H400S Engineering Operation & Maintenance

CE

H400S

Metal Pumps

WILDEN®

A DOVER COMPANY

TT4078 2.5M

EOM-H400S 8/03
REPLACES EOM-H400S 10/02

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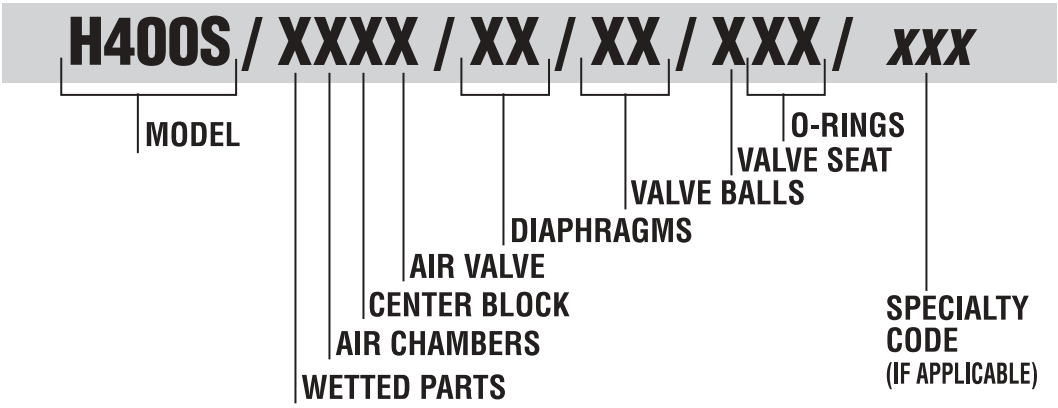
Member of Hydraulic Institute

Class I & II Ozone NON U.S. Clean Air Act Amendments of 1990 USE Depleting Substances

SECTION 1

WILDEN PUMP DESIGNATION SYSTEM



MODEL H400S METAL MATERIAL CODES

WETTED PARTS
A = ALUMINUM

AIR CHAMBERS
A = ALUMINUM

CENTER SECTION/BLOCK
A = ALUMINUM

AIR VALVE
B = BRASS
S = STAINLESS STEEL

DIAPHRAGMS
TF = TEFLON® PTFE (White)

VALVE BALL
TF = TEFLON® PTFE (White)

VALVE SEAT
A = ALUMINUM

VALVE SEAT O-RING
TF = TEFLON® PTFE

Teflon is a registered trademark of DuPont.

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.

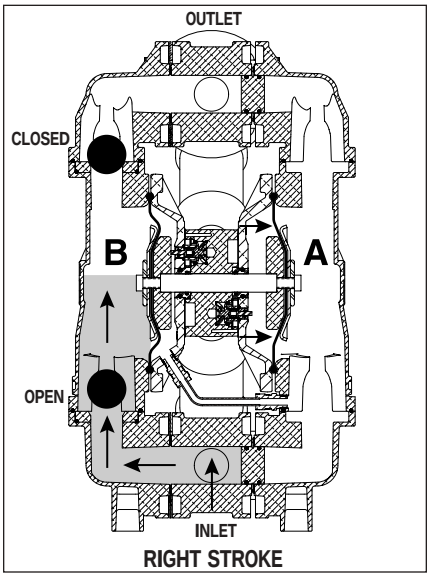


FIGURE 1: When air pressure is supplied to the pump, the air valve directs pressure to the back side of diaphragm A. The compressed air moves the diaphragm away from the center section of the pump. The opposite diaphragm is pulled in by the shaft connected to the pressurized diaphragm. Diaphragm B is on its suction stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port. The movement of diaphragm B towards 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).

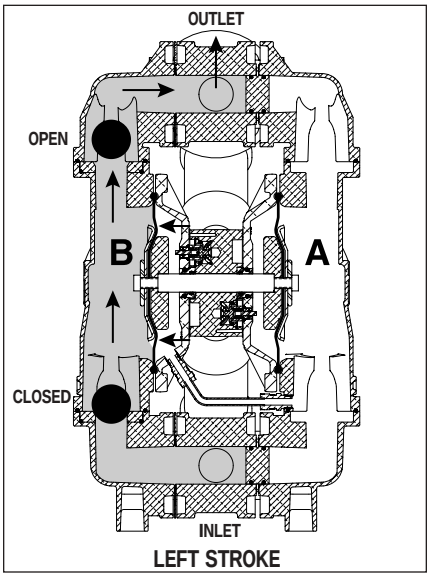


FIGURE 2: Once the shaft has reached the end of its stroke, the inner piston activates the pressure relief valve and the air valve shifts, directing pressurized air to the back side of diaphragm B. This pressurized air is also directed to the opposite side of diaphragm A through the connecting hose and fittings. The pressurized air forces diaphragm B away from the center section while also pushing 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, forcing fluid to flow through the pump discharge. The pressure on diaphragm A creates a force on the shaft that is combined with the pressure from diaphragm B. This total load is transferred to the liquid creating a liquid pressure that is 2X greater than the supplied air pressure.

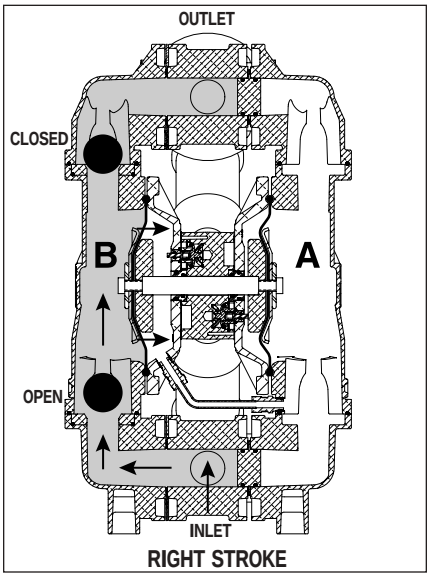
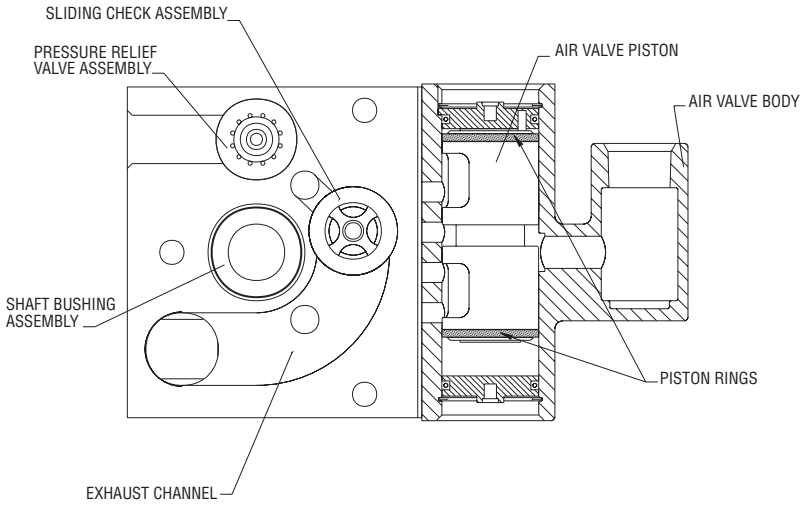


FIGURE 3: Once the shaft has reached the end of its second stroke, the inner piston activates the other pressure relief valve and the air valve shifts back to its original position, again directing air to the back side of diaphragm A. As the pump reaches its original starting point, the diaphragm has 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.

WIL-FLO™ AIR DISTRIBUTION SYSTEM OPERATION — HOW IT WORKS



The Wil-Flo™ patented air distribution system greatly improves the performance characteristics of the air-operated, double-diaphragm pump. This innovative design incorporates instantaneous shift mechanisms and an enhanced exhaust configuration.

As compressed air is supplied to the air valve, differential pressure causes the thermoplastic air valve piston to move vertically. (See figure at left.) The vertical movement alternately supplies air pressure to the power ports, through the sliding check assembly and directly behind one of the diaphragms. Piston shifting is initiated by inner piston contact with one of the pressure relief valves located on each side of the center block. This contact bleeds air pressure from one end of the air valve piston creating a pressure differential in the air valve body and forcing the piston to shift vertically.

Upon the shifting of the air valve piston, compressed air in the air chamber moves the sliding check assembly into its recess within the center block, thus exposing the exhaust channel. This channel vents exhaust air directly to atmosphere, bypassing the air valve and eliminating a major cause of freezing while maximizing flow rates and efficiency.

SECTION 3

WILDEN MODEL H400S METAL CAUTIONS – READ FIRST!

CAUTION: The discharge pressure generated by this pump is 2X the inlet pressure supplied.

CAUTION: Do not apply compressed air to the exhaust ports — pump will not function.

CAUTION: Do not over-lubricate air supply — excess lubrication will reduce pump performance. Pump is pre-lubed with NLGI Grade 2 molybdenum grease.

ELASTOMER TEMPERATURE LIMITS:
Teflon® PTFE 4.4°C to 104.4°C 40°F to 220°F

CAUTION: When choosing pump materials, be sure to check the temperature limits for all wetted components. Example: Teflon® has a maximum limit of 104.4°C (220°F). Therefore the pump is rated to 104.4°C (220°F).

CAUTION: Maximum temperature limits are based upon mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperatures. Consult chemical resistance guide (E-4) for chemical compatibility and temperature limits.

WARNING: Prevention of static sparking — If static sparking occurs, fire or explosion could result. Pump, valves, and containers must be grounded to a proper grounding point 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: The process fluid and cleaning fluids must be chemically compatible with all wetted pump components (see E-4).

CAUTION: Pumps should be thoroughly flushed with water before installing into process lines.

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

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 pipeline debris is clear. Use an in-line air filter. **A 5µ micron air filter is suggested.**

NOTE: When installing Teflon® diaphragms, it is important to tighten outer pistons simultaneously (turning in opposite directions) to ensure tight fit. (See torque specifications in Section 8C.)

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.

NOTE: To ensure reliable performance, the temperature of the air valve should not exceed 57°C (135°F). Hot air generators or other heating devices are not recommended.

CAUTION: Plastic mufflers are not recommended for use with the Wil-Flo™ air distribution system. Plastic mufflers may reduce pump performance.

CAUTION: Pump is not rated for UL 79 service. For UL 79 transfer use Wilden's UL-approved M Series pump.

CAUTION: Wil-Flo™ pumps are not submersible. Use an M Series pump for submersible applications.

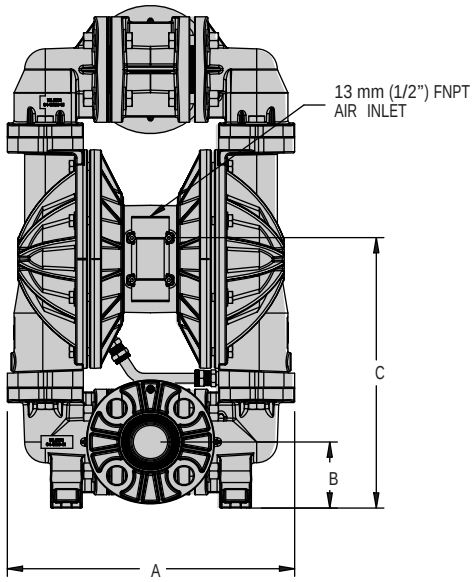
CAUTION: Tighten all hardware prior to installation.

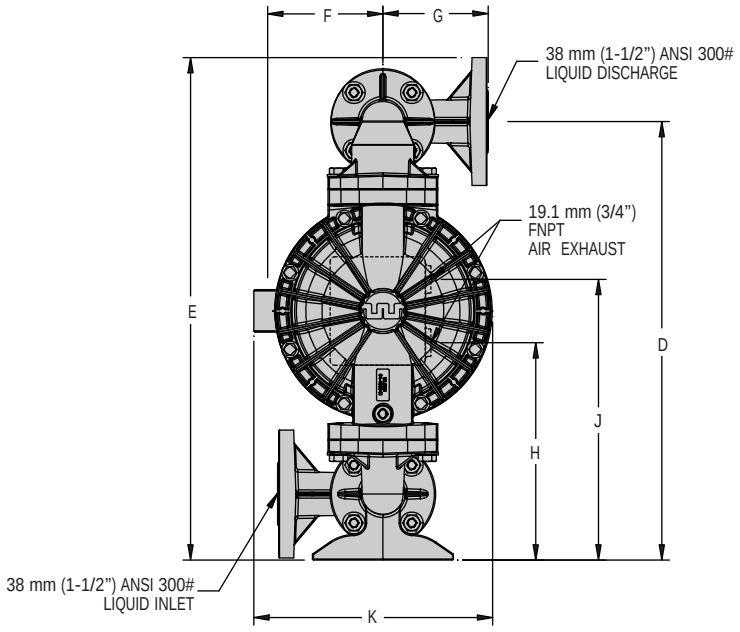
CAUTION: All piping valves, gauges and other components installed on the liquid discharge must have a minimum pressure rating of 300 psig.

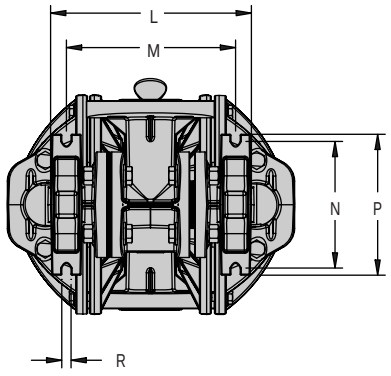
WARNING: Do not overlubricate air supply.

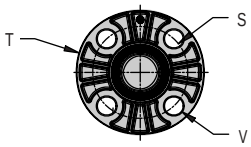
SECTION 4

DIMENSIONAL DRAWING
WILDEN MODEL H400S METAL PUMP









DIMENSIONS – H400S METAL		
ITEM	METRIC (mm)	STANDARD (inch)
A	345	13.6
B	79	3.1
C	325	12.8
D	531	20.9
E	605	23.8
F	137	5.4
G	125	4.9
H	264	10.4
J	340	13.4
K	285	11.2
L	241	9.5
M	203	8.0
N	152	6.0
P	170	6.7
R	10	0.4
	DIN (mm)	ANSI (inch)
S	110 DIA.	4.5 DIA.
T	150 DIA.	6.0 DIA.
V	18 DIA.	0.9 DIA.

SECTION 5

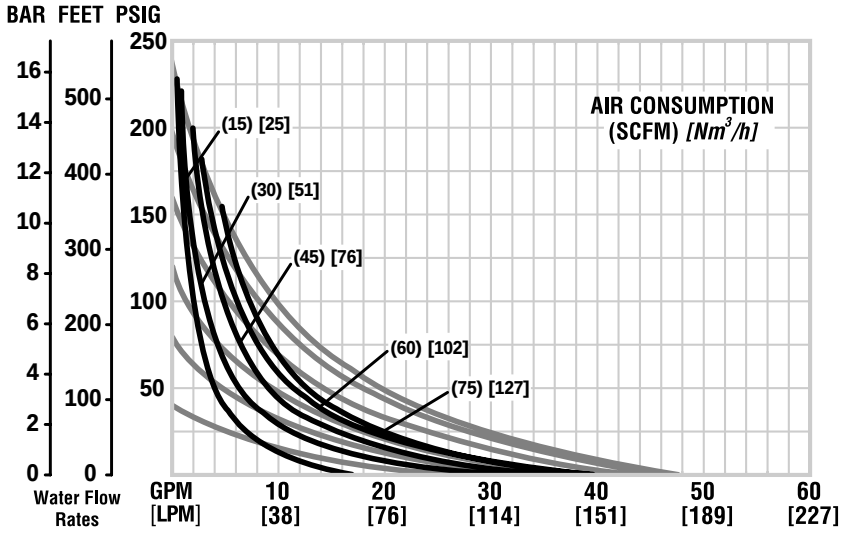
PERFORMANCE CURVES

MODEL H400S METAL TEFLON®-FITTED

Height .....605 mm (23.8")
Width .....345 mm (13.6")
Depth .....285 mm (11.2")
Ship Weight .....Aluminum 26 kg (57 lbs.)
Air Inlet .....13 mm (½")
Inlet .....38 mm (1-½")
Outlet .....38 mm (1-½")
Suction Lift .....2.3 m Dry (7.4')
8.8 m Wet (28.9')
Max. Flow Rate .....182 lpm (48 gpm)
Max. Size Solids .....8 mm (.31")

Example: To pump 57 lpm (15 gpm) against a discharge pressure head of 7.0 bar (100 psig) requires 8.0 bar (110 psig) and 135.92 Nm^3/h (80 scfm) air consumption.

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

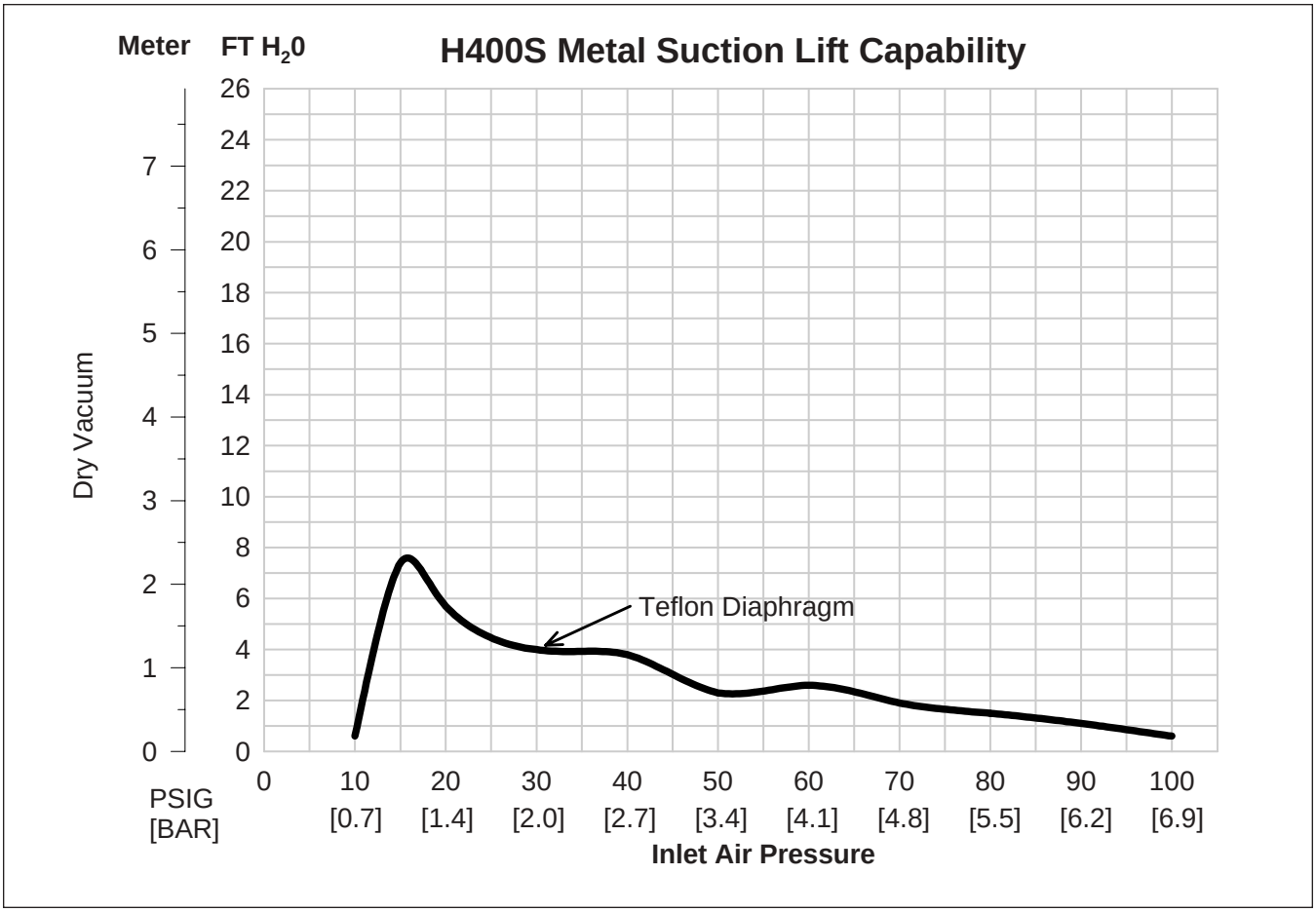


Air inlet pressure values are 50% of discharge pressure values shown on the Y axis

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 6
SUCTION LIFT CURVE



Suction lift curves are calibrated for pumps operating at 305 m (1,000') above sea level. This chart is meant to be a guide only. There are many variables which can affect your pump's operating characteristics. The number of intake and discharge elbows, viscosity of pumping fluid, elevation (atmospheric pressure) and pipe friction loss all affect the amount of suction lift your pump will attain.

SECTION 7A
INSTALLATION

The Wil-Flo® model H400S has a 38 mm (1-½") inlet and 38 mm (1-½") outlet and is designed for discharge pressure to 250 psig. Refer to Section 5 for performance characteristics. The **H400S Metal** pump is manufactured with wetted parts of Aluminum. The **H400S** is available with a brass air valve and aluminum center block with aluminum air chambers.

The suction pipe size should be at least 38 mm (1-½") diameter or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as the H400S is capable of pulling a high vacuum. Discharge piping should be at least 38 mm (1-½"); larger diameter can be used to reduce friction losses. It is critical that all fittings and connections are airtight or a reduction or loss of pump suction capability will result.

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 where equipment will be situated on the production floor. Multiple installations with conflicting requirements can result in congestion of utility areas, leaving few choices for additional pumps.

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

ACCESS: First of all, the location should be accessible. If it's 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 (see Section 5). Use air pressure up to a maximum of 8.6 bar (125 psig) depending on pumping requirements.

For best results, the pumps should use a 5 micron air filter, needle valve and regulator. The use of an air filter before the pump will ensure that the majority of any pipeline contaminants will be eliminated.

SOLENOID OPERATION: When operation is controlled by a solenoid valve in the air line, three-way valves should be used. This valve allows trapped air between the valve and the pump to bleed off which improves pump performance.

MUFFLER: Due to its advanced design, Wil-Flo™ pumps have two exhaust ports and therefore utilize two mufflers. Sound levels are reduced below OSHA specifications using the standard Wilden muffler. Other mufflers can be used to further reduce sound levels, but they usually reduce pump performance.

ELEVATION: Selecting a site that is well within the pump's dynamic lift capability will assure that loss-of-prime troubles will be eliminated. In addition, pump efficiency can be adversely affected 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. In addition, the piping should be aligned so as to avoid placing stress on the pump fittings.

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.

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 model's ability.

When pumps are installed in applications involving flooded suction or suction head pressures, a gate valve should be installed in the suction line to permit closing of the line for pump service.

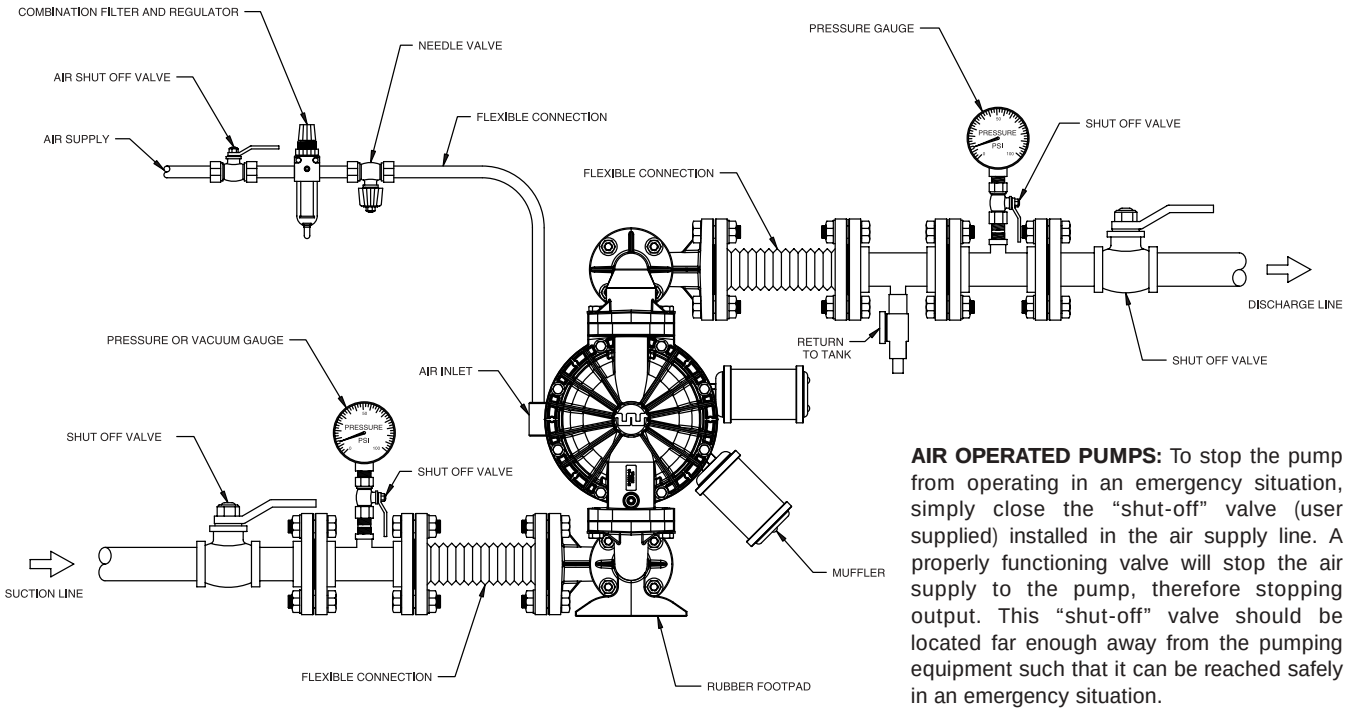
Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 0.5–0.7 bar (7–10 psig). Premature diaphragm failure may occur if positive suction is 0.7 bar (10 psig) and higher.

THE MODEL H400S WILL PASS 8 mm (.31") SOLIDS. WHENEVER THE POSSIBILITY EXISTS THAT LARGER SOLID OBJECTS MAY BE SUCKED INTO THE PUMP, A STRAINER SHOULD BE USED ON THE SUCTION LINE.

CAUTION: DO NOT EXCEED 8.6 BAR (125 PSIG) AIR SUPPLY PRESSURE.

SECTION 7A CONT.

SUGGESTED INSTALLATION



AIR OPERATED PUMPS: To stop the pump from operating in an emergency situation, simply close the "shut-off" valve (user supplied) installed in the air supply line. A properly functioning valve will stop the air supply to the pump, therefore stopping output. This "shut-off" valve should be located far enough away from the pumping equipment such that it can be reached safely in an emergency situation.

NOTE: In the event of a power failure, the shut-off valve should be closed, if the restarting of the pump is not desirable once power is regained.

SECTION 7B

SUGGESTED OPERATION AND MAINTENANCE INSTRUCTIONS

OPERATION: The H400S is pre-lubricated, and does not require in-line lubrication. Additional lubrication will not damage the pump, however if the pump is heavily lubricated by an external source, the pump may cease to operate. If the pump is then moved to a non-lubricated location, it may need to be disassembled and re-lubricated as described in the ASSEMBLY/DISASSEMBLY INSTRUCTIONS.

Pump discharge rate can be controlled by limiting the volume and/or pressure of the air supply to the pump (preferred method). A regulator is used to control air pressure while a needle valve is used to control volume. Pump discharge rate can also be controlled by throttling the pump discharge by partially closing a valve in the discharge line of the pump. This action increases friction loss which reduces flow rate. (See Section 5.) This is useful when the need exists to control the pump from a remote location. When the pump discharge pressure equals or exceeds the air supply pressure, the pump will stop; no bypass or pressure relief valve is needed, and pump damage will not occur. The pump has reached a "deadhead" situation and can be restarted by reducing the fluid discharge pressure or increasing the air inlet pressure. The Wilden H400S pump runs solely on compressed air and does not generate heat, therefore your process fluid temperature will not be affected.

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 affect 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.

SUGGESTED MAINTENANCE:

1. Replace sliding check valve elastomers on both sides when replacing diaphragms.
2. Inspect bushing when replacing Glyd™ ring seals.
3. Inspect pressure relief valve elastomers on both sides when performing routine maintenance.

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.

SECTION 7C
TROUBLESHOOTING

Pump will not run or runs slowly.

1. Verify that air valve gasket is installed properly. (3/16" air valve bleed ports must be unobstructed.)
2. Ensure that the air inlet pressure is at least 0.4 bar (5 psig) above startup pressure and that the differential pressure (the difference between air inlet and liquid discharge pressures) is not less than 0.7 bar (10 psig).
3. Check that pump is not lubricated, too much lubrication may stop the pump.
4. Check air inlet filter for debris (see recommended installation).
5. Check for extreme air leakage (blow by) which would indicate worn seals/bores in the air valve, main shaft, shuttle bores, relief valves.
6. Disassemble pump and check for obstructions in the air passageways or objects which would obstruct the movement of internal parts.
7. Check for sticking ball check valves. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball check valves and seals with proper elastomers. Also, as the check valve balls wear out, they become smaller and can become stuck in the seats. In this case, replace balls and seats.
8. Check for broken inner piston, air valve piston or actuator pin which will cause the air valve spool to be unable to shift.
9. Remove shipping plugs.

Pump runs but little or no product flows.

1. Check for pump cavitation; slow pump speed down to allow thick material to flow into liquid chambers.
2. Verify that vacuum required to lift liquid is not greater than the vapor pressure of the material being pumped (cavitation).
3. Check for sticking ball check valves. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball check valves and seals with proper elastomers. Also, as the check valve balls wear out, they become smaller and can become stuck in the seats. In this case, replace balls and seats.

Pump shifts unevenly.

1. Inspect/replace sliding check valve assembly/elastomers.
2. Inspect/replace pressure relief valve assembly/elastomers.

Pump muffler freezes.

1. Remove muffler.
2. Add plumbing to move muffler away from pump.
3. Check for excessive moisture in compressed air. Install a dryer — **do not** install a hot air generator (HAG). Alternatively, a coalescing filter may be used to remove the water from the compressed air in some applications.

Air bubbles in pump discharge.

1. Check for ruptured diaphragm.
2. Check tightness of outer pistons (refer to Section 8C).
3. Check tightness of fasteners and integrity of O-rings and seals, especially at intake manifold.
4. Ensure pipe connections are airtight.

Product comes out air exhaust.

1. Check for diaphragm rupture.
2. Check tightness of outer pistons to shaft.

SECTION 8A
MODEL H400S 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 the hazardous effects of contact with your process fluid.

The Wilden H400S metal pump has a 38 mm (1-½") inlet and outlet and is designed for flows up to 182 LPM (48 GPM). Its air distribution system is based on a revolutionary design which increases reliability and performance. The model H400S is available in aluminum wetted parts. The center block is available in aluminum. Air valve comes in brass.

TOOLS REQUIRED:

14 mm (9/16") Wrench

19 mm (¾") Wrench

Adjustable Wrench

Vise equipped w/soft jaws
(such as plywood, plastic or other suitable material)

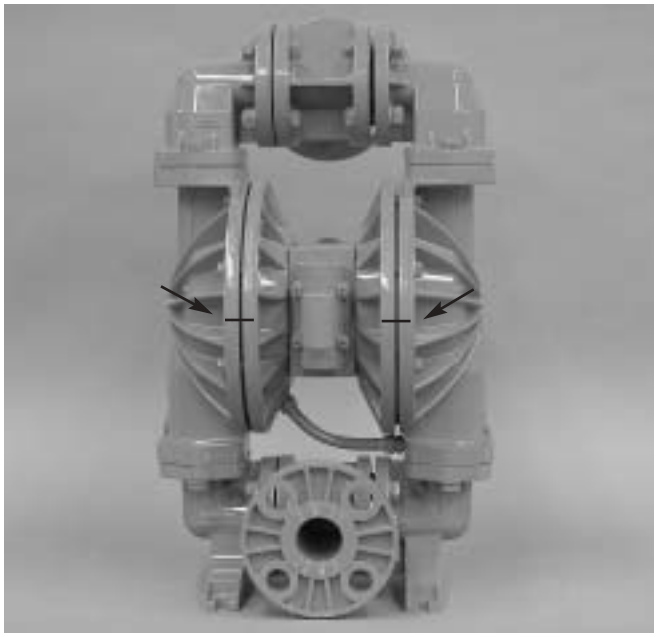


Figure 1

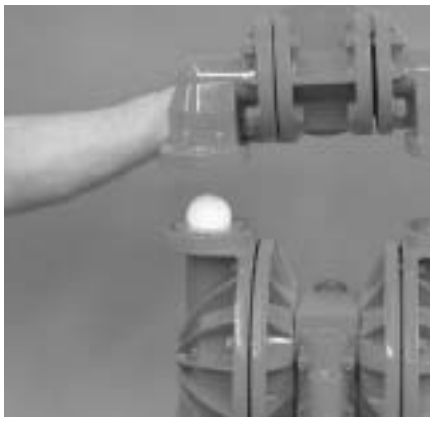
DISASSEMBLY:

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*

Utilizing a 19 mm (¾") wrench, remove the manifold bolts that fasten the discharge manifold to the liquid chambers. *(Figure 2)*



Step 3. *Figure 3*

Remove the discharge manifold to expose the top left valve ball and seat. NOTE: The H400S pump does not use valve balls on the side that the amplification chamber is located on. Inspect left valve ball, valve seat, O-ring and ball cage area of manifold for excessive wear or damage. *(Figure 3)*

Step 4. *Figure 4*

To ensure no excessive wear or damage has occurred to the seat plug O-rings, first remove seat plugs located between both top and bottom tee sections and elbows, right side of pump only. Inspect and replace seat plug O-rings if necessary. Install Buna-N O-ring on air side of plug and the encapsulated Viton® O-ring on liquid side of plug. *(Figure 4)*

Step 5. *Figure 5*

Remove the discharge valve ball, valve seat, and valve seat O-ring from the left liquid chamber and inspect for nicks, gouges, chemical attack or abrasive wear. Replace worn parts with genuine Wilden parts for reliable performance. The Teflon® valve seat O-rings should be replaced when pump is reassembled. *(Figure 5)*

Step 6. *Figure 6*

Utilizing a 19 mm (¾") wrench, remove the manifold bolts that fasten the inlet manifold to the liquid chambers. *(Figure 6)*

Step 7. *Figure 7*

Lift liquid chambers and center section from inlet manifold to expose left inlet valve ball, valve seat, and valve seat O-ring. Inspect for nicks, gouges, chemical attack or abrasive wear. Replace worn parts with genuine Wilden parts for reliable performance. The Teflon® valve seat O-rings should be replaced when pump is reassembled. *(Figure 7)*

Step 8. *Figure 8*

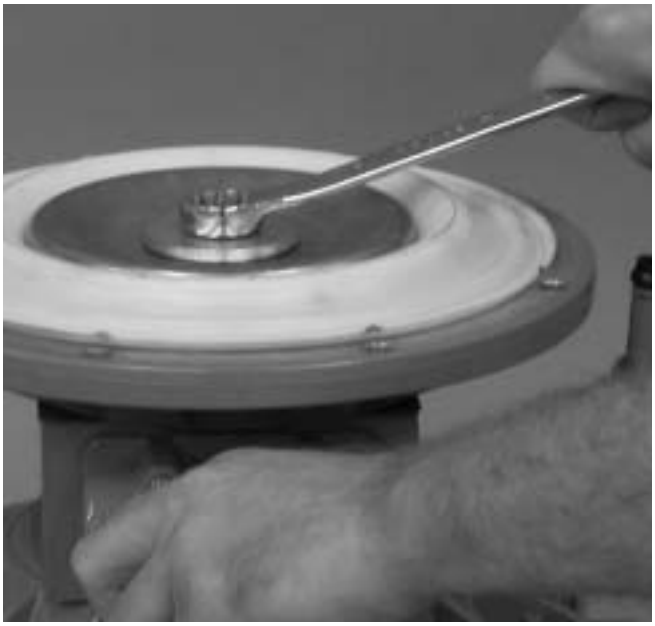
To allow for easy removal of the right liquid chamber, first detach the nylon tubing connecting the left air chamber to the right liquid chamber. *(Figure 8)*

Step 9. *Figure 9*

With a 14 mm (9/16") wrench, remove liquid chamber bolts that connect the liquid chamber to the air chamber. *(Figure 9)*

Step 10. *Figure 10*

Lift liquid chamber away from center section to expose diaphragm, outer piston, and shaft bolt. *(Figure 10)*



Step 11. *Figure 11*

Using a 19 mm (¾") wrench, remove the shaft bolt by turning counter clockwise. *(Figure 11)*

Step 12. *Figure 12*

After removing the shaft bolt, outer piston, and diaphragm from right side of pump, remove left liquid chamber. *(Figure 12)*

Step 13. *Figure 13*

Using a 19 mm (¾") wrench, remove the left shaft bolt by turning counter clockwise. *(Figure 13)*

Step 14. *Figure 14*

Now that both diaphragm assemblies have been removed from pump, remove main shaft from center section. *(Figure 14)*

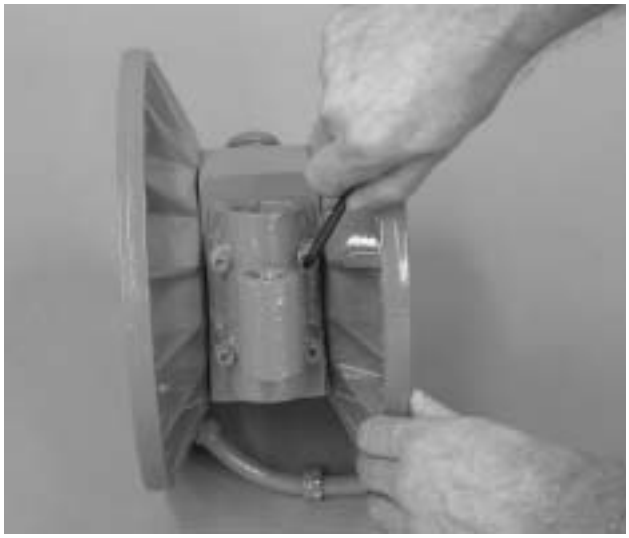
SECTION 8B
WIL-FLO™ AIR DISTRIBUTION SYSTEM
DIRECTIONS FOR DISASSEMBLY/REASSEMBLY

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 liquid inlet and discharge lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container. Be aware of the hazardous effects of contact with your process fluid.

The Wilden Metal H400S utilizes a revolutionary Wil-Flo™ air distribution system. A 13 mm (½") (12.7 mm) air inlet connects the air supply to the center section. Proprietary composite seals reduce the coefficient of friction and allow the H400S to run lube-free. Sliding check valves and pressure relief assemblies ensure that the Wil-Flo™ runs efficiently and reliably with enhanced performance characteristics. Constructed of aluminum, the Wil-Flo™ air distribution system is designed to perform in on/off, non-freezing, non-stalling, tough duty applications.

TOOLS REQUIRED:

5 mm (⅞") Hex Head Wrench
6 mm (¼") Hex Head Wrench
Snap Ring Pliers
O-Ring Pick



Step 1. *Figure 1*

Loosen the air valve bolts utilizing a 6 mm (¼") hex head wrench. *(Figure 1)*

Step 2. *Figure 2*

With snap ring pliers, remove the bottom end cap retaining snap ring. *(Figure 2)*

Step 3. *Figure 3*

Apply pressurized air to the 5 mm (⅜") hole on the opposite end of the air valve face. **CAUTION:** The air valve end cap may come out with considerable force. Inspect the piston and cylinder bore for nicks and scoring. *(Figure 3)*

Step 4. *Figure 4*

Inspect the cylinder end caps, end cap O-rings and piston guide pin. Ensure that guide pin is straight or the piston will not move freely in the cylinder. Inspect the anti-centering pin holes found at the ends of the air valve piston and ensure they are free of debris. Clean filter by removing reducer bushing. Replace air valve gasket if necessary. *(Figure 4)*

Step 6. *Figure 6*

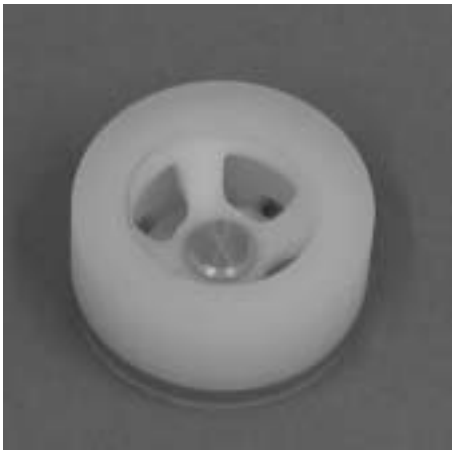
Remove the air chamber bolts with a 6 mm (¼") hex head wrench. *(Figure 6)*

Step 7. *Figure 7*

Remove the air chamber gasket. Inspect gasket for signs of wear or chemical attack and replace if necessary. *(Figure 7)*

Step 8. *Figure 8*

Remove the sliding check valve. Be careful not to damage the elastomeric spring and external seal. *(Figure 8)*



Step 9. *Figure 9*

Inspect external seals and elastomeric spring for signs of wear. Replace the entire assembly if necessary. *(Figure 9)*

Step 10. *Figure 10*

Using your thumb, or by pushing on the lip from the opposite side, remove the shaft bushing and replace if necessary. If Glyd™ rings are worn, replace with P/N 08-3210-55-225. *(Figure 10)*

Step 11. *Figure 11*

Using snap ring pliers, remove the snap ring pressure relief retainer. *(Figure 11)*

Step 12. *Figure12*

The entire relief assembly can be removed from the center block *(Figure 12).* Notice that the legs of the elastomeric spring point away from the assembly.

Step 13. *Figure 13*

The pressure relief valve can be separated into two major parts. *(Figure 13)*

Step 14. *Figure 14*

The actuator pin assembly can be removed from the pressure relief assembly *(Figure 14).*

Step 15. *Figure 15*

The actuator pin can be removed to expose the elastomeric spring. *(Figure 15)*

Step 16. *Figure 16*

Reverse the actuator pin and use it to remove the elastomeric spring. *(Figure 16)*

Step 17. *Figure 17*

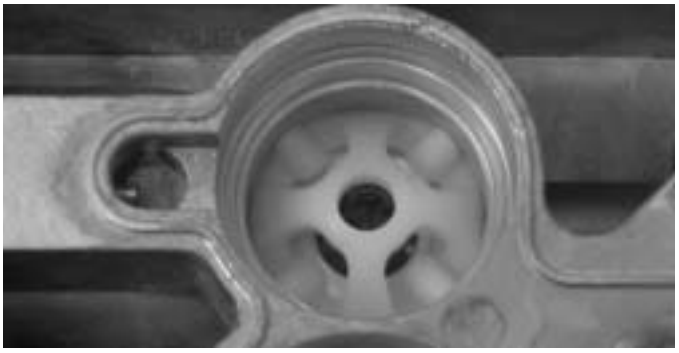
The pressure relief assembly is comprised of 7 distinct parts *(Figure 17).* An entire pressure relief valve assembly can be purchased or a seal kit can be purchased to rebuild the entire pressure relief valve. **IMPORTANT:** Both sides of the pump must be rebuilt at the same time.

SECTION 8C
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.

- Lightly lubricate center section shaft and outer diameter of the sliding check assembly with NLGI grade 2 molybdenum disulfide based grease or equivalent.
- Stainless bolts should be lubed to reduce the possibility of seizing during tightening.
- Level the water chamber side of the intake/discharge manifolds to ensure a proper sealing surface. This is most easily accomplished by placing them on a flat surface prior to tightening their bolts to the desired torque. (See this page for torque specifications.)
- Be sure to tighten outer pistons simultaneously on Teflon®-fitted pumps to ensure proper torque values.
- If main shaft is difficult to remove from piston assembly, use soft jaws to secure main shaft. Remove shaft bolt by turning counter-clockwise.
- Place one liquid chamber on its side and align center section with chamber using alignment marks made during disassembly before tightening large clamp bands. Push down on opposite side diaphragm assembly until diaphragm is inverted. Place opposite liquid chamber on center section and align.
- Both sliding check spring kits must be replaced at the same time.
- Be sure to align anti-rotation “nub” on the end cap (P/N 04-2300-03) with the machined groove in the bore of the air valve body.



When replacing the pressure relief assembly, place the elastomeric spring in the bore prior to seating the pressure relief assembly. Replace both pressure relief valves or seal kits at the same time.

MAXIMUM TORQUE SPECIFICATIONS

Description of Part	Torque
Air Valve	4.4 N•m [40 in.-lbs.]
Center Section	47.4 N•m [35 ft.-lbs.]
Diaphragm Shaft Bolt	61.0 N•m [45 ft.-lbs.]
Liquid Chamber to Air Chamber	17.6 N•m [13 ft.-lbs.]
Tee Section to Elbow	27.1 N•m [20 ft.-lbs.]
Manifold to Liquid Chamber	54 N•m [40 ft.-lbs.]

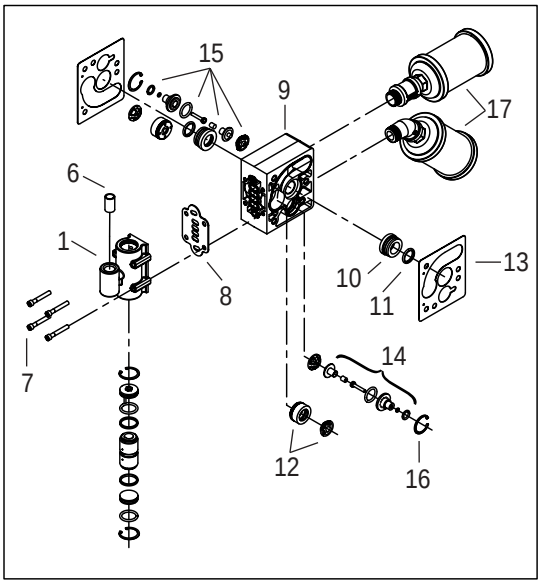
NOTES

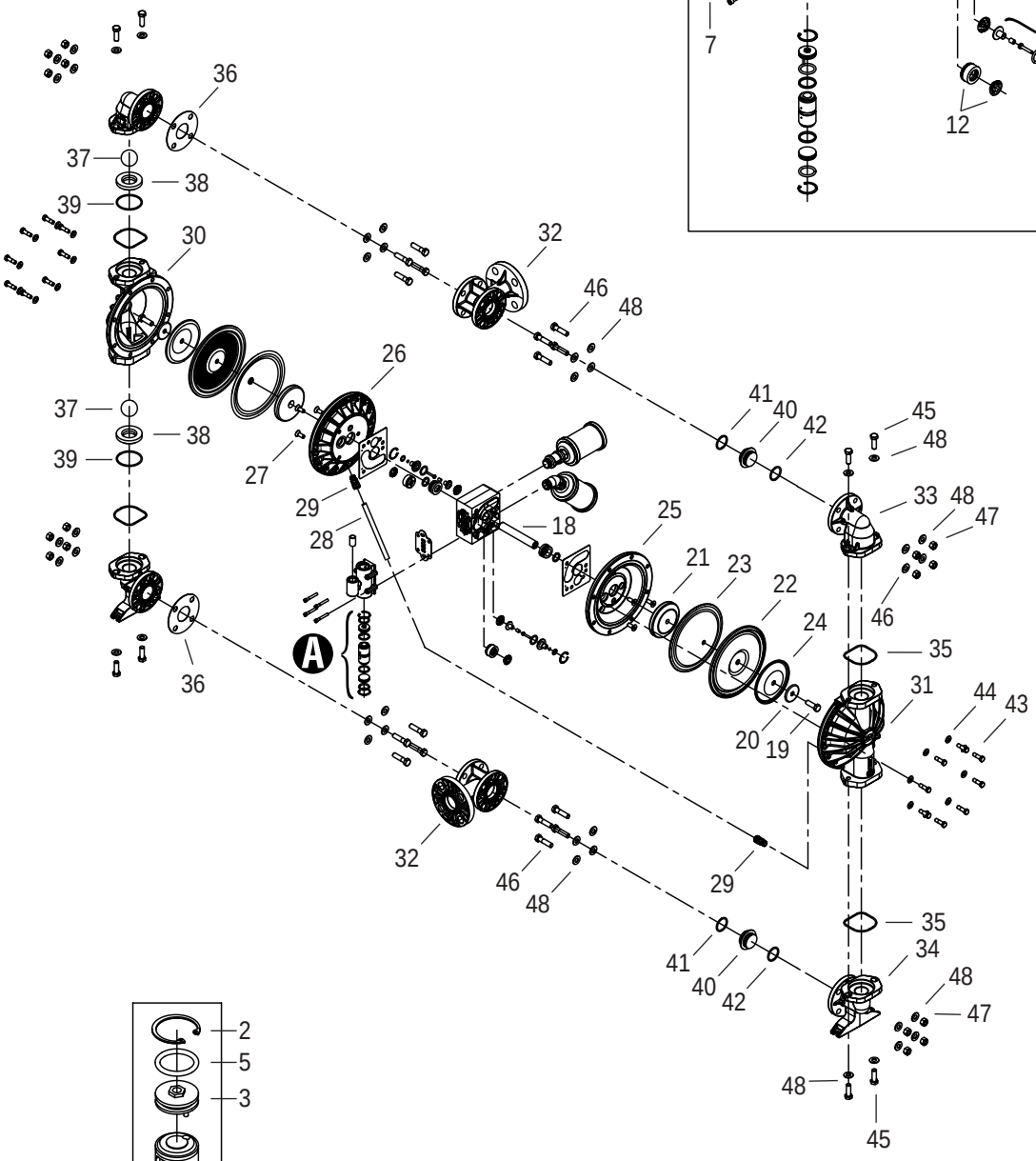
EXPLODED VIEW/PARTS LISTING

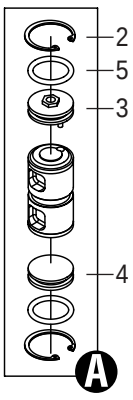
H400S

METAL

TEFLON®-
FITTED







H400S Metal, Teflon®-Fitted

Item #	Part Description	Qty. per Pump	H400S/AAAB/TF/TF/ATF P/N	H400S/AAAB/TF/TF/ATF/504 P/N
1	**Air Valve Assembly, W4[1]**	1	04-2015-07	04-2015-07
2	Retaining Ring, Air Valve	2	04-2650-03	04-2650-03
3	End Cap W/Guide	1	04-2300-23	04-2300-23
4	End Cap W/O Guide	1	04-2330-23	04-2330-23
5	O-Ring, (.984 X .139) Buna-N	2	04-2390-52	04-2390-52
6	Screen, Air Valve	1	04-2500-07	04-2500-07
7	Air Valve Screw, 1/4-20 X 2	4	04-6000-08	04-6000-08
8	Gasket, Air Valve, W4	1	04-2604-52	04-2604-52
9	Center Block W4	1	04-3115-01	04-3115-01
10	Assy, Shaft Bushing	2	08-3305-99	08-3305-99
11	**Glyd™ Ring**	**2**	**08-3210-55-225**	**08-3210-55-225**
12	**Assy, Sliding Check, Wil-Flo™**	**2**	**08-2800-99**	**08-2800-99**
13	Center Block Gasket	2	04-3527-52	04-3527-52
14	**Pressure Relief Assembly[2]**	**2**	**08-2745-99**	**08-2745-99**
15	**Pressure Relief Seal Kit[3]**	**1**	**99-9345-99**	**99-9345-99**
16	Retaining Ring	2	04-2650-03	04-2650-03
17	Kit, Muffler, W4/W8	1	04-9222-99	04-9222-99
18	Shaft, Pro-Flo™, Non-PTFE, SS	1	04-3800-03-700	04-3800-03-700
19	Shaft Bolt 1.2-20 X 1 1/2	2	04-6091-08	04-6091-08
20	Washer, Rnfr (.531x2 .188x .1943)	2	04-6800-08	04-6800-08
21	Piston, Inner	2	08-3761-01	08-3761-01
22	**Diaphragm, Primary**	**2**	**04-1010-55**	**04-1010-55**
23	**Diaphragm, Back-Up**	**2**	**04-1060-51**	**04-1060-51**
24	Piston, Outer	2	04-4550-08	04-4550-08
25	Chamber, Air, W4, Bolted	1	04-3682-01	04-3682-01
26	Chamber, Air, H400S	1	04-3683-01	04-3683-01
27	Screw, HSFHS, 3/8-16 X 1	6	71-6250-08	71-6250-08
28	Tubing, Nylon, 1.2" X 7", H400S	1	04-7741-23	04-7741-23
29	Fitting, Comp, Brass 3.8 X 1/2	2	04-7785-07	04-7785-07
30	Chamber, Liquid, Bolted	1	04-4980-01	04-4980-01
31	Chamber, Liquid, H400S	1	04-4981-01	04-4981-01
32	T-Section, H400S	2	04-5181-01	04-5186-01
33	Elbow, Discharge, Bolted	2	04-5250-01	04-5250-01
34	Elbow, Inlet, Bolted	2	04-5210-01	04-5210-01
35	Outboard O-Ring	4	04-1370-55	04-1370-55
36	Gasket, Bolted, Tee, PTFE	2	04-1325-55	04-1325-55
37	**Ball, Valve, Teflon®**	**2**	**04-1080-55**	**04-1080-55**
38	**Seat, Valve, Bolted, Aluminum**	**2**	**04-1125-01**	**04-1125-01**
39	**Valve Seat O-Ring**	**2**	**04-1205-55**	**04-1205-55**
40	Seat, Plug, H400S	2	04-1135-01	04-1135-01
41	O-Ring (1.484 X .139) Encap Viton®	2	05-1370-60	05-1370-60
42	O-Ring (1.484 X .139) Buna-N	2	02-1230-52	02-1230-52
43	Screw, HHC, 3/8-16 X 1 1/4	16	04-6190-03	04-6190-03
44	Washer, Flat (.406 X .812 X .065)	16	04-6740-03	04-6740-03
45	Screw, HHC, 1/2-13 X 1 1/2	8	04-6180-03	04-6180-03
46	Screw, HHC, 1/2-13 X 2.25	16	08-6181-03	08-6181-03
47	Nut, Hex, 1/2-13	16	15-6420-03	15-6420-03
48	Washer, Flat (.531 X 1.062 X /095)	40	04-6730-03	04-6730-03

[1]Air Valve Assembly includes items 2–6.
[2]Pressure Relief Assembly (P/N 08-2745-99) includes Pressure Relief Seal Kit (P/N 99-9345-99).
[3]Pressure Relief Seal Kit (P/N 99-9345-99) contains all parts necessary to rebuild *both* pressure relief valves.

NOTE: Muffler Kit (P/N 04-9222-99) comes equipped with (1) P/N 08-3250-08 3/4" 45° street elbow, (1) P/N 08-7420-08 3/4" threaded pipe and (1) P/N 04-7501-08 3/4" coupling. Wil-Flo™ pumps require 2 mufflers each (P/N 08-3510-99).

All boldface items are primary wear parts.

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NOTES

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 one year from date of startup or two years from date of shipment, 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 form 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.

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Number of pumps in facility? _____Diaphragm _____Centrifugal

_____Gear _____Submersible _____Lobe _____Other _____

Fluid being pumped _____

How did you hear of Wilden Pump? _____Trade Journal _____Trade Show

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