

---

**GROUP 35****SERVICE BRAKES****CONTENTS**

<b>BASIC BRAKE SYSTEM .....</b>	<b>35A</b>
<b>ANTI-LOCK BRAKING SYSTEM (ABS).....</b>	<b>35B</b>
<b>TRACTION CONTROL SYSTEM (TCL) .....</b>	<b>35C</b>

## GROUP 35A

# BASIC BRAKE SYSTEM

## CONTENTS

<b>GENERAL INFORMATION .....</b>	<b>35A-4</b>	BRAKE DISC INSIDE DIAMETER CHECK. ....	35A-28
<b>BASIC BRAKE SYSTEM DIAGNOSIS</b>	<b>35A-4</b>	AUTO ADJUSTER FUNCTION CHECK ...	35A-28
INTRODUCTION TO BASIC BRAKE SYSTEM		MASTER CYLINDER FUNCTION CHECK. ....	35A-29
DIAGNOSIS .....	35A-4	<b>BRAKE PEDAL. ....</b>	<b>35A-30</b>
BASIC BRAKE SYSTEM DIAGNOSTIC		REMOVAL AND INSTALLATION .....	35A-30
TROUBLESHOOTING STRATEGY .....	35A-4	<b>MASTER CYLINDER ASSEMBLY AND</b>	
SYMPTOM CHART. ....	35A-5	<b>BRAKE BOOSTER. ....</b>	<b>35A-31</b>
SYMPTOM PROCEDURES .....	35A-5	REMOVAL AND INSTALLATION .....	35A-31
<b>SPECIAL TOOLS. ....</b>	<b>35A-16</b>	MASTER CYLINDER .....	35A-33
<b>ON-VEHICLE SERVICE. ....</b>	<b>35A-17</b>	INSPECTION. ....	35A-34
BRAKE PEDAL CHECK AND ADJUSTMENT .....	35A-17	<b>FRONT DISC BRAKE ASSEMBLY ..</b>	<b>35A-35</b>
STOPLIGHT SWITCH CHECK. ....	35A-18	REMOVAL AND INSTALLATION .....	35A-35
BRAKE BOOSTER OPERATING TEST ...	35A-18	INSPECTION. ....	35A-36
CHECK VALVE OPERATION CHECK ...	35A-19	DISASSEMBLY AND ASSEMBLY .....	35A-37
PROPORTIONING VALVE FUNCTION TEST .....	35A-20	INSPECTION. ....	35A-41
BLEEDING .....	35A-21	<b>REAR DISC BRAKE ASSEMBLY ...</b>	<b>35A-42</b>
BRAKE FLUID LEVEL SENSOR CHECK. ....	35A-21	REMOVAL AND INSTALLATION .....	35A-42
DISC BRAKE PAD CHECK AND REPLACEMENT .....	35A-22	INSPECTION. ....	35A-44
DISC BRAKE ROTOR CHECK. ....	35A-24	DISASSEMBLY AND ASSEMBLY .....	35A-44
FRONT DISC BRAKE RUN-OUT CHECK AND		INSPECTION. ....	35A-47
CORRECTION .....	35A-24	<b>REAR DRUM BRAKE. ....</b>	<b>35A-49</b>
REAR DISC BRAKE RUN-OUT CHECK AND		REAR DRUM BRAKE SHOE .....	35A-49
CORRECTION .....	35A-25	REAR DRUM BRAKE WHEEL CYLINDER. ....	35A-51
BRAKE DISC THICKNESS CHECK. ....	35A-26	WHEEL CYLINDER. ....	35A-52
BRAKE LINING THICKNESS CHECK ....	35A-27	INSPECTION. ....	35A-53
BRAKE DRUM INSIDE DIAMETER CHECK .....	35A-27	<b>PROPORTIONING VALVE. ....</b>	<b>35A-53</b>
BRAKE LINING AND BRAKE DRUM CONTACT		REMOVAL AND INSTALLATION .....	35A-53
CHECK .....	35A-28		

---

<b>SPECIFICATION(S) . . . . .</b>	<b>35A-54</b>	
FASTENER TIGHTENING SPECIFICATIONS		
. . . . .	35A-54	
GENERAL SPECIFICATIONS . . . . .	35A-55	
SERVICE SPECIFICATIONS . . . . .		35A-55
LUBRICANTS . . . . .		35A-56
SEALANT . . . . .		35A-57



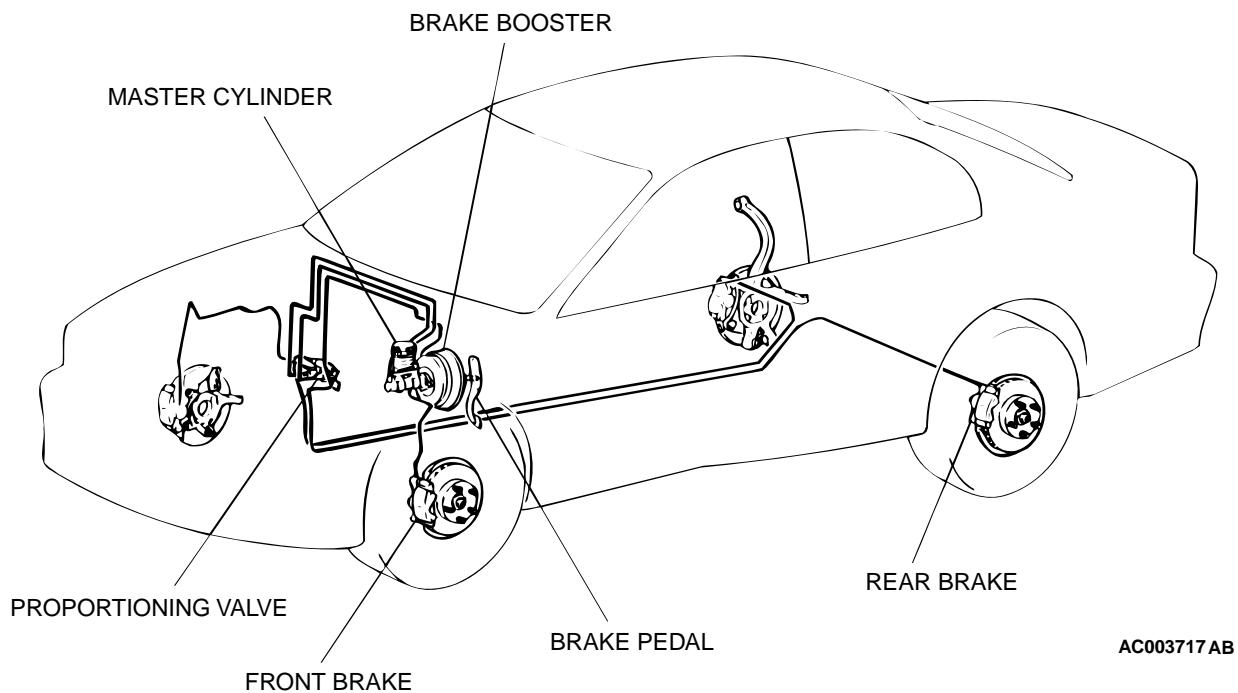
## GENERAL INFORMATION

M1351000100064

The basic brake system uses a X-type hydraulic feed arrangement. The left front and right rear brakes operate together from the same circuit, right front and left rear operate likewise. If a leak develops in the left front line or piston, the right rear brake would be affected. For safety and control, the right front and left rear circuit operates normally, providing stable braking. In this case, the left front leak must be repaired immediately as the right front left rear circuit is only provided half the braking power required for this vehicle. The main features are as follows:

- A tandem type master cylinder is equipped in all models.
- Tandem type 8 + 9-inch brake booster is used.
- The following type of brakes are used.
  - Front: Floating caliper, 1-piston, ventilated disc brakes.
  - Rear: Leading-trailing type drum brake. <2.4L Engine> Floating caliper, 1-piston, solid disc brakes. <3.0L Engine>

## CONFIGURATION DIAGRAM



## BASIC BRAKE SYSTEM DIAGNOSIS

## INTRODUCTION TO BASIC BRAKE SYSTEM DIAGNOSIS

M1351009700063

Hydraulic brakes configured of the brake pedal, master cylinder, brake booster and drum or disc brakes, are incorporated. Malfunctions such as insufficient braking power or the generation of noise may occur due to wear, damage or incorrect adjustment of these parts.

## BASIC BRAKE SYSTEM DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1351009800060

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you

have exhausted most of the possible ways to find a basic brake system fault.

1. Gather information from the customer.
2. Verify that the condition described by the customer exists.
3. Find the malfunction by following the symptom chart.
4. Verify malfunction is eliminated.

## SYMPTOM CHART

M1351009900078

SYMPTOMS	INSPECTION PROCEDURE	REFERENCE PAGE
Vehicle pulls to one side when brakes are applied	1	P.35A-5
Insufficient braking power	2	P.35A-7
Increased pedal stroke (Reduced pedal-to-floor board clearance)	3	P.35A-8
Brake drag	4	P.35A-9
Scraping or grinding noise when brake are applied	5	P.35A-11
Squealing, groaning or chattering noise when brake are applied	6	P.35A-13
Squealing noise when brakes are not applied	7	P.35A-13
Groaning, clicking or rattling noise when brakes are not applied	8	P.35A-15

## SYMPTOM PROCEDURES

### INSPECTION PROCEDURE 1: Vehicle pulls to one side when brakes are applied

#### DIAGNOSIS

**STEP 1. Check for oil, water, etc., on the pad or lining contact surface of all brakes.**

**Q: Is oil, water, etc., on the pad or lining contact surface?**

**YES** : Replace the part and determine and repair source/cause of foreign material. Then go to Step 8.

**NO** : Go to Step 2.

**STEP 2. Check the lining and brake drum contact.**

**<Vehicles equipped with rear drum brake>**

(1) If equipped with rear disc brake, go to Step 5.

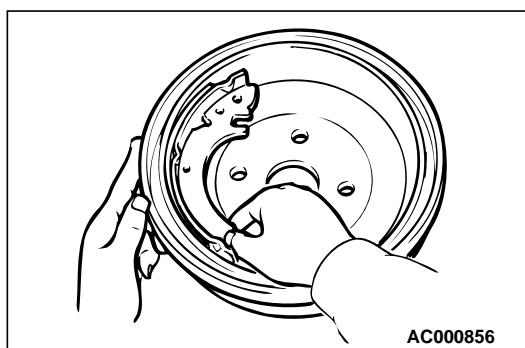
(2) Put chalk on the inner surface of the brake drum. Rub the lining against the drum inner surface.

*NOTE: Clean off chalk after check.*

**Q: Does the lining wipe off or smudge the chalk across the full width of the lining?**

**YES** : Go to Step 3.

**NO** : Replace the shoe and lining assemblies on both sides. Then go to Step 4.



---

**STEP 3. Check the auto adjuster function (Refer to [P.35A-28](#)).****Q: Is there fault?****YES** : Repair it. Then go to step 8.**NO** : Go to Step 4.

---

**STEP 4. Check the brake drum inside diameter (Refer to [P.35A-27](#)).****Q: Is the brake drum inside diameter outside of specifications?****YES** : Replace the part. Then go to Step 8.**NO** : Go to Step 5.

---

**STEP 5. Check disc brake pistons for smooth operation.**

- (1) With engine not running, depress the brake pedal rapidly several times to deplete booster vacuum reserves.
- (2) Test each disc brake assembly one at a time.
  - a. Remove the lower caliper bolt, then remove caliper from mount.
  - b. Have an assistant slowly depress the brake pedal. Confirm piston(s) extend slowly and smoothly with no jumpiness. Repeat for each disc brake assembly.

**Q: Do (does) the piston(s) move correctly?****YES** : Go to Step 6.**NO** : Disassemble and inspect brake assembly (Refer to [P.35A-37](#) and/or [P.35A-44](#)). Then go to Step 8.

---

**STEP 6. Check brake disc(s) for run out (Refer to [P.35A-24](#) or [P.35A-25](#)).****Q: Is runout outside of specifications?****YES** : Repair and replace as necessary. Then go to Step 8.**NO** : Go to Step 7.

---

**STEP 7. Check brake discs for correct thickness (Refer to [P.35A-26](#)).****Q: Is the thickness outside of specifications?****YES** : Repair or replace as necessary. Then go to Step 8.**NO** : Go to Step 8.

---

**STEP 8. Check symptoms.****Q: Is the symptom eliminated?****YES** : Repair complete.**NO** : Start over at Step 1. If a new symptom appears, refer to the symptom chart.

---

**INSPECTION PROCEDURE 2: Insufficient braking power**

---

**DIAGNOSIS**

---

**STEP 1. Check whether the brake fluid is low, is the correct fluid (A/T fluid, engine oil, etc.) or is contaminated (debris, sand, etc.).**

**Q: Is there fault?**

**YES** : Refill or replace with the specified brake fluid DOT 3 or DOT 4. Bleed the brakes if necessary (Refer to [P.35A-21](#)). Then go to Step 9.

**NO** : Go to Step 2.

---

**STEP 2. Check for spongy (not firm brakes).**

- (1) With engine not running, depress the brake pedal rapidly several times to deplete booster vacuum reserve.
- (2) With the brake pedal fully released, depress the brake pedal slowly until it stops.
- (3) With a measuring stick (ruler, etc.) next to the brake pedal, depress the pedal firmly and measure the distance the pedal traveled.

**Q: Is the distance greater than 20 mm (0.8 inch)?**

**YES** : Bleed the brakes to remove air in the fluid (Refer to [P.35A-21](#)). Then go to Step 9.

**NO** : Go to Step 3.

---

**STEP 3. Check the lining and brake drum contact.**

**<Vehicles equipped with rear drum brake>**

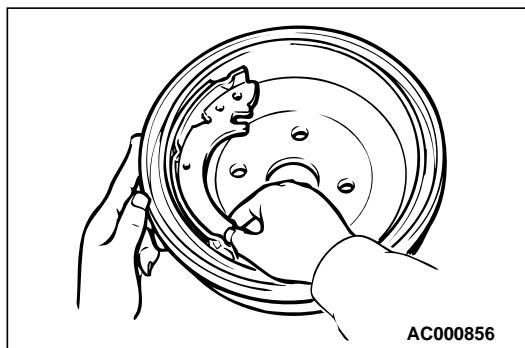
- (1) If equipped with rear disc brake, go to Step 4.
- (2) Put chalk on the inner surface of the brake drum. Rub the lining against the drum inner surface.

*NOTE: Clean off chalk after check.*

**Q: Does the lining wipe off or smudge the chalk across the full width of the lining?**

**YES** : Go to Step 5.

**NO** : Replace the shoe and lining assemblies on both sides. Go to Step 9.



---

**STEP 4. Check the auto adjuster function.**

Refer to [P.35A-28](#).

**Q: Is there fault?**

**YES** : Repair it. Then go to Step 9.

**NO** : Go to Step 5.

---

**STEP 5. Check the brake booster function.**

Refer to [P.35A-18](#).

**Q: Is there fault?**

**YES** : Replace the part. Then go to Step 9.

**NO** : Go to Step 6.

---

**STEP 6. Check for pinched or restricted brake tube or hose.****Q: Is there pinched or restricted brake tube or hose?****YES** : Replace that complete section of brake tube or brake hose. Then go to Step 9.**NO** : Go to Step 7.

---

**STEP 7. Check for oil, water, etc., on the pad or lining contact surfaces of all brakes.****Q: Is oil, water, etc., on the pad or lining contact surface?****YES** : Replace the part and determine and repair source/cause of foreign material. Recheck symptom. Then go to Step 9.**NO** : Diagnosis is complete. If condition persists, go to Step 8.

---

**STEP 8. Check the proportioning valve operation.**Refer to [P.35A-20](#).**Q: Is there fault?****YES** : Replace the part. Then go to Step 9.**NO** : Go to Step 9.

---

**STEP 9. Recheck symptom.****Q: Is the symptom eliminated?****YES** : Diagnosis is complete.**NO** : Start over at step 1. If a new symptom surfaces, refer to the symptom chart.

---

**INSPECTION PROCEDURE 3: Increased pedal stroke (reduced pedal-to-floor board clearance)****DIAGNOSIS****STEP 1. Check for spongy (not firm brakes).**

- (1) With engine not running, depress the brake pedal rapidly several times to deplete booster vacuum reserve.
- (2) With the brake pedal fully released, depress the brake pedal slowly until it stops.
- (3) With a measuring stick (ruler, etc.) next to the brake pedal, depress the pedal firmly and measure the distance the pedal traveled.

**Q: Is the distance greater than 20 mm (0.8 inch)?****YES** : Bleed the brakes to remove air in the fluid (Refer to [P.35A-21](#).) . Then go to Step 8 .**NO** : Go to Step 2.

---

**STEP 2. Check the pad or lining for wear.**Refer to [P.35A-22](#) or [P.35A-27](#).**Q: Is the pad or lining thickness outside of specifications?****YES** : Replace the part. Then go to Step 8.**NO** : Go to Step 3.

---

**STEP 3. Check the vacuum hose and check valve for damage.**Refer to [P.35A-19](#).**Q: Is there damage?****YES** : Replace the part. Then go to Step 8.**NO** : Go to Step 4.

**STEP 4. Check the master cylinder function.**

Refer to [P.35A-29](#).

**Q: Is there fault?**

**YES** : Repair it. Then go to Step 8.

**NO** : Go to Step 5.

**STEP 5. Check for brake fluid leaks.**

**Q: Is there leaks?**

**YES** : Check the connection for looseness, corrosion, etc. Clean and repair as necessary. If leaking in any tube or hose section, replace the complete tube or hose. Then go to Step 8 .

**NO** : Go to Step 6.

**STEP 6. Check the auto adjuster function.**

Refer to [P.35A-28](#).

**Q: Is there fault?**

**YES** : Repair the part. Then go to Step 8.

**NO** : Go to Step 7.

**STEP 7. Check the clearance (too much) between the pushrod and primary piston.**

Refer to [P.35A-31](#).

**Q: Is the clearance outside of specifications?**

**YES** : Adjust the clearance. Then go to Step 8.

**NO** : Go to Step 8.

**STEP 8. Recheck symptom.**

**Q: Is the symptom eliminated?**

**YES** : Diagnosis is complete.

**NO** : Start over at step 1. If a new symptom surfaces, refer to the symptom chart.

**INSPECTION PROCEDURE 4: Brake drag**

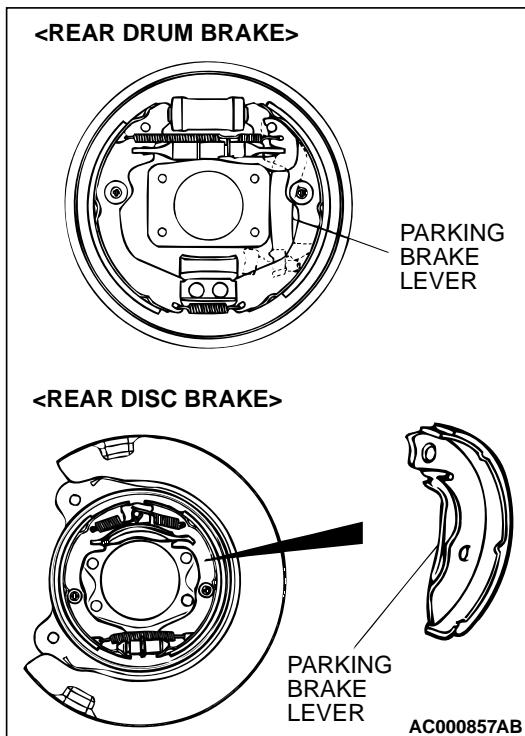
**DIAGNOSIS**

**STEP 1. Check the parking brake lever return.**

**Q: Is there fault?**

**YES** : Repair it. Then go to Step 10.

**NO** : Go to Step 2.



---

**STEP 2. Check the parking brake pull amount.**

Refer to GROUP 36, On-vehicle Service – Parking Brake Lever Stroke Check and Adjustment [P.36-4](#).

**Q: Is there fault?**

**YES** : Adjust it. Then go to Step 10.

**NO** : Go to Step 3.

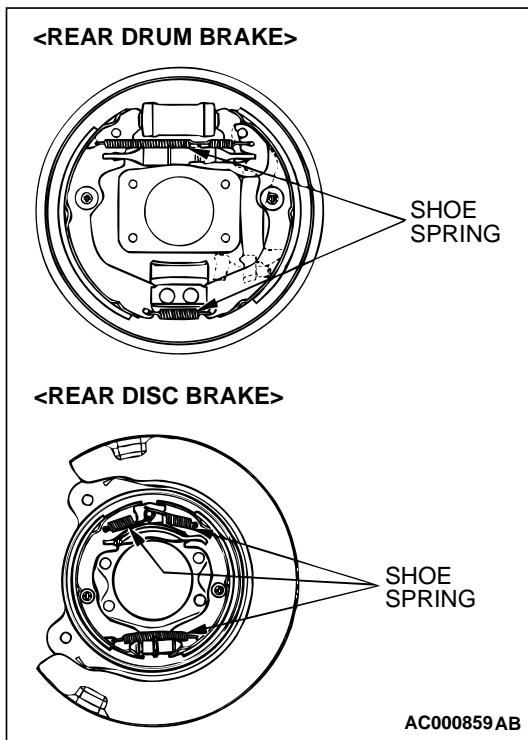
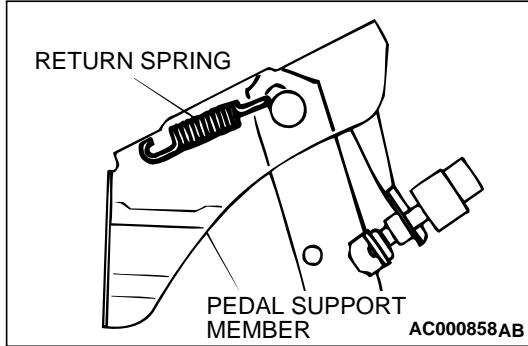
---

**STEP 3. Check the brake pedal return spring for deterioration.**

**Q: Is there deterioration?**

**YES** : Replace the spring. Then go to Step 10.

**NO** : Go to Step 4.



---

**STEP 4. Check the brake shoe springs for breakage.**

**Q: Are the brake shoe springs broken?**

**YES** : Replace the spring. Then go to Step 10.

**NO** : Go to Step 5.

---

**STEP 5. Check the amount of grease at each sliding section.**

Refer to [P.35A-44](#) or refer to GROUP 36, Parking Brake Drum [P.36-11](#).

**Q: Is the grease amount low?**

**YES** : Apply grease. Then go to Step 10.

**NO** : Go to Step 6.

---

**STEP 6. Check the clearance (too low) between the pushrod and primary piston.**

Refer to [P.35A-31](#).

**Q: Is there fault?**

**YES** : Adjust the clearance. Then go to Step 10.

**NO** : Go to Step 7.

---

**STEP 7. Check the master cylinder piston return spring for damage and return port for clogging.**

Refer to [P.35A-33](#).

**Q: Is there damage?**

**YES** : Replace the part. Then go to Step 10.

**NO** : Go to Step 8.

---

**STEP 8. Check port for clogging.**

**Q: Is the port clogged?**

**YES** : Repair it. Then go to Step 10.

**NO** : Go to Step 9.

---

**STEP 9. Check disc brake pistons for sticking.**

Depress the brake pedal, then release. Confirm each wheel spins freely.

**Q: Are all wheels stuck?**

**YES** : Inspect that brake assembly. Then go to Step 10.

**NO** : Go to Step 10.

---

**STEP 10. Recheck symptom.**

**Q: Is the symptom eliminated?**

**YES** : Diagnosis is complete.

**NO** : Start over at step 1. If a new symptom surfaces, refer to the symptom chart.

---

**INSPECTION PROCEDURE 5: Scraping or grinding noise when brakes are applied**

---

**DIAGNOSIS**

---

**STEP 1. Check the front brakes, then rear brakes, for metal-to-metal condition.**

**Q: Is the metal-to-metal contact evident?**

**YES** : Repair or replace components. Then go to Step 6.

**NO** : Go to Step 2.

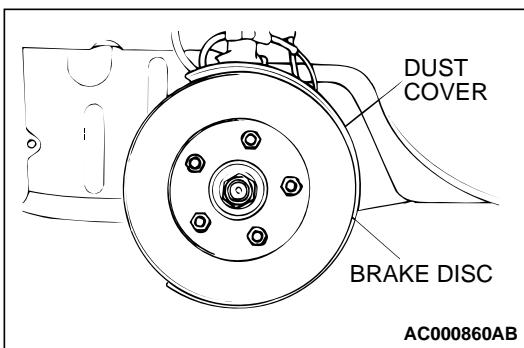
---

**STEP 2. Check for interference between the caliper and wheel.**

**Q: Is there interference?**

**YES** : Repair or replace the part. Then go to Step 6.

**NO** : Go to Step 3.

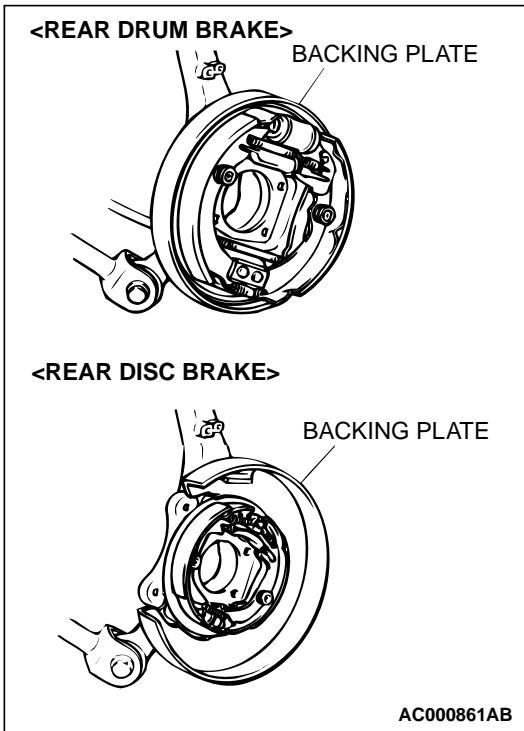


---

**STEP 3. Check for interference between the dust cover and brake disc.**

**Q: Is there interference?**

**YES** : Repair or replace the part. Then go to Step 6.  
**NO** : Go to Step 4.



---

**STEP 4. Check the brake drums or discs for cracks.**

**Q: Are there cracks?**

**YES** : Repair or replace the part. Then go to Step 6.  
**NO** : Go to Step 5.

---

**STEP 5. Check for bent backing plate(s).**

**Q: Is (Are) the backing plate(s) bent?**

**YES** : Repair or replace the part. Then go to Step 6.  
**NO** : Go to Step 6.

---

**STEP 6. Recheck symptom.**

**Q: Is the symptom eliminated?**

**YES** : Diagnosis is complete.  
**NO** : Start over at step 1. If a new symptom surfaces, refer to the symptom chart.

---

**INSPECTION PROCEDURE 6: Squealing, groaning or chattering noise when brakes are applied**

---

**DIAGNOSIS**

---

**STEP 1. Check the brake drums and lining or  
brake disc and pads for wear or cutting.**

**Q: Is there wear or cutting?**

**YES** : Repair or replace the part. Then go to Step 7.

**NO** : Go to Step 2.

---

**STEP 2. Check the calipers for rust.**

**Q: Is there rust?**

**YES** : Remove the rust. Then go to Step 7.

**NO** : Go to Step 3.

---

**STEP 3. Check the lining parts for damage.**

If equipped with rear disc brakes, go to Step 6.

**Q: Is there damage?**

**YES** : Repair or replace the part. Then go to Step 7.

**NO** : Go to Step 4.

---

**STEP 4. Check whether the lining is dirty or  
greasy.**

**Q: Is the lining dirty or greasy?**

**YES** : Clean or replace the part. Then go to Step 7.

**NO** : Go to Step 5.

---

**STEP 5. Check whether the shoe hold-down  
springs are weak or the shoe-hold-down pins  
and springs are loose or damaged.**

**Q: Is there fault?**

**YES** : Repair or replace the part. Then go to Step 7.

**NO** : Go to Step 6.

---

**STEP 6. Adjust the brake pedal or brake booster  
pushrod.**

Refer to [P.35A-17](#) or [P.35A-31](#).

**Q: Is the adjustment value come?**

**YES** : Adjust. Then go to Step 7.

**NO** : Go to Step 7.

---

**STEP 7. Recheck symptom.**

**Q: Is the symptom eliminated?**

**YES** : Diagnosis is complete.

**NO** : Start over at step 1. If a new symptom  
surfaces, refer to the symptom chart.

---

**INSPECTION PROCEDURE 7: Squealing noise when brakes are not applied**

---

**DIAGNOSIS**

---

**STEP 1. Check whether the backing plate is bent or loose  
and interfering with the drum. <Vehicles equipped with  
rear drum brakes>**

If equipped with rear disc brakes, go to Step 4.

**Q: Is there fault?**

**YES** : Replace the part. Then go to Step 10.

**NO** : Go to Step 2.

---

**STEP 2. Check whether the drum is damaged due to  
interference with the backing plate or shoe.**

**Q: Is there damage?**

**YES** : Replace the part. Then go to Step 10.

**NO** : Go to Step 3.

---

**STEP 3. Check the brake drum for wear and the shoe-to-shoe spring for damage.****Q: Is there wear or damage?****YES** : Replace the part. Then go to Step 10.**NO** : Go to Step 4.

---

**STEP 4. Check the brake discs for rust.****Q: Are the brake discs rusted?****YES** : Remove the rust by using sand paper. If still rusted, turn the rotors with an on-the-car brake lathe. Then go to Step 10.**NO** : Go to Step 5.

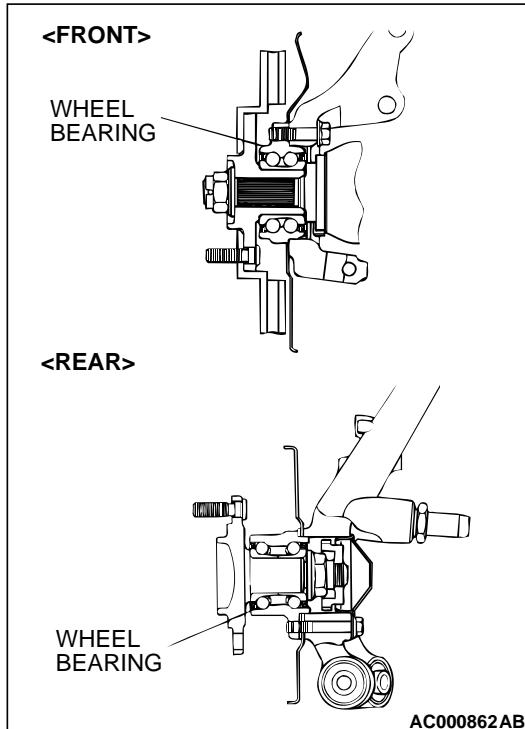
---

**STEP 5. Check the brake pads for correct installation.****Q: Are the pads installed incorrectly?****YES** : Repair it. Then go to Step 10.**NO** : Go to Step 6.

---

**STEP 6. Check the calipers for correct installation.****Q: Are the calipers installed incorrectly?****YES** : Repair it. Then go to Step 10.**NO** : Go to Step 7.

---

**STEP 7. Check the wheel bearings for deterioration or damage, and the grease quality and quantity.****Q: Are the wheel bearings damaged or out of grease?****YES** : Apply grease or replace the part. Then go to Step 10.**NO** : Go to Step 8.

---

**STEP 8. Check whether the brake booster, master cylinder or wheel cylinder return is insufficient.**

**Q: Is the brake booster, master cylinder or wheel cylinder return insufficient?**

**YES** : Replace the part. Then go to Step 10.

**NO** : Go to Step 9.

---

**STEP 9. Adjust the brake pedal or brake booster pushrod.**

Refer to [P.35A-17](#) or [P.35A-31](#).

**Q: Is the adjustment value come?**

**YES** : Adjust. Then go to Step 10.

**NO** : Go to Step 10.

---

**STEP 10. Recheck symptom.**

**Q: Is the symptom eliminated?**

**YES** : Diagnosis is complete.

**NO** : Start over at step 1. If a new symptom surfaces, refer to the symptom chart.

---

## INSPECTION PROCEDURE 8: Groaning, clicking or rattling noise when brakes are not applied.

---

### DIAGNOSIS

---

**STEP 1. Check whether foreign material has entered the wheel covers.**

**Q: Is there foreign material?**

**YES** : Remove it. Then go to Step 5.

**NO** : Go to Step 2.

---

**STEP 2. Check for looseness of the wheel nuts.**

**Q: Are the wheel nuts loose?**

**YES** : Tighten to 88 – 108 N·m (66 – 81 ft-lb). Then go to Step 5.

**NO** : Go to Step 3.

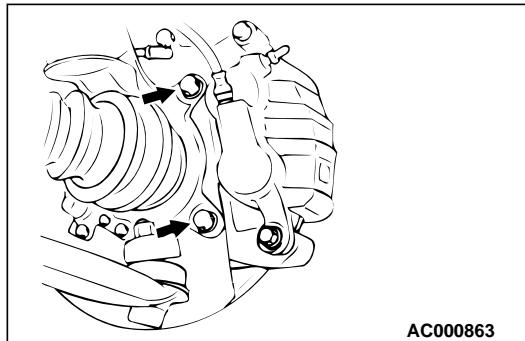
---

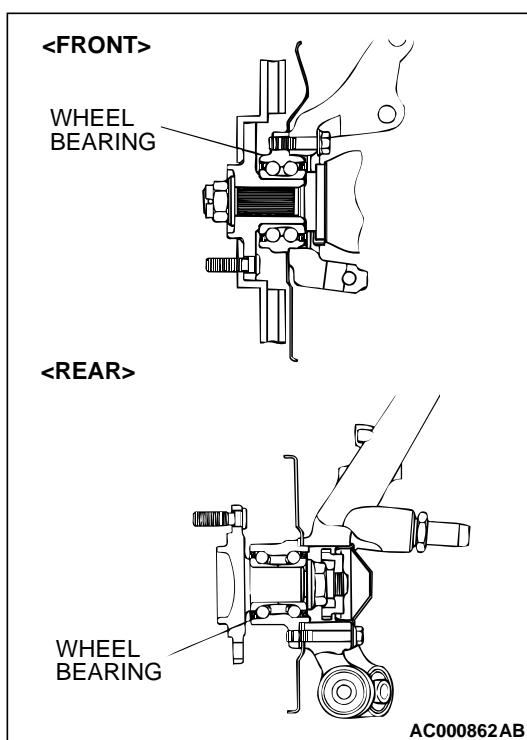
**STEP 3. Check for looseness of the caliper installation bolt.**

**Q: Is the caliper installation bolt loose?**

**YES** : Tighten to 90 – 110 N·m (66 – 81 ft-lb) for the front caliper, or 55 – 65 N·m (41 – 48 ft-lb) for the rear caliper. Then go to Step 5.

**NO** : Go to Step 4.



**STEP 4. Check the wheel bearings for wear, damage or dryness.****Q: Is there fault?**

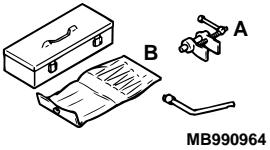
**YES** : Apply grease or replace the part. Then go to Step 5.  
**NO** : Go to Step 5.

**STEP 5. Recheck symptom.****Q: Is the symptom eliminated?**

**YES** : Diagnosis is complete.  
**NO** : Start over at step 1. If a new symptom surfaces, refer to the symptom chart.

**SPECIAL TOOLS**

M1351000600069

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 MB990964	MB990964 Brake tool set A: MB990520 Disc brake piston expander B: MB990619 Installer	General service tool	<ul style="list-style-type: none"> <li>Pushing-in of the disc brake piston</li> <li>Installation of the drum brake wheel cylinder piston cup</li> </ul>
 MB990998	MB990998 Front hub remover and installer	MB990998-01	Provisional holding of the wheel bearing

## ON-VEHICLE SERVICE

## BRAKE PEDAL CHECK AND ADJUSTMENT

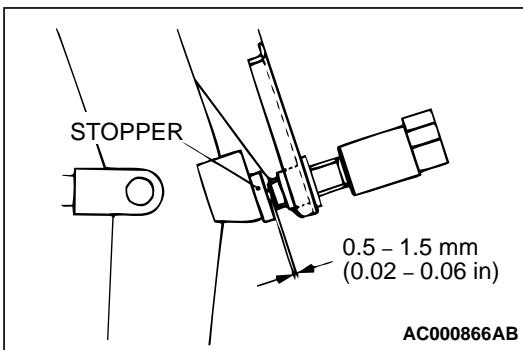
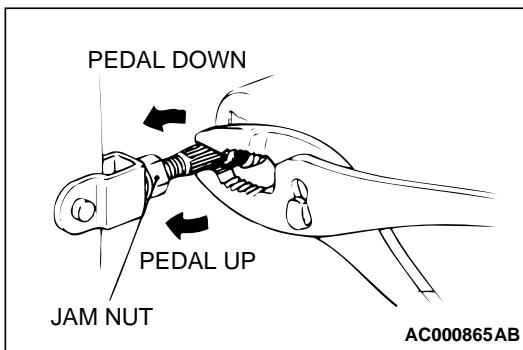
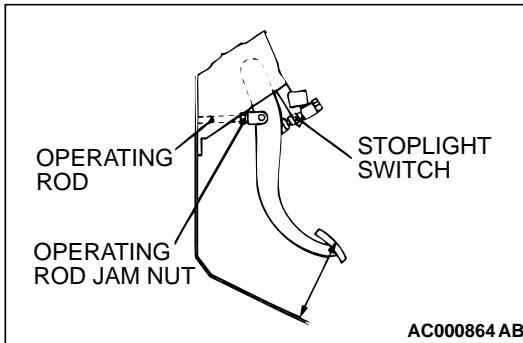
M1351000900060

## BRAKE PEDAL HEIGHT

1. Turn up the carpet etc. under the brake pedal.
2. Measure the brake pedal height as illustrated. If it is not within the standard value, adjust as follows.

**Standard value: 175 – 178 mm (6.9 – 7.0 inches) [From the surface of melting sheet (floorboard) to the face of pedal pad]**

- (1) Disconnect the stoplight switch connector.
- (2) Rotate the stoplight switch 1/4 turn counter clockwise to loosen.
- (3) Loosen the operating rod jam nut. Turn the serrations of the operating rod with pliers to adjust the brake pedal height to the standard value.



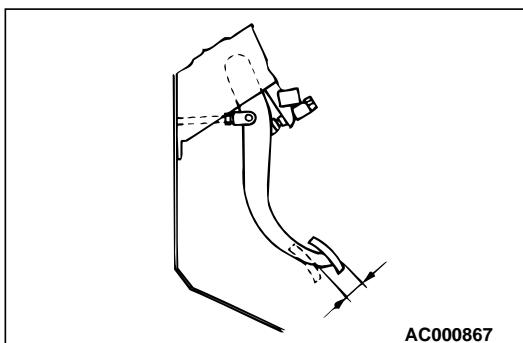
- (4) Turn the stoplight switch until it contacts the stopper. During this step, secure the pedal by moving it forward by hand.
- (5) Adjust the stoplight switch so that it has the specified clearance as shown. Turn the stoplight switch 1/4 turn clockwise to secure.
- (6) Connect the connector of the stoplight switch.
- (7) Check to be sure that the stoplight does not illuminate with the brake pedal released
3. Return the carpet, etc. to its original position.

## BRAKE PEDAL FREE PLAY

1. Turn the ignition switch to the "LOCK" (OFF) position, depress the brake pedal two or three times. After eliminating the vacuum in the brake booster, press the pedal down by hand, and confirm that the amount of movement before resistance is met (free play) is within the standard value range.

**Standard value: 3 – 8 mm (0.12 – 0.31 inch)**

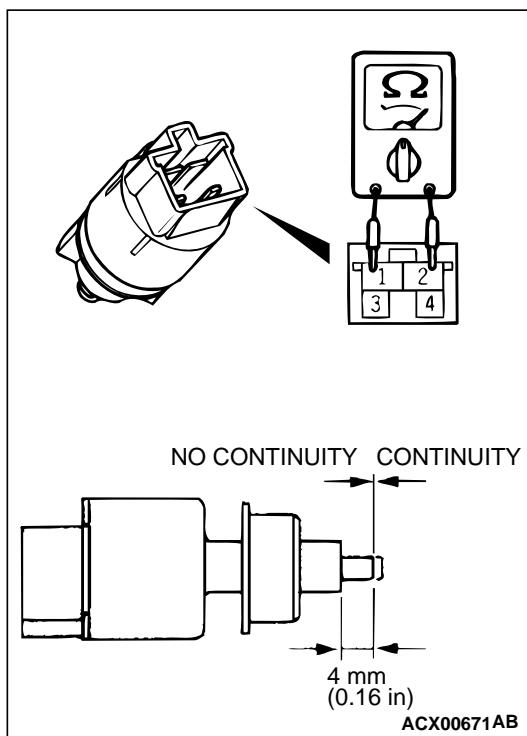
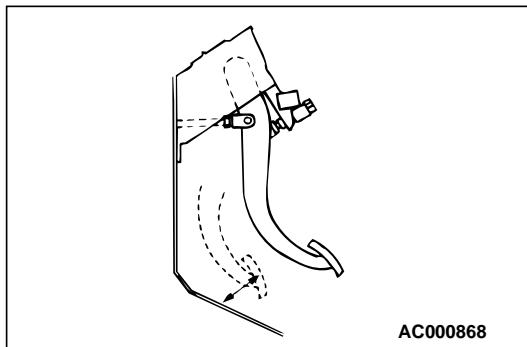
2. If the brake pedal play is not within the standard value, check the following, and adjust or replace if necessary:
  - Excessive play between the brake pedal and the clevis pin, or between the clevis pin and the brake booster operating rod



- Brake pedal height
- Installation position of the stoplight switch, etc.

## CLEARANCE BETWEEN BRAKE PEDAL AND FLOORBOARD

1. Turn up the carpet etc. under the brake pedal.
2. Start the engine, depress the brake pedal with approximately 490 N (110 pound) of force, and measure the clearance between the brake pedal and the floorboard.  
**Standard value: 90 mm (3.5 inches) or more [From the surface of melting sheet (floorboard) to the face of pedal pad]**
3. If the clearance is outside the standard value, check for air trapped in the brake line, thickness of the disc brake pad, clearance between the lining and the drum and dragging in the parking brake. And then adjust and replace defective parts as required.
4. Return the carpet etc. to its original position.



## STOPLIGHT SWITCH CHECK

M1351008900086

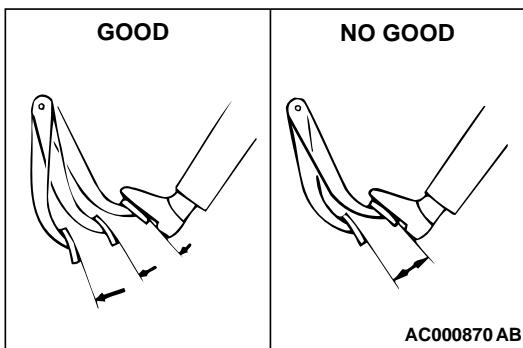
1. Connect an ohmmeter between the stoplight switch connector terminals.
2. There should be no continuity between the terminals when the plunger is pushed in as shown. There should be continuity when it is released.

TESTER CONNECTION	PLUNGER	SPECIFIED CONDITION
1 – 2	IN	Open circuit
	OUT	Less than $2\Omega$

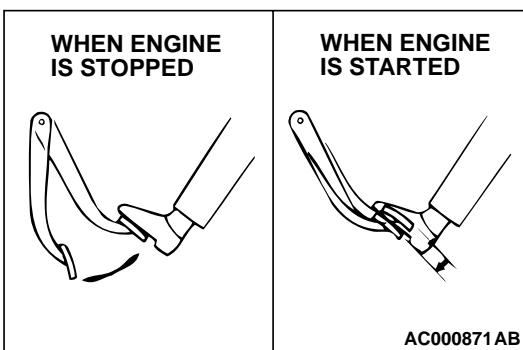
## BRAKE BOOSTER OPERATING TEST

M1351001000060

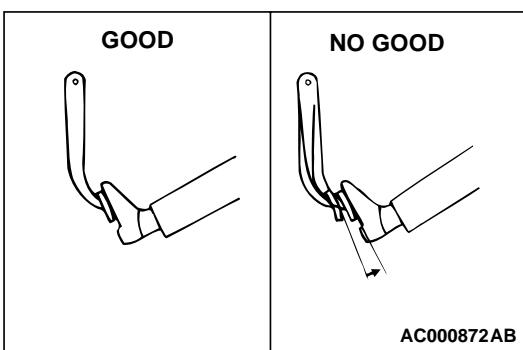
1. For simple checking of the brake booster operation, carry out the following tests:



(1) Run the engine for one or two minutes, and then stop it. If the pedal depresses fully the first time but gradually becomes higher when depressed succeeding times, the booster is operating properly. If the pedal height remains unchanged, the booster is defective. Go to step 2.



(2) With the engine stopped, step on the brake pedal several times. Then step on the brake pedal and start the engine. If the pedal moves downward slightly, the booster is in good condition. If there is no change, the booster is defective. Go to step 3.



(3) With the engine running, step on the brake pedal and then stop the engine. Hold the pedal depressed for 30 seconds. If the pedal height does not change, the booster is in good condition, if the pedal rises, the booster is defective.

2. If the above three tests are okay, the booster is OK. If one of the above three tests is not okay, the check valve, vacuum hose, or booster is defective. Check the check valve (Refer to [P.35A-19.](#)), vacuum hose for leaks, high volume engine vacuum applied to booster. Repair or replace as necessary. If these are OK, replace booster and repeat this test starting at Step 1.

## CHECK VALVE OPERATION CHECK

M1351009000064

### CAUTION

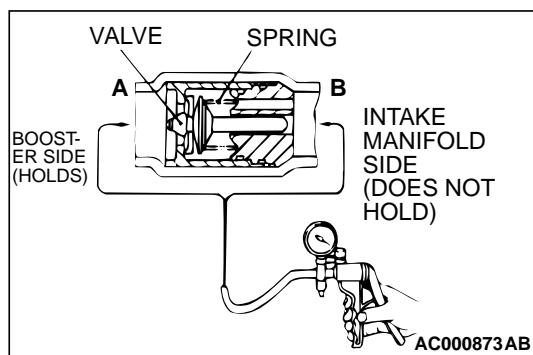
The check valve should not be removed from the vacuum hose.

1. Remove the vacuum hose. (Refer to [P.35A-31.](#))

**CAUTION**

If the check valve is defective, replace it as an assembly unit together with the vacuum hose.

- Check the operation of the check valve by using a vacuum pump.

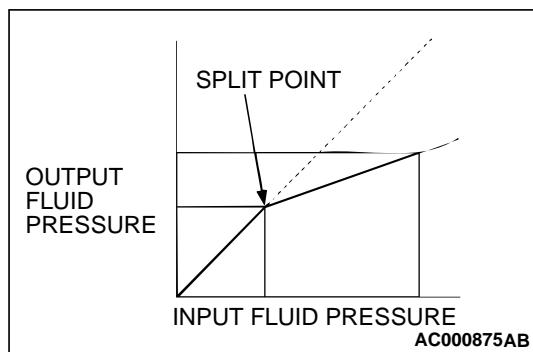
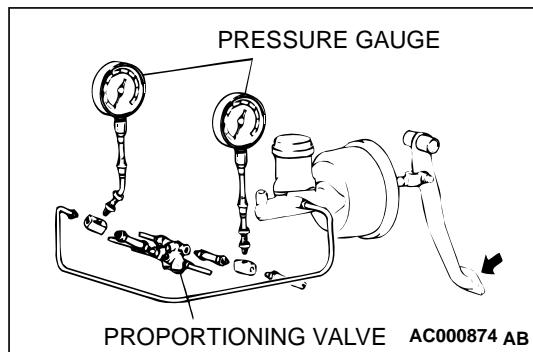


VACUUM PUMP CONNECTION	CRITERIA
Connection at the brake booster side (A)	A negative pressure (vacuum) is created and held.
Connection at the intake manifold side (B)	A negative pressure (vacuum) is not created.

**PROPORTIONING VALVE FUNCTION TEST**

M1351001100067

- Connect two pressure gauges, one each to the input side and output side of the proportioning valve, as shown.
- Air bleed the brake line and the pressure gauge.
- While gradually depressing the brake pedal, make the following measurements and check to be sure that the measured values are within the allowable range.



- (1) Output fluid pressure begins to drop relative to input fluid pressure (split point).

**Standard value: 2.7 – 3.2 MPa (391 – 462 psi)**

- (2) Check that the output fluid pressure is at standard value when the input fluid pressure indicates 9.8 MPa (1,422 psi).

**Standard value: 4.3 – 5.1 MPa (619 – 732 psi)**

- (3) Output fluid pressure difference between left and right brake lines.

**Limit: 0.4 MPa (57 psi)**

4. If the measured fluid pressures are not within allowable ranges, replace the proportioning valve.

## BLEEDING

M1351001400080

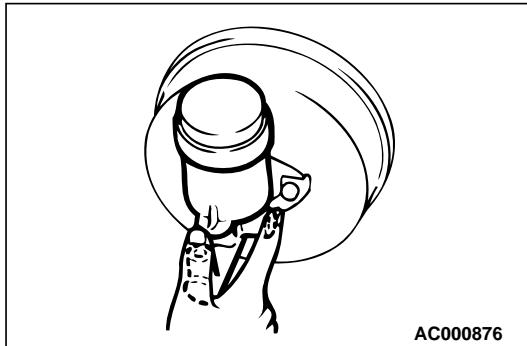
**CAUTION**

Use only brake fluid DOT 3 or DOT 4. Never mix the specified brake fluid with other fluid as it will influence the braking performance significantly.

**MASTER CYLINDER BLEEDING**

The master cylinder used has no check valve, so if bleeding is carried out by the following procedure, bleeding of air from the brake pipeline will become easier. (When brake fluid is not contained in the master cylinder.)

1. Fill the reserve tank with brake fluid.
2. Keep the brake pedal depressed.
3. Have another person cover the master cylinder outlet with a finger.
4. With the outlet still closed, release the brake pedal.
5. Repeat steps 2 – 4 three or four times to fill the inside of the master cylinder with brake fluid.

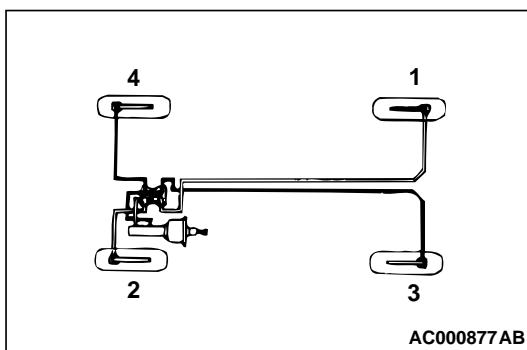


AC000876

**BRAKE LINE BLEEDING****CAUTION**

For vehicles equipped with ABS, be sure to filter/strain the brake fluid being added to the master cylinder reservoir tank. Debris may damage the hydraulic unit.

Start the engine and bleed the air in the sequence shown in the figure.

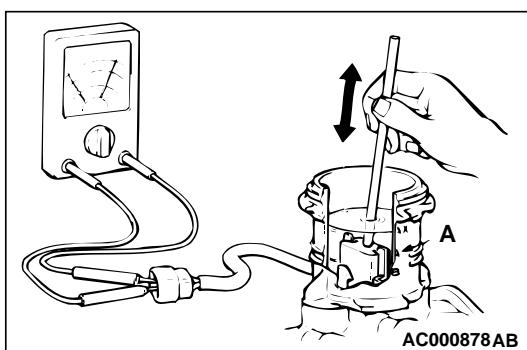


AC000877AB

**BRAKE FLUID LEVEL SENSOR CHECK**

M1351009100061

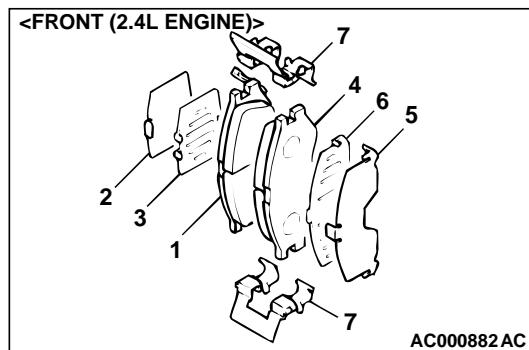
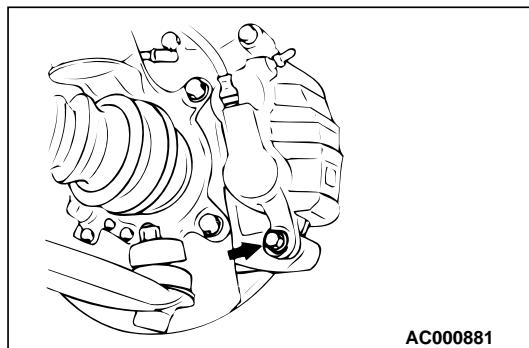
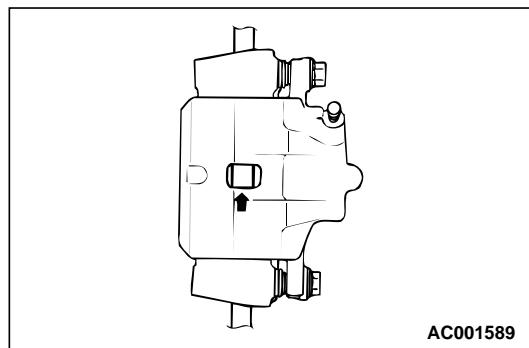
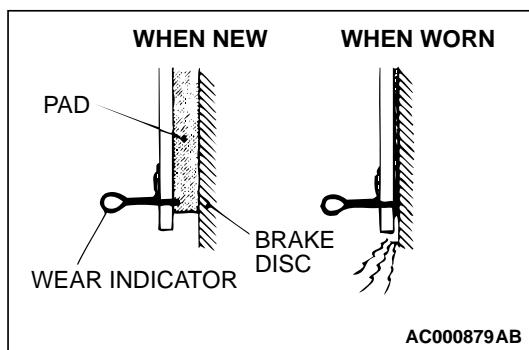
The brake fluid level sensor is in good condition if there is no continuity when the float surface is above "A" and if there is continuity when the float surface is below "A."



AC000878AB

## DISC BRAKE PAD CHECK AND REPLACEMENT

M1351002300053



**NOTE:** The brake pads have indicators that contact the brake disc when the brake pad thickness becomes 2 mm (0.08 inch), and emit a squealing sound to warn the driver.

**CAUTION**

- Whenever a pad must be replaced, replace both LH and RH wheel pads as a set to prevent the vehicle from pulling to one side when braking.
- If there is a significant difference in the thicknesses of the pads on the left and right sides, check the sliding condition of the piston, lock pin, and guide pin.

1. Check the brake pad thickness through the caliper body check port.

**Standard value: 10.0 mm (0.39 inch)**  
**Minimum limit: 2.0 mm (0.08 inch)**

**CAUTION**

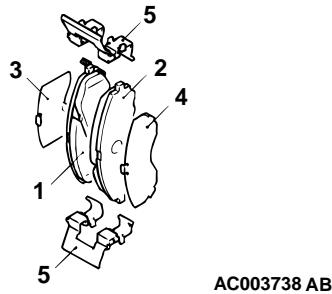
**Do not wipe the special grease from the guide pin. Do not contaminate the guide pin.**

2. Remove the guide pin. Lift the caliper assembly and secure it with a wire.

3. Remove the following parts from caliper support.  
<FRONT (2.4L ENGINE)>

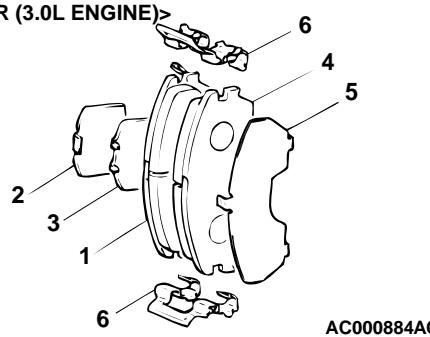
- (1) Pad and wear indicator assembly
- (2) Inner shim B
- (3) Inner shim A
- (4) Pad assembly
- (5) Outer shim B
- (6) Outer shim A
- (7) Clip

<FRONT (3.0L ENGINE)>



AC003738 AB

<REAR (3.0L ENGINE)>



AC000884AC

4. Remove the following parts from caliper support.

<FRONT (3.0L ENGINE)>

- (1) Pad and wear indicator assembly
- (2) Pad assembly
- (3) Inner shim
- (4) Outer shim
- (5) Pad clip

5. Remove the following parts from caliper support.

<REAR (3.0L ENGINE)>

- (1) Pad and wear indicator assembly
- (2) Inner shim B
- (3) Inner shim A
- (4) Pad assembly
- (5) Outer shim
- (6) Clip

6. Measure the hub torque before and after pad installation.

Follow the procedure:

Front: Refer to [P.35A-35](#).

Rear: Refer to [P.35A-42](#).

**CAUTION**

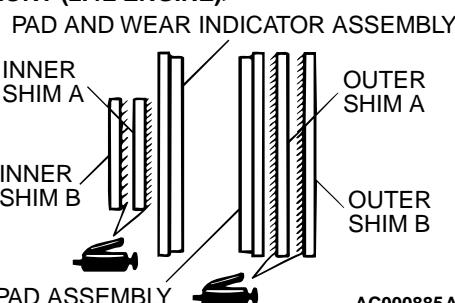
**Do not apply excessive grease. Excessive grease may cause brake performance to become poor.**

7. For front disc brake <2.4L ENGINE> and rear disc brake <3.0L ENGINE>, apply brake grease SAE J310, NLGI number 1 to the following positions before installing the pad.

<FRONT (2.4L ENGINE)>

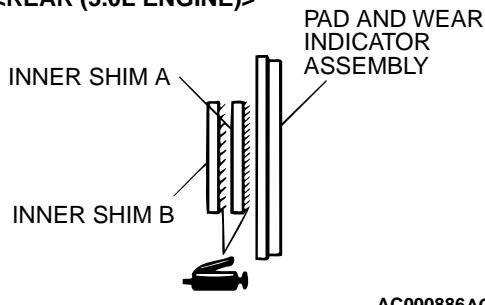
- Pad and wear indicator assembly and inner shim A contact surface
- Inner shim A and inner shim B contact surface
- Pad assembly and outer shim A contact surface
- Outer shim A and inner shim B contact surface

<FRONT (2.4L ENGINE)>



AC000885AC

<REAR (3.0L ENGINE)>



AC000886AC

<REAR (3.0L ENGINE)>

- Pad and wear indicator assembly and inner shim A contact surface
- Inner shim A and inner shim B contact surface

8. Install the pad and caliper assembly, and check the brake drag force.  
Front: Refer to [P.35A-35](#).  
Rear: Refer to [P.35A-42](#).

## DISC BRAKE ROTOR CHECK

M1351002900066

### **⚠ CAUTION**

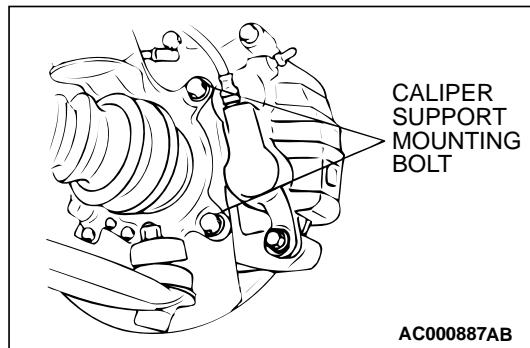
**Disc brakes must be kept within the allowable service values in order to maintain normal brake operation.**

Before turning the brake disc, the following conditions should be checked.

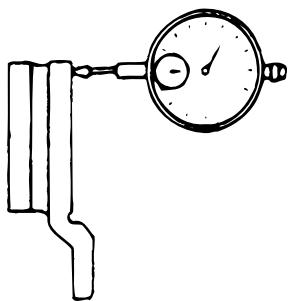
INSPECTION ITEMS	REMARKS
Scratches, rust, saturated lining materials and wear	<ul style="list-style-type: none"> <li>• If the vehicle is not driven for a long period of time, sections of the discs that are not in contact with the pads will become rusty, causing noise and shuddering.</li> <li>• If grooves and scratches resulting from excessive disc wear are not removed prior to installing a new pad assembly, there will be inadequate contact between the disc and the lining (pad) until the pads conform to the disc.</li> </ul>
Run-out	Excessive run-out of the discs will increase the pedal depression resistance due to piston kick-back.
Change in thickness (parallelism)	If the thickness of the disc changes, this will cause pedal pulsation, shuddering and surging.
Warping (flatness) or distortion	Overheating and improper handling while servicing will cause warping or distortion.

## FRONT DISC BRAKE RUN-OUT CHECK AND CORRECTION

M1351009400084



1. Remove the caliper support; then raise the caliper assembly upward and secure it with a wire.
2. Inspect the disc surface for grooves, cracks and rust. Clean the disc thoroughly and remove all rust.

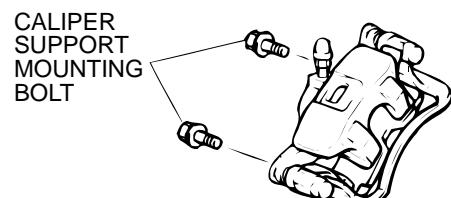


ACX00669AB

3. Place a dial gauge approximately 5 mm (0.2 inch) from the outer circumference of the brake disc, and measure the run-out of the disc.  
**Limit: 0.06 mm (0.002 inch)**
4. If the run-out of the brake disc is limit value or more, turn rotor with an on-car type brake lathe ("Accuturn-8750" or equivalent). If it still exceeds the limit, inspect hub end play.  
**Limit: 0.05 mm (0.002 inch)**
5. If the play exceeds the limit, check the hub. If the play does not exceed the limit, replace the brake disc.

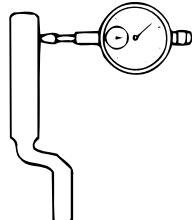
## REAR DISC BRAKE RUN-OUT CHECK AND CORRECTION

M1351009400103



AC000888 AB

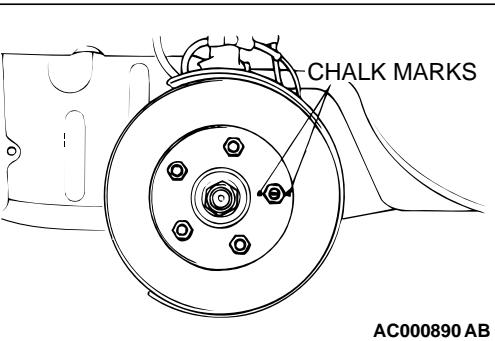
1. Remove the caliper support; then raise the caliper assembly upward and secure it with a wire.
2. Check the disc surface for grooves, cracks and rust. Clean the disc thoroughly and remove all rust.



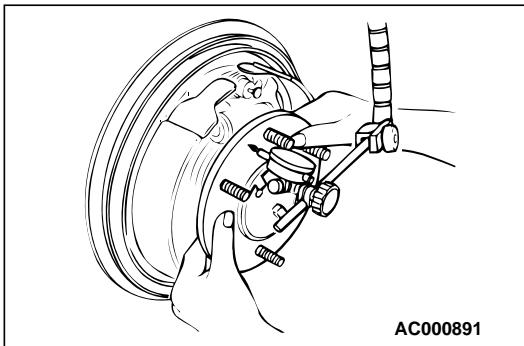
AC000889

3. Place a dial gauge approximately 5 mm (0.2 inch) from the outer circumference of the brake disc, and measure the run-out of the disc.  
**Limit: 0.08 mm (0.003 inch)**
4. If the run-out of the brake disc is the limit value or more, change the phase of the disc and hub, and then measure the run-out again.

(1) Before removing the brake disc, place a mating mark on both the wheel stud and disc with chalk where the run-out is greatest.

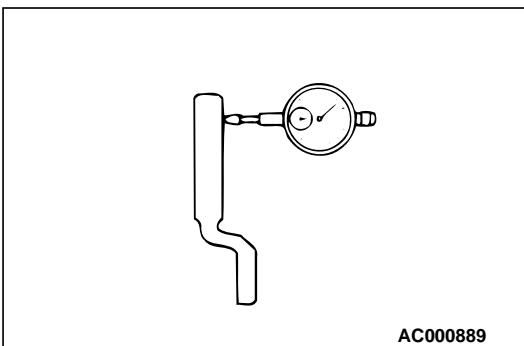


AC000890 AB



AC000891

(2) Place a dial gauge as shown in the illustration, and then move the hub in the axial direction and measure the play.  
**Limit: 0.05 mm (0.002 inch)**



AC000889

(3) If the play does not exceed the limit install the brake disc at a different phase, and then check the run-out of the brake disc again.  
 5. If the run-out cannot be corrected by changing the phase of the brake disc, replace the disc.

## BRAKE DISC THICKNESS CHECK

M1351002400050

### <Front>

1. Remove dirt and rust from the brake disc surface.
2. Using a micrometer, measure disc thickness at eight positions, approximately 45 degrees apart and 10 mm (0.4 inch) in from the outer edge of the disc.

#### 2.4L ENGINE

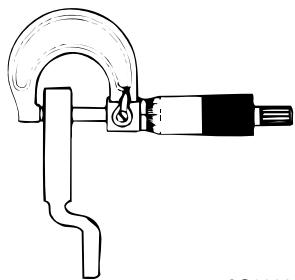
**Standard value: 24.0 mm (0.9 inch)**  
**Minimum limit: 22.4 mm (0.88 inch)**

#### 3.0L ENGINE

**Standard value: 26.0 mm (1.02 inch)**  
**Minimum limit: 24.4 mm (0.96 inch)**

*NOTE: Thickness variation (at least 8 positions) should not be more than 0.015 mm (0.0006 inch).*

3. If the disc thickness is less than the limits, replace it with a new one. If thickness variation exceeds the specification, turn rotor with an on-the-car type brake lathe ("Accuturn-8750" or equivalent).  
 If the calculated final thickness after turning the rotor is less than the standard value, replace the disc.



## &lt;Rear&gt;

1. Remove dirt and rust from the brake disc surface.
2. Measure the disc thickness at four positions or more.

**Standard value: 10.0 mm (0.4 inch)**  
**Minimum limit: 8.4 mm (0.33 inch)**

*NOTE: Thickness variation (at least 8 positions) should not be more than 0.015 mm (0.0006 inch).*

3. If the disc is less than 8.4 mm (0.33 inch) thick, replace it with a new one. If thickness variation exceeds the specification, turn rotor with an on-the-car brake lathe ("Accuturn-8750" or equivalent).

If the calculated final thickness is less than the standard value, replace the disc.

**BRAKE LINING THICKNESS CHECK**

M1351003000055

**⚠ CAUTION**

- Whenever the shoe and lining assembly is replaced, replace both RH and LH assemblies as a set to prevent the car from pulling to one side when braking.
- If there is a significant difference in the thickness of the shoe and lining assemblies on the left and right sides, check the sliding condition of the piston.

*NOTE: For brake lining thickness for drum-in-disc brake, refer to GROUP 36, Parking Brake Drum – Inspection [P.36-12](#).*

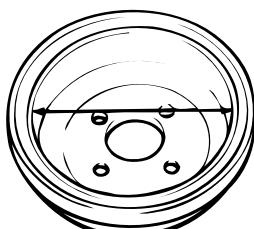
1. Remove the brake drum.
2. Measure the thickness of the brake lining at the area with the worst wear.

**Standard value: 4.9 mm (0.19 inch)**  
**Minimum limit: 1.0 mm (0.04 inch)**

3. Replace the shoe and lining assembly if the brake lining thickness is less than the limit or if it is not worn evenly. For installation procedures for the shoe and lining assembly, refer to [P.35A-49](#).

**BRAKE DRUM INSIDE DIAMETER CHECK**

M1351003200082



1. Remove the brake drum.

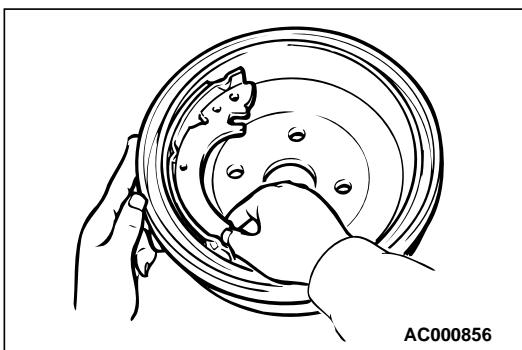
2. Measure the inside diameter of the brake drum at two or more locations.

**Standard value: 228.6 mm (9.00 inches)**  
**Limit: 230.6 mm (9.08 inches)**

3. Replace the brake drums, shoe and lining assembly when wear exceeds the limit value or is badly imbalanced.

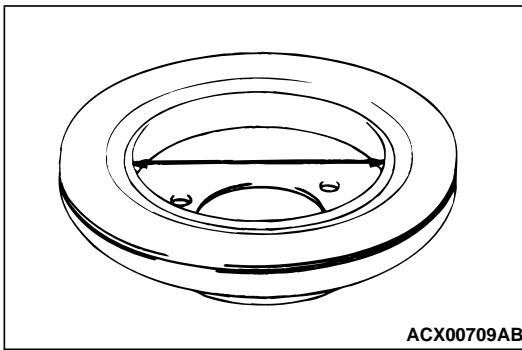
BRAKE LINING AND BRAKE DRUM CONTACT  
CHECK

M1351003100052



1. Remove the brake drum.
2. Remove the shoe and lining assembly. (Refer to P.35A-49.)
3. Chalk the inner surface of the brake drum and rub with the shoe and lining assembly.
4. Replace the shoe and lining assembly or brake drums if there are any irregular contact areas.

*NOTE: Clean off chalk after check.*



## BRAKE DISC INSIDE DIAMETER CHECK

M1351003200093

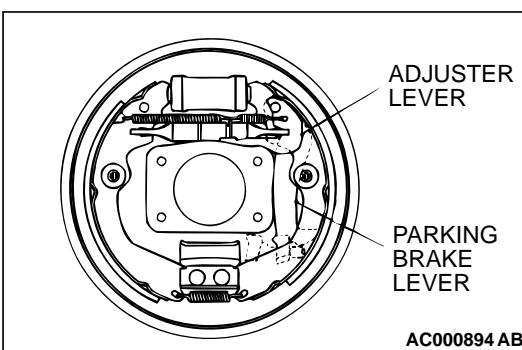
1. Remove the rear brake assembly, raise the rear brake assembly and secure it with a wire, etc.
2. Remove the brake disc.
3. Measure the inside diameter of the hub and disc at two or more locations.

**Standard value: 168.0 mm (6.61 inches)**  
**Limit: 169.0 mm (6.65 inches)**

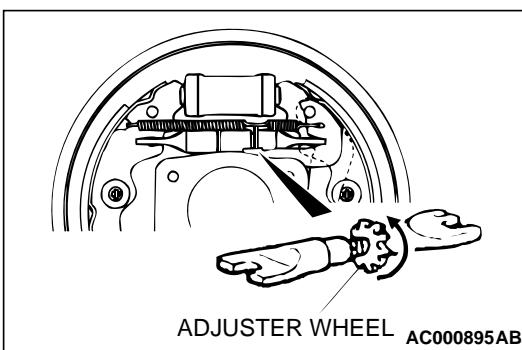
4. Replace the brake discs and shoe and lining assembly when the wear exceeds the limit value or if the measured areas are not equal to each other. (concentric).

## AUTO ADJUSTER FUNCTION CHECK

M1351010100054

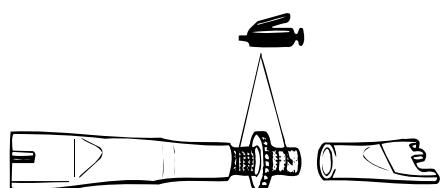


1. Remove the brake drum.
2. Operate the parking brake lever. Observe adjuster lever movement for ratcheting action of the auto adjuster. Repair or replace the lever(s) as required.
3. Remove the shoe-to-lever spring.
4. Remove the adjuster.



*NOTE: It may be necessary to rotate the adjuster wheel bottom to top to release tension.*

5. Inspect the adjuster wheel for wear, i.e., flat spots, worn teeth, etc. Replace if faulty.
6. Check both ends of the adjuster for smooth rotation. Replace if faulty.



AC000896

7. Apply brake grease SAE J310, NLGI number 1 as shown.
8. To install adjuster, assemble the adjuster so it is at its minimum length and insert between shoe and lining assemblies.
9. Install adjuster lever and shoe-to-lever spring.
10. Rotate the adjuster wheel top to bottom until the drum has a slight drag when the drum is installed.

## **MASTER CYLINDER FUNCTION CHECK**

M1351010200051

1. Remove the reservoir cap and diaphragm.
2. While watching the open reservoir from a distance of 50 cm (20 inches), have an assistant depress the brake pedal.  
If there was a stream of brake fluid rising from the reservoir, proceed to Step 3.  
If there was no stream of brake fluid rising from the reservoir, repair or replace the master cylinder.
3. While watching the open reservoir from a distance of 50 cm (20 inches), have the assistant release the brake pedal.  
If there was a small amount of air bubbles rising through the brake fluid, master cylinder function is normal.  
If there were no bubbles rising through the brake fluid, repair or replace the master cylinder.

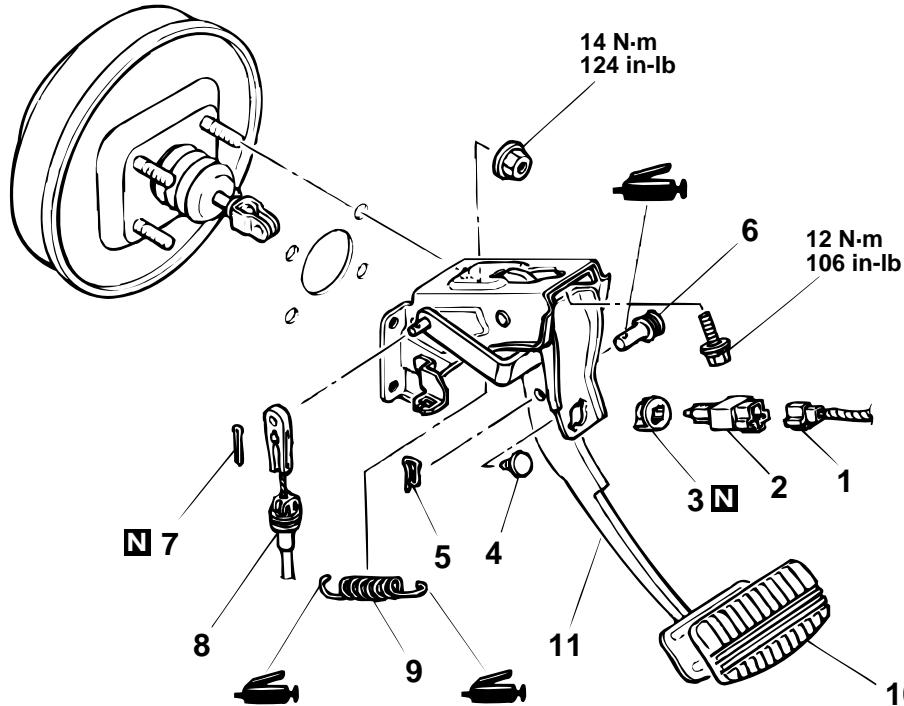
## BRAKE PEDAL

## REMOVAL AND INSTALLATION

M1351003400053

## Post-installation Operation

Brake Pedal Adjustment (Refer to P.35A-17.)



## REMOVAL STEPS

1. HARNESS CONNECTOR
2. STOPLIGHT SWITCH
3. ADJUSTER
4. PEDAL STOPPER
5. SNAP PIN
6. CLEVIS PIN
7. COTTER PIN <AT>

## REMOVAL STEPS (Continued)

8. SHIFT LOCK CABLE CONNECTION <AT>
9. RETURN SPRING
10. PEDAL PAD
11. BRAKE PEDAL AND PEDAL SUPPORT MEMBER ASSEMBLY

# MASTER CYLINDER ASSEMBLY AND BRAKE BOOSTER

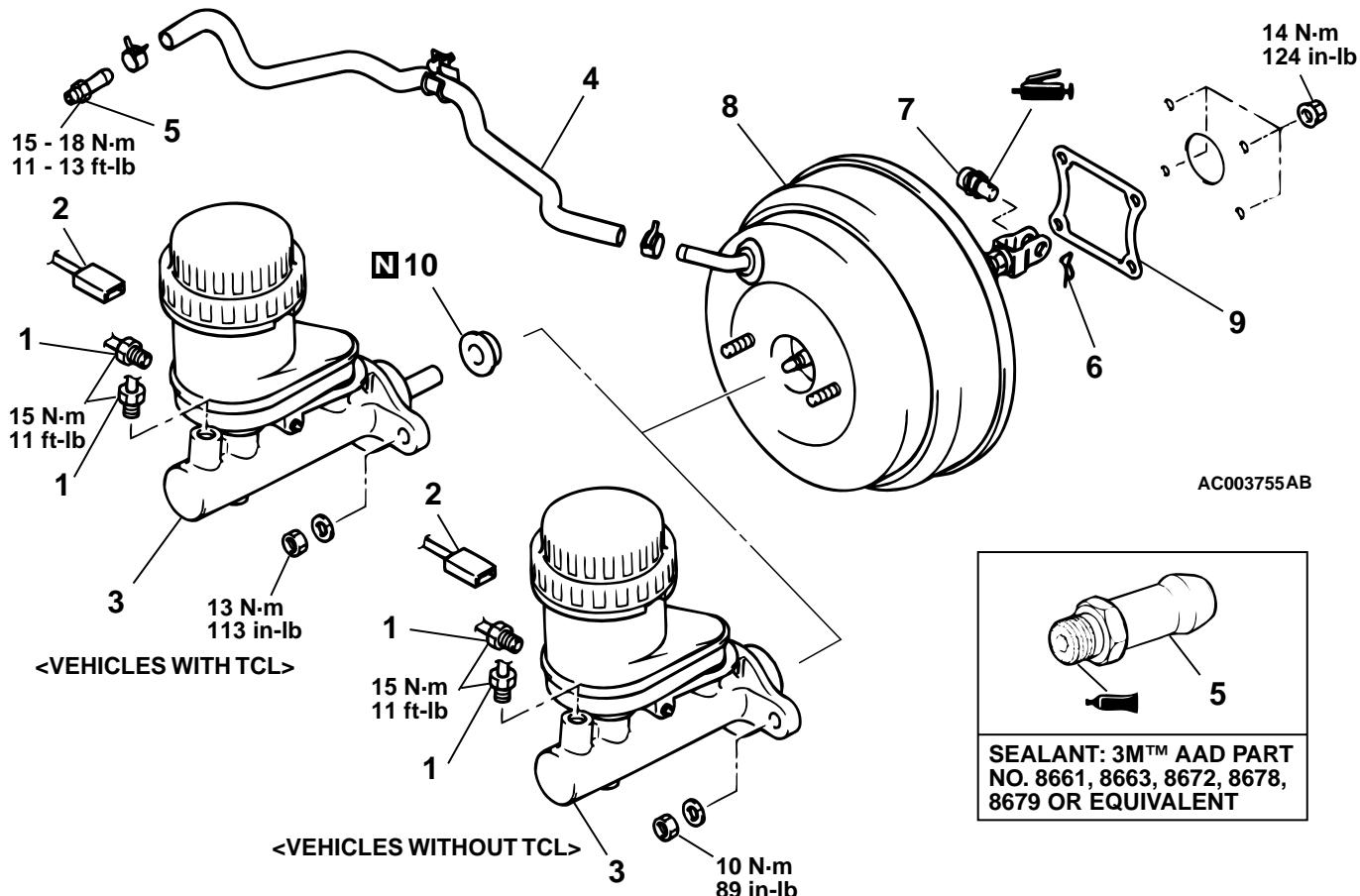
## REMOVAL AND INSTALLATION

M1351003700054

### CAUTION

Do not remove the check valve from the vacuum hose. If the check valve is defective, replace it together with the vacuum hose.

Pre-removal Operation	Post-installation Operation
Brake Fluid Draining	<ul style="list-style-type: none"> <li>Brake Fluid Supplying</li> <li>Brake Line Bleeding (Refer to P.35A-21.)</li> <li>Brake Pedal Adjustment (Refer to P.35A-17.)</li> </ul>



### REMOVAL STEPS

1. BRAKE TUBE CONNECTION
2. BRAKE FLUID LEVEL SENSOR CONNECTOR
3. MASTER CYLINDER ASSEMBLY
  - ADJUSTMENT OF CLEARANCE BETWEEN BRAKE BOOSTER PUSH-ROD AND PRIMARY PISTON
- >>B<< 4. VACUUM HOSE (WITH BUILT-IN CHECK VALVE)
- >>A<< 4. VACUUM HOSE (WITH BUILT-IN CHECK VALVE)

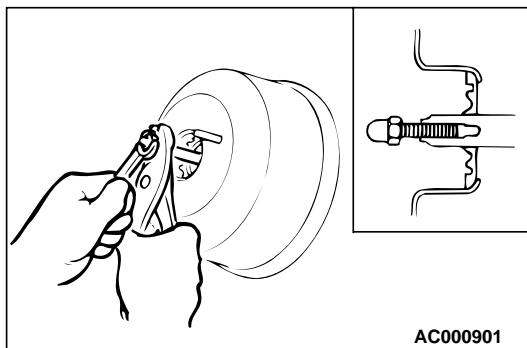
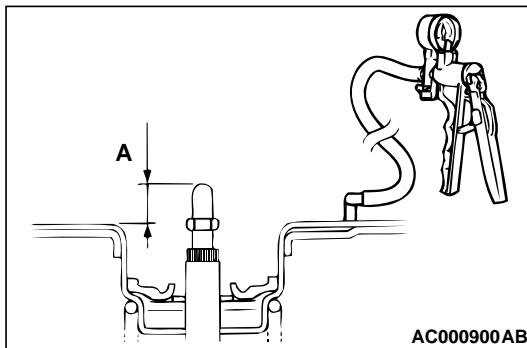
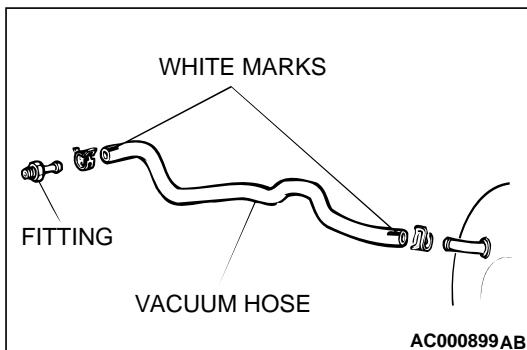
### REMOVAL STEPS (Continued)

5. FITTING
6. SNAP PIN
7. CLEVIS PIN
8. BRAKE BOOSTER
9. SEALER
10. PLATE AND SEAL ASSEMBLY <VEHICLES WITH TCL>

## INSTALLATION SERVICE POINTS

## &gt;&gt;A&lt;&lt; VACUUM HOSE CONNECTION

1. Install the vacuum hose with the white-marked sections facing up.
2. Insert securely and completely until the vacuum hose at the engine side contacts the edge of the hexagonal part of the fitting, and then secure with the hose clamp.



## &gt;&gt;B&lt;&lt; CLEARANCE ADJUSTMENT BETWEEN BRAKE BOOSTER PUSHROD AND PRIMARY PISTON

1. Using a hand vacuum pump, apply a negative pressure of - 66.7 kPa (19.6 inHg) to the brake booster.
2. Measure protruding length A at the pushrod.

**Standard value (A): 10.28 – 10.53 mm (0.404 – 0.415 inch)**

3. If the protruding length is not within the standard value range, adjust by changing the pushrod length by turning the end of the pushrod.

## MASTER CYLINDER

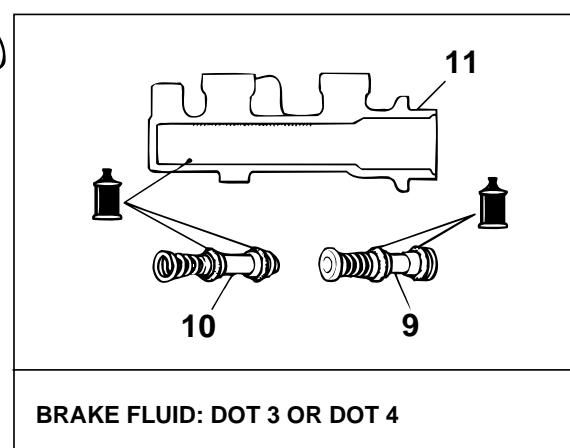
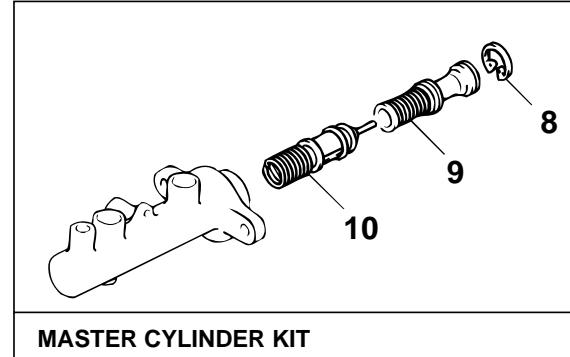
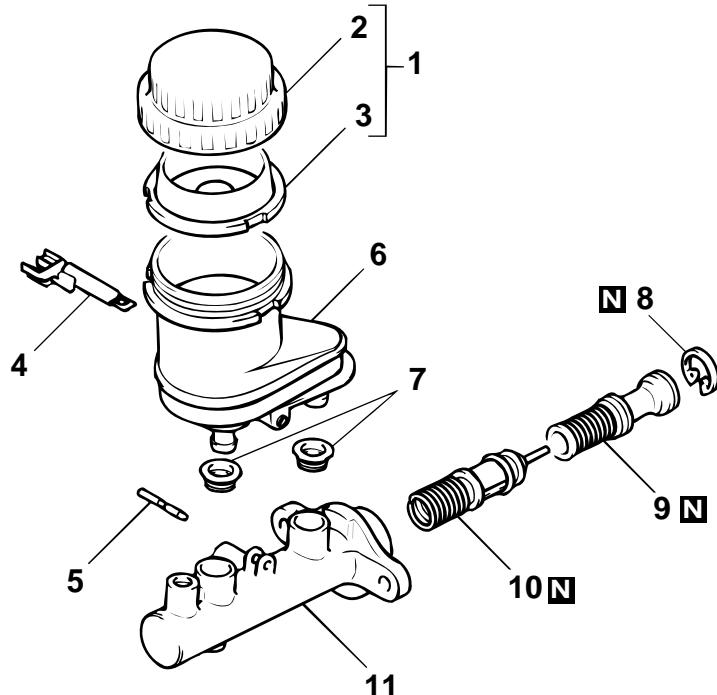
M1351004200052

### DISASSEMBLY AND ASSEMBLY

#### CAUTION

Do not disassemble the primary piston and secondary piston assembly.

<VEHICLES WITHOUT TCL>



AC000902AC

#### DISASSEMBLY STEPS

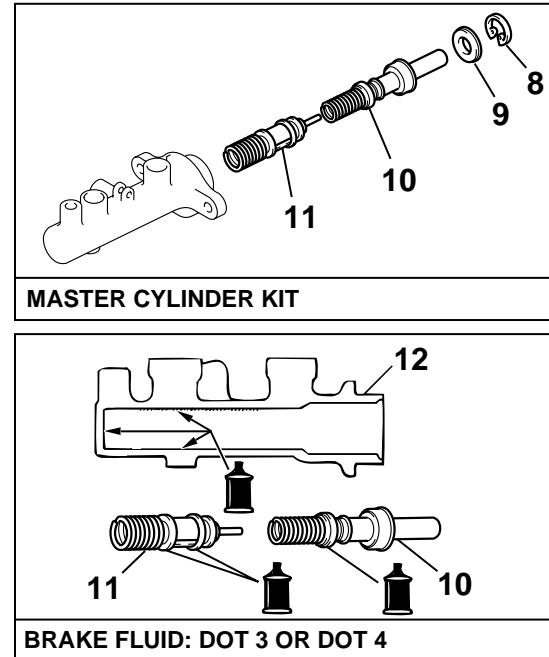
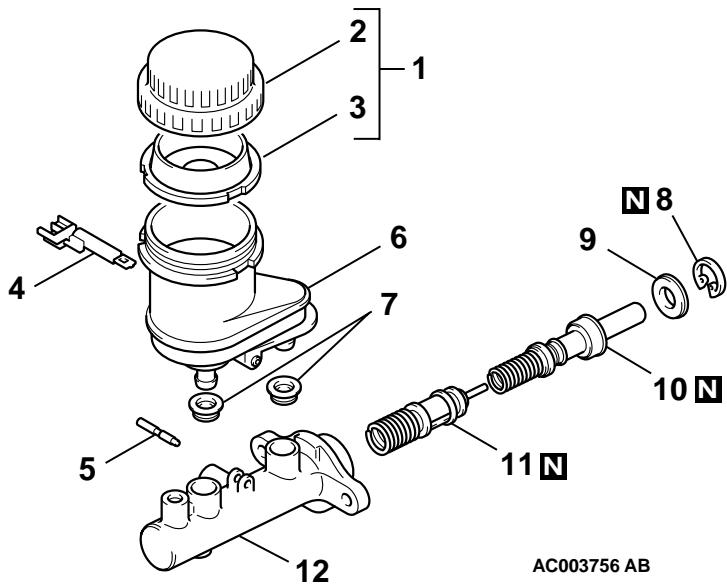
1. RESERVOIR CAP ASSEMBLY
2. RESERVOIR CAP
3. DIAPHRAGM
4. BRAKE FLUID LEVEL INDICATOR ASSEMBLY
5. SPRING PIN

<<A>>

#### DISASSEMBLY STEPS (Continued)

6. RESERVOIR TANK
7. RESERVOIR SEAL
8. PISTON STOPPER RING
9. PRIMARY PISTON ASSEMBLY
10. SECONDARY PISTON ASSEMBLY
11. MASTER CYLINDER BODY

&lt;VEHICLES WITH TCL&gt;

**DISASSEMBLY STEPS**

1. RESERVOIR CAP ASSEMBLY
2. RESERVOIR CAP
3. DIAPHRAGM
4. BRAKE FLUID LEVEL INDICATOR ASSEMBLY
5. SPRING PIN
6. RESERVOIR TANK

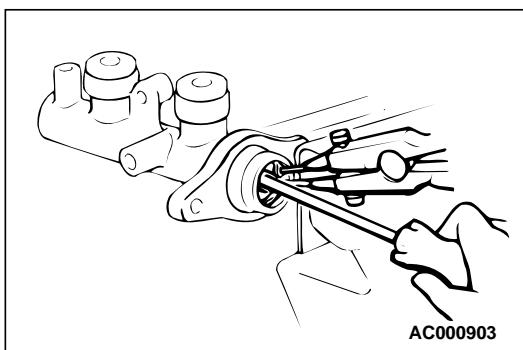
&lt;&lt;A&gt;&gt;

**DISASSEMBLY STEPS (Continued)**

7. RESERVOIR SEAL
8. PISTON STOPPER RING
9. PLATE
10. PRIMARY PISTON ASSEMBLY
11. SECONDARY PISTON ASSEMBLY
12. MASTER CYLINDER BODY

**DISASSEMBLY SERVICE POINT****<<A>> PISTON STOPPER RING DISASSEMBLY**

Remove the piston stopper ring while depressing the piston.



AC000903

**INSPECTION**

M1351004300059

- Check the inner surface of master cylinder body for rust or pitting.
- Check the primary and secondary pistons for rust, scoring, wear or damage.
- Check the diaphragm for cracks and wear.

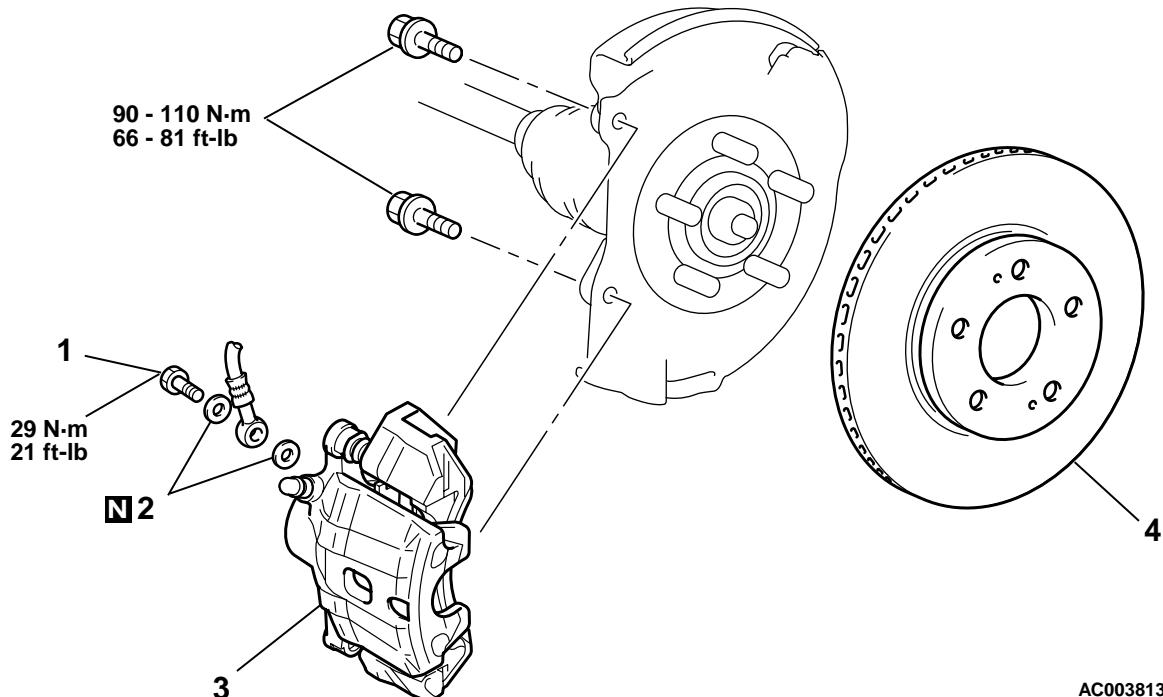
TSB Revision

## FRONT DISC BRAKE ASSEMBLY

## REMOVAL AND INSTALLATION

M1351006000054

<b>Pre-removal Operation</b> Brake Fluid Draining	<b>Post-installation Operation</b> Brake Line Bleeding (Refer to <a href="#">P.35A-21.</a> )
--	---



AC003813 AB

**REMOVAL STEPS**

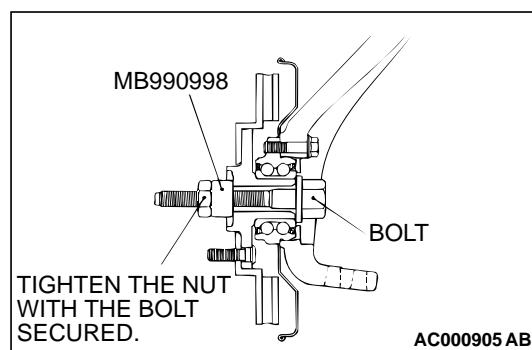
- 1. BRAKE HOSE CONNECTOR BOLT
- 2. GASKET
- >>A<< 3. FRONT BRAKE ASSEMBLY
- 4. BRAKE DISC

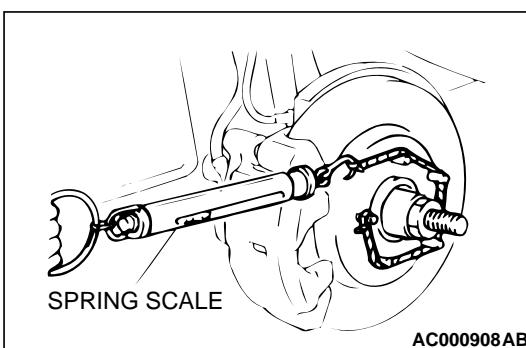
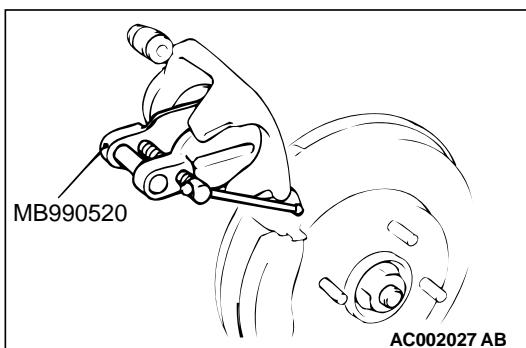
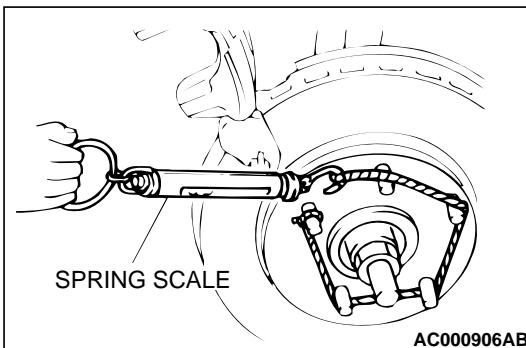
**Required Special Tool:**

- MB990520: Disc Brake Piston Expander
- MB990998: Front Hub Remover and Installer

**INSTALLATION SERVICE POINT****>>A<< FRONT BRAKE ASSEMBLY INSTALLATION**

1. In order to measure the brake drag torque, measure the hub torque with the pads removed by the following procedure.
  - (1) Remove the driveshaft. (Refer to GROUP 26, Driveshaft [P.26-11.](#))
  - (2) Attach special tool MB990998 to the front hub assembly as shown in the illustration, and tighten it to the specified torque.

**Tightening torque: 196 – 255 N·m (167 – 188 ft-lb)**



(3) Use a spring scale to measure the hub torque in the forward direction. Record hub torque with pads removed.

**CAUTION**

**Do not let any oil, grease or other contamination get onto the friction surfaces of the pads and brake discs.**

2. After re-installing the caliper support to the knuckle, install the pad clips and the pads to the caliper support.

3. Clean the piston and insert into cylinder with special tool MB990520.

4. Be careful that the piston boot does not become caught, when lowering the caliper assembly and installing the guide pin.

5. Check the brake drag force as follows.

- (1) Start the engine and hold the brake pedal down for 5 seconds. [Pedal depression force: approximately 196 N (44 pound)]
- (2) Stop the engine.
- (3) Turn the brake disc forward 10 times.
- (4) Use a spring scale to measure the hub torque with pads installed in the same direction as earlier.
- (5) Calculate the drag force of the disc brake [difference between hub torque with pads installed and hub torque with pads removed].

**Standard value: 69 N (16 pound) or less**

6. If the brake drag force exceeds the standard value, disassemble and clean the piston. Check for corrosion or worn piston seal, and check the sliding condition of the lock pin and guide pin.

## INSPECTION

### BRAKE DISC CHECK

M1351006100051

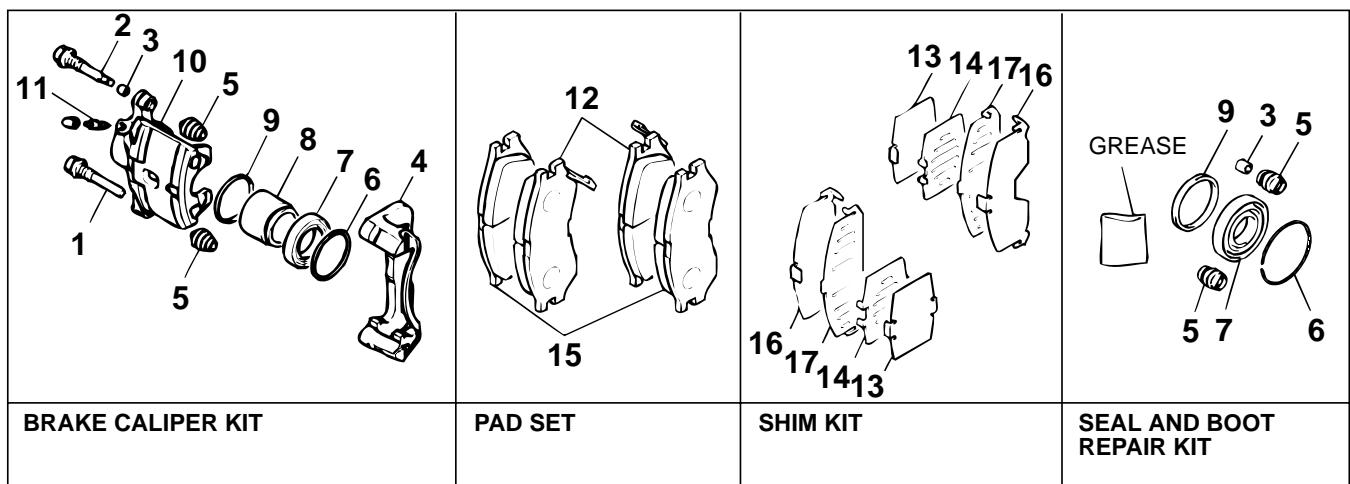
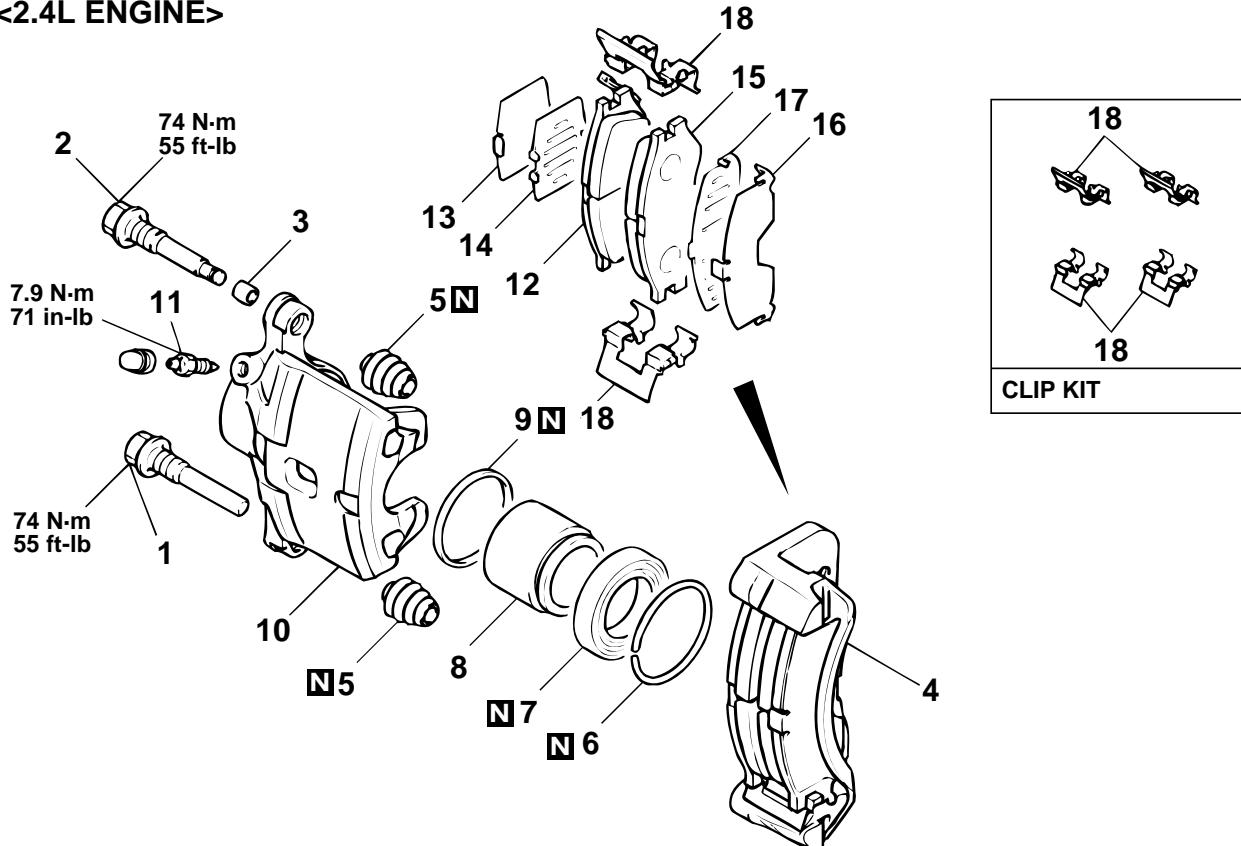
Disc wear (Refer to [P.35A-24.](#))

Disc run-out (Refer to [P.35A-24.](#))

## DISASSEMBLY AND ASSEMBLY

M1351006200069

## **<2.4L ENGINE>**



AC000910 AC

## CALIPER ASSEMBLY DISASSEMBLY STEPS

- >>A<< 1. GUIDE PIN
- >>A<< 2. LOCK PIN
- >>A<< 3. BUSHING
- >>A<< 4. CALIPER SUPPORT, PAD, CLIP AND SHIM ASSEMBLY
- >>A<< 5. PIN BOOT
- >>A<< 6. BOOT RING
- >>A<< 7. PISTON BOOT
- <<A>> 8. PISTON
- <<B>> 9. PISTON SEAL

## **CALIPER ASSEMBLY DISASSEMBLY STEPS (Continued)**

10. CALIPER BODY
11. BLEEDER SCREW

**PAD ASSEMBLY DISASSEMBLY STEPS**

1. GUIDE PIN
2. LOCK PIN
3. BUSHING
4. CALIPER SUPPORT, PAD, CLIP AND SHIM ASSEMBLY

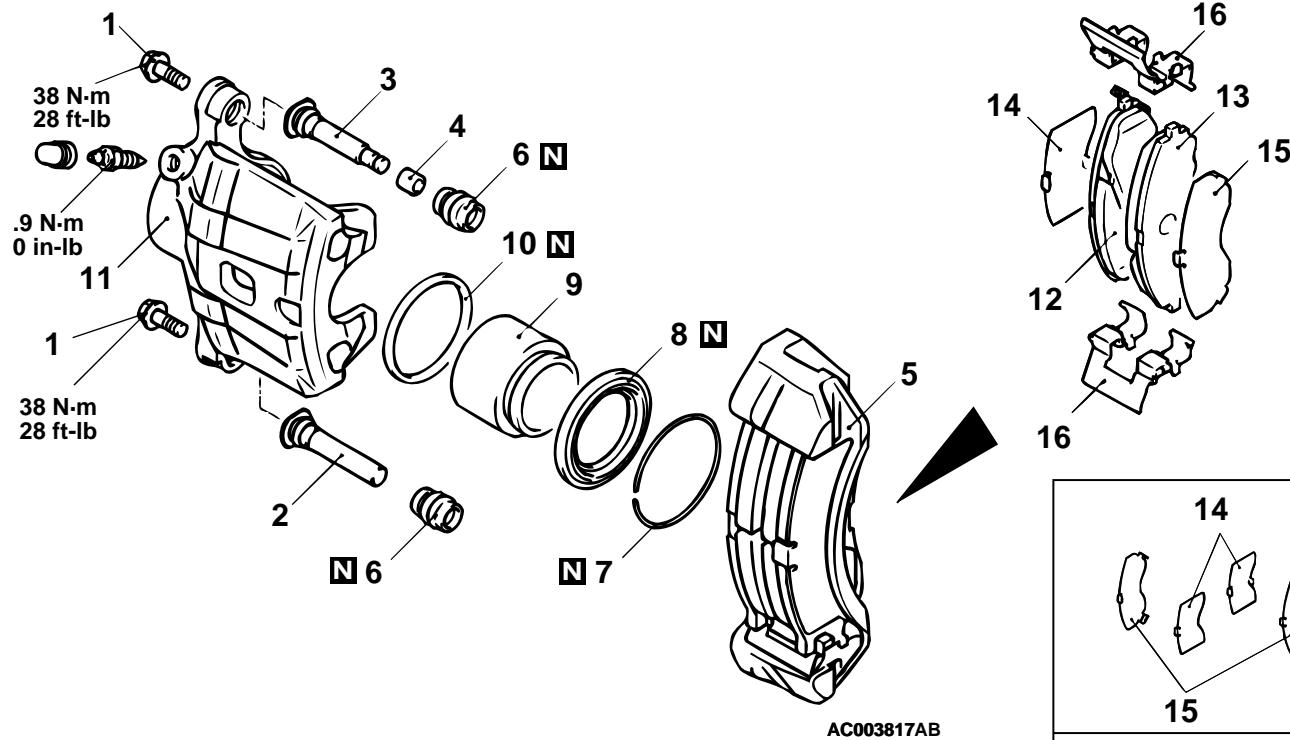
12. PAD AND WEAR INDICATOR ASSEMBLY

## TSB Revision

PAD ASSEMBLY DISASSEMBLY  
STEPS (Continued)

13. INNER SHIM B
14. INNER SHIM A
15. PAD ASSEMBLY
16. OUTER SHIM B
17. OUTER SHIM A
18. CLIP

## &lt;3.0L ENGINE&gt;



BRAKE CALIPER KIT	PAD SET	CLIP SET	SEAL AND BOOT REPAIR KIT

CALIPER ASSEMBLY DISASSEM-  
BLY STEPS

- >>B<< 1. PIN BOLT
- >>B<< 2. GUIDE PIN
- >>B<< 3. LOCK PIN
- >>B<< 4. BUSHING
- 5. CALIPER SUPPORT, PAD, CLIP  
AND SHIM ASSEMBLY
- 6. PIN BOOT

CALIPER ASSEMBLY DISASSEM-  
BLY STEPS (Continued)

- <<A>> 7. BOOT RING
- <<A>> 8. PISTON BOOT
- <<B>> 9. PISTON
- 10. PISTON SEAL
- 11. CALIPER BODY

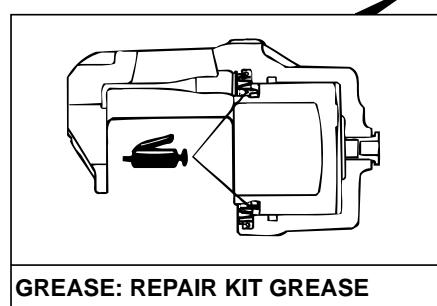
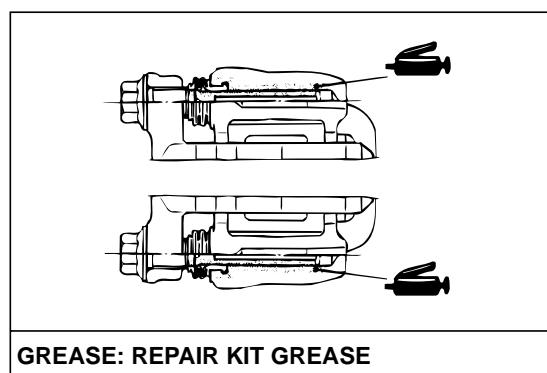
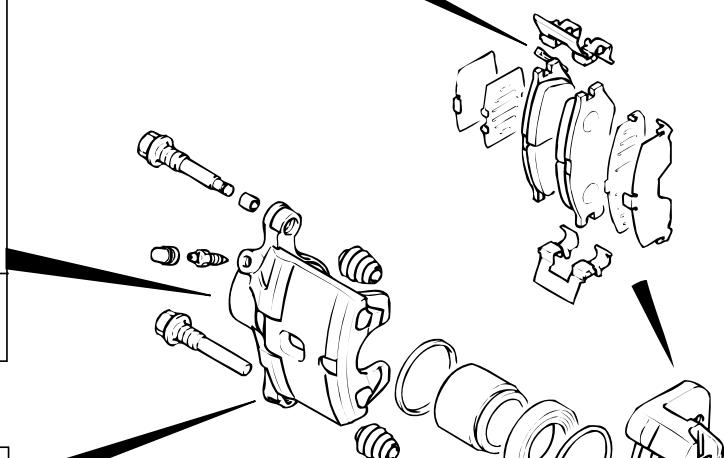
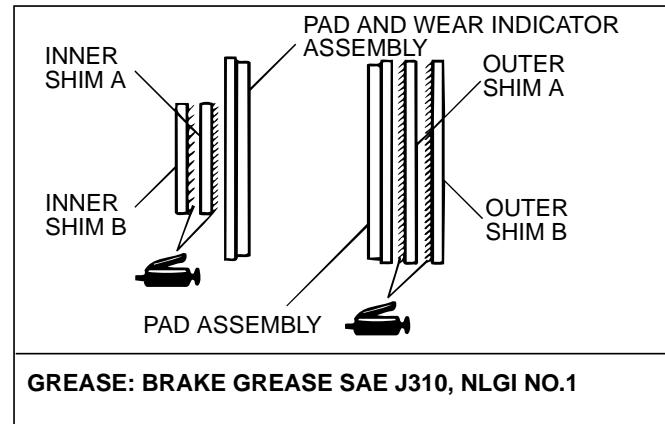
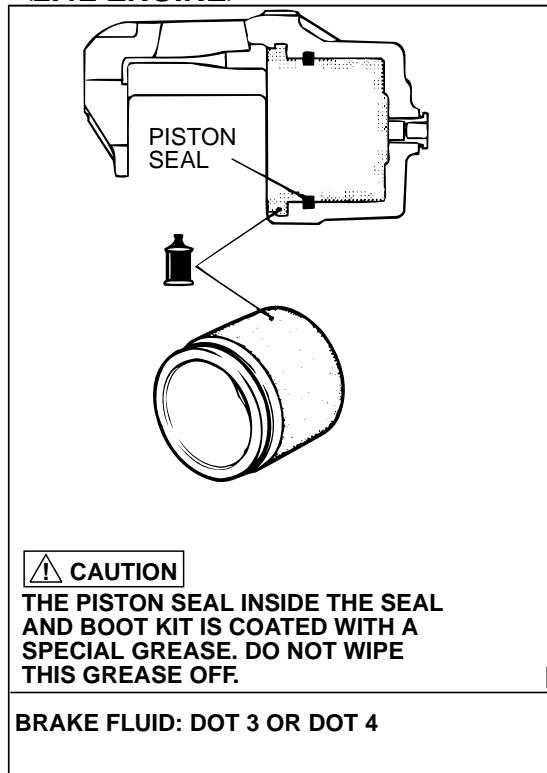
**PAD ASSEMBLY DISASSEMBLY**

**STEPS**

1. PIN BOLT
- >>B<< 2. GUIDE PIN
- >>B<< 3. LOCK PIN
- >>B<< 4. BUSHING
5. CALIPER SUPPORT, PAD, CLIP AND SHIM ASSEMBLY
12. PAD AND WEAR INDICATOR ASSEMBLY
13. PAD ASSEMBLY
14. INNER SHIM
15. OUTER SHIM
16. PAD CLIP

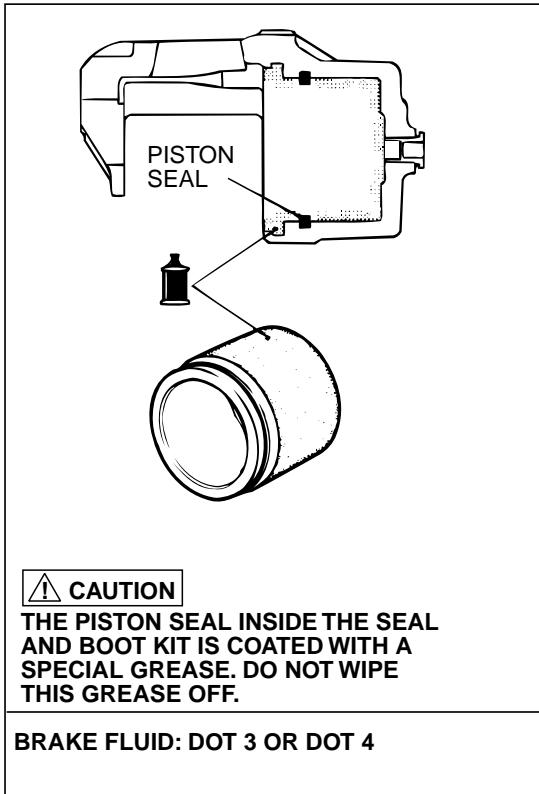
**LUBRICATION POINTS**

**<2.4L ENGINE>**



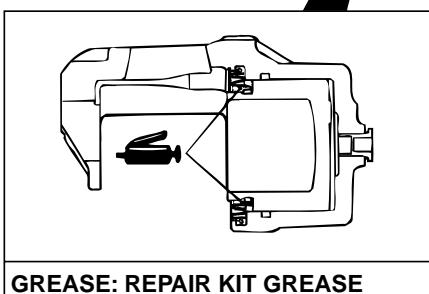
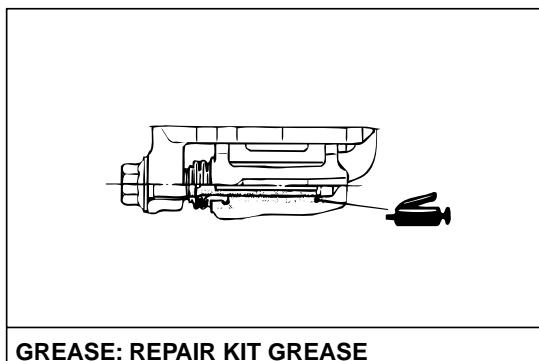
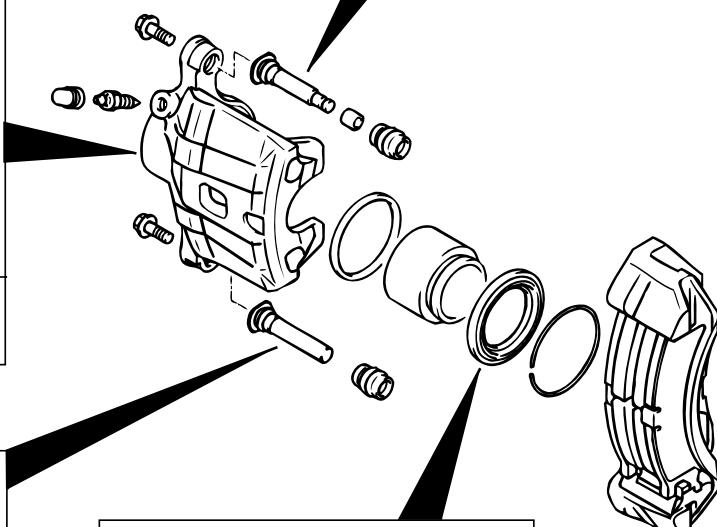
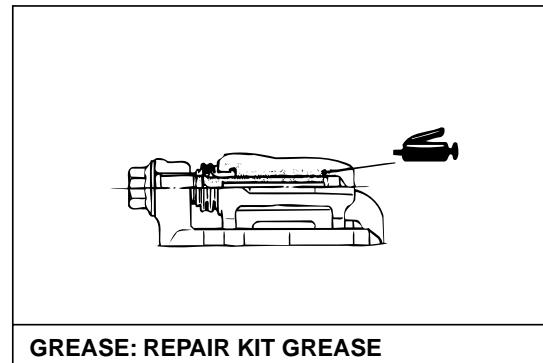
AC000911AC

&lt;3.0L ENGINE&gt;

**CAUTION**

THE PISTON SEAL INSIDE THE SEAL AND BOOT KIT IS COATED WITH A SPECIAL GREASE. DO NOT WIPE THIS GREASE OFF.

BRAKE FLUID: DOT 3 OR DOT 4



AC003819 AB

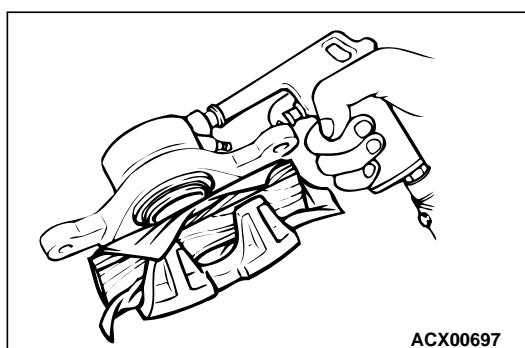
**DISASSEMBLY SERVICE POINTS**

When disassembling the disc brakes, disassemble both sides (left and right) as a set.

**<<A>> PISTON BOOT/PISTON REMOVAL****CAUTION**

Blow air little by little to remove the piston. The piston will rush out if a force of air is applied suddenly.

Place a piece of wood, etc. against the caliper body as shown. Blow compressed air through the brake hose to remove the piston boot and piston.



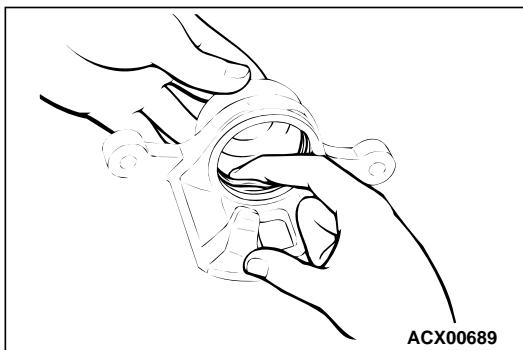
ACX00697

## &lt;&lt;B&gt;&gt; PISTON SEAL REMOVAL

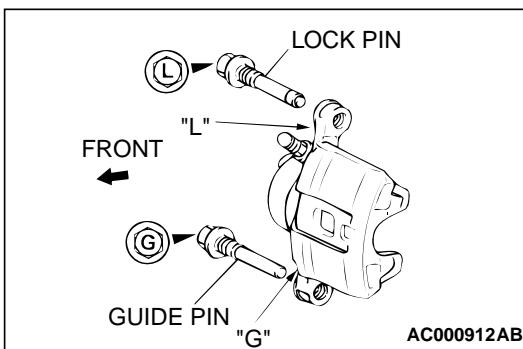
**CAUTION**

Do not use a flat-tipped screwdriver or similar tool to remove piston seal. These may damage the inner side of the cylinder.

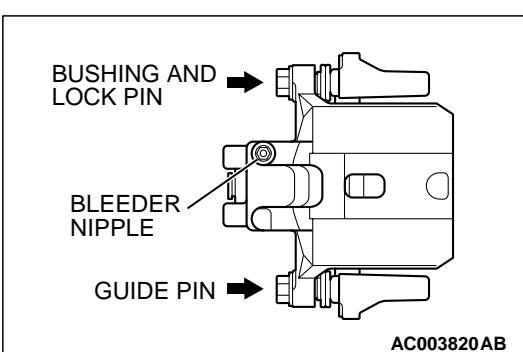
1. Remove the piston seal with your finger tip.
2. Clean the piston surface and inner cylinder with alcohol or brake fluid DOT 3 or DOT 4.

**ASSEMBLY SERVICE POINTS****>>A<< LOCK PIN/GUIDE PIN INSTALLATION <2.4L ENGINE>**

Install the guide pin as illustrated that each head mark of the guide pin and the lock pin matches the indication mark ("G" or "L") located on the caliper body.

**>>B<< BUSHING/LOCK PIN/GUIDE PIN INSTALLATION <3.0L ENGINE>**

Install the bushing and lock pin to the bleeder nipple side at the caliper body, the guide pin to its opposite side, respectively.

**INSPECTION**

M1351006300066

- Check the cylinder for wear, damage or rust.
- Check the piston surface for wear, damage or rust.
- Check the caliper body or sleeve for wear.
- Check the pad for damage or adhesion of grease, check the backing metal for damage.

## PAD WEAR CHECK

**WARNING**

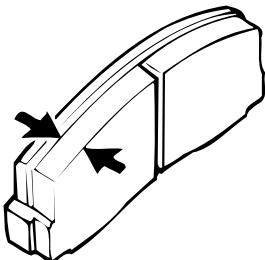
- Always replace both brake pads on each wheel as a set (both front wheels or both rear wheels). Failure to do so will result in uneven braking, which may cause unreliable brake operation.
- If there is significant difference in the thickness of the pads on the left and right sides, check the sliding condition of the piston, lock pin and guide pin.

Measure thickness at the thinnest and most worn area of the pad.

Replace the pad assembly if pad thickness is less than the limit value.

Standard value: 10 mm (0.39 inch)

Minimum limit: 2.0 mm (0.08 inch)



ACX00690

## REAR DISC BRAKE ASSEMBLY

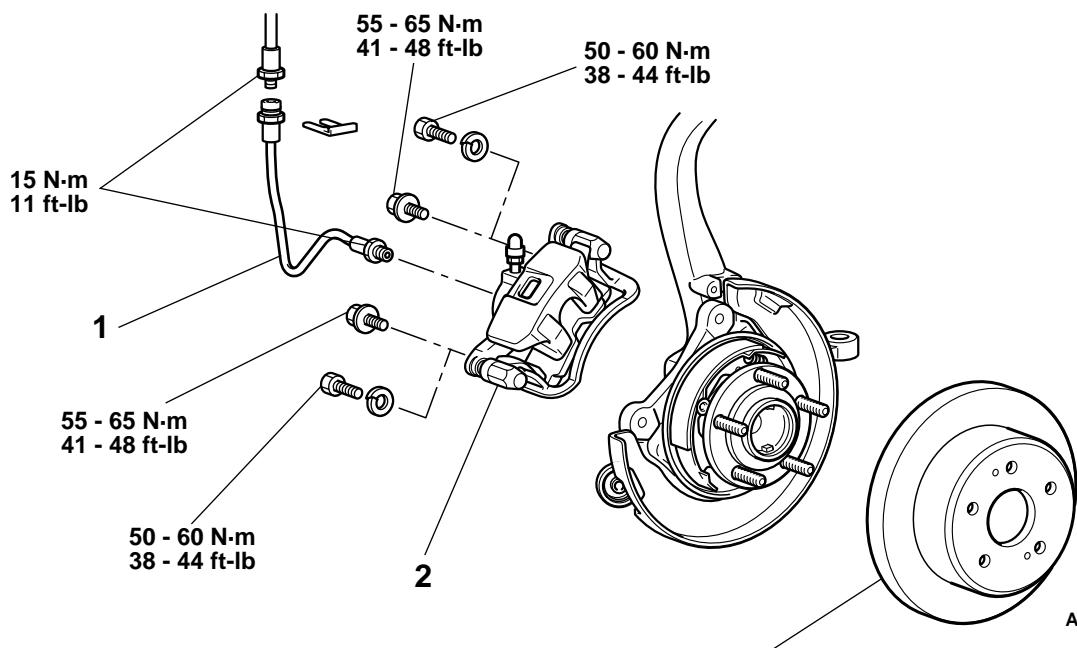
## REMOVAL AND INSTALLATION

M1351007000046

Pre-removal Operation  
Brake Fluid Draining

## Post-installation Operation

- Brake Fluid Supplying
- Brake Line Bleeding (Refer to P.35A-21.)



## REMOVAL STEPS

>>A<<

1. BRAKE HOSE
2. REAR BRAKE ASSEMBLY
3. BRAKE DISC

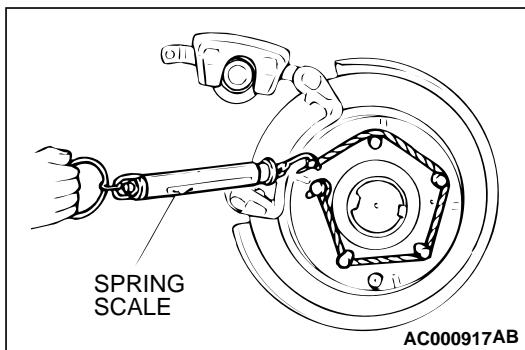
## Required Special Tool:

- MB990520: Disc Brake Piston Expander

**INSTALLATION SERVICE POINT**

**>>A<< REAR BRAKE ASSEMBLY INSTALLATION**

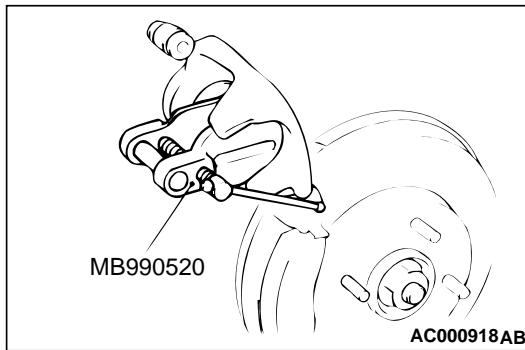
1. In order to measure brake drag torque after pad installation, measure hub torque with the pads removed.
2. Use a spring scale to measure hub torque in the direction shown. Record the value.



**⚠ CAUTION**

**Do not let any oil, grease or other contamination get onto the friction surfaces of the pads and brake discs.**

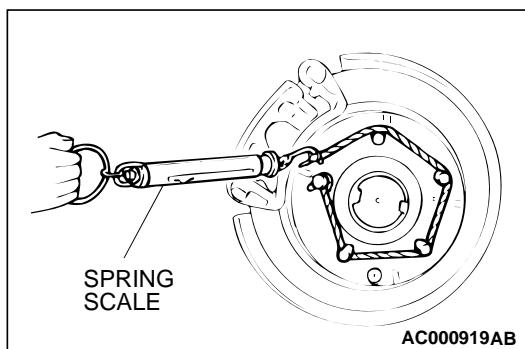
3. After re-installing the caliper support, install the pad clips and pads to the caliper support.
4. Clean the piston and insert it into the cylinder with special tool MB990520.



5. Be careful that the piston boot does not become caught, when lowering the caliper assembly and installing the guide pin.
6. Check brake drag force as follows:
  - (1) Start the engine and hold the brake pedal down for five seconds. [Pedal depression force: approximately 196 N (44 pound)]
  - (2) Stop the engine.
  - (3) Turn the brake disc forward ten times.
  - (4) Use a spring scale to measure the hub torque with pads installed in the same direction as earlier.
  - (5) Calculate the drag force of the disc brake [difference between hub torque with pads installed and hub torque with pads removed].

**Standard value: 69 N (16 pound) or less**

7. If the drag torque exceeds the standard value, disassemble and clean the piston. Check for corrosion or worn piston seal, and check the sliding condition of the lock pin and guide pin.



## INSPECTION

M1351007100054

## BRAKE DISC CHECK

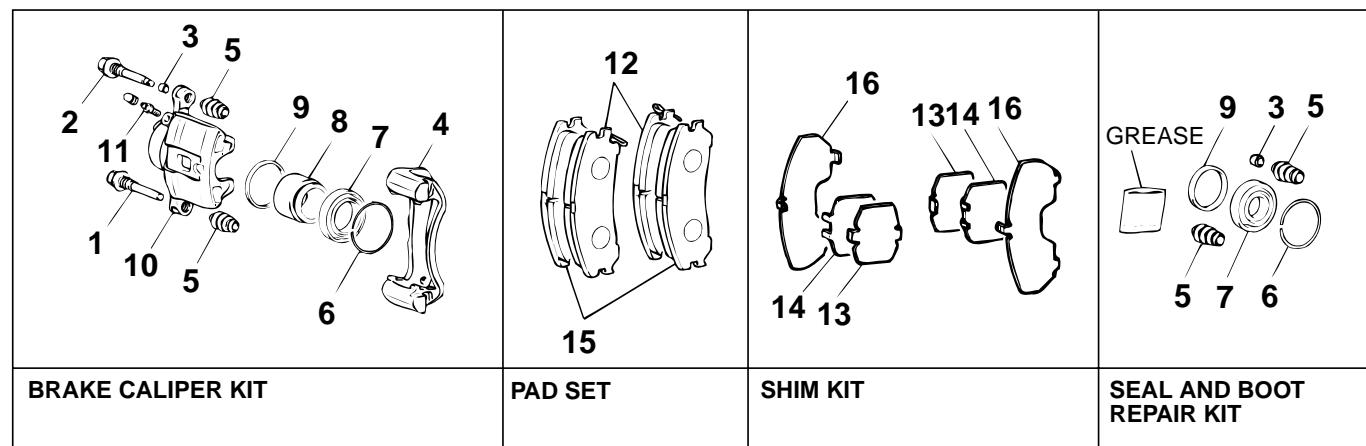
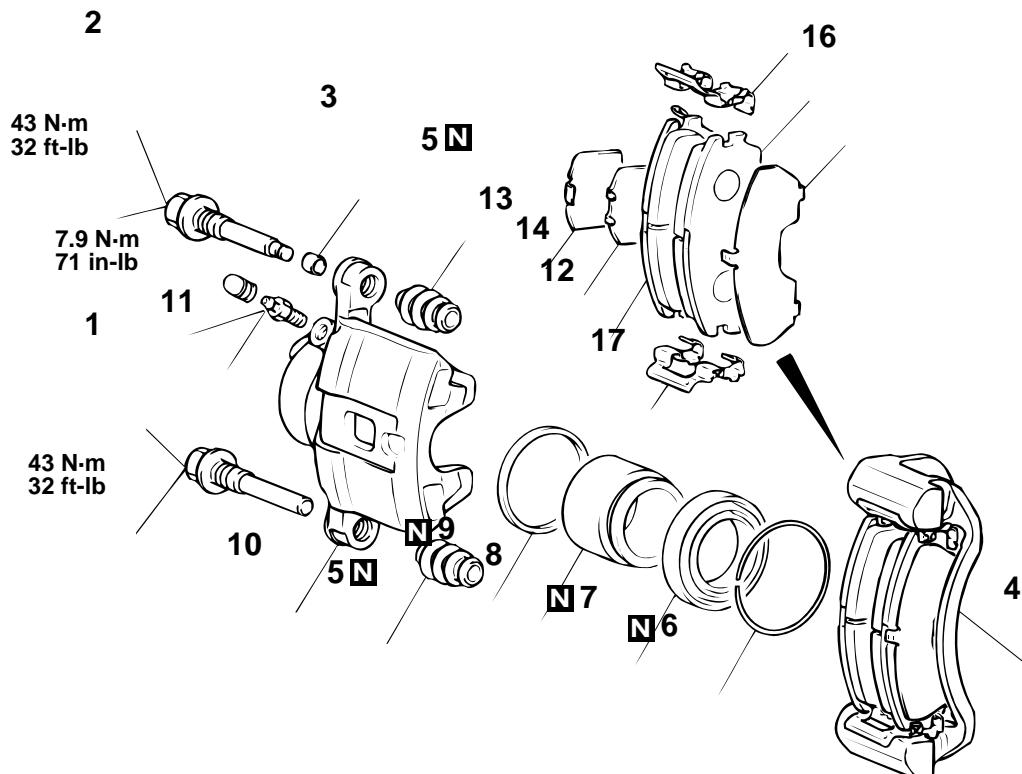
Disc wear (Refer to P.35A-24.)

Disc run-out (Refer to P.35A-25.)

Disc inside diameter (Refer to P.35A-28.)

## DISASSEMBLY AND ASSEMBLY

M1351007200040



AC000920 AD

## CALIPER ASSEMBLY DISASSEMBLY STEPS

- >>A<< 1. GUIDE PIN
- >>A<< 2. LOCK PIN
- 3. BUSHING
- 4. CALIPER SUPPORT, PAD, CLIP AND SHIM ASSEMBLY
- 5. BOOT
- 6. BOOT RING
- 7. PISTON BOOT

## CALIPER ASSEMBLY DISASSEMBLY STEPS (Continued)

- <<A>> 8. PISTON
- <<B>> 9. PISTON SEAL
- 10. CALIPER BODY
- 11. BLEEDER SCREW

**PAD ASSEMBLY DISASSEMBLY STEPS**

- >>A<< 1. GUIDE PIN
- >>A<< 2. LOCK PIN

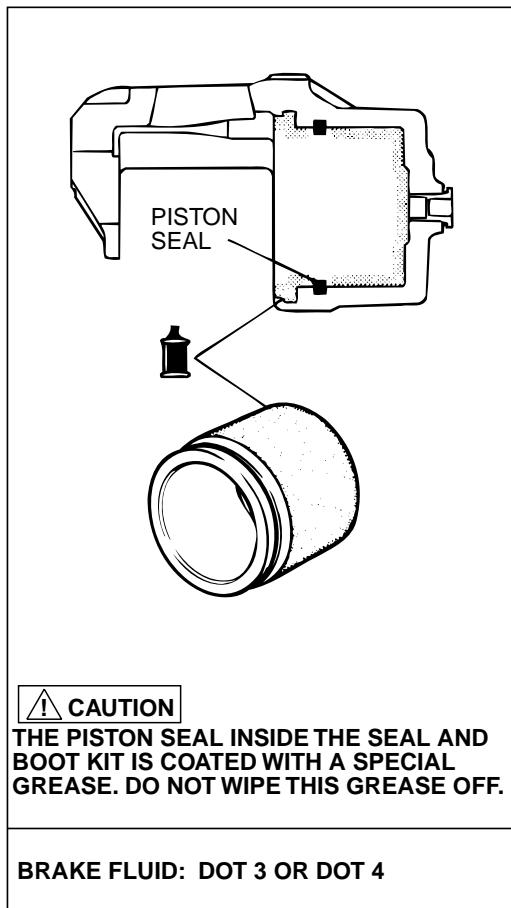
&lt;&lt;A&gt;&gt;

**PAD ASSEMBLY DISASSEMBLY**

**STEPS (Continued)**

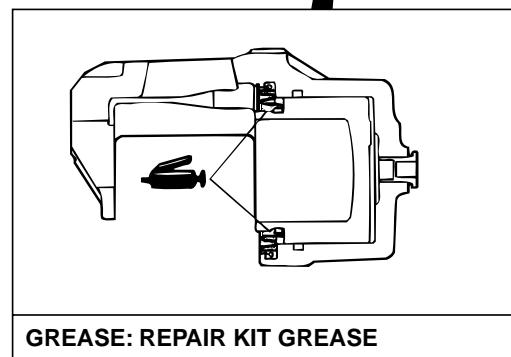
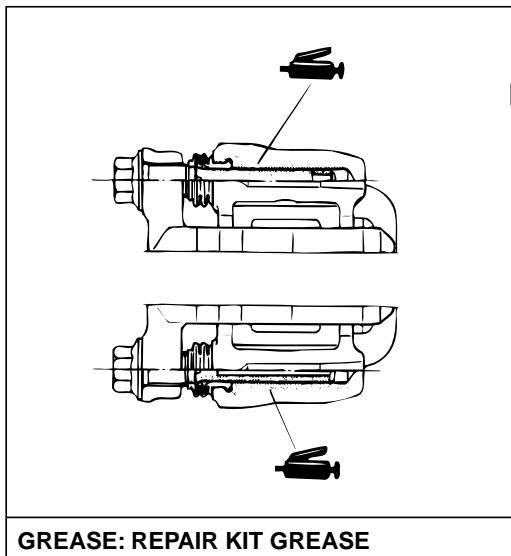
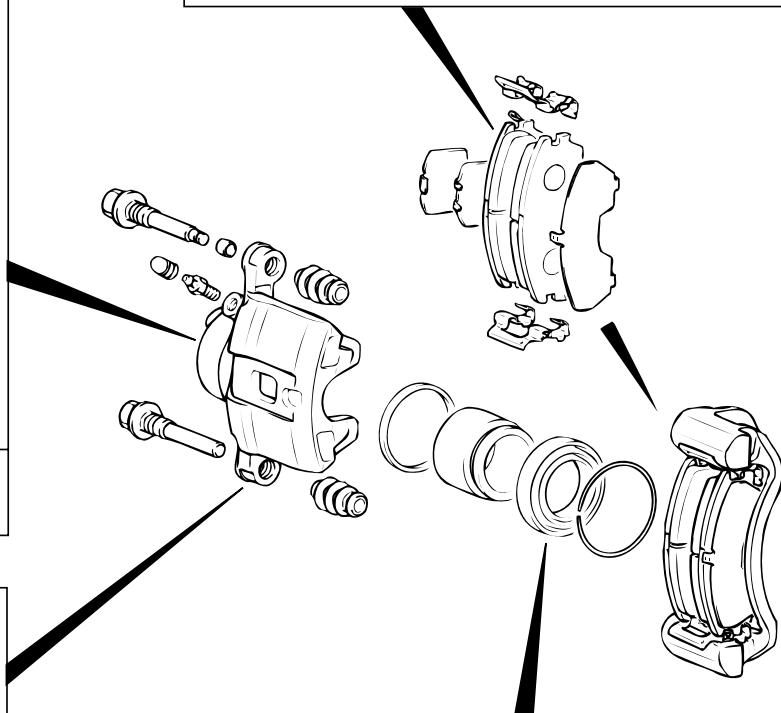
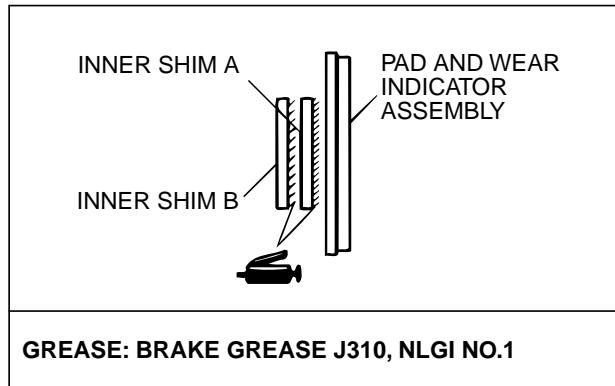
3. BUSHING
4. CALIPER SUPPORT, PAD, CLIP  
AND SHIM ASSEMBLY
12. PAD AND WEAR INDICATOR  
ASSEMBLY
13. INNER SHIM B
14. INNER SHIM A
15. PAD ASSEMBLY
16. OUTER SHIM
17. CLIP

## LUBRICATION POINTS

**CAUTION**

THE PISTON SEAL INSIDE THE SEAL AND BOOT KIT IS COATED WITH A SPECIAL GREASE. DO NOT WIPE THIS GREASE OFF.

BRAKE FLUID: DOT 3 OR DOT 4



AC000921 AC

## DISASSEMBLY SERVICE POINTS

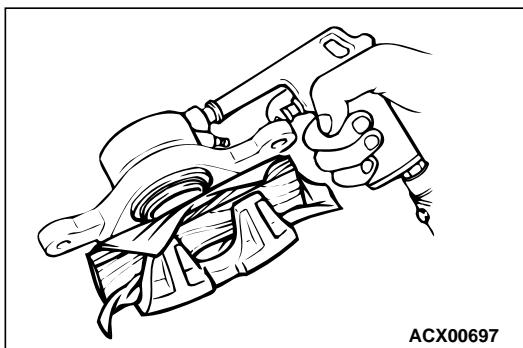
When disassembling the disc brakes, disassemble both sides (left and right) as a set.

## &lt;&lt;A&gt;&gt; PISTON BOOT/PISTON REMOVAL

**CAUTION**

Blow air little by little to remove the piston. The piston will rush out if a force of air is applied suddenly.

Place a piece of wood, etc. against the caliper body as shown. Blow compressed air through the brake hose connection hole to remove the piston boot and piston.

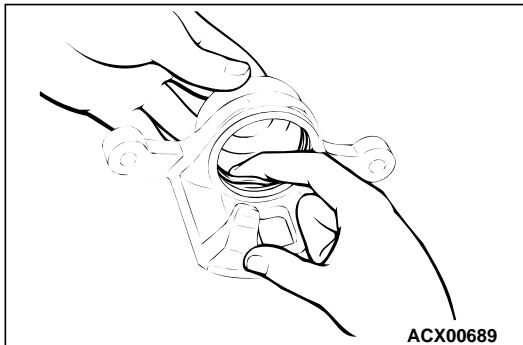


## &lt;&lt;B&gt;&gt; PISTON SEAL REMOVAL

**CAUTION**

Do not use a flat-tipped screwdriver or similar tool to remove piston seal. These may damage the inner side of the cylinder.

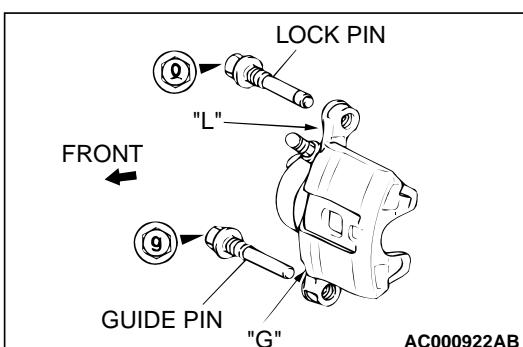
1. Remove the piston seal with your finger tip.
2. Clean piston surface and inner cylinder with alcohol, or brake fluid DOT 3 or DOT 4.



## ASSEMBLY SERVICE POINT

## &gt;&gt;A&lt;&lt; LOCK PIN/GUIDE PIN INSTALLATION

Install the guide pin as illustrated that each head mark of the guide pin and the lock pin matches the indication mark ("G" or "L") located on the caliper body.



## INSPECTION

M1351007300047

- Check the cylinder for wear, damage or rust.
- Check the piston surface for wear, damage or rust.
- Check the caliper body or sleeve for wear.
- Check the pad for damage or adhesion of grease, check the backing metal for damage.

## PAD WEAR CHECK

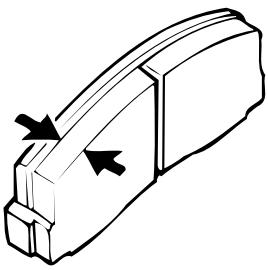
**⚠ WARNING**

- **Always replace both brake pads on each wheel as a set (both front wheels or both rear wheels). Failure to do so will result in uneven braking, which may cause unreliable brake operation.**
- **If there is significant difference in the thickness of the pads on the left and right sides, check the sliding condition of the piston, lock pin and guide pin.**

Measure thickness at the thinnest and most worn area of the pad. Replace the pad assembly if pad thickness is less than the limit value.

**Standard value: 10 mm (0.39 inch)**

**Minimum limit: 2.0 mm (0.08 inch)**



ACX00690AB

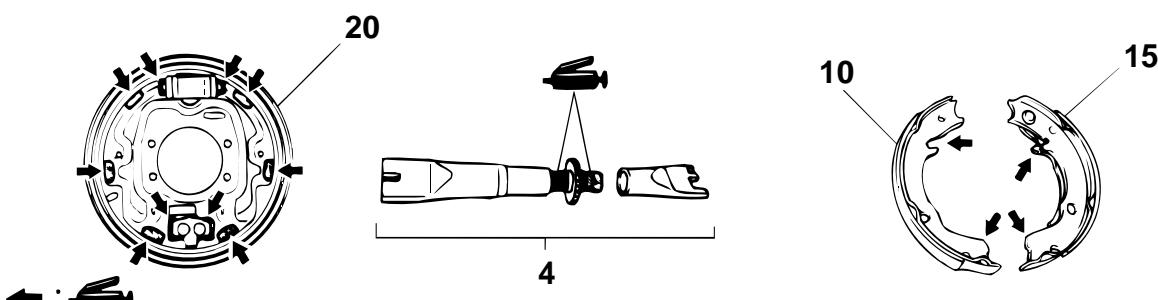
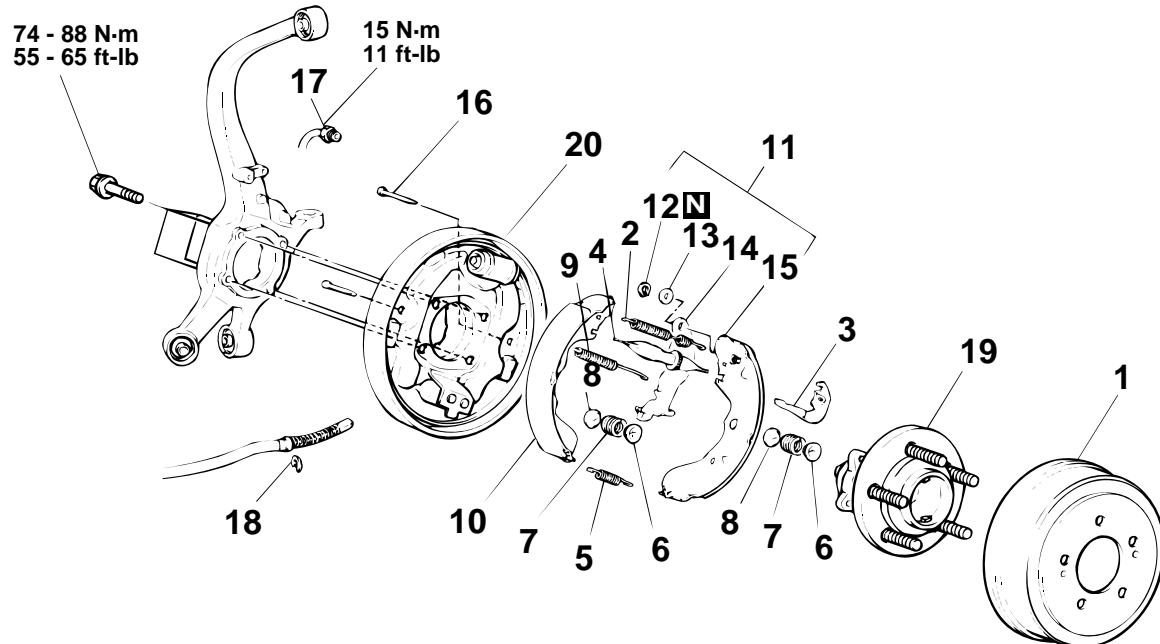
## REAR DRUM BRAKE

## REAR DRUM BRAKE SHOE

M1351007500052

## REMOVAL AND INSTALLATION

Pre-removal Operation	Post-installation Operation
<ul style="list-style-type: none"> <li>Loosening the Parking Brake Cable Adjusting Nut.</li> <li>Brake Fluid Draining</li> </ul>	<ul style="list-style-type: none"> <li>Brake Fluid Filling and Air Bleeding (Refer to P.35A-21.)</li> <li>Parking Brake Lever Stroke Adjustment (Refer to GROUP 36, On-vehicle Service – Parking Brake Lever Stroke Check and Adjustment P.36-4.)</li> </ul>



SPECIFIED GREASE: BRAKE GREASE SAE J310, NLGI NO.1

AC000923AC

REAR DRUM BRAKE REMOVAL  
STEPS

1. BRAKE DRUM
2. SHOE-TO-LEVER SPRING
3. ADJUSTER LEVER
4. AUTO ADJUSTER ASSEMBLY
5. RETAINER SPRING
6. SHOE HOLD-DOWN CUP
7. SHOE HOLD-DOWN SPRING
8. SHOE HOLD-DOWN CUP
9. SHOE-TO-SHOE SPRING
10. SHOE AND LINING ASSEMBLY

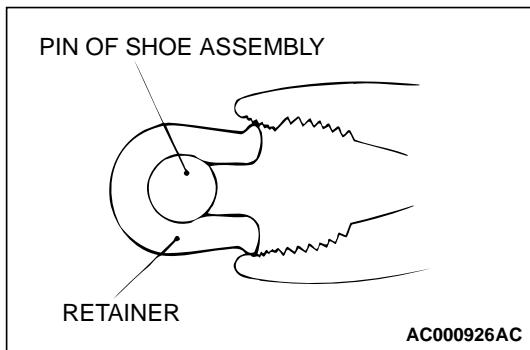
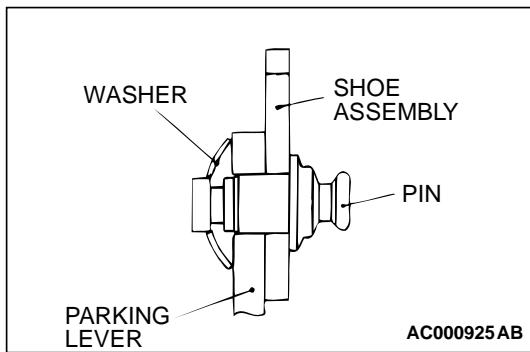
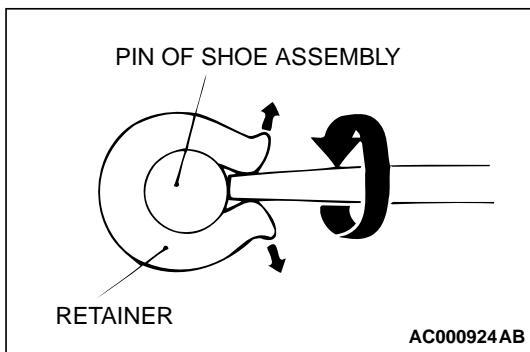
<<A>> >>B<<  
>>A<<REAR DRUM BRAKE REMOVAL  
STEPS (Continued)

11. SHOE AND LEVER ASSEMBLY
12. RETAINER
13. WAVE WASHER
14. PARKING LEVER
15. SHOE AND LINING ASSEMBLY
16. SHOE HOLD-DOWN PIN
17. BRAKE TUBE CONNECTION
18. SNAP RING
19. REAR HUB ASSEMBLY
20. BACKING PLATE

TSB Revision

**REMOVAL SERVICE POINT****<<A>> RETAINER REMOVAL**

Use a flat-tipped screwdriver or a similar tool to open up the retainer joint. Then remove the retainer.

**INSTALLATION SERVICE POINTS****>>A<< WAVE WASHER INSTALLATION**

Install the washer in the direction shown in the illustration.

**>>B<< RETAINER INSTALLATION**

Use pliers or a similar tool to close the retainer end onto the pin.

## REAR DRUM BRAKE WHEEL CYLINDER

M1351009300043

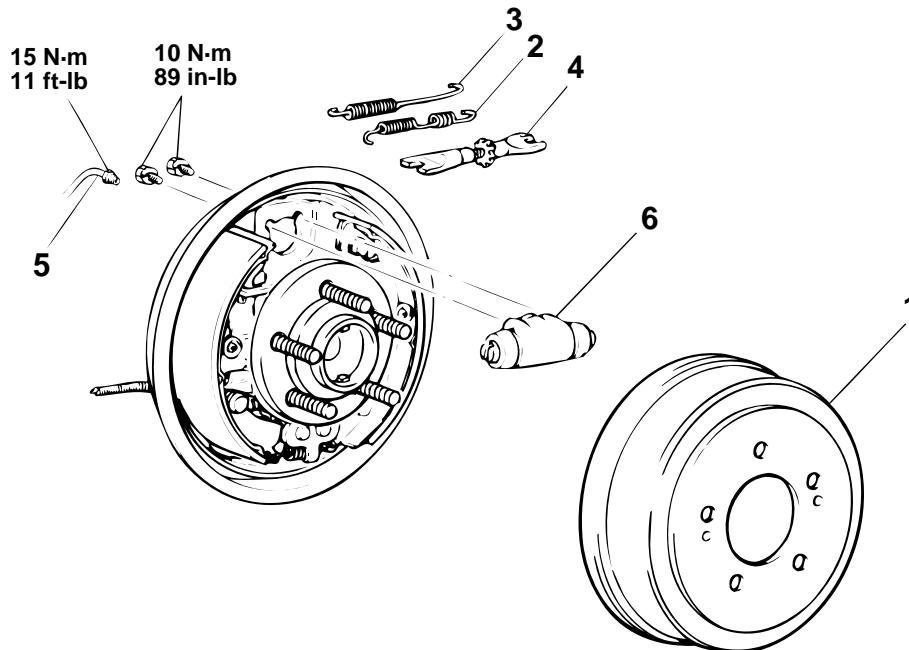
## REMOVAL AND INSTALLATION

## Pre-removal Operation

Brake Fluid Draining

## Post-installation Operation

- Brake Fluid Filling
- Brake Line Bleeding (Refer to P.35A-21.)



AC000927 AC

## REMOVAL STEPS

1. BRAKE DRUM
2. SHOE-TO-LEVER SPRING
3. SHOE-TO-SHOE SPRING
4. AUTO ADJUSTER ASSEMBLY

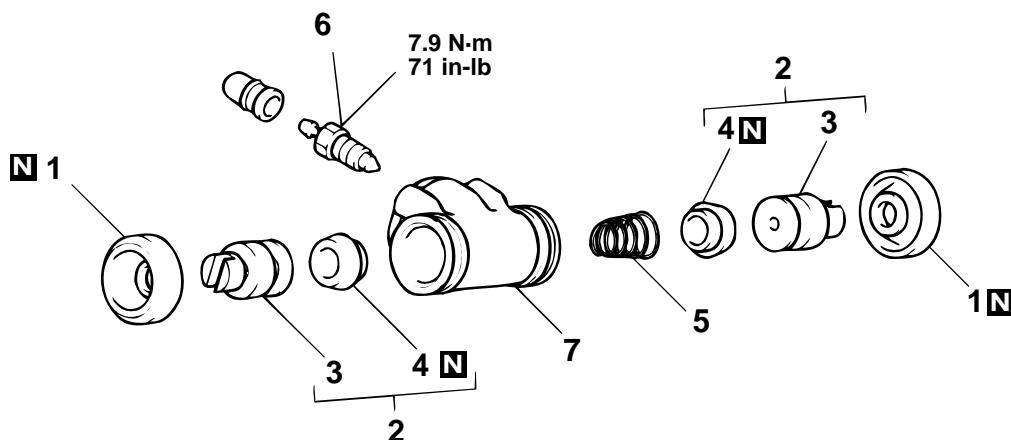
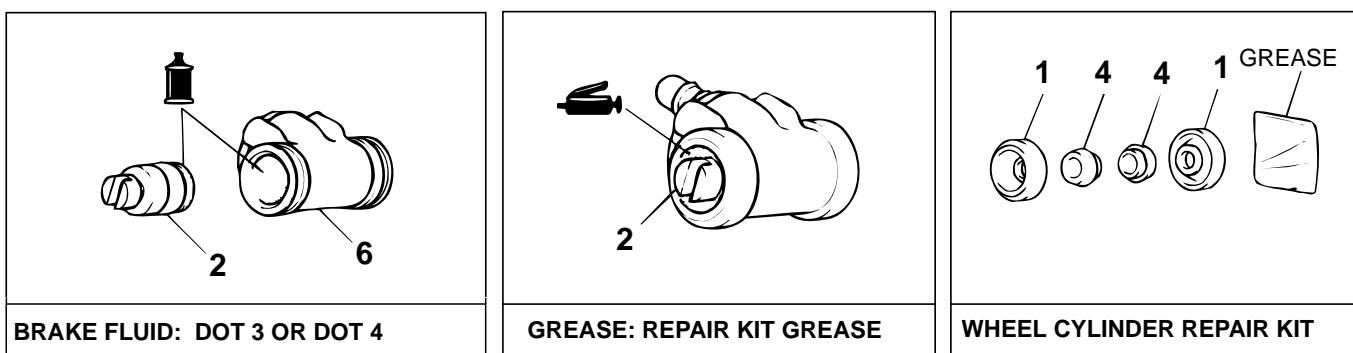
## REMOVAL STEPS (Continued)

5. CONNECTION FOR THE BRAKE PIPE
6. WHEEL CYLINDER

## WHEEL CYLINDER

## DISASSEMBLY AND ASSEMBLY

M1351007700056



AC000928AC

## DISASSEMBLY STEPS

1. BOOTS
2. PISTON ASSEMBLY
- >>A<< 3. PISTON
- >>A<< 4. PISTON CUP

## DISASSEMBLY STEPS (Continued)

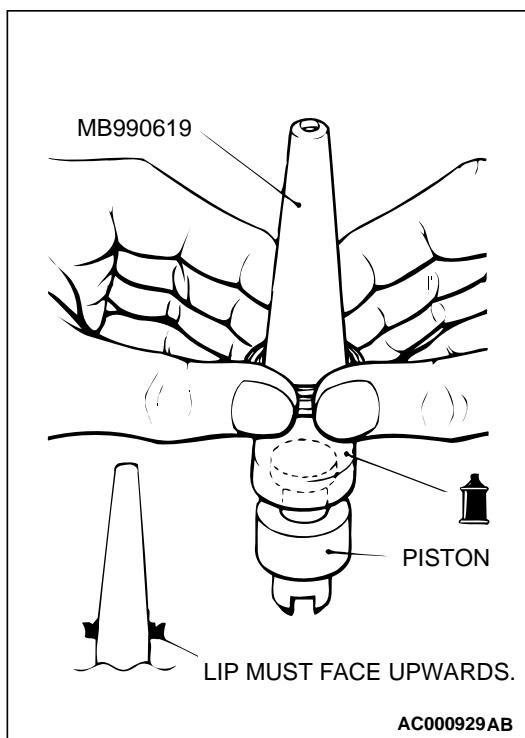
5. SPRING
6. BLEEDER SCREW
7. WHEEL CYLINDER BODY

Required Special Tool:  
MB990619: Installer

## ASSEMBLY SERVICE POINT

## &gt;&gt;A&lt;&lt; PISTON CUP/PISTON REASSEMBLY

1. Use alcohol or brake fluid DOT 3 or DOT 4 to clean the wheel cylinder and the piston.



2. Apply brake fluid DOT 3 or DOT 4 to the piston cups and special tool MB990619.

**⚠ CAUTION**

In order to keep the piston cup from becoming twisted or slanted, slide the piston cup down special tool MB990619 slowly and carefully, without stopping.

3. Set the piston cup on special tool MB990619 with the lip of the cup facing up. Fit the cup onto special tool MB990619, and then slide it down the outside of special tool MB990619 into the piston groove.

**INSPECTION**

M1351007800053

Check the piston and wheel cylinder walls for rust, pitting, or damage. If there is any abnormality, replace the entire wheel cylinder assembly.

## PROPORTIONING VALVE

### REMOVAL AND INSTALLATION

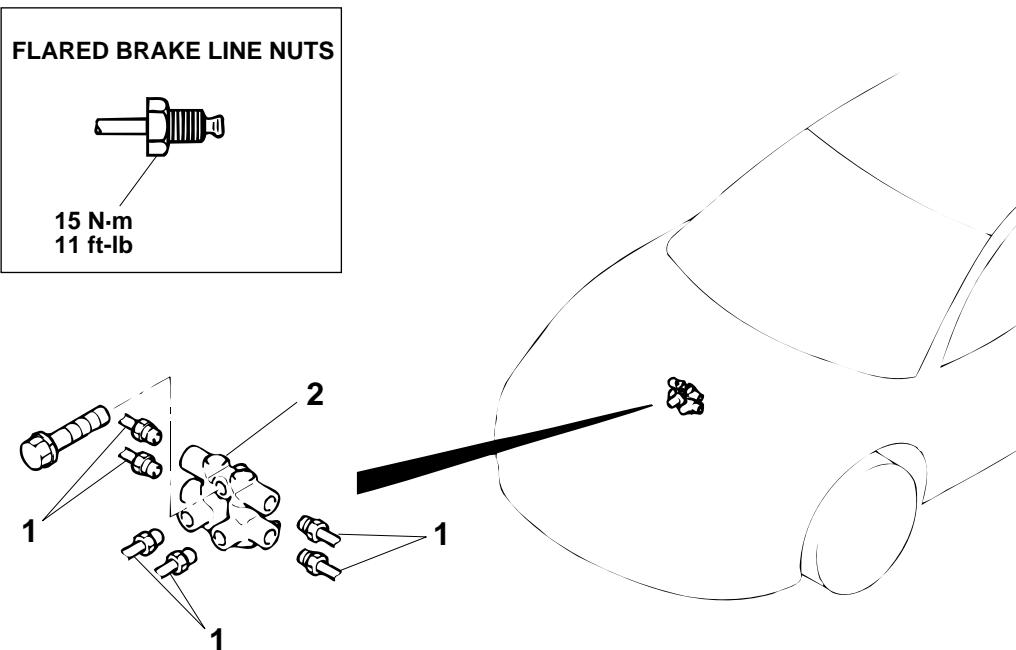
M1351005700050

**Pre-removal Operation**

Brake Fluid Draining

**Post-installation Operation**

- Brake Fluid Supplying
- Brake Line Bleeding (Refer to [P.35A-21](#).)



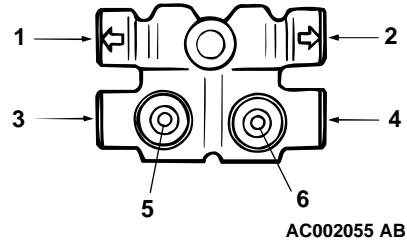
AC002054AC

**REMOVAL STEPS**

>>A<< 1. BRAKE PIPE  
2. PROPORTIONING VALVE

**INSTALLATION SERVICE POINT****>>A<< BRAKE PIPE CONNECTION**

Connect the pipes to the hydraulic unit as shown in the illustration.



1. Proportioning valve – Rear brake (LH)
2. Proportioning valve – Rear brake (RH)
3. Proportioning valve – Front brake (RH)
4. Proportioning valve – Front brake (LH)
5. Proportioning valve – Master cylinder (secondary)
6. Proportioning valve – Master cylinder (primary)

**SPECIFICATIONS****FASTENER TIGHTENING SPECIFICATIONS**

M1351009600066

ITEMS	SPECIFICATIONS
Brake line	Brake tube flare nut 15 N·m (11 ft-lb)
Brake pedal	Pedal support member mounting bolt 12 N·m (106 in-lb)
	Pedal support member mounting nut 14 N·m (124 in-lb)

<b>ITEMS</b>		<b>SPECIFICATIONS</b>
Front disc brake	Bleeder screw	7.9 N·m (71 in-lb)
	Brake hose connector bolt	29 N·m (21 ft-lb)
	Front brake assembly mounting bolt	90 – 110 N·m (60 – 81 ft-lb)
	Guide pin <2.4L ENGINE>	74 N·m (55 ft-lb)
	Lock pin <2.4L ENGINE>	74 N·m (55 ft-lb)
	Pin bolt <3.0L ENGINE>	38 N·m (28 ft-lb)
Master cylinder and brake booster	Brake booster mounting nut	14 N·m (124 in-lb)
	Fitting	15 – 18 N·m (11 – 13 ft-lb)
	Master cylinder mounting nut	Vehicles without TCL
		10 N·m (89 in-lb)
		Vehicles with TCL
Rear disc brake	Bleeder screw	7.9 N·m (71 in-lb)
	Rear disc brake assembly mounting bolt	Bolt and washer
		50 – 60 N·m (38 – 44 ft-lb)
	Flange bolt	55 – 65 N·m (41 – 48 ft-lb)
	Guide pin	43 N·m (32 ft-lb)
	Lock pin	43 N·m (32 ft-lb)
Rear drum brake	Bleeder screw	7.9 N·m (71 in-lb)
	Rear hub mounting bolt	74 – 88 N·m (55 – 65 ft-lb)
	Wheel cylinder mounting bolt	10 N·m (89 in-lb)

## GENERAL SPECIFICATIONS

M1351000200050

<b>ITEMS</b>	<b>2.4L ENGINE</b>	<b>3.0L ENGINE</b>
Master cylinder ID mm (in)	27.0 (1.06)	27.0 (1.06)
Brake booster effective diameter of power cylinder mm (in)	205 + 230 (8 + 9)	205 + 230 (8 + 9)
Brake booster boosting ratio	7.0	6.5
Front disc brake disc effective diameter mm (in)	204 (8.0)	222 (8.7)
Front disc brake wheel cylinder ID mm (in)	60.3 (2.37)	60.3 (2.37)
Rear disc brake disc effective diameter mm (in)	–	222 (8.7)
Rear disc brake wheel cylinder ID mm (in)	–	34.9 (1.4)
Rear drum brake drum ID mm (in)	228.6 (9.0)	–
Rear drum brake wheel cylinder ID mm (in)	19.05 (0.75)	–
Rear drum brake lining thickness mm (in)	4.9 (0.20)	–

## SERVICE SPECIFICATIONS

M1351000300057

<b>ITEMS</b>	<b>STANDARD VALUE</b>	<b>LIMIT</b>
Brake booster push rod protruding length mm (in)	10.28 – 10.53 (0.404 – 0.415)	–
Brake pedal height mm (in)	175 – 178 (6.9 – 7.0)	–
Brake pedal free play mm (in)	3 – 8 (0.12 – 0.31)	–
Brake pedal to floor board clearance mm (in)	90 (3.5) or more	–

ITEMS		STANDARD VALUE	LIMIT
Proportioning valve output fluid pressure MPa (psi)	Split point	2.7 – 3.2 (391 – 462)	–
	When input fluid pressure is 9.8 MPa (1,422 psi).	4.3 – 5.1 (619 – 732)	–
Proportioning valve output fluid pressure difference between left and right MPa (psi)		–	0.4 (57)
Disc brake pad thickness mm (in)		10.0 (0.39)	Minimum 2.0 (0.08)
Disc brake disc thickness mm (in)	Front <2.4L ENGINE>	24.0 (0.9)	Minimum 22.4 (0.88)
	Front <3.0L ENGINE>	26.0 (1.02)	Minimum 24.4 (0.96)
	Rear	10.0 (0.4)	Minimum 8.4 (0.33)
Disc brake disc run-out mm (in)	Front	–	0.06 (0.002)
	Rear	–	0.08 (0.003)
Front disc brake drags force N (lb)		69 (16) or less	–
Rear disc brake drag force N (lb)		69 (16) or less	–
Rear drum brake lining thickness mm (in)		4.9 (0.19)	Minimum 1.0 (0.04)
Rear drum inside diameter mm (in)		228.6 (9.00)	230.6 (9.08)
Rear disc inside diameter mm (in)		168.0 (6.61)	169.0 (6.65)
Front hub end play mm (in)		–	0.05 (0.002)
Rear axle shaft end play mm (in)		–	0.05 (0.002)

## LUBRICANTS

M1351000400054

ITEMS	SPECIFIED LUBRICANT
Brake fluid	DOT3 or DOT4
Brake piston seal	Repair kit grease
Guide pin boot inner surface	
Lock pin boot inner surface	
Piston boot mounting grooves	
Brake piston boot inner surface	
Lock pin bush inner surface	
Piston cup surface	
Front brake pad and inner shim A contact surface <2.4L ENGINE>	Repair kit grease
Front disc brake inner shim A and inner shim B contact surface <2.4L ENGINE>	Brake grease SAE J310, NLGI NO.1
Front brake pad and outer shim A contact surface <2.4L ENGINE>	
Front disc brake outer shim A and outer shim B contact surface <2.4L ENGINE>	
Rear brake pad and inner shim A contact surface	
Rear disc brake inner shim A and inner shim B contact surface	
Rear brake shoe and backing plate contact surface	
Auto adjuster assembly	

**SEALANT**

M1351000500051

<b>ITEM</b>	<b>SPECIFIED SEALANT</b>	<b>REMARKS</b>
Thread part fitting	3M™ AAD Part No. 8661, 8663, 8672, 8678, 8679 or equivalent	Semi-drying sealant

---

**NOTES**