

BMW

320i
528i
633CSi
733i

DESCRIPTION

Brake system is hydraulically operated. System uses both a tandem master cylinder and a power brake unit. 528i, 633CSi, and 733i models have 4 piston ATE front disc brake calipers and 2 piston ATE rear disc brake calipers. 320i models are equipped with 2 piston ATE front disc brake calipers and drum rear brakes. Parking brake is lever actuated and cable operated. On 528i, 633CSi and 733i models only, parking brake shoes work against a drum machined in rear disc brake rotor. Some models are equipped with pressure regulator to reduce line pressure to rear brakes. All models are also fitted with disc pad wear indicators.

ADJUSTMENT

DISC PADS

Front and rear disc brake assemblies are self-adjusting; therefore, no adjustment in service is required.

REAR DRUM BRAKES

320i — Raise vehicle. Release parking brake. Using special tool 34 2 000 (or equivalent wrench), tighten brake shoes by turning left cam counterclockwise and right cam clockwise. Loosen cam $\frac{1}{8}$ turn or until wheel is just free to turn.

PARKING BRAKE

Except 320i — 1) Release parking brake lever. Raise and support vehicle. Remove rear wheels. Insert a brake adjusting tool through inspection hole in rotor. Turn adjuster until rotor can no longer be turned by hand. Back off adjuster 2 or 3 teeth.

2) Working inside driver compartment, tighten adjustment nuts on lever until parking brake holds vehicle securely before fifth ratchet stop is reached.

320i — 1) Raise and support rear of vehicle. Fully release parking brake. Tighten brake shoes until wheel is locked. Back off adjusters about $\frac{1}{8}$ turn or until wheel can just barely turn.

2) Work inside drivers compartment and tighten nuts on lever until parking brake holds vehicle securely before fifth ratchet stop is reached.

BRAKE SYSTEM BLEEDING

NOTE — BMW recommends replacing brake fluid in entire system once a year to avoid moisture build-up.

CAUTION — Follow tool manufacturer's instructions when using pressure bleeder.

Raise and support vehicle. Remove wheels. Attach a bleeder hose to bleeder screw and immerse opposite end of hose in a container. Open bleeder screw and allow air to escape from system, then close bleeder. Continue operation until all air is bled from system.

NOTE — On 528i and 633CSi models only, bleed lower in-board screw before bleeding lower outboard screw on front brakes.

REMOVAL & INSTALLATION

DISC PADS

Removal — Raise and support vehicle. Remove wheels. Disconnect pad wear sensors. Drive out retaining pin toward inside of vehicle. Remove cross spring. Using an extractor tool, remove disc pads from caliper. If disc pad thickness has worn to .080" (2 mm), replace pads. Only replace pads in matched sets.

Installation — 1) Using a cylinder brush, clean guide surface and support surface in caliper. Siphon sufficient fluid from master cylinder reservoir to prevent overflowing, then press pistons to bottom of bores.

2) On rear two piston calipers, ensure machined position of piston face makes a 20° angle to lower caliper wall. Install disc pads, cross spring, and retaining pins. After installation, depress brake pedal several times to position pads against rotor.

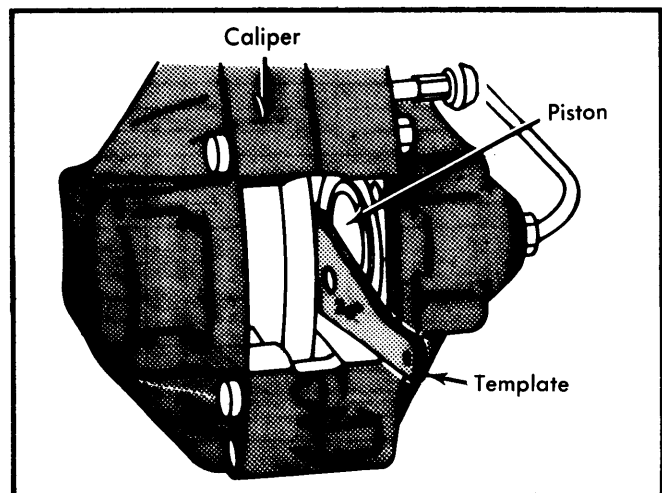


Fig. 1 Piston Alignment for Dual Piston Calipers

CALIPER ASSEMBLY

Removal — Drain brake fluid from master cylinder reservoir. Remove caliper mounting bolts. Disconnect disc pad wear indicator electrical lead. Disconnect brake fluid inlet lines. Lift caliper off rotor.

Installation — Reverse removal procedure and bleed hydraulic system.

ROTOR

Removal (Front) — Raise and support front of vehicle. Separate bracket from strut. Remove caliper and tie out of way with brake line still connected. Remove mounting bolt from hub and take off rotor.

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NOTE — Brake rotors are balanced. DO NOT remove or reposition balance clips. Also, if a rotor must be replaced, replace both rotors as a set.

Installation — To install, reverse removal procedure.

Removal (Rear) — Raise and support vehicle on safety stands. Remove tire and wheel. Remove caliper and support out of way. Brake line can stay connected. Slip brake line out of clamp. Take out mounting bolt and remove brake rotor.

NOTE — If a rotor must be replaced, replace both rotors as a set.

Installation — To install, reverse removal procedure.

PARKING BRAKE SHOES

Removal — With rear caliper and rotor removed, disconnect lower return spring using brake spring pliers. Turn retaining springs 90° using removal tool, then set spring aside. Pull brake shoes apart at bottom and lift upward.

Installation — Reverse removal procedure and adjust parking brake shoes and cables.

BRAKE DRUM

Removal & Installation — Loosen brake adjuster cams. Remove countersunk Allen bolt and slide off brake drum. To install, reverse removal procedure and note: If one brake drum is reground, drum on other side must also be reground.

BRAKE SHOES

Removal — Remove brake drum. Disengage mounting spring, retainer and pin from each shoe. Disconnect bottom return spring. Pull shoes apart and out of wheel cylinder. Disconnect parking brake cable and remove brake shoes. If brake shoe lining has worn to .118" (3.0 mm) or less, replace brake shoes.

Installation — Reverse removal procedure and note: Connect long end of spring between parking brake lever and brake shoe.

WHEEL CYLINDER

Removal — Remove brake drum. Disconnect brake fluid inlet line. Remove wheel cylinder bleeder valve. Remove cylinder mounting bolts and take off cylinder, being careful not to drop brake fluid on brake shoes.

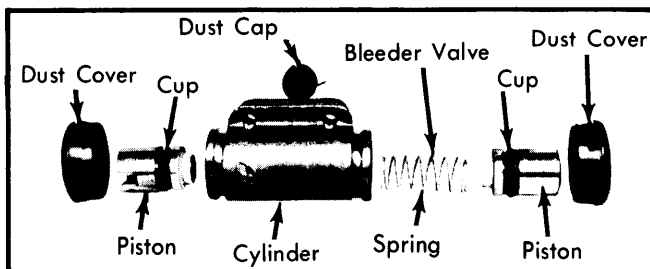


Fig. 2 Exploded View of 320i Rear Wheel Cylinder

Installation — To install, reverse removal procedure and make sure to bleed brake system.

MASTER CYLINDER

NOTE — On 320i models only, mixture control unit must be removed to take off master cylinder.

Removal — 1) Siphon off brake fluid from reservoir. On 320i models, disconnect clutch hose connection. On 633CSi models, remove air cleaner. On 528i models, there is a relay holder that may have to be detached and set aside with components still attached to gain required clearance.

2) Disconnect all hydraulic lines from master cylinder. Remove nuts mounting master cylinder to power booster. On 320i models, remove nuts mounting master cylinder support to inner fender panel. Remove support and master cylinder.

Installation — To install, reverse removal procedure and note: Make sure "O" ring on master cylinder is not damaged. An imperfect fit will not allow correct vacuum build-up.

POWER BRAKE UNIT

NOTE — On 320i, mixture control unit must be removed to take off power brake unit (with master cylinder).

Removal (320i) — 1) Remove air intake ducting. Remove 3 screws located in top of control unit. Spread open cable clips. Remove wire holder. Lift up mixture control unit and retain piston with fingers until it can be tapped into place. Disconnect remaining vacuum lines. Remove unit mounting nuts and lift off unit.

2) Siphon out brake fluid from reservoir. Disconnect push rod from brake pedal. Separate hydraulic lines from master cylinder. Also, disconnect clutch hose.

3) Disconnect vacuum hose from brake unit. Remove brake unit mounting nuts and bolts. Separate master cylinder support from inner fender panel. Slide master cylinder and power brake assembly from vehicle.

Installation — To install master cylinder and power brake assembly as a unit, reverse removal procedure.

NOTE — On 733i models only, power steering pump also supplies hydraulic pressure through hydraulic accumulator to the power brake unit. If power steering fails, there will be sufficient pressure in the hydraulic accumulator to provide a few brake applications with full power.

Removal (528i, 633CSi & 733i) — 1) Drain off brake fluid from master cylinder reservoir and/or cylinder body. Remove lower left trim panel. Disconnect push rod from brake pedal.

2) Disconnect and plug master cylinder hydraulic lines. Disconnect hydraulic lines (733i only) or vacuum line (all other models) from power brake unit. Remove master cylinder/power brake unit as an assembly after removing power unit mounting bolts.

Brakes

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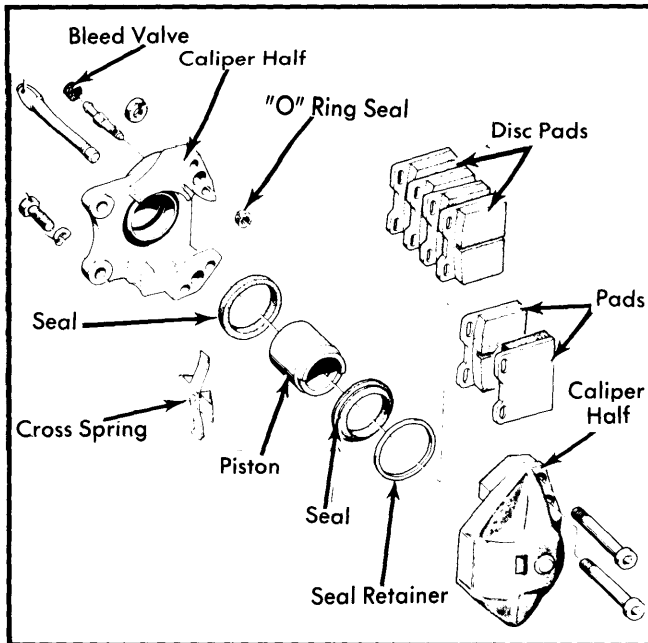


Fig. 3 Disassembled View of Dual Piston Rear Disc Brake Caliper Used on 528i, 633CSi and 733i Models. Front Caliper for 320i Models is Similar

Installation — To install brake unit with master cylinder connected, reverse removal procedure. Bleed brake system after assembly is installed.

Check Valve Replacement (Exc. 733i) — Check valve is located in power unit vacuum line at intake manifold. To remove, loosen hose clamps, remove vacuum lines, and remove valve. To install, reverse removal procedure. Make sure arrow or black portion of valve faces intake manifold.

Filter Replacement (Exc. 733i) — With power brake unit removed from vehicle, pull back rubber dust boot. Remove retaining ring. Remove silencer and filter. To install, reverse removal procedure.

OVERHAUL

BRAKE CALIPER

Disassembly — With caliper removed from vehicle and disc pads removed from caliper, remove clamping rings and rubber protecting caps. Hold one piston in place using a suitable clamp, insert a piece of wood in caliper cavity, then apply

Reassembly — Reassemble caliper (if separated) using new seals and expansion bolts. Tighten expansion bolts from inside out. Coat pistons and caliper bores with ATE brake cylinder paste (or equivalent), install sealing rings, then install pistons

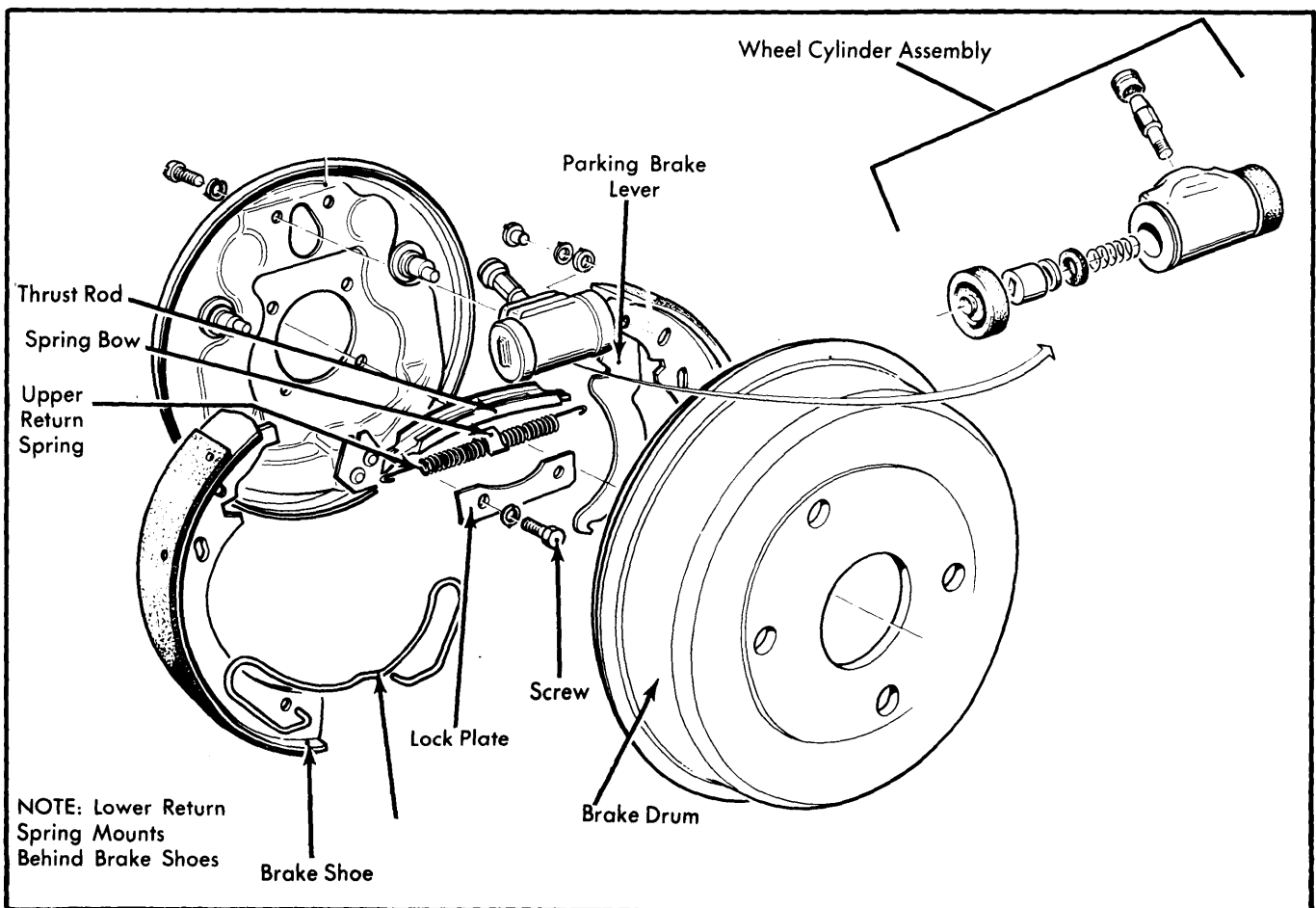


Fig. 4 Exploded View of Rear Drum Brake Assembly Used on BMW 320i Models. See Note on Illustration.

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into bores. Make sure pistons are not tilted when inserting. On two piston calipers, make sure machined surface of piston face makes a 20° angle to lower caliper wall. Install rubber protecting caps and clamp rings.

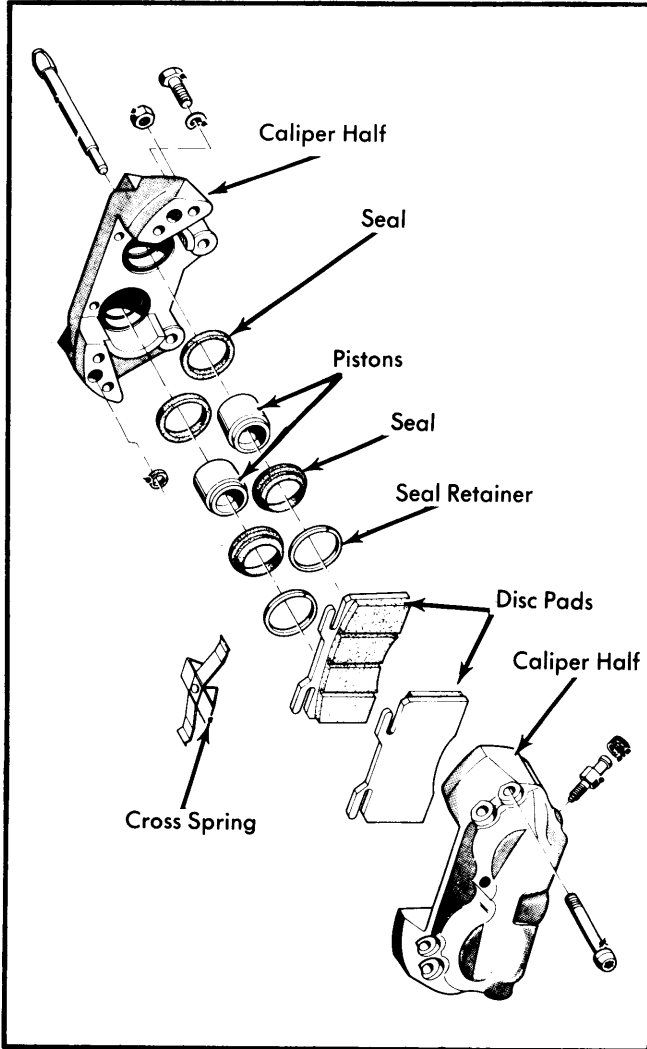


Fig. 5 4 Piston Front Disc Brake Caliper Assembly Used on 528i, 633CSi and 733i

MASTER CYLINDER

NOTE — All master cylinders are similar, procedures outlined are general.

Disassembly — Push in on primary piston and remove secondary piston stop screw. Remove snap ring from end of cylinder and remove primary and secondary piston assemblies and return spring. Disassemble piston assemblies noting number and position of parts used.

Cleaning & Inspection — Clean all parts in alcohol and inspect for wear or damage.

NOTE — Cylinders with surface defects in bores must be replaced; do not overhaul.

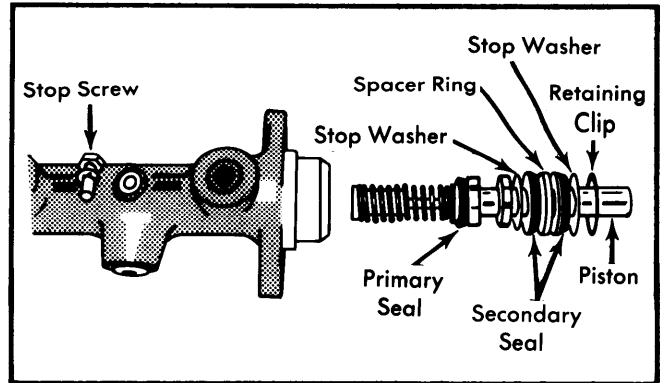


Fig. 6 Master Cylinder Primary Piston Assembly

Reassembly — Reassemble piston assemblies using thin coating of ATE brake paste. Install piston assemblies into cylinder bore using a suitable guide sleeve (BMW 34 3 000) to prevent damaging seals. Install secondary piston stop screw, making sure that piston is pushed fully forward before screw is installed and tightened. Install retaining ring in end of master cylinder bore.

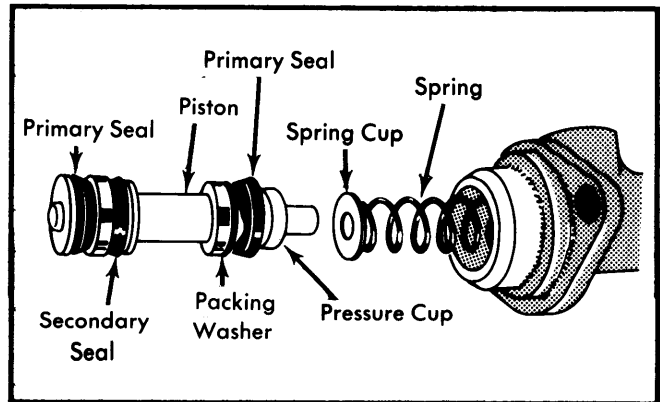


Fig. 7 Master Cylinder Secondary (Front) Piston Assy.

TIGHTENING SPECIFICATIONS

Application	Fr. Lbs. (mkg)
Caliper Mounting Bolts	
Front	58-69 (8.0-9.5)
Rear	43-48 (6.0-6.7)
Rotor-to-Wheel Hub	
320i	3.0-3.5 (.4-.5)
528i & 633CSi	11-13 (1.5-1.8)
733i	23-24 (3.2-3.3)
Brake Line-to-Caliper	9-12 (1.3-1.6)
Master Cylinder-to-Power Unit	
320i	12-14 (.16-2.0)
528i	15-18 (2.1-2.5)
633CSi	16-21 (2.1-2.9)
733i	12-18 (1.7-2.5)
Power Brake Unit-to-Mounting	16-17 (2.2-2.4)

Brakes

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DISC BRAKE ROTOR SPECIFICATIONS						
Application	Disc Diameter In. (mm)	Lateral Runout In. (mm)	Parallelism In. (mm)	③ Original Thickness In. (mm)	Minimum Refinish Thickness In. (mm)	Discard Thickness In. (mm)
320i Front	10.040① (255)	.008② (.2)	.0008 (.02)	.866 (22)	.....	.827 (21)
528i Front	11.024① (280)	.008② (.2)	.0008 (.02)	.866 (22)	.....	.827 (21)
Rear	10.708① (272)	.008② (.2)	.0008 (.02)	.374 (9.5)	.....	.334 (8.5)
633CSi Front	11.024① (280)	.008② (.2)	.....	.866 (22)	.....	.827 (21)
Rear	10.708① (272)	.008② (.2)	.....	.748 (19)	.....	.709 (18)
733i Front	11.024① (280)	.006② (1.5)	.....	.866 (22)	.....	.827 (21)
Rear	11.024① (280)	.006② (1.5)	.....	.394 (10)	.....	.354 (9)

① - ±.008" (.2 mm).

② - Installed on vehicle.

③ - Machining of each braking surface is .020" (.5 mm). Minimum rotor thickness must be observed.

BRAKE SYSTEM SPECIFICATIONS				
Application	Drum Diam. In. (mm)	Wheel Cylinder Diameter		Master Cylinder Diameter In. (mm)
		Front In. (mm)	Rear In. (mm)	
320i	9.842① (250)	1.890② (48)	.750 (19.05)	.....
528i & 633CSi	6.300② (160)	1.575② (40)	1.652② (42)	.....
733i	6.300② (160)	1.575 (40)	1.29 (33)	.....

① - Rear

② - Piston Diameter

③ - Parking brake inside diameter.