TECH-MAG

Installation, Operation, Maintenance & Safety Instruction for

TA - Series Pumps

Sealless Mag-Drive Regen Turbine Pumps

This manual presents installation, servicing, troubleshooting and maintenance for the TECH-MAG TA Series pumps.
Information that may be required regarding performance, alterations or detailed technical data which is not included here may be obtained from your TECH-MAG PUMPS representative.

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1. SAFETY

Installation, Operation and Maintenance must be done by thoroughly qualified personnel in strict accordance with this manual and must comply with all local, state and federal codes. For your protection and the protection of others, learn and always follow the safety rules outlined in this booklet. Observe warning signs on machines and act accordingly. Form safe working habits by reading the rules and abiding by them. Keep this booklet handy and review it from time to time to refresh your understanding of the rules.

DANGER

The use of the word "Danger" always signifies an immediate hazard with a high likelihood of severe personnel injury or death if instructions, including recommended precautions, are not followed.

WARNING

The use of word "Warning" signifies the presence of hazard or unsafe practices which could result in severe personal injury or death if instructions, including recommended precautions, are not followed.

CAUTION

The use of the word "Caution" signifies possible hazards or unsafe practices which could result in minor injury, product or property damage if instructions, and recommended precautions are not followed.

MAGNETIC

WMDAT pumps are magnetic driven. The use of the word "Magnetic" indicates the presence of a powerful magnetic field. Such fields present immediate danger to individuals having electronic medical devices, metallic heart valves, metallic prosthetics or metallic surgical clips.

2. Inspection

All TECH-MAG Pumps are inspected prior to shipping and well packed for safe transportation. Upon receipt of your TA Series pumps, check for any damage that may have occurred during shipment. Notify the courier and TECH-MAG Pumps promptly if damage has occurred.

3. Storage

If the pump is not installed immediately, it should be protected from exposure to moisture and dust. Shipping protections of the ports installed at the factory must be kept securely in place. Storage instruction provided by the motor manufacturer should be observed.

4 Installation

1) Locate the pump securely as close to the liquid source as possible, preferably below liquid level in such a way to facilitate access for maintenance and inspection.
2) Mount the pump horizontally. If mounted vertically, the unit must be pump downwards, not motor.

5 Operation Safety Basics

Listed below are some of basics guidelines that should be considered in addition to your company rules regarding installation, operation and maintenance.

NEVER: Start this pump without proper priming (casing must be full of liquid)

NEVER: Operate this pump with the suction or the discharge valve closed.

NEVER: Run this pump dry over a few minutes.

NEVER: Operate pump if there are signs of leakage.

NEVER: Change pump condition of service without approval by your authorized TECH-MAG distributor or representative.

NEVER: Loosen port connection while system is under pressure.

NEVER: Attempt to clean the pump while it is operating.

NEVER: Operate pump above rated temperature and pressure.

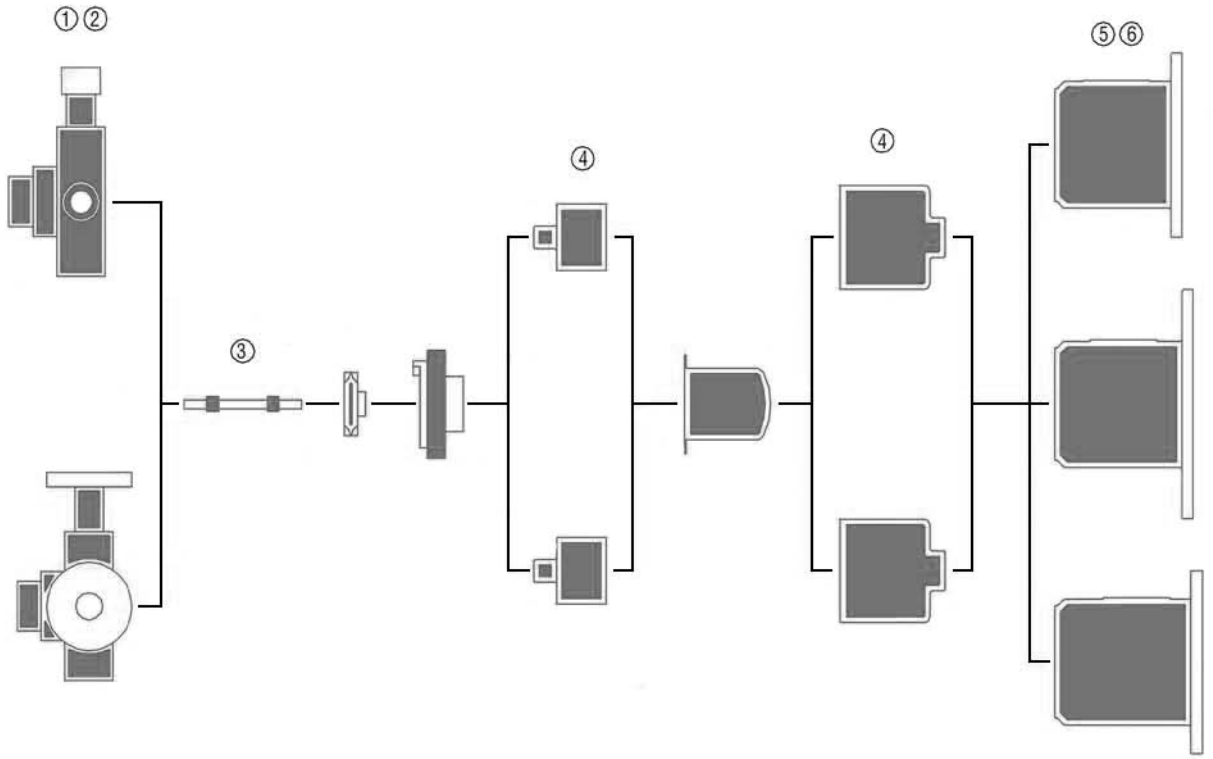
NEVER: Pump liquids containing ferromagnetic particles of any size, or substances, that will erode or chemically attack the internal parts of the pump. If in doubt, please contact your authorized representative or the factory.

NEVER: Restrict either the inlet and the discharge lines while the pump is operating. Restriction of the inlet may cause the pump to cavitate, lending, to loss of efficiency and rapid wear. Reduced flow can be obtained if required by a valved branch from the discharge side of the pump back to the liquid source. If the pump is shutdown for an extended period, circulate clean water (or other suitable solvent compatible with pump materials) for several minutes, to avoid the risk of internal precipitation or crystallization.

6 Pump Identification

Every TECH-MAG pump is equipped with a chemically resistant name tag located on the adapter bracket. It is recommended that the serial number be recorded and referenced when requesting information or service parts. The serial number needs to be used for all correspondence and spare parts ordering.

Reference chart for pump components



7 Suction and Discharge Piping

Piping should be supported independently of the pump and line up properly to pump ports. Suction piping should be installed with as few restrictions as possible to provide no less than the minimum NPSH as listed on the specification sheet.

The length of the suction pipe should be kept to a minimum. Suction line should be clean and/or a strainer should be installed to protect the impeller from damage by welding slag, mill scale, or other foreign particles during initial startup. In suction pipe use only a full flow valve. A pressure gauge should be installed in both the suction and discharge piping. The gauges will enable the operator to easily observe the operation of the pump, and to control if the pump is operating in conformance with the duty point required. If cavitation or other unstable operation should occur, widely fluctuation pressure will be noted.

8 Electrical

DANGER

Only a qualified electrician should make the electrical connections to the motor. Thoroughly read motor manufacturers instructions before making installation. Check motor nameplate date to be certain that all wiring, switches, starter, and overload protection are correctly sized.

Install the motor according to local electrical codes. Check all connections to motor and starting device with wiring diagram. Check voltage, phase, and frequency on motor nameplate with line circuit.

NOTE: Install a flexible electrical coupling on the motor. Allow for movement of at least 12 inches. This is necessary to service and inspect the pump.

9 Pump Speed

WMDAT Pumps are designed to rotate at speed up to 4000 rpm. Standard Speeds are:

ELECTRIC MOTOR	50Hz	60Hz
2 POLES	2900RPM	3500RPM
4 POLES	1450RPM	1750RPM

If the pump is driven at variable speed via an a.c. frequency inverter, keep within the recommended limit of speed.

10 Starting

Fully open the suction valve. Pump requires a flooded suction.

WARNING

Do not operate pump with suction or discharge valve closed. Operating pump more than a few minutes with the suction valve closed can cause bearing failure.

CAUTION

Check driver for proper rotation. Correct rotation is counter clockwise when viewed from the pump casing.

CAUTION

At start-up immediately check pressure gauges. If discharge pressure is not quickly reached stop the driver, reprime and attempt to restart.

Check the pump and piping to assure that there are no leaks.

11 Troubleshooting

TROUBLE	POSSIBLE CAUSE	INVESTIGATE / CORRECTIVE ACTION
No flow, No pressure at start up.	Pump not completely filled with liquid.	Bleed all vapor or air from port 6.
		Allow more cool; down time if pumping low temperature fluid.
		Check suction for air leak if suction pressure is lower than atmospheric.
	NPSH actually lower than NPSH requirement listed on specification sheet.	Suction line blocked - check suction screen and valve.
		Excessive pressure drop through suction piping.
		Flow restricted by vapor pockets in high points of suction line.
		Suction tank level or pressure too low.
		Entrained air or vapor in pumped fluid.
		NPSH reduced by presence of more volatile fluid in process fluid. Contact WARCO PUMPS representative about use of an inducer.
	Failure of drive component, such as interconnecting shaft or impeller key, or item missing from assembly.	Dissemble and inspect.
	Reverse direction of rotation.	NOTE: impeller and drive rotate in the same direction.
Insufficient flow or head- rise.	Flow too high.	Check head-rise and flow rate against performance curve.
	NPSH actually lower than NPSH requirement listed on specification sheet.	Refer to solution listed under "NO flow, no pressure at start up".
	Flow too low, causing overheating of fluid resulting in internal boiling or unstable pump operation.	Increase through-flow rate.
		By pass part of pump discharge to supply tank.
		Use seal cavity bypass and vent the high point of the pump to continuously increase inlet flow rate.
	Diffuser discharge partially plugged or impeller damaged by passage of solid particle	Clean these areas of all obstructions and restore surface to a smooth polished finish (use emery cloth or machine), free of all corrosion pitting.

TROUBLE	POSSIBLE CAUSE	INVESTIGATE / CORRECTIVE ACTION
	Process fluid specific gravity or viscosity different from values shown on specification sheet.	Check actual viscosity and specific gravity at operating temperature. Viscosity higher than ten centipoises will cause reduced head and flow and increased power consumption.
	Drive speed to low.	Check speed against value listed on specification sheet.
	Pressure gauges of flow meters in error.	Calibrate instrumentation.

Driven overloaded.	Fluid specific gravity or viscosity higher than values listed on specification sheet.	Check actual viscosity and specific gravity against value listed on specification sheet.
	Electrical failure in electric driver.	Check circuit breaker heater size and setting. Check voltage. Current for each phase should be balanced within three percent.
	Mechanical failure in drive, or pump.	Remove driver and check for freedom of rotation of pump shaft assemblies. Remove fluid end and search for any mechanical failures.
Excessive discharge pressure pulsations.	Flow rate too low	Increase flow rate through pump. Add bypass to suction tank if necessary.
	Insufficient NPSH.	Refer to solution for insufficient NPSH under "No flow, no pressure at startup", above.
	Defective flow control valve.	Check control valve.
	Flow rate too low for control by back pressure control valve or parallel pump operation.	Increase pressure drop between pump and control valve. increase flow rate.

12 Maintenance And Disassembly

WARNING

MAGNETIC

TECH-MAG Pump units contain extremely strong magnets. The use of non magnetic tools and work surface is highly recommended.

The maintenance and disassembly procedure are intended for use during standard field inspection or service. The use of non-metallic work surface is recommended.

A) Disassembly

In case the pump has handled hot liquids, make sure that it cools down before disassembly. The pump could have handled dangerous or toxic liquids: it is therefore necessary to wear protection for the skin and eyes. The liquid must be recovered and eliminated according to the existing environmental laws. In case the pump has to be sent back to the manufacturer to be reconditioned, in case it pumped aggressive or toxic liquids, the same has to be thoroughly drained and cleaned by the customer.

1) Remove bolts connecting pump and motor to foundation or base plate.
2) Remove hex bolts connecting pump to motor
3) Separate the pump from the motor and pull the driver away from the pump.

MAGNETIC

Strong magnetic attraction when disassembling / assembling drive end to liquid end.

CAUTION

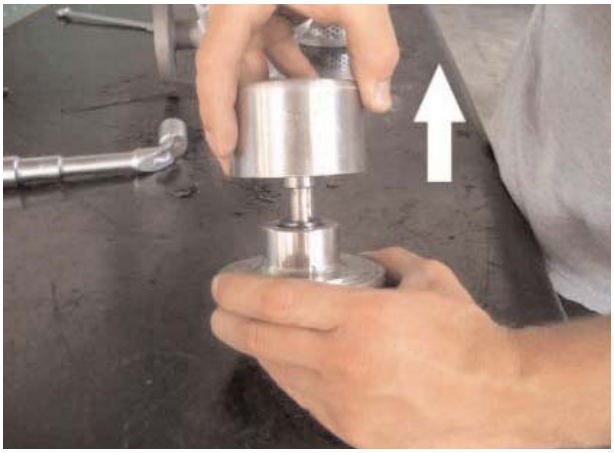
The shop area must be clean and free of any ferro-magnetic particles.

4) Remove hex bolts connecting the pump casing from the bracket.

5) Pull the internal assembly from the pump casing.

6) Remove hex bolt connecting internal magnet to the pump shaft.

7) Pull the internal magnet from the shaft.



8) Pull the volute ring from the shaft.

9) Remove the retaining ring from the shaft.

10) Pull the key from the shaft.

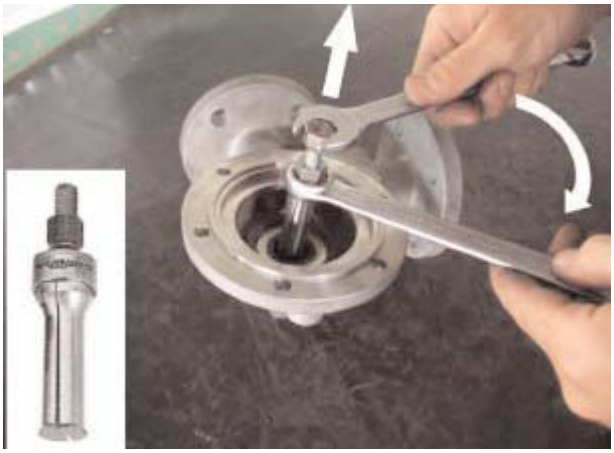
11) Pull out the two sleeve bushings from the shaft.

12) Pull out the impeller.

13) Remove the two screws from the pump casing and pull out the special carbon ring.

14) Remove the two screws from the volute ring and pull out the special carbon ring.

15) The use of the extractor to pull out the bushing from the casing is recommended



16) Remove the screw.

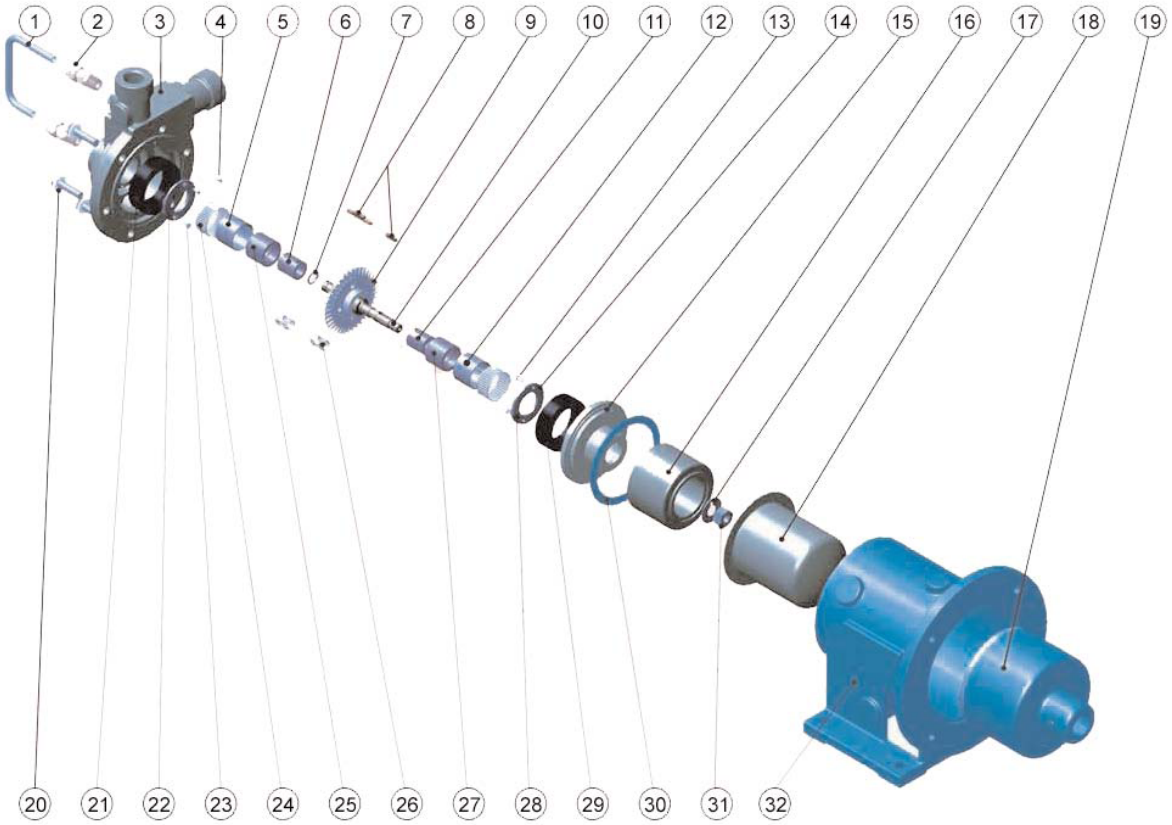
17) Using an extractor pull out the external magnet from the motor shaft.

B) To re-assemble follow the above instructions in reverse.

CAUTION

Thoroughly clean all parts before assembly.
Make sure all parts are free of dirt, metallic particles, etc.

12 PUMP PARTS LIST



ITEM #	DESCRIPTION	MATERIAL
1,2	Flushing Kit	SS316
3	Pump casing	SS316
4	Screw	SS316
5,12	Bushing elastic ring	SS316
6,11	Sleeve bushings	SiC
7,17,31,8	Seger, washer, nut, shaft key	SS316
9	Impeller	SS316
10	Shaft	SS316
13,14,22,23	Lock washer & screws	SS316
15	Volute ring	SS316
16	Internal magnet *	SS316
18	Rear casing **	SS316
19	External magnet *	Carbon steel
20	Set screws	SS316
21	Pump casing wear ring	Special carbon
24,28	Bushing tolerance rings	SS316
25,27	Bushing	Special carbon
26	Sleeve bushing tolerance rings	SS316
29	Volute ring wear ring	Special carbon
30	Body gasket	SS316
32	Bracket	Carbon steel
* With rare earth magnet sectors		
** Minimum thickness 1.5 mm (0.059")		

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