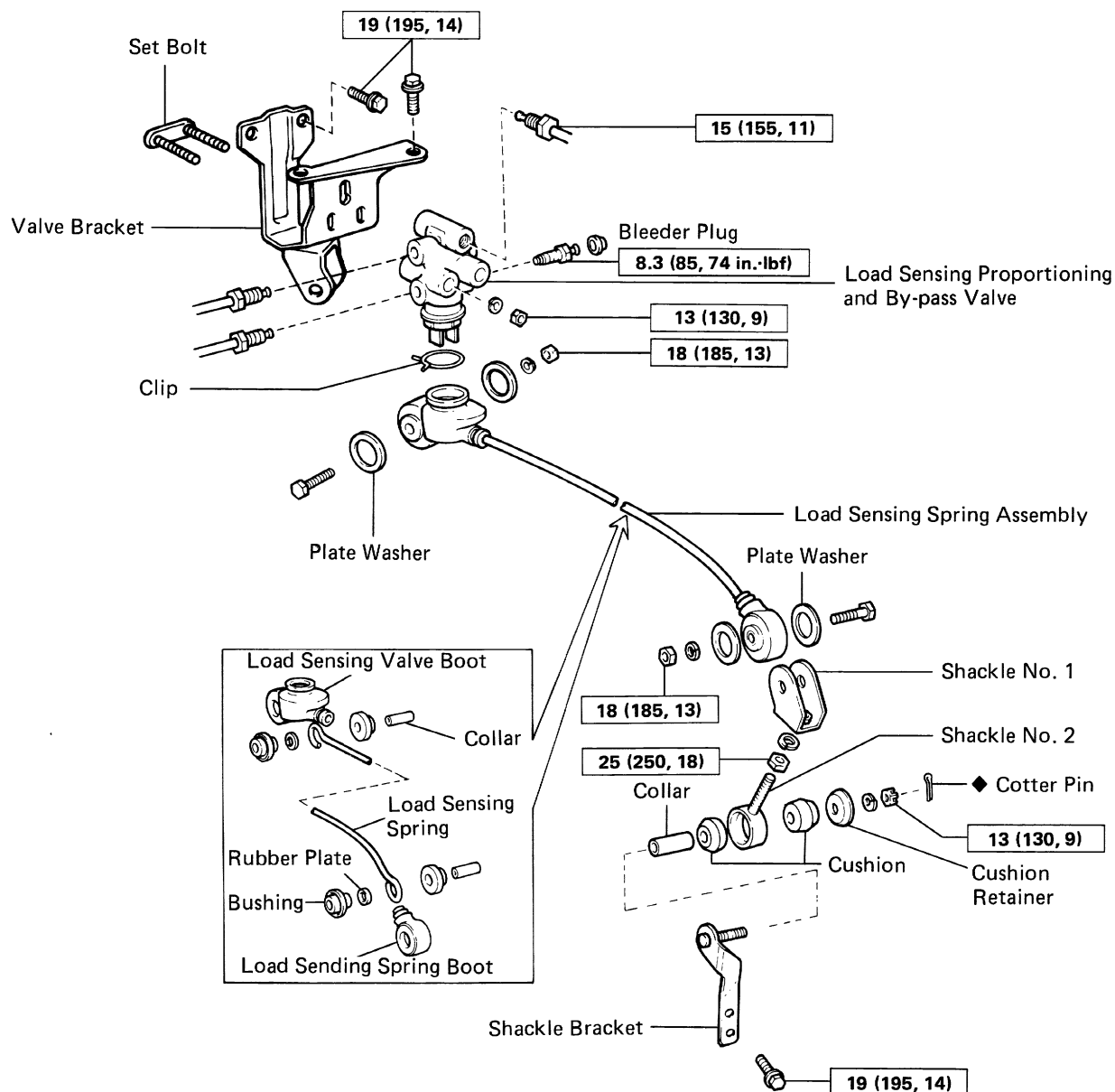


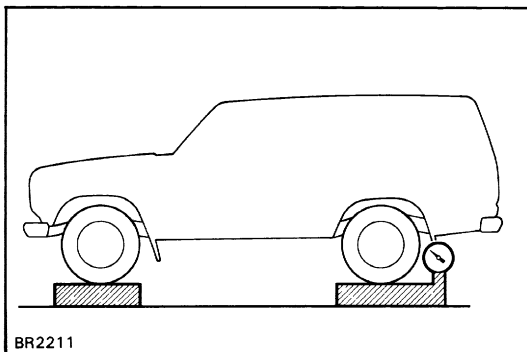
LOAD SENSING PROPORTIONING AND BY-PASS VALVE (LSP & BV) COMPONENTS



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

◆ Non-reusable part

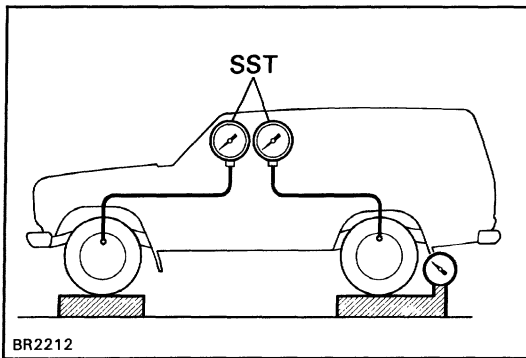
R01347



CHECK AND ADJUSTMENT OF FLUID PRESSURE

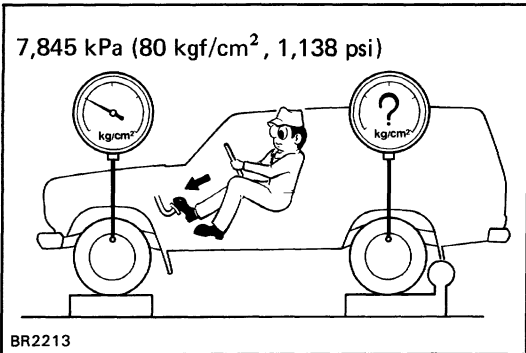
1. SET REAR AXLE LOAD

Rear axle load (include vehicle weight):
1,150 kg (2,535 lb)



2. INSTALL LSPV GAUGE (SST) AND BLEED AIR

SST 09709-29017

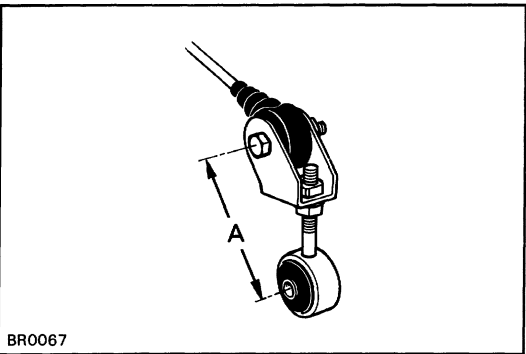


3. RAISE FRONT BRAKE PRESSURE TO 7,845 kPa (80 kgf/cm², 1,138 psi) AND CHECK REAR BRAKE PRESSURE

Rear brake pressure:

4,413 ± 588 kPa (45 ± 6 kgf/cm², 640 ± 85 psi)

HINT: The brake pedal should not be depressed twice and/or returned while setting to the specified pressure. Read the value of rear brake pressure two seconds after adjusting the specified fluid pressure.



4. IF NECESSARY, ADJUST FLUID PRESSURE

(a) Disconnect the No. 2 shackle from the shackle bracket.

(b) Adjust the length of the No. 2 shackle by turning it.

Low pressure – Lengthen A

High pressure – Shorten A

Initial set: 90 mm (3.54 in.)

Adjusting range: 84 – 96 mm (3.31 – 3.78 in.)

HINT: One turn of the No. 2 shackle changes the fluid pressure about following specification.

98.1 kPa (1.0 kgf/cm², 14.2 psi)

(c) In the event pressure cannot be adjusted by the No. 2 shackle, raise or lower the valve body.

Low pressure – Lower

High pressure – Raise

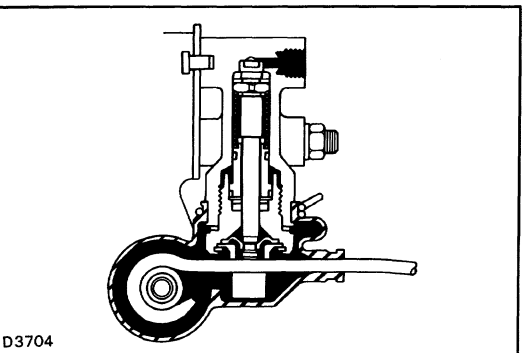
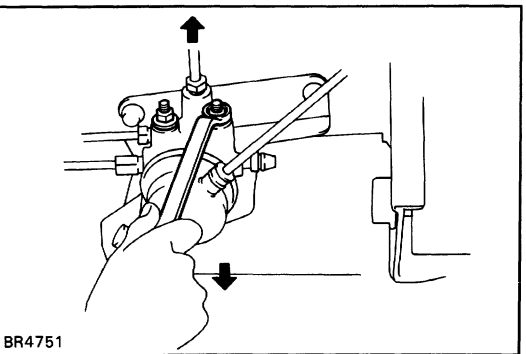
(d) Torque the nuts.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(e) Adjust the length of the No. 2 shackle again.

If it cannot be adjusted, inspect the valve housing.

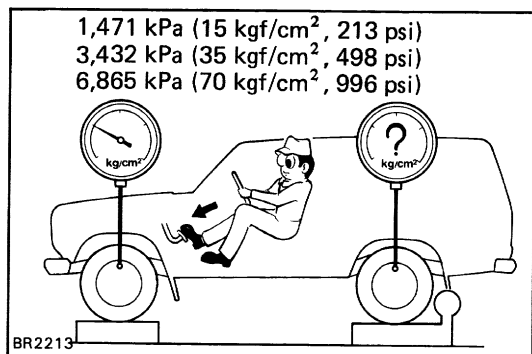
(f) Connect the No. 2 shackle to the shackle bracket.



5. IF NECESSARY, CHECK VALVE BODY

(a) Assemble the valve body in the upper most position.

HINT: When the brakes are applied, the piston will move down about 1 mm (0.04 in.). Even at this time, the piston should not make contact with or move the load sensing spring.



- (b) In this position, check the rear brake pressure.
 kPa (kgf/cm², psi)

Front brake pressure	Rear brake pressure
1,471 (15, 213)	1,471 (15, 213)
3,432 (35, 498)	1,765 – 2,157 (18–22, 256–313)
6,865 (70, 996)	2,481 – 3,168 (25.3 – 32.3, 360 – 459)

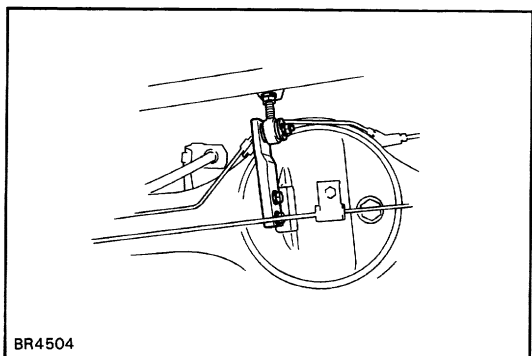
If the measured value is not within standard, replace the valve body.

REMOVAL OF LSP & BV

(See page [BR-36](#))

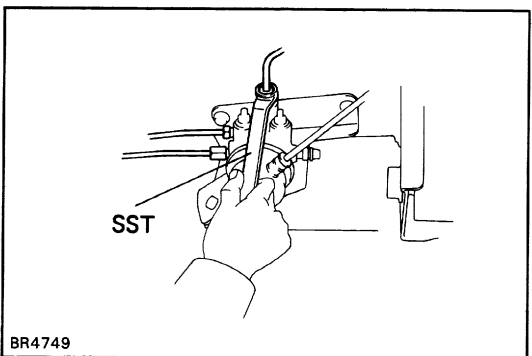
1. DISCONNECT SHACKLE NO. 2 FROM BRACKET

- Remove the cotter pin.
- Remove the nut and disconnect the shackle No. 2 from the bracket.
- Remove the two retainers, two bushings and collar.

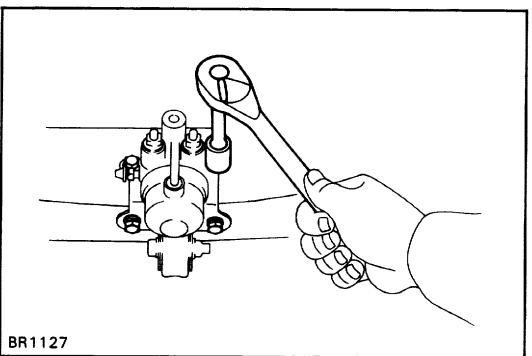


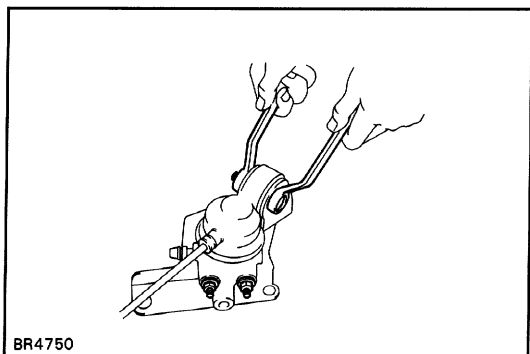
2. REMOVE LSP & BV ASSEMBLY

- Using SST, disconnect the brake tubes from the valve body.
 SST 09751-36011



- Remove the valve bracket mounting bolts and nut, then remove the LSP & BV assembly.

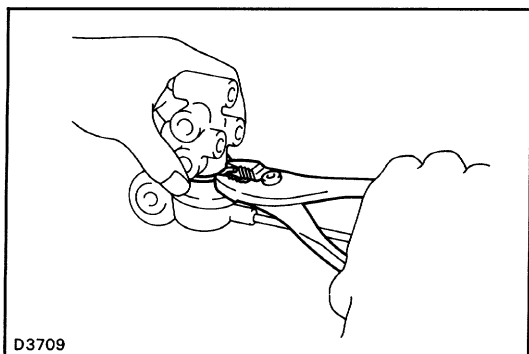




DISASSEMBLY OF LSP & BV ASSEMBLY

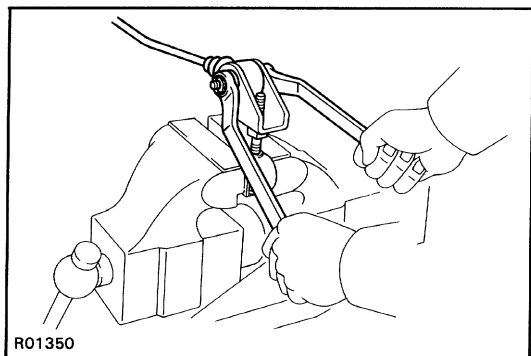
1. REMOVE VALVE BRACKET

- (a) Remove the nut and bolt as shown.
- (b) Remove the two nuts, and remove the bracket and set plate from the valve body.



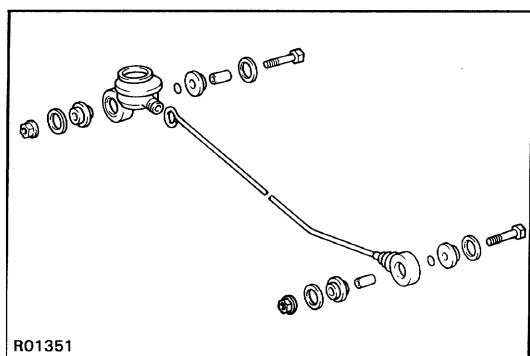
2. DISCONNECT SPRING FROM VALVE

Using pliers, remove the clip, and remove the spring from the valve.



3. REMOVE SHACKLE NO. 1 AND NO. 2

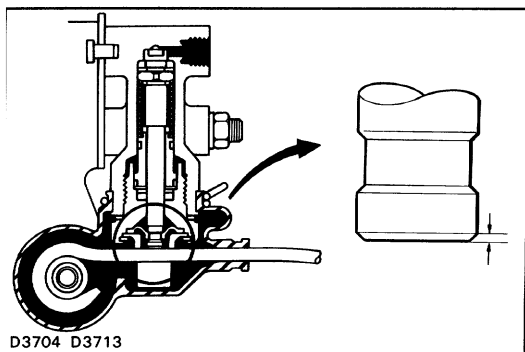
- (a) Remove the bolt and nut, then remove the following parts.
 - Load sensing spring
 - Two plate washers
- (b) Loosen the lock nut, and remove the shackle No. 1 from the shackle No. 2.



4. DISASSEMBLE LOAD SENSING SPRING

Disassemble the following parts.

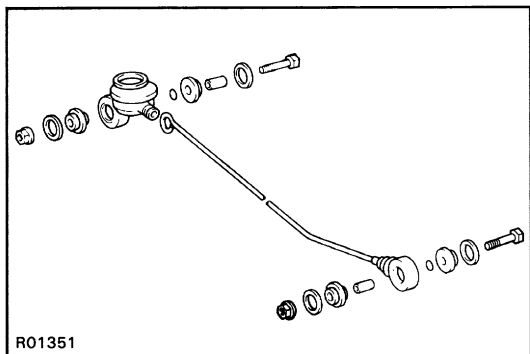
- (a) Bushings
- (b) Collars
- (c) Rubber plates
- (d) Load sensing valve boot
- (e) Load sensing spring boot



INSPECTION OF LSP & BV

INSPECT VALVE PISTON PIN AND LOAD SENSING SPRING CONTACT SURFACE FOR WEAR

Wear limit: 0.7 mm (0.028 in.)



ASSEMBLY OF LSP & BV ASSEMBLY

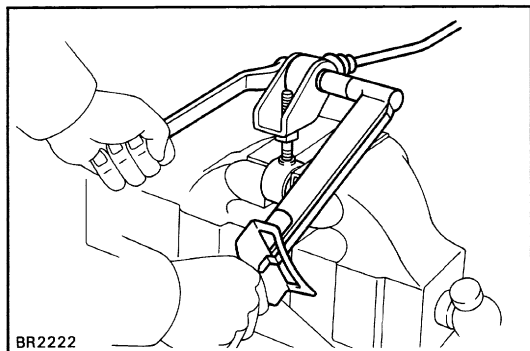
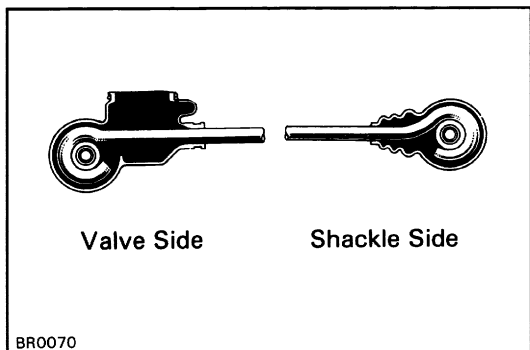
(See page [BR-36](#))

1. ASSEMBLE FOLLOWING PARTS TO LOAD SENSING SPRING

- (a) Load sensing valve boot
- (b) Load sensing spring boot
- (e) Collars
- (d) Rubber plates
- (e) Bushings

HINT:

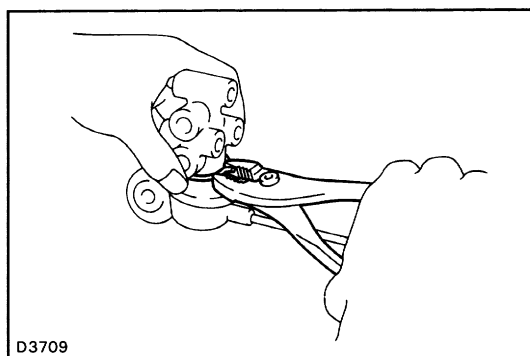
- Apply lithium soap base glycol grease to all rubbing areas.
- Do not mistake the valve side for the shackle side of the load sensing spring.



2. INSTALL SHACKLE NO. 1 AND NO. 2 TO LOAD SENSING SPRING

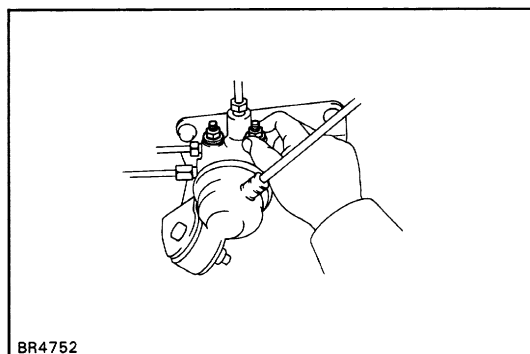
- (a) Install the lock nut and shackle No. 1 to the shackle No. 2.
- (b) Install the shackle to the load sensing spring through the two plate washers.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



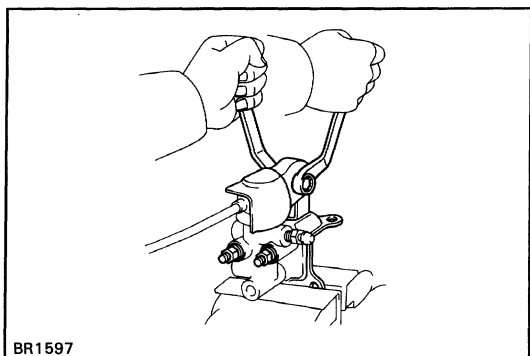
3. INSTALL LOAD SENSING SPRING TO VALVE BODY

Install the load sensing spring assembly to the load sensing valve with a clip.



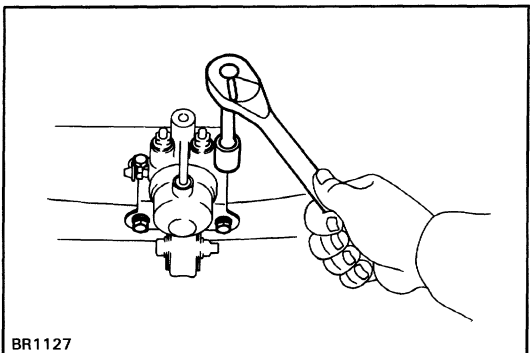
4. INSTALL VALVE BRACKET

- (a) Install the set plate to the valve assembly through the valve bracket and temporarily tighten the two valve body mounting nuts.



- (b) Torque the bolt and nut of load sensing spring boot through the two plate washers.

Torque: 18 N-m (185 kgf-cm, 13 ft-lbf)

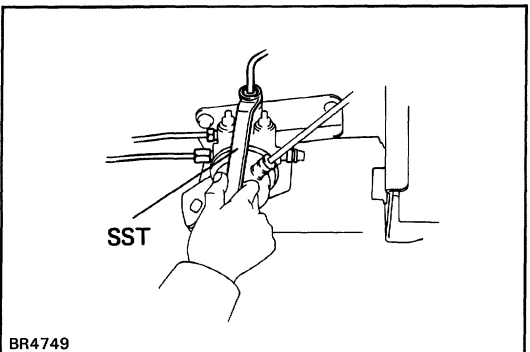


INSTALLATION OF LSP & BV

1. INSTALL LSP & BV ASSEMBLY

Install the LSP & BV assembly to the frame with four bolts.

Torque: 19 N-m (795 kgf-cm, 14 ft-lbf)

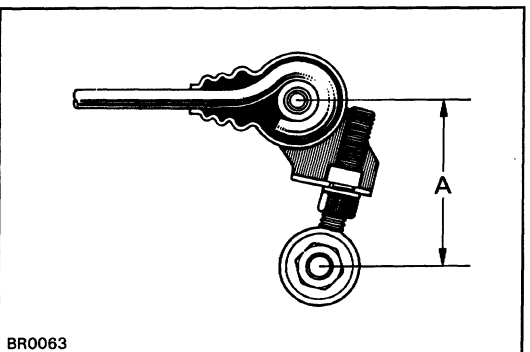


2. CONNECT BRAKE TUBES

Using SST, connect the brake tubes.

SST 09751-36011

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



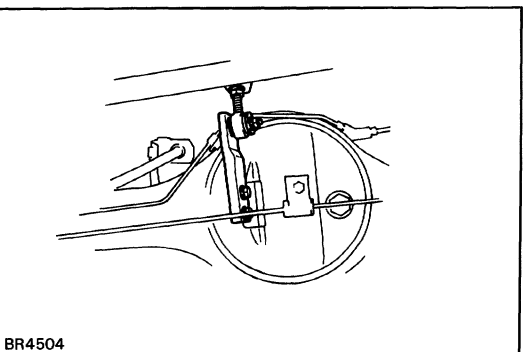
3. CONNECT SHACKLE NO. 2 TO BRACKET

- (a) Set the dimension A by turning the shackle No. 2.

Initial set: 90 mm (3.54 in.)

- (b) Tighten the lock nut.

Torque: 25 N-m (250 kgf-cm, 18 ft-lbf)



- (c) Install the two bushings and a collar to the load sensing spring shackle.

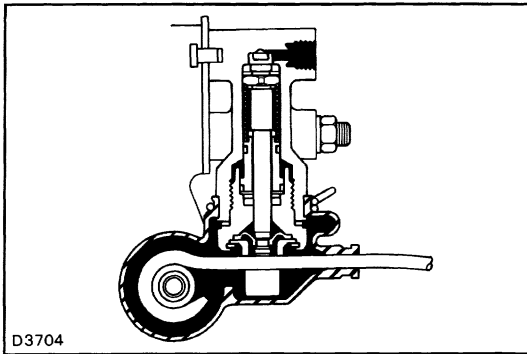
- (d) Install the load sensing spring to the shackle bracket with the two retainer and a nut.

Torque: 13 N-m (130 kgf-cm, 9 ft-lbf)

- (e) Install the new cotter pin.

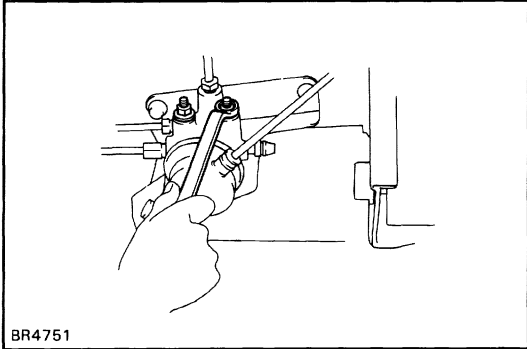
4. SET REAR AXLE LOAD

(See page [BR-36](#))



5. SET VALVE BODY

- (a) When pulling down the load sensing spring, confirm that the valve piston moves down smoothly.
- (b) Position the valve body so that the valve piston lightly contacts the load sensing spring.



- (c) Tighten the valve body mounting nuts.

Torque: 13 N-m (130 kgf-cm, 9 ft-lbf)

6. BLEED BRAKE SYSTEM

(See page [BR-7](#))

7. CHECK FOR FLUID LEAKAGE

8. CHECK AND ADJUST LSP & BV FLUID PRESSURE

(See page [BR-37](#))