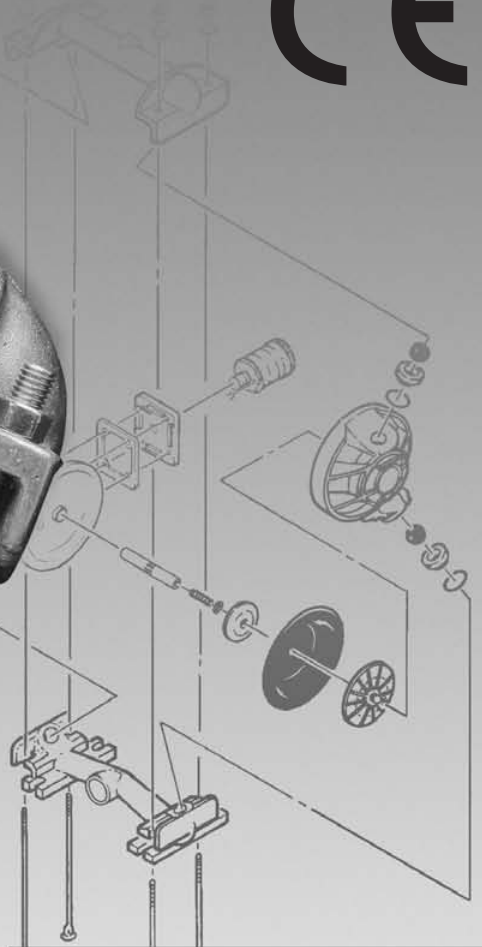


BIOPHARM™

A2

Engineering Operation & Maintenance

CE



WILDEN®

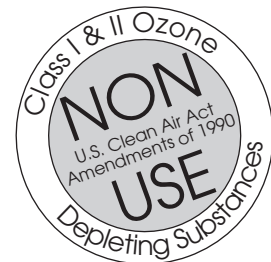
A DOVER COMPANY

ACCUFLO™
SOLENOID PUMP TECHNOLOGY

**Metal
Pumps**

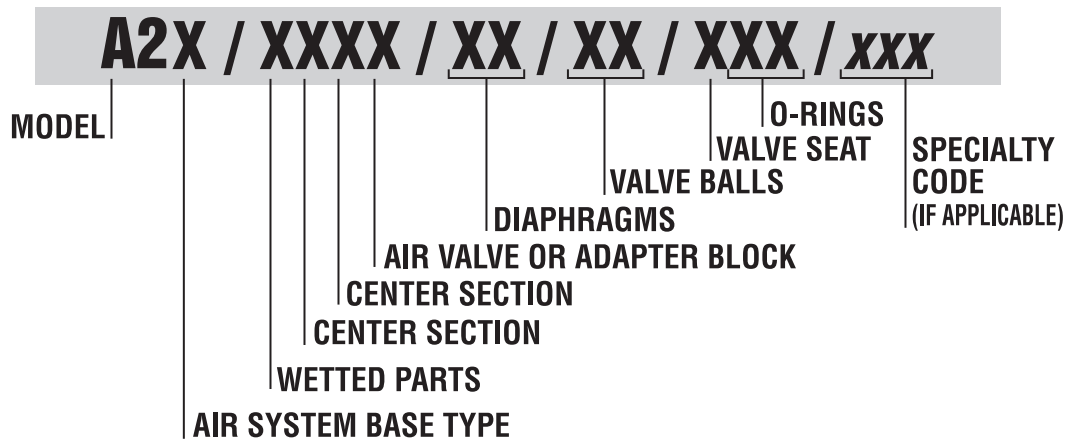
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SECTION 1

WILDEN PUMP DESIGNATION SYSTEM



MODEL A2 METAL MATERIAL CODES

AIR SYSTEM BASE TYPE

- B = ADAPTER BLOCK
- T = TURBO-FLO™
- P = PRO-FLO®

WETTED PARTS

- H = ALLOY C
- S = STAINLESS STEEL

CENTER SECTION

- CC = PTFE-COATED
- NN = NICKEL-PLATED
- PP = POLYPROPYLENE
- RR = CARILON

AIR VALVE

- A = ALUMINUM
(available on A2T only)
- L = ACETAL (Available on
A2P & A2B only)
- P = POLYPROPYLENE (available
on A2P and A2B only)
- U = UHMW PE (Available on
A2B only)

DIAPHRAGMS

- TS = PTFE W/SANIFLEX™
BACK-UP (White)

VALVE BALL

- TF = PTFE (White)

VALVE SEAT

- H = ALLOY C
- S = STAINLESS STEEL

VALVE SEAT O-RING

- TF = PTFE

SPECIALTY CODE (AVAILABILITY VARIES BY MODEL.)

- 900 BioPharm
- 901 BioPharm, BSP
- 902 BioPharm, DIN
- 903 BioPharm, FDA (Tri-Clover® flanges & wing nuts)
- 904 BioPharm, USDA (Food Master)
- 905 BioPharm, 3A (CIP), Wil-Gard 110V
- 906 BioPharm, 3A (CIP), Wil-Gard 220V
- 907 BioPharm, LSH, side ported
- 908 BioPharm, FDA, Accu-Flo, 24V DC coil
- 909 BioPharm, FDA, Accu-Flo, 24V DC x-proof coil
- 910 BioPharm, FDA, Accu-Flo, 24V AC / 12V DC coil
- 911 BioPharm, FDA, Accu-Flo, 24V AC / 12V DC x-proof coil
- 912 BioPharm, FDA, Accu-Flo, 110V AC coil
- 913 BioPharm, FDA, Accu-Flo, 110V AC x-proof coil
- 914 BioPharm, Accu-Flo, 24V DC coil
- 915 BioPharm, Accu-Flo, 24V DC x-proof coil
- 916 BioPharm, Accu-Flo, 24V AC / 12V DC coil
- 917 BioPharm, Accu-Flo, 24V AC / 12V DC x-proof coil
- 918 BioPharm, Accu-Flo, 110V AC coil
- 919 BioPharm, Accu-Flo, 110V AC x-proof coil

NOTE: MOST ELASTOMERIC MATERIALS USE COLORED DOTS FOR IDENTIFICATION.

THE THREE ACCU-FLO™ OPTIONS AVAILABLE:

1. AxT: This is the same Accu-Flo configuration that has been available from Wilden since March 1994. An aluminum solenoid valve is attached directly to a T-series center section and the shaft/inner piston configuration is altered.

2. AxP: This option uses a plastic (polypropylene or acetal) spacer that is assembled between the Pro-Flo® air valve and the Pro-Flo® center section. The same solenoid operator – coil assembly that is found on AxT pumps is assembled on the plastic spacer discussed above for electronic interface. This spacer together with the Pro-Flo® air valve replaces the aluminum air valve used in the AxT with a more chemically resistant option. Spacers will be available in the ¼ in, ½ in, and 1-in sizes. The use

of the Pro-Flo® ADS provides additional flow in most applications (refer to EOM for details). The AxP provides the Pro-Flo® benefits of lower start-up pressure, reduced blow-by, and increased life.

3. AxB: This option uses an Adapter Block in place of an air valve. A user supplied, 4-way pneumatic valve must be used in conjunction with this technology. This configuration enables the solenoid valve to be remotely installed, preventing chemical attack in very aggressive environments. Adapter Blocks are available for both the T and P-series center sections in all pump sizes. (See EOM AxB for details.)

Note: The "x" in the above Accu-Flo descriptions are used in place of a pump model size. See Pump Designation System chart above.

SECTION 2

THE WILDEN PUMP – HOW IT WORKS

The Wilden diaphragm pump is an air-operated, positive displacement, self-priming pump. These drawings show the flow pattern through the pump upon its initial stroke. It is assumed the pump has no fluid in it prior to its initial stroke.

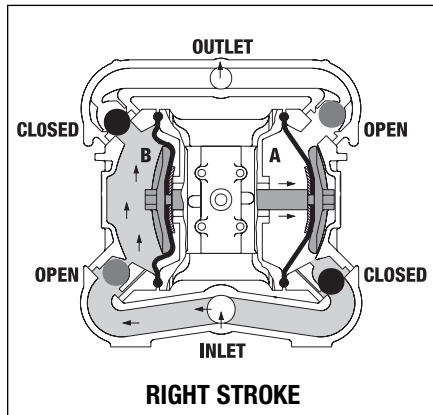


FIGURE 1 When the solenoid is energized, the air valve directs pressure to the back side of diaphragm A. The compressed air is applied directly to the liquid column separated by elastomeric diaphragms. The diaphragm acts as a membrane between the compressed air and the liquid, balancing the load and removing mechanical stress from the diaphragm. The compressed air moves the diaphragm away from the center section of the pump. The opposite diaphragm is pulled in by the shaft connected to the pressurized diaphragm. Diaphragm B is on its suction stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port. The movement of diaphragm B toward the center section of the pump creates a vacuum within chamber B. Atmospheric pressure forces fluid into the inlet manifold forcing the inlet valve ball off of its seat. Liquid is free to move past the inlet valve ball and fill the liquid chamber (see shaded area).

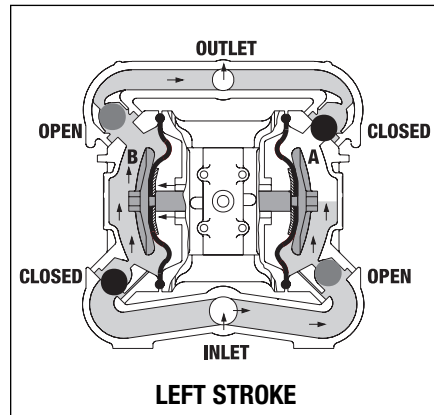


FIGURE 2 When the solenoid valve is deenergized, the air valve redirects pressurized air to the back side of diaphragm B. The pressurized air forces diaphragm B away from the center section while pulling diaphragm A to the center section. Diaphragm B is now on its discharge stroke. Diaphragm B forces the inlet valve ball onto its seat due to the hydraulic forces developed in the liquid chamber and manifold of the pump. These same hydraulic forces lift the discharge valve ball off of its seat, while the opposite discharge valve ball is forced onto its seat, forcing fluid to flow through the pump discharge. The movement of diaphragm A toward the center section of the pump creates a vacuum within liquid chamber A. Atmospheric pressure forces fluid into the inlet manifold of the pump. The inlet valve ball is forced off of its seat allowing the fluid being pumped to fill the liquid chamber.

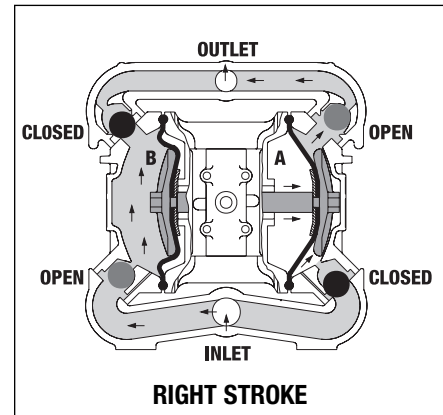


FIGURE 3 Once the solenoid valve is reenergized the air is directed to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one intake and one discharge stroke. This constitutes one complete pumping cycle. The pump may take several cycles to completely prime depending on the conditions of the application.

SECTION 3

WILDEN MODEL A2 METAL CAUTIONS – READ FIRST!



TEMPERATURE LIMITS:

Saniflex™ -28.9°C to 104.4°C -20°F to 220°F
PTFE 4.4°C to 148.9°C 40°F to 300°F



CAUTION: When choosing pump materials, be sure to check the temperature limits for all wetted components.



CAUTION: Maximum temperature limits are based upon mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperatures. Consult engineering guide for chemical compatibility and temperature limits.



CAUTION: Always wear safety glasses when operating pump. If diaphragm rupture occurs, material being pumped may be forced out air exhaust.



WARNING: Prevention of static sparking — If static sparking occurs, fire or explosion could result. Pump, valves, and containers must be properly grounded when handling flammable fluids and whenever discharge of static electricity is a hazard.



CAUTION: Do not exceed 8.6 Bar (125 psig) air supply pressure.



CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container.



CAUTION: Blow out air line for 10 to 20 seconds before attaching to pump to make sure all pipe line debris is clear. Use an in-line air filter. A 5µ (micron) air filter is recommended.



NOTE: Tighten all fasteners prior to installation. Fittings may loosen during transportation.



NOTE: When installing PTFE diaphragms, it is important to tighten outer pistons simultaneously (turning in opposite directions) to ensure tight fit.



NOTE: Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber. This line will assist in proper alignment during reassembly.



CAUTION: Verify the chemical compatibility of the process and cleaning fluid to the pump's component materials in the Chemical Resistance Guide (see E4).



CAUTION: Only explosion proof (NEMA 7) solenoid valves should be used in areas where explosion proof equipment is required.



CAUTION: Do not lubricate lube-free pumps.

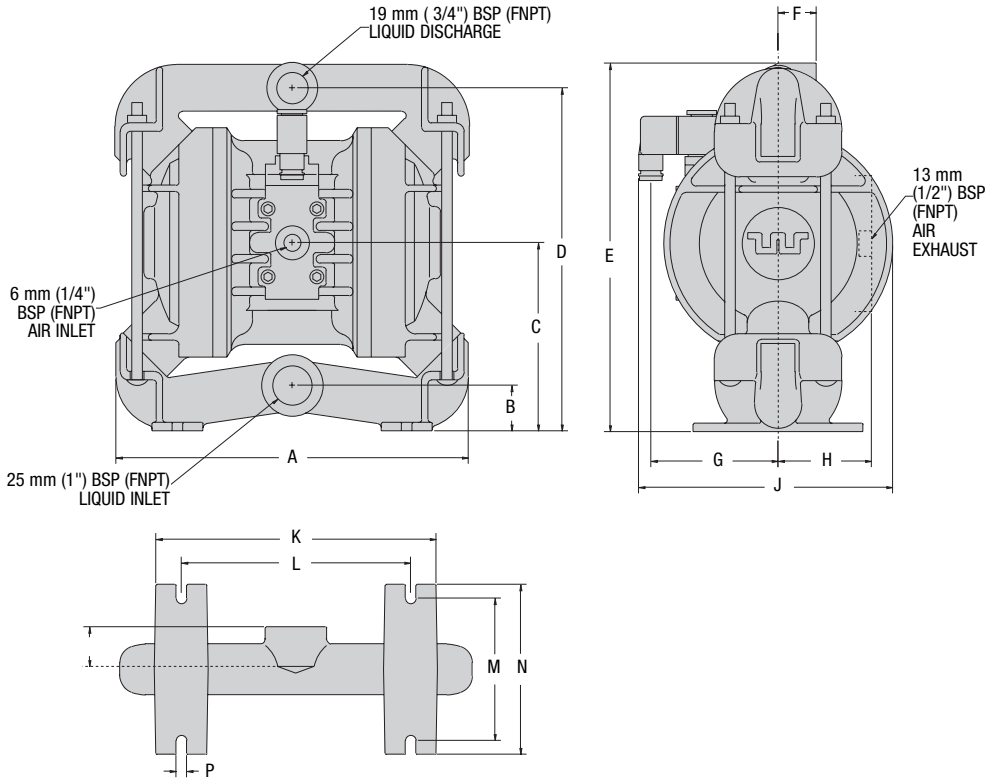


CAUTION: The A2 pump is not submersible.

SECTION 4A

DIMENSIONAL DRAWING

WILDEN MODEL A2T METAL ACCU-FLO™

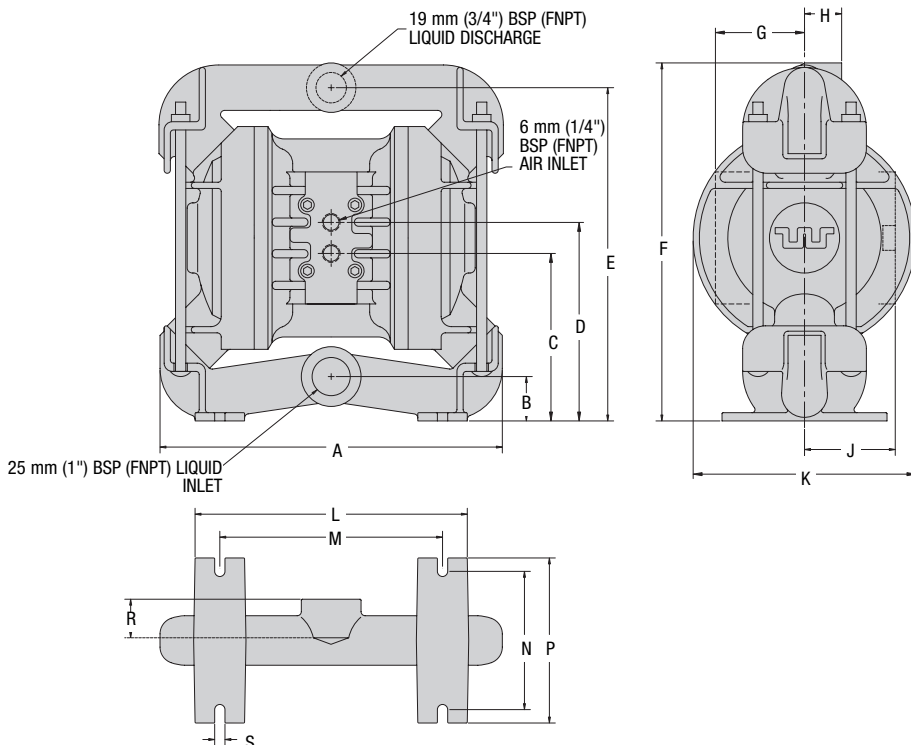


DIMENSIONS - A2T METAL		
ITEM	METRIC (mm)	STANDARD (inch)
A	267	10.5
B	36	1.4
C	137	5.4
D	254	10.0
E	279	11.0
F	28	1.1
G	97	3.8
H	76	3.0
J	191	7.5
K	211	8.3
L	173	6.8
M	107	4.2
N	127	5.0
P	8	0.3
R	33	1.3

SECTION 4B

DIMENSIONAL DRAWING

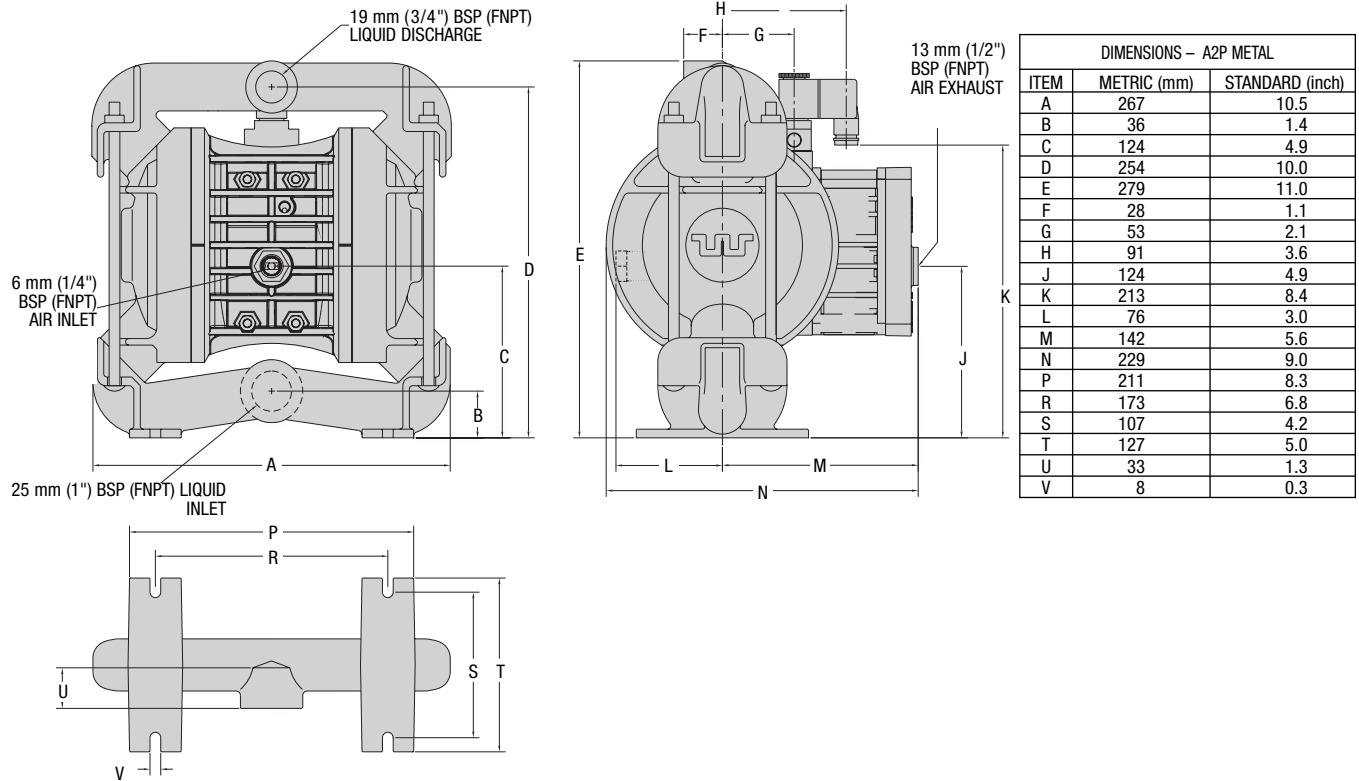
WILDEN MODEL A2B METAL (T-SERIES CENTER SECTION)



DIMENSIONS - A2B METAL		
ITEM	METRIC (mm)	STANDARD (inch)
A	267	10.5
B	36	1.4
C	130	5.1
D	152	6.0
E	254	10.0
F	279	11.0
G	69	2.7
H	28	1.1
J	76	3.0
K	173	6.8
L	211	8.3
M	173	6.8
N	107	4.2
P	127	5.0
R	33	1.3
S	8	0.3

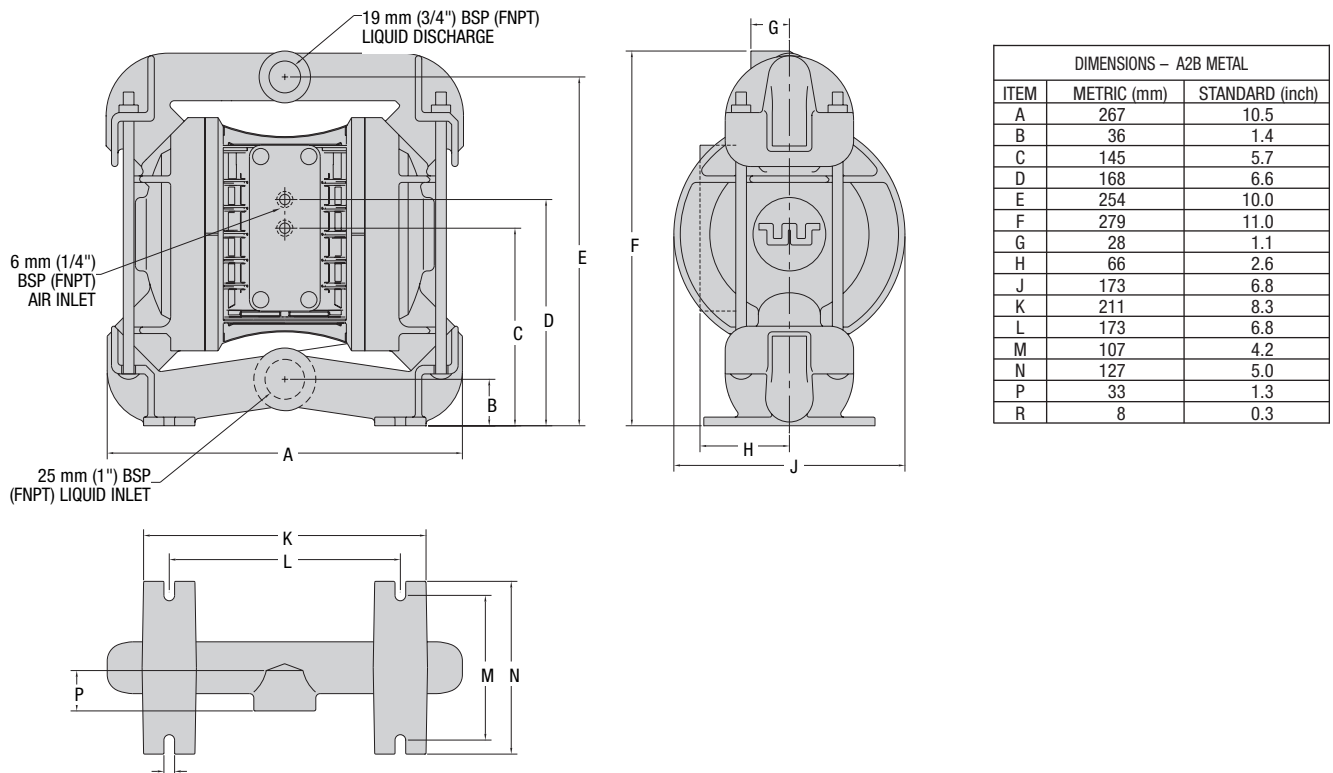
SECTION 4C

DIMENSIONAL DRAWING WILDEN MODEL A2P METAL ACCU-FLO™



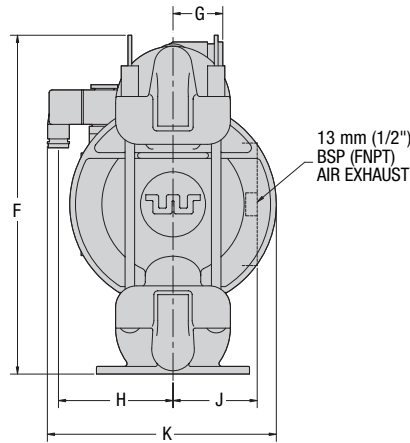
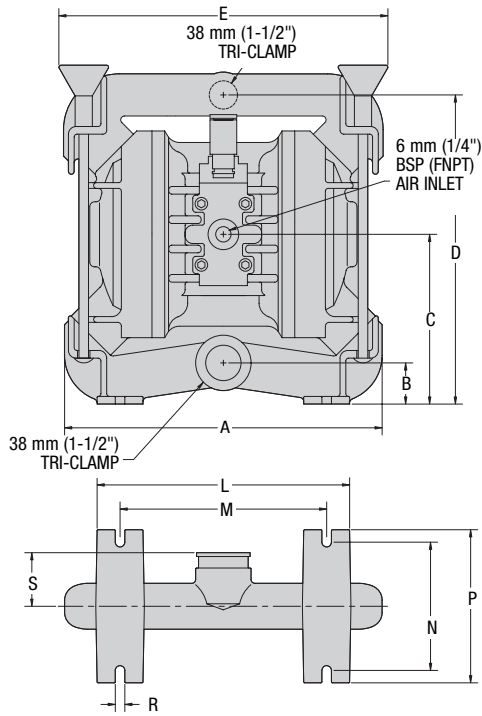
SECTION 4D

DIMENSIONAL DRAWING WILDEN MODEL A2B METAL (P-SERIES CENTER SECTION)



SECTION 4E

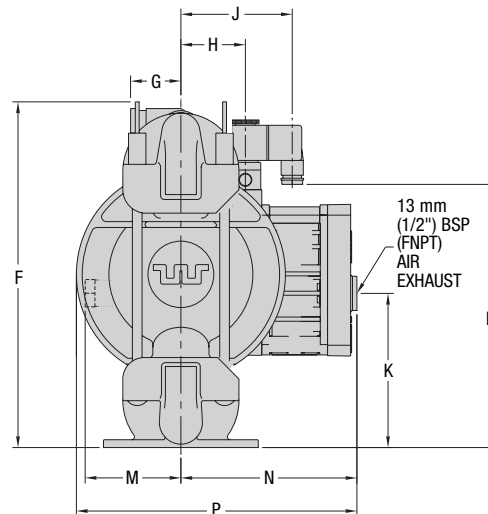
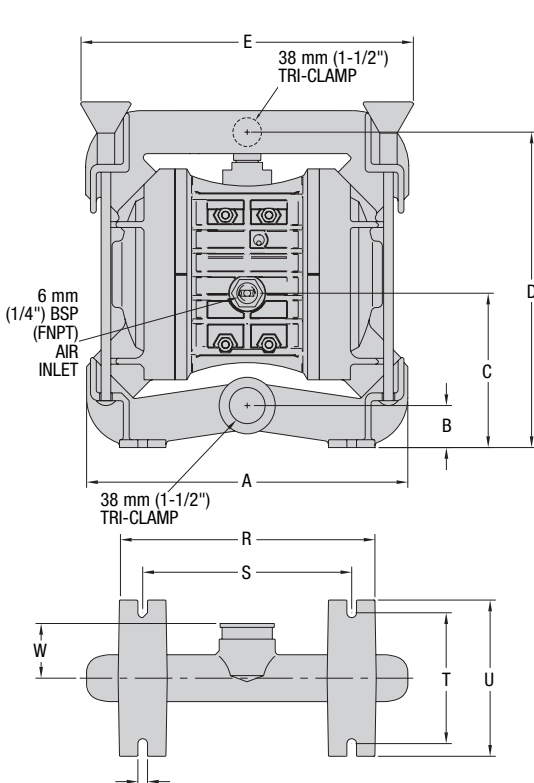
DIMENSIONAL DRAWING WILDEN MODEL A2T METAL BIOPHARM ACCU-FLO™



DIMENSIONS – A2T FDA		
ITEM	METRIC (mm)	STANDARD (inch)
A	267	10.53
B	36	1.43
C	137	5.43
D	254	10.00
E	267	10.50
F	295	11.63
G	41	1.63
H	97	3.78
J	76	3.03
K	191	7.50
L	211	8.25
M	173	6.75
N	107	4.19
P	127	5.00
R	8	.31
S	43	1.72

SECTION 4F

DIMENSIONAL DRAWING WILDEN MODEL A2P METAL BIOPHARM ACCU-FLO™



DIMENSIONS – A2P FDA		
ITEM	METRIC (mm)	STANDARD (inch)
A	267	10.53
B	36	1.43
C	124	4.94
D	254	10.00
E	267	10.50
F	295	11.63
G	41	1.63
H	53	2.06
J	91	3.56
K	124	4.94
L	213	8.42
M	76	3.03
N	117	4.59
P	203	8.00
R	211	8.25
S	173	6.75
T	107	4.19
U	127	5.00
V	8	.31
W	43	1.72

SECTION 5A

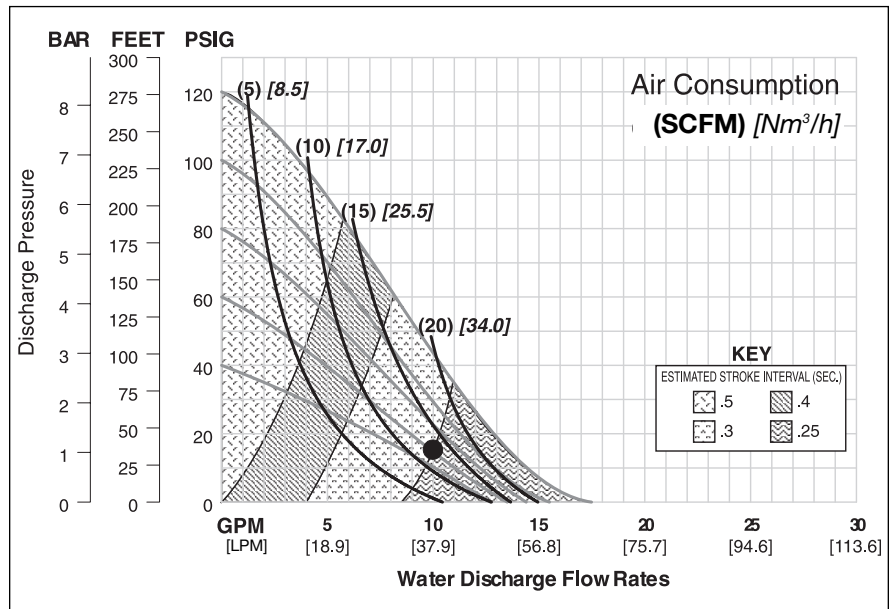
PERFORMANCE CURVES MODEL A2T METAL PTFE-FITTED

Height279 mm (11.0")
 Width267 mm (10.5")
 Depth191 mm (7.5")
 Ship WeightStainless Steel 16.6 kg (36 lbs.)
 Alloy C 16 kg (40 lbs.)
 Air Inlet.....6 mm (¼")
 Inlet25 mm (1")
 Outlet.....19 mm (¾")
 Suction Lift.....4.85 m Dry (15.9')
 8.66 m Wet (28.4')

Displacement per
 Stroke15 l (.039 gal.)¹
 Max. Flow Rate66 lpm (17.5 gpm)
 Max. Size Solids3.18 mm (⅛")
¹Displacement per stroke was calculated at 4.8 bar (70 psig) air inlet pressure against a 2 bar (30 psig) head pressure.

Example: To pump 37.9 lpm (10 gpm) against a discharge pressure head of 1.03 bar (15 psig) requires 4.1 bar (60 psig) and 21.3 Nm³/h (12.5 scfm) air consumption. (See dot on chart.)

Caution: Do not exceed 8.6 bar (125 psig) air supply pressure.



Flow rates indicated on chart were determined by pumping water.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 5B

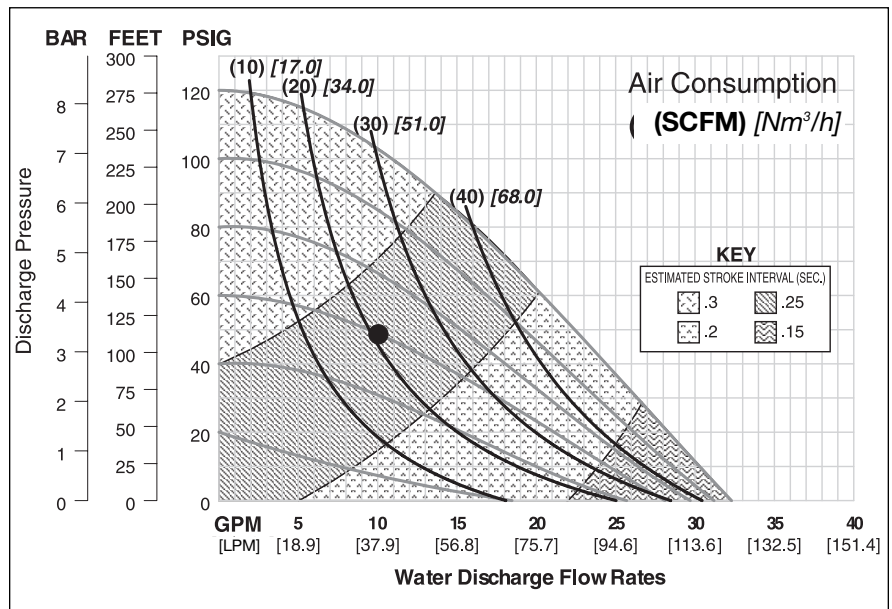
PERFORMANCE CURVES MODEL A2P METAL PTFE-FITTED

Height279 mm (11.0")
 Width267 mm (10.5")
 Depth229 mm (9.0")
 Ship WeightStainless Steel 16.6 kg (36 lbs.)
 Alloy C 16 kg (40 lbs.)
 Air Inlet.....6 mm (¼")
 Inlet25 mm (1")
 Outlet.....19 mm (¾")
 Suction Lift.....6.55 m Dry (21.5')
 8.99 m Wet (29.5')

Displacement per
 Stroke 20 l (.054 gal.)¹
 Max. Flow Rate122 lpm (32.3 gpm)
 Max. Size Solids3.18 mm (⅛")
¹Displacement per stroke was calculated at 4.8 bar (70 psig) air inlet pressure against a 2 bar (30 psig) head pressure.

Example: To pump 37.9 lpm (10 gpm) against a discharge pressure head of 3.4 bar (49 psig) requires 4.1 bar (60 psig) and 35.7 Nm³/h (21 scfm) air consumption. (See dot on chart.)

Caution: Do not exceed 8.6 bar (125 psig) air supply pressure.



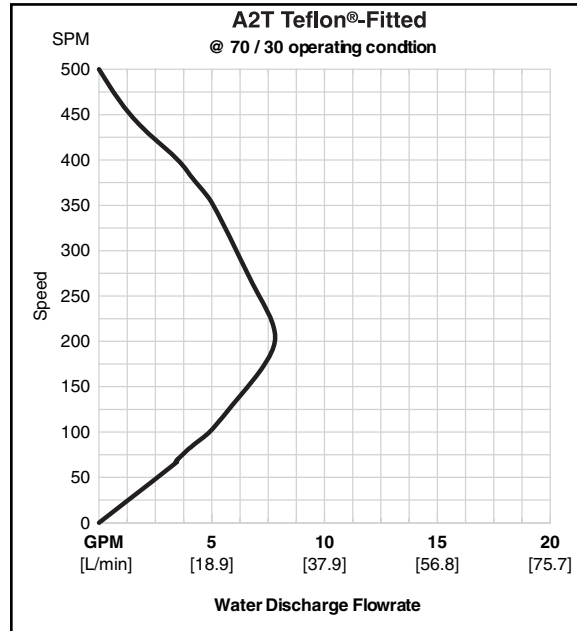
Flow rates indicated on chart were determined by pumping water.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 6A

70/30 OPERATING CONDITION MODEL A2T METAL ACCU-FLO™

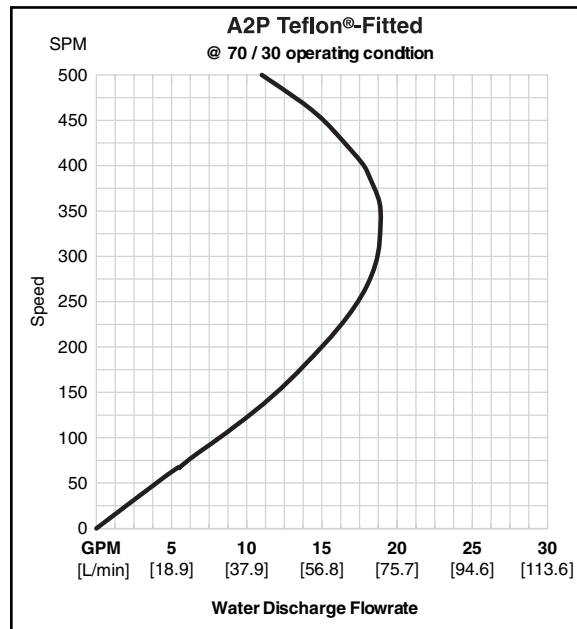
These curves demonstrate the flow created when the stroke rate is modified under static air and fluid pressure condition. This curve can be applied to different pressure conditions to estimate the change in flow due to stroke rate.



SECTION 6B

70/30 OPERATING CONDITION MODEL A2P METAL ACCU-FLO™

These curves demonstrate the flow created when the stroke rate is modified under static air and fluid pressure condition. This curve can be applied to different pressure conditions to estimate the change in flow due to stroke rate.



SECTION 7A

INSTALLATION

All Wilden pumps are manufactured with a variety of materials for the air distribution system, liquid path and elastomers. This variety is offered to satisfy the temperature, chemical compatibility, abrasion and flex life requirements for most applications. Consult manual for available materials and temperature limitations for this pump model.

For Accu-Flo™ models only, all wiring used to operate the pump should be placed and connected according to all applicable electrical codes. It is important that the wiring be of adequate gauge to carry the current required to operate the pump. In addition, it is necessary that the electrical power supply be large enough to supply the current required to operate the pump. Wiring should be above ground level if possible (in case of fluid spill or leakage), and all wiring and connections which could become wet or damp should be made watertight.

The suction pipe used for installation should be sized equal to, or greater than, the pump liquid inlet connection. This will minimize pump cavitation and potential blockages of the pump inlet. The discharge piping should also be sized equal to, or greater than, the pump liquid discharge connection. If the pump is to be used in a self-priming application, be sure that all connections are airtight and that the suction lift is within the pump's ability. (Consult manual for suction lift information.) Note: Materials of construction and elastomer materials have an effect on suction lift parameters.

INSTALLATION: Months of careful planning, study and selection efforts can result in unsatisfactory pump performance if installation details are left to chance.

Premature failure and long term dissatisfaction can be avoided if reasonable care is exercised throughout the installation process.

LOCATION: Noise, safety, and other logistical factors usually dictate that "utility" equipment be situated away from the production floor. Multiple installations with conflicting requirements can result in congested utility areas, leaving few choices for siting additional pumps.

Within the framework of these and other existing conditions, every pump should be located in such a way that key factors are balanced against each other to maximum advantage.

ACCESS: First of all, the location should be accessible. If it is easy to reach the pump, maintenance personnel will have an easier time carrying out routine inspections and adjustments. Should major repairs become necessary, ease of access can play a key role in speeding the repair process and reducing total downtime.

AIR SUPPLY: Every pump location should have an air line large enough to supply the volume of air necessary to achieve the desired pumping rate. (Consult manual for performance information.) The use of an air filter before the pump will ensure that the majority of pipeline contaminants will be eliminated. For best results, the pump should use an air filter, regulator system.

Sound levels are reduced below OSHA specifications using the standard Wilden muffler.

ELEVATION: Selecting a site that is well within the pump's dynamic lift capability will assure that a loss-of-prime condition will be avoided. In addition, pump efficiency can be adversely effected if proper attention is not given to site location.

PIPING: Final determination of the pump site should not be made until the piping problems of each possible location have been evaluated. The impact of current and future installations should be considered ahead of time to make sure that inadvertent restrictions are not created for any remaining sites.

The best choice possible will be a site involving the shortest and straightest hook-up of suction and discharge piping. Unnecessary elbows, bends, and fittings should be avoided. Pipe sizes should be selected so as to keep friction losses within practical limits. All piping should be supported independently of the pump to avoid damage. In addition, the piping should be aligned so as to avoid placing stress on the pump fittings.

Flexible hose can be installed to aid absorbing the forces created by the natural reciprocating action of the pump. If the pump is to be bolted down to a solid location, a mounting pad placed between the pump and the foundation will assist in minimizing pump vibration. Flexible connections between the pump and rigid piping will also assist in minimizing pump vibration. If quick-closing valves are installed at any point in the discharge system, or if pulsation within a system becomes a problem, a Wilden Equalizer® surge dampener should be installed to protect the pump, piping and gauges from surges and water hammer. Installation of a tee at the discharge of the pump will allow the addition of an Equalizer to the system at a later date without requiring piping modifications. Installation of inlet and discharge isolation valves are also recommended to make service and repair easier.

Pumps in service with a positive suction head are most efficient when pressure is limited to .4-.7 bar (7-10 psig). Premature diaphragm failure may occur if positive suction exceeds these recommended pressures.

A STRAINER SHOULD BE USED ON THE SUCTION LINE OF THE SYSTEM IF THERE IS A POSSIBILITY THAT SOLIDS ENTERING THE PUMP MAY EXCEED THE PUMP'S SOLIDS HANDLING CAPABILITIES.

PLEASE READ AND FOLLOW ALL CAUTIONS NOTED IN THIS MANUAL.

Pump should be thoroughly flushed before installing into process line.

Blow out air line for 10 to 20 seconds before attaching pump to clear all pipe line debris.

SECTION 7B

OPERATING PRINCIPLES BEHIND ACCU-FLO™ PUMPS

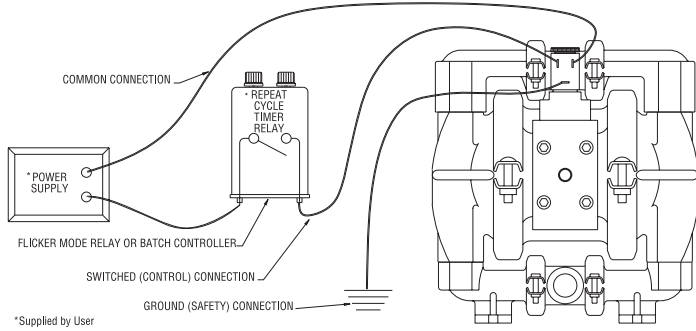
When the solenoid is unpowered, one air chamber is pressurized with air, while the opposite chamber is exhausted. When electric power is applied, the solenoid shifts, and the pressurized air chamber is exhausted while the opposite chamber is pressurized. By alternately applying and removing power, the solenoid-operated pump runs like a standard Wilden pump.

The speed of the pump is controlled electrically. Since each stroke is controlled by an electrical signal, the pump is ideal for batching and other electrically controlled dispensing applications.

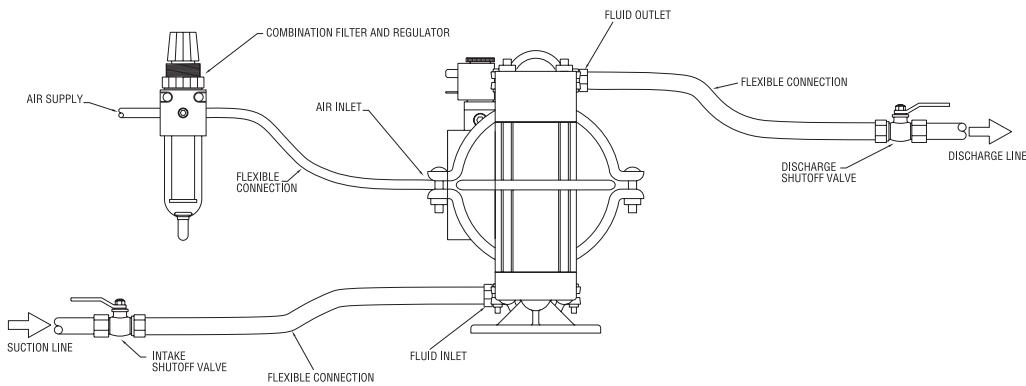
Although the speed of the pump is controlled electrically, the air pressure is important. Air pressure displaces the fluid, and if the pressure is insufficient to complete the physical stroke before an electronic impulse signals the pump to shift, the stroke will not be completed, and the displacement per stroke will be reduced. This does not harm the unit in any way, but it may cause inaccuracy when attempting to batch specific quantities with high precision if this effect is not taken into account.

There are three coil voltage options available. One coil allows for 24V DC operation. The second coil option allows for operation with either 12V DC or 24V AC at 60 Hz and the third coil option allows for 110V AC operation.

ELECTRICAL CONNECTIONS



PLUMBING CONNECTIONS



SECTION 7C

SUGGESTED OPERATION AND MAINTENANCE INSTRUCTIONS

The pump will not shift reliably unless the minimum supply pressure is provided. For the A2T the minimum supply pressure for reliable operation is 2.7 bar (40 psig).

The solenoid operated pump is permanently lubricated during assembly, and requires no additional lubrication under normal operation. If the unit runs under extreme conditions (continuous operation at high speeds), it may be necessary to relubricate the center block with a **BUNA-N compatible NLGI Grade 2 grease** every 50 million cycles. Continuous lubrication with a compatible oil is not harmful, and will provide longer seal life, but it may flush all grease out of the unit.

A red button on the side of the air valve is a manual override; when actuated it will shift the valve as if an electric current had actuated the solenoid.

RECORDS: When service is required, a record should be made of all necessary repairs and replacements. Over a period of

time, such records can become a valuable tool for predicting and preventing future maintenance problems and unscheduled downtime. In addition, accurate records make it possible to identify pumps that are poorly suited to their applications.

MAINTENANCE AND INSPECTIONS: Since each application is unique, maintenance schedules may be different for every pump. Frequency of use, line pressure, viscosity and abrasiveness of process fluid all effect the parts life of a Wilden pump. Periodic inspections have been found to offer the best means for preventing unscheduled pump downtime. Personnel familiar with the pump's construction and service should be informed of any abnormalities that are detected during operation. Internal maintenance is not recommended for Accu-Flo™ solenoid air valves. When worn or damaged, a new air valve body, coil or terminal connector must be purchased. Please consult Section 9 for part numbers.

SECTION 7D

TROUBLESHOOTING

Pump will not run.

1. Check for pressurized air at the inlet.
2. Check air inlet and filter for debris.
3. Connect a test lamp to the two wires which run to pump and ensure that the lamp cycles on and off.
4. Make sure that the air valve manual override (small red knob on front of valve) is switched to the "0" position.
5. Check pilot pressure vent at the top of the operator/coil assembly to ensure that it is not clogged.
6. Check for a worn out air valve. If air continually blows out the exhaust in very large quantities, the air valve seals may be worn beyond their ability to function. In this case, the valve must be replaced.

NOTE: Before the valve is scrapped, it is possible that it may be saved by completely disassembling the valve, cleaning all components and relubricating the valve.

Pump runs but little or no fluid comes out.

1. Check that the discharge isolation valve is not closed.
2. Check that the electronic signal is slow enough that the pump is able to complete each physical stroke before it is signaled to change direction. The time required to complete the stroke is determined by a variety of factors which include fluid viscosity and head pressure.
3. Check for pump cavitation; slow pump speed down to match the thickness of the material being pumped.
4. Check for sticking ball check valves. If the material being pumped is not compatible with the pump elastomers, swelling may occur. Replace ball check valves and o-ring with the proper elastomers.
5. Check to make sure that all suction connections are air tight, and that the clamp bands are properly tightened.

Pump air passages blocked with ice.

1. Check for excessive moisture in compressed air line. As the air expands out the exhaust during the operation of the pump, water vapor entrapped in the compressed air can freeze and block the air passageways in the pump. If this occurs, it may be necessary to install a coalescing filter, an air dryer, or a hot air generator for the compressed air.

Air bubbles in pump discharge.

1. Check for ruptured diaphragm.
2. Check tightness of fasteners, and the integrity of the o-rings, especially at intake manifold.

Product comes out air exhaust.

1. Check for diaphragm rupture.
2. Check tightness of piston plates to shaft.

Pump rattles.

1. See E9 Troubleshooting Guide.
2. Create false discharge head or suction lift.

Solenoid buzzes or solenoid burnout.

1. Incorrect voltage, faulty or dirty solenoid.

Solenoid valve fails to shift electrically but shifts with manual override.

1. Incorrect voltage, defective coil or wiring.

Solenoid valve fails to shift electrically or with manual override.

1. Inadequate air supply, contamination, inadequate or improper lubrication, mechanical binding in the valve.

Valve shifts but fails to return.

1. Broken spring, mechanical binding.

Excessive leaking from air valve vent.

1. Worn seals in air valve.

SECTION 8A

MODEL A2 METAL DIRECTIONS FOR DISASSEMBLY/REASSEMBLY

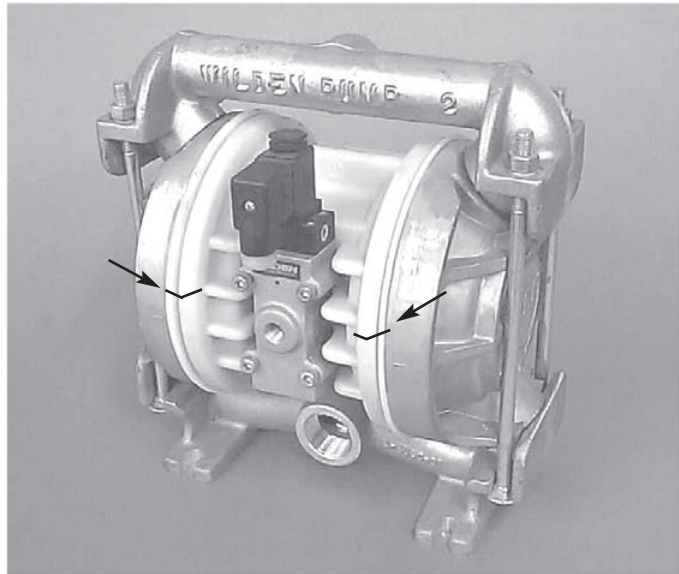
CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from the pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container. Be aware of any hazardous effects of contact with your process fluid.

The Wilden model A2 is an air-operated, double-diaphragm pump with wetted parts of aluminum, stainless steel and Alloy C. The single-piece center section, consisting of center block and air chambers, is molded of polypropylene or aluminum. All o-rings used in the pump are of a special material and shore hardness that should only be replaced with factory-supplied parts.

TOOLS REQUIRED:

Adjustable Wrench
9/16" Box Wrench
3/4" Box Wrench
3/16" Allen Wrench
Vise equipped with soft jaws (such as plywood, plastic or other suitable material)

NOTE: The model used for these instructions incorporates PTFE diaphragms, balls, and seats. Models with rubber diaphragms, balls and seats are the same except where noted.



DISASSEMBLY:

Figure 1

Step 1.

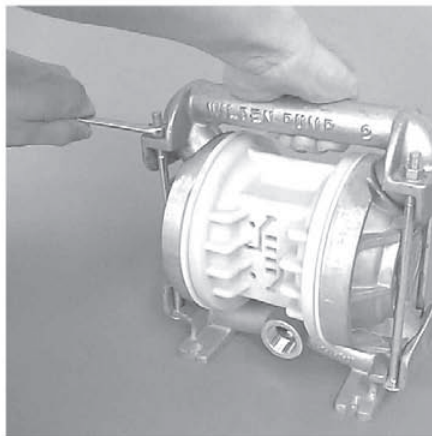
Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber. This line will assist in proper alignment during reassembly. (Figure 1)



Step 2.

Figure 2

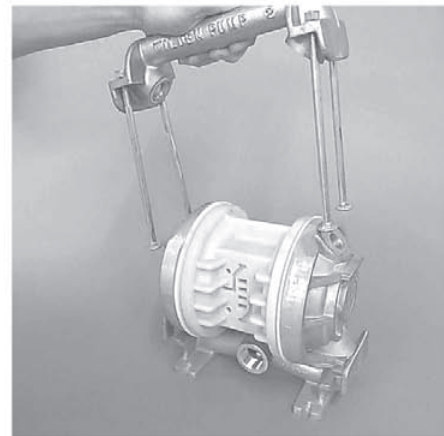
Using a 3/16" Allen wrench, remove air valve bolts. Inspect air valve assembly for wear or damage. (Figure 2)



Step 3.

Figure 3

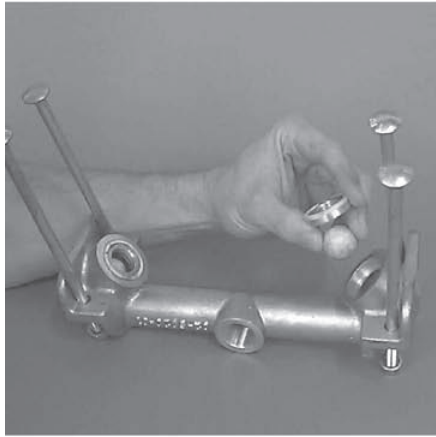
Utilizing the 9/16" box wrench, start by removing the four long carriage bolts that secure the top and bottom manifolds to the center section. (Figure 3)



Step 4.

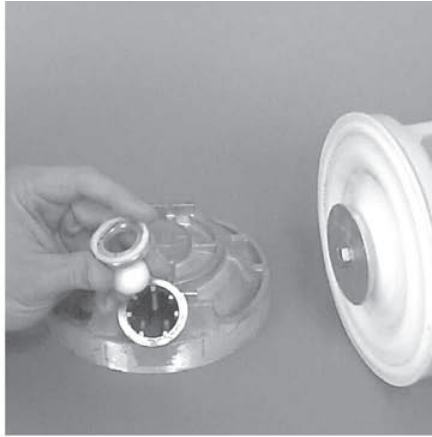
Figure 4

Remove the top manifold and lift the center section off the inlet manifold. (Figure 4)



Step 5. *Figure 5*

Remove the discharge valve balls, seats and o-rings from the discharge manifold and inspect for nicks, gouges, chemical attack or abrasive wear. Replace worn parts with genuine Wilden parts for reliable performance. PTFE o-rings should be replaced when reassembled. (Figure 5)



Step 6. *Figure 6*

Inspect the valve seat, valve seat O-ring, and valve ball from intake manifold. Check for nicks, gouges, chemical attack or abrasive wear. Replace worn parts with genuine Wilden parts for reliable performance. PTFE o-rings should be replaced when reassembled. (Figure 6)



Step 7. *Figure 7*

With the 3/4" box wrench or by rotating the diaphragm by hand, remove the diaphragm assembly. (Figure 7)



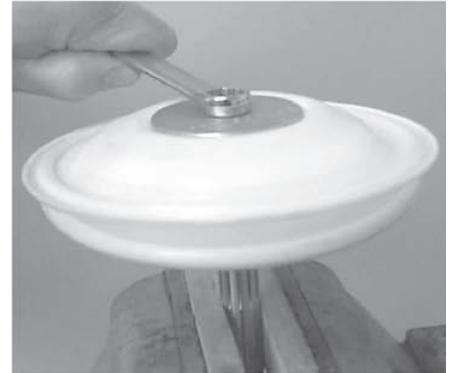
Step 8A. *Figure 8A*

NOTE: Due to varying torque values, one of the following two situations may occur: 1) The outer piston, diaphragm and inner piston remain attached to the shaft and the entire assembly can be removed from the center section (Figure 8A)



Step 8B. *Figure 8B*

2) The outer piston, diaphragm, inner piston, and disc spring separate from the shaft which remains connected to the opposite side diaphragm assembly (Figure 8A) PTFE-fitted pumps come standard with back-up diaphragms (not shown).



Step 9. *Figure 9*

To remove the diaphragm assembly from the shaft, secure shaft with soft jaws (a vise fitted with plywood or other suitable material) to ensure shaft is not nicked, scratched, or gouged. Using a wrench, remove diaphragm assembly from shaft. Inspect all parts for wear and replace with genuine Wilden parts if necessary. (Figure 9)

SECTION 8B

REASSEMBLY HINTS & TIPS

ASSEMBLY:

Upon performing applicable maintenance to the air distribution system, the pump can now be reassembled. Please refer to the disassembly instructions for photos and parts placement. To reassemble the pump, follow the disassembly instructions in reverse order. The air distribution system needs to be assembled first, then the diaphragms and finally the wetted path. Please find the applicable torque specifications on this page. The following tips will assist in the assembly process.

- Clean the inside of the center section shaft bushing to ensure no damage is done to new seals.
- Stainless bolts should be lubed to reduce the possibility of seizing during tightening.
- Be sure to tighten outer pistons simultaneously on PTFE-fitted pumps to ensure proper torque values.
- Place one liquid chamber on its side and align center section with chamber using alignment marks made during disassembly. Push down on diaphragm assembly until diaphragm is inverted. Place opposite liquid chamber on center section and align.
- Position valve balls, seats, and o-rings in discharge manifold. Place vertical bolts through discharge manifold with threads pointing up. Install washer and start threads of bolt (about 1½ turns).
- Place center section and liquid chambers on intake manifold.
- Position discharge manifold and bolt assembly on liquid chambers. Ensure proper alignment of mating surfaces between liquid chambers and manifolds before tightening bolts.
- Apply a small amount of Loctite 242 to the steel bore of the shaft from the diaphragm assembly.

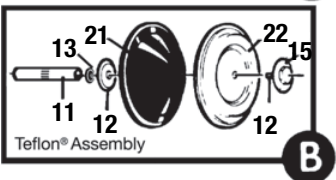
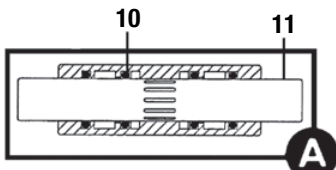
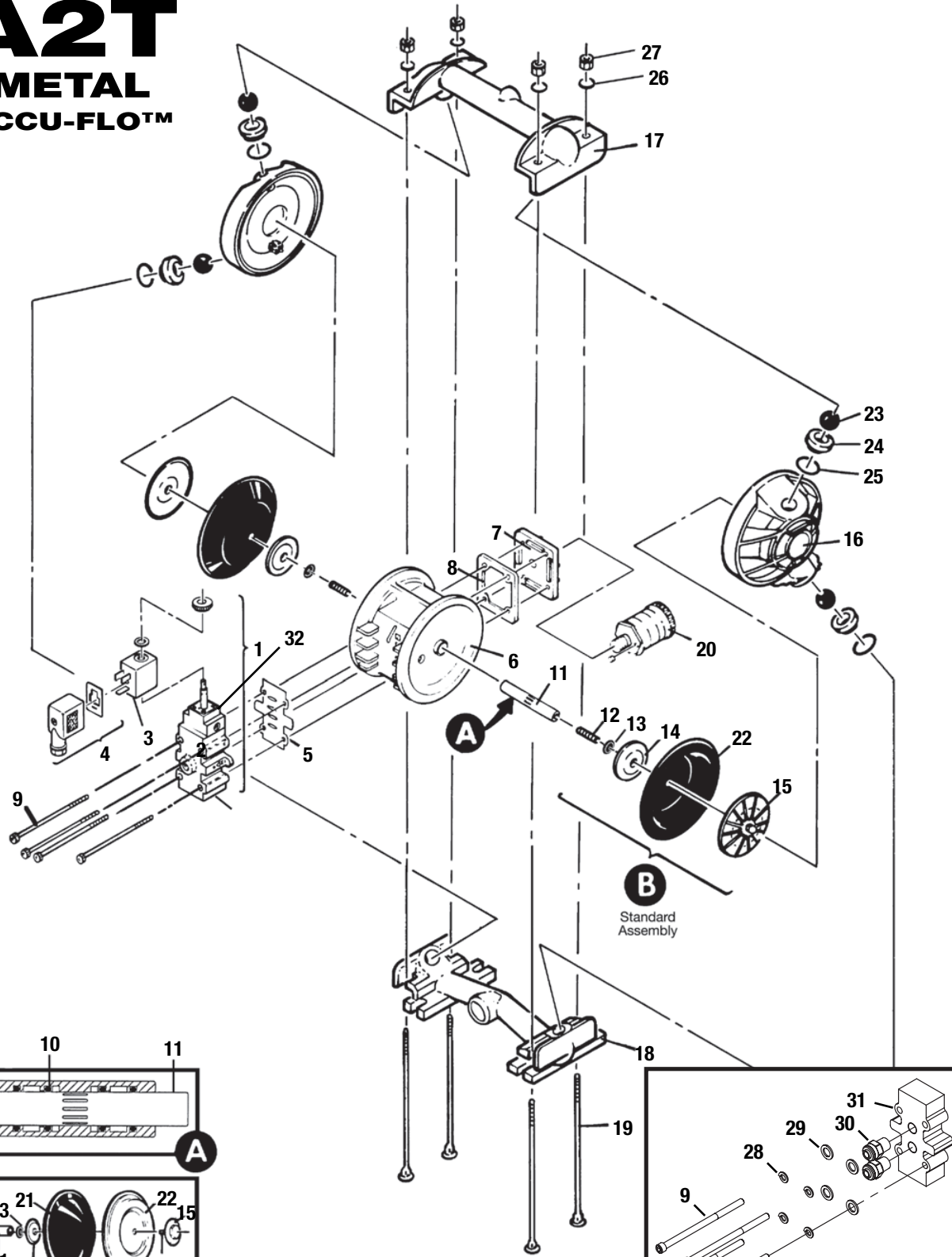
MAXIMUM TORQUE SPECIFICATIONS

Description of Part	Metal Pumps
Solenoid Air Valve (Turbo-Flo™)	3.4 N•m [30 in.-lbs.]
Solenoid Air Valve (Pro-Flo®)	3.1 N•m [27 in.-lbs.]
Adapter Block Air Valve	3.1 N•m [27 in.-lbs.]
Outer Piston	38 N•m [28 ft.-lbs.]
Vertical Bolts	13.0 N•m [115 in.-lbs.]

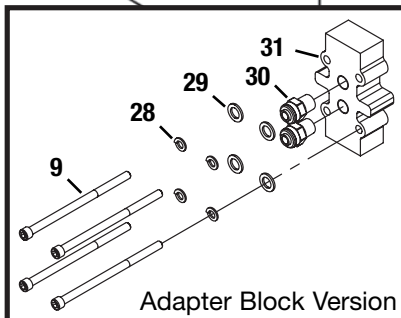
SECTION 9A

EXPLODED VIEW/PARTS LISTING

A2T
METAL
ACCU-FLO™



NOTE: PTFE Diaphragm Models Assembled With PTFE Gasket Kit At Factory (Not Shown)



MODEL A2T METAL ACCU-FLO™

Item	Description	Qty. Per Pump	PTFE-Fitted Pumps				
			A2T/ APPA-914 P/N	A2T/ APPA-917 P/N	A2T/ SPPA-914 P/N	A2T/ HPPA-914 P/N	A2T/ SPPA-908 P/N
1	Solenoid Valve Assembly	1	02-2000-99-150	02-2000-99-150	02-2000-99-150	02-2000-99-150	02-2000-99-150
2	Main Valve Body	1	02-2000-01-150	02-2000-01-150	02-2000-01-150	02-2000-01-150	02-2000-01-150
3	Coil	1	00-2110-99-150	00-2110-99-150	00-2110-99-150	00-2110-99-150	00-2110-99-150
4	Terminal Connector	1	00-2130-99	00-2130-99	00-2130-99	00-2130-99	00-2130-99
5	Air Valve Gasket — Buna-N	1	02-2600-52	02-2600-52	02-2600-52	02-2600-52	02-2600-52
6	Center Section	1	02-3151-20-225	02-3151-20-225	02-3151-20-225	02-3151-20-225	02-3151-20-225
7	Muffler Plate	1	02-3180-20	02-3180-20	02-3180-20	02-3180-20	02-3180-20
8	Muffler Plate Gasket — Buna-N	1	02-3500-52-500	02-3500-52-500	02-3500-52-500	02-3500-52-500	02-3500-52-500
9	Air Valve Screws, 1/4-20 x 6	4	02-6000-08	02-6000-03	02-6000-03	02-6000-03	02-6000-03
10	Center Section Glyd™ Ring	4	02-3210-55-225	02-3210-55-225	02-3210-55-225	02-3210-55-225	02-3210-55-225
11	Shaft	1	02-3820-03-07	02-3820-03-07	02-3820-03-07	02-3820-03-07	02-3820-03-07
12	Stud	2	15-6130-08	15-6130-08	02-6150-08	02-6150-08	02-6150-08
13	Disc Spring	2	02-6802-08	02-6802-08	02-6802-08	02-6802-08	02-6802-08
14	Pistons — Inner	2	02-3750-01	02-3750-01	02-3750-01	02-3750-01	02-3750-01
15	Pistons — Outer	2	02-4600-01	02-4600-01	02-4600-03	02-4600-04	02-4600-03
16	Liquid Chamber	2	02-5000-01	02-5000-01	02-5000-03	02-5000-04	02-5000-03
17	Discharge Manifold	1	02-5020-01	02-5020-01	02-5020-03	02-5020-04	02-5020-03-70
18	Inlet Housing	1	02-5080-01	02-5080-01	02-5080-03	02-5080-04	02-5080-03-70
19	Manifold Bolt, 3/8-16 x 8 1/2	4	02-6080-03	02-6080-03	02-6080-03	02-6080-03	02-6080-03
20	Muffler	1	02-3510-99	02-3510-99	02-3510-99	02-3510-99	02-3510-99
21	Back-up Diaphragm**	2	02-1060-56	02-1060-56	02-1060-56	02-1060-56	02-1060-56
22	Diaphragm	2	02-1010-55	02-1010-55	02-1010-55	02-1010-55	02-1010-55
23	Valve Balls	4	02-1080-55	02-1080-55	02-1080-55	02-1080-55	02-1080-55
24	Valve Seat	4	02-1120-01	02-1120-01	02-1120-03	02-1120-04	02-1120-03
25	Valve Seat O-Ring	4	02-1200-55	02-1200-55	02-1200-55	02-1200-55	02-1200-55
	Hex Nut 1/4-20, S.S.*** (Not Shown)	4	04-6400-08	04-6400-08	04-6400-03	04-6400-03	04-6400-03
26	Manifold Bolt Washer	4	15-6720-03	15-6720-03	02-6730-03	02-6730-03	08-6720-07-70
27	Manifold Bolt Nut, 3/8-16	4	02-6430-08	02-6430-03	02-6430-03	02-6430-03	02-6680-03-70
28	Lock Washer, 1/4	4	50-6760-03	50-6760-03	50-6760-03	50-6760-03	50-6760-03
29	Flat Washer	4	01-6730-03	01-6730-03	01-6730-03	01-6730-03	01-6730-03
30	Fitting, Air Inlet	2	00-2170-20	00-2170-20	00-2170-20	00-2170-20	00-2170-20
31	Adapter Block	1	02-2150-XX	02-2150-XX	02-2150-XX	02-2150-XX	02-2150-XX
	Vert Plug (not shown)	1	02-7020-17	02-7020-17	02-7020-17	02-7020-17	02-7020-17
32	Solenoid Operator	1	00-2120-99	00-2120-99	00-2120-99	00-2120-99	00-2120-99

**Required only for PTFE fitted pumps.

***Part to be used with P/N 02-6000-03 to secure air valve and muffler plate.

NOTE: Models A2/SPPE-908 rubber-fitted and A2/SPPE-908 PTFE-fitted have 1.5" cast tri-clamp inlet and outlet ports and use wing nut type fasteners on manifold bolts. (Food Processing pumps.)

All boldface items are primary wear parts.

NOTE: For pumps fitted with wing nuts and tri-clamp connection please contact factory for exploded view drawing and part numbers.

Item 1 Valve Assembly Options (CONSISTS OF VALVE BODY, COIL AND CONNECTOR)

Pump Models Designating Specialty Code #	Part Number	Description
915	02-2000-99-151	24V AC / 12V DC Valve Assembly
916	02-2000-99-153	24V AC / 12V DC Valve Assembly (NEMA 7)
914	02-2000-99-150	24V DC Valve Assembly
917	02-2000-99-154	24V DC Valve Assembly (NEMA 7)
918	02-2000-99-155	110V AC Valve Assembly
919	02-2000-99-156	110V AC Valve Assembly (NEMA 7)

Item 2 Main Valve Body Options

Part Number	Description
02-2000-01-150	Main Valve Body
02-2000-01-154	Main Valve Body (NEMA 7)

Item 32 Adapter Block Options

Part Number	Description
02-2150-20	Polypropylene
02-2150-32	UHMW PE

Item 3 Coil Options

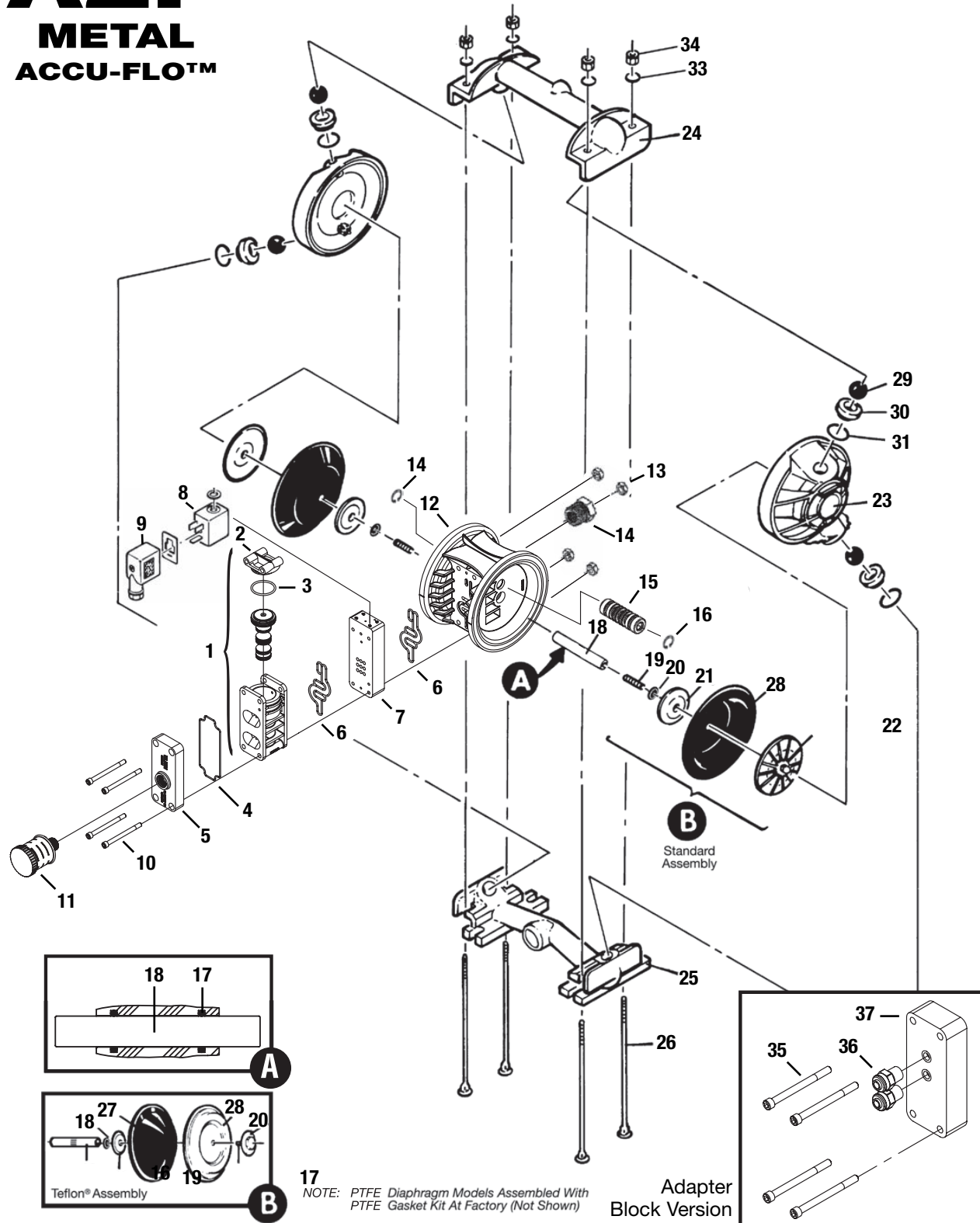
Pump Models Designating Specialty Code #	Part Number	Description
915	00-2110-99-151	24V AC / 12V DC Coil
916	00-2110-99-153	24V AC / 12V DC Coil (NEMA 7)
914	00-2110-99-150	24V DC Coil
917	00-2110-99-154	24V DC Coil (NEMA 7)
918	00-2110-99-155	110V AC Coil
919	00-2110-99-156	110V AC Coil (NEMA 7)

*Meet European standards and regulations; CENELEC/PTB file # EX-9.C.2027.

SECTION 9B

EXPLODED VIEW/PARTS LISTING

A2P METAL ACCU-FLO™



MODEL A2P METAL ACCU-FLO™

Item	Description	Qty. Per Pump	PTFE-Fitted Pumps				
			A2P/ APPA-914 P/N	A2P/ APPA-917 P/N	A2P/ SPPA-914 P/N	A2P/ HPPA-914 P/N	A2P/ SPPA-908 P/N
1	Pro-Flo® Air Valve Assembly	1	01-2010-20	01-2010-20	01-2010-20	01-2010-20	01-2010-20
2	Pro-Flo® Air Valve End Cap	1	01-2332-20	01-2332-20	01-2332-20	01-2332-20	01-2332-20
3	End Cap O-Ring	1	01-2395-52	01-2395-52	01-2395-52	01-2395-52	01-2395-52
4	Gasket, Muffler Plate	1	01-3505-52	01-3505-52	01-3505-52	01-3505-52	01-3505-52
5	Muffler Plate	1	01-3181-20	01-3181-20	01-3181-20	01-3181-20	01-3181-20
6	Gasket, Air Valve	2	01-2615-52	01-2615-52	01-2615-52	01-2615-52	01-2615-52
7	Pro-Flo® Solenoid Spacer	1	01-2160-20	01-2160-20	01-2160-20	01-2160-20	01-2160-20
8	Coil	1	00-2110-99-150	00-2110-99-150	00-2110-99-150	00-2110-99-150	00-2110-99-150
9	Connector	1	00-2130-99	00-2130-99	00-2130-99	00-2130-99	00-2130-99
10	Air Valve Bolt, 1/4-20 x 4 1/2	4	01-6000-03	01-6000-03	01-6000-03	01-6000-03	01-6000-03
11	Muffler	1	02-3510-99	02-3510-99	02-3510-99	02-3510-99	02-3510-99
12	Pro-Flo® Center Section	1	02-3140-18	02-3140-18	02-3140-18	02-3140-18	02-3140-18
13	Nut, 1/4-20	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03
14	Reducer Bushing	1	01-6950-20	01-6950-20	01-6950-20	01-6950-20	01-6950-20
15	Pilot Spool Assembly	1	02-2285-99	02-2285-99	02-2285-99	02-2285-99	02-2285-99
16	Retaining Ring	2	00-2650-03	00-2650-03	00-2650-03	00-2650-03	00-2650-03
17	Center Section Glyd™ Ring	2	02-3210-55-225	02-3210-55-225	02-3210-55-225	02-3210-55-225	02-3210-55-225
18	Shaft	1	02-3810-03	02-3810-03	02-3810-03	02-3810-03	02-3810-03
19	Stud	2	15-6130-08	15-6130-08	02-6150-08	02-6150-08	02-6150-08
20	Disc Spring	2	02-6802-08	02-6802-08	02-6802-08	02-6802-08	02-6802-08
21	Pistons — Inner	2	02-3751-01	02-3751-01	02-3751-01	02-3751-01	02-3751-01
22	Pistons — Outer	2	02-4550-01	02-4550-01	02-4550-03	02-4550-04	02-4550-03
23	Liquid Chamber	2	02-5000-01	02-5000-01	02-5000-03	02-5000-04	02-5000-03
24	Discharge Manifold	1	02-5020-01	02-5020-01-03	02-5020-03	02-5020-04	02-5020-03-70
25	Inlet Manifold	1	02-5080-01	02-5080-01-03	02-5080-03	02-5080-04	02-5080-03-70
26	Manifold Bolt, 3/8-16 x 8 1/2	4	02-6080-03	02-6080-03	02-6080-03	02-6080-03	02-6080-03
27	Back-up Diaphragm	2	02-1060-56	02-1060-56	02-1060-56	02-1060-56	02-1060-56
28	Diaphragm	2	02-1010-55	02-1010-55	02-1010-55	02-1010-55	02-1010-55
29	Valve Balls	4	02-1080-55	02-1080-55	02-1080-55	02-1080-55	02-1080-55
30	Valve Seat	4	02-1120-01	02-1120-01	02-1120-03	02-1120-04	02-1120-03
31	Valve Seat O-Ring	4	02-1200-55	02-1200-55	02-1200-55	02-1200-55	02-1200-55
32	Solenoid Operator	1	00-2120-99	00-2120-99	00-2120-99	00-2120-99	00-2120-99
33	Manifold Bolt Washer, 3/8	4	02-6730-03	02-6730-03	02-6730-03	02-6730-03	08-6720-07-70
34	Manifold Bolt Nut, 3/8-16	4	02-6430-03	02-6430-03	02-6430-03	02-6430-03	02-6680-03-70
35	Air Valve Bolt, 1/4-20 x 2'	4	04-6000-03	04-6000-03	04-6000-03	04-6000-03	04-6000-03
36	Fitting, Air Inlet ¹	2	00-2170-20	00-2170-20	00-2170-20	00-2170-20	00-2170-20
37	Adapter Block ¹	1	00-2155-XX	00-2155-XX	00-2155-XX	00-2155-XX	00-2155-XX

¹Part used only on adapter block version.

NOTE: Models A2/SPPE-908 rubber-fitted and A2/SPPE-908 PTFE-fitted have 1.5" cast tri-clamp inlet and outlet ports and use wing nut type fasteners on manifold bolts. (Food Processing pumps.)

All boldface items are primary wear parts.

NOTE: For pumps fitted with wing nuts and tri-clamp connection please contact factory for exploded view drawing and part numbers.

Item 37 Adapter Block Options

Part Number	Description
01-2155-20	Polypropylene
01-2155-13	Acetal

Item 8 Coil Options

Pump Models Designating Specialty Code #	Part Number	Description	Operator P/N
915	00-2110-99-151	24V AC / 12V DC Coil	00-2120-99
916	00-2110-99-153	24V AC / 12V DC Coil (NEMA 7)	00-2121-99
914	00-2110-99-150	24V DC Coil	00-2120-99
917	00-2110-99-154	24V DC Coil (NEMA 7)	00-2121-99
918	00-2110-99-155	110V AC Coil	00-2120-99
919	00-2110-99-156	110V AC Coil (NEMA 7)	00-2121-99

¹Meet European standards and regulations; CENELEC/PTB file # EX-9.C.2027.

SECTION 9B

MATERIAL CODE DESIGNATIONS

Material Code	Material Description	Material Code	Material Description
01	Aluminum	51	Neoprene
02	Cast Iron	52	Buna-N / Nitrile
03	Stainless Steel	53	Viton® / FKM
04	Alloy C	54	Nordel® / EPDM
05	PTFE coated	55	PTFE / PTFE
06	Electroless, nickel plated	56	Saniflex™ / Hytrel
07	Brass	57	FDA Wil-Flex™
08	Alloy Steel	58	Wil-Flex™
09	Mild steel, chrome plated	59	PTFE encapsulated silicone
10	Stainless steel, polished	60	PTFE encapsulated Viton®
11	Aluminum, anodized	61	Buna-N high temp.
12	Cardboard	62	Polyurethane - ether
13	Acetal	63	50/50 Wil-Flex™
14	Plexiglass®	64	PTFE/Neoprene laminate
16	Acetal, carbon filled	65	Isoplast®
17	Polyvinyl Chloride (PVC)	66	Delrin® AF
20	Polypropylene	67	R.T.P.
21	Kynar®/PVDF	68	FDA Viton®
22	PTFE/PFA	69	FDA Buna-N
23	Nylon	70	Isoplast®, SS filled
24	Phenolic	71	Verton®
26	Polyethylene	72	PTFE/EPDM laminate
28	Nylon, graphite filled	73	HALAR® coated aluminum
29	Nylon, clear	74	FDA EPDM
30	Cellulose fiber	75	Polyetheretherketone (PEEK), carbon filled
31	Armstrong N8090	76	Polyetherimide (PEI)
32	UHMW Polyethylene	77	Polyphenylene sulfide (PPS), glass filled
33	Chemraz®	78	Vinyl ester, glass filled
34	Fluoro-Seal™	79	G-10 fiberglass
37	Turcite®	81	EPDM/PTFE laminate
48	Expanded PTFE	82	Viton/PTFE laminate
49	Polyurethane	99	Multiple materials/Assemblies
50	Polyurethane - ester		

SECTION 10A

ELECTRICAL INFORMATION

NEMA 4¹ / UL / CSA

Part Number	Voltage $\pm 10\%$			Power (W) $\pm 10\%$	Current (A)			Resistivity (Ω)
	DC	AC			DC	AC		
		60 Hz	50 Hz			Inrush	Holding	
00-2110-99-150	24	48	44	4.8	.20	.20	.20	121
00-2110-99-151	12	24	22	4.8	.40	.40	.40	32
00-2110-99-155	60	120	110	4.8	.08	.08	.06	840

NEMA 7 / UL / CSA

Part Number	Voltage $\pm 10\%$			Power (W) $\pm 10\%$	Current (A)			Resistivity (Ω)
	DC	AC			DC	AC		
		60 Hz	50 Hz			Inrush	Holding	
00-2110-99-153	12	24	22	7	.60	.55	.32	19
00-2110-99-154	24	48	44	7	.30	.30	.18	75
00-2110-99-156	60	120	110	7	.12	.13	.06	475

INTERNATIONAL EXPLOSION PROOF / CENELEC / PTB FILE # EX-91.C.2027

Part Number	DC Voltage $\pm 10\%$	Power (W) $\pm 10\%$	Current (A)		Resistivity (Ω)
			Inrush	Holding	
00-2110-99-157	24	3.3	.135	.135	177

¹NEMA 4 and IEC 144/855420 I.P. 66 for "Dust-tight, watertight corrosion resistant."

WARRANTY

Each and every product manufactured by Wilden Pump and Engineering, LLC is built to meet the highest standards of quality. Every pump is functionally tested to insure integrity of operation.

Wilden Pump and Engineering, LLC warrants that pumps, accessories and parts manufactured or supplied by it to be free from defects in material and workmanship for a period of five (5) years from date of installation or six (6) years from date of manufacture, whichever comes first. Failure due to normal wear, misapplication, or abuse is, of course, excluded from this warranty.

Since the use of Wilden pumps and parts is beyond our control, we cannot guarantee the suitability of any pump or part for a particular application and Wilden Pump and Engineering, LLC shall not be liable for any consequential damage or expense arising from the use or misuse of its products on any application. Responsibility is limited solely to replacement or repair of defective Wilden pumps and parts.

All decisions as to the cause of failure are the sole determination of Wilden Pump and Engineering, LLC.

Prior approval must be obtained from Wilden for return of any items for warranty consideration and must be accompanied by the appropriate MSDS for the product(s) involved. A Return Goods Tag, obtained from an authorized Wilden distributor, must be included with the items which must be shipped freight prepaid.

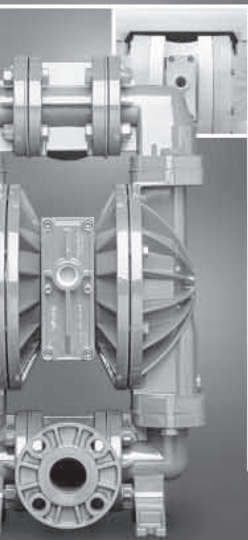
The foregoing warranty is exclusive and in lieu of all other warranties expressed or implied (whether written or oral) including all implied warranties of merchantability and fitness for any particular purpose. No distributor or other person is authorized to assume any liability or obligation for Wilden Pump and Engineering, LLC other than expressly provided herein.

PLEASE PRINT OR TYPE AND FAX TO WILDEN

PUMP INFORMATION			
Item # _____		Serial # _____	
Company Where Purchased _____			
YOUR INFORMATION			
Company Name _____			
Industry _____			
Name _____		Title _____	
Street Address _____			
City _____	State _____	Postal Code _____	Country _____
Telephone _____	Fax _____	E-mail _____	Web Address _____
Number of pumps in facility? _____		Number of Wilden pumps? _____	
Types of pumps in facility (check all that apply): <input type="checkbox"/> Diaphragm <input type="checkbox"/> Centrifugal <input type="checkbox"/> Gear <input type="checkbox"/> Submersible <input type="checkbox"/> Lobe			
<input type="checkbox"/> Other _____			
Media being pumped? _____			
How did you hear of Wilden Pump? <input type="checkbox"/> Trade Journal <input type="checkbox"/> Trade Show <input type="checkbox"/> Internet/E-mail <input type="checkbox"/> Distributor			
<input type="checkbox"/> Other _____			

ONCE COMPLETE, FAX TO (909) 783-3440

NOTE: WARRANTY VOID IF PAGE IS NOT FAXED TO WILDEN



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Advance Your Process

- Advanced wetted path designs
- Lower the cost of operation
- Maximize product containment
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- Enhanced internal clearance
- The result of advanced thought

UNITEC™ SERIES

Enrich Your Process

- Simplicity of design
- Unique Technology
- Reliable, leak-free & quiet
- Validated & certified
- Intrinsically safe
- The result of unique thought



SANIFLO™ SANITARY PUMP TECHNOLOGY

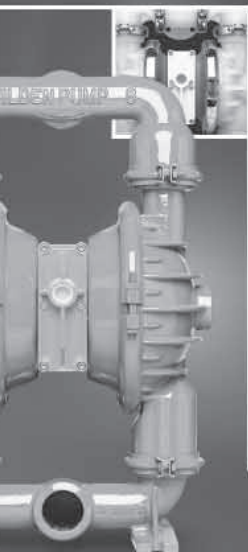
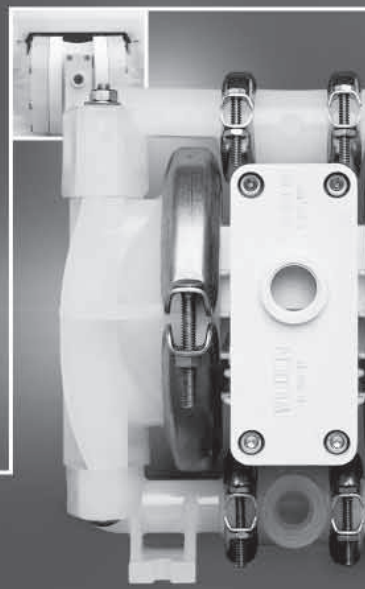
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