

# UV PROCESS SUPPLY, INC.

## ¼" DOUBLE DIAPHRAM PUMP INSTRUCTION MANUAL

### PART # J004-051

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#### **GENERAL DESCRIPTION**

The ¼" Diaphragm Pump offers high volume delivery even at low air pressures, easy self-priming, the ability to pump various viscosity materials and the ability to pass solids (as stated in the chart above). The pump is designed to correspond to the needs of the user by offering a variety of wetted parts configurations to handle almost any application. The Acetal material used in this pump contains Stainless Steel fibers, its conductivity allows it to be connected to a suitable ground, a ground screw is provided for this.

#### **OPERATING INSTRUCTIONS**

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

#### **OPERATING AND SAFETY PRECAUTIONS**

- *Read and heed all Warnings, Cautions, and Safety Precautions before operating this pump.*
- *Use only genuine replacement parts to assure compatible pressure rating and longest service life.*

**WARNING** EXCESSIVE AIR PRESURE. Can cause pump damage, personal Injury or property damage.

- Do not exceed the maximum Inlet air pressure as stated on the pump model Pilate.

**WARNING** STATIC SPARK Can ignite flammable material and vapors resulting in fire or explosion causing severe personal injury or property damage.

- The pumping system end object being sprayed must be grounded when it is pumping, trashing, re-circulating or spraying flammable materials such as paints, solvents, lacquers, etc. or used in a location where surrounding atmosphere is conducive to spontaneous combustion.
- Groundable Acetal pumps: Use the pump grounding screw provided. A screw terminal is provided on the Fluid Cap (Remove the cover to gain access). Connect a 12 gal. (min.) wire (a kit is available) to a good earth ground source.
- Ground dispensing valve or device, containers, hoses and any outlet to which material is being pumped. After grounding, periodically verify continuity of electrical path to ground. Test with an ohmmeter from each component (e.g., hoses, pump, clamps, container, spray gun, etc.) to ground to insure continuity. Ohmmeter should show 10 ohms or less.
- Secure pump, connections and all contact points to avoid vibration and generation of contact or static spark.
- Consult local building codes and electrical codes for specific grounding requirements.

**WARNING** DIAPHRAGM RUPTURE. Can cause serious injury or property damage. Material can be forced out of the air exhaust muffler.

- Pipe the exhaust to a safe remote location when pumping hazardous or inflammable materials.
- Use a grounded 1/4" min. I.D. hose between the pump and the muffler.

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

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

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

**UV Process Supply, Inc.**  
 1229 W. Cortland St.  
 Chicago, IL 60614-4805  
 Web: [www.uvprocess.com](http://www.uvprocess.com)

773-248-0099 • 800-621-1296 • 888-UVLAMPSTM  
 FAX 773-880-6647 • 800-99FAXUVTM  
 UV FAXTS...Service<sup>®</sup> 773- 880-6649  
 E-mail: [info@uvps.com](mailto:info@uvps.com)

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

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#### **SAFETY PRECAUTIONS (GENERAL) should include:**

- Use of static wire hoses.
- Submersion of outlet hose end, dispensing valve or device within material being dispensed whenever possible. (Avoid free streaming of material being dispensed.)
- Proper ventilation of area away from heat, open flames and sparks.
- Keeping inflammables away from heat, open flames and sparing.
- Keeping containers closed when not in use.
- Be sure material hoses and other components are able to withstand fluid pressures developed by this pump. Check all hoses for damage or wear. Be certain dispensing device is clean and in proper working condition.

**CAUTION** Verify the chemical compatibility of the pump wetted parts and the substance before pumped, flushed or re-circulated. Chemical compatibility may change with temperature and concentration of the chemical(s) within the substances being pumped, flushed or circulated.

**CAUTION** Maximum temperatures are based on mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperature.

- Temperature Limits:
  - Polypropylene 35°F to 120°F
  - Groundable Acetal 10°F to 150°F.

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

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

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

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

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

#### **AIR AND LUBE REQUIREMENTS**

**WARNING** EXCESSIVE AIR PRESURE. Can cause pump damage, personal Injury or property damage.

- A filter capable of filtering out particles larger than 50 microns should be used on the air supply. In most applications there is no lubrication required other than the O ring lubricant which is applied during assembly or repair.
- The pump can be rotated 360° to suit the application. It may be mounted upside down or on the wall with no effect on suction lift or operating efficiency. The filter and regulator need to be oriented in a normal vertical direction to function properly.
- Pipe plugs included for the material inlets, can be switched to accommodate piping requirements, however the fluid inlet must always be in the port closest to the mounting base.
- When lubricated air is necessary, supply the air lubricator with a good grade of SAE 90 wt. non-detergent oil and set the lubricator to a rate not to exceed one drop per minute.

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### **MAINTENANCE**

Refer to the part views and descriptions as provided on page 4 for parts identification and Service Kit information.

- Provide a clean work surface to protect sensitive internal moving parts from contamination from dirt and foreign matter during service disassembly and re-assembly.
- Keep good records of service activity and include pump in preventive maintenance program.

### **SERVICE KIT**

A Diaphragm and Air Valve Repair Kit (# **J004-060**) is available for this pump. It consists of 2 diaphragms, 2 "U"-cups, 9 different "O"-rings , 1 Air cap seal, 1 Valve Block gasket and Key-Lube Grease.

### **GENERAL PUMP REPAIR NOTES**

- Tools needed to complete disassembly and repair.:  
7/16" Wrench, 9/16 Wrench, 7/16. Socket, 9/16. Socket, Spanner Wrench, Torque Wrench (measuring inch pounds), "O"ring Pick
- Once the pump is disassembled, you have the opportunity to clean and inspect all parts for wear. Look for deep scratches on metallic surfaces, and nicks or cuts in "O" rings. Replace all parts with new ones as necessary.
- Take precautions to prevent cutting "O" rings upon installation.
- Lubricate "O" rings and "U" Cups with Key-lube or equivalent. A packet of this lubricant is included in each Service Kit.
- Do not over tighten fasteners, refer to torque specification block on view.
- Re-torque fasteners following restart.

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SERVICE KITS	KIT NUMBER	THESE ITEMS ARE INCLUDED IN KIT														
DIAPHRAM & AIR VALVE KIT	J004-060	7	19	33	64	70	102	110		119	132	137	138	144	146	147

Keytube packet 93706-1 is included with all kits.

COMMON PARTS						
ITEM	DESCRIPTION (SIZE IN INCHES)	QTY	POLYPROPYLENE 666023,J,L,N		GROUNDABLE 666026,H,M,P	
			PART NO.	[MTL]	PART NO.	[MTL]
<input type="checkbox"/> 1	Rod (2-13/16 Long)	(1)	93916	[SS]	93916	[SS]
<input type="checkbox"/> 5	Washer (1-3/4 O.D.)	(2)	93915	[SS]	93915	[SS]
<input type="checkbox"/> 6	Diaphragm Nut (1/4-20)	(2)	93810-1	[P]	93810-2	[D]
<input type="checkbox"/> 16	Manifold	(4)	93817-1	[P]	93817-2	[G]
<input type="checkbox"/> 36	Manifold Tube	(○)	93813-1	[P]	93813-2	[D]
37	Manifold Plug	(○)	93941-1	[P]	93941-2	[D]
43	Ground Screw (10-32 x 1/4) Not Shown	(1)	—	—	93005	[S]
62	Nut (1/4-20)	(6)	93828	[SS]	93828	[SS]
63	Pipe Plug (1/4-18) Not Shown	(2)	93832-1	[P]	93832-2	[D]
<input type="checkbox"/> 65	Fluid Cap, W/AIR INLET	(1)	93812-1	[P]	93812-2	[G]
<input type="checkbox"/> 66	Fluid Cap	(1)	93811-1	[P]	93811-2	[G]
<input type="checkbox"/> 68	Air Cap, Right	(1)	93804	[P]	93804	[P]
<input type="checkbox"/> 69	Air Cap, Left	(1)	93805	[P]	93805	[P]
70	Seal	(1)	■93829	[B]	■93829	[B]
71	Check Asm.: Seat, Disc, Stop	(4)	■66973-1	[P]	■66973-2	[D]
72	Cover, Right	(1)	93816-2	[P]	93816-2	[P]
73	Cover, Left	(1)	93816-1	[P]	93816-1	[P]
131	Bolt (1/4-20 x 6.250)	(6)	93827	[SS]	93827	[SS]

MATERIAL CODE
[A]=Aluminum
[B]=Buna "N"
[D]=Acetal (Orange)
[F]=Fluoraz
[G]=Groundable Acetal (Dk Gray)
[K]=Kralon
[N]=Neoprene
[P]=Polypropylene (Lt Gray)
[R]=Ryton
[S]=Steel
[SP]=Santoprene
[SS]=Stainless Steel
[T]=Teflon
[U]=Polyurethane
*Refers to welded parts only

### PART NOTES

- Manifold Qty's will be either 1 or 2 depending on the inlet/outlet option selected. (Refer to chart on page 3.)
- These parts are available in Service Kits only, see the Service Kit Chart at the top of the page and on page 3.
- "Smart Parts" keep these items on hand in addition to the Service Kits for fast repair and reduction of down time.

AIR SECTION PARTS									
ITEM	DESCRIPTION (Size in Inches)	QTY	PART NO.	[MTL]	ITEM	DESCRIPTION (Size in Inches)	QTY	PART NO.	[MTL]
102	"O" Ring (7/8 O.D.)	(3)	■Y325-018	[B]	137	"O" Ring (1 O.D.)	(1)	■Y325-020	[B]
103	Bushing	(1)	93917	[D]	138	"O" Ring (13/16 O.D.)	(1)	■Y325-114	[B]
110	"U" Cup (13/16 O.D.)	(1)	■Y186-54	[B]	142	Screw (#4-20)	(3)	93942	[SS]
<input type="checkbox"/> 111	Spool	(1)	93914	[D]	144	"U" Cup (5/8 O.D.)	(2)	■Y186-45	[B]
<input type="checkbox"/> 118	Trip Rod	(1)	93918	[D]	<input type="checkbox"/> 145	Minor Valve Block	(1)	93807	[R]
119	"O" Ring (5/8 O.D.)	(5)	■15066	[B]	146	"O" Ring (5/16 O.D.)	(2)	■Y325-008	[B]
132	Gasket	(1)	■93809	[K]	147	"O" Ring (7/16 O.D.)	(2)	■Y325-011	[B]
<input type="checkbox"/> 135	Valve Block	(1)	93806	[R]					

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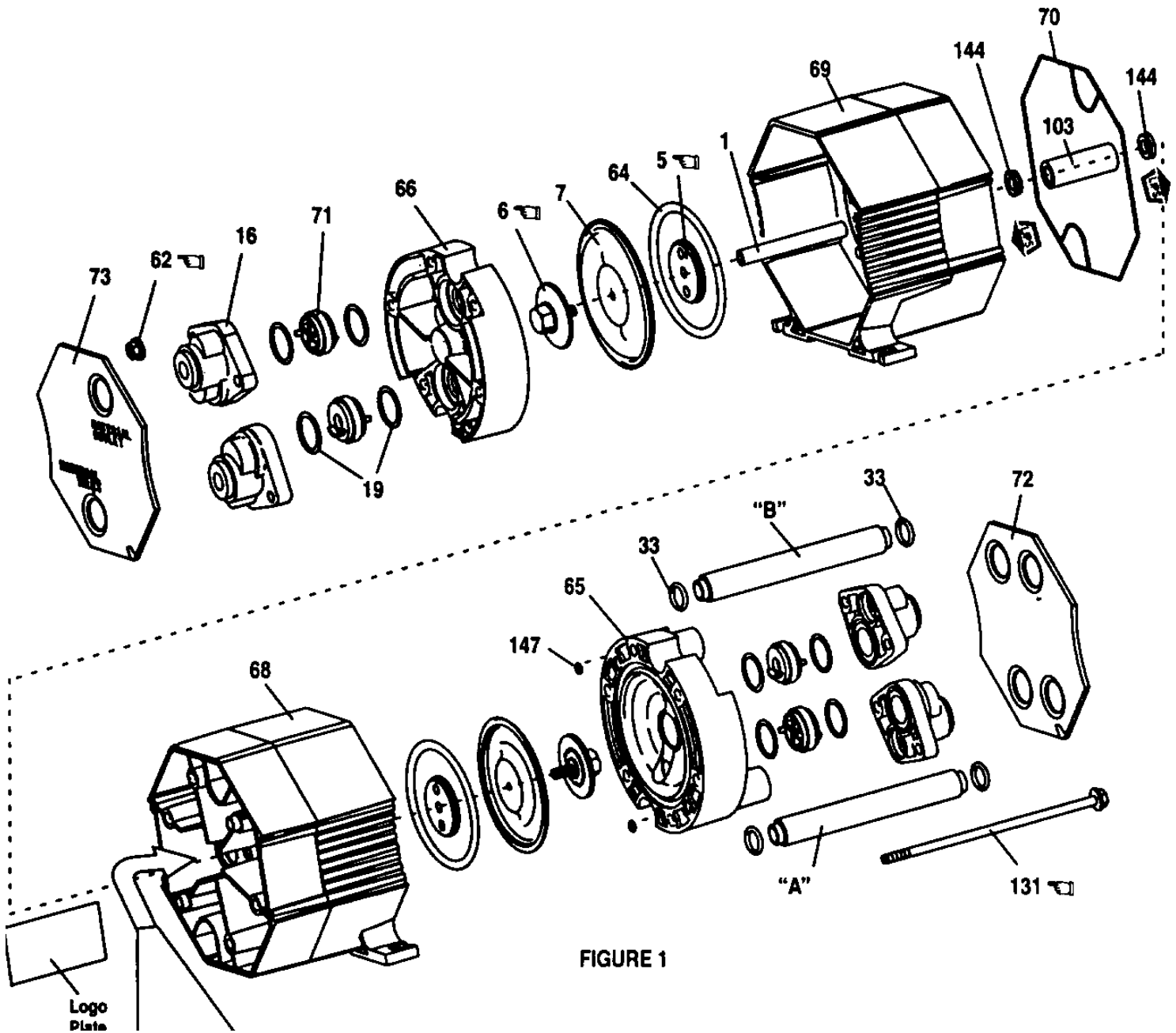


FIGURE 1

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#### **PUMP DISASSEMBLY**

1. Place the pump on a flat workbench. Remove both cover plates and set them aside.
  2. Using a 7/16-inch wrench, remove the nuts from each of the six bolts that run through the pump. Pull the bolts through the pump body and set them aside.
  3. The fluid caps and manifolds may fall free at this time. If not, grasp the fluid caps and separate them from the pump body.
  4. The air inlet fluid cap has two small "O" rings at the air inlet and exhaust ports. Remove these with the "O" ring pick.
  5. The manifold tubes may have pulled free of the pump when the fluid caps were removed, if not remove both tubes from the pump body.
  6. Remove the "O" rings from the ends of each manifold tube.
  7. If the manifolds did not fall free, separate them from the fluid cap at this time.
  8. To remove the checks, it may be necessary to push a dowel through the fluid caps.
  9. Use the pick to remove any "O" rings that remain in the manifold or fluid cap.
  10. With the 9/16" socket and 9/16" wrench, loosen and remove either diaphragm nut. Gently pull the diaphragm away from the pump body.
- NOTE:** Models with Teflon diaphragms will have back up "O" rings.
11. Push the connecting rod through the pump body. Wrap the connecting rod in a shop rag and secure in a soft-jawed vise.
  12. Remove the remaining diaphragm nut with a 9/16" wrench.
- NOTE:** Be careful not to mar the connecting rod surface during this step.
13. Using the 9/16 wrench and the spanner wrench, remove the backup washer from the diaphragm nut. This will allow you to separate the diaphragm from the nut.
- NOTE:** Be careful not to round the diaphragm nut during this step.
14. Pull apart the two air caps. The connecting rod bushing will fall free. If the air valve blocks did not fall free, pull them from the air cap at this time.
  15. Use the "O" ring pick to remove the air cap seal.
  16. Use the pick to remove the U-cups and any "O" rings that may remain in the air caps.
  17. Separate the valve block and minor valve block. Pull the piston from the minor valve block. Then remove all "O" rings using the pick. Gently push the spool from the valve block. A dowel may be needed to push out the spool.
- NOTE:** Be careful not to damage either part during the step.
18. Use the pick to remove all "O" rings from the spool and the center gasket from the valve block.

#### **PUMP REBUILD PROCEDURES**

##### AIR VALVE SECTION (Step 1-6)

1. Install new "O" rings and "U" cups on the spool and piston.
  2. Lubricate the spool, piston and internal bores of the valve blocks.
  3. Insert the piston into the minor valve block, being careful not to damage any "O" rings during this process. Now slide the spool into the valve block, inserting the small end first.
- NOTE:** There may be some resistance when installing the piston and spool, however you should not have to force the parts into place.
4. Install new "O" rings on the valve check and minor valve block.
  5. Install the shaped "O" rings onto the valve block and insert the block into the minor valve block.
- NOTE:** Do not lubricate the gasket or valve block surfaces.
6. Insert new, lubricated "U" cups in each of the air caps. The lips of the "U" cups should face towards the diaphragm chambers. Install the air cap seal.
  7. Reassemble the Diaphragms by first inserting a nut through the new diaphragms. Attach the backup washers, securing with the 9/16" wrench and the spanner wrench. Using the torque wrench, tighten each diaphragm nut to 80-inch pounds.
- NOTE:** Be careful not to round off the diaphragm nut. Backup "O" rings are included in the Service Kit for models with Teflon diaphragms.

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### **PUMP REASSEMBLY**

8. First hand tighten the connecting rod to one of the diaphragm assemblies.

9. Place the air cap on end. Insert the air valve assembly and bushing in place (be sure the "U" cups are installed). Align logo plates and push the air caps together.

**NOTE:** Be sure the bushing, air cap seal and air valve assembly remain in place.

10. Lubricate the connecting rod and insert it into the air cap.

**NOTE:** Models with Teflon diaphragms have backup "O" rings that are placed in the groove of each air cap.

12. Attach the second diaphragm assembly to the connecting rod, hand tighten the diaphragm nut until it bottoms out on the connecting rod.

**NOTE:** Models with Teflon diaphragms have backup "O" rings that are placed in the groove of each air cap. Do not over-tighten the nut.

13. Replace the "O" rings at the air inlet and exhaust ports of the air inlet fluid cap.

14. Properly align the fluid cap and attach it to the pump body. When in place, the air inlet should be at the upper right, with the exhaust at the lower left.

15. Insert a bolt into the bore just below the air inlet and one just above the exhaust port. Applying a small amount of anti-seize compound or lubricant to the threads will help prevent the nut from binding. Properly align the second fluid cap and push it into position.

16. Secure the fluid caps by installing nuts and washers onto each bolt, but do not tighten fully at this time.

17. Insert the manifold tubes through the pump body, being careful that the "O" rings do not fall off during this step.

18. Press two of the check assemblies into the tower inlet ports of the fluid caps. The checks are keyed and can be assembled only one way.

**NOTE:** If the old checks are to be used, clean all parts in an appropriate solvent.

19. Place manifolds over each check, pushing firmly to secure the check and the manifold tube.

20. Press the remaining checks into the upper outlet ports of the fluid caps. Make sure the smaller seat opening is inserted first.

21. Place manifolds over each check, pushing firmly to secure the check and the manifold tube.

22. Insert two bolts through each manifold. Secure by attaching a nut to each bolt. Applying a small amount of anti-seize compound or lubricant to the threads will help prevent the nut from binding.

23. Tightening sequence.

- Torque all six nuts to 40-inch pounds.
- Cross tighten the nuts in an alternation star shaped pattern.
- Repeat torque sequence twice.

24. Finish re assembly by pressing both cover plates into place.

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**TROUBLESHOOTING CHART** - Most problems can be avoided through regular cleaning and maintenance. If the pump is not properly cleaned or maintained, dried ink or foreign matter may accumulate within the pump, and block or reduce material flow.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Pump will not start (stalls)*	<ol style="list-style-type: none"> <li>1. Inadequate air supply (20 PSI Min.)</li> <li>2. Contaminated air supply</li> <li>3. Ruptured diaphragm (2)</li> <li>4. Check shuttle valve for wear (11)</li> <li>5. Check shaft seal o-rings for wear</li> <li>6. Debris is blocking flow*</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase air inlet pressure</li> <li>2. An air dryer might be required</li> <li>3. Replace diaphragm (2)</li> <li>4. Replace shuttle valve if necessary (11)</li> <li>5. Replace o-rings if necessary</li> <li>6. Clean blockage*</li> </ol>
Pump runs, but no fluid	<ol style="list-style-type: none"> <li>1. A leak or break in the product inlet line</li> <li>2. A leak or break in the product discharge line</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace product line</li> <li>2. Replace product line</li> </ol>
Pump leaks thru exhaust port	<ol style="list-style-type: none"> <li>1. Leak at upper exhaust port o-ring (13)</li> <li>2. Shaft seal o-rings damaged or worn</li> <li>3. Inadequate slide lubrication</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace exhaust port (13)</li> <li>2. Replace shaft seal o-rings</li> <li>3. Replace with shuttle valve kit</li> </ol>
Flow rate is low	<ol style="list-style-type: none"> <li>1. Tubing or hose is damaged or blocked</li> <li>2. Check viscosity of medium being pumped</li>   <li>3. Check valves not seated correctly (6)</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean or replace</li> <li>2. Reduce viscosity of medium, increase hose diameter or contact factory for recommendation</li> <li>3. Reinstall check valves (6)</li> </ol>
Pump leaks	<ol style="list-style-type: none"> <li>1. Ruptured or worn out diaphragm (2)</li> <li>2. Pump housing screws not torque adequately</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace diaphragm (2)</li> <li>2. Torque screws to 20 in/lb.</li> </ol>

\*To remove material blockage, you must open the pump, clean out all dried ink and foreign particulate. After cleaning, examine air pressure, air and material lines, the diaphragm and other internal components. If components are OK, reassemble the pump and test. If these troubleshooting remedies and the others listed above do not correct the problem, the pump may be returned for evaluation (must obtain return authorization number first). **Failure to clean the pump prior to return will result in a cleaning and maintenance fee above and beyond any repair costs, and regardless of whether the repair is covered by warranty.**

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