

BRAKES

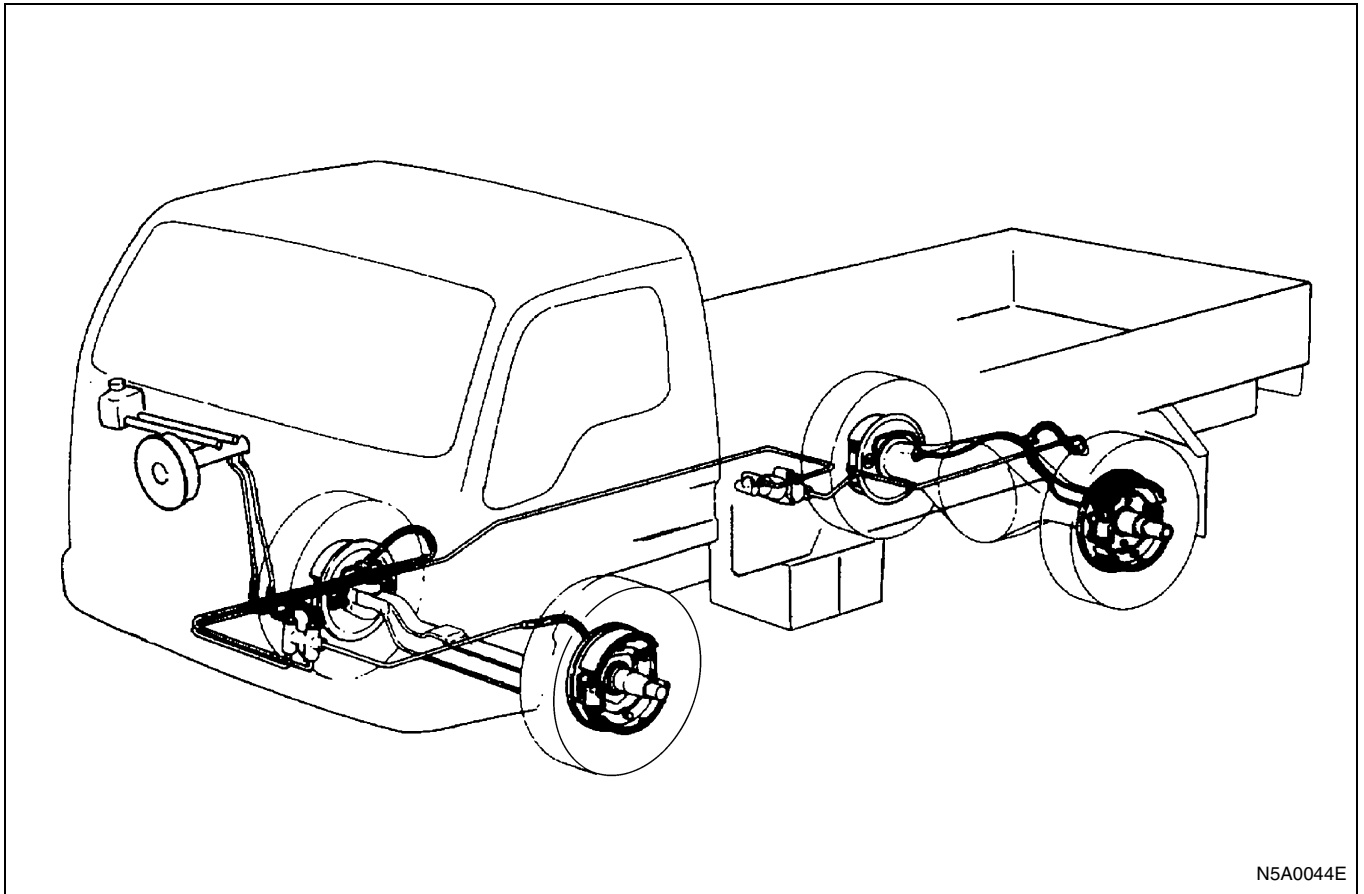
SECTION 5A HYDRAULIC BRAKES

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GENERAL DESCRIPTION

Hydraulic Brake System

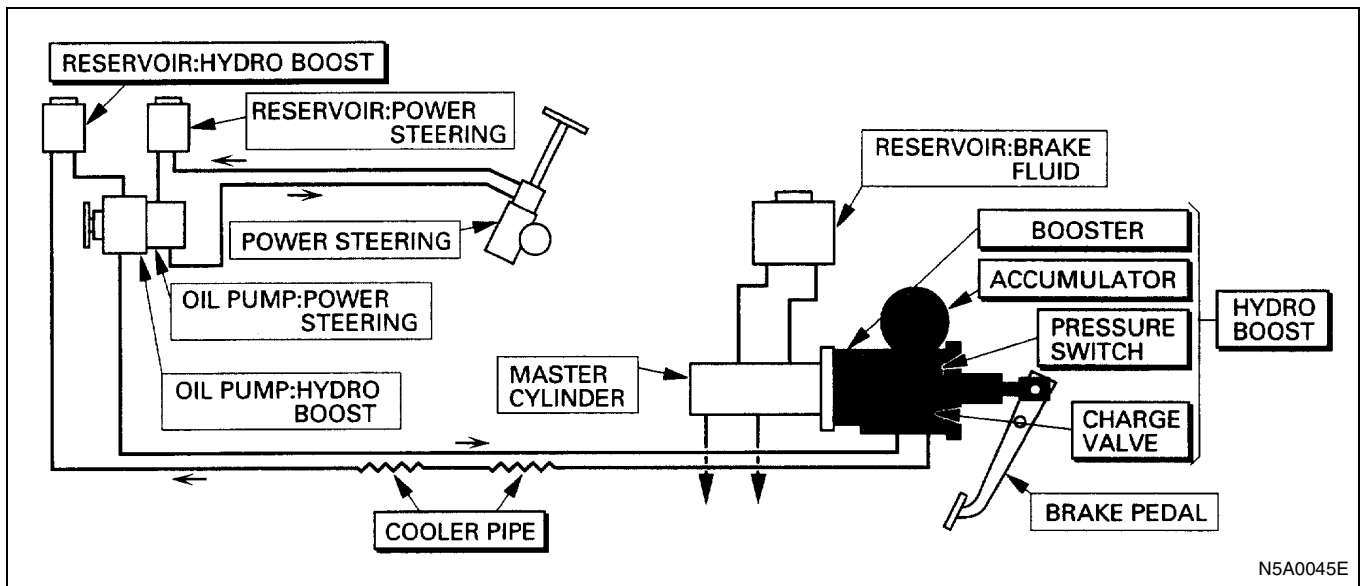


The brake system has dual hydraulic circuit with vacuum booster (Master-vac).

The master cylinders and the wheel cylinders at the front and rear of the vehicle are connected by steel piping and flexible hoses.

The vacuum booster is connected to the vacuum pump through the vacuum tank. This provides the most effective vacuum assist.

Hydraulic Booster Brake system



The hydro boost system, which functions as a brake force boosting device that allows the brake to be operated with less force than otherwise, includes the hydro boost, which has the booster, accumulator, charge valve, and pressure switch in an integrated structure, a reservoir, and a cooler pipe.

Functions of the Main Constituent Parts

Booster:

Controls the hydraulic oil ejected from the oil pump and amplifies the force on the pedal.

Accumulator:

Accumulates the hydraulic oil under pressure for the boosting operation after the pump stops.

Charge valve:

Performs switching operation and feeds the hydraulic oil to the accumulator when the accumulator oil pressure declines.

Pressure switch:

Detects that the accumulator oil pressure has declined to the warning set pressure and operates the warning buzzer.

Oil pump:

Is driven by the engine rotation and feeds the hydraulic oil to the hydro boost through the piping.

Reservoir:

The pump stores the hydraulic oil for doing suction and expulsion.

Cooler pipe:

Located before the radiator, facilitates heat radiation of the hydraulic oil in the system piping, and inhibits an increase in the temperature of the oil.

Other units relating to this system include, as shown in the figure, the power steering, the pump and reservoir for the power steering, the master cylinder, which receives the output of the hydro boost and activates the brake, the reservoir for the master cylinder, and the brake pedal that activates the booster.

The master cylinder is integrally bolted to the booster of the hydro boost. The pump for the power steering is integrated as a tandem pump that shares the hydro boost pump and the drive unit. But as systems, the hydro boost and the power steering are independent of each other, and their reservoirs are separate as well.

Booster Assembly

The hydraulic booster is a device that applies force to the master cylinder when the brake pedal is applied. The fluid flowing through the booster head is controlled by brake pedal movement.

The hydraulic booster cylinder rod attaches to a piston that connects with the spool valve. This assembly moves when brake pedal pressure is applied. The spool valve restricts fluid flow and builds pressure on one side of the piston. The pressure overcomes the return spring and moves the piston to a balanced position. As the piston moves, it pushes the cylinder rod and applies pressure to the master cylinder.

A relief valve inside the pump limits the pressure to 11,770 kPa (120 kg/cm² / 1707 psi). This pressure level provides good braking without damaging the brake pipes or hoses. When actuated, the relief valve allows fluid to bypass the piston.

Fluid and Fluid Handling

This system uses no special fluids. However, care must be taken to use the correct fluids. The master cylinder and brake system uses brake fluid, while the hydraulic brake booster pump uses power steering fluid.

Substandard or Contaminated Fluid

Notice:

Hydraulic brake systems use two distinct and incompatible fluids. Power steering fluid is used in the hydraulic booster brake system. Brake fluid is used in the master cylinder and brake pipes to the wheels. Be extremely careful when selecting brake system fluids or seal damage can result. Refer to Section 0B MAINTENANCE AND LUBRICATION to select the correct fluid.

Notice:

Do not reuse brake system fluids. Do not mix power steering fluid with brake fluid. Swelling and deterioration of rubber parts can result from fluid contamination. This can lead to reduced brake performance and the eventual loss of braking capability.

Contaminated fluid causes swelling and deterioration of rubber parts that can lead to reduced brake performance and the eventual loss of braking capability. Check the condition of the fluid at regular intervals and note any unusual consistency, color, and signs of contaminants in the fluid. Do not reuse brake system fluids. Always discard used fluids. Do not mix power steering fluid with hydraulic brake fluid. If contamination occurs, flush the hydraulic booster system with clean power steering fluid.

Booster components bench servicing should be done in a clean work area separated from the brake servicing area. Wash hands before changing between brake or booster work areas. Do not use the same containers for fluids.

Flushing the Hydraulic Booster System

Flushing is required when dirt, sludge, or water is found in the system. Flushing involves running clean fluid through the system until the draining fluid appears the same as clean fluid.

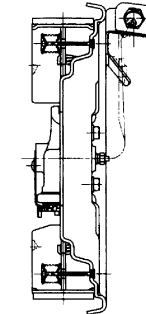
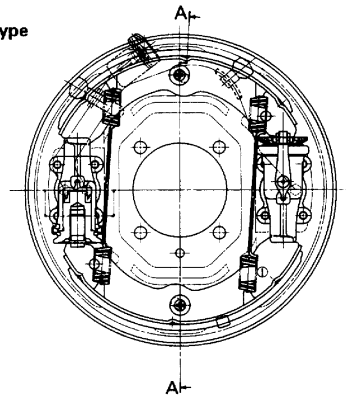
Contaminated fluid in the booster system can cause rubber parts to deteriorate.

The hydraulic booster system should be cleaned and flushed when the hydraulic pump is replaced.

Metal shavings from a worn hydraulic pump often contaminate the system. Pipes and hoses should be removed and blown clean of all metal shavings.

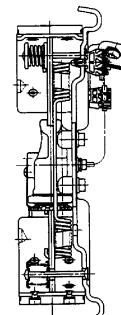
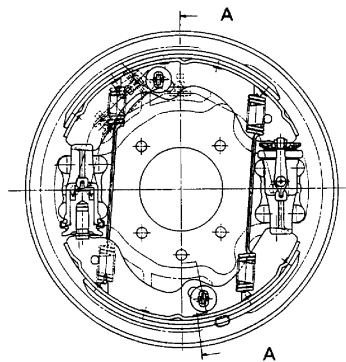
Front Drum Brake Drum Inside Diameter

279.4 & 300 mm – 2L Type



Section A-A

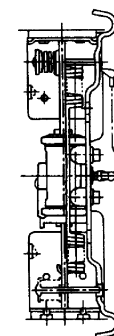
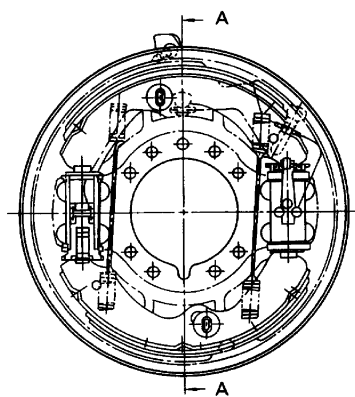
320 mm – 2L Type



Section A-A

N5A0047E

NPS



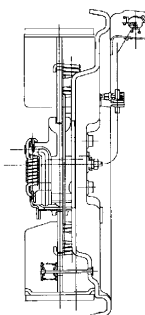
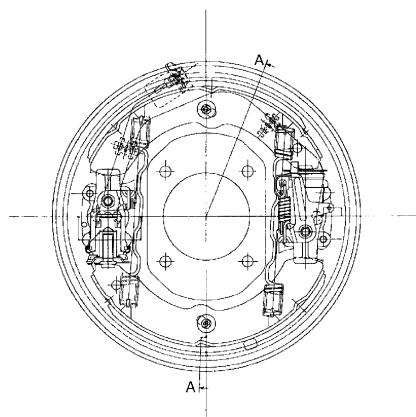
Section A-A

N5A0048E

Front Drum Brake (Auto-adjuster Type)

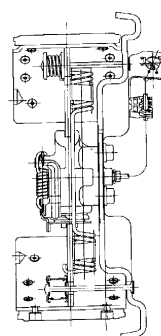
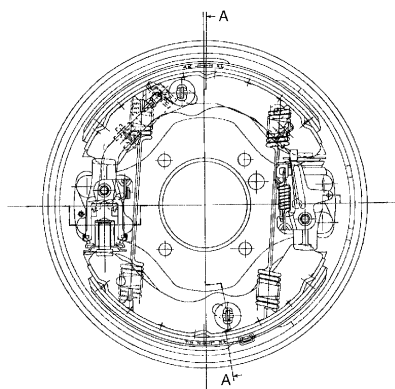
Drum Inside Diameter

300mm - 2L Type



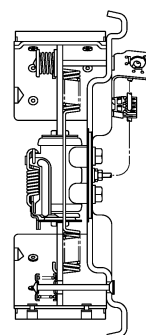
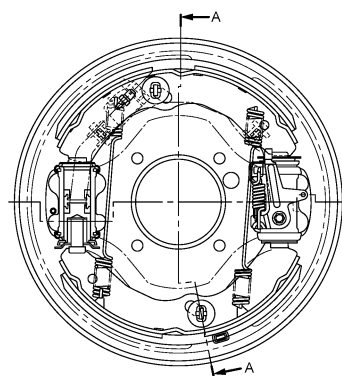
Section A-A

320mm - 2L Type



Section A-A

320mm - D2L Type

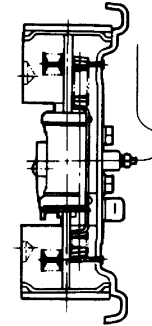
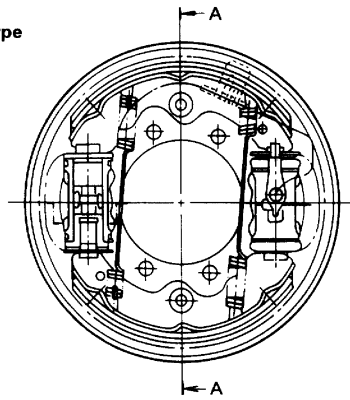


Section A-A

Rear Drum Brake (Manual Adjuster Type)

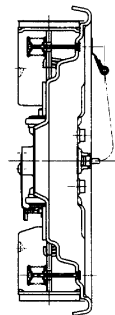
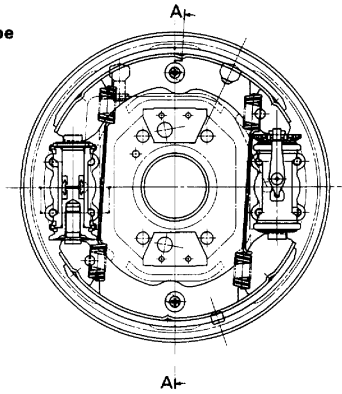
Drum Inside Diameter

228.6 mm – D2L Type



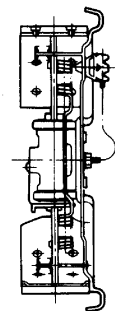
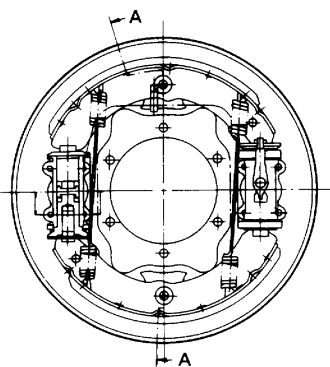
Section A-A

279.4 mm – D2L Type



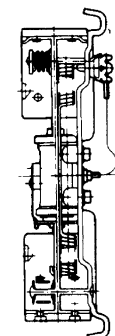
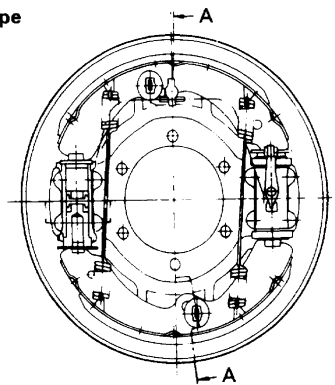
Section A-A

300 mm – D2L Type



Section A-A

320 mm – D2L Type

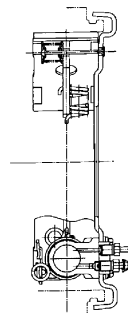
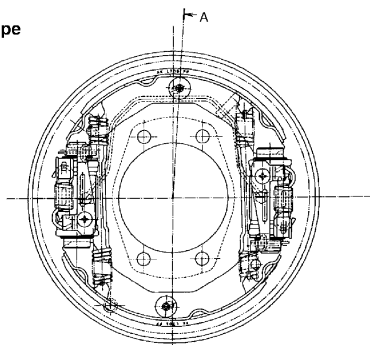


Section A-A

Rear Drum Brake (Auto-Adjuster Type)

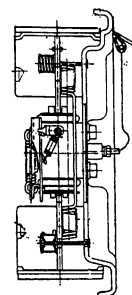
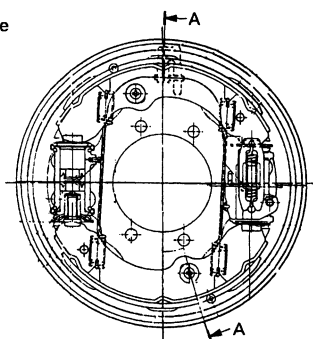
Drum Inside Diameter

240mm - D2L Type



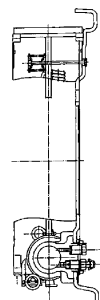
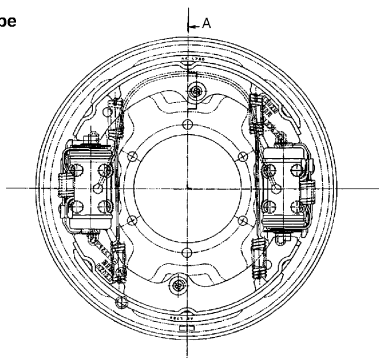
Section A-A

260mm - D2L Type



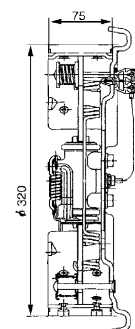
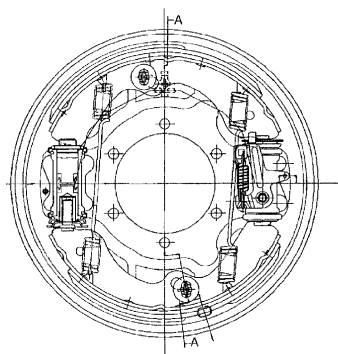
Section A-A

290mm - D2L Type



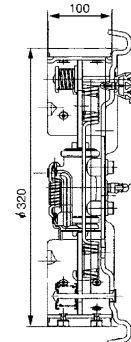
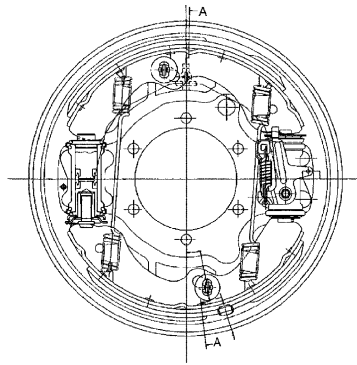
Section A-A

320mm - D2L Type



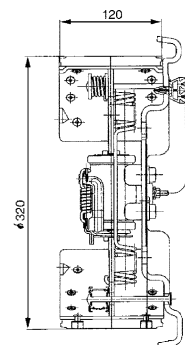
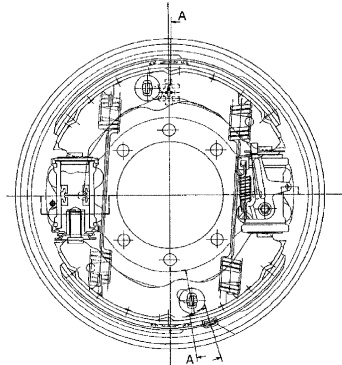
Section A-A

320mm - D2L Type



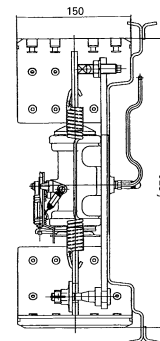
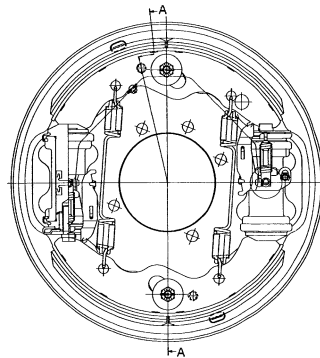
Section A-A

320mm - D2L Type



Section A-A

370mm - D2L Type



Section A-A

N5A0054E

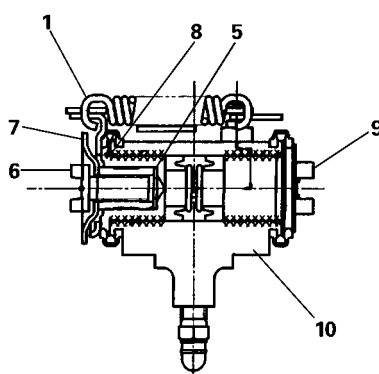
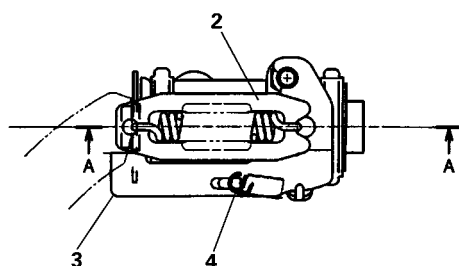
The dual two leading shoe type brake eliminates the problem of weaker braking force on reverse stops common to two leading shoe type brakes while maintaining the many advantages of this type of brake.

This combination of two leading shoes provides nearly equal braking force. This prevents an uneven load distribution on the wheel hub bearings.

This type of brakes is widely used on the rear wheels of many vehicles.

Auto-Adjuster

Drum Inside Diameter 260 mm

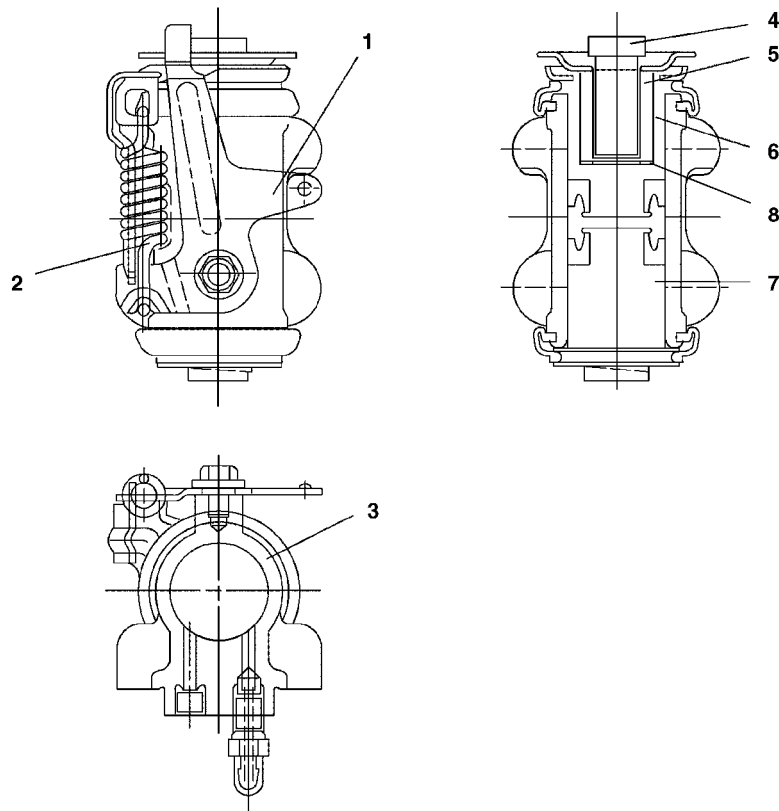


Section A-A

N5A0055E

Legend

- | | |
|------------------------|---------------------------------|
| 1. Over-travel spring | 6. Adjust screw |
| 2. Fitting | 7. Adjust gear and nut assembly |
| 3. Adjust lever | 8. Piston and bracket assembly |
| 4. Lever return spring | 9. Anchor piston |
| 5. Washer | 10. Body |

Drum Inside Diameter 300 mm, 320 mm

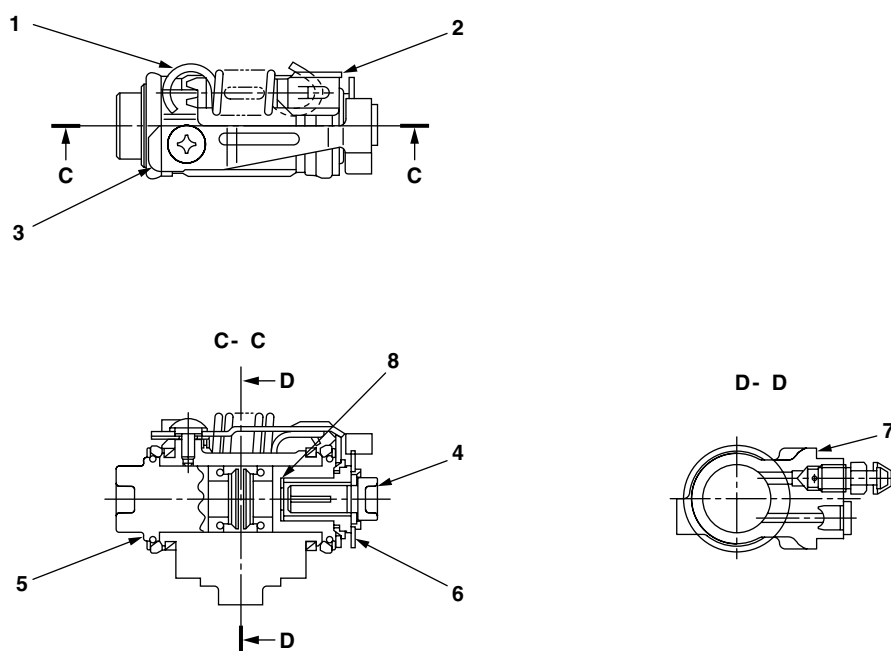
N5A0056E

Legend

- | | |
|---|---------------------------------|
| 1. Adjust lever | 5. Adjust gear and nut assembly |
| 2. Over-travel spring and fitting (Bracket) (including:
lever return spring) | 6. Piston and bracket assembly |
| 3. Body | 7. Anchor piston |
| 4. Adjust screw | 8. Washer |

5A-12 HYDRAULIC BRAKES

Drum Inside Diameter 240 mm

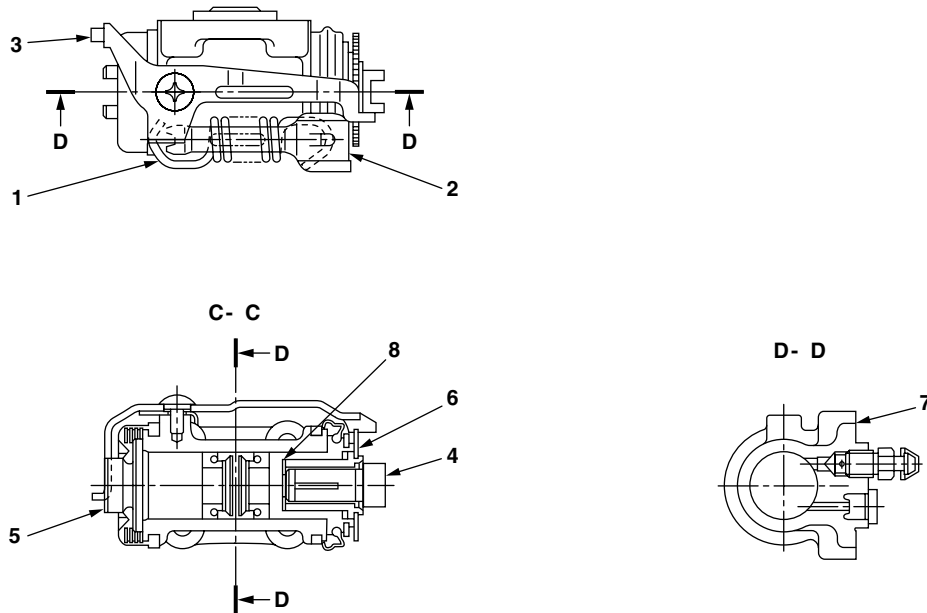


N5A0057E

Legend

- | | |
|--------------------------------|---------------------------------|
| 1. Overtravel spring | 5. Anchor piston |
| 2. Piston and bracket assembly | 6. Adjust gear and nut assembly |
| 3. Adjust lever | 7. Body |
| 4. Adjust screw | 8. Washer |

Drum Inside Diameter 290 mm



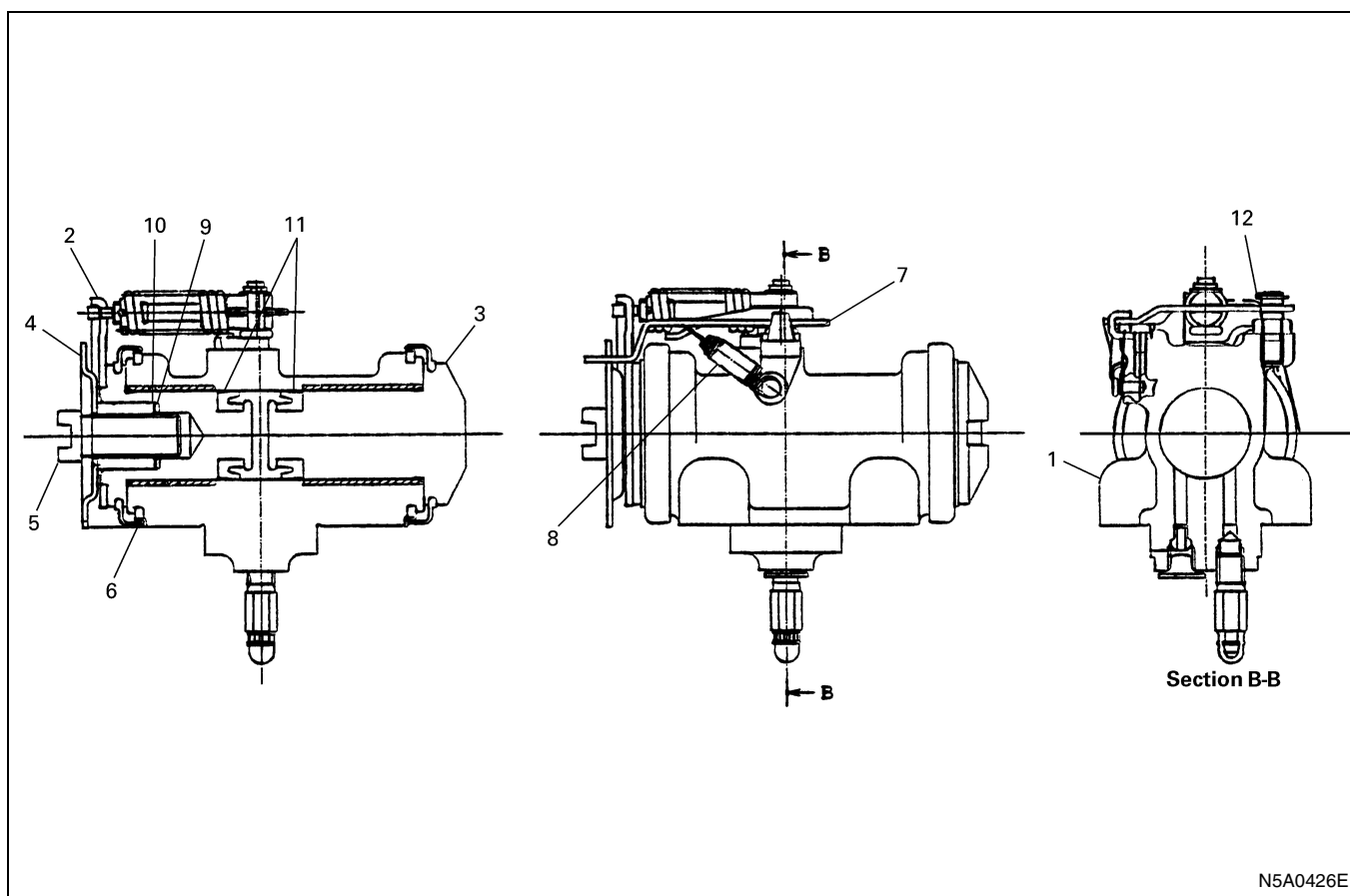
N5A0058E

Legend

- | | |
|--------------------------------|---------------------------------|
| 1. Overtravel spring | 5. Anchor piston |
| 2. Piston and bracket assembly | 6. Adjust gear and nut assembly |
| 3. Adjust lever | 7. Body |
| 4. Adjust screw | 8. Washer |

5A-14 HYDRAULIC BRAKES

Drum Inside Diameter 370 mm

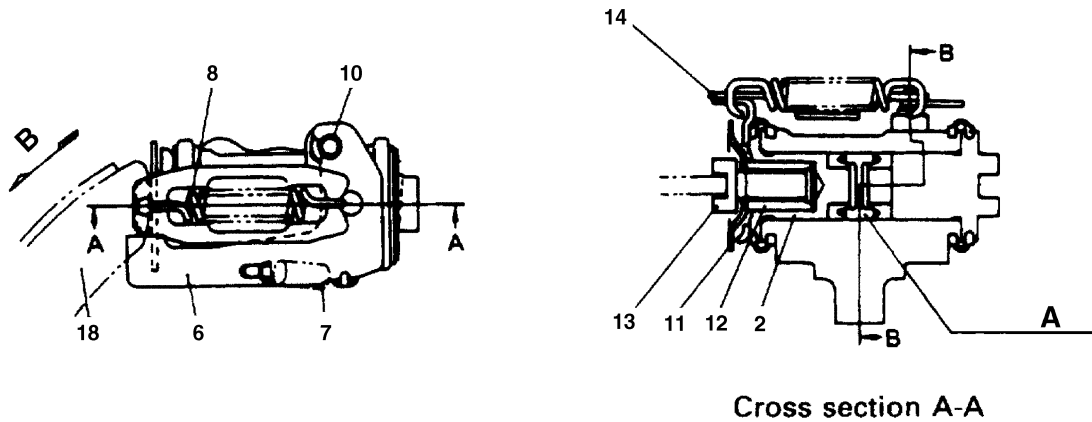


N5A0426E

Legend

- | | |
|--------------------------------|----------------------|
| 1. Body | 7. Lever assembly |
| 2. Piston and bracket assembly | 8. Spring |
| 3. Anchor piston | 9. Plain washer |
| 4. Gear and nut assembly | 10. Plain washer |
| 5. Adjust screw | 11. Cup |
| 6. Boot | 12. Snap ring-E type |

Operation of Auto-adjuster



N5A0059E

Legend

A. Oil chamber

B. Rotational direction of the drum (forward)

The entire auto-adjust mechanism is incorporated into the wheel cylinder assembly, and the adjust operation is carried out only when in the forward movement.

The operation of the auto-adjuster is as follows:

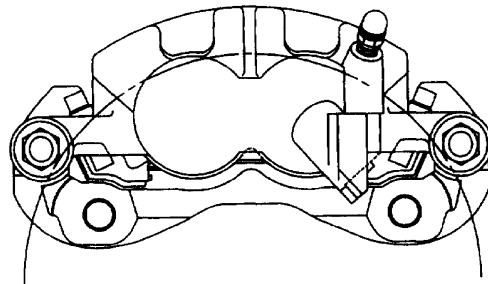
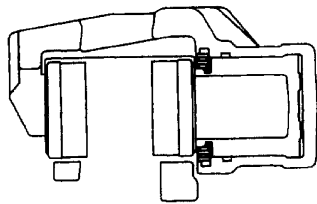
- When fluid pressure is applied to the oil chamber (A), the piston, which is resistant to the over-travel spring installed between the bracket (14) and the adjust lever (6), is forced out to the brake shoe (18) side. (The piston and bracket are welded into a monolithic construction.)
- When force delivered by the over-travel spring (18) is intensified as the piston (2) moves, the balance maintained with the lever return spring (7) installed between the adjust lever (6) and lever pin (10) is destroyed, and the adjust lever (6) with the lever pin (10) as a pivot, rotates the adjust gear (11) in the rotational direction.
- When the shoe clearance (clearance between the brake shoe and the brake drum) gets to the specified value, the adjust lever (6) adjusts the shoe clearance by driving one gear tooth or more of the adjust gear (11) in the rotational direction through the force of the over-travel spring (8).
- When the brake shoe (18) comes into contact with the brake drum, the frictional force generated between the adjust screw (13) and the adjust nut (12) gets larger, and the adjust gear (11) cannot be rotated by the force of the over-travel spring (8). (The adjust gear and the adjust nut are welded into a monolithic construction.) That is, the automatic adjustment of the shoe clearance is carried out until the brake shoe comes in touch with brake drum. However, over adjust can be avoided since this automatic adjustment will not be performed for the increased amount of the piston shift caused by the

deformation of the drum and shoe after their contact.

- When the fluid pressure is released from the oil chamber (A), the force by which the lever return spring (7) rotates the adjust gear (6) adversely gets weaker than the frictional force generated between the adjust screw (13) and the adjust nut (12), therefore, the adjust lever (6) slides on the adjust gear (11) to get back to its former state before operation and this operation is completed with the adjust gear (11) left in the state in the rotational direction into which it has been driven.

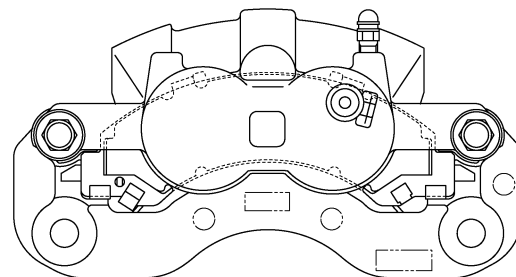
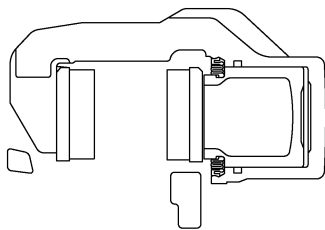
Front Disc Brake

Independent Suspension Models



N5A0407E

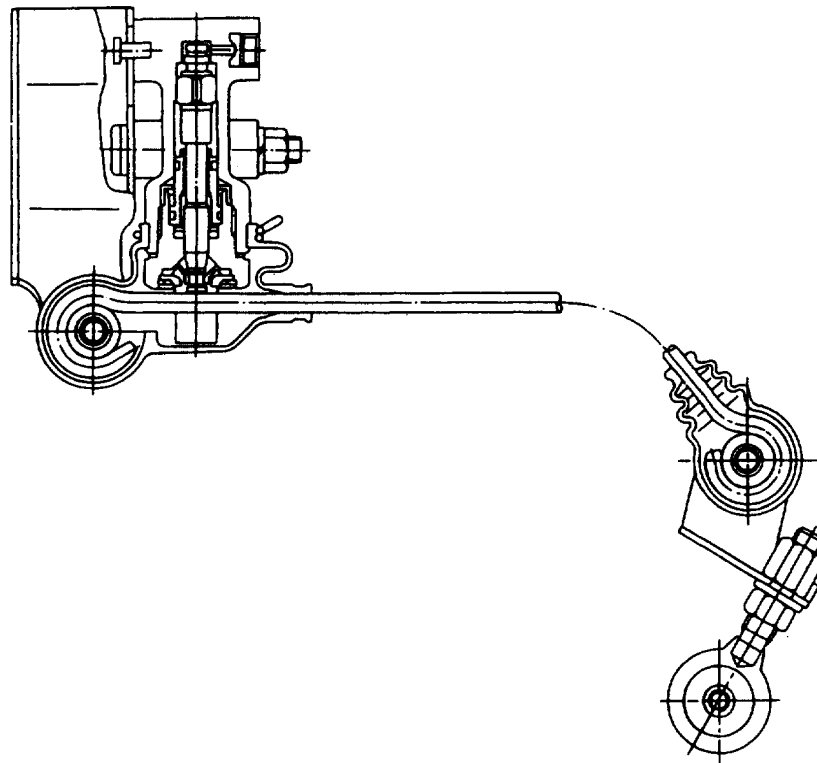
Leaf Spring Suspension Models (Rigid Axle Type)



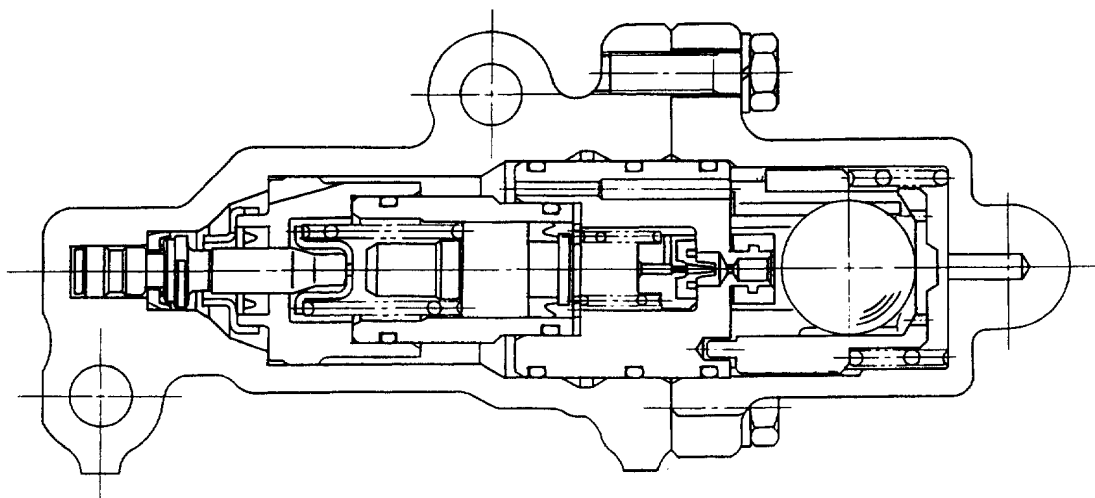
N5A0060E

The disc brake assembly consists of a caliper, piston, disc, pad assembly and support bracket.

The caliper assembly has two bores and is mounted to the support bracket with 2 mounting bolts. The support bracket allows the caliper to move laterally against the disc. The caliper is a one-piece casting with the inboard side containing the piston bore. A square cut rubber seal is located in a groove in the piston bore which provides the hydraulic seal between the piston and the cylinder wall.

Load Sensing Proportioning Valve (LSPV)

N5A0061E

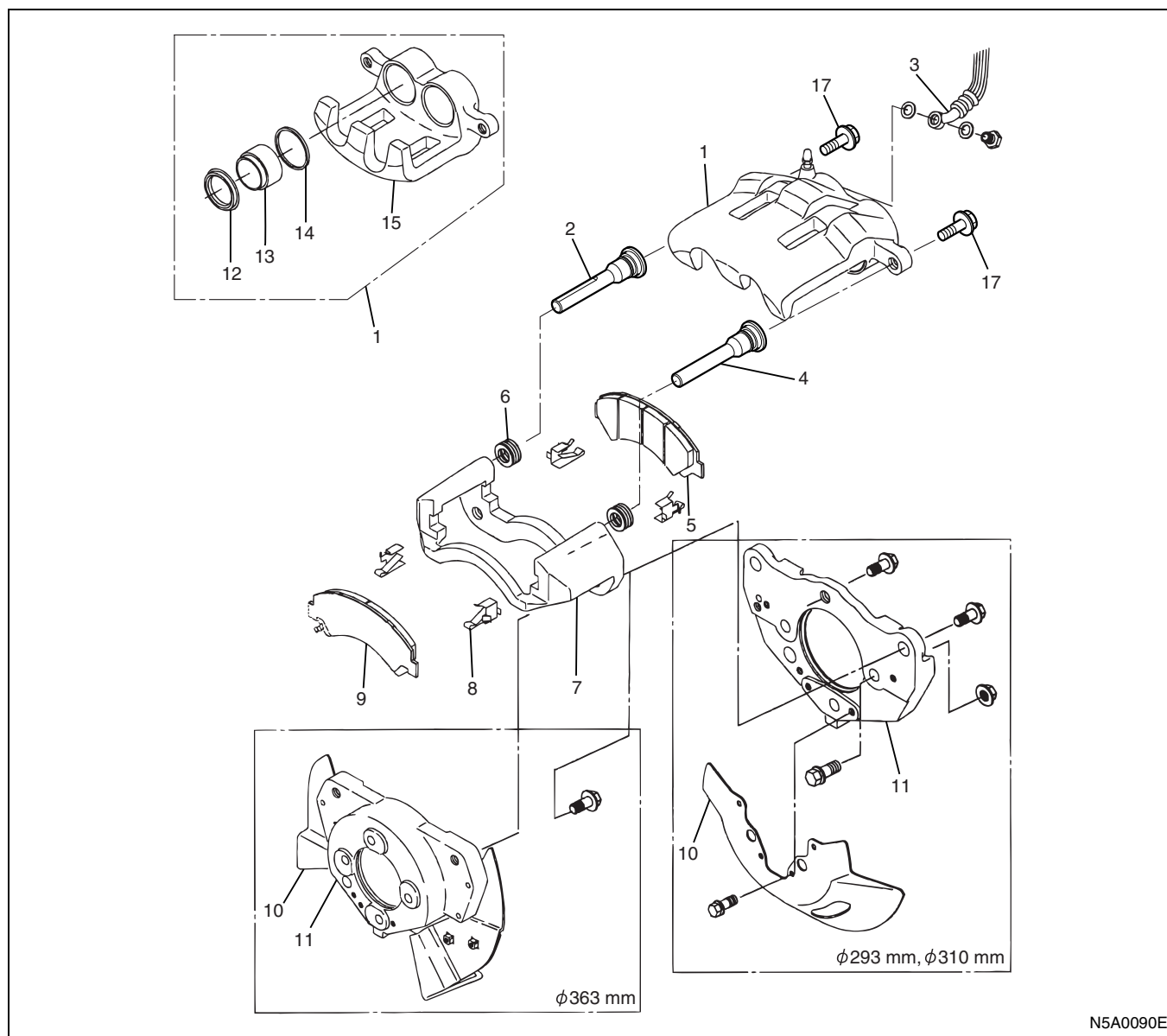
Deceleration Sensing Proportioning Valve (DSPV)

N5A0062E

ON-VEHICLE SERVICE

Front Disc Brake Assembly

Leaf Spring Suspension Models (ø293, ø310 and ø363 mm)



N5A0090E

Legend

- | | |
|------------------------|----------------------------|
| 1. Caliper assembly | 9. Outer pad (Pad Kit) |
| 2. Guide pin (Green) | 10. Wind guide |
| 3. Flexible hose | 11. Adapter |
| 4. Lock pin (Yellow) | 12. Piston boot (Seal Kit) |
| 5. Inner pad (Pad Kit) | 13. Piston |
| 6. Pin boot (Seal Kit) | 14. Piston seal (Seal Kit) |
| 7. Support assembly | 15. Body assembly |
| 8. Pad clip | 16. Pin bolt |

Removal

Position jack stands under vehicle.

Notice:

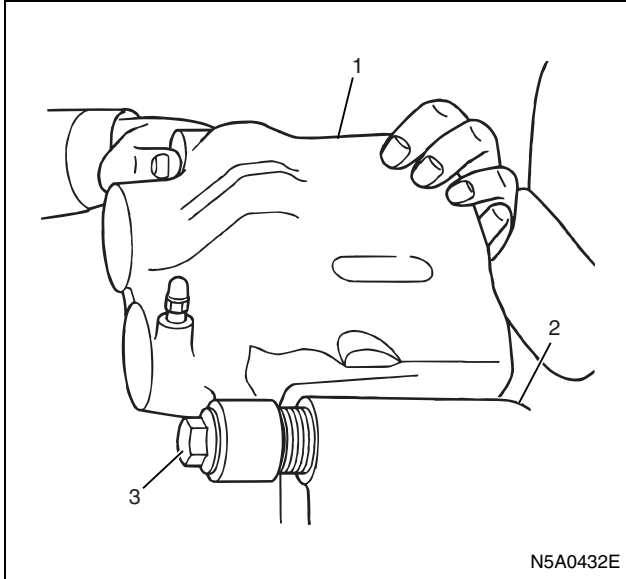
- Block vehicle wheels and apply the parking brake.
- Rise the axle to clear the tire from the ground.

- Remove the wheel.

Notice:

Seal parts cannot be reused. When reassembling, be sure to replace with a new seal kit.

1. Flexible hose
2. Pin bolt (Lock pin side)
3. Caliper assembly
 - Slide the caliper assembly free from the inside.

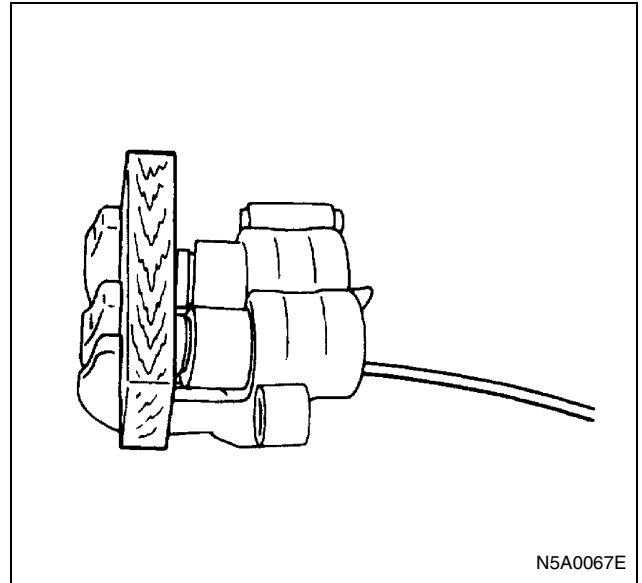


Legend

1. Caliper Assembly
2. Support Assembly
3. Pin Bolt
4. Outer pad
5. Inner pad
6. Pad clips
7. Support assembly
 - Remove the hub and disc before removing the support assembly.
8. Wind guide
 - Remove the hub and disc before removing the wind guide.
9. Adapter

Disassembly

1. Place a piece of wood across the body assembly to prevent piston damage.
2. Apply approximately 196 kPa (2.0 kg/cm² / 28.4 psi) of compressed air to the body assembly oil port to remove the pistons.

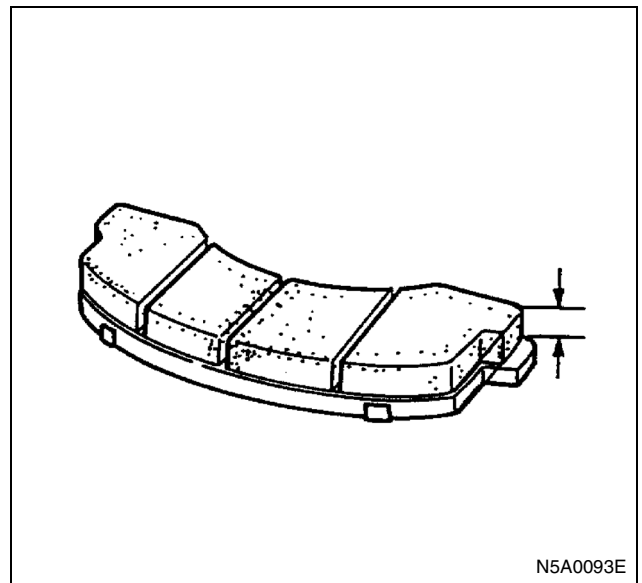


Inspection

1. All parts for wear distortion or other conditions and replace as needed.
2. Inner and outer pads.
 - Use a vernier caliper to measure the inner pad and outer pad thickness.

Pad Thickness		mm (in)
Standard	Limit	
13 (0.51)	1 (0.04)	

- If the measured value is less than the specified limit, the pads must be replaced with the repair pad kit.



3. Piston and Cylinder Clearance.

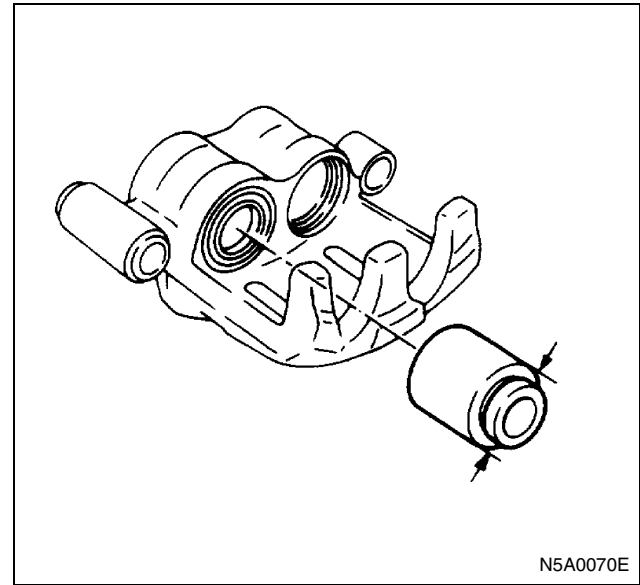
- Use a micrometer to measure the piston diameter.
- Use an inside dial indicator to measure the cylinder bore.

5A-20 HYDRAULIC BRAKES

- Calculate the piston and cylinder bore clearance.

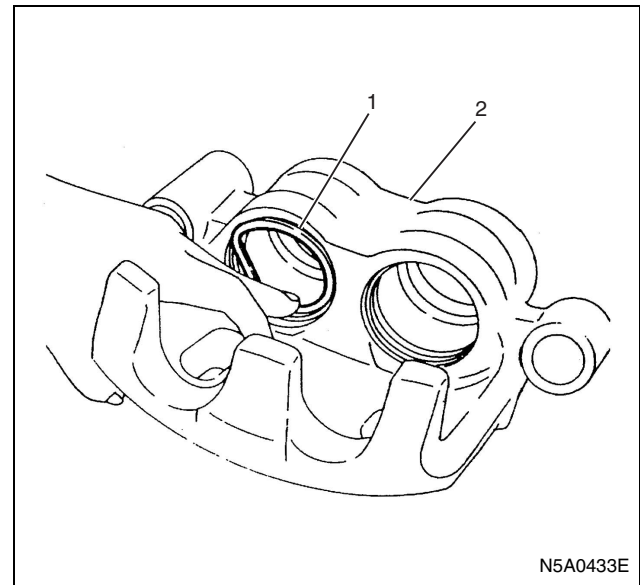
Piston and cylinder bore clearance		mm (in)
Standard	Limit	
0.08 — 0.18 (0.003 — 0.007)	0.23 (0.009)	

- If the clearance exceeds the specified limit, the piston and/or the body assembly must be replaced along with the repair seal kit.



Reassembly

1. Piston Seal
 - Be sure to use a new seal ring.
 - Apply rubber grease to the piston seal. The rubber grease is included in the seal kit.
 - Install the piston seal to the cylinder bore groove.

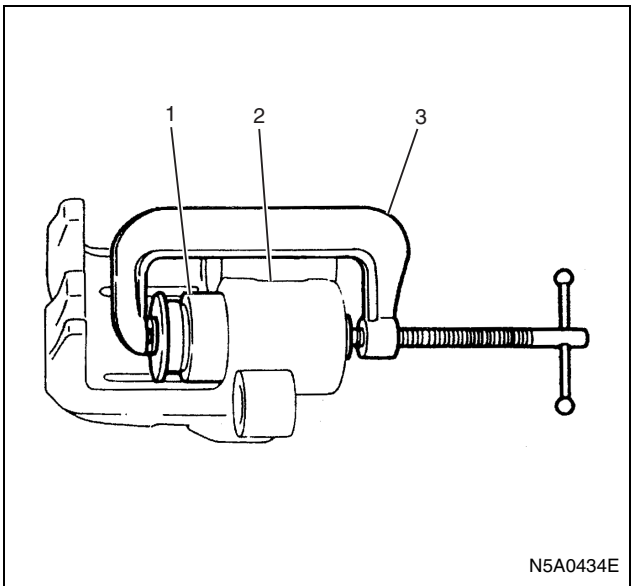


Legend

1. Piston Seal
2. Body Assembly

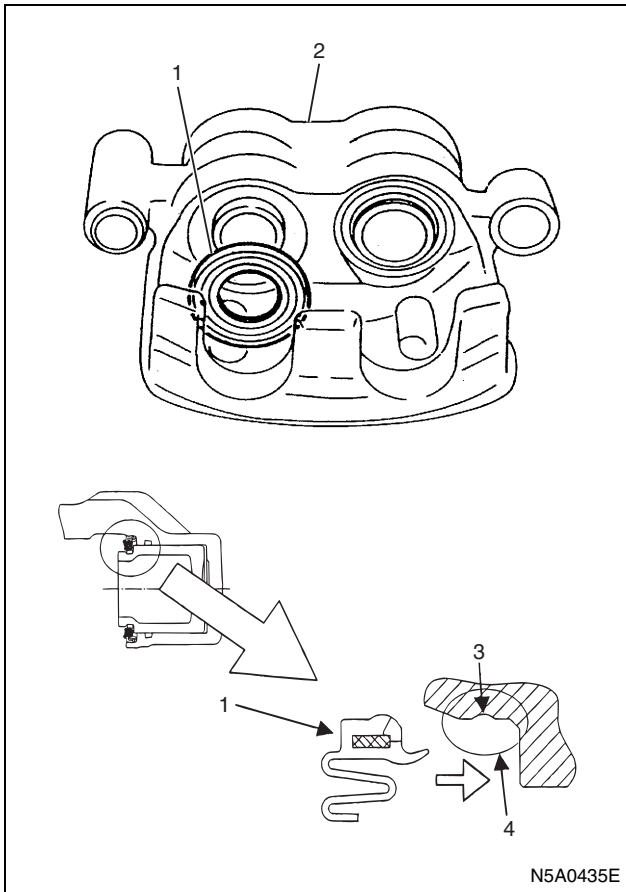
2. Piston and Piston Boot

- Apply brake oil to the piston outer circumference.
- Use a hand vise to install the pistons to the cylinder.
- Apply special grease to the piston. This will prevent cylinder and piston corrosion.
- Use a new piston boot. Do not confuse the front and rear sides of the boot. Carefully press the insert portion of the boot into the cylinder body groove. Be sure that the insertion depth is uniform.
- Install the piston boot inner lip to the piston groove. Handle the piston boot carefully.



Legend

1. Piston
2. Body Assembly
3. Hand Vise



Legend

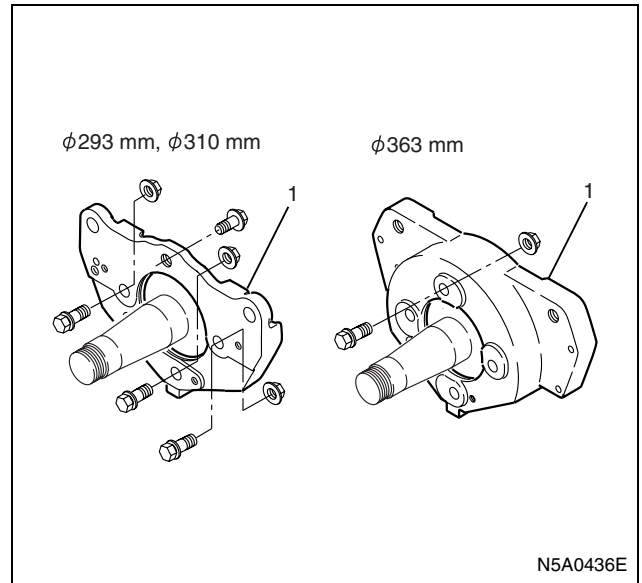
1. Piston Boot
2. Body Assembly
3. Cylinder Body Groove
4. Boot Insert Portion

Installation

1. Adapter
 - Install the adapter to the knuckle.
 - Tighten the fixing bolts and nuts to the specified torque.

Tighten:

Fixing bolts and nuts to 162 N·m (16.5 kg·m / 119 lb·ft).



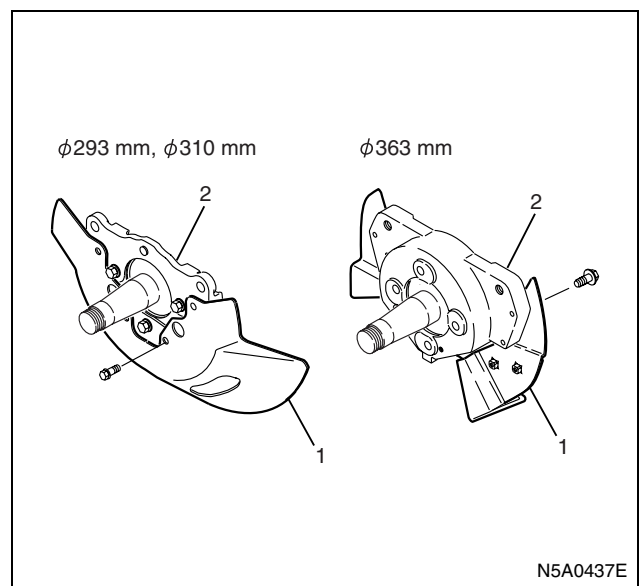
Legend

1. Adapter

2. Wind Guide
 - Tighten the fixing bolts to the specified torque.

Tighten:

Fixing bolts to 13 N·m (1.3 kg·m / 113 lb·in).



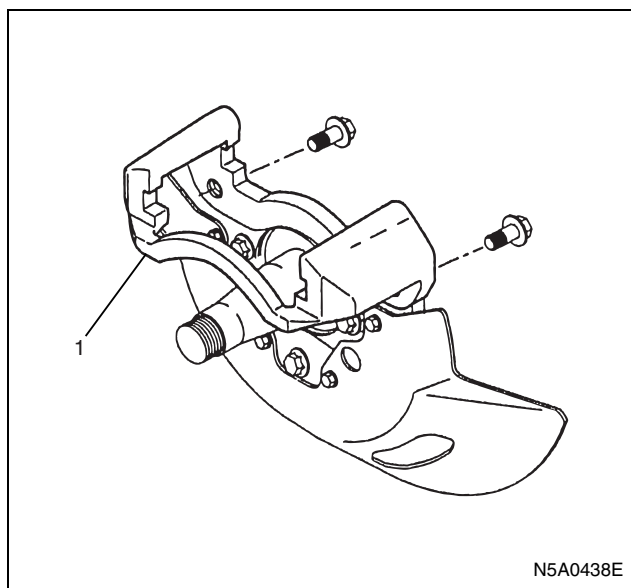
Legend

1. Wind Guide
2. Adapter

3. Support Assembly
 - Tighten the fixing bolts to the specified torque.

Tighten:

Fixing nuts to 221 N·m (22.5 kg·m / 163 lb·ft).

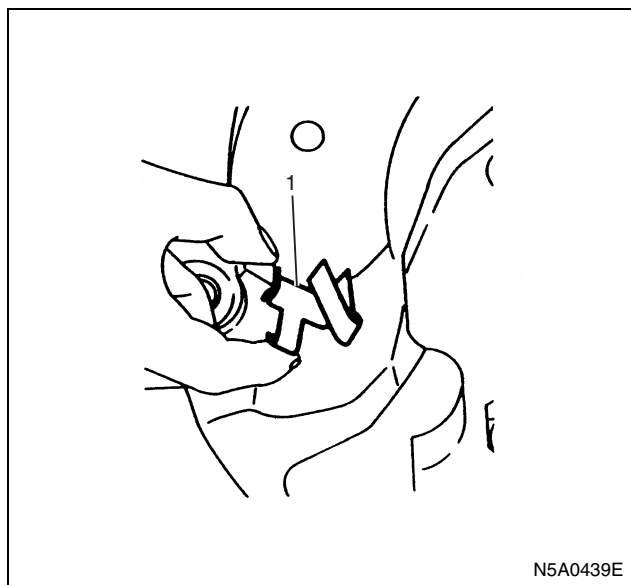


Legend

1. Support Assembly

4. Pad Clips

- Be sure that the clips are completely installed to the support assembly.

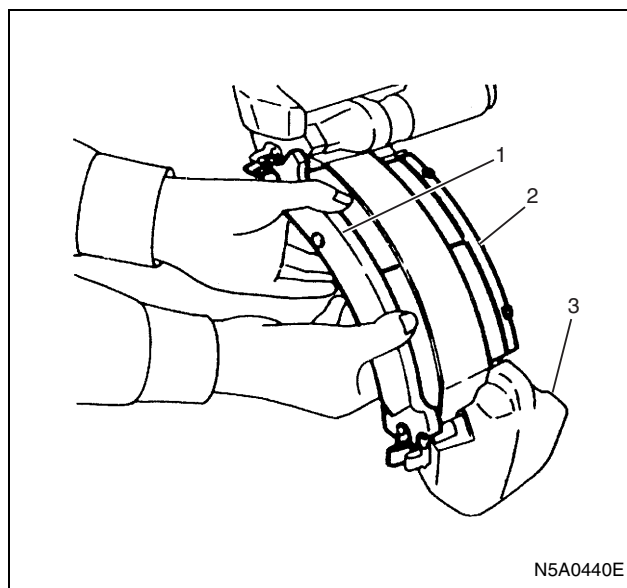


Legend

1. Pad Clip

5. Pads

- Install the inner pad and the outer pad to the support assembly.

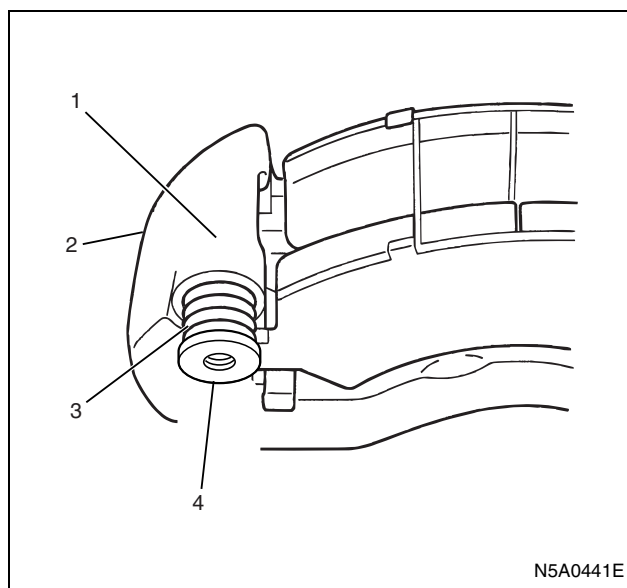


Legend

1. Outer Pad (WEAR INDICATOR....ø310 / ø363)
2. Inner Pad (WEAR INDICATOR....ø293)
3. Support Assembly

6. Pin Boot

- Under normal conditions, there is no need to remove the pin boot.
- Apply approximately 1g (0.035 oz) of special grease to the pin boot bore and pin boss bore of support.
- This will prevent pin corrosion.
- The special grease is included in the seal kit.
- Install the pin boot to the support assembly.
- Check that the pin boot is securely inserted to the groove.



Legend

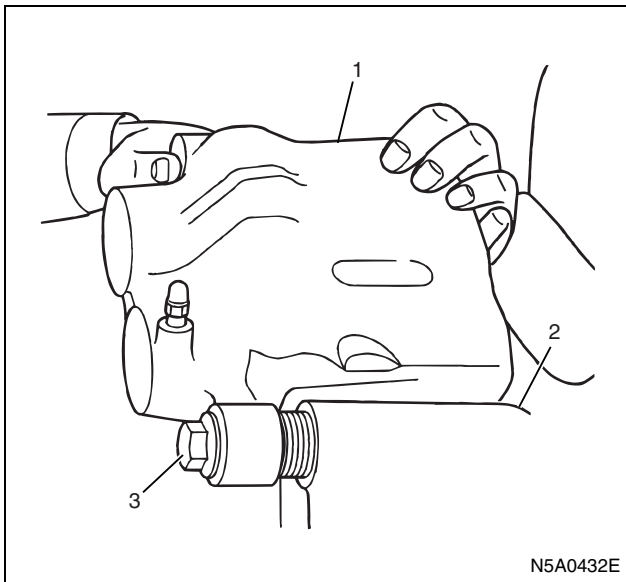
1. Pin Boss of Support
2. Support Assembly
3. Pin Boot
4. Pin

7. Caliper Assembly and Bolt (Lock pin side)

- Install the caliper assembly to the support assembly guide pin from the inside.
- Return the caliper assembly to its original position.
- Tighten the bolt (lock pin side) to the specified torque.

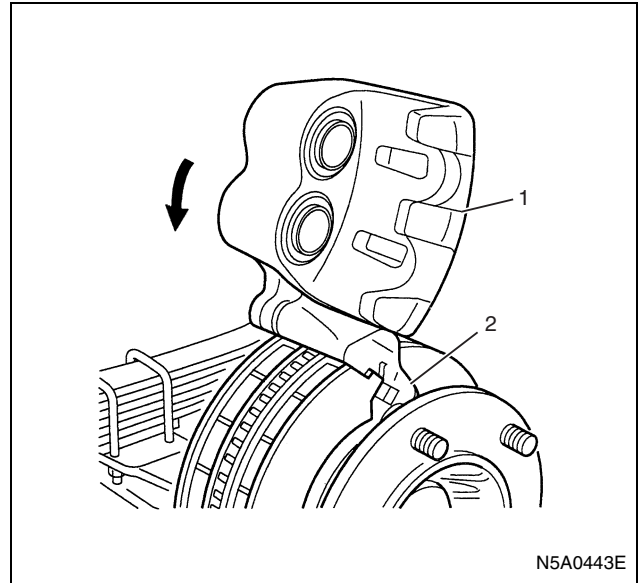
Tighten:

Bolt (Lock pin side) to 125 N·m (12.7 kg·m / 92 lb·ft).



Legend

1. Caliper Assembly
2. Support Assembly
3. Pin Bolt



Legend

1. Caliper Assembly
2. Support Assembly

8. Flexible Hose

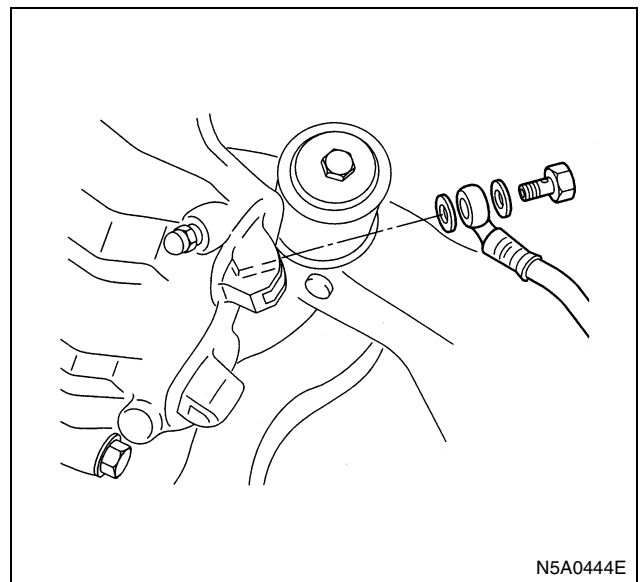
- Tighten the flexible hose bolt to the specified torque.

Tighten:

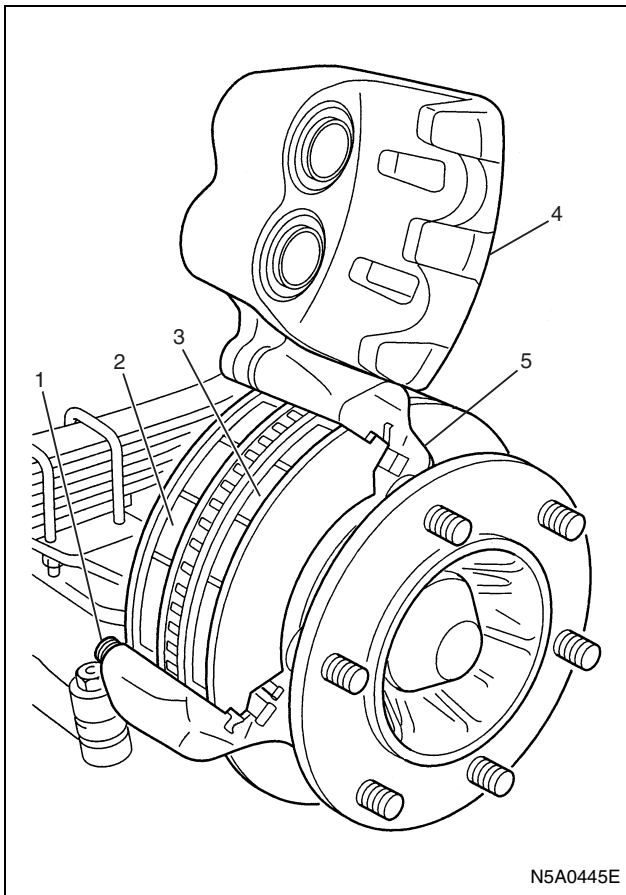
Hose bolt to 34 N·m (3.5 kg·m / 25 lb·ft).

Air Bleeding

Refer to "Brake Bleeding" in Section 00 of section.



Front Disc Brake Pad



N5A0445E

Legend

1. Lock Pin
2. Inner Pad
3. Outer Pad
4. Caliper Assembly
5. Support Assembly

Removal

Notice:

- Block vehicle wheels and apply the parking brake.
- Rise the axle to clear the tire from the ground.

Position jack stands under vehicle.

- Remove the wheel.

1. Loosen and remove the lock pin bolt from the lower side of the caliper.
2. Turn the caliper assembly up and wire it to the frame firmly so that the hose is not stretched.

Notice:

- Do not disconnect the brake hose.
3. Remove the pad assembly with clips.
 4. Conduct disc wear check, and resurface or replace it as required.
 5. When removing brake disc, slide caliper assembly inside of the vehicle, and take out brake disc from support assembly.

Take care not to wipe the special grease from guide pin, and prevent from sticking dust or any foreign material to guide pin.

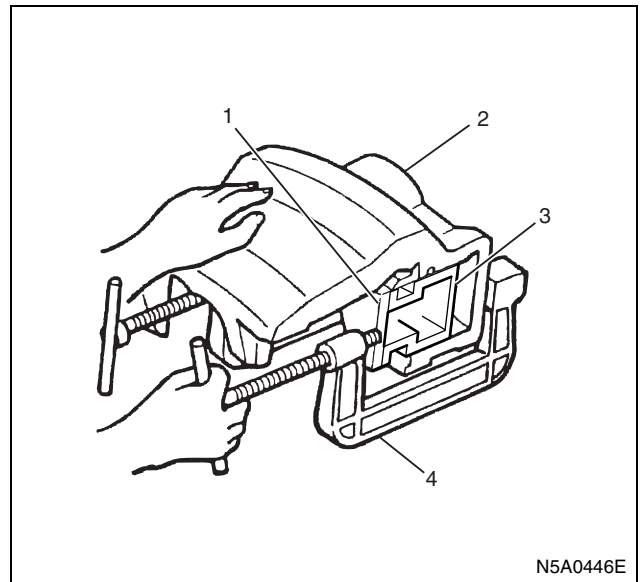
6. Refer to Section 4C FRONT AXLE and Section 3C FRONT SUSPENSION for disc wear check and replacement procedures.

Installation

1. Keep the rotor face away from the brake oil or grease.
2. Use a hand vise to push the piston backward until it reaches the cylinder bottom, as the piston was pushed forward by the distance where the pad worn.

Notice:

- When using a hand vise, push the piston at its center.



N5A0446E

Legend

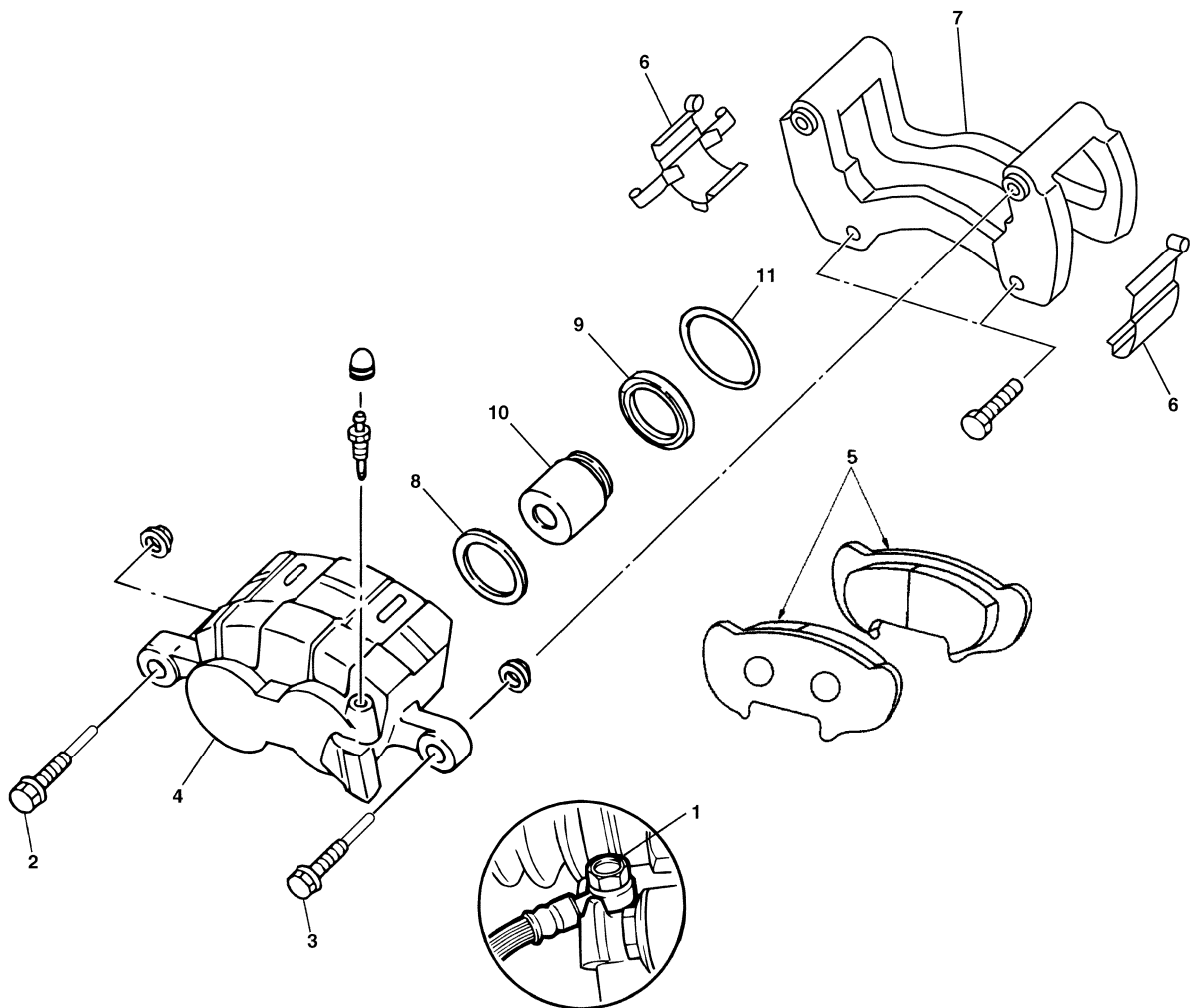
1. Steel Plate
2. Caliper Assembly
3. Piston
4. Hand Vise

3. Remove hand vise and install the new pads along with new clips.

Notice:

- Be careful not to assemble the inner and outer pad reversely.
4. Install the bolt (Lock pin side) into the lock pin by turning the caliper carefully so that the piston boot and pin boot may not be wedged.
- After assembling the caliper assembly, make sure that the piston boot and pin boot fitted correctly, and not damaged.

Independent Suspension Models (NKR)



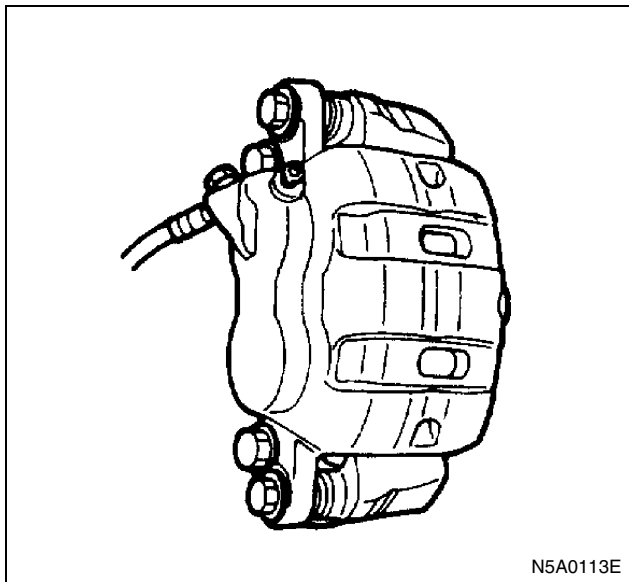
N5A0112E

Legend

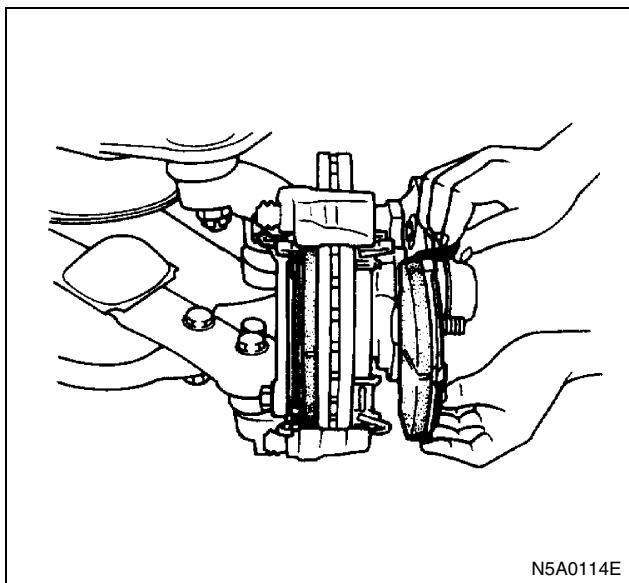
- | | |
|---------------------------------|---------------------|
| 1. Joint bolt and flexible hose | 7. Support assembly |
| 2. Lock pin bolt | 8. Boot ring |
| 3. Guide pin bolt | 9. Piston boot |
| 4. Caliper assembly | 10. Piston |
| 5. Pad | 11. Piston seal |
| 6. Pad clip | |

Removal

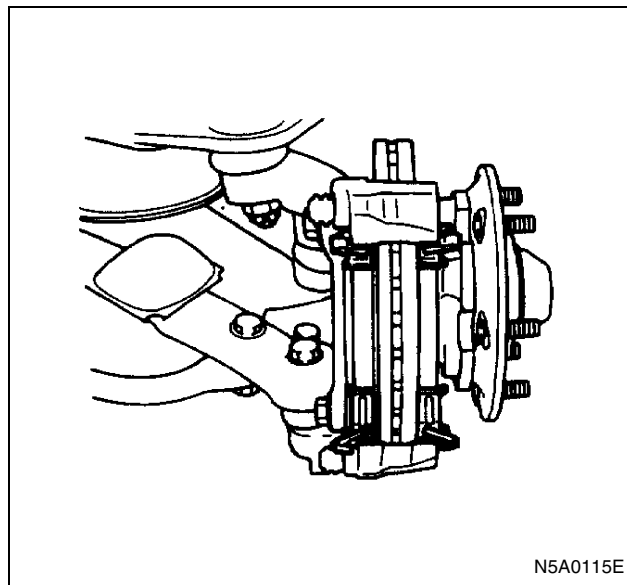
1. Joint bolt and Flexible Hose
2. Lock Pin Bolt
3. Guide Pin Bolt
4. Caliper Assembly



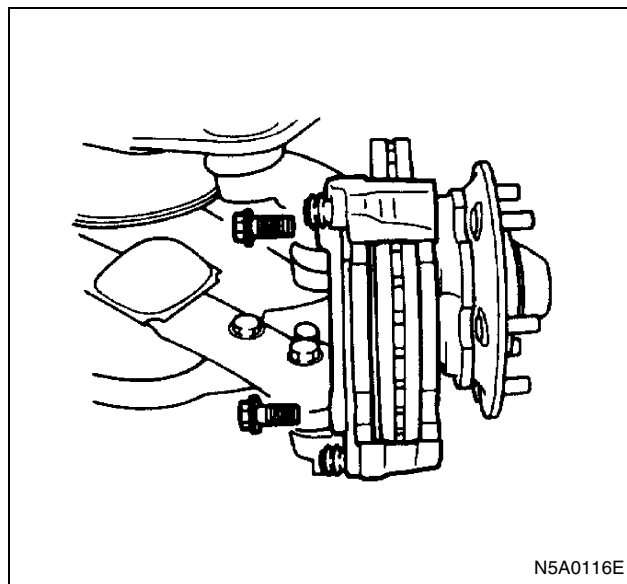
5. Pad



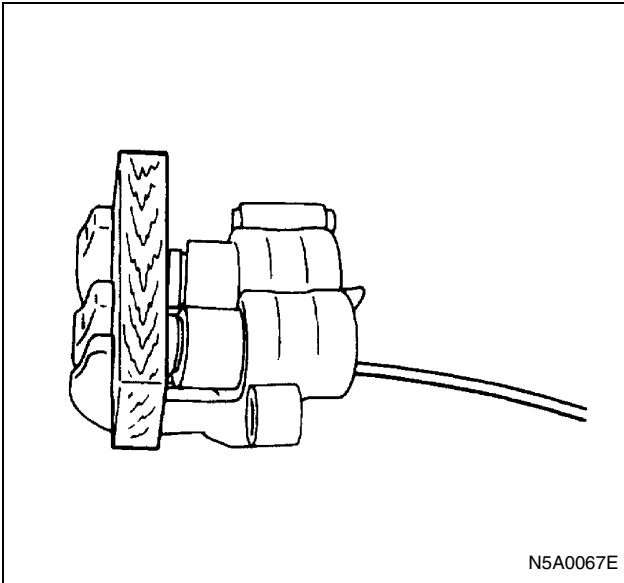
6. Pad Clip



7. Support Assembly



8. Boot Ring
9. Piston Boot
10. Piston
 - 1) Place a piece of wood across the body assembly to prevent piston damage.
 - 2) Apply approximately 196 kPa (2 kg/cm² / 28.4 psi) of compressed air to the body assembly oil port to remove the pistons.



11. Piston Seal

Inspection and Repair

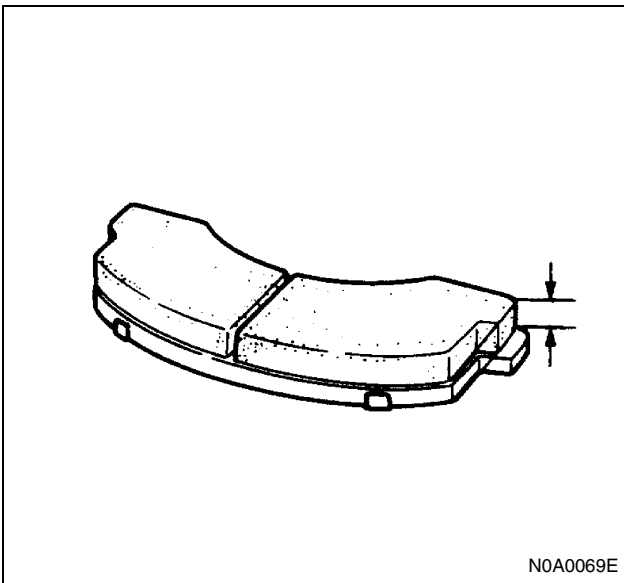
Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

Pad

Use a vernier caliper to measure the pad thickness.

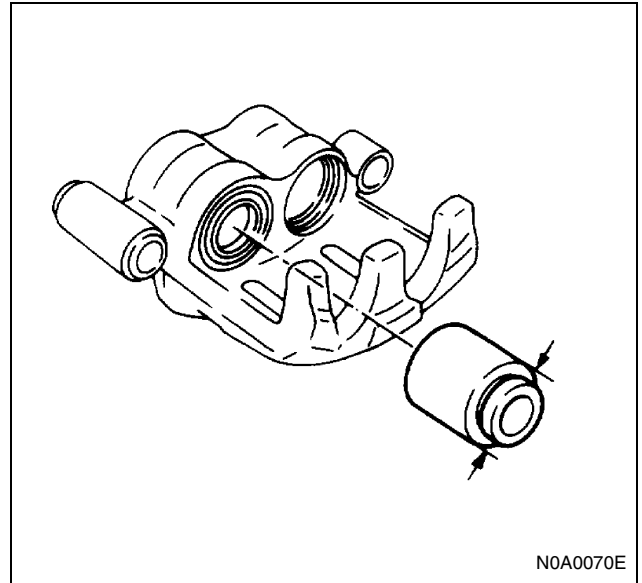
Pad Thickness		mm (in)
Standard	Limit	
14 (0.551)	1 (0.039)	

If the measured value is less than the specified limit, the pads must be replaced with the repair pad kit.



Piston and Cylinder Clearance

1. Use a micrometer to measure the piston diameter.



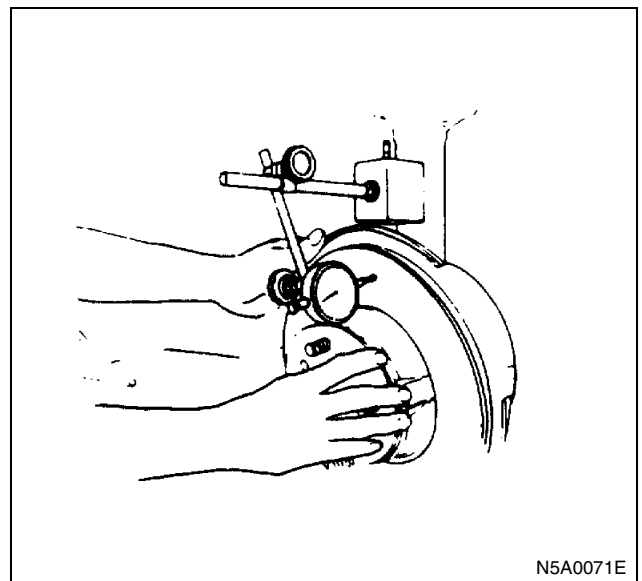
2. Use an inside dial indicator to measure the cylinder bore.
3. Calculate the piston and cylinder clearance.

Piston and cylinder Clearance		mm (in)
Standard	Limit	
0.08 — 0.18 (0.0031 — 0.0071)	0.23 (0.0091)	

If the clearance exceeds the specified limit, the piston and/or the body assembly must be replaced along with the repair seal kit.

Lateral Runout

1. Adjust the wheel bearing correctly.
Refer to Section 4C FRONT AXLE.
2. Attach a dial indicator to some portion of the suspension so that the stem contacts the disc face about 29 mm (1.14 in) from the disc edge.



5A-28 HYDRAULIC BRAKES

3. Move the disc one complete rotation.
The lateral runout should not exceed 0.13 mm (0.005 in).

Maximum runout mm (in)	0.13 (0.005)
------------------------	--------------

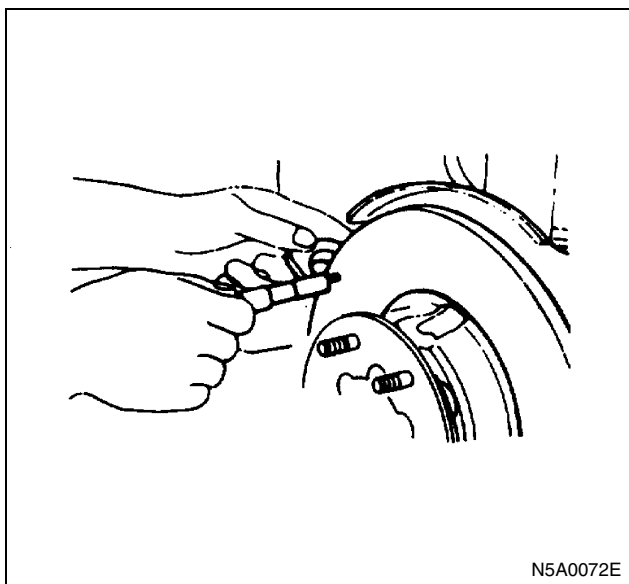
Parallelism and thickness

Parallelism is the measurement of the thickness of the disc at four or more points around the circumference of the disc. All measurement must be made at 29 mm (1.14 in) from the edge of the disc.

The disc thickness must not vary more than 0.010 mm (0.0004 in) from the point to point.

Maximum parallelism mm (in)	0.02 (0.0008)
-----------------------------	---------------

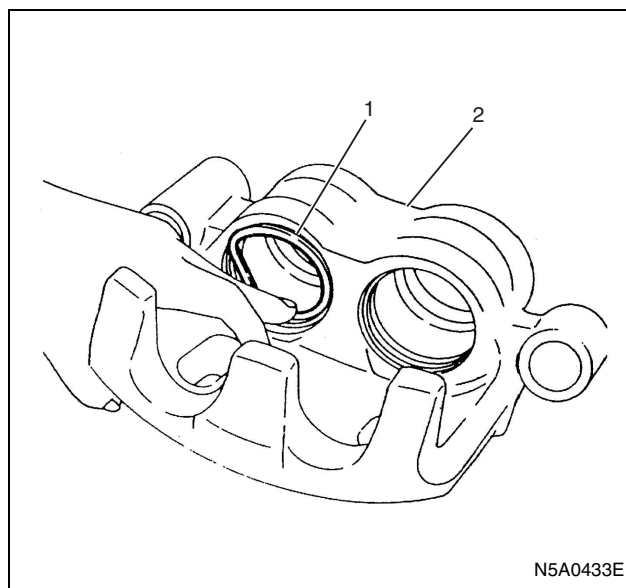
Disc Thickness		mm (in)
Standard	Limit	
35.0 (1.378)	32.0 (1.260)	



N5A0072E

Installation

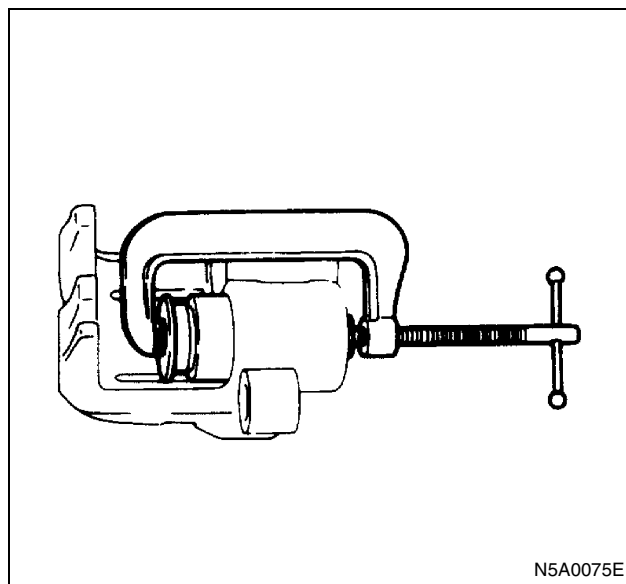
1. Piston Seal
 - 1) Apply rubber grease to the piston seal.
The rubber grease is included in the seal kit.
 - 2) Install the piston seal to the cylinder bore groove.



N5A0433E

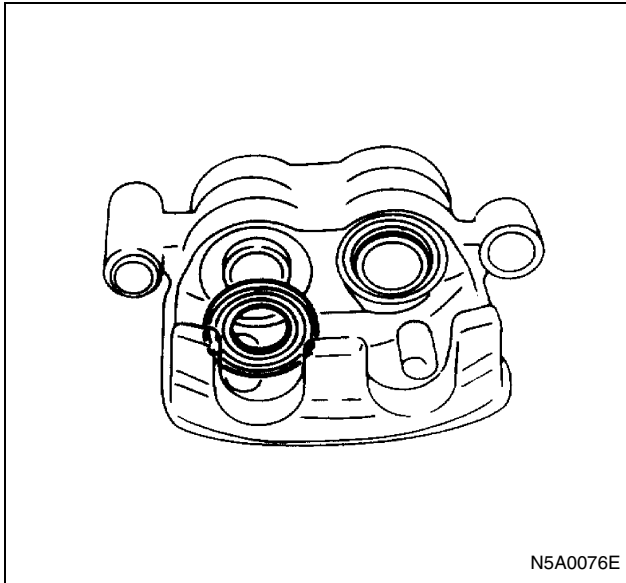
Legend

1. Piston Seal
 2. Body Assembly
-
2. Piston
 3. Piston Boot
 4. Boot Ring
 - 1) Apply brake oil to the piston outer circumference.
 - 2) Use a hand vise to install the pistons to the cylinder.



N5A0075E

- 3) Apply special grease to the piston.
This will prevent cylinder and piston corrosion.
- 4) Install the piston boot outer lip to the cylinder bore groove.
Install the piston boot inner lip to the piston groove.
Handle the piston boot carefully.



- 5) Install the boot ring to the cylinder bore groove.
The boot ring must be completely installed to the groove.

5. Support Assembly

Tighten:

Support assembly bolt to 226 N·m (23.0 kg·m / 116 lb·ft)

- 6. Pad Clip
- 7. Pad
- 8. Caliper Assembly
- 9. Guide Pin Bolt
- 10. Lock Pin Bolt

Tighten:

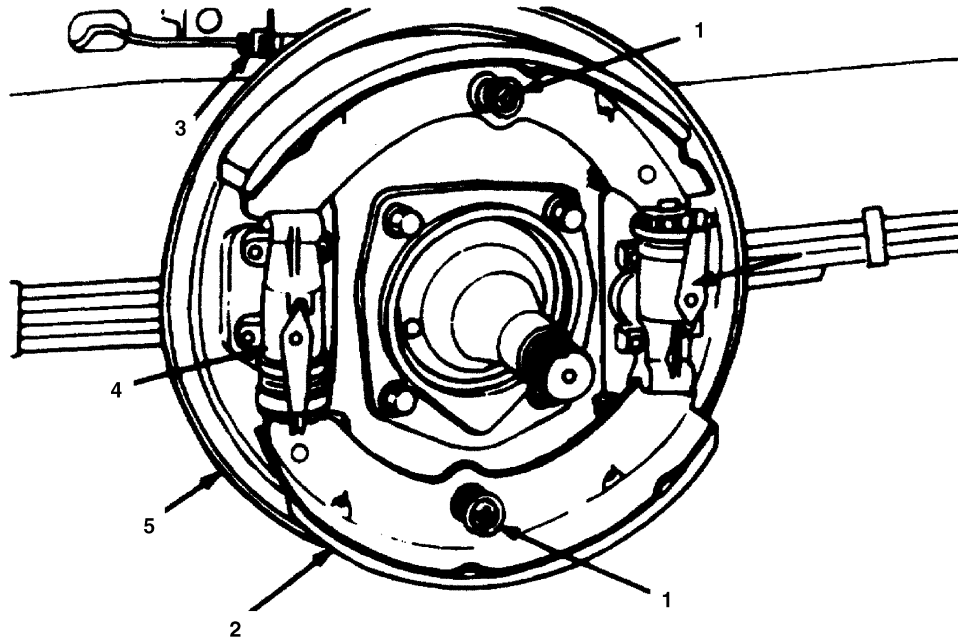
Guide pin and lock pin bolt to 137 N·m (14.0 kg·m / 101 lb·ft)

11. Joint Bolt and Flexible Hose

Tighten:

Joint bolt to 34 N·m (3.5 kg·m / 25 lb·ft)

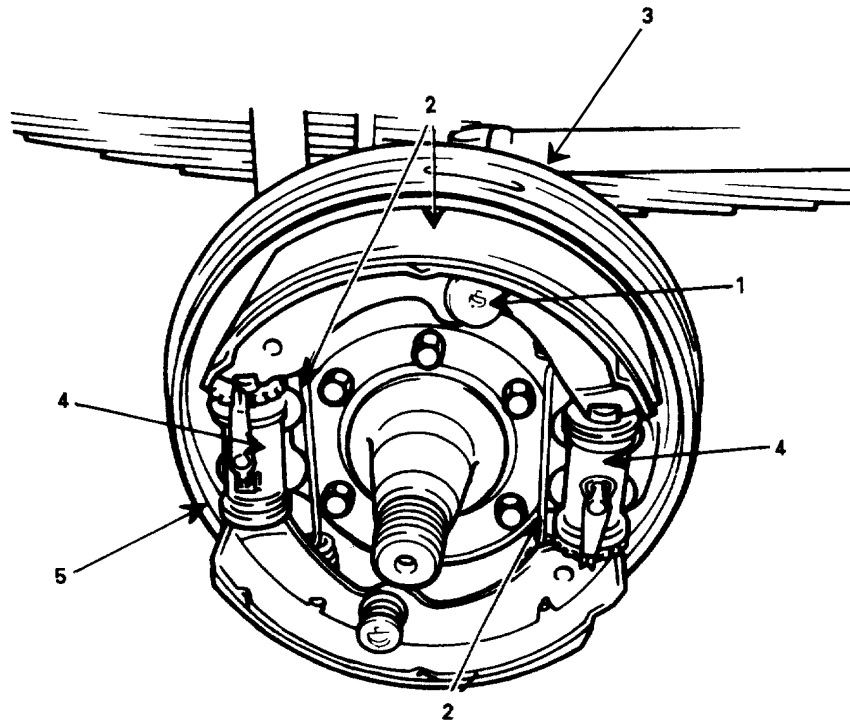
Front Drum Brake Assembly (Two Leading and Dual Two Leading)
Two Leading Type (2L Type)



N5A0126E

Legend

- | | |
|-------------------------------------|------------------------------------|
| 1. Shoe holding spring, cup and pin | 4. Wheel cylinder assembly |
| 2. Brake shoe and return spring | 5. Back plate and oil shield cover |
| 3. Brake flexible hose and pipe | |

Dual Two Leading Type (D2L Type)

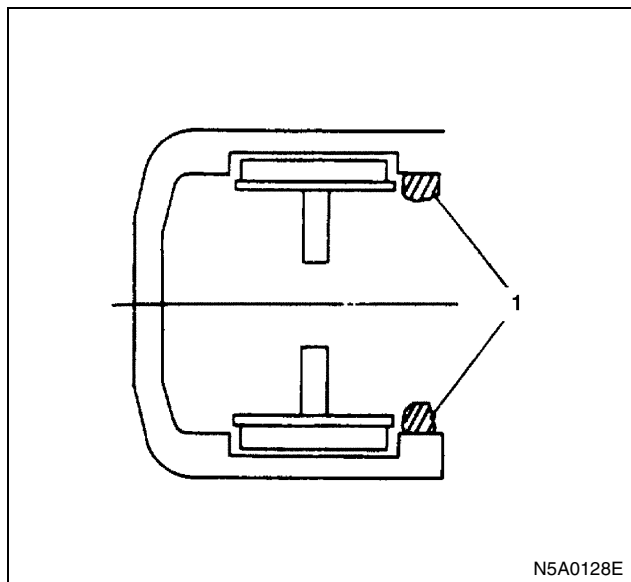
N5A0127E

Legend

- | | |
|-------------------------------------|------------------------------------|
| 1. Shoe holding spring, cup and pin | 4. Wheel cylinder assembly |
| 2. Brake shoe and return spring | 5. Back plate and oil shield cover |
| 3. Brake flexible hose and pipe | |

Removal

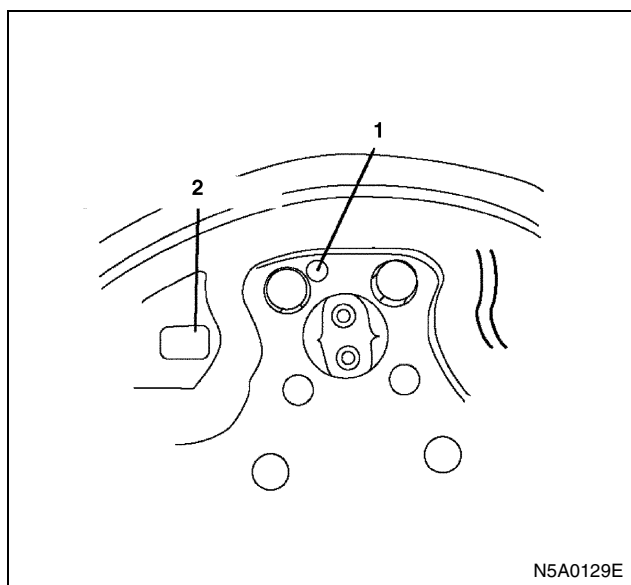
If the brake drum has step wear or the brake drum edge is corroded, it will be difficult to remove the brake drum. The following procedure will make brake drum removal easier.



Legend

1. Corroded portion

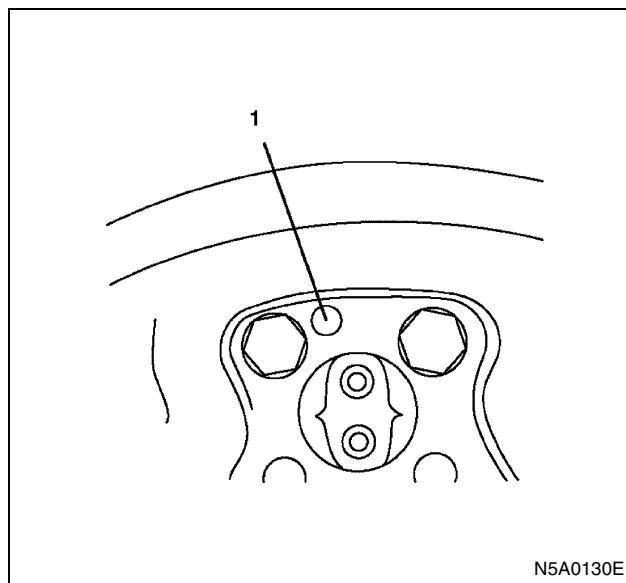
1. Remove the rubber cover from the brake lining clearance adjusting hole and auto-adjuster lever release hole.
2. Remove the adjust hole cover and adjuster lever release hole cover.



Legend

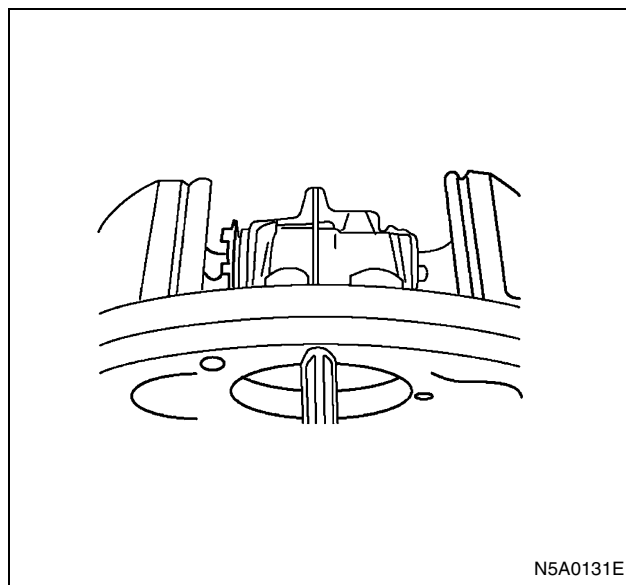
1. Adjuster lever release hole cover
2. Adjust hole cover

3. Using $\phi 5$ mm plus driver put it into the adjuster lever release hole and then push up the adjuster lever.

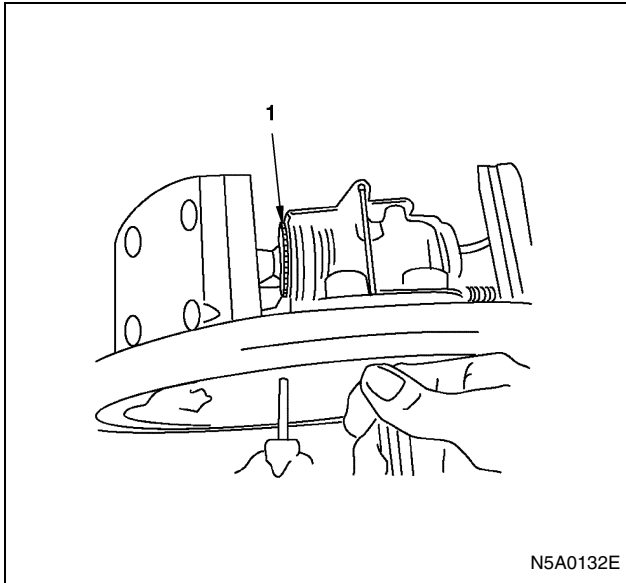


Legend

1. Adjuster lever release hole



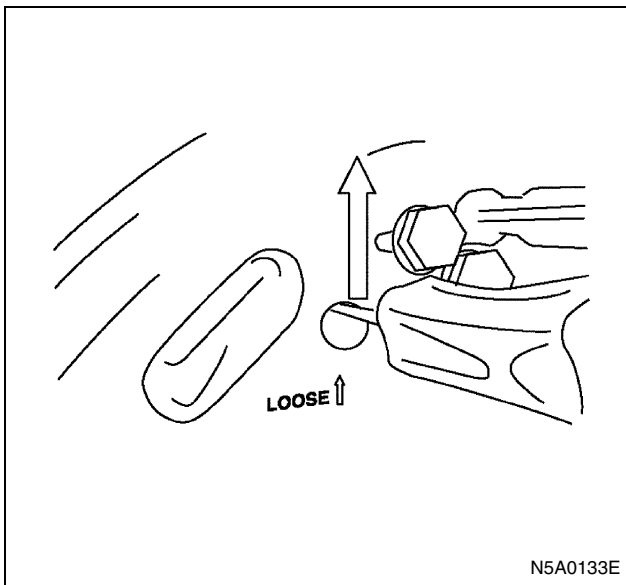
4. Put the slotted screwdriver into the adjuster hole while push up the adjuster lever.



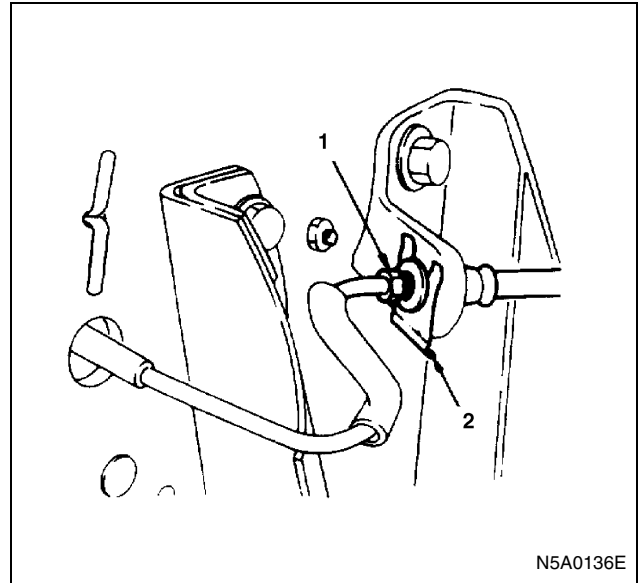
Legend

1. Adjuster gear

5. Turn the adjuster gear to the marked arrow "LOOSE" on the backing plate.



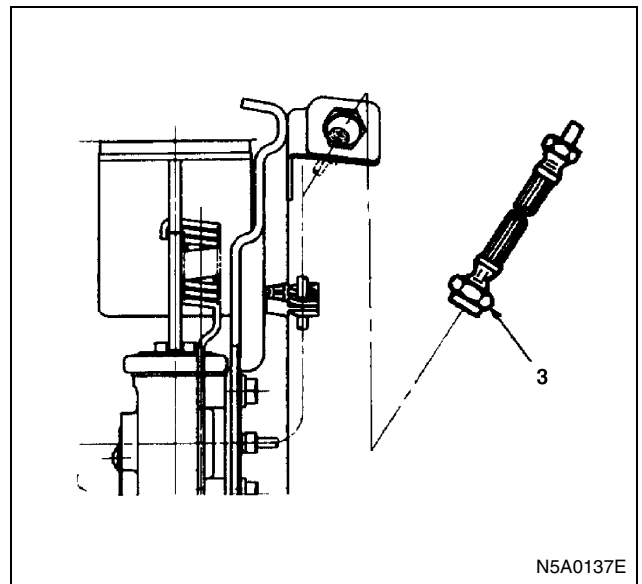
6. Shoe Holding Spring, Cup and Pin
7. Brake Shoe and Return Spring
8. Brake flexible Hose and Pipe
1) Place a tray beneath the flexible hose to receive the brake fluid.
2) Loosen the union nut (1).



- 3) Remove the clip (2) and loosen the hose end (3) from the pipe to remove the flexible hose.

Notice:

Take care not to twist the piping and the flexible hose.



9. Wheel Cylinder Assembly
10. Back Plate and Oil Shield Cover
Store all of the removed parts in a clean part tray.

Inspection and Repair

Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

Brake Drum Inside Diameter

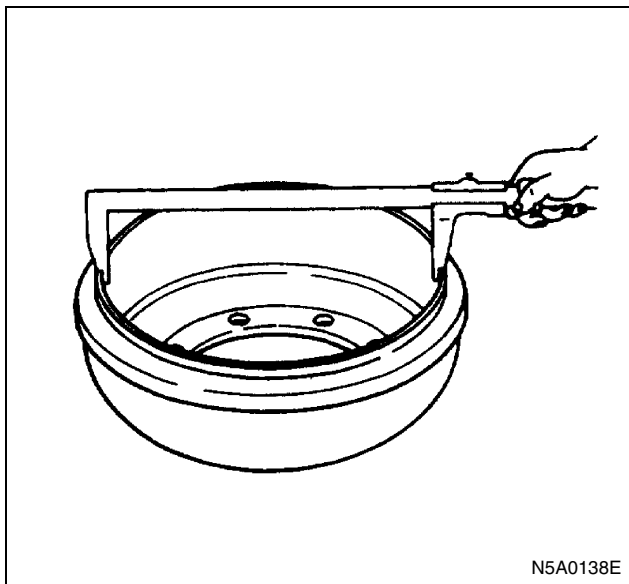
Visually inspect the brake drum for excessive wear and scoring.

If the brake drum is scored or worn, lathed to the specified limit.

Use a vernier caliper to measure the brake drum inside diameter.

5A-34 HYDRAULIC BRAKES

Brake Drum Inside Diameter		mm (in)
Drum size	Standard	Limit
279.4	279.4 (11.00)	281.0 (11.06)
300.0	300.0 (11.81)	301.5 (11.87)
320.0	320.0 (12.60)	321.5 (12.66)
Out of round:		
• Limit: 0.13 mm (0.005 in)		

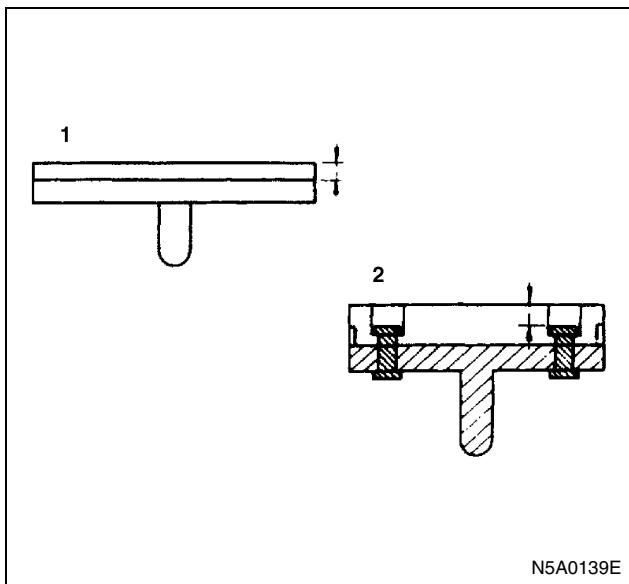


Brake Lining Thickness Measurement

Use a vernier caliper to measure the brake lining thickness or the rivet depth.

If the measured value is less than the specified limit, the brake shoe assembly and/or the lining must be replaced.

Brake Lining Thickness or Rivet Depth		mm (in)
Limit		1.0 (0.039)

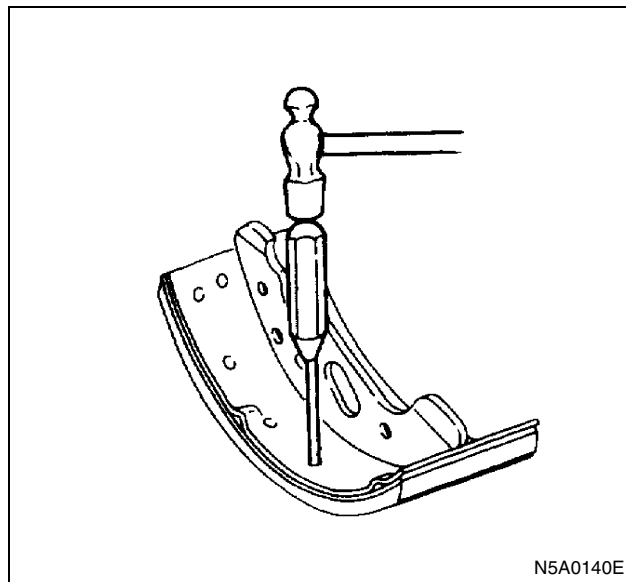


Legend

1. Adhesion type
2. Riveted type

Brake Lining Removal (Riveted Type Only)

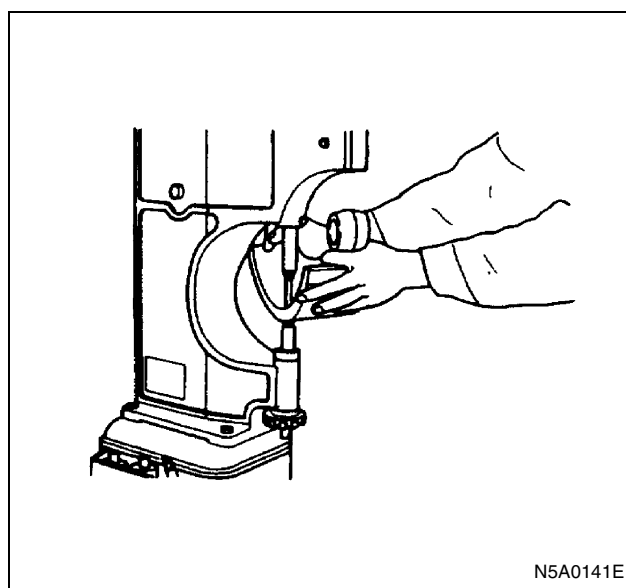
1. Remove the rivet caulking portions with a hammer and chisel.
2. Remove the rivets with a hammer and punch.



3. Inspect the brake shoe for cracking.

Brake Lining Installation (Riveted Type Only)

1. Install the brake lining the rivets to the brake shoe.
2. Place the brake shoe assembly in the air hydraulic riveter.
3. Use the air hydraulic riveter to set and caulk each of the rivets.

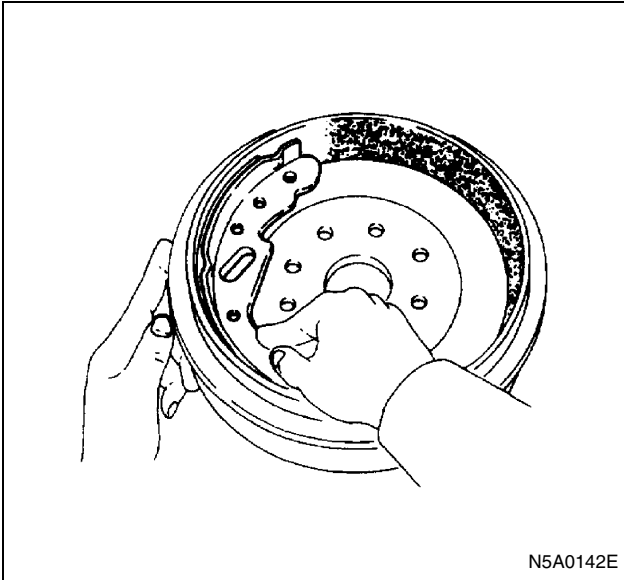


4. Start riveting at the center of lining and work towards the ends.

Brake Lining and Drum Contact

1. Apply chalk powder to the entire inside brake drum surface.

2. Place the brake shoe assembly in the inside brake drum.
3. Move the brake shoe assembly around the inside brake drum.
Check for uniform contact between the brake lining and the brake drum.



4. Correct any areas having poor contact with sandpaper.
5. Repeat Steps 1 through 4 until the contact between the brake lining and the brake drum is perfect.

Installation

1. Back Plate and Oil Shield cover
Tighten the back plate and oil shield cover bolts to the specified torque.

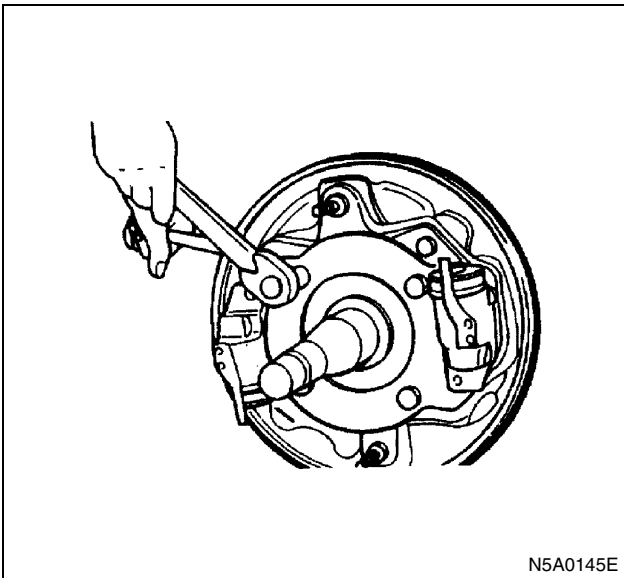
Tighten:

Back plate and oil shield cover bolts to

NPS model: 98 N·m (10.0 kg·m / 72 lb·ft)

NQR model: 157 N·m (16.0 kg·m / 116 lb·ft)

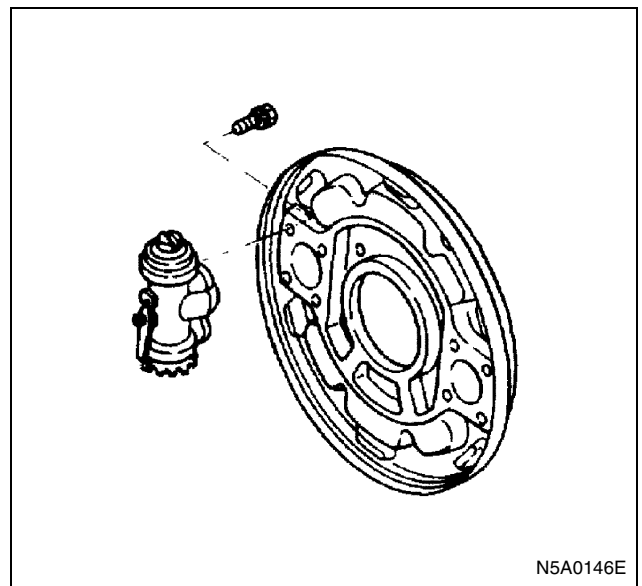
Others: 88 N·m (9.0 kg·m / 65 lb·ft)



2. Wheel Cylinder Assembly
Tighten the wheel cylinder assembly bolts to the specified torque.

Wheel Cylinder Assembly Bolt Torque

		N·m (kg·m/lb·ft)
Drum Inside Dia. mm (in)	Lining Width mm (in)	—
279.4 (11.00)	60 (2.36)	27 (2.8/20)
300.0 (11.81)	75 (2.95)	34 (3.5/25)
320.0 (12.60)		43 (4.4/32)
320.0 (12.60)	100 (3.94)	74 (7.5/54)
320.0 (12.60)	120 (4.72)	94 (9.6/69)



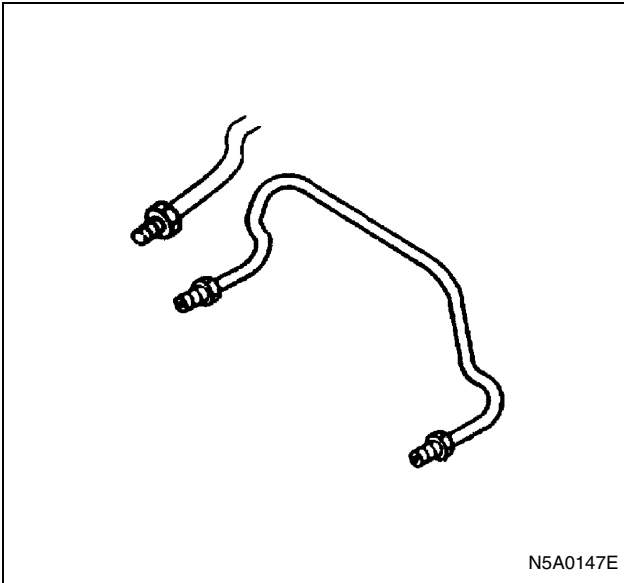
3. Brake Flexible Hose and Pipe
Tighten the brake pipe flare nuts to the specified torque.

Tighten:

Brake pipe flare nuts to 16 N·m (1.6 kg·m / 12 lb·ft)

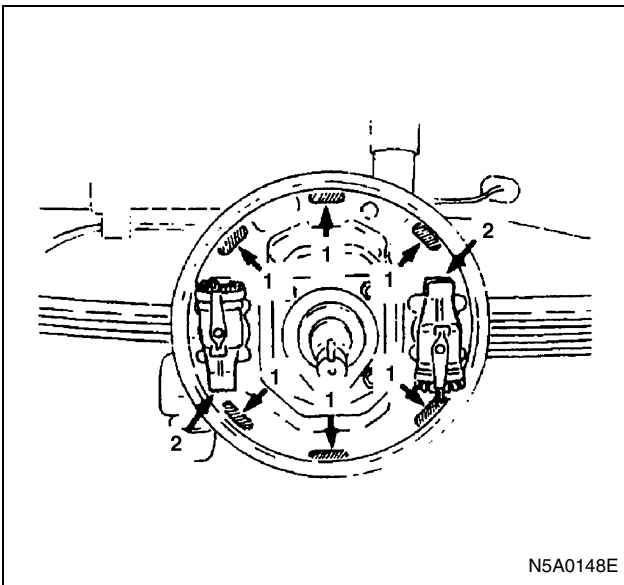
Notice:

Take care not to twist the piping and the flexible hose.

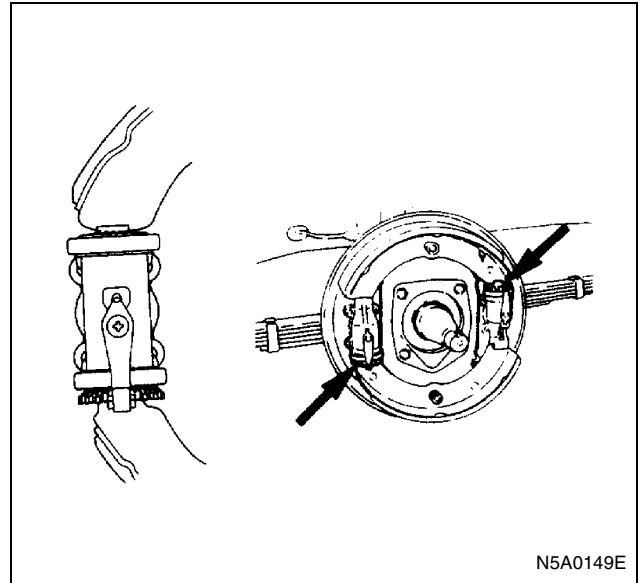


4. Brake Shoe and Return Spring (Two Leading Type)

- 1) Before setting the brake shoes, apply a thin coat of molybdenum disulfide grease to the back plate portions (1) contacting the brake shoe edge as shown in the illustrations.
- 2) Apply a coat of molybdenum disulfide grease to the wheel cylinder parts contacting the shoe (2).



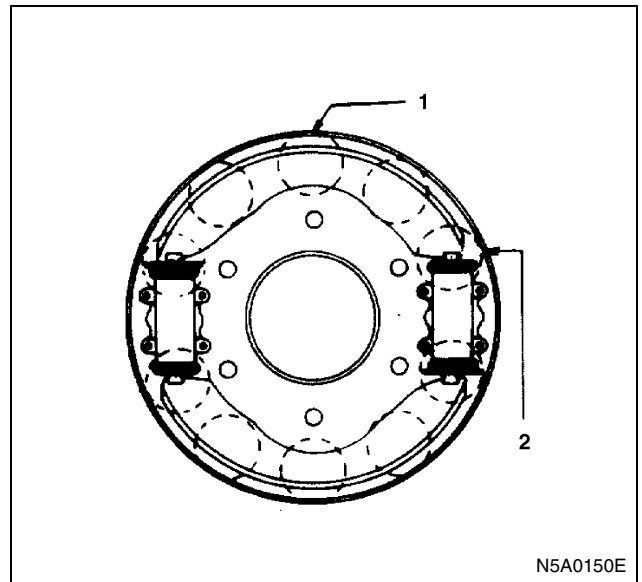
- 3) Set the brake shoe assembly to the cylinder adjusting screw at the brake shoe small angle end.
Do not install it at the round end to the adjusting screw.



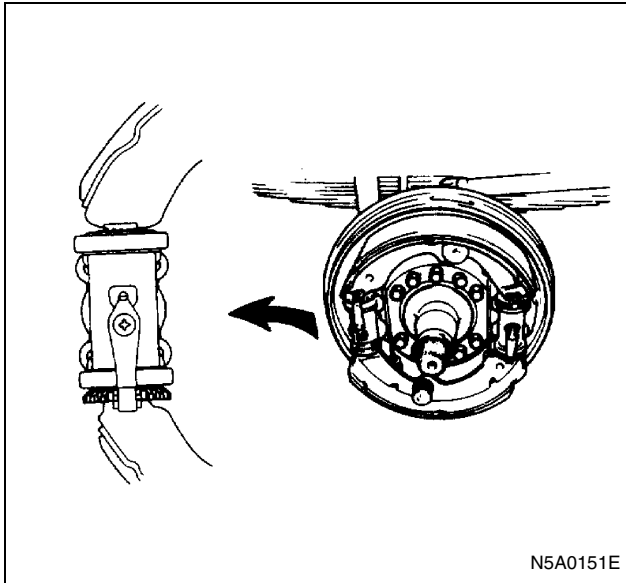
- 4) Install the brake shoes and the return springs to the wheel cylinders.
Keep the lining surface clean.

5. Brake Shoe and Return Spring (Dual Two Leading Type)

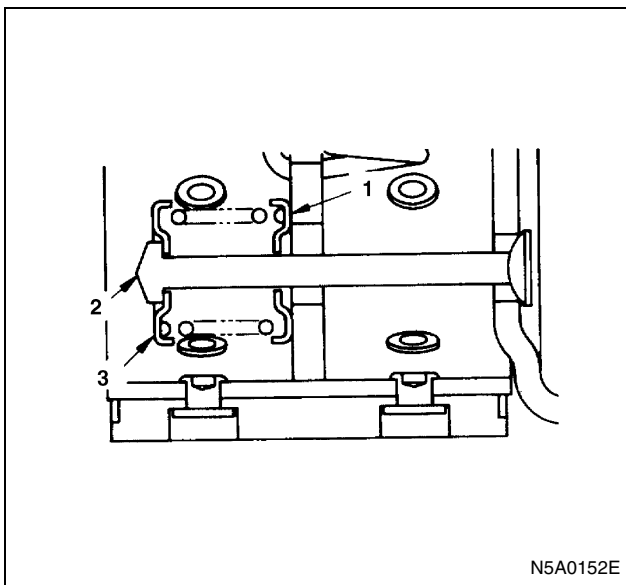
- 1) Before setting the brake shoes, apply a thin coat of molybdenum disulfide grease to the back plate portions (1) contacting the brake shoe edge as shown in the illustrations.
- 2) Apply a coat of molybdenum disulfide grease to the wheel cylinder parts contacting the brake shoe (2).



- 3) Set the brake shoe assembly to the cylinder adjusting screw at the brake shoe small angle end.
Do not install it at the round end to the adjusting screw.



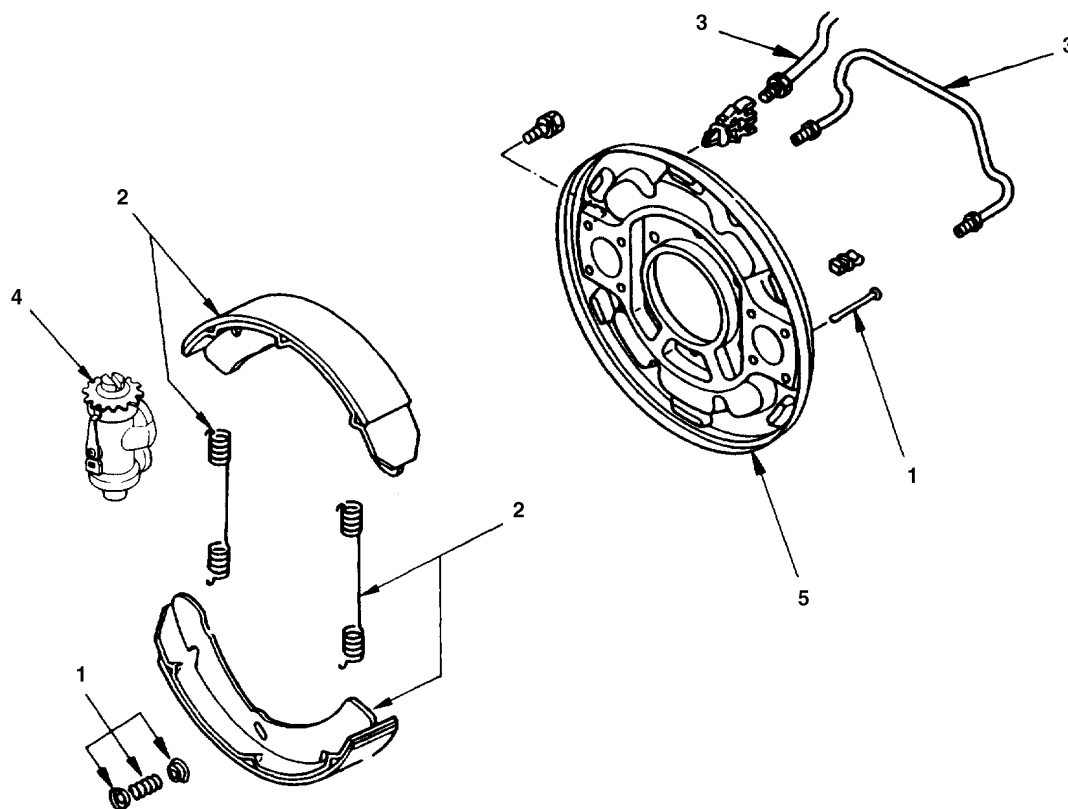
- 4) Install the brake shoes and the return springs to the wheel cylinders.
Keep the brake lining clean.
6. Shoe Holding Spring, Cup and Pin
 - 1) Before installing the holding pin, apply a coat of molybdenum disulfide grease to the holding cup seating faces (1) contacting the brake shoe.



- 2) After installation of the pins, cups and the springs, make sure the pin (2) seats to the cup (3) properly.
- After assembly, adjust the lining clearance and air bleeding the brake, referring to "SERVING" in Section 00 of this section.

Rear Drum Brake Assembly (Except Drum Inside Diameter 370 mm)

These removal steps are based on the without auto-adjuster type brake.



N5A0153E

Legend

- | | |
|-------------------------------------|----------------------------|
| 1. Shoe holding spring, cup and pin | 4. Wheel cylinder assembly |
| 2. Brake shoe and return spring | 5. Back plate |
| 3. Brake pipe | |

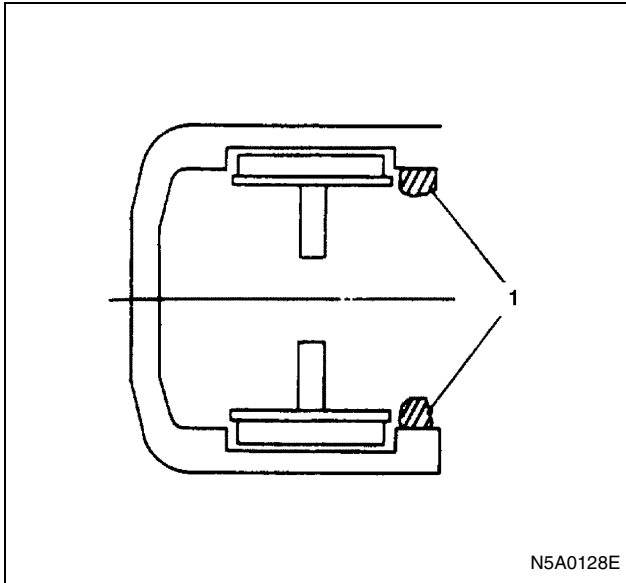
Removal

1. Shoe Holding Spring, Cup and Pin
2. Brake Shoe Return Spring
3. Brake Pipe
4. Wheel Cylinder Assembly
5. Back Plate

Store all of the removed parts in a clean part tray.

With Auto-adjuster

If the brake drum has step wear or the brake drum edge is corroded, it will be difficult to remove the brake drum. The following procedure will make brake drum removal easier.



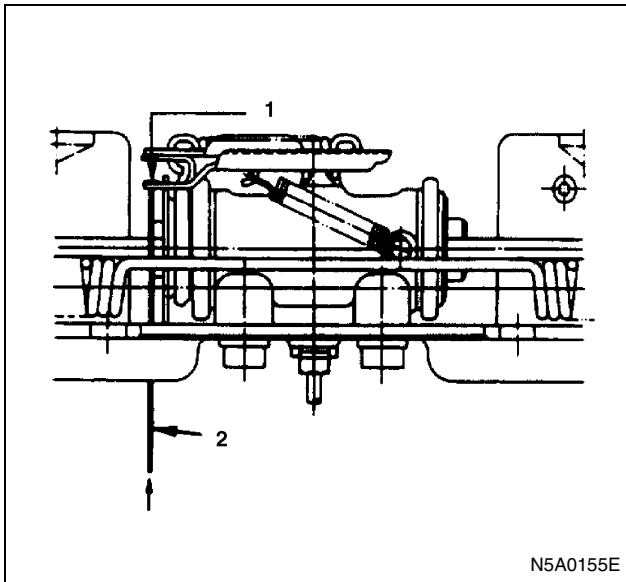
N5A0128E

Legend

1. Corroded portion

Drum Inside Diameter 260 mm

1. Remove the rubber covers from the brake lining clearance adjusting hole and auto-adjuster lever release hole.
2. Push up the auto-adjuster lever with a long drift or a suitable rod.
(Outside diameter: 4 mm (0.15 in) length: 80 mm (3.1 in))



N5A0155E

Legend

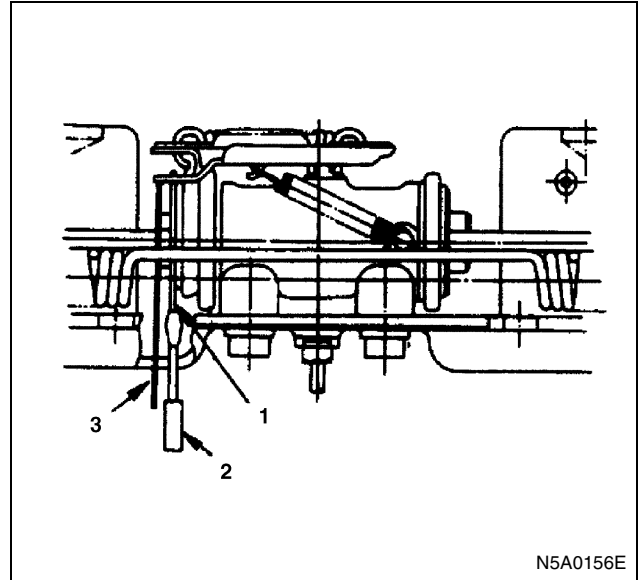
1. Auto-adjuster lever
2. Rod

3. Hold the auto-adjuster lever stationary. Use a screwdriver to rotate adjusters at back of the brake to provide clearance between lining and drum.

Notice:

Be sure to push up the auto-adjuster lever (Step 2). Failure to do so will result in damage to the teeth of the auto-adjuster lever.

Take care not to damage the rubber boot with the bar or the screwdriver.



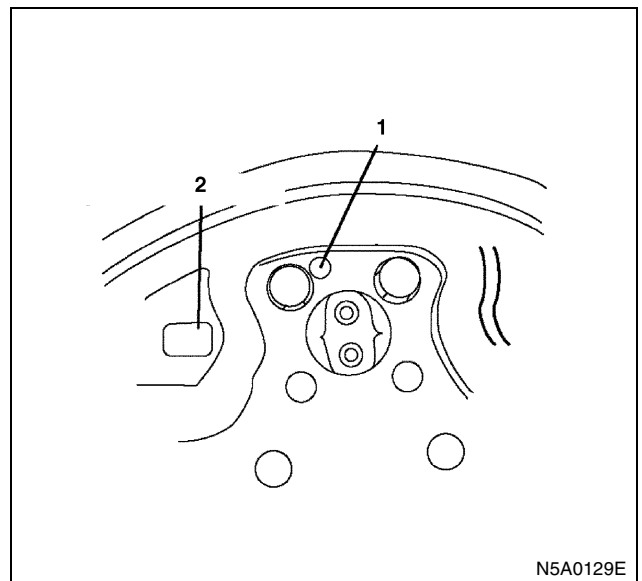
N5A0156E

Legend

1. Adjuster
2. Screw driver
3. Rod

Drum Inside Diameter 320 mm

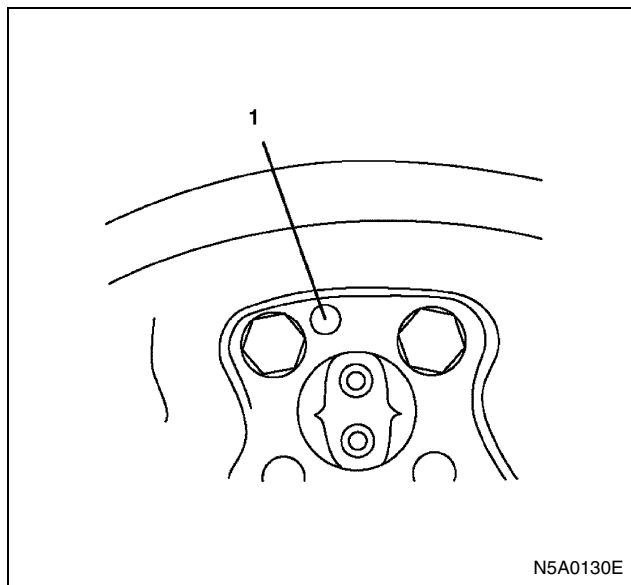
1. Remove the rubber cover from the brake lining clearance adjusting hole and auto-adjuster lever release hole.
2. Remove the adjust hole cover and adjuster lever release hole cover.



N5A0129E

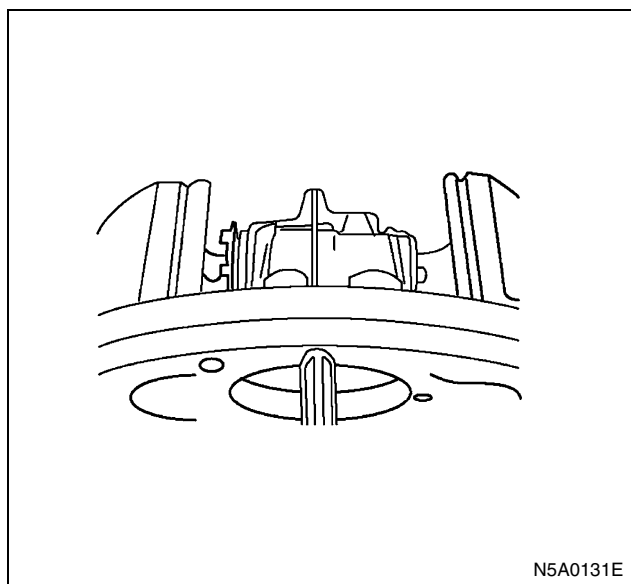
Legend

1. Adjuster lever release hole cover
2. Adjuster hole cover

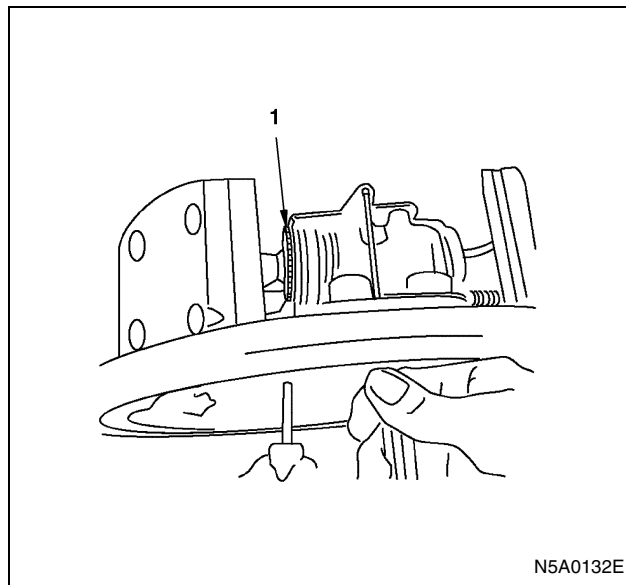


Legend

1. Adjuster lever release hole



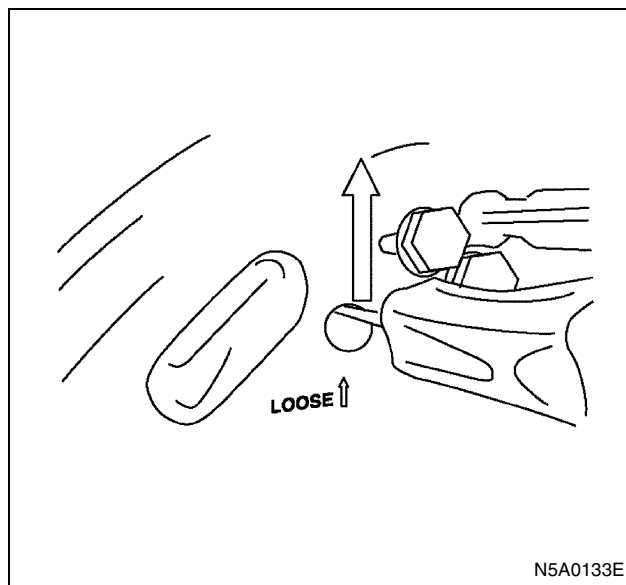
4. Put the flathead screwdriver into the adjuster hole while push up the adjuster lever.



Legend

1. Adjuster gear

5. Turn the adjuster gear to the marked arrow "LOOSE" on the backing plate.



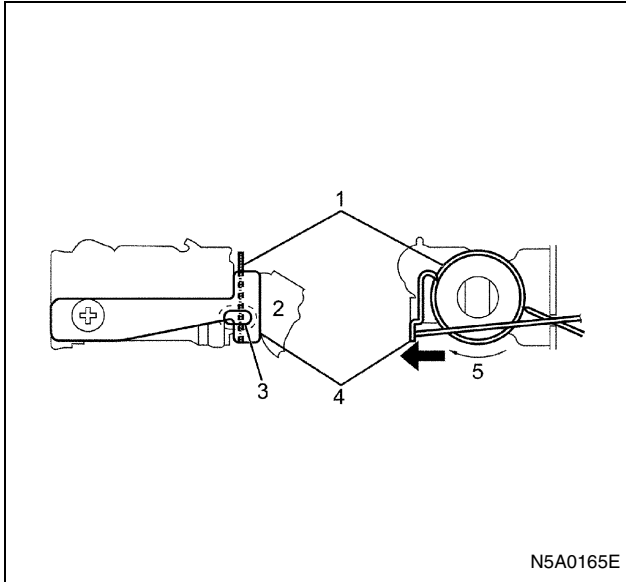
Drum Inside Diameter 240 mm

1. Remove the rubber cover from the brake lining clearance adjusting hole/auto-adjuster lever release hole in the back plate.
2. Insert a thin, suitable rod in the hole, and push up the auto-adjuster lever (4).
3. With the auto-adjuster lever (4) pushed up, insert a keystone tip screwdriver in the adjusting hole, and turn the adjuster gear (1) to increase the gap between the gear and the brake shoe (the outside diameter of the shoe will decrease).

Notice:

Do not fail to push up the auto-adjuster lever before turning the gear. Failure to do so will result in damage to the teeth of the gear because it is locked with the lever.

Exercise care not to damage the boot of the wheel cylinder and other parts when turning the gear and pushing up the lever.


Legend

1. Adjuster gear
2. Brake shoe
3. Plug hole
4. Auto-adjuster lever
5. Loosening direction

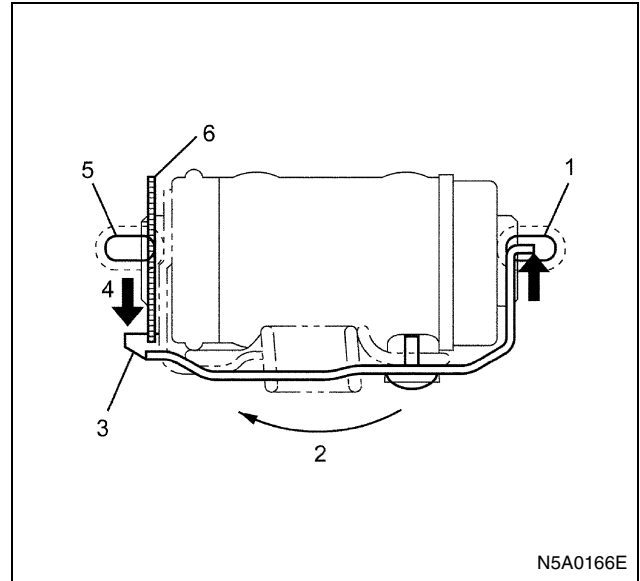
Drum Inside Diameter 290 mm

1. Remove the rubber cover from the brake lining clearance adjusting hole/auto-adjuster lever release hole in the back plate.
2. Insert a thin, suitable rod in the auto-adjuster lever release hole, and push the end of the auto-adjuster lever (3) in the direction of the arrow (4).
3. With the auto-adjuster lever (3) pushed up, insert a keystone tip screwdriver in the adjusting hole, and turn the adjuster gear (6) to increase the gap between the gear and the brake shoe (the outside diameter of the shoe will decrease).

Notice:

Do not fail to push up the auto-adjuster lever before turning the gear. Failure to do so will result in damage to the teeth of the gear because it is locked with the lever.

Exercise care not to damage the boot of the wheel cylinder and other parts when turning the gear and pushing up the lever.


Legend

1. Plug hole
2. Rotating direction of tire (forward)
3. Auto-adjuster lever
4. Loosening direction
5. Plug hole
6. Adjuster gear

Inspection and Repair

Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

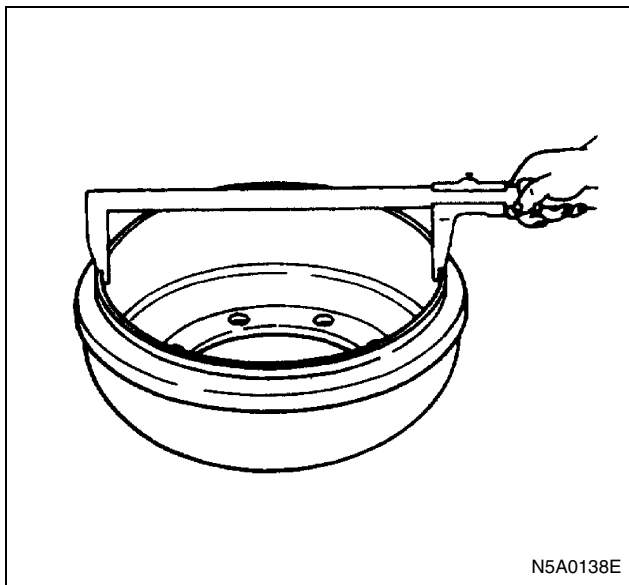
Brake Drum Inside Diameter

Visually inspect the brake drum for excessive wear and scoring.

If the brake drum is scored or worn, lathed to the specified limit.

Use a vernier caliper to measure the brake drum inside diameter.

Brake Drum Inside Diameter		mm (in)
Drum size	Standard	Limit
228.6	228.6 (9.00)	230.0 (9.06)
240	240.0 (9.45)	241.5 (9.51)
260	260.0 (10.24)	261.5 (10.30)
279.4	279.4 (11.00)	281.0 (11.06)
290	290.0 (11.42)	291.5 (11.48)
300	300.0 (11.81)	301.5 (11.87)
320	320.0 (12.60)	321.5 (12.66)
Out of round		
• Limit: 0.13 mm (0.005 in)		

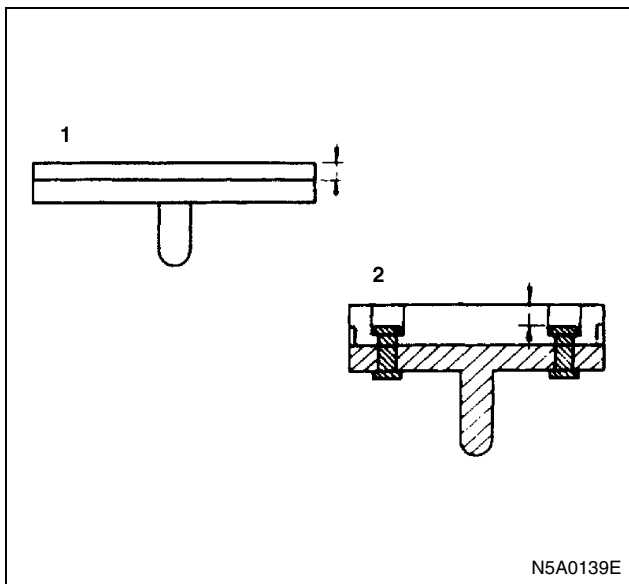


Brake Lining Thickness Measurement

Use a vernier caliper to measure the brake lining thickness or the rivet depth.

If the measured value is less than the specified limit, the brake shoe assembly and/or the lining must be replaced.

Brake Lining Thickness or Rivet Depth		mm (in)
Limit		1.0 (0.039)

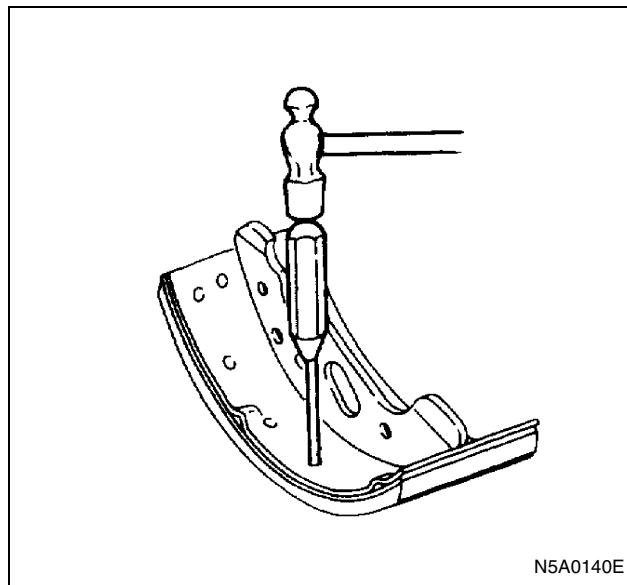


Legend

1. Adhesion type
2. Riveted type

Brake Lining Removal (Riveted Type Only)

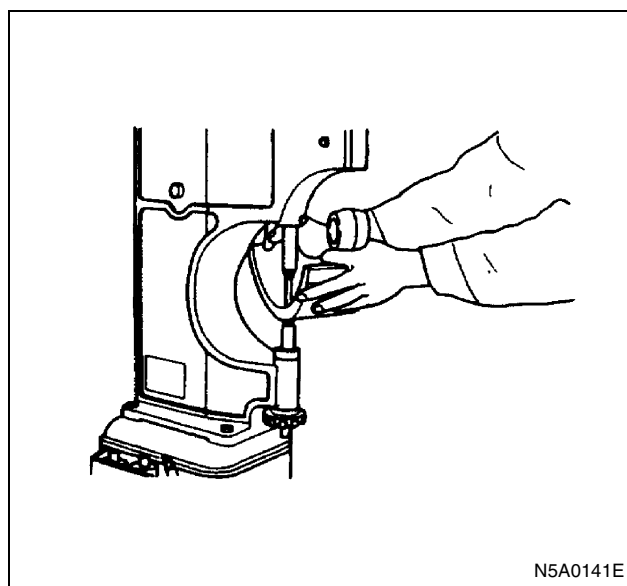
1. Remove the rivet caulking portions with a hammer and chisel.
2. Remove the rivets with a hammer and punch.



3. Inspect the brake shoe for cracking.

Brake Lining Installation (Riveted Type Only)

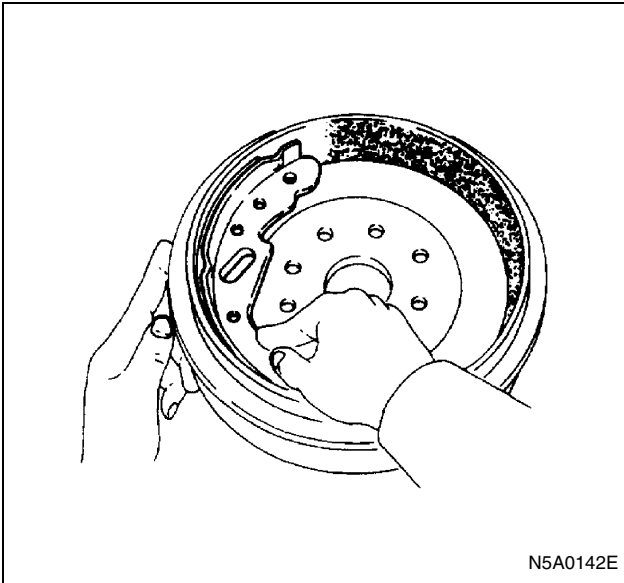
1. Install the brake lining and the rivets to the brake shoe.
2. Place the brake shoe assembly in the air hydraulic riveter.
3. Use the air hydraulic riveter to set and caulk each of the rivets.



4. Start riveting at the center of lining and work towards the ends.

Brake Lining and Drum Contact

1. Apply chalk powder to the entire inside brake drum surface.
2. Place the brake shoe assembly in the inside brake drum.
3. Move the brake shoe assembly around the inside brake drum.
Check for uniform contact between the brake lining and the brake drum.



4. Correct any areas having poor contact with sandpaper.
5. Repeat Steps 1 through 4 until the contact between the brake lining and the brake drum is perfect.

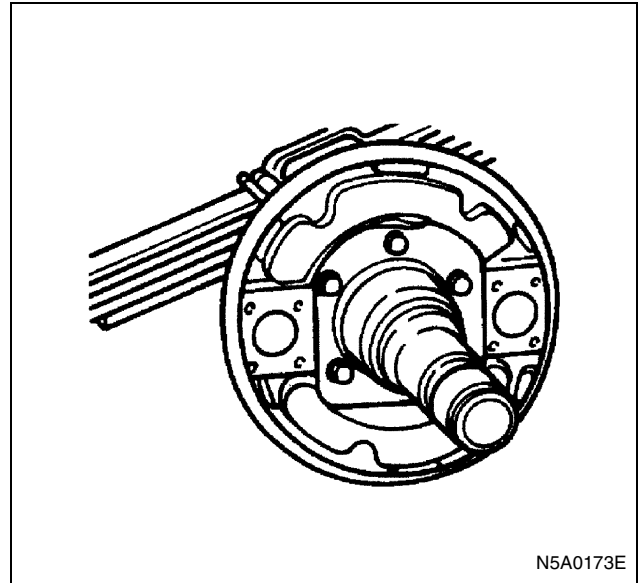
Installation

1. Back Plate
Tighten the back plate bolts to the specified torque.

Back Plate Bolt Torque		N-m (kg-m/lb-ft)
Drum Inside Dia. mm (in)	Lining Width mm (in)	—
228.6 (9.00)	75 (2.95)	108 (11.0/80)
240.0 (9.45)	60 (2.36)	108 (11.0/80)
260.0 (10.24)	90 (3.54)	108 (11.0/80)
279.4 (11.00)	60 (2.36)	74 (7.5/54)
290.0 (11.42)	75 (2.95)	108 (11.0/80)
300.0 (11.81)	75 (2.95)	* 44 (4.5/33)
		** 108 (11.0/80)
320.0 (12.60)	75 (2.95)	108 (11.0/80)
	100 (3.94)	108 (11.0/80)
	120 (4.72)	157 (16.0/116)

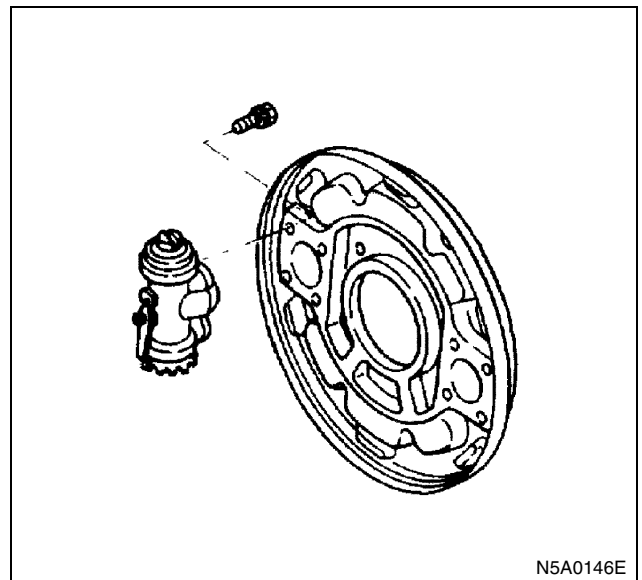
* Single Tire models

** Dual Tire models



2. Wheel Cylinder Assembly
Tighten the wheel cylinder assembly bolts to the specified torque.

Wheel Cylinder Assembly Bolt Torque			N-m (kg-m/lb-ft)
Drum Inside Dia. mm (in)	Lining Width mm (in)	—	
228.6 (9.00)	75 (2.95)	34 (3.5/25)	
240.0 (9.45)	60 (2.36)	25 (2.5/18)	
260.0 (10.24)	90 (3.54)	43 (4.4/32)	
279.4 (11.00)	60 (2.36)	27 (2.8/20)	
290.0 (11.42)	75 (2.95)	25 (2.5/18)	
300.0 (11.81)	75 (2.95)	34 (3.5/25)	
320.0 (12.60)	75 (2.95)	43 (4.4/32)	
	100 (3.94)	74 (7.5/55)	
	120 (4.72)	94 (9.6/69)	



5A-44 HYDRAULIC BRAKES

3. Brake Pipe

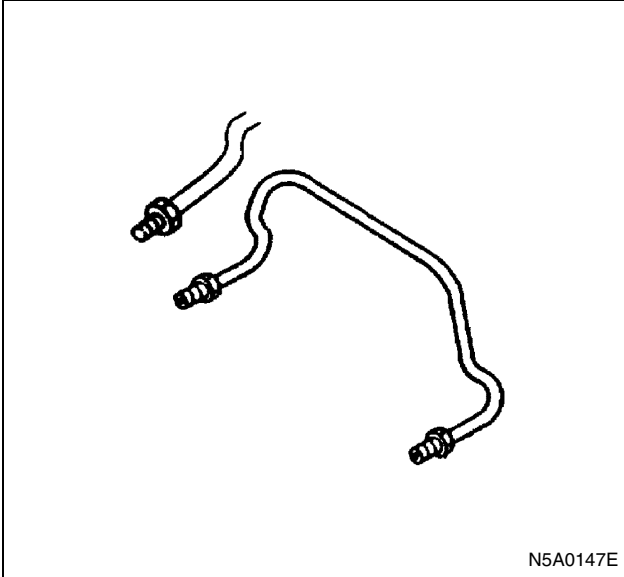
Tighten the brake pipe flare nuts to the specified torque.

Tighten:

Brake pipe flare nuts to 16 N·m (1.6 kg·m / 12 lb·ft)

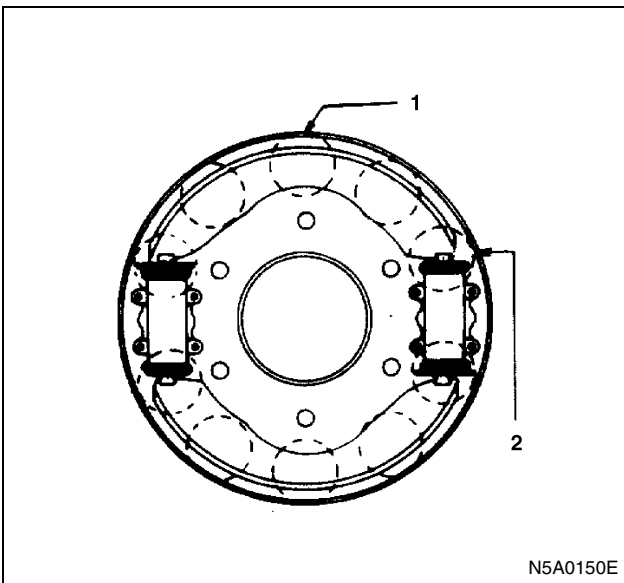
Notice:

Take care not to twist the piping.

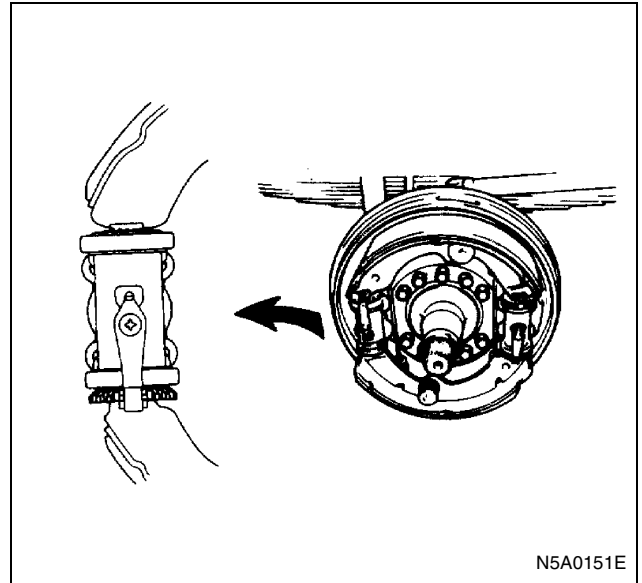


4. Brake Shoe and Return Spring

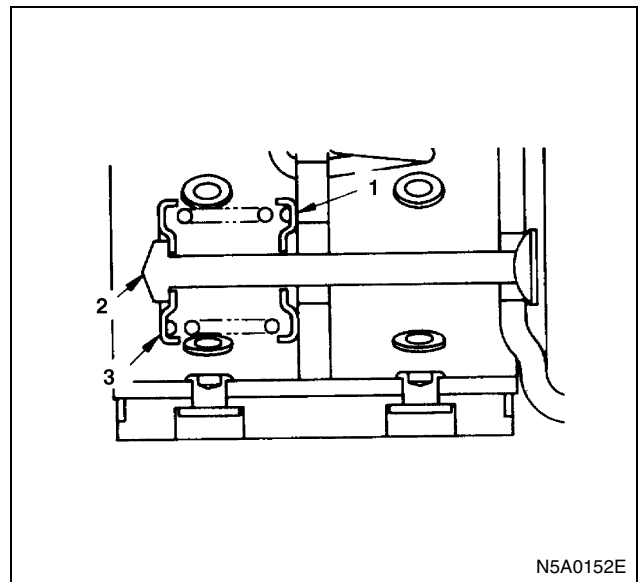
- 1) Before setting the brake shoes, apply a thin coat of molybdenum disulfide grease to the back plate portions (1) contacting the brake shoe edge as shown in the illustrations.
- 2) Apply a coat of molybdenum disulfide grease to the wheel cylinder parts contacting the brake shoe (2).



- 3) Set the brake shoe assembly to the cylinder adjusting screw at the brake shoe small angle end.
Do not install it at the round end.



- 4) Install the brake shoes and the return springs to the wheel cylinders.
Keep the brake lining clean.
5. Shoe Holding Spring, Cup and Pin
 - 1) Before installing the holding pin.
Apply a coat of molybdenum disulfide grease to the holding cup seating faces (1) contacting the brake shoe.
 - 2) After installation of the pins, cups and the springs, make sure the pin (2) seats to the cup (3) properly.

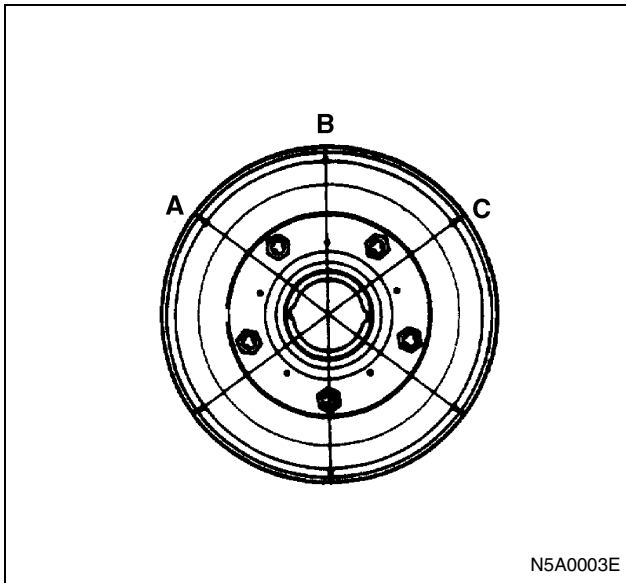


6. After installation of brake drum, be sure to perform the preload adjustment of hub bearing.
7. Bleed the air from brake.

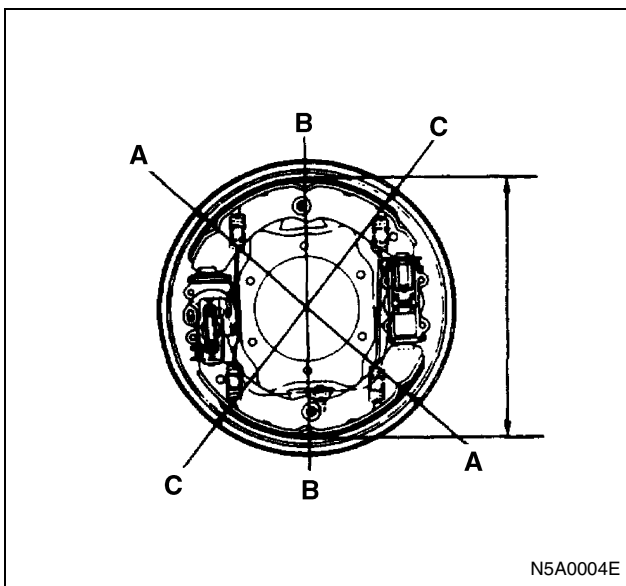
With Auto-adjuster

For the drum brake with auto-adjuster, perform the following procedure before Step 6 and 7.

1. Measure the internal diameter of the brake drum.
 - Take measurement of the distance at (A), (B) and (C) points.



2. Measure the external diameter of the brake shoe.
 - Take measurement of the distance at (A), (B) and (C) points.



3. Turn the adjuster gear so that the difference between the internal diameter of the brake drum and the internal diameter of the brake shoe becomes 0.6 mm (0.024 in).
4. Install the brake drum.

Adjustment

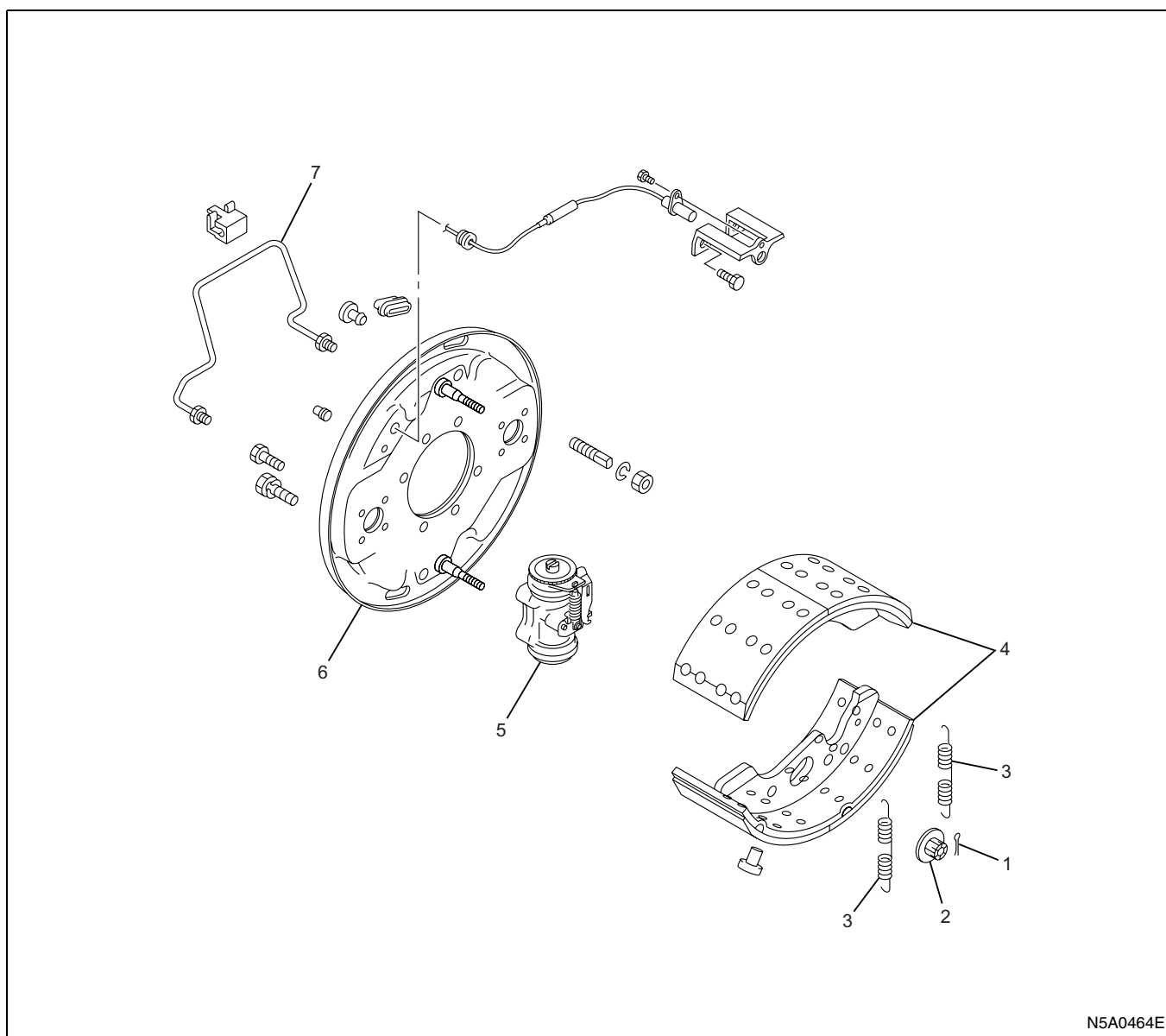
Without Auto-adjuster

Turn the adjuster until the brake drum stops rotating. Depress the brake pedal several times and turn the adjuster furthermore. When the brake drum stops rotating completely, turn the adjuster back for 5 to 6 notches.

With Auto-adjuster

Strongly depress the brake pedal several times while rotating the brake drum in the direction of moving forward or driving the vehicle forward. This adjusts the brake drum clearance automatically.

Rear Drum Brake Assembly (Drum Inside Diameter 370 mm)



N5A0464E

Legend

- | | |
|-----------------------------|----------------------------|
| 1. Cotter pin | 5. Wheel cylinder assembly |
| 2. Shoe hold nut | 6. Back plate |
| 3. Brake shoe return spring | 7. Brake pipe |
| 4. Brake shoe assembly | |

Removal

- Block vehicle wheels and apply the parking brake.
 - Raise the axle to clear the tire from the ground. Position jack stands under vehicle.
- Wheel and tire assembly and brake drum and hub assembly.
 - Refer to Section 3E WHEELS AND TIRES.
 - Refer to Section 4C FRONT AXLE and Section 3C FRONT SUSPENSION.
 - Refer to Section 4B REAR AXLE.

- Holder nuts.
- Shoe return springs using a return spring plier. Return spring plier: 9-8522-0026-0
- Shoe and lining assemblies.
- Brake pipes.

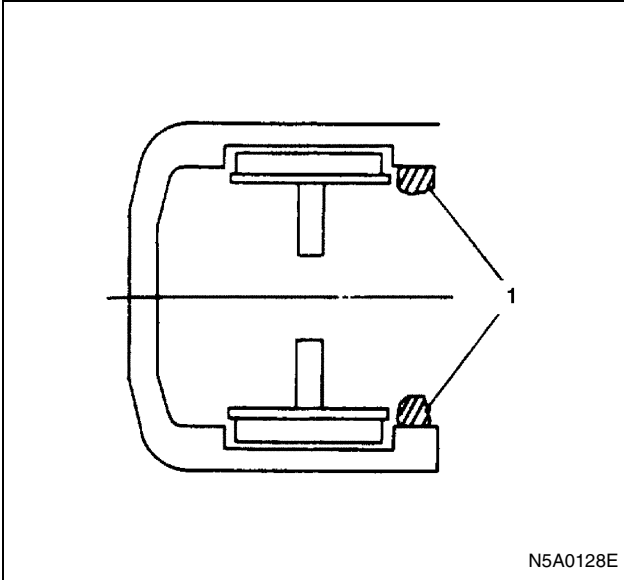
Notice:

The brake pipes to the wheel cylinders must be removed before the wheel cylinders can be removed.

- Brake hose.
- Back plate.
- Wheel cylinders.

Drum Inside Diameter 370.0 mm (14.57 in)

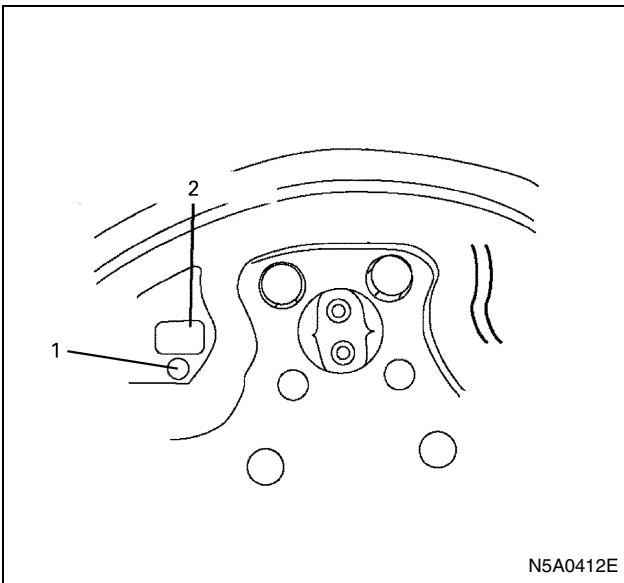
If the brake drum has step wear or the brake drum edge is corroded, it will be difficult to remove the brake drum. The following procedure will make brake drum removal easier.



Legend

1. Corroded portion

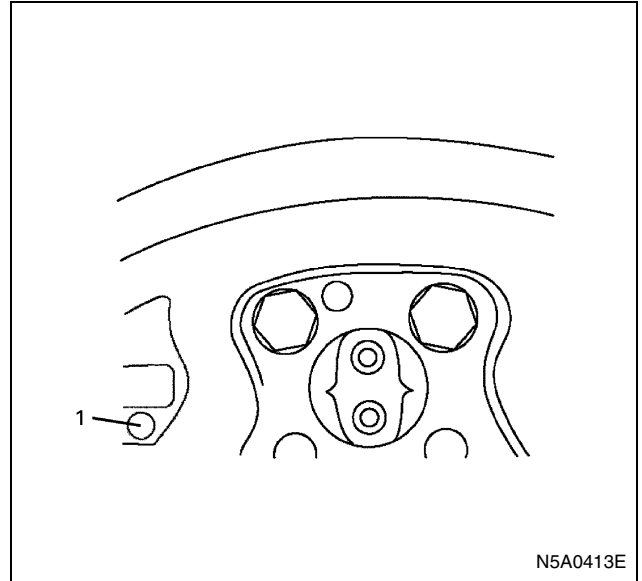
1. Remove the rubber cover from the brake lining clearance adjusting hole and auto-adjuster lever release hole.
2. Remove the adjust hole cover and adjuster lever release hole cover.



Legend

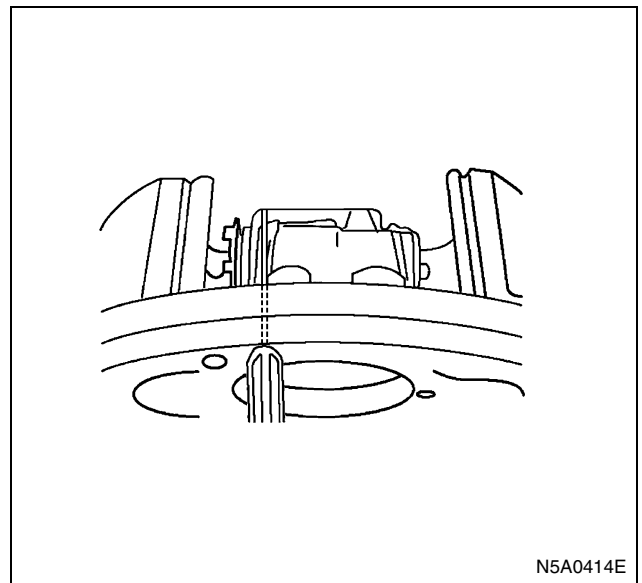
1. Adjuster lever release hole cover
2. Adjuster hole cover

3. Using $\phi 5$ mm Phillips screwdriver put it into the adjuster lever release hole and then push up the adjuster lever.

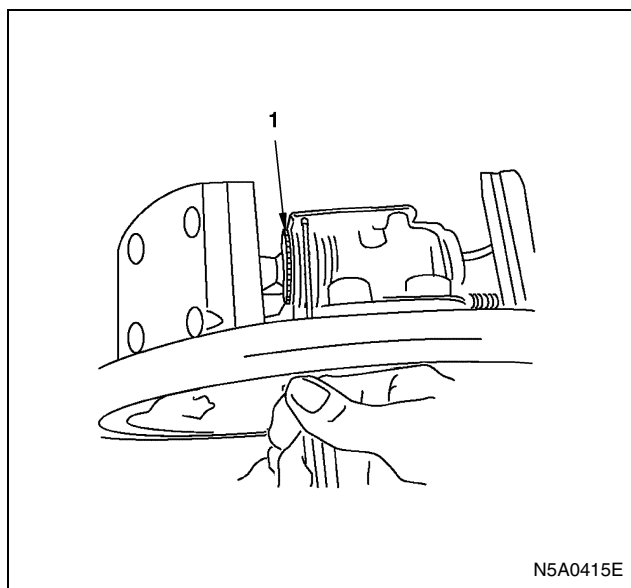


Legend

1. Adjuster lever release hole

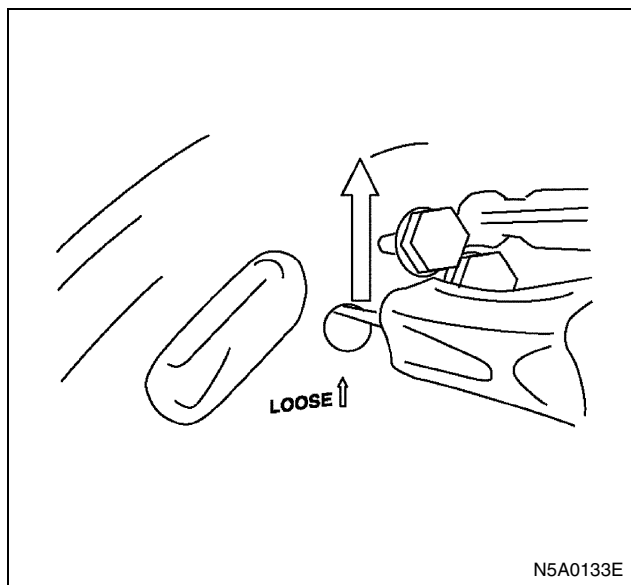


4. Put the flathead screwdriver into the adjuster hole while push up the adjuster lever.

**Legend**

1. Adjuster gear

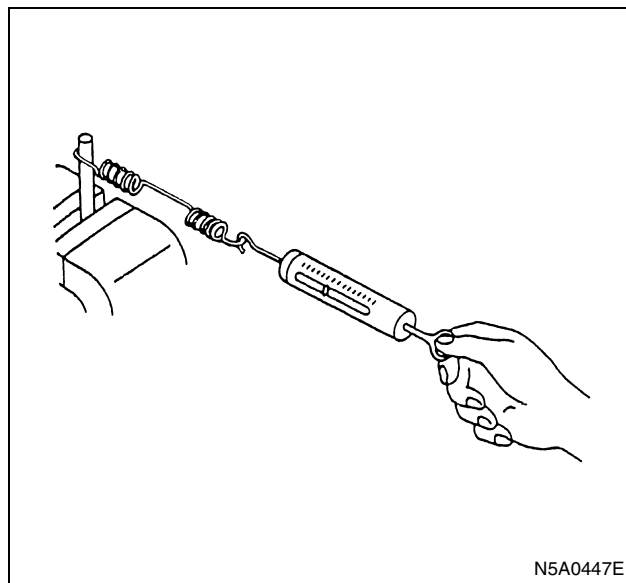
5. Turn the adjuster gear to the marked arrow "LOOSE" on the backing plate.

**Inspection**

- All components for wear or damage. Replace as necessary.

Measurement

Set the return spring as it is installed, and measure the tension.



- Return spring tension.

Free Length mm (in)	209.3 (8.24)
Set Length mm (in)	226 (8.90)
Set Load N (kg/lb)	292.2 — 357 (29.8 — 36.4 / 65.7 — 80.2)

Installation

1. Wheel cylinder assemblies.

Tighten:

Wheel cylinder mounting bolts to 120 N·m (12.2 kg·m / 89 lb·ft)

2. Back Plate.

Tighten:

Mounting plate bolts to 157 N·m (16.0 kg·m / 116 lb·ft)

3. Brake pipes and hoses.

Tighten:

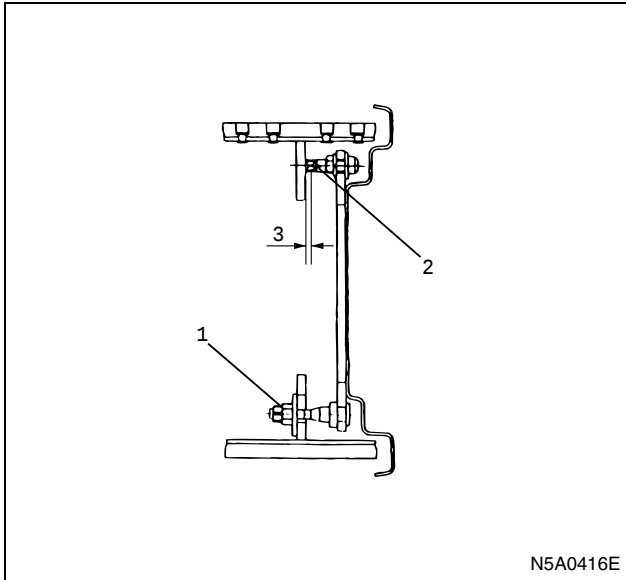
Brake pipe nuts to 15 N·m (1.5 kg·m / 11 lb·ft)

4. Shoe and lining assemblies.
5. Shoe return spring using a return spring plier.
Return spring plier: 9-8522-0026-0
6. Holder nuts.
 - Brake holder nut clearance.
 - Turn nut (1) clockwise until shoe comes into contact with the bolts (2).
 - Turn nut (1) counterclockwise 1/3 turn. Back off the nut until the hole in the holding pin lines up with the nearest slot in the nut within 1/6 turn, and install split pin.
 - Check to see if clearance between bolt and shoe in 0.3 — 0.5 mm (0.012 — 0.020 in). If

clearance is not specified, it should be readjusted.

Caution:

Do not loosen the nuts on the shoe hold bolts during the operation.



Legend

1. Nut
2. Bolt
3. Clearance 0.3 — 0.5 mm (0.012 — 0.020 in)

7. Cotter pin.
Use a new cotter pin. Be sure to bend back the legs of the pin.
8. Hub and drum assembly and wheel and tire assembly. Adjust wheel bearings.
 - Refer to Section 3E WHEELS AND TIRES.
 - Refer to Section 4C FRONT AXLE and Section 3C FRONT SUSPENSION.
 - Refer to Section 4B REAR AXLE.

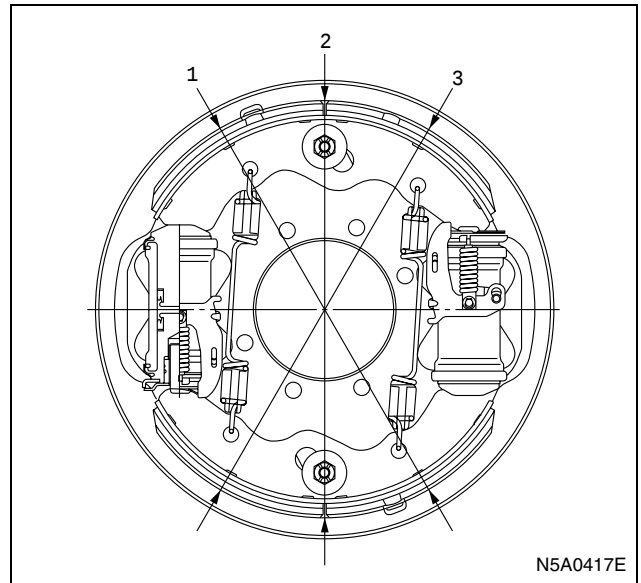
Adjustment

1. After reassembling the brake assembly, adjust the brake lining external diameter to 369.3 — 369.8 mm (14.54 — 14.56 in) by turning the wheel cylinder adjuster gear.
If the measurement at 1, 2 and 3 point are within the range of specified value, brake drum can be installed easily.

Notice:

Be sure to push up the auto-adjuster lever. Failure to do so will result in damage to the teeth of auto-adjuster-gear.

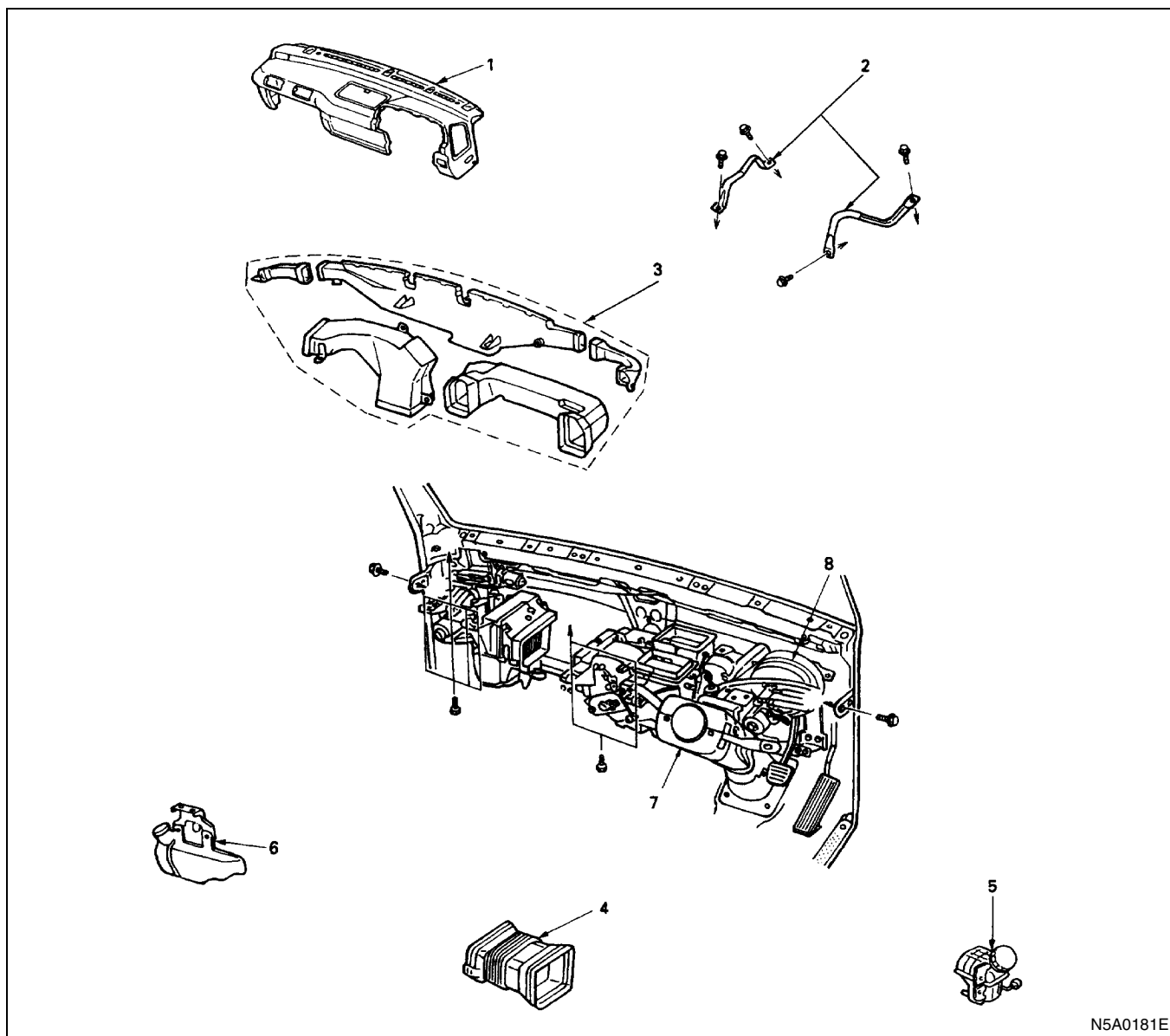
Take care not to damage the rubber boot with the screw driver.



2. Install the brake drum.
3. Rotate the brake drum and depress the brake pedal as far as possible.

Brake Pedal and Control

Brake Vacuum Booster and Brake Pedal Assembly



Legend

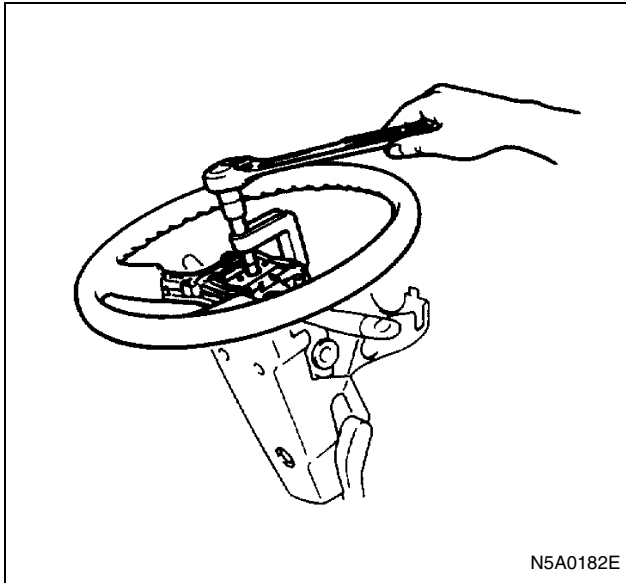
- | | |
|-----------------------------------|--|
| 1. Instrument panel | 5. Brake and clutch fluid reservoir |
| 2. Stay | 6. Windshield washer tank |
| 3. Defroster nozzle and vent duct | 7. Steering cowl assembly |
| 4. Center duct (NPR model only) | 8. Vacuum booster and brake pedal assembly |

Removal

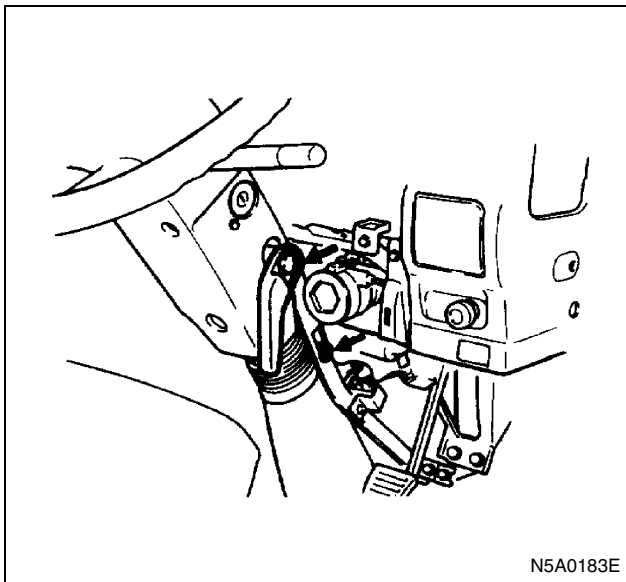
1. Instrument Panel
2. Stay
3. Defroster Nozzle and Vent Duct
4. Center Duct (NPR model only)
5. Brake and Clutch Fluid Reservoir
6. Windshield Washer Tank

For the removal procedure for above, refer to Section 2 CAB AND FRAME.

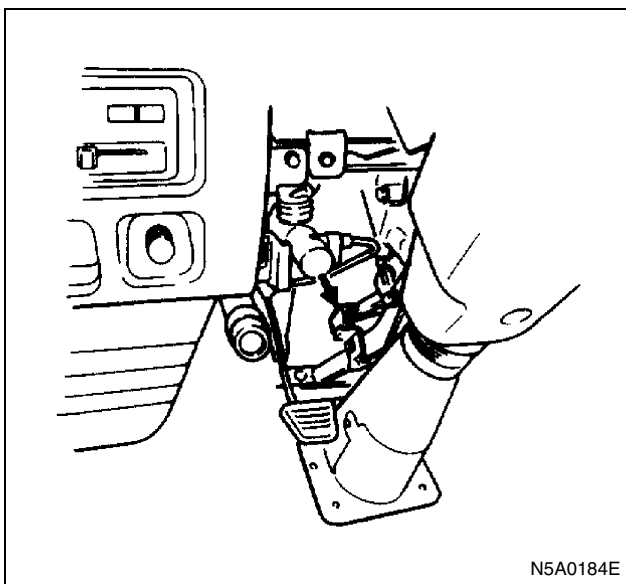
7. Steering Cowl Assembly
Wheel remover: 5-8840-2215-0



Remove the tilt lever and steering cowl.

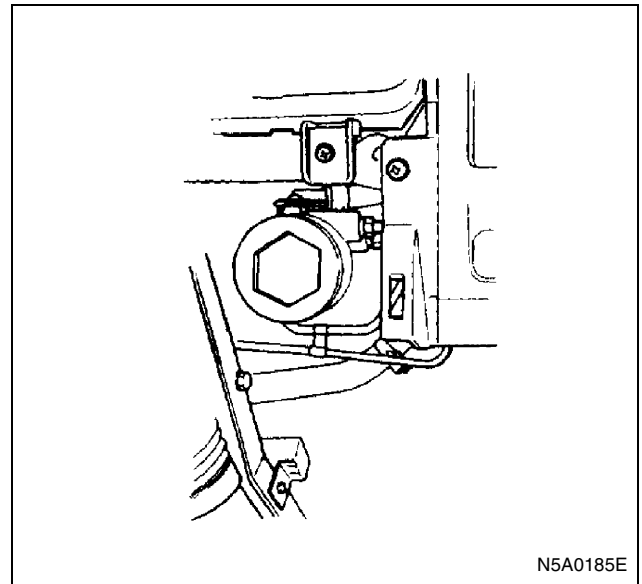


Disconnect the wire harness connectors.

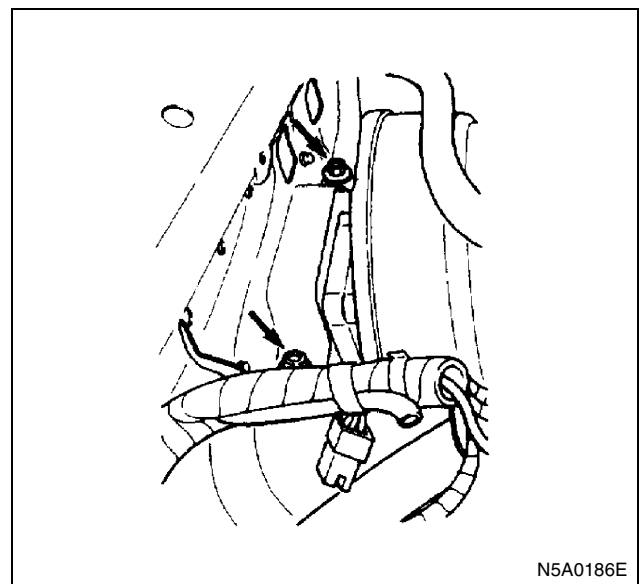


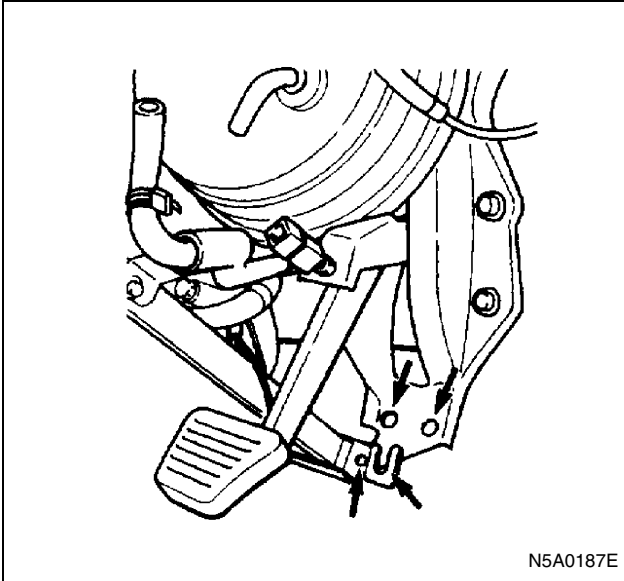
8. Vacuum Booster and Brake Pedal Assembly

- 1) Disconnect the brake pipes and hoses.

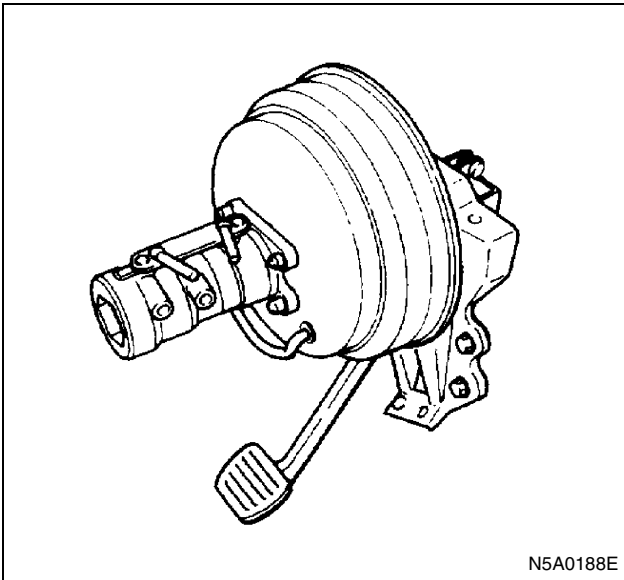


- 2) Plug or cover the brake rubber hoses, pipes and the master cylinder brake fluid ports to prevent brake fluid spillage. If brake fluid spillage occurs, wipe it up immediately.
- 3) Remove the brake pedal bracket fixing bolts and vacuum booster and brake pedal assembly.

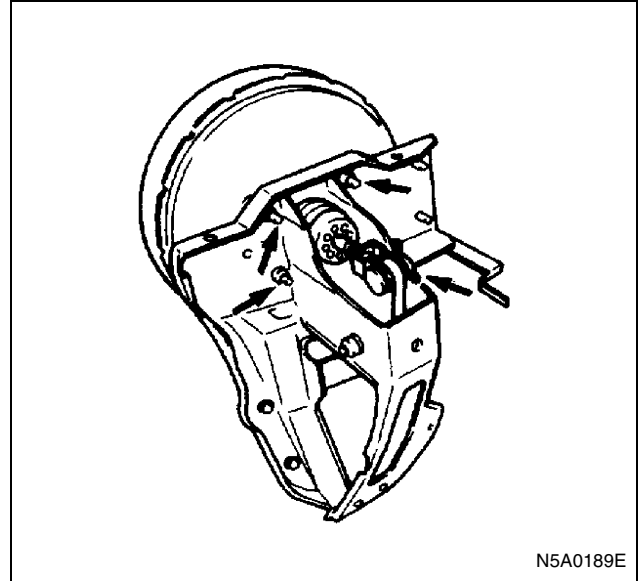




4) Remove the brake pedal and master cylinder.

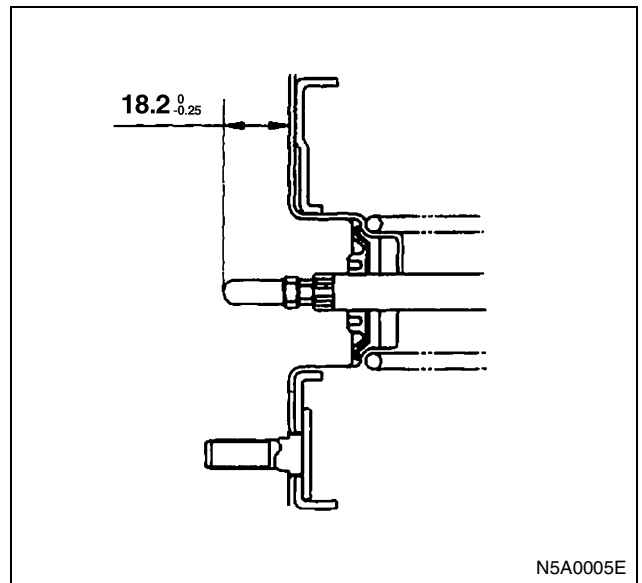


5) Remove the vacuum booster assembly from brake pedal assembly.

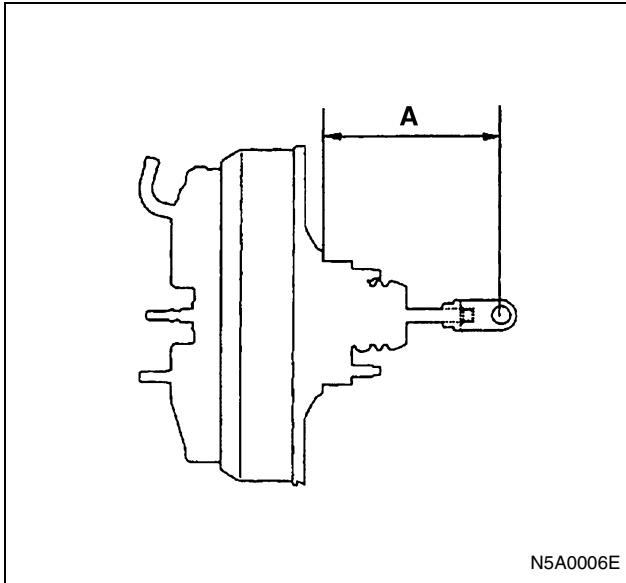


Installation

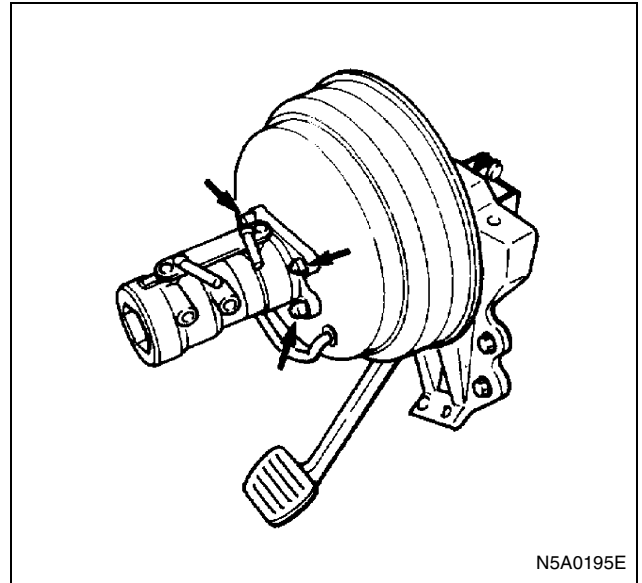
1. Vacuum Booster and Brake Pedal Assembly
 - 1) Vacuum booster cannot be overhauled. If it is found faulty, replace its assembly with a new one.
 - 2) Make necessary adjustment, so that distance between end of push rod and flange face is adjusted to 18.2 mm (0.717 in) in condition of vacuum applying.



- 3) Push rod length (A) is measured from the center of the clevis pin hole to the mounting surface of the brake pedal bracket. Adjusted to 109 mm (4.291 in); without spacer, 129 mm (5.079 in); with spacer and tighten the lock nut. When fixed under this condition, there is no need to adjust the height of brake pedal from floor and free play.



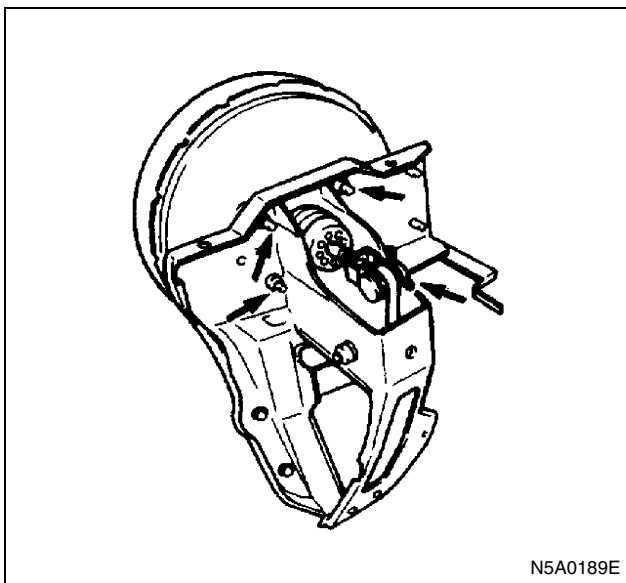
- 4) Install the vacuum booster to brake pedal assembly.
 - Adjust the clearance between the tip of threaded portion of the stop light switch and the pedal arm to 0.5 — 1.0 mm (0.02 — 0.04 in).



- 8) Install the vacuum booster and brake pedal assembly.

Tighten:

Vacuum booster and brake pedal assembly bolts to 42 N·m (4.3 kg·m / 32 lb·ft)



- 5) Tighten the vacuum booster bolts to the specified torque.

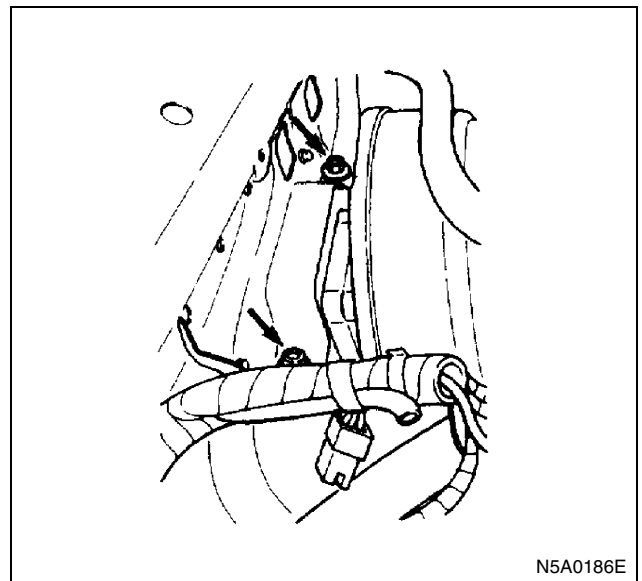
Tighten:

Vacuum booster bolts to 14 N·m (1.4 kg·m / 122 lb·in)

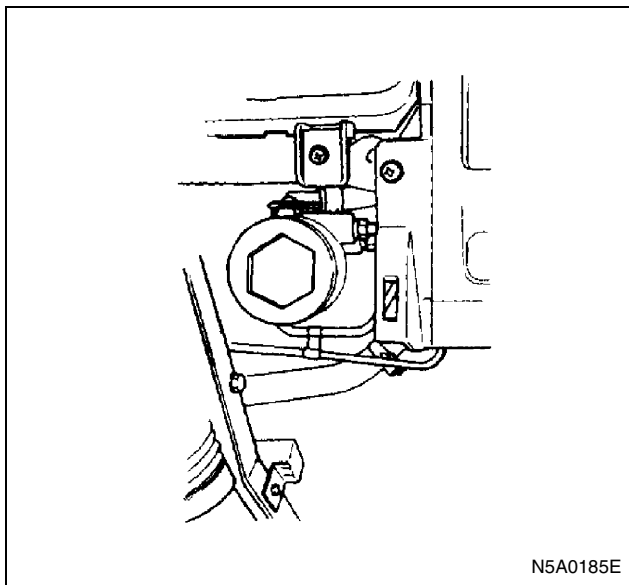
- 6) Install the master cylinder assembly to vacuum booster or brake pedal assembly.
- 7) Tighten the master cylinder nut to the specified torque.

Tighten:

Master cylinder nut to 14 N·m (1.4 kg·m / 122 lb·in)



- 9) Connect the brake hoses and pipes.

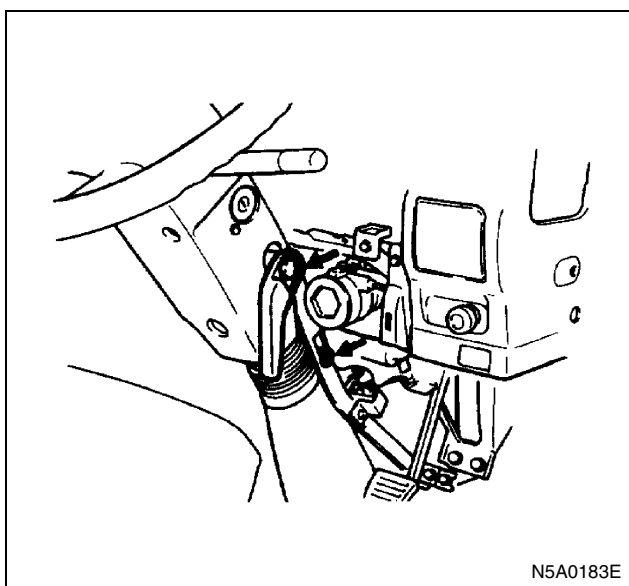


2. Steering Cowl Assembly

- 1) Connect the wire harness connectors.
- 2) Install the steering cowl.

Tighten:

Steering cowl bolt to 14 N·m (1.4 kg·m / 122 lb·in)



- 3) Install the tilt lever.

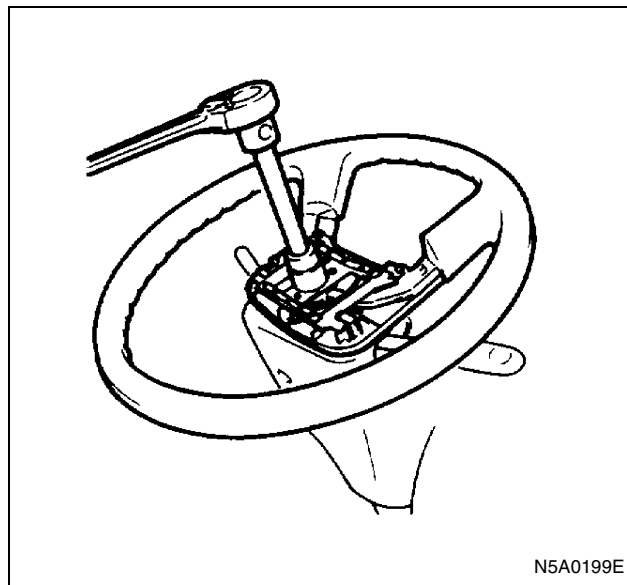
Tighten:

Tilt lever bolt to 45 N·m (4.6 kg·m / 33 lb·ft)

- 4) Install the steering wheel.

Tighten:

Steering wheel nut to 49 N·m (5.0 kg·m / 36 lb·ft)



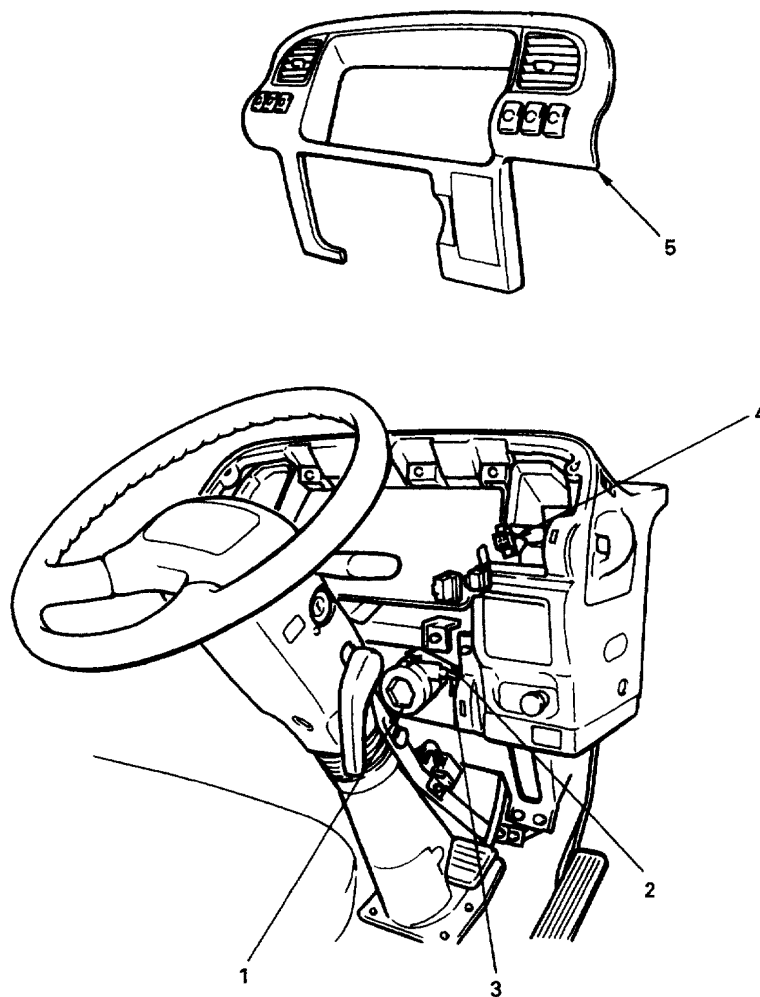
3. Windshield Washer Tank

4. Brake and Clutch Fluid Reservoir
5. Center Duct (NPR model only)
6. Defroster Nozzle and Vent Duct
7. Stay
8. Instrument Panel

For the installation procedure for above, refer to Section 2 CAB AND FRAME.

Master Cylinder Assembly

This illustration is based on RHD.



N5A0200E

Legend

- | | |
|---------------------|--------------------|
| 1. Meter cluster | 4. Brake hose |
| 2. Switch connector | 5. Master cylinder |
| 3. Brake pipe | |

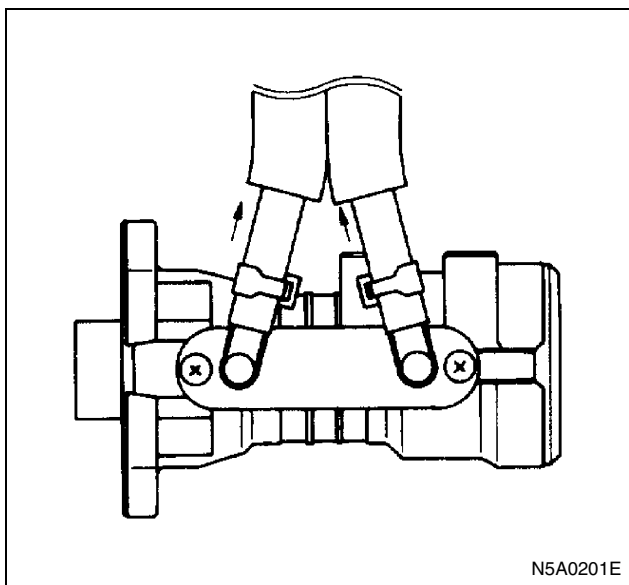
Removal

1. Meter Cluster

2. Switch connector

For the removal procedure for above, refer to Section 2 CAB AND FRAME.

3. Brake Pipe

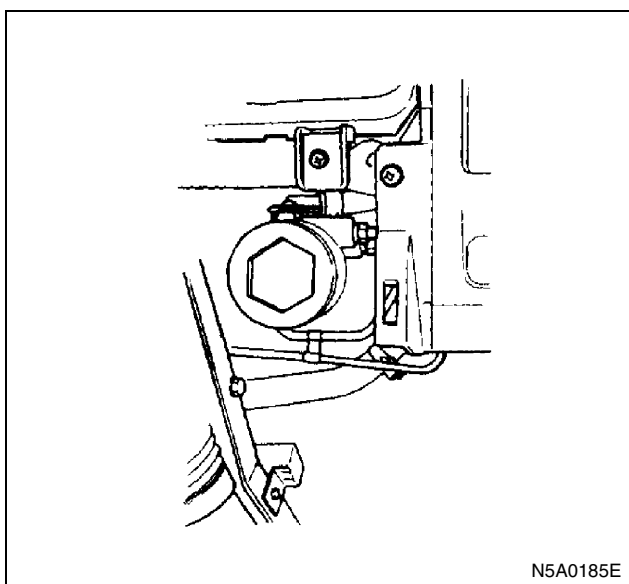


4. Brake Hose

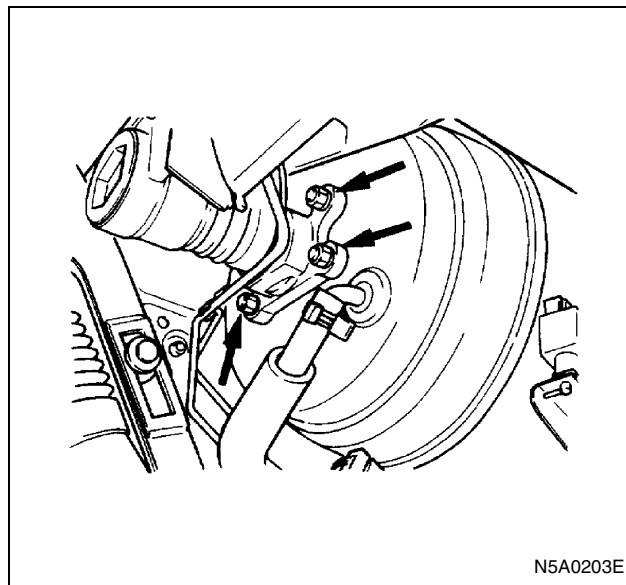
1) Disconnect the brake pipes and hoses.

2) Plug or cover the brake rubber hoses, pipes and the master cylinder brake fluid ports to prevent brake fluid spillage.

If brake fluid spillage occurs, wipe it up immediately.



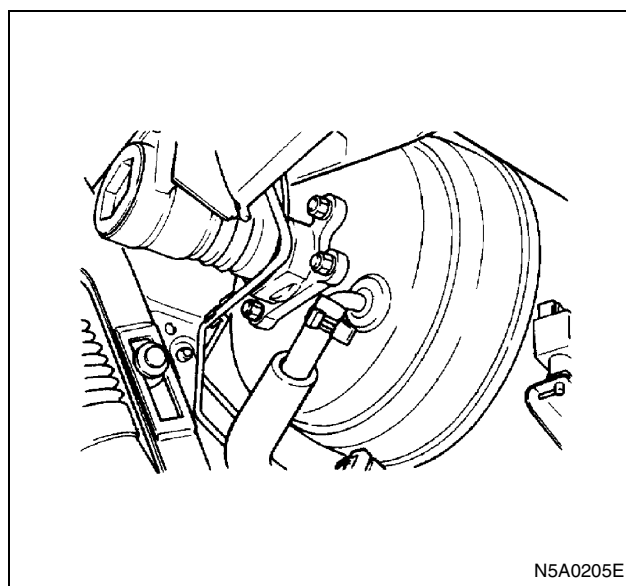
5. Master Cylinder



Installation

1. Master Cylinder

1) Install the master cylinder assembly to the vacuum booster or brake pedal assembly.



2) Tighten the nuts to the specified torque.

Tighten:

Master cylinder assembly nuts to 14 N·m (1.4 kg·m / 122 lb·in)

2. Brake Hose

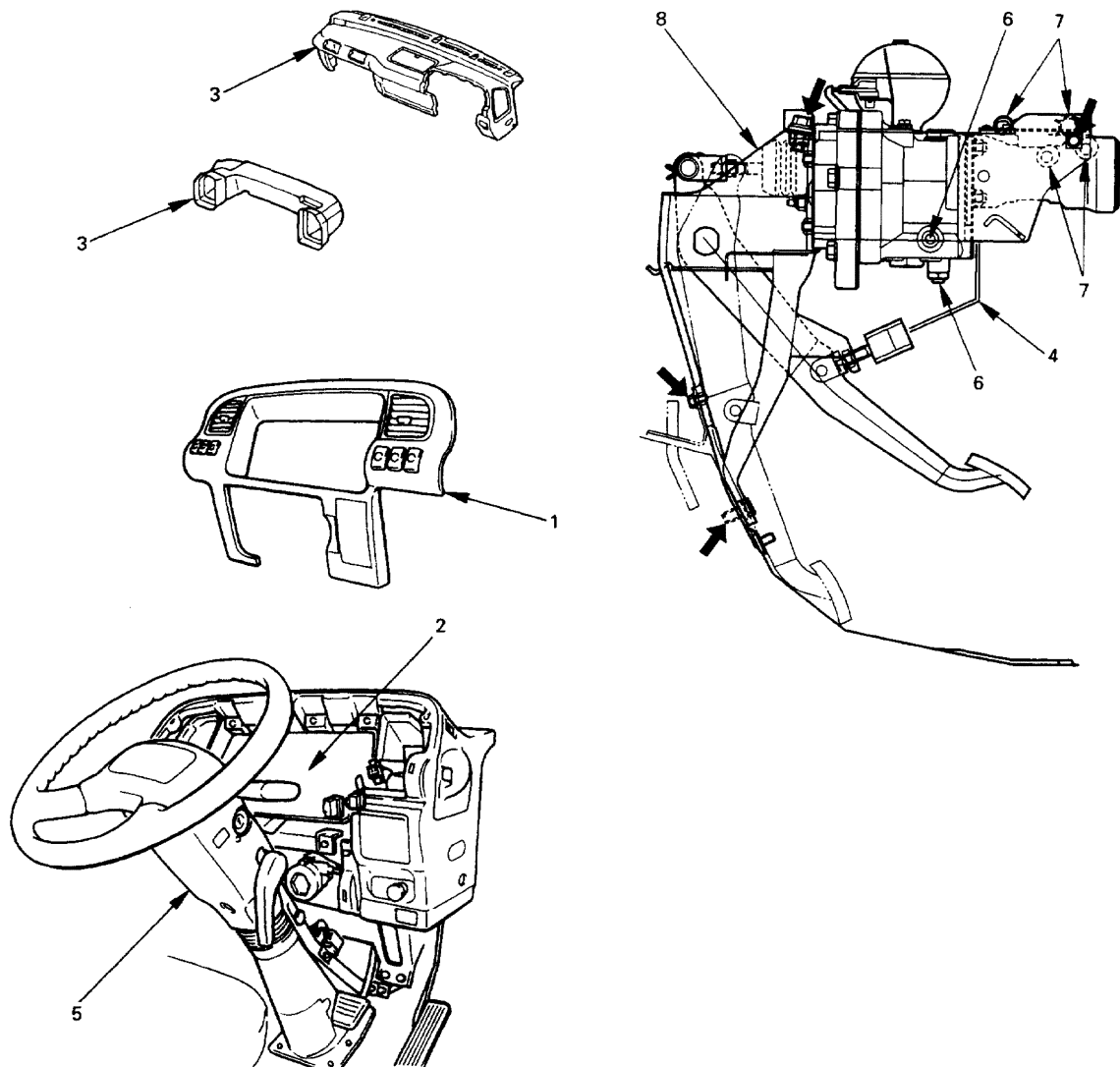
3. Brake Pipe

4. Switch Connector

5. Meter Cluster

Hydraulic Booster and Brake Pedal Assembly

This illustration is based on RHD.



N5A0206E

Legend

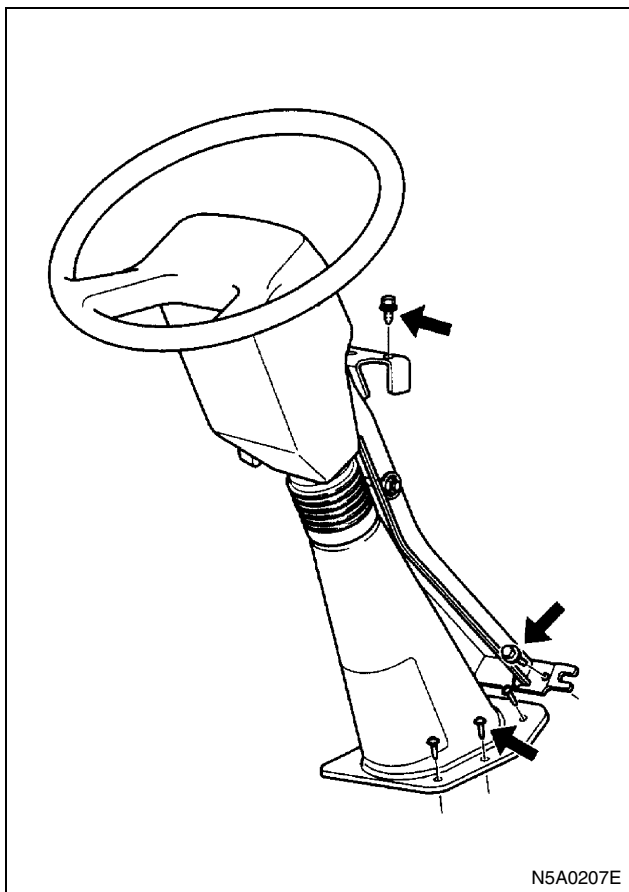
- | | |
|---------------------------------------|--|
| 1. Meter cluster | 6. ATF pipe |
| 2. Meter | 7. Brake pipe and hose |
| 3. Instrument panel and duct | 8. Brake pedal assembly with master cylinder and hydraulic booster |
| 4. Heat protector | |
| 5. Steering wheel and column assembly | |

Removal

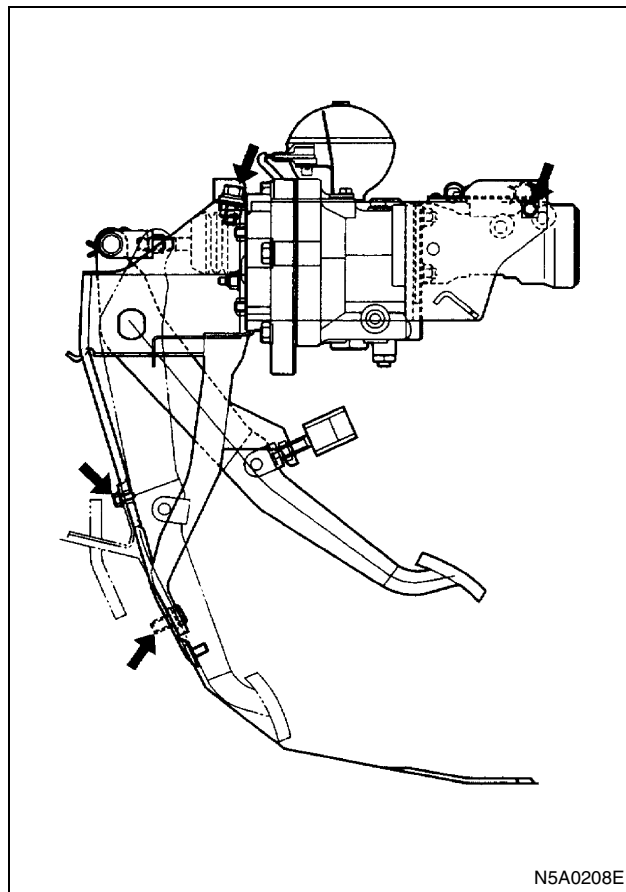
- Block the vehicle wheels and apply the parking brake.
 - Disconnect the battery ground cable.
 - By brake pedal operation with the engine off, reduce the pressure of the hydraulic oil in the accumulator, and after confirming that the temperature of the hydro boost assembly has been reduced, remove the hydro boost assembly from the vehicle.
1. Remove meter cluster.
 2. Remove meter assembly and harness connector.
 3. Remove instrument panel assembly and ventilation duct.
 4. Remove heat protector under the hydraulic booster.
 5. Steering wheel and column assembly.
 - Remove inspection window and mark steering worm shaft and U-joint yoke. Remove key bolt and nut.
 - Remove screws: boots to floor.

5A-58 HYDRAULIC BRAKES

- Remove bolts and nuts: support bracket to floor.
- Remove bolts: steering column bracket to instrument reinforcement assembly.
- Remove bolts: steering column bracket to brake pedal bracket.



6. ATF pipe: inlet and outlet.
 - Disconnect pipes from the booster.
7. Brake pipe and hose: front and rear.
 - Disconnect pipes and hoses from the brake master cylinder.
8. Brake pedal assembly with master cylinder and hydraulic booster.
 - Remove accelerator pedal bracket.
 - Remove brake pedal assembly mounting bolts.
 - Remove radiator grille and disconnect ATF inlet pipe from flexible hose in front of the radiator.
Remove ATF inlet pipe.
 - Remove brake pedal assembly.



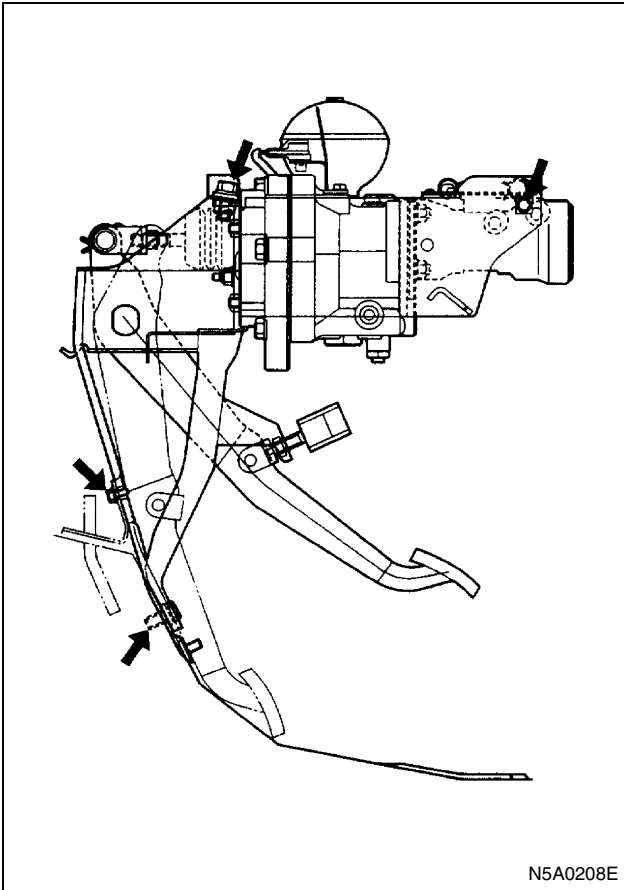
Installation

1. Brake Pedal Assembly with Master Cylinder and Hydraulic Booster
 - Set ATF inlet pipe and install brake pedal assembly.

Tighten:

M10 mounting bolts to 42 N·m (4.3 kg·m / 32 lb·ft)

- Connect ATF inlet pipe with flexible hose.
- Install accelerator pedal bracket.
- Install radiator grille.

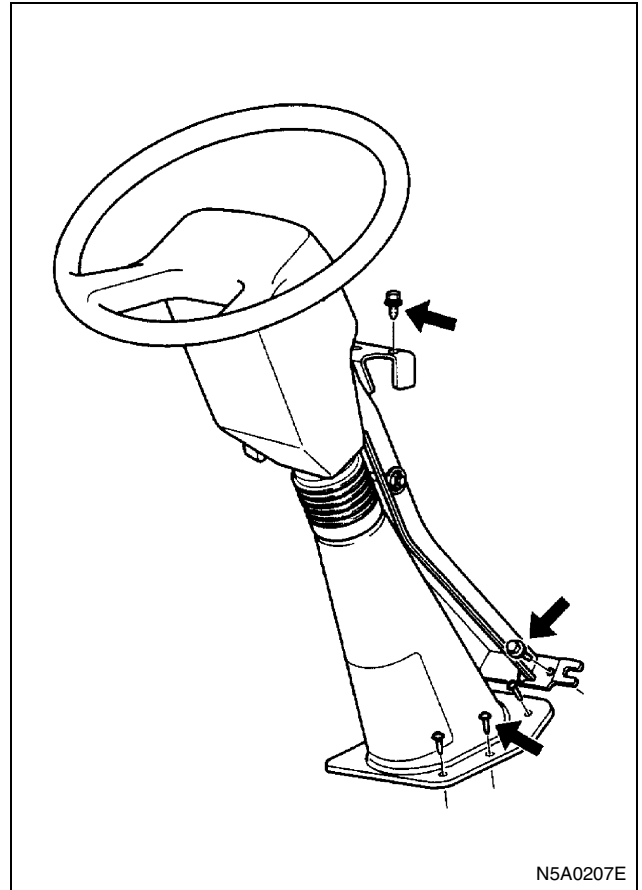


2. ATF Pipe
 - Install ATF pipes to hydraulic booster.
3. Brake Pipe and Hose
 - Install master cylinder hydraulic lines to master cylinder.
4. Steering Wheel and Column Assembly
 - Set steering wheel and column assembly.
 - Install mounting bolts, nuts and screws to body.
 - Install key bolt and nut.

Tighten:

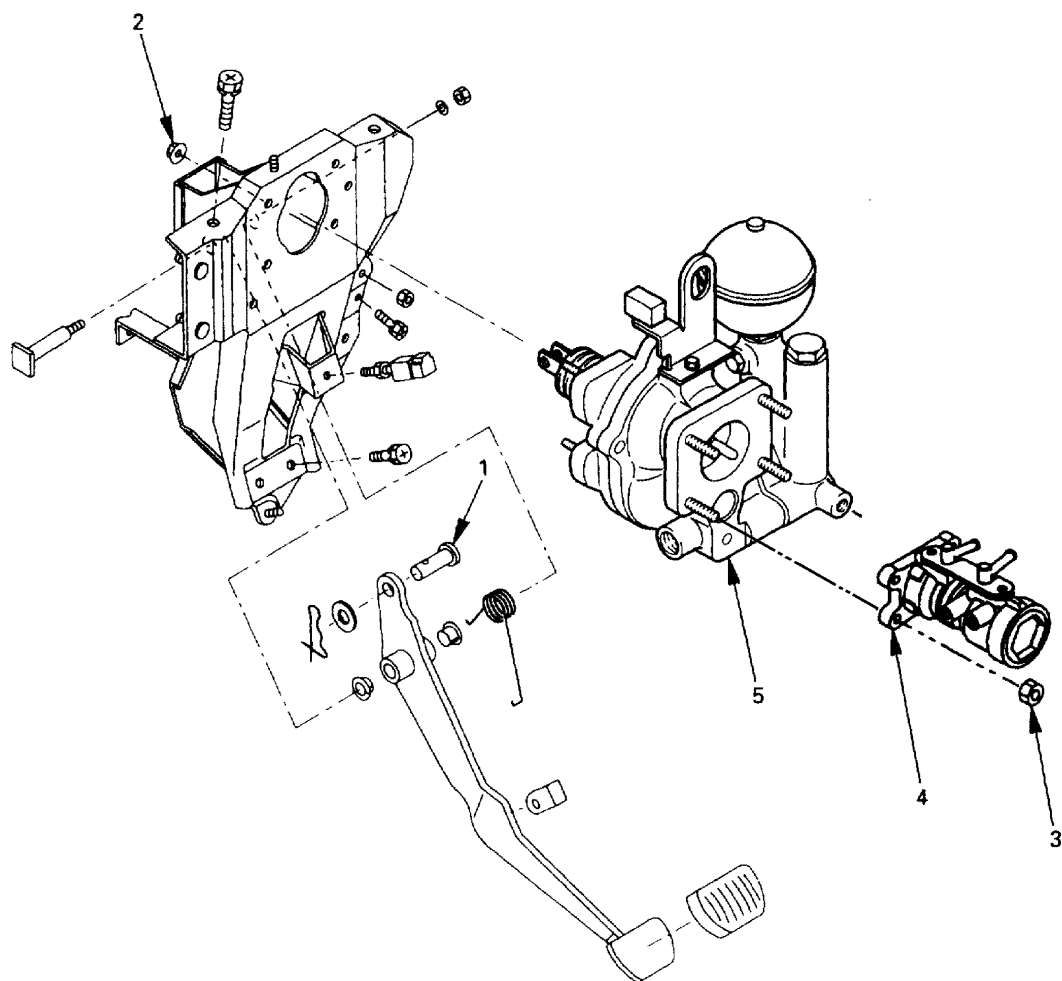
Key bolt to 38 N·m (3.9 kg·m / 28 lb·ft)

- Install inspection window.



5. Heat Protector
 - Install hydraulic booster heat protector.
6. Instrument Panel and Duct
 - Install ventilation duct and instrument panel assembly.
7. Meter
 - Install meter assembly and harness connector.
8. Meter Cluster
 - Install meter cluster.
9. Battery ground cable.
10. After attaching it to the vehicle, always replenish with new hydraulic oil (Besco ATF III), and completely release the air from the hydro boost.
11. Bleed brake lines.
12. Release the parking brake and remove the wheel blocks.

Hydraulic Booster



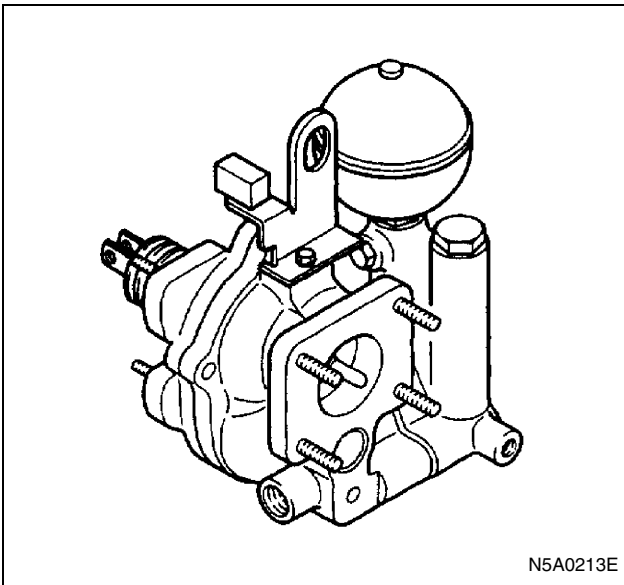
N5A0212E

Legend

- | | |
|--------------------------|----------------------|
| 1. Clevis pin | 4. Master cylinder |
| 2. Hydraulic booster nut | 5. Hydraulic booster |
| 3. Master cylinder nut | |

Removal

1. Clevis Pin
2. Hydraulic Booster Nut
 - Four hydraulic booster mounting nuts at pedal bracket.
 - Remove master cylinder with hydraulic booster.
3. Master Cylinder Nut
 - Four nuts retaining master cylinder to hydraulic booster.
4. Master Cylinder
5. Hydraulic Booster

**Installation**

1. Hydraulic Booster
2. Master Cylinder Assembly
3. Master Cylinder Nut

Tighten:

Master cylinder nut to 14 N·m (1.4 kg·m / 122 lb·in)

4. Hydraulic Booster Nut
 - Four hydraulic booster mounting nuts to pedal bracket.

Tighten:

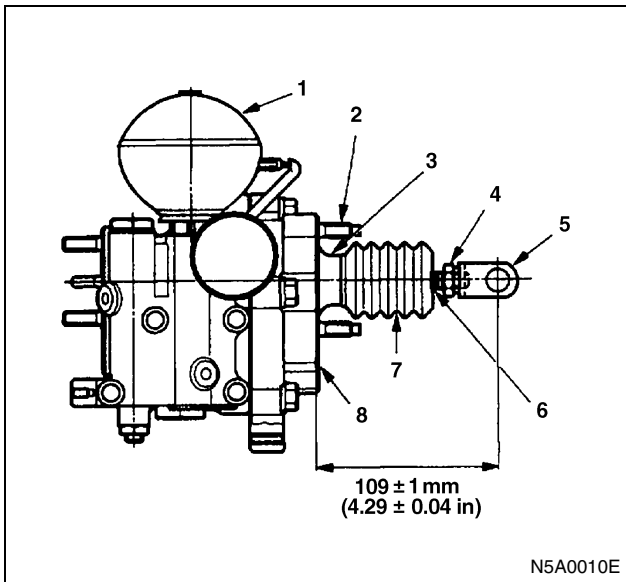
Hydraulic booster nut to 14 N·m (1.4 kg·m / 122 lb·in)

5. Clevis Pin
 - Connect hydraulic booster clevis to brake pedal and install clevis pin.

Accumulator and O-ring Replacement

Removal

- Block the vehicle and apply the parking brake.
- Disconnect the battery ground cable.
- Reduce the pressure of the hydraulic oil in the accumulator by brake pedal operation with the engine off, and after confirming that the temperature of the hydro boost assembly has been reduced, remove the hydro boost assembly from the vehicle.
 - 1) Remove meter cluster.
 - 2) Remove meter assembly and harness connector.
 - 3) Remove ventilation duct.
 - 4) Using an oil filter wrench, remove accumulator and O-ring.



Legend

1. Accumulator
2. Stud bolt
3. Cover boss
4. Lock nut
5. Clevis
6. Operating rod
7. Guard
8. Flange

Installation

1. Verify that there is no foreign matter adhering to the screw part of the accumulator or to the attachment part on the booster side.
2. Put an O-ring coated with new hydraulic oil (ATF DEXRON®-III) into the screw part of the accumulator, being careful not to damage it. Always use a new O-ring.
3. Using an oil filter wrench, hold the accumulator shell fixed, and tighten it via the wrench to the specified torque.

Tighten:

Accumulator to 29 N·m (3.0 kg·m / 22 lb·ft)

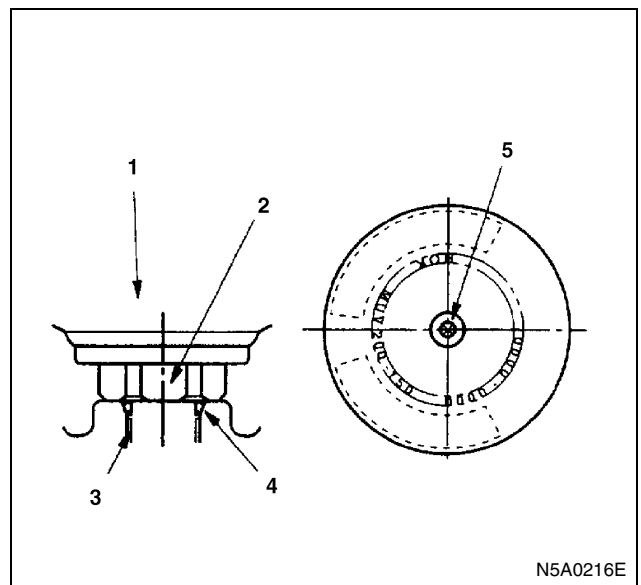
4. Install ventilation duct.
5. Connect harness connector and install meter assembly.
6. Install meter cluster.
7. Connect the battery ground cable.
8. After attaching it to the vehicle, always replenish with new hydraulic oil (ATF DEXRON®-III), and completely release the air from the hydro boost.
9. Release the parking brake and remove the wheel blocks.

Notice:

How to dispose of the accumulator

To dispose of the accumulator, drill a hole in the position shown in the diagram according to the indications printed on the accumulator, completely release the nitrogen gas scaled inside the accumulator, then dispose of the accumulator.

Concerning disposal with the hydro boost assembly as well, dispose of it after first letting out all the nitrogen gas inside the accumulator, by the above method.



Legend

1. Accumulator
2. HEX25
3. Thread
4. O-ring
5. Drilling point for gas releasing

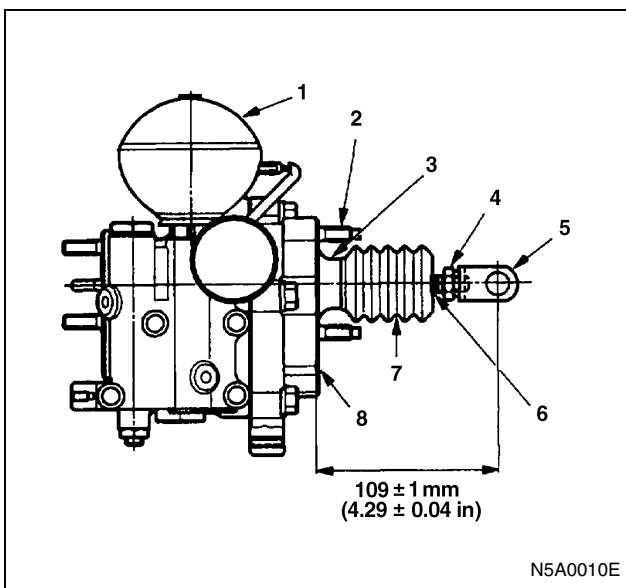
Clevis and Lock Nut Replacement

Removal

1. Remove hydraulic booster assembly.
Refer to "Removal" of Hydraulic Booster in this section.
2. Secure the hydro boost assembly to the jig using the four stud bolts on the surface of the flange for attachment to the vehicle.
3. Being careful not to exert any off-center load on the operating rod, loosen the lock nut and remove the clevis and lock nut.

Installation

1. Screw the lock nut and then the clevis onto the operating rod.



Legend

1. Accumulator
2. Stud bolt
3. Cover boss
4. Lock nut
5. Clevis
6. Operating rod
7. Guard
8. Flange

2. Adjust so that the booster clevis position dimension (the distance to the center of the clevis hole from the surface of the flange for attachment to the vehicle) is 109 ± 1 mm (4.29 ± 0.04 in), and tighten the lock nut with the prescribed torque.
When tightening the lock nut, be careful not to deform the clevis.

Tighten:

Lock nut to 20 N·m (2.0 kg·m / 14 lb·ft)

3. Attach the hydro boost assembly to the vehicle.
Refer to "Installation" of Hydraulic Booster in this section.

Guard Replacement

Removal

1. Remove hydraulic booster assembly.
Refer to "Removal" of Hydraulic Booster in this section.
2. Secure the hydro boost assembly to the jig using the four stud bolts on the surface of the flange for attachment to the vehicle.
3. Being careful not to exert any off-center load on the operating rod, loosen the lock nut and remove the clevis and lock nut.
4. Remove the guard from the cover boss anchoring groove and from the operating rod anchoring groove, and pull it out.

Installation

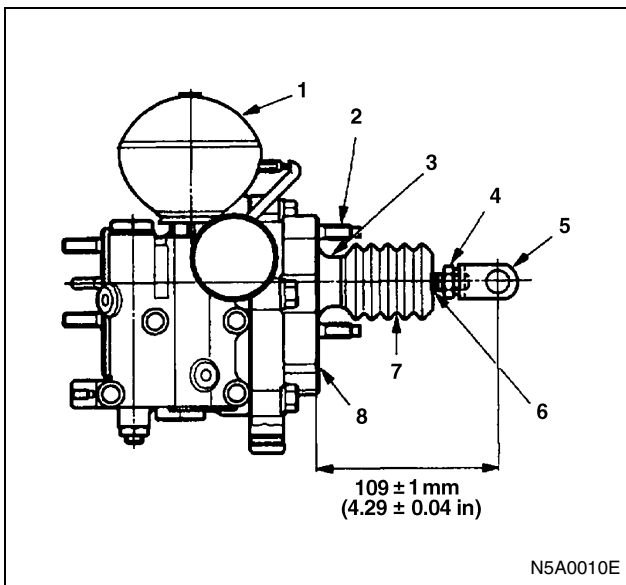
1. With a dry cloth, clean well the cover boss anchoring groove and the operating rod anchoring groove, and verify that no foreign matter is present.
2. Insert from the large diameter hole side of the guard end-face into the operating rod outside diameter part, assemble the small diameter hole part of the guard end-face into the anchoring groove of the operating rod, then assemble the large diameter hole part securely into the anchoring groove of the boss of the cover.
3. Screw the lock nut and then the clevis onto the operating rod.

4. Adjust so that the booster clevis position dimension (the distance to the center of the clevis hole from the surface of the flange for attachment to the vehicle) is 109 ± 1 mm (4.29 ± 0.04 in), and tighten the lock nut with the prescribed torque. When tightening the lock nut, be careful not to deform the clevis.

Tighten:

Lock nut to 20 N·m (2.0 kg·m / 14 lb·ft)

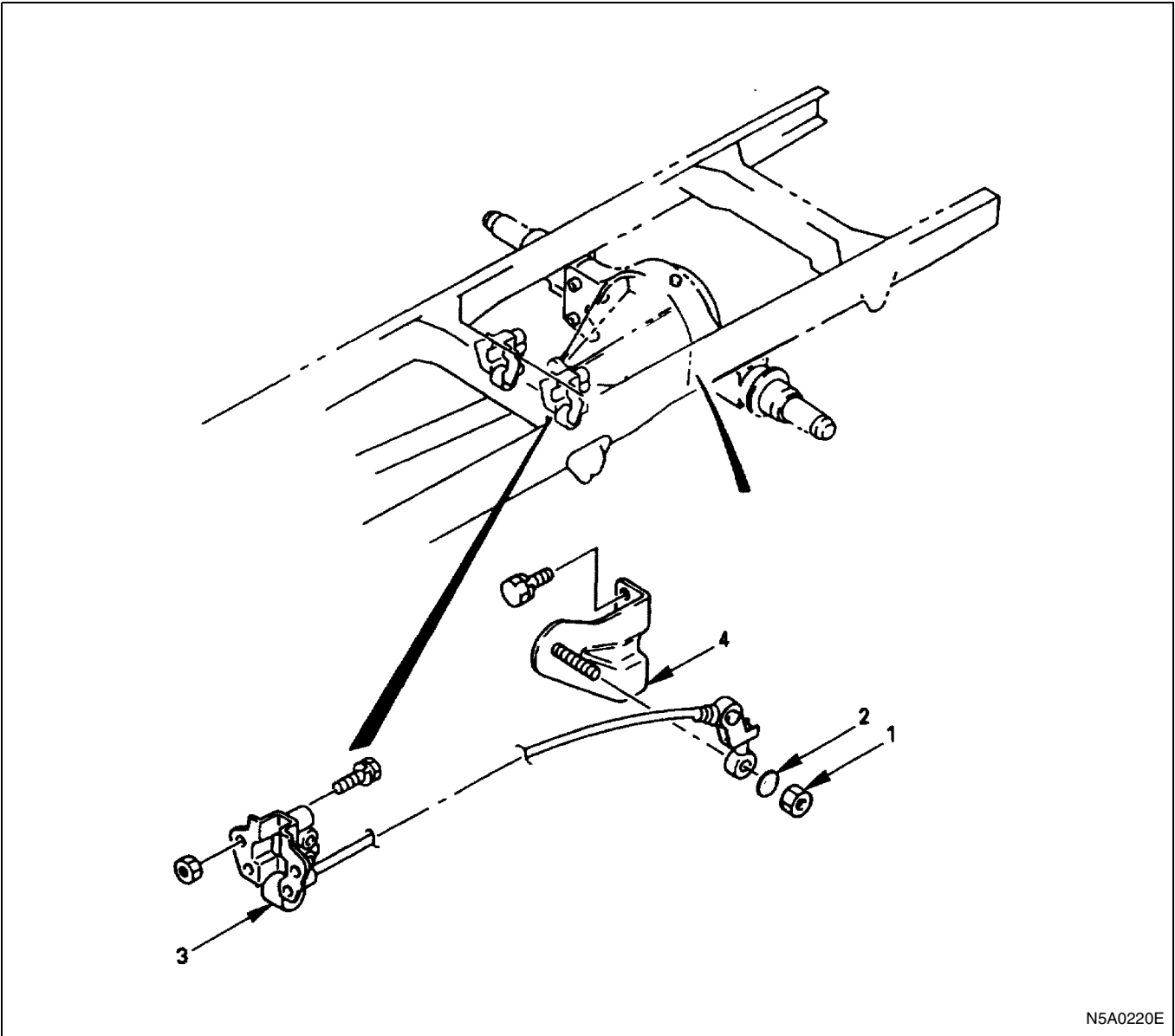
5. Attach the hydro boost assembly to the vehicle.
Refer to "Installation" of Hydraulic Booster in this section.



Legend

1. Accumulator
2. Stud bolt
3. Cover boss
4. Lock nut
5. Clevis
6. Operating rod
7. Guard
8. Flange

Load Sensing Proportioning Valve



N5A0220E

Legend

- 1. Nut
- 2. Washer
- 3. Load sensing proportioning valve
- 4. Bracket

Removal

- 1. Nut
- 2. Washer
- 3. Load sensing Proportioning Valve
- 4. Bracket

Installation

To install, follow the removal steps in the reverse order.

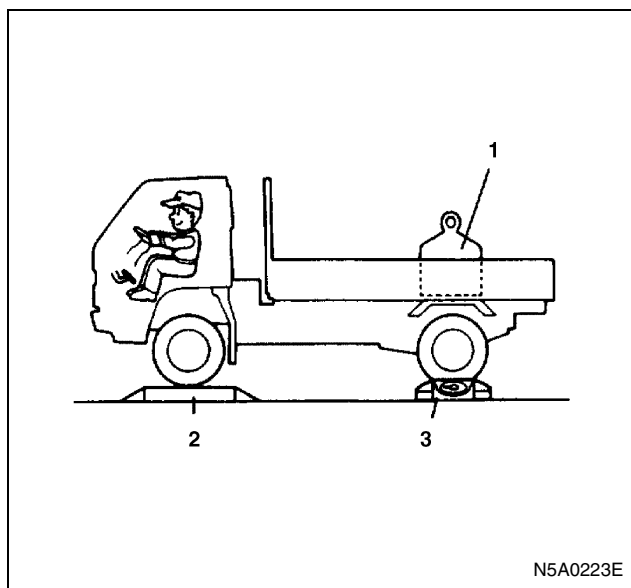
Adjustment

- 1. Fluid Pressure Measurement
 - 1) Rear axle weight adjustment

With an axle weight meter, adjust the rear axle weight with a person sitting in the driver's seat and a weight loaded in the rear body.

N (kg/lb)	
Adjustment value	(A)

For (A), refer to the adjustment standard table.

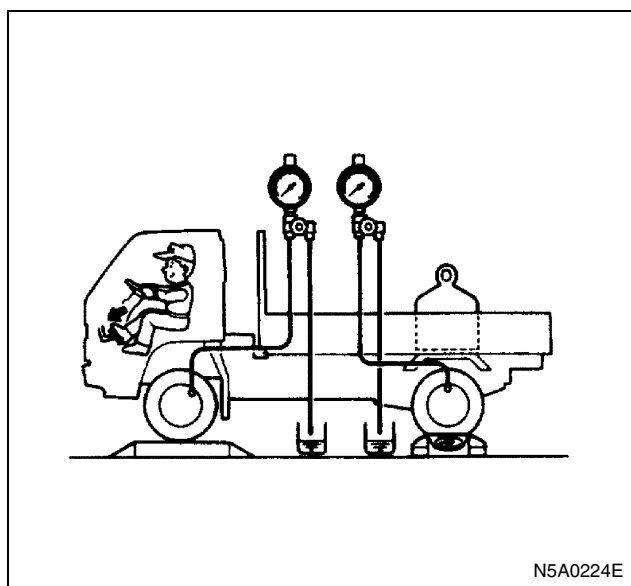
**Legend**

1. Weight
2. Platform (which is the same height as the axle weight meter)
3. Axle weight meter

2) Installation of a fluid pressure gauge

Remove the air bleeder of the left hand wheel front and rear brakes. Bleed air out of the fluid pressure gauge with the measurement hose of the fluid pressure gauge installed.

Pressure Tester: Brake oil (Fluid pressure gauge)
5-8840-2190-0



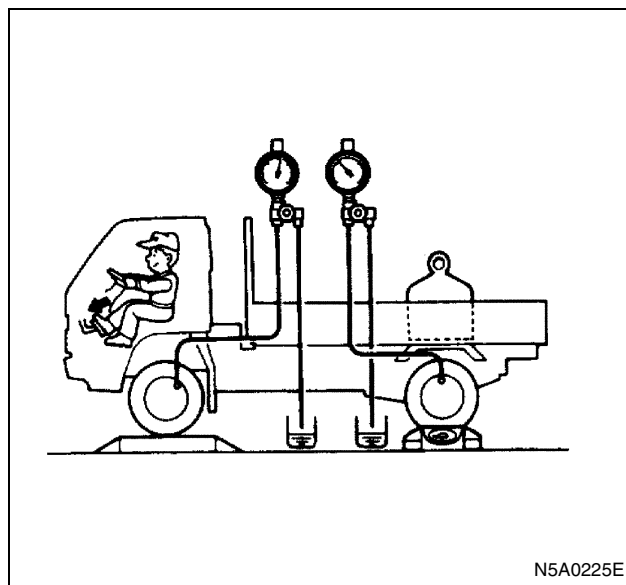
3) Rear wheel cylinder fluid pressure measurement

Step on the brake pedal until the fluid pressure of the front wheel cylinder gets to 7845 kPa (80 kg/cm² / 1138 psi), and check the rear wheel cylinder fluid pressure. (Read the value of the front wheel cylinder fluid pressure 2 seconds

after the measurement. When measuring the L.S.V fluid pressure, keep the brake pedal pressed down without stepping it down twice or releasing it.)

Rear Wheel Cylinder Fluid Pressure kPa (kg/cm ² / psi)	
Standard	(B)

For (B), refer to the adjustment standard table.



2. Oil Pressure Adjustment

1) L.S.V spring shackle adjustment

Loosen the adjust nut of the L.S.V spring shackle, and adjust the length of the L.S.V spring shackle.

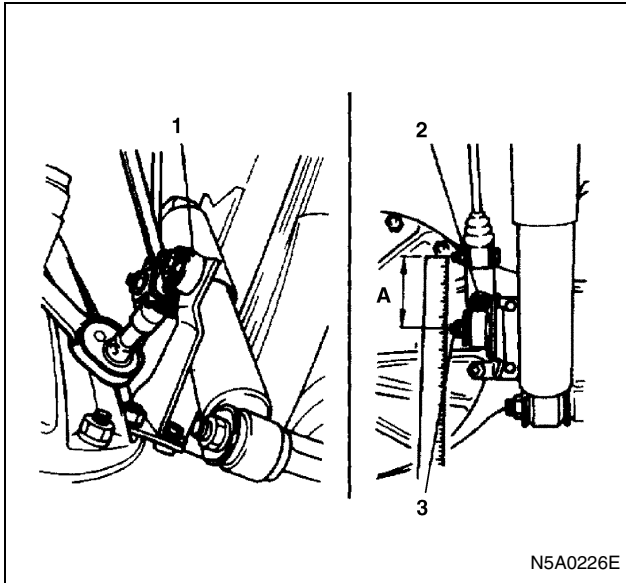
When the oil pressure is insufficient, turn the adjust nut clockwise to extend the span "A". When the oil pressure is too high, turn the adjust nut counterclockwise to reduce the span "A".

mm (in)	
Item	Span adjusted
Standard of span "A"	78 (3.07)
Range adjustable	72 — 84 (2.83 — 3.31)

After adjustment, tighten the lock nut securely and install the cotter pin.

Tighten:

Lock nut to Max. 10 N·m (1.0 kg·m / 87 lb·in)



Legend

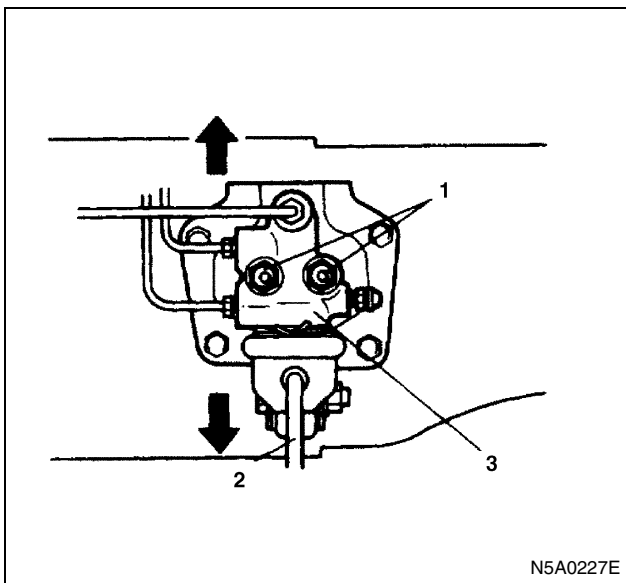
- 1. L.S.V spring shackle
- 2. Adjust nut
- 3. Lock nut

2) L.S.V adjustment

When the adjustment cannot be done with the L.S.V spring shackle, loosen the L.S.V adjust nut (2 pcs.) and adjust the oil pressure to the standard value by sliding the L.S.V up and down. After the L.S.V adjustment, readjust the length of the L.S.V spring shackle.

Tighten:

L.S.V adjust nut to 13 N·m (1.3 kg·m / 113 lb·in)

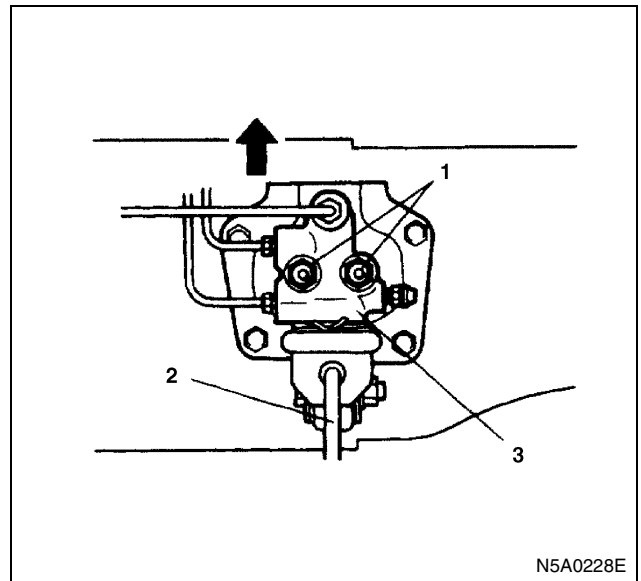


Legend

- 1. L.S.V adjust nut
- 2. L.S.V spring
- 3. L.S.V

3. Unit Inspection of L.S.V

- 1) Loosen the L.S.V adjust nut (2 pcs.). And then lift the L.S.V up fully and tighten it up tentatively so that the L.S.V spring will not move.



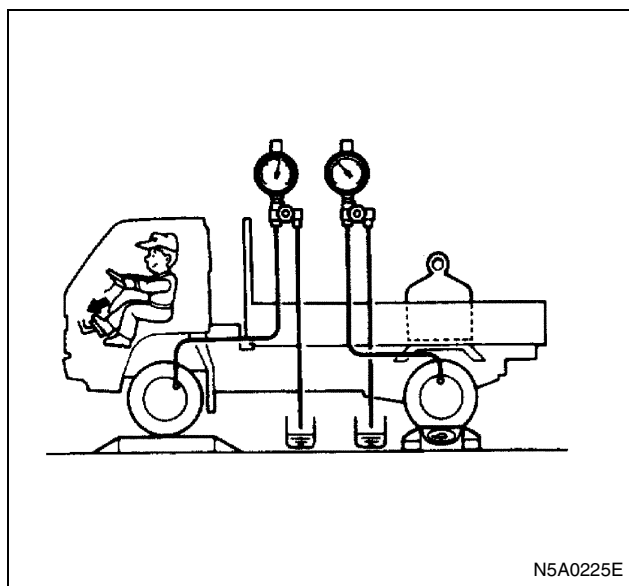
Legend

- 1. L.S.V adjust nut
- 2. L.S.V spring
- 3. L.S.V

- 2) Under the same conditions as 1) above, check the rear wheel cylinder fluid pressure.

Standard	
Master cylinder fluid pressure kPa (kg/cm ² /psi)	Rear fluid pressure kPa (kg/cm ² /psi)
2942 (30 / 427)	(C)
7845 (80 / 1138)	(D)

For (C) and (D), refer to the adjustment standard table.

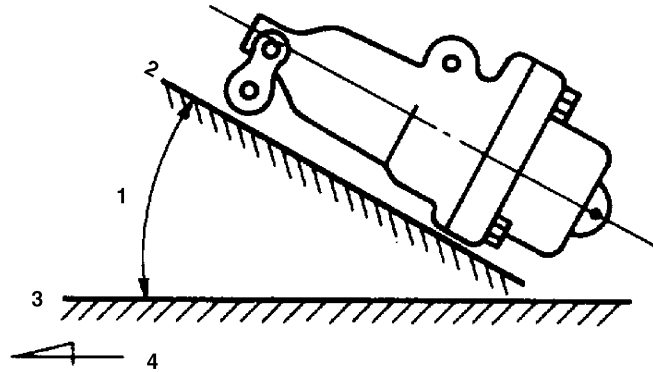
**Adjustment Standard Table**

Models	(A) N (kg/lb)	(B) kPa (kg/cm ² /psi)	(C) kPa (kg/cm ² /psi)	(D) kPa (kg/cm ² /psi)
NHR55-1C	5884(600/1323)	3687±588 (37.6±6/535±85)	1442±196 (14.7±2/209±28)	1932±343 (19.7±3.5/280±50)
NHR55-3C	8826(900/1984)			
NKR77-1D	12258(1250/2756)			
NKR77-5D	11768(1200/2646)			
NKR77-3E	6865(700/1543)			
NKR77-5E	8826(900/1984)			
NKR77-5H	8826(900/1984)			
NKR55-1E	6865(700/1543)			
NKR55-3E	6865(700/1543)			
NKR55-5H	9807(1000/2205)	5031±588 (51.3±6/730±85)	1697±196 (17.3±2/246±28)	2922±343 (29.8±3.5/424±50)
NKR77-3EXY (Taiwan)	6865(700/1543)	3687±588 (37.6±6/535±85)	1442±196 (14.7±2/209±28)	1932±343 (19.7±3.5/280±50)
NKR77-3EXA (Taiwan)	7845(800/1764)			
NKR77-5E (Taiwan)	9807(1000/2205)			
NKR77-5H (Taiwan)	9807(1000/2205)	5031±588 (51.3±6/730±85)	1697±196 (17.3±2/246±28)	2922±343 (29.8±3.5/424±50)
NPR77-5D/5CW	11768(1200/2646)	3687±588 (37.6±6/535±85)	1442±196 (14.7±2/209±28)	1932±343 (19.7±3.5/280±50)

Models	(A) N (kg/lb)	(B) kPa (kg/cm ² /psi)	(C) kPa (kg/cm ² /psi)	(D) kPa (kg/cm ² /psi)
NPR75-5E	8826(900/1984)	5031±588 (51.3±6/730±85)	1697±196 (17.3±2/246±28)	2922±343 (29.8±3.5/424±50)
NPR77-5H	8826(900/1984)			
NPR70/75-5J/5HW	14710(1500/3307)			
NPR75-5J/5HW	14710(1500/3307)			
NPR70/75-5L/5KW	16671(1700/3748)			
NQR75-5L/5KW	14710(1500/3307)			
NQR75-5N (Australia)	12749(1300/2866)			
NPR66-5J	8826(900/1984)			
NPR66-5E	15691(1600/3527)			
NPR66-5L (South Africa)	12749(1300/2866)			
NPR66-5L (GCC)	13729(1400/3086)			
NPR71 / NQR70-5L	13729(1400/3086)			
NQR71-5N	13729(1400/3086)			
NQR75-5N (South Africa)	14710(1500/3307)			
NPS71/75-5J	17652(1800/3968)			

Deceleration Sensing Proportioning Valve

DSPV Mounting Angle



N5A0230E

Legend

- | | |
|---------------------|-------------------|
| 1. Mounting angle | 3. Ground surface |
| 2. Mounting surface | 4. Front |

Models	Mounting Angle
NHR	12°00'±45'
NKR	12°30'±45'

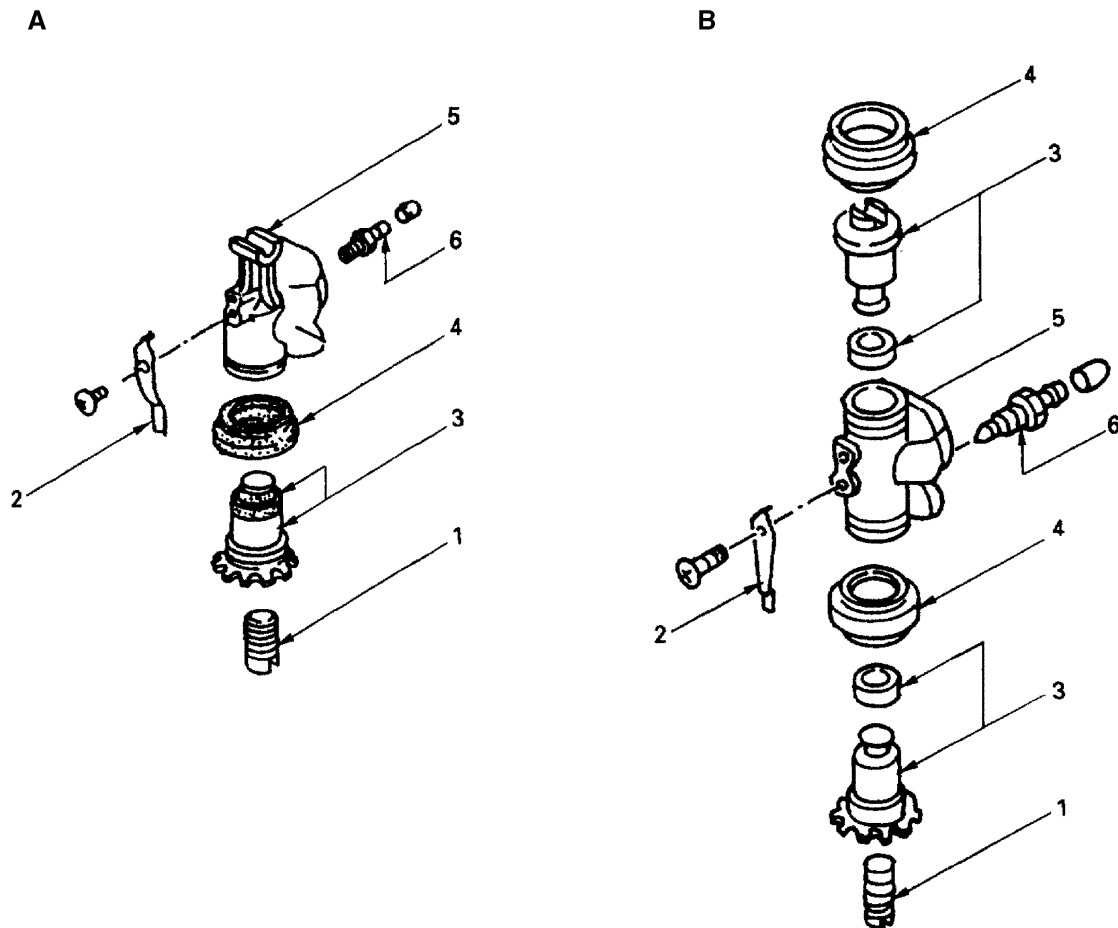
Conduct the following inspections, and if any abnormality is found, replace.

5A-70 HYDRAULIC BRAKES

Condition	Procedure	Judgement
As installed in the vehicle	Measure braking force to make sure of normality.	If no braking force, adherence of ball (deceleration sensing) to seal is suspected.
	Bleed air also from the DSPV side of breather.	If no brake fluid does not come out, the same trouble as above is suspected.
	Check fluid leakage.	No problem, if there is no leak.
	Check mounting angle. (Refer to the table.)	If installed at an abnormal angle, though rare, specified braking force is unobtainable or DSPV does not work.
As not installed in the vehicle	Incline DSPV back and forth to see if the ball moves insides.	No problem, if a ball sound is heard from within.

UNIT REPAIR

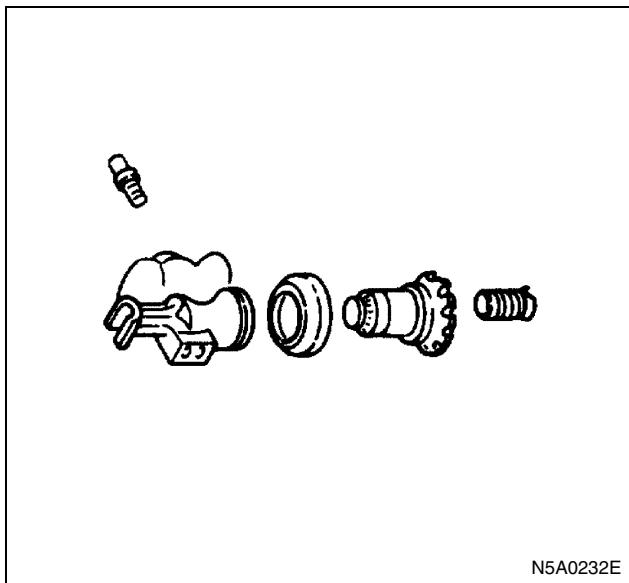
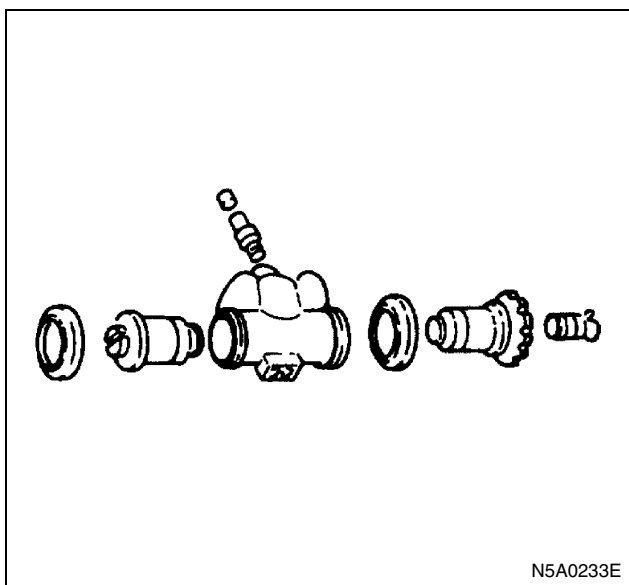
Wheel Cylinder Assembly (without Auto-adjuster)



N5A0231E

Legend

- | | |
|--------------------|----------------------------|
| A. 2L type | 3. Piston and cup assembly |
| B. D2L type | 4. Boot |
| 1. Adjusting screw | 5. Wheel cylinder body |
| 2. Lock plate | 6. Bleeder screw |

Disassembly**2L Type****D2L Type**

1. Adjusting Screw
2. Lock Plate
3. Piston and cup Assembly
4. Boot
5. Wheel Cylinder Body
6. Bleeder Screw

Store all of the removed parts in a clean part tray.

Inspection and Repair

Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

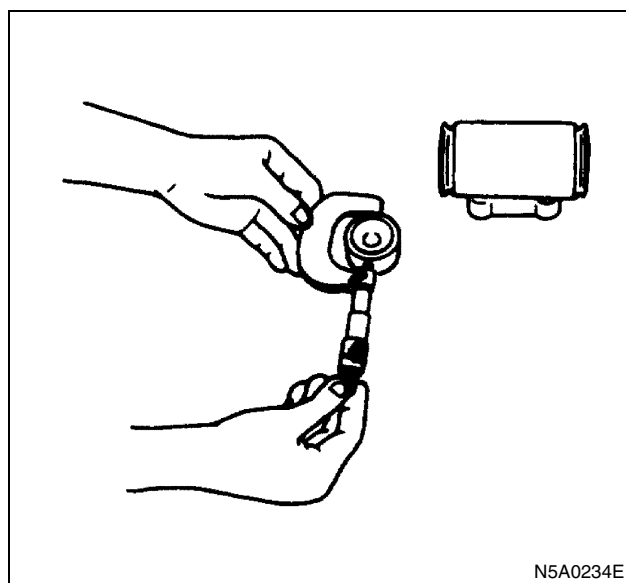
Wheel Cylinder Assembly**Wheel Cylinder and Piston Clearance**

1. Use a micrometer to measure the piston diameter.
2. Use an inside dial indicator to measure the cylinder bore.

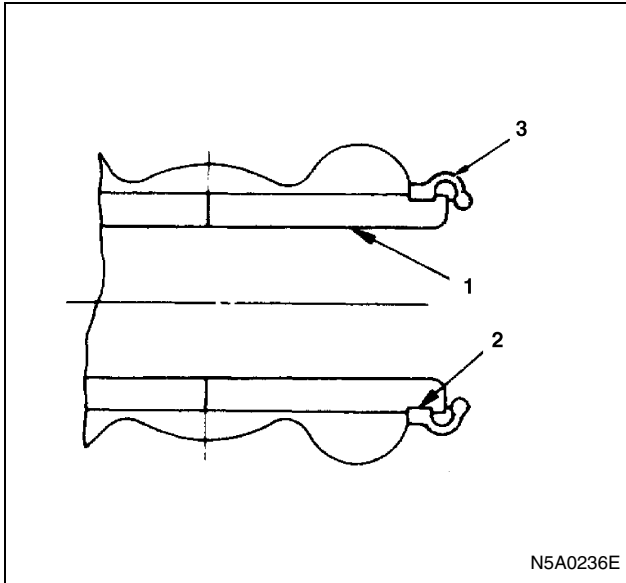
3. Calculate the clearance between the wheel cylinder and the piston.
If the clearance exceeds the specified limit, the piston and/or wheel cylinder body must be replaced.

Wheel Cylinder and Piston Clearance	
mm (in)	
Wheel Cylinder size	Limit
22.22 (0.875)	0.15 (0.006)
25.40 (1.000)	
28.57 (1.125)	
30.16 (1.188)	
33.33 (1.312)	
34.93 (1.375)	

When the wheel cylinder disassembled, the repair kit (piston cup and boot) must be replaced.

**Reassembly**

1. Bleeder Screw
2. Wheel Cylinder Body
 - 1) Apply a coat of rubber grease to the cylinder body bore (1) and the grooves for the boots (2).
 - 2) Fit the boot edge securely into the mating groove of the cylinder body.



N5A0236E

Legend

1. Cylinder body bore
2. Groove
3. Boot

3. Boot

4. Piston Assembly

- 1) Apply a coat of rubber grease to the piston cups and the pistons.
Be sure to lubricate the entire cylinder body bore with the rubber grease.
- 2) Install the piston assembly to the cylinder.

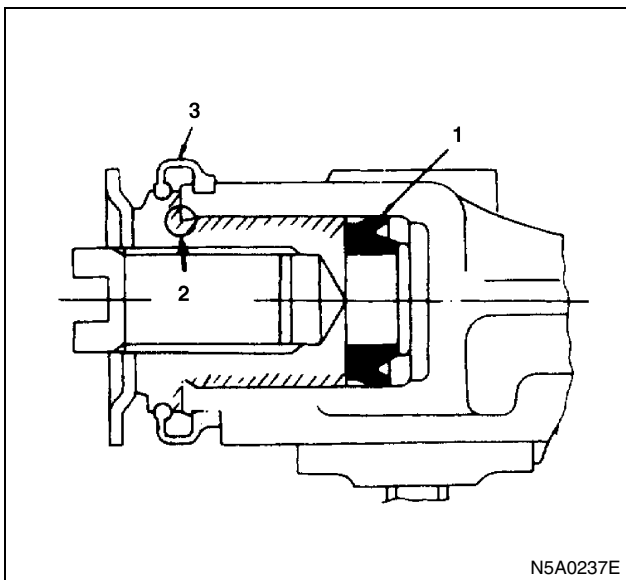
Notice:

After installation of the piston assembly into the cylinder body bore, fit the boot edge securely into the mating groove of the piston.

Make sure that the two boot edges firmly sealed into the grooves.

Be careful not to damage the piston cups and the boots.

2L Type

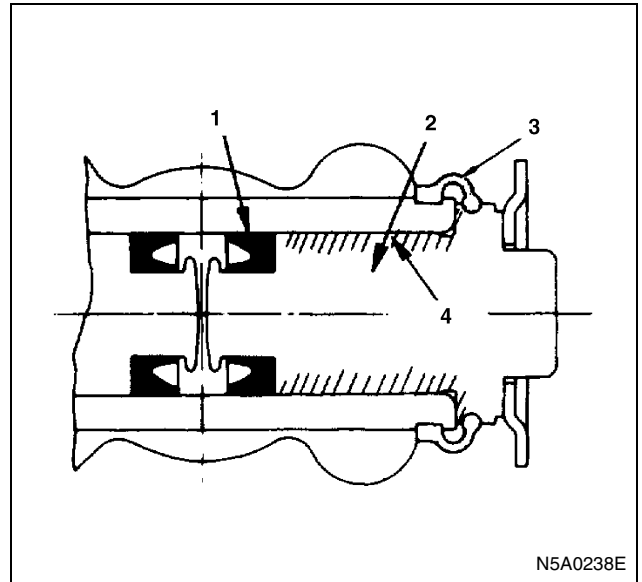


N5A0237E

Legend

1. Piston cup
2. Edge
3. Boot

D2L Type



N5A0238E

Legend

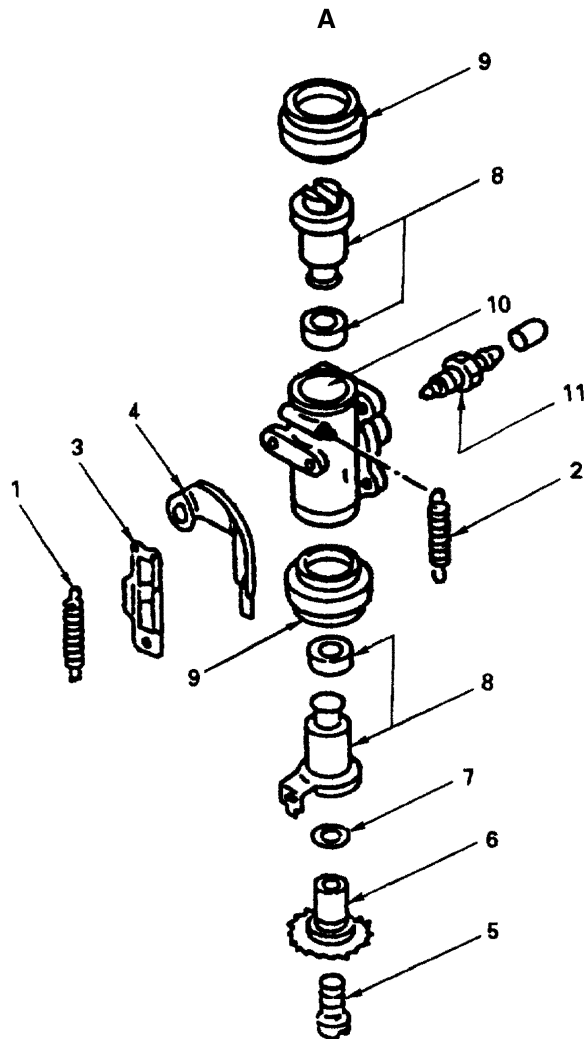
1. Piston cup
2. Piston
3. Boot
4. Grease

1. Lock Plate

2. Adjusting Screw

Apply a coat of molybdenum disulfide grease to the adjusting screw slit and threads.

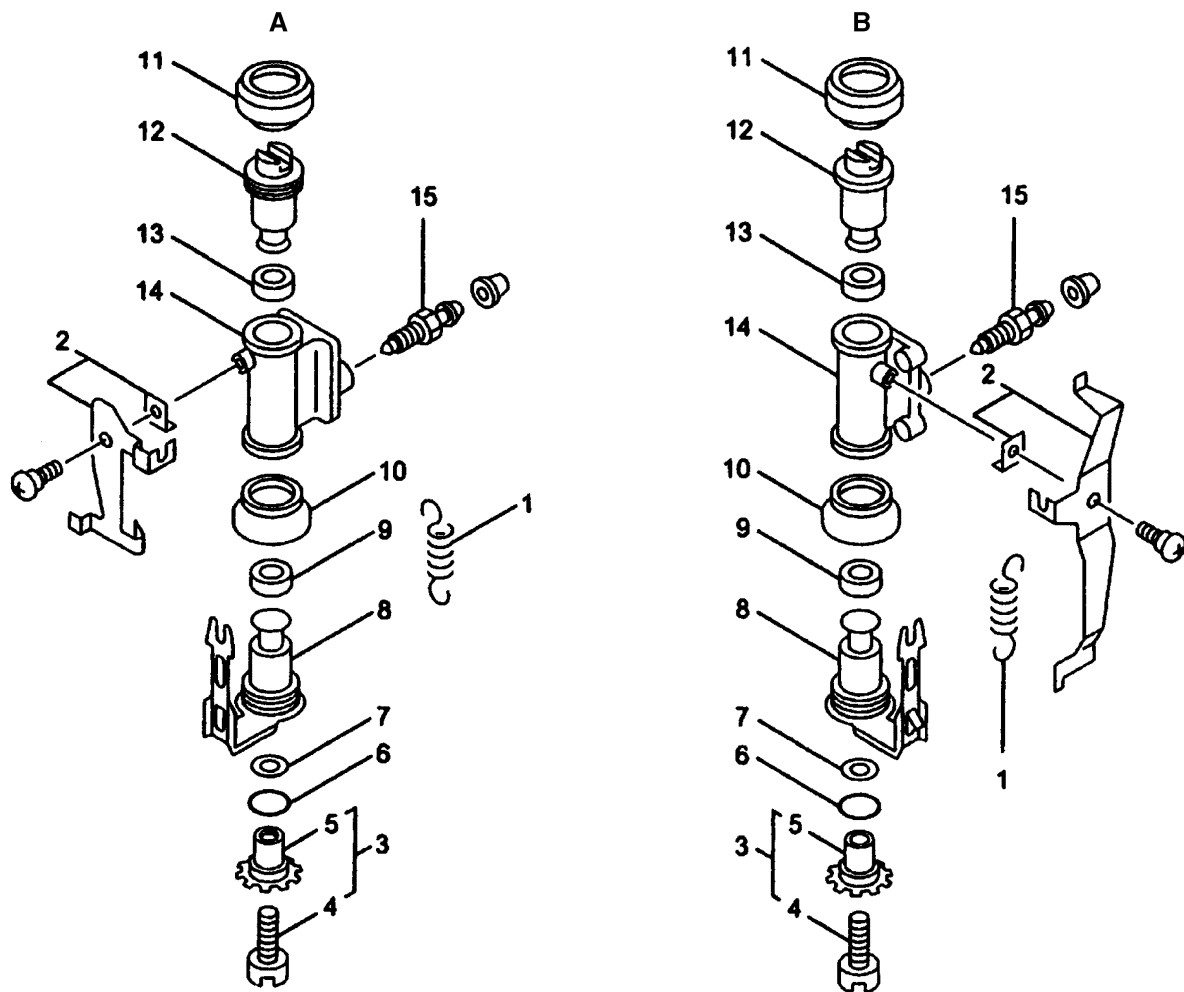
Wheel Cylinder Assembly (with Auto-adjuster)



N5A0240E

Legend

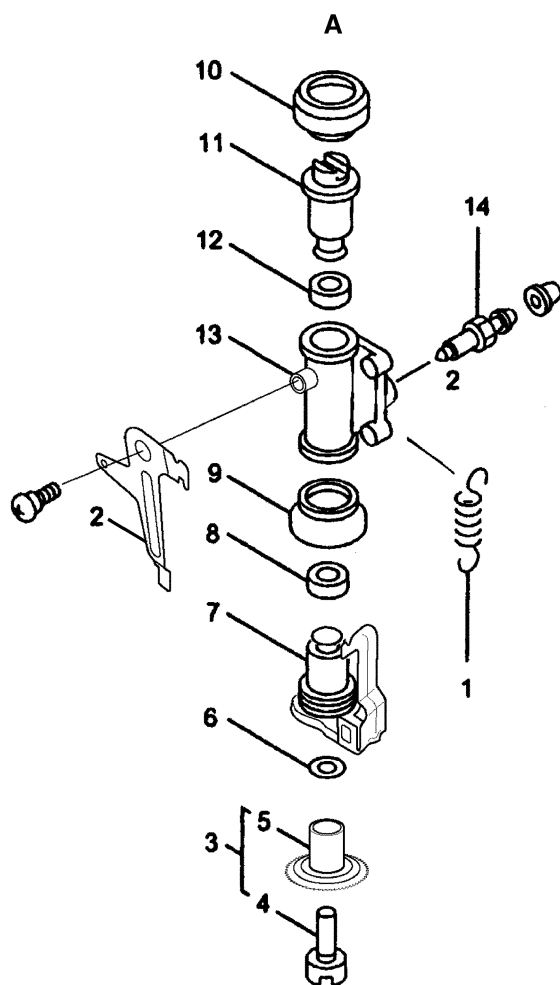
- | | |
|--------------------------------|-----------------------------------|
| A. Drum inside diameter 260 mm | 6. Adjuster gear and nut assembly |
| 1. Overtravel spring | 7. Washer |
| 2. Return spring | 8. Piston and cup assembly |
| 3. Fitting | 9. Boot |
| 4. Adjuster lever | 10. Wheel cylinder body |
| 5. Adjusting screw | 11. Bleeder screw |



N5A0241E

Legend

- | | |
|-----------------------------------|--------------------------------|
| A. Drum inside diameter 240 mm | 8. Piston and bracket assembly |
| B. Drum inside diameter 290 mm | 9. Piston cup |
| 1. Overtravel spring | 10. Boot |
| 2. Adjuster lever | 11. Boot |
| 3. Adjusting screw and gear | 12. Anchor piston |
| 4. Adjusting screw | 13. Piston cup |
| 5. Adjuster gear and nut assembly | 14. Cylinder body |
| 6. Seal | 15. Bleeder |
| 7. Seat (washer) | |

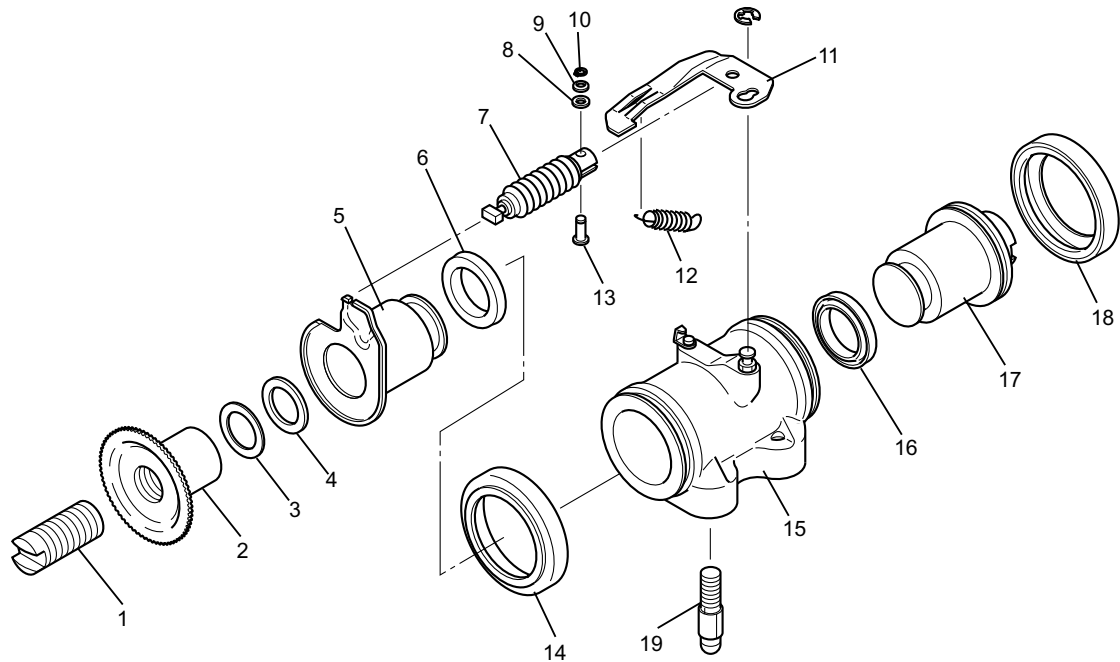


N5A0242E

Legend

- | | |
|--|-------------------|
| A. Drum inside diameter 300 mm, 320 mm | 8. Piston cup |
| 1. Overtravel spring | 9. Boot |
| 2. Adjuster lever | 10. Boot |
| 3. Adjusting screw and gear | 11. Anchor piston |
| 4. Adjusting screw | 12. Piston cup |
| 5. Adjuster gear and nut assembly | 13. Cylinder body |
| 6. Seat (Washer) | 14. Bleeder |
| 7. Piston | |

A



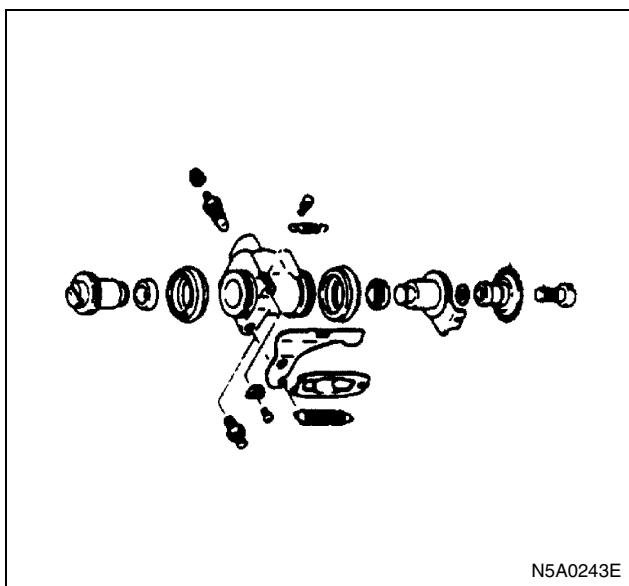
N5A0448E

Legend

- | | |
|-----------------------------------|-----------------------|
| A. Drum inside diameter 370 mm | 10. Snap ring |
| 1. Adjusting screw | 11. Lever |
| 2. Adjuster gear and nut assembly | 12. Return spring |
| 3. Washer (SUS) | 13. Pin |
| 4. Washer (OIL LESS) | 14. Boot |
| 5. Piston | 15. Cylinder assembly |
| 6. Piston cup | 16. Piston cup |
| 7. Spring assembly | 17. Piston |
| 8. Washer | 18. Boot |
| 9. Wave washer | 19. Bleeder |

Disassembly

Drum inside diameter 260 mm



N5A0243E

1. Overtravel Spring
 2. Return Spring
 3. Fitting
 4. Adjuster Lever
 5. Adjusting Screw
 6. Adjuster Gear
 7. Piston and cup Assembly
 8. Boot
 9. Wheel Cylinder Body
 10. Bleeder Screw
- Store all of the removed parts in a clean part tray.

Drum inside diameter 240, 290 mm

Inspect the wheel cylinder.

Remove the parts of the brakes with a drum inside diameter of 240 mm and 290 mm in the order shown below.

1. Overtravel spring
2. Auto-adjuster lever
3. Adjusting screw and gear assembly
4. Adjusting screw
5. Adjuster gear
6. Seal
7. Seat (washer)
8. Piston
9. Piston cup
10. Boot
11. Boot
12. Piston
13. Piston cup
14. Cylinder
15. Bleeder

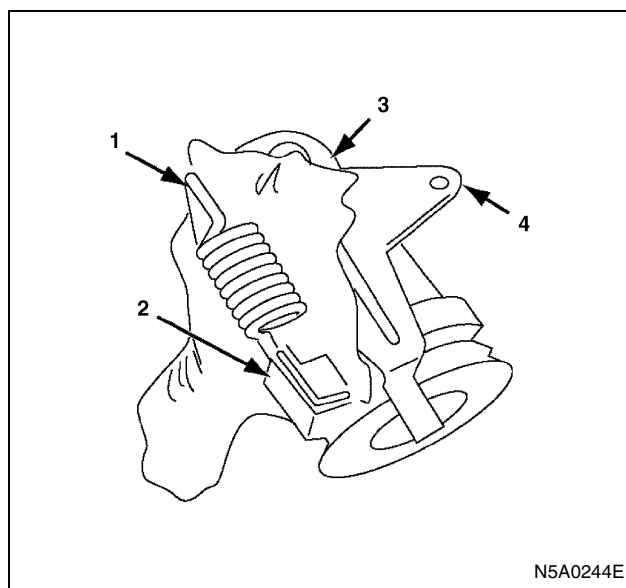
Drum inside diameter 300, 320 mm

1. Auto-adjuster
2. Boot

3. Piston
4. Adjusting screw
5. Adjuster gear
6. Washer
7. Piston cup
8. Piston
9. Bleeder screw and cap
10. Cylinder body

Disassembly of piston on adjust side (Drum inside diameter 300, 320 mm)

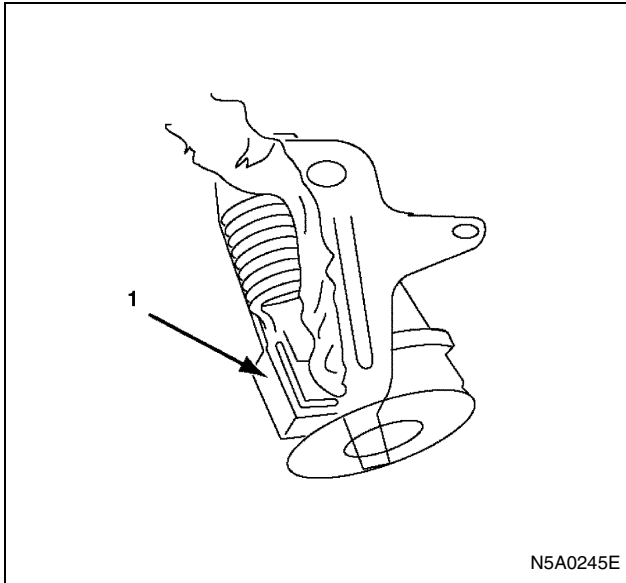
1. Fit the waste cloth between the lever and spring not to damage each parts.



N5A0244E

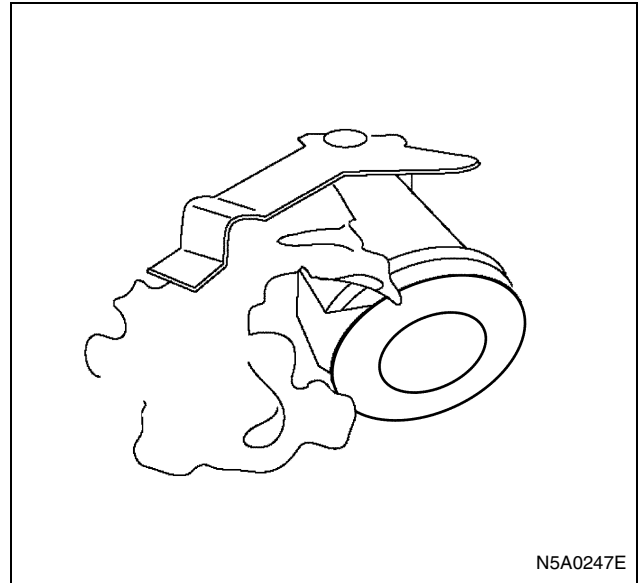
Legend

1. Spring
 2. Bracket
 3. Lever fixing bolt
 4. Lever
-
2. Disassemble the lever fixing bolt.
 3. Remove the piston assembly to hold the lever to fit the bracket.

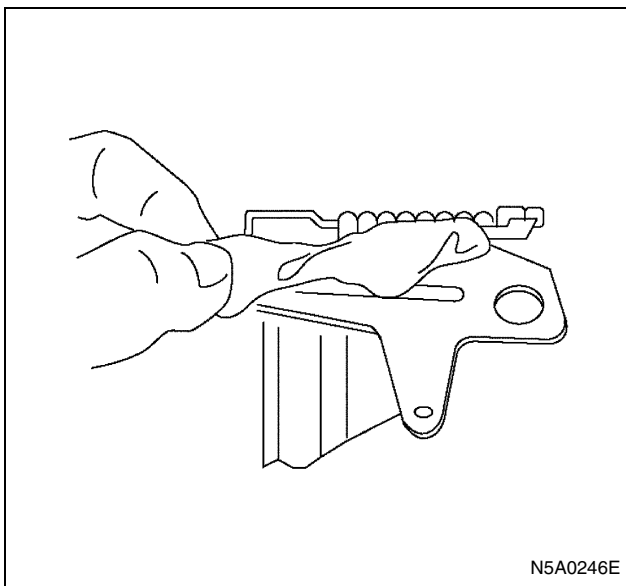


Legend

1. Attach the lever to the bracket

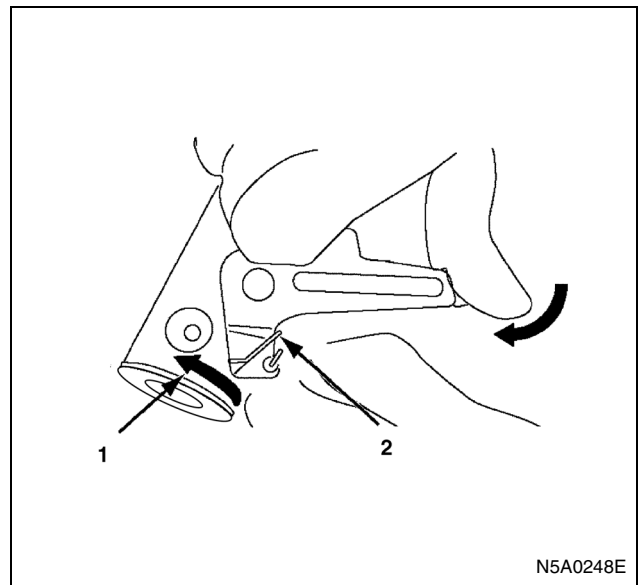


2. After running the lever up on the bracket, turn the lever to the direction at the connecting point of lever and spring.



Disassembly of lever spring

1. Fit the waste cloth between the lever and spring not to damage each parts.



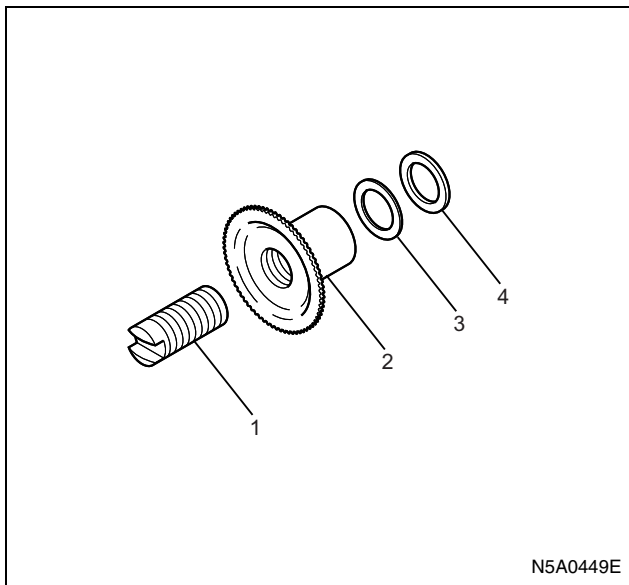
Legend

1. Reassemble the lever from the direction
2. Connecting point of lever and spring

3. Disassemble the lever from the bracket.

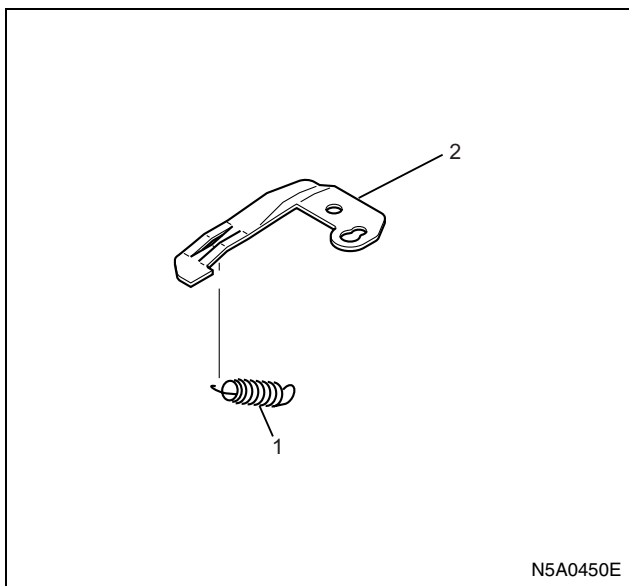
Drum inside diameter 370 mm

1. Remove the adjusting screw (1).
2. Remove the adjuster gear and nut assembly (2).
3. Remove the washer (SUS) (3).
4. Remove the washer (OIL LESS) (4).



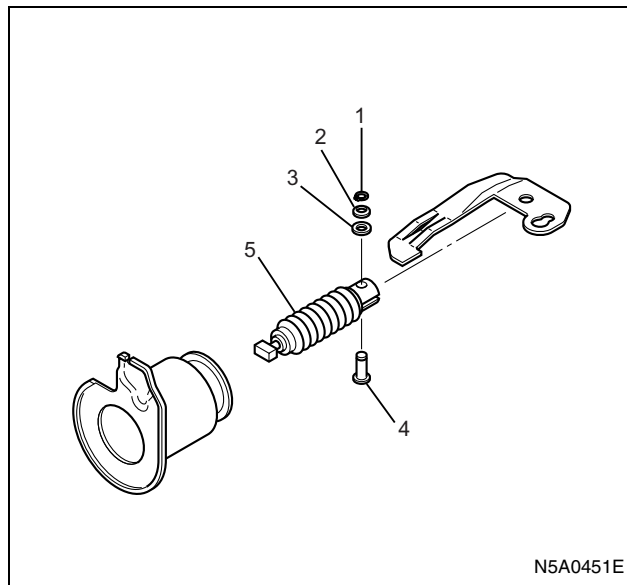
N5A0449E

5. Remove the return spring (1).
Remove the spring from lever side and cylinder side.
6. Remove the lever (2).



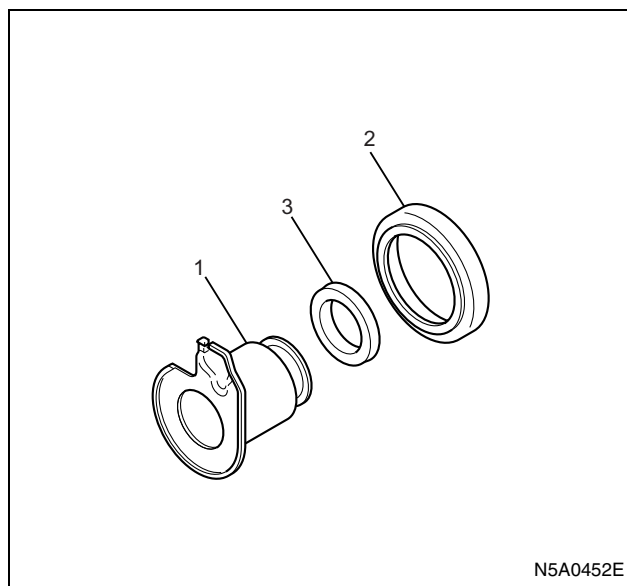
N5A0450E

7. Remove the snap ring (1).
8. Remove the wave washer (2).
9. Remove the washer (3).
10. Remove the pin (4).
11. Remove the spring assembly (5).
Pull out the pin from lever and separate the spring. For piston side, remove it from flange groove of piston.



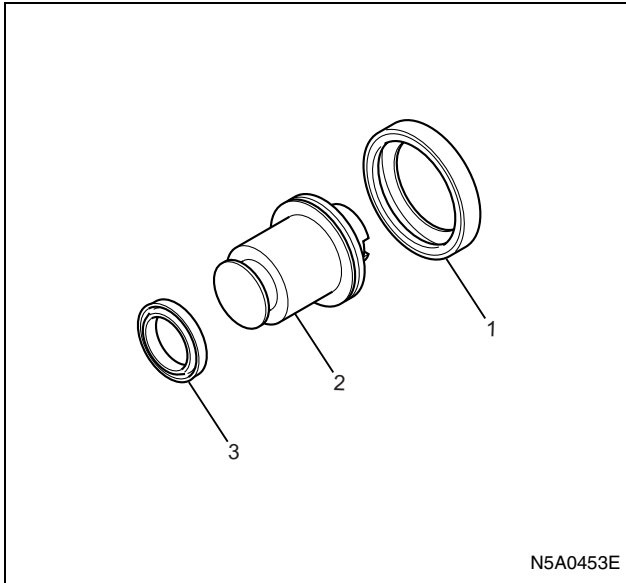
N5A0451E

12. Remove the piston (1).
Remove the boot from cylinder and pull out the piston.
13. Remove the boot (2).
14. Remove the piston cup (3).
15. Remove the cylinder assembly.



N5A0452E

16. Remove the boot (1).
17. Remove the piston (2).
18. Remove the piston cup (3).



19. Remove the bleeder.

Inspection and Repair

Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

Wheel cylinder assembly

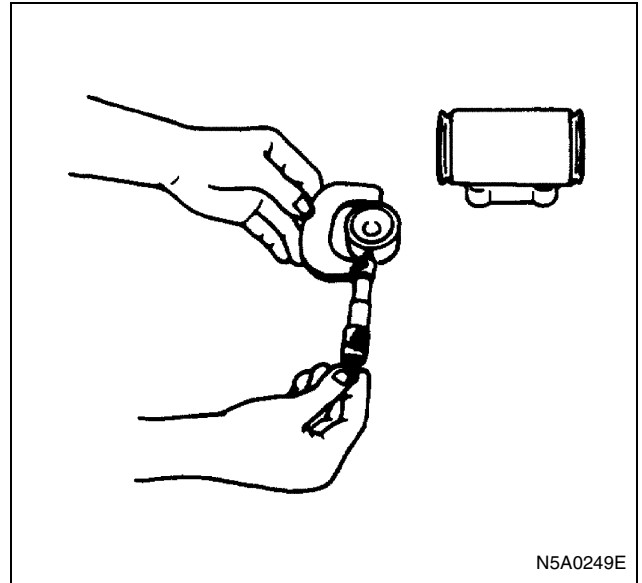
Wheel Cylinder and Piston Clearance

1. Use a micrometer to measure the piston diameter.
2. Use an inside dial indicator to measure the cylinder bore.
3. Calculate the clearance between the wheel cylinder and the piston.

If the clearance exceeds the specified limit, the piston and/or wheel cylinder body must be replaced.

Wheel Cylinder and Piston Clearance	
mm (in)	
Wheel Cylinder size	Limit
28.6 (1.125)	0.15 (0.006)
30.2 (1.188)	
25.4 (1.000)	
33.3 (1.313)	

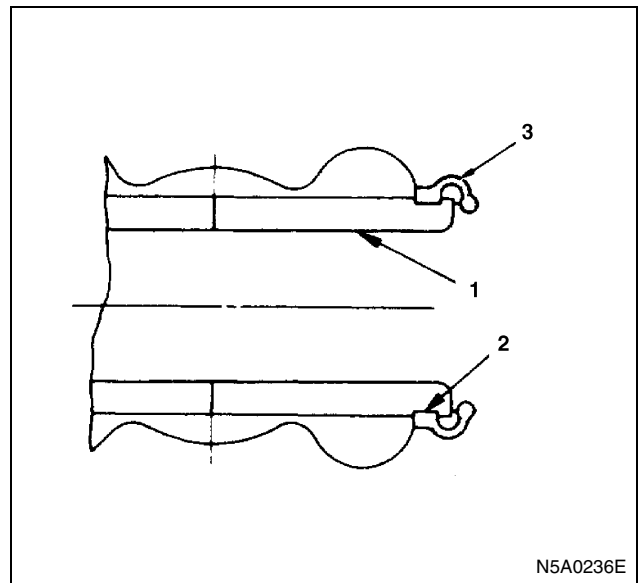
When the wheel cylinder disassembled, the repair kit (piston cup and boot) must be replaced.



Reassembly

Drum Inside Diameter 260 mm

1. Bleeder Screw
2. Wheel Cylinder Body
 - 1) Apply a coat of rubber grease to the cylinder body bore (1) and the grooves for the boots (2).

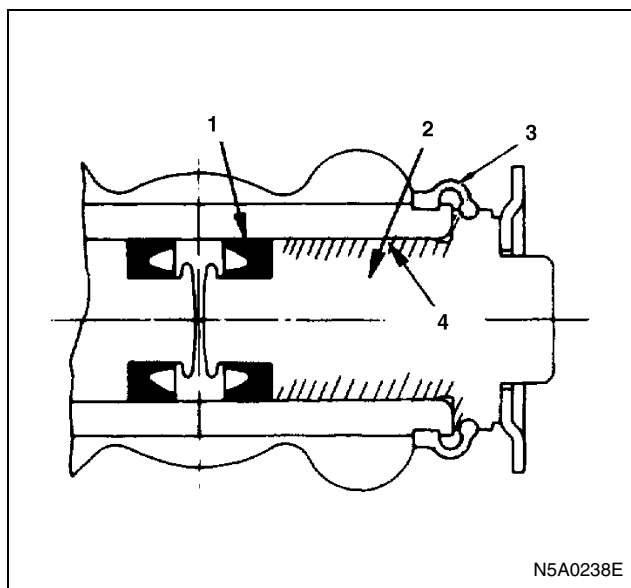


Legend

1. Cylinder body bore
2. Groove
3. Boot

2) Fit the boot edge securely into the mating groove of the cylinder body.

3. Boot
4. Piston Assembly



Legend

1. Piston cup
2. Piston
3. Boot
4. Grease

- 1) Apply a coat of rubber grease to the piston cups and the pistons.
Be sure to lubricate the entire cylinder body bore with the rubber grease.
- 2) Install the piston assembly to the cylinder.

Notice:

After installation of the piston assembly into the cylinder body bore, fit the boot edge securely into the mating groove of the piston.

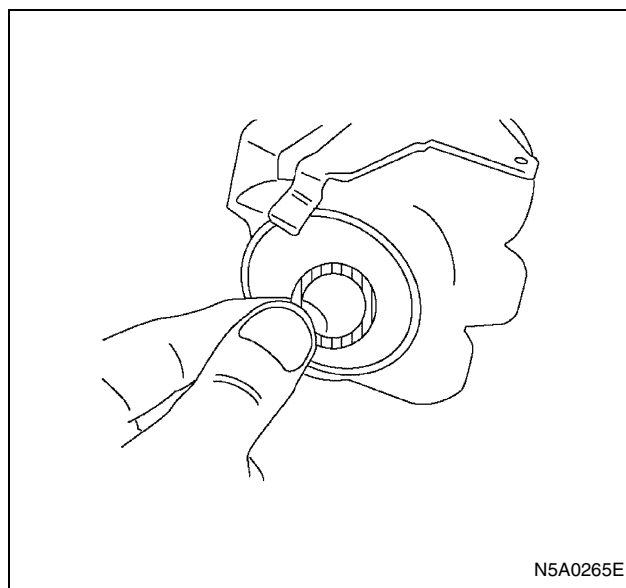
Make sure that the two boot edges firmly sealed into the grooves.

Be careful not to damage the piston cups and the boots.

5. Adjuster Gear
6. Adjusting Screw
Apply a coat of molybdenum disulfide grease to the adjusting screw slit and threads.

Plain washer

Make sure to assemble the plain washer of coating side to the adjust side.

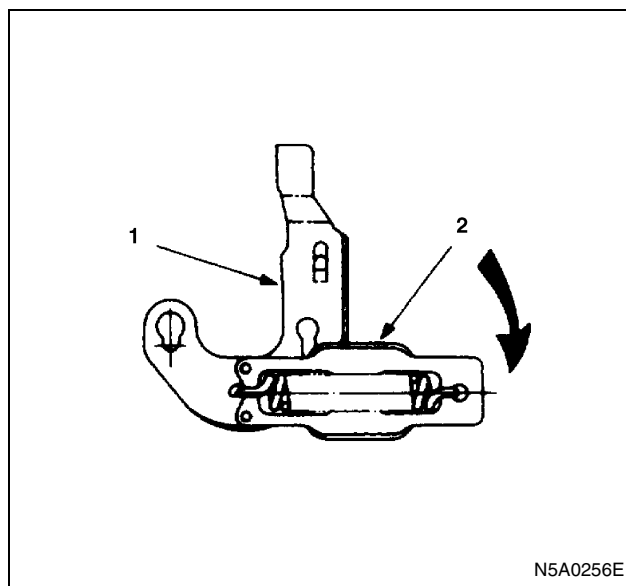


Assemble the plain washer with the copper-colored surface facing inward and the coating (black) surface facing outward.

Notice:

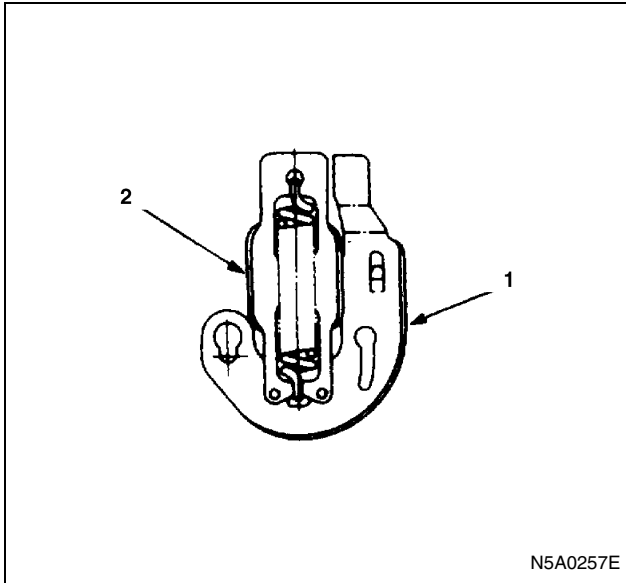
Failure to assemble the plain washer or assembling it inside out causes auto adjuster not to operate properly. Be sure to assemble it correctly.

7. Adjuster Lever
8. Fitting
9. Overtravel Spring



Legend

1. Adjuster lever
2. Overtravel spring

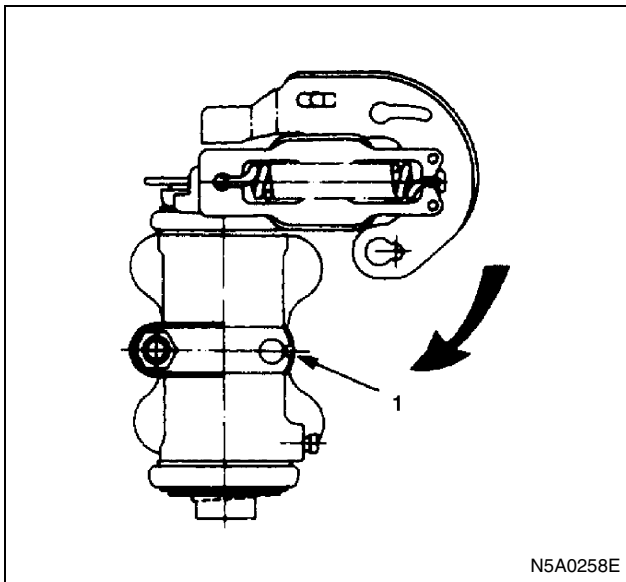


Legend

1. Adjuster lever
2. Overtravel spring

- 1) Hook one end of the overtravel spring to the adjuster lever hole as shown in the illustration.
- 2) Hook the other end of the overtravel spring to the fitting slot.
- 3) Turn the overtravel spring 90 degrees counter-clockwise as shown in the illustrations.

(Wheel Cylinder Body)



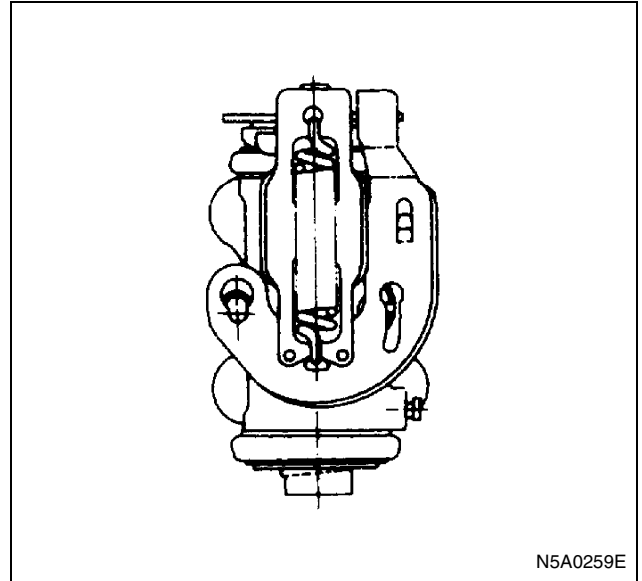
Legend

1. Wheel cylinder

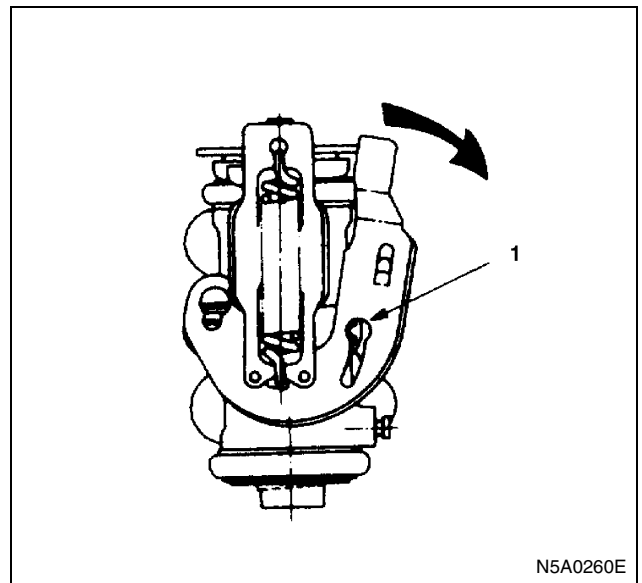
Install the adjuster lever and the overtravel spring to the wheel cylinder body.

- 1) Hook the overtravel spring fitting slot side to the wheel cylinder body bracket hole.

- 2) Turn the adjuster lever and the overtravel spring 90 degrees clockwise as shown in the illustration.



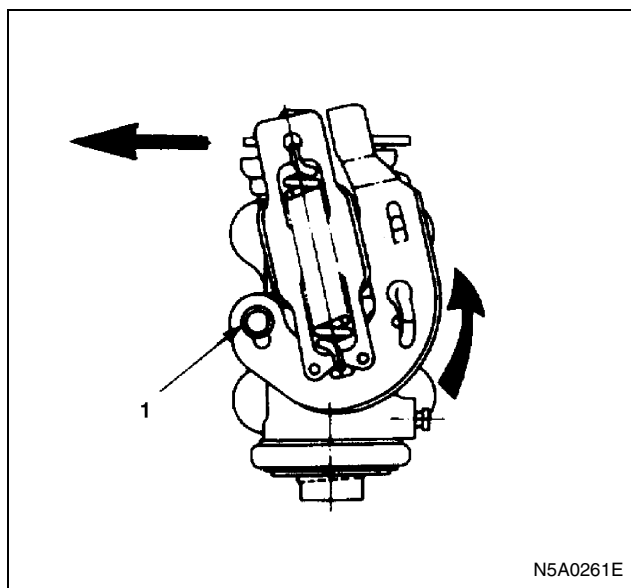
- 3) Turn the adjuster lever slightly clockwise to attach the adjuster lever hole to the wheel cylinder body hook.



Legend

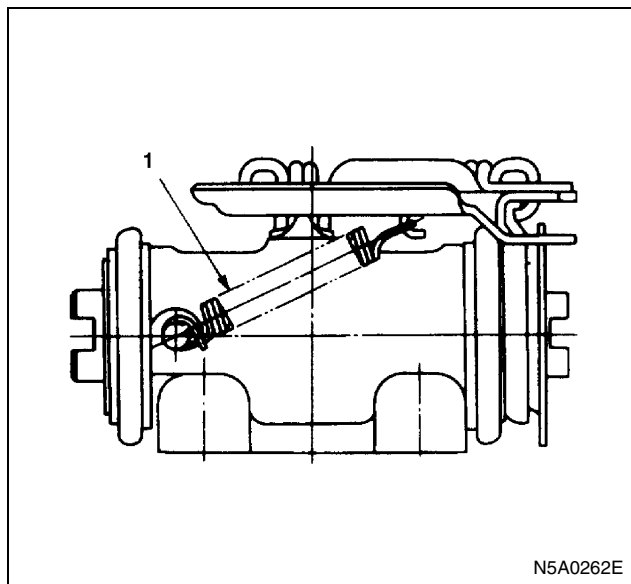
1. Cylinder body hook

- 4) Push the wheel cylinder body and bracket to the left as shown in the illustration.



Legend

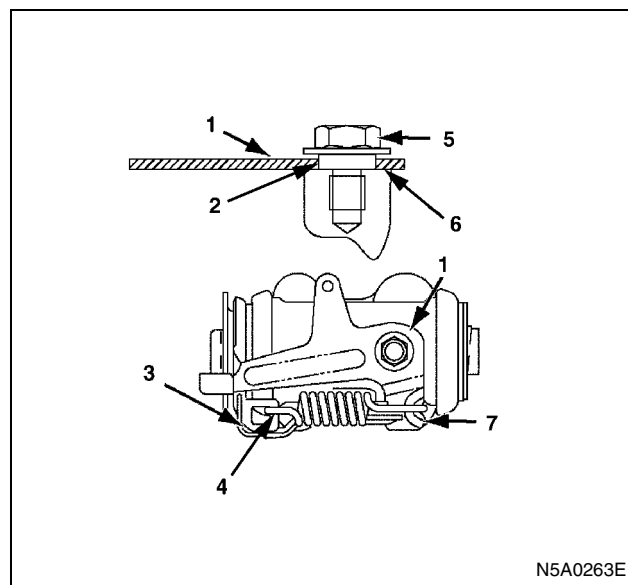
1. Pin head
- 5) Turn the adjuster lever counterclockwise to install the pin head through the adjuster lever hole.
10. Return Spring
Hook the return spring to the wheel cylinder body pin.



Legend

1. Return spring

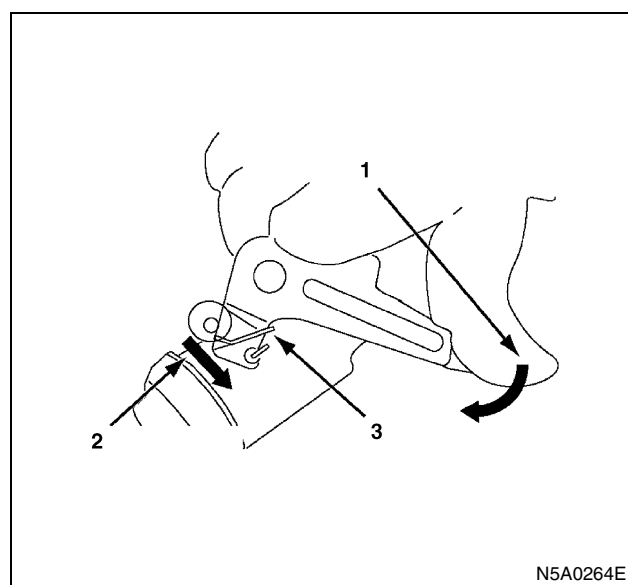
Drum Inside Diameter 300, 320 mm



Legend

1. Lever
2. Bolt sleeve
3. Bracket
4. Spring hook (short): Hook to the bracket square hole
5. Lever fixing bolt
Torque: 7.85 — 11.77 N·m (0.80 — 1.20 kg·m/ 5.79 — 8.68 lb·ft)
6. Body surface
7. Spring hook (Long): Hook the lever

1. Reassemble the spring hook (short) to the bracket square hole and spring hook (long) to the lever.
2. Turn the lever to the direction at the connecting point of lever and spring and reassemble the lever to the bracket.



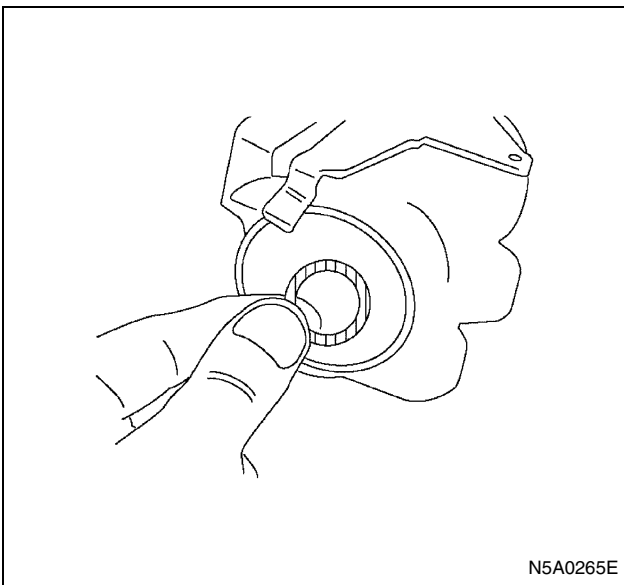
Legend

1. Turn the lever to the arrow, and extend the spring
2. Assemble the lever from the direction
3. Connecting point of lever and spring

3. Install the lever fixing bolt to the specified torque.
4. Make sure not to bite the lever between the bolt sleeve and body surface.
5. Make sure fit the lever to the gear properly after fixing the bolt.

Plain washer

Make sure to assemble the plain washer of coating side to the adjust side.



Assemble the plain washer with the copper-colored surface facing inward and the coating (black) surface facing outward.

Notice:

Failure to assemble the plain washer or assembling it inside out causes auto adjuster not to operate properly. Be sure to assemble it correctly.

Drum Inside Diameter 370 mm

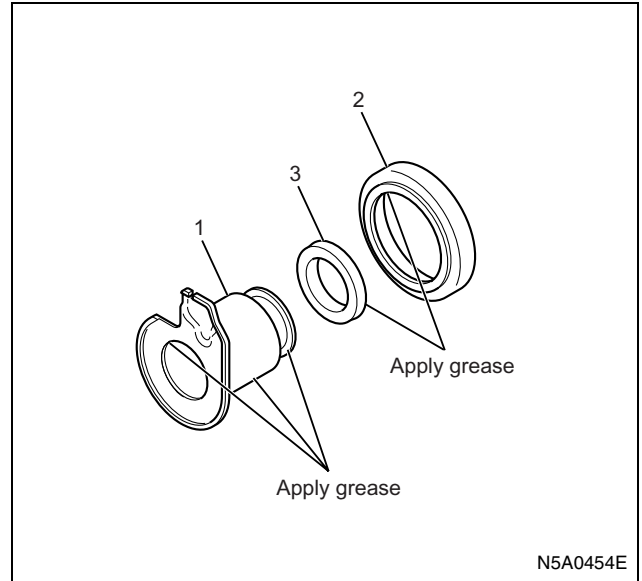
1. Assemble the piston.
 - 1) Apply grease to the outer circumference of piston (1) and installation groove of boot. Install the boot (2) and apply grease to the insertion groove of cup.

Notice:

After installation of boot, make sure that there are still enough grease in boot.

- 2) Assemble the grease-applied piston cup (3) to piston.

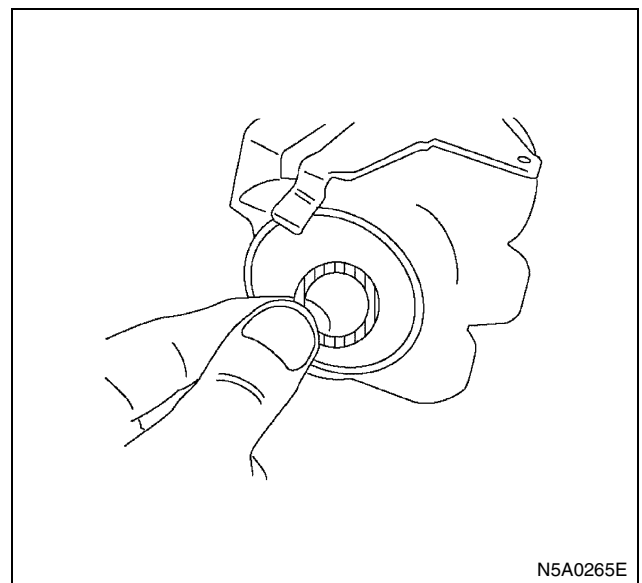
Grease: NIGLUBE RX-2



2. Install the washer (OIL LESS) (1).
Apply grease to both sides.

Plain washer

Make sure to assemble the plain washer of coating side to the adjust side.



Assemble the plain washer with the copper-colored surface facing inward and the coating (black) surface facing outward.

Notice:

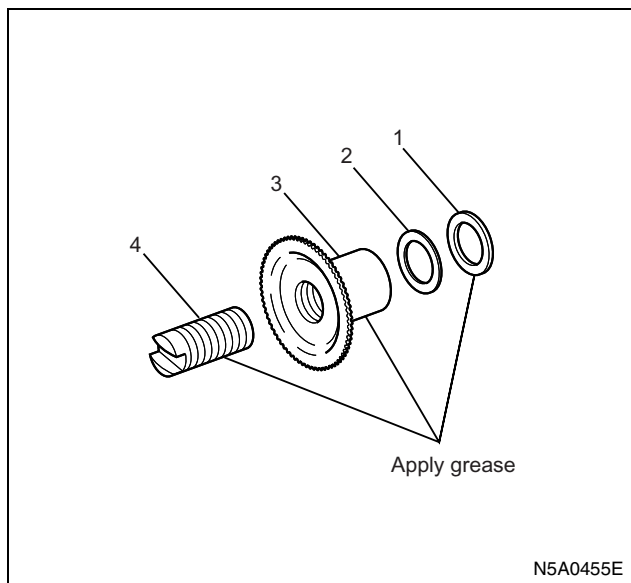
Failure to assemble the plain washer or assembling it inside out causes auto adjuster not to operate properly. Be sure to assemble it correctly.

3. Install the washer (SUS) (2).
4. Install the adjuster gear and nut assembly (3).
Apply grease to the inner surface of piston and adjuster gear and nut assembly, and assemble it to piston.

Grease: NIGLUBE RX-2

5A-86 HYDRAULIC BRAKES

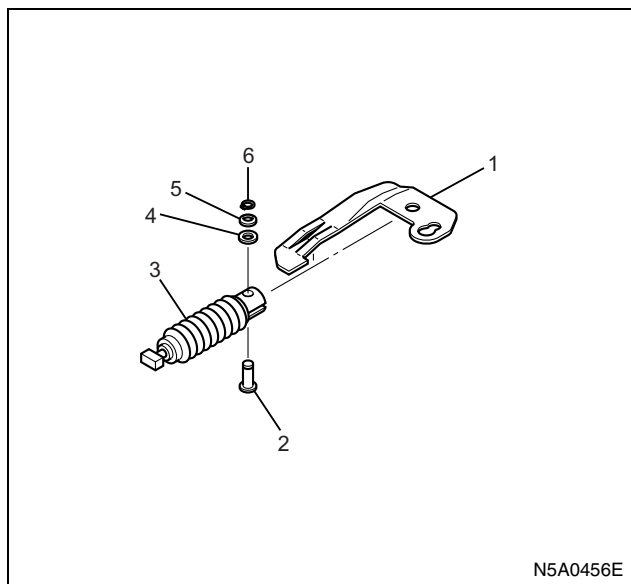
5. Install the adjusting screw (4).
Apply grease and screw it in to adjuster gear and nut assembly.



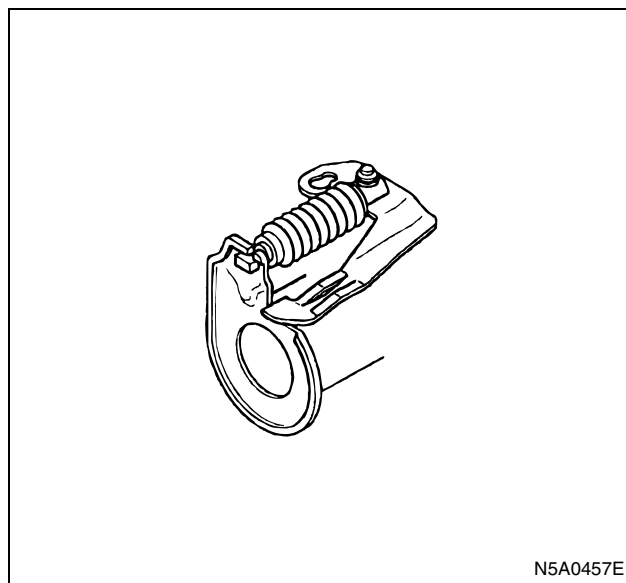
6. Install the cylinder assembly.
Apply grease to the sliding part of piston. Assemble the piston and install the boot.

Grease: NIGLUBE RX-2

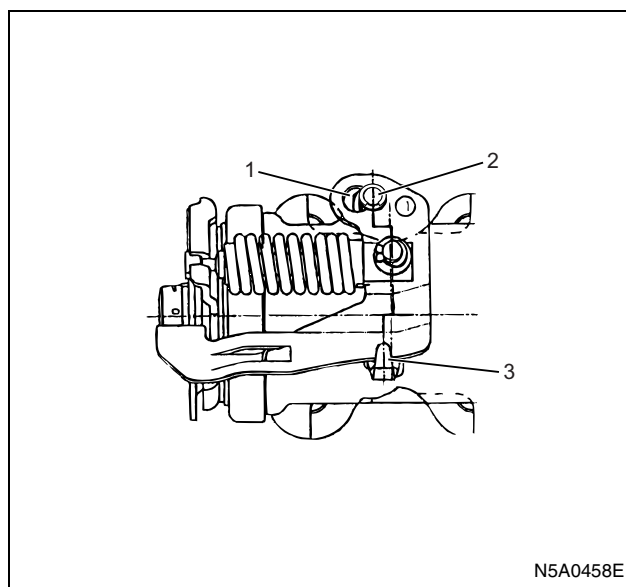
7. Assemble the lever assembly.
Install the pin (2), spring assembly (3), washer (4), wave washer (5) and snap ring (6) to lever (1).



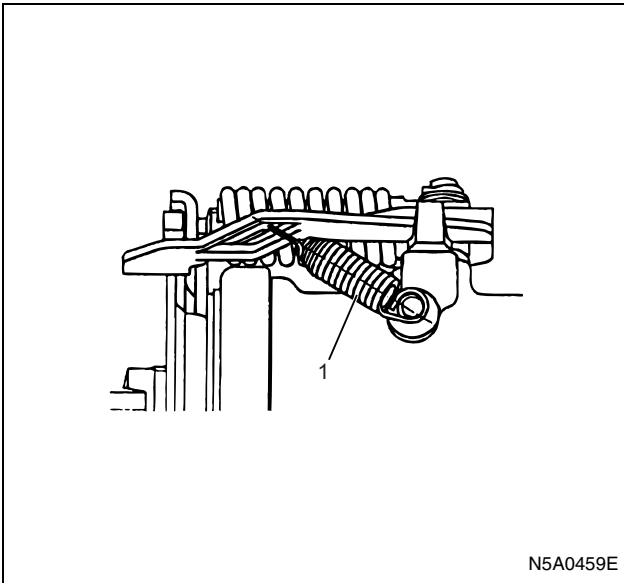
8. Fix the cylinder assembly in a vise and assemble the tip of spring assembly to cutout groove of piston flange.



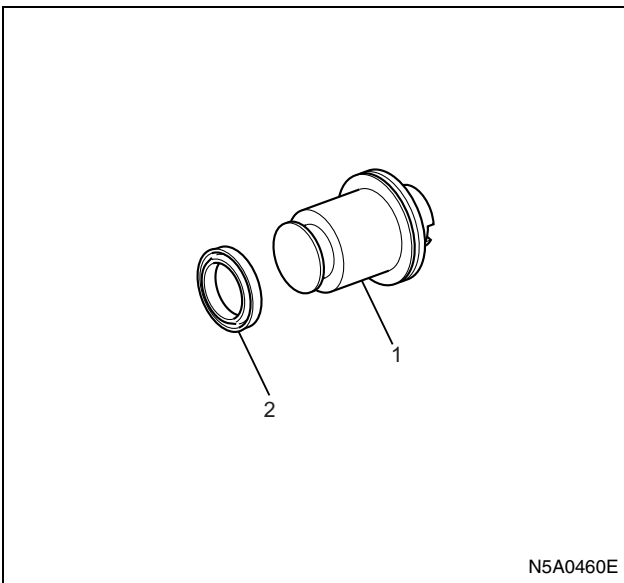
9. While matching the lever to cylinder's hook (3) and stretching the spring assembly, fix the lever to cylinder pin (2) through the double hole (1) of lever.



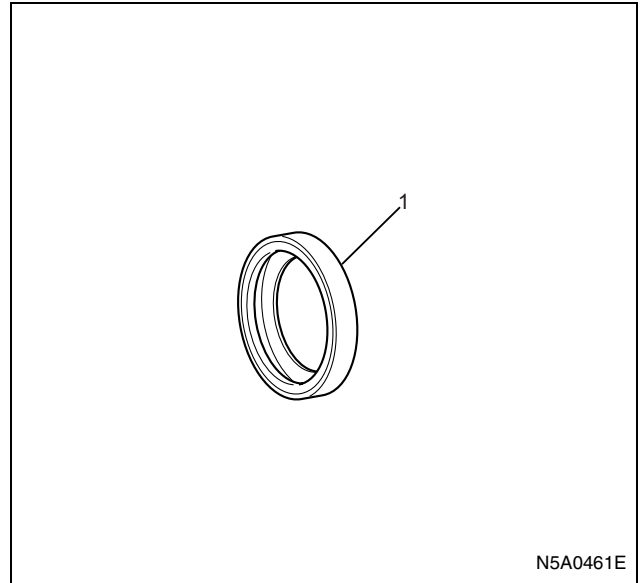
10. Install the return spring (1).
Install the closed hook of return spring to pin side.



11. Install the piston (1).
Apply grease to the outer circumference of piston and groove of piston cup (2), and install the grease-applied piston cup.



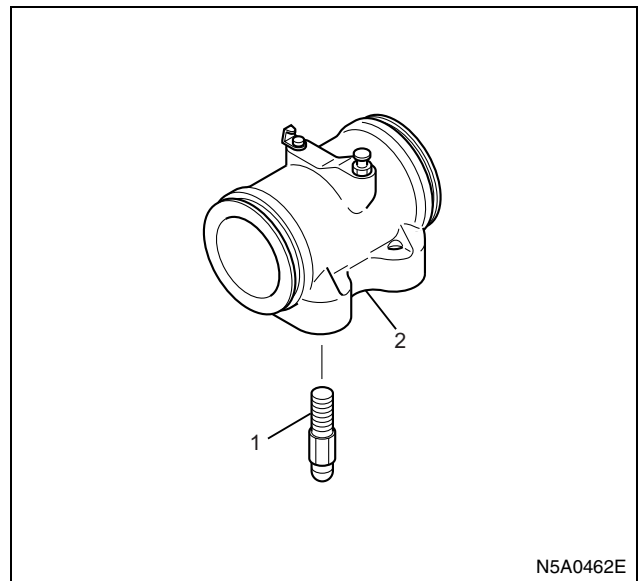
12. Install the boot (1).
Apply grease to the boot installation groove of cylinder, fill the grease to inside of boot and install it.
Grease: BESCO rubber grease



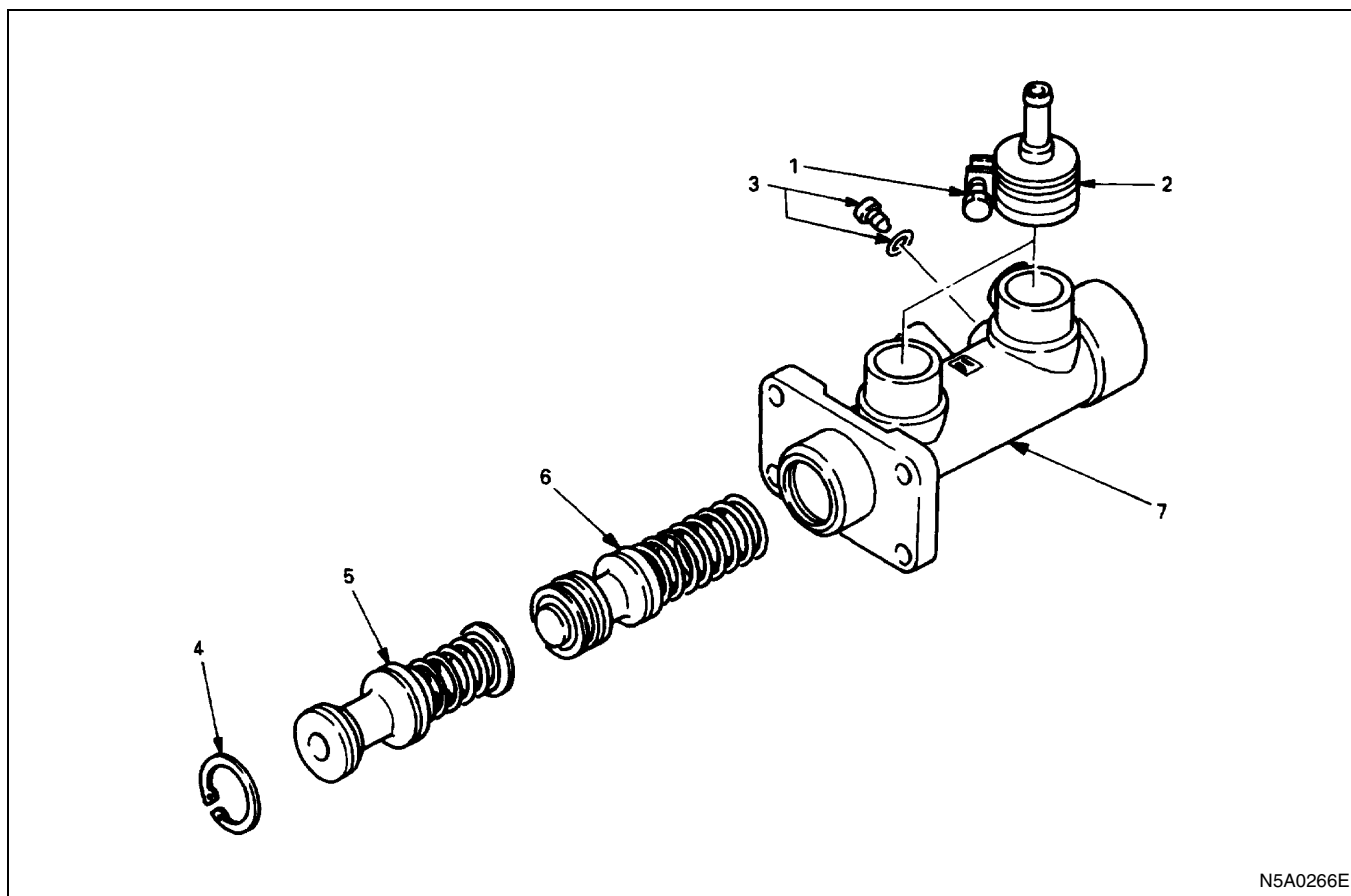
13. Install the bleeder (1) to cylinder assembly (2).

Tighten:

Bleeder to 6.9 — 11.8 N·m (0.7 — 1.2 kg·m / 5.1 — 8.7 lb·ft)



Master Cylinder Assembly (NHR)



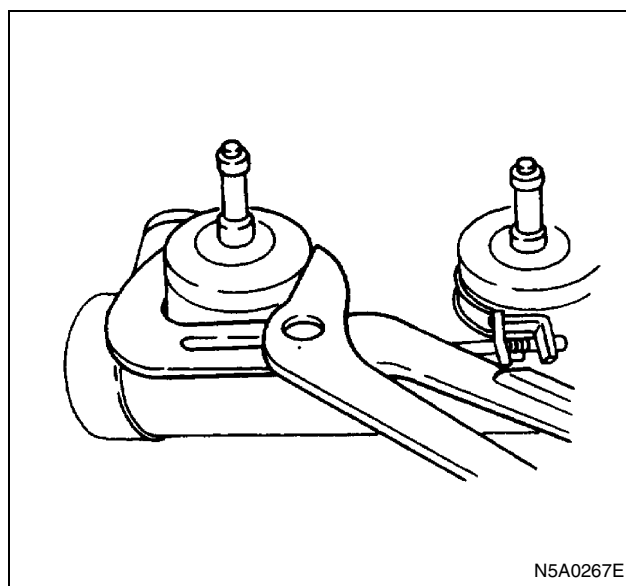
N5A0266E

Legend

- | | |
|-----------------------------|------------------------------|
| 1. Hose clamp | 5. Primary piston assembly |
| 2. Hose joint | 6. Secondary piston assembly |
| 3. Stopper screw and gasket | 7. Cylinder body |
| 4. Snap ring | |

Disassembly

1. Hose Clamp
2. Hose Joint
Use a pair of pliers to remove the hose joint.
Take care not to damage the hose joint and the cylinder body.



N5A0267E

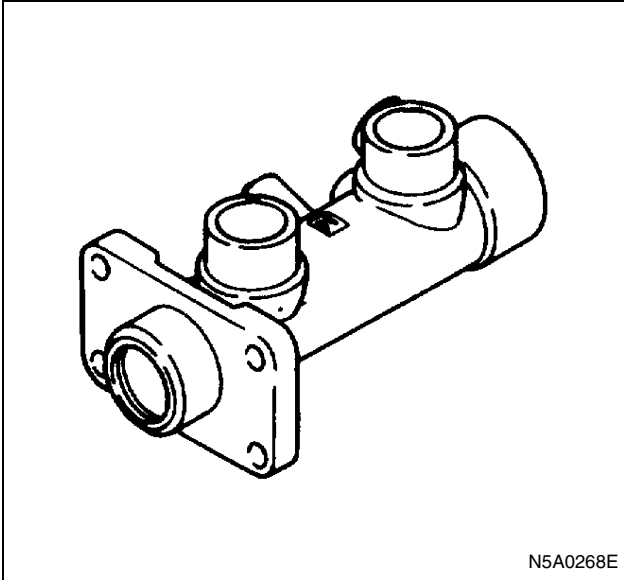
3. Stopper Screw and Gasket
4. Snap Ring
5. Primary Piston Assembly

6. Secondary Piston Assembly

7. Cylinder Body

Inspection and Repair

Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

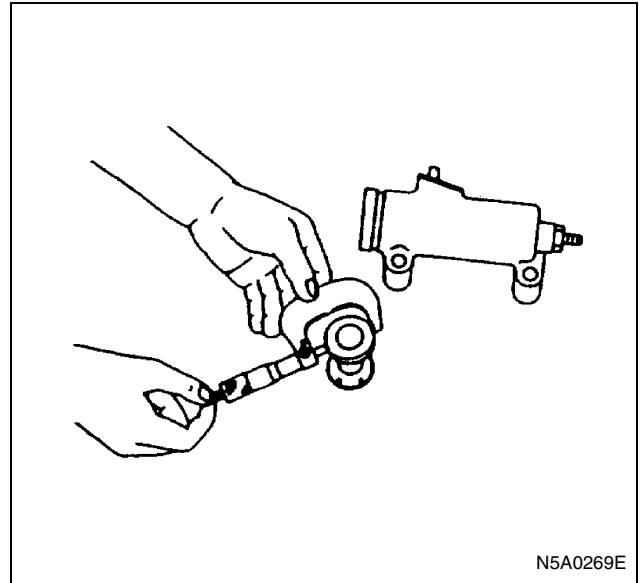
Cylinder Body

Visually check that the master cylinder bore, for scuff or scratch, if these conditions are presented, the cylinder body must be replaced.

Piston and Master Cylinder Clearance

1. Use a micrometer to measure the piston diameter.
2. Use an inside dial indicator to measure the cylinder bore.
3. Calculate the clearance between the wheel cylinder and the piston.
If the clearance exceeds the specified limit, the piston assembly must be replaced.

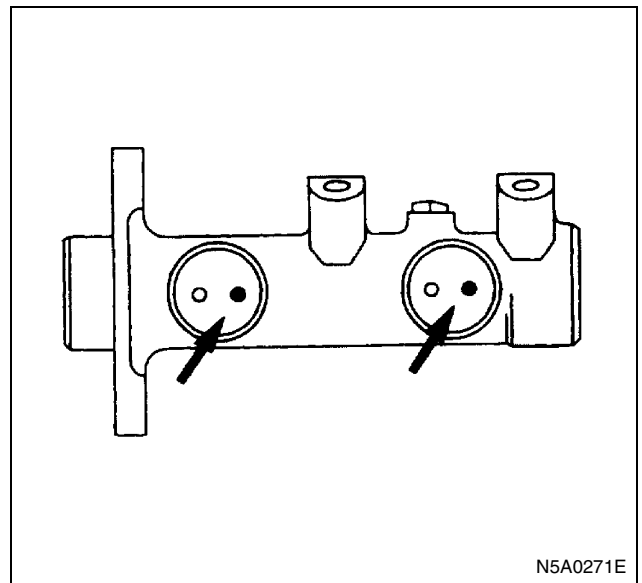
Piston and Master Cylinder Clearance		mm (in)
Standard	Limit	
0.11 — 0.195 (0.004 — 0.008)	0.22 (0.009)	

**Reassembly**

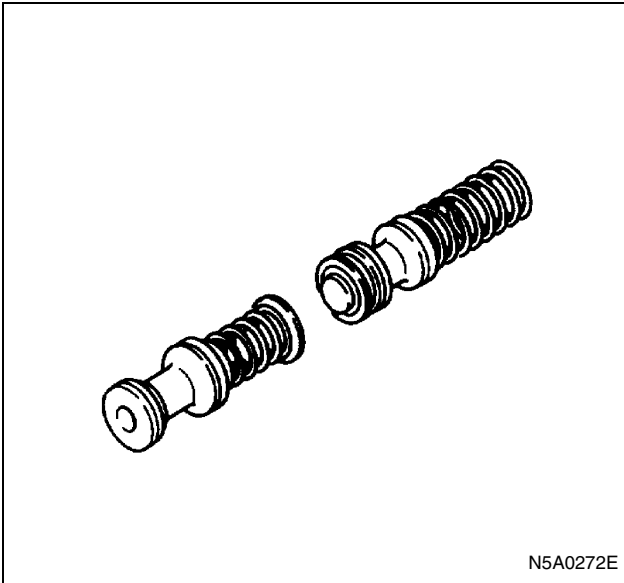
1. Cylinder Body

Clean the cylinder body and blow the return ports with compressed air.

Do not allow the return ports clogged with any foreign material.



2. Secondary Piston Assembly



3. Primary Piston Assembly

- 1) Rinse the piston assembly in clean brake fluid.
- 2) Install the piston assembly to the master cylinder.

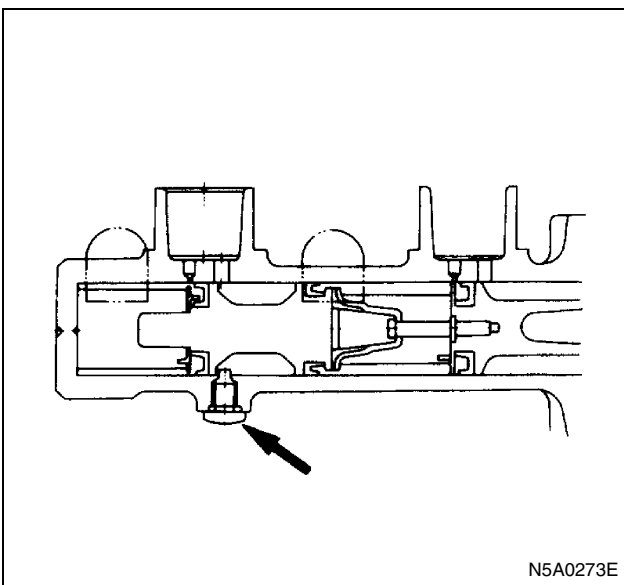
Notice:

Take care not to scratch the primary and secondary cups when installing the piston assembly.

4. Snap Ring
5. Stopper Screw and Gasket
 - 1) Slide the piston until the oil cavity of the secondary piston dears the stopper bolt hole.
 - 2) Install the stopper screw and tighten it to the specified torque.

Tighten:

Stopper screw to 27 N·m (2.8 kg·m / 20 lb·ft)

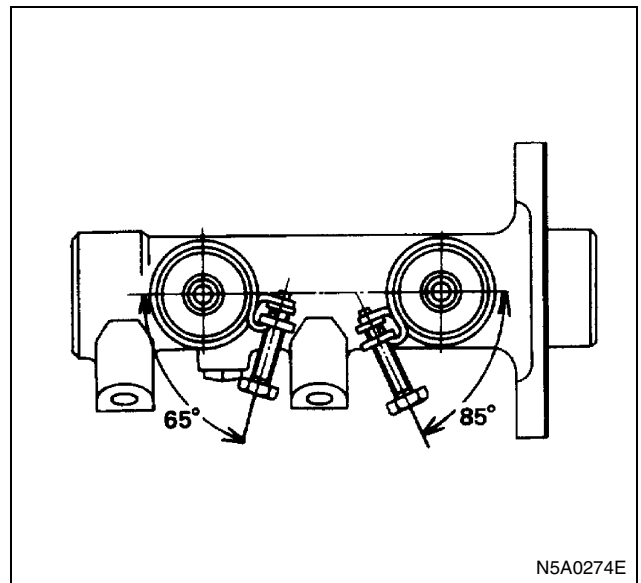


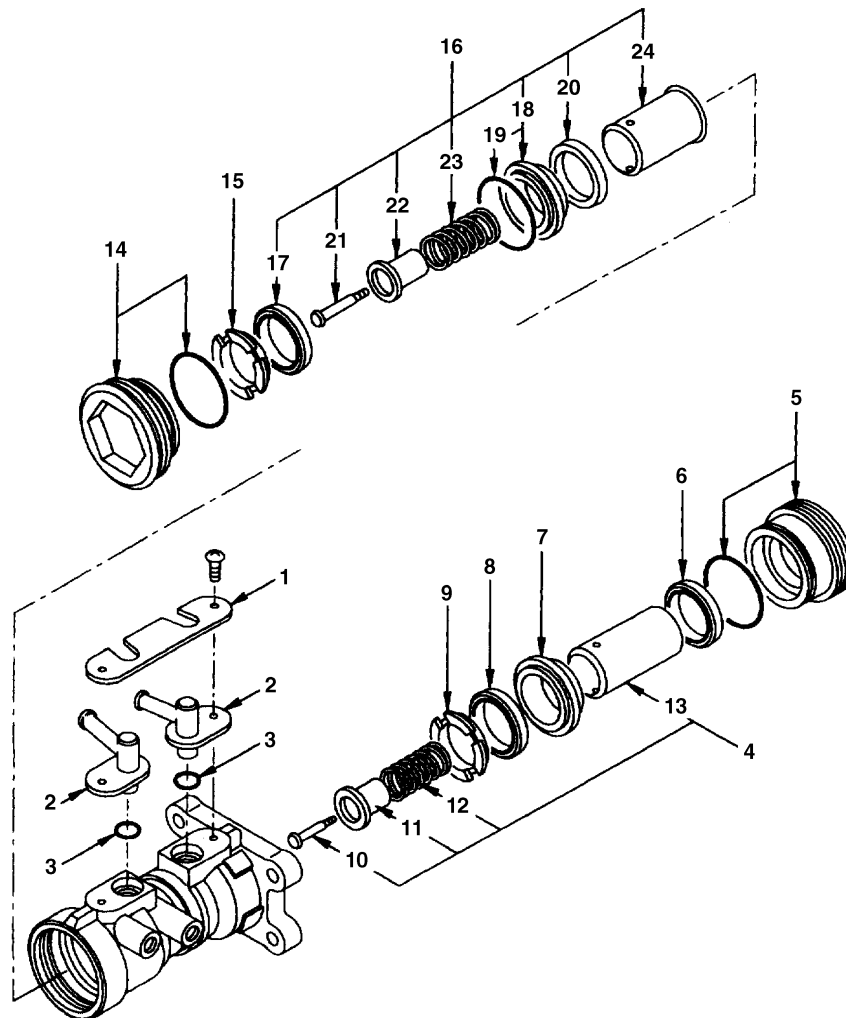
6. Hose Joint
7. Hose Clamp
 - 1) Set the clamp in position.

- 2) Dip the hose joint in hot water (60 — 80°C / 140 — 176°F) for several minutes.
- 3) Take out of the hose joint and blow off water immediately and completely.
- 4) Fit the hose joint to the cylinder body.
- 5) Align the position of the clamp screw as shown in the illustration.
- 6) Tighten the clamp screw to the specified torque.

Tighten:

Clamp screw to 2 N·m (0.2 kg·m / 17 lb·in)



Master Cylinder Assembly (NKR / NPR / NQR / NPS)

N5A0275E

Legend

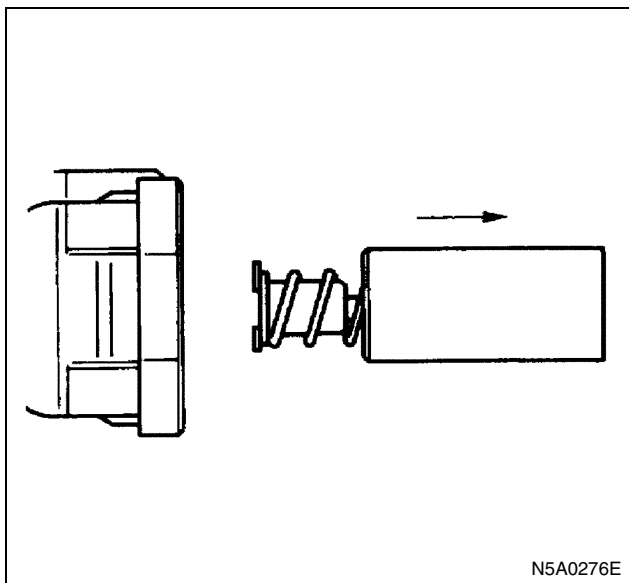
- | | |
|----------------------------|-------------------------------|
| 1. Holder plate | 13. Primary piston |
| 2. Hose joint | 14. Plug and O-ring |
| 3. O-ring | 15. Supporter |
| 4. Primary piston assembly | 16. Secondary piston assembly |
| 5. Plug and O-ring | 17. Primary cup |
| 6. Secondary cup | 18. Bushing |
| 7. Bushing | 19. O-ring |
| 8. Primary cup | 20. Secondary cup |
| 9. Supporter | 21. Screw |
| 10. Screw | 22. Spring retainer |
| 11. Spring retainer | 23. Secondary piston spring |
| 12. Primary piston spring | 24. Secondary piston |

Disassembly

1. Holder Plate
2. Hose Joint
3. O-ring

4. Primary Piston Assembly

Draw out Piston by hand so that it may not be damaged.



5. Plug and O-ring

Install master cylinder on a support plate (1), fix the support in a vice, and loosen plug using a wrench (2).

Support plate : 5-8840-2371-0

Wrench : 5-8840-2370-0

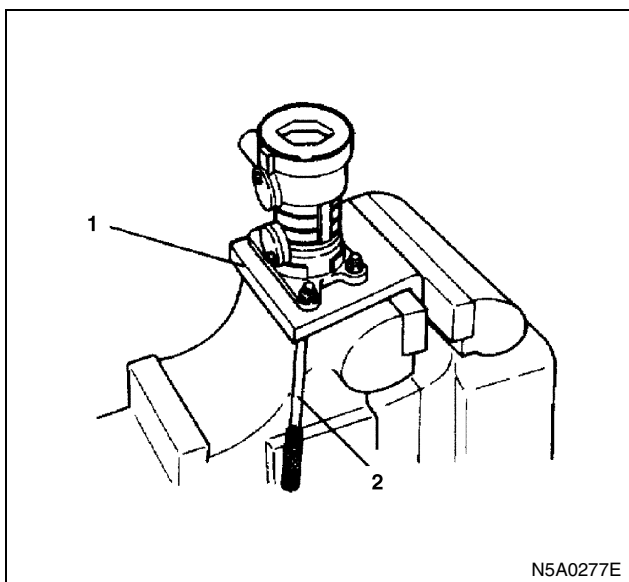
(Master cylinder inside diameter 31.7 mm, 30.1 mm)

Wrench : 5-8840-2369-0

(Master cylinder inside diameter 28.5 mm)

Wrench : 5-8840-2805-0

(Master cylinder inside diameter 34.9 mm)



6. Secondary Cup
7. Bushing
8. Primary Cup
9. Supporter
10. Screw
11. Spring Retainer
12. Primary Piston Spring
13. Primary Piston
14. Plug and O-ring

Install master cylinder on a support plate (1), fix the support in a vice, and loosen plug using a wrench (2).

Support plate : 5-8840-2371-0

Wrench : 5-8840-2370-0

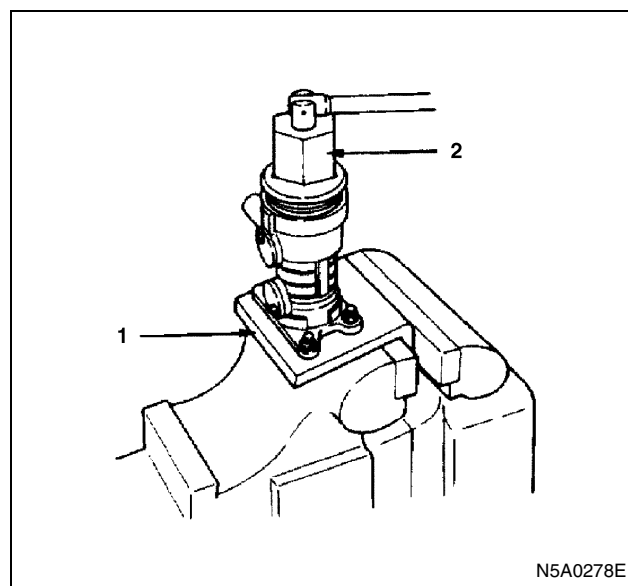
(Master cylinder inside diameter 31.7 mm, 30.1 mm)

Wrench : 5-8840-2369-0

(Master cylinder inside diameter 28.5 mm)

Wrench : 5-8840-2805-0

(Master cylinder inside diameter 34.9 mm)



15. Supporter
16. Secondary Piston Assembly
17. Primary Cup
18. Bushing
19. O-ring
20. Secondary Cup
21. Screw
22. Spring Retainer
23. Secondary Piston Spring
24. Secondary Piston

Inspection and Repair

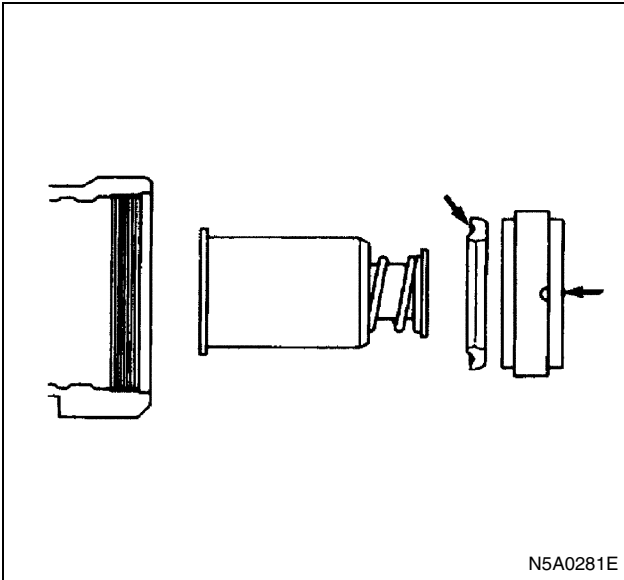
Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

Cup and O-ring

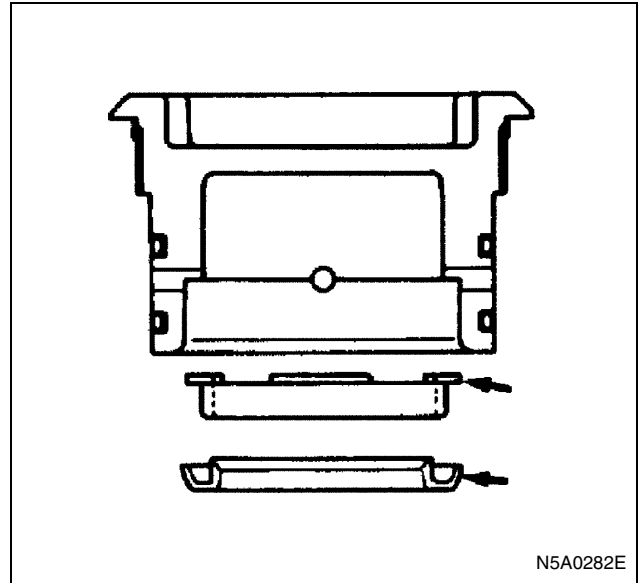
1. Wash each part with brake oil and check for wear, deterioration, and damage.
2. Replace the cups and O-rings.

Reassembly

1. Secondary Piston
2. Secondary Piston Spring
3. Spring Retainer
4. Screw
5. Secondary Cup
6. Bushing
Combine secondary cup and bushing with secondary piston as indicated as arrows, and push the assembly in until bushing comes into contact with cylinder body step.
7. O-ring
Install the O-ring to the bushing.



8. Primary Cup
9. Supporter
10. Plug and O-ring
Combine primary cup and supporter with plug as indicated by arrows.



Then tighten plug to specified tightening torque.

Plug Torque		N·m (kg·m/lb·ft)
Master Cylinder Inside diameter (mm)	28.5	40 (4.1/30)
	30.1	44 (4.5/33)
	31.7	
	34.9	49 (5.0/37)

Support plate : 5-8840-2371-0

Wrench : 5-8840-2370-0

(Master cylinder inside diameter 31.7 mm, 30.1 mm)

Wrench : 5-8840-2369-0

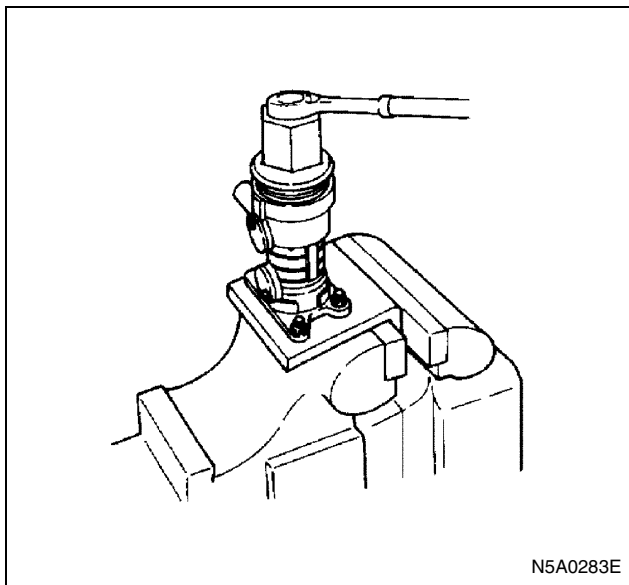
(Master cylinder inside diameter 28.5 mm)

Wrench : 5-8840-2805-0

(Master cylinder inside diameter 34.9 mm)

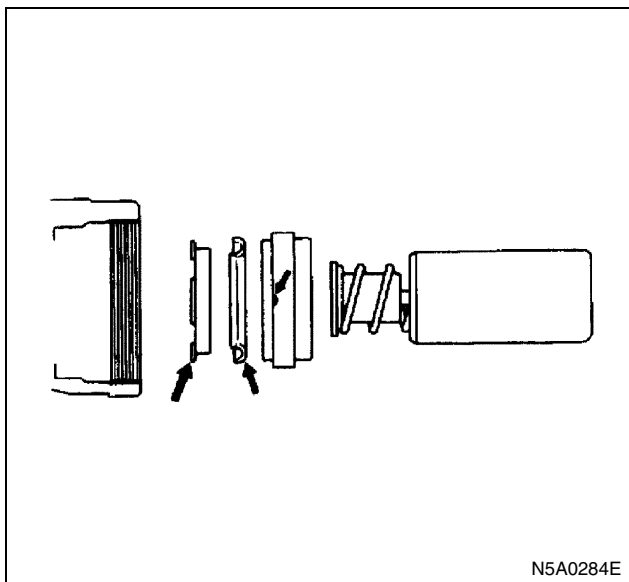
Notice:

If plug tightened to specified torque is found floating from cylinder body, plug should be disassembled again and check for abnormal parts fitting. Then reassemble.



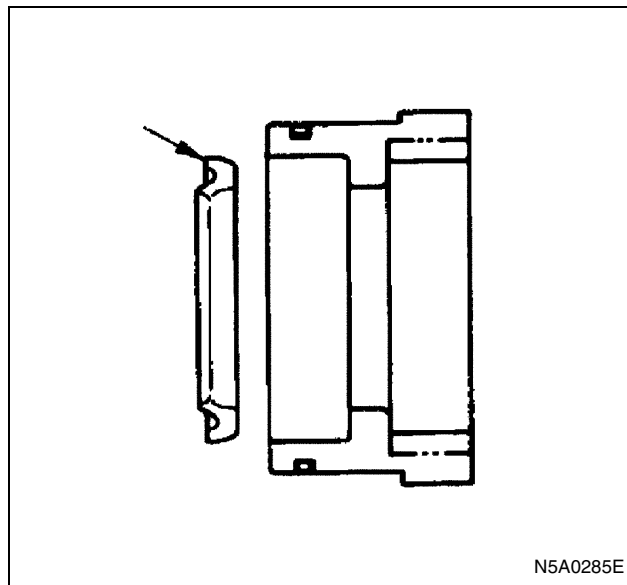
- 11. Primary Piston
- 12. Primary Piston Spring
- 13. Spring Retainer
- 14. Screw
- 15. Supporter
- 16. Primary Cup
- 17. Bushing

- 1) Combined the parts of primary piston as indicated by arrows.
Then push the assembly in until bushing comes into contact with the step in cylinder body.



- 2) Draw out primary piston alone taking care not to be let bushing get out of the step.

- 18. Secondary Cup
 - 19. Plug and O-ring
- Combine secondary cup with plug as indicated by arrow, and tighten to specified tightening torque.



Plug Torque		N·m (kg·m/lb·ft)
Master Cylinder Inside diameter (mm)	28.5	40 (4.1/30)
	30.1	44 (4.5/33)
	31.7	
	34.9	49 (5.0/37)

Support plate : 5-8840-2371-0

Wrench : 5-8840-2370-0

(Master cylinder inside diameter 31.7 mm, 30.1 mm)

Wrench : 5-8840-2369-0

(Master cylinder inside diameter 28.5 mm)

Wrench : 5-8840-2805-0

(Master cylinder inside diameter 34.9 mm)

Notice:

If plug tightened to specified torque is found floating from cylinder body, plug should be disassembled again and check for abnormal parts fitting. Then reassemble.

- 20. O-ring
- 21. Hose Joint
- 22. Holder Plate