Installation, Operating, Maintenance & Safety Instruction for VP Series Plastic Seal-Less Mag-Drive Vane Pumps (VP 01/02/03/04)



This manual presents installation, servicing, troubleshooting, and maintenance for M *PUMPS* VP models.

Information that may be required regarding performance, alterations or

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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 personal injury or death if instructions, including recommended precautions, are not followed.

⚠ WARNING

The use of the 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

VP are magnetic driven pumps.

The use of the word “Magnetic” indicates the persistent presence of a 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 *M PUMPS* are inspected prior to shipping and prepared for safe transportation.

Upon receipt of VP pump, check usually for any damage which may have occurred during shipment.

Notify the courier and *M 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 it is mounted vertically, the unit must be downwards, and the motor upwards.

5 OPERATION SAFETY BASICS

Listed below are some of basics you should keep during 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 question signs of leakage.

NEVER: change pump condition of service without approval by your authorized 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.

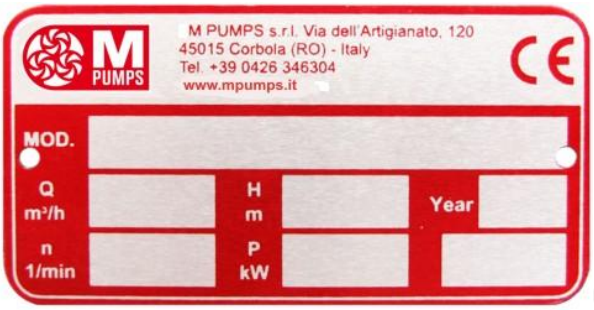
NEVER: Pump liquids containing ferromagnetic particles of any size, or substances which will erode or chemically attack the internal parts of the pump.
If in doubt, please contact your authorized representative for advice.

NEVER: Restrict both the inlet and the discharge lines while the pump is operating.
Restriction of the inlet may cause the pump to cavitation, leading to loss of efficiency and rapid wear.
Reduced flow can be obtained if required by a valve branch from the discharge side of the pump back to the liquid source.

If the pump is to be 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 *M PUMPS* pump unit has a nameplate located on the side of the casing. It is recommended that the purchaser record the serial number and reference it when requesting information or service parts from *M PUMPS*. The serial number must be used for all correspondence and spare parts ordering.



Nameplate

7 SUCTION AND DISCHARGE PIPING

- Piping should be supported independently of the pump and the 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 start up.

- In suction use only a full flow valve.

- 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 instable operation should occur, widely fluctuating 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 data to be certain that all wiring, switches, starter, and overload protection are correctly sized.**

Install the motor according 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

M PUMPS VP series are designed for speed up to 1750 rpm.
Standard speed are:

El. motor	50 Hz	60 Hz
4 poles	1450 rpm	1750 rpm
6 poles	960 rpm	1150 rpm

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.
VP pumps are self priming pumps up to 7m dry (23ft).

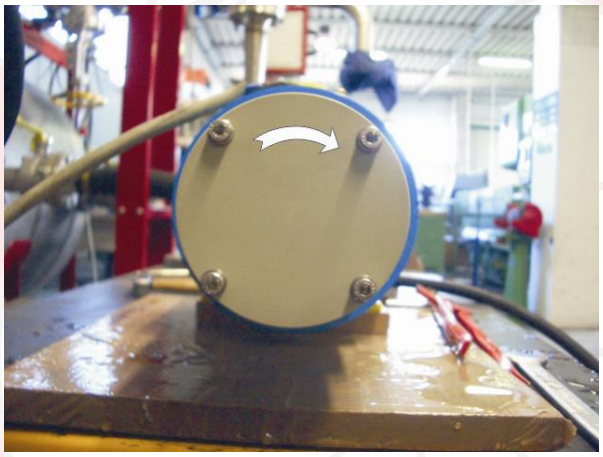
⚠ WARNING

▲ **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 <u>clockwise</u> when viewed from the pump casing.**

▲ **Do not run the pump in reverse. Reverse rotation will lead to accelerated wear and eventual failure.**



⚠ CAUTION

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

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

11 TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	INVESTIGATIVE/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 vapour pockets in high points of suction line. Suction tank level or pressure too low. Entrained air or vapour in pumped fluid. NPSH reduced by presence of more volatile fluid in process fluid.
	Reverse direction of rotation.	Note: impeller and driver rotate in the same direction.
Insufficient flow or head-rise.	NPSH actually lower than NPSH requirement listed on specification sheet.	Refer to solutions listed under “No flow, no pressure at start up”.
	Carbon cartridge damaged by passage of a solid particle.	Change carbon cartridge damaged.
	Drive speed too 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 driver, or pump.	Remove driver and check for freedom of rotation of pump shaft assemblies. Remove fluid end and search for any mechanical failure.
Excessive discharge pressure pulsations.	Insufficient NPSH.	Refer to solution for insufficient NPSH under “No flow, no pressure at start up”, above

12 MAINTENANCE AND DISASSEMBLY

The maintenance and disassembly procedure are intended for use during standard field inspection or service.
VP pumps contain very strong magnets.
The 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 the eyes.
The liquid must be recovered and eliminated according 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.

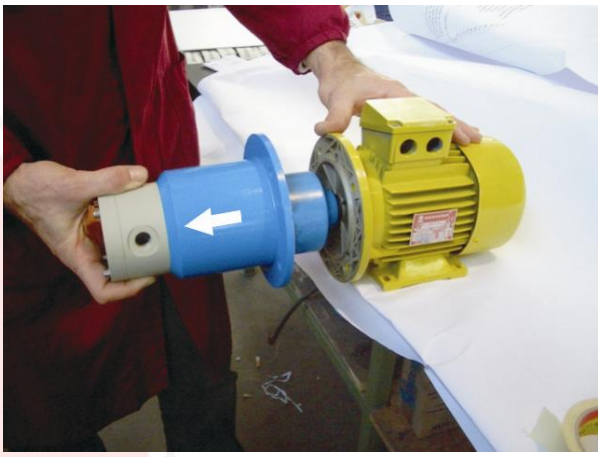
2) Remove hex bolts connecting pump to motor.

3) Separate the pump from the motor and pull the driver away from the pump.

⚠WARNING ⚠MAGNETIC

▲ ***M PUMPS*** **units contain extremely strong magnets. The use of non magnetic tools and work surface is highly recommended.**

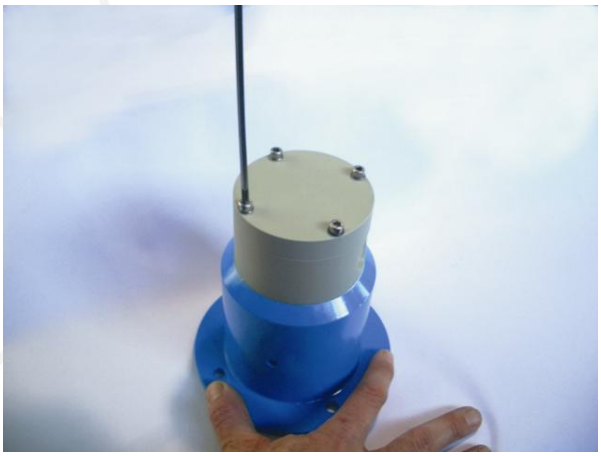
▲ **Strong magnetic attraction when disassembling / assembling drive end to liquid end.**



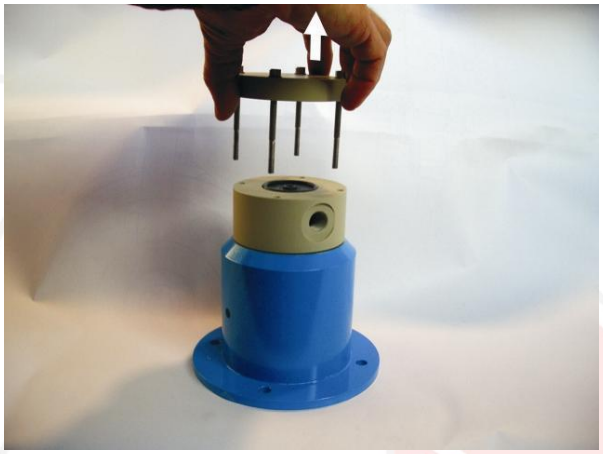
⚠ CAUTION

▲ **The shop area must be clean and free of any ferrous particles.**

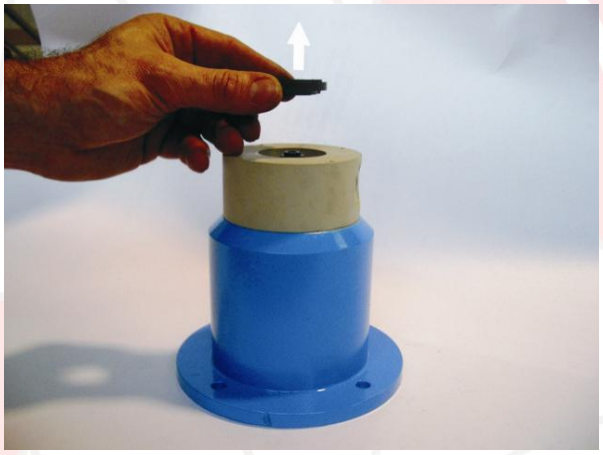
4) Remove socket head cap screws connecting the pump casing from the bracket.



5) Pull out the cover from the pump.



6) Check status and remove front pump casing o-ring from its seat, if necessary.



7) Pull out the internal assembly.



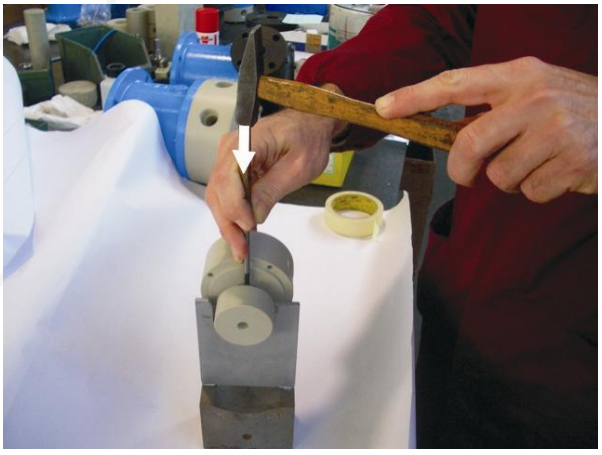
8) Check status and remove rear casing o-ring from it, if necessary.



9) Remove the rear casing.



10) Remove the dowel pin connecting internal magnet to the pump shaft.



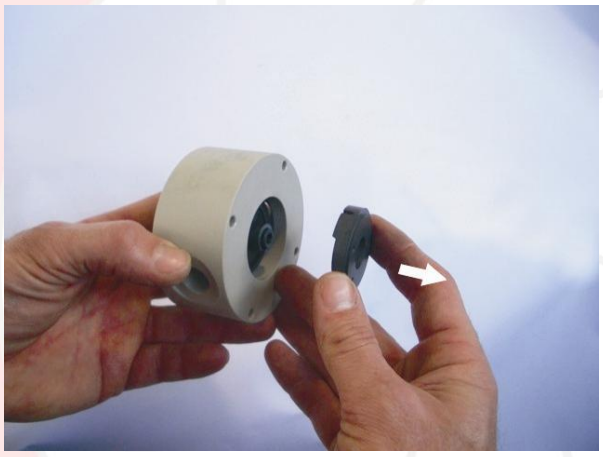
11) Pull the internal magnet from the shaft.



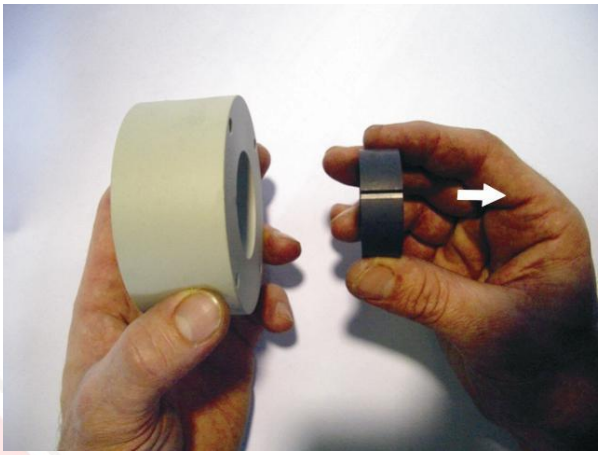
⚠MAGNETIC

▲ Reminder: Keep all metal tools away from magnetic field of the inner magnet.

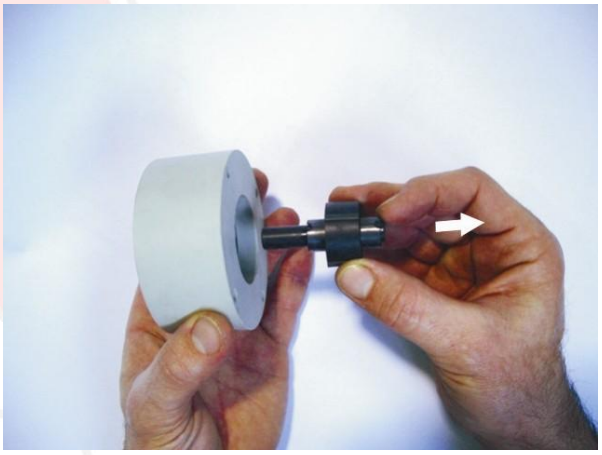
12) Remove the front disc from the pump casing to check status and replace it if necessary.



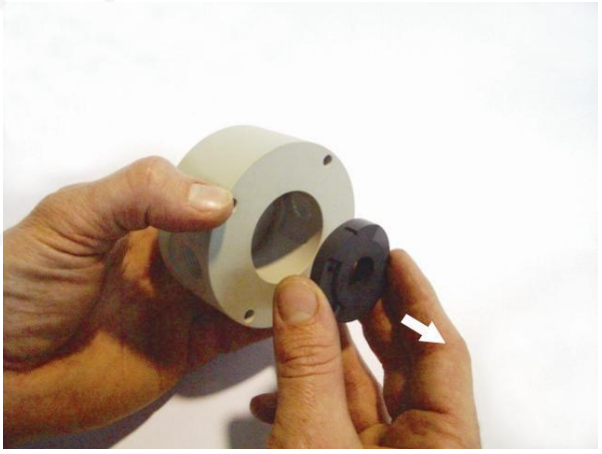
13) Remove the stator to check status and replace it if necessary.



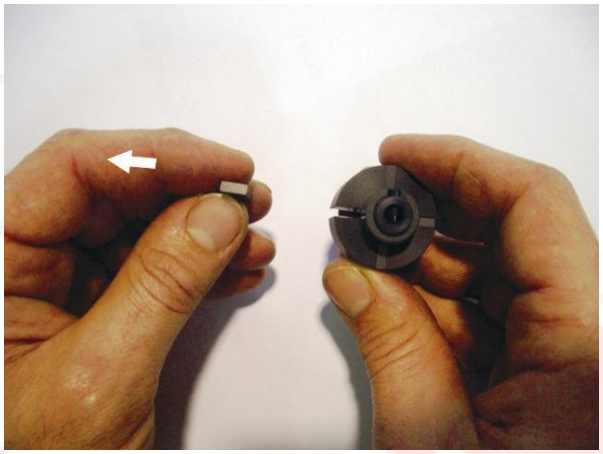
14) Remove the rotor shaft to check status and replace it if necessary.



15) Remove the rear disc from the pump casing to check status and replace it if necessary.

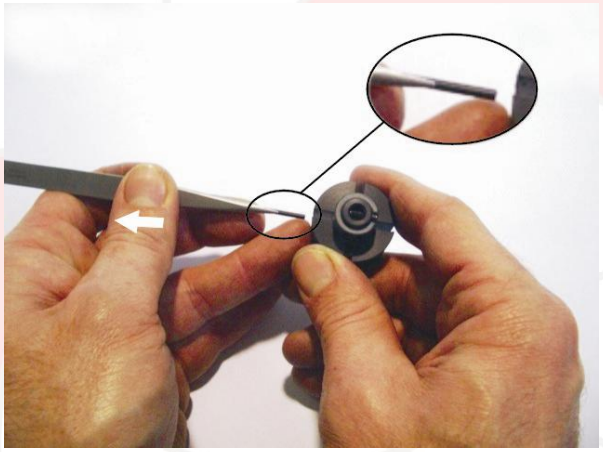


16) Remove the vanes from rotor shaft to check status and replace if necessary.

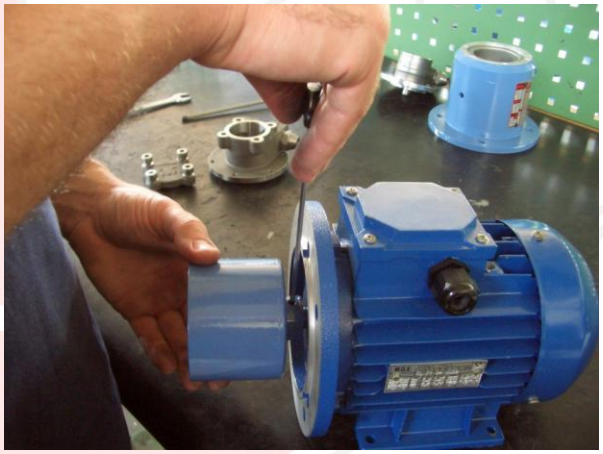


⚠ CAUTION

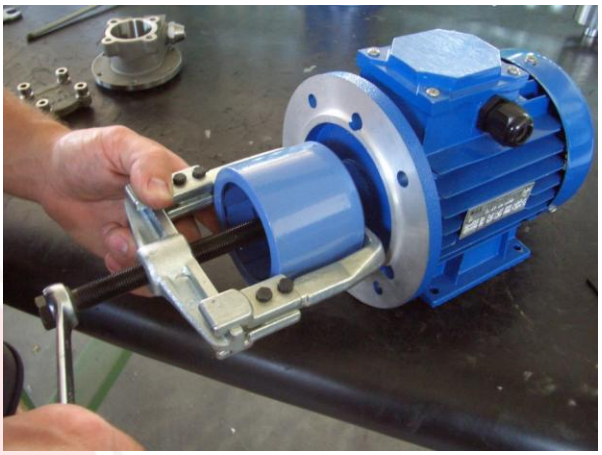
▲ Disassembling internal assembly make attention to not loose the small pins inside the hole's shaft.



13) Remove the screw from external magnet hub.

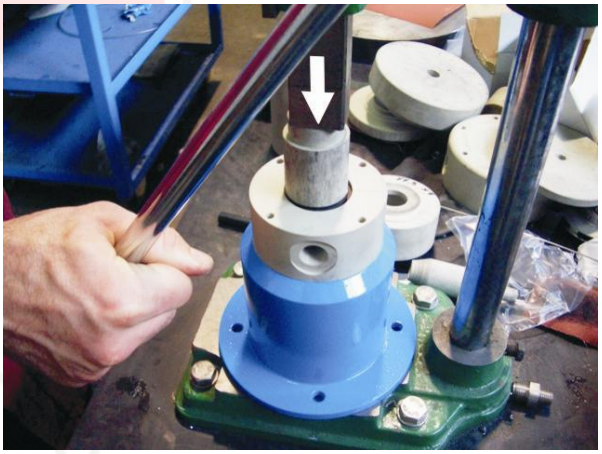


14) Using an extractor pull-out the external magnet from motor shaft.



To re-assemble the pump, please follow the above instruction on the contrary.

When you reassembly the cartridge make care to push together the discs and stator to avoid leakages.



⚠ CAUTION

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

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