

1-1/2", 2" PERFORMANCE PLUS MAINTENANCE MANUAL

CHECK VALVE AND O-RING MAINTENANCE

1. Flush and neutralize the pump to be certain all corrosives or hazardous materials are removed prior to any maintenance. This procedure should always be followed when returning pumps for factory service also.
2. **PLASTIC PUMPS:** Remove the elbow to outer pumping chamber band clamps (35). Suction check valve seats (26) and check balls (27) are located inside of the bottom of the outer chamber (28). Gently remove and inspect for excessive wear, pitting or other signs of degradation. Inspect valve seat o-rings (24) and replace if necessary. Discharge check valves are located inside of the bottom of the discharge elbows (32). Repeat procedure for inspection of discharge check valves.
- 2A. **METAL PUMPS:** To inspect the check valves, remove the cap screws (19) from manifold sections (21, 23). Repeat procedure above. There are no manifold o-rings in the metallic pumps.
3. To inspect the manifold o-rings remove the manifold band clamps from each manifold assembly. Inspect and replace o-rings if necessary. Then reassemble, lightly tighten fasteners. The check ball should fit into the curved portion of the valve seat facing upward when reinserted into the valve seat location. Tighten all external fasteners to final torque requirement after pump is completely assembled.

NOTE: When using pumps built with PTFE o-rings always replace with new PTFE o-rings, since the original o-rings will not reseal the pump.

DIAPHRAGM AND PILOT SLEEVE ASSEMBLY MAINTENANCE

4. To inspect diaphragms remove cap screws (16) and reinforcement bracket (25) from the outer pumping chambers. If replacement is necessary due to abrasion or rupture unscrew the outer diaphragm plates (29). Models that are built with PTFE elastomers will have a PTFE overlay (30) that faces the outer pumping chamber (28) and a back-up diaphragm (31) on the air side of pump. Pumps without PTFE will contain only the back-up diaphragms.
5. If there has been a diaphragm rupture and corrosive or viscous fluid has entered the air side of pump the complete air system should be inspected. After removing diaphragms, inner diaphragm plate (33), and flat washer (47) the pilot sleeve assembly (13, 14, 15, 42, 45, 48) and diaphragm rod assembly (34, 49) may be removed by removing the retaining plates (46) (you may only need to remove one retaining plate) and pushing the entire unit out through the bore in the intermediate (41). Diaphragm rod assembly must be unscrewed to remove pilot sleeve.
NOTE: To aid in reassembly use a non-synthetic, petroleum based lubricating grease without EP additives. Carleton-Stuart MagnaLube G is recommended.
6. Clean or replace any components that have excessive wear, dirt build-up, or chemical attack. Lube all components prior to reassembling. Reassemble pilot sleeve spacers, o-rings and lip seals (14) within bore of intermediate. Make sure that the open side of the lip seals is facing outward toward the diaphragms. Also make sure that the end pilot spacers (45) are at the end on either side of the pilot sleeve assembly and all inner spacers (48) are separated by o-rings. Next carefully insert the diaphragm rod assembly with pilot sleeve assembly inside the bore. Reattach retaining plates. Do not over tighten self-tapping screws (38).
7. With the curved side of the inner diaphragm plate facing the diaphragm, assemble onto outer diaphragm plate stud and then screw assembly into diaphragm rod. Push diaphragm rod to opposite side of intermediate and add the opposite diaphragm assembly. **Tighten the outer diaphragm plates to 372 in-lbs (42,04 NM) of torque.** Assemble the outer chamber, reinforcement brackets and bolts first on

the side where the diaphragm has been inverted. Next reach under the opposite diaphragm assembly and pull diaphragm rod to opposite side (a large flat screwdriver may be used as an aid in this process) and assemble remaining outer chamber, reinforcement brackets and cap screws. When positioning outer diaphragm chambers onto intermediate make sure that witness lines are matching.

NOTE: If air valve has been removed, proper orientation of air system with fluid chambers must be observed. The top of the intermediate has a single vertical air passage slot on the air valve mounting face while the outer chamber check ball cavity should be pointing downward.

PLASTIC PUMPS NOTE: When positioning band clamps use soapy water or a compatible lubricating spray on the inside of band clamps to aid assembly. Tap with a mallet on the outside of clamp to help position the clamp while tightening the fasteners. The band clamp fasteners and cap screws are stainless steel. To prevent galling always apply an anti-seize compound to the thread. Tighten all external fasteners to final torque requirement after pump is completely assembled.

8. Position the reassembled manifolds making sure of the proper orientation in relation to the air valve for your application. Also make sure that the valve seat o-rings do not shift from their grooves during reassembly. Flat washers should be placed under the head of each cap screw and nut. Tighten all external fasteners to final torque requirement after pump is completely assembled.
- 8A. **METAL PUMPS:** Position manifold/elbow sections making sure that the valve seat o-rings do not shift from their grooves. Tighten fasteners on bolts loosely.

EXTERNAL FASTENER TORQUE REQUIREMENTS

NOTE: When reassembling loosely tighten all external fasteners adjusting and aligning and gradually, in an alternating fashion, tighten to torque requirements listed below.

CHAMBER BOLTS (Outer Chamber – all versions), 15 ft-lbs (20,34 NM)

BAND CLAMPS (Manifolds and Elbow), 80 in-lbs (9,04 NM)

METAL PUMPS (Elbow to Chamber Bolts), 37 ft-lbs (50,17 NM)

AIR VALVE CAP SCREWS, 40 in-lbs (4,52 NM)

AIR VALVE MAINTENANCE

9. To evaluate air valve components, remove the six cap screws (11), washers, (8, 10) and nuts from the air valve body (7). The valve plate (5) and shuttle (6) may be inspected by removing them from their location in the slot in the back of the air valve. Inspect for scratches or surface irregularities. Replace if necessary. To remove the plug (1) at the bottom of the air valve, point the bottom of the air valve safely away from people, direct compressed air through one of the lower holes in the back of the air valve body and the plug will shoot out. Next push the air valve spool (2) out of the air valve body. Gently reach in and pull lip seals (43) out of inside bore of the air valve body. Check for cracks, splitting or scratches. Clean components if replacement is not necessary. Inspect plug o-ring (44) for any damage and replace if necessary and reinsert in o-ring groove.
NOTE: Make sure that the open side of the two lip seals face each other when reassembling air valve. Lube all components with suggested maintenance grease as an aid in reassembly.
10. Reinsert air valve spool inside of air valve body. Place shuttle on middle rib of air valve spool through the square slot in back of air valve. If using original valve plate lubricate side of plate that was facing the shuttle (or if new valve plate is used lubricate the lapped and polished side of plate) and place the lubricated side next to the shuttle in the slot. Press valve plug into air valve body, chamfered end first.
11. Check that gasket (4) is not cracked and If damaged, replace.
12. After gasket is pressed back into position, align air valve onto intermediate and reinsert the six cap screws with lock washer and flat washers. **Apply 40 in-lbs (4,52 NM) of torque to fasteners.**

U.S. Patent Number 5232352

SPECIFICATIONS: 1-1/2", 2" PERFORMANCE PLUS

1-1/2" CAPACITY:

Adjustable 0-130 GPM (492 LPM)

2" CAPACITY:

Adjustable 0-180 GPM (681 LPM)

MAXIMUM TEMP:

PVDF models – 200°F (93°C)

Other plastic models – 150°F (66°C)

Metallic models – 200°F (93°C)

MAXIMUM AIR PRESSURE:

120 psi (8,2 bar)

MINIMUM AIR PRESSURE:

20 psi (1,3 bar)

WEIGHT 1-1/2" Models:

Poly models – 46lbs (20,8 kg)

PVDF models – 65lbs (29,4 kg)

Alum models – 60lbs (27,2 kg)

SS models – 133lbs (60,3 kg)

WEIGHT 2" Models:

Poly models – 48lbs (21,7 kg)

PVDF models – 69lbs (31,3 kg)

Alum models – 61lbs (27,7 kg)

SS models – 133lbs (60,3 kg)

DRY LIFT:

Models with PTFE balls – 10 feet (3 meters)

Other models – 15 feet (4,5 meters)

MAXIMUM SOLIDS:

1/4" (6,4 mm)

AIR SUPPLY:

Inlet – 3/4" NPT Female (BSP compatible)

Outlet – 3/4" NPT Female

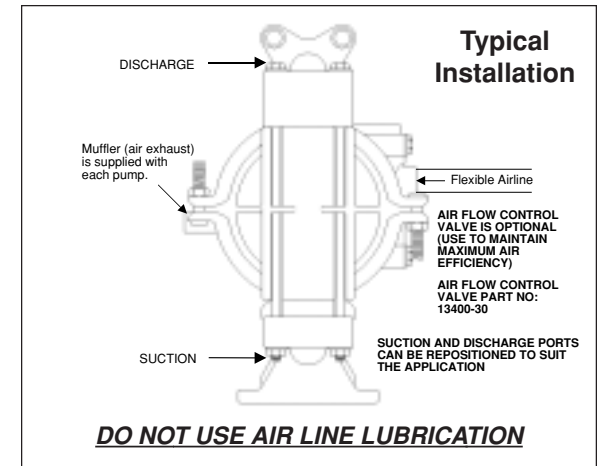
FLUID INLET/DISCHARGE:

1-1/2" Flange (ANSI and DIN compatible)

2" BSP Female (2" metal models)

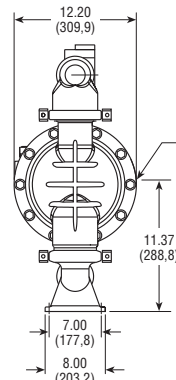
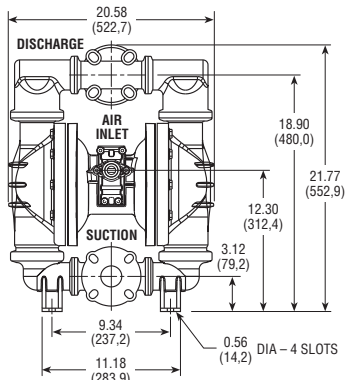
2" Flange (2" plastic models)

(ANSI and DIN compatible)

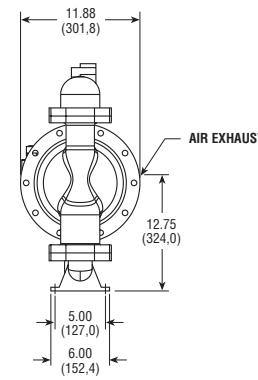
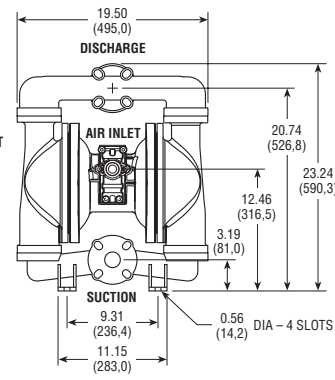


1-1/2" DIMENSIONS Dimensions in inches and (mm)

Plastic

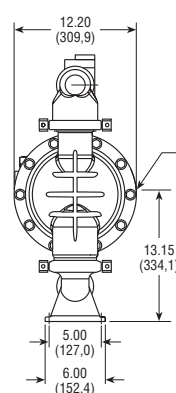
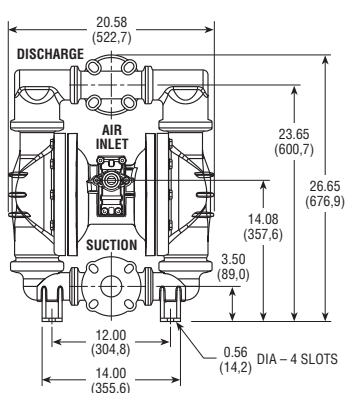


Metallic

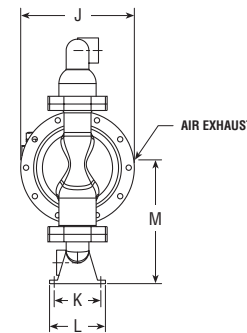
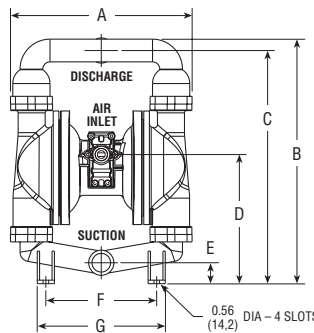


2" DIMENSIONS Dimensions in inches and (mm)

Plastic



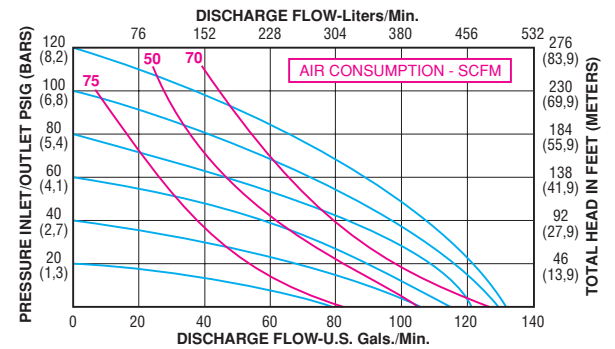
Metallic



MODEL	DIMENSIONS Inches / (mm)										
Size (Inlet/Outlet)	A	B	C	D	E	F	G	J	K	L	M
2" Aluminum NPT & BSP	19.50 (495.0)	26.26 (667.0)	25.04 (636.0)	13.86 (352.0)	2.25 (57.1)	10.06 (255.5)	12.00 (304.8)	12.20 (309.9)	5.00 (127.0)	6.00 (152.4)	12.90 (327.6)
2" Stainless Steel NPT & BSP	19.50 (495.0)	24.62 (625.3)	23.00 (584.2)	15.05 (382.3)	3.50 (89.0)	12.00 (304.8)	13.85 (351.5)	12.20 (309.9)	5.00 (127.0)	6.00 (152.4)	14.10 (358.1)
Flanged 2" Flange	19.50 (495.0)	24.62 (625.3)	21.62 (549.2)	13.25 (336.6)	3.50 (89.0)	12.00 (304.8)	13.85 (351.5)	11.88 (301.8)	5.00 (127.0)	6.00 (152.4)	12.75 (324.0)

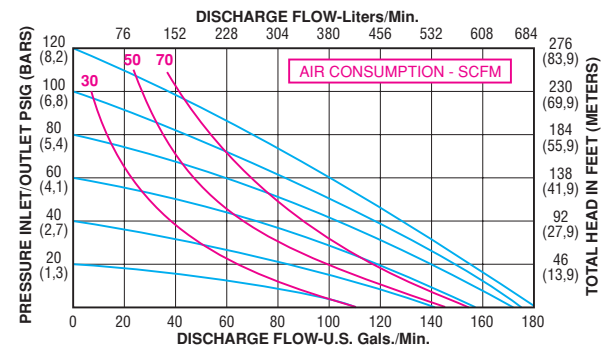
1-1/2" PERFORMANCE CURVE

(Based on water-flooded suction)



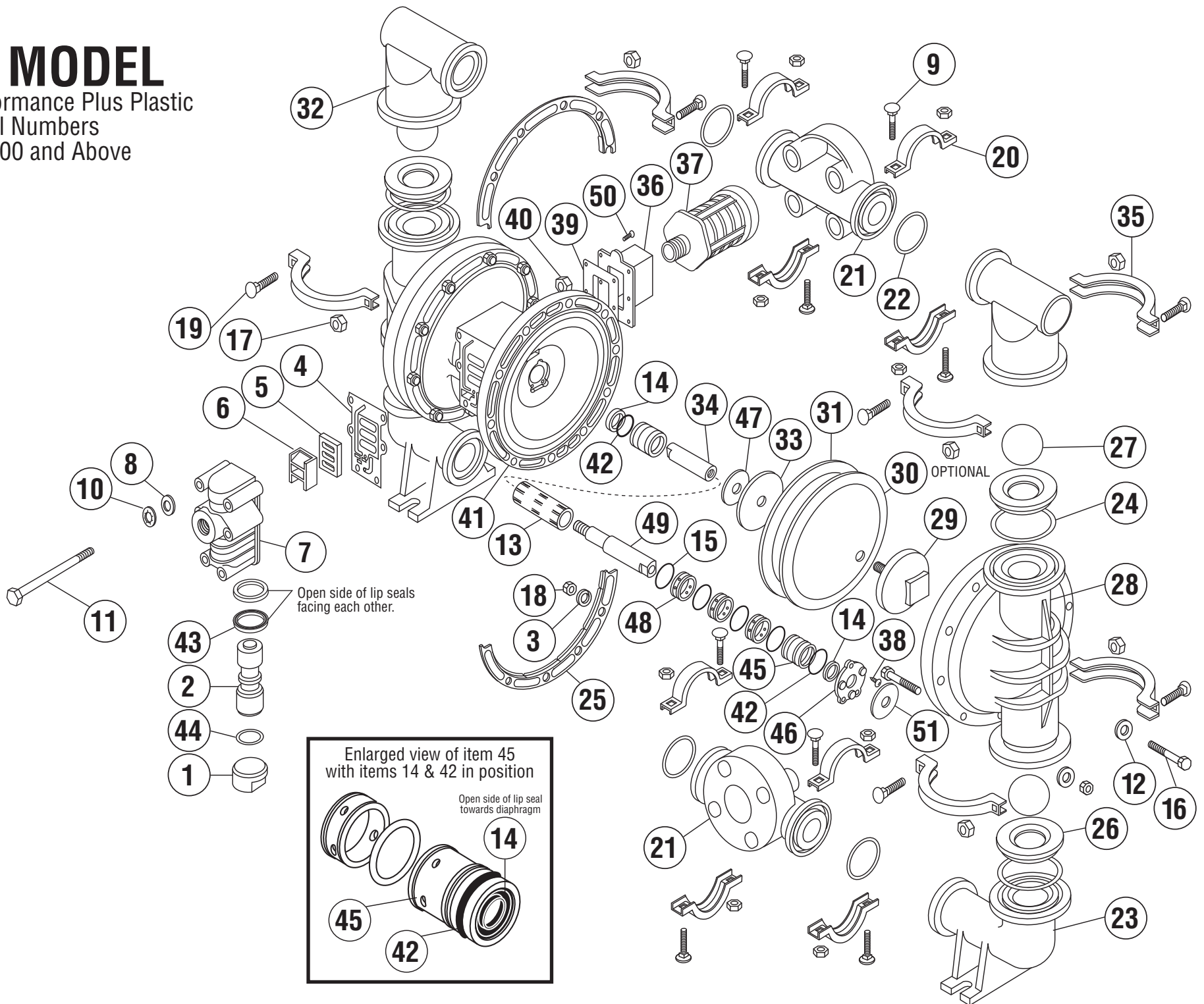
2" PERFORMANCE CURVE

(Based on water-flooded suction)



2" MODEL

Performance Plus Plastic
Serial Numbers
143700 and Above



2" PERFORMANCE PLUS PLASTIC MODELS

JANUARY 2008

ITEM	DESCRIPTION	QTY PER PUMP	PUMP MODELS	PART NUMBER	MATERIAL
1	AIR VALVE END PLUG	1	ALL MODELS	11703-60	POLYPRO
2	AIR VALVE SPOOL	1	ALL MODELS	10481-31	ACETAL
3	COMPRESSION WASHER	20	ALL MODELS	12319-26	SS
4	AIR VALVE GASKET	1	ALL MODELS	12121-19	NITRILE
5	SHUTTLE PLATE	1	ALL MODELS	10450-77	CERAMIC
6	SHUTTLE	1	ALL MODELS	10430-00	SPECIAL
7	AIR VALVE BODY	1	ALL MODELS	11617-60	POLYPRO
8	FLAT WASHER	6	ALL MODELS	12300-26	SS
9	CARR. BOLT (5/16" X 1-1/2")	8	ALL MODELS	12509-26	SS
10	LOCK WASHER (1/4")	6	ALL MODELS	12350-26	SS
11	CAP SCREW (1/4" X 6")	6	ALL MODELS	12515-26	SS
12	FLAT WASHER	20	ALL MODELS	12306-26	SS
13	PILOT SLEEVE	1	ALL MODELS	10106-31	ACETAL
14	LIP SEAL (Diaphragm Rod)	2	ALL MODELS	12002-76	NITRILE
15	O-RING (Pilot Sleeve)	4	ALL MODELS	11919-16	URETHANE
16	CAP SCREW (1/2" X 3 1/4")	20	ALL MODELS	12555-26	SS
17	HEX NUT (5/16" - 18)	16	ALL MODELS	12601-26	SS
18	HEX NUT (1/2" - 13)	20	ALL MODELS	12604-26	SS
19	CARRIAGE BOLT (5/16" X 2")	8	ALL MODELS	12529-26	SS
20	CLAMP, MANIFOLD (Complete With Fasteners)	4	ALL MODELS	12901-26	SS
21	MANIFOLD	2	PB, PE, PT KE, KT	10580-40 10580-56	POLYPRO PVDF
22	O-RING (Manifold)	4	PB PT, KT KE, PE	11922-11 11922-17 11922-15	NITRILE PTFE EPDM
23	SUCTION ELBOW	2	PB, PE, PT KE, KT	10802-40 10802-56	POLYPRO PVDF
24	O-RING (Valve Seat)	4	PB PT, KT PE, KE	11926-11 11926-17 11926-15	NITRILE PTFE EPDM
25	POWER RING (Set)	2	ALL MODELS	12812-26SET	SS
26	VALVE SEAT	4	PB, PE, PT KE, KT OPT ALL MODELS	10918-40 10918-56 10918-26	POLYPRO PVDF SS
27	BALL BALL, HEAVY WEIGHT	4 OPT OPT	PB PT, KT PE, KE HIGH VISCOSITY ALL MODELS	11004-11 11004-45 11004-23 11004-22 11004-26	GEOLAST PTFE SANTO NITRILE SS
28	OUTER CHAMBER	2	PB, PE, PT KE, KT	10724-40 10724-56	POLYPRO PVDF
29	OUTER DIAPHRAGM PLATE	2	PB, PE, PT KE, KT	11203-40 11203-56	POLYPRO PVDF

ITEM	DESCRIPTION	QTY PER PUMP	PUMP MODELS	PART NUMBER	MATERIAL
30	OVERLAY	2	PT, KT	11403-59	PTFE
31	DIAPHRAGM	2	PB ALL OTHERS	10603-19 10603-23	GEOLAST SANTO
32	DISCHARGE ELBOW	2	PB, PE, PT KE, KT	11305-40 11305-56	POLYPRO PVDF
33	INNER DIAPHRAGM PLATE	2	ALL MODELS	11103-25	PS
34	DIAPHRAGM ROD (Short)	1	ALL MODELS	*	SS
35	CLAMPS, ELBOW (Complete With Fasteners)	4	ALL MODELS	12905-26	SS
36	MUFFLER PLATE	1	ALL MODELS	13107-60	POLYPRO
37	EXTERNAL MUFFLER	1	ALL MODELS	13001-00	SPECIAL
38	SCREW (#6 X 3/4")	6	ALL MODELS	12549-26	SS
39	GASKET (Muffler Plate)	1	ALL MODELS	12108-11	NITRILE
40	HEX NUT (1/4" - 20)	6	ALL MODELS	12600-26	SS
41	INTERMEDIATE	1	ALL MODELS	11524-60	POLYPRO
42	O-RING (End Spacer)	2	ALL MODELS	11919-11	NITRILE
43	LIP SEAL (Air Valve)	2	ALL MODELS	12003-76	NITRILE
44	O-RING (Valve Plug)	1	ALL MODELS	11913-11	NITRILE
45	END SPACER (Pilot sleeve)	2	ALL MODELS	10206-40	POLYPRO
46	RETAINING PLATE	2	ALL MODELS	12709-54	NYLON
47	FLAT WASHER	2	ALL MODELS	12315-25	PS
48	INNER SPACER (Pilot Sleeve)	3	ALL MODELS	10205-40	POLYPRO
49	DIAPHRAGM ROD (Long)	1	ALL MODELS	*	SS
50	SCREW (#8 X 3/4")	6	ALL MODELS	12540-26	SS
51	BUMPER	2	ALL MODELS	12317-16	URETHANE

*** DIAPHRAGM ROD AVAILABLE ONLY AS AN ASSEMBLY**

DIAPHRAGM ROD ASSEMBLY	1	ALL MODELS	35000-00	SS
Includes items 34 & 49				

OPTIONAL ASSEMBLIES AVAILABLE

AIR VALVE ASSEMBLY	1	ALL MODELS	47000-60	VARIOUS
Includes items 1 thru 7, 43, 44				
PILOT SLEEVE ASSEMBLY	1	ALL MODELS	46000-00	VARIOUS
Includes items 13, 14, 15, 42, 45, 48				
REPAIR KITS - WET END				
Includes items 22, 24, 26, 27, 31 & (30 - Used in pumps built w/ PTFE)				
To order a wet end repair kit, add "KIT" to the pump model. e.g. NC-20 KIT				

NOTES:

1. PS = PLATED STEEL, SS = STAINLESS STEEL