



612043

2" DIFFERENTIAL TRANSFER PUMP

**1:1 RATIO
CARBON STEEL
(55 GAL. TANK)**

GENERAL DESCRIPTION

The Aro 2" Differential Air Motor (1:1 Ratio) Pump Ass'y. is designed for transfer of light, oils & lubricants.

They have a 6" stroke & displace approx. 18.85 cubic inches of material per cycle.

The 2" Air Motor Ass'y. is a differential double-acting type air motor.

The 612043 2" Differential 1:1 Ratio Pump Ass'y. is for bung mounting in 55 gal. tanks.



USE SERVICE KIT 637105

MODEL 612043
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DO NOT EXCEED MAXIMUM WORKING PRESSURE OF 150 P.S.I. (10.3 BAR) AT 150 P.S.I. (10.3 BAR) AIR INLET PRESSURE.

NOTICE: READ THIS MANUAL CAREFULLY BEFORE OPERATING, INSTALLING OR SERVICING THIS EQUIPMENT.



LOWER PUMP END

The 1:1 ratio is an expression of the relationship between the effective air motor area and the effective lower pump end area. When 150 P.S.I. (10 bar) of air pressure is supplied to the air motor, the lower pump end will develop a maximum of 150 P.S.I. (10 bar) of fluid pressure (at no flow) — as the fluid control is opened, the flow rate will increase as the air motor cycle rate increases to keep up with the demand.

SAFETY INSTRUCTIONS

Use ARO replacement parts to assure compatible pressure rating. Read All Warnings and Safety Instructions carefully before operation of this unit.

HEED ALL WARNINGS.

WARNING

1. **Component Rupture** — This unit is capable of producing high fluid pressure as stated on the pump model plate. To avoid component rupture and possible injury **do not exceed 75 cycles per minute or operate at an air inlet pressure greater than 150 P.S.I. (10 bar).**
2. **Servicing** — Before servicing, cleaning or removing any component, always disconnect or shut-off power source and carefully relieve all fluid pressure from the system.

CAUTION: When pumping, flushing or recirculating volatile solvent, the area must be adequately ventilated.

AIR AND LUBE REQUIREMENTS

Excessive air pressure will shorten the life of the pump. **Do Not operate pump above recommended maximum air pressure of 150 pounds per square inch (10 bar) or 75 cycles per minute.** Failure to observe warnings may cause personal injury and damage to the pump. If necessary, an air regulator should be installed to maintain the desired pressure when pump is in operation.

Filtered and oiled air will allow the pump to operate more efficiently and yield a longer life to operating parts and mechanisms. Fill lubricator daily with a good grade of non-detergent 90 W oil.

FILTER-REGULATOR-LUBRICATOR combination (F-R-L) 128121-300 is recommended for use with this pump. The capacity of the individual Filter-Regulator-Oiler is adequate to provide clean (40 micron), regulated, and oiled air for the pump. (See Figure 1).

INSTALLATION

1. Place the pump and bung adapter into bung or drum mounting bracket. Position pump in the desired position and tighten the bung adapter into the bung or drum mounting bracket and then turn thumb screw to tighten the bung adapter to the pump.

SPACER SECTION

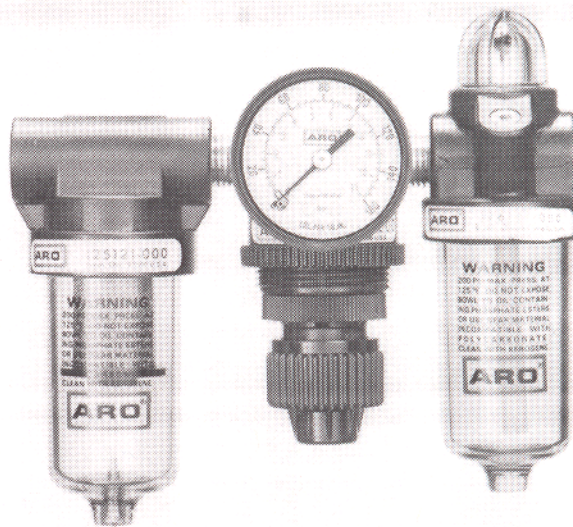
The 1:1 Ratio Double-Acting Lower Pump Section is completely separate from the air motor to prevent any of the material, being pumped, from coming in contact with the air motor ass'y.

CAUTION: Materials and solvent being pumped must be compatible with the parts of the pump that become wetted when in contact with material or solvent. Wetted parts consist of the following: Carbon Steel and Thiokol Leather.

CAUTION: Keep solvents away from heat, sparks and open flames, keep containers closed when not in use.

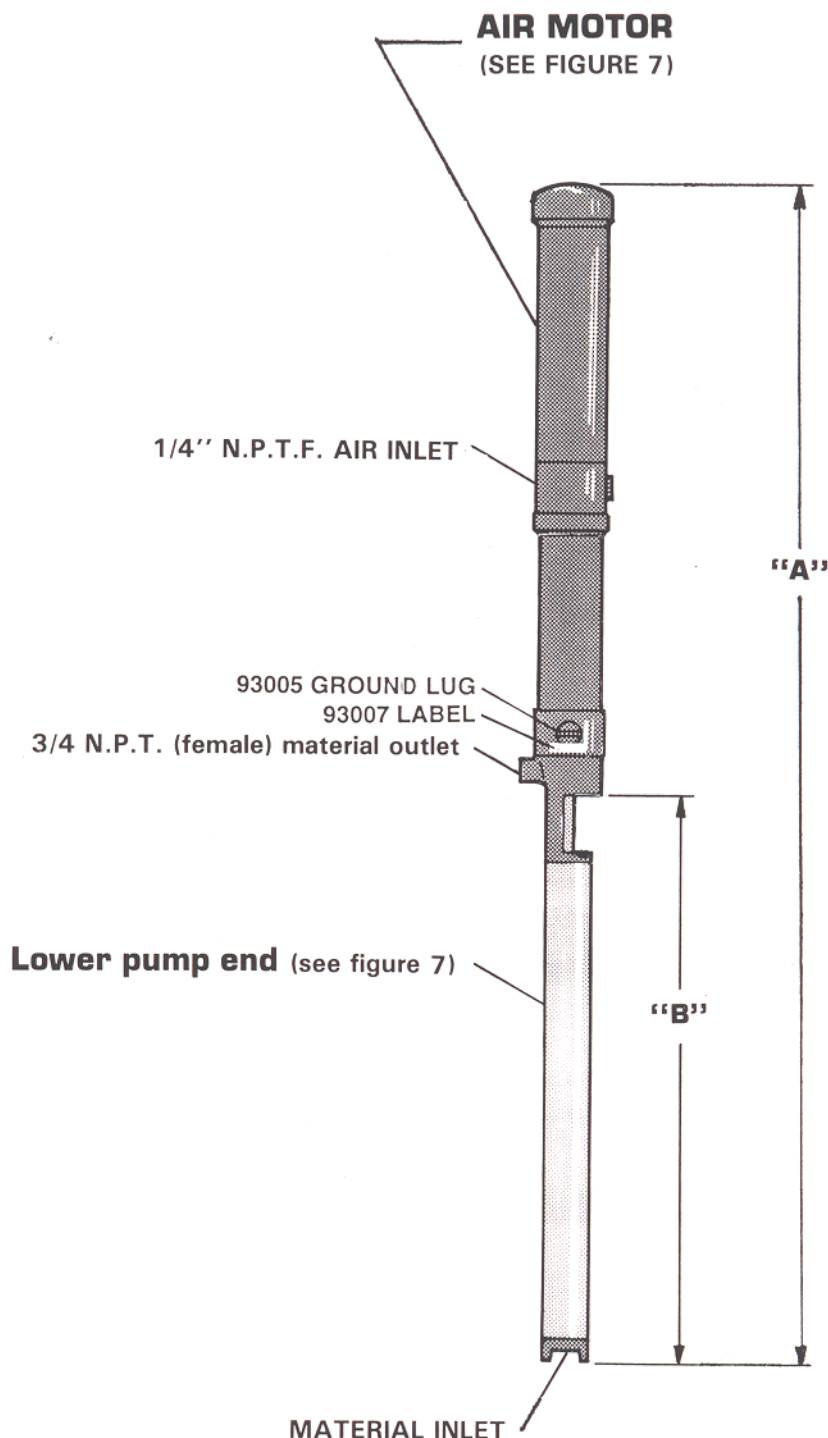
WARNING:
PREVENT STATIC SPARKING if static sparking occurs, fire or explosion could result. Pump, dispensing valve, and containers must be grounded when handling flammable fluids such as solvents, paints, lacquers, etc. and wherever discharge of static electricity is a hazard.

Use grounded hoses (static wire and be sure the object being serviced is grounded, if it can produce a static charge.



**128121-300
FIGURE 1**

2. Connect fluid hose to pump material outlet.
3. Be sure lower pump end material inlet is immersed into material being pumped. If using an in-line pump, connect the hose or pipe connection from the material source, to the material inlet of the pump.



2" DIFFERENTIAL TRANSFER PUMP

1:1 RATIO CARBON STEEL

Model No.	Pump Drum Size	Piston Material	"A"	"B"	Service Kit
612043	55 Gallon	Thiokol Leather	54" (1372 mm)	34 5/8" (879 mm)	637105

FIGURE 2

OPERATING INSTRUCTIONS

Be sure material hose, lines and other components are able to withstand pressures developed by pump.

1. When pump is installed and ready to operate: connect air supply to air motor inlet. Regulate

air pressure from 30 P.S.I. (2 bar) to 50 P.S.I. (3 bar). Allow pump to cycle slowly to prime with material and bleed all air from system.

NOTE: Be certain that air supply does not exceed recommended maximum air pressure of 150 P.S.I. (10 bar).

MAINTENANCE

If the pump is to be inoperative for a lengthy period of time (a few hours) disconnect air and relieve all pressure from system.

Refer to Disassembly Procedures of air motor and lower pump end for correct breakdown.

Periodically flush pump with a solvent that is compatible with material being pumped.

Disassembly should be done on a clean work bench with clean cloths to keep parts clean.

If replacement parts are necessary, consult drawings containing parts for identification.

Before reassembling, lubricate parts where required. When assembling "O" rings or parts adjacent to "O" rings, care must be exercised to prevent damage to "O" rings and "O" ring groove surfaces.

TROUBLE SHOOTING

Problem

(Pump continually cycles)

Cause
Solution

Material on one stroke only (fast downstroke)

Cause
Solution

Material on one stroke only (fast upstroke)

Cause
Solution

Air leakage the exhaust holes.

Cause
Solution
Cause
Solution

NOTE: See Figure 7 for part number reference.

Cause & Solution

Empty material supply.
Disconnect the air (from the pump) replenish material supply.

30 Foot valve ass'y. not checking or sealing properly.
Remove foot valve ass'y. and inspect. If the foot valve ass'y. is damaged, replace with new foot valve ass'y. If foot valve isn't damaged, thoroughly clean and replace.

Worn or damaged **32** lower cup type packing.
Replace piston.

76090 valve plate disassembled from the 76856 spacer (air motor see Figure 5.)
Reassemble (see Figure 6)

Worn or damaged 60656 piston ass'y. in the 61088 spacer and piston ass'y.
Replace the 60656 piston ass'y. (see Figure 6)

DISASSEMBLY OF 2" DIFFERENTIAL — 1:1 RATIO PUMP ASS'Y.

NOTE: All threads are right hand.

1. Place the 2" differential pump in a vise as shown in Fig. 3. Rotate the pump ass'y. so that the material outlet is resting against the vise.

CAUTION: Do not clamp the pump tightly.

2. Place a strap wrench around the **1** cap; remove the cap.

NOTE: If the **6** cylinder comes off with the **1** cap, place the cap in a vise and use a strap wrench around the **6** cylinder & unscrew from cap.

CAUTION: Do not squeeze or use pipe wrench on **6** cylinder.

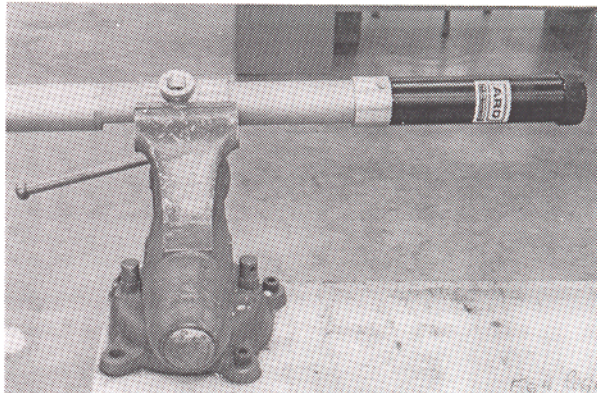


FIGURE 3

3. Unthread and remove the **6** cylinder, from the **16** pump body, by using a strap wrench on the **6** cylinder as shown in Fig. 4.

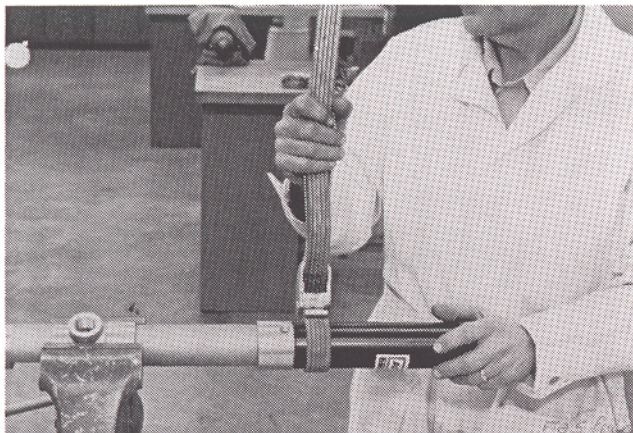


FIGURE 4

4. Remove **15** "O" ring from **16** pump body.
5. Unthread and remove **7** spacer & piston ass'y. from **11** plunger tip.
6. Remove **8** gasket from **11** plunger tip.

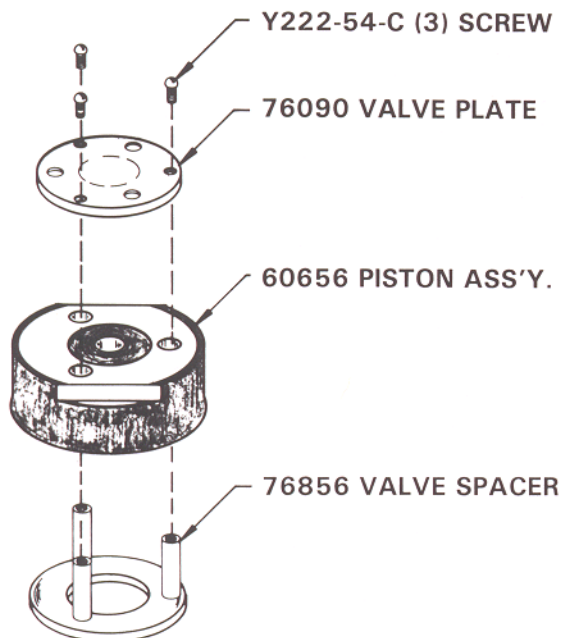


FIGURE 5

61088 SPACER & PISTON ASS'Y

7. Remove the (3) Y222-54-C screws from the 76856 valve spacer (see Fig. 5).
8. Remove the 76090 valve plate (see Fig. 5).
9. Remove the 76856 valve spacer from 60656 piston ass'y. (see Fig. 5).
10. Unthread & drop down the **10** plunger from the **11** plunger tip by using a wrench on the flats of the **11** plunger tip & a strap wrench or pipe wrench on the **10** plunger. (see Fig. 6)

CAUTION: Place strap wrench or pipe wrench on the very upper most part of the **10** plunger (see Fig. 6).

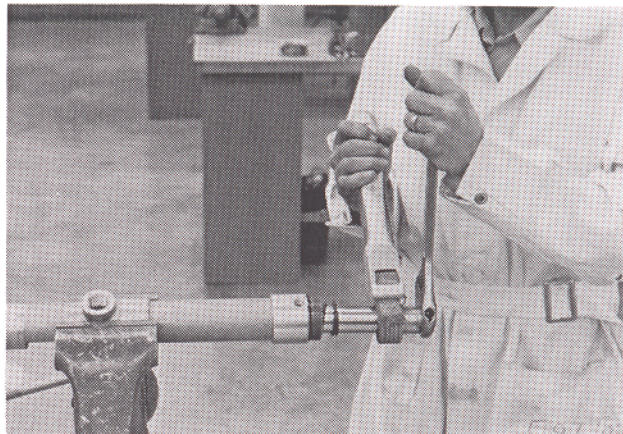


FIGURE 6

11. Remove **9** "O" ring.
12. Remove **12** Pin.
13. Remove **11** Plunger Tip.
14. Remove **10** Plunger.
15. Remove **14** Spring from the **16** Pump Body.
16. Remove **17** "O" Ring from the **16** Pump Body.
17. Unthread & remove **21** suction tube from the **16** pump body by using a pipe wrench.

CAUTION: Do not dent or damage **21** suction tube.

18. Remove **20** "O" Ring from the **16** Pump Body.
19. Grasp the **13** Piston Rod & remove by pulling straight out.
20. Unthread & remove **23** tube from **16** pump body, by using a strap wrench on the **23** tube.

CAUTION: Do not dent or damage **23** tube.

21. Remove **22** "O" Ring from **16** pump body.
22. Clamp **30** foot valve ass'y. in vise.
23. Unthread and remove **21** suction tube from **30** foot valve ass'y., by using a strap wrench on **21** suction tube.

CAUTION: Do not dent or damage **23** tube.

24. Place wrench on flats of **13** piston rod.
25. Unthread & remove **40** nut from **13** piston rod. (see Fig. 8)
26. Remove **29** washer from **13** piston rod (see Fig. 8)
27. Remove **27** nut from **37** adapter. (see Fig. 8)
28. Remove **28** washer.

REF.	PART NO.	DESCRIPTION
1	76073-2	CAP
2	77290	WASHER
3	Y325-138	"O" RING 2 5/16 O.D.
4	77208	SPRING
5	90638	BUTTON
6	76074-2	CYLINDER
7	61088	SPACER & PISTON ASS'Y.
8	F21-53	GASKET
9	Y325-214	"O" RING 1 1/4 O.D.
10	76215	PLUNGER
11	77794	PLUNGER TIP
12	Y148-29	PIN
13	77804	PISTON ROD
14	76070	SPRING
15	* Y325-134	"O" RING 2 1/16 O.D.
16	77807	PUMP BODY
17	77803	"O" RING 1 13/16 O.D.
18	79057	PLUG
19	Y327-014	"O" RING 5/8 O.D.
20	72864	"O" RING 2 1/16 O.D.
21	77798	SUCTION TUBE
22	* Y325-124	"O" RING 1 7/16 O.D.
23	77806	TUBE
24	79242	ADAPTER
25	79259	NUT
26	79301	WASHER
27	79264	NUT
28	79265	WASHER
29	77800	WASHER
30	60657	INTAKE VALVE ASS'Y.
31	Y122-85	PIN
32	* 79260	CUP TYPE PACKING
33	79257	WASHER
34	* Y325-012	"O" RING 1/2 O.D.
35	79258	WASHER
36	77801	RETAINING RING
37	79261	ADAPTER
38	* 79262	CUP TYPE PACKING
39	79263	WASHER
40	Y115-14	NUT

*PARTS SO MARKED ARE INCLUDED WITH 637105 SERVICE KIT.

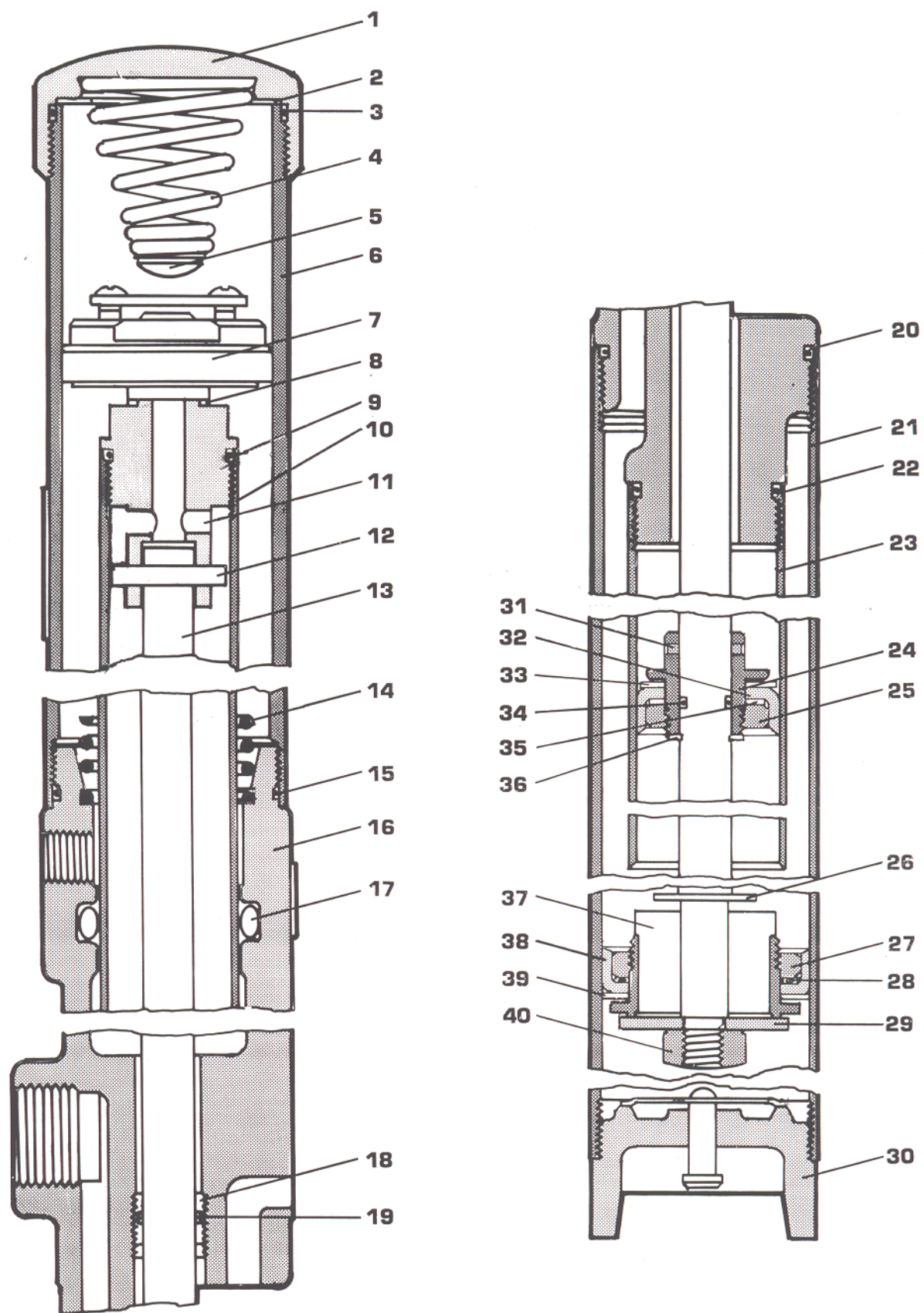


FIGURE 7

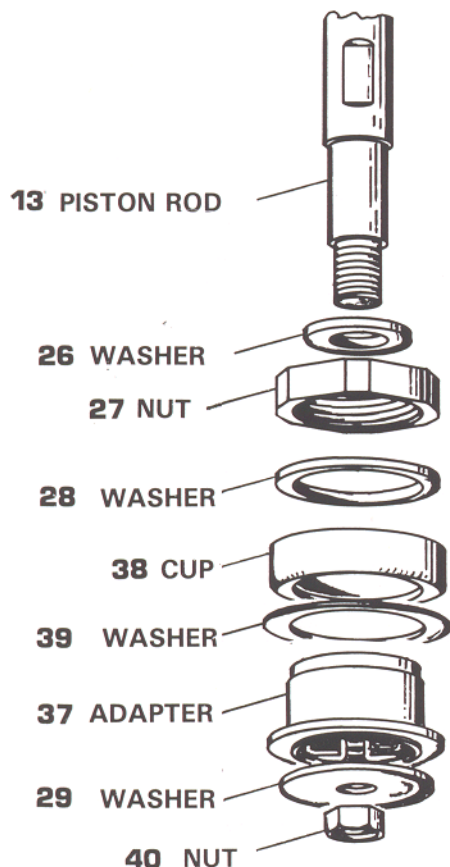


FIGURE 8

29. Remove **38** packing cup.
 30. Remove **37** adapter.
 31. Remove **26** washer from **13** piston rod.
 32. Remove **36** snap ring from **13** piston rod by using tru-arc pliers. (see Fig. 9)
 33. Remove **25** nut from **24** adapter.
 34. Remove **35** washer.
 35. Remove **32** cup.
 36. Remove **31** pin from **13** piston rod.
- NOTE: Do not remove the following except when replacing **13** piston rod.
37. Remove **24** adapter from **13** piston rod.
 38. Remove **34** "O" ring from **13** piston rod.

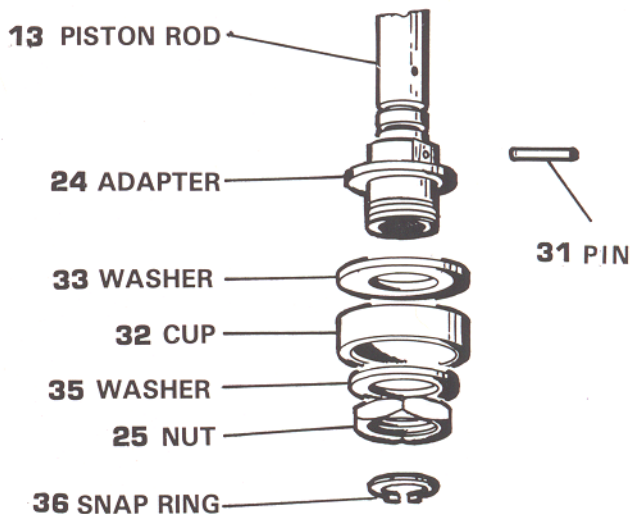


FIGURE 9

ASSEMBLY OF 2" DIFFERENTIAL — 1:1 RATIO PUMP ASS'Y.

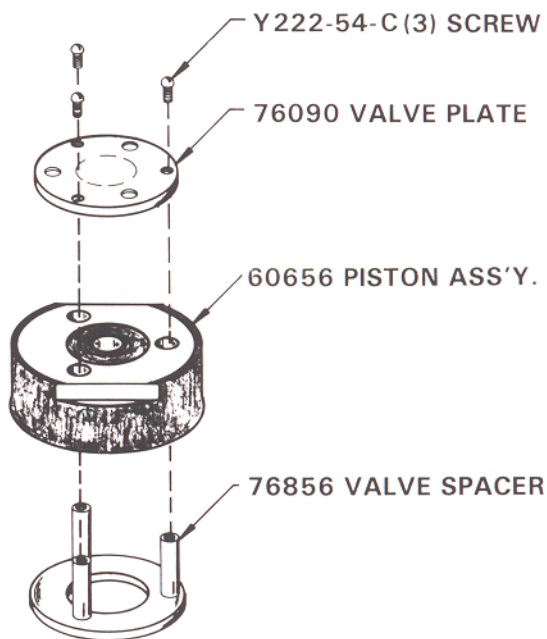


FIGURE 10

61088 SPACER & PISTON ASS'Y

NOTE: All threads are right hand.

1. Insert the 76856 valve spacer through the bottom of 60656 piston assembly. (Figure 5).
2. Place the 76090 valve plate on top of the piston ass'y. and align the three hole with the post of the 76856 spacer.
3. Fasten the valve plate down with the (3)Y222-54-C screws. This is the 61088 spacer & piston ass'y.
4. Place **34** "O" Ring on **13** Piston Rod
5. Place **24** adapter on **13** piston rod and secure with **31** pin.
6. Place **33** washer on **24** adapter.
7. Place **32** cup on **24** adapter. Place **35** washer on **24** adapter.
8. Place **25** nut on **24** adapter.
9. Place **36** snap ring on **13** piston rod using truarc pliers.
10. Place **26** washer on **13** piston rod. (see Fig. 11)
11. Pre-assemble the packing unit by putting the **38** cup, **39** washer onto **13** piston rod.
12. Place **29** on **13**.
13. Thread the **40** nut, tighten down with wrench.
14. Place **16** pump body in vise & rotate pump body so that the material outlet is resting against the vise.

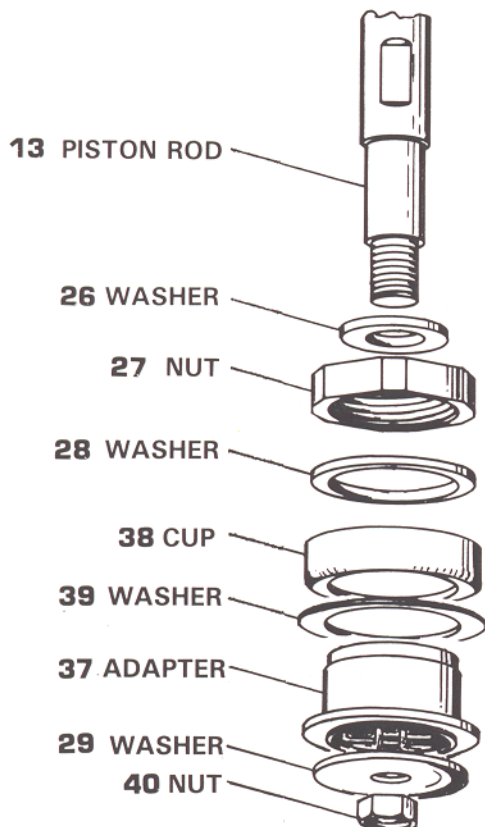


FIGURE 11

CAUTION: Do not clamp the pump body tightly. (see Fig. 12)

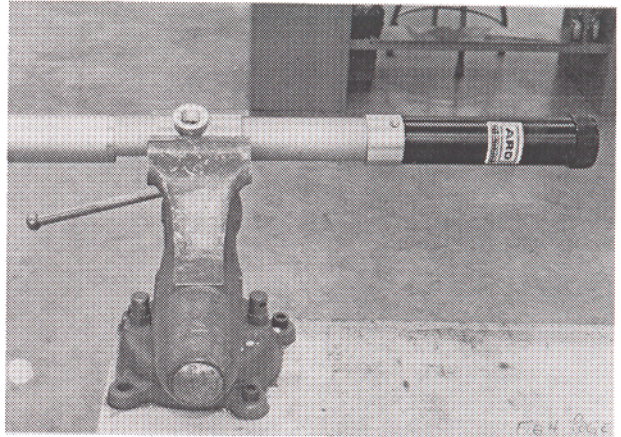


FIGURE 12

15. Place the **22** "O" Ring on **16** pump body.
16. Thread & tighten **23** tube on **16** pump body by using a strap wrench.
17. Place the **13** piston rod up through the **16** pump body.
18. Grease & place **15** "O" ring over the threads of **16** pump body.
19. Thread & tighten **21** suction tube on **16** pump body, using a strap wrench.
20. Thread & tighten **30** foot valve ass'y. on **21** suction tube, by using a pipe wrench on the flats.
21. Place **9** "O" Ring on **11** plunger tip.
22. Pull **16** plunger up & thread & tighten on **11** plunger tip by using a wrench on the flats of **11** plunger tip & a strap wrench on the **10** plunger.
23. Place **8** gasket over the threads of the **11** plunger tip.
24. Thread & tighten **7** spacer & piston ass'y. onto the **11** plunger tip by using a wrench.
25. Place **15** "O" Ring on **16** pump body.
26. Thoroughly grease the inside of the **6** cylinder & insert it over the **7** spacer & piston ass'y.
27. Thread the **6** cylinder onto the **16** pump body.
28. Screw the **1** cap on the **6** cylinder & tighten with a strap wrench.



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