SERVICE BRAKES

CONTENTS

BASIC BRAKE SYSTEM 35A

ANTI-SKID BRAKING SYSTEM (ABS) <2WD> 35B

BASIC BRAKE SYSTEM

CONTENTS

GENERAL 3
Outline of Changes 3

GENERAL INFORMATION <SPACE RUNNER> 3

SERVICE SPECIFICATIONS 3

ON-VEHICLE SERVICE 4
Front Disc Brake Pad Check and Replacement <SPACE RUNNER> 4
Front Brake Disc Thickness Check <SPACE RUNNER> 5
Front Brake Disc Run-out Check and Connection 5

BRAKE PEDAL 6

MASTER CYLINDER AND BRAKE BOOSTER 7

FRONT DISC BRAKE <SPACE RUNNER> 9

GENERAL

OUTLINE OF CHANGES

- The service procedure for the front disc brake has been changed as the front disc brake has been changed.
  <SPACE RUNNER>
- The limit value of the front brake disc runout has been changed. <SPACE WAGON>
- The stop lamp switch has been changed as the cruise control system has been added as an option. <2400>
- The service procedure for the brake booster has been changed since the brake vacuum line routing has been changed.
  <2400>
- The service procedure for the brake booster has been changed as the clutch fluid hose bracket has been modified.
  <L.H. drive vehicles>

GENERAL INFORMATION <SPACE RUNNER>

Items		New	Old
Front brakes	Type	Floating caliper, 1 piston, ventilated disc	Floating caliper, 2 piston, ventilated disc
	Disc effective dia. × thickness mm	222 × 26	227.8 × 24
	Wheel cylinder I.D. mm	60.33	42.86
	Pad thickness mm	10.0	10.0
	Clearance adjustment	Automatic	Automatic

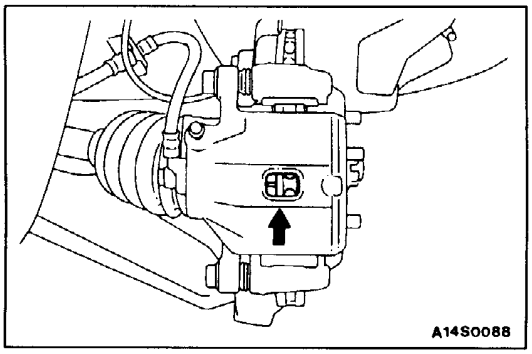
SERVICE SPECIFICATIONS

Item		Standard value	Limit
Front disc brake <SPACE RUNNER>	Pad thickness mm	10.0	2.0
	Disc thickness mm	26.0	24.4
	Disc runout mm	–	0.03
	Drag force N	69	–
Front disc brake <SPACE WAGON>	Disc runout mm	–	0.03

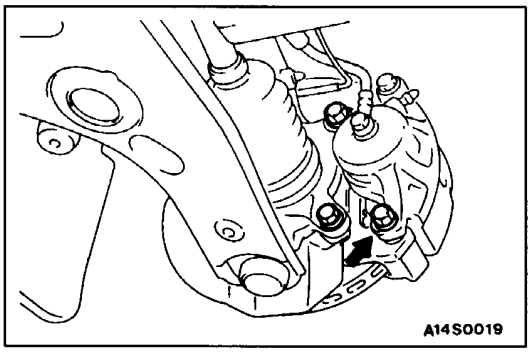
ON-VEHICLE SERVICE

FRONT DISC BRAKE PAD CHECK AND REPLACEMENT <SPACE RUNNER>

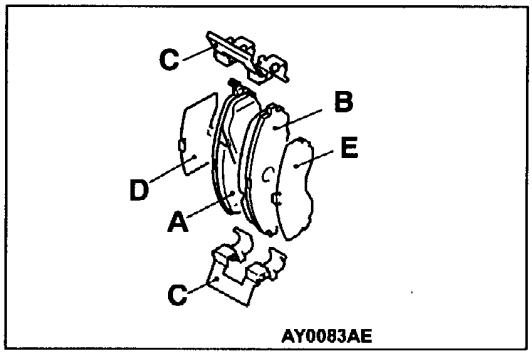
NOTE
The brake pads have wear indicators that contact the brake disc when the brake pad thickness reaches approximately 2 mm and emit a squealing sound to warn the driver.



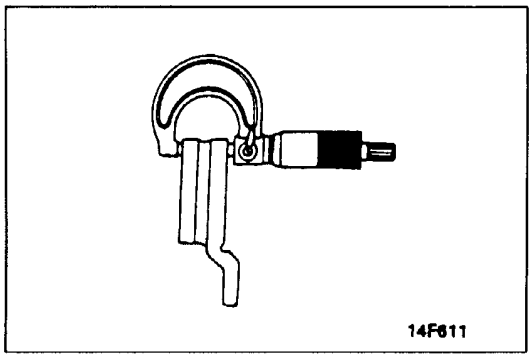
1. Check the brake pad thickness through the caliper body check port.
   Standard value: 10.0 mm
   Limit: 2.0 mm
2. When the thickness is less than the limit, always replace the pads at an axle set.



3. Remove the guide pin bolt. Pivot the caliper assembly and hold it with wires.



4. Remove the following parts from the caliper support.
   A. Pad and wear indicator assembly
   B. Pad assembly
   C. Clip
   D. Inner shim
   E. Outer shim
5. In order to measure the brake drag force after pad installation, measure the rotary-sliding resistance of the hub with the pads removed. (Refer to P.35A-10.)
6. Install the pads and caliper assembly, and then check the brake drag force. (Refer to P.35A-10.)



FRONT BRAKE DISC THICKNESS CHECK <SPACE RUNNER>

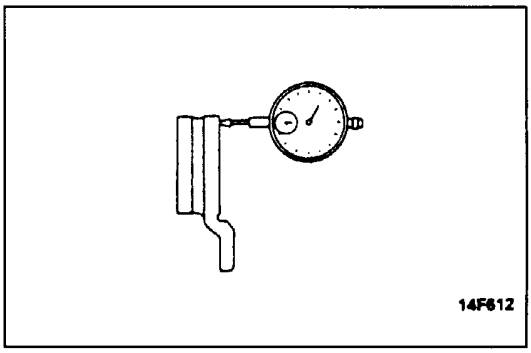
1. Using a micrometer, measure disc thickness at eight positions, approximately 45° apart and 10 mm in from the outer edge of the disc.

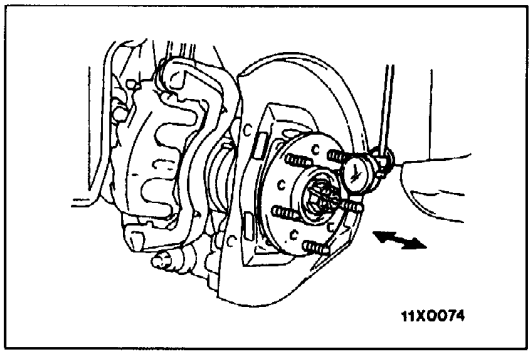
   Brake disc thickness

   Standard value: 26.0 mm

   Limit: 24.4 mm

   Thickness variation (at least 8 positions)
   The difference between any thickness measurements should not be more than 0.015 mm.
2. If the disc is beyond the limits for thickness, remove it and install a new one. If disc run-out exceeds the specification, replace the brake disc or grind it with on-the-car type brake lathe ("MAD, DL-8700PF" or equivalent).





FRONT BRAKE DISC RUN-OUT CHECK AND CORRECTION

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

   Limit: 0.03 mm or less
3. 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.

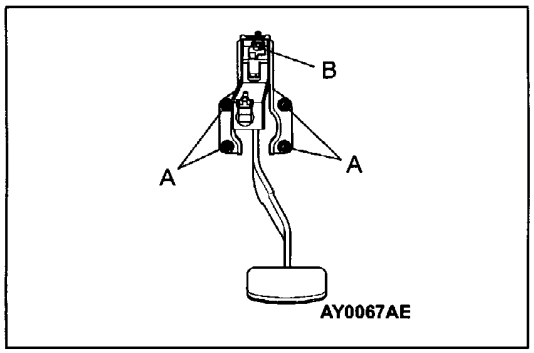
   Limit: 0.06 mm

   (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.
4. 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 PEDAL

REMOVAL AND INSTALLATION

The procedure is the same as before.

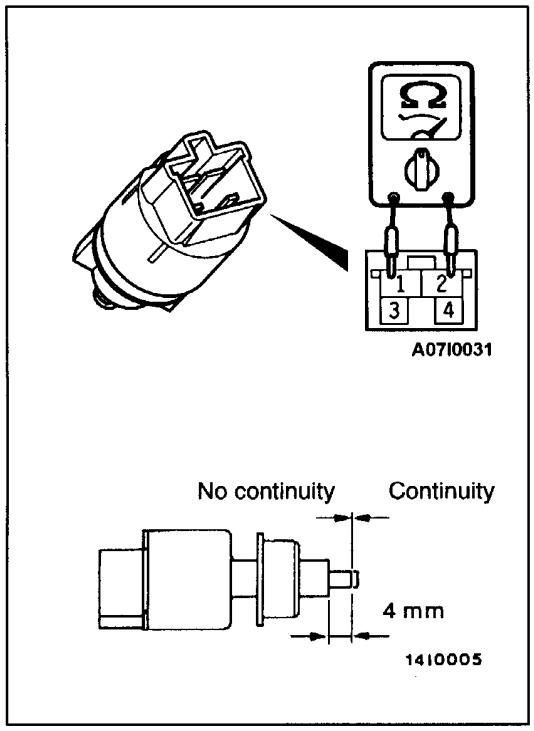


INSTALLATION SERVICE POINT

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 <2400>

STOP LAMP SWITCH CHECK
<Vehicles with auto-cruise control>

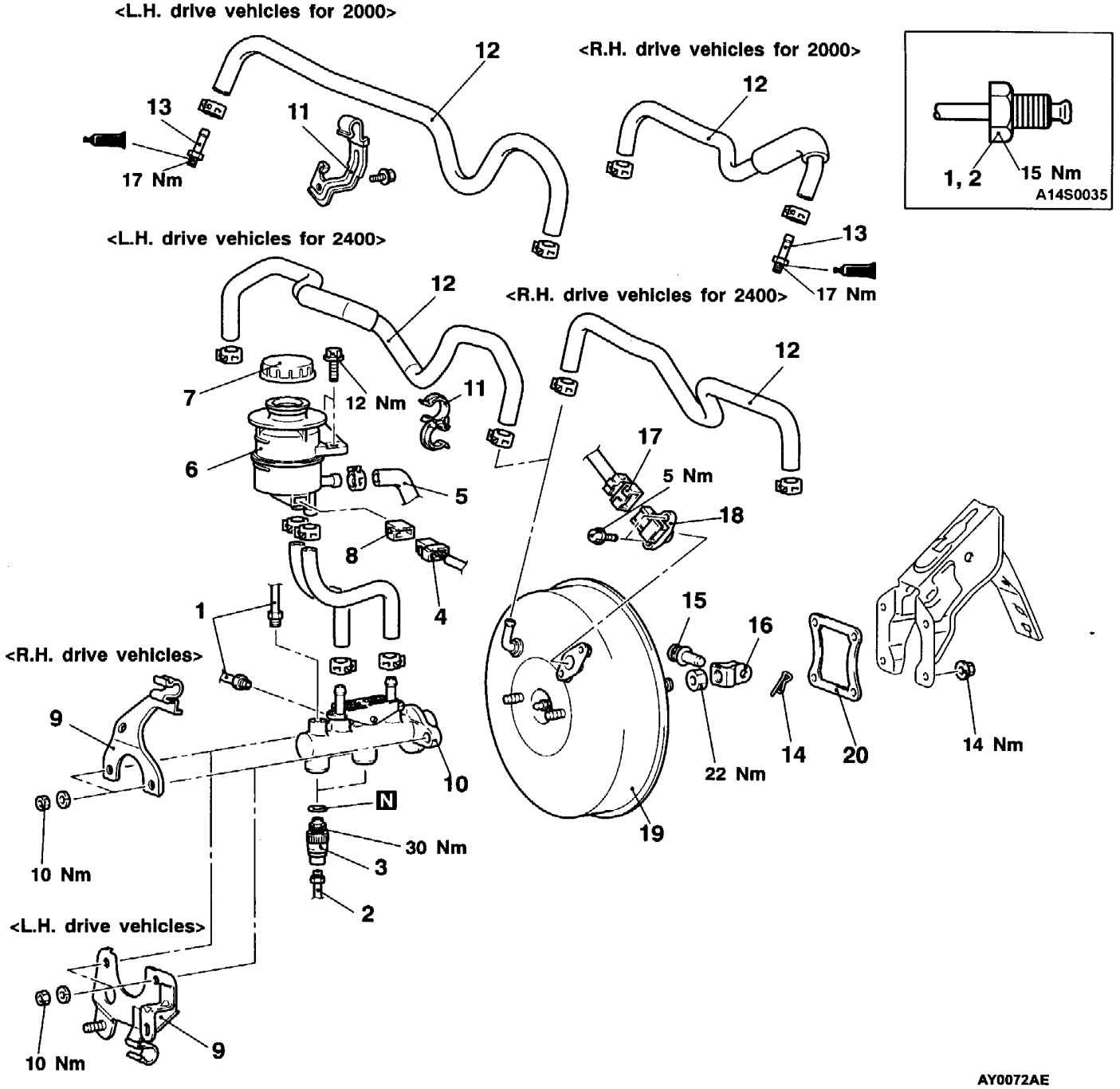
1. Connect an ohmmeter between the stop lamp switch connector terminals.
2. There should be no continuity between the terminals when the plunger is pushed in as shown. There should be continuity when it is released.

MASTER CYLINDER AND BRAKE BOOSTER

REMOVAL AND INSTALLATION

Pre-removal Operation
- Brake Fluid Draining
- Air Cleaner Removal <L.H. drive vehicles>
- Rocker Cover Removal (Refer to GROUP 11 – Cylinder Head Gasket.)*

Post-installation Operation
- Rocker Cover Installation (Refer to GROUP 11 – Cylinder Head Gasket.)*
- Air Cleaner Installation <L.H. drive vehicles>
- Brake Fluid Supplying
- Brake Line Bleeding (Refer to P.35A-12.)*
- Brake Pedal Adjustment (Refer to P.35A-7.)*



NOTE
*: Refer to '99 SPACE RUNNER/SPACE WAGON Workshop Manual (Pub. No. PWDE9803).

Removal steps

1. Brake pipe connection
2. Brake pipe connection <SPACE RUNNER - Vehicles without ABS>
3. Proportioning valve <SPACE RUNNER - Vehicles without ABS>
4. Brake fluid level sensor connector
5. Reservoir hose
6. Reservoir assembly
7. Reservoir cap assembly
8. Brake fluid level sensor
9. Bracket
10. Master cylinder assembly

▶A◀ • Push rod protruding length check and adjustment

11. Hose clip <L.H. drive vehicles>
12. Vacuum hose (With built-in check valve)
13. Fitting <2000>
14. Snap pin
15. Pin assembly
16. Clevis
17. Vacuum sensor connector
18. Vacuum sensor
19. Brake booster
20. Sealer

INSTALLATION SERVICE POINTS

▶A◀ PUSH ROD PROTRUDING LENGTH CHECK AND ADJUSTMENT

The procedure is the same as before.

INSPECTION

VACUUM SENSOR CHECK <2400>

Refer to 13A – Troubleshooting.

NOTE

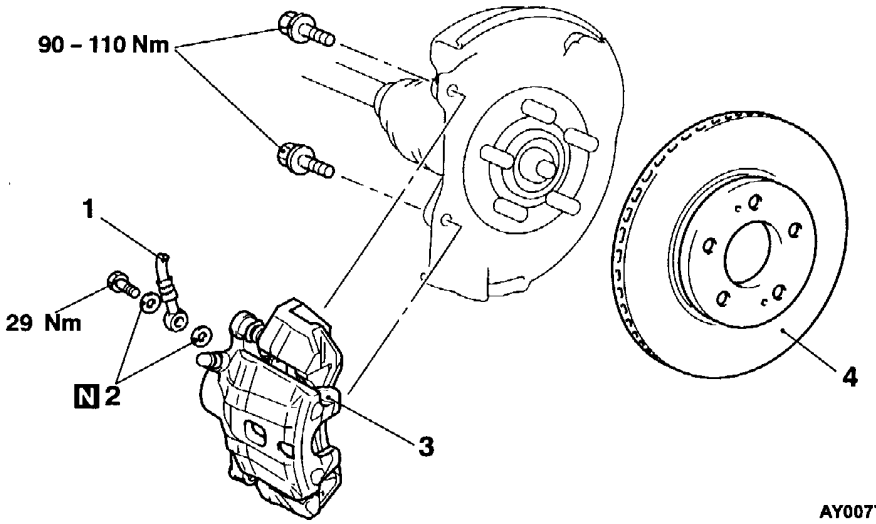
The engine-ECU always monitors the vacuum sensor. If the sensor is defective, a diagnosis code will be set.

FRONT DISC BRAKE <SPACE RUNNER>

REMOVAL AND INSTALLATION

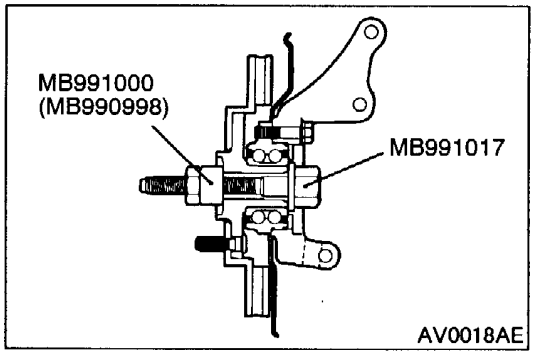
Pre-removal Operation
Brake Fluid Draining

Post-installation Operation
- Brake Fluid Supplying
- Brake Line Bleeding (Refer to P.35A-12.)*



NOTE
*: Refer to '99 SPACE RUNNER/SPACE WAGON Workshop Manual (Pub. No. PWDE9803).

Removal steps
1. Brake hose connection
2. Gasket
▶A◀ 3. Front Disc brake assembly
4. Front Brake disc



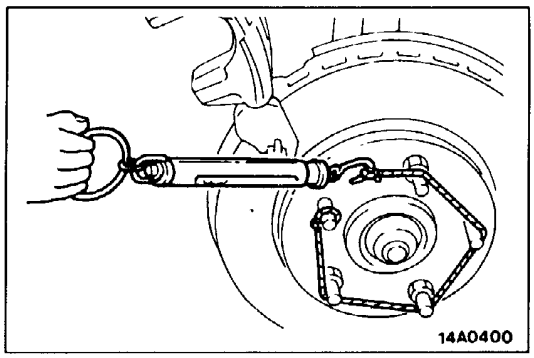
INSTALLATION SERVICE POINT

▶A◀ FRONT DISC BRAKE ASSEMBLY INSTALLATION

1. In order to measure the brake drag torque after pad installation, measure the rotary-sliding resistance of the hub by the following procedure with the pads removed.
   (1) Remove the drive shaft. (Refer to GROUP 26.)*

   NOTE
   *:Refer to '99 SPACE RUNNER/SPACE WAGON Workshop Manual (Pub. No. PWDE9803).
   (2) Attach the special tool to the hub assembly as shown in the illustration, and tighten it to the specified torque.

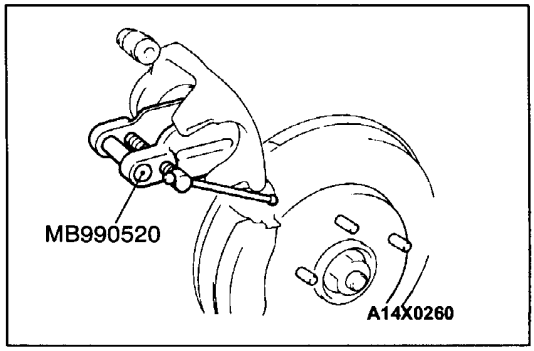
   Tightening torque: 196 – 255 Nm



(3) Use a spring balance to measure the rotary-sliding resistance of the hub in the forward direction.

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

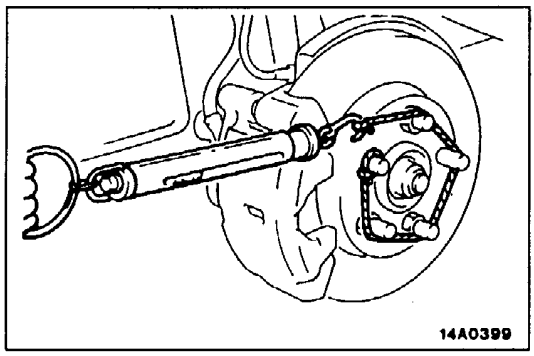
Caution
Do not let any oil, grease or other contamination get onto the friction surfaces of the pads and brake discs.



3. Clean piston and insert into cylinder with special tool.
4. Be careful that the piston boot does not become caught when lowering the caliper assembly, and tighten the guide pin bolt to the specified torque.

Tightening torque: 37 Nm

5. Start the engine and then depress the brake pedal 2–3 times.
6. Stop engine.
7. Turn brake disc forward 10 times.

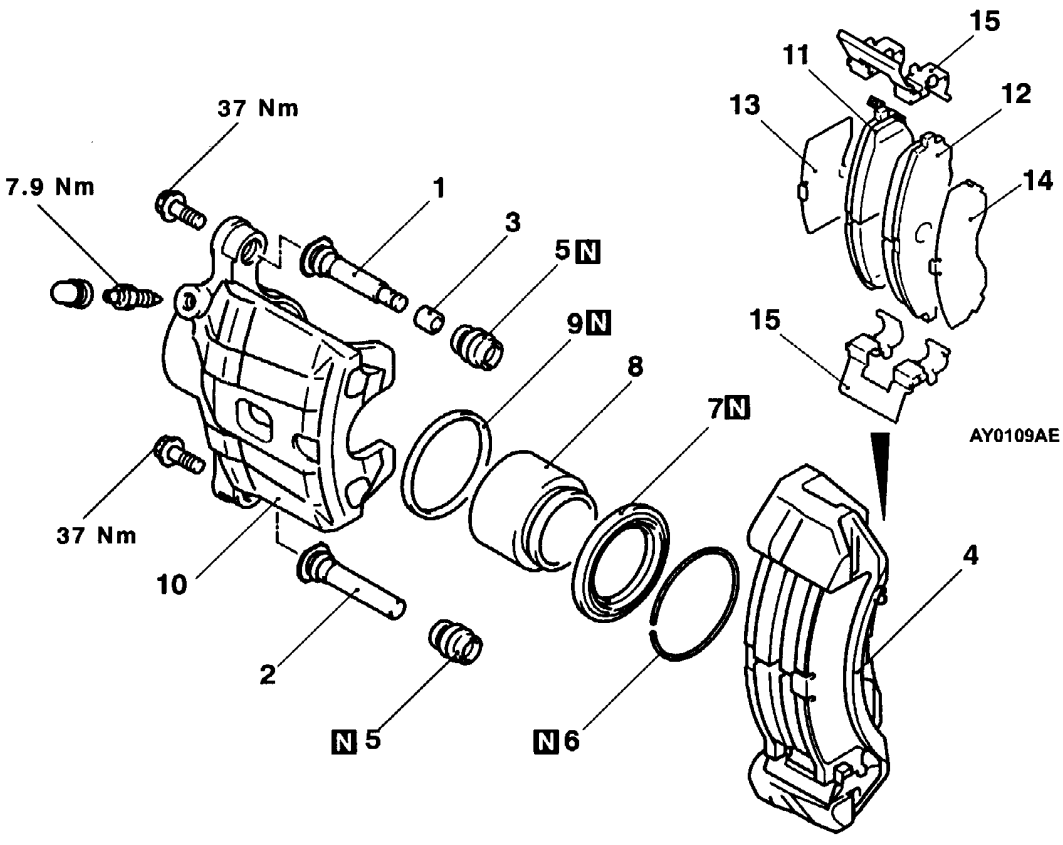


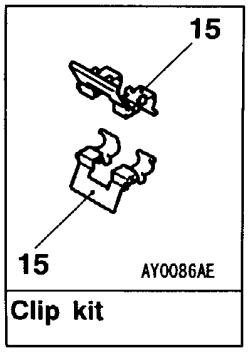
8. Use a spring balance to measure the rotation sliding resistance of the hub in the forward direction.
9. Calculate the drag force of the disc brake (difference between of values measured in item 8 and item 1.)

Standard value: 69 N or less

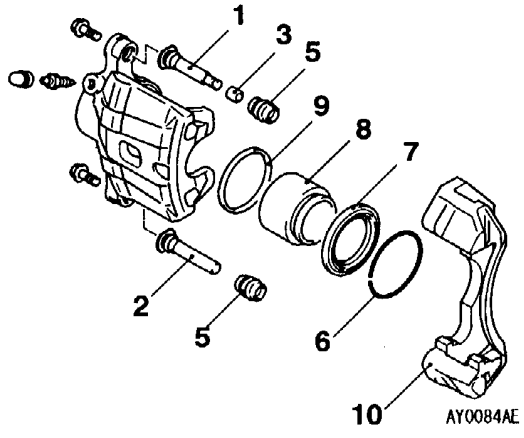
10. If the drag force of the disc brake exceeds the standard value, disassemble piston and clean piston. Check for corrosion or worn piston seal, and check the sliding condition of the lock pin and guide pin.

DISASSEMBLY AND REASSEMBLY

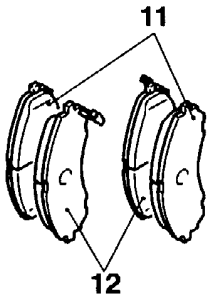




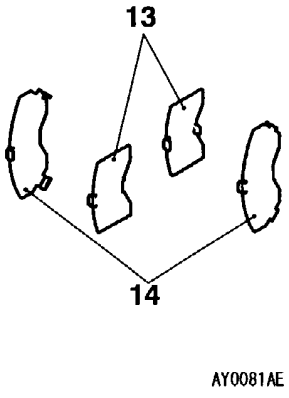
Clip kit



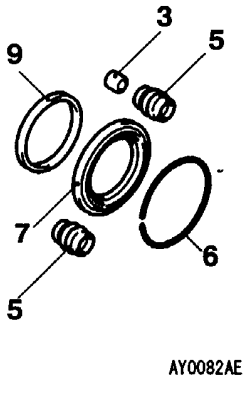
Brake caliper kit



Pad set



Shim kit



Seal and boot kit

Disassembly steps

1. Lock pin
2. Guide pin
3. Bushing
4. Caliper support (pad, clip, shim)
5. Pin boot
6. Boot ring

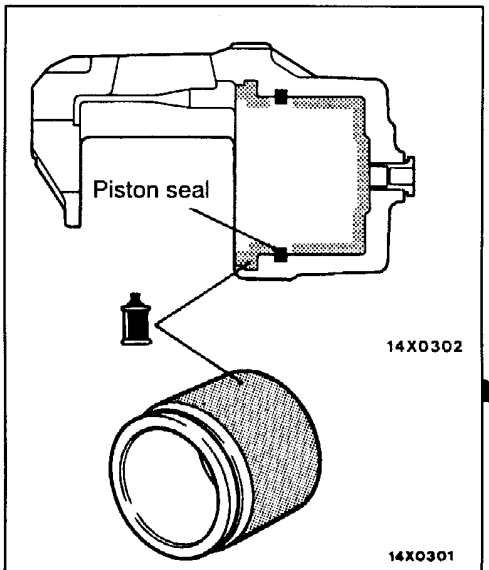
◀A▶ 7. Piston boot

◀A▶ 8. Piston

◀B▶ 9. Piston seal

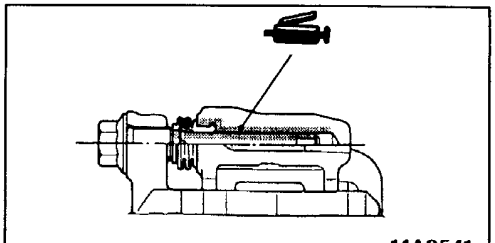
10. Caliper body
11. Pad and wear indicator assembly
12. Pad assembly
13. Inner shim
14. Outer shim
15. Clip

LUBRICATION POINTS

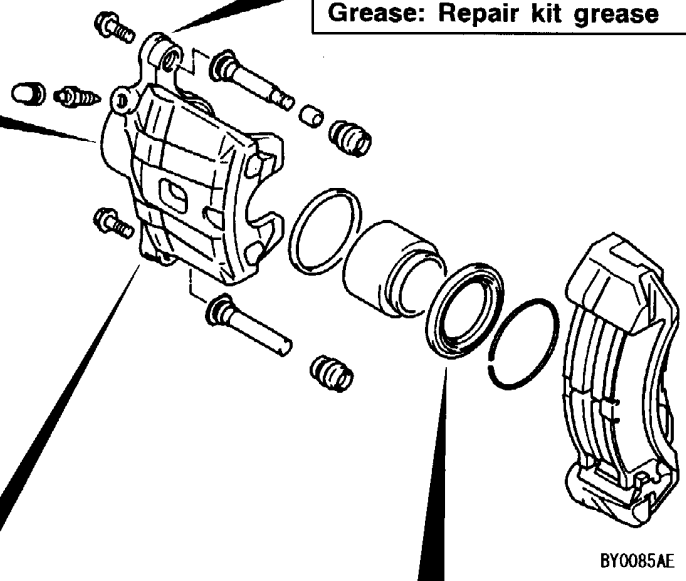


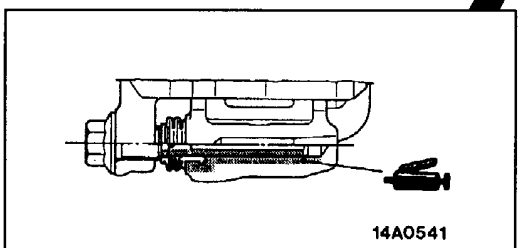
Caution
The piston seal inside the seal and boot kit is coated with special grease, so do not wipe this grease off.

Brake fluid: DOT3 or DOT4

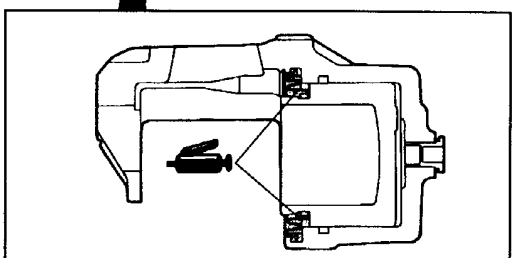


Grease: Repair kit grease

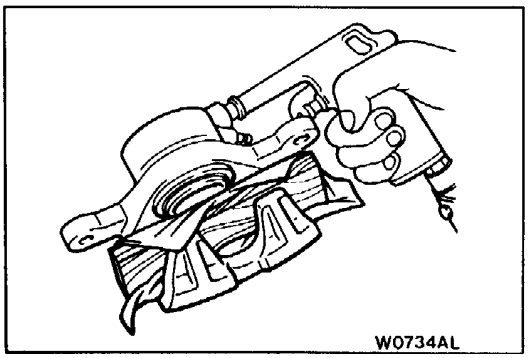




Grease: Repair kit grease



Grease: Repair kit grease

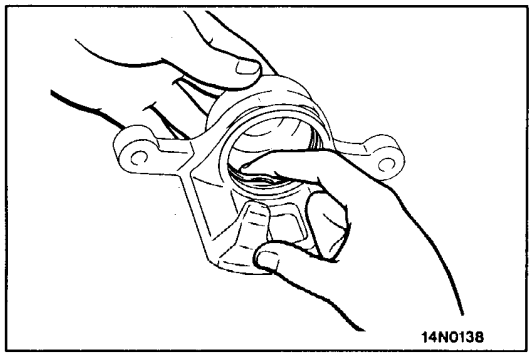


DISASSEMBLY SERVICE POINTS

◀A▶ PISTON BOOT/PISTON REMOVAL

Place a piece of wood against the outer side of the caliper body. Then push out the piston and boot by applying compressed air through the brake hose nipple.

Caution
Be careful to apply compressed air gradually, otherwise the piston may be fired from the cylinder, causing injury.



◀B▶ PISTON SEAL REMOVAL

1. Remove the piston seal with finger tip.

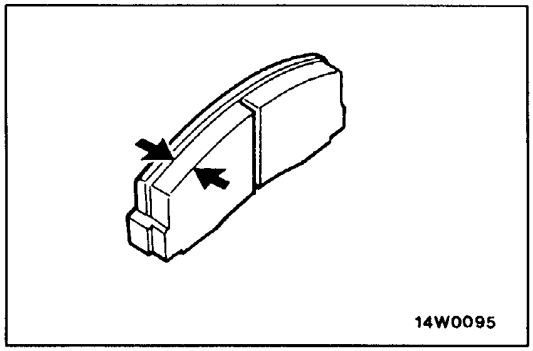
   Caution
   Do not use a flat-tipped screwdriver or other tool to prevent damage to inner cylinder.

2. Clean piston surface and inner bore with trichloroethylene, alcohol or the specified brake fluid.

   Specified brake fluid: DOT3 or DOT4

INSPECTION

- 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 pad for damage or adhesion of grease, check the backing metal for damage.



PAD WEAR CHECK

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

Standard value: 10 mm

Limit: 2.0 mm

Caution

1. **Always replace the brake pads as an axle set.**
2. **If an excessive difference is found in the thickness between the right and left brake pads, check moving parts.**

GROUP 35B
ANTI-SKID BRAKING SYSTEM (ABS) <2WD>

GENERAL

OUTLINE OF CHANGE

- The brake warning lamp illumination circuit, which is used as the EBD (Electronic Brake force Distribution) warning lamp, has been discontinued.

Operation of the warning lamp when the ABS system is defective

Condition	New system	Old system
When the ABS system is defective (Malfunction NOT related to the EBD)	The ABS warning lamp illuminates	The ABS warning lamp illuminates
When the ABS system is defective (Malfunction related to the EBD)	The ABS warning lamp illuminates	• The ABS warning lamp illuminates. • The brake warning lamp illuminates.