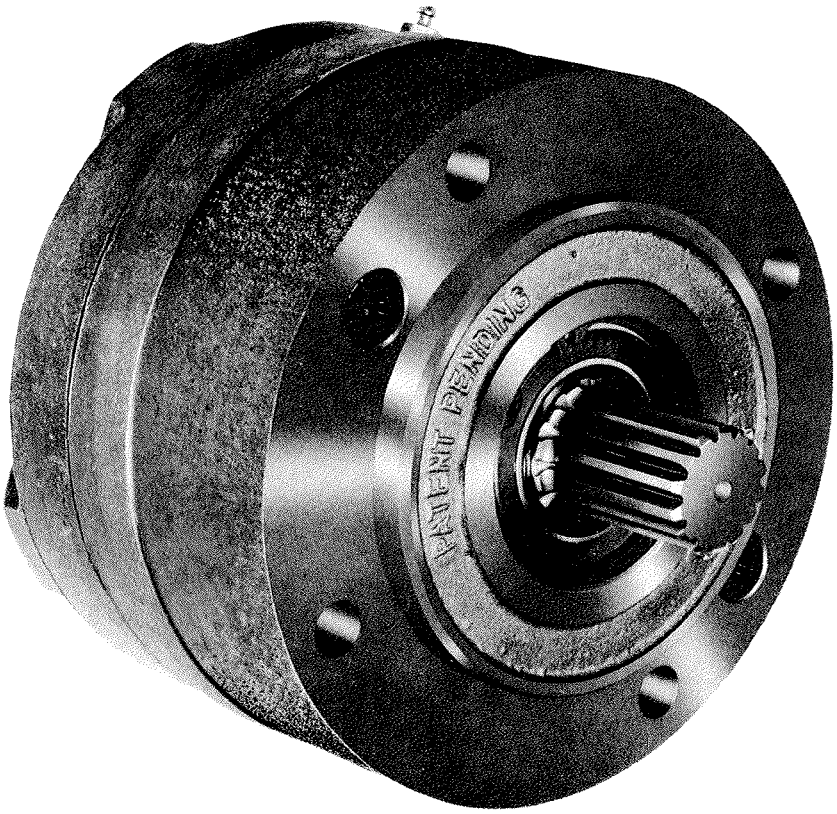
Modular MULTIPLE DISC BRAKE with pressure override (SAE C size)

Service Instructions



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TYPICAL BRAKE

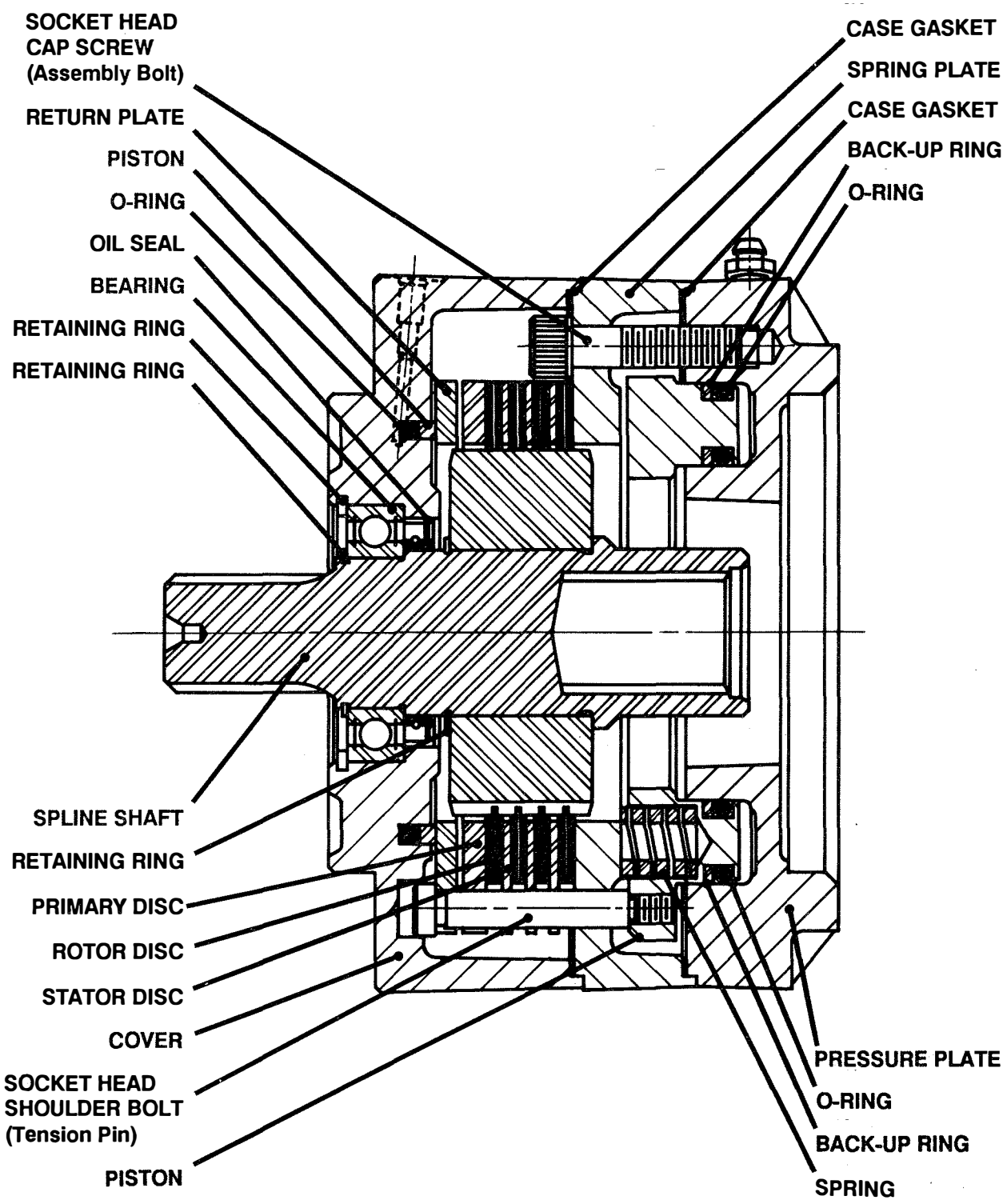


FIGURE 1

PRINCIPLES OF OPERATION

These brakes are spring-set, hydraulically released, multiple disc brakes with a secondary pressure apply piston. The secondary piston allows modulation of the brake torque via any external pressure source. This type of brake is used primarily where positioning and limited dynamic braking is required. The parking or safety brake portion of a pressure override brake, although rated 1500 psi require only 130 psi to 320 psi to make them function normally. The exact pressure required for operation is dependent upon the number of springs used to generate the torque necessary to hold the designed load. Thus, a brake with a full compliment of springs, will generate the highest level of torque and require approximately 320 psi to fully release the brake and provide adequate running clearance for the individual discs. A brake with 1/2 of the full spring compliment will have 1/2 as much torque and will require only 160 psi to fully release the brake. Consult catalog to choose the torque which best suits your design parameters.

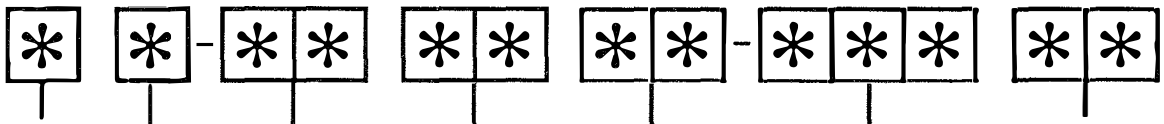
It is very important to remember that any pressure on the brake's release piston will directly affect the level of torque.

Two application examples:

1. The brake has a release pressure of 200 psi. The actuation pressure is provided by a charge pump. During certain phases of the machine's operation, the charge pump pressure dips from 200 psi to 100 psi. At 200 psi the brake runs free (zero torque) but at 100 psi the brake will generate slightly less than half of its rated torque. The brake will drag - failure may occur. In this case, a brake should be selected which has a lower release pressure.
2. A brake has a release pressure of 200 psi. The system is set up to hold a load when a variable pump is shifted into neutral. Everything is running fine until the filter clogs, causing a build-up of back pressure in the return line to the tank. At a pressure of 60 psi, the brake will lose 25% of its holding torque; thus the load may slip. The situation can be corrected by replacing the filter or adding an extra margin of safety to your required brake torque in the initial design.

The service portion of a pressure override brake can be modulated by a master cylinder or hydraulic power brake valve. The modulation of the service portion in no way affects the release pressure of the safety brake portion. It is imperative that residual pressures in the modulating circuit do not exceed 10 psi and maximum operating pressures do not exceed 600 psi or damage may result. In all but a very few applications, flow thru oil cooling is required in this type of brake. It is very important that case pressures do not exceed 15 psi or leakage will occur. These brakes are designed to give thousands of trouble free hours of service when set up correctly in the hydraulic circuit.

DESCRIPTION OF MODEL NUMBERS



P- PRESSURE OVERRIDE

OUTPUT FACE
C - SAE C-Mount 4-Bolt

OUTPUT SPLINE
14 - 14T 12/24
17 - 17T 12/24

INPUT SPLINE
14 - 14T 12/24
06 - 1.0 Dia. 6B
17 - 17T 12/24

OPTIONS
(Available separately or in combination)
S - Speed Sensor
Z - Oil Cooled*

INPUT FACE
M - MAB 4-Bolt and SAE A-Mount 2-Bolt
K4 - Char-Lynn Standard 4000
C - SAE C-Mount Standard
C24 - 2-Bolt and 4-Bolt C-Mount
B - SAE B-Mount 2-Bolt

TORQUE* 1 psi = .06895 bar

Code	Torque (lbs. in.)	Initial Release Pressure (psi)	Full Release Pressure (psi)
98	9800	240	320
80	8000	200	270
70	7000	180	250
55	5500	140	190
45	4500	110	150
36	3600	100	130

*** NOTE: On oil cooled models (Z - option) actual torque is 67% of value shown on torque code chart.**

DISASSEMBLY

1. Remove two flat head assembly bolts (1) and o-rings (2). A suitable holding fixture is useful to keep brake in position.
2. Tap female end of spline shaft assembly (13) and spring plate (19) with soft mallet to separate cover. If sections will not separate, use a screwdriver to carefully pry sections apart.
3. Remove return plate (10) and return springs (12).
4. Remove case gasket (11) from cover (7).
5. Remove retaining ring (3) from spline shaft assembly (13).
6. Remove spline shaft assembly (13) from cover (7) by tapping male end of spline shaft assembly with soft mallet.
7. Remove piston (9) and o-ring (8) from cover (7).
8. If required, remove retaining ring (4) from cover (7) and press out oil seal (6) and bearing (5).
9. Remove four socket head shoulder bolts (15). A suitable holding fixture is useful to hold brake in position.

   CAUTION: Do not remove shoulder bolts without pressurization of brake (approx. 300 psi) or damage may result.

10. Remove primary disc (16), four rotor discs (17) and three stator discs (18).
11. Remove two socket head cap screws (14).
12. Remove spring plate (19).
13. Remove case gasket (11) from spring plate (19).
14. Before removing springs (20), note pattern and color for reassembly purposes.
15. Remove piston (21) by carefully exerting hydraulic pressure through brake release port on pressure plate (26).
16. Remove outside and inside o-rings (23 & 25) and outside and inside back-up rings (22 & 24) from piston (21).

    CAUTION: Care must be taken so as not to scratch or mar piston.

ASSEMBLY

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

1. Use an alkaline wash to clean parts before assembly.
2. Press oil seal (6) into cover plate bore (7) until it is flush with bearing shoulder.

   DRY DESIGN BRAKE; oil seal (6) must be installed with open side facing pilot end of cover (7).

   LIQUID COOLED BRAKE; oil seal (6) must be installed with closed side facing pilot end of cover (7).
3. Press bearing (5) into position until it bottoms out on oil seal borestep.
4. Install snap ring (4) into cover (7).
5. Press spline shaft assembly (13) into bearing (5) until shaft bottoms on shaft shoulder. Bearing inner race must be supported during this operation.
6. Install retaining ring (3) on spline shaft assembly (13).
7. Install o-ring (8) and piston (9) in cover (7).
8. Install back-up rings (22 & 24) on piston (21) toward spring pockets.
9. Install o-rings (23 & 25) on piston (21). Be sure o-rings are flat and all twists removed.

   CAUTION: Care must be taken so as not to scratch or mar piston.

10. Lubricate piston (21) with type fluid used in the system. Carefully press piston into pressure plate (26). Be sure piston is aligned correctly at all times and that there are no extrusions. Press piston until it bottoms on pressure plate (26).
11. Install springs (20) according to pattern and color during disassembly. Different colored springs must be alternated.
12. Affix case gaskets (11) to cover (7) and spring plate (19).
13. Place unit on a press. Using fixture, depress and install two socket head cap screws (14). **SEE NOTE BELOW.** Torque bolts to 55 ft. lbs. A suitable holding fixture is useful to hold brake in position.
14. Install stator disc (18) and rotor discs (17). Begin with a rotor disc (17) and alternate with stator disc (18).
15. Install primary disc (16).
16. Align discs and partially screw in four socket head shoulder bolts (15). **SEE NOTE BELOW.** Inspect for free movement of stack. Pressurize brake release port (approx. 300 psi) to release discs. Torque shoulder bolts to 15 ft. lbs. and release pressure. A suitable holding fixture is useful to hold brake in position.
17. Install return springs (12) over the two 3/8 - 16 tapped holes in spring plate (19). Place and align return plate (10) over the return springs (12).
18. Install cover (7) using flat head assembly bolts (1) and o-rings (2) making sure bolts go through tabs on return plate (10) and return springs (12) before engaging spring plate (19). **SEE NOTE BELOW.** Torque bolts to 25 ft. lbs.

NOTE: Bolts should have one or two drops of Loctite #242 applied to threads.

▲ Brake models assembled prior to 2-28-92 required a 1.170" long spring to be assembled over the roll pin in cover (7) and on top of socket head cap screw (14).

The new assembly procedure requires the use of a 2.000" long spring to be assembled over the two flat head assembly bolts (1). Refer to Figure 1A on page 2 and assembly steps 17 & 18 on page 4.

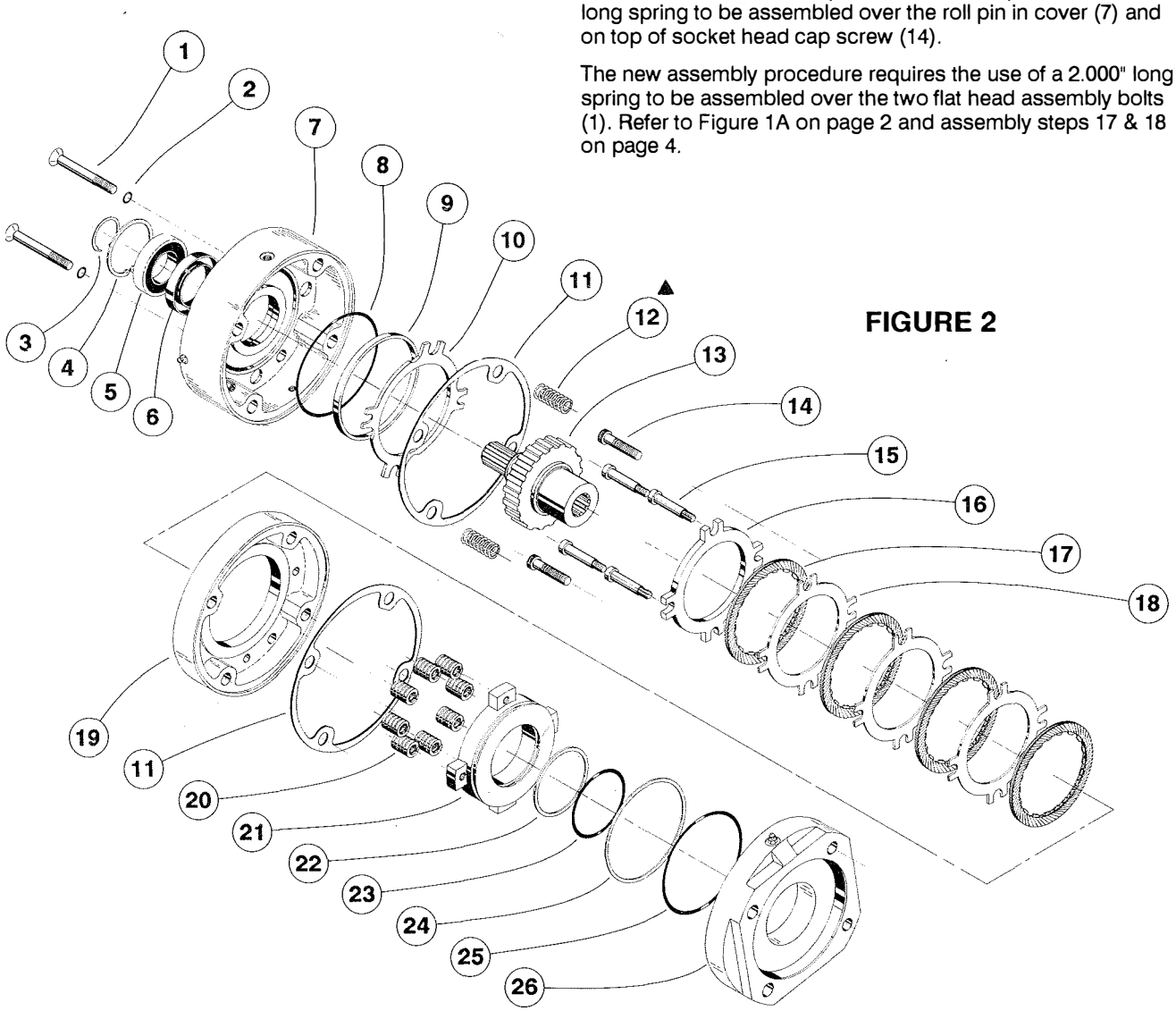


FIGURE 2

FOR REPAIR KIT INFORMATION REFER TO PAGE 7

PARTS LIST

ITEM	DESCRIPTION
1	FLAT HEAD ASSEMBLY BOLTS (2)
2	O-RINGS
3	RETAINING RING
4	RETAINING RING
5	BEARING
6	OIL SEAL
7	COVER
8	O-RING
9	PISTON
10	RETURN PLATE
11	CASE GASKETS (2)
12	RETURN SPRINGS (2)
13	SPLINE SHAFT ASSEMBLY
14	SOCKET HEAD CAP SCREWS (2) (Assembly Bolts)
15	SOCKET HEAD SHOULDER BOLTS (4) (Tension Pins)
16	PRIMARY DISC
17	ROTOR DISCS
18	STATOR DISCS
19	SPRING PLATE
20	SPRINGS
21	PISTON
22	BACK-UP RING
23	O-RING
24	BACK-UP RING
25	O-RING
26	PRESSURE PLATE

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 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 thickness
	D. Springs broken or have taken a permanent set	Broken or set springs can cause reduced torque - a rare occurrence	Check release pressure (See spring replacement)
Brake drags or runs hot	A. Low actuation pressure	The brake should be pressurized to minimum of 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
	B. Bearing failure	If the bearing should fail, a large amount of drag can be generated	Replace bearing
	C. Oil in brake	Excess fill of oil in sump condition thru wet brakes can cause the unit to run hot. Also excessive rpm in sump condition.	Drain oil and refill as specified for brakes or Switch to flow thru cooling.
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 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

REPAIR KITS
(Refer to page 5 for item numbers)

NUMBER	DESCRIPTION	KIT INCLUDES
12-501-124	Lining Kit	Case Gasket (11) Rotor Discs (17) Stator Discs (18) Primary Disc (16) O-rings (2) Loctite
12-501-096	Bearing Kit	Oil Seal (6) Bearing (5) Case Gaskets (11) O-rings (2) Loctite
12-501-086	O-ring and Seal Kit	Case Gasket (11) Oil Seal (6) Back-up Ring (24) O-ring (25) Back-up Ring (22) O-ring (23) O-ring (8) O-rings (2) Loctite
12-501-112	Spring Kit	Case Gasket (11) Springs, Red (20) Springs, Blue (20) Spring - Return (12) O-rings (2) Loctite

NOTE: All kits include mounting face, gaskets and o-rings.