SPRING APPLY
Caliper Disc Brake

Installation and Service Instructions

TABLE 1

Model Number	*Lining Kit Number	Seal Kit Number	**Repair Kit Number
03-530-900 (HO)	20-060-092	02-500-185	02-500-166
03-530-902 (HO)	20-060-092	02-500-185	02-500-166
03-530-904 (HO)	20-060-092	02-500-185	02-500-166

HO = Mineral Base Hydraulic Oil

*** See Figure 7 on page 3 for lining replacement information.**

**** Belleville springs are pre-greased. DO NOT remove grease from springs. See Grease Note on page 2, Figure 5.**

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 Spring 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 the point of replacement, replace with lining kit specified in TABLE 1. This series of 530 Spring Brakes is designed for use with a disc thickness of 12.7 mm (0.50 in).

MOUNTING PROCEDURE

(Refer to Figures 1, 2, and 3)

1. Figure 2 on page 2 illustrates the method of mounting this brake. 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, determine “A” dimension and locate mounting bracket assembly holes.
3. Install bleeder screw (provided with the brake).
4. Figure 2 on page 2 illustrates the position of the collar tool while the brake is being installed. The collar tool holds the brake linings apart so the brake can slide easily on the disc. The collar tool is not to be used to release the brake. It is only used to hold the brake in the release position.

NOTE: When reinstalling the brake after servicing, apply hydraulic pressure of appriximately 69.0 bar (1000 PSI) to the brake pressure port to reposition the collar tool as needed.

5. Mount the brake and bracket assembly on the disc and bolt securely to the machine using SAE Grade 8 or better bolts with lock washers.
6. Retain the collar tool for future use. Apply rated hydraulic pressure of at least 69.0 bar (1000 PSI) to the brake pressure port.
7. Remove cap screw, washer, and collar tool. Rotate and reinstall collar tool as shown in Figure 3. Securely tighten cap screw.
8. Release the hydraulic pressure.

PLUMBING PROCEDURE

1. After caliper assembly is mounted on the machine, install the hydraulic line. **NOTE: All porting is designed for #4 SAE o-ring boss port adapter.**
2. Bleed system making sure all air is eliminated and torque bleeder screw approximately 13.6 N·m (10 lb·ft). Apply rated hydraulic pressure and check for leaks.

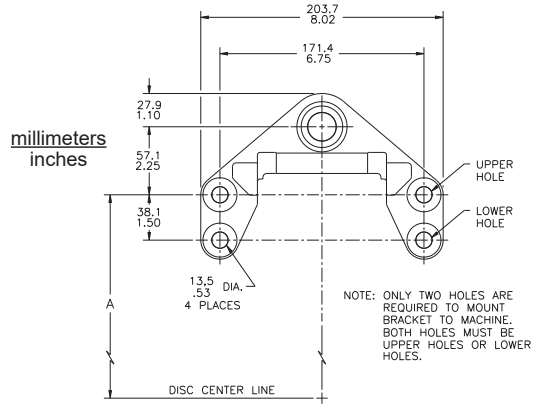


FIGURE 1

NOTE: For disc diameters greater than 609.6 mm add 3.2 mm (24 inch add 0.125 in) to disc radius to obtain “A” dimension.

DISC CENTERLINE TO MOUNTING HOLE DIMENSION

Disc Diameter	“A” Dimension
254.0 mm (10 in)	130.2 mm (5.125 in)
304.8 mm (12 in)	155.6 mm (6.125 in)
355.6 mm (14 in)	181.0 mm (7.125 in)
406.4 mm (16 in)	206.4 mm (8.125 in)
457.2 mm (18 in)	231.8 mm (9.125 in)
508.0 mm (20 in)	257.2 mm (10.125 in)
558.8 mm (22 in)	282.6 mm (11.125 in)
609.6 mm (24 in)	308.0 mm (12.125 in)

TABLE 2

NOTE
The collar tool is not to be used to release the brake. It is only to be used to hold the brake in the release position.

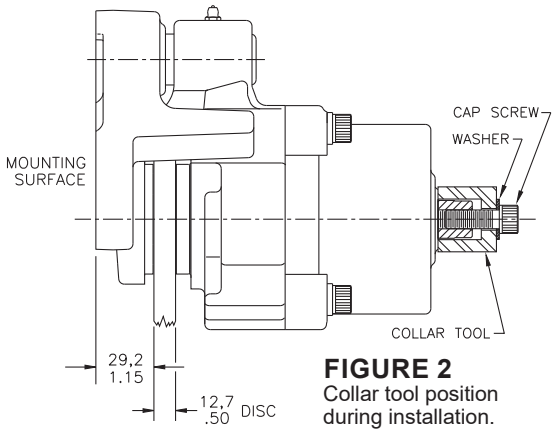


FIGURE 2
Collar tool position during installation.

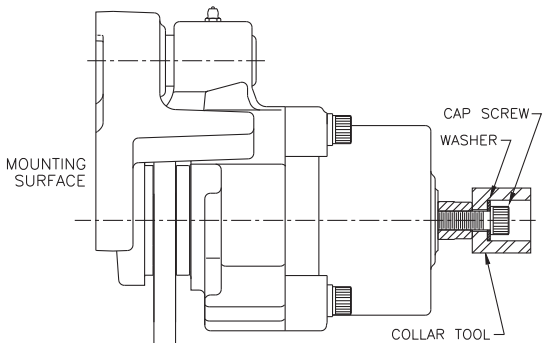


FIGURE 3
Collar tool position after installation.

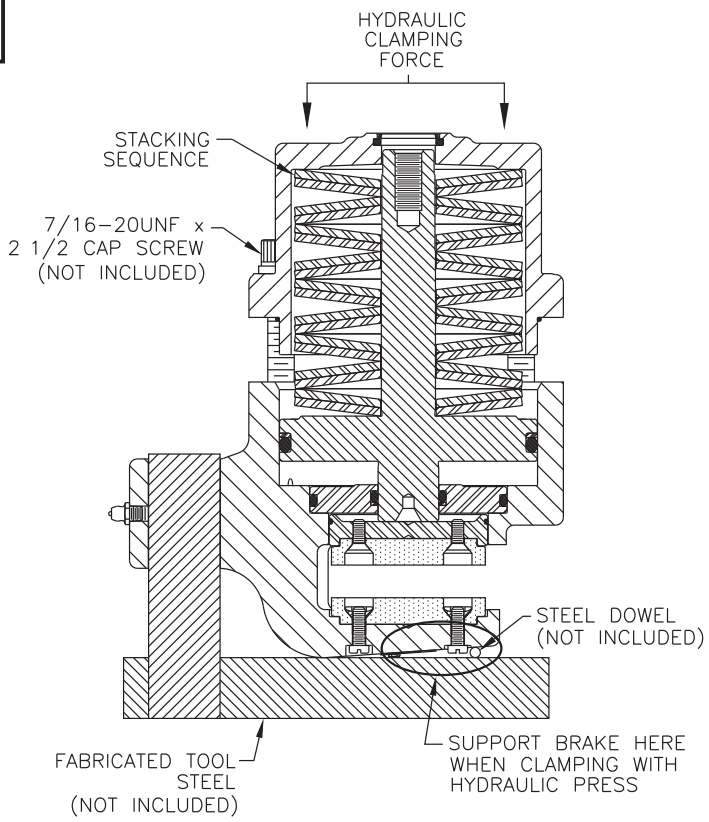
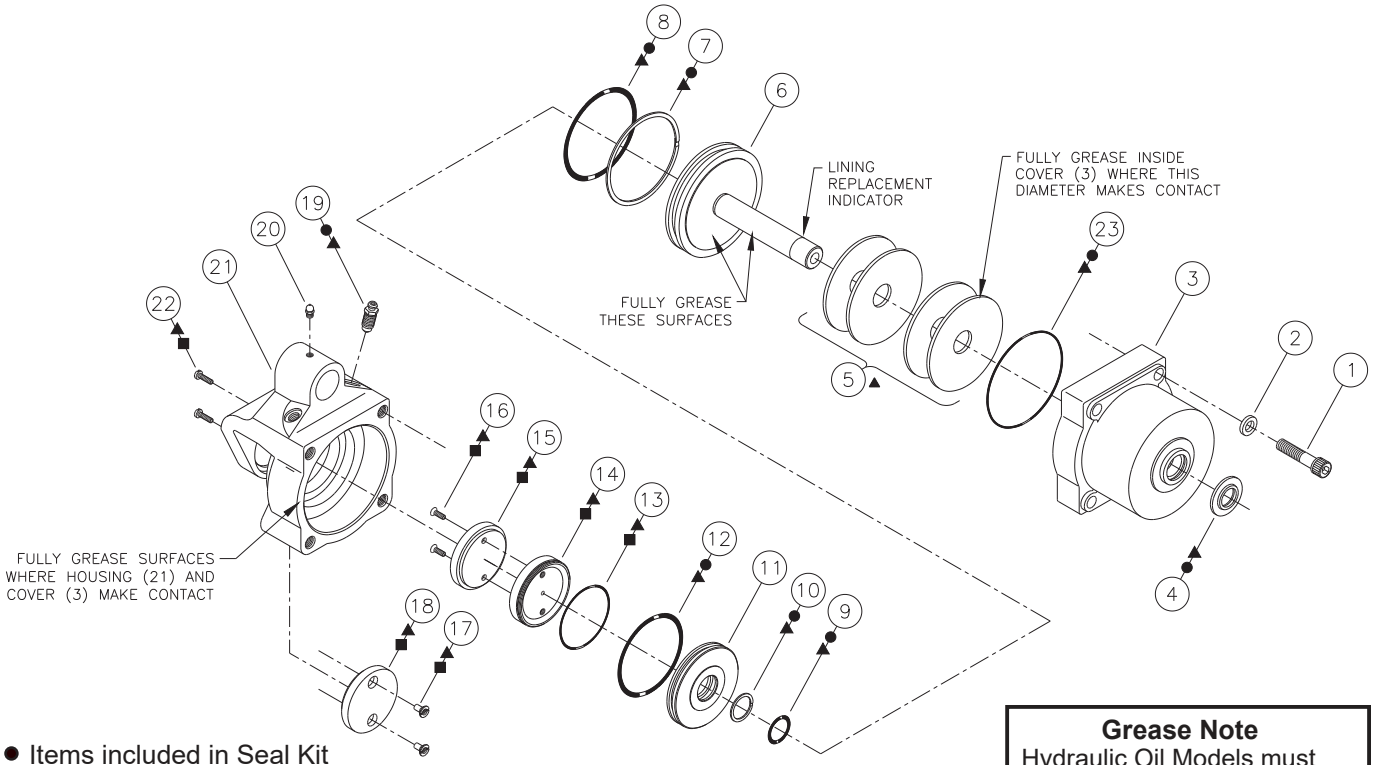


FIGURE 4



● Items included in Seal Kit
▲ Items included in Repair Kit
■ Items included in Lining Kit

Grease Note
Hydraulic Oil Models must use mineral base grease.

FIGURE 5

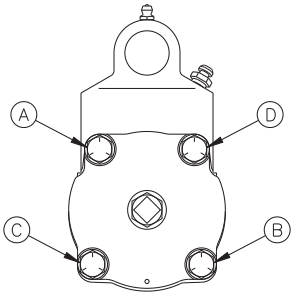


FIGURE 6

CHANGE LINING PROCEDURE

(Refer to Figure 5)

NEW LININGS MUST BE KEPT FREE OF OIL, GREASE, ETC.

1. Disconnect fluid line from the brake.

⚠ CAUTION

Cap the 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 the brake and mounting bracket assembly from the machine and remove the mounting bracket assembly from the brake.
3. Place the brake on a table. Connect a fluid line from a portable pressure source and apply approximately 69.0 bar (1000 PSI) to the brake. Be sure it is the same type fluid as used in the brake system.
4. Remove screws (22) and bushings (17). Using a thin blade tool, pry lining (18) from housing (21). Remove lining (18) through the disc clearance slot.
5. Pry piston (14)/lining (15) assembly from housing (21) bore using a thin blade tool. Remove piston/lining assembly through the disc clearance slot. **NOTE: Be careful not to scratch or mar piston or housing bore.**
6. Install new lining (15) on new piston (14) using new screws (16). Torque screws (16) 2.7-3.4 N·m (24-30 lb·in).
7. Lubricate new o-ring (13) with clean type fluid used in the system and install on new piston (14)/lining (15) assembly.
8. Install new piston (14)/lining (15) assembly by installing into housing (21) bore through the disc clearance slot.
9. Insert new bushings (17) into new lining (18). Install new lining (18) into housing (21) through the disc clearance slot. Line up holes with the housing and fasten with new screws (22) and torque 2.5-3.2 N·m (22-28 lb·in).
10. Release hydraulic pressure.
11. To continue refer to MOUNTING PROCEDURE Section (steps 4 through 8) and PLUMBING PROCEDURE Section.

CHANGE SEAL KIT or REPAIR KIT PROCEDURE

Disassembly

(Refer to Figure 5)

If Seal Kit is being installed, disregard steps 12 and 13.

1. Disconnect fluid line from the brake.

⚠ CAUTION

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

2. Place the brake on a table. Connect a fluid line from a portable hydraulic pressure source and apply approximately 69.0 bar (1000 PSI) to the brake. Be sure it is the same type fluid as used in the brake system.
3. Remove the bolts used to fasten the mounting bracket to the machine. Remove the brake and mounting bracket assembly from the machine and remove the mounting bracket assembly from the brake.

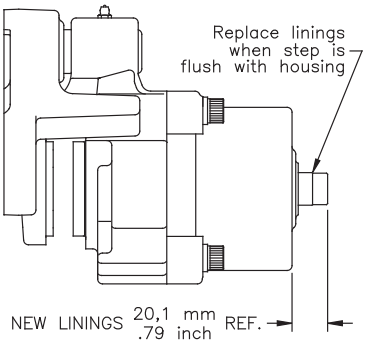


FIGURE 7

4. Release hydraulic pressure and disconnect the portable fluid line from the brake. Allow fluid to drain from the brake.
5. Remove the cap screw, washer, and collar tool and place the brake in a hydraulic press capable of 4990 kgf (11,000 lb) clamping force. The brake must be positioned with the lining wear indicator piston (6) facing up, see Figure 4 on page 2. A fabricated tool and dowel as shown in Figure 4 will aid in the disassembly and assembly process.
6. Apply at least 4990 kgf (11,000 lb) of clamping force to cover (3), see Figure 4.
7. With the clamping force applied, remove four cap screws (1) and washers (2).

⚠ CAUTION

Loosen cap screws (1) evenly and in order A, B, C, D until spring preload is released. See Figure 6.

8. Slowly release the clamping force from on the brake. Remove cover (3), belleville springs (5) and o-ring (23). Using a thin blade tool, remove seal (4) from cover (3).
9. Remove piston (6) from housing (21) bore. Remove o-ring (8) and back-up ring (7) from piston (6). **NOTE: Be careful not to scratch or mar housing bore or piston.**
10. Remove piston (11) from housing (21) bore. Remove o-rings (9 & 12) and back-up ring (10) from piston (11). **NOTE: Be careful not to scratch or mar housing bore or piston.**
11. Remove bleeder screw (19).
12. Remove screws (22) and bushings (17). Using a thin blade tool, pry lining (18) from housing (21). Remove lining (18) through the disc clearance slot.
13. Pry piston (14)/lining (15) assembly from housing (21) bore using a thin blade tool. Remove piston/lining assembly through the disc clearance slot. **NOTE: Be careful not to scratch or mar piston or housing bore.**

Assembly

(Refer to Figure 5)

LUBRICATE ALL RUBBER COMPONENTS WITH CLEAN TYPE FLUID USED IN THE SYSTEM. NEW LININGS MUST BE KEPT FREE OF OIL, GREASE, ETC. (IF SEAL KIT IS BEING INSTALLED, EXISTING LININGS MUST BE KEPT FREE OF OIL, GREASE, ETC.

If Seal Kit is being installed, disregard steps 3, 4, 5, and 6.

NOTE

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

1. Clean housing (21) bore, pistons (6 & 11) and inside of cover (3) with clean type fluid used in the system. **NOTE: Use a heavy, water proof grease to lubricate the surfaces as shown in Figure 5 on page 2. See Grease Note.**

continued...

2. Install new bleeder screw (19) and finger tighten.
3. Install new bushings (17) into new lining (18). Install new lining (18) into housing (21) through the disc clearance slot. Line up the holes with holes in housing and fasten with new screws (22) and torque 2.5-3.2 N·m (22-28 lb·in).
4. Attach new lining (15) to new piston (14) with new screws (16) and torque 2.7-3.4 N·m (24-30 lb·in) Install new o-ring (13) on new piston (14).
5. Position housing (21) vertically as shown in Figure 4 on page 2.
6. Lubricate outer diameter of piston (14) with clean type fluid used in the system and insert piston (14)/lining (15) assembly into housing (21) bore until lining (15) contacts the lining already attached to the housing.
7. Install new o-rings (9 & 12) and new back-up ring (10) on piston (11). Install piston (11) into housing (21) bore. Note direction of piston (11), see Figure 4 on page 2. **NOTE: Be careful not to scratch or mar piston or housing bore.**
8. Install new back-up ring (7) and new o-ring (8) on piston (6). Note the order of components.
9. Carefully align stem of piston (6) with hole in piston (11) and install piston (6) into housing (21) bore. **NOTE: Be careful not to scratch or mar piston or housing bore.**
10. Install belleville springs (5) over the end of piston (6). Follow the stacking sequence as shown in Figure 4 on page 2. **NOTE: If seal kit is being installed use the existing belleville springs after completely lubricating them with a light coat of heavy, water proof grease, see Grease Note in Figure 5 on page 2. If repair kit is being installed use new belleville springs, already greased. Note that the belleville spring nearest the cover must contact the cover on its outside diameter.**
11. Install new seal (4) in cover (3) and place new o-ring (23) in housing (21).
12. **NOTE: This step is to align cover (3) with housing (21). The four 7/16-20UNF x 2 1/2 inch long cap screws required for this step are not included in the kits.** Place cover (3) on belleville springs (5) and install four 7/16-20UNF x 2 1/2 inch long cap screws through the holes in cover (3), see Figure 4. Engage threads of the 2 1/2 inch long cap screws into housing (21).

NOTE

The following steps will require the use of a hydraulic press capable of more than 4990 kgf (11,000 lb) clamping force.

13. Slowly press cover (3) down until contact is made with housing (21).
14. With hydraulic clamping force applied to cover (3), remove the 2 1/2 inch long cap screws and replace them with cap screws (1) and washers (2). Apply a small amount of Loctite 242 to threads of cap screws (1). Torque cap screws (1) 99.0-105.8 N·m (73-78 lb·ft).

⚠ CAUTION

Tighten cap screws (1) evenly and in order A, B, C, D until spring preload is released. See Figure 6 on page 3.

15. Release hydraulic clamping force.
16. To continue refer to MOUNTING PROCEDURE Section (steps 4 through 8) and PLUMBING PROCEDURE Section.

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