

DANA Model 70 Axle Pinion MULTIPLE DISC BRAKE (dry design)



Service Instructions

NOTE:
 This service sheet covers
Product Number:
 13-545-234
Order Code number:
 S-004517-S

REPAIR KITS
 (Refer to page 3 for item numbers)

Number	Description	Includes
12-501-098	O-ring and Back-up Ring Kit	Case Gaskets (3 & 11) Oil Seals (2 & 21) O-rings (15 & 17) Back-up Rings (14 & 16) Loctite
12-501-100	Lining Kit	Case Gaskets (3 & 11) Primary Disc (7) Stator Discs (9) Rotor Discs (8) Loctite
12-501-104	Bearing Kit	Case Gaskets (3 & 11) Oil Seals (2 & 21) Bearing (19) Loctite
12-501-102	Lining Kit (dry designs)	Case Gaskets (3 & 11) Springs - red (12) Loctite
12-501-240	Piston Repair Kit	Piston (13) O-rings (15 & 17) Back-up Rings (14 & 16) Nut (item 1, Figure 1) Loctite
12-501-287	Repair Kit	Bearing (19) Retaining Ring (20) Retaining Ring (item 3, Figure 1) Nut (item 8, Figure 1)

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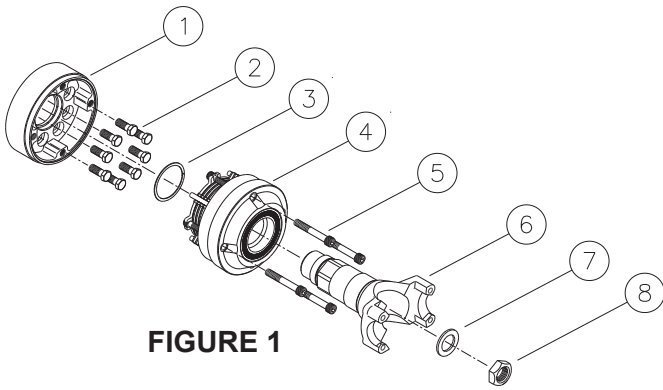


FIGURE 1

REMOVAL INSTRUCTIONS

(Refer to Figure 1)

1. Disconnect driveline from yoke shaft (6) and position away from brake.
2. Disconnect hydraulic pressure line used for releasing brake.
3. Remove nut (8) and washer (7) which retains yoke shaft (6) to splined pinion shaft on axle.
4. Remove four 1/2-13 UNC socket head cap screws (5) which attaches brake module (4) to cover plate (1).
5. Pull brake module (4) and yoke shaft (6) assembly away from cover plate (1).
6. Remove snap ring (3) from yoke shaft (6) and remove yoke shaft (6) from brake module (4).
7. Remove eight 9/16-12UNC hex bolts (2) which attach cover plate (1) to Dana axle flange. Remove cover plate (1) from axle.

INSTALLATION INSTRUCTIONS

(Refer to Figure 1)

1. Insert yoke shaft (6) into new brake module (4) through seal, bearing, and internal hex of spline ring.
2. Attach snap ring (3) in groove on yoke shaft (6) to retain spline ring.
3. Install cover plate (1) on input flange of Dana Model 70 axle. Apply sealant between axle flange and cover plate surfaces.
4. Attach cover plate (1) to axle using eight 9/16-12UNC hex bolts (SAE grade 8) and torque evenly to 149.2 N·m (110 lb·ft).
5. Install brake module (4) and yoke shaft (6) assembly into cover (1) engaging internal yoke shaft spline with pinion spline. Position brake module so mounting bolt holes are in alignment and brake module seats properly on cover flange. Be sure pressure and bleeder ports are facing up.
6. Insert four 1/2-13UNC socket head cap screws (5) through brake module (4) and into cover plate (1). Torque screws evenly 115.3 N·m (85 lb·ft).
7. Install washer (7) and new nut (8) on threaded end of spline shaft which engages yoke shaft (6). Torque nut (8) 325.4-433.9 N·m (240-320 lb·ft). **NOTE: Not all kits include nut (8). For these kits, reinstall nut (8) removed during disassembly.**
8. Reattach driveline on yoke shaft (6).
9. Connect pressure line to brake, bleed system, and test operation of brake on machine.

Disassembly

(Refer to Figures 2 and 3)

1. Remove case gasket (3) from cover (1).
2. Press out oil seal (2) from cover (1) if replacement is necessary.
3. Remove outer spline (4) from brake module.

CAUTION

Do not remove shoulder bolts (5) without pressurization of the brake, approximately 27.6 bar (400 PSI), or damage may result.

4. Remove four socket head shoulder bolts (5). A suitable holding fixture is useful to hold brake in position.
5. Remove primary disc (7), seven rotor discs (8), and seven stator discs (9). **NOTE: Primary disc (7) is offset from other stator discs (9). Reinstall new plates in the same sequence.**
6. Remove the four socket head cap screws (6) that attach spring plate (10) to pressure plate (18).
7. Remove spring plate (10) from pressure plate (18).
8. Remove case gasket (11) from spring plate (10).
9. Remove springs (12) from piston (13). Note spring pattern for reassembly purposes.
10. Remove piston (13) by carefully applying hydraulic pressure to brake release port on pressure plate (18).
11. Remove o-rings (15 & 17) and back-up rings (14 & 16). **NOTE: Be careful not to scratch or mar piston (13).**
12. Remove oil seal (21) from pressure plate (18).

NOTE

A special removal tool with 2.990/2.980 inch outer diameter is required to press bearing (19) from pressure plate (18) bore. Therefore, bearing (19) should only be removed if replacement is necessary.

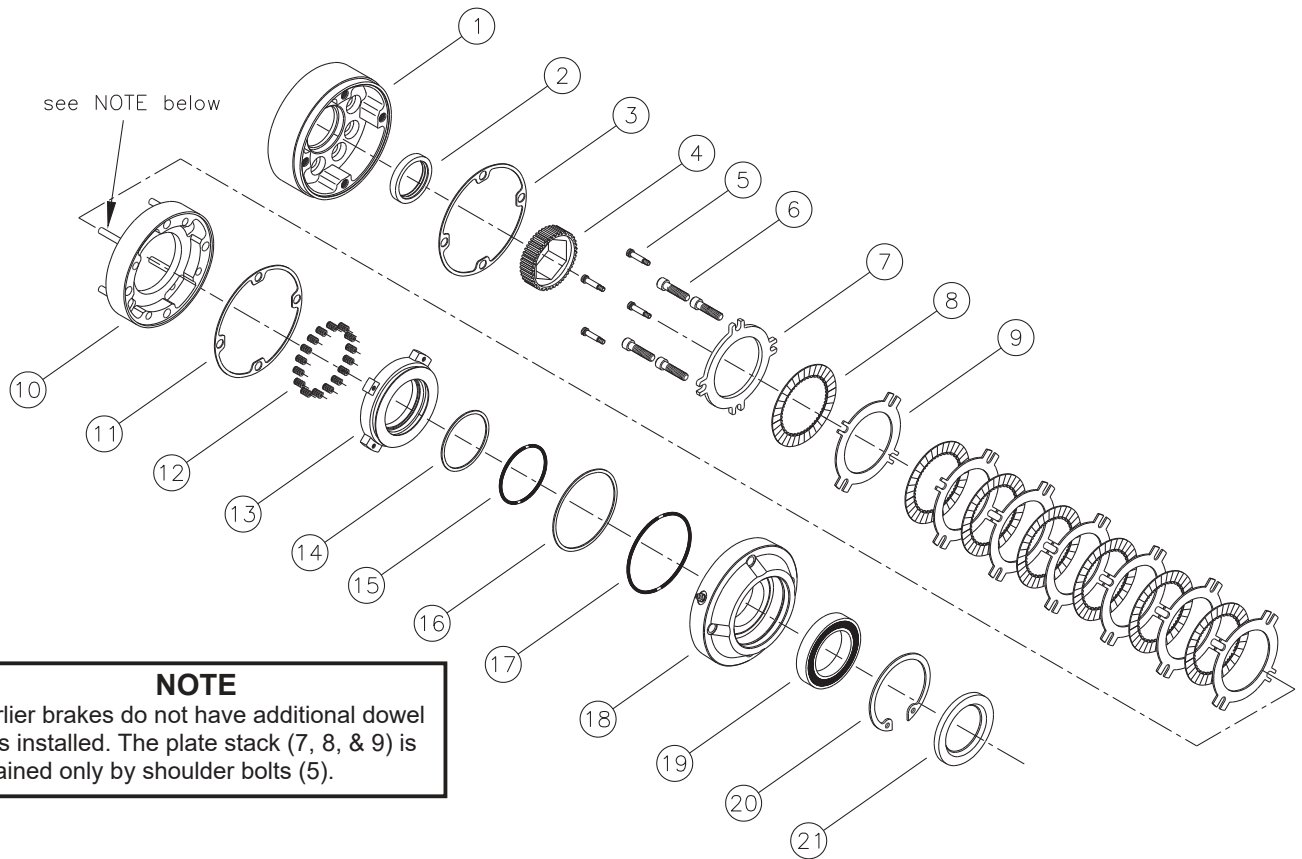
13. If necessary, remove snap ring (20) and press bearing (19) from pressure plate (18).

Assembly

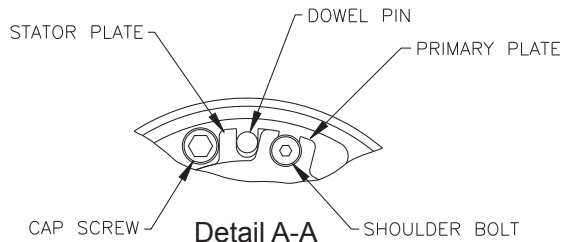
(Refer to Figures 2 and 3)

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

1. Clean all parts thoroughly before assembling.
2. If removed, press new bearing (19) in pressure plate bore (18). Insert snap ring (20).
3. Press seal (21) into pressure plate (18) until flush with end of pressure plate.
4. Install back-up rings (14 & 16) on piston (13) toward spring pockets.
5. Install o-rings (15 & 17) on piston (13). Be sure o-rings are flat and all twists removed. **NOTE: Be careful not to scratch or mar piston (13).**
6. Lubricate pressure plate piston bore (18) with clean type fluid used in the system. Carefully press piston (13) into pressure plate (18). Be sure piston (13) is positioned so the threaded holes in piston are aligned with through holes in spring plate (10) when installed. Press piston (13) until it bottoms on pressure plate (18).
7. Install twelve springs (12) in piston (13) according to spring pattern noted during disassembly. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.
8. Install case gasket (11) on spring plate (10).
9. Install spring plate (10) on pressure plate (18). Compress springs (12) until spring plate bottoms on pressure plate.



NOTE
 Earlier brakes do not have additional dowel pins installed. The plate stack (7, 8, & 9) is retained only by shoulder bolts (5).



Stack Assembly Detail

FIGURE 2

10. Install four socket head cap screws (6). Torque cap screws 74.6 N·m (55 lb·ft). A suitable holding fixture is useful to hold brake in position. **NOTE: Apply two drops of Loctite 242 to threads of cap screws (6).**
11. Install stator discs (9) and rotor discs (8). Begin with a stator disc (9) and alternate with rotor discs (8).

CAUTION
 Slots in stator discs (9) must engage with fixed dowel pins in spring plate (10).

12. Install primary disc (7). Offset from stator discs (9).
13. Align tabs on primary disc (7) with through holes in spring plate (10) and partially screw in four socket head shoulder bolts (5) into piston (13). **NOTE: Apply two drops of Loctite 242 to threads of cap screws (5).**
14. Using outer spline (4) align and center rotor discs (8) in brake module. Be certain outer spline (4) is installed with counterbore end towards bearing in brake.
15. Pressurize brake release port, approximately 27.6 bar (400 PSI), to completely release discs. Torque shoulder bolts 24.4 N·m (18 lb·ft) and release pressure. A suitable holding fixture is useful to hold brake in position.
16. Press oil seal (2) into cover (1). Note direction of seal during installation.
17. Install case gasket (3) in cover (1).

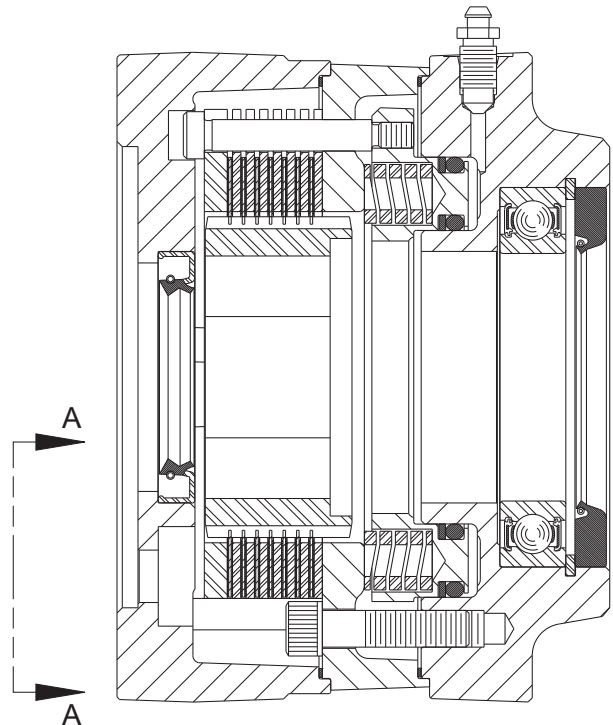


FIGURE 3

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	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.
	Oil in brake if designed for dry use	Dry linings generate 50% more torque than linings saturated with oil. If the brake has oil in it, check the type of oil. <ol style="list-style-type: none"> 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 replace as required
	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.
	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 new spring kit).
Brake drags or runs hot	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.
	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	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.
	Bad o-rings	If release piston will not hold pressure, the brake will not release.	Replace o-rings. Refer to kits on page 1.
	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.