

TECH-MAG SERIES CPA SLIDING VANE MAG-DRIVE PUMP

Installation, Operation & Maintenance Manual

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1. SAFETY

Installation, Operation and Maintenance must be done by thoroughly qualified person nel 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

CPA Series pumps are mag-drive. This indicates the continuous presense of a strong magnetic field. These exceptional strong magnetic fields present immediate dangero 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 prepared for safe transportation. Upon receipt of your CPA Series pump, check for any damage which 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 on a firm base close to the liquid source, preferably below liquid level in such a way to be easily accessible for maintenance and inspection.
- 2) Mount the pump horizontally. If mounted vertically, the unit must be downwards, not motor upwards.

5 Operation Safety Basics

Listed below are some of basics you should keep in mind, in addition to your own company rules regarding installation, operation and maintenance.

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 Pump distributor or factory 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, which will erode or chemically attack the internal parts of the pump. If in doubt, please contact your authorized representative.

NEVER: Restrict either the inlet and the discharge lines while the pump is operating. Restriction of the inlet may cause the pump to cavitate, leading, 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 encrustation.

6 Pump Identification

Every TECH-MAG CPA pump has a nameplate located on the adapter bracket. It is recommended that the purchaser record the serial number and reference it when requesting information or service parts from TECH-MAG pumps. The serial number is very helpful for all correspondence and spare parts ordering.

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 Operating Speed

CPA Series Pumps are designed to rotate at speed up to 3000 rpm. Standard Speeds are:

ELECTRIC MOTOR	50 Hz	60Hz
4 POLE	1450 RPM	1750 RPM
6 POLE	960RPM	1150RPM

If the pump is driven at variable speed via an a.c. frequency inverter, ensure that the recommended speed limit is not exceeded.

10 Starting Pump

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 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. TECH-MAG pumps contain very strong magnets. Use of a non-metallic work surface is highly 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 ferrous particles.

- 4) Remove socket head cap screws connecting the pump casing to the bracket.
- 5) Pull the internal assembly from the pump casing.
- 6) Remove the dowel pin connecting the internal magnet to the pump shaft.



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- 7) Pull the internal magnet from the shaft.



- 8) Remove socket head cap screws connecting the cover to the pump casing.



- 9) Remove the o-ring from the cartridge.



- 10) Before removing carbon cartridge and rotor from pump casing, it may be helpful to heat the assembly up to a temperature of 300-350°F.



- 11) Then you can easily pull out the cartridge from the pump casing.



- 12) Pay close attention to small pins inside the holes on the shaft when disassembling the cartridge.



- 13) Remove hex nut from the pump casing and pull out the by-pass components.





- 14) Remove the screw from the external magnet.



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



B) To re-assemble follow the above instructions on the contrary.

CAUTION

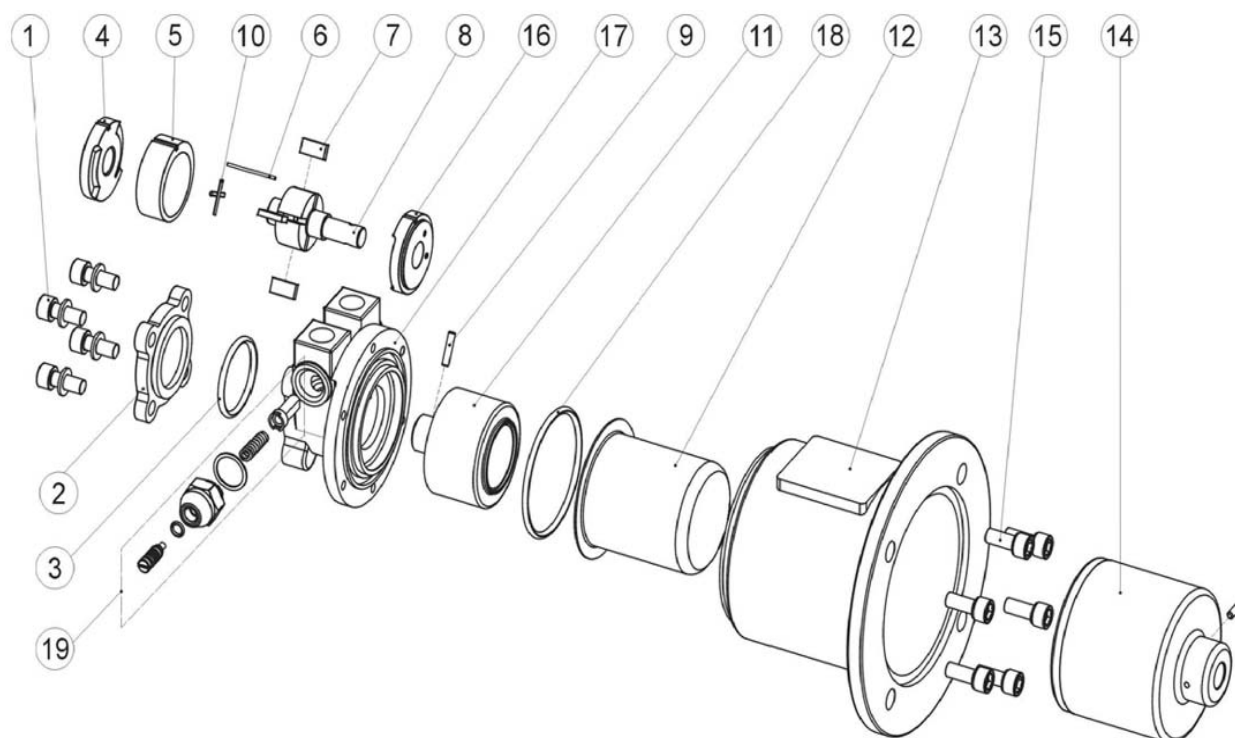
Thoroughly clean all parts before assembly.
Make sure all parts are free of dirt, metallic particles, etc.

11 Troubleshooting

TROUBLE	POSSIBLE CAUSE	INVESTIGATE / CORRECTIVE ACTION
No flow, No pressure at start up.	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.
	Reverse direction of rotation.	NOTE: impeller and drive rotate in the same direction.
Insufficient flow or head- rise.	NPSH actually lower than NPSH requirement listed on specification sheet.	Refer to solution listed under "NO flow, no pressure at start up".
	Carbon cartridge damaged by passage of a solid particle.	Changed damaged carbon cartridge
	Drive speed too low	Check speed against value listed on specification sheet
	Pressure gauges of flow meters in error.	Calibrate instrumentation.
Driven overloaded.	Process fluid specific gravity or viscosity different from values shown 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 settings. Check voltage. Current for each phase should be balanced within three percent.
	Mechanical failure in driver, or pump	Remove driver and check pump shaft assemblies rotate freely Remove fluid end and check for any mechanical failure.
Excessive discharge pressure pulsation.	Insufficient NPSH.	Refer to solution for insufficient NPSH under "No flow, no pressure at startup", above.

Series CPA Mag-Drive Sliding Vane Pump

Exploded View Parts List



ITEM #	DESCRIPTION	MATERIAL
1	Set Screw - Cover	SS 316
2	Cover	SS 316
3	Cover O-Ring	Viton
4, 5, 6, 7, 10, 16	Cartridge - Option (1)	Phenolic carbon
4, 5, 6, 7, 10, 16	Cartridge - Option (2) High temp	Special carbon
8, 9	Rotor	SS 316
11	Internal Magnet*	SS 316
12	Rear Casing**	SS 316
13	Adapter Bracket	Carbon Steel Epoxy
14	External Magnet	Carbon Steel
15	Set Screw - Rear	SS 316
17	Pump Casing Wear Ring	SS 316
18	Rear Casing O-Ring	Viton
19	By-Pass Relief Valve (top ported only)	SS 316
* Rare earth segmented magnet		
** Minimum thickness 0.040"		

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