MAGNETIC COUPLED SEAL-LESS PUMP
SERIES "C"

OPERATION AND
SERVICE GUIDE
O-920C
MAR. 1990

Refer to Parts List P-9200

SAFETY PRECAUTIONS
BEFORE STARTING PUMP

1. Read operating instructions and instructions supplied with chemicals to be used.
2. Refer to Chemical Resistance Data Chart in Serfilco Product Catalog for compatibility of materials in pump with solution to be used.
3. Note temperature and pressure limitations.
4. Personnel operating pump should always wear suitable protective clothing; face mask or goggles, apron and gloves.
5. All piping must be supported and aligned independently of the pump.
6. Always close valves slowly to avoid hydraulic shock.
7. Ensure that all fittings and connections are properly tightened.

BEFORE CHANGING APPLICATION OR PERFORMING MAINTENANCE

1. Wear protective clothing as described in item 4 above.
2. Flush pump thoroughly with a neutralizing solution to prevent possible harm to personnel.
3. Verify compatibility of materials as stated in item 2 above.
4. Shut off power to motor at disconnect switch.

IMPORTANT

1. The pump is constructed of Kynar (Polyvinylidene Fluoride) and all fasteners are stainless steel. Kynar or polypropylene may be chemically compatibile with the solution being pumped, but care should be taken to protect the pump components against unnecessary wear and physical abuse.
2. Record all model and serial numbers for future reference. Always specify model number and serial number when ordering parts.
3. Pump flow curves are based upon pumping water. Impeller is designed to provide maximum flow and pressure.
4. Maximum operating temperature is 212°F with a maximum static pressure of 50 PSIG.
5. Pump inlet piping should be one to two sizes larger than pump suction size for long suction lines operating near vaporization temperature and low atmospheric pressure (high elevation). Refer to Product Catalog for pipe fittings, etc. Be aware of the high rate of thermal expansion of plastic pipe when piping to a pump.
6. Review Parts List P-9200 and maintain an emergency inventory of replacement items to assure that pump is returned to service with the least delay.
7. When using the pump for recirculation use a syphon breaker to prevent solution loss due to malfunction.

PRE-START-UP

1. Install proper motor starter with overload protection if not included with pump and motor.
2. Wire motor for clockwise rotation when facing the pump suction. Check pump rotation only with liquid in the pump. If pump rotation is incorrect, the motor should be stopped and properly wired.
3. Install a strainer on the pump suction to prevent foreign material from entering the pump and possibly causing damage.
4. Do not over-tighten suction and discharge connections to the pump body. To prevent leakage at these points, it is suggested that TFE tape be used on threads rather than a pipe compound.
5. Check pump for friction-free rotation by turning motor fan blade with screwdriver or similar tool.

START-UP AND PRIMING

1. Do not operate pump when dry as liquid being pumped is necessary for lubrication.
2. If pump is installed with a suction head at the suction line, it will not be necessary to prime the pump. It is only necessary to make sure that liquid is in the suction line and pump body before energizing the motor.
3. If the pump is installed without a positive suction head, proper priming procedure should be followed. It is absolutely necessary that the suction line and pump be completely filled with liquid. If piped in place, liquid for priming may be introduced through the discharge line. If hose connected, liquid for priming may be introduced through the suction hose. Be sure that air is not trapped in the hose. Fill hose to over-filling, place hand over open end of hose and submerge into tank. Start motor. If a valve is used on the discharge line keep it closed until motor has been run momentarily. Open valve slowly eliminating all air in the line.

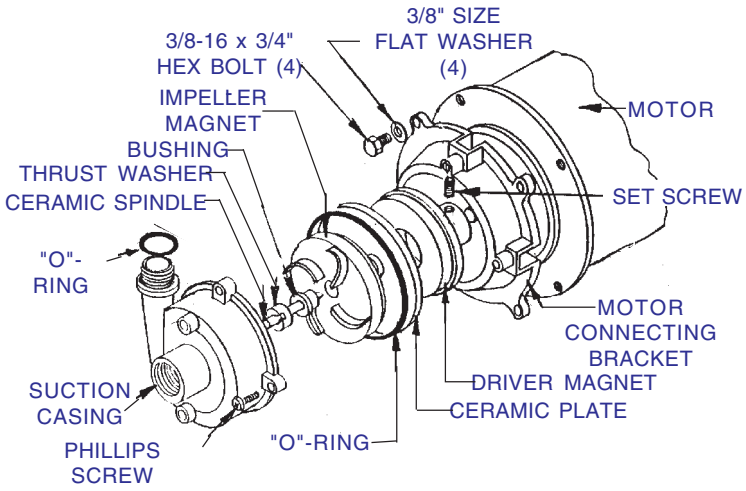
OPERATING TIPS

1. If pump remains idle, flush with water or neutral solution to avoid crystallization.
2. If pump is used on electroless plating solution, a metallic film may deposit on the internal surfaces. This reduces clearance, can affect pump performance and cause premature wear of pump body or impeller assembly. Periodically check and remove metal build-up by immersing parts in, or pumping a "stripping" agent. Be sure to check compatibility with the pump and "O" ring material.
3. Inspect impeller magnet and pump body for signs of wear. Excessive clearance between these items indicates replacement is required of either or both. An excessively worn body or impeller assembly can accelerate the wear of the other new component. Therefore, replacement of both items is recommended.
4. Place in stock, a spare "O" ring and impeller assembly to aviod shut-down for lack of a replacement part. Suction casing and motor could also be held in stock, depending upon the necessity of uninterrupted operation of the pump and system.
5. Install pump with hose, rather than pipe, to avoid stress on pump body and permit ease of inspection. Hose connections to rigid pipe can then complete the installation.
6. If motor fails to rotate when energized: Check for proper voltage, starter wiring, wedged impeller magnet or misalignment between pump body and drive magnet.

7. If motor rotates, but pump does not deliver flow (when primed properly), check for:
   a. Impeller in pump body.
   b. Solution specific gravity for impeller diameter. (Reduce impeller diameter).
   c. Loose connections in suction system to pump (tighten all clamps, fittings, etc.)
   d. Proper rotation is clockwise when facing pump.
   e. Check the ceramic plate for cracks.
8. IMPORTANT: An aqueous solution at 130°F, or higher will evaporate a considerable volume of water. The remaining solution will have a greater S.G. and therefore, can cause seperation of the impeller from the drive magnet, and zero flow rate will result. Correct by adding water or trimming impeller (see above).
9. Solution containing ferrous fines can cause accelerated pump wear due to their magnetic attraction to the impeller magnet.
10. Pump body may be installed in any one of three positions onto the mounting screws.

PUMP SERVICE

NOTE: All repairs or inspections performed on this pump must be done with pump removed from motor.



TO REPLACE SUCTION CASING:

1. Remove piping or hose from suction casing.
2. Remove the 4-3/8" hex head bolts holding the connecting bracket to the motor.
3. Pull pump assembly away from motor face.
4. Remove the 4 Philips head screws holding the suction casing, pull suction casing off pump.
5. Replace suction casing in reverse order of assembly making sure the spindle is sitting in the guide hole on the ceramic plate.

TO REPLACE "O" RING:

1. Same as above but remove "O" ring from groove in suction casing.

TO REPLACE CERAMIC SPINDLE:

1. Remove suction casing as described above.
2. Ceramic spindle can be removed by grasping end with a pair of pliers and pulling straight out.
3. Install ceramic thrust washer into recess in suction casing inlet.
4. Immerse suction casing in hot water for approximately 5 minutes to expand spindle hole. Lay suction casing on table with inlet down. Insert spindle, aligning flat on spindle with flat in "D" hole, tap spindle in place, until spindle is 1/32" higher than back of suction casing.
5. Reassemble suction casing.

TO REPLACE IMPELLER BUSHING OR IMPELLER:

1. Remove suction casing.
2. Remove impeller and take out bushing.
3. Press in new bushing using arbor or a smooth piece of plastic block on the flange and press in the bushing by hand. Bushing flange should be approximately 1/64" above surface of back vane.
4. Replace impeller and suction casing.

TO REPLACE MOTOR:

1. Remove all pump parts from motor. Disconnect electrical line to motor.
2. Set driver magnet clearance by laying a .015 thick shim on the back side of the ceramic disk.
3. Assemble drive magnet on motor shaft, do not tighten set screw, drive magnet should slide freely on motor shaft. Attach motor bracket to motor "C" face.
4. Slide impeller magnet on ceramic disk of the motor bracket, driver magnet will slide toward ceramic disk and .015 shim. Lock driver magnet on motor shaft and remove shim.

TO TRIM IMPELLER DIAMETER FOR SPECIFIC GRAVITY:

1. Remove impeller.
2. Reduce diameter of front impeller in lathe or with razor knife.
3. Be careful not to break through encapsulation of magnet. See flow curve on page 3 for impeller diameter vs. specific gravity. Replace impeller in pump.

diagram

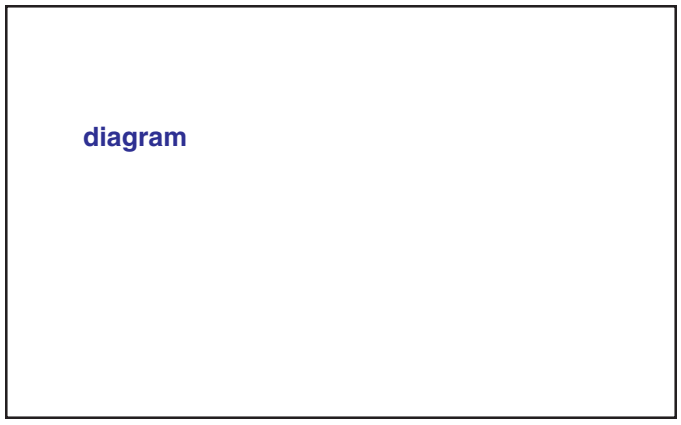
PUMPING HIGH DENSITY SOLUTIONS

The flow curve below shows flow rate and equivalent horse power required for Series "C" pump when pumping water (S.G. = 1.0) with less than full diameter impellers. This information allows determination of flow and horse power for solutions having a specific gravity greater than 1.0.

Note, maximum S.G. for a full diameter impeller (3-5/8") is 1.1. For higher specific gravity a 3-1/2 diameter impeller, or smaller, should be selected. This allows for consistent and immediate pumping without concern for slight variations in magnetic torque, solution density or inaccurate head-flow requirements. Also, for specific gravity up to 1.1 with a full impeller, the H.P. requirement must be checked to prevent motor overloading. If a trimmed impeller will give adequate flow, then this should be provided rather than a full diameter with 3/4 H.P. motor.

Example No. 1
Solution specific gravity is 1.1.
Flow requirement is 15 GPM @ 40' TDH.

The full diameter impeller will flow 15 GPM @ 41' TDH and H.P. requirement for water (S.G. = 1.0) is .44 H.P. Multiply water H.P. requirement by S.G. of solution to obtain required H.P. (.44 x 1.0 = .44 H.P. required). The 1/2 H.P. motor will therefore be adequate. Had the flow requirement been 25 GPM @ 30' TDH, .58 H.P. would have been required for a full diameter impeller (.5 H.P. x 1.1 = .55 H.P. required). However, if the 3-1/2" diameter impeller is selected then a .5 H.P. is adequate (.45 H.P. x 1.1 = .49 H.P. required).



Pressure-head relationship of identical pumps handling liquids of different specific gravities.

Example No. 2
Solution specific gravity is 1.6.
Flow requirement is 10 GPM @ 25' TDH.

Full diameter impeller would lose sychronization and would require a .6 H.P. if direct drive. However, if we select impeller No. 2 (2-3/4" dia), the 1/2 H.P. is adequate (.25 H.P. x 1.6 = .40 H.P. required).

Example No. 3
Solution specific gravity is 1.1.
Flow requirement is 25 GPM @ 33" TDH.
Full diameter impeller is the only size which will provide the required flow, but a 1/2 H.P. motor is inadequate (.50 x 1.1 = .55 H.P.). A 3/4 H.P. motor is required.

The TDH relationship does not change with specific gravity. Discharge pressure at the pump does change with S.G. This is an important point of clarification when sizing and recommending a pump.