stop the motor, wait until complete stop, and then restart the motor again.
The sum of the inlet and outlet pressure must not exceed 20 bar/290 psi in any case.

[STANDARD MAINTENANCE]

The **Fluid-o-Tech** magnet drive rotary vane pumps maintenance and replacement of parts subject to wear have to be done by a qualified technician.
Periodic cleaning of the circuit and filters is advisable in order to avoid cavitation and wear of the internal components.

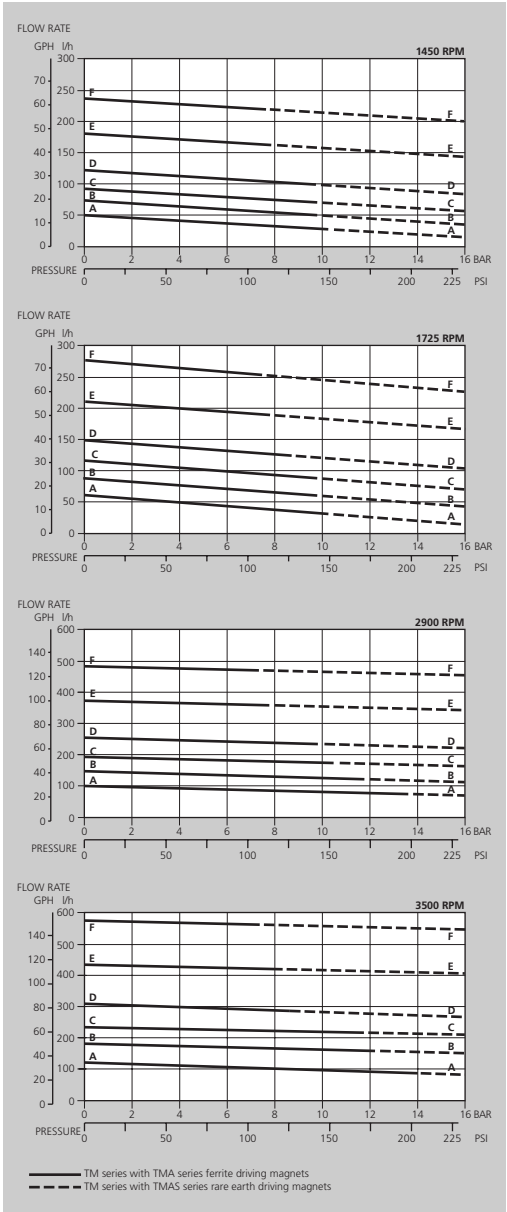
[CERTIFICATIONS]

The pump itself, without the motor, is not to be considered as a machine, but only a component, therefore the mark "CE" is not applicable.
A conformity declaration may be requested to state the essential safety features ("Direttiva Macchine" 89/392/CEE).
The complete group is instead considered as a machine ready to be used and it is supplied with the mark "CE" that grants its conformity.
TMOT…A and TMSS…A series pumps are NSF listed.

[WARRANTY]

Every new pump is guaranteed to be free of defects when leaving the factory for a period of 24 months from the production date stamped on the pump's housing.
The warranty is not recognized if:

- The directions on how to handle, install or operate the pump are disregarded.
- The pump has been disassembled by anyone other than a Fluid-o-Tech (or authorized by Fluid-o-Tech) technician or repaired with non-original components.
- The pump operated dry or in cavitation (throttled/undersized inlet or filter)
- Solid estraneous particles are found in the pump.
- Evident signs of operating pressure higher than 16 bar (high pressure may compromise the integrity of the internal parts of the pump and cause leaking) are found.
- The pump has been utilized for an application for which it was not intended to be used where the operating conditions and/or the pumped liquid were incompatible with the pump itself and such application has not been specifically approved by Fluid-o-Tech.
- In case of pumps equipped with relief valve, the operating pressure results to be 3 bar below the relief valve setting. In this case the internal parts get hot, scale develops and the hydraulic performances drop.



Fluid-o-Tech reserves the right to alter the specifications indicated in this manual at any time and without prior notice

MANUAL - TM - 12/04 Ed.

Fluid-o-Tech
PUMP TECHNOLOGY AT ITS BEST

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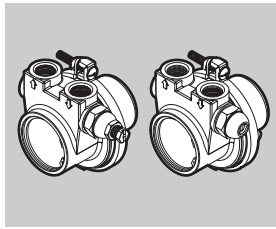
POSITIVE DISPLACEMENT MAGNET DRIVE ROTARY VANE PUMPS TM SERIES



INSTRUCTION MANUAL

UNI ENI ISO 9001:2000
Cert. n°: 0363/2

INSTALLATION

The pump has to be installed exclusively by authorized staff. Handle with care.

WARNING

For food applications the pumps (even when NSF listed or WRAS approved) needs to be sanitized from the customer first through pasteurization.

It's recommended not to pull out the two protection sponge caps placed on the inlet and outlet ports of the pump before mounting the fittings and the pipes, in order to avoid the incidental entrance of any solid estraneous object which might damage the internal components of the pump.

The **TM** series rotary vane pumps look **identical in their exterior aspect**, although the **flow rates are different**. For this reason, when replacing just the pump, it is necessary to **check the model** of the new pump. Changing the pump with a model of different capacity may damage the system and the pump itself.

If continuous operation is needed, the pump has to be mounted in an airy space in order to dissipate the heat produced by the motor. To avoid vibrations of mechanical parts and noise, it is advisable mounting the motor with rubber shock-absorbing supports.

Particular care must be taken when connecting the pump with fittings in order to avoid leaks.
If a sealing fluid or Teflon tape is used, make sure to avoid any quantity of it to fall into the pump.
If the pump is in Stainless Steel, the fittings must be in Stainless Steel or Plastic, **not Brass**, in order to avoid corrosion to take place.

[ASSEMBLING THE MAGNET ONTO THE MOTOR SHAFT]

MOTORS WITH FLAT SHAFT ("D" TYPE)

1. Tighten the set screw in its seat in the magnet holder until it protrudes from the bore of the brass insert in order to verify that there are no imperfections in the thread which might stop the set screw before it is able to block the magnet on the rotor shaft.
2. Untighten the set screw until it does not protrude any longer into the bore where the shaft will be inserted.
3. Place the magnet on the tool AT126/A with the bore where the set screw sits in correspondence with the flat surface of the "D" pin (fig. 1)
4. Tighten the set screw until it touches the pin, but do not tighten so much to make the extraction of the magnet difficult. The pin should not be scratched by the set screw when extracting the shaft.
5. Remove the magnet and place it on the motor shaft. In such conditions the set screw, protruding slightly from the internal diameter of the bore in the brass bushing, prevents an incorrectly oriented assembling onto the motor shaft.
6. Place the unit vertically on the bench with the magnet facing downwards (see fig. 2) to place the magnet in the correct position.
   Tighten the set screw with a max torque of 2.0 Nm.

MOTORS WITH SHAFT KEY SEAT AND "TMA"/"TMAS" SERIES DRIVING MAGNETS.

1. Tighten the set screw in its seat in the magnet holder until it protrudes from the bore of the brass insert in order to verify that there are no imperfections in the thread which might stop the set screw before it is able to block the magnet on the rotor shaft.
2. Untighten the set screw until it does not protrude any longer into the bore where the shaft will be inserted.

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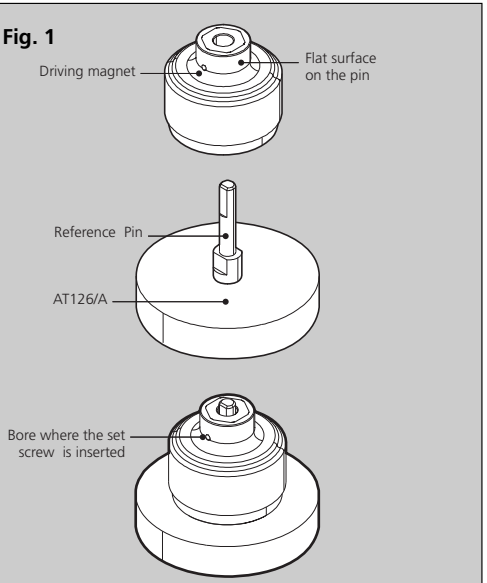
Fig. 1



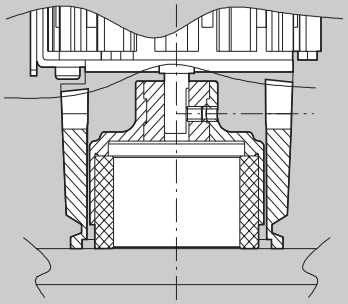
3. Remove the shaft key from the motor shaft.
4. Predispose the magnet on the motor shaft paying attention, in case the magnet is of TMA or TMAS series, not to tighten the set screw close to the shaft key seat. In case the magnet is of TMAS-C series please see the paragraph: "motors with shaft key seat and "TMAS-C" series driving magnets".
5. Position the unit vertically: a) on the test bench for TMA series magnets in order to have the magnet and the motor adapter on the same level or b) on tool AT155/1 for TMAS series magnets in order to assemble the magnet in the correct position.
   Tighten the set screw with a max torque of 2.0 Nm.

MOTORS WITH SHAFT KEY SEAT AND "TMAS-C" SERIES DRIVING MAGNETS.

1. Tighten the set screw in its seat in the magnet holder until it protrudes from the bore of the brass insert in order to verify that there are no imperfections in the thread which might stop the set screw before it is able to block the magnet on the rotor shaft.
2. Untighten the set screw until it does not protrude any longer into the bore where the shaft will be inserted.
3. Make sure the shaft key is in it seat on the motor shaft.
4. Align the shaft key with the relevant seat in the magnet bore and slide the magnet on the motor shaft.
5. Position the unit vertically on tool AT155/1 with the magnet facing downwards in order to set the magnet in the correct position (see fig. 2).
   Tighten the set screw with a max torque of 2.0 Nm.

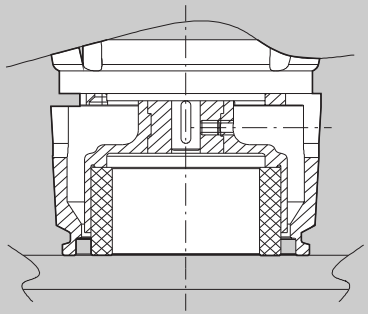
Fig. 2

TMA series driving magnets with "D" shaft



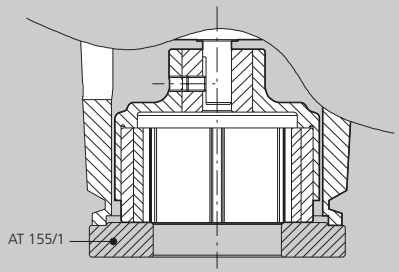
Place the unit vertically on the bench in order to have the magnet and the motor adapter on the same level.

TMA series driving magnets with shaft key seat



Driving magnet TMA series

TMAS/TMAS-C series driving magnets with "D" shaft or shaft key seat



Place the unit vertically on tool **AT155/1** in order to assemble the magnet in the correct position.

[WIRING THE MOTOR TO THE POWER SUPPLY]

- The power supply must be consistent with the electrical data printed on the motor plate, with particular regard to voltage, frequency and current.
- The power supply should be switched off during installation.
- The **motor rotation must be clockwise** (looking the motor in front).
  If operated **counterclockwise, the pump won't work**.
  In case the rotation is counterclockwise, proceed according to the scheme generally enclosed in the electrical wiring box.

The pumps - although identical in their aspect – may have GAS or NPT threaded ports. The thread of the fitting should match the thread of the pump port. If the pump has GAS threads the sealing is provided by an o-ring which is pressed against the flat surface of the port.
With the NPT thread, the sealing is provided by the contact between the threads. In this case a few turns of PTFE tape around the fittings are necessary. Do not exceed in using PTFE tape as pieces of it may fall into the pump (especially on the Inlet side) and cause the pump to fail.
The use of pipe dope (liquid sealant) should be avoided.
A particular care is needed while mounting the fittings, to avoid liquid leaks.
Hold the pump with a wrench **in the area marked with the arrows** indicating the inlet-outlet ports and the rotation sense, **without over-tightening. Maximum torque recommended: 15 Kg/cm. It is suggested to use aluminium sheet on each side of the pump to avoid damages to the ports.**
Do not use the motor as pump support when tightening the fittings, in order to avoid a possible misalignment and stress of the shafts.
If the **pump** is made **of stainless steel** the **fittings** have to be made of **stainless steel or plastic**, not in brass, to avoid problems of corrosion.

- The circuit should be **carefully flushed** before starting the pump.

[OPERATING CONDITIONS]

Make sure that the pumped fluid is compatible with the materials of the pump.
The Fluid-o-Tech pumps are designed to handle clean water at ambient temperature. Any other fluid and/or operating condition needs to be tested and approved by the customer and verified by Fluid-o-Tech.
The maximum liquid temperature is 70 °C (158 °F).
It is strongly recommended to use, especially for the inlet, **piping** with **internal diameter ≥10 mm (3/8")**.
This will avoid cavitation and consequent failure of the pump.
The piping on the outlet port has to be resistant at a pressure of 20 bar.
It is also recommended before the pump a **filter** capable of keeping out particles bigger than **125 µ** which could cause fast wear of the internal components, and with a surface area big enough, in order not to cause hydraulic losses in the circuit.
It is also important checking periodically the filter cartridge.
In order to keep the filter under control, it is advisable installing a vacuum gauge before and after the filter.
In case the vacuum increases more than 0.1 bar, the cartridge should be cleaned or changed.
For a long life of the pump, the pumped fluid must not contain solid particles.
Although the magnet drive rotary vane pumps are self-priming, they should operate under water head, in fact dry running causes fast wear of the internal components.
A **dirty filter** or an **insufficient supply** of water could cause **cavitation** and fast wear of the internal components of the pump.
If the line is subject to scarce pressure or flow it is necessary to fit a **pressure/level switch** before the pump in order to switch the motor off.
It is also necessary to protect the system from incidental overpressures with safety devices such as a **pressure relief valve or a pressure switch connected to the motor**.
It is **not advisable to install solenoid valves** in the circuit; however, if needed, the soleinoid valve should be installed after the pump. The internal diameter should be well sized to the pump capacity.
In order to **avoid pressure strokes** it is necessary to **operate the solenoid valve only after the pump stopped, allowing a few seconds to go by after the motor has been switched off**.
Soleinod valves before the pump are to be avoided at all times.
If the pump is equipped with a relief valve (by pass), the valve will act, in case of accidental overpressure, to limit the pressure, thanks to an internal recirculation of the fluid.

The by pass is not and must not be used as a flow regulator.
If used as a flow regulator, the water in excess will recirculate inside the pump through the by pass and the pump will fail.
The maximum differential pressure should be at least 3 bar (~45 psi) lower than the by-pass setting in order to avoid operation with the bypass valve open.
The maximum differential pressure must not exceed anyway 16 bar (230 psi).

Thanks to the magnetic coupling the pump does not need a mechanical seal in order to prevent leakage.
This eliminates the problems connected to the use of a mechanical seal.
However the maximum pressure depends on the pump model and it decreases with the increase of the flow rate.
Beyond the values specified in the graphs indicated at page 4 of this leaflet (continous line for pumps with TMA Series driving magnets - intermittent line for pumps with TMAS Series driving magnets) being the transmittible torque limited by the magnet, the coupling between the motor and the pump is not guaranteed and therefore the pump might stop.
In order to reestablish the coupling it is sufficient to