

TECH-MAG™ “M” SERIES SEAL-LESS CENTRIFUGAL PUMPS

INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS

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

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

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

INSTALLATION:

1) LOCATION: Locate pump close to the liquid source with suction line as straight and short as possible.

2) PRIMING: The “M” Series pump is inherently not self-priming. If self-priming is required please **CONSULT THE FACTORY!**

3) SYSTEM PIPING:

a) The nominal diameters of the pump ports shall not be taken as indicating system piping size selection. The pipe diameter shall be selected according to the system capacity and related frictional losses. The inlet pipe should never be smaller in diameter than the size of the pump inlet port. As a general rule for fluid line velocities are as follows: approx 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 so must be avoided.

b) Any possibility of an air pocket (*pipng “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 (*such as outdoor installations*) that could lead to piping stress.

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

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 - declining to the pump is preferred.

g) Use rigid or reinforced suction 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 pump protection power sensing relay*) is 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 seriously damage pump.

OPERATIONS:

Two conditions must be avoided:

DO NOT RUN THE PUMP DRY 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 system 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 may cause damage to the pump.

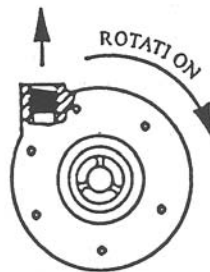


Figure 1: Direction and Port Location

Check the **MOTOR OPERATION AND MAINTENANCE INSTRUCTIONS** if rotation is not as indicated above in Fig 1.

MONITORING:

Flow metering or power sensing relays are recommended to prevent unsuitable operating conditions (*i.e. dead-heading, dry-running, cavitation, etc*). Current amp sensors are not advisable. Consult with your local TECH-MAG sales representative or factory for appropriate minimum and maximum flow limits for any specific pump model. Maximum flow settings may also vary depending 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 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 if that flow point is on the pump curve. Throttling will reduce the power required by the pump, and will reduce the NPSHr. In certain cases the pump must be operated at the desired duty point using throttling. If desired flow rate cannot be achieved by throttling, a flow by-pass line may be utilized. The by-pass line should have a fluid velocity of 7 ft/s. A typical by-pass illustration is shown in Fig. 2.

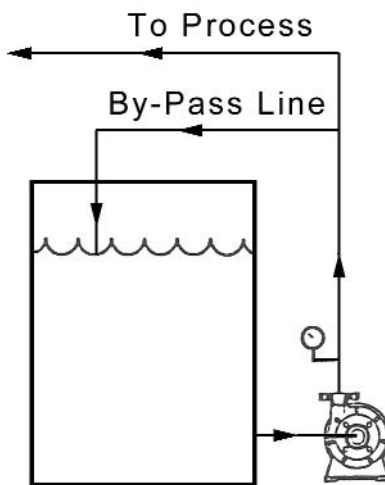


Figure 2: By-pass Configuration

F) FLUSHING THE PUMP:

The pump should be flushed with water (or fluid compatible with the pump materials) to prevent 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 need not be operating during flushing cycle. 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.)

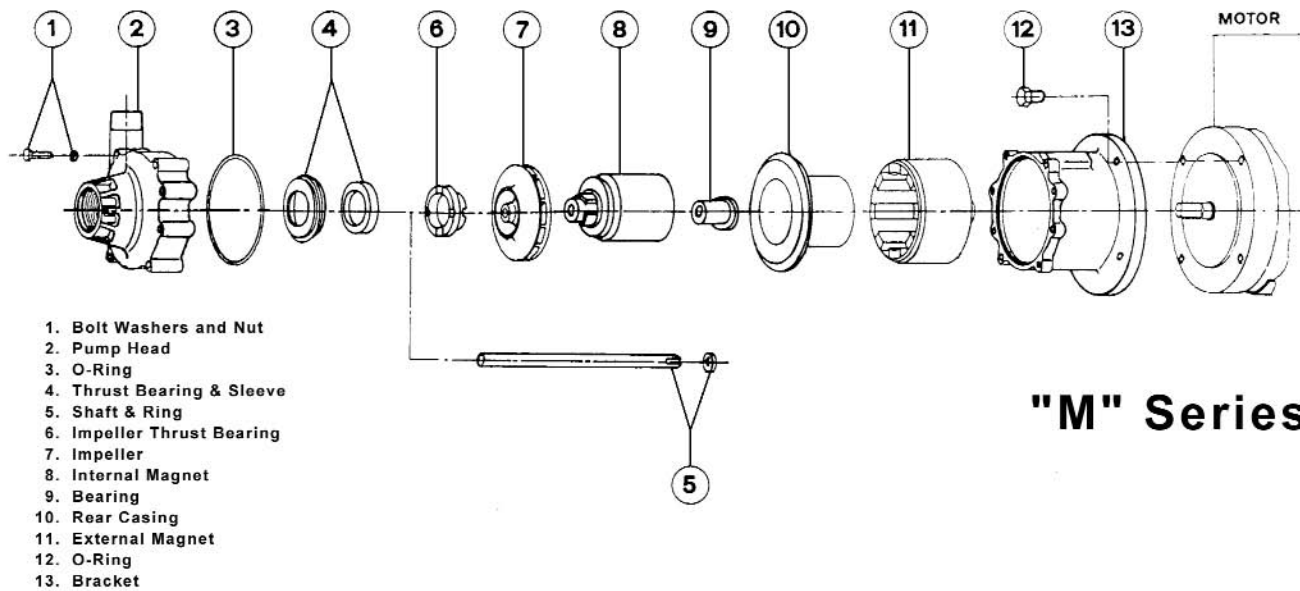
MAINTENANCE:

In general, the TECH-MAG “M” series pump requires no routine maintenance, and therefore requires no regular disassembly / inspection. However, it is advisable to check the impeller thrust and sleeve bearings on an annual basis for wear.

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 casing.)

EXPLODED VIEW:



INSTRUCTIONS:

- 1) Turn off power supply to the motor before disconnecting 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 (12) bolts that secure bracket to motor.
- 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 ATTRACTION FORCES WHEN THEY ARE IN CLOSE PROXIMITY TO EACH OTHER!

- 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 may require replacement. This section involves the proper procedures to follow.

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 pressed out and will likely be damaged or destroyed. Use caution to avoid damaging the internal magnet bearing seats.

2) Insert the new bearings squarely into the pump head, rear casing and internal magnet as required. Do not use 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 engaged. This design is equipped with a single shaft.

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 evenly on the wrenches against impeller to pop the impeller from the internal magnet. Placing the assembly on a raised surface may provide additional leverage (*see figure 4*).

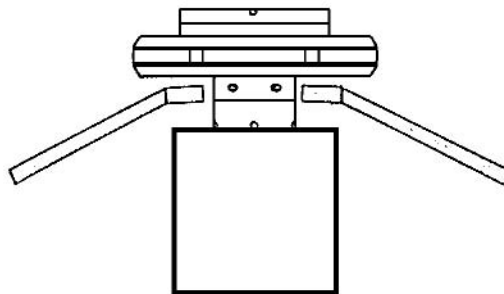


Figure 4: Impeller Removal Example

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 TECH-MAG 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. It may be removed by hand.
- 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.

OPERATING LIMITS

FLOW: All pumps may be operated at any point along the related published performance curves of each impeller diameter. The minimum flow required is indicated by the end of the curve left. The maximum flow is generally indicated by the end of the curve right. Adequate suction pressure or NPSHa to allow for operating at that point.

OPERATING PRESSURE: All polypro and PVDF pumps are rated for 110 PSI max system pressure at 70°F. The max pressure will decline with increased temperature. Contact your local area TECH-MAG distributor or factory for guidance with elevated temperature and higher working pressures.

TEMPERATURE: Polypropylene Pumps - 160°F continuous, 180°F intermittent
PVDF Pumps - 190°F continuous, 220°F intermittent

TECH-MAG pumps are designed for use with liquids of 1.8 S.G. and 45 cPs viscosity. For services beyond these limits contact your local area TECH-MAG distributor or the factory.

For More Information, Please contact:

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