

OPERATOR'S MANUAL

PF20X-XXX-XXX

INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

RELEASED: 6-14-96
 REVISED: 7-15-16
 (REV. R)

2" DIAPHRAGM PUMP 1:1 RATIO, FLAP VALVE (METALLIC)



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

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

SERVICE KITS

Refer to Model Description Chart to match the pump material options.

- 67089-X major air valve assembly (see page 7)
- 637302 for air section repair (see page 6).
- 637310-XX for fluid section repair (see page 4). Note: This kit also contains several replacement air motor seals.

PUMP DATA

- Models**..... see Model Description Chart for "-XXX"
- Pump Type**..... Metallic, Air Operated Double Diaphragm, Flap Valve
- Material**..... see Model Description Chart
- Weight**..... PF20A-XAX-SXX..... 74 lbs (33.6 kgs)
 PF20A-XCX-SXX..... 161 lbs (73.0 kgs)
 PF20A-ASX-SXX..... 153 lbs (69.4 kgs)
 PF20A-BSX-SXX..... 153 lbs (69.4 kgs)
 PF20A-FSX-SXX..... 145 lbs (65.8 kgs)

(add 34 lbs [15.4 kgs] for stainless steel or cast iron air motor section)

- Maximum Air Inlet Pressure** 120 p.s.i.g. (8.3 bar)
- Maximum Material Inlet Pressure**... 10 p.s.i.g. (0.69 bar)
- Maximum Outlet Pressure** 120 p.s.i.g. (8.3 bar)
- Maximum Flow Rate (flooded inlet)** ... 170 g.p.m. (643.5 l.p.m.)
- Displacement / Cycle @ 100 p.s.i.g.** .. 1.4 gal. (5.3 lit.)
- Maximum Particle Size** 2" dia. (51 mm) semi-solids
- Maximum Temperature Limits (diaphragm / flap / bumper material)**
 - E.P.R. / EPDM..... -60° to 280° F (-51° to 138° C)
 - Nitrile 10° to 180° F (-12° to 82° C)
 - Polyurethane..... 10° to 150° F (-12° to 66° C)
 - Santoprene®..... -40° to 225° F (-40° to 107° C)
 - PTFE..... 40° to 225° F (4° to 107° C)
 - Viton® -40° to 350° F (-40° to 177° C)

- Dimensional Data**..... see page 8
- Mounting Dimension** .. 9-1/16" x 10-1/16" (230 mm x 256 mm)
- Noise Level @ 70 p.s.i., 60 c.p.m.** ① ... 85.0 db(A)②

- ① Tested with 67263 muffler assembly installed.
- ② The pump sound pressure levels published here have been updated to an Equivalent Continuous Sound Level (L_{Aeq}) to meet the intent of ANSI S1.13-1971, CAGI-PNEUROP S5.1 using four microphone locations.

NOTICE: All possible options are shown in the chart, however, certain combinations may not be recommended, consult a representative or the factory if you have questions concerning availability.

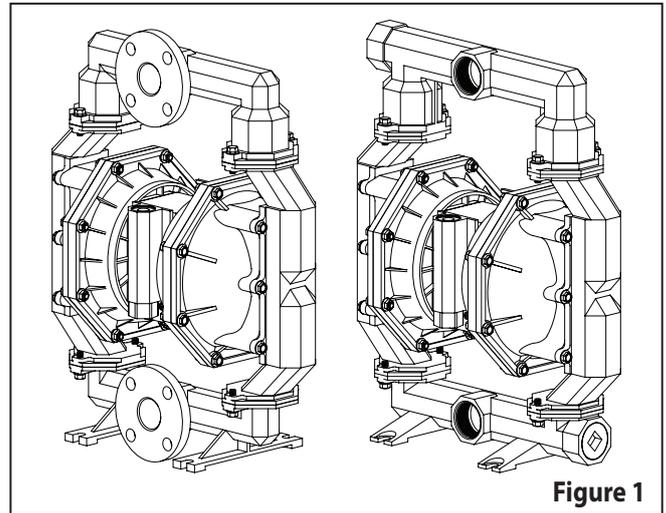


Figure 1

MODEL DESCRIPTION CHART

PF20 X - X X X - S X X	
Center Section Material	A - Aluminum C - Cast Iron S - Stainless Steel
Fluid Connection	A - 2 - 11-1/2 N.P.T.F. - 1 B - Rp 2 (2 - 11 BSP, parallel) F - 2" A.N.S.I. / DIN Flange
Fluid Cap & Manifold Material	A - Aluminum C - Cast Iron S - Stainless Steel
Hardware Material	P - Carbon Steel S - Stainless Steel
Seat Material	S - Stainless Steel
Flap Material	A - E.P.R. U - Polyurethane G - Nitrile V - Viton
Diaphragm Material	A - Santoprene L - Long Life PTFE V - Viton G - Nitrile T - PTFE / Santoprene
Fluid Section Service Kit Selection	PF20X - XXX - S X X 637310 - <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
EXAMPLE: Model #PF20A-AAP-SAA	Flap <input checked="" type="checkbox"/> Diaphragm <input checked="" type="checkbox"/>
Fluid Section Service Kit # 637310-AA	

OPERATING AND SAFETY PRECAUTIONS

READ, UNDERSTAND AND FOLLOW THIS INFORMATION TO AVOID INJURY AND PROPERTY DAMAGE.



WARNING EXCESSIVE AIR PRESSURE. Can cause personal injury, pump damage or property damage.

- Do not exceed the maximum inlet air pressure as stated on the pump model plate.
- Be sure material hoses and other components are able to withstand fluid pressures developed by this pump. Check all hoses for damage or wear. Be certain dispensing device is clean and in proper working condition.

WARNING STATIC SPARK. Can cause explosion resulting in severe injury or death. Ground pump and pumping system.

- Use the pump grounding screw terminal provided. Use ARO® part no. 66885-1 ground kit or connect a suitable ground wire (12 ga. min.) to a good earth ground source.
- Secure pump, connections and all contact points to avoid vibration and generation of contact or static spark.
- Consult local building codes and electrical codes for specific grounding requirements.
- After grounding, periodically verify continuity of electrical path to ground. Test with an ohmmeter from each component (e.g., hoses, pump, clamps, container, spray gun, etc.) to ground to insure continuity. Ohmmeter should show 0.1 ohms or less.
- Submerge the outlet hose end, dispensing valve or device in the material being dispensed if possible. (Avoid free streaming of material being dispensed.)
- Use hoses incorporating a static wire.
- Use proper ventilation.
- Keep inflammables away from heat, open flames and sparks.
- Keep containers closed when not in use.

WARNING Pump exhaust may contain contaminants. Can cause severe injury. Pipe exhaust away from work area and personnel.

- In the event of a diaphragm rupture, material can be forced out of the air exhaust muffler.
- Pipe the exhaust to a safe remote location when pumping hazardous or inflammable materials.
- Use a grounded 1" minimum i.d. hose between the pump and the muffler.

WARNING HAZARDOUS PRESSURE. Can result in serious injury or property damage. Do not service or clean pump, hoses or dispensing valve while the system is pressurized.

- Disconnect air supply line and relieve pressure from the system by opening dispensing valve or device and / or carefully and slowly loosening and removing outlet hose or piping from pump.

WARNING HAZARDOUS MATERIALS. Can cause serious injury or property damage. Do not attempt to return a pump to the factory or service center that contains hazardous material. Safe handling practices must comply with local and national laws and safety code

requirements.

- Obtain Material Safety Data Sheets on all materials from the supplier for proper handling instructions.

WARNING EXPLOSION HAZARD. Models containing aluminum wetted parts cannot be used with 1,1,1-trichloroethane, methylene chloride or other halogenated hydrocarbon solvents which may react and explode.

- Check pump motor section, fluid caps, manifolds and all wetted parts to assure compatibility before using with solvents of this type.

WARNING MISAPPLICATION HAZARD. Do not use models containing aluminum wetted parts with food products for human consumption. Plated parts can contain trace amounts of lead.

CAUTION Verify the chemical compatibility of the pump wetted parts and the substance being pumped, flushed or recirculated. Chemical compatibility may change with temperature and concentration of the chemical(s) within the substances being pumped, flushed or circulated. For specific fluid compatibility, consult the chemical manufacturer.

CAUTION Maximum temperatures are based on mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperature. Consult the chemical manufacturer for chemical compatibility and temperature limits. Refer to PUMP DATA on page 1 of this manual.

CAUTION Be certain all operators of this equipment have been trained for safe working practices, understand it's limitations, and wear safety goggles / equipment when required.

CAUTION Do not use the pump for the structural support of the piping system. Be certain the system components are properly supported to prevent stress on the pump parts.

- Suction and discharge connections should be flexible connections (such as hose), not rigid piped, and should be compatible with the substance being pumped.

CAUTION Prevent unnecessary damage to the pump. Do not allow pump to operate when out of material for long periods of time.

- Disconnect air line from pump when system sits idle for long periods of time.

CAUTION Use only genuine ARO replacement parts to assure compatible pressure rating and longest service life.

NOTICE Replacement warning labels are available upon request: "Static Spark and Diaphragm Rupture" pn \ 94080.

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.

NOTICE = Important installation, operation or maintenance information.

GENERAL DESCRIPTION

The ARO diaphragm pump offers high volume delivery even at low air pressure and a broad range of material compatibility options are available. Refer to the model and option chart. ARO pumps feature stall resistant design, modular air motor / fluid sections.

Air operated double diaphragm pumps utilize a pressure differential in the air chambers to alternately create suction and a positive fluid pressure in the fluid chambers, flap checks insure a positive flow of fluid.

Pump cycling will begin as air pressure is applied and it will continue to pump and keep up with the demand. It will build and maintain line pressure and will stop cycling once maximum line pressure is reached (dispensing device closed) and will resume pumping as needed.

AIR AND LUBE REQUIREMENTS

⚠ WARNING EXCESSIVE AIR PRESSURE. Can cause pump damage, personal injury or property damage.

- A filter capable of filtering out particles larger than 50 microns should be used on the air supply. There is no lubrication required other than the "O" ring lubricant which is applied during assembly or repair.
- If lubricated air is present, make sure that it is compatible with the "O" rings and seals in the air motor section of the pump.

OPERATING INSTRUCTIONS

- Always flush the pump with a solvent compatible with the material being pumped if the material being pumped is subject to "setting up" when not in use for a period of time.
- Disconnect the air supply from the pump if it is to be inactive for a few hours.
- The outlet material volume is governed not only by the air supply, but also by the material supply available at the inlet. The material supply tubing should not be too small or restrictive. Be sure not to use hose which might collapse.
- When the diaphragm pump is used in a forced-feed (flooded inlet) situation, it is recommended that a "check valve" be installed at the air inlet.
- Secure the diaphragm pump legs to a suitable surface to insure against damage by vibration.

MAINTENANCE

Refer to the part views and descriptions as provided on pages 4 through 7 for parts identification and service kit information.

- Certain ARO "Smart Parts" are indicated which should be available for fast repair and reduction of down time.
- Provide a clean work surface to protect sensitive internal moving parts from contamination from dirt and foreign matter during service disassembly and reassembly.
- Keep good records of service activity and include the pump in preventive maintenance program.
- Service kits are available to service two separate diaphragm pump functions: 1. AIR SECTION, 2. FLUID SECTION. The Fluid Section is divided further to match typical active Material Options.
- Before disassembling, empty captured material in the outlet manifold by turning the pump upside down to drain material from the pump.

FLUID SECTION DISASSEMBLY

1. Remove (61) top manifold, (60) bottom manifold and (53) manifold elbow.
 2. Remove the flap valve cartridge / seat assemblies.
 3. Remove (15) fluid caps.
- NOTE: Only PTFE diaphragm models use a primary diaphragm (7) and a backup diaphragm (8). Refer to the auxiliary view in the Fluid Section illustration (page 5).
4. Remove the (14) diaphragm screw, (6) diaphragm washer, (7) or (7 / 8) diaphragms and (5) backup washer.

NOTE: Do not scratch or mar the surface of (1) diaphragm rod.

FLUID SECTION REASSEMBLY

- Reassemble in reverse order. Refer to the torque requirements on page 5.
- Clean and inspect all parts. Replace worn or damaged parts with new parts as required.
- Lubricate (1) diaphragm rod and (144) "U" cups with Lubriplate® FML-2 grease (94276 grease packet is included in service kit).
- For models with PTFE diaphragms: Item (8) Santoprene diaphragm is installed with the side marked "AIR SIDE" toward the pump center body. Install the (7) PTFE diaphragm with the side marked "FLUID SIDE" toward the (15) fluid cap.
- Re-check the torque settings after the pump has been re-started and run a while.

• Viton® are registered trademarks of the DuPont Company • Santoprene® is a registered trademark of Monsanto Company, licensed to Advanced Elastomer Systems, L.P. •
• Lubriplate® is a registered trademark of Lubriplate Division (Fiske Brothers Refining Company) • ARO® is a registered trademark of Ingersoll-Rand Company •
• Loctite® is a registered trademark of Henkel Loctite Corporation • 262™, 271™ and 572™ are trademarks of Henkel Loctite Corporation •

PARTS LIST / PF20X-XXX-XXX FLUID SECTION

★ 637310-XX Fluid Section Service Kits include: Diaphragms (see Diaphragm Option, refer to -XX in chart below), flap valve items 47, 48, 51 and 55, items 44, 46, 70, 75, 144 and 175 (listed below) plus items 174 and 94276 Lubriplate® FML-2 grease (page 6).

FLAP VALVE OPTIONS PF20X-XXX-SXX

★ "47"			★ "48"			★ "51"			★ "55"			
-XX	Bumper	Qty	[Mtl]	Flap	Qty	[Mtl]	Gasket	Qty	[Mtl]	"O" Ring	Qty	[Mtl]
-XAX	93197-5	(4)	[E]	93196-5	(4)	[E]	94365-1	(4)	[E]	94364-1	(4)	[E]
-XGX	93197-2	(4)	[B]	93196-2	(4)	[B]	94365-2	(4)	[B]	94364-2	(4)	[B]
-XUX	93197-5	(4)	[E]	93070	(4)	[U]	94365-1	(4)	[E]	94364-1	(4)	[E]
-XVX	93197-3	(4)	[V]	93196-3	(4)	[V]	94365-3	(4)	[V]	94364-3	(4)	[V]

MATERIAL CODE

[A]	= Aluminum
[B]	= Nitrile
[C]	= Carbon Steel
[Co]	= Copper
[CI]	= Cast Iron
[E]	= E.P.R.
[L]	= Long Life PTFE
[Sp]	= Santoprene
[SS]	= Stainless Steel
[T]	= PTFE
[U]	= Polyurethane
[V]	= Viton

DIAPHRAGM OPTIONS PF20X-XXX-SXX

-XXX	★ Service Kit -XX = (Flap Valve) -XX = (Diaphragm)	★ "7"			★ "8"		
		Diaphragm	Qty	[Mtl]	Diaphragm	Qty	[Mtl]
-XXA	637310-XA	94329-A	(2)	[Sp]	-----	---	---
-XXG	637310-XG	96330-2	(2)	[B]	-----	---	---
-XXL	637310-XL	94355-L	(2)	[L]	94330-A	(2)	[Sp]
-XXT	637310-XT	94355-T	(2)	[T]	94330-A	(2)	[Sp]
-XXV	637310-XV	95344	(2)	[V]	-----	---	---

☐ "Smart Parts", keep these items on hand in addition to the service kit for fast repair and reduction of down time.

✓ Indicates items included in air section service kit (see page 6).

CENTER SECTION - AIR CAP PART OPTIONS PF20X-XXX-SXX

Item	Description (size)	Qty	Aluminum PF20A-XXX-SXX		Cast Iron PF20C-XXX-SXX		Stainless Steel PF20S-XXX-SXX	
			Part No.	[Mtl]	Part No.	[Mtl]	Part No.	[Mtl]
5	Backup Washer	(2)	96503	[A]	94357-2	[SS]	94357-2	[SS]
68	Air Cap	(1)	94324-1	[A]	94345-1	[CI]	94349-1	[SS]
69	Air Cap	(1)	94324-2	[A]	94345-2	[CI]	94349-2	[SS]
126	Pipe Plug (1/4 - 18 N.P.T. x 7/16")	(2)	-----	---	Y17-51-S	[SS]	Y17-51-S	[SS]
131	Screw (M10 x 1.5 - 6g x 120 mm)	(4)	94531	[C]	94531	[C]	96656	[SS]
★ ✓ 175	"O" Ring (3/32" x 1" o.d.)	(2)	Y325-117	[B]	-----	---	-----	---
★ ✓	(3/32" x 1-1/16" o.d.)	(2)	-----	---	Y325-118	[B]	Y325-118	[B]
181	Roll Pin (5/32" o.d. x 3/4")	(4)	-----	---	Y178-56-S	[SS]	Y178-56-S	[SS]

MANIFOLD THREAD / FLUID CAP MATERIAL OPTIONS PF20X-XXX-SXX

Item	Description (size)	Qty	Aluminum PF20X-XAX-SXX			Cast Iron PF20X-XCX-SXX			Stainless Steel PF20X-XSX-SXX				PF20X-FSX-SXX		
			Part No.	Part No.	Mtl	Part No.	Part No.	Mtl	Part No.	Part No.	Mtl	Part No.	Mtl	Flange	
														Part No.	Mtl
☐ 6	Diaphragm Washer	(2)	96503	96503	[A]	94357-2	94357-2	[SS]	94357-2	94357-2	[SS]	94357-2	[SS]		
15	Fluid Cap	(2)	94331	94331	[A]	94359	94359	[CI]	95560	95560	[SS]	95560	[SS]		
53	Manifold Elbow	(2)	94361	94361	[A]	94362	94362	[CI]	95563	95563	[SS]	95563	[SS]		
60	Bottom Manifold	(1)	94327-1	94327-2	[A]	94347-1	94347-2	[CI]	95510-1	95510-2	[SS]	95512	[SS]		
61	Top Manifold	(1)	94326-1	94326-2	[A]	94348-1	94348-2	[CI]	95511-1	95511-2	[SS]	95513	[SS]		
63	Pipe Plug	(2)	Y17-128	94439-2	[A]	Y17-28-C	94439-1	[C]	-----	-----	---	-----	---		
128	Pipe Plug (1/8 - 27 N.P.T.)	(2)	Y227-2-L	Y227-2-L	[C]	Y227-2-L	Y227-2-L	[C]	Y17-50-S	Y17-50-S	[SS]	Y17-50-S	[SS]		

EXTERNAL HARDWARE OPTIONS PF20X-XXX-SXX

Item	Description (size)	Qty	Carbon Steel PF20X-XXP-SXX		Stainless Steel PF20X-XXS-SXX	
			Part No.	[Mtl]	Part No.	[Mtl]
26	Screw (M10 x 1.5 - 6g x 34 mm)	(20)	94409-1	[C]	94409-2	[SS]
27	Screw (M10 x 1.5 - 6g x 45 mm)	(16)	94990-1	[C]	94990	[SS]
29	Nut (M10 x 1.5 - 6h)	(16)	94992-1	[C]	94992	[SS]

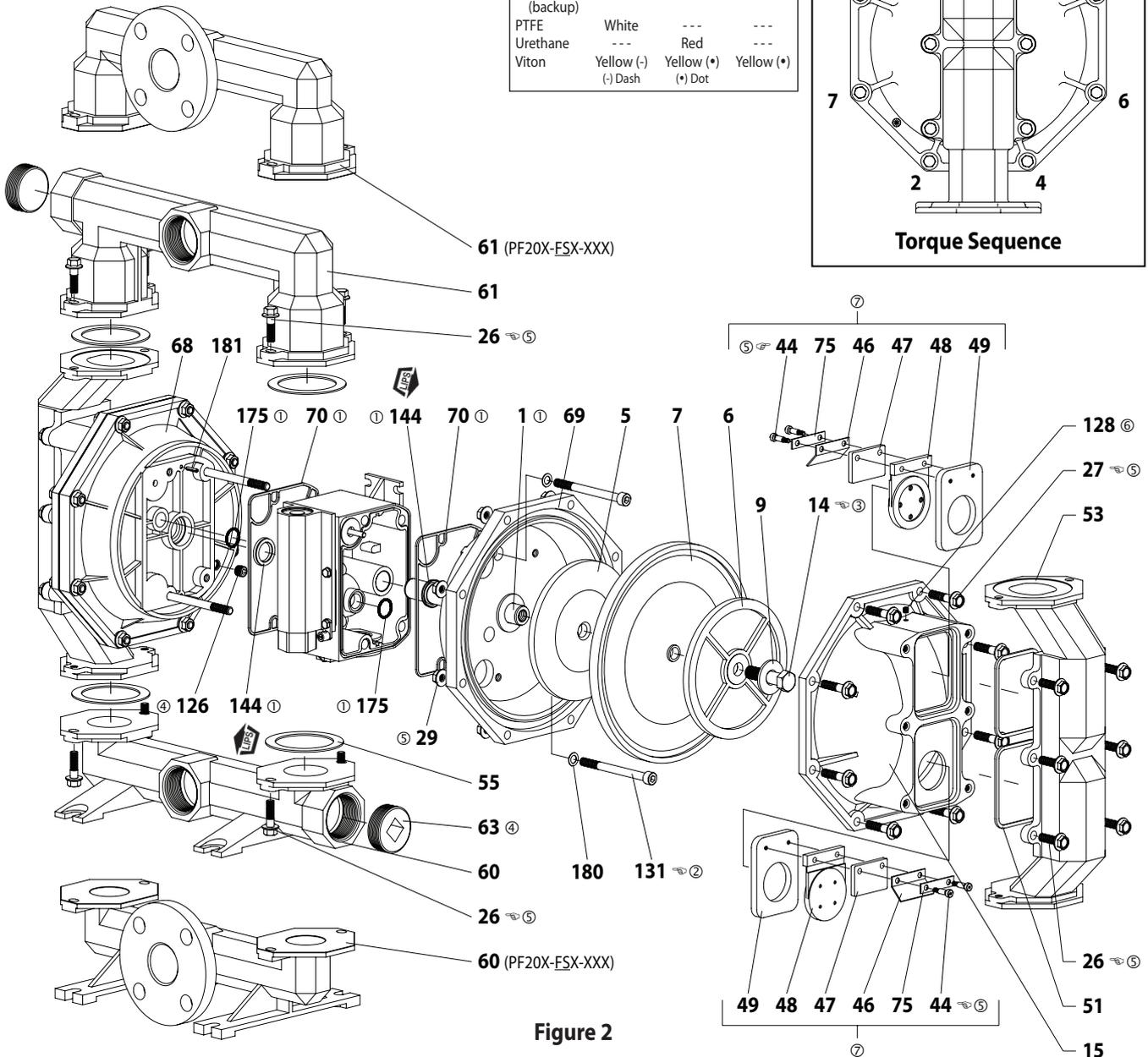
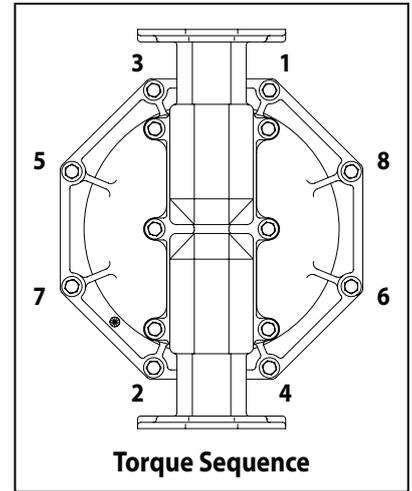
COMMON PARTS

Item	Description (size)	Qty	Part No.	[Mtl]	Item	Description (size)	Qty	Part No.	[Mtl]
☐ 1	Rod	(1)	94358	[C]	49	Seat	(4)	94366	[SS]
9	Washer	(2)	93065	[SS]	★ ✓ 70	Gasket	(2)	94100	[B]
14	Diaphragm Screw (5/8" - 18 x 2-1/2")	(2)	Y5-111-T	[SS]	★ 75	Plate	(4)	94620	[SS]
43	Ground Lug (see page 7)	(1)	93004	[Co]	★ ✓ 144	"U" Cup (3/16" x 1-3/8" o.d.)	(2)	Y186-51	[B]
★ 44	Screw	(8)	94408	[SS]	✓ 180	Washer (0.406" i.d. x 0.031" thick)	(4)	94098	[Co]
★ 46	Bracket	(4)	93192	[SS]					

PARTS LIST / PF20X-XXX-XXX FLUID SECTION

FOR THE AIR MOTOR SECTION, SEE PAGES 6 & 7.

COLOR CODE			
Material	Diaphragm Color	Flap Color	Bumper Color
E.P.R.	---	Blue (•)	Blue (•)
Nitrile	Black	Red (•)	Red (•)
Santoprene	Tan	---	---
Santoprene (backup)	Green	---	---
PTFE	White	---	---
Urethane	---	Red	---
Viton	Yellow (-)	Yellow (•)	Yellow (•)
	(-) Dash	(•) Dot	



PARTS LIST / PF20X-XXX-XXX AIR MOTOR SECTION

✓ Indicates parts included in 637302 air section repair kit (shown below) plus items 70, 144, 175 and 180 shown on page 4.

AIR MOTOR PARTS LIST

Item	Description (size)	(Qty)	Part No.	[Mtl]
101	Center Body (PF20A-XXX-XXX)	(1)	94028	[A]
	(PF20C-XXX-XXX, PF20S-XXX-XXX)	(1)	94109	[SS]
□ 103	Bushing	(1)	94092	[D]
107	Inlet Plug	(1)	94034	[C]
109	Piston	(1)	92011	[D]
✓ 110	"U" Cup (3/16" x 1-3/8" o.d.)	(1)	Y186-51	[B]
□ 111	Spool (PF20A-XXX-XXX)	(1)	92005	[A]
	(PF20C-XXX-XXX, PF20S-XXX-XXX)	(1)	93047	[C]
□ 112	Washer (1.557" o.d.)	(5)	92877	[Z]
✓ 113	"O" Ring (1/8" x 1-1/4" o.d.)	(5)	Y325-214	[B]
✓ 114	"O" Ring (3/32" x 1-9/16" o.d.)	(7)	Y325-126	[B]
□ 115	Spacer	(4)	92876	[Z]
□ 116	Spacer	(1)	94027	[A]
□ 118	Actuator Pin (0.250" x 2.276" long)	(2)	94083	[SS]
121	Sleeve	(2)	94084	[D]
⑤ 127	St. Elbow (1-1/2 - 11-1/2 N.P.T.)	(1)	94860	[C/I]
✓ 132	Gasket (valve body)	(1)	94099	[B]
133	Lock Washer (1/4") (PF20A-XXX-XXX)	(3)	Y117-416-C	[C]
	(PF20C-XXX-XXX, PF20S-XXX-XXX)	(3)	Y14-416-T	[SS]
134	Screw (M6 x 1.0 x 16 mm) (PF20A-X-X)	(4)	96721030	[C]
	(PF20C-XXX-XXX, PF20S-XXX-XXX)	(4)	96720081	[SS]
135	Valve Block (PF20A-XXX-XXX)	(1)	94032	[A]
	(PF20C-XXX-XXX, PF20S-XXX-XXX)	(1)	94318	[SS]

Item	Description (size)	(Qty)	Part No.	[Mtl]
136	Piston Plug	(1)	94033	[D]
③ ✓ 146	"O" Ring (3/32" x 1-1/16" o.d.)	(1)	Y325-118	[B]
③ ✓ 147	"O" Ring (1/8" x 1/2" o.d.)	(2)	Y325-202	[B]
④ ✓ 166	Track Gasket	(1)	94026	[B]
✓ 167	Pilot Piston (includes 168 and 169)	(1)	67164	[D]
168	"O" Ring (3/32" x 5/8" o.d.)	(2)	94433	[U]
169	"U" Cup Packing (1/8" x 7/8" o.d.)	(1)	Y240-9	[B]
□ 170	Piston Sleeve	(1)	94081	[D]
✓ 171	"O" Ring (3/32" x 1-1/8" o.d.)	(1)	Y325-119	[B]
✓ 172	"O" Ring (1/16" x 1-1/8" o.d.)	(1)	Y325-22	[B]
✓ 173	"O" Ring (1/16" x 1-3/8" o.d.)	(2)	Y325-26	[B]
★ ✓ 174	"O" Ring (1/8" x 1/2" o.d.)	(2)	Y325-202	[B]
✓ 176	Diaphragm (check valve)	(2)	94102	[Sp]
✓ 177	Retaining Ring (PF20X-XXP-XXX)	(1)	Y147-16-C	[C]
	(PF20X-XXS-XXX)	(1)	Y147-16-S	[SS]
⑤ 201	Muffler Kit (includes item 127)	(1)	67213	
★ ✓	Lubriplate FML-2 Grease Packet	(1)	94276	
	Lubriplate Grease, 10 Pack		637308	
③	Used on models PF20C-XXX-XXX and PF20S-XXX-XXX only			
④	Used on models PF20A-XXX-XXX only			
⑤	Indicates items not shown			

□ "Smart Parts", keep these items on hand in addition to the service kit for fast repair and reduction of down time.

★ Indicates items included in fluid section service kit (see page 4).

MATERIAL CODE

[A] = Aluminum	[D] = Acetal	[SS] = Stainless Steel
[B] = Nitrile	[I] = Iron	[U] = Polyurethane
[Br] = Brass	[Sp] = Santoprene	[Z] = Zinc
[C] = Carbon Steel		

AIR MOTOR SECTION SERVICE

Service is divided into two parts - 1. Pilot Valve, 2. Major Valve.

GENERAL REASSEMBLY NOTES:

- Air motor section service is continued from fluid section repair.
- Inspect and replace old parts with new parts as necessary. Look for deep scratches on metallic surfaces, and nicks or cuts in "O" rings.
- Take precautions to prevent cutting "O" rings upon installation.
- Lubricate "O" rings with Lubriplate FML-2 grease.
- Do not over-tighten fasteners. Refer to torque specification block on view.
- Re-torque fasteners following restart.
- SERVICE TOOLS - To aid in the installation of (168) "O" rings onto the (167) pilot piston, use tool #204130-T, available from ARO.

PILOT VALVE DISASSEMBLY

1. A light tap on (118) should expose the opposite (121) sleeve, (167) pilot piston and other parts.
2. Remove (170) sleeve and inspect the inner bore of sleeve for damage.

PILOT VALVE REASSEMBLY

1. Clean and lubricate parts not being replaced from service kit.
2. Install new (171 and 172) "O" rings and replace (170) sleeve.
3. Install new (168) "O" rings, (169) "U" cup (note lip direction). Lubricate and replace (167) pilot piston.
4. Reassemble remaining parts. Replace (173 and 174) "O" rings.

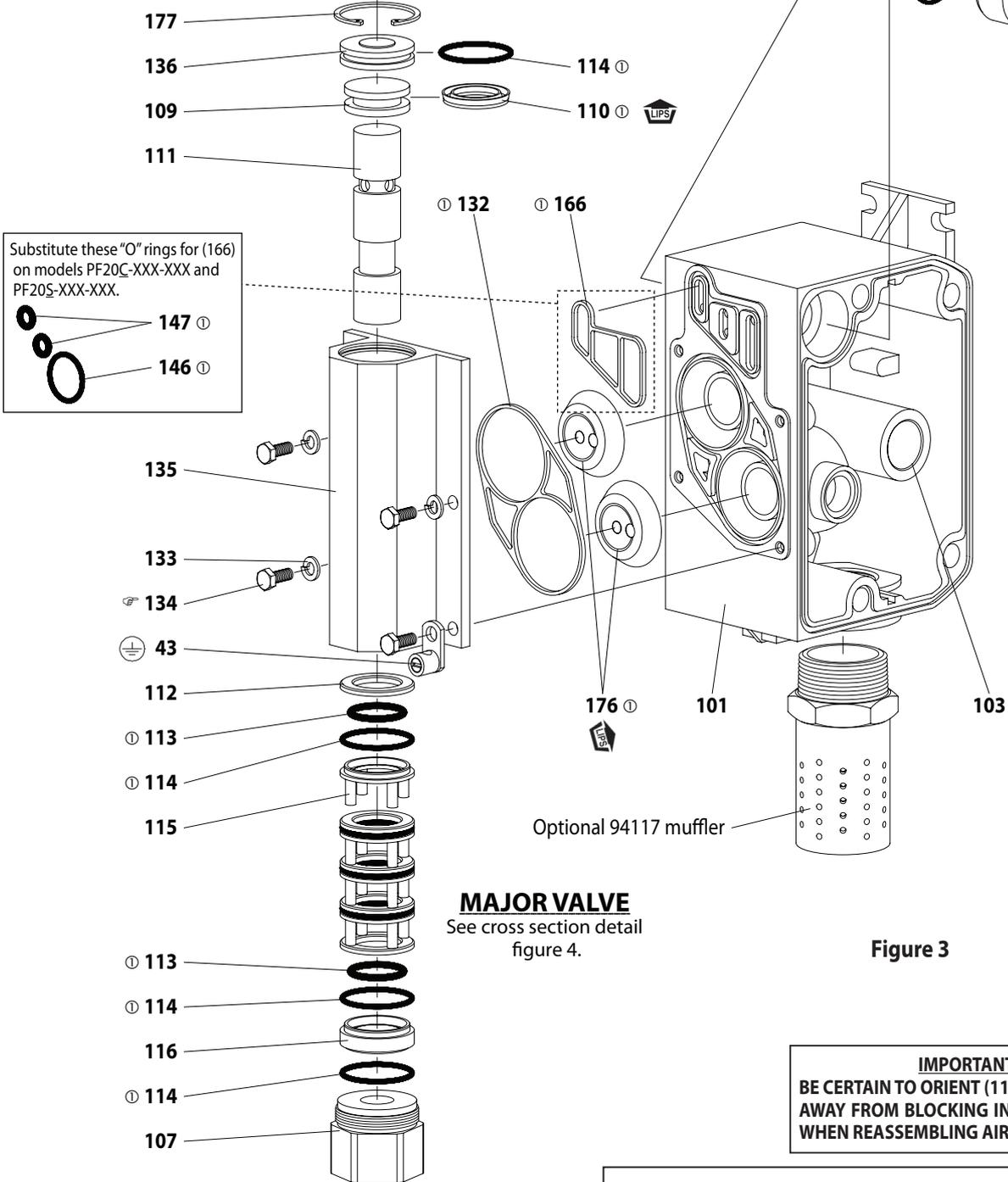
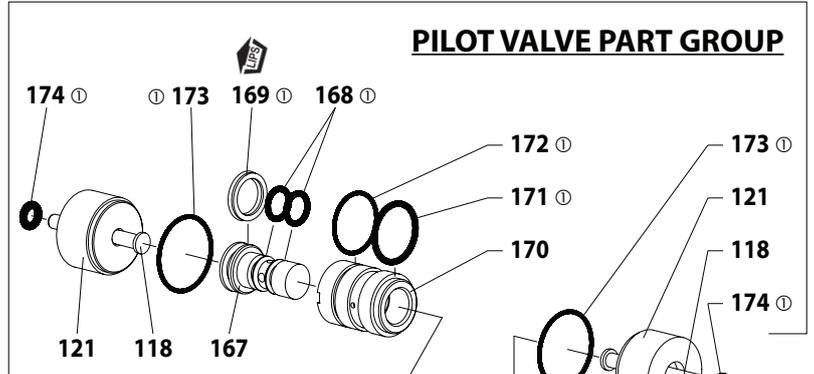
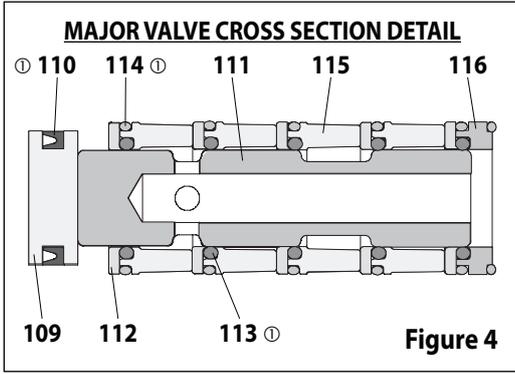
MAJOR VALVE DISASSEMBLY

1. Remove (135) valve block, exposing (166 and 132) gaskets and (176) checks.
2. Remove (177) retaining ring and (107) inlet plug.
3. On the side opposite the air inlet, push on the inner diameter of (111) spool. This will force the (136) piston plug and (109) piston out. Continue pushing (111) spool and remove. Check for scratches for gouges.
4. Remove the (112 - 116) major valve parts.

MAJOR VALVE REASSEMBLY

1. Replace (112) washer, (114) "O" ring and (113) "O" ring onto (115) spacer and insert etc. Continue this routine to build the major valve stack. **NOTE: Be careful to orient the spacer legs away from blocking internal ports.**
2. Replace (111) spool on (136) plug. Replace (110) "U" cup on (109) piston and replace (109) piston, (136) plug and (177) retaining ring.

PARTS LIST / PF20X-XXX-XXX AIR MOTOR SECTION



IMPORTANT
BE CERTAIN TO ORIENT (115) SPACER LEGS AWAY FROM BLOCKING INTERNAL PORTS WHEN REASSEMBLING AIR SECTION.

TORQUE REQUIREMENTS
NOTE: DO NOT OVERTIGHTEN FASTENERS.
ALL FASTENERS ARE METRIC.
(134) screw, 40 - 50 in. lbs (4.5 - 5.6 Nm).

LUBRICATION / SEALANTS
Apply Lubriplate FML-2 grease to all "O" rings, "U" cups and mating parts.

A major valve service assembly is available separately which includes the following:

Pump Models	Valve Assembly	Items Included
PF20A-XXX-XXX	67089-1	107 - 116, 132, 135, 136, 166, 176, 177
PF20C-XXX-XXX	67089-2	107 - 116, 132, 135, 136, 146, 147, 176, 177
PF20S-XXX-XXX	67089-2	107 - 116, 132, 135, 136, 146, 147, 176, 177

TROUBLE SHOOTING

Product discharged from exhaust outlet.

- Check for diaphragm rupture.
- Check tightness of (14) diaphragm screw.

Air bubbles in product discharge.

- Check connections of suction plumbing.
- Check gaskets between intake manifold and inlet side fluid caps.
- Check tightness of (14) diaphragm screw.

Motor blows air or stalls.

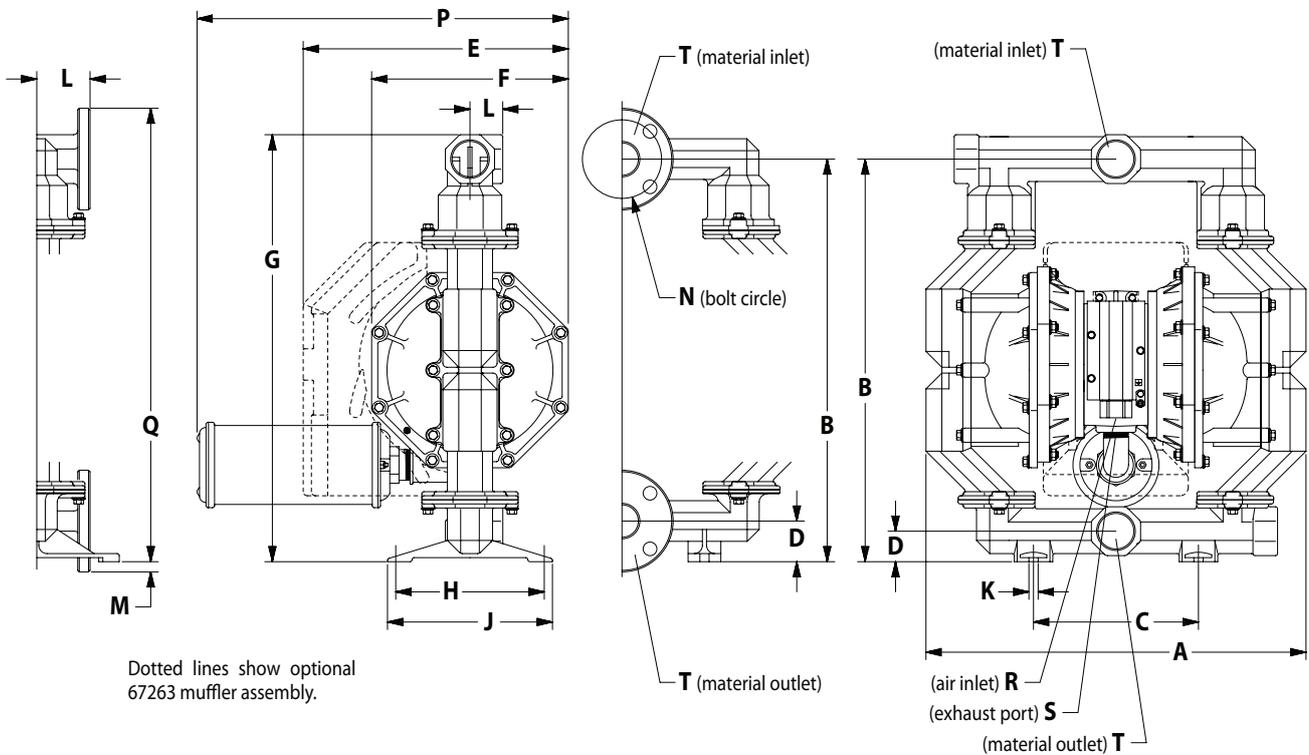
- Check (176) check valves for damage or wear.
- Check for restrictions in valve / exhaust.

Low output volume, erratic flow or no flow.

- Check air supply.
- Check for plugged outlet hose.
- Check for kinked (restrictive) outlet material hose.
- Check for kinked (restrictive) or collapsed inlet material hose.
- Check for pump cavitation - suction pipe should be sized at least as large as the inlet thread diameter of the pump for proper flow if high viscosity fluids are being pumped. Suction hose must be non-collapsible type, capable of pulling a high vacuum.
- Check all joints on the intake manifolds and suction connections. These must be air tight.
- Inspect the pump for solid objects lodged in the diaphragm chamber or the seat area.

DIMENSIONAL DATA

Dimensions shown are for reference only, they are displayed in inches and millimeters (mm).



Dotted lines show optional 67263 muffler assembly.

DIMENSIONS

A - 23-3/16" (588.9 mm)	F - 12" (304.8 mm)	L - see below	R - 3/4 - 14 N.P.T.F. - 1
B - 24-3/4" (628.7 mm)	G - 26-1/4" (666.8 mm)	M - 5/8" (15.9 mm)	S - 1-1/2 - 11-1/2 N.P.T.
C - 10-1/16" (255.6 mm)	H - 9-1/16" (230.2 mm)	N - 4.834" (122.8 mm)	T - see below
D - see below	J - 10-1/16" (255.6 mm)	P - 21-5/8" (548 mm)	
E - 16-3/16" (411.2 mm)	K - 9/16" (14.3 mm)	Q - 27-7/8" (708.0 mm)	
	"D"	"L"	"T"
PF20X-XAX-XXX	1-7/8" (47.6 mm)	2" (50.8 mm)	2 - 11-1/2 N.P.T.F.
PF20X-XCX-XXX	1-7/8" (47.6 mm)	2" (50.8 mm)	Rp 2 (2 - 11 BSP, parallel)
PF20X-ASX-XXX	2-1/2" (63.5 mm)	2-3/32" (53.2 mm)	2" A.N.S.I. / DIN flange
PF20X-BSX-XXX	2-1/2" (63.5 mm)	2-3/32" (53.2 mm)	
PF20X-FSX-XXX	2-1/2" (63.5 mm)	3-1/4" (82.6 mm)	

Figure 5