
SERVICE BRAKES

BASIC BRAKE SYSTEM

CONTENTS

35109000456

GENERAL INFORMATION	3	Front Disc Brake Rotor Check	12
SERVICE SPECIFICATIONS	4	Brake Disc Thickness Check	12
LUBRICANTS	5	Brake Disc Run-out Check	13
SEALANTS	5	Brake Disc Run-out Correction	13
SPECIAL TOOLS	5	Brake Lining Thickness Check	14
ON-VEHICLE SERVICE	6	Brake Drum Inside Diameter Check	14
Brake Pedal Check and Adjustment	6	Brake Lining and Brake Drum Connection Check	14
Stop Lamp Switch Check	7	BRAKE PEDAL	15
Brake Booster Operating Test	8	MASTER CYLINDER AND BRAKE BOOSTER	17
Check Valve Operation Check	8	FRONT DISC BRAKE	20
Proportioning Valve Function Test	9	REAR DRUM BRAKE	22
Brake Fluid Level Sensor Check	10	WHEEL CYLINDER	24
Bleeding	10	PROPORTIONING VALVE	25
Front Disc Brake Pad Check and Replacement	11		

GENERAL INFORMATION

35100010243

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

MASTER CYLINDER

Type	Tandem type
I.D. mm	23.81

BRAKE BOOSTER

Type	Vacuum type, Tandem
Effective dia. of power cylinder mm	265
Boosting ratio	6.5

PROPORTIONING VALVE

Decompression ratio	0.25
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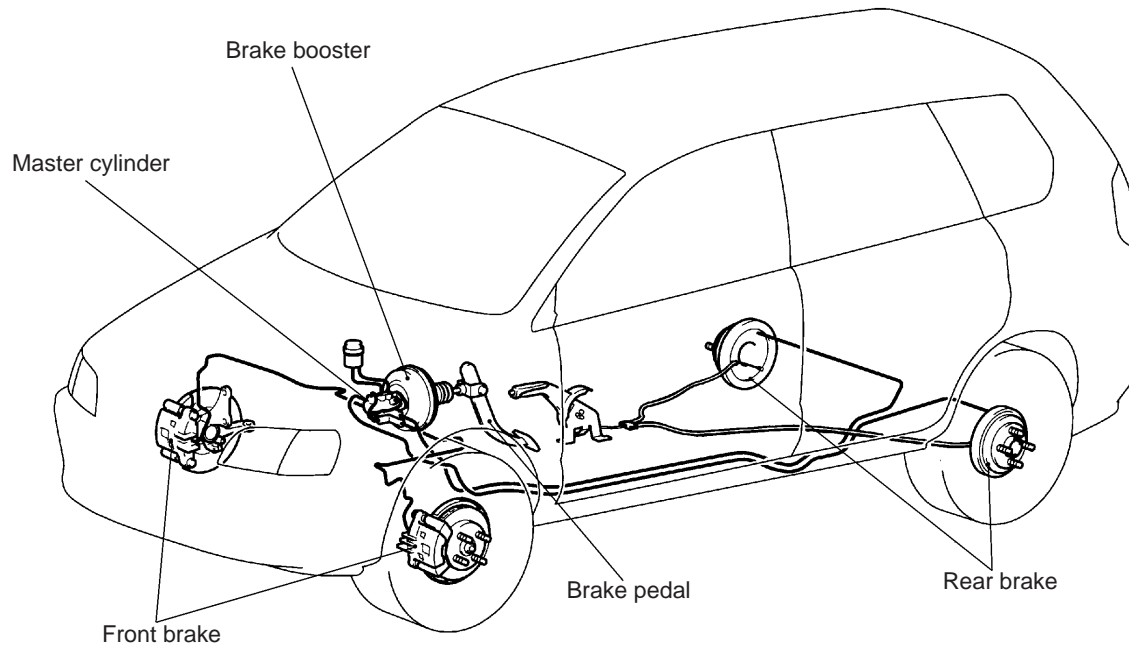
FRONT BRAKES

Type	Floating caliper 1-piston, ventilated disc
Disc effective dia. × thickness mm	211.0 × 24
Wheel cylinder I.D. mm	53.97
Pad thickness mm	10.0
Clearance adjustment	Automatic

REAR DRUM BRAKE

Type	Leading trailing
Drum I.D. mm	203
Wheel cylinder I.D. mm	19.05
Lining thickness mm	4.38
Clearance adjustment	Automatic

CONSTRUCTION DIAGRAM



AV0188AJ

SERVICE SPECIFICATIONS

35100030287

Items		Standard value	Limit
Brake pedal height mm	L.H. drive vehicles	163.5 – 166.5	–
	R.H. drive vehicles	162.5 – 165.5	–
Brake pedal free play mm		3 – 8	–
Brake pedal to floor board clearance mm		80 or more	–
Proportioning valve	Split point MPa	24.5	–
	Output fluid pressure (Input fluid pressure) MPa	4.30 ± 0.4 (9.81)	–
	Output fluid pressure difference between left and right MPa	–	0.4
Brake booster push rod to master cylinder piston clearance mm		0.6 – 0.8	–
Front disc brake	Pad thickness mm	10.0	2.0
	Disc thickness mm	24.0	22.4
	Disc runout mm	–	0.06
	Drag force (tangential force of wheel mounting bolts) N	40 or less	–
Front hub end play mm		–	0.05

Items		Standard value	Limit
Rear drum brake	Lining thickness mm	4.38	1.0
	Drum inside diameter mm	203	205

LUBRICANTS

35100040044

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	

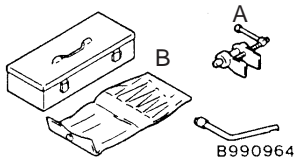
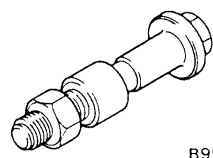
SEALANTS

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Items	Specified sealant	Remarks
Thread part fitting	3M ATD Part No. 8661 or equivalent	Semi-drying sealant

SPECIAL TOOLS

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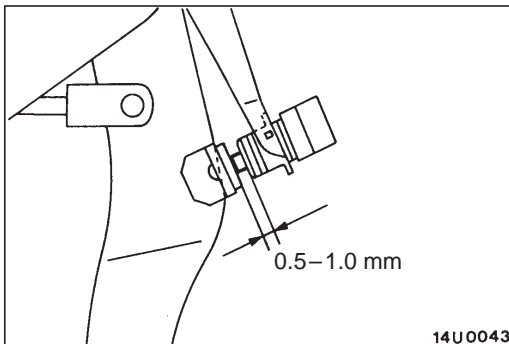
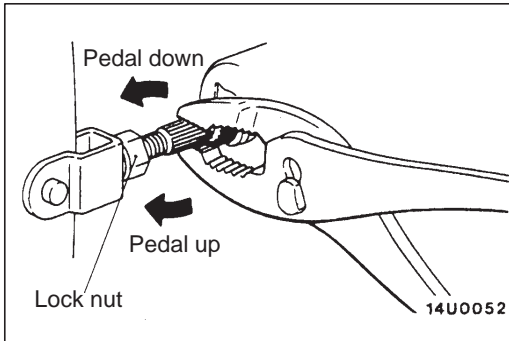
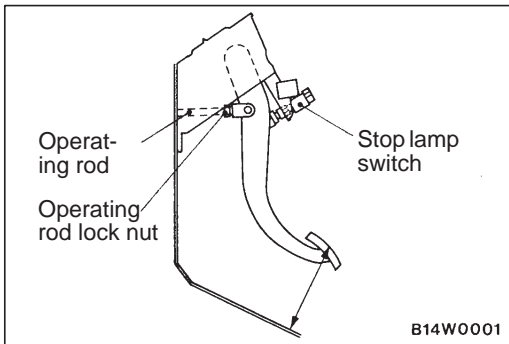
Tool	Number	Name	Use
	MB990964 A: MB990520 B: MB990773	Brake tool set	Pushing-in of the disc brake piston Installation of drum brake wheel cylinder piston cup
	MB990998	Front hub remover and installer	Provisional holding of the wheel bearing

ON-VEHICLE SERVICE**BRAKE PEDAL CHECK AND ADJUSTMENT**

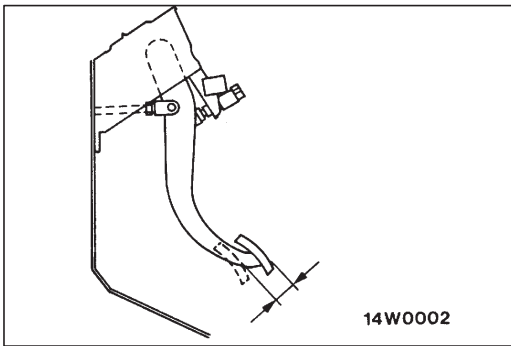
1. Measure the brake pedal height as illustrated. If the brake pedal height is not within the standard value, adjust or replace.

Standard value:

<L.H. drive vehicles> 163.5 – 166.5 mm
 <R.H. drive vehicles> 162.5 – 165.5 mm



- (1) Disconnect the stop lamp switch connector.
- (2) Adjust the brake pedal height by turning the operating rod with pliers (with the operating rod lock nut loosened), until the correct brake pedal height is obtained.
- (3) Secure by tightening the lock nut of the operating rod.
- (4) Push the stop lamp switch in the direction of the pedal stroke until it stops. (The switch will slide if it is pushed firmly.)
- (5) Lift up the pedal until the operating rod is fully extended, and then slide the stop lamp switch back to the required position. Adjust the position of the switch by turning it until the distance shown in the illustration is correct.
- (6) Connect the connector of the stop lamp switch.
- (7) Check that the stop lamp is not illuminated with the brake pedal unpressed.

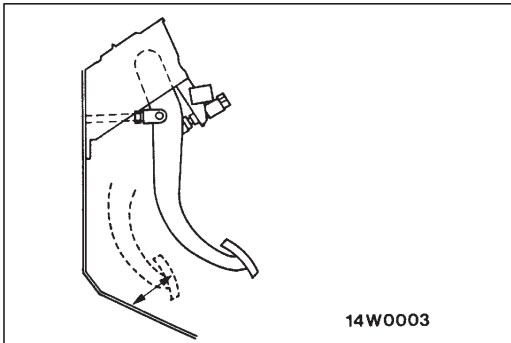


- With the engine stopped, depress the brake pedal two or three times. After eliminating the vacuum in the power brake booster, press the pedal down by hand, and confirm that the amount of movement before resistance is met (the free play) is within the standard value range.

Standard value: 3 – 8 mm

If the free play exceeds the standard value, it is probably due to excessive play between the retaining ring bolt and brake pedal arm.

Check for excessive clearance and replace faulty parts as required.

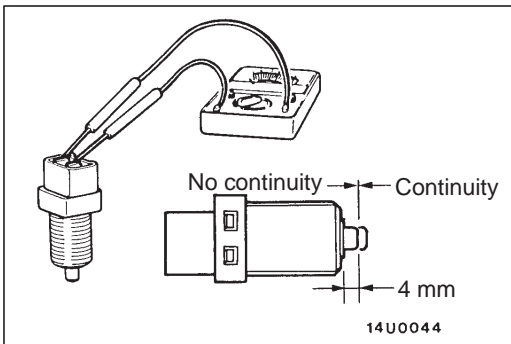


- Start the engine, depress the brake pedal with approximately 490 N of force, and measure the clearance between the brake pedal and the floorboard.

Standard value: 80 mm or more

If the clearance is outside the standard value, check for air trapped in the brake line, clearance between the lining and the drum and dragging in the parking brake.

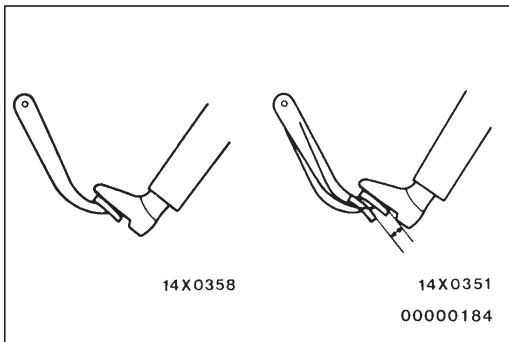
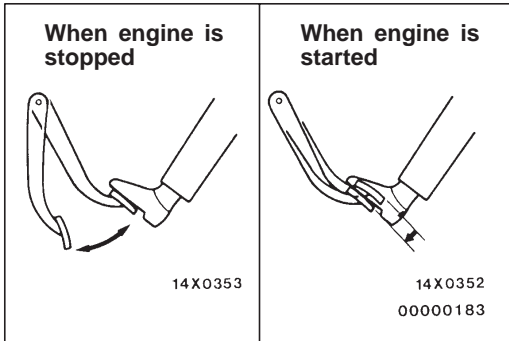
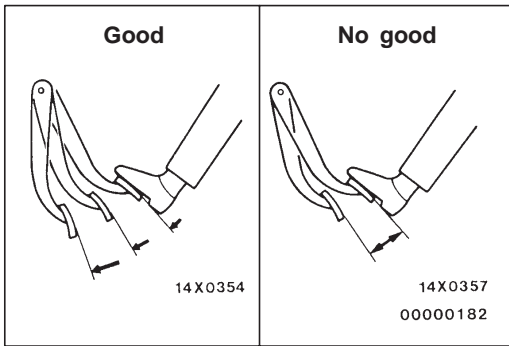
Adjust and replace defective parts as required.



STOP LAMP SWITCH CHECK

35100890045

Connect a circuit tester to the stop lamp switch, and check whether or not there is continuity when the plunger of the stop lamp switch is pushed in and when it is released. The stop lamp switch is in good condition if there is no continuity when the plunger is pushed in to a depth of within 4 mm from the outer case edge surface, and if there is continuity when it is released.

**BRAKE BOOSTER OPERATING TEST**

35100100155

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

1. Run the engine for one or two minutes, and then stop it.

If the pedal depresses fully the first time but gradually becomes higher when depressed succeeding times, the booster is operating properly, if the pedal height remains unchanged, the booster is defective.

2. With the engine stopped, step on the brake pedal several times.

Then step on the brake pedal and start the engine. If the pedal moves downward slightly, the booster is in good condition. If there is no change, the booster is defective.

3. With the engine running, step on the brake pedal and then stop the engine.

Hold the pedal depressed for 30 seconds. If the pedal height does not change, the booster is in good condition, if the pedal rises, the booster is defective.

If the above three tests are okay, the booster performance can be determined as good.

If one of the above three tests is not okay, the check valve, vacuum hose, or booster will be defective.

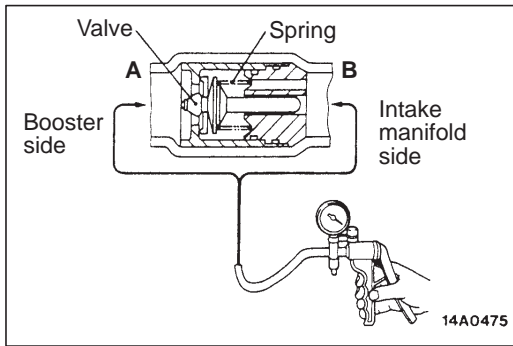
CHECK VALVE OPERATION CHECK

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1. Remove the vacuum hose. (Refer to P.35A-17.)

Caution

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

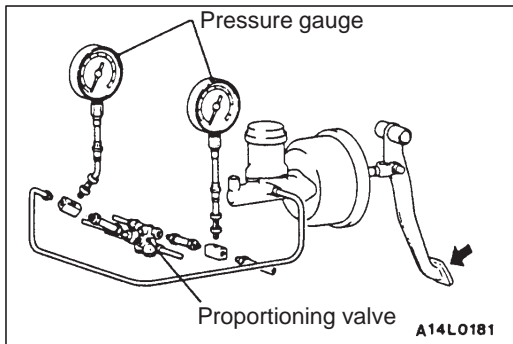


2. Check the operation of the check valve by using a vacuum pump.

Vacuum pump connection	Accept/reject criteria
Connection at the brake booster side (A)	A negative pressure (vacuum) is created and held.
Connection at the intake manifold side (B)	A negative pressure (vacuum) is not created.

Caution

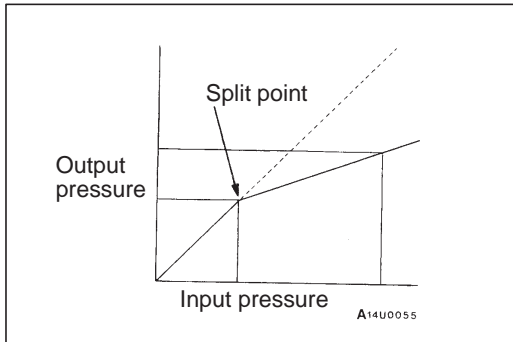
If the check valve is defective, replace it as an assembly unit together with the vacuum hose.



PROPORTIONING VALVE FUNCTION TEST

35100110219

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: 2.45 MPa

- (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:

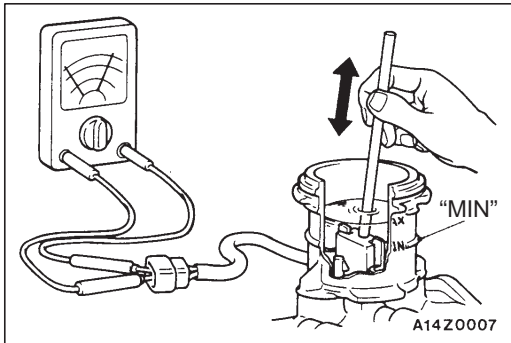
MPa

Items	Specifications
Output fluid pressure (Input fluid pressure)	4.30 ± 0.4 (9.81)

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

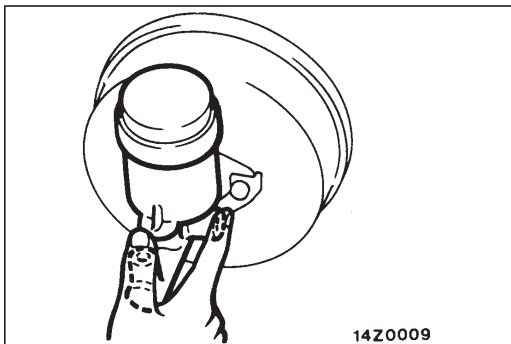
Limit: 0.4 MPa

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



BRAKE FLUID LEVEL SENSOR CHECK 35100910048

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



BLEEDING

35100140195

Caution

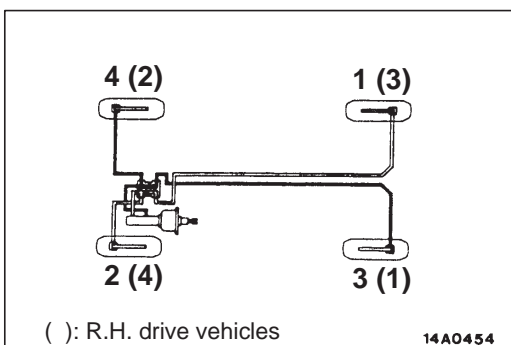
Use the specified brake fluid. Avoid using a mixture of the specified brake fluid and other fluid.

Specified brake fluid: DOT3 or DOT4

MASTER CYLINDER BLEEDING

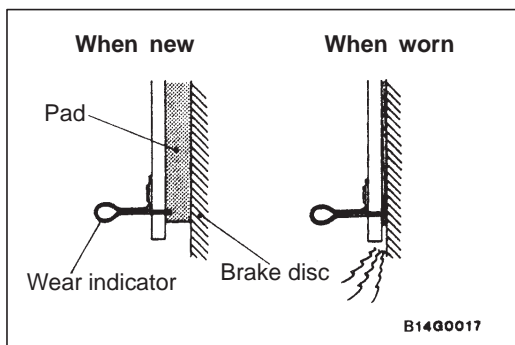
The master cylinder used has no check valve, so if bleeding is carried out by the following procedure, bleeding of air from the brake pipeline will become easier. (When brake fluid is not contained in the master cylinder.)

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



BRAKE PIPE LINE BLEEDING

Bleed the air in the sequence shown in the figure.

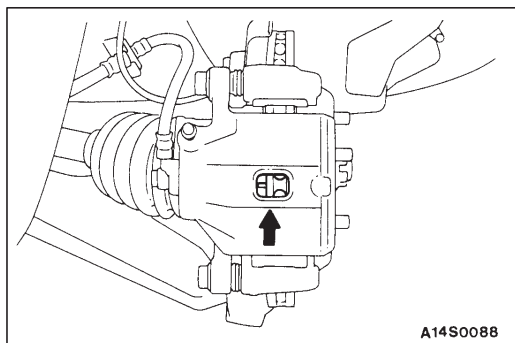


FRONT DISC BRAKE PAD CHECK AND REPLACEMENT

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NOTE

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



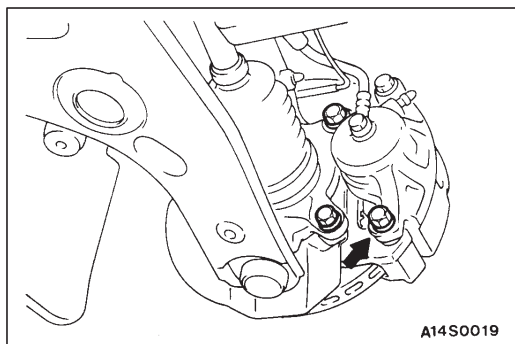
1. Check brake pad thickness through caliper body check port.

Standard value: 10 mm

Limit: 2.0 mm

Caution

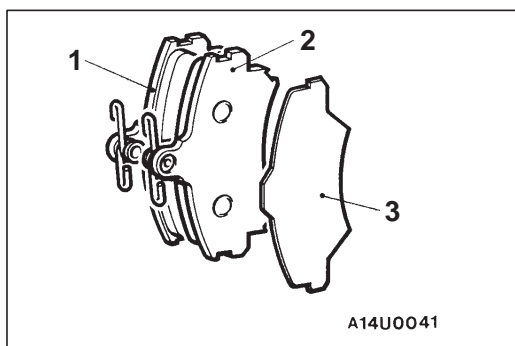
- (1) When the limit is exceeded, replace the pads at both sides, and also the brake pads for the wheels on the opposite side at the same time.
- (2) If there is a significant difference in the thickness of the pads on the left and right sides, check the sliding condition of the piston, lock pin and guide pin.



2. Remove lock pin. Lift caliper assembly and retain with wires.

Caution

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



3. Remove the following parts from caliper support.
 1. Pad & wear indicator assembly
 2. Pad assembly
 3. Outer shim

4. In order to measure the brake drag torque after pad installation, measure the rotary-sliding resistance of the hub (A) with the pads removed. (Refer to P.35A-20.)
5. Install the pads and the caliper assembly, and then check the brake drag torque. (Refer to P.35A-20.)

FRONT DISC BRAKE ROTOR CHECK

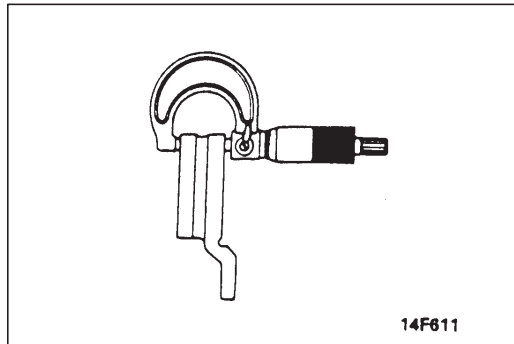
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CAUTION

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

Before re-finishing or re-processing the brake disc surface, the following conditions should be checked.

Inspection items	Remarks
Scratches, rust, saturated lining materials and wear	<ul style="list-style-type: none"> • If the vehicle is not driven for a certain period, the sections of the discs that are not in contact with lining will become rusty, causing noise and shuddering. • If grooves resulting from excessive disc wear and scratches are not removed prior to installing a new pad assembly, there will momentarily be inappropriate contact between the disc and the lining (pad).
Run-out or drift	Excessive run-out or drift of the discs will increase the pedal depression resistance due to piston knock-back.
Change in thickness (parallelism)	If the thickness of the disc changes, this will cause pedal pulsation, shuddering and surging.
Inset or warping (flatness)	Overheating and improper handling while servicing will cause inset or warping.



BRAKE DISC THICKNESS CHECK

35100160191

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

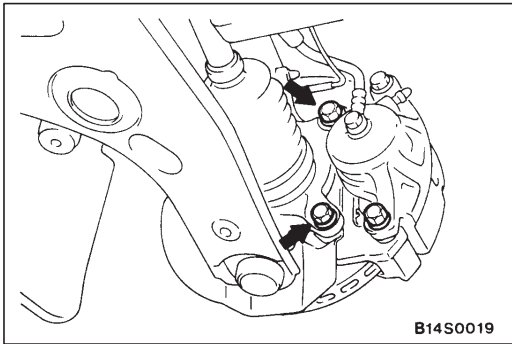
Standard value: 24.0 mm

Limit: 22.4 mm

Thickness variation (at least 8 positions)

The difference between any thickness measurements should not be more than 0.015 mm.

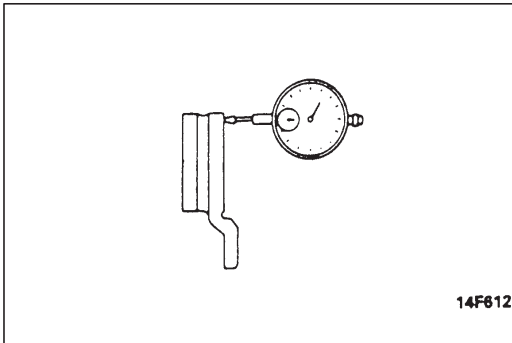
2. If the disc is beyond the limits for thickness, remove it and install a new one. If thickness variation exceeds the specification, replace the brake disc or turn rotor with on the car type brake lathe ("MAD, DL-8700PF" or equivalent).



BRAKE DISC RUN-OUT CHECK

35100170156

1. Remove the caliper support; then raise the caliper assembly upward and secure by using wire.
2. Inspect the disc surface for grooves, cracks and rust. Clean the disc thoroughly and remove all rust.

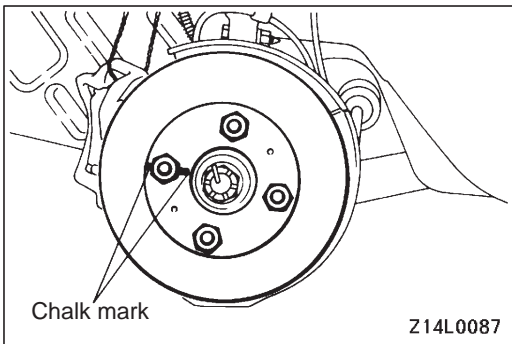


3. Place a dial gauge approximately 5 mm from the outer circumference of the brake disc, and measure the run-out of the disc.

Limit: 0.06 mm or less

NOTE

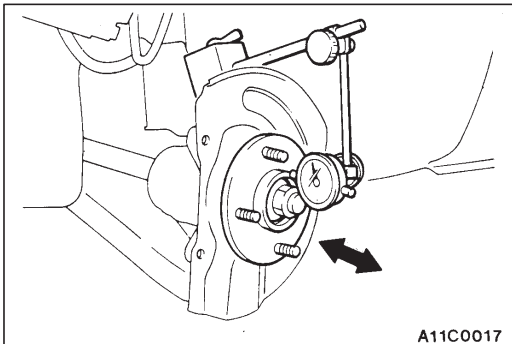
Tighten the nuts in order to secure the disc to the hub.



BRAKE DISC RUN-OUT CORRECTION

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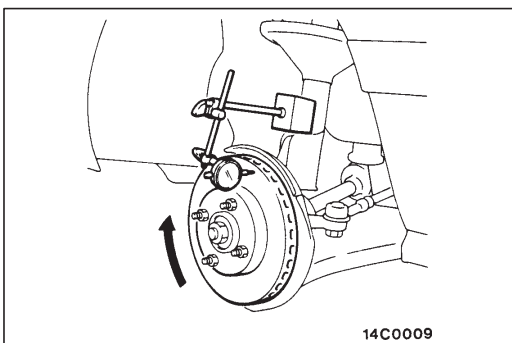
1. If the run-out of the brake disc is equivalent to or exceeds the limit specification, change the phase of the disc and hub, and then measure the run-out again.
 - (1) Before removing the brake disc, chalk both sides of the wheel stud on the side at which run-out is greatest.



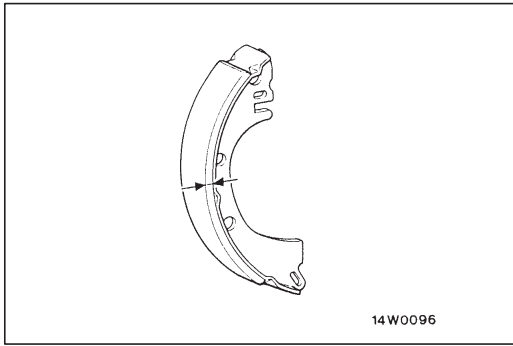
- (2) Remove the brake disc, and then place a dial gauge as shown in the illustration; then move the hub in the axial direction and measure the play.

Limit: 0.05 mm

If the play is equivalent to or exceeds the limit, disassemble the hub knuckle and check each part.



- (3) If the play does not exceed the limit specification, install the brake disc at a position 180° away from the chalk mark, and then check the run-out of the brake disc once again.
2. If the run-out cannot be corrected by changing the phase of the brake disc, replace the disc or turn rotor with on the car type brake lathe ("MAD, DL-8700PF or equivalent).



BRAKE LINING THICKNESS CHECK

35100300241

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

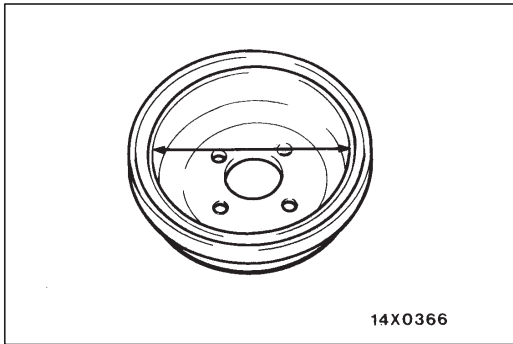
Standard value: 4.38 mm

Limit: 1.0 mm

Replace the shoe and lining assembly if brake lining thickness is less than the limit if it is not worn evenly. For information concerning the procedures for installation of the shoe and lining assembly, refer to P.35A-22.

Caution

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



BRAKE DRUM INSIDE DIAMETER CHECK

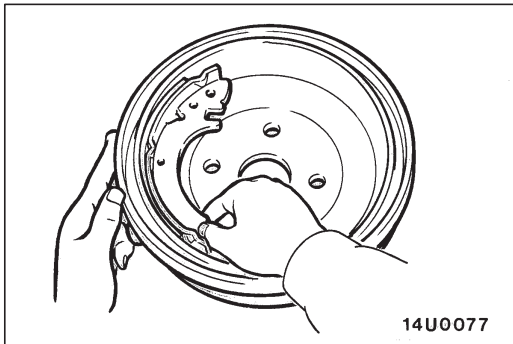
35100320049

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

Standard value: 203 mm

Limit: 205 mm

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



BRAKE LINING AND BRAKE DRUM CONNECTION CHECK

35100310053

1. Remove the brake drum.
2. Remove the shoe and lining assembly. (Refer to P.35A-22.)
3. Chalk inner surface of brake drum and rub with shoe and lining assembly.
4. Replace shoe and lining assembly or brake drums if there are any irregular contact area.

NOTE

Clean off chalk after check.

BRAKE PEDAL

REMOVAL AND INSTALLATION

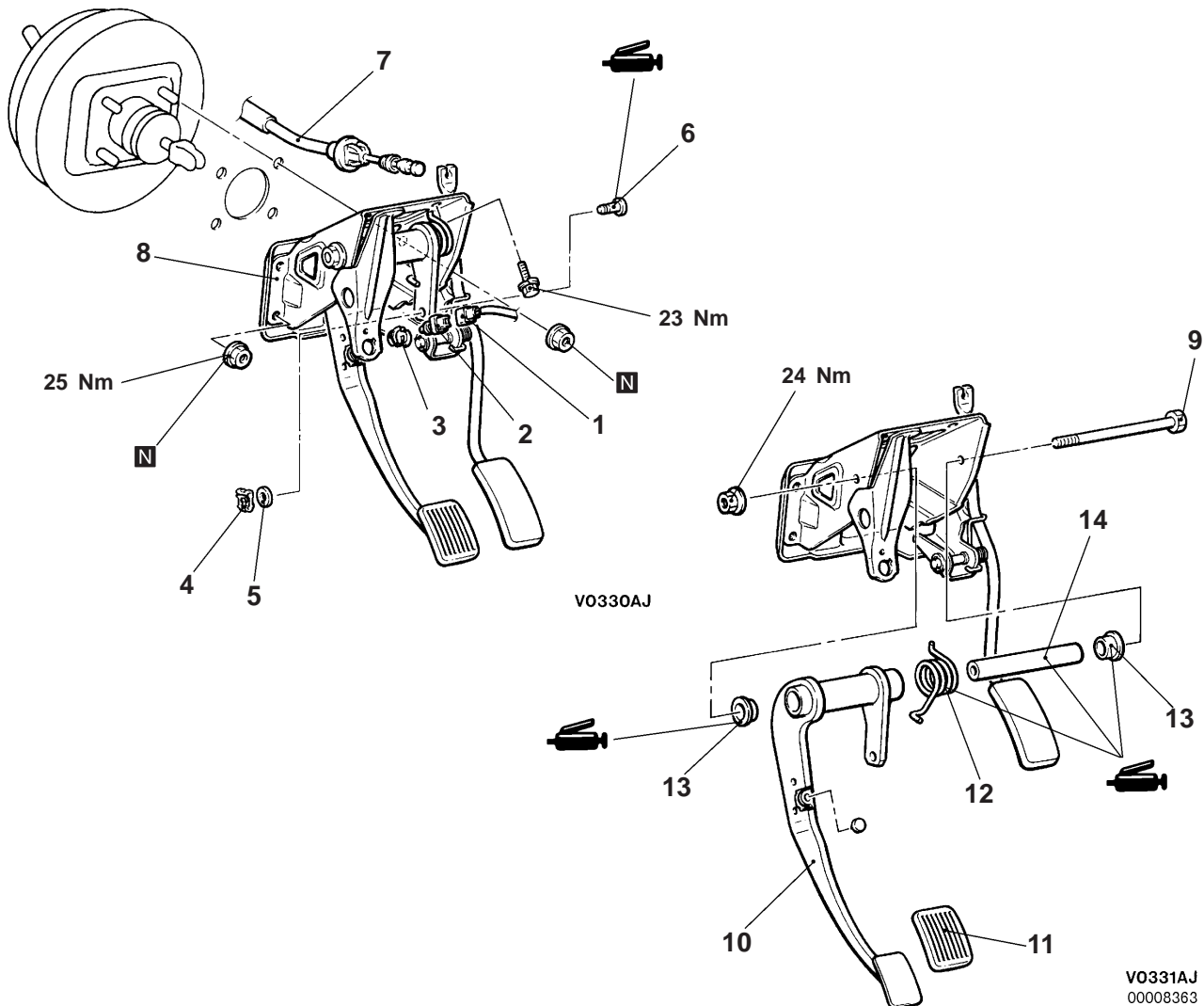
Pre-removal Operation

- Instrument Under Cover Removal (Refer to GROUP 52A – Instrument Panel.)
- Steering Column Assembly Removal (Refer to GROUP 37A – Steering Wheel and Shaft.)
- Brake booster Removal (Refer to P.35A-17,18.)

Post-installation Operation

- Brake booster Installation (Refer to P.35A-17,18.)
- Steering Column Assembly Installation (Refer to GROUP 37A – Steering Wheel and Shaft.)
- Instrument Under Cover Installation (Refer to GROUP 52A – Instrument Panel.)
- Brake Pedal Adjustment (Refer to P.35A-6.)

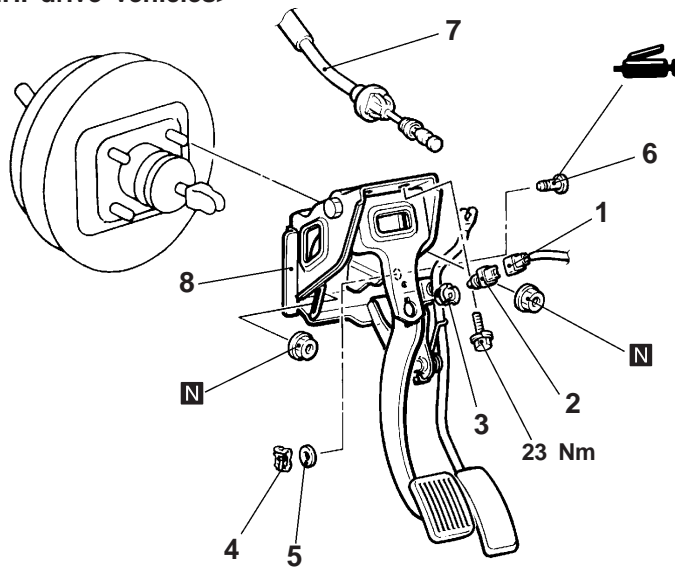
<L.H. drive vehicles>



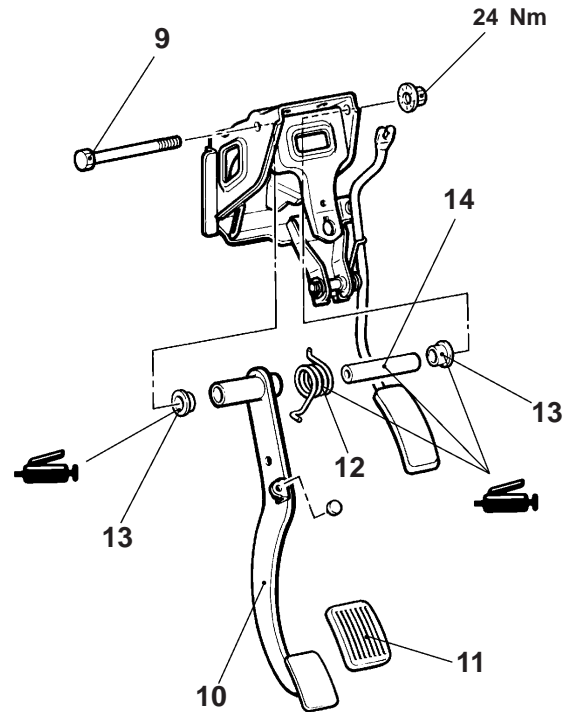
Removal steps

- | | |
|---------------------------------|-------------------------------|
| 1. Stop lamp switch connector | 8. Brake pedal assembly |
| 2. Stop lamp switch | 9. Brake pedal shaft bolt |
| 3. Ring | 10. Brake pedal |
| 4. Retaining clip | 11. Brake pedal pad |
| 5. Washer | 12. Brake pedal return spring |
| 6. Retaining ring bolt | 13. Bushing |
| 7. Accelerator cable connection | 14. Pipe |

<R.H. drive vehicles>



V0332AJ

V0333AJ
00008364**Removal steps**

1. Stop lamp switch connector
2. Stop lamp switch
3. Ring
4. Retaining clip
5. Washer
6. Retaining ring bolt
7. Accelerator cable connection

8. Brake pedal assembly
9. Brake pedal shaft bolt
10. Brake pedal
11. Brake pedal pad
12. Brake pedal return spring
13. Bushing
14. Pipe

MASTER CYLINDER AND BRAKE BOOSTER

REMOVAL AND INSTALLATION

<L.H. drive vehicles>

Caution

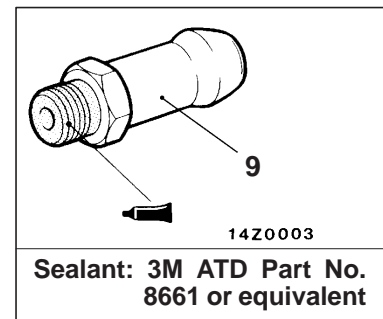
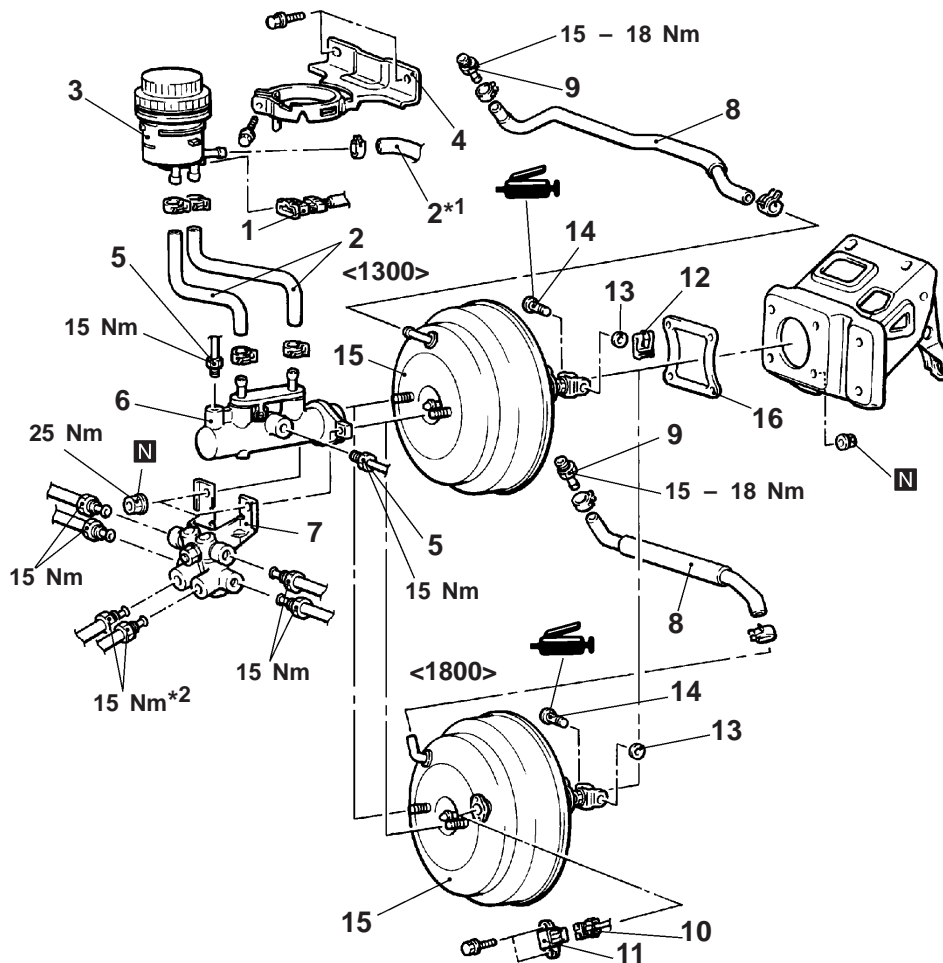
For the reservoir hose marked with *1, disconnect the reservoir assembly-side connection only and do not lower the disconnected hose below the master cylinder to prevent the air from entering into brake fluid line.

Pre-removal Operation

- Brake Fluid Draining
- Air Cleaner Assembly Removal
- Relay Box Removal
- Canister Removal

Post-installation Operation

- Canister Installation
- Relay Box Installation
- Air Cleaner Assembly Installation
- Brake Fluid Supplying
- Brake Line Bleeding (Refer to P.35A-10.)
- Brake Pedal Adjustment (Refer to P.35A-6.)



Removal steps

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Brake fluid level sensor connector 2. Reservoir hose 3. Reservoir assembly 4. Reservoir bracket 5. Brake pipe connection 6. Master cylinder assembly 7. Proportioning valve bracket 8. Vacuum hose (With built-in check valve) | <ol style="list-style-type: none"> 9. Fitting 10. Brake vacuum connector 11. Brake vacuum sensor 12. Retaining clip 13. Washer 14. Retaining ring bolt 15. Brake booster 16. Sealer |
|--|---|

NOTE

*2 indicates vehicles with ABS.

35A-18 BASIC BRAKE SYSTEMS – Master Cylinder and Brake Booster

<R.H drive vehicles>

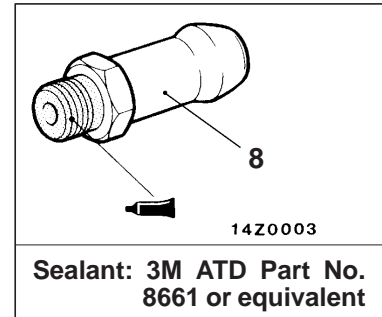
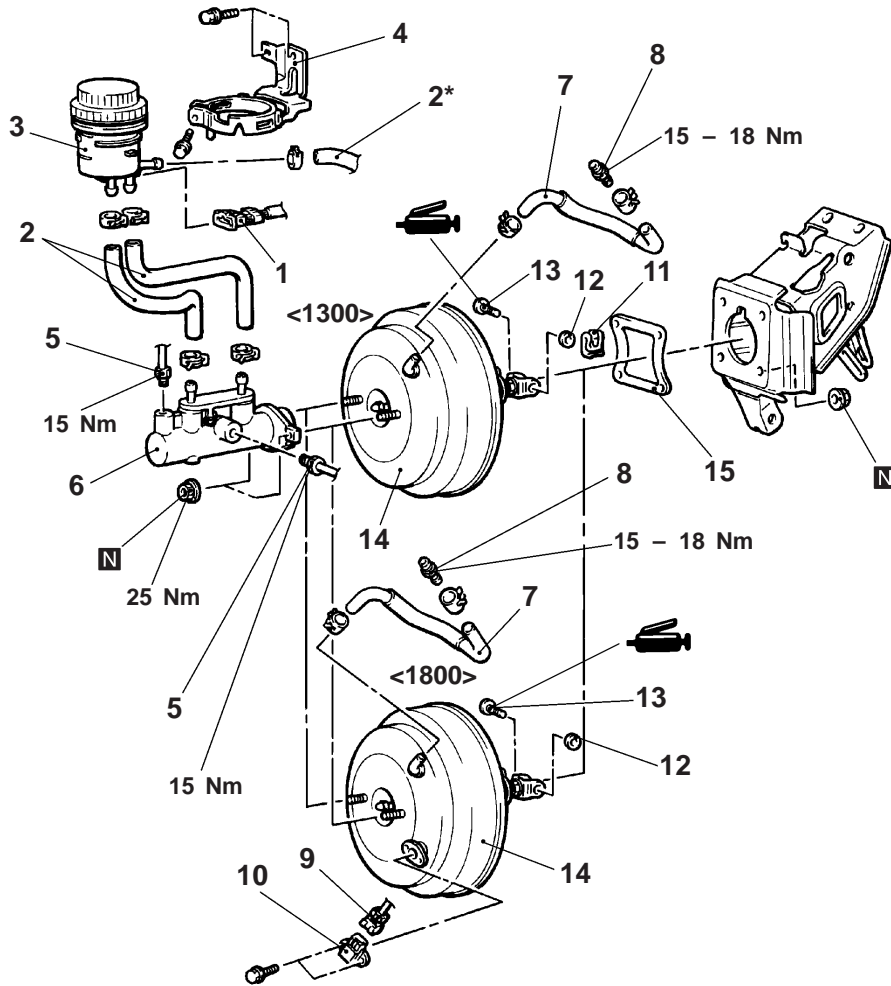
Caution

For the reservoir hose marked with *1, disconnect the reservoir assembly-side connection only and do not lower the disconnected hose below the master cylinder to prevent the air from entering into brake fluid line.

Pre-removal Operation
Brake Fluid Draining

Post-installation Operation

- Brake Fluid Supplying
- Brake Line Bleeding (Refer to P.35A-10.)
- Brake Pedal Adjustment (Refer to P.35A-6.)



- Removal steps**
1. Brake fluid level sensor connector
 2. Reservoir hose
 3. Reservoir assembly
 4. Reservoir bracket
 5. Brake pipe connection
 6. Master cylinder assembly
 7. Vacuum hose (With built-in check valve)
- B◄ ● Clearance adjustment between brake booster push rod and primary piston
- A◄

8. Fitting
9. Brake vacuum connector
10. Brake vacuum sensor
11. Retaining clip
12. Washer
13. Retaining ring bolt
14. Brake booster
15. Sealer

V0218AJ
00008366

INSTALLATION SERVICE POINTS

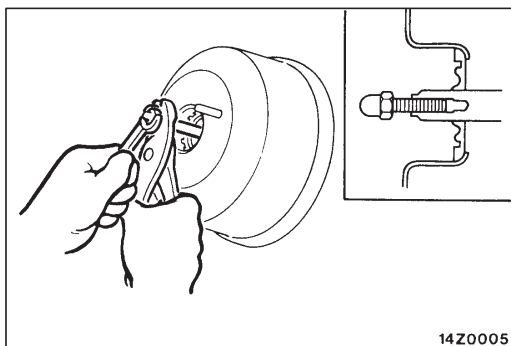
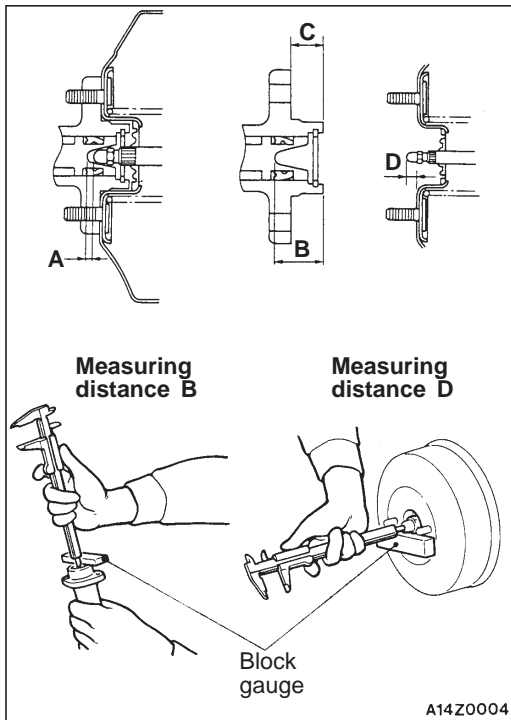
►A◄ VACUUM HOSE CONNECTION

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

►B◄ CLEARANCE ADJUSTMENT BETWEEN BRAKE BOOSTER PUSH ROD AND PRIMARY PISTON

Calculate clearance A from the B, C and D measurements.
 $A = B - C - D$

Standard value: 0.6 – 0.8 mm



If the clearance is not within the standard value range, adjust by changing the push rod length by turning the screw of the push rod.

FRONT DISC BRAKE

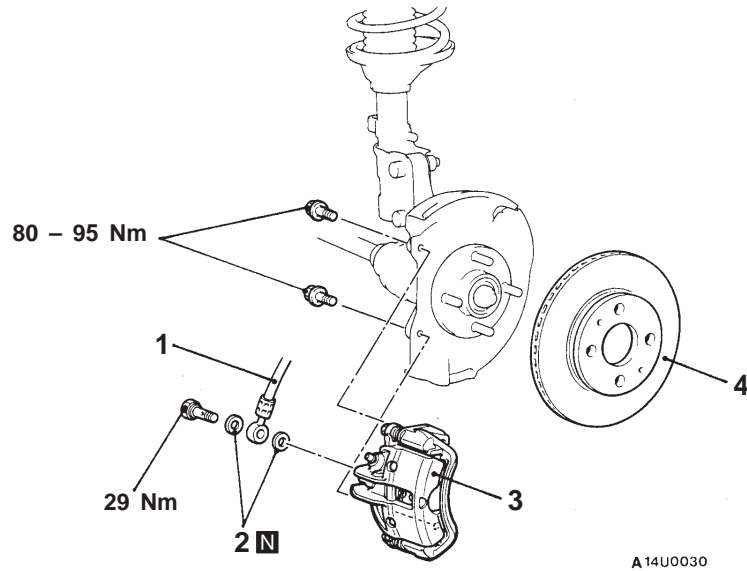
35100600204

REMOVAL AND INSTALLATION

Pre-removal Operation
 Brake Fluid Draining

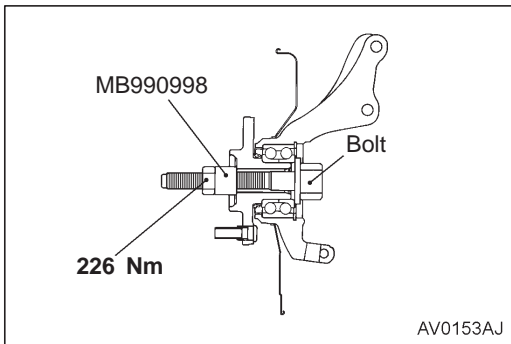
Post-installation Operation

- Brake Fluid Supplying
- Brake Line Bleeding (Refer to P.35A-10.)



Removal steps

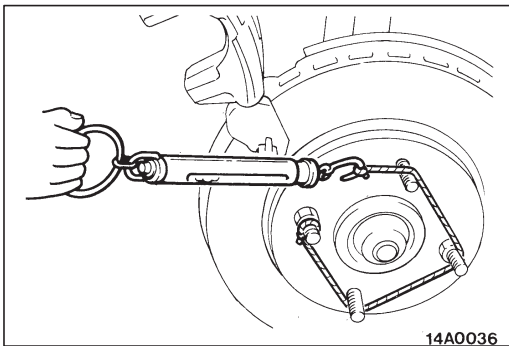
1. Brake hose connection
2. Gasket
3. Disc brake assembly
4. Brake disc



INSTALLATION SERVICE POINT

DISC BRAKE ASSEMBLY INSTALLATION

1. In order to measure the brake drag torque after pad installation, measure the rotary-sliding resistance of the hub (A) by the following procedure with the pads removed.
 - (1) Remove the drive shaft. (Refer to GROUP 26 – Front Axle.)
 - (2) Attach the special tool to the front hub assembly as shown in the illustration, and tighten it to the specified torque.
 - (3) Use a spring balance to measure the rotary-sliding resistance of the hub in the forward direction.

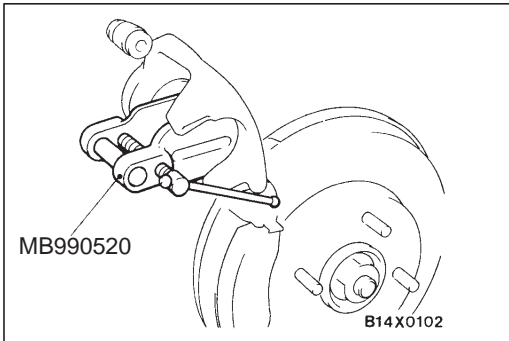


14A0036

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

Caution

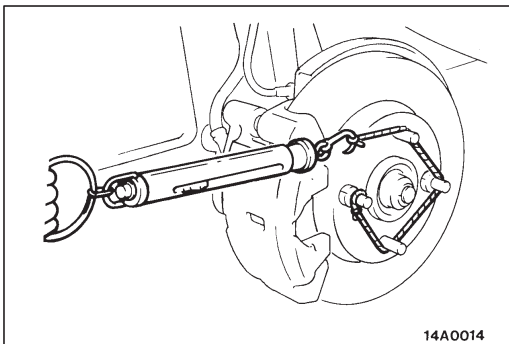
Do not let any oil, grease or other contamination get onto the friction surfaces of the pads and brake discs.



MB990520

B14X0102

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 install the lock pin.
5. Check brake drag torque as follows.
 - (1) Start the engine and then depress the brake pedal 2-3 times.
 - (2) Stop engine.
 - (3) Turn brake disc forward 10 times.



14A0014

6. Check hub torque (B) with spring balance.
7. Calculate the drag torque of the disc brake [difference between hub torque (B) and hub torque (A)].

Standard value: 40 N or less

8. If the difference between brake drag torque and hub torque exceeds the standard value, replace the disc brake assembly.

REAR DRUM BRAKE

35100750183

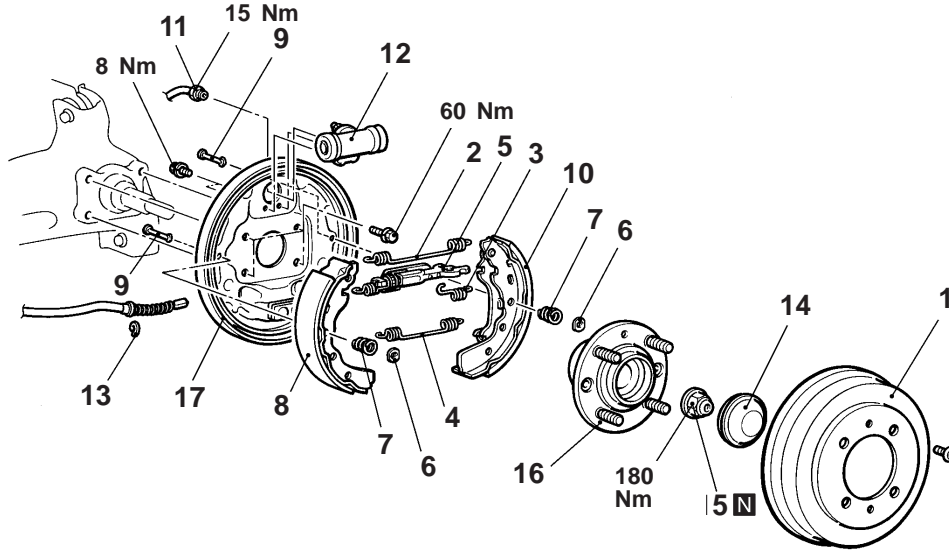
REMOVAL AND INSTALLATION

Pre-removal Operation

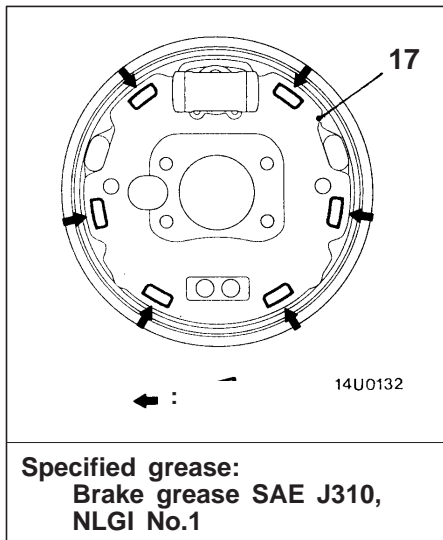
- Loosening the Parking Brake Cable Adjusting Nut. (Refer to GROUP 36 On-vehicle service)
- Brake Fluid Draining

Post-installation Operation

- Brake Line Bleeding (Refer to P.35A-10.)
- Parking Brake Lever Stroke Adjustment (Refer to GROUP 36 On-vehicle service)



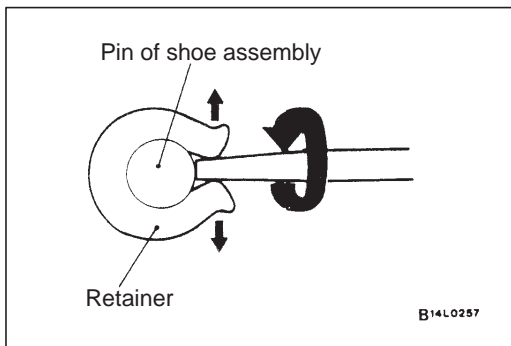
W0252AJ
00009367



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

Rear drum brake removal steps

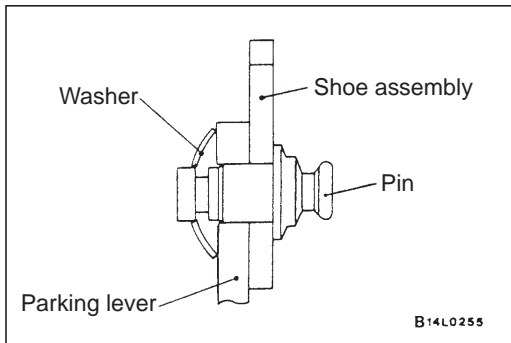
1. Brake drum
2. Return shoe spring
3. Strut retaining spring
4. Retaining shoe spring
5. Auto-adjuster assembly
6. Shoe hold-down cup
7. Shoe hold-down spring
8. Shoe and lining assembly
9. Shoe hold-down pin
10. Shoe, lining and lever assembly
11. Brake pipe connection
12. Wheel cylinder assembly
13. Snap ring
14. Hub cap
15. Flange nut
16. Rear hub assembly (Refer to GROUP 27 – Rear Axle Hub.)
17. Backing plate



REMOVAL SERVICE POINT

◀A▶ RETAINER REMOVAL

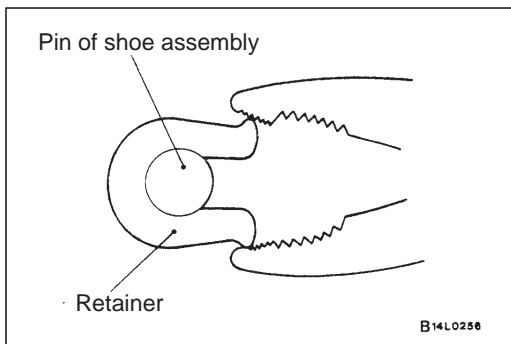
Use a flat-tipped screwdriver or the like to open up the retainer joint, and remove retainer.



INSTALLATION SERVICE POINTS

▶A◀ WAVE WASHER INSTALLATION

Install the washer in the direction shown in the illustration.

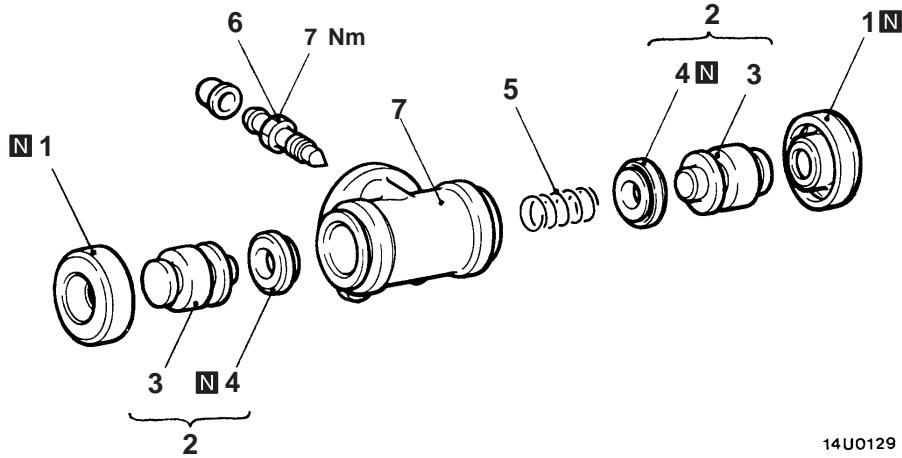


▶B◀ RETAINER INSTALLATION

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

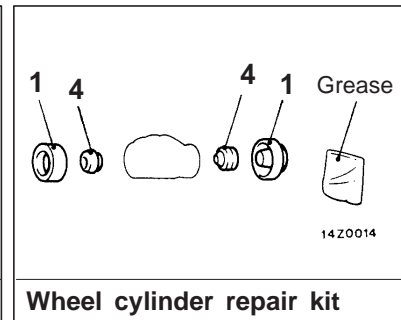
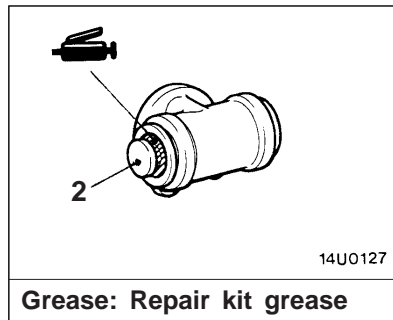
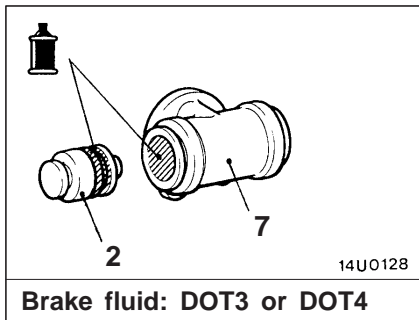
WHEEL CYLINDER

DISASSEMBLY AND REASSEMBLY



14U0129

00006932



Disassembly steps

1. Boots
2. Piston assembly
- ▶◀ 3. Pistons
- ▶◀ 4. Piston cups

5. Spring
6. Bleeder
7. Wheel cylinder body

REASSEMBLY SERVICE POINT

▶◀ PISTON CUP/PISTON REASSEMBLY

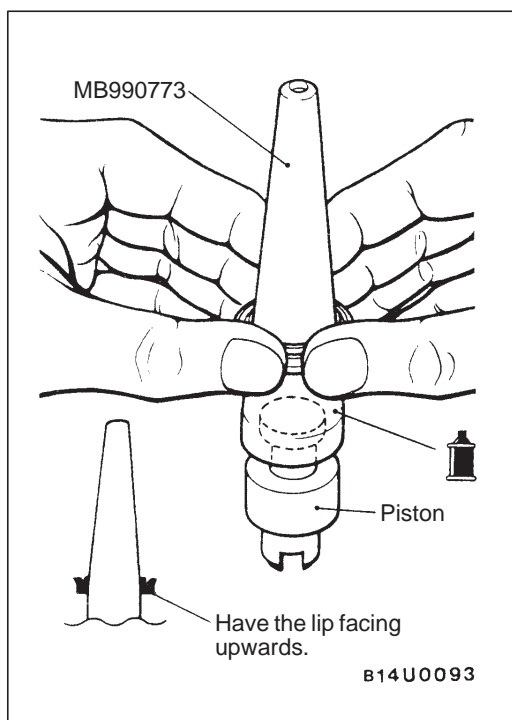
- (1) Use alcohol or specified brake fluid to clean the wheel cylinder and the piston.
- (2) Apply the specified brake fluid to the piston cups and the special tool.

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

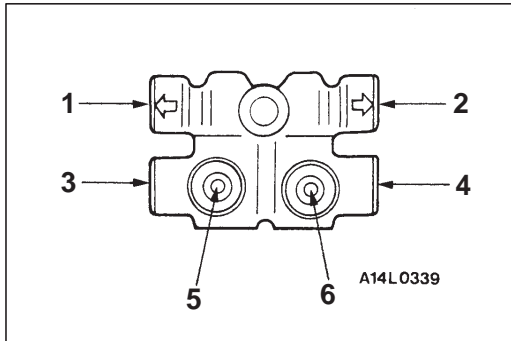
In order to keep the piston cup from becoming twisted or slanted, slide the piston cup down the tool slowly and carefully, without stopping.



INSPECTION

35100780038

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



PROPORTIONING VALVE

35100570055

INSTALLATION SERVICE POINT

BRAKE PIPE CONNECTION

Connect the pipes to the hydraulic unit as shown in the illustration.

1. Proportioning valve – Rear brake (L.H.)
2. Proportioning valve – Rear brake (R.H.)
3. Proportioning valve – Front brake (R.H.)
4. Proportioning valve – Front brake (L.H.)
5. Proportioning valve – Master cylinder (secondary)
6. Proportioning valve – Master cylinder (primary)

NOTES

BASIC BRAKE SYSTEM

CONTENTS

GENERAL	3	Disc Brake Pad (Rear) Check and Replacement	4
Outline of Changes	3	Brake Disc Thickness (Rear) Check	4
Rear Disc Brake	3	Brake Disc Run-out Check	4
SERVICE SPECIFICATIONS	3	BRAKE PEDAL	5
ON-VEHICLE SERVICE	4	MASTER CYLINDER AND BRAKE BOOSTER <1900>	6
Brake Pedal Check and Adjustment <R.H. Drive Vehicles-A/T>	4	REAR DISC BRAKE	7
Proportioning Valve Function Test <Vehicles without ABS>	4		



GENERAL

OUTLINE OF CHANGES

- Drum brakes have been changed to disc brakes to install for rear brakes.
- Due to the adoption of electronic brake-force distribution (EBD*) system to obtain the ideal braking force, a proportioning valve has been abolished. <Vehicles with ABS>
- Due to the installation of rear disc brakes, proportioning valve specifications have been changed. <Vehicles without ABS>
- Due to the adoption of the 1900 mL diesel engine, removal and installation of brake booster has been established.
- The limit of the front brake disc runout has been changed.

NOTE

*EBD: Electronic Brake-force Distribution

REAR DISC BRAKE

Items	Specifications
Type	Floating caliper 1-piston, solid disc
Disc effective dia. × thickness mm	211.6 × 10.0
Wheel cylinder I.D. mm	35.0
Pad thickness mm	9.0
Clearance adjustment	Automatic

SERVICE SPECIFICATIONS

Items		Standard value	Limit
Brake pedal height mm	R.H.drive vehicles-A/T	157.2 – 160.2	–
Proportioning valve <Vehicles without ABS>	Split point MPa	1.96	–
	Output fluid pressure (Input fluid pressure) MPa	3.92 ± 0.4 (9.81)	–
	Output fluid pressure difference between left and right MPa	–	0.4
Front disc brake	Pad thickness mm	10.0	2.0
	Disc thickness mm	24.0	22.4
	Disc runout mm	–	0.03 or less
	Drag force (tangential force of wheel mounting bolts) N	40 or less	–
Rear disc brake	Pad thickness mm	9.0	2.0
	Disc thickness mm	10.0	8.4
	Disc runout mm	–	0.08 or less
	Drag force (tangential force of wheel mounting bolts) N	20 or less	–

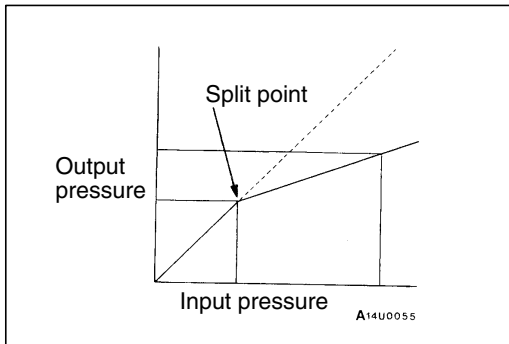
ON-VEHICLE SERVICE

Service specifications have been established in the following. Service procedures are the same procedures as before.

BRAKE PEDAL CHECK AND ADJUSTMENT <R.H. drive vehicles-A/T>

Brake pedal height has been established in the following.

Standard value: 157.2 – 160.2 mm



PROPORTIONING VALVE FUNCTION TEST <Vehicles without ABS>

Standard values have been established in the following.

1. Standard value of input fluid pressure (Split point).
2. Standard value of output fluid pressure when the input fluid pressure is 9.81 MPa.

Standard value: 1.96 MPa

Standard value: 3.92 ± 0.4 MPa

DISC BRAKE PAD (REAR) CHECK AND REPLACEMENT

The standard value and the limit of brake pad thickness have been established in the following.

Standard value: 9.0 mm

Limit: 2.0 mm

BRAKE DISC THICKNESS (REAR) CHECK

The standard value and the limit of rear brake disc thickness have been established in the following.

Standard value: 10.0 mm

Limit: 8.4 mm

BRAKE DISC RUN-OUT CHECK

The limit of brake disc runout has been established in the following.

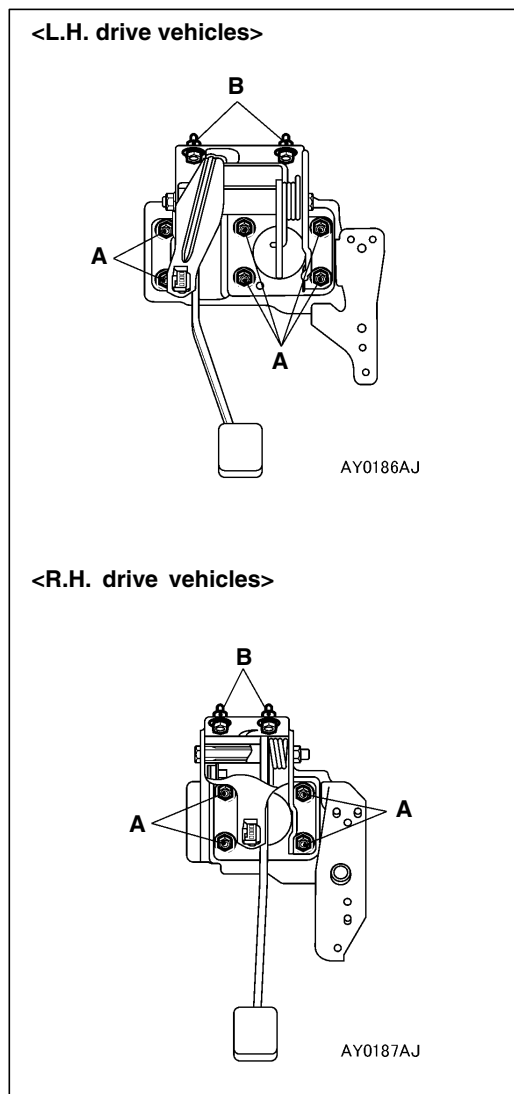
Limit:

0.03 mm or less <FRONT>

0.08 mm or less <REAR>

BRAKE PEDAL

The same procedures as before are applied except for installation service points described below.



INSTALLATION SERVICE POINT

►A◄ BRAKE PEDAL ASSEMBLY 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 their holes are oblong holes.

MASTER CYLINDER AND BRAKE BOOSTER <1900>

REMOVAL AND INSTALLATION

Caution

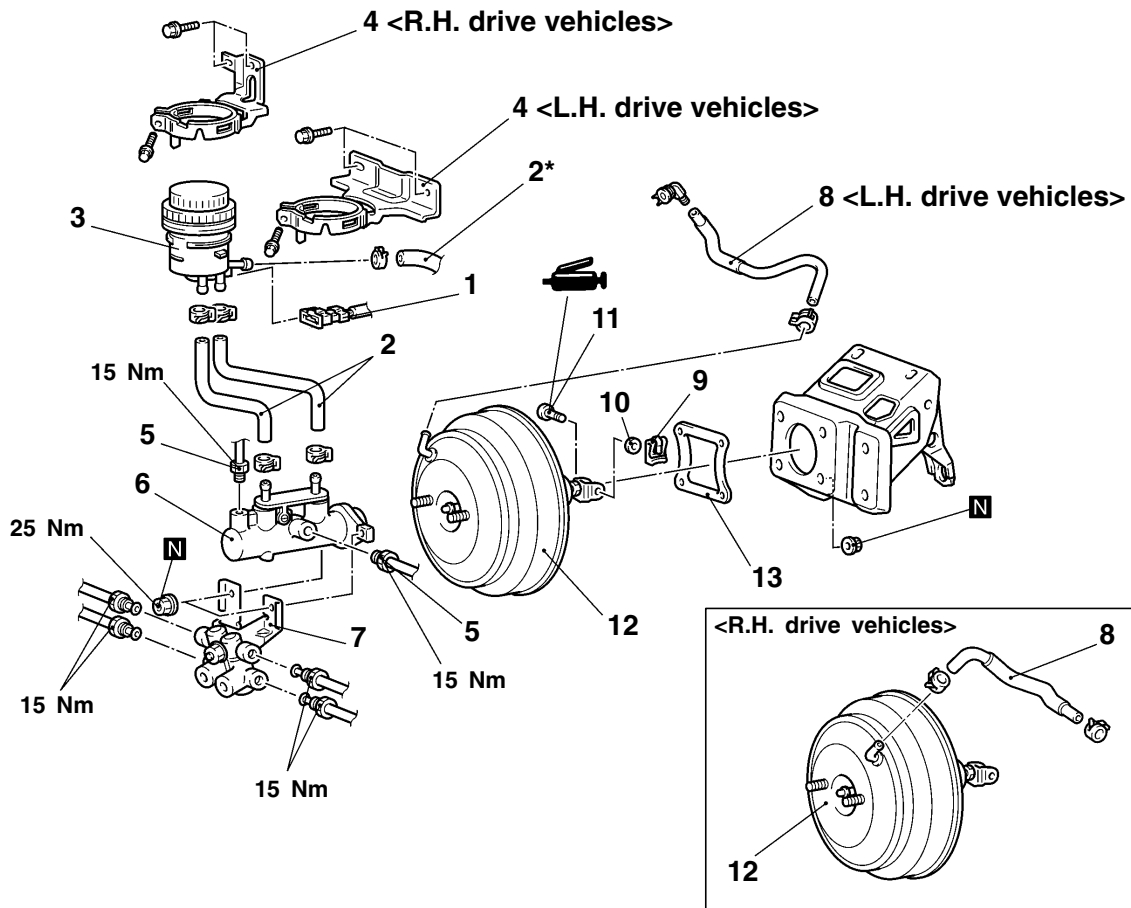
For the reservoir hose marked with *, disconnect the reservoir assembly-side connection only and do not lower the disconnected hose below the master cylinder to prevent the air from entering into brake fluid line.

Pre-removal Operation

- Brake Fluid Draining
- Air Cleaner Assembly Removal <L.H. drive vehicles>
- Relay Box Removal <L.H. drive vehicles>
- Canister Removal <L.H. drive vehicles>

Post-installation Operation

- Canister Installation <L.H. drive vehicles>
- Relay Box Installation <L.H. drive vehicles>
- Air Cleaner Assembly Installation <L.H. drive vehicles>
- Brake Fluid Supplying
- Brake Line Bleeding
- Brake Pedal Adjustment (Refer to P.35A-4.)



AY0195AJ

Removal steps

1. Brake fluid level sensor connector
2. Reservoir hose
3. Reservoir assembly
4. Reservoir bracket
5. Brake pipe connection
6. Master cylinder assembly
- ▶B◀ ● Clearance adjustment between brake booster push rod and primary piston
7. Proportioning valve bracket <L.H. drive vehicles> (Vehicles without ABS)

- ▶A◀ 8. Vacuum hose (With built-in check valve)
9. Retaining clip
10. Washer
11. Retaining ring bolt
12. Brake booster
13. Sealer

NOTE

The same procedures as before are applied for installation service points.

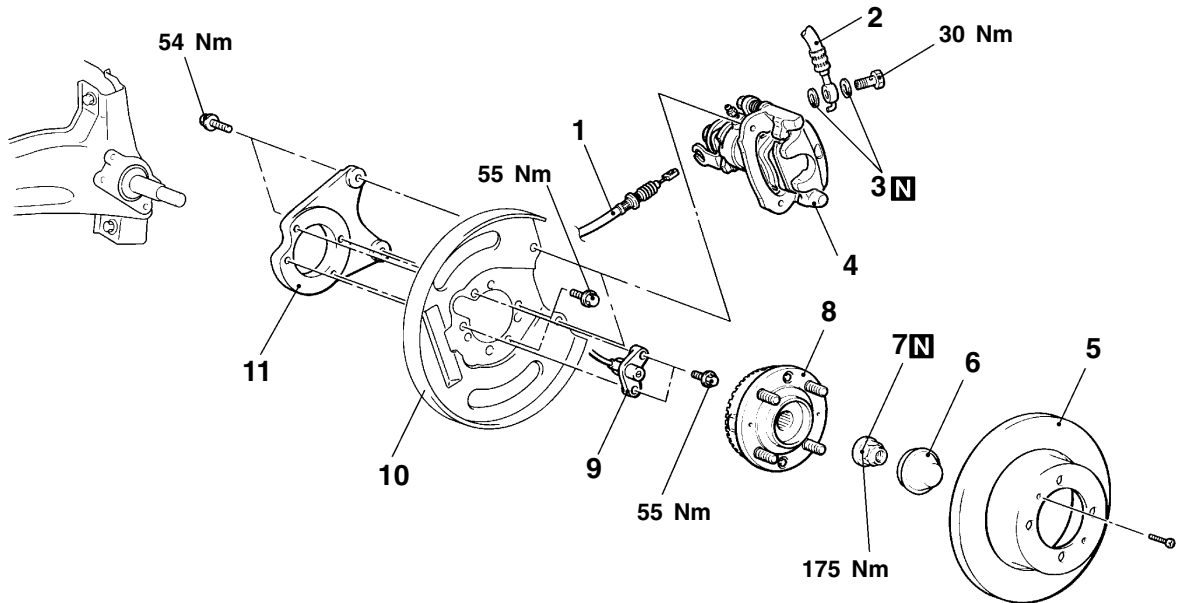
REAR DISC BRAKE

REMOVAL AND INSTALLATION

Pre-removal Operation
 Brake Fluid Draining

Post-installation Operation

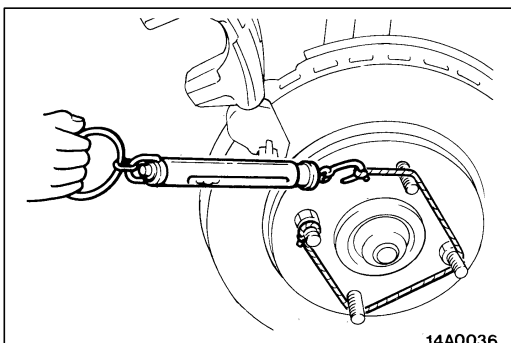
- Brake Fluid Supplying
- Brake Line Bleeding



AX0075BN

Removal steps

- | | | | |
|-----|---|-----|--|
| ▶A◀ | <ol style="list-style-type: none"> 1. Parking brake cable connection 2. Brake hose connection 3. Gasket 4. Disc brake assembly 5. Brake disc 6. Hub cap | ▶B◀ | <ol style="list-style-type: none"> 7. Self locking nut 8. Rear hub and rotor assembly 9. Rear speed sensor 10. Dust shield 11. Disc brake adapter |
|-----|---|-----|--|

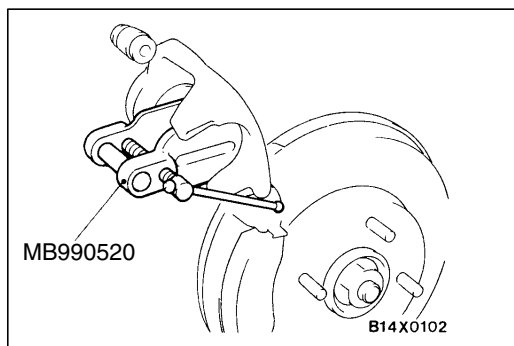


14A0036

INSTALLATION SERVICE POINTS

▶A◀ DISC BRAKE ASSEMBLY INSTALLATION

1. Use a spring balance to measure the rotation sliding resistance of the hub in the forward direction with the brake ass'y removed so that drag force of brakes after the brake pad installation can be measured.

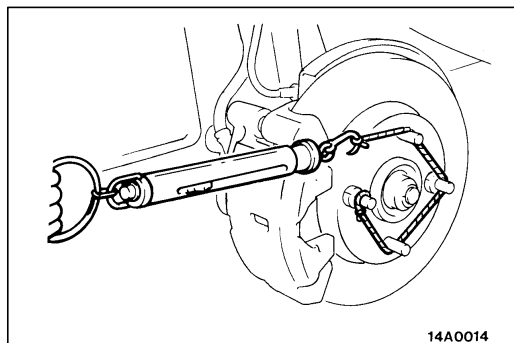


2. Install the caliper support, and then install the brake pad to the caliper support.

Caution

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

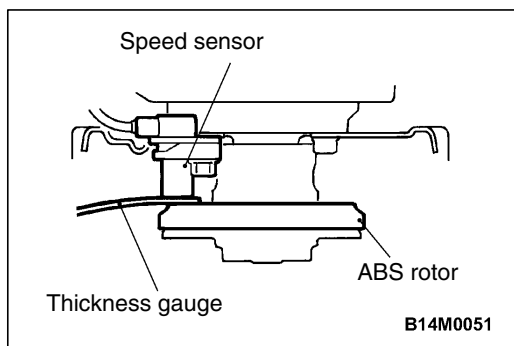
3. Clean piston and insert into cylinder with special tool.
4. Be careful that the piston boot does not become caught, when lowering the caliper assembly and install the guide pin to the caliper.



5. Start the engine and then depress the brake pedal 2-3 times.
6. Stop the 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: 20 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.



►B◄ REAR SPEED SENSOR INSTALLATION

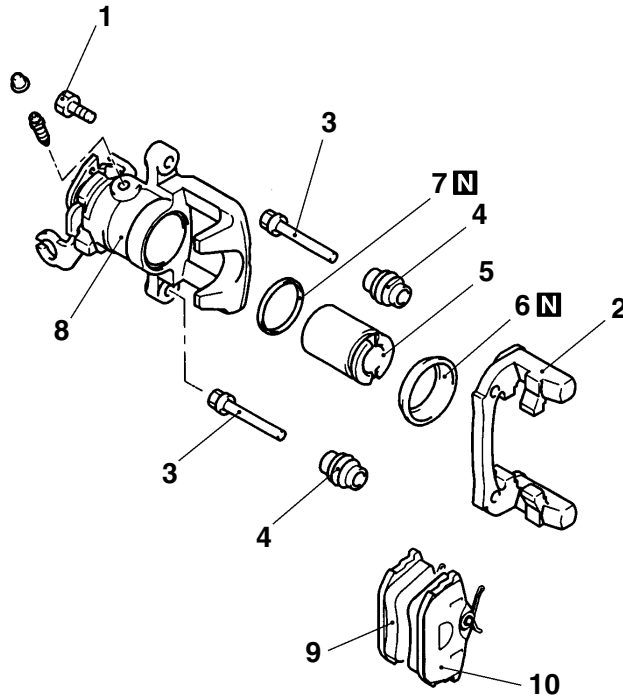
Caution

Be sure not to damage the pole piece at the tip of the speed sensor by striking against other parts.

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

Standard value: 0.1 – 1.9 mm

DISASSEMBLY AND REASSEMBLY



AY0182AJ

<p>AY0183AJ</p>	<p>AY0184AJ</p>	<p>AY0185AJ</p>
<p>Brake caliper kit</p>	<p>Pad set</p>	<p>Seal and boots kit</p>

Disassembly steps

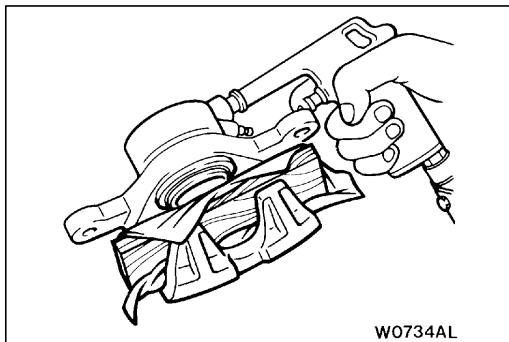
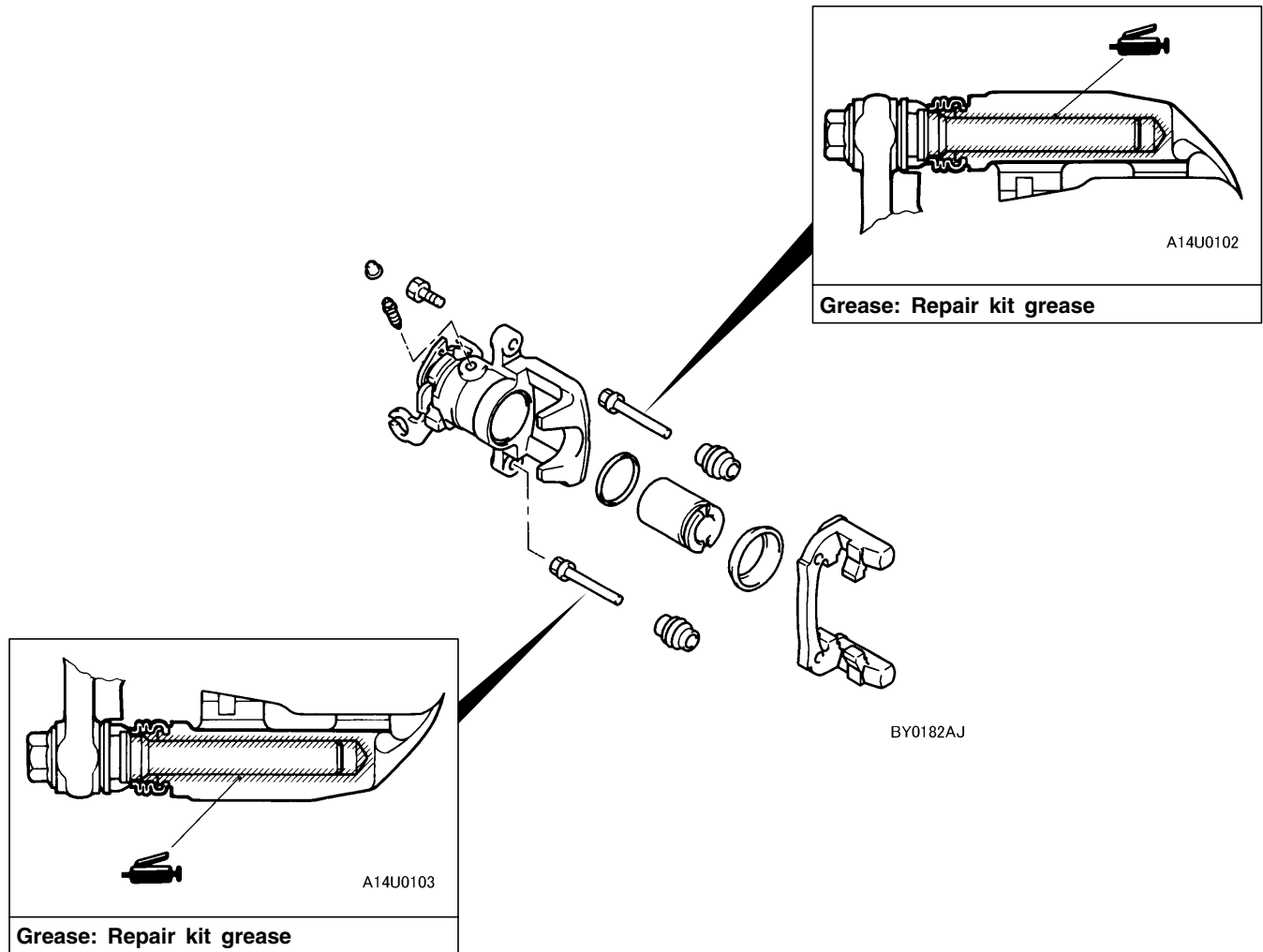
1. Bolt
2. Caliper support
3. Guide pin
4. Boot
5. Piston



6. Piston boot
7. Piston seal
8. Caliper body
9. Pad and wear indicator assembly
10. Pad assembly



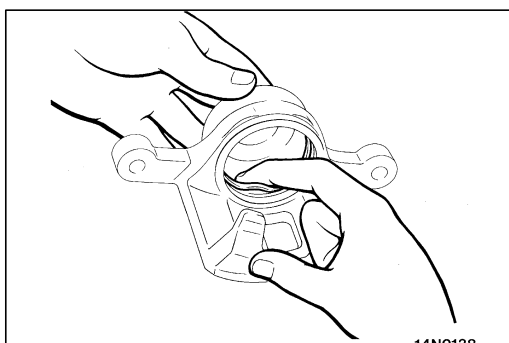
LUBRICATION POINTS

**DISASSEMBLY SERVICE POINTS****◀A▶ PISTON BOOT/PISTON REMOVAL**

Use a piece of wood to protect the caliper body outer side, and then apply compressed air through the brake hose connection hole to withdraw the piston and piston boot.

Caution

If air is blown into the caliper body suddenly, the piston will pop out, causing damage to the caliper body. Be sure to apply compressed air gradually.

**◀B▶ PISTON SEAL REMOVAL**

1. Remove 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 cylinder with trichloroethylene, alcohol or specified brake fluid.

Specified brake fluid: DOT3 or DOT4

INSPECTION

- Check cylinder for wear, damage or rust.
- Check piston surface for wear, damage or rust.
- Check caliper body or guide pin for wear.
- Check pad for damage or adhesion of grease, check backing metal for damage.

PAD WEAR CHECK

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

Standard value: 9.0 mm

Limit: 2.0 mm

Caution

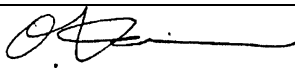
1. **Always replace the right and left brake pads as a set.**
2. **If an excessive difference is found in the thickness between the right and left brake pads, check moving parts.**

NOTES

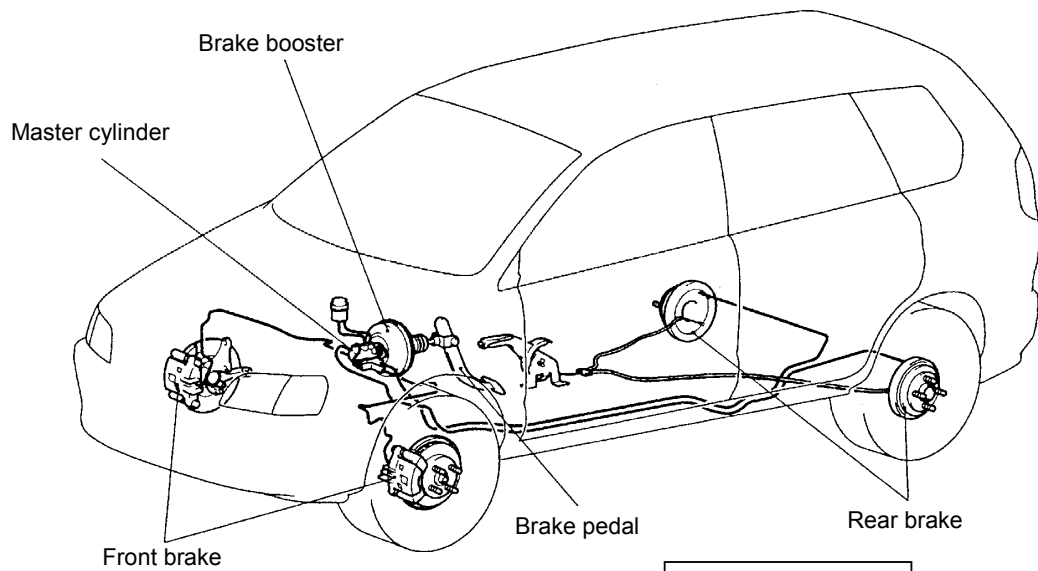


SERVICE BULLETIN

PUBLICATION GROUP, AFTER SALES SERVICE DEP.
MITSUBISHI MOTOR SALES EUROPE BV

SERVICE BULLETIN		No.: ESB-99E35-503	
		Date: 1999-12-15	<Model> <M/Y>
Subject: CORRECTION TO BRAKE PEDAL HEIGHT		(EC) SPACE STAR (DG1A, DG5A)	99-10
Group: SERVICE BRAKE			
CORRECTION		 O. Kai - E.V.P. & G.M. After Sales Service Dept.	
1. Description:			
The incorrectness of the brake pedal height has been rectified.			
2. Applicable Manuals:			
Manual	Pub. No.	Language	Page(s)
'99 SPACE STAR Workshop Manual chassis	CMXE99E1	(English)	35A-4, 6
	CMXS99E1	(Spanish)	
	CMXF99E1	(French)	
	CMXG99E1	(German)	
	CMXD99E1	(Dutch)	
	CMXW99E1	(Swedish)	
	CMXI99E1	(Italian)	
3. Details:			

CONSTRUCTION DIAGRAM



Av0188AJ

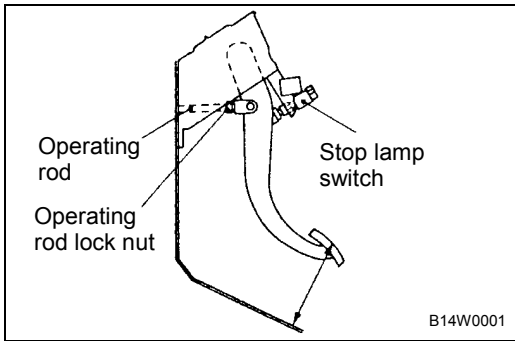
SERVICE SPECIFICATIONS

152.2 - 155.2 <Correct>

156.0 - 159.0 <Correct>

35100030267

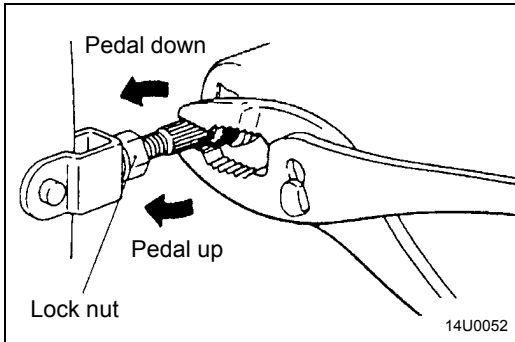
Items		Standard value	Limit
Brake pedal height mm	L.H. drive vehicles	163.5 - 166.5 <Incorrect>	
	R.H. drive vehicles	162.5 - 165.5 <Incorrect>	
Brake pedal free play mm		3 - 8	-
Brake pedal to floor board clearance mm		80 or more	-
Proportioning valve	Split point Mpa	24.5	-
	Output fluid pressure (Input fluid pressure) Mpa	4.30 ± 0.4 (9.81)	-
	Output fluid pressure difference between left and right Mpa	-	0.4
Brake booster push rod to master cylinder piston clearance mm		0.6 - 0.8	-
Front disc brake	Pad thickness mm	10.0	2.0
	Disc thickness mm	24.0	22.4
	Disc runout mm	-	0.06
	Drag force (tangential force of wheel mounting bolts) N	40 or less	-
Front hub end play mm		-	0.05



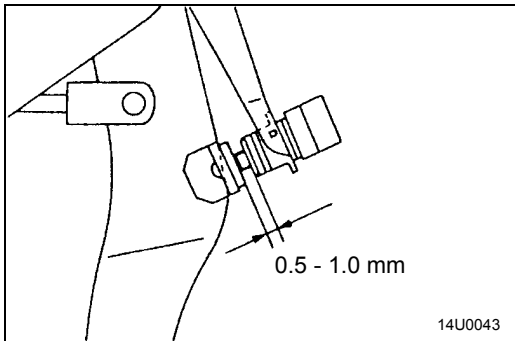
ON-VEHICLE SERVICE BRAKE PEDAL CHECK AND ADJUSTMENT

1. Measure the brake pedal height as illustrated. If the brake pedal height is not within the standard value, adjust or replace.

Standard value:	<Incorrect> ↓	156.0 - 159.0
<L.H. drive vehicles>	163.5 - 166.5 mm	<Correct>
<R.H. drive vehicles>	162.5 - 165.5 mm	<Correct>
	<Incorrect> ↑	152.2 - 155.2



- (1) Disconnect the stop lamp switch connector.
- (2) Adjust the brake pedal height by turning the operating rod with pliers (with the operating rod lock nut loosened), until the correct brake pedal height is obtained.
- (3) Secure by tightening the lock nut of the operating rod.

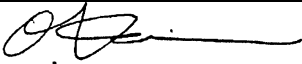


- (4) Push the stop lamp switch in the direction of the pedal stroke until it stops. (The switch will slide if it is pushed firmly.)
- (5) Lift up the pedal until the operating rod is fully extended, and then slide the stop lamp switch back to the required position. Adjust the position of the switch by turning it until the distance shown in the illustration is correct.
- (6) Connect the connector of the stop lamp switch.
- (7) Check that the stop lamp is not illuminated with the brake pedal unpressed.



SERVICE BULLETIN

PUBLICATION GROUP, AFTER SALES SERVICE DEP.
MITSUBISHI MOTOR SALES EUROPE BV

SERVICE BULLETIN		No.: ESB-01E35-001	
		Date: 2001-07-03	<Model> <M/Y>
Subject:	REPLACEMENT AND CLEANING FOR BRAKE BOOSTER VACUUM NIPPLE ON 4G93 GDI EQUIPPED VEHICLES	(EC)CARISMA (EC)SPACE STAR (EC)PAJERO PININ	98-10
Group:	SERVICE BRAKE	draftno.: 01AL005	
INFORMATION		 O. Kai - E.V.P. & G.M. After Sales Service Dept.	
1. Description:			
On 4G93-GDI engine-equipped vehicles for Europe, the vacuum nipple of the brake booster must be replaced and cleaned periodically. This Service Bulletin covers the replacement and cleaning procedures which should be added in On-Vehicle Service as shown below.			
2. Applicable Manuals:			
Manual	Pub. No.	Language	Page(s)
'98 CARISMA GDI Workshop Manual chassis	PWDE9502-C	(English)	35A-1
	PWDS9503-C	(Spanish)	35A-1
	PWDF9504-C	(French)	35A-1
	PWDG9505-C	(German)	35A-1
	PWDD9505-C	(Dutch)	35A-1
	PWDW9506-C	(Swedish)	35A-1
	PWDI96E1-C	(Italian)	35A-1
'99 SPACE STAR Workshop Manual chassis	CMXE99E1	(English)	35A-14
	CMXS99E1	(Spanish)	35A-14
	CMXF99E1	(French)	35A-14
	CMXG99E1	(German)	35A-14
	CMXD99E1	(Dutch)	35A-14
	CMXW99E1	(Swedish)	35A-14
	CMXI99E1	(Italian)	35A-14
'00 PAJERO PININ Workshop Manual chassis	CKRE00E1	(English)	35A-13
'00 MONTERO io Workshop Manual chassis	CKRS00E1	(Spanish)	35A-13
'00 PAJERO PININ Workshop Manual chassis	CKRF00E1	(French)	35A-13
	CKRG00E1	(German)	35A-13
	CKRD00E1	(Dutch)	35A-13
	CKRW00E1	(Swedish)	35A-13
	CKRI00E1	(Italian)	35A-13

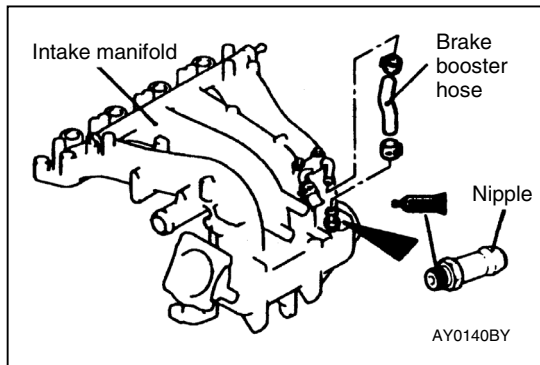
GROUP 35A BASIC BRAKE SYSTEM

GENERAL

OUTLINE OF CHANGES

The following maintenance service points have been established to correspond to the addition of a pressure sensor. Maintenance service procedures not listed below are the same as before.

<Added>



ON-VEHICLE SERVICE

BRAKE BOOSTER VACUUM NIPPLE REPLACEMENT

1. Remove the brake booster hose from the intake manifold.
2. Replace the nipple with a new one, using a sealing agent and tighten to 15 – 18 N.m

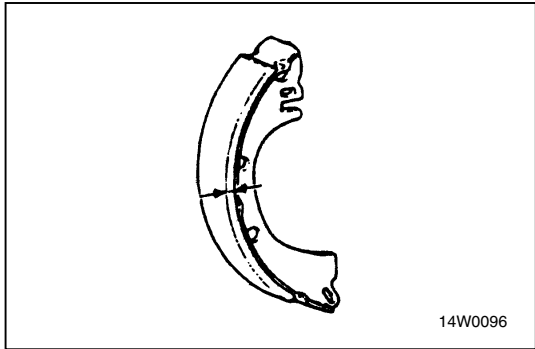
Specified sealant:

3M ATD Part No.8661 or equivalent

Caution

Take care when applying the thread sealant as too much could block the nipple.

3. After replacement, re-install the brake booster hose.



BRAKE LINING THICKNESS CHECK

35100300241

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

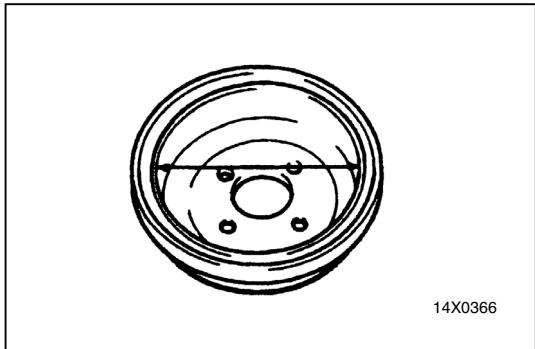
Standard value: 4.38 mm

Limit: 1.0 mm

Replace the shoe and lining assembly if brake lining thickness is less than the limit if it is not worn evenly. For information concerning the procedures for installation of the shoe and lining assembly, refer to P.35A-22.

Caution

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



BRAKE DRUM INSIDE DIAMETER CHECK

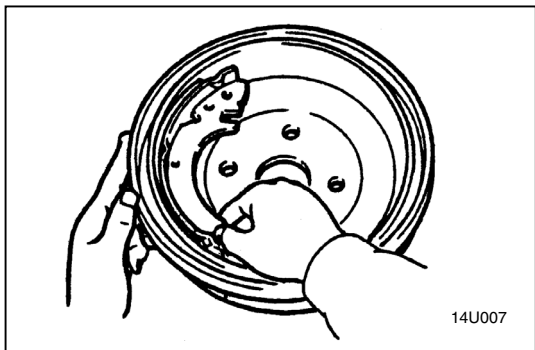
35100320049

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

Standard value: 203 mm

Limit: 205 mm

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



BRAKE LINING AND BRAKE DRUM CONNECTION CHECK

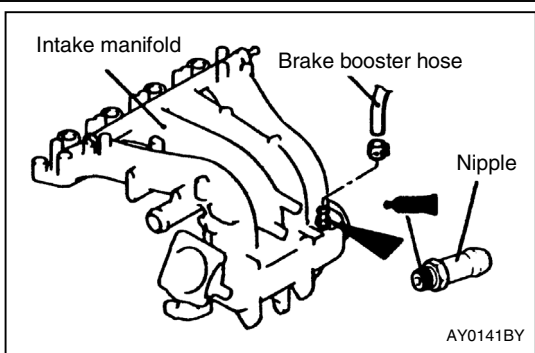
35100310053

1. Remove the brake drum.
2. Remove the shoe and lining assembly. (Refer to P.35A-22.)
3. Chalk inner surface of brake drum and rub with shoe and lining assembly.
4. Replace shoe and lining assembly or brake drums if there are any irregular contact area.

NOTE

Clean off chalk after check.

<Added>



BRAKE BOOSTER VACUUM NIPPLE REPLACEMENT

1. Remove the brake booster hose from the intake manifold.
2. Replace the nipple with a new one, using a sealing agent and tighten to 15 – 18 N.m

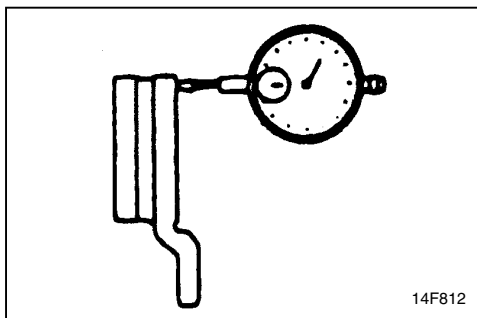
Specified sealant:

3M ATD Part No.8661 or equivalent.

Caution

Take care when applying the thread sealant as too much could block the nipple.

3. After replacement, re-install the brake booster hose.



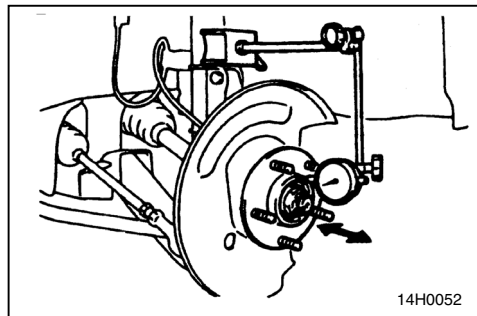
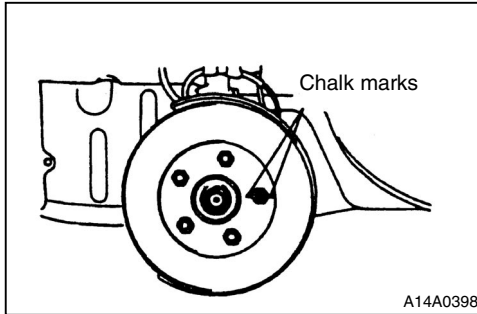
BRAKE DISC RUN-OUT CHECK AND CORRECTION

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: <Front> 0.06 mm or less,
<Rear> 0.08 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 show



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

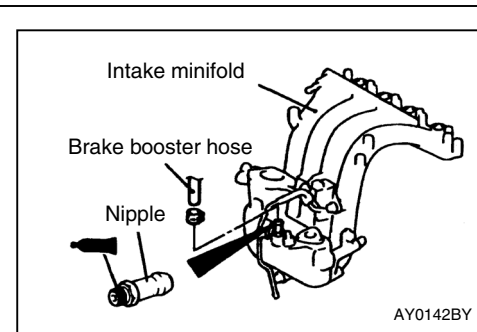
Limit: <Front> 0.2 mm, <Rear> 0.025 mm

(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).

<Added>



BRAKE BOOSTER VACUUM NIPPLE REPLACEMENT <SCREW TYPE NIPPLE>

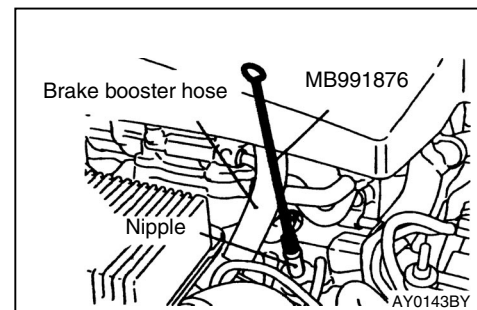
1. Remove the brake booster hose from the intake manifold.
2. Replace the nipple with a new one, using a sealing agent and tighten to 15 – 18 N.m.

Specified sealant:
3M ATD Part No.8661 or equivalent

Caution

Take care when applying the thread sealant as too much could block the nipple.

3. After replacement, re-install the brake booster hose.



BRAKE BOOSTER VACUUM NIPPLE CLEANING <PRESS FIT TYPE NIPPLE>

1. Remove the brake booster hose from the intake manifold.
2. Insert special tool into the nipple and remove the carbon deposit by rotating and reciprocating of the special tool.

Caution

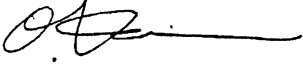
The special tool should be inserted more than 50 mm and confirm that it goes through into the intake manifold.

3. Make sure that no parts of the special tool remain in the manifold.
4. After cleaning, re-install the brake booster hose.



SERVICE BULLETIN

PUBLICATION GROUP, AFTER SALES SERVICE DEP.
MITSUBISHI MOTOR SALES EUROPE BV

SERVICE BULLETIN		No.: ESB-00E35-501	
		Date: 2001-07-02	<Model> <M/Y>
Subject: CORRECTION TO LIMIT VALUES OF FRONT BRAKE DISC THICKNESS		(EC)CARISMA	00-10
		(EC)SPACE STAR	99-10
Group: SERVICE BRAKE	Draftno: 00CH103013		
CORRECTION		 O. Kai - E.V.P. & G.M. After Sales Service Dept.	

1. Description:

Correction has been made to the limit values of thickness of the front brake disc.

2. Applicable Manuals:

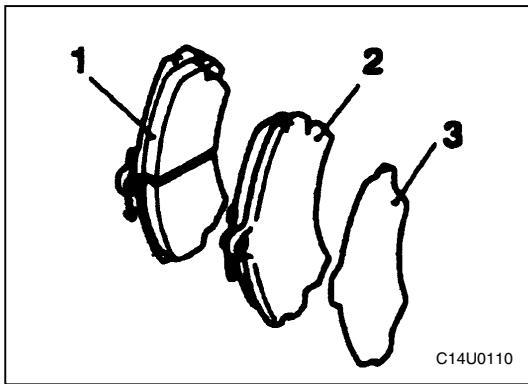
Manual	Pub. No.	Language	Page(s)
2000 CARISMA Workshop Manual chassis	PWDE9502-D	(English)	35A-4, 6
	PWDS9503-D	(Spanish)	
	PWDF9504-D	(French)	
	PWDG9505-D	(German)	
	PWDD9506-D	(Dutch)	
	PWDW9507-D	(Swedish)	
	PWDI96E1-D	(Italian)	
2001 CARISMA Workshop Manual chassis	PWDE9502-E	(English)	35A-3
	PWDS9503-E	(Spanish)	
	PWDF9504-E	(French)	
	PWDG9505-E	(German)	
	PWDD9507-E	(Dutch)	
	PWDW9508-E	(Swedish)	
'99 SPACE STAR Workshop Manual chassis	CMXE99E1	(English)	35A-4, 12
	CMXS99E1	(Spanish)	
	CMXF99E1	(French)	
	CMXG99E1	(German)	
	CMXD99E1	(Dutch)	
	CMXW99E1	(Swedish)	
	CMXI99E1	(Italian)	
2001 SPACE STAR Workshop Manual chassis	CMXE99E1-A	(English)	35A-3
	CMXS99E1-A	(Spanish)	
	CMXF99E1-A	(French)	
	CMXG99E1-A	(German)	
	CMXD99E1-A	(Dutch)	
	CMXW99E1-A	(Swedish)	
	CMXI99E1-A	(Italian)	

SERVICE SPECIFICATIONS

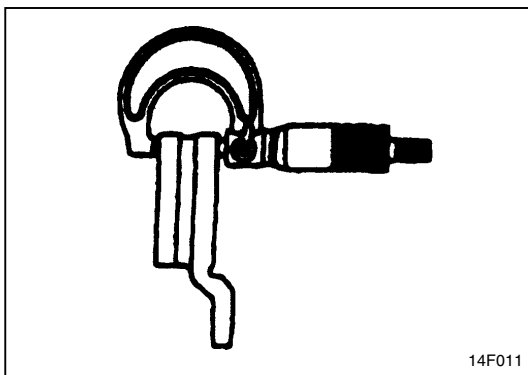
Items				Standard value	Limit
Proportioning valve	Split point fluid pressure MPa	Hatchback	Vehicles with rear drum brake	3.68-4.17	-
			Vehicles with rear disc brake	3.19-3.68	-
		Sedan	Vehicles with rear drum brake	3.19-3.68	-
			Vehicles with rear disc brake	2.70-3.19	-
	Output fluid pressure Mpa (Input fluid pressure: 13.7 Mpa)	Hatchback	Vehicles with rear drum brake	4.66-5.15	-
			Vehicles with rear disc brake	4.64-5.13	-
		Sedan	Vehicles with rear drum brake	4.17-4.66	-
			Vehicles with rear disc brake	4.15-4.64	-
Output fluid pressure difference between left and right MPa				-	0.39
Front disc brake	Pad thickness mm	14 inch disc brake		10.0	2.0
		15 inch disc brake		12.0	2.0
		Disc thickness mm		24.0	22.4
	Disc runout mm		-	0.06 or less	
	Drag force N		40 or less	-	
Rear disc brake	Pad thickness mm		9.0	2.0	
	Disc thickness mm		10.0	8.4	
	Disc runout mm		-	0.08 or less	
	Drag force N		20 or less	-	
Hub and play mm				-	0.05
Brake booster push rod to master cylinder piston clearance mm				0.4-0.6	-

LUBRICANT

Item	Specified Lubricant
Guide pin and boot	Repair kit grease



3. Remove the following parts form caliper support.
 1. Pad & wear indicator assembly
 2. Pad assembly
 3. Outer shim <Front 14 inch disc brake>
4. In order to measure the brake drag torque after pad installation, measure the rotary-sliding resistance of the hub with the pads removed. (Refer to P.35A-10.)
5. Install the pads and the caliper assembly, and then check the brake drag torque. (Refer to P.35A-10.)



BRAKE DISC THICKNESS CHECK

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:

<Front> 24.0 mm

<Rear> 10.0 mm

Limit: <Incorrect>

<Front> ~~22.4~~ mm

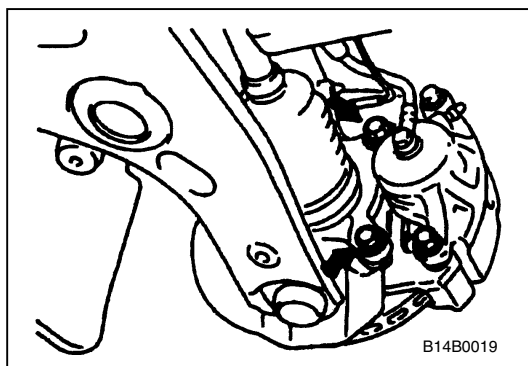
<Rear> 8.4 mm

<Correct>
21.5

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 thickness variation exceeds the specifications, replace the brake disc or turn rotor with on-the-car type brake lathe ("MAD, DL-DL8700PF" or equivalent).



BRAKE DISC RUN-OUT CHECK

1. Remove the caliper support; then raise the caliper assembly upward and secure by using wire.
2. Inspect the disc surface for grooves, cracks and rust. Clean the disc thoroughly and remove all rust.

GENERAL**OUTLINE OF CHANGES**

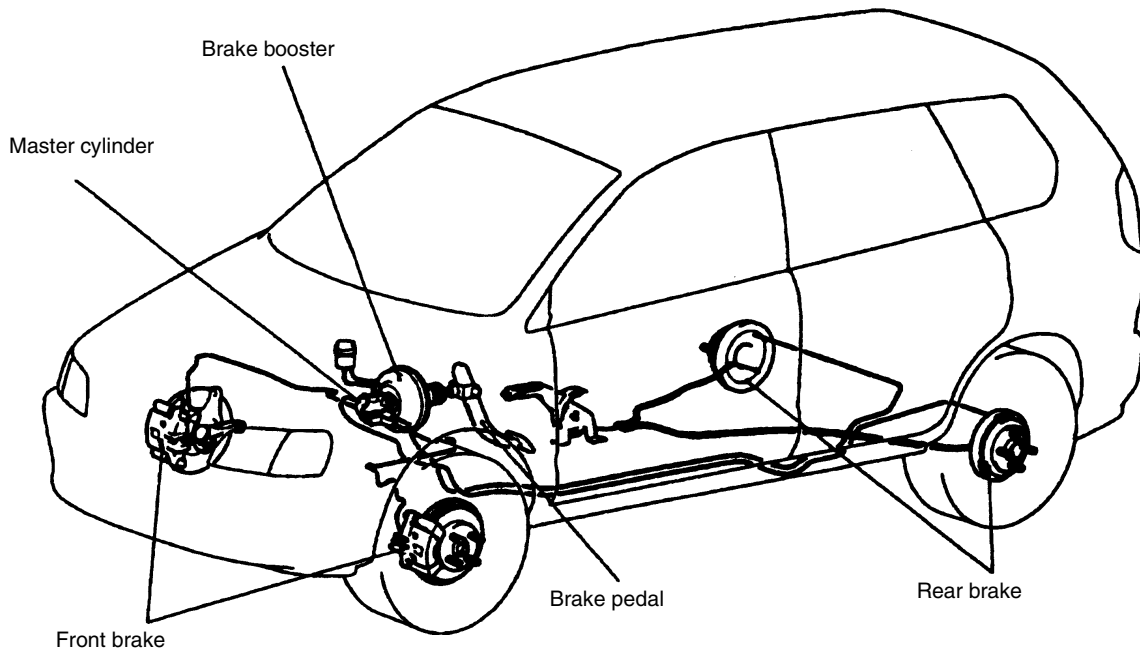
- The limit value for the front brake disc run-out has been changed.
- The proportioning valve has been discontinued since the Electronic-controlled Braking force Distribution (EBD) system, which realizes a ideal braking force, has been introduced. <Vehicles with ABS>
- On vehicles without ABS, the specifications of the proportioning valve have been changed.
- "NOTE" has been added into the brake pedal service procedure.

SERVICE SPECIFICATIONS

Items		Standard value	Limit
Proportioning valve <Vehicles without ABS>	Split point MPa	Hatchback	2.94
		Sedan	2.45
	Output fluid pressure (Input fluid pressure) Mpa	Hatchback	4.66 ± 0.4 (9.81)
		Sedan	4.30 ± 0.4 (9.81)
Output fluid pressure difference between left and right MPa		-	0.4
Front disc brake	Pad thickness mm	12.0	0.2
	Disc thickness mm	24.0	22.4
	Disc runout mm	-	0.03 or less
	Drag force (tangential force of wheel mounting bolts) N	40 or less	-

<Incorrect>
21.5 → ~~22.4~~
<Correct>

CONSTRUCTION DIAGRAM



AV0188AJ

SERVICE SPECIFICATIONS

35100030287

Items		Standard value	Limit
Brake pedal height mm	L.H. drive vehicles	163.5-166.5	-
	R.H. drive vehicles	162.5-165.5	-
Brake pedal free play mm		3-8	-
Brake pedal to floor board clearance mm		80 or more	-
Proportioning valve	Split point Mpa	24.5	-
	Output fluid pressure (Input fluid pressure) Mpa	4.30 ± 0.4(9.81)	-
	Output fluid pressure difference between left and right MPa	-	0.4
Brake booster push rod to master cylinder piston clearance mm		0.6-0.8	-
Front disc brake	Pad thickness mm	10.0	2.0
	Disc thickness mm	24.0 <Incorrect>	22.4
	Disc runout mm	-	0.06
	Drag force (tangential force of wheel mounting bolts) N	40 or less	-
Front hub end play mm		-	0.05

21.5
<Correct>

FRONT DISC BRAKE ROTOR CHECK

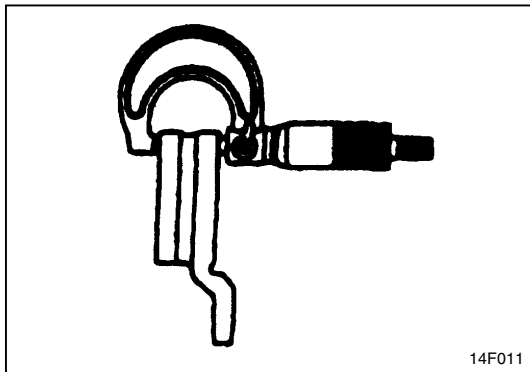
CAUTION

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

Before re-finishing or re-processing the brake disc surface, the following conditions should be checked.

SERVICE SPECIFICATIONS

Inspection items	Remarks
Scratches, rust, saturated lining materials and wear	<ul style="list-style-type: none"> If the vehicle is not driven for a certain period, the sections of the discs that are not in contact with lining will become rusty, causing noise and shuddering. If grooves resulting from excessive disc wear and scratches are not removed prior to installing a new pad assembly, there will momentarily be inappropriate contact between the disc and the lining (pad).
Run-out or drift	Excessive run-out or-drift of the discs will increase the pedal depression resistance due to piston knock-back.
Change in thickness (parallelism)	If the thickness of the disc changes, this will cause pedal pulsation, shuddering and surging.
Inset or warping (flatness)	Overheating and improper handling while servicing will cause inset or warping.



BRAKE DISC THICKNESS CHECK

35100160191

- 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: 24.0 mm

<Incorrect>

Limit: ~~22.4~~ mm

21.5

<Correct>

Thickness variation (at least 8 positions)

The difference between any thickness measurements should not be more than 0.015 mm.

- If the disc is beyond the limits for thickness, remove it and install a new one. If thickness variation exceeds the specification, replace the brake disc or turn rotor with on the car type brake lathe ("MAD< DL-8700PF" or equivalent).

GENERAL**OUTLINE OF CHANGES**

- Drum brakes have been changed to disc brakes to install for rear brakes.
- Due to the adoption of electronic brake-force distribution (EBD*) system to obtain the ideal braking force, a proportioning valve has been abolished. <Vehicles with ABS>
- Due to the installation of rear disc brakes, proportioning valve specifications have been changed.
- Due to the adoption of the 1900 mL diesel engine, removal and installation of brake booster has been established.
- The limit of the front brake disc runout has been changed.

NOTE

*EBD: Electronic Brake-force Distribution

REAR DISC BRAKE

Items	Specifications
Type	Floating caliper 1-piston, solid disc
Disc effective dia. x thickness mm	211.6 x10.0
Wheel cylinder I.D mm	35.0
Pad thickness mm	9.0
Clearance adjustment	Automatic

SERVICE SPECIFICATIONS

Items		Standard value	Limit
Brake pedal height mm	R.H. drive vehicles-A/T	157.2-160.2	-
Proportioning valve <Vehicles without ABS>	Split point Mpa	1.96	-
	Output fluid pressure (Input fluid pressure) MPa	3.92 ± 0.4(9.81)	- <Correct>
	Output fluid pressure difference between left and right MPa	-	0.4 21.5
Front disc brake	Pad thickness mm	10.0	2.0
	Disc thickness mm	24.0 <Incorrect>	22.4
	Disc runout mm	-	0.03 or less
	Drag force (tangential force of wheel mounting bolts) N	40 or less	-
Rear disc brake	Pad thickness mm	9.0	2.0
	Disc thickness mm	10.0	8.4
	Disc runout mm	-	0.08 or less
	Drag force (tangential force of wheel mounting bolts) N	20 or less	-