MULTIPLE DISC BRAKE

(wet design - SAE B size)

Service Instructions

NOTE:
This service sheet covers models: 02-556-300
02-556-356
02-556-446
02-556-448
02-556-450

REPAIR KITS

(Refer to page 3 for item numbers)

Number	Description	Includes
02-500-163	O-ring and Back-up Ring Kit	Back-up Rings (8 & 11) O-rings (4, 7, & 10) Oil Seal (21) Case Seal (6)
20-060-100	Lining Kit	Stator Discs (13) Rotor Discs (14) Return Plate (15) Case seal (6)
02-500-160	Bearing Kit	Oil Seal (21) Bearings (5 & 18) O-ring (4) Case Seal (6)
12-501-518	Spring Kit	Springs (16) Case Seal (6)

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 (3) from cover (20) by removing four cap screws (1) and four washers (2).

⚠ 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. If necessary tap pressure plate (3) with a soft mallet to dislodge bearing (5) from shaft (12).
3. Remove bearing (5) and o-ring (4) from pressure plate (3).
4. Remove case seal (6) from cover (20).
5. Remove piston (9) from pressure plate (3).
6. Remove o-rings (7 & 10) and back-up rings (8 & 11) from piston (7).
7. Remove stack assembly, consisting of stator discs (13), return plate (15), and rotor discs (14) from cover (20).
8. Before removing springs (16), record the spring pattern for reassembly purposes. Remove dowel pins (19), springs (16), and spring retainer (17) from cover (20).
9. Remove shaft (12) by pressing or using a soft mallet on the male end of shaft (12).
10. Remove bearing (18) from shaft (12).
11. Press oil seal (21) from cover (20).

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 assembling.
2. Press new oil seal (21) into cover (20). Note direction of oil seal (21).
3. Install new bearing (18) on shaft (12).
4. Install shaft (12) in cover (20). Be sure bearing (18) bottoms on the borestep.
5. Install dowel pins (19), spring retainer (17), and springs (16) in cover (20). Be sure to use the same number of springs and spring pattern as recorded during disassembly. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.
6. Position return plate (15) on springs (16).
7. Install new rotor discs (14) and new stator discs (13) on shaft (12) in cover plate (20). See the stacking arrangement Figure 1a, for models 02-556-446, 02-556-448 and 02-556-450.

NOTE

Return plate (15), stator discs (13), and rotor discs (14) must remain dry during installation procedures. Do not allow oil residue or contaminants on friction surfaces.

8. Install new o-rings (7 & 10) and new back-up rings (8 & 11) on piston (9). Note the order of o-rings and back-up rings. Install piston (9) in pressure plate (3). Be careful not to shear o-rings or back-up rings.
9. Install new case seal (6) on cover (20).
10. Install new o-ring (4) and new bearing (5) in pressure plate (3).
11. Position pressure plate (3) on cover (20) while aligning dowel pins (19) with holes in pressure plate (3).
12. Install four cap screws (1) and four washers (2) and tighten evenly to draw pressure plate (3) to cover (20). 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.**
13. Seat bearing (5) on shaft (12) by supporting male end of shaft (12) and pressing on the inner race of bearing (5).

⚠ 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.

OIL REQUIREMENTS

Add 88.7 mL (3 oz) Chevron DELO gear lubicant ESI SAE 80W-90 during assembly of the brake.

SPRING CHART

Model Number	Red Springs (16)	Blue Springs (16)
02-556-300	10	0
02-556-356	12	0
02-556-446	8	0
02-556-448	10	0
02-556-450	8	0

▲ Items included in Lining Kit
● Items included in Bearing Kit
■ Items included in O-ring and Back-up Ring Kit
∗ Items included in Spring Kit

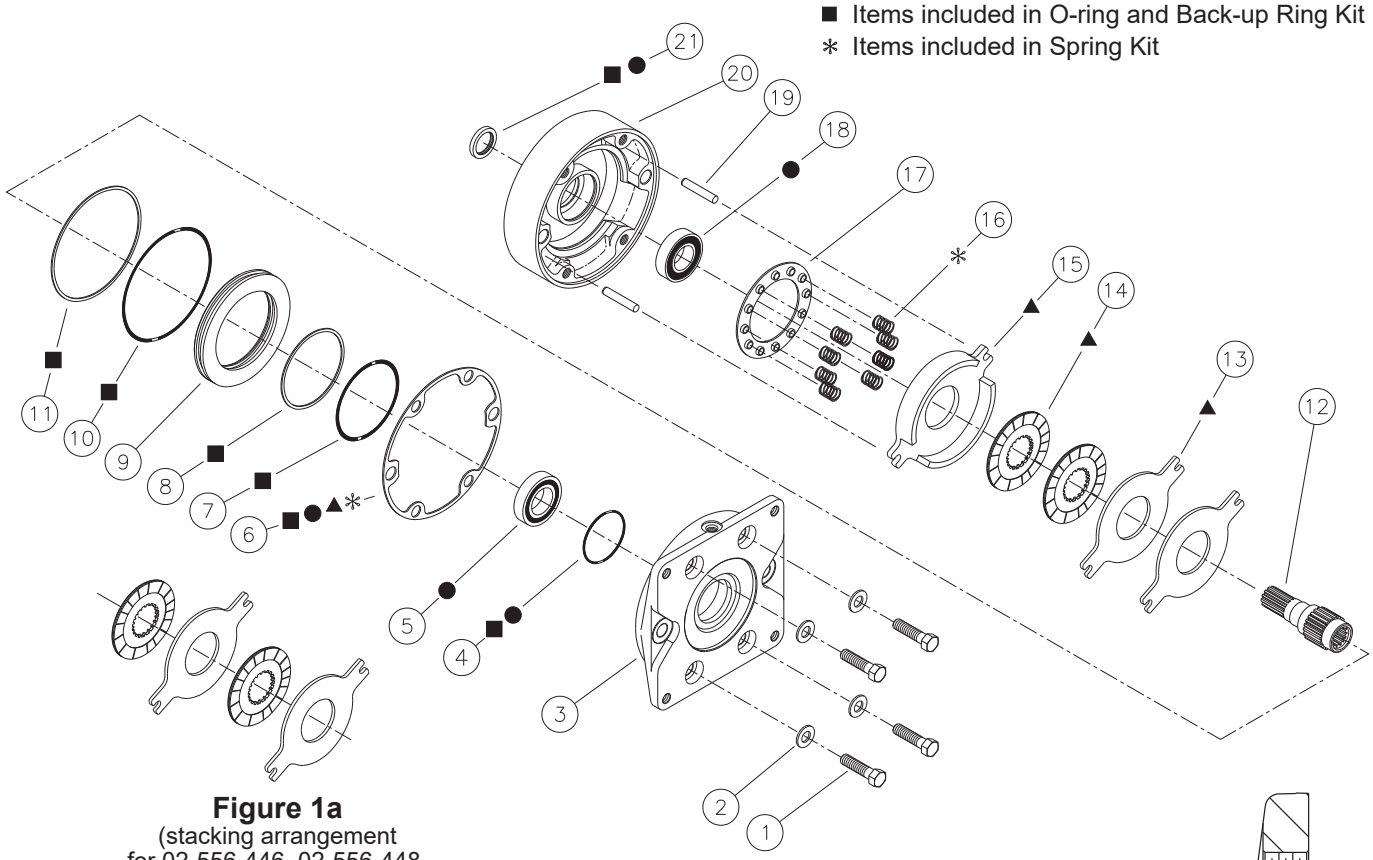

Figure 1a
(stacking arrangement
for 02-556-446, 02-556-448,
and 02-556-450)

FIGURE 1

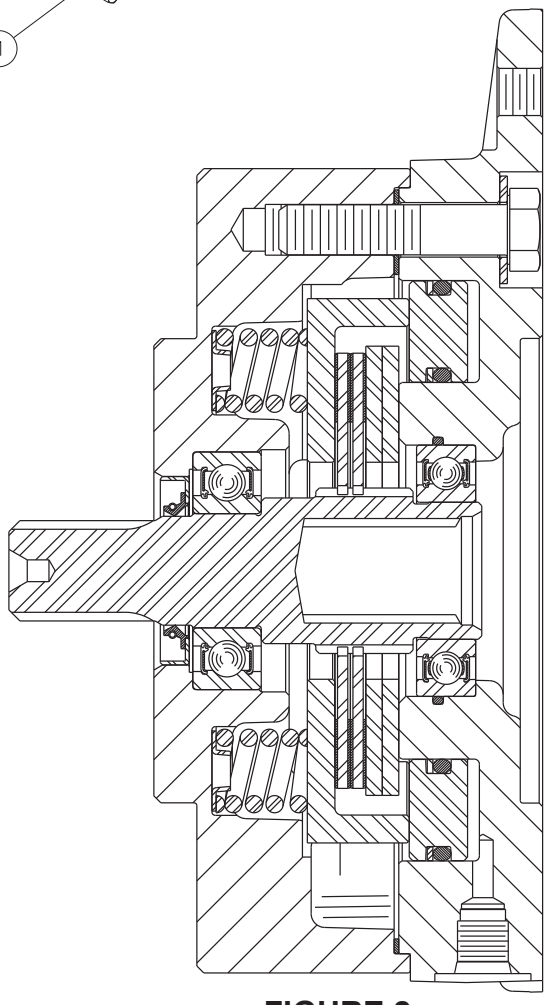

FIGURE 2
(02-556-300 shown)

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	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. 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.
	C. 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	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 a pressure gauge to bleed port and check pressure with system on.
	B. 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	A. Stuck or clogged valve	Brakes are designed to apply 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.