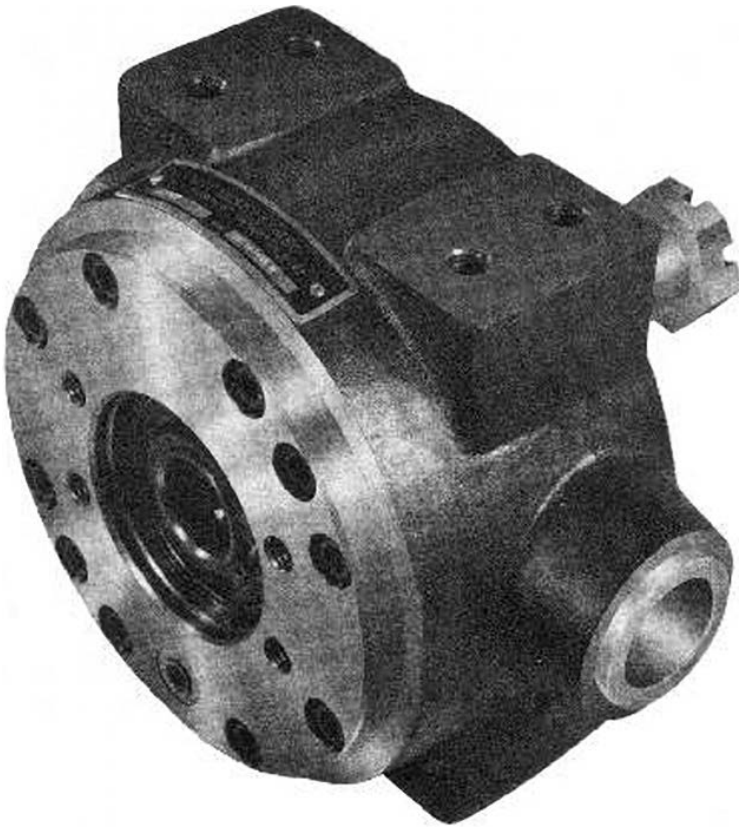
MULTIPLE DISC BRAKE
(trunnion)

Service Instructions



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TYPICAL BRAKE

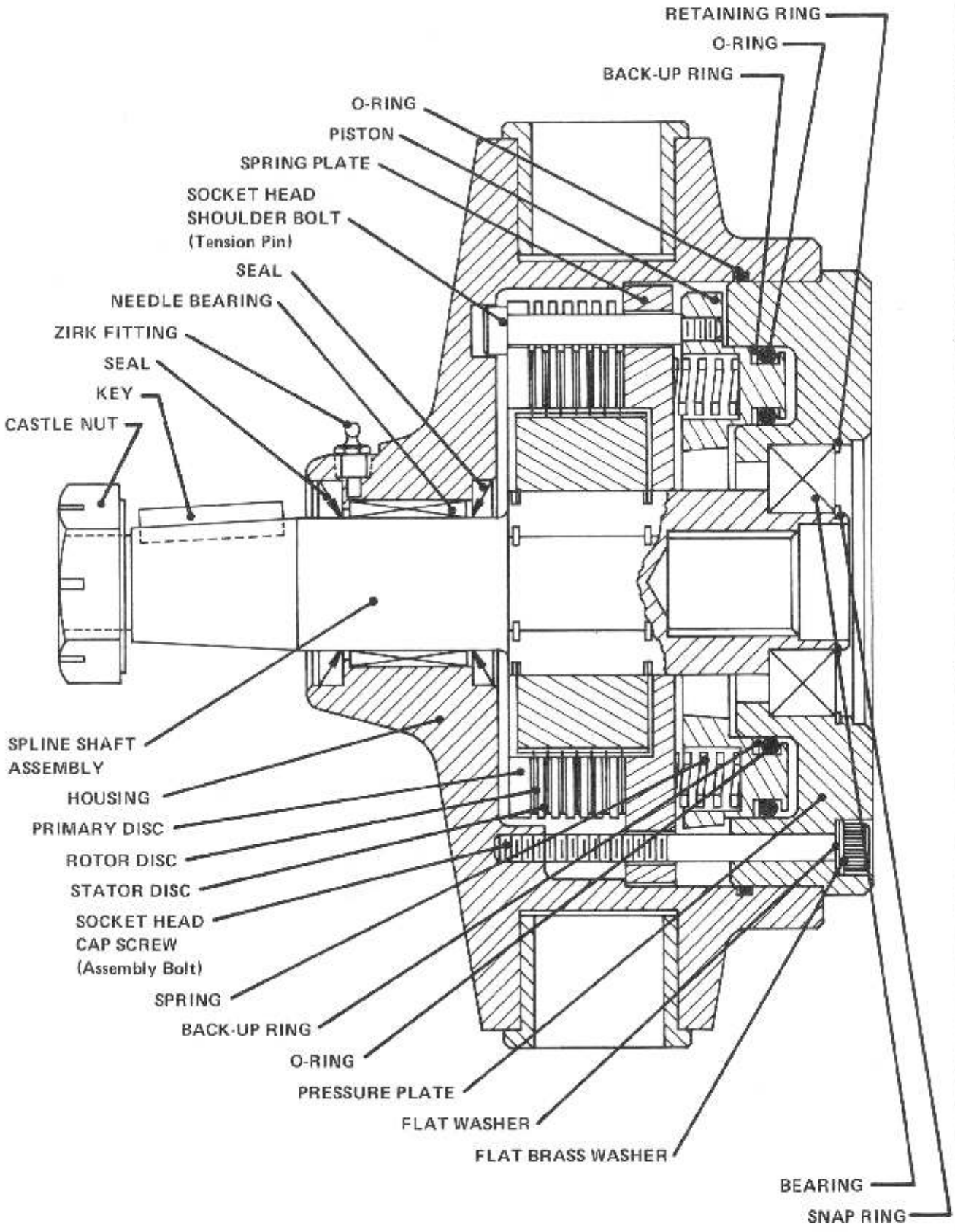


FIGURE 1

PRINCIPLES OF OPERATION

These brakes are spring-set, hydraulically released, multi disc brakes. They are used primarily for holding loads, vehicles, conveyors, etc. in place when the hydraulic drive system is shut down or fails. Although the brakes are rated at 3,000 psi, they only require 300 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 300 psi to fully release the brake and provide adequate running clearance for the individual discs.

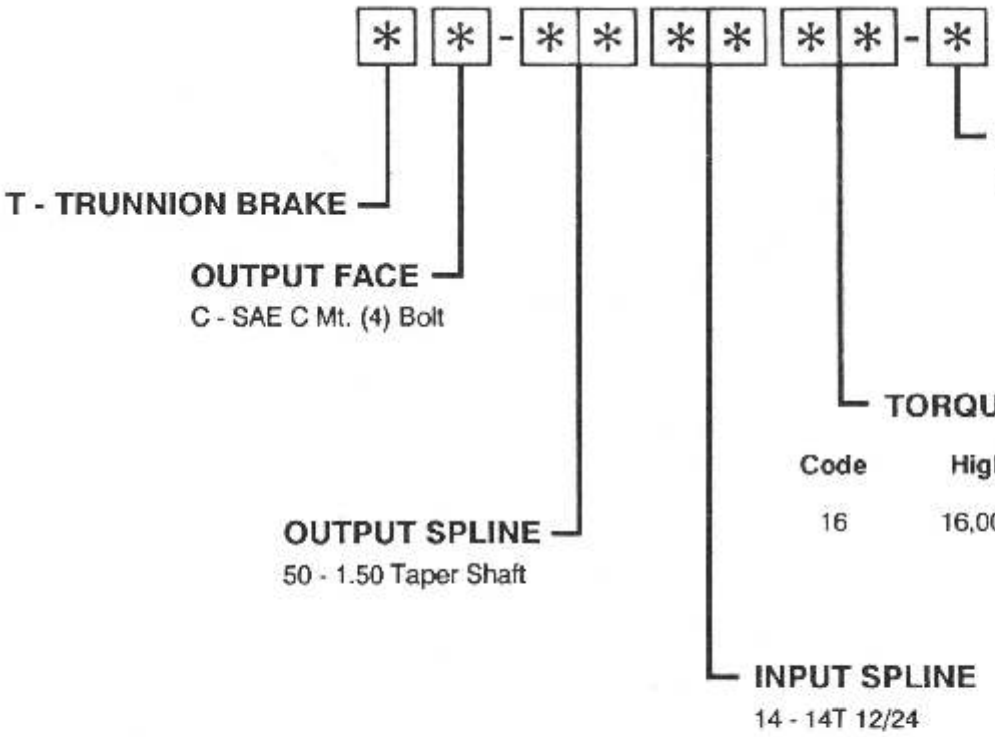
It is very important to remember that any pressure on the brake's release piston will directly effect the level of torque.

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.

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



Code	High	Release Pressure	Full Release Pressure
16	16,000	250	300

DISASSEMBLY

1. Remove castle nut (26) and key (20) from output end of spline shaft assembly (19).
2. Remove 10 socket head assembly bolts (4) and flat washers (5 & 6). Washers (5) are brass. A suitable holding fixture is useful to keep brake in position.
3. Tap output end of spline shaft assembly (19) with a soft mallet to separate housing (22) from internal parts assembly.
4. Remove o-ring (21) from housing (22).
5. Needle bearing (24) and seals (23 & 25) will remain in housing (22). Inspect parts for wear and remove only if necessary.
6. Remove snap ring (1) from input end of spline shaft assembly (19).
7. Tap input end of spline shaft assembly (19) with a soft mallet to separate spline shaft from internal parts assembly. Bearing (3) and retaining ring (2) will remain in pressure plate (7).
8. Remove both and inspect for wear.
9. Remove four socket head shoulder bolts (18). 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 (17), seven rotor discs (16) and six stator discs (15).
11. Remove spring plate (14).
12. Before removing spring (13), note pattern for reassembly purposes.
13. Separate piston (12) and pressure plate (7) by carefully exerting hydraulic pressure through brake release port on pressure plate.
14. Remove outside and inside o-rings (8 & 10) and outside and inside back-up rings (9 & 11) from piston (12).

    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 SYSTEM.

1. Use an alkaline wash to clean parts before assembly.
2. Install back-up rings (9 & 11) on piston (12) toward spring pockets.
3. Install o-rings (8 & 10) on piston (12). Be sure o-rings are flat and all twists removed.

   CAUTION: Care must be taken so as not to scratch or mar piston.
4. Lubricate piston (12) with type fluid found in the system. Carefully press piston into pressure plate (7). Be sure piston is aligned correctly at all times and that there are no extrusions. Press piston until it bottoms on pressure plate (7).
5. Install springs (13) according to pattern noted during disassembly.
6. Place spring plate (14) over springs (13).
7. Install stator discs (15) and rotor discs (16). Begin with a rotor disc (16) and alternate with stator discs (15).
8. Install primary disc (17).
9. Align discs and partially screw in four socket head shoulder bolts (18).

   NOTE: Socket head shoulder bolts (18) should have loctite applied. Apply one or two drops of Loctite to the threads.

   Inspect for free movement of stack. Align and center internal splined teeth such that shaft assembly (19) will engage rotors properly. 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.
10. Install spline shaft assembly (19) through stack input end first and out pressure plate (7).
11. Install bearing (3) and retaining ring (2) in pressure plate (7).
12. Install snap ring (1) on input end of spline shaft assembly (19).
13. If seals (23 & 25) and needle bearing (24) were removed from housing (22) they must be installed. Note direction of both seals.
14. Install o-ring (21) in housing (22).
15. Install housing (22) with the internal parts assembly using 10 socket head assembly bolts (4) and flat washers (5 & 6).

    NOTE: The ten socket head assembly bolts (4) should have Loctite applied. Apply one or two drops of Loctite to the threads.

    Washers (5) are brass and should be installed first on the bolts. Torque bolts to 35 ft. lbs.
16. Install castle nut (26) and key (20) on output end of spline shaft assembly (19).

FOR REPAIR KIT INFORMATION REFER TO PAGE 7

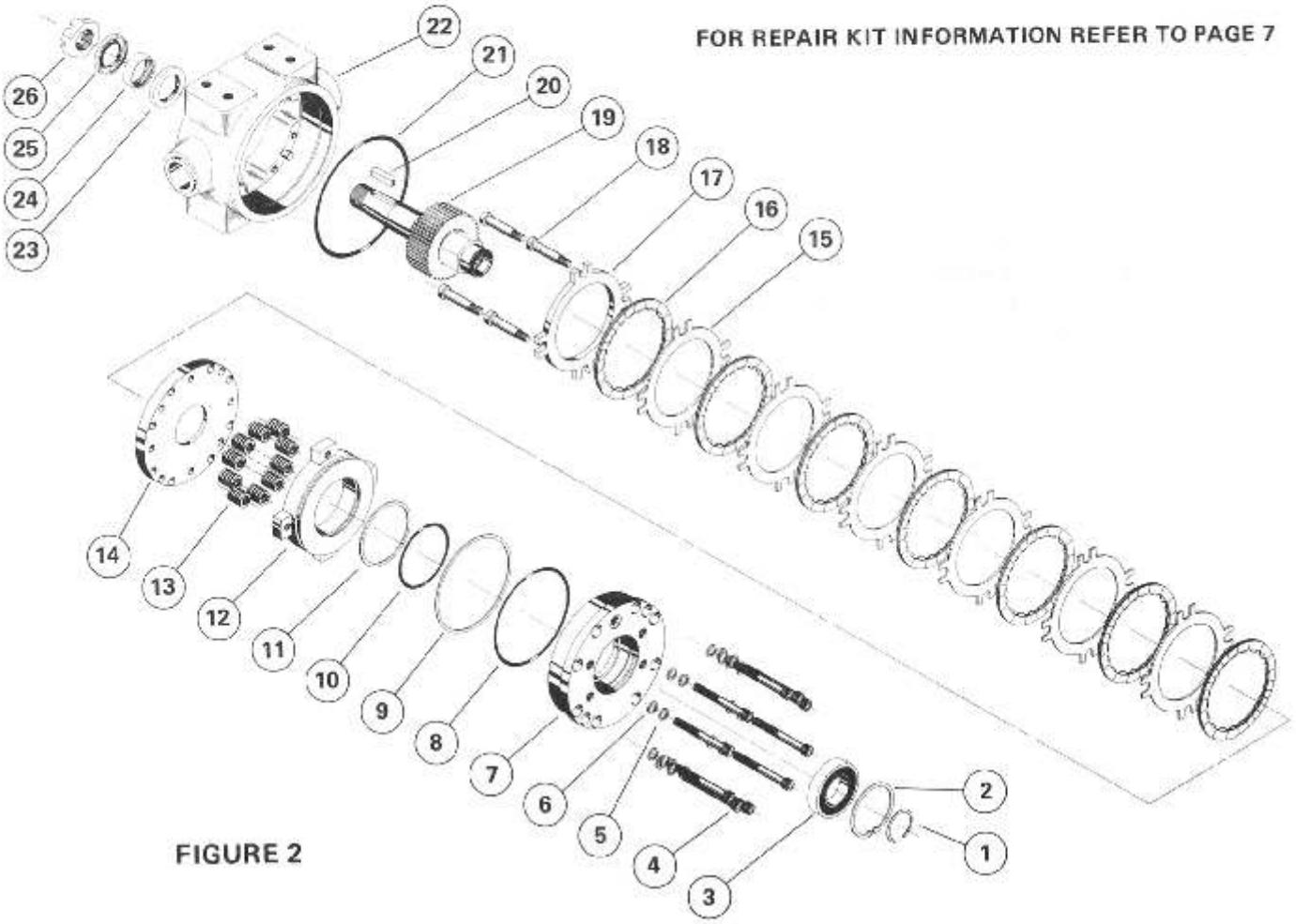


FIGURE 2

PARTS LIST

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

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 brakes actuation line, the holding torque of the brakes is reduced.	Check filters, hose size, restrictions in other hydraulic components.
	B. Oil in brake if designed for dry use	Dry linings generate 66% more torque than linings saturated with oil. 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. Spring 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 20 psi over the specified release pressure under normal operating conditions. Lower pressures will cause the brake to drag thus generating heat.	Place pressure gauge in bleed port & 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 Switch to flow thru cooling.
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 cannot get to brake, the brake will not release.	Place pressure gauge in bleed port - check for adequate pressure - Replace defective line or components
	B. Bad o-rings	If release piston will not hold pressure, brake will not release.	Replace o-rings.
	C. Discs frozen	Sy-Tec 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	INCLUDES
12-501-026	O-ring and Back-up Ring Kit	Flat Brass Washers (items 5) Seals (Items 23 & 25) O-rings (items 8, 10, & 21) Back-up Rings (items 9 & 11) Loctite
12-501-106	Lining Kit	Flat Brass Washers (items 5) O-ring (item 21) Primary Disc (item 17) Stator Discs (items 15) Rotor Discs (items 16) Loctite
12-501-108	Bearing Kit	Flat Brass Washers (items 5) O-ring (item 21) Seals (items 23 & 25) Bearings (items 3 & 24) Loctite
12-501-114	Spring Kit	Flat Brass Washers (items 5) O-ring (item 21) Springs (items 13) Loctite