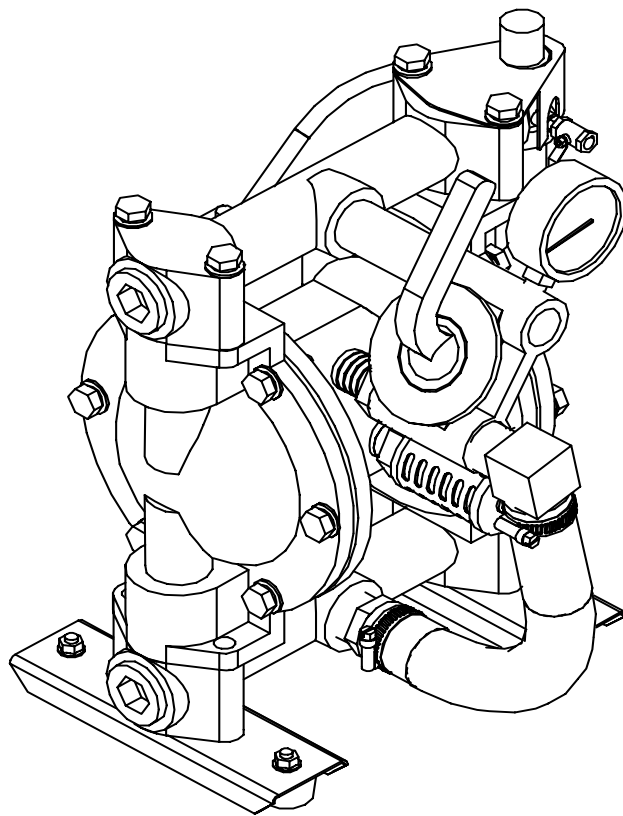


Parts and Service Manual
DIAPHRAGM PUMP
NDP-25BAN-C
(IMT P/N 51714060)



IOWA MOLD TOOLING CO., INC.

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MANUAL PART NUMBER 99900881

Iowa Mold Tooling Co., Inc. is an Oshkosh Truck Corporation company.

REVISIONS LIST

DATE	LOCATION	DESCRIPTION OF CHANGE
20000912	3-7	51714060-ADD FILTER 73052090 AND BOWL 70145917 AS REF PARTS UNDER REGULATOR
	3-9	PUMP REPLACEMENT PARTS-ADD CUSHION 76395846
20010105	3-7	ECN8646-51714060-ADD BARBED NIPPLE (20) CHG DWG
20021002	3-22	ECN 9019 - CHG 4-WAY VALVE ON 51714060 PUMP ASM.
20070329	COVER	UPDATED OWNERSHIP STATEMENT

WARNING SUMMARY

DO NOT use any liquids not compatible with pump component materials.

DO NOT over-pressurize the pump.

DO NOT modify parts of the pump.

USE ONLY factory replacement parts.

DO NOT drive pump using a combustible gas.

DO NOT place your hand on or near the pump suction line.

STOP THE PUMP IMMEDIATELY if it operates improperly. DO NOT use the pump again until the problem has been identified and corrected.

GROUND THE PUMP, pump containers and all equipment located in the pumping area to reduce the risk of static sparking.

IT IS THE USER'S RESPONSIBILITY to operate the pump in conformance with O.S.H.A rules for dispensing liquids.

CLEAN THE PUMP before using. Processing lubricants can contaminate the fluid.

FOLLOW ALL ELECTRICAL AND SAFETY CODES, including the following:

Occupational Safety and Health Act (OSHA)

National Electrical Code

National Fire Protection Association, Inc. (NFPA)

Code 30 (Flamable and Combustible Code)

Code 77 (Static Electricity)

Code 78 (Lighting Protection)

Code 80 (Standard Method of Fire Test of Building Construction)

Code 704 (Identification of Fire Hazards of Materials)

State and Local Codes and Ordinances

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TO ORDER PARTS:

1. Give the model number.
2. Give the serial number.
3. Give the part number, description and quantity needed.

NOTE:

IMT will not be responsible for parts ordered without the serial number.

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PARTS CODE DEFINITIONS

Following is an explanation of the "**CODE**" listed in the parts drawing bills of material:

C CRITICAL PART

A part which is vital to the continual operation of the unit.

P PREVENTIVE MAINTENANCE PART

A part which is replaced on an established schedule to protect the integrity of the unit and its warranty.

W NORMAL WEAR PART

A part used at a friction point and which incurs normal wear. It is designed to be replaced to bring unit to original equipment specifications.

SECTION 1. INTRODUCTION

INTRODUCTION

The IMT NDP-25BAN Pump is designed for pumping chemical liquids that are compatible with pump component materials, such as transfer of calcium chloride solution from tanks to tires. See Figure 1 for general pump components, Figure 2 for dimensional information and Figure 3 for performance data.

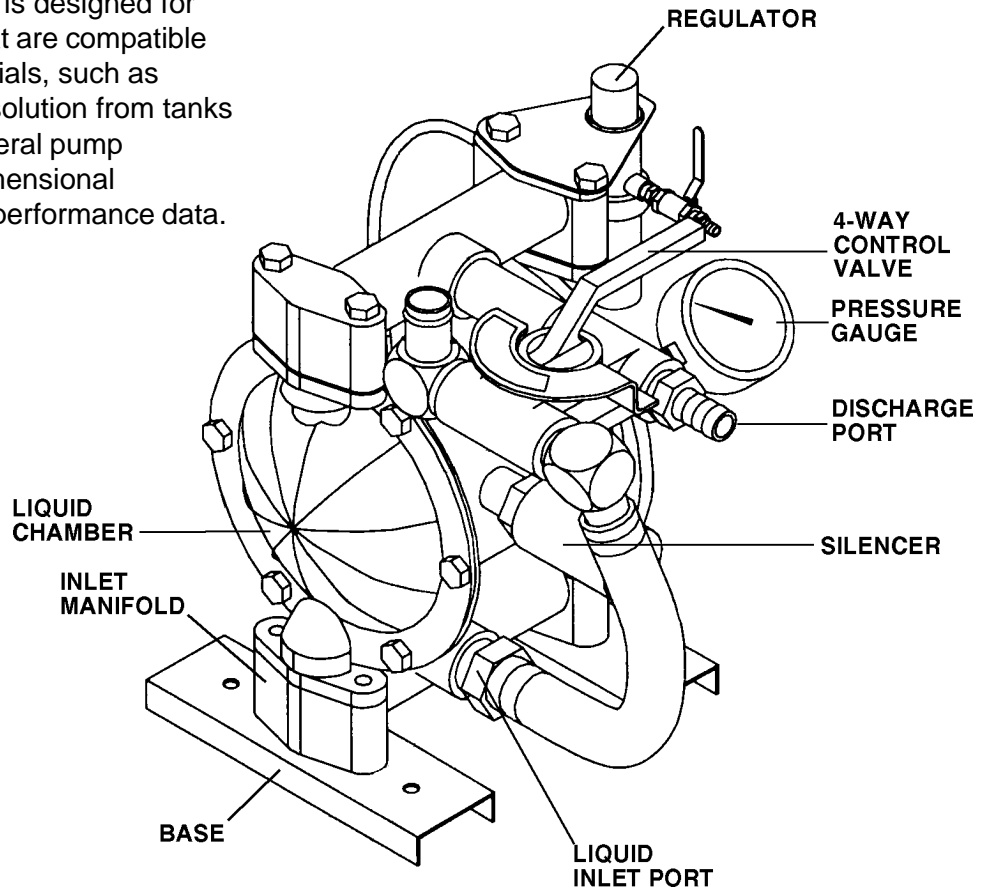


FIGURE 1. COMPONENT LOCATIONS

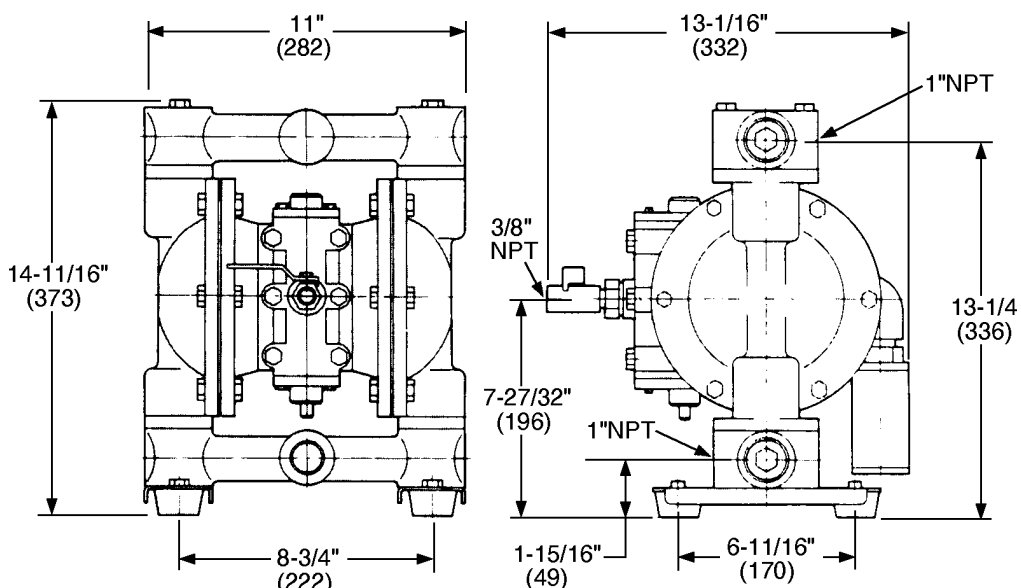


FIGURE 2. REFERENCE DIMENSIONS

SPECIFICATIONS

PRIMING PORT DIAMETER	1" (25MM)
MATERIAL CASING (WETTED PARTS)	ALUMINUM ALLOY (356-T6)
DIAPHRAGM BALL	BUNA N (NBR)
FOR MATERIAL INLET	1" NPT(F)
OUTLET	1" NPT(F)
FOR AIR INLET	3/8" NPT(F) WITH AIR COCK
OUTLET	3/4" NPT(F) WITH MUFFLER
DISCHARGE CYCLE () FOR TEFLON	0.23 GALLONS (0.17 GALLONS)
CYCLES	0~210/MIN
SIZE OF ACCEPTABLE SOLIDS IN MATERIALS	LESS THAN 3/16"
WEIGHT	28.6 LBS

PERFORMANCE DATA

Performance curves are test data based on normal temperature (70°F) fresh water. Discharge volume and discharge head vary according to the viscosity, specific gravity, etc. of the material to be transferred by air pressure.

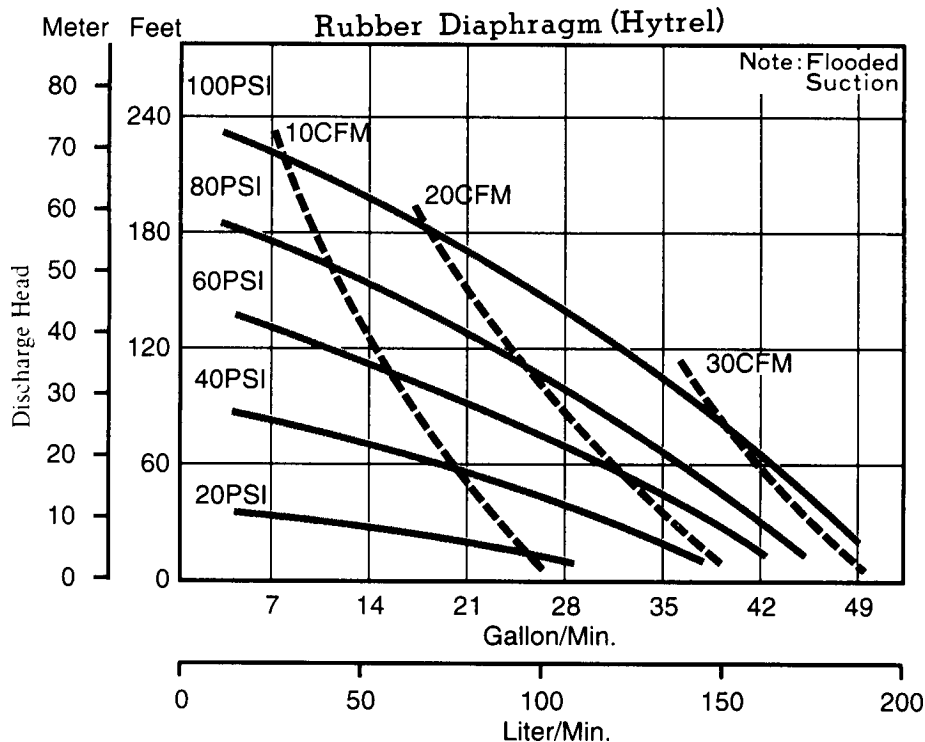


FIGURE 3. PERFORMANCE DATA

SECTION 2. OPERATION

PRINCIPLE OF OPERATION

The IMT NDP-25BAN Pump is simple in operating principle. Two diaphragms fixed to both ends of a center rod, actuated by air pressure, pump the material. Compressed air enters Air Chamber "a" (see figure below) moving the center rod to the left, forcing the material out of Liquid Chamber "A" while the material is drawn into Liquid Chamber "B".

When the center rod is at full stroke to the left, the air valve switches, sending air into Air Chamber "b". The center rod then moves right, forcing out material from Liquid Chamber "B", at the same time, drawing material into Liquid Chamber "A". Continual movement of the material is achieved by repeating the operation.

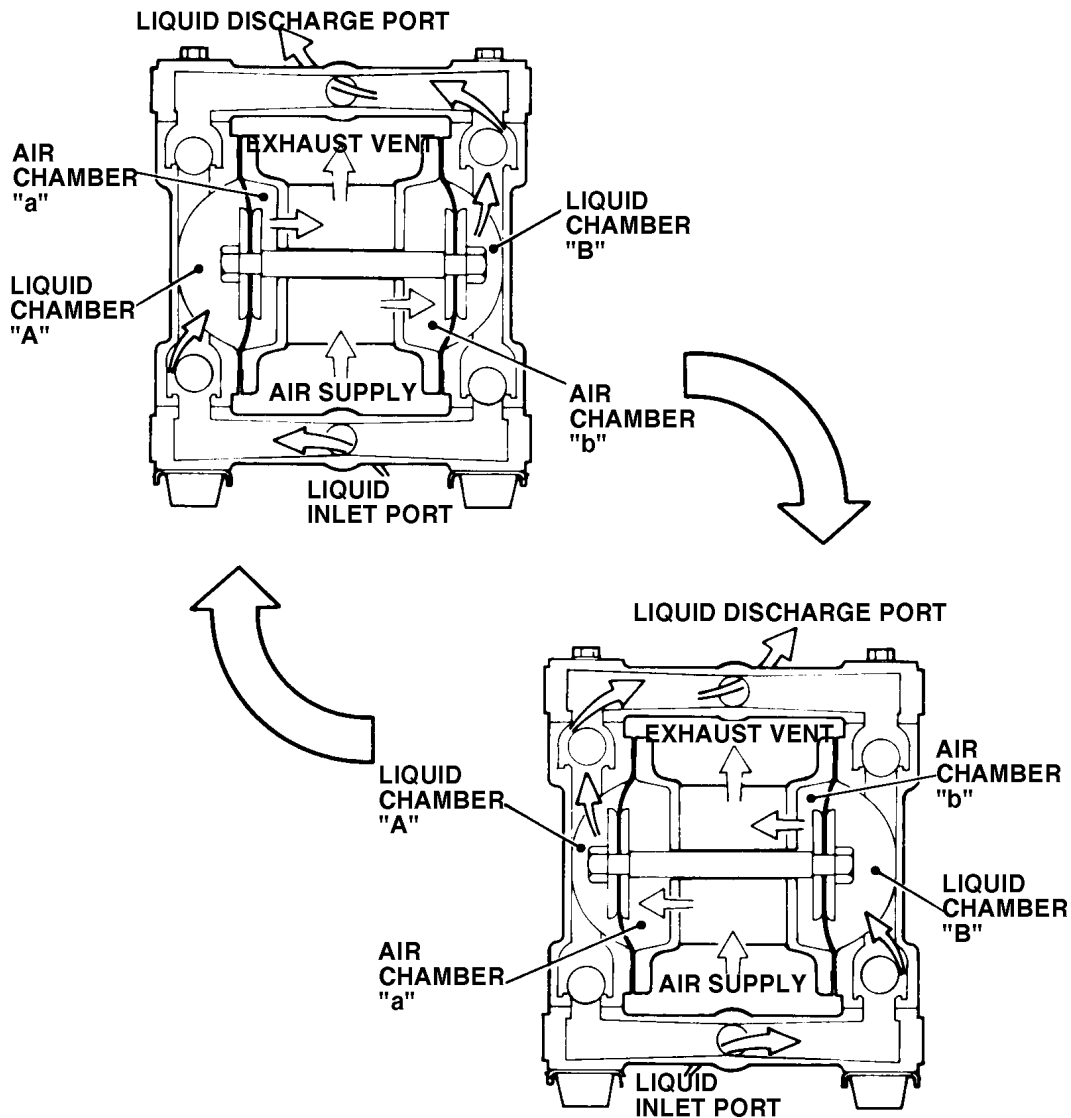


FIGURE 4. OPERATING PRINCIPLE

OPERATION

WARNING

DO NOT BEGIN USING YOUR PUMP WITHOUT FIRST READING THESE INSTRUCTIONS.

WARNING

THE AIR CHAMBERS AND THE FLUID CHAMBERS ARE SEPARATED BY TWO DIAPHRAGMS MADE OF RUBBER. THESE DIAPHRAGMS ARE PRODUCED THROUGH A STRICT QUALITY CONTROL AND INSPECTION SYSTEM. HOWEVER, SHOULD THE DIAPHRAGMS BE DAMAGED, WORN OUT, OR TORN, THE LIQUID WILL ENTER THE AIR CHAMBER AND ESCAPE OUT THE AIR EXHAUST MUFFLER.

DEPENDING ON THE FLUID BEING PUMPED, A DANGEROUS SITUATION CAN RESULT IF AIR FROM THE AIR CHAMBER MIXES WITH HAZARDOUS LIQUIDS.

WHEN PUMPING HAZARDOUS LIQUIDS, FOLLOW ALL RULES, REGULATIONS AND PROTECTIVE MEASURES APPLICABLE TO THE FLUID BEING PUMPED.

DRAIN ALL LIQUIDS FROM THE SYSTEM BEFORE OPERATION.

SECURE THE DISCHARGE LINE BEFORE STARTING THE PUMP. AN UNSECURED DISCHARGE LINE WILL SLIP, POSSIBLY CAUSING PERSONAL INJURY AND/OR PROPERTY DAMAGE.

CHECK HOSES FOR WEAKNESS OR TEARS BEFORE EACH USE, MAKING CERTAIN THAT ALL CONNECTIONS ARE SECURE.

WARNING

WEAR SAFETY GLASSES AT ALL TIMES WHILE PUMP IS IN OPERATION.

WEAR A FACE SHIELD AND PROPER APPAREL WHEN PUMPING HAZARDOUS CHEMICALS.

KEEP WORK AREA CLEAN, UNCLUTTERED, AND WELL LIGHTED.

WARNING

BEFORE USING THE PUMP, CHECK FOR LEAKS EVERY WORKDAY. DO NOT USE THE PUMP IF ANY ABNORMALITIES ARE FOUND - CONTACT YOUR DISTRIBUTOR.

The allowable velocity of the fluid entering the pump varies according to the relative conditions of viscosity and specific gravity of the fluid, suction lift, etc. If the pump (diaphragm) is actuated faster than the allowable flow velocity, it will cause a cavitation which will reduce the discharge volume, seriously shortening the life of the diaphragms.

IMPORTANT

To obtain maximum discharge volume, first start the pump by opening the air valve gradually while watching the discharge volume until it reaches its peak, causing cavitation. Close the valve slightly to gain maximum discharge volume and maintain the condition.

It is not dangerous to leave the pump at a standstill for a short period of time while keeping the discharge port closed while supplying air. However, if this condition is maintained for a long period of time and in that time leaks occur, the pump will operate discharging the fluid from the point of leakage.

Should the pump be kept at a standstill for a long period of time, close the air valve and open the fluid discharge valve, releasing the remaining pressure in the hose. Furthermore, if the pump is kept at a standstill while transferring a liquid containing slurry, the slurry may settle in the outer-chamber and adhere to it. This may cause damage to the diaphragms. After keeping the pump at a standstill, wash it thoroughly to remove slurry.

If difficulty starting the pump is encountered, push the reset button.

TROUBLESHOOTING CHART

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Little or no flow	<ol style="list-style-type: none"> 1. Insufficient air supply 2. Closed valve or clogged line 3. Hose too small 4. Air valve stopped in neutral position 5. Damaged air valve 6. Clogged diaphragm chamber 7. Relief valve not adjusted properly 8. Damaged diaphragm 9. Incorrectly positioned & plumbed 10. Clogged muffler 	<ol style="list-style-type: none"> 1. Check air supply 2. Open valve or remove restriction 3. Increase hose size; should be at least same size as pump port 4. Push reset button for manual start 5. Repair or replace 6. Clean diaphragm chamber 7. Adjust or clean 8. Replace diaphragm 9. Position pump with discharge at top and suction on bottom. Pump must be horizontal. 10. Clean or replace
Pulsating flow	<ol style="list-style-type: none"> 1. Some pulsation flow is normal 2. Clogged check valve 3. Damaged check ball 4. Damaged valve seat 5. Air leak in suction line 6. Clogged discharge line 7. Clogged diaphragm chamber 	<ol style="list-style-type: none"> 1. None required 2. Clean or replace 3. Replace ball 4. Replace seat 5. Repair or replace 6. Clean line 7. Clean diaphragm chamber
Unbalanced pumping	<ol style="list-style-type: none"> 1. Damaged diaphragm 2. Damaged check ball 3. Damaged valve seat 4. Damaged spool & detent 	<ol style="list-style-type: none"> 1. Replace diaphragm 2. Replace ball 3. Replace seat 4. Replace spool & detent
Air exhaust from discharge	<ol style="list-style-type: none"> 1. Damaged diaphragm 2. Air leak in suction line 	<ol style="list-style-type: none"> 1. Replace diaphragm 2. Repair or replace
Liquid returns from inlet	<ol style="list-style-type: none"> 1. Damaged check ball 2. Damaged valve seat 3. Viscosity of liquid too high 4. Pump speed too fast 	<ol style="list-style-type: none"> 1. Replace ball 2. Replace seat 3. Reduce pump speed 4. Reduce pump speed
Pump does not stop when discharge is closed	<ol style="list-style-type: none"> 1. Clogged check valve 2. Damaged check ball 3. Damaged valve seat 4. Air leak in suction line 	<ol style="list-style-type: none"> 1. Clean or replace 2. Replace ball 3. Replace seat 4. Repair or replace
Abnormal sound in exhaust	<ol style="list-style-type: none"> 1. Clogged diaphragm chamber 	<ol style="list-style-type: none"> 1. Clean diaphragm chamber

MIXING SOLUTION

Prepare by pouring the calcium chloride mixture into the water (never the water into the calcium chloride, as considerable heat is generated in this mixing process). The solution should be allowed to cool to atmospheric temperature before pumping in the tire.

CONNECTING THE VALVE STEM

The following connections should be made when the pump is not running and with control handle in the check position. To connect liquid fill core ejector to 2-piece style rear tractor valves (see Figure 5):

1. Unscrew union (item 1) from core ejector body (item 2) and screw on valve stem finger tight.
2. Screw core ejector body on union (item 1) making certain rubber gasket (item 3) is in place, with handle (item 4) of core ejector pulled out.
3. Push handle (item 4) of core ejector in until it makes contact with the core housing of the valve, then hold the core ejector in left hand, strike the handle (item 4) with the right hand to force the core housing in ejector chuck (item 6).
4. Turn handle (item 4) to the left to unscrew the core housing, pushing inward lightly so you can feel the threads disengage when completely unscrewed.
5. Pull handle (item 4) out as far as it will go to retract core housing into ejector body. The handle will pull out easier if rotated while pulling, as packing nut (item 7) should be tight enough to prevent air or liquid leaks.

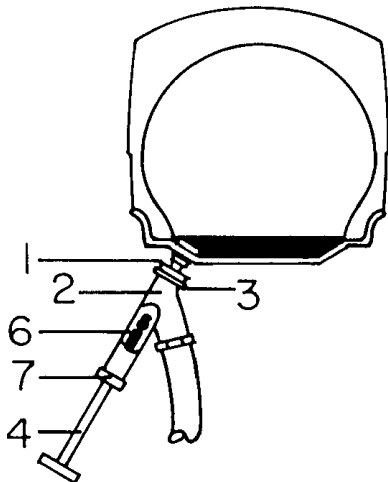


FIGURE 5.

To connect liquid fill core ejector to 1-piece style front tractor valves (see Figure 6):

1. Screw adapter (item A) and gasket to union (item 1).
2. Insert large end of core remover (item B) securely into chuck of core housing ejector (item 6).
3. Screw adapter and union assembly on valve stem finger tight.
4. Screw ejector union and adapter assembly to core ejector body making sure gasket is in place. The rest of the operation is the same as with the above 2-piece valve as described above.

REMOVING SOLUTION FROM TUBE-TYPE OR TUBELESS TIRE

Jack up tractor until tire is slightly deflected and valve is at the bottom. Connect core housing ejector and union to valve stem as previously described. Unscrew and retract core housing into ejector body with control handle at check position.

Turn control handle to evacuate position and start pump. Run until tire is completely evacuated. Turn control handle to check position, stop pump and disconnect core ejector after replacing core housing in valve stem.

In case of a tubeless tire, unseat beads and demount front bead from rim and pump remaining solution from tire.

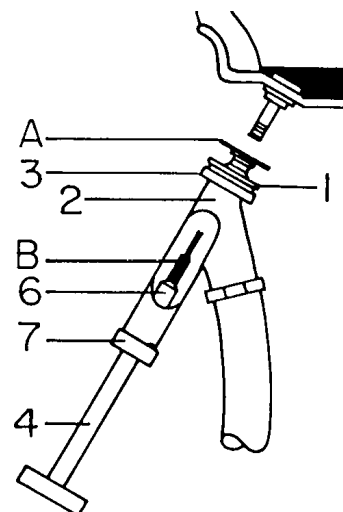


FIGURE 6.

FILLING TUBE-TYPE OR TUBELESS TIRES WITH SOLUTION

To fill a tire 75% with water or solution:

1. Inflate tire to 35 psi after beads have been fully seated in mounting procedure.
2. Jack up the wheel, if done on a tractor, and turn to bring valve to top position.
3. Lower jack until tire is slightly deflected.
4. With pump not running and control handle at check position, connect ejector and remove core housing as described above.
5. After connection is made, bleed pressure down to about 5 lbs. (to keep the beads seated on the rim) by moving control handle to evacuate position.
6. Start pump and move control handle to fill position. Start hydroinflating tire. Check pressure in tire every few minutes with pump gauge by placing pump in the check position. If pressure exceeds 20 psi move handle to evacuate until pressure is bled back to not less than 5 psi. After pressure is lowered, continue pumping. Repeat above steps as often as necessary to fill until water or solution weight added to the assembly is equal to that shown in the Liquid Weighting Tables.

2-5

7. Replace core housing in valve stem by pushing handle in until contact is made and turn to right until core housing is screwed tight in valve stem.
8. Withdraw core ejector handle, turn control handle to evacuate, and pump all liquid from hose.
9. Shut off pump, then unscrew ejector body (item 2) and union (item 1) from valve.
10. Set final working pressure after tire has been mounted on tractor with weight on tire and valve at bottom, using an air-water gauge according to tire manufacturer's specifications.

WARNING

NEVER INFLATE BEYOND 35 LBS. PRESSURE. IF BEADS HAVE NOT SEATED BY THE TIME PRESSURE REACHES 35 PSI, DEFLATE THE ASSEMBLY, REPOSITION THE TIRE ON THE RIM, RE-LUBRICATE AND RE-INFLATE. AFTER SEATING BEADS, ADJUST INFLATION TO RECOMMENDED PRESSURE. ALLOWING AIR PRESSURE TO BUILD WITHIN THE ASSEMBLY IN AN ATTEMPT TO SEAT THE BEADS IS A DANGEROUS PRACTICE. IN SEATING BEADS, INFLATION BEYOND 35 POUNDS PRESSURE MAY BREAK THE BEAD (OR EVEN THE RIM) WITH EXPLOSIVE FORCE SUFFICIENT TO CAUSE SERIOUS PHYSICAL INJURY OR DEATH. INSPECT BOTH SIDES OF THE TIRE TO BE SURE BEADS ARE EVENLY SEATED. IF NOT, COMPLETELY DEFLATE TIRE, UNSEAT BEADS AND REPEAT ENTIRE MOUNTING PROCEDURE.

LIQUID WEIGHTING OF TRACTOR TIRES

The following tables provide data on the filling of front and rear tractor tires with calcium chloride solution, based on valve level or approximately 75% fill.

These tables are based on the use of Type 1 - 77% commercial calcium chloride flake. If Type 2 - 94% calcium chloride flake is used, reduce the pounds/kilograms CaCl₂ weights in these tables by 25%.

Where freezing temperatures never occur, plain water can be used, but the weight added will be 20% less than calcium chloride solution. Plain water freezes solid at 32°F/0°C.

Where anti-freeze protection is needed, the 3-1/2 lb/420g calcium chloride solution is slush free to -12°F/-24°C and will freeze solid at -52°F/-47°C. The 5 lb/600g calcium chloride solution is slush free to -52°F/-47°C and will freeze solid at -62°F/-52°C.

LIQUID WEIGHTING - FRONT TRACTOR TIRES

TIRE SIZE	WATER		3-1/2 lbs/420g CaCl ₂			5 lbs/600g CaCl ₂		
		WEIGHT	WATER	CaCl ₂	TOTAL WT	WATER	CaCl ₂	TOTAL WT
	GAL/LITER	LBS/KG	GAL/LITER	LBS/KG	LBS/KG	GAL/LITER	LBS/KG	LBS/KG
4.00-12	2/8	177/7	1.7/7	6/2.7	20/9.1	1.6/6	8/3.6	21/9.5
4.00-15	2.5/10	219/5	2/8	7/3.2	24/11	2/8	10/4.5	27/12
5.00-15	4/15	33/15	3/12	10/4.5	35/16	3/12	15/6.8	40/18
5.50-16	5/19	42/19	4/15	14/6.4	47/21	4/15	20/9.1	53/24
6.00-14	6/23	50/23	5/19	18/8.2	60/27	5/19	25/11	67/30
6.00-16	6/23	50/23	5/19	18/8.2	60/27	5/19	25/11	67/30
6.50-16	7/27	58/26	6/23	21/9.5	71/32	5.5/21	28/13	74/34
7.50-10	6/23	50/23	5/19	18/8.2	60/27	4.8/18	24/11	64/29
7.5L-15	8.5/33	71/32	7/27	24/11	82/37	7/27	35/16	93/42
7.50-16	10/38	83/38	8.5/33	30/14	101/46	8/28	40/18	107/49
7.50/18	11/42	92/42	9.5/37	33/15	112/51	9/35	45/20	120/54
7.50-20	12/46	100/45	10/38	35/16	118/54	9.5/37	48/22	127/58
9.00-10	9/35	75/34	7.5/29	26/12	89/40	7.2/28	36/16	96/44
9.5L-15	11/42	92/42	9.5/37	33/15	112/51	9/35	45/20	120/54
9.50-15	18/69	150/68	16/62	56/25	189/86	15/58	75/34	200/91
9.50-20	18/69	150/68	16/62	56/25	189/86	15/58	72/33	200/91
9.50-24	20/77	167/77	17/65	60/27	202/92	16/62	80/36	213/97
10.00-16	18/69	150/68	16/62	56/25	189/86	15/58	69/31	184/84
11L-15	14/54	117/53	12/46	42/19	142/64	11/42	53/24	147/67
11L-16	15/58	123/56	13/50	46/21	155/70	12/46	60/27	160/73
11.00-15	24/92	200/91	20/77	70/32	237/108	19/73	95/43	253/115
11.00-16	25/96	208/94	22/85	77/35	260/118	20/77	93/42	267/121
14L-16.1	28/108	233/106	24/92	84/38	284/129	23/88	110/50	307/139
16.5L-16.1	41/158	342/155	35/135	122/55	414/188	33/127	167/76	440/220

LIQUID WEIGHTING - REAR TRACTOR TIRES

TIRE SIZE	WATER		3-1/2 lbs/420g CaCl ₂			5 lbs/600g CaCl ₂		
		WEIGHT	WATER	CaCl ₂	TOTAL WT	WATER	CaCl ₂	TOTAL WT
	GAL/LITER	LBS/KG	GAL/LITER	LBS/KG	LBS/KG	GAL/LITER	LBS/KG	LBS/KG
7.2-16	7/26	58/26	6/23	21/9.5	71/32	5/19	25/11	67/30
8.3-16	9/34	75/34	8/30	28/13	95/43	8/27	40/18	107/49
9.5-16	12/45	100/45	10/38	35/16	118/54	10/38	50/23	133/60
11.2-16	18/68	150/68	15/57	53/24	178/81	14/53	70/32	187/85
12.4-16	21/79	175/79	18/68	63/29	213/97	17/64	85/39	227/103
13.6-16.1	31/117	258/117	26/98	91/41	308/140	25/95	125/57	333/151
18.4-16.1	49/185	409/186	42/159	147/67	497/225	39/148	195/88	520/236
8.3-24	13/49	108/49	11/42	39/18	131/59	10/38	50/23	133/60
9.5-24	17/64	142/64	15/57	53/24	178/81	14/53	70/32	187/85
11.2-24	24/91	200/91	20/76	70/32	237/108	19/72	95/43	253/115
12.4-24	30/114	250/113	26/98	91/41	308/140	25/95	125/57	333/151
13.6-24	38/144	317/144	32/121	112/51	379/172	30/114	150/68	400/181
14.9-24	47/178	392/178	40/151	140/64	474/215	38/144	190/86	507/230
16.9-24	61/231	509/231	52/197	182/83	616/279	49/185	245/111	654/297
17.5L-24	55/208	459/208	47/178	165/75	557/253	45/170	225/102	600/272
19.5L-24	69/265	575/265	60/231	210/95	710/322	56/215	280/127	747/339
21L-24	87/335	725/335	74/285	259/118	876/398	70/269	350/159	934/424
14.9-26	48/182	400/181	41/155	144/65	486/220	39/148	195/88	520/236
16.9-26	65/246	542/246	56/212	196/89	663/301	52/197	260/118	694/315
18.4-26	79/299	659/299	68/257	238/108	805/365	64/242	320/145	854/387
23.1-26	128/485	1068/485	109/413	328/173	1291/586	103/390	515/234	1374/623
24L-26	128/484	1068/484	1068/484	110/416	385/175	1302/591	104/394	520/236
28L-26	157/594	1309/594	134/507	469/213	1587/720	127/481	635/288	1694/769
11.2-28	27/102	225/102	24/91	84/38	284/129	22/83	110/50	293/178
12.4-28	35/132	292/132	30/114	105/48	355/161	28/106	140/64	374/170
13.6-28	43/163	359/163	37/140	130/59	439/199	35/132	175/79	467/212
14.9-28	53/201	442/201	46/174	161/73	545/247	43/163	215/98	574/260
16.9-28	69/261	575/261	59/223	207/94	699/317	56/212	280/127	747/339
18.4-28	84/318	701/318	72/273	252/114	852/387	68/257	340/154	907/412
21L-28	97/367	809/367	83/314	291/132	982/445	79/299	395/179	1054/478
14.9-30	57/216	475/216	48/182	168/76	568/258	46/174	230/104	614/279
16.9-30	73/276	609/276	63/238	221/100	746/338	59/223	292/132	787/357
18.4-30	89/337	742/337	77/291	270/123	912/414	72/273	360/163	960/436
23.1-30	143/541	1193/541	123/466	431/196	1457/661	116/439	580/263	1547/702
24.5-32	170/644	1418/643	146/553	511/232	1729/784	138/522	690/313	1841/835
30.5L-32	217/821	1809/821	186/704	651/295	2202/999	176/666	880/399	2347/1065
35.5L-32	313/1204	2609/1204	268/1031	938/426	3172/1440	254/977	1270/577	3388/1538
14.9-34	63/238	525/238	54/204	189/86	639/290	51/193	255/116	680/308
16.9-34	82/310	684/310	70/265	245/111	829/376	66/250	330/150	880/399
18.4-34	100/379	834/378	85/322	298/135	1007/457	81/307	405/184	1081/490
20.8-34	128/485	1068/485	109/413	328/173	1291/586	103/390	515/234	1374/623
23.1-34	159/602	1326/602	136/515	476/216	1610/730	128/485	640/290	1708/775
13.9-36	51/193	425/193	44/167	154/70	521/236	42/159	210/95	560/254
13.6-38	57/216	475/216	49/185	172/78	581/264	46/174	230/104	614/279
15.5-38	66/250	550/250	56/212	196/89	663/301	53/201	265/120	707/321
16.9-38	90/341	751/341	77/291	270/123	912/414	73/276	365/166	974/442
18.4-38	110/416	971/416	94/356	329/149	1113/505	89/337	445/202	1187/539
20.8-38	140/530	1168/530	120/454	420/191	1421/645	114/432	570/259	1521/690
18.4-42	115/442	959/435	98/377	343/156	1160/527	93/358	465/211	1240/563
20.8-42	148/569	1234/560	127/488	444/202	1503/682	120/462	600/272	1600/726
14.9-46	80/303	667/303	68/257	238/108	805/365	65/246	325/147	867/393
18.4-46	129/488	1075/488	111/420	389/176	1314/596	105/397	525/238	1400/635
20.8-46	150/568	1251/568	128/384	448/203	1515/687	121/458	605/274	1614/732
10-16.5	12/46	97/44	10/38	35/16	119/54	10/38	50/23	134/61
12-16.5	15/58	126/57	13/50	46/21	154/70	13/50	65/30	78/35
14-17.5	22/85	185/84	19/73	67/30	227/103	19/73	95/43	114/52
15-19.5	29/112	240/109	25/96	87/39	294/133	25/96	125/57	150/68

SECTION 3. INSTALLATION, MAINTENANCE AND PARTS

WARNING

POSSIBLE EXPLOSION HAZARD CAN RESULT IF 1,1,1,-TRICHLOROETHANE, METHYLENE CHLORIDE OR OTHER HALOGENATED HYDROCARBON SOLVENTS ARE USED IN PRESSURIZED FLUID SYSTEMS HAVING ALUMINUM OR GALVANIZED WETTED PARTS. DEATH, SERIOUS BODILY INJURY OR PROPERTY DAMAGE COULD RESULT. CONSULT WITH THE FACTORY IF YOU HAVE QUESTIONS CONCERNING THE USE OF HALOGENATED HYDROCARBON SOLVENTS.

INSTALLATION PROCEDURE

Position the pump as close as possible to the source of the liquid to be pumped. Avoid long or undersized suction lines and use as few fittings as necessary. At the time of installation, inspect all external fasteners for tightness. Tighten loose fittings to prevent leakage.

AIR SUPPLY

NDP-25BAN Pump Assembly (51714060) comes equipped with a piggyback combination regulator/filter. This regulator/filter (70048197) is factory set to 100 psi (6.90 bar) and is not adjustable. The glass sediment bulb is to be drained manually.

WARNING

DO NOT EXCEED 100 PSI (6.90 BAR) TO PUMP BY BYPASSING REGULATOR/FILTER (70048197) AT ANY TIME. EXCESSIVE WEAR, PREMATURE WEAR, OR PUMP DAMAGE WILL OCCUR AND VOID THE WARRANTY.

A shutoff valve has been installed in the air line to permit removal of the pump for servicing.

MAINTENANCE

CAUTION

BEFORE MAINTENANCE OR REPAIR, SHUT OFF THE COMPRESSED AIR, BLEED THE PRESSURE AND DISCONNECT THE AIR LINE FROM THE PUMP. THE PUMP DISCHARGE LINE MAY BE PRESSURIZED AND MUST BE BLED. WHEN THE PUMP IS USED FOR TOXIC OR CAUSTIC FLUIDS, IT SHOULD BE FLUSHED CLEAN PRIOR TO DISASSEMBLY.

1. After each use, flush the pump using water or a suitable solvent.
2. Maintain the pump by keeping the location clean and dry.
3. Every 200 hours of operation inspect the pump for excessive wear or damage. This particularly refers to diaphragms, ball valves and valve seats.
4. Replace any worn or damaged parts immediately.
5. When the pump is used for materials that tend to settle out or change state from a liquid to a solid, extra care must be taken after each use or during idle time to remove them and flush the pump as required to prevent damage.
6. In freezing temperatures, the pump must be completely drained unless the liquid is resistant to freezing. After disconnecting the discharge and inlet hoses, tilt the pump to drain the fluid.

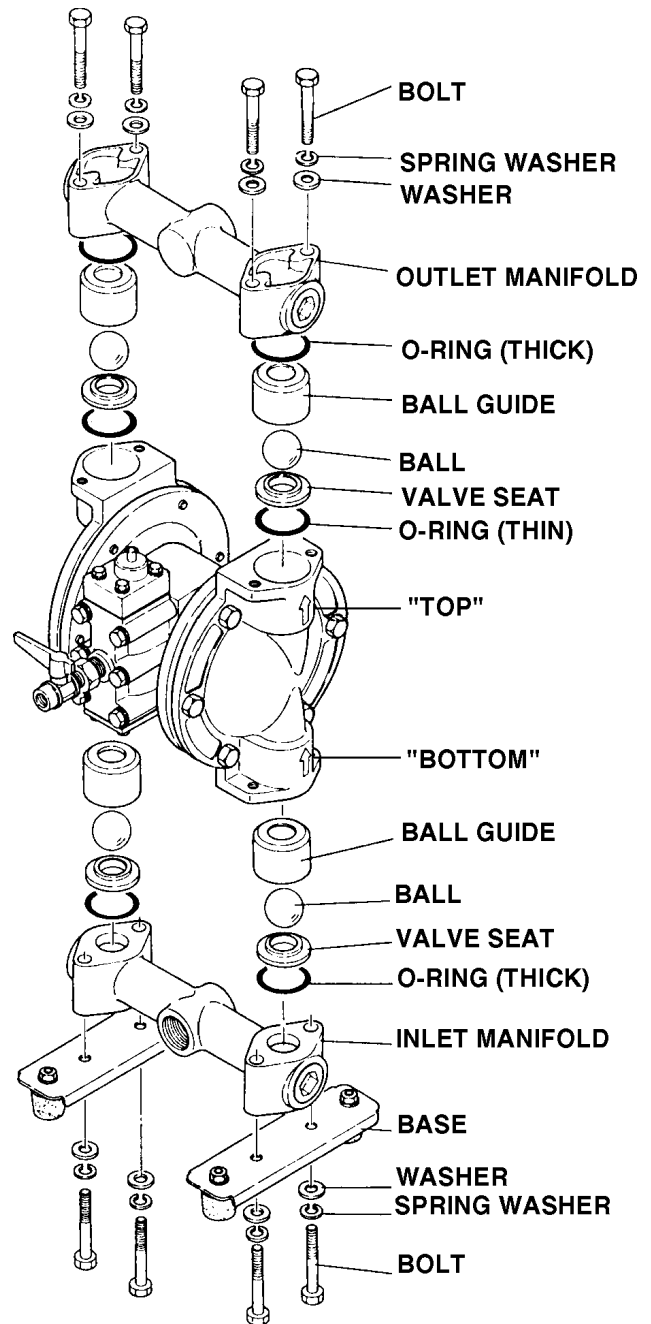
WARNING

WEAR SAFETY GLASSES WHENEVER REPAIRS ARE BEING PERFORMED. FAILURE TO DO SO CAN RESULT IN SERIOUS INJURY.

DISASSEMBLY AND CHECKING, BALLS & VALVE SEATS

Before disassembly of the pump, prepare a location on a suitable workbench which is clean and well organized. See Figure 7 for reference.

1. Locate the four bolts securing the outlet manifold to the chambers. Remove the four bolts, spring washers and washers.
2. Lift the outlet manifold from the pump.
3. Remove the o-ring, ball guide, ball, valve seat and lower o-ring. Be careful not to nick or damage any surfaces.
4. Turn remaining pump assembly over and place on a clean cloth to prevent damage to the manifold mounting surfaces.
5. Locate the four bolts securing the inlet manifold to the chambers. Remove the four bolts, spring washers, washers and both base plates.
6. Lift the inlet manifold from the pump.
7. Remove the o-ring, valve seat, ball and ball guide. Be careful not to nick or damage any surfaces. Keep these parts separated from those removed from the outlet manifold.
8. Using a suitable cleaning solvent, clean all of the disassembled parts.
9. Check the balls and valve seats for any defects such as wear, nicks, cracks or scratches. Any parts found to have such defects must be replaced before re-assembly. The o-rings should be replaced whenever the pump is disassembled to provide for a positive seal when re-assembled. Doing so will minimize future down-time.



**FIGURE 7.
BALL & VALVE SEAT REFERENCE**

DISASSEMBLY AND CHECKING, DIAPHRAGMS

It is necessary that the outlet and inlet manifolds be removed before attempting to remove the chambers and their associated diaphragms. With the pump positioned in a clean work area, refer to Figure 8 and proceed as follows:

1. Locate the six mounting bolts securing the liquid chamber to the remaining pump assembly.
2. Loosen slightly the six bolts in a criss-cross fashion. Once all bolts are loosened, they may be removed completely.
3. Remove the chamber to reveal the diaphragm which is secured by a hex nut and associated disks and washers.
4. Repeat the previous steps to gain access to the diaphragm on the opposite side of the pump assembly.

5. Using two spanner wrenches, one on each of the nuts, loosen and remove the nuts.
6. Remove the coned disk spring, washer, center disk, and finally the diaphragm from both sides of the pump.
7. Inspect the diaphragms for wear, tears, swelling, and other defects. Any defect found is reason for replacement.

CAUTION

WHEN REPLACING DIAPHRAGMS, IT WILL BE NECESSARY TO HOLD CENTER SHAFT SECURELY WHILE LOOSENING OR TIGHTENING THE NUT SECURING THE DIAPHRAGM. DO NOT MAR, MARK, OR DAMAGE THE CENTER SHAFT DURING THIS PROCESS. USE BRASS PLIERS OR WOOD BLOCKS SECURED IN VISE TO HOLD CENTER SHAFT WHILE REMOVING OR INSTALLING THE LAST OR FIRST DIAPHRAGM, RESPECTIVELY.

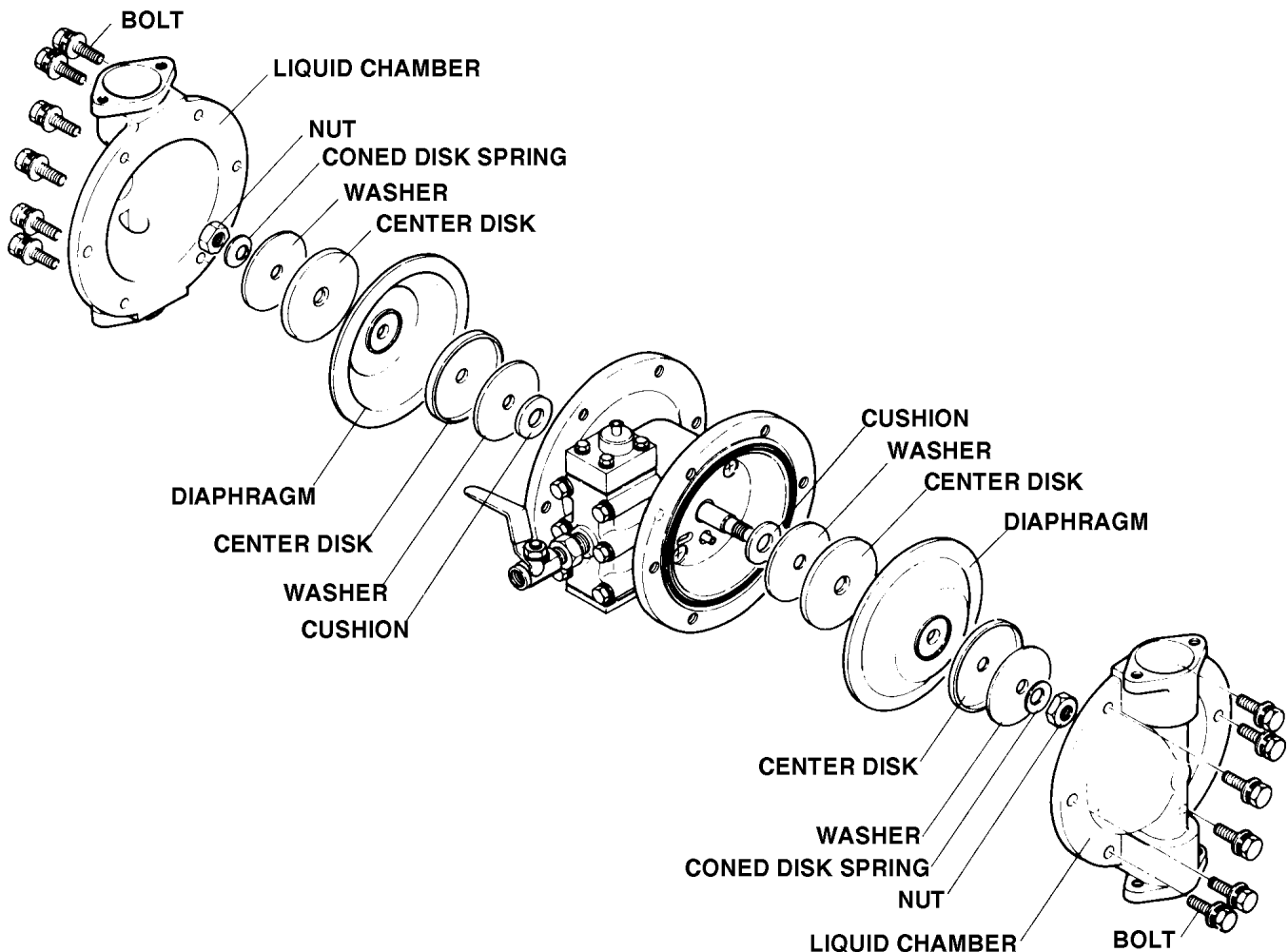


FIGURE 8. DIAPHRAGM ASSEMBLY REFERENCE

MOUNTING DIAPHRAGMS

Refer to Figure 8 and Figure 9 for reference in the mounting of diaphragms. The diaphragms are mounted on the center rod, between the inner and outer center disks, as shown in the figures.

1. Check that the cushion is properly positioned as shown in Figure 9.
2. Refer to Figure 8 for parts sequence and slide the washer and center disk onto the rod, as shown.
3. The side of the diaphragm which is embossed with the word "OUTSIDE" must face the liquid material or towards the outside of the pump. Position the diaphragm on the rod.
4. Slide the remaining center disk, washer, and coned disk spring onto the rod as shown. Hand-tighten the nut onto the rod. Do not torque the nut at this time.
5. Proceed to the opposite side of the pump and assemble in the same sequence as previously used. Remember to position the diaphragm correctly.

6. Confirm that all parts are positioned correctly. Torque the nuts to 350 lb-in (400 kg-cm).

To assemble outer chambers, begin on the side where the diaphragm is pushed outward by the center rod:

7. The outer chamber is marked by an arrow. This arrow is to always point upward. Also, make certain the circumferences of the diaphragms are properly positioned between the air chambers and outer chambers.
8. Fasten the outer chamber temporarily by hand-tightening the six bolts.
9. Fasten the outer chamber on the opposite side in a similar fashion.
10. To adjust the angle for each portion of the manifold and outer chamber, place the body on a flat surface. Adjust chambers and manifolds until they align with each other perfectly.
11. Hand tighten all chamber mounting bolts snugly. In a criss-cross pattern, tighten the bolts and torque to 90 lb-in (100 kg-cm).

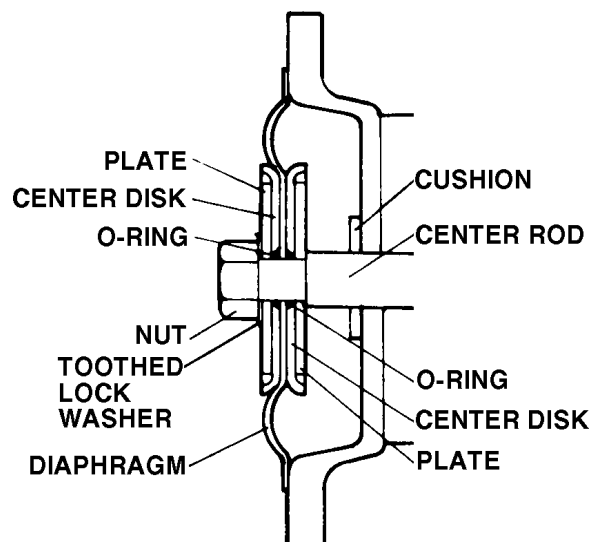
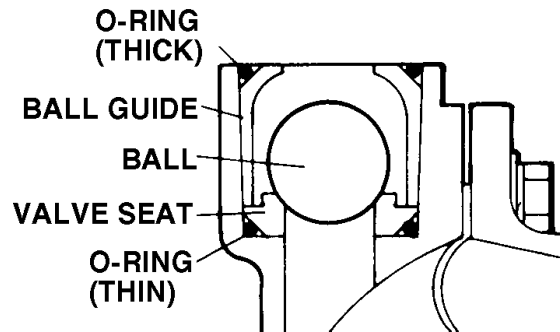
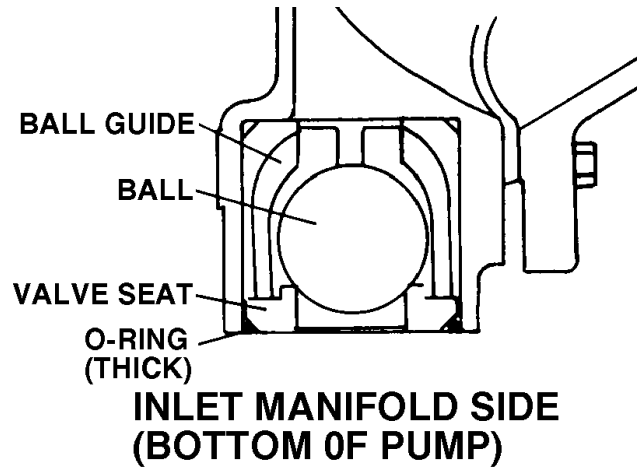


FIGURE 9. MOUNTING RUBBER DIAPHRAGM

RE-ASSEMBLY OF BALLS & SEATS

Refer to Figure 7 and Figure 10 for reference.

1. Place the unit upside-down for easier assembly of the lower housing.
2. Place the ball guide, ball, valve seat and thick o-ring into the housing. Do this on each side of pump as shown in Figure 7.
3. Position the inlet manifold onto the lower side of the outer chamber housing.
4. Place the base plates, with attached feet positioned properly, onto the manifold.
5. Note sequence of mounting hardware and hand tighten the four lower manifold mounting bolts.
6. Torque the mounting bolts to 90 lb-in (100 kg-cm). Do not torque beyond 90 lb-in.
7. Turn the pump assembly right-side-up on the work surface. Insert the thin o-ring, valve seat, ball, ball guide and thick o-ring into the upper portion of the housing. Do this on each side of pump as shown in figure 7.
8. Place the outlet manifold onto the outer chamber housing and attach using the mounting hardware shown in Figure 7.
9. Torque the mounting bolts to 90 lb-in (100 kg-cm). Do not torque beyond 90 lb-in.
10. Check that all bolts have been torqued properly.



**FIGURE 10.
BALL & VALVE SEAT ASSEMBLY**

DISASSEMBLY AND CHECKING OF AIR VALVE ASSEMBLY

Refer to Figure 11 for reference.

1. Remove the caps by first removing the four bolts securing the top cap and four bolts securing the bottom cap.
2. Remove the cushion from the valve body casing.
3. Push the spool assembly out by hand.
4. Check the seal rings of the spool assembly. If any defects exist, replace the seal.
5. Inspect the convex part of the spool. If any defacement is found replace the spool and seal rings.
6. Inspect the sleeve assembly. If any defects are found, replace.

RE-ASSEMBLY OF AIR VALVE

1. Carefully insert the spool assembly into the valve body. Take precautions to avoid damage to the seal rings.
2. Place the cushions, gaskets and caps in their original position. Tighten the four bolts on the top and the four bolts on the bottom cap.

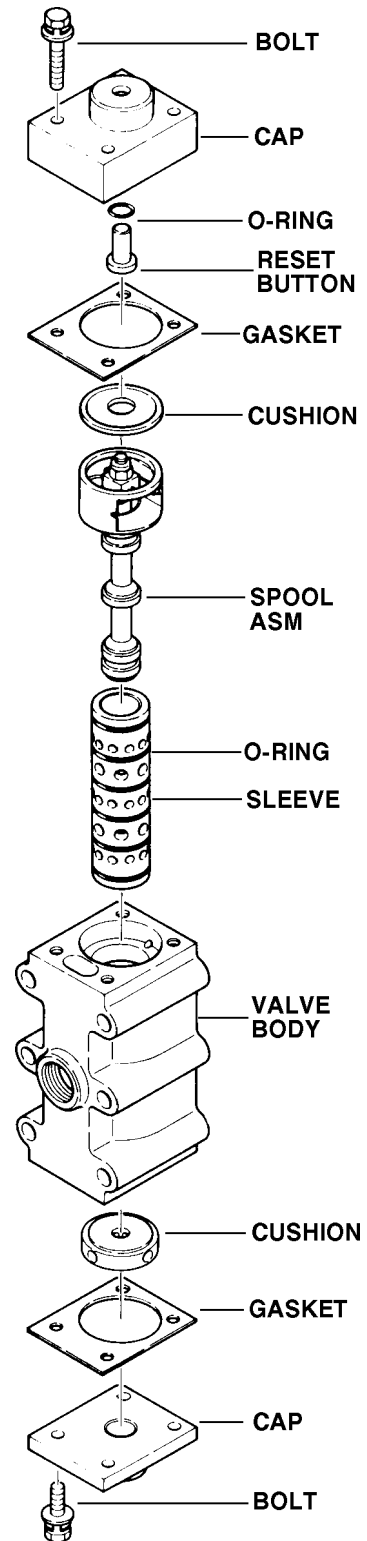
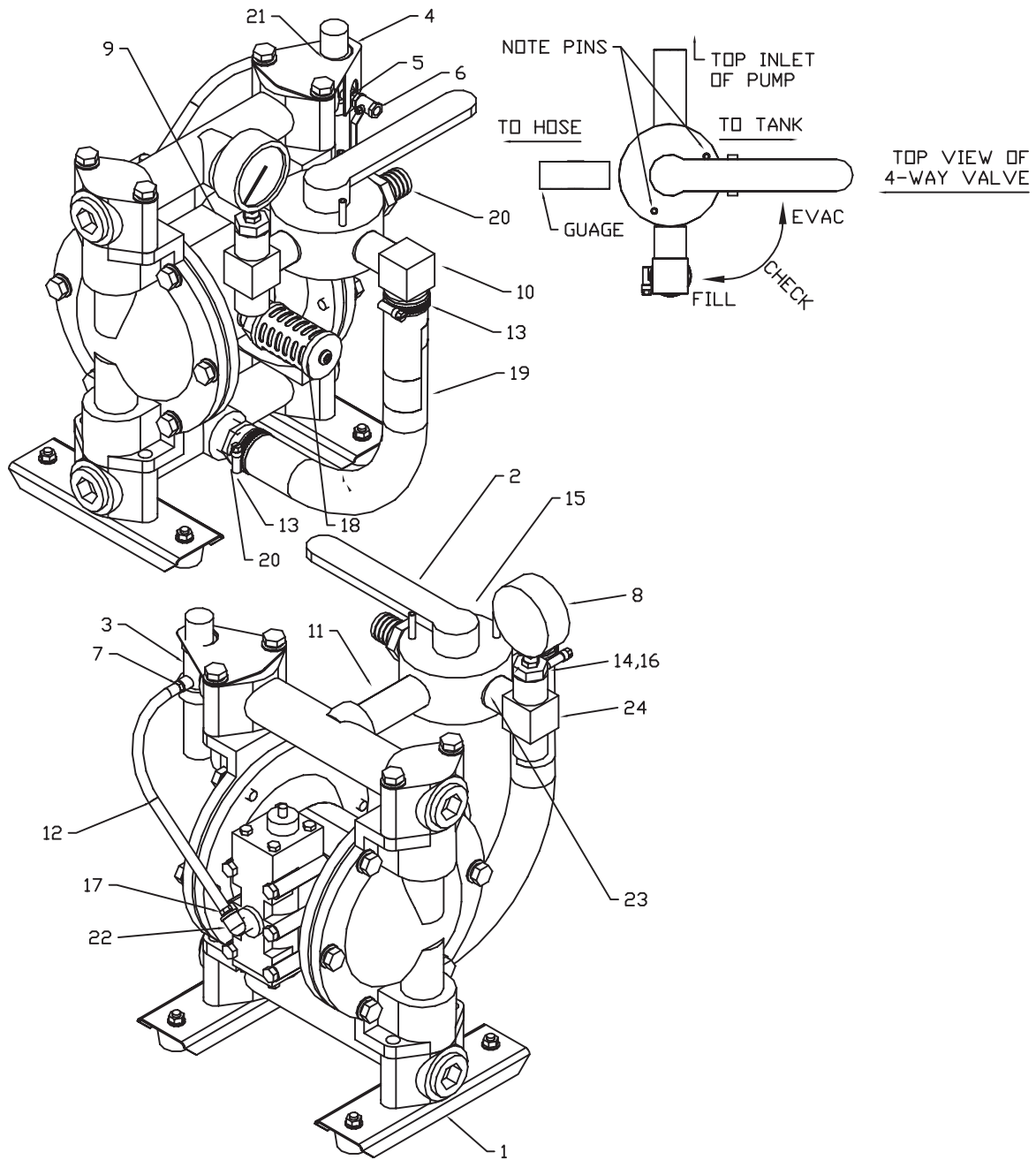


FIGURE 11. AIR VALVE ASSEMBLY



ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
1.	70733196	PUMP	1	13.	72661284	HOSE CLAMP SAE16	2
2.	70733763	VALVE 4-WAY ALUM 1 FPT	1	14.	72531835	RED BUSHING STL 1.00-1/2	1
3.	70048197	REGULATOR-AIR	1	15.	70394442	DECAL-FILL/CHECK/EVAC	1
	73052090	FILTER ONLY	REF	16.	72531828	RED BUSHING STL 1/2-1/8	1
	70145917	BOWL ONLY	REF	17.	72533569	HOSE FITTING 1/4 3/8 BRS	1
4.	70145563	BRACKET	1	18.	70048198	SILENCER	1
5.	72053722	ADAPTER 3/8MPT 1/4MPT	1	19.	89039188	HOSE 1X18	1
6.	73054625	BALL VALVE 3/8NPT	1	20.	72532470	BARB NIPPLE 1MPT 1HOSE	2
7.	72532552	HOSE FITTING 1/4 1/4	1	21.	77044714	NUT	1
8.	70048199	GAUGE	1	22.	72053590	STREET ELBOW 3/8NPT 90°	1
9.	70394450	PLACARD-SER NO	1	23.	72053804	ADPTR 1.00 MPT 1.00 MPT HEX	1
10.	72532345	BARB NIPPLE 1MPT 1HOSE90°	1	24.	72053614	TEE-STL 1.00	1
11.	72053191	PIPE NIPPLE 1NPT X 4	1				
12.	89392146	HOSE 1/4 AIR X12	1				

FIGURE 12. PUMP ASSEMBLY (51714060)

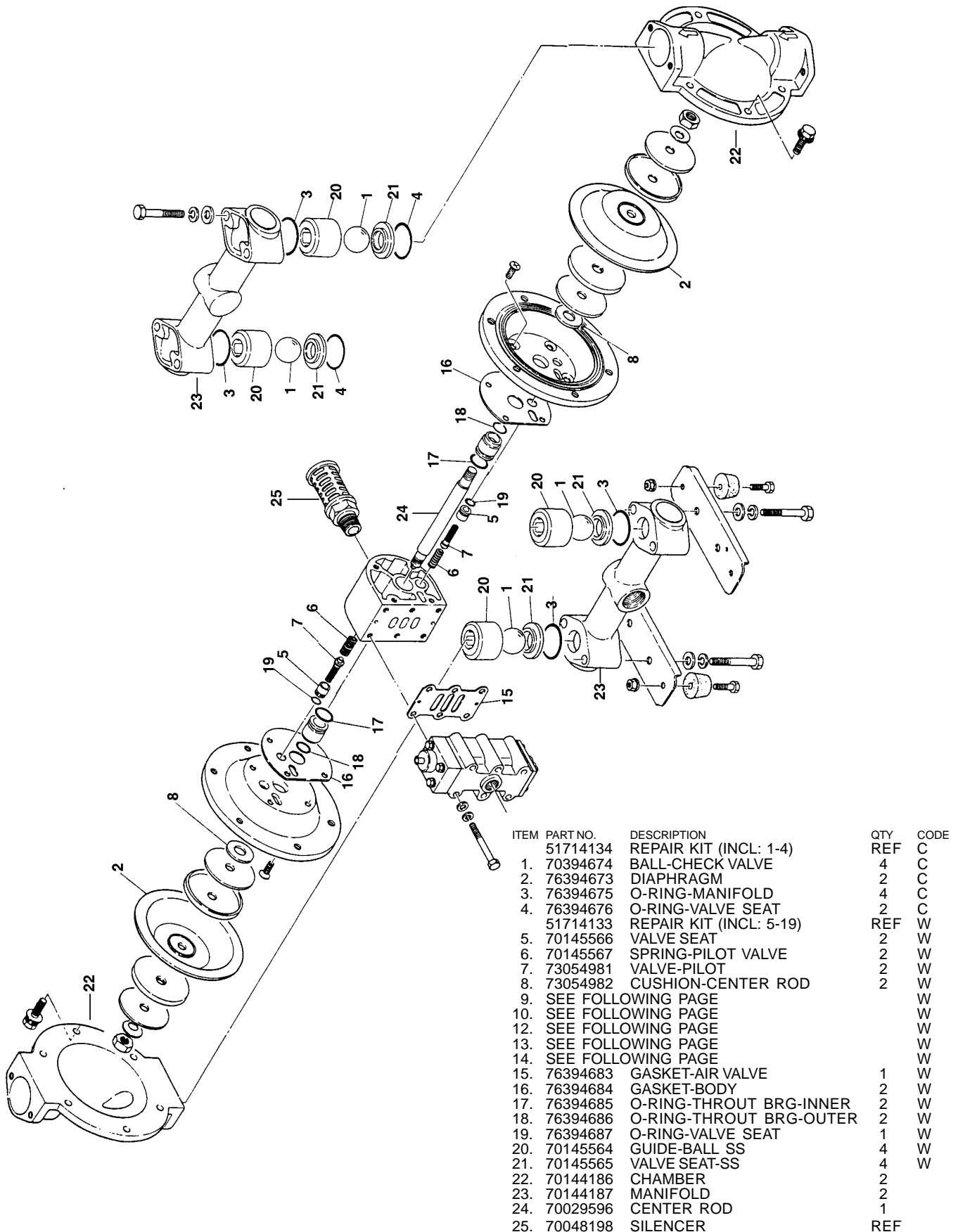
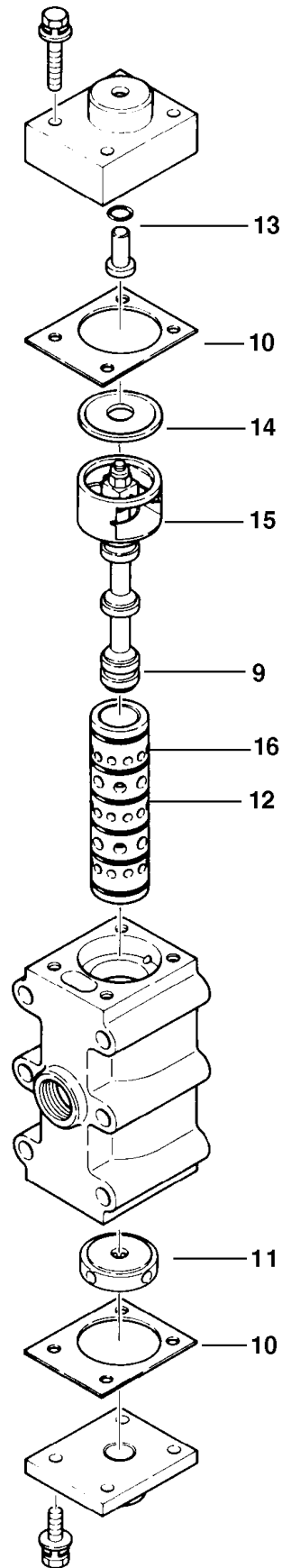
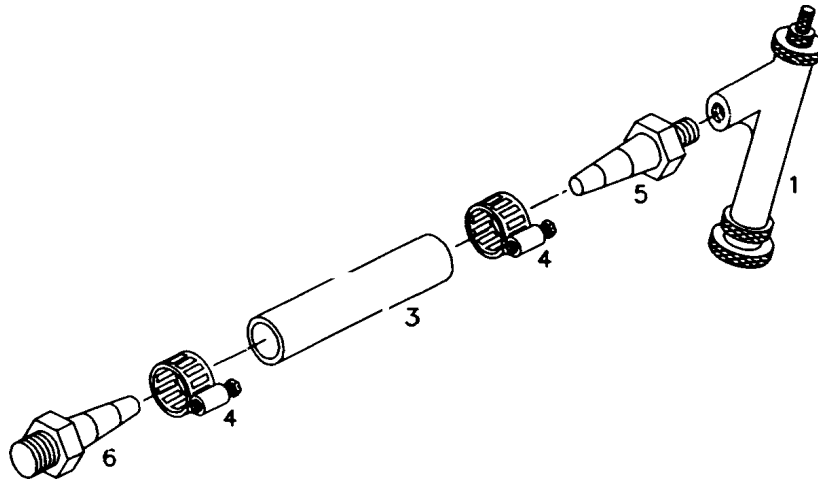


FIGURE 13. NDP-25 PUMP REPLACEMENT PARTS



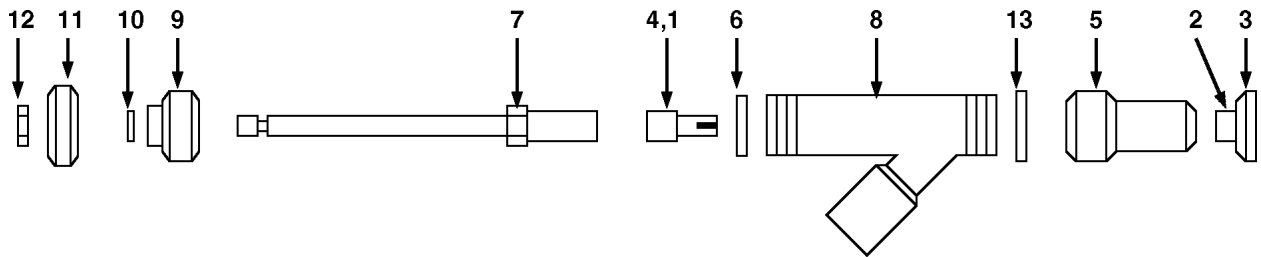
ITEM	PART NO.	DESCRIPTION	QTY	CODE
9.	76394677	SEAL-RING SPOOL	5	W
10.	76394678	GASKET-AIR VALVE	2	W
11.	76395846	CUSHION	1	W
12.	76394680	O-RING-SLEEVE	6	W
13.	76394681	O-RING-AIR VALVE	1	W
14.	76394682	PACKING-AIR VALVE	1	W
15.	70145723	C SPOOL ASM	1	W
16.	70145722	SLEEVE-C SPOOL	1	W

FIGURE 14. NDP-25 PUMP REPLACEMENT PARTS



ITEM	PART NO.	DESCRIPTION	QTY	CODE
1.	79085286	EJECTOR (SEE DWG)	1	
2.	51701520	HOSE ASM (INCL: 3-6)	1	
3.	89039182	HOSE 3/4X18' 300PSI	18'REF	
4.	72661422	HOSE CLAMP 1-1/4X1/2	2REF	
5.	72531547	BARB NIPPLE 1/2MPT 3/4HOSE	1REF	
6.	72053458	BARB NIPPLE 1/2MPT 3/5HOSE	1REF	

FIGURE 15. CHLORIDE HOSE ASSEMBLY WITH EJECTOR (51704964)



ITEM	PART NO.	DESCRIPTION	QTY	CODE
1.	70142505	CORE REMOVER-LG BORE	1	
2.	70024336	ADAPTER-STD VALVE	1	
3.	76392856	O-RING (USED W/ITEM 2)	1	C
4.	70142506	CORE REMOVER-STD CORE	1	
5.	70143369	EJECTOR UNION	1	C
6.	76392857	GASKET	1	C
7.	70143370	STEM	1	W
8.	70143371	ADAPTER BODY	1	
9.	70143372	SEALING NUT-STEM	1	
10.	76392858	O-RING (USED W/ ITEM 9)	1	C
11.	70143373	HAND WHEEL	1	
12.	72062219	LOCK NUT	1	
13.	70145021	WASHER-TEFLON	1	C

FIGURE 16. OPTION - VALVE ADAPTER GUN (79085286)

RECOMMENDED SPARE PARTS LIST

1 Year Supply

DIAPHRAGM PUMP NDP-25BAN-C

For Manual: 99900881

This spare parts list does not necessarily indicate that the items can be expected to fail in the course of a year. It is intended to provide the user with a stock of parts sufficient to keep the unit operating with minimal down-time waiting for parts. There may be parts failures not covered by this list. Parts not listed are considered as not being Critical or Normal Wear items during the first year of operations and you need to contact the distributor or manufacturer for availability.

ASSEMBLY DESIGNATION	ITEM NO.	PART NO.	DESCRIPTION	QTY	CODE	SHELF LIFE MO.	ORDER QTY
51714060.02.07-07-1997			PUMP ASSEMBLY				
		51714134	REPAIR KIT (INCL: 1-4)	REF	C	N/A	
	1	70394674	BALL-CHECK VALVE	4	C	N/A	
	2	76394673	DIAPHRAGM	2	C	N/A	
	3	76394675	O-RING-MANIFOLD	4	C	N/A	
	4	76394676	O-RING-VALVE SEAT	2	C	N/A	
		51714133	REPAI KIT (INCL: 5-19)	REF	W	N/A	
	5	70145566	VALVE SEAT	2	W	N/A	
	6	70145567	SPRING-PILOT VALVE	2	W	N/A	
	7	73054981	VALVE-PILOT	2	W	N/A	
	8	73054982	CUSHION-CENTER ROD	2	W	N/A	
	9	76394677	SEAL-RING SPOOL	5	W	N/A	
	10	76394678	GASKET-AIR VALVE	2	W	N/A	
	12	76394680	O-RING-SLEEVE	6	W	N/A	
	13	76394681	O-RING-AIR VALVE	1	W	N/A	
	14	76394682	PACKING-AIR VALVE	1	W	N/A	
	15	76394683	GASKET-AIR VALVE	1	W	N/A	
	16	76394684	GASKET-BODY	2	W	N/A	
	17	76394685	O-RING-THROUT BRG-INNER	2	W	N/A	
	18	76394686	O-RING-THROUT BRG-OUTER	2	W	N/A	
	19	76394687	O-RING-VALVE SEAT	1	W	N/A	
	20	70145564	GUIDE-BALL SS	4	W	N/A	
	21	701445565	VALVE SEAT-SS	4	W	N/A	
79085286.01.07-07-1997			VALVE ADAPTER GUN				
	3	76392856	O-RING (USED W/ITEM 2)	1	C	N/A	
	5	70143369	EJECTOR UNION	1	C	N/A	
	6	76362857	GASKET	1	C	N/A	
	7	70143370	STEM	1	W	N/A	
	10	76392858	O-RING (USED W/ITEM 9)	1	C	N/A	
	13	70145021	WASHER-TEFLON	1	C	N/A	

Note: C = Critical Part, P = Preventive Maintenance Part, W = Normal Wear Part.

