MULTIPLE DISC BRAKE
(dry design)

Service Instructions

TABLE 1

Model Number	Lining Kit Number	Bearing Kit Number	O-ring Kit Number	Spring Kit Number	Red Springs Quantity	Blue Springs Quantity
13-547-512	12-501-448	12-501-449	12-501-442	12-501-443	4	0
13-547-514	12-501-448	12-501-449	12-501-442	12-501-450	16	0
13-547-520	12-501-448	12-501-449	12-501-442	12-501-443	4	0
13-547-536	12-501-448	12-501-484	12-501-483	12-501-450	16	0

NOTE: All repair kits include mounting face gaskets and o-rings. Some motors and gearboxes allow for the use of o-rings to seal the mounting faces on either side of the brake. Do not use the o-ring and face gaskets together to seal a mounting face.

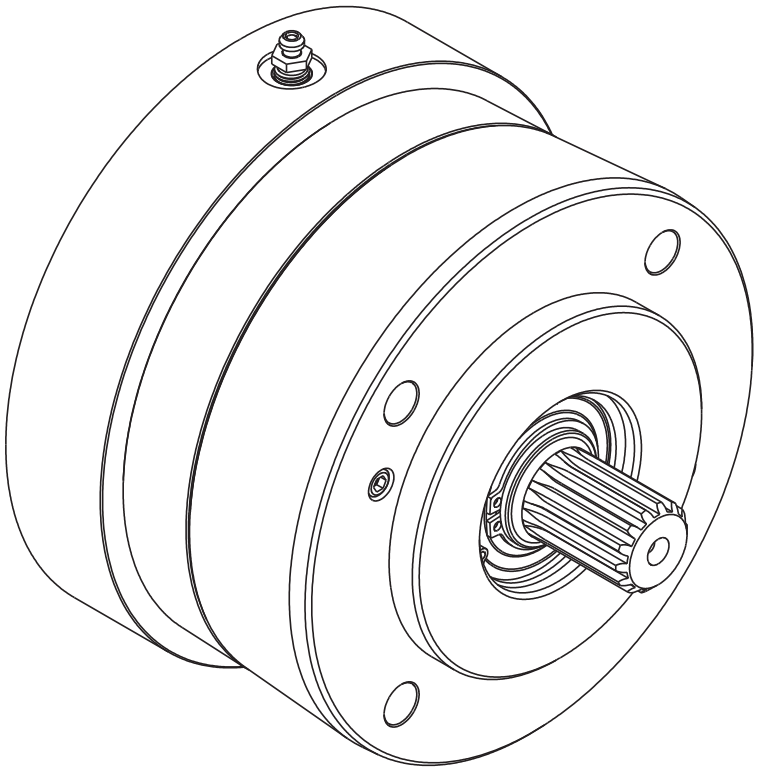

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TABLE 2 (items included in kits)

Lining Kit	Bearing Kit	O-ring Kit	Spring Kit
Case Seals (7) Primary Disc (10) Rotor Discs (11) Stator Discs (12)	Bearing (3) Oil Seal (4) Case Seals (7)	Oil Seal (4) Case Seals (7) Back-up Rings (18 & 20) O-rings (19 & 21)	Case Seals (7) Springs (15)

NOTE

This literature services various models in this brake series. The components shown in Figures 1 and 2 may appear different than what is found in your brake.

DISASSEMBLY

(Refer to Figures 1 and 2)

1. Remove two socket head cap screws (5). A suitable holding fixture is useful to hold the brake in position.
2. Tap shaft assembly (8) and spring plate (14) with a soft mallet to separate cover (6). If sections will not separate, use a screwdriver to carefully pry sections apart. See Figure 1.
3. Remove retaining ring (2) from shaft assembly (8).
4. Remove shaft assembly (8) from cover (6) by tapping shaft assembly (8) with a soft mallet. See Figure 1.
5. Remove retaining ring (1) from cover (6) and press out oil seal (4) and bearing (3).
6. Remove four socket head shoulder bolts (9). A suitable holding fixture is useful to hold the brake in position.

⚠ CAUTION

Do not remove shoulder bolts without pressurization of the brake, approximately 55.2 bar (800 PSI), or damage may result.

7. Before removing primary disc (10), rotor discs (11), and stator discs (12), record the stacking arrangement for reassembly purposes. Remove primary disc (10), rotor discs (11), and stator discs (12).
8. Release pressure from brake before removing four socket head cap screws (13). Remove four socket head cap screws (13).
9. Remove spring plate (14) and separate piston (16) from spring plate (14).
10. Remove case seal (7) from spring plate (14).
11. Before removing springs (15) from piston (16), record the spring pattern for reassembly purposes. Remove springs (15).
12. Remove piston (17) from pressure plate (22) by carefully applying hydraulic pressure to the brake release port in pressure plate (22).
13. Remove o-rings (19 & 21) and back-up rings (18 & 20) from piston (17). **NOTE: Be careful not to scratch or mar piston.**
14. Remove case seal (7) from pressure plate (22).

ASSEMBLY

(Refer to Figures 1 and 2)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Clean all parts thoroughly before assembling.
2. Press oil seal (4) into cover plate (6) until it is flush with bearing shoulder. Install retaining ring (1).
3. Press bearing (3) into position until it bottoms out on oil seal borestep.
4. Press shaft assembly (8) into bearing (3) until shaft bottoms on shaft shoulder. Bearing inner race must be supported during this operation.
5. Install retaining ring (2) on shaft assembly (8).
6. Install back-up rings (18 & 20) on piston (17) toward spring pocket side of piston.
7. Install o-rings (19 & 21) on piston (17). Be sure o-rings are flat and all twists are removed. **NOTE: Be careful not to scratch or mar piston.**
8. Lubricate piston (17) with clean type fluid used in the system. Carefully press piston (17) into pressure plate (22).
9. Install springs (15) in piston (16) according to the spring pattern recorded during disassembly. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.
10. Affix case seals (7) to pressure plate (22) and spring plate (14).
11. Place pressure plate (22), piston (16), and spring plate (14) on a press. Using a fixture, depress and install four socket head cap screws (13). **NOTE: Apply two drops of Loctite #242 to threads.** Torque cap screws (13) 47.5-54.2 N·m (35-40 lb·ft). A suitable holding fixture is useful to hold brake in position.
12. Install rotor discs (11) and stator discs (12). Begin with a rotor disc (11) and alternate with stator discs (12).
13. Install primary disc (10). Align tabs on primary disc (15) and stator discs (12) with through holes in spring plate (14) and partially engage threads of four socket head shoulder bolts (9). **NOTE: Apply two drops of Loctite #242 to threads.** Inspect for free movement of stack. Pressurize brake release port, approximately 55.2 bar (800 PSI), to release discs. Torque shoulder bolts 20.3-24.4 N·m (15-18 lb·ft) and release pressure. A suitable holding fixture is useful to hold brake in position.
14. Install cover plate (6) using two socket head cap screws (5). **NOTE: Apply two drops of Loctite #242 to threads.** Torque cap screws (5) 12.2-14.9 N·m (9-11 lb·ft).

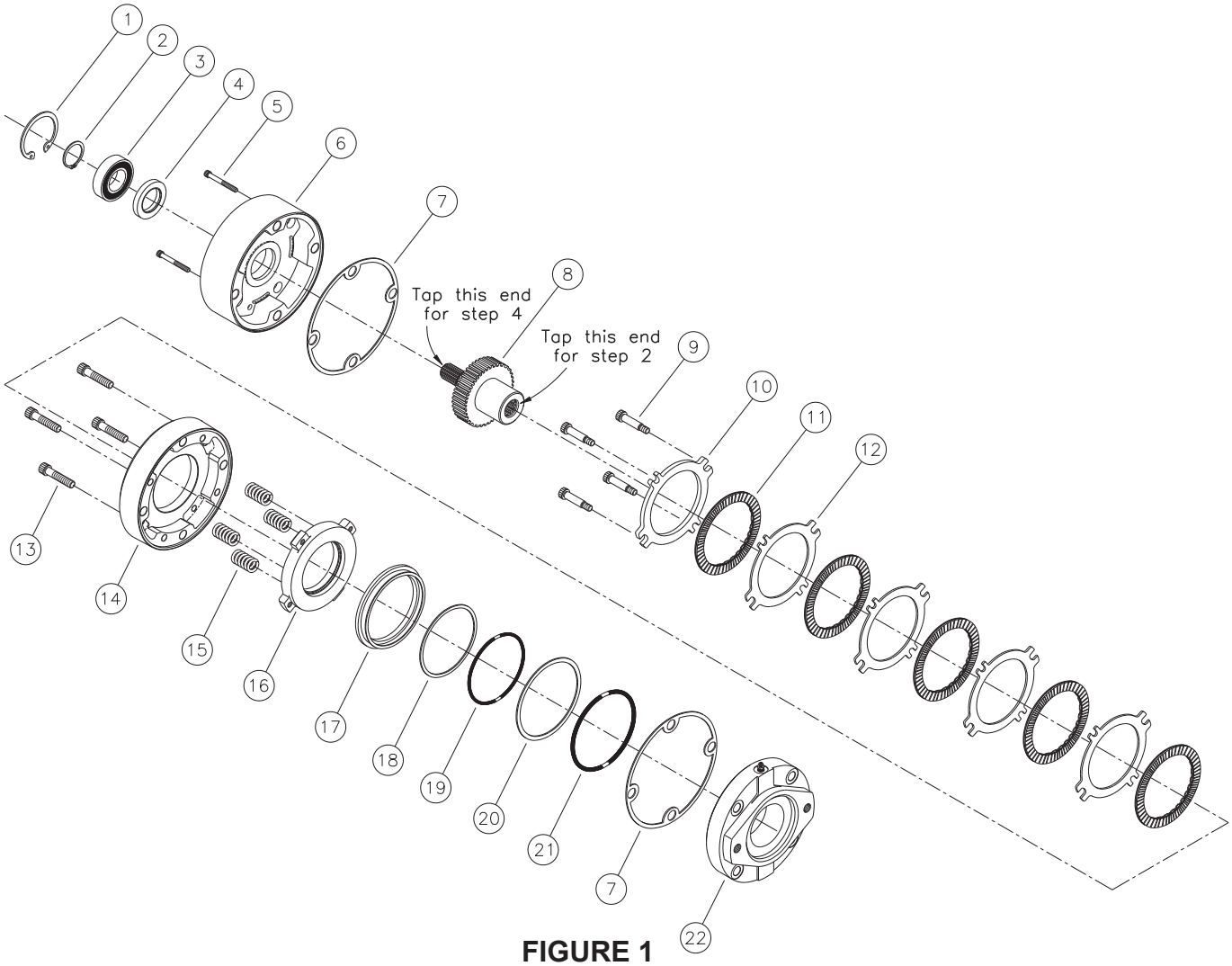
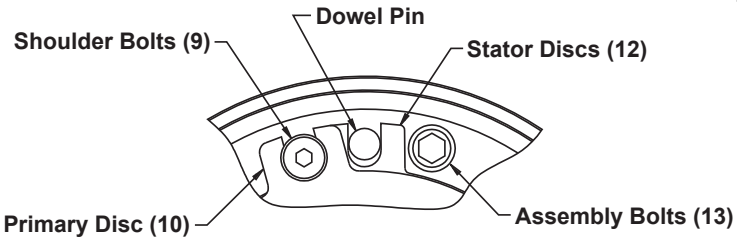


FIGURE 1



VIEW A-A

Stack Assembly Detail for 13-547-514.

Slots in stator discs (12) engage with dowel pins in spring plate (16). See Figure 2.

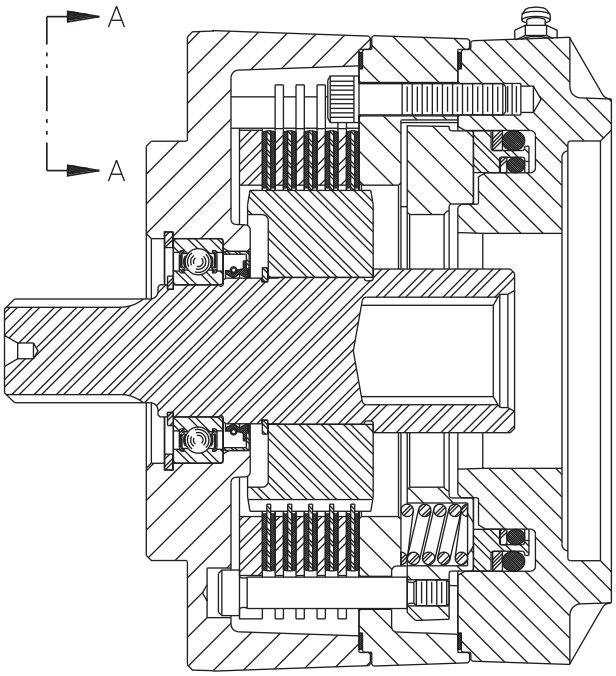


FIGURE 2
(13-547-514 Shown)

BLEEDING

1. Install brake in system and connect pressure lines.
2. Bleed pressure release section of brake by pressurizing side inlet port and allowing air to escape from top port. Pressure should not exceed 6.89 bar (100 PSI) during bleeding.
3. Apply sufficient pressure to release brake and check for proper operation in system.

SERVICE DIAGNOSIS

PROBLEM	CAUSE	EXPLANATION	ACTION
Brake slips	A. Excessive pressure in hydraulic system	If there is back pressure in the actuation line of the brake, holding torque will be reduced.	Check filters, hose size, restrictions in other hydraulic components.
	B. Oil in brake if designed for dry use	Dry linings generate 50% more torque than linings saturated with oil. If the brake has oil in it, check the type of oil. 1. Gearbox oil 2. Hydraulic oil	Replace oil seal in brake. Check motor seal. Check piston seals. **NOTE: Internal components will need to be inspected, cleaned, and replace as required**
	C. Disc plates worn	The thickness of the disc stack sets the torque level. A thin stack reduces torque.	Check disc thickness and contact ZF Off-Highway Solutions Minnesota Inc.
	D. Springs are broken or have taken a permanent set	Broken or set springs can cause reduced torque, a rare occurrence.	Check release pressure and contact ZF Off-Highway Solutions Minnesota Inc. (May need servicing with new spring kit).
Brake drags or runs hot	A. Low actuation pressure	The brake should be pressurized to a minimum of 1.38 bar (20 PSI) over the full release pressure under normal operating conditions. Lower pressures will cause the brake to drag thus generating heat.	Attach pressure gauge to bleed port and check pressure with system on.
	B. Bearing failure	If bearing should fail, a large amount of drag can be generated.	Replace the bearing. Refer to kits on page 1.
Brake will not release	A. Stuck or clogged valve	Brakes are designed to come on when system pressure drops below stated release pressure. If pressure cannot get to the brake, the brake will not release.	Attach pressure gauge to bleed port. Check for adequate pressure. Replace defective line or component.
	B. Bad o-rings	If release piston will not hold pressure, the brake will not release.	Replace o-rings. Refer to kits on page 1.
	C. Discs frozen	These brakes are designed for only limited dynamic braking. A severe emergency stop or prolonged reduced release pressure operation may result in this type of damage.	Replace disc stack. Refer to kits on page 1.