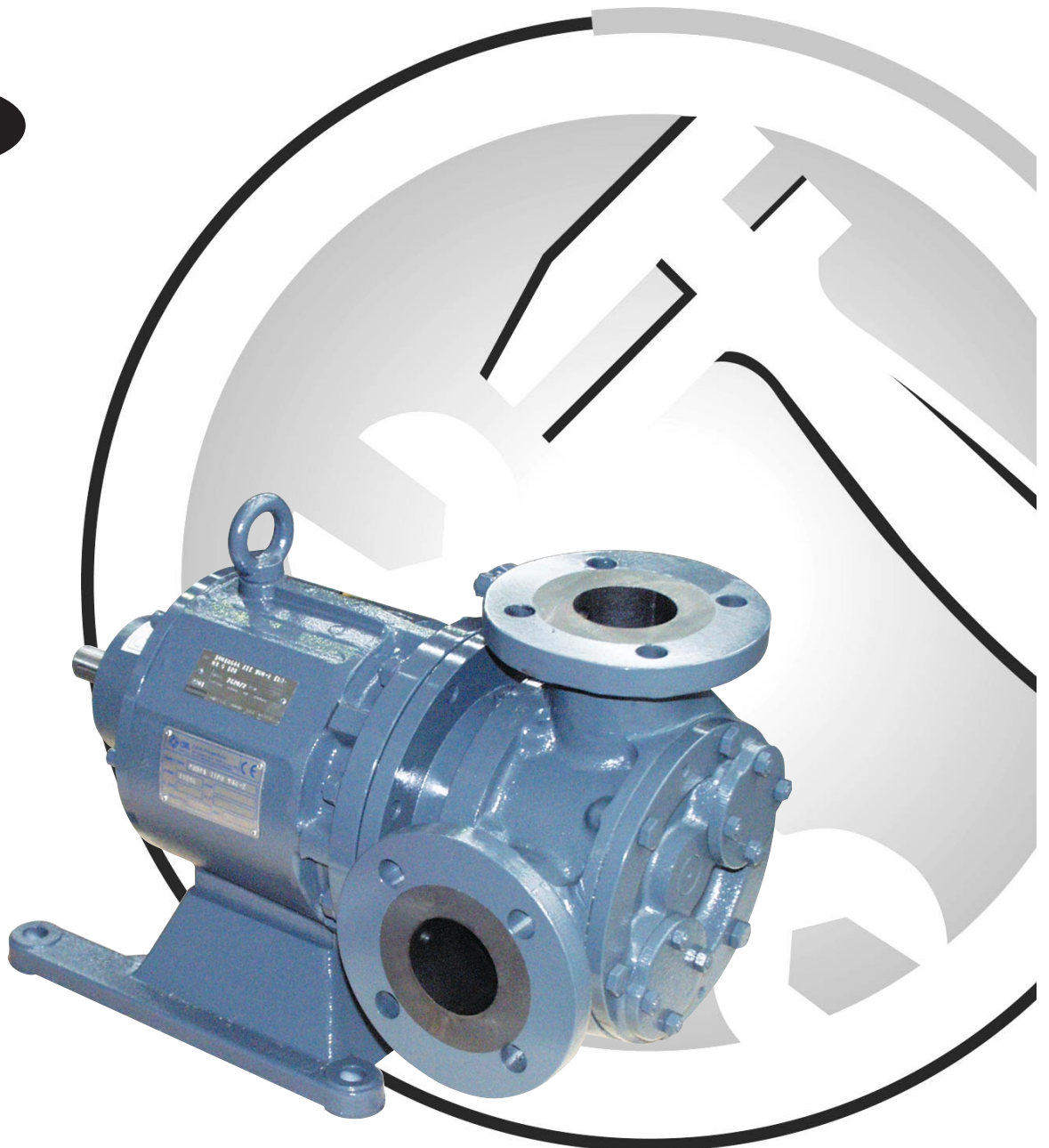




varisco®

a solid name in fluids

GB



**Use and maintenance
manual of magnetic drive
type cycloidal pumps of
the**

V TRM
series

Features the New
“PWD” Magnetic Coupling
by CDR Pompe S.p.A.
Milano, Italy



ATTENTION!

**VARISCO MAGNETIC DRIVE TYPE PUMPS
UTILISE HIGH INTENSITY RANGE
MAGNETS. MAINTENANCE OF THESE
PUMPS IS, THEREFORE, NOT
RECOMMENDED FOR USERS OF
PACEMAKERS**



Before starting the pump, read this instruction manual carefully.

If the instructions for use and maintenance are observed, the pump will yield full performance for a long time. This manual also contains information for the prevention and elimination of the most common operating problems.

The following instructions are valid in general for the installation, use and preventive maintenance of the V series cycloidal type pumps. For disassembly and maintenance, see the specific manuals of the various versions. For special pumps, further information may be supplied with the pump whenever necessary. The pump model and serial number should be noted. These must be quoted whenever requesting information or spare parts.

Pump type _____ Serial number _____

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1 IDENTIFICATION

1.1 Manufacturer

VARISCO POMPE Srl Zona Ind. Nord - Terza Strada, 9 - 35129 PADOVA

1.2 Type of pump

Self-priming horizontal axis gear pump

1.3 Model

The model is indicated on the nameplate of the pump.

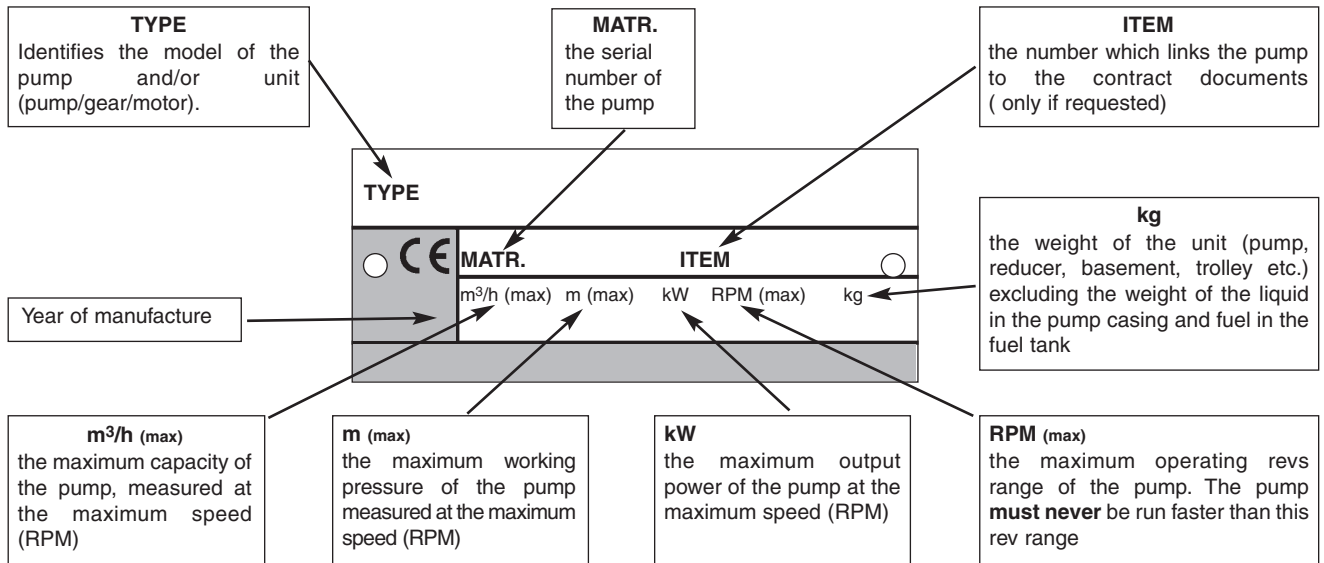
1.4 Year of manufacture

The year of manufacture is indicated on the nameplate of the pump.

1.5 Identification of the manual

Prepared: January 2002 Edition : 04 Rev.: 00 Date of revision.:

1.6 Nameplate information



The values indicated on the nameplate refer to testing with oil at 20° C and viscosity of 100 cSt

1.7 Field of application

The pumps are suitable for handling liquids of a viscosity up to 1000 cSt.

1.8 In case of breakdown

Telephone the following number: **049 82 94 111**

2 WARRANTY

- The manufacturer guarantees that only high quality materials are used in the construction of the pumps and that machining and assembly are carried out to the highest standards.
- The pumps are guaranteed against defective materials or faulty workmanship for a period of one year from the date of delivery unless otherwise specifically stated in writing.
- **The warranty is not valid if the pump has been tampered with by third parties.**
- Replacement of parts of the pump itself can only be carried out after careful examination of the pump in an authorised workshop by qualified personnel. The pump should be sent carriage paid.
- This guarantee does not cover parts subject to deterioration or normal wear and tear (seals, diaphragms, pressure and vacuum gauges, rubber or plastic items, etc.) or damage caused by misuse or improper handling of the pump by the end user.
- Parts replaced under guarantee become the property of the manufacturer.

3 GENERAL INSTRUCTIONS

The Goods must be examined upon arrival in order to ascertain any damage that may have occurred during transportation. Loss or damage must be notified immediately to the carriers and the sender. Check that the goods correspond exactly to the description indicated in the shipping documents and report any differences as soon as possible to the sender. Always quote the pump type and serial number stamped on the nameplate.

The pumps must be used only in applications intended by the manufacturer:

- the construction material
- the operating conditions (pressure, speed, temperature, etc.)
- the field of application

In case of doubt, contact the Technical Department of VARISCO POMPE at the following number:

049 82 94 111

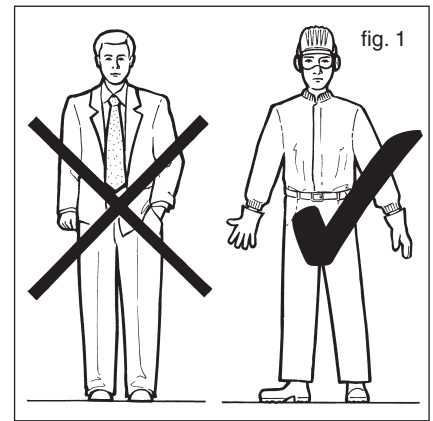
4 SAFETY AND ACCIDENT PREVENTION INFORMATION

When working near the pump, dress appropriately, avoiding clothing with loose items (ties, scarves, etc.) which could get caught in moving parts. Use overalls made according to safety regulations, gloves, insulating shoes, safety glasses, ear plugs and helmet (fig.1).

Do not carry out maintenance on the motor while it is running. Keep hands away from moving parts (e.g. belt, couplings, etc) Keep hands away from the hot areas of the engine. Do not stand onto the pump in order to carry out any maintenance operations of any kind.



VARISCO MAGNETIC DRIVE TYPE PUMPS UTILISE HIGH INTENSITY RANGE MAGNETS. MAINTENANCE OF THESE PUMPS IS, THEREFORE, NOT RECOMMENDED FOR USERS OF PACEMAKERS



5 IN CASE OF EMERGENCY

Shut down the motor.

Notify the person in charge of running the plant immediately.

6 HANDLING AND TRANSPORT

6.1 Method of transport

The pump must be transported in the horizontal position and stowed safely.

6.2 Hook-on

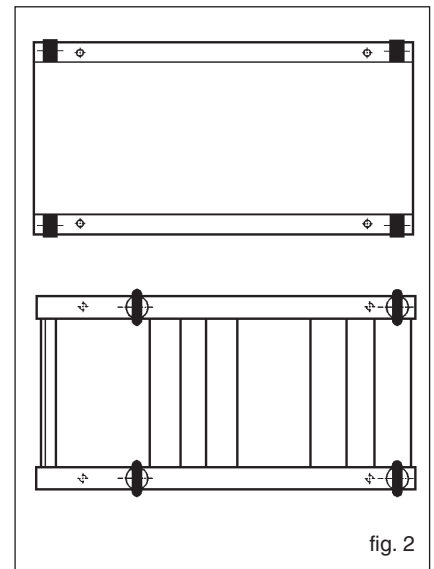
During the hook-on and maintenance operations, it is important to ensure adequate transport and handling techniques are used and that these employ appropriate hoisting. In order to avoid damage to the pump or injury to personnel, all movement and handling must be performed by specialised personnel.

The lifting rings of the various components must be utilised exclusively to lift those components.

In figure 2, the lifting points of some basements are indicated in bold..



Maximum lifting velocity : $V_{max} \leq 0,5 \text{ m/s}$



7 CONSTRUCTION AND FUNCTIONING

The series V-TRM are magnetic drive type volumetric pumps which are a mono block construction version with a stainless steel and cast iron support.

The main characteristics of these pumps is the magnetic type transmission. The external magnetic nucleus (847.1) (see figure 7 of Page 11) connected to the crank shaft (213) transmits the torque to the internal magnetic nucleus — rotor (02), the magnetic field generates the rotation of the rotor without physical contact. A glass (151) is positioned between the two nuclei which hermetically seal the liquid pumped from the atmosphere (see figure 7 Page 9).

The design of the pump was performed in collaboration with CDR Pompe, a company which has been present in the market for over 20 years and is leader in the design and manufacture of drive components.

8 INSTALLATION

8.1 The pumps are tested and regulated with a liquid which also serves to protect the internal surfaces for six months from the date of shipment.

This liquid is a mixture of oil and passive neutral detergent; if this liquid can pollute the product that is to be pumped, it is necessary to wash out the pump before installation **Do not pump water for any reason or leave traces of water in the casing.**

8.2 Install the pump as close as possible to the source of liquid that is to be pumped, leaving sufficient space for inspection and maintenance access. In particular, space is required in front of the pump in order to remove the cover, near the gland for replacing the packaging, near the oil discharge plug of the gear box (if fitted) and on the terminal box side of the electric motor.

8.3 Identify the suction and discharge ports before installation. V series pumps are totally reversible: the direction of flow can be inverted by changing the direction of rotation of the shaft. This means that the suction and discharge ports are not fixed at the outset but can be interchanges. If a by-pass relief valve is fitted, however, it will operate in only one direction of flow (see paragraph 7.4).

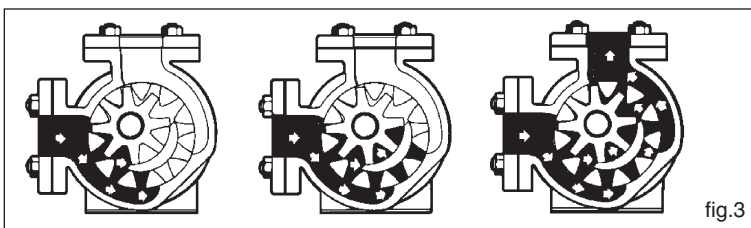
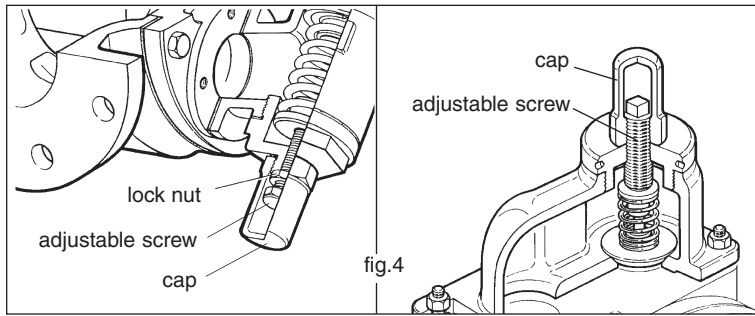


Figure 3 shows the flow path of the liquid inside the pump; as the gears open, liquid is drawn into the pump through the disjoints of the teeth in between the rotors which are, therefore, in proximity the suction port. The liquid is carried between the gears and the crescent and is expelled from the discharge port as the gears mesh during the rejoining phase of the teeth.

- 8.4 It is always advisable to mount a by-pass relief safety valve which can be supplied and mounted even after the pump has been installed. If for any reason the discharge line should be blocked when the pump is operating, the pressure generated can reach extremely high levels, thus endangering the transmission organs or the pipework joints. The relief valve is mounted externally on the pump cover or casing and can be calibrated from the outside.



With reference to figure 4, the force exerted by the spring onto the valve can be either increased or decreased by means of the regulation screw positioned under the cap. When the pressure generated by the pump acts on the lower face of the valve plate with a force equal to the thrust of the spring, the valve will begin to open. The pressure at which this occurs is called "cracking pressure". The liquid begins to flow through the by-pass towards the suction side. The full flow capacity depends on a pressure which is a function of the pump rotation speed and the viscosity of the liquid. The cracking pressure is the pressure setting of the relief valve. Unless otherwise specified, the by-pass is set at 2 bar.

Full flow through the by-pass is reached at an average over pressure of 15% of the cracking pressure.

The by-pass safety relief valve can be mounted onto the pump cover or on top of the casing. In the first case, the regulation screw cover cap must be on the suction side of the pump whilst in the second case (stainless steel pumps), it must be positioned on the discharge side.

If the pump is frequently used in both directions of rotation, it is advisable to mount a double by-pass, available upon request, which can be fitted in the place of the single by-pass.

ATTENTION: Do not use the pressure relief valve as a flow regulation device (for example in filling systems with a nozzle, in dosing plants etc.). The liquid which circulates through the pump is subject to heating and this causes the reduction in lubrication of the moving parts, especially of the idler bush. Furthermore, the liquid may vaporise or cause incrustations. In these cases, a return to tank line with a spring valve or other type of valve must be fitted to the pipework otherwise, a system to regulate the pump rotation speed may be installed. The pressure relief valve should, therefore, be used only as a safety valve in order to prevent damage to the pump or pipework caused by excessive discharge pressure.

If it is not possible to fit a relief valve, a system which breaks the power transmission between the motor and pump, such as a torque breaker coupling should be fitted. Torque converters are unsuitable for the following reason; they only ensure smooth start-up of the pump. AT and AW model pumps for abrasive liquids cannot mount a by-pass as they are not suitable for products which wear out the valve seat.

- 8.5 The base plate onto which the unit is mounted should be sufficiently robust and should absorb vibrations rather than cause or amplify them. Steel base plates supplied by Varisco meet these requirements. The foundations onto which these base plates are to be mounted should be perfectly level and at least 50-100 mm wider than the base plate. In order to avoid deforming the base plate, shims should be added to the anchor bolts if required. The anchor bolts, with forms that are defined in the current normative and available upon request, should be adequate for the force applied and must have a diameter which is proportional to the holes of the base plate.

Check the alignment of the unit after tightening the anchor nuts and before connecting the piping.

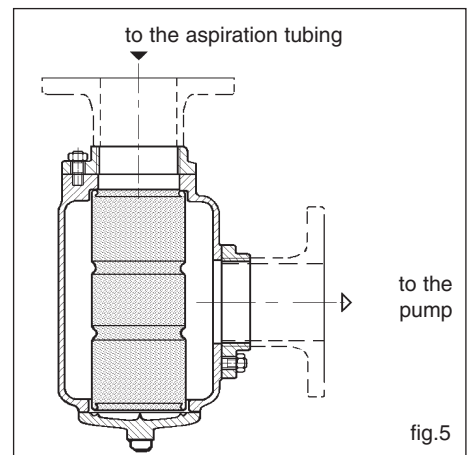
- 8.6 The pipework must be suitably sized to ensure that the pump operates with the required performance. Most of the problems are related to the suction line. Other sections of this manual contain useful tables related to the correct dimensions of the system. It is, however, necessary to follow some important points:

- 8.6.1 The diameter of the pipes must never be less than that of the pump ports.
- 8.6.2 Ensure that the pipes are clean and do not contain any foreign material such as nuts, screws, rags, welding slag, pieces of electrodes, etc.
- 8.6.3 Mount a non-return valve in the piping in order to avoid having to fill it every time the pump is started. If the pump operates on a suction lift, install a foot valve which is large enough not to create excessive losses due to friction.
- 8.6.4 The suction pipe must have a diameter equal to or greater than that of the pump suction port and should not contain any upward bends where air pocket can be formed.
- 8.6.5 The joints of the suction pipe must be perfectly airtight: use either flanged or threaded joints with teflon tape or tow on the threading. During pumping, the pressure in the suction pipe is lower than the atmospheric pressure if the pump operates on suction lift. This means that any leaks in the pipe will not cause the liquid to drip from the pipe but air will be drawn in through the leaks which is more difficult to detect.
- 8.6.6 It is recommended that both pressure and vacuum gauges be installed to check the pressure. The pumps are fitted with connections adjacent the suction and discharge flange for the mounting of gauges.

- 8.6.7 Install a filter in the suction line in order to intercept any impurities or foreign bodies in the liquid which could damage the pump. The filter basket must have a surface for free passage on the suction side of the pump. Special care should be taken when filtering high viscosity liquid; it is recommended to oversize the filter. The filter screen holes must be sized so as not to impede the operation of the pump. The following table indicates the maximum size of the filter screen holes for the various pump models:

The filter should be installed in such a way that it is easy to clean. During installation, take care that the direction of flow is that indicated by the manufacturer. The liquid should always flow from the inside of the basket towards the outside.

Varisco manufactures filters with replaceable baskets which can be opened without the aid of tools (fig 5). The drawing indicates the recommended mounting position in which the filter basket can be cleaned quickly.



Pump type	Dim. (mm)
V20, V25, V25-2, V30-2, V50-3, V60-2, V70-2, V80-2, V85-2, V90-2, V100-2	0,8
V120-2, V150-2, V151, V180, V200	1

9 STARTING

During the pump start-up phase, special care should be taken and the following points should be followed in order to avoid expensive problems. See the respective manuals of each model pump for the recommended spare parts for start-up.

Before starting the pump, check the following:

- Check that all safety devices are in operation.
- Fill the pump. When the pump is empty (completely dry) it should **NOT** be started, except in **exceptional cases** but only for a few seconds. Otherwise, there is a very high risk of mechanical damage, which can even be quite severe.
- When full, the pump should be well bled. The pump casing is usually constructed to be self-breathing. Therefore, it is important to check that there are no air bubbles within the piping, especially in the **suction line**.
- Check the alignment of the pump, gear box (if fitted) and motor.
- Check that the filter and pipework are free from welding scales and metal shreds.
- Check that the joints are well tightened.
Check that the piping does not weigh too heavily on the pump casing. See the maximum permissible nozzle loads in the first section of the Technical Manual. If the liquid can reach high temperatures, check that expansion joints are fitted in the pipework. Check the electrical connections and rating of the motor and check its rotational direction.
- Ensure that the direction of rotation of the pump is correct. The control of the rotation direction of the pumps installed on a base with a B3 type motor should be carried out by uncoupling the motor from the pump by removing the appropriate spacer of the two half-joints. For pumps close coupled to a B5 and/or B14 type motor, the rotation direction should **ONLY** be checked when there is liquid in the pump.
- If a by-pass relief valve is fitted, it must be mounted correctly.
- The inside of the tube should not be dry, especially if it is to self-prime. Fill or wet the internal parts with oil, the liquid to be pumped or a liquid that is compatible with the liquid pumped.
- Check that the pump shaft is free to rotate. Prior to start-up and with the certainty that there is liquid in the pump, check that the pump-motor coupling can be hand turned freely and that the pump/motor alignment is correct.
- During assembly, the pumps are protected with a passivating oily liquid. If this liquid is not compatible with the liquid pumped, the pump must be disassembled and cleaned (see point 8.1)
- Fit the connections for the pressure and vacuum gauges.
- Do not use V series gear pumps for tests with water.
- Prior to pumping liquids that are different to those for which the pump is intended, consult the Technical Manual and other specific model manuals or consult the Sales Department.
- Check that all of the valves are open. The pump must be started with the **suction and discharge valves completely open**.
- For pumps with heating jackets which are destined for pumping liquids that can solidify, it is recommended to heat the pump by means of the appropriate heating chambers for at least two hours prior to performing the start-up procedure.
- To check the correct operation of the pump at the required duty point, it is absolutely necessary to install a pressure gauge on the delivery line upstream of the control valve. In certain cases it is advisable to install a vacuum/pressure gauge on the suction line.
- By means of the pressure gauge and, if fitted, the flow meter, check that the pump is operating within the correct range with respect to the duty point and the performance curve.
- After starting the pump, check that the liquid has entered and that the pump is operating correctly. If, after 1 minute, the pump is still running dry, stop the pump and check the pump and pipework following the indications of point 10.1 described below.

For any problems, doubts or information, VARISCO technicians are at your complete disposal. Do not hesitate to contact us in order to avoid operations which could compromise the correct operation of the pump.

10 OPERATING PROBLEMS

If operating problems are encountered either upon start-up or after the pump has been running for some time, proceed as follows prior to intervening onto the pump:

- ensure that there is no pressure within the pump.
- ensure that the pump does not start-up again by mistake or through automatic controls (disconnect the power supply to the motor).
- read the following instructions carefully.

10.1 The pump fails to prime

- Incorrect rotational direction.
- No liquid in the pump to create a seal between the gears and the casing. The suction gauge hardly moves or else oscillates. If the pump is required to self-prime at every start-up and has difficulty in priming, it is advisable to fit a "goose-neck" or foot valve in the suction line in order to ensure that there is always liquid in the pump.
- Suction valve closed, suction line or filter clogged. The vacuum gauge reading is high.
- It is not easy to identify the leaks in the suction pipework. Listen for the characteristic hiss of the air leaks near the joints.
- The pump is not able to expel the air through the discharge line. Check that all of the valves are open; if necessary, bleed the delivery pipe.
- Excessive suction lift, especially when pumping liquid with high vapour pressure. Install the pump on flooded suction.
- Low rotational speed.
- By-pass relief valve blocked in the open position by impurities.
- Empty suction tank.
- Pump cover installed in the wrong position.

10.2 Low capacity

- Rotational speed too low for required capacity.
- Suction line or filter clogged or valve closed.
- The vacuum gauge reading is too high; Metallic cavitation sound.
- Air leaks into the suction line. The vacuum and pressure gauges oscillate. Check the suction line.
Attention: it is not easy to trace air leaks in the suction pipework. Listen for the characteristic hiss of air leaks near the joints.
- The by-pass relief valve is set at a pressure which is too low and causes some of the liquid to re-circulate within the pump Tighten the regulation screws as indicated in the respective manuals; the pressure gauge will indicate a higher pressure.
- Air pockets may have formed within the suction line, especially if the pipework includes vertical bends
- The liquid vaporises before entering the pump, especially when trying to pump liquefied gases or liquids with high vapour pressure on suction lift. The static suction lift is too high.
- The suction pipe is not sufficiently immersed into the liquid thus allowing liquid to enter the suction line. The vacuum gauge oscillates. The pipe must be immersed into the liquid to a depth of at least twice the diameter.
- The liquid is too viscous for the rotational speed of the pump. The vacuum gauge reading is too high and a metallic noise comes from inside the pump.
Fluidise the product by heating it; reduce the rotational speed of the pump; use tubing of a larger diameter.
- The pump cover has been mounted incorrectly.

10.3 Excessive pump noise

- Not enough liquid reaches the pump because the viscosity is too high. Reduce the rotational speed, increase the diameter of the suction pipework, eliminate the friction losses in the suction line.
- The pump cavitates because the liquid is too volatile. Increase the diameter and/or reduce the length of the suction line. Raise the level of the liquid in the suction tank; if necessary, mount the pump on flooded suction.
- Check the alignment of the couplings.
- The by-pass valve vibrates: tighten the regulation screw.
- Check the anchorage of the base plate and the pipework supports.
- Foreign bodies within the pump.
- The cover is mounted at 180° C with respect to the correct position.

10.4 The pump absorbs too much power

- Excessive rotational speed.
- Excessive viscosity: reduce the rotational velocity in accordance to the tables or else heat the product.
- Excessive pressure: increase the diameter of the delivery line, ensure that all of the valves are open and that the tubing is not clogged. Do not exceed the pressures indicated in the table.
- Check the alignment of the pump (noise will generate).
- Tolerances are too tight for the liquid to be pumped.
The brushes overheat and seize, and the extremity of the idler pin on the cover heats to over 80° C. Stop the pump and increase the tolerances as indicated by Varisco.

10.5 The pump wears out quickly

Rapid wear of the pump causes a sudden drop in performance. Following is a list of the main causes and respective remedies.

- The liquid is abrasive and contains solid particles. It is possible to note: grooves present on the surface, the brushes wear out quickly, the tolerances are changes and the surfaces are irregular.
Clean the tubing thoroughly, install a suction filter. Reduce the delivery pressure. Use the AT and AW version..
- Corrosion and formation of rust or porosity of the surfaces, pitting on the surfaces or damage of the elastomers. Check that the materials used are the more appropriate for that application, check that the liquid has not been contaminated and become corrosive.
Check that the concentrations indicated have not been altered and/or that the temperature of the fluid is within the limits allowed.
- Exceeding of the operative limits, excessive noise and breaking of the brushes, bent or broken shaft, vibrations etc. Use a larger pump, consult the catalogue for an appropriate model.
- Tight tolerances, seizure of the pump, over-heating and breaking or damage to the bushes, excessive power absorption. Increase the tolerances after having contacted Varisco.
- Noise reducer. Ensure that the lubrication of the reducer occurs according to the instructions.
- Misalignment, non-uniform wear (wear on just one side of the casing, of the packing or of the cover). Deformation of the casing due to weight of the tubes, misaligned coupling, belts too tight, base plate not level.
Check the alignment of the pump while running in conditions as close as possible to operating conditions, support the tubing, check the type of belt used.
- Dry running and pump seizure due to the deformation of the internal components, overheating and colour changes caused by excessive heat. Ensure that liquid is present within the system, mount a foot valve when starting the pump or install an adequate alarm system or motor cut-out for when the pump runs dry.

11 ROUTINE MAINTENANCE

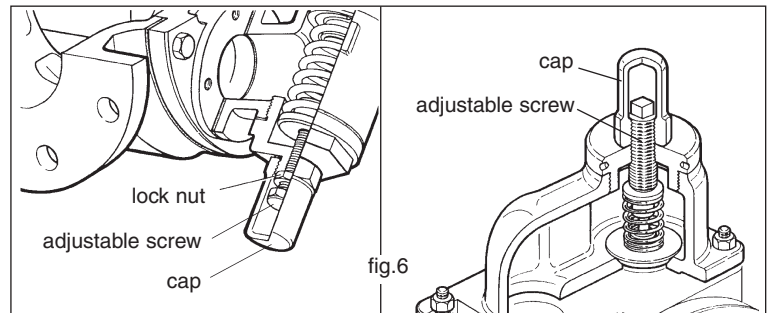
11.1 Regulation of the by-pass valve. (fig. 6)

Example of calibration of the by-pass at 8 bar

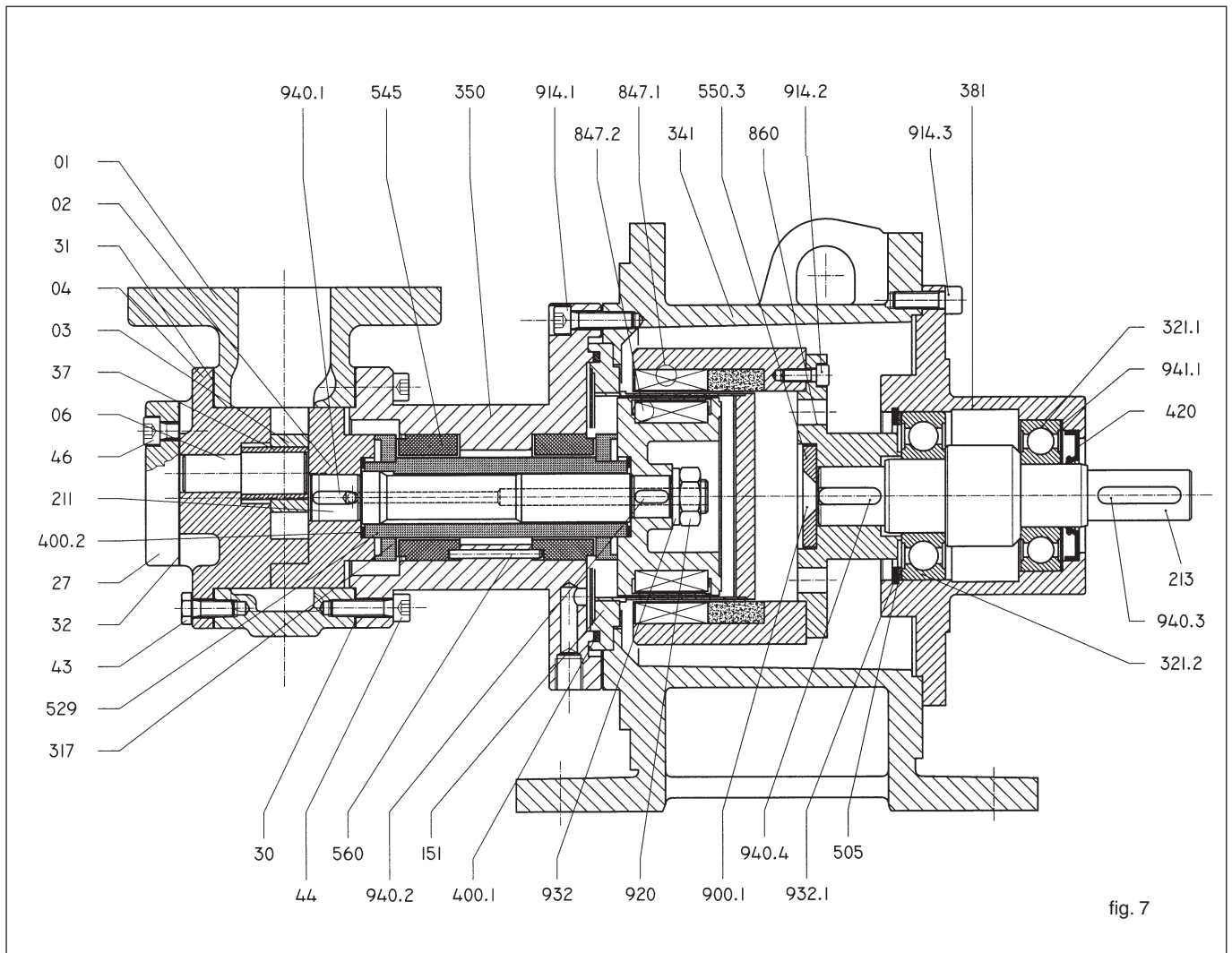
- ❑ Calibration must be performed while the system is running.
- ❑ Unscrew the cap.
- ❑ Loosen the lock nut.
- ❑ Close it almost completely by means of the regulation screw (turn it in the clock wise sense in order to load the spring).
- ❑ Adjust the delivery valve of the piping system until the pressure gauge reading on the delivery side reaches the requires setting (in our example , 8 bar):
- ❑ Loosen the regulation screw (turn it anti clockwise in order to unload the spring) until the pressure gauge reading starts to fall below the setting (ex. 8bar).
- ❑ At this point, the by-pass is set and the delivery valve can be opened to let the system operate normally.
- ❑ The same procedure should be followed in order to reset the by-pass pressure to either a higher or lower pressure..

Attention:do not loosen the screw too much. When the spring is no longer compressed, the regulation screw will freely loosen. It is not recommended to loosen the screw any further.

Attention: It is essential to use caution when working with inflammable or corrosive liquids.



12 DISASSEMBLY



If the pump is under warranty, do not disassemble it without consulting the manufacturer or their authorised representative. If this is not done, then the warranty will not be applicable.

Prior to opening the pump, check that:

- it is free from internal pressure.
- if liquefied gas is being pumped, that all the gas has been vented.
- it is cooled in the case where hot liquids are being used.

In the case of large heavy pumps, for example, the V100-2, V120-2, V150-2, V151, V180 and V200 models, adequate hoisting equipment is necessary to handle these components.

Prior to hoisting or moving them with belts or cables, ensure that the machine surfaces are protected .

Do not use water to clean the pump or its components. Should this be inevitable, dry it accurately and lubricate with oil.

12.1 Removing the cover (04) (fig. 7)

- Unscrew the nuts (43). Use the two threaded holes on the cover (if present) to facilitate the removal of the cover.
- When removing the cover, care should be taken in order to avoid the basket from damaging (31). Should this occur, replace it. Do not use damaged gaskets or gaskets with a thickness that is different from that of the original gasket.
- Slide the cover-idler assembly carefully out of the pump casing. .

Attention: When the cover has been removed, the idler may fall off the idler pin if it is not held. This could be a potential cause of injury.

- If the pump is fitted with a by-pass relief valve (figure 11) on the cover, it will not be necessary to remove it. If, however, the by-pass valve requires maintenance, loosen the screw (46) and remove it and ensure that the gasket(s) is/are not damaged (32). If the gaskets are damaged, replace them..
- If the pump is fitted with a heating racket on the cover (option +R2), this component will separate from the pump as soon as the screws are removed (43)(See fig. 7).

Should this occur, ensure that the gaskets are not damaged.

- If the cover-idler assembly does not require maintenance, go to paragraph 4.6.

12.2 Removing the idler (03) (fig. 7)

- Slip the idler from the idler pin (06). The idler bush is fitted in the centre of the idler. Some versions do not have an idler bush and mount a large diameter pin.
- The idler bushes can be composed of various materials. The choice of the material used depends on different factors such as the type of application intended etc..
- Remove the idler bush by means of a bench press. The brush is normally press fitted.
- Clean the bush accurately and check the surfaces for wear. Replace the bush if it has external or localised cracks, signs of abrasion, severe wear, deformation, external or localized blackening, rust, etc.

The tolerances and clearances of the bush depend on the version of pump used and specific application for which it is intended. It is, therefore, not advisable to replace the bushes with others of similar dimensions or of different material composition with respect to the original. The pump may be damaged.

Note:The bushes play an essential role for the correct functioning of the pump. They have been designed and tested to ensure perfect contact between the idler and the idler pin and between the shaft and support.

Do not improvise alternative solutions or adjustments which tend to alter the tolerances or chemical and mechanical characteristics.

- After removing the bush, the idler bush can be inspected.
- Clean it thoroughly and check the state of wear of the surfaces.
- In the case of evident traces of excessive wearing or ovalization of the hole, replace the idler.
- Insert the new bush using a bench press using a steady movement. For the V180 and V200 versions, heat the idler to 80° C and then fit the bush. Use a lathe to bring the hole up to tolerance indicated.

12.3 Removing the idler pin (06) (fig. 7)

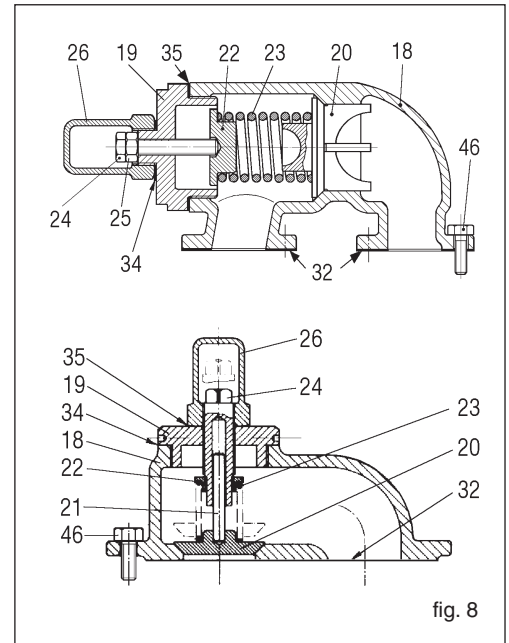
- The idler pin is fixed to the cover. The pin should be removed only if it requires replacement or when replacing the cover. It is not necessary to remove it to check the state of wear. The working surfaces of the idler bush sticks out completely from the cover.
- Remove the idler pin from its seat by means of a press.
If there are any evident signs of wear, the idler pin should be replaced. If the idler pin shows signs of overheating, this usually indicates that the idler tends to gall. Check the idler bush and idler thoroughly.

12.4 Removing the casing (01) (fig. 7)

- The casing can be removed without dismantling the pump from the basement. It will be sufficient to remove the screws from the suction and discharge flange. If the pump mounts a jacketed casing or cover, the auxiliary heating (or cooling) liquid pipes should be removed.
- Remove the screws (44)
- Disengage the casing from the support-flange (09), paying attention not to damage the basket (30). Should this occur, replace it.
- The support-flange remains centred with the support.
- Clean the casing thoroughly and check the state of wear.
Replace if necessary.

12.5 Removing and disassembly of the by-pass relief valve. (fig. 8)

- ❑ Remove the entire relief-valve assembly, unscrewing the screws (46) taking care not to damage the gasket(s) (32). If there is damage, it/they must be replaced.
- ❑ Remove the cap (26), the basket (35) by loosening the lock nut (25). Remove the cover (19), taking care not to damage the basket (34). If the basket is damaged, replace it.
Remove the valve washer (22), the spring (23) and the valve (20).
Check the state of wear of the valve and of its seat on the by-pass casing (18). If necessary, replace it..
- ❑ Check the spring and washer, replace if necessary.
Re-assemble the valve by proceeding in the opposite way.
Note: For the pressure setting, see paragraph 11.1. Set the valve to 1 bar more than the delivery pressure.



12.6 Disassembly of the magnetic joint (fig. 7)

- ❑ Dismantle the pump casing (01) from the support axle bearing (350) by unscrewing the appropriate screws (44).
- ❑ Dismantle the axle bearing support (350) from the lantern by means of the appropriate screws (914.1). Remove the nut (920) and lift the internal magnetic nucleus (847.2). Remove the footstep thrust bearing (317) and, therefore, the axle bearings (545) and (529).
The axle bearings are usually made of very fragile synthesized material and should, therefore, be handled with extreme caution.
- ❑ Remove the glass (151), unscrew the screws (914.3) and remove the support of the bearings (381) of the lantern. (341).
- ❑ Loosen the screw (900.1) and withdraw the external magnetic nucleus (847.1); remove the seeger (932.1) and the spacer (505), withdraw the primary shaft (213) with the relevant bearings (321.1) (321.2).

13 ASSEMBLY

The normal procedure involves the inverse of what is mentioned above.

13.1 Mounting the idler bush

- ❑ The bush of the idler should be mounted with the aid of a press. It is perfectly symmetrical and can, therefore, be mounted equally in either direction. When mounting the idler in its position, apply continual force. In the V180 and V200 models, preheat the idler and the support-flange to 80° C prior to introducing the bush. Wait for complete cooling and work the hole with a machine tool until the tolerance indicated by Varisco is reached.

14 STORAGE

If the pump is to be stored for a certain period of time, it is advisable to empty and clean it. If necessary, wash it with an appropriate solvent. Avoid using water. Pour some oil, fuel oil or rust preventer into the pump, grease the bearing and turn the pump over a few times. If the pump is to be left out in the open, close the ports and cover with a waterproof piece of canvas. In order to avoid condensation, ensure that ventilation holes are left.

15 SPARE PARTS

In order to order spare parts, indicate:

- type of pump.
- serial number of the pump.
- the reference number and the designer of the part, as indicated in the spare parts sheet.

16 DISPOSAL

- Do not abandon in the environment.
- The metal parts can be recycled back to the raw material.
- Grease and oil must be recovered and stored as indicated in the relevant legislation for disposal by approved bodies.
- The elastomere gaskets are to be separated and forwarded to be scrapped.



VARISCO POMPE S.r.l.

Zona Industriale Nord - Terza Strada, 9 - 35129 PADOVA - Italy

Tel. 049 82 94 312 - Fax 049 80 76 762 e-mail: export@variscopompe.com

Web site : www.variscopompe.com