

SAFETY MANUAL— READ FIRST!

IMPORTANT: READ THESE WARNINGS AND SAFETY PRECAUTIONS PRIOR TO INSTALLATION OR OPERATION. FAILURE TO COMPLY WITH THESE INSTRUCTIONS COULD RESULT IN PERSONAL INJURY AND OR PROPERTY DAMAGE. RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE.

⚠ WARNING Pump, valves and all containers must be properly grounded prior to handling flammable fluids and/or whenever static electricity is a hazard.

⚠ WARNING Prior to servicing the pump, ensure that the air and fluid lines are closed and disconnected. While wearing personal protective equipment, flush, drain and process liquid from the pump in a safe manner.

⚠ CAUTION Do not connect a compressed air source to the exhaust port of the pump.

⚠ CAUTION Ensure that the muffler is properly installed prior to pump operation.

⚠ CAUTION Do not lubricate air supply.

⚠ CAUTION When selecting pump materials, be aware of the following temperature limitations:

Buna-N (Nitrile):	10°F to 180°F (-12C to 82C)
Geolast®:	10°F to 180°F (-12C to 82C)
EPDM:	-40°F to 280°F (-40C to 138C)
Santoprene®:	-40°F to 225°F (-40C to 107C)
Viton® (FKM):	-40°F to 350°F (-40C to 177C)
PTFE:	40°F to 220°F (4C to 104C)
Polyethylene:	32°F to 158°F (0C to 70C)
Polypropylene:	32°F to 180°F (0C to 82C)
PVDF:	0°F to 250°F (-18C to 181C)
Nylon:	0°F to 200°F (-18C to 93C)

Temperature limits are solely based upon mechanical stress and certain chemicals will reduce the maximum operating temperature. Consult a chemical resistance guide for chemical compatibility and a more precise safe temperature limit. Always use minimum air pressure when pumping at elevated temperatures.

⚠ WARNING = Hazards or unsafe practices which could result in severe personal injury, death or substantial property damage

⚠ CAUTION = Hazards or unsafe practices which could result in minor personal injury, product or property damage.

⚠ CAUTION Do not exceed 120 psig (8.3 bar) air-inlet pressure.

⚠ CAUTION Ensure all wetted components are chemically compatible with the process fluid and the cleaning fluid.

⚠ CAUTION Ensure pump is thoroughly cleaned and flushed prior to installation into a process line.

⚠ CAUTION Always wear Personal Protective Equipment (PPE) when operating pump.

⚠ CAUTION Close and disconnect all compressed air and bleed all air from the pump prior to service. Remove all process fluid in a safe manner prior to service.

⚠ CAUTION Blow out all compressed air lines in order to remove any debris, prior to pump installation.

⚠ CAUTION Ensure air exhaust is piped to atmosphere prior to a submerged installation.

⚠ CAUTION Ensure all hardware is set to correct torque values prior to operation.

⚠ CAUTION Ensure that the selected pump model number is made from the correct material and matches that which was ordered.

INSTALLATION

Notice: Re-torque fasteners prior to use. Refer to torque requirements listed in maintenance manual and attached to pump.

1. A lube-free, clean, dry compressed air source (or any nonflammable, compressed gas) is recommended. Use a filter that is capable of filtering out particles larger than 50 microns.
2. All pumps should be mounted in an upright position with the exception of the 1/4" models which may be rotated 360° to suit the application.
3. When particles exceed the maximum particle specification of the pump or are sharp enough to cut elastomers install a particle fluid filter on the fluid suction line.
4. Fluid suction lines and air exhaust lines should never be smaller than specified pipe size of the pump.
5. Apply PTFE (Teflon®) tape to threads upon assembly to prevent leakage.
6. Never use pipe dope on air line connections.
7. Never use collapsible tube on fluid inlet.
8. Do not exceed 10 ft-lbs of torque on plastic pipe threads.
9. If changing to a different application reconfirm compatibility of fluid.

SUBMERGED APPLICATIONS

1. Fluid must be compatible with fasteners and intermediate material.
2. Pipe exhaust above the level of the fluid.

HIGH VISCOSITY APPLICATIONS

1. Position the pump close to or below the level of the fluid source
2. Suction lines should be increased in size - up to three times the size of the inlet manifold. Dual manifolds may be used when available.
3. Start the pump slowly using a valve on the air line.

LOW TEMPERATURE AND UV EXPOSURE

1. Polypropylene tends to embrittle at freezing temperatures. Pump must be insulated or heated, otherwise use pumps with different materials of construction.
2. If excessive icing occurs at the pump exhaust, air source must be dried using mechanical means or through the introduction of ethyl alcohol in the air line.
3. UV rays will damage polypropylene pumps, either shroud the pumps from UV rays or use pumps with UV stabilized materials.

GENERAL MAINTENANCE

1. Check periodically for product or air leakage. Tighten any joint where leakage is occurring.
2. When pumping hazardous or toxic materials, diaphragms should be replaced at regularly scheduled intervals based upon pump usage.
3. In freezing temperatures, the pump must be completely drained when idle.
4. When pumping highly abrasive fluids reduce discharge flow rate or reduce air pressure to prolong diaphragm life.
5. If you are pumping a material that will settle or compact, the pump must be flushed before shut down.

TROUBLE SHOOTING

AIR IS APPLIED TO PUMP BUT PUMP IS NOT STARTING

1. Clean filters and debris from all fluid lines.
2. Make sure all valves on fluid lines are open.
3. Inspect diaphragms for rupture.
4. Air pressure must not be below 20 psi (1,3 bar).

PUMP IS PUMPING BUT NOT PRIMING

1. Check all suction line connections for leakage.
2. Inspect check valves for wear or debris.
3. Suction lift specifications may be exceeded.
4. If fluid is viscous use larger suction lines.

LEAKAGE

1. Retorque all fasteners to specified torque requirements.
2. Replace o-rings.
3. Inspect diaphragms for rupture.

LOW FLOW RATE

1. Confirm air pressure and air capacity at the air valve as required.
2. Check for leaks in suction line or obstructions in lines.
3. If fluid is viscous use larger lines.
4. Viscosity of fluids may have increased if temperature is lower.

AIR IN DISCHARGE LINES

1. Check for leaks in suction lines.
2. Inspect diaphragms for rupture.

ERRATIC CYCLING

1. Inspect check valve seats for debris.
2. Inspect fluid lines for debris.
3. Automatic valves must be properly functioning.
4. Viscosity of product may be changing.

PREMATURE DESTRUCTION OF WETTED COMPONENTS

1. If fluid is abrasive, slow down pump or increase size of pump.
2. Filter fluid for sharp objects.
3. Make sure fluid is compatible with wetted materials.

3/8" SPECIALTY PERFORMANCE MAINTENANCE MANUAL

BEFORE YOU BEGIN

Flush and neutralize the pump to be certain all corrosive or hazardous materials are removed prior to any maintenance. This procedure should always be followed when performing maintenance, transporting used pumps or returning pumps for factory service.

VALVE AND O-RING MAINTENANCE

1. Remove the nuts (3) and washers (4) from the bolts (23) in manifolds. Remove the manifolds (20), (11). Two of the four max pass valves and back-ups (13, 14) are located inside of the bottom of the outer chambers (16). Gently remove and inspect for excessive wear, pitting or other signs of degradation. Inspect manifold o-ring (12) as well and replace if necessary.
2. The other two max-pass valves are located inside of the bottom of the discharge manifold (20). Repeat the procedure for inspection of discharge valves, back-ups and o-rings. (Some pumps such as those built with PTFE have ball valves in place of the max pass valves. Repeat the procedure—inspect valve seat (28), balls (29), ball cage (27) and o-ring (12)).
3. When re-assembling the max-pass pump, the sleeve (15) should be assembled into the valve cavity first, followed by the max-pass valve (13), the valve back-up (14) and finally the o-ring (12). For pumps with balls valves, the cage (27) should be assembled into the valve cavity first, followed by the ball (29), valve seat (28), and finally the o-ring (12). Lightly tighten all external fasteners when assembling, torquing them to their requirements 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 may not reseal the pump.

DIAPHRAGM MAINTENANCE

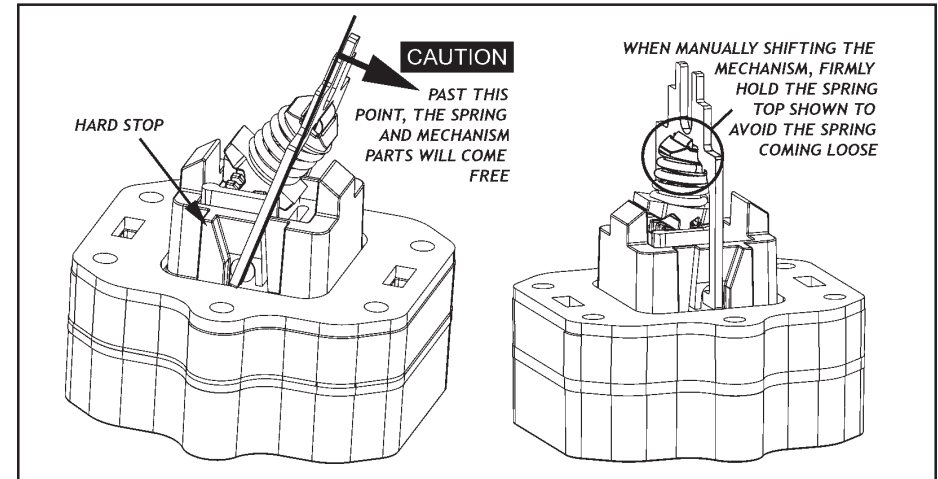
4. To inspect diaphragms, remove the nuts (7) from the carriage bolts (8) on the band clamps (16) surrounding the outer pump chambers (16). If replacement is necessary due to abrasion or rupture, unscrew the outer diaphragm plates (17). Only models that have PTFE elastomers will have both a PTFE overlay (18) that faces the outer pump chamber and an o-ring (25) on the air side of pump. (NOTE: Pumps that do not contain PTFE will not have o-ring (25) – they are built with diaphragms (19) only.)
5. To inspect the diaphragm rod's lip seals, remove diaphragm rod and carefully pick out the lip seals from inside the intermediate (22). Replace if necessary. Be sure to reinsert the lip seals with open cup facing the inside of the pump. Make sure that the rod guide is facing the air valve assembly and slide the diaphragm rod back into intermediate.
6. Take one diaphragm and with the curved side of the inner diaphragm plate facing the diaphragm, assemble onto the outer diaphragm plate stud. Screw the assembly into the end of the diaphragm rod. Repeat for the other side. Torque the outer diaphragm plates to requirements.
7. Position outer diaphragm chambers onto the intermediate, making sure that the witness line of the intermediate matches with the parting line of the chamber.
8. When positioning band clamps, use soapy water or a compatible lubricating spray on the inside of the band clamps to aid assembly. Tap with a mallet on the outside of the

clamp to help position it while tightening the fasteners. The band clamp fasteners are stainless steel. To prevent galling, apply an anti-seize compound to the thread. Tighten to final torque requirements.

9. Position the manifolds, making sure of their orientation in relation to the air valve for your application. Also, make sure that the manifold o-rings do not shift from their grooves during reassembly. Tighten all external fasteners to final torque requirements after the pump is completely assembled.

AIR VALVE ASSEMBLY INSPECTION

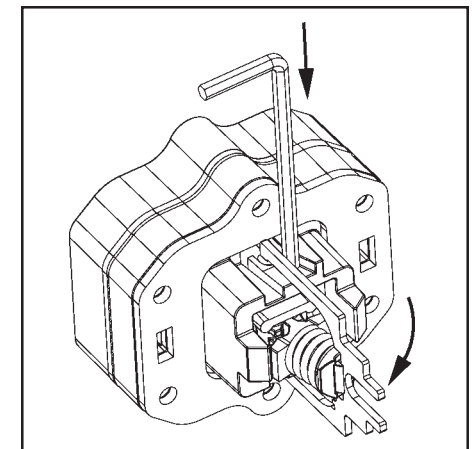
CAUTION: Only one side of the mechanism has a hard-stop. Shifting the mechanism past its operating position can cause the spring to pop free and internal components to come loose. Use caution when shifting the mechanism manually.



10. If there has been a diaphragm rupture and fluid has entered the air side of the pump, the complete air system should be inspected. Remove the air valve assembly (2) by unscrewing the six long hex-head air valve assembly screws (9).
11. Clean or replace the air valve assembly if there is excessive wear, dirt build-up or chemical attack. Inspect for proper shifting of the spring mechanism by manually pushing the metal spring retainer from one side to the other.

12. To reinstall the air valve, first shift the spring mechanism to the side with the hard-stop. Next, prop the spring retainer into a more neutral position by inserting a 7/64" or 3mm hex key as shown between the hard-stop and the spring retainer.

13. With the rod guide (1) positioned such that the opened end is facing the air valve assembly opening, slide the air valve assembly in place so that the forks slide into the rod guide. Once the fork of the spring retainer is in the rod guide, pull the hex key free and push the air valve assembly fully into place. Finally, reinsert and tighten the air valve assembly screws to the torque listed on the specs sheet.



(Over)

FASTENER TORQUE REQUIREMENTS

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

AIR VALVE ASSEMBLY SCREWS 12 in-lbs (1,35 NM)
 BAND CLAMPS 13.3 ft-lbs (18,8 NM)
 MANIFOLD BOLTS, 10 in-lbs (1,13 NM)
 OUTER DIAPHRAGM PLATES, 40 in-lbs (4,5 NM)

U.S. Patent Number 5232352

SPECIFICATIONS

CAPACITY:

Adjustable 0-9 GPM (34,0 LPM)

MAXIMUM TEMP:

PVDF models – 200°F (93°C)
 Other models – 150°F (66°C)

MAXIMUM AIR PRESSURE:

120 psi (8,2 bar)

MINIMUM AIR PRESSURE:

20 psi (1,3 bar)

DRY LIFT:

Models with PTFE balls –
 10 feet (3 meters)
 Models with Max-Pass™ valves –
 17 feet (5,2 meters)

WEIGHT:

PVDF models – 5 pounds (2,3 kg)
 Other models – 3.8 pounds (1,7 kg)

MAXIMUM SOLIDS:

Models with Max-Pass™ valves – 1/4"
 (6,4 mm)
 Other models – 1/16" (3,2 mm)

AIR SUPPLY:

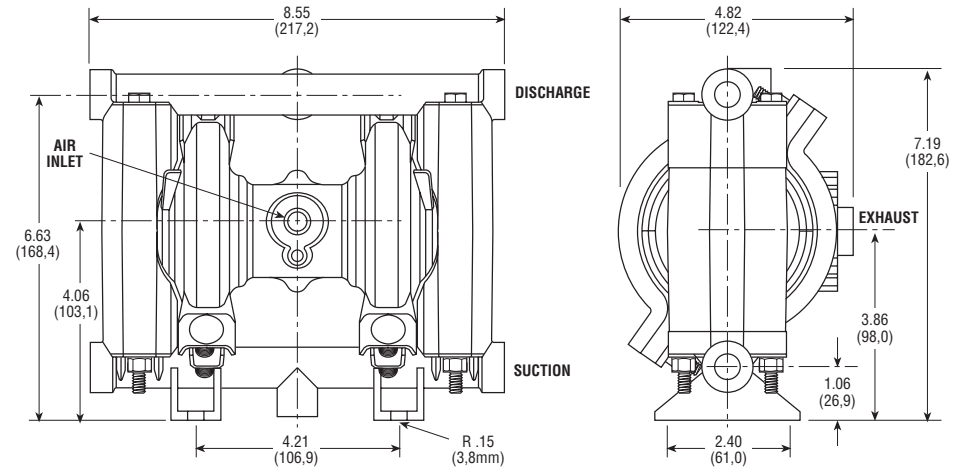
Inlet – 1/4" NPS Female
 (BSP or NPT compatible)
 Outlet – 3/8" NPS Female
 (BSP or NPT compatible)

FLUID INLET/DISCHARGE:

3/8" NPS Female
 (BSP or NPT compatible)

DIMENSIONS

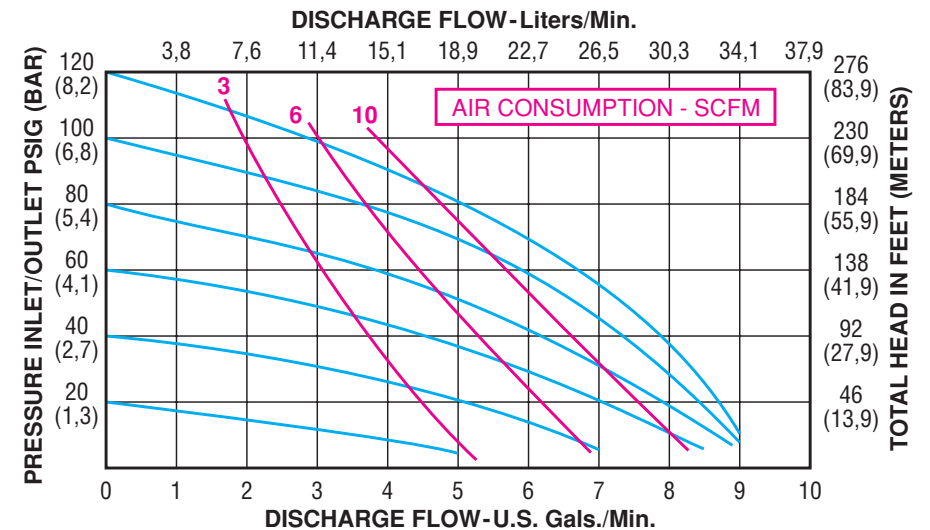
Dimensions in inches and (mm)



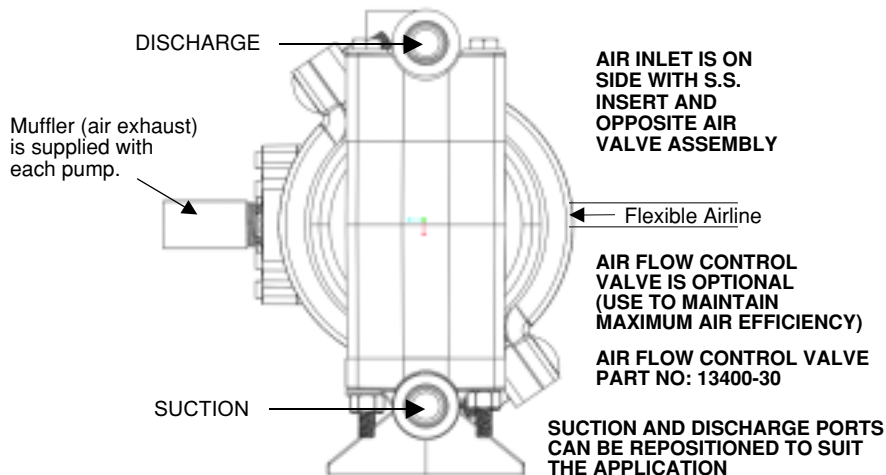
NOTE: AIR INLET IS ON THE SIDE WITH STAINLESS STEEL INSERT. THE AIR VALVE ASSEMBLY IS ON THE OPPOSITE SIDE OF THE PUMP.

PERFORMANCE CURVE

(Based on water-flooded suction)



Typical Installation

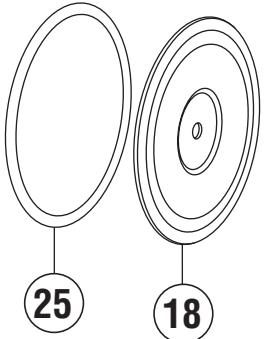


DO NOT USE AIR LINE LUBRICATION

3/8" MODEL

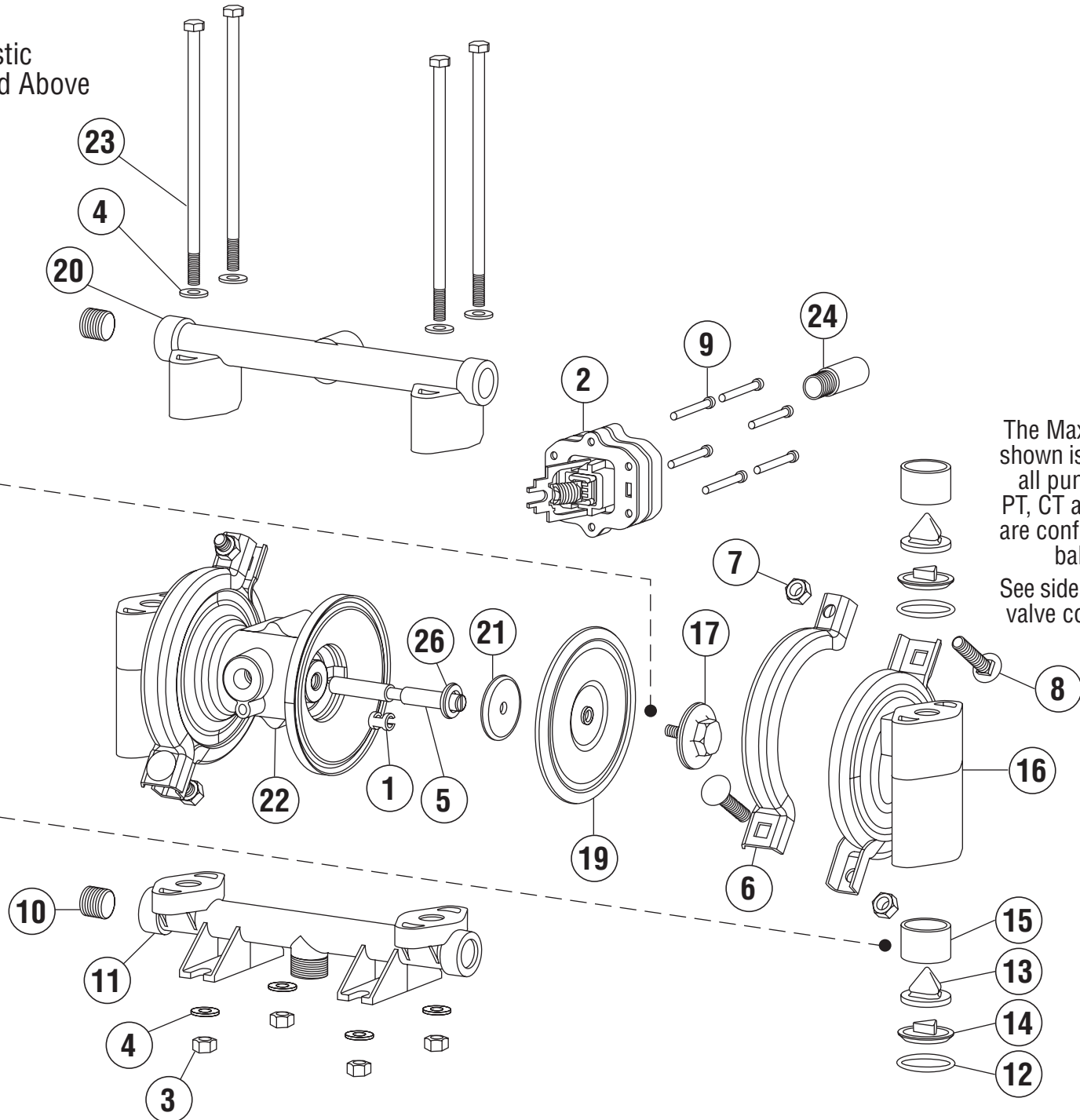
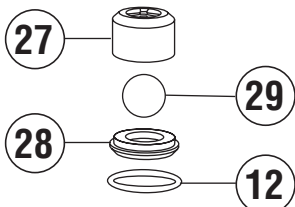
Specialty Performance Plastic
Serial Numbers 128600 and Above

Diaphragm
configuration for
PT, CT and
KT pumps.



PTFE Diaphragm
requires O-ring.

Ball valve
configuration
for PT, CT and
KT
pumps.



The Max-Pass Valve
shown is standard for
all pumps-except
PT, CT and KT which
are configured with a
ball valve.
See side panel for ball
valve configuration.

ITEM	DESCRIPTION	QTY PER PUMP	MODELS	PART NO.	MATERIAL
1	Rod Guide	1	All	12807-31	Acetal
2	Air Valve Assembly	1	All	40380-54	Various
3	Hex Nut (1/4" x 20)	4	All	12600-26	SS
4	Flat Washer	8	All	12300-26	SS
5	Diaphragm Rod	1	All	10316-26	SS
6	Clamp (Complete with Fastners)	2	All	12913-26	SS
7	Hex Nut (5/16" - 18)	4	All	12601-26	SS
8	Carriage Bolt (5/16" x 1-1/2")	4	All	12509-26	SS
9	#8 x 1-3/4 Phillips Pan	6	All	12548-26	SS
10	Pipe Plug, 3/8" NPT	2	PB, PT, PE, PV CB, CE, CT, CV KT, KE, KV	12206-40 12206-42 12206-56	Polypro Nylon PVDF
11	Suction Manifold	1	PB, PT, PE, PV CB, CE, CT, CV KT, KE, KV	10570-40 10570-46 10570-56	Polypro Cond. Nylon PVDF
12	O-ring, Check Valve	4	PB, CB, PT, CT, KT PE, CE, KE PV, CV, KV	11938-11 11938-17 11938-15 11938-82	Nitrile PTFE EPDM Viton
13	Max-Pass Valve	4	PB, CB, PE, CE, KE PV, CV, KV	10915-11 10915-15 10915-82	Nitrile EPDM Viton
14	Max-Pass Valve Backup	4	PB, PE, PV CB,CE,CV KE, KV	10916-40 10916-46 10916-56	Polypro Cond. Nylon PVDF
15	Max-Pass Sleeve	4	PB, PE, PV CB, CE, CV KE, KV	10917-40 10917-42 10917-56	Polypro Nylon PVDF
16	Outer Chamber	2	PB, PT, PE, PV CB, CE, CT, CV KT, KE, KV	10701-40 10701-46 10701-56	Polypro Cond. Nylon PVDF
17	Outer Diaphragm Plate	2	PB, PT, PE, PV CB, CE, CT, CV KT, KE, KV	11201-40 11201-46 11201-56	Polypro Cond. Nylon PVDF

ITEM	DESCRIPTION	QTY PER PUMP	MODELS	PART NO.	MATERIAL
18	Diaphragm	2	PT, CT, KT PV, CV, KV	11401-59	PTFE
19	Diaphragm	2	PB, CB, KB PE, KE	10601-19 10601-23	Geolast Santoprene
20	Discharge Manifold	1	PB, PT, PE, PV CB, CE, CT, CV KT, KE, KV	10571-40 10571-46 10571-56	Polypro Cond. Nylon PVDF
21	Inner Diaphragm Plate	2	All	11101-25	PS
22	Intermediate	1	All	11503-60	Polypro
23	Cap Screw	4	All	12515-26	SS
24	Muffler	1	All	13008-00	Special
25	O-ring, Diaphragm	2	PT, CT, KT PV, CV, KV	11942-11	Nitrile
26	Lip Seal	2	All	12005-76	Nitrile
27	Ball Cage Check balls are standard in PT, KT and CT Pumps optional for other pumps	4	PT CT KT	10914-40 10914-46 10914-56	Polypro Cond. Nylon PVDF
28	Valve Seat Check balls are standard in PT, KT and CT Pumps optional for other pumps	4	PT CT KT	10913-40 10913-26 10913-56	Polypro SS PVDF
29	Ball Check balls are standard in PT, KT and CT Pumps optional for other pumps	4 4 opt. 4 opt. 4 opt.	PT, CT, KT PB,CB,KB (B1) PE,CE,KE (B3) PV,CV,KV (B6)	11000-45 11000-19 11000-23 11000-13	PTFE Geolast Santoprene Viton

REPAIR KITS - WET END

Models CT, KT & PT include items 12, 18, 25, 28 & 29
 Models PV, CV & KV include items 12, 13, 19 & 25
 Models PB, CB, CE, PE & KE include items 12, 13, & 19
 To order a wet end repair kit, add "KIT to the pump model. e.g. PB-038 KIT

NOTES:

1. SS = Stainless Steel, PS = Plated Steel
2. Stock models (except PT, KT and CT models) are built with Max-Pass Valves and use items 13, 14, and 15.
3. PT, KT and CT pumps are not built with Max-Pass valves. These pumps have a Check Ball configuration
4. Pumps with the B1, B2, B3 or B6 option are not built with Max-Pass valves. These pumps have a Check Ball configuration.