



SERIES 'M' MAGNETIC-COUPLED PUMP

OPERATION AND
SERVICE GUIDE
O-187
JAN. 1997

MODELS	
1 x ¾ MPVCR	1½ x 1 MPVCR
1 x ¾ MKVCR	1½ x 1 MKVCR

Refer to Bulletin P-509 and
Parts List P-4080.

SAFETY PRECAUTION BEFORE STARTING PUMP

1. Read operating instructions and instructions supplied with chemicals to be used.
2. Refer to Chemical Resistance Data Chart for compatibility of materials 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. Shut off power to motor at disconnect switch.

ASSEMBLY

Unpack pump, drive magnet assembly and hardware package from carton and check for shipping damage.

PUMPS WITH MOTORS

Proceed to Installation Section.

PUMPS WITHOUT MOTORS (56C frame)

1. Remove pump, drive magnet assembly and hardware package from box.

CAUTION

Keep away from metallic particles, tools and electronics.

CAUTION

Drive magnets MUST be free of metal chips.

2. Slide drive magnet assembly (Item 8) onto the motor shaft until it is between 3-3/32" (3.094) and 3-7/64" (3.109) as measured from the motor face to the top of the drive magnet assembly. See Figure 1. Align set screws (Item 13) with flat or key slot on the motor shaft and tighten set screws with a 1/8" Allen wrench to 70 in.-lbs.

CAUTION

Do not operate/test the motor with the drive magnet assembly exposed.

WARNING

Magnets are strong. To avoid damage and pinching fingers, tightly grasp pump assembly keeping finger tips away from the area where the motor adapter and motor meet.

3. Carefully slide the pump assembly over the drive magnet assembly. Orient the discharge port to either the 12 or 9 o'clock position. Make sure rabbet (step) on motor is fully seated into the motor adapter (Item 9). Align bolt holes in motor adapter and motor. Install (4) -3/8" bolts and washers (items 14 & 15) from hardware package.
4. Manually rotate pump assembly to ensure that the pump is not binding or rubbing on the drive magnet assembly.
5. Install pump into the system according to installation instructions.

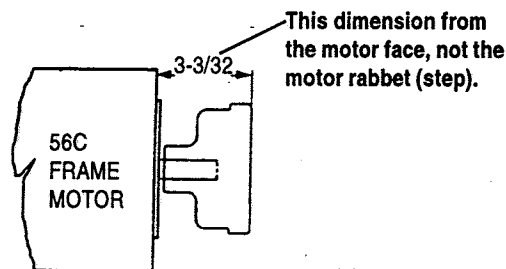


FIGURE 1

PUMPS WITHOUT MOTORS (71/B14 & 80/B14 frame)

1. Remove pump, drive magnet assembly and hardware package from box.

CAUTION

Keep away from metallic particles, tools and electronics.

2. Remove screws and washers (Items 10 & 11) from impeller housing (Item 1) and remove pump assembly from motor adapter (Item 9).
3. Install motor adapter onto motor (labels at top) and secure with motor bolts and washer (Items 14 & 15) from hardware package. Refer to Figure 2.
4. Slide drive magnet assembly (Item 8) onto the motor shaft until it is recessed 1.588 mm [1/16" (.0625") + or -.005"] below the surface of the face of the motor adapter (place a straight edge across the face of the motor adapter to make measurements easier). See Figure 2.

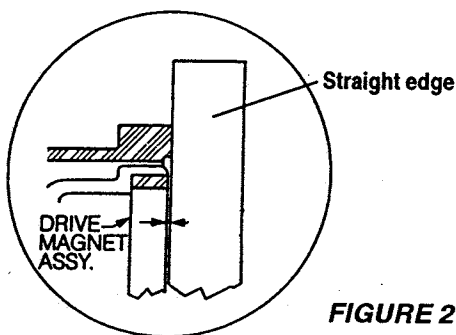


FIGURE 2

Align set screws (Item 13) with flat or key slot on motor shaft and tighten set screws with a 1/8" Allen wrench to 7.9 N/m (70 in-lbs.).

CAUTION
Do not operate/test the motor with the drive magnet assembly exposed.

CAUTION
Drive magnets **MUST** be free of metal chips.

NOTE: Prior to start-up, double check 2 set screws to assure that they are firmly tightened. Failure to do so could result in internal damage. Rotate to assure clearance with the motor adapter.

WARNING
Magnets are strong. To avoid damage and pinching fingers, tightly grasp pump assembly keeping finger tips away from the area where the housing and motor adapter meet.

5. Place impeller assembly (comprised of Items 3 & 4) in barrier (Item 7). Grasping the barrier at opposite bolt tabs, carefully lower the barrier assembly into the motor adapter/drive assembly. Line up the tabs of the barrier between the tabs on the motor adapter to avoid pinching fingers. Once seated, rotate the barrier until bolt hoses line up.
6. Install the "O"-ring (Item 6) on the barrier. Lubricate the "O"-ring with a compatible lubricant if necessary to facilitate "O"-ring installation.
7. Place the impeller housing (Item 1) on the barrier being careful not to dislodge the "O"-ring.
8. Align mounting holes and install 6 mounting screws and washer (Items 10 & 11) from hardware package. Hand tighten screws using pattern shown in Figure 3.
9. Install pump into the system according to installation instructions.

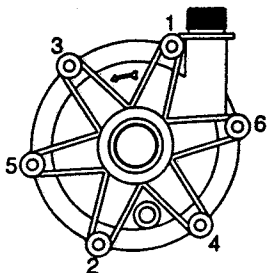


FIGURE 3

INSTALLATION

MOUNTING

Motor should be securely fastened.

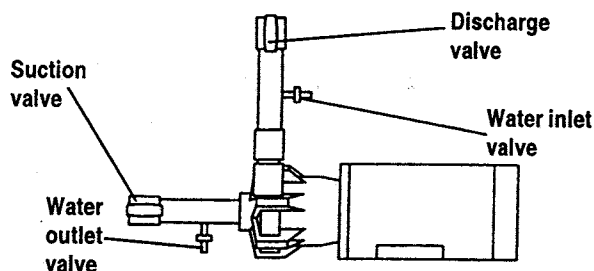


FIGURE 4

PIPING

1. Support piping near the pump to eliminate any strain on the pump casings.
2. To minimize head loss from friction:
 - a. Increase pipe size by 1 diameter.
 - b. Use minimal number of pipe bends.
3. Keep bends and valves a minimum of 10 pipe diameters from the suction and discharge.
4. Position pump as close to the liquid source as possible.
5. Maintain a flooded suction (liquid above pump prior to being primed).
6. Ensure that the piping does not leak and suction is not prone to clogging.
7. If flexible hose is preferred, use a reinforced hose rated for the proper temperature and pressure. This helps avoid collapse or kinks.
8. Install valves on suction and discharge lines (a minimum of 10 pipe diameters from the pump).
9. For units in a suction lift system, install appropriate piping in the discharge to allow priming of the pump.
10. The suction valve should be completely open to avoid restricting suction flow.

CAUTION
To stop the pump if prime is lost, use one of the following: (1) pressure switch on the discharge, (2) vacuum switch on the suction, (3) a motor minder to monitor motor current.

11. When pumping liquids that may solidify or crystallize, a flush system should be added to the piping. See Figure 4. Install water inlet and outlet valves as shown.

NOTE: This pump is provided with a provision for a customer installed 1/4" NPT drain in the impeller housing. See drain installation section for details.

ELECTRICAL

Install motor according to NEC requirements and local electrical codes. Motor should have an overload protection circuit.

CAUTION
Before starting, jog motor to determine correct rotation. Refer to directional arrow on pump (CCW as viewed through suction port).

NOTE: A pump running backwards will pump but at a greatly reduced flow and pressure.

OPERATION

FLOODED SUCTION SYSTEM

1. Completely open suction and discharge valves.
2. Start the pump and check liquid flow. If there is no flow, see the troubleshooting section.
3. Adjust the flow rate and pressure by regulating the discharge valve. Do not attempt to adjust the flow with the suction valve.

SUCTION LIFT SYSTEM

1. Prime the system by filling the priming chamber and/or suction line with a liquid. Allow time for trapped air to work its way out.
2. If priming via filling the suction line, close the discharge valve prior to returning the suction line to the tank.

FLUSH SYSTEMS

CAUTION

Some liquids react with water.

1. Completely close suction and discharge valves.
2. Connect water supply to water inlet valve.
3. Connect drain hose to water valve.
4. Open inlet and outlet valves. Flush system until pump is clean (approximately 5 minutes).

MAINTENANCE

DISASSEMBLY

1. Disconnect power. Remove electrical wiring and motor mounting bolts.
2. Close suction and discharge valves. Disconnect piping.
3. Remove the 6 screws from the impeller housing.
4. Securely hold or clamp motor in place. Remove the impeller housing from the barrier and pull out the impeller assembly. Remove the barrier and "O"-ring.
5. Remove the drive magnet assembly, if necessary, to change the motor. Insert an 1/8" hex wrench into the access hole on the top of the motor adapter and loosen the 2 set screws. Remove the drive magnet assembly from the motor shaft.

CAUTION

Keep the drive magnet and impeller assemblies away from metal chips or particles.

EXAMINATION

1. Check impeller drive bushing (Item 5), thrust ring, ceramic thrust ring and shaft for cracks, chips, scoring or excess wear. See Figure 5. Replace as required.
2. Check for loose magnets on drive assembly or rubbed areas on impeller or barrier assemblies. Contact your distributor if a problem is found.
3. If you did not remove the drive magnet assembly, check the set screws for tightness before reassembly.

BUSHING REPLACEMENT

1. To remove the bushing, insert 1/16" pin punch into balance hole (inner circle of 4 holes) of impeller assembly (Items 3 & 4). Gently tap the bushing out of the back of the impeller assembly. The punch may need to be moved to a different hole if the bushing is difficult to remove.
2. To replace the bushing, clean the impeller bore. Insert the new bushing into the back of the impeller assembly by aligning the bushing with the impeller bore. Press gently until the bushing bottoms out (use a block of wood and mallet if necessary).

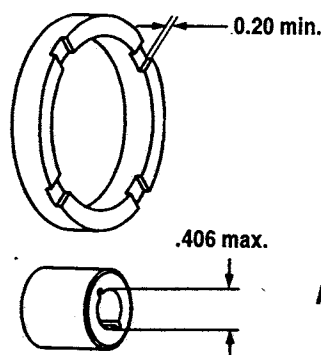


FIGURE 5

REASSEMBLY

1. Place impeller assembly (comprised of Items 3 & 4) in barrier (Item 7). Grasping the barrier at opposite bolt tabs, carefully lower the barrier assembly into the motor adapter/drive assembly. Line up the tabs of the barrier between the tabs on the motor adapter to avoid pinching fingers. Once seated, rotate the barrier until bolt holes line up.
2. Install the "O"-ring (Item 6) on the barrier. Lubricate the "O"-ring with a compatible lubricant if necessary to facilitate "O"-ring installation.
3. Place the impeller housing (Item 1) on the barrier being careful not to dislodge the "O"-ring.
4. Align mounting holes and install 6 mounting screws and washers (Items 10 & 11) from hardware package. Hand tighten screws using pattern shown in Figure 3.

NOTE: Plastic pumps will expand and contract with temperature so periodically check and hand tighten screws. This pump is designed to accept an "O"-ring on the discharge flange and inlet chamfer as a back-up to the NPT or BSP threads to ensure leak-free operation after temperature cycling.

OPTIONAL DRAIN INSTALLATION SECTION

1. Remove the impeller housing from the pump assembly.
2. Clamp the impeller housing to a drill press table.
3. Using a 7/16" drill and the molded boss as a guide, drill completely through the molded boss into the interior of the impeller housing. Deburr the hole on the inside of the impeller housing. See Figure 6.



FIGURE 6

Drain fitting molded boss.
Use as a guide for drilling and
tapping 1/4" NPT.

CAUTION

Do not tap too deep or the impeller housing may be damaged.

4. Using a 1/4" NPT tap, tap the hole in the molded boss to the appropriate depth.
5. Install drain plug or valve, being careful not to overtighten.

TROUBLESHOOTING

GENERAL NOTES:

1. Do not pump liquids containing metal fines.
2. Orient the discharge port to either 12 or 9 o'clock position.
3. If magnets decouple, stop the pump immediately. The rare earth magnets used in this pump are more resistant to de-magnetization than ceramic magnets, but operating the pump with the magnets decoupled will eventually weaken the magnets.
4. Plastic pumps will expand and contract with temperature so periodically check and hand-tighten screws. This pump is designed to accept an "O"-ring on the discharge flange and inlet chamber as a backup to the NPT or BSP threads to ensure leak-free operation after temperature cycling.
5. Fitting "O"-rings on discharge flange and inlet chamfer is possible.

NO DISCHARGE

1. Air leaks in suction piping.
2. Pump not primed.
3. Discharge head too high.
4. Suction lift too high or insufficient NPSHA. Suction lift should be 2 feet above NPSHR.
5. Closed valve.
6. Viscosity or specific gravity too high (magnets uncoupled).

INSUFFICIENT DISCHARGE

1. Air leaks in suction piping.
2. Discharge head higher than anticipated.
3. Suction lift too high or insufficient NPSHA. Suction lift should be 2 feet above NPSHR.
4. Clogged suction line, foot valve or crimp in hose.
5. Foot valve too small.
6. Foot valve or suction opening not submerged enough.
7. Incorrect pump rotation.

INSUFFICIENT PRESSURE

1. Air or gasses in liquid.
2. Impeller diameter too small.
3. Discharge head higher than anticipated.
4. Incorrect pump rotation.

LOSS OF PRIME

1. Leaking suction or discharge line.
2. Suction lift too high or insufficient NPSHA. Should be 2 feet above NPSHR.
3. Air or gasses in liquid.
4. Foreign matter in impeller.
5. Leaking valve.

EXCESSIVE POWER CONSUMPTION

1. System head lower than rating. Pumps too much liquid.
2. Specific gravity or viscosity of liquid pumped is too high or higher than that defined in application.
3. Binding pump parts.

VIBRATION/NOISE

1. Excess bearing wear.
2. Drive magnet uncoupled.
3. Loose magnet.
4. Pump cavitating.
5. Motor or piping not properly secured.
6. Foreign object in impeller.



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