

1999-2000 BRAKES**Disc - Miata****DESCRIPTION & OPERATION**

All models use hydraulic-operated brake system with a tandem master cylinder, proportioning valve and a power brake unit. All models are equipped with four wheel disc brakes.

NOTE: For information on anti-lock brake systems, see the ANTI-LOCK - MIATA article.

BLEEDING BRAKE SYSTEM

NOTE: If vehicle is equipped with anti-lock brakes, see ANTI-LOCK - MIATA article for brake bleeding procedure.

BRAKE LINE BLEEDING SEQUENCE

Application	(1) Sequence
Miata	Longest Line First
(1) Bleed master cylinder and hydraulic unit before bleeding wheel cylinders and calipers.	

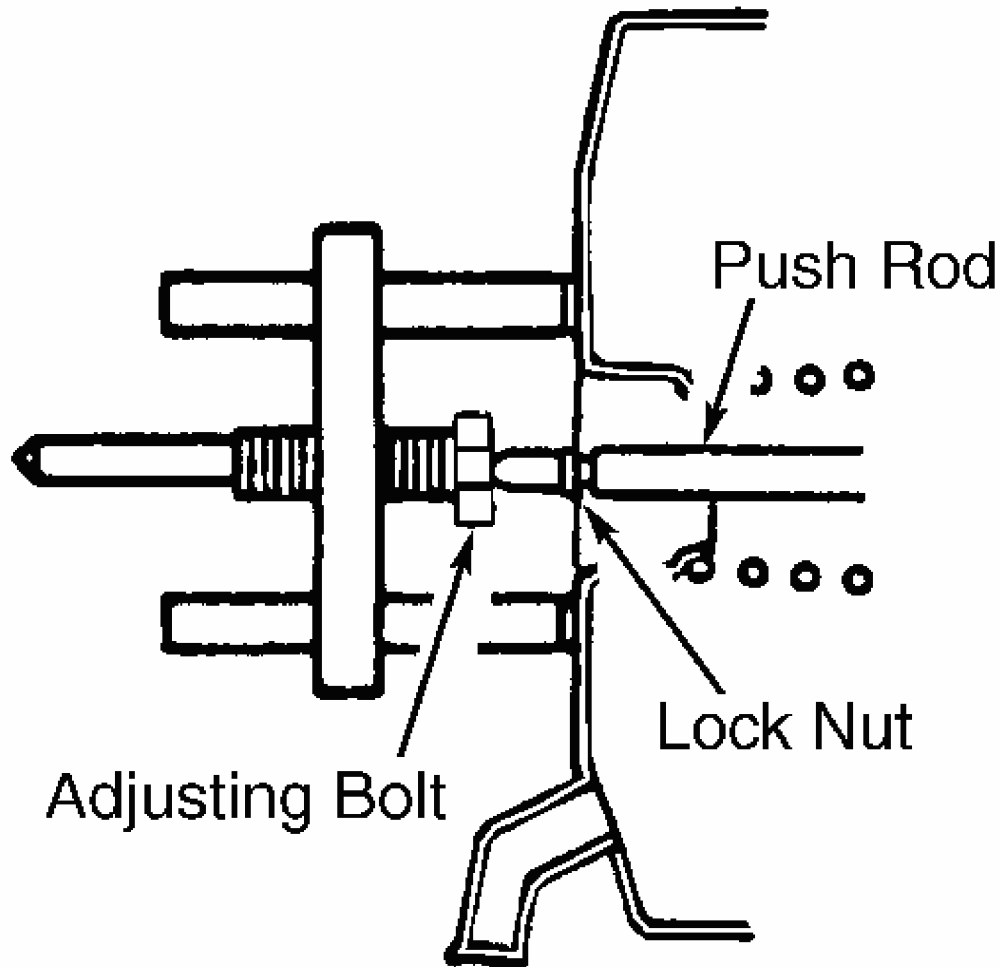
ADJUSTMENTS**MASTER CYLINDER PUSH ROD**

NOTE: Push rod has an adjustment screw to maintain correct distance between booster push rod and master cylinder piston. If push rod is adjusted too long, it prevents master cylinder piston from completely releasing hydraulic pressure, causing brakes to drag. If push rod is adjusted too short, it causes excessive pedal travel and an undesirable clunk in booster area.

Without ABS

1. Place Adjustment Gauge (49-F043-001) onto master cylinder. Turn adjusting bolt on adjuster gauge until it contacts bottom of piston. Remove adjuster gauge. Apply 19.7 in. Hg to power brake unit.
2. Invert adjuster gauge and place gauge on power brake unit. Measure clearance between end of adjusting bolt and push rod of power brake unit. See **Fig. 1**. Clearance should be 0" (0 mm). If not, loosen push rod lock nut and turn push rod to make adjustment.

After master cylinder is installed to power brake unit, clearance between push rod and piston should be .004-.016" (.10-.40 mm).



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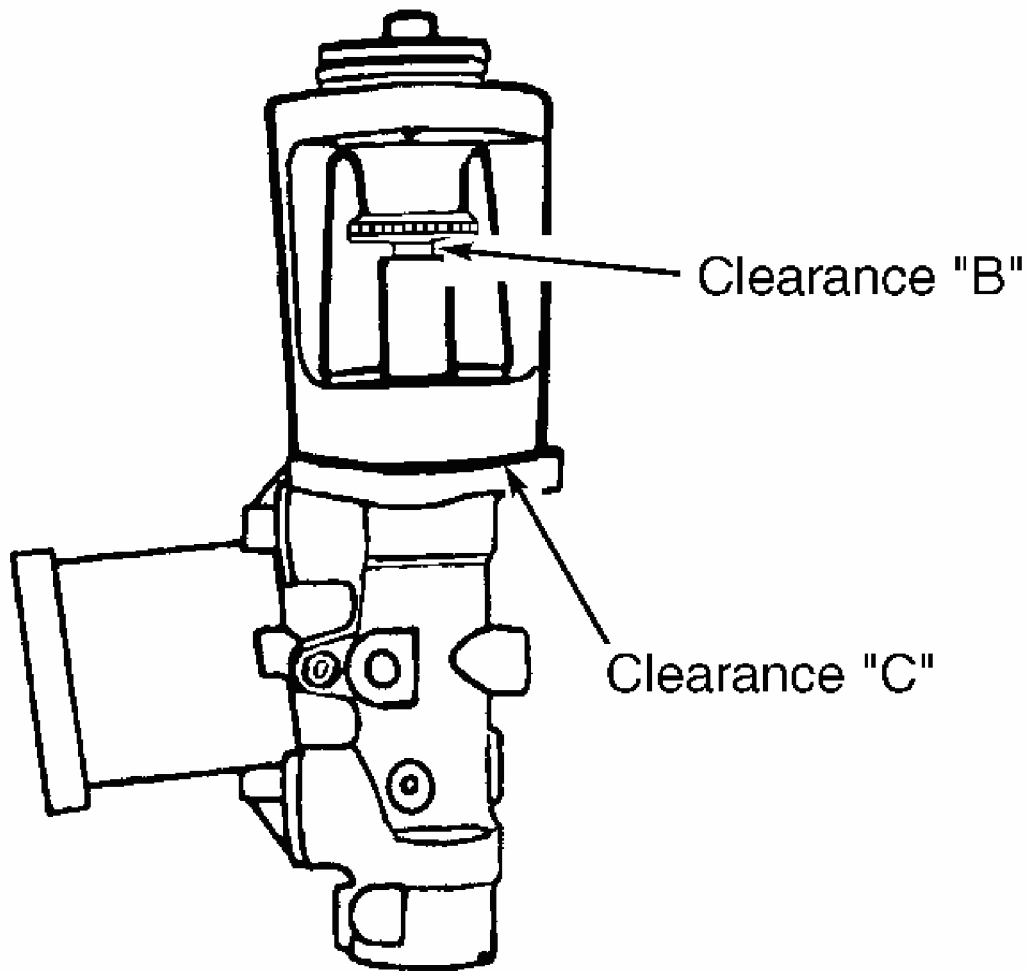
Fig. 1: Measuring Adjusting Bolt & Push Rod Clearance At Power Brake Unit
Courtesy of MAZDA MOTORS CORP.

With ABS

1. Turn adjusting nut on Adjustment Gauge (49-B043-001) clockwise to fully retract gauge rod. Place adjustment gauge onto power brake unit and tighten mounting nuts to 7.3-11 ft. lbs. (9.9-15 N.m). Apply 19.7 in. Hg to power brake unit. Turn adjustment gauge adjusting nut counterclockwise until it just contacts push rod. Ensure gauge rod is seated by pressing lightly on end of gauge rod. Ensure there is no clearance between

gauge and push rod.

- Without disturbing adjusting nut, remove adjustment gauge from power brake booster and place on brake master cylinder. Press lightly on gauge rod to ensure rod is bottomed in master cylinder piston. DO NOT push so hard that piston moves.
- Note any clearance between adjustment gauge adjusting nut ("B") and adjusting gauge body. Note any clearance between adjustment gauge body and master cylinder ("C"). See **Fig. 2**. There should be no clearance. To adjust clearance "B", use Rod Holder (49-B043-003) and Socket (49-B043-004), and turn nut to lengthen power booster push rod an amount equal to clearance measured at "B".



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Fig. 2: Adjusting Push Rod Clearances ("B" & "C")
Courtesy of MAZDA MOTORS CORP.

- To adjust clearance "C", measure and record height "D1" of gauge rod at push rod. See

Fig. 3 . Turn adjusting nut until body sets squarely on master cylinder. Measure and record height "D2" of gauge rod. See **Fig. 4** . Subtract measurement "D1" from "D2". Using Rod Holder (49-B043-003) and Socket (49-B043-004), turn nut to shorten power booster push rod an amount equal to sum of "D1" minus "D2".

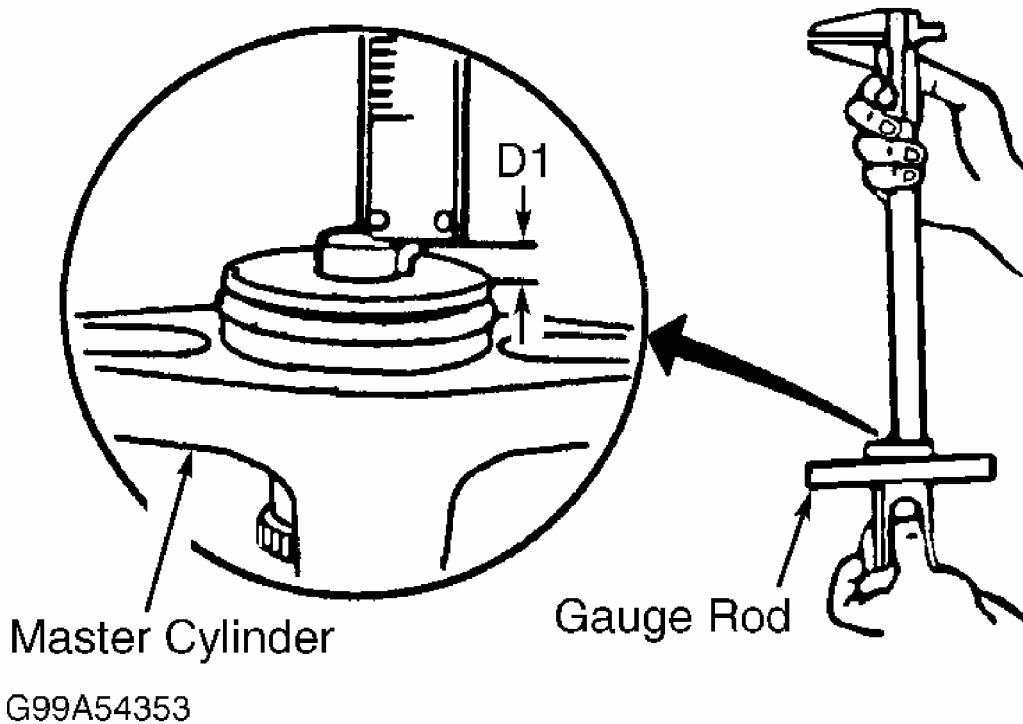
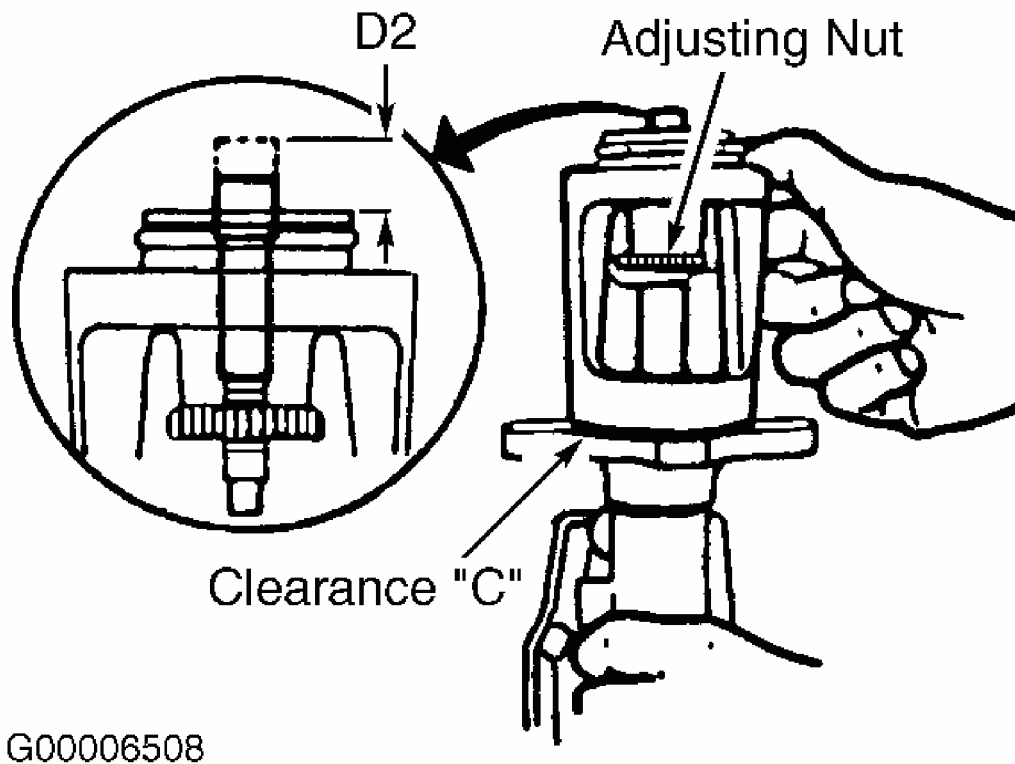


Fig. 3: Adjusting Push Rod Height "D1"
Courtesy of MAZDA MOTORS CORP.



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Fig. 4: Adjusting Push Rod Height "D2"
 Courtesy of MAZDA MOTORS CORP.

REAR BRAKE SHOES ADJUSTMENT

NOTE: Rear brakes are self-adjusting and require manual adjustment only if brake shoes have been replaced.

PARKING/EMERGENCY BRAKE

Depress brake pedal several times, and remove cover. Turn adjusting nut to adjust lever stroke. Pull parking brake lever one notch. Ensure parking brake warning light illuminates when brake lever is pulled one notch. Release parking brake. Turn wheels, and ensure brakes do not drag.

BRAKE PEDAL FREE PLAY

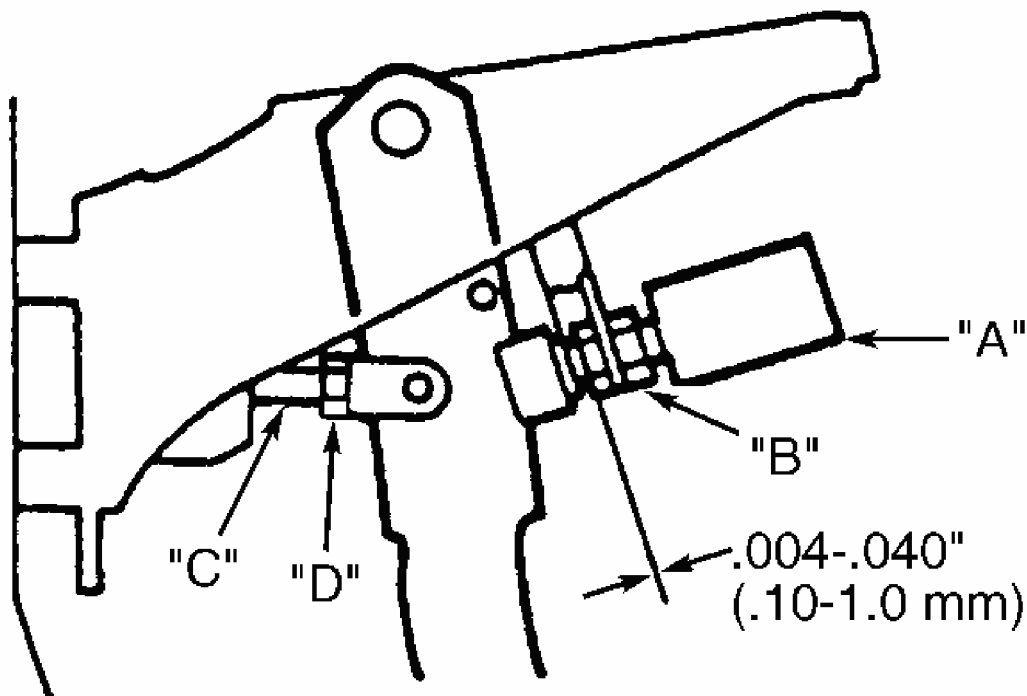
With engine off, depress pedal a few times to eliminate vacuum. Depress brake pedal by hand, and check pedal free play. See **BRAKE PEDAL FREE PLAY SPECIFICATIONS** table.

BRAKE PEDAL FREE PLAY SPECIFICATIONS

Application	In. (mm)
Miata	.16-.33 (4.0-8.4)

BRAKE PEDAL HEIGHT & STOPLIGHT SWITCH

- Released pedal height is measured from carpet surface on vertical portion of firewall to brake pedal pad center. Height should be 6.73-7.13" (171-181 mm). Disconnect brake switch connector. Loosen lock nut "B", and rotate switch "A" away from pedal. Loosen lock nut "D", and rotate rod "C" to adjust height.
- To adjust stoplight switch, tighten bolt with lock nut "B" so clearance between bolt for brake switch "A" and pedal stopper is .004-.040" (.10-1.0 mm). See **Fig. 5** . See **TORQUE SPECIFICATIONS** . Connect brake switch connector. After adjustment, inspect pedal play and brake light operation.



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Fig. 5: Adjusting Brake Pedal Height At Pedal Stopper
 Courtesy of MAZDA MOTORS CORP.

COMPONENT TESTS

PROPORTIONING VALVE

Connect 2 pressure gauges and adapters to brake pipes. Bleed brake system. See **BLEEDING BRAKE SYSTEM** . Measure fluid pressure from master cylinder and to rear brakes. If not as specified, replace proportioning valve. See **PROPORTIONING VALVE PRESSURE SPECIFICATIONS** table.

PROPORTIONING VALVE PRESSURE SPECIFICATIONS

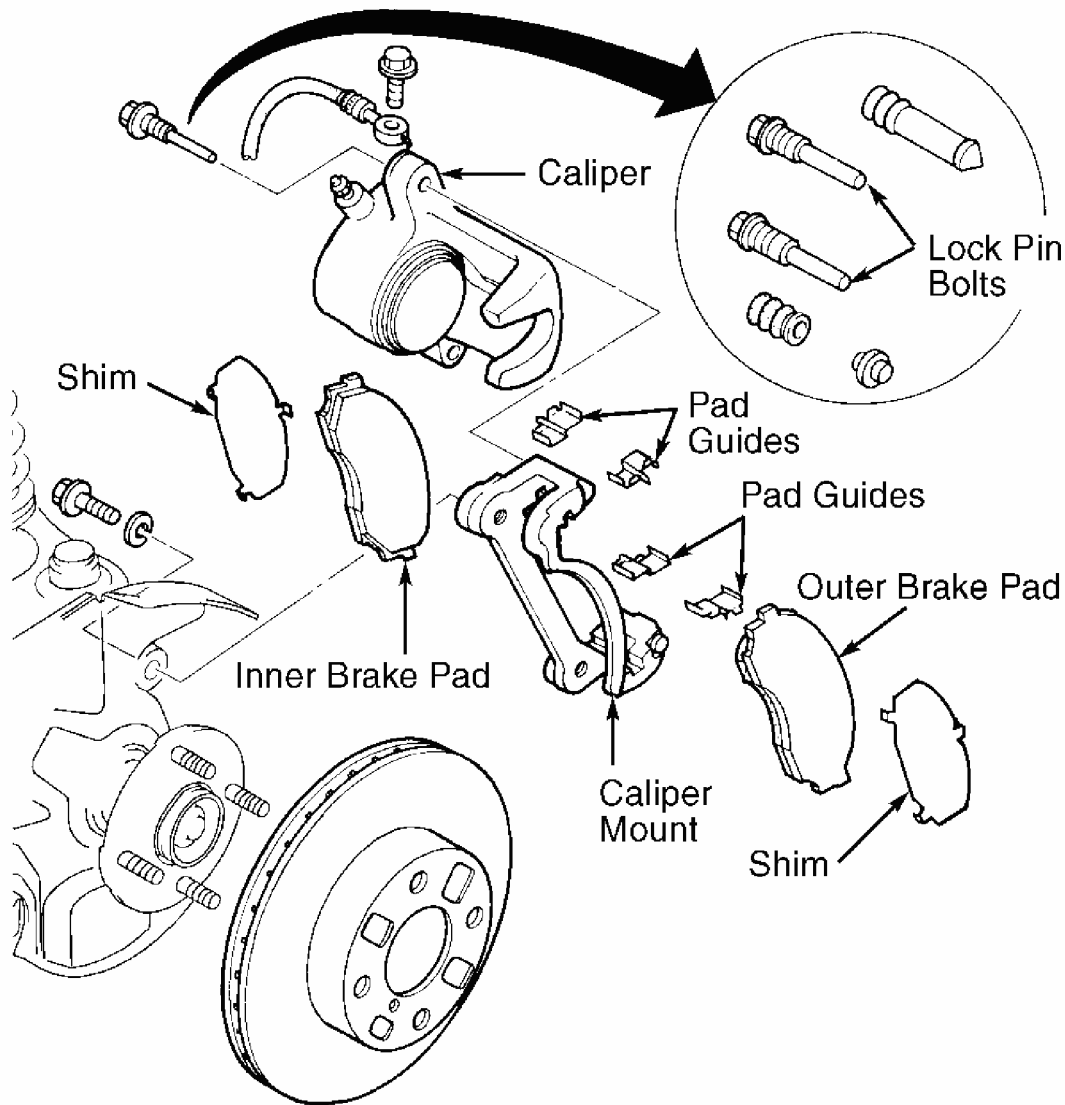
Inlet Pressure - psi (kg/cm ²)	Outlet Pressure - psi (kg/cm ²)
569 (40)	526-612 (37-43)
850 (60)	626-740 (45.4-53.4)

POWER BRAKE UNIT

1. With engine off, depress brake pedal several times. Press and hold brake pedal, and start engine. If brake pedal moves down slightly immediately after engine starts, power brake unit is operating. If brake pedal does not move as specified, go to next step.
2. Start and run engine for 1-2 minutes. Stop engine. Press brake pedal several times and note if first pedal stroke is long and becomes shorter with subsequent strokes. If first pedal stroke is long and becomes shorter with subsequent strokes, power brake unit is operating. If length of strokes is equal, check valve and vacuum hose between vacuum source and power brake unit. Repair as necessary, and go to next step.
3. Start engine. Press and hold brake pedal. Stop engine. Hold pedal down for about 30 seconds. If brake pedal remains at same height, power brake unit is operating. If pedal height recedes, check valve and vacuum hose between vacuum source and power brake unit. Repair as necessary.

REMOVAL & INSTALLATION**FRONT DISC BRAKE PADS****Removal & Installation**

1. Raise and support vehicle. Remove front wheel assemblies. Remove lower lock pin/guide bolt. See **Fig. 6** . Remove spring.



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Fig. 6: Exploded View Of Front Disc Brake Assembly
 Courtesy of MAZDA MOTORS CORP.

2. Remove pads, shims, mounting support and guide plate. Replace pad if lining thickness is less than specified. See **MINIMUM PAD LINING SPECIFICATIONS (FRONT)** table.
3. To install, reverse removal procedure. Use Disc Brake Expander (49-0221-600C) to push piston fully inward to install disc pads.

MINIMUM PAD LINING SPECIFICATIONS (FRONT)

Application	Thickness - In. (mm)
Miata	.04 (1.0)

FRONT DISC BRAKE CALIPER**Removal & Installation**

Raise and support vehicle. Remove front wheel assemblies and disconnect brake hose. Plug all openings. Remove front disc brake pads. See **FRONT DISC BRAKE PADS** . Remove remaining mounting bolt(s). Remove caliper from vehicle. To install, reverse removal procedure. Bleed air from system.

FRONT BRAKE ROTOR**Removal & Installation**

1. Raise and support vehicle. Remove front wheel assemblies. Remove front disc brake caliper with brake hose connected. See **FRONT DISC BRAKE CALIPER** . Wire caliper aside. Remove rotor-to-hub screws (if equipped). Remove rotor.
2. Machine rotor if lateral runout exceeds specification. Replace rotor if measured thickness is less than specified minimum thickness. See **DISC BRAKE SPECIFICATIONS** table. To install, reverse removal procedure.

REAR DISC BRAKE PADS**Removal & Installation**

1. Raise and support vehicle. Remove rear wheel assemblies. Remove plug, cap and lock bolt. Remove spring. See **Fig. 7** .

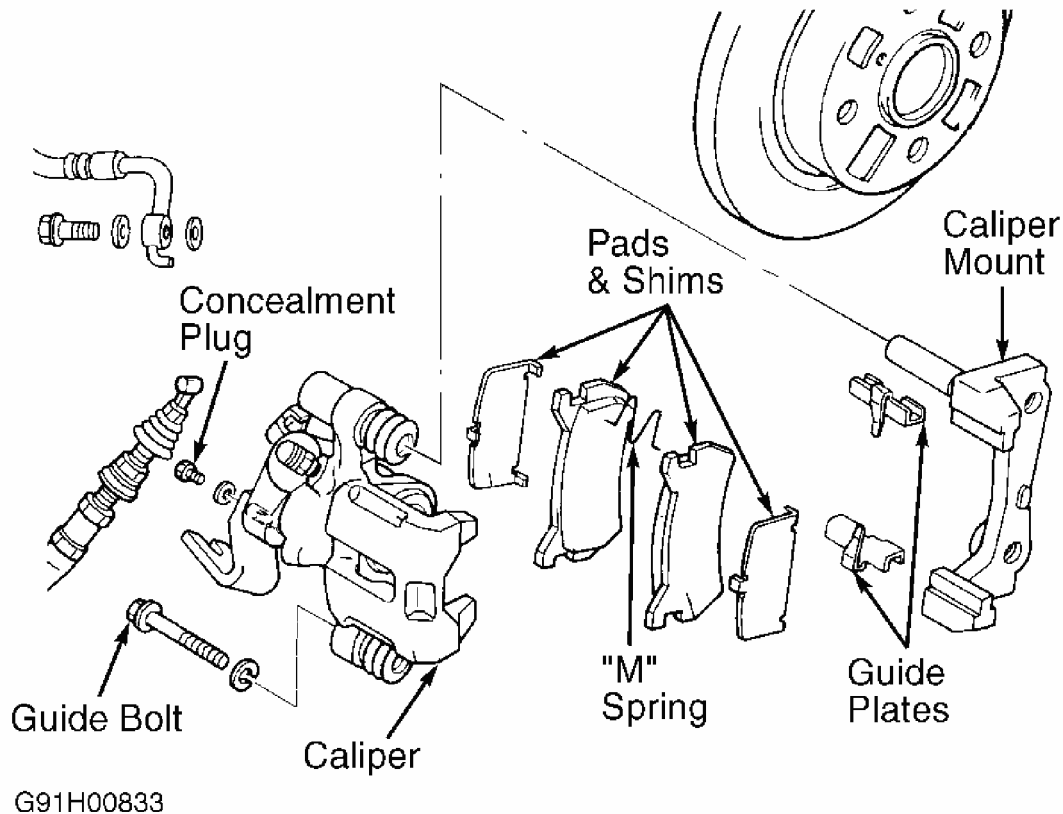


Fig. 7: Exploded View Of Rear Disc Brake Assembly
 Courtesy of MAZDA MOTORS CORP.

2. Remove pads, shims, and guide plates. Replace pad if lining thickness is less than .04" (1.0 mm). To install, turn manual adjustment gear counterclockwise with Allen wrench to retract caliper piston. Install disc pads. Turn manual adjustment gear clockwise until pads just touch rotor. Turn adjustment gear back 1/3 turn. To complete installation, reverse removal procedure.

REAR BRAKE CALIPER

Removal & Installation

Raise and support rear of vehicle. Remove rear wheel assemblies. Disconnect brake flexhose from caliper. Remove rear brake pads. See **REAR DISC BRAKE PADS**. Remove remaining caliper guide bolt. Remove brake caliper from caliper mount. To install, reverse removal procedure. Bleed air from system.

REAR BRAKE ROTOR

Removal & Installation

1. Raise and support vehicle. Remove rear wheel assemblies. Disconnect parking brake cable. Remove rear brake caliper with brake hose connected. See **REAR BRAKE CALIPER** . Support caliper using wire. Remove rotor-to-hub screws (if equipped). Remove rotor.
2. Machine rotor if lateral runout exceeds specification. Replace rotor if measured thickness is less than specified minimum thickness. See **DISC BRAKE SPECIFICATIONS** table. To install, reverse removal procedure.

REAR AXLE BEARING & OIL SEAL

NOTE: For information on models with sealed wheel bearings, see appropriate article in **SUSPENSION**.

MASTER CYLINDER

Removal & Installation

Disconnect fluid level sensor electrical connector at fluid reservoir. Remove brake pipe, connector bolt, nut and washer and connector bracket. Remove proportioning by-pass valve and bracket. Remove master cylinder. On ABS models, remove "O" ring. To install master cylinder, reverse removal procedure. Bleed air from system.

POWER BRAKE UNIT

Removal & Installation

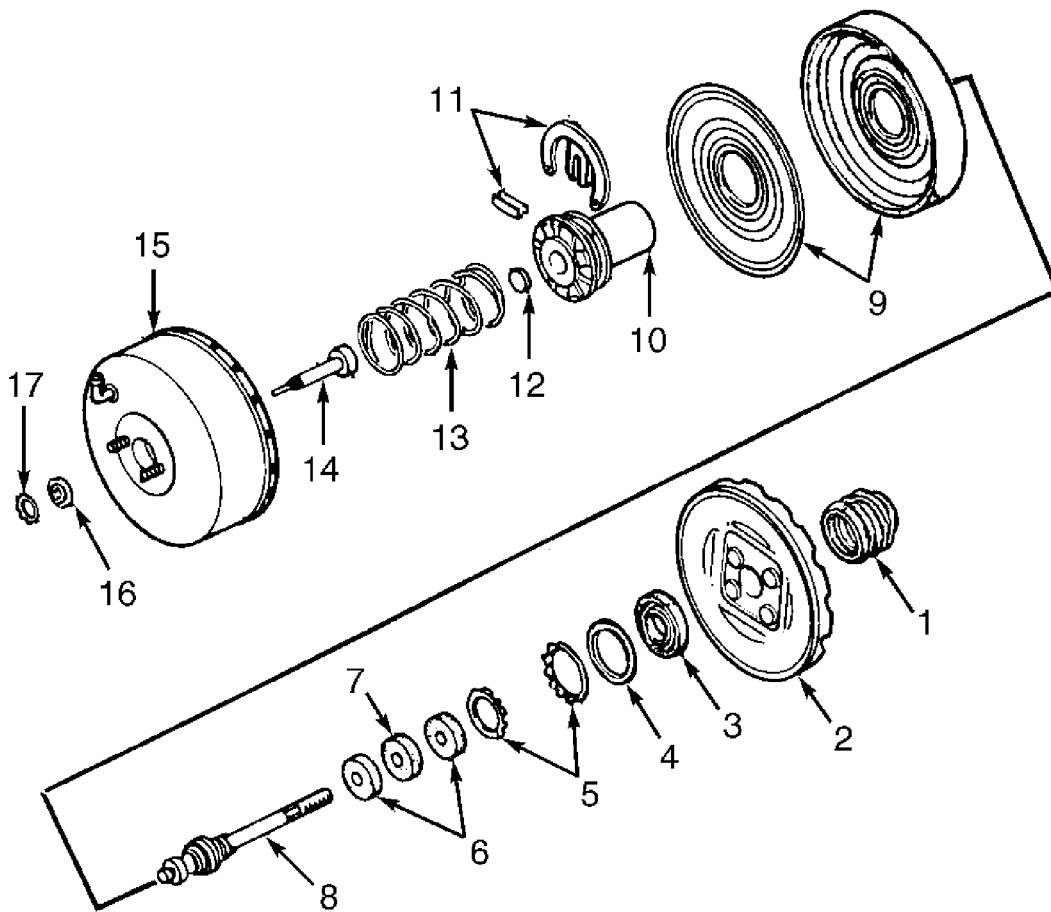
Remove master cylinder and proportioning by-pass valve from power brake unit. See **MASTER CYLINDER** . Disconnect vacuum line at power brake unit. From inside vehicle, remove snap pin and clevis pin. Separate push rod from brake pedal. Remove power brake unit-to-firewall nuts. Remove power brake unit and gasket. To install, reverse removal procedure. Bleed air from system.

OVERHAUL

NOTE: Use appropriate illustrations for exploded view of rear caliper assembly and master cylinder. See **Fig. 8 -Fig. 10** . Overhaul information for power brake unit is not available.

1999 Mazda MX-5 Miata

1999-2000 BRAKES Disc - Miata



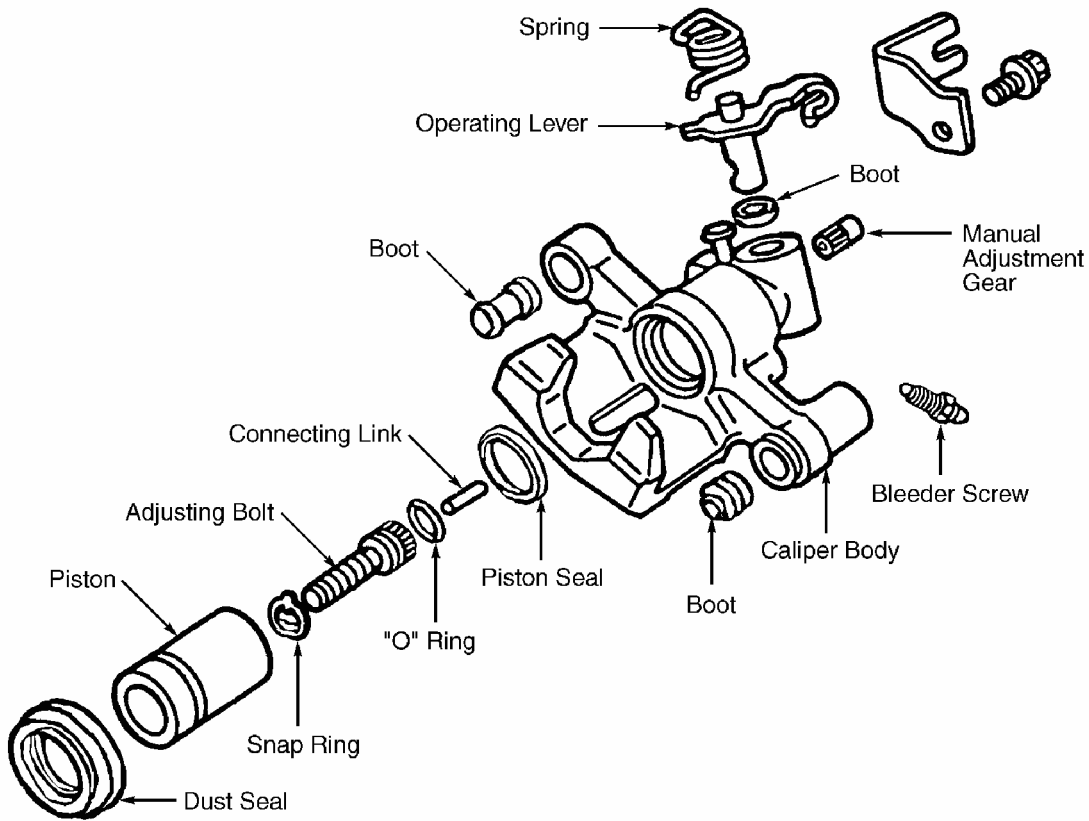
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|------------------------|-------------------|
| 1. Dust Boot | 10. Power Piston |
| 2. Rear Shell | 11. Retainer Key |
| 3. Dust Seal | 12. Reaction Disc |
| 4. Bearing | 13. Spring |
| 5. Retainer | 14. Push Rod |
| 6. Air Filter | 15. Front Shell |
| 7. Air Silencer | 16. Seal |
| 8. Valve Rod & Plunger | 17. Retainer |
| 9. Diaphragm & Plate | |

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Fig. 8: Exploded View Of Power Brake Unit
Courtesy of MAZDA MOTORS CORP.

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1999-2000 BRAKES Disc - Miata

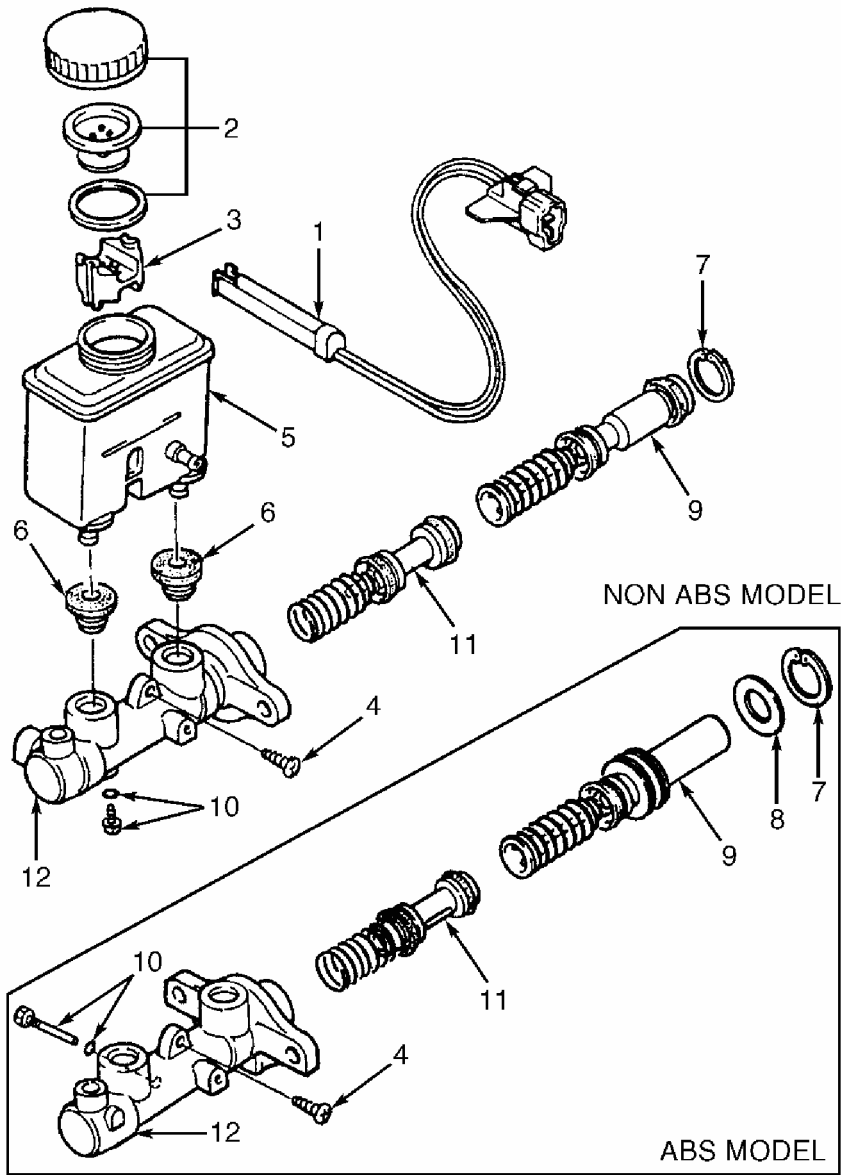


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Fig. 9: Exploded View Of Rear Caliper Assembly
Courtesy of MAZDA MOTORS CORP.

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1999-2000 BRAKES Disc - Miata



- 1. Fluid Level Sensor
- 2. Cap Set
- 3. Filter
- 4. Screw
- 5. Reservoir
- 6. Bushing
- 7. Snap Ring
- 8. Spacer
- 9. Primary Piston
- 10. Stop Screw
- 11. Secondary Piston
- 12. Master Cylinder Body

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Fig. 10: Exploded View Of Master Cylinder
Courtesy of MAZDA MOTORS CORP.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
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1999 Mazda MX-5 Miata

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Brake Hose-To-Caliper Bolt	16-21 (22-29)
Caliper Bracket Bolt (Front)	37-50 (50-68)
Caliper Bracket Bolt (Rear)	34-49 (46-66)
Caliper Lock Bolt (Front - M10)	33-39 (45-53)
Caliper Lock Bolt (Front - M12)	51-57 (69-78)
Caliper Lock Bolt (Rear)	26-28 (35-39)
Master Cylinder Mounting Nut/Washer	7-12 (10-16)
Parking Brake Bolt	14-18 (19-25)
Parking Brake Cable-To-Caliper Nut	12-16 (16-22)
Power Brake Unit Mounting Nuts	14-18 (19-25)
Proportioning By-Pass Valve Tubing	10-16 (13-22)
INCH Lbs. (N.m)	
Bleeder Screw & Bleeder Cap	53-78 (6-9)
Master Cylinder Reservoir Screw	9-13 (1.0-1.5)
Master Cylinder Stop Screw & "O" Ring (Non ABS)	18-22 (2.0-2.5)
Master Cylinder Stop Screw & "O" Ring (ABS)	61-87 (7-10)
Proportioning By-Pass Valve Bolt	70-104 (8-12)

DISC BRAKE SPECIFICATIONS**DISC BRAKE SPECIFICATIONS**

Application	In. (mm)
Front ⁽¹⁾	
Original Thickness	.04 (1)
Minimum Thickness ⁽²⁾	.71 (18)
Rear ⁽¹⁾	
Original Thickness	.04 (1)
Minimum Thickness ⁽³⁾	.31 (8)

(1) Maximum lateral runout is .004" (.10 mm).

(2) If using a brake lathe to machine rotor on vehicle, minimum thickness is .74" (18.8 mm).

(3) If using a brake lathe to machine rotor on vehicle, minimum thickness is .33" (8.4 mm).