

HYDRAULIC Caliper Disc Brake



Installation and Service Instructions

TABLE 1

Caliper Model Number	Caliper with Rectangular Bracket Model Number	Caliper with Triangular Bracket Model Number	Lining Kit Number (see pages 3 and 6)	Seal Kit Number (see pages 3 and 5)	Repair Kit Number (see pages 3 and 4)
01-530-016 (HO) n/a	02-530-016 (HO) n/a	03-530-016 (HO)	20-060-014	02-500-181	02-500-024
01-530-021 (BF) n/a	02-530-021 (BF)	03-530-018 (HO)	20-060-099	02-500-181	02-500-212
n/a	02-530-023 (BF)	03-530-021 (BF)	20-060-014	02-500-182	02-500-022
n/a	02-530-024 (HO)	n/a	20-060-014	02-500-182	02-500-183
n/a	02-530-025 (BF)	03-530-024 (HO)	20-060-014	02-500-181	02-500-184
n/a	02-530-041 (BF)	n/a	20-060-075	02-500-182	02-500-235
		n/a	20-060-014	02-500-182	02-500-022

HO = Mineral Base Hydraulic Oil BF = Automotive Brake Fluid

NOTE: If your product number is not listed, contact ZF Off-Highway Solutions Minnesota Inc. for information.

BE SURE TO READ GENERAL INSTALLATION GUIDELINES SHEET (81-600-001) BEFORE PROCEEDING

⚠ WARNING

ZF Off-Highway Solutions Minnesota Inc. disc brake linings do not contain asbestos. Brake lining compounds do, however, contain elements that may become airborne during the life of the lining. To prevent any health problems associated with lining dust, we suggest ventilators be installed as needed on enclosed or stationary equipment. A Safety Data Sheet is available upon request.

When installing these caliper disc brakes, it is of utmost importance that the caliper be centered evenly and squarely over the disc. This will ensure even lining to disc contact. When linings have been worn to a point of replacement, replace with the lining kit specified in TABLE 1. During initial brake application, the linings will contact the disc, upon pressure release, the retractor compensator will provide the proper running clearance of 0.38 mm (0.015 in) per side. This series of caliper disc brakes is designed for use with a disc thickness of 12.7 mm (0.50 in).

⚠ CAUTION

Minimum recommended disc thickness for this brake is 11.1 mm (0.438 in). For other disc thicknesses, contact ZF Off-Highway Solutions Minnesota Inc. The position or setting of the end plug and retractor compensator nut are factory set and do not need adjustment during the life of the linings.

MOUNTING PROCEDURE

1. Figures 1 and 2 on page 2 illustrate the two methods of mounting this series of brakes. The mounting surface to disc face dimension should be closely held as this provides for the required caliper movement. Use shims as needed to obtain the proper distance.
2. Using TABLE 2 and Figures 3 and 4 on the page 2 determine "A" dimension and locate mounting bracket assembly holes.
3. Mount the brake and mounting bracket assembly on the disc and bolt securely to machine using SAE grade 8 or better mounting bolts with lock washers.

PLUMBING PROCEDURE

1. After the brake is mounted on the machine, install bleeder screw (provided with brake) and hydraulic line
NOTE: All porting is designed for #4 SAE o-ring boss port adapters.
2. Bleed system making sure all air is eliminated. Apply rated pressure and check for leaks. Tighten fittings if leaks occur.
3. Torque bleeder screw 12.2-20.3 N·m (9-15 lb·ft).

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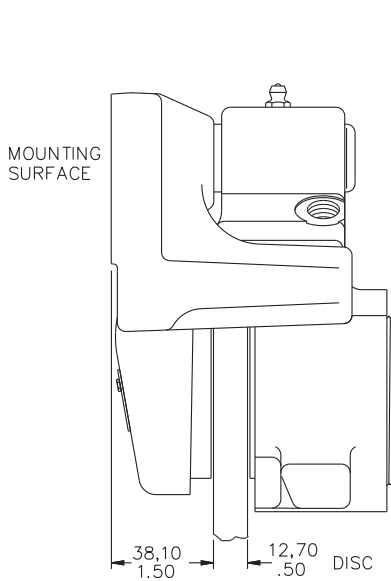


FIGURE 1

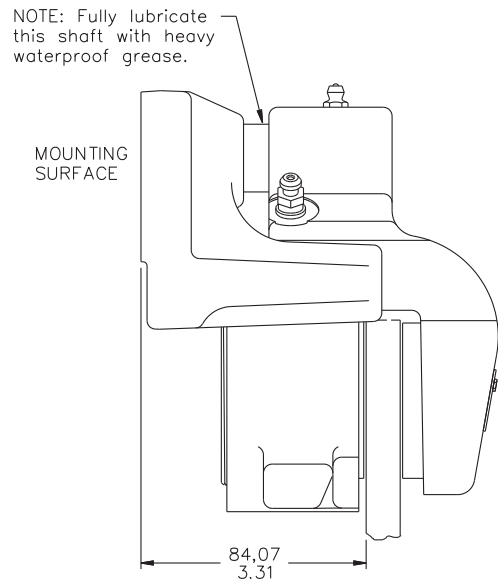


FIGURE 2

millimeters
inches

NOTE
Dimensions shown in Figures 1 and 2 are typical for all models. Mounting surface to disc face dimension is typical of rectangular and triangular brackets. Mounting bolts not included.

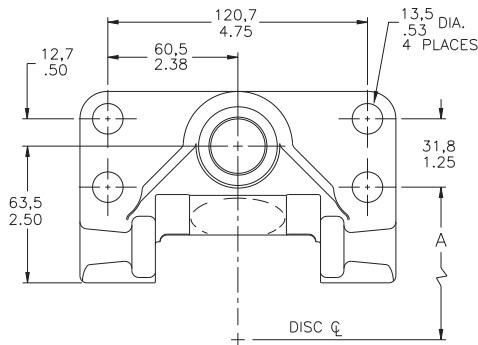


FIGURE 3
(rectangular mount)

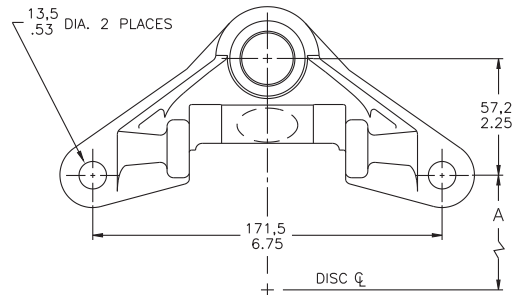


FIGURE 4
(triangular mount)

millimeters
inches

NOTE: For disc diameters greater than 609.6 mm (24 inch add 1.75 in) to disc radius to obtain "A" dimension.

NOTE: For disc diameters greater than 609.6 mm (24 inch add 0.125 in) to disc radius to obtain "A" dimension.

**DISC CENTERLINE TO
MOUNTING HOLE DIMENSION**

Disc Diameter	Rectangular Mount "A" Dimension	Triangular Mount "A" Dimension
228.6 mm (9 in)	155.6 mm (6.125 in)	117.5 mm (4.625 in)
254.0 mm (10 in)	168.3 mm (6.625 in)	130.2 mm (5.125 in)
304.8 mm (12 in)	193.7 mm (7.625 in)	155.6 mm (6.125 in)
355.6 mm (14 in)	219.1 mm (8.625 in)	181.0 mm (7.125 in)
406.4 mm (16 in)	247.6 mm (9.75 in)	206.4 mm (8.125 in)
457.2 mm (18 in)	273.0 mm (10.75 in)	231.8 mm (9.125 in)
508.0 mm (20 in)	298.4 mm (11.75 in)	257.2 mm (10.125 in)
558.8 mm (22 in)	323.8 mm (12.75 in)	282.6 mm (11.125 in)
609.6 mm (24 in)	349.2 mm (13.75 in)	308.0 mm (12.125 in)

TABLE 2

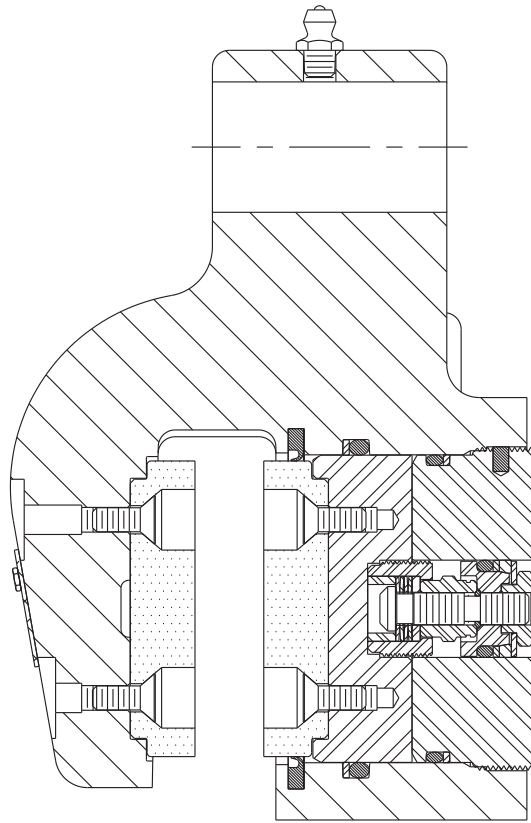


FIGURE 5

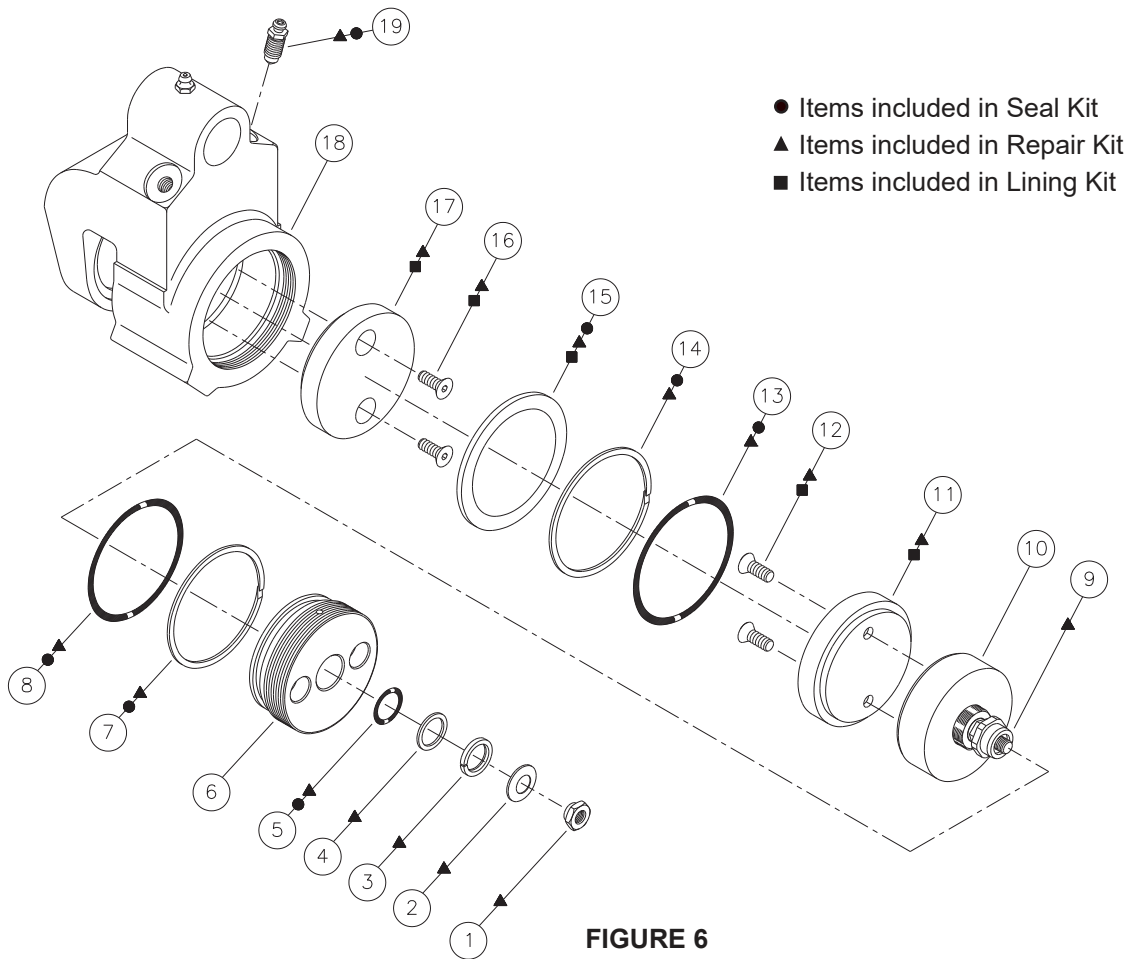


FIGURE 6

CHANGE REPAIR KIT PROCEDURE

(Refer to Figures 5 and 6)

See Figure 6 for components included in repair kit.

NOTE

When removing seals and back-up rings be careful not to scratch or mar pistons. When installing new seals in the brake, make sure the repair kit is the proper one for the system fluid.

New linings must be kept free of oil, grease, etc.

1. Disconnect fluid line from the brake.

⚠ CAUTION

Cap end of fluid line to prevent entry of dirt into the hydraulic system.

2. Remove the bolts used to fasten the mounting bracket assembly to the machine. Remove brake and mounting bracket assembly from the machine and remove the mounting bracket assembly from the brake.
3. Place the brake in a soft jawed vise with end plug (6) facing up in a vertical position. **NOTE: Clamping should be done on the sides of the brake on the machined surfaces.**
4. Remove bleeder screw (19).
5. Remove hex nut (1) from compensator assembly (9).
6. Remove belleville spring (2), wedge ring (3), washer (4) and o-ring (5) from compensator assembly (9).
7. Using a spanner wrench, remove end plug (6) from housing (18).
8. Remove piston (10) and lining (11) assembly from housing bore.
9. Remove flat head screws (12) to separate lining (11) and piston (10).
10. Remove compensator assembly (9) from piston (10).
11. Loosen vise jaws and rotate caliper so that disc clearance slot is facing up.
12. Remove o-ring (8) and back-up ring (7) from end plug (6).
13. Using a thin blade tool, remove back-up ring (14), o-ring (13) and seal (15) from housing bore.
14. Remove flat head screws (16) and lining (17) from housing (18).
15. Install new lining (17) in housing (18) using new flat head screws (16). Torque screws 2.7-3.4 N·m (24-30 lb·in).
16. Rotate caliper to original position.
17. Lubricate all seals, o-rings and back-up rings from repair kit in clean system fluid.
18. Carefully install new back-up ring (7) and o-ring (8) over non-threaded end of end plug (6) and into groove. Make sure back-up ring and o-ring are installed in the proper position in groove.

NOTE

When installing back-up rings, it is essential that the surfaces of diagonal splice match with each other after back-up ring is installed in groove.

19. Install new o-ring (13) and new back-up ring (14) in housing bore. Make sure o-ring and back-up ring are installed in the proper position in groove.
20. Install new seal (15) into groove of housing bore through the disc clearance slot end of bore. Note the direction of seal.
21. Install new compensator assembly (9) in piston (10) and torque 19.0-24.4 N·m (14-18 lb·ft).
22. Install new lining (11) on piston (10) using new flat head screws (12). Torque screws 2.7-3.4 N·m (24-30 lb·in).
23. Carefully assemble piston (10) and lining (11) assembly to end plug (6).
24. Install new o-ring (5), new washer (4), new wedge ring (3), new belleville spring (2) and new hex nut (1) on compensator assembly (9). **NOTE: Make sure wedge ring (3) and belleville spring (2) are installed in the proper direction.**
25. Apply Loctite 262 or equivalent to threads of hex nut (1) and torque 2.8-4.5 N·m (25-40 lb·in).
26. Lightly lubricate housing bore and piston (10) with clean system fluid.
27. Carefully reinstall end plug and piston assembly into housing bore keeping lining face free of system fluid and contamination. Tighten end plug (6) with a spanner wrench until it bottoms out on housing (18) and torque 74.6-88.1 N·m (55-65 lb·ft).
28. Install new bleeder screw (19) and finger tighten.
29. To continue refer to MOUNTING PROCEDURE Section (step 3), and PLUMBING PROCEDURE Section.

⚠ CAUTION

Do not move the machine until a firm brake pedal is obtained.

CHANGE SEAL KIT PROCEDURE

(Refer to Figures 5 and 6)

See Figure 6 for components included in seal kit.

NOTE

When removing seals and back-up rings be careful not to scratch or mar pistons. When installing new seals in the brake, make sure the seal kit is the proper one for the system fluid.

1. Disconnect fluid line from the brake.

⚠ CAUTION

Cap end of fluid line to prevent entry of dirt into the hydraulic system.

2. Remove the bolts used to fasten the mounting bracket assembly to the machine. Remove brake and mounting bracket assembly from the machine and remove the mounting bracket assembly from the brake.
3. Place the brake in a soft jawed vise with end plug (6) facing up in a vertical position. **NOTE: Clamping should be done on the sides of the brake on the machined surfaces.**
4. Remove bleeder screw (19).
5. Remove hex nut (1) from compensator assembly (9).
6. Remove belleville spring (2), wedge ring (3), washer (4) and o-ring (5) from compensator assembly (9). **DO NOT discard - save for reassembly.**
7. Using a spanner wrench, remove end plug (6) from housing (18).
8. Remove piston (10) and lining (11) assembly from housing bore. **NOTE: Do not remove compensator assembly (9) from piston (10).**
9. Remove o-ring (8) and back-up ring (7) from end plug (6).
10. Using a thin blade tool, remove back-up ring (14), o-ring (13) and seal (15) from housing bore.
11. Lubricate all seals, o-rings, and back-up rings from seal kit in clean system fluid.
12. Carefully install new back-up ring (7) and o-ring (8) over non-threaded end of end plug (6) and into groove. Make sure they are installed in proper position in groove.

NOTE

When installing back-up rings, it is essential that the surfaces of diagonal splice match with each other after back-up ring is installed in groove.

13. Install new o-ring (13) and new back-up ring (14) in housing bore. Make sure they are installed in the proper position in groove.
14. Install new seal (15) into groove of housing bore through the disc clearance slot end of bore. Note the direction of seal.
15. Carefully assemble piston (10) and lining (11) assembly to end plug (6).

16. Install new o-ring (5), washer (4), wedge ring (3), belleville spring (2) and hex nut (1) on compensator assembly (9). **NOTE: Make sure wedge ring (3) and belleville spring (2) are installed in proper direction.**
17. Apply Loctite 262 or equivalent to threads of hex nut (1) and torque 2.8-4.5 N·m (25-40 lb·in).
18. Lightly lubricate housing bore and piston (10) with clean system fluid.
19. Carefully reinstall end plug and piston assembly into housing bore keeping lining face free of system fluid and contamination. Tighten end plug (6) with a spanner wrench until it bottoms out on housing (18) and torque 74.6-88.1 N·m (55-65 lb·ft).
20. Install new bleeder screw (19) and finger tighten.
21. To continue refer to MOUNTING PROCEDURE Section (step 3), and PLUMBING PROCEDURE Section.

⚠ CAUTION

Do not move the machine until a firm brake pedal is obtained.

CHANGE LINING KIT PROCEDURE

(Refer to Figures 5 and 6)

NOTE

New linings must be kept free of oil, grease, etc.

1. Disconnect fluid line from the brake.

⚠ CAUTION

Cap end of fluid line to prevent entry of dirt into the hydraulic system.

2. Remove the bolts used to fasten the mounting bracket assembly to the machine. Remove brake and mounting bracket assembly from the machine and remove the mounting bracket assembly from the brake.
3. Place the brake in a soft jawed vise with end plug (6) facing up in a vertical position. **NOTE: Clamping should be done on the sides of the brake on the machined surfaces.**
4. Remove hex nut (1) from compensator assembly (9).
5. Remove belleville spring (2), wedge ring (3), washer (4), and o-ring (5) from compensator assembly (9). **DO NOT discard - save for reassembly.**
6. Using a spanner wrench, remove end plug (6) from housing (18).
7. Remove piston (10) and lining (11) assembly from housing bore. **NOTE: Do not remove compensator assembly (9) from piston (10).**
8. Remove flat head screws (12) to separate lining (11) and piston (10).
9. Install new lining (11) on piston (10) using new flat head screws (12). Torque screws 2.7-3.4 N·m (24-30 lb·in).
10. Loosen vise jaws and rotate caliper so that the disc clearance slot is facing up.
11. Remove flat head screws (16) and lining (17) from housing (18).
12. Install new lining (17) in housing (18) using new flat head screws (16). Torque screws 2.7-3.4 N·m (24-30 lb·in).
13. Rotate caliper to original position in vise.
14. Remove seal (15) from housing bore.
15. Lubricate new seal (15) from lining kit in clean system fluid.
16. Install new seal (15) into the groove of housing bore through the disc clearance slot end of bore. Note the direction of seal.
17. Carefully assemble piston (10) and lining (11) assembly to end plug (6).
18. Install o-ring (5), washer (4), wedge ring (3), belleville spring (2) and hex nut (1) on compensator assembly (9). **NOTE: Make sure wedge ring (3) and belleville spring (2) are installed in the proper direction.**
19. Apply Loctite 262 or equivalent to threads of hex nut (1) and torque 2.8-4.5 N·m (25-40 lb·in).

20. Lightly lubricate housing bore and piston (10) with clean system fluid.
21. Carefully reinstall end plug and piston assembly into housing bore keeping lining face free of system fluid and contamination. Tighten end plug (6) with a spanner wrench until it bottoms out on housing (18) and torque 74.6-88.1 N·m (55-65 lb·ft).
22. To continue assembly refer to MOUNTING PROCEDURE Section (step 3), and PLUMBING PROCEDURE Section.

⚠ CAUTION

Do not move the machine until a firm brake pedal is obtained.

BASIC SERVICE PROCEDURES

SERVICE CHECKS

1. Maintain a proper fluid level. When adding fluid, use clean brake fluid that meets SAE specifications. If the brake requires mineral base hydraulic oil, follow vehicle manufacturer fluid specifications.
2. Check brake lines and fittings for leaks, chaffing, etc. Always install new hoses, lines, or fittings if they look the least bit questionable.
3. Check lining wear when servicing the brake.
4. Disc should be serviced in accordance with original machine manufacture instructions.

SERVICE PRECAUTIONS

1. Never use mineral base hydraulic oil in a brake fluid system, or brake fluid in a mineral base hydraulic oil system.
2. Keep grease, oil, and fluid off of the linings, caliper assembly, and disc surfaces.
3. Clean fittings and seats when servicing the brake.

NOTE

Lubricating slider pin grease zerk weekly is recommended. Under severe service conditions more frequent greasing will be required.

