MULTIPLE DISC BRAKE
(dry design)
for Clark Series 18000 Long Drop Transmission

Service Instructions

NOTE:
This service sheet covers the 13-547-408 Closed End Transmission Brake.

REPAIR KITS
(Refer to page 3 for item numbers)

Number	Description	Includes
12-501-297	O-ring and Back-up Ring Kit	Case Gaskets (7) Back-up Rings (12 & 14) O-rings (13 & 15) Loctite
12-501-296	Lining Kit	Case Gaskets (7) Primary Disc (3) Stator Discs (5) Rotor Discs (4) Loctite
12-501-298	Spring Kit	Case Gaskets (7) Springs (10) Loctite

ZF Off-Highway Solutions Minnesota Inc.
1911 Lee Boulevard / North Mankato, MN U.S.A. 56003
Tel: +1 507 625 6426 **Fax:** +1 507 625 3212

Form No. 81-547-002 Revised 1995-05-01

www.mico.com

DISASSEMBLY

(Refer to Figures 1 and 2)

1. Remove four socket head assembly screws (18).
2. Tap spring plate with soft mallet to separate cover (1). If sections will not separate, use a screwdriver to carefully pry sections apart.
3. Remove four socket head shoulder bolts (2). A suitable holding fixture is useful to hold the brake in position.

⚠ CAUTION

Do not remove shoulder bolts without pressurization of brake approximately 20.7 bar (300 PSI), or damage may result.

4. Remove primary disc (3), seven rotor discs (4), and seven stator discs (5). **NOTE: Primary disc (3) is offset from stator discs (5) which are located on dowel pins (8). * See note on page 3.**
5. Release pressure to brake before removing four socket head cap screws (6).
6. Remove spring plate (9).
7. Remove case gasket (7) from spring plate (9).
8. Before removing springs (10), note pattern and color for reassembly purposes.
9. Remove piston (11) by carefully exerting hydraulic pressure to the brake release port in the pressure plate (17).
10. Remove o-rings (13 & 15) and back-up rings (12 & 14) from piston (11). **NOTE: BE careful not to scratch or mar piston.**
11. Remove case gasket (7) from pressure plate (17).

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. Install back-up rings (12 & 14) on piston (11) on the spring pockets side of the grooves.
3. Install o-rings (13 & 15) on piston (11). Be sure o-rings are flat and all twists removed. **NOTE: Be careful not to scratch or mar piston.**
4. Lubricate piston (11) with clean type fluid used in the system. Carefully press piston (11) into pressure plate (17). Be sure piston (11) is oriented so threaded holes in piston (11) are in alignment with through holes in spring plate (9) when installed.
5. Install springs (10) according to the pattern and color noted during disassembly. Different colored springs must be alternated. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.
6. Affix case gaskets (7) to pressure plate (17) and spring plate (9).
7. Place unit on a press. Using a fixture, depress and install four socket head assembly bolts (6). **NOTE: Apply two drops of Loctite #242 to the bolt threads.** Torque bolts 47.5-54.2 N·m (35-40 lb·ft). A suitable holding fixture is useful to hold the brake in position.
8. Install stator discs (5) and rotor discs (4). Begin with a stator disc (4) and alternate with rotor discs (5). **NOTE: Slots in stator discs (5) should engage with the dowel pins (8) in spring plate (9). Refer to view A-A for proper stack assembly detail. * See note on page 3.**
9. Install primary disc (3) offset slightly from stator discs (5).
10. Align tabs on primary disc (3) with through holes in spring plate (9) and partially screw in four socket head shoulder bolts (2). **NOTE: Apply two drops of Loctite #242 to threads.** Inspect for free movement of stack. Pressurize brake release port, approximately 27.6 bar (400 PSI) to release discs. Torque shoulder bolts (2) 20.3-24.4 N·m (15-18 lb·ft). A suitable holding fixture is useful to hold brake in position.
11. At this point it will become necessary to remove the outer spline shaft from the transmission shaft and use it to align and center the rotor discs (4).
12. After rotor discs (4) are properly aligned remove the pressure to the brake module and reinstall the outer spline onto the transmission shaft.
13. Install brake module on cover (1) using four socket head assembly bolts (18). **NOTE: Apply two drops of Loctite #242 to threads.** Torque bolts 115.3-122.0 N·m (85-90 lb·ft).

⚠ CAUTION

If hydrostatic bench testing is performed on the brake assembly, release pressure should not exceed 69.0 bar (1000 PSI) unless four additional bolts are used for supplemental clamping.

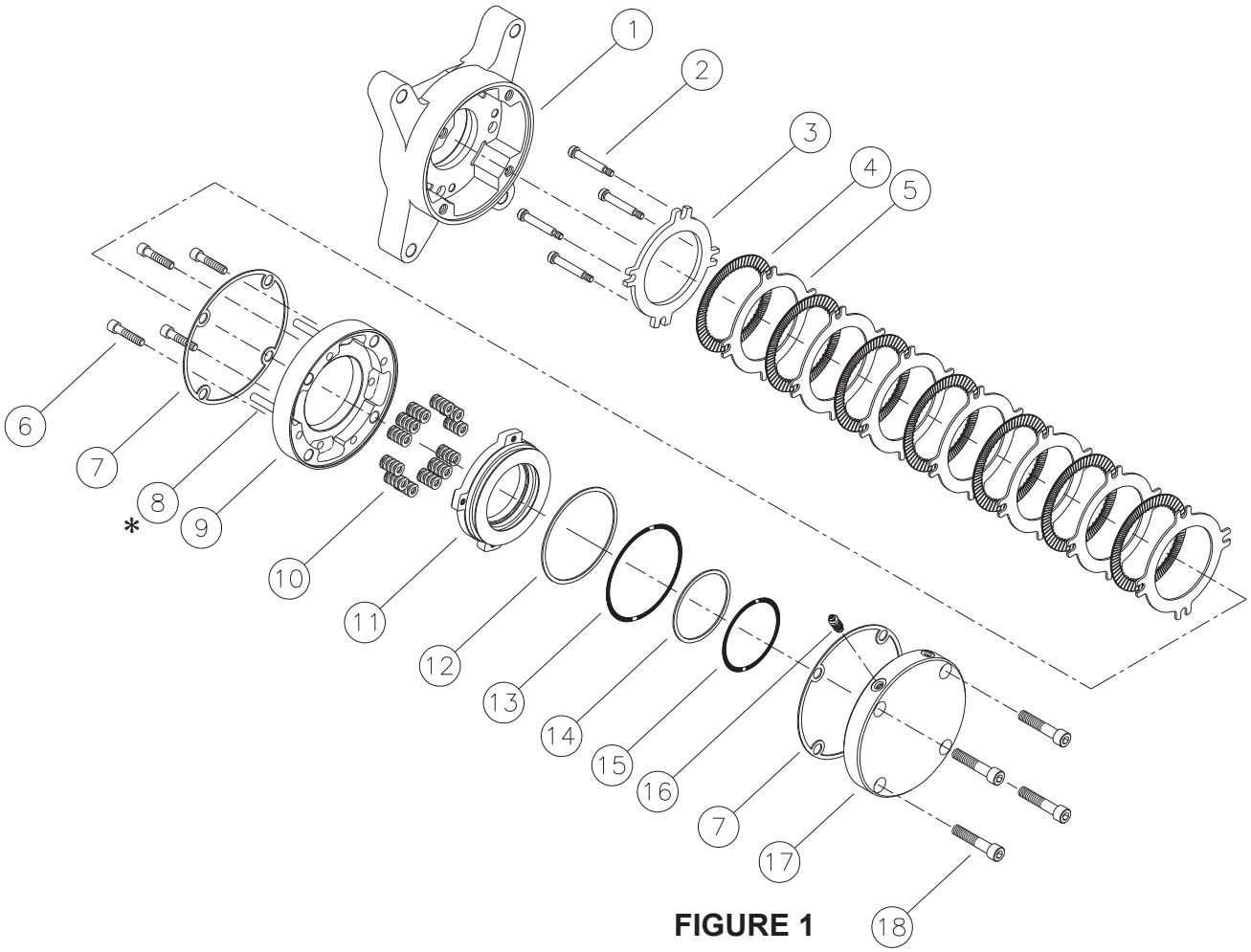
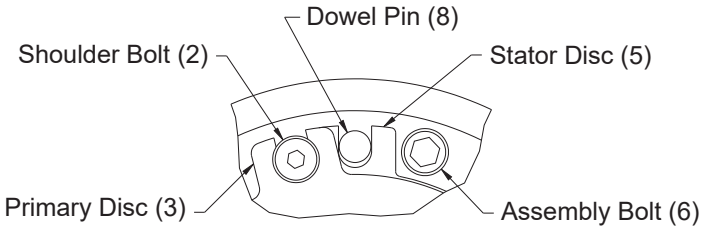


FIGURE 1



VIEW A-A

STACK ASSEMBLY DETAIL

*** Earlier models did not include dowel pins (8). For earlier models all tabs on stator discs (5) must line up over shoulder bolts (2).**

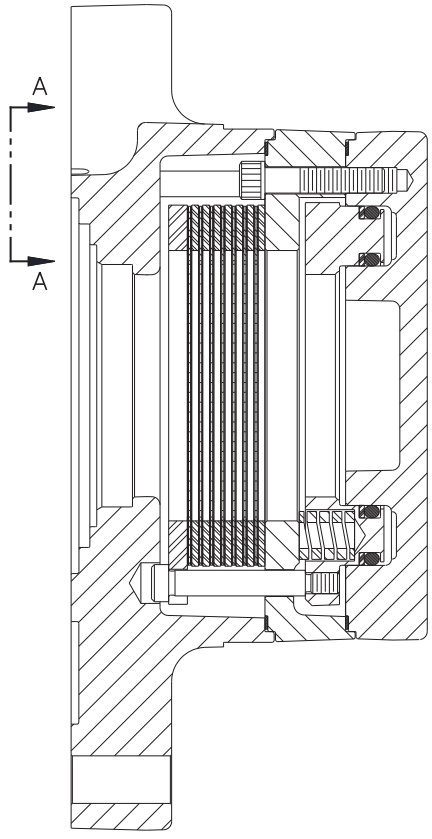


FIGURE 2

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 brake if 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.**
	C. Disc plates worn	The thickness of the disc stack sets the torque level. A thin stack reduces torque.	Check disc thicknesses.
	D. Springs broken or have taken a permanent set	Broken or set springs can cause reduced torque - a rare occurrence.	Check release pressure.
Brake drags or runs hot	A. 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.	Place pressure gauge in bleed port and check pressure with system on.
Brake will not release	A. Stuck valve or clogged	Brakes are designed to come on when system pressure drops below stated release pressure. If pressure can not get to brake, the brake will not release.	Place pressure gauge in bleed port - check for adequate pressure. Replace defective line or component.
	B. Bad o-rings	If release piston will not hold pressure,brake will not release.	Replace o-rings.
	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.