NOTE: This sheet covers model numbers:

*	13-587-034	13-587-054	13-587-068	13-587-080
	13-587-040	13-587-056	13-587-072	13-587-082
	13-587-048	13-587-060	13-587-074	
	13-587-050	13-587-062	13-587-076	
	13-587-052	13-587-064	13-587-078	

* S/N 02 C 357 and later are wet sump oil design.

Wheel Mount MULTIPLE DISC BRAKE

Service Instructions

NOTE: Figure 3 on page 3 shows the S/N location.

Explanation: 01 = year 2001
C = build location
065 = 65th day of the year

Model: 13-587-034

S/N 01 C 065 and Earlier

Repair Kit Number	Description	Items included in Repair Kit (see page 3)
12-501-391	Repair Kit for 13-587-034	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 24)
S/N 01 C 066 to 02 C 191		
12-501-415	Repair Kit for 13-587-034	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19)
S/N 02 C 192 and Later		
12-501-424	Repair Kit for 13-587-034	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19) Oil Seal (25)

Models: 13-587-040 13-587-056 13-587-074
13-587-048 13-587-060 13-587-076
13-587-050 13-587-062 13-587-078
13-587-052 13-587-064 13-587-080
13-587-054 13-587-072 13-587-082

S/N 02 C 191 and Earlier

Repair Kit Number	Description	Items included in Repair Kit (see page 3)
12-501-391	Repair Kit for 13-587-048 13-587-052 13-587-060	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 24)
12-501-415	Repair Kit for 13-587-054 13-587-062	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 24)

continued...

...continued

12-501-394	Repair Kit for 13-587-040 13-587-050 13-587-056	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 24)
12-501-423	Repair Kit for 13-587-064	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19)
S/N 02 C 192 and Later		
12-501-424	Repair Kit for 13-587-034 13-587-048 13-587-052 13-587-054 13-587-062 13-587-064	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19) Oil Seal (25)
12-501-425	Repair Kit for 13-587-040 13-587-050 13-587-056	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19) Oil Seal (25)
12-501-430	Repair Kit for 13-587-072 13-587-074	Plug (1) Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19) Quad Ring/Oil Seal (25)
12-501-433	Repair Kit for 13-587-078	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19) Quad Ring (25)
12-501-435	Repair Kit for 13-587-080	Plug (1) Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19) Quad Ring/Oil Seal (25)

continued on page 2...

...continued from page 1

Repair Kit Number	Description	Items included in Repair Kit (see page 3)
12-501-436	Repair Kit for 13-587-076 13-587-082	Plug (1) Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19) Quad Ring/Oil Seal (25)

Model: 13-587-068
S/N 02 C 192 to 02 C 356

Repair Kit Number	Description	Items included in Repair Kit (see page 3)
12-501-424	Repair Kit for 13-587-068	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19) Oil Seal (25)
S/N 02 C 357 and Later		
12-501-451	Repair Kit for 13-587-068	Case Seal (8) Back-up Rings (10 & 13) O-rings (9 & 12) Stator Disc (14) Rotor Disc (15) Return Plate (16) Springs (17) Bearings (5 & 19) Quad Ring/Oil Seal (25)

NOTE: All repair kits include mounting face gaskets and face seals. Some motors allow for the use of o-rings to seal the mounting surfaces on the input side of the brake. Do not use the o-ring and face gasket 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.

DISASSEMBLY
(Refer to Figures 1 and 2)

1. Carefully drill a 6 mm (1/4 inch) hole through the center of frost plug (1). Remove frost plug (1) by prying it out of pressure plate (7). **NOTE: Be careful not to damage shaft (26) with the drill bit. Only brakes with a S/N 07 C 001 and later use frost plug (1).**
2. Remove retaining ring (2) and washer (3) from shaft (26). **NOTE: Only brakes with S/N 02 C 192 and later use washer (3).**
3. Position brake assembly so pressure plate (7) is facing up. A suitable holding fixture is useful to keep the brake in position. Remove two cap screws (6) and remove pressure plate (7) from shaft (26)

⚠ CAUTION
Pressure plate (7) is under spring tension of approximately 1814kgf (4000 lb). The two cap screws should be loosened evenly to relieve this force. If a hydraulic press is available, 2268 kgf (5000 lb) maximum, the pressure plate can be held in position while removing the cap screws.

4. Remove piston (11) from pressure plate (7).
5. Remove o-rings (9 & 12) and back-up rings (10 & 13) from piston (11). **NOTE: Be careful not to scratch or damage piston (11).**
6. Remove case seal (8) from cover plate (21).
7. Remove stack assembly, consisting of stator discs (14), rotor discs (15), and return plate (16) from cover plate (21).
8. Remove dowel pins (20), springs (17), and spring retainer(18) from cover plate (21). **NOTE: Record the spring pattern and color for reassembly purposes.**
9. Remove retaining ring (22) and washer (23) from shaft (26). Remove shaft (26) from cover (21). **NOTE: Only brakes with S/N 07 C 001 and later use retaining ring (22) and washer (23).**
10. **Earlier Designs** - Remove bearing (19), or oil seal (25) and bearing (24) from cover plate (21). Note direction of oil seal (25). **NOTE: Not all brakes use bearings (19), or bearing (24) and oil seal (25).**
    Later Designs - Remove bearing (19) and quad-ring/oil seal (25) from cover plate (21).
11. Remove retaining ring (4) from pressure plate (7) and press bearing (5) out of pressure plate (7).

ASSEMBLY
(Refer to Figures 1 and 2)

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

1. Clean all parts thoroughly before assembling.
2. Press new bearing (19) into cover plate (21) until it is flush with the inside surface of cover plate (21), see Figure 4, or until it bottoms on cover plate (21) borestep, see Figure 3. **NOTE: Not all brakes use bearing (19).**
3. Install new quad-ring/oil seal (25) in cover plate (21). Note direction of oil seal (25), see Figure 1b. **NOTE: Not all brakes use oil seal (25).**
4. Install shaft (26) in cover plate (21). **NOTE: All brakes that use bearing (19) must fully coat the area on shaft (26) shown in Figure 1 with polymer base moly grease before installing.**
5. Install washer (23) and retaining ring (22) on shaft (26) of applicable brakes.
6. Install dowel pins (20), spring retainer (18), and new springs (17) in cover plate (21). Be sure to install new springs (17) according to the spring pattern and color recorded during disassembly. Different colored springs must be positioned in a symetrical pattern. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.
7. Install new return plate (16), new rotor discs (15), and new stator discs (14) over dowel pins (20) and spline of shaft (26). **NOTE: See Figure 1a for the stacking arrangement for a list of model numbers.**
8. Install new o-rings (9 & 12) and new back-up rings (10 & 13) on piston (11). Note the order of o-rings and back-up rings. **NOTE: Be careful not to scratch or mar piston (11).**
9. Carefully insert piston (11) into pressure plate (7). Note the direction of piston (11). Be careful not to shear the o-rings or back-up rings.
10. Install new case seal (8) on cover plate (21).
11. Position pressure plate (7) on cover plate (21) aligning dowel pins (20) with the holes in pressure plate (7). Install cap screws (6) and tighten evenly to draw pressure plate (7) to cover plate (21). Torque cap screws 47.5-54.2 N·m (35-40 lb·ft).

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

12. Support the brake assembly and shaft (26) so the bearing shoulder on shaft (26) is above the bearing borestep in pressure plate (7). Press new bearing (5) on shaft (26) and into pressure plate (7) until it bottoms on the shoulder of shaft (26). Install washer (3) and retaining ring (2). **NOTE: Only brakes with S/N 02 C 192 and later use washer (3). For these brakes, washer (3) must be reinstalled to properly position shaft (26).**
13. Press on the outer race of new bearing (5) until it bottoms on pressure plate (7) borestep. Install retaining ring (4) in pressure plate (7).
14. Install new frost plug (1) in pressure plate (7) until flush with pressure plate (7) surface. **NOTE: Frost plug (1) is only used in later designs.**

NOTE

If available, a hydraulic press can be used to clamp pressure plate (7) while installing and tightening cap screws (6). Be sure to support shaft (26) so clamping force is not on the studs.

Notes for Wet Design Brakes ("Z option")

COOLING OIL RECOMMENDATIONS

Oil Type: Mineral base hydraulic oil such as Mobil DTE 24, Citgo A/W 32 or equivalent.

Maximum Case Pressure: 1.03 bar (15 PSI)

Sump Oil Volume: Horizontal - 177.4 mL (6 fl oz)

NOTE: Brakes are shipped dry and customer is responsible for adding proper type and volume of cooling oil.

See pages 1 and 2 for items included in kits.

* Not used on all earler designs.

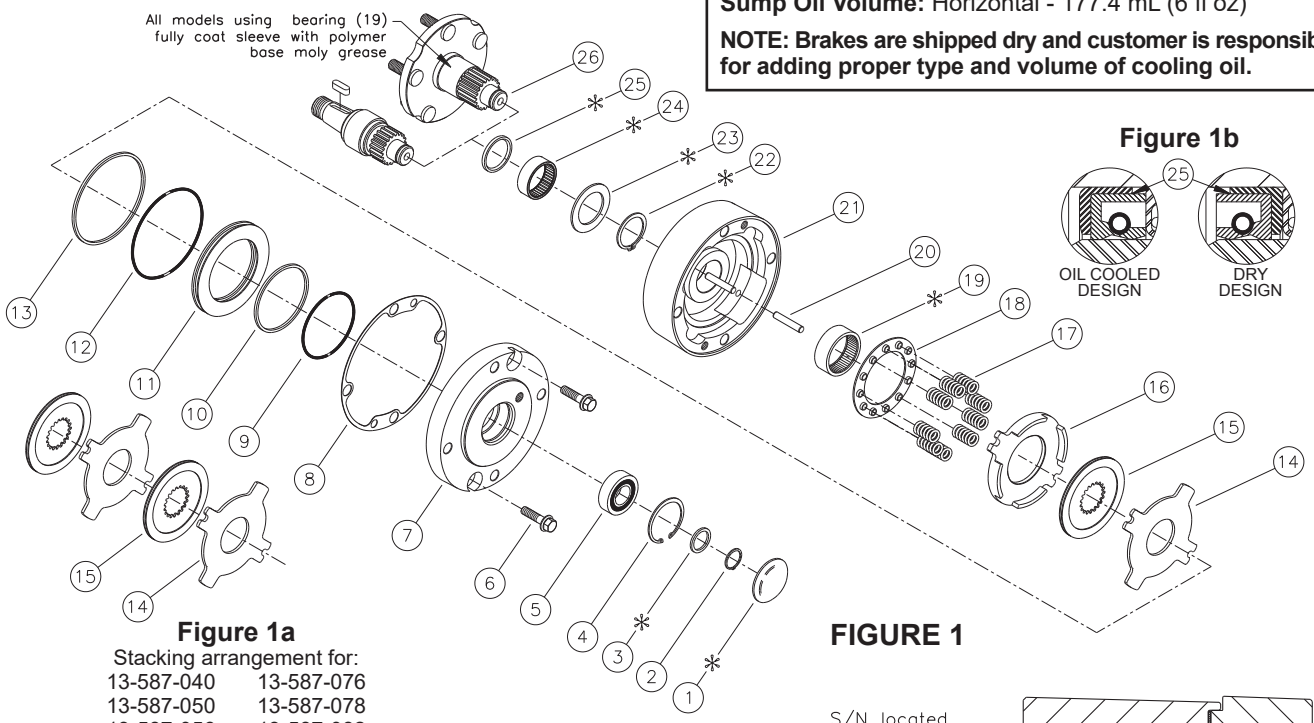

Figure 1a

Stacking arrangement for:
13-587-040 13-587-076
13-587-050 13-587-078
13-587-056 13-587-082
Later design of 13-587-068

Figure 1b

FIGURE 1

Spring Chart

Model Number	Red Springs (17)	Blue Springs (17)	Yellow Springs (17)
*13-587-034	8	2	0
13-587-040	12	0	0
13-587-048	6	2	0
**13-587-050	4	4	0
***13-587-052	0	0	14
13-587-054	12	0	0
13-587-056	12	0	0
13-587-060	6	2	0
13-587-062	12	0	0
13-587-064	0	0	14
****13-587-068	6	4	0
13-587-072	0	0	14
13-587-074	8	2	0
13-587-076	12	0	0
13-587-078	0	0	14
13-587-080	12	0	0
13-587-082	12	0	0

* Earlier design used 6 red and 3 blue springs.
** Earlier design used 6 red and 2 blue springs.
*** Earlier design used 12 yellow springs.
**** Earlier design used 6 red and 2 blue springs.

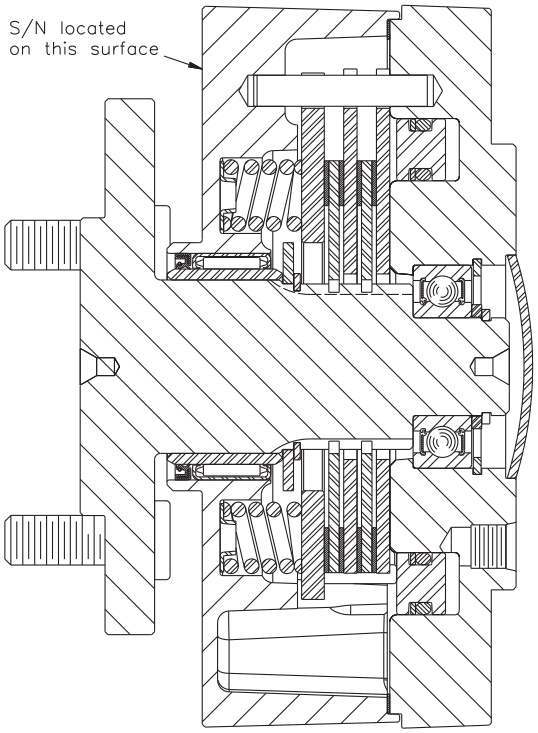

FIGURE 2

(later design 13-587-082 shown)

BLEEDING

1. Install brake in system and connect pressure lines.
2. Bleed the pressure release section of the brake by pressurizing the 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 33% of the dry torque rating.	Replace oil seal in the brake. Check piston seals. **NOTE: Internal components will need to be inspected, cleaned, and replaced as required.**
	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 have 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. May need servicing with new springs.
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 the 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 pages 1 and 2.
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 a pressure gauge to the 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 pages 1 and 2
	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 pages 1 and 2.

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