Lutz® The Fluid Managers

JESCO®

A measured step forward™

AIRTRAN™

1 1/2" AODD Pumps

Total Fluid Management | *Metering* *Transfer* *Chem Feed*

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Warnings, Dangers And Cautions

CAUTIONS — Read First!

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.

WARNING *The TX marking refers to the maximum surface temperature depending not on the equipment itself, but mainly on operating conditions. In this case, the maximum surface temperature depends upon the temperature of the process fluids.*

CAUTION *The temperature of the process fluid and air input must be no more than 36°F (20C) less of the maximum temperature allowed for the appropriate non-metallic material. See the list of temperatures below for each material's maximum recommended temperature:*

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)
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. The allowable temperature range for the process fluid is determined by the materials in contact with the fluid being pumped. 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.

CAUTION Do not lubricate air supply.

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 connect a compressed air source to the exhaust port of the pump.

WARNING Use only with liquid process fluid.

WARNING Maintenance must not be performed when a hazardous atmosphere is present.

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

CAUTION *Do not exceed 10 psig (0.7 bar) or 23 ft-H2O suction 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.

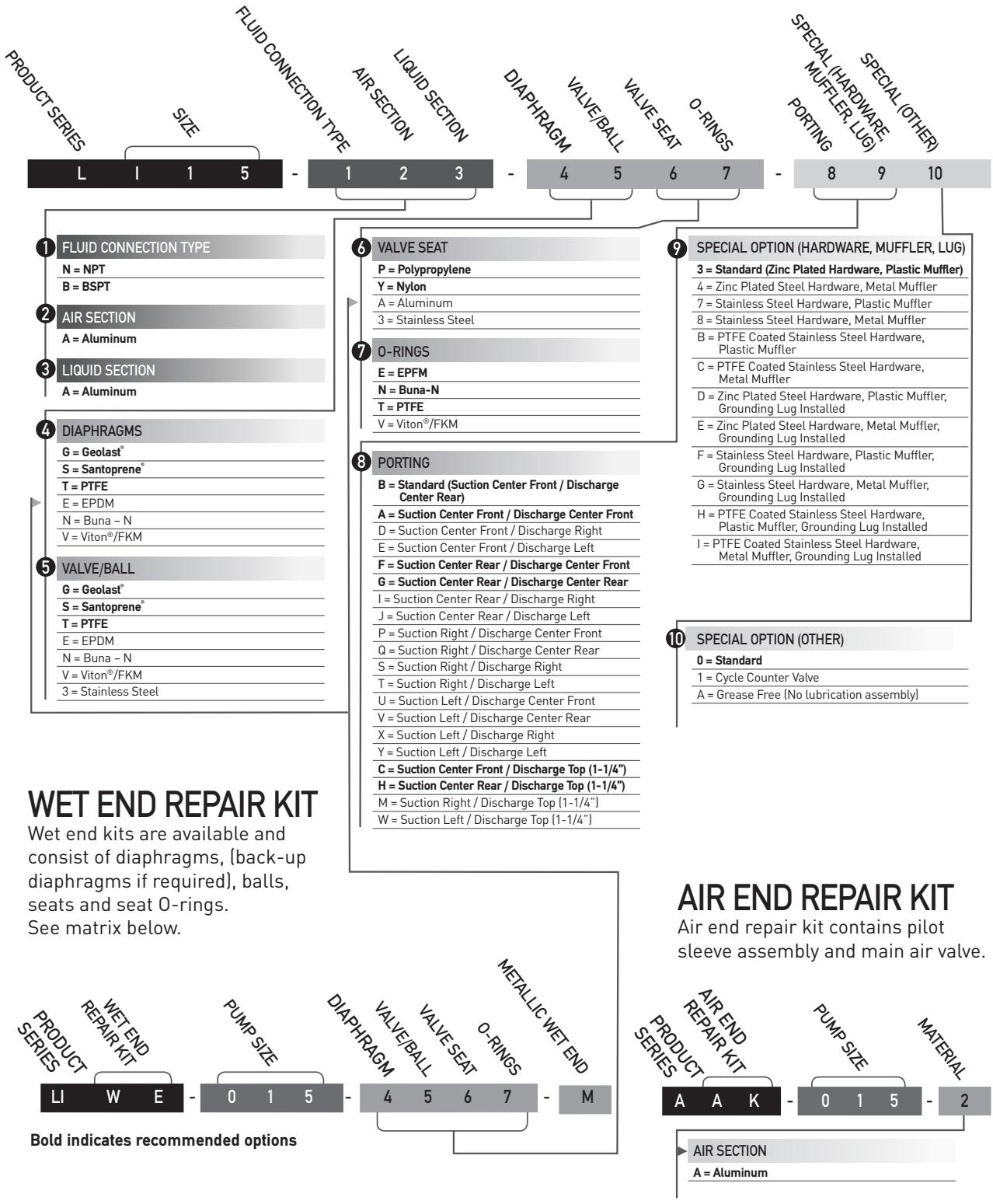
CAUTION Close and disconnect all compressed air and bleed all air from the pump prior to service. Remove all process fluid in a safe manner prior to service.

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.

Model Designation Matrix & Repair Kits - Threaded Aluminum



WET END REPAIR KIT

Wet end kits are available and consist of diaphragms, (back-up diaphragms if required), balls, seats and seat O-rings.
See matrix below.

Bold indicates recommended options

AIR END REPAIR KIT

Air end repair kit contains pilot sleeve assembly and main air valve.

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Model Designation Matrix & Repair Kits - Threaded Stainless Steel

PRODUCT SERIES	SIZE	FLUID CONNECTION TYPE	AIR SECTION	LIQUID SECTION	DIAPHRAGM	VALVE/BALL	VALVE SEAT	O-RINGS	PORTING	SPECIAL (HARDWARE, MUFFLER, LUG)	SPECIAL (OTHER)
L	I 1 5	-	1	2	3	-	4	5	6	7	-	8	9	10

1 FLUID CONNECTION TYPE
- **N = NPT**
- **B = BSPT**

2 AIR SECTION
- **A = Aluminum**
- 3 = Stainless Steel

3 LIQUID SECTION
- **3 = Stainless Steel**

4 DIAPHRAGMS
- **G = Geolast®**
- **S = Santoprene®**
- **T = PTFE**
- E = EPDM
- N = Buna – N
- V = Viton®/FKM

5 VALVE/BALL
- **G = Geolast®**
- **S = Santoprene®**
- **T = PTFE**
- E = EPDM
- N = Buna – N
- V = Viton®/FKM
- 3 = Stainless Steel

6 VALVE SEAT
- **3 = Stainless Steel**
- A = Aluminum
- P = Polypropylene
- Y = Nylon

7 O-RINGS
- **E = EPFM**
- **N = Buna-N**
- **T = PTFE**
- V = Viton®/FKM

8 PORTING
- **B = Standard (Suction Center Front / Discharge Center Rear)**
- **A = Suction Center Front / Discharge Center Front**
- D = Suction Center Front / Discharge Right
- E = Suction Center Front / Discharge Left
- **F = Suction Center Rear / Discharge Center Front**
- **G = Suction Center Rear / Discharge Center Rear**
- I = Suction Center Rear / Discharge Right
- J = Suction Center Rear / Discharge Left
- P = Suction Right / Discharge Center Front
- Q = Suction Right / Discharge Center Rear
- S = Suction Right / Discharge Right
- T = Suction Right / Discharge Left
- U = Suction Left / Discharge Center Front
- V = Suction Left / Discharge Center Rear
- X = Suction Left / Discharge Right
- Y = Suction Left / Discharge Left
- **C = Suction Center Front / Discharge Top (1-1/4")**
- **H = Suction Center Rear / Discharge Top (1-1/4")**
- M = Suction Right / Discharge Top (1-1/4")
- W = Suction Left / Discharge Top (1-1/4")

9 SPECIAL OPTION (HARDWARE, MUFFLER, LUG)
- **7 = Standard (Stainless Steel Hardware, Plastic Muffler)**
- 8 = Stainless Steel Hardware, Metal Muffler
- B = PTFE Coated Stainless Steel Hardware, Plastic Muffler
- C = PTFE Coated Stainless Steel Hardware, Metal Muffler
- F = Stainless Steel Hardware, Plastic Muffler, Grounding Lug Installed
- G = Stainless Steel Hardware, Metal Muffler, Grounding Lug Installed
- H = PTFE Coated Stainless Steel Hardware, Plastic Muffler, Grounding Lug Installed
- I = PTFE Coated Stainless Steel Hardware, Metal Muffler, Grounding Lug Installed

10 SPECIAL OPTION (OTHER)
- **0 = Standard**
- 1 = Cycle Counter Valve
- A = Grease Free (No lubrication assembly)

WET END REPAIR KIT

Wet end kits are available and consist of diaphragms, (back-up diaphragms if required), balls, seats and seat O-rings.
See matrix below.

PRODUCT SERIES	WET END REPAIR KIT	PUMP SIZE	DIAPHRAGM	VALVE/BALL	VALVE SEAT	O-RINGS	METALLIC WET END
LI	W E	-	0 1 5	-	4	5	6	7	-	M

Bold indicates recommended options

AIR END REPAIR KIT

Air end repair kit contains pilot sleeve assembly and main air valve.

PRODUCT SERIES	AIR END REPAIR KIT	PUMP SIZE	MATERIAL
A A K	-	0 1 5	-	2

AIR SECTION
- **A = Aluminum**
- 3 = Stainless Steel

Model Designation Matrix & Repair Kits - Flanged Stainless Steel

PRODUCT SERIES	SIZE	FLUID CONNECTION TYPE	AIR SECTION	LIQUID SECTION	DIAPHRAGM	VALVE /BALL	VALVE SEAT	O-RINGS	PORTING	SPECIAL (HARDWARE, MUFFLER, LUG)	SPECIAL (OTHER)
L	I 1 5	-	1	2	3	-	4	5	6	7	-	8	9	10

1 FLUID CONNECTION TYPE
- **F = ANSI/DIN Flange**

2 AIR SECTION
- **A = Aluminum**
- 3 = Stainless Steel

3 LIQUID SECTION
- **3 = Stainless Steel**

4 DIAPHRAGMS
- **G = Geolast®**
- **S = Santoprene®**
- **T = PTFE**
- E = EPDM
- N = Buna – N
- V = Viton®/FKM

5 VALVE/BALL
- **G = Geolast®**
- **S = Santoprene®**
- **T = PTFE**
- E = EPDM
- N = Buna – N
- V = Viton®/FKM
- 3 = Stainless Steel

6 VALVE SEAT
- **3 = Stainless Steel**
- P = Polypropylene
- Y = Nylon

7 O-RINGS
- **E = EPFM**
- **N = Buna-N**
- **T = PTFE**
- V = Viton®/FKM

8 PORTING
- **B = Standard (Suction Center Front / Discharge Center Rear)**
- A = Suction Center Front / Discharge Center Front
- F = Suction Center Rear / Discharge Center Front
- G = Suction Center Rear / Discharge Center Rear

9 SPECIAL OPTION (HARDWARE, MUFFLER, LUG)
- **7 = Standard (Stainless Steel Hardware, Plastic Muffler)**
- 8 = Stainless Steel Hardware, Metal Muffler
- B = PTFE Coated Stainless Steel Hardware, Plastic Muffler
- C = PTFE Coated Stainless Steel Hardware, Metal Muffler
- F = Stainless Steel Hardware, Plastic Muffler, Grounding Lug Installed
- G = Stainless Steel Hardware, Metal Muffler, Grounding Lug Installed
- H = PTFE Coated Stainless Steel Hardware, Plastic Muffler, Grounding Lug Installed
- I = PTFE Coated Stainless Steel Hardware, Metal Muffler, Grounding Lug Installed

10 SPECIAL OPTION (OTHER)
- **0 = Standard**
- 1 = Cycle Counter Valve
- A = Grease Free (No lubrication assembly)

WET END REPAIR KIT

Wet end kits are available and consist of 2 diaphragms, (back-up diaphragms if required), 4 balls, 4 seats, and 4 seat O-rings. See matrix below.

PRODUCT SERIES	WET END REPAIR KIT	PUMP SIZE	DIAPHRAGM	VALVE	VALVE SEAT	O-RINGS	METALLIC WET END
LI	W E	-	0 1 5	-	4	5	6	7	-	M

Bold indicates recommended options

AIR END REPAIR KIT

Air end repair kit contains pilot sleeve assembly and main air valve.

PRODUCT SERIES	AIR END REPAIR KIT	PUMP SIZE	MATERIAL
A A	K	-	0 1 5	-	2

AIR SECTION
- **A = Aluminum**
- 3 = Stainless Steel

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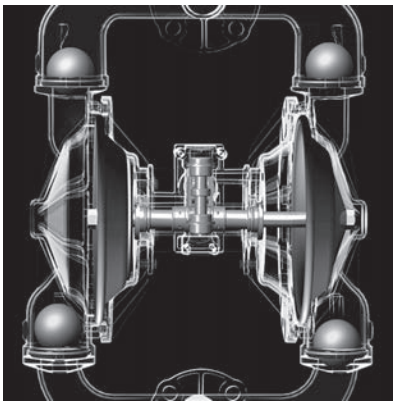
Principles of Operation

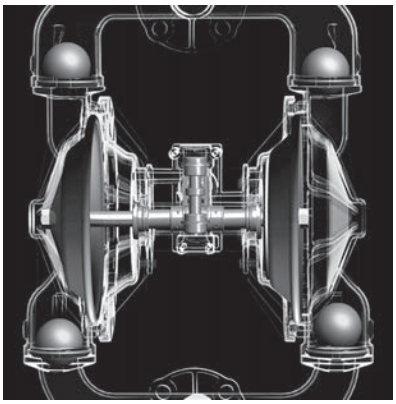
How an Air Operated Double Diaphragm Pump Works



The air-valve directs pressurized air behind the diaphragm on the right, causing the diaphragm on the right to move outward (to the right).

Since both the right diaphragm and the left diaphragm are connected via a diaphragm rod, when the right diaphragm moves to the right, the left diaphragm (through the action of the diaphragm rod) moves to the right also.

When the diaphragm on the left side is moving to the right, it is referred to as suction stroke. When the left diaphragm is in its suction stroke, the left suction ball moves upward (opens) and the left discharge ball moves downward (closes). This action creates suction and draws liquid into the left side chamber.



The air-valve directs pressurized air behind the left diaphragm, causing the left diaphragm to move outward (to the left).

Since both the left diaphragm and the right diaphragm are connected via a diaphragm rod, when the left diaphragm moves to the left, the right diaphragm (through the action of the diaphragm rod) moves to the left also.

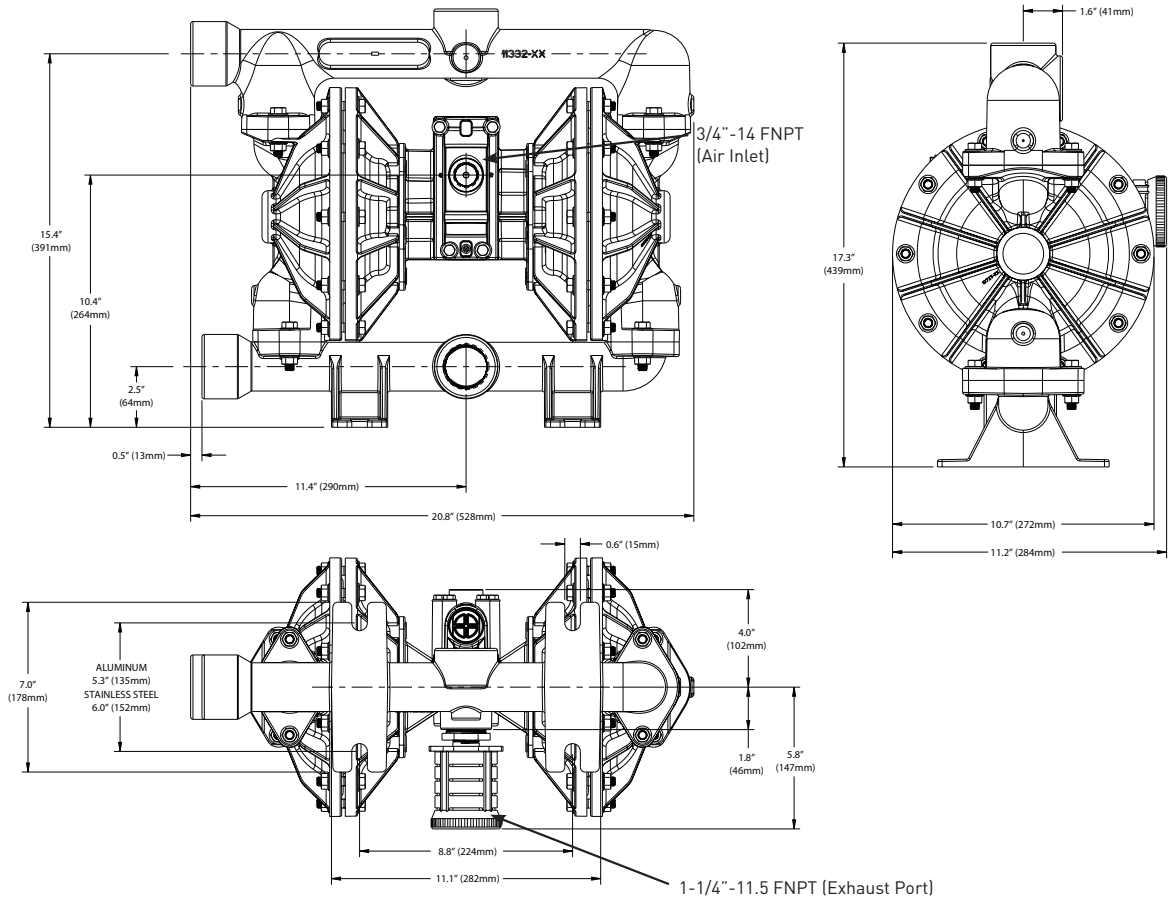
When the diaphragm on the left side moves outward, the left discharge ball moves upward (opens) and the left suction ball moves downward (closes). This causes the liquid to leave the left side liquid outlet of the pump.

Simultaneously, the right diaphragm moves inward (to the left), which causes the right suction ball to open and the right discharge to close, which in turn causes suction, drawing liquid into the right chamber.

The process of alternating right suction / left discharge (and vice-versa) continues as long as compressed air is supplied to the pump.

Dimensional Drawings

1-1/2” Pump Dimensions - Threaded Aluminum & Stainless Steel



Dimensions in inches (mm)

** Note: Standard Muffler shown.*

***Note: A reducer bushing is included with the standard muffler which reduces the port to 3/4”-14 FNPT.*

**** All liquid ports are 1-1/2 inch FNPT or FBSPT, except top discharge port which is 1-1/4 inch FNPT or FBSPT.*

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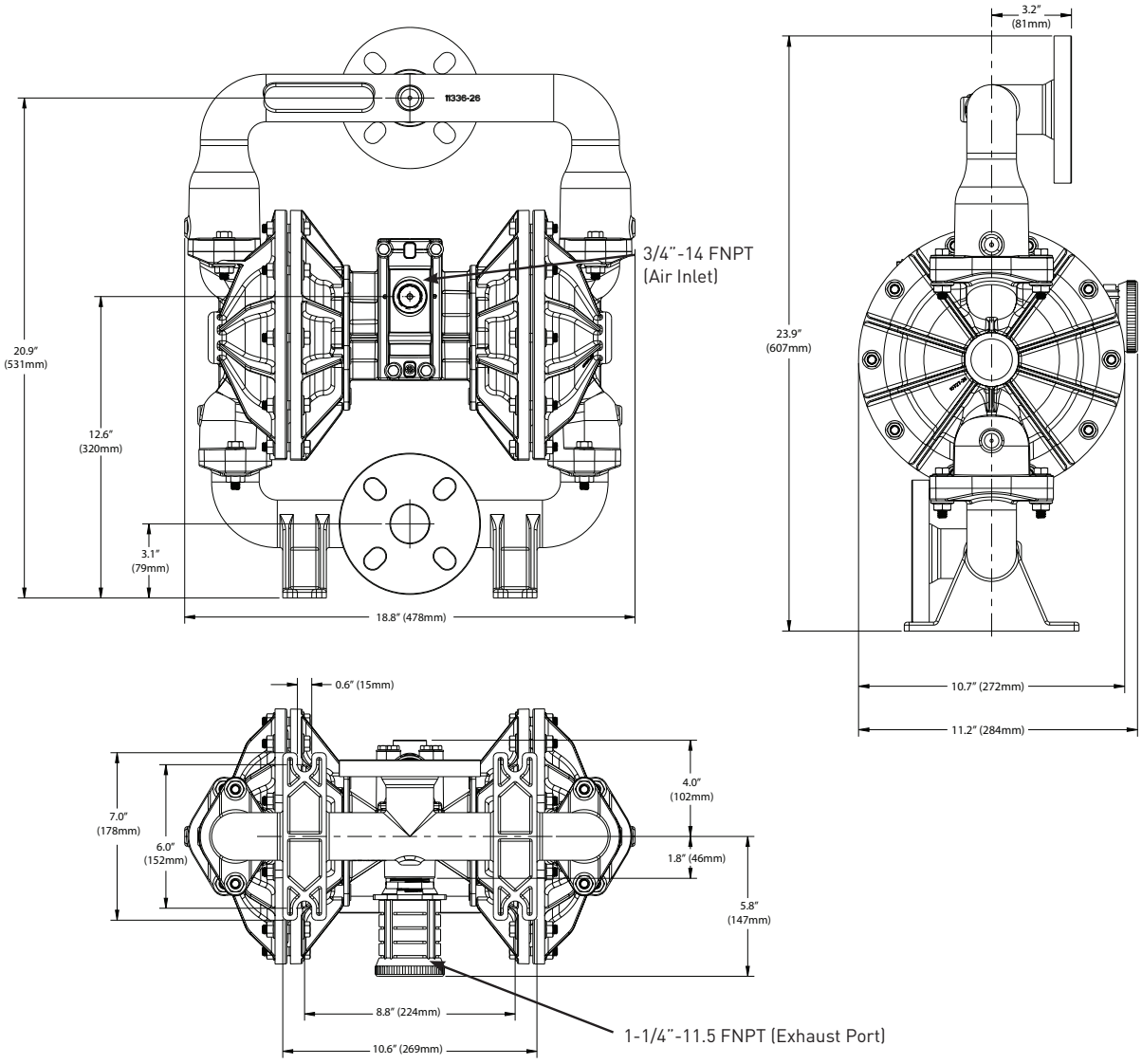
Dimensional Drawings

1-1/2" Pump Dimensions - Flanged Stainless Steel



Dimensions in inches (mm)

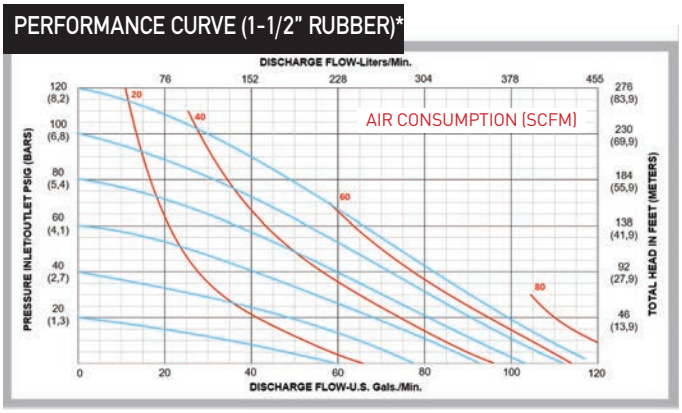
** Note: Standard Muffler shown.*

***Note: A reducer bushing is included with the standard muffler which reduces the port to 3/4"-14 FNPT.*

Performance Curves

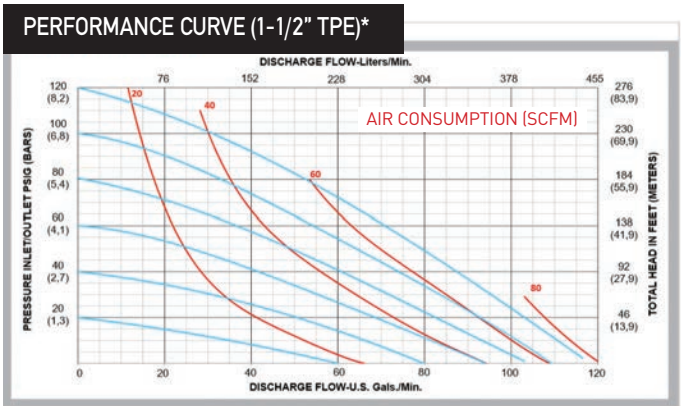
1-1/2" Discharge Ports

PERFORMANCE CURVE (1-1/2" RUBBER)*



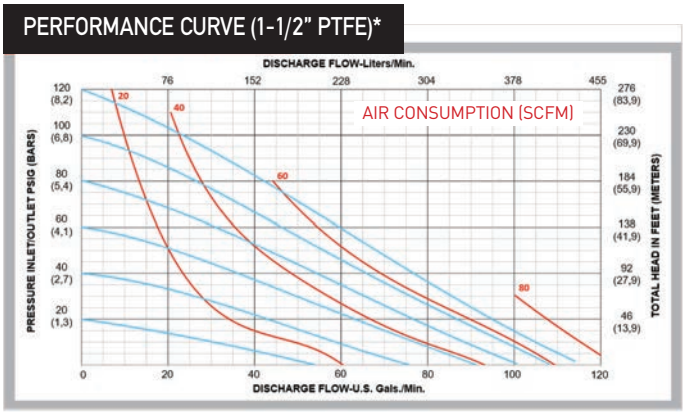
Performance Specifications	
Max. Flow:	115 gpm (435 lpm)
Max. Air Pressure:	120 psi (8.3 bar)
Max. Solids:	1/4" (6.4 mm)
Max. Suction Lift Dry:	22 ft-H_2O (6.7 m-H_2O)
Max. Suction Lift Wet:	31 ft-H_2O (9.4 m-H_2O)
Weight Threaded:	AL-45 lbs (20 kg)/SS-70 lbs (32 kg)
Weight Flanged:	SS-84 lbs (38 kg)
Air Inlet:	3/4" FNPT
Liquid Inlet:	1-1/2" FNPT, 1-1/2" FBSPT, or ANSI/DIN Flanged
Liquid Outlet:	1-1/2" FNPT, 1-1/2" FBSPT, or ANSI/DIN Flanged
Height:	17.3" (439 mm) Threaded / 23.9" (607 mm) Flanged
Width:	20.8" (528 mm) Threaded / 18.8" (478 mm) Flanged
Depth:	11.2" (284 mm) Threaded & Flanged

PERFORMANCE CURVE (1-1/2" TPE)*



Performance Specifications	
Max. Flow:	115 gpm (435 lpm)
Max. Air Pressure:	120 psi (8.3 bar)
Max. Solids:	1/4" (6.4 mm)
Max. Suction Lift Dry:	22 ft-H_2O (6.7 m-H_2O)
Max. Suction Lift Wet:	31 ft-H_2O (9.4 m-H_2O)
Weight Threaded:	AL-45 lbs (20 kg)/ SS-70 lbs (32 kg)
Weight Flanged:	SS-84 lbs (38 kg)
Air Inlet:	3/4" FNPT
Liquid Inlet:	1-1/2" FNPT, 1-1/2" FBSPT, or ANSI/DIN Flanged
Liquid Outlet:	1-1/2" FNPT, 1-1/2" FBSPT, or ANSI/DIN Flanged
Height:	17.3" (439 mm) Threaded / 23.9" (607 mm) Flanged
Width:	20.8" (528 mm) Threaded / 18.8" (478 mm) Flanged
Depth:	11.2" (284 mm) Threaded & Flanged

PERFORMANCE CURVE (1-1/2" PTFE)*



Performance Specifications	
Max. Flow:	115 gpm (435 lpm)
Max. Air Pressure:	120 psi (8.3 bar)
Max. Solids:	1/4" (6.4 mm)
Max. Suction Lift Dry:	18 ft-H_2O (5.5 m-H_2O)
Max. Suction Lift Wet:	31 ft-H_2O (9.4 m-H_2O)
Weight Threaded:	AL-45 lbs (20 kg)/ SS-70 lbs (32 kg)
Weight Flanged:	SS-84 lbs (38 kg)
Air Inlet:	3/4" FNPT
Liquid Inlet:	1-1/2" FNPT, 1-1/2" FBSPT, or ANSI/DIN Flanged
Liquid Outlet:	1-1/2" FNPT, 1-1/2" FBSPT, or ANSI/DIN Flanged
Height:	17.3" (439 mm) Threaded / 23.9" (607 mm) Flanged
Width:	20.8" (528 mm) Threaded / 18.8" (478 mm) Flanged
Depth:	11.2" (284 mm) Threaded & Flanged

*Flow rates indicated on all three charts shown were determined by pumping water at flooded suction. For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

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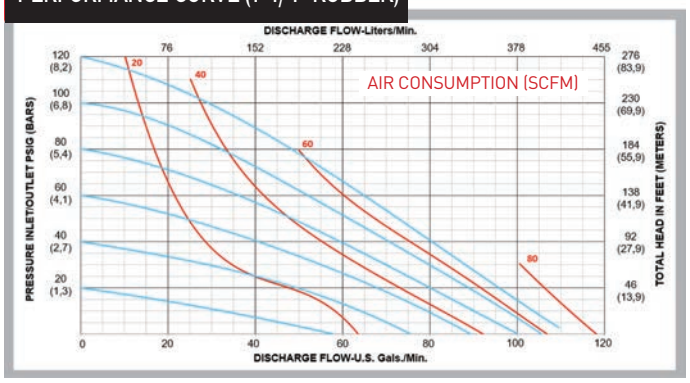
Performance Curves

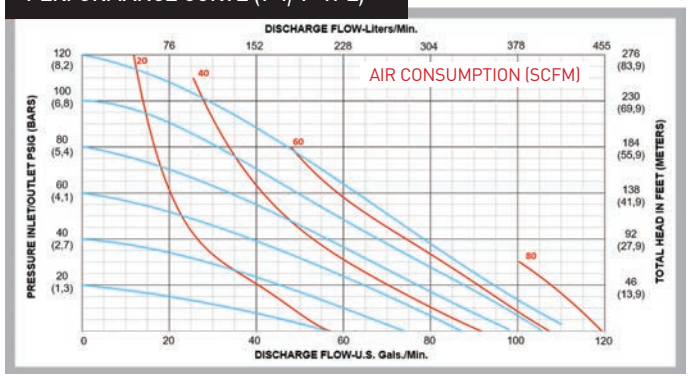
1-1/4" Top Discharge Ports

PERFORMANCE CURVE (1-1/4" RUBBER)*



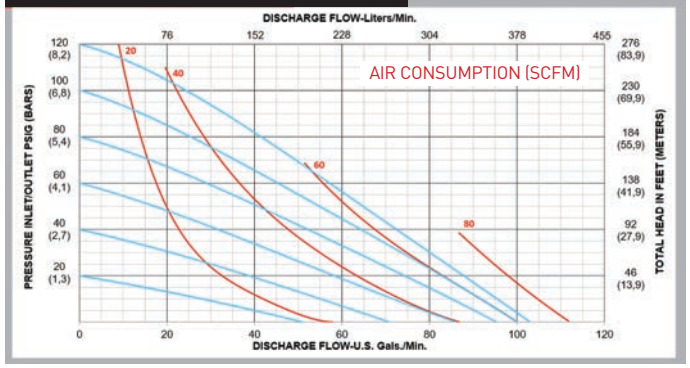
Performance Specifications	
Max. Flow:	105 gpm (398 lpm)
Max. Air Pressure:	120 psi (8.3 bar)
Max. Solids:	1/4" (6.4 mm)
Max. Suction Lift Dry:	22 ft-H_2O (6.7 m-H_2O)
Max. Suction Lift Wet:	31 ft-H_2O (9.4 m-H_2O)
Weight Threaded:AL-45 lbs (20 kg) / SS-70 lbs (32 kg)	
Air Inlet:	3/4" FNPT
Liquid Inlet:	1-1/2" FNPT, 1-1/2" FBSPT
Liquid Outlet:	1-1/4" FNPT, 1-1/2" FBSPT
Height:	17.3" (439 mm) Threaded
Width:	20.8" (528 mm) Threaded
Depth:	11.2" (284 mm) Threaded

PERFORMANCE CURVE (1-1/4" TPE)*



Performance Specifications	
Max. Flow:	105 gpm (398 lpm)
Max. Air Pressure:	120 psi (8.3 bar)
Max. Solids:	1/4" (6.4 mm)
Max. Suction Lift Dry:	22 ft-H_2O (6.7 m-H_2O)
Max. Suction Lift Wet:	31 ft-H_2O (9.4 m-H_2O)
Weight Threaded:AL-45 lbs (20 kg) / SS-70 lbs (32 kg)	
Air Inlet:	3/4" FNPT
Liquid Inlet:	1-1/2" FNPT, 1-1/2" FBSPT
Liquid Outlet:	1-1/4" FNPT, 1-1/2" FBSPT
Height:	17.3" (439 mm) Threaded
Width:	20.8" (528 mm) Threaded
Depth:	11.2" (284 mm) Threaded

PERFORMANCE CURVE (1-1/4" PTFE)*



Performance Specifications	
Max. Flow:	105 gpm (398 lpm)
Max. Air Pressure:	120 psi (8.3 bar)
Max. Solids:	1/4" (6.4 mm)
Max. Suction Lift Dry:	18 ft-H_2O (5.5 m-H_2O)
Max. Suction Lift Wet:	31 ft-H_2O (9.4 m-H_2O)
Weight Threaded:AL-45 lbs (20 kg) / SS-70 lbs (32 kg)	
Air Inlet:	3/4" FNPT
Liquid Inlet:	1-1/2" FNPT, 1-1/2" FBSPT
Liquid Outlet:	1-1/4" FNPT, 1-1/2" FBSPT
Height:	17.3" (439 mm) Threaded
Width:	20.8" (528 mm) Threaded
Depth:	11.2" (284 mm) Threaded

*Flow rates indicated on all three charts shown were determined by pumping water at flooded suction. For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

Installation, Troubleshooting and Maintenance

Installation

Piping

Whenever possible ensure the pump is installed using the shortest possible pipe lengths with the minimum amount of pipe fittings. Ensure all piping is supported independent of the pump.

Suction and discharge piping should not be smaller than the connection size of the pump. When pumping liquids of high viscosity, larger piping may be used, in order to reduce frictional pipe loss.

Employ flexible hoses in order to eliminate the vibration caused by the pump. Mounting feet can also be used to reduce vibration effects.

All hoses should be reinforced, non-collapsible and be capable of high vacuum service. Ensure that all piping and hoses are chemically compatible with the process and cleaning fluid.

For processes where pulsation effects should be reduced, employ a pulsation dampener on the discharge side of the pump.

For self-priming applications, ensure all connections are airtight and the application is within the pumps dry-lift capability. Refer to product specifications for further details.

For flooded suction applications, install a gate valve on the suction piping in order to facilitate service.

For unattended flooded suction operation, it is recommended to pipe the exhaust air above the liquid source. In the event of a diaphragm failure this will reduce or eliminate the possibility of liquid discharging through the exhaust onto the ground.

Location

Ensure that the pump is installed in an accessible location, in order to facilitate future service and maintenance.

Air

Ensure that the air supply is sufficient for the volume of air required by the pump. Refer to product specifications for further details. For reliable operation, install a 5 micron air filter, air-valve and pressure regulator. Do not exceed the pumps maximum operating pressure of 120 psig.

Remote Operation

Utilize a three way solenoid valve for remote operation. This ensures that air between the solenoid and the pump is allowed to "bleed off," ensuring reliable operation. Liquid transfer volume is estimated by multiplying displacement per stroke times the number of strokes per minute

Noise

Correct installation of the muffler reduces sound levels. Refer to product specifications for further details.

Submerged Operation

For submersible operation, pipe the air exhaust to atmosphere

Grounding the Pump

Loosen grounding screw and install a grounding wire. Tighten grounding screw. Wire size should be a 12 gauge wire or larger. Connect the other end of the wire to a true earth ground. Equipment must be grounded to achieve ATEX rating and it is recommended to configure the pump with a grounding lug option.

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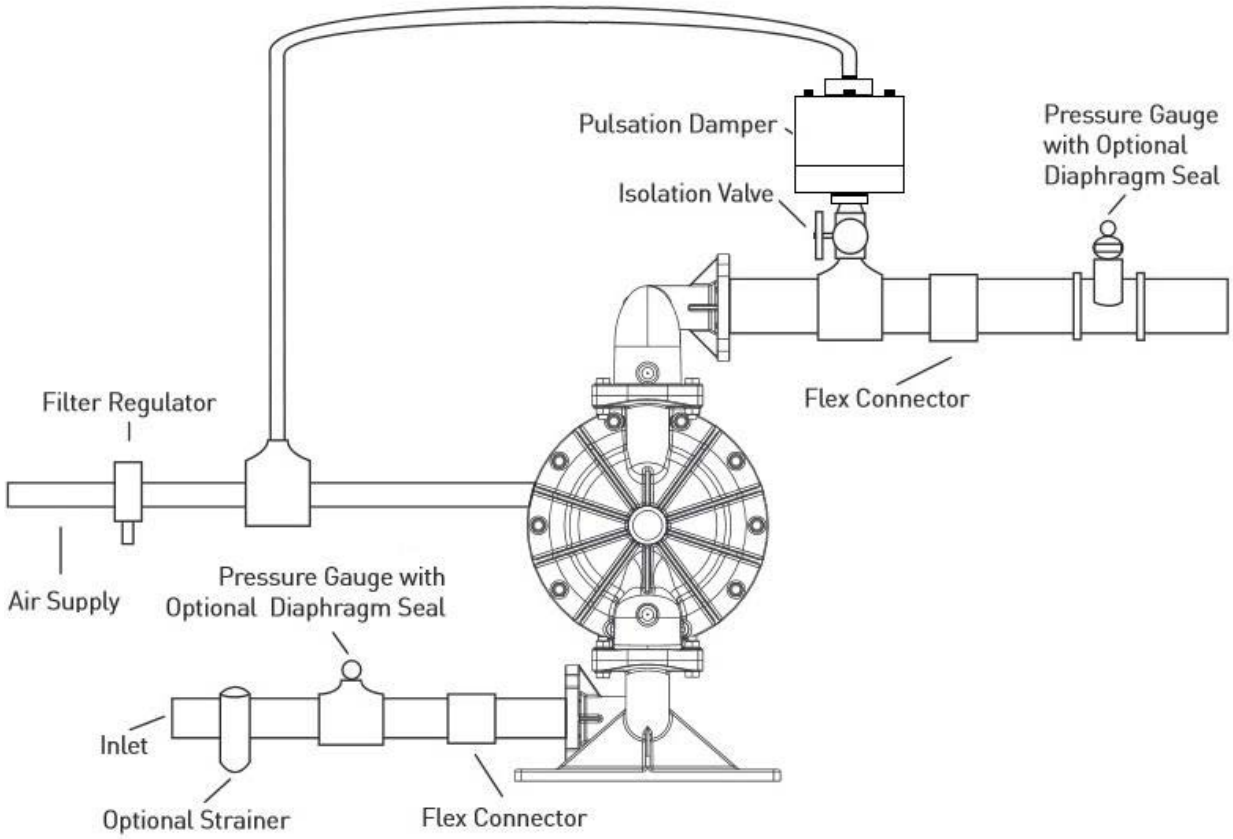
Suggested Installation



This illustration is a generic representation of an air operated double-diaphragm pump.

Troubleshooting

Problem	Effect/Solution
Pump Will Not Cycle	
	Discharge line closed or plugged
	Discharge filter blocked
	Check valve stuck
	Air filter blocked
	Air supply valve closed
	Air supply hooked up to muffler side of pump
	Compressor not producing air or turned off
	Muffler iced or blinded
	Diaphragm ruptured
	Air line in plant air supply lines ruptured
	Air valve wear/debris
	Pilot sleeve wear/debris
	Diaphragm rod broken
	Diaphragm plate loose
Pumped Fluid Coming Out of Muffler	
	Diaphragm ruptured
	Diaphragm plate loose
	Inlet liquid pressure excessive (above 10 psig)
Pump Cycles but no Flow	
	Inlet strainer clogged
	Suction valve closed
	Suction line plugged
	No liquid in the suction tank
	Suction lift excessive
	Debris stuck in valves
	Excessive wear of check valves
	Air leak on suction side with suction lift
Pump Cycles with Closed Discharge Valve	
	Debris stuck in check valve
	Excessive wear of check valves
Pump Running Slowly/Not Steady	
	Air compressor undersized
	Leak in air supply
	Air-line, filter regulator or needle valve undersized
	Muffler partially iced or blinded
	Air valve gasket leak or misalignment
	Air valve wear/debris
	Pilot sleeve wear/debris
	Liquid fluid filter blocked
	Pump may be cavitating, reduce speed of operation
	Suction strainer clogged
Pump Will Not Prime	
	Air leak in suction pipe
	Air leak in pump manifold connections
	Suction strainer and lines clogged
	Excessive lift conditions
	Check valve wear
	Debris in check valve

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Operation

The Air-Operated Double Diaphragm Pump requires a minimum of 20 psig of air to operate, with some variation according to diaphragm material. Increasing the air pressure results in a more rapid cycling of the pump and thus a higher liquid flow rate. In order to not exceed 120 psig of inlet air pressure, and for accurate control of the pump, it is suggested to use a pressure regulator on the air inlet.

An alternate means of controlling the flow-rate of the pump is to use an inlet air valve and partially open or close accordingly. When the air valve is completely in the closed position, the pump will cease to operate.

A third method of controlling the flow rate of the pump is to use a liquid discharge valve. Closing the liquid discharge valve will cause a decrease in the flow rate since the pump will operate against a higher discharge pressure.

Solenoid control of the inlet air may also be used in order to facilitate remote operation. A three way solenoid valve is recommended, in order to allow the air to "bleed off" between the solenoid and the pump.

Do not use valves for flow control on the suction side of the pump. (Closing or partially closing a liquid suction valve restrict the suction line and may cause damage to the diaphragms.) Suction strainers may be employed to reduce or eliminate larger solids, but routine maintenance is necessary in order to prevent a restriction on the suction.

Maintenance

Due to the unique nature of each application, periodic inspection of the pump is the best method to determine a proper maintenance schedule. A record should be kept of all repairs made to an installed pump. This will serve as the best predictor of future maintenance.

Typical maintenance involves replacing of "wear-parts" such as the diaphragms, balls, valve seats and O-rings. Proper maintenance can ensure trouble-free operation of the pump. Refer to repair and assembly instructions for further details.

WARNING Maintenance must not be performed when a hazardous atmosphere is present.

Maintenance Schedule

Weekly (or daily)

Make a visual check of the pump. If pumped fluid is leaking out of the pump, pipe fittings or muffler turn off pump and schedule maintenance.

Every three months

Inspect fasteners and tighten any loose fasteners to recommended torque settings.

Schedule pump service based on pump's service history.

Repair and Assembly

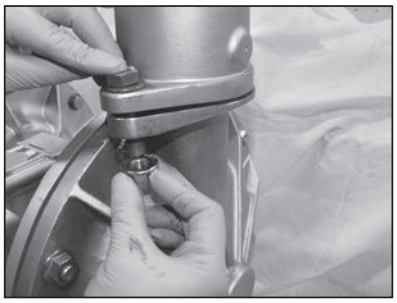
Pump Wet End Removal

Tools needed

1) Two Wrenches, 9/16 Inch
2) Two Wrenches, 1 Inch
3) One Socket Wrench, 1-1/16 Inch
4) One Flat (Spanner) Wrench, 3/4 Inch (May Be Required)

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.

WARNING Maintenance must not be performed when a hazardous atmosphere is present.

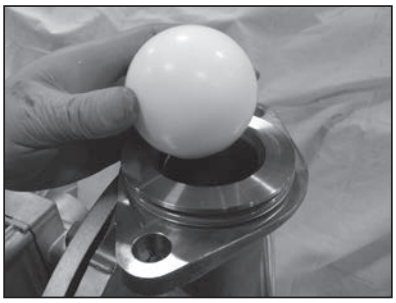


STEP 1

Using the 9/16 inch wrench remove four "Hex-Head Cap Screws (3/8"- 16x1-3/4")", four "Compression Washers (3/8")" and four "Flanged Hex Nut (3/8"- 16)" from the "Discharge Manifold".

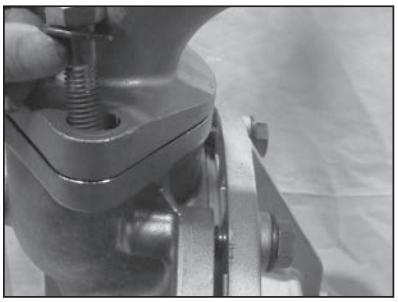
STEP 2

Remove the "Discharge Manifold".



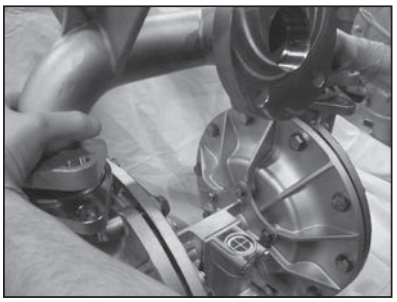
STEP 3

Remove the "O-Ring", "Valve Seat" and "Ball" from "Discharge Manifold".



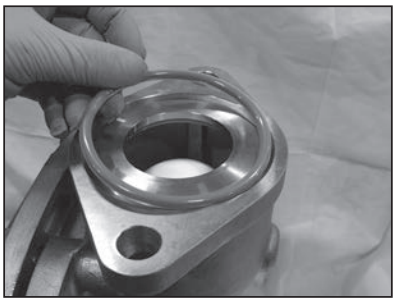
STEP 4

Using the 9/16 inch wrench remove four "Hex-Head Cap Screws (3/8"- 16x1-3/4")", four "Flat & Lock Washers (3/8")" and four "Flanged Hex Nut (3/8" -16")" from the "Suction Manifold".



STEP 5

Remove the "Suction Manifold".



STEP 6

Remove the "O-Ring", "Valve Seat" and "Ball" from the "Suction Manifold".

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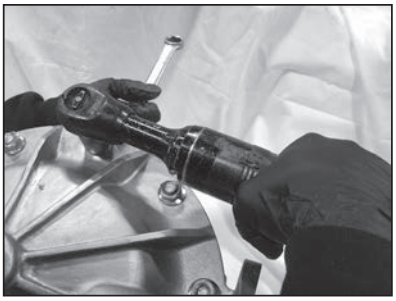
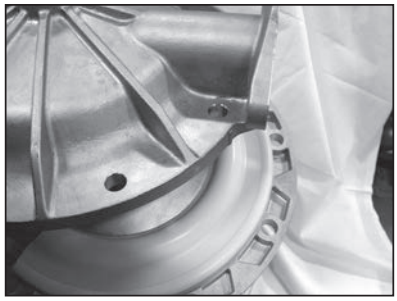


STEP 7

In order to remove both "Outer Chambers" use two 9/16 Inch wrenches. Remove ten "Hex-Head Cap Screws (3/8"-16x1-3/4")", ten "Flat & Lock Washers (3/8")" and ten "Flanged Hex Nut (3/8"- 16)" from each "Outer Chamber". (Air ratchet may also be used as shown in image.)



STEP 8

Remove both "Outer Chambers" from the "Intermediate."

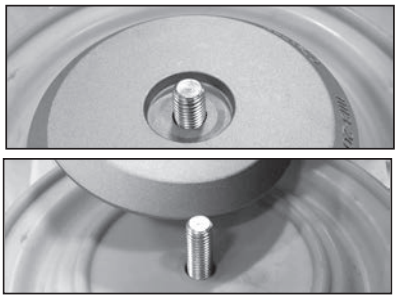
STEP 9

Using two 1 Inch wrenches, remove "Outer Diaphragm Plate", "Diaphragm", "Inner Diaphragm Plate" and "Nut" from one side of the pump.

Flat 3/4" wrench may be used on flat of diaphragm rod to assist in diaphragm removal.

STEP 10

Placing the 1 inch wrench on the "Outer Diaphragm Plate", and the 1 1/16 inch socket on the "Nut", remove the "Inner Diaphragm Plate".



STEP 11

Remove "inner Diaphragm Plate" and "Outer Diaphragm Plate" from "Diaphragm."

Pump Wet End Assembly

To assemble the wet end of the pump, reverse the order of disassembly. Ensure all hardware is fastened in accordance with torque specifications (see page 21). Inverting one of the diaphragms during reassembly will facilitate ease of assembly.

Repair and Assembly

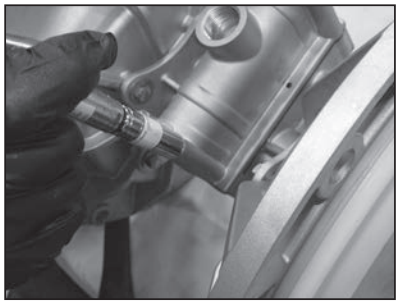
Air Valve Removal

Tools needed

1) One Wrench, 7/16 Inch
2) One Pick, General Purpose
3) One Pair of Pliers

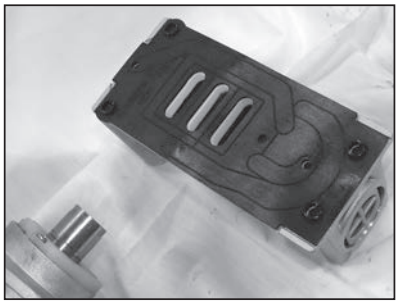
WARNING Prior to servicing the pump, ensure that the air and fluid lines are closed and disconnected. While wearing personal protective equipment, flush, drain and process liquid from the pump in a safe manner.

WARNING Maintenance must not be performed when a hazardous atmosphere is present.



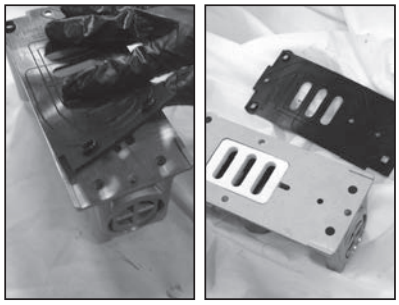
STEP 1

Using the $^{7}/_{16}$ inch wrench, remove four "Hex Head Cap Screws (1/4"–20 x 3")", four "Lock Washers" (1/4") and four flat Washers (1/4")".



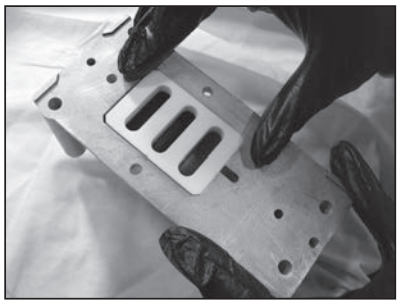
STEP 2

Remove the main "Air-Valve Assembly" from the pump.



STEP 3

Remove the "Air-Valve Gasket" from the main "Air-Valve Assembly".



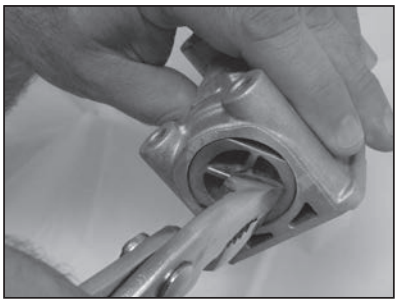
STEP 4

Remove the "Shuttle Plate" from the main "Air-Valve Assembly".

Note: The smooth shiny side of the shuttle plate should be toward the shuttle car.

STEP 5

Remove the "Shuttle" from the main "Air-Valve Assembly".



STEP 6

Using the pair of pliers, remove the "Air Valve End Plug" from the main "Air-Valve Assembly".

Ensure the "O-Ring" is installed when reassembling.

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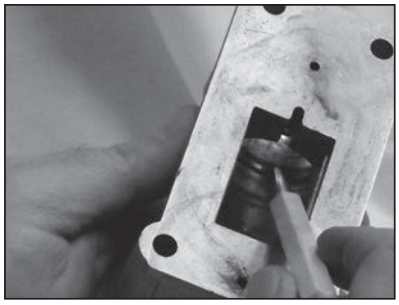
STEP 7

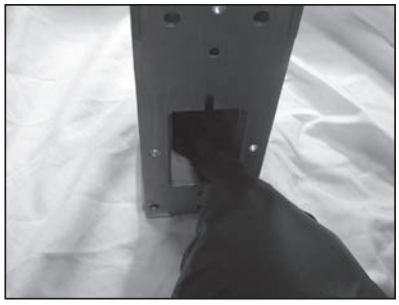
Remove the “Air Valve Spool” from the main “Air-Valve Assembly”.

Note: The longer piston is to be on the plug side.



STEP 8

Using the pick, remove the “Lip Seal (Air Valve)” from the main “Air-Valve Assembly”.



STEP 9

Using the pick, remove the second “Lip Seal (Air Valve)” from the main “Air-Valve Assembly”.

Air Valve Assembly

To assemble the air valve, reverse the order of disassembly. During assembly, ensure that the open side of the lip-seals are both facing each other inward. Install the shuttle plate with the smooth/shiny side toward the shuttle car. Lubrication of the air valve assembly, with a non-synthetic lubricant, is recommended. Magna-Lube or Magna-Plate are recommended for assembly lubrication (see detailed parts list for ordering information).

Note that if the lip-seals are installed incorrectly, they will be unable to rotate. Insert the spool, the spool’s shorter piston is to be on the plug side, ensure O-ring is installed, and then the air-valve end plug into position.

Repair and Assembly

Pilot Valve Removal

Tools needed

1) One Screwdriver, Phillips #2
2) Two Wrenches, 3/4 Inch

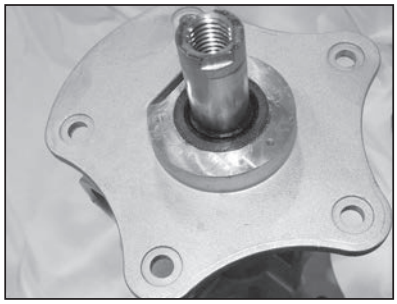
The chambers do not need to be removed for this procedure. The graphics show the inner chambers removed for clarity.

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.

WARNING Maintenance must not be performed when a hazardous atmosphere is present.

STEP 1

Using the screwdriver, remove three "Phillips Pan Head Mach Screw (#6-32-x 3/8")" in order to remove the "Retaining Plate". Repeat for both sides of the pump.



STEP 2

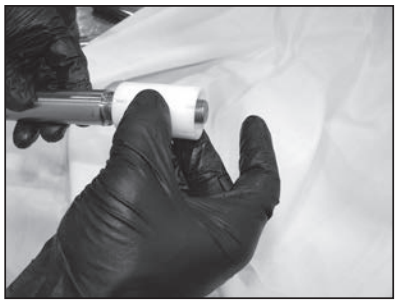
Remove the "Diaphragm Rod" and the "Pilot Sleeve Assembly" from the "Intermediate".

STEP 3

Remove the "Lip Seal" and "End Spacer".

STEP 4

Remove "O-Rings" and "Inner Spacer".



STEP 5

Remove "Pilot Sleeve" from Diaphragm Rod. The two piece rod must be disassembled to remove the "Pilot Sleeve". Use the 3/4 inch wrenches to separate the rod. Note they are installed with thread locker.

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Pilot Valve Assembly

To assemble the pilot valve, reverse the order of disassembly. Should process fluid have contact with the pilot valve O-rings, they should be replaced as swelling may occur and cause irregular operation. During assembly, ensure that the open side of the lip-seals are facing outward. Lubrication of the pilot sleeve assembly, with a non-synthetic lubricant, is recommended in order to facilitate re-assembly into the intermediate. Magna-Lube or Magna-Plate are recommended for assembly lubrication (see detailed parts list for ordering information).

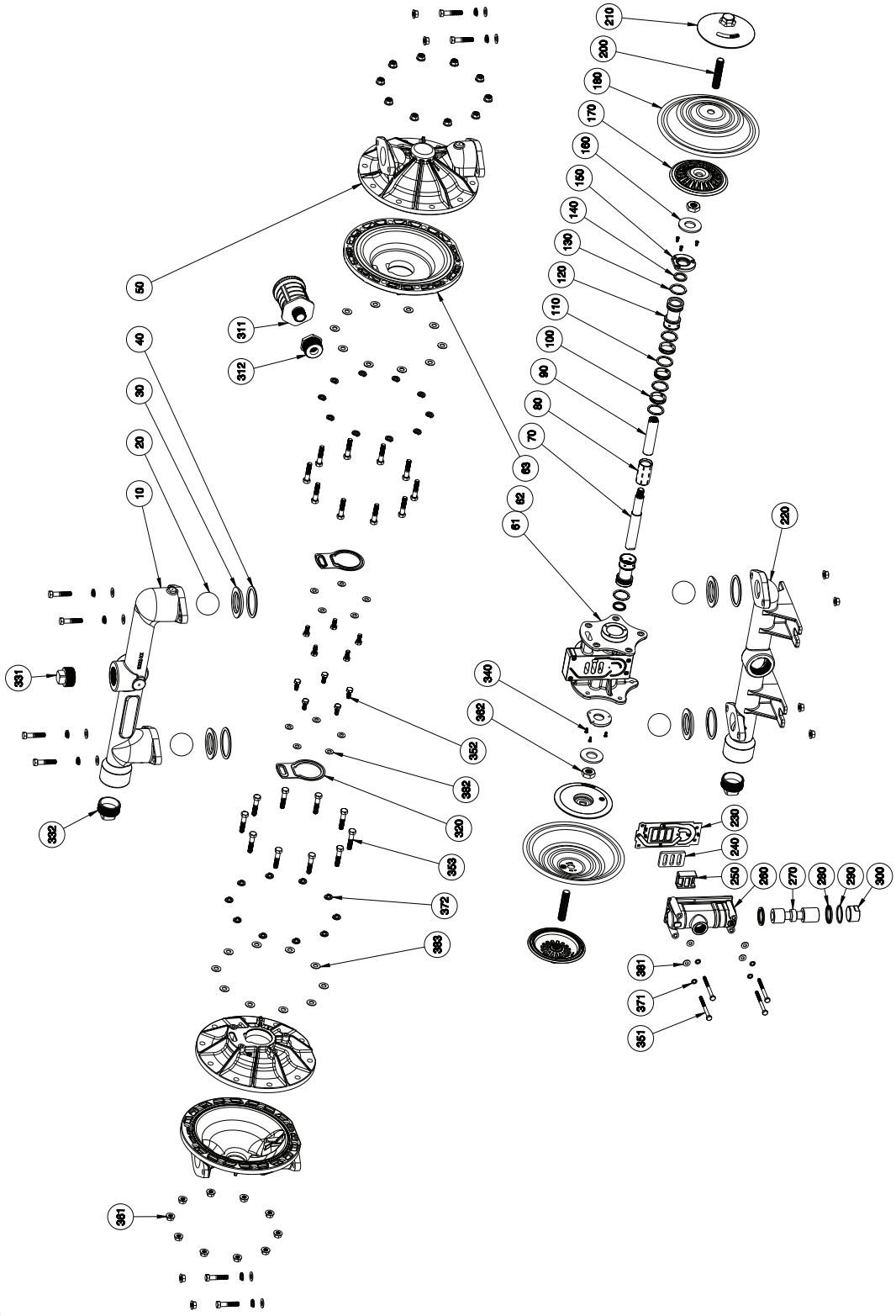
Torque Specification Chart

Recommended Torque Specifications

	1-1/2" Pumps	Wrench Size
Manifold Bolts	30 ft-lbs (40.7 N-m)	9/16"
Chamber Bolts	15 ft-lbs (20.3 N-m)	9/16"
Air Valve Bolts	40 in-lbs (4.5 N-m)	7/16"
Inner Diaphragm Plate Nut	50 ft-lbs (67.8 N-m)	1-1/16"
Intermediate Bolts	11 ft-lbs (14.9 N-m)	1/2"
Outer Diaphragm plate	Hand tight then 1/8 to 1/4 turn more	

Exploded View & Parts List: Full Stroke

Exploded View: Threaded Aluminum & Stainless Steel Full Stroke LI15-***-****-***



Parts List: Threaded Aluminum & Stainless Steel
Full-Stroke LI15-***-****-***

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
10	DISCHARGE MANIFOLD - THREADED	1	LI15-N*A-****-*** LI15-N*3-****-*** LI15-B*A-****-*** LI15-B*3-****-***	11332-20-NPT 11332-26-NPT 11332-20-BSPT 11332-26-BSPT	Aluminum Stainless Steel Aluminum Stainless Steel
20	BALL	4	LI15-***-*V**-*** LI15-***-*E**-*** LI15-***-*G**-*** LI15-***-*N**-*** LI15-***-*S**-*** LI15-***-*T**-***	11010-13 † 11010-15 † 11010-19 † 11010-21 † 11010-23 † 11010-59 †	Viton®/FKM EPDM Geolast® Buna-N Santoprene® PTFE
30	VALVE SEAT	4	LI15-***-**A*-*** LI15-***-**3*-*** LI15-***-**P*-*** LI15-***-**Y*-***	10930-20 † 10930-26 † 10930-39 † 10930-42 †	Aluminum Stainless Steel Polypropylene Nylon
40	O-RING, VALVE SEAT	4	LI150-***-***N-*** LI15-***-***V-*** LI15-***-***E-*** LI15-***-***T-***	11952-11 † 11952-13 † 11952-15 † 11952-17 †	Nitrile Viton®/FKM EPDM PTFE
50	OUTER CHAMBER	2	LI15-*AA-****-*** LI15-**3-****-***	10727-20 10727-26	Aluminum Stainless Steel
61&62	INTERMEDIATE	1	LI15-*A*-****-*** LI15-*33-****-***	11525-20 11525-26	Aluminum Stainless Steel
63	INNER CHAMBER	2	LI15-*A*-****-*** LI15-*33-****-***	11806-20 11806-26	Aluminum Stainless Steel
70&90	DIAPHRAGM ROD ASSEMBLY (FULL STROKE)	1	All non-PTFE Models	35003-00	Stainless Steel
80	VALVE SLEEVE	1	All Models	10107-31 Δ	Acetal
100	INNER SPACER (PILOT SLEEVE)	3	All Models	10205-40 Δ	Polypropylene
110	O-RING (PILOT SLEEVE)	4	All Models	11919-16 Δ	Urethane
120	END SPACER (PILOT SLEEVE)	2	All Models	10208-40 Δ	Polypropylene
130	O-RING (END SPACER)	2	All Models	11919-11 Δ	Nitrile
140	LIP SEAL (DIAPHRAGM ROD)	2	All Models	12002-76 Δ	Nitrile
150	RETAINING PLATE	2	All Models	12717-54	Nylon
160	BUMPER	2	All Models	12317-16	Urethane
170	INNER DIAPHRAGM PLATE (FULL STROKE) (NON-PTFE MODELS)	2	LI15-*A*-****-*** LI15-*33-****-***	11112-20 11112-26	Aluminum Stainless Steel
180	DIAPHRAGM	2	 LI15-***-V***-*** LI15-***-E***-*** LI15-***-G***-*** LI15-***-S***-***	10614-11 † 10614-13 † 10614-15 † 10614-19 † 10614-23 †	Buna-N Viton®/FKM EPDM Geolast® Santoprene®
190	N/A				
200&210	OUTER DIAPHRAGM PLATE WITH STUD	2	LI15-**A-****-*** LI15-**3-****-***	11221-20 11221-26	Aluminum Stainless Steel
220	SUCTION MANIFOLD - THREADED	1	LI15-N*A-****-*** LI15-N*3-****-*** LI15-B*A-****-*** LI15-B*3-****-***	11333-20-NPT 11333-26-NPT 11333-20-BSPT 11333-26-BSPT	Aluminum Stainless Steel Aluminum Stainless Steel
230	AIR VALVE GASKET	1	All Models	12124-19 ‡	Nitrile
240	SHUTTLE PLATE	1	All Models	10450-77 ‡	Ceramic
250	SHUTTLE	1	All Models	10430-00 ‡	Special

Parts List: Threaded Aluminum & Stainless Steel
Full Stroke LI15- ***-****-*** (con't)

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
260	AIR VALVE BODY	1	LI15-*A*-****-*** LI15-*33-****-***	11618-20 ‡ 11618-26 ‡	Aluminum Stainless Steel
270	AIR VALVE SPOOL	1	All Models	10483-31 ‡	Acetal
280	LIP SEAL (AIR VALVE)	2	All Models	12003-76 ‡	Nitrile
290	O-RING (AIR VALVE END PLUG)	1	All Models	11913-11 ‡	Nitrile
300	AIR VALVE END PLUG	1	LI15-*A*-****-*** LI15-*33-****-***	11706-20 ‡ 11706-26 ‡	Aluminum Stainless Steel
311&312	MUFFLER w/ BUSHING	1	LI15-***-****-*0* Optional	13013-00 13010-00	Polypropylene Metal
320	INNER CHAMBER GASKET	2	All Models	12123-19	Nitrile
331	PIPE PLUG 1-1/4"	1	LI15-B*A-****-*** LI15-N*A-****-*** LI15-B*3-****-*** LI15-N*3-****-***	12275-20-BSPT 12275-20-NPT 12275-26-BSPT 12275-26-NPT	Aluminum Aluminum Stainless Steel Stainless Steel
332	PIPE PLUG 1-1/2"	1	LI15-B*A-****-*** LI15-N*A-****-*** LI15-B*3-****-*** LI15-N*3-****-***	12270-20-BSPT 12270-20-NPT 12270-26-BSPT 12270-26-NPT	Aluminum Aluminum Stainless Steel Stainless Steel
340	SCREW, SELF-LOCKING PHILLIPS (#6-32 X 3/8")	6	All Models	12571-26	Stainless Steel
351	SCREW ,HEX HEAD CAP (1/4"-20 X 3")	4	LI15-**A-****-*0* LI15-**3-****-*0*	12516-25 12516-26	Plated Steel Stainless Steel
352	SCREW, HEX HEAD CAP (5/16"-18 X 3/4")	10	LI15-**A-****-*0* LI15-**3-****-*0*	12536-25 12536-26	Plated Steel Stainless Steel
353	SCREW, HEX HEAD CAP (3/8"-16 X 1-3/4")	28	LI15-**A-****-*0* LI15-**3-****-*0*	12581-25 12581-26	Plated Steel Stainless Steel
361	NUT, FLANGE (3/8"-16)	28	LI15-**A-****-*0* LI15-**3-****-*0*	12612-25 12612-26	Plated Steel Stainless Steel
362	NUT (5/8"-11)	2	All Models	12579-25	Plated Steel
371	WASHER, LOCK (1/4")	4	LI15-**A-****-*0* LI15-**3-****-*0*	12350-25 12350-26	Plated Steel Stainless Steel
372	WASHER, SPLIT LOCK (3/8")	28	LI15-**A-****-*0* LI15-**3-****-*0*	12316-25 12316-26	Plated Steel Stainless Steel
381	WASHER, FLAT (1/4")	4	LI15-**A-****-*0* LI15-**3-****-*0*	12300-25 12300-26	Plated Steel Stainless Steel
382	WASHER (5/16")	10	LI15-**A-****-*0* LI15-**3-****-*0*	12310-25 12310-26	Plated Steel Stainless Steel
383	WASHER (3/8")	28	LI15-**A-****-*0* LI15-**3-****-*0*	12303-25 12303-26	Plated Steel Stainless Steel
390	N/A				
400	GROUNDING LUG (NOT SHOWN)	1	Optional	13481-20	Aluminum
	Magnalube .75 OZ.		As Required, All Models	13404-00	Grease

* Any Character

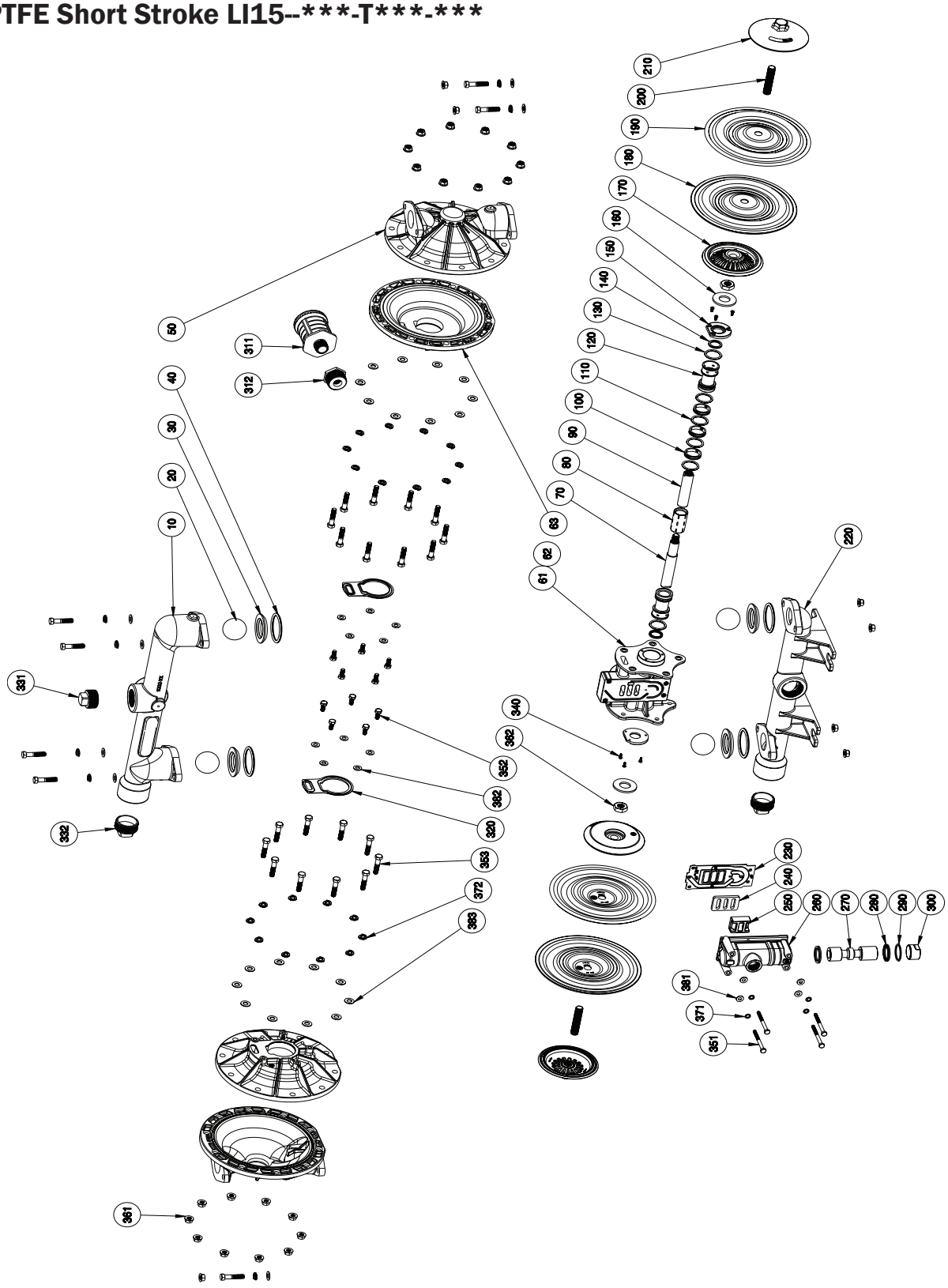
‡ , Δ Only sold as part of assembly

ASSEMBLY PART NUMBERS	PUMP MODEL	PART NO.	MATERIAL
‡ MAIN AIR VALVE ASSEMBLY 230, 240, 250, 260, 270, 280, 290, 300	LI15-*A*-****-*** LI15-*3*-****-***	AMK-150-A AMK-150-3	Various Various
Δ PILOT VALVE ASSEMBLY 80, 100, 110, 120, 130, 140	LI15-*A*-****-*** LI15-*3*-****-***	APK-150-A APK-150-3	Various Various
† WET END REPAIR KIT	LI15-*A*-****-***	AWE-150-****-M	Various
20, 30, 40, 180, 190	LI15-*3*-****-***	AWE-150-****-3	Various

Exploded View & Parts List: PTFE Short Stroke

Exploded View: Threaded Aluminum & Stainless Steel

PTFE Short Stroke LI15--***-T***-***



Parts List: Threaded Aluminum & Stainless Steel PTFE Short Stroke, LI15-***-T***-***

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
10	DISCHARGE MANIFOLD - THREADED	1	LI15-N*A-****-*** LI15-N*3-****-*** LI15-B*A-****-*** LI15-B*3-****-***	11332-20-NPT 11332-26-NPT 11332-20-BSPT 11332-26-BSPT	Aluminum Stainless Steel Aluminum Stainless Steel
20	BALL	4	LI15-***-*V**-*** LI15-***-*E**-*** LI15-***-*G**-*** LI15-***-*N**-*** LI15-***-*S**-*** LI15-***-*T**-***	11010-13 † 11010-15 † 11010-19 † 11010-21 † 11010-23 † 11010-59 †	Viton®/FKM EPDM Geolast® Buna-N Santoprene® PTFE
30	VALVE SEAT	4	LI15-***-**A*-*** LI15-***-**3*-*** LI15-***-**P*-*** LI15-***-**Y*-***	10930-20 † 10930-26 † 10930-39 † 10930-42 †	Aluminum Stainless Steel Polypropylene Nylon
40	O-RING, VALVE SEAT	4	LI15-***-***N-*** LI15-***-***V-*** LI15-***-***E-*** LI15-***-***T-***	11952-11 † 11952-13 † 11952-15 † 11952-17 †	Nitrile Viton®/FKM EPDM PTFE
50	OUTER CHAMBER	2	LI15-*AA-****-*** LI15-**3-****-***	10727-20 10727-26	Aluminum Stainless Steel
61&62	INTERMEDIATE	1	LI15-*A*-****-*** LI15-*33-****-***	11525-20 11525-26	Aluminum Stainless Steel
63	INNER CHAMBER	2	LI15-*A*-****-*** LI15-*33-****-***	11806-20 11806-26	Aluminum Stainless Steel
70&90	DIAPHRAGM ROD ASSEMBLY (SHORT STROKE)	1	LI15-***-T***-***	35004-00	Stainless Steel
80	VALVE SLEEVE	1	All Models	10107-31 Δ	Acetal
100	INNER SPACER (PILOT SLEEVE)	3	All Models	10205-40 Δ	Polypropylene
110	O-RING (PILOT SLEEVE)	4	All Models	11919-16 Δ	Urethane
120	END SPACER (PILOT SLEEVE)	2	All Models	10208-40 Δ	Polypropylene
130	O-RING (END SPACER)	2	All Models	11919-11 Δ	Nitrile
140	LIP SEAL (DIAPHRAGM ROD)	2	All Models	12002-76 Δ	Nitrile
150	RETAINING PLATE	2	All Models	12717-54	Nylon
160	BUMPER	2	All Models	12317-16	Urethane
170	INNER DIAPHRAGM PLATE (SHORT STROKE) (PTFE PUMP MODELS)	2	LI15-*A*-T***-*** LI15-*33-T***-***	11114-20 11114-26	Aluminum Stainless Steel
180	DIAPHRAGM (BACKUP)	2	LI15-***-S***-***	10615-23 †	Santoprene®
190	OVERLAY (DIAPHRAGM)	2	LI15-***-T***-***	11410-59 †	PTFE
200&210	OUTER DIAPHRAGM PLATE WITH STUD	2	LI15-**A-****-*** LI15-**3-****-***	11221-20 11221-26	Aluminum Stainless Steel
220	SUCTION MANIFOLD - THREADED	1	LI15-N*A-****-*** LI15-N*3-****-*** LI15-B*A-****-*** LI15-B*3-****-***	11333-20-NPT 11333-26-NPT 11333-20-BSPT 11333-26-BSPT	Aluminum Stainless Steel Aluminum Stainless Steel
230	AIR VALVE GASKET	1	All Models	12124-19 ‡	Nitrile
240	SHUTTLE PLATE	1	All Models	10450-77 ‡	Ceramic
250	SHUTTLE	1	All Models	10430-00 ‡	Special
260	AIR VALVE BODY	1	LI15-*A*-****-*** LI15-*33-****-***	11618-20 ‡ 11618-26 ‡	Aluminum Stainless Steel
270	AIR VALVE SPOOL	1	All Models	10483-31 ‡	Acetal

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Parts List - Threaded Aluminum & Stainless Steel PTFE Short Stroke, LI15-***-T***-*** (cont.)

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
280	LIP SEAL (AIR VALVE)	2	All Models	12003-76 ‡	Nitrile
290	O-RING (AIR VALVE END PLUG)	1	All Models	11913-11 ‡	Nitrile
300	AIR VALVE END PLUG	1	LI15-*A*-****-*** LI15-*33-****-***	11706-20 ‡ 11706-26 ‡	Aluminum Stainless Steel
311&312	MUFFLER w/ BUSHING	1	LI15-***-****-*0* Optional	13013-00 13010-00	Polypropylene Metal
320	INNER CHAMBER GASKET	2	All Models	12123-19	Nitrile
331	PIPE PLUG 1-1/4"	1	LI15-B*A-****-*** LI15-N*A-****-*** LI15-B*3-****-*** LI15-N*3-****-***	12275-20-BSPT 12275-20-NPT 12275-26-BSPT 12275-26-NPT	Aluminum Aluminum Stainless Steel Stainless Steel
332	PIPE PLUG 1-1/2"	1	LI15-B*A-****-*** LI15-N*A-****-*** LI15-B*3-****-*** LI15-N*3-****-***	12270-20-BSPT 12270-20-NPT 12270-26-BSPT 12270-26-NPT	Aluminum Aluminum Stainless Steel Stainless Steel
340	SCREW, SELF-LOCKING PHILLIPS (#6-32 X 3/8")	6	All Models	12571-26	Stainless Steel
351	SCREW, HEX HEAD CAP (1/4"-20 X 3")	4	LI15-**A-****-*0* LI15-**3-****-*0*	12516-25 12516-26	Plated Steel Stainless Steel
352	SCREW, HEX HEAD CAP (5/16"-18 X 3/4")	10	LI15-**A-****-*0* LI15-**3-****-*0*	12536-25 12536-26	Plated Steel Stainless Steel
353	SCREW, HEX HEAD CAP (3/8"-16 X 1-3/4")	28	LI15-**A-****-*0* LI15-**3-****-*0*	12581-25 12581-26	Plated Steel Stainless Steel
361	NUT, FLANGE (3/8"-16)	28	LI15-**A-****-*0* LI15-**3-****-*0*	12612-25 12612-26	Plated Steel Stainless Steel
362	NUT (5/8"-11)	2	All Models	12579-25	Plated Steel
371	WASHER, LOCK (1/4")	4	LI15-**A-****-*0* LI15-**3-****-*0*	12350-25 12350-26	Plated Steel Stainless Steel
372	WASHER, SPLIT LOCK (3/8")	28	LI15-**A-****-*0* LI15-**3-****-*0*	12316-25 12316-26	Plated Steel Stainless Steel
381	WASHER, FLAT (1/4")	4	LI15-**A-****-*0* LI15-**3-****-*0*	12300-25 12300-26	Plated Steel Stainless Steel
382	FLAT WASHER, (5/16")	10	LI15-**A-****-*0* LI15-**3-****-*0*	12310-25 12310-26	Plated Steel Stainless Steel
383	WASHER (3/8")	28	LI15-**A-****-*0* LI15-**3-****-*0*	12303-25 12303-26	Plated Steel Stainless Steel
390	N/A				
400	GROUNDING LUG (NOT SHOWN)	1	Optional	13481-20	Aluminum
	Magnalube .75 OZ.	As Required, All Models		13404-00	Grease

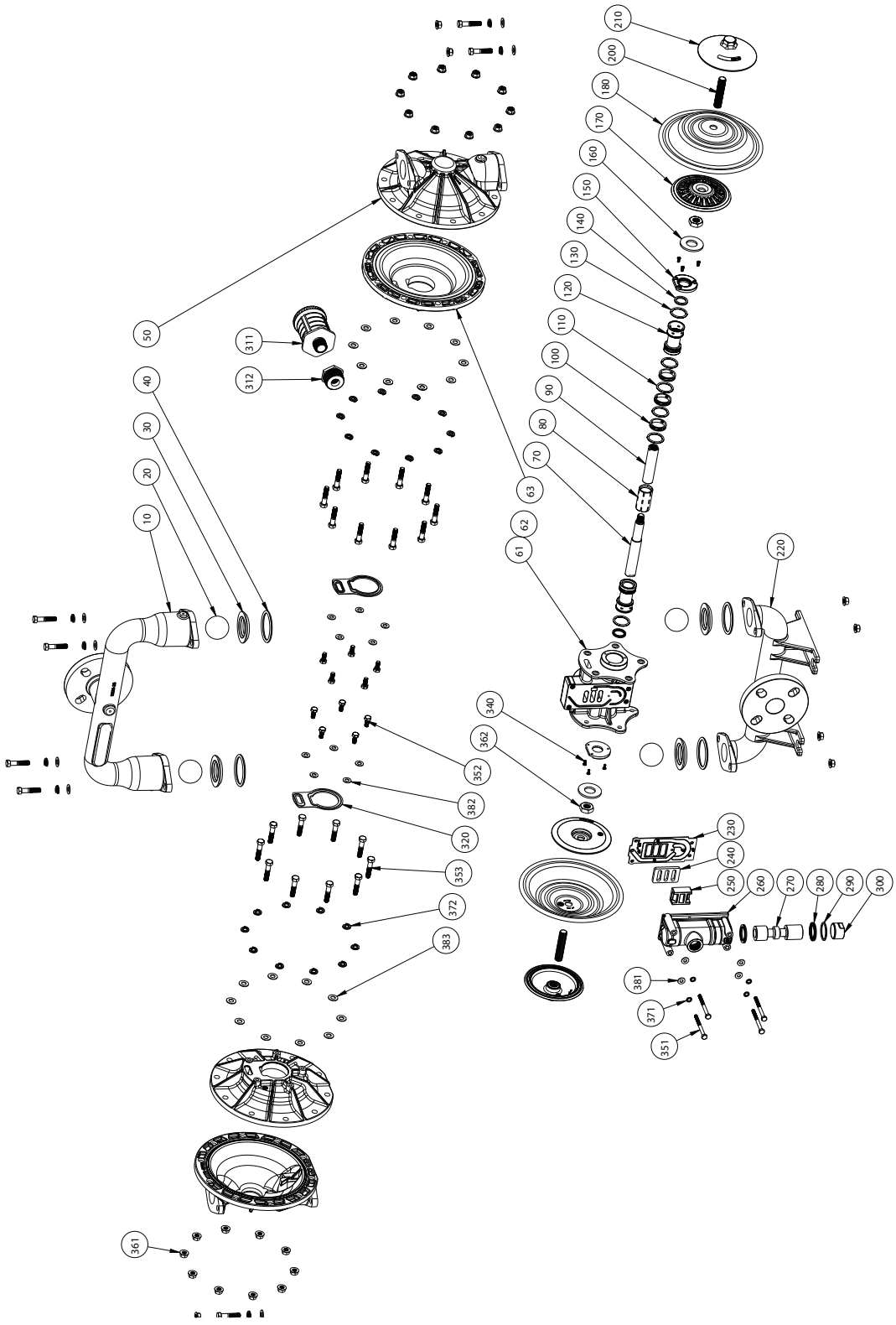
* Any Character

‡ , Δ Only sold as part of assembly

‡ MAIN AIR VALVE ASSEMBLY 230, 240, 250, 260, 270, 280, 290, 300	LI15-*A*-****-*** LI15-*3*-****-***	AMK-150-A AMK-150-3	Various Various
ASSEMBLY PART NUMBERS	**PUMP MODEL**	**PART NO.**	**MATERIAL**
80, 100, 110, 120, 130, 140	LI15-*3*-****-***	APK-150-3	Various
† WET END REPAIR KIT	LI15-*A*-****-***	AWE-150-****-M	Various
20, 30, 40, 180, 190	LI15-*3*-****-***	AWE-150-****-3	Various

Exploded View & Parts List: Flanged Stainless Steel Full Stroke

Exploded View: Flanged Stainless Steel Full Stroke LI15-F*3-****-***



Parts List: Flanged Stainless Steel Full Stroke LI15-F*3-****-***

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
10	DISCHARGE MANIFOLD - FLANGED	1	LI15-F*3-****-***	11336-26	Stainless Steel
20	BALL	4	LI15-***-*V**-*** LI15-***-*E**-*** LI15-***-*G**-*** LI15-***-*N**-*** LI15-***-*S**-*** LI15-***-*T**-***	11010-13 † 11010-15 † 11010-19 † 11010-21 † 11010-23 † 11010-59 †	Viton®/FKM EPDM Geolast® Buna-N Santoprene® PTFE
30	VALVE SEAT	4	LI15-***-**A*-*** LI15-***-**3*-*** LI15-***-**P*-*** LI15-***-**Y*-***	10930-20 † 10930-26 † 10930-39 † 10930-42 †	Aluminum Stainless Steel Polypropylene Nylon
40	O-RING, VALVE SEAT	4	LI15-***-***N-*** LI15-***-***V-*** LI15-***-***E-*** LI15-***-***T-***	11952-11 † 11952-13 † 11952-15 † 11952-17 †	Nitrile Viton®/FKM EPDM PTFE
50	OUTER CHAMBER	2	LI15-**3-****-***	10727-26	Stainless Steel
61&62	INTERMEDIATE	1	LI15-*A*-****-*** LI15-*33-****-***	11525-20 11525-26	Aluminum Stainless Steel
63	INNER CHAMBER	2	LI15-*A*-****-*** LI15-*33-****-***	11806-20 11806-26	Aluminum Stainless Steel
70&90	DIAPHRAGM ROD ASSEMBLY (FULL STROKE)	1	All non-PTFE Models	35003-00	Stainless Steel
80	VALVE SLEEVE	1	All Models	10107-31 Δ	Acetal
100	INNER SPACER (PILOT SLEEVE)	3	All Models	10205-40 Δ	Polypropylene
110	O-RING (PILOT SLEEVE)	4	All Models	11919-16 Δ	Urethane
120	END SPACER (PILOT SLEEVE)	2	All Models	10208-40 Δ	Polypropylene
130	O-RING (END SPACER)	2	All Models	11919-11 Δ	Nitrile
140	LIP SEAL (DIAPHRAGM ROD)	2	All Models	12002-76 Δ	Nitrile
150	RETAINING PLATE	2	All Models	12717-54	Nylon
160	BUMPER	2	All Models	12317-16	Urethane
170	INNER DIAPHRAGM PLATE (FULL STROKE) (NON-PTFE MODELS)	2	LI15-*A*-****-*** LI15-*33-****-***	11112-20 11112-26	Aluminum Stainless Steel
180	DIAPHRAGM	2	LI15-***-N***-*** LI15-***-V***-*** LI15-***-E***-*** LI15-***-G***-*** LI15-***-S***-***	10614-11 † 10614-13 † 10614-15 † 10614-19 † 10614-23 †	Buna-N Viton®/FKM EPDM Geolast® Santoprene®
190	N/A				
200&210	OUTER DIAPHRAGM PLATE WITH STUD	2	LI15-**3-****-***	11221-26	Stainless Steel
220	SUCTION MANIFOLD - FLANGED	1	LI15-F*3-****-***	11337-26	Stainless Steel
230	GASKET, AIR VALVE	1	All Models	12124-19 ‡	Nitrile
240	SHUTTLE PLATE	1	All Models	10450-77 ‡	Ceramic
250	SHUTTLE	1	All Models	10430-00 ‡	Special
260	AIR VALVE BODY	1	LI15-*A*-****-*** LI15-*33-****-***	11618-20 ‡ 11618-26 ‡	Aluminum Stainless Steel
270	AIR VALVE SPOOL	1	All Models	10483-31 ‡	Acetal

Parts List: Flanged Stainless Steel Full Stroke LI15-F*3-****-*** (con't)

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
280	LIP SEAL (AIR VALVE)	2	All Models	12003-76 ‡	Nitrile
290	O-RING (AIR VALVE END PLUG)	1	All Models	11913-11 ‡	Nitrile
300	AIR VALVE END PLUG	1	LI15-*A*-****-*** LI15-*33-****-***	11706-20 ‡ 11706-26 ‡	Aluminum Stainless Steel
311&312	MUFFLER w/ BUSHING	1	LI15-***-****-*0* Optional	13013-00 13010-00	Polypropylene Metal
320	INNER CHAMBER GASKET	2	All Models	12123-19	Nitrile
330	N/A				
340	SCREW, SELF-LOCKING PHILLIPS (#6-32 X 3/8")	6	All Models	12571-26	Stainless Steel
351	SCREW, HEX HEAD CAP (1/4"-20 X 3")	4	LI15-**3-****-*0*	12516-26	Stainless Steel
352	SCREW, HEX HEAD CAP (5/16"-18 X 3/4")	10	LI15-**3-****-*0*	12536-26	Stainless Steel
353	SCREW, HEX HEAD CAP (3/8"-16 X 1-3/4")	28	LI15-**3-****-*0*	12581-26	Stainless Steel
361	NUT, FLANGE (3/8"-16)	28	LI15-**3-****-*0*	12612-26	Stainless Steel
362	NUT (5/8"-11)	2	All Models	12579-25	Plated Steel
371	WASHER, LOCK (1/4")	4	LI15-**3-****-*0*	12350-26	Stainless Steel
372	WASHER, SPLIT LOCK (3/8")	28	LI15-**3-****-*0*	12316-26	Stainless Steel
381	WASHER, FLAT (1/4")	4	LI15-**3-****-*0*	12300-26	Stainless Steel
382	FLAT WASHER, (5/16")	10	LI15-**3-****-*0*	12310-26	Stainless Steel
383	WASHER (3/8")	28	LI15-**3-****-*0*	12303-26	Stainless Steel
390	N/A				
400	GROUNDING LUG (NOT SHOWN)	1	Optional	13481-20	Aluminum
	Magnalube .75 OZ.	As Required, All Models		13404-00	Grease
* Any Character					
‡ , Δ Only sold as part of assembly					

ASSEMBLY PART NUMBERS	PUMP MODEL	PART NO.	MATERIAL
‡ MAIN AIR VALVE ASSEMBLY	LI15-*A*-****-***	AMK-150-A	Various
230, 240, 250, 260, 270, 280, 290, 300	LI15-*3*-****-***	AMK-150-3	Various
Δ PILOT VALVE ASSEMBLY	LI15-*A*-****-***	APK-150-A	Various
80, 100, 110, 120, 130, 140	LI15-*3*-****-***	APK-150-3	Various
† WET END REPAIR KIT	LI15-*A*-****-***	AWE-150-****-M	Various
20, 30, 40, 180, 190	LI15-*3*-****-***	AWE-150-****-3	Various

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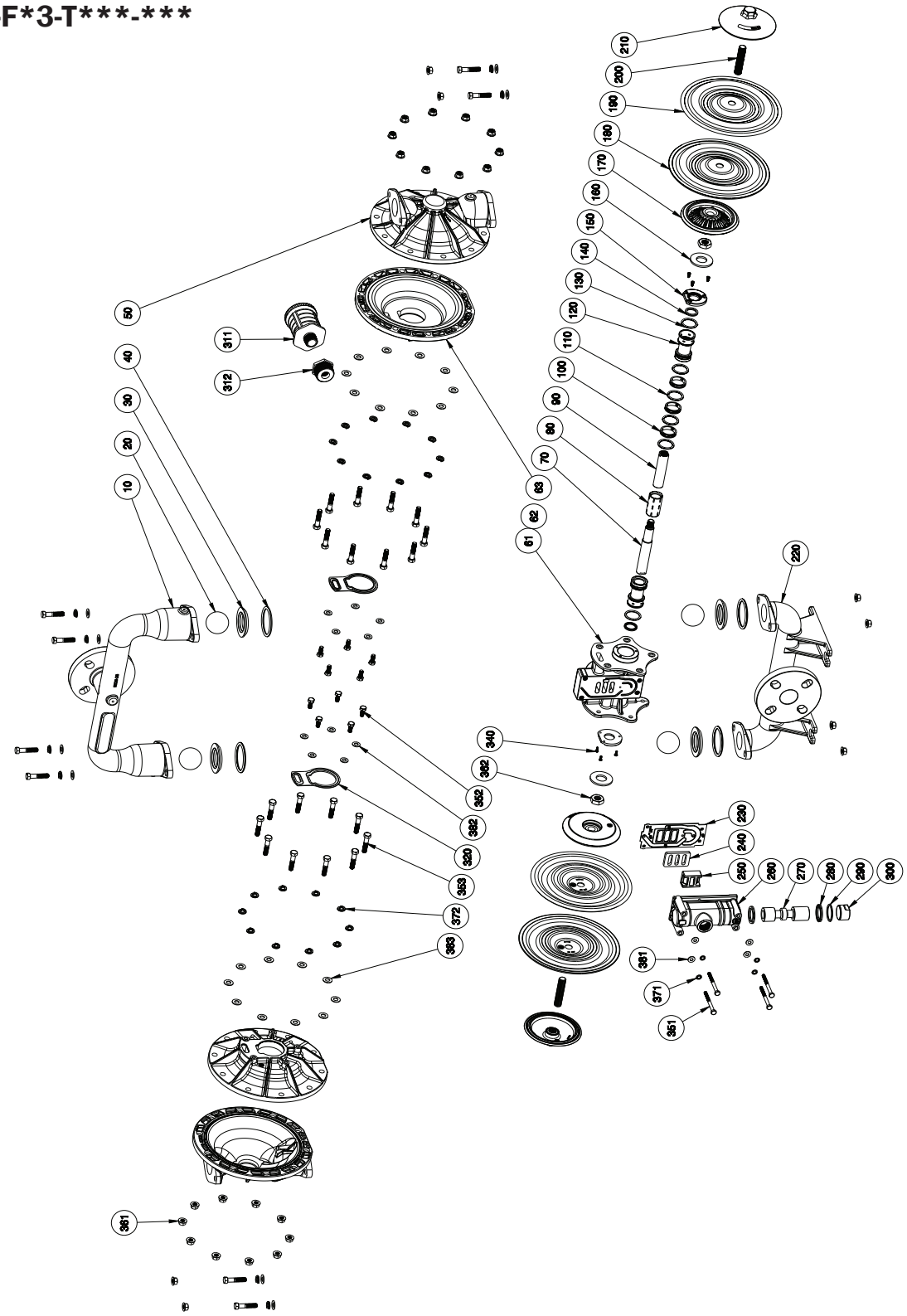
Exploded View & Parts List: Flanged Stainless Steel PTFE Short Stroke

Exploded View: Flanged Stainless Steel PTFE Short Stroke

LI15-F*3-T***-***



Parts List: Flanged Stainless Steel Short Stroke LI15-F*3-T***-***

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
10	DISCHARGE MANIFOLD - FLANGED	1	LI15-F*3-****-***	11336-26	Stainless Steel
20	BALL	4	LI15-***-*V**-*** LI15-***-*E**-*** LI15-***-*G**-*** LI15-***-*N**-*** LI15-***-*S**-*** LI15-***-*T**-***	11010-13 † 11010-15 † 11010-19 † 11010-21 † 11010-23 † 11010-59 †	Viton®/FKM EPDM Geolast® Buna-N Santoprene® PTFE
30	VALVE SEAT	4	LI15-***-**A*-*** LI15-***-**3*-*** LI15-***-**P*-*** LI15-***-**Y*-***	10930-20 † 10930-26 † 10930-39 † 10930-42 †	Aluminum Stainless Steel Polypropylene Nylon
40	O-RING, VALVE SEAT	4	LI15-***-***N-*** LI15-***-***V-*** LI15-***-***E-*** LI15-***-***T-***	11952-11 † 11952-13 † 11952-15 † 11952-17 †	Nitrile Viton®/FKM EPDM PTFE
50	OUTER CHAMBER	2	LI15-**3-****-***	10727-26	Stainless Steel
61&62	INTERMEDIATE	1	LI15-*A*-****-*** LI15-*33-****-***	11525-20 11525-26	Aluminum Stainless Steel
63	INNER CHAMBER	2	LI15-*AA-****-*** LI15-*33-****-***	11806-20 11806-26	Aluminum Stainless Steel
70&90	DIAPHRAGM ROD ASSEMBLY (SHORT STROKE)	1	LI15-***-T***-***	35004-00	Stainless Steel
80	VALVE SLEEVE	1	All Models	10107-31 Δ	Acetal
100	INNER SPACER (PILOT SLEEVE)	3	All Models	10205-40 Δ	Polypropylene
110	O-RING (PILOT SLEEVE)	4	All Models	11919-16 Δ	Urethane
120	END SPACER (PILOT SLEEVE)	2	All Models	10208-40 Δ	Polypropylene
130	O-RING (END SPACER)	2	All Models	11919-11 Δ	Nitrile
140	LIP SEAL (DIAPHRAGM ROD)	2	All Models	12002-76 Δ	Nitrile
150	RETAINING PLATE	2	All Models	12717-54	Nylon
160	BUMPER	2	All Models	12317-16	Urethane
170	INNER DIAPHRAGM PLATE (SHORT STROKE) (PTFE MODELS ONLY)	2	LI15-*A*-T***-*** LI15-*33-T***-***	11114-20 11114-26	Aluminum Stainless Steel
180	DIAPHRAGM (BACKUP)	2	LI15-***-S***-***	10615-23 †	Santoprene®
190	OVERLAY (DIAPHRAGM)	2	LI15-***-T***-***	11410-59 †	PTFE
200&210	OUTER DIAPHRAGM PLATE WITH STUD	2	LI15-**3-****-***	11221-26	Stainless Steel
220	SUCTION MANIFOLD - FLANGED	1	LI15-FA3-****-***	11337-26	Stainless Steel
230	GASKET, AIR VALVE	1	All Models	12124-19 ‡	Nitrile
240	SHUTTLE PLATE	1	All Models	10450-77 ‡	Ceramic
250	SHUTTLE	1	All Models	10430-00 ‡	Special
260	AIR VALVE BODY	1	LI15-*A*-****-*** LI15-*33-****-***	11618-20 ‡ 11618-26 ‡	Aluminum Stainless Steel
270	AIR VALVE SPOOL	1	All Models	10483-31 ‡	Acetal
280	LIP SEAL (AIR VALVE)	2	All Models	12003-76 ‡	Nitrile
290	O-RING (AIR VALVE END PLUG)	1	All Models	11913-11 ‡	Nitrile
300	AIR VALVE END PLUG	1	LI15-*A*-****-*** LI15-*33-****-***	11706-20 ‡ 11706-26 ‡	Aluminum Stainless Steel
311&312	MUFFLER w/ BUSHING	1	LI15-***-****-*0* Optional	13013-00 13010-00	Polypropylene Metal

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Parts List: Flanged Stainless Steel Short Stroke LI15-F*3-T***-*** (con't)

ITEM	DESCRIPTION	QTY	PUMP MODEL	PART NO.	MATERIAL
320	INNER CHAMBER GASKET	2	All Models	12123-19	Nitrile
330	N/A				
340	SCREW, SELF-LOCKING PHILLIPS (#6-32 X 3/8")	6	All Models	12571-26	Stainless Steel
351	SCREW, HEX HEAD CAP (1/4"-20 X 3")	4	LI15-**3-****-*0*	12516-26	Stainless Steel
352	SCREW, HEX HEAD CAP (5/16"-18 X 3/4")	10	LI15-**3-****-*0*	12536-26	Stainless Steel
353	SCREW, HEX HEAD CAP (3/8"-16 X 1-3/4")	28	LI15-**3-****-*0*	12581-26	Stainless Steel
361	NUT, FLANGE (3/8"-16)	28	LI15-**3-****-*0*	12612-26	Stainless Steel
362	NUT (5/8"-11)	2	All Models	12579-25	Plated Steel
371	WASHER, LOCK (1/4")	4	LI15-**3-****-*0*	12350-26	Stainless Steel
372	WASHER, SPLIT LOCK (3/8")	28	LI15-**3-****-*0*	12316-26	Stainless Steel
381	WASHER, FLAT (1/4")	4	LI15-**3-****-*0*	12300-26	Stainless Steel
382	FLAT WASHER, (5/16")	10	LI15-**3-****-*0*	12310-26	Stainless Steel
383	WASHER (3/8")	28	LI15-**3-****-*0*	12303-26	Stainless Steel
390	N/A				
400	GROUNDING LUG (NOT SHOWN)	1	Optional	13481-20	Aluminum
	Magnalube .75 OZ.	As Required, All Models		13404-00	Grease
* Any Character					
‡ , Δ Only sold as part of assembly					
‡ MAIN AIR VALVE ASSEMBLY			LI15-*A*-****-***	AMK-150-A	Various
230, 240, 250, 260, 270, 280, 290, 300			LI15-*3*-****-***	AMK-150-3	Various
Δ PILOT VALVE ASSEMBLY			LI15-*A*-****-***	APK-150-A	Various
80, 100, 110, 120, 130, 140			LI15-*3*-****-***	APK-150-3	Various
† WET END REPAIR KIT			LI15-*A*-****-***	AWE-150-****-M	Various
ASSEMBLY PART NUMBERS			PUMP MODEL	PART NO.	MATERIAL

Elastomers

BUNA-N (NITRILE)
is a general purpose elastomer used with water and many oils. Temperature range 10°F to 180°F (-12C to 82C).

GEOLAST®
is an injection molded thermoplastic material with characteristics similar to Nitrile. Has excellent abrasion resistance. Temperature range 10°F to 180°F (-12C to 82C).

EPDM
is a general purpose elastomer with good resistance to many acids and bases. Temperature range -40°F to 280°F (-40C to 138C).

SANTOPRENE®
is an injection molded material with characteristics similar to EPDM. Has excellent abrasion resistance. Temperature range -40°F to 225°F (-40C to 107C).

VITON®
is an elastomer with good corrosion resistance to a wide variety of chemicals. Temperature range -40°F to 350°F (-40C to 177C).

FKM
is an elastomer with good corrosion resistance to a wide variety of chemicals. Similar in chemical resistance to Viton®.Temperature range -40°F to 350°F (-40C to 177C).

PTFE (POLYTETRAFLUOROETHYLENE)
is a thermoplastic polymer that is inert to most chemicals. Similar in chemical resistance to Teflon®. Temperature range 40°F to 220°F (4C to 104C).

Most of the above elastomers are available in FDA approved formulations.

Viton® is a registered trademark of DuPont Performance Elastomers L.L.C.
Geolast® is a registered trademark of ExxonMobil Chemical Co.
Santoprene® is a registered trademark of ExxonMobil Chemical Co.
Teflon® is a registered trademark of DuPont Performance Elastomers L.L.C.
Magnalube® is a registered trademark of Carleton-Stuart Corp.

II 2 GD c TX

Warning: The TX marking refers to the maximum surface temperature depending not on the equipment itself, but mainly on operating conditions. In this case, the maximum surface temperature depends upon the temperature of the process fluids.

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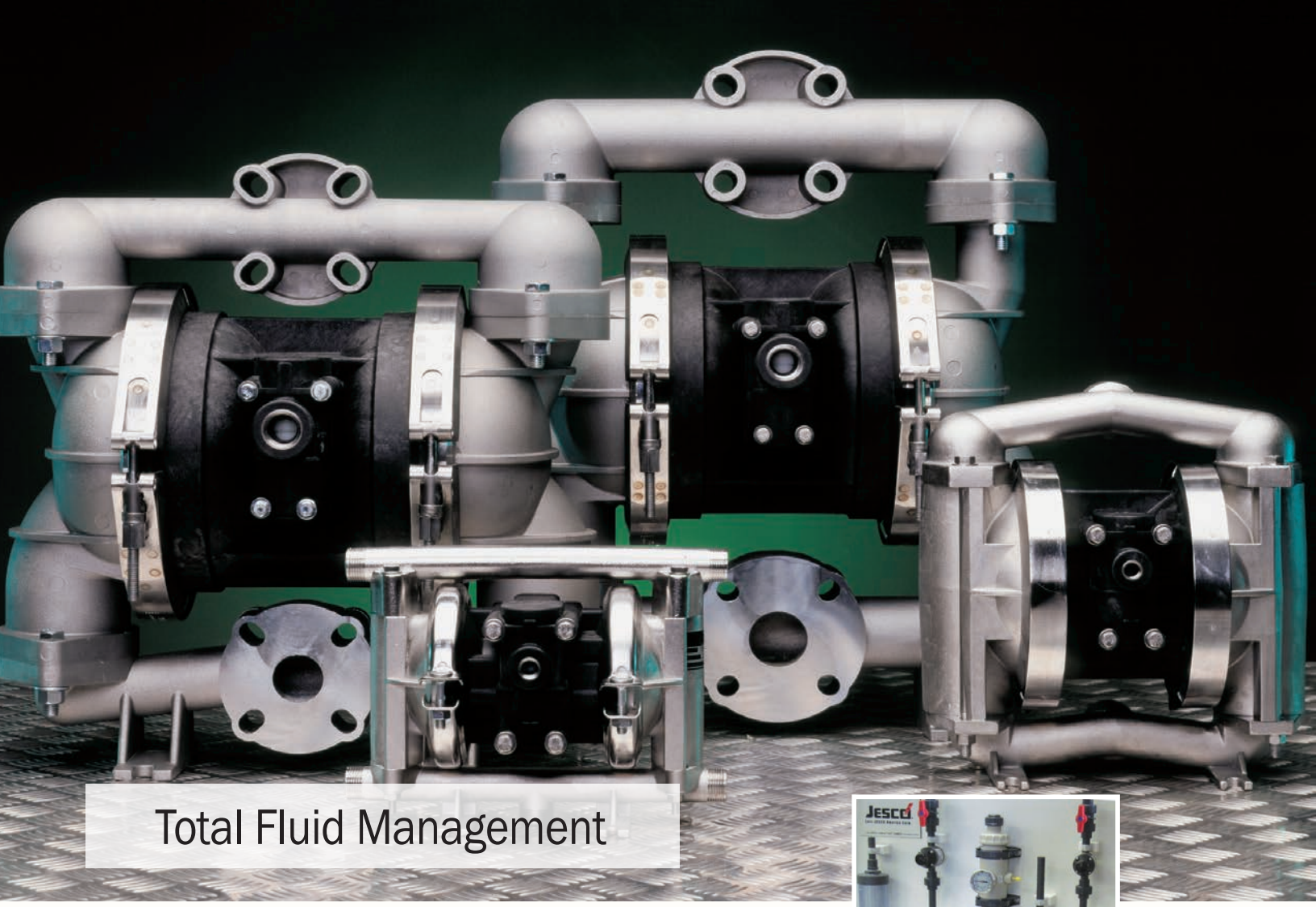

Total Fluid Management

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