MULTIPLE DISC BRAKE

(dry design - SAE B size)

Service Instructions

NOTE:
This service sheet covers model numbers:

02-556-390
02-556-396
02-556-406

REPAIR KITS

(Refer to page 3 for item numbers)

NUMBER	DESCRIPTION	INCLUDES
12-501-389	Repair Kit for 02-556-390 02-556-396	Case Seal (4) Back-up Rings (6 & 9) O-rings (5 & 8) Stator Discs (11) Rotor Disc (13) Return Plate (14) Springs (15) Bearing (18) Oil Seal (22)
12-501-440	Repair Kit for 02-556-406	Case Seal (4) Back-up Rings (6 & 9) O-rings (5 & 8) Stator Discs (11) Rotor Disc (13) Return Plate (14) Springs (15) Bearing (18) Oil Seal (22)

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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 (3) from cover (21) by removing cap screws (1) and washers (2).

⚠ CAUTION

Pressure plate is under spring tension of approximately 680 kgf (1500 lb). The four 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 (4) from cover (21).
3. Remove piston (7) from pressure plate (3).
4. Remove o-ring (5), back-up ring (6), o-ring (8), and back-up ring (9) from piston (7).
5. Remove stack assembly, consisting of stator disc (11), sensor ring (12), rotor disc (13), and return plate (14) from cover (21). **NOTE: Not all models use sensor ring (12).**
6. Before removing springs (15), record the spring pattern for reassembly purposes. Remove dowel pins (20), springs (15), and spring retainer (16) from cover (21).
7. Remove retaining ring (17) from cover (21).
8. Remove shaft (10) by pressing or using a soft mallet on the male end of shaft (10).
9. Remove retaining ring (19) and bearing (18) from shaft (10).
10. Press rotary oil seal (22) 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 rotary oil seal (22) into cover (21). Note direction of oil seal (22).
3. Install new bearing (18) and retaining ring (19) on shaft (10).
4. Install shaft (10) assembly and retaining ring (17) in cover (21).
5. Install dowel pins (20), spring retainer (16), and new springs (15) in cover (21). **NOTE: Be sure to use the same spring pattern as recorded during disassembly. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.**
6. Position new return plate (14) on springs (15). The hole in return plate (14) must line up with the hole in cover (21). **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.**
7. Press speed sensor ring (12) on new rotor disc (13). **NOTE: Not all models use sensor ring (12).**
8. Place new rotor disc (13) on shaft (10) until it contacts return plate (14). Install new stator disc (12).
9. Install new back-up rings (6 & 9) and new o-rings (5 & 8) on piston (7). Note order of back-up rings and o-rings. Install piston (7) in pressure plate (3). Be careful not to shear o-rings or back-up rings.
10. Install new case seal (4) in cover (21).
11. Position pressure plate (3) on cover (21) aligning dowel pins (20) with holes in pressure plate (3).
12. Install four cap screws (1) and washers (2) and tighten evenly to draw pressure plate (3) to cover (21). Torque 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 cap screws.**

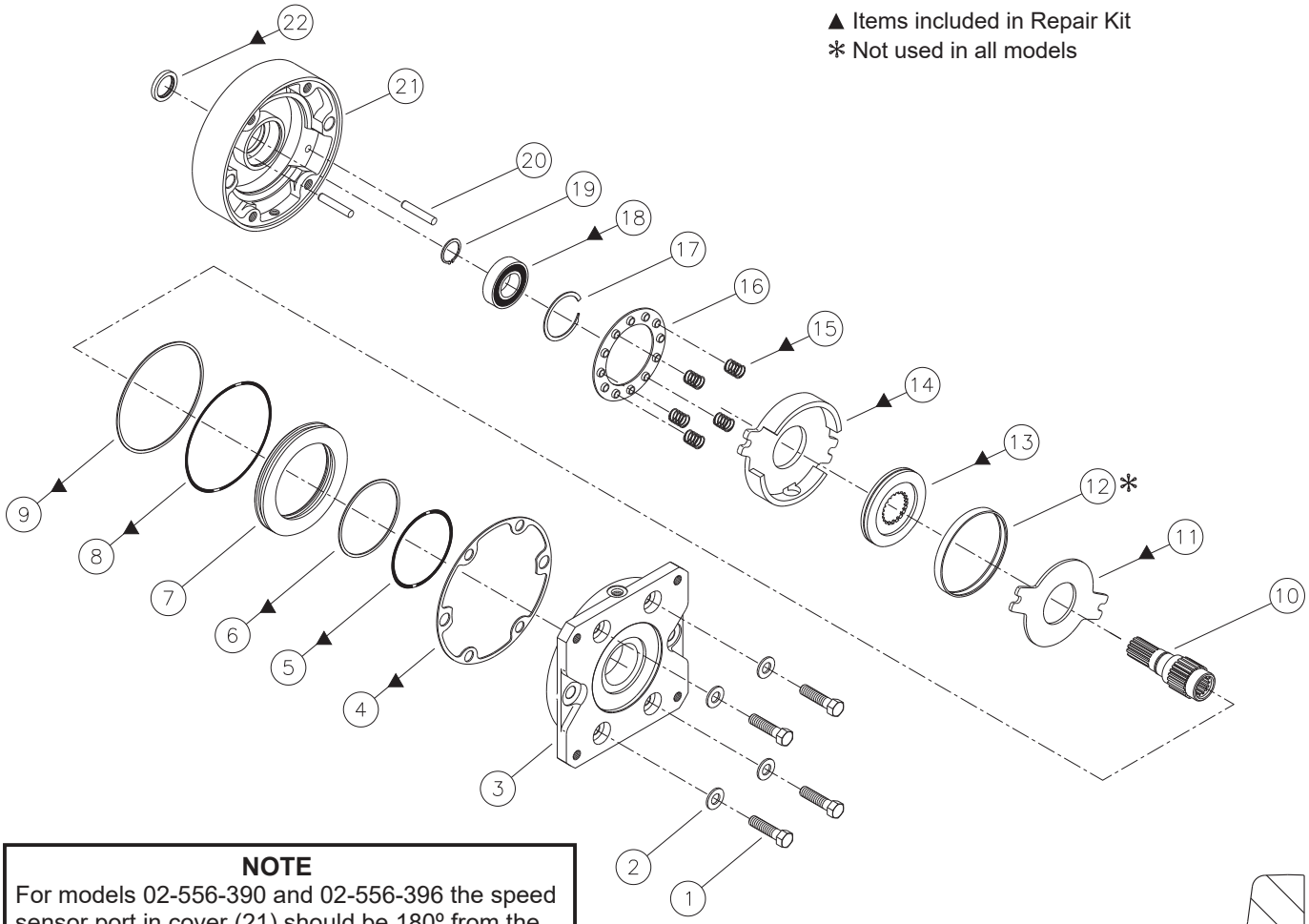
⚠ CAUTION

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.

SPRING CHART

Model Number	Red Springs (15)	Blue Springs (15)
02-556-390	5	0
02-556-396	6	0
02-556-406	4	0

▲ Items included in Repair Kit
✻ Not used in all models



NOTE
For models 02-556-390 and 02-556-396 the speed sensor port in cover (21) should be 180º from the brake release port in pressure plate (3).

FIGURE 1

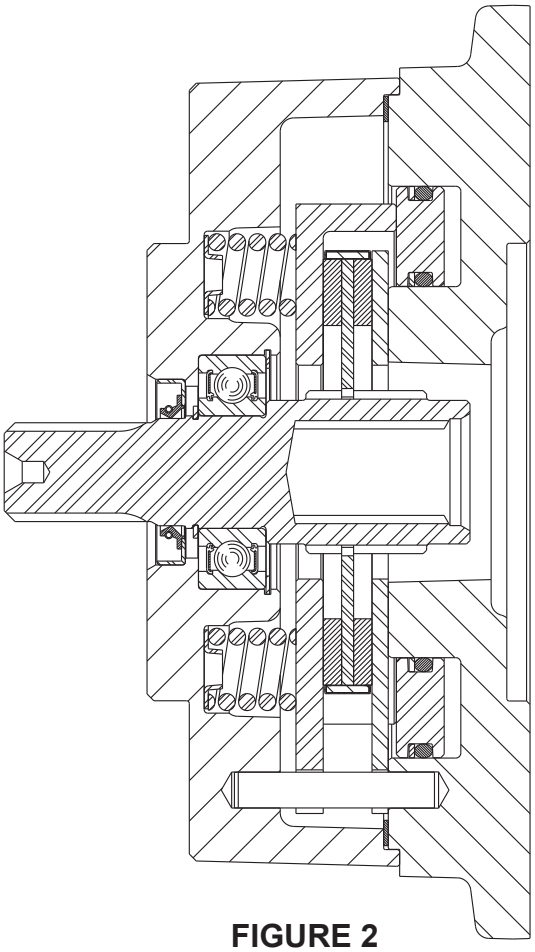


FIGURE 2
(02-556-390 shown)

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

PROBLEM	CAUSE	EXPLANATION	ACTION
Brake slips	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.
	Oil in a brake designed for dry use	Wet linings generate 67% of the dry torque rating. If the brake has oil in it, check the type of oil hydraulic or gearbox. 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 replaced as required.**
	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. Refer to kits on page 1.
	Springs 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.
Brake drags or runs hot	Low actuation pressure	The brake should be pressurized to 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 a pressure gauge to the bleed port and check pressure with system on.
	Bearing failure	If the bearing should fail, a large amount of drag can be generated	Replace the bearing. Refer to kits on page 1.
Brake will not release	Stuck or clogged valve	Brakes are designed to come on when system pressure drops below stated release pressure. If pressure cannot get to brake, the brake will not release.	Attach a pressure gauge to bleed port. Check for adequate pressure. Replace inoperative line or component.
	Bad o-rings	If release piston will not hold pressure, brake will not release.	Replace o-rings. Refer to kits on page 1
	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.