MULTIPLE DISC BRAKE

(dry design - SAE B size)

Service Instructions

NOTE:
This service sheet covers models: 02-558-080
02-558-084
02-558-086
02-558-088
02-558-092
02-558-094
02-558-096
02-558-098
02-558-114
02-558-116

REPAIR KITS

(Refer to page 3 for item numbers)

Number	Description	Includes
02-500-160	Bearing Kit for: 02-558-080, 02-558-086, 02-558-088, 02-558-096, 02-558-114, 02-558-116	Case Seal (3) O-ring (4) Bearings (5 & 21) Oil Seal (25)
02-500-161	Bearing Kit for: 02-558-084, 02-558-094, 02-558-098	Case Seal (3) Bearings (5 & 21) Oil Seal (25)
02-500-162	Bearing Kit for: 02-558-092	Case Seal (3) Bearings (5 & 21) Oil Seal (25)
02-500-163	Seal Kit for: 02-558-080, 02-558-084, 02-558-086, 02-558-088, 02-558-094, 02-558-096, 02-558-114, 02-558-116	Case Seal (3) O-rings (6 & 9) Back-up Rings (7 & 10)
02-500-164	Seal Kit for: 02-558-092	Case Seal (3) O-rings (6 & 9) Back-up Rings (7 & 10)
02-500-165	Seal Kit for: 02-558-098	Case Seal (3) O-rings (6 & 9) Back-up Rings (7 & 10)
20-060-069	Lining Kit for: 02-558-096	Case Seal (3) Return Plate (16) Stator Discs (12) Rotor Discs (14)
20-060-090	Lining Kit for: 02-558-080, 02-558-084, 02-558-088, 02-558-098, 02-558-114, 02-558-116	Case Seal (3) Return Plate (16) Stator Discs (12) Rotor Discs (14)
20-060-091	Lining Kit for: 02-558-086, 02-558-092, 02-558-094	Case Seal (3) Return Plate (16) Stator Discs (12) Rotor Discs (14)

NOTE: All repair kits include mounting face gaskets and o-rings. Some motors and gearboxes allow for the use 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.

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 (23) by removing four washer head cap screws (1).

⚠ CAUTION

Pressure plate is under spring tension of approximately 680 kgf (1500 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. If necessary, tap pressure plate (2) with a soft mallet to dislodge bearing (5) from shaft (11).
3. If bearing (5) or o-ring (4) are being replaced, remove bearing (5) and o-ring (4) from pressure plate (2). **NOTE: Not all models use o-ring (4).**
4. Remove piston (8) from pressure plate (2).
5. Remove o-rings (6 & 9) and back-up rings (7 & 10) from piston (8).
6. Remove case seal (3) and separators (15) from cover (23).
7. Remove stack assembly, consisting of stator discs (12), return plate (16), rotor discs (14), and springs (13). **NOTE: Not all models use springs (13).**
8. Before removing springs (17 & 18) record the spring pattern for reassembly purposes. Remove dowel pins (22), springs (17 & 18), and spring guide (19) from cover (23).
9. Remove retaining ring (20) from cover (23).
10. Remove shaft (11) by pressing on the male end shaft (11).
11. If bearing (21) is being replaced, remove retaining ring (24) and bearing (21) from shaft (11).
12. If oil seal (25) is being replaced, remove oil seal (25) from cover (23).

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. If necessary, press new oil seal (25) into cover (23). Note direction of oil seal (25).
3. Install new case seal (3), dowel pins (22), spring guide (19), and springs (17 & 18) in cover (23). Reinstall springs according to the spring pattern recorded during disassembly. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.
4. If necessary, press new bearing (21) on the male end of shaft (11) until the inner bearing race seats on the shoulder of shaft (11). Install retaining ring (24) on shaft (11).
5. Install shaft/bearing assembly in cover (23) and install new retaining ring (20). Be sure bearing (21) seats on the borestep in cover (23).
6. Position new return plate (16) in cover with tabs guided by dowel pins (22) until it rests on springs (17 & 18). **NOTE: Return plate (16), rotor discs (14), and stator discs (12) must remain dry during installation. No oil residue should be allowed to contaminate the disc surfaces.**
7. Install new rotor disc (14) on shaft (11) and return plate (16). Install one spring (13) on each dowel pin (22). Install additional new stator discs (12), new rotor discs (14), and springs (13). **NOTE: Not all models use springs (13). See Figure 1a for stacking arrangement for 02-558-114 and 02-558-116. See Figure 1b for stacking arrangement for 02-558-092 and 02-558-094.**
8. Install separators (15) on dowel pins (22) in cover (23).
9. Install new o-rings (6 & 9) and new back-up rings (7 & 10) on piston (8). Note the order of o-rings and back-up rings.
10. Install piston (8) into pressure plate (2). Be careful not to sheer the o-rings or back-up rings.
11. If bearing (5) or o-ring (4) are being replaced, install new o-ring (4) and new bearing (5) in pressure plate (2). **NOTE: Not all models use o-ring (4).**
12. Position pressure plate (2) on cover (23) aligning dowel pins (22) with holes in pressure plate and push pressure plate until top rotor disc (14) aligns with shaft (11)
13. Install four washer head cap screws (1). Tighten the cap screws evenly to draw pressure plate (2) to cover (23), and to position bearing (5) onto shaft (11). Torque cap screws (1) 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	Small Springs (17)	Large Springs (18)	Model Number	Small Springs (17)	Large Springs (18)
02-558-080	6	6	02-558-094	6	6
02-558-084	6	6	02-558-096	6	6
02-558-086	6	6	02-558-098	6	6
02-558-088	4	4	02-558-114	10	10
02-558-092	6	6	02-558-116	10	10

See page 1 for items included in kits.
* Not used in all models.

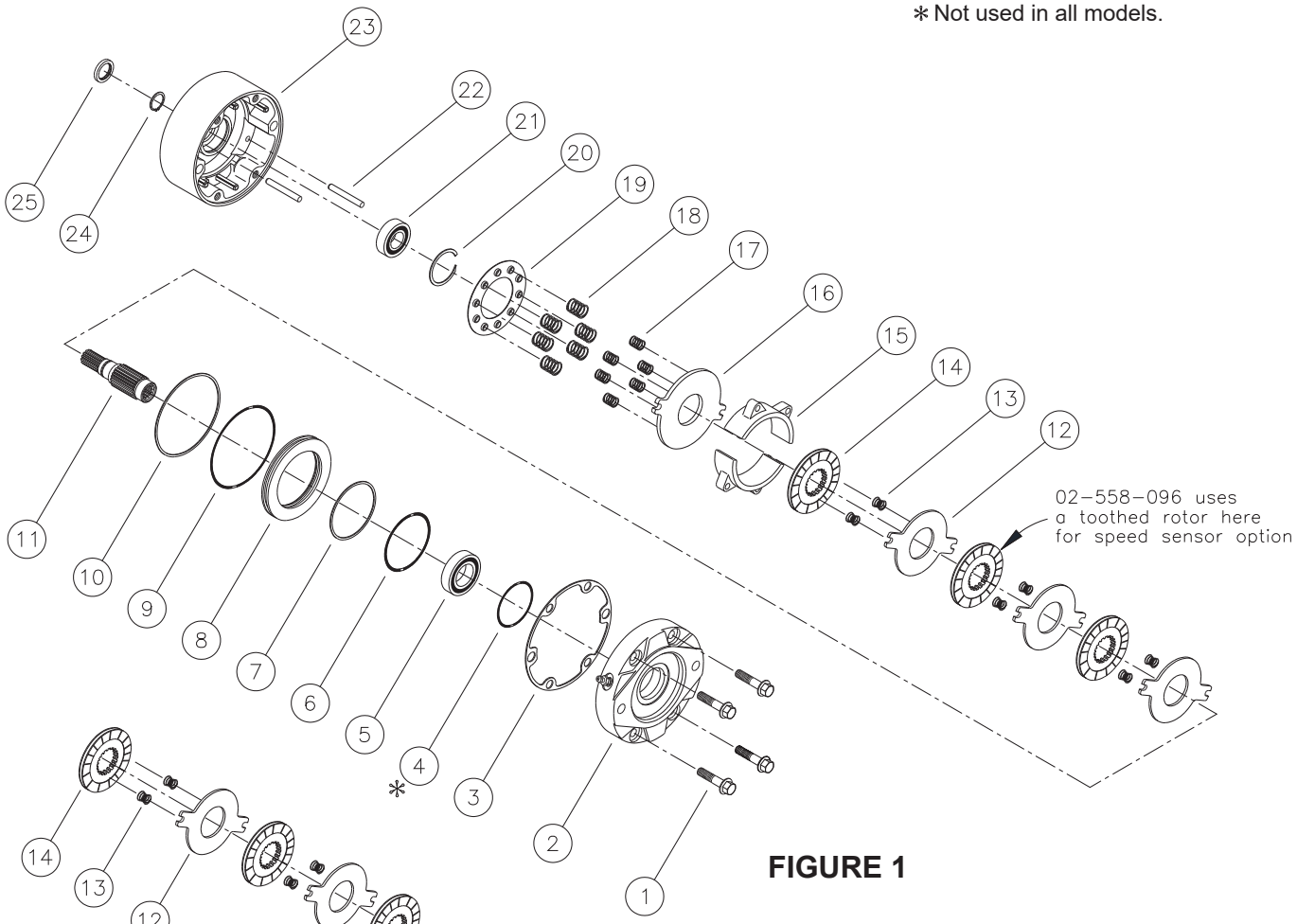

FIGURE 1

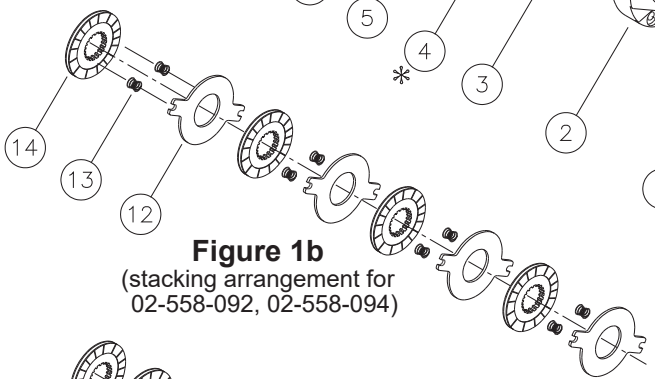

Figure 1b
(stacking arrangement for
02-558-092, 02-558-094)

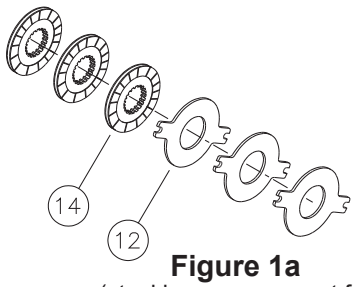

Figure 1a
(stacking arrangement for
02-558-114, 02-558-116)

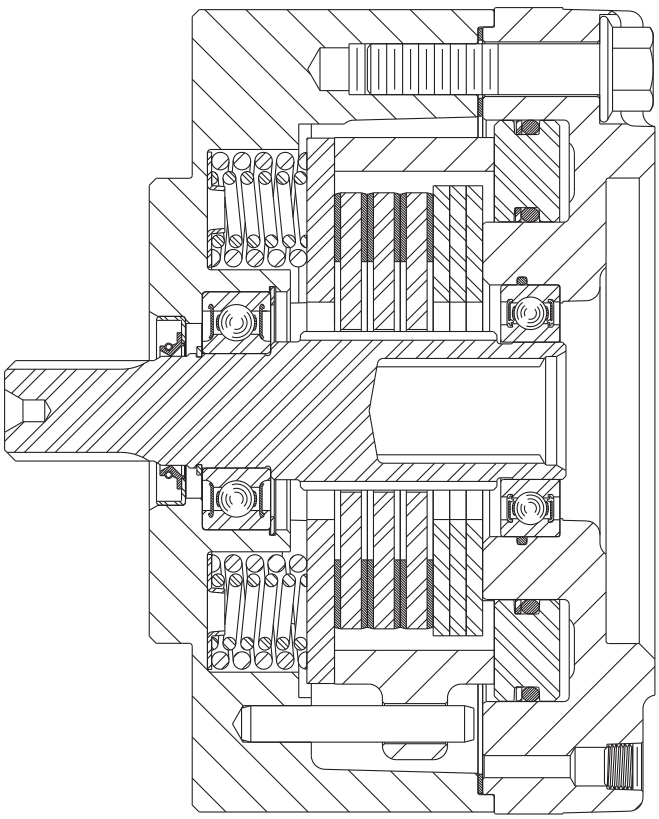

FIGURE 2
(02-558-114 shown)

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 a brake designed for dry use	Wet linings generate 67% of the dry torque rating. If the brake has oil it, check the oil type: 1. Gearbox oil. 2. Hydraulic oil.	Replace oil seal the 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 have 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 a new 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.

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