MULTIPLE DISC BRAKE

(wet design - SAE B size)

Service Instructions

NOTE:

This service sheet covers model numbers:

21-100-100
21-100-104
21-100-106
21-100-108

REPAIR KITS

(Refer to page 3 for item numbers)

NUMBER	DESCRIPTION	INCLUDES
02-500-215	O-ring Kit	Case Seal (3) Back-up Rings (5 & 8) O-rings (4 & 7)
12-501-372	Spring Kit for 21-100-100	Case Seal (3) Springs (12)
12-501-373	Spring Kit for 21-100-104	Case Seal (3) Springs (12)
12-501-374	Spring Kit for 21-100-108	Case Seal (3) Springs (12)
12-501-375	Spring Kit for 21-100-106	Case Seal (3) Springs (12)
20-060-103	Lining Kit	Case Seal (3) Stator Discs (9) Rotor Discs (10) Plate (11)

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 (15) by removing washer head cap screws (1).

⚠ CAUTION

Pressure plate is under spring tension of approximately 907 kgf (2000 lb). The two 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 (15).
3. Remove piston (6) from pressure plate (2).
4. Remove o-ring (4), back-up ring (5), o-ring (7), and back-up ring (8) from piston (6).
5. Remove stack assembly, consisting of stator discs (9), plate (11), and rotor discs (10) from cover (15).
6. **NOTE: Not all models use the same number of springs or spring pattern. Record this information for reassembly purposes.** Remove dowel pins (14), springs (12), and spring retainer (13) from cover (15).

ASSEMBLY

(Refer to Figures 1 and 2)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

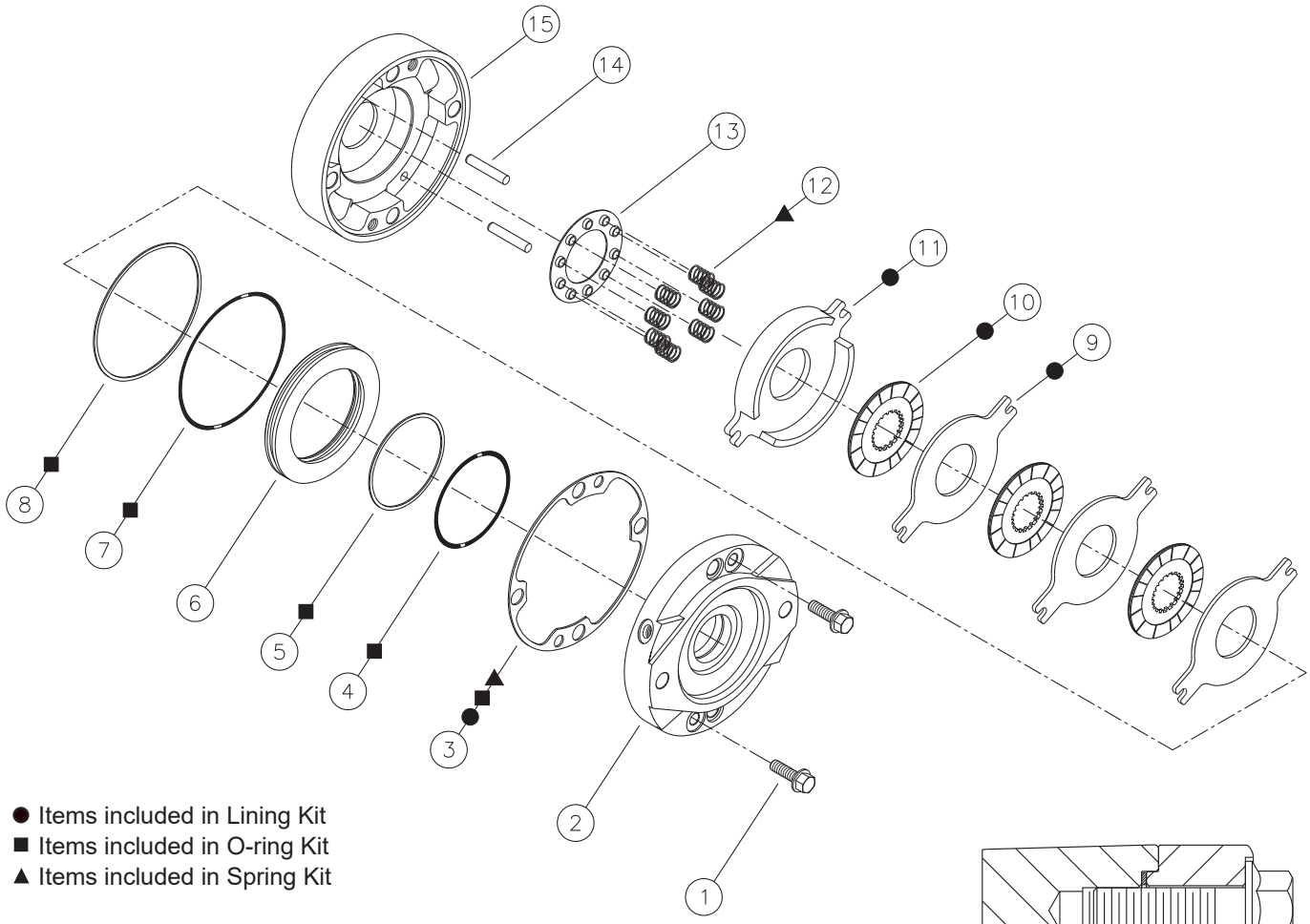
1. Clean all parts thoroughly before assembly.
2. Insert dowel pins (14), spring retainer (13), and springs (12) in cover (15). **NOTE: Be sure to use the same number of springs and spring pattern as recorded during disassembly. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.**
3. Position plate (11) on springs (12). **NOTE: discs (9 & 10) and plate (11) should remain dry during installation. No oil residue should be allowed to contaminate disc surfaces.**
4. Place a new rotor disc (10) on plate (11).
5. Add additional new stator discs (9) and new rotor discs (10) as required to complete the assembly.
6. Install new o-rings (4 & 7) and new back-up rings (5 & 8) on piston (6). Note the order of o-rings and back-up rings. Install piston (6) into pressure plate (2). Be careful not to shear o-rings or back-up rings.
7. Install new case seal (3) on cover (15).
8. Position pressure plate (2) on cover (15) aligning dowel pins (14) with holes in pressure plate.
9. Install washer head cap screws (1) and tighten evenly to draw pressure plate (2) to cover (15). Torque washer head cap screws 47.5 N·m (35 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 34.5 bar (500 PSI) unless two additional bolts are used for supplemental clamping.

SPRING CHART

Model Number	Red Springs (12)	Blue Springs (12)
21-100-100	8	0
21-100-104	5	0
21-100-106	6	0
21-100-108	4	0



● Items included in Lining Kit
■ Items included in O-ring Kit
▲ Items included in Spring Kit

FIGURE 1

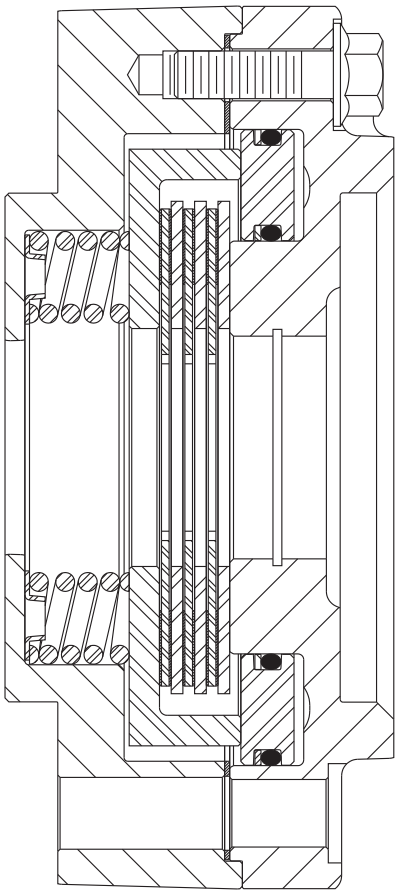


FIGURE 2
(21-100-100 shown)

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.
	C. Springs are 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 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.
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.