Wheel Mount MULTIPLE DISC BRAKE

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	Yellow Springs Quantity	Rotor Stacking Arrangement
13-587-002	12-501-302	12-501-303	12-501-304	12-501-305	14	0	0	Figure 1
13-587-004	12-501-302	12-501-376	12-501-304	12-501-305	14	0	0	Figure 1
13-587-006	12-501-302	12-501-376	12-501-304	12-501-305	6	3	0	Figure 1
13-587-008	12-501-302	12-501-303	12-501-304	12-501-305	14	0	0	Figure 1
13-587-012	12-501-302	12-501-303	12-501-304	12-501-305	6	3	0	Figure 1
13-587-014	12-501-302	12-501-303	12-501-304	12-501-305	6	3	0	Figure 1
13-587-016	12-501-369	12-501-303	12-501-304	12-501-365	14	0	0	Figure 1b
13-587-020	12-501-369	12-501-303	12-501-304	12-501-305	0	0	11	Figure 1b
13-587-022	none	12-501-303	none	none	0	0	0	none
13-587-024	12-501-370	12-501-303	12-501-304	12-501-305	0	0	11	Figure 1a
13-587-028	12-501-302	12-501-303	12-501-380	12-501-305	14	0	0	Figure 1
13-587-030	12-501-413	12-501-303	12-501-304	12-501-305	10	2	0	Figure 1c
13-587-032	12-501-369	12-501-303	12-501-304	12-501-305	0	0	11	Figure 1b
13-587-058	12-501-302	12-501-303	12-501-304	12-501-406	14	0	0	Figure 1
13-587-066	12-501-302	12-501-303	12-501-304	12-501-305	12	0	0	Figure 1
13-587-084	12-501-302	12-501-303	12-501-304	12-501-305	14	0	0	Figure 1
13-587-094	12-501-302	12-501-376	12-501-304	12-501-305	0	0	14	Figure 1
13-587-096	12-501-413	12-501-303	12-501-304	12-501-305	10	2	0	Figure 1c
13-587-100	12-501-470	12-501-376	12-501-304	12-501-305	0	0	14	Figure 1
13-587-104	12-501-502	12-501-503	12-501-304	12-501-305	0	0	14	Figure 1
13-587-110	12-501-413	12-501-303	12-501-304	12-501-305	10	2	0	Figure 1c

NOTE: If your model number is not listed, contact ZF Off-Highway Solutions Minnesota Inc. for information.

TABLE 2

Lining Kit	Bearing Kit	O-ring Kit	Spring Kit
O-ring (19) Stator Discs (10) Rotor Discs (11)	Bearing (3) Bearing (22) O-ring (19)	Back-up Rings (12 & 16) O-rings (13, 15, & 19)	O-ring (19) Springs - red (18) Springs - blue (18) Springs - yellow (18)

NOTE: All repair kits include mounting face gaskets and face seals. 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 o-ring and face gaskets together to seal a mounting face.

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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 castle nut (1) and key (8) from output end of spline shaft.
2. Remove bleeder screw and any other plugs or fittings from pressure ports in housing (5). Drain oil from brake as thoroughly as possible.
3. With tapered end of shaft facing up, remove either two or four cap screws (4). A suitable holding fixture is useful to keep the brake in position. **NOTE: Model number 13-587-084 also uses washers and locknuts. Remove washers and locknuts.**

⚠ CAUTION

Cover (20) is under spring tension of approximately 1134 kgf (2500 lb), bolts (4) should be loosened evenly to relieve this force. If a hydraulic press is available 2268 kgf (5000 lb) maximum, the cover can be held in position while removing the bolts.

4. Carefully pry upwards on housing (5) to free it from piston (14).
5. Remove oil seal (2) and bearing (3) from housing (5) only if bearing is damaged. **NOTE: Not all models use oil seal (2).**
6. Remove plate stack assembly consisting of rotors (11) and stators (10) from outer spline (7).

NOTE

Be careful to avoid contaminating friction surfaces with oil as this is a dry design brake.

7. Remove retaining ring (6) and outer spline (7) from shaft (9).
8. Carefully remove piston (14) making sure not to disturb spring arrangement.
9. Remove o-rings (13 & 15) and back-up rings (12 & 16) from piston (14). **NOTE: Be careful not to scratch or mar piston.**
10. Before removing springs (18) and retainer (17) be sure to note spring pattern and color for reassembly purposes. Remove retainer (17) and springs (18).
11. Remove retaining ring (24) from shaft (9) and press shaft out of bearing (22).
12. Remove retaining ring (23) from cover (20) and press bearing (22) out of cover.
13. For brake models that have oil seal (21), remove oil seal from cover (20) only if it is damaged.
14. Remove o-ring (19) from cover (20).

ASSEMBLY

(Refer to Figures 1 and 2)

SEE FRONT COVER FOR ITEMS INCLUDED IN KITS. LUBRICATE ALL RUBBER COMPONENTS FROM KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Clean all parts thoroughly before assembling.
2. Press bearing (3) and oil seal (2), if removed, into housing (5) from wheel side until flush with housing. See Figure 2. **NOTE: Not all models use oil seal (2).**
3. Install outer spline (7) onto shaft (9) and secure with retaining ring (6) to form shaft assembly.
4. While supporting housing (5) install shaft assembly allowing shoulder on shaft (9) to rest on bearing (3).
5. Install stator disc (10) on spline shaft assembly and alternate with remaining rotor discs (11) and stator discs (10). **NOTE: See Table 1 for stacking arrangements.**
6. Install back-up rings (12 & 16) and o-rings (13 & 15) on piston (14). Be sure o-rings are flat and all twists removed. **NOTE: Be careful not to scratch or mar piston.**
7. Lubricate piston (14) with type fluid used in the system. Carefully push piston (14) into bore of housing (5) until piston bottoms on top of lining stack. **NOTE: Be careful to avoid contaminating friction surfaces with oil as this is a dry design brake.**
8. Install retainer (17) and springs (18) in piston (14). Be sure to install springs according to pattern and color noted during disassembly. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.
9. If required, press oil seal (21) into cover (20). Seal lip must be facing motor side of cover. See Figure 2. **NOTE: Not all models use oil seal (21).**
10. Install o-ring (19) onto cover (20).
11. Position cover (20) on housing (5). Install either two or four cap screws (4) and tighten evenly to draw cover (20) to housing (5). Torque cap screws 115.3-122.0 N·m (85-90 ft·lb). **NOTE: Model 13-587-084 also uses washers and locknuts. Install washers and locknuts and torque the nuts 115.3-122.0 N·m (85-90 lb·ft).**

NOTE

If available, a hydraulic press will simplify installation of cover (20) on housing (5). Clamp cover in position while tightening the cap screws.

12. Support brake on the tapered end of shaft (9) so that the bearing shoulder on the shaft is above the bearing shoulder in cover (20).
13. Install bearing (22) by pressing on the inner bearing race until it bottoms out on the shoulder of shaft (9).
14. Install retaining ring (24) on shaft (9).
15. While supporting housing (5) allowing shaft assembly to move freely, press on outer race of bearing (22) until it bottoms out in cover (20) bore.
16. Install retaining ring (23) into cover (20).

⚠ CAUTION

If hydraulic bench testing is performed on the brake assembly, release pressure should not exceed 69.0 bar (1000 PSI) unless four additional bolts, SAE grade 5 or better, are used for supplemental clamping.

See front cover for items include in kits.
∗ Not used in all models

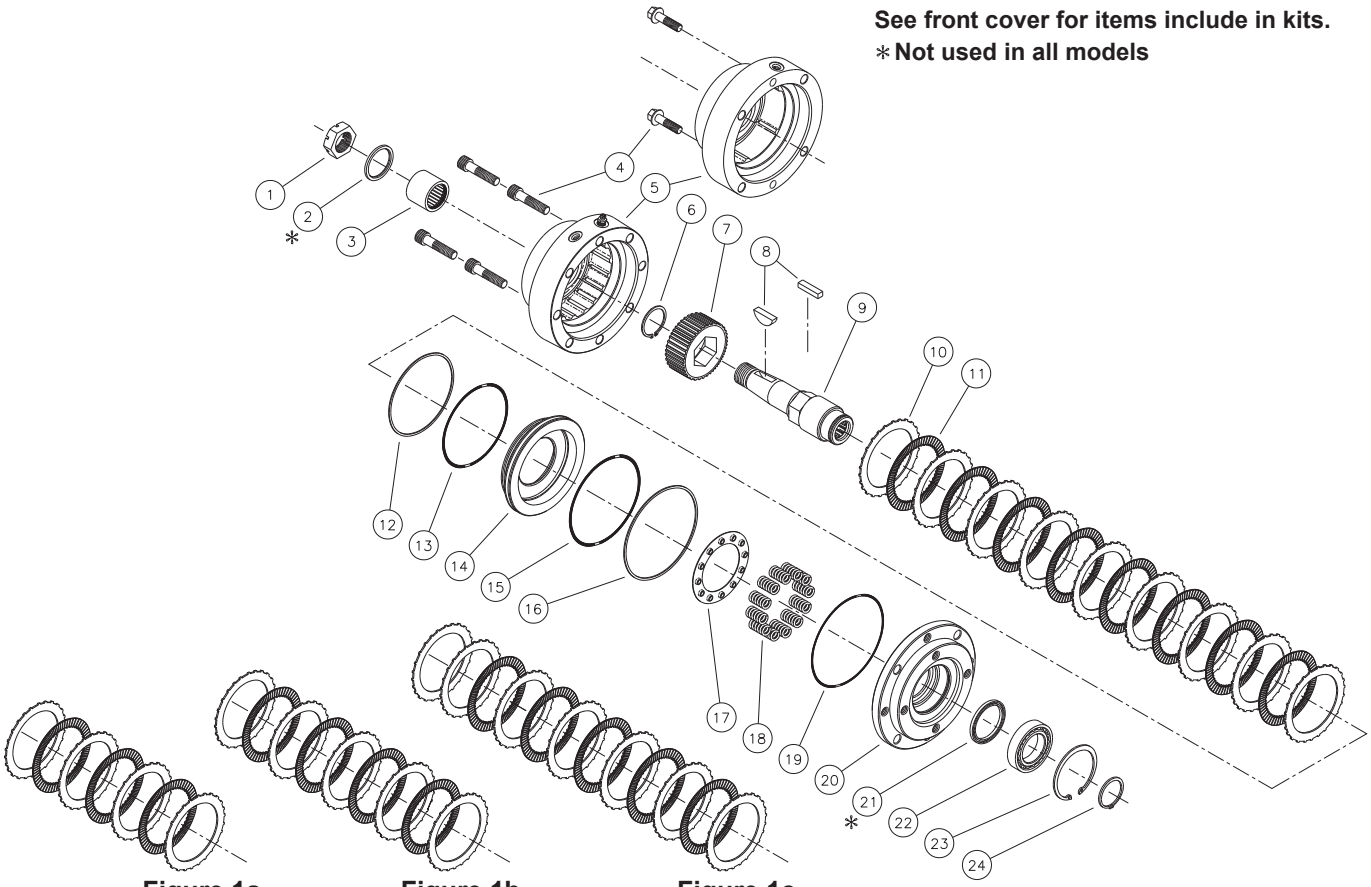

Figure 1a Figure 1b Figure 1c

FIGURE 1

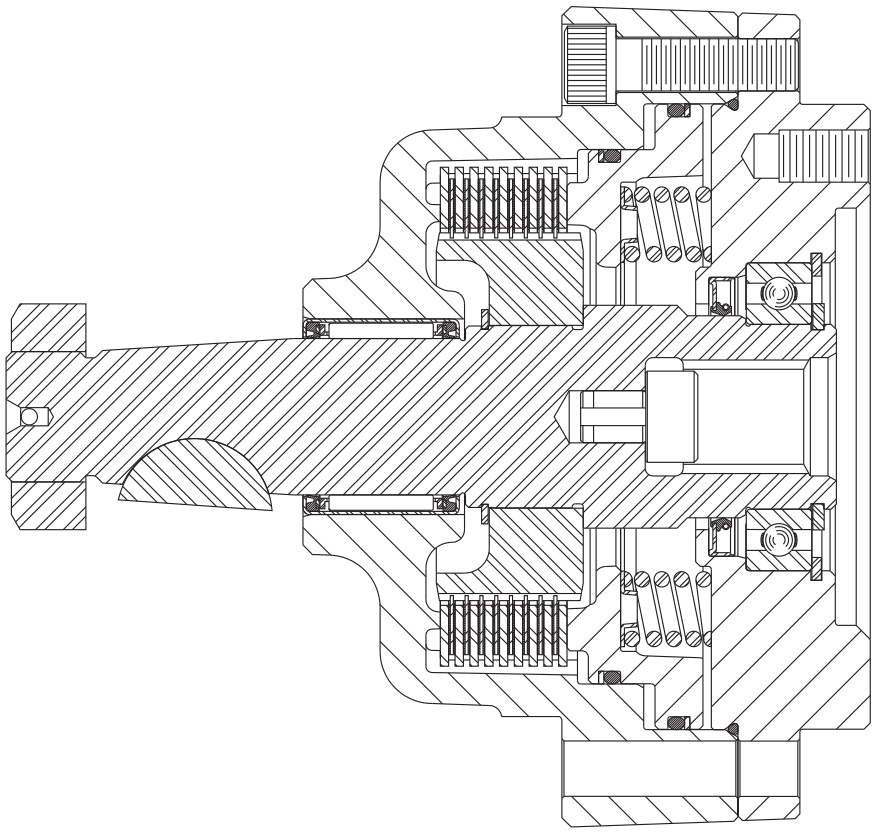

FIGURE 2

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 broken or haven taken 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.
	C. Oil in brake	Excess fill of oil in sump condition through wet brakes can cause the unit to run hot. Also excessive RPM in sump condition.	Drain oil and refill as specified for brake. Switch to flow through cooling.
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.