

# BRAKE SYSTEM

## PRECAUTIONS

1. 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 parts of the same part number or equivalent.
2. It is very important to keep parts and the area clean when repairing the brake system.

## TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Low or spongy pedal	Linings worn Brake pads worn Leak in brake system Master cylinder faulty Air in brake system Wheel cylinder faulty Brake cylinder faulty Piston seals worn or damaged Rear brake automatic adjuster faulty	Replace brake shoes Replace pads Repair leak Repair or replace master cylinder Bleed brake system Repair wheel cylinder Repair cylinder Repair brake cylinder Repair or replace adjuster	<a href="#">BR-40</a> , 47 55 <a href="#">BR-18</a> , 26 33 <a href="#">BR-10</a> <a href="#">BR-8</a> <a href="#">BR-40</a> , 47 55 <a href="#">BR-18</a> , 26 33 <a href="#">BR-40</a> , 47 55
Brakes drag	Parking brake out of adjustment Binding parking brake wire Booster push rod out of adjustment Tension or return spring faulty Brake line restricted Lining cracked or distorted Pad cracked or distorted Wheel cylinder or caliper piston sticking Adjuster broken Master cylinder faulty	Adjust parking brake Repair as necessary Adjust push rod Replace spring Repair as necessary Replace shoe Replace pad Repair as necessary Replace adjuster Repair or replace master cylinder	<a href="#">BR-9</a> <a href="#">BR-17</a> <a href="#">BR-40</a> , 47 55 <a href="#">BR-40</a> , 47 55 <a href="#">BR-18</a> , 26 33 <a href="#">BR-18</a> , 26 33 <a href="#">BR-10</a>
Brakes pull	Tires improperly inflated Oil or grease on shoes or pads Brake shoes distorted, linings worn or glazed Brake pads distorted, worn or glazed Drum or disc out of round  Tension or return spring faulty Wheel cylinder faulty Brake cylinder faulty Piston frozen in brake cylinder Brake pad sticking	Inflate tires to proper pressure Check for cause. Replace shoes or pads Replace brake shoes Replace pads Replace drum or disc  Replace spring Repair wheel cylinder Repair cylinder Repair cylinder Replace pads	 <a href="#">BR-40</a> , 47 55 <a href="#">BR-18</a> , 26 33 <a href="#">BR-18</a> , 26 33,40 47, 55 <a href="#">BR-40</a> , 47 55 <a href="#">BR-18</a> , 26 33 <a href="#">BR-18</a> , 26 33 <a href="#">BR-18</a> , 26 33

## TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
Hard pedal but brakes inefficient	Oil or grease on shoes or pads	Check for cause. Replace shoes or pads Replace brake shoes Replace pads	<a href="#">BR-40</a> , 47 55 <a href="#">BR-18</a> , 26 33 <a href="#">BR-18</a> , 26 33 <a href="#">BR-16</a>
	Brake shoes distorted, linings worn or glazed, drums worn Brake pads distorted, worn or glazed		
	Piston frozen in brake cylinder	Repair cylinder	
	Brake booster faulty Vacuum leaks Brake line restricted	Repair booster Repair as necessary Repair as necessary	
Snapping or clicking noise when brakes are applied	(Drum brake) Brake shoes binding at backing plate ledges Backing plate ledges worn	Lubricate  Replace and lubricate ledges	<a href="#">BR-40</a> , 47 55 <a href="#">BR-40</a> , 47 55 <a href="#">BR-40</a> , 47 55 <a href="#">BR-40</a> , 47 55
	Loose or missing shoe hold-down spring	Replace shoe hold-down spring	
	Loose set bolt at backing plate	Tighten	
	(Disc brake) Loose or missing pad support plate	Replace pad support plate	<a href="#">BR-18</a> , 26 33 <a href="#">BR-18</a> , 26 33
	Loose installation bolt	Tighten	
Scraping or grinding noise when brakes are applied	Worn brake linings or pads	Replace or refinish drums or rotors if heavily scored	<a href="#">BR-18</a> , 26 33,40 47, 55 <a href="#">BR-18</a> , 26 33 <a href="#">BR-18</a> , 26 33,40 47, 55
	Caliper to wheel or rotor interference	Replace as required	
	Dust cover to rotor or backing plate to drum interference	Correct or replace	
	Other brake system components faulty Tires rubbing against chassis and/or body	Repair or replace as necessary Repair as necessary	

# TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
<p>Squeaking, squealing groaning or chattering noise when brakes are applied</p> <p>HINT: Brake friction materials inherently generate noise and heat in order to dissipate energy. As a result, occasional squeal is normal and is aggravated by severe environmental conditions such as cold, heat, wetness, snow, salt, mud, etc. This occasional squeal is not a functional problem and does not indicate any loss of brake effectiveness</p>	<p>Brake drums and linings, rotors and pads worn or scored</p> <p>Dirty, greased, contaminated or glazed linings or pads</p> <p>Improper linings or pads using</p> <p>Maladjustment of brake pedal or booster push rod</p> <p>(Disc brake)</p> <p>Missing or damaged brake pad anti-squeal shim</p> <p>Pad wear and pad wear indicator making contact with the rotor</p> <p>Burred or rusted calipers</p> <p>(Drum brake)</p> <p>Weak damaged or incorrect shoe hold-down springs, loose or damaged shoe hold-down spring pins and springs and grooved backing plate ledges</p>	<p>Inspect, repair or replace</p> <p>Clean or replace</p> <p>Inspect for correct usage or replace</p> <p>Inspect and adjust</p> <p>Replace</p> <p>Replace</p> <p>Clean or deburr</p> <p>Inspect, repair or replace</p>	<p>BR-18, 26</p> <p>33,40</p> <p>47, 55</p> <p>BR-18, 26</p> <p>33,40</p> <p>47, 55</p> <p>BR-6, 17</p> <p>BR-1</p> <p>8, 26</p> <p>33</p> <p>BR-18, 26</p> <p>33</p> <p>BR-18, 26</p> <p>33</p> <p>BR-40, 47</p> <p>55</p>
<p>Squealing and squeaking noise when brakes are not applied</p>	<p>Mal-adjustment of brake pedal or booster push rod</p> <p>Poor return of brake booster or master cylinder or brake cylinder</p> <p>(Disc brake)</p> <p>Rusted or stuck piston</p> <p>Improper positioning of pad in caliper</p> <p>Rotor rubbing against caliper housing</p> <p>Improper installation of disc brake pad support plate</p> <p>Pad wear and pad wear indicator making contact with the rotor</p> <p>(Drum brake)</p> <p>Weak, damaged or incorrect shoe hold-down springs</p> <p>Grooved backing plate ledges</p> <p>Bent or warped backing plate causing interference with drum</p> <p>Improper machining of drum causing interference with backing plate or shoe</p> <p>Other brake system components:</p> <p>Loose or extra parts in brakes</p> <p>Rear drum adjustment too tight causing lining to glaze</p> <p>Worn, damaged or insufficiently lubricated wheel bearings</p>	<p>Inspect and adjust</p> <p>Inspect, repair or replace</p> <p>Inspect and lubricate as necessary</p> <p>Reinstall correctly</p> <p>Inspect and replace</p> <p>Reinstall correctly</p> <p>Replace</p> <p>Replace</p> <p>Repair or replace</p> <p>Repair or replace</p> <p>Replace drum</p> <p>Inspect, repair or replace as necessary</p>	<p>BR-6, 17</p> <p>BR-10, 16</p> <p>18,26</p> <p>33,40</p> <p>47, 55</p> <p>BR-18, 26</p> <p>33</p> <p>BR-18, 2</p> <p>33</p> <p>BR-18, 26</p> <p>33</p> <p>BR-40, 47</p> <p>55</p> <p>BR-40, 47</p> <p>55</p> <p>BR-40, 47</p> <p>55</p> <p>BR-40, 47</p> <p>55</p> <p>BR-40, 47</p> <p>55</p>

## TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
Groaning, clicking or rattling noise when brakes are not applied	Stones or foreign material trapped inside wheel covers	Remove foreign material	
	Loose wheel nuts	Tighten to correct torque Replace if stud holes are elongated Inspect and adjust	
	Mal-adjustment of brake pedal or booster push rod		BR-6, 17
	Worn, damaged or dry wheel bearings (Disc brake)	Inspect and lubricate or replace	
	Loose or missing anti-rattle spring or pad support plate or crimping on outer pad		
	Failure of shim	Inspect, repair or replace	BR-18, 26 33
		Inspect, replace if necessary	BR-18, 26 33
			BR-18, 26
	Wear on slide bushing	Inspect, replace if necessary	33
			BR-18, 26
	Loose installation bolt	Inspect, tighten if necessary	33
	Poor return of piston	Inspect, repair or replace	BR-18, 26 33
	(Drum brake) Loose or extra parts	Inspect and repair	BR-40, 47 55

## CHECKS AND ADJUSTMENTS

### CHECK AND ADJUSTMENT OF BRAKE PEDAL

#### 1. CHECK THAT PEDAL HEIGHT IS CORRECT, AS SHOWN PEDAL HEIGHT FROM ASPHALT SHEET:

2WD 148 MM (5.83 IN.)

4WD 145 MM (5.71 IN.)

#### 2. IF NECESSARY, ADJUST PEDAL HEIGHT

- (a) Disconnect the connector from the stop light switch.
- (b) Loosen the stop light switch lock nut and remove the stop light switch.
- (c) Loosen the push rod lock nut.
- (d) Adjust the pedal height by turning the pedal push rod.

- (e) Tighten the push rod lock nut.

**Torque: 25 N-m (260 kgf-cm, 19 ft-lbf)**

- (f) Install the stop light switch and turn it until it lightly contacts the pedal stopper.

- (g) Return the stop light switch one turn.

- (f) Check the clearance

- (A) between stop light switch and pedal.

**Clearance: 0.5 – 2.4mm (0.02 – 0.09 in.)**

- (i) Tighten the stop light switch lock nut.

- (j) Check that the stop light come on when the brake pedal is depressed, and go off when the brake pedal is released.

- (k) After adjusting the pedal height, check the pedal free play.

HINT: If clearance

- (A) between the stop light switch and the pedal stopper has been adjusted correctly, the pedal freeplay will meet the specifications.

#### 3. CHECK THAT PEDAL FREEPLAY IS CORRECT, AS SHOWN

- (a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.

- (b) (Single booster)

Push in the pedal until the beginning of resistance is felt. Measure the distance, as shown.

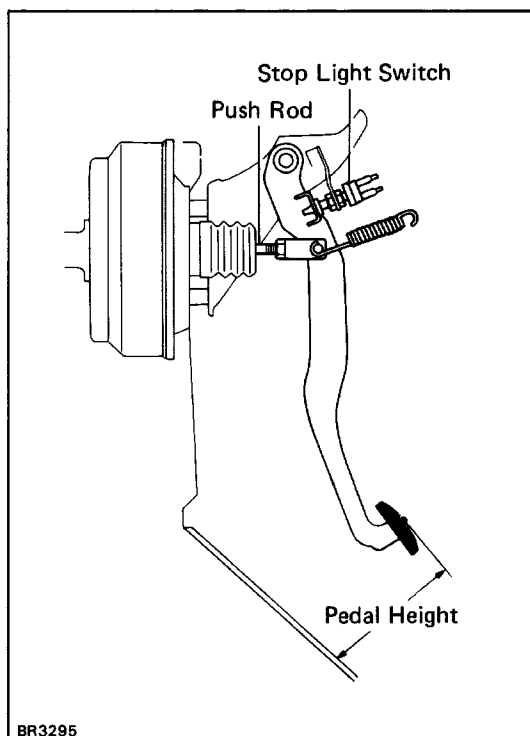
(Tandem booster)

Push in the pedal by hand until the beginning of the second resistance is felt, measure the distance, as shown.

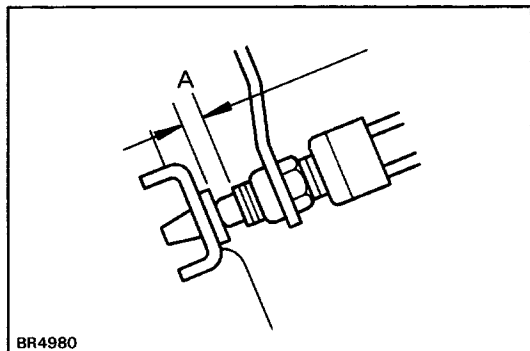
**Pedal freeplay: 3 – 6mm (0.12 – 0.24 in.)**

(Tandem booster)

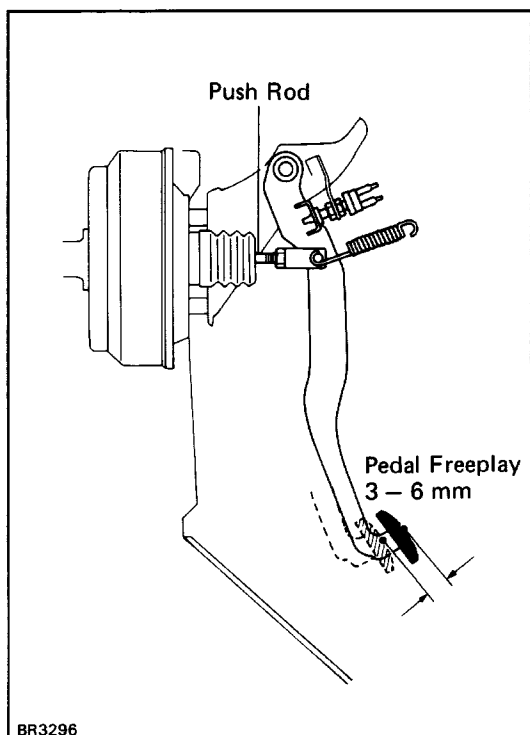
HINT: The freeplay to the first resistance is due to the play between the clevis and pin. And it is 1 – 3mm (0.04 – 0.12 in.) on the pedal.



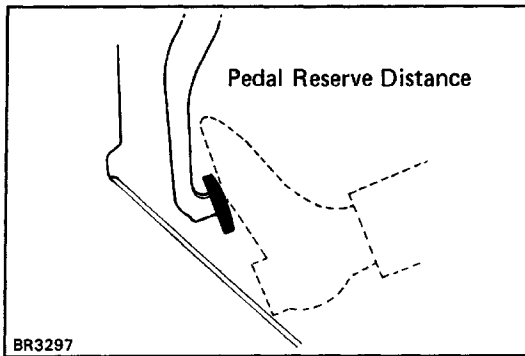
BR3295



BR4980



BR3296



#### 4. CHECK THAT PEDAL RESERVE DISTANCE IS CORRECT, AS SHOWN

Release the parking brake.

With engine running, depress the pedal and measure the pedal reserve distance, as shown.

**Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110.2 lbf):**

**(2WD)**

**22R-E Engine                      More than 70 mm (2.76 in.)**

**3VZ-E Engine**

**1 ton                                  More than 75 mm (2.95 in.)**

**1/2 ton                                More than 65 mm (2.56 in.)**

**C&C**

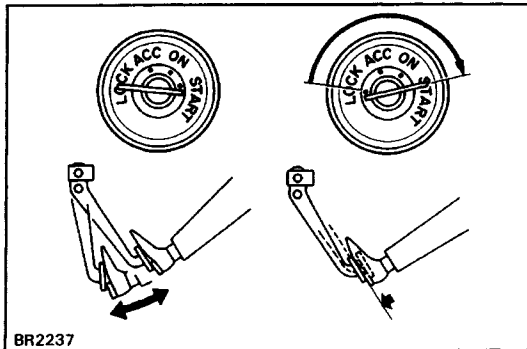
**SRW                                 More than 75 mm (2.95 in.)**

**DRW                                 More than 55 mm (2.17 in.)**

**(4WD)**

**More than 65 mm (2.56 in.)**

If incorrect, troubleshoot the brake system.



#### OPERATIONAL TEST OF BRAKE BOOSTER

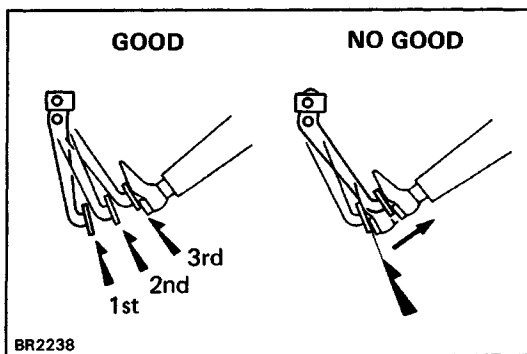
**HINT:** If available, use a brake booster tester to check the booster operating condition.

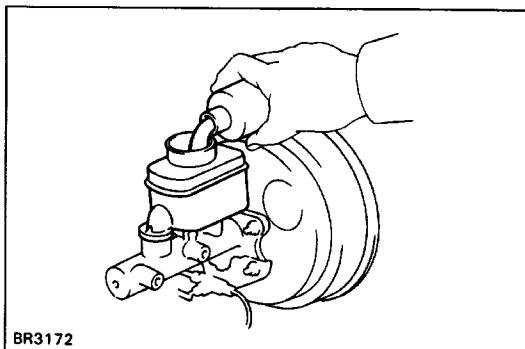
##### 1. OPERATING CHECK

- (a) Depress the brake pedal several times with the engine off, and check that there is no change in the pedal reserve distance.
- (b) Depress the brake pedal and start engine. If the pedal goes down slightly, operation is normal.

##### 2. AIR TIGHTNESS CHECK

- (a) Start the engine and stop it after one or two minutes. Depress the brake pedal several times slowly. If the pedal goes down deepest the first time, but gradually rises after the second or third time, the booster is air tight.
- (b) Depress the brake pedal while the engine is running, and stop it with the pedal depressed. If there is no change in pedal reserve travel after holding the pedal for thirty seconds, the booster is air tight.





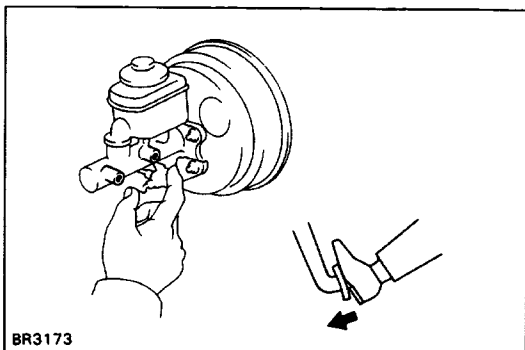
## BLEEDING OF BRAKE SYSTEM

**HINT:** If any work is done on the brake system or if air is suspected in the brake lines, bleed the system of air.

**NOTICE:** Do not let brake fluid remain on a painted surface. Wash it off immediately.

### 1. FILL BRAKE RESERVOIR WITH BRAKE FLUID

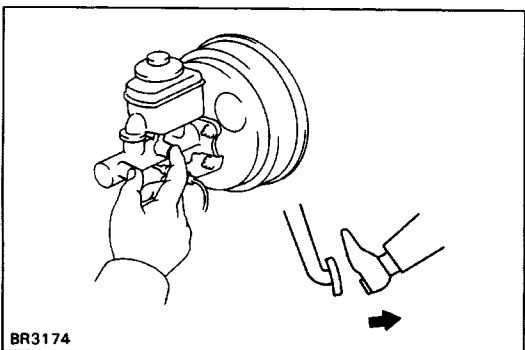
Check the fluid level in the reservoir after bleeding each wheel. Add fluid, if necessary.



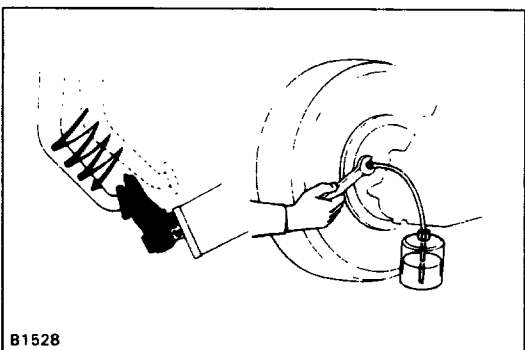
### 2. BLEED MASTER CYLINDER

**HINT:** If the master cylinder was disassembled or if the reservoir tank becomes empty, bleed the air from the master cylinder.

- (a) Disconnect the brake tubes from the master cylinder.
- (b) Slowly depress the brake pedal and hold it.



- (c) Block off the outlet plug with your finger, and release the brake pedal.
- (d) Repeat (b) and (c) three or four times.



### 3. CONNECT VINYL TUBE TO WHEEL CYLINDER BLEEDER PLUG

Insert other end of the tube in a half-full container of brake fluid.

**HINT:** Begin air bleeding from the wheel cylinder with the longest hydraulic line.

### 4. BLEED BRAKE LINE

- (a) Slowly depress the brake pedal several times.
- (b) While an assistant depresses the pedal, loosen the bleeder plug until fluid starts to run out. Then close the bleeder plug.
- (c) Repeat this procedure until there are no more air bubbles in the fluid.

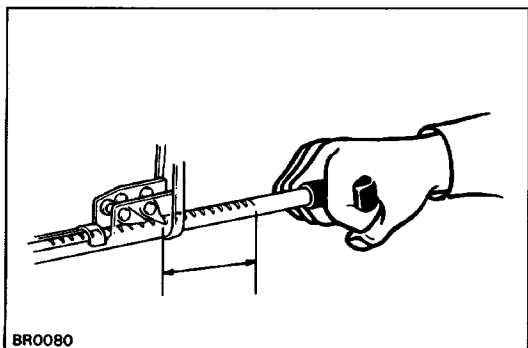
**Bleeder plug tightening torque:**

11 N·m (110 kgf·cm, 8 ft·lbf)

### 5. REPEAT PROCEDURE FOR EACH WHEEL

### 6. BLEED LSP & BV





## CHECK AND ADJUSTMENT OF PARKING BRAKE

### 1. CHECK THAT PARKING BRAKE LEVER TRAVEL IS CORRECT

Pull the parking brake lever all the way up, and count the number of clicks.

**Parking brake lever travel at 196 N (20 kgf, 44.1 lbf)**

**2WD 1/2 ton 12 – 18 clicks**

**1 ton 11 – 17 clicks**

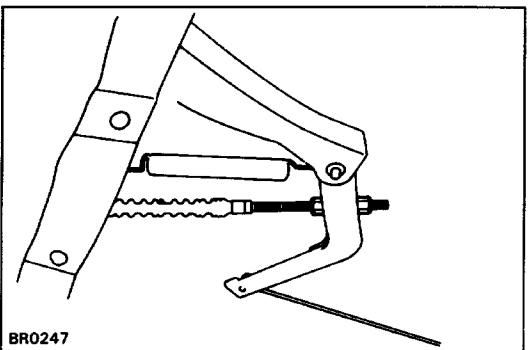
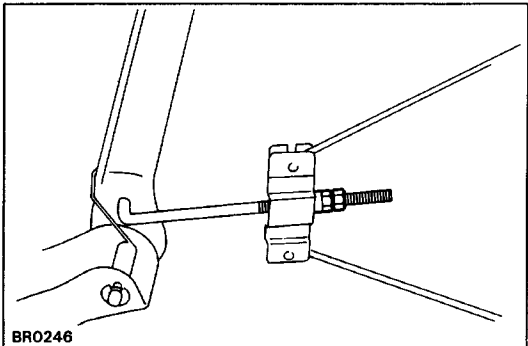
**4WD 11 – 17 clicks**

### 2. IF NECESSARY, ADJUST PARKING BRAKE

**HINT:** Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted.

(2WD)

- (a) Tighten the adjusting nut until the travel is correct. Then tighten the lock nut.
- (b) After adjusting the parking brake, confirm that the rear brakes are not dragging.

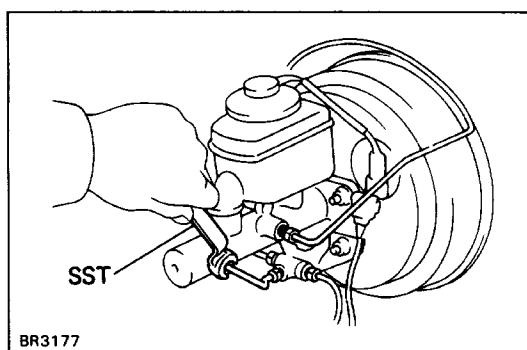
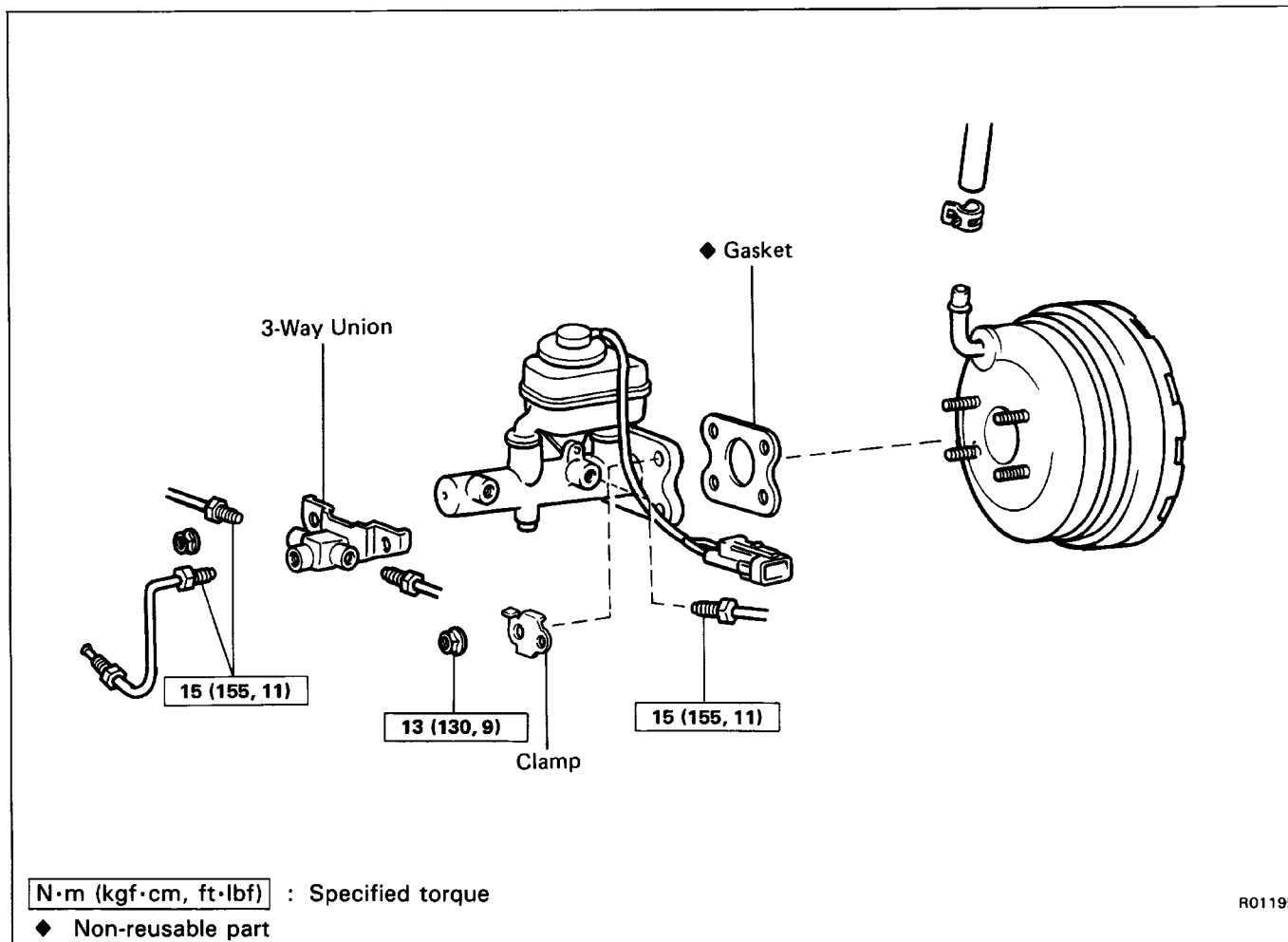


(4WD)

- (a) Tighten one of the adjusting nuts of the intermediate lever while loosening the other one until the travel is correct. Tighten the two adjusting nuts.
- (b) After adjusting the parking brake, confirm that the bellcrank stopper screw comes in contact with the backing plate.

## MASTER CYLINDER

### REMOVAL OF MASTER CYLINDER



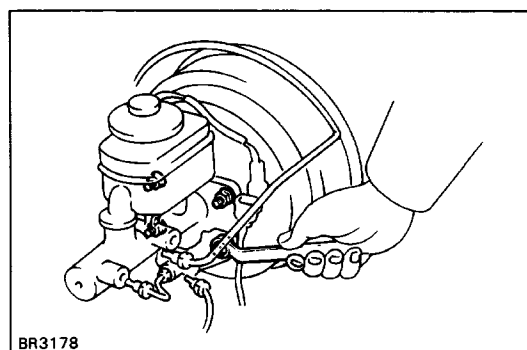
1. DISCONNECT LEVEL WARNING SWITCH CONNECTOR
2. DRAW OUT FLUID WITH SYRINGE

**NOTICE:** Do not let brake fluid remain on a painted surface. Wash it off immediately.

3. DISCONNECT BRAKE TUBES

Using SST, disconnect the brake tubes from the master cylinder.

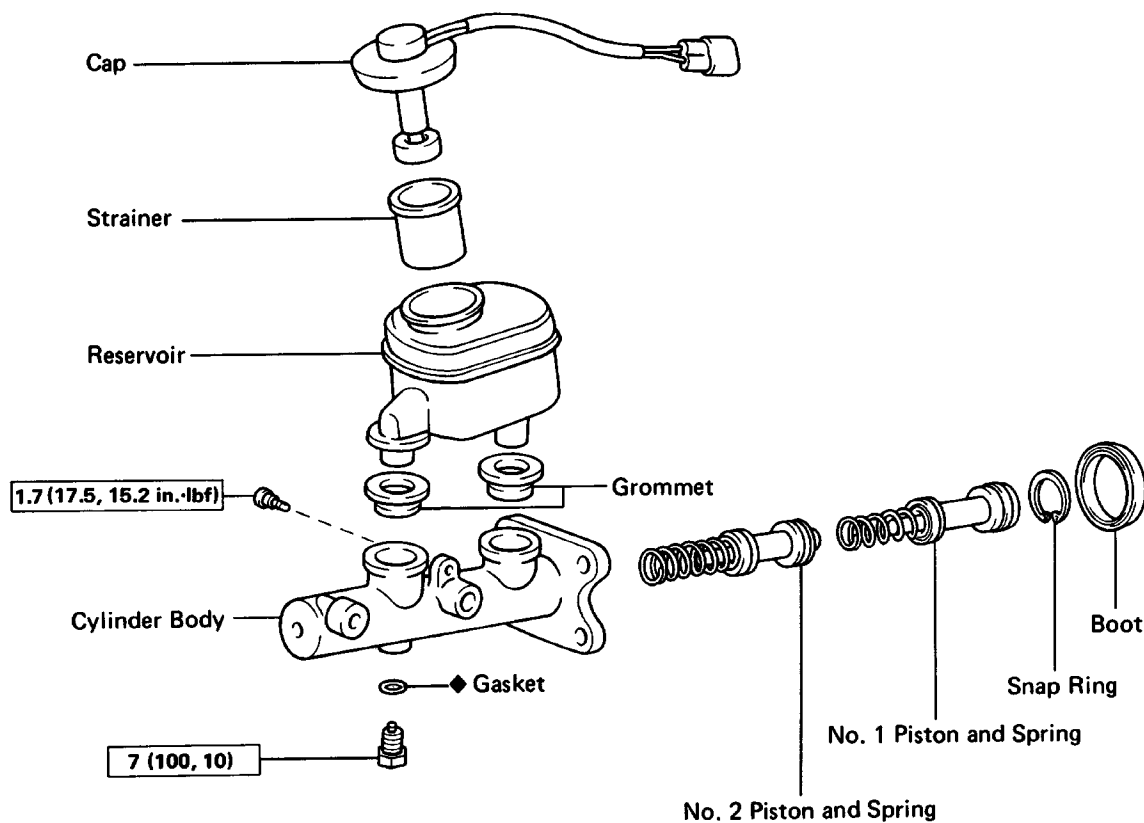
SST 09751-36011



4. REMOVE MASTER CYLINDER

- (a) Remove the four nuts and 3-way union.
- (b) Remove the clamp.
- (c) Remove the master cylinder and gasket from the brake booster.

## COMPONENTS



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

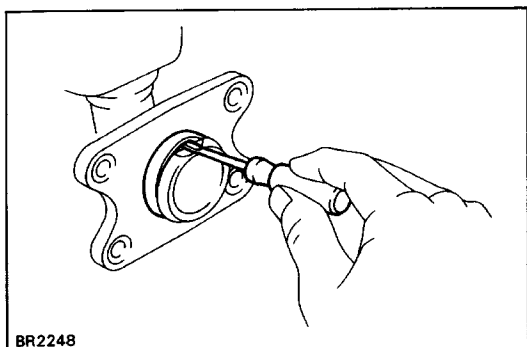
◆ Non-reusable part

BR3124

### DISASSEMBLY OF MASTER CYLINDER

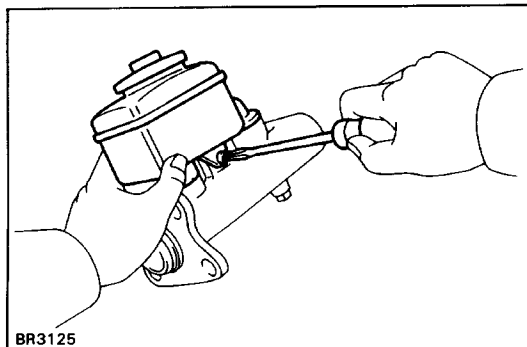
#### 1. REMOVE MASTER CYLINDER BOOT

Using a screwdriver, remove the master cylinder boot.



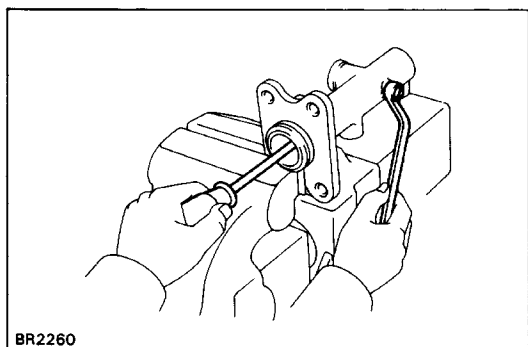
#### 2. REMOVE RESERVOIR

- Remove the set screw and pull out the reservoir.
- Remove the cap and strainer from the reservoir.



#### 3. REMOVE TWO GROMMETS

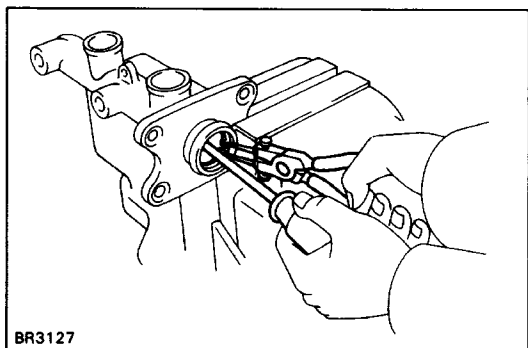
#### 4. PLACE CYLINDER IN VISE



### 5. REMOVE PISTON STOPPER BOLT

Using a screwdriver, push the pistons in all the way and remove the piston stopper bolt and gasket.

HINT: Tape the screwdriver tip before use.

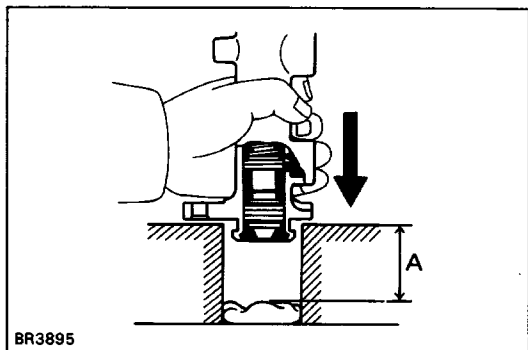


### 6. REMOVE TWO PISTONS AND SPRINGS

(a) Push in the piston with a screwdriver and remove the snap ring with snap ring pliers.

(b) Remove the No. 1 piston and spring by hand, pulling straight out, not at an angle.

**NOTICE:** If pulled out at an angle, there is possibility of damaging the cylinder bore.



(c) Place a rag and two wooden blocks on the work table, and lightly tap the cylinder flange against the block edges until the No.2 piston drops out of cylinder.

HINT: Make sure the distance

(A) from the rag to the top of the blocks is at least 100 mm (3.94 in.).

## INSPECTION OF MASTER CYLINDER COMPONENTS

HINT: Clean the disassembled parts with compressed air.

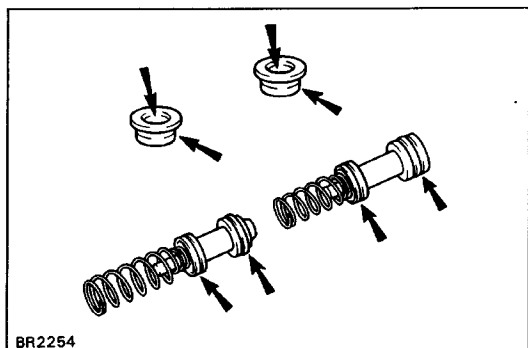
### 1. INSPECT CYLINDER BORE FOR RUST OR SCORING

### 2. INSPECT CYLINDER FOR WEAR OR DAMAGE

If necessary, clean or replace the cylinder.

**ASSEMBLY OF MASTER CYLINDER**

(See page BR-11)

**1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO RUBBER PARTS INDICATED BY ARROWS****2. INSTALL TWO SPRINGS AND PISTONS**

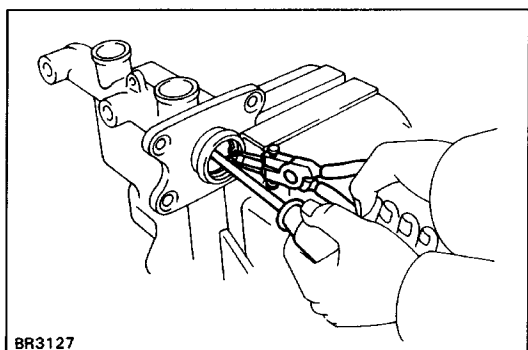
**NOTICE:** Be careful not to damage the rubber lips on the pistons.

- (a) Insert the two springs and pistons straight in, not at an angle.

**NOTICE:** If inserted at an angle, there is a possibility of damaging the cylinder bore.

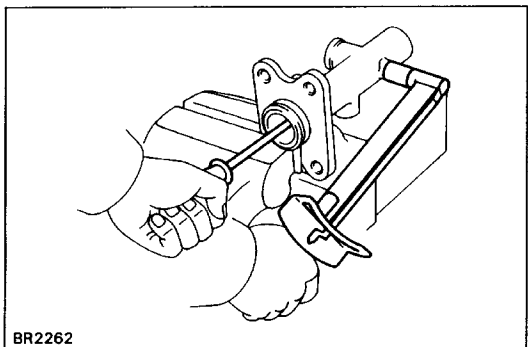
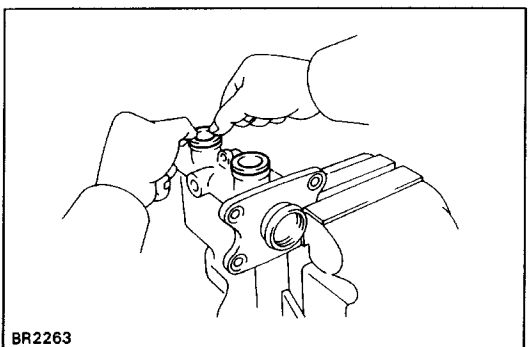
- (b) Push in the piston with a screwdriver and install the snap ring with snap ring pliers.

**HINT:** Tape the screwdriver tip before use.

**3. INSTALL PISTON STOPPER BOLT**

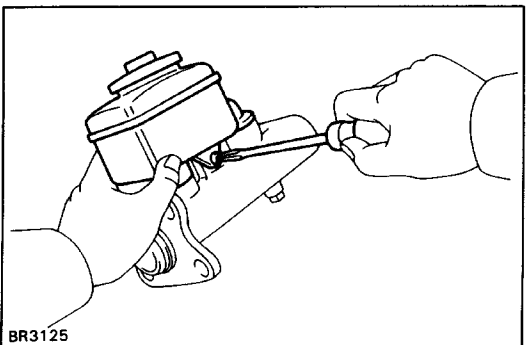
Using a screwdriver, push the piston in all the way and install the piston stopper bolt over the gasket. Torque the bolt.

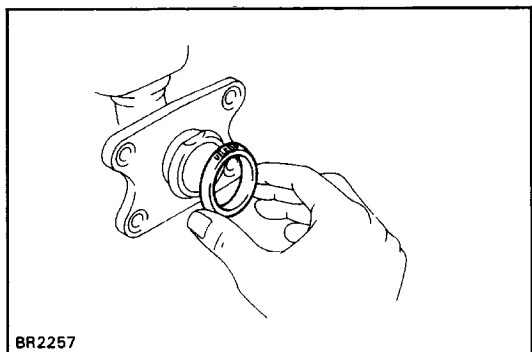
**Torque:** 10 N-m (100 kgf-cm, 7 ft-lbf)

**4. INSTALL TWO GROMMETS****5. INSTALL RESERVOIR**

- (a) Install the cap and strainer to the reservoir.  
 (b) Push the reservoir onto the cylinder.  
 (c) Install the set screw while pushing on the reservoir.

**Torque:** 1.7 N-m (17.5 kgf-cm, 15.2 in. -lbf)



**6. INSTALL MASTER CYLINDER BOOT**

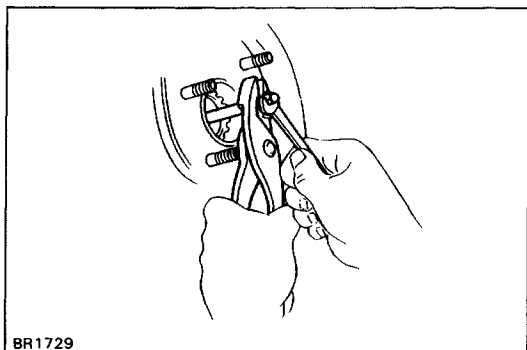
Facing the up mark on the master cylinder boot upwards, install the cylinder boot to the master cylinder.

## INSTALLATION OF MASTER CYLINDER

(See page [BR-10](#))

### 1. ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD BEFORE INSTALLING MASTER CYLINDER

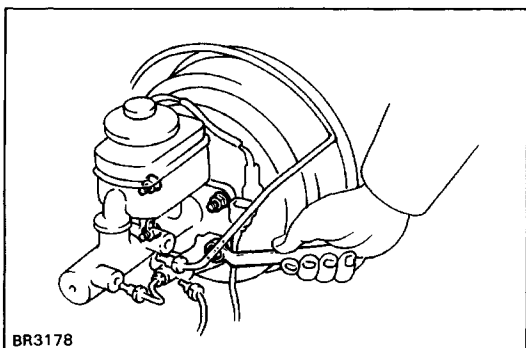
(See page [BR-17](#))



### 2. INSTALL MASTER CYLINDER

Install the master cylinder and gasket on the brake booster with four nuts.

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

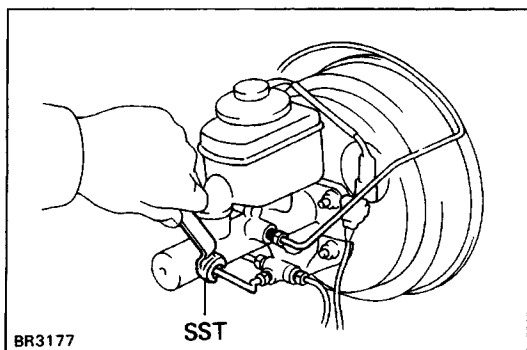


### 3. CONNECT TWO BRAKE TUBES

Using SST, connect the brake tubes to the master cylinder. Torque the union nuts.

SST 09751-36011

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



### 4. CONNECT LEVEL WARNING SWITCH CONNECTOR

### 5. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM

(See page [BR-8](#))

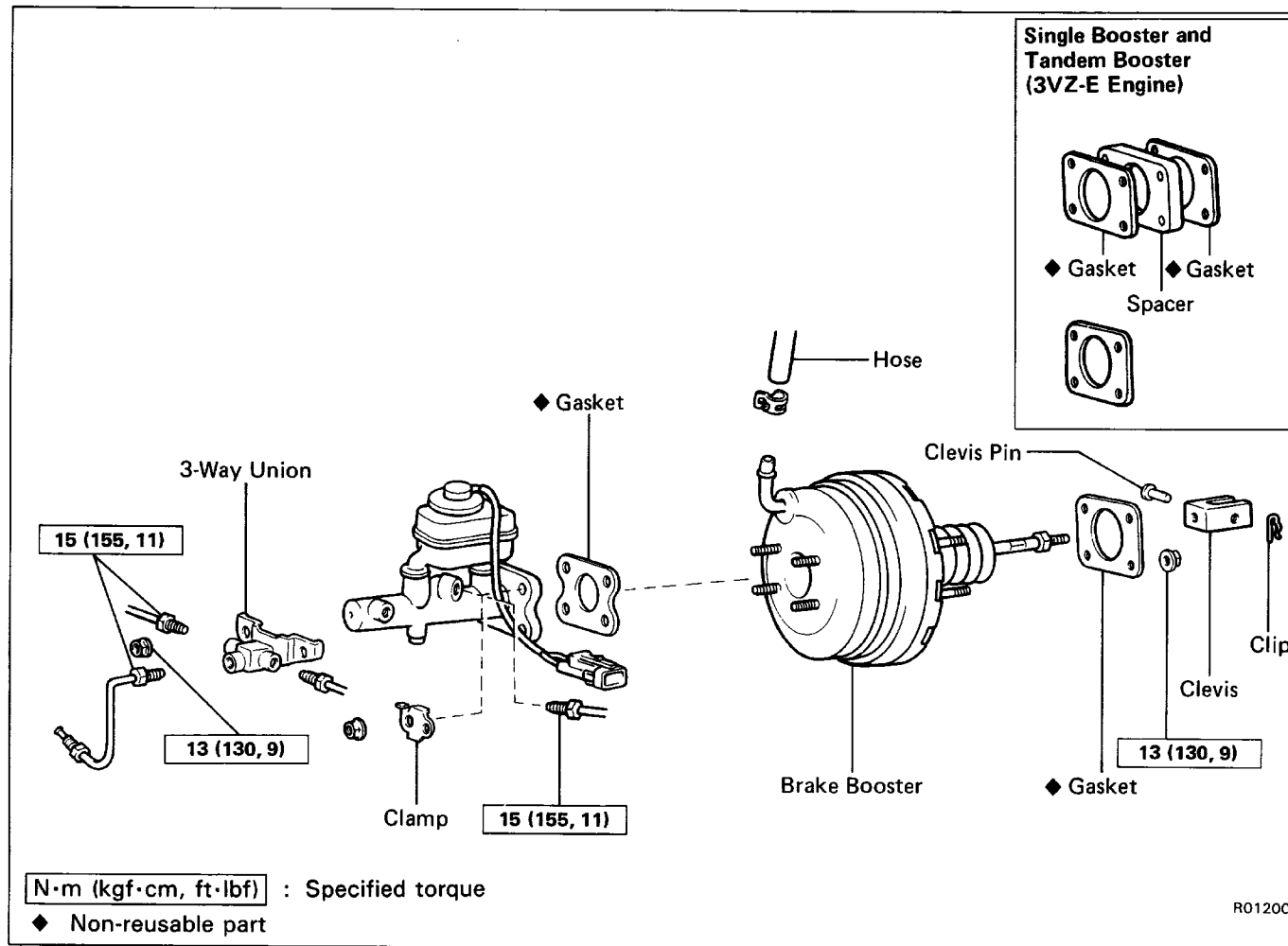
### 6. CHECK FOR FLUID LEAKAGE

### 7. CHECK AND ADJUST BRAKE PEDAL

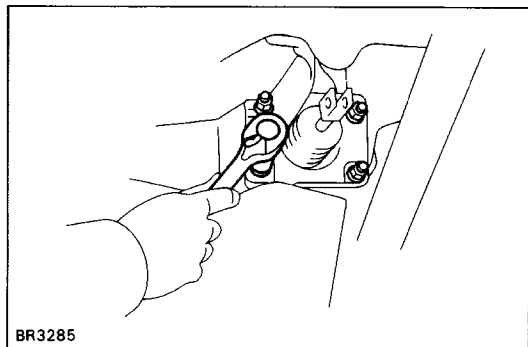
(See page [BR-6](#))

# BRAKE BOOSTER

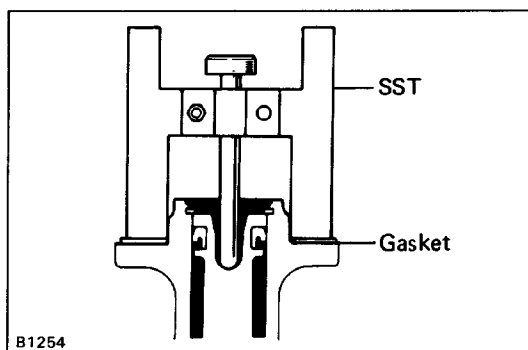
## REMOVAL OF BRAKE BOOSTER



1. REMOVE MASTER CYLINDER  
(See page [BR-10](#))
2. DISCONNECT VACUUM HOSE FROM BRAKE BOOSTER
3. REMOVE PEDAL RETURN SPRING
4. REMOVE CLIP AND CLEVIS PIN
5. REMOVE BRAKE BOOSTER, GASKET AND CLEVIS





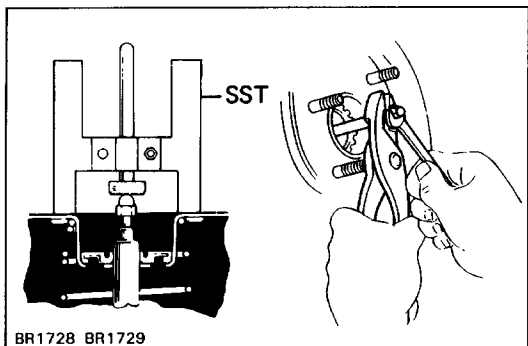


## INSTALLATION OF BRAKE BOOSTER

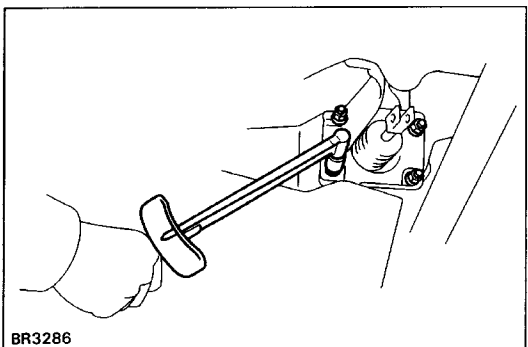
(See page [BR-16](#))

### 1. ADJUST LENGTH OF BOOSTER PUSH ROD

- Install the gasket on the master cylinder.
- Set the SST on the gasket, and lower the pin until its tip slightly touches the piston.  
SST 09737-00010



- Turn the SST upside down, and set it on the booster.  
SST 09737-00010
- Measure the clearance between the booster push rod and pin head (SST).  
**Clearance: 0 mm (0 in.)**
- Adjust the booster push rod length until the push rod lightly touches the pin head.



### 2. INSTALL BRAKE BOOSTER, GASKET AND CLEVIS

- Install the booster and gasket.
- Install the clevis.
- Install and torque the booster mounting nuts.  
**Torque: 13 N·m (130 kgf·cm, 9 ft·lbf )**

### 3. CONNECT CLEVIS TO BRAKE PEDAL

Insert the clevis pin into the clevis and brake pedal and install the clip to the clevis pin.

### 4. INSTALL PEDAL RETURN SPRING

### 5. INSTALL MASTER CYLINDER

(See page [BR-15](#))

### 6. CONNECT HOSE TO BRAKE BOOSTER

### 7. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM

(See page [BR-8](#))

### 8. CHECK FOR FLUID LEAKAGE

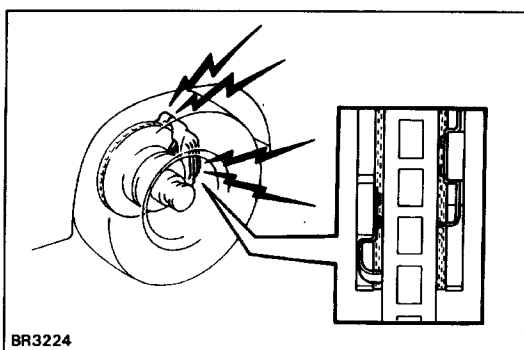
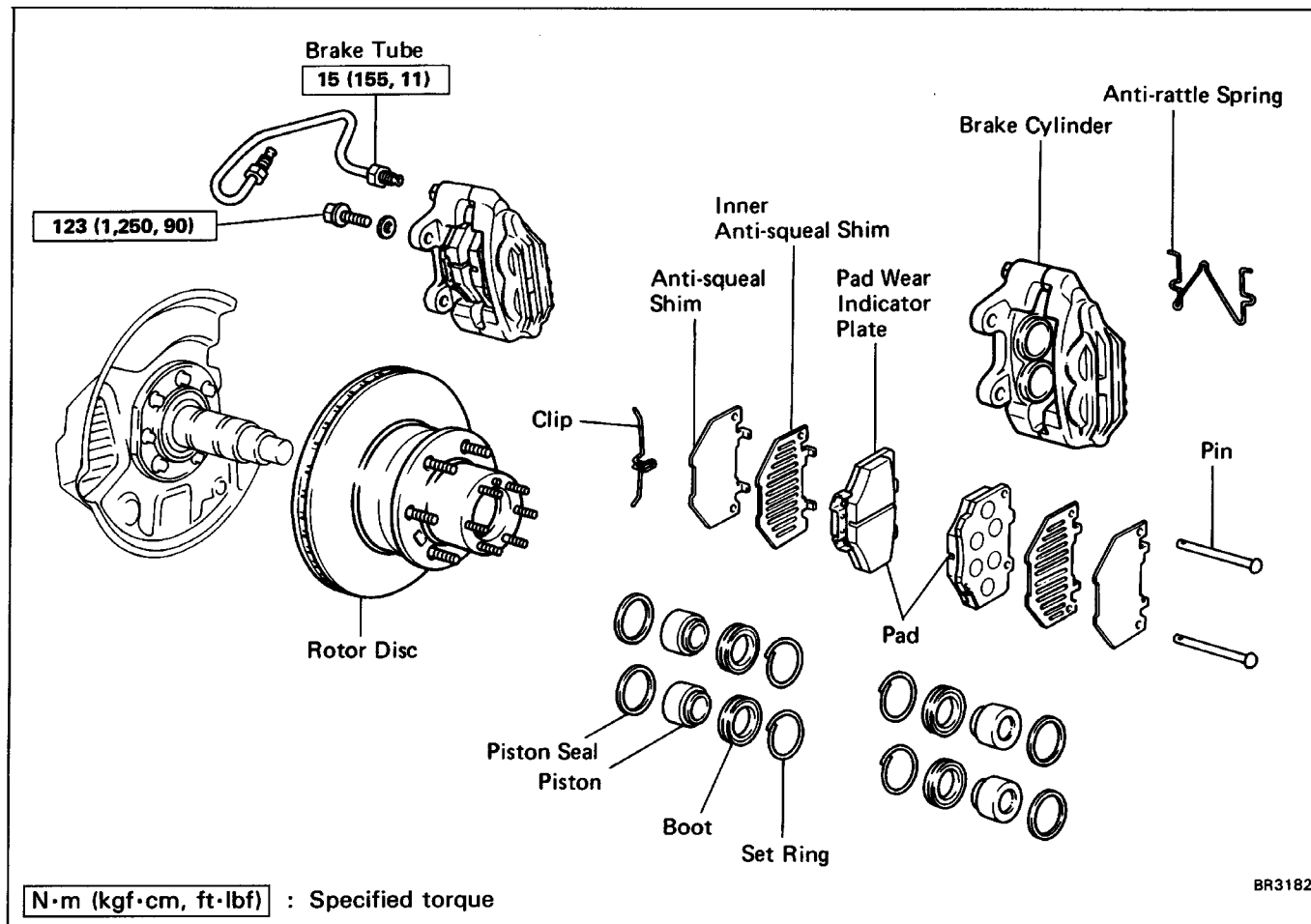
### 9. CHECK AND ADJUST BRAKE PEDAL

(See page [BR-6](#))

### 10. PERFORM OPERATIONAL CHECK

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

# FRONT BRAKE 4WD (S12 + 12 Type Disc) COMPONENTS



BR3224

## REPLACEMENT OF BRAKE PADS

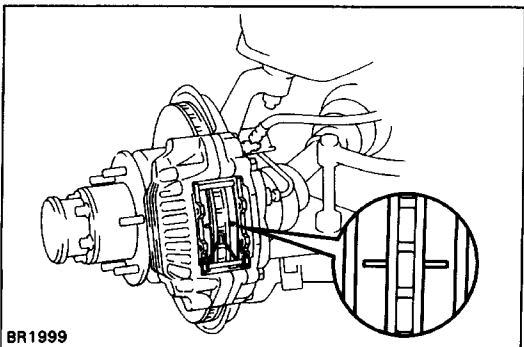
**HINT:** If a squealing noise occurs from the brakes while driving, check the pad wear indicator plate. If the pad wear indicator plate contacts the rotor disc, the brake pads should be replaced.

### 1. REMOVE FRONT WHEEL

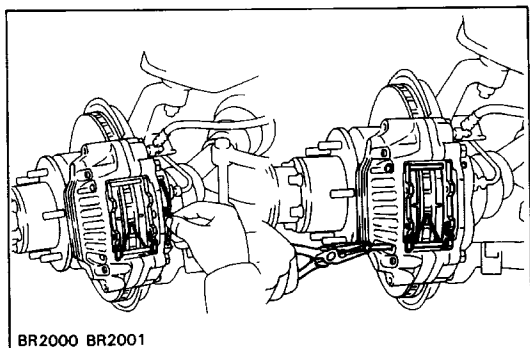
### 2. INSPECT PAD LINING THICKNESS

Check the pad thickness and replace pads if not within specification.

**Minimum thickness: 1.0 mm (0.039 in.)**



BR1999



### 3. REMOVE FOLLOWING PARTS

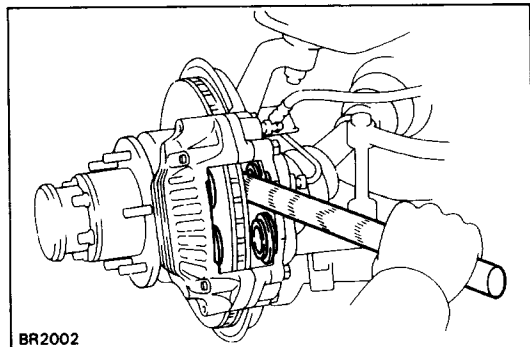
- (a) Clip
- (b) Two pins
- (c) Anti-rattle spring
- (d) Two pads
- (e) Four anti-squeal shims

### 4. CHECK ROTOR DISC THICKNESS

(See step 2 on page [BR-37](#))

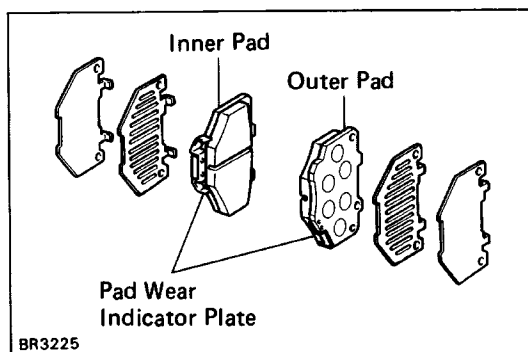
### 5. CHECK ROTOR DISC RUNOUT

(See step 3 on page [BR-37](#))



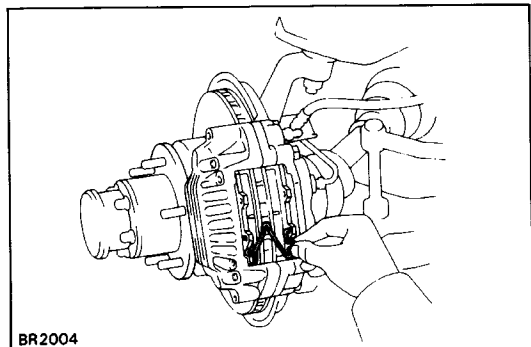
### 6. INSTALL NEW PADS

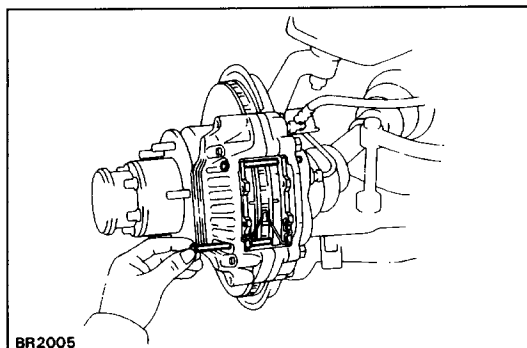
- (a) Draw out a small amount of brake fluid from the reservoir.
- (b) Press in the pistons with a hammer handle or an equivalent.  
HINT: Always change the pads on one wheel at a time as there is possibility of the opposite piston flying out.



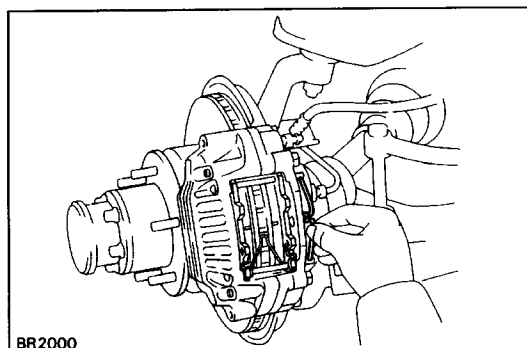
- (c) Install the four anti-squeal shims to new pads as shown.  
HINT: Apply disc brake grease to both sides of the inner anti-squeal shims.
- (d) Install the two pads as shown in the illustration.  
**NOTICE: Do not allow oil or grease to get on the rubbing face.**

### 7. INSTALL ANTI-RATTLE SPRING

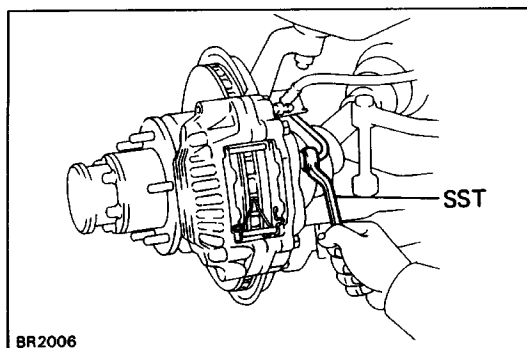




## 8. INSTALL TWO PINS



## 9. INSTALL CLIP



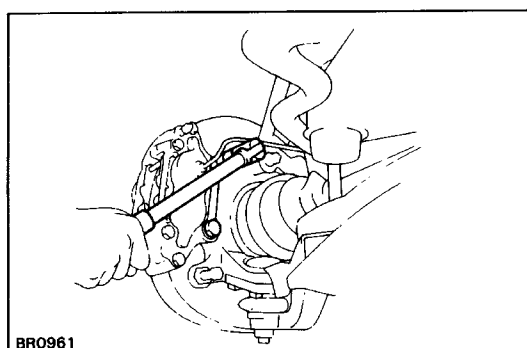
## REMOVAL OF CYLINDER

(See page [BR-33](#))

### 1. REMOVE FRONT WHEEL

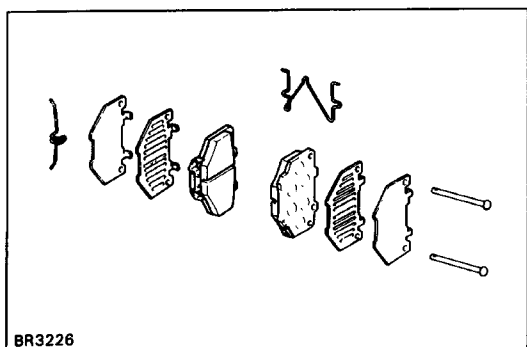
### 2. DISCONNECT BRAKE TUBE

Using SST, disconnect the brake tube.  
Use a container to catch the brake fluid.  
SST 09751-36011



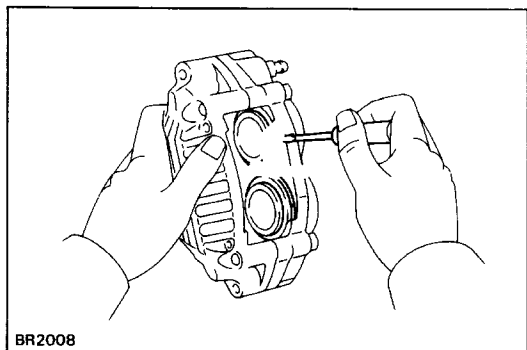
### 3. REMOVE CYLINDER

Remove the two mounting bolts and remove the cylinder.



### 4. REMOVE FOLLOWING PARTS:

- (a) Clip
- (b) Two pins
- (c) Anti-rattle spring
- (d) Two pads
- (e) Four anti-squeal shims

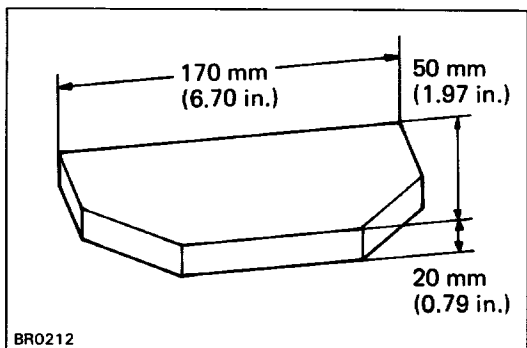


## DISASSEMBLY OF CYLINDER

(See page [BR-33](#))

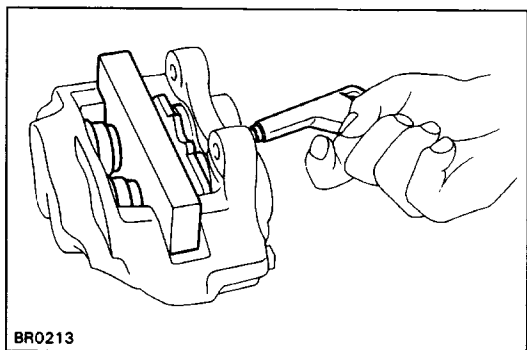
### 1. REMOVE CYLINDER BOOT SET RINGS AND BOOTS

Using a screwdriver, remove the four cylinder boot set rings and four boots.



### 2. REMOVE PISTONS FROM CYLINDER

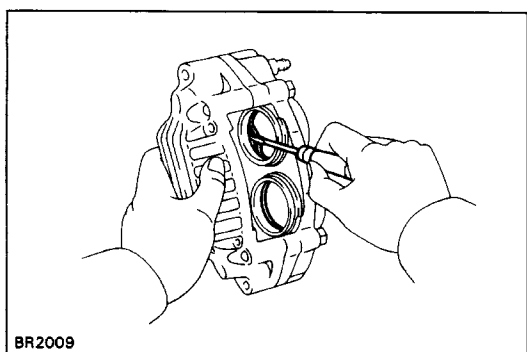
(a) Prepare the wooden plate as shown in the illustration to hold the pistons.



(b) Place the plate between the pistons and insert a pad at one side.

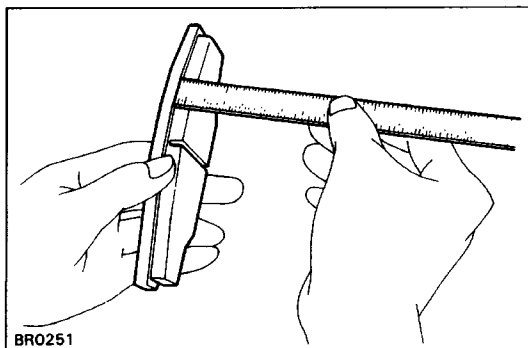
(c) Use compressed air to remove the pistons alternately from the cylinder.

**NOTICE:** Do not place your fingers in front of the pistons when using compressed air.



### 3. REMOVE PISTON SEALS

Using a screwdriver, remove the four seals from the cylinder.



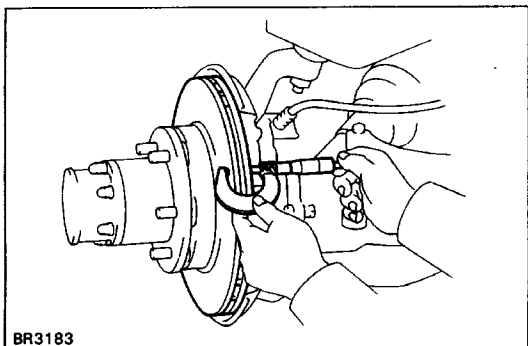
## INSPECTION AND REPAIR OF FRONT BRAKE COMPONENTS

### 1. MEASURE PAD LINING THICKNESS

**Standard thickness: 9.5 mm (0.374 in.)**

**Minimum thickness: 1.5 mm (0.059 in.)**

Replace the pads if the thickness is less than the minimum (the 1.5 mm slit is no longer visible) or if it shows sign of uneven wear.

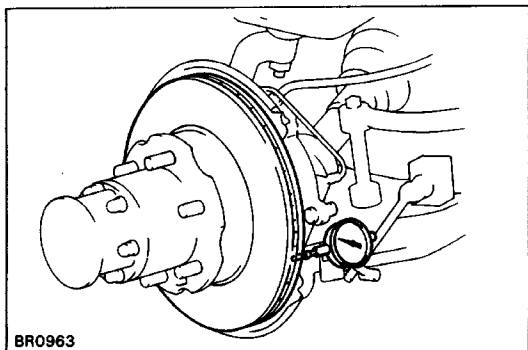


### 2. MEASURE ROTOR DISC THICKNESS

**Standard thickness: 20.0 mm (0.787 in.)**

**Minimum thickness: 18.0 mm (0.709 in.)**

If the disc is scored or worn, or if thickness is less than minimum, repair or replace the disc.



### 3. MEASURE ROTOR DISC RUNOUT

Measure the rotor disc runout at 10 mm (0.39 in.) from the outer edge of the rotor disc.

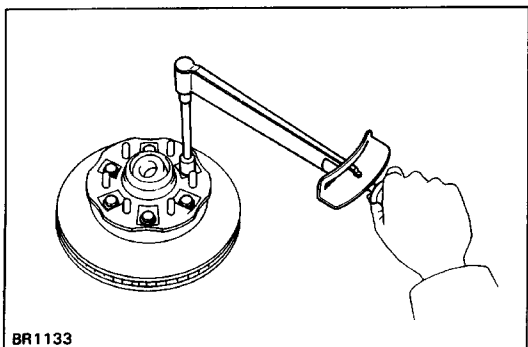
**Maximum disc runout: 0.09 mm (0.0035 in.)**

If the runout is greater than maximum, replace the rotor disc.

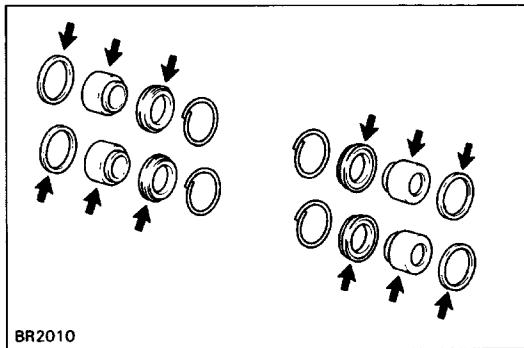
**HINT:** Before measuring the runout, confirm that the front bearing play is within specification.

### 4. IF NECESSARY, REPLACE ROTOR DISC

- (a) Remove the front axle hub.
- (b) Remove the disc from the axle hub.



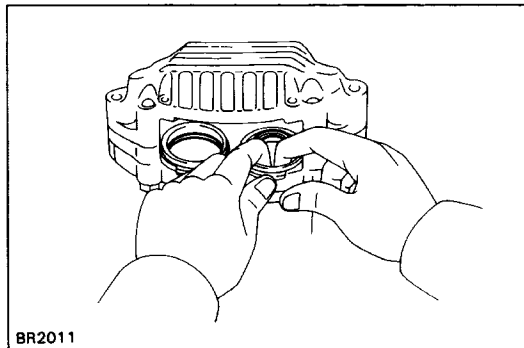
- (c) Install a new rotor disc and torque the bolts.  
**Torque: 64 N-m (650 kgf-cm, 47 ft-lbf)**
- (d) Install the axle hub and adjust the front bearing pre-load.



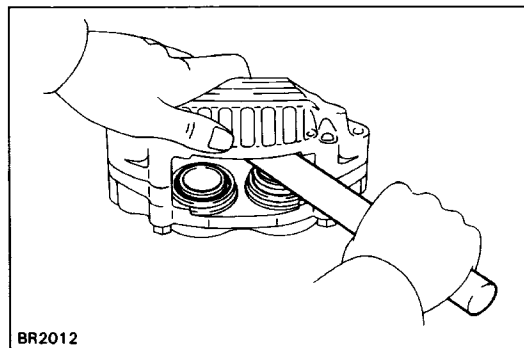
## ASSEMBLY OF CYLINDER

(See page [BR-33](#))

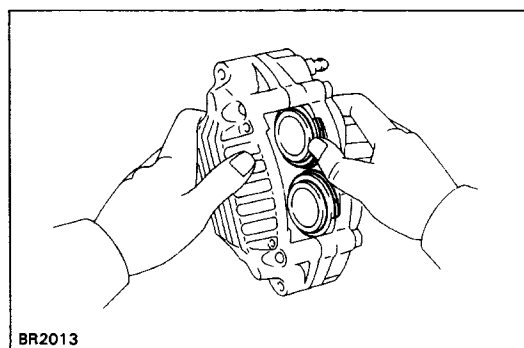
1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO PARTS INDICATED BY ARROWS



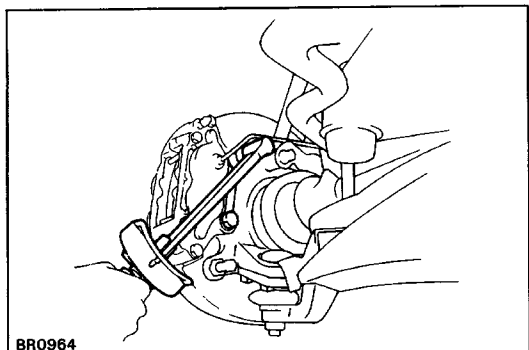
2. INSTALL PISTON SEALS INTO CYLINDER



3. INSTALL PISTONS INTO CYLINDER



4. INSTALL CYLINDER BOOTS AND SET RINGS INTO CYLINDER



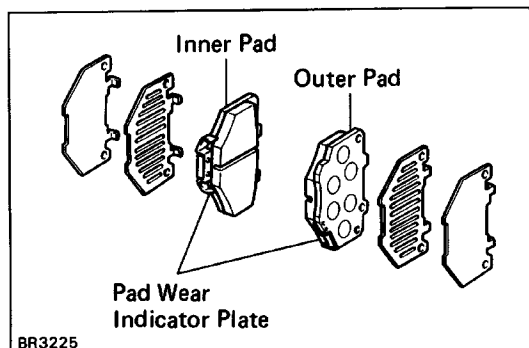
## INSTALLATION OF CYLINDER

(See page [BR-33](#))

### 1. INSTALL CYLINDER

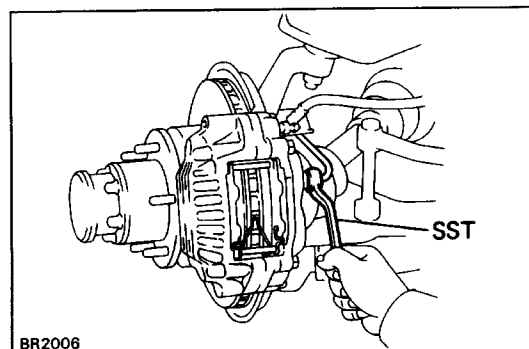
Install the brake cylinder, and torque the two mounting bolts.

Torque: 123 N-m (1,250 kgf-cm, 90 ft-lbf)



### 2. INSTALL PADS

(See steps 6 to 9 on pages [BR-34](#) and 35)



### 3. CONNECT BRAKE TUBE

Using SST, connect the brake tube.

SST 09751-36011

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

### 4. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM

(See page [BR-8](#))

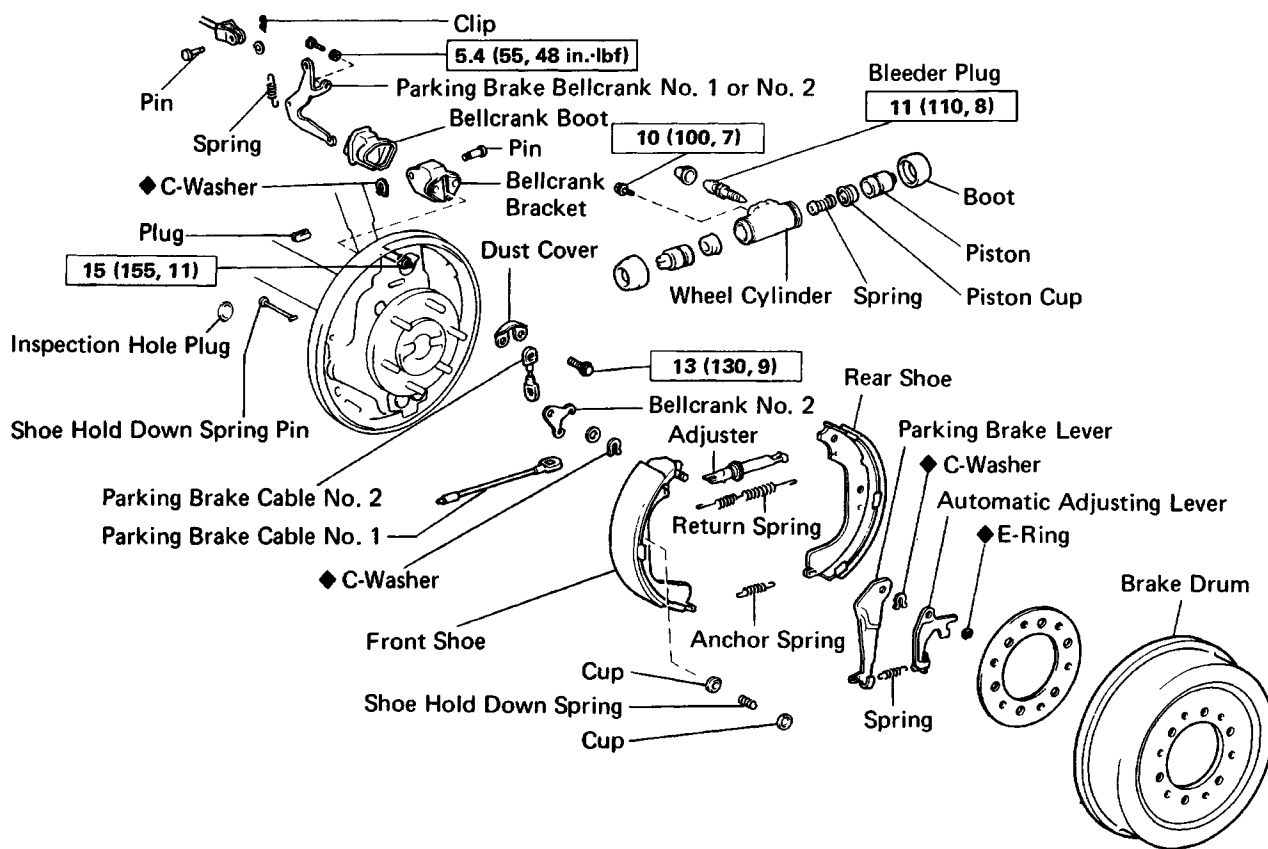
### 5. CHECK FOR FLUID LEAKAGE

### 6. INSTALL FRONT WHEEL



# REAR BRAKE 4WD COMPONENTS

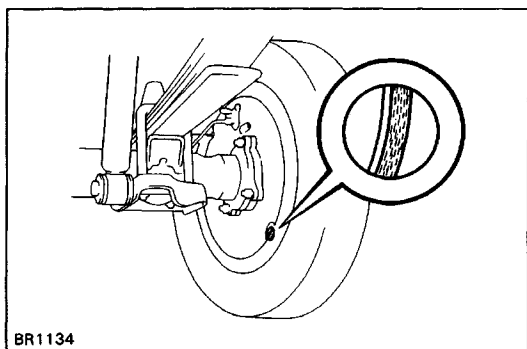
Bellcrank No. 1: For Right Wheel  
Bellcrank No. 2: For Left Wheel



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

◆ Non-reusable part

BR3270



BR1134

## REMOVAL OF REAR DRUM BRAKE

### 1. INSPECT SHOE LINING THICKNESS

Remove the inspection hole plug, and check the shoe lining thickness through the hole.

If less than minimum, replace the shoes.

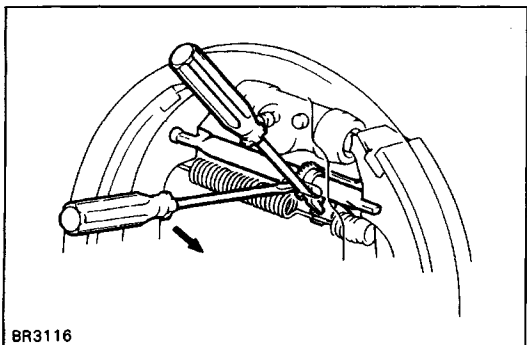
**Minimum thickness: 1.0 mm (0.039 in.)**

### 2. REMOVE REAR WHEEL

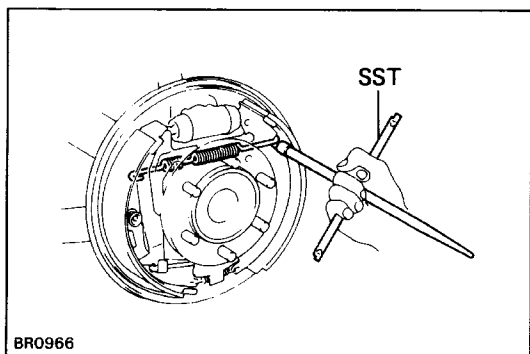
### 3. REMOVE BRAKE DRUM

**HINT:** If the brake drum cannot be removed easily, perform the following.

- Insert a screwdriver through the hole in the backing plate, and hold the automatic adjusting lever away from the adjusting bolt.
- Using another screwdriver, reduce the brake shoe adjustment by turning the adjusting bolt clockwise.

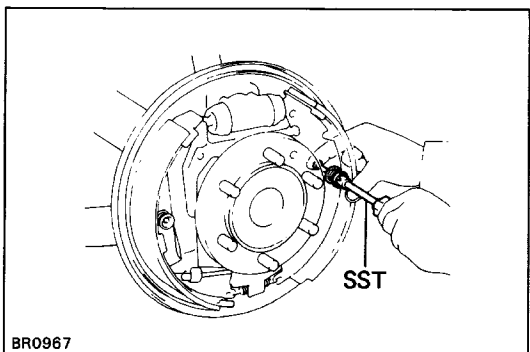


BR3116

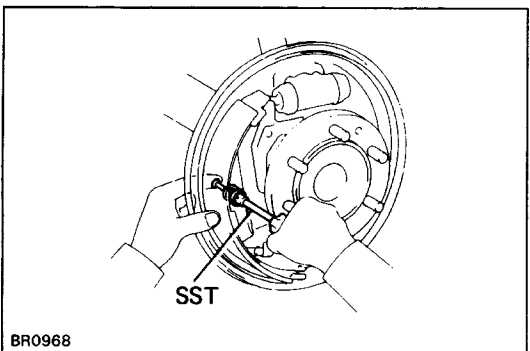


#### 4. REMOVE REAR SHOE

- (a) Using SST, disconnect the return spring.  
SST 09703-30010

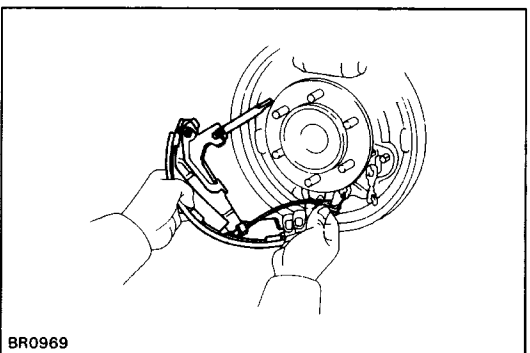


- (b) Using SST, remove the shoe hold-down spring, cups and pin.  
SST 09718-00010  
(c) Disconnect the anchor spring from the rear shoe and remove the rear shoe.  
(d) Remove the anchor spring from the front shoe.

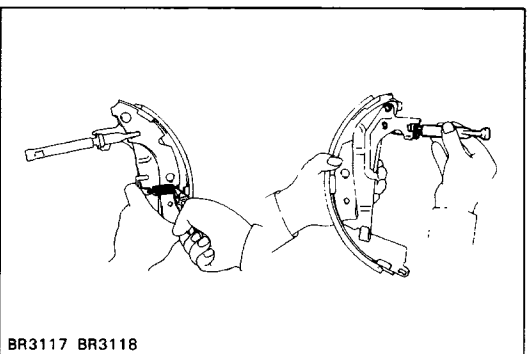


#### 5. REMOVE FRONT SHOE

- (a) Using SST, remove the shoe hold-down spring, cups and pin.  
SST 09718-00010  
(b) Remove the return spring from the front shoe.

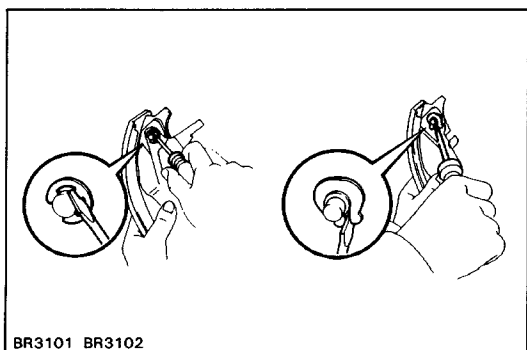


- (c) Disconnect the parking brake cable No. 1 from the parking brake bellcrank No. 3.  
(d) Remove the front shoe with adjuster.  
(e) Disconnect the parking brake cable from the front shoe.



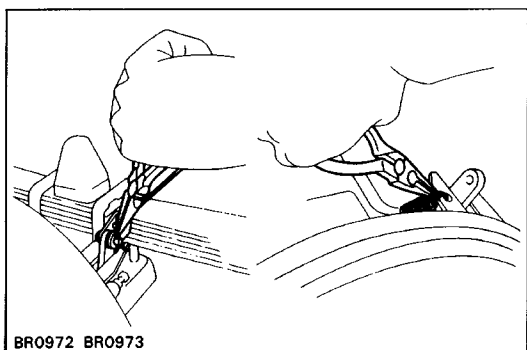
#### 6. REMOVE ADJUSTER FROM FRONT SHOE

- (a) Remove the adjusting lever spring.  
(b) Remove the adjuster.



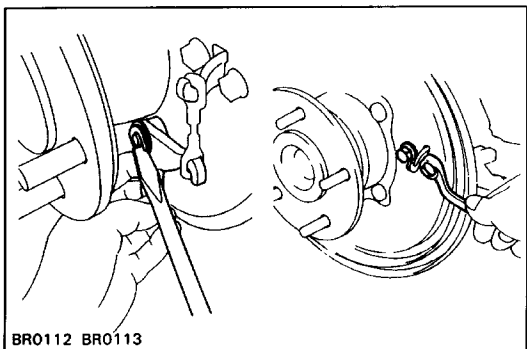
## 7. REMOVE AUTOMATIC ADJUSTING LEVER AND PARKING BRAKE LEVER

- (a) Remove the E-ring.
- (b) Remove the automatic adjusting lever.
- (c) Remove the C-washer.
- (d) Remove the parking brake lever.

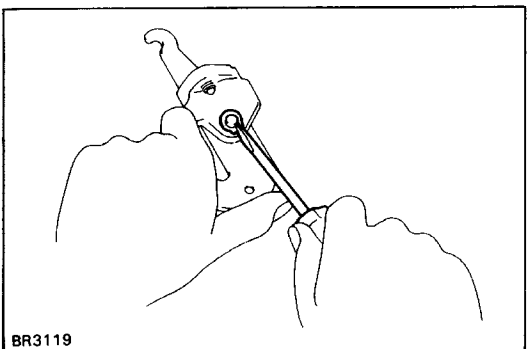


## 8. REMOVE AND DISASSEMBLE PARKING BRAKE BELLCRANK

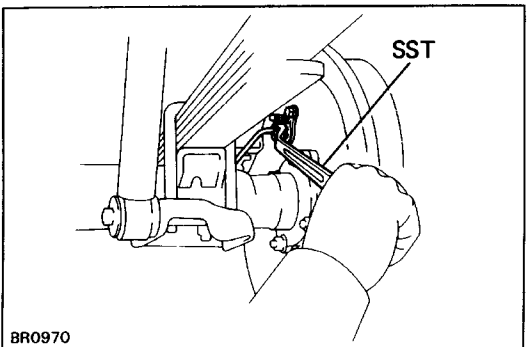
- (a) Remove the clip and disconnect the parking brake cable.
- (b) Remove the tension spring.



- (c) Using a screwdriver, remove the bellcrank No. 3 from the backing plate with parking brake cable No. 2.
- (d) Remove the parking brake bellcrank No. 1 or No. 2 and dust cover with the two bolts.
- (e) Remove the bellcrank boot from the bellcrank bracket.

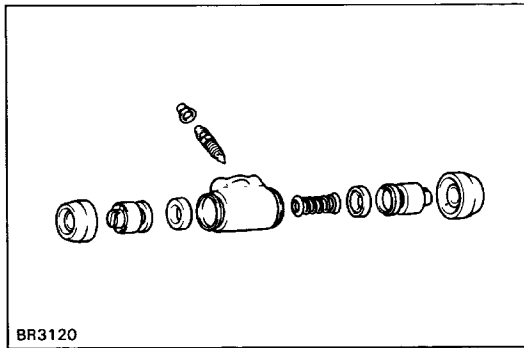


- (f) Remove the C-washer and pin.
- (g) Remove the parking brake bellcrank from the bellcrank bracket.



## 9. REMOVE WHEEL CYLINDER

- (a) Using SST, disconnect the brake tube. Use a container to catch the brake fluid.  
SST 09751-36011
- (b) Remove the two bolts and the wheel cylinder.



## 10. DISASSEMBLE WHEEL CYLINDER

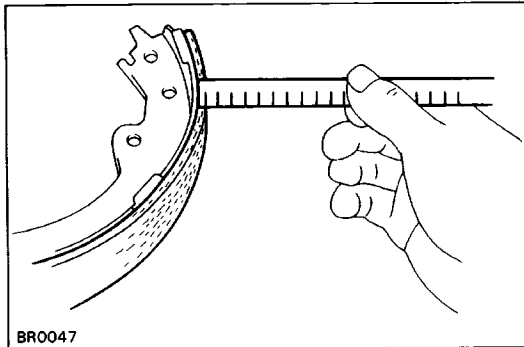
Remove the following parts from the wheel cylinder:

- Two boots
- Two pistons
- Two piston cups
- Spring

## INSPECTION AND REPAIR OF REAR BRAKE COMPONENTS

### 1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



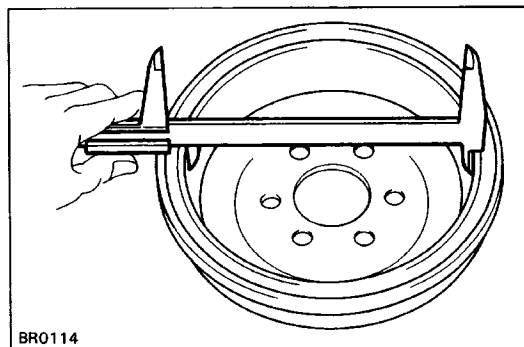
### 2. MEASURE BRAKE SHOE LINING THICKNESS

**Standard thickness: 6.0 mm (0.236 in.)**

**Minimum thickness: 1.0 mm (0.039 in.)**

If the shoe lining is less than minimum or shows signs of uneven wear, replace the brake shoes.

**HINT:** If any of the brake shoes have to be replaced, replace all of the rear shoes in order to maintain even braking.

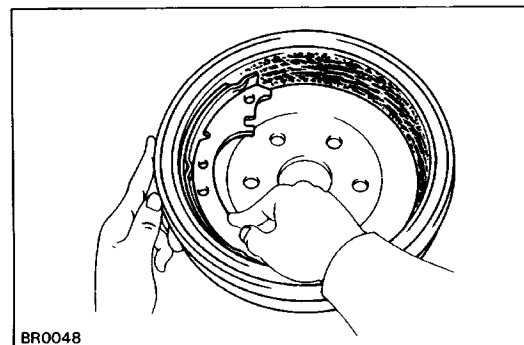


### 3. MEASURE BRAKE DRUM INSIDE DIAMETER

**Standard inside diameter: 295.0 mm (11.61 in.)**

**Maximum inside diameter: 297.0 mm (11.69 in.)**

If the drum is scored or worn, the brake drum may be lathed to the maximum inside diameter.

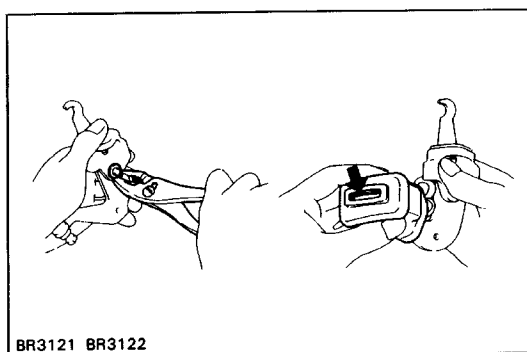
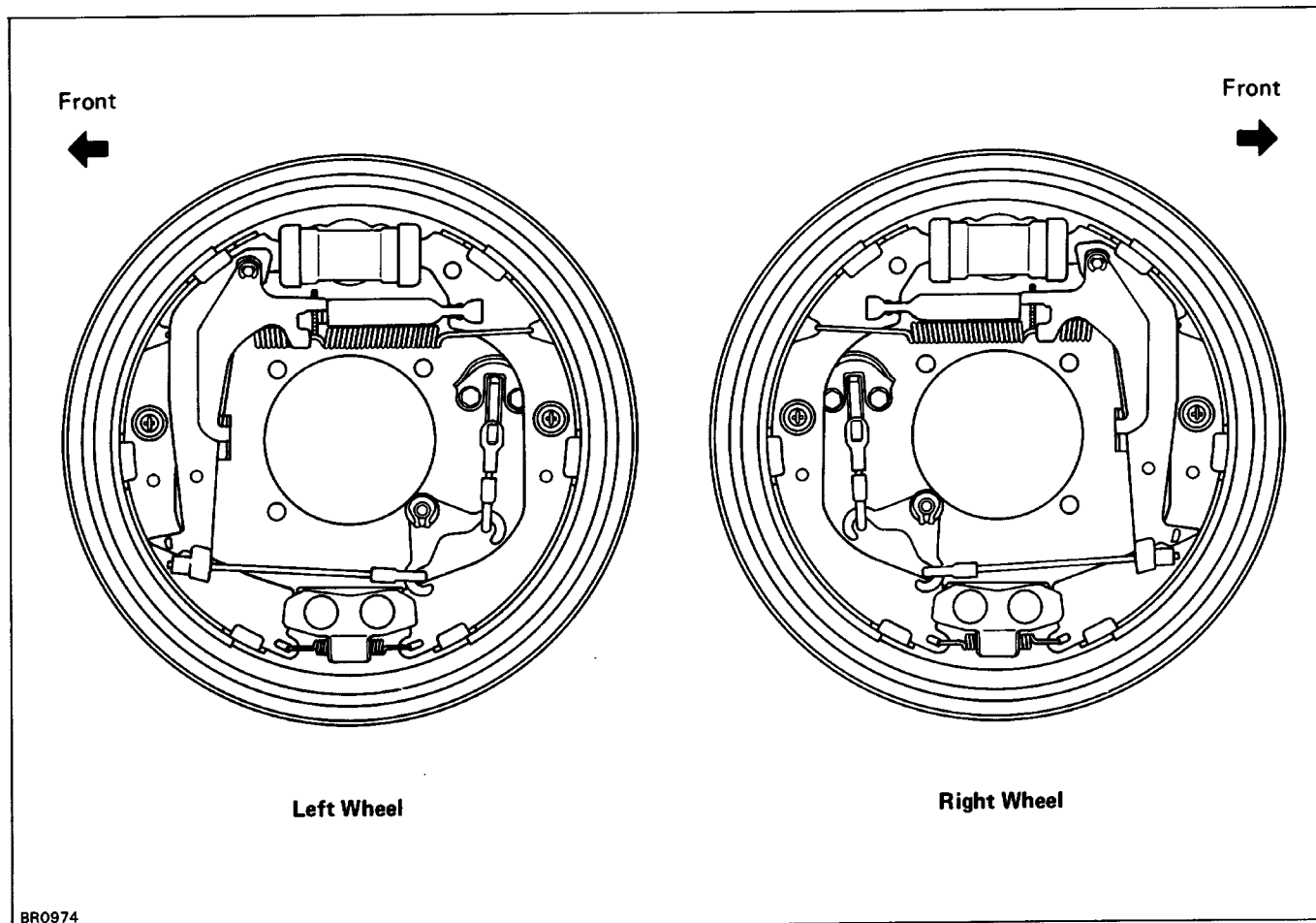


### 4. INSPECT REAR BRAKE LINING AND DRUM FOR PROPER CONTACT

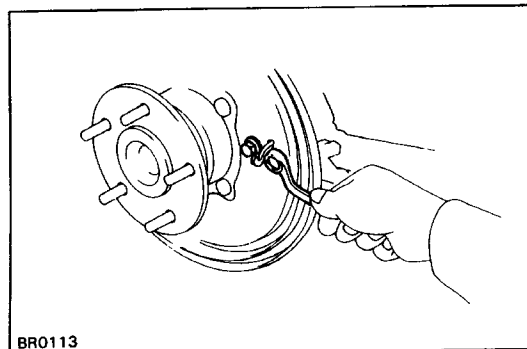
If the contact between the brake lining and drum is improper, repair the lining with a brake shoe grinder, or replace the brake shoe assembly.

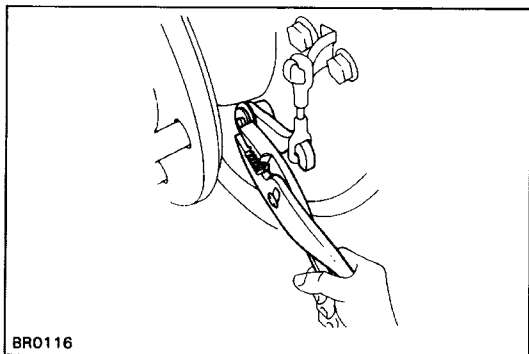
**ASSEMBLY OF REAR BRAKES**(See page [BR-55](#))

HINT: Assemble the parts in the correct direction as shown.

**1. ASSEMBLE AND INSTALL PARKING BRAKE BELL-CRANK**

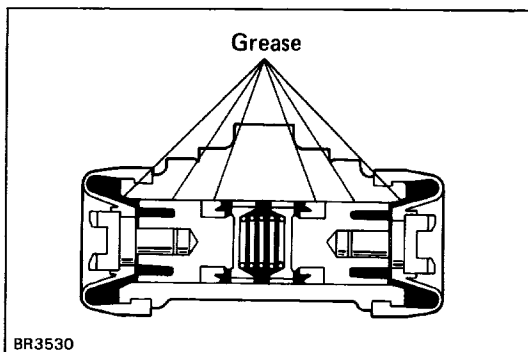
- Apply high temperature grease to the rotating parts of the bellcrank.
- Apply lithium soap base glycol grease to the bellcrank boot and insert it to the parking brake bellcrank.
- Install the parking brake bellcrank to the bellcrank bracket.
- Install the pin with a new C-washer.
- Install the bellcrank boot to the parking brake bellcrank bracket.
- Install the parking brake bellcrank and dust cover on the backing plate.

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



BR0116

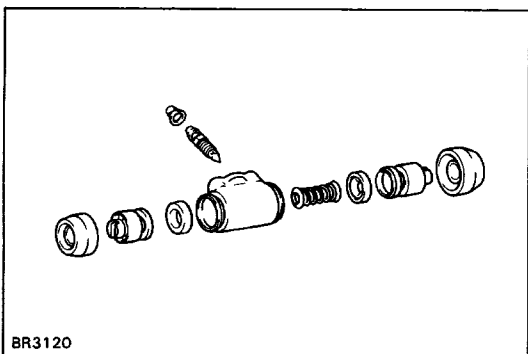
- (g) Install the parking brake cable No.2 to the parking brake bellcrank No. 1 or No. 2.
- (h) Hook the bellcrank No. 3 to the cable No. 2, and then install the bellcrank No.3 with a new C-washer.



BR3530

## 2. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO FOLLOWING PARTS:

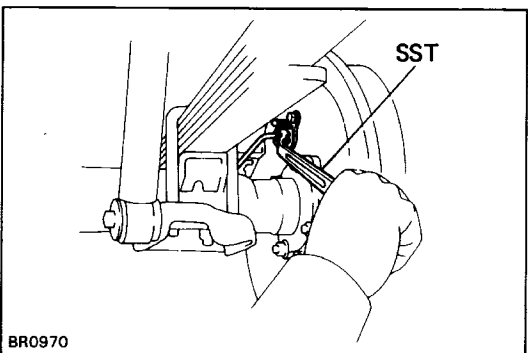
- (a) Two piston cups
- (b) Two pistons



BR3120

## 3. ASSEMBLE WHEEL CYLINDER

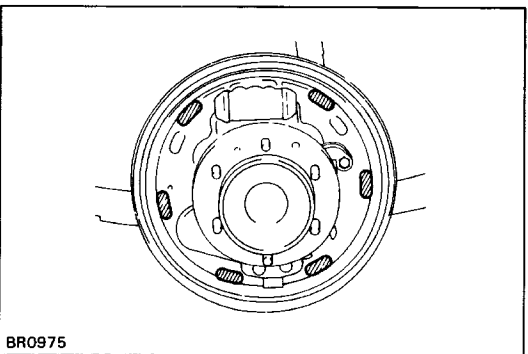
- (a) Install the cup to the each piston.
- (b) Install the spring and two pistons into the wheel cylinder. Make sure flanges of the cups are pointed inward.
- (c) Install the two boots.



BR0970

## 4. INSTALL WHEEL CYLINDER

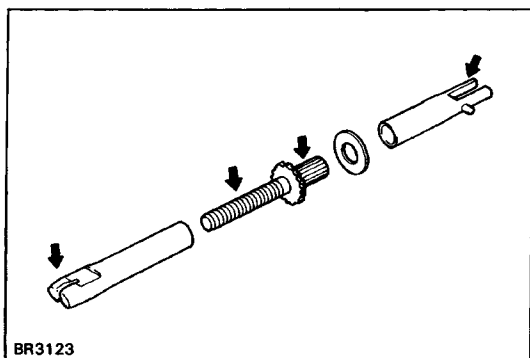
- (a) Install the wheel cylinder on the backing plate with two bolts.  
Torque: 10 N-m (100 kgf-cm, 7 ft-lbf)
- (b) Using SST, connect the brake tube.  
SST 09751-36011  
Torque: 15 N-m (155 kgf-cm, 11 ft-lbf)



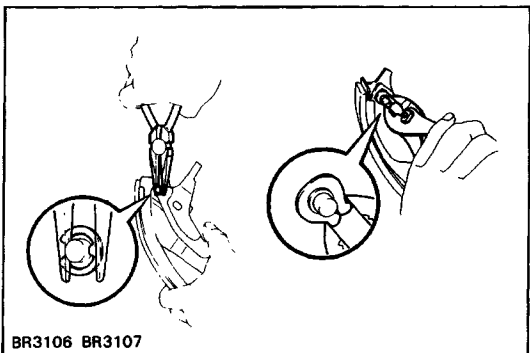
BR0975

## 5. APPLY HIGH TEMPERATURE GREASE TO BACKING PLATE AND ADJUSTER

- (a) Apply high temperature grease to the brake shoe contact surfaces as shown.

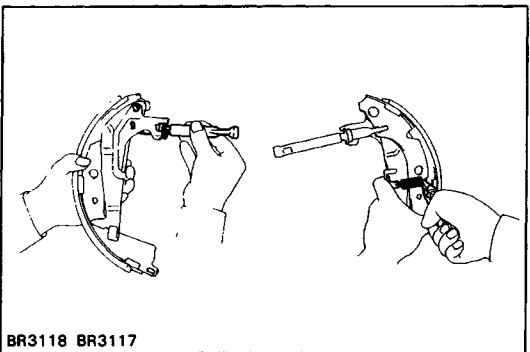


- (b) Apply high temperature grease to the adjuster bolt threads and ends.



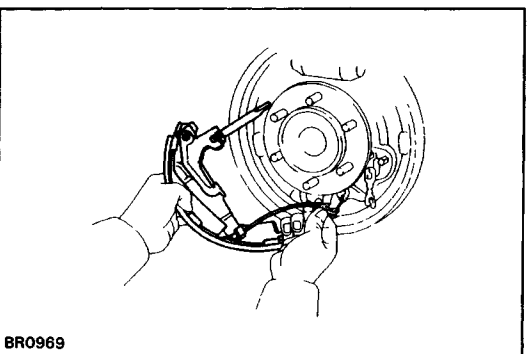
## 6. INSTALL PARKING BRAKE LEVER AND AUTOMATIC ADJUSTING LEVER

- (a) Install the parking brake lever with a new C-washer.  
(b) Install the automatic adjusting lever with the E-ring.



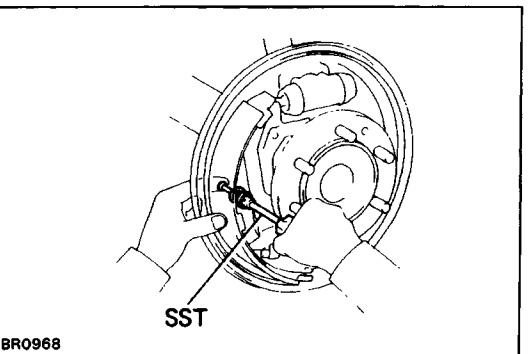
## 7. INSTALL ADJUSTER TO FRONT SHOE

- (a) Install the adjuster to the adjust lever.  
(b) Install the adjust lever spring.



## 8. INSTALL FRONT SHOE

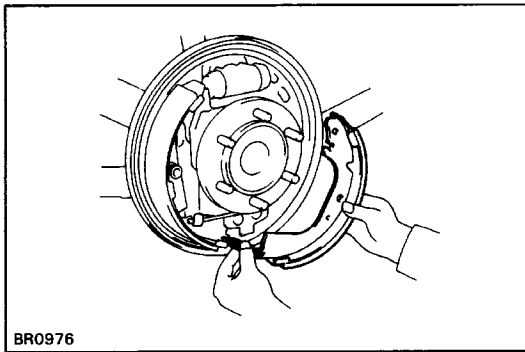
- (a) Install the parking brake cable No. 1 to the parking brake shoe lever.  
(b) Hook the another side of the cable No. 1 to the bellcrank No.3.  
(c) Install the return spring to the front shoe.



- (d) Set the front shoe in place with the end of the shoe inserted in the piston.  
(e) Using SST, install the shoe hold-down spring, cups and pin.

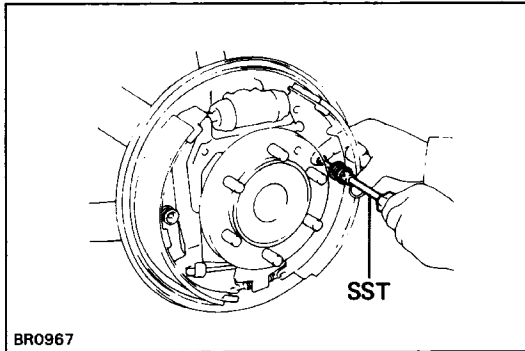
SST 09718-00010

**NOTICE:** Do not allow oil or grease to get on the rubbing face.

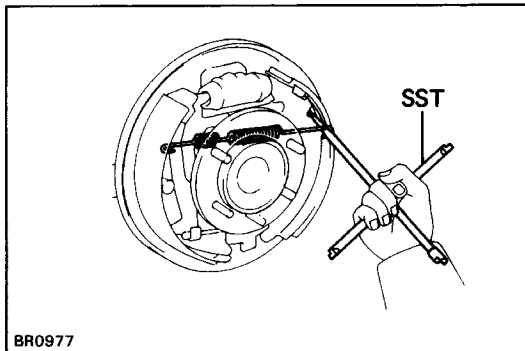


## 9. INSTALL REAR SHOE

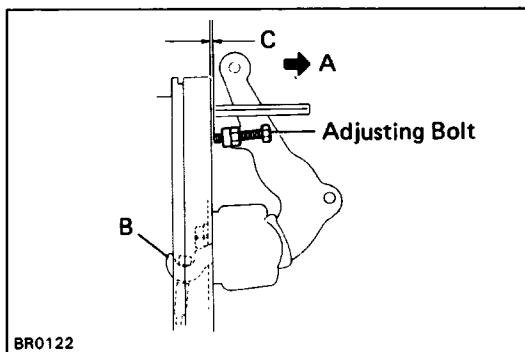
- (a) Install the anchor spring between the front and rear shoes.
- (b) Set the rear shoe in place with the end of the shoe inserted in the wheel cylinder and the adjuster in place.



- (c) Using SST, install the shoe hold down spring, cups and pin.  
SST 09718-00010  
**NOTICE: Do not allow oil or grease to get on the rubbing face.**

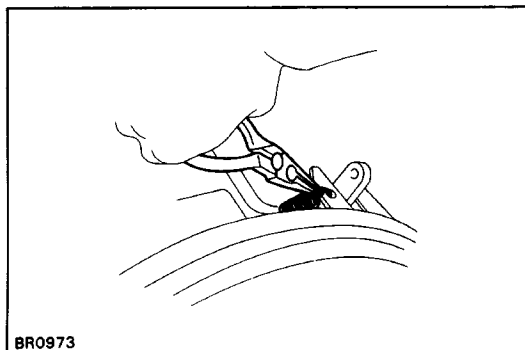


- (d) Using SST, connect the return spring.  
SST 09718-00010



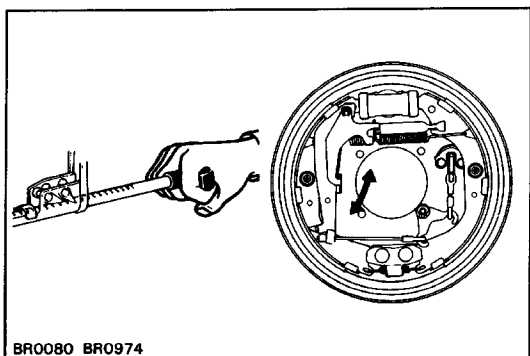
## 10. ADJUST BELLCRANK

- (a) Lightly pull the bellcrank in direction A until there is no slack at part B.
- (b) In this condition, turn the adjusting bolt so that dimension C will be 0.4 – 0.8 mm (0.016 – 0.031 in.).
- (c) Lock the adjust bolt with the lock nut.



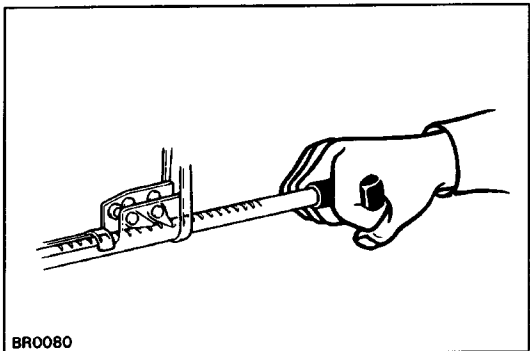
- (d) Connect the parking brake cable to the parking brake bellcrank and install the clip.
- (e) Install the tension spring.





## 11. CHECK OPERATION OF AUTOMATIC ADJUSTING MECHANISM

- Move the parking brake lever of the front shoe back and forth, as shown. Check that the adjuster turns.  
If the adjuster does not turn, check for incorrect installation of the rear brakes.
- Adjust the adjuster length to the shortest possible amount.
- Install the brake drum.
- Pull the parking brake lever all the way up until a clicking sound can no longer be heard.

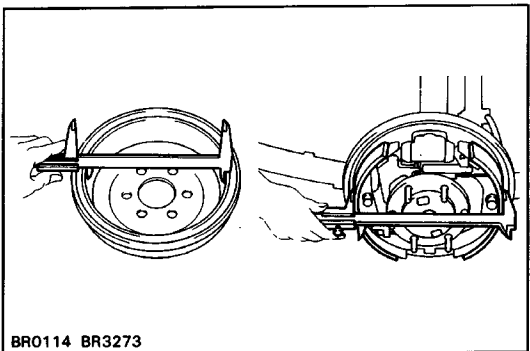


## 12. CHECK CLEARANCE BETWEEN BRAKE SHOES AND DRUM

- Remove the brake drum.
- Measure the brake drum inside diameter and diameter of the brake shoes. Check that the difference between the diameters is the correct shoe clearance.

**Shoe clearance: 0.6 mm (0.024 in.)**

If incorrect, check the parking brake system.



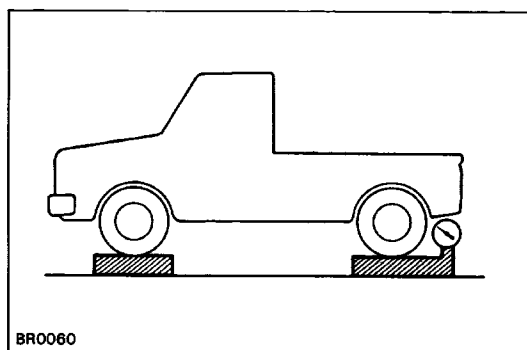
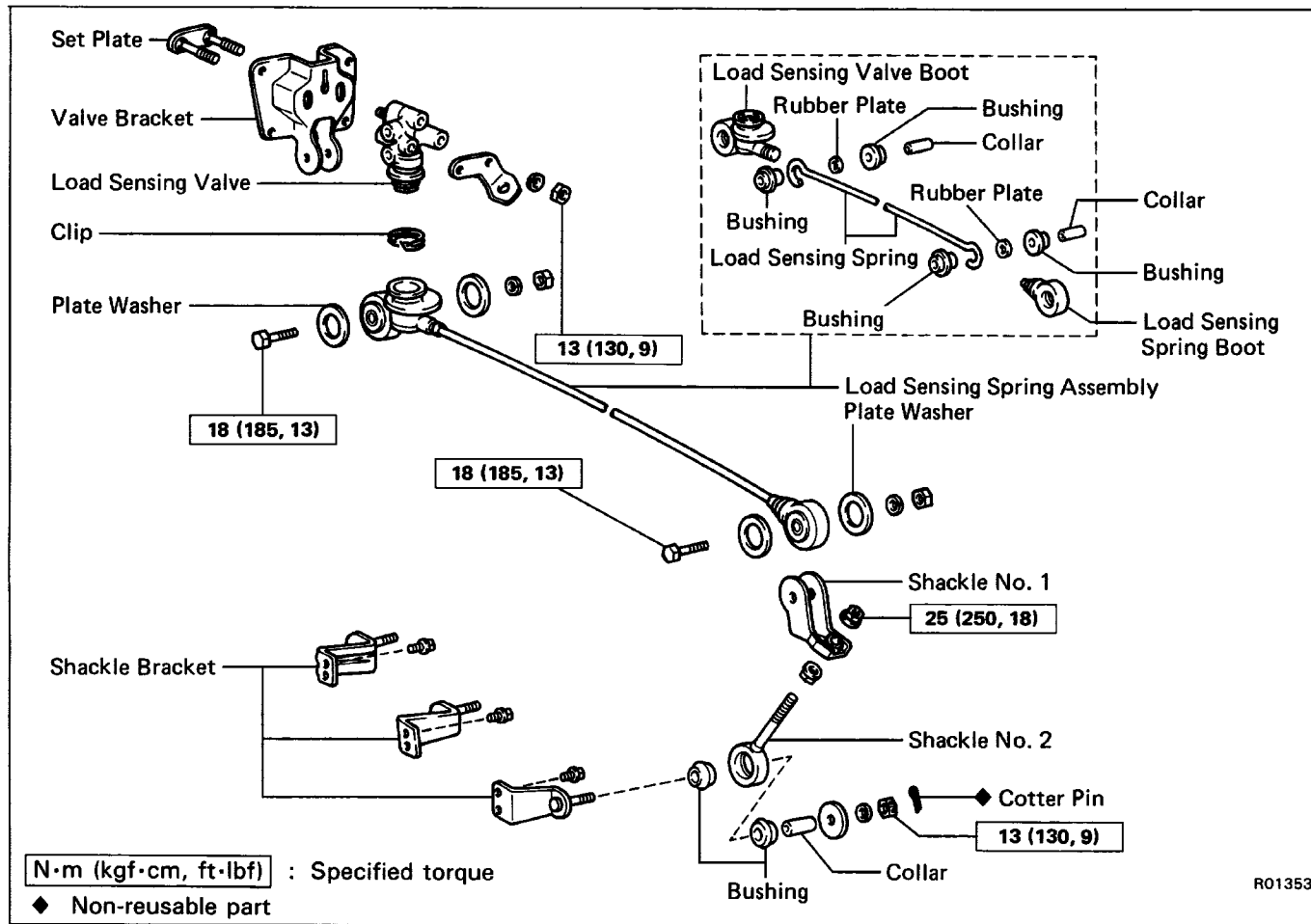
## 13. INSTALL BRAKE DRUM

## 14. INSTALL REAR WHEEL

## 15. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-8](#))

## 16. CHECK FOR FLUID LEAKAGE

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



## CHECK AND ADJUSTMENT OF FLUID PRESSURE

### 1. SET REAR AXLE LOAD

Rear axle load (includes vehicle weight):

2WD 1 ton, C & C (SRW)	900 kg (1,984 lb)
1/2 ton	700 kg (1,543 lb)
C & C (DRW)	1,150 kg (2,535 lb)
4WD	800 kg (1,764 lb)

HINT: (For C & C)

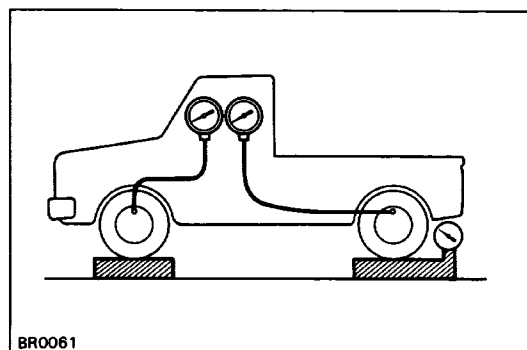
If the vehicle unladen weight exceeds the specification above, set the rear axle load to the specification shown below. (See step 4 on page [BR-65](#))

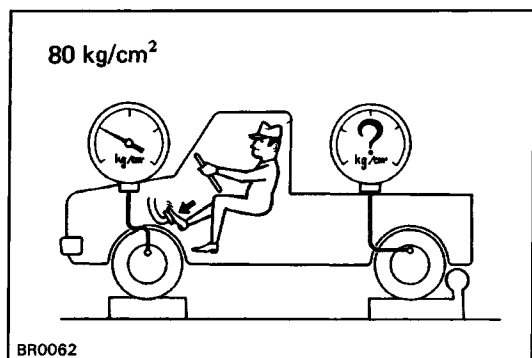
Rear axle load (includes vehicle weight):

SRW	1,678 kg (3,699 lb)
DRW	1,996 kg (4,400 lb)

### 2. INSTALL LSPV GAUGE (SST) AND BLEED AIR

SST 09709-29017





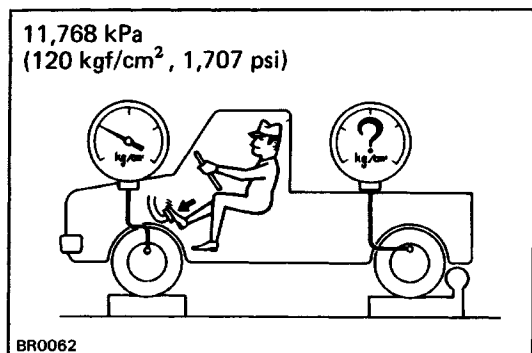
### 3. RAISE FRONT BRAKE PRESSURE TO 7,845 kPa (80 kgf/cm<sup>2</sup>, 1,138 psi) AND CHECK REAR BRAKE PRESSURE

Rear brake pressure:

2WD 1 ton, C & C (SRW)	4,413±490 kPa (45±5 kgf/cm <sup>2</sup> , 640±71 psi)
1/2 ton	4,315 ± 490 kPa (44±5 kgf/cm <sup>2</sup> , 626 ± 71 psi)
C & C (DRS)	4,707 ± 490 kPa (48±5 kgf/cm <sup>2</sup> , 683 ± 71 psi )
4WD Regular cab	3,923±490 kPa (40±5 kgf/cm <sup>2</sup> , 569±71 psi )
Extra cab	4,315±490 kPa (43±5 kgf/cm <sup>2</sup> , 626±71 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.

If the brake pressure is incorrect, adjust the fluid pressure.

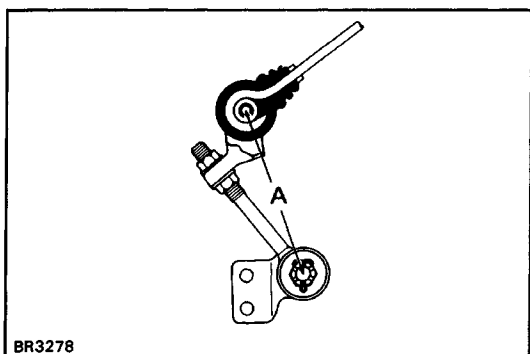


### 4. (C&C)

#### RAISE FRONT BRAKE PRESSURE TO 11,768 kPa (120 kgf/cm<sup>2</sup>, 1,707 psi) AND CHECK REAR BRAKE PRESSURE

Rear brake pressure:

SRW	9,709 ± 588 kPa (99 ± 6 kgf/cm <sup>2</sup> , 1,408 ± 85 psi)
DRW	8,336 ± 588 kPa (85 ± 6 kgf/cm <sup>2</sup> , 1,209 ± 85 psi)



### 5. IF NECESSARY, ADJUST FLUID PRESSURE

(a) Adjust the length of the No.2 shackle.

Low pressure Lengthen A

High pressure Shorten A

Initial set:

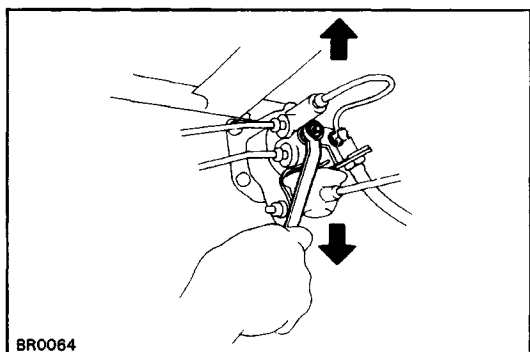
2WD	78 mm (3.07 in.)
4WD	120 mm (4.72 in.)

Adjusting range:

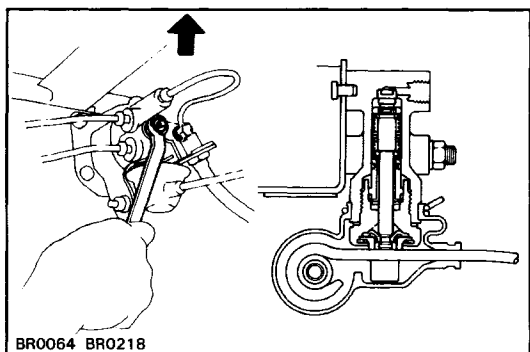
2WD	72 – 84 mm (2.83 – 3.31 in.)
4WD	114 – 126 mm (4.49 – 4.96 in.)

HINT: One turn of the nut changes the fluid pressure as shown in the table below.

		Rear brake pressure
2WD	1/2 ton, C & C (SRW )	74 kPa (0.75 kgf/cm <sup>2</sup> , 11 psi)
	1 ton, C & C (DRW)	98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi)
4WD		59 kPa (0.6 kgf/cm <sup>2</sup> , 8.5 psi)

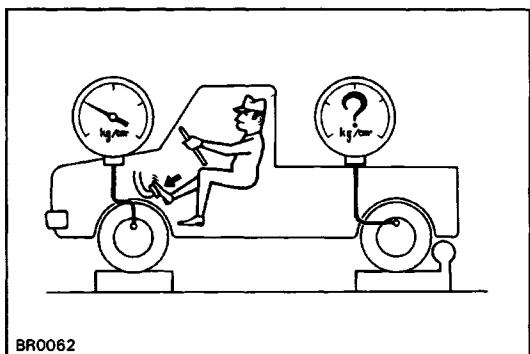


- (b) In event the pressure cannot be adjusted by the No. 1 shackle, raise or lower the valve body.  
 Low pressure – Lower  
 High pressure – Raise
- (c) Torque the nuts.  
**Torque: 13 N-m (130 kgf-cm, 9 ft-lbf)**
- (d) Adjust the length of the No. 1 shackle again.  
 If it cannot be adjusted, inspect the valve housing.



## 6. IF NECESSARY, CHECK VALVE BODY

- (a) Assemble the valve body in the uppermost 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.

2WD (SRW)

kPa (kgf/cm<sup>2</sup>, psi)

Front brake pressure	Rear brake pressure
490 (5, 71)	490 (5, 71)
2,452 (25, 356)	883 – 1,275 (9 – 13, 128 – 185)
5,884 (60, 853)	1,765 – 2,452 (18 – 25, 256 – 356)

4WD (DRW)

kPa (kgf/cm<sup>2</sup>, psi)

Front brake pressure	Rear brake pressure
490 (5, 71)	490 (5, 71)
2,452 (25, 356)	1,020 – 1,412 (10.4 – 14.4, 148 – 205)
5,884 (60, 853)	2,148 – 2,834 (21.9 – 28.9, 311 – 411)

4WD (Regular cab)

kPa (kgf/cm<sup>2</sup>, psi)

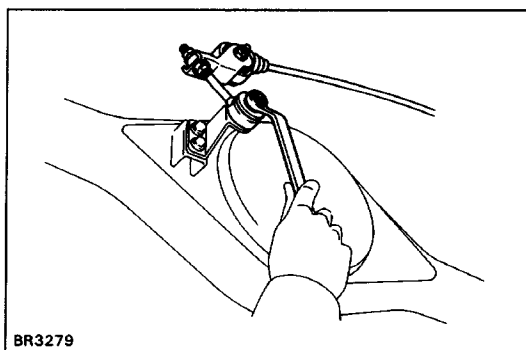
Front brake pressure	Rear brake pressure
981 (10, 142)	981 (10, 142)
2,452 (25, 356)	1,079 – 1,471 (11 – 15, 156 – 213)
5,884 (60, 853)	1,618 – 2,305 (16.5 – 23.5, 235 – 334)

4WD (Extra cab)

kPa (kgf/cm<sup>2</sup>, psi)

Front brake pressure	Rear brake pressure
981 (10, 142)	981 (10, 142)
2,452 (25, 356)	1,157 – 1,549 (11.8 – 15.8, 168 – 225)
5,884 (60, 853)	1,863 – 2,550 (19 – 26, 270 – 370)

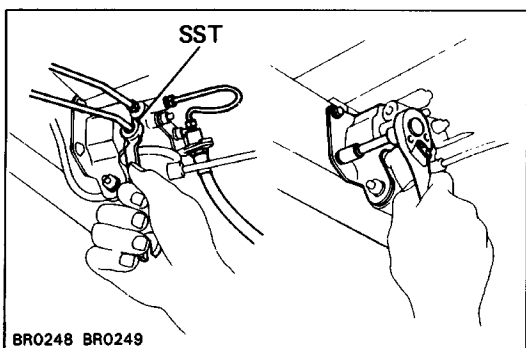
If the measured value is not within standard, replace the valve body.



## REMOVAL OF LSP & BV OR LSPV

(See page [BR-64](#))

### 1. DISCONNECT SHACKLE NO.2 FROM BRACKET

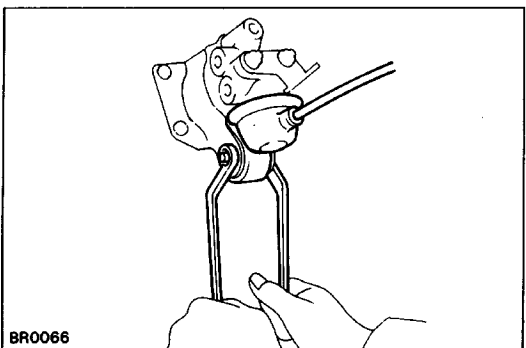


### 2. REMOVE LSP & BV (LSPV) ASSEMBLY

- (a) Using SST, disconnect the brake tube from the valve body.

SST 09751-36011

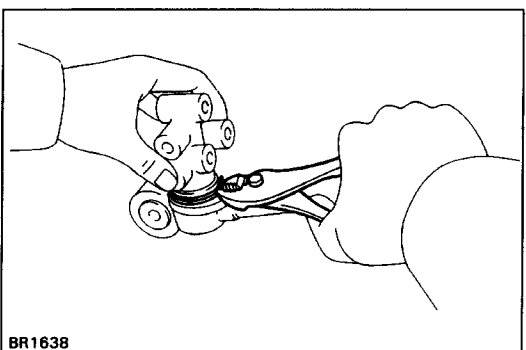
- (b) Remove the valve bracket mounting bolts and remove the LSP & BV (LSPV) assembly.



## DISASSEMBLY OF LSP & BV OR LSPV ASSEMBLY

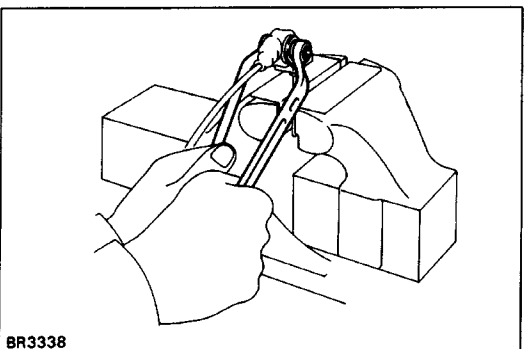
### 1. REMOVE VALVE BRACKET

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



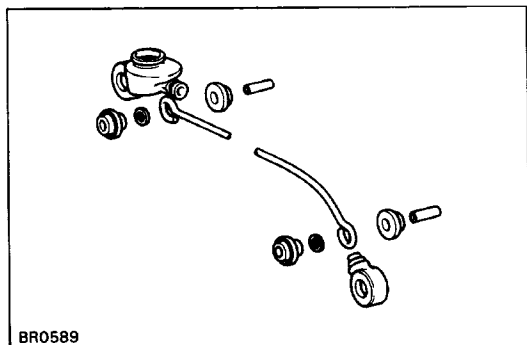
### 2. DISCONNECT SPRING FROM VALVE

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



### 3. REMOVE SHACKLE NO. 1 AND NO.2

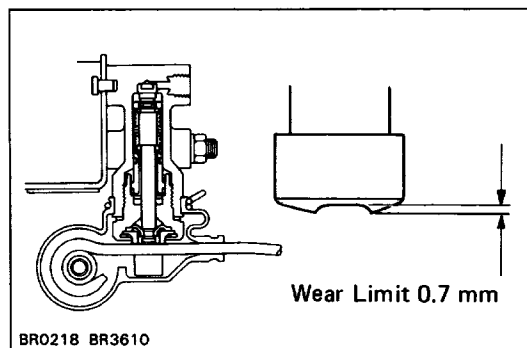
Remove the nut and bolt, and then remove the shackle No.1 and No.2, and two plate washers from the load sensing spring assembly.



#### 4. DISASSEMBLE LOAD SENSING SPRING

Disassemble the following parts.

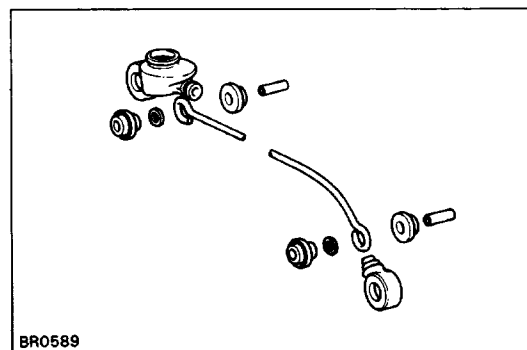
- (a) Bushings
- (b) Collars
- (c) Rubber plates
- (d) Load sensing valve boot
- (e) Load sensing spring boot



### INSPECTION OF LSP & BV OR LSPV

INSPECT VALVE PISTON PIN AND LOAD SENSING CONTACT SURFACE FOR WEAR

Wear limit: 0.7 mm (0.028 in.)



#### ASSEMBLY OF LSP & BV OR LSPV

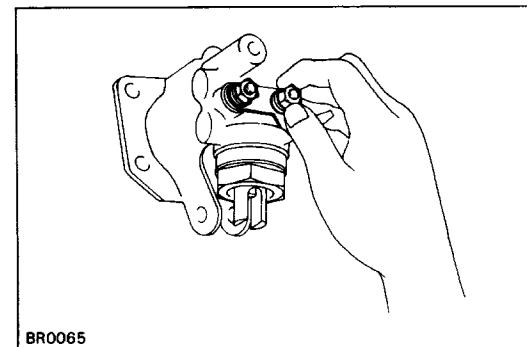
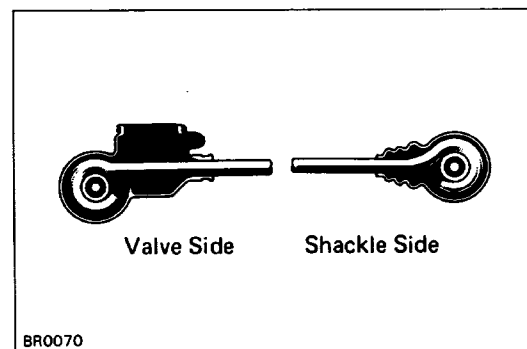
(See page [BR-64](#))

##### 1. ASSEMBLE FOLLOWING PARTS TO LOAD SENSING SPRING:

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

HINT: Apply lithium soap glycol grease to all rubbing areas.

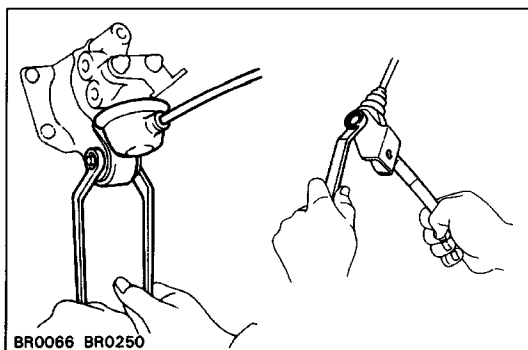
Do not mistake the valve side for the shackle side of the load sensing spring.



##### 2. ASSEMBLE VALVE BODY TO BRACKET

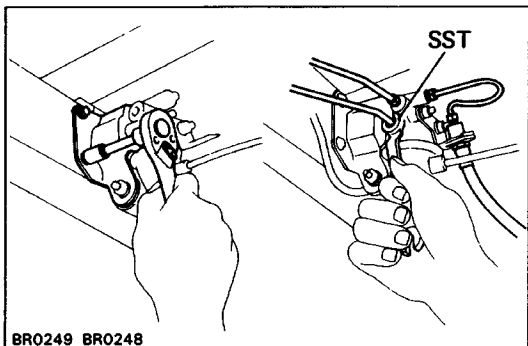
Assemble the valve body to the valve body bracket.

HINT: Finger tighten the valve body mounting nuts.



### 3. CONNECT VALVE BODY AND NO. 1 SHACKLE TO LOAD SENSING SPRING

**CAUTION:** When connecting the shackle to the load sensing spring with a bolt and nut, insert the bolt from the front side of vehicle.



### INSTALLATION OF LSPV & BV OR LSPV

#### 1. INSTALL LSP & BV (LSPV) ASSEMBLY TO FRAME

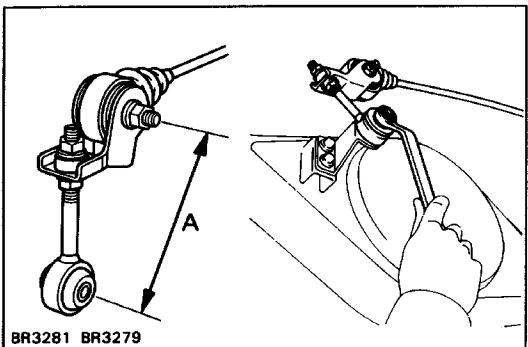
Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)

#### 2. CONNECT BRAKE TUBE

Using SST, connect the brake tubes.

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

SST 09751-36011



#### 3. CONNECT SHACKLE NO.2 BRACKET

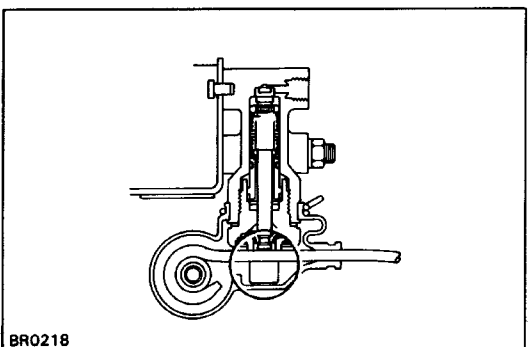
(a) Install the shackle No.2 to the load sensing spring.

(b) Set dimension A.

Initial set: 2WD 78 mm (3.07 in.)

4WD 120 mm (4.72 in.)

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



#### 4. SET REAR AXLE LOAD (See page BR-64)

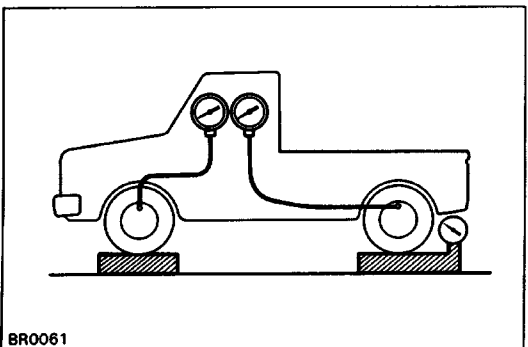
#### 5. SET VALVE BODY

(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 load sensing spring.

(c) Tighten the valve body mounting nuts.

#### 6. BLEED BRAKE LINE (See page BR-8)



#### 7. CHECK AND ADJUST LSP & BV OR (LSPV) FLUID PRESSURE

(See page BR-64)

#### 8. APPLY SEALANT TO SHACKLE NO.2

Apply sealant to the top portion of the shackle No.2 bolt threads not to lose the upper lock nut.

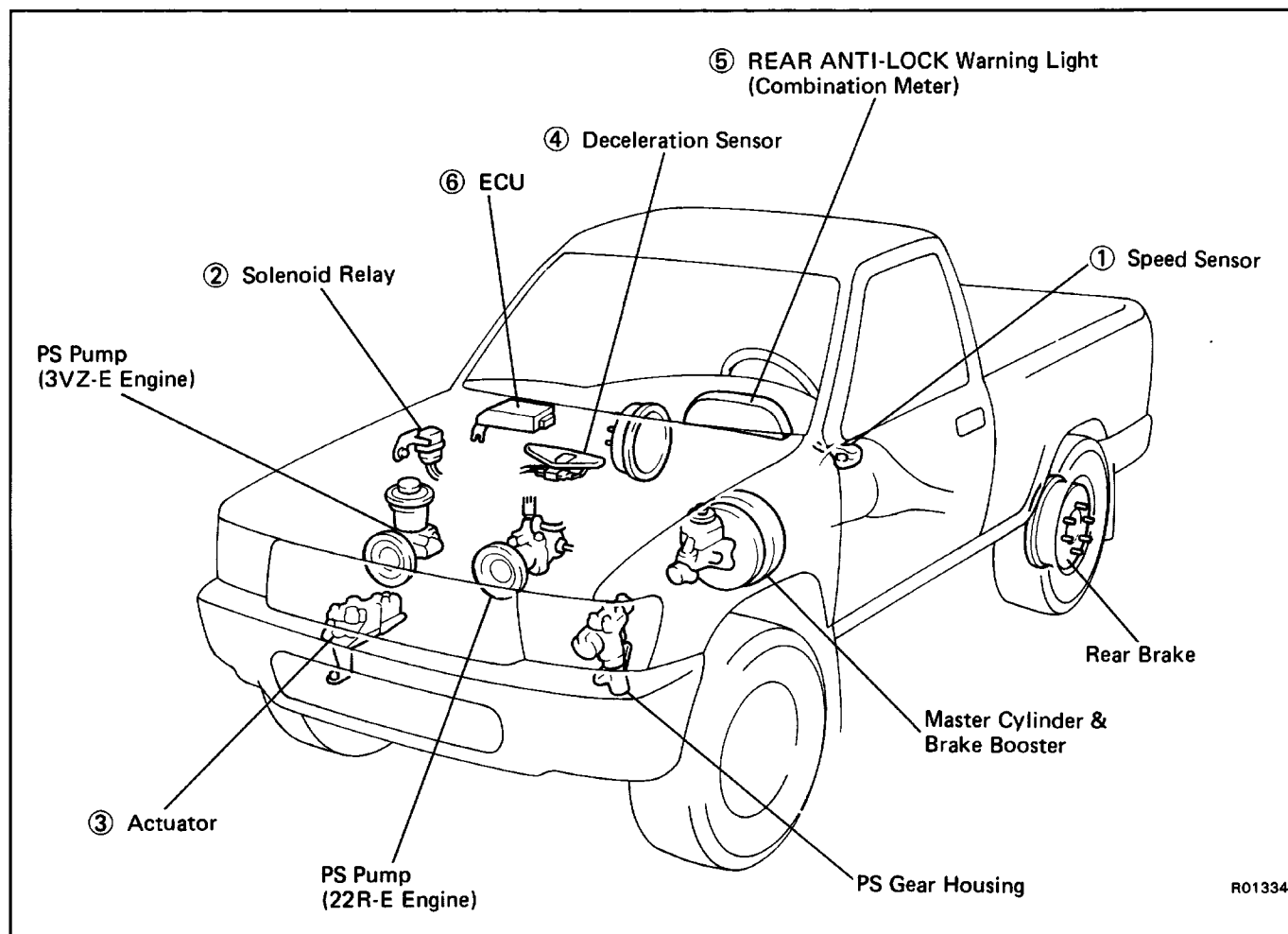
Sealant: Part No. 08833-00070, THREE BOND 1324 or equivalent

# REAR-WHEEL ANTI-LOCK BRAKE SYSTEM

## General Description

- The Rear-Wheel Anti-Lock Brake System is a brake system which controls the wheel cylinder hydraulic pressure of the rear wheels during sudden braking and braking on slippery road surfaces, preventing the rear wheels from locking.
- In case a malfunction occurs, a diagnosis function and fail-safe system have been adopted for the Rear-Wheel Anti-Lock Brake System to increase serviceability.

## LOCATION OF SYSTEM COMPONENTS

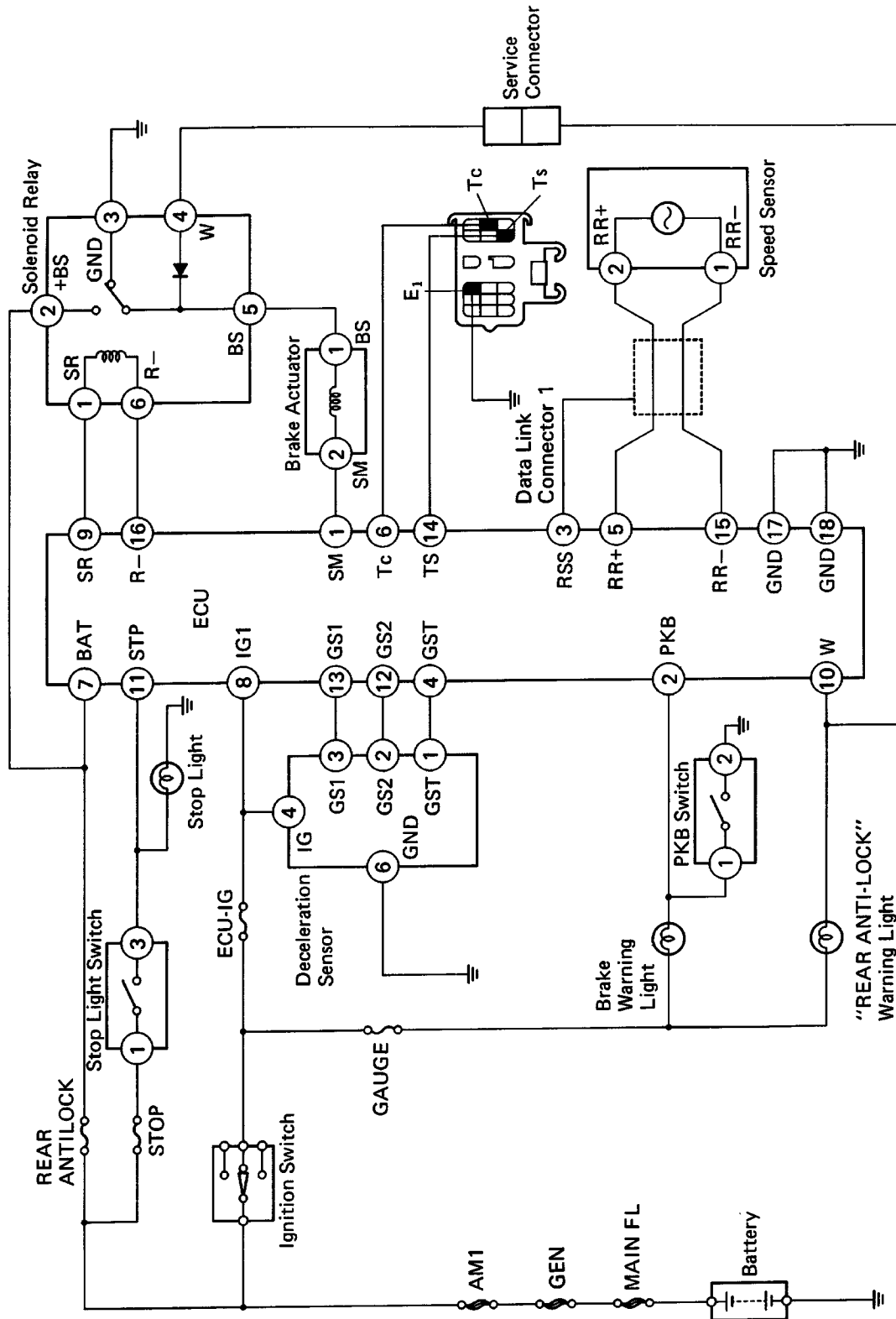


## FUNCTION OF COMPONENTS

No.	Components	Function
1	Speed Sensor	Detects the wheel speed from the rotation of the rear differential ring gear.
2	Solenoid Relay	Supplies electric current to the solenoid valve of the actuator.
3	Actuator	Controls the brake fluid pressure to rear brake wheel cylinders through signals from the ECU.
4	Deceleration Sensor	Detects the vehicle deceleration rate from the deceleration of the body.
5	REAR ANTI-LOCK Warning Light	Lights up to alert the driver when trouble has occurred in the Rear-wheel Anti-Lock Brake System.
6	ECU	According the wheel speed signals from the speed sensor and vehicle deceleration signals from the deceleration sensor, it calculates acceleration, deceleration and slip values and sends signals to the actuator to control brake fluid pressure.

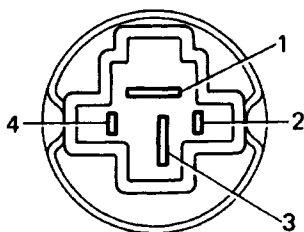


## WIRING DIAGRAM

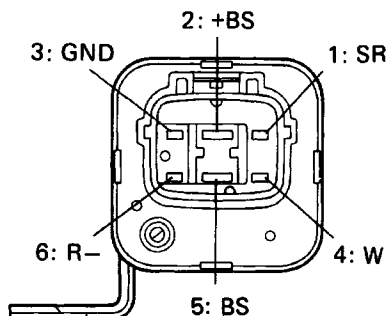


## CONNECTORS

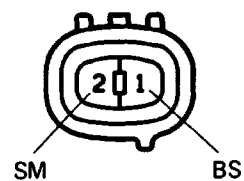
Stop Light Switch



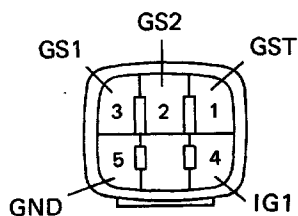
Solenoid Relay



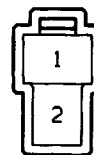
Brake Actuator



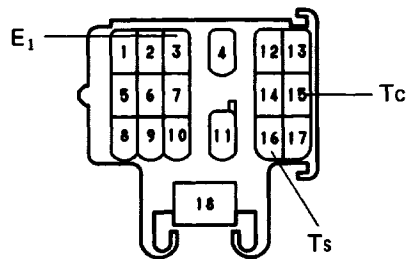
Deceleration Sensor



Parking Brake Switch



Data Link Connector 1

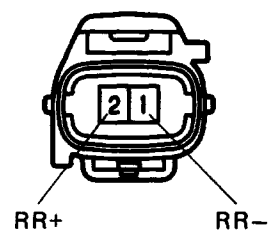


Service Connector

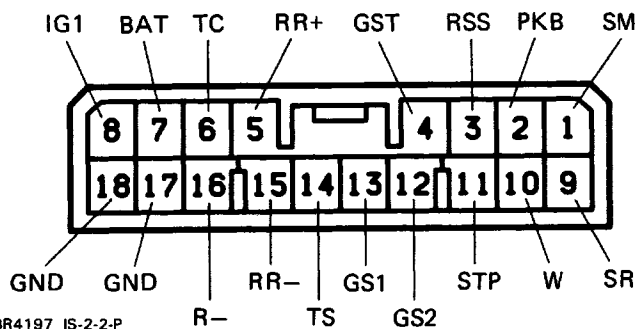


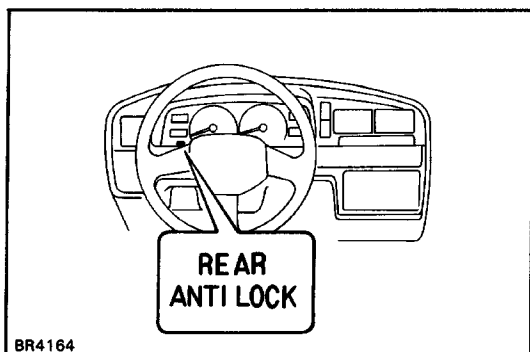
(Solenoid Relay Side)

Speed Sensor



Rear-Wheel Anti-Lock Brake System ECU





BR4164

## Diagnosis System

### DESCRIPTION

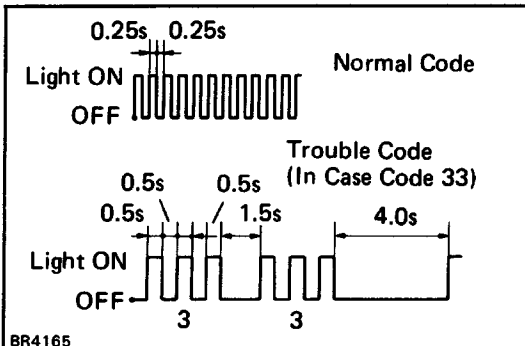
If a functional malfunction occurs, diagnosis system will identify the problem and ECU stores the codes for the trouble items.

At the same time, the system informs the driver of a malfunction via the "REAR ANTILOCK" warning light in the combination meter.

By turning on the ignition switch and disconnecting the service connector, the trouble can be identified by the number of blinks (diagnosis code) of the warning light.

In event of two codes, that having the smallest number (code) will be identified first.

HINT: The warning light do not show the diagnostic trouble codes while the vehicle is running.



BR4165

### INSPECTION OF DIAGNOSIS SYSTEM

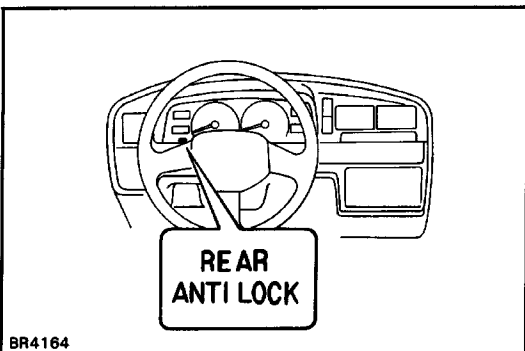
#### 1. INSPECT BATTERY POSITIVE VOLTAGE

Inspect that the battery positive voltage is about 12 V.

#### 2. CHECK THAT WARNING LIGHT TURNS ON

- Turn the ignition switch to ON.
- Check that the "REAR ANTILOCK" warning light turns on for about 3 seconds.

If not, inspect and repair or replace the fuse, bulb and wire harness.

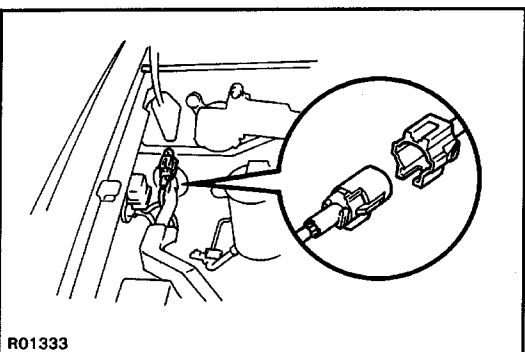


BR4164

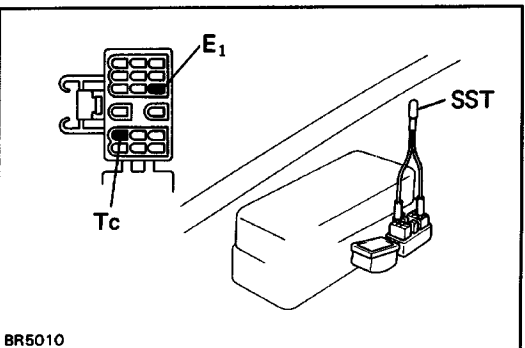
#### 3. READ DIAGNOSTIC TROUBLE CODE

- Turn the ignition switch to ON.
- Disconnect the service connector.

SST 09843-18020

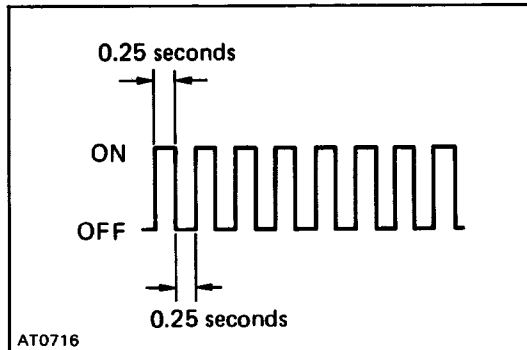
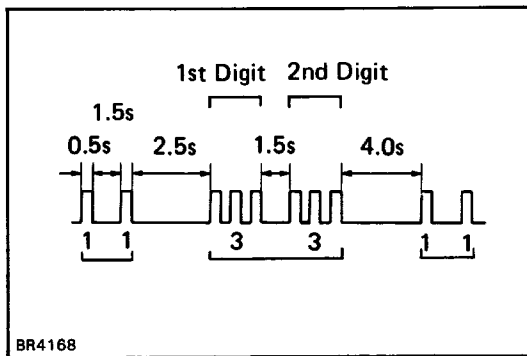


R01333



BR5010

- Using SST, connect the terminal Tc to E, of the data link connector 1.



- (d) In event of a malfunction, 4 seconds later the warning light will begin to blink. Read the number of blinks.

(See DIAGNOSTIC TROUBLE CODE on page [BR-75](#))

HINT: The first number of blinks will equal the first digit of a two digit diagnostic trouble code. After a 1.5 seconds pause, the 2nd number of blinks will equal the 2nd number of a two digit code. If there are two or more codes, there will be a 2.5 seconds pause between each, and indication will begin after 4.0 seconds pause from the smaller value and continue in order to larger.

- (e) If the system is operating normally (no malfunction), the warning light will blink 2 times per second.

- (f) Repair the malfunctioning parts.

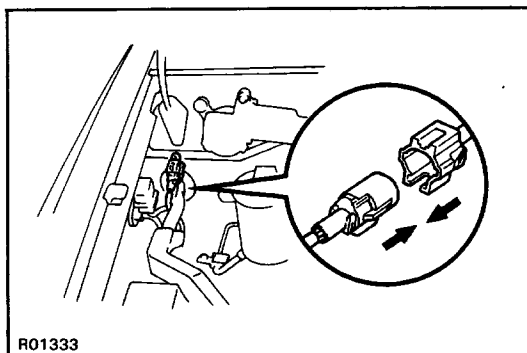
- (g) After the malfunctioning parts has been repaired, clear the diagnostic trouble codes stored in the ECU .  
(See page [BR-76](#))

HINT: If you disconnect the battery cable while repairing, all diagnostic trouble codes in the ECU will be erased.










- (h) Disconnect the terminal Tc from E1 of the data link connector 1.

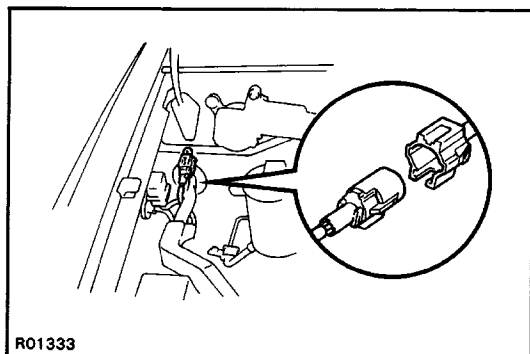
- (i) Connect the service connector.

Turn the ignition switch to ON, and check that the "REAR ANTILOCK" warning light goes off after the warning light goes on for about 2 seconds.



## DIAGNOSTIC TROUBLE CODE

Code No.	Light Pattern	Diagnosis	Trouble Part
11	ON OFF 	Open circuit in solenoid relay circuit or solenoid circuit	<ul style="list-style-type: none"> <li>• Solenoid</li> <li>• Solenoid relay</li> <li>• Wire harness and connector of solenoid and/or solenoid relay circuit</li> </ul>
12		Short circuit in solenoid relay circuit	
25		Short circuit in solenoid circuit	
33		Open or short circuit in speed sensor circuit	<ul style="list-style-type: none"> <li>• Speed sensor</li> <li>• Wire harness and connector of speed sensor circuit</li> </ul>
41		Low battery positive voltage (9.5 V or lower)	<ul style="list-style-type: none"> <li>• Battery</li> </ul>
42		Abnormally high battery positive voltage (17 V or higher)	
43		Mechanical malfunction in deceleration sensor	<ul style="list-style-type: none"> <li>• Deceleration sensor</li> <li>• Wire harness and connector of deceleration sensor circuit</li> </ul>
44		Electrical malfunction in deceleration sensor circuit	
Always ON		Malfunction in ECU	<ul style="list-style-type: none"> <li>• ECU</li> </ul>



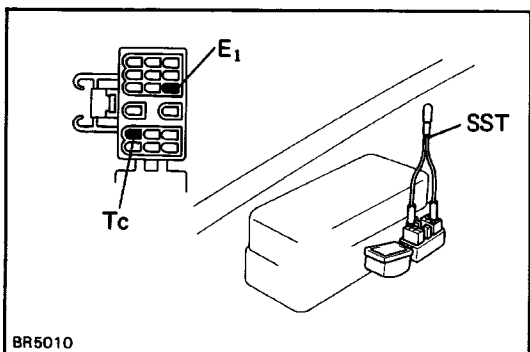
## CLEARING OF DIAGNOSTIC TROUBLE CODES

### CLEAR DIAGNOSTIC TROUBLE CODES

(a) Turn the ignition switch to ON.

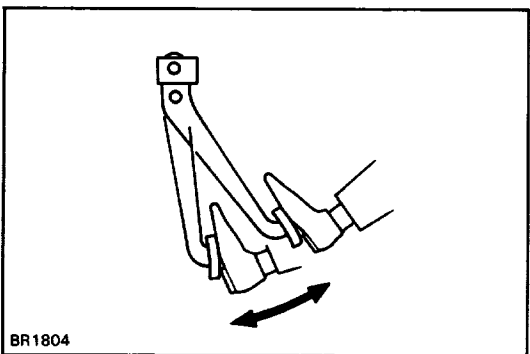
(b) Disconnect the service connector.

HINT: Keep the vehicle stopped (vehicle speed 0 km/h (0 mph)).

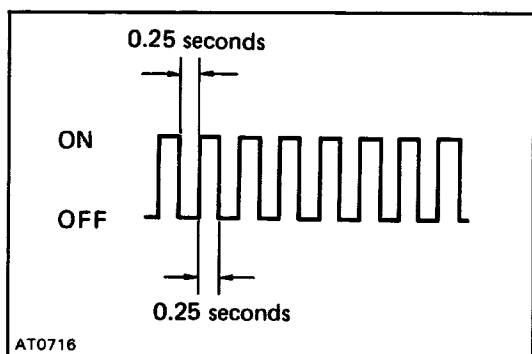


(c) Using SST, connect the terminal Tc to E, of the data link connector 1.

SST 09843-18020



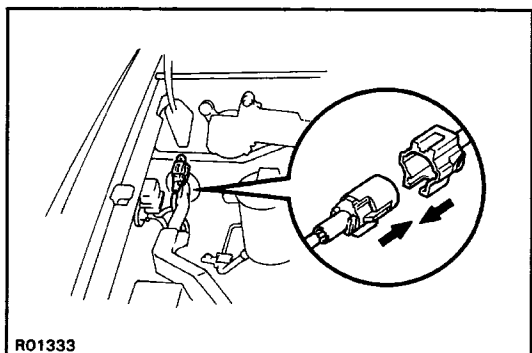
(d) Clear the diagnostic trouble codes stored in ECU by depressing the brake pedal 8 or more times within 3 seconds.



(e) Check that the warning light shows the –normal code.

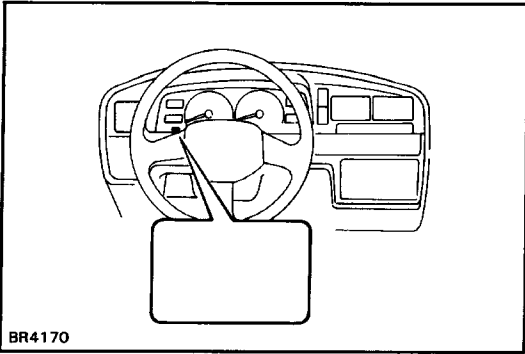
If the warning light still shows the diagnostic trouble codes, check for cause and repair or replace the trouble

parts, then clear the diagnostic trouble codes again.



(f) Connect the service connector.

(g) Disconnect the terminal Tc from E, of the data link connector 1.



(h) Check that the warning light goes off.

## Troubleshooting

Problem		No.
"REAR ANTILOCK" warning light	Always comes on after ignition switch is turned to ON.	1
	Does not come on for about 3 seconds after ignition switch on.	2
	Comes on and off.	3
	Comes on while running.	1
Brake working	Brakes pull.	4
	Braking inefficient.	4
	Rear-Wheel Anti-Lock Brake System operates at ordinary braking.	4
	Rear-Wheel Anti-Lock Brake System operates just before stopping at ordinary braking.	4
	Brake pedal pulsates abnormally while Rear-Wheel Anti-Lock Brake System is operating.	4
	Skidding noise occurs while Rear-Wheel Anti-Lock Brake System working. (Rear-Wheel Anti-Lock Brake System works inefficiently)	5

### 1 "REAR ANTILOCK" warning light comes on.

Disconnect service connector and connect the terminal Tc to E, of the data link connector 1. (See page [BR-73](#))

Does warning light always come on or show the normal code ?  
(Ignition switch on)

NO

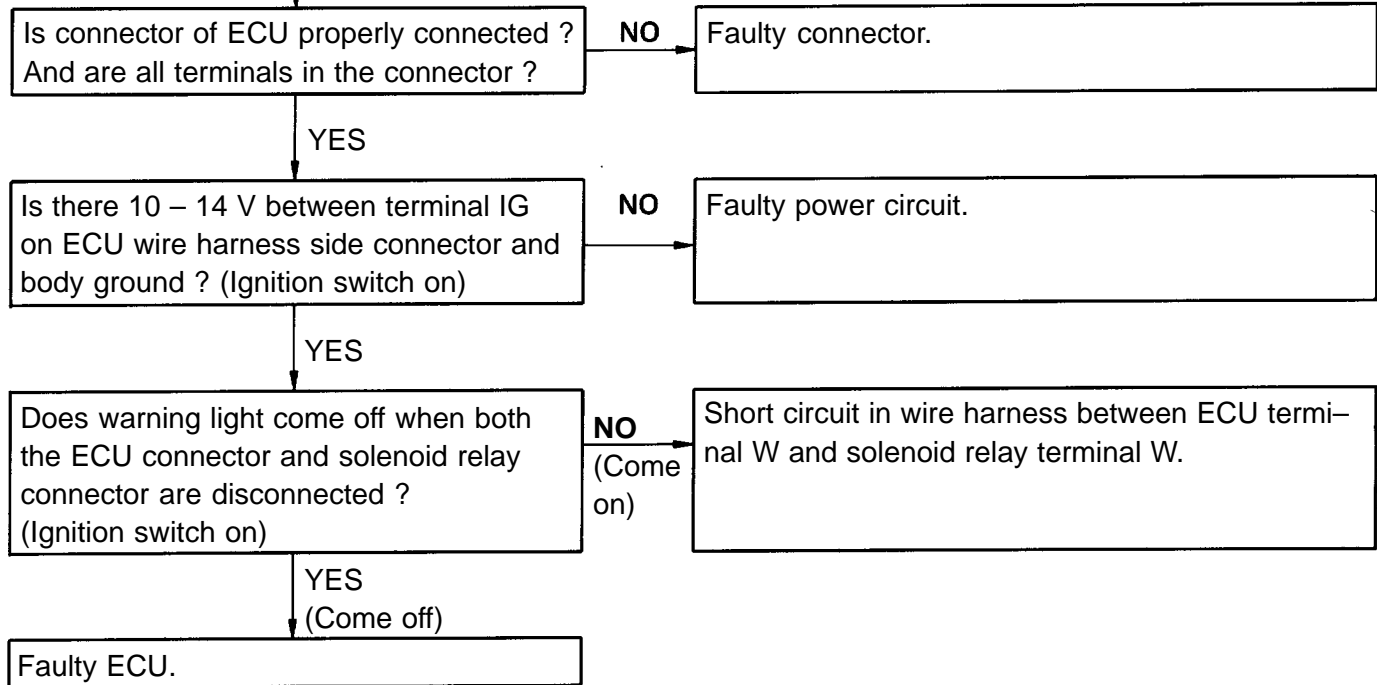
See diagnostic trouble code.  
(See page [BR-75](#))

YES

Continued on page [BR-79](#)



Continued from page BR-78



2

**"REAR ANTILOCK" warning light does not come on for about 2 seconds after ignition switch on.**

Disconnect service connector and ground the terminal W of the wire harness side connector. (Ignition switch on)

Does warning light come on ?

NO

Bulb burned out or open circuit in wire harness between warning light and service connector terminal W.

YES

Disconnect connector from ECU and solenoid relay, and ground terminal W of ECU wire harness side connector. (ignition switch on)

Does warning light come on ?

NO

Open circuit in wire harness between ECU terminal W and warning light.

YES

With ignition switch off, disconnect solenoid relay connector, and check continuity between terminal W and BS on solenoid relay side.

Reverse tester leads and check again. Is there one way continuity between terminals ?

NO

Short circuit in solenoid relay inside diode.

YES

Faulty ECU.

HINT: If the diode is short-circuited, a malfunction at ECU terminal W will occur.

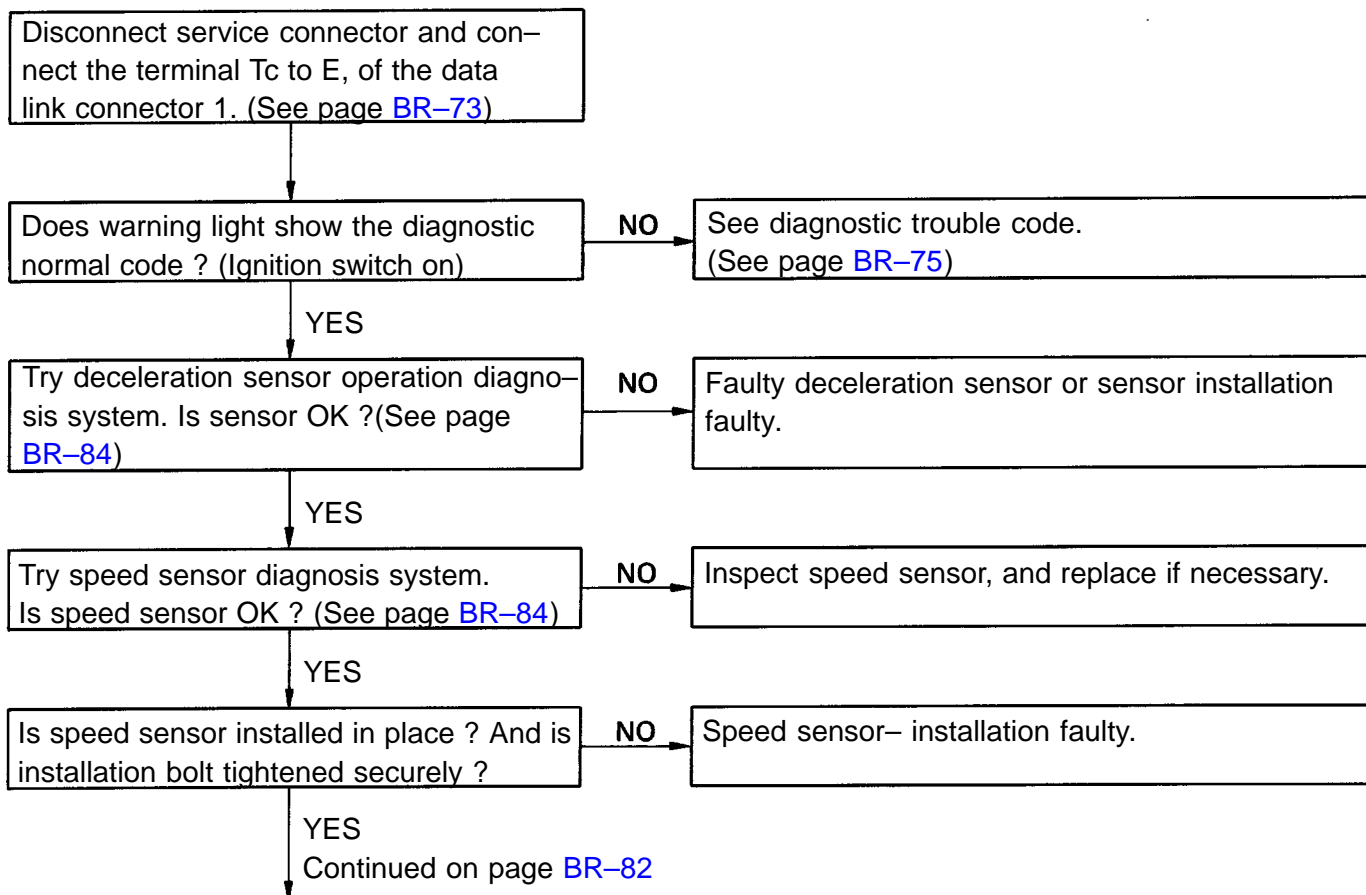
When inspecting the terminal, connect the ECU connector and disconnect solenoid relay connector. Then turn the ignition switch on, and check that the warning light goes on. If it does, the ECU terminal is OK.

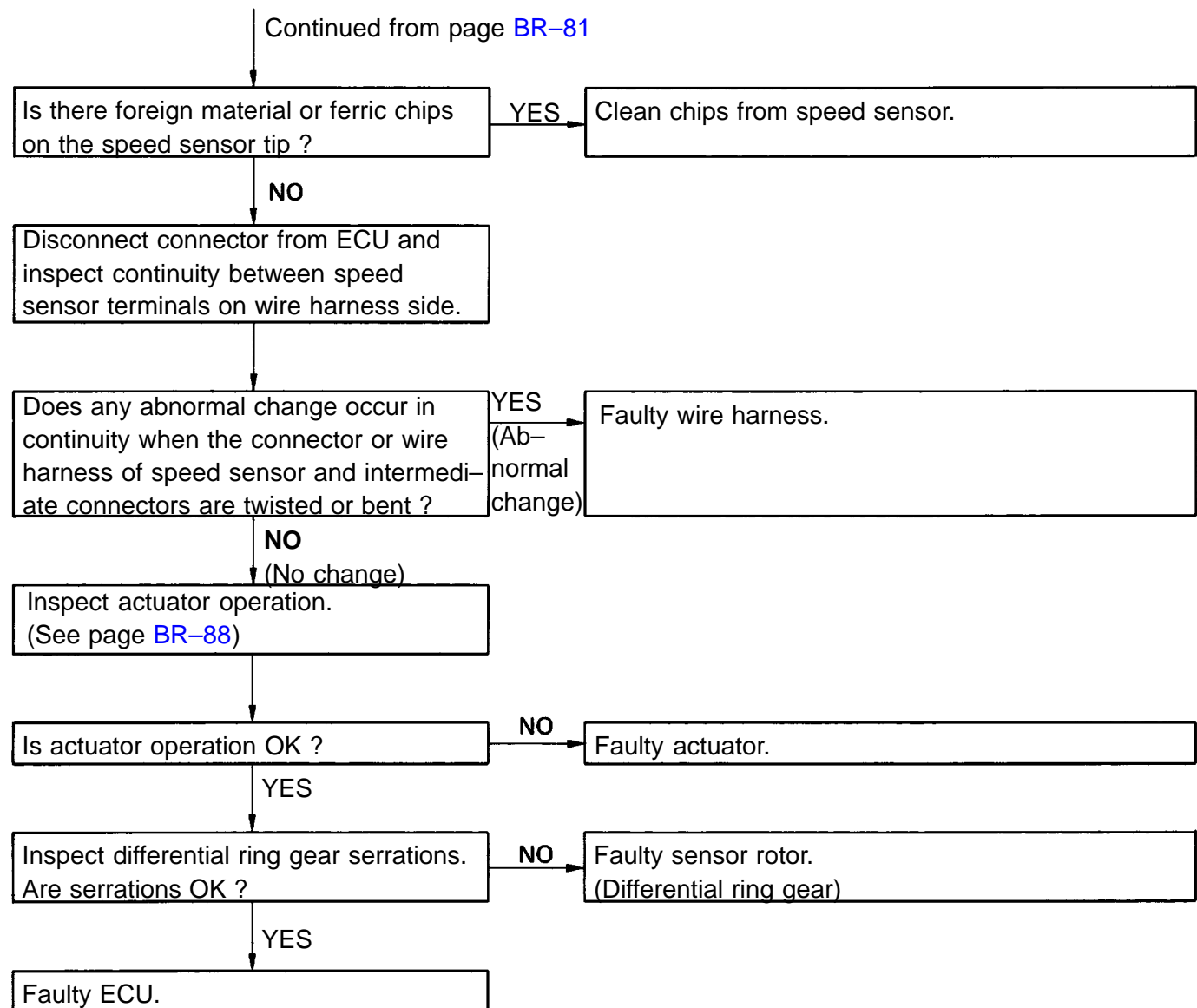
### 3 ”REAR ANTILOCK” warning light comes on and off .

- Short circuit in wire harness between ECU terminal TS and data link connector 1 terminal Ts.
- Short circuit in wire harness between ECU terminal TC and data link connector 1 terminal Tc.

4

- Braking inefficient.
- Rear-Wheel Anti-Lock Brake System operates at ordinary braking.
- Rear-Wheel Anti-Lock Brake System operates just before stopping at ordinary braking.
- Brake pedal pulsates abnormally while Rear-Wheel Anti-Lock Brake System working.





**5 Rear-Wheel Anti-Lock Brake System works inefficiently.**

Disconnect service connector and connect the terminal Tc to E , of the data link connector

1. (See page [BR-73](#))

Does warning light show the diagnostic normal code ?  
(Ignition switch on)

NO

See diagnostic trouble code.  
(See page [BR-75](#))

YES

Is there battery positive voltage between ECU terminal STP and body ground when depressing brake pedal ?

NO

Open circuit in stop light switch and/or wire harness.

YES

Inspect actuator.  
(See page [BR-87](#))

## Deceleration Sensor and Speed Sensor Diagnosis System

### PRECAUTION

- While checking the deceleration sensor and speed sensor diagnosis system, the Rear-Wheel Anti-Lock Brake System does not work and brake system works as normal brake system.

### INSPECTION OF DIAGNOSIS SYSTEM

#### 1. INSPECT BATTERY POSITIVE VOLTAGE

Inspect that the battery positive voltage is about 12 V.

#### 2. CHECK THAT WARNING LIGHT TURNS ON

- Turn the ignition switch to ON.
- Check that the "REAR ANTI-LOCK" warning light turns on for about 3 seconds.  
If not, inspect and repair or replace the fuse, bulb and wire harness.
- Check that the "REAR ANTI-LOCK" warning light turns off.
- Turn the ignition switch to OFF.

#### 3. PERFORM FOLLOWING STEPS

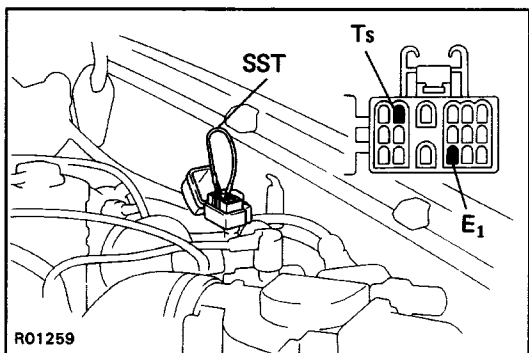
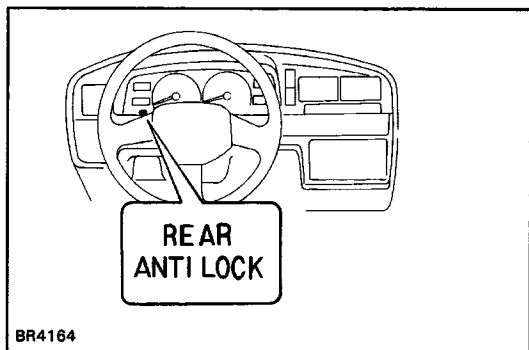
- Using SST, connect the terminal Ts to E1 of the data link connector 1.  
SST 09843-18020
- Start the engine.

- (2 WD model)

Check that the warning light blinks about 4 times every 1 second after blinking 1 time in 1.5 seconds as shown.

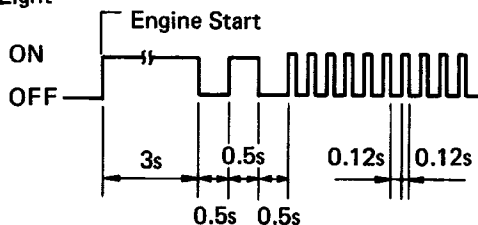
- (4 WD model)

Check that the warning light blinks about 4 times every 1 second after blinking 2 times in 2.0 seconds as shown.



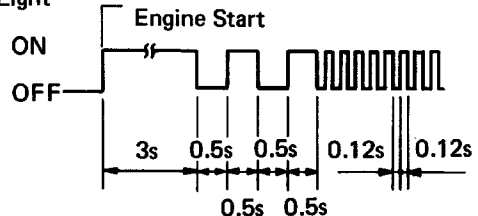
(2WD)

Warning Light

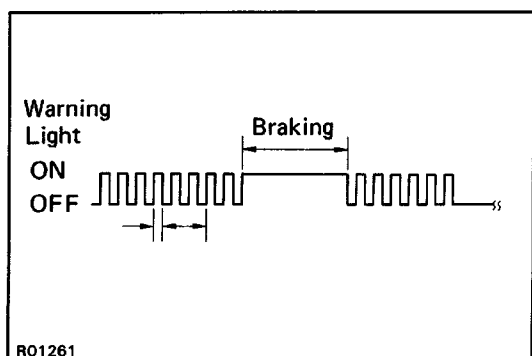


(4WD)

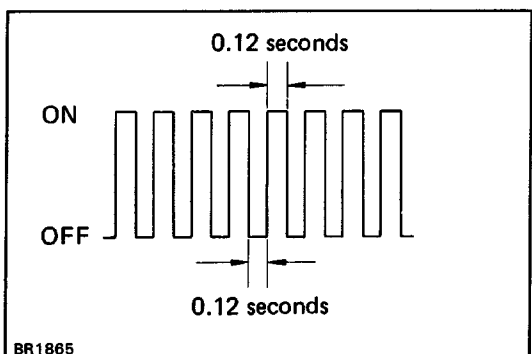
Warning Light



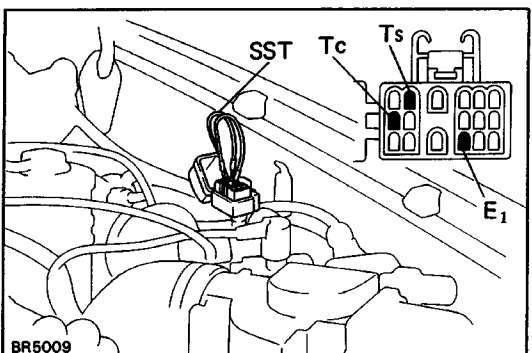
R01260



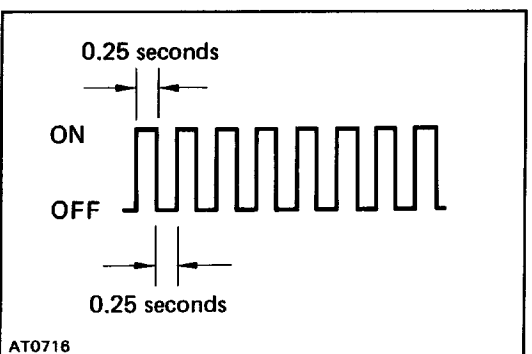
- (e) Drive the vehicle straight ahead at about 20 km/h (12.4 mph) or more, depress the brake pedal strongly.
- (f) Check that the warning light turns on while braking.



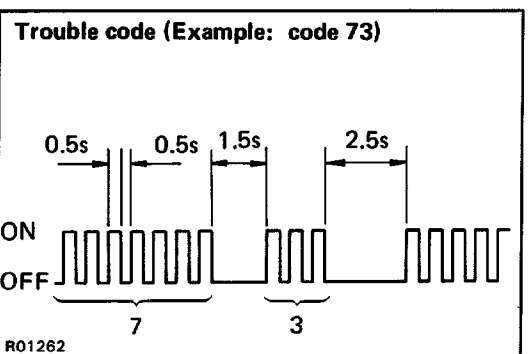
- (g) Drive the vehicle straight ahead at about 50 km/h (31 mph) or more, and stop the vehicle.
- (h) Check that the warning light blinks about 4 times every 1 second as shown.



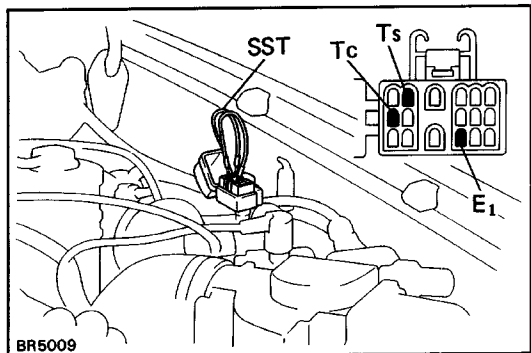
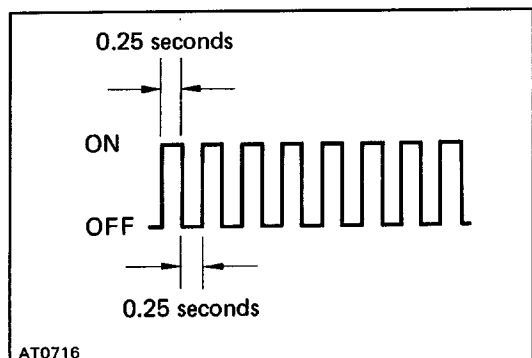
- (i) Using SST, connect terminals Tc and E 1 of the data link connector 1.  
SST 09843–18020



- (j) Check that the warning light shows the normal code.



- (k) In event of a malfunction, 2.5 seconds later the warning light will begin to blink. Read the number of blinks.  
(See DIAGNOSTIC TROUBLE CODE on page [BR–86](#))  
HINT: The first number of blinks will equal the first digit of a two digit diagnostic trouble code. After a 1.5 seconds pause, the 2nd number of blinks will equal the 2nd number of a two digit code. If there are two or more codes, there will be a 2.5 seconds pause between each,  
and indication will begin after 2.5 seconds pause from the smaller value and continue in order to larger.



- (l) If the system is operating normally (no malfunction), the warning light will blink once every 0.5 seconds.
- (m) Repair the system.
- (n) After the malfunctioning components have been repaired, clear the diagnostic trouble codes stored in the ECU.

(See page [BR-76](#))

HINT: If you disconnect the battery cable while repairing, all diagnostic trouble codes in the ECU will be erased.

- (o) Remove the SST from terminals Ts, Tc and E 1 of the data link connector 1.

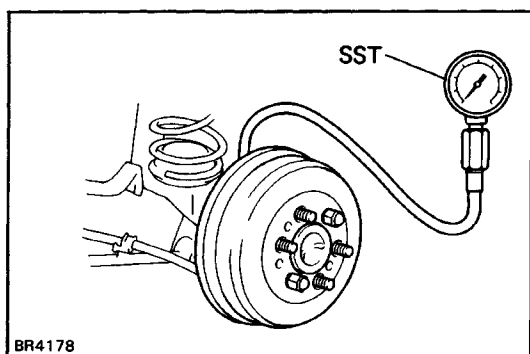
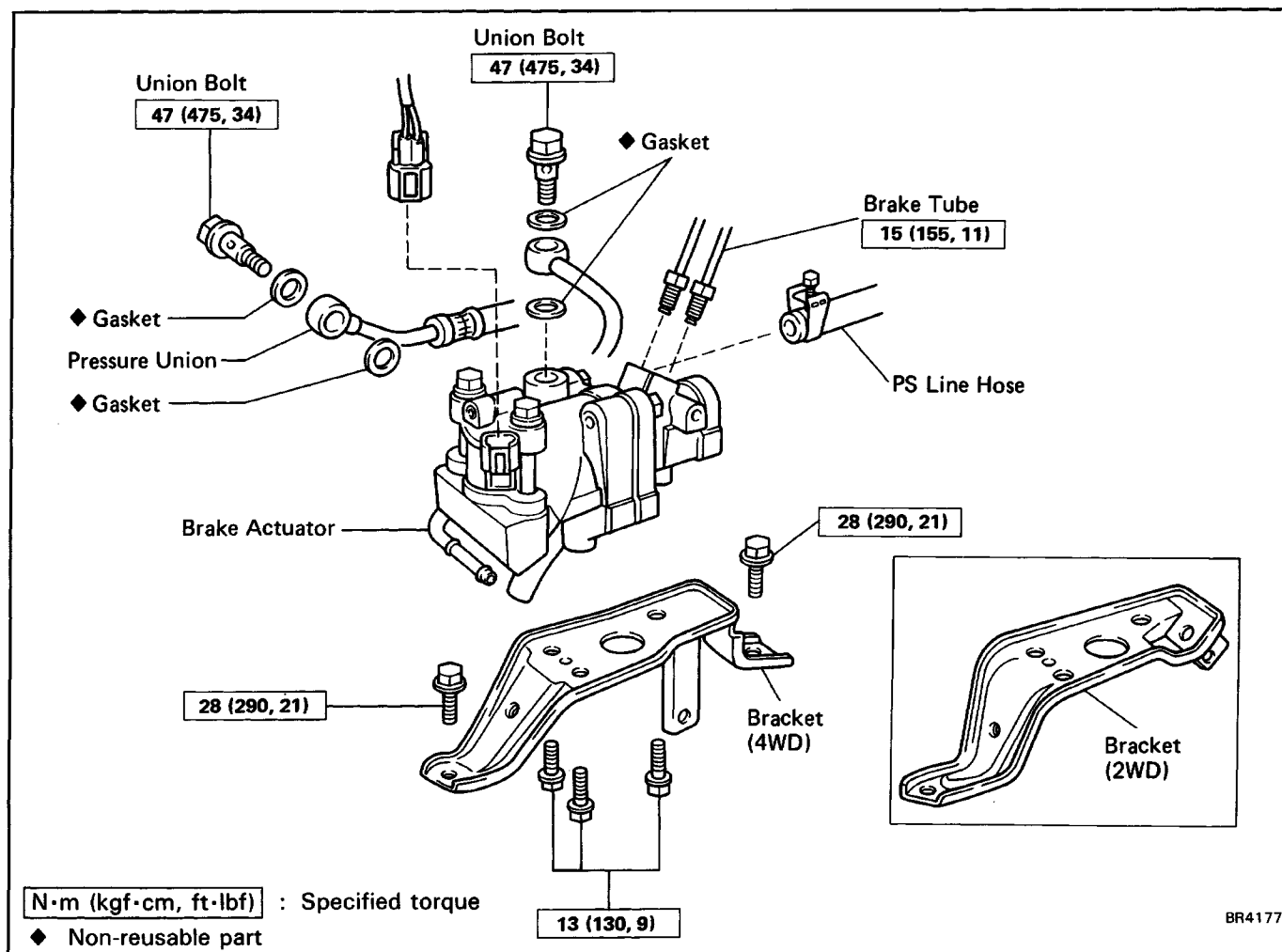
SST 09843-18020

## DIAGNOSTIC TROUBLE CODE

Code No.	Light Pattern	Diagnosis	MAIfunctioning Part
	ON OFF	Speed sensor and sensor rotor are normal	
73		Low output voltage of speed sensor signal	Speed sensor Sensor rotor Differential ring gear
77		Abnormal change of output voltage of speed sensor signal	Sensor rotor Differential ring gear
79		Sticking of deceleration sensor pendulum	Deceleration sensor



## Brake Actuator COMPONENTS

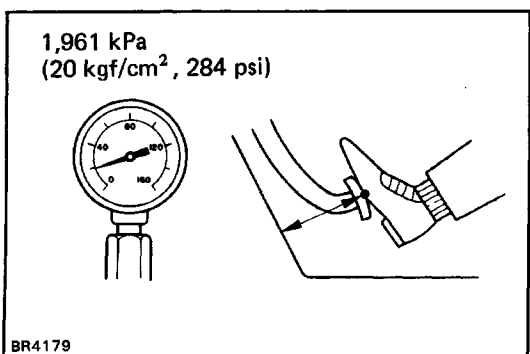


### INSPECTION OF BRAKE ACTUATOR 1. CHECK BRAKE FLUID PRESSURE

(a) Remove the bleeder plug from the rear wheel cylinder and connect SST.

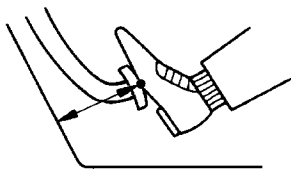
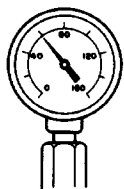
SST 09709-29017

(b) Bleed the air from SST.



(c) With the engine off, hold the brake pedal depressed for about 10 seconds with the pressure at 1,961 kPa (20 kgf/cm<sup>2</sup>, 284 psi), and check that there is no change in the pedal reserve distance. If there is a change in the brake pedal reserve distance, check the brake line, master cylinder and wheel cylinder for fluid leakage.

5,884 kPa  
(60 kgf/cm<sup>2</sup>, 853 psi)



BR4180

- (d) With the engine running, hold the brake pedal depressed for about 10 seconds with the pressure at 5,844 kPa (60 kgf/cm<sup>2</sup>, 853 psi), and check that there is no change in the pedal reserve distance. If there is a change in the brake pedal reserve distance, inspect the brake actuator.

## 2. CHECK POWER STEERING FLUID PRESSURE

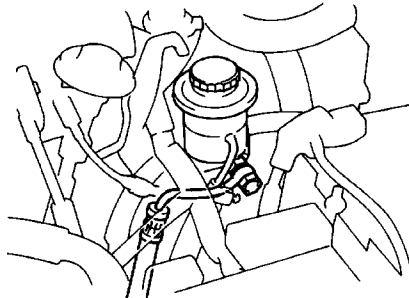
- (a) (4WD w/ 22R-E Engine)

Using SST, disconnect the power steering pressure line from the power steering pump.

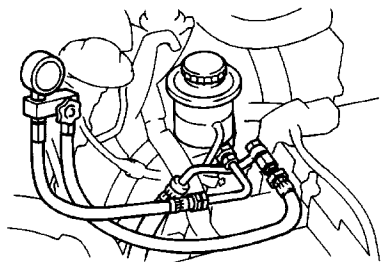
SST 0963 1-22020

- (b) (Except 4WD w/ 22R-E Engine)

Remove the union bolt and disconnect the power steering pressure line from the power steering pump.



BR4181



BR4182

- (c) Connect the power steering pressure gauge between the power steering pump and hose with the gauge valve on the actuator side.  
(d) Bleed the system and check that the fluid level is correct.  
(See page [BR-94](#))

- (e) Start the engine and run it at idle.

- (f) Close the pressure gauge valve and observe the reading on the gauge.

**Minimum pressure: 7,355 kPa (75 kgf/cm<sup>2</sup>, 1,067 psi)**

HINT:

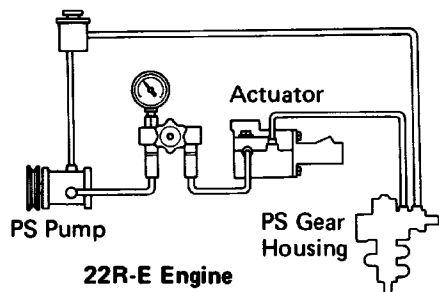
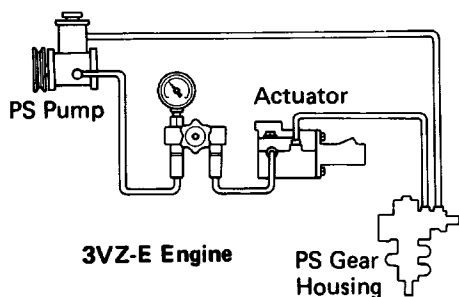
- Do not keep the valve closed for more than 10 seconds.
- Check with the fluid temperature at least 80°C (176°F).

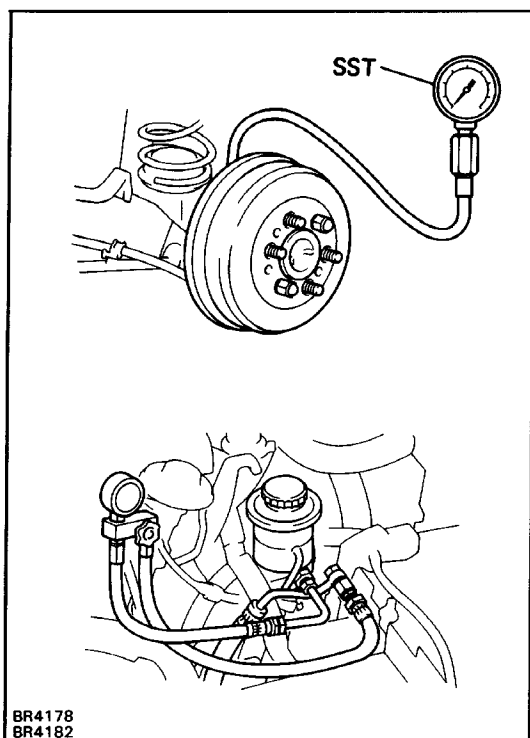
If pressure is low, repair or replace the power steering pump.

## 3. CHECK RELATION BETWEEN BRAKE FLUID AND POWER STEERING FLUID PRESSURE

HINT:

- Be sure the tires in the straight-ahead position.
- Be sure the power steering pressure gauge valve is fully open.
- Check with the power steering fluid temperature at least 80°C (176°F).

BR4183  
BR4184

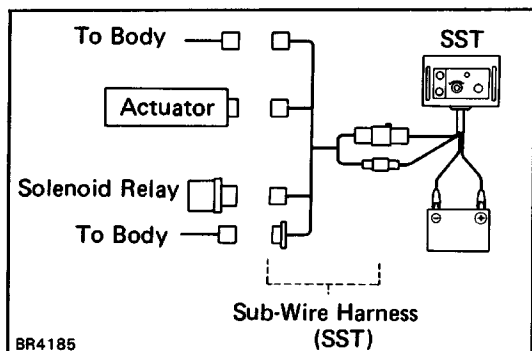


With the engine running, the brake and power steering fluid pressure should conform to the following table.

kPa (kgf/cm<sup>2</sup>, psi)

Brake Fluid Pressure	2,941 (30, 427)	9,807 (100, 1,422)
PS Fluid Pressure	1,569 – 2,550 (16 – 26, 228 – 370)	3,236 – 4,609 (33 – 47, 469 – 668)

If not within specification, check the actuator.



#### 4. CHECK ACTUATOR OPERATION

- Disconnect the connector from the actuator.
- Disconnect the connector from the solenoid relay.
- Connect the actuator checker (SST) to the actuator, solenoid relay and body side wire harness through the sub-wire harness (SST) as shown.  
SST 09990-00150 and 09990-00205
- Connect the red cable of the checker to the battery positive (+) terminal and black to the negative (-) terminal.

- Start the engine, and run it at idle.
- Turn the selector switch of actuator checker to "REAR" position.

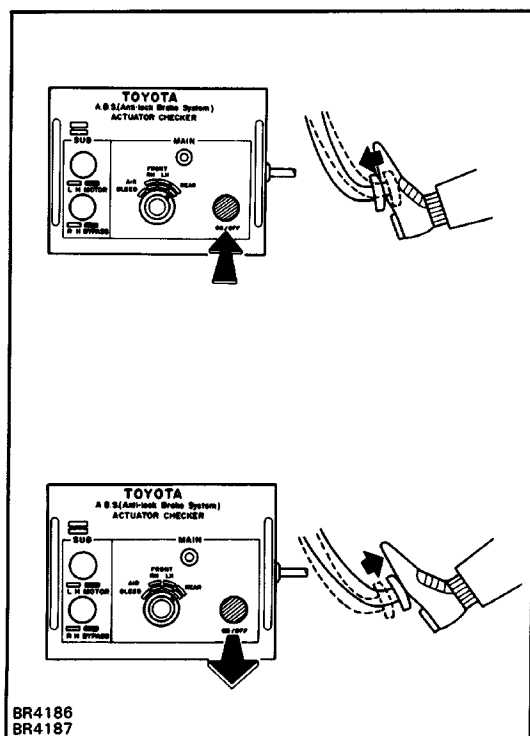
- Strongly depress the brake pedal and hold it.
- Push the ON/OFF switch, and check that the brake pedal sinks a little and that it returns to the original position when the switch is released.

#### NOTICE:

- To avoid damaging the master cylinder piston cup, do not push on SST switch before depressing the brake pedal and do not release your foot from the brake pedal while SST switch is pushing on.
- Do not keep the ON/OFF switch pushing more than 10 seconds.

If operation is not as specified, replace the actuator.

- Release the switch, then release the brake pedal.



**5. REMOVE ACTUATOR CHECKER (SST)**

Remove SST, then connect the connectors of the actuator and solenoid relay.

SST 09990-00150 and 09990-00205

**6. REMOVE SST FROM WHEEL CYLINDER**

**SST 09709-29017**

**7. REMOVE PRESSURE GAUGE FROM PS PUMP**

Remove the pressure gauge from the PS line, then bleed the power steering system.

**8. BLEED SYSTEM**

(a) Fill brake reservoir with brake fluid.

(b) Fill PS reservoir with fluid.

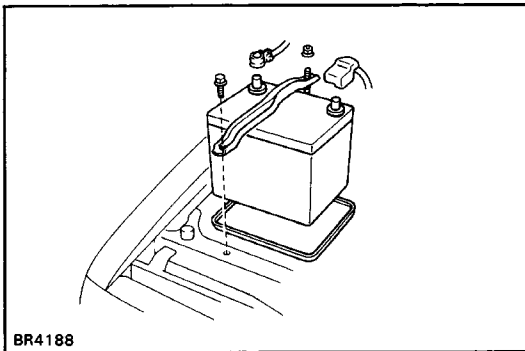
**Fluid type: ATF DEXRON® II**

(c) Bleed the system.

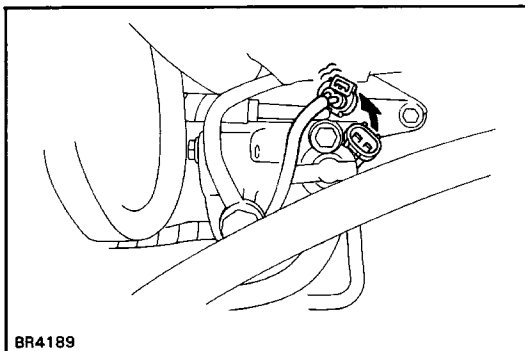
(See page [BR-94](#))

**REMOVAL OF BRAKE ACTUATOR****1. REMOVE BATTERY**

Disconnect the wire harnesses from the terminals and remove the battery and tray.

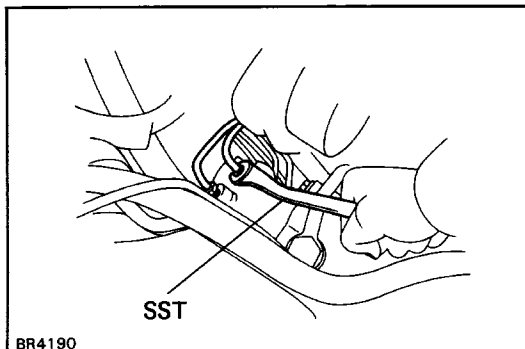
**2. DISCONNECT CONNECTOR**

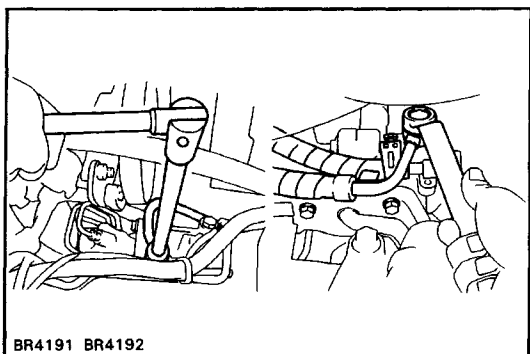
Disconnect the connector from the actuator.

**3. DISCONNECT TWO BRAKE TUBES**

Using SST, disconnect the two brake tubes.

SST 09751-36011





#### 4. DISCONNECT POWER STEERING LINES FROM ACTUATOR

HINT: Turn the steering wheel clockwise until it locks before disconnecting the PS lines. And if you cannot work from the upper side, work from the wheel house.

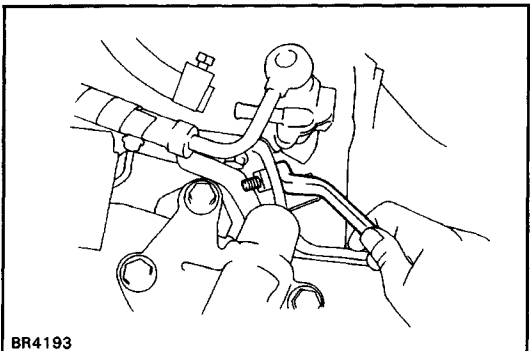
(a) Remove the two union bolts and disconnect the two power steering pressure tubes.

(b) (22R-E Engine)

Disconnect the power steering line hose.

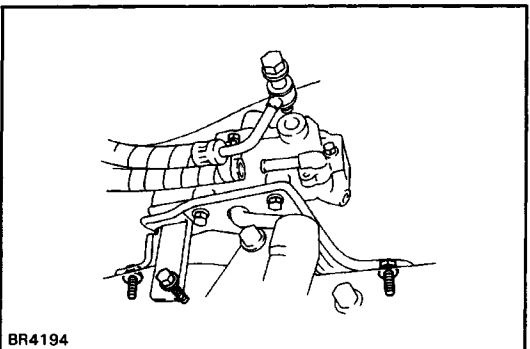
(c) (3VZ-E Engine)

Disconnect the two power steering line hoses.



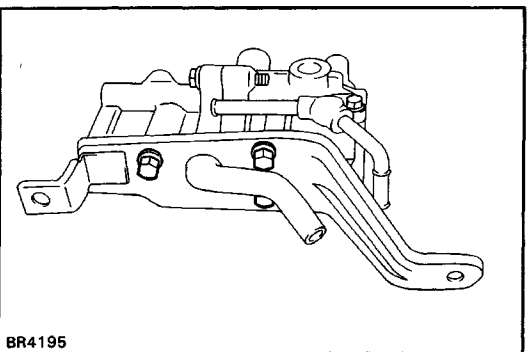
#### 5. REMOVE PS TUBE CLAMP INSTALLATION BOLT

Remove the installation bolt of the power steering tube clamp.



#### 6. REMOVE ACTUATOR

Remove the three bolts and remove the actuator from the wheel house.



#### 7. REMOVE BRACKET FROM ACTUATOR

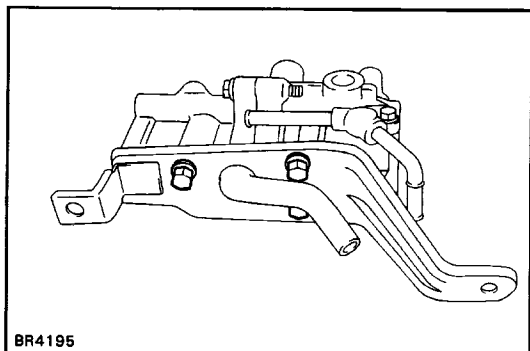
Remove the three bolts and separate the actuator and bracket.

## INSTALLATION OF BRAKE ACTUATOR

### 1. INSTALL BRACKET TO ACTUATOR

Install the bracket to the actuator with the three bolts.

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



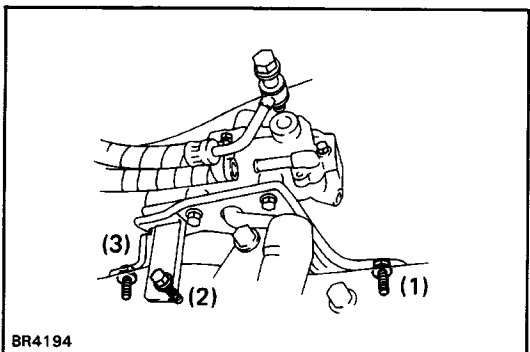
### 2. INSTALL ACTUATOR

Install the actuator in place and tighten the three bolts.

**Torque: 28 N-m (290 kgf-cm, 21 ft-lbf)**

HINT: Install the bolts in following order.

- (1) Front side bolt
- (2) Wheel house side bolt of rear bolts
- (3) Upper side bolt on frame of rear bolts

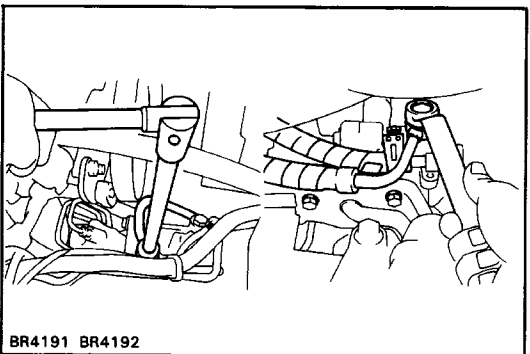


### 3. CONNECT POWER STEERING LINES

- (a) Set the pressure union and new gaskets in place, then install the union bolt.

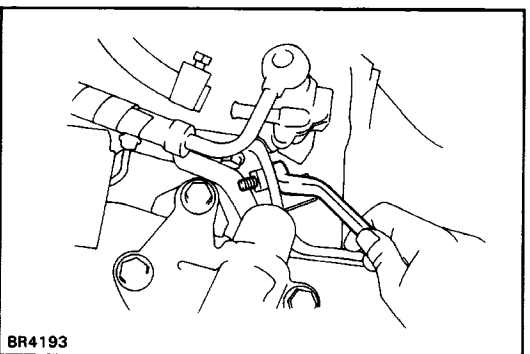
**Torque: 47 N-m (475 kgf-cm, 34 ft-lbf)**

- (b) Similarly connect the other pressure tube.
- (c) Connect the PS line hose to the actuator, then fix it with the hose clamp.
- (d) (3VZ-E Engine)  
Similarly connect the other PS line hose.



### 4. INSTALL PS TUBE CLAMP

Install the PS pressure tube clamp in place and tighten the bolt.

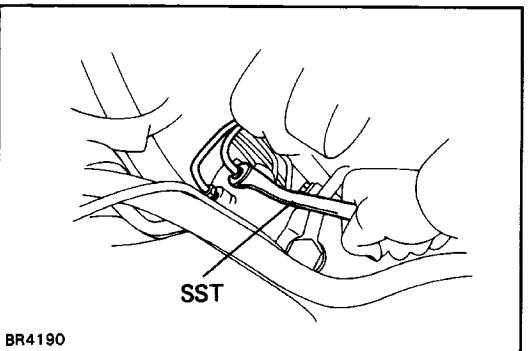


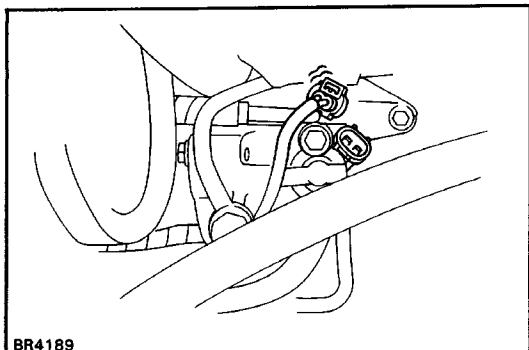
### 5. CONNECT TWO BRAKE TUBES

Using SST, connect the two brake tubes to the actuator.  
SST 09751-36011

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

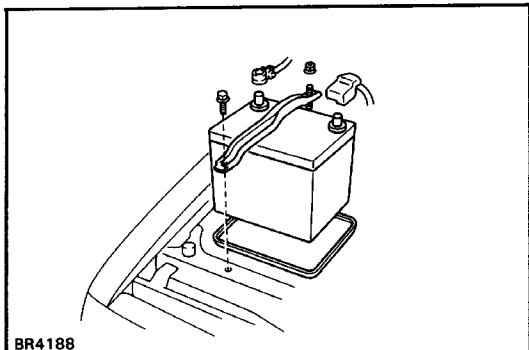
HINT: First connect the painted brake tube to the painted hole of the actuator, then the other.





## 6. CONNECT CONNECTOR

Connect the connector to the actuator.



## 7. INSTALL BATTERY

Install the tray and battery in place, then connect the wire harnesses to the terminals.

## 8. BLEED SYSTEM

- (a) Fill brake reservoir with brake fluid.
- (b) Fill PS reservoir with fluid.

**Fluid type: ATF DEXRON®II**

- (c) Bleed the system.  
(See page [BR-94](#))

## BLEEDING OF REAR-WHEEL ANTI-LOCK BRAKE SYSTEM

HINT: Whenever PS hoses or PS pressure tube are disconnected or actuator is removed from the vehicle, the Rear-Wheel Anti-Lock Brake System should be bled in the following procedure.

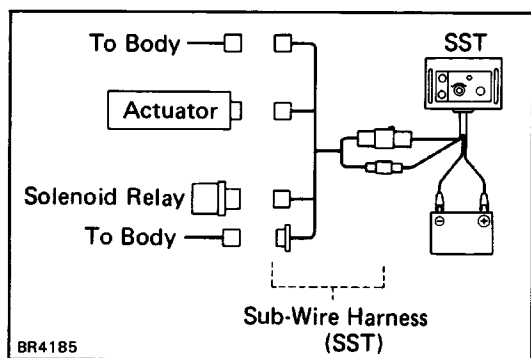
At the other times, use the conventional procedure.

### 1. BLEED POWER STEERING SYSTEM

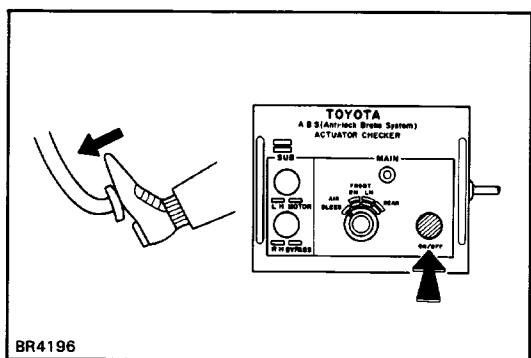
Use the conventional procedure.

### 2. BLEED BRAKE SYSTEM

- (a) Bleed the system with the engine running.
- (b) Bleed the system with the engine off.



BR4185



BR4196

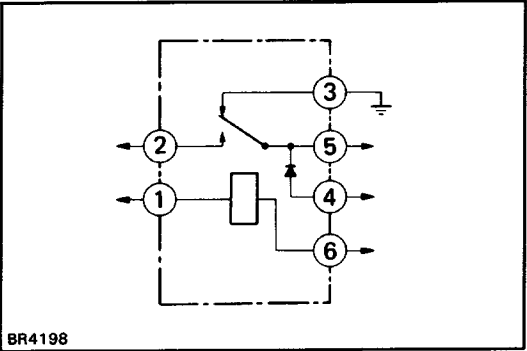
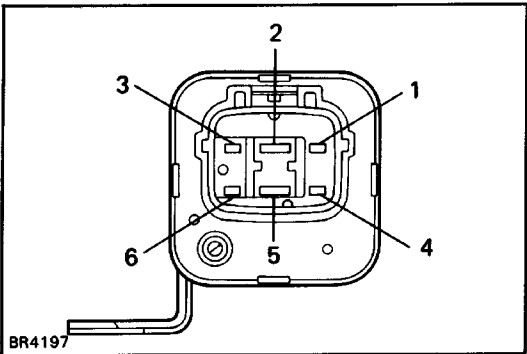
### 3. BLEED POWER STEERING SYSTEM AGAIN

- (a) Disconnect the connector from the actuator.
- (b) Disconnect the connector from the solenoid relay.
- (c) Connect the actuator checker (SST) to the actuator, solenoid relay and body side wire harness through the sub-wire harness (SST) as shown.  
SST 09990-00150 and 09990-00205
- (d) Connect the red cable of the checker to the battery positive (+) terminal and black to the negative (-) terminal.
- (e) Start the engine, and run it at idle.
- (f) Turn the selector switch of actuator checker to "AIR BLEED" position.
- (g) Strongly depress the brake pedal and hold it.
- (h) Push on and release the ON/OFF switch three seconds each for five times.

#### NOTICE:

- To avoid damaging the master cylinder piston cup, do not push on SST switch before depressing the brake pedal and do not release your foot from the brake pedal while SST switch is pushing on.
- Do not keep the ON/OFF switch pushing more than 10 seconds.
- (i) Release the switch, then release the brake pedal.
- (j) Check the PS and brake fluid level, and add the fluid if necessary.
- (k) Remove SST, then connect the connectors of the actuator and solenoid relay.  
SST 09990-00150 and 09990-00205





# Control Relay

## INSPECTION OF SOLENOID RELAY

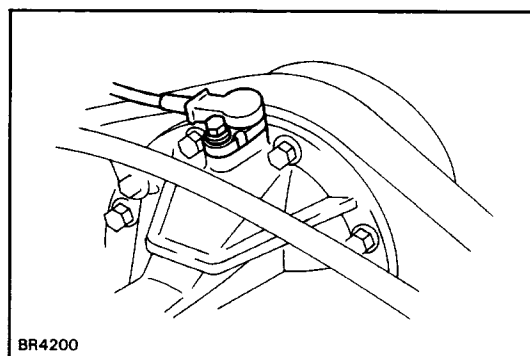
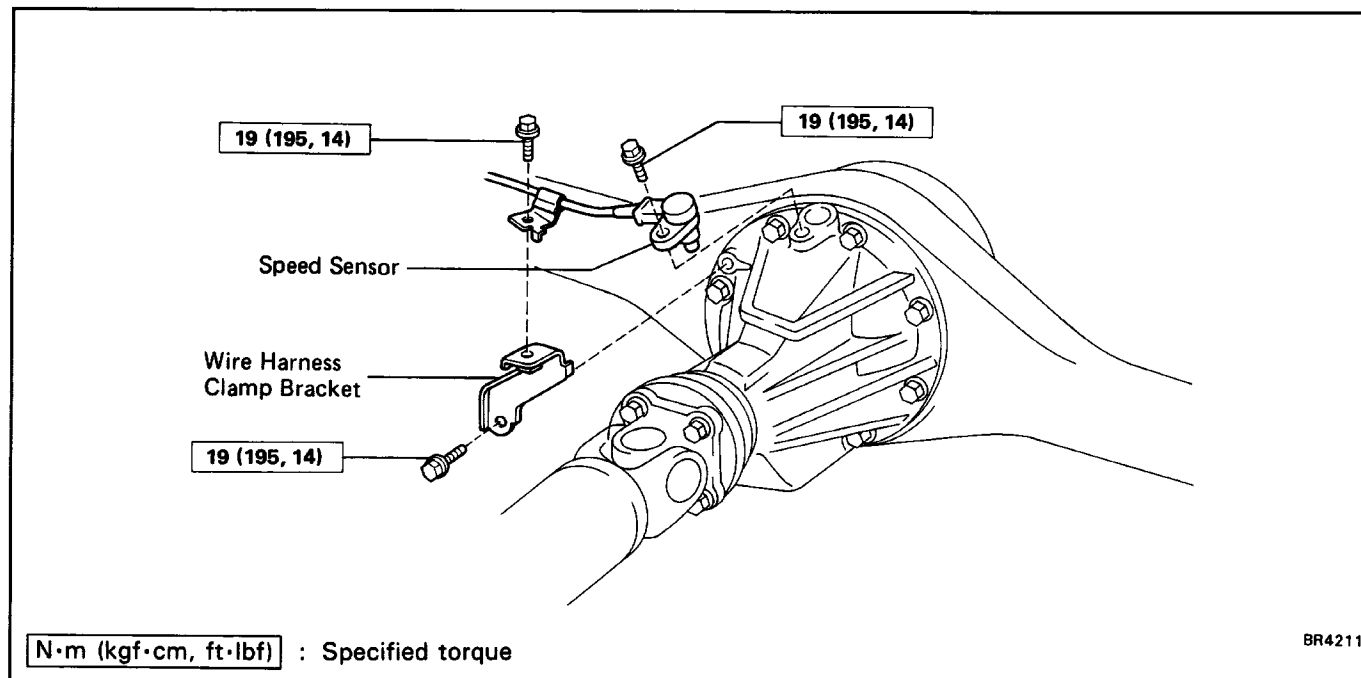
### INSPECT SOLENOID RELAY OPERATION

Inspect the relay continuity between terminals.

Terminal	6	1	2	3	5	4
Condition						
Constant	○	○		○	○	○
Apply battery positive voltage between terminals 1 and '6			○		○	○

If relay operation is not as specified, replace the solenoid relay.

## Speed Sensor



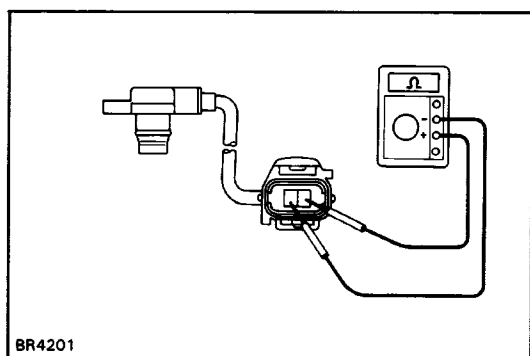
## INSPECTION OF SPEED SENSOR

### 1. INSPECT SENSOR INSTALLATION

Check that the sensor installation bolt is tightened properly.

If not, tighten the bolt.

**Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)**



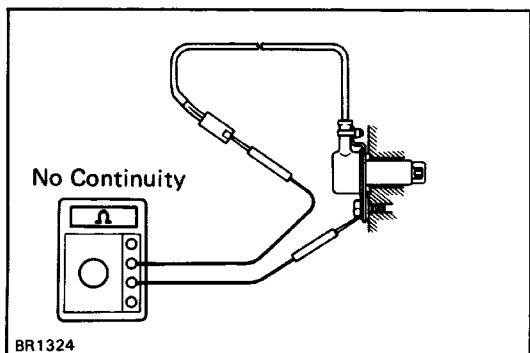
### 2. INSPECT SPEED SENSOR

(a) Disconnect the speed sensor connector.

(b) Measure the resistance between terminals.

**Resistance: 580 – 700**

If resistance value is not as specified, replace the sensor.



(c) Check that there is no continuity between each terminal and sensor body.

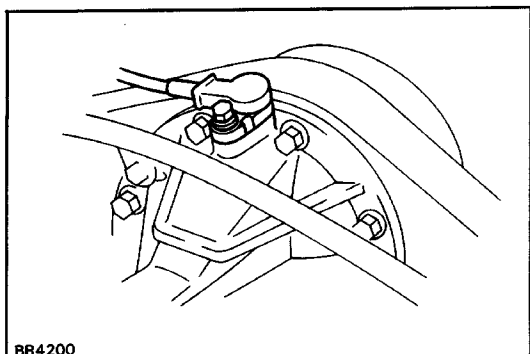
If there is continuity, replace the sensor.

(d) Connect the speed sensor connector.

### 3. VISUALLY INSPECT SENSOR ROTOR SERRATIONS

(a) Disconnect the speed sensor wire harness clamp bolt.

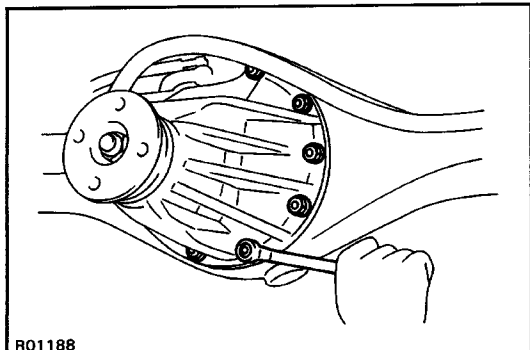
(b) Remove the speed sensor installation bolt and pull out the speed sensor.



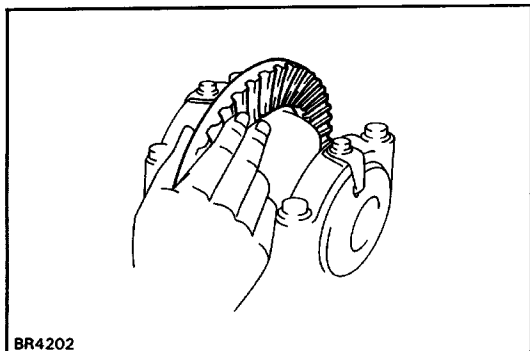
(c) Remove the differential carrier assembly.

(See page [SA-136](#))

**NOTICE:** To prevent damage to the ring gear serrations, do not strike the ring gear.

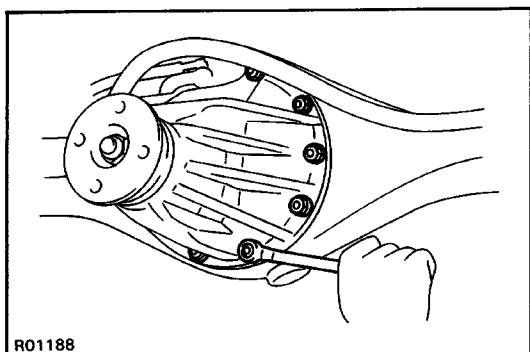


(d) Inspect the ring gear (sensor rotor) serrations for scratches, cracks, warping or missing teeth. If necessary, replace the ring gear.



(e) Install the differential carrier assembly.

(See page [SA-151](#) )

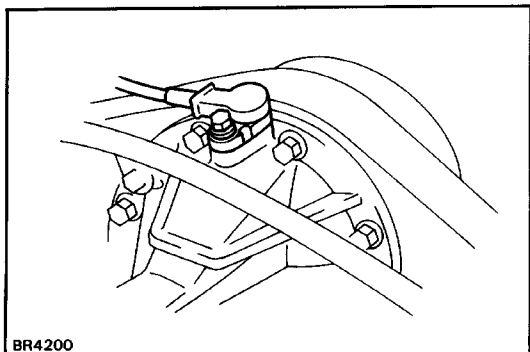


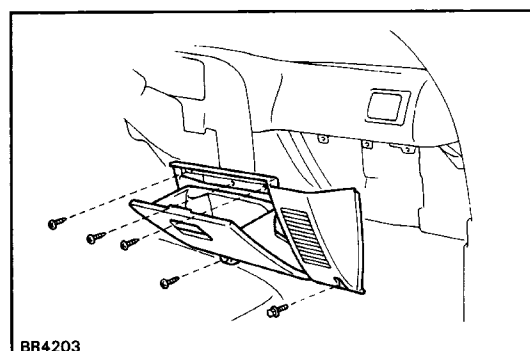
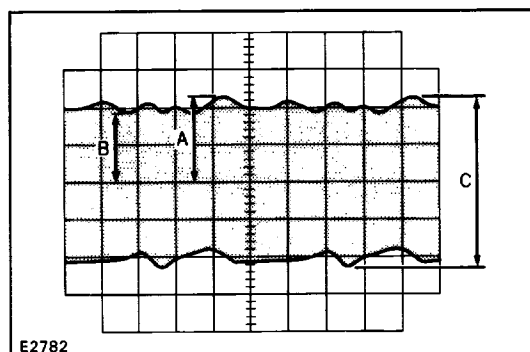
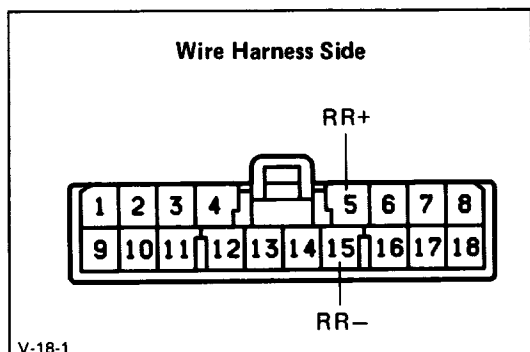
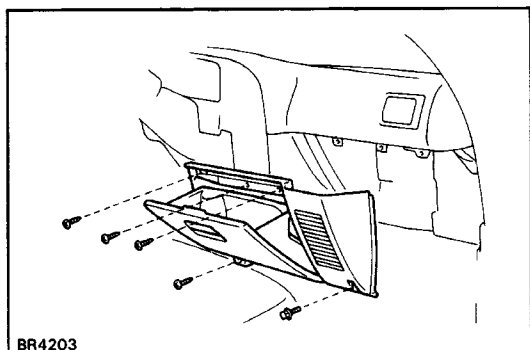
(f) Install the speed sensor and tighten the installation bolt.

**Torque:** 19 N-m (195 kgf-cm, 14 ft-lbf)

(g) Set the speed sensor wire harness clamp in place and tighten the clamp bolt.

**Torque:** 19 N-m (195 kgf-cm, 14 ft-lbf)



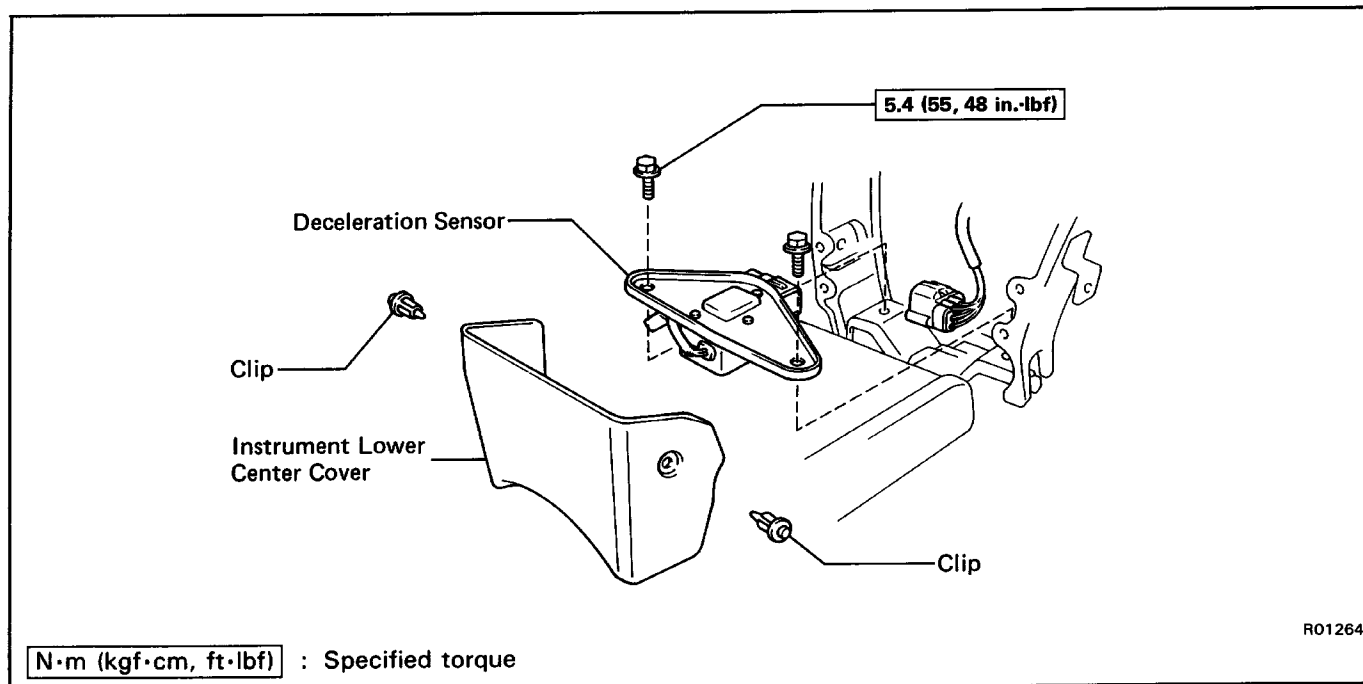


## INSPECTION OF SPEED SENSOR AND SENSOR ROTOR SERRATIONS (REFERENCE)

### INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS BY USING AN OSCILLOSCOPE

- (a) Remove the glove box assembly and disconnect the radio speaker connector.
- (b) Disconnect the connector from the rear-wheel anti-lock brake system ECU.
- (c) Connect an oscilloscope to the terminals RR + and RR - on the wire harness side connector.
- (d) Run the vehicle at 20 km/h (0 2.4 mph), and inspect speed sensor output wave.
- (e) Check that C is 0.4 V or more.  
If it is not as specified, replace the speed sensor.
- (f) Check that B is 70% or more of A.  
If it is not as specified, replace the sensor rotor.
- (g) Remove the oscilloscope and connect the connector to the ECU.
- (h) Connect the radio speaker connector and install the glove box assembly.

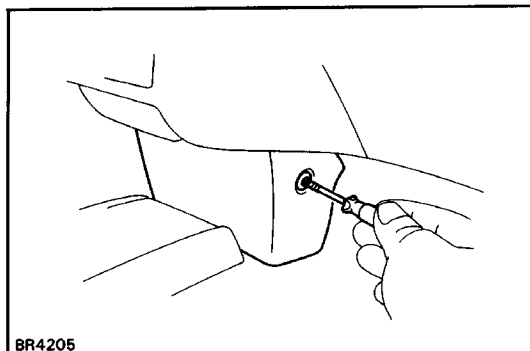
## Deceleration Sensor



## INSPECTION OF DECELERATION SENSOR

### INSPECT SENSOR INSTALLATION

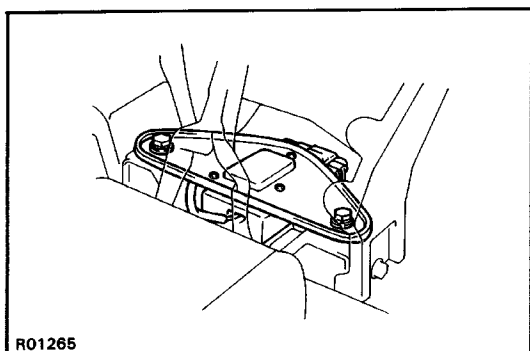
- (a) Remove the two clips, then remove the instrument lower center cover.



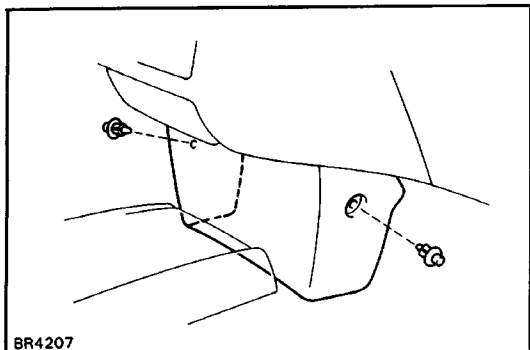
- (b) Inspect that the sensor direction is correct.  
 (c) Check that the sensor installation bolts are tightened properly.

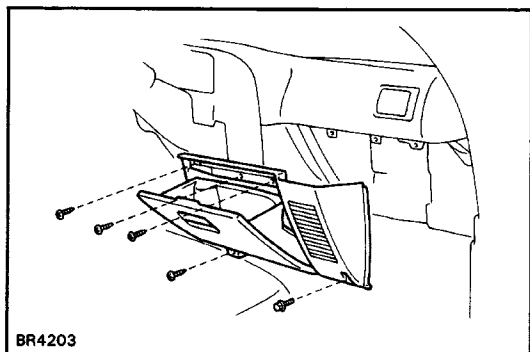
If not, tighten the bolts.

**Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)**

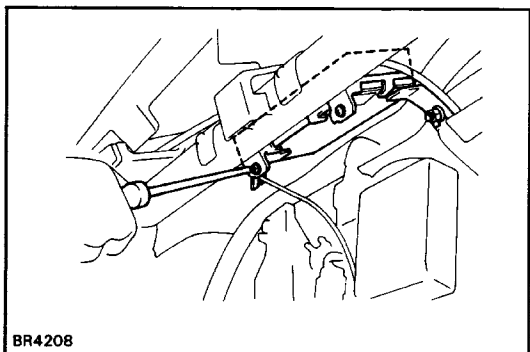


- (d) Install the instrument lower center cover and two clips.





BR4203



BR4208

## Rear-Wheel Anti-Lock Brake System Circuit

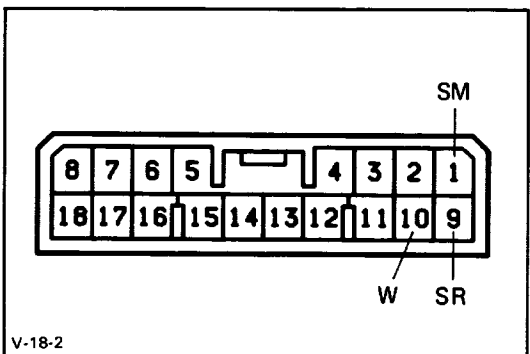
### REMOVAL OF REAR-WHEEL ANTI-LOCK BRAKE SYSTEM ECU

#### 1. REMOVE GLOVE BOX ASSEMBLY

Remove the four screws and a bolt, then remove the glove box assembly and disconnect the radio speaker connector.

#### 2. REMOVE ECU

- (a) Remove the two screws and a nut.
- (b) Pull out the ECU.



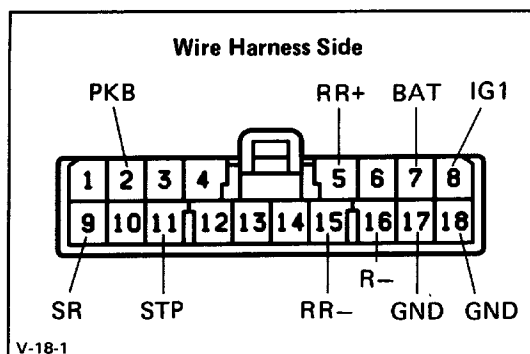
V-18-2

## INSPECTION OF SYSTEM CIRCUIT

### 1. INSPECT SYSTEM CIRCUIT WITH CONNECTOR CONNECTED

Using a voltmeter with high impedance (10 k $\Omega$  minimum), measure the voltage at each terminal and body ground.

Tester Connection	Condition	Voltage	Trouble Part
SM – Body ground	Ignition switch ON	Battery positive voltage	Solenoid relay, Actuator
	Ignition switch ON and "REAR ANTILOCK" warning light goes on	About 0 V	
SR – Body ground	Ignition switch ON	Battery positive voltage	
	Ignition switch ON and "REAR ANTILOCK" warning light goes on	About 0 V	
W – Body ground	Ignition switch ON	Battery positive voltage	Warning light bulb
	Ignition switch ON and "REAR ANTILOCK" warning light goes on	About 0 V	

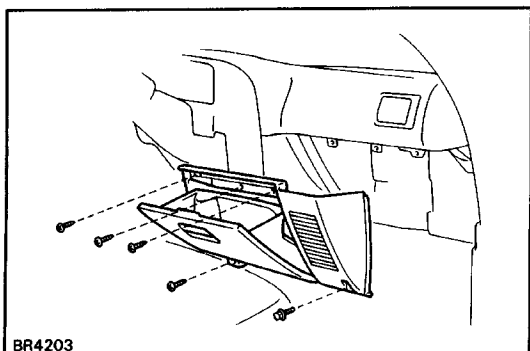


## 2. INSPECT SYSTEM CIRCUIT WITH CONNECTOR DISCONNECTED

- (a) Disconnect the connector from the ECU and inspect at the wire harness side connector.

Tester Connection	Check Item	Condition	Voltage or Resistance Value	Trouble Part
PKB – Body ground	Voltage	Ignition SW on and PKB lever pulled	About 0 V	PKB switch, level warning switch
		Ignition SW on and PKB lever returned	Battery positive voltage	
RR + – RR –	Resistance	—	580 – 700 Ω	Speed sensor
BAT – Body ground	Voltage	—	Battery positive voltage	Wire harness
IG1 – Body ground	Voltage	Ignition SW on	Battery positive voltage	ECU-IG fuse, wire harness
		Ignition SW off	About 0 V	
SR – R –	Resistance	—	80 Ω	Solenoid relay
STP – Body ground	Voltage	Ignition SW off and brake pedal depressed	Battery positive voltage	Stop light switch, stop light
	Continuity	Ignition SW off and brake pedal returned	Continuity	
GND – Body ground	Continuity	—	Continuity	Wire harness

- If the circuit is not as specified, check and repair or replace the trouble part shown in the table above.
- (b) Connect the connector.



## INSTALLATION OF ECU

### 1. INSTALL ECU

Install the ECU in place with a nut and two screws.

### 2. INSTALL GLOVE BOX ASSEMBLY

Connect the radio speaker connector and install the glove box assembly in place and install the four screws and a bolt.