HYDRAULIC
Caliper Disc Brake

Installation and Service Instructions

TABLE 1

Model Number	Piston Replacement Kit Number	Lining Kit Number	Seal Kit Number
02-520-300 (HO)	02-500-246	20-060-123	02-500-245
*02-520-305 (HO)	02-500-246	20-060-123	02-500-245

HO = Hydraulic Oil
* Includes fittings for installation.
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 this 520 Series Disc Brake, it is of utmost importance that the caliper be centered evenly and squarely over the disc. This will ensure even and equal piston travel and lining to disc contact.

⚠ CAUTION

This 520 Series Brake is designed to be used with discs 25.4 mm (1.00 in) thick. For other disc thicknesses, contact Zf Off-Highway Solutions Minnesota Inc.

Position the brake with a hex bleeder in an uppermost location.

MOUNTING PROCEDURE

1. When planning or designing an installation of this brake on a machine, the mounting surface to disc face dimension of 30.2 mm (1.19 in) should be closely held. Use shims as needed to obtain the proper distance. **NOTE: Mounting surface must be parallel with disc.**
2. Using Table 2, determine "A" dimension and locate caliper mounting holes. This brake is designed to be mounted to a bracket with two 1 inch-8UNC tapped holes using the 1 inch-8UNC socket head cap screws provided with the brake. Torque the cap screws 407 N·m (300 lb·ft) minimum. The lock washers and hex nuts are provided primarily for shipping purposes, however, they can be used for mounting where "through-holes" in the bracket are desired rather than tapped holes. When this type mounting is desired, relocate the two lock washers to the hex nut end and torque the same as above. Use a 26 mm (1 1/32 in) diameter drill maximum.

PLUMBING PROCEDURE

1. After caliper assembly is mounted on machine, install hydraulic lines. **NOTE: All porting is designed for #4 SAE o-ring boss port adapter.**
2. Bleed the system making sure all air is eliminated. Apply hydraulic pressure and check for leaks.

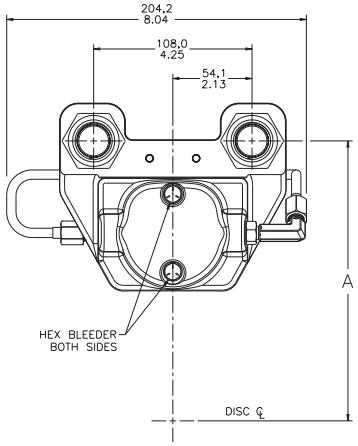

FIGURE 1

DISC CENTERLINE TO MOUNTING HOLE DIMENSION

Disc Diameter	"A" Dimension
254.0 mm (10 in)	152.4 mm (6.00 in)
304.8 mm (12 in)	177.8 mm (7.00 in)
355.6 mm (14 in)	203.2 mm (8.00 in)
406.4 mm (16 in)	228.6 mm (9.00 in)
457.2 mm (18 in)	254.0 mm (10.00 in)
508.0 mm (20 in)	279.4 mm (11.00 in)
609.6 mm (24 in)	304.8 mm (12.00 in)

TABLE 2

NOTE: Add 25.4 mm (1.00 in) to disc radius to obtain "A" dimension.

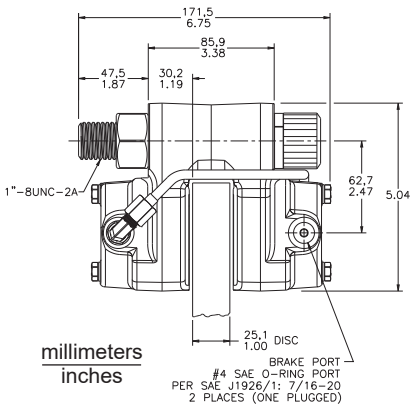

FIGURE 2

CHANGE LINING PROCEDURE

(Refer to Figure 3)

See TABLE 1 for Lining Kit required for your brake.

> **NOTE**
>
> Brake linings should be replaced when lining thickness is worn to approximately 7 mm (0.28 in), or within 3 mm (0.13 in) of the mounting slot in the lining (not including steel backing plate). Damage to the piston will result if the lining is allowed to wear beyond this point.

1. With zero hydraulic pressure applied to the caliper brake, remove two cap screws (1) and two lock washers (2) from one of the caliper brake halves.
2. Remove lining stop bracket (3) and slide lining (4) out of the caliper brake.
3. Repeat steps 1 and 2 to remaining caliper brake half.
4. Before installing new linings, force the pistons in each caliper brake half all the way into the cylinders. If residual pressure remains in the cylinders, it may be necessary to loosen one of the bleed screws (12) on each cylinder to release the pressure.
5. With piston fully retracted, slide new lining (4) onto piston (9) lining retainer. See Figure 3a.
6. Install lining stop bracket (3) using two lock washers (2) and two cap screws (1). Torque cap screws (1) 6.8-10.9 N·m (5-8 lb·ft).
7. Repeat steps 5 and 6 to remaining caliper brake half.

CHANGE SEAL KIT or PISTON REPLACEMENT PROCEDURE

(Refer to Figure 3)

See TABLE 1 for Seal Kit or Piston Replacement Kit required for your brake.

1. With zero hydraulic pressure applied to the caliper brake, disconnect the hydraulic input pressure. Remove caliper brake from mounting bracket and separate caliper brake halves by disconnecting one of the tube nuts on the crossover tube and removing two hex nuts (7), two lock washers (6) and two cap screws (5). Drain fluid from caliper housing halves. Note, some applications use two cap screws (5) to bolt to threaded holes in the mounting bracket. Hex nuts (7) and lock washers (6) are not used with these applications.
2. Remove two cap screws (1), two lock washers (2), lining stop bracket (3) and lining (4) from caliper brake half. Repeat step 2 to remaining caliper brake half.
3. Carefully work outer diameter of boot (11) from groove in caliper housing. Pull piston assembly (8) from caliper housing cylinder. Do not remove the lining retractor mechanism pin from caliper housing cylinder.
4. If Seal Kit is being installed, remove quad ring (10) and boot (11) from piston (9) (Discard old piston if Replacement Kit is being installed). Install new quad ring (10) and new boot (11) on piston (9). Be sure new quad ring (10) is properly seated in groove.
5. Repeat steps 3 & 4 to remaining caliper brake half.
6. Coat the quad ring and cylinder wall with compatible system fluid. Partially install new or refurbished piston assembly (8) into caliper housing cylinder and onto the lining retractor mechanism pin far enough to install the outer diameter of boot (11) into the groove in caliper housing.
7. Force the piston assembly all the way into the cylinder. Install lining (4) on piston (9) lining retainer. See Figure 3a. Install lining stop bracket (3), two lock washers (2) and two cap screws (1). Torque cap screws (1) 6.8-10.9 N·m (5-8 lb·ft).
8. Remove two hex bleeder screws (12) and two seals (13) from caliper brake housing. Install two new seals (13) and two hex bleeder screws (12) in caliper brake housing. Torque hex bleeder screws (12) 6.8-10.9 N·m (5-8 lb·ft).
9. Repeat steps 6, 7 and 8 to remaining caliper brake half.
10. Install the two caliper brake housing halves on the rotor disc and bolt to the mounting bracket using cap screws (5), lock washers (6) and hex nuts (7). Torque cap screws (5) a minimum of 406.8 N·m (300 lb·ft). **NOTE: Lock washers (6) and hex nuts (7) may not be used in all applications.**
11. Reconnect the tube nut on the crossover tube and torque 12.2-20.3 N·m (9-15 lb·ft).
12. Reconnect hydraulic input pressure to the brake and bleed all trapped air. While hydraulic pressure is applied to the brake, gently loosen the hex bleeder screw (12) located at the highest position of the caliper half and allow air and a small amount of fluid to escape. Repeat this process for both caliper brake halves until no bubbles appear in the escaping fluid. Be sure adequate supply of fluid is available to the brake during entire bleeding process to prevent air ingestion into the system. Re-torque hex bleeders (12) 6.8-10.9 N·m (5-8 lb·ft). Check all connections for leaks and tighten if leaks occur. **NOTE: Re-tighten hex bleeders (12) before removing applied hydraulic pressure to the brake or air will be sucked into the brake.**

THEORY OF OPERATION

(Lining Retractor Mechanism)

(Refer to Figure 4)

The lining retractor mechanism prevents unnecessary lining wear by maintaining a constant lining to rotor disc clearance distance.

Pin (14) is fixed to the caliper cylinder housing by snap ring (15). Piston assembly (8) is positioned by two retaining rings (16) which slide along pin (14). Spring (17) is retained in the piston by washer (18) and snap ring (19). The force required to slide the retaining rings (16) on the pin is greater that the force developed by spring (17).

When hydraulic pressure is applied, piston assembly (8) moves outward, compressing spring (17) until washer (18) bottoms against spring guide (20). Hydraulic pressure moves piston assembly (8) and forces the two retaining rings (16) outward on pin (14).

When the hydraulic pressure is removed, retaining rings (14) maintain their new position on pin (14). Spring (17) then retracts piston assembly (8) until spring guide (20) bottoms against piston assembly (8). The gap between spring guide (20) and washer (18) is equal to the clearance between linings and rotor disc.

● Items included in Lining Kit
■ Items included in Seal Kit
▲ Items included in Piston Replacement Kit

Figure 3a

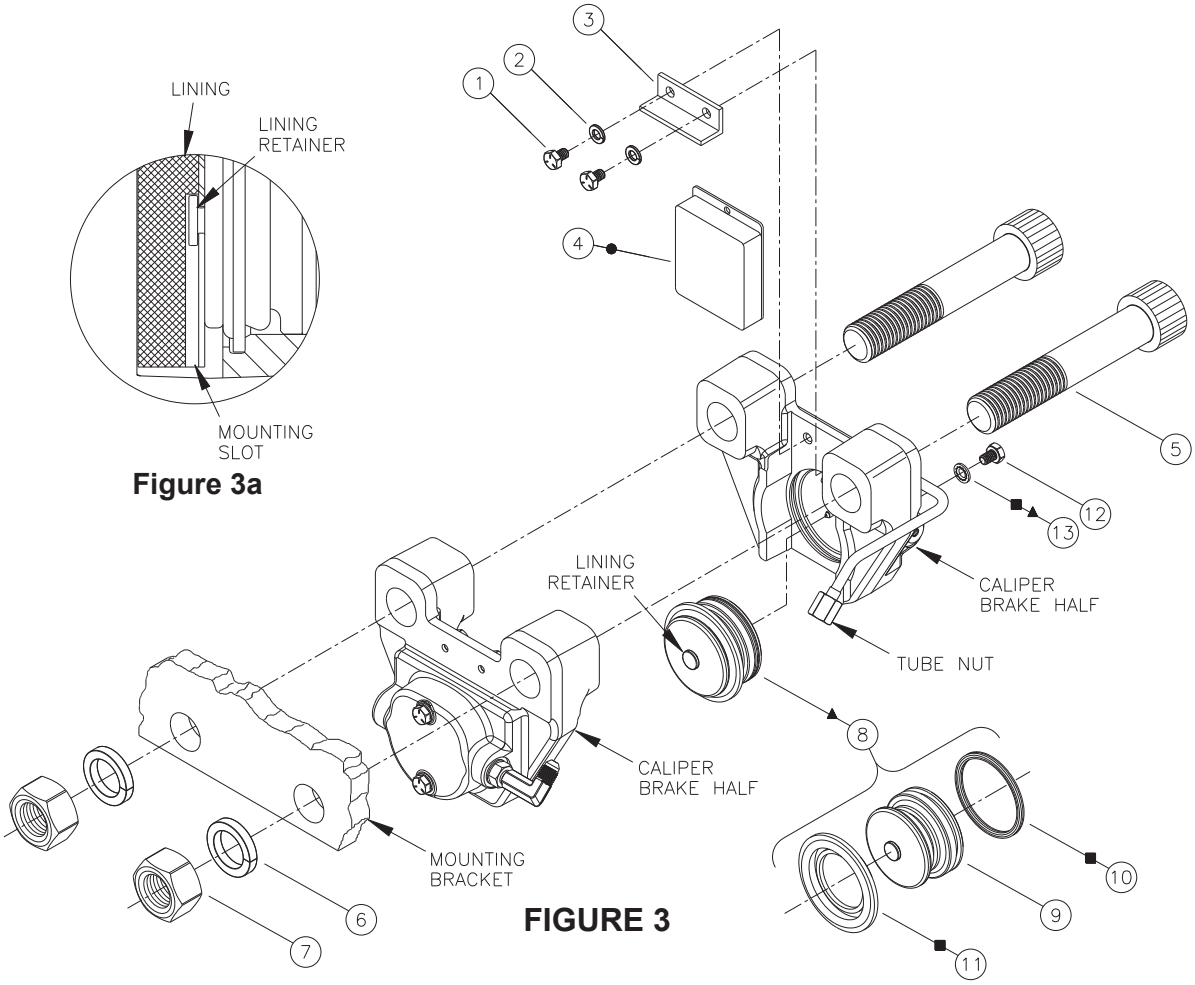

FIGURE 3

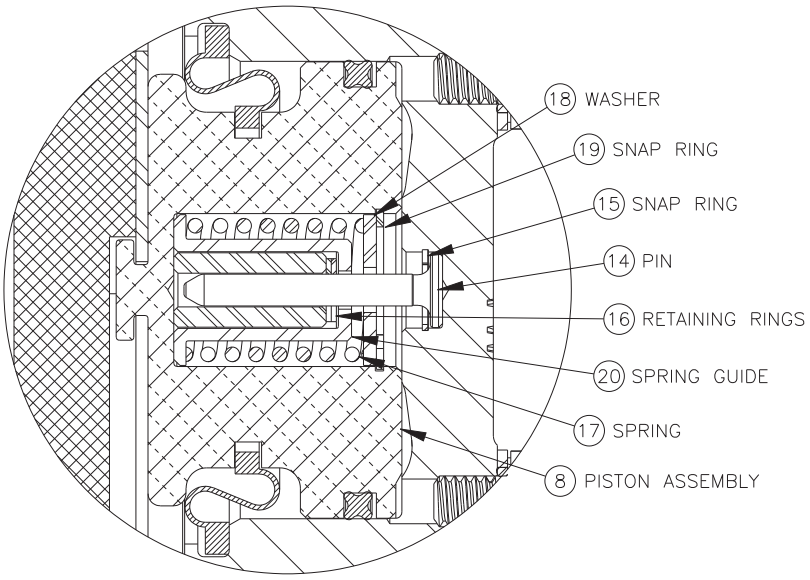

FIGURE 4

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