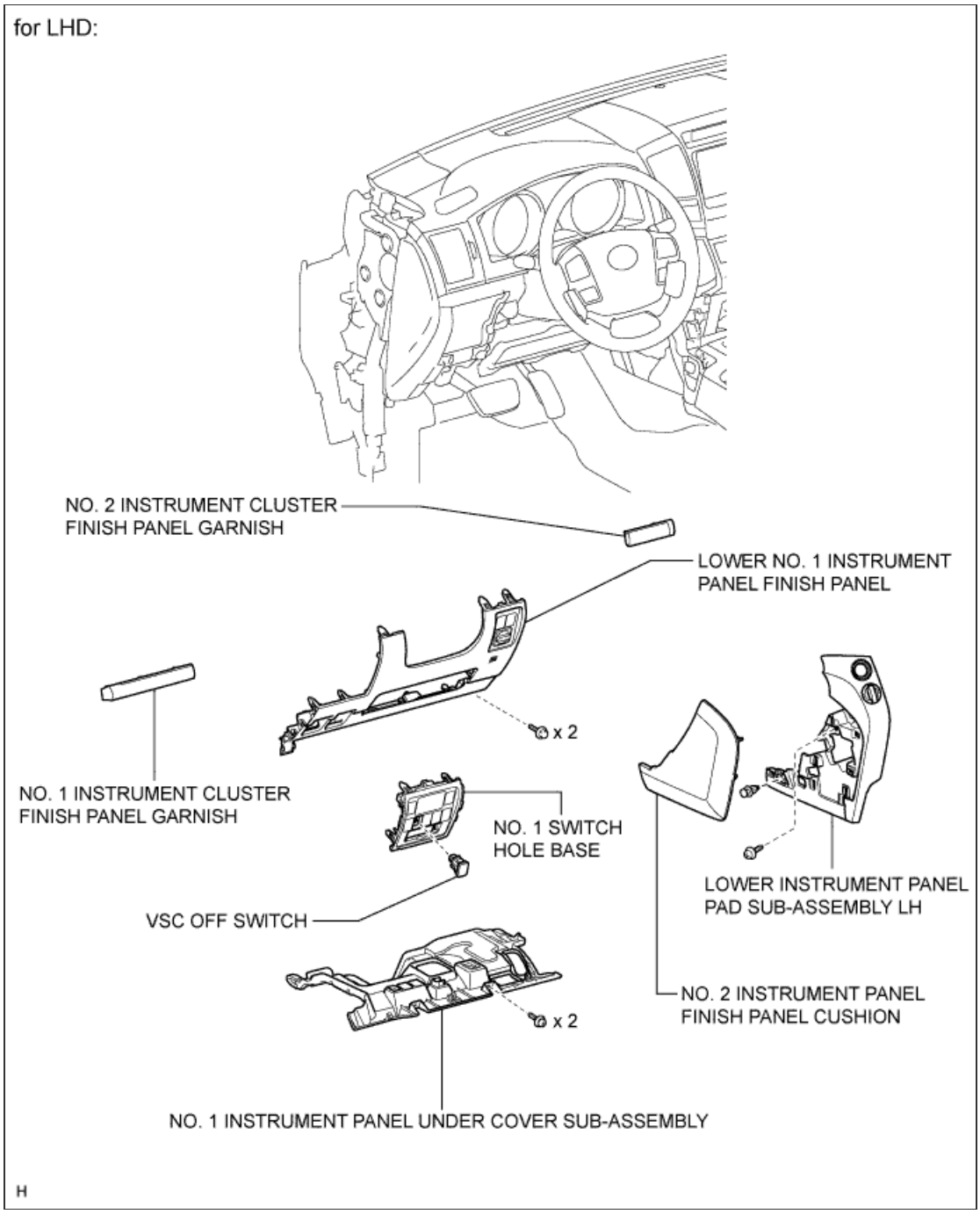
7. INSTALL FRONT DOOR SCUFF PLATE

8. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

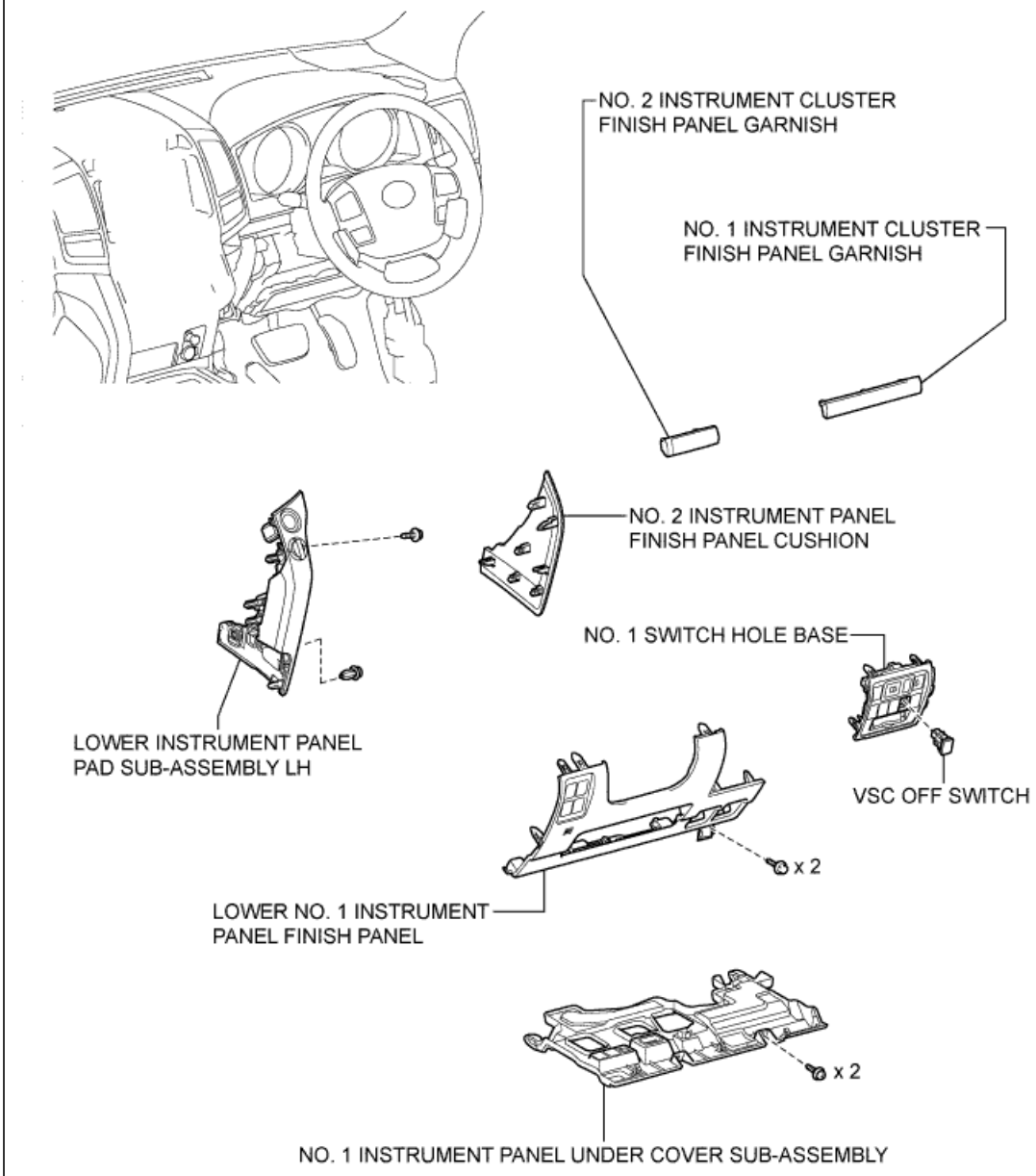
NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

for Preparation Click here



for RHD:


NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH
NO. 1 INSTRUMENT CLUSTER FINISH PANEL GARNISH
NO. 2 INSTRUMENT PANEL FINISH PANEL CUSHION
NO. 1 SWITCH HOLE BASE
LOWER INSTRUMENT PANEL PAD SUB-ASSEMBLY LH
VSC OFF SWITCH
x 2
LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL
x 2
NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

T

for Preparation Click here

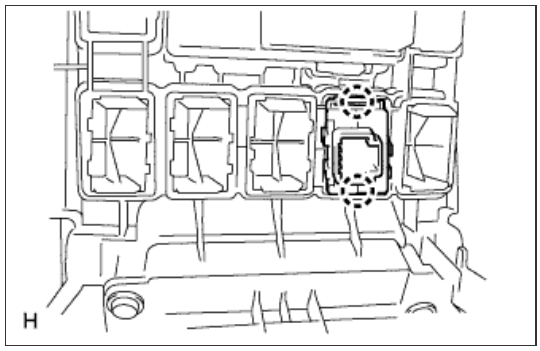
1. REMOVE NO. 1 SWITCH HOLE BASE

(Click here)

2. REMOVE VSC OFF SWITCH

a. Disconnect the VSC OFF switch connector.

b. Detach the 2 claws and remove the VSC OFF switch form the No. 1 switch hole base.



for Preparation Click here

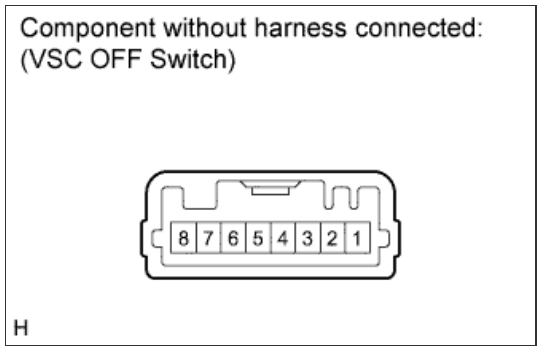
1. CHECK VSC OFF SWITCH

a. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

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

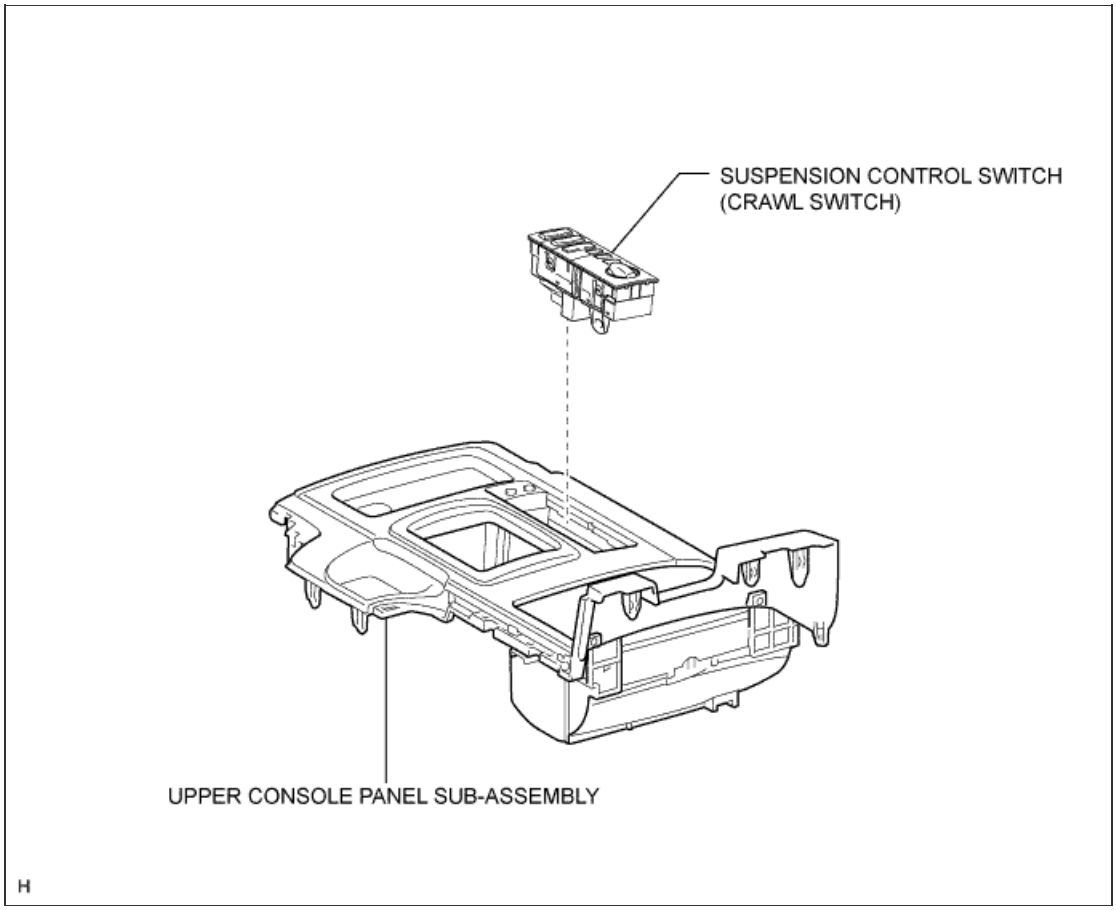
a. Attach the 2 claws to install the VSC OFF switch to the No. 1 switch hole base.

b. Connect the VSC OFF switch connector.

2. INSTALL NO. 1 SWITCH HOLE BASE

(Click here)

for Preparation Click here



for Preparation Click here

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here).

2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

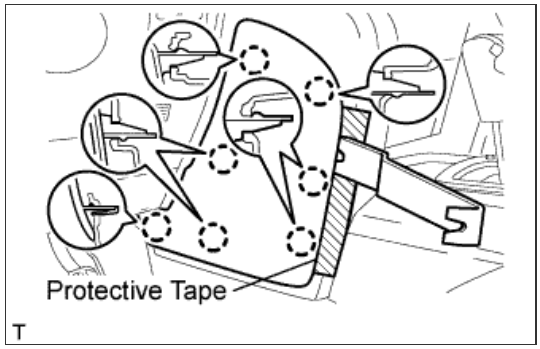
NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

3. REMOVE 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.



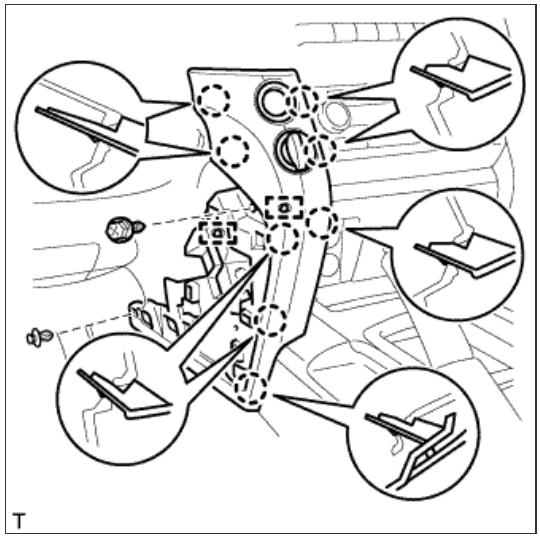
4. REMOVE LOWER INSTRUMENT PANEL PAD SUB-ASSEMBLY LH

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.



5. 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.

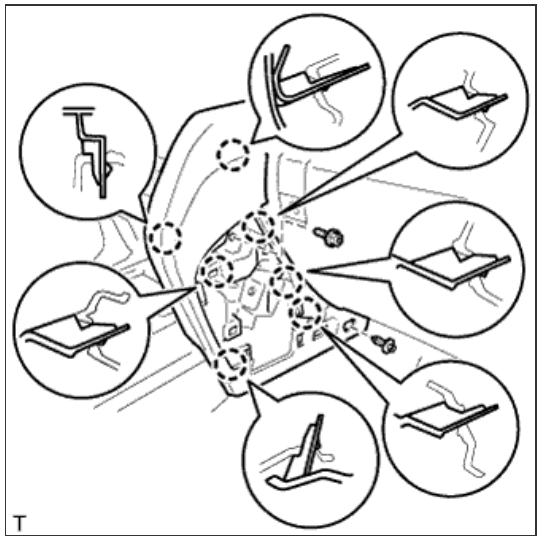


6. REMOVE LOWER INSTRUMENT PANEL PAD SUB-ASSEMBLY RH

a. Remove the clip.

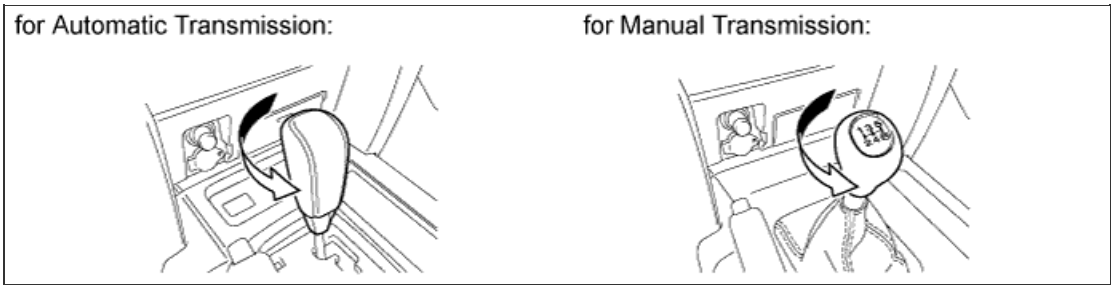
b. Remove the screw.

c. Detach the 7 claws and remove the panel.



7. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY

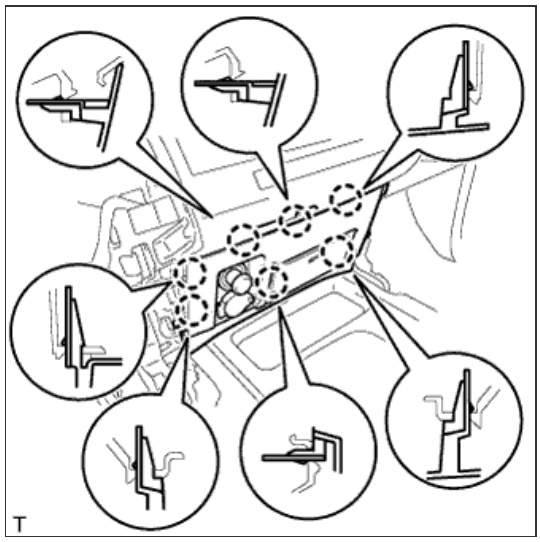
a. Twist the shift lever knob in the direction indicated by the arrow and remove it.



8. REMOVE LOWER CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY

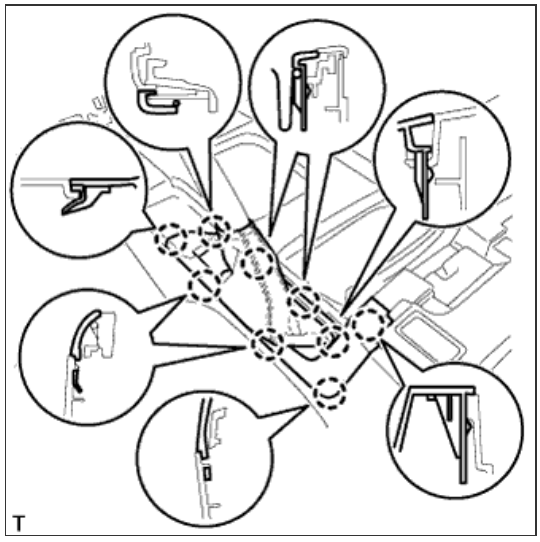
a. Detach the 7 claws.

b. Disconnect the connectors and remove the panel.



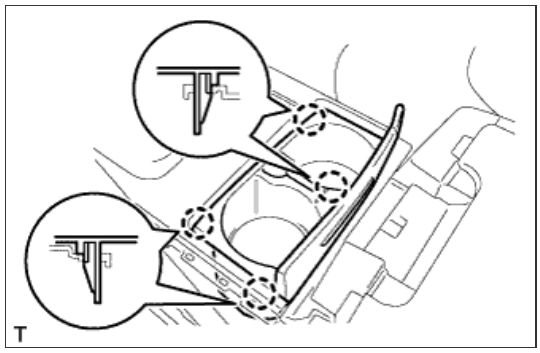
9. REMOVE REAR UPPER CONSOLE PANEL SUB-ASSEMBLY

a. Detach the 9 claws and remove the panel.



10. REMOVE CONSOLE CUP HOLDER BOX SUB-ASSEMBLY

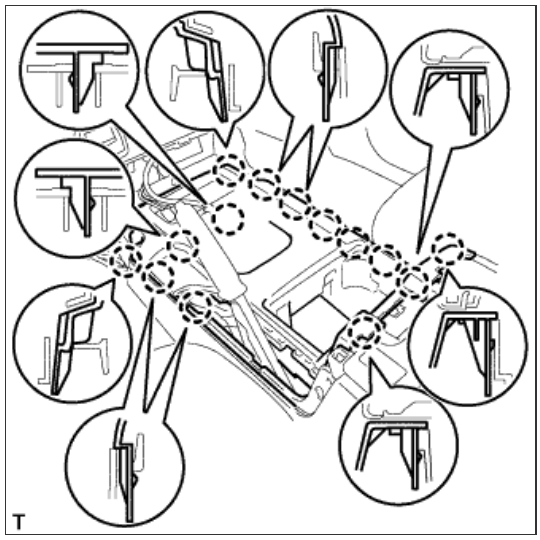
a. Detach the 4 claws and remove the box.



11. REMOVE UPPER CONSOLE PANEL SUB-ASSEMBLY

a. Detach the 14 claws.

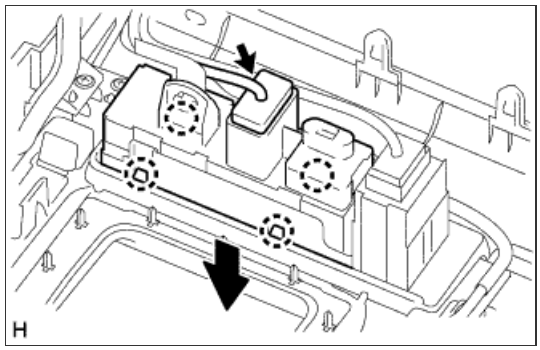
b. Disconnect the connectors and remove the console panel.



12. 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.

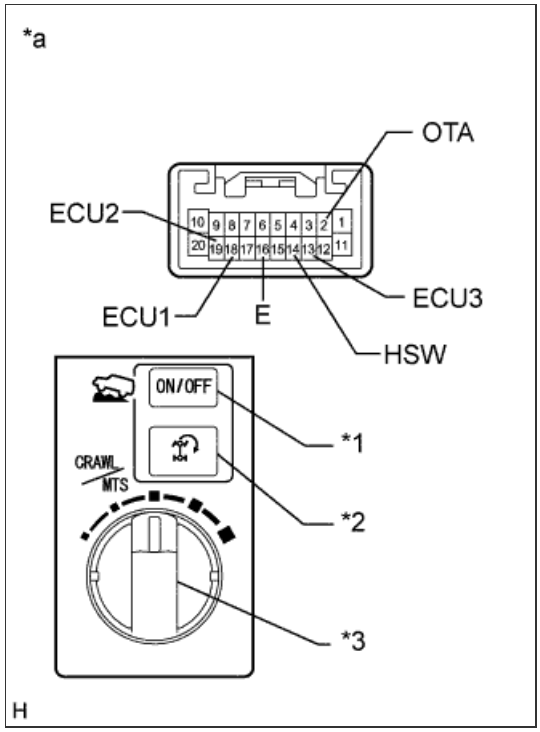


for Preparation Click here

1. CHECK SUSPENSION CONTROL SWITCH (CRAWL SWITCH)

Text in Illustration

*1	CRAWL ON/OFF Switch
*2	Turn Assist Function Switch
*3	CRAWL Speed Selector Switch
*a	Component without harness connected: (CRAWL Switch)



a. Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Switch Condition	Specified Condition
18 (ECU1) - 16 (E)	Speed selector switch: Medium	10 kΩ or higher
	Speed selector switch: Medium-high	
	Speed selector switch: High	
	Speed selector switch: Low	Below 1 Ω
	Speed selector switch: Medium-low	
19 (ECU2) - 16 (E)	Speed selector switch: Medium-low	10 kΩ or higher
	Speed selector switch: Medium	
	Speed selector switch: Medium-high	
	Speed selector switch: Low	Below 1 Ω
	Speed selector switch: High	
13 (ECU3) - 16 (E)	Speed selector switch: Low	10 kΩ or higher
	Speed selector switch: Medium-low	
	Speed selector switch: Medium	
	Speed selector switch: Medium-high	Below 1 Ω
	Speed selector switch: High	
14 (HSW) - 16 (E)	ON/OFF switch: Pressed	Below 1 Ω
	ON/OFF switch: Not pressed	10 kΩ or higher
2 (OTA) - 16 (E)	Turn assist function switch: Pressed	Below 1 Ω
	Turn assist function switch:	10 kΩ or higher

	Not pressed	

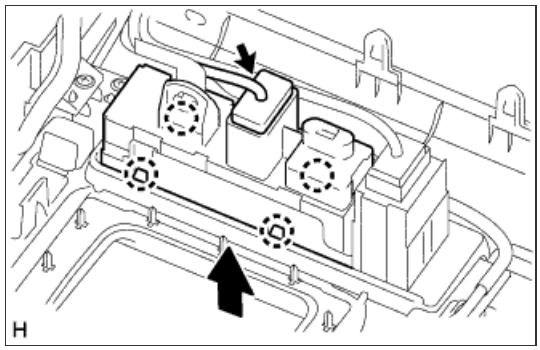
If the result is not as specified, replace the suspension control switch (CRAWL switch).

for Preparation Click here

1. INSTALL SUSPENSION CONTROL SWITCH (CRAWL SWITCH)

a. Attach the 4 claws to install the suspension control switch (CRAWL switch).

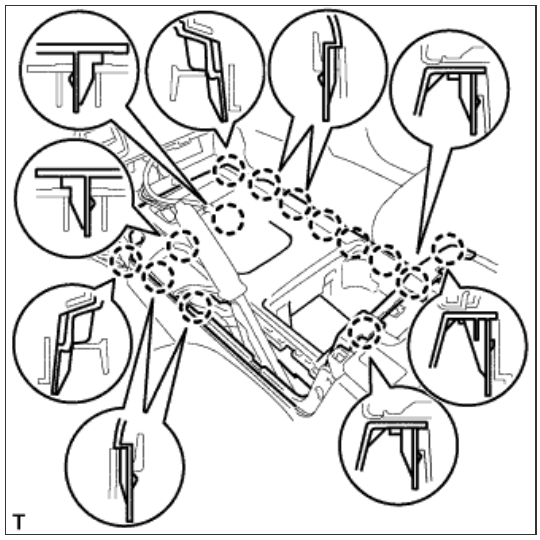
b. Connect the 2 connectors.



2. INSTALL UPPER CONSOLE PANEL SUB-ASSEMBLY

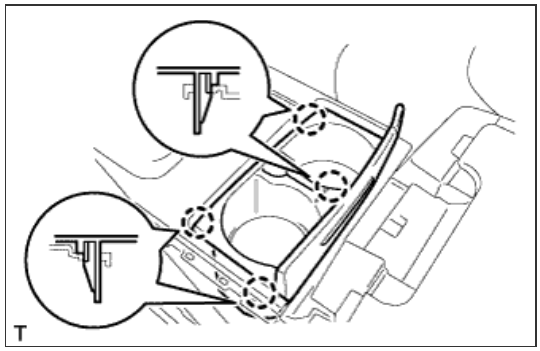
a. Connect the connectors.

b. Attach the 14 claws to install the console panel.



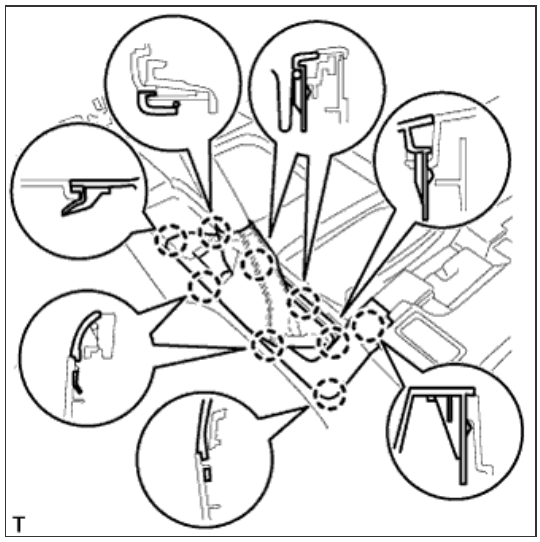
3. INSTALL CONSOLE CUP HOLDER BOX SUB-ASSEMBLY

a. Attach the 4 claws to install the box.



4. INSTALL REAR UPPER CONSOLE PANEL SUB-ASSEMBLY

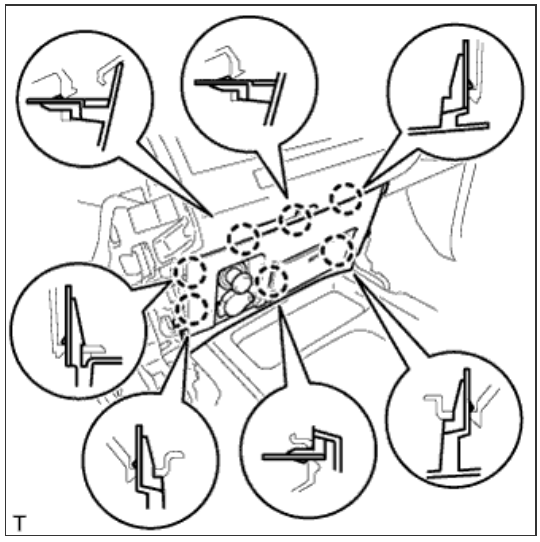
a. Attach the 9 claws to install the panel.



5. INSTALL LOWER CENTER INSTRUMENT CLUSTER FINISH PANEL SUB-ASSEMBLY

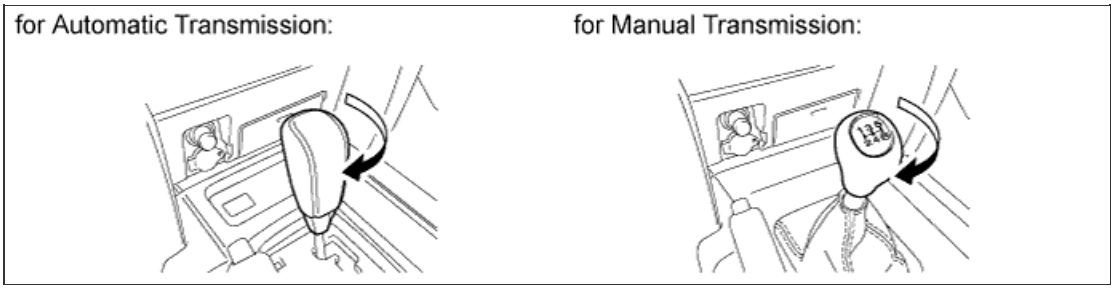
a. Connect the connectors.

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.

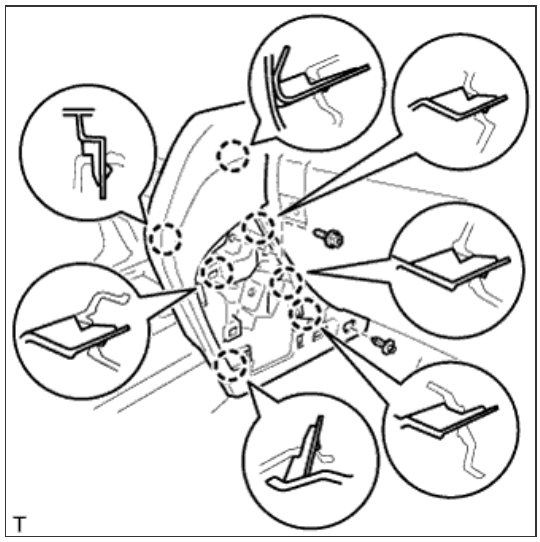


7. INSTALL LOWER INSTRUMENT PANEL PAD SUB-ASSEMBLY RH

a. Attach the 7 claws to install the panel pad.

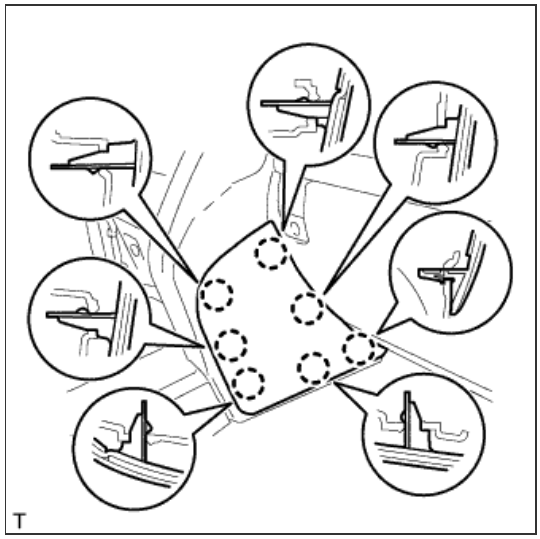
b. Install the screw.

c. Install the clip.



8. INSTALL NO. 1 INSTRUMENT PANEL FINISH PANEL CUSHION

a. Attach the 7 claws to install the panel cushion.



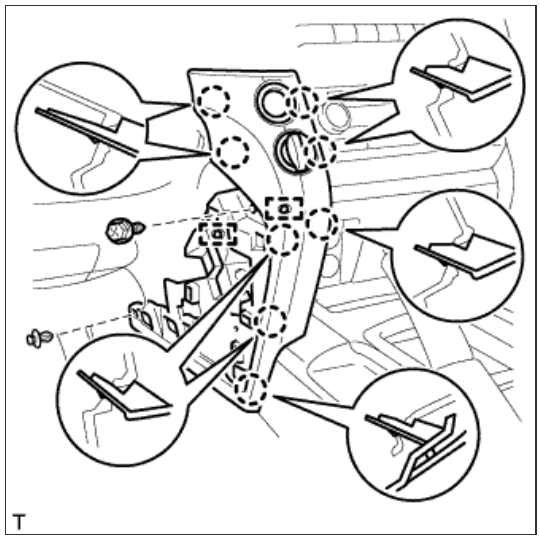
9. INSTALL LOWER INSTRUMENT PANEL PAD SUB-ASSEMBLY LH

a. Connect the connectors and 2 clamps.

b. Attach the 8 claws to install the panel pad.

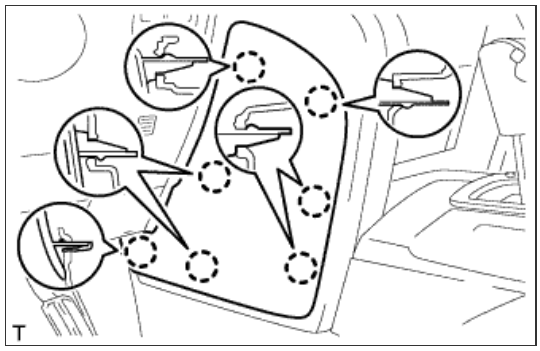
c. Install the screw.

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:

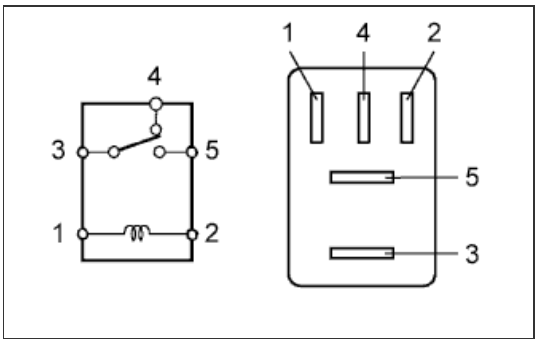
When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

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

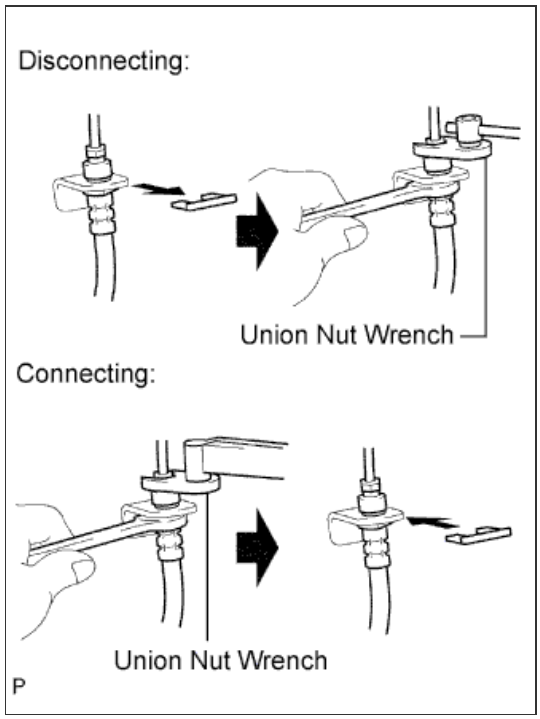
CAUTION:

Make sure to replace each part properly. Improper installation or repair could affect the performance of the brake system and cause a driving hazard.

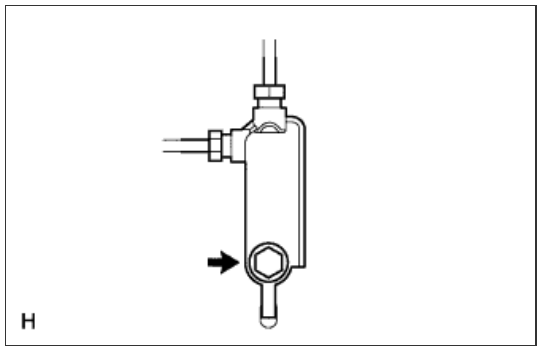
NOTICE:

- 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.



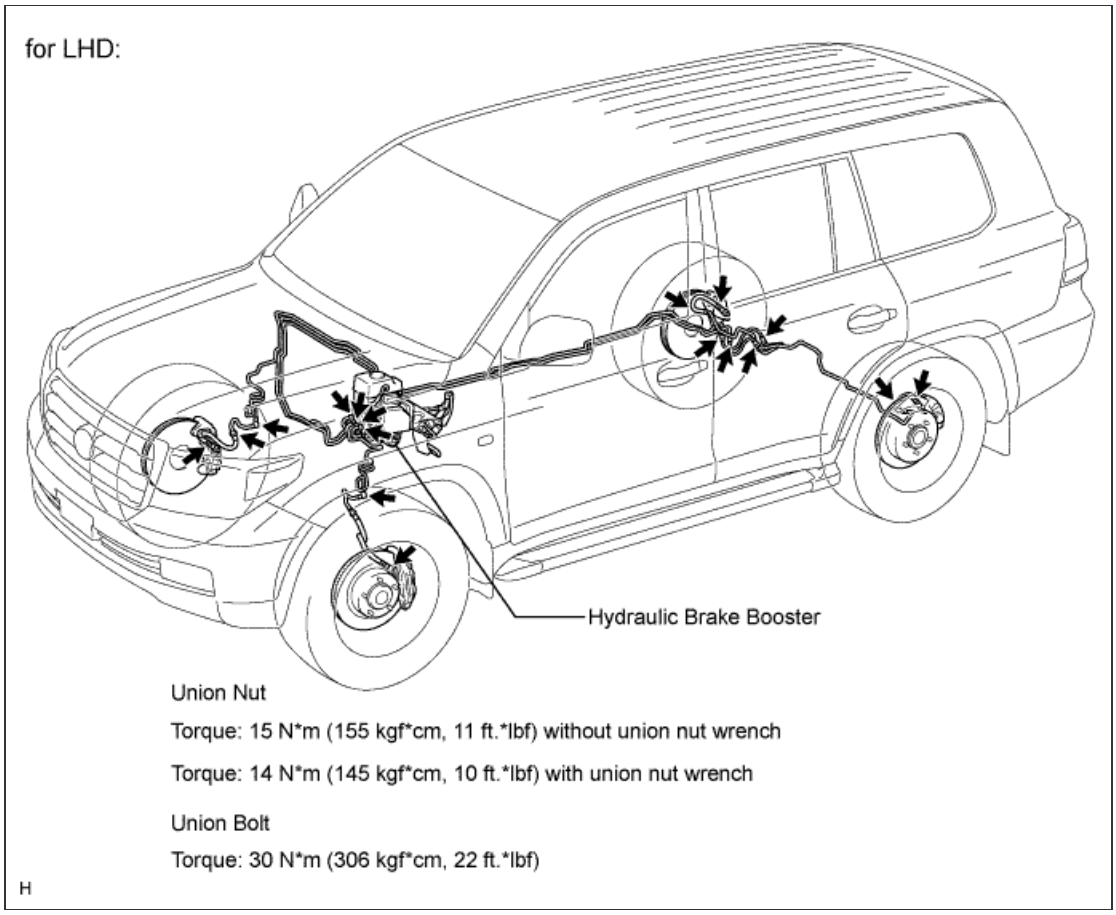
- Follow these procedures when connecting the brake tube and 2-way.
    1. Connect the brake tubes to the 2-way and temporarily tighten the flare nuts of the brake tubes.
    2. Support the 2-way to prevent deformation to the brake tubes and install the bolt to fix the 2-way to the frame.
    3. Support 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.

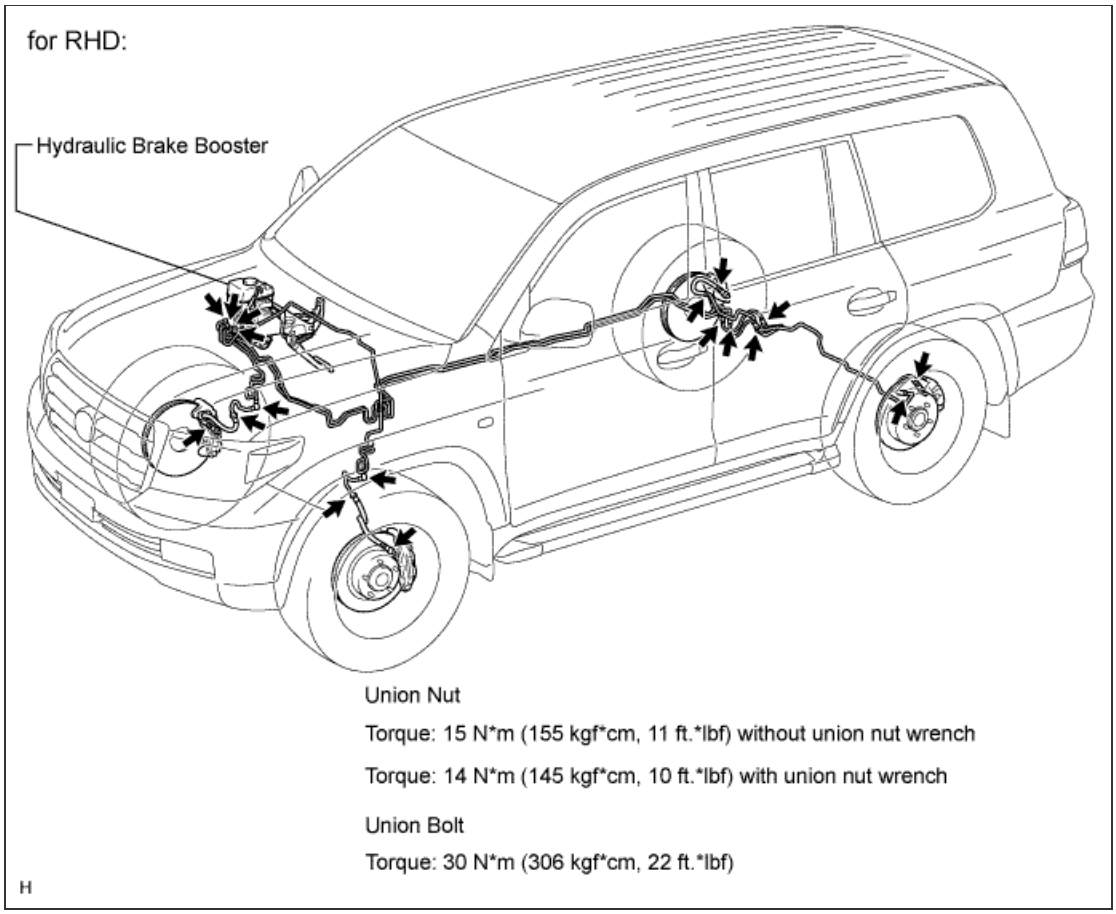


for Preparation Click here

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.

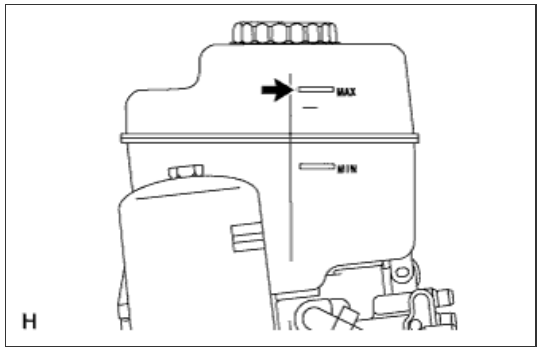
HINT:

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 GTS, damage or accidents may result. Therefore, always use the GTS 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 GTS to the DLC3.

k. Turn the ignition switch to ON.

l. Turn the GTS 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.

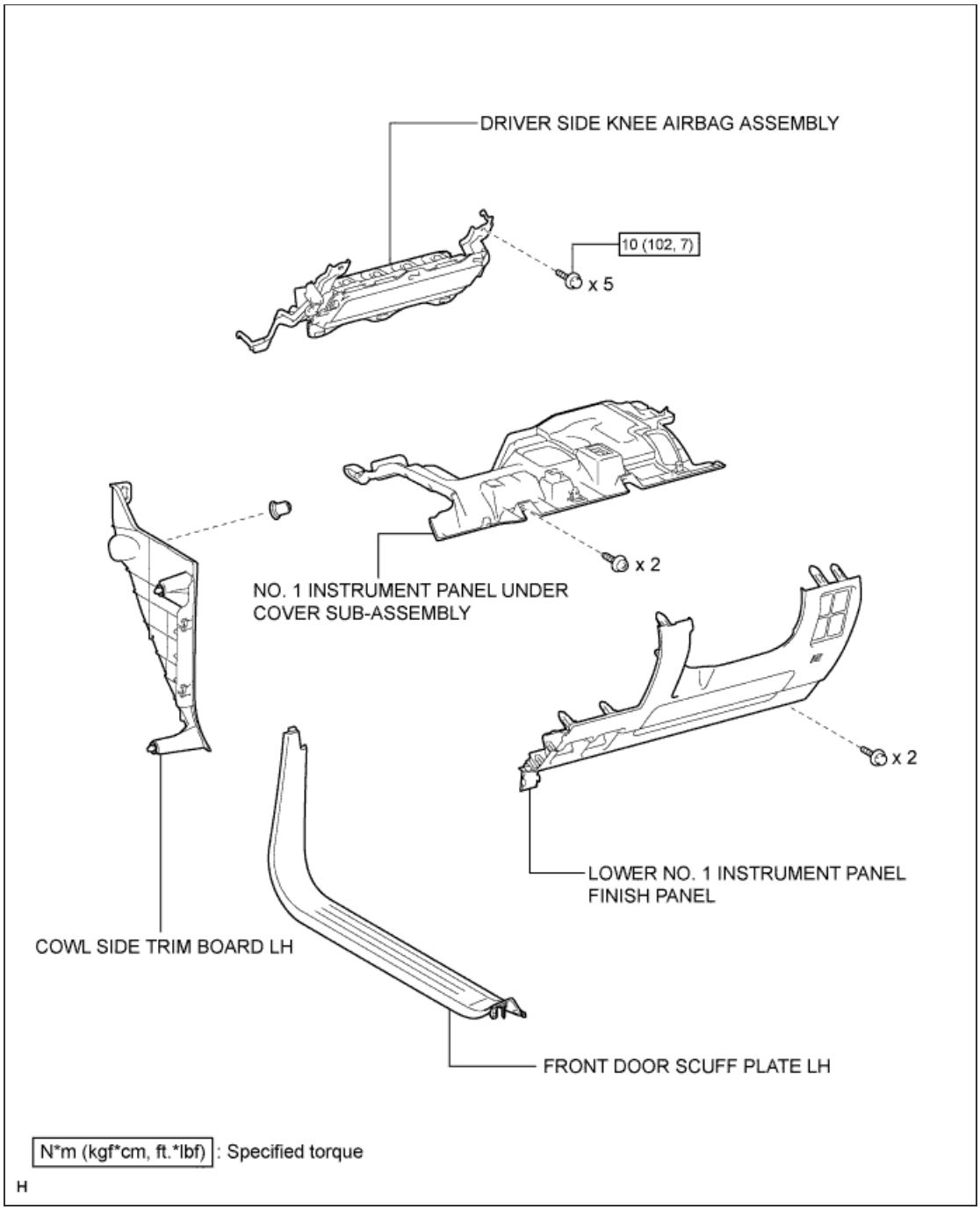
v. Turn the GTS off and turn the ignition switch off.

w. Inspect for brake fluid leaks.

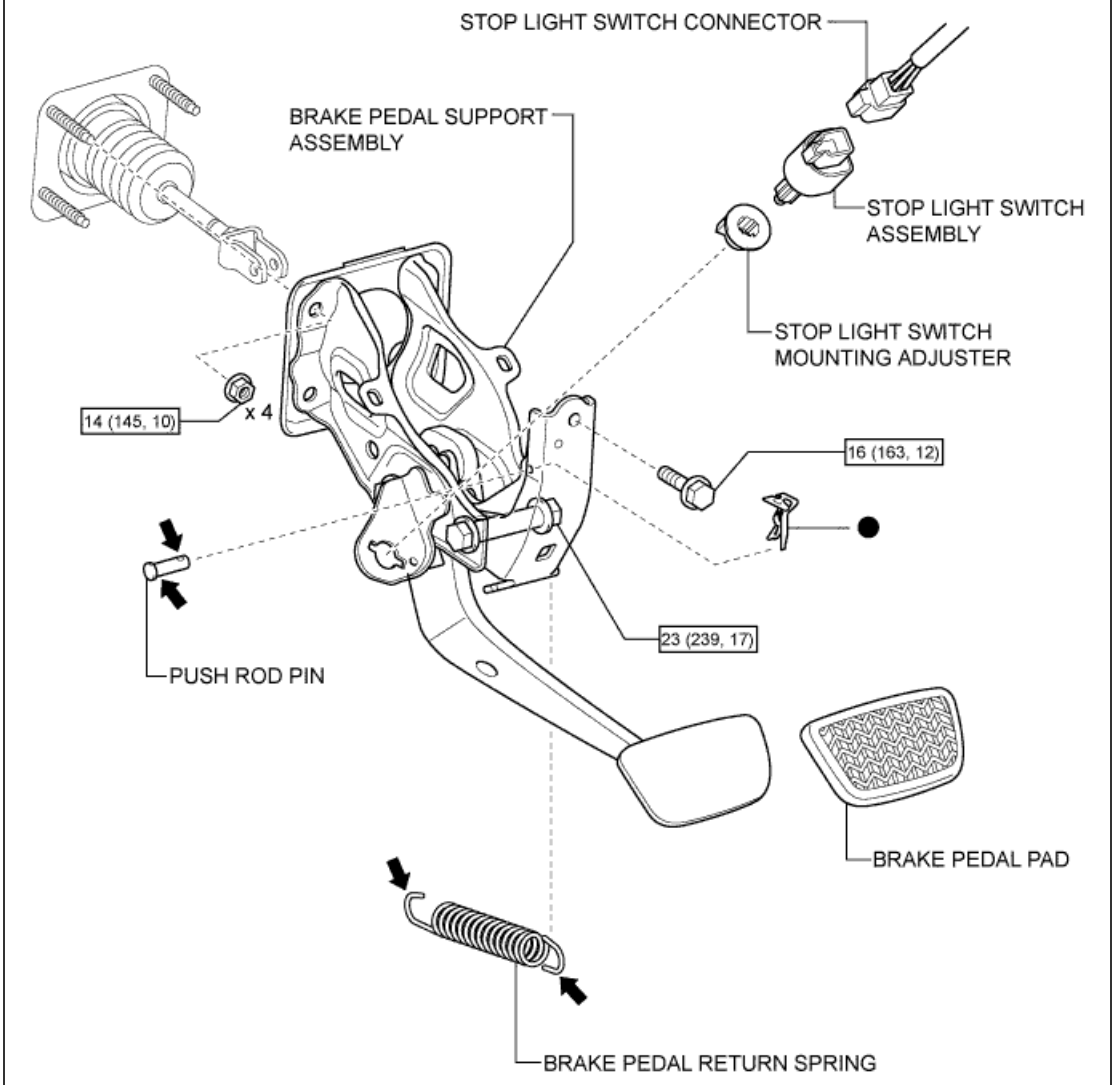
x. Check and adjust the brake fluid level (Click here).

y. Clear the DTCs (Click here).

for Preparation Click here



for Automatic Transmission:



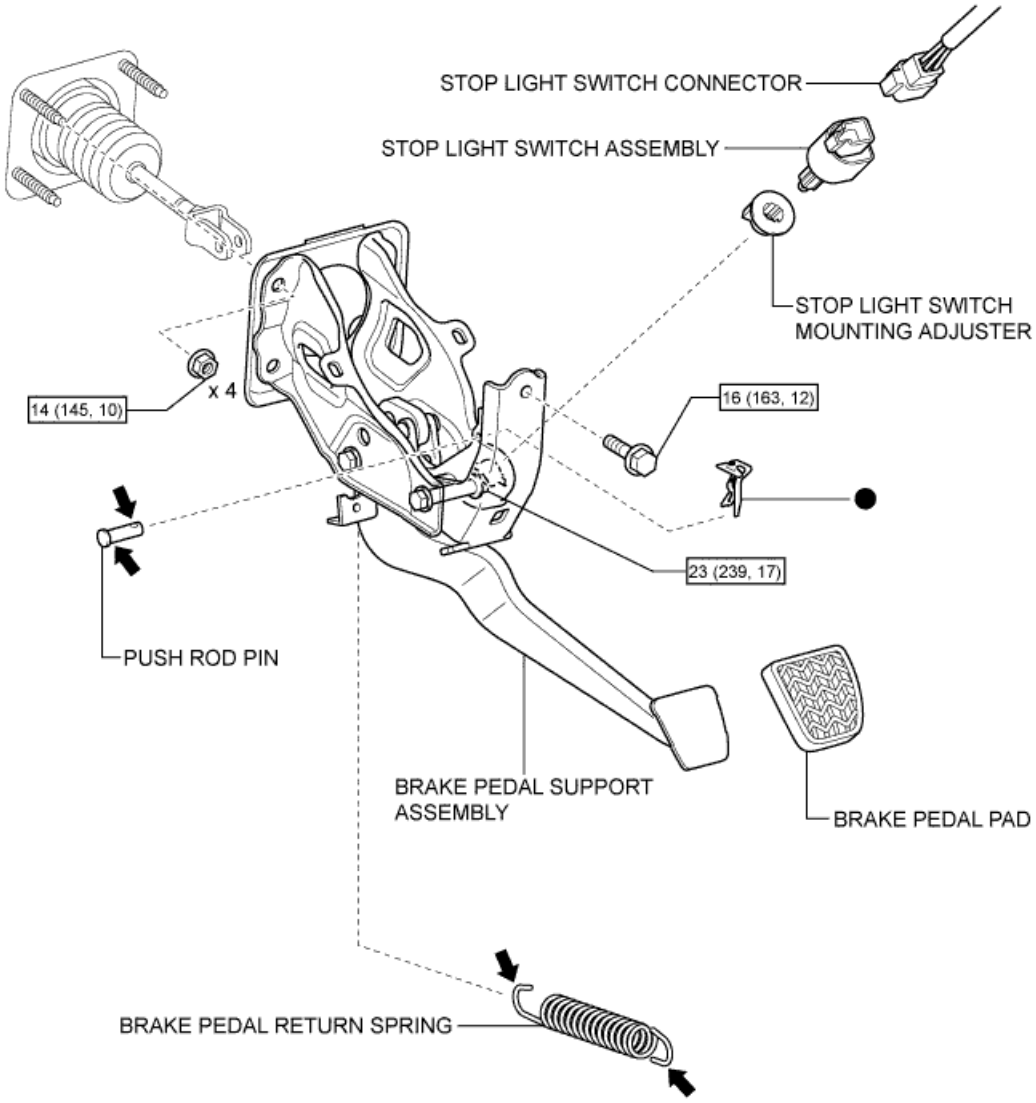
N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

⬅ Lithium soap base glycol grease

H

for Manual Transmission:



H

for Preparation Click here

1. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here).

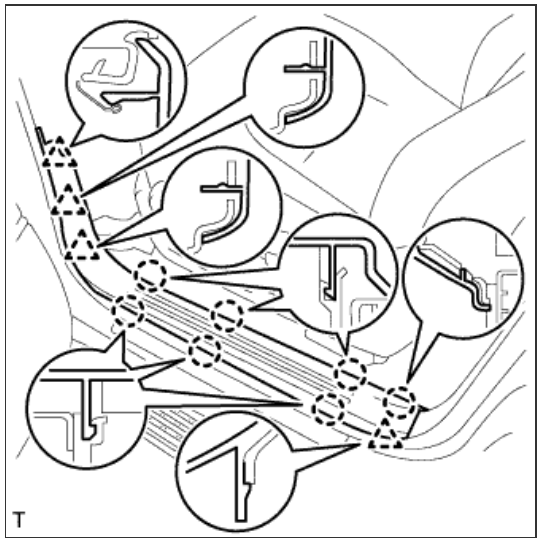
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

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

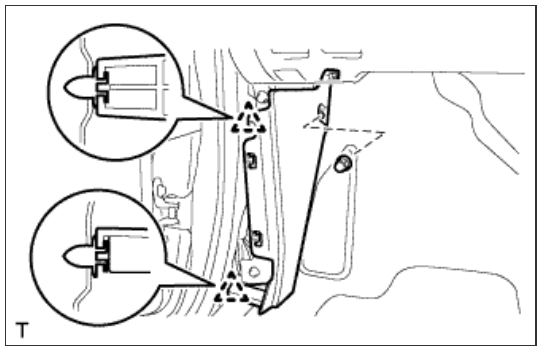
a. Detach the 7 claws and 4 clips, and remove the scuff plate.



4. REMOVE COWL SIDE TRIM BOARD LH

a. Remove the cap nut.

b. Detach the 2 clips and remove the cowl side trim board.

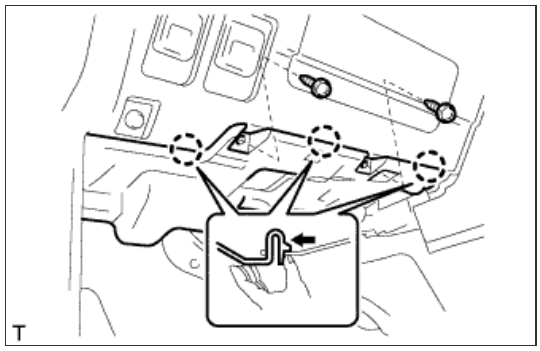


5. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Remove the 2 screws.

b. Detach the 3 claws.

c. Disconnect the connectors and remove the No. 1 instrument panel under cover.



6. REMOVE LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

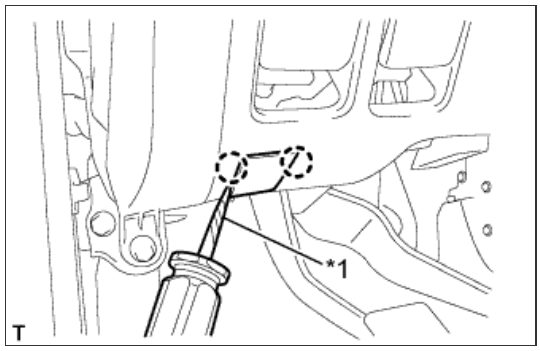
a. Using a screwdriver, detach the 2 claws and open the hole cover.

HINT:

Tape the screwdriver tip before use.

Text in Illustration

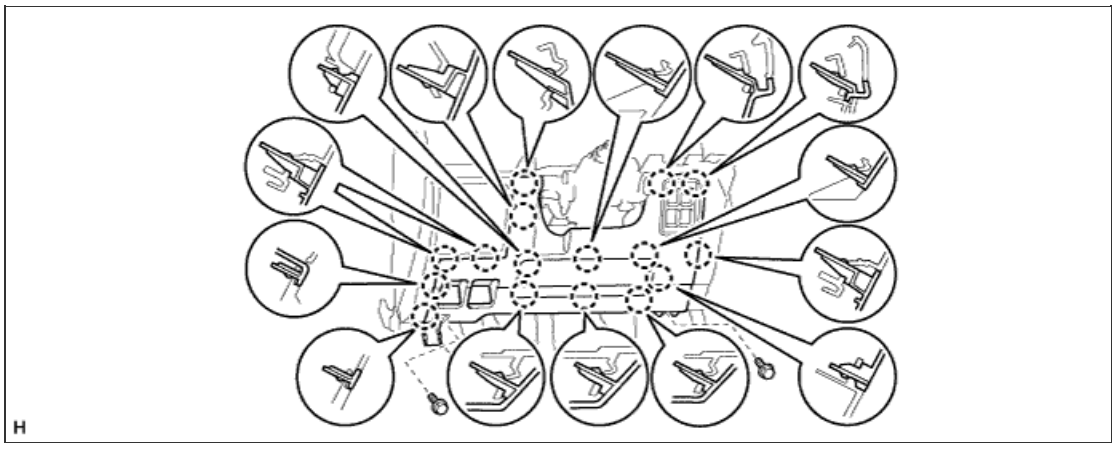
*1	Protective Tape



b. w/ Driver Side Knee Airbag:

i. Remove the 2 bolts.

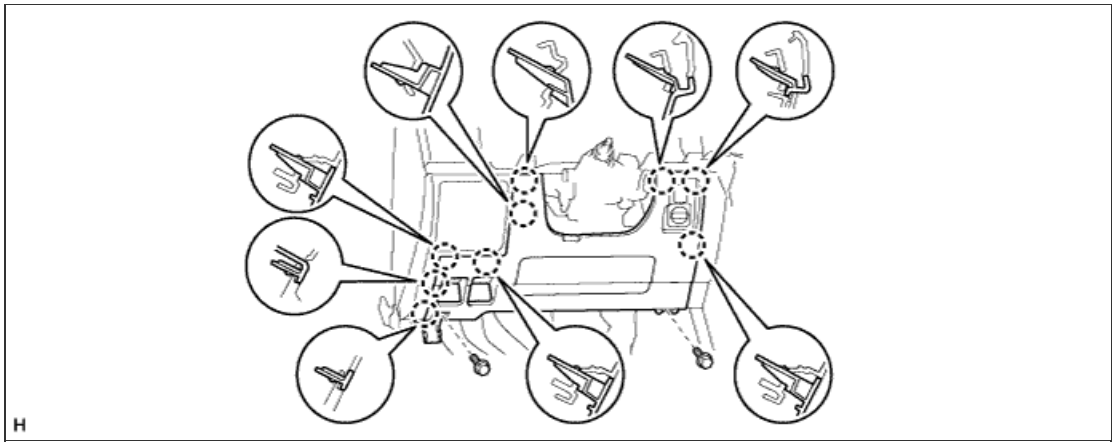
ii. Detach the 16 claws.



c. w/o Driver Side Knee Airbag:

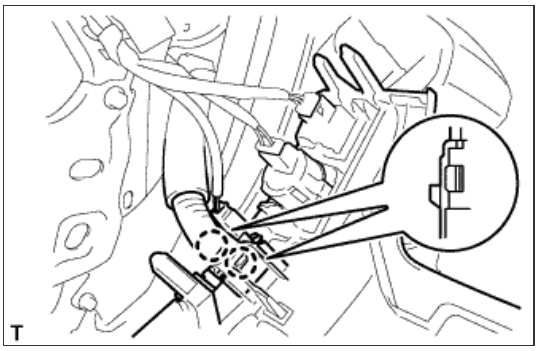
i. Remove the 2 bolts.

ii. Detach the 9 claws.



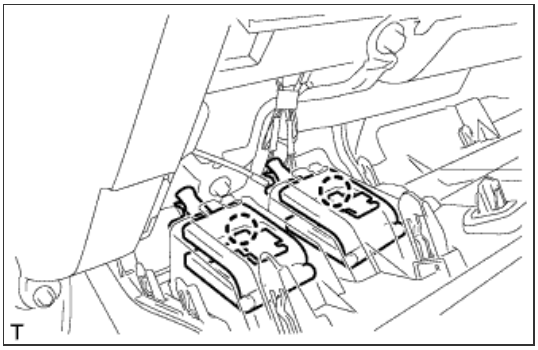
d. for Automatic Air Conditioning System:

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

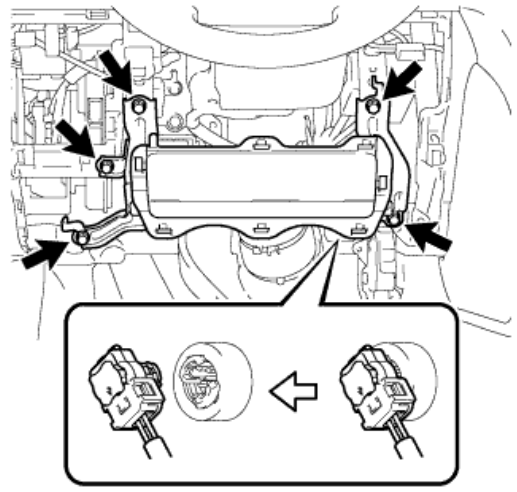
a. Remove the 5 bolts and driver side knee airbag.

b. Disconnect the connector.

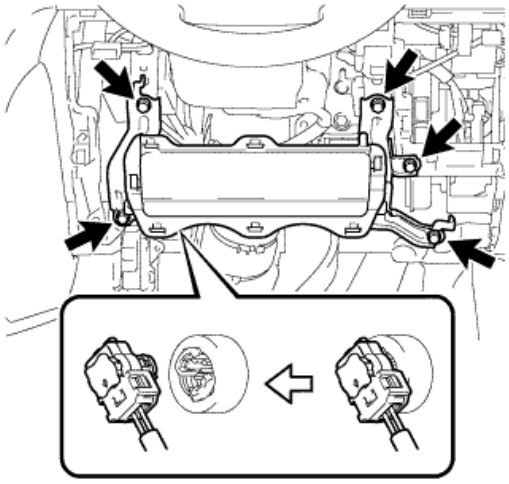
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

for LHD:

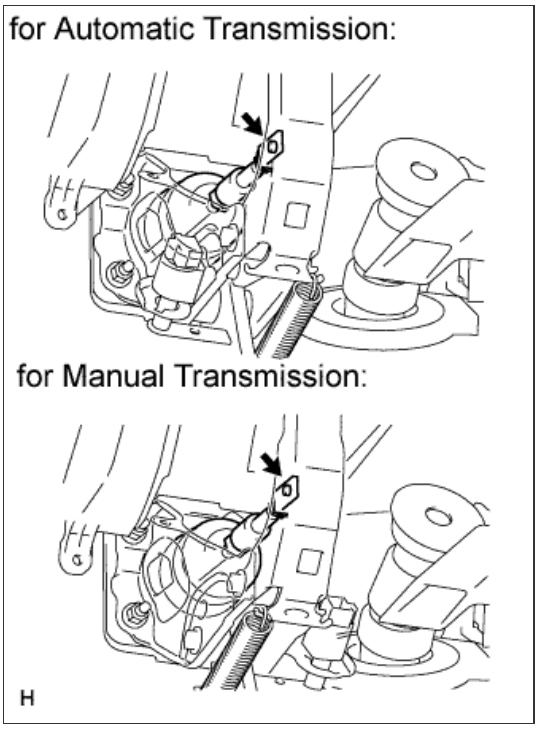


for RHD:



8. REMOVE PUSH ROD PIN

a. Remove the clip and push rod pin from the brake pedal lever.



9. REMOVE STOP LIGHT SWITCH ASSEMBLY

a. Disconnect the stop light switch connector.

b. Remove the stop light switch (Click here).

10. REMOVE BRAKE PEDAL SUPPORT ASSEMBLY

a. Loosen the hexagon bolt.

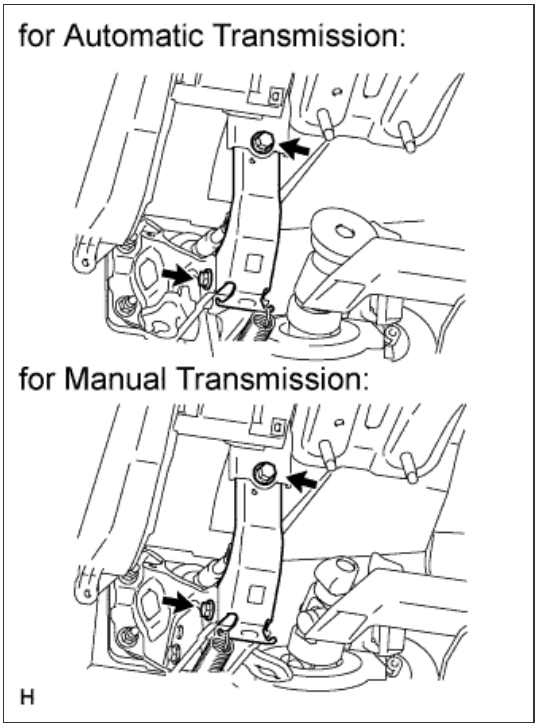
HINT:

Hold the bolt in place and loosen the nut.

NOTICE:

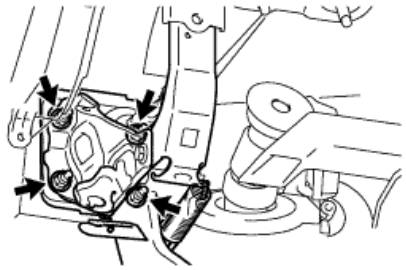
Only loosen the nut. Do not remove the bolt or nut.

b. Remove the brake pedal support reinforcement set bolt.

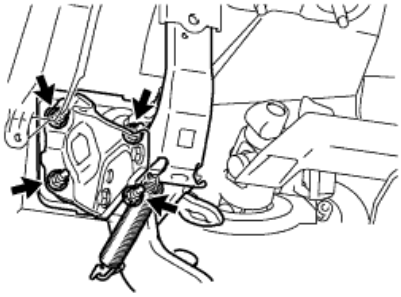


c. Remove the 4 nuts and brake pedal support assembly.

for Automatic Transmission:



for Manual Transmission:

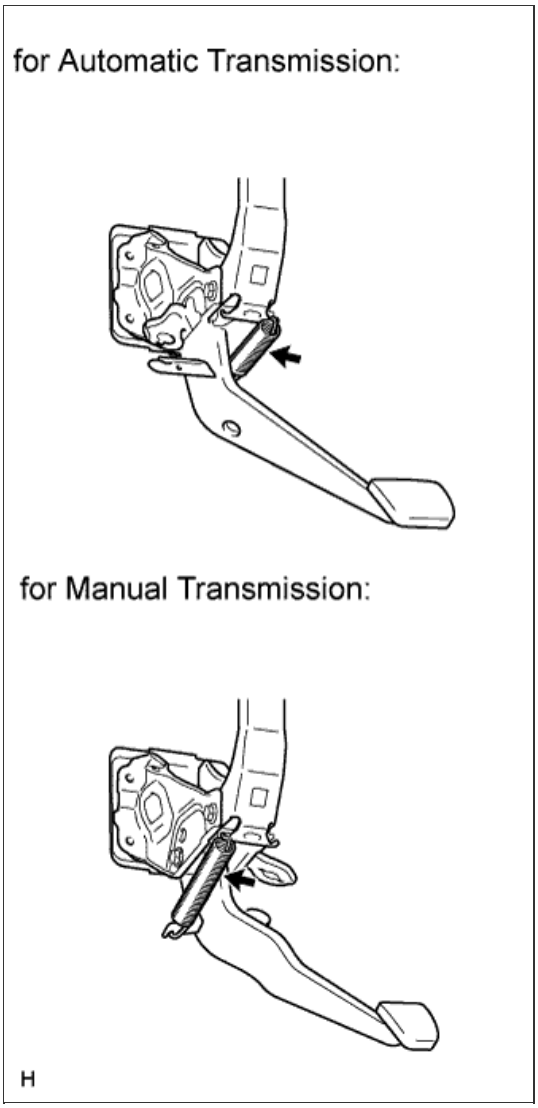


H

for Preparation Click here

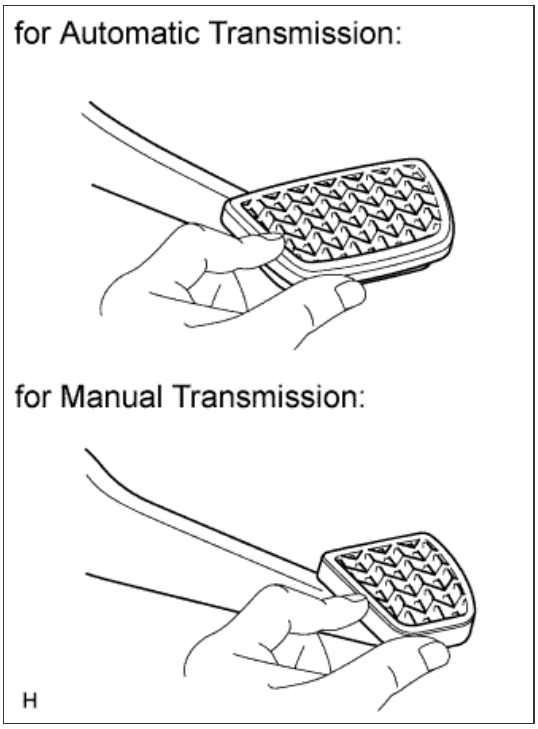
1. REMOVE BRAKE PEDAL RETURN SPRING

a. Remove the return spring.



2. REMOVE BRAKE PEDAL PAD

a. Remove the brake pedal pad from the brake pedal sub-assembly.



3. REMOVE STOP LIGHT SWITCH MOUNTING ADJUSTER

a. Remove the stop light switch mounting adjuster from the brake pedal support.

for Preparation Click here

1. CHECK BRAKE PEDAL HEIGHT

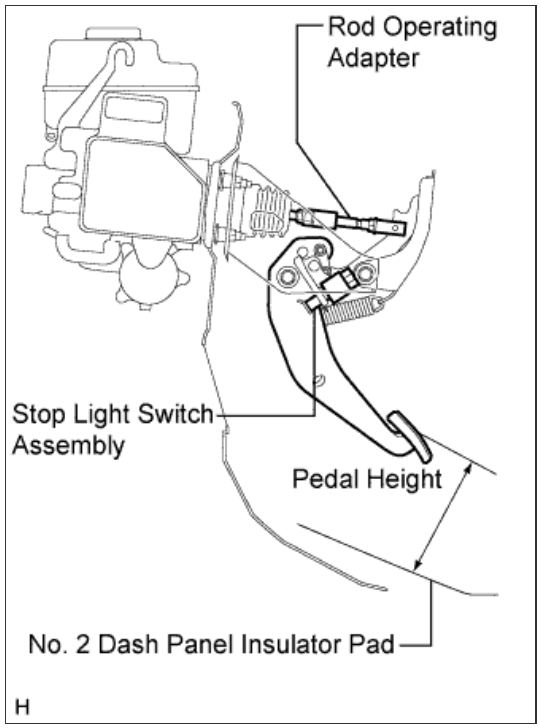
a. Check the brake pedal height.

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.

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.

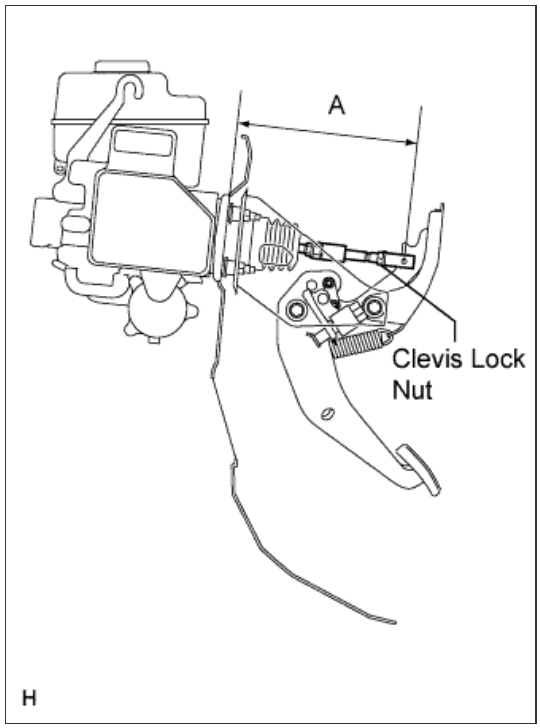
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

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.



2. CHECK AND ADJUST STOP LIGHT SWITCH ASSEMBLY

HINT:

If the pedal height is incorrect, check and adjust the stop light switch clearance.

a. Disconnect the stop light switch assembly connector from the stop light switch assembly.

b. Turn the stop light switch assembly counterclockwise and remove the stop light switch assembly.

c. Insert the stop light switch assembly until the body hits the brake pedal bracket.

NOTICE:

When inserting the stop light switch assembly, support the pedal from behind so that the pedal is not pushed in.

d. Turn the stop light switch assembly a quarter turn clockwise to install it.

HINT:

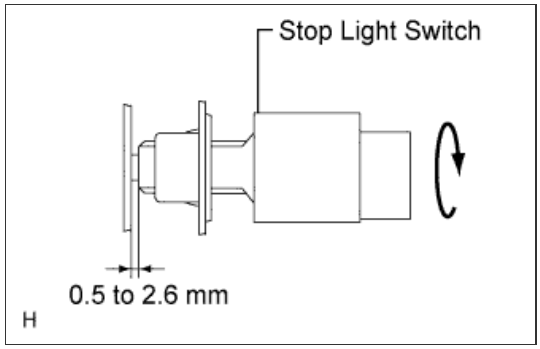
Turning the stop light switch assembly counterclockwise loosens the switch.

e. Connect the stop light switch connector to the stop light switch assembly.

f. Check the protrusion of the rod.

Standard Rod Protrusion:
0.5 to 2.6 mm (0.0197 to 0.102 in.)

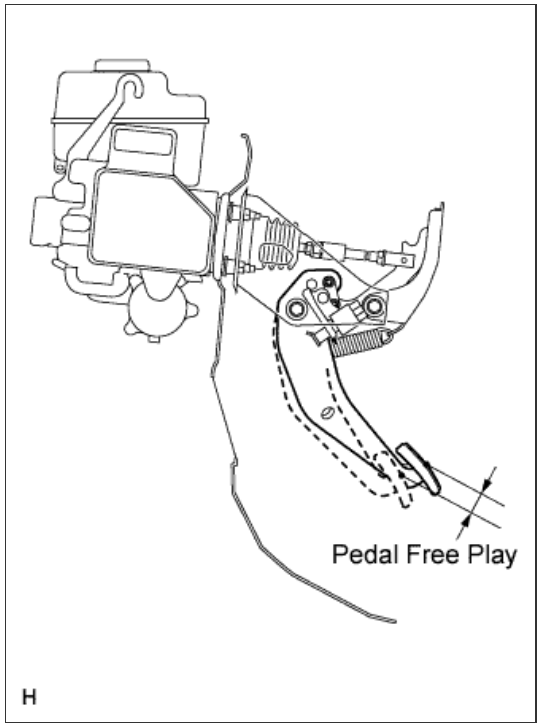
g. After adjusting the pedal height, check the pedal free play.



3. 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.)

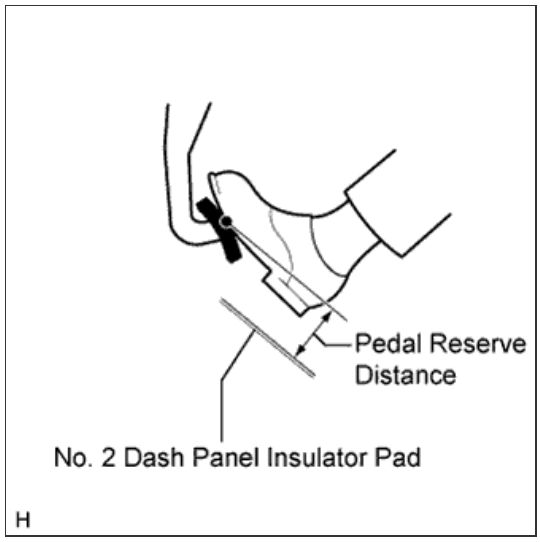


4. CHECK PEDAL RESERVE DISTANCE

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

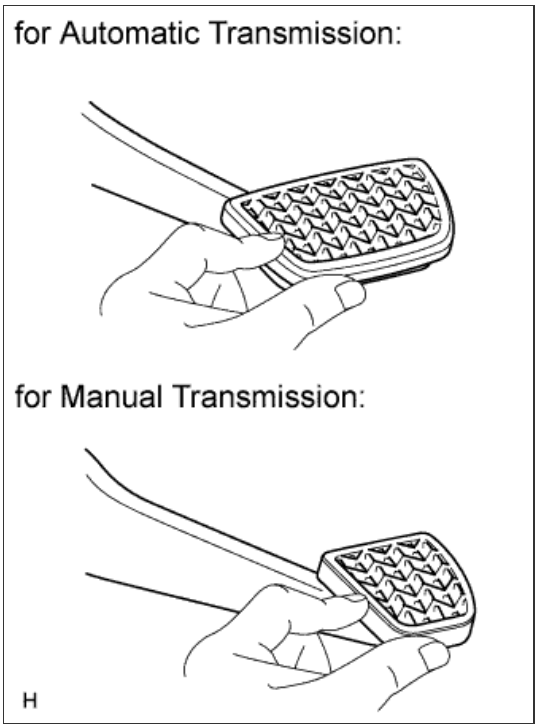
for Preparation Click here

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.

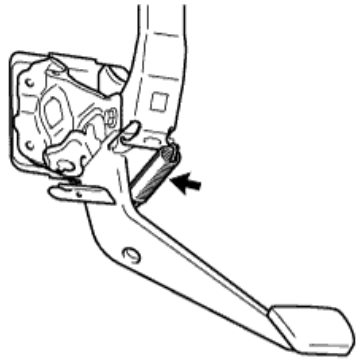


3. INSTALL BRAKE PEDAL RETURN SPRING

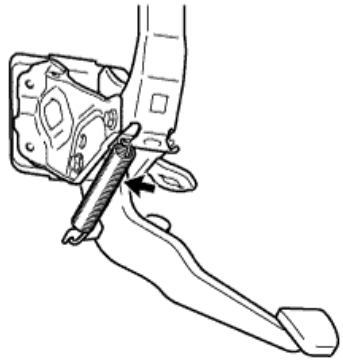
a. Apply a light coat of lithium soap base glycol grease to inner surface of the hole in the brake pedal support assembly.

b. Install the brake pedal return spring to the brake pedal support assembly.

for Automatic Transmission:



for Manual Transmission:



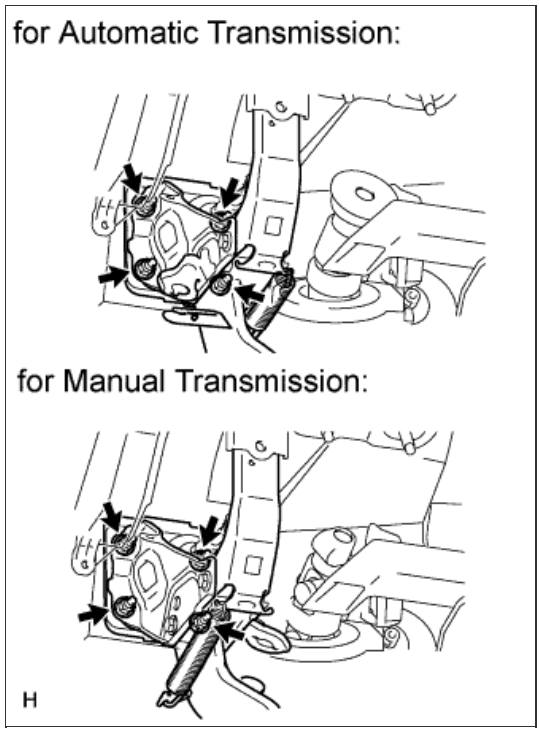
H

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.

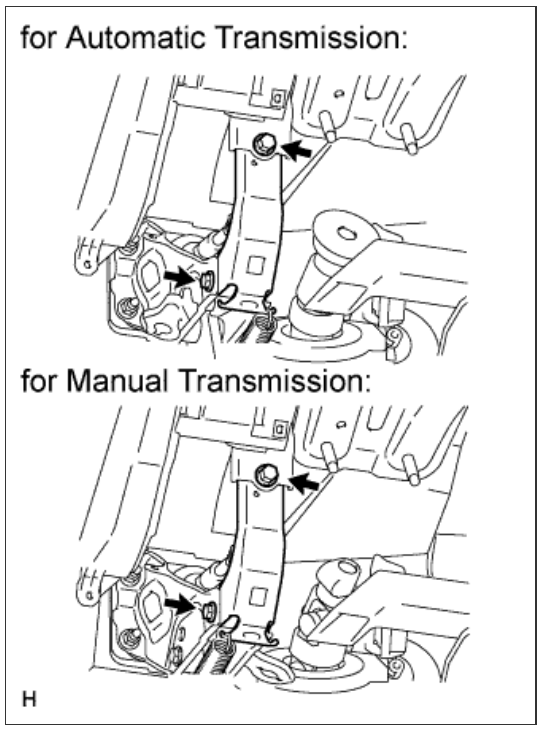
Torque:
16 N*m{ 163 kgf*cm , 12 ft.*lbf }

c. Tighten the hexagon bolt.

Torque:
23 N*m{ 239 kgf*cm , 17 ft.*lbf }

HINT:

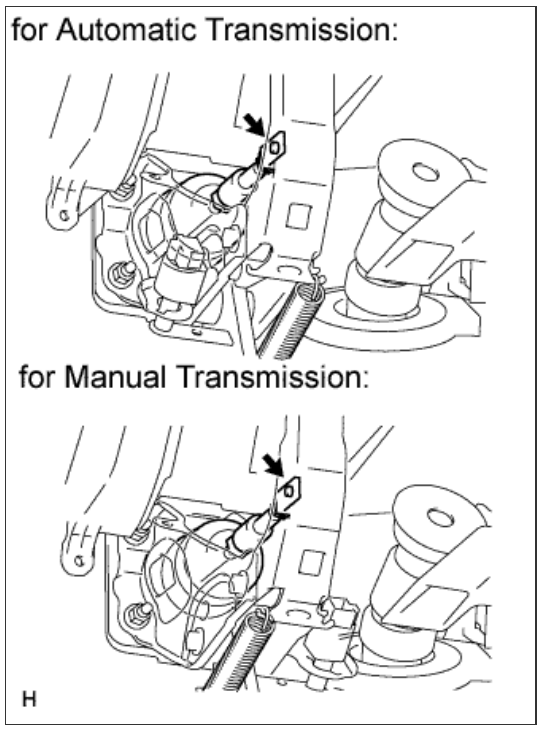
Hold the bolt in place and tighten the nut.



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

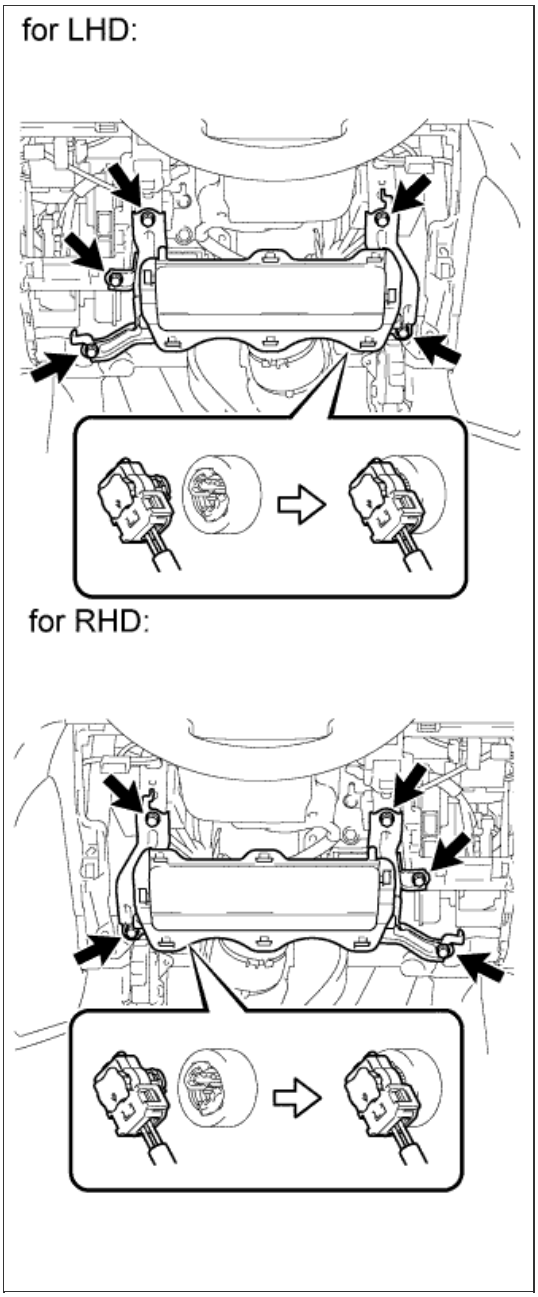
a. Connect the connector.

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 }

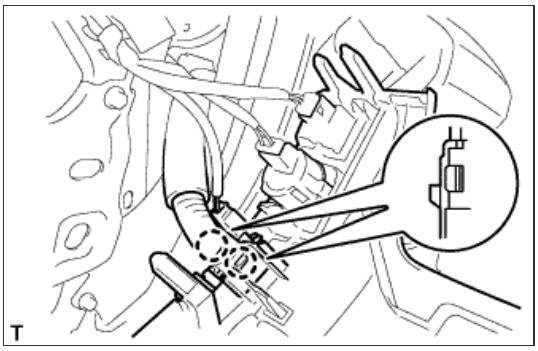


5. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

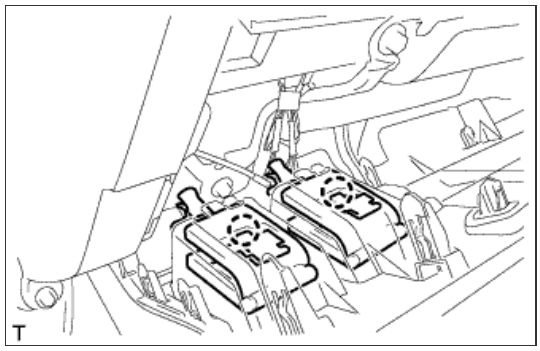
a. Connect the connectors.

b. for Automatic Air Conditioning System:

i. Attach the 2 claws to install the room temperature sensor.



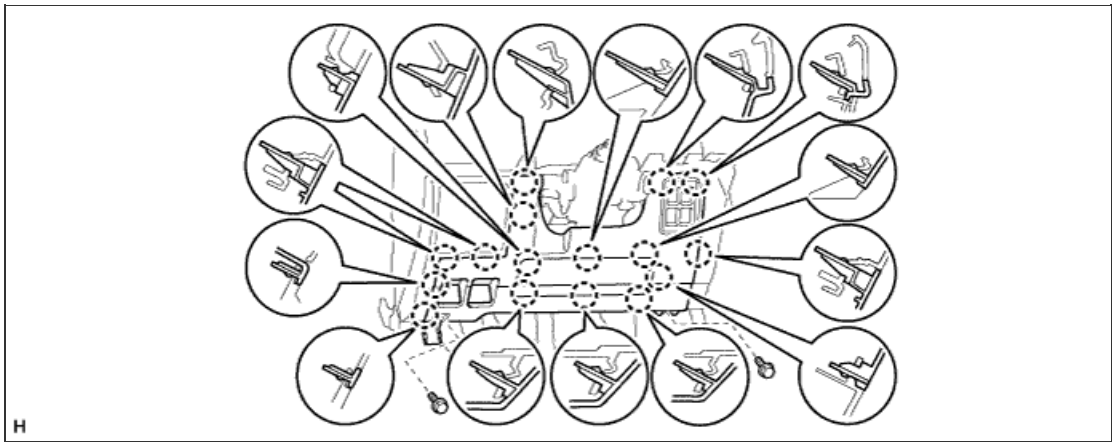
c. Attach the 2 claws to connect the 2 control cables.



d. w/ Driver Side Knee Airbag:

i. Attach the 16 claws to install the lower No. 1 instrument panel finish panel.

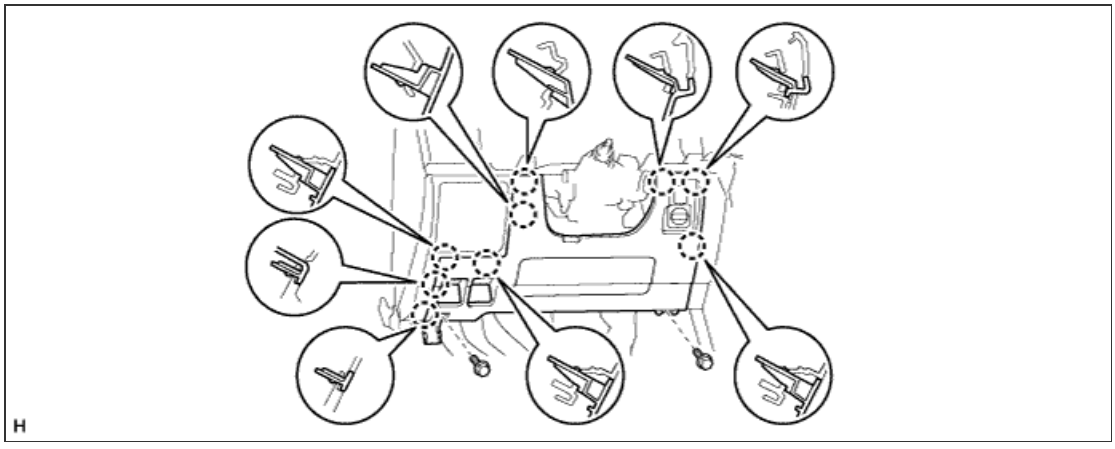
ii. Install the 2 bolts.



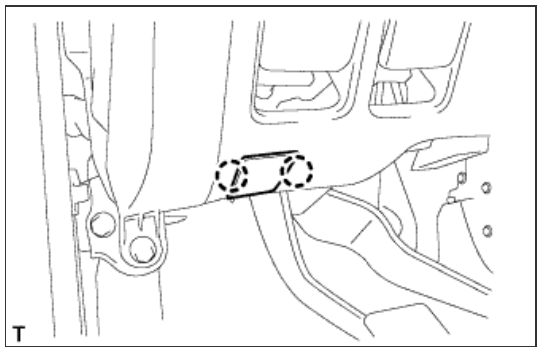
e. w/o Driver Side Knee Airbag:

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.

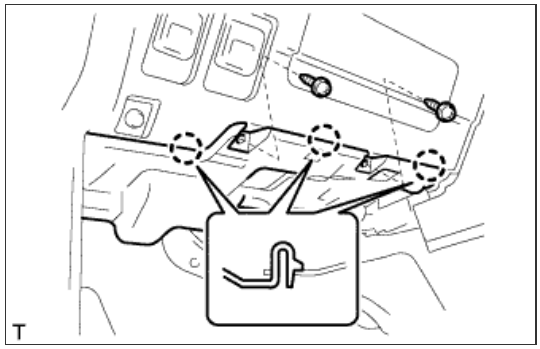


6. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Connect the connectors.

b. Attach the 3 claws to install the No. 1 instrument panel under cover.

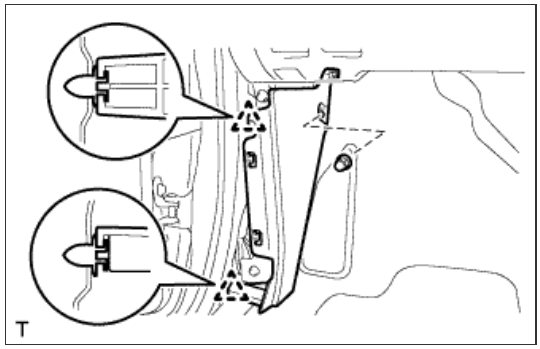
c. Install the 2 screws.



7. INSTALL COWL SIDE TRIM BOARD LH

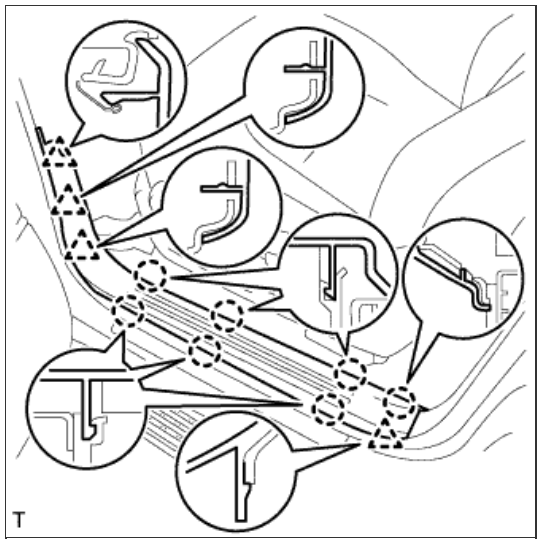
a. Attach the 2 clips to install the cowl side trim board.

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

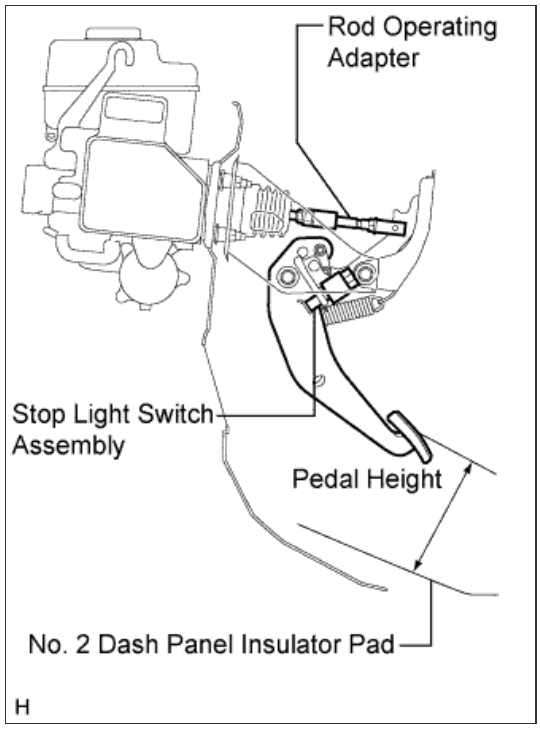
a. Check the brake pedal height.

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.

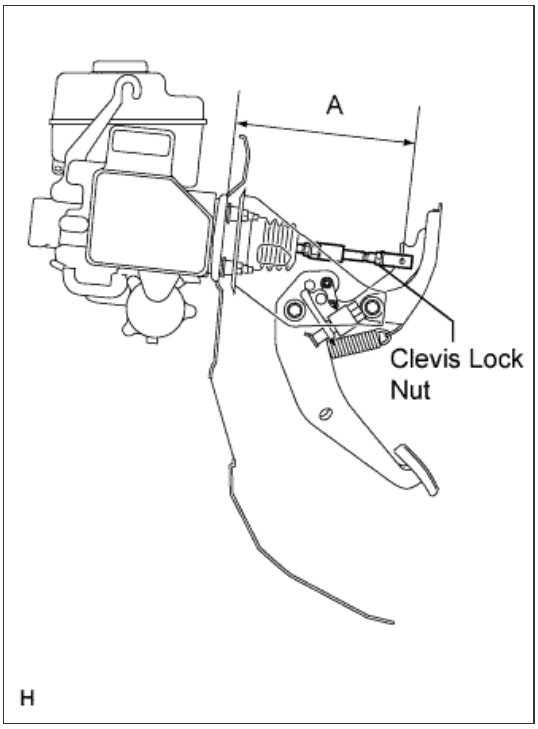
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

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.

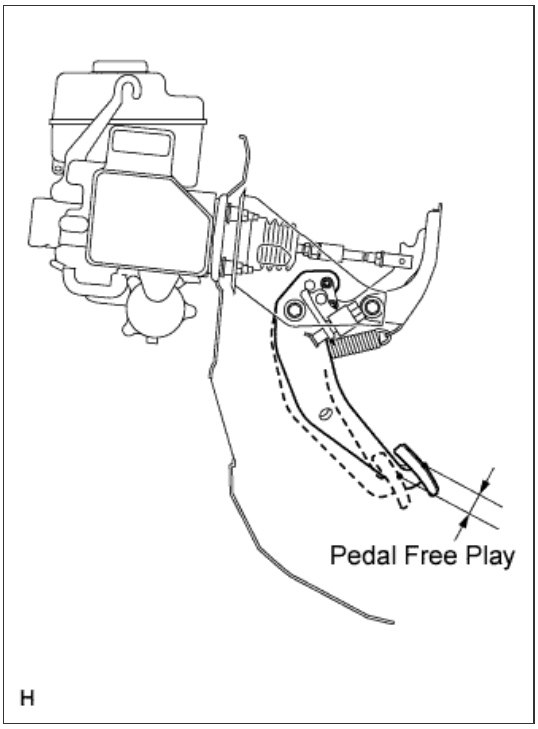
- Even if there is damage, there is no problem if the reserve distance is within the standard value.
- If necessary, replace any damaged parts.



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.)

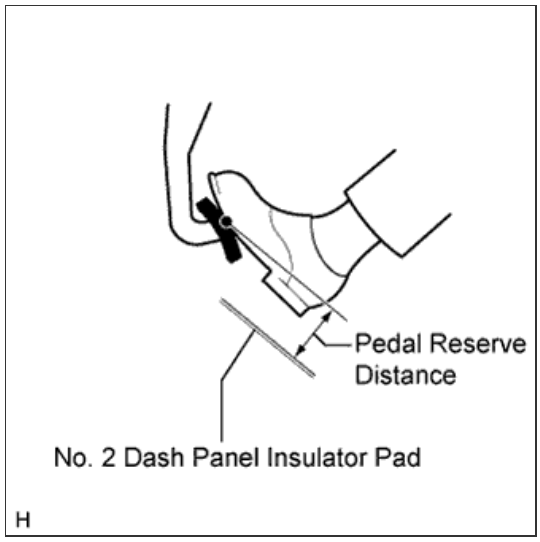


12. CHECK PEDAL RESERVE DISTANCE

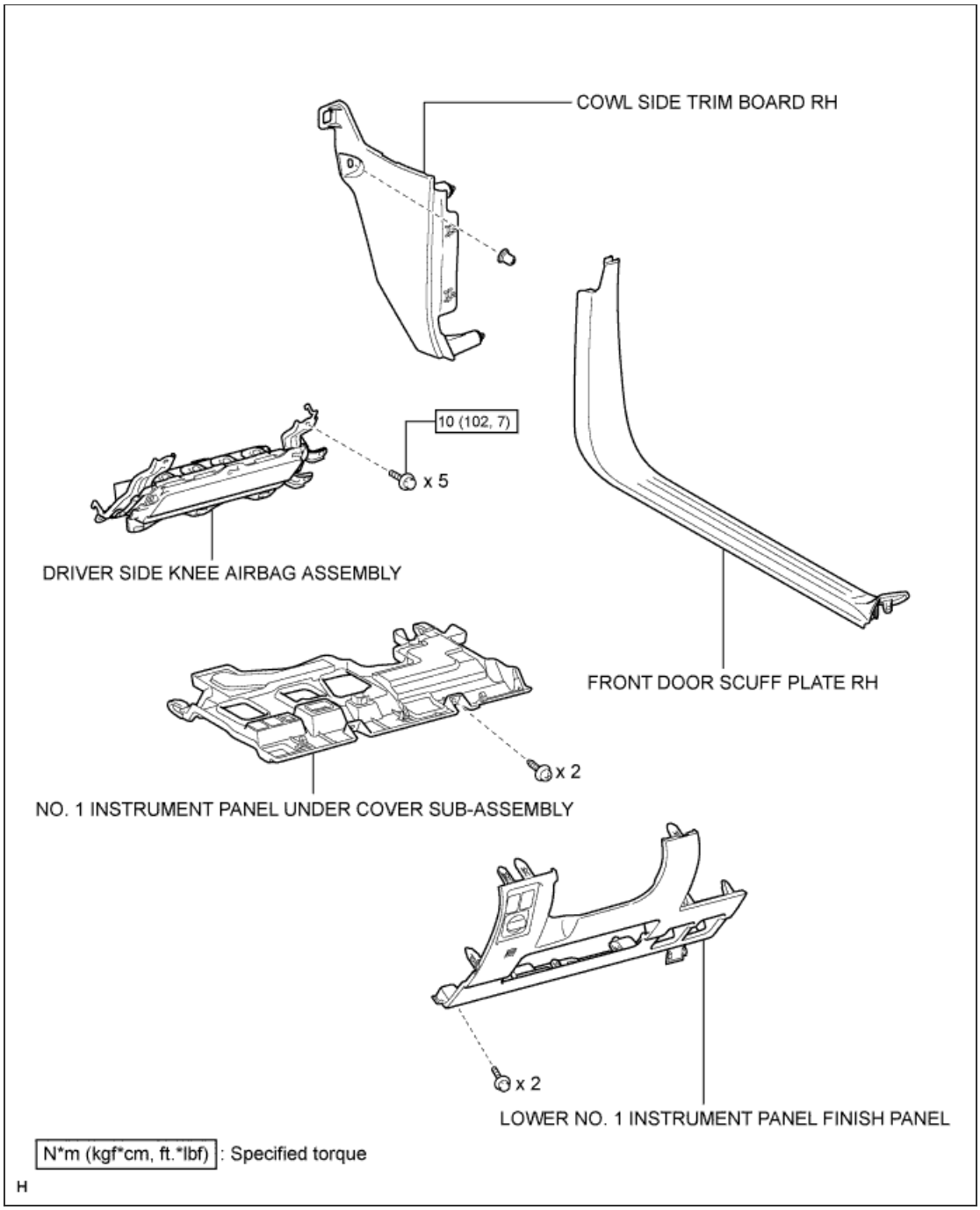
a. Release the parking brake lever. With the engine running, depress the pedal and measure the pedal reserve distance as shown in the illustration.

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.)

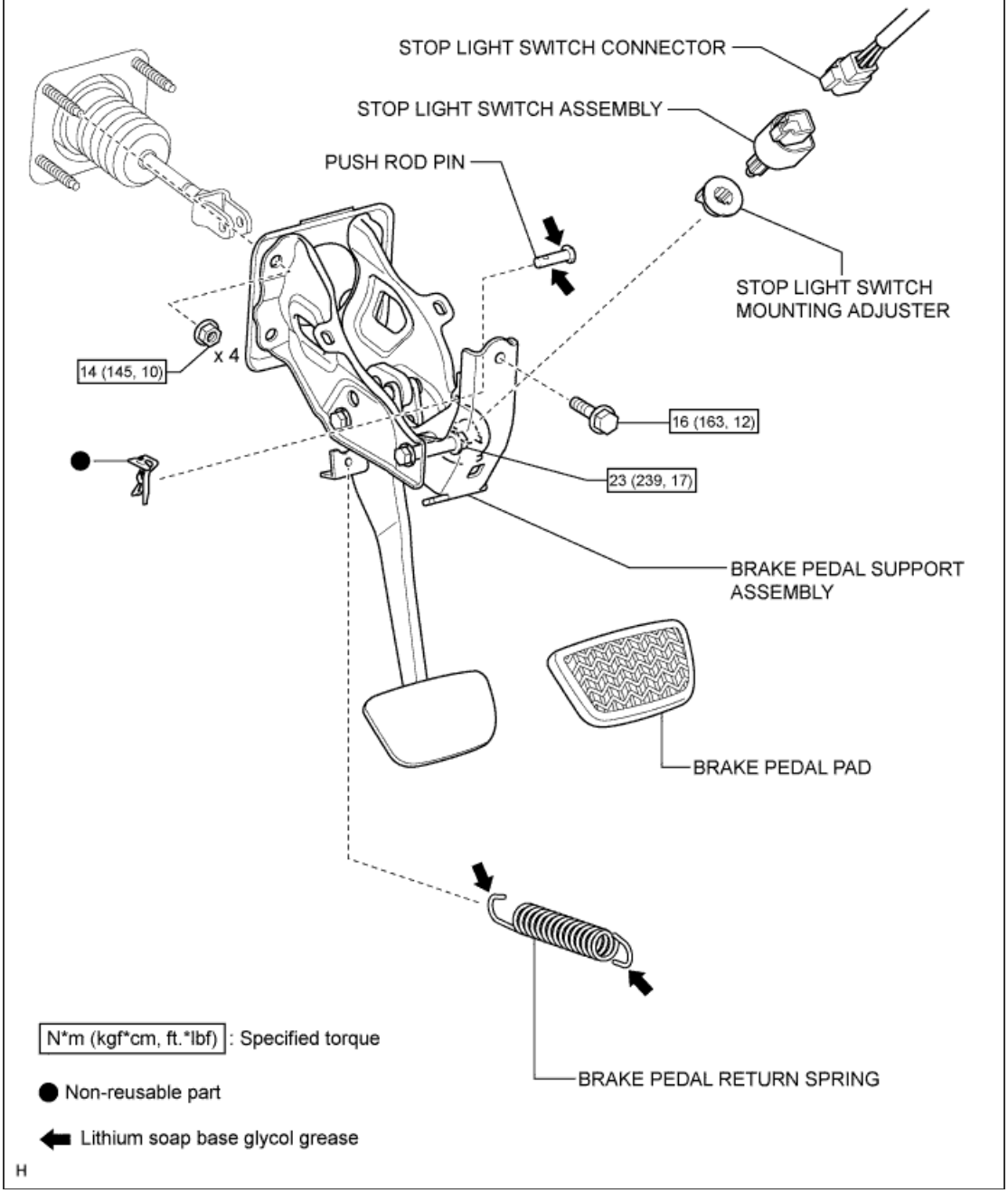
If incorrect, troubleshoot the brake system.

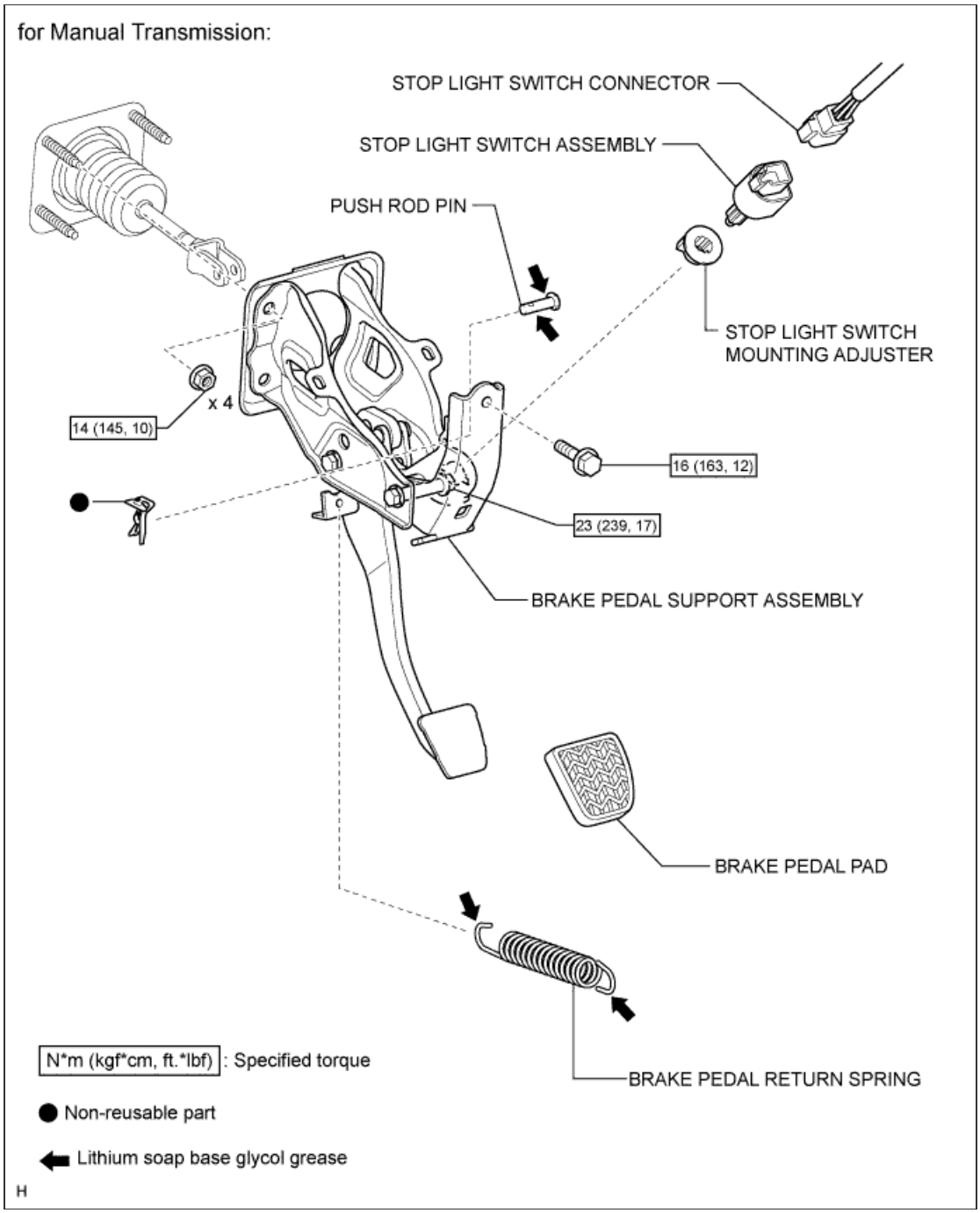

Pedal Reserve
Distance
No. 2 Dash Panel Insulator Pad
H

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. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here),

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

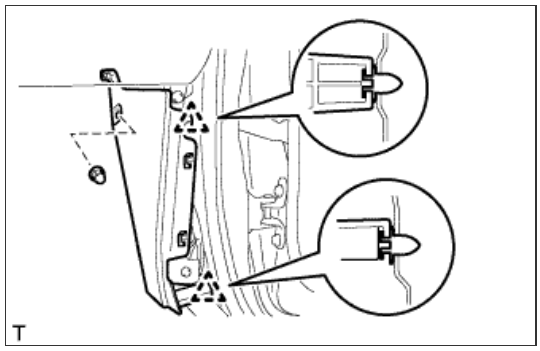
HINT:

Use the same procedures described for the LH side.

4. REMOVE COWL SIDE TRIM BOARD RH

a. Remove the cap nut.

b. Detach the 2 clips and remove the cowl side trim board.

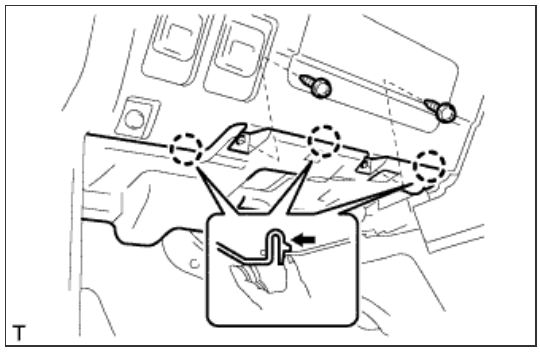


5. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Remove the 2 screws.

b. Detach the 3 claws.

c. Disconnect the connectors and remove the No. 1 instrument panel under cover.



6. REMOVE LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

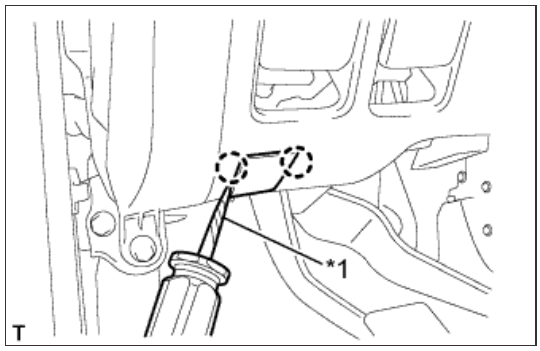
a. Using a screwdriver, detach the 2 claws and open the hole cover.

HINT:

Tape the screwdriver tip before use.

Text in Illustration

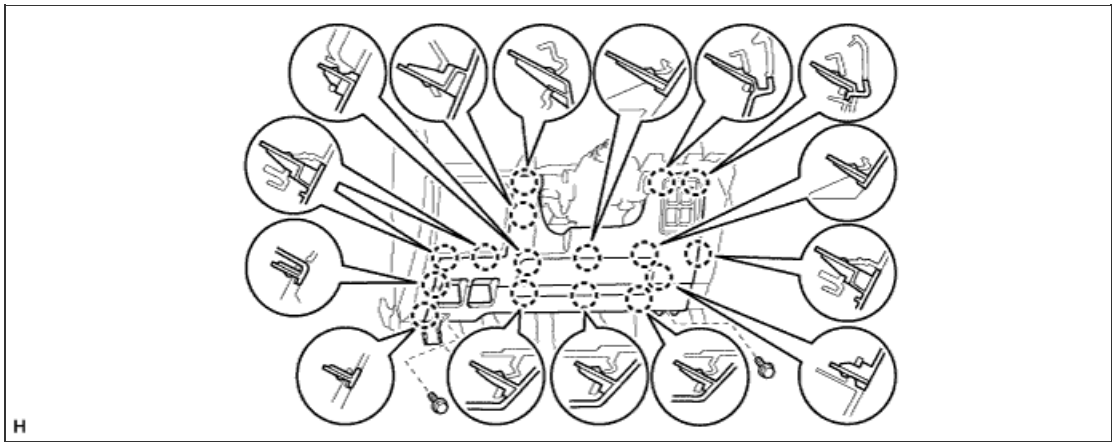
*1	Protective Tape



b. w/ Driver Side Knee Airbag:

i. Remove the 2 bolts.

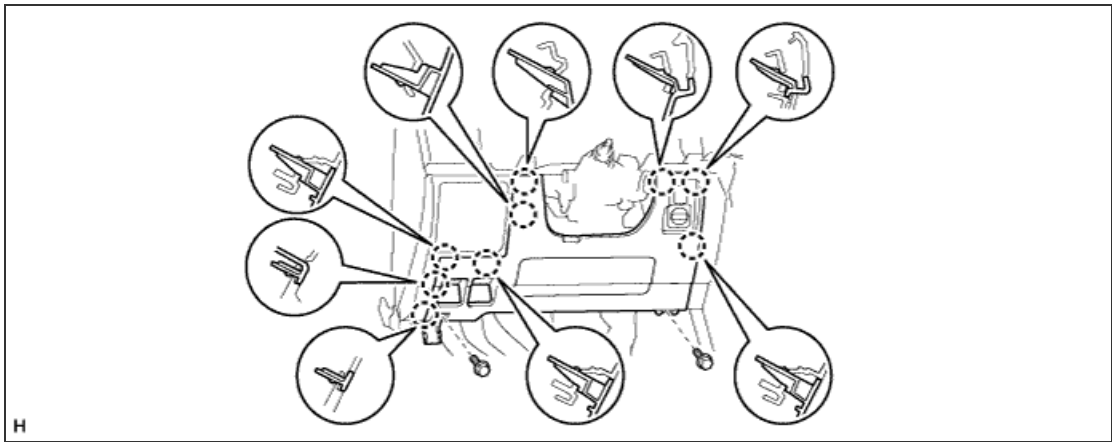
ii. Detach the 16 claws.



c. w/o Driver Side Knee Airbag:

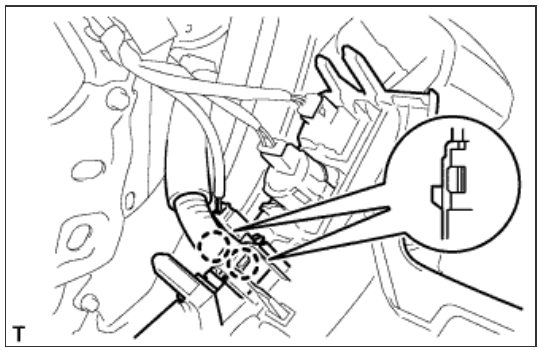
i. Remove the 2 bolts.

ii. Detach the 9 claws.



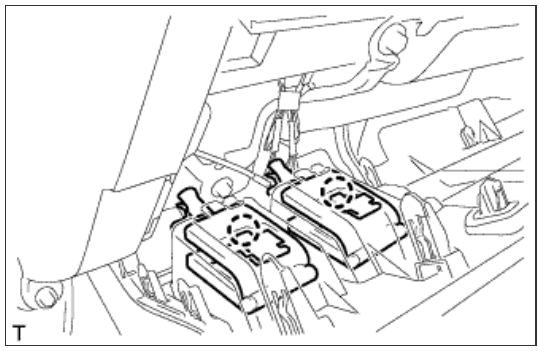
d. for Automatic Air Conditioning System:

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.



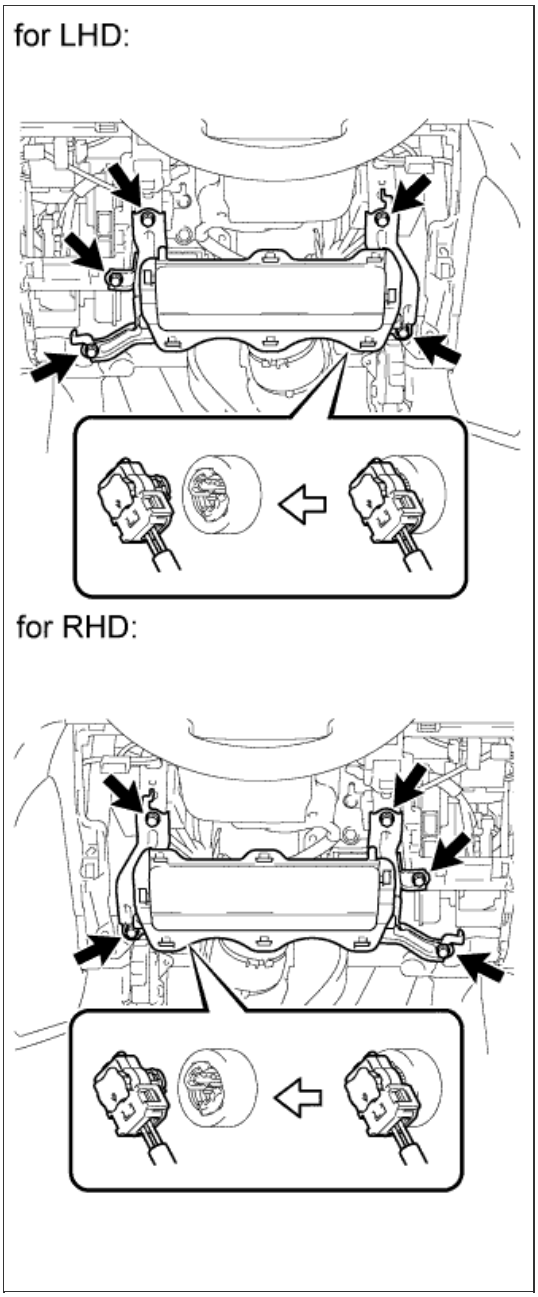
7. REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY

a. Remove the 5 bolts and driver side knee airbag.

b. Disconnect the connector.

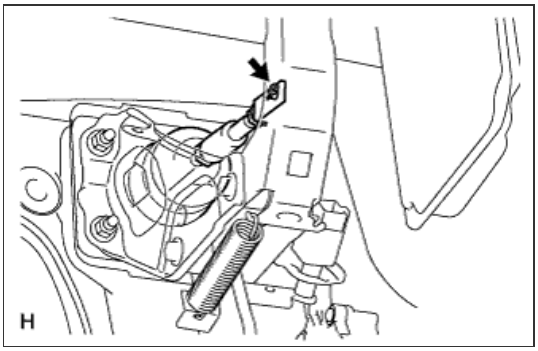
NOTICE:

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 STOP LIGHT SWITCH ASSEMBLY

a. Disconnect the stop light switch connector.

b. Remove the stop light switch (Click here).

10. REMOVE BRAKE PEDAL SUPPORT ASSEMBLY

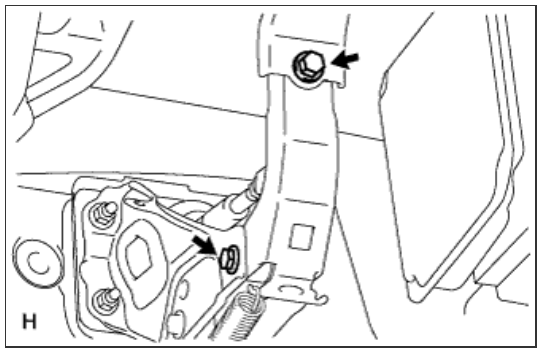
a. Loosen the hexagon bolt.

HINT:

Hold the bolt in place and loosen the nut.

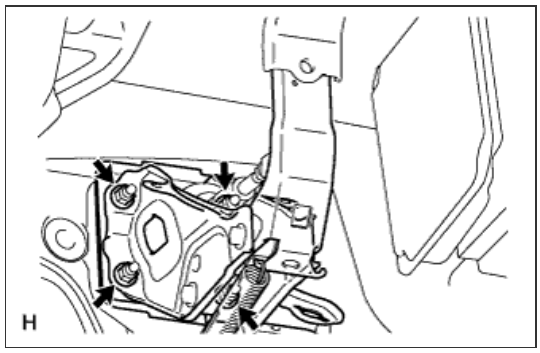
NOTICE:

Only loosen the nut. Do not remove the bolt or nut.



b. Remove the bolt from the brake pedal support reinforcement.

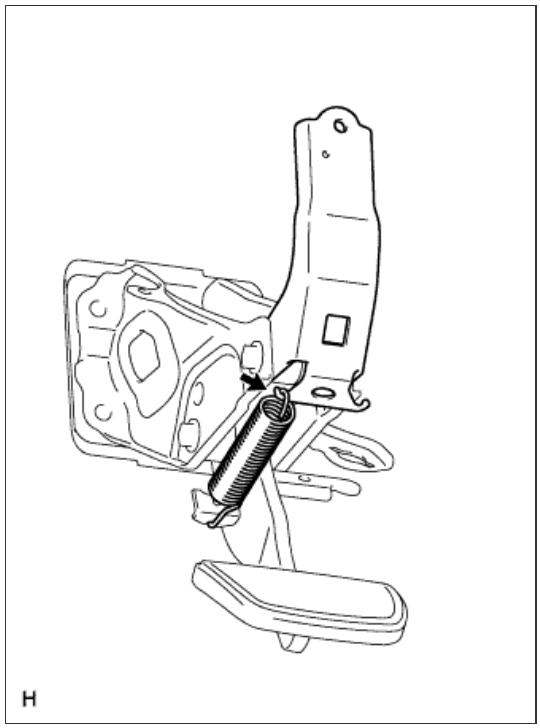
c. Remove the 4 nuts and brake pedal support assembly.



for Preparation Click here

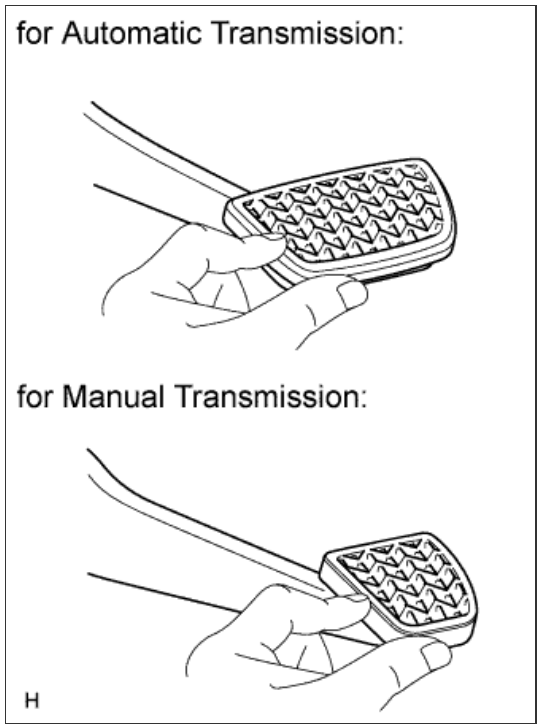
1. REMOVE BRAKE PEDAL RETURN SPRING

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 adjuster from the brake pedal support.

for Preparation Click here

1. CHECK BRAKE PEDAL HEIGHT

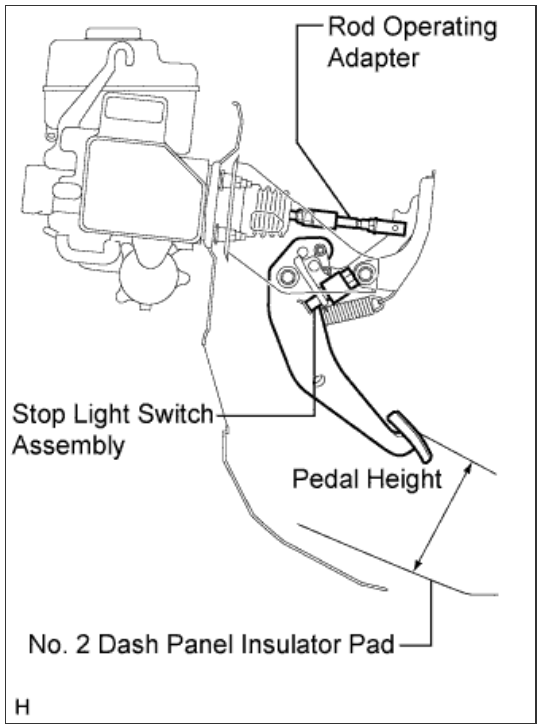
a. Check the brake pedal height.

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.

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.

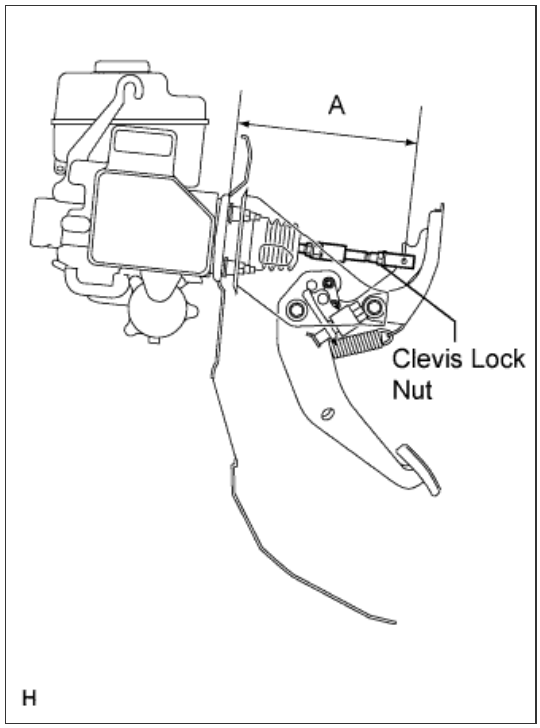
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

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.



2. CHECK AND ADJUST STOP LIGHT SWITCH ASSEMBLY

HINT:

If the pedal height is incorrect, check and adjust the stop light switch clearance.

a. Disconnect the stop light switch assembly connector from the stop light switch assembly.

b. Turn the stop light switch assembly counterclockwise and remove the stop light switch assembly.

c. Insert the stop light switch assembly until the body hits the brake pedal bracket.

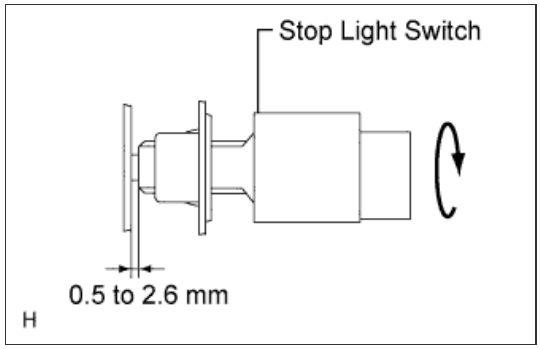
NOTICE:

When inserting the stop light switch assembly, support the pedal from behind so that the pedal is not pushed in.

d. Turn the stop light switch assembly a quarter turn clockwise to install it.

HINT:

Turning the stop light switch assembly counterclockwise loosens the switch.



e. Connect the stop light switch connector to the stop light switch.

f. Check the protrusion of the rod.

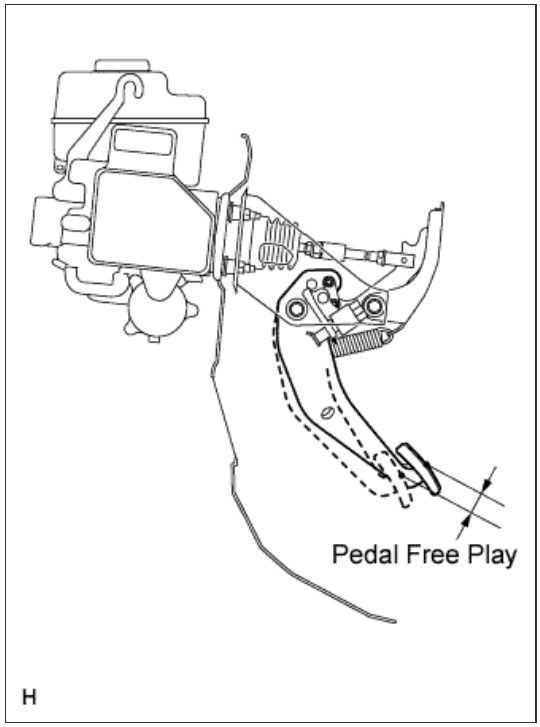
Standard Rod Protrusion:
0.5 to 2.6 mm (0.0197 to 0.102 in.)

g. After adjusting the pedal height, check the pedal free play.

3. 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.)

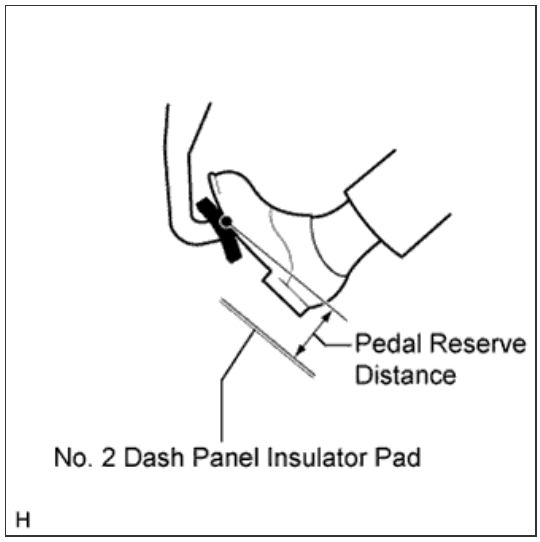


4. CHECK PEDAL RESERVE DISTANCE

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 67.5 mm (2.66 in.)

If incorrect, troubleshoot the brake system.


Pedal Reserve
Distance
No. 2 Dash Panel Insulator Pad
H

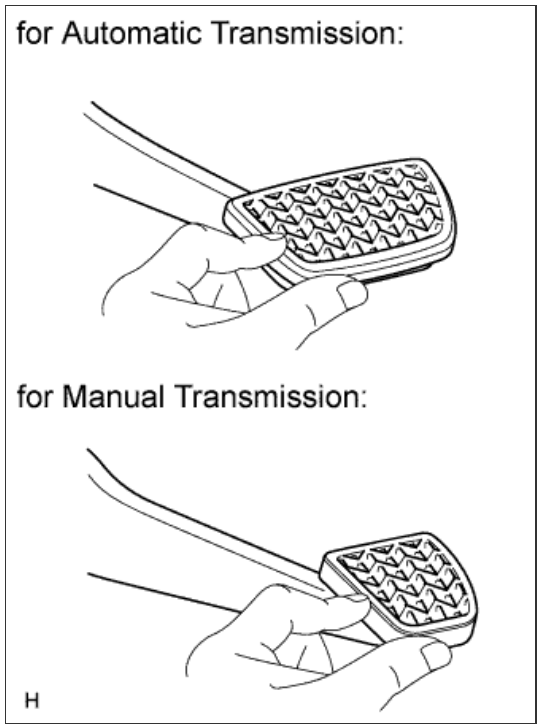
for Preparation Click here

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

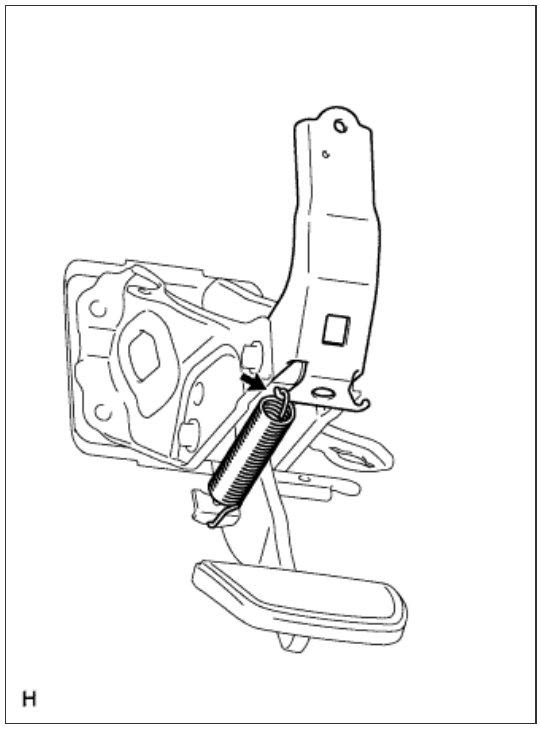
a. Install the brake pedal pad onto the brake pedal.



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.



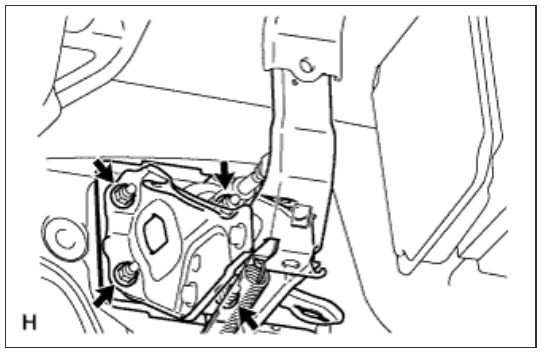
H

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.

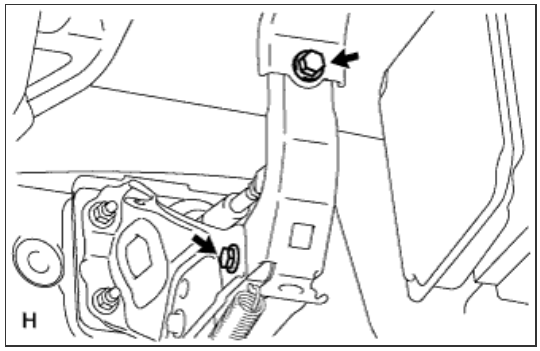
Torque:
16 N*m{ 163 kgf*cm , 12 ft.*lbf }

c. Tighten the hexagon bolt.

Torque:
23 N*m{ 239 kgf*cm , 17 ft.*lbf }

HINT:

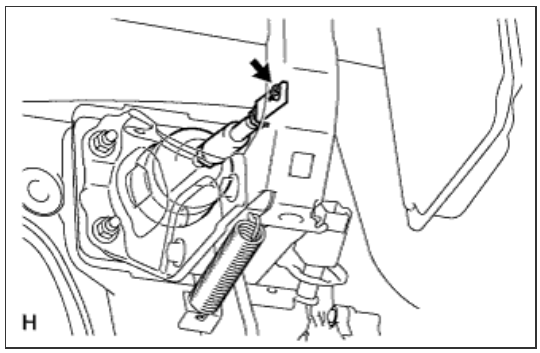
Hold the bolt in place and tighten the nut.



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

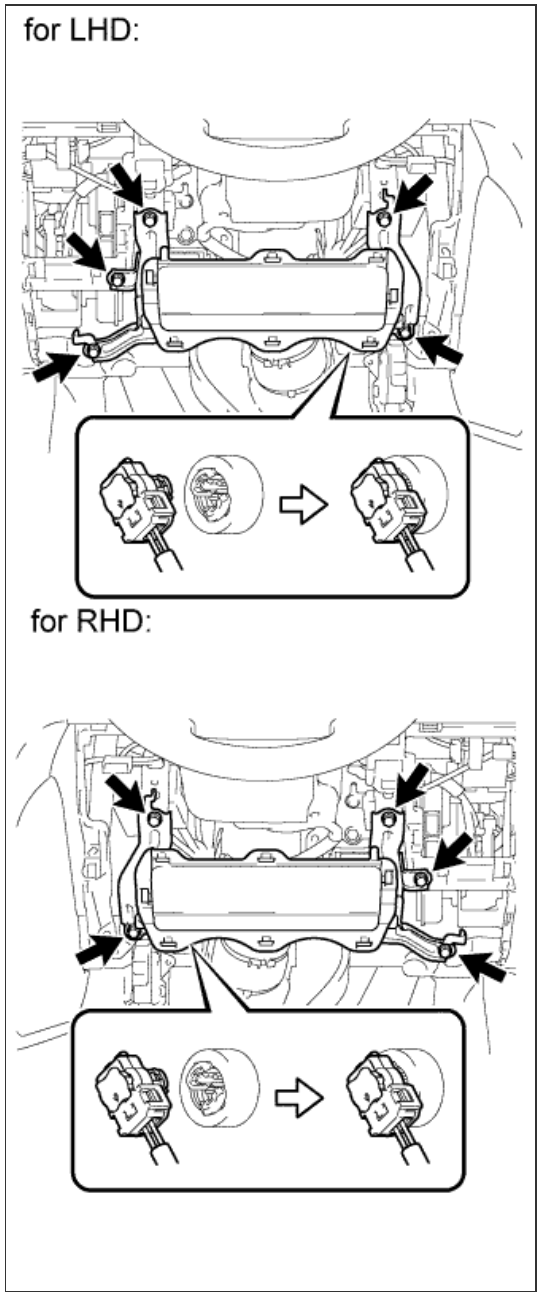
a. Connect the connector.

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 }

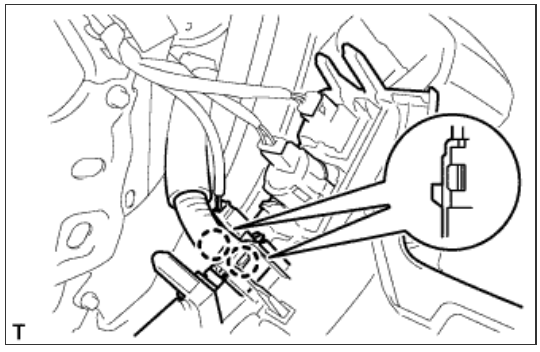


5. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

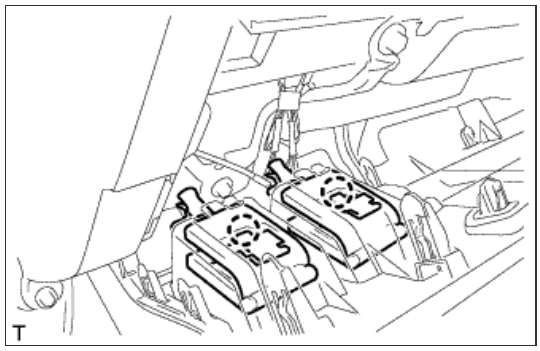
a. Connect the connectors.

b. for Automatic Air Conditioning System:

i. Attach the 2 claws to install the room temperature sensor.



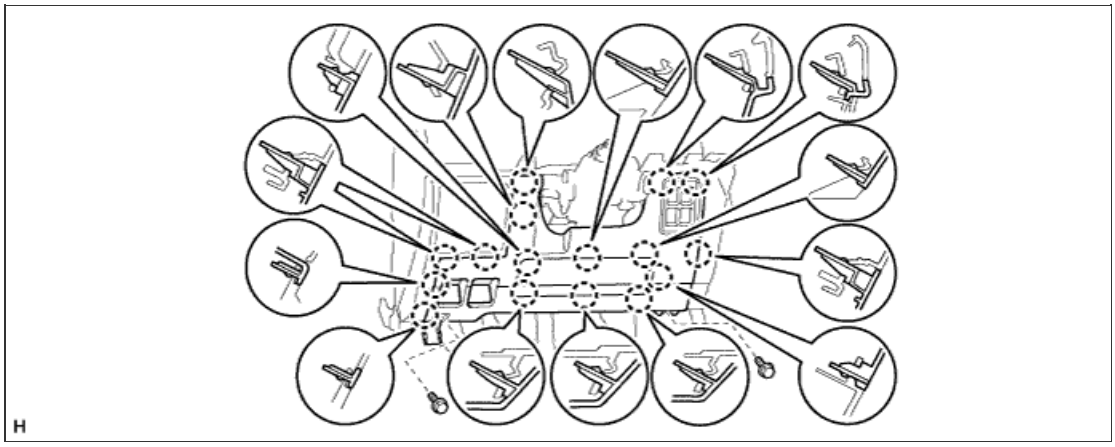
c. Attach the 2 claws to connect the 2 control cables.



d. w/ Driver Side Knee Airbag:

i. Attach the 16 claws to install the lower No. 1 instrument panel finish panel.

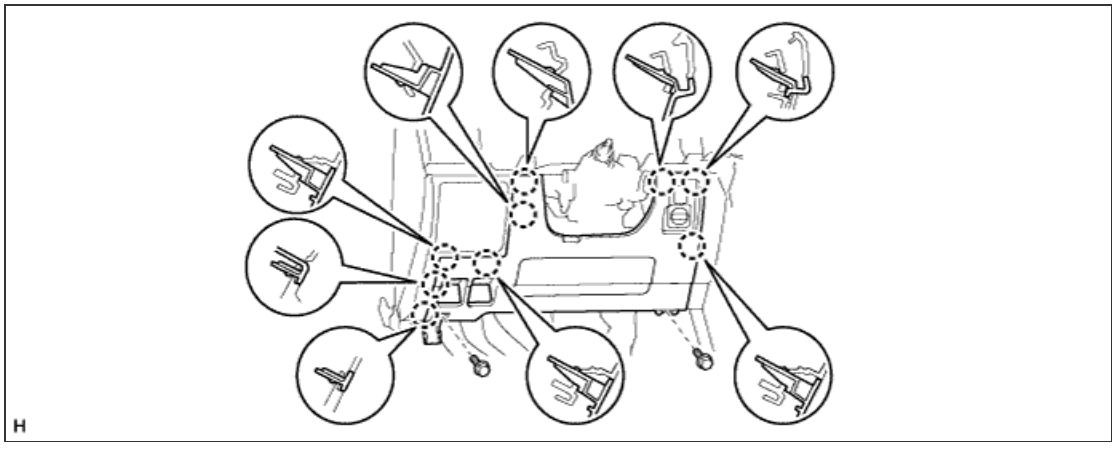
ii. Install the 2 bolts.



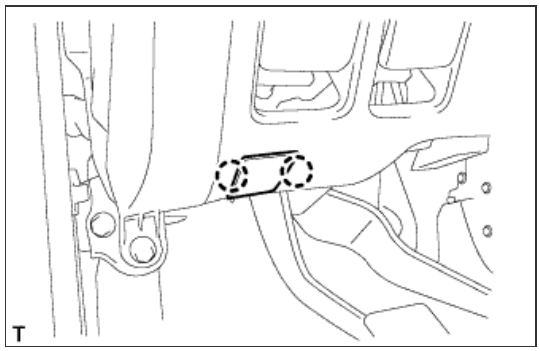
e. w/o Driver Side Knee Airbag:

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.

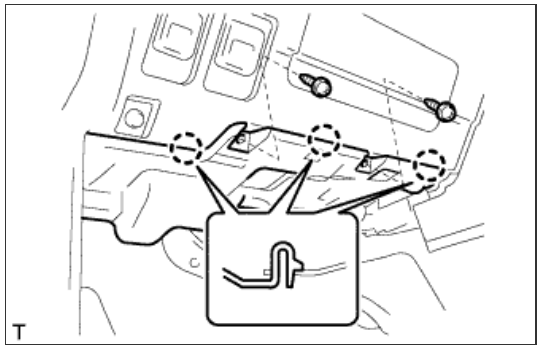


6. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Connect the connectors.

b. Attach the 3 claws to install the No. 1 instrument panel under cover.

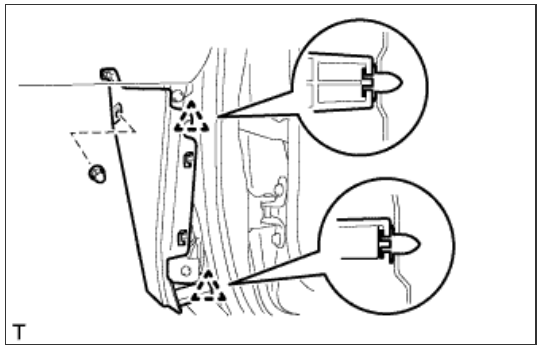
c. Install the 2 screws.



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 initialized after the cable is reconnected (Click here).

10. CHECK BRAKE PEDAL HEIGHT

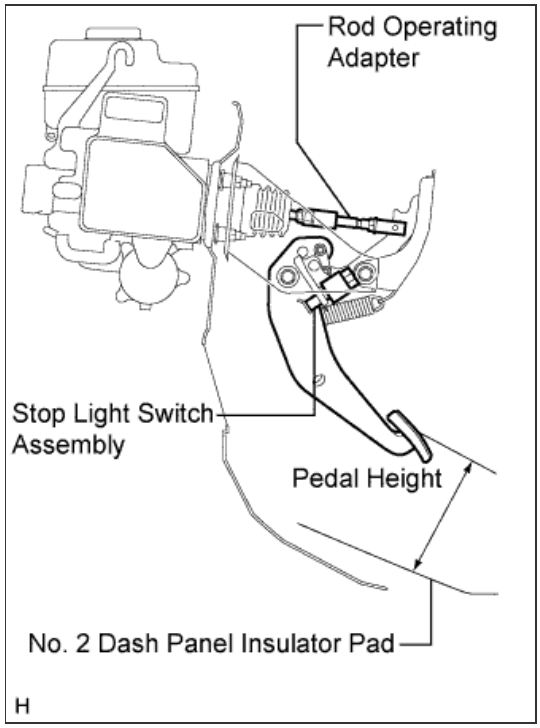
a. Check the brake pedal height.

Standard Pedal Height from No. 2 Dash Panel Insulator Pad:
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.

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.

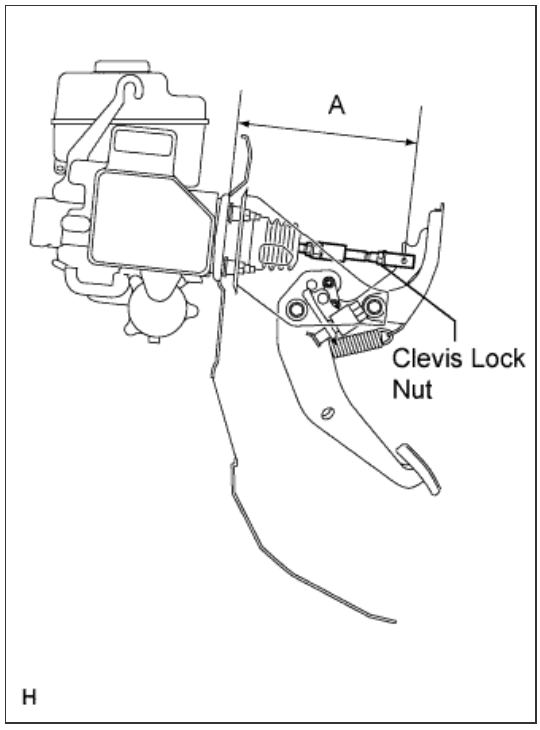
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

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.

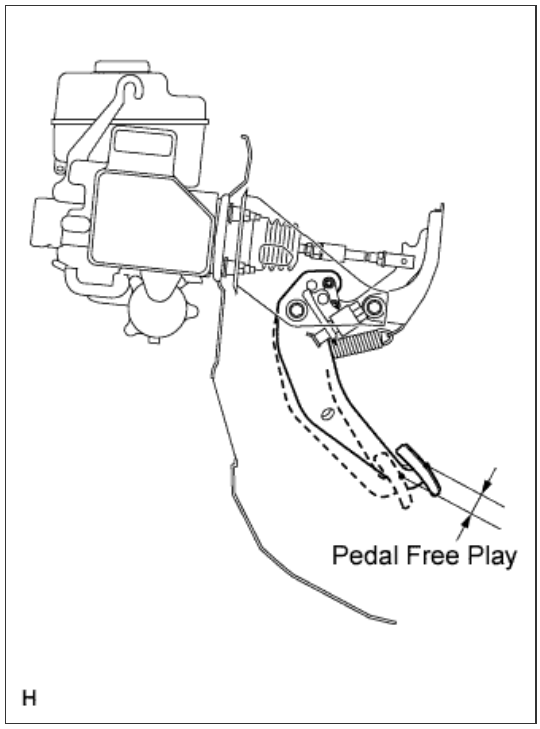
- Even if there is damage, there is no problem if the reserve distance is within the standard value.
- If necessary, replace any damaged parts.



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.)

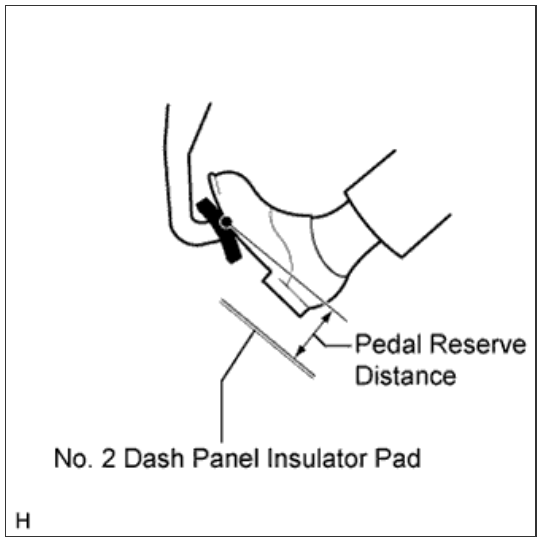


12. CHECK PEDAL RESERVE DISTANCE

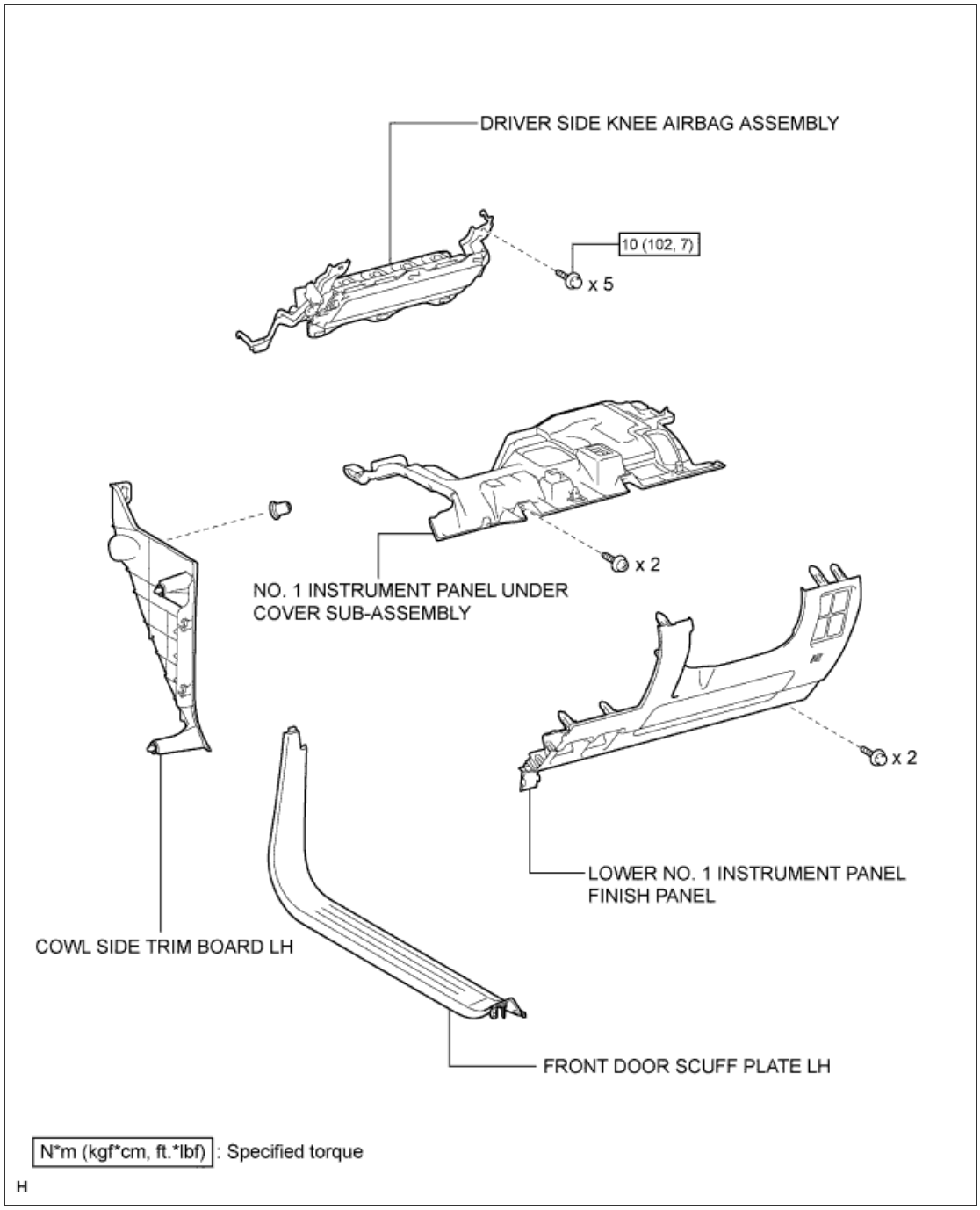
a. Release the parking brake lever.
With the engine running, depress the pedal and measure the pedal reserve distance as shown in the illustration.

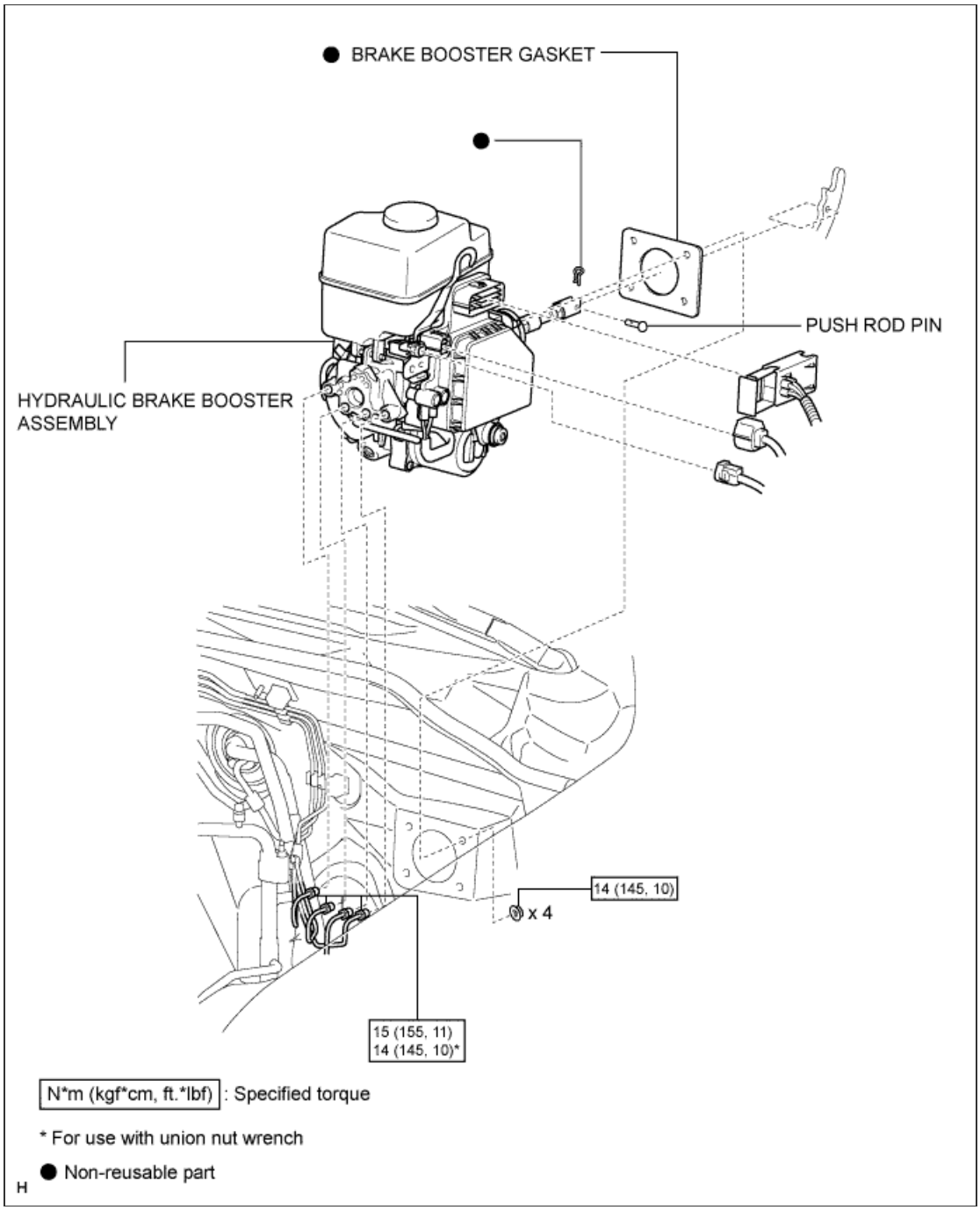
Standard Pedal Reserve Distance from No. 2 Dash Panel Insulator Pad at 490 N (50 kgf, 110.2 lbf):
More than 67.5 mm (2.66 in.)

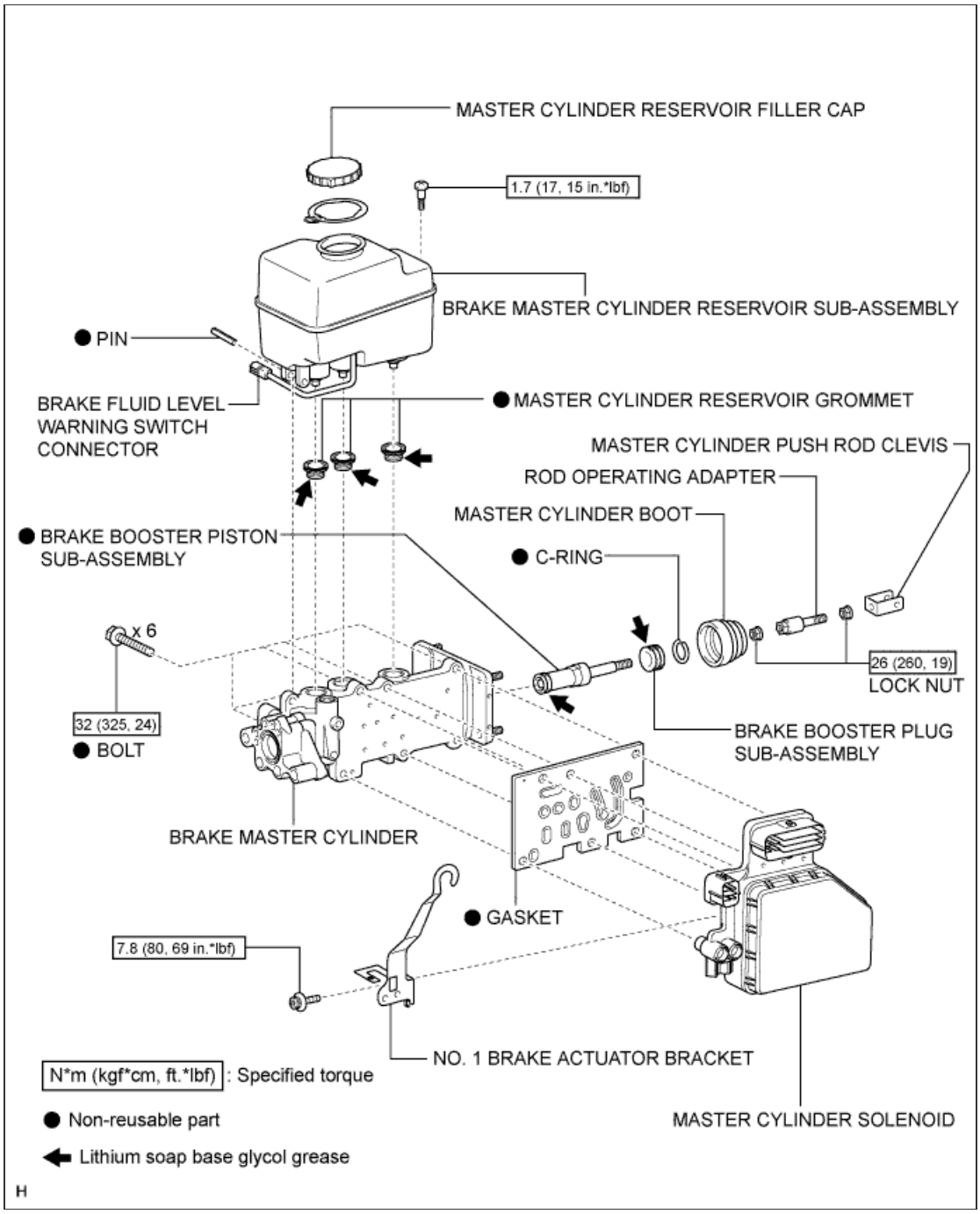
If incorrect, troubleshoot the brake system.

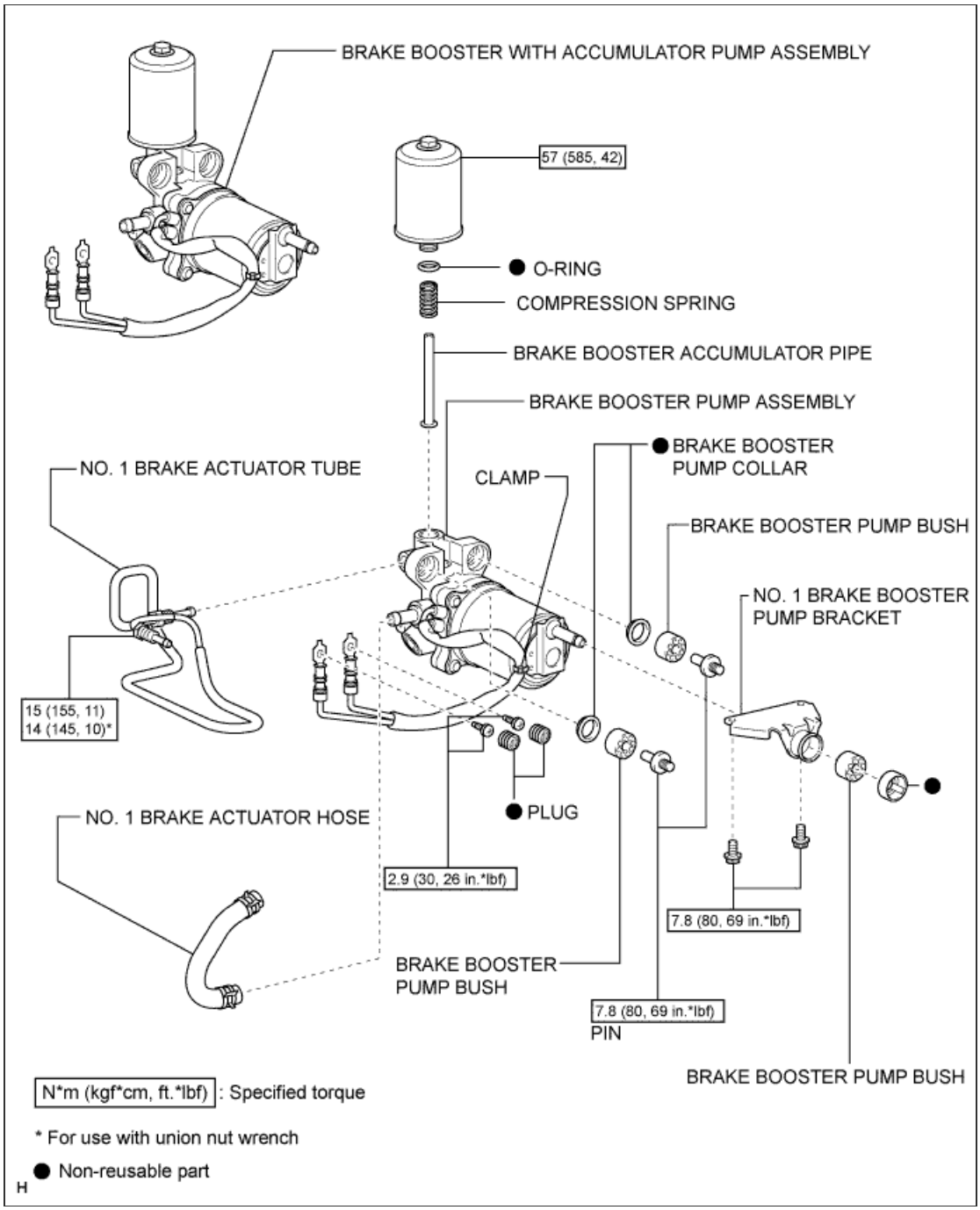


for Preparation Click here




● 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):

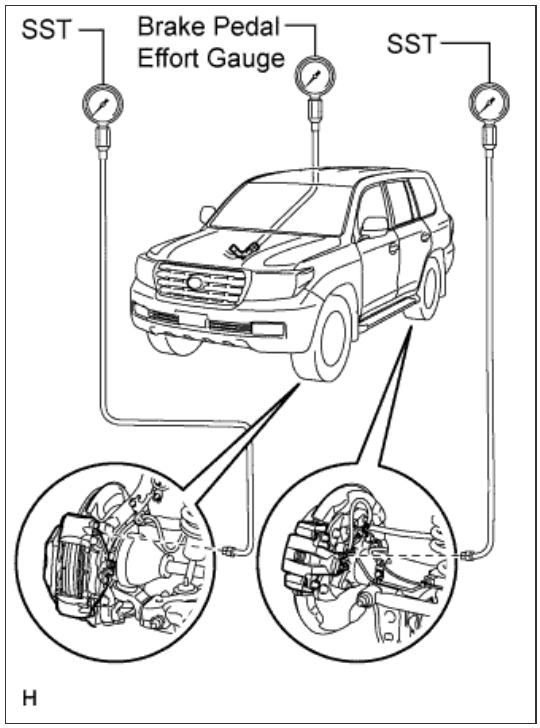
Front Brake Pressure	Rear Brake Pressure
3840 to 5040 kPa (39.2 to 51.3 kgf/cm^2, 557 to 730 psi)	4000 to 5200 kPa (40.8 to 53.0 kgf/cm^2, 580 to 754 psi)

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 GTS to the DLC3.

f. Turn the ignition switch on.

g. Turn the GTS 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 GTS.

ii. Turn "VSC/TRC Solenoid (SRCF)" on with the GTS, 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 GTS 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 GTS.

ii. Turn "VSC/TRC Solenoid (SRCR)" and "VSC/TRC Solenoid (SRCF)" on simultaneously with the GTS, 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 GTS 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 GTS.

ii. Turn "ABS Solenoid (SFRH)" on with the GTS, 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 GTS 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 GTS.

ii. Turn "ABS Solenoid (SFLH)" on with the GTS, 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 GTS 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 GTS.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SFRR)" and "ABS Solenoid (SFRH)" on simultaneously with the GTS.

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 GTS 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 GTS.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SFLR)" and "ABS Solenoid (SFLH)" on simultaneously with the GTS.

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 GTS 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 GTS.

ii. Depress the brake pedal with a stable force, then turn "VSC/TRC Solenoid (SRMF)" on with the GTS.

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 GTS 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 GTS.

ii. Turn "VSC/TRC Solenoid (SRMR)" and "VSC/TRC Solenoid (SRMF)" on simultaneously with the GTS.

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 GTS 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 GTS.

ii. Turn "ABS Solenoid (SRRH)" on with the GTS, 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 GTS 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 GTS.

ii. Turn "ABS solenoid (SRLH)" on with the GTS, 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 GTS 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 GTS.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SRRR)" and "ABS Solenoid (SRRH)" on simultaneously with the GTS.

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 GTS 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 GTS.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SRLR)" and "ABS Solenoid (SRLH)" on simultaneously with the GTS.

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 GTS 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 GTS.

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:

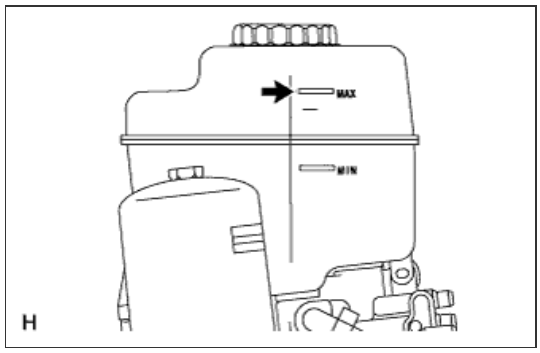
When the pressure in the accumulator is released, the pedal stroke will lengthen.

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. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here).

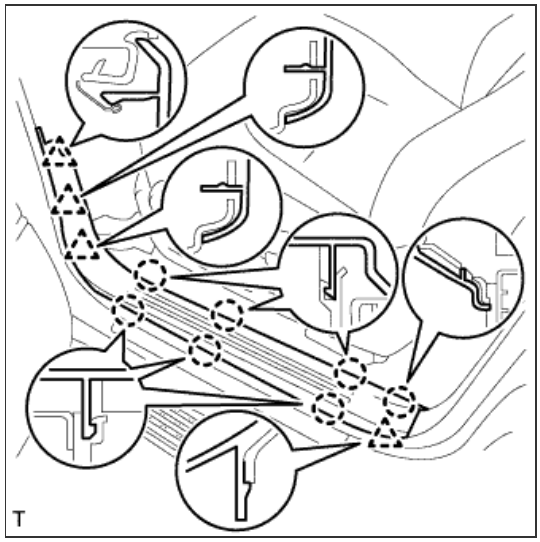
3. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

4. REMOVE FRONT DOOR SCUFF PLATE LH

a. Detach the 7 claws and 4 clips, and remove the scuff plate.

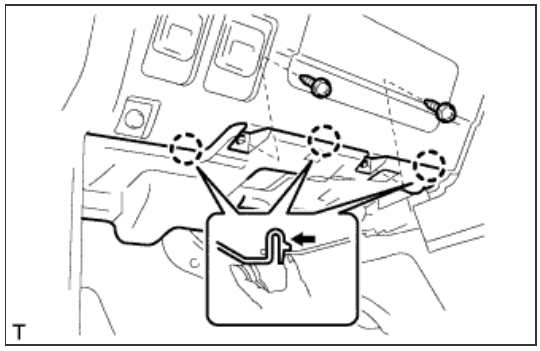


5. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Remove the 2 screws.

b. Detach the 3 claws.

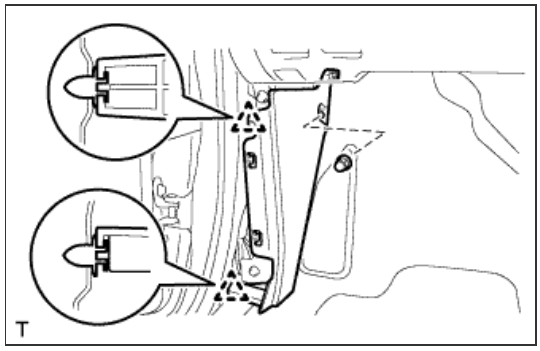
c. Disconnect the connectors and remove the No. 1 instrument panel under cover.



6. REMOVE COWL SIDE TRIM BOARD LH

a. Remove the cap nut.

b. Detach the 2 clips and remove the cowl side trim board.



7. REMOVE LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

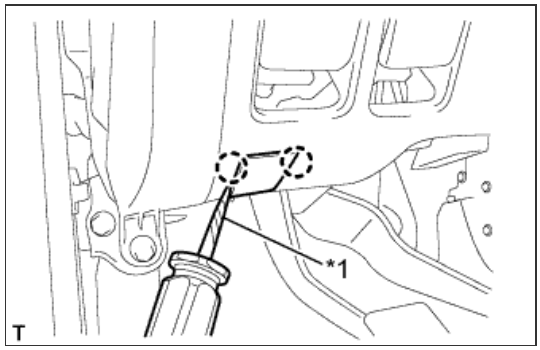
a. Using a screwdriver, detach the 2 claws and open the hole cover.

HINT:

Tape the screwdriver tip before use.

Text in Illustration

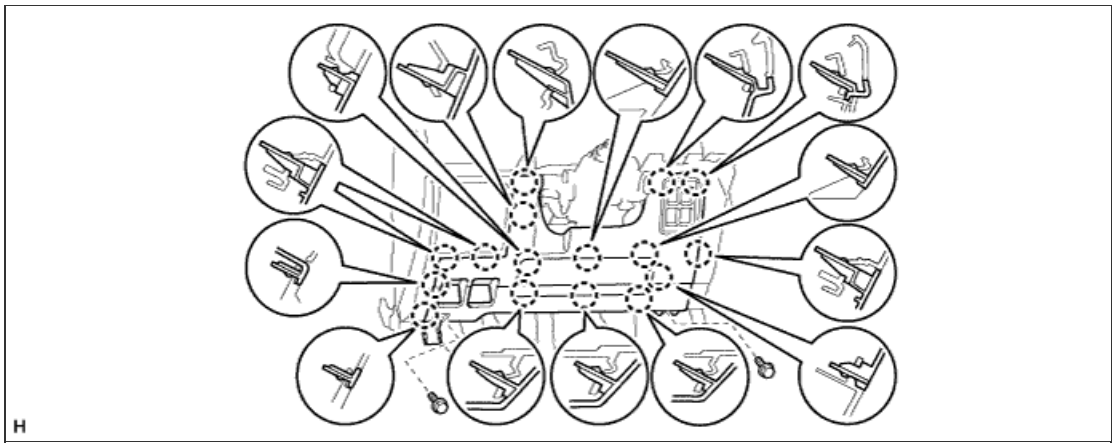
*1	Protective Tape



b. w/ Driver Side Knee Airbag:

i. Remove the 2 bolts.

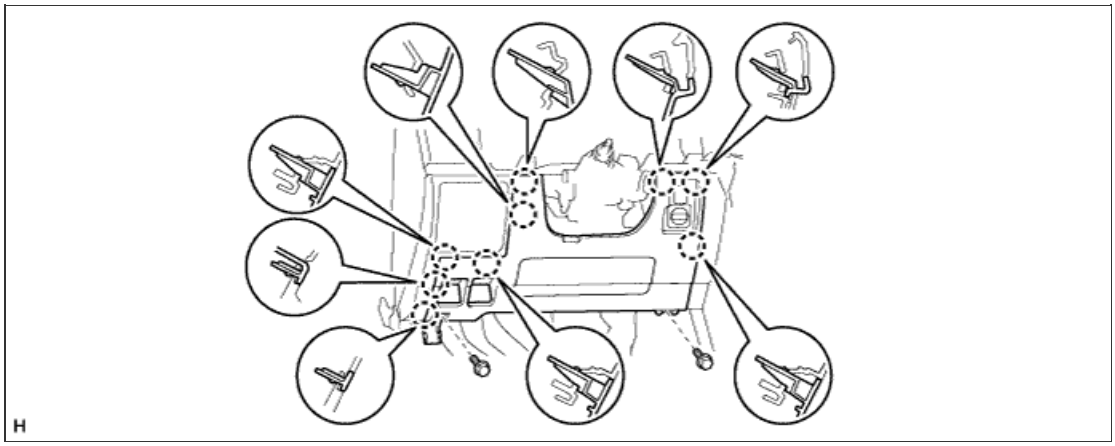
ii. Detach the 16 claws.



c. w/o Driver Side Knee Airbag:

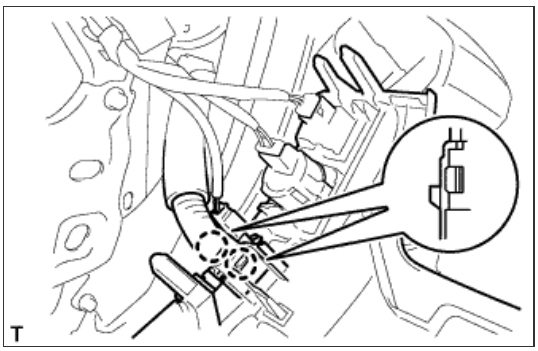
i. Remove the 2 bolts.

ii. Detach the 9 claws.



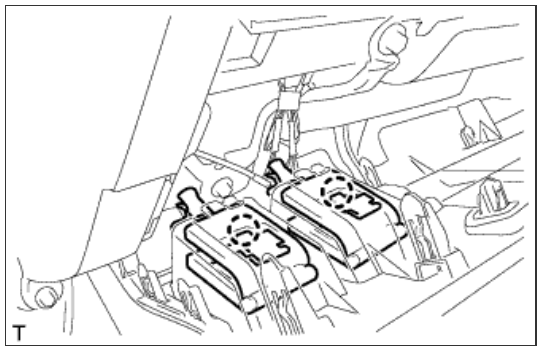
d. for Automatic Air Conditioning System:

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.



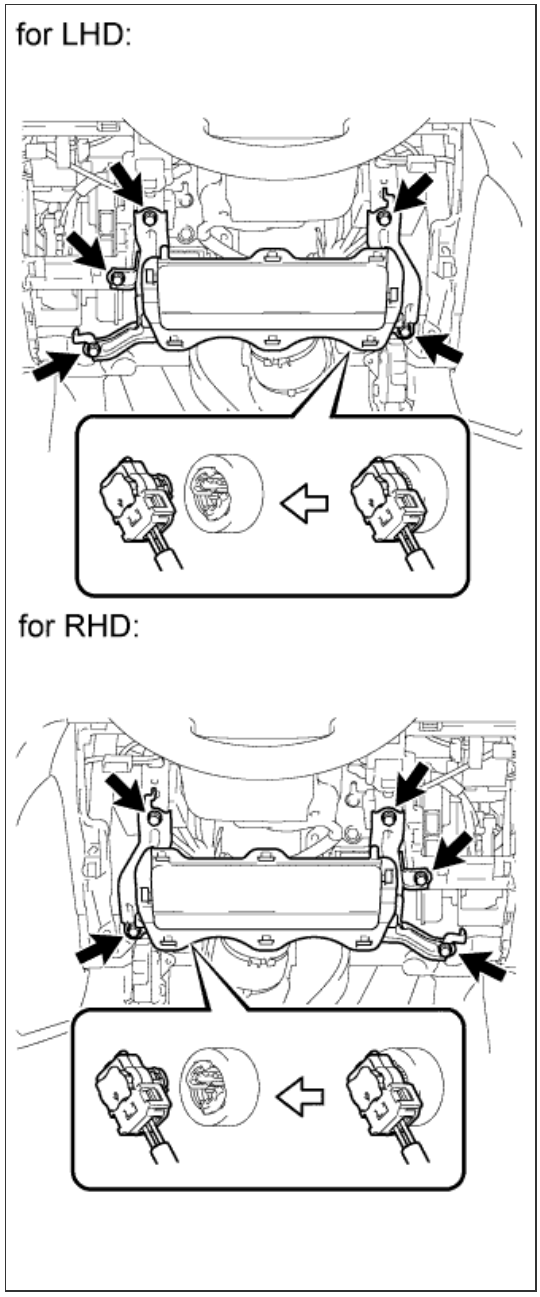
8. REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY

a. Remove the 5 bolts and driver side knee airbag.

b. Disconnect the connector.

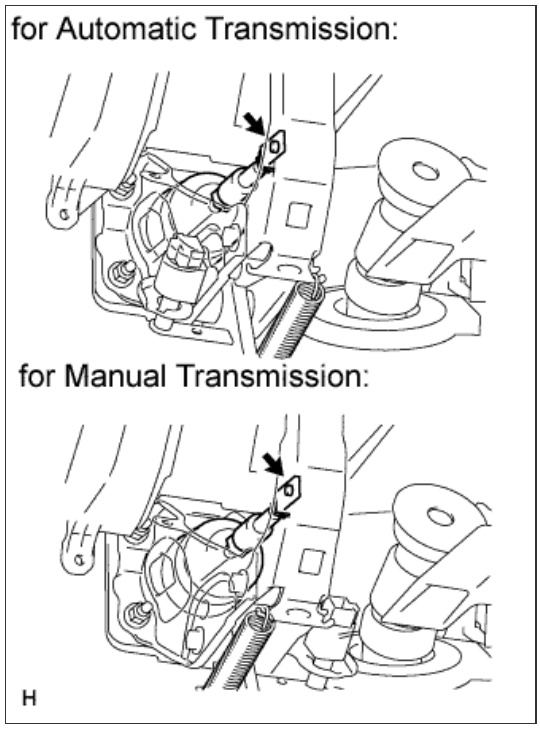
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



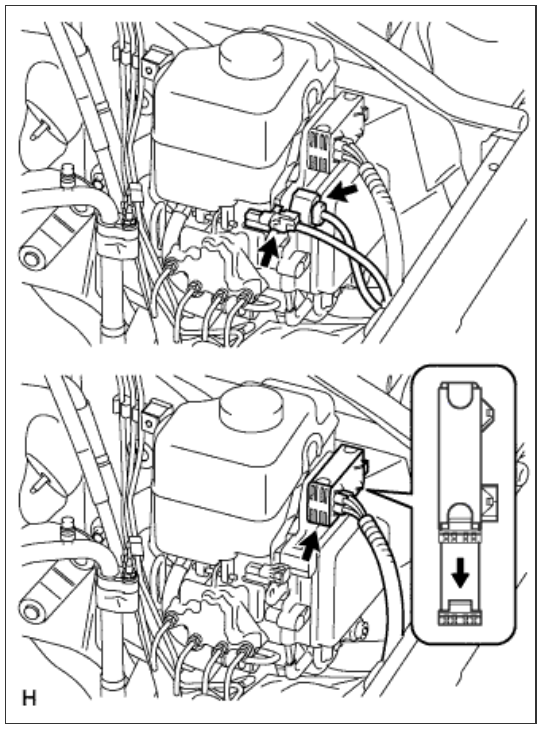
9. REMOVE PUSH ROD PIN

a. Remove the clip and push rod pin from the brake pedal lever.

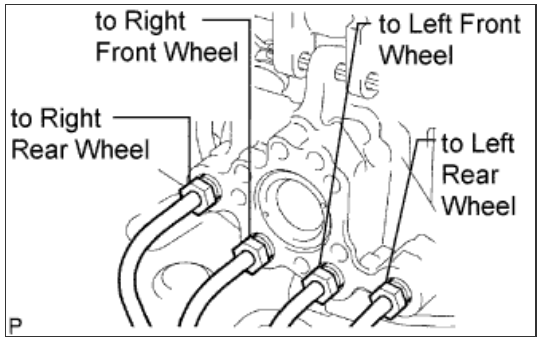


10. REMOVE HYDRAULIC BRAKE BOOSTER ASSEMBLY

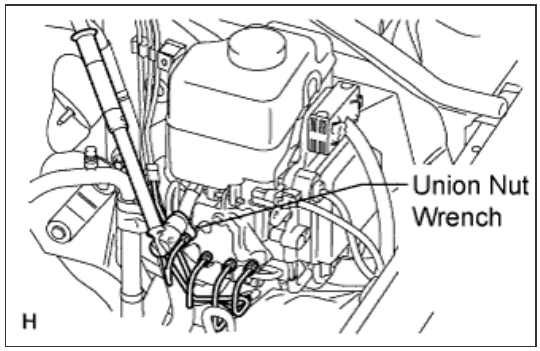
a. Disconnect the 3 connectors from the hydraulic brake booster assembly.



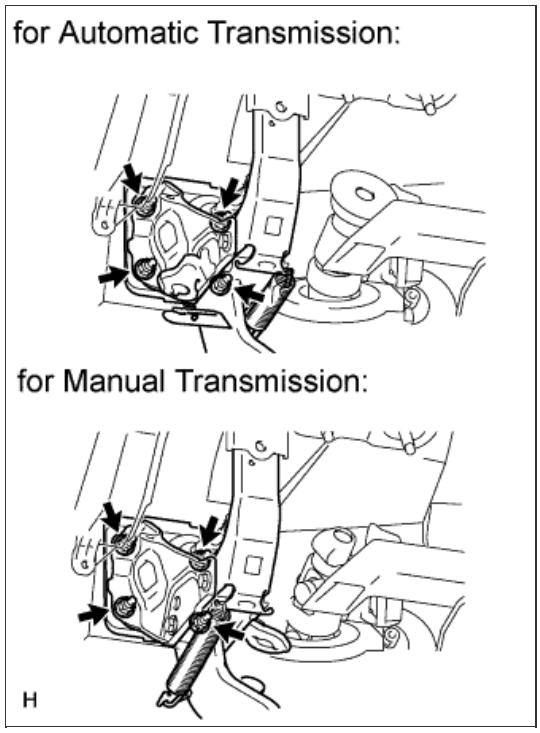
b. Use tags or make a memo to identify the place to reconnect.



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.



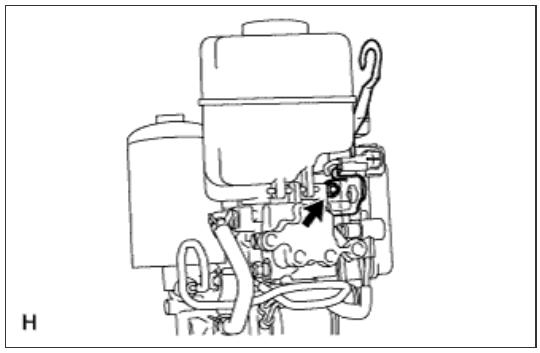
11. REMOVE BRAKE BOOSTER GASKET

a. Remove the brake booster gasket from the hydraulic brake booster assembly.

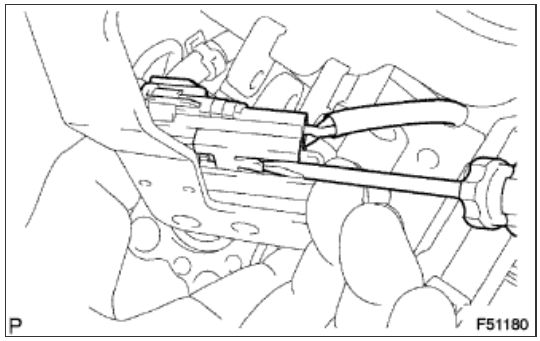
for Preparation Click here

1. REMOVE NO. 1 BRAKE ACTUATOR BRACKET

a. Using a 5 mm hexagon wrench, remove the bolt and No. 1 brake actuator bracket.

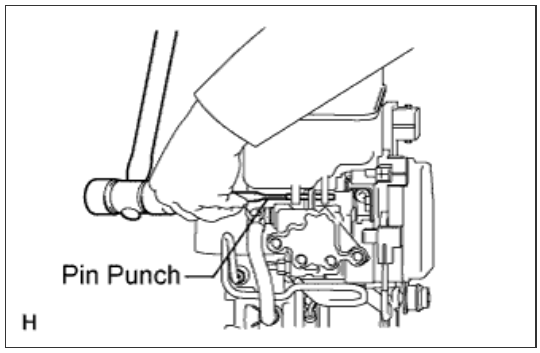


b. Using a screwdriver, disconnect the brake fluid level warning switch connector from the No. 1 brake actuator bracket.



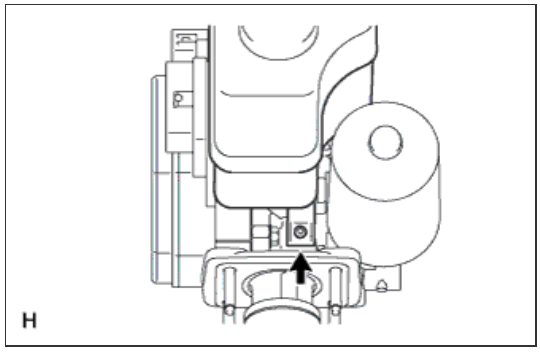
2. REMOVE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

a. Using a pin punch and hammer, remove the pin from the brake master cylinder reservoir.



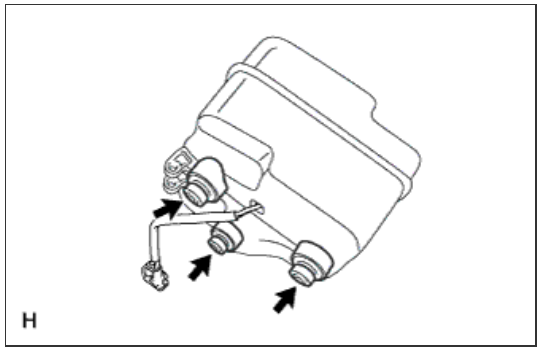
b. Remove the screw and pull out the brake master cylinder reservoir sub-assembly.

c. Remove the master cylinder reservoir filler cap.



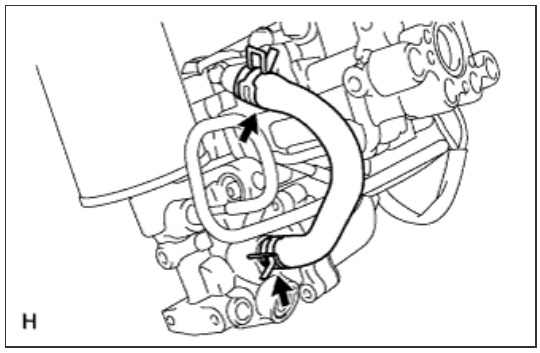
3. REMOVE MASTER CYLINDER RESERVOIR GROMMET

a. Remove the 3 reservoir grommets from the master cylinder reservoir.



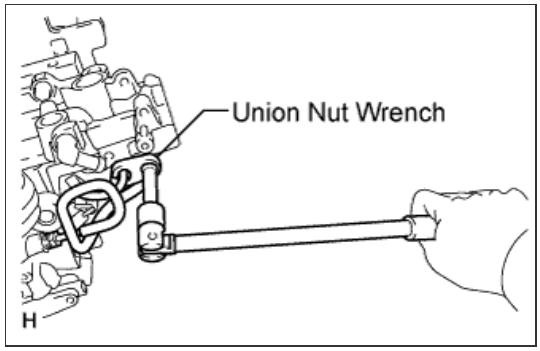
4. REMOVE NO. 1 BRAKE ACTUATOR HOSE

a. Using needle nose pliers, slide the 2 clips and remove the brake actuator hose and 2 clips.



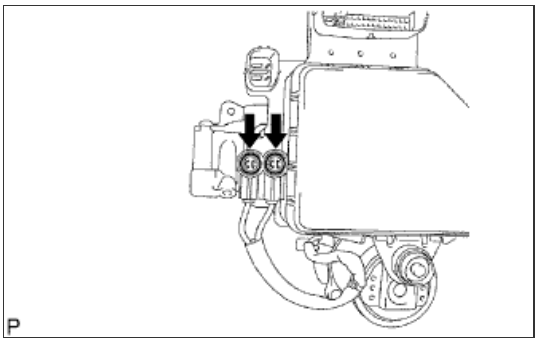
5. REMOVE NO. 1 BRAKE ACTUATOR TUBE

a. Using a union nut wrench, remove the No. 1 brake actuator tube.

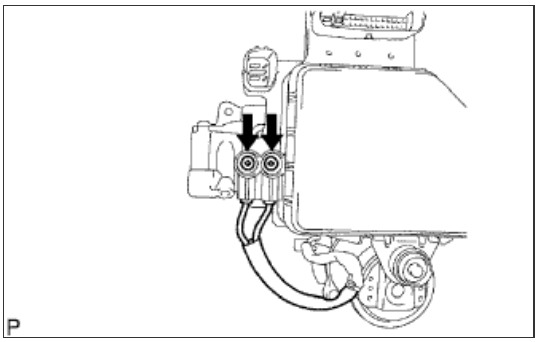


6. REMOVE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

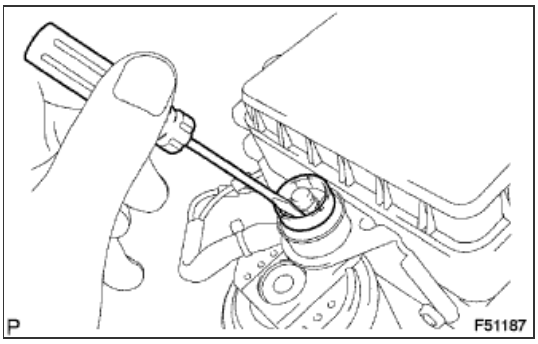
a. Using a screwdriver, remove the 2 plugs.



b. Remove the 2 screws and disconnect the wire harnesses from the master cylinder solenoid.

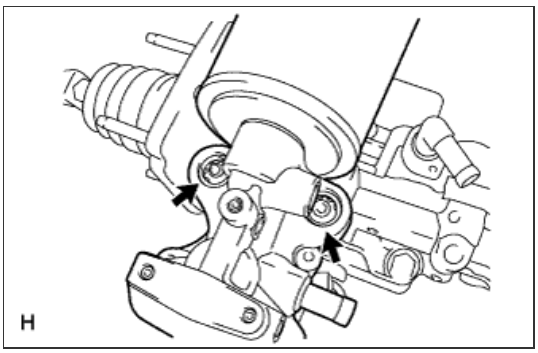


c. Using a screwdriver, remove the clip.

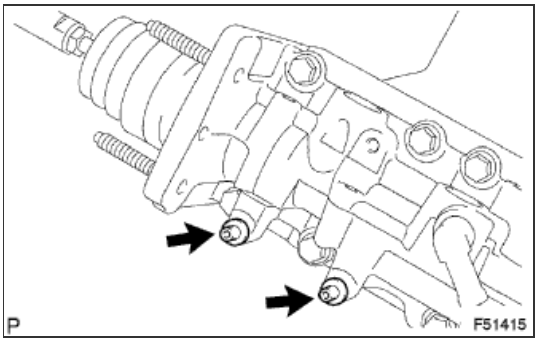


d. Remove the brake booster with accumulator pump assembly from the brake master cylinder.

e. Remove the 2 brake booster pump collars and 2 brake booster pump bushes from the brake booster with accumulator pump assembly.



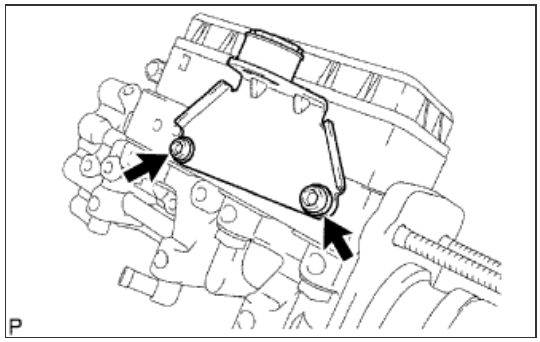
f. Using a 4 mm hexagon wrench, remove the 2 pins.



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.

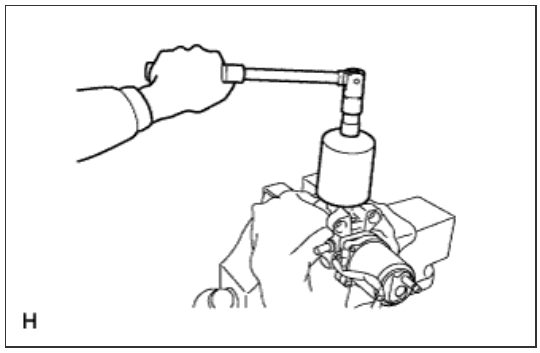
b. Remove the brake booster accumulator.

c. Remove the O-ring from the brake booster accumulator.

NOTICE:

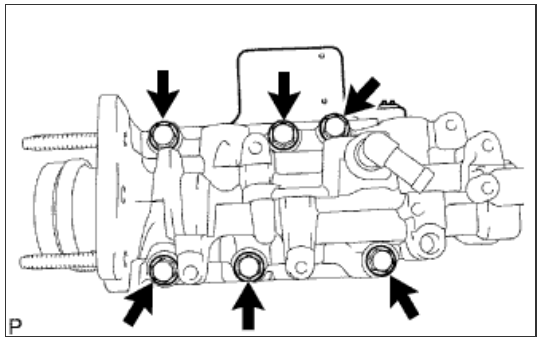
Ensure no foreign matter enters the pump.

d. Remove the brake booster accumulator pipe and compression spring.

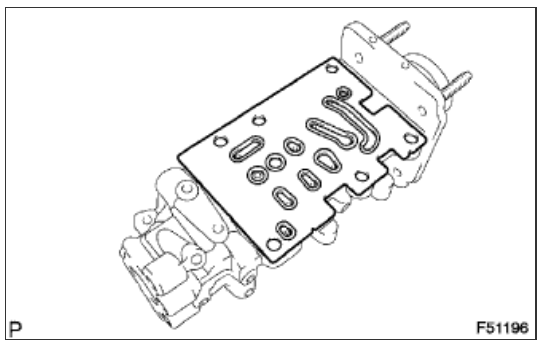


9. REMOVE MASTER CYLINDER SOLENOID

a. Remove the 6 bolts and master cylinder solenoid.



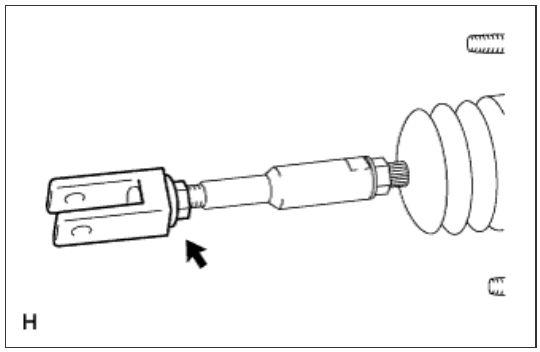
b. Remove the gasket.



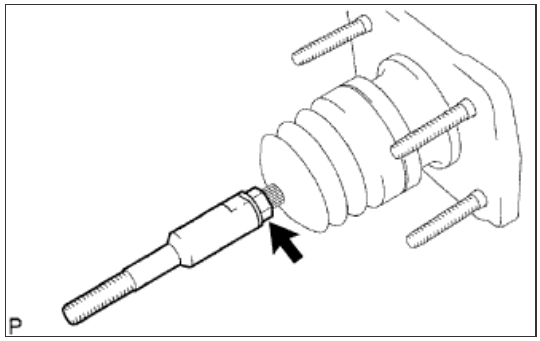
10. REMOVE MASTER CYLINDER PUSH ROD CLEVIS

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:

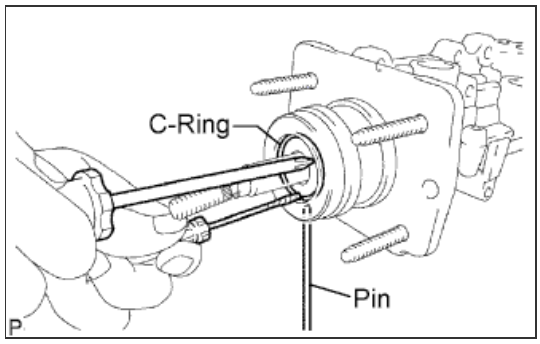
Tape the screwdriver tip before use.

b. Remove the plug from the piston.

c. Remove the piston by pulling it straight out, not at an angle.

NOTICE:

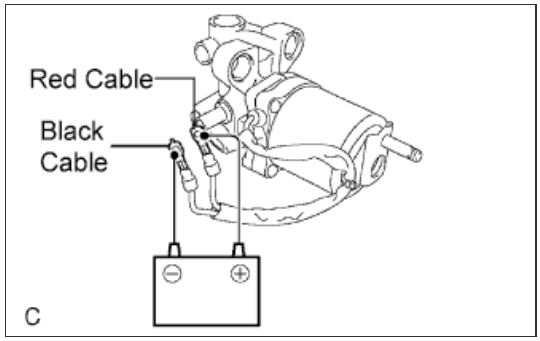
If the piston is pulled out at an angle, there is a possibility that the cylinder bore could be damaged.



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:

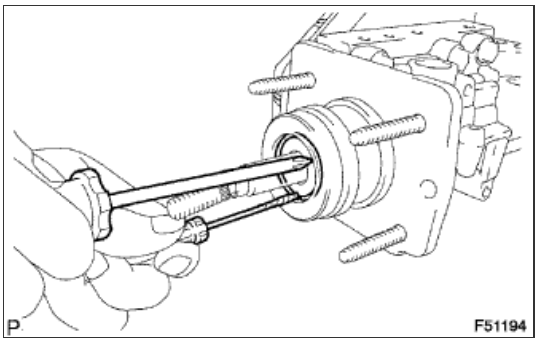
When installing, be careful not to damage the seals, etc.

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.

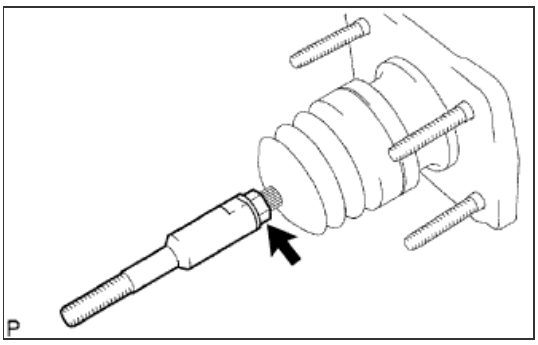


2. INSTALL MASTER CYLINDER BOOT

3. INSTALL MASTER CYLINDER PUSH ROD CLEVIS

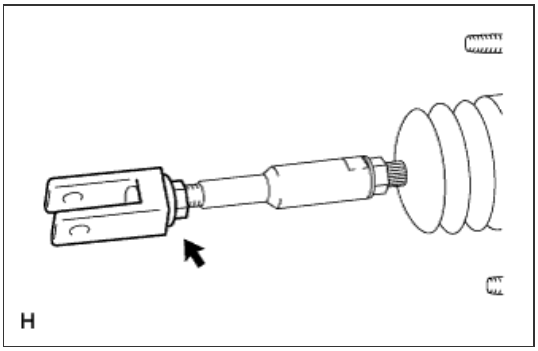
a. Install the brake master cylinder side lock nut and rod operating adapter to the brake master cylinder.

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 }

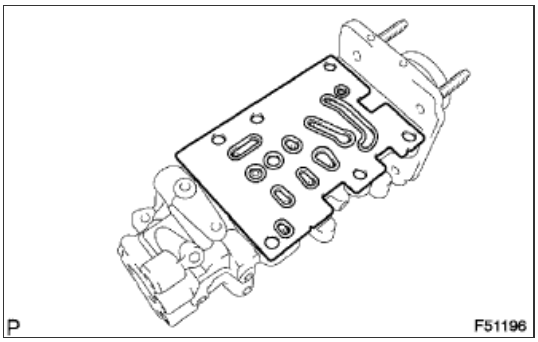


4. INSTALL MASTER CYLINDER SOLENOID

a. Install a new gasket.

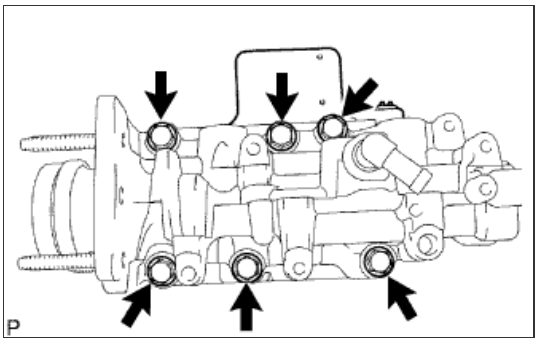
NOTICE:

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.

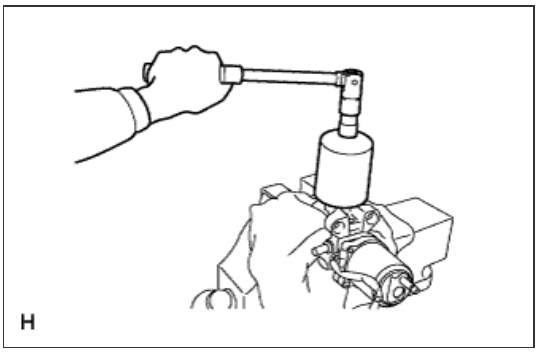
NOTICE:

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 }

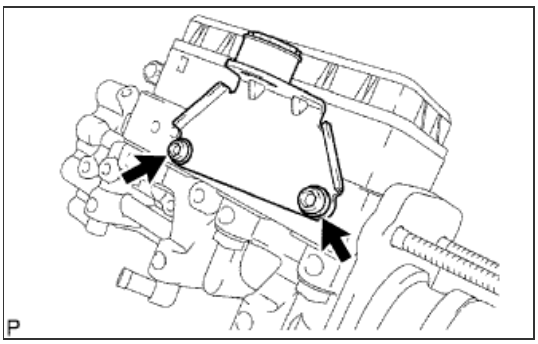


6. INSTALL NO. 1 BRAKE BOOSTER PUMP BRACKET

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 }

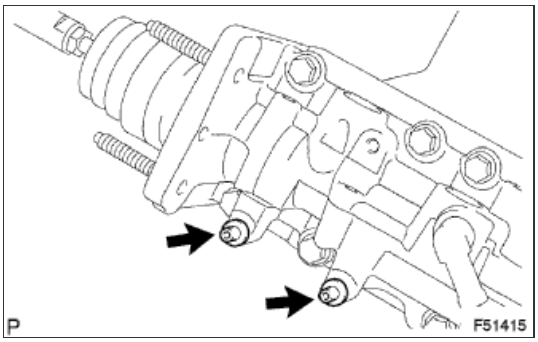


7. INSTALL BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

a. Using a 4 mm hexagon wrench, install the 2 pins to the brake master cylinder.

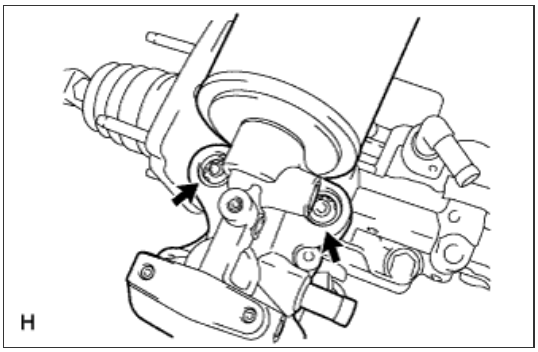
Torque:

7.8 N*m{ 80 kgf*cm , 69 in.*lbf }

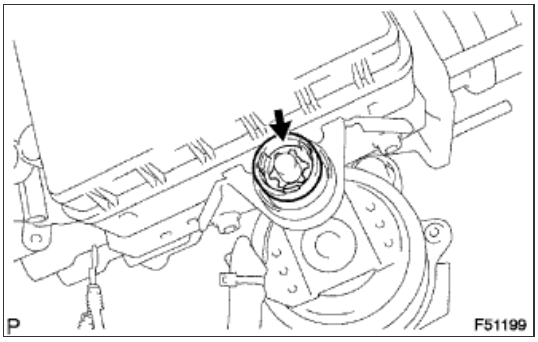


b. Install 2 new brake booster pump collars and 2 brake booster pump bushes to the brake booster with accumulator pump assembly.

c. Install the brake booster with accumulator pump assembly to the brake master cylinder.

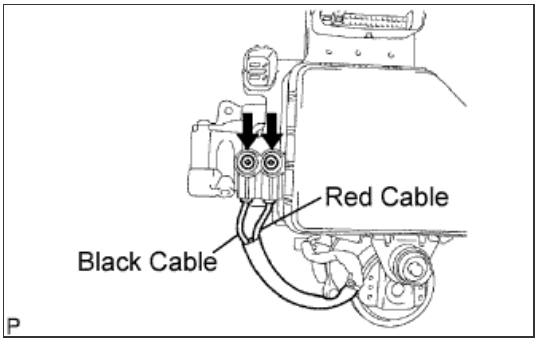


d. Install a new clip.

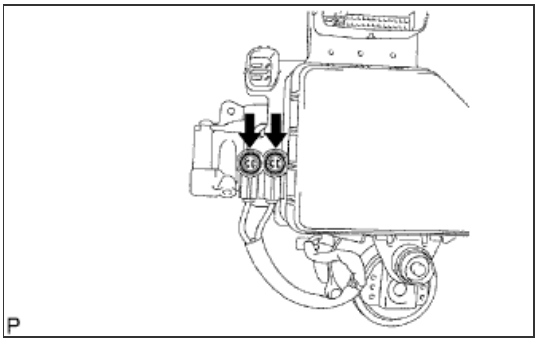


e. Connect the wire harnesses with the 2 screws.

Torque:
2.9 N*m{ 30 kgf*cm , 26 in.*lbf }



f. Install 2 new plugs.



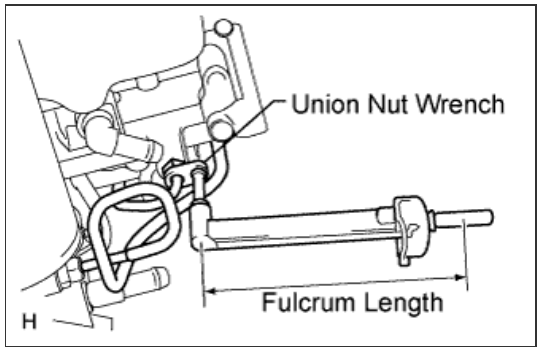
8. INSTALL NO. 1 BRAKE ACTUATOR TUBE

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 }

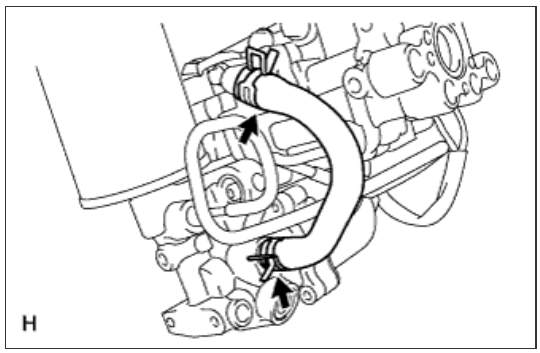
HINT:

- **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.



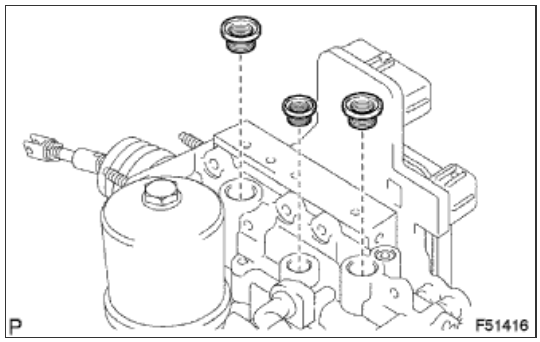
10. INSTALL MASTER CYLINDER RESERVOIR GROMMET

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.

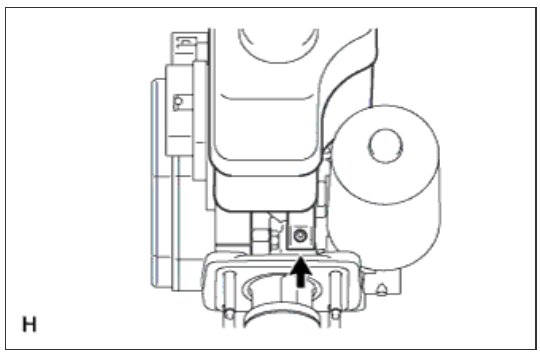


11. INSTALL BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

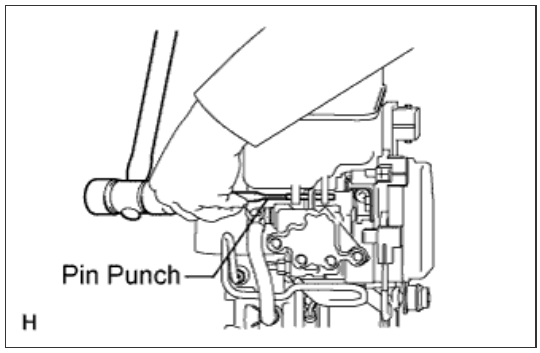
a. Install the brake master cylinder reservoir sub-assembly with the screw.

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.

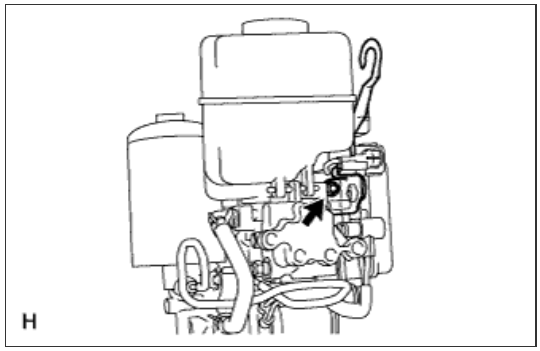


12. INSTALL NO. 1 BRAKE ACTUATOR BRACKET

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

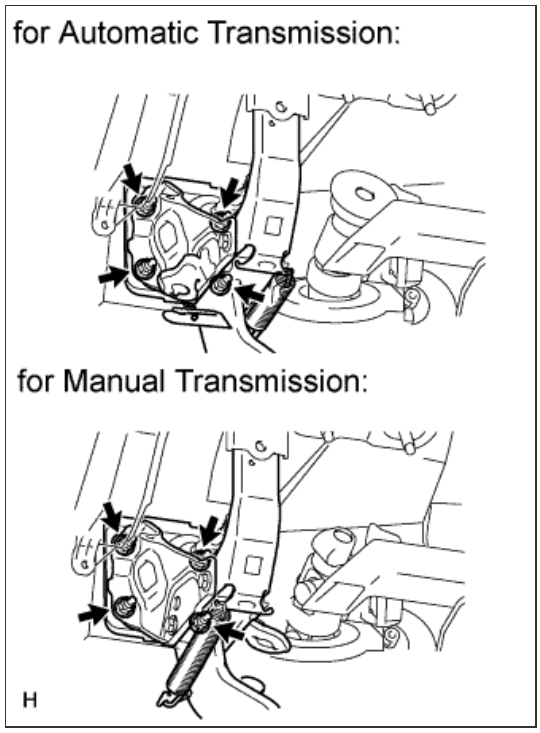
1. INSTALL BRAKE BOOSTER GASKET

a. Install a new brake booster gasket to the hydraulic brake booster.

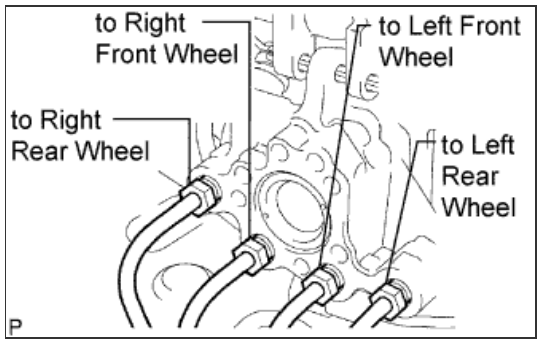
2. INSTALL HYDRAULIC BRAKE BOOSTER ASSEMBLY

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.

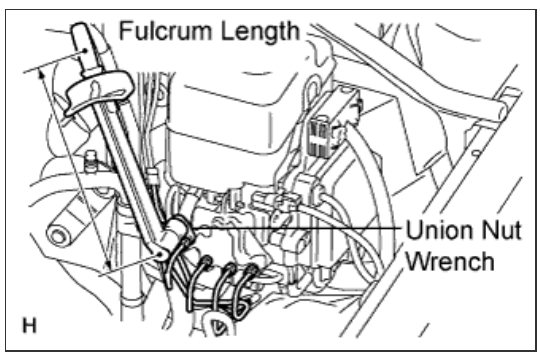


c. Using a union nut wrench, tighten the 4 brake lines.

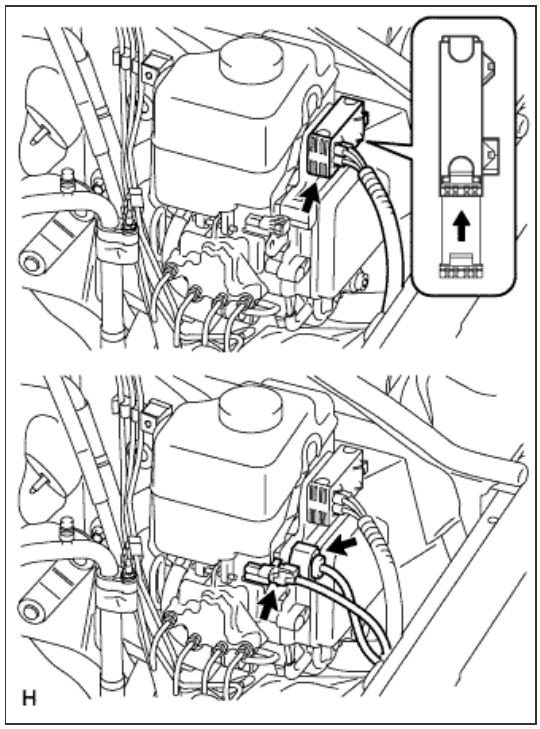
Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

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.**



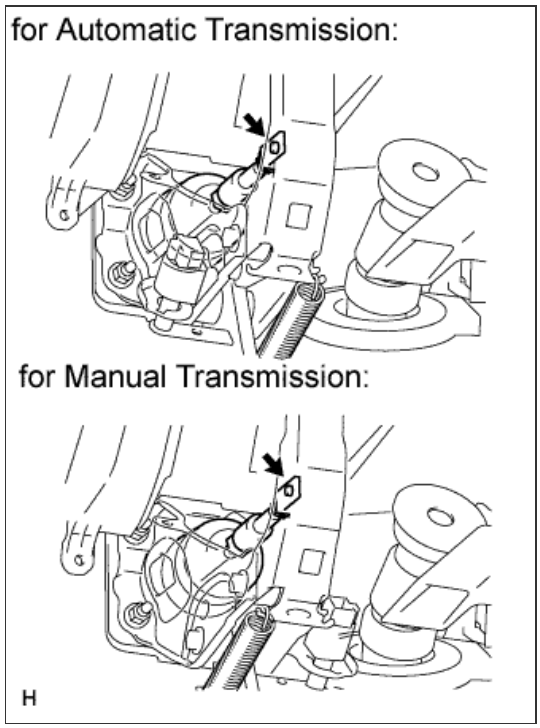
d. Connect the 3 connectors to the hydraulic brake booster.



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.

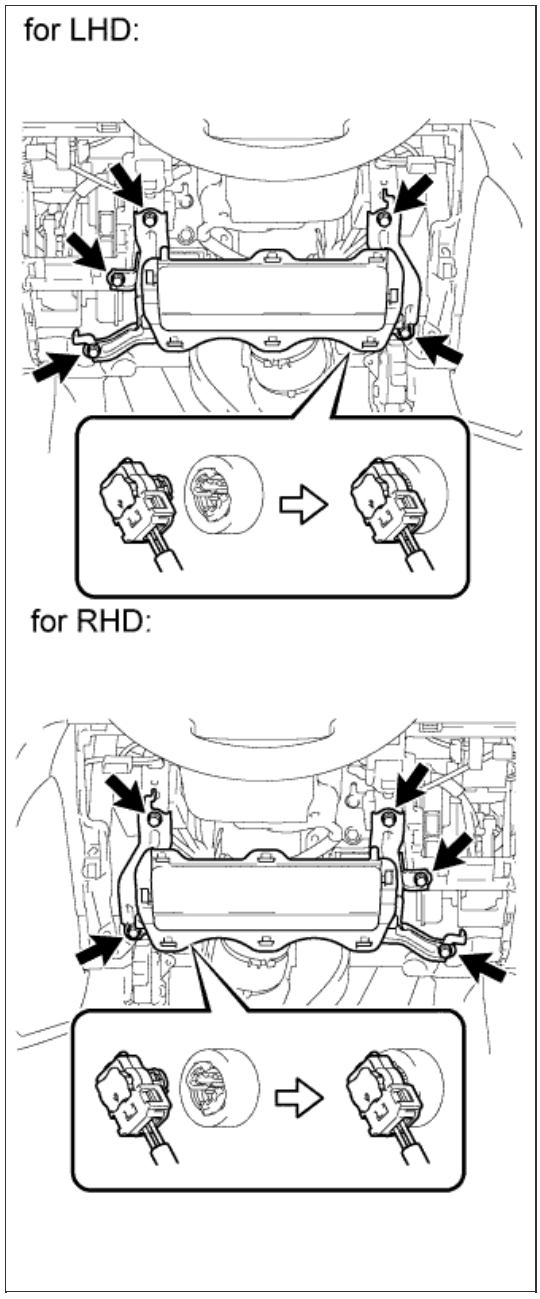
NOTICE:

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 }

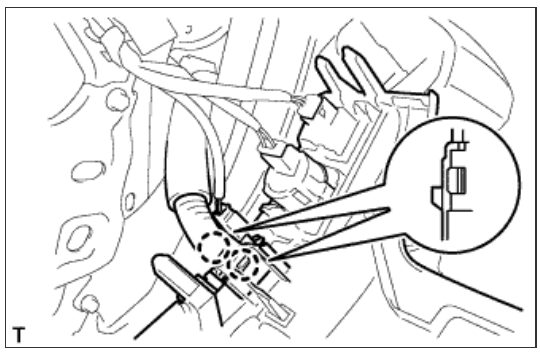


5. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

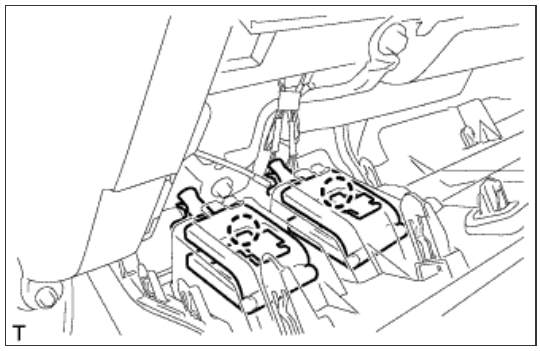
a. Connect the connectors.

b. for Automatic Air Conditioning System:

i. Attach the 2 claws to install the room temperature sensor.



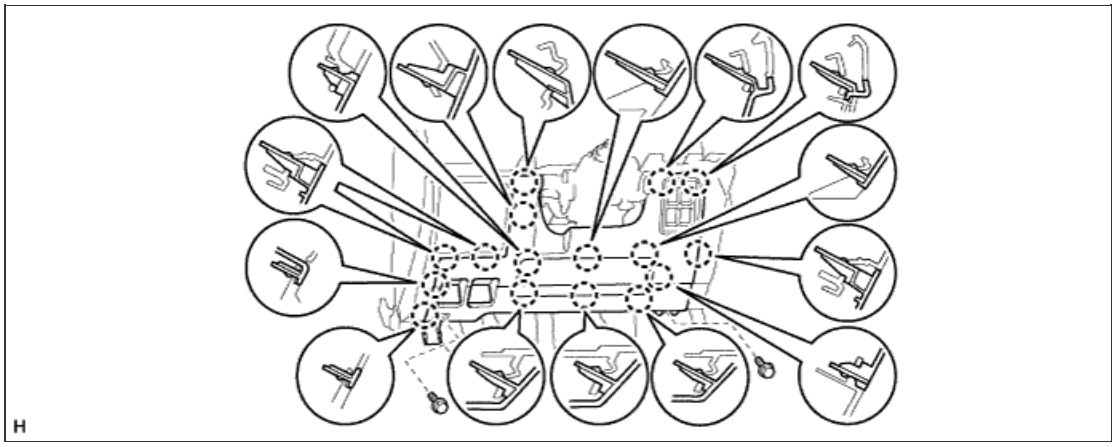
c. Attach the 2 claws to connect the 2 control cables.



d. w/ Driver Side Knee Airbag:

i. Attach the 16 claws to install the lower No. 1 instrument panel finish panel.

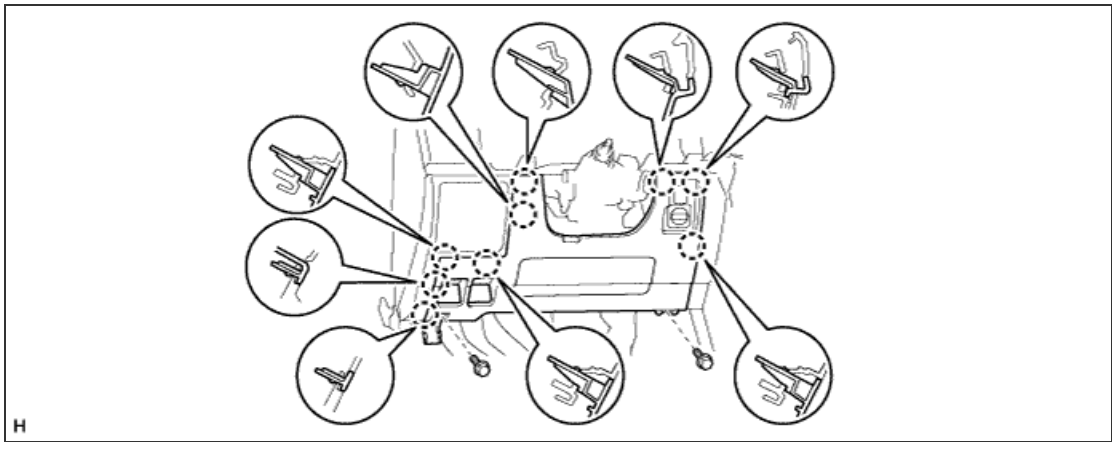
ii. Install the 2 bolts.



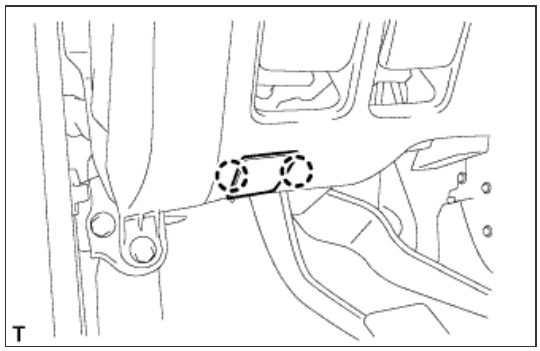
e. w/o Driver Side Knee Airbag:

i. Attach the 9 claws to install the lower No. 1 instrument panel finish panel.

ii. Install the 2 bolts.



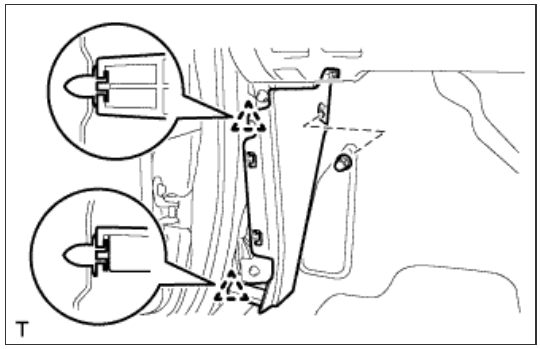
f. Attach the 2 claws to close the hole cover.



6. INSTALL COWL SIDE TRIM BOARD LH

a. Attach the 2 clips to install the cowl side trim board.

b. Install the cap nut.

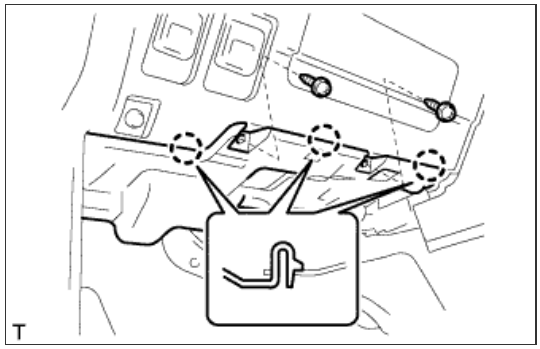


7. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Connect the connectors.

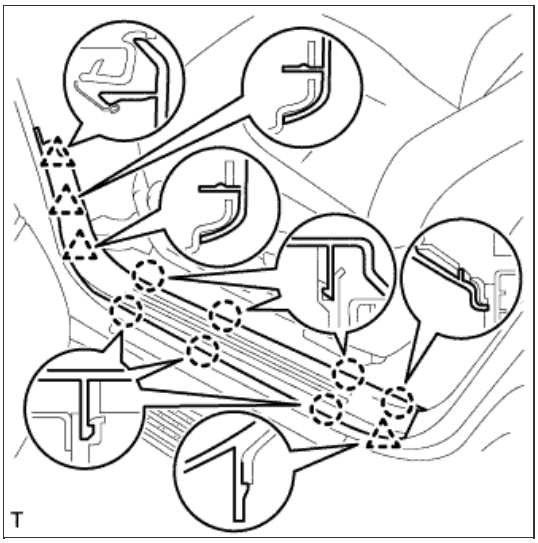
b. Attach the 3 claws to install the No. 1 instrument panel under cover.

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 GTS, damage or accidents may result. Therefore, always use the GTS 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 GTS to the DLC3.

k. Turn the ignition switch to ON.

l. Turn the GTS 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 GTS 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

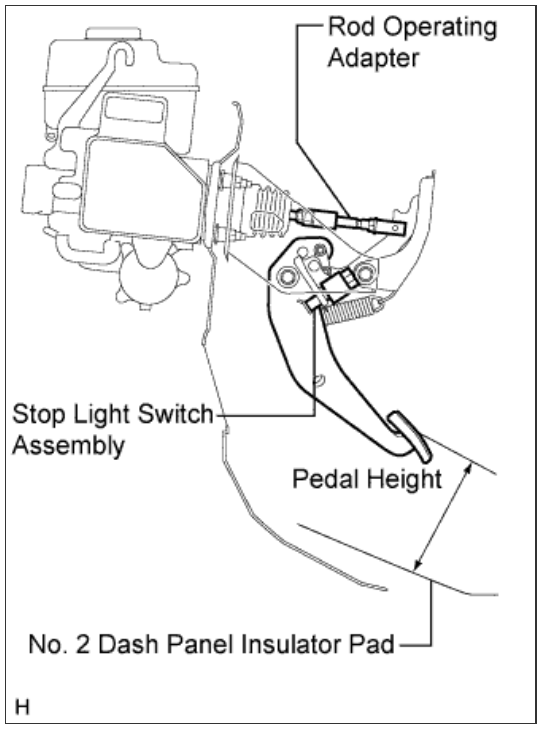
a. Check the brake pedal height.

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. 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.

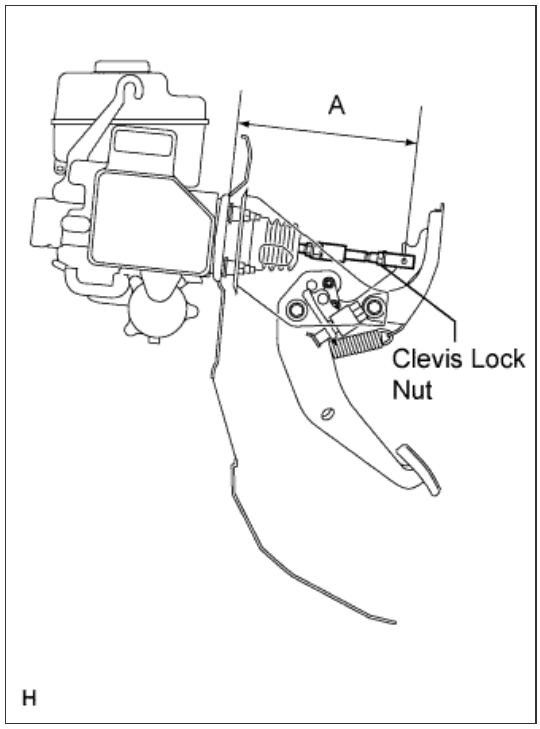
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

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.

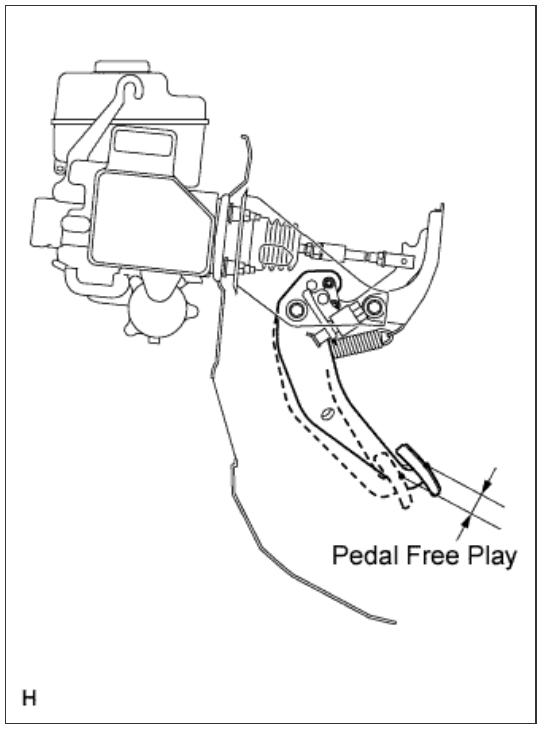
- Even if there is damage, there is no problem if the reserve distance is within the standard value.
- If necessary, replace any damaged parts.



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.)

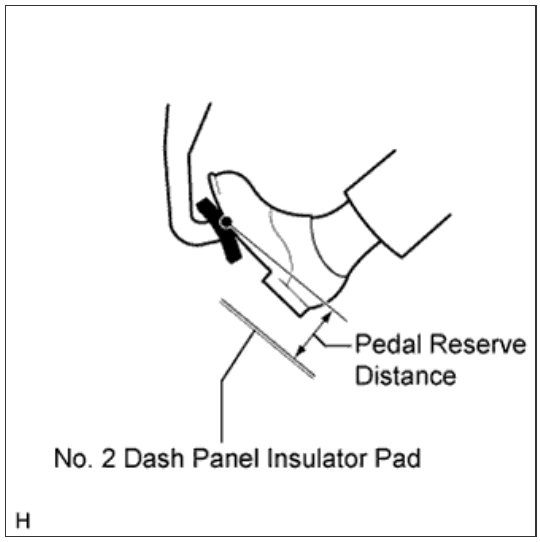


13. CHECK PEDAL RESERVE DISTANCE

a. 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.



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.

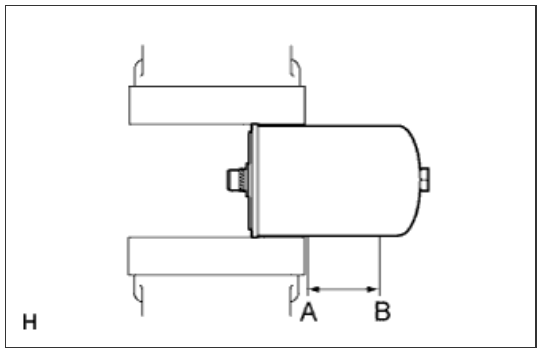
CAUTION:

- **Cover with a piece of cloth when working because gas may blow out.**
- **Cut the accumulator carefully, not abruptly.**
- **Wear protective glasses.**

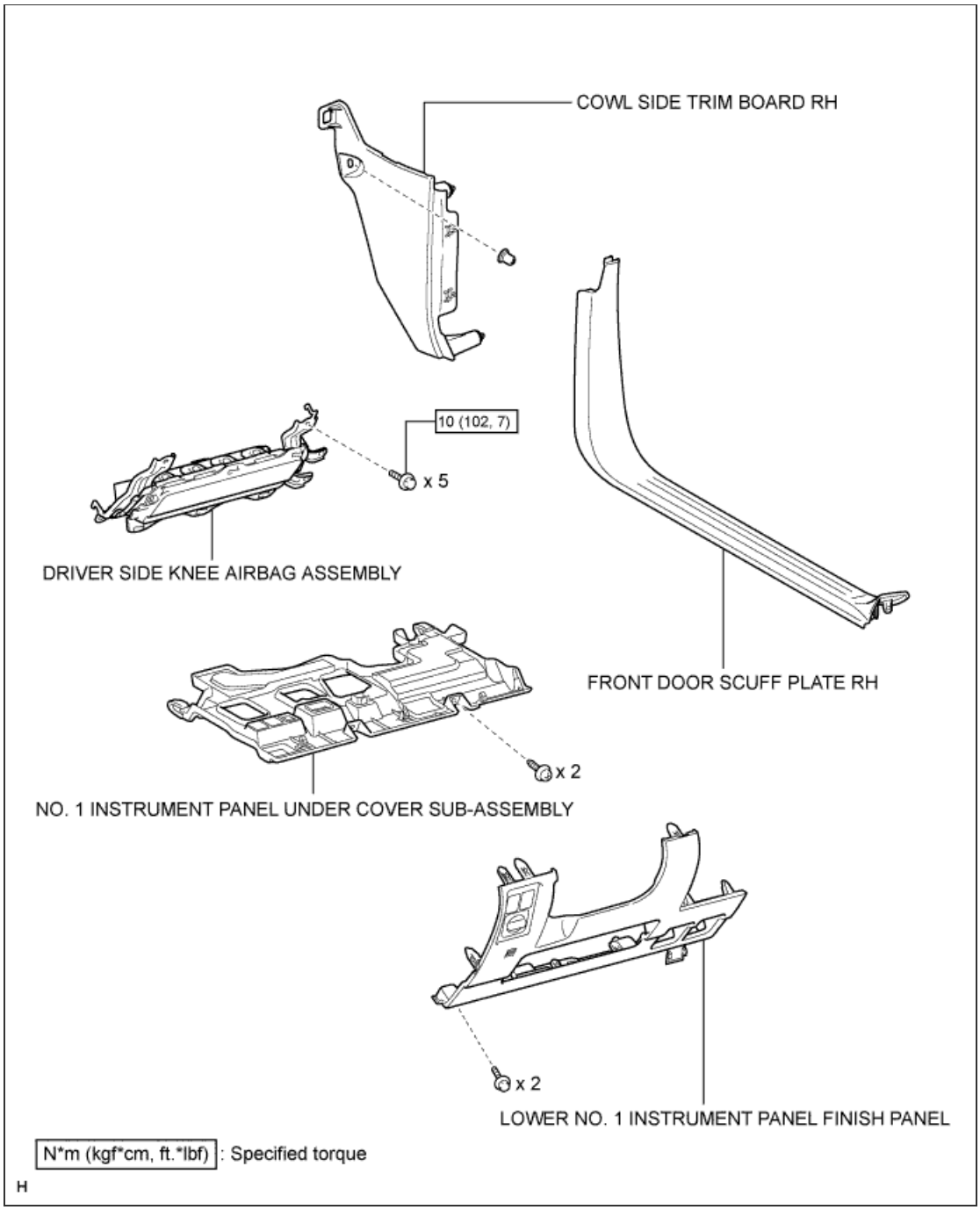
c. When the outer body of the brake booster accumulator is cut, gas and liquid discharge.

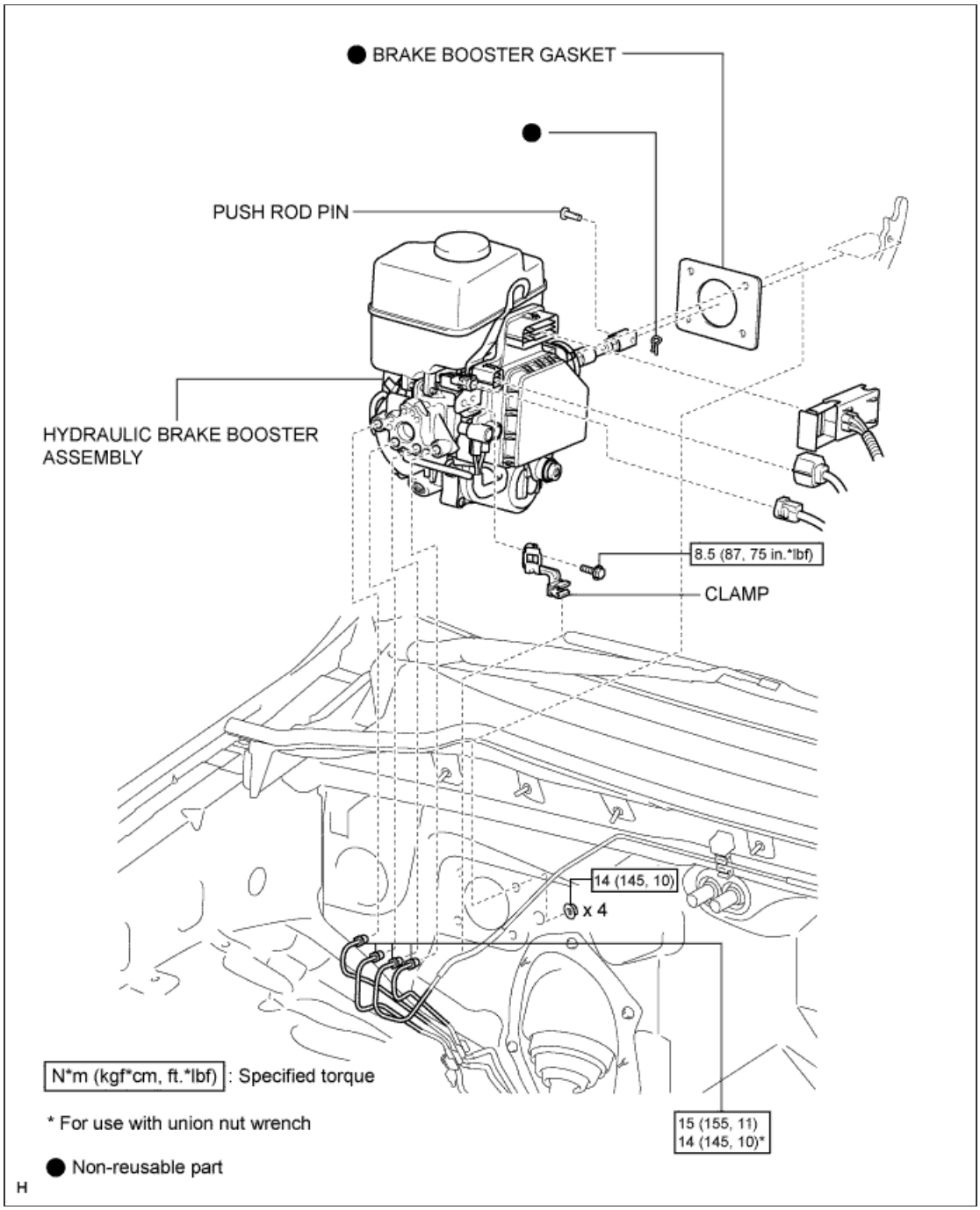
HINT:

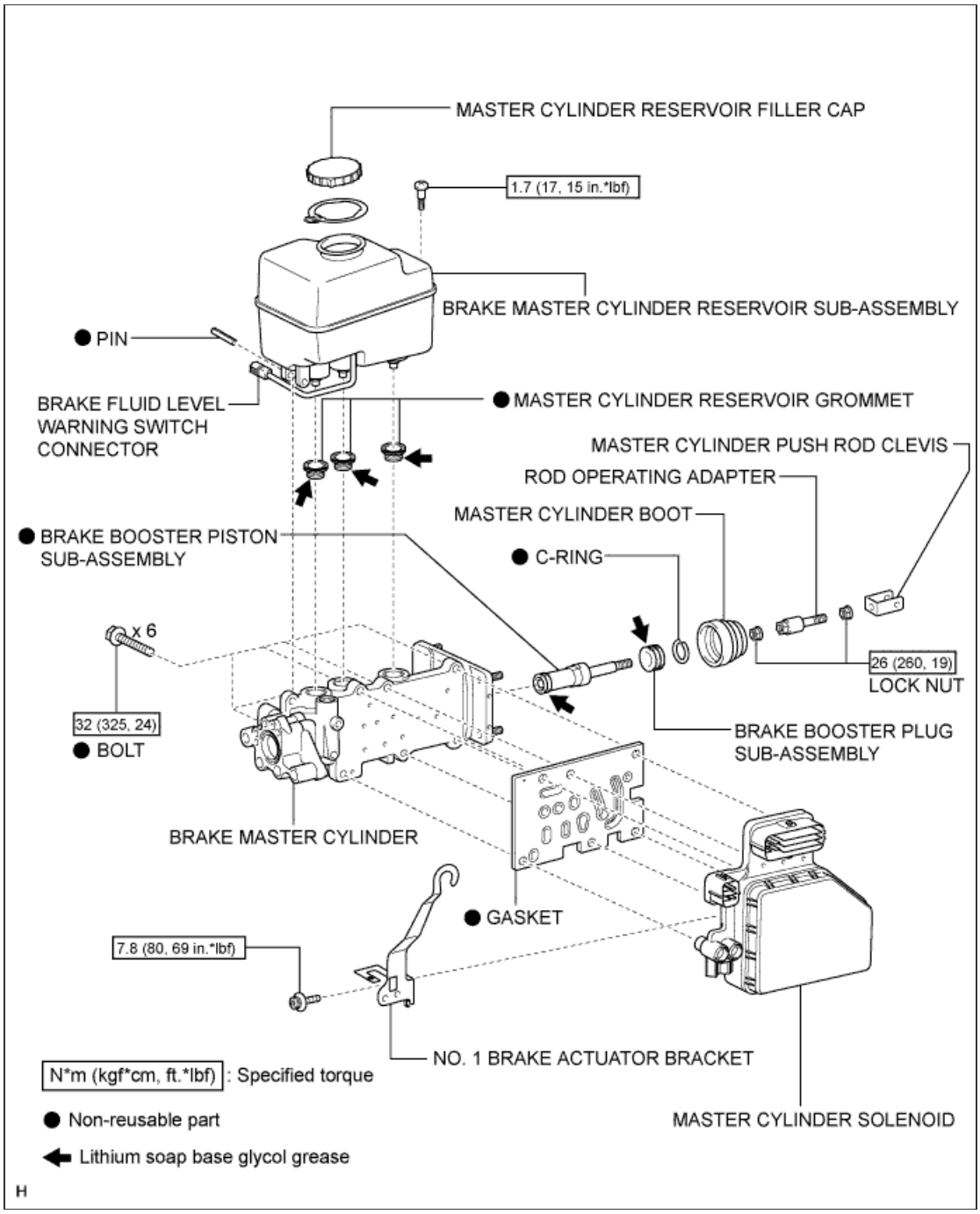
The gas is colorless, odorless and non-poisonous.

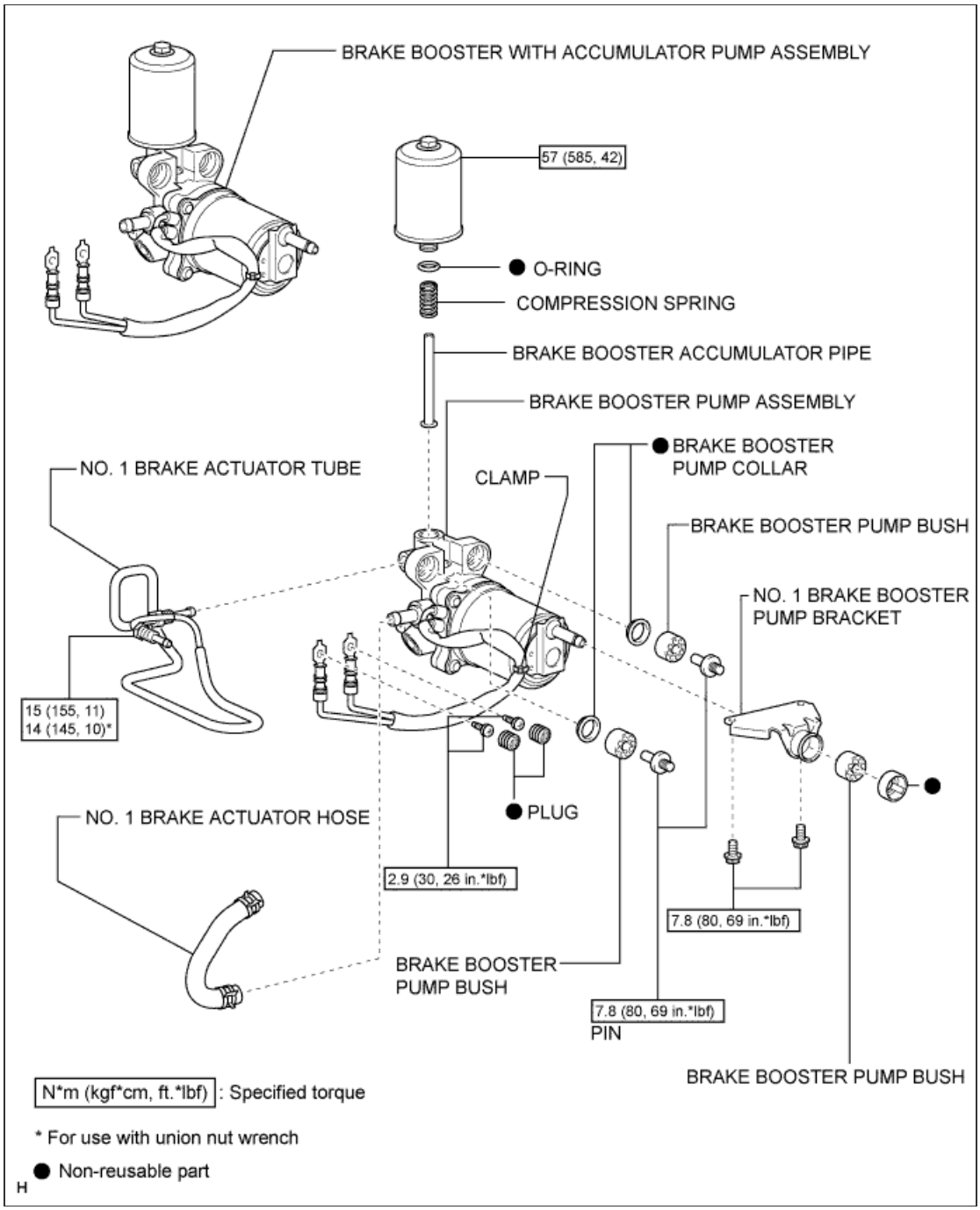


for Preparation Click here




● 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

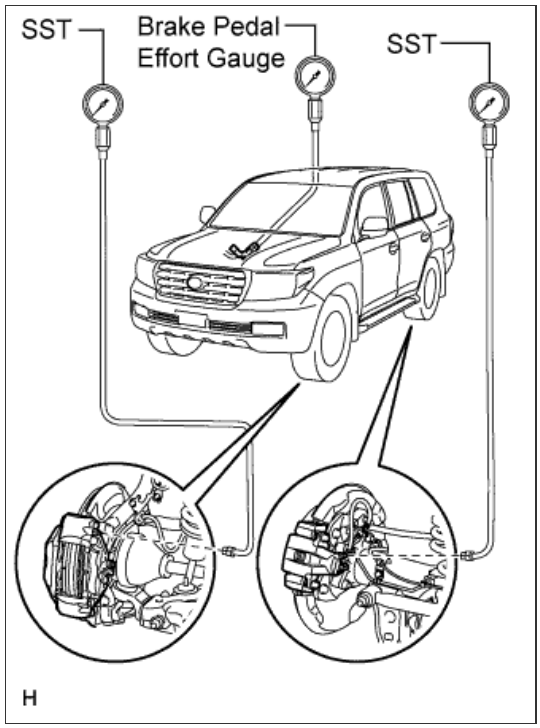
b. Turn the ignition switch off and depress the brake pedal more than 20 times.

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 GTS to the DLC3.

f. Turn the ignition switch on.

g. Turn the GTS 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 GTS.

ii. Turn "VSC/TRC Solenoid (SRCF)" on with the GTS, 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 GTS 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 GTS.

ii. Turn "VSC/TRC Solenoid (SRCR)" and "VSC/TRC Solenoid (SRCF)" on simultaneously with the GTS, 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 GTS 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 GTS.

ii. Turn "ABS Solenoid (SFRH)" on with the GTS, 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 GTS 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 GTS.

ii. Turn "ABS Solenoid (SFLH)" on with the GTS, 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 GTS 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 GTS.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SFRR)" and "ABS Solenoid (SFRH)" on simultaneously with the GTS.

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 GTS 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 GTS.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SFLR)" and "ABS Solenoid (SFLH)" on simultaneously with the GTS.

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 GTS 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 GTS.

ii. Depress the brake pedal with a stable force, then turn "VSC/TRC Solenoid (SRMF)" on with the GTS.

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 GTS 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 GTS.

ii. Turn "VSC/TRC Solenoid (SRMR)" and "VSC/TRC Solenoid (SRMF)" on simultaneously with the GTS.

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 GTS 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 GTS.

ii. Turn "ABS Solenoid (SRRH)" on with the GTS, 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 GTS 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 GTS.

ii. Turn "ABS Solenoid (SRLH)" on with the GTS, 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 GTS 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 GTS.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SRRR)" and "ABS Solenoid (SRRH)" on simultaneously with the GTS.

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 GTS 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 GTS.

ii. Depress the brake pedal with a stable force, then turn "ABS Solenoid (SRLR)" and "ABS Solenoid (SRLH)" on simultaneously with the GTS.

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 GTS 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 GTS.

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:

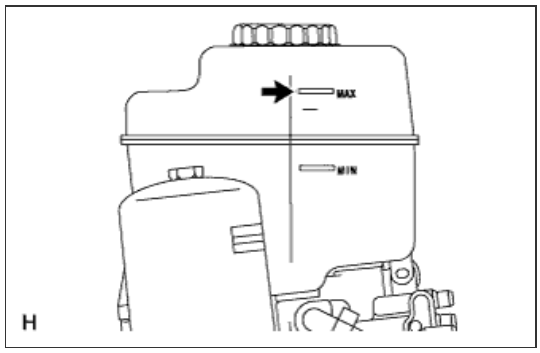
When the pressure in the accumulator is released, the pedal stroke will lengthen.

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. PRECAUTION

NOTICE:

After turning the ignition switch off, waiting time may be required before disconnecting the cable from the battery terminal. Therefore, make sure to read the disconnecting the cable from the battery terminal notice before proceeding with work (Click here).

3. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected (Click here).

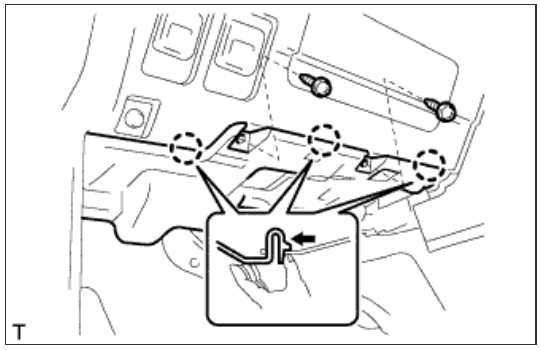
4. REMOVE FRONT DOOR SCUFF PLATE RH

5. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

a. Remove the 2 screws.

b. Detach the 3 claws.

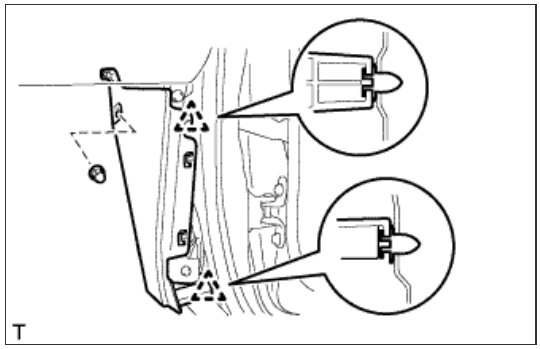
c. Disconnect the connectors and remove the No. 1 instrument panel under cover.



6. REMOVE COWL SIDE TRIM BOARD RH

a. Remove the cap nut.

b. Detach the 2 clips and remove the cowl side trim board.



7. REMOVE LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

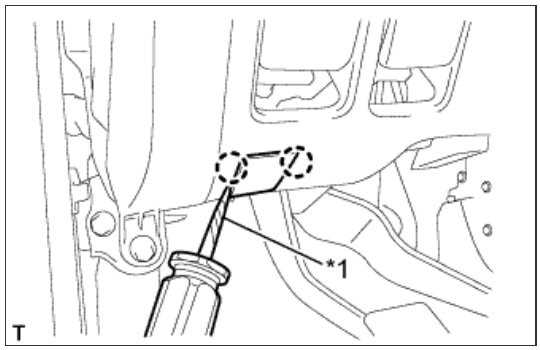
a. Using a screwdriver, detach the 2 claws and open the hole cover.

HINT:

Tape the screwdriver tip before use.

Text in Illustration

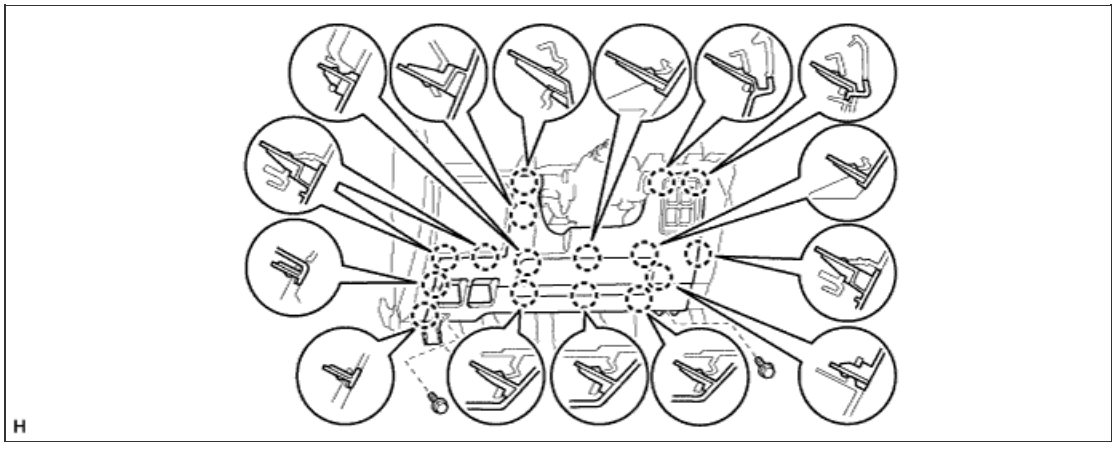
*1	Protective Tape



b. w/ Driver Side Knee Airbag:

i. Remove the 2 bolts.

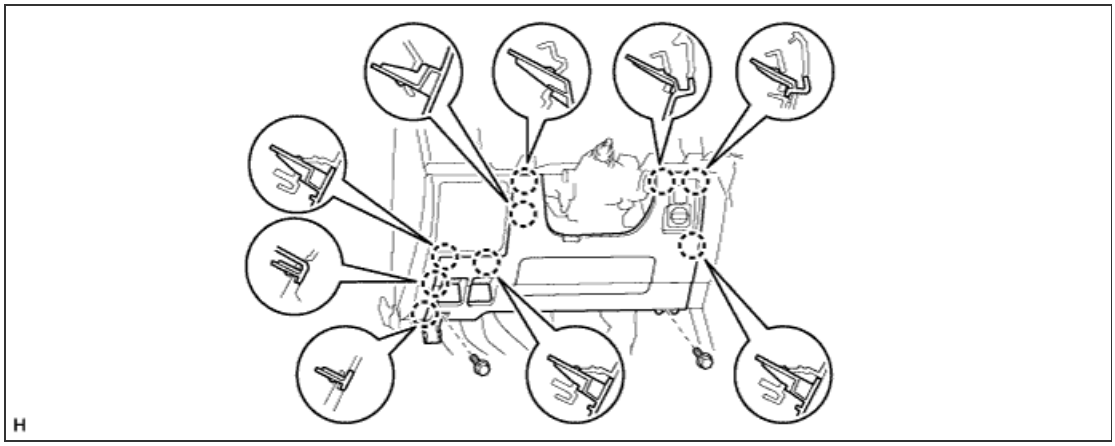
ii. Detach the 16 claws.



c. w/o Driver Side Knee Airbag:

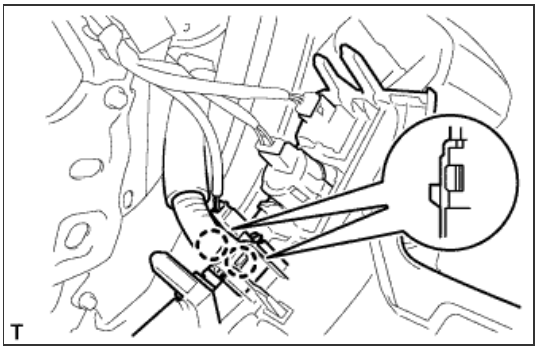
i. Remove the 2 bolts.

ii. Detach the 9 claws.



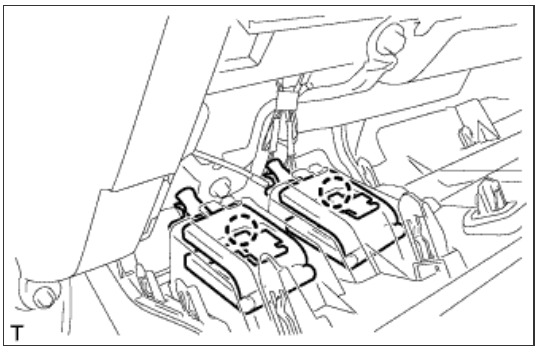
d. for Automatic Air Conditioning System:

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.



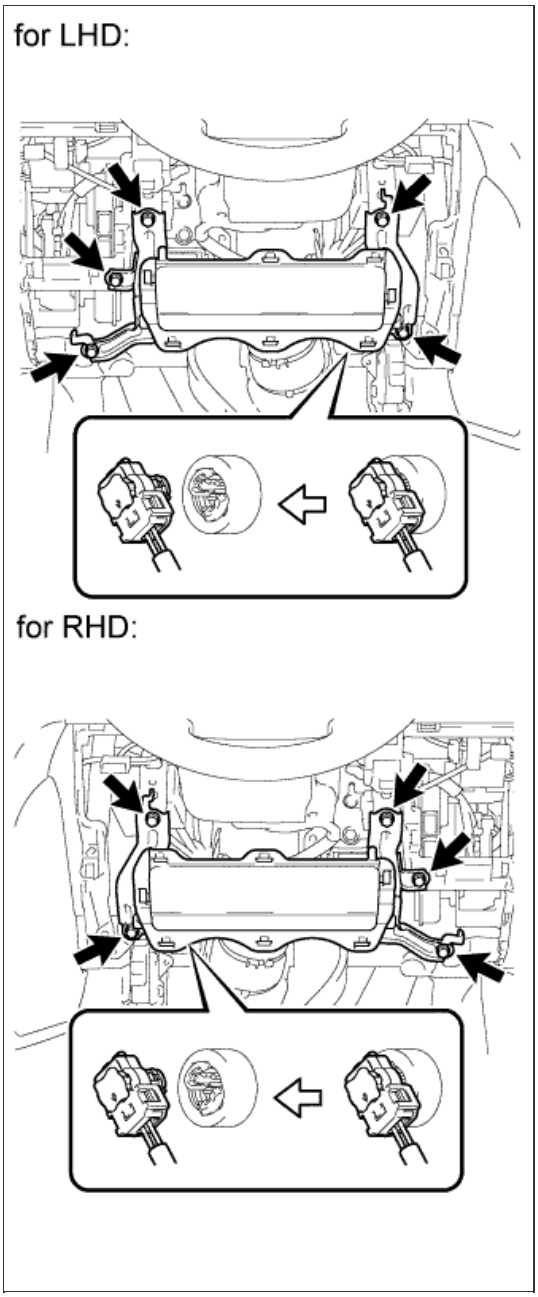
8. REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY

a. Remove the 5 bolts and driver side knee airbag.

b. Disconnect the connector.

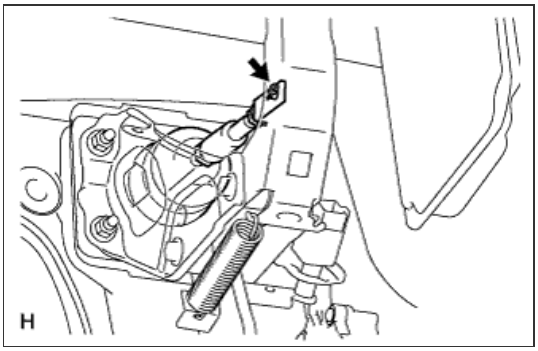
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



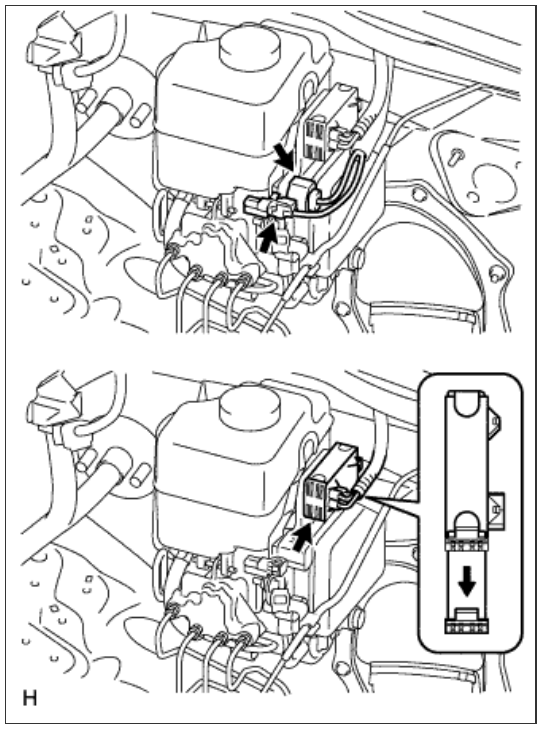
9. REMOVE PUSH ROD PIN

a. Remove the clip and push rod pin from the brake pedal lever.

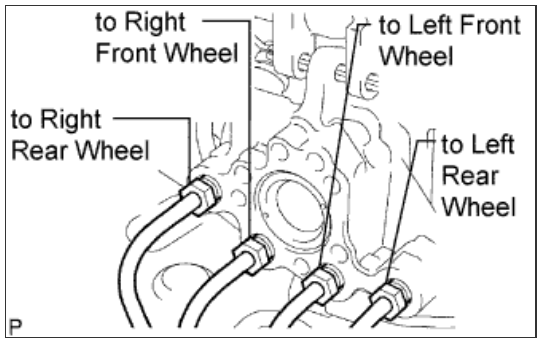


10. REMOVE HYDRAULIC BRAKE BOOSTER ASSEMBLY

a. Disconnect the 3 connectors from the hydraulic brake booster.

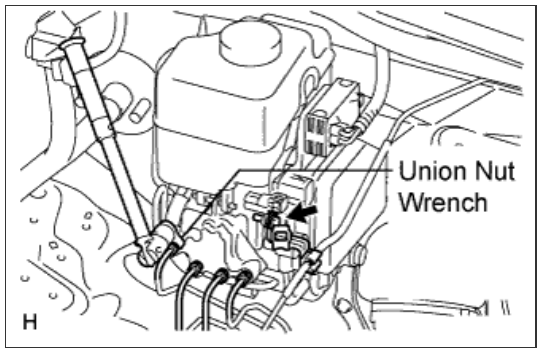


b. Use tags or make a memo to identify the place to reconnect.

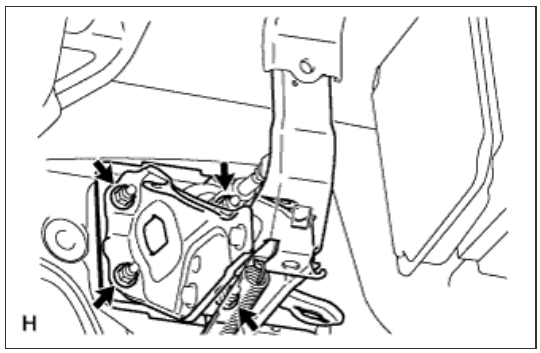


c. Using a union nut wrench, disconnect the 4 brake lines from the hydraulic brake booster.

d. Remove the bolt and disconnect the clamp from the hydraulic brake booster assembly.



e. Remove the 4 nuts and pull out the hydraulic brake booster assembly.



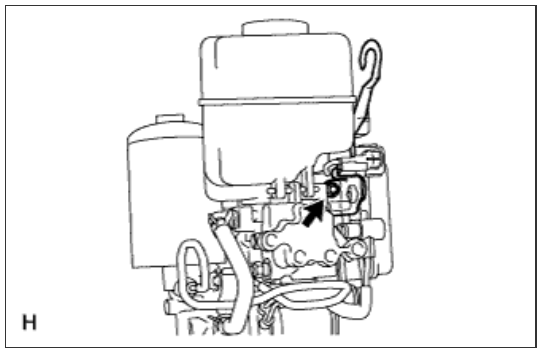
11. REMOVE BRAKE BOOSTER GASKET

a. Remove the brake booster gasket from the hydraulic brake booster assembly.

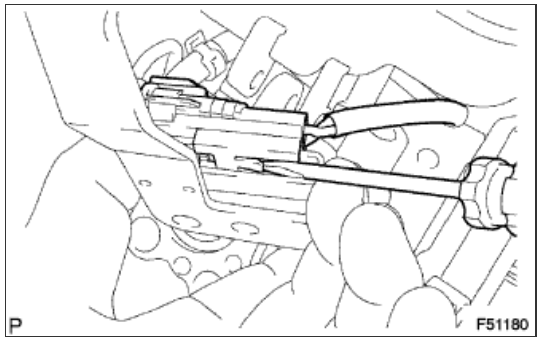
for Preparation Click here

1. REMOVE NO. 1 BRAKE ACTUATOR BRACKET

a. Using a 5 mm hexagon wrench, remove the bolt and No. 1 brake actuator bracket.

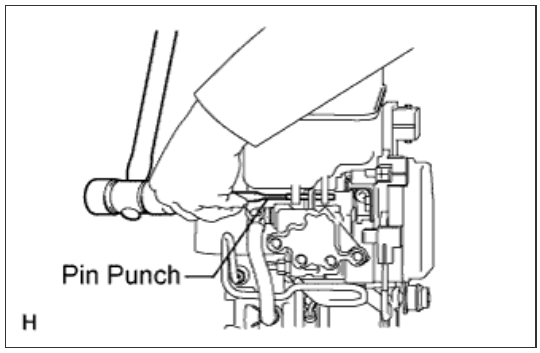


b. Using a screwdriver, disconnect the brake fluid level warning switch connector from the No. 1 brake actuator bracket.



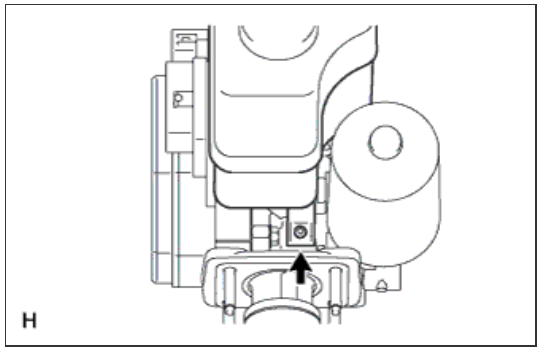
2. REMOVE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

a. Using a pin punch and hammer, remove the pin from the brake master cylinder reservoir.



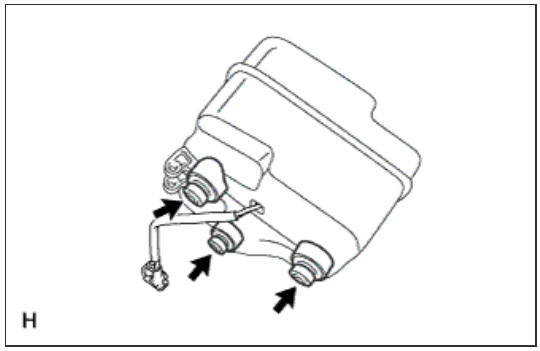
b. Remove the screw and pull out the brake master cylinder reservoir sub-assembly.

c. Remove the master cylinder reservoir filler cap.



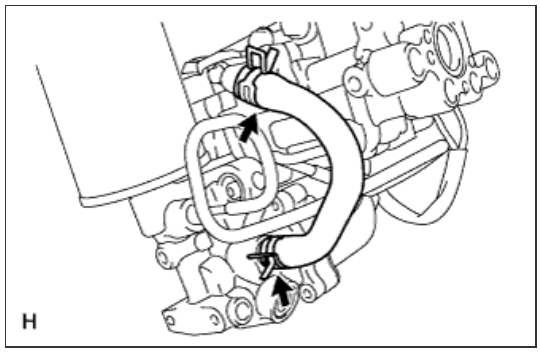
3. REMOVE MASTER CYLINDER RESERVOIR GROMMET

a. Remove the 3 reservoir grommets from the master cylinder reservoir.



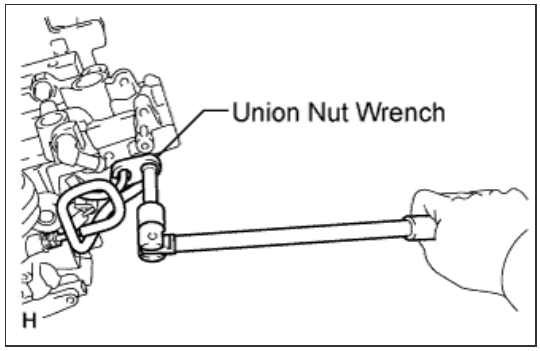
4. REMOVE NO. 1 BRAKE ACTUATOR HOSE

a. Using needle nose pliers, slide the 2 clips and remove the brake actuator hose and 2 clips.



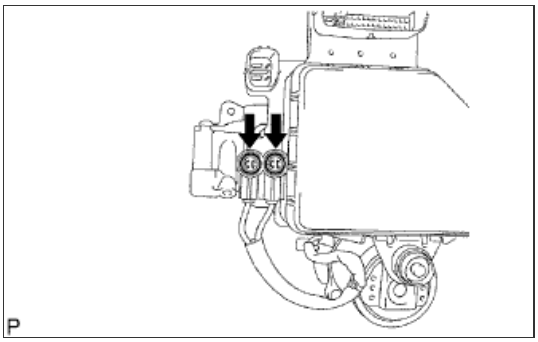
5. REMOVE NO. 1 BRAKE ACTUATOR TUBE

a. Using a union nut wrench, remove the No. 1 brake actuator tube.

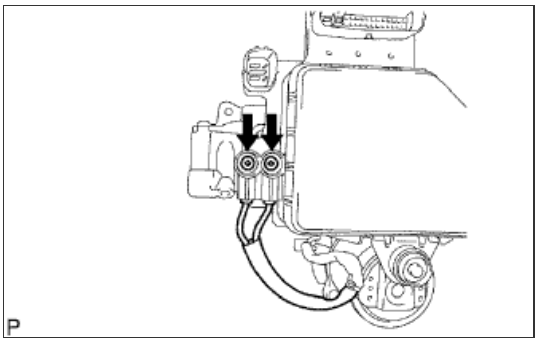


6. REMOVE BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

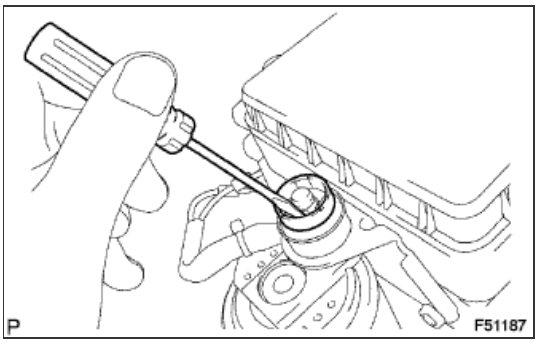
a. Using a screwdriver, remove the 2 plugs.



b. Remove the 2 screws and disconnect the wire harnesses from the master cylinder solenoid.

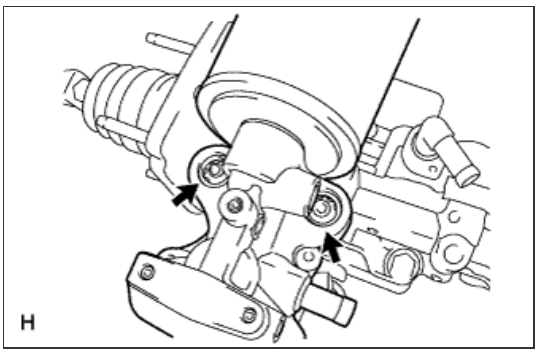


c. Using a screwdriver, remove the clip.

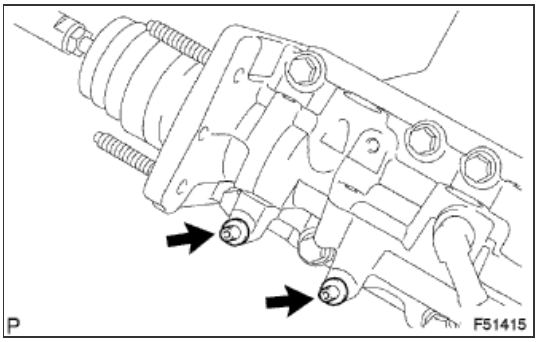


d. Remove the brake booster with accumulator pump assembly from the brake master cylinder.

e. Remove the 2 brake booster pump collars and 2 brake booster pump bushes from the brake booster with accumulator pump assembly.



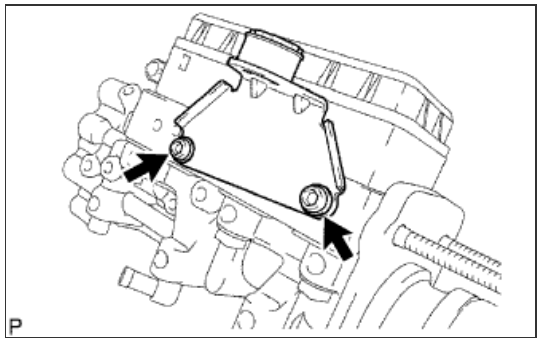
f. Using a 4 mm hexagon wrench, remove the 2 pins.



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.

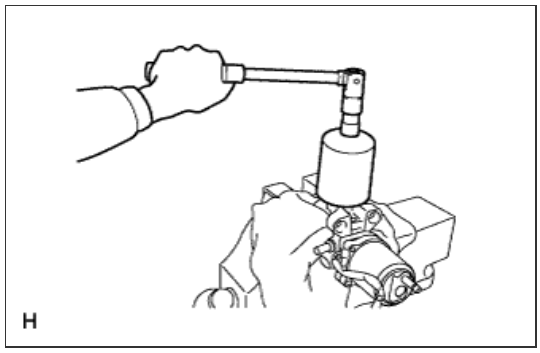
b. Remove the brake booster accumulator.

c. Remove the O-ring from the brake booster accumulator.

NOTICE:

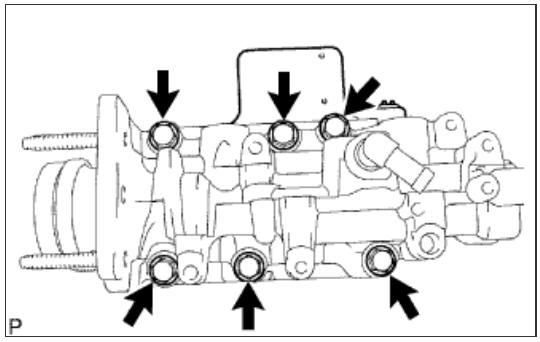
Ensure no foreign matter enters the pump.

d. Remove the brake booster accumulator pipe and compression spring.

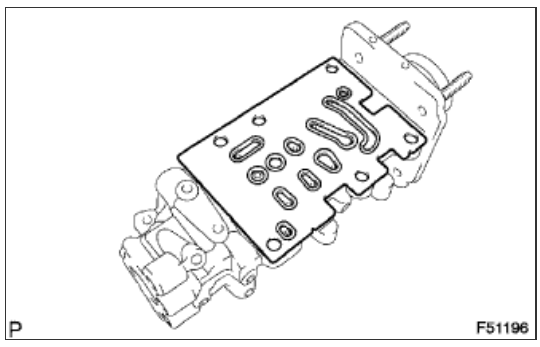


9. REMOVE MASTER CYLINDER SOLENOID

a. Remove the 6 bolts and master cylinder solenoid.



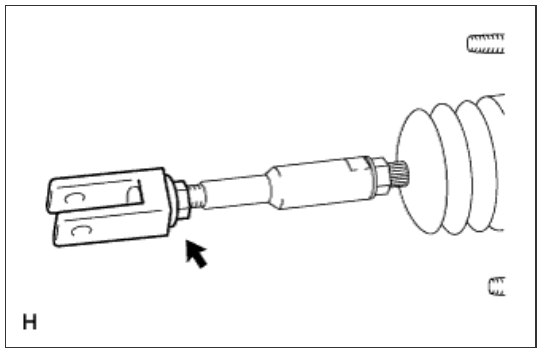
b. Remove the gasket.



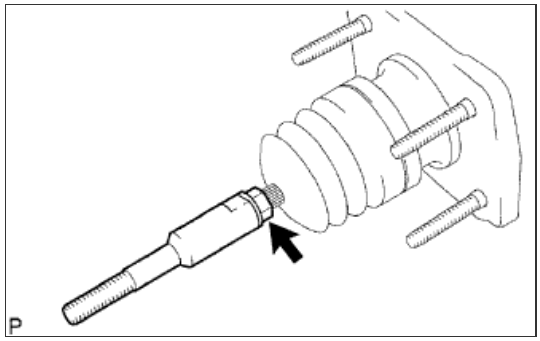
10. REMOVE MASTER CYLINDER PUSH ROD CLEVIS

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:

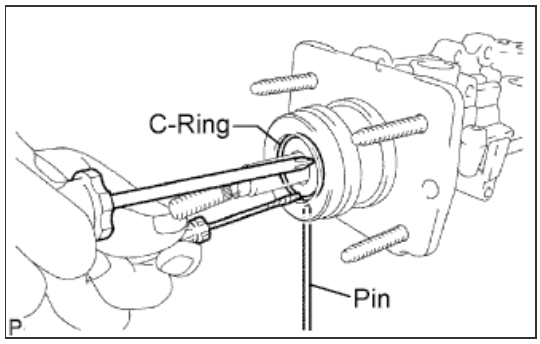
Tape the screwdriver tip before use.

b. Remove the plug from the piston.

c. Remove the piston by pulling it straight out, not at an angle.

NOTICE:

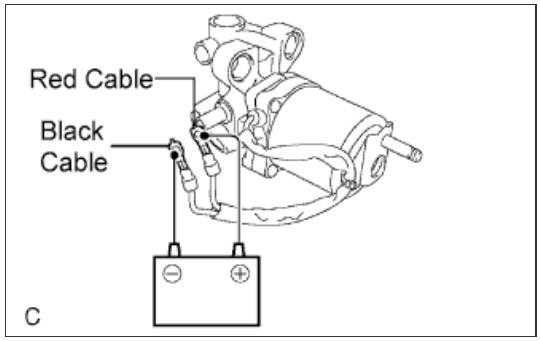
If the piston pulled out at an angle, there is a possibility that the cylinder bore could be damaged.



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:

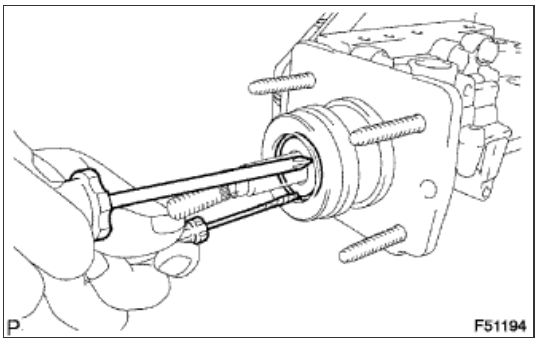
When installing, be careful not to damage the seals, etc.

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.

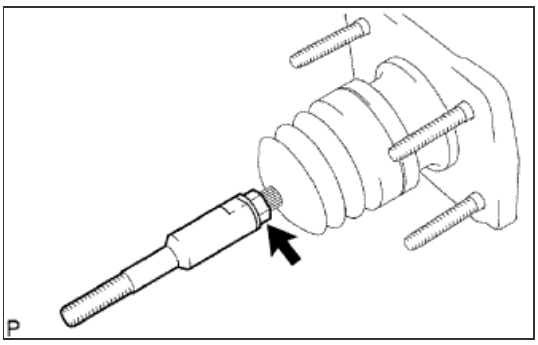


2. INSTALL MASTER CYLINDER BOOT

3. INSTALL MASTER CYLINDER PUSH ROD CLEVIS

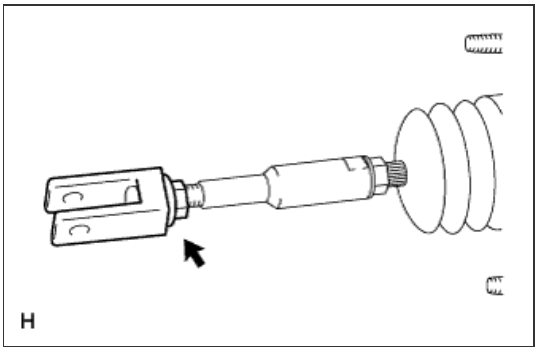
a. Install the brake master cylinder side lock nut and rod operating adapter to the brake master cylinder.

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 }

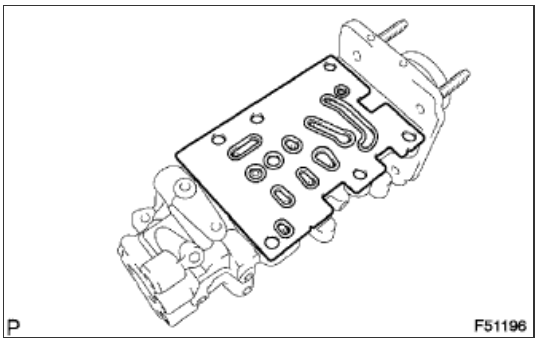


4. INSTALL MASTER CYLINDER SOLENOID

a. Install a new gasket.

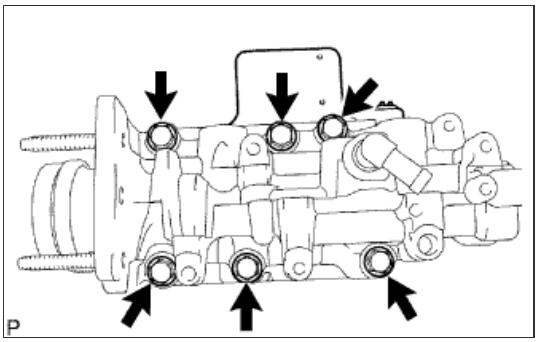
NOTICE:

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.

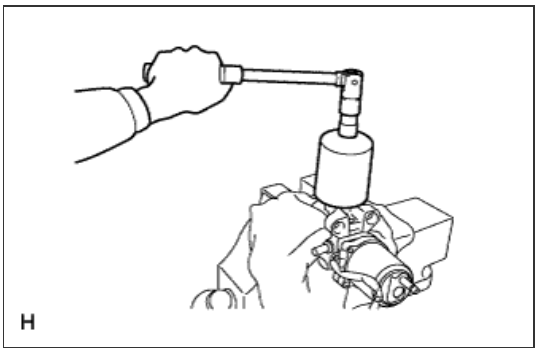
NOTICE:

Ensure that no foreign matter enters the pump.

b. Install a new O-ring to the brake booster accumulator.

c. Install the brake booster accumulator.

Torque:
57 N*m{ 585 kgf*cm , 42 ft.*lbf }

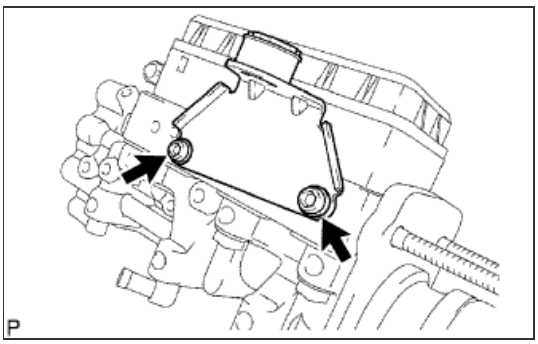


6. INSTALL NO. 1 BRAKE BOOSTER PUMP BRACKET

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 }



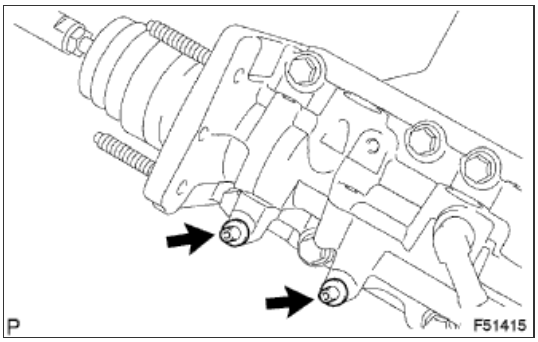
7. INSTALL BRAKE BOOSTER WITH ACCUMULATOR PUMP ASSEMBLY

a. Using a 4 mm hexagon wrench, install the 2 pins to the brake master cylinder.

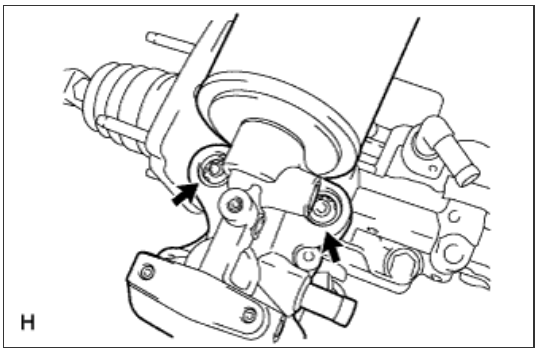
Torque:

7.8 N*m{ 80 kgf*cm , 69 in.*lbf }

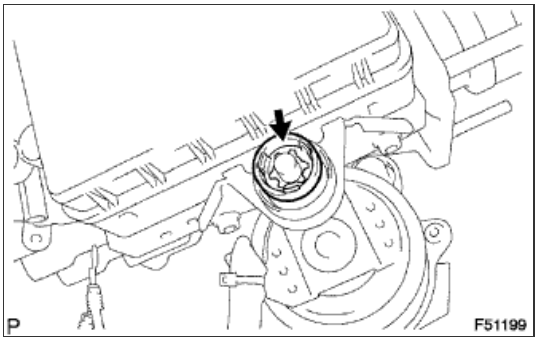
b. Install 2 new brake booster pump collars and 2 brake booster pump bushes to the brake booster with accumulator pump assembly.



c. Install the brake booster with accumulator pump assembly to the brake master cylinder.

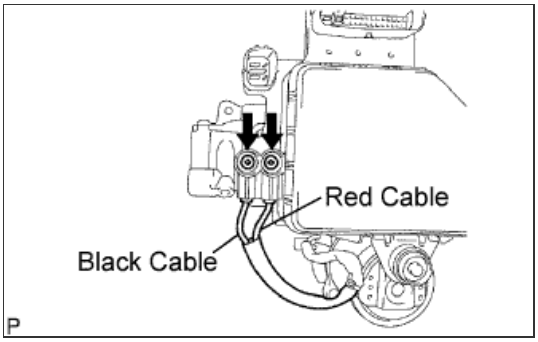


d. Install a new clip.

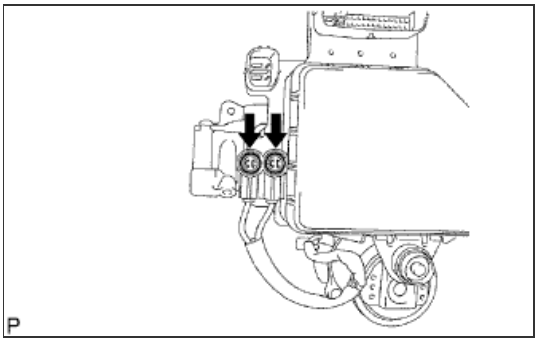


e. Connect the wire harnesses with the 2 screws.

Torque:
2.9 N*m{ 30 kgf*cm , 26 in.*lbf }



f. Install 2 new plugs.



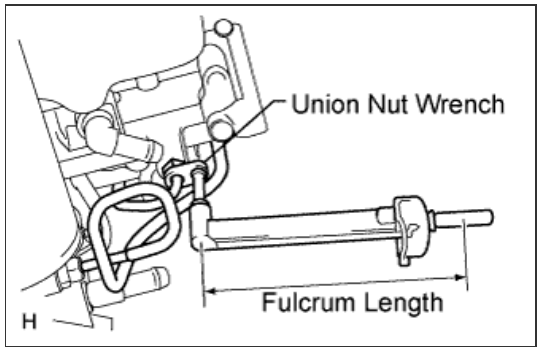
8. INSTALL NO. 1 BRAKE ACTUATOR TUBE

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 }

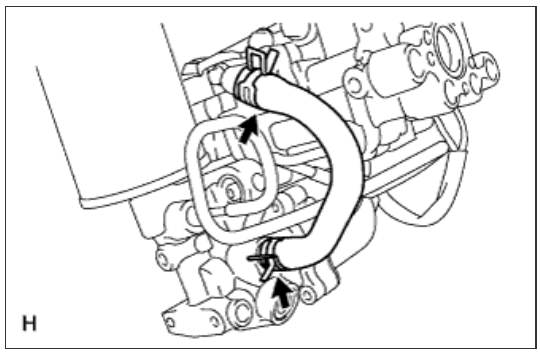
HINT:

- **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.



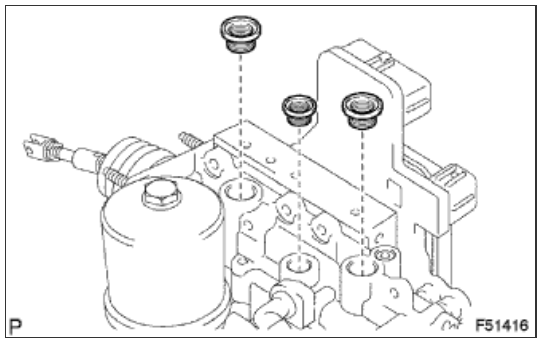
10. INSTALL MASTER CYLINDER RESERVOIR GROMMET

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.

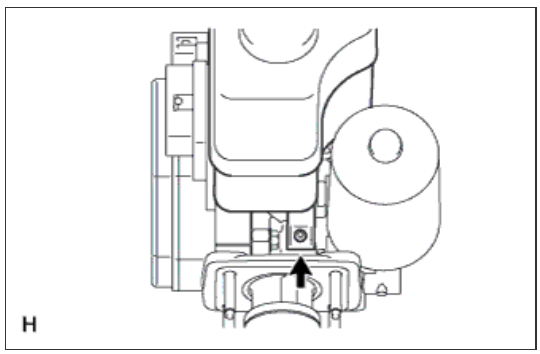


11. INSTALL BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY

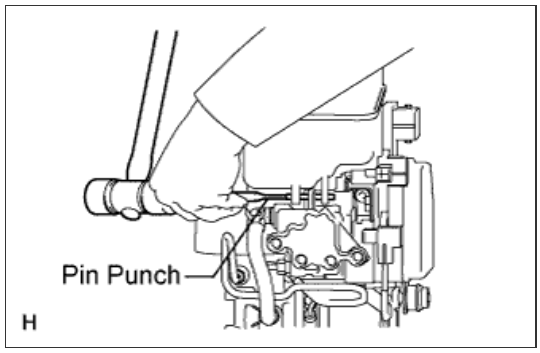
a. Install the brake master cylinder reservoir sub-assembly with the screw.

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.

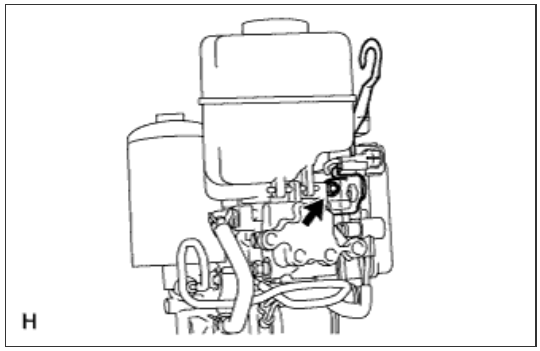


12. INSTALL NO. 1 BRAKE ACTUATOR BRACKET

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

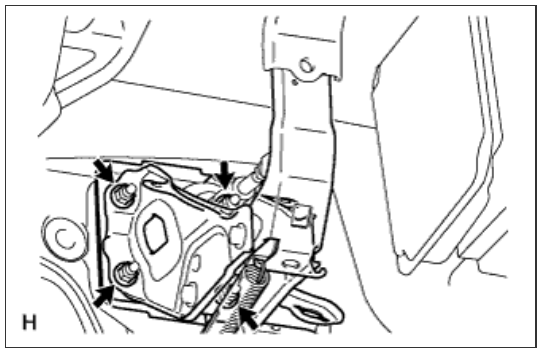
1. INSTALL BRAKE BOOSTER GASKET

a. Install a new brake booster gasket to the hydraulic brake booster.

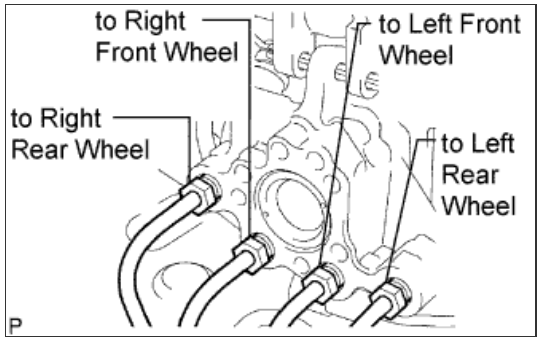
2. INSTALL HYDRAULIC BRAKE BOOSTER ASSEMBLY

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.

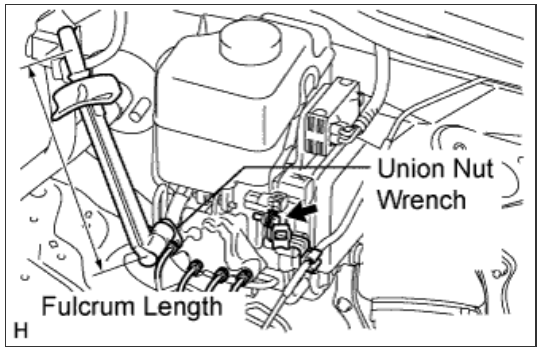


c. Install the clamp with the bolt.

Torque:
8.5 N*m{ 87 kgf*cm , 75 in.*lbf }

d. Using a union nut wrench, tighten the 4 brake lines.

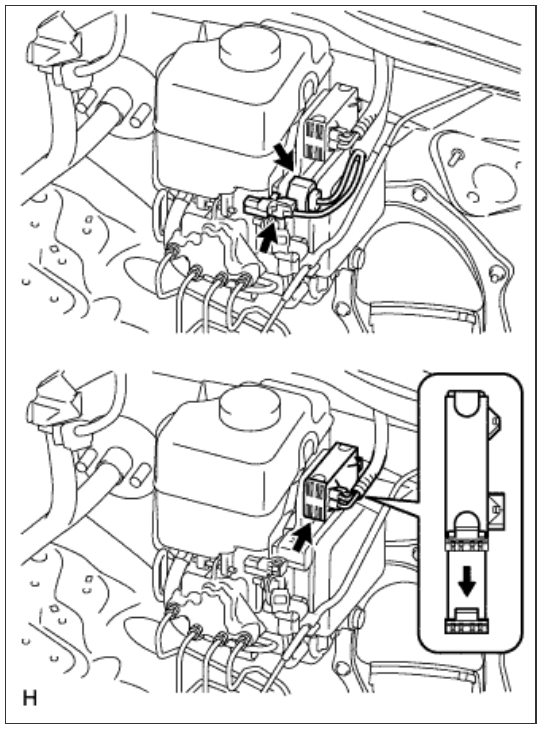
Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }



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.**

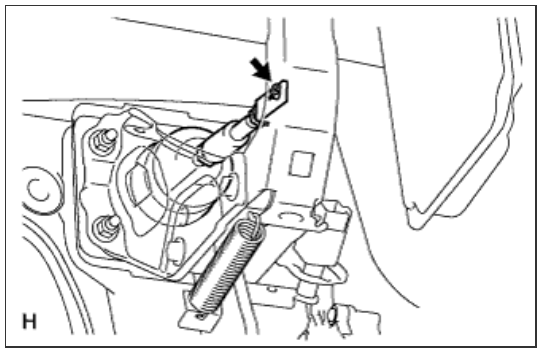
e. Connect the 3 connectors to the hydraulic brake booster.



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 DRIVER SIDE KNEE AIRBAG ASSEMBLY

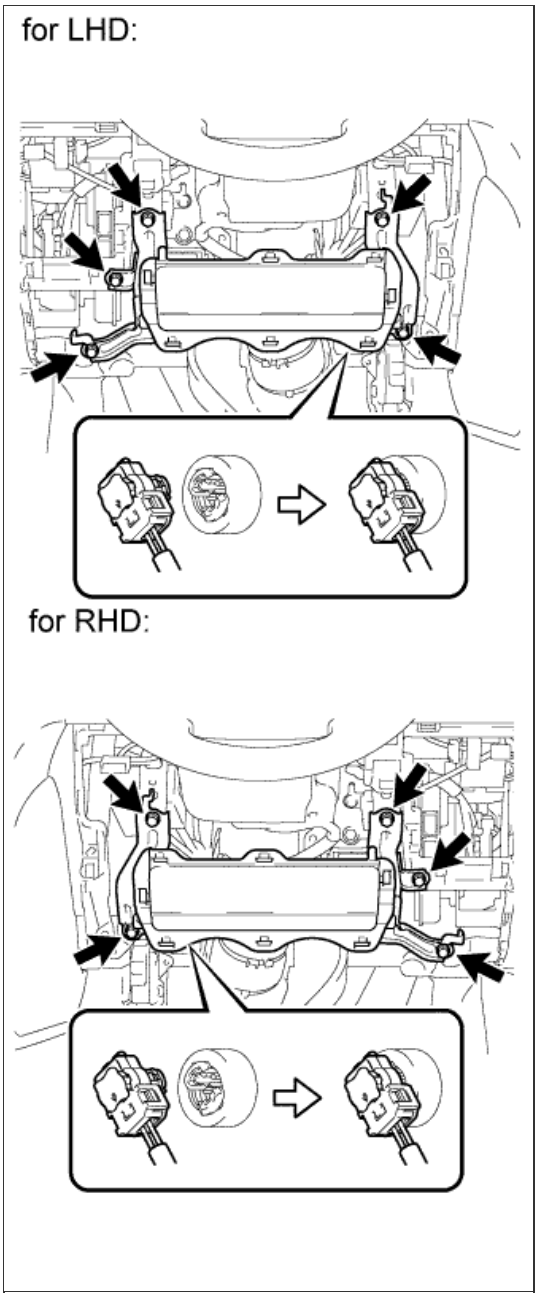
a. Connect the connector.

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 }

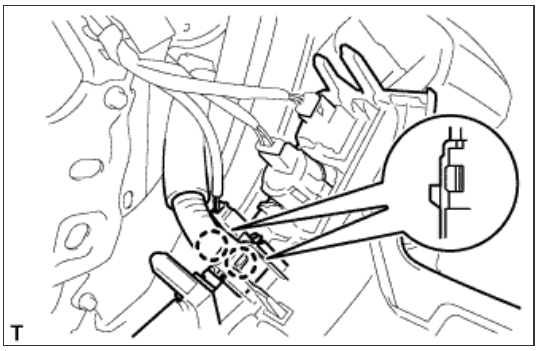


5. INSTALL LOWER NO. 1 INSTRUMENT PANEL FINISH PANEL

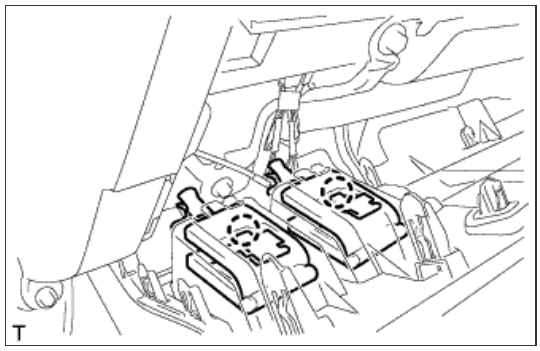
a. Connect the connectors.

b. for Automatic Air Conditioning System:

i. Attach the 2 claws to install the room temperature sensor.



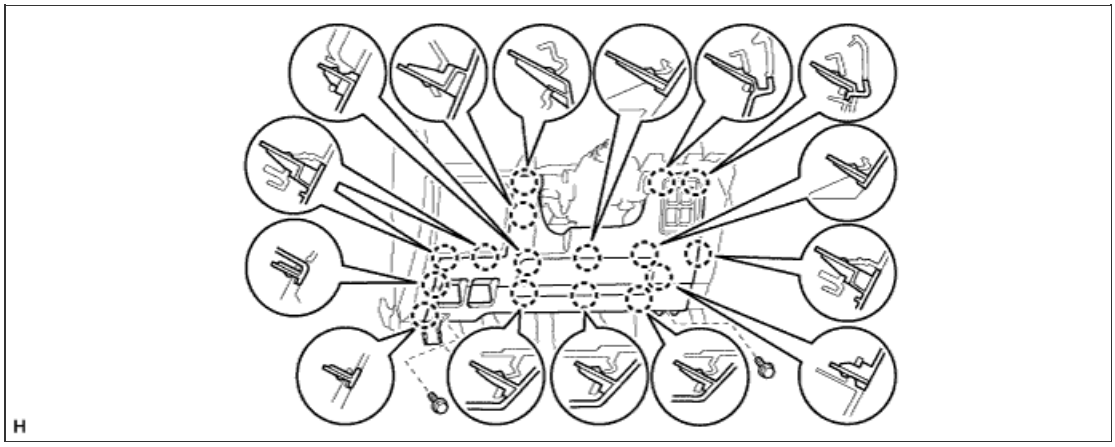
c. Attach the 2 claws to connect the 2 control cables.



d. w/ Driver Side Knee Airbag:

i. Attach the 16 claws to install the lower No. 1 instrument panel finish panel.

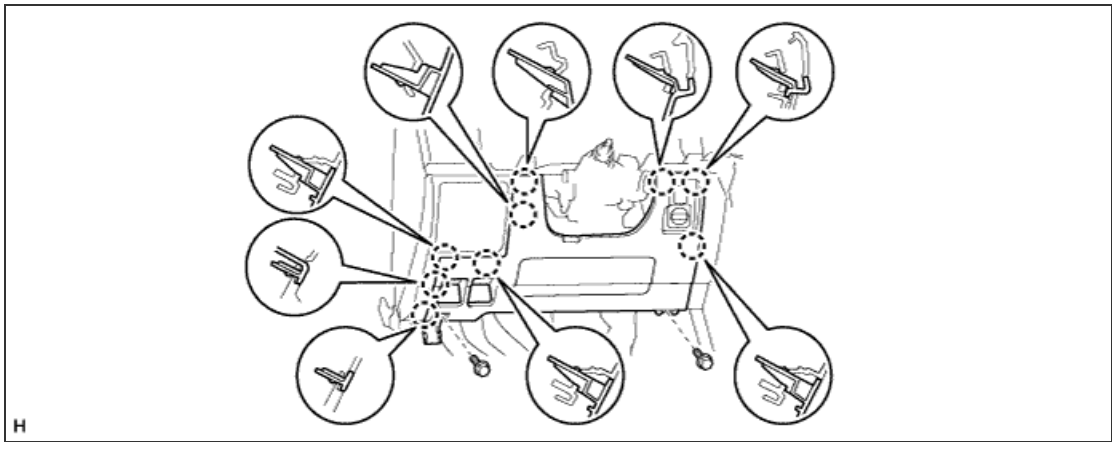
ii. Install the 2 bolts.



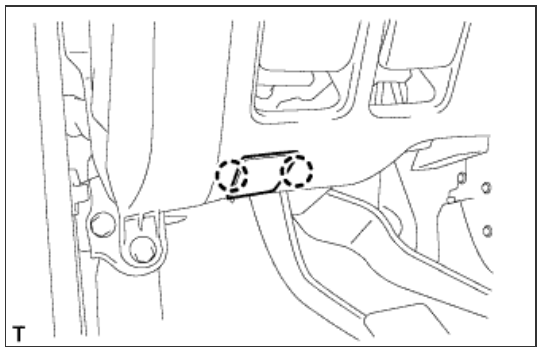
e. w/o Driver Side Knee Airbag:

i. Attach the 9 claws to install the lower No. 1 instrument panel finish panel.

ii. Install the 2 bolts.



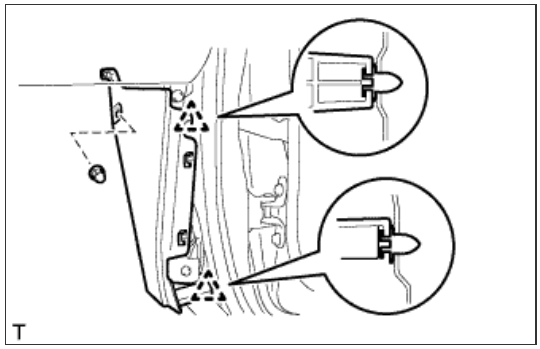
f. Attach the 2 claws to close the hole cover.



6. INSTALL COWL SIDE TRIM BOARD RH

a. Attach the 2 clips to install the cowl side trim board.

b. Install the cap nut.

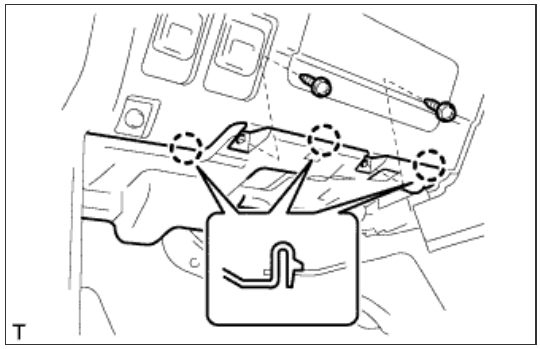


7. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

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 RH

HINT:

Use the same procedures described for the LH side.

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 GTS, damage or accidents may result. Therefore, always use the GTS 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 GTS to the DLC3.

k. Turn the ignition switch to ON.

l. Turn the GTS 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 GTS 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

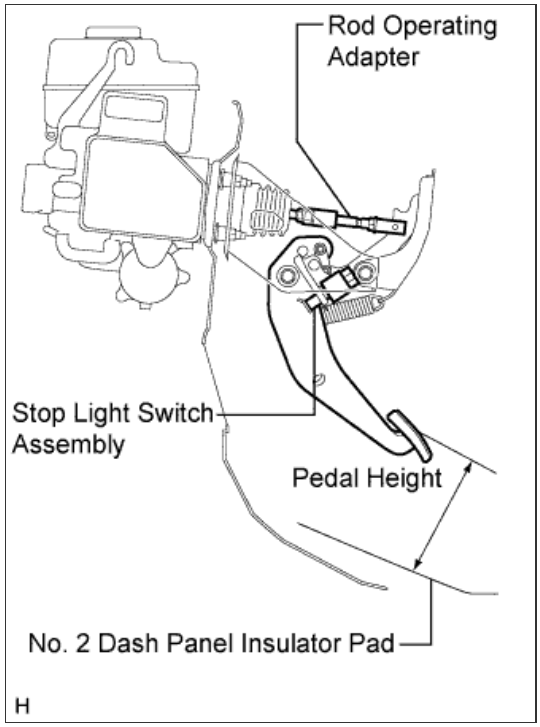
a. Check the brake pedal height.

Standard Pedal Height from No. 2 Dash Panel Insulator Pad:
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.

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.

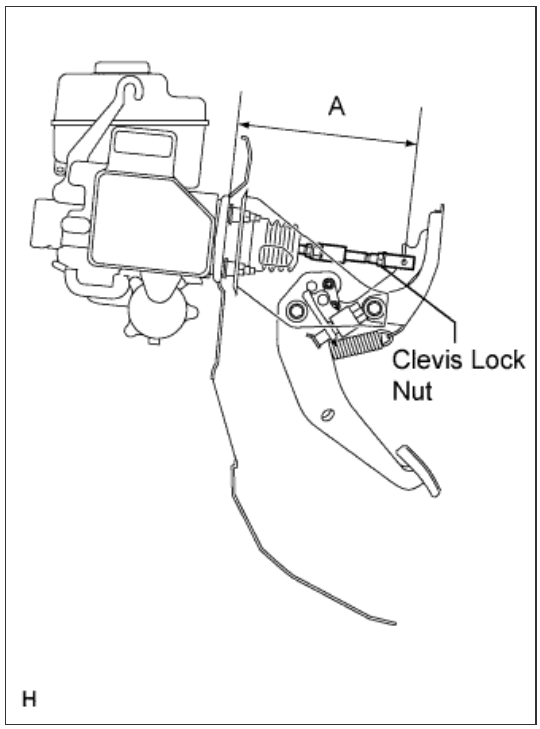
Standard Rod Operating Adapter Length "A":
201.7 to 202.7 mm (7.94 to 7.98 in.)

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.

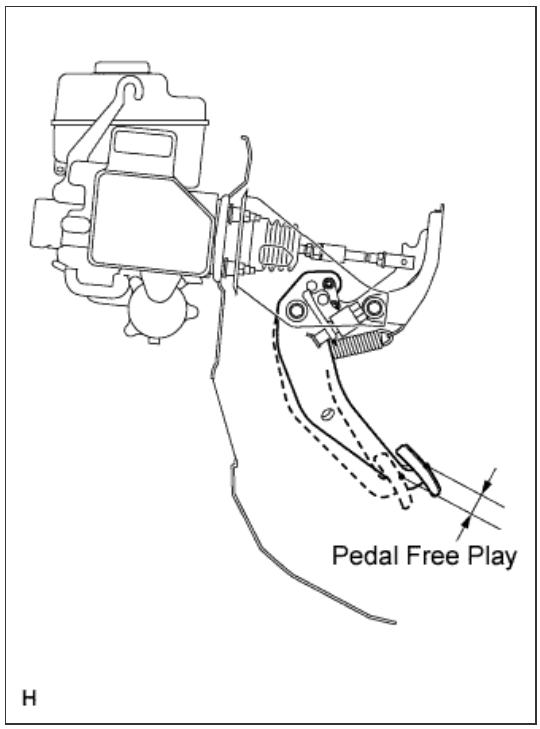
- Even if there is damage, there is no problem if the reserve distance is within the standard value.
- If necessary, replace any damaged parts.



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.)

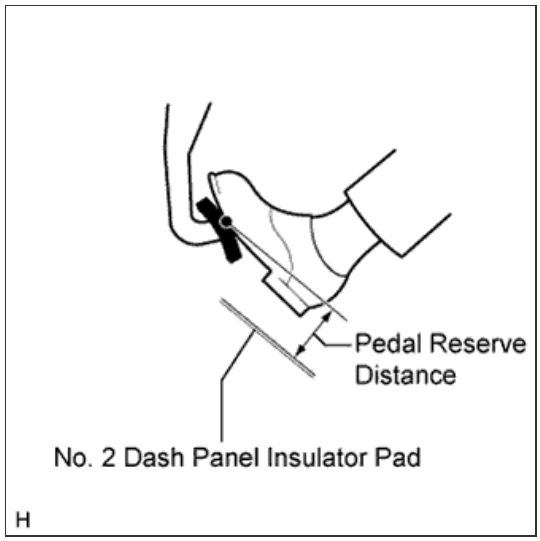


13. CHECK PEDAL RESERVE DISTANCE

a. 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 67.5 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.

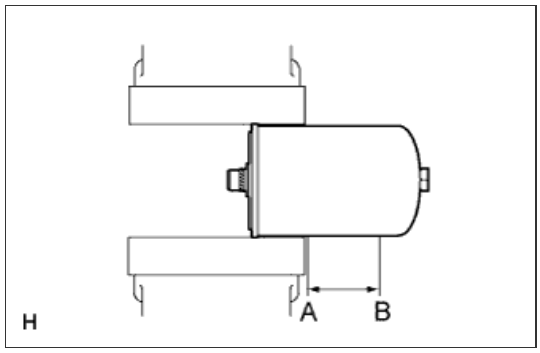
CAUTION:

- **Cover with a piece of cloth when working because gas may blow out.**
- **Cut the accumulator carefully, not abruptly.**
- **Wear protective glasses.**

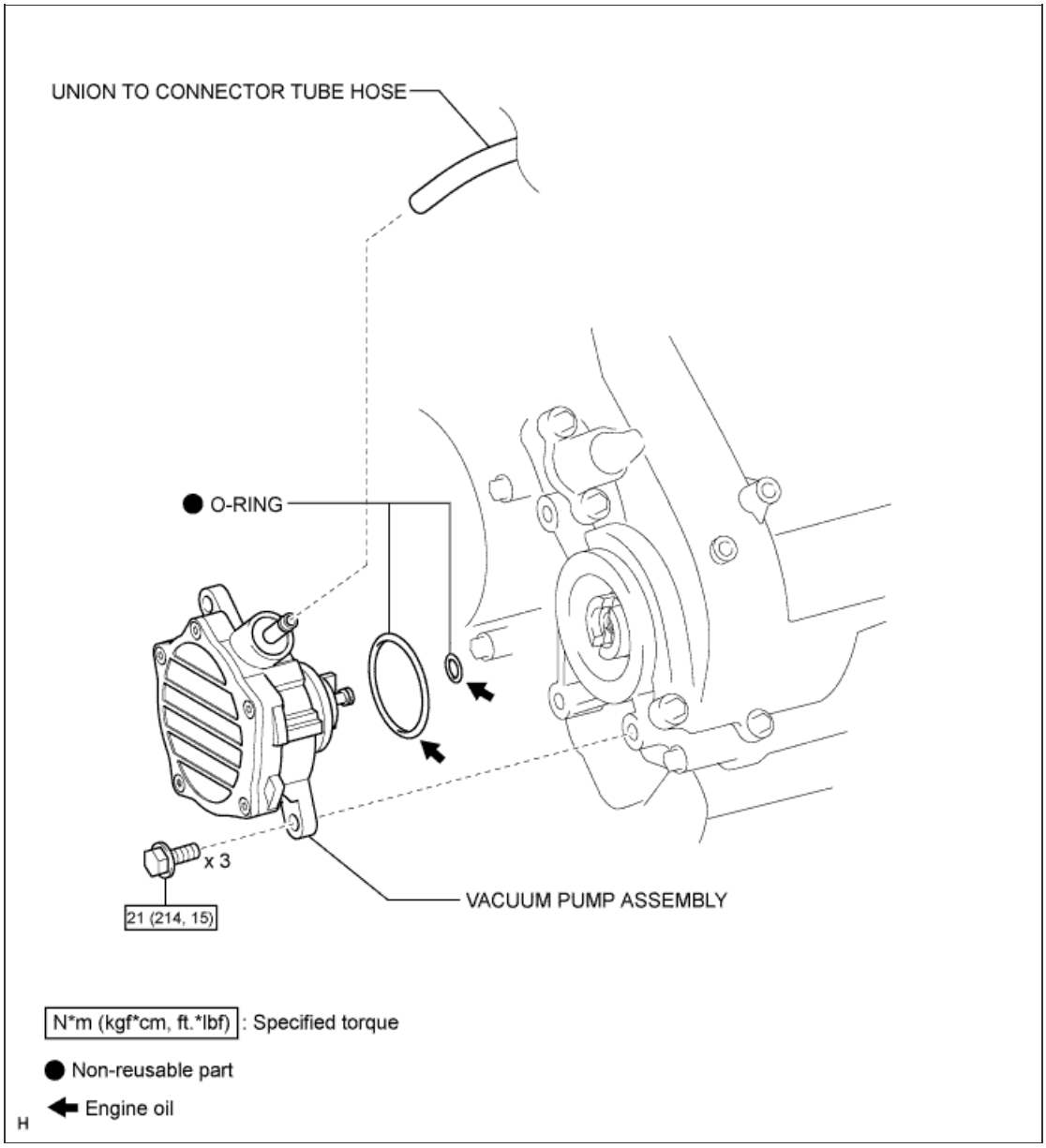
c. When the outer body of the brake booster accumulator is cut, gas and liquid discharge.

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.

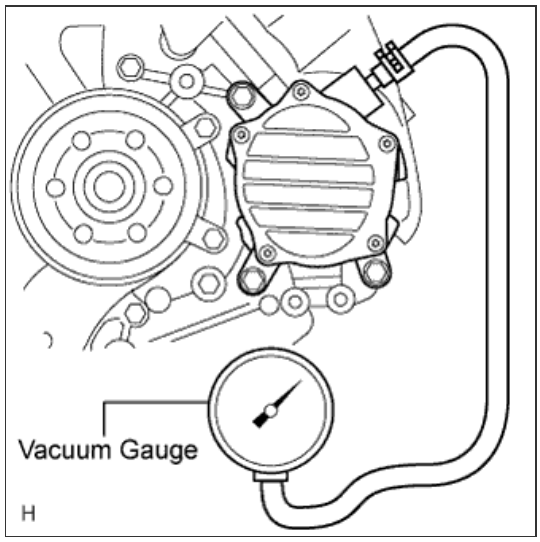
Standard Pressure:
More than 86.7 kPa (650 mmHg, 25.6 in.Hg)

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.



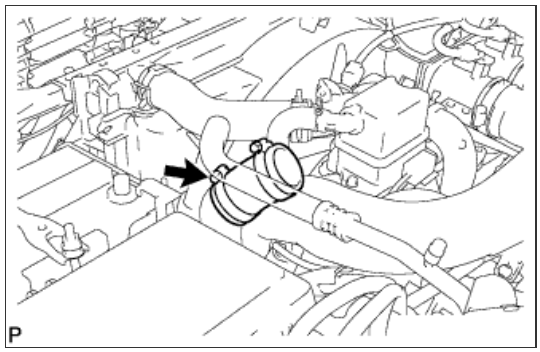
for Preparation Click here

1. REMOVE INTERCOOLER ASSEMBLY

a. Remove the intercooler assembly (Click here).

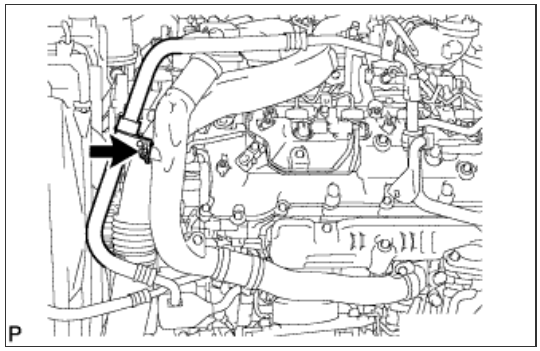
2. REMOVE NO. 2 AIR HOSE

a. Loosen the hose clamp and remove the No. 2 air hose.

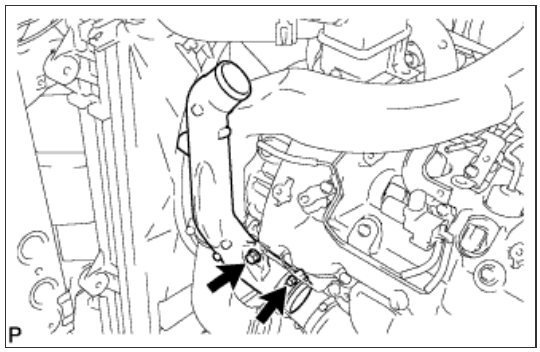


3. REMOVE NO. 4 AIR TUBE

a. Remove the bolt and disconnect the suction hose.



b. Loosen the hose clamp and remove the bolt and No. 4 air tube.

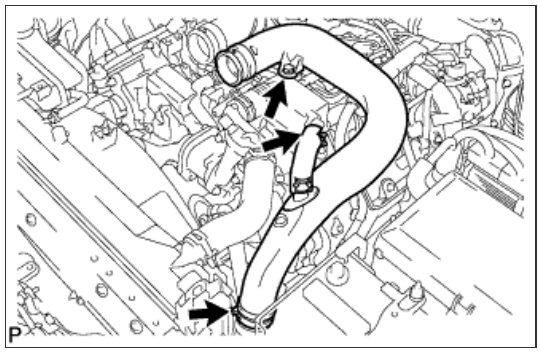


4. REMOVE NO. 2 AIR CLEANER PIPE SUB-ASSEMBLY

a. Disconnect the ventilation hose from the oil separator.

b. Loosen the hose clamp.

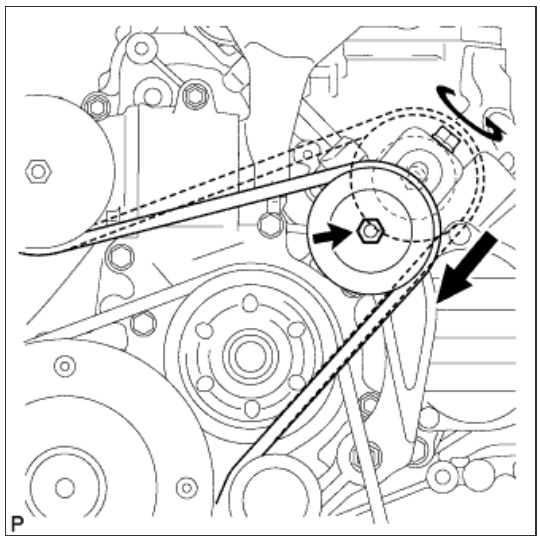
c. Remove the bolt and No. 2 air cleaner pipe.



5. REMOVE V-RIBBED BELT (w/ Viscous Heater)

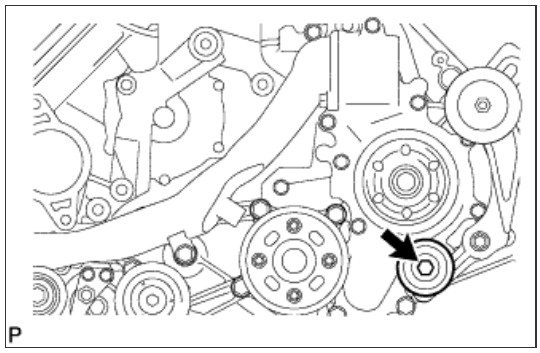
a. Loosen the lock nut and turn the bolt counterclockwise.

b. Remove the V-ribbed belt.



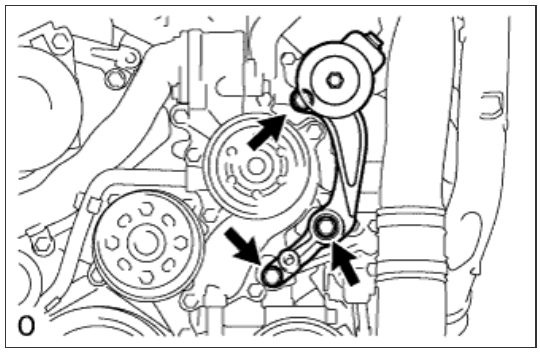
6. REMOVE NO. 2 IDLER PULLEY (w/ Viscous Heater)

a. Remove the bolt, cover, No. 2 idler pulley and collar.



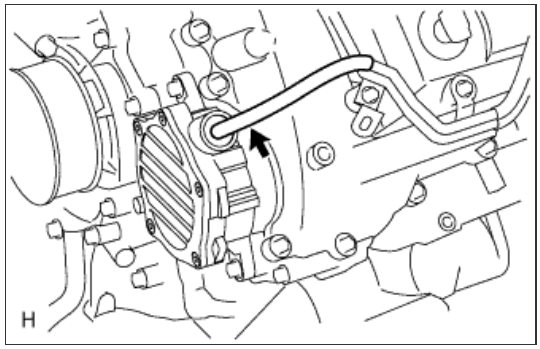
7. REMOVE NO. 2 IDLER PULLEY BRACKET (w/ Viscous Heater)

a. Remove the 3 bolts and idler pulley bracket.



8. DISCONNECT UNION TO CONNECTOR TUBE HOSE

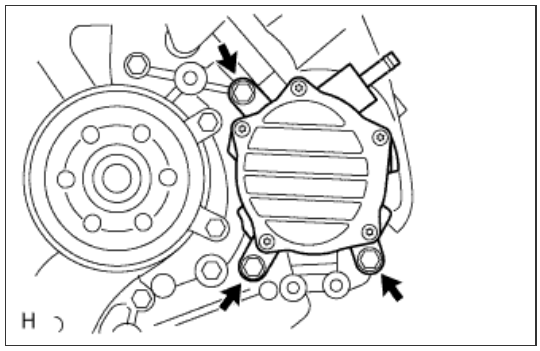
a. Disconnect the hose from the vacuum pump.



9. REMOVE VACUUM PUMP ASSEMBLY

a. Remove the 3 bolts and vacuum pump.

b. Remove the 2 O-rings.

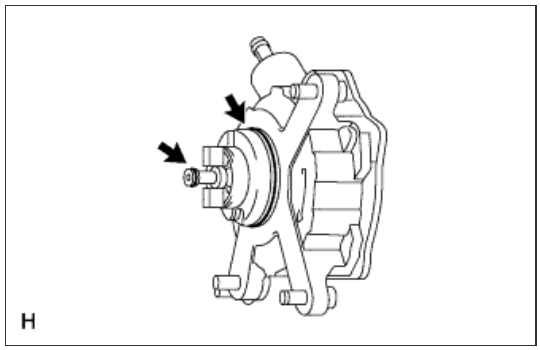


for Preparation Click here

1. INSTALL VACUUM PUMP ASSEMBLY

a. Apply engine oil to 2 new O-rings.

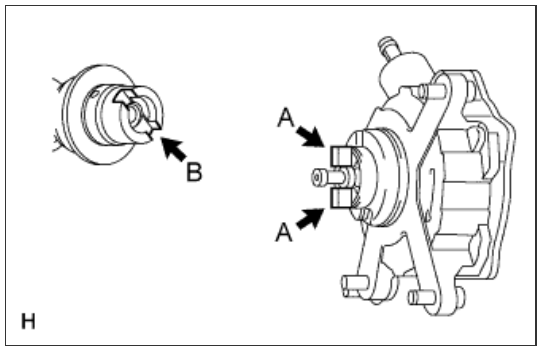
b. Install the 2 O-rings to the vacuum pump.



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.

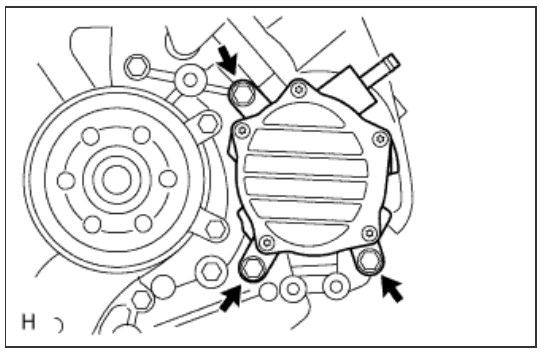


d. Install the vacuum pump with the 3 bolts.

Torque:
21 N*m{ 214 kgf*cm , 15 ft.*lbf }

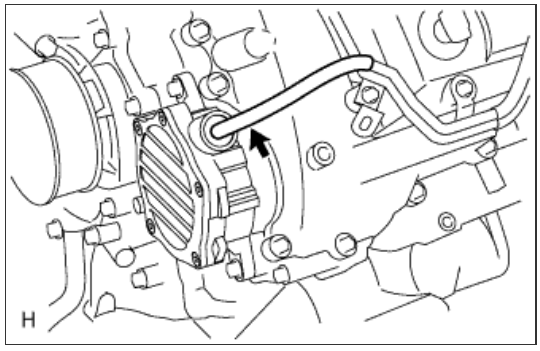
NOTICE:

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

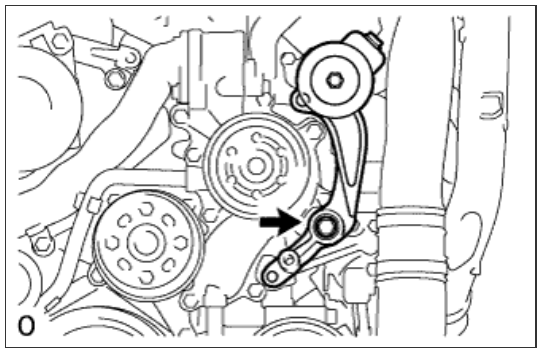
a. Connect the hose to the vacuum pump.



3. INSTALL NO. 2 IDLER PULLEY BRACKET (w/ Viscous Heater)

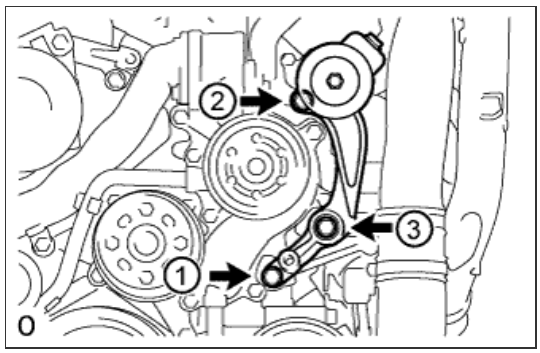
a. Temporarily install the No. 2 idler pulley bracket with the bolt.

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.

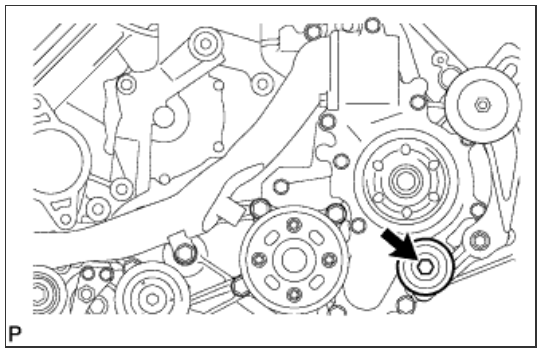
Torque:
49 N*m{ 495 kgf*cm , 36 ft.*lbf }



4. INSTALL NO. 2 IDLER PULLEY (w/ Viscous Heater)

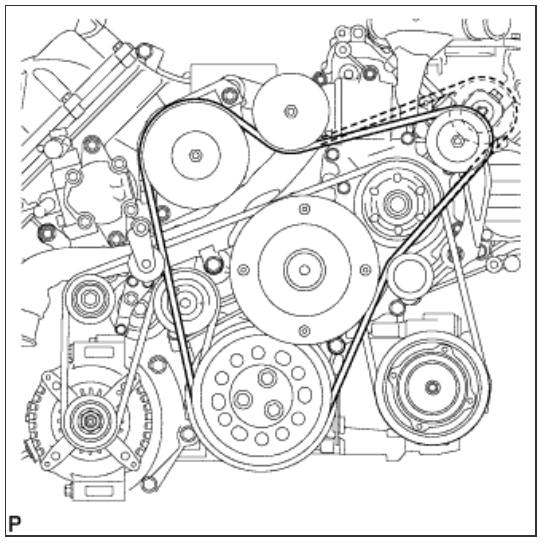
a. Install the collar, No. 2 idler pulley and cover with the bolt.

Torque:
49 N*m{ 495 kgf*cm , 36 ft.*lbf }

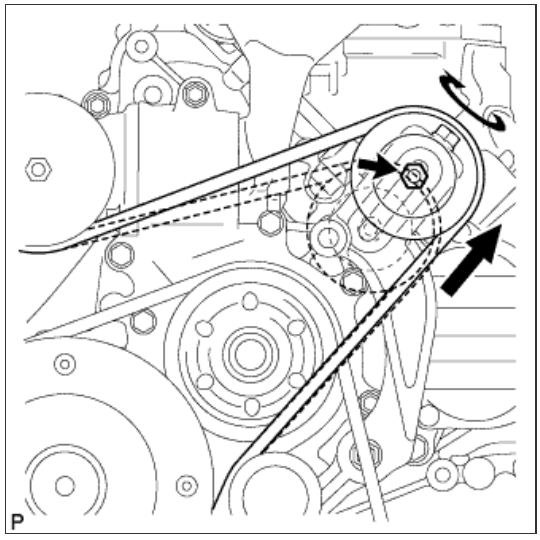


5. INSTALL V-RIBBED BELT (w/ Viscous Heater)

a. Install the V-ribbed belt as shown in the illustration.



b. Temporarily install the lock nut, and turn the bolt clockwise.



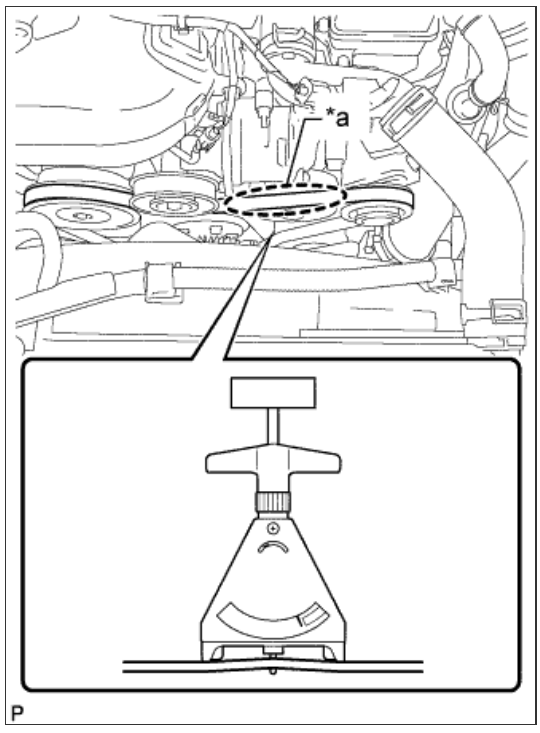
c. Using a belt tension gauge, inspect the belt tension.

Standard Belt Tension:

Item	Condition	Specified Condition
New belt	5 to 35°C (41 to 95°F)	550 to 800 N (56 to 82 kgf, 123.6 to 179.8 lbf)
Used belt	5 to 35°C (41 to 95°F)	300 to 500 N (31 to 51 kgf, 67.4 to 112.4 lbf)

Text in Illustration

*a	Measuring Point

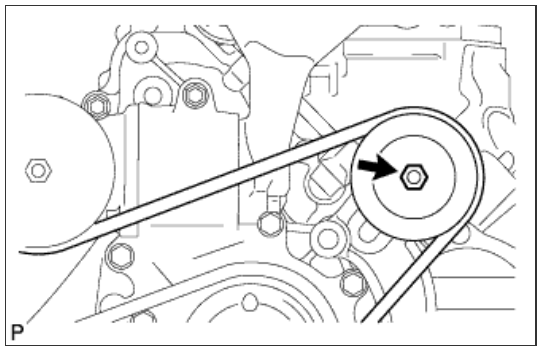


HINT:

- **When measuring the tension of a new belt, measure the tension immediately after installing it to the engine but before starting the engine.**
- **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 }

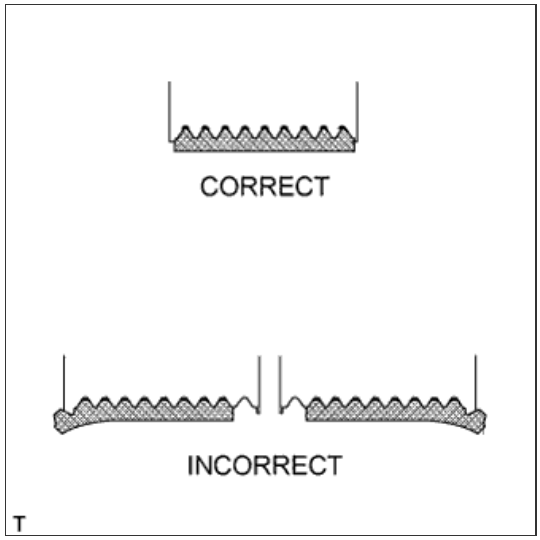


e. Check that the belt fits properly in the ribbed grooves.

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 }

Text in Illustration

*1	Paint Mark
*a	Top

b. Tighten the hose clamp.

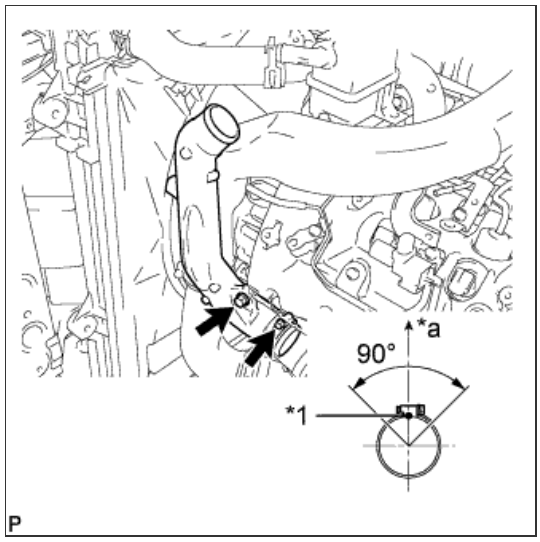
Torque:
6.3 N*m{ 64 kgf*cm , 56 in.*lbf }

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.

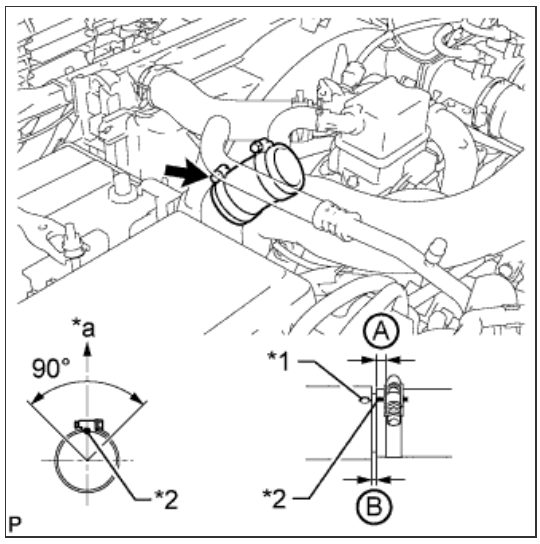
Torque:
6.3 N*m{ 64 kgf*cm , 56 in.*lbf }

Text in Illustration

*1	Protrusion
*2	Paint Mark
*a	Top

HINT:

- **Align the paint mark of the air hose with the protrusion and push on 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.

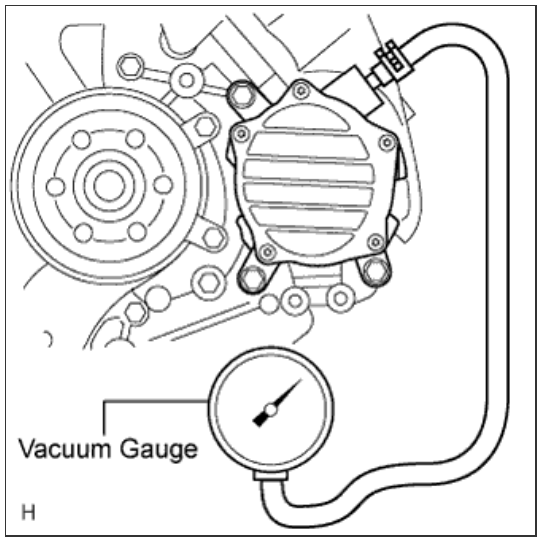
Standard Pressure:
More than 86.7 kPa (650 mmHg, 25.6 in.Hg)

HINT:

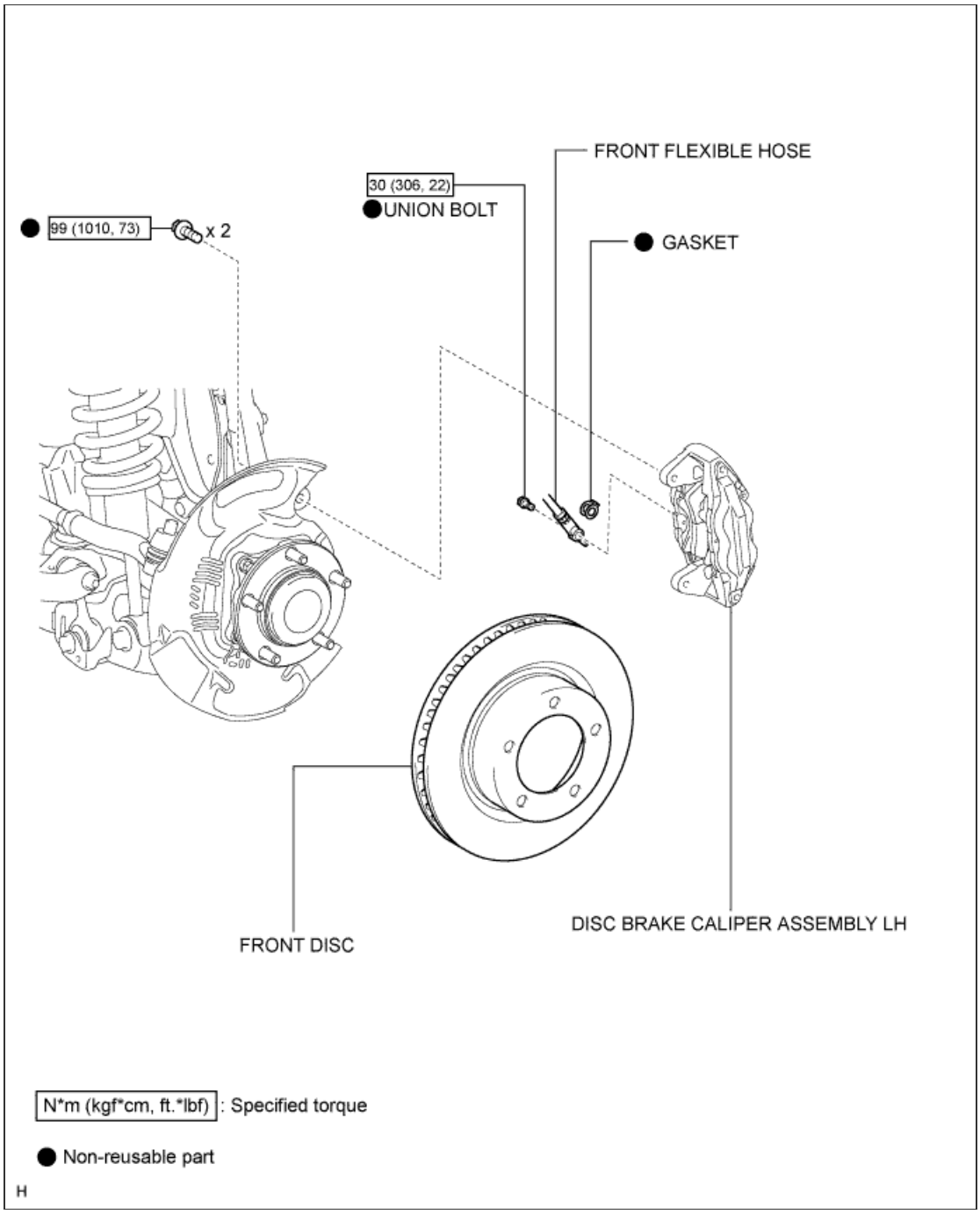
It is necessary to replace the vacuum pump assembly every 200000 km (124000 miles).

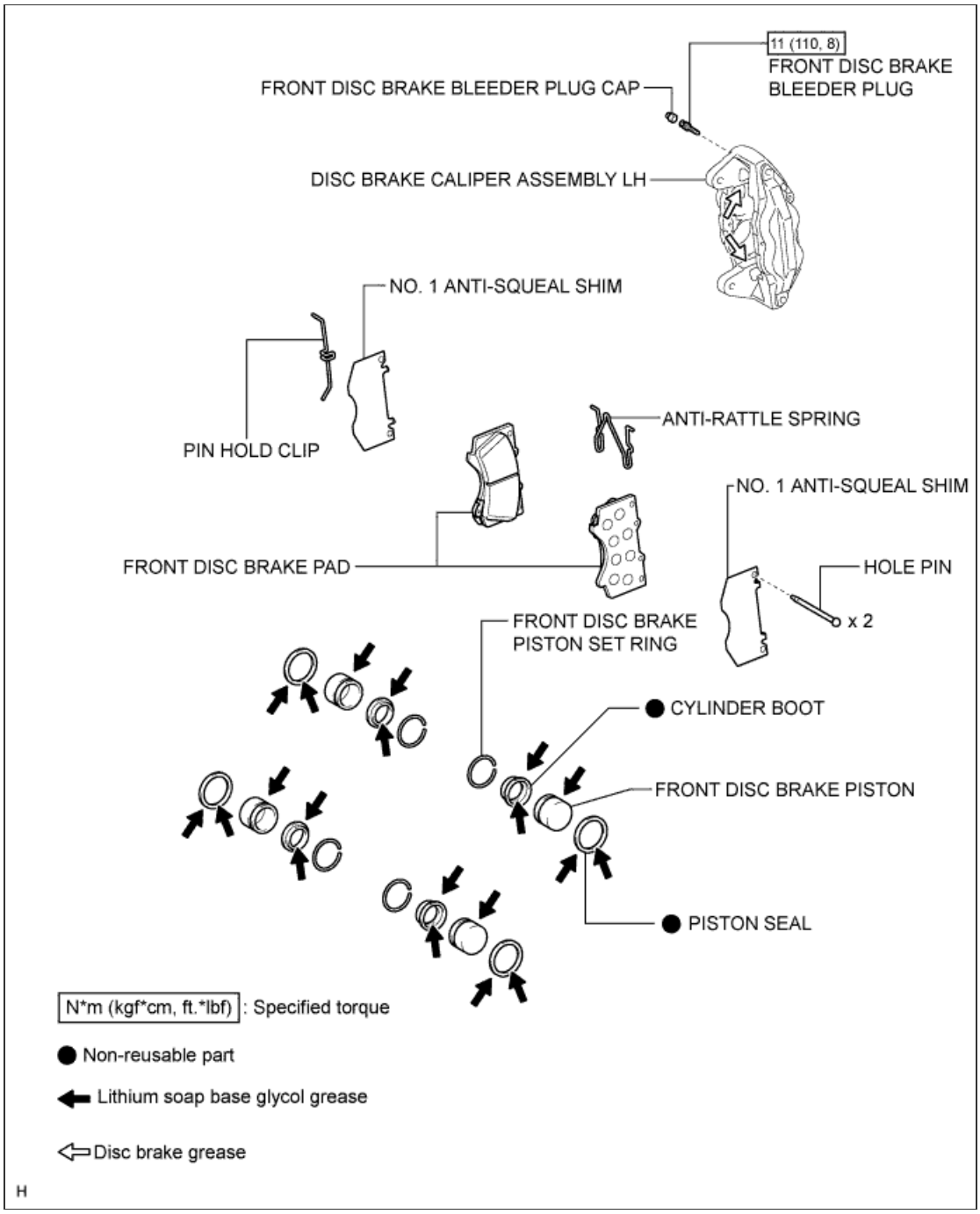
e. Remove the vacuum gauge from the vacuum pump.

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.

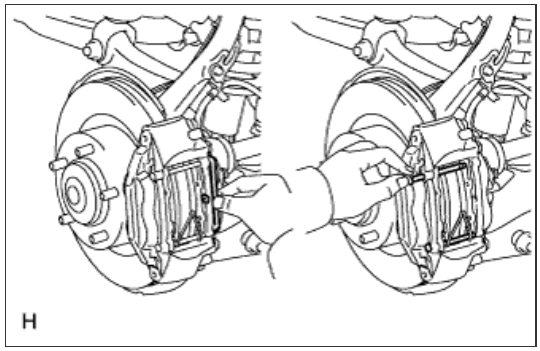
3. REMOVE FRONT DISC BRAKE PAD

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.

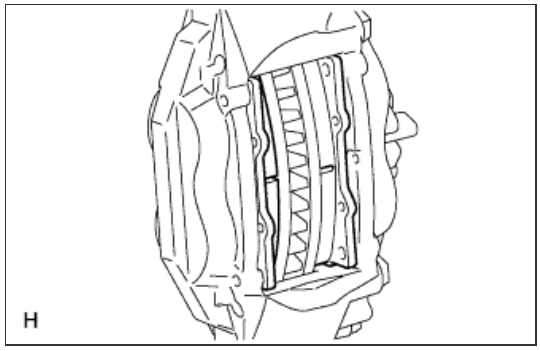
NOTICE:

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.



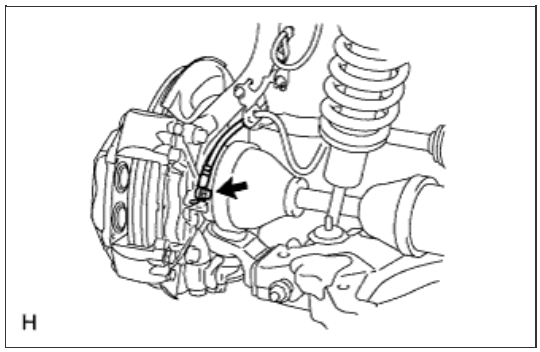
d. Remove the 2 pads from the disc brake caliper.

e. Remove the No. 1 anti-squeal shims from each pad.



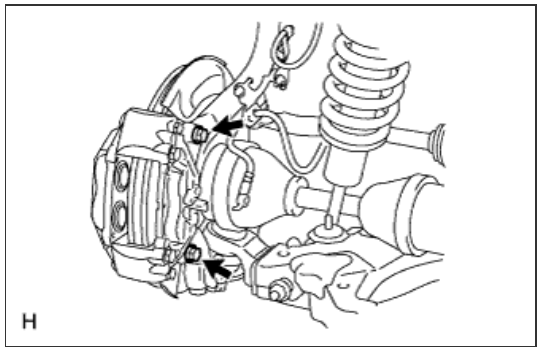
4. DISCONNECT FRONT FLEXIBLE HOSE

a. Remove the union bolt and gasket, and then disconnect the flexible hose.



5. REMOVE DISC BRAKE CALIPER ASSEMBLY LH

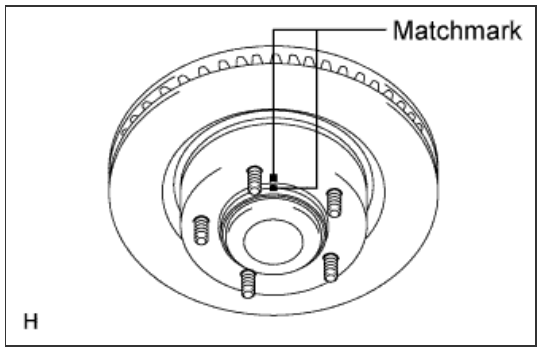
a. Remove the 2 bolts and disc brake caliper from the knuckle.



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:

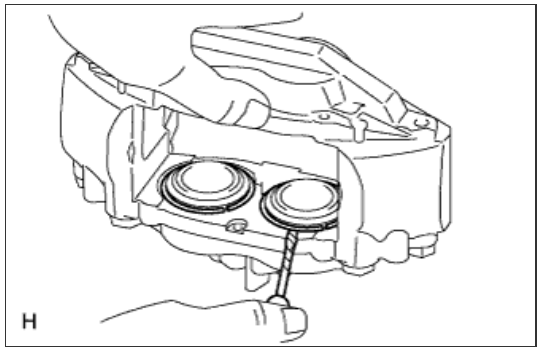
- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

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

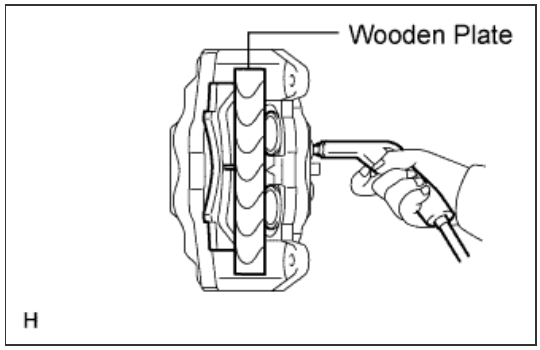
a. Install one side of the disc brake pad.

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

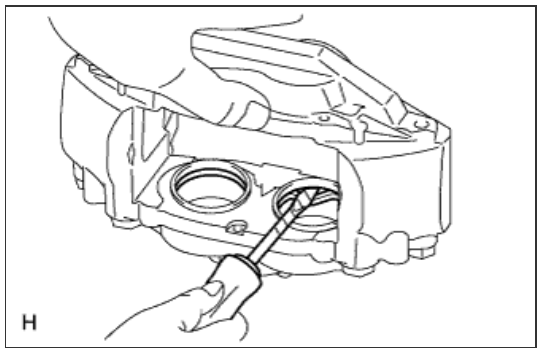
a. Using a screwdriver, remove the 4 piston seals from the disc brake caliper.

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.

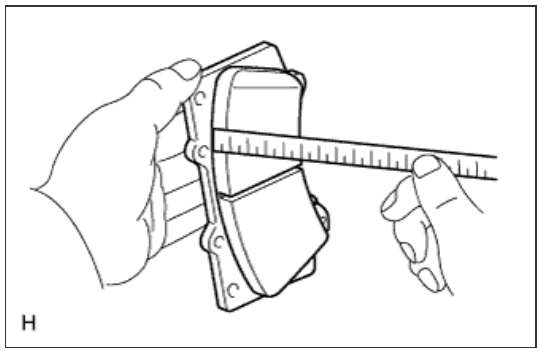
Standard Thickness:
11.9 mm (0.469 in.)

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.

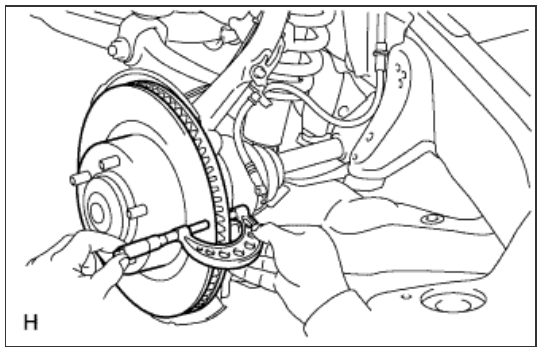
4. CHECK DISC THICKNESS

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.



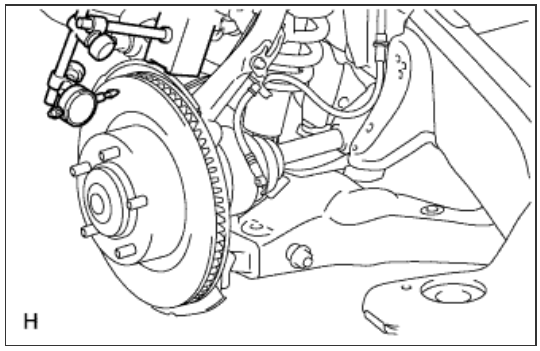
5. CHECK DISC RUNOUT

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:

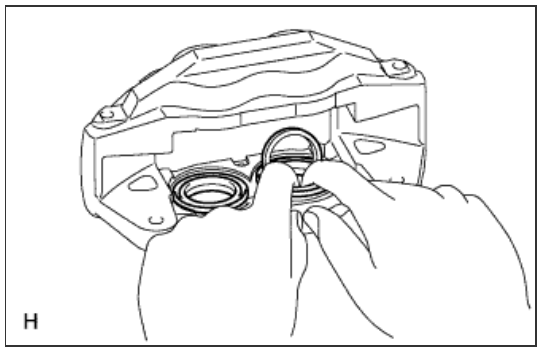
The bleeder plug will be tightened to a torque specification in the "Bleed Brake Line" procedure.

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

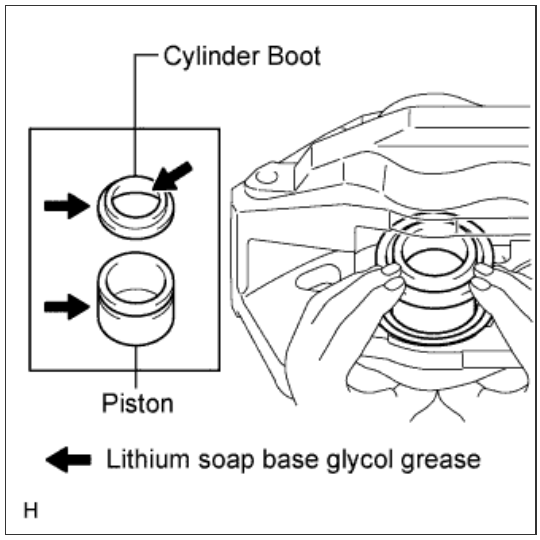
a. Apply lithium soap base glycol grease to the 4 front disc brake pistons and 4 new cylinder boots.

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.

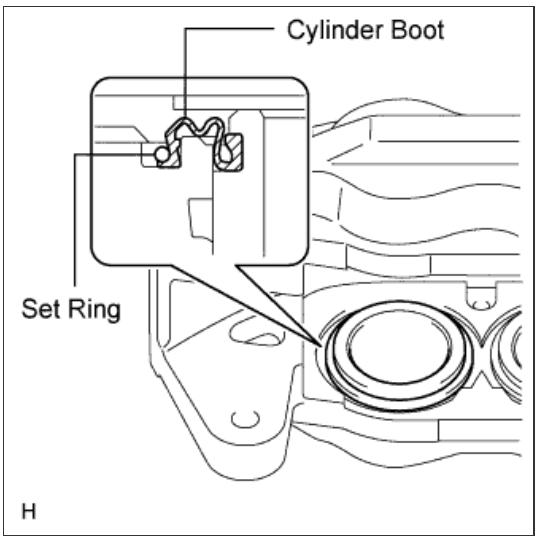


5. INSTALL CYLINDER BOOT

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.

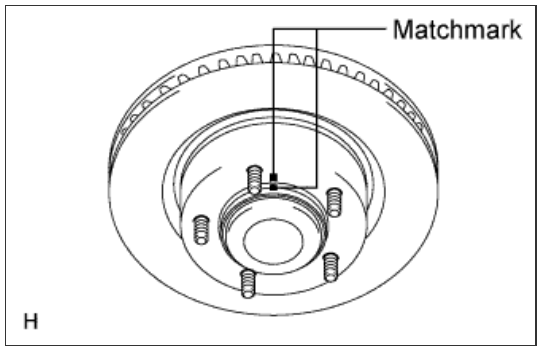
for Preparation Click here

1. INSTALL FRONT DISC

a. Align the matchmarks, and then install the front disc.

HINT:

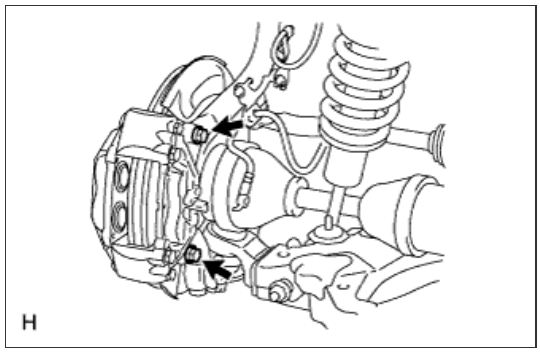
When replacing the front disc with a new one, select the installation position where the front disc has the minimum runout.



2. INSTALL DISC BRAKE CALIPER ASSEMBLY LH

a. Install the disc brake caliper with 2 new bolts.

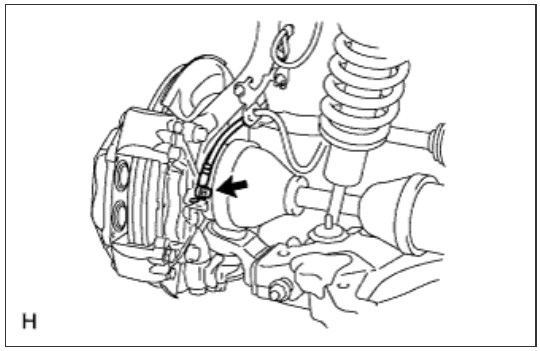
Torque:
99 N*m{ 1,010 kgf*cm , 73 ft.*lbf }



3. CONNECT FRONT FLEXIBLE HOSE

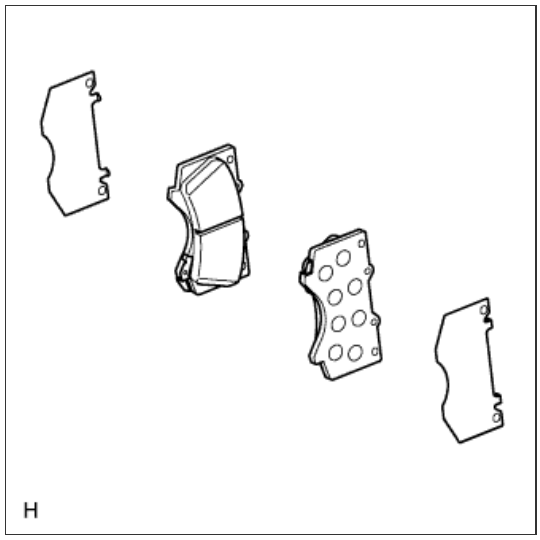
a. Install a new gasket and connect the flexible hose with the new union bolt.

Torque:
30 N*m{ 306 kgf*cm , 22 ft.*lbf }

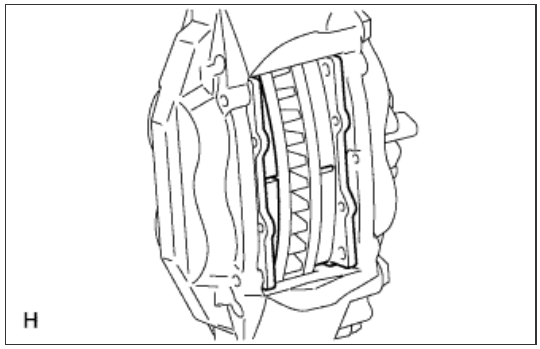


4. INSTALL FRONT DISC BRAKE PAD

a. Install the No. 1 anti-squeal shims to each pad.



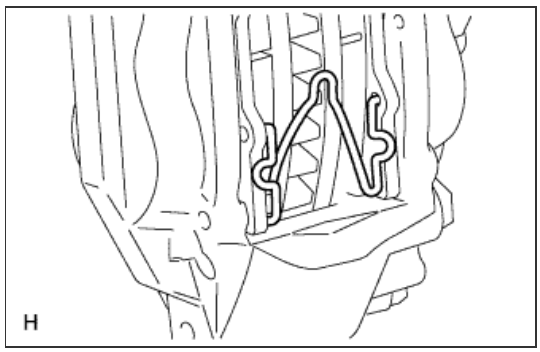
b. Install the 2 pads to the disc brake caliper.



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.

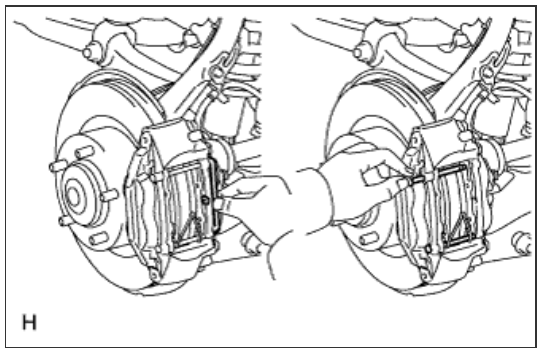


d. Install the 2 hole pins.

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.

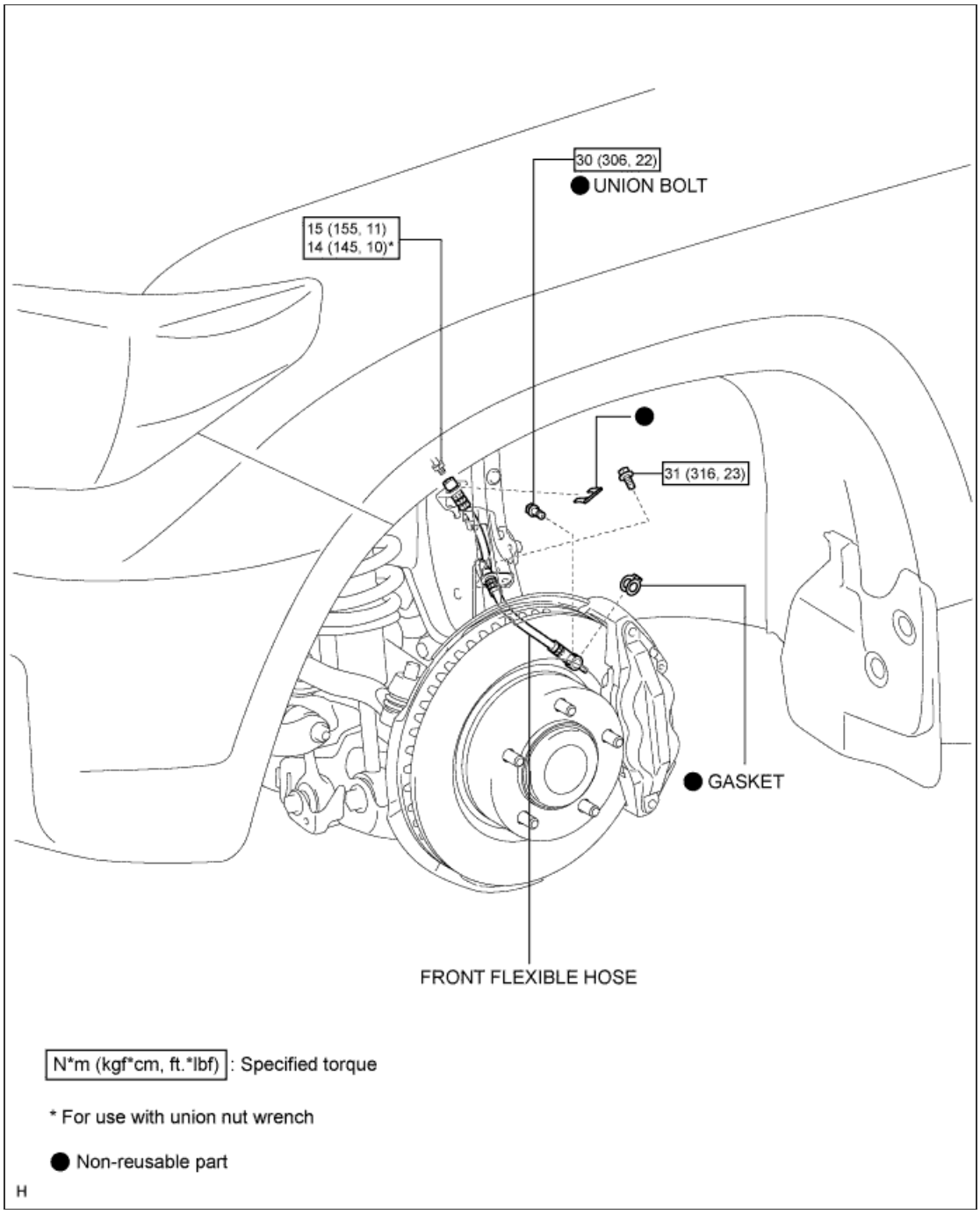
l. Check and adjust the brake fluid level (Click here).

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



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

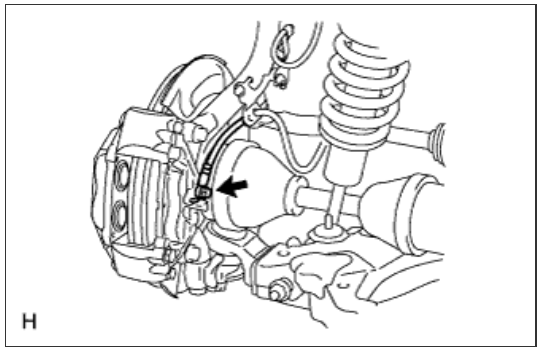
2. DRAIN BRAKE FLUID

NOTICE:

Wash 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.



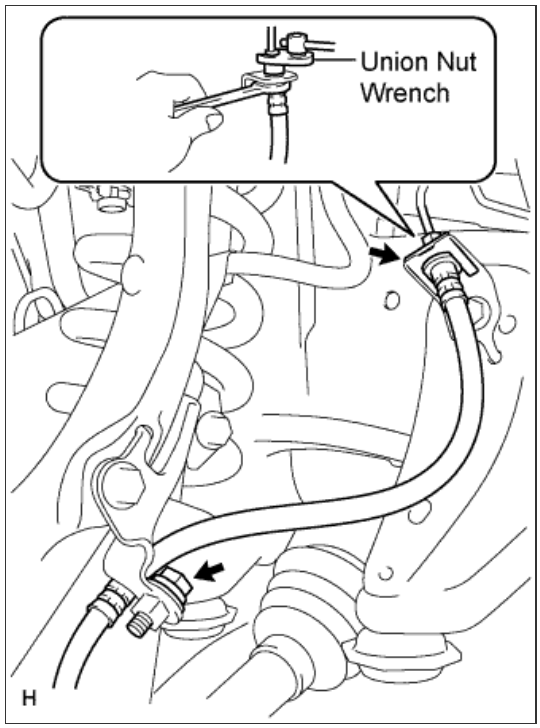
b. Remove the bolt.

c. Remove the brake tube from the flexible hose with a union nut wrench while holding the flexible hose with a wrench.

NOTICE:

- **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.**

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

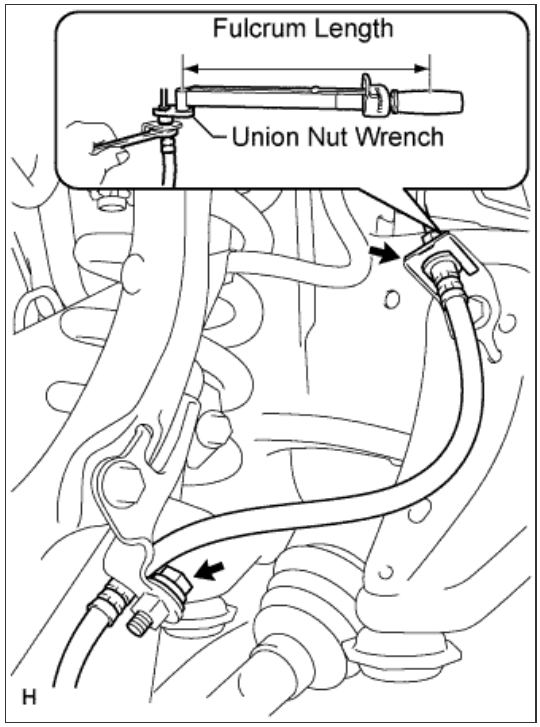
a. Install a new clip to the flexible hose.

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.**

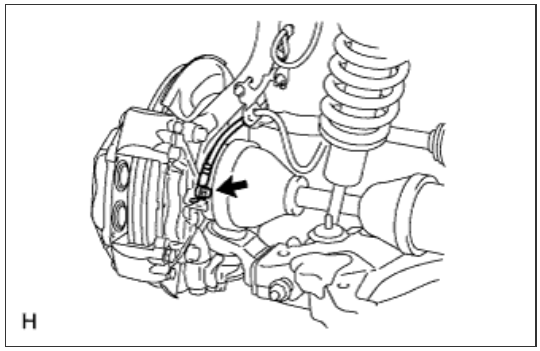


c. Install the bolt.

Torque:
31 N*m{ 316 kgf*cm , 23 ft.*lbf }

d. Install a new gasket and connect the flexible hose with the new 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.

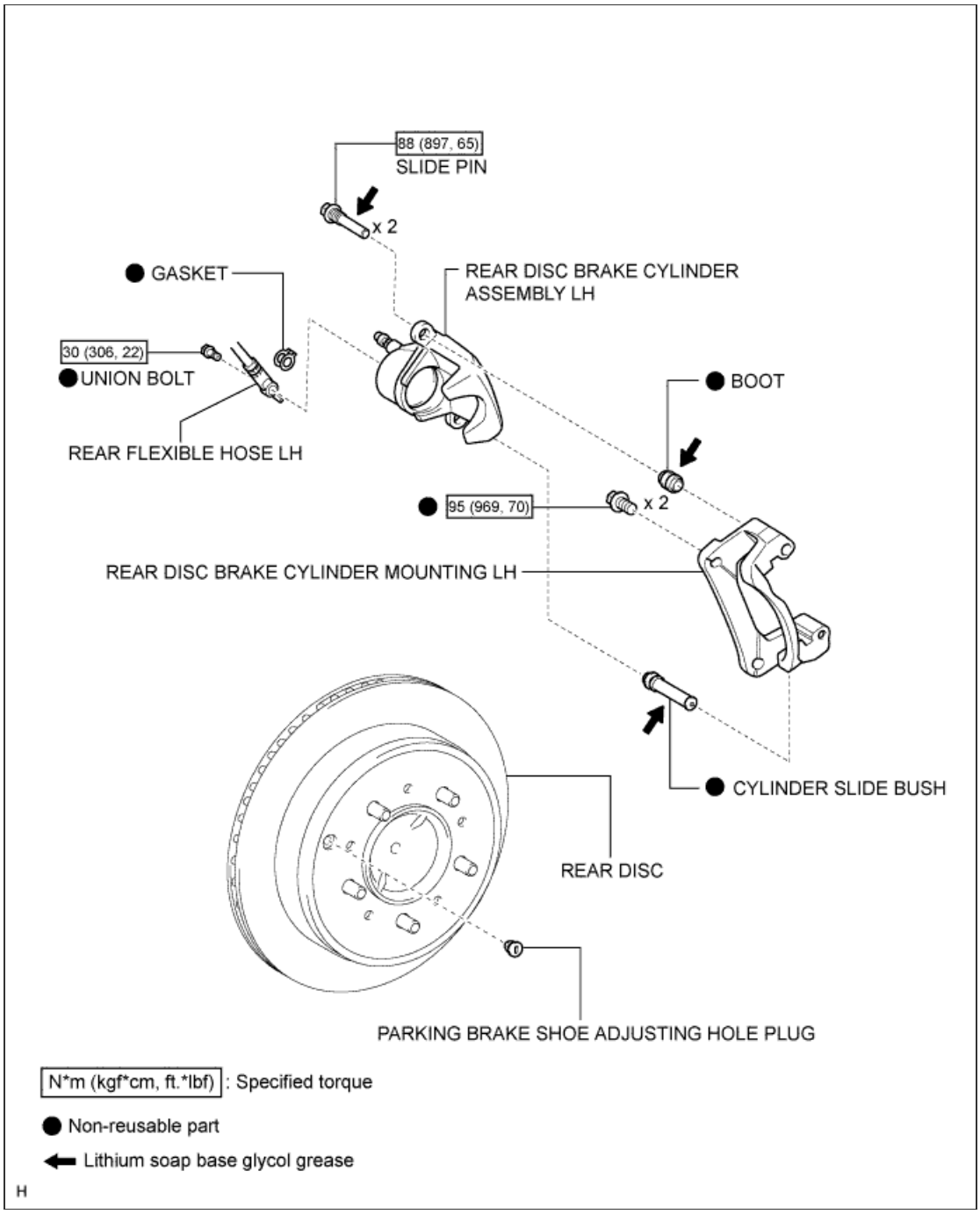
l. Check and adjust the brake fluid level (Click here).

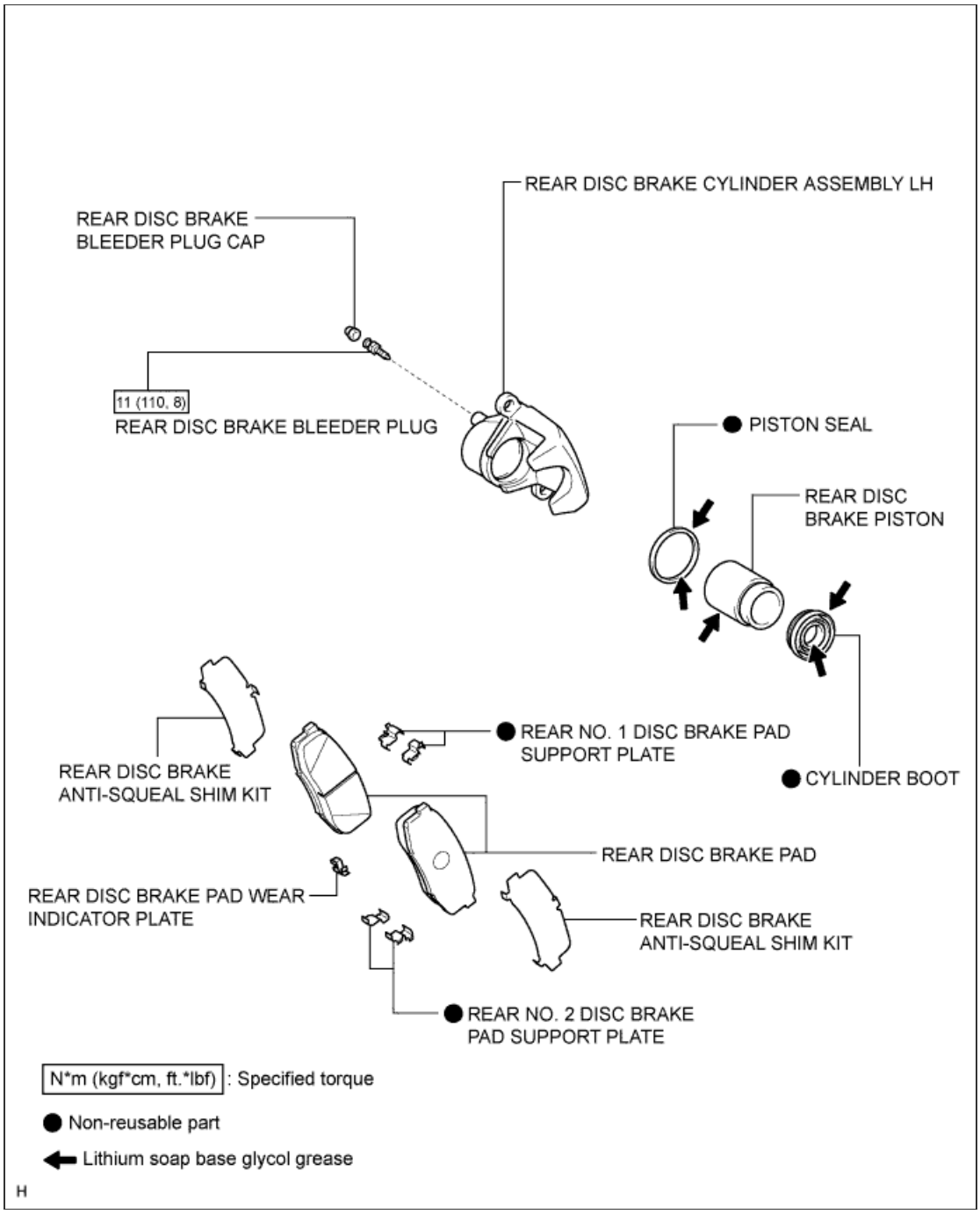
m. Clear the DTCs (Click here).

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

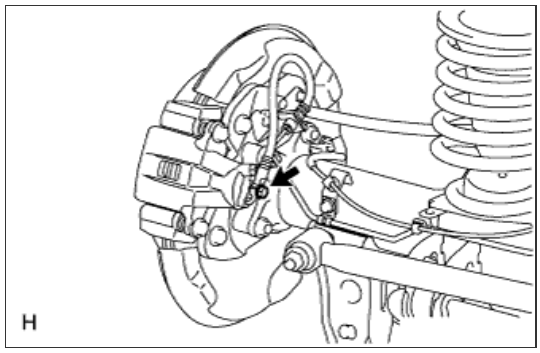
2. DRAIN BRAKE FLUID

NOTICE:

Wash brake fluid off immediately if it is spilled on any painted surface.

3. DISCONNECT REAR FLEXIBLE HOSE LH

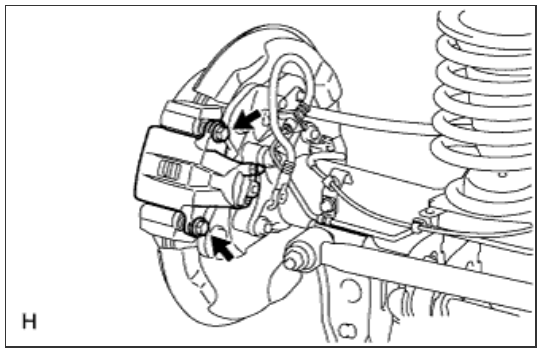
a. Remove the union bolt and gasket, and then disconnect the flexible hose from the rear disc brake cylinder. Use a container to catch brake fluid as it drains out.



4. REMOVE REAR DISC BRAKE CYLINDER ASSEMBLY LH

a. Remove the 2 slide pins.

b. Remove the cylinder from the rear disc brake cylinder mounting.



5. REMOVE REAR DISC BRAKE PAD

a. Remove the 2 brake pads from the rear disc brake cylinder mounting.

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-squeal 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 mounting.

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 mounting.

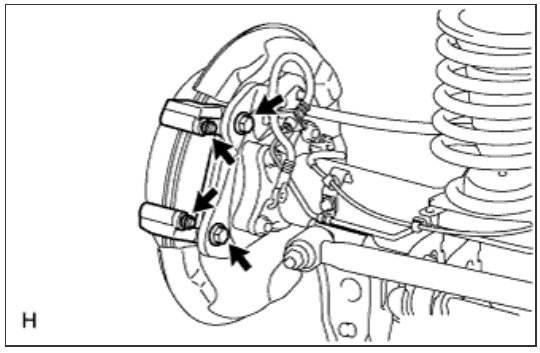
10. REMOVE REAR DISC BRAKE CYLINDER MOUNTING LH

a. Remove the 2 bolts and rear disc brake cylinder mounting.

NOTICE:

If the pad supports are removed during maintenance of parts, replace them with new ones.

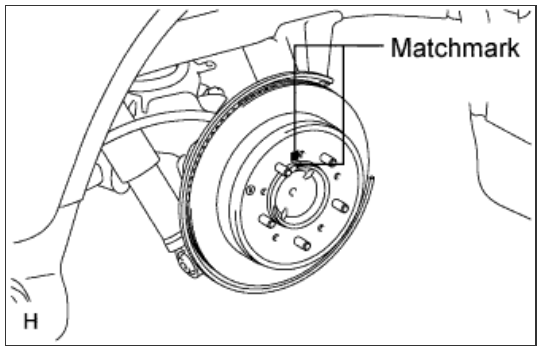
b. Remove the cylinder slide bush and boot from the rear disc brake cylinder mounting.



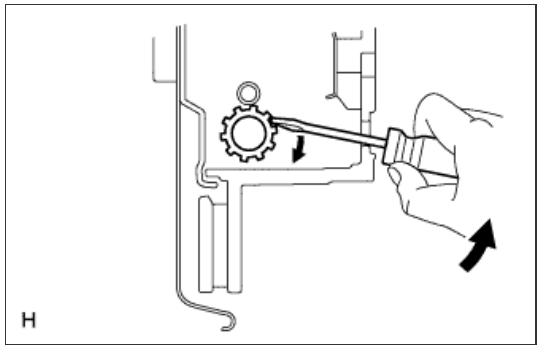
11. REMOVE PARKING BRAKE SHOE ADJUSTING HOLE PLUG

12. 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.



for Preparation Click here

1. REMOVE REAR DISC BRAKE BLEEDER PLUG CAP

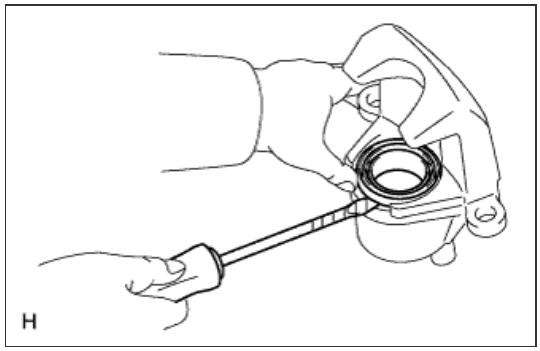
2. REMOVE REAR DISC BRAKE BLEEDER PLUG

3. REMOVE CYLINDER BOOT

a. Using a screwdriver, remove the cylinder boot from the cylinder.

HINT:

Tape the screwdriver tip before use.



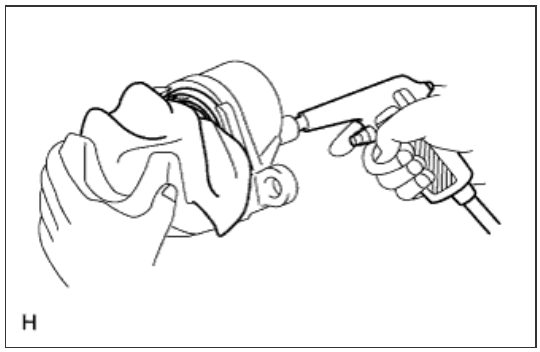
4. REMOVE REAR DISC BRAKE PISTON

a. Place a piece of cloth or a similar object 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

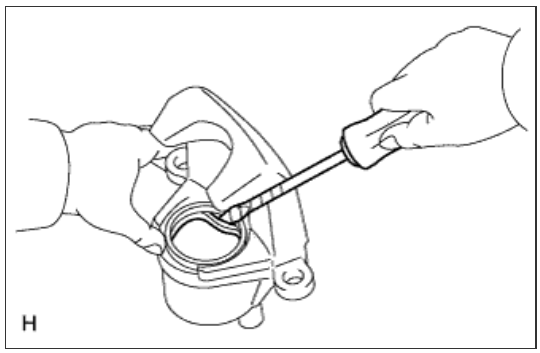
a. Using a screwdriver, remove the piston seal from the cylinder.

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.

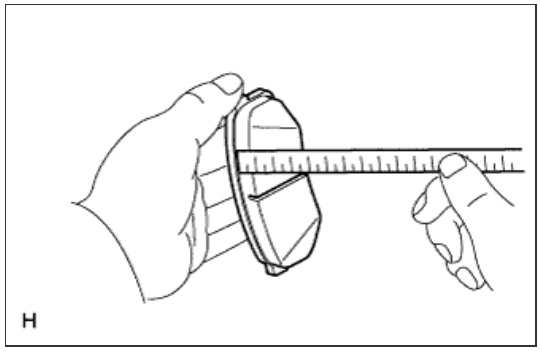
Standard Thickness:
12.0 mm (0.472 in.)

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

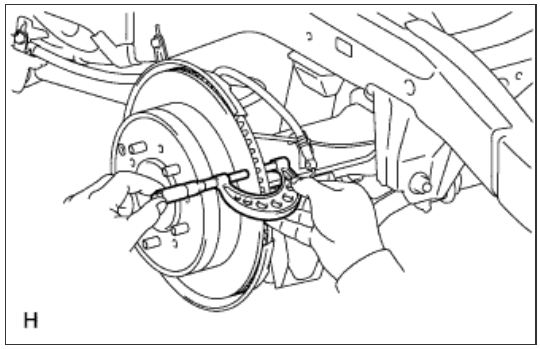
a. Temporarily install the disc with the 3 hub nuts.

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

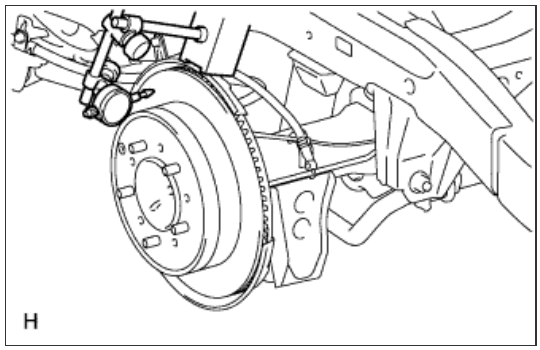
a. Fix the disc in place with the 5 hub nuts.

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.

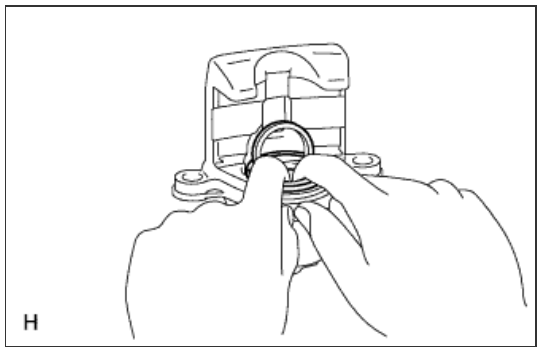
d. Repeat the 2 previous steps until the disc has been installed on the 3 remaining hub positions. If the minimum runout recorded above is less than 0.15 mm (0.00590 in.), install the disc in that position. If the minimum runout recorded above is more than 0.15 mm (0.00590 in.), replace the disc and 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.

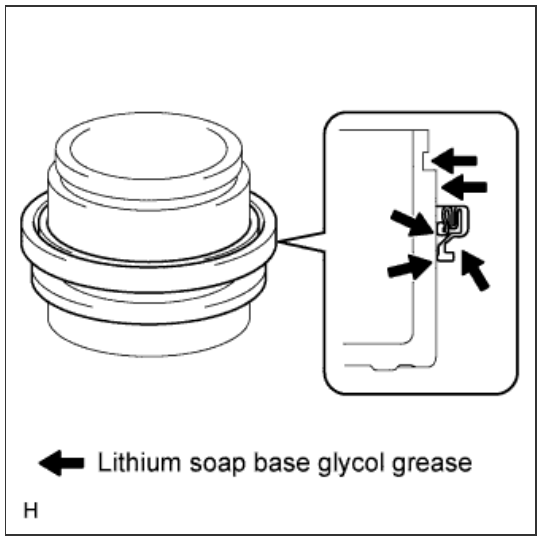
b. Install the piston seal to the disc brake cylinder.



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.

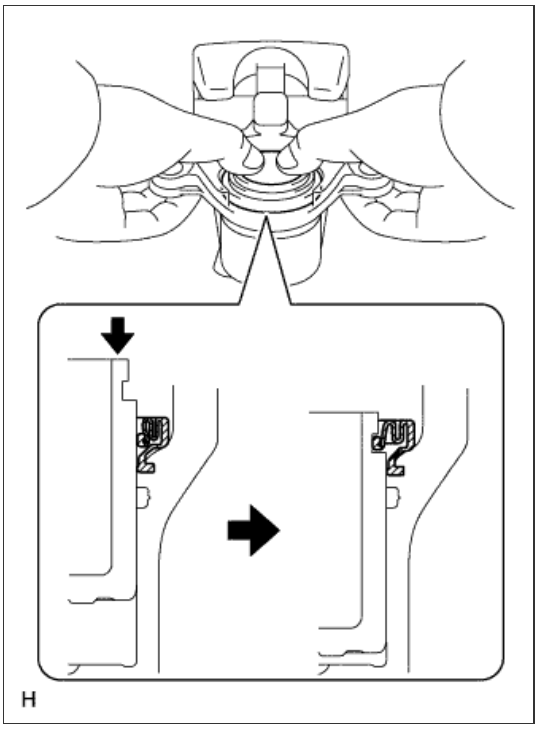
NOTICE:

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.



4. 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:

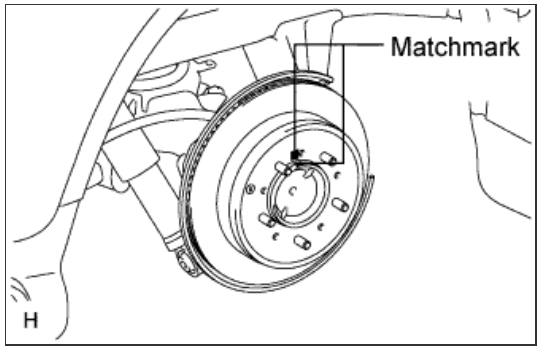
- **Use the same procedures for the LH side and RH side.**
- **The procedures listed below are for the LH side.**

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

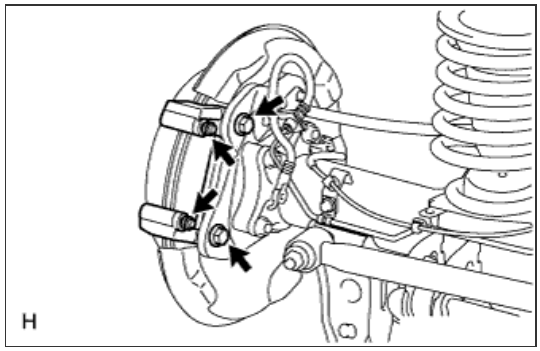
a. Install a new boot and a new cylinder slide bush to the rear disc brake cylinder mounting.

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.**

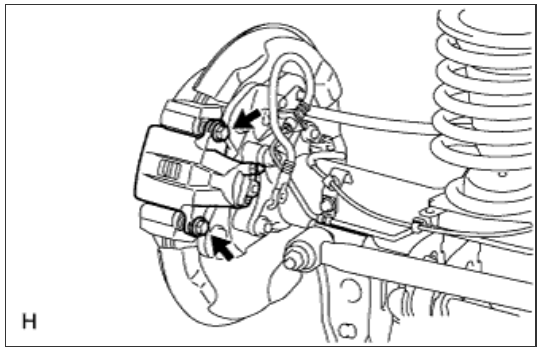
a. Install the 2 disc brake pads to the disc brake cylinder mounting.

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 }

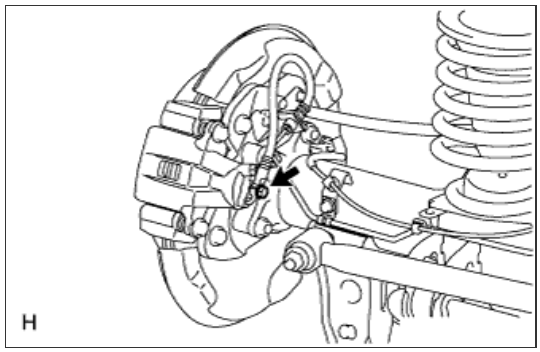


10. CONNECT REAR FLEXIBLE HOSE LH

a. Install a new gasket and connect the flexible hose with the new union bolt.

Torque:

30 N*m{ 306 kgf*cm , 22 ft.*lbf }



11. 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).

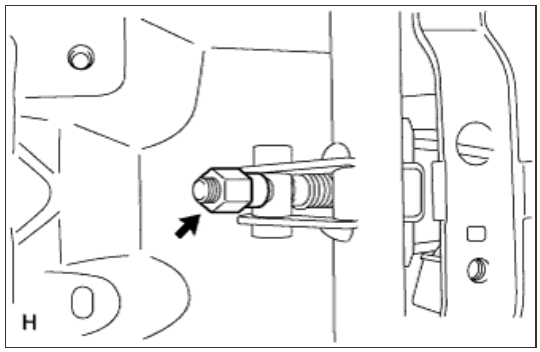
12. ADJUST PARKING BRAKE LEVER TRAVEL

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.

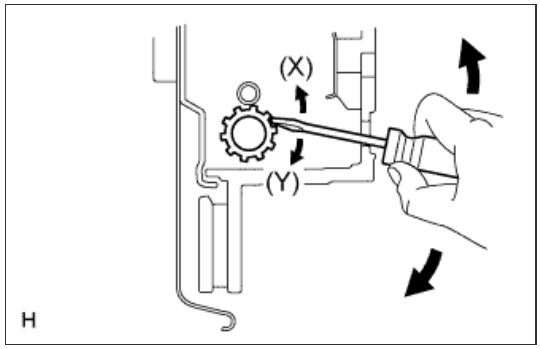


e. Insert an adjustment tool into the adjustment hole of the disc. Rotate the adjustment wheel in the "X" direction until the shoes are locked. Then rotate the adjustment wheel in the "Y" direction 8 notches.

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.

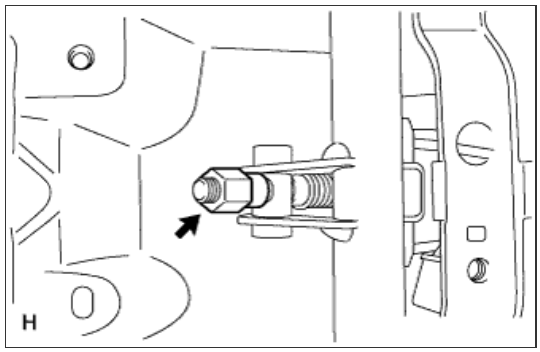


i. Turn the adjusting nut until the parking brake lever travel becomes correct.

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.

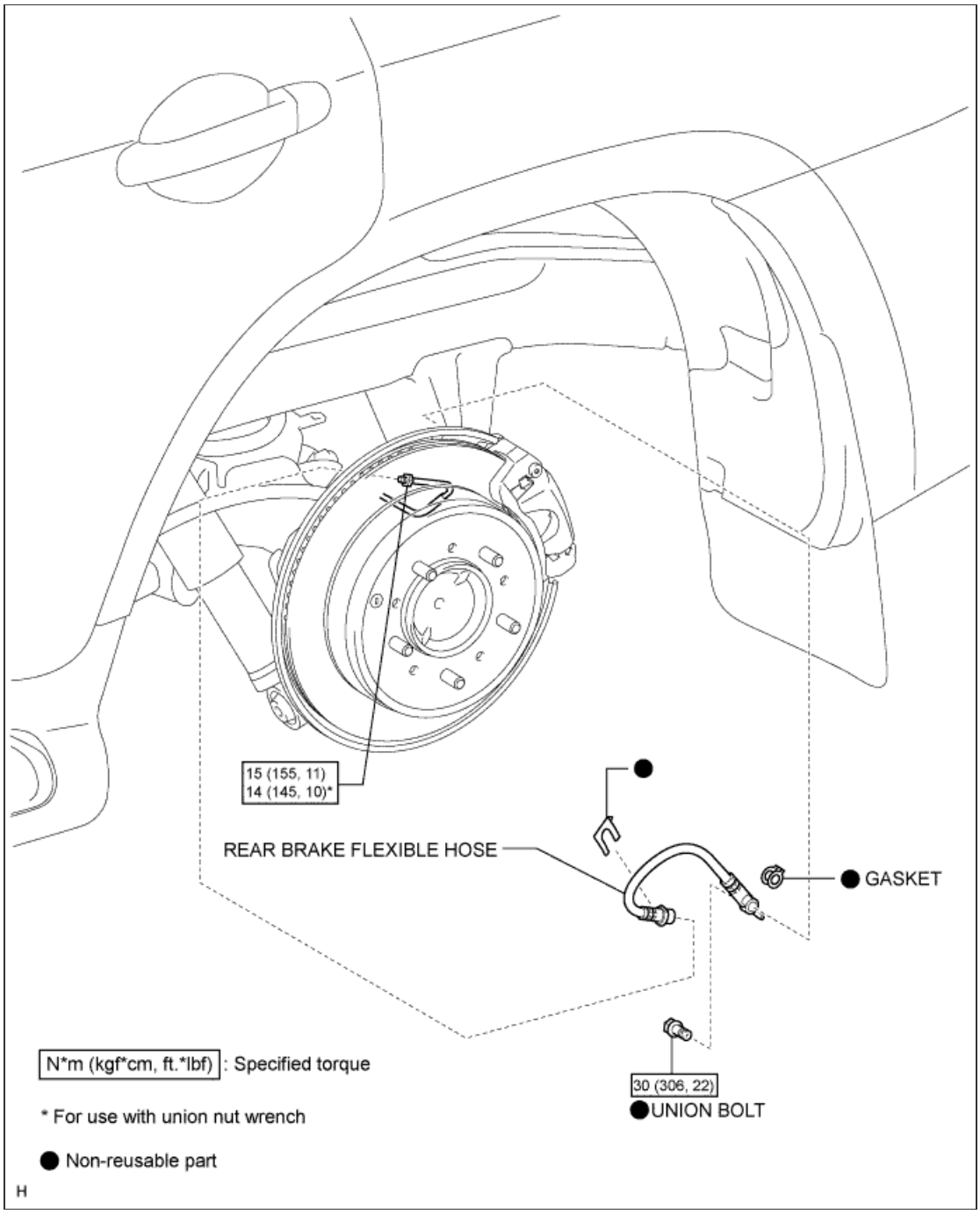
Standard Condition:
The brake warning light always illuminates at the first click.

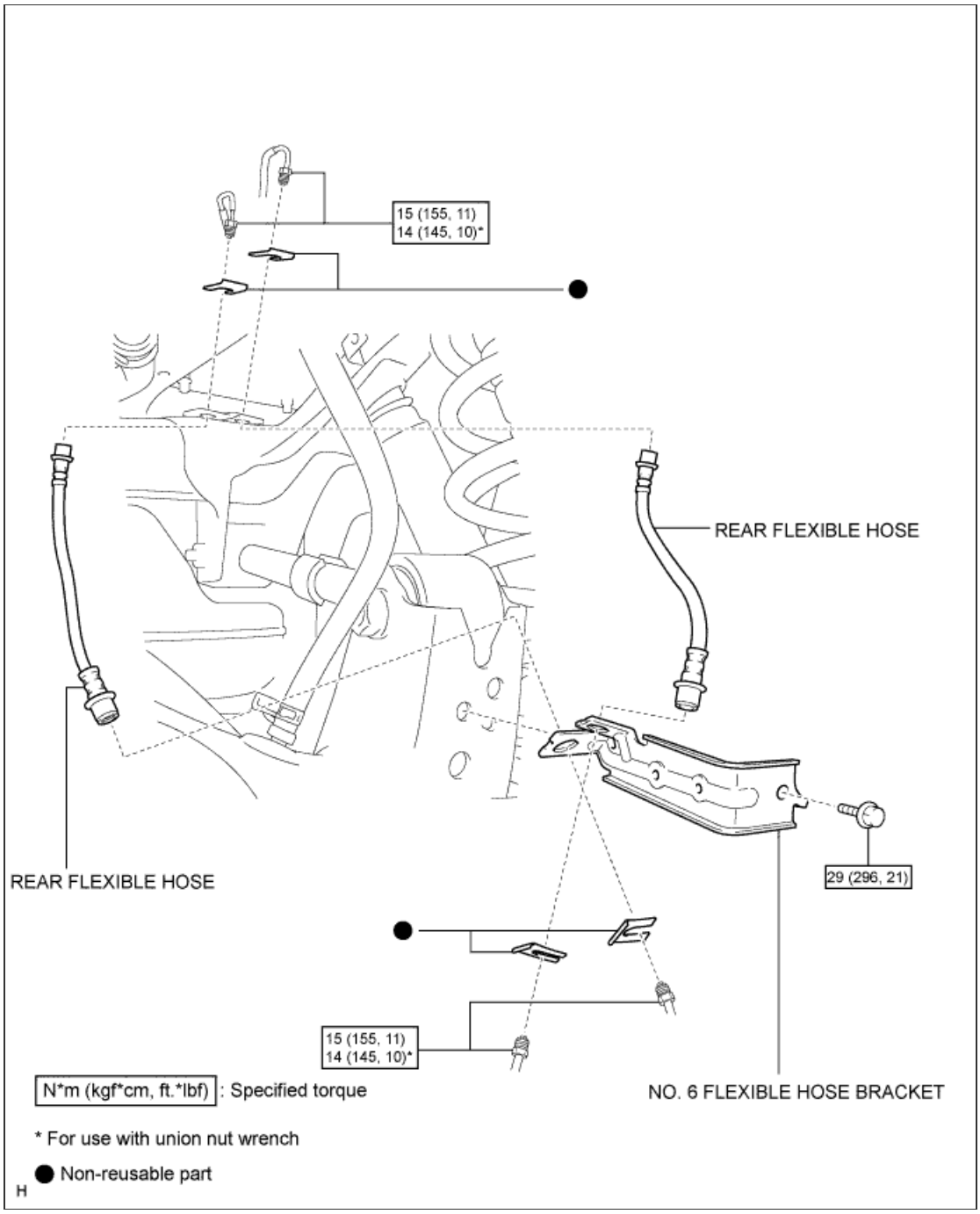
13. INSTALL PARKING BRAKE SHOE ADJUSTING HOLE PLUG

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

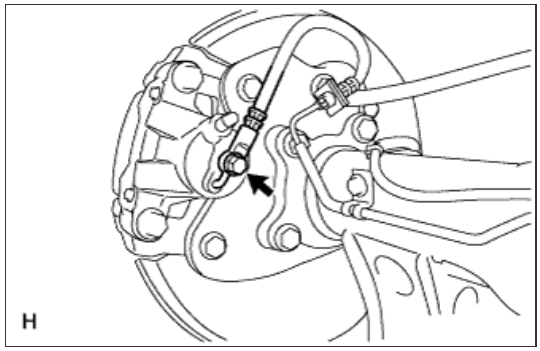
2. DRAIN BRAKE FLUID

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.

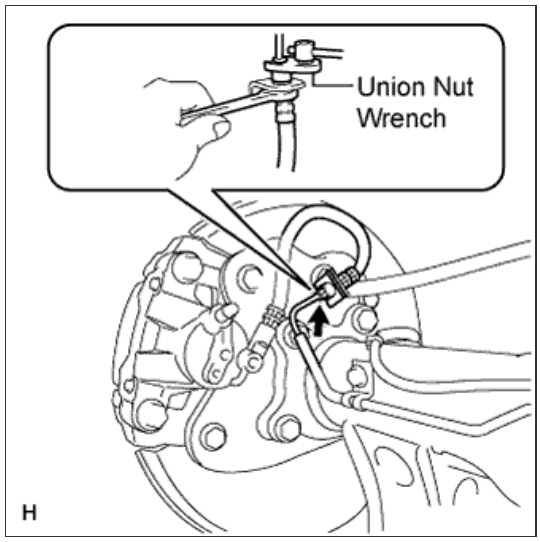


b. Disconnect the brake tube from the flexible hose with a union nut wrench while holding the flexible hose with a wrench.

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.

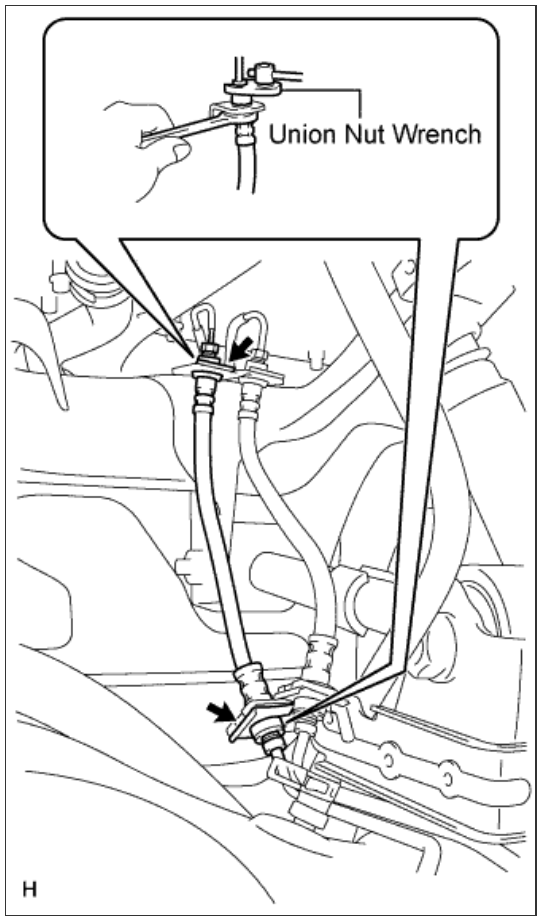


4. REMOVE REAR FLEXIBLE HOSE

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.

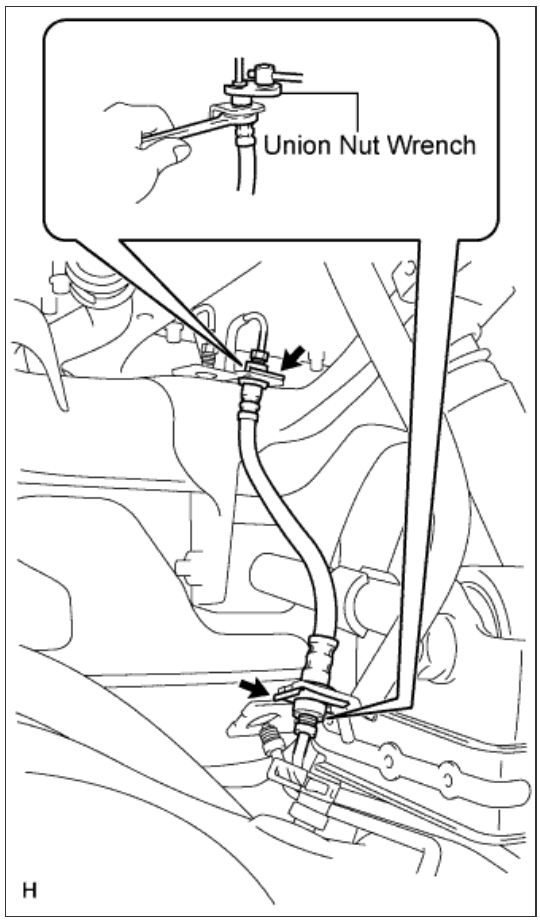
c. Remove the flexible hose.



d. Disconnect each brake tube from the flexible hose with a union nut wrench while holding the flexible hose with a wrench.

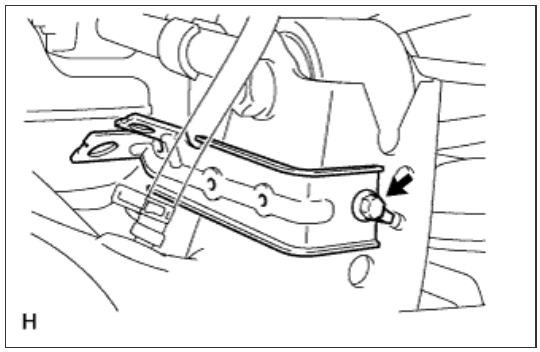
e. Remove the 2 clips.

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

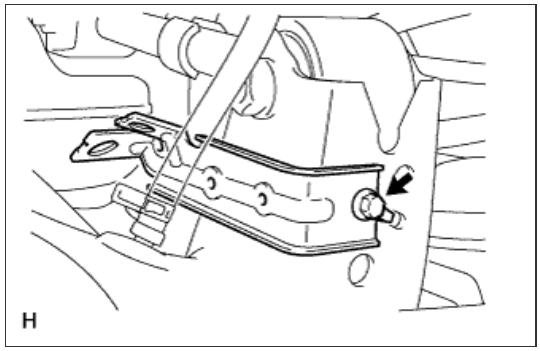
HINT:

- **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.

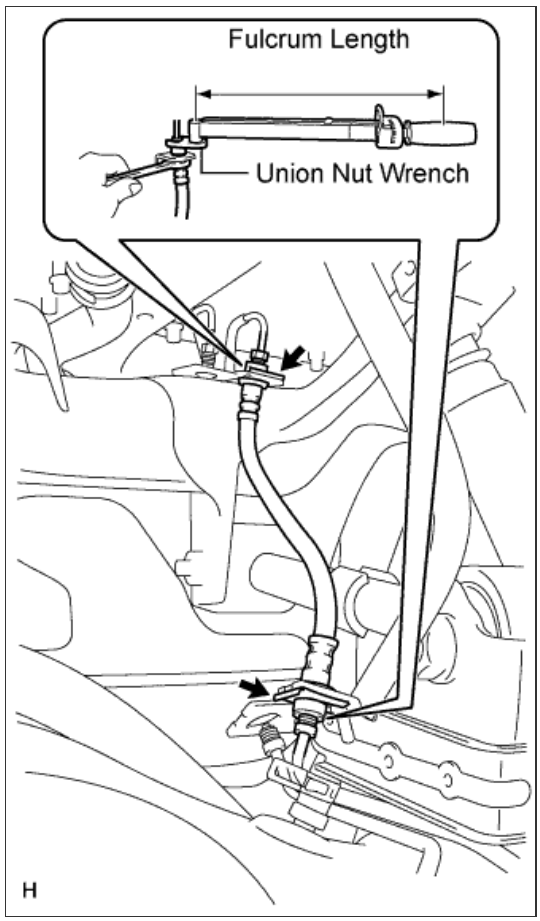
Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

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.

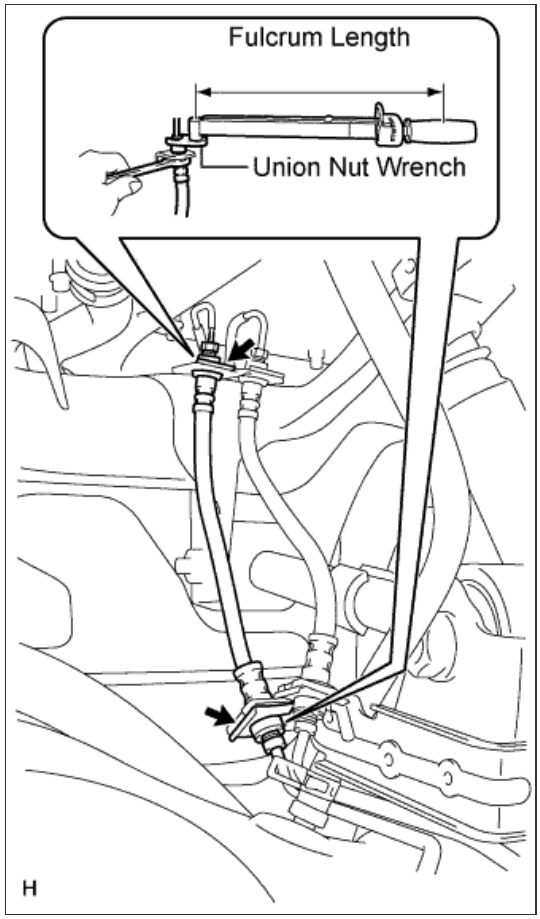
Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

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.

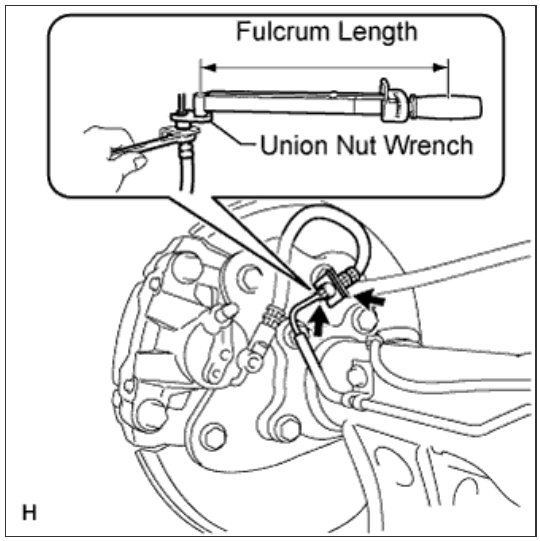
Torque:
without union nut wrench:
15 N*m{ 155 kgf*cm , 11 ft.*lbf }
with union nut wrench:
14 N*m{ 145 kgf*cm , 10 ft.*lbf }

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.**

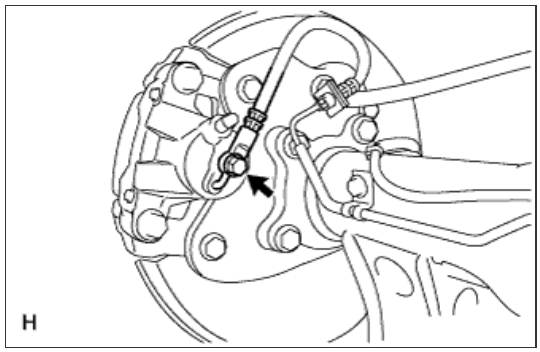


c. Install the flexible hose and a new gasket to the disc brake cylinder with the new union bolt.

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	Parking brake lever travel (Out of adjustment)	Click here
	Parking brake cable (Sticking)	Click here
	Parking brake shoe clearance (Out of adjustment)	Click here
	Parking brake shoe lining (Cracked or distorted)	Click here
	Tension or return spring (Damaged)	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)

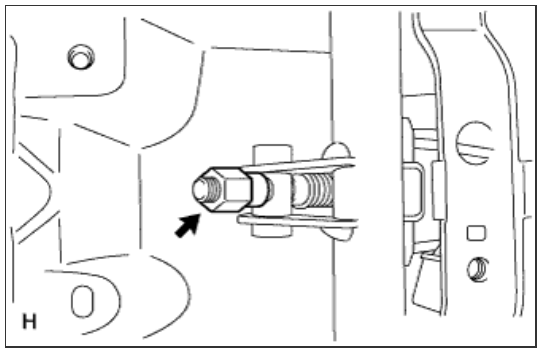
6. ADJUST PARKING BRAKE LEVER TRAVEL

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.

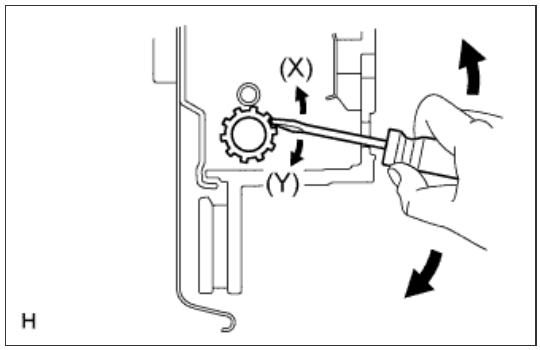


e. Insert an adjustment tool into the adjustment hole of the disc. Rotate the adjustment wheel in the "X" direction until the shoes are locked. Then rotate the adjustment wheel in the "Y" direction 8 notches.

f. Check that the disc can be rotated lightly. If not, rotate the adjustment wheel in the "Y" direction and check again.

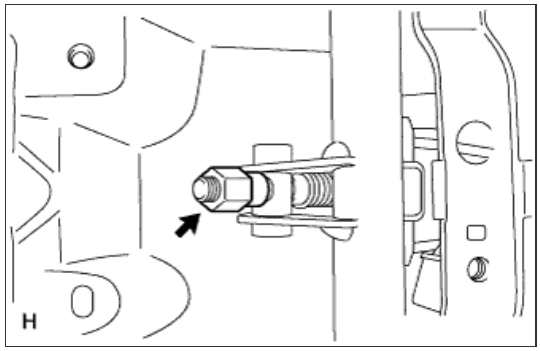
g. Install the hole plug.

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)

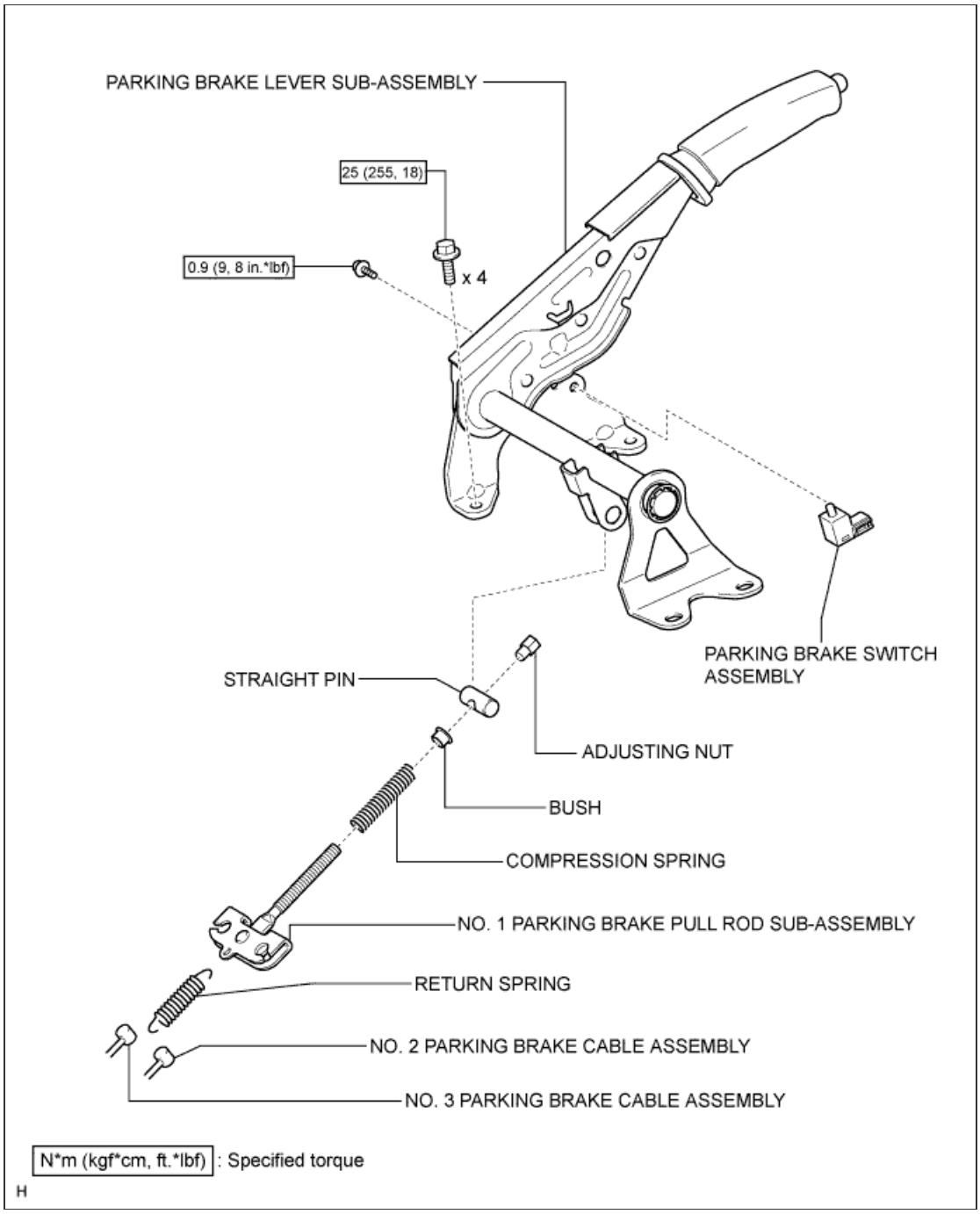
9. INSTALL CONSOLE CUP HOLDER BOX SUB-ASSEMBLY (w/o Cool Box)

(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)

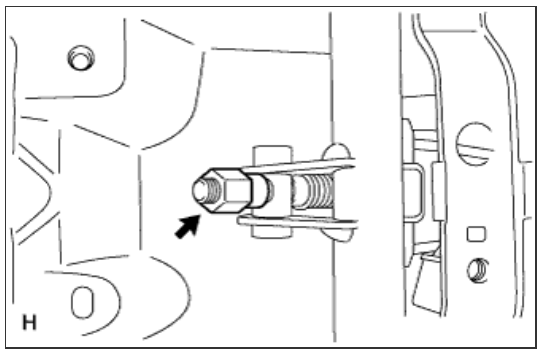
(Click here)

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.

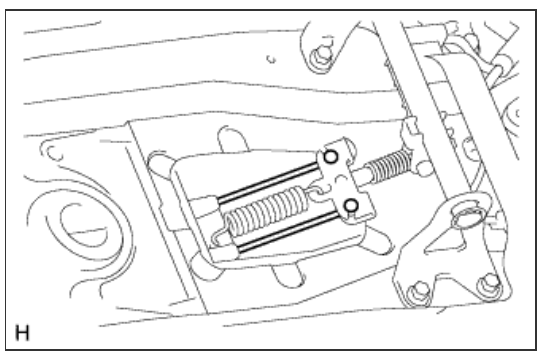


d. Remove the parking brake return spring.

e. Disconnect the No. 2 parking brake cable and No. 3 parking brake cable from the No. 1 parking brake pull rod.

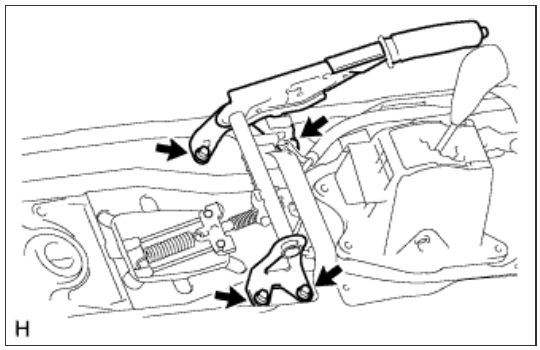
f. Remove the No. 1 parking brake pull rod, bush and compression spring from the parking brake lever.

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

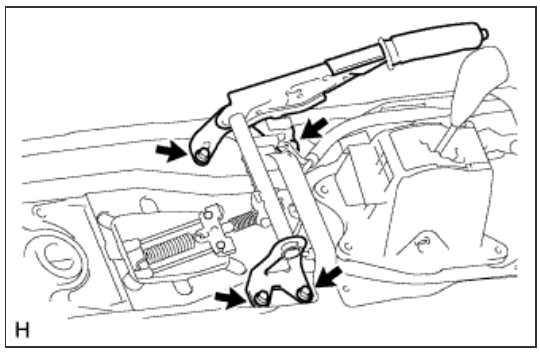
a. Install the parking brake lever with the 2 bolts.

Torque:
25 N*m{ 255 kgf*cm , 18 ft.*lbf }

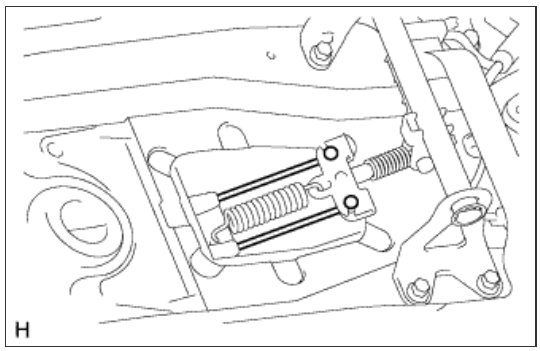
b. Install the parking brake lever support with the 2 bolts.

Torque:
25 N*m{ 255 kgf*cm , 18 ft.*lbf }

c. Install the straight pin to the parking brake lever.



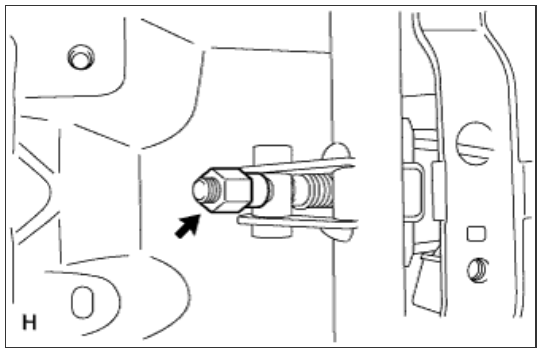
d. Connect the No. 2 parking brake cable and No. 3 parking brake cable to the No. 1 parking brake pull rod.



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)

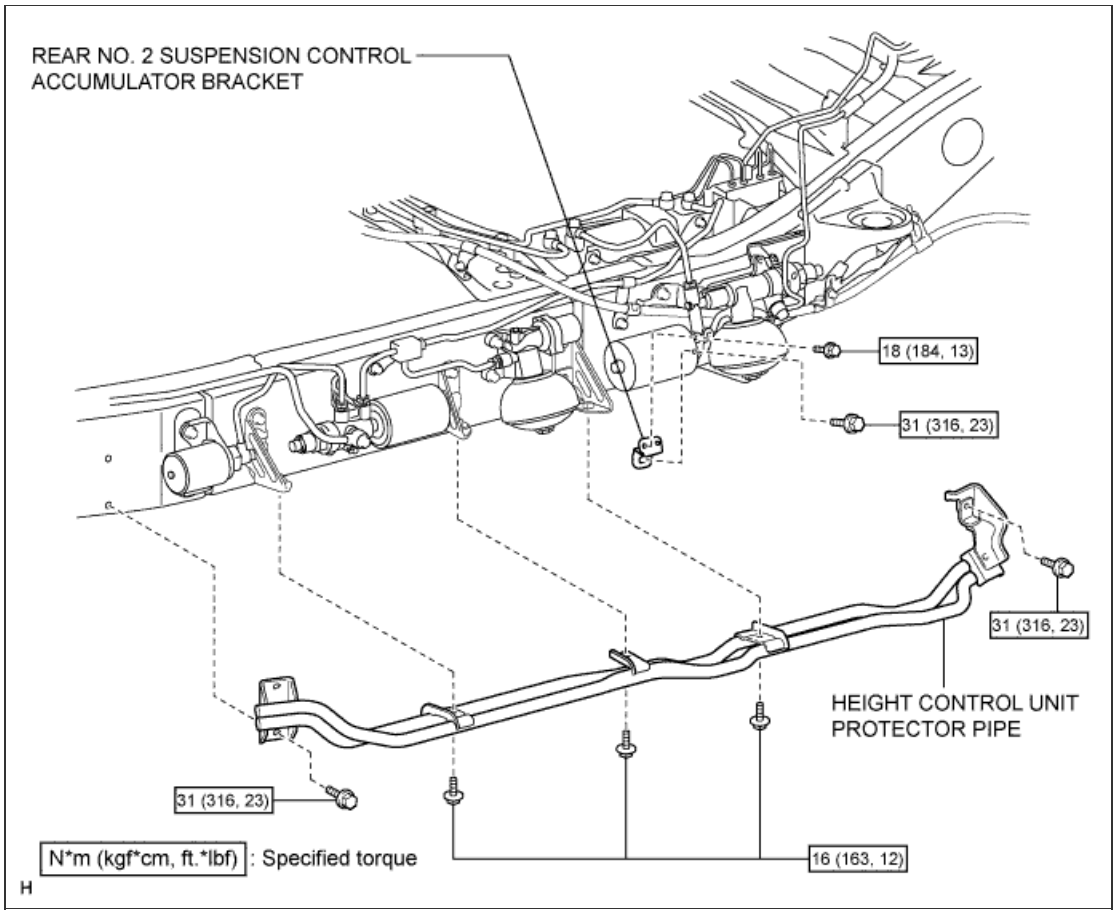
5. INSTALL COOLING BOX ASSEMBLY (w/ Cool Box)

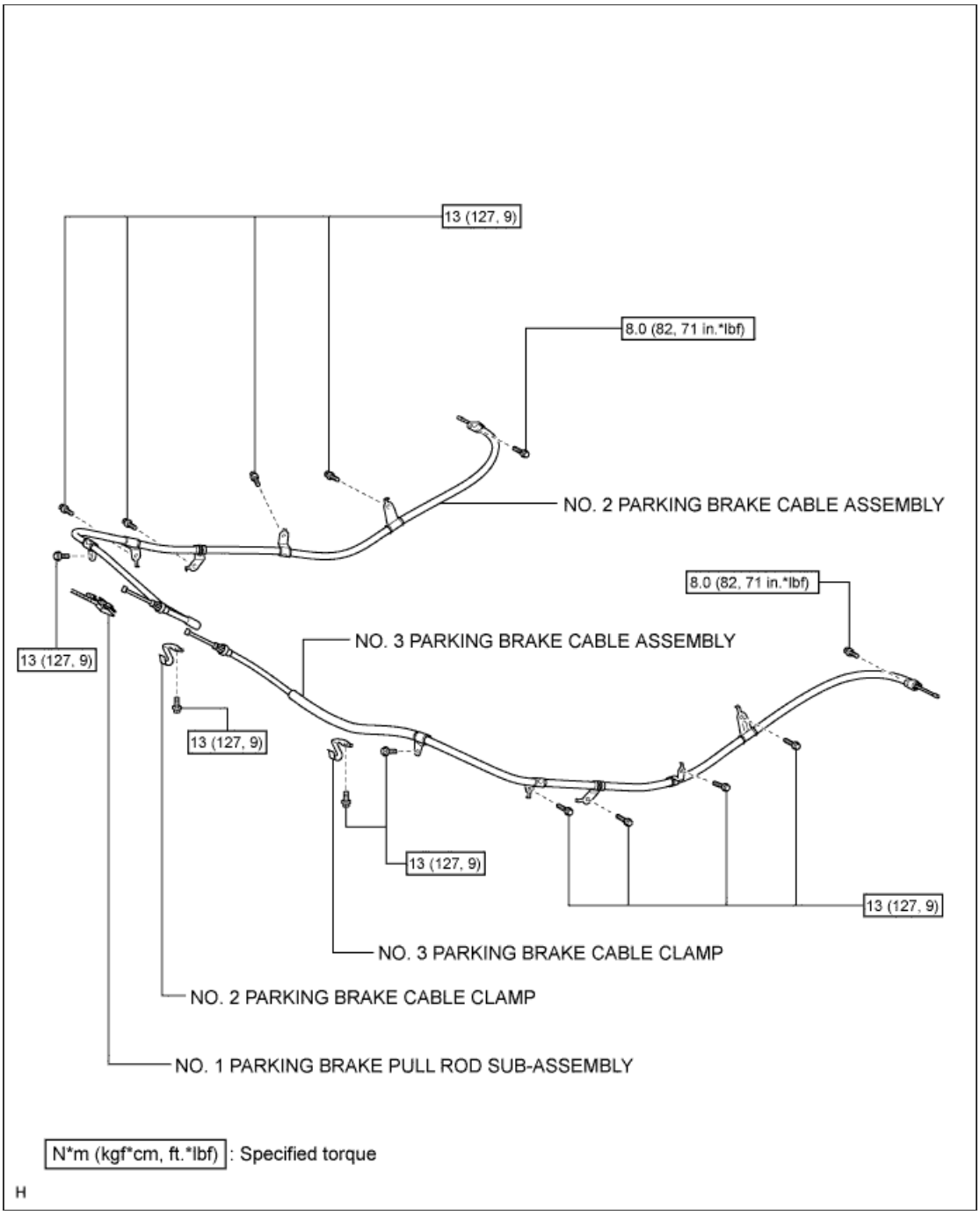
(Click here)

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

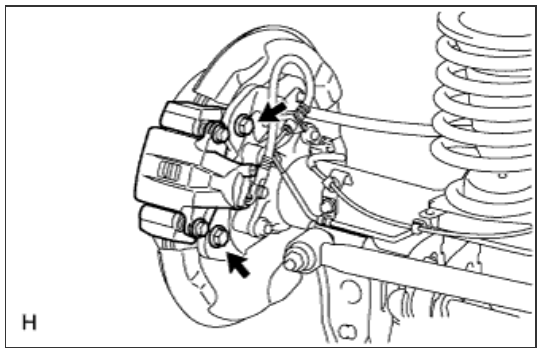
2. DISCONNECT REAR DISC BRAKE CYLINDER ASSEMBLY LH

a. Remove the 2 bolts and disconnect the rear disc brake cylinder.

NOTICE:

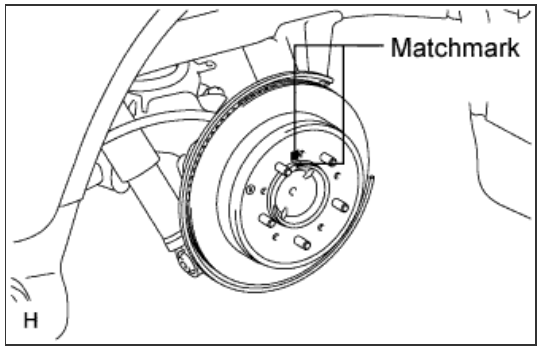
- **Do not disconnect the flexible hose from the disc brake cylinder.**
- **Do not twist or bend the flexible hose.**

b. Hang the disc brake cylinder with a piece of wire.

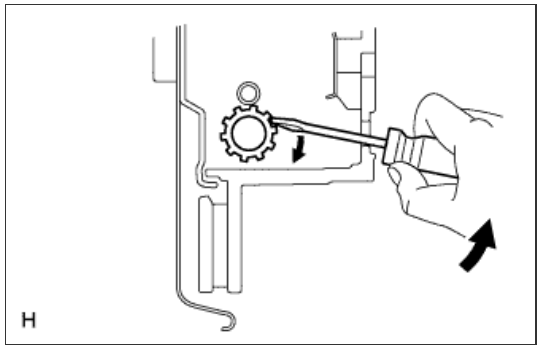


3. REMOVE REAR DISC

a. Put matchmarks on the rear disc and axle hub if planning to reuse the disc.



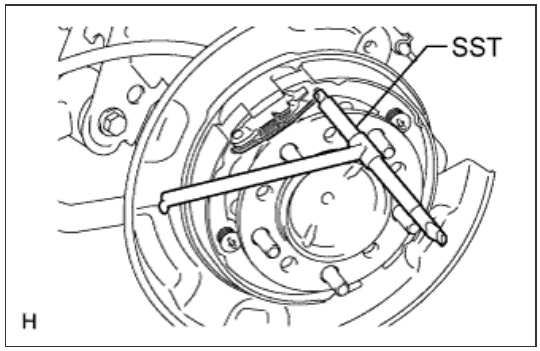
b. Turn the shoe adjuster as shown in the illustration until the disc turns freely, and then remove the disc.



4. REMOVE PARKING BRAKE SHOE RETURN SPRING

a. Using SST, remove the return spring.

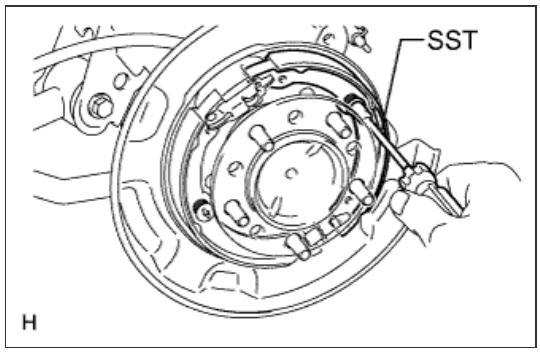
SST
09703-30011



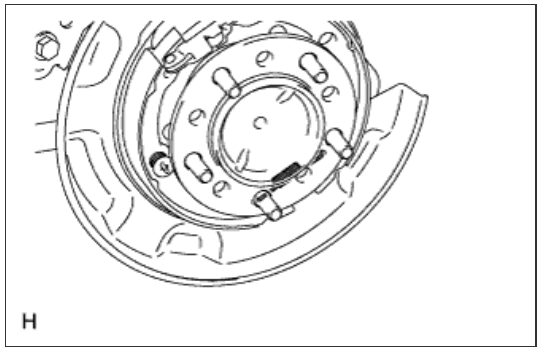
5. REMOVE NO. 1 PARKING BRAKE SHOE ASSEMBLY LH

a. Using SST, remove the shoe hold down spring cup, compression spring and shoe hold down spring pin.

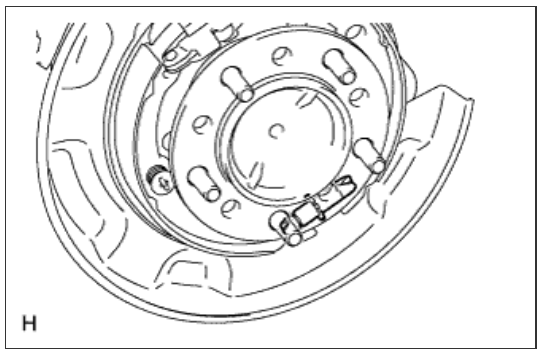
SST
09718-00011



b. Disconnect the tension spring from the No. 1 parking brake shoe.



c. Remove the No. 1 parking brake shoe and shoe adjuster screw set.

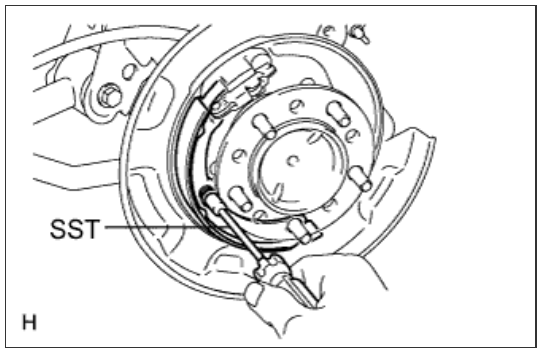


6. REMOVE NO. 2 PARKING BRAKE SHOE ASSEMBLY LH

a. Using SST, remove the shoe hold down spring cup, compression spring and shoe hold down spring pin.

SST
09718-00011

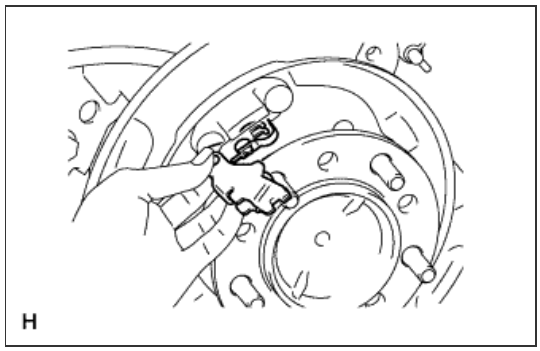
b. Remove the No. 2 parking brake shoe.



7. REMOVE PARKING BRAKE SHOE LEVER LH

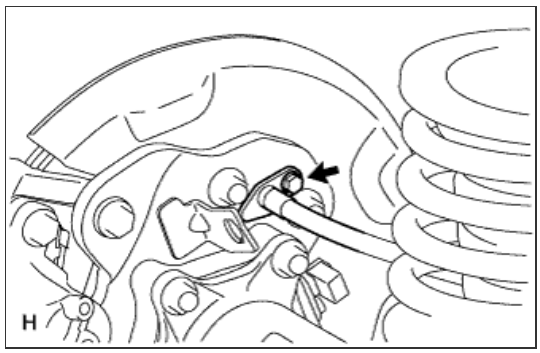
a. Disconnect the No. 3 parking brake cable from the parking brake shoe lever.

b. Remove the parking brake shoe lever.



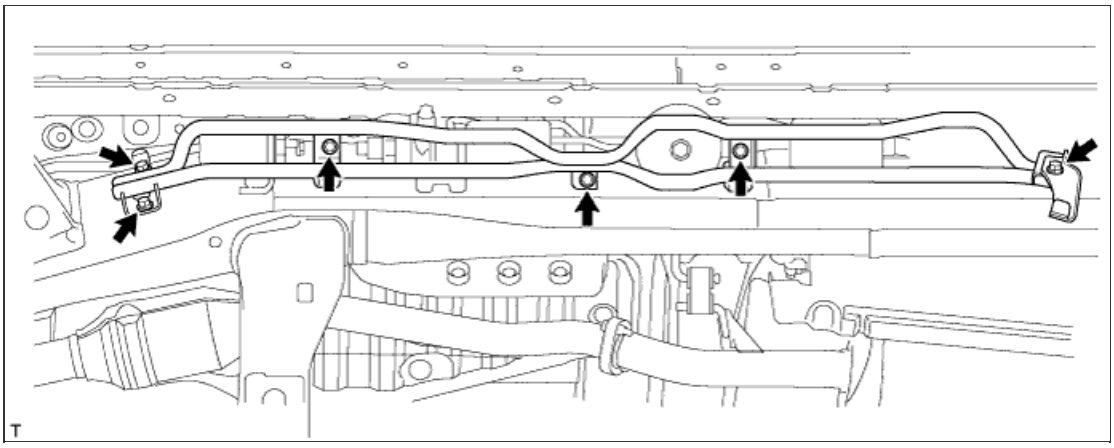
8. DISCONNECT NO. 3 PARKING BRAKE CABLE ASSEMBLY

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)

(Click here)

12. REMOVE COOLING BOX ASSEMBLY (w/ Cool Box)

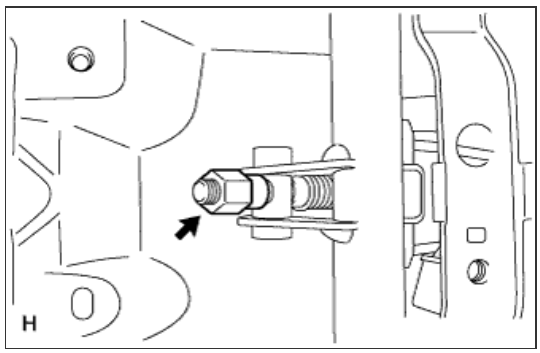
(Click here)

13. REMOVE REAR CONSOLE BOX SUB-ASSEMBLY (w/o Cool Box)

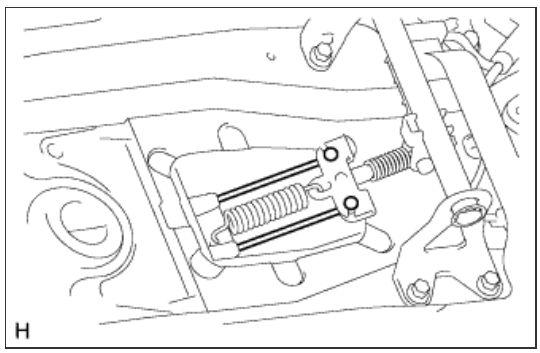
(Click here)

14. REMOVE NO. 2 PARKING BRAKE CABLE ASSEMBLY

a. Loosen the adjusting nut.

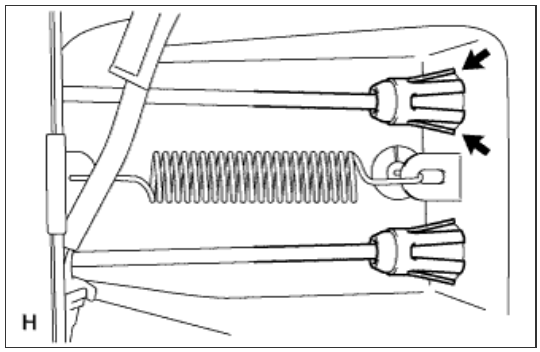


b. Disconnect the No. 2 parking brake cable from the No. 1 parking brake pull rod.

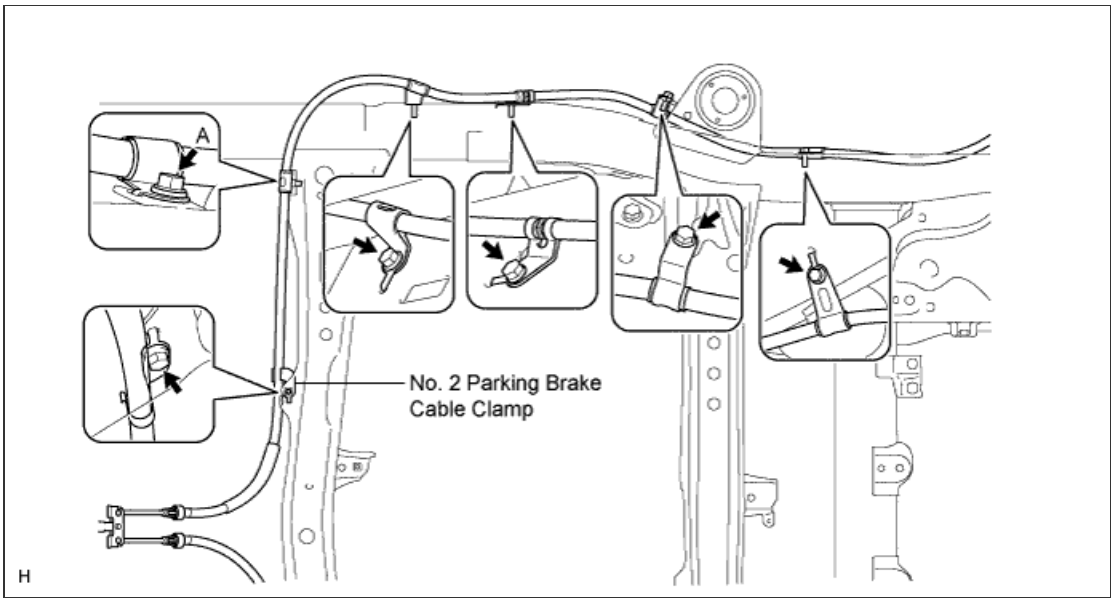


c. Pinch the claws of the No. 2 parking brake cable end and push the cable outside of

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.

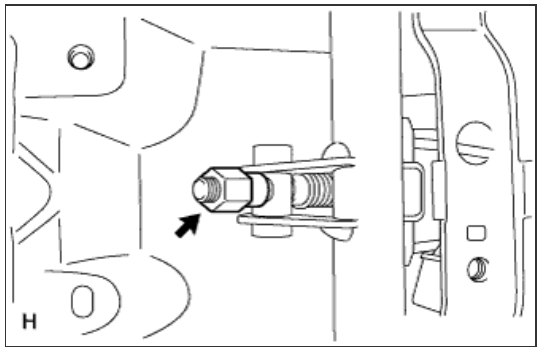


e. Remove the 6 bolts and No. 2 parking brake cable.

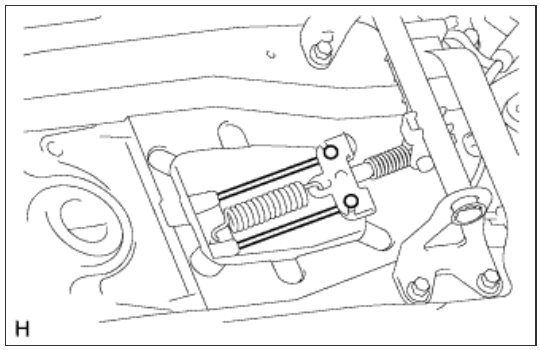
f. Remove the No. 2 parking brake cable clamp from the No. 2 parking brake cable.

15. REMOVE NO. 3 PARKING BRAKE CABLE ASSEMBLY

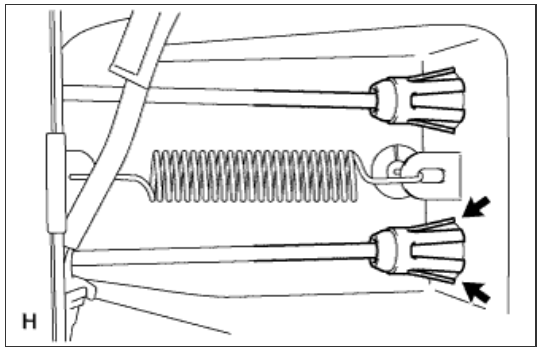
a. Loosen the adjusting nut.



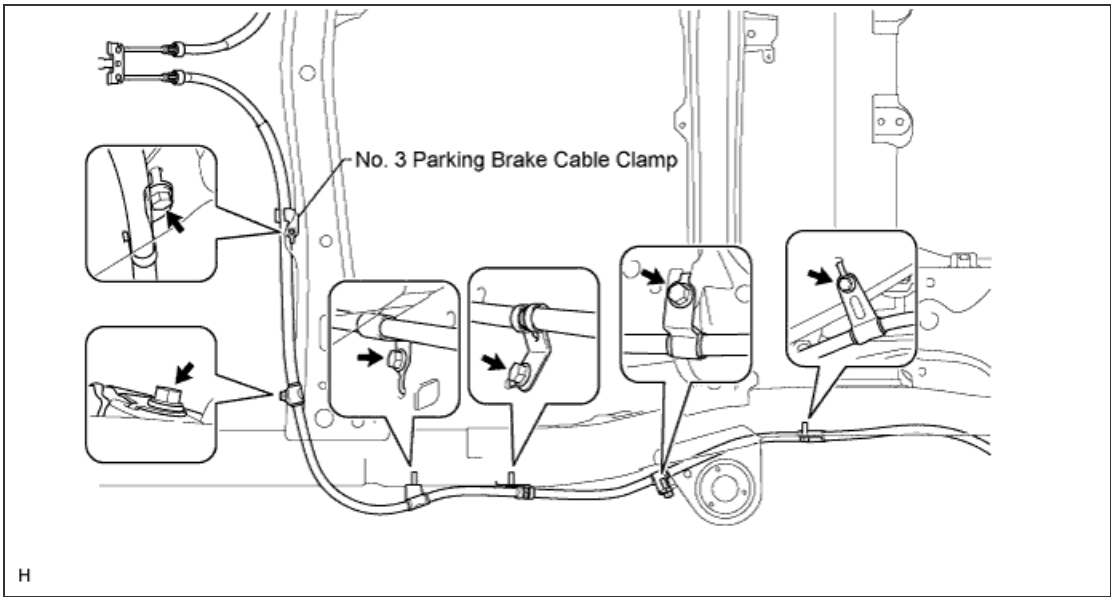
b. Disconnect the No. 3 parking brake cable from the No. 1 parking brake pull rod.



c. Pinch the claws of the No. 3 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

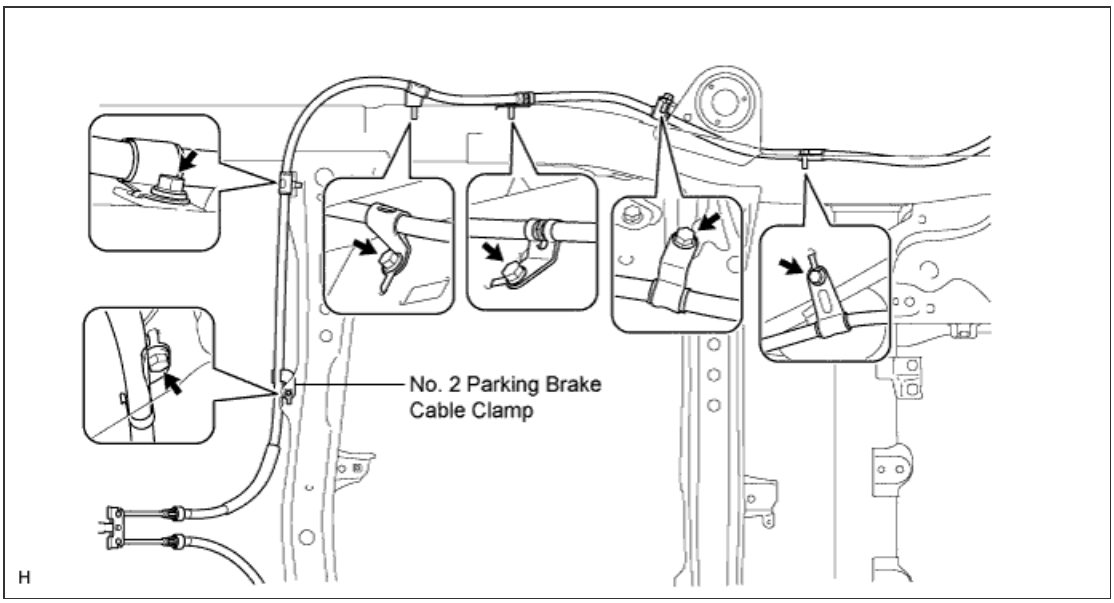
HINT:

- **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.

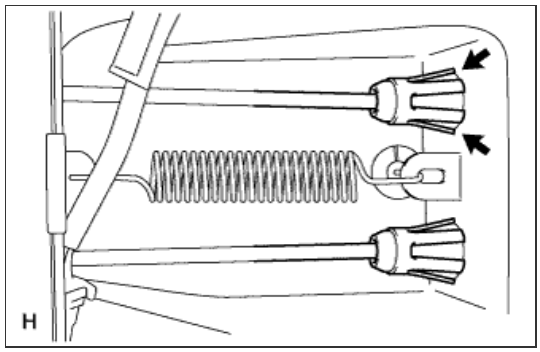
b. Install the No. 2 parking brake cable with the 6 bolts.



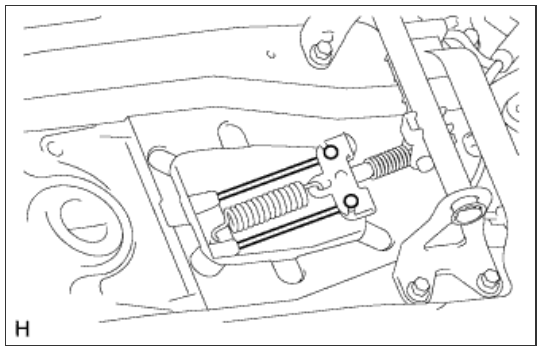
Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

c. Install the fuel tank (Click here).

d. Attach the claws of the No. 2 parking brake cable.



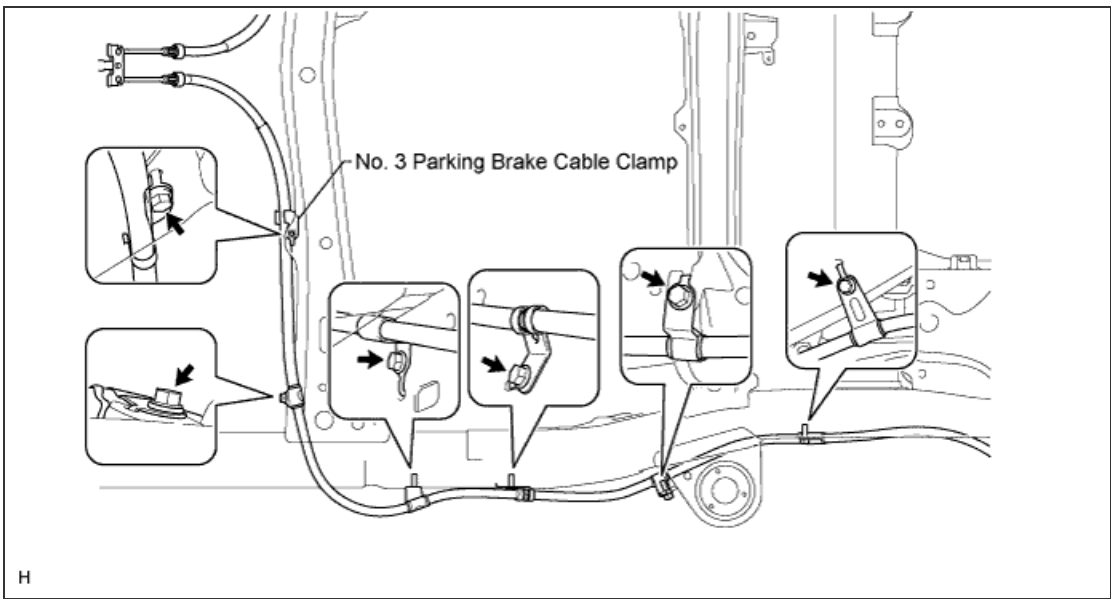
e. Connect the No. 2 parking brake cable to the No. 1 parking brake pull rod.



2. INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY

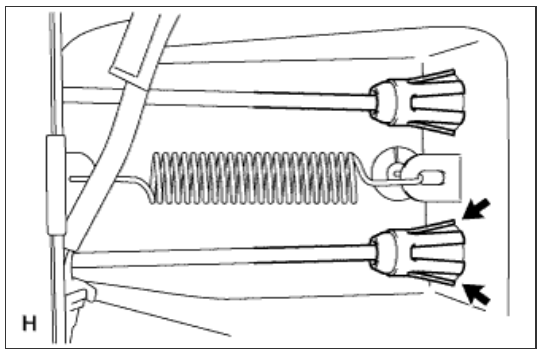
a. Install the No. 3 parking brake cable clamp.

b. Install the No. 3 parking brake cable with the 6 bolts.

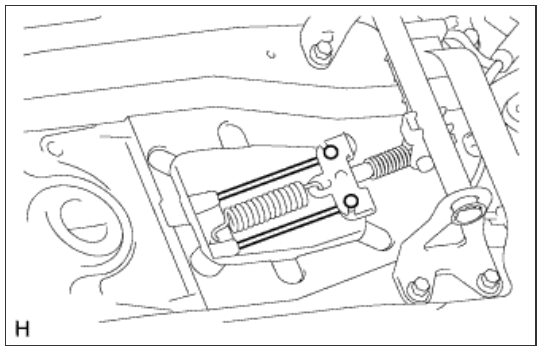


Torque:
13 N*m{ 127 kgf*cm , 9 ft.*lbf }

c. Attach the claws of the No. 3 parking brake cable.



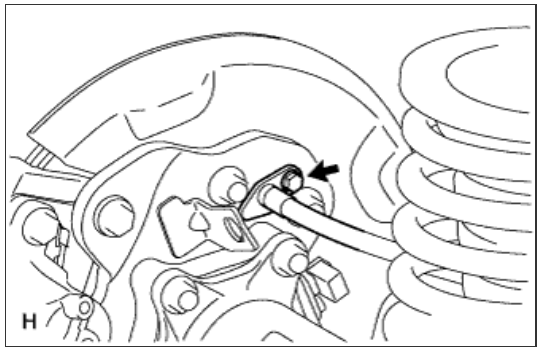
d. Connect the No. 3 parking brake cable to the No. 1 parking brake pull rod.



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 }



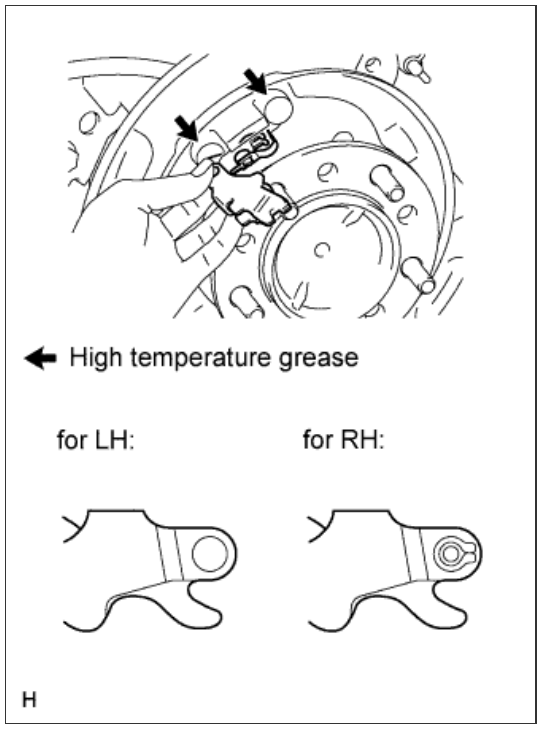
4. INSTALL PARKING BRAKE SHOE LEVER LH

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.



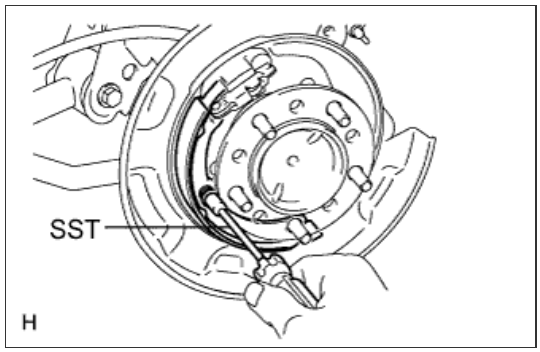
5. INSTALL NO. 2 PARKING BRAKE SHOE ASSEMBLY LH

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.

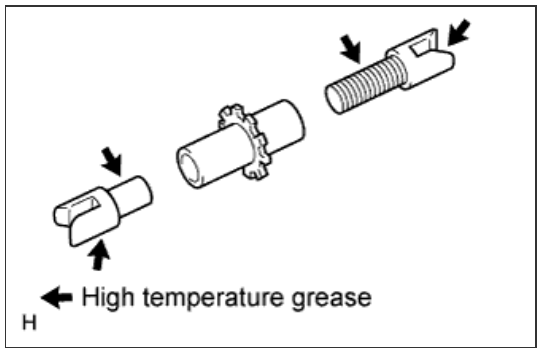
SST
09718-00011



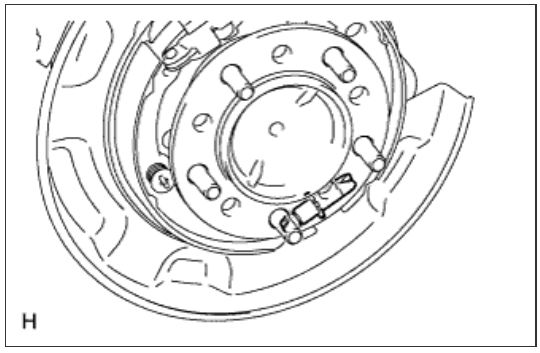
6. INSTALL NO. 1 PARKING BRAKE SHOE ASSEMBLY LH

a. Apply high temperature grease to the areas of the backing plate that contact the shoe.

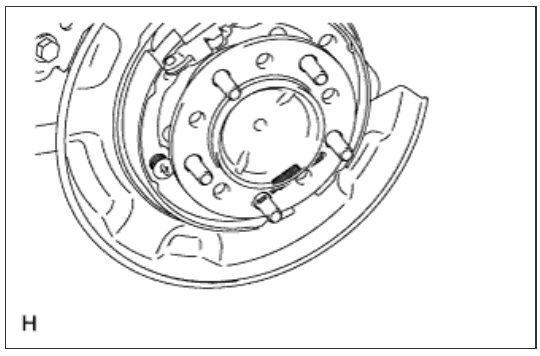
b. Apply high temperature grease to the thread and all joining areas of the parking brake shoe adjuster screw set.



c. Set the No. 1 parking brake shoe and shoe adjuster screw set in place.

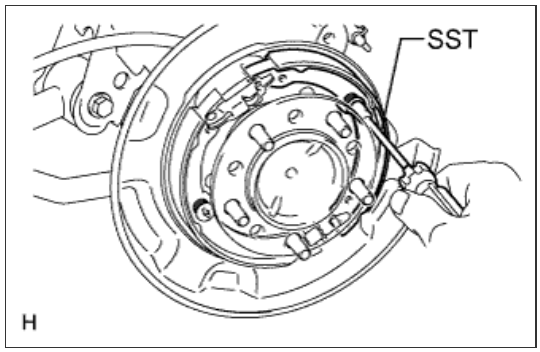


d. Connect the tension spring.



e. Using SST, install the shoe hold down spring pin, compression spring and shoe hold down spring cup.

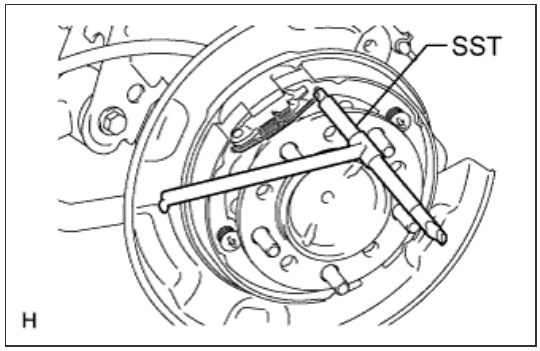
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7. INSTALL PARKING BRAKE SHOE RETURN SPRING

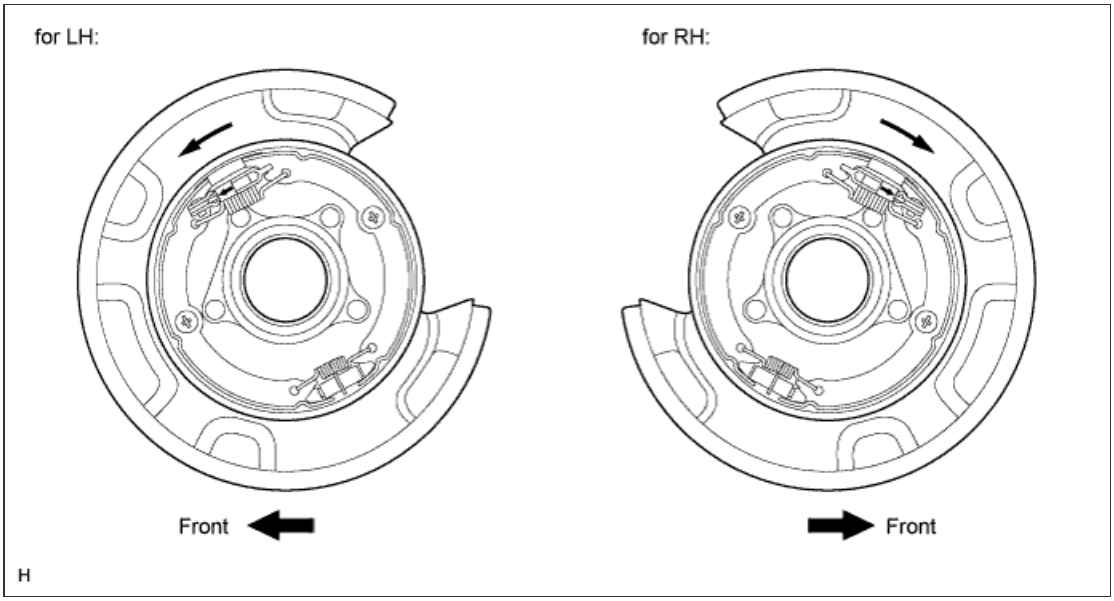
a. Using SST, install the shoe return spring.

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8. CHECK PARKING BRAKE INSTALLATION

a. Check that each part is installed properly.

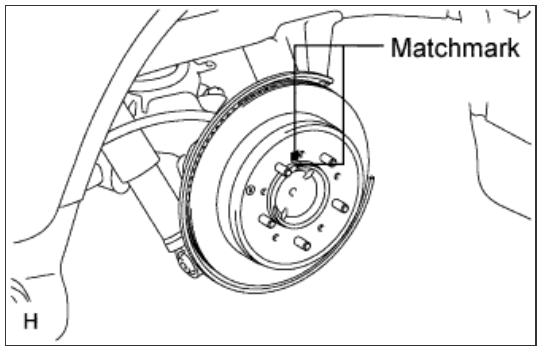


9. INSTALL REAR DISC

a. Align the matchmarks, and then install the rear disc.

HINT:

When replacing the rear disc with a new one, select the installation position where the rear disc has the minimum runout.



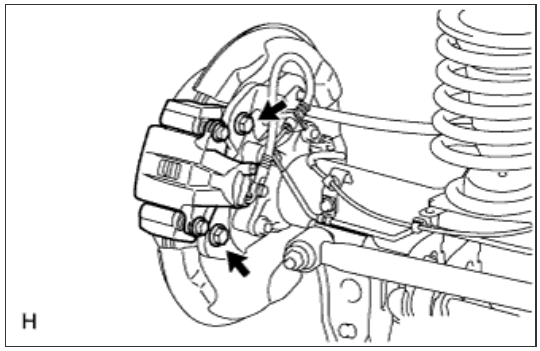
10. CONNECT REAR DISC BRAKE CYLINDER ASSEMBLY LH

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

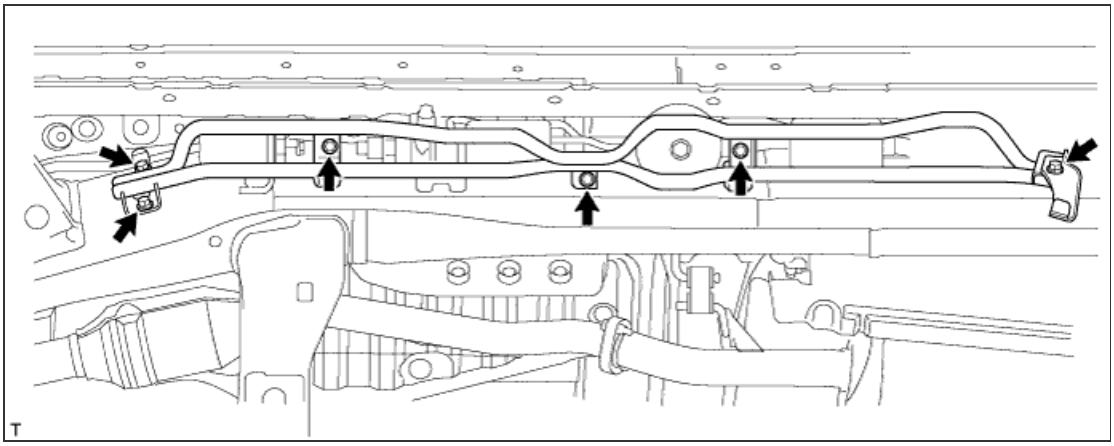
a. Install the bracket to the shock absorber control valve with the bolt.

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)

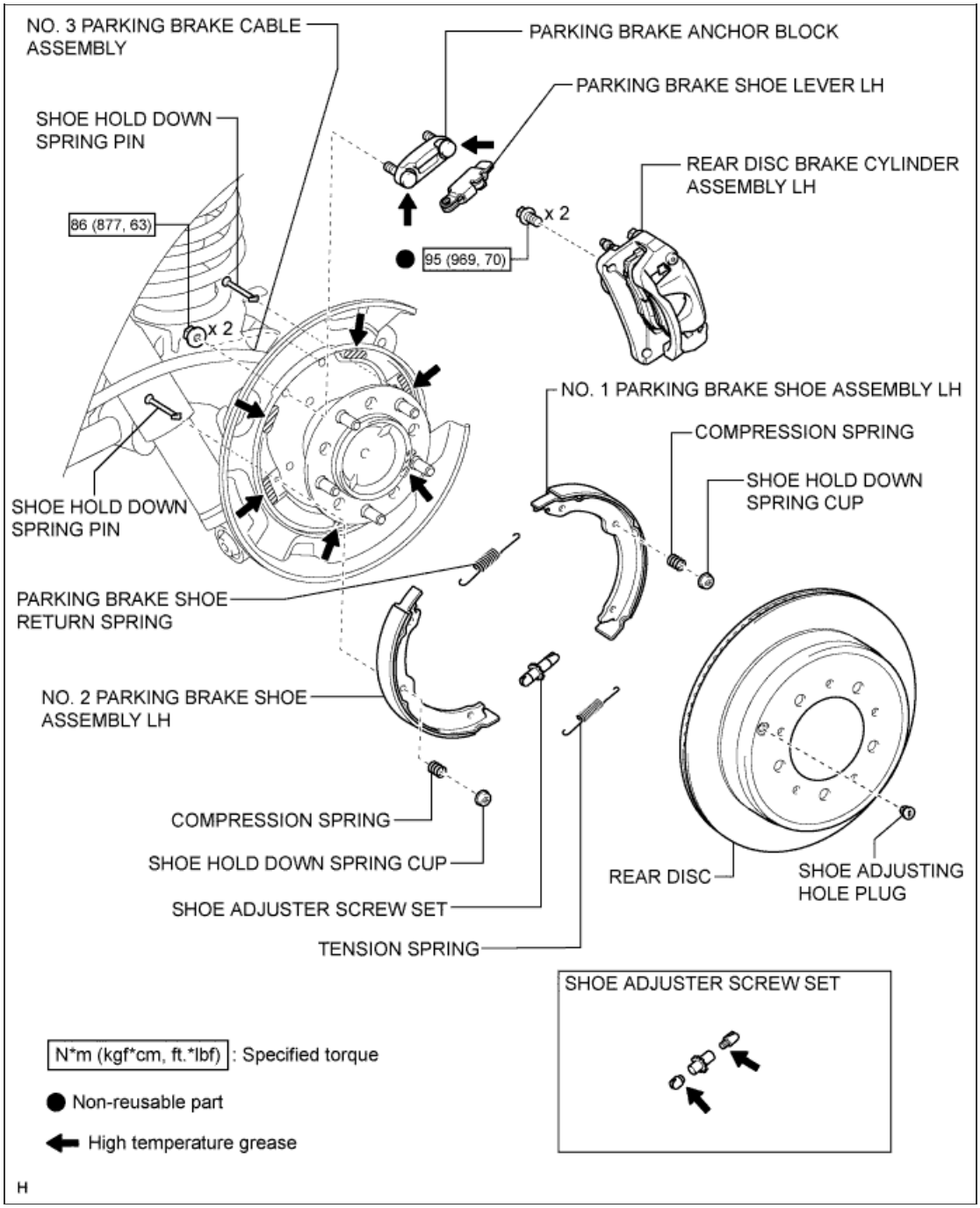
16. INSTALL COOLING BOX ASSEMBLY (w/ Cool Box)

(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

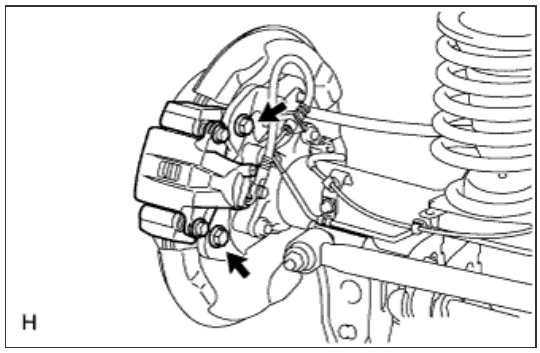
2. DISCONNECT REAR DISC BRAKE CYLINDER ASSEMBLY LH

a. Remove the 2 bolts and disconnect the rear disc brake cylinder.

NOTICE:

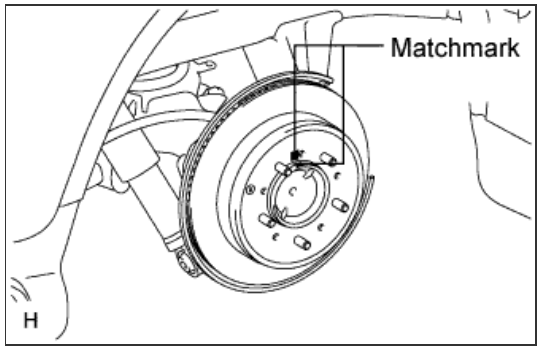
- **Do not disconnect the flexible hose from the disc brake cylinder.**
- **Do not twist or bend the flexible hose.**

b. Hang the disc brake cylinder with a piece of wire.

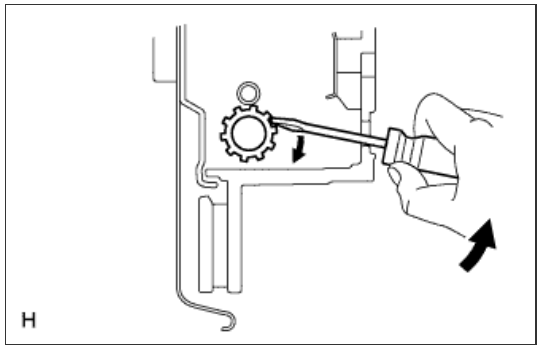


3. REMOVE REAR DISC

a. Put matchmarks on the rear disc and axle hub if planning to reuse the disc.



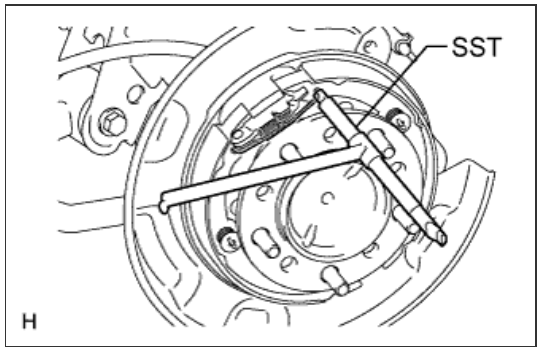
b. Turn the shoe adjuster until the disc turns freely, and then remove the disc.



4. REMOVE PARKING BRAKE SHOE RETURN SPRING

a. Using SST, remove the return spring.

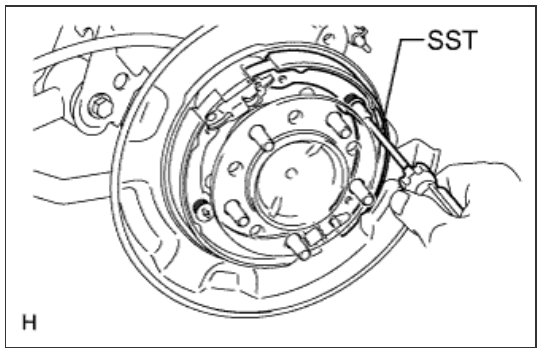
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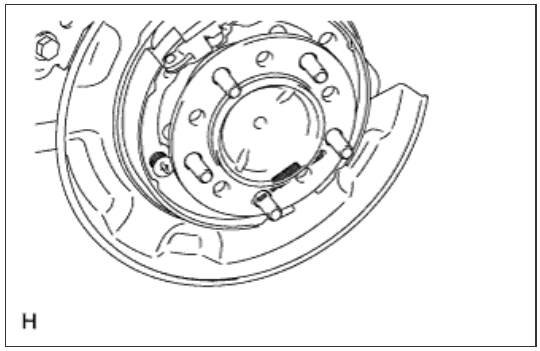
5. REMOVE NO. 1 PARKING BRAKE SHOE ASSEMBLY LH

a. Using SST, remove the shoe hold down spring cup, compression spring and shoe hold down spring pin.

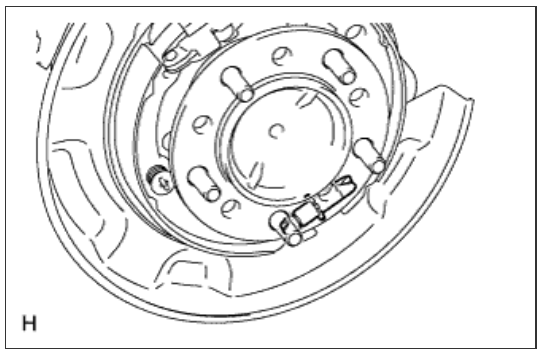
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b. Disconnect the tension spring from the No. 1 parking brake shoe.



c. Remove the No. 1 parking brake shoe and shoe adjuster screw set.

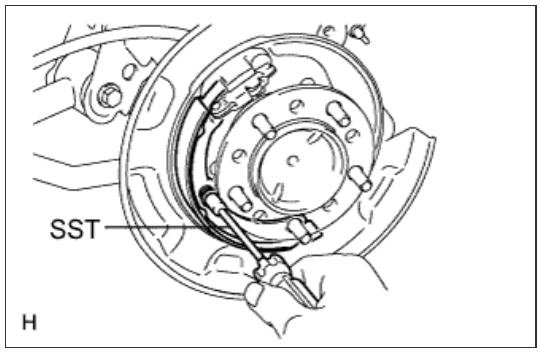


6. REMOVE NO. 2 PARKING BRAKE SHOE ASSEMBLY LH

a. Using SST, remove the shoe hold down spring cup, compression spring and shoe hold down spring pin.

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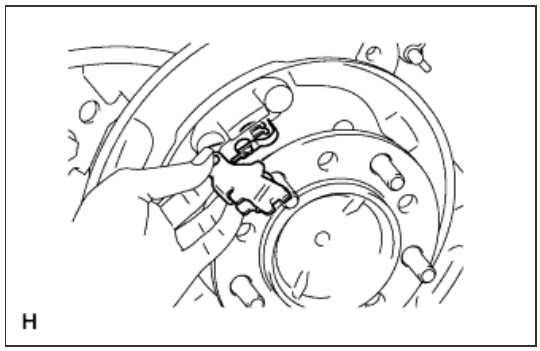
b. Remove the No. 2 parking brake shoe.



7. REMOVE PARKING BRAKE SHOE LEVER LH

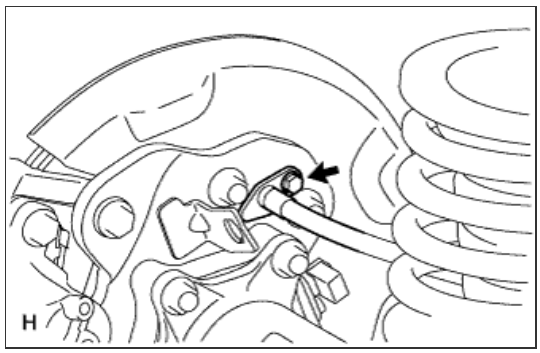
a. Disconnect the No. 3 parking brake cable from the parking brake shoe lever.

b. Remove the parking brake shoe lever.



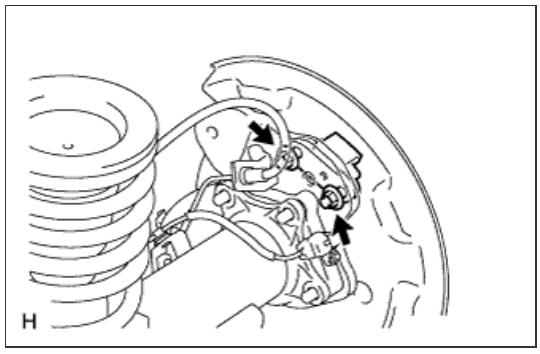
8. REMOVE NO. 3 PARKING BRAKE CABLE ASSEMBLY

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

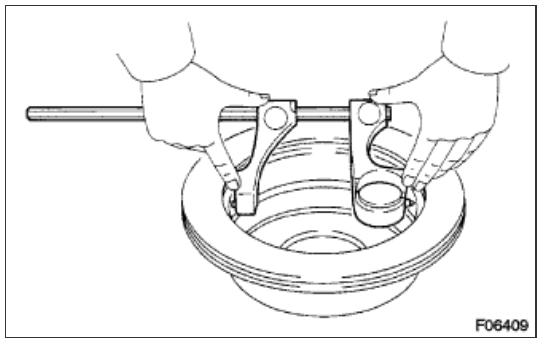
1. CHECK BRAKE DISC INSIDE DIAMETER

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.



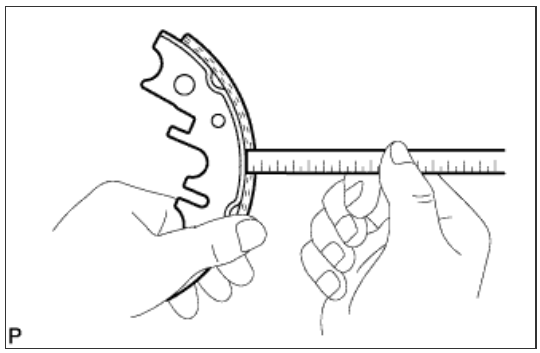
2. CHECK PARKING BRAKE SHOE LINING THICKNESS

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.)

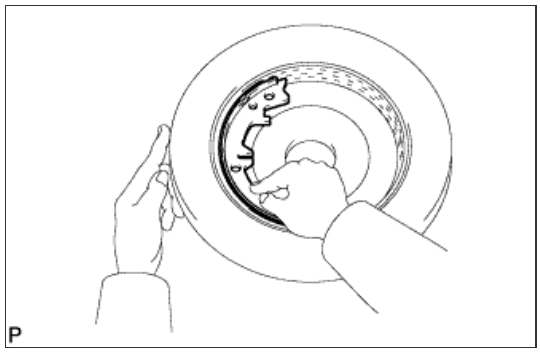
If the lining thickness is equal to or less than the minimum, or if severe or uneven wear is present, replace the shoe.



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

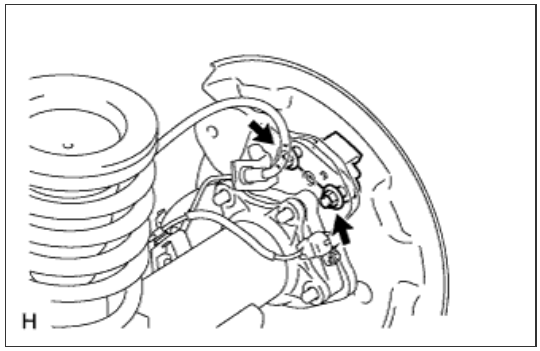
HINT:

- **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.

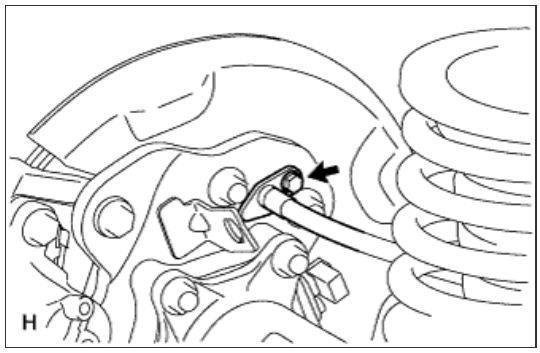
Torque:
86 N*m{ 877 kgf*cm , 63 ft.*lbf }



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 }



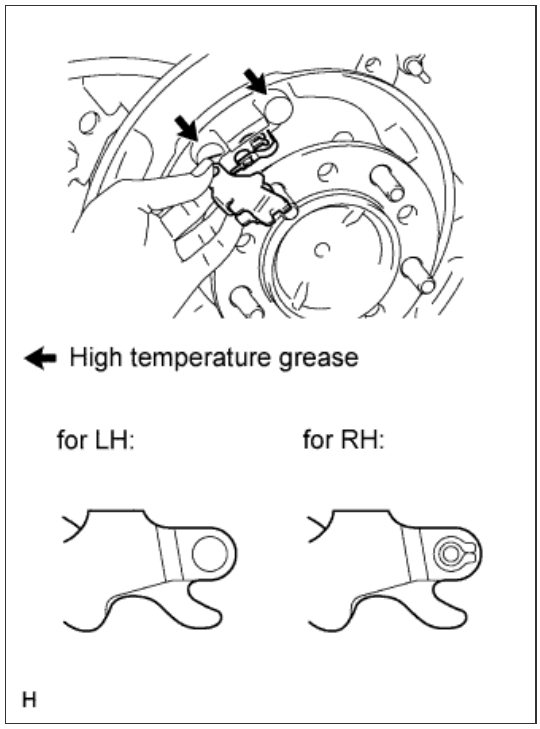
3. INSTALL PARKING BRAKE SHOE LEVER LH

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.

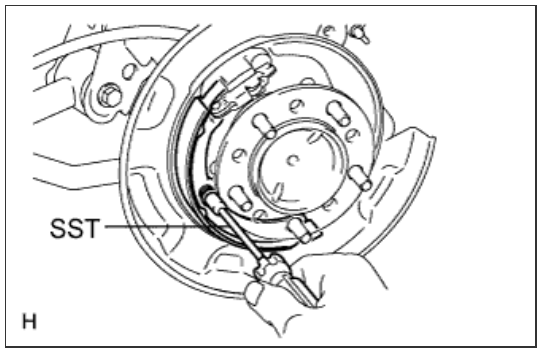


4. INSTALL NO. 2 PARKING BRAKE SHOE ASSEMBLY LH

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.

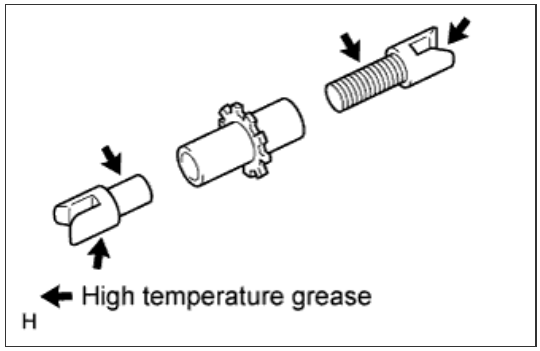
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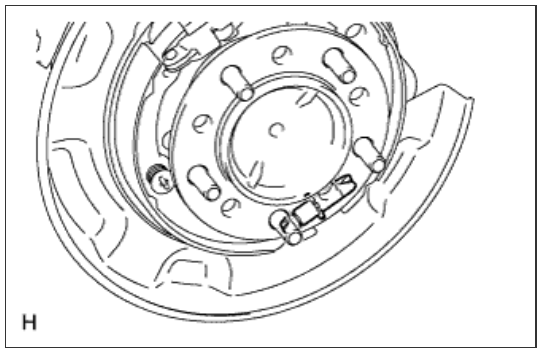
5. INSTALL NO. 1 PARKING BRAKE SHOE ASSEMBLY LH

a. Apply high temperature grease to the areas of the backing plate that contact the shoe.

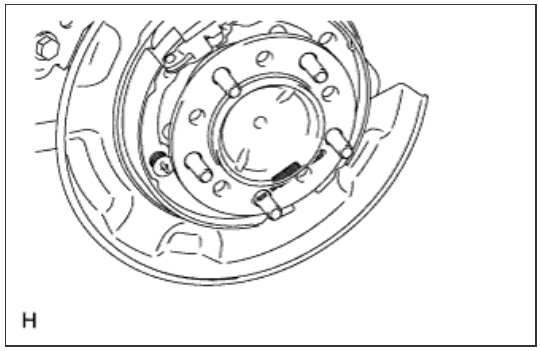
b. Apply high temperature grease to the thread and all joining areas of the parking brake shoe adjuster screw set.



c. Set the No. 1 parking brake shoe and shoe adjuster screw set in place.

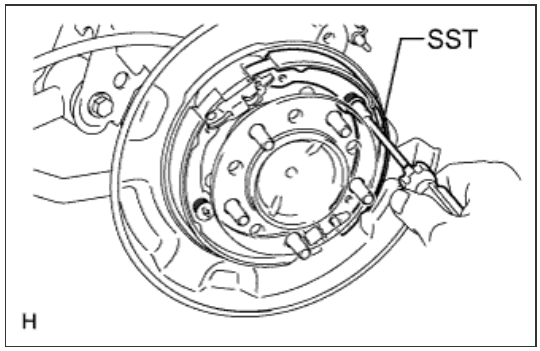


d. Connect the tension spring.



e. Using SST, install the shoe hold down spring pin, compression spring and shoe hold down spring cup.

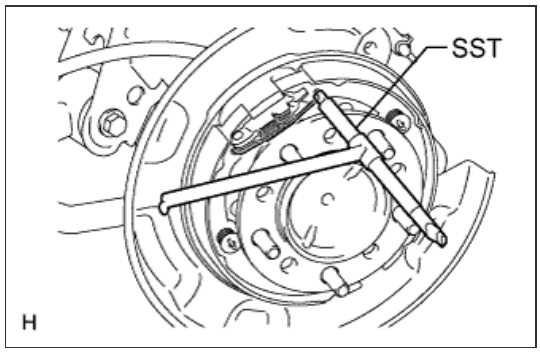
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6. INSTALL PARKING BRAKE SHOE RETURN SPRING

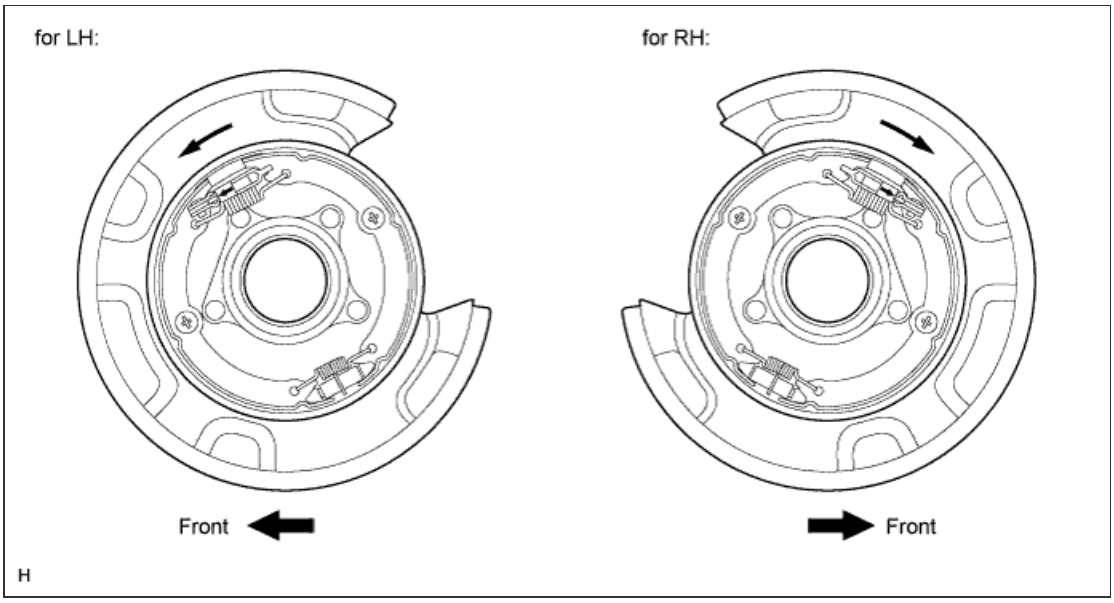
a. Using SST, install the shoe return spring.

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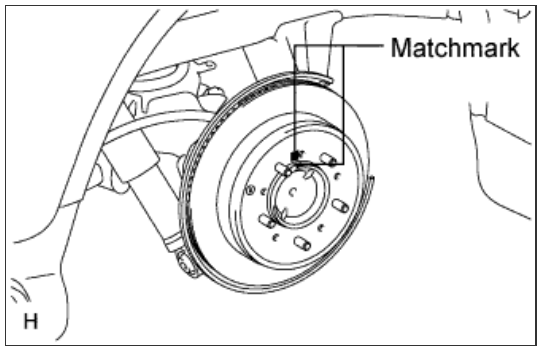
7. CHECK PARKING BRAKE INSTALLATION

a. Check that each part is installed properly.



8. INSTALL REAR DISC

a. While aligning the matchmarks, install the rear disc.



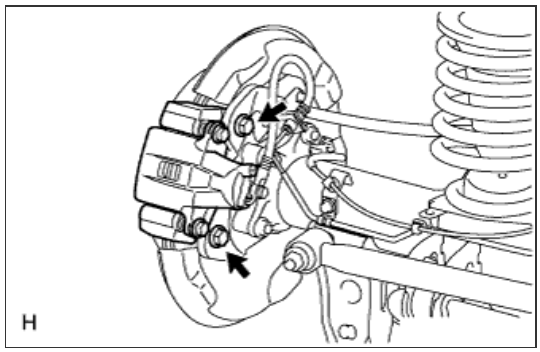
9. CONNECT REAR DISC BRAKE CYLINDER ASSEMBLY LH

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 }