GROUP 35A

BASIC BRAKE

CONTENTS

GENERAL INFORMATION

M1351000101380

Brake systems with higher reliability and durability have achieved distinguished braking performance.

FEATURES

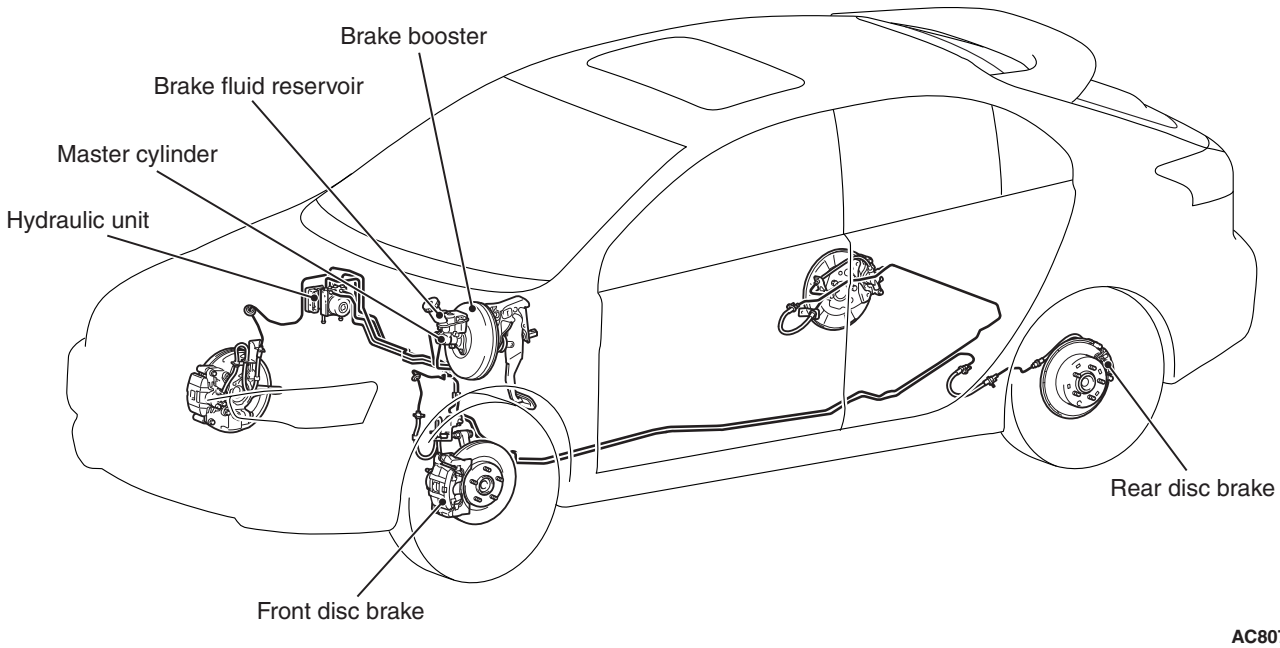
IMPROVEMENT OF BRAKING PERFORMANCE

- A 10-inch single brake booster with the variable boost ratio mechanism has been used to assure maximum braking force with less pedal pressure in case of emergency.
- In addition to the 10-inch single brake booster, a small and long stroke-type master cylinder has been adopted to achieve downsizing and secure assist force.
- 16-inch ventilated disk brakes have been adopted for the front.
- 16-inch solid disk brake has been adopted for the rear.
- The aluminum pedal pad has been adopted to the brake pedal. <2.0 L Engine>

IMPROVEMENT IN SAFETY

- X-type piping of brake lines have been adopted for the front and rear wheels.
- The brake pedal retreat suppression mechanism that suppresses the retraction of brake pedal surface upon a frontal collision is adopted.
- Audible wear indicators are used on the front and rear brake pads to warn the driver of wear limit.

CONSTRUCTION DIAGRAM



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GENERAL SPECIFICATIONS

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Item			Specification
Master cylinder	Type		Tandem type
	I.D. mm (in)	2.0 L Engine	22.2 (0.87)
		2.4 L Engine	20.6 (0.81)
Brake booster	Type		Vacuum type, single
	Effective dia. of power cylinder mm (in)		255 (10.0)
	Boost ratio		6.5 (Pedal depression force: 92 N) 8.5 (Pedal depression force: 156 N)
Front disk brake	Type (Disk brake nomenclature)	2.0 L Engine	Floating caliper 2 piston ventilated disk (V6-W43)
		2.4 L Engine	Floating caliper 1 piston ventilated disk (V6-S57)
	Disk effective dia × thickness mm (in)	2.0 L Engine	247 × 24 (9.7 × 0.9)
		2.4 L Engine	241 × 26 (9.5 × 1.0)
	Cylinder I.D. mm (in) {Number of pistons}	2.0 L Engine	42.8 (1.69) {2}
		2.4 L Engine	57.1 (2.25) {1}
	Brake pad thickness mm (in)		10.0 (0.39)
	Clearance adjustment		Automatic adjustment
Rear disk brake	Type (Disk brake nomenclature)	2.0 L Engine	Floating caliper 1 piston solid disk (S6-S38)
		2.4 L Engine	Floating caliper 1 piston solid disk (S6-S35)
	Disk effective dia × thickness mm (in)		258 × 10 (10.2 × 0.4)
	Cylinder I.D. mm (in) {Number of pistons}	2.0 L Engine	38.1 (1.50) {1}
		2.4 L Engine	34.9 (1.37) {1}
	Brake pad thickness mm (in)		10.0 (0.39)
	Clearance adjustment		Automatic adjustment

SERVICE SPECIFICATIONS

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Item			Standard value	Limit
Brake pedal height mm (in)			219.8 –227.8 (8.7 –9.0)	–
Dimension from the brake booster stud bolt end to the clevis hole center mm (in)			75.8 –80.2 (2.98 –3.16)	–
Brake pedal free play mm (in)			3 –8 (0.12 –0.31)	–
Pedal-to-floor clearance when brake pedal is depressed mm (in) [Pedal depression force: approx. 500 N]			85 (3.35) or more	–
Brake pedal distortion mm	Distance from the pedal pad surface to the level surface	M/T	240 –245 (9.4 –9.6)	–
		CVT, TC-SST	239 –248 (9.4 –9.8)	–
Fluid pressure generated by brake booster non-servo effect test kPa (psi)	Pedal depression force: 100 N (22.5 lb)	2.0 L Engine	0 –510 (0 –74)	–
		2.4 L Engine	0 –590 (0 –85)	–
	Pedal depression force: 300 N (67.4 lb)	2.0 L Engine	1,170 –1,880 (170 –273)	–
		2.4 L Engine	1,360 –2,180 (197 –316)	–
Fluid pressure generated by brake booster servo effect test kPa (psi)	Pedal depression force: 100 N (22.5 lb)	2.0 L Engine	4,180 –5,470 (606 –794)	–
		2.4 L Engine	4,850 –6,460 (703 –937)	–
	Pedal depression force: 300 N (67.4 lb)	2.0 L Engine	9,110 –9,820 (1,322 –1,425)	–
		2.4 L Engine	10,550 –11,380 (1,530 –1,650)	–
Front disk brake	Brake pad thickness mm (in)		10.0 (0.39)	2.0 (0.08)
	Brake disk thickness mm (in)	2.0 L Engine	24.0 (0.94)	22.4 (0.88)
		2.4 L Engine	26.0 (1.02)	24.4 (0.96)
	Brake disk run-out mm (in)		–	0.06 (0.0024)
	Brake drag force N (lb)	2.0 L Engine	85 (19.1) or less	–
		2.4 L Engine	68 (15.3) or less	–
Rear disk brake	Brake pad thickness mm (in)		10.0 (0.39)	2.0 (0.08)
	Brake disk thickness mm (in)		10.0 (0.39)	8.4 (0.33)
	Brake disk run-out mm (in)		–	0.08 (0.0032)
	Brake drag force N (lb)		68 (15.3) or less	–

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LUBRICANTS

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Item			Specified lubricant	Quantity
Brake fluid			DOT3 or DOT4	As required
Front disk brake		Piston, caliper body, piston seal	DOT3 or DOT4	
		Guide pin, lock pin, pin boot, bushing, boot ring, piston boot	Repair kit grease (Color: Translucent red), Niglube RX-2 or equivalent	
Rear disk brake	2.0 L Engine	Piston, caliper body, piston seal	DOT3 or DOT4	
		Guide pin, lock pin, pin boot, bushing	Niglube RM or equivalent	
		Piston boot	Repair kit grease (Color: Translucent red), Niglube RX-2 or equivalent	
		Shim, brake pad assembly	Repair kit grease (Color: Yellow)	
	2.4 L Engine	Piston, caliper body, piston seal	DOT3 or DOT4	
		Guide pin, lock pin, pin boot, bushing	Niglube RM or equivalent	
		Piston boot	Repair kit grease (Color: Translucent red), Niglube RX-2 or equivalent	

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 disc brakes. 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 No.	Reference page
Vehicle pulls to one side when brakes are applied	1	P.35A-6
Insufficient braking power	2	P.35A-7
Increased pedal stroke (Reduced pedal-to-floor board clearance)	3	P.35A-8
Brake drag	4	P.35A-8
Scraping or grinding noise when brake are applied	5	P.35A-10
Squealing, groaning or chattering noise when brake are applied	6	P.35A-10
Squealing noise when brakes are not applied	7	P.35A-11
Groaning, clicking or rattling noise when brakes are not applied	8	P.35A-12

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 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 disk 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 disk 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 disk brake assembly.

Q: Do (does) the piston(s) move correctly?
YES : Go to Step 3.
NO : Disassemble and inspect the brake assembly {Front: refer to P.35A-43 <2.0 L Engine> or P.35A-46 <2.4 L Engine>, Rear: refer to P.35A-51 <2.0 L Engine> or P.35A-54 <2.4 L Engine>}. Then go to Step 5.

STEP 3. Check brake disk(s) for runout.

Refer to P.35A-27.

Q: Is runout outside of specifications?
YES : Repair or replace the brake disk(s) as necessary. Then go to Step 5.
NO : Go to Step 4.

STEP 4. Check brake disks for correct thickness.

Refer to P.35A-27.

Q: Is the thickness outside of specifications?
YES : Repair or replace the brake disk(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.

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INSPECTION PROCEDURE 2: Insufficient Braking Power

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-18). 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-18). Then go to Step 6.
- **NO :** Go to Step 3.

STEP 3. Check the brake booster function.

Refer to P.35A-16.

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. Recheck symptom. Then go to Step 6.
- **NO :** The procedure is complete. Then go to Step 6.

STEP 6. Recheck symptom.

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 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-18). Then go to Step 6.
NO : Go to Step 2.

STEP 2. Check the pad for wear.

Refer to P.35A-20.

Q: Is the pad thickness outside of specifications?
YES : Replace the part. Then go to Step 6.
NO : Go to Step 3.

STEP 3. Check the vacuum hose and check valve for damage.

Refer to P.35A-18.

Q: Is there a damage?
YES : Replace the part. Then go to Step 6.
NO : Go to Step 4.

STEP 4. Check for brake fluid leaks.

Q: Is there a leak?
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 6 .
NO : Go to Step 5.

STEP 5. Check the master cylinder assembly.

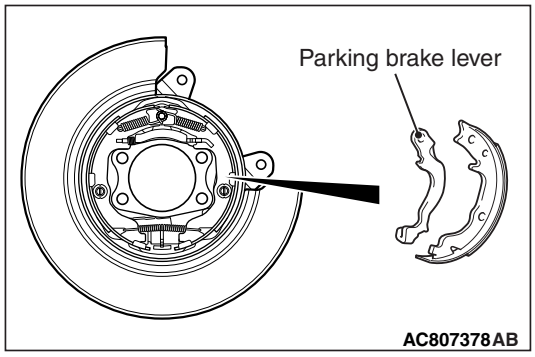
(1) Remove the master cylinder assembly (Refer to P.35A-34 <2.0 L Engine> or P.35A-37 <2.4 L Engine>).
(2) Check for brake fluid leaks from the master cylinder assembly seal.

Q: Is a brake fluid leaking from the master cylinder assembly seal present?
YES : Replace the master cylinder assembly and the brake booster assembly (Refer to P.35A-34 <2.0 L Engine> or P.35A-37 <2.4 L Engine>). Then go to Step 6.
NO : Go to Step 6.

STEP 6. Recheck symptom.

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



DIAGNOSIS

STEP 1. Check the parking brake lever return.

Q: Is the operation faulty?
YES : Repair it. Then go to Step 7.
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 7.
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.36-15 <2.0 L Engine> or P.36-18 <2.4 L Engine>.

Q: Is the grease amount low?

YES : Apply grease. Then go to Step 7.
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.36-9.

Q: Is there a fault?

YES : Adjust it. Then go to Step 7.
NO : Go to Step 5.

STEP 5. Check port for clogging.

Q: Is the port clogged?

YES : Repair it. Then go to Step 7.
NO : Go to Step 6.

STEP 6. Check disk 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 7.
NO : Go to Step 7.

STEP 7. Recheck symptom.

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 any 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 any 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 shield and brake disk <Front>, interference between the backing plate and brake disk <Rear>.

Q: Is there any interference?
YES : Repair or replace the part. Then go to Step 6.
NO : Go to Step 4.

STEP 4. Check the brake disks 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 dust shield or backing plate.

Q: Is the dust shield or backing plate bent?
YES : Repair or replace the part. Then go to Step 6.
NO : Go to Step 6.

STEP 6. Recheck symptom.

Q: Is the symptom eliminated?
YES : The procedure is complete.
NO : Start over at step 1. If a new symptom surfaces, refer to the symptom chart.

INSPECTION PROCEDURE 6: Squealing, Groaning or Chattering Noise when Brakes are Applied

DIAGNOSIS

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

Q: Is there wear or cutting?
YES : Repair or replace the part. Then go to Step 4.
NO : Go to Step 2.

STEP 2. Check the calipers for rust.

Q: Is there any rust?
YES : Remove the rust. Then go to Step 4.
NO : Go to Step 3.

STEP 3. Adjust the brake pedal.
Refer to P.35A-14.

Q: Is the brake pedal adjusted correctly?
YES : Go to Step 4.
NO : Adjust the brake pedal. Then go to Step 4.

STEP 4. Recheck symptom.

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.

Q: Is there a fault?
YES : Replace the part. Then go to Step 8.
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 any damage?
YES : Replace the part. Then go to Step 8.
NO : Go to Step 3.

STEP 3. Check the brake drum for wear and the shoe spring for damage.

Q: Is there any wear or damage?
YES : Replace the part. Then go to Step 8.
NO : Go to Step 4.

STEP 4. Check the brake disks for rust.

Q: Are the brake disks 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 8.
NO : Go to Step 5.

STEP 5. Check the brake pads for correct installation.

Q: Are the pads installed incorrectly?
YES : Install the pads correctly. Then go to Step 8.
NO : Go to Step 6.

STEP 6. Check the calipers for correct installation.

Q: Are the calipers installed incorrectly?
YES : Install the calipers correctly. Then go to Step 8.
NO : Go to Step 7.

STEP 7. Check the wheel bearings for end play.
Refer to GROUP 26 –On-vehicle Service, Wheel bearing play check P.26-10 <Front>, GROUP 27A – On-vehicle Service, Wheel bearing end play check P.27A-5 <Rear (FWD)> or GROUP 27B –On-vehicle Service, Wheel bearing end play check P.27B-17 <Rear (AWD)>.

Q: Does the measured end play exceed the limit?
YES : Replace the faulty hub assembly (Refer to GROUP 26 –Front Axle Hub Assembly P.26-16 <Front>, GROUP 27A –Rear Axle Hub Assembly P.27A-7 <Rear (FWD)> or GROUP 27B –Rear Axle Hub Assembly P.27B-19 <Rear (AWD)>). Then go to Step 8.
NO : Go to Step 8.

STEP 8. Recheck symptom.

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 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 any foreign material?

YES : Remove it. Then go to Step 5.
NO : Go to Step 2.

STEP 2. Check for looseness of the wheel nuts.

Refer to GROUP 31 –Wheel and Tire P.31-8.

Q: Are the wheel nuts loose?

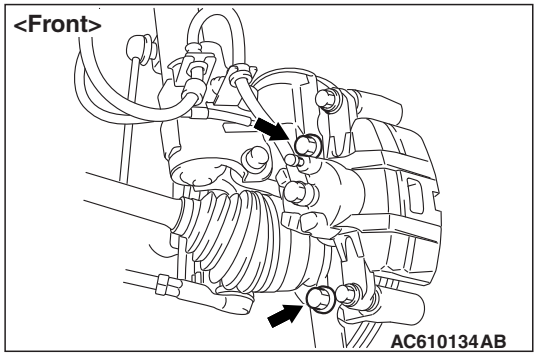
YES : Tighten the wheel nuts to the specified torque (Refer to GROUP 31 –Wheel and Tire P.31-8). Then go to Step 5.
NO : Go to Step 3.

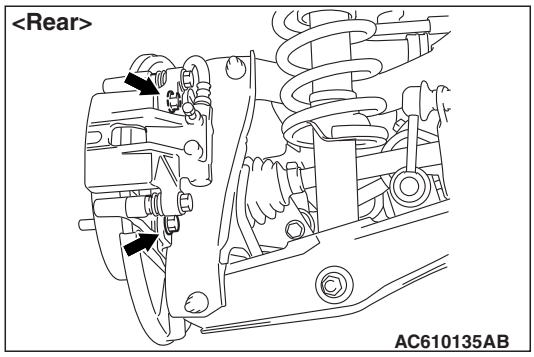
STEP 3. Check for looseness of the caliper installation bolts.

Refer to P.35A-43 <Front (2.0 L Engine)>, P.35A-46 <Front (2.4 L Engine)>, P.31-8 <Rear (2.0 L Engine)> or P.31-8 <Rear (2.4 L Engine)>.

Q: Are the caliper installation bolts loose?

YES : Tighten the caliper installation bolts to the specified torque (Refer to P.35A-43 <Front (2.0 L Engine)>, P.35A-46 <Front (2.4 L Engine)>, P.31-8 <Rear (2.0 L Engine)> or P.31-8 <Rear (2.4 L Engine)>. Then go to Step 5.
NO : Go to Step 4.





STEP 4. Check the wheel bearings for end play.
Refer to GROUP 26 –On-vehicle Service, Wheel bearing play check P.26-10 <Front>, GROUP 27A –On-vehicle Service, Wheel bearing end play check P.27A-5 <Rear (FWD)> or GROUP 27B –On-vehicle Service, Wheel bearing end play check P.27B-17 <Rear (AWD)>.

Q: Does the measured end play exceed the limit?

YES : Replace the faulty hub assembly (Refer to GROUP 26 –Front Axle Hub Assembly P.26-16 <Front>, GROUP 27A –Rear Axle Hub Assembly P.27A-7 <Rear (FWD)> or GROUP 27B –Rear Axle Hub Assembly P.27B-19 <Rear (AWD)>). Then go to Step 5.

NO : Go to Step 5.

STEP 5. Recheck symptom.

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 TOOL

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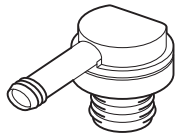
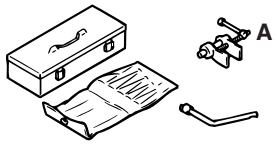
Tool	Number	Name	Use
 MB992146	MB992146	Booster test adapter	Inspection using a simplified tester
 MB990964	MB990964 A: MB990520	Brake tool set A: Piston expander	Disc brake piston pushing back

ON-VEHICLE SERVICE

BRAKE PEDAL CHECK AND ADJUSTMENT

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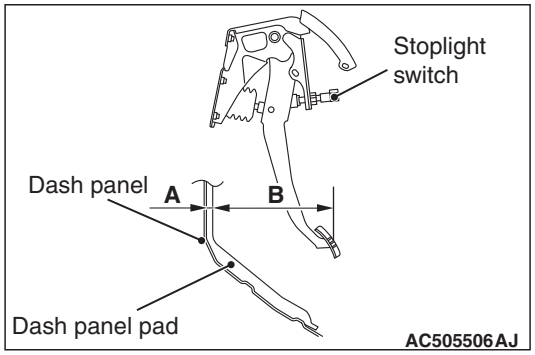
⚠ CAUTION

Do not apply grease or lubricant to the switch and the switch installation section to avoid malfunction of the switch. In addition, do not use gloves which have grease on them.

BRAKE PEDAL HEIGHT CHECK



1. Turn up the floor carpet under the brake pedal.
2. Remove the stoplight switch (Refer to P.35A-31).
3. Use a needle or similar tool to measure the dimension A in the figure (distance from the dash panel pad surface to the dash panel).
4. Measure the dimension B in the figure (distance from the pedal pad surface to the dash panel pad surface).
5. Make sure that the total of the dimensions A and B measured in Steps 2 and 3 (brake pedal height) is within the standard value.

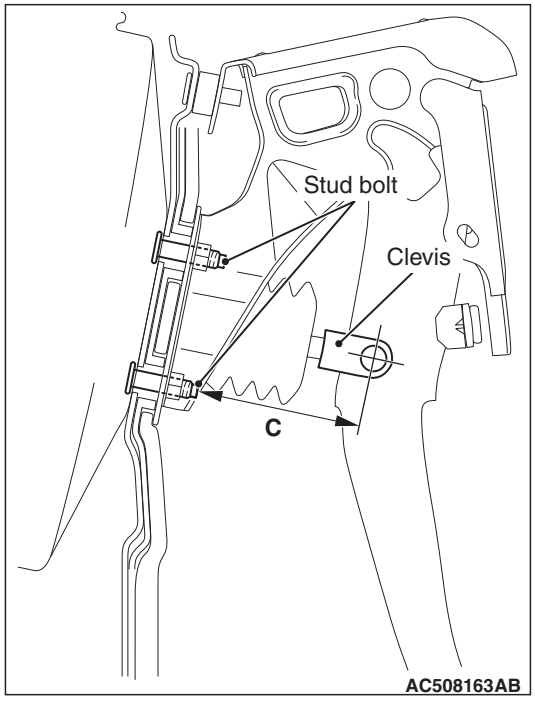
   Standard value (A+B): 219.8 –227.8 mm (8.7 –9.0 inches)

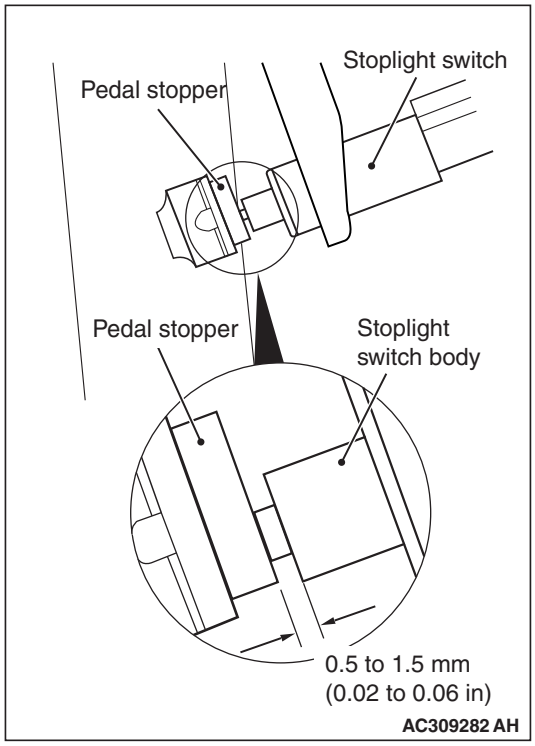
6. When the brake pedal height is not within the standard value, inspect the brake pedal in the following procedure.
   (1) Remove the brake pedal assembly (Refer to P.35A-31).
   (2) Check the removed brake pedal assembly for distortion, and replace it when deformed (Refer to P.35A-33).
   (3) Install the brake pedal assembly (Refer to P.35A-31).

   NOTE: When installing, compress the dash panel pad.
   (4) Measure the brake pedal height again, and make sure that it is within the standard value (A+B).
   When the measured value is not within the standard value, measure the dimension C in the figure (distance from the stud bolt end to the clevis hole center), and make sure it is within the standard value (C).

   Standard value (C): 75.8 –80.2 mm (2.98 –3.16 inches)

   (5) When the measured value is not within the standard value (C), replace the brake booster (Refer to P.35A-34 <2.0 L Engine> or P.35A-37 <2.4 L Engine>).





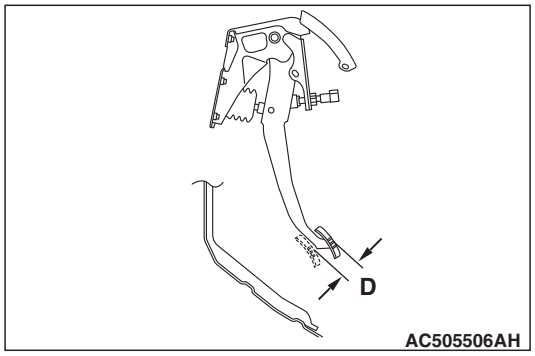
7. After checking the brake pedal height, install the stoplight switch in the following procedure:
   (1) Pull and hold the brake pedal by hand. Insert the stoplight switch until the stoplight switch body contacts the pedal stopper, then turn the switch approximately one eighth of a clockwise turn to fix it.
   (2) Check that the clearance between the stoplight switch and the pedal stopper is as shown in the figure.

⚠ CAUTION

Make sure that the stoplight is not illuminated when the brake pedal is not depressed.

   (3) Connect the stoplight switch connector.
8. Check the key interlock mechanism and the shift lock mechanism (Refer to GROUP 22C –On-vehicle Service, Shift Lock Mechanism Check P.22C-483 <TC-SST> or GROUP 23A –On-vehicle Service, Shift Lock Mechanism Check P.23A-145 <CVT>).
9. Recover the floor carpet under the brake pedal.

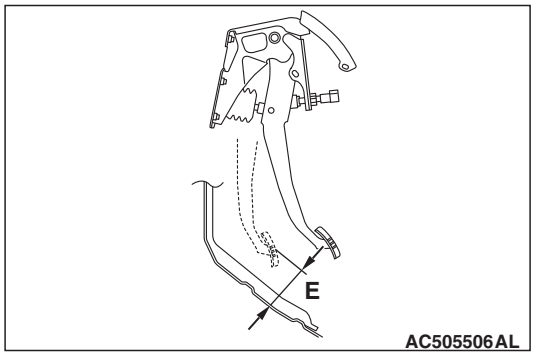
BRAKE PEDAL FREE PLAY CHECK AND ADJUSTMENT



1. With the engine stopped, depress the brake pedal 2 or 3 times to release the vacuum in the brake booster. Then, press the brake pedal with your finger and check if the pedal stroke until the pedal becomes heavy (play) is within the standard value.

   Standard value (D): 3 –8 mm (0.12 –0.31 inch)
2. When the brake pedal free play is not within the standard value, check the brake pedal-to-clevis pin looseness, clevis pin-to-booster operating rod looseness, brake pedal height, and stoplight switch position, and adjust or replace as necessary.

BRAKE PEDAL-TO-FLOOR PANEL CLEARANCE CHECK AND ADJUSTMENT



1. Turn up the floor carpet under the brake pedal.
2. Start the engine and depress the brake pedal with approximately 500 N, and measure clearance between the brake pedal and the floor panel.

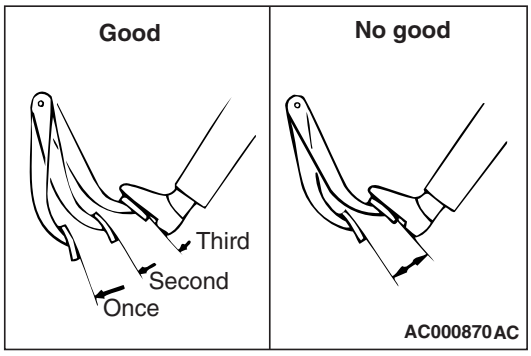
   Standard value (E): 85 mm (3.35 inches) or more
3. When the clearance is not within the standard value, check for air in the brake line and thickness of the disk brake pad, and correct or replace as necessary.
4. Recover the floor carpet under the brake pedal.

BRAKE BOOSTER OPERATION CHECK

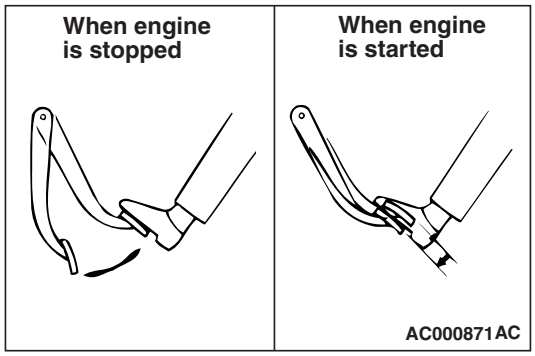
M1351001001018

INSPECTION WITHOUT USING TESTER

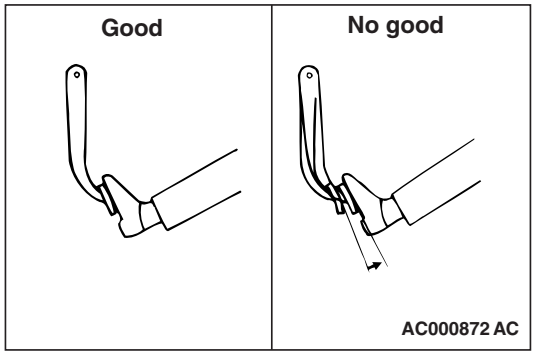
1. Carry out the simplified brake booster operation check in the following procedure:
   (1) Run the engine for 1 to 2 minutes, and then stop. Depress the brake pedal with normal depression force. The result is judged as "Good" when the pedal stroke is great at the first depression, and becomes smaller as you repeat depressing the pedal. If the pedal stroke does not change, the result is judged as "No Good."



   (2) With the engine stopped, depress the brake pedal several times. Keep the brake pedal depressed and start the engine. At this time, when the pedal moves down slightly, the result is judged as "Good." The result is judged as "No Good" if the pedal does not move down.



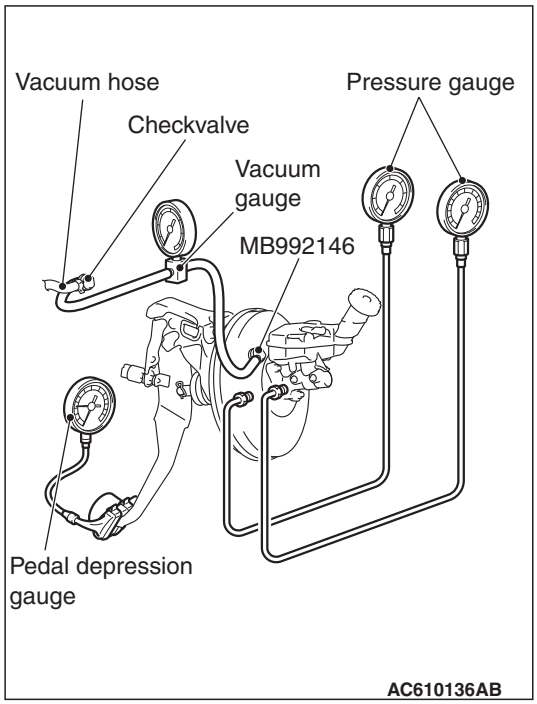
   (3) With the engine running, depress the brake pedal. Stop the engine in this condition. The result is judged as "Good" when the pedal height does not change for approximately 30 seconds. The result is judged as "No Good" if the pedal moves up.



2. The brake booster is judged as normal when the results of all the above checks are "Good."
   When one or more of the above check results are "No Good," then the check valve, vacuum hose, or brake booster is suspected faulty.

INSPECTION USING SIMPLIFIED TESTER

1. Before starting this inspection, remove the brake booster check valve from the vehicle and check its operation (Refer to P.35A-34 <2.0 L Engine> or P.35A-37 <2.4 L Engine>).



2. After checking, install the check valve to the vacuum hose and connect it to the vacuum gauge. Install the booster test adapter (Special tool: MB992146) to the brake booster and connect it to the vacuum gauge. Connect the pressure gauge and pedal depression gauge as shown in the figure. Bleed the pressure gauge and then perform the following tests:
   (1) Airtightness test with no load
   Start the engine, and stop it when the vacuum gauge indicator has reached approximately −67 kPa (−9.7 psi). The result is judged as "Good" when the drop of the vacuum approximately 15 seconds after the engine was stopped is within −3.3 kPa (−0.5 psi).
   (2) Airtightness test with load
   Start the engine and depress the brake pedal with 200 N. Stop the engine when the vacuum gauge indicator reached approximately −67 kPa (−9.7 psi). The result is judged as "Good" when the drop of the vacuum approximately 15 seconds after the engine was stopped is within −3.3 kPa (−0.5 psi).
   When one or more of the above check results are judged as "No Good," the vacuum hose or brake booster is suspected faulty.
   (3) Brake booster characteristics test
   Perform this test after the above (1) and (2) were performed.
   a. Non-servo effect test
   With the engine stopped, make sure that the vacuum gauge reading is 0 kPa (0 psi). Depress the brake pedal with 100 N (22.5 lb) and 300 N (67.4 lb), and measure the fluid pressure generated.

Standard value:

<2.0 L Engine>

Item	Pedal depression force	
	100 N (22.5 lb)	**300 N (67.4 lb)**
Generated fluid pressure kPa (psi)	0 –510 (0 –74)	1,170 –1,880 (170 –273)

<2.4 L Engine>

Item	Pedal depression force	
	100 N (22.5 lb)	**300 N (67.4 lb)**
Generated fluid pressure kPa (psi)	0 –590 (0 –85)	1,360 –2,180 (197 –316)

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b. Servo effect test
Start the engine. Depress the brake pedal with 100 N (22.5 lb) and 300 N (67.4 lb) when the vacuum gauge indicator reached approximately −67 kPa (−9.7 psi), and measure the fluid pressure generated.

Standard value:

<2.0 L Engine>

Item	Pedal depression force	
	100 N (22.5 lb)	**300 N (67.4 lb)**
Generated fluid pressure kPa (psi)	4,180 –5,470 (606 –794)	9,110 –9,820 (1,322 –1,425)

<2.4 L Engine>

Item	Pedal depression force	
	100 N (22.5 lb)	**300 N (67.4 lb)**
Generated fluid pressure kPa (psi)	4,850 –6,460 (703 –937)	10,550 –11,380 (1,530 –1,650)

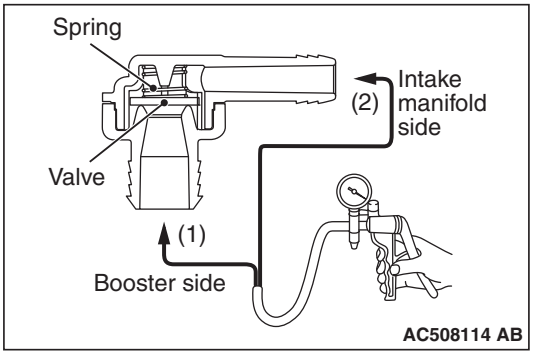
CHECK VALVE OPERATION CHECK

M1351009001023

1. Remove the check valve (Refer to P.35A-34 <2.0 L Engine> or P.35A-37 <2.4 L Engine>).

⚠ CAUTION
Replace the check valve when it is faulty.

2. Using a vacuum pump, check operation of the check valve.



Vacuum pump connection	Normal condition
When connected to the booster side (1)	Vacuum is generated and maintained.
When connected to the engine side (2)	No vacuum is generated.

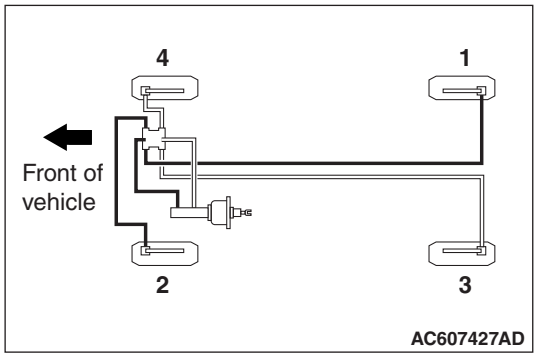
BLEEDING

M1351001401191

⚠ CAUTION
Be sure to use the specified brand and type of brake fluid. Avoid mixing with other type of brake fluid.

Brake fluid: DOT3 or DOT4

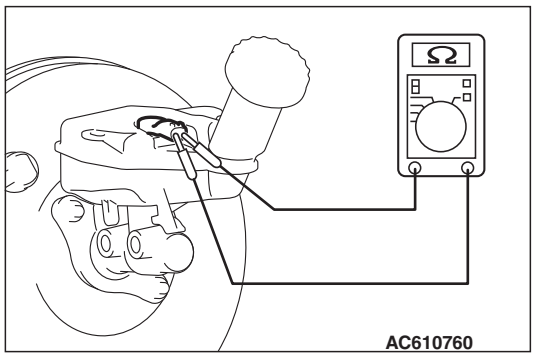
BLEEDING OF BRAKE PIPELINE



Perform the bleeding in the order shown in the figure.

BRAKE FLUID LEVEL SWITCH CHECK

M1351009100726



The brake fluid level switch is normal when the following conditions are met: When the brake fluid level is above "MIN," continuity is detected; and when the level is below "MIN," no continuity is detected.

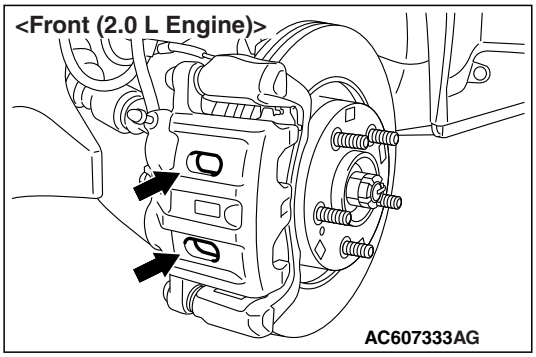
BRAKE PAD CHECK

M1351017300338

⚠ CAUTION

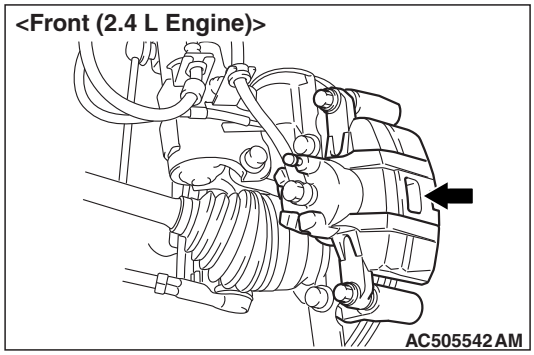
If there is a significant difference in thickness between the brake pads at right and left, check the sliding area and the runout of the brake disk (Refer to P.35A-27).

<Front (2.0 L Engine)>



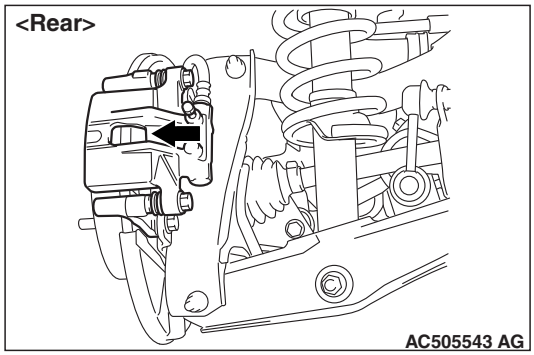
AC607333AG

<Front (2.4 L Engine)>



AC505542AM

<Rear>



AC505543AG

1. Visually check the thickness of brake pad from the inspection hole of the caliper body.

   Standard value: 10.0 mm (0.39 inch)
   Limit: 2.0 mm (0.08 inch)

2. If the brake pad thickness is less than the limit value, replace the brake pad (Refer to P.35A-21 <2.0 L Engine> or P.35A-24 <2.4 L Engine>).

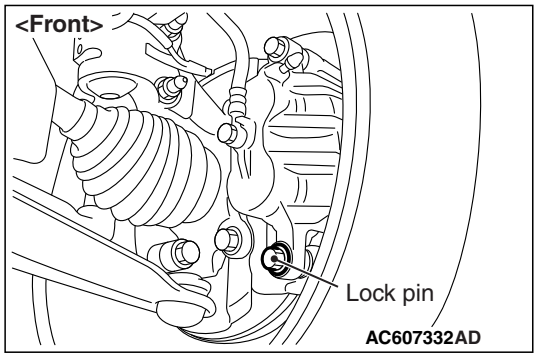
BRAKE PAD REPLACEMENT <2.0 L Engine>

M1351017400517

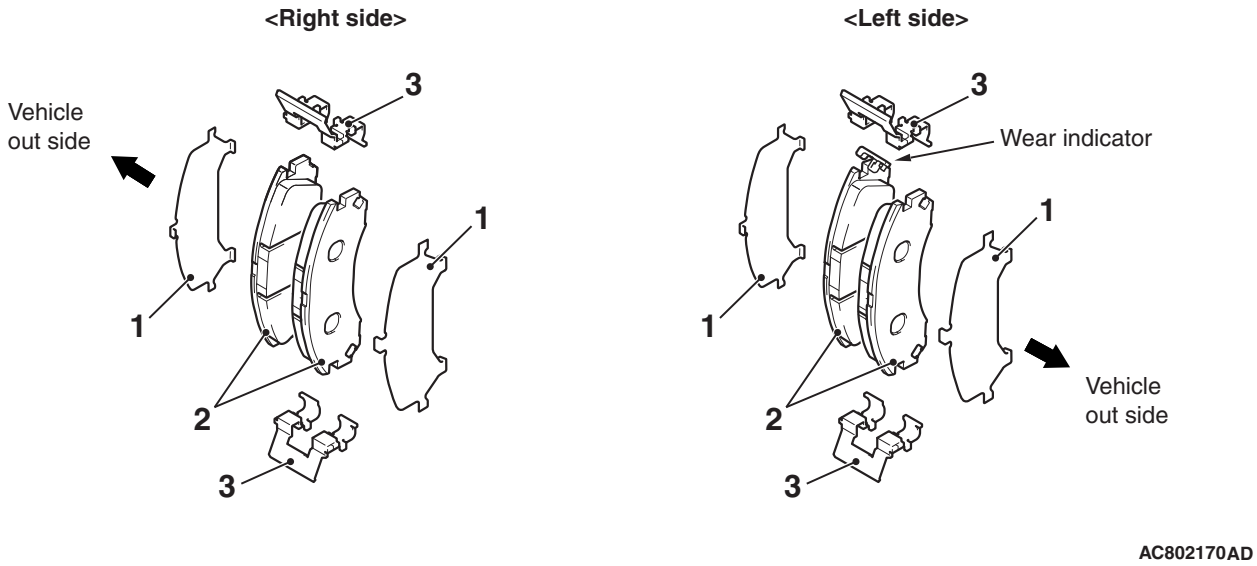
<FRONT>

⚠ CAUTION

When replacing, replace both brake pads (right and left) as a set.



1. Remove the parts indicated in the figure, swivel the caliper body upward and retain it with a wire or similar tool.

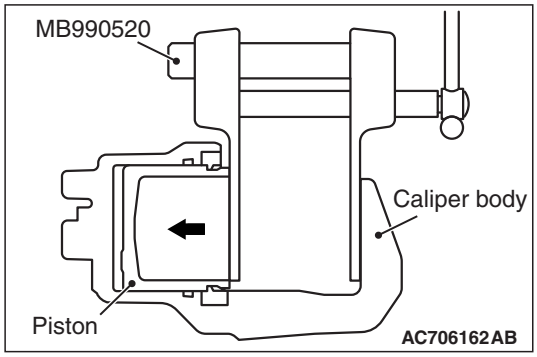


2. Remove the following parts from the caliper body.
   (1) Shim
   (2) Brake pad assembly
   (3) Clip

NOTE:

- *The brake pad assembly with wear indicator is installed only to the inner side of the brake disk of the left-side brake at factory.*
- *As for the accessory pad set, the brake pad with wear indicator has been established to the inner side of the brake disk on both right side brake and left side brake.*

TSB Revision



⚠ CAUTION

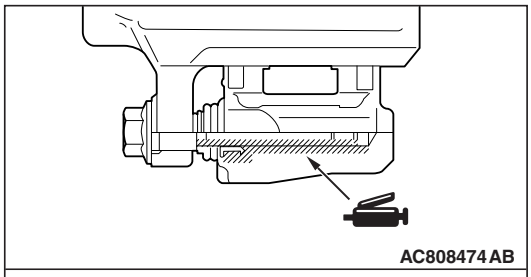
Keep grease or other soiling off the pad and brake disk friction surfaces.

3. Clean the piston part, and press the piston into the cylinder using the special tool piston expander (MB990520).
4. Assemble the shim, brake pad assembly and clip to the caliper support, and tighten the lock pin to the specified torque.

   Tightening torque: 74 ± 10 N· m (55 ± 7 ft-lb)

   NOTE: Install the brake pad assembly (with wear indicator) to the inner side of the brake disk, making sure that the wear indicator is located on the top.

LUBRICATION POINT



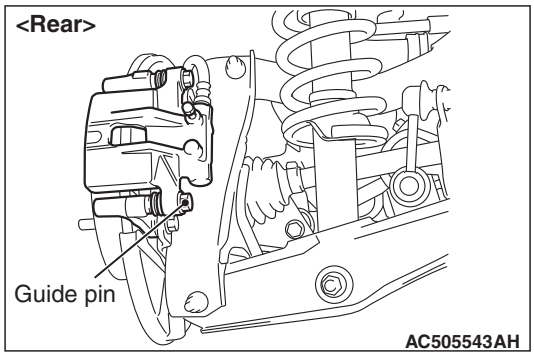
Grease: Repair kit grease (Color: Translucent red), Niglube RX-2 or equivalent

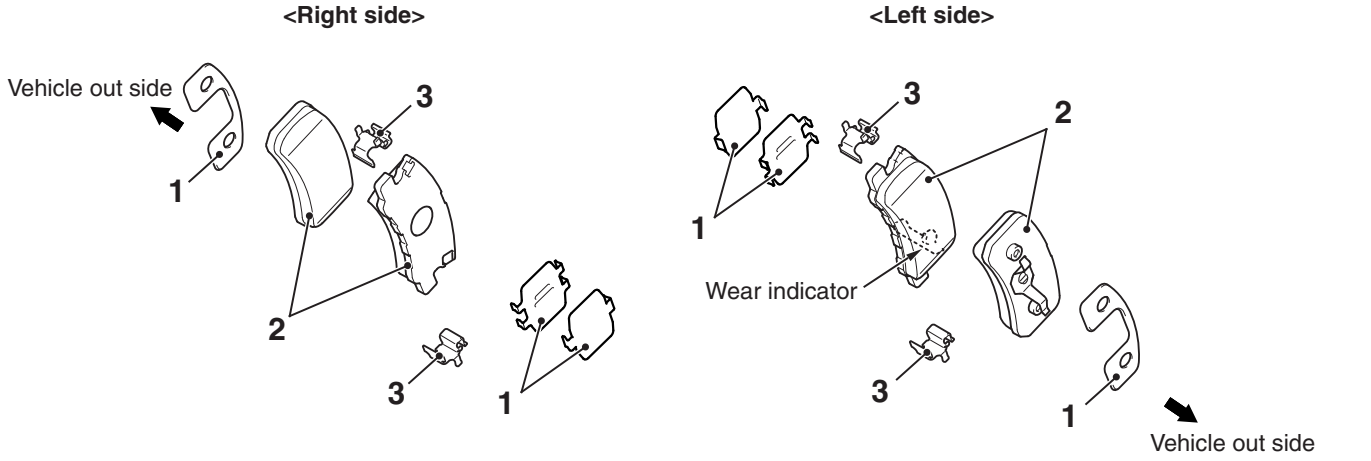
<REAR>

⚠ CAUTION

When replacing, replace both brake pads (right and left) as a set.

1. Remove the parts indicated in the figure, swivel the caliper body upward and retain it with a wire or similar tool.



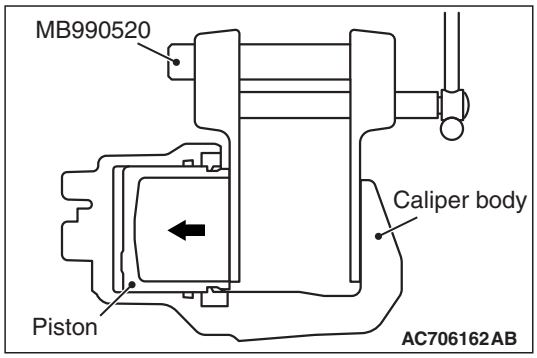


2. Remove the following parts from the caliper body.
   (1) Shim
   (2) Brake pad assembly
   (3) Clip

NOTE:
- *The brake pad assembly with wear indicator is installed only to the inner side of the brake disk of the left-side brake at factory.*
- *As for the accessory pad set, the brake pad with wear indicator has been established to the inner side of the brake disk on both right side brake and left side brake.*

⚠ CAUTION

Keep grease or other soiling off the pad and brake disk friction surfaces.



3. Clean the piston part, and press the piston into the cylinder using the special tool piston expander (MB990520).
4. Assemble the shim, brake pad assembly and clip to the caliper support, and tighten the guide pin to the specified torque.

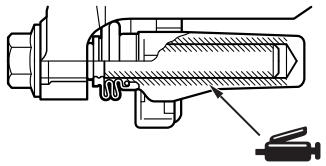
   Tightening torque: 44 ± 5 N· m (32 ± 4 ft-lb)

   NOTE: Install the brake pad assembly (with wear indicator) to the inner side of the brake disk, making sure that the wear indicator is located on the bottom.

LUBRICATION POINT

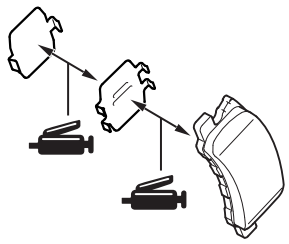
BRAKE PAD REPLACEMENT <2.4 L Engine>

M1351017400506



AC802113AB

Grease: Niglube RM or equivalent



AC801367AB

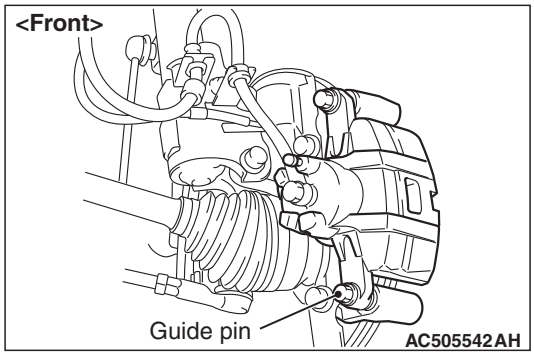
Grease: Repair kit grease (Color: Yellow)

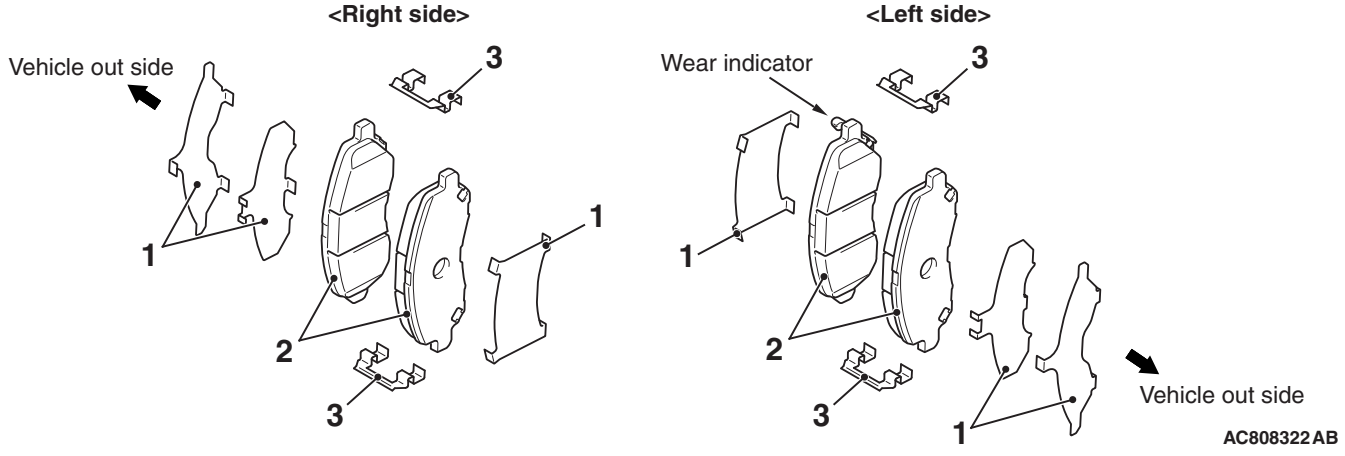
<FRONT>

⚠ CAUTION

When replacing, replace both brake pads (right and left) as a set.

1. Remove the parts indicated in the figure, swivel the caliper body upward and retain it with a wire or similar tool.



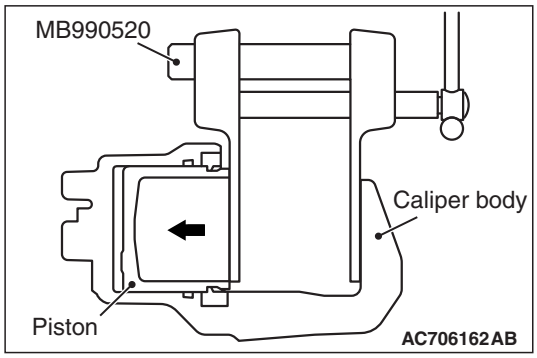


TSB Revision

2. Remove the following parts from the caliper body.
   (1) Shim
   (2) Brake pad assembly
   (3) Clip

NOTE:
- *The brake pad assembly with wear indicator is installed only to the inner side of the brake disk of the left-side brake at factory.*
- *As for the accessory pad set, the brake pad with wear indicator has been established to the inner side of the brake disk on both right side brake and left side brake.*

⚠ CAUTION
Keep grease or other soiling off the pad and brake disk friction surfaces.

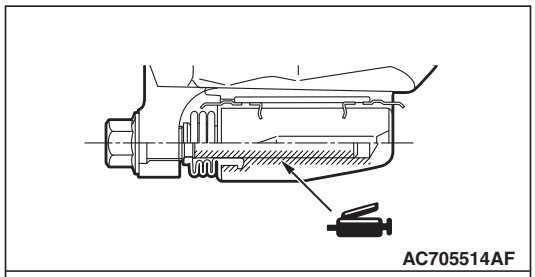


3. Clean the piston part, and press the piston into the cylinder using the special tool piston expander (MB990520).
4. Assemble the shim, brake pad assembly and clip to the caliper support, and tighten the guide pin to the specified torque.

   Tightening torque: 44 ± 5 N· m (32 ± 4 ft-lb)

   NOTE: Install the brake pad assembly (with wear indicator) to the inner side of the brake disk, making sure that the wear indicator is located on the top.

LUBRICATION POINT

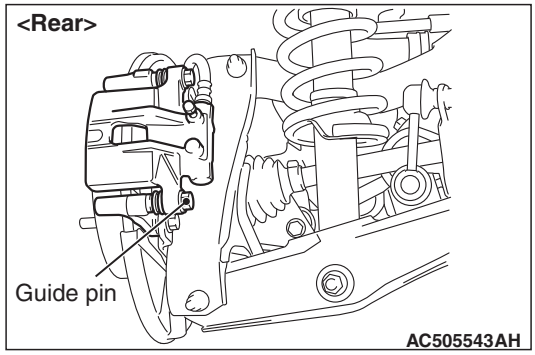


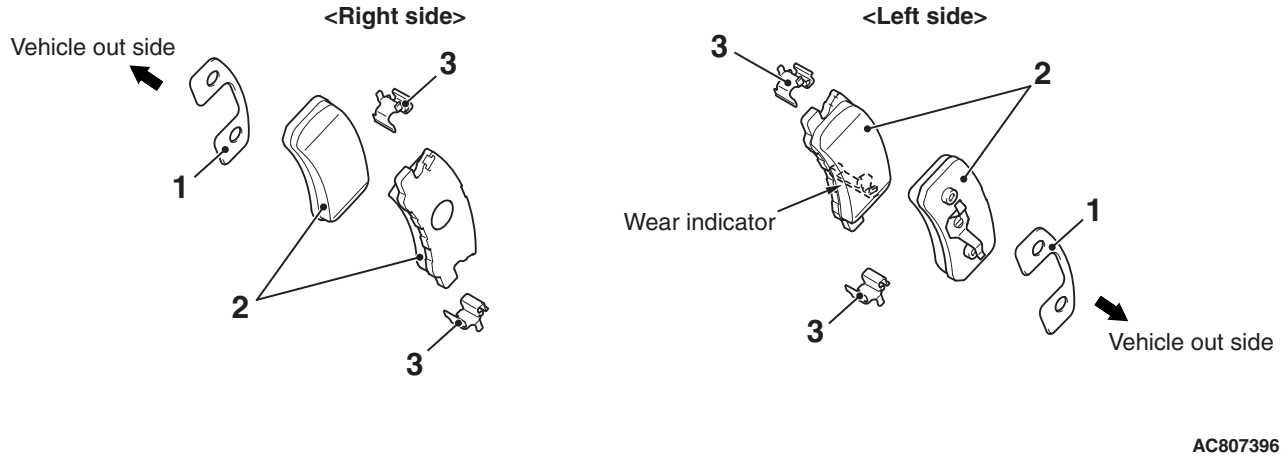
Grease: Repair kit grease (Color: Translucent red), Niglube RX-2 or equivalent

<REAR>

⚠ CAUTION
When replacing, replace both brake pads (right and left) as a set.

1. Remove the parts indicated in the figure, swivel the caliper body upward and retain it with a wire or similar tool.





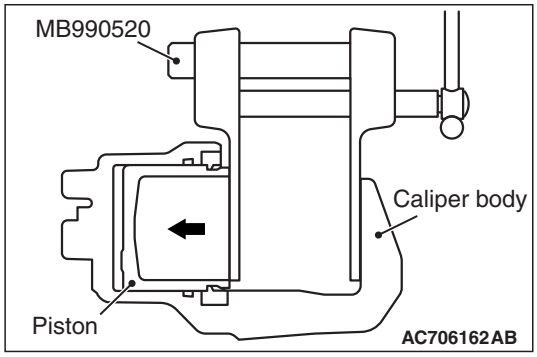
AC807396AB

2. Remove the following parts from the caliper body.
   (1) Shim
   (2) Brake pad assembly
   (3) Clip

NOTE:
- *The brake pad assembly with wear indicator is installed only to the inner side of the brake disk of the left-side brake at factory.*
- *As for the accessory pad set, the brake pad with wear indicator has been established to the inner side of the brake disk on both right side brake and left side brake.*

⚠ CAUTION

Keep grease or other soiling off the pad and brake disk friction surfaces.



3. Clean the piston part, and press the piston into the cylinder using the special tool piston expander (MB990520).
4. Assemble the shim, brake pad assembly and clip to the caliper support, and tighten the guide pin to the specified torque.

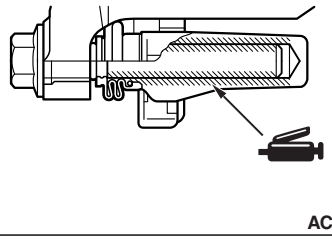
   Tightening torque: 44 ± 5 N· m (32 ± 4 ft-lb)

   NOTE: Install the brake pad assembly (with wear indicator) to the inner side of the brake disk, making sure that the wear indicator is located on the bottom.

LUBRICATION POINT

DISK BRAKE ROTOR CHECK

M1351002900958



AC802113AB

Grease: Niglube RM or equivalent

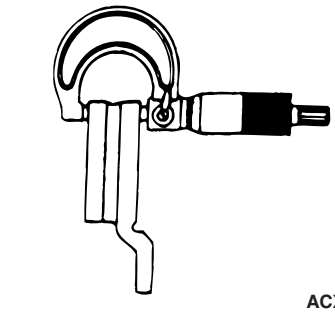
⚠ CAUTION

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

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

Inspection item	Remark
Scratches, rust, saturated lining materials and wear	• If the vehicle is not driven for a long period of time, sections of the disks that are not in contact with the pads will become rusty, causing noise and shuddering. • If grooves and scratches resulting from excessive disk wear are not removed prior to installing a new pad assembly, there will be inadequate contact between the disk and the lining (pad) until the pads conform to the disk.
Run-out	Excessive run-out of the disks will increase the pedal depression resistance due to piston kick-back.
Change in thickness (parallelism)	If the thickness of the disk 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 DISK THICKNESS CHECK



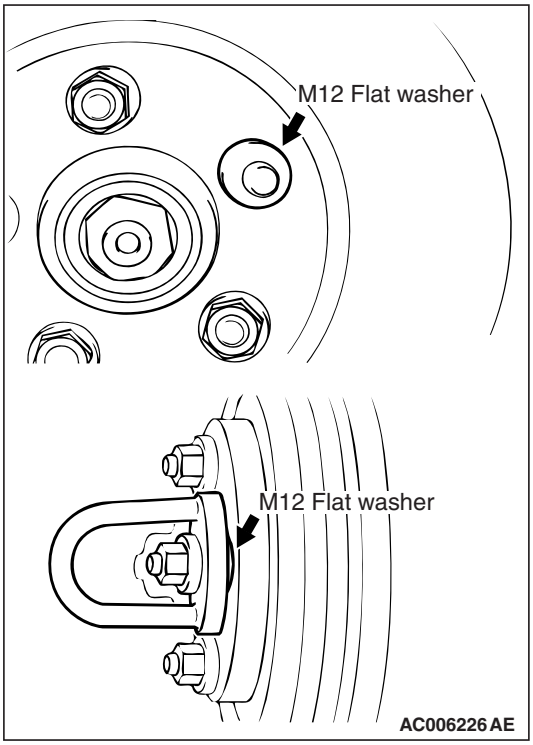
ACX00668AB

1. Using a micrometer, measure disk thickness at eight positions, approximately 45 degrees apart and 10 mm (0.4 inch) in from the outer edge of the disk.

   Standard value:
   24.0 mm (0.94 inch) <Front (2.0 L Engine)>
   26.0 mm (1.02 inches) <Front (2.4 L Engine)>
   10.0 mm (0.39 inch) <Rear>

   Limit:
   22.4 mm (0.88 inch) <Front (2.0 L Engine)>
   24.4 mm (0.96 inch) <Front (2.4 L Engine)>
   8.4 mm (0.33 inch) <Rear>

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

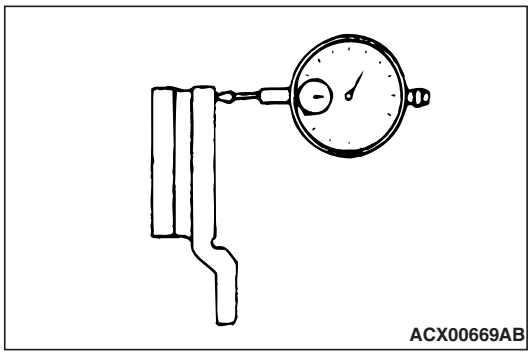


⚠ CAUTION

- **After a new brake disk is installed, always grind the brake disk with on-the-car type brake lathe. If this step is not carried out, the brake disk 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 disk side according to the figure, and then install the adapter. If the adapter is installed with M12 flat washer not seated, the brake disk rotor may be deformed, resulting in inaccurate grinding.**
- **Grind the brake disk 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 disk rotor or drum may be deformed, resulting in judder.**

2. If the disk 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 ("MAD, DL-8700PF" or equivalent). If the calculated final thickness after turning the rotor is less than the standard value, replace the disk.

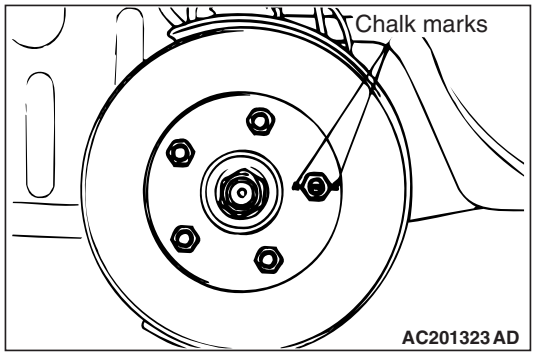
FRONT BRAKE DISK RUN-OUT CHECK AND CORRECTION



1. Remove the brake assembly, and then hold it with wire.
2. Temporarily install the disk with the hub nut.
3. Place a dial gauge approximately 5 mm (0.2 inch) from the outer circumference of the brake disk, and measure the run-out of the disk.

   Limit:
   0.06 mm (0.0024 inch) <Front>
   0.08 mm (0.0032 inch) <Rear>

4. When the run-out exceeds the limit value, correct the brake disk run-out in the following procedure.

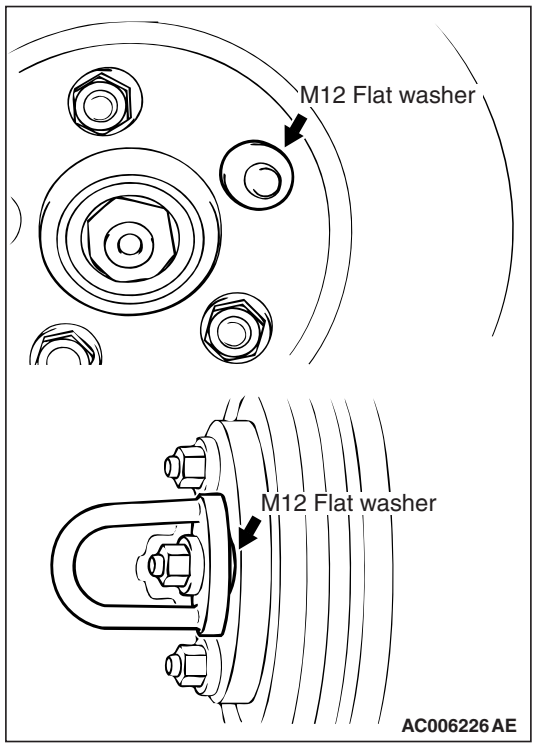


(1) Before removing the brake disk, mark the stud bolt on the side of greater run-out and its both sides with a chalk.
(2) Check for wheel bearing looseness in the axial direction (Refer to GROUP 26 –On-vehicle Service, Wheel bearing play check P.26-10 <Front>, GROUP 27A –On-vehicle Service, Wheel bearing end play check P.27A-5 <Rear (FWD)> or GROUP 27B –On-vehicle Service, Wheel bearing end play check P.27B-17 <Rear (AWD)>).
(3) When the looseness is within the limit value, install the brake disk after changing the phase between the hub and the brake disk, then check the run-out of the brake disk again.

⚠ CAUTION

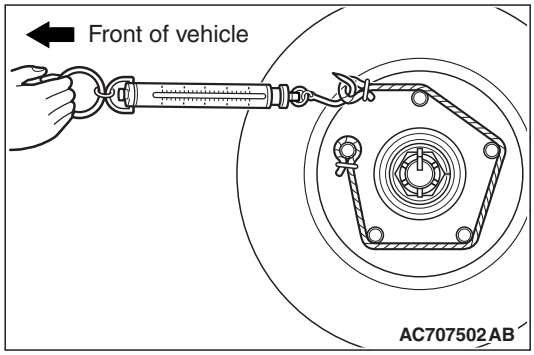
- **After a new brake disk is installed, always grind the brake disk with on-the-car type brake lathe. If this step is not carried out, the brake disk run-out exceeds the specified value, resulting in judder.**
- **When the on-the-car type lathe is used, first install M12 flat washer on the stud bolt in the brake disk side according to the figure, and then install the adapter. If the adapter is installed with M12 flat washer not seated, the brake disk rotor may be deformed, resulting in inaccurate grinding.**
- **Grind the brake disk 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 disk rotor or drum may be deformed, resulting in judder.**

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



BRAKE DRAG FORCE CHECK

M1351017200364



1. Remove the brake pad, shim and clip (Refer to P.35A-21 <2.0 L Engine> or P.35A-24 <2.4 L Engine>).
2. Using a spring scale, measure the hub sliding torque in the forward direction with the brake pad, shim and clip removed.
3. Install the brake pad, shim and clip (Refer to P.35A-21 <2.0 L Engine> or P.35A-24 <2.4 L Engine>).
4. Start the engine, and depress the brake pedal forcibly two or three times. Then, stop the engine.
5. Turn the brake disk 10 times in the forward direction.
6. Using a spring scale, measure the hub sliding torque in the forward direction with the brake pad, shim and clip installed.
7. Obtain the disk brake drag force (difference between measured values of item 2 and item 6).

   Standard value:
   85 N (19.1 lb) or less <Front (2.0 L Engine)>
   68 N (15.3 lb) or less <Front (2.4 L Engine)>
   68 N (15.3 lb) or less <Rear>

8. If the brake drag force exceeds the standard value, disassemble the brake caliper assembly to check for fouling/rust on the piston sliding section and piston seal deterioration, and confirm whether the guide pin and lock pin slide properly (Refer to P.35A-43 <Front (2.0 L Engine)>, P.35A-46 <Front (2.4 L Engine)>, P.35A-51 <Rear (2.0 L Engine)> or P.35A-54 <Rear (2.4 L Engine)>).

BRAKE PEDAL

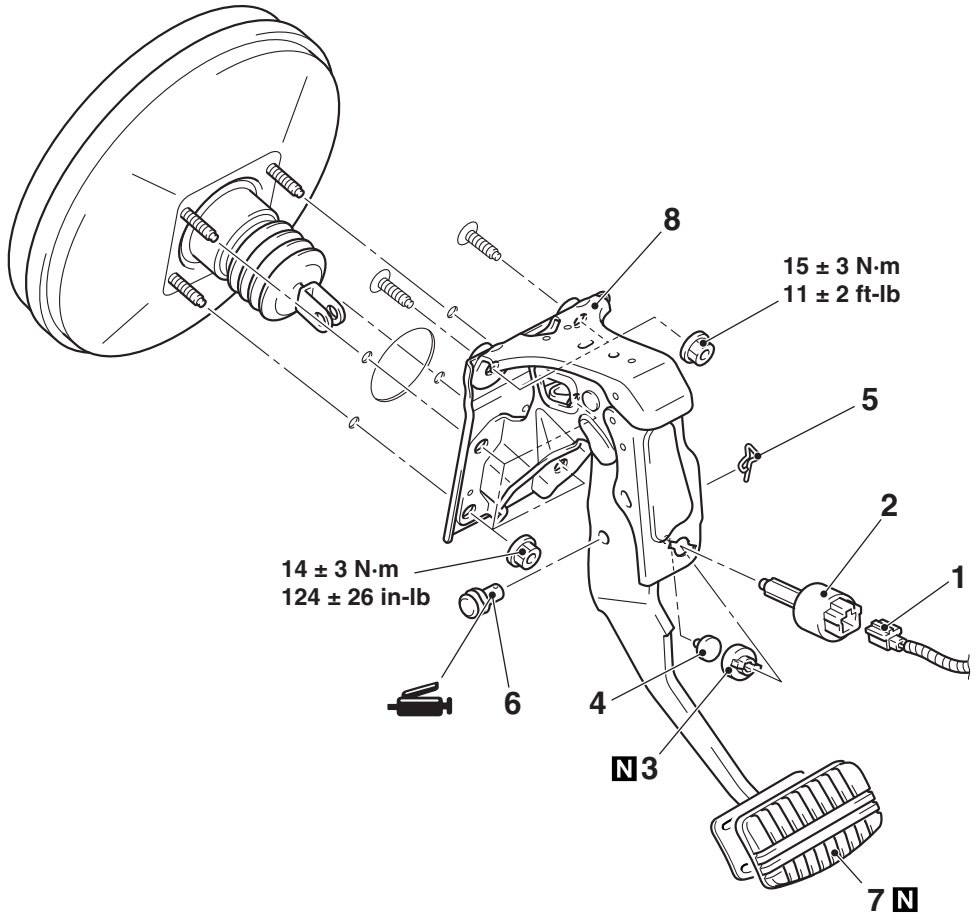
REMOVAL AND INSTALLATION

M1351003401410

⚠ CAUTION

Do not apply grease or lubricant to the switch and the switch installation section to avoid malfunction of the switch. In addition, do not use gloves which have grease on them.

Pre-removal and Post-installation operation
Instrument panel cover lower removal and installation <Vehicles with instrument panel cover lower> (Refer to GROUP 52A –Instrument Lower Panel P.52A-8).



AC801822AC

Removal steps
1. Stoplight switch connector connection
2. Stoplight switch
3. Pedal clip
4. Pedal stopper

Removal steps (Continued)
5. Snap pin
6. Pin assembly
7. Pedal pad
8. Brake pedal assembly

TSB Revision

INSPECTION

STOPLIGHT SWITCH CHECK

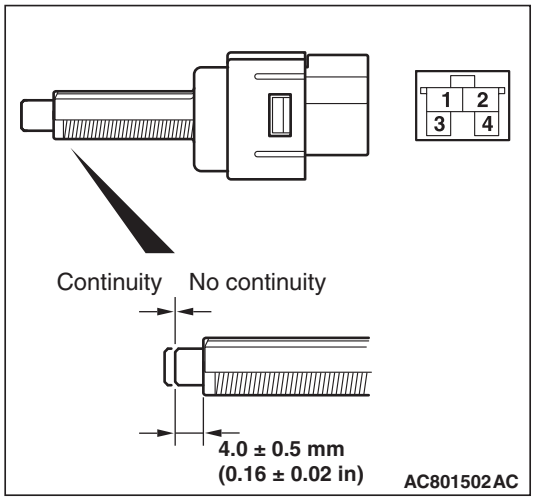
M1351008900462

<VEHICLES WITHOUT CRUISE CONTROL SYSTEM>

⚠ CAUTION

Do not apply grease or lubricant to the switch and the switch installation section to avoid malfunction of the switch. In addition, do not use gloves which have grease on them.

Check for continuity between the terminals of the switch.



Check condition	Terminal connector of tester	Normal condition
At free position	1 –2	Continuity exists (2 Ω or less)
Press the plunger from the edge of the outer case by the dimension shown in the figure.	1 –2	No continuity

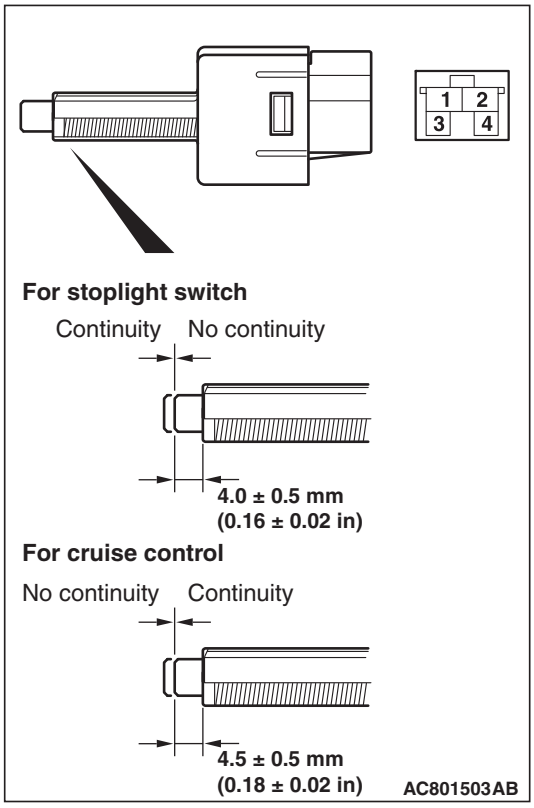
<VEHICLES WITH CRUISE CONTROL SYSTEM>

⚠ CAUTION

Do not apply grease or lubricant to the switch and the switch installation section to avoid malfunction of the switch. In addition, do not use gloves which have grease on them.

Check for continuity between the terminals of the switch.

Check condition	Terminal connector of tester	Normal condition
At free position	1 –2 (for stoplight switch)	Continuity exists (2 Ω or less)
	3 –4 (for cruise control)	No continuity
Press the plunger from the edge of the outer case by the dimension shown in the figure.	1 –2 (for stoplight switch)	No continuity
	3 –4 (for cruise control)	Continuity exists (2 Ω or less)



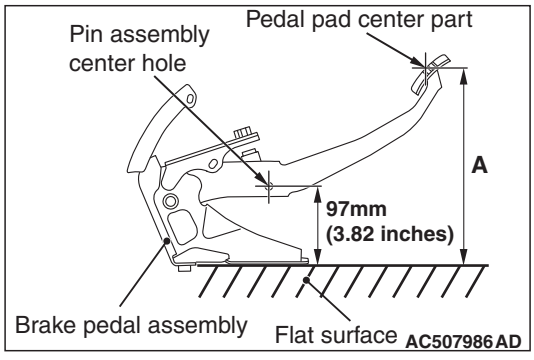
BRAKE PEDAL DISTORTION CHECK

M1351016300335

1. Place the brake pedal assembly on a level surface as shown in the figure, and set the distance from the center of the pin assembly mounting hole to the level surface to 97 mm (3.82 inches). Make sure that the dimension A in the figure (distance from the pedal pad center part to the level surface) is within the standard value.

   Standard value (A):
   240 –245 mm (9.4 –9.6 inches) <M/T>
   239 –248 mm (9.4 –9.8 inches) <CVT, TC-SST>

2. When dimension A is not within the standard value, replace the brake pedal assembly.



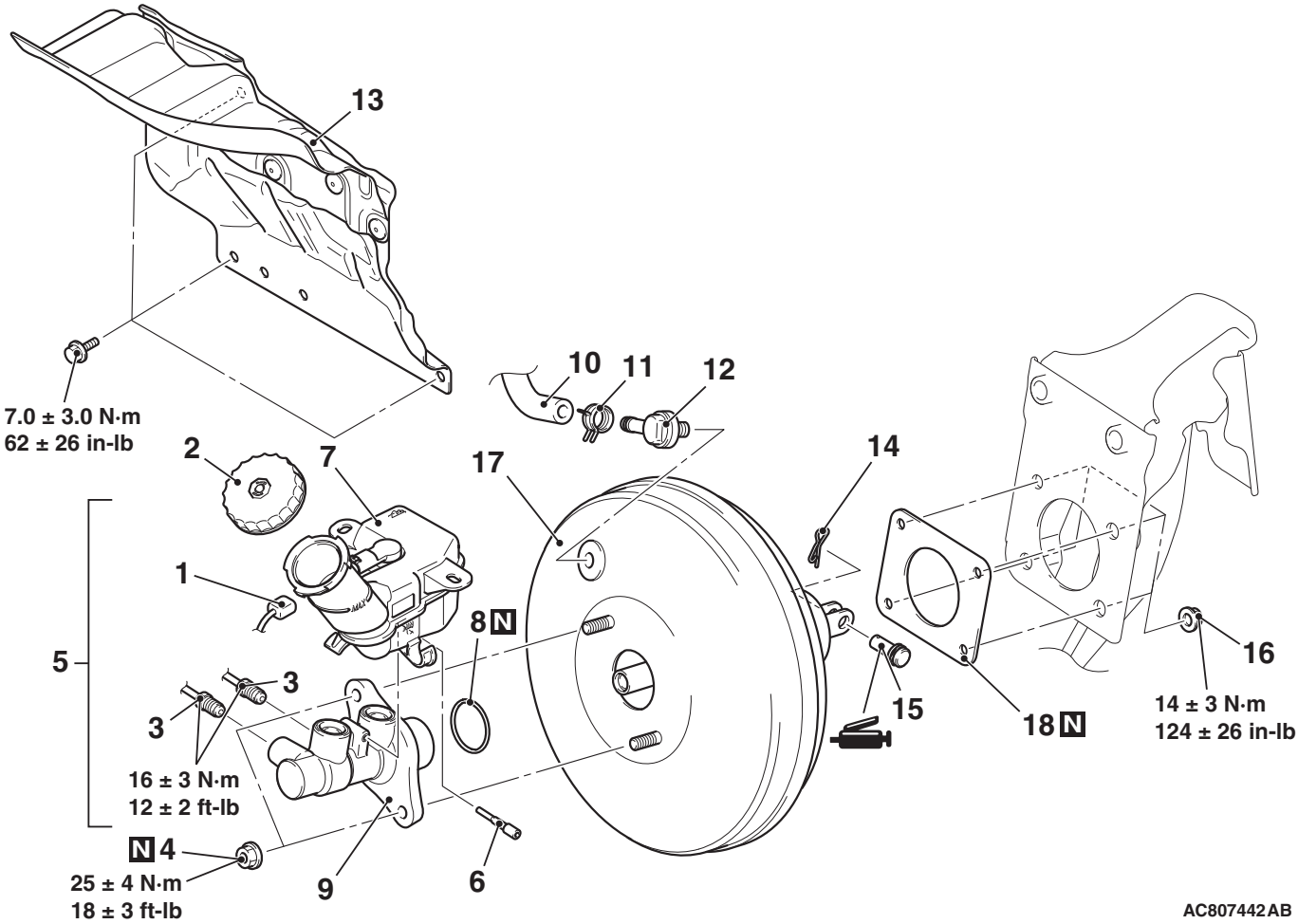
MASTER CYLINDER ASSEMBLY AND BRAKE BOOSTER ASSEMBLY

REMOVAL AND INSTALLATION <2.0 L Engine>

M1351003702351

<MASTER CYLINDER AND BRAKE BOOSTER>

Pre-removal operation	Post-installation operation
• Brake fluid draining • Air cleaner cover removal (Refer to GROUP 15 –Air Cleaner P.15-9).	• Air cleaner cover installation (Refer to GROUP 15 –Air Cleaner P.15-9>). • Brake fluid refilling and air bleeding (Refer to P.35A-18).



Master cylinder removal steps

1. Brake fluid level switch connector connection
2. Reservoir cap
3. Brake pipe connection

>>B<< • Bleeding of master cylinder assembly (only at installation)

4. Master cylinder mounting nuts
5. Reservoir assembly and master cylinder assembly
6. Torx bolt
7. Reservoir assembly
8. O-ring
9. Master cylinder assembly

Brake booster removal steps

1. Brake fluid level switch connector connection
3. Brake pipe connection

>>B<< • Bleeding of master cylinder assembly (only at installation)

4. Master cylinder mounting nuts
5. Reservoir assembly and master cylinder assembly

>>A<< 10. Vacuum hose connection
11. Hose clip
12. Check valve
13. Dash panel heat protector
14. Snap pin
15. Pin assembly

TSB Revision

Brake booster removal steps (Continued)

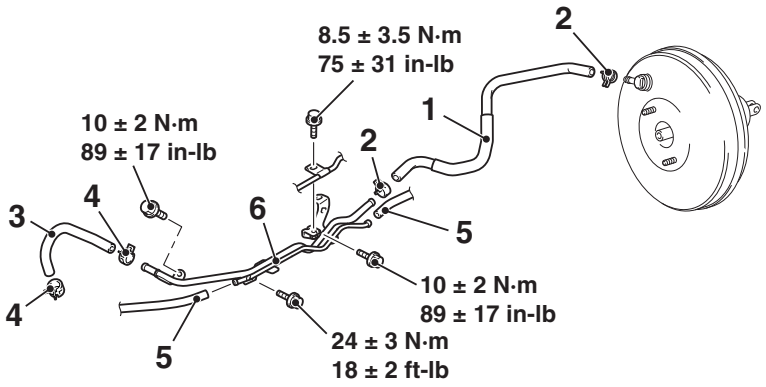
- Instrument panel cover lower (Refer to GROUP 52A –Instrument Lower Panel P.52A-8)

16. Brake booster mounting nut
- Cowl top panel (Refer to GROUP 42A –Loose Panel P.42A-221.)
- Strut tower bar (Refer to GROUP 42A –Strut Tower Bar P.42A-15.)

17. Brake booster assembly
18. Seal

<VACUUM HOSE AND VACUUM PIPE>

Pre-removal operation	Post-installation operation
• Charge air cooler intake hose A removal (Refer to GROUP 15 –Charge Air Cooler P.15-11). • Air cleaner to turbocharger duct removal (Refer to GROUP 15 –Air Cleaner P.15-9)	• Air cleaner to turbocharger duct installation (Refer to GROUP 15 –Air Cleaner P.15-9) • Charge air cooler intake hose A installation (Refer to GROUP 15 –Charge Air Cooler P.15-11).



AC803021AB

Removal steps

>>A<< 1. Vacuum hose
2. Hose clip
>>A<< 3. Vacuum hose

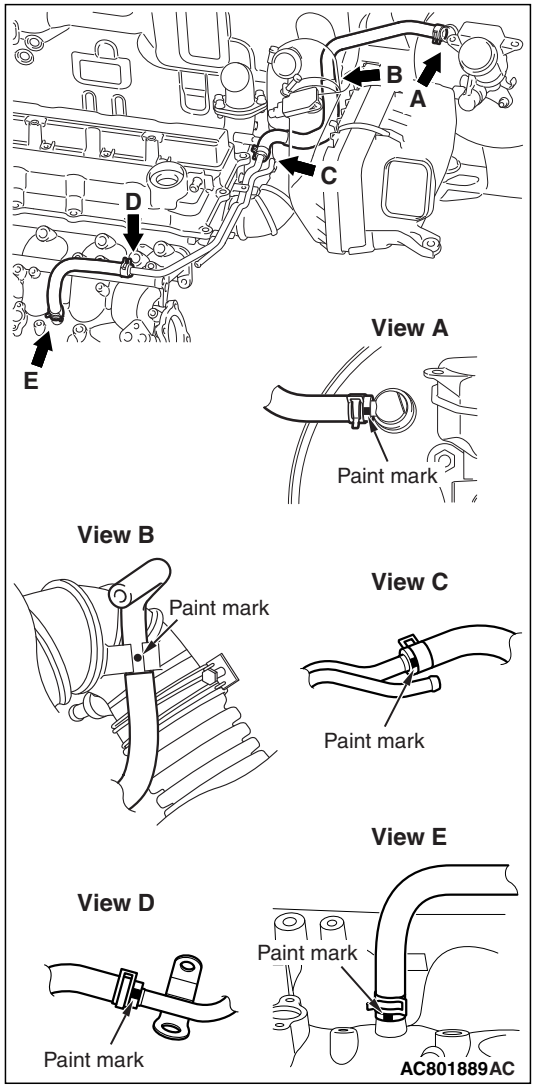
Removal steps (Continued)

4. Hose clip
5. Emission vacuum hose connection
6. Vacuum pipe assembly

INSTALLATION SERVICE POINTS

>>A<< VACUUM HOSE INSTALLATION

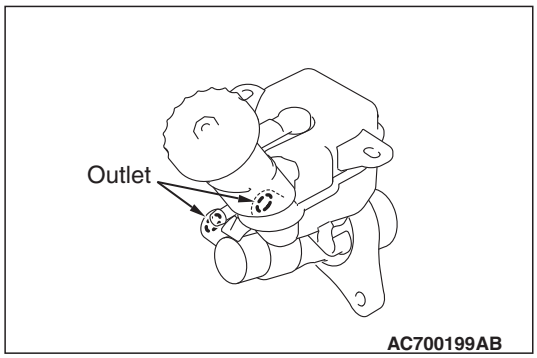
Align the mark as shown in the figure to assemble the vacuum hose.



>>B<< BLEEDING OF MASTER CYLINDER ASSEMBLY

When removed the master cylinder assembly, bleed the master cylinder in the following procedure to make bleeding of the brake pipeline easier (When no brake fluid is in the master cylinder).

1. Fill the brake fluid reservoir with the brake fluid.
2. Depress and hold the brake pedal.



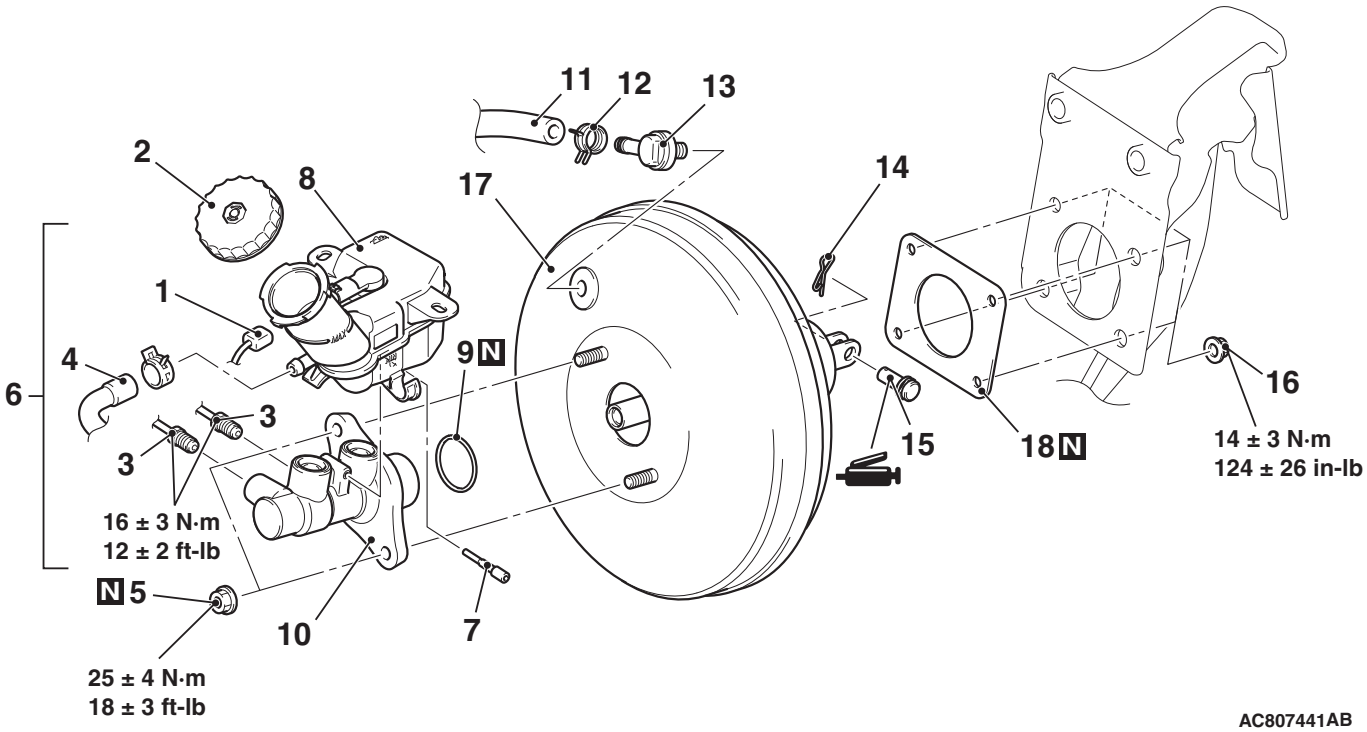
3. Another operator closes the master cylinder outlets with his fingers.
4. In this condition, release the brake pedal.
5. Repeat Steps 2 to 4 for 3 or 4 times to fill the master cylinder with the brake fluid.

REMOVAL AND INSTALLATION <2.4 L Engine>

M1351003702340

<MASTER CYLINDER AND BRAKE BOOSTER>

Pre-removal operation	Post-installation operation
• Brake fluid draining • Air cleaner cover removal (Refer to GROUP 15 –Air Cleaner P.15-10).	• Air cleaner cover installation (Refer to GROUP 15 –Air Cleaner P.15-10). • Brake fluid refilling and air bleeding (Refer to P.35A-18).



Master cylinder removal steps

1. Brake fluid level switch connector
2. Reservoir cap
3. Brake pipe connection

>>B<< • Bleeding of master cylinder assembly (only at installation)

4. Reservoir hose connection
5. Master cylinder mounting nuts
6. Reservoir assembly and master cylinder assembly
7. Torx bolt
8. Master cylinder assembly

Master cylinder removal steps (Continued)

9. Reservoir assembly
10. O-ring

Brake booster removal steps

1. Brake fluid level switch connector
2. Reservoir cap
3. Brake pipe connection

>>B<< • Bleeding of master cylinder assembly (only at installation)

4. Reservoir hose connection
5. Master cylinder mounting nuts

TSB Revision

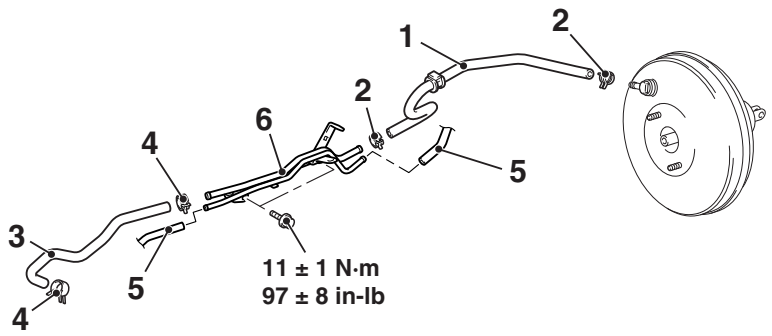
Brake booster removal steps (Continued)

6. Reservoir assembly and master cylinder assembly

>>A<< 11. Vacuum hose connection
12. Check valve
13. Hose clip
14. Snap pin
15. Pin assembly
16. Brake booster mounting nut
- Cowl top panel (Refer to GROUP 42A –Loose Panel P.42A-221.)
- Strut tower bar (Refer to GROUP 42A –Strut Tower Bar P.42A-15.)

17. Brake booster assembly
18. Seal

<VACUUM HOSE AND VACUUM PIPE>



AC803022AB

Removal steps

>>A<< 1. Vacuum hose
2. Hose clip
>>A<< 3. Vacuum hose

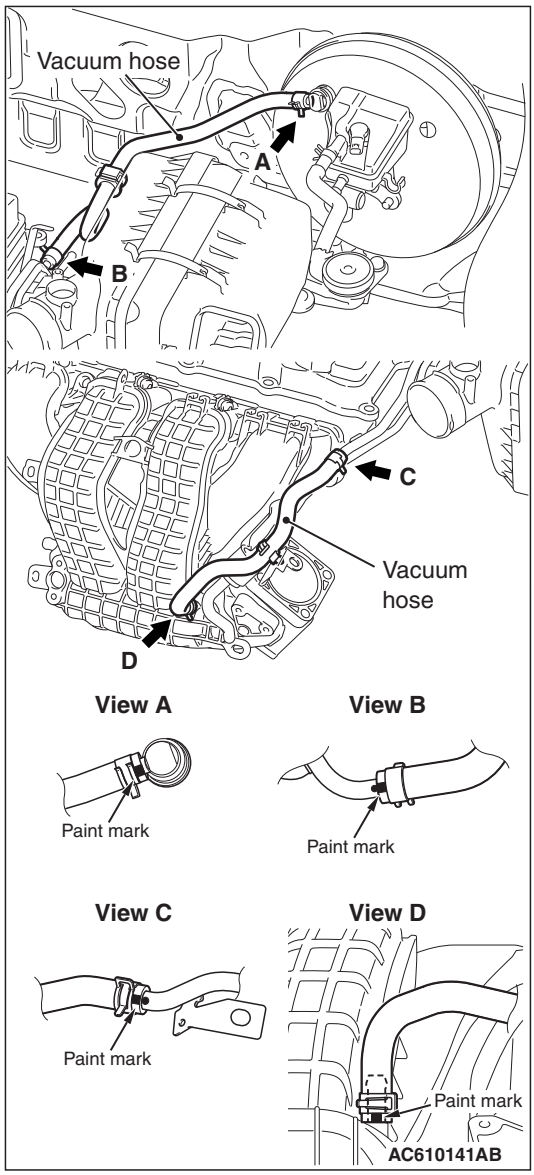
Removal steps (Continued)

4. Hose clip
5. Emission vacuum hose connection
6. Vacuum pipe assembly

INSTALLATION SERVICE POINTS

>>A<< VACUUM HOSE INSTALLATION

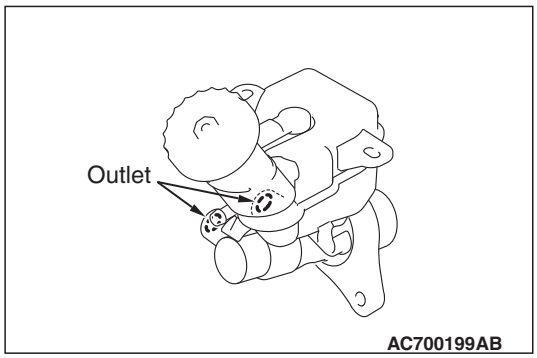
Align the mark as shown in the figure to assemble the vacuum hose.



>>B<< BLEEDING OF MASTER CYLINDER ASSEMBLY

When removed the master cylinder assembly, bleed the master cylinder in the following procedure to make bleeding of the brake pipeline easier (When no brake fluid is in the master cylinder).

1. Fill the brake fluid reservoir with the brake fluid.
2. Depress and hold the brake pedal.



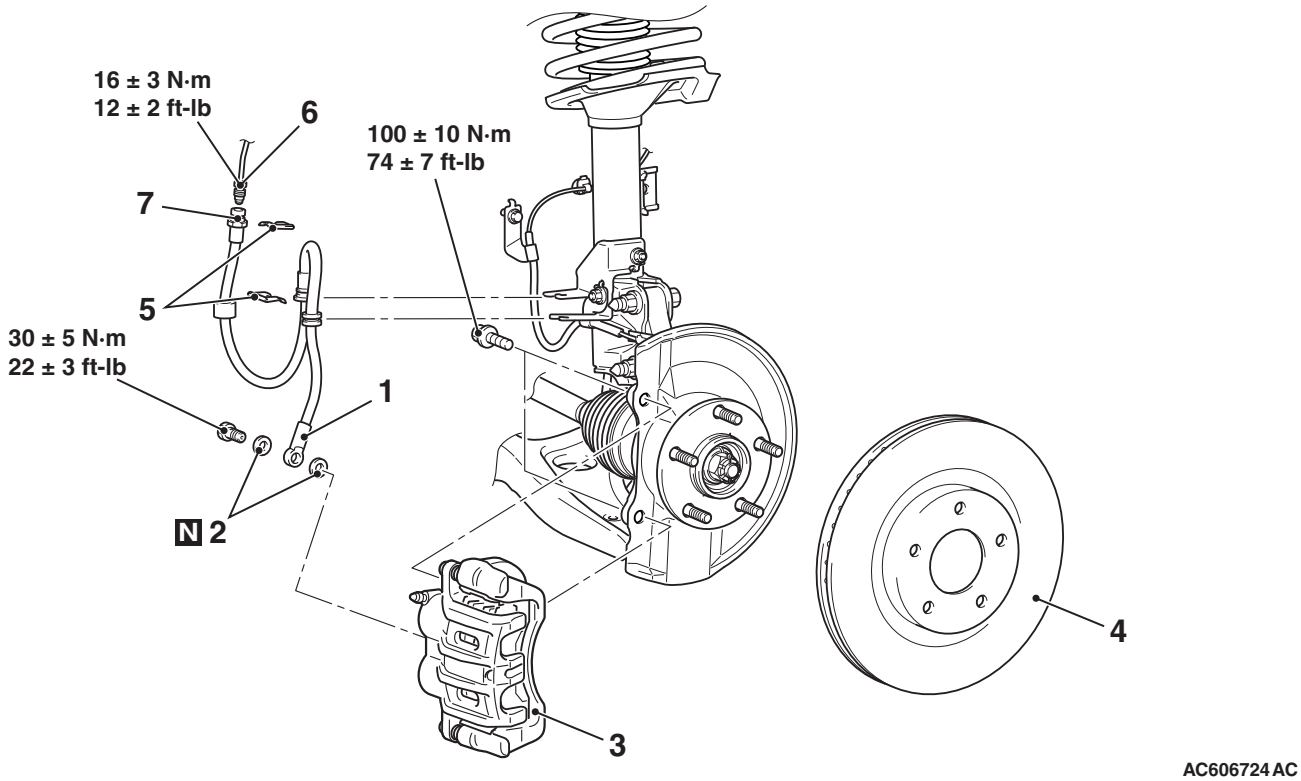
3. Another operator closes the master cylinder outlets with his fingers.
4. In this condition, release the brake pedal.
5. Repeat Steps 2 to 4 for 3 or 4 times to fill the master cylinder with the brake fluid.

FRONT DISC BRAKE ASSEMBLY

REMOVAL AND INSTALLATION <2.0 L Engine>

M1351006001499

Pre-removal operation	Post-installation operation
Brake fluid draining	• Brake fluid refilling and air bleeding (Refer to P.35A-18). • Brake disk run-out inspection/correction (Refer to P.35A-27).



Removal steps

1. Brake hose (brake caliper side) connection
2. Gasket
3. Brake caliper assembly

Removal steps (Continued)

4. Front brake disk
5. Clip
6. Brake pipe connection

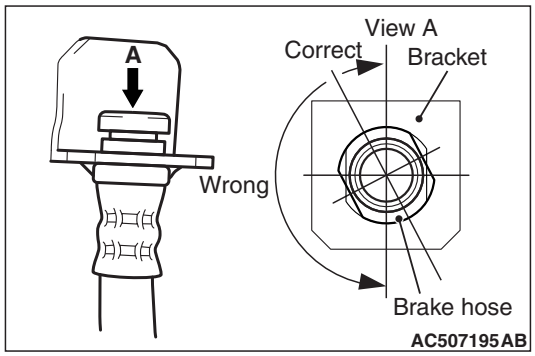
>>A<< 7. Brake hose

TSB Revision

INSTALLATION SERVICE POINT

>>A<< BRAKE HOSE INSTALLATION

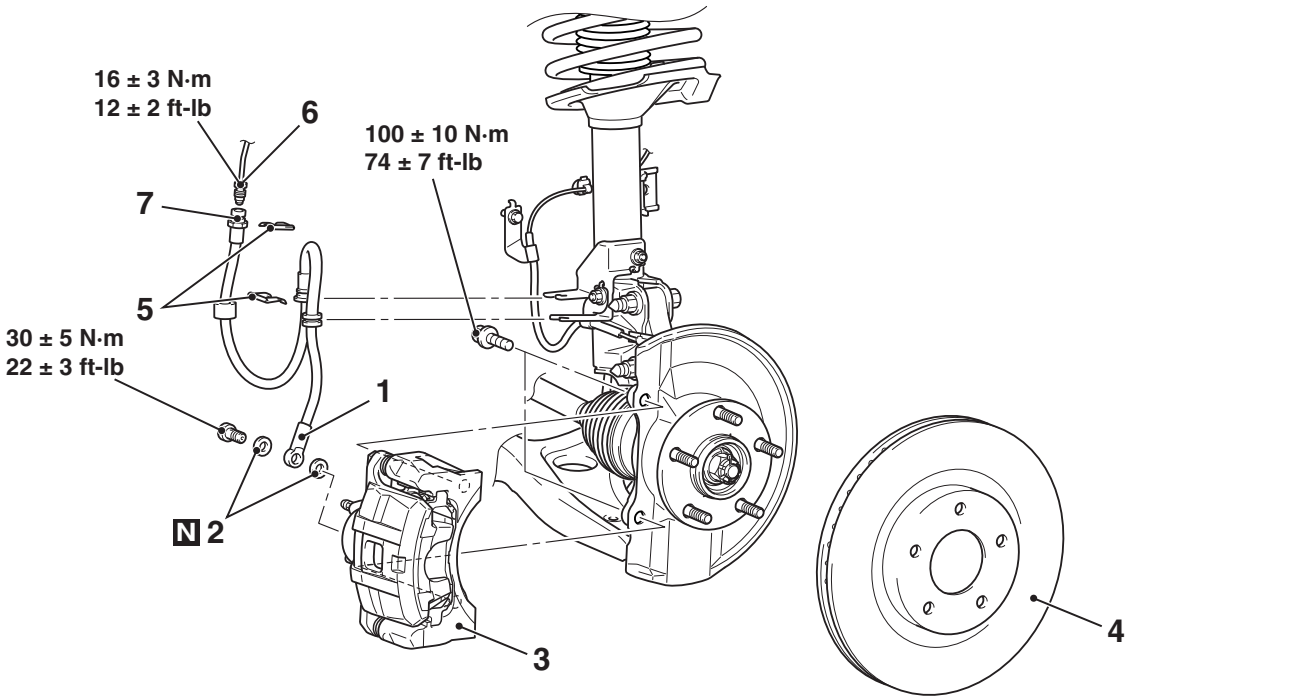
1. Pass the brake hose through the hole in the body-side bracket.
2. Install the brake hose to the brake caliper.
3. Install the brake hose at the two fixing points.
4. Twist the brake hose toward the lesser torsion between the brake hose and body-side bracket as shown in the figure, and fix it to the body-side bracket with a clip.



REMOVAL AND INSTALLATION <2.4 L Engine>

M1351006001477

Pre-removal operation	Post-installation operation
Brake fluid draining	• Brake fluid refilling and air bleeding (Refer to P.35A-18). • Brake disk run-out inspection/correction (Refer to P.35A-27).



Removal steps

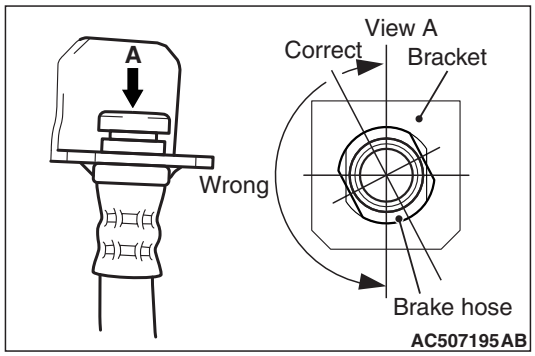
1. Brake hose (brake caliper side) connection
2. Gasket
3. Brake caliper assembly

Removal steps (Continued)

4. Front brake disk
5. Clip
6. Brake pipe connection

>>A<< 7. Brake hose

TSB Revision



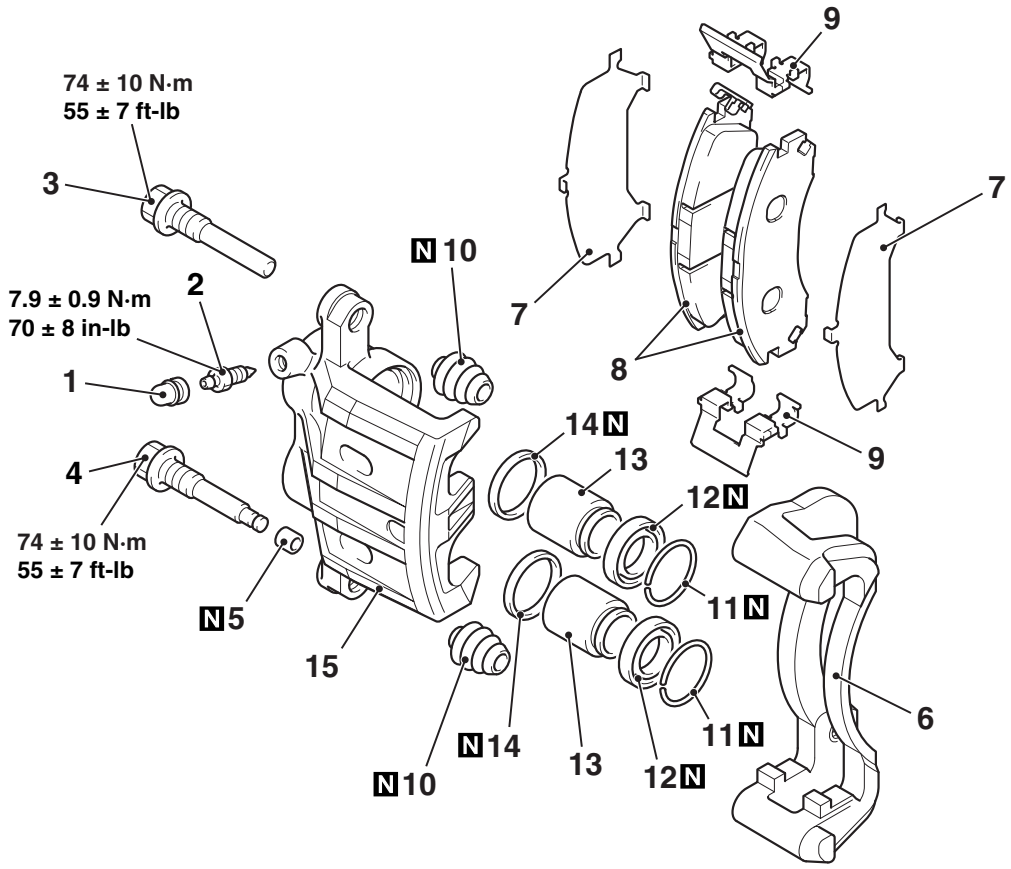
INSTALLATION SERVICE POINT

>>A<< BRAKE HOSE INSTALLATION

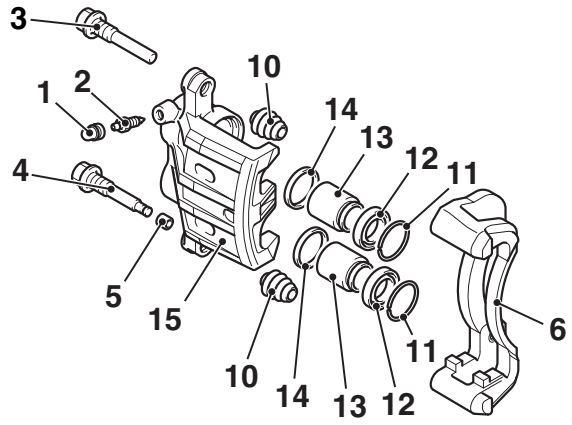
1. Pass the brake hose through the hole in the body-side bracket.
2. Install the brake hose to the brake caliper.
3. Install the brake hose at the two fixing points.
4. Twist the brake hose toward the lesser torsion between the brake hose and body-side bracket as shown in the figure, and fix it to the body-side bracket with a clip.

DISASSEMBLY AND ASSEMBLY <2.0 L Engine>

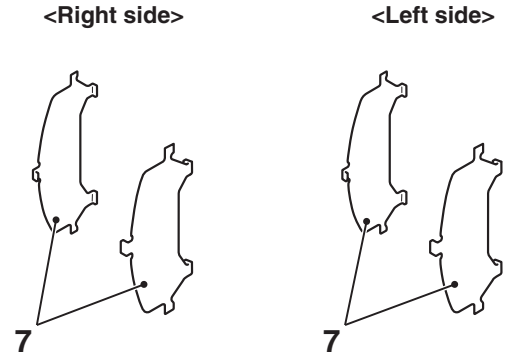
M1351006201943



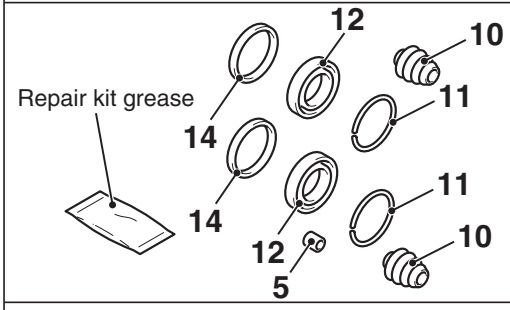
AC808475AB



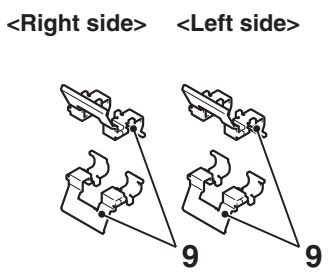
Front brake caliper kit



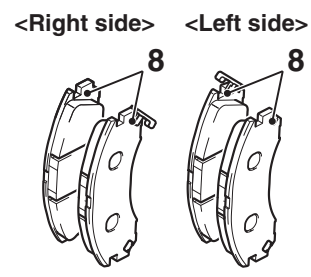
Front brake shim set



Front brake caliper seal kit



Front brake clip set



Front brake pad set

TSB Revision

Disassembly steps

1. Bleeder cap
2. Bleeder
3. Guide pin
4. Lock pin
5. Bushing
6. Caliper support (including brake pad, clip, and shim)
7. Shim
8. Brake pad assembly
9. Clip
10. Pin boot
11. Boot ring

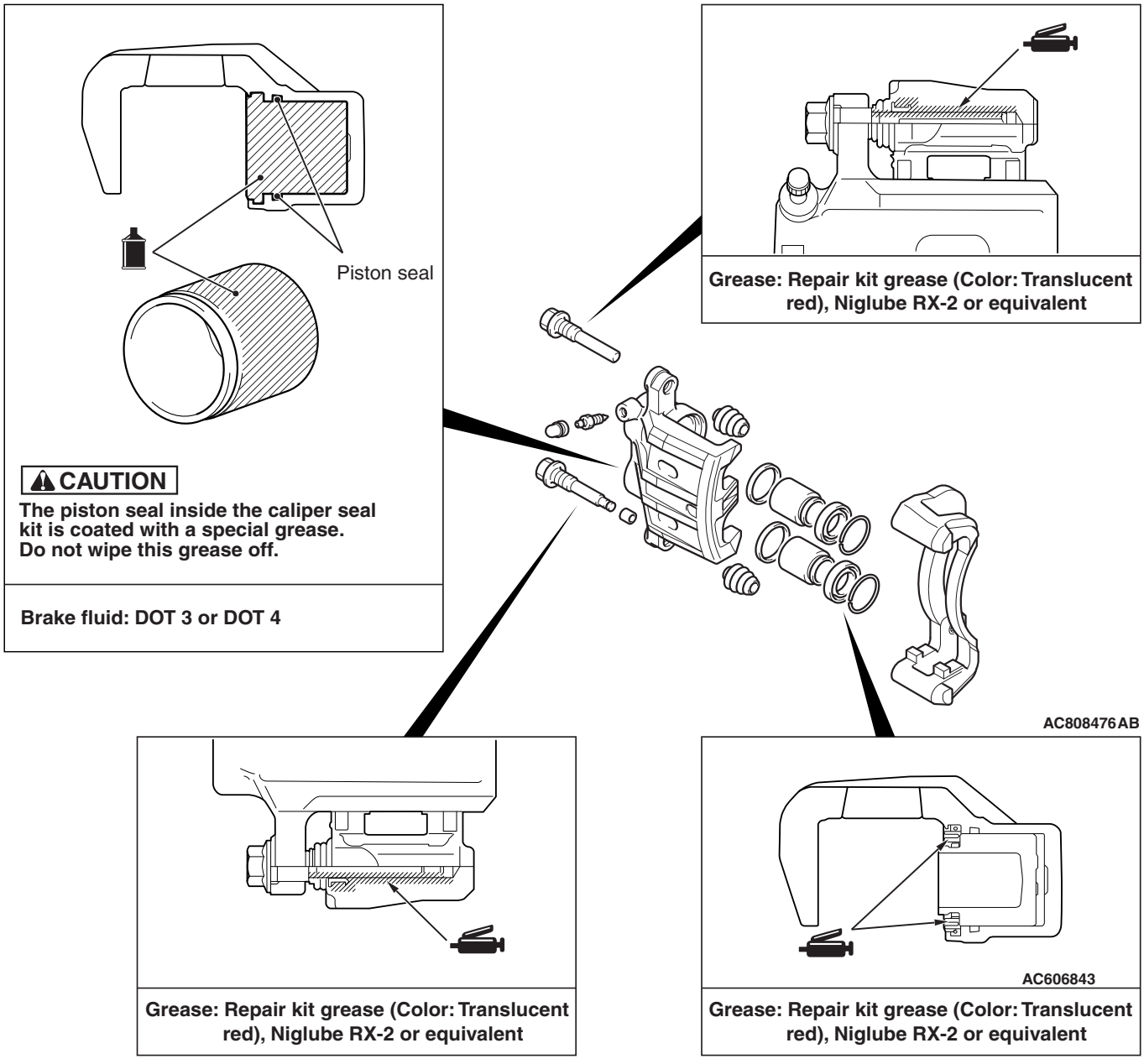
Disassembly steps (Continued)

<<**A**>> 12. Piston boot
<<**A**>> 13. Piston
<<**B**>> 14. Piston seal
15. Caliper body

NOTE:

- *The brake pad assembly with wear indicator is installed only to the inner side of the brake disk of the left-side brake at factory.*
- *As for the accessory pad set, the brake pad with wear indicator has been established to the inner side of the brake disk on both right side brake and left side brake.*
- *Install the brake pad assembly (with wear indica-*

LUBRICATION POINTS



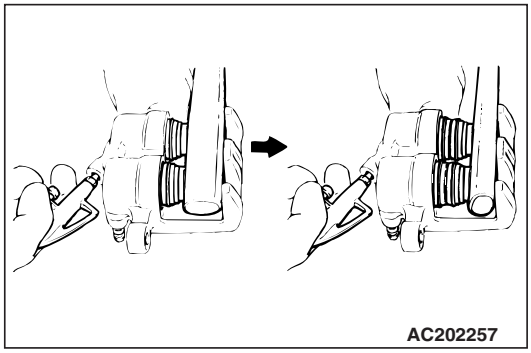
TSB Revision

DISASSEMBLY SERVICE POINTS

<<A>> PISTON BOOT/PISTON REMOVAL

⚠ CAUTION

- **Blow air little by little to remove the pistons. The pistons will rush out if a force of air is applied suddenly.**
- **If one piston has been removed completely, it will become impossible to remove the second piston.**

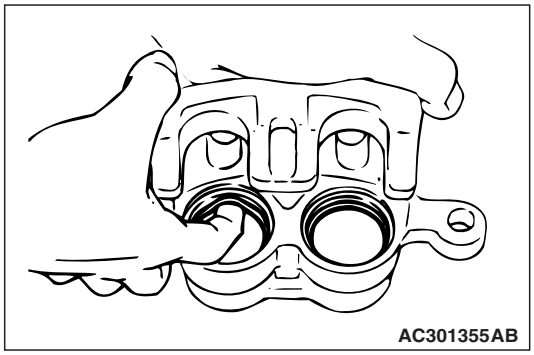

AC202257

Remove the pistons and the piston boots by pumping in air from the brake hose connection. Be sure to use the handle of a plastic hammer and adjust the height of the two pistons so that the pistons protrude evenly.

<<B>> 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.

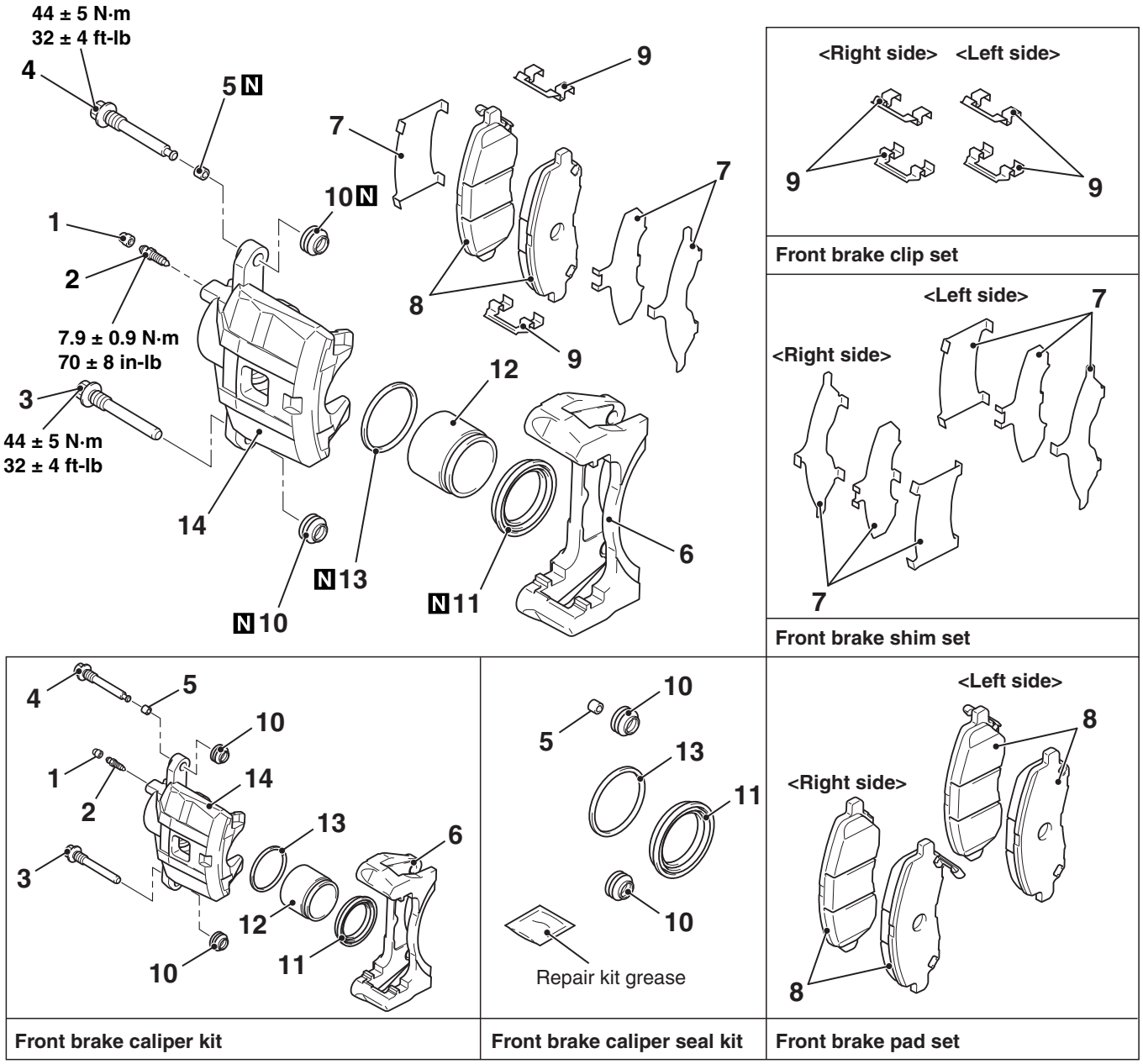

AC301355AB

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

   Brake fluid: DOT 3 or DOT 4

DISASSEMBLY AND ASSEMBLY <2.4 L Engine>

M1351006201932



AC705550AD

Disassembly steps

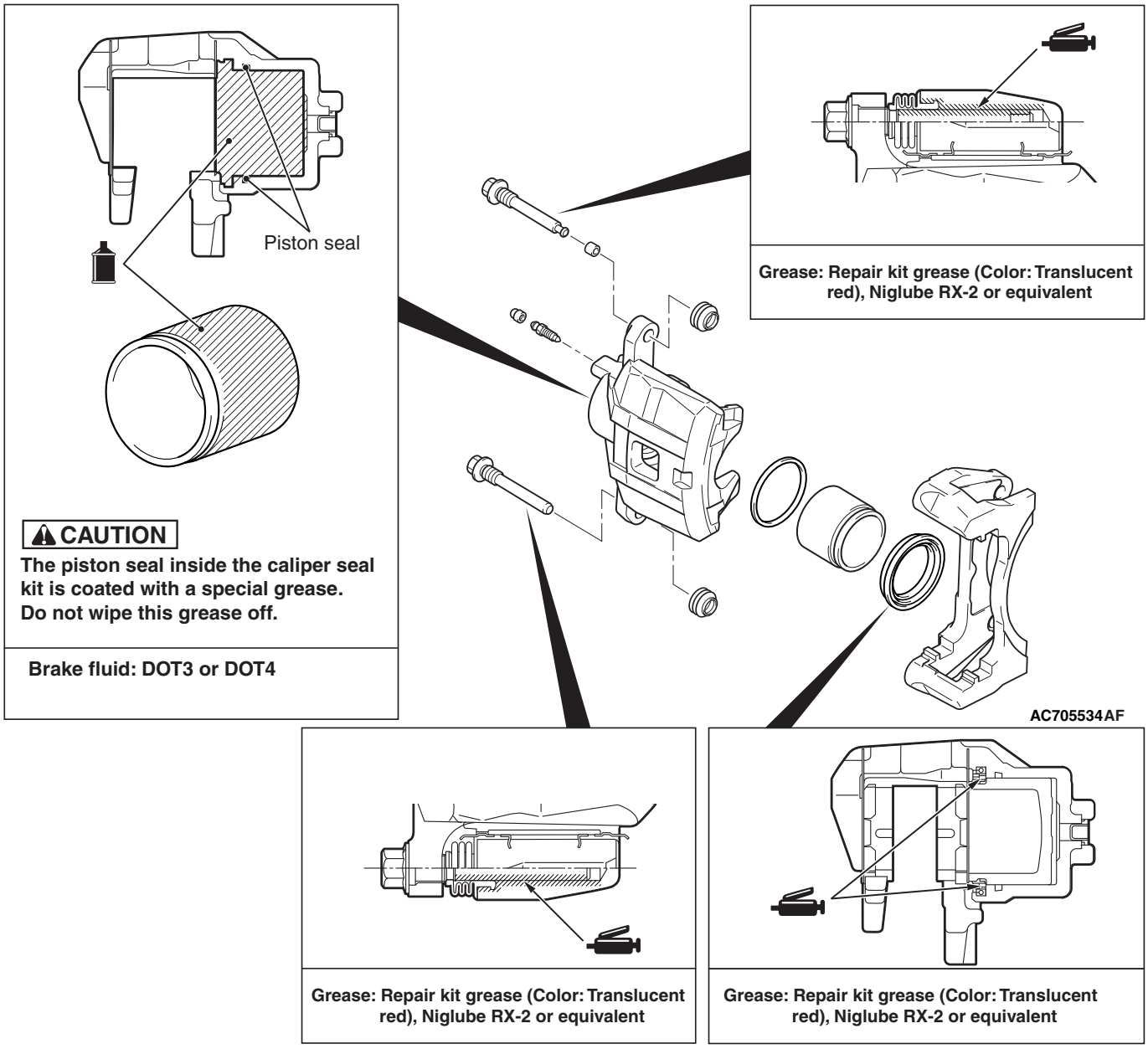
1. Bleeder cap
2. Bleeder
3. Guide pin
4. Lock pin <<A>>
5. Bushing <<A>>
6. Caliper support <<B>>
   (including brake pad assembly, clip, and shim)
7. Shim

Disassembly steps (Continued)

8. Brake pad assembly
9. Clip
10. Pin boot
11. Piston boot
12. Piston
13. Piston seal
14. Caliper body

TSB Revision

LUBRICATION POINTS



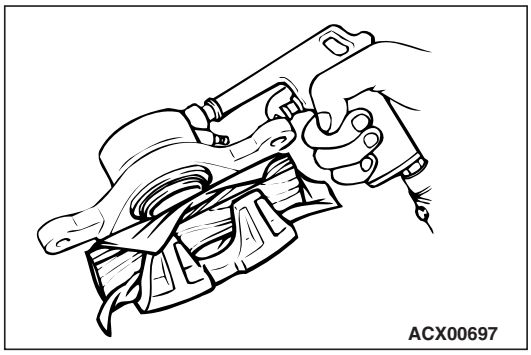
DISASSEMBLY SERVICE POINTS

<<A>> PISTON BOOT/PISTON REMOVAL

⚠ CAUTION

Blow air gradually to remove the pistons. The pistons will rush out if a force of air is applied suddenly.

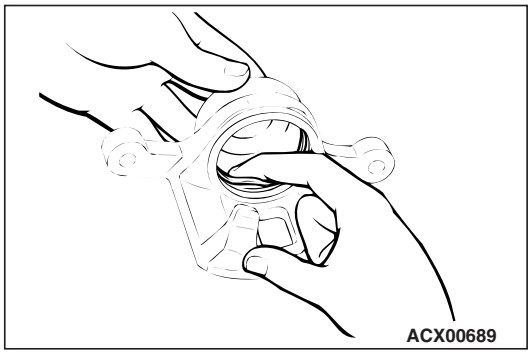
Cover the caliper body outer side with a cloth or similar materials. Blow compressed air through the brake hose installation area to remove the piston and piston boot.


ACX00697

<<B>> PISTON SEAL REMOVAL

⚠ CAUTION

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


ACX00689

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

   Brake fluid: DOT3 or DOT4

INSPECTION

M1351015000740

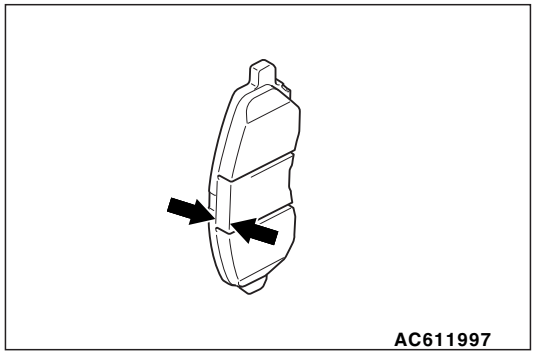
BRAKE PAD WEAR INSPECTION

⚠ CAUTION

- **When replacing, replace both brake pad assembly (right and left) as a set.**
- **If there is a significant difference in thickness between the brake pads at right and left, check the sliding area of the brake caliper.**

Measure the brake pad thickness at the most worn area. If the brake pad thickness is less than the limit value, replace the brake pad.

Standard value: 10.0 mm (0.39 inch)
Limit: 2.0 mm (0.08 inch)

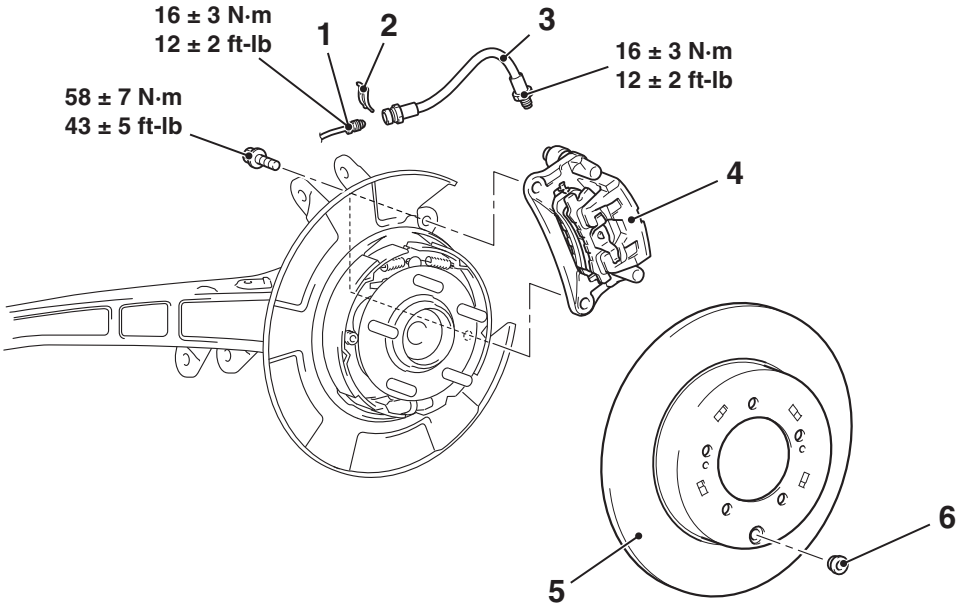

AC611997

REAR DISC BRAKE ASSEMBLY

REMOVAL AND INSTALLATION <2.0 L Engine>

M1351007001180

Pre-removal operation	Post-installation operation
Brake fluid draining	• Brake fluid refilling and air bleeding (Refer to P.35A-18). • Brake disk run-out inspection/correction (Refer to P.35A-27). • Parking brake lining seating procedure (Refer to GROUP 36 –Parking Brake Lining Seating Procedure P.36-10).



Removal steps

1. Brake tube (brake hose side) connection
2. Clip
3. Brake hose

Removal steps (Continued)

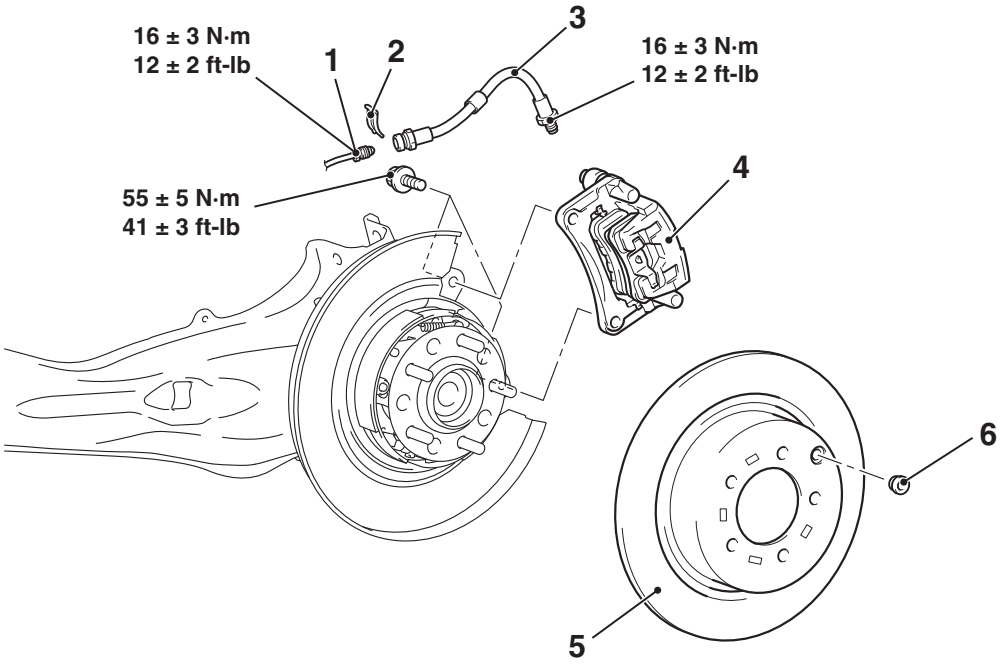
4. Rear brake caliper assembly
5. Rear brake disk
6. Plug

TSB Revision

REMOVAL AND INSTALLATION <2.4 L Engine>

M1351007001179

Pre-removal operation	Post-installation operation
Brake fluid draining	• Brake fluid refilling and air bleeding (Refer to P.35A-18). • Brake disk run-out inspection/correction (Refer to P.35A-27). • Parking brake lining seating procedure (Refer to GROUP 36 –Parking Brake Lining Seating Procedure P.36-10).



AC610145AC

Removal steps

1. Brake tube (brake hose side) connection
2. Clip
3. Brake hose

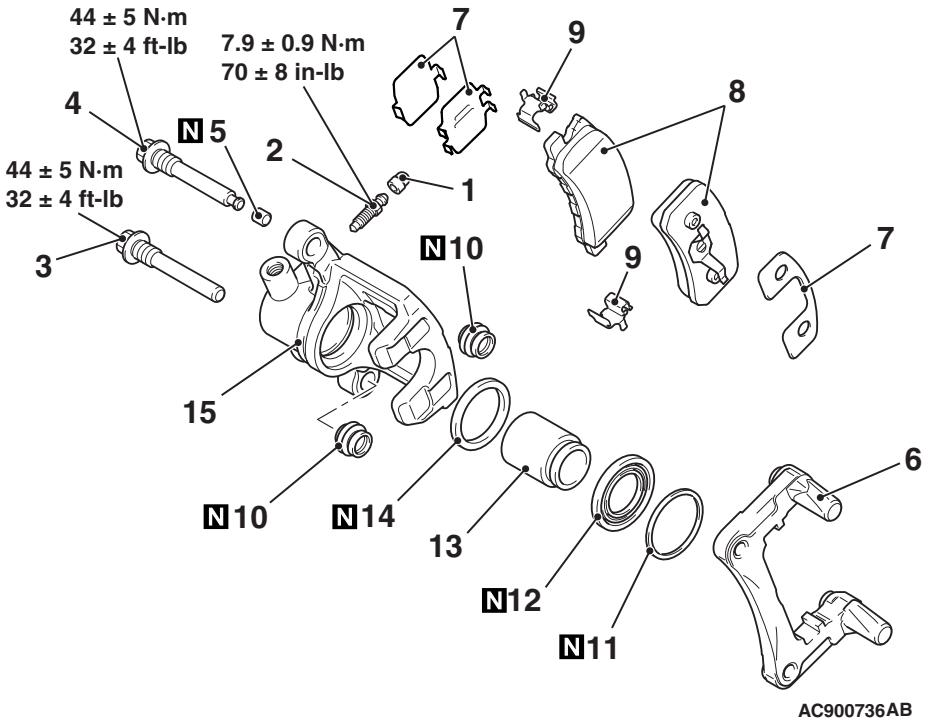
Removal steps (Continued)

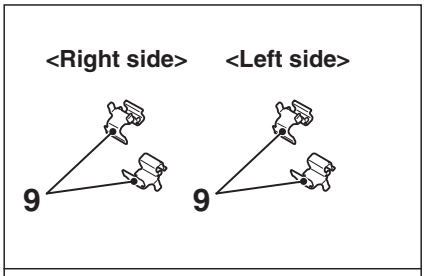
4. Rear brake caliper assembly
5. Rear brake disk
6. Plug

TSB Revision

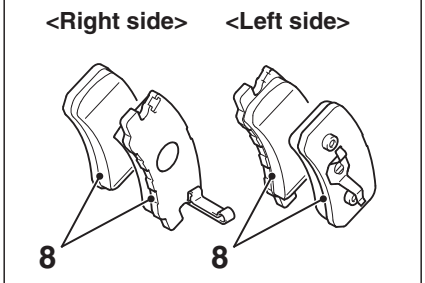
DISASSEMBLY AND ASSEMBLY <2.0 L Engine>

M1351007201399

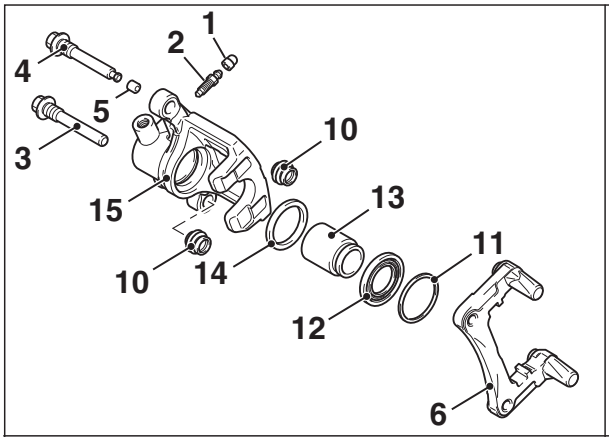




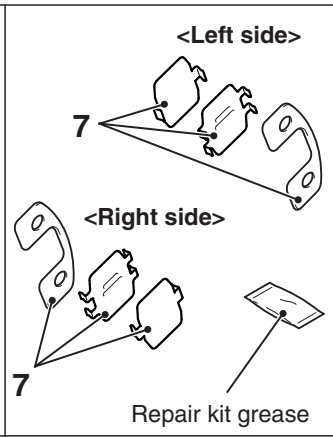
Rear brake clip set



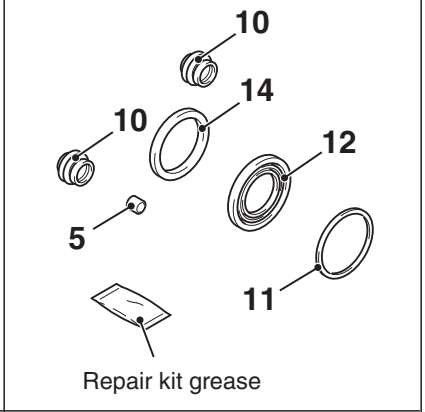
Rear brake pad set



Rear brake caliper kit



Rear brake shim set



Rear brake caliper seal kit

Disassembly steps

1. Bleeder cap
2. Bleeder
3. Guide pin
4. Lock pin
5. Bushing
6. Caliper support
7. Shim
8. Brake pad assembly
9. Clip
10. Pin boot
11. Boot ring

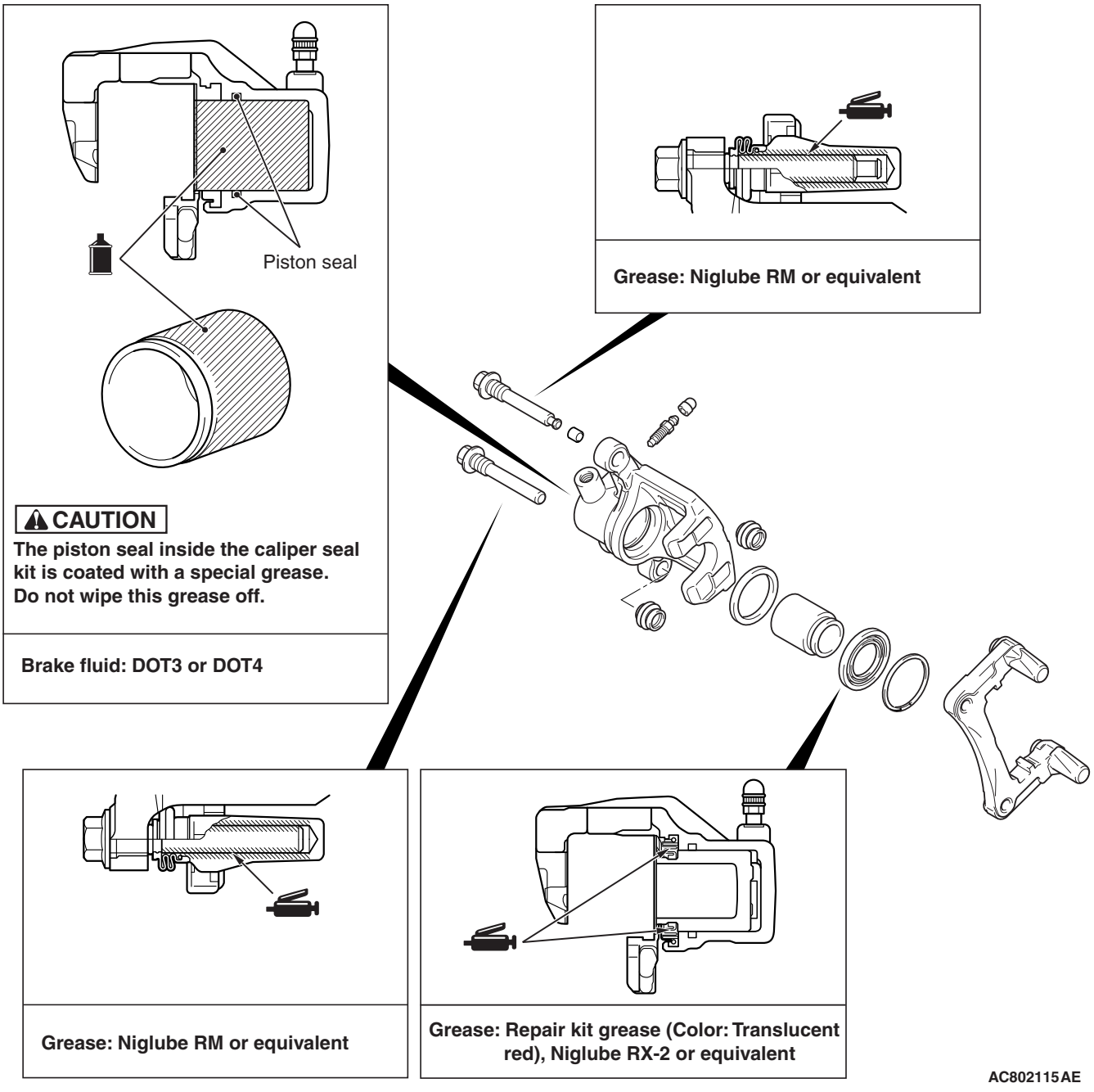
<<A>> 12. Piston boot
<<A>> 13. Piston
<<B>> 14. Piston seal
15. Caliper body

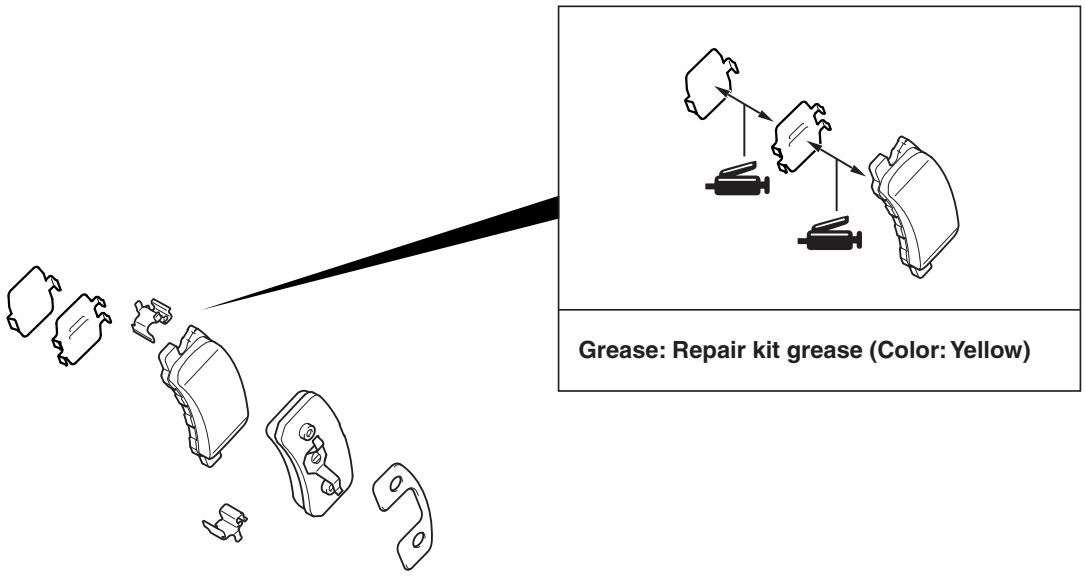
NOTE:

- *The brake pad assembly with wear indicator is installed only to the inner side of the brake disk of the left-side brake at factory.*
- *As for the accessory pad set, the brake pad with wear indicator has been established to the inner side of the brake disk on both right side brake and left side brake.*
- *Install the brake pad assembly (with wear indicator) to the inner side of the brake disk, making sure that the wear indicator is located on the bottom.*

TSB Revision

LUBRICATION POINTS



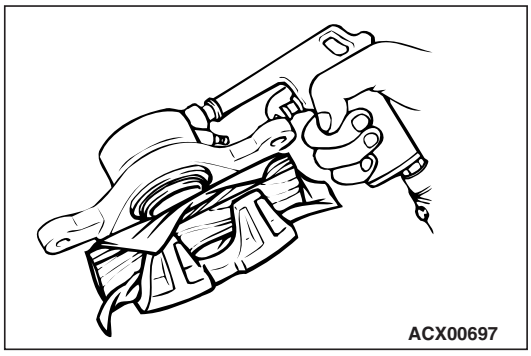


AC900737AB

DISASSEMBLY SERVICE POINTS

<<A>> PISTON BOOT/PISTON REMOVAL

⚠ CAUTION
Blow air gradually to remove the pistons. The pistons will rush out if a force of air is applied suddenly.

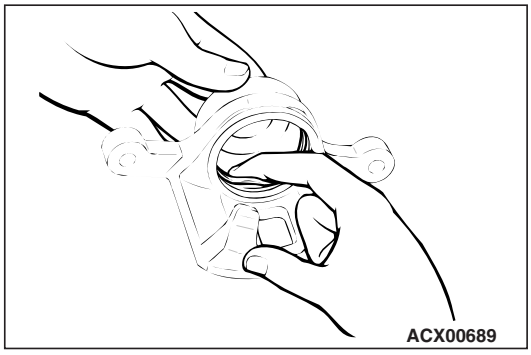


ACX00697

Cover the caliper body outer side with a cloth or similar materials. Blow compressed air through the brake hose installation area to remove the piston and piston boot.

<<B>> 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.



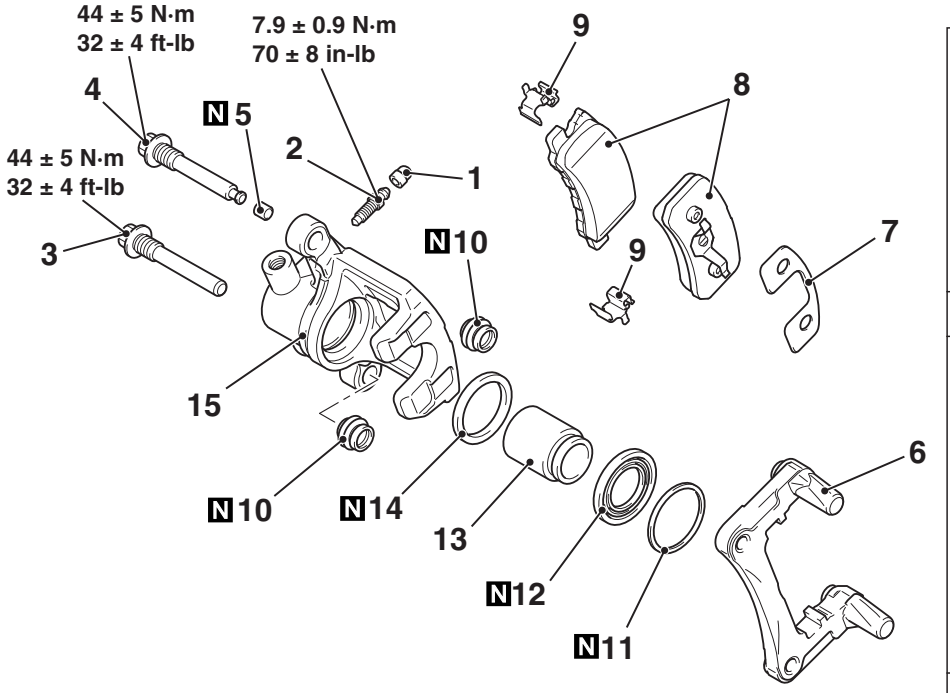
ACX00689

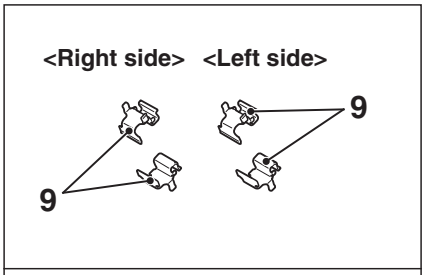
1. Remove the piston seal with your finger tip.
2. Clean the piston surface and cylinder inner face with alcohol or specified brake fluid.

   Brake fluid: DOT3 or DOT4

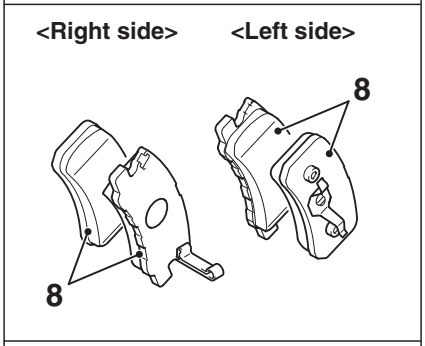
DISASSEMBLY AND ASSEMBLY <2.4 L Engine>

M1351007201388

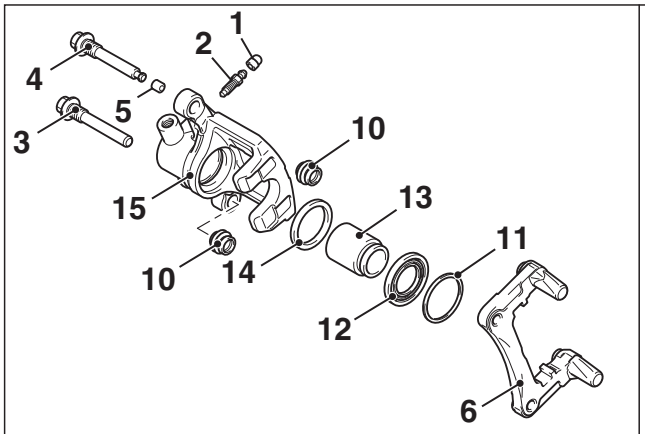




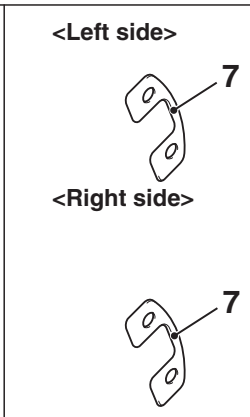
Rear brake clip set



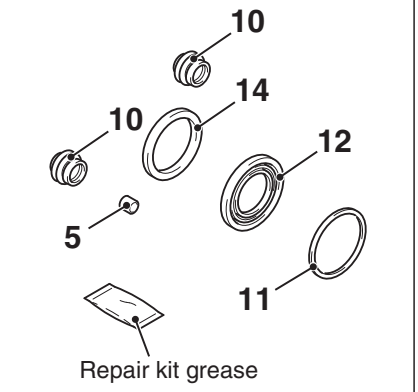
Rear brake pad set



Rear brake caliper kit



Rear brake shim set



Rear brake caliper seal kit

AC802002AB

Disassembly steps

1. Bleeder cap
2. Bleeder
3. Guide pin
4. Lock pin
5. Bushing
6. Caliper support (including brake pad assembly, clip, and shim)
7. Shim
8. Brake pad assembly
9. Clip
10. Pin boot
11. Boot ring

<<A>> 12. Piston boot
<<A>> 13. Piston

Disassembly steps (Continued)

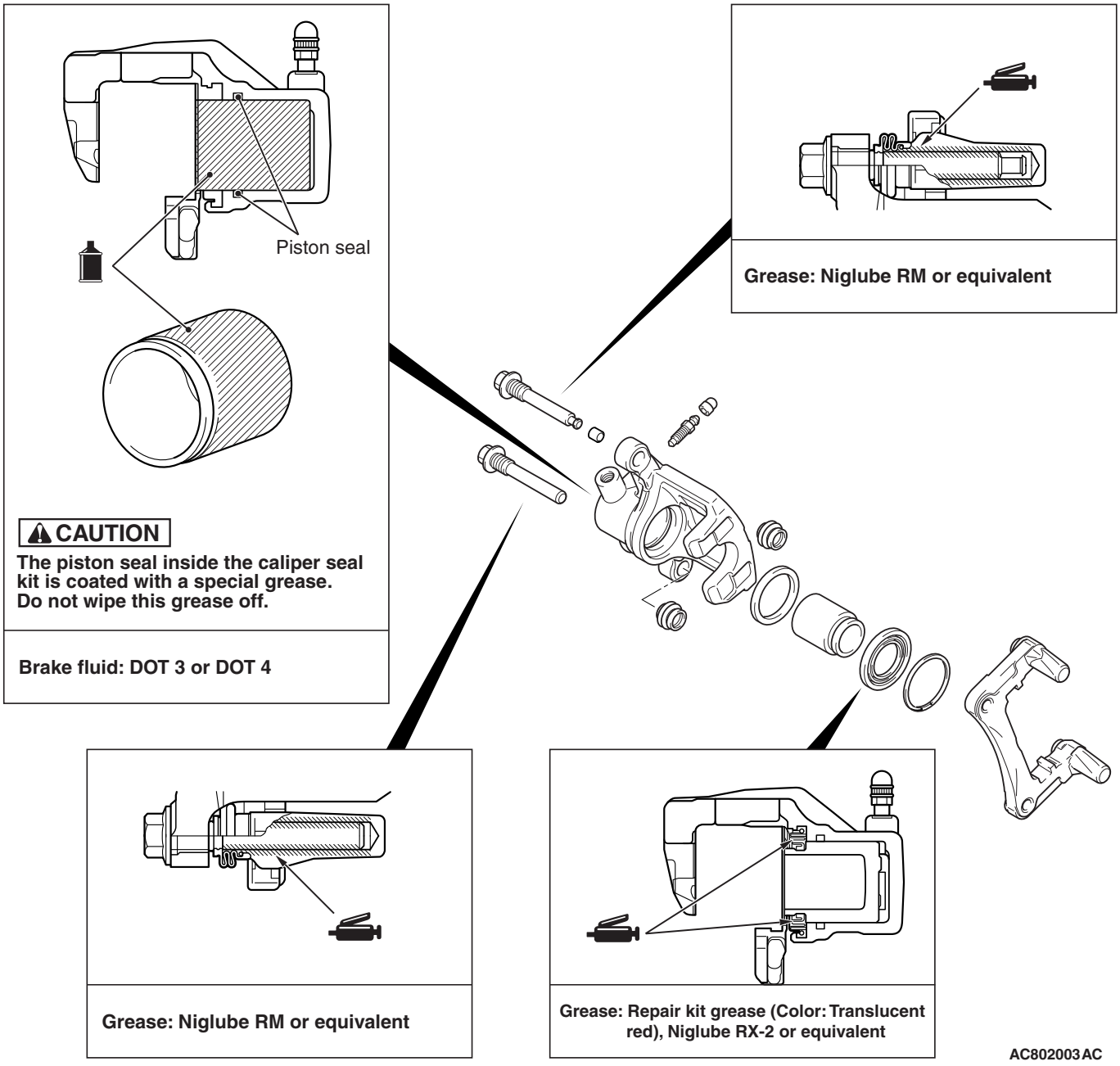
<<B>> 14. Piston seal
15. Caliper body

NOTE:

- *The brake pad assembly with wear indicator is installed only to the inner side of the brake disk of the left-side brake at factory.*
- *As for the accessory pad set, the brake pad with wear indicator has been established to the inner side of the brake disk on both right side brake and left side brake.*
- *Install the brake pad assembly (with wear indicator) to the inner side of the brake disk, making sure that the wear indicator is located on the bottom.*

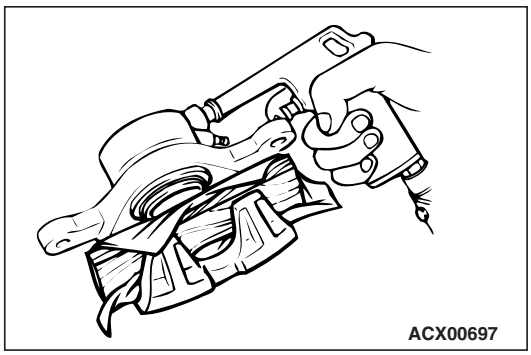
TSB Revision

LUBRICATION POINTS



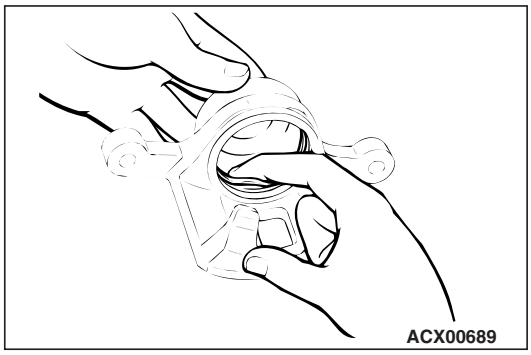
DISASSEMBLY SERVICE POINTS

<<A>> PISTON BOOT/PISTON REMOVAL


ACX00697

⚠ CAUTION
Blow air gradually to remove the pistons. The pistons will rush out if a force of air is applied suddenly.
Cover the caliper body outer side with a cloth or similar materials. Blow compressed air through the brake hose installation area to remove the piston and piston boot.

<<B>> PISTON SEAL REMOVAL


ACX00689

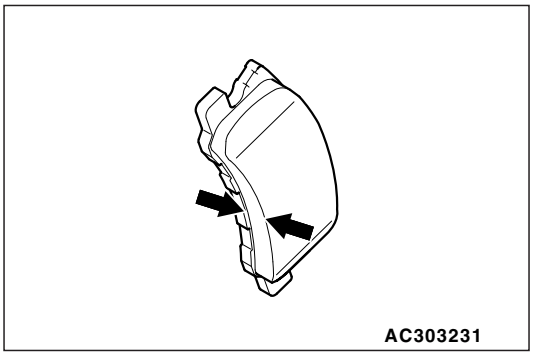
⚠ CAUTION
Do not use a flat-tipped screwdriver or similar tool to remove the piston seal. These may damage the inner side of the cylinder.
1. Remove the piston seal with your finger tip.
2. Clean the piston surface and cylinder inner face with alcohol or specified brake fluid.

   Brake fluid: DOT3 or DOT4

INSPECTION

M1351015000751

BRAKE PAD WEAR INSPECTION


AC303231

⚠ CAUTION
- **When replacing, replace both brake pad assembly (right and left) as a set.**
- **If there is a significant difference in thickness between the brake pads at right and left, check the sliding area of the brake caliper.**

Measure the brake pad thickness at the most worn area. If the brake pad thickness is less than the limit value, replace the brake pad.

Standard value: 10.0 mm (0.39 inch)
Limit: 2.0 mm (0.08 inch)