SPRING APPLY
Caliper Disc Brake

Installation and Service Instructions

TABLE 1

Model Number	Lining Kit Number	Seal Kit Number	Repair Kit Number •	Model Number	Lining Kit Number	Seal Kit Number	Repair Kit Number •
02-515-001 (BF)	20-060-082	02-500-037	02-500-192	*02-515-152 (HO)	20-060-082	02-500-095	02-500-199
02-515-002 (HO)	20-060-082	02-500-036	02-500-187	02-515-154 (HO)	20-060-082	02-500-036	02-500-186
02-515-003 (BF)	20-060-082	02-500-037	02-500-193	*03-515-003 (BF)	20-060-082	02-500-137	02-500-205
02-515-004 (HO)	20-060-082	02-500-036	02-500-186	*03-515-004 (HO)	20-060-082	02-500-095	02-500-200
02-515-005 (BF)	20-060-082	02-500-037	02-500-194	*03-515-005 (BF)	20-060-082	02-500-137	02-500-204
02-515-006 (HO)	20-060-082	02-500-036	02-500-188	*03-515-006 (HO)	20-060-082	02-500-095	02-500-201
02-515-007 (BF)	20-060-082	02-500-037	02-500-195	*03-515-008 (HO)	20-060-082	02-500-095	02-500-202
02-515-008 (HO)	20-060-082	02-500-036	02-500-190	*03-515-013 (BF)	20-060-082	02-500-139	02-500-205
02-515-012 (HO)	20-060-082	02-500-036	02-500-189	*03-515-014 (HO)	20-060-082	02-500-095	02-500-200
02-515-018 (HO)	20-060-036	02-500-036	02-500-188	*03-515-016 (HO)	20-060-082	02-500-095	02-500-201
02-515-020 (HO)	20-060-082	02-500-036	02-500-190	*03-515-018 (HO)	20-060-082	02-500-095	02-500-202
02-515-022 (HO)	20-060-082	02-500-077	none	*03-515-023 (BF)	20-060-082	02-500-137	02-500-205
02-515-024 (HO)	20-060-082	02-500-077	02-500-197	*03-515-028 (HO)	20-060-082	02-500-095	02-500-202
02-515-028 (HO)	20-060-082	02-500-077	none	03-515-034 (HO)	20-060-082	02-500-036	02-500-200
02-515-038 (HO)	20-060-082	02-500-036	02-500-191	03-515-036 (HO)	20-060-082	02-500-036	02-500-186
02-515-044 (HO)	20-060-082	02-500-036	02-500-216	03-515-038 (HO)	20-060-082	02-500-095	02-500-203
02-515-058 (HO)	20-060-126	02-500-036	02-500-190	*03-515-104 (HO)	20-060-082	02-500-208	02-500-209
02-515-119 (BF)	20-060-082	02-500-037	02-500-196				

BF = Brake Fluid HO = Mineral Base Hydraulic Oil

* With swivel fitting (see swivel fitting block drawing, Figure 5 on page 3).

• Belleville springs included in this kit are pre-greased. DO NOT remove grease from springs (see Grease Note in Figure 4 on page 3).

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 to maintain parallelism between mounting bolts and that the caliper be centered evenly and squarely over the disc. This will prevent binding of the caliper and ensure even lining to disc contact.

⚠ CAUTION

These Caliper Disc Brakes are designed to be used with a disc thickness of 12.7 mm (0.50 in). For other disc thicknesses, contact ZF Off-Highway Solutions Minnesota Inc.

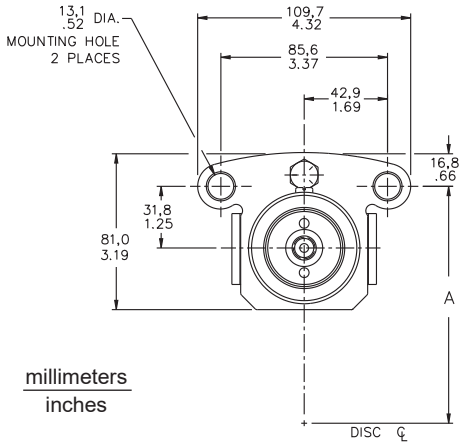

FIGURE 1

DISC CENTERLINE TO MOUNTING HOLE DIMENSION

Disc Diameter	"A" Dimension
152.4 mm (6 in)	85.9 mm (3.38 in)
203.2 mm (8 in)	111.3 mm (4.38 in)
254.0 mm (10 in)	136.7 mm (5.38 in)
304.8 mm (12 in)	162.1 mm (6.38 in)
355.6 mm (14 in)	187.5 mm (7.38 in)
406.4 mm (16 in)	212.9 mm (8.38 in)
457.2 mm (18in)	283.3 mm (9.38 in)
508.0 mm (20 in)	263.7 mm (10.38 in)
558.8 mm (22 in)	289.1 mm (11.38 in)
609.6 mm (24 in)	314.5 mm (12.38 in)

TABLE 2

For disc diameters greater than 660.4 mm, add 3.3 mm (26 in, add 0.13 in) to disc radius to obtain "A" dimension.

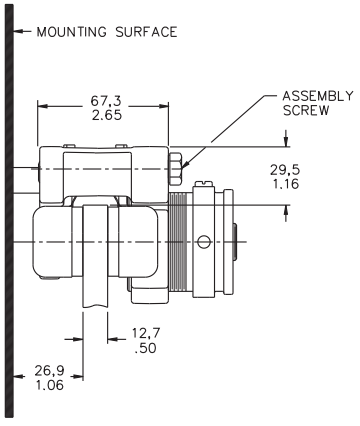

FIGURE 2

MOUNTING PROCEDURE

1. Using Figure 1 and Table 2, determine “A” dimension and locate caliper mounting holes.
2. Mount the brake on the disc and bolt securely to the vehicle or machine using SAE grade 5 or better mounting bolts or pins.

HYDRAULIC CONNECTION AND ADJUSTMENT PROCEDURE

(Refer to Figure 4)

Port Size: #4 SAE O-ring Boss

1. Install the hydraulic line, leaving tube nut slightly loose to allow turning adjustment of brake module. **NOTE: The adjusting procedure may be simplified if a swivel fitting is used. (See swivel fitting block chart, Table 3).**
2. Bleed system using bleeder screw (8) at the highest point making sure all air is eliminated.

⚠ CAUTION

During the bleeding process for Caliper Disc Brakes, hydraulic pressure should not exceed 13.8 bar (200 PSI).

3. Apply hydraulic pressure and check for leaks.
4. Apply rated hydraulic pressure.
5. Thread in the brake module until a total clearance of approximately 0.30 mm (0.012 in) is obtained between the disc and linings. Use a spanner wrench if necessary.
6. Tighten set screw (16) and release hydraulic pressure.
7. Tighten hydraulic fitting (tube nut).

CHANGE SEAL KIT OR REPAIR KIT PROCEDURE

(Refer to Figures 3 and 4)

See Table 1 for the kit required for your brake.

1. Disconnect fluid line from brake and remove caliper from vehicle or machine.

⚠ CAUTION

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

2. Remove set screw (16) from housing (19) and remove brake module housing (7) from housing.
3. Position brake module housing (7) in a wheel puller (Refer to Figure 3). Apply force until piston (12) retracts approximately 0.80 mm (0.03 in). Using a spanner wrench, remove piston (1).
4. Carefully remove o-ring (3) and back-up ring (2) from piston (1). **NOTE: Be careful not to scratch or mar piston.**
5. Remove wheel puller from brake module housing (7). Carefully remove piston (12), washers (10), belleville springs (11), spacer (9), back-up ring (6), o-ring (5), and insert (4) from brake module housing. **NOTE: Be careful not to scratch or mar brake module housing bore.**

NOTE

Note the quantity and order of belleville springs (11), washers (10), and spacer (9) for assembly purposes.

NOTE: Due to the extreme pressure created by the belleville springs (11), the procedure shown in Figure 3 is needed to disassemble brake module housing (7).

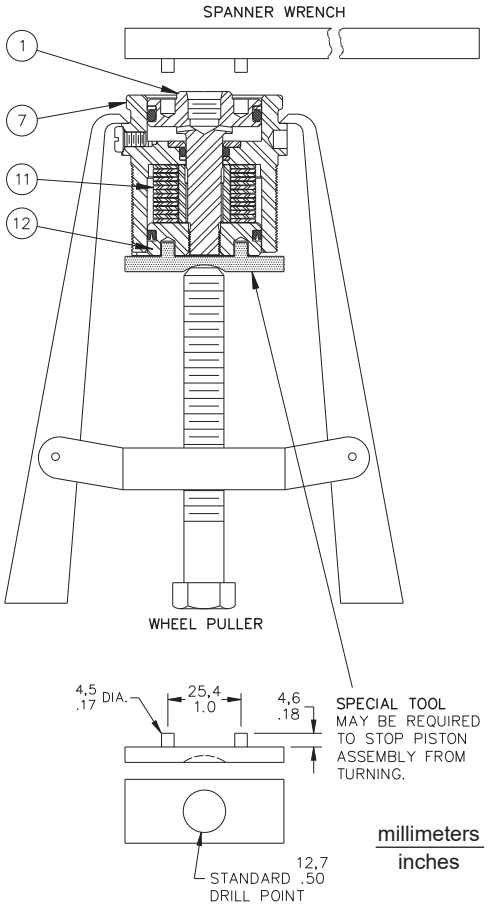

FIGURE 3

6. Remove cup (13) from piston (12). **NOTE: In older models item 13 will be an o-ring.**
7. Clean all parts thoroughly and lubricate all rubber components from seal kit or repair kit with clean type system fluid.
8. Carefully install new back-up ring (6), new o-ring, (5), and insert (4) in brake module housing (7). Note order of back-up ring and o-ring.
9. Carefully install new o-ring (3), and new back-up ring (2) on piston (1). Note order of o-ring and back-up ring.
10. Carefully install piston (1) into brake module housing (7).
11. Lubricate all items as shown in Figure 4 with a light coat of heavy, waterproof grease (See GREASE NOTE, Figure 4). Install belleville springs (11), washers (10), and spacer (9) into brake module housing (7). **NOTE: If seal kit is being installed use existing belleville springs after completely lubricating with a light coat of heavy, water proof grease (See Grease Note, Figure 4).**
If repair kit is being installed use new belleville springs, already greased. Be sure to use the same number of belleville springs and washers in the same order as they were disassembled.

12. Install new cup (13) on piston (12) and carefully install in brake module housing (7) by threading onto piston (1). Note direction of cup(13).
13. Reposition brake module housing (7) in wheel puller (Refer to Figure 3). Apply force until piston (12) moves approximately 0.80 mm (0.03 in). Using a spanner wrench, tighten piston (1) securely.
14. Remove wheel puller.
15. Install brake module housing (7) into housing (19). Hand tighten brake module housing.

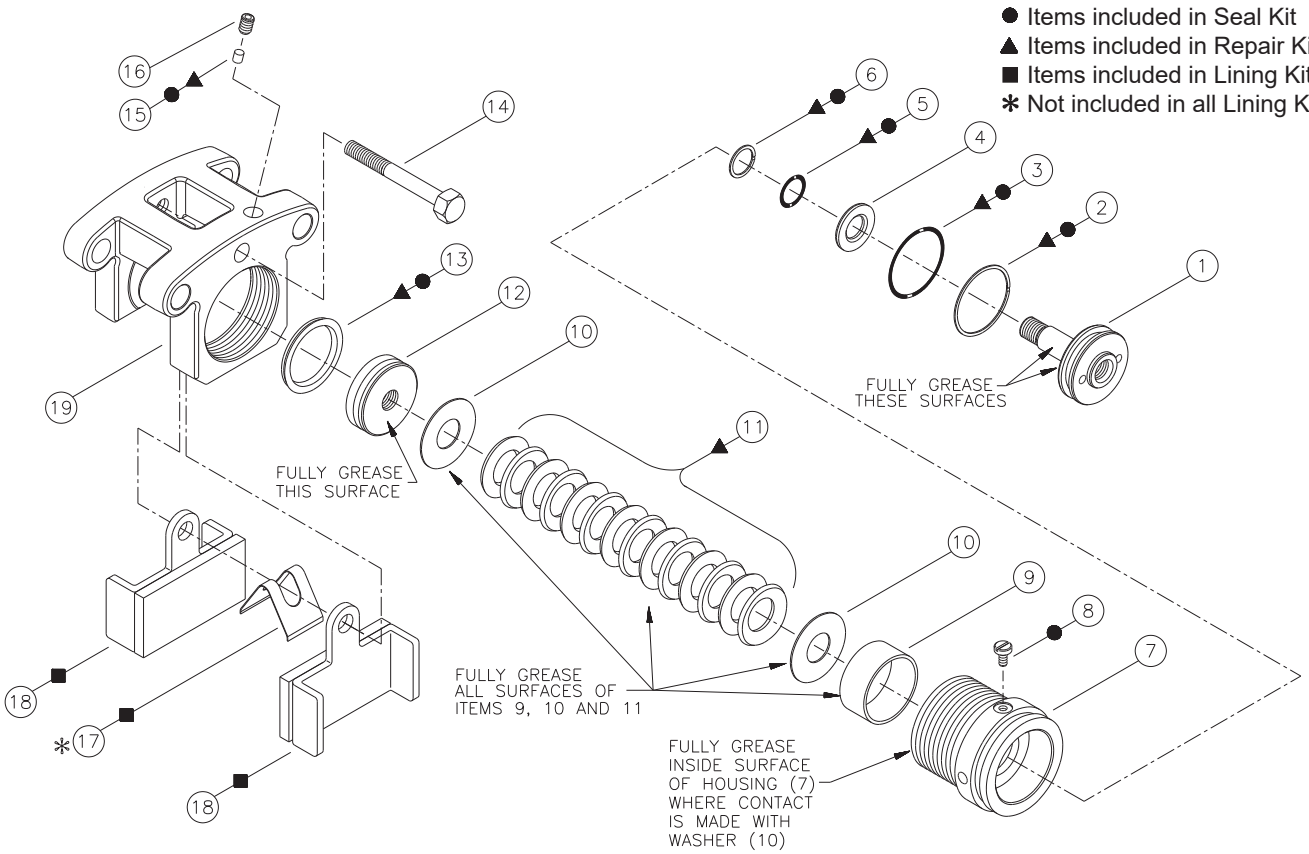

FIGURE 4

Grease Note

Brake Fluid Models must use a silicone base grease.

Hydraulic Oil Models must use a mineral base grease.

NOTE: The number and order of belleville springs (11) and washers (10) vary from model to model. Size and location of spacer (9) also varies from model to model. Some models do not use washers and/or spacers.

OPTIONAL SWIVEL FITTING BLOCK MODEL NUMBERS

1/8-27 NPTF	# 4 SAE O-ring Boss	1/4 Inverted Tube Seat
02-515-152	03-515-013	03-515-023
03-515-003	03-515-014	03-515-028
03-515-004	03-515-016	
03-515-005	03-515-018	
03-515-006		
03-515-008		
03-515-104		

TABLE 3

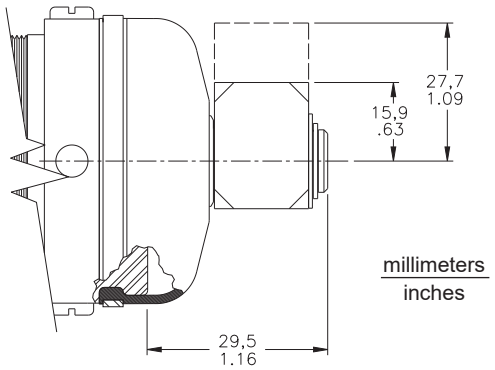

FIGURE 5

16. Install flexible hydraulic line, leaving tube nut slightly loose to allow turning adjustment of brake module. **NOTE: The adjusting procedure may be simplified if a swivel fitting is used (see swivel fitting block chart, Table 3).**
17. Remove bleeder screw (8). Adjust module housing (7) so bleeder screw port is at the highest point and bleed system of air. Install new screw (8) and torque 12.4-13.6 N·m (110-120 lb·in).

⚠ CAUTION

During the bleeding process for these Caliper Disc Brakes, hydraulic pressure should not exceed 13.8 bar (200 PSI).

18. Apply hydraulic pressure and check for leaks.
19. Apply rated hydraulic pressure.
20. Thread in brake module housing (7) until a total clearance of approximately 0.30 mm (0.012 in) is obtained between disc and lining assemblies (18). Use a spanner wrench if necessary.
21. Insert new nylon plug (15) into set screw (16) hole. Install nylon plug (15) even if originally not included on your model.
22. Install and tighten set screw (16) and release hydraulic pressure.
23. Tighten hydraulic fitting (tube nut).

CHANGE LINING PROCEDURE

(Refer to Figure 6)

See Table 1 for lining kit required for your brake. Lining assemblies (18) can be replaced without removing brake module housing (7).

1. Remove cap screw (14) and spring clip (17); allow lining assemblies (18) to drop out of housing (19). **NOTE: On small diameter discs with large hubs, it may be necessary to remove one mounting bolt and swing housing aside to free lining assemblies. Earlier models used a compression spring which is not included in the lining kit.**
2. Thread brake module housing (7) out of housing (19) so that piston (12) is flush with housing.
3. Install new lining assemblies (18) in housing (19).

● Items included in Seal Kit
▲ Items included in Repair Kit
■ Items included in Lining Kit
✻ Not included in all Lining Kits

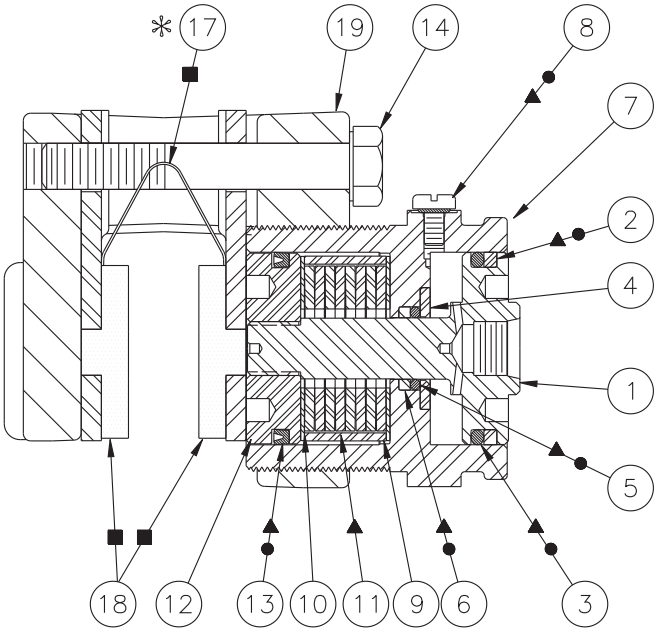

FIGURE 6

4. Install new spring clip (17) and cap screw (14) and torque 13.6-16.3 N·m (10-12 lb·ft). **NOTE: If the lining kit does not include new spring clip (17), reinstall compression spring.**
5. To continue, refer to HYDRAULIC CONNECTION and ADJUSTMENT PROCEDURE Section.

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