MULTIPLE DISC BRAKE
with pressure override
(dry design - SAE B size)

Service Instructions

This service sheet is for model numbers:

02-556-394
02-556-398
02-556-400
02-556-410
02-556-416
02-556-434
02-556-468
02-556-470

REPAIR KITS

(Refer to page 3 for item numbers)

NUMBER	DESCRIPTION	INCLUDES
12-501-399	Repair Kit for 02-556-398 02-556-400 02-556-416 02-556-434 02-556-468 02-556-470	Case Seal (3) Back-up Rings (7 & 10) O-rings (4, 6 & 9) Stator Discs (12) Rotor Discs (13) Return Plate (14) Springs (16) Bearing (19) Oil Seal (23)
12-501-414	Repair Kit for 02-556-394 02-556-410	Case Seal (3) Back-up Rings (7 & 10) O-rings (4, 6 & 9) Stator Disc (12) Rotor Disc (13) Return Plate (14) Springs (16) Bearing (19) Oil Seal (23)

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.

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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. See cover page for items included in kits.

DISASSEMBLY

(Refer to Figures 1 and 2)

1. Remove pressure plate (2) from cover (21) by removing washer head cap screws (1).

⚠ CAUTION

Pressure plate is under spring tension of approximately 907 kgf (2000 lb). The four 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.

2. Remove case seal (3) from cover (21).
3. Remove piston (5) and o-ring (4) from pressure plate (2).
4. Remove piston (8) from pressure plate (2).
5. Remove o-ring (6), back-up ring (7), o-ring (9), and back-up ring (10) from piston (8).
6. Remove stack assembly, consisting of stator disc (12), rotor disc (13), return plate (14), and spring clips (15). **NOTE: Later design of 02-556-394 and 02-556-410 use compression springs in place of spring clips (15).**
7. Before removing springs (16), record the spring pattern and color for reassembly purposes. Remove dowel pins (20), springs (16), and spring retainer (17) from cover (21).
8. Remove retaining ring (18) from cover (21).
9. Remove shaft (11) by pressing or using a soft mallet on male end of shaft (11).
10. Remove retaining ring (22) and bearing (19) from shaft (11).
11. Press oil seal (23) from cover (21).

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 assembly.
2. Press new oil seal (23) into cover (21). Note direction of seal.
3. Install new bearing (19) and retaining ring (22) on shaft (11).
4. Install shaft assembly and retaining ring (18) in cover (21).
5. Install dowel pins (20), spring retainer (17), and springs (16) in cover (21). Install springs (16) according to the spring pattern and color recorded during disassembly. Different colored springs must be positioned in a symetrical pattern. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.
6. While installing spring (15), position return plate (14) on springs (16). **NOTE: Return plate (14), rotor disc (13), and stator disc (12) must remain dry during installation. No oil residue is to be allowed to contaminate disc surfaces. Later design of 02-556-394 and 02-556-410 use compression springs in place of spring clips (15).**
7. Install new rotor discs (13) and new stator discs (12).
8. Install new back-up rings (7 & 10) and new o-rings (6 & 9) on piston (8). Note order of o-rings and back-up rings. Install piston (8) in pressure plate (2). Be careful not to shear o-rings or back-up rings.
9. Install new o-ring (4) and piston (5) in pressure plate (2).
10. Install new case seal (3) in cover (21).
11. Position pressure plate (2) on cover (21) aligning dowel pins (20) with holes in the pressure plate.
12. Install washer head cap screws (1) and tighten evenly to draw pressure plate (2) to cover (21). Torque washer head cap screws 74.6 N·m (55 lb·ft). **NOTE: A hydraulic press will simplify installation of pressure plate on cover. Clamp pressure plate in position while tightening the washer head cap screws.**

⚠ CAUTION

If hydrostatic bench testing is performed on the brake assembly, release pressure should not exceed 137 bar (2000 PSI) unless two additional bolts are used for supplemental clamping.

SPRING CHART

Model Number	Red Springs (16)	Blue Springs (16)
02-556-394	4	0
02-556-398	3	0
02-556-400	6	2
02-556-410	6	0
02-556-416	3	0
02-556-434	4	0
02-556-468	8	0
02-556-470	8	0

● Items included in Repair Kit

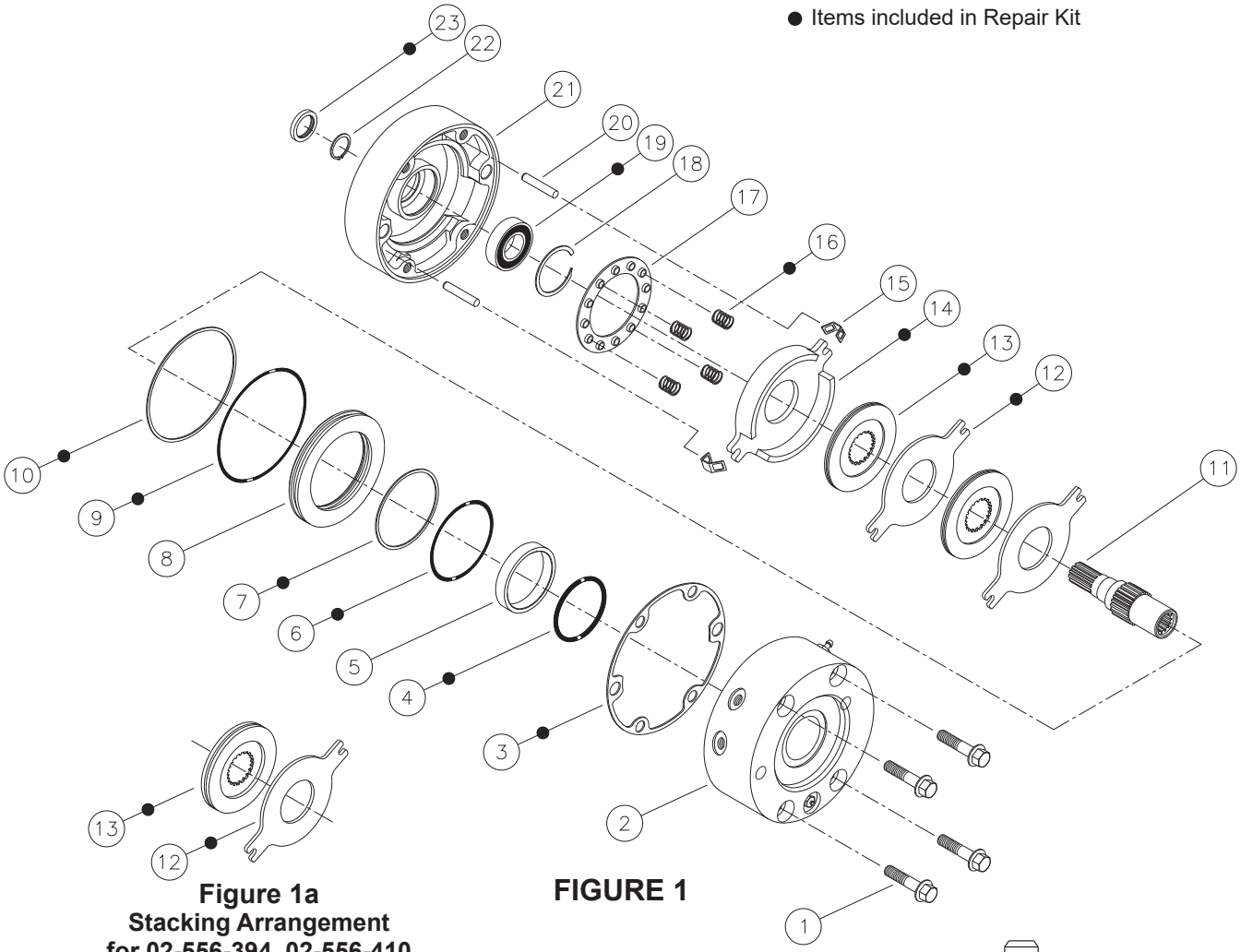

Figure 1a
Stacking Arrangement
for 02-556-394, 02-556-410

FIGURE 1

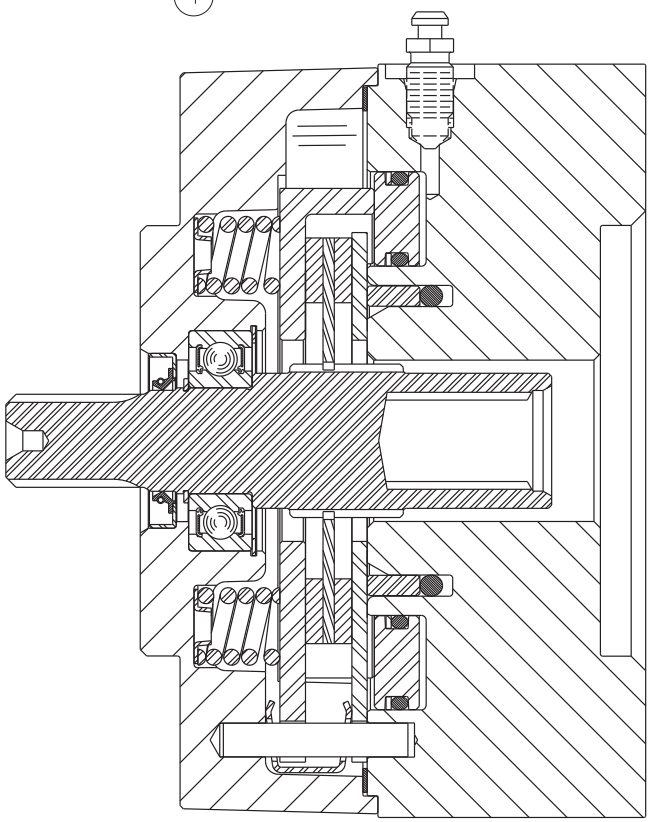

FIGURE 2
(02-556-394 shown)

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 6.9 bar (100 PSI) during bleeding.
3. Apply sufficient pressure to release brake and check for proper operation in system.

SERVICE DIAGNOSIS - Parking Brake Functions

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.

SERVICE DIAGNOSIS - Service Brake Functions

PROBLEM	CAUSE	EXPLANATION	ACTION
Brake drags or runs hot	A. Excessive pressure in service braking	Creates braking torque	Check the service brake system for residual pressure.
	B. Broken spring clips	Friction plates are not being seperated.	Replace the spring clips. Contact ZF Off-Highway Solutions Minnesota Inc.