GROUP 35A

BASIC BRAKE SYSTEM

CONTENTS

GENERAL DESCRIPTION	35A-3	BRAKE DISC THICKNESS CHECK 35A-28
		BRAKE LINING THICKNESS CHECK 35A-29
BASIC BRAKE SYSTEM		BRAKE DRUM INSIDE DIAMETER CHECK
DIAGNOSIS	35A-4	<pre><vehicles brakes="" drum="" with=""> 35A-30</vehicles></pre>
INTRODUCTION	35A-4	BRAKE LINING AND BRAKE DRUM
DIAGNOSTIC TROUBLESHOOTING		CONTACT CHECK
STRATEGY	35A-4	<vehicles brakes="" drum="" with=""> 35A-30 PEAR BRAKE DISC INCIDE DIAMETER CHECK</vehicles>
SYMPTOM CHART	35A-4	REAR BRAKE DISC INSIDE DIAMETER CHECK <vehicles brakes="" disc="" with=""> 35A-30</vehicles>
SYMPTOM PROCEDURES	35A-5	AUTO ADJUSTER FUNCTION CHECK
SPECIAL TOOLS	35A-18	MASTER CYLINDER FUNCTION
		CHECK
ON-VEHICLE SERVICE	35A-18	
BRAKE PEDAL CHECK AND		BRAKE PEDAL 35A-32
ADJUSTMENT		REMOVAL AND INSTALLATION
STOPLIGHT SWITCH CHECK	35A-20	
BRAKE BOOSTER OPERATING CHECK .	35A-20	MASTER CYLINDER ASSEMBLY
CHECK VALVE OPERATION CHECK	35A-21	AND BRAKE BOOSTER 35A-33
PROPORTIONING VALVE FUNCTION TEST	-	REMOVAL AND INSTALLATION
<vehicles abs="" without=""></vehicles>	35A-21	DISASSEMBLY AND ASSEMBLY 35A-35
BLEEDING	35A-22	INSPECTION
BRAKE FLUID LEVEL SWITCH CHECK	35A-23	
DISC BRAKE PAD CHECK AND	054.00	FRONT DISC BRAKE ASSEMBLY 35A-36
REPLACEMENT	35A-23	REMOVAL AND INSTALLATION
DISC BRAKE ROTOR CHECK	35A-25	DISASSEMBLY AND ASSEMBLY 35A-38
FRONT BRAKE DISC RUN-OUT CHECK AND CORRECTION	35A-26	INSPECTION
REAR BRAKE DISC RUN-OUT CHECK AND		
CORRECTION	054.07	Continued on next page

35A-2

REAR DISC BRAKE ASSEMBLY	35A-42	PROPORTIONING VALVE	35A-52
REMOVAL AND INSTALLATION	35A-42	REMOVAL AND INSTALLATION	35A-52
INSPECTION	35A-43		
DISASSEMBLY AND ASSEMBLY	35A-44	SPECIFICATIONS	35A-52
INSPECTION	35A-47	FASTENER TIGHTENING	
		SPECIFICATIONS	35A-52
REAR DRUM BRAKE	35A-48	GENERAL SPECIFICATIONS	35A-53
REMOVAL AND INSTALLATION	35A-48	SERVICE SPECIFICATIONS	35A-53
WHEEL CYLINDER DISASSEMBLY AND		LUBRICANTS	35A-54
ASSEMBLY	35A-50	SEALANT	35A-54
INSPECTION	35A-51		

GENERAL DESCRIPTION

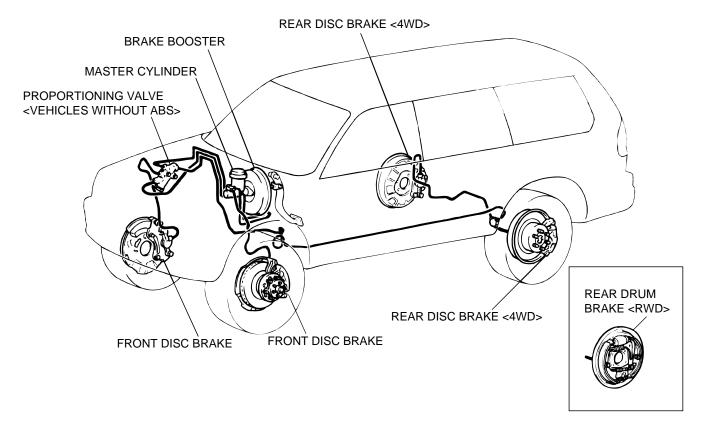
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The brake system has high reliability and durability which maintains excellent braking performance and braking feeling. The main features are as follows:

- A dual type master cylinder is equipped in all models.
- Tandem type brake booster is used.

- The following type of brake is used.
 - Front: Floating caliper, 2-piston, ventilated disc brakes. (V5-W43 or V6-W43)
 - Rear: Leading-trailing type drum brake.
 RWD> Floating caliper, 1-piston, solid disc brakes (S5-S43P) <4WD>

CONFIGURATION DIAGRAM



AC202864 AB

BASIC BRAKE SYSTEM DIAGNOSIS

INTRODUCTION M1351009700193

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.

DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1351009800190

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

M1351009900205

SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Vehicle pulls to one side when brakes are applied.	1	P.35A-5
Insufficient braking power	2	P.35A-6
Increased pedal stroke (Reduced pedal-to-floor board clearance)	3	P.35A-8
Brake drag	4	P.35A-9
Insufficient parking brake function	5	P.35A-11
Scraping or grinding noise when brakes are applied	6	P.35A-12
Squealing, groaning or chattering noise when brakes are applied	7	P.35A-13
Squealing noise when brakes are not applied	8	P.35A-14
Groaning, clicking or rattling noise when brakes are not applied	9	P.35A-16

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.

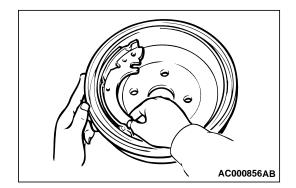
(2) Put chalk on the inner surface of the brake drum. Rub the lining against the drum inner surface.

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 8.



STEP 3. Check the auto adjuster function (Refer to P.35A-31.).

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-20.)

Q: Is the brake drum inside diameter outside of specifications?

YES: Replace the part. Then go to Step 8.

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-38 and/or P.35A-44). Then go to Step 8.

STEP 6. Check brake disc(s) for run out (Refer to P.35A-26 or P.35A-27).

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-25).

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. Retest the system.

Q: Is the symptom eliminated?

YES: The procedure is complete.

NO: Start over at Step 1. If a new symptom appears, refer to the symptom chart P.35A-4.

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-22). Then go to Step 9.

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-22.) 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.



Refer to P.35A-31.

Q: Is there fault?

YES: Repair it. Then go to Step 9.

NO: Go to Step 6.

STEP 5. Check the brake booster function.

Refer to P.35A-20.

Q: Is there fault?

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

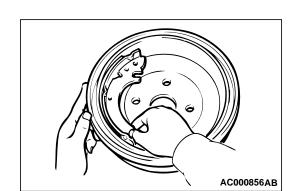
NO: Go to Step 5.

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.



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

STEP 8. Check the proportioning valve operation. <Vehicles without ABS>

Refer to P.35A-21.

Q: Is there fault?

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

NO: Go to Step 9.

STEP 9. Retest the system.

Q: Is the symptom eliminated?

YES: The procedure is complete.

NO : Start over at Step 1. If a new symptom surfaces, refer to the symptom chart P.35A-4.

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-22. Then go to Step 8.

NO: Go to Step 2.

STEP 2. Check the pad or lining for wear.

Refer to P.35A-28 or P.35A-29.

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-21.

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-31.

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.

STEP 6. Check the auto adjuster function.

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-33.

Q: Is the clearance outside of specifications?

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

NO: Go to Step 8.

STEP 8. Retest the system.

Q: Is the symptom eliminated?

YES: The procedure is complete.

NO: Start over at Step 1. If a new symptom surfaces, refer to the symptom chart P.35A-

4

INSPECTION PROCEDURE 4: Brake Drag

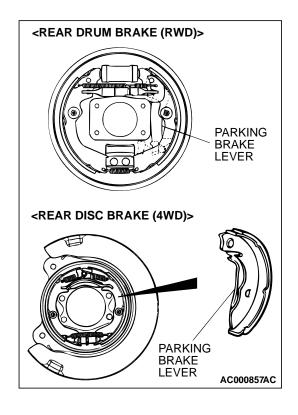
DIAGNOSIS

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.

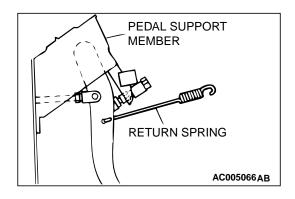


STEP 2. Check the parking brake pull amount.

Refer to GROUP 36, On-vehicle Service – Parking Brake Lever Stroke Check and Adjustment P.36-2.

Q: Is there fault?

YES: Adjust it. Then go to Step 10.

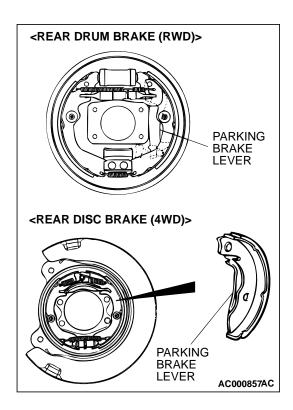


STEP 3. Check the brake pedal return spring for deterioration.

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-48 or refer to GROUP 36 – Parking Brake Drum P.36-7.

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-33.

Q: Is there fault?

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

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

Refer to P.35A-35.

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. Retest the system.

Q: Is the symptom eliminated?

YES: The procedure is complete.

NO: Start over at Step 1. If a new symptom surfaces, refer

to the symptom chart P.35A-4.

INSPECTION PROCEDURE 5: Insufficient Parking Brake Function

DIAGNOSIS

STEP 1. Check the lining for wear.

Refer to P.35A-30.

Q: Is there wear?

YES: Replace the part. Then go to Step 6.

NO: Go to Step 2.

STEP 2. Check for oil or water, etc., on the lining contact surface.

If found, replace the part and determine source or cause of foreign material. Recheck symptom. If the symptom is eliminated, diagnosis is complete. If the symptom is not eliminated, go to Step 3.

Q: Does the condition exists?

YES: Repair it. Then go to Step 6.

NO: Go to Step 3.

STEP 3. Check the parking brake cable.

Refer to GROUP 36, Parking Brake Cable P.36-6.

Q: Is there fault?

YES: Replace the part. Then go to Step 6.

NO: Go to Step 4.

STEP 4. Check the auto adjuster function
 <

- (1) If not equipped with rear drum brakes, go to Step 5.
- (2) Refer to P.35A-31.

Q: Is there fault?

YES: Repair it. Then go to Step 6.

STEP 5. Check the parking brake pull amount (excessive).

Refer to GROUP 36, On-vehicle Service – Parking Brake Lever Stroke Check and Adjustment P.36-2.

Q: Is there fault?

YES: Adjust it. Then go to Step 6.

NO: Go to Step 6.

STEP 6. Retest the system.

Q: Is the symptom eliminated?

YES: The procedure is complete.

NO: Start over at Step 1. If a new symptom surfaces, refer to the symptom chart P.35A-

4.

INSPECTION PROCEDURE 6: 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 in good condition?

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.

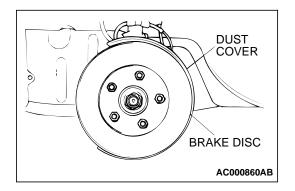
NO: Go to Step 3.

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.

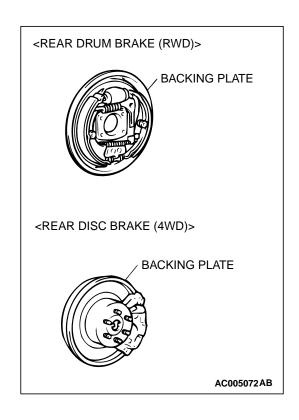
NO: Go to Step 4.



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.



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. Retest the system.

Q: Is the symptom eliminated?

YES: The procedure is complete.

NO: Start over at Step 1. If a new symptom surfaces, refer

to the symptom chart P.35A-4.

INSPECTION PROCEDURE 7: 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.

BASIC BRAKE SYSTEM BASIC BRAKE SYSTEM DIAGNOSIS

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-18 or P.35A-33.

Q: Is the adjustment value come?

YES: Adjust. Then go to Step 7.

NO: Go to Step 7.

STEP 7. Retest the system

Q: Is the symptom eliminated?

YES: The procedure is complete.

NO: Start over at Step 1. If a new symptom surfaces, refer to the symptom chart P.35A-

4.

INSPECTION PROCEDURE 8: 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.

to Step 10.

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.

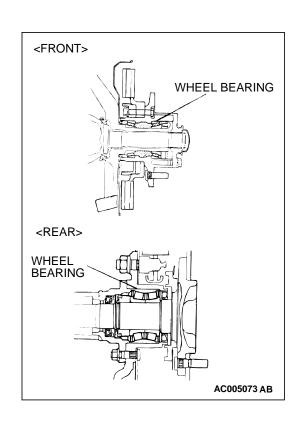
NO: Go to Step 7.

STEP 7. Check the wheel bearings for deterioration or damage, and the 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-18 or P.35A-33.

Q: Is the adjustment value come?

YES: Adjust. Then go to Step 10.

STEP 10. Retest the system.

Q: Is the symptom eliminated?

YES: The procedure is complete.

NO : Start over at Step 1. If a new symptom surfaces, refer to the symptom chart P.35A-4.

INSPECTION PROCEDURE 9: 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 98 – 120 N·m (78 – 87 ft-lb). Then go to

Step 5.

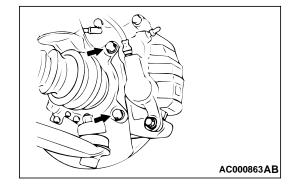
NO: Go to Step 3.

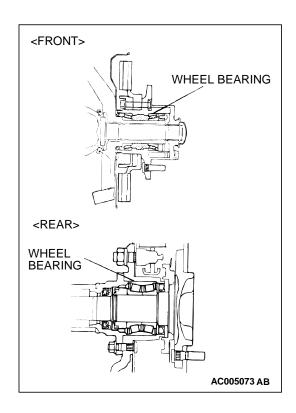
STEP 3. Check for looseness of the caliper installation bolt.

Q: Is the caliper installation bolt loose?

YES: Tighten to 88 N·m (65 ft-lb) for the front caliper and

rear caliper. Then go to Step 5.





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. Retest the system.

Q: Is the symptom eliminated?

YES: The procedure is complete.

NO: Start over at Step 1. If a new symptom surfaces, refer

to the symptom chart P.35A-4.

SPECIAL TOOLS

M1351000600207

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
MB990964	MB990964 Brake tool set A: MB990520 Disc brake piston expander B: MB990623 Installer	General service tool	 Pushing-in of the disc brake piston Installation of the drum brake wheel cylinder piston cup
MB991714	MB991714 Pushrod adjust gauge	_	Clearance adjustment between brake booster pushrod and master cylinder primary piston

ON-VEHICLE SERVICE

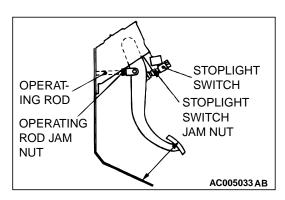
BRAKE PEDAL CHECK AND ADJUSTMENT

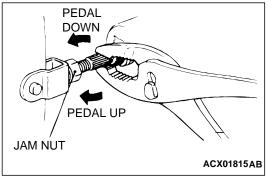
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BRAKE PEDAL HEIGHT

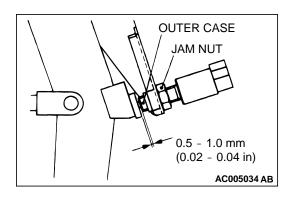
- 1. Turn up the carpet etc. under the brake pedal.
- 2. Measure the brake pedal height as illustrated. If it is not within the standard value, adjust as follows.

Standard value: 176 - 181 mm (6.9 - 7.1 inches) [From the surface of melting sheet (floorboard) to the face of pedal pad]

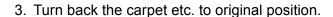


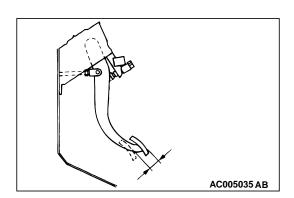


- (1) Disconnect the stoplight switch connector, loosen the jam nut and move the stoplight switch to a position where it does not contact the brake pedal arm.
- (2) Adjust the brake pedal height by turning the operating rod with pliers (with the operating rod jam nut loosened).



- (3) Screw in the stoplight switch until it contacts the brake pedal stopper (just before brake pedal begins to move). Return the stoplight switch half to one turn and secure with the jam nut.
- (4) Connect the connector of the stoplight switch.
- (5) Check to be sure that the stoplight is not illuminated with the brake pedal released.





BRAKE PEDAL FREE PLAY

 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 (0.1 - 0.3 inch)

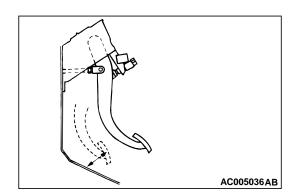
- 2. If the free play exceeds the standard value, it is probably due to excessive play between the clevis pin and brake pedal arm.
- 3. Check for excessive clearance and replace faulty parts as required. (Refer to P.35A-32.)

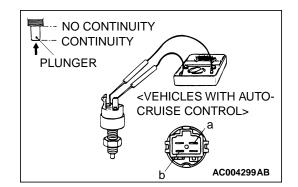


- 1. Turn up the carpet etc. under the brake pedal.
- 2. Start the engine, depress the brake pedal with approximately 490 N (110 pound) of force, and measure the clearance between the brake pedal and the floorboard.

Standard value: 95 mm (3.7 inches) or more [From the surface of melting sheet (floorboard) to the face of pedal pad]

- If the clearance is outside the standard value, check for air trapped in the brake line, clearance between the lining, and the drum and dragging in the parking brake. Adjust and replace defective parts as required.
- 4. Return the carpet etc. to its original position.





STOPLIGHT SWITCH CHECK

M1351008900194

Connect an ohmmeter to the stoplight switch, and Check for continuity by pushing in and releasing the stoplight switch. The stoplight switch is in good condition if there is no continuity when the plunger is pushed in to a depth of within 4 mm (0.2 inch) from the outer case edge surface, and if there is continuity when it is released.

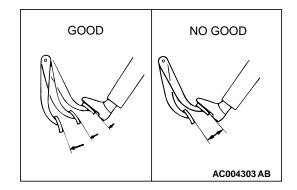
For vehicles with auto-cruise control system, Check for continuity between the terminals "a" and "b" of the stoplight switch.

BRAKE BOOSTER OPERATING CHECK

11351001000210

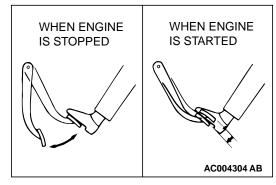
For simple checking of the brake booster operation, carry out the following tests:

 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.



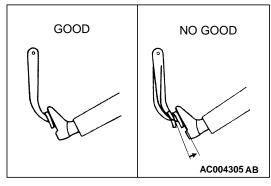
With the engine stopped, step on the brake pedal several times. Then step on the brake pedal and start the engine. If the pedal moves downward slightly, the booster is in good condition.

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. 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 will be defective.

Check the check valve (Refer to P.35A-21.), vacuum hose for leaks, high volume engine vacuum applied to booster. Repair or replace as necessary. If OK, replace booster and this step starting at Step 1.



CHECK VALVE OPERATION CHECK

M1351009000213

⚠ CAUTION

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

1. Remove the vacuum hose. (Refer to P.35A-33.)



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

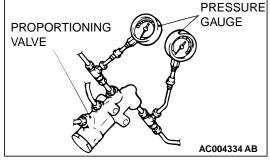
2. Check the operation of the check valve by using a vacuum pump.

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 <VEHICLES WITHOUT ABS>

M1351001100216

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



VALVE

BOOSTER

(HOLDS)

SIDE

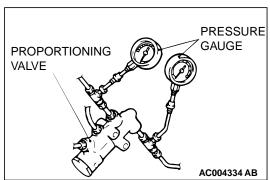
SPRING

INTAKE

SIDE (DOES NOT HOLDS)

MANIFOLD

C004325 AB



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

Standard value:

Vehicles with 15 inch front disc brake disc	2,452 kPa (356 psi)
Vehicles with 16 inch front disc brake disc	3,432 kPa (498 psi)

(2) Check to be sure that the output fluid pressure is at the standard value when the pedal depression force is increased so that the input fluid pressure is at the values shown in the table below.

Standard value:

Input fluid pressure kPa (psi)		5,884 (853)
Output fluid pressure kPa (psi)	Vehicles with 15 inch front disc brake disc	3,526 – 3,918 (512 – 568)
	Vehicles with 16 inch front disc brake disc	4,114 – 4,536 (601 – 657)

BLEEDING

M1351001400239

⚠ CAUTION

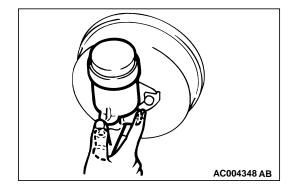
Use only the specified brake fluid. Never mix the specified brake fluid with other fluid as it will influence the braking performance significantly.

Specified brake fluid: DOT3 or DOT4

MASTER CYLINDER BLEEDING

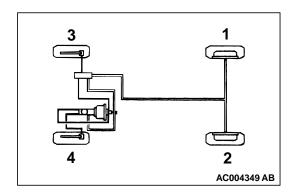
The master cylinder used has no check valve, so if bleeding is carried out by the following procedure, bleeding of air from the brake pipeline will become easier. (When brake fluid is not contained in the master cylinder.)

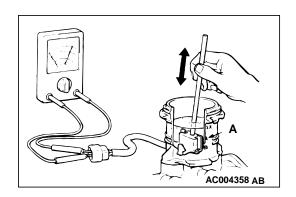
- 1. Fill the reserve tank with brake fluid.
- 2. Keep the brake pedal depressed.
- 3. Have another person cover the master cylinder outlet with a finger.
- 4. With the outlet still closed, release the brake pedal.
- 5. Repeat steps (2) (4) three or four times to fill the inside of the master cylinder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



BRAKE LINE BLEEDING

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

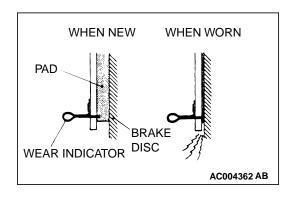




BRAKE FLUID LEVEL SWITCH CHECK

M1351009100210

The brake fluid level switch 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."



DISC BRAKE PAD CHECK AND REPLACEMENT

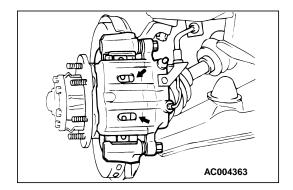
NOTE: The brake pads have indicators that contact the brake disc when the brake pad thickness becomes 2 mm (0.08 inch), and emit a squealing sound to warn the driver.

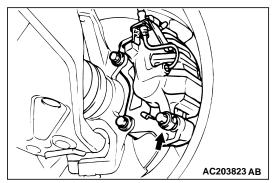
<Front>

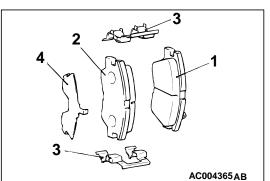
⚠ CAUTION

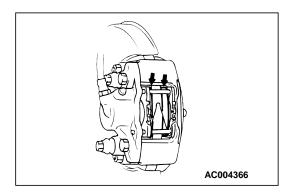
- Whenever a pad must be replaced, replace both LH and RH wheel pads as a set to prevent the vehicle from pulling to one side when braking.
- If there is a significant difference in the thicknesses of the pads on the left and right sides, check the sliding condition of the piston, lock pin and guide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

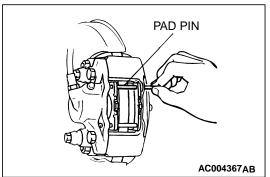
Standard value: 10.0 mm (0.39 inch) Minimum limit: 2.0 mm (0.08 inch)











⚠ CAUTION

Do not wipe the special grease from the lock pin. Do not contaminate the lock pin.

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

- 3. Remove the following parts from caliper support.
 - (1) Pad and wear indicator assembly
 - (2) Pad assembly
 - (3) Clip
 - (4) Outer Shim
- 4. Measure the hub torque before and after pad installation. Follow the procedure:

Refer to P.35A-36.

5. Install the pad and caliper assembly, and check the brake drag force. (Refer to P.35A-36.)

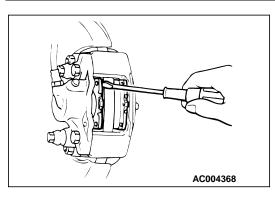
<Rear>

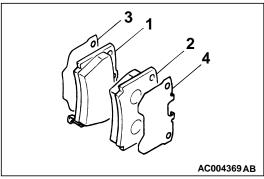
⚠ CAUTION

- 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 inner and outer pads, check the sliding condition of the piston and sleeve.
- 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)

2. Remove the clip and pad pin.





- 3. Remove the pad and shim with a flat-tipped screwdriver, etc.
 - (1) Pad and wear indicator assembly
 - (2) Pad assembly
 - (3) Inner shim
 - (4) Outer shim
- 4. Measure the hub torque before and after pad installation. Follow the procedure: Refer to P.35A-36.
- 5. Install the pad and caliper assembly, and check the brake drag force. (Refer to P.35A-36.)

DISC BRAKE ROTOR CHECK

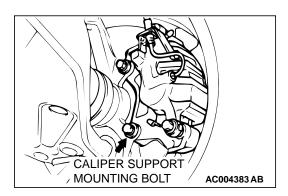
M1351002900196

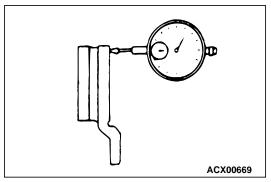
⚠ CAUTION

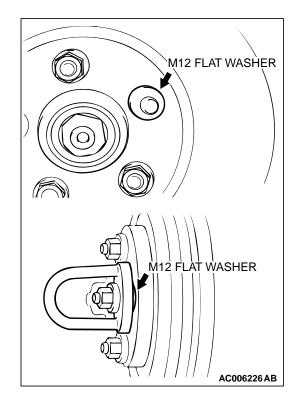
When servicing disc brakes, it is necessary to exercise caution to keep the disc brakes within the allowable service values in order to maintain normal brake operation.

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

INSPECTION ITEMS	REMARKS
Scratches, rust, saturated lining materials and wear	 If the vehicle is not driven for a certain period, the sections of the discs that are not in contact with lining will become rusty, causing noise and shuddering. If grooves resulting from excessive disc wear and scratches are not removed prior to installing a new pad assembly, there will momentarily be inappropriate contact between the disc and the lining (pad).
Run-out or drift	Excessive run-out or drift of the discs will increase the pedal depression resistance due to piston knockback.
Change in thickness (parallelism)	If the thickness of the disc changes, this will cause pedal pulsation, shuddering and surging.
Inset or warping (flatness)	Overheating and improper handling while servicing will cause inset or warping.







FRONT BRAKE DISC RUN-OUT CHECK AND CORRECTION

M1351009400330

- 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.

Place a dial gauge approximately 15 mm (0.6 inch) from the outer circumference of the brake disc, and measure the runout of the disc.

Limit: 0.03 mm (0.001 inch)

⚠ CAUTION

- After a new brake disc is installed, always grind the brake disc with on-the-car type brake lathe. If this step is not carried out, the brake disc run-out exceeds the specified value, resulting in judder.
- When the on-the-car type lathe is used, first install M12 flat washer on the stud bolt in the brake disc side according to the figure, and then install the adapter. If the adapter is installed with M12 flat washer not seated, the brake disc rotor may be deformed, resulting in inaccurate grinding.
- Grind the brake disc with all wheel nuts diagonally and equally tightened to the specified torque 100 N·m (74 ftlb). When all numbers of wheel nuts are not used, or the tightening torque is excessive or not equal, the brake disc rotor or drum may be deformed, resulting in judder.
- 4. If the run-out of the brake disc is limit valve or more, turn rotor with on the car type brake lathe ("Accuturn-8750" or equivalent).

If still exceeds the limit, inspect hub end play.

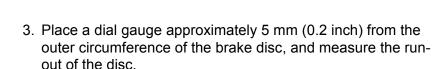
Limit: 0.05 mm (0.002 inch)

5. If the play exceeds the limit, check the hub. If the play does not exceed the limit, replace the brake disc.

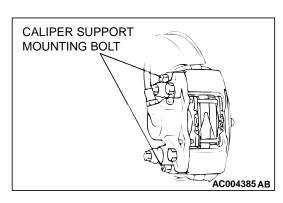
REAR BRAKE DISC RUN-OUT CHECK AND CORRECTION

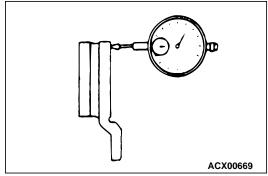
M1351009400341

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



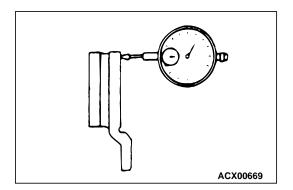
Limit: 0.08 mm (0.003 inch)





- 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.
 - (2) Place a dial gauge as shown in the illustration, and then move the hub in the axial direction and measure the play.

Standard value: 0 - 0.25 mm (0 - 0.010 inch)



AC004386 AB

- (3) If the play does not exceed the standard value install the brake disc at a different phase, and then check the runout 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

M1351002400191

<Front>

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

BRAKE DISC THICKNESS

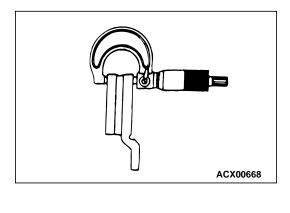
Standard value: 24.0 mm (0.94 inch) Minimum limit: 22.4 mm (0.88 inch)

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

⚠ CAUTION

- After a new brake disc is installed, always grind the brake disc with on-the-car type brake lathe. If this step is not carried out, the brake disc run-out exceeds the specified value, resulting in judder.
- When the on-the-car type lathe is used, first install M12 flat washer on the stud bolt in the brake disc side according to the figure, and then install the adapter. If the adapter is installed with M12 flat washer not seated, the brake disc rotor may be deformed, resulting in inaccurate grinding.
- Grind the brake disc with all wheel nuts diagonally and equally tightened to the specified torque 100 N·m (74 ftlb). When all numbers of wheel nuts are not used, or the tightening torque is excessive or not equal, the brake disc rotor or drum may be deformed, resulting in judder.
- 4. If the disc thick is less than 22.4 mm (0.88 inch) thick, 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.



M12 FLAT WASHER

WASHER

AC006226 AB

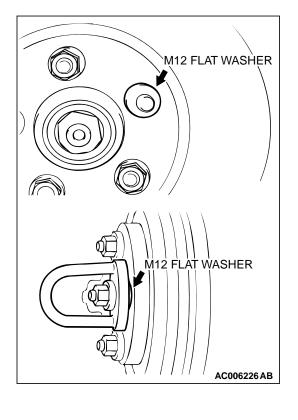
ACX00668

<Rear>

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

Standard value: 18.0 mm (0.71 inch) Minimum limit: 16.4 mm (0.65 inch)

3. Thickness variation (at least 4 positions) should not be more than 0.015 mm (0.0006 inch).



⚠ CAUTION

- After a new brake disc is installed, always grind the brake disc with on-the-car type brake lathe. If this step is not carried out, the brake disc run-out exceeds the specified value, resulting in judder.
- When the on-the-car type lathe is used, first install M12 flat washer on the stud bolt in the brake disc side according to the figure, and then install the adapter. If the adapter is installed with M12 flat washer not seated, the brake disc rotor may be deformed, resulting in inaccurate grinding.
- Grind the brake disc with all wheel nuts diagonally and equally tightened to the specified torque 100 N·m (74 ftlb). When all numbers of wheel nuts are not used, or the tightening torque is excessive or not equal, the brake disc rotor or drum may be deformed, resulting in judder.
- 4. 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

M1351003000196

↑ CAUTION

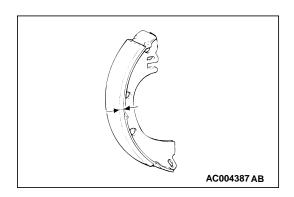
- Whenever the shoe and lining assembly is replaced, replace both RH and LH assemblies as a set to prevent the car from pulling to one side when braking.
- If there is a significant difference in the thickness of the shoe and lining assemblies on the left and right sides, check the sliding condition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

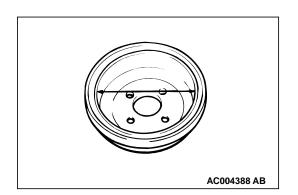
NOTE: For brake lining thickness for drum-in-disc brake, refer to GROUP 36, Parking Brake P.36-9.

- 1. Remove the brake drum.
- 2. Measure the thickness of the brake lining at the place worn the most.

Standard value: 4.7 mm (0.19 inch) Minimum limit: 1.0 mm (0.04 inch)

Replace the shoe and lining assembly if brake lining thickness is less than the limit or if it is not worn evenly. For information concerning the procedures for installation of the shoe and lining assembly, refer to P.35A-48.





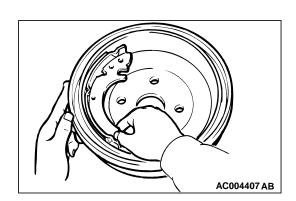
BRAKE DRUM INSIDE DIAMETER CHECK <VEHICLES WITH DRUM BRAKES>

M1351003200327

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

Standard value: 270.0 mm (10.63 inches) Limit: 272.0 mm (10.71 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 < VEHICLES WITH DRUM BRAKES>

M1351003100193

- 1. Remove the brake drum.
- 2. Remove the shoe and lining assembly. (Refer to P.35A-48.)
- 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 area.

NOTE: Clean off chalk after check.

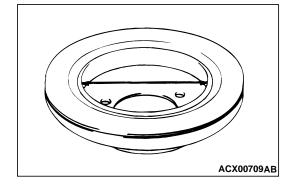
REAR BRAKE DISC INSIDE DIAMETER CHECK <VEHICLES WITH DISC BRAKES>

M1351003200338

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

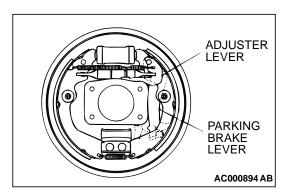
Standard value: 197.0 mm (7.76 inches) Limit: 198.0 mm (7.80 inches)

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

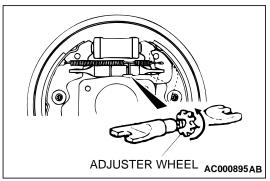


AUTO ADJUSTER FUNCTION CHECK < VEHICLES WITH DRUM BRAKES>

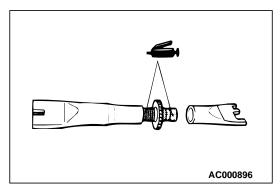
M1351010100173



- 1. Remove the brake drum.
- 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.
- Check both ends of the adjuster for smooth rotation. Replace if faulty.



- 7. Apply brake grease SAE J310, NLGI number 1 as shown.
- 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

M1351010200170

- 1. Remove the reservoir cap and diaphragm.
- 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
 - 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 couple 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.

TSB Revision

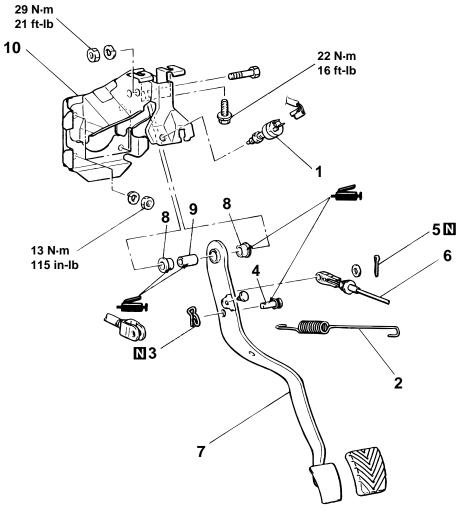
BRAKE PEDAL

REMOVAL AND INSTALLATION

M1351003400202

Post-installation Operation

• Brake Pedal Adjustment (Refer to P.35A-18.)



REMOVAL STEPS

- 1. STOPLIGHT SWITCH
- 2. BRAKE PEDAL RETURN SPRING
- 3. COTTER PIN
- 4. CLEVIS PIN
- 5. COTTER PIN

REMOVAL STEPS (Continued)

AC203962AB

- 6. SHIFT LOCK CABLE CONNECTION
- 7. BRAKE PEDAL
- 8. BUSHING
- 9. SPACER
- 10. PEDAL SUPPORT MEMBER

MASTER CYLINDER ASSEMBLY AND BRAKE BOOSTER

REMOVAL AND INSTALLATION

M1351003700203

⚠ CAUTION

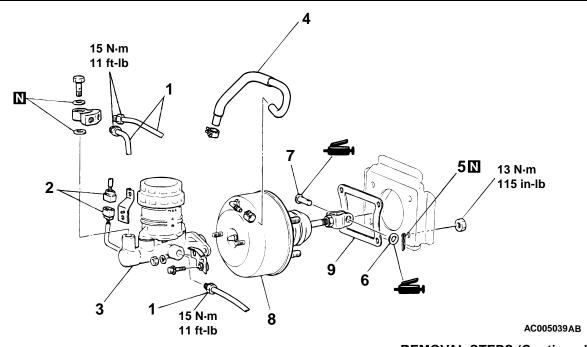
Do not remove the check valve from the vacuum hose. If the check valve is defective, replace it together with the vacuum hose.

Pre-removal Operation

- · Brake Fluid Draining
- Evaporative Emission Canister Assembly Removal (Refer to GROUP 17, Evaporative Emission Canister P.17-101.)

Post-installation Operation

- Evaporative Emission Canister Assembly Installation (Refer to GROUP 17, Evaporative Emission Canister P.17-101.)
- · Brake Fluid Supplying
- Brake Line Bleeding (Refer to P.35A-22.)
- Brake Pedal Adjustment (Refer to P.35A-18.)



REMOVAL STEPS

- 1. BRAKE TUBE CONNECTION
- 2. BRAKE FLUID LEVEL SENSOR CONNECTOR
- MASTER CYLINDER ASSEMBLY

>>B<<

 ADJUSTMENT OF CLEARANCE BETWEEN BRAKE BOOSTER PUSH ROD AND PRIMARY PISTON

REMOVAL STEPS (Continued)

- >>A<< 4. VACUUM HOSE (WITH BUILT-IN CHECK VALVE)
 - 5. COTTER PIN
 - 6. WASHER
 - 7. CLEVIS PIN
 - 8. BRAKE BOOSTER
 - 9. SEALER

Required Special Tool:

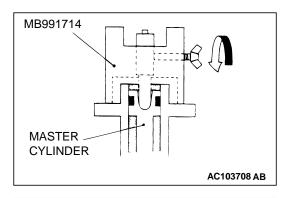
• MB991714: Pushrod Adjust Gauge

INSTALLATION SERVICE POINTS

>>A<< VACUUM HOSE CONNECTION

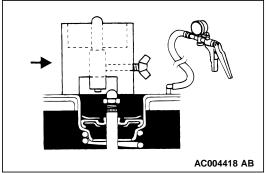
Insert securely and completely until the vacuum hose at the engine side contacts the edge of the hexagonal part of the fitting, and then secure by using the hose clamp.

TSB Revision

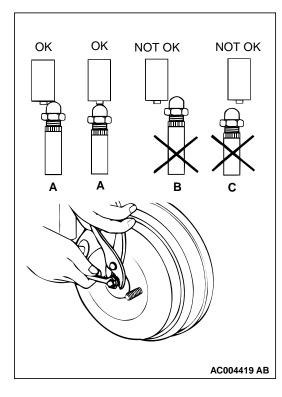


>>B<< CLEARANCE ADJUSTMENT BETWEEN BRAKE BOOSTER PUSHROD AND PRIMARY PISTON

- 1. Set the special tool MB991714 in the master cylinder.
- 2. Set the special tool shaft to a position where it lightly contacts the master cylinder's piston.
- 3. Turn the thumb bolt to fix the shaft.



- 4. Apply a negative pressure of –66.7 kPa (19.6 in.Hg) on the brake booster, using a hand vacuum pump.
- 5. Reverse the special tool MB991714 to shift it from the center of the brake booster.



 Slide the special tool MB991714 toward the center, and confirm that the protrusion of the shaft contacts the end of the brake booster pushrod as shown in drawing A on the left.

If the state is as shown in drawings B and C on the left, adjust the pushrod length with the following steps to achieve the state shown in A.

B: If a section other than the shaft protrusion is contacted, shorten the pushrod.

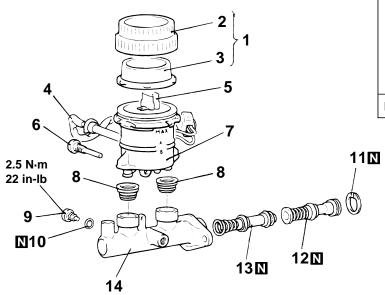
C: If there is no contact with the shaft, lengthen the pushrod.

DISASSEMBLY AND ASSEMBLY

M1351004200193

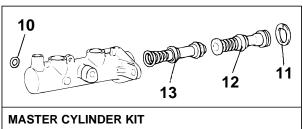
⚠ CAUTION

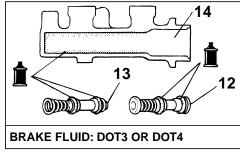
Do not disassemble the primary piston and secondary piston assembly.





- 1. RESERVOIR CAP ASSEMBLY
- 2. RESERVOIR CAP
- 3. DIAPHRAGM
- 4. BRAKE FLUID LEVEL SENSOR
- 5. FLOAT
- 6. RESERVOIR STOPPER BOLT
- 7. RESERVOIR TANK





AC005040AB

REMOVAL STEPS (Continued)

- 8. RESERVOIR SEAL
- 9. PISTON STOPPER BOLT
- 10. GASKET
- 11. PISTON STOPPER RING
- 12. PRIMARY PISTON ASSEMBLY
- 13. SECONDARY PISTON ASSEMBLY
- 14. MASTER CYLINDER BODY

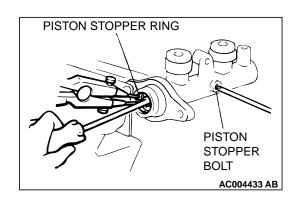
DISASSEMBLY SERVICE POINT

<<A>>>

<<A>>>

<<A>> PISTON STOPPER BOLT/PISTON STOPPER RING DISASSEMBLY

Remove the piston stopper bolt and piston stopper ring while depressing the piston.



INSPECTION

M1351004300178

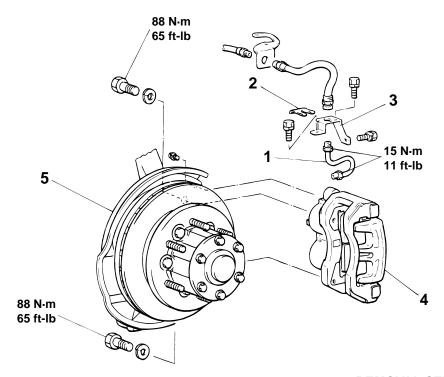
- Check the inner surface of master cylinder body for rust or pitting.
- Check the primary and secondary pistons for rust, scoring, wear or damage.
- · Check the diaphragm for cracks and wear.

FRONT DISC BRAKE ASSEMBLY

REMOVAL AND INSTALLATION

M1351006000203

Pre-removal Operation	Post-installation Operation
Brake Fluid Draining	Brake Fluid Supplying
	 Brake Line Bleeding (Refer to P.35A-22.)



REMOVAL STEPS

- 1. BRAKE TUBE
- 2. CLIP
- 3. BRAKE HOSE BRACKET

REMOVAL STEPS (Continued)

AC005047AB

- >>A<< 4. FRONT BRAKE ASSEMBLY
 - 5. BRAKE DISC (REFER TO GROUP 26, FRONT HUB ASSEMBLY.)

Required Special Tool:

• MB990520: Disc Brake Piston Expander

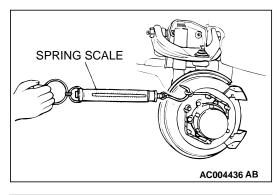
INSTALLATION SERVICE POINT

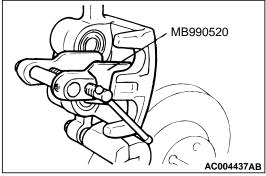
>>A<< FRONT BRAKE ASSEMBLY INSTALLATION

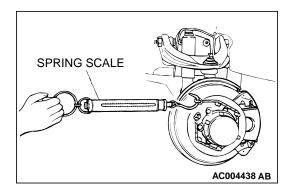
⚠ CAUTION

For the vehicles with 4WD, engage RWD before measurement.

- 1. Measure hub torque (A) with the pad removed to measure the brake drag force after pad installation.
- 2. Securely attach the pad clip to the caliper support.







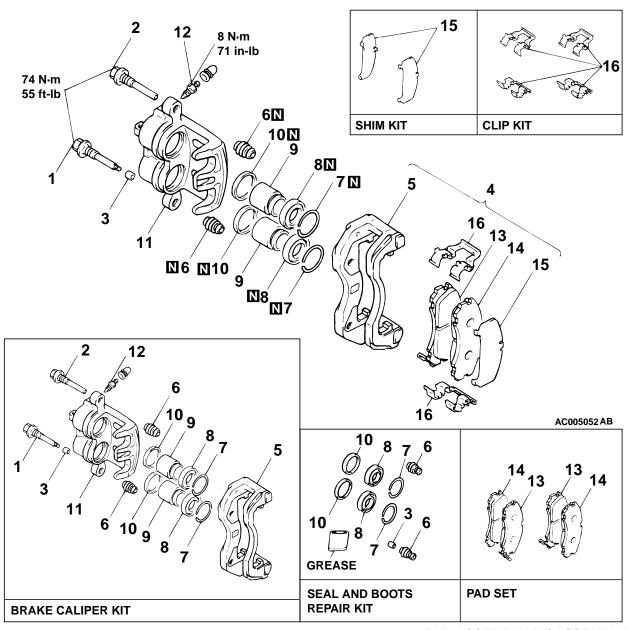
- 3. Clean the piston and insert into cylinder with special tool MB990520.
- Be careful that the piston boot does not become caught, when lowering the caliper assembly and installing the lock pin.
- 5. Check the brake drag force as follows.
 - Start the engine and hold the brake pedal down for 5 seconds. [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

 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.

DISASSEMBLY AND ASSEMBLY

M1351006200229



CALIPER ASSEMBLY DISASSEMBLY STEPS

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

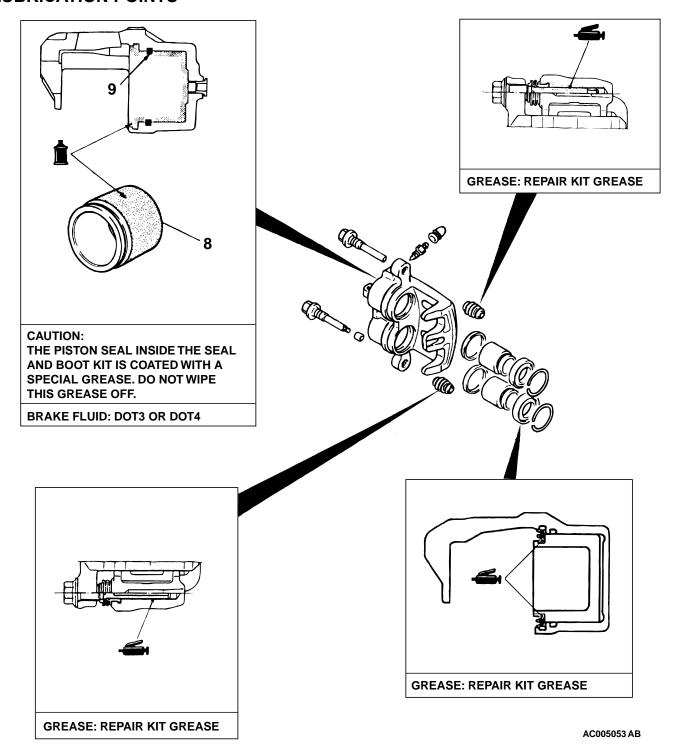
<<A>>>

- <> 10. PISTON SEAL
 - 11. CALIPER BODY
 - 12. BLEEDER SCREW

PAD ASSEMBLY DISASSEMBLY STEPS

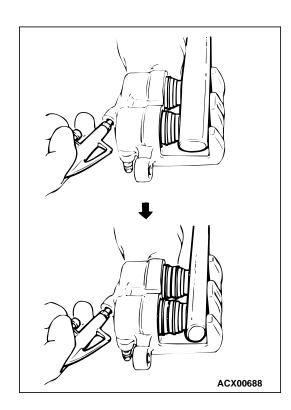
- >>A<< 1. LOCK PIN
- >>**A**<< 2. GUIDE PIN
 - 3. BUSHING
 - 4. CALIPER SUPPORT, PAD, CLIP AND SHIM ASSEMBLY
 - 13. PAD AND WEAR INDICATOR ASSEMBLY
 - 14. PAD ASSEMBLY
 - 15. OUTER SHIM
 - 16. CLIP

LUBRICATION POINTS



DISASSEMBLY SERVICE POINTS

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

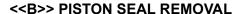


<<A>> PISTON BOOT/PISTON REMOVAL

⚠ CAUTION

- When removing the pistons, be sure to use the handle of a plastic hammer and adjust the height of the two pistons while pumping air slowly in so that the pistons protrude evenly.
- Do not remove one piston completely before trying to remove the other piston, because it will become impossible to remove the second piston.

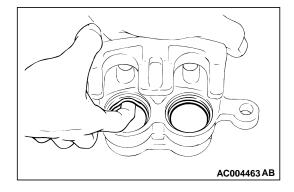
Protect the caliper body with a shop towel. Blow compressed air through the brake hose to remove the piston boot and piston.



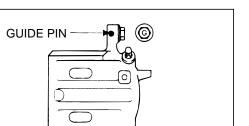
⚠ CAUTION

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 the specified brake fluid DOT3 or DOT4.



ASSEMBLY SERVICE POINT



AC004464 AB

LOCK PIN

>>A<< LOCK PIN/GUIDE PIN INSTALLATION

Install the lock pin and guide pin to the caliper body as shown in the illustration.

INSPECTION

M1351006300215

- 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.

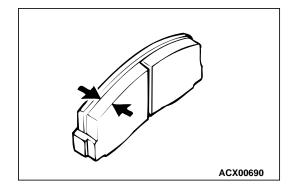
PAD WEAR CHECK

MARNING

- 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: 10.0 mm (0.39 inch) Minimum limit: 2.0 mm (0.08 inch)



REAR DISC BRAKE ASSEMBLY

REMOVAL AND INSTALLATION

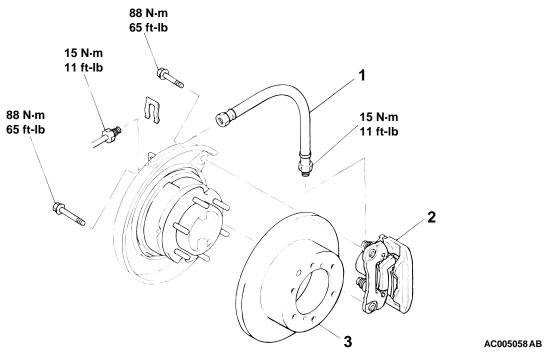
M1351007000154

Pre-removal Operation

· Brake Fluid Draining

Post-installation Operation

- Brake Fluid Supplying
- Brake Line Bleeding (Refer to P.35A-22.)



REMOVAL STEPS

- 1. BRAKE HOSE
- >>A<< 2. REAR BRAKE ASSEMBLY
 - 3. BRAKE DISC

Required Special Tool:

• MB990520: Disc Brake Piston Expander

INSTALLATION SERVICE POINT

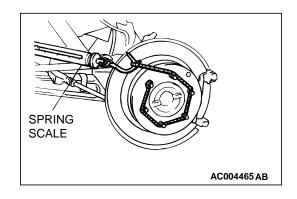
>>A<< DISC BRAKE ASSEMBLY INSTALLATION

1. In order to measure brake drag torque after pad installation, measure hub torque (A) with the pads removed.

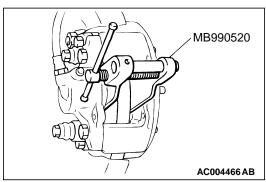
⚠ CAUTION

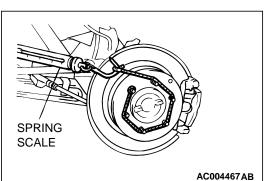
Do not let any oil, grease or other contamination get onto the friction surfaces of the pads and brake discs.

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



BASIC BRAKE SYSTEM REAR DISC BRAKE ASSEMBLY





- 3. Clean the piston, and insert it into the cylinder with special tool MB990520.
- 4. Install the pad assembly to the caliper.
- 5. Start the engine. Depress the brake pedal fully a few times, and then stop the engine.
- 6. Turn the brake disc forward 10 times.
- 7. Check the hub torque (B) with a spring scale.
- 8. Calculate the drag force of the disc brake [difference between hub torque (A) and hub torque (B)].

Standard value: 56 N (13 pound) or less

 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.

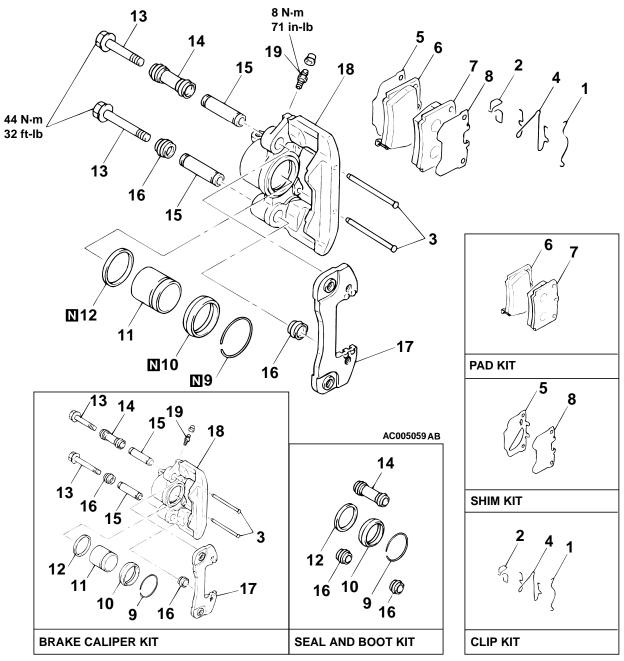
INSPECTION

M1351007100162

BRAKE DISC CHECK
Disc wear (Refer to P.35A-28.)
Disc run-out (Refer to P.35A-27.)

DISASSEMBLY AND ASSEMBLY

M1351007200158



CALIPER ASSEMBLY DISASSEMBLY STEPS

- 1. CLIP
- 2. K-SPRING
- 3. PAD PIN
- 4. SPRING
- T. OITHING
- 5. INNER SHIM
- <<A>> 7. PAD ASSEMBLY
 - 8. OUTER SHIM
 - 9. RETAINING RING
- <> 10. PISTON BOOT
- <> 11. PISTON
- <<C>> 12. PISTON SEAL

CALIPER ASSEMBLY DISASSEMBLY STEPS (Continued)

- 13. SLEEVE BOLT
- 14. BUSHING
- 15. SLEEVE
- 16. PIN BOOT
- 17. INNER CALIPER
- 18. TORQUE PLATE
- 19. BLEEDER SCREW

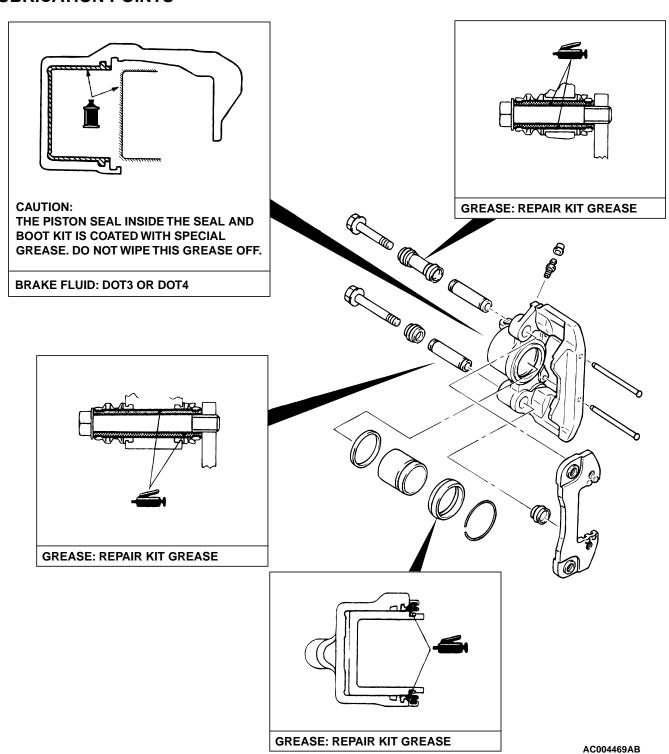
PAD ASSEMBLY DISASSEMBLY STEPS

- CLIP
- 2. K-SPRING
- 3. PAD PIN
- 4. SPRING

PAD ASSEMBLY DISASSEMBLY STEPS (Continued)

- 5. INNER SHIM
- 6. PAD AND WEAR INDICATOR ASSEMBLY
- 7. PAD ASSEMBLY
- 8. OUTER SHIM

LUBRICATION POINTS

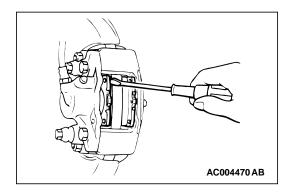


DISASSEMBLY SERVICE POINTS

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

<<A>> PAD AND WEAR INDICATOR ASSEMBLY/PAD ASSEMBLY REMOVAL

Use a flat-tipped screwdriver to remove the pad and wear indicator assembly and the pad assembly.



<> PISTON BOOT/PISTON REMOVAL

⚠ CAUTION

Blow compressed air gently.

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

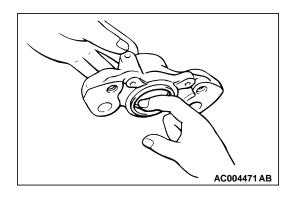


<<C>> PISTON SEAL REMOVAL

⚠ CAUTION

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

- 1. Remove the piston seal with your finger tip.
- Clean the piston surface and inner cylinder with trichloroethylene, alcohol or specified brake fluid DOT3 or DOT4.



INSPECTION PAD WEAR CHECK

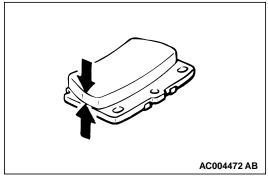
M1351007300155

MARNING

- · 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 an unpredictable vehicle condition.
- 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: 10.0 mm (0.39 inch) Minimum limit: 2.0 mm (0.08 inch)



REAR DRUM BRAKE

REMOVAL AND INSTALLATION

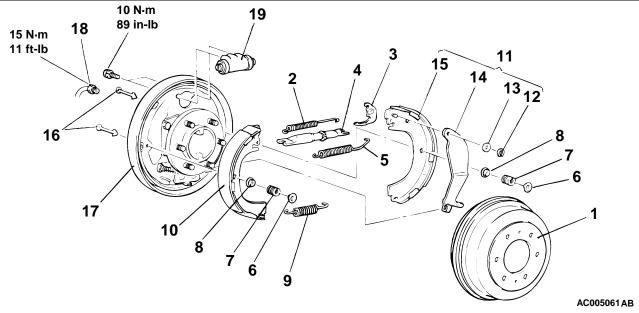
M1351007500193

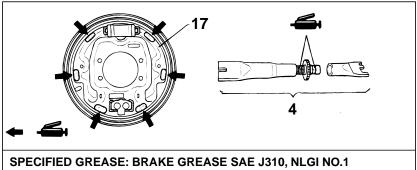
Pre-removal Operation

- · Loosening the Parking Brake Cable Adjusting Nut.
- · Brake Fluid Draining

Post-installation Operation

- Brake Fluid Filling and Air Bleeding (Refer to P.35A-22 or GROUP 35B, On-vehicle Service P.35B-56.)
- Parking Brake Lever Stroke Adjustment (Refer to GROUP 36, On-vehicle Service P.36-2.)





17

SEALANT: 3M™ AAD PART NO. **8509 OR EQUIVALENT**

REAR DRUM BRAKE REMOVAL STEPS

- 1. BRAKE DRUM
- 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
- 11. SHOE AND LEVER ASSEMBLY

<<A>>> >>B<< 12. RETAINER

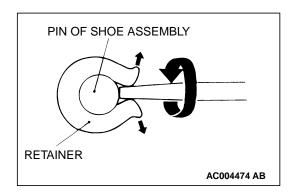
REAR DRUM BRAKE REMOVAL STEPS (Continued)

- >>**A**<< 13. WAVE WASHER
 - 14. PARKING LEVER
 - 15. SHOE AND LINING ASSEMBLY
 - 16. SHOE HOLD-DOWN PIN
 - 17. BACKING PLATE (REFER TO GROUP 27, REAR AXLE SHAFT.) WHEEL CYLINDER REMOVAL **STEPS**
 - 1. BRAKE DRUM
 - 18. BRAKE TUBE CONNECTION
 - 19. WHEEL CYLINDER

REMOVAL SERVICE POINT

<<A>> RETAINER REMOVAL

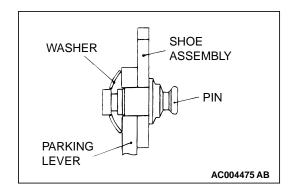
Use a flat-tipped screwdriver or the like to open up the retainer joint, and remove retainer.



INSTALLATION SERVICE POINTS

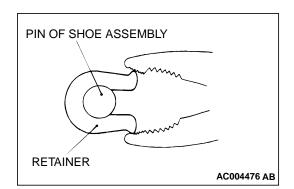
>>A<< WAVE WASHER INSTALLATION

Install the washer in the direction shown in the illustration.



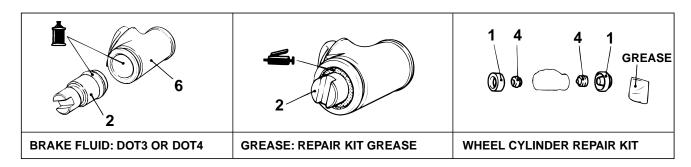
>>B<< RETAINER INSTALLATION

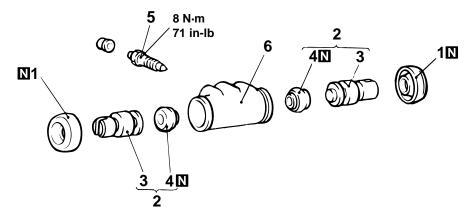
Use pliers or the like to close the retainer end onto the pin.



WHEEL CYLINDER DISASSEMBLY AND ASSEMBLY

M1351007700197





DISASSEMBLY STEPS

- 1. BOOTS
- 2. PISTON ASSEMBLY

>>**A**<< 3. PISTONS

DISASSEMBLY STEPS (Continued)

AC005062AB

- >>A<< 4. PISTON CUPS
 - 5. BLEEDER SCREW
 - 6. WHEEL CYLINDER BODY

Required Special Tool:

• MB990623: Installer

ASSEMBLY SERVICE POINT

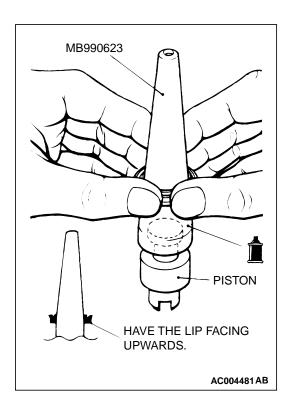


- 1. Use alcohol or specified brake fluid DOT3 or DOT4 to clean the wheel cylinder and the piston.
- 2. Apply the specified brake fluid DOT3 or DOT4 to the piston cups and special tool MB990623.



In order to keep the piston cup from becoming twisted or slanted, slide the piston cup down the tool MB990623 slowly and carefully, without stopping.

 Set the piston cup on special tool MB990623 with the lip of the cup facing up. Fit the cup onto the special tool MB990623, and then slide it down the outside of the tool MB990623 into the piston groove.



INSPECTION

M1351007800172

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

<VEHICLES WITHOUT ABS>

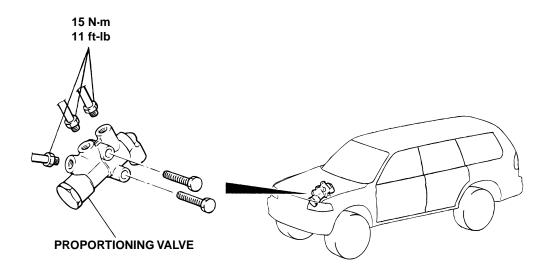
M1351005700157

Pre-removal Operation

- · Brake Fluid Draining
- Air Cleaner Removal (Refer to GROUP 15, Air Cleaner P.15-4.)

Post-installation Operation

- Air Cleaner Installation (Refer to GROUP 15, Air Cleaner P.15-4.)
- Brake Fluid Supplying
- Brake Lines Bleeding (Refer to P.35A-22.)



AC005063 AB

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1351009600196

ITEM	SPECIFICATION	
Brake line		
Brake tube flare nut	15 N·m (11 ft-lb)	
Brake pedal		
Brake pedal mounting nut	29 N·m (21 ft-lb)	
Pedal support member mounting bolt	22 N·m (16 ft-lb)	
Front disc brake	-	
Bleeder screw	8 N·m (71 in-lb)	
Front brake assembly mounting bolt	88 N·m (65 ft-lb)	
Guide pin	74 N·m (55 ft-lb)	
Lock pin	74 N·m (55 ft-lb)	
Master cylinder and brake booster		
Brake booster mounting nut	13 N·m (115 in-lb)	
Piston stopper bolt	2.5 N·m (22 in-lb)	
Rear disc brake	'	

BASIC BRAKE SYSTEM SPECIFICATIONS

ITEM	SPECIFICATION	
Bleeder screw	8 N⋅m (71 in-lb)	
Rear disc brake assembly mounting bolt	88 N·m (65 ft-lb)	
Sleeve bolt	44 N·m (32 ft-lb)	
Rear drum brake		
Bleeder screw	8 N⋅m (71 in-lb)	
eel cylinder mounting bolt 10 N·m (89 in-lb)		

GENERAL SPECIFICATIONS

M1351000200180

ITEM		RWD	4WD
Master cylinder ID mm (in)	Vehicles with 15 inch front disc brake disc	23.8 (0.9)	23.8 (0.9)
	Vehicles with 16 inch front disc brake disc	25.4 (1.0)	25.4 (1.0)
Brake booster effective dia. of power cylinder mm (in)		205 + 230 (8.1 + 9.1)	205 + 230 (8.1 + 9.1)
Brake booster boosting ratio	Vehicles with 15 inch front disc brake disc	6.0 + 7.5	6.0 + 7.5
	Vehicles with 16 inch front disc brake disc	6.5 + 8.0	6.5 + 8.0
Front disc brake disc effective dia. mm (in)	Vehicles with 15 inch front disc brake disc	228 (9.0)	228 (9.0)
	Vehicles with 16 inch front disc brake disc	266 (10.5)	266 (10.5)
Front disc brake wheel cylinder ID mm (in)		42.9 (1.7)	42.9 (1.7)
Rear disc brake disc effective dia. mm (in)		_	272 (10.7)
Rear disc brake wheel cylinder ID mm (in)		_	42.9 (1.7)
Rear drum brake drum ID mm (in)		270 (10.1)	_
Rear drum brake wheel cylinder ID mm (in)		23.8 (0.9)	_
Rear drum brake lining thickness mm (in)		4.7 (0.12)	-

SERVICE SPECIFICATIONS

M1351000300239

ITEM		STANDARD VALUE	LIMIT
Brake pedal height mm (in)		176 – 181 (6.9 – 7.1)	_
Brake pedal play mm (in)		3 - 8 (0.1 - 0.3)	_
Brake pedal to floor board clearance mm (in)		95 (3.7) or more	_
pressure kPa (psi) inch front disc brake disc	2,452 (356)	-	
	inch front disc	3,432 (498)	_
Proportioning valve input fluid pressure kPa (psi)		5,884 (853)	-

BASIC BRAKE SYSTEM SPECIFICATIONS

ITEM		STANDARD VALUE	LIMIT
Proportioning valve output fluid pressure kPa (psi) <vehicles abs="" without=""></vehicles>	Vehicles with 15 inch front disc brake disc	3,526 – 3,918 (512 – 568)	_
	Vehicles with 16 inch front disc brake disc	4,114 – 4,536 (601 – 657)	-
Disc brake pad thickness mm (in)	•	10.0 (0.39)	Minimum 2.0 (0.08)
Disc brake disc thickness mm (in)	Front	24.0 (0.94)	Minimum 22.4 (0.88)
	Rear	18.0 (0.71)	Minimum 16.4 (0.65)
Disc brake disc run-out mm (in)	Front	_	0.03 (0.001)
	Rear	_	0.08 (0.003)
Front disc brake drags force N (lb)		69 (16) or less	_
Rear disc brake drag force N (lb)		56 (13) or less	_
Rear drum brake lining thickness mm (in)		4.7 (0.19)	Minimum 1.0 (0.04)
Rear drum inside diameter mm (in)		270.0 (10.63)	272.0 (10.71)
Rear disc inside diameter mm (in)		197.0 (7.76)	198.0 (7.80)
Front hub end play mm (in)		_	0.05 (0.002)
Rear axle shaft end play mm (in)		0 - 0.25 (0 - 0.010)	_

LUBRICANTS

M1351000400214

ITEM	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	
Rear brake shoe and backing plate contact surface	Brake grease SAE J310, NLGI No.1
Auto adjuster assembly	

SEALANT

M1351000500222

ITEM	SPECIFIED SEALANT	REMARK
Shoe hold-down pin	3M™ AAD Part No.8509 or equivalent	Drying sealant