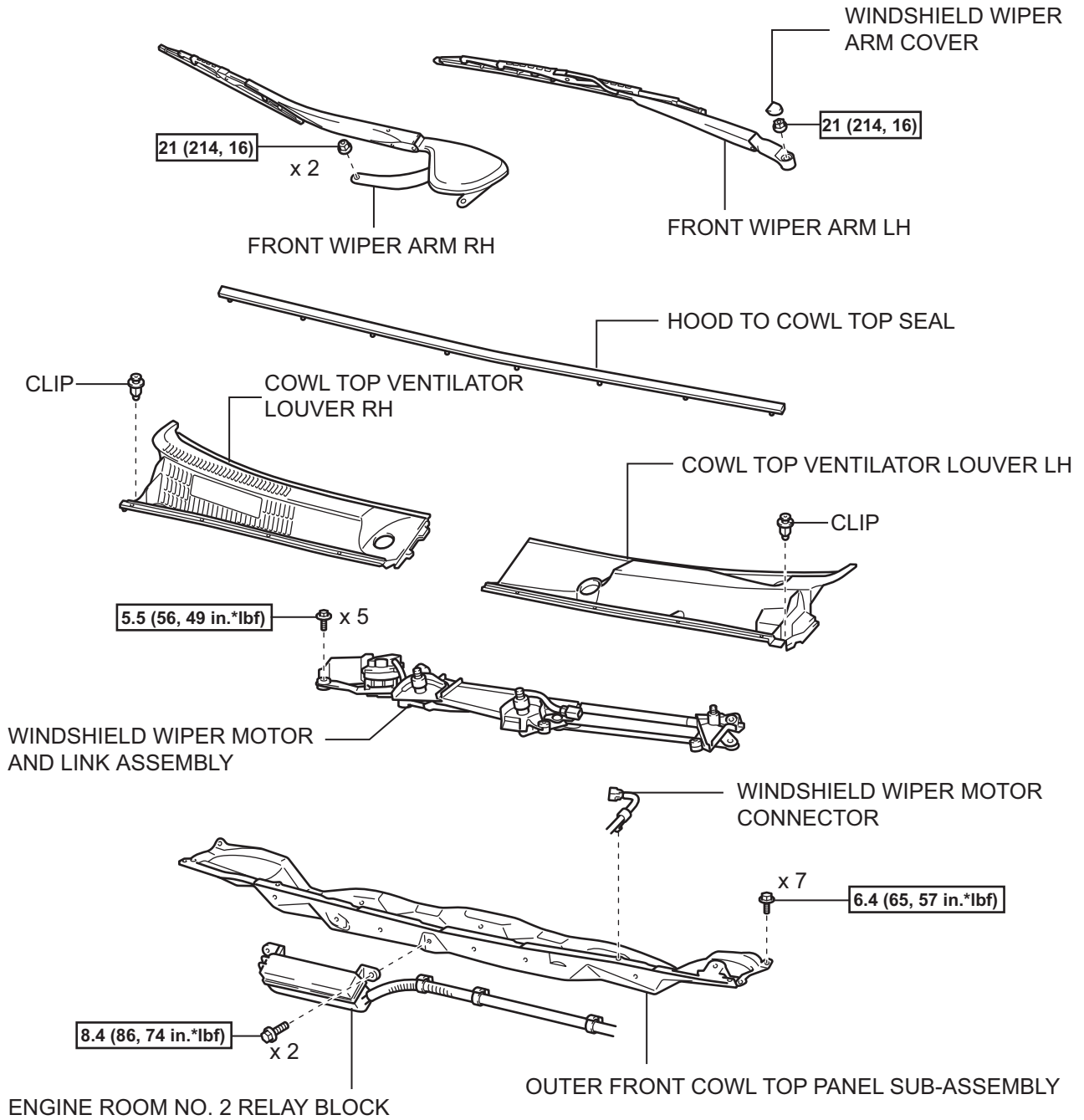


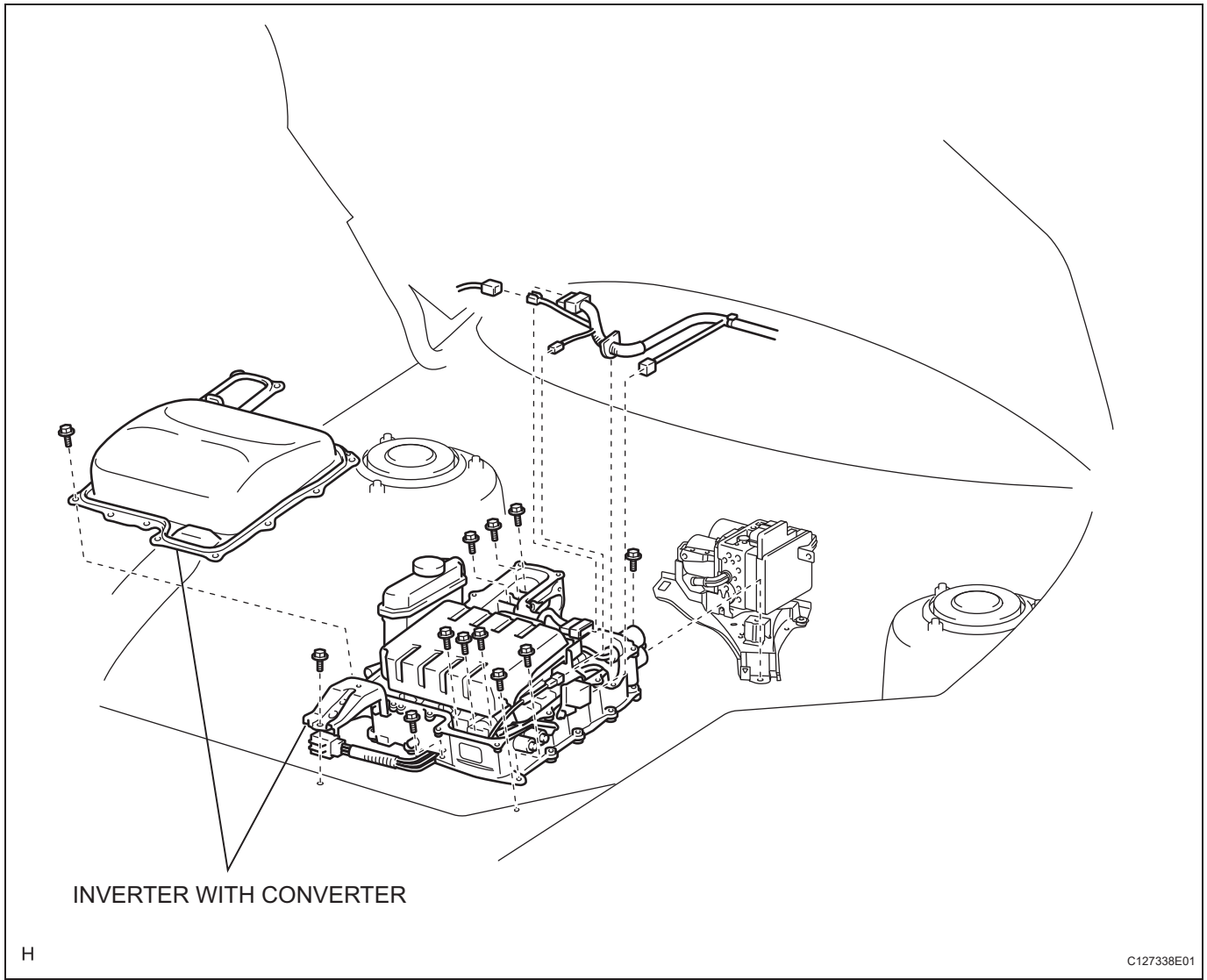
BRAKE ACTUATOR

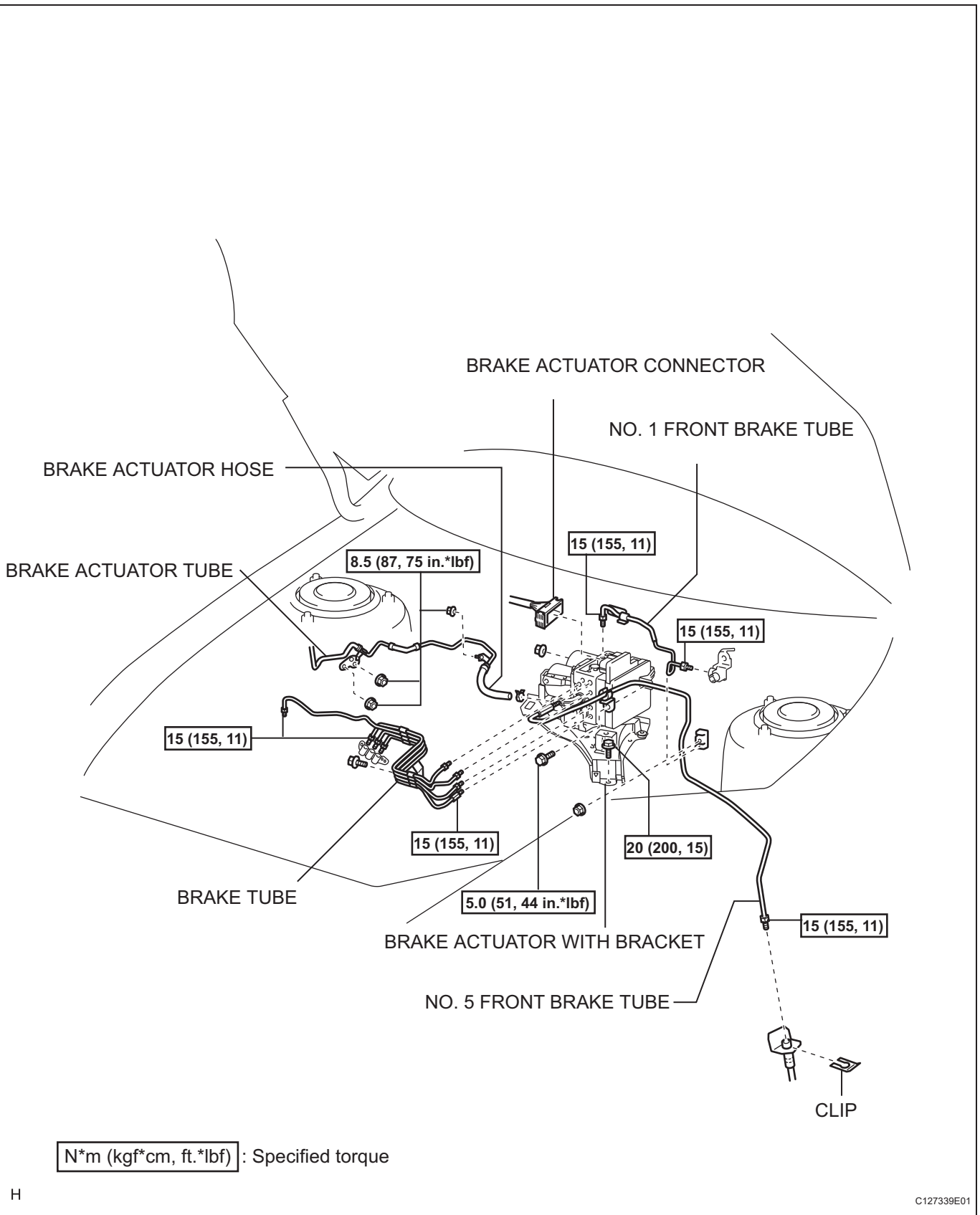
COMPONENTS



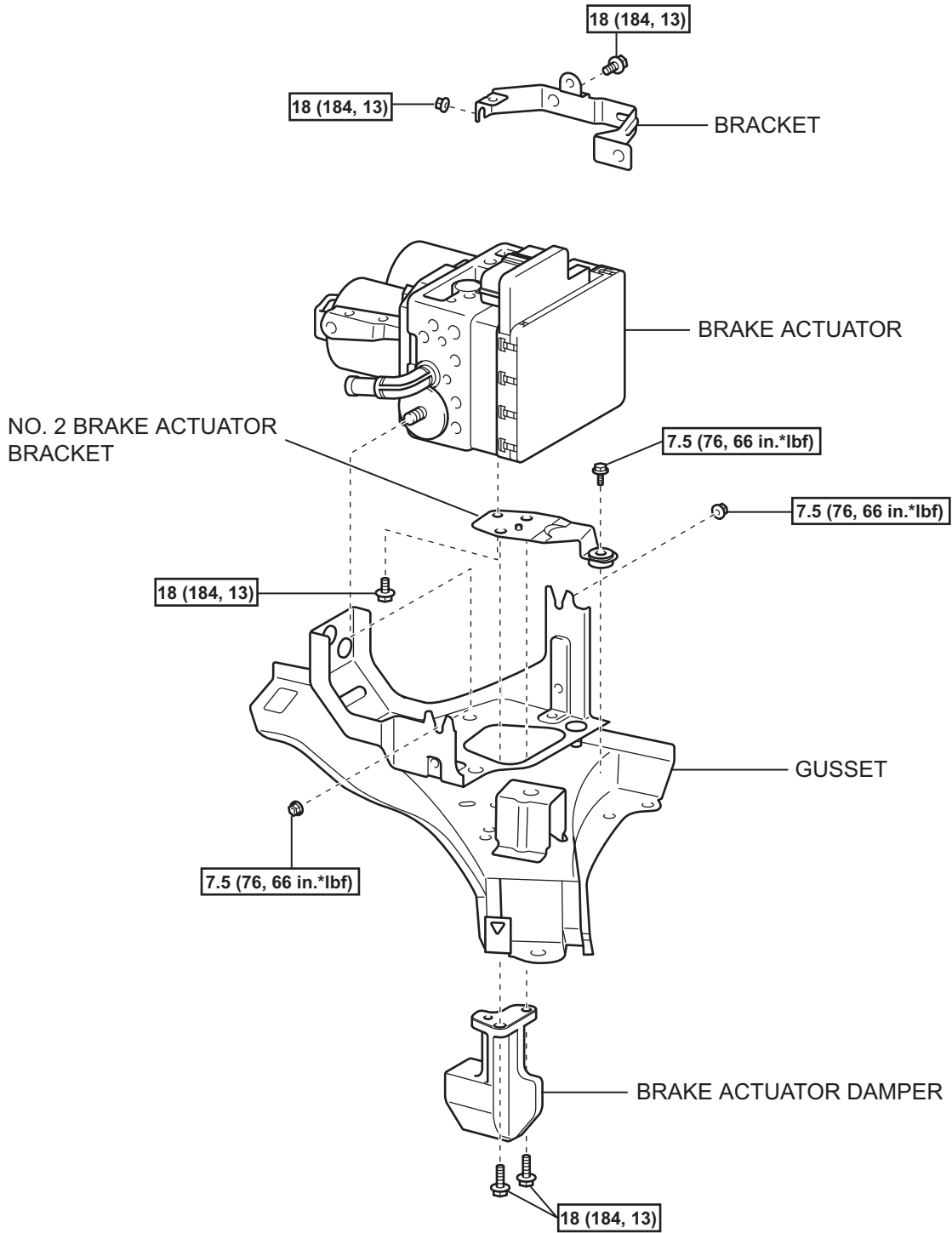
N*m (kgf*cm, ft.*lbf) : Specified torque

BC





BC



N*m (kgf*cm, ft.*lbf) : Specified torque

BC

ON-VEHICLE INSPECTION

1. INSPECT BRAKE ACTUATOR OPERATION

- (a) Pre-check preparation
- (1) Move the shift lever to the P position. Apply the parking brake and connect the intelligent tester to the DLC3.
 - (2) Turn the power switch ON (IG).
 - (3) Turn on the intelligent tester. Select "MAS CYL PRS 1", "MAS CYL PRS 2", "FR PRESS SENS", "FL PRESS SENS", "RR PRESS SENS" and "RL PRESS SENS".
- (b) Check FR system solenoid (SLA**, SLR**, SMC1, SMC2)
- (1) Select "SLAFR CUR". → Set the current to 1.2 A. → Check the output voltage.

NOTICE:

Do not depress the brake pedal.

HINT:

It takes approximately 35 seconds to complete the check.

If incorrect, troubleshoot the brake system (see page [BC-28](#)).

Standard output voltage

Sensor	10 to 20 sec. after check start (V)	35 sec. or more after check start (V)
MAS CYL PRS 1	0.3 to 0.7	0.3 to 0.7
MAS CYL PRS 2	0.3 to 0.7	0.3 to 0.7
FR PRESS SENS	2.5 to 4.5	0.3 to 0.7
FL PRESS SENS	0.3 to 0.7	0.3 to 0.7
RR PRESS SENS	0.3 to 0.7	0.3 to 0.7
RL PRESS SENS	0.3 to 0.7	0.3 to 0.7

- (c) Check FL system solenoid (SLA**, SLR**, SMC1, SMC2)
- (1) Select "SLAFL CUR". → Set the current to 1.2 A. → Check the output voltage.

NOTICE:

Do not depress the brake pedal.

HINT:

It takes approximately 35 seconds to complete the check.

If incorrect, troubleshoot the brake system (see page [BC-28](#)).

Standard output voltage

Sensor	10 to 20 sec. after check start (V)	35 sec. or more after check start (V)
MAS CYL PRS 1	0.3 to 0.7	0.3 to 0.7
MAS CYL PRS 2	0.3 to 0.7	0.3 to 0.7
FR PRESS SENS	0.3 to 0.7	0.3 to 0.7
FL PRESS SENS	2.5 to 4.5	0.3 to 0.7
RR PRESS SENS	0.3 to 0.7	0.3 to 0.7
RL PRESS SENS	0.3 to 0.7	0.3 to 0.7

- (d) Check RR system solenoid (SLA**, SLR**, SMC1, SMC2)
 - (1) Select "SLARR CUR". → Set the current to 1.2 A. → Check the output voltage.

NOTICE:

Do not depress the brake pedal.

HINT:

It takes approximately 35 seconds to complete the check.

If incorrect, troubleshoot the brake system (see page BC-28).

Standard output voltage

Sensor	10 to 20 sec. after check start (V)	35 sec. or more after check start (V)
MAS CYL PRS 1	0.3 to 0.7	0.3 to 0.7
MAS CYL PRS 2	0.3 to 0.7	0.3 to 0.7
FR PRESS SENS	0.3 to 0.7	0.3 to 0.7
FL PRESS SENS	0.3 to 0.7	0.3 to 0.7
RR PRESS SENS	2.5 to 4.5	0.3 to 0.7
RL PRESS SENS	0.3 to 0.7	0.3 to 0.7

- (e) Check RL system solenoid (SLA**, SLR**, SMC1, SMC2)
 - (1) Select "SLARL CUR". → Set the current to 1.2 A. → Check the output voltage.

NOTICE:

Do not depress the brake pedal.

HINT:

It takes approximately 35 seconds to complete the check.

If incorrect, troubleshoot the brake system (see page BC-28).

Standard output voltage

Sensor	10 to 20 sec. after check start (V)	35 sec. or more after check start (V)
MAS CYL PRS 1	0.3 to 0.7	0.3 to 0.7
MAS CYL PRS 2	0.3 to 0.7	0.3 to 0.7
FR PRESS SENS	0.3 to 0.7	0.3 to 0.7
FL PRESS SENS	0.3 to 0.7	0.3 to 0.7
RR PRESS SENS	0.3 to 0.7	0.3 to 0.7
RL PRESS SENS	2.5 to 4.5	0.3 to 0.7

- (f) Check SMC1, SMC2
 - (1) Select and enter "ECB INVALID" to prohibit the brake control (ECB) on the intelligent tester menu screen.
 - (2) Check that the ECB warning light comes on.
 - (3) Check the output voltage by depressing the brake pedal.

Standard difference in output voltage

Sensor	Specified Condition
Between "MAS CYL PRES 1" and "FR PRESS SENS"	Less than 0.4 V
Between "MAS CYL PRES 2" and "FL PRESS SENS"	Less than 0.4 V

- (4) Press the return key on the intelligent tester and cancel brake control prohibition (ECB INVALID).

2. INSPECT PRESSURE SENSOR OPERATION

- (a) Check battery voltage.

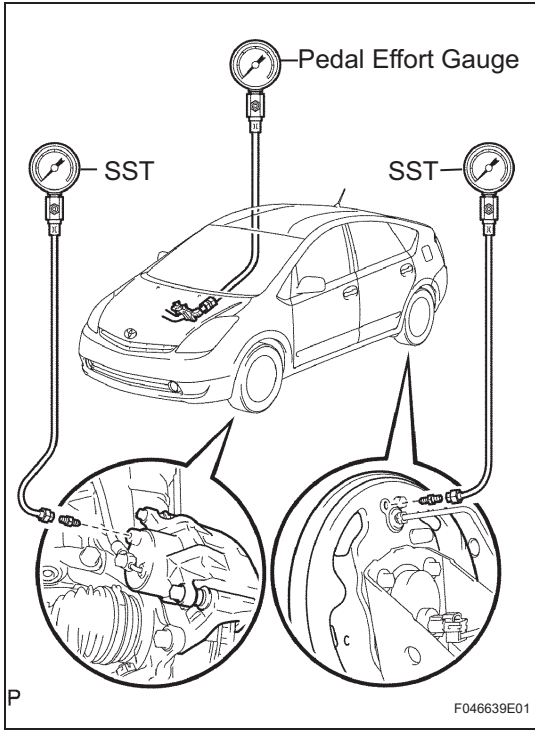
Standard battery voltage:

10 to 14 V (during engine stop)

- (b) Connect the hydro booster pressure gauge and pedal effort gauge.
 - (1) Install the LSPV gauge (SST) and brake pedal effort gauge.
 - (2) Bleed the air out of the hydro booster pressure gauge.
 - (3) Move the shift lever to the P position. Connect intelligent tester to the DLC3 with the parking brake applied.
 - (4) Turn the power switch ON (IG).
 - (5) Clear the DTC (see page BC-38).
- (c) Check wheel cylinder pressure sensor and master pressure sensor.

- (1) Turn on the intelligent tester. Select "MAS CYL PRS 1", "MAS CYL PRS 2", "FR PRESS SENS", "FL PRESS SENS", "RR PRESS SENS" and "RL PRESS SENS".
- (2) Check the brake effort, pressure gauge reading, and output pressure voltage. If incorrect, troubleshoot the brake system (see page BC-28).

Standard output voltage



Brake effort N (kgf, lbf)	MAS CYL PRS 1 (V)	MAS CYL PRS 2 (V)
200 (20.4, 45)	0.9 to 1.2	0.9 to 1.2
500 (51, 112)	1.7 to 2.2	1.7 to 2.2

Brake effort N (kgf, lbf)	Front right wheel hydraulic pressure MPa (kgf/cm ² , psi)	FR PRESS SENS (V)
50 (5.1, 11)	3.6 (36.4, 518)	1.15 to 1.35
100 (10.2, 22)	6.9 (70.0, 996)	1.8 to 2.0
150 (15.3, 34)	9.1 (93.3, 1,327)	2.25 to 2.45
200 (20.4, 45)	11.4 (115.9, 1,648)	2.65 to 2.95

Brake effort N (kgf, lbf)	Front left wheel hydraulic pressure MPa (kgf/cm ² , psi)	FL PRESS SENS (V)
50 (5.1, 11)	3.6 (36.4, 518)	1.15 to 1.35
100 (10.2, 22)	6.9 (70.0, 996)	1.8 to 2.0
150 (15.3, 34)	9.1 (93.3, 1,327)	2.25 to 2.45
200 (20.4, 45)	11.4 (115.9, 1,648)	2.65 to 2.95

Brake effort N (kgf, lbf)	Rear right wheel hydraulic pressure MPa (kgf/cm ² , psi)	RR PRESS SENS (V)
50 (5.1, 11)	3.9 (39.4, 560)	1.2 to 1.4
100 (10.2, 22)	4 (40.8, 580)	1.25 to 1.5
150 (15.3, 34)	4 (40.8, 580)	1.25 to 1.5
200 (20.4, 45)	4 (40.8, 580)	1.25 to 1.5

Brake effort N (kgf, lbf)	Rear left wheel hydraulic pressure MPa (kgf/cm ² , psi)	RL PRESS SENS (V)
50 (5.1, 11)	3.9 (39.4, 560)	1.2 to 1.4
100 (10.2, 22)	4 (40.8, 580)	1.25 to 1.5
150 (15.3, 34)	4 (40.8, 580)	1.25 to 1.5
200 (20.4, 45)	4 (40.8, 580)	1.25 to 1.5

- (d) Check accumulator (ACC) pressure sensor.
- (1) Move the shift lever to the P position. Apply the parking brake and connect the intelligent tester.
 - (2) Turn the power switch ON (IG).
 - (3) Turn on the intelligent tester. Select the accumulator (ACC) pressure sensor 1 ("ACC PRESS SENS").
 - (4) Temporarily operate the pump motor by depressing the brake pedal 4 to 5 times.
 - (5) After confirming that the pump motor stops, check the pressure output voltage.
If incorrect, troubleshoot the brake system (see page [BC-28](#)).

Standard output voltage:

2.6 to 3.8 V

REPLACEMENT

NOTICE:

Be sure to replace the actuator and the resistor together. If they are not replaced together, motor noise may be increased.

1. REPLACE BRAKE ACTUATOR ASSEMBLY

- (a) Remove the windshield wiper motor and link (see page [WW-13](#)).

HINT:

Refer to the procedures from the removal of the front wiper arm LH/RH up until the removal of the windshield wiper motor and link assembly.

- (b) Perform the accumulator pressure "ZERO DOWN" operation.

NOTICE:

Carry out the accumulator "ZERO DOWN" operation and lower the internal pressure before removing the brake actuator.

- (1) Move the shift lever to the P position. Apply the parking brake and connect the intelligent tester to the DLC3.
- (2) Turn the power switch ON (IG).
- (3) Turn on the intelligent tester. Select "ZERO DOWN".

NOTICE:

Keep the fluid inside the reservoir above the "LOW" level by replenishing.

HINT:

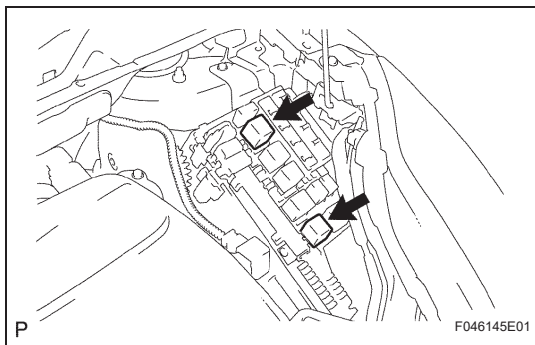
- Accumulator pressure is released and accumulated repeatedly, which circulates the fluid inside the accumulator when performing this procedure.
- The pump motor rotates and the accumulator is pressurized every time turning the power switch from OFF to ON (IG).

- (4) Turn the power switch OFF.

- (c) Set the brake control (ECB) off.

NOTICE:

- **Prohibit the brake control (ECB) before air bleeding.**
- **Be sure to remove the No. 1 and No. 2 motor relays first, then the brake actuator.**



- (1) With the power switch OFF to prohibit brake control, remove the No. 1 and No. 2 motor relays.

NOTICE:

If the pump motor operates while there is air remaining inside the brake actuator hose, the air will enter the actuator, resulting in difficulty in air bleeding.

- (d) Remove the outer front cowl top panel (see page [BR-28](#)).
 (e) Remove the inverter with converter (see page [HV-530](#)).

HINT:

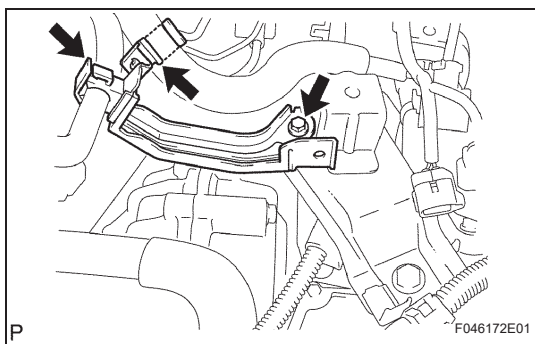
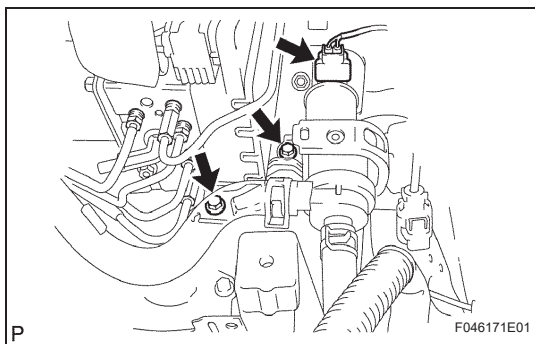
Refer to the procedures from the removal of the engine under cover LH up until the removal of the inverter with converter.

- (f) Drain brake fluid.

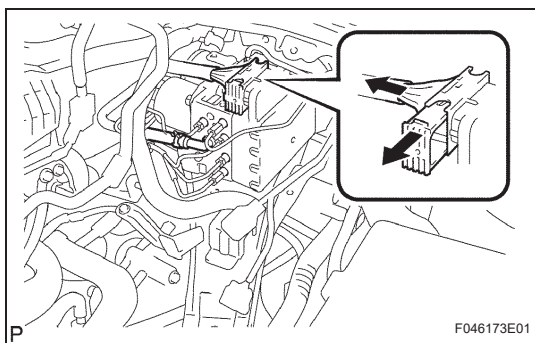
NOTICE:

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

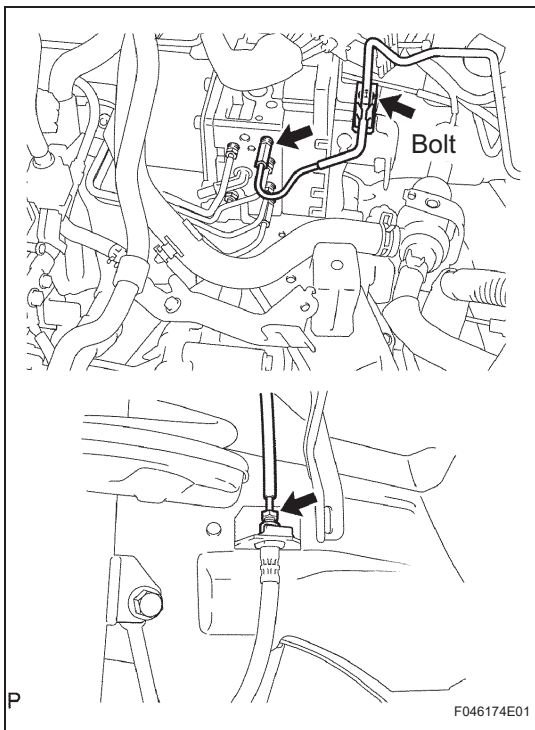
- (g) Separate the water pump with motor and bracket.
 (1) Disconnect the connector.
 (2) Remove the 2 bolts and disconnect the water pump from the gusset.



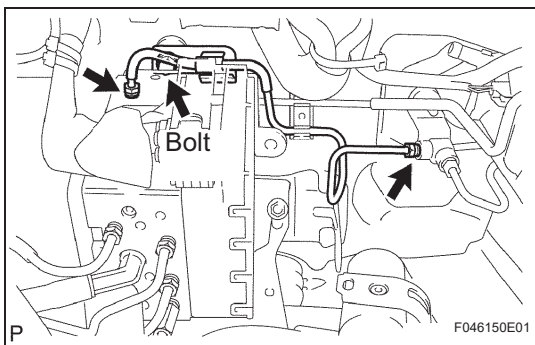
- (3) Remove the 2 clamps, bolt and heater hose bracket from the gusset.



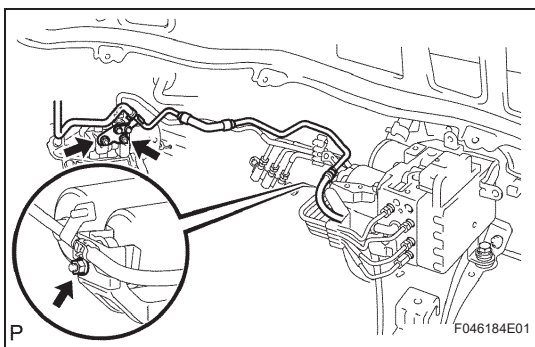
- (h) Remove the brake actuator with bracket.
 (1) Release the lock and disconnect the brake actuator connector.
 (2) Remove the clip and disconnect the No. 2 brake actuator hose from the brake actuator.



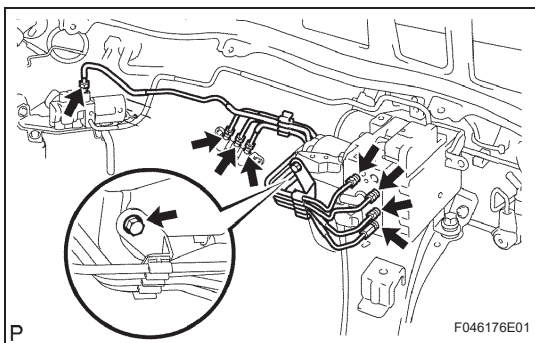
- (3) Using SST, disconnect the No. 5 front brake tube from the brake actuator and front brake flexible hose.
SST 09023-00101
- (4) Remove the bolt and No. 5 front brake tube from the bracket of the brake actuator.



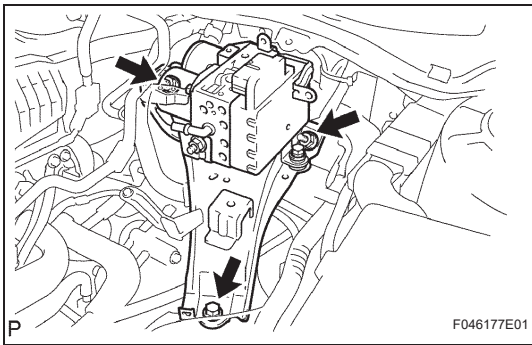
- (5) Using SST, disconnect the No. 1 front brake tube.
SST 09023-00101
- (6) Remove the bolt and No. 1 front brake tube from the bracket of the brake actuator.



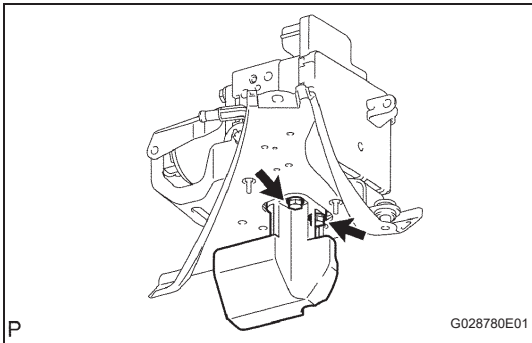
- (7) Remove the 3 nuts and brake actuator tubes from the brake stroke simulator cylinder and brake actuator.



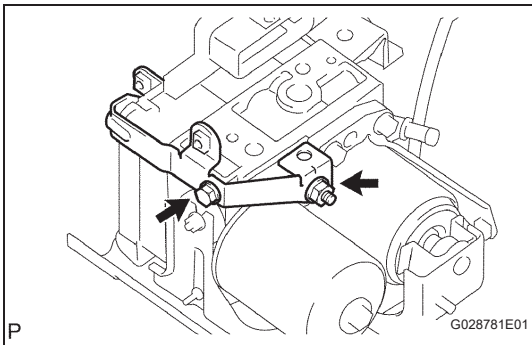
- (8) Remove the bolt from the brake actuator.
- (9) Using SST, remove the 4 brake tubes from the brake stroke simulator cylinder and brake actuator.
SST 09023-00101



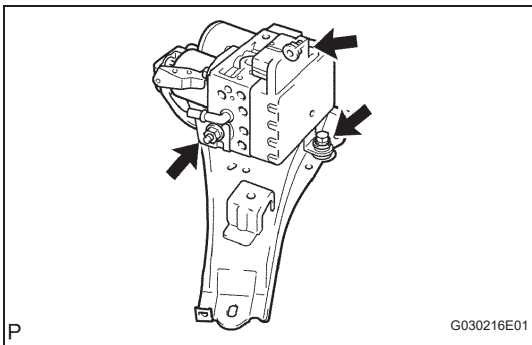
(10) Remove the bolt, 2 nuts and brake actuator with gusset.



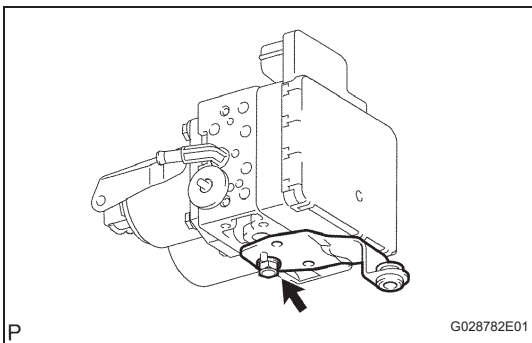
- (i) Remove the brake actuator.
 (1) Remove the 2 bolts and brake actuator damper.



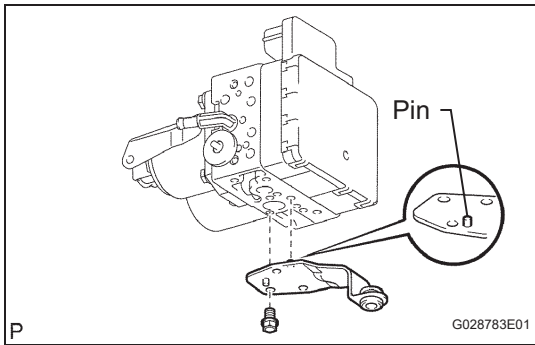
(2) Remove the bolt, nut and bracket from the brake actuator.



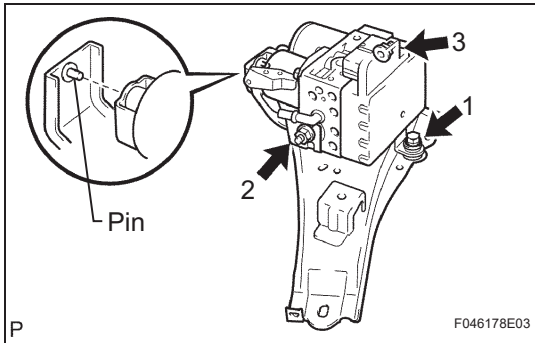
(3) Remove the 2 nuts, bolt and brake actuator from the gusset.



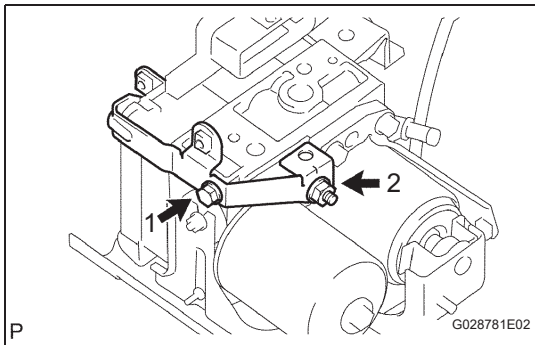
(4) Remove the bolt and No. 2 brake actuator bracket from the brake actuator.



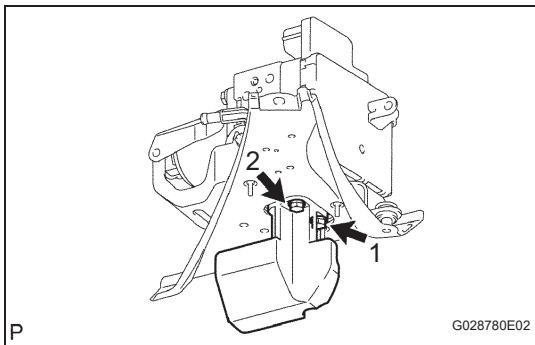
- (j) Install the brake actuator.
 (1) Aligning the positioning pin, install the No. 2 brake actuator bracket to the brake actuator with the bolt.
Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)



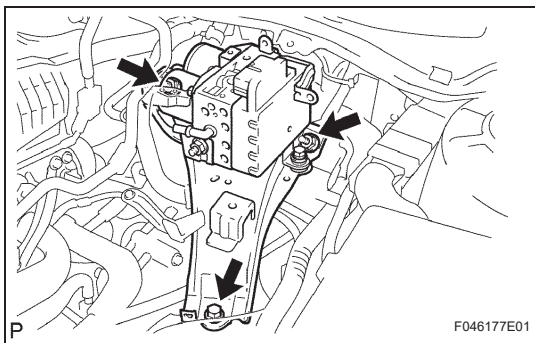
- (2) Aligning the positioning pin, install the brake actuator to the gusset with the 2 nuts and bolt.
Torque: 7.5 N*m (76 kgf*cm, 66 in.*lbf)
NOTICE:
Tighten the nuts and bolt in the order shown in the illustration.



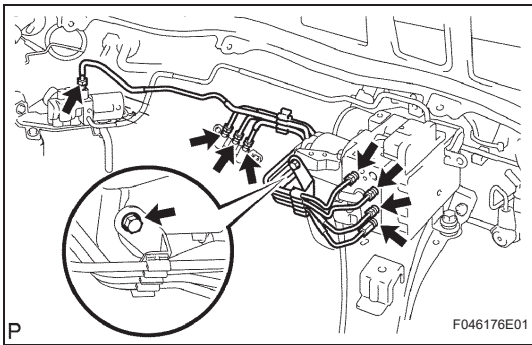
- (3) Install the bracket to the brake actuator with the bolt and nut.
Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)
NOTICE:
Tighten the nut and bolt in the order shown in the illustration.



- (4) Install the brake actuator damper to the brake actuator with the 2 bolts.
Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)
NOTICE:
Tighten the bolts in the order shown in the illustration.



- (k) Install the brake actuator with bracket.
 (1) Install the brake actuator with gusset with the bolt and 2 nuts.
Torque: 20 N*m (200 kgf*cm, 15 ft.*lbf)

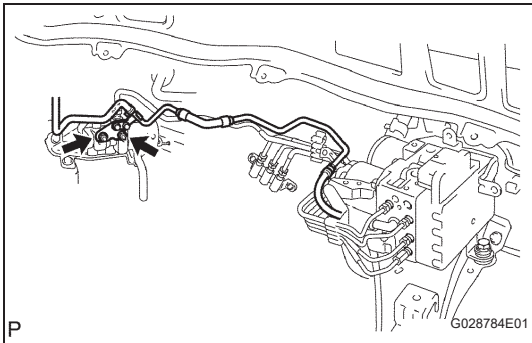


- (2) Using SST, install the 4 brake tubes to the brake stroke simulator cylinder and brake actuator.

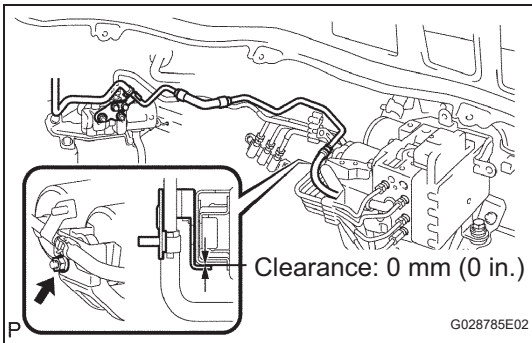
SST 09023-00101

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

- (3) Set the brake tube with the clamp bracket bolt.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)



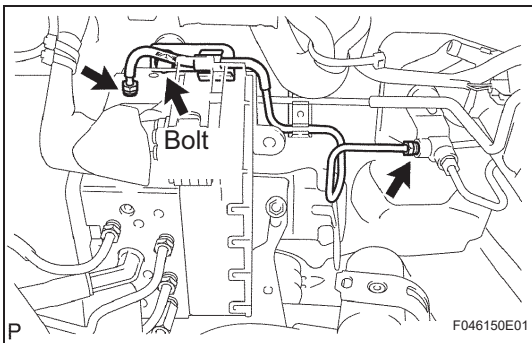
- (4) Install the brake actuator tube with the 2 nuts.
Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)



- (5) Set the brake actuator tube with the nut.
Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)

NOTICE:

Press the brake actuator tube so that there is no clearance between the bracket and the actuator tube as shown in the illustration, and tighten the nut.



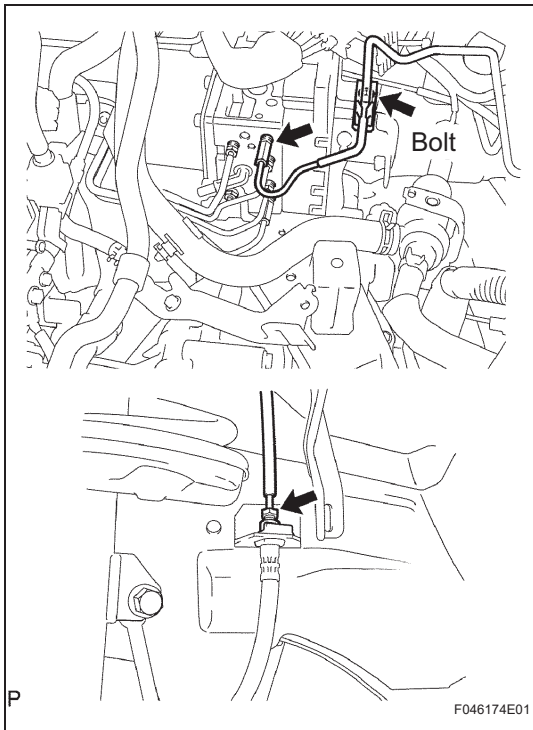
- (6) Using SST, install the No. 1 front brake tube to the brake actuator and 2-way.

SST 09023-00101

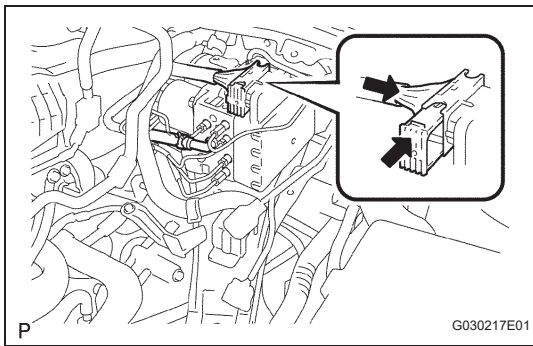
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf)

- (7) Install the No. 1 front brake tube to the bracket of the brake actuator with the bolt.

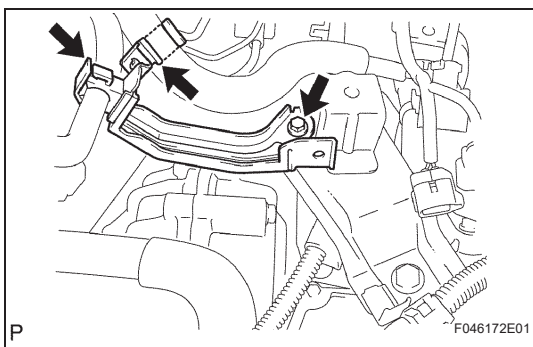
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)



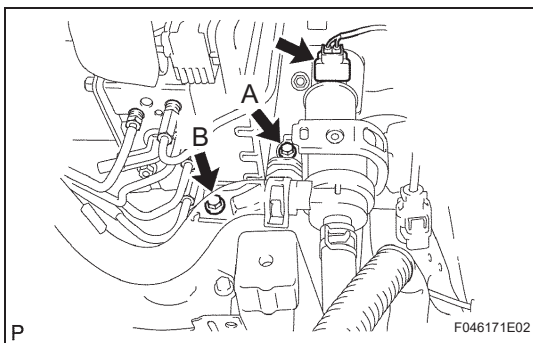
- (8) Using SST, connect the No. 5 front brake tube.
SST 09023-00101
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf)
- (9) Install the bracket of the No. 5 front brake tube with the bolt.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)



- (10) Connect the brake actuator connector and fix it with the lock.
- (11) Install the No. 2 brake actuator hose to the brake actuator with the clip.



- (l) Connect the water pump with motor and bracket.
 - (1) Install the heater hose bracket to the gusset with the 2 clamps and bolt.



- (2) Install the heater water pump with the 2 bolts.
NOTICE:
Tighten bolt A and then bolt B.
- (3) Connect the heater water pump connector.
- (m) Install the inverter with converter (see page [HV-535](#)).
HINT:
Refer to the procedures from the installation of the inverter with converter up until the installation of the engine under cover LH.

- (n) Install the outer front cowl top panel (see page [BR-32](#)).
- (o) Install the windshield wiper motor and link (see page [WW-15](#)).

HINT:

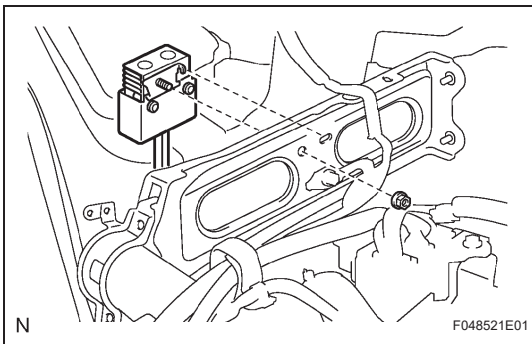
Refer to the procedures from the installation of the windshield wiper motor and link assembly up until the installation of the front wiper arm LH/RH.

2. REPLACE BRAKE ACTUATOR RESISTOR

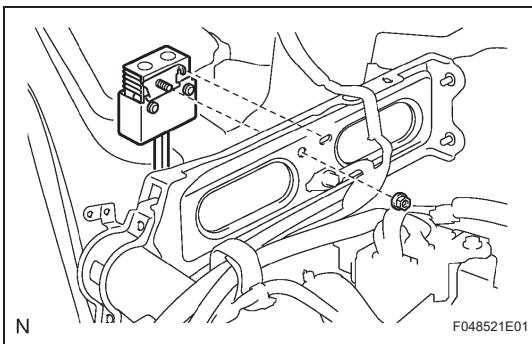
- (a) Remove the instrument panel (see page [IP-5](#)).

HINT:

Refer to the procedures from the removal of the No. 1 instrument panel register assembly up until the removal of the instrument panel sub-assembly.



- (b) Remove the brake actuator resistor.
 - (1) Remove the nut.
 - (2) Disconnect the connector and remove the resistor.



- (c) Install the brake actuator resistor.
 - (1) Connect the connector and install the resistor.
 - (2) Install the nut.

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

- (d) Install the instrument panel (see page [IP-11](#)).

HINT:

Refer to the procedures from the installation of the instrument panel sub-assembly up until the installation of the No. 1 instrument panel register assembly.

3. FILL RESERVOIR WITH BRAKE FLUID (See page [BR-5](#))**4. BLEED AIR FROM BRAKE ACTUATOR (See page [BR-8](#))****5. CHECK FOR BRAKE FLUID LEAKAGE****6. CHECK FLUID LEVEL IN RESERVOIR****7. CHECK AND CLEAR DTC**

- (a) Check and clear the DTC (see page [BC-38](#)).

8. PERFORM INITIALIZATION

- (a) Perform initialization (see page [IN-32](#)).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

9. PERFORM SYSTEM INITIALIZATION

- (a) Perform the brake system initialization (see page [BC-19](#)).

10. PERFORM ACTIVE TEST

- (a) Perform the Active Test (see page [BC-43](#)).

DISPOSAL**1. DISPOSE OF BRAKE ACTUATOR ASSEMBLY**

- (a) Using a drill, slowly make a hole at the radius indicated at the middle of A in the illustration and bleed the charged gas.

CAUTION:

Be sure to wear protective glasses as fragments may fly out due to pressure.

HINT:

- The hole may be drilled up to approximately 5 to 10 mm (0.20 to 0.39 in.) away from the point indicated by A.
- The gas is nitrogen, which is colorless, odorless, and harmless.

