# SERVICE BRAKES

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# GROUP 35A
# BASIC BRAKE SYSTEM

## GENERAL

### OUTLINE OF CHANGES

- The specifications of the proportioning valve have been changed.
  Applicable models: All models
- The checking procedure for the brake disc thickness has been added to correspond to the addition of the diesel-powered vehicle. In addition, the procedure is the same as for 1600 models.
  Applicable models: 1900D
- The service procedures for the master cylinder and brake booster have been added to correspond to the addition of the diesel-powered vehicle.
  Applicable models: 1900D

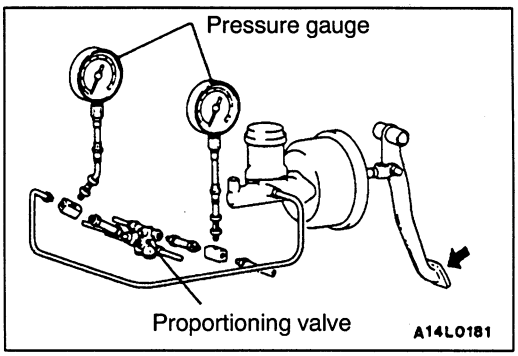
## SERVICE SPECIFICATIONS

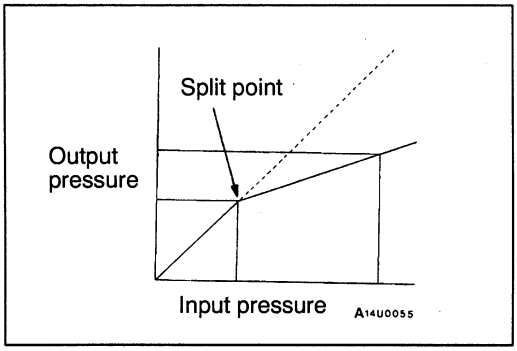
### PROPORTIONING VALVE

| Items | | | Standard value | Limit |
|---|---|---|---|---|
| Split point Mpa | Hatchback | 1600, 1900D, 1800-DOHC | 3.43 ± 0.25 | – |
| | | 1800-SOHC | 3.92 ± 0.25 | – |
| | Sedan | 1600, 1900D, 1800-DOHC | 2.94 ± 0.25 | – |
| | | 1800-SOHC | 3.43 ± 0.25 | – |
| Output fluid pressure (Input fluid pressure) MPa | Hatchback | 1600, 1900D, 1800-DOHC | 5.03 ± 0.4 (9.81) | – |
| | | 1800-SOHC | 5.39 ± 0.4 (9.81) | – |
| | Sedan | 1600, 1900D, 1800-DOHC | 4.66 ± 0.4 (9.81) | – |
| | | 1800-SOHC | 5.03 ± 0.4 (9.81) | – |
| Output fluid pressure difference between left and right MPa | | | – | 0.8 |

### FRONT DISC BRAKE <1900D>

| Item | Standard value | Limit |
|---|---|---|
| Disc thickness mm | 18.0 | 16.4 |




# ON-VEHICLE SERVICE

## PROPORTIONING VALVE FUNCTION TEST

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

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

**Standard value:**

MPa

| Items | 1600, 1900D, 1800-DOHC | 1800-SOHC |
|---|---|---|
| Hatchback | 3.43 ± 0.25 | 3.92 ± 0.25 |
| Sedan | 2.94 ± 0.25 | 3.43 ± 0.25 |

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

**Standard value:**

MPa

| Items | | 1600, 1900D, 1800-DOHC | 1800-SOHC |
|---|---|---|---|
| Output fluid pressure (Input fluid pressure) | Hatchback | 5.03 ± 0.4 (9.81) | 5.39 ± 0.4 (9.81) |
| | Sedan | 4.66 ± 0.4 (9.81) | 5.03 ± 0.4 (9.81) |

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

**Limit: 0.8 MPa**

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

## BRAKE DISC THICKNESS CHECK <1900D>

For the checking procedure, refer to the basic manual.

**Brake disc thickness**
**Standard value: 18.0 mm**
**Limit: 16.4 mm**

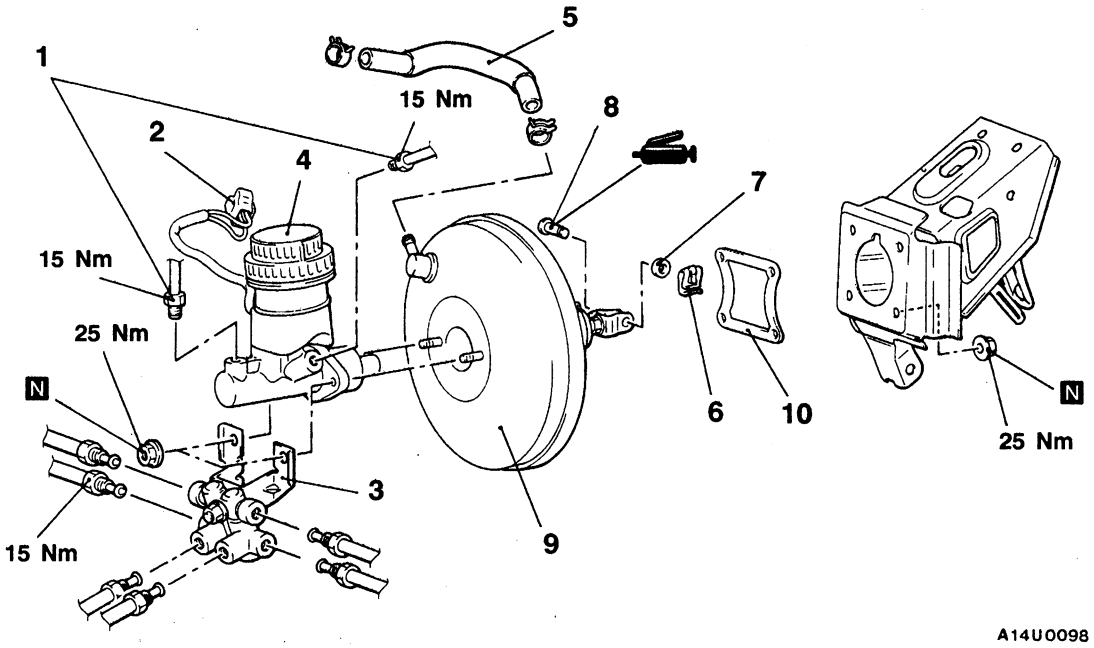
# MASTER CYLINDER AND BRAKE BOOSTER

## REMOVAL AND INSTALLATION

**<L.H. drive vehicles>**

**Pre-removal Operation**
- Brake Fluid Draining

**Post-installation Operation**
- Brake Fluid Supplying
- Brake Line Bleeding
- Brake Pedal Adjustment




**Removal steps**

1. Brake pipe connection
2. Brake fluid level sensor connector
3. Proportioning valve bracket
4. Master cylinder assembly

▶B◀ • Clearance adjustment between brake booster push rod and primary piston

▶A◀ 5. Vacuum hose (With built-in check valve)

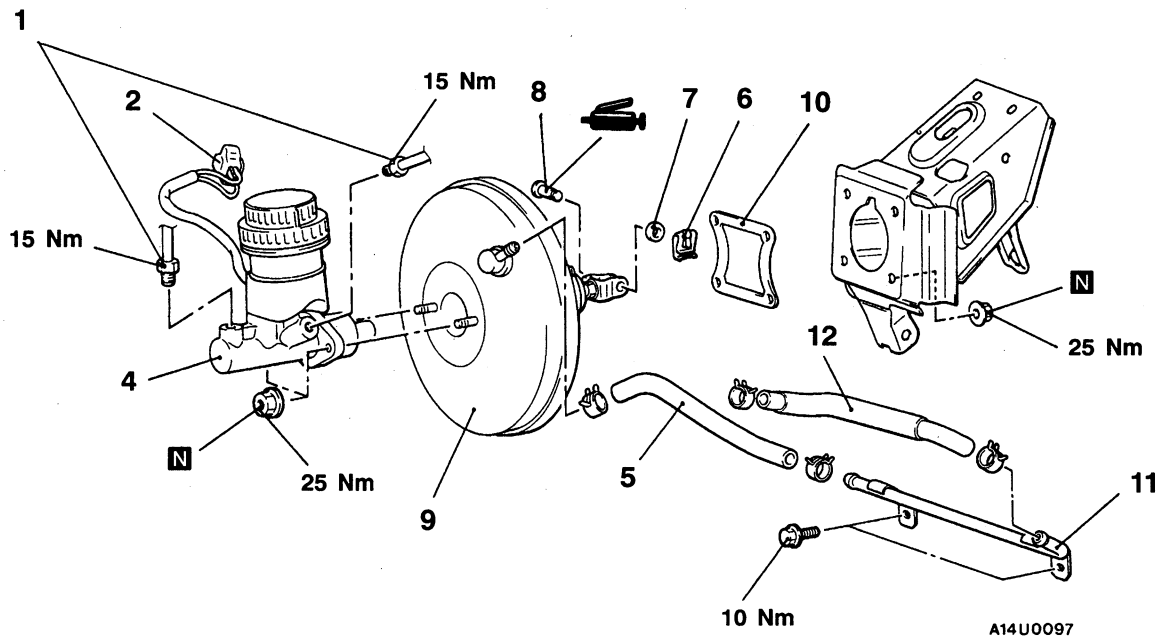
6. Retaining clip
7. Washer
8. Retaining ring bolt
9. Brake booster
10. Sealer

NOTE
For each service point, refer to Basic Manual.

## <R.H. drive vehicles>

**Pre-removal Operation**
- Brake Fluid Draining

**Post-installation Operation**
- Brake Fluid Supplying
- Brake Line Bleeding
- Brake Pedal Adjustment




**Removal Steps**

1. Brake pipe connection
2. Brake fluid level sensor connector
4. Master cylinder assembly

▶B◀ • Clearance adjustment between brake booster push rod and primary piston

▶A◀ 5. Vacuum hose (With built-in check valve)

6. Retaining clip
7. Washer
8. Retaining ring bolt
9. Brake booster
10. Sealer
11. Vacuum pipe
12. Vacuum hose

NOTE
For each service point, refer to Basic Manual.

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

## GENERAL

### OUTLINE OF CHANGES

- The specifications of the proportioning valve have been changed.
  Applicable models: All models
- The service procedures for the master cylinder and brake booster have been added to correspond to the addition of the diesel-powered vehicle.
  Applicable models: 1900D
- The following service procedures have been added, because the rear drum brakes have had the ABS system.
  Applicable models: 1600, 1800-SOHC, 1900D
  1. Removal and installation of the rear drum brakes
  2. Removal and installation of the wheel-speed sensor
- The following service procedures have been changed to correspond to the change of the rear wheel-speed sensor.
  Applicable models: 1800-DOHC
  1. Removal and installation of the rear disc brakes
  2. Removal and installation of the wheel-speed sensor

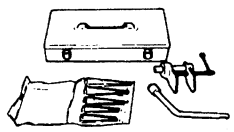
## SERVICE SPECIFICATIONS

| Items | Standard value |
|---|---|
| Clearance between rear speed sensor pole piece and rotor mm | 0.1 – 1.9 |
| Wheel speed sensor's internal resistance kΩ | 1.28 – 1.92 |
| Wheel speed sensor insulation resistance kΩ | 100 or more |

## LUBRICANTS

| Items | Specified Lubricant |
|---|---|
| Brake fluid | DOT3 or DOT4 |
| Wheel cylinder body inner surfaces | Repair kit grease |
| Rear brake shoe and backing plate contact surfaces | Brake grease SAE J310, NLGI No.1 |
| Shoe assembly and auto adjuster assembly contact surfaces | |
| Shoe and lever assembly and auto adjuster assembly contact surfaces | |

## SPECIAL TOOL

| Tool | Number | Name | Use |
|---|---|---|---|
|  | MB990964<br>MB990773 | Brake tool set | Installation of drum brake wheel cylinder piston cup |

# ON-VEHICLE SERVICE

## PROPORTIONING VALVE FUNCTION TEST

The testing procedures are the same as for non-ABS vehicles. Refer to GROUP 35A – On-vehicle Service.

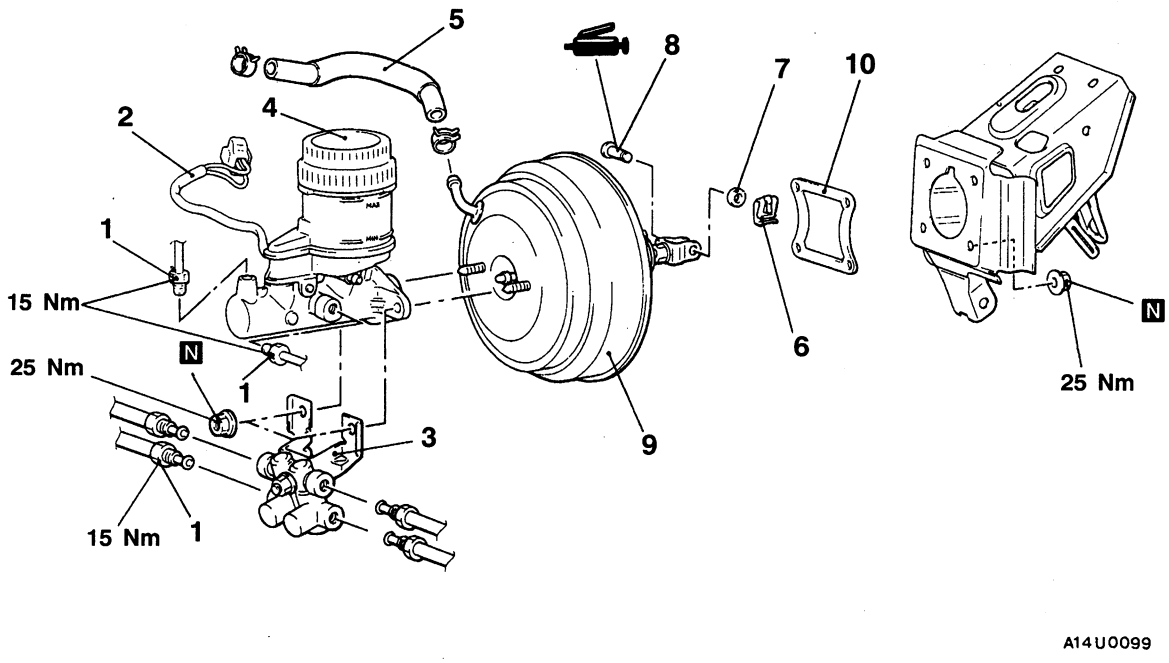
# MASTER CYLINDER AND BRAKE BOOSTER

## REMOVAL AND INSTALLATION

**<L.H. drive vehicles>**

**Pre-removal Operation**
- Brake Fluid Draining

**Post-installation Operation**
- Brake Fluid Supplying
- Brake Line Bleeding
- Brake Pedal Adjustment

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**Removal steps**

1. Brake pipe connection
2. Brake fluid level sensor connector
3. Proportioning valve bracket
4. Master cylinder assembly

▶B◀ • Clearance adjustment between brake booster push rod and primary piston

▶A◀ 5. Vacuum hose (With built-in check vlave)

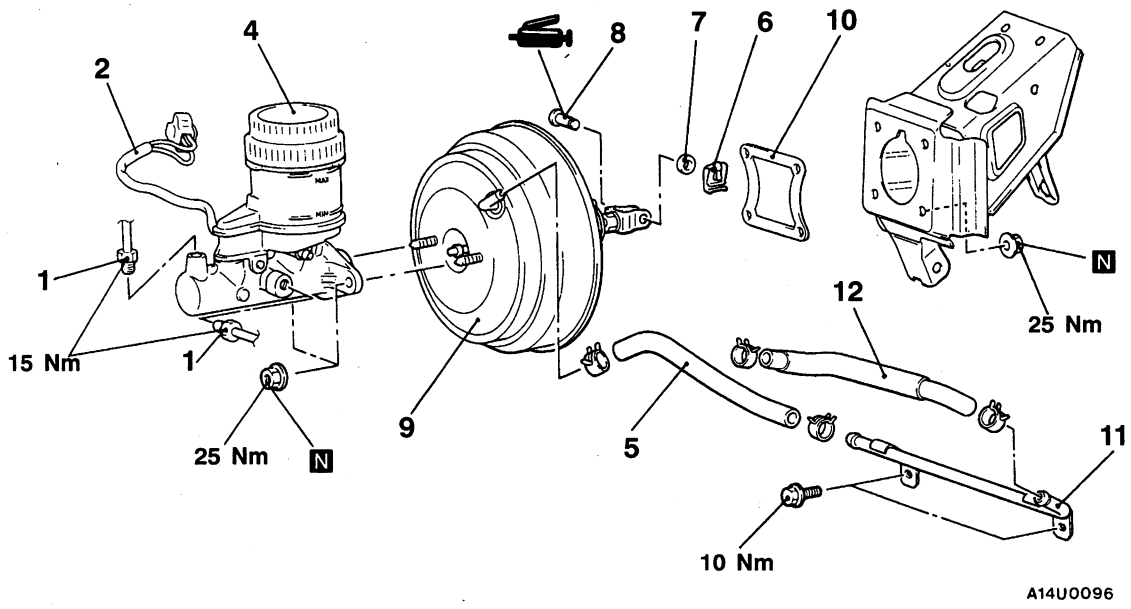
6. Retaining clip
7. Washer
8. Retaining ring bolt
9. Brake booster
10. Sealer

NOTE
For each service point, refer to Basic Manual.

## <R.H. drive vehicles>

**Pre-removal Operation**
- Brake Fluid Draining

**Post-installation Operation**
- Brake Fluid Supplying
- Brake Line Bleeding
- Brake Pedal Adjustment




**Removal steps**

1. Brake pipe connection
2. Brake fluid level sensor connector
4. Master cylinder assembly

▶B◀ • Clearance adjustment between brake booster push rod and primary piston

▶A◀ 5. Vacuum hose (With built-in check valve)

6. Retaining clip
7. Washer
8. Retaining ring bolt
9. Brake booster
10. Sealer
11. Vacuum pipe
12. Vacuum hose

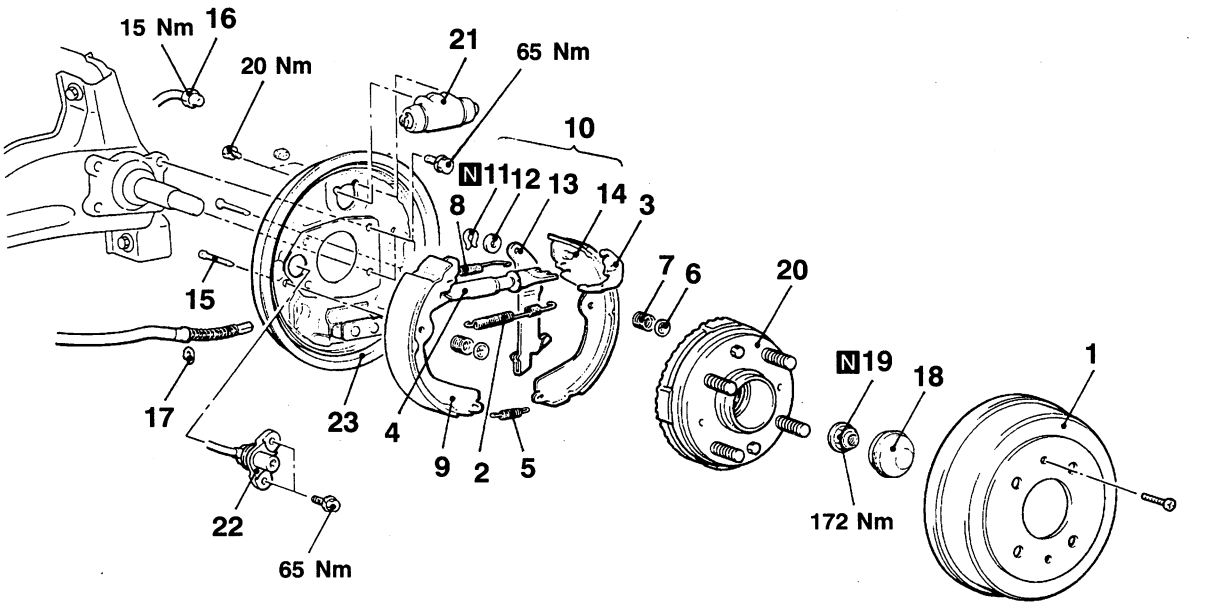
NOTE
For each service point, refer to Basic Manual.

# REAR DRUM BRAKE

## REMOVAL AND INSTALLATION

**Pre-removal Operation**
- Loosening the Parking Brake Cable Adjusting Nut.
- Brake Fluid Draining

**Post-installation Operation**
- Brake Line Bleeding
- Parking Brake Lever Stroke Adjustment

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**Rear drum brake removal steps**

1. Brake drum
2. Shoe-to-lever spring
3. Adjuster lever
4. Auto adjuster assembly
5. Retainer spring
6. Shoe hold-down cup
7. Shoe hold-down spring
8. Shoe-to-shoe spring
9. Shoe and lining assembly
10. Shoe, lining and lever assembly

◀A▶ ▶B◀ 11. Retainer

▶A◀ 12. Wave washer

13. Parking lever
14. Shoe and lining assembly
15. Shoe hold-down pin
16. Brake pipe connection
17. Snap ring
18. Hub cap
19. Flange nut
20. Rear hub and rotor assembly
21. Wheel cylinder
22. Speed sensor
23. Backing plate

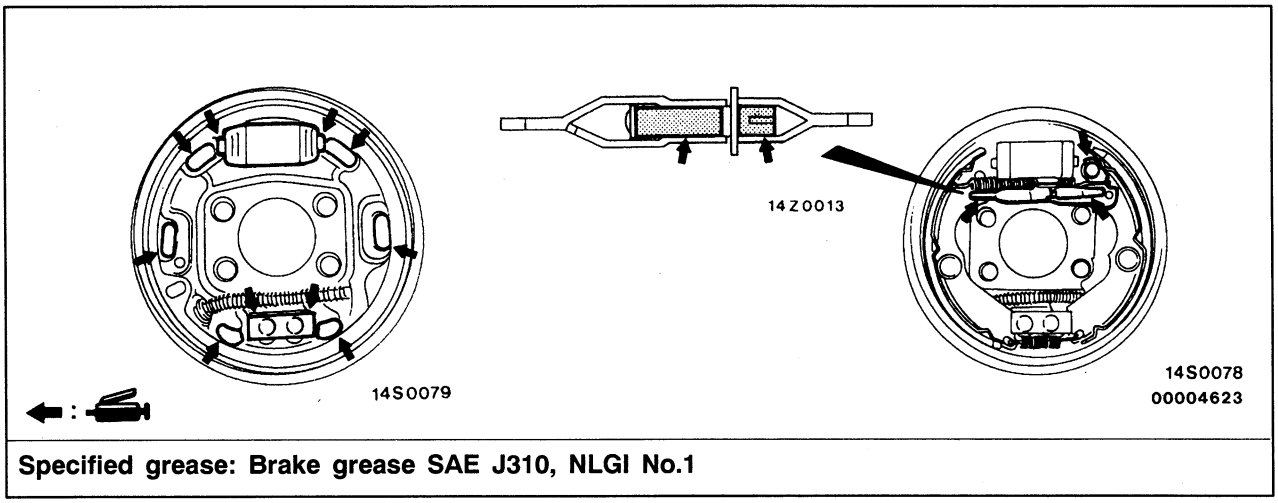
**Wheel cylinder removal steps**

1. Brake drum
2. Shoe-to-lever spring
8. Shoe-to-shoe spring
16. Brake pipe connection
21. Wheel cylinder

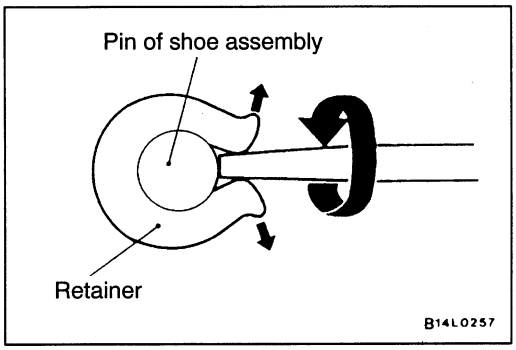
**Caution**

1. **Be careful when handling the pole piece at the tip of the speed sensor and the toothed edge of the rotor so as not to damage them by striking against other parts.**
2. **When removing the rear hub assembly, the wheel bearing inner race may be left at the spindle side. In this case, always replace the rear hub assembly, otherwise the hub will damage the oil seal, causing oil leaks or excessive play.**

## LUBRICATION POINTS



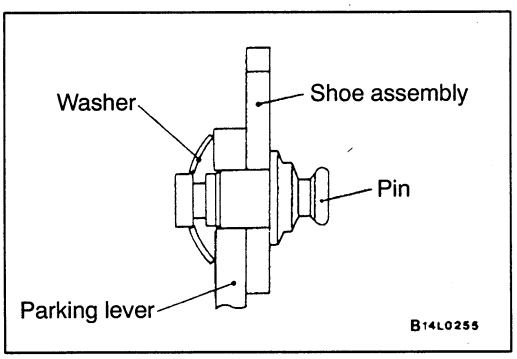

**Specified grease: Brake grease SAE J310, NLGI No.1**




## REMOVAL SERVICE POINT

### ◀A▶ RETAINER REMOVAL

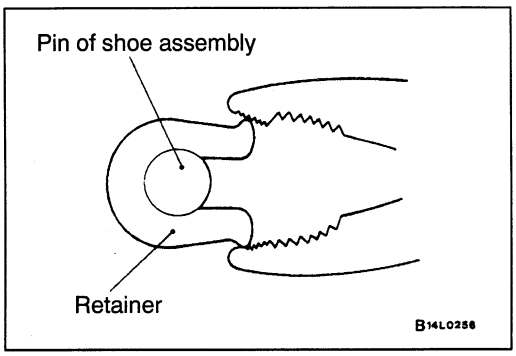
Use a flat-tipped screwdriver or the like to open up the retainer joint, and remove retainer.




## INSTALLATION SERVICE POINTS

### ▶A◀ WAVE WASHER INSTALLATION

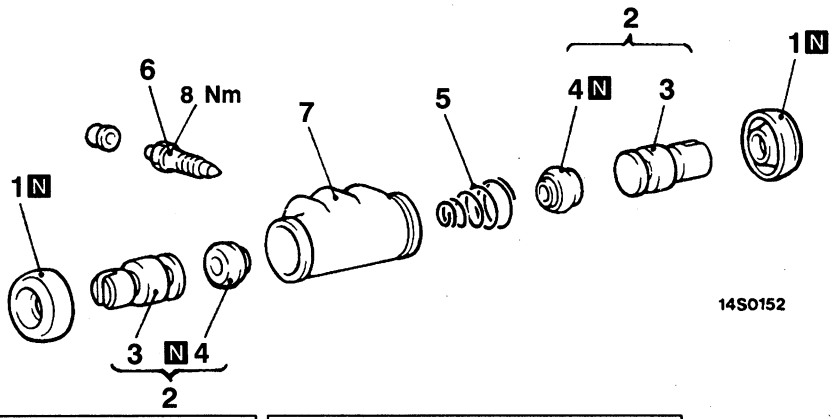
Install the washer in the direction shown in the illustration.




### ▶B◀ RETAINER INSTALLATION

Use pliers or the like to install the retainer or the pin positively.

## WHEEL CYLINDER
## DISASSEMBLY AND REASSEMBLY

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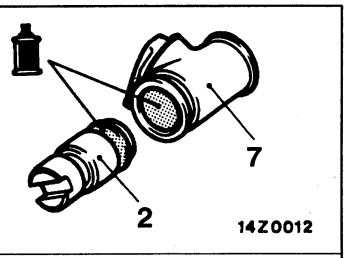
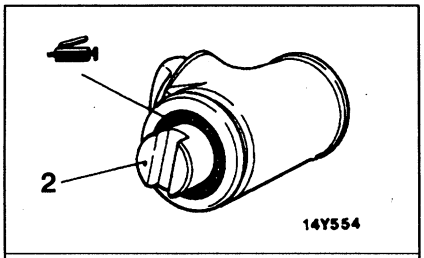
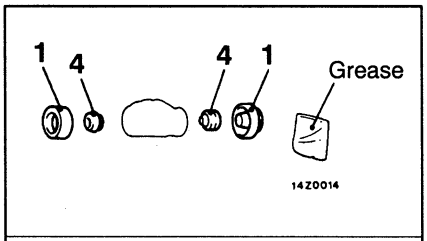



Brake fluid: DOT3 or DOT4



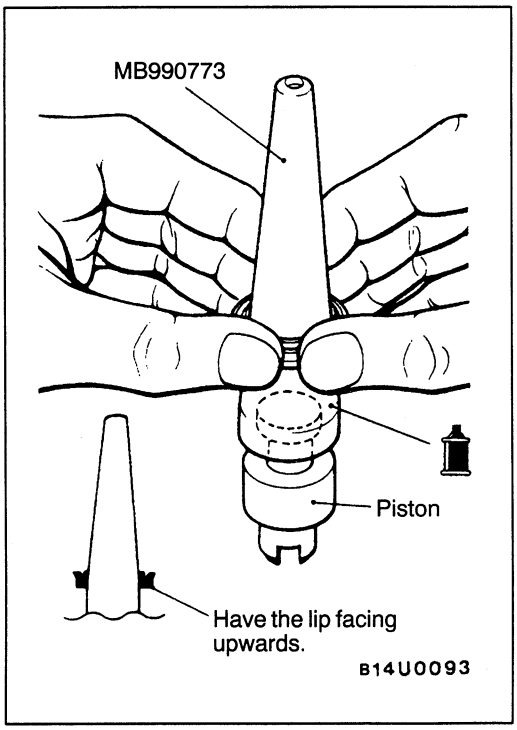

Grease: Repair kit grease




Wheel cylinder repair kit

**Disassembly steps**

1. Boots
2. Piston assembly
3. ▶A◀ Pistons
4. ▶A◀ Piston cups
5. Spring
6. Bleeder
7. Wheel cylinder body




## REASSEMBLY SERVICE POINT

### ▶A◀ PISTON CUP/PISTON REASSEMBLY

(1) Use alcohol or specified brake fluid to clean the wheel cylinder and the piston.
(2) Apply the specified brake fluid to the piston cups and the special tool.

**Specified brake fluid: DOT3 or DOT4**

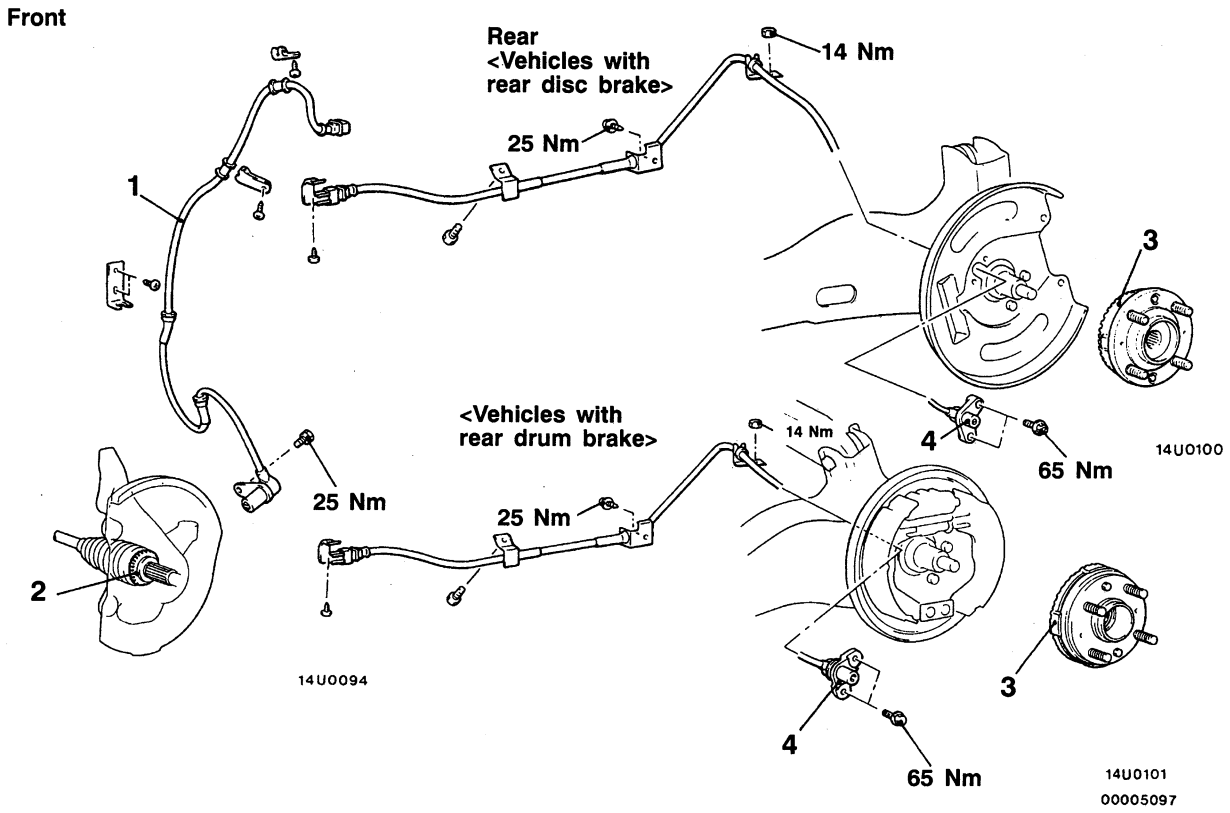
(3) Set the piston cup on the special tool with the lip of the cup facing up, fit the cup onto the special tool, and then slide it down the outside of the tool into the piston groove.

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

# WHEEL SPEED SENSOR

## REMOVAL AND INSTALLATION

**Post-installation Operation**
- Wheel Speed Sensor Output Voltage Check




**Front speed sensor removal steps**

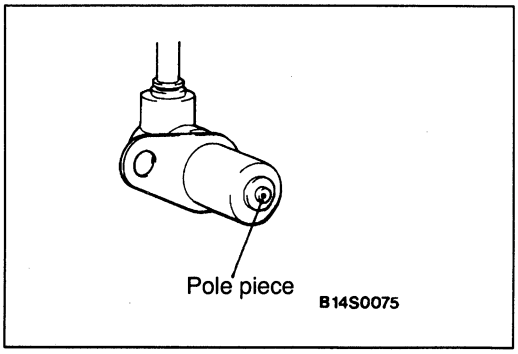
◀A▶ 1. Front speed sensor
2. Front rotor
(Refer to Basic Manual.)

**Rear speed sensor removal steps**

3. Rear rotor
(Refer to GROUP 27 – Rear Axle Hub.)

◀A▶ ▶A◀ 4. Rear speed sensor

NOTE
The front rotor is integrated with the drive shaft and is not disassembled.




## REMOVAL SERVICE POINT

### ◀A▶ FRONT SPEED SENSOR/REAR SPEED SENSOR REMOVAL

**Caution**
**Be careful when handling the pole piece at the tip of the speed sensor and the toothed edge of the rotor so as not to damage them by striking against other parts.**

## INSPECTION

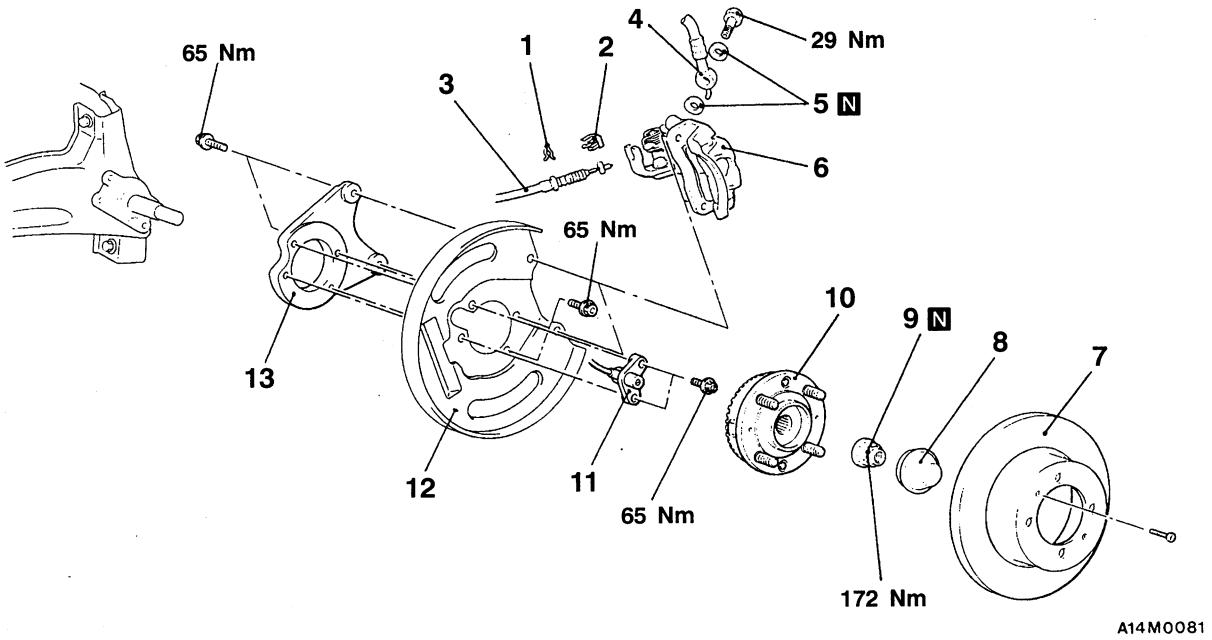
Check the piston and wheel cylinder walls for rust or damage, and if there is any abnormality, replace the entire wheel cylinder assembly.

# REAR DISC BRAKE

## REMOVAL AND INSTALLATION

**Pre-removal Operation**
- Brake Fluid Draining

**Post-installation Operation**
- Brake Fluid Supplying
- Brake Line Bleeding



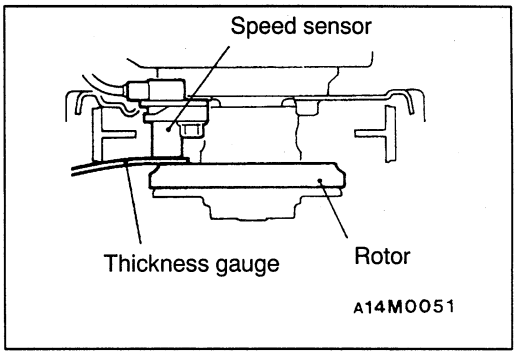

**Removal steps**

1. Clip
2. Retainer spring
3. Parking brake cable connection
4. Brake hose connection
5. Gasket
▶A◀ 6. Disc brake assembly
7. Brake disc
8. Hub cap
9. Self locking nut
10. Rear hub and rotor assembly
11. Rear speed sensor
12. Dust shield
13. Disc brake adapter

NOTE
For service point, refer to Basic Manual.

## DISASSEMBLY AND REASSEMBLY

Refer to Basic Manual.




## INSTALLATION SERVICE POINT

### ▶A◀ REAR SPEED SENSOR INSTALLATION

**Caution**
**Be careful that the pole piece at the end of the speed sensor and the rotor teeth do not become damaged by striking them against the metal parts.**

Insert a thickness gauge into the space between the speed sensor's pole piece and the rotor's toothed surface, and check the clearance is the standard value all around.

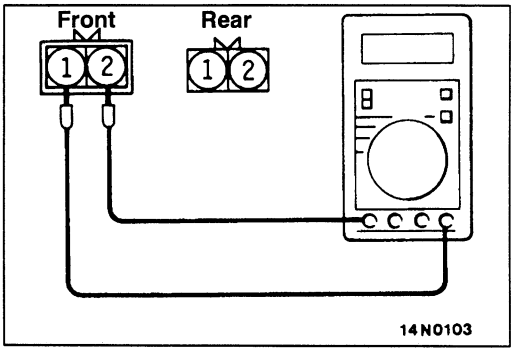
**Standard value: 0.1 – 1.9 mm**

## INSPECTION

### SPEED SENSOR

(1) Check whether any metallic foreign material has adhered to the pole piece at the speed sensor tip, and if so, remove it.
Also check whether the pole piece is damaged, and if so, replace it with a new one.

NOTE
The pole piece can become magnetized because of the magnet built in the speed sensor, with the result that metallic foreign material easily adheres to it. Moreover, the pole piece may not be able to function to correctly sense the wheel rotation speed if it is damaged.



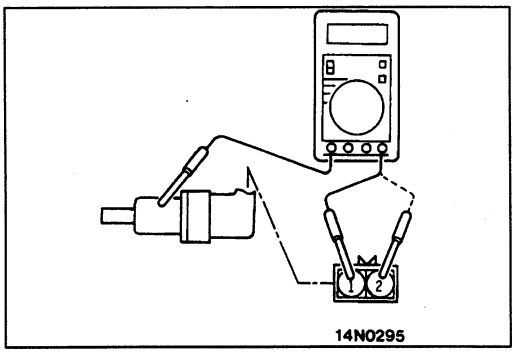

(2) Measure the resistance between the speed sensor terminals.

**Standard value: 1.28 – 1.92 kΩ**

If the internal resistance of the speed sensor is not within the standard value, replace with a new speed sensor.

(3) Check the speed sensor cable for breakage, damage or disconnection; replace with a new one if a problem is found.

NOTE
When checking for cable damage, remove the cable clamp part from the body and then bend and pull the cable near the clamp to check whether or not temporary disconnection occurs.




## SPEED SENSOR INSULATION INSPECTION

(1) Remove all connections from the speed sensor, and then measure the resistance between terminals (1) and (2) and the body of the speed sensor.

**Standard value: 100 kΩ or more**

(2) If the speed sensor insulation resistance is outside the standard value range, replace with a new speed sensor.

## TOOTHED ROTOR

Check whether rotor teeth are broken or deformed, and, if so, replace the rotor.