# WMTA SERIES SEAL-LESS TURBINE PUMPS

**INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS**

**TO OBTAIN THE BEST PERFORMANCE FROM YOUR WARRENDER MTA, PLEASE READ THIS MANUAL CAREFULLY.**

**Failure to follow the recommended procedures may result in early and severe damage to your WARRENDER pump, and may also invalidate the guarantee.**

Thank you for your purchase of a WARRENDER MTA Series regenerative turbine 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 MTA pump will self-prime approximately 1 to 1.5 feet only if the pump head is primed *(pump filled)* with fluid, and if the pump ports are facing in the upright position.
*( Please Consult the Factory if the pump is expected to lift prime )*

**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 bore 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:** Restriction of the suction pipe work 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 entrance in the suction line must be avoided.
**c)** All piping must be connected to the pump without forcing. All pipe work should be properly supported *(free standing.)* Additionally, flexible pipe connections should be 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 objects and flushed before connections are finalized.
**e)** Mounted pipe lines must be checked to ensure 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 if there is any possible of water hammer when the pump is shut down.
**i)** A pressure relief regulator with by-pass *(or LINEMAN pump protector)* is recommended if excessive 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 the pump and over-load the drive.

## OPERATION:

Two conditions are critical when operating a mag-drive pump:

**DO NOT RUN THE PUMP WITHOUT FLUID IN THE PUMP!**
**DO NOT DEAD-HEAD THE PUMP!**

**1)** Fill the pump body with liquid before starting the unit. If pump has 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 operating temperature before the fluid is introduced to prevent possible thermal shock damage.

**2)** If the unit is long-coupled, the bearing frame housing should contain the proper oil at the proper level. The unit must also be properly aligned. Consult the **BEARING FRAME OPERATION AND MAINTENANCE INSTRUCTIONS** before proceeding.

**3)** Consult the **MOTOR OPERATION AND MAINTENANCE INSTRUCTIONS** for wiring, and other driver information.

**4)** When the pump is ready to run, bump start the motor to check rotation ***(see Figure 1)*** To change the suction and discharge ports, simply reverse motor rotation.

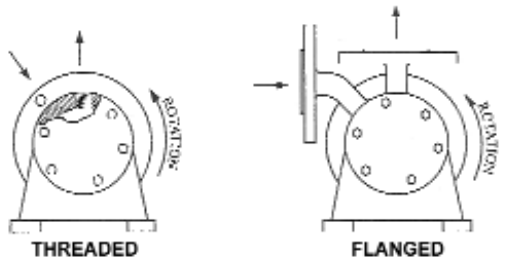


***Figure 1:*** Direction and Port Location

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 operation conditioned *(i.e. dead-heading, dry-running, cavitation, etc.)* Current amp sensors are not advisable. Consult with your local sales representative of Warrender 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 generate 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 blocked, a dry run. Restricting the discharge pipe may overload the motor *(a turbine pump requires more power with increasing head.)* If completely obstructed *(dead-head)*, the fluid will not cool or lubricate the bearings properly. Consult the factory on minimum flow.

**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 or fines.

**D) PUMP FLUIDS THAT ARE CLEAN**
Mag drive pumps are designed to handle clean liquids. If particulates 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 flow is not impeded. Consult factory for assistance.

**E) FLOW BY-PASS LINES:**
Throttling a regenerative turbine pump is not the best way to control fluid flow. Throttling may induce unnecessary head, which may in turn overload the monitor. Turbine pumps have a minimum flow requirements. Applications that require throttling must be checked by the factory. The best way to control the flow of a turbine pump is to run a by-pass line. The by-pass line should run from the discharge of the pump preferably back to the supply tank *(although return to suction may be used.)* Line fluid velocity of 7 ft/s is indicated ***(see also Figure 2.)***

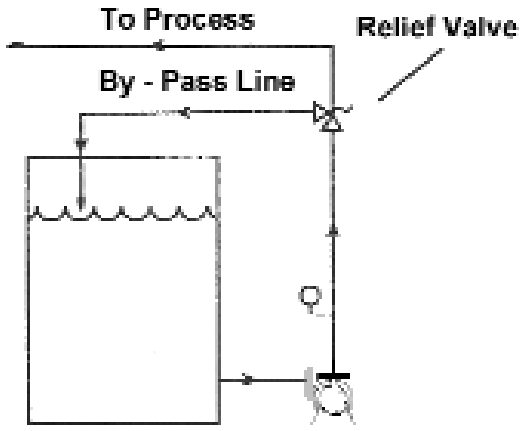


***Figure 2:*** By-pass Configuration

**F) FLUSHING THE PUMP:**
The pump should be flushed with water *(or other 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. If the pump is to be flushed while in operation, the volume of water should be adequate for the particular unit *(if the operational pump flow is 10 GPM , it should be flushed with 10 GPM of water.)*

## MAINTENANCE:

In general, the WARRENDER MTA 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 *(shut down periods are best for this.)*

**DISMANTLING THE PUMP:**
The pump may be dismantled in two ways:

**a)** The pipe work is disconnected from the pump, and the pump end is removed *(this allows the motor and bracket to remain.)*

**b)** The motor and bracket are withdrawn from the pump end *(this allows the pipe work to remain intact on the volute.)*

**NOTE:** For pumps equipped with silicon carbide shaft and bearings, special care must be taken so as to avoid breakage. Procedure b is recommended when sic parts are present.

**MTA INSTRUCTIONS:**

**1)** Shut off power 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 fluid)* to avoid deposit formation.
**3)** Remove bolts securing the pump head to the bracket.

**The next steps are to be followed if procedure "a" is chosen.**

**4)** Remove the pump head from bracket.

**NOTE:** THE POSITION OF THESE PARTS, in particular the fashion in which the end cover, pump body, and rear ring are assembled *(there is a guide pin.)*

**5)** Carefully guide the pump internals from the bracket. With gloves, pull the internals of the pump out by grasping, and pulling the impeller. The gloves are required in case the unit should slip: the impeller is sharp. MTA 49 single and dual Cobalt Samarium pumps, and larger may require a wedge to facilitate removal of the internals (see figure 3 on page 5). The wedge is used to avoid pinching fingers between the rear ring and the bracket. Using the wedge to increase the gap between the rear ring and bracket,have another operator assist in the removal by grasping the rear ring and remove the internals. If the rear casing needs to be removed, do so now by grasping the shaft and pulling straight out.

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

**6)** Examine the shaft, bearings, and impeller for signs of wear, and also check for minimal play. Examine the O-ring. If particles have entered the pump, check the impeller mating surface of the pump head and rear ring for wear.

**The next steps are to be followed if procedure "b" is chosen:**

**4)** Remove the motor from the bracket. With smaller pumps (25 & 37), the motor and attached bracket may be removed from the pump, since the bracket is not the mounting device. For units that are mounted with the bracket, loosen the bolts that secure the bracket to the foundation.

**5)** Carefully guide the bracket, or bracket motor assembly, away for the pump head. Do not angle or use 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. It is advisable to ware gloves when handling the impeller magnet assembly, the impeller edges are sharp.

**NOTE:** THE POSITION OF THESE PARTS, in particular how the pump head and rear ring are assembled *(there is a guide pin.)*

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

**6)** Carefully examine the shaft, bearings and impeller for signs of wear. Also check for minimal play. Examine the O-rings.

**REASSEMBLING THE PUMP:**
To reassemble the pump, simply reverse the order above according to procedure “a” or “b”. Once again it must be stated that care should be taken when the internal and external magnets are brought together. For larger MTA pumps (MTA49 and above), the use of a wedge may be advised. The wedge (shown in figure 3) allows for slow guided insertion of the pump internals into the bracket. Gloves are advisable while grasping the impeller.

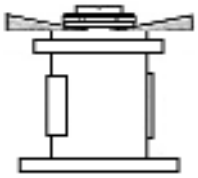

***Figure 3:*** Wedge Sample

## SPECIAL MAINTENANCE PROCEDURES:

Occasionally parts will require replacement, and this section will demonstrate the proper procedures to follow. Remember, these are to replace worn or broken parts, not to be performed for practice. If your pump is equipped with Silicon Carbide shaft bearings, please see the MTA SILICON CARBIDE BEARING SUPPLEMENT for proper procedures, and disregard the procedures below.

**SLEEVE BEARING REPLACEMENT:**
**1)** Remove the impeller (see impeller replacement section).

**2)** Remove old bearings.

**3)** Remove the stationary bearing located in the rear casing (to accomplish this, the shaft must be removed first-See shaft replacement section). To remove this bearing, insert a large, slightly oversized flat head screwdriver into the bearing. Push screwdriver into the bearing until it bites into the bearing material. Twist and pull bearing loose.

**4)** Insert stationary bearing into rear casing using an arbor press.

**5)** Insert the first bearing squarely into the internal magnet end. Do not use a side-to-side or twisting motion, as this may damage the bearing. If the bearing does not slide in easily, the internal magnet may be heated. Heat the internal magnet in hot water - DO NOT USE A TORCH TO HEAT MAGNET DIRECTLY!

**6)** Repeat this procedure for the second bearing to be inserted into the impeller end.

**THRUST BEARING REPLACEMENT:**
**1)** Remove and save the screws (2) from the front thrust bearing (located on end cover.)
Pull thrust bearing from end cover.

**2)** To assemble, press the thrust bearing into place by hand, noting screw hole positions.

**3)** Insert the screws (2) into the bearing and tighten. Note that the screws should bottom out such that they are recessed in the bearing. Do not over tighten to avoid bearing damage.

## REAR THRUST BEARING

**1)** Remove impeller (See impeller replacement section)

**2)** Remove and save the screws (2) from the rear thrust bearing (located on rear ring.) Pull thrust bearing from rear ring.

**3)** To assemble, press the thrust bearing into place by hand, noting screw hole positions.
**Note:** MTA 25 only - the re-circulation holes must be properly aligned with mated hole on the rear ring.

**4)** Insert the screws (2) into the bearing, and tighten. Note the screws should bottom out such that they are recessed in the bearing. ***Do not over tighten screws*** to avoid thrust bearing damage.

## SHAFT REPLACEMENT:

**1)** Cushion the shaft with fiber reinforced gasket material.
**Note:** Regular gasket material may twist out of the vise.
**2)** Place cushioned shaft in to vise, tighten vise, and twist/pull shaft out. If the shaft has shattered (Ceramic), and is not long enough to pull into the vise, pull shaft out with channel locks or pliers. If the shaft is to short for pliers, it must be broken out. If this last option is tried be careful not to damage the rear casing - and WEAR SAFETY GOGGLES.

**3)** Insert the new shaft into the bearing in the rear casing. When positioning rear casing and shaft, cushion the shaft end. The shaft for these pumps will bottom-out when it is fully inserted. Only one shaft is supplied for this pump design.
Note: If Ceramic shaft is used, remember that material is brittle. Exercise caution when using the arbor press bearings so as not to over compress (and break the shaft)

## IMPELLER REPLACEMENT:

**1)** Remove retaining screws (4) from the impeller-magnet assembly. Note position of impeller on internal magnet. If the sleeve bearings are to be replaced, remove rear ring at this time.

**2)** To assemble, put rear ring on the internal magnet if removed. Rear thrust bearing should face towards the back of the impeller.

**3)** Place the impeller on with the recessed end towards the internal magnet. Be sure to align the impeller so that it slides over the guide pins ( if guide pins are found.) If it appears that the impeller will not slide pin/screw impeller configuration.)

**4)** Screw in all retaining screws (4.) All screws should be recessed into the impeller. Using a small punch, lightly tap the dimples on the impeller to lock the screws in place.