

PROMAG “M” SERIES SEAL-LESS CENTRIFUGAL PUMPS

INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS

TO OBTAIN THE BEST PERFORMANCE FROM YOUR PROMAG “M” PUMP,
PLEASE READ THE MANUAL CAREFULLY.

Failure to follow the recommended procedures may result in early and severe damage to your PROMAG pump, and may also invalidate the warranty.

Thank you for your purchase of a PROMAG “M” Series centrifugal pump. Proper installation and maintenance will provide many years of trouble free operation.

INSTALLATION:

1) LOCATION: Locate the pump close to the liquid source.

2) PRIMING: The “M” pump inherently is not a self-priming pump. If one tends to operate the “M” unit as a self-priming unit ***CONSULT THE FACTORY!***

3) SYSTEM PIPING:

a) The nominal diameters of the pump ports shall not be taken as reference for piping size selection. The pipe diameter shall be selected according to the involved capacity and associated frictional losses. The inlet pipe should be no smaller in diameter than the nominal size of the pump inlet port. As a general rule the maximum fluid velocities are as follows: 5 ft/s for the suction line and 7 ft/s for the discharge line.

NOTE: Restrictions of the suction piping system may cause cavitation, leading to a loss of efficiency and rapid wear.

b) Any possibility of an air pocket (*piping “U” bend, concentric reducers etc.*) or air entering the suction line must be avoided.

c) All piping must be connected to the pump without the use of force. All piping system should be properly supported (*free standing.*) Additionally, flexible pipe connections should be installed if thermal cycling is possible (*e.g. outdoor installations*) to prevent pipe stress.

d) The suction and discharge piping must be cleaned of any foreign object and flushed before the connections are finalized.

e) Mounted pipelines must be checked to insure proper sealing, particularly on the suction pipe

f) Keep the suction pipe as short and straight as possible.

g) Use rigid or reinforced pipe that will not deform or collapse under suction conditions.

h) Gate or check valves should be installed near the pump discharge if there is the possibility of water hammer when the pump is shut down.

i) A pressure relief regulating valve with by-pass (*or Lineman power sensing relay*) are recommended if excessive discharge pressure is probable.

j) A pressure gauge with gauge guard is recommended (*near the pump discharge port*) for monitoring system parameters.

NOTE: Dead-head operation will damage pump and over-load drive.

OPERATIONS:

Two conditions should be avoided:

DO NOT RUN THE PUMP WITHOUT FLUID!

DO NOT DEAD-HEAD THE PUMP!

1) Fill the pump body with liquid before starting the unit. If the pump has a flooded suction, open the suction valve. If the unit is priming, pump should be filled through the top port.

NOTE: If the fluid is extremely hot or cold, the pump should be gradually brought to rating temperature before the fluid is introduced to prevent possible thermal shock damage.

2) Consult the **MOTOR OPERATION AND MAINTENANCE INSTRUCTIONS** for wiring, and additional information.

3) When the pump is ready to run, bump start the motor to check rotation and configuration. (*see Figure 1.*) Operating the pump in reverse rotation will result in reduced performance, and will damage the pump.

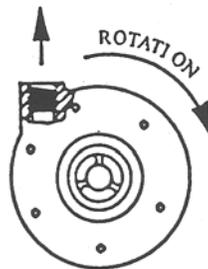


Figure 1: Direction and Port Location

Check the **MOTOR OPERATION AND MAINTENANCE INSTRUCTIONS** if rotation is not as indicated.

MONITORING:

Flow metering or power sensing relays are strongly recommended to prevent unsuitable operating conditions (*i.e. dead-heading, dry-running, cavitation, etc.*) Current amp sensors are not advisable. Consult with your local sales representative of PROMAG pump division for appropriate minimum and maximum flow limits for a specific pump model. Maximum flow settings often are contingent upon the NPSH available from the system.

ESSENTIAL RUNNING PRECAUTIONS:

A) DO NOT RUN THE PUMP DRY!

The process fluid acts as the lubricating and cooling agent. Without fluid in the pump, frictional forces generates heat which may damage the pump.

B) DO NOT DEAD-HEAD THE PUMP!

In general, the inlet and discharge lines should not be restricted any more than necessary.

Restricting the suction line may lead to cavitation, or if completely obstructed (*dead-head*), the fluid will not cool or lubricate the bearings properly. Consult the factory for minimum flow requirements.

C) DO NOT PUMP FLUIDS WITH FERRO-MAGNETIC PARTICLES:

Magnetic particles will collect on the internal magnet - regardless of size. Consult the factory for guidance when handling magnetic solids of particulates.

D) PUMP FLUIDS THAT ARE CLEAN:

Mag-drive pumps are designed to handle clean liquids. If particles are present, a 50 to 100 micron suction strainer is recommended. If the concentration of solids might plug strainer, make sure that the suction fluid is not impeded. Consult factory for assistance.

E) FLOW BY-PASS LINES:

The “M” series centrifugal pump may be throttled to the desired duty point ONLY if that point is on the pump curve. Throttling will reduce the power required by the pump, and will reduce the NPSH. In certain cases the pump must be operated at the desired duty point using throttling. If desired flow rate cannot be achieved by throttling, the pump should have a by-pass line. The by-pass line should have a fluid velocity of 7 ft/s. An illustration of what this should look like is shown in **Figure 2**.

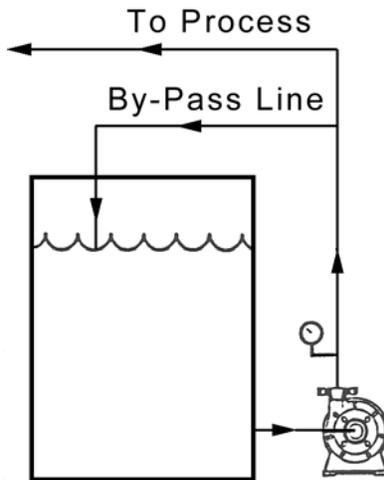


Figure 2: By-pass Configuration

F) FLUSHING THE PUMP:

The pump should be flushed with water (or fluid compatible with the pump materials) to remove deposits from drying or precipitation. Deposits may form if the unit is down for an extended period of time, or if the pump is cooled to the point where crystals form. The pump does not need to be operating while being flushed. If the pump is to be flushed while in operation, the volume of water should be adequate for the particular unit (operational pump flow is 20 GPM max., it should be flushed with a minimum of 10 GPM of liquid.)

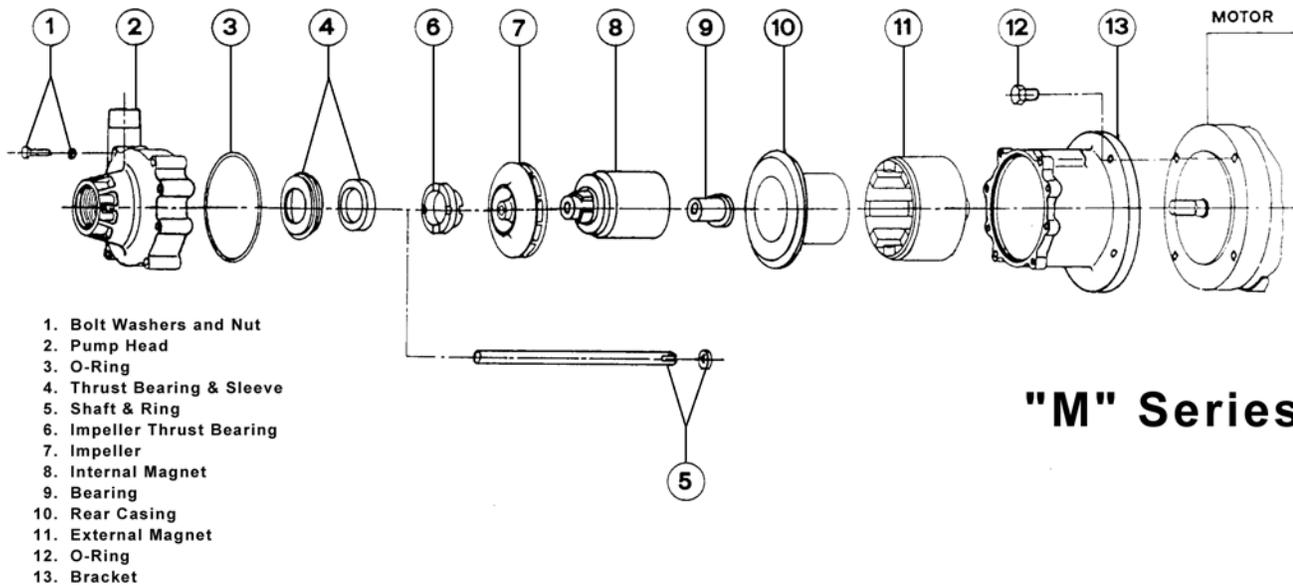
MAINTENANCE:

In general, the PROMAG “M” series pump does not require routine maintenance, and therefore does not need to be dismantled frequently. However, it is advisable to check the impeller and bearings once every year (during a scheduled shut down.)

DISMANTLING THE PUMP:

The motor and bracket are withdrawn from the pump end (this allows the piping system to remain intact on intact on the volute.)

EXPLODED VIEW:



INSTRUCTIONS:

- 1) Shut off the power to the motor before disconnecting the leads.
- 2) Drain the fluid from the system, and the pump, then isolate the unit. It may be necessary to blow down the pump to insure complete drainage. The pump may be flushed with water (*or compatible liquid*) to avoid deposit formation.
- 3) Remove the bolts (1) that secure the pump head (2) to the bracket (13).
- 4) Remove the motor from the bracket (13) by loosening the bolts that secure the motor to the foundation.
- 5) Carefully guide the bracket away from the pump head. Do not angle or use a side-to-side motion to remove the bracket from the pump, as this may damage the pump. At this point the pump internals should be retained in the bracket housing. It is advisable to have an operator stand-by to assure that the internals do not drop out on to the foundation.

NOTE: THE POSITION OF THESE PARTS, Especially the placement of the small Ceramic ring in the rear casing.

CAUTION: MAGNETS CAN PRODUCE STRONG MECHANICAL FORCES
WHEN THEY ARE CLOSE TOGETHER!

- 6) Examine the shaft, (5), bearings (4,5,6,9), rear casing (10) and the impeller (7) for signs of wear. Also check for minimal play. Examine the O-ring (3).

REASSEMBLING THE PUMP:

To reassemble the pump, simply reverse the order above according to the procedure. Once again it must be stated that care should be taken when the internal (8) and external (11) magnets are brought together.

SPECIAL MAINTENANCE PROCEDURES:

Occasionally parts only require replacement, and this section will demonstrate the proper procedures to follow. Remember, these are to replace worn or broken parts, not to perform for practice.

SLEEVE BEARING REPLACEMENT:

1) Remove the bearings (9) from the internal magnet (8) by pressing the bearing out of the magnet from impeller end of magnet. The M8.0 has two additional sleeve bearings, one in the pump head (2) and the other in the rear casing (10). These bearings should only be removed if they need to be replaced as they must be pried out and will be destroyed. Use caution to avoid damaging the bearing seats.

2) Insert the new bearings squarely into the pump head, rear casing and internal magnet as required. Do not use a side-to-side or twisting motion to insert the bearings. If an arbor press is to be used, be sure to pad the bearing to avoid breakage .

SHAFT REPLACEMENT:

Insert the new shaft and ring (5) in the rear casing, aligning locating flats. The shaft for these pumps will bottom-out when it is fully inserted. There is only one shaft supplied for this design

IMPELLER MAGNET REPLACEMENT:

1) Pull impeller (7) from internal magnet (8). If impeller does not pull off, insert the boxed end of two wrenches between the impeller and the internal magnet. These ends should be cushioned so as not to deform the impeller or the internal magnet. Apply force on the wrenches against the impeller to pop the impeller from the internal magnet. Placing the assembly on a raised surface may provide additional leverage (*see figure 4*).

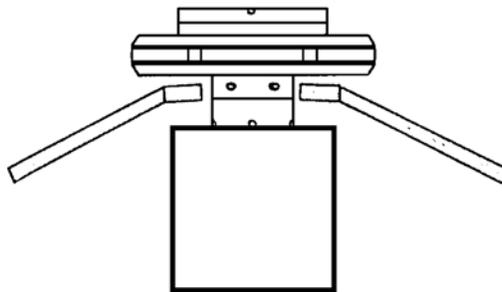


Figure 4: Impeller Removal Example

2) To assemble, snap impeller (7) on internal magnet (8) with impeller thrust bearing (6) facing away from magnet.

THRUST BEARING REPLACEMENT :

Two front thrust bearings (4,6) are found in every PROMAG centrifugal pump. One is located on the impeller (7), and the other is on the pump head (12). Most often the bearing in the impeller will need changing, while the ceramic one in the pump head lasts for the life of the pump.

Impeller Front Thrust Bearing Replacement :

1) Insert a flat head screwdriver into the side of the bearing, and lift off.

2) The new bearing may be pressed in by hand, noting the position of the guide notches.

Pump Head Ceramic Front Thrust Bearing Replacement :

1) Insert a punch into the suction port of the pump. Gently tap the ceramic lip of the bearing evenly, so that the unit frees itself from the pump head. Note that there are two components that make up this bearing. If the bearing is cracked (*or broken*) carefully break the ceramic front thrust bearing apart, take care not to damage the shaft support in the pump head and

WEAR SAFETY GOGGLES.

2) Lubricate the exterior of the elastomer around the bearing with a material that is compatible with the process fluid. Also lubricate the slot where the bearing slides into the pump head or rear ring. Noting that the polished side faces out of the pump head, insert the bearing into the slot. If an arbor press is used, be sure to cushion the end contacting the Ceramic bearing.

PROMAG Pumps

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