

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)
01-530-040 (HO) 01-530-045 (BF)	02-530-040 (HO) 02-530-045 (BF)	03-530-040 (HO) 03-530-045 (BF)	20-060-118 20-060-118	02-500-237 02-500-239	02-500-236 02-500-238

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 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 530 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.

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 fitting if leaks occur.
3. Torque bleeder screw 12.2-20.3 N·m (9-15 lb·ft).

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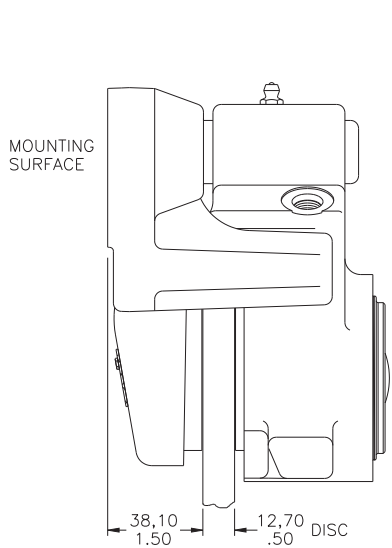


FIGURE 1

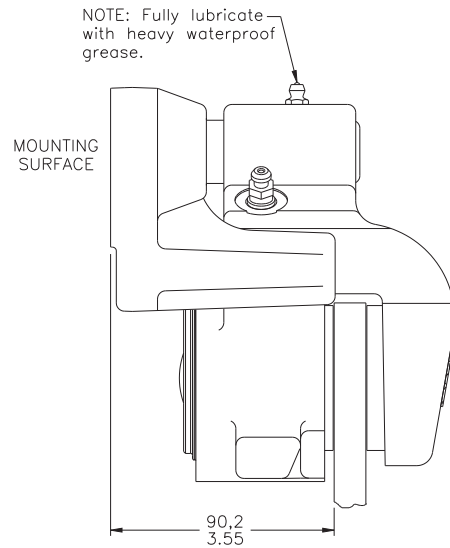


FIGURE 2

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 are not included.

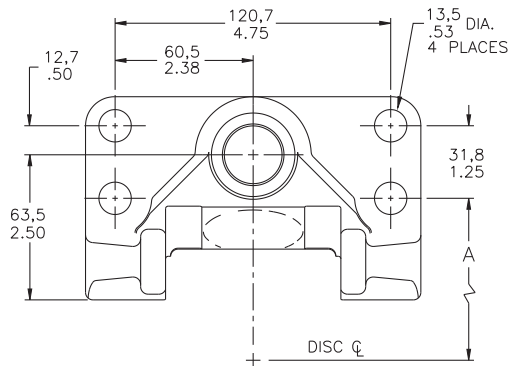


FIGURE 3
(rectangular mount)

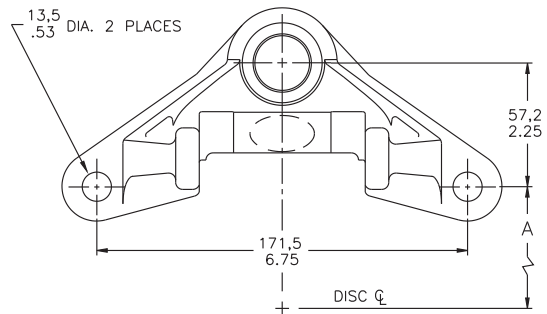


FIGURE 4
(triangular mount)

NOTE: For disc diameters greater than 609.6 mm add 44.4 mm (24 inch add 1.75 in) to disc radius to obtain "A" dimension.

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	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

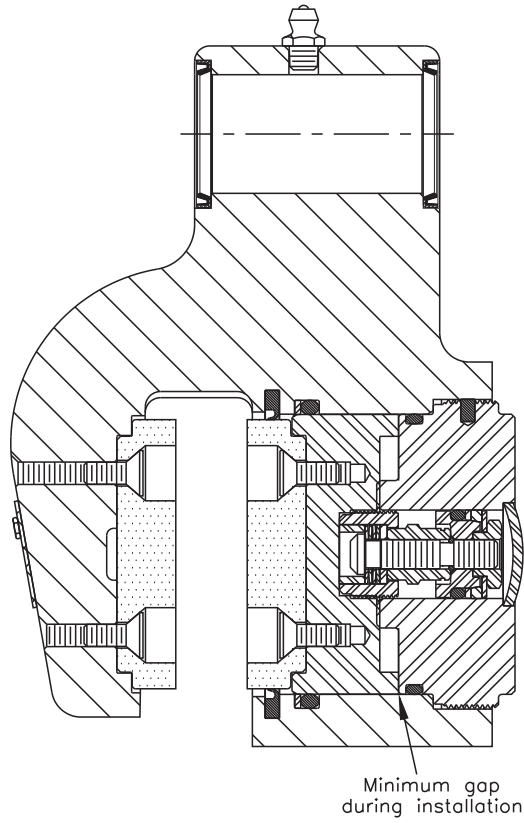


FIGURE 5

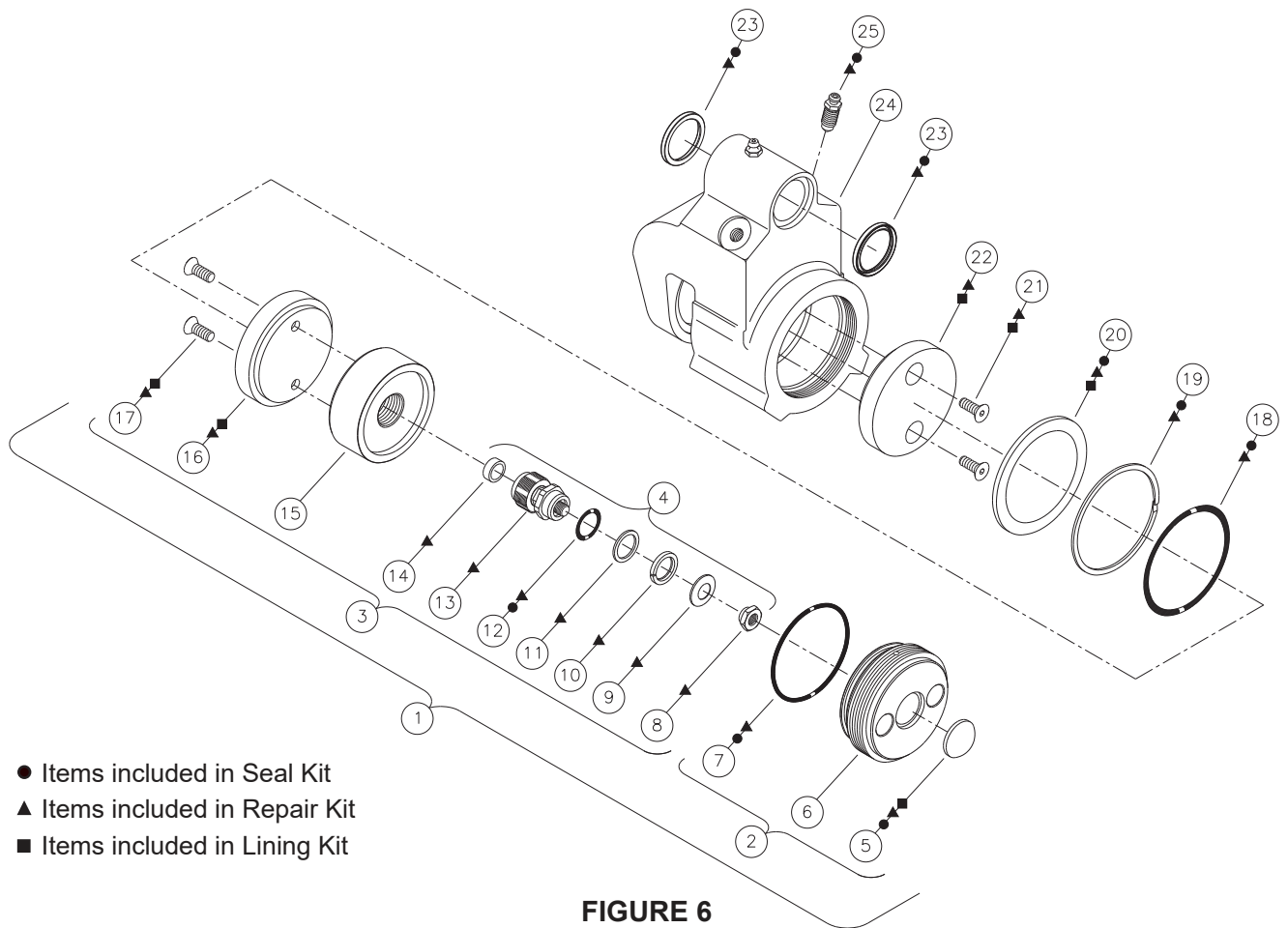


FIGURE 6

CHANGE REPAIR KIT PROCEDURE

(Refer to Figures 5 and 6)

See Figure 6 for components included in the 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 the brake and mounting bracket assembly from the machine and remove the mounting bracket assembly from the brake.
3. Using a sharp bladed tool, remove two seals (23) from housing (24).
4. Remove bleeder screw (25).
5. 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.**
6. Using a spanner wrench, remove assembly (1) from housing (24).
7. Screw the spanner wrench side of end plug (6) back into the housing still clamped in the vise. This will hold assembly (1) while using two large flat screw drivers to carefully separate piston assembly (3) from end plug assembly (2). Separate piston assembly (3) from end plug assembly (2). **NOTE: Be careful not to damage piston (15) or end plug (6).**

NOTE

If end plug assembly (2) and piston assembly (3) will not separate, flip end plug assembly (1) over and screw into housing approximately three threads. Carefully drill a 3 mm (0.125 in) hole through the center of plug (5). Be careful not to contact compensator assembly (4) with the drill bit. Remove plug (5) by prying it out of end plug (6) pocket. Loosen nut (8) so wedge (10) can move in piston (6) bore.

8. Remove end plug (6) from housing (24). Remove o-ring (7) and plug (5) from end plug (6).
9. Remove compensator assembly (4) from piston (15).
10. Remove screws (17) and lining (16) from piston (15).
11. Loosen vise jaws and rotate the brake so that the disc clearance slot is facing up.
12. Remove screws (21) and lining (22) from housing (24).
13. Using a thin blade tool, remove o-ring (18), back-up ring (19) and seal (20) from housing (24) bore.
14. Clean all parts thoroughly before assembling.
15. Lubricate o-rings and back-up ring from repair kit with clean system fluid. **DO NOT LUBRICATE seals (23) or seal (20).**
16. Carefully install new o-ring (7) over the non-threaded end of end plug (6) and into the groove.

17. Install new back-up ring (19) and new o-ring (18) in housing (24) bore. Make sure they are installed in the proper position in the groove.

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.

18. Install new seal (20) into the groove of housing (24) bore through the disc clearance slot end of the bore. Note the direction of seal (20).
19. Install new lining (22) in housing (24) using new screws (21). Torque screws (21) 2.7-3.4 N·m (24-30 lb·in).
20. Install new compensator assembly (4) in piston (15). Torque compensator assembly 19.0-24.4 N·m (14-18 lb·ft). **DO NOT TIGHTEN NUT (8) at this point.**
21. Install new lining (16) on piston (15) using new screws (17). Torque screws (17) 2.7-3.4 N·m (24-30 lb·in).
22. Lubricate o-ring (12) on compensator assembly with clean type fluid used in the system. Assemble piston assembly (3) to end plug (6) by carefully inserting compensator assembly (4) into end plug (6) bore. Compress assembly (1) so there is a minimum gap as shown in Figure 5 on page 3. Remove nut (8) and apply Loctite 262 or equivalent to the threads. Reinstall nut (8) and torque 2.8-4.5 N·m (25-40 lb·in).
23. Place assembly (1) on a flat surface with the spanner wrench holes facing upward. Install new plug (5).
24. Rotate the brake in the vise to original position.
25. Lightly lubricate the housing bore and piston (15) with clean system fluid. Carefully reinstall assembly (1) into housing (24) bore keeping lining face free of system fluid and contamination. Tighten end plug (6) with a spanner wrench until it bottoms out on housing (24) and torque 74.6-88.1 N·m (55-65 lb·ft). **NOTE: Assembly (1) must remain compressed with a minimum gap. See Figure 5 on page 3.**
26. Install new bleeder screw (25) in housing (24) and finger tighten.
27. Carefully install two new seals (23) in housing (24). Note direction of seals (23). Cup side of seals (23) face outward. **DO NOT LUBRICATE seals (23).**
28. 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 the 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 the brake and mounting bracket assembly from the machine and remove the mounting bracket assembly from the brake.
3. Using a sharp bladed tool, remove two seals (23) from housing (24).
4. Remove bleeder screw (25).
5. 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.**
6. Using a spanner wrench, remove assembly (1) from housing (24).
7. Screw the spanner wrench side of end plug (6) back into the housing still clamped in the vise. This will hold assembly (1) while using two large flat screw drivers to carefully separate piston assembly (3) from end plug assembly (2). Separate piston assembly (3) from end plug assembly (2). **NOTE: Be careful not to damage piston (15) or end plug (6).**

NOTE

If end plug assembly (2) and piston assembly (3) will not separate, flip end plug assembly (1) over and screw into housing approximately three threads. Carefully drill a 3 mm (0.125 in) hole through the center of plug (5). Be careful not to contact compensator assembly (4) with the drill bit. Remove plug (5) by prying it out of end plug (6) pocket. Loosen nut (8) so wedge (10) can move in piston (6) bore.

8. Remove end plug (6) from housing (24). Remove o-ring (7) and plug (5) from end plug (6).
9. Do not remove compensator assembly (4) from piston (15). Remove nut (8), belleville spring (9), wedge (10), washer (11), and o-ring (12) from compensator assembly (4).
10. Loosen vise jaws and rotate the brake so that the disc clearance slot is facing up.
11. Using a thin blade tool, remove o-ring (18), back-up ring (19) and seal (20) from housing (24) bore.
12. Clean all parts thoroughly before assembling.
13. Lubricate o-rings and back-up ring from seal kit with clean system fluid. DO NOT LUBRICATE seals (23) or seal (20).
14. Carefully install new o-ring (7) over the non-threaded end of end plug (6) and into the groove.

15. Install new back-up ring (19) and new o-ring (18) in housing (24) bore. Make sure they are installed in the proper position in the groove.

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.

16. Install new seal (20) into the groove of housing (24) bore through the disc clearance slot end of the bore. Note the direction of seal (20).
17. Install new o-ring (12), washer (11), wedge ring (10), and belleville spring (9) on compensator (13). **NOTE: Make sure wedge ring (10) and belleville spring (9) are installed in the proper direction.**
18. Apply Loctite 262 or equivalent to the threads of nut (8) and install on compensator assembly (4). DO NOT TIGHTEN nut (8) at this point.
19. Lubricate o-ring (12) on compensator assembly with clean type fluid used in the system. Assemble piston assembly (3) to end plug (6) by carefully inserting compensator assembly (4) into end plug (6) bore. Compress assembly (1) so there is a minimum gap as shown in Figure 5 on page 3. Torque nut (8) 2.8-4.5 N·m (25-40 lb·in).
20. Place assembly (1) on a flat surface with spanner wrench holes facing upward. Install new plug (5).
21. Rotate the brake in the vise to original position.
22. Lightly lubricate the housing bore and piston (15) with clean system fluid. Carefully reinstall assembly (1) into housing (24) bore keeping lining face free of system fluid and contamination. Tighten end plug (6) with a spanner wrench until it bottoms out on housing (24) and torque 74.6-88.1 N·m (55-65 lb·ft). **NOTE: Assembly (1) must remain compressed with a minimum gap. See Figure 5 on page 3.**
23. Install new bleeder screw (25) in housing (24) and finger tighten.
24. Carefully install two new seals (23) in housing (24). Note direction of seals (23). Cup side of seals (23) face outward. DO NOT LUBRICATE seals (23).
25. 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)

See Figure 6 for components included in the lining kit.

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 the 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. Using a spanner wrench, remove assembly (1) from housing (24).
5. Screw the spanner wrench side of end plug (6) back into the housing still clamped in the vise. This will hold assembly (1) while using two large flat screw drivers to carefully separate piston assembly (3) from end plug assembly (2). Separate piston assembly (3) from end plug assembly (2). **NOTE: Be careful not to damage piston (15) or end plug (6).**

NOTE

If end plug assembly (2) and piston assembly (3) will not separate, flip end plug assembly (1) over and screw into housing approximately three threads. Carefully drill a 3 mm (0.125 in) hole through the center of plug (5). Be careful not to contact compensator assembly (4) with the drill bit. Remove plug (5) by prying it out of end plug (6) pocket. Loosen nut (8) so wedge (10) can move in piston (6) bore.

6. Remove end plug (6) from housing (24). Remove plug (5) from end plug (6).
7. Remove screws (17) and lining (16) from piston (15).
8. Install new lining (16) on piston (15) using new screws (17). Torque screws (17) 2.7-3.4 N·m (24-30 lb·in).
9. Loosen vise jaws and rotate the brake so that the disc clearance slot is facing up.
10. Remove screws (21) and lining (22) from housing (24).
11. Remove seal (20) from housing (24) bore.
12. Install new seal (20) into the groove of housing (24) bore through the disc clearance slot end of the bore. Note the direction of seal (20). **DO NOT LUBRICATE seal (20).**
13. Install new lining (22) in housing (24) using new screws (21). Torque screws (21) 2.7-3.4 N·m (24-30 lb·in).
14. Remove nut (8) from compensator assembly (4). Apply Loctite 262 or equivalent to the threads of nut (8) and reinstall on compensator assembly (4). **DO NOT TIGHTEN nut (8) at this point**

15. Lubricate o-ring (12) on compensator assembly with clean type fluid used in the system. Assemble piston assembly (3) to end plug (6) by carefully inserting compensator assembly (4) into end plug (6) bore. Compress assembly (1) so there is a minimum gap as shown in Figure 5 on page 3. Torque nut (8) 2.8-4.5 N·m (25-40 lb·in).
16. Place assembly (1) on a flat surface with the spanner wrench holes facing upward. Install new plug (5).
17. Rotate the brake in the vise to original position.
18. Lightly lubricate the housing bore and piston (15) with clean system fluid. Carefully reinstall assembly (1) into housing (24) bore keeping lining face free of system fluid and contamination. Tighten end plug (6) with a spanner wrench until it bottoms out on housing (24) and torque 74.6-88.1 N·m (55-65 lb·ft). **NOTE: Assembly (1) must remain compressed with a minimum gap. See Figure 5 on page 3.**
19. 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.

BASIC SERVICE PROCEDURES

SERVICE CHECKS

1. Maintain a proper fluid level.
 - Brake Fluid Models** - use clean brake fluid that meets SAE specifications.
 - Hydraulic Oil Models** - use clean mineral base hydraulic oil. Follow machine manufacture 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 the 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 the linings, caliper assembly, and disc surfaces.
3. Clean the fittings and seats when servicing the brake.

NOTE

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

