

GROUP 35A

BASIC BRAKE SYSTEM

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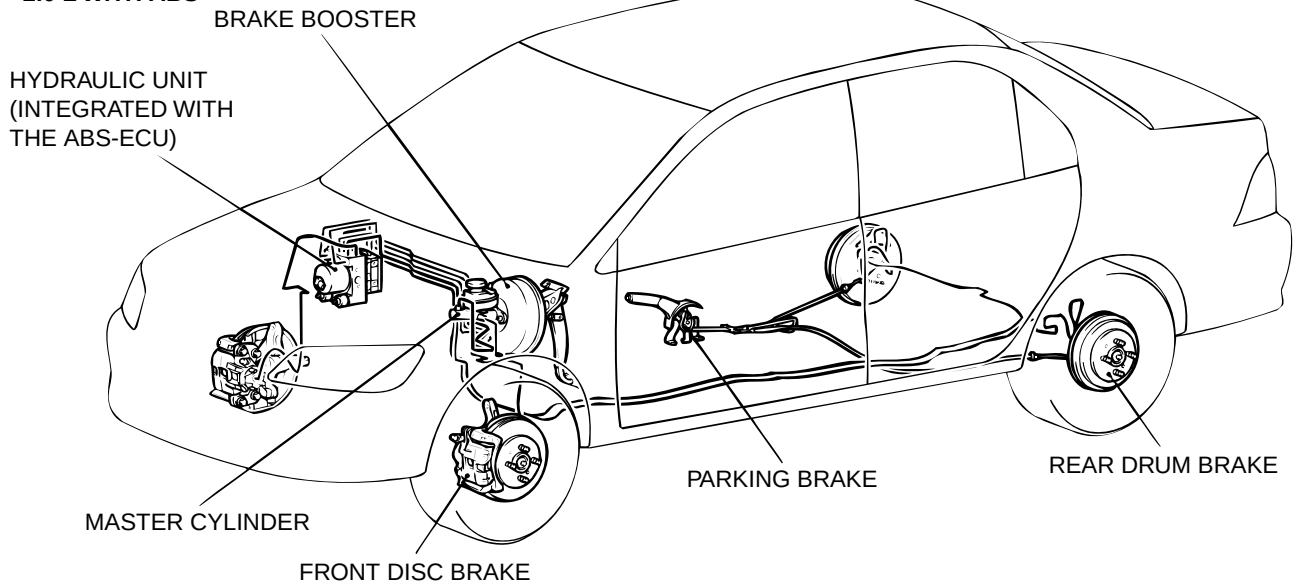
GENERAL DESCRIPTION

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The brake system offers high dependability and durability along with improved braking performance and brake sensitivity.

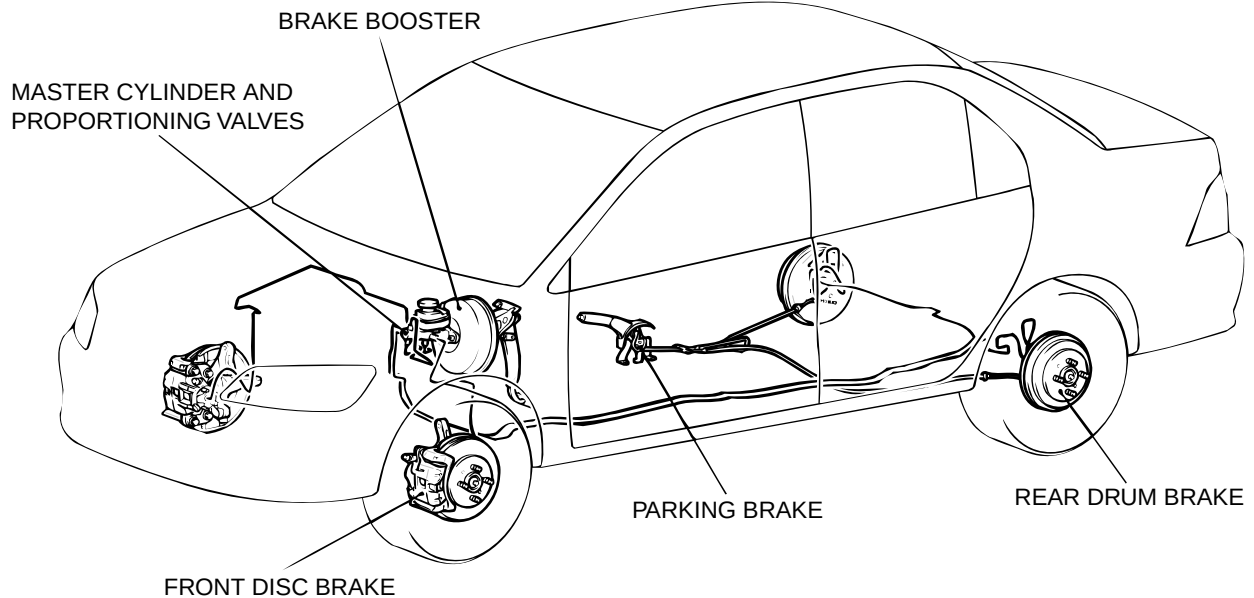
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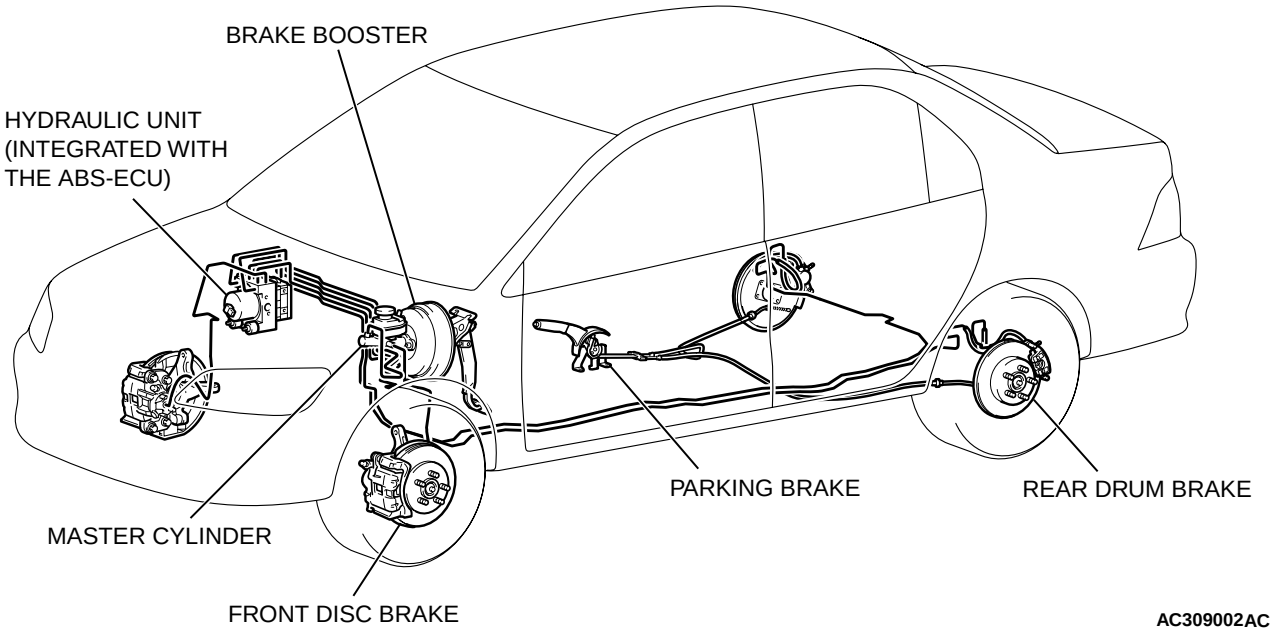
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BASIC BRAKE SYSTEM DIAGNOSIS

INTRODUCTION TO BASIC BRAKE SYSTEM DIAGNOSIS

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

BASIC BRAKE SYSTEM DIAGNOSTIC TROUBLESHOOTING STRATEGY

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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

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SYMPTOMS	INSPECTION PROCEDURE		REFERENCE PAGE
Vehicle pulls to one side when brakes are applied	1	Vehicles with rear drum brakes	P.35A-5
		Vehicles with rear disc brakes	P.35A-7
Insufficient braking power	2	Vehicles with rear drum brakes	P.35A-7
		Vehicles with rear disc brakes	P.35A-9

SYMPTOMS	INSPECTION PROCEDURE		REFERENCE PAGE
Increased pedal stroke (Reduced pedal-to-floor board clearance)	3		P.35A-10
Brake drag	4	Vehicles with rear drum brakes	P.35A-11
		Vehicles with rear disc brakes	P.35A-12
Scraping or grinding noise when brake are applied	5		P.35A-14
Squealing, groaning or chattering noise when brake are applied	6		P.35A-15
Squealing noise when brakes are not applied	7		P.35A-16
Groaning, clicking or rattling noise when brakes are not applied	8		P.35A-18

SYMPTOM PROCEDURES

INSPECTIONPROCEDURE 1: Vehicle Pulls to One Side when Brakes are Applied <Vehicles with Rear Drum Brakes>

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.

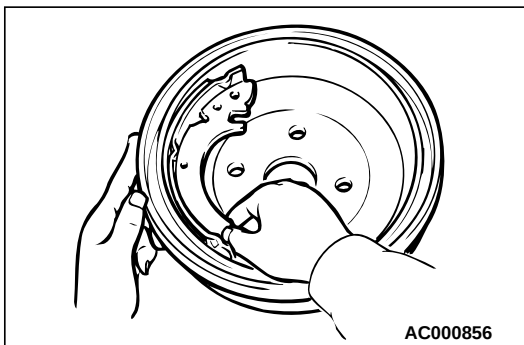
Put chalk on the inner surface of the brake drum. Rub the lining against the drum inner surface.

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-33.

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-32](#).

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 the brake assembly (Refer to [P.35A-41](#)). Then go to Step 8.

STEP 6. Check brake disc(s) for run out.

Refer to [P.35A-30](#).

Q: Is runout outside of specifications?

YES : Repair and replace the brake disc(s) as necessary. Then go to Step 8.

NO : Go to Step 7.

STEP 7. Check brake discs for correct thickness.

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

Q: Is the thickness outside of specifications?

YES : Repair or replace the brake discs(s) 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.

INSPECTION PROCEDURE 1: Vehicle Pulls to One Side when Brakes are Applied <Vehicles with Rear Disc Brakes>

DIAGNOSIS

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

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

YES : Replace the part and determine the source/cause of foreign material. Then go to Step 5.

NO : Go to Step 2.

STEP 2. 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 extend slowly and smoothly with no jumpiness. Repeat for each disc brake assembly.

Q: Do the piston move correctly?

YES : Go to Step 3.

NO : Disassemble and inspect the brake assembly (Front: refer to [P.35A-44](#), Rear: refer to [P.35A-55](#)). Then go to Step 5.

STEP 3. Check brake discs for runout.

Refer to [P.35A-30](#).

Q: Is runout outside of specifications?

YES : Repair or replace the brake disc(s) as necessary. Then go to Step 5.

NO : Go to Step 4.

STEP 4. Check brake discs for correct thickness.

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

Q: Is the thickness outside of specifications?

YES : Repair or replace the brake disc(s) as necessary. Then go to Step 5.

NO : Perform the brake line bleeding. Then 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 appears, refer to the appropriate symptom chart.

INSPECTION PROCEDURE 2: Insufficient Braking Power <Vehicles with Rear Drum Brakes>

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-24](#)). Then go to Step 9.

NO : Go to Step 2.

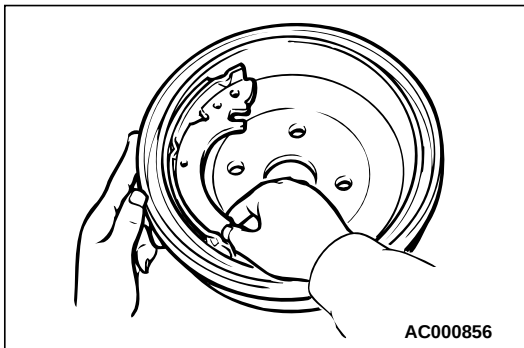
STEP 2. Check for spongy (not firm brakes).

- (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-24.](#)). Then go to Step 9.

NO : Go to Step 3.

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

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-33.](#)

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-22.](#)

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. Retest the system. Then go to Step 9.

NO : The procedure is complete. If condition persists, go to Step 8.

STEP 8. Check the proportioning valve operation.

Refer to [P.35A-23](#).

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.

INSPECTION PROCEDURE 2: Insufficient Braking Power <Vehicles with Rear Disc Brakes>

DIAGNOSIS

STEP 1. Check that the specified brake fluid is used, its level is correct, and no contamination is found.

Q: Is there a fault?

YES : Refill or replace with the specified brake fluid DOT 3 or DOT 4. Bleed the brakes if necessary (Refer to [P.35A-24](#)). Then go to Step 6.

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 the booster vacuum reserve.
- (2) With the brake pedal fully released, depress the brake pedal slowly until it stops.
- (3) With a measuring device (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-24](#)). Then go to Step 6.

NO : Go to Step 3.

STEP 3. Check the brake booster function.

Refer to [P.35A-22](#).

Q: Is there a fault?

YES : Replace the brake booster. Then go to Step 6.

NO : Go to Step 4.

STEP 4. Check for pinched or restricted brake tube or hose.

Q: Is there a pinched or restricted brake tube or hose?

YES : Replace that complete section of brake tube or brake hose. Then go to Step 6.

NO : Go to Step 5.

STEP 5. Check for oil, water, etc., on the pad contact surfaces of all brakes.

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

YES : Replace the part and determine the source/cause of foreign material. Retest the system. Then go to Step 6.

NO : The procedure is complete.

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 appropriate 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-24](#).) Then go to Step 8.**NO :** Go to Step 2.

STEP 2. Check the pad or lining for wear.Refer to [P.35A-25](#) or [P.35A-32](#).**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-23](#).**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-33](#).**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 <Vehicles with rear drum brakes> :** Go to Step 6.**NO <Vehicles with rear disc brakes> :** Go to Step 7.

STEP 6. Check the auto adjuster function.

<Vehicles with rear drum brakes>

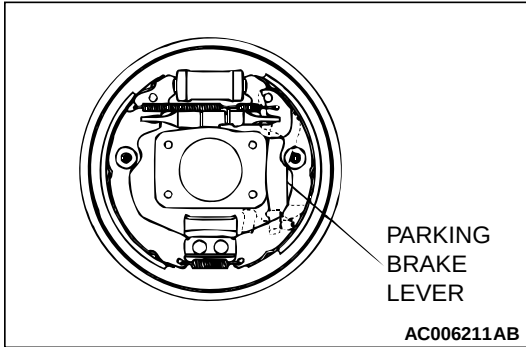
Refer to [P.35A-33](#).**Q: Is there fault?****YES :** Repair the part. Then go to Step 8.**NO :** Go to Step 7.

STEP 7. Check the clearance (too much) between the push rod and primary piston.Refer to [P.35A-36](#).**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.

INSPECTION PROCEDURE 4: Brake Drag <Vehicles with Rear Drum Brakes>

DIAGNOSIS



STEP 1. Check the parking brake lever return.

Q: Is there fault?

YES : Repair it. Then go to Step 9.

NO : Go to Step 2.

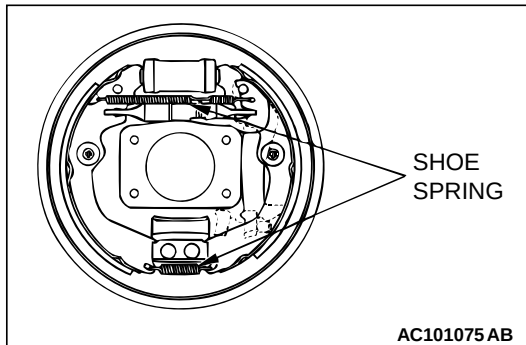
STEP 2. Check the parking brake pull amount.

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 9.

NO : Go to Step 3.



STEP 3. Check the brake shoe springs for breakage.

Q: Are the brake shoe springs broken?

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

NO : Go to Step 4.

STEP 4. Check the amount of grease at each sliding section.

Refer to [P.35A-48](#).

Q: Is the grease amount low?

YES : Apply grease. Then go to Step 9.

NO : Go to Step 5.

STEP 5. Check the clearance (too low) between the push rod and primary piston.

Refer to [P.35A-36](#).

Q: Is there fault?

YES : Adjust the clearance. Then go to Step 9.

NO : Go to Step 6.

STEP 6. Check the master cylinder piston return spring for damage and return port for clogging.

Refer to [P.35A-38](#).

Q: Is there damage?

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

NO : Go to Step 7.

STEP 7. Check port for clogging.

Q: Is the port clogged?

YES : Repair it. Then go to Step 9.

NO : Go to Step 8.

STEP 8. 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 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.

INSPECTION PROCEDURE 4: Brake Drag <Vehicles with Rear Disc Brakes>

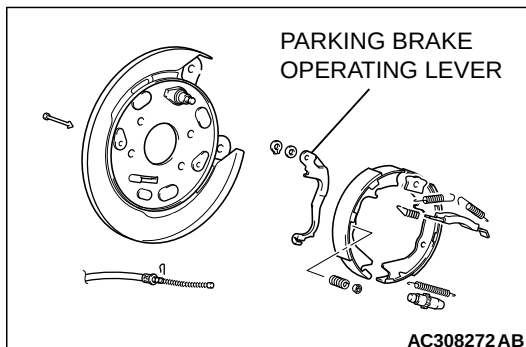
DIAGNOSIS

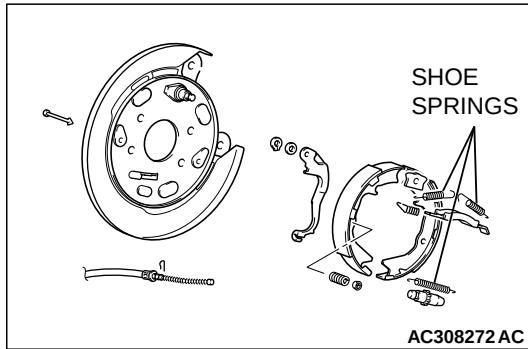
STEP 1. Check the parking brake operating lever return.

Q: Is the operation faulty?

YES : Repair it. Then go to Step 9.

NO : Go to Step 2.





STEP 2. Check the brake shoe springs for breakage.

Q: Are the brake shoe springs broken?

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

NO : Go to Step 3.

STEP 3. Check the amount of grease at each sliding section.

Refer to GROUP 36, Parking Brake Lining and Drum [P.36-9](#).

Q: Is the grease amount low?

YES : Apply grease. Then go to Step 9.

NO : Go to Step 4.

STEP 4. 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 a fault?

YES : Adjust it. Then go to Step 9.

NO : Go to Step 5.

STEP 5. Check for insufficient clearance between the push rod and primary piston.

Refer to [P.35A-36](#).

Q: Is there a fault?

YES : Adjust the clearance. Then go to Step 9.

NO : Go to Step 6.

STEP 6. Check the master cylinder piston return spring for damage and return port for clogging.

Refer to [P.35A-38](#).

Q: Is there damage?

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

NO : Go to Step 7.

STEP 7. Check port for clogging.

Q: Is the port clogged?

YES : Repair it. Then go to Step 9.

NO : Go to Step 8.

STEP 8. Check disc brake pistons for sticking.

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

Q: Does any wheel stick?

YES : Inspect that brake assembly. 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.

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 the 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?**

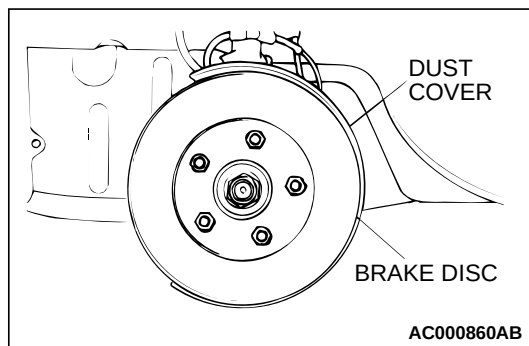
YES : Repair or replace the part. Then go to Step 6.

NO : Go to Step 3.

STEP 3. Check for interference between the dust cover and brake disc.**Q: Is there interference?**

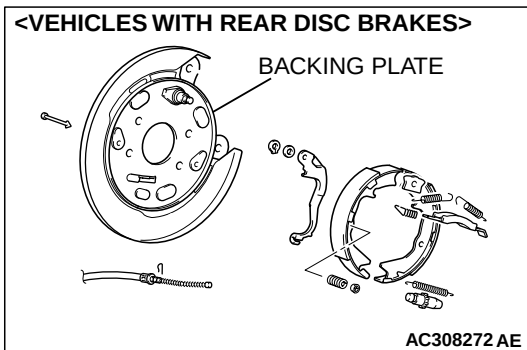
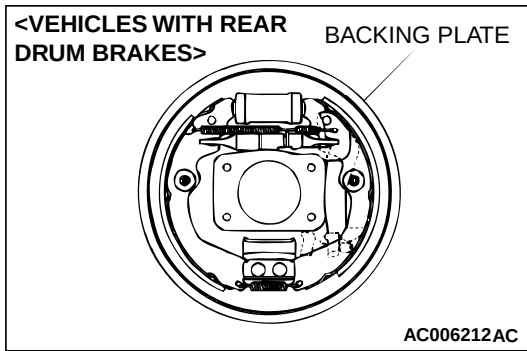
YES : Repair or replace the part. Then go to Step 6.

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. 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.

INSPECTION PROCEDURE6: 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.

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-20](#) or [P.35A-36](#).

Q: Are the brake pedal and the brake booster pushrod adjusted correctly?

YES : Adjust the brake pedal and the brake booster pushrod. 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.

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.

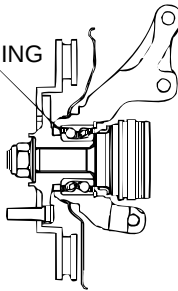
Q: Are the wheel bearings damaged or out of grease?

YES : Apply grease or replace the part. Then go to Step 10.

NO : Go to Step 8.

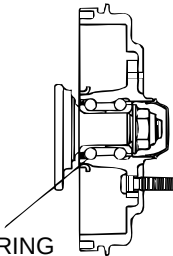
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WHEEL BEARING



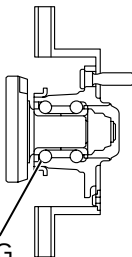
<REAR DRUM BRAKE>

WHEEL BEARING



<REAR DISC BRAKE>

WHEEL BEARING



AC309097AB

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-20](#) or [P.35A-36](#).

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 98 ± 10 N·m (73 ± 7 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 100 ± 10 N·m (74 ± 7 ft-lb) for the front caliper. Tighten to 60 ± 5 N·m (45 ± 3 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.

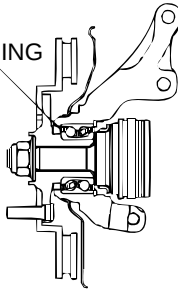
Q: Is there fault?

YES : Apply grease or replace the part. Then go to Step 5.

NO : Go to Step 5.

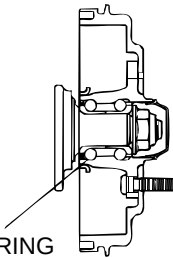
<FRONT>

WHEEL BEARING



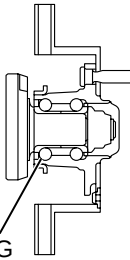
<REAR DRUM BRAKE>

WHEEL BEARING



<REAR DISC BRAKE>

WHEEL BEARING



AC309097AB

STEP 5. Retest the system.

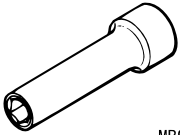
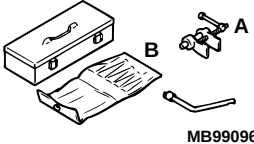
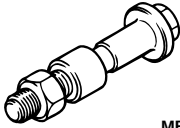
Q: Is the symptom eliminated?

YES : The procedure is complete.

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

SPECIAL TOOLS

M1351000600092

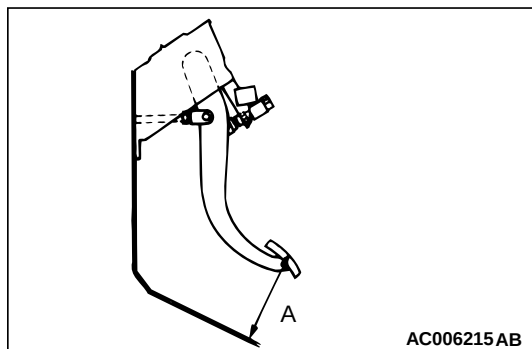
TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 MB991568	MB991568 Push rod adjusting socket	General service tool	Adjustment of the brake booster push rod protrusion amount
 MB990964	MB990964 Brake tool set A: MB990520 Disc brake piston expander B: MB990619 Installer	MB990619-01 or general service tool	- Pushing-in of the disc brake piston - Installation of the drum brake wheel cylinder piston cup
 MB990998	MB990998 Front hub remover and installer	MB990998-01	Provisional holding of the wheel bearing

ON-VEHICLE SERVICE

BRAKE PEDAL CHECK AND ADJUSTMENT

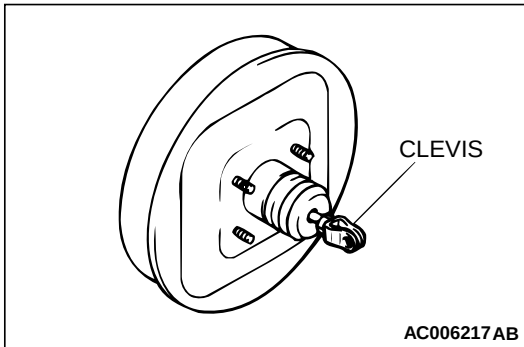
M1351000900101

BRAKE PEDAL HEIGHT

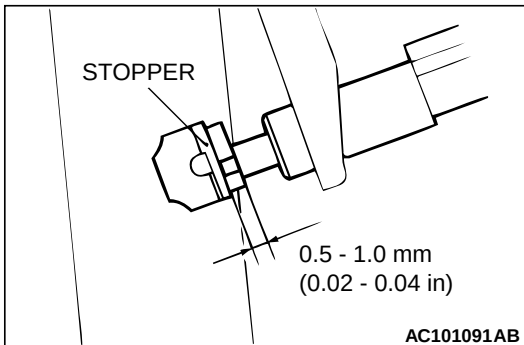


- Turn up the carpet, etc. under the brake pedal.
- Measure the brake pedal height as illustrated.
Standard value (A): 169.1 – 172.1 mm (6.7 – 6.8 inches)
[From the surface of melting sheet (floorboard) to the face of pedal pad]
- If the brake pedal height is not within the standard value, follow the procedure below.
 - Disconnect the stoplight switch connector.
 - If the brake pedal height is not within the standard value, follow the procedure below.
 - Remove the brake booster. (Refer to [P.35A-36.](#))

NOTE: With the master cylinder and brake pipe connected, remove the brake booster only.



- (4) Adjust the brake pedal height by turning the clevis.
NOTE: When the clevis is turned 180 degrees, the pedal height is changed approximately 2.4 mm (0.09 in).
- (5) Install the brake booster. (Refer to [P.35A-36](#).)
- (6) Measure the brake pedal height, and ensure that the measured value is within the specified value. When it is out of the specified value, repeat Step (3) - (6).



- (7) Screw in the stop light switch until its thread contacts the stopper, and fix the stop light switch by turning it approximately one quarter of a turn clockwise.
- (8) Check that the clearance between the stop light switch and the stopper is as shown.
- (9) Connect the connector at the stoplight switch.

⚠ CAUTION

Check that the stop lamp does not illuminate when the brake pedal is not depressed.

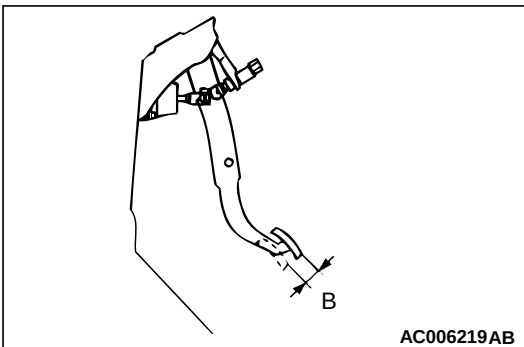
4. For A/T models, check the key interlock and shift lock mechanisms. (Refer to GROUP 23A, On-vehicle Service [P.23A-344](#).)
5. Return the carpet, etc.

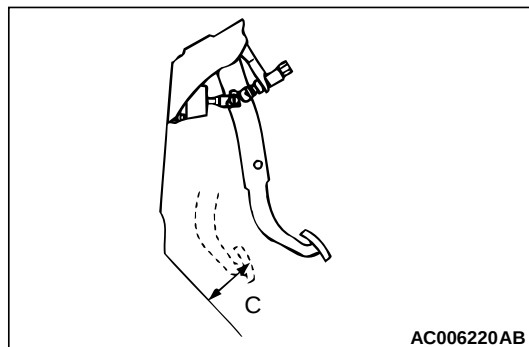
BRAKE PEDAL FREE PLAY

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 (C): 90 mm (3.5 inches) or more [From the surface of melting sheet (floorboard) to the face of pedal pad]

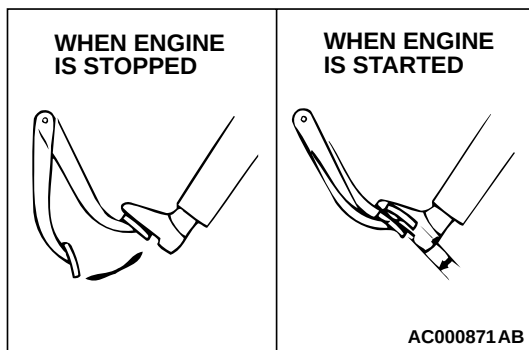
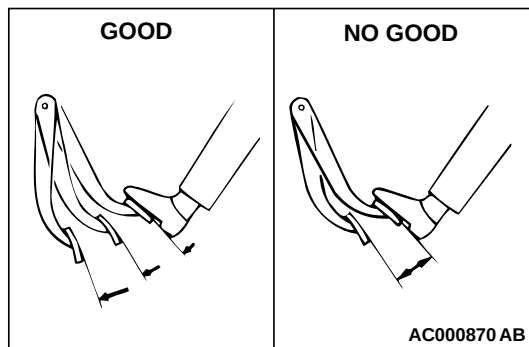
3. If the clearance is outside the standard value, check for air trapped in the brake line, thickness of the disc brake pad, clearance between the lining and the drum and dragging in the parking brake. And then adjust and replace defective parts as required.
4. Return the carpet etc. to its original position.

BRAKE BOOSTER OPERATING TEST

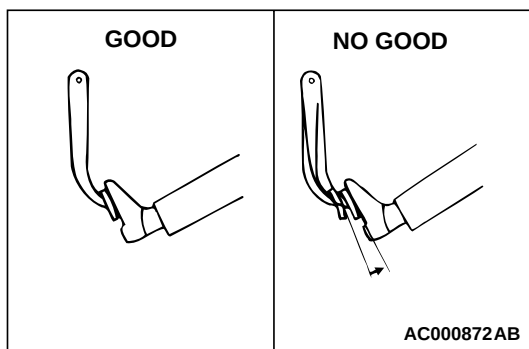
M1351001000093

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-23](#).), 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

M1351009000097

⚠ CAUTION

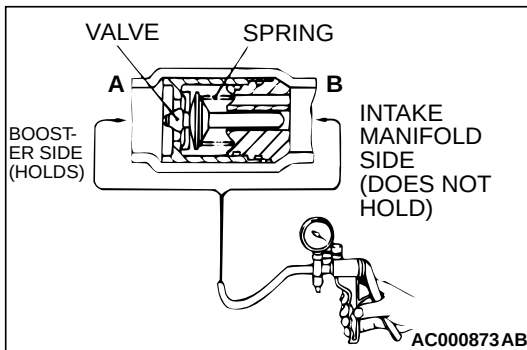
The check valve should not be removed from the vacuum hose.

1. Remove the vacuum hose. (Refer to [P.35A-36](#).)

⚠ CAUTION

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.

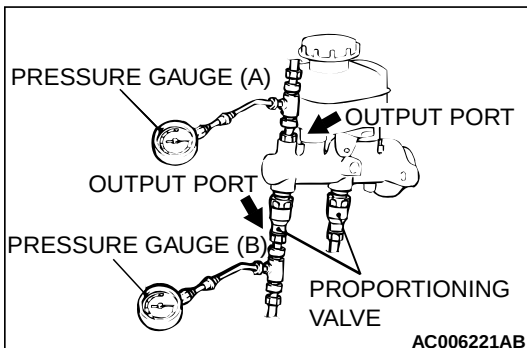
PROPORTIONING VALVE FUNCTION TEST <VEHICLES WITHOUT ABS>

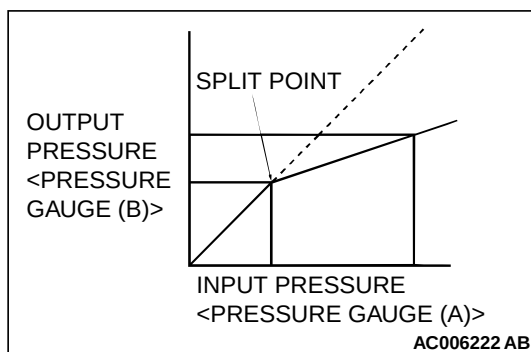
M1351001100368

⚠ CAUTION

The proportioning valves are installed independently for the right and left brake lines. Always measure each valve.

1. Connect two pressure gauges to the output port of the master cylinder and output port of the proportioning valve.
2. Bleed the brake line and the pressure gauges (Refer to [P.35A-24](#)).





- Depress the brake pedal gradually. Then check that the split point, where the output fluid pressure begins to drop in proportion to the output fluid pressure, is at the standard value.

Standard value: 3.19 – 3.67 MPa (463 – 532 psi)

- Depress the brake pedal more strongly than at the above step. Then check that the output fluid pressure is at the standard value when the input fluid pressure is 6.86 MPa (995 psi).

Standard value: 4.17 – 4.66 MPa (605 – 676 psi)

- Measure each output fluid pressure at both valves, and check that the difference between the two is at the limit value or less.

Limit: 0.5 MPa (73 psi)

- If the measured pressure exceeds the limit, replace the proportioning valve.

BLEEDING

M1351001400284

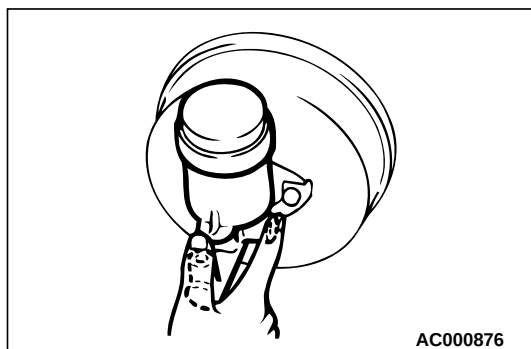
CAUTION

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.)

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



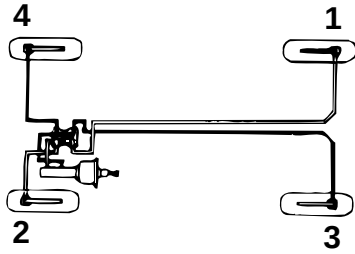
BRAKE LINE BLEEDING

⚠ CAUTION

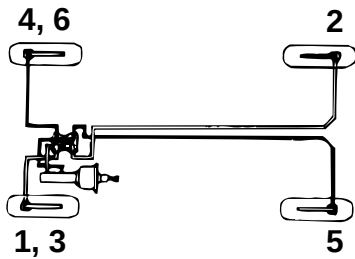
For vehicles equipped with ABS, be sure to filter/strain the brake fluid being added to the master cylinder reservoir tank. Debris may damage the hydraulic unit.

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

VEHICLES WITH ABS



VEHICLES WITHOUT ABS

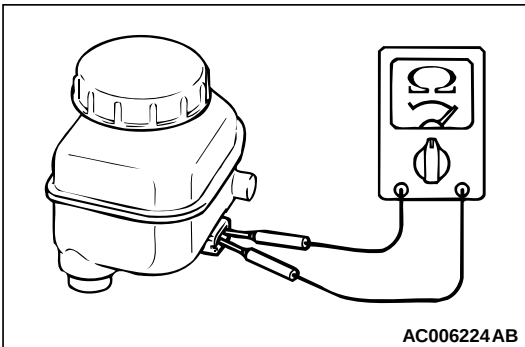


AC006223 AB

BRAKE FLUID LEVEL SENSOR CHECK

M1351009100094

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

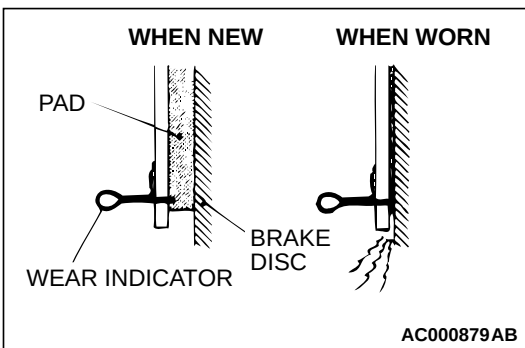


AC006224 AB

FRONT DISC BRAKE PAD CHECK AND REPLACEMENT

M1351002300440

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.



AC000879 AB

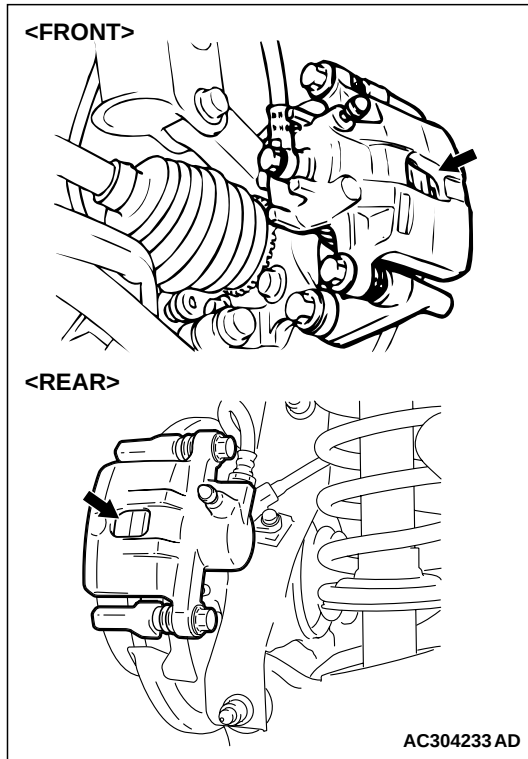
⚠ CAUTION

- 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 and slide pins.

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

Standard value: 10.0 mm (0.39 inch)

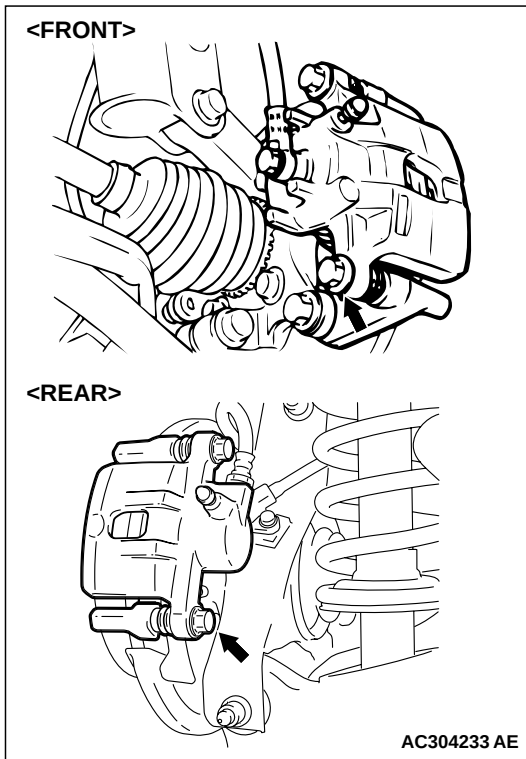
Minimum limit: 2.0 mm (0.08 inch)



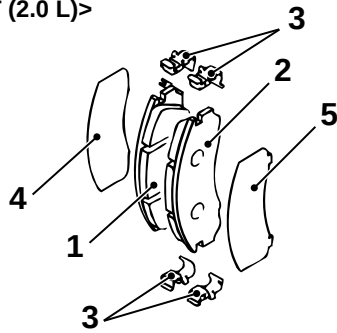
⚠ CAUTION

Do not wipe off the special grease that is on the slide pin or allow it to contaminate the slide pin.

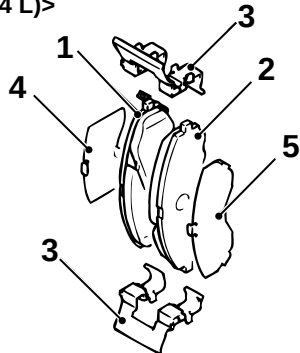
2. Remove the front brake bolt/rear brake pin (lock pin). Pivot the caliper assembly and hold it with wires.



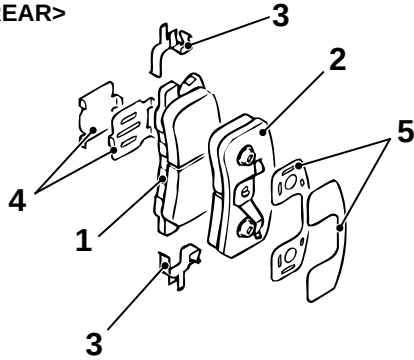
<FRONT (2.0 L)>



<FRONT (2.4 L)>



<REAR>



AC309119 AB

3. Remove the following parts from caliper support.
- (1) Pad and wear indicator assembly or pad assembly
 - (2) Pad assembly
 - (3) Front brake clip/rear brake clip
 - (4) Inner shim
 - (5) Outer shim

4. In order to measure the brake drag force after pad installation, measure the rotary-sliding resistance of the hub with the pads removed. For the front brakes, refer to [P.35A-39](#). For the rear brakes, refer to [P.35A-53](#).
5. Install the pads and caliper assembly, and then check the brake drag force. For the front brakes, refer to [P.35A-39](#). For the rear brakes, refer to [P.35A-53](#).

DISC BRAKE ROTOR CHECK

M1351002900099

CAUTION

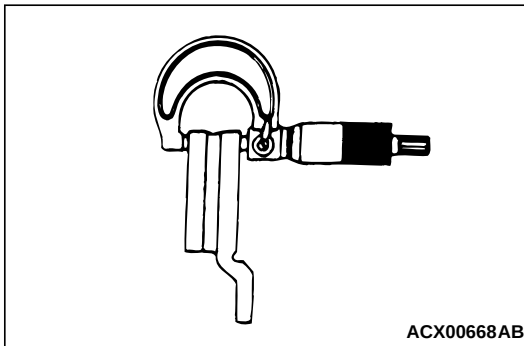
Disc brakes must be kept within the allowable service values in order to maintain normal brake operation.

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

INSPECTION ITEMS	REMARKS
Scratches, rust, saturated lining materials and wear	- 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. - 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.
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.
Inset or warping (flatness)	Overheating and improper handling while servicing will cause warping or distortion.

BRAKE DISC THICKNESS CHECK

M1351002400395



- 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.

Standard value:

<Front> 26.0 mm (1.02 inch)

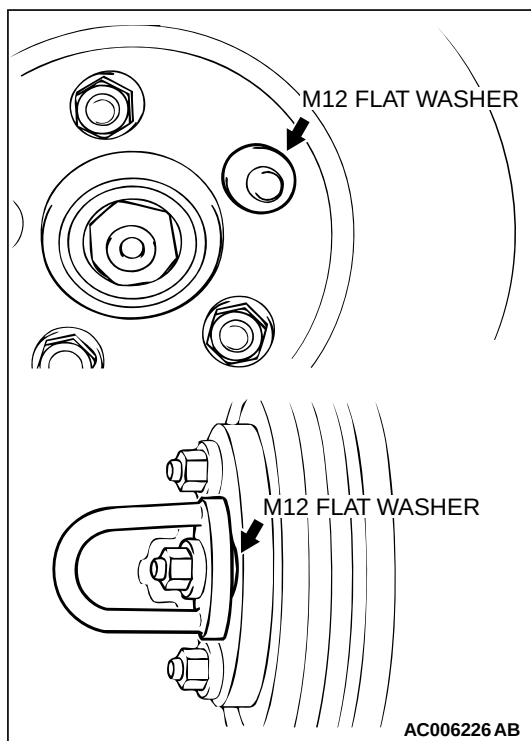
<Rear> 10.0 mm (0.39 inch)

Minimum limit:

<Front> 24.4 mm (0.96 inch)

<Front> 8.4 mm (0.33 inch)

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

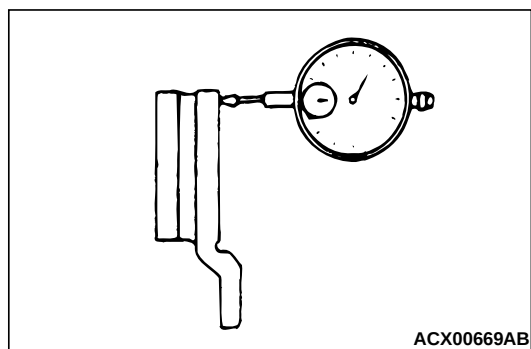
**⚠ CAUTION**

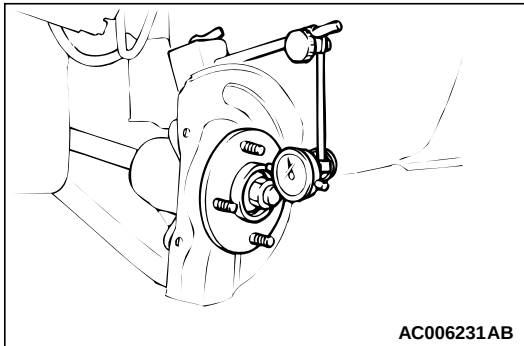
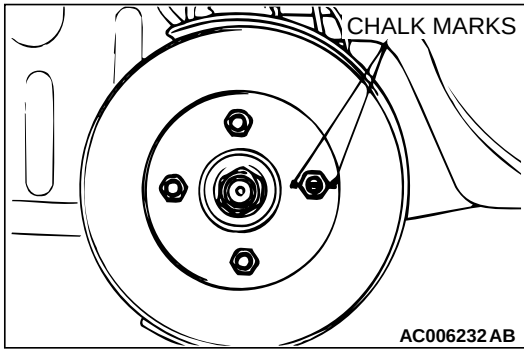
- After a new brake disc is installed, always grind the brake disc with on-the-car type brake lathe. If this step is not carried out, the brake disc run-out exceeds the specified value, resulting in judder.
 - When the on-the-car type lathe is used, first install M12 flat washer on the stud bolt in the 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 ft-lb). 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.
2. 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.

FRONT BRAKE DISC RUN-OUT CHECK AND CORRECTION

M1351009400482

1. Remove the brake assembly, and then hold it with wire.
2. Temporarily install the disc with the hub nut.
3. Place a dial gauge approximately 5 mm from the outer circumference of the brake disc, and measure the run-out of the disc.

Limit: 0.04 mm (0.0015 inch)



4. If the brake disc run-out exceeds the limit, correct it as follows:
 - (1) Chalk phase marks on the wheel stud and the brake disc, which run-out is excessive as shown.

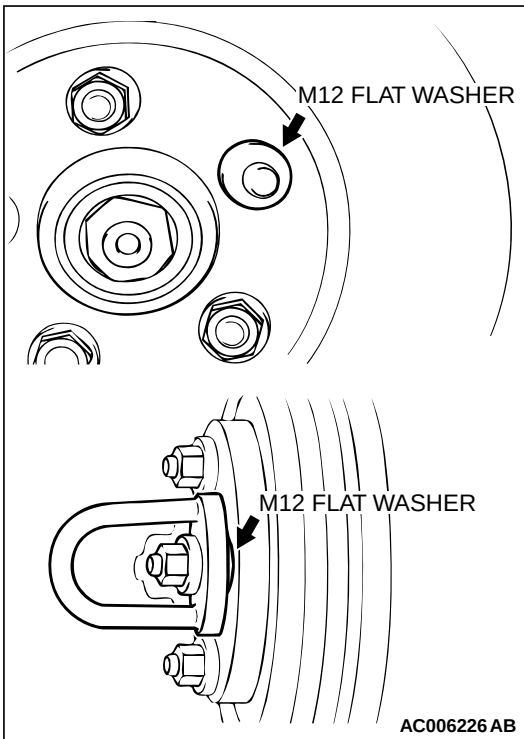
- (2) Remove the brake disc. Then place a dial gauge as shown, and measure the end play by pushing and pulling the wheel hub.

Limit: 0.05 mm (0.002 inch)

- (3) If the end play exceeds the limit, disassemble the hub and knuckle assembly to check each part.
 - (4) If the end play does not exceed the limit, dephase the brake disc and secure it. Then recheck the brake disc run-out.

⚠ 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 ft-lb). 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.
5. If the run-out cannot be corrected by changing the phase of the brake disc, replace the brake disc or grind it with the on-the-car type brake lathe ("MAD, DL-8700PF" or equivalent).



BRAKE LINING THICKNESS CHECK

M1351003000248

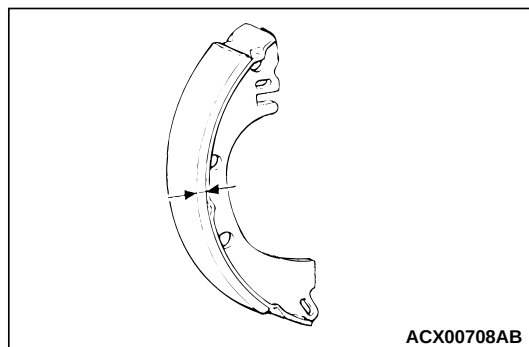
 CAUTION

- 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.

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

Standard value: 4.3 mm (0.17 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-48](#).



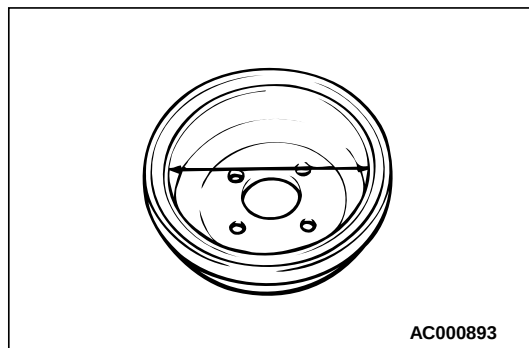
BRAKE DRUM INSIDE DIAMETER CHECK

M1351003200402

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

Standard value: 203 mm (7.99 inches)**Limit: 205 mm (8.07 inches)**

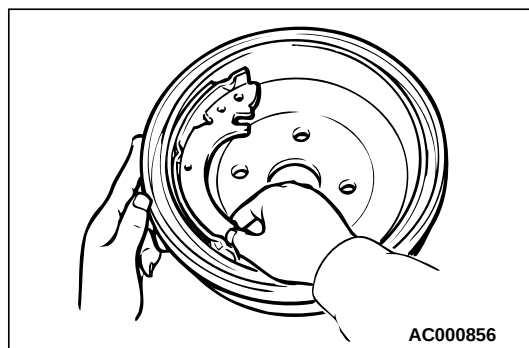
3. Replace the brake drums, shoe and lining assembly when wear exceeds the limit value or is badly imbalanced.



BRAKE LINING AND BRAKE DRUM CONTACT CHECK

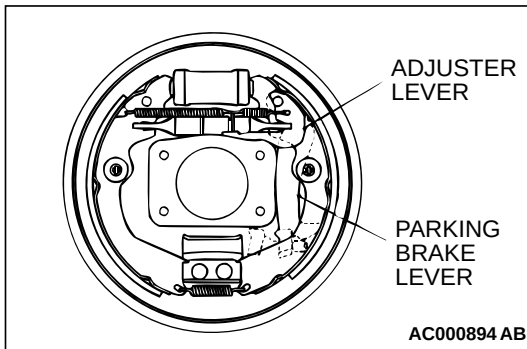
M1351003100245

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 areas.

NOTE: Clean off chalk after check.

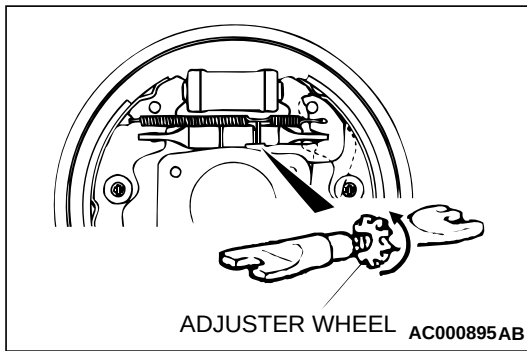
AUTO ADJUSTER FUNCTION CHECK

M1351010100203

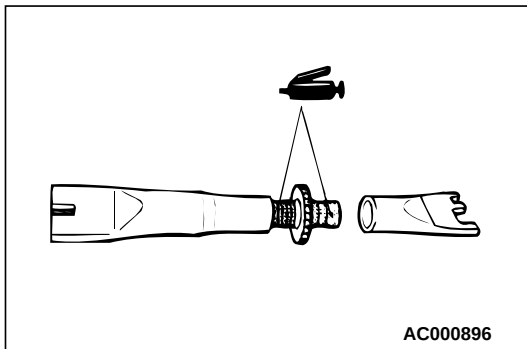


1. Remove the brake drum.
2. Operate the parking brake lever. Observe adjuster lever movement for ratcheting action of the auto adjuster. Repair or replace the lever(s) as required.
3. Remove the shoe-to-lever spring.
4. Remove the adjuster.

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.



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

M1351010200084

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.

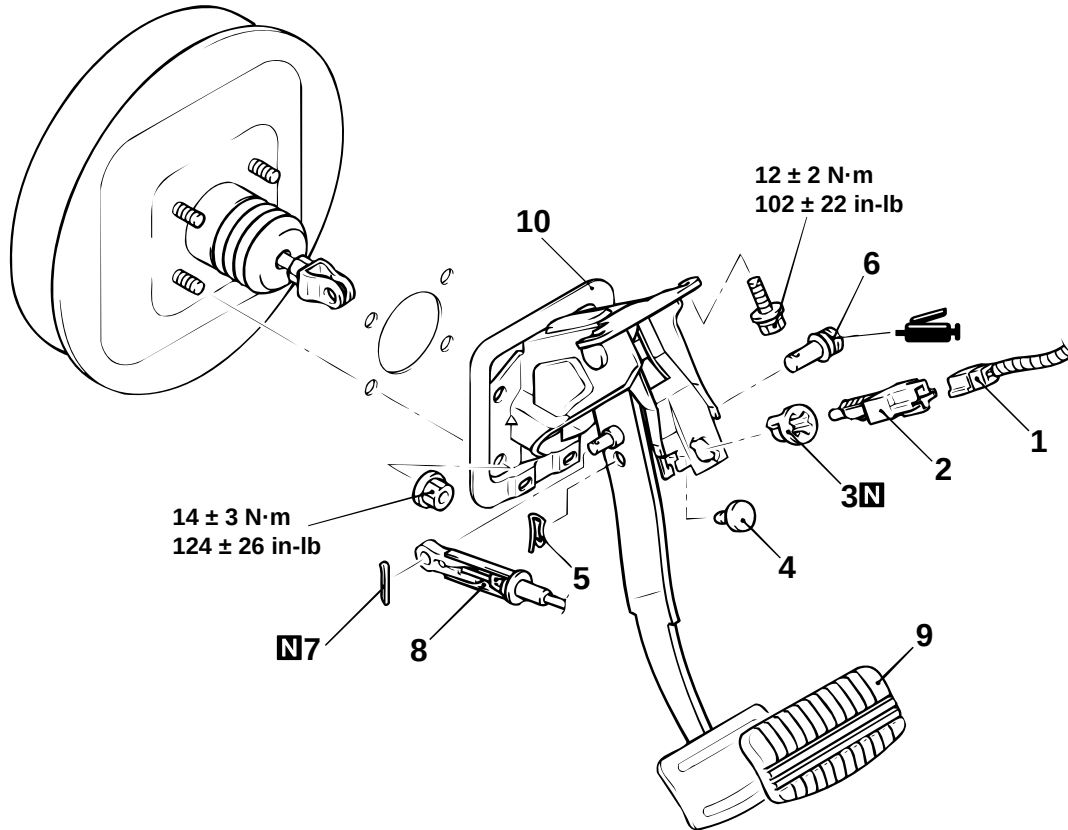
BRAKE PEDAL

REMOVAL AND INSTALLATION

M1351003400428

Post-installation Operation

- Brake Pedal Adjustment (Refer to [P.35A-20.](#))



AC006233AC

REMOVAL STEPS

1. HARNESS CONNECTOR
2. STOPLIGHT SWITCH
3. ADJUSTER
4. PEDAL STOPPER
5. SNAP PIN
6. PIN ASSEMBLY

REMOVAL STEPS (Continued)

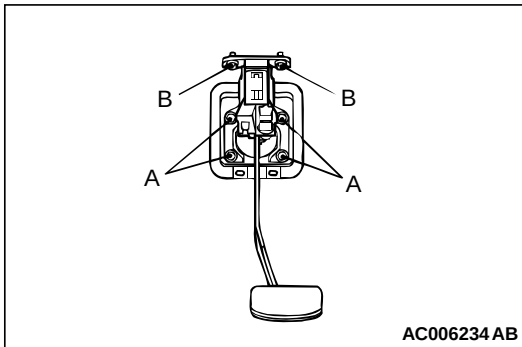
7. SPLIT PIN <A/T>
8. SHIFT LOCK CABLE CONNECTION <A/T>
9. PEDAL PAD
- >>A<< 10. BRAKE PEDAL AND PEDAL SUPPORT MEMBER

INSTALLATION SERVICE POINT

>>A<< BRAKE PEDAL AND PEDAL SUPPORT MEMBER INSTALLATION

Tighten the brake booster mounting nuts (A), and then the brake pedal mounting bolts (B).

NOTE: The pedal support member can not be positioned correctly if the pedal mounting bolts (B) are tightened first as the their holes are oblong holes.

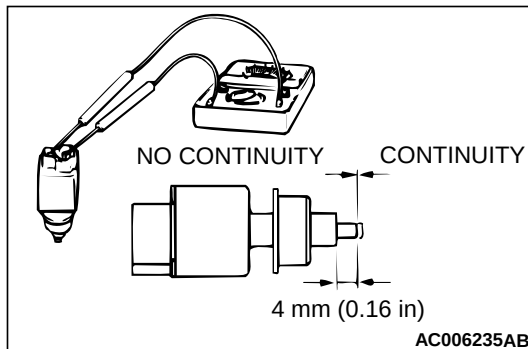


INSPECTION

M1351003500102

STOPLIGHT SWITCH CHECK

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.



MASTER CYLINDER ASSEMBLY AND BRAKE BOOSTER

REMOVAL AND INSTALLATION

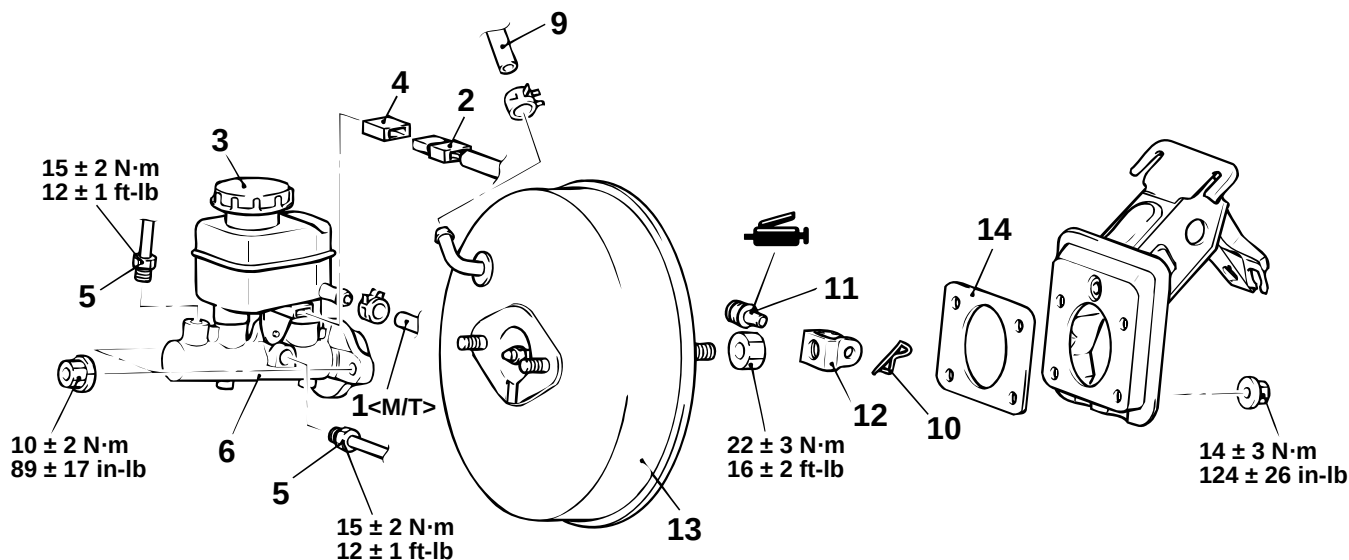
M1351003700452

Pre-removal Operation

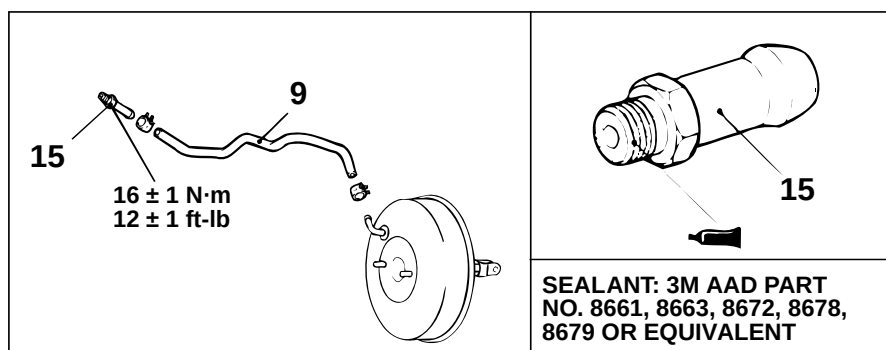
- Air Intake Hose and Air Cleaner Removal
- Brake Fluid Draining

Post-installation Operation

- Brake Fluid Supplying and Air Bleeding (Refer to [P.35A-24.](#))
- Brake Pedal Adjustment (Refer to [P.35A-20.](#))
- Air Intake Hose and Air Cleaner Installation



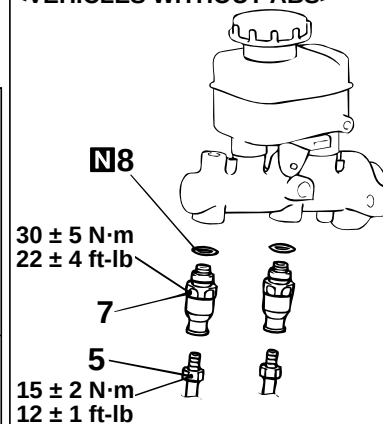
AC006236AB



MASTER CYLINDER REMOVAL STEPS

1. CLUTCH HOSE CONNECTION <M/T>
2. BRAKE FLUID LEVEL SENSOR CONNECTOR
3. RESERVOIR CAP ASSEMBLY
4. BRAKE FLUID LEVEL SENSOR
5. BRAKE PIPE CONNECTION
6. MASTER CYLINDER

PROPORTIONING VALVES <VEHICLES WITHOUT ABS>



PROPORTIONING VALVE REMOVAL STEPS

5. BRAKE PIPE CONNECTION
7. PROPORTIONING VALVE
8. O RING

BRAKE BOOSTER REMOVAL STEPS

2. BRAKE FLUID LEVEL SENSOR CONNECTOR
5. BRAKE PIPE CONNECTION
6. MASTER CYLINDER

**BRAKE BOOSTER REMOVAL
STEPS (Continued)**

- >>B<<**
- PUSH ROD PROTRUSION AMOUNT CHECK AND ADJUSTMENT
- >>A<<**
9. VACUUM HOSE (WITH BUILT-IN CHECK VALVE)
 10. SNAP PIN
 11. PIN ASSEMBLY
 12. CLEVIS
 - REMOVE A/C LIQUID PIPE B FROM THE RETAINING CLIP. (REFER TO GROUP 55A, REFRIGERANT LINE.)

**BRAKE BOOSTER REMOVAL
STEPS (Continued)**

13. BRAKE BOOSTER
14. SEALER

FITTING REMOVAL STEPS

- >>A<<**
9. VACUUM HOSE (WITH BUILT-IN CHECK VALVE)
 15. FITTING

Required Special Tool:

- MB991568: Push Rod Adjusting Socket

INSTALLATION SERVICE POINTS

>>A<< VACUUM HOSE CONNECTION

Insert the vacuum hose to the brake booster with its paint mark facing upward, and then secure the hose by using the hose clip.

>>B<< PUSH ROD PROTRUSION AMOUNT CHECK AND ADJUSTMENT

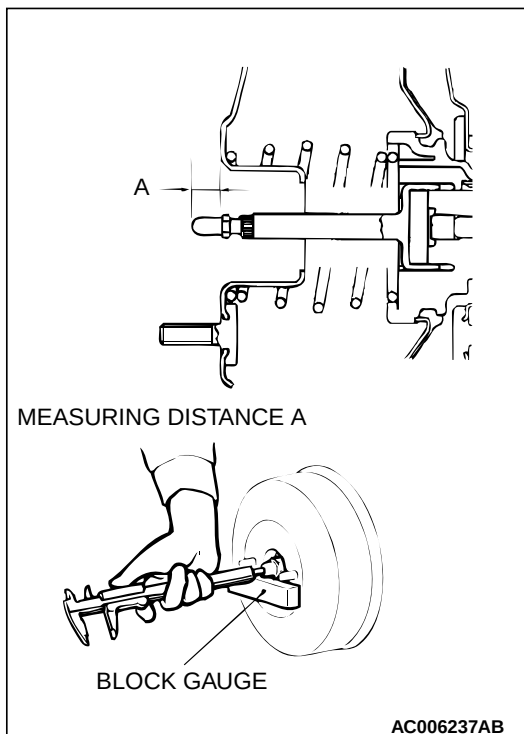
1. Measure dimension (A).

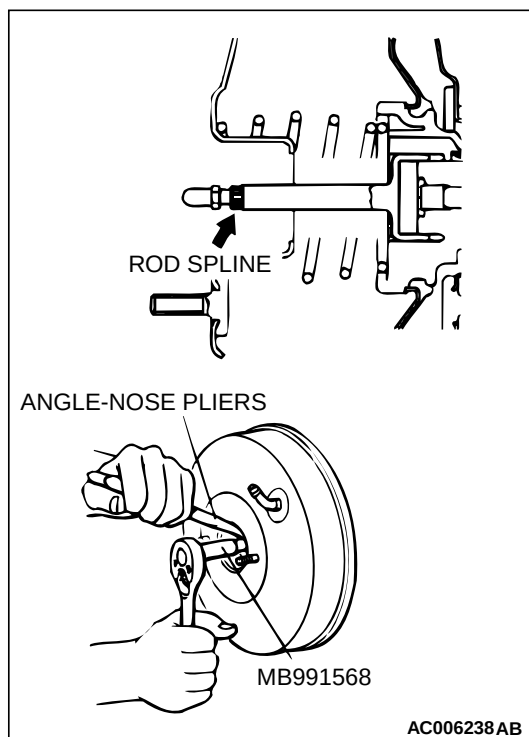
Standard value (A):

<2.0 L> 9.18 – 9.43 mm (0.361 – 0.371 in)

<2.4 L> 9.68 – 9.92 mm (0.381 – 0.390 in)

NOTE: When a negative pressure of 66.7 kPa is applied to the brake booster, the push rod should protrude 10.28 - 10.53 mm (0.405 – 0.415 in).

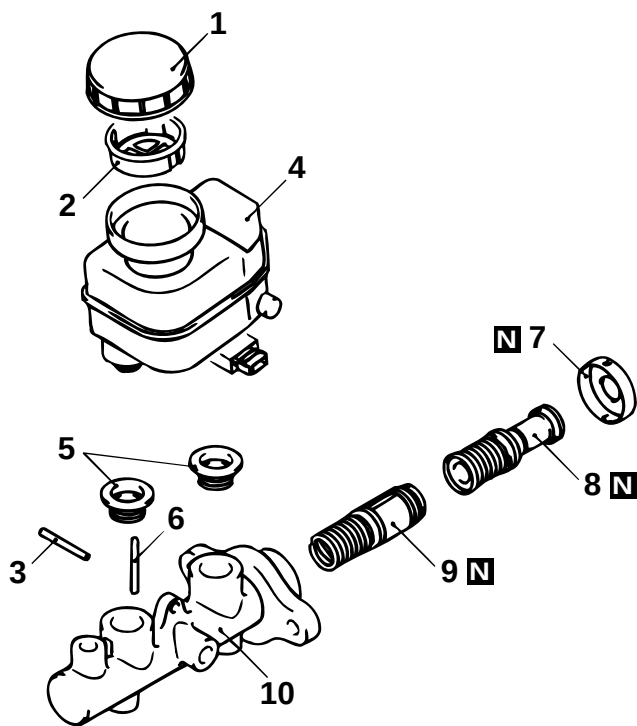




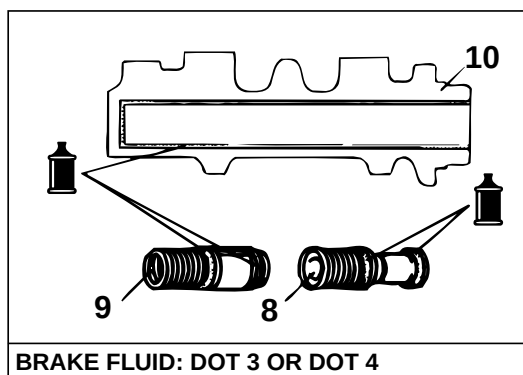
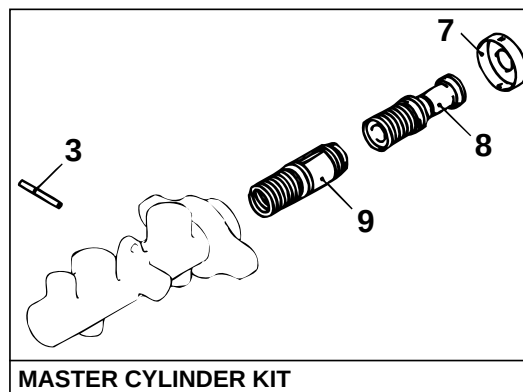
- If the protrusion amount is not within the standard value range, adjust the push rod length by turning the push rod. Use the special tool MB991568 to turn the push rod while holding the rod spline with angle-nose pliers.

MASTER CYLINDER DISASSEMBLY AND ASSEMBLY

M1351004200085



AC006239AB



DISASSEMBLY STEPS

1. RESERVOIR CAP
2. FILTER <VEHICLES WITH ABS>
3. SPRING PIN
4. RESERVOIR TANK
5. RESERVOIR SEAL

DISASSEMBLY STEPS (Continued)

6. PIN <VEHICLES WITH ABS>
7. PISTON RETAINER
8. PRIMARY PISTON ASSEMBLY
9. SECONDARY PISTON ASSEMBLY
10. MASTER CYLINDER BODY

INSPECTION

M1351004300082

- 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

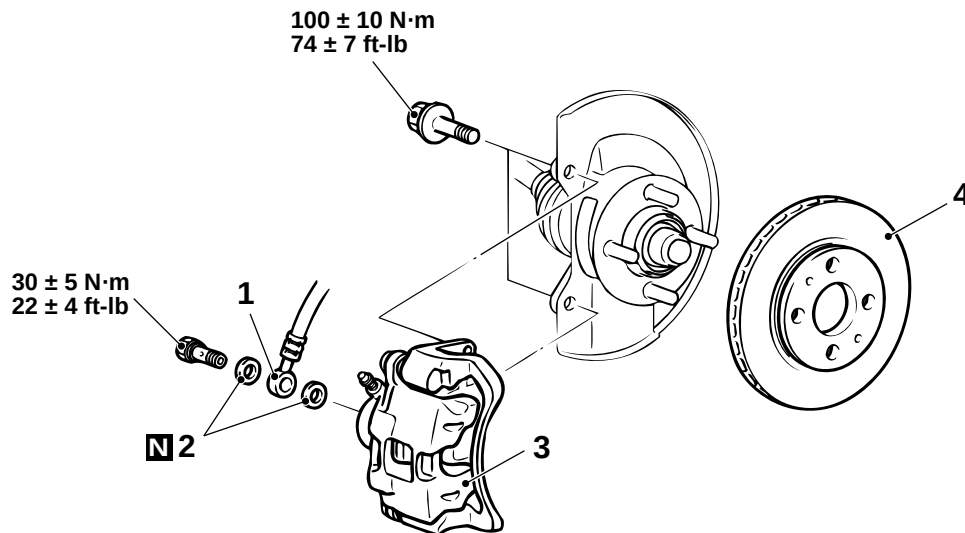
M1351006000258

Pre-removal Operation

- Brake Fluid Draining

Post-installation Operation

- Brake Fluid Supplying and Air Bleeding (Refer to [P.35A-24.](#))



AC006240 AB

REMOVAL STEPS

1. BRAKE HOSE CONNECTION
2. GASKET
- >>A<< 3. DISC BRAKE ASSEMBLY
4. BRAKE DISC

Required Special Tools:

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

INSTALLATION SERVICE POINT

>>A<< DISC 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.26-17.)
- (2) Attach special tool MB990998 to the front hub assembly as shown in the illustration, and tighten it to the specified torque.

Tightening torque: 245 ± 29 N·m (181 ± 21 ft-lb)

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

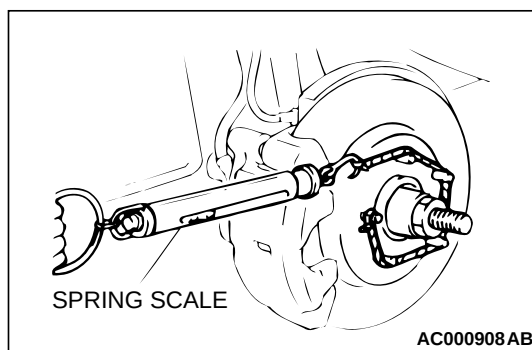
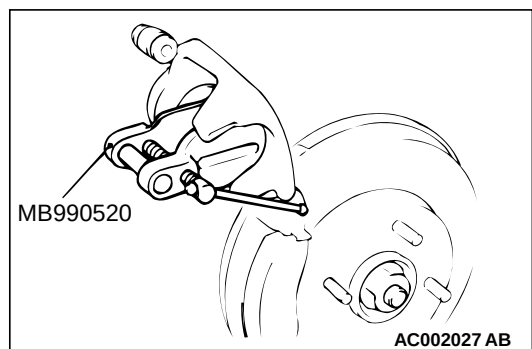
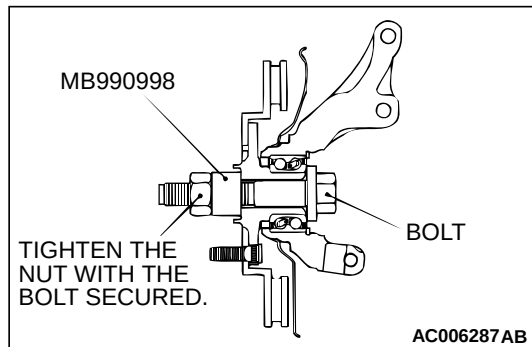
CAUTION

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 slide 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 200 N (45 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: 78 N (17 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

M1351006100095

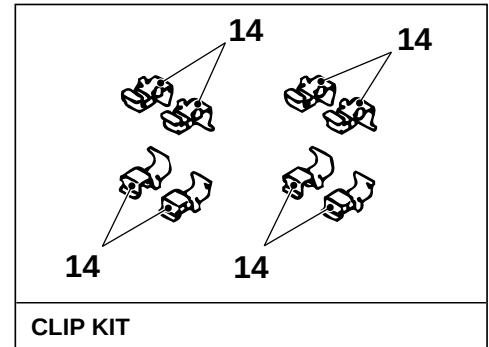
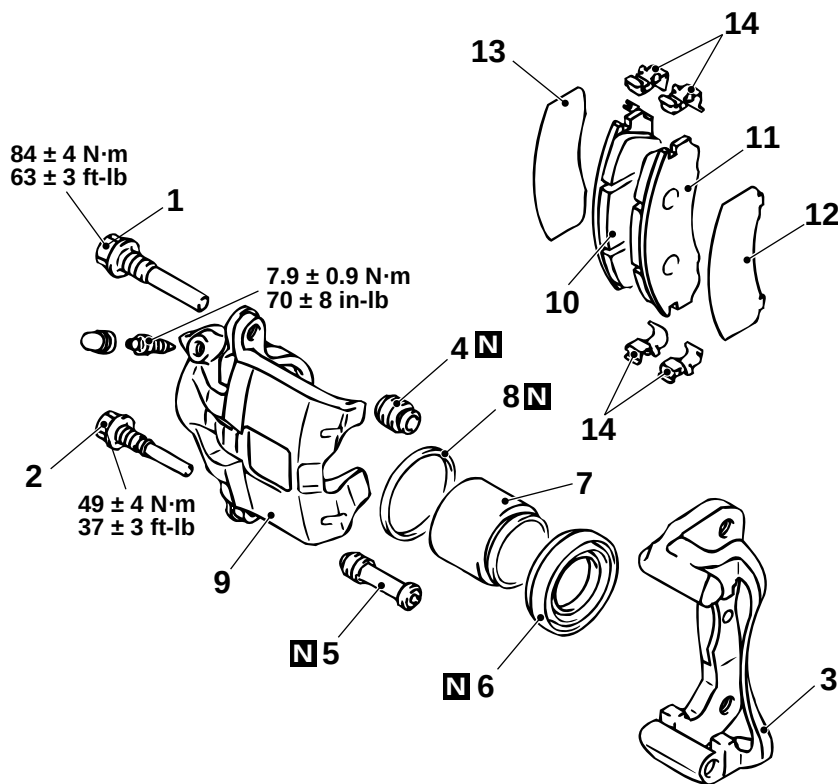
BRAKE DISC CHECK

Disc wear (Refer to P.35A-29.)

Disc run-out (Refer to P.35A-29.)

DISASSEMBLY AND ASSEMBLY <2.0 L>

M1351006200531



AC006289AB

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

DISASSEMBLY STEPS

1. SLIDE PIN (MAIN)
2. SLIDE PIN (SUB)
3. CALIPER SUPPORT (INCLUDING PAD, CLIP, AND SHIM)
4. PIN BOOT
5. BUSHING
6. PISTON BOOT
7. PISTON

<<A>>

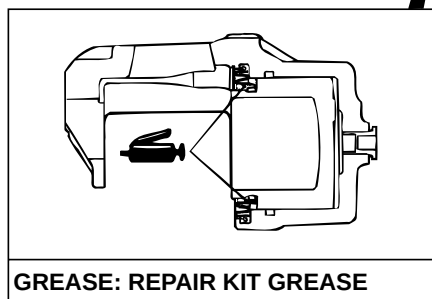
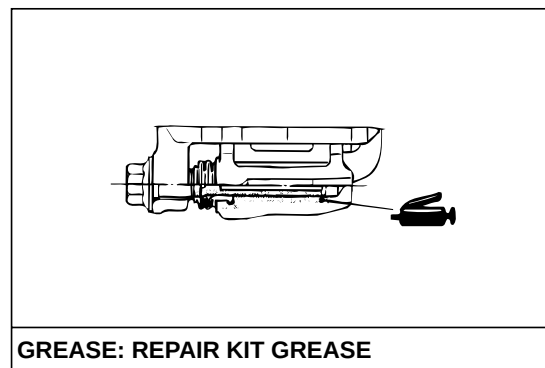
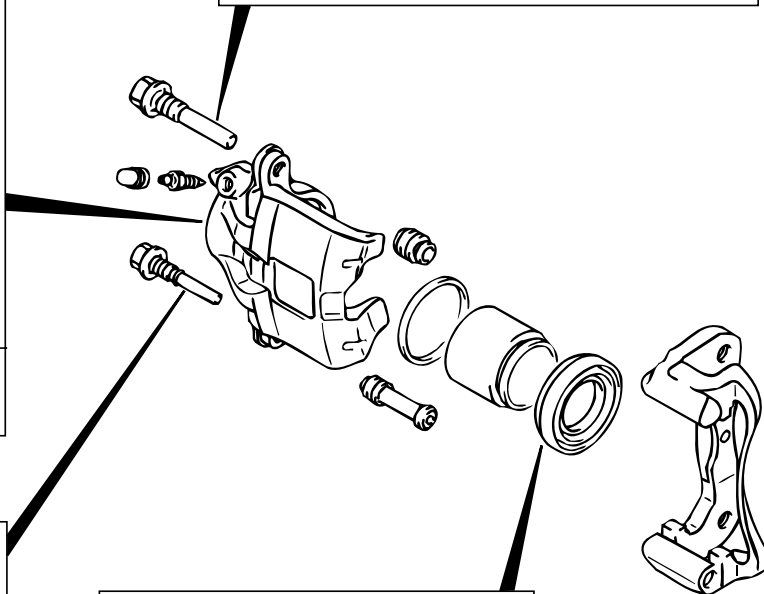
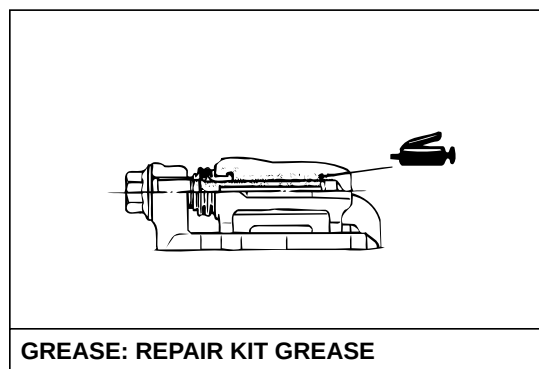
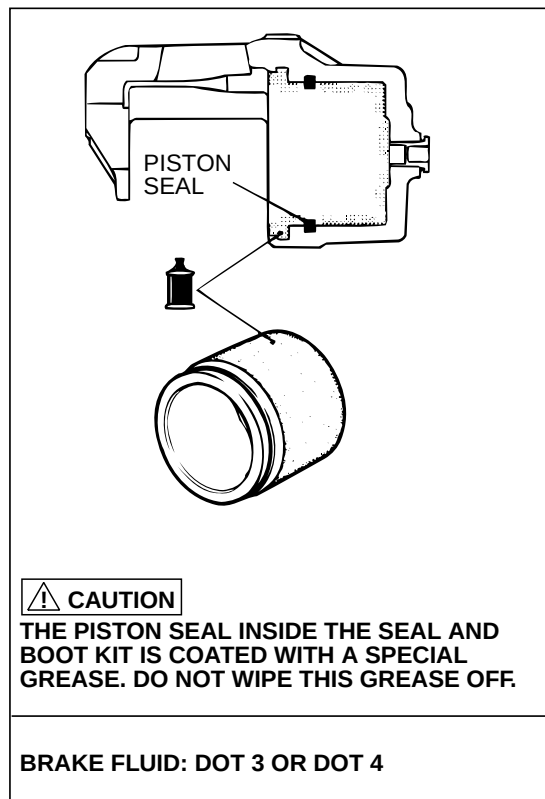
<<A>>

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DISASSEMBLY STEPS (Continued)

8. PISTON SEAL
9. CALIPER BODY
10. PAD AND WEAR INDICATOR ASSEMBLY
11. PAD ASSEMBLY
12. OUTER SHIM (RUBBER COAT)
13. INNER SHIM (STAINLESS)
14. CLIP

LUBRICATION POINTS



AC006288 AB

DISASSEMBLY SERVICE POINTS

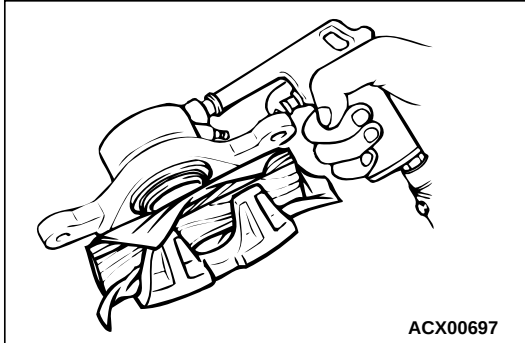
When disassembling the disc brakes, disassemble both sides (left and right) as a set.

<<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.

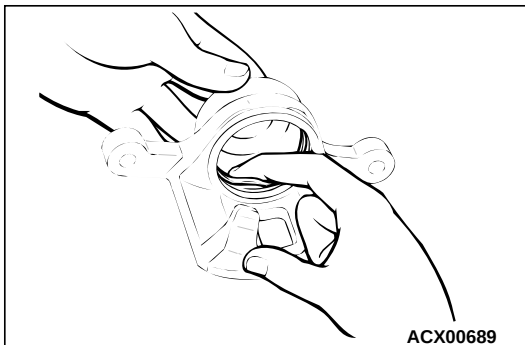


<> PISTON SEAL REMOVAL

CAUTION

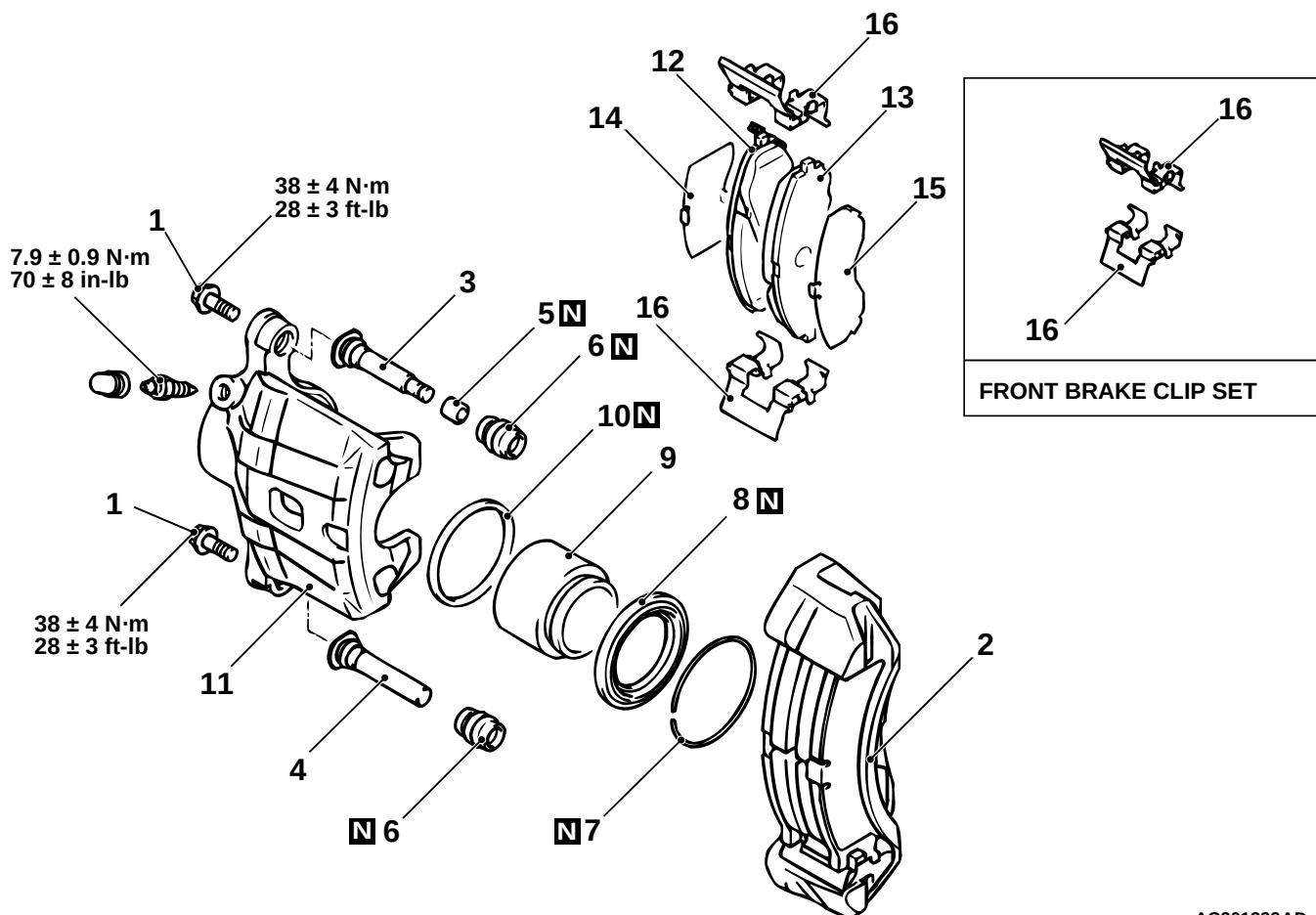
Do not use a flat-tipped screwdriver or similar tool to remove piston seal. These may damage the inner side of the cylinder.

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.



DISASSEMBLY AND ASSEMBLY <2.4 L>

M1351006200542



AC201322AD

FRONT BRAKE CALIPER KIT	FRONT BRAKE PAD SET	FRONT BRAKE SHIM SET	FRONT BRAKE CALIPER SEAL KIT

DISASSEMBLY STEPS

1. FRONT BRAKE BOLT
2. FRONT BRAKE CALIPER SUPPORT (INCLUDING PAD, CLIP AND SHIM)
3. FRONT BRAKE PIN (LOCK PIN)
4. FRONT BRAKE PIN (GUIDE PIN)
5. FRONT BRAKE BUSHING
6. PIN BOOT
7. BOOT RING
8. PISTON BOOT

DISASSEMBLY STEPS (Continued)

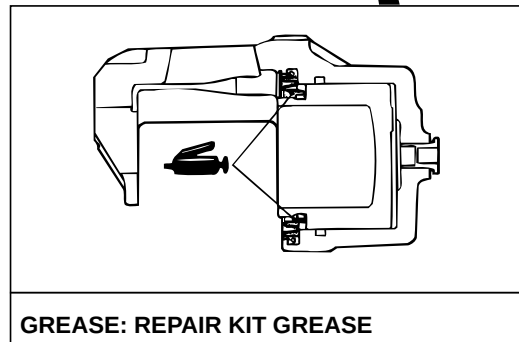
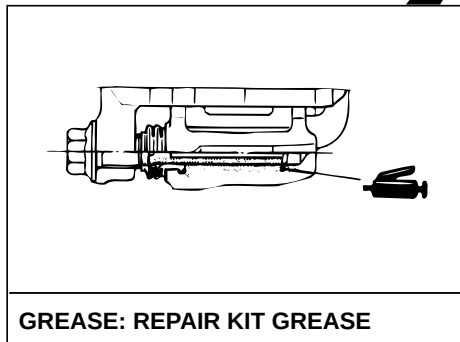
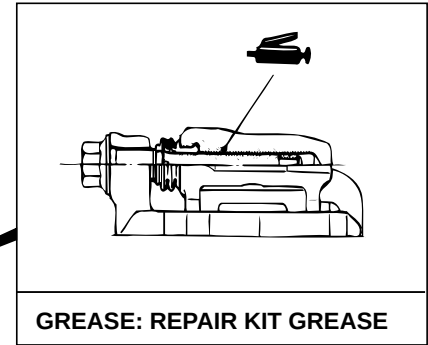
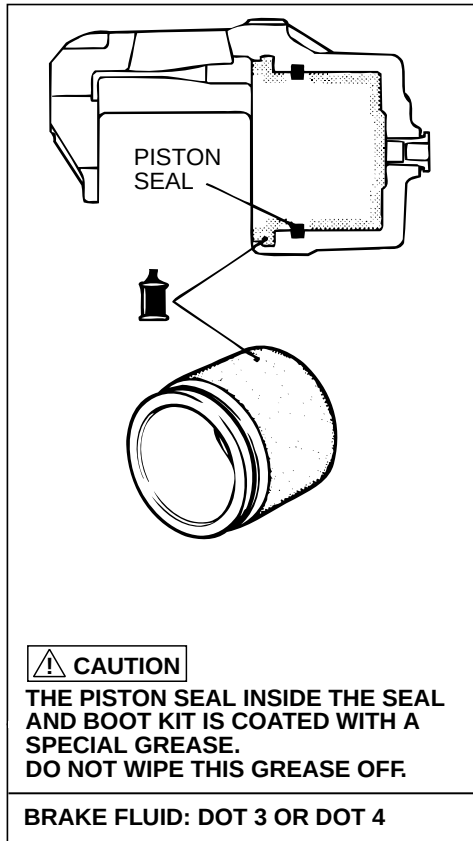
9. FRONT BRAKE CALIPER PISTON
10. PISTON SEAL
11. CALIPER BODY
12. PAD AND WEAR INDICATOR ASSEMBLY OR PAD ASSEMBLY
13. PAD ASSEMBLY
14. INNER SHIM
15. OUTER SHIM
16. FRONT BRAKE CLIP

<<A>>

<<A>>

<>

LUBRICATION POINTS



AC102648AF

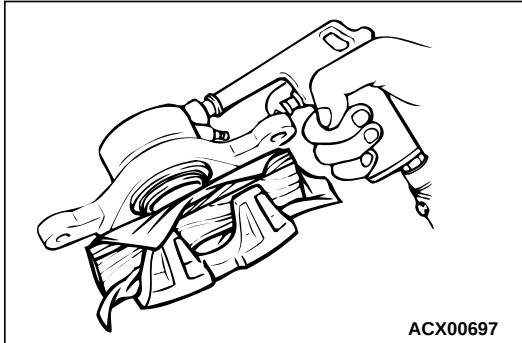
DISASSEMBLY SERVICE POINTS

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

<<A>> PISTON BOOT/FRONT BRAKE CALIPER PISTON REMOVAL**⚠ CAUTION**

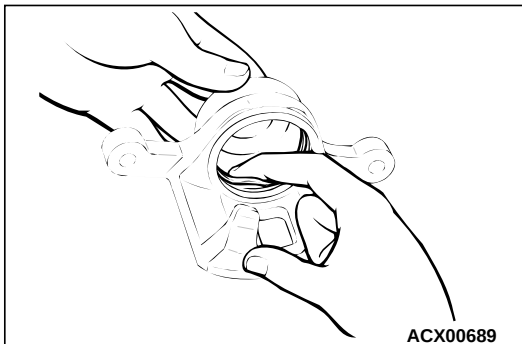
Blow air little by little to remove the piston. The piston will rush out if a force of air is applied suddenly.

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.

**<> PISTON SEAL REMOVAL****⚠ CAUTION**

Do not use a flat-tipped screwdriver or similar tool to remove the 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.

**INSPECTION**

M1351006300237

- 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

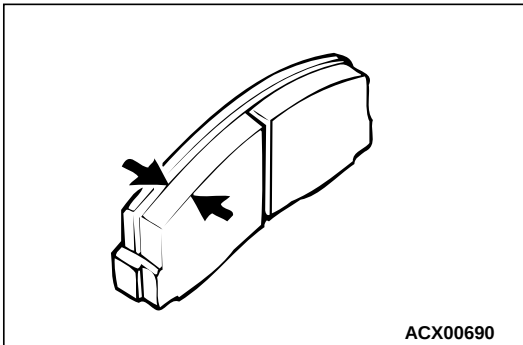
- *Always replace both brake pads on each wheel as a set (both front wheels or both rear wheels). Failure to do so will result in uneven braking, which may cause unreliable brake operation.*
- *If there is significant difference in the thickness of the pads on the left and right sides, check the sliding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

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)



REAR DRUM BRAKE

REMOVAL AND INSTALLATION

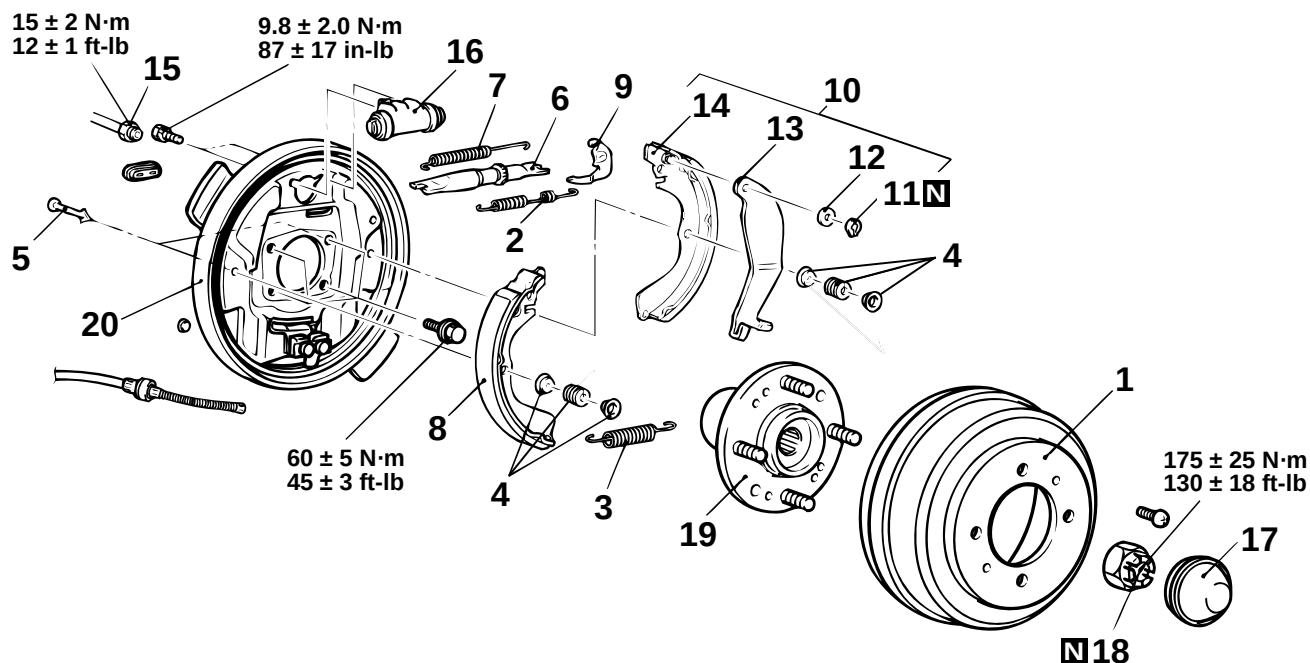
M1351007500438

Pre-removal Operation

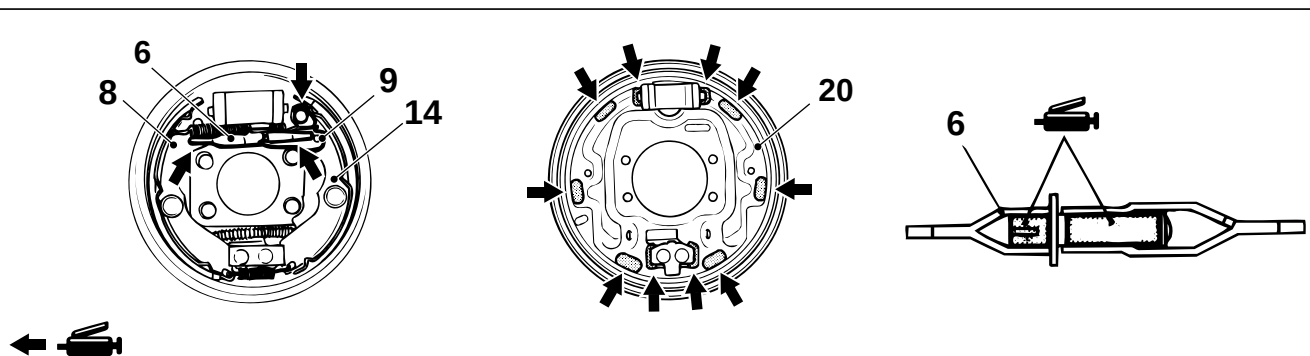
- Loosening the Parking Brake Cable Adjusting Nut. (Refer to GROUP 36, On-vehicle Service – Parking Brake Lever Stroke Check and Adjustment P.36-4.)
- Brake Fluid Draining

Post-installation Operation

- Brake Fluid Filling and Air Bleeding (Refer to P.35A-24.)
- Parking Brake Lever Stroke Adjustment (Refer to GROUP 36, On-vehicle Service – Parking Brake Lever Stroke Check and Adjustment P.36-4.)



AC006290 AD



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

REMOVAL STEPS

- BRAKE DRUM
 - Parking brake cable connection
- SHOE-TO-SHOE SPRING
- RETAINER SPRING
- SHOE HOLD-DOWN CUP AND SPRING
- SHOE HOLD-DOWN PIN
- AUTO ADJUSTER ASSEMBLY
- SHOE-TO-LEVER SPRING
- SHOE AND LINING ASSEMBLY
- ADJUSTER LEVER
- SHOE AND LEVER ASSEMBLY
- RETAINER

REMOVAL STEPS (Continued)

- WAVE WASHER
- PARKING LEVER
- SHOE AND LINING ASSEMBLY
- BRAKE PIPE CONNECTION
- WHEEL CYLINDER ASSEMBLY
- HUB CAP
- LOCK NUT (REFER TO GROUP 27, REAR AXLE HUB ASSEMBLY P.27-9.)
- REAR HUB ASSEMBLY (REFER TO GROUP 27, REAR AXLE HUB ASSEMBLY P.27-9.)
- BACKING PLATE

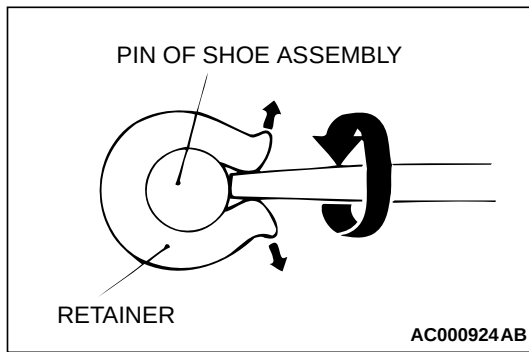
**WHEEL CYLINDER REMOVAL
STEPS**

1. BRAKE DRUM
15. BRAKE PIPE CONNECTION
16. WHEEL CYLINDER ASSEMBLY

REMOVAL SERVICE POINT

<<A>> RETAINER REMOVAL

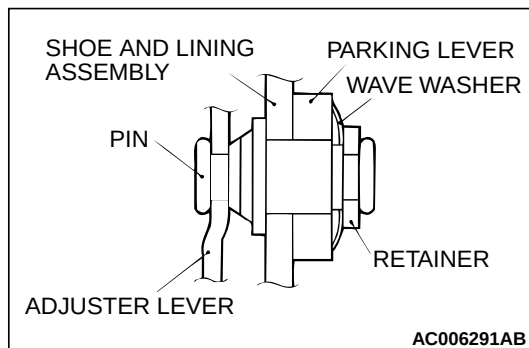
Use a flat-tipped screwdriver or a similar tool to open up the retainer joint. Then remove the retainer.



INSTALLATION SERVICE POINTS

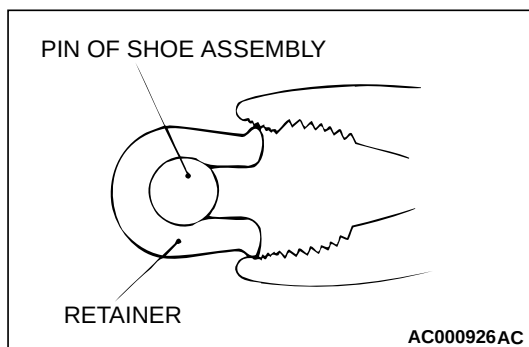
>>A<< WAVE WASHER INSTALLATION

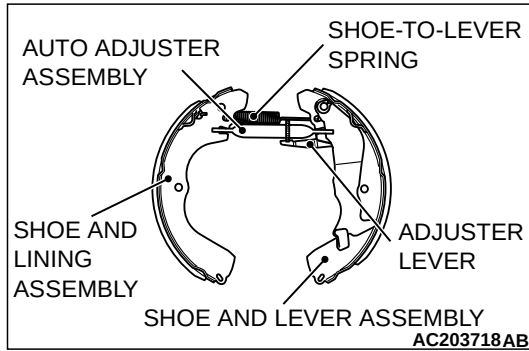
Install the wave washer in the direction shown in the illustration.



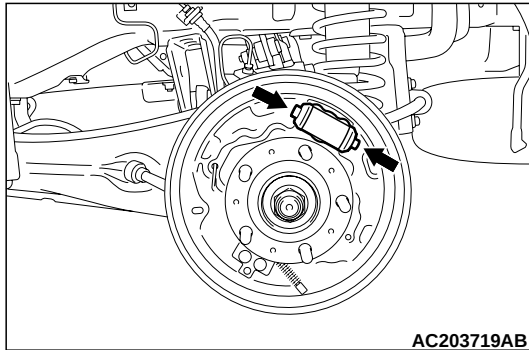
>>B<< RETAINER INSTALLATION

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

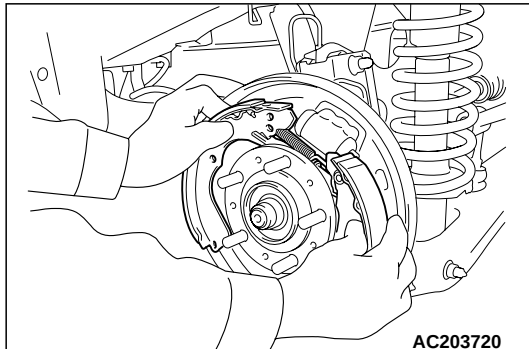


**>>C<< SHOE AND LEVER ASSEMBLY/ADJUSTER LEVER/SHOE AND LINING ASSEMBLY/SHOE-TO-LEVER SPRING/AUTO ADJUSTER ASSEMBLY INSTALLATION**

1. Assemble the shoe and lever assembly, the adjuster lever, the shoe and lining assembly, the shoe-to-lever spring, the automatic adjuster assembly temporarily.



2. Depress the wheel cylinder piston by hand.



3. Install the assembly to the backing plate carefully.

INSPECTION

M1351007600037

BRAKE LINING THICKNESS CHECK

Refer to [P.35A-32](#).

BRAKE DRUM INSIDE DIAMETER CHECK

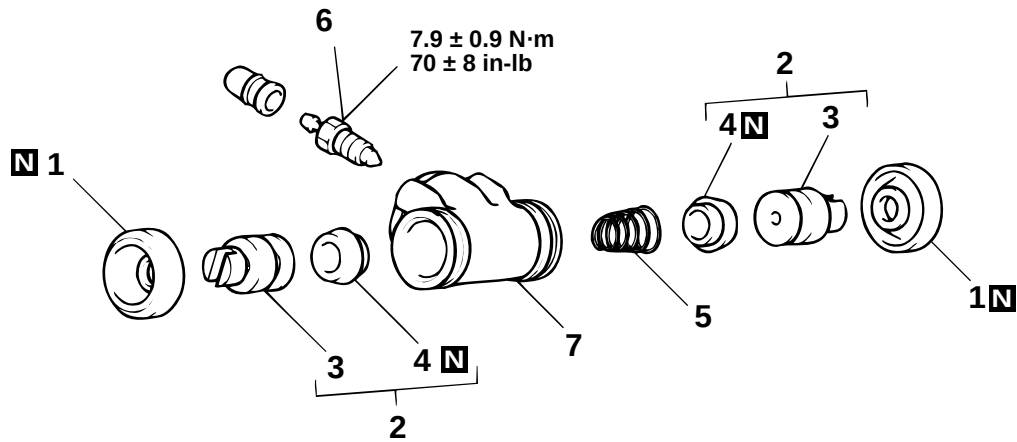
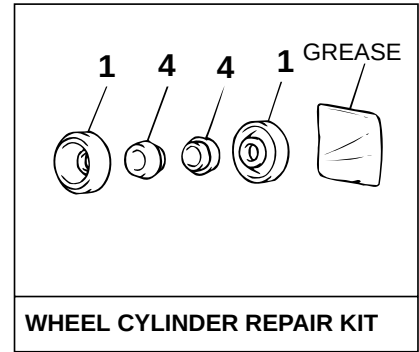
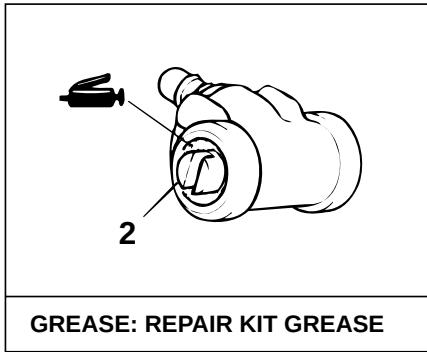
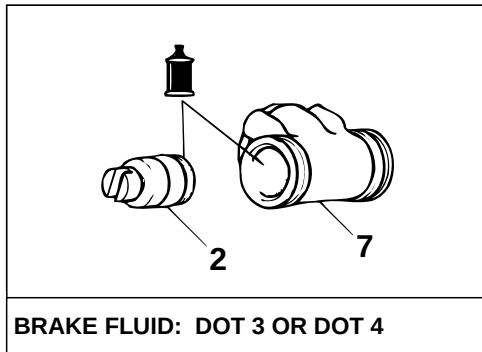
Refer to [P.35A-32](#).

BRAKE LINING AND BRAKE DRUM CONTACT CHECK

Refer to [P.35A-32](#).

WHEEL CYLINDER

DISASSEMBLY AND ASSEMBLY



AC000928AC

DISASSEMBLY STEPS

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

DISASSEMBLY STEPS (Continued)

6. BLEEDER SCREW
7. WHEEL CYLINDER BODY

Required Special Tool:

- MB990619: Installer

ASSEMBLY SERVICE POINT

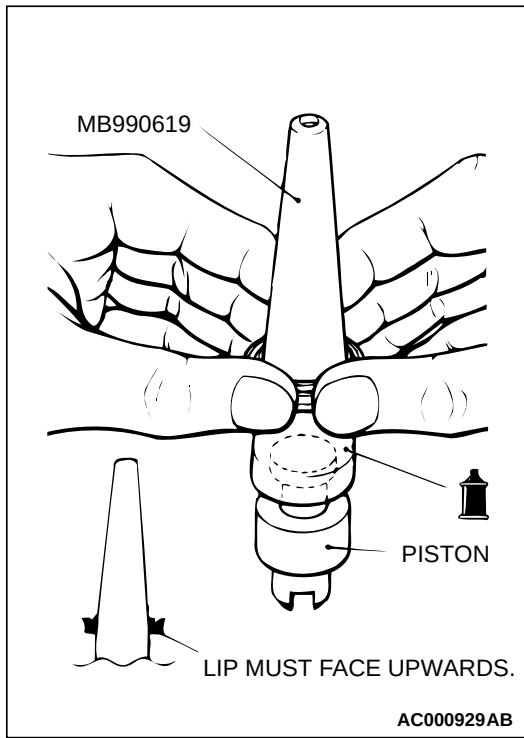
>>A<< PISTON CUP/PISTON ASSEMBLY

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

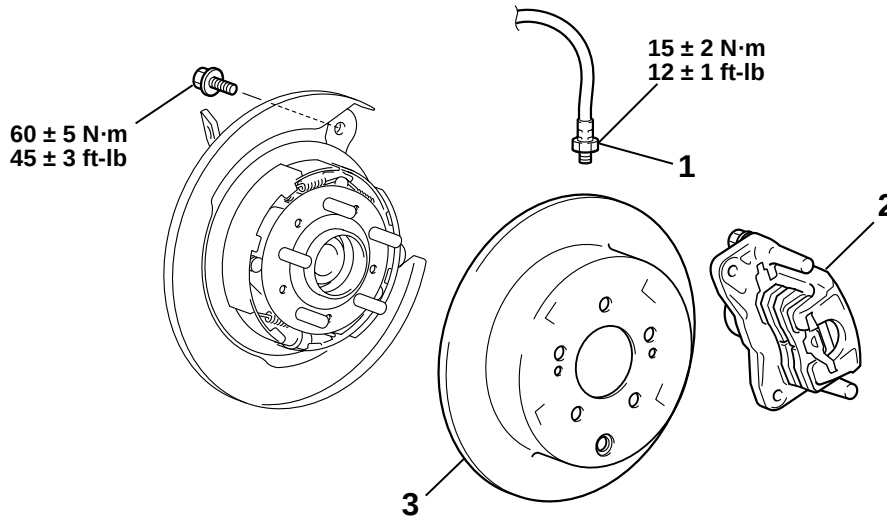
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Check the piston and wheel cylinder walls for rust, pitting, or damage. If there is any abnormality, replace the entire wheel cylinder assembly.

REAR DISC BRAKE ASSEMBLY

REMOVAL AND INSTALLATION

M1351007000336



AC309056AB

REMOVAL STEPS

- BRAKE FLUID DRAINING
- 1. BRAKE HOSE CONNECTION
- 2. REAR BRAKE ASSEMBLY
- 3. REAR BRAKE DISC

INSTALLATION STEPS

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

INSTALLATION STEPS (Continued)

1. BRAKE HOSE CONNECTION
- BRAKE FLUID SUPPLYING AND AIR BLEEDING (REFER TO [P.35A-24](#)).
- >>B<< • BRAKE DRAG FORCE CHECK

Required Special Tool:

- MB990520: Disc Brake Piston Expander

INSTALLATION SERVICE POINTS

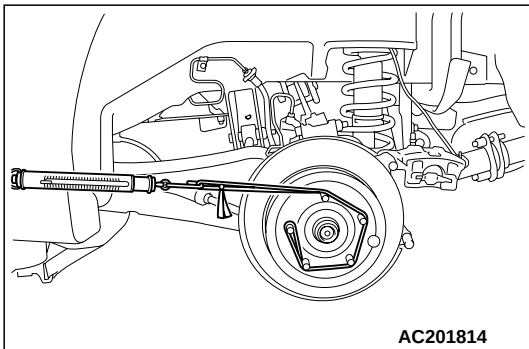
>>A<< REAR BRAKE ASSEMBLY INSTALLATION

1. In order to measure the brake drag torque, measure the hub torque with the pads removed by the following procedure.
Use a spring scale to measure the hub torque in the forward direction. Record hub torque with pads removed.

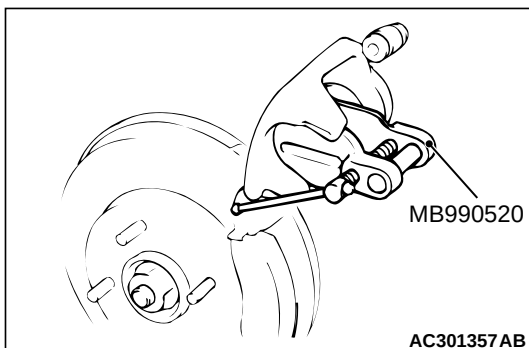
CAUTION

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 backing plate, 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 lock pin.



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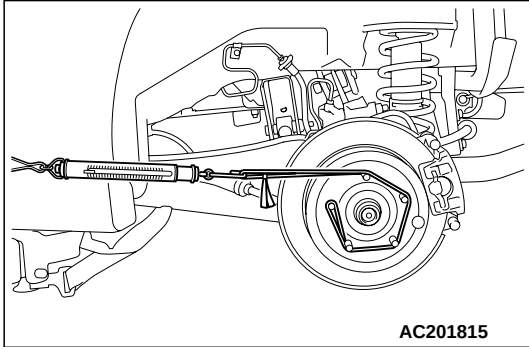
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>>B<< BRAKE DRAG FORCE CHECK

1. Check the brake drag force as follows.
 - (1) Start the engine and hold the brake pedal down for 5 seconds. [Pedal depression force: approximately 200 N (45 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: 68 N (15 pounds) or less

2. 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

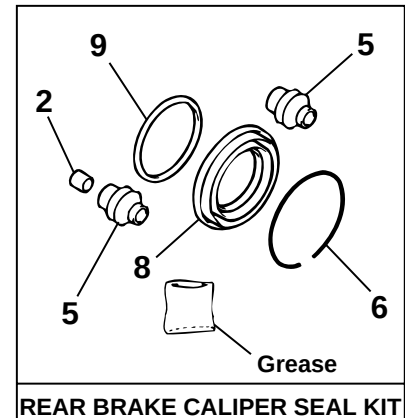
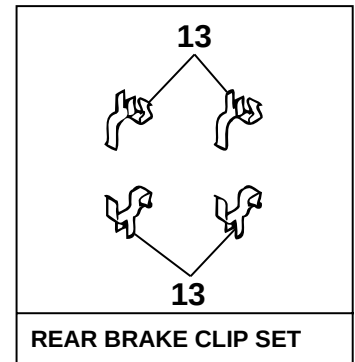
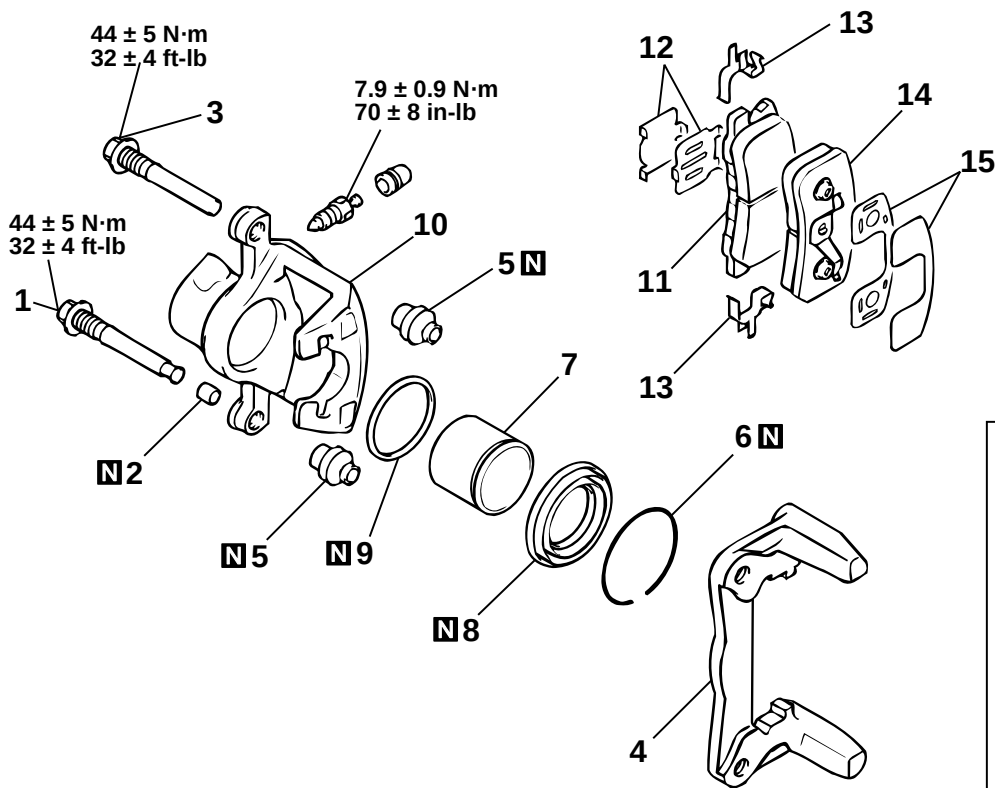
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BRAKE DISC CHECK

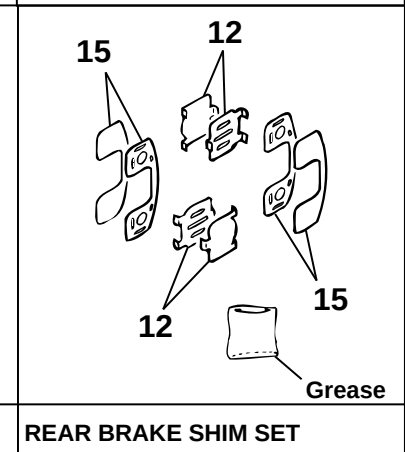
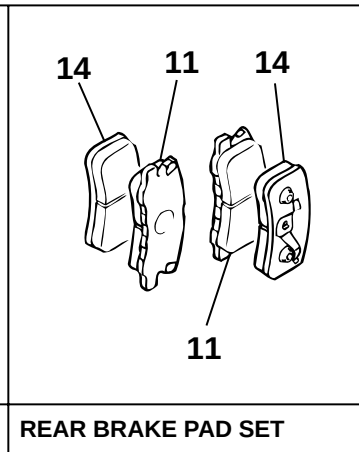
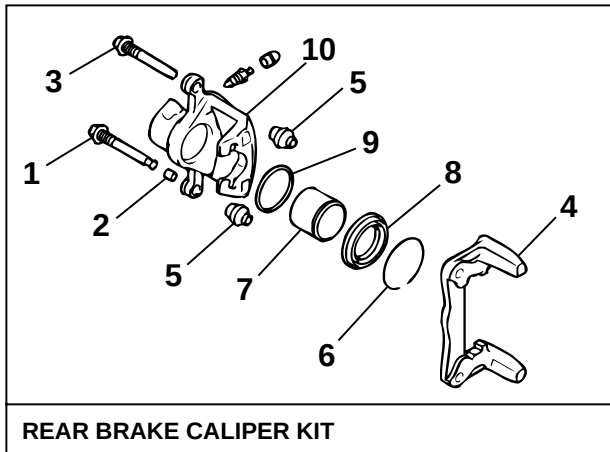
Disc wear (Refer to [P.35A-29](#)).
Disc run-out (Refer to [P.35A-30](#)).

DISASSEMBLY AND ASSEMBLY

M1351007200330



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DISASSEMBLY STEPS

1. REAR BRAKE PIN (LOCK PIN)
2. REAR BRAKE BUSHING
3. REAR BRAKE PIN (GUIDE PIN)
4. REAR BRAKE CALIPER SUPPORT
5. PIN BOOT
6. BOOT RING
7. REAR BRAKE CALIPER PISTON
8. PISTON BOOT

<<A>>

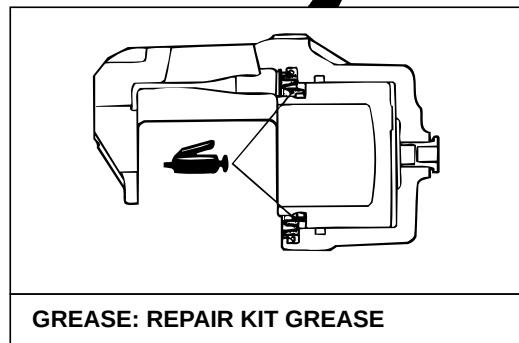
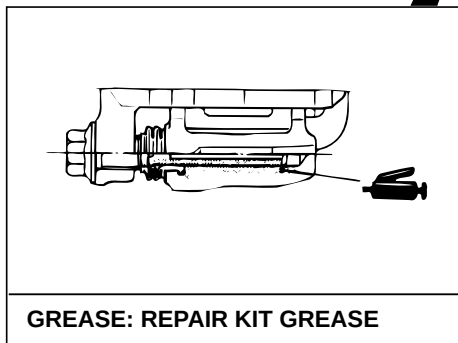
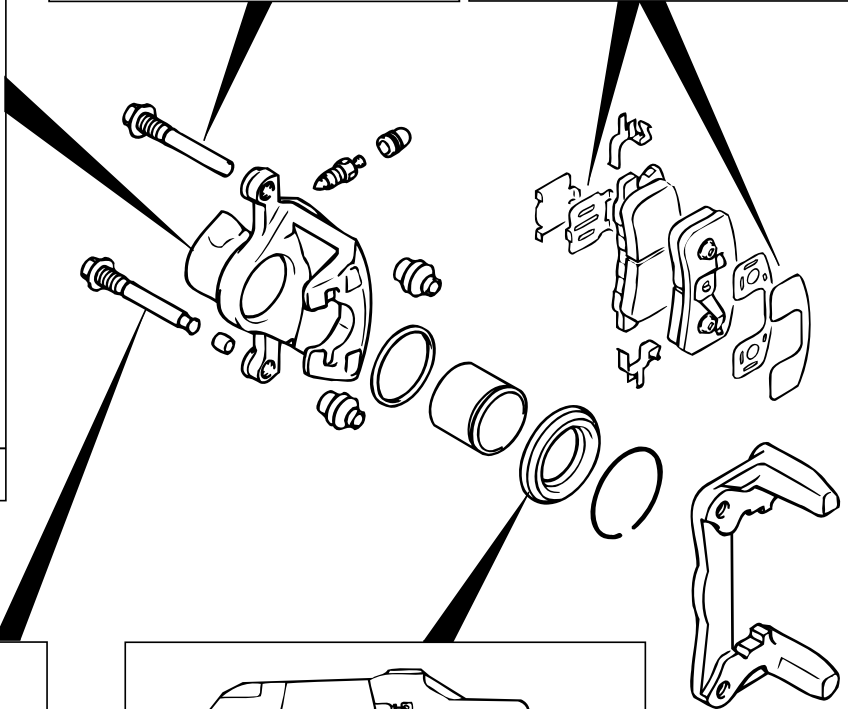
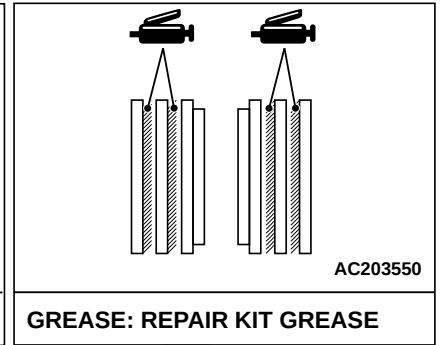
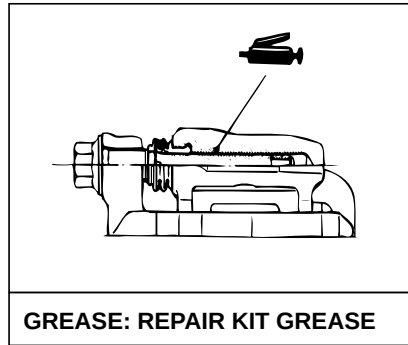
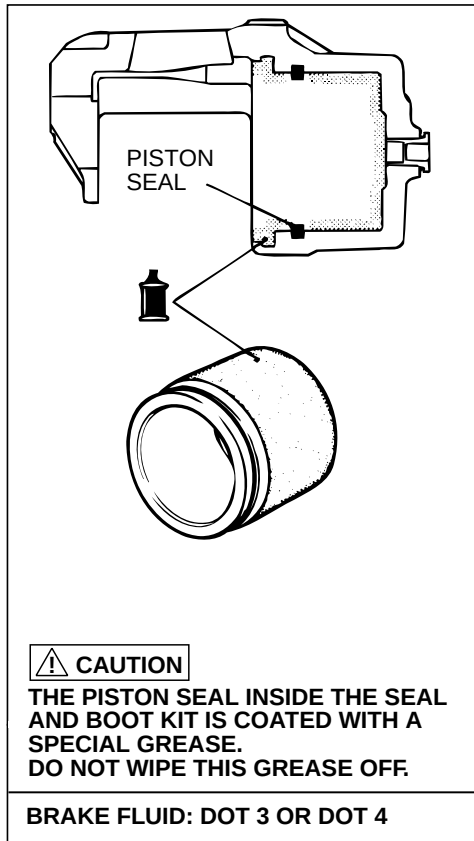
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DISASSEMBLY STEPS (Continued)

9. PISTON SEAL
10. CALIPER BODY
11. PAD AND WEAR INDICATOR ASSEMBLY
12. INNER SHIM
13. REAR BRAKE CLIP
14. PAD ASSEMBLY
15. OUTER SHIM

LUBRICATION POINTS



DISASSEMBLY SERVICE POINTS

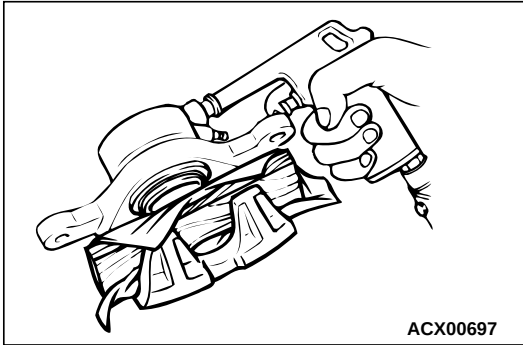
When disassembling the disc brakes, disassemble both sides (left and right) as a set.

<<A>> REAR BRAKE CALIPER PISTON/PISTON BOOT 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.

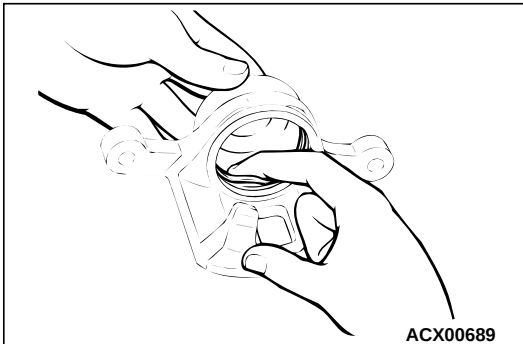


<> PISTON SEAL REMOVAL

CAUTION

Do not use a flat-tipped screwdriver or similar tool to remove the 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.



INSPECTION

Refer to [P.35A-46](#).

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SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1351009600442

ITEMS	SPECIFICATIONS
Brake line	
Brake tube flare nut	15 ± 2 N·m (12 ± 1 ft-lb)
Brake pedal	
Pedal support member mounting bolt	12 ± 2 N·m (102 ± 22 in-lb)
Pedal support member mounting nut	14 ± 3 N·m (124 ± 26 in-lb)
Front disc brake <2.0 L>	
Bleeder screw	7.9 ± 0.9 N·m (70 ± 8 in-lb)
Brake hose connector bolt	30 ± 5 N·m (22 ± 4 ft-lb)
Front brake assembly mounting bolt	100 ± 10 N·m (74 ± 7 ft-lb)
Slide pin (main)	84 ± 4 N·m (62 ± 3 ft-lb)
Slide pin (sub)	49 ± 4 N·m (37 ± 3 ft-lb)
Front disc brake <2.4 L>	
Bleeder screw	7.9 ± 0.9 N·m (70 ± 8 in-lb)
Brake hose connector bolt	30 ± 5 N·m (22 ± 4 ft-lb)
Front brake assembly mounting bolt	100 ± 10 N·m (74 ± 7 ft-lb)
Front brake bolt (pin bolt)	38 ± 4 N·m (28 ± 3 ft-lb)
Master cylinder assembly and brake booster	
Brake booster mounting nut	14 ± 3 N·m (124 ± 26 in-lb)
Fitting	16 ± 1 N·m (12 ± 1 ft-lb)
Master cylinder mounting nut	10 ± 2 N·m (89 ± 17 in-lb)
Operating rod jam nut	22 ± 3 N·m (16 ± 2 ft-lb)
Proportioning valve	30 ± 5 N·m (22 ± 4 ft-lb)
Rear drum brake	
Bleeder screw	7.9 ± 0.9 N·m (70 ± 8 in-lb)
Backing plate bolt	60 ± 5 N·m (45 ± 3 ft-lb)
Lock nut	175 ± 25 N·m (130 ± 18 ft-lb)
Wheel cylinder mounting bolt	9.8 ± 2.0 N·m (87 ± 17 in-lb)
Rear disc brake	
Bleeder screw	7.9 ± 0.9 N·m (70 ± 8 in-lb)
Brake hose flare nut	15 ± 2 N·m (12 ± 1 ft-lb)
Rear brake assembly mounting bolt	60 ± 5 N·m (45 ± 3 ft-lb)
Rear brake pin (lock pin/guide pin)	44 ± 5 N·m (32 ± 4 ft-lb)

GENERAL SPECIFICATIONS

M1351000200403

ITEMS	2.0 L	2.4 L
Master cylinder ID mm (in)	22.2 (0.87)	25.4 (1.0)
Brake booster effective diameter of power cylinder mm (in)	255 (10)	205 + 230 (8 + 9)
Brake booster boosting ratio	5.0	7.0
Front disc brake disc effective diameter mm (in)	207 (8.0)	222 (8.7)
Front disc brake wheel cylinder ID mm (in)	54.0 (2.13)	60.3 (2.37)
Rear drum brake drum ID mm (in)	203 (8.0)	—
Rear drum brake wheel cylinder ID mm (in)	19.0 (0.75)	—
Rear drum brake lining thickness mm (in)	4.3 (0.17)	—
Rear disc brake disc effective diameter mm (in)	—	226 (8.9)
Rear disc brake wheel cylinder ID mm (in)	—	38.1 (0.17)

SERVICE SPECIFICATIONS

M1351000300518

ITEMS	STANDARD VALUE	LIMIT
Brake pedal height mm (in)	169.1 – 172.1 (6.7 – 6.8)	—
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	—
Proportioning valve output fluid pressure MPa (psi)	Split point	3.19 – 3.67 (463 – 532)
	When input fluid pressure is 6.86 MPa (995 psi)	4.17 – 4.66 (605 – 676)
Proportioning valve output fluid pressure difference between left and right MPa (psi)	—	0.5 (73)
Disc brake pad thickness mm (in)	10.0 (0.39)	Minimum 2.0 (0.08)
Disc brake disc thickness mm (in)	Front	26.0 (1.02)
	Rear	10.0 (0.39)
Disc brake disc run-out mm (in)	Front	—
	Rear	—
Disc brake drags force N (lb)	Front	78 (18) or less
	Rear	68 (15) or less
Rear drum brake lining thickness mm (in)	4.3 (0.17)	Minimum 1.0 (0.04)
Rear drum inside diameter mm (in)	203 (7.99)	205 (8.07)
Front hub end play mm (in)	—	0.05 (0.002)
Brake booster push rod protruding length mm (in)	2.0 L	9.18 – 9.43 (0.361 – 0.371)
	2.4 L	9.68 – 9.92 (0.381 – 0.390)

LUBRICANTS

M1351000400463

ITEMS		SPECIFIED LUBRICANT
Brake fluid		DOT3 or DOT4
Vehicles with rear drum brakes	Brake piston seal	Repair kit grease
	Slide pin (main) boot inner surface	
	Piston boot mounting grooves	
	Brake piston boot inner surface	
	Slide pin bush inner surface	
	Pin assembly	
	Rear brake shoe and backing plate contact surface	Repair kit grease Brake grease SAE J310, NLGI NO.1
	Auto adjuster assembly	
Vehicles with rear disc brakes	Brake pin (guide pin)	Repair kit grease
	Brake pin (lock pin)	
	Brake bushing (lock pin bushing) outer surface	
	Pin boot inner surface	
	Pin boot mounting grooves	
	Piston boot inner surface	

SEALANT

M1351000500084

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