NOTE
Earlier models of the 556 Series “B” Mount Brakes have been replaced with the models listed in TABLE 1. Use these instructions to service both the earlier models and the models listed. If your product number is not listed on TABLE 1, please contact ZF Off-Highway Solutions Minnesota Inc.

MULTIPLE DISC BRAKE
(dry design - SAE B size)

Service Instructions

TABLE 1

Model Number	Complete Repair Kit Number	Lining Kit Number	O-ring Kit Number	Bearing Kit Number	Spring Kit Number	Red Springs Quantity	Blue Springs Quantity	Total Rotor Quantity	Rotor Stacking Arrangement
02-556-304	none	20-060-100	02-500-141	02-500-142	12-501-513	4	2	2	Figure 1
02-556-306	none	20-060-100	02-500-141	02-500-142	12-501-513	6	3	2	Figure 1
02-556-308	none	20-060-100	02-500-141	02-500-142	12-501-513	6	3	2	Figure 1
*02-556-310	none	20-060-105	02-500-207	02-500-210	12-501-515	8	2	1	Figure 6
02-556-312	none	20-060-105	02-500-207	02-500-210	12-501-515	9	0	1	Figure 6
02-556-314	none	20-060-100	02-500-141	02-500-142	12-501-516	8	4	2	Figure 1
02-556-316	none	20-060-102	02-500-207	02-500-210	12-501-513	4	4	2	Figure 1
02-556-318	none	20-060-100	02-500-141	02-500-142	12-501-513	4	2	2	Figure 1
02-556-320	none	20-060-100	02-500-141	02-500-142	12-501-515	10	0	2	Figure 1
02-556-322	none	20-060-100	02-500-141	02-500-142	12-501-513	6	2	2	Figure 3
02-556-324	none	20-060-100	02-500-141	02-500-142	12-501-516	8	4	2	Figure 1
02-556-326	none	20-060-100	02-500-141	02-500-142	12-501-513	6	3	2	Figure 1
02-556-328	none	20-060-100	02-500-141	02-500-142	12-501-513	6	3	2	Figure 1
02-556-330	none	20-060-100	02-500-141	02-500-142	12-501-515	8	0	2	Figure 3
02-556-332	none	20-060-100	02-500-141	02-500-142	12-501-513	4	4	2	Figure 1
02-556-334	none	20-060-100	02-500-141	02-500-142	12-501-515	12	0	2	Figure 1
02-556-336	none	20-060-100	02-500-141	02-500-142	12-501-515	12	0	2	Figure 1
02-556-338	none	20-060-102	02-500-207	02-500-210	02-500-214	6	2	2	Figure 1
02-556-340	none	20-060-100	02-500-167	02-500-168	12-501-515	12	0	2	Figure 1
02-556-346	none	20-060-105	02-500-141	02-500-142	12-501-515	8	0	2	Figure 3
02-556-348	none	20-060-108	02-500-218	02-500-217	12-501-513	6	2	2	Figure 1
02-556-350	none	20-060-108	02-500-218	02-500-217	12-501-516	8	4	2	Figure 1
02-556-352	none	20-060-107	02-500-218	02-500-217	12-501-515	9	0	3	Figure 2
02-556-358	none	20-060-109	02-500-141	02-500-142	12-501-515	9	0	3	Figure 2
02-556-360	none	20-060-100	02-500-141	02-500-142	12-501-515	8	0	2	Figure 1
02-556-364	none	20-060-109	02-500-167	02-500-168	12-501-516	10	2	3	Figure 2
02-556-366	none	20-060-100	02-500-141	02-500-142	12-501-512	4	0	2	Figure 3
02-556-368	none	20-060-105	02-500-141	02-500-142	12-501-515	8	0	1	Figure 6
02-556-370	none	20-060-107	02-500-218	02-500-217	12-501-516	10	2	3	Figure 2
02-556-372	none	20-060-377	02-500-141	02-500-142	12-501-512	4	0	1	Figure 4
02-556-376	none	20-060-107	02-500-141	02-500-142	12-501-515	9	0	3	Figure 2
02-556-378	none	20-060-100	02-500-141	02-500-142	12-501-516	8	4	2	Figure 1
02-556-380	none	20-060-109	02-500-141	02-500-142	12-501-513	4	4	3	Figure 2
02-556-382	none	20-060-109	02-500-141	02-500-142	12-501-513	4	6	3	Figure 2
02-556-384	none	20-060-109	02-500-141	02-500-142	12-501-515	8	0	3	Figure 2
02-556-386	none	20-060-109	02-500-141	02-500-142	12-501-515	6	2	3	Figure 2
02-556-388	none	20-060-100	02-500-141	02-500-142	12-501-513	2	4	2	Figure 1
02-556-392	none	20-060-107	02-500-167	02-500-168	12-501-515	9	0	3	Figure 2
02-556-402	none	20-060-107	02-500-218	02-500-217	12-501-512	6	0	3	Figure 2
02-556-404	none	20-060-100	02-500-167	02-500-168	12-501-516	8	4	2	Figure 1
02-556-408	none	20-060-107	02-500-167	02-500-168	12-501-513	4	4	3	Figure 2
02-556-412	12-501-409	none	none	none	none	8	3	2	Figure 7
02-556-414	none	20-060-100	02-500-141	02-500-142	12-501-516	8	4	2	Figure 1
02-556-418	12-501-410	none	none	none	none	4	6	3	Figure 5
02-556-420	none	20-060-109	02-500-167	02-500-168	12-501-515	12	0	3	Figure 2
02-556-422	12-501-420	none	none	none	none	14	0	3	Figure 2
02-556-424	none	20-060-100	02-500-167	02-500-168	12-501-515	12	0	2	Figure 1
02-556-428	none	20-060-107	02-500-426	02-500-427	12-501-515	9	0	3	Figure 2
02-556-430	none	20-060-109	02-500-141	02-500-142	12-501-513	4	6	3	Figure 2
02-556-432	none	20-060-107	02-500-167	02-500-168	12-501-517	0	4	3	Figure 2
02-556-436	none	20-060-100	02-500-141	02-500-142	12-501-513	6	2	2	Figure 3
02-556-438	none	20-060-107	02-500-167	02-500-168	12-501-513	4	4	3	Figure 2
02-556-440	none	20-060-107	02-500-218	02-500-217	12-501-516	10	2	3	Figure 2
02-556-442	none	20-060-108	02-500-218	02-500-429	12-501-513	6	2	2	Figure 1
02-556-454	none	20-060-107	02-500-426	02-500-427	12-501-515	12	0	3	Figure 2
02-556-456	none	20-060-100	02-500-141	02-500-142	12-501-516	8	4	2	Figure 1
02-556-458	none	20-060-107	02-500-167	02-500-168	12-501-513	4	4	2	Figure 1
02-556-464	none	20-060-107	02-500-218	02-500-217	12-501-512	6	0	3	Figure 2
02-556-466	none	20-060-109	02-500-141	02-500-142	12-501-513	4	4	3	Figure 2
407 124 003 0	none	20-060-109	02-500-141	02-500-142	12-501-513	4	4	3	Figure 2

*** Earlier design of 02-556-310 used 8 red springs. When replacing springs in earlier design of 02-556-310 use 8 red springs and 2 blue springs.**

NOTE

This literature services various models in this brake series. The components shown in Figures 1-8 may appear different than what is found in your brake. See TABLE 2 for items included in kits.

DISASSEMBLY

(Refer to Figures 1 through 8)

1. Remove retaining ring (3). **NOTE: Not all models use retaining ring (3).**
2. Separate pressure plate (6) from cover (23) by removing washer head cap screws (1). **NOTE: Some models use only two washer head cap screws (1).**

⚠ CAUTION

Pressure plate (6) is under spring tension of approximately 907 kgf (2000 lb). The washer head cap screws should be loosened evenly to relieve this force. If a hydraulic press is available, 1361 kgf (3000 lb) maximum, the pressure plate can be held in position while removing the washer head cap screws.

3. Remove case seal (7) from cover (23). Remove piston (10) from pressure plate (6).
4. Remove o-rings (8 & 11) and back-up rings (9 & 12) from piston (10). **NOTE: Not all models use back-up rings (9 & 12).**
5. Before removing stators (14) and rotors (15), record the stacking arrangement for reassembly purposes. Remove stators (14), rotors (15) and return plate (16).
6. Before removing springs (17), record the pattern and color for reassembly purposes. Remove dowel pins (22), springs (17) and spring retainer (18) from cover (23). **NOTE: Earlier design of 02-556-310 used eight red springs (17). When replacing springs (17) in an earlier design of 02-556-310 position the eight new red springs in a pattern as recorded during disassembly. Position the two new blue springs 180° apart on spring retainer (18).**
7. Remove retaining ring (19) from cover (23).
8. Remove shaft (13) by pressing or using a soft mallet on male end of shaft (13).
9. Remove retaining ring (21) and bearing (20) from shaft (13).
10. Press oil seal (24) from cover (23). **NOTE: Not all models use oil seal (24).**
11. Remove retaining ring (2) from pressure plate (6). Press bearing (4) and oil seal (5) from pressure plate (6). **NOTE: Not all models use retaining ring (2), bearing (4), or oil seal (5).**

ASSEMBLY

(Refer to Figures 1 through 8)

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 (24) into cover (23). Install new bearing (20) and retaining ring (21) on shaft (13). NOTE: Not all models use retaining ring (21) and not all models use oil seal (24).
3. Insert shaft assembly in cover (23) and install retaining ring (19).
4. Install dowel pins (22), spring retainer (18) and springs (17) in cover (23). Be sure to install springs according to pattern and color recorded during disassembly. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern. **NOTE: Earlier design of 02-556-310 used eight red springs (17). When replacing springs (17) in an earlier design of 02-556-310 position the eight new red springs in a pattern as recorded during disassembly. Position the two new blue springs 180° apart on spring retainer (18).**
5. Position return plate (16) on springs (17). **NOTE: Be careful to avoid contaminating friction surfaces with oil.**
6. Install rotor disc (15) and stator discs (14) in the same sequence as recorded during disassembly. Refer to TABLE 1 for rotor disc quantity and Figures 1-7 for stacking arrangement.
7. Install o-rings (8 &11) and back-up rings (9 & 12) on piston (10). Note order of o-rings and back-up rings. Be sure o-rings are flat and all twists are removed. **NOTE: Not all models use back-up rings (9 & 12).**
8. Lubricate piston (10) with clean type fluid used in the system. Carefully press piston (10) into pressure plate (6).
9. Press oil seal (5) and bearing (4) into pressure plate (6). Install retaining ring (2). **NOTE: Not all models use retaining ring (2), bearing (4) and oil seal (5).**
10. Install new case seal (7) in cover (23).
11. Position pressure plate (6) on cover (23) aligning dowel pins (22) with holes in pressure plate (6).
12. Install washer head cap screws (1) and tighten evenly to draw pressure plate (6) to cover (23). Torque washer head cap screws 74.6 N·m (55 lb·ft). For models that use bearing (4), bearing inner race must be supported during this operation. **NOTE: A hydraulic press will simplify installation of pressure plate on cover. Clamp pressure plate in position while tightening the washer head cap screws.**
13. Install retaining ring (3). **NOTE: Not all models use retaining ring (3).**

NOTE

If hydrostatic bench testing is performed on the brake assembly, release pressure should not exceed 137.9 bar (2000 PSI) unless two additional bolts are used for supplemental clamping.

TABLE 2 (Items included in kits)

Lining Kit	O-ring Kit	Bearing Kit	Spring Kit	Complete Repair Kit
Case Seal (7) Stator (14) Rotor (15) Return Plate (16)	Case Seal (7) Oil Seals (5* & 24*) O-rings (8 & 11) Back-up Rings (9 & 12*)	Case Seal (7) Oil Seals (24*) Oil Seals (5*) Bearing (20) Bearing (4*) Retaining Rings (19 & 21*) Retaining Rings (2 & 3*)	Case Seal (7) Red Springs (17) Blue Springs (17)	Case Seal (7) O-rings (8 & 11) Back-up Rings (9 & 12) Stator (14) Rotor (15) Return Plate (16) Red Springs (17) Blue Springs (17) Retaining Rings (19 & 21) Bearing (20) Oil Seal (24*)

* Not used on all models

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 gasket together to seal a mounting face.

Refer to TABLE 1 and 2 for kit numbers and items.

* Not used on all models

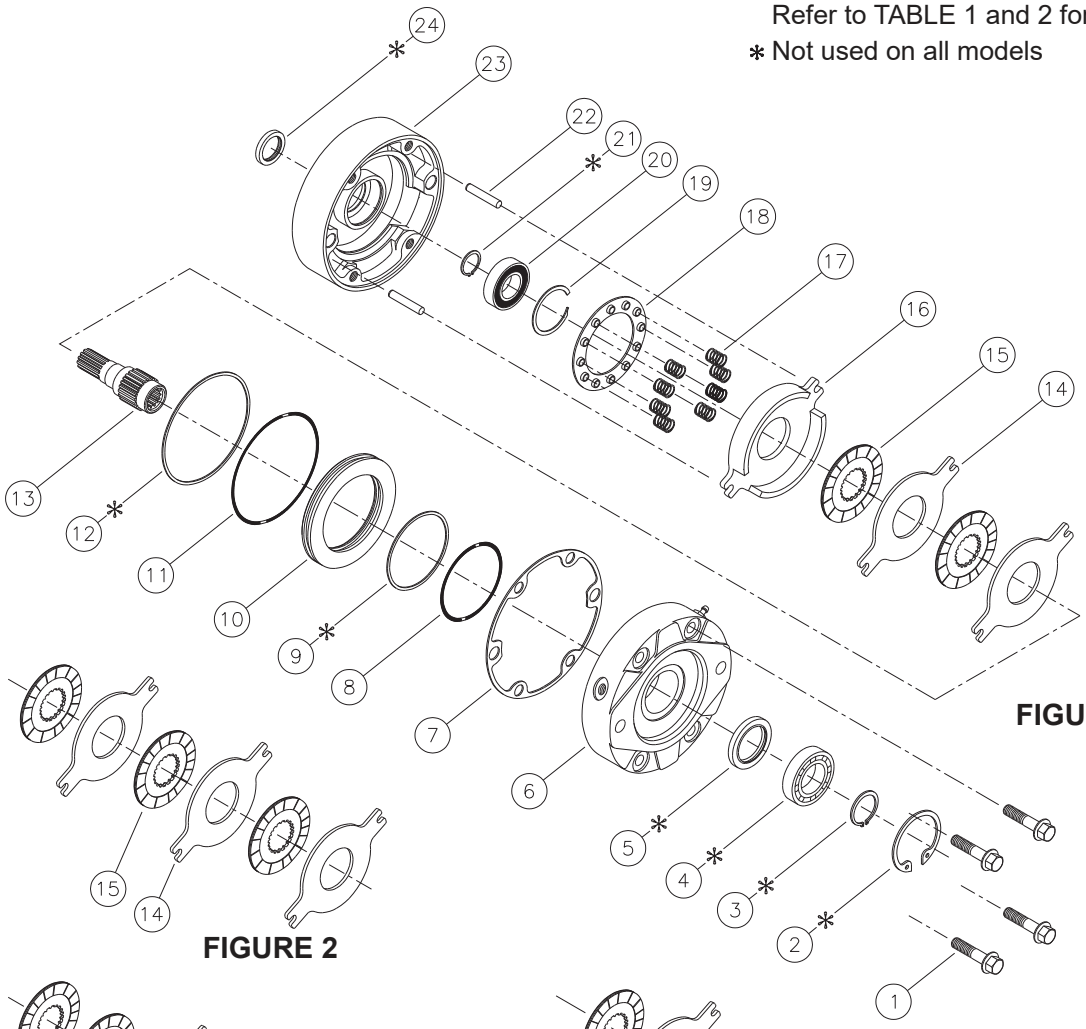

FIGURE 1

FIGURE 2

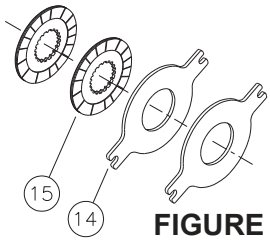

FIGURE 3

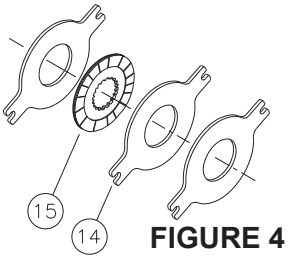

FIGURE 4

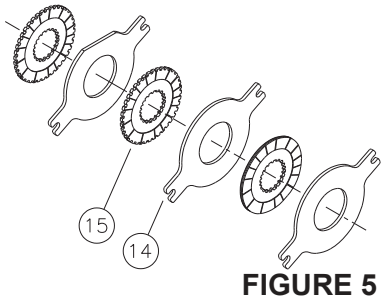

FIGURE 5

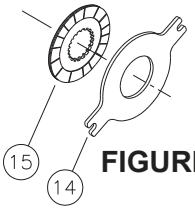

FIGURE 6

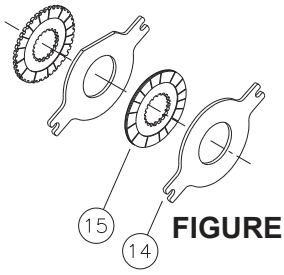

FIGURE 7

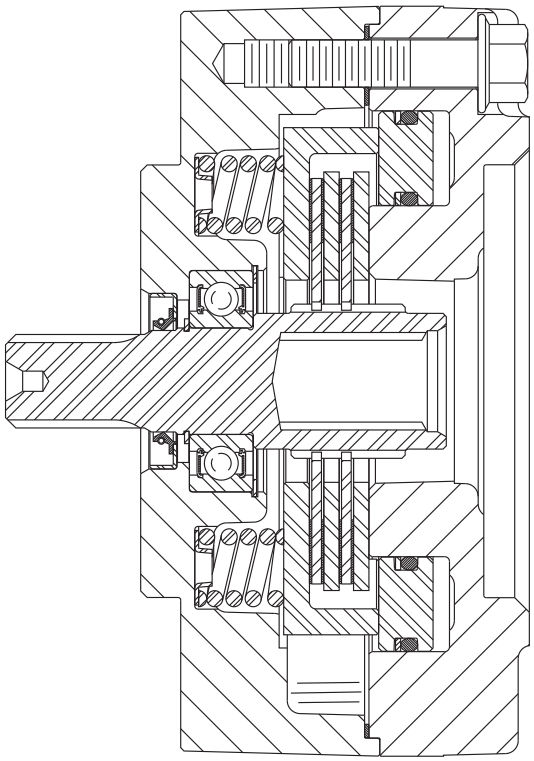

FIGURE 8
(02-556-348 Shown)

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	Wet linings generate 67% of the dry torque rating If the brake has oil in it, check the type if oil. 1. Gearbox oil 2. Hydraulic oil	Replace oil seal in brake. Refer to kits on page 1 and 2. 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.
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.

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