



Patent Number
5,495,917

MODEL NUMBER

SERIAL NUMBER



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LIMITED WARRANTY

PAX PRODUCTS, INC. (the "Company") warrants to the original purchaser of each PAX LUBE SYSTEM that the System will be free from defects in material and workmanship, under normal and proper installation, use, and maintenance in accordance with the Company's instructions, for a period of 90 days after the date of shipment from the Company's plant.

Purchaser's exclusive remedy and the Company's sole liability under the above warranty or in connection with any other claim relating to the Pax Lube System shall be limited to the repair, or at the Company's option, the replacement or refund of the purchase price, of and System or part or component thereof which is returned to the Company freight prepaid and which is defective in material or workmanship. Defective Systems or parts or components thereof which the Company replaces become the property of the Company. All systems or parts or components thereof which are returned to the purchaser will be returned freight collect.

EXCEPT AS EXPRESSLY STATED ABOVE, THE COMPANY MAKES NO WARRANTY, EXPRESS OR IMPLIED, WHETHER OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR USE OTHERWISE, ON ANY PAX LUBE SYSTEM, OR ANY PARTS OR LABOR FURNISHED DURING THE SALE, DELIVERY, OR SERVICING OF ANY PAX LUBE SYSTEM.

IN NO EVENT SHALL THE COMPANY BE LIABLE TO ANY PURCHASER OR PERSON CLAIMING THROUGH ANY PURCHASER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NONDELIVERY, SERVICING, USE OR LOSS OF USE, OF ANY PAX LUBE SYSTEM OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT THE COMPANY'S WRITTEN CONSENT, EVEN THOUGH THE COMPANY HAS BEEN NEGLIGENT. IN NO EVENT SHALL THE COMPANY'S LIABILITY UNDER ANY CLAIM MADE BY ANY PURCHASER OR PERSON CLAIMING THROUGH ANY PURCHASER EXCEED THE PURCHASE PRICE OF THE PAX LUBE SYSTEM OR PART OR COMPONENT THEREOF IN RESPECT OF WHICH DAMAGES ARE CLAIMED.

Purchaser shall promptly inspect each System upon receipt. Claims under the above warranty shall be made by contacting the Company at 5097 Monroe Rd., Celina, OH 45822, Attn: Service Department (1-800-733-6930) or (419) 586-6948. No claim under the above warranty will be allowed unless made within 10 days after the date of the warranty period on which the defect is or should have been discovered by the purchaser.

DESIGN CHANGES

Consistent with sound engineering principles and recognized practices, Pax Products, Inc., reserves the right to discontinue or change specifications, designs and materials, at any time and without notice.

Design differences or changes that exist between the unit received and the system illustrated in the manual are the result of design improvements or special arrangements contracted for at the time of purchase. Every effort is made to keep the manual consistent with the majority of systems supplied.



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SAFETY

UNDER NO CIRCUMSTANCES SHOULD THE PAX LUBE SYSTEM OR ANY COMPONENT BE PLACED IN SUCH A MANNER THAT WILL CAUSE POSSIBLE PERSONAL INJURY OR DAMAGE TO ANY EQUIPMENT.

PAX PRODUCTS, INC. RECOMMENDS THAT WHENEVER POSSIBLE, PERMANENT FIXTURES WITH QUICK DISCONNECT COUPLINGS SHOULD BE INSTALLED TO INSURE ULTIMATE LOCATION, CONTROL, PERFORMANCE RELIABILITY, AND OVERALL SAFETY.

SYSTEMS SHOULD BE PLACED IN SUCH A WAY SO THAT NO COMPONENT OR COMBINATION OF COMPONENTS INTERFERE WITH THE NORMAL OPERATION OF ANY MACHINE.

BEFORE OPERATING, INSURE CLEARANCES OF THE SPRAY LINES (NOZZLES INCLUDED), MAGNETIC BASES AND POSTS, AND RELATED COMPONENTS.

PRIOR TO SERVICING OR TROUBLESHOOTING ANY PAX LUBE SYSTEM, DISCONNECT THE ELECTRICAL POWER AND THE AIR SOURCE.

NOTICE: AN *OPTIONAL* AIR SHUT-OFF DEVICE CONFORMING TO THE OSHA LOCKOUT/TAGOUT STANDARD IS AVAILABLE (REF. FIG. 2. OR 3.)



SYSTEM INSTALLATION

Please read this manual carefully for information regarding SAFETY, ASSEMBLY, INSTALLATION, OPERATION, MAINTENANCE, TROUBLESHOOTING, AND PARTS SERVICE.

The 5, 15 & 30 gallon systems are shipped assembled but require final assembly of the Air Filter/Regulator/Lubricator (FRL) unit. The FRL is boxed separately and stored in the system shipping container. Please refer to Fig. 2. for proper installation of the FRL. There is no assembly of the FRL required for the 6T, 10T and 14T Tankless systems.

PLACEMENT OF THE PAX LUBE SYSTEM.



ATTENTION



IMPROPER PLACEMENT OF THE PAX LUBE SYSTEM MAY RESULT IN PERSONAL INJURY, DAMAGE TO THE PRESS, THE PAX LUBE SYSTEM, OR OTHER EQUIPMENT.

When planning the location of the system, consideration should be given to the routing of air and electrical lines for the unit. If a lubricant return line is to be used, the routing of this line should also be considered. Avoid creating situations that may be hazardous or conditions that may interfere with the operator or cause damage to these lines.

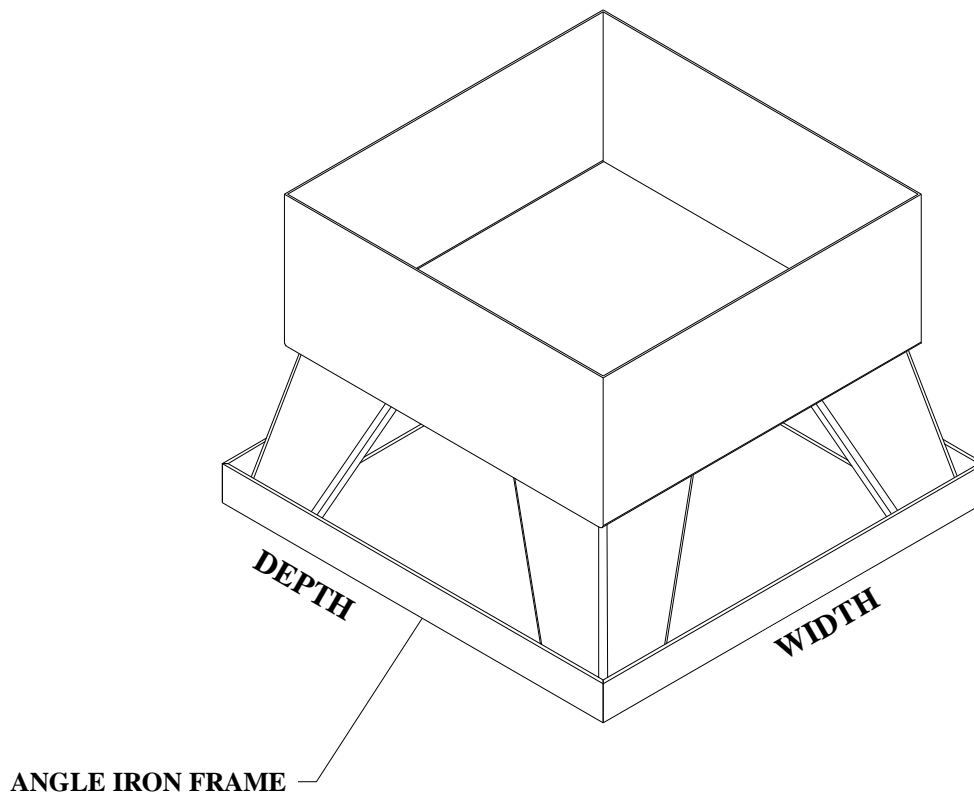
It is recommended that a steel angle frame (Fig. 1.) be secured to the floor to prevent movement of the system due to vibrations. The frame should permit easy removal of or access to the system for cleaning, service, maintenance, adjustments, or to fill/empty the reservoir.

Locate the Pax Lube System at a convenient place as near to the press as possible where the unit will not be in the path of vehicles or moving parts of the press but will permit easy access for servicing the FRL and filling or draining the reservoir.

Consideration should also be given for the type of spray lines and the routing of the lines. The optional spray lines are 8 feet long, from the quick connect plug to the end of the spray nozzle assembly. We recommend that these lines be shortened to the length required for each application. Use of lines longer than 8 feet requires use of a semi-rigid line that may be as long as 20 feet.

For the most efficient operation of the system, placement should be as close as practical to the points where the lubrication will be applied. It is more efficient to use either steel tubing or the semi-rigid tubing for best transfer of the lubricant over longer distances (longer than 8 feet). The use of rigid tubing will help prevent the loss of line pressure, thus helping to assure the best performance. When spraying higher viscosity lubricants, rigid tubing and shorter lines (shorter than 8 feet) are strongly recommended. Generally speaking, the shorter the line, the better the spray pattern. The spray pattern may also improve by using the more rigid tubing for less viscous lubricants.

Magnetic base spray assemblies were designed for quick setup and versatility. They also assist with determining the most efficient location for the spray nozzles. Once the best location is determined, it is recommended that a permanent spray line and manifold block be installed. This permits the spray lines to be located in the same position at all times and eliminates setup inconsistencies.



**INSIDE FRAME DIMENSIONS
(WxD) INCLUDES APPROXIMATELY 1/8"
CLEARANCE PER SIDE**

| MODEL | |
|--------------|-----------------|
| 5 | 14.00" X 14.00" |
| 15 | 16.50" X 16.50" |
| 30 | 22.50" X 22.50" |

Figure 1. Suggested Floor Mounting Frame for 5, 15, or 30 Gallon Systems



AIR REQUIREMENTS



ATTENTION



USE OF AIR PRESSURE IN EXCESS OF 125 PSI MAY RESULT IN PERSONAL INJURY OR DAMAGE TO THE AIR REGULATOR ASSEMBLY AND WILL VOID THE WARRANTY OF THE PAX LUBE SYSTEM.

The air pressure requirements of the Pax Lube System are as follows:

1. The maximum safe operating air pressure is 125 PSI.
2. The minimum operating air pressure is 30 PSI. (Measured when the solenoid is engaged).
3. The minimum recommended input line is 1/4" pipe or equivalent.
4. The air volume of the Pax Lube System is .002 cubic feet of free uncompressed air per pump per cycle. This volume also includes the spent air of the manifold, solenoid valve, and diaphragm pump.

The air volume rate was calculated based on the input air pressure adjusted to 40 PSI and the volume adjustment on the pump fully open (down). The air usage rate indicated is a mean figure and the actual usage of air may vary slightly from unit to unit.

NOTE: MAINTAIN OR ADJUST THE AIR PRESSURE AT THE LOWEST POSSIBLE SETTING (MIN 30 PSI) WHICH PRODUCES A GOOD SPRAY PATTERN (TYPICALLY 35-45 PSI IS APPROPRIATE FOR MOST WATER SOLUBLE LUBRICANTS). HIGHER PRESSURE MAY BE REQUIRED FOR HEAVIER VISCOSITY LUBRICANTS. FOR LUBRICANTS WITH VISCOSITY GREATER THAN 300 SUS AT 100°F CONTACT THE FACTORY FOR SUGGESTIONS ABOUT COMPONENTS THAT WILL ENHANCE THE SYSTEM PERFORMANCE.



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**FINAL ASSEMBLY & INSTALLATION OF THE FILTER/REGULATOR/LUBRICATOR (FRL)**

NOTE: TOOLS REQUIRED—2 EACH 7/16" AND 1 EACH 5/8" WRENCHES

The FRL (Fig. 2.) with the mounting bracket installed and a loose stainless steel tube are located in a separate package. Remove the FRL and stainless steel tube from the packaging. Remove the FRL from the mounting bracket by turning the release screws (1) counterclockwise and lifting clamp device.

Install the S.S. tube (6) into the brass fitting (2) finger tight. Remove the nuts and one set of washers (3 and 4) from the mounting bolts (5). Leave the mounting bolts and flat washers in place and install the bracket on the sidewall of the reservoir. At the same time install the free end of the S.S. tube (6) into the manifold (7) brass fitting. Align the S.S. tube in a straight line to the vertical (side view). Fasten the washers and nuts. Tighten the mounting bracket nuts and bolts using two 7/16" wrenches. Secure the S.S. tube by tightening the nuts on the brass fittings using the 5/8" wrench.

Once the bracket and stainless steel tube are properly installed and secured, place the FRL assembly into the mounting bracket, close clamping device, and turn the screws (1) clockwise until tight and the FRL is securely in place.

DO NOT CONNECT THE AIR SOURCE UNTIL THE PROCEDURES FOR OPERATING THE FRL ASSEMBLY ARE IMPLEMENTED.

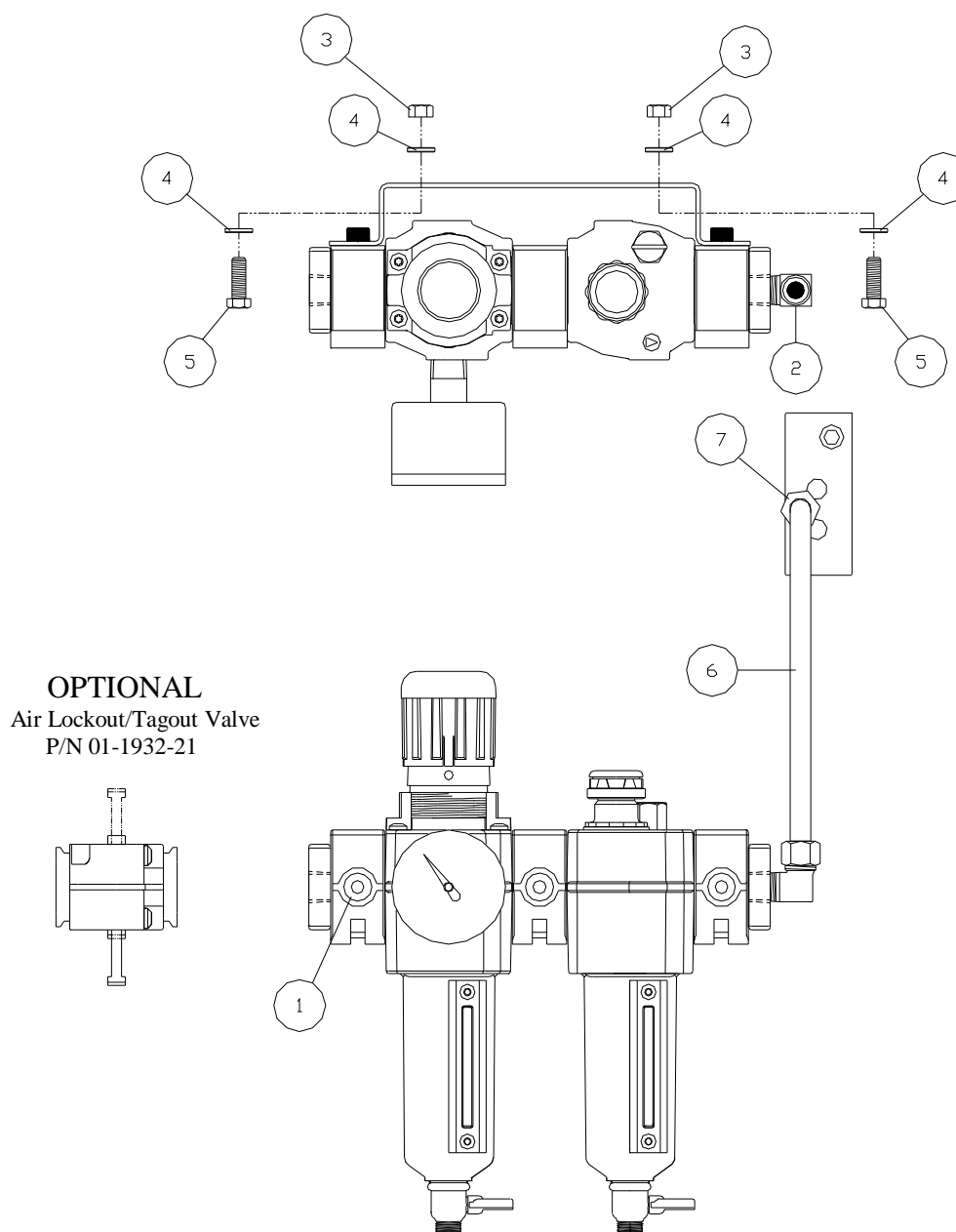
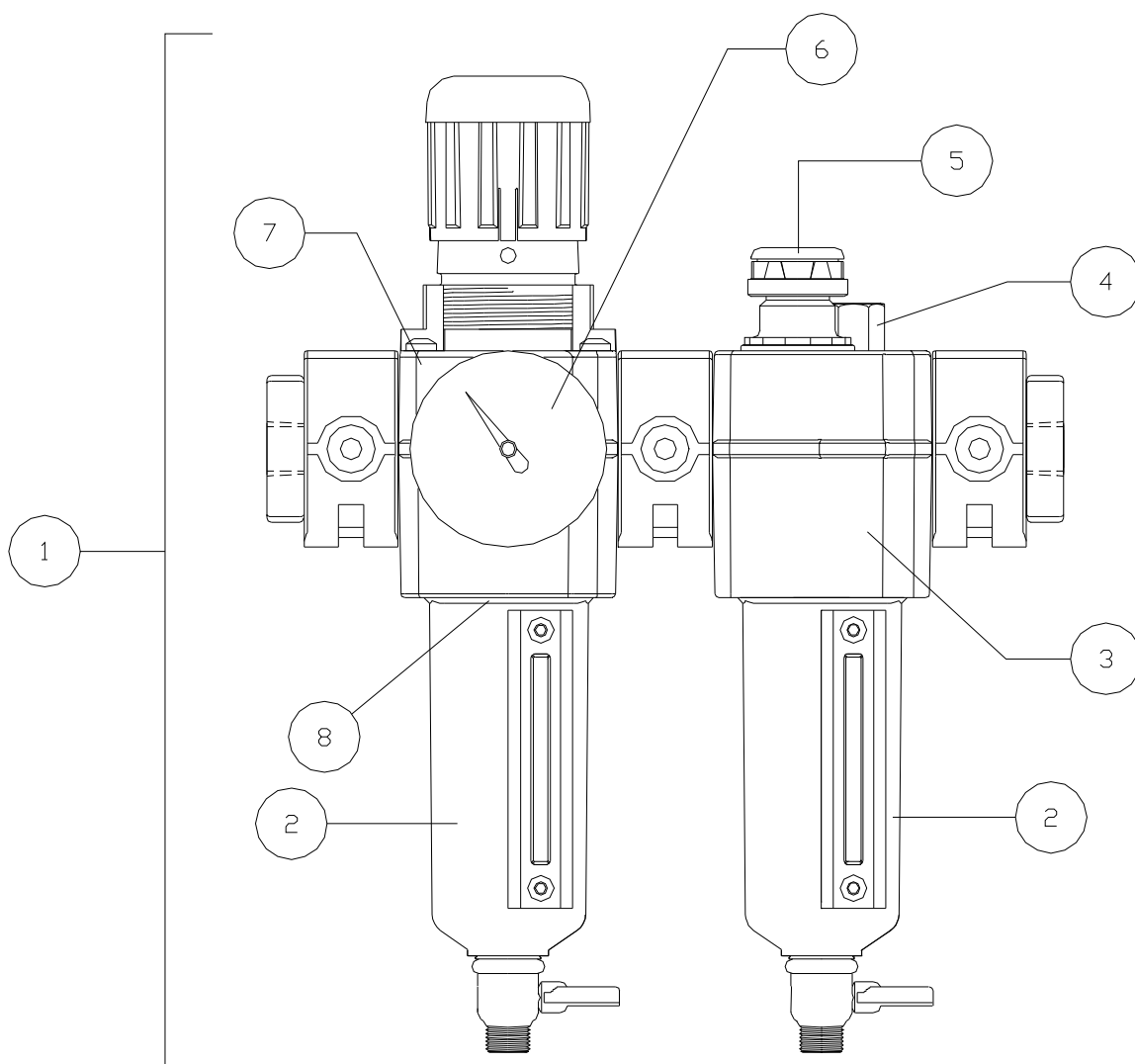


Figure 2. FRL Parts Identification for Assembly



| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> |
|----------------|-----------------|------------------------------|
| 1 | 01-2148-30 | Quick Mount FRL Assembly |
| 2 | 01-1832-20 | 50RL/50RF Metal Bowl |
| 3 | 01-1814-22 | Lubricator Rebuild Kit |
| 4 | 01-1828-21 | Fill Plug & O-Ring |
| 5 | 01-1801-20 | Lubricator Sight Dome |
| 6 | 01-0909-20 | Air Gauge |
| 7 | 01-1829-21 | Filter/Regulator Rebuild Kit |
| 8 | 01-1824-21 | 50 Micron Filter |

Figure 2A. FRL Parts List



OPERATING THE FRL ASSEMBLY



WARNING



NEVER ATTEMPT TO FILL THE AIR LUBRICATOR RESERVOIR WITHOUT FIRST TURNING OFF THE AIR SUPPLY AND RELIEVING ALL PRESSURE. FAILURE TO RELEASE PRESSURE MAY CREATE A HAZARDOUS CONDITION THAT COULD CAUSE SERIOUS INJURY.

1. Moisture or contaminants in the pressurized air entering the manifold assembly will cause premature wear of the pump viton O-rings and a possible malfunction of the Pax Lube System.
2. The oil level in the air lubricator reservoir (Fig. 3.1) must always be visible in the reservoir sight glass (Fig. 3.2). Check on a daily basis. Remove the fill plug (Fig. 3.3) and fill to the indicated level on the bowl. **DO NOT OVERFILL!**
NOTE: THE SIGHT GLASS WILL APPEAR TO CHANGE COLOR.
3. Failure to maintain the air lubricator reservoir with the proper lubricant oil level or maintaining the proper oil drip rate will void the warranty of the Pax Lube System. **ADJUST THE DRIP RATE (REF. FIG. 3.4) FOR APPROXIMATELY ONE DRIP PER FIVE CYCLES OF THE SOLENOID VALVE.**
4. Use a high quality light turbine oil for use in pneumatic systems. The air lubricator oil should have a viscosity rating of 150 SUS at 100°F or an ISO viscosity grade 32 (28.8 centistokes at 40°C). The following are examples of acceptable oils. Any equivalent oil may be used:

MOBIL D.T.E. 24 LIGHT
SHELL TELLUS 32

AIR FILTER: Periodically inspect the air filter bowl sight glass (Fig. 3.5) to assure the liquid level does not rise more than halfway in the sight glass. The FRL is drained by turning the valve, (Fig. 3.6) located on the bottom of the air filter bowl, open until all the visible water has drained. Before operating the system, insure the air filter bowl valve is closed by turning it to a horizontal position.



AIR REGULATOR AND GAUGE: The air pressure supplied to the Pax Lube System will be indicated on the pressure gauge (Fig. 3.7), refer to the AIR section of this manual for proper air supply information. Adjustment of the air pressure can be accomplished by pulling up on the adjustment knob (Fig. 3.8). Turn the adjusting knob (Fig. 3.8) in a clockwise rotation to increase the air pressure to the manifold assembly and in a counterclockwise rotation to decrease the air pressure. Refer to the AIR section of this manual for proper range settings. After the air pressure is adjusted within the recommended range, insure the adjustment knob (Fig. 3.8) is in the locked position by pushing down on the adjustment knob.

AIR LUBRICATOR: The air lubricator (Fig. 3.1) is engineered into the Pax Lube System to supply positive lubrication to all moving parts within the system via the air supply. As recommended, check the air lubricator bowl on a daily basis to insure the recommended oil is maintained at the proper operating level.

ADDING OIL TO THE AIR LUBRICATOR

To fill the air lubricator reservoir, the following steps must be taken:

1. Disconnect the pressurized air supply from the regulator input on the Pax Lube System or turn off the air supply and relieve the pressure.
2. Remove the fill cap (Fig. 3.3) located on the top of the air lubricator.
3. Fill the reservoir to within 1/8" from the top of the sight glass (Fig. 3.2) on the reservoir.
DO NOT OVERFILL.
4. Replace the fill cap and secure lightly with wrench.
5. Connect the pressurized air supply to the air regulator input.

ADJUSTING THE AIR LUBRICATOR OIL DRIP RATE

To set the drip rate, the following steps must be taken:

1. Prior to adjusting the FRL oil drip rate, insure the unit is operational and cycling at the normal expected operating speed and pressure setting.
2. Look through the glass under the adjustment screw and count the number of pump cycles between drips of oil.
3. Turn the adjustment knob (Fig. 3.4) (counterclockwise to increase the drip rate or clockwise to decrease the drip rate) until the oil drips **at least** one time for every five cycles of the solenoid valve.
4. The drip rate MUST BE A MINIMUM of 1 drop per 5 cycles of the Pax Lube System.

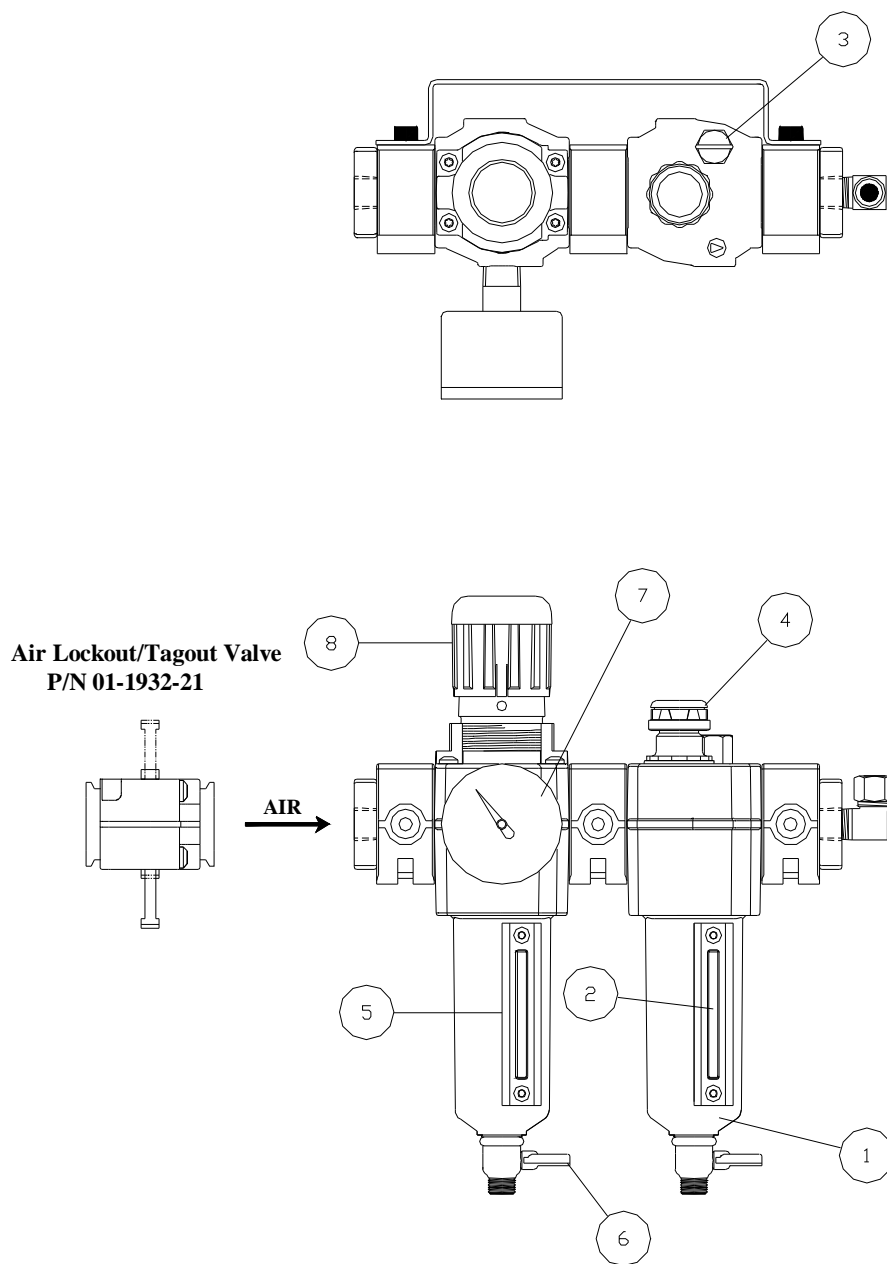




Figure 3. Filter, Regulator, Lubricator (FRL)



ELECTRICAL REQUIREMENTS

The Pax Lube System requires an electrical supply of 120 VAC 60 HZ at 1 Amp minimum. Contact the factory to determine the availability of other voltages and frequencies.

ELECTRICAL POWER

**IMPORTANT**

DAMAGE INCURRED DUE TO IMPROPER ELECTRICAL CONNECTIONS WILL VOID WARRANTY. ALL ELECTRICAL CONNECTIONS MADE ON THE PAX LUBE SYSTEM MUST BE MADE BY A QUALIFIED ELECTRICIAN TO KEEP THE WARRANTY IN EFFECT AND PREVENT PERSONAL INJURY.

All connections must be made in the electrical section on the back side of the manifold mounting panel. The system must be wired in the following manner so that the warranty is not voided:

1. Terminal #1 on the terminal strip is the 120 VAC 60 HZ hot lead.
2. Terminal #2 on the terminal strip is the neutral lead.
3. A ground screw is supplied on the terminal strip mounting plate for customer use in meeting local, state & national electrical codes.
4. Use MAXIMUM 3 AMP fuse for the electrical circuit.

When all electrical connections are completed and secured in such a manner as to prevent any possible damage, replace the back cover plate. Align the plate and insert the retaining screws and secure. The system is now ready for operation. The spray cycle on the Pax Lube System starts when the solenoid coil is **DE-ENERGIZED** (Reference the “LUBE SYSTEM OPERATION” section of the Manual for a detailed explanation).

ELECTRICAL SIGNAL (DRY CONTACT)

The electrical signal required (Dry Contact) to activate the Pax Lube System can be obtained from several sources:

1. Rotary switch on press
2. Cam switch on press
3. Limit switch on press
4. Electric relay on press
5. Optional timer (permits LUBE SYSTEM to operate with or without press signal)
6. Press programmable controller
7. Any type of programmable logic control

Other sources of a contact signal may be available and each individual installation will dictate the exact source. Care should be taken that any signal provided will meet the electrical requirements.



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5, 15 & 30 GALLON PRE-PRESSURIZED LUBE SYSTEM OPERATION

SOLENOID, PUMP AND MANIFOLD ASSEMBLY (REFER TO FIGURES 5. & 6.)

The solenoid valve (6) switches the air between the manifold chambers (7 & 9) by the alternate energizing and de-energizing of the coil (3). Reference Fig. 5.; when the coil (3) is energized, chamber (7) is pressurized and chamber (9) is the exhaust. Reference Fig. 6.; when the coil is de-energized, the chambers reverse roles; chamber (7) becomes the exhaust and chamber (9) is pressurized. This is one full or complete cycle of the solenoid valve and pump assembly. It is important to note that the air is not mixed with the lubricant.

PRE-PRESSURIZED LUBRICANT INTAKE (REFER TO FIG. 5.)

When the coil (3) is energized, the solenoid valve spool (2) is forced downward by the air input from the FRL. This air pressure should be greater than 30 PSI in order to overcome the spool return spring (1). When the spool (2) moves downward, the air input (8) travels through the manifold chamber (7) as air intake while simultaneously exhausting the air below the pump piston (10) through the manifold chamber (9).

This air intake in chamber (7) drives the distribution pump piston (10) downward. At the same time, the same air source forces the fluid supply pump diaphragm (18) against the return spring (19) causing the fluid supply pump inlet check ball (20) to seat and the fluid supply pump outlet check ball (21) to open sending fluid to the distribution manifold passage (15). During this downward cycle of the piston (10), check ball (12) should be properly seated closing the lubricant exhaust or spray line. Simultaneously, the poppet (14) is forced open by the lubricant from the pre-pressurized fluid supply pump. At this point of operation the distribution pump chamber (11) is filled and ready to be pumped.

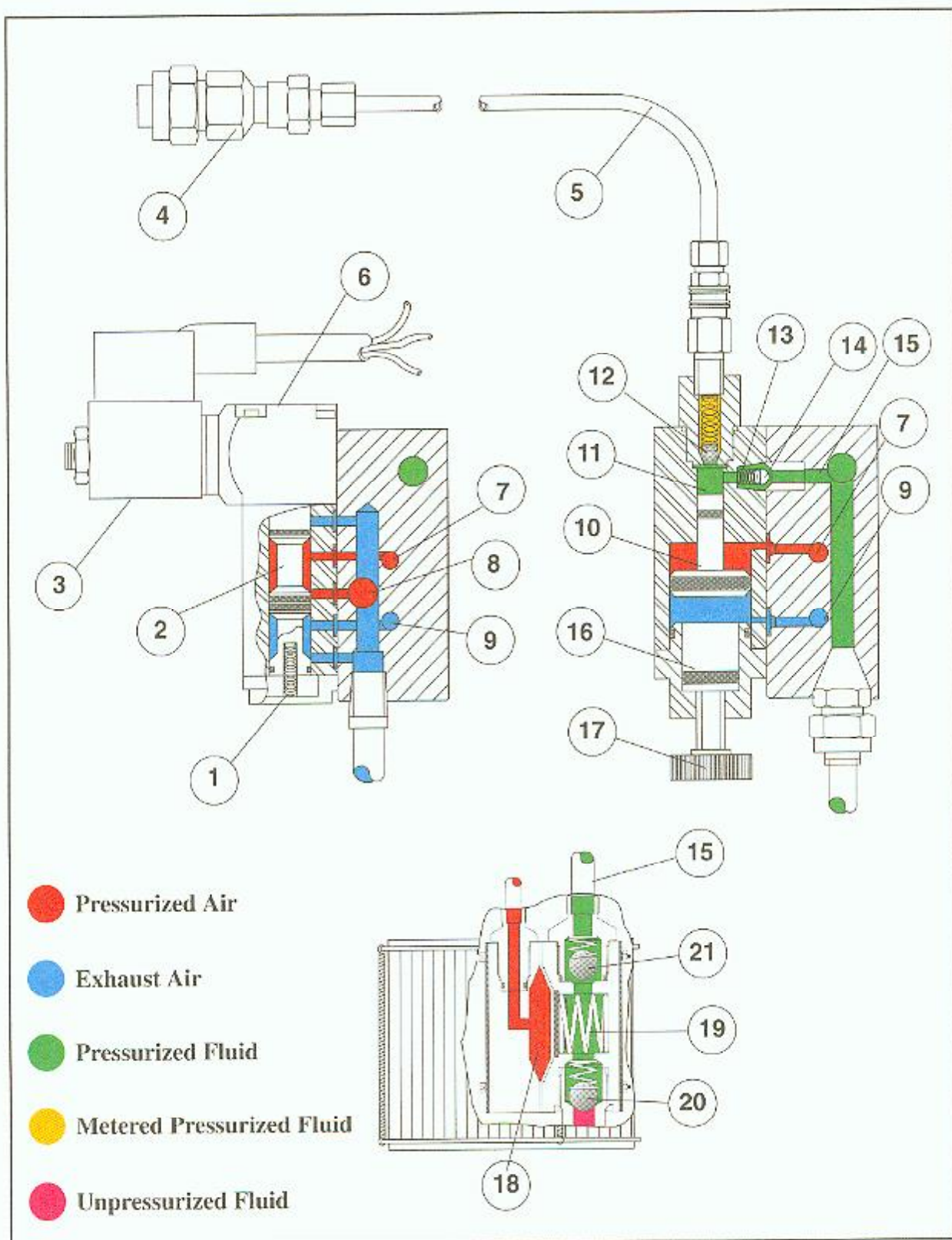


Figure 5. Pre-Pressurized Lubricant Intake



PRE-PRESSURIZED LUBRICANT OUTPUT (REFER TO FIG. 6.)

When the coil (3) is de-energized, the solenoid valve spool (2) is returned to its normal position by the spring (1). At this time, the air in the chamber above the piston (10) is being exhausted through the top manifold chamber (7) while the air flows from the air inlet (8) to the bottom manifold chamber (9). This air flow will cause the piston (10) to move upward applying force to the lubricant in chamber (11). This pressurized lubricant forces the inlet check poppet (14) to set (closed) and forces the outlet check ball (12) to unseat (open). Simultaneously the air is being exhausted from the fluid supply pump allowing the diaphragm return spring (19) to move the diaphragm (18) to its original position. This diaphragm movement causes the outlet check ball (21) to seat and the inlet check ball (20) to unseat, allowing fluid to fill diaphragm pump chamber.

The pressurized lubricant in the pump cylinder (11) flows into the spray line (5) during the upward stroke of the pump piston (10) displacing the lubricant that is already captured in the spray line. The positive displacement force moves the lubricant through the spray nozzle (4). Depending on the lubricant viscosity and the type of spray tip, various spray patterns may be obtained. Higher viscosities may result in squirting a stream or a glob of lubricant during the displacement process. Contact the factory to determine if the performance may be enhanced.

The amount of lubricant displacement or volume, is controlled by the adjustment screw (17) which controls the piston (10) stroke, thus controlling the amount of lubricant that enters the pump cylinder (11) and controls the lubricant displaced in the spray line (5). The adjustment plunger (16) is shown fully open or in the maximum volume position. The sealed plunger (16) is attached to adjustment screw (17). When this screw is turned clockwise it will limit the stroke of the piston (10), thereby limiting the volume of lubricant in the pump cylinder (11). This allows the pump unit to be adjusted for the volume of lubricant required.

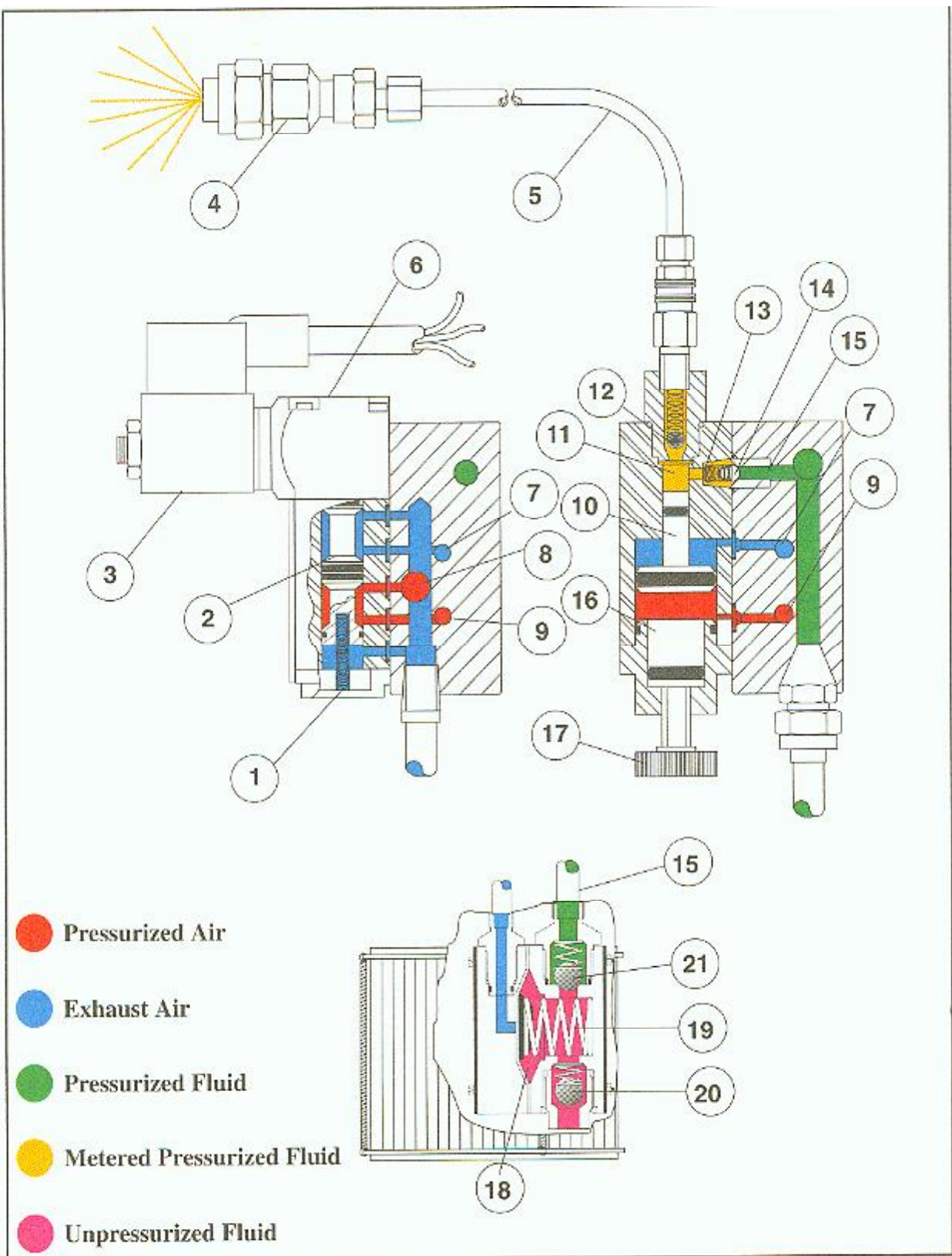


Figure 6. Pre-Pressurized Lubricant Output
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TABLE 1. PUMP VOLUME ADJUSTMENT DATA

THE CONVERSION DATA REFERENCE IS:

1 fl oz = 1.805 cu in = 29.57cc

1 cu in = 0.554 fl oz = 16.387 cc

1 cc = 0.061 cu in = 0.034 fl oz

The **STANDARD VOLUME** pump adjustment
data is:

The **HIGH VOLUME** pump adjustment
data is:

| | # of TURNS | fl oz | cu in | cc | | # of TURNS | fl oz | cu in | cc |
|---------|------------|--------|--------|-------|--|------------|--------|--------|-------|
| MAXIMUM | OPEN | 0.0210 | 0.0378 | 0.621 | | OPEN | 0.0420 | 0.0758 | 1.242 |
| | 1 CW | 0.0187 | 0.0337 | 0.553 | | 1 CW | 0.0373 | 0.0673 | 1.103 |
| | 2 CW | 0.0163 | 0.0294 | 0.482 | | 2 CW | 0.0327 | 0.0590 | 0.967 |
| | 3 CW | 0.0140 | 0.0253 | 0.414 | | 3 CW | 0.0280 | 0.0505 | 0.828 |
| | 4 CW | 0.0117 | 0.0211 | 0.346 | | 4 CW | 0.0232 | 0.0420 | 0.659 |
| | 5 CW | 0.0093 | 0.0168 | 0.275 | | 5 CW | 0.0187 | 0.0337 | 0.553 |
| | 6 CW | 0.0070 | 0.0126 | 0.207 | | 6 CW | 0.0140 | 0.0253 | 0.414 |
| | 7 CW | 0.0047 | 0.0085 | 0.139 | | 7 CW | 0.0093 | 0.0168 | 0.275 |
| | 8 CW | 0.0023 | 0.0042 | 0.068 | | 8 CW | 0.0047 | 0.0085 | 0.139 |
| CLOSED | 9 CW | FULLY | CLOSED | | | 9 CW | FULLY | CLOSED | |

NOTE: The pump is normally mounted on the manifold with the adjustment knob (red) located on the bottom. Therefore, the clockwise direction is turning the adjusting screw to the right or moving the knob and adjusting piston in the upward direction as the screw travels.



MAINTENANCE SCHEDULE

A DAILY MAINTENANCE SCHEDULE IS RECOMMENDED FOR MAXIMUM OPERATIONAL EFFICIENCY

There are several precautions that will assist with the system operation insuring the best operating characteristics. **NOTE: FOR BEST RESULTS, PERFORM THESE PROCEDURES DAILY. THEY ARE:**

1. Inspect the FRL assembly and perform the following procedures:
 - a. Air filter bowl should be drained
 - b. Check and adjust, as required, the air pressure input by adjusting the regulator as required (Refer to Air Pressure section of this manual-Page 9)
 - c. Inspect the air lubricator bowl to insure the oil level is at the proper level. Fill with the recommended oil per the procedures outlined in the FRL section of this manual—Page 14.
 - d. Check the drip rate of the air line lubricator. The drip rate should be a minimum of one drip per 5 cycles of the solenoid valve.
2. Inspect the Pax Lube System reservoir to insure the lubricant level is sufficient for operating the system. **NOTE: If a water soluble lubricant is used, inspect lubricant to determine if separation has occurred. If it has, mix. An optional air agitation feature may be added to the system.**
3. Inspect and clean, if required, the system filter assembly found in the reservoir. (We recommend a spare filter be utilized to exchange as needed). The following steps are recommended for cleaning or replacing the filter:
 - a. Turn the system power off and remove the pressurized air supply from the system.
 - b. Remove the filter assembly from the tank.
 - c. Remove the four (4) springs.
 - d. Remove the cover plate.
 - e. Clean or replace the filter element.
 - f. Replace the cover plate.
 - g. Install the four (4) springs.
 - h. Install the filter assembly in the reservoir.**NOTE: A damaged filter must be replaced at once.**
4. Should it become necessary to change lubricants, it is **ABSOLUTELY NECESSARY TO RUN COMPATABILITY TESTS** between the two lubricants involved. Contact the manufacturer of the lubricant for information about methods of testing. Should the lubricants prove to be incompatible, it will be necessary to remove the filter assembly from the tank and thoroughly clean prior to the introduction of the new lubricant into the Pax Lube System. You must also purge all spray lines of the old lubricant to prevent reaction of the lubricants in the lines which could cause poor performance or failure of the Pax Lube System. **NOTE: THE FILTER ASSEMBLY WILL RETAIN A SMALL AMOUNT OF LUBRICANT. FLUSH OR RINSE AS NECESSARY.**
5. Hand operate the system to insure proper spray operation. Purge the spray lines of any trapped air. If the spray lines do not spray properly, follow the procedures outlined in the troubleshooting chart on Pages 27, 28 and 29.



TROUBLESHOOTING THE PRE-PRESSURIZED PAX LUBE SYSTEMS (5, 15, & 30 GALLON)

Review the Pre-Pressurized “LUBE SYSTEM OPERATION” section on Pages 21 & 23 of this manual.

Note: The fluid supply pump refers to the diaphragm pump mounted inside the filter. The fluid distribution pump refers to the stainless steel pump on the manifold assembly.

| <u>PROBLEM</u> | <u>CAUSE</u> | <u>SOLUTION</u> |
|---------------------------------------|---|--|
| SYSTEM WILL NOT OPERATE | 1. No Power. | 1. Check the fuse and all electrical connections to insure proper connections. |
| | 2. Faulty wiring. | 2. Check for correct, loose or faulty wire connections. |
| | 3. Defective solenoid coil. | 3. Replace coil. |
| | 4. Air pressure regulator. | 4. Adjust within operating range—30 PSI to 125 PSI. |
| INSUFFICIENT FLUID IN SPRAY LINES | 1. Insufficient fluid reservoir. | 1. Add fluid to reservoir and operate hand cycle until spray pattern is crisp and no air is in the spray lines. |
| | 2. Fluid supply pump is not supplying fluid to the fluid supply line(s). | 2. Clogged filter. Remove, clean, check for damage and replace if it is damaged. After cleaning the filter install undamaged filter and operate hand cycle until the fluid supply line(s) are full and spray tips perform as expected. |
| | 3. Malfunctioning fluid supply pump. | 3. Remove fluid supply pump, check the components for damage. Replace any damaged components as required. |
| INDIVIDUAL SPRAY LINE NOT FUNCTIONING | 1. Fluid distribution pump not operating properly. | 1.1. Remove the distribution pump outlet valve body (Fig. 12 item 10) page 38 and check for piston motion with the system operating. |
| | | 1.2. If the piston does not move, gently bump the piston with a blunt instrument in order to free the piston. Replace the outlet valve body. Resume checking the system. |
| | | 1.3. If the piston is moving, shut the unit off. Verify that fluid is in the manifold supply lines. If there is no fluid, verify that fluid is in the reservoir. |
| | 2. Check ball assembly not installed in the spray nozzle body or is not seating properly. | 2. Check the nozzle body for the check ball and spring. If not there, clean and install the check ball assembly. If there, inspect for damage or foreign material. Clean or replace as required. |



TROUBLESHOOTING (cont'd)

| <u>PROBLEM</u> | <u>CAUSE</u> | <u>SOLUTION</u> |
|--|---|---|
| INDIVIDUAL SPRAY LINE NOT FUNCTIONING | 3. Spray line fittings not tight. 4. Distribution pump outlet check ball and/or inlet check poppet have burrs, nicks, or debris interfering with the proper seating. | 3. Insure that the fittings are free of burrs, nicks and dirt. Tighten the fittings and test. 4. Check the finishes of the inlet and outlet valve seats, check ball, and check poppet. Remove any debris and if free from damage, install and test. If damaged, replace and test the system. |
| DRIPPING NOZZLE BODY SPRAY TIP ASSEMBLY | 1. Spray tip retainer is not secure or there may be damage to the surfaces of the tip or to the check ball assembly. | 1. Remove the spray tip and check ball assembly from the nozzle body. Clean and inspect for damage. Replace any damaged part(s). Clean the surfaces of the nozzle body, check ball assembly, and the face of the spray tip. Inspect to insure that all surfaces are free of damage. Install all components securely and test for leaks. If leak persists, replace the tip and check ball assembly. Test again. |
| SPRAY PATTERN IS NOT GOOD | 1. Air pressure not regulated properly. 2. Air is being pumped into the spray lines. 3. The spray nozzle assembly is contaminated | 1. The input air pressure must be at least 30 PSI minimum. The more viscous the lubricant, the higher the pressure should be. 2.1. Check the lubricant level and fill if required. 2.2. Check the filter assembly in the reservoir. Clean or replace the filter element as required. 2.3. Check the reservoir for dirt or sludge. Clean as required. 2.4. Manually operate the system by depressing the hand cycle button. Look for air rising in the spray line. If air is present, try to clean the air from the line by operating the hand cycle rapidly several times. If the air does not clear, then follow the procedures for low fluid, clogged or dirty filter, malfunctioning fluid supply pump, loose fitting or remove the piston from the pump and check the o-ring on the smaller diameter of the piston for wear. Replace if worn and check the system for proper operation. 3.1. Check the spray nozzle assembly for the check ball assembly. If not a part of the nozzle assembly, install and test the system. |



TROUBLESHOOTING (cont'd)

PROBLEM

CAUSE

SOLUTION

SPRAY PATTERN
IS NOT GOOD

4. Flexible (soft) spray lines are too long.

5. Air is trapped in the spray line.

3.2. Check the assembly for damage or foreign material. All surfaces must be clean and free of damage. Clean or replace as required.

4. The flexible spray lines should be no longer than 8 feet. If it is required to have the spray lines longer than 8 feet, replace the flexible line with hard tubing. This hard tubing should not be longer than 20 feet. The shorter the length of tubing, the better the spray pattern should be.

5. The spray lines should be routed in such a way so that the spray nozzle is the highest point in the line. Rapid cycling of the pump may clear the line of air.



PARTS LIST

ORDER REPAIR AND REPLACEMENT PARTS FROM:

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5097 MONROE ROAD
P.O. BOX 257
CELINA, OH 45822

PH: (419) 586-6948

or

1-800-733-6930

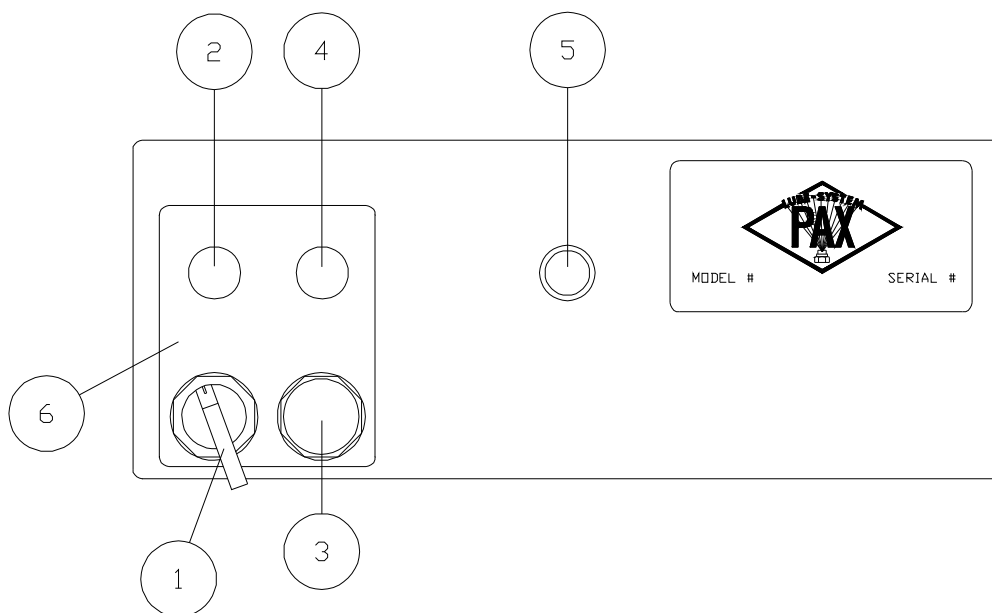
and

FAX: (419) 586-6932

PLEASE PROVIDE THE MODEL AND SERIAL NUMBER OF THE PAX
LUBE SYSTEM.

**NOTE: SUBSTITUTING PARTS NOT AUTHORIZED BY PAX PRODUCTS, INC. MAY CAUSE
A DETERIORATED PERFORMANCE OF THE PAX LUBE SYSTEM.**

STANDARD FEATURES

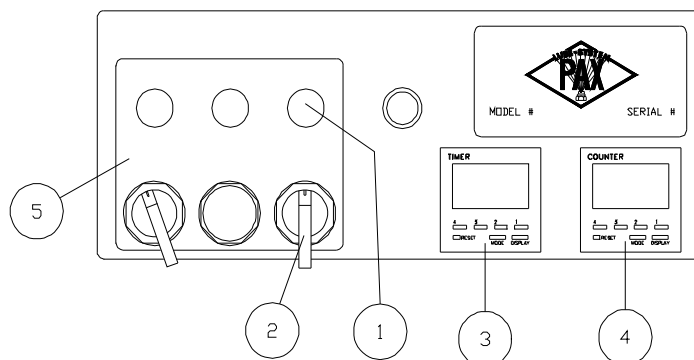
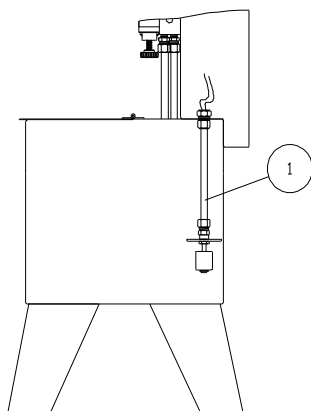


| | | |
|----|------------|---|
| 1 | 00-1082-31 | 2 POSITION SWITCH, ON/OFF |
| | A | 08-1363-20 2 Position Switch Operator |
| | A | 08-1366-20 Contact Block Mounting Adapter |
| | A | 08-1368-20 N.O. Contact Block |
| 2. | 00-1458-30 | INDICATING LAMP, GREEN POWER ON |
| | A | 08-1451-20 Green Lens 120V LED |
| | A | 05-1457-20 Insulated Spade |
| 3 | 00-1081-31 | HAND CYCLE PUSH BUTTON |
| | A | 01-1329-20 Spade Terminal 18-22 GA Wire #6 Stud |
| | A | 08-1365-20 Push Button Operator |
| | A | 08-1366-20 Contact Block Mounting Adapter |
| | A | 08-1368-20 N.O. Contact Block |
| 4 | 00-1459-30 | INDICATING LAMP, WHITE SOLENOID ON |
| | A | 08-1452-20 White Lens 120V LED |
| | A | 05-1457-20 Insulated Spade |
| 5 | 05-1313-20 | Panel Mount Fuse Holder |
| | 01-1323-21 | 3 Amp Fuse |
| 6 | 05-1394-20 | STANDARD LEGEND PLATE |

Figure 7. On/Off Switch, Power On Green Light, Hand Cycle, Solenoid on White Light, and Fuse Holder



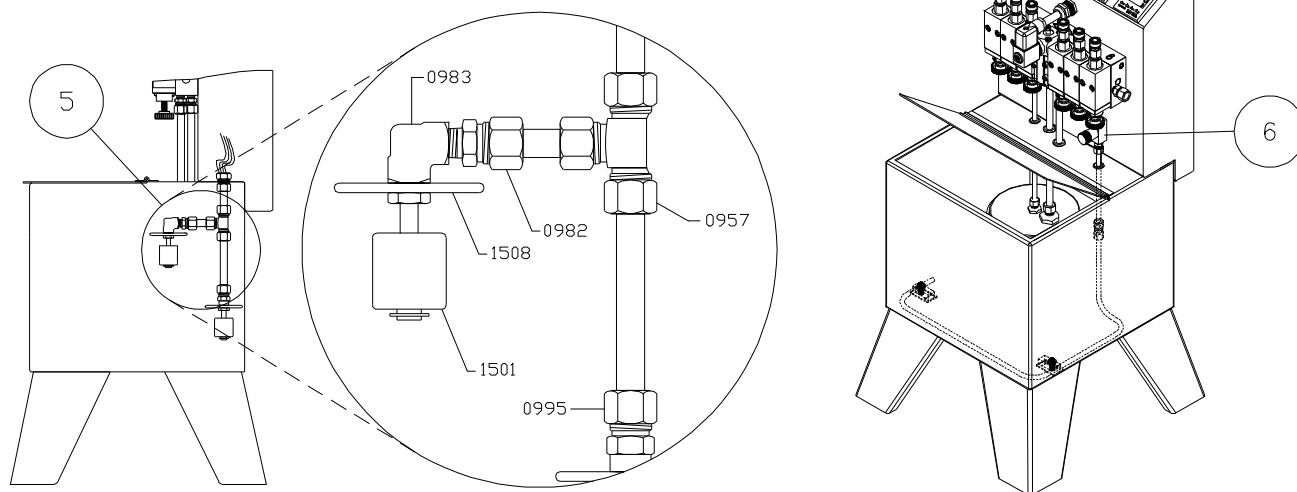
OPTIONAL FEATURES



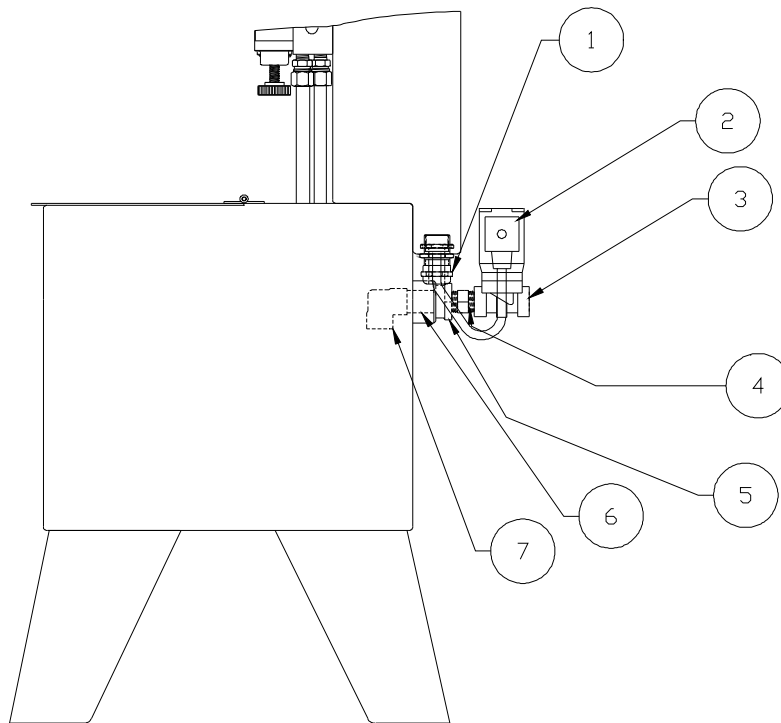
| | | | |
|-------------------|------------|---|---|
| 1 | 00-1052-32 | LOW LEVEL FLOAT WITH LIGHT AND RELAY | |
| | | A | 07-1508-10 Float Washer |
| | | A | 07-0916-40 Modified Female Connector |
| | | A | 01-1387-20 3PDT Relay |
| | | A | 07-1328-20 Female Disconnect Terminal |
| | | A | 07-1501-23 Float Switch |
| | | A | 08-1453-20 Amber Lens 120V LED |
| | | A | 05-1457-20 Insulated Spade |
| | | A | 01-0159-20 6-32 x 1/4 BHCS |
| | | A | 90-9013-20 3/8" Dia. S.S. Tubing |
| | | A | 07-0995-20 Female Connector |
| 2 | 00-1083-31 | 3 POSITION SWITCH, (TIMER/OFF/SOURCE) | |
| | | A | 08-1364-20 3 Position Switch Operator |
| | | A | 08-1366-20 Contact Block Mounting Adapter |
| | | A | 08-1368-20 N.O. Contact Block |
| 3 | 00-1094-30 | DIGITAL TIMER | |
| | | A | 01-1380-21 Digital Timer |
| | | A | 01-1381-20 DPDT Relay |
| | | A | 01-1328-20 Female Disconnect Terminal |
| | | A | 01-0159-20 6-32 x 1/4 BHCS |
| 4 | 00-1079-31 | DIGITAL COUNTER | |
| 2,3&4 Combined | 00-1097-30 | TIMER & COUNTER WITH 3 POS SWITCH OPTION | |
| | | A | 08-1372-21 Counter |
| | | A | 01-1380-21 Timer |
| | | A | 08-1364-20 3 Position Switch Operator |
| | | A | 08-1366-20 Contact Block Mtg Adapter |
| | | A | 08-1388-20 Double N.O. Contact Block |
| | | A | 01-1381-20 DPDT Relay |
| | | A | 07-1328-20 Female Disconnect Terminal |
| | | A | 01-0159-20 6-32 x 1/4 BHCS |
| 5* | | LEGEND PLATE CONTACT FACTORY FOR DETAILS | |

Figure 8. Low Level Float with Amber Light and Relay; 3 Position Switch; Digital Timer; and/or Digital Counter

OPTIONAL FEATURES (cont'd)



| | | | |
|---|------------|-----------------------------------|-------------------------------------|
| 5 | 00-1095-30 | AUTOMATIC REFILL CONTROL ASSEMBLY | |
| | A | 01-0159-20 | 6-32 x 1/4 BHCS |
| | A | 01-0957-20 | #641 x 6 Union Tee |
| | A | 01-0982-20 | 681 x 6 x 2 Male Connector |
| | A | 01-0983-20 | 3500 x 2 1/8 NPT Female Elbow |
| | A | 07-0916-40 | Modified Female Connector |
| | A | 01-1381-20 | DPDT Relay |
| | A | 07-0995-20 | #661 x 6 x 2 Female Connector |
| | A | 07-1328-20 | Female Disconnect Terminal |
| | A | 07-1501-23 | Float Switch |
| | A | 90-9013-20 | 3/8" Dia. S.S. Tubing |
| | A | 07-0916-40 | Modified Female Connector |
| | A | 07-1508-10 | Float Washer |
| | | | |
| 6 | 00-1078-31 | AIR AGITATION | |
| | A | 01-0132-20 | 1/4-28 Nut—Stainless Steel |
| | A | 01-0219-20 | 1/4" I.D. Rubber Grommet |
| | A | 01-0745-10 | Agitation Tube Clamp |
| | A | 01-2151-30 | Air Agitation Clamp Assembly |
| | A | 01-0901-20 | #681 x 4 Weatherhead Male Connector |
| | A | 01-0902-20 | #621 x 4 Union |
| | A | 01-0984-20 | 3328 x 2 1/8" NPT Nipple |
| | A | 01-1116-20 | Bulk 1/4" Tubing (Per Ft.) |
| | A | 01-1123-20 | Bulk 1/4" Copper |
| | A | 01-1926-20 | Easy Read Needle Valve |



AUTO REFILL SOLENOID VALVE ASSEMBLY
00-2157-31

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY.</u> |
|----------------|-----------------|-----------------------------------|-------------|
| 1 | 500-5733-0 | Cord Connector Assembly | 1 |
| 2 | 05-1404-20 | Din Style Connector | 1 |
| 3 | 04-2158-22 | Auto Refill Solenoid and Manifold | 1 |
| 4 | 04-1219-20 | Hex Nipple | 1 |
| 5 | 04-1208-20 | Bushing | 1 |
| 6 | 04-1211-20 | Nipple | 1 |
| 7 | 04-1210-20 | Elbow | 1 |



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**Magnetic Base Limit Switch Option
00-1076-32**

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> |
|----------------|-----------------|-------------------------------------|
| 1 | 09-1383-20 | Limit Switch Arm |
| 2 | 09-1382-20 | Limit Switch |
| 3 | 09-2090-30 | Limit Switch Release Lever Assembly |
| 4 | 09-0139-20 | 10-32 x 1 1/2" SHCS |
| 5 | 09-1615-30 | Magnetic Base—for Limit Switch |
| 6 | 01-1393-20 | Cord Connector |
| 7 | 09-1384-20 | 10' Molded Cord |
| 8 | 09-1385-20 | Receptacle |
| 9 | 01-0154-20 | Sealing Washer |
| 10 | 01-0155-20 | Lock Nut |

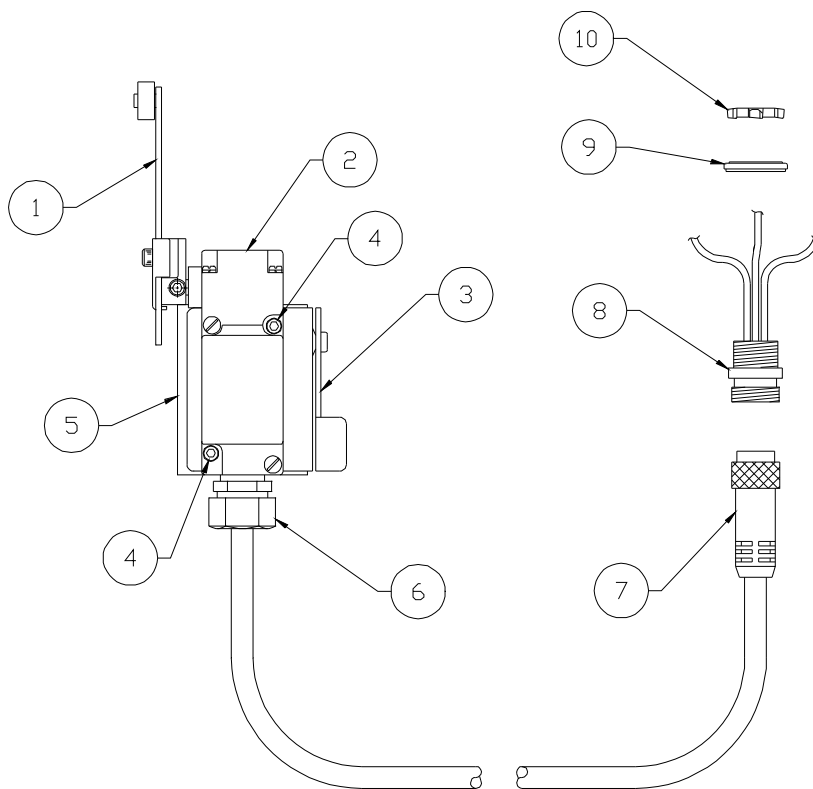


Figure 10. Magnetic Base Limit Switch



| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY</u> |
|----------------|-----------------|---------------------------------------|----------------------|
| 1 | 01-2123-30 | 5 Gallon 6 Pump Back Assembly | 1 |
| | 01-2125-30 | 15 Gallon 6 Pump Back Assembly | 1 |
| | 01-2127-30 | 15 Gallon 10 Pump Back Assembly | 1 |
| | 01-2128-30 | 30 Gallon 6 Pump Back Assembly | 1 |
| | 01-2130-30 | 30 Gallon 10 Pump Back Assembly | 1 |
| | 01-2131-30 | 30 Gallon 14 Pump Back Assembly | 1 |
| 2 | 01-0737-20 | Model # / Serial Number Tag | 1 |
| 3 | 01-0122-22 | 10-32 x 3/8" BHCS | 8,10,12 |
| 4 | 01-0768-20 | 5 Gallon Cover Plate | 1 |
| | 01-0770-20 | 15 Gallon Cover Plate | 1 |
| | 01-0772-20 | 30 Gallon Cover Plate | 1 |
| 5 | 01-0221-20 | 1/2" Wide Adhesive Back Gasket | Order by Linear Feet |
| 6 | 01-1124-20 | 5 Gallon 6 Pump S.S. Air Inlet Tube | 1 |
| | 01-1125-10 | 15 Gallon 6 Pump S.S. Air Inlet Tube | 1 |
| | 01-1126-10 | 15 Gallon 10 Pump S.S. Air Inlet Tube | 1 |
| | 01-1127-10 | 30 Gallon 6 Pump S.S. Air Inlet Tube | 1 |
| | 01-1128-10 | 30 Gallon 10 Pump S.S. Air Inlet Tube | 1 |
| | 01-1129-10 | 30 Gallon 14 Pump S.S. Air Inlet Tube | 1 |
| 7 | 01-0821-10 | 2" Square Muffler Pad | 1 |
| 8 | 01-2124-30 | 5 Gallon Tank Assembly | 1 |
| | 01-2126-30 | 15 Gallon Tank Assembly | 1 |
| | 01-2129-30 | 30 Gallon Tank Assembly | 1 |
| 9 | 01-1117-20 | 3/8" Tubing | Order by Linear Feet |
| 10 | 01-0220-20 | 3/8" I.D. Grommet | 2,3 |
| 11 | 01-0219-20 | 1/4" I.D. Grommet | 1 |
| 12 | 01-1116-20 | 1/4 " Tubing | Order by Linear Feet |

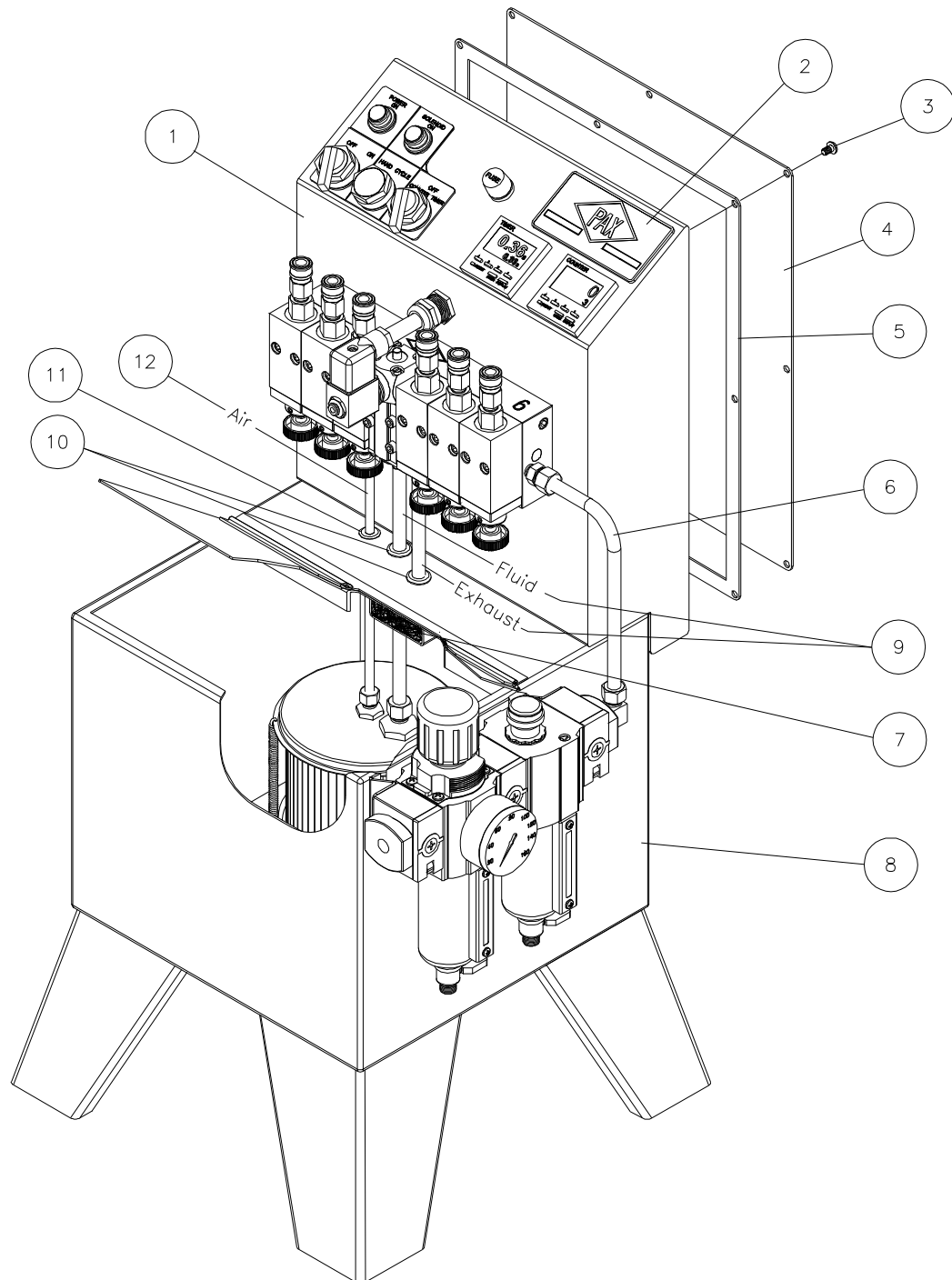


Figure 11. System Configuration Models 5, 15, and 30



| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY</u> |
|----------------|-----------------|---|------------|
| 1 | 02-0517-10 | 6 Pump Manifold Pressurized Fluid Supply | 1 |
| | 02-0518-10 | 10 Pump Manifold Pressurized Fluid Supply | 1 |
| | 02-0519-10 | 14 Pump Manifold Pressurized Fluid Supply | 1 |
| 2 | 03-2110-33 | Replacement Standard Pump | 1 |
| | 03-2111-30 | Replacement High Volume Pump | 1 |
| | •03-2053-32 | Standard Pump Rebuild Kit | 1 |
| | •03-2079-31 | High Volume Rebuild Kit | 1 |
| 3 | 04-2119-20 | Solenoid Valve (State Voltage & Frequency) | 1 |
| 4 | 04-1379-23 | Din Style Connector with 2' cord | 1 |
| 5 | 04-0157-20 | # 10-32 x 1 3/8" Socket Head Cap Screws | 3 |
| 6 | 03-0911-20 | Quick Connect Coupling | 1 |
| 6A | 03-0926-20 | #143 Valve Stem | 1 |
| 7 | 03-0302-20 | Outlet Valve Spring | 1 |
| 8* | 06-0404-20 | S.S. Check Ball | 1 |
| 9 | 03-2098-30 | Brass Outlet Valve Body Assy. (with O-Ring) | 1 |
| 10 | 03-0204-20 | O-Ring | 1 |
| 11 | 03-0607-13 | Pump Body (Standard Volume) | 1 |
| | 03-0609-10 | Pump Body (High Volume) | 1 |
| 12 | 03-0103-20 | #10-32 x 1 1/4" Socket Head Cap Screw | 2/pump |
| 13 | 03-0202-20 | O-Ring (Standard Volume Pump) | 1 |
| | 03-0203-20 | O-Ring (High Volume Pump) | 1 |
| 14 | 03-0601-13 | Piston (Standard Volume) | 1 |
| | 03-0610-10 | Piston (High Volume) | 1 |
| 15 | 03-0201-20 | O-Ring | 1 |
| 16 | 03-0115-20 | Red Knob | 1 |
| 17 | 03-0114-41 | Adjustment Screw | 1 |
| 18 | 03-0137-20 | #10-32 x 3/16" Set Screw | |
| 19 | 03-0611-10 | Brass Lock Insert | 1 |
| 20 | 03-0101-20 | #8-32 x 1/2 Socket Head Cap Screws | 4/pump |
| 21 | 03-0605-12 | Pump Cap | 1 |
| 22 | 03-0205-20 | O-Ring | 1 |
| 23 | 03-0606-14 | Adjustment Piston | 1 |
| 24 | 03-0206-20 | O-Ring | 1 |
| 25 | 03-0301-20 | Inlet Valve Spring | 1/pump |
| 26 | 03-0402-21 | Inlet Check Poppet | 1/pump |
| 27 | 03-0216-21 | O-Ring—Fluid Inlet | 1 |
| 28 | 02-0520-10 | Inlet Valve Seat | 1/pump |
| 29 | 03-0202-20 | O-ring—Pump Air Inlet | 2/pump |
| 30 | 02-1206-20 | 1/8" NPT Dry Seal Socket Pipe Plug | 3 |
| 31 | 02-0502-12 | Manifold Plug | 4 |
| 32 | 01-0982-20 | 1/8" Pipe x 3/8" Tubing Male Connector | 3 or 4** |
| 33 | 03-2114-31 | Pump Cover Plate Assy. | 1 |
| 33A | 03-0612-10 | Pump Cover Plate | 1 |
| 33B | 03-0138-20 | #10-32 x 5/8" Socket Head Cap Screws | 2 |
| 34 | 01-0901-20 | 1/8" Pipe x 1/4" Tubing Connector | 1 |

NOTE: Pump Rebuild Kits include items 7, 8, 10, 13, 15, 24, 25, 26, 27 and 29

*S.S. Check Ball for use with Brass Outlet Valve only use Teflon Ball (P/N 03-0401-20) with S.S. Outlet Valve Body

**3 each for 6 Pump Manifold; 4 each for 10 or 14 Pump Manifolds

•See Pages 69 & 70 for Pump Rebuilding Instructions

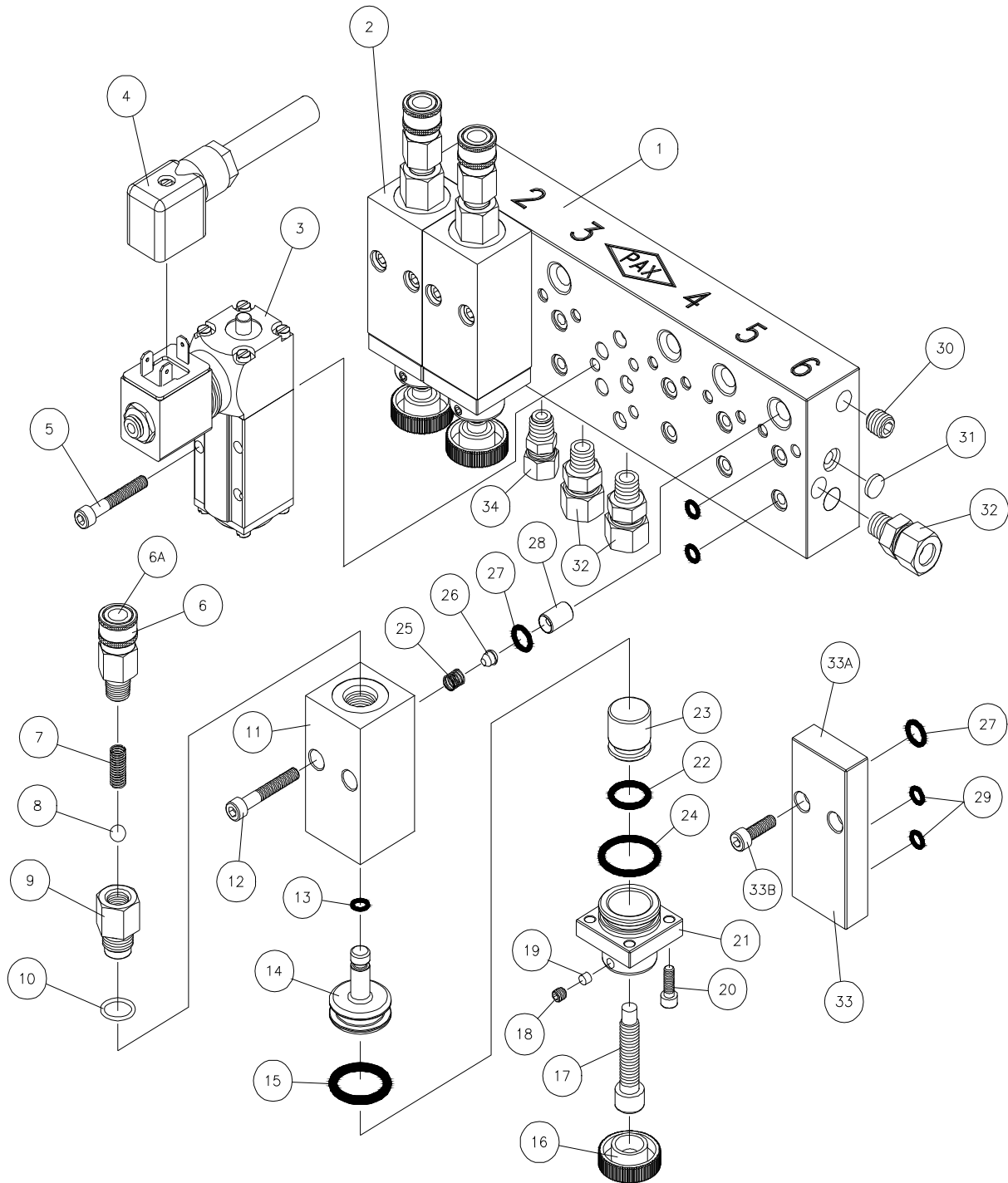


Figure 12. Manifold Assembly



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| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY</u> |
|----------------|-----------------|---------------------------------|------------|
| 1 | 04-0133-20 | Nut | 1 |
| 2 | 04-1373-20 | Din Type Coil 120V60 (Standard) | 1 |
| | 04-1373-21 | Din Type Coil 240V60 | } OPTIONAL |
| | 04-1373-22 | Din Type Coil 24 VDC/48VAC | |
| | 04-1373-23 | Din Type Coil 12 VDC/24VAC | |
| 3 | 04-0225-20 | Gasket | 1 |
| 4 | 04-0977-20 | Sleeve | 1 |
| 5 | 04-0976-20 | Plunger Assy. | 1 |
| 6 | 04-0214-20 | Gasket | 1 |
| 7 | 04-0135-20 | Screw | 4 |
| 8 | 04-1927-20 | Solenoid Cap | 1 |
| 9 | 04-0213-20 | O-Ring | 1 |
| 10 | 04-1934-20 | Manual Operating Pin | 1 |
| 11 | 04-0224-20 | U-Cup | 1 |
| 12 | 04-1928-20 | Spool | 1 |
| 13 | 04-0222-20 | O-Ring | 4 |
| 14 | 04-0310-20 | Return Spring | 1 |
| 15 | 04-1929-20 | Bearing | 2 |
| 16 | 04-0223-20 | O-Ring | 2 |
| 17 | 04-1930-20 | Body Assy. | 1 |
| 18 | 04-0212-20 | O-Ring | 5 |
| 19 | 04-1931-20 | End Cap | 1 |
| 20 | 04-0136-20 | Screw | 4 |
| 21 | 04-0208-20 | O-Ring | 1 |
| 22 | 04-0226-20 | O-Ring | 2 |
| | 04-2135-31 | Solenoid Valve | 1 |
| | | Rebuild Kit | |

Items 9, 11, 13, 16, 18, 21 and 22 are included in Rebuild Kit

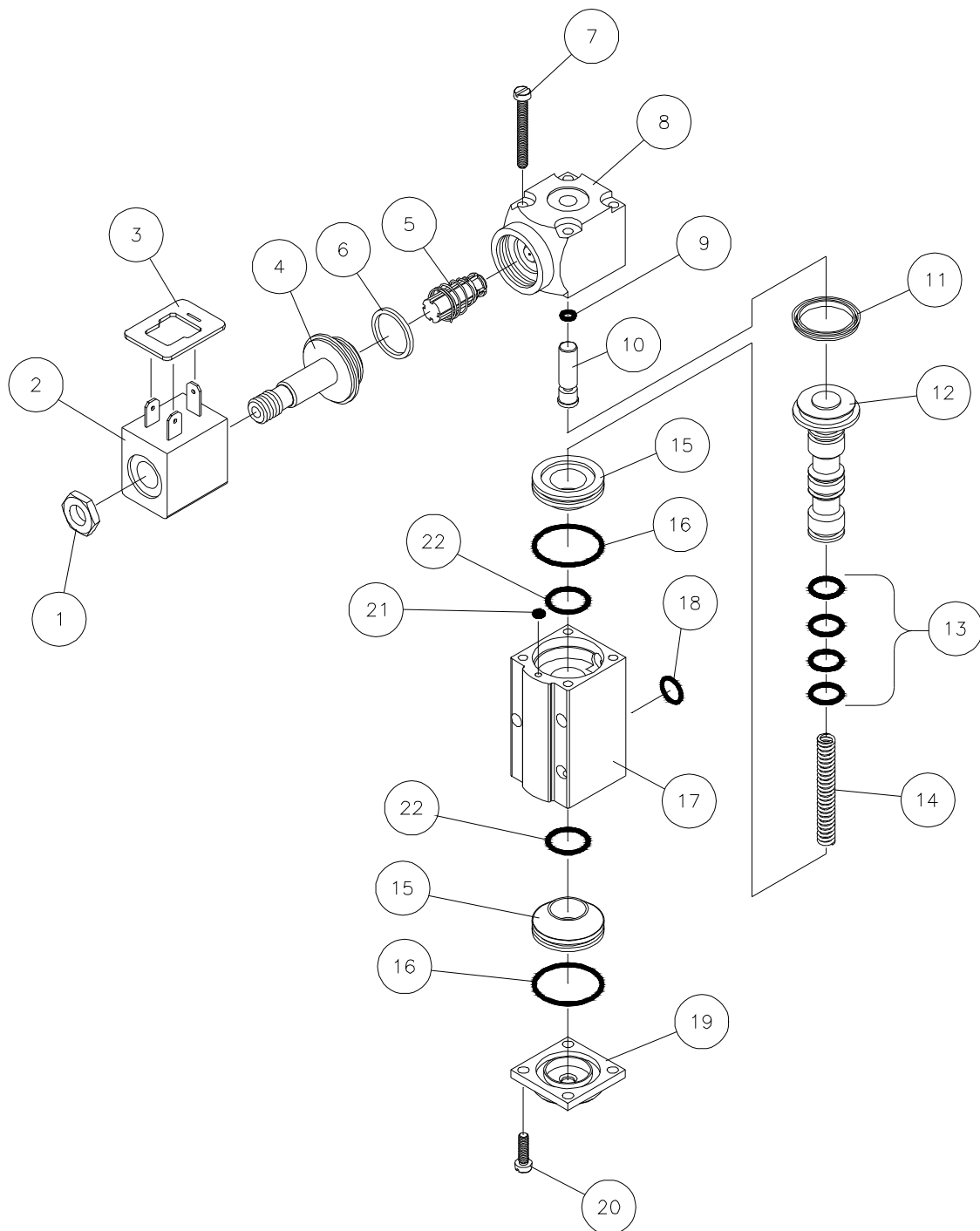


Figure 13. Solenoid Valve



PROCEDURE TO ASSEMBLE THE SINGLE DIAPHRAGM FLUID SUPPLY PUMP

Reference Figure 14

The procedures are presented in order of importance for proper assembly of the FLUID SUPPLY DIAPHRAGM PUMP. Following these procedures will insure proper assembly. Disassembly will follow the reverse order.

1. With the flat surfaces (2A) facing down place the pump assembly on a table or bench surface. Install one inlet valve spring (4) in the cavity opposite the flat surface.
2. Place one 1/2" S.S. check ball (10) on top of inlet valve spring.
3. Install one inlet valve seat (5) in the opening opposite the flat surface. Tighten snugly using the 5/8" wrench. DO NOT EXCEED 120 in lbs of torque. Parts need to be clean and dry.
4. Install 4 ea. 10—32x2 1/4" machine screws (11) through the flat face (9) of the AIR pump body (9) with the cavity facing away or opposite the heads of the screws. Insure the heads of the screws are against the surface (9) of the air pump body. Place this assembly on a flat surface with the heads of the screws against a table or bench surface.
5. Install the VITON diaphragm (8) over the 4 screws (11).
6. Place the spring cap (7) on the surface of the diaphragm with the large diameter surface facing down or against the diaphragm. The smaller diameter should be facing up.
7. Place the diaphragm spring (6) over the smaller diameter of the spring cap (7).
8. Place the FLUID pump body (2) over the spring with the spring fitting in the pocket of the FLUID pump body (2) and the flat edge (2A) aligned with the flat edge of the air pump body (9).
9. Compress or squeeze the whole assembly together until the 4 machine screws protrude through the 4 holes of the fluid pump body (9).
10. Install 4 nuts (3).
11. Align the flat edge of each nut (3) with the rib part of the fluid pump body (2B). This alignment is important to keep the nuts from turning when the machine screws are torqued.
12. Using a torque screwdriver, set the torque at 14 in lbs. Follow an X pattern to tighten the 4 screws. Tighten each to about 6 in lbs the first time through the X pattern.
13. Repeat step 12 and tighten each screw to the 14 in lbs following the X pattern.
14. If no torque screwdriver is available, follow the X pattern procedure using a common screwdriver. Repeat the pattern several times until the diaphragm has been compressed 0.003".
15. After the FLUID SUPPLY PUMP is fully assembled, use a knife to trim the diaphragm on the flat edges. Use care so the knife does not damage the pump bodies and insure no foreign material enters the pump.
16. Rotate the pump assembly so the flat surfaces are facing up.
17. Install o-ring (12) in the outside cavity of the fluid pump body (2). Insure the o-ring is flat in the bottom of the cavity.
18. Install one each 1/2" S.S. check ball (10) in the outside cavity of the fluid pump body (2).
19. Install one each outlet valve spring (14) in each outside cavity of the fluid pump body (2) so the spring rests on top of the 1/2" S.S. check ball (10).
20. Align the top end cover plate (13) so the holes are over each of the cavities on the flat surfaces. Also insure the top cover plate is installed with the recessed side facing toward the diaphragm fluid supply pump.
21. Place the o-ring (18) on the air inlet adapter (19).
22. Install the air inlet adapter (19) through the top cover plate and snug finger tight. Keep the top cover plate loose so the other fitting may be installed. Install the outlet valve adapter (15) and snug finger tight.
23. Secure the air inlet adapter (19) using 11/16" wrench. Make sure the other fittings remain aligned for proper installation.
24. Secure the outlet valve adapter (15) using 1" wrench.
25. Install the air and fluid lines using the compression sleeves (16 & 20) and compression nuts (17 & 21). Secure as required to insure no leaking.

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY</u> |
|----------------|-----------------|-------------------------------------|------------|
| — | 03-2120-30 | Single Diaphragm Pump Assy | |
| 2 | 03-0613-10 | Pump Body Fluid Side | 1 |
| 3 | 03-0152-20 | 10-32 Nut | 4 |
| 4 | 03-0308-20 | Inlet Valve Spring | 1 |
| 5 | 03-0617-10 | Inlet Valve Seat | 1 |
| 6 | 03-0306-20 | Return Spring | 1 |
| 7 | 03-0619-11 | Spring Cap | 1 |
| 8 | 03-0217-10 | Diaphragm | 1 |
| 9 | 03-0614-10 | Single Diaphragm Pump Body Air Side | 1 |
| 10 | 03-0403-20 | 1/2" Dia. S.S. Check Ball | 2 |
| 11 | 03-0150-20 | 10-32 x 2 1/4" Machine Screw | 4 |
| 12 | 03-0218-20 | O-Ring | 1 |
| 13 | 01-0818-10 | Top Plate-Single Diaphragm Pump | 1 |
| 14 | 03-0307-20 | Outlet Valve Spring | 1 |
| 15 | 03-0616-10 | Outlet Valve Adapter | 1 |
| 16 | 01-0968-20 | 3/8" Compression Sleeve | 1 |
| 17 | 01-0969-20 | 3/8" Compression Nut | 1 |
| 18 | 03-0203-20 | O-Ring | 1 |
| 19 | 03-0618-10 | Air Inlet Adapter | 1 |
| 20 | 01-0929-20 | 1/4" Compression Sleeve | 1 |
| 21 | 01-0930-20 | 1/4" Compression Nut | 1 |

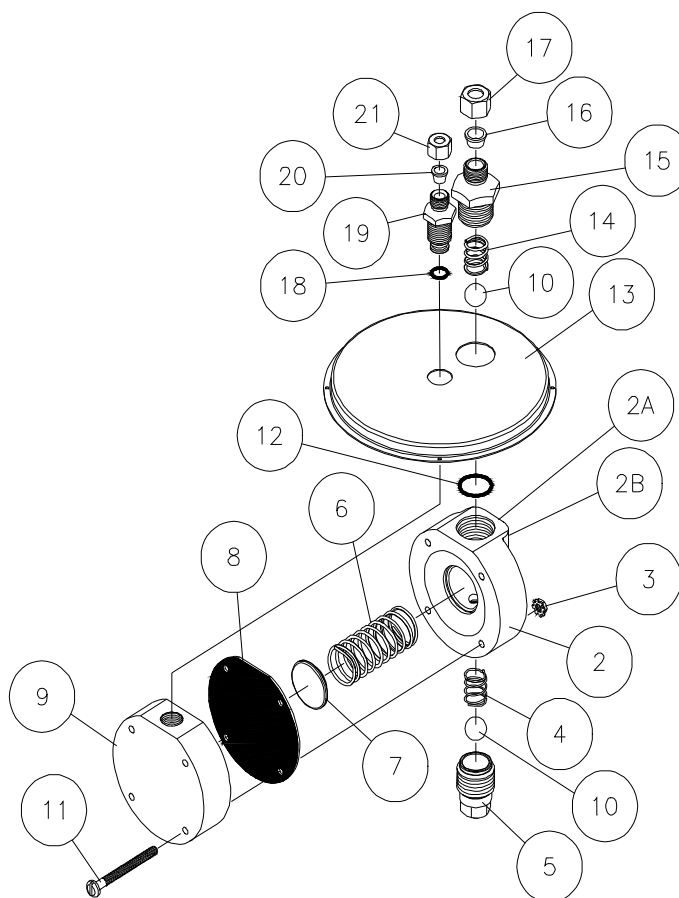


Figure 14. Single Diaphragm Pump



PROCEDURE TO ASSEMBLE THE DOUBLE DIAPHRAGM FLUID SUPPLY PUMP

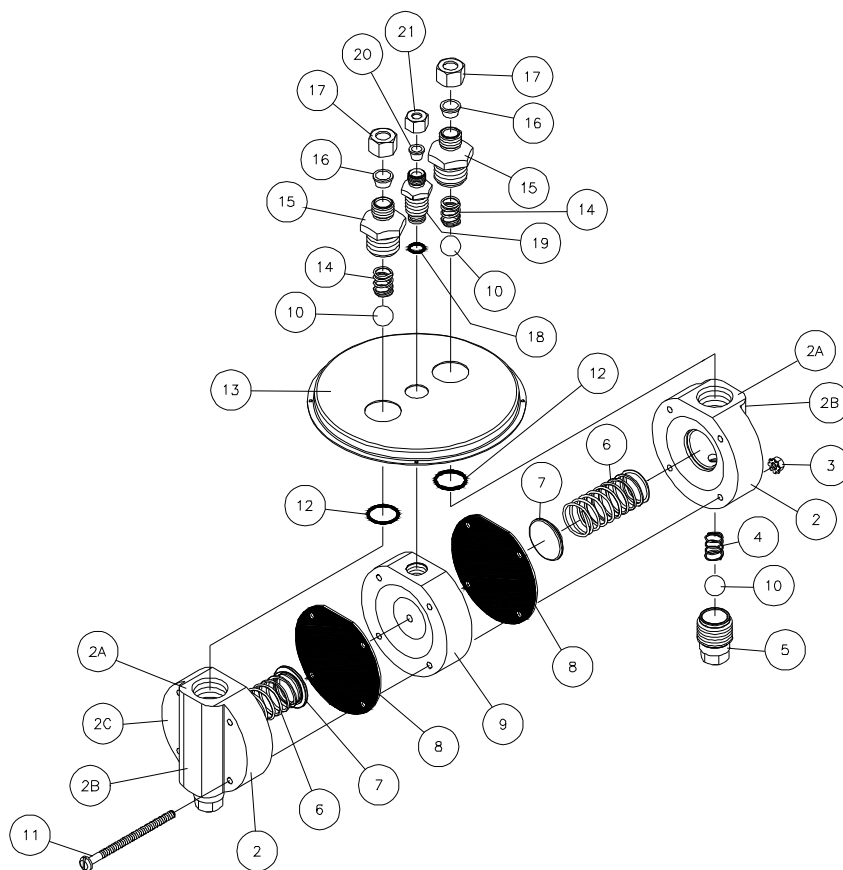
Reference Figure 15

The procedures are presented in order of importance for proper assembly of the FLUID SUPPLY DIAPHRAGM PUMP. Following these procedures will insure proper assembly. Disassembly will follow the reverse order.

1. With the flat surfaces (2A) facing down place the pump assembly on a table or bench surface. Install one inlet valve spring (4) in each of the cavities opposite the flat surfaces.
2. Place one each 1/2" S.S. check ball (10) on top of inlet valve spring.
3. Install one inlet valve seat (5) in each opening opposite the flat surface. Tighten snugly using the 5/8" wrench. DO NOT EXCEED 120 in lbs of torque. Parts need to be clean and dry.
4. Install 4 ea. 10—32 x 3" machine screws through the ribbed face of one FLUID pump body (2B) with the cavity facing away or opposite the heads of the screws. Insure the heads of the screws are against the surface (2C) of the fluid pump body.
5. Place the spring (6) in the pocket.
6. Install the spring cap (7) with the small diameter fitting inside the spring.
7. Install a VITON diaphragm (8) over the 4 machine screws. Insure the large diameter of the spring cap (7) is facing or touching the diaphragm.
8. Install the air pump body (9) over the 4 machine screws with the flat edge of (9) aligned with the flat edge (2A) of the fluid pump body.
9. Install a second VITON diaphragm (8) over the 4 screws (11).
10. Place the spring cap (7) on the surface of the diaphragm with the large diameter surface facing or touching the diaphragm. The smaller diameter should be facing up.
11. Place the second diaphragm spring (6) over the smaller diameter of the spring cap (7).
12. Place the second FLUID pump body (2) over the 4 machine screws (11) with the spring (6) fitting in the pocket of the FLUID pump body (2) and the flat edge (2A) aligned with the flat edges of the air pump body (9) and the first fluid pump body (2).
13. Compress or squeeze the whole assembly together until the 4 machine screws protrude through the 4 holes of the second fluid pump body.
14. Install the 4 nuts (3).
15. Align the flat edge of each of the four nuts (3) with the rib part of the fluid pump body (2B). This alignment is important to keep the nuts from turning when the machine screws are torqued.
16. Using a torque screwdriver, set the torque at 17 in lbs. Follow an X pattern to tighten the 4 screws. Tighten each to about 6 in lbs the first time through the X pattern.
17. Repeat step 16 and tighten each screw to 17 in lbs. following the X pattern.
18. If no torque screwdriver is available, follow the X pattern procedure using a common screwdriver. Repeat the pattern several times until the diaphragms have been compressed a total of 0.006".
19. After the FLUID SUPPLY PUMP is fully assembled, use a knife to trim the two diaphragms on the flat edges of the pump assembly. Use care so the knife does not damage the pump bodies.
20. Rotate the pump assembly so the flat surfaces are facing up.
21. Install o-rings (12) in the outside cavity of the fluid pump body (2). Insure the o-rings are flat in the bottom of the cavity.
22. Install one each 1/2" S.S. check ball (10) in the outside cavity of the fluid pump body (2).
23. Install one each outlet valve spring (14) in each outside cavity of the fluid pump body (2) so the spring rests on top of the 1/2" S.S. check ball (10).
24. Align the top end cover plate (13) so the holes are over each of the cavities on the flat surfaces. Also, insure the top cover plate is installed with the recessed side facing toward the diaphragm fluid supply pump.
25. Place the o-ring (18) on the air inlet adapter (19).
26. Install the air inlet adapter (19) through the top cover plate and snug finger tight. Keep the top cover plate loose so the other fittings may be installed. Install the outlet valve adapters (15) and snug finger tight.
27. Secure the air inlet adapter (19) using 11/16" wrench. Make sure the other fittings remain aligned for proper installation.
28. Secure the outlet valve adapter (15) using 1" wrench.
29. Install the air and fluid lines using the compression sleeves (16 & 20) and compression nuts (17 & 21). Secure as required to insure no leaking.

DOUBLE DIAPHRAGM PUMP—PARTS LIST

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY.</u> |
|-----------------------|------------------------|-------------------------------------|--------------------|
| — | 03-2121-30 | Double Diaphragm Pump Assy. | |
| 2 | 03-0613-10 | Pump Body Fluid Side | 2 |
| 3 | 03-0152-20 | 10-32 Nut | 4 |
| 4 | 03-0308-20 | Inlet Valve Spring | 2 |
| 5 | 03-0617-10 | Inlet Valve Seat | 2 |
| 6 | 03-0306-20 | Return Spring | 2 |
| 7 | 03-0619-11 | Spring Cap | 2 |
| 8 | 03-0217-10 | Diaphragm | 2 |
| 9 | 03-0615-10 | Double Diaphragm Pump Body Air Side | 1 |
| 10 | 03-0403-20 | 1/2" Dia. S.S. Check Ball | 4 |
| 11 | 03-0151-20 | 10-32 x 3" Machine Screw | 4 |
| 12 | 03-0218-20 | O-Ring | 2 |
| 13 | 01-0819-10 | Top Plate-Single Diaphragm Pump | 1 |
| 14 | 03-0307-20 | Outlet Valve Springs | 2 |
| 15 | 03-0616-10 | Outlet Valve Adapter | 2 |
| 16 | 01-0968-20 | 3/8" Compression Sleeve | 2 |
| 17 | 01-0969-20 | 3/8" Compression Nut | 2 |
| 18 | 03-0203-20 | O-Ring | 1 |
| 19 | 03-0618-10 | Air Inlet Adapter | 1 |
| 20 | 01-0929-20 | 1/4" Compression Sleeve | 1 |
| 21 | 01-0930-20 | 1/4" Compression Nut | 1 |

**Figure 15. Double Diaphragm Pump**

**INSTALLATION OF THE FLUID SUPPLY PUMP(S) INTO THE FILTER ASSEMBLY****Reference Figure 16**

The procedures are presented in order of importance for proper assembly of the FLUID SUPPLY DIAPHRAGM PUMP(S) FILTER ASSEMBLY. Following these procedures will insure proper assembly. Disassembly will follow the reverse order

1. Place the filter element (3) in the bottom cover plate (4). Insure the filter is properly seated inside the cover plate.
2. Place the pump assembly with the top cover plate installed into the filter element. Insure the 4 spring clip holes of the top cover plate are in line with the 4 spring clip holes of the bottom cover plate.
3. Install the 4 filter assembly springs (2) one at a time following the X pattern.

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY.</u> |
|-----------------------|------------------------|--------------------------------|--------------------|
| 1A | 03-2120-30 | Single Diaphragm Pump Assembly | 1 |
| 1B | 03-2121-30 | Double Diaphragm Pump Assembly | 1 |
| 2 | 01-0309-21 | Filter Assy. Spring | 4 |
| 3 | 01-0820-10 | Filter Element—150 micron | 1 |
| 4 | 01-0817-10 | Bottom Plate | 1 |

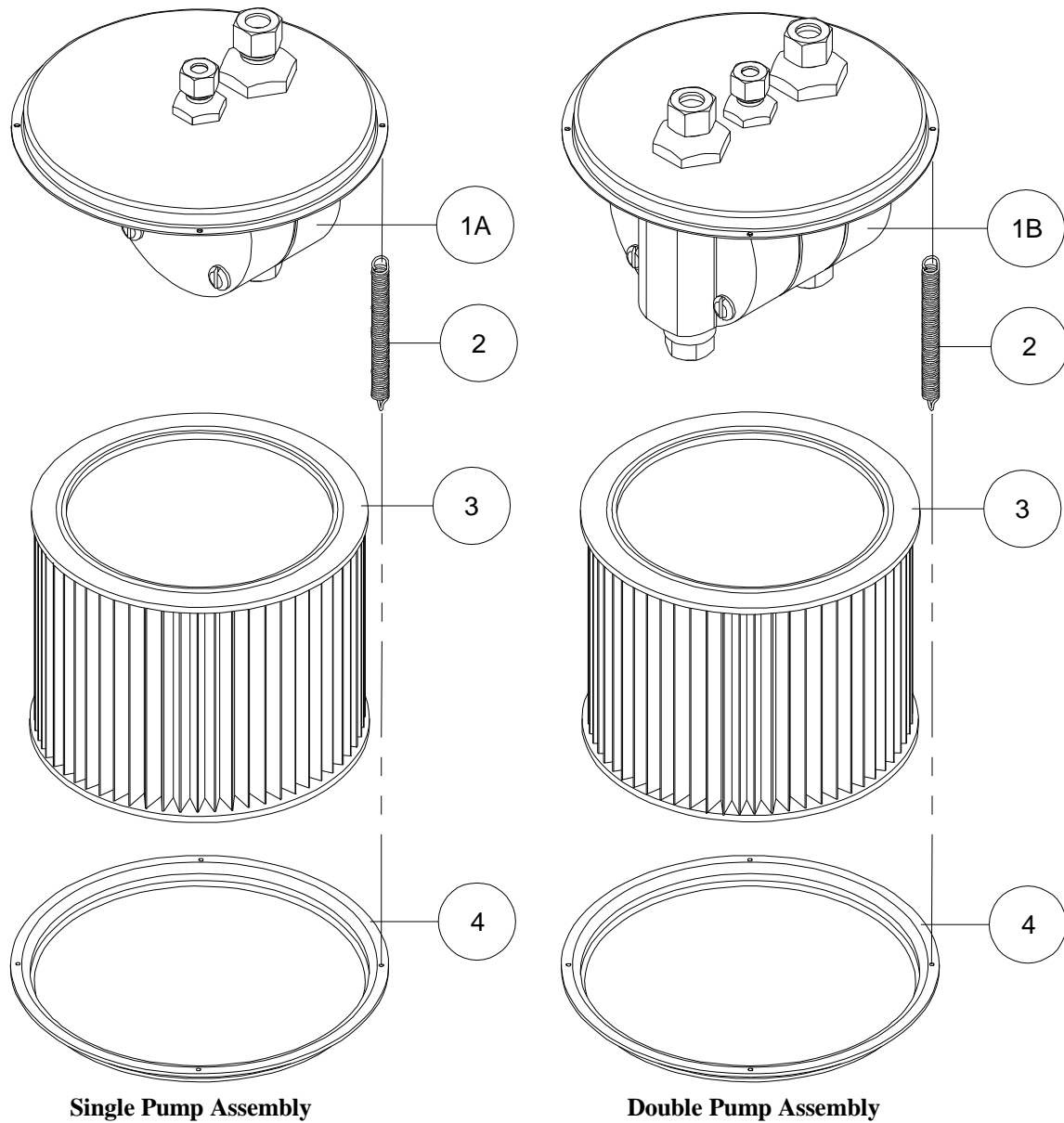
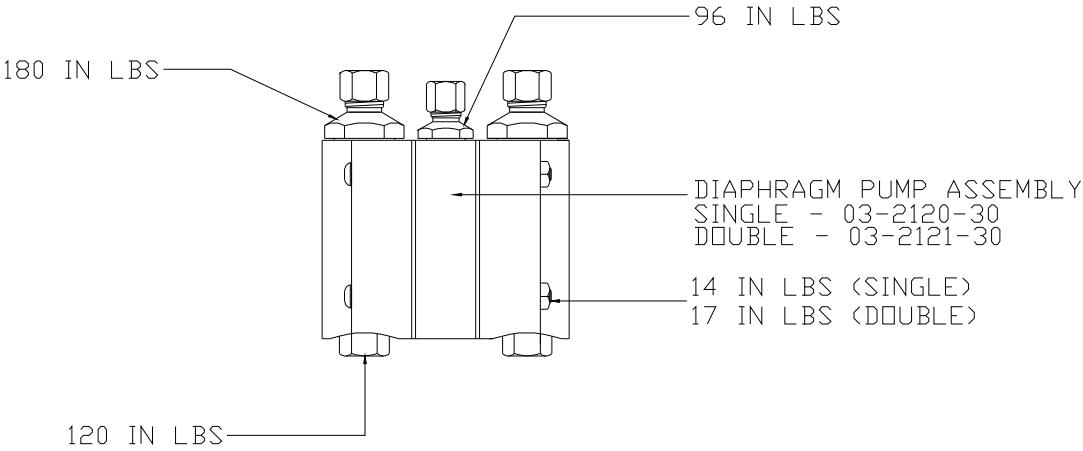


Figure 16. Installation of Pumps into Filter Assembly



DIAPHRAGM PUMP TORQUE SPECIFICATIONS





SPRAY TIP TABLE 2

NOTE: TESTS FOR SPRAY PATTERNS WERE CONDUCTED USING TELLUS #10 OIL MAINTAINING A 6" VERTICAL DISTANCE AND 35 PSI AIR PRESSURE.

| | P/N | DESCRIPTION | PATTERN SIZE |
|-----------|------------|---------------------|----------------|
| FLAT | 06-0952-20 | 110° (.031 Orifice) | 2.50" x 14.00" |
| | 06-1909-20 | 95° (.031 Orifice) | 2.25" x 12.00" |
| | 06-0950-20 | 80° (.031 Orifice) | 2.00" x 9.50" |
| | 06-1908-20 | 65° (.031 Orifice) | 2.00" x 7.50" |
| | 06-0951-20 | 50° (.031 Orifice) | 2.00" x 5.75" |
| | 06-0973-20 | 25° (.031 Orifice) | 1.50" x 3.50" |
| CONE | 06-0959-20 | .030" Orifice TG0.7 | 5.50" Dia. |
| | 06-0953-20 | .024" Orifice TG0.5 | 4.25" Dia. |
| | 06-0958-20 | .020" Orifice TG0.3 | 3.50" Dia. |
| DEFLECTED | 06-0956-20 | .041" Orifice TK1.5 | 4.00" x 18.00" |

SELECTING SPRAY TIPS

There are many variables that impact the performance of the system to provide a specific spray pattern. Consideration should be given to:

1. **VISCOSITY** - is that characteristic of any liquid which resists the forces of movement. Viscosity is the measure of the internal resistance of a fluid to shear and is related to the internal friction of the fluid.
2. **SURFACE TENSION** - is the characteristic of any liquid where the surface tends to assume the smallest size possible. The higher the surface tension the more resistance to flow.
3. **TEMPERATURE** - may affect viscosity, surface tension, and specific gravity. Therefore, temperature may affect spray patterns. The chemical configuration of the fluid is the determining factor. Moderate changes in temperature may not have any effect on some fluids.

NOTE: Spray patterns will also be affected by tip orifice wear. The spray patterns will change size and the droplet size will increase. Spray coverage will change and may not be as even as when the tip was new.



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**For Use with Models 5, 15 and 30 Pre-Pressurized Systems Only
beginning with
Serial Number 5700.**

SELECTING THE COMBINATION OF NOZZLE AND TIP -
Determine the type of tip configuration required for your application and select from Table 2.
Select the nozzle body style from Figure 18.

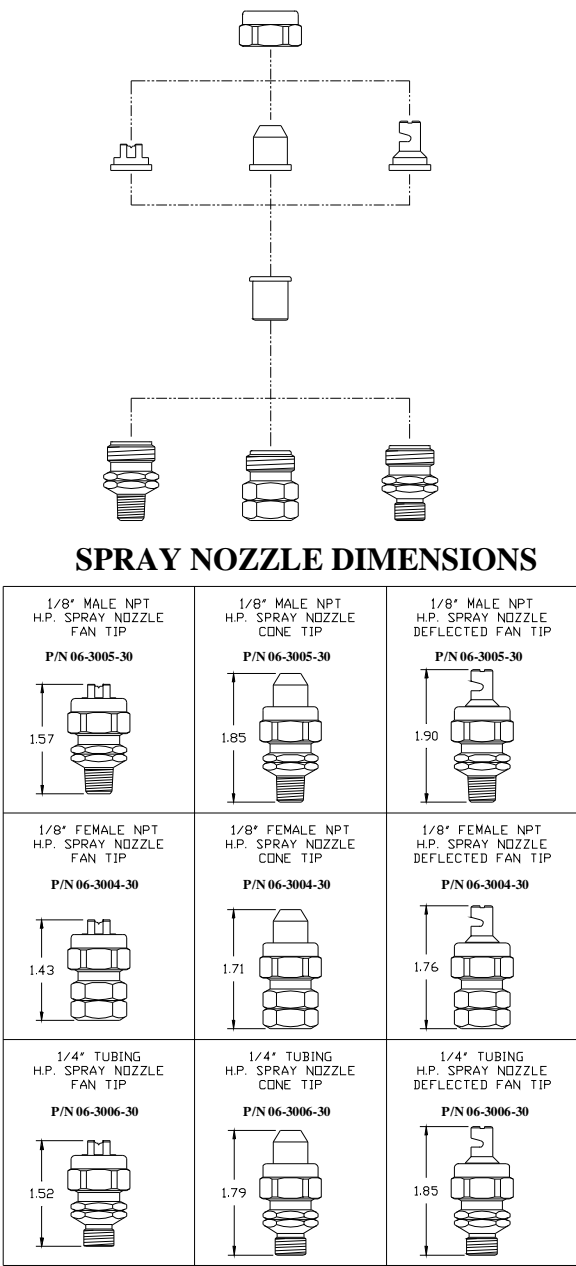


Figure 18. High Pressure Nozzle Assemblies

**High Pressure Spray Assembly**

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY.</u> |
|-----------------------|------------------------|----------------------------------|---------------------|
| 1 | 06-0928-32 | Quick Connect Plug Assembly | 1 |
| 2 | 01-1116-20 | 1/4" Tubing (Soft) | 8' |
| | 01-1116-21 | 1/4" Tubing (Semi-Rigid) | up to 20' (8' std.) |
| 3 | 01-0930-20 | 1/4" Compression Nut | |
| 4 | 01-0929-20 | 1/4" Compression Sleeve | |
| 5 | 06-1923-10 | H.P. 1/4" Tubing Nozzle Body | |
| 6 | 06-3000-31 | Check Valve Seat for H.P. Nozzle | |
| 7 | — | Spray Tip | |
| 8 | 06-0932-20 | Tip Retainer | |

Items 5 and 6 are used with models 5, 15, and 30 only beginning with serial number 5700.

Note: When ordering spray assemblies specify tip (Ref. Table 2.)

If tip is not specified a 110° fan tip will be supplied.

| | |
|------------|---|
| 06-3009-30 | High Pressure Spray Assembly |
| 06-3010-30 | High Pressure Spray Assembly with Semi-Rigid Tubing |

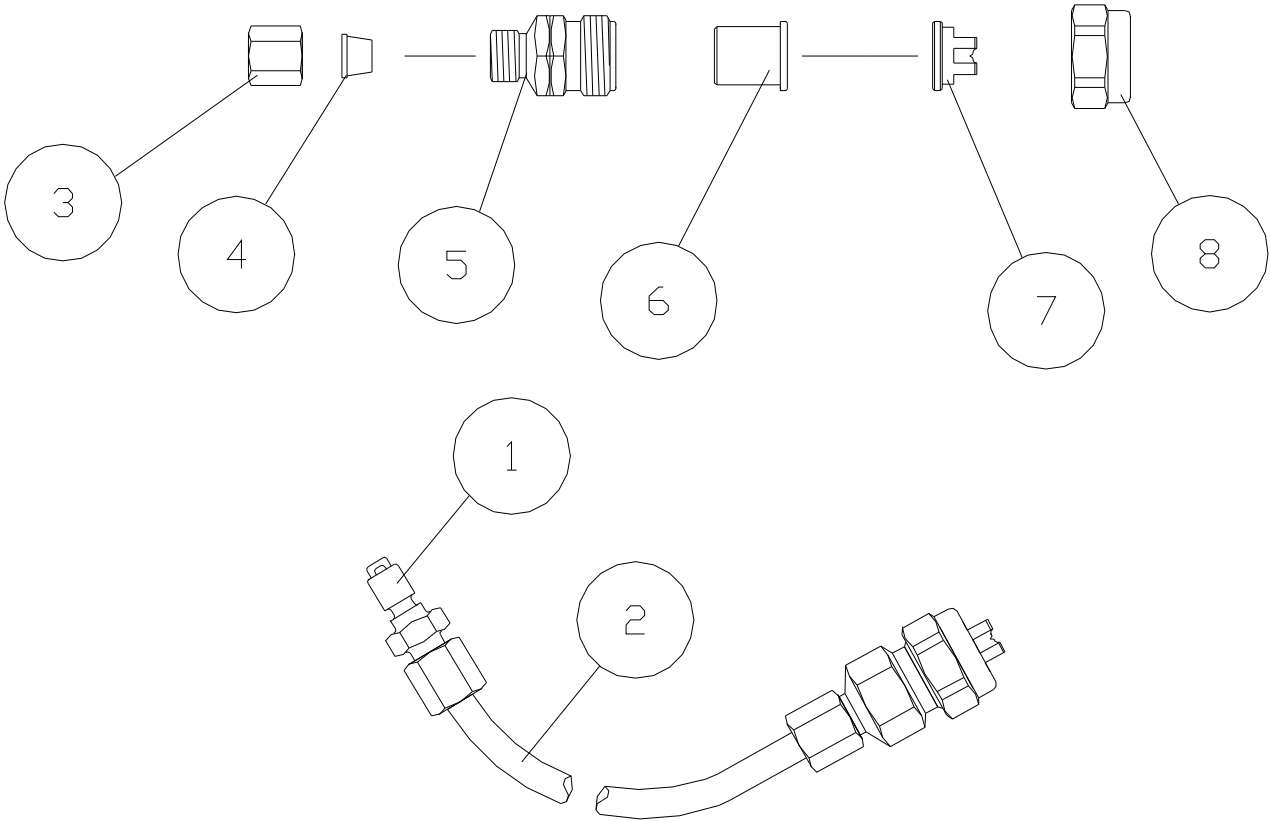


Figure 19. High Pressure Spray Line Assembly

**H.P. Magnetic Base Post, Tube and Clamp Spray Assembly**

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY.</u> |
|-----------------------|------------------------|----------------------------------|---------------------|
| 1 | 06-0928-32 | Quick Connect Plug | 1 |
| 2 | 01-1116-20 | 1/4" Tubing (Soft) | 8' |
| | 01-1116-21 | 1/4" Tubing (Semi-Rigid) | up to 20' (8' Std.) |
| 3 | 06-0910-20 | Female Connector | 1 |
| 4 | 06-1612-10 | 12" S.S. Tube | 1 |
| 5 | 06-1614-30 | Clamp Assembly | 1 |
| 6 | 06-1640-30 | Magnetic Base with Post | 1 |
| 7 | 06-1921-10 | H.P. Female Nozzle Body | |
| 8 | 06-3000-31 | Check Valve Seat for H.P. Nozzle | |
| 9 | — | Spray Tip | |
| 10 | 06-0932-20 | Tip Retainer | |

Items 7 and 8 are used with models 5, 15, and 30 only beginning with serial number 5700.

**Note: When ordering spray assemblies specify tip (Ref. Table 2.)
If tip is not specified a 110° fan tip will be supplied.**

| | |
|------------|--|
| 06-3013-31 | H.P. Magnetic Base Spray Assembly |
| 06-3014-31 | H.P. Magnetic Base Spray Assembly with Semi-Rigid Tubing |

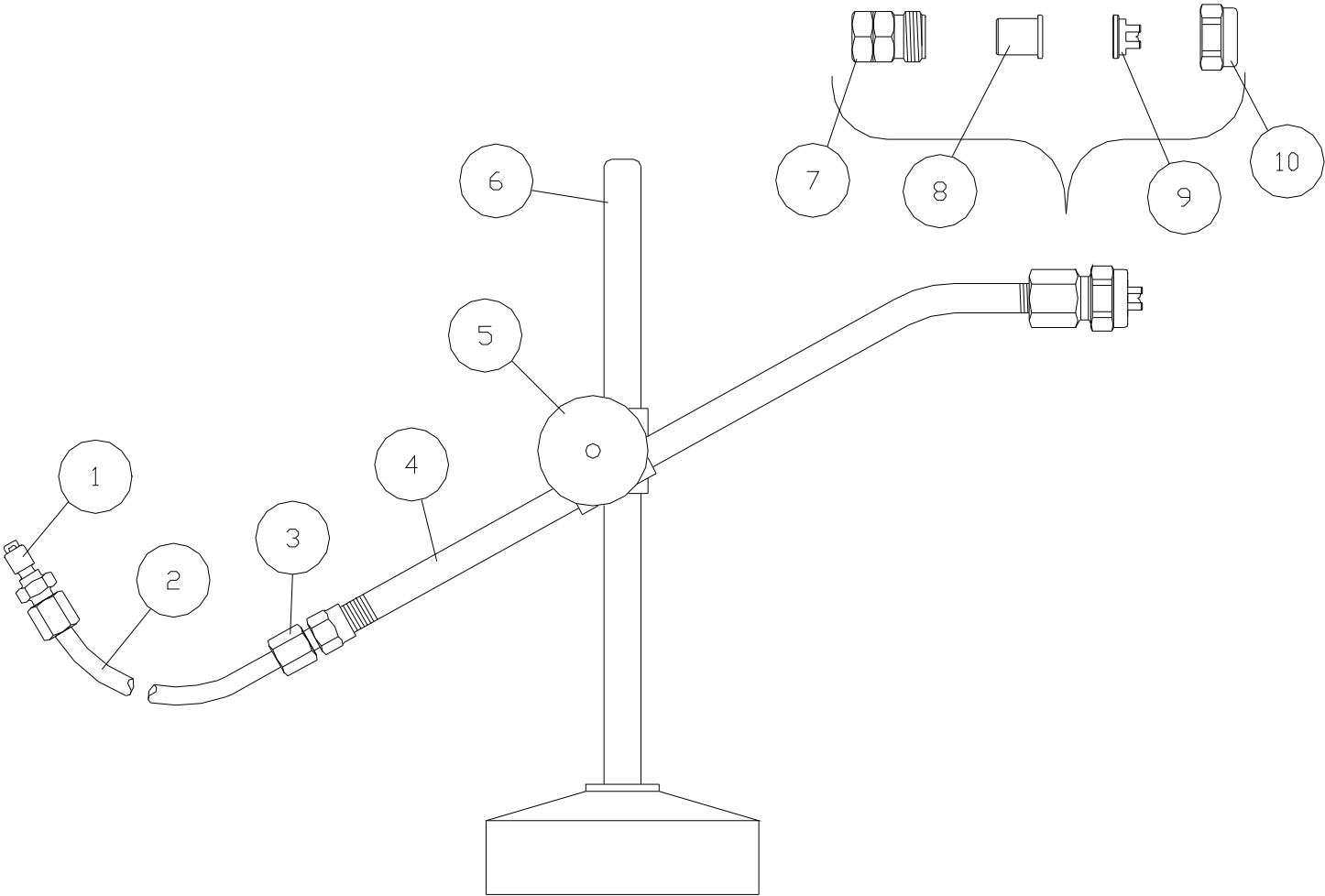


Figure 20. H.P. Magnetic Base Post, Tube, and Clamp Spray



H.P. Flex Tube Magnetic Base Spray Assembly

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY.</u> |
|----------------|-----------------|---|---------------------|
| 1 | 06-0928-32 | Quick Connect Plug | 1 |
| 2 | 01-1116-20 | 1/4" Tubing (Soft) | 8' |
| | 01-1116-21 | 1/4" Tubing (Semi-Rigid) | up to 20' (8' Std.) |
| 3 | 06-0304-20 | Flex Tube Anti-Kink Spring | 1 |
| 4 | 06-1627-10 | Flex Tube Bracket Adapter Segment | 1 |
| 5 | 06-1625-20 | Flex Tube Segment | 12 |
| 6 | 06-1626-10 | Flex Tube Nozzle Adapter Insert | 1 |
| 7 | 01-0929-20 | Compression Sleeve | 1 |
| 8 | 06-1923-10 | H.P. Nozzle Body (For 1/4" Tubing) | |
| 9 | 06-3000-31 | Check Valve Seat for H.P. Nozzle | |
| 12 | — | Tip (Ref. Table 2.) | |
| 13 | 06-0932-20 | Tip Retainer | 1 |
| 14A | 06-0141-20 | 1/4-28 x 3/8" SHCS | 2 |
| 14B | 06-0168-10 | 1/4" Flat Washer—Stainless Steel | 2 |
| 15 | 01-0122-22 | 10-32 x 3/8" BHCS | 2 |
| 16 | 06-2093-30 | Magnetic Base Release Lever Assy.—Flex Tube | 1 |
| 17 | 09-1615-30 | Magnetic Base—Flat Top | 1 |

Items 8 and 9 are used with the pre-pressurized Pax Lube System models 5, 15, and 30 only beginning with serial number 5700.

**Note: When ordering spray assemblies specify tip (Ref. Table 2.)
If tip is not specified a 110° fan tip will be supplied.**

| | |
|------------|--|
| 06-3017-30 | H.P. Flex Tube Mag Base Spray Assembly |
| 06-3018-30 | H.P. Flex Tube Mage Base Spray Assembly with Hard Tubing |

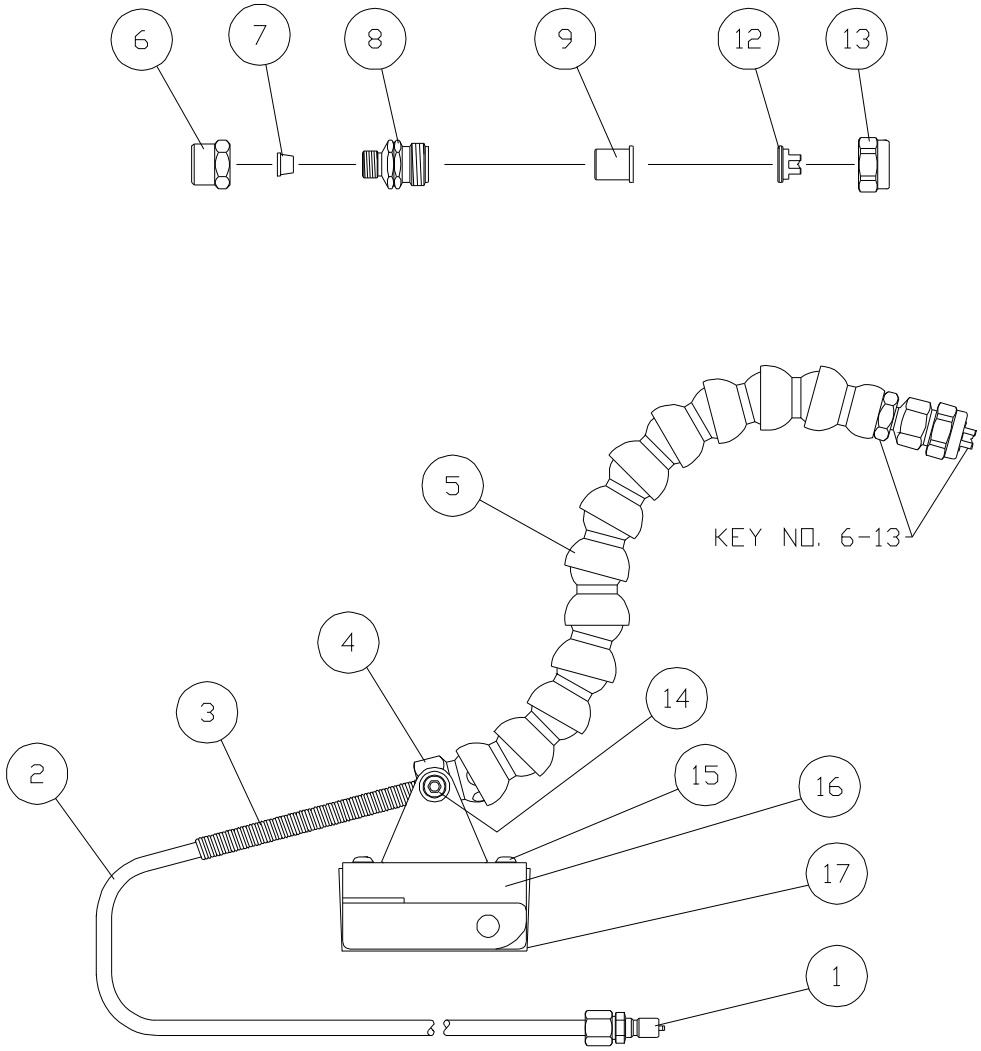


Figure 21. H.P. Flex Tube Magnetic Base Spray



**Magnetic Base Post, Tube, and Clamp Piston Spray Assembly
(See Figure 22)**

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY.</u> |
|-----------------------|------------------------|---------------------------|---------------------|
| 1 | 06-0928-32 | Quick Connect Plug | 1 |
| 2 | 01-1116-20 | 1/4" Tubing (Soft) | 8' |
| | 01-1116-21 | 1/4" Tubing (Semi-Rigid) | up to 20' (8' Std.) |
| 3 | 06-0910-20 | Female Connector | 1 |
| 4 | 06-1612-10 | 12" S.S. Tube | 1 |
| 5 | 06-1614-30 | Clamp Assembly | 1 |
| 6 | 06-1640-30 | Magnetic Base with Post | 1 |
| 7 | 06-0932-20 | Tip Retainer | 1 |
| 8 | - | Spray Tip | 1 |
| 9 | 06-3132-30 | Seal Cap Assembly | 1 |
| 10 | 06-1955-10 | Piston Nozzle Body | 1 |
| 11 | 06-1957-10 | Piston | 1 |
| 12 | 03-0305-20 | Spring | 1 |
| 13 | 06-1958-10 | End Cap | 1 |
| 14 | 06-0164-20 | Socket Head Cap Screw | 2 |
| 15 | 03-0202-20 | O-Ring | 1 |

**Note: When ordering spray assemblies specify tip (Ref. Table2.)
If tip is not specified a 110° fan tip will be supplied.**

06-3103-31 H.P. Magnetic Base Spray Assembly with Piston Style Nozzle and Soft Tubing
06-3104-31 H.P. Magnetic Base Spray Assembly with Piston Style Nozzle and Hard Tubing

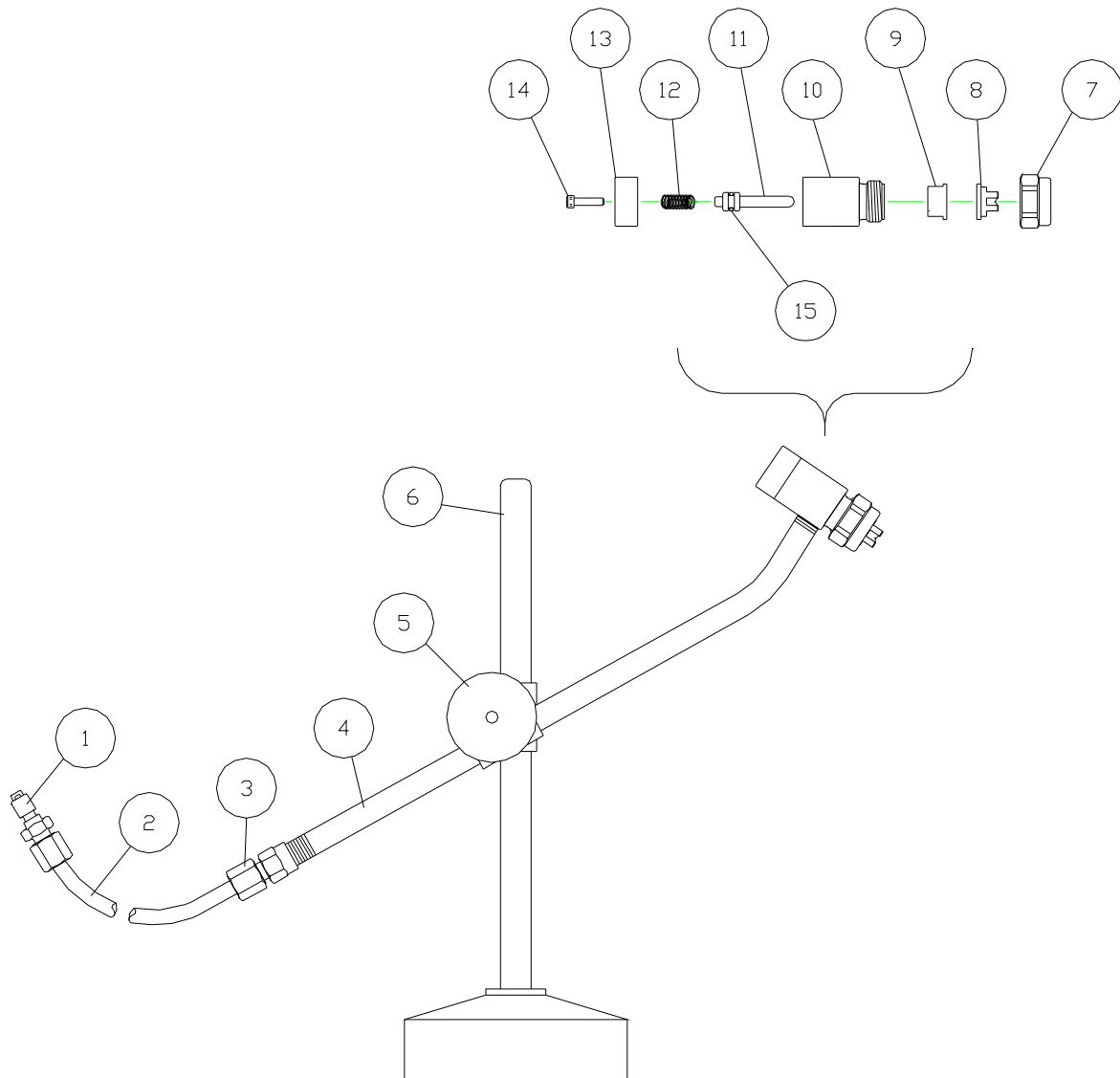
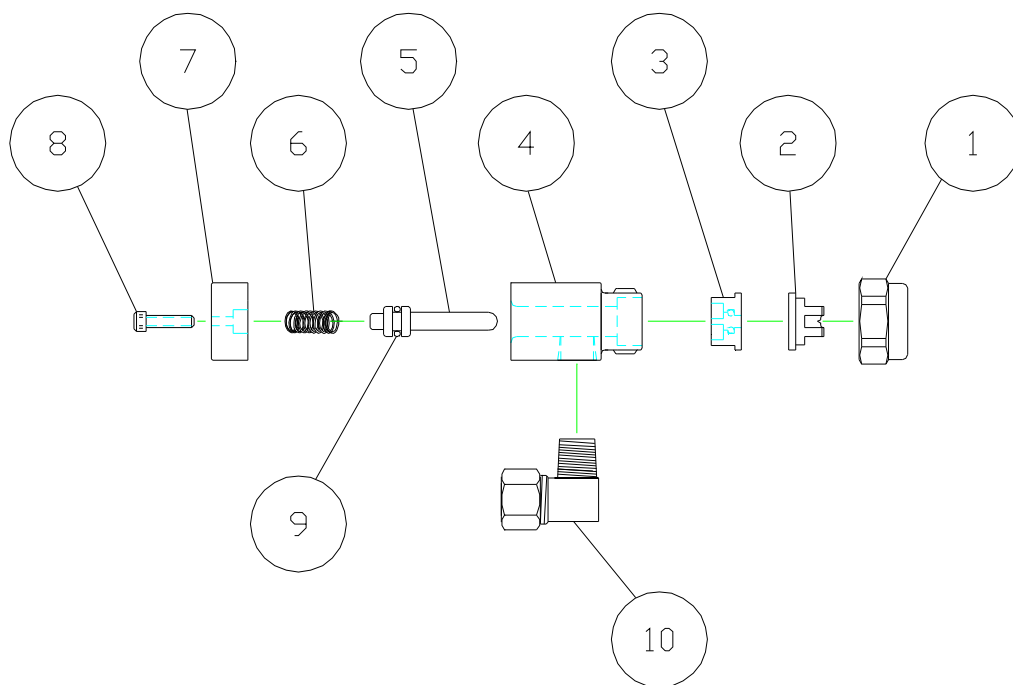


Figure 22. Magnetic Base Post, Tube and Clamp Piston Spray Assembly



**Figure 23. Piston Spray Assembly
06-3100-30**

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY.</u> |
|----------------|-----------------|-----------------------|-------------|
| 1 | 06-0932-20 | Tip Retainer | 1 |
| 2 | - | Spray Tip | 1 |
| 3 | 06-3132-30 | Seal Cap Assembly | 1 |
| 4 | 06-1955-10 | Piston Nozzle Body | 1 |
| 5 | 06-1957-10 | Piston | 1 |
| 6 | 03-0305-20 | Spring | 1 |
| 7 | 06-1958-10 | End Cap | 1 |
| 8 | 06-0164-20 | Socket Head Cap Screw | 2 |
| 9 | 03-0202-20 | O-Ring | 1 |
| 10 | 01-0914-21 | Male Elbow | 1 |

**Note: When ordering spray assemblies specify tip (Ref. Table2.)
If tip is not specified a 110° fan tip will be supplied.**



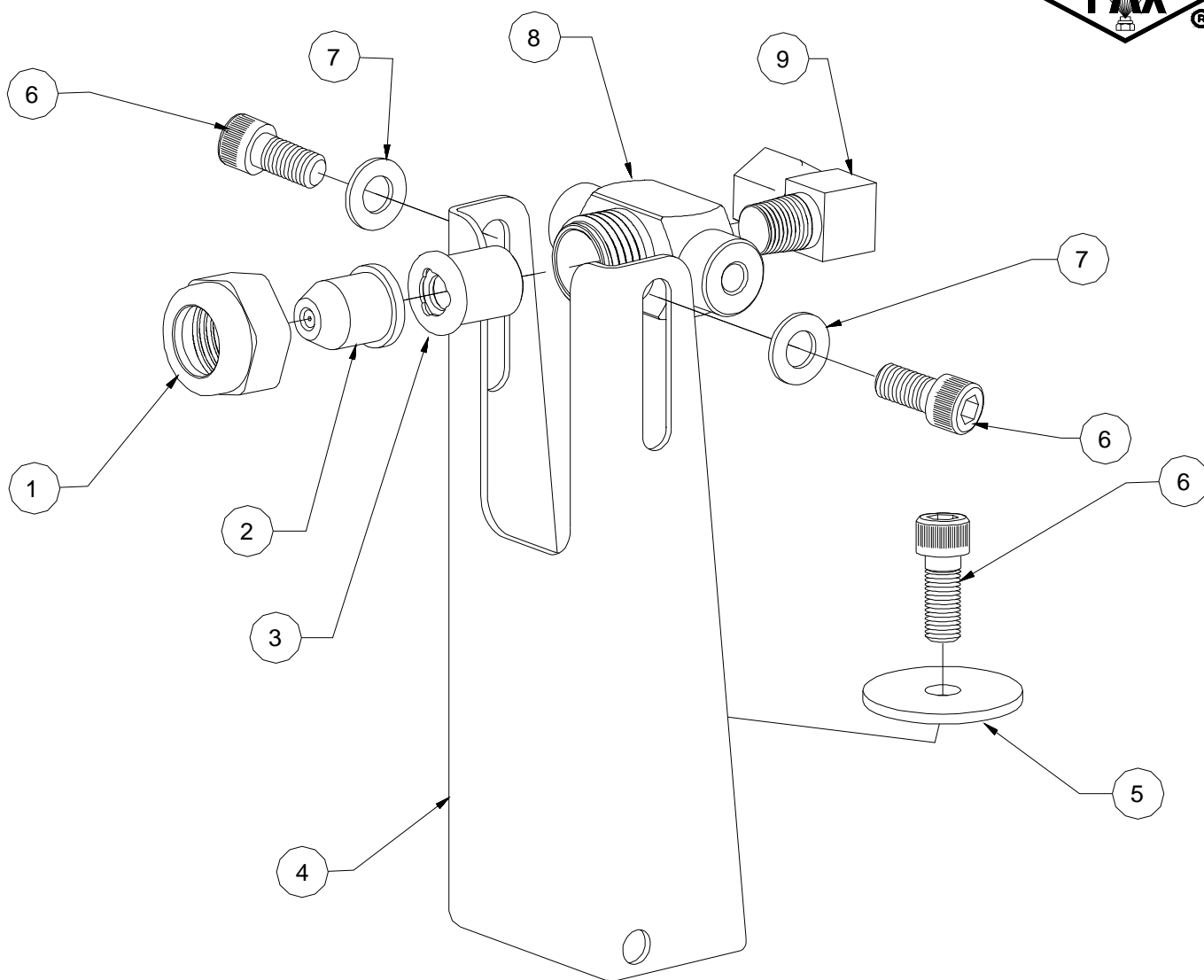
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Bracket Mount Spray Assemblies
Reference Figure 24

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> |
|-----------------------|------------------------|---------------------------------|
| 1 | 06-0932-20 | Tip Retainer |
| 2 | — | Spray Tip |
| 3 | 06-3000-31 | Check Valve Seat |
| 4 | 06-1971-10 | 1"-2" Nozzle Bracket |
| 4 | 06-1972-10 | 2"-3" Nozzle Bracket |
| 4 | 06-1973-10 | 3"-4" Nozzle Bracket |
| 4 | 06-1974-10 | 4"-5" Nozzle Bracket |
| 4 | 06-1975-10 | 5"-6" Nozzle Bracket |
| 4 | 06-1976-10 | 6"-7" Nozzle Bracket |
| 4 | 06-1977-10 | 7"-8" Nozzle Bracket |
| 4 | 06-1978-10 | 8"-9" Nozzle Bracket |
| 4 | 06-1979-10 | 9"-10" Nozzle Bracket |
| 5* | 06-0167-10 | 1 1/8" x 1/4" S.S. Washer |
| 6 | 500-5619-0 | 1/4-20 x 5/8" SHCS (3 pc) |
| 7 | 06-0168-10 | 9/16" x 1/4" S.S. Washer (2 pc) |
| 8 | 06-1970-10 | Bracket Mount Spray Nozzle |
| 9 | 01-0914-21 | Male Elbow |

*06-0167-10 is used with 06-1971-10 (1"-2" Nozzle Bracket) only.



BRACKET MOUNT SPRAY ASSEMBLIES

| | |
|------------|------------------------------------|
| 06-3031-30 | 1"-2" BRACKET MOUNT SPRAY ASSEMBLY |
| 06-3032-30 | 2"-3" BRACKET MOUNT SPRAY ASSEMBLY |
| 06-3033-30 | 3"-4" BRACKET MOUNT SPRAY ASSEMBLY |
| 06-3034-30 | 4"-5" BRACKET MOUNT SPRAY ASSEMBLY |
| 06-3035-30 | 5"-6" BRACKET MOUNT SPRAY ASSEMBLY |
| 06-3036-30 | 6"-7" BRACKET MOUNT SPRAY ASSEMBLY |
| 06-3037-30 | 7"-8" BRACKET MOUNT SPRAY ASSEMBLY |
| 06-3038-30 | 8"-9" BRACKET MOUNT SPRAY ASSEMBLY |
| 06-3039-30 | 9"-10 BRACKET MOUNT SPRAY ASSEMBLY |

Note: When ordering spray assemblies specify tip (Ref. Table 2.)
If tip is not specified a 110° fan tip will be supplied.

FIGURE 24

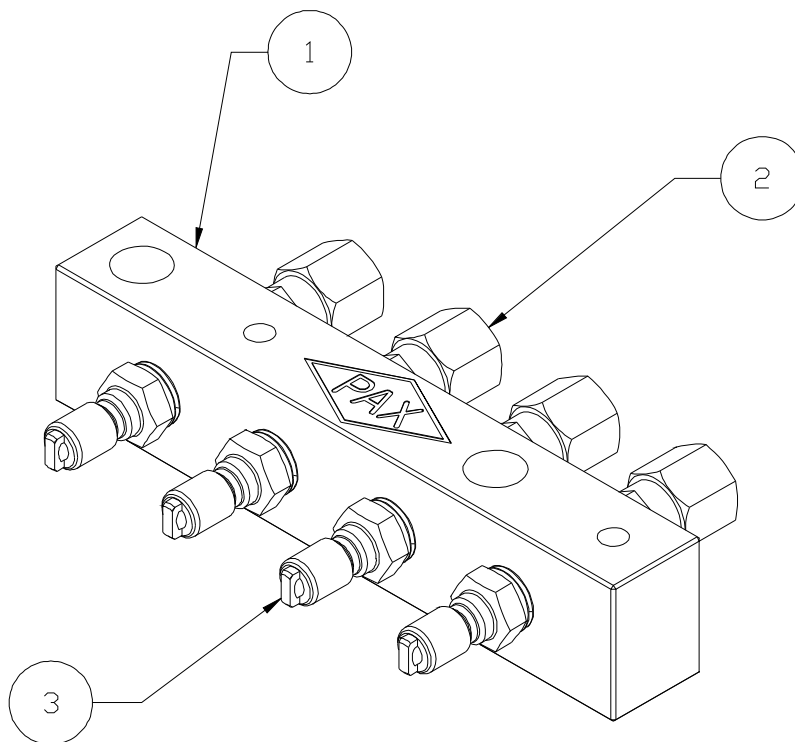


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**4 PORT STACKABLE DIE MANIFOLD ASSEMBLY
FOR 1/4" TUBING
02-3222-30**

| <u>KEY NO.</u> | <u>PART NO.</u> | <u>DESCRIPTION</u> | <u>QTY.</u> |
|----------------|-----------------|-------------------------------|-------------|
| 1 | 06-1980-10 | 4 Port Stackable Die Manifold | 1 |
| 2 | 01-0901-20 | Male Connector | 4 |
| 3 | 06-0967-10 | Quick Connect Plug | 4 |



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DISTRIBUTION PUMP REBUILD INSTRUCTIONS

In order to rebuild the pump correctly, the following steps should be performed.

- 1) Begin disassembling the pump by removing the four 8-32 socket head cap screws that secure the pump cap to the pump body. Remove the pump cap.
- 2) Opposite the pump cap, remove the outlet valve and quick connect assembly from the pump body.
- 3) Disassemble the outlet valve body by removing the brass quick connect coupling. This will allow for removal of the outlet check ball and the outlet spring.
- 4) Using a blunt, soft object such as a nylon rod, gently tap the smaller head of the piston to remove it from the pump body. A hard or sharp object may cause damage to the piston, pump body, or both.
- 5) Remove the o-rings from the piston, pump cap, outlet valve assembly on the pump, inlet valve seat o-ring, and the two air chamber o-rings on the manifold at the position the pump was removed from (if applicable).
- 6) Thoroughly clean all the pump components. When cleaning the inside bores of the pump body, use a soft bristle brush or a cloth. Avoid using abrasives or sharp objects in the bores of the pump body.
- 7) Inspect all parts for damage. Pay close attention to the walls of the bores. Hold the pump body up to a light and look through the bores from both ends. If scratches are evident on the walls, the pump body is damaged to a point where the bores need to be honed to remove the scratches or possibly replaced depending on the depth of the scratches. **A SCRATCHED BORE WILL QUICKLY DESTROY NEW O-RINGS.**

If honing is required, it is recommended that a bronze mandrel with a Sunnen J-95 or equivalent stone be used. The pumps should be honed until the scratches are no longer visible. The maximum diameter of the small bore is .316" for a standard pump and .441" for a high volume pump. The maximum diameter for the large bore on either pump is 1.005". If honing to these maximum diameters does not remove the scratches, then the pump body should be replaced.

Scratches on the piston may cause the bore to become scratched also. A piston with a few surface scratches can be salvaged by polishing in some cases. If light polishing does not eliminate the scratches, then the piston should be replaced.

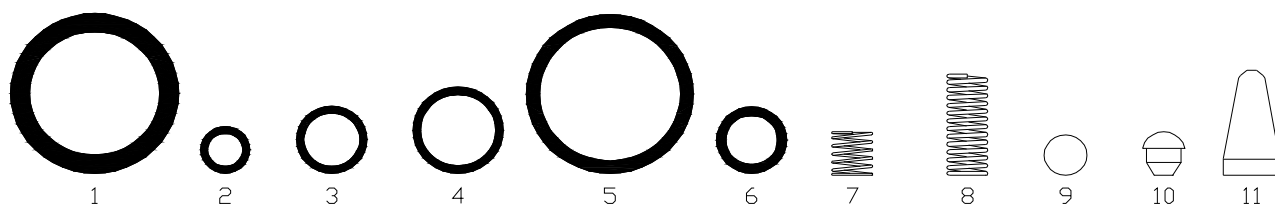
- 8) The first step in reassembling the pump is installing the o-rings. Reference page 70 for the location and placement of the o-rings.
- 9) Reassemble the outlet valve assembly. Place the outlet ball into the outlet valve body. Place the outlet spring on top of the ball and finally secure the quick connect coupling to the outlet valve body (use Teflon tape or another type of thread sealant on the pipe threads).
- 10) Lubricate the o-rings on the piston with silicone or a similar grease and place the piston into the pump body.
- 11) Lubricate the o-ring on the outlet valve assembly completed in step 9 and secure this assembly to the pump body.
- 12) Place the pump cap on the pump body making sure the small set screw is facing the front of the pump. Tighten the four 8-32 cap screws.
- 13) Place the inlet valve spring into the back of the pump and place the check poppet on the spring. A light oil will help hold the spring and poppet in the pump when remounting the pump to the manifold. The oil will also help prime the pump. The pump can now be mounted to the manifold.



PAX LUBE SYSTEMS

P/N 03-2053-32 STD. PUMP REBUILD KIT
P/N 03-2079-31 HIGH VOLUME PUMP REBUILD KIT

| KEY | QTY. | P/N | DESCRIPTION | |
|-----|------|------------|---|-------------------------|
| 1 | 1 | 03-0201-20 | O-RING—PISTON—1" DIA. END | |
| 2A | 1 | 03-0202-20 | O-RING—PISTON—5/16" DIA. END | (STANDARD PUMP ONLY) |
| 2B | 2 | 03-0202-20 | O-RING—MANIFOLD—AIR PORTS | |
| 3 | 1 | 03-0203-20 | O-RING—PISTON—7/16" DIA. END | (HIGH VOLUME PUMP ONLY) |
| 4 | 1 | 03-0204-20 | O-RING—OUTLET VALVE BODY | |
| 5 | 1 | 03-0206-20 | O-RING—PUMP CAP | |
| 6 | 1 | 03-0216-21 | O-RING—MANIFOLD—INLET VALVE (BLACK) | |
| 7 | 1 | 03-0301-20 | SPRING—INLET VALVE | |
| 8 | 1 | 03-0302-20 | SPRING—OUTLET VALVE BODY | |
| 9A | 1 | 03-0401-20 | 1/4" DIA. TEFLON CHECK BALL (STAINLESS OUTLET VALVE BODY) | |
| 9B | 1 | 06-0404-20 | 1/4" DIA. STAINLESS CHECK BALL (BRASS OUTLET VALVE BODY) | |
| 10 | 1 | 03-0402-21 | CHECK POPPET—INLET VALVE | |
| 11 | 1 | 03-0608-10 | O-RING INSTALLATION CONE | (STANDARD PUMP ONLY) |



USE OF O-RING INSTALLATION CONE

(FOR STANDARD PUMPS ONLY)

- 1) REMOVE CONE FROM PACKAGING (HANDLE CAREFULLY—BOTTOM EDGE WILL DAMAGE EASILY)
- 2) PLACE CONE ON TOP OF PISTON (SEE ILLUSTRATION)
- 3) SELECT PROPER O-RING FROM REPAIR KIT (P/N 03-0202-20 KEY #2A)
- 4) APPLY A LIGHT WEIGHT OIL TO THE O-RING
- 5) PLACE THE O-RING ON THE CONE
- 6) FORCE THE O-RING DOWN THE CONE WITH FINGERS UNTIL IT DROPS INTO THE GROOVE

