HYDRAULIC
Caliper Disc Brake

Installation and Service Instructions

TABLE 1

Model Number	Lining Kit Number	Repair Kit Number
02-520-201 (BF) Replaces 02-520-033	20-060-087	02-500-043
02-520-202 (HO) Replaces 02-520-034	20-060-087	02-500-042
02-520-203 (BF)	20-060-087	02-500-043
02-520-205 (BF)	20-060-087	02-500-043
02-520-206 (HO)	20-060-087	02-500-042
02-520-208 (HO)	20-060-087	02-500-241
02-520-210 (HO)	20-060-087	02-500-430
03-520-205 (BF)	20-060-087	02-500-043

BF = Automotive Brake Fluid HO = Mineral Base Hydraulic Oil
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. This 520 Series Brake is designed to be used 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 Moinnesota Inc.

MOUNTING PROCEDURE

1. When planning or designing an installation of this brake on a vehicle or machine, the mounting surface to disc face dimension of 57.9 mm (2.28 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. Bolt caliper assembly securely to vehicle or machine. **SEE TORQUE NOTE.**

TORQUE NOTE

It is recommentded to use 1/2-20 plated SAE grade 8 mounting bolts and heat treated washers.
Torque: 122.0-135.6 N·m (90-100 lb·ft).

PLUMBING PROCEDURE

1. After caliper assembly is mounted on vehicle or 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.
3. Torque bleeder screws 12.2-20.0 N·m (9-15 lb·ft).

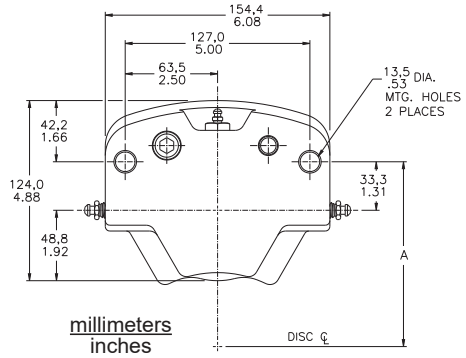

FIGURE 1

DISC CENTERLINE TO MOUNTING HOLE DIMENSION

Disc Diameter	“A” Dimension
254 mm (10 in)	127.0 mm (5.00 in)
305 mm (12 in)	152.4 mm (6.00 in)
356 mm (14 in)	181.1 mm (7.13 in)
406 mm (16 in)	206.5 mm (8.13 in)
457 mm (18 in)	231.9 mm (9.13 in)
508 mm (20 in)	258.8 mm (10.19 in)
610 mm (24 in)	312.7 mm (12.31 in)

TABLE 2

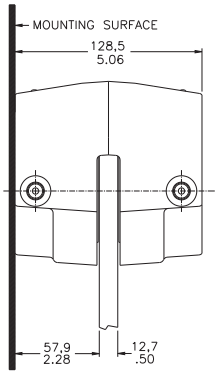

FIGURE 2

LINING REPLACEMENT INSTRUCTIONS

See table 1 for Lining Kit required for your brake.

1. Follow steps 1-3 of Change Repair Kit Procedure Disassembly (for Externally or Internally Ported Models).
2. Gently press piston back into housing bore. Piston must bottom on housing to assure lining to disc clearance on vehicle or machine.
3. Install new lining assemblies into housing pockets.
4. Complete brake assembly by following steps 10-15 (for Externally Ported Models) or steps 11-15 (for Internally Ported Models) of Assembly Procedure.

EXTERNALLY PORTED MODEL NUMBERS:

02-520-033
02-520-034

REPAIR KIT REPLACEMENT INSTRUCTIONS

Disassembly Procedure

(Refer to Figure 3)

See table 1 for Repair Kit required for your brake.

1. Remove brake from vehicle or machine by disconnecting necessary fluid lines and removing mounting bolts. Drain fluid from assembly.
2. Separate housing (3) halves by removing cap screws (1), washers (2), tubing assembly (10) and spacer (9).
3. Remove lining assembly (8) from housing (3).
4. Remove bleeder screw (12) from one housing (3) half. Remove o-ring (11) from bleeder screw.
5. Remove piston (7) from housing (3) half by pulling piston from bore. If piston fails to move, place housing half face down on bench. Protect piston face by placing a cloth between piston and bench. Support housing half on bench in such a way that piston can be eased out of its bore. This is accomplished by carefully introducing low pressure air, 0.7-1.0 bar (10-15 PSI), through fluid inlet fittings.

⚠ CAUTION

Do not use high pressure as it is dangerous and unnecessary. Use just enough air pressure to ease the piston out of the bore. Do not blow piston out of the bore If piston is seized or cocked or does not come out readily, release the air pressure and use a soft (brass) hammer to rap sharply on and around the end of the piston. Reapply air pressure to remove the piston.

While pulling piston out of its bore, work boot (6) lip from piston groove. **Be careful not scratch piston.**

6. Remove boot (6) from housing (3) half. Remove back-up ring (5) and o-ring (4) from inner housing groove. Use a small screwdriver or similar tool. **Be careful not to scratch the bore.**
7. Repeat steps 3-6 for second housing (3) half.

Assembly Procedure

(Refer to Figure 3)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM. MAKE SURE THE REPAIR KIT USED IS THE PROPER ONE FOR YOUR SYSTEM.

1. Wash housing bore with clean type fluid used in system.
2. Install new o-ring (4) and new back-up ring (5) in groove of one housing (3) half. Note order of o-ring and back-up ring.

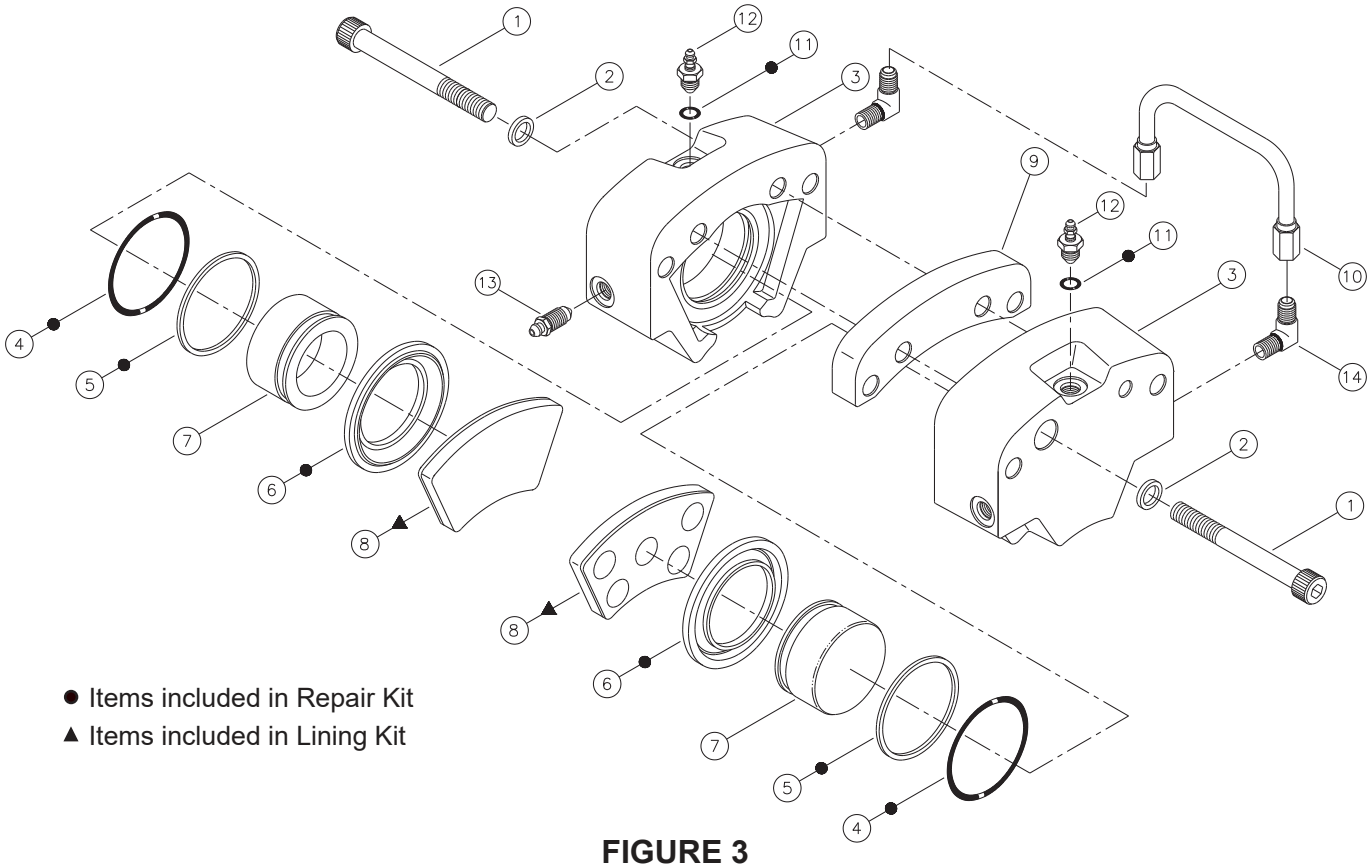

FIGURE 3

⚠ CAUTION

When installing back-up ring (5) be sure it is positioned on the lining side of groove. If back-up ring is cupped, be sure the cupped side is against o-ring (4).

3. Install new boot (6) in one housing (3) half.
4. Lubricate piston (7) with clean type fluid used in the system. Carefully insert piston (7) through boot (6). Gently push piston (7) into housing (3) bore using a twisting motion. Piston (7) must bottom in housing to assure lining to disc clearance.
5. Position boot (6) in piston (7) groove so inner diameter of boot (6) is flat and is not twisted. Do not allow air to become trapped behind boot (6) and impede a proper fit of the outer diameter of boot (6) to housing (3).
6. Install lining assembly (8) in housing (3) pocket.
7. Install new o-ring (11) on bleeder screw (12). Install bleeder screw in housing (3) half.
8. Repeat steps 1-7 for second housing (3) half.
9. Position spacer (9) between the housing (3) halves. Install washers (2) and cap screws (1). Torque: 122.0-135.6 N·m (90-100 lb·ft).
10. Connect tubing assembly (10).
11. Install brake on vehicle or machine with bleeder screws (4) facing up. Shim as required to center caliper over disc. **SEE TORQUE NOTE ON PAGE 1.**
12. Connect necessary fluid lines.
13. Bleed the system making sure all air is eliminated.
14. Make several static brake applications. Check for leaks and bleed once more.
15. Check linings to be sure there is no drag. If lining to disc drag occurs, refer to step 4 above to correct.

INTERNALLY PORTED MODEL NUMBERS:

02-520-201 02-520-206
02-520-202 02-520-208
02-520-203 02-520-210
02-520-205 03-520-205

REPAIR KIT REPLACEMENT INSTRUCTIONS

Disassembly Procedure

(Refer to Figure 4)

See Table 1 for Repair Kit required for your brake.

1. Remove brake from vehicle or machine by disconnecting necessary fluid lines and removing mounting bolts. Drain fluid from assembly.
2. Separate housing (3) halves by removing cap screws (1), and washers (2).
3. Remove lining assembly (11) from housing (3).
4. Remove bleeder screw (4) from one housing (3) half. Remove o-ring (5) from bleeder screw.
5. Remove seal (6) from housing (3).
6. Remove piston (10) from housing (3) half by pulling piston from bore. If piston fails to move, place housing half face down on bench. Protect piston face by placing a cloth between piston and bench. Support housing half on bench in such a way that piston can be eased out of its bore. This is accomplished by carefully introducing low pressure air, 0.7-1.0 bar (10-15 PSI), through fluid inlet fittings.

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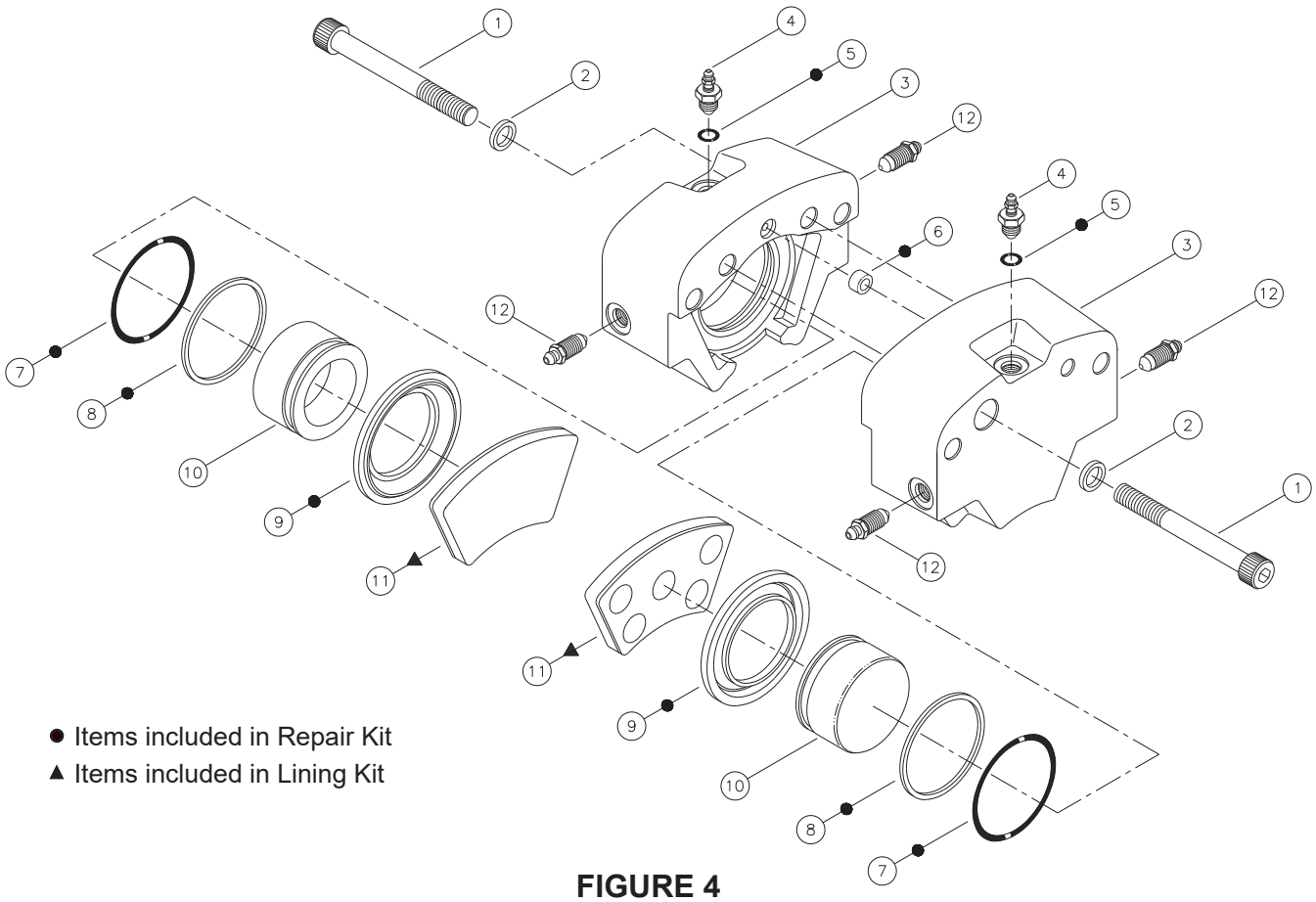

FIGURE 4

⚠ CAUTION

Do not use high pressure as it is dangerous and unnecessary. Use just enough air pressure to ease and piston out of the bore. Do not blow piston out of the bore If piston is seized or cocked or does not come out readily, release the air pressure and use a soft (brass) hammer to rap sharply on and around the end of the piston. Reapply air pressure to remove the piston.

While pulling piston out of its bore, work boot (9) lip from piston groove. **Be careful not scratch piston.**

7. Remove boot (9) from housing (3) half. Remove back-up ring (8) and o-ring (7) from inner housing groove. Use a small screwdriver or similar tool. **Be careful not to scratch the bore.**
8. Repeat steps 3-7 for second housing (3) half.

Assembly Procedure

(Refer to Figure 4)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM. MAKE SURE THE REPAIR KIT USED IS THE PROPER ONE FOR YOUR SYSTEM.

1. Clean housing bore with clean type fluid used in the system.
2. Install new o-ring (7) and new back-up ring (8) in groove of one housing (3) half. Note order of o-ring and back-up ring.

⚠ CAUTION

When installing back-up ring (8) be sure it is positioned on the lining side of groove. If back-up ring is cupped, be sure the cupped side is against o-ring (7).

3. Install new boot (9) in one housing (3) half.
4. Lubricate piston (10) with clean type fluid used in the system. Carefully insert piston (10) through boot (9). Gently push piston (10) into housing (3) bore with a twisting motion. Piston (10) must bottom in housing to assure lining to disc clearance.
5. Position boot (9) in piston (10) groove so inner diameter of boot (9) is flat and is not twisted. Do not allow air to become trapped behind boot (9) and impede a proper fit of the outer diameter of boot (9) to housing (3).
6. Install lining assembly (11) in housing (3) pocket.
7. Install new o-ring (5) on bleeder screw (4). Install bleeder screw in housing (3) half.
8. Repeat steps 1-8 for second housing (3) half.
9. Install new seal (6) in one housing (3) half.
10. Install washers (2) and cap screws (1). Torque: 122.0-135.6 N·m (90-100 lb·ft).
11. Install brake on vehicle or machine with bleeder screws (4) facing up. Shim as required to center caliper over disc. **SEE TORQUE NOTE ON FIRST PAGE.**
12. Connect necessary fluid lines.
13. Bleed the system making sure all air is eliminated.
14. Make several static brake applications. Check for leaks and bleed once more.
15. Check linings to be sure there is no drag. If lining to disc drag occurs, refer to step 4 above to correct.

ZF Off-Highway Solutions Minnesota Inc.
1911 Lee Boulevard / North Mankato, MN U.S.A. 56003
Tel: +1 507 625 6426 **Fax:** +1 507 625 3212