Electric diaphragm pump on the frame

Technical specification:

Intended use	**To lower the groundwater level**
Make / Type	**Caffini / M30**
Maximal flow	**32 m3 / h**
Maximal head	**15 mwc**
Free passage	**Up to 60mm**
Maximal suction lift	**8,5m**
Suction connection	**4’’**
Discharge connection	**4’’**
Dimensions L x W x H	**1100mm x 900mm x 760mm**
Weight	**107kg**
Engine	**Electric motor**
Engine brand / Type	**Technomotori / GMA2**
Engine power / rpm	**3 kW / 1400 rpm**
Electro motor voltage / Phase / Frequency	**400V / 3 phase / 50Hz**
Rated current	**15A**
Connection socket	**32A with phase change**
GPS	**Not equipped**

Caffini PUMPS

Libellula 1-3” Electro

Libellula 1-4” Electro

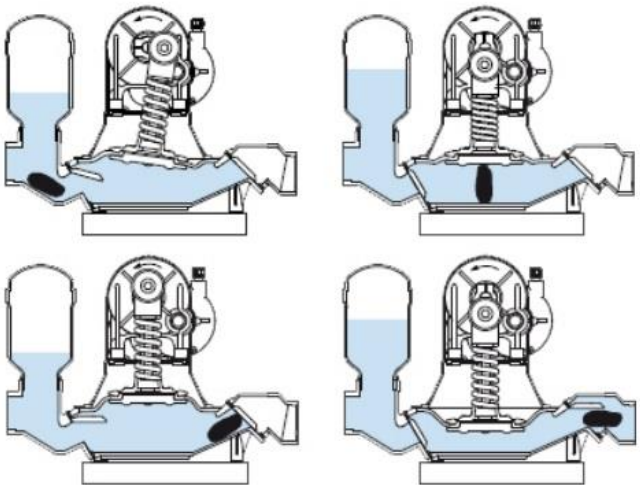
Contents

1 Description and working principle

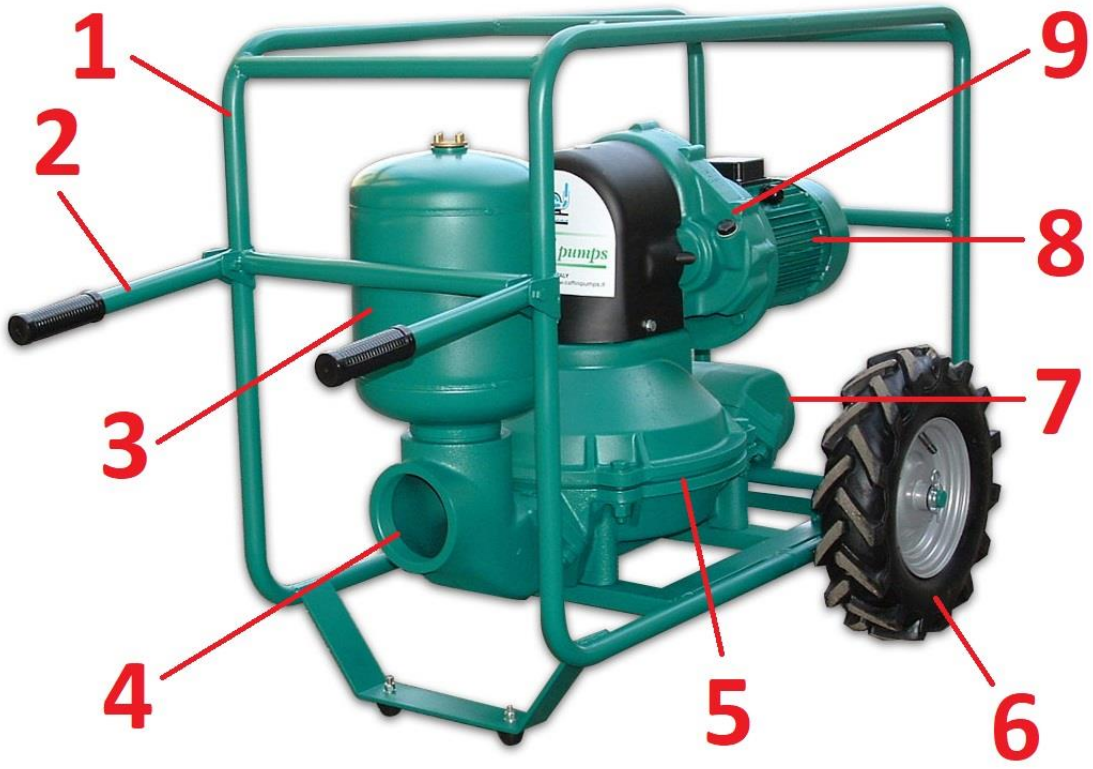
WARNING: **This manual is intended to give Important Information that must be followed during Storage, Transportation, Installation, Operation and Maintenance of the Pump-Set. We therefore recommend that this manual is read carefully before the Pump-Set is put into operation. To prevent damage being caused by inappropriate or incorrect use, or by being used outside the normal operating parameters of the Pump-set, the Instructions in this manual must be followed. Failure to do so may lead to damage to or premature failure of the Pump-set and may cause Injury. Any such actions will invalidate the warranty**.

Working principle:

Libellula pumps are diaphragm pumps with a coupling rod driven by a gear box speed reducer. The flow generated by the movement of the diaphragm is controlled by check valves at the suction and delivery. As the diaphragm rises away from the bottom of the casing it produces a vacuum which draws the liquid into the casing through the suction valve. When the diaphragm is on the downstroke, the liquid is expelled through the delivery valve. Libellula pumps are reciprocating positive displacement pumps. The delivery line must therefore have an adequate diameter and be free to discharge the liquid being pumped to avoid pressure build up which can damage the diaphragm or the drive mechanism. The pump should be connected to pipework using sections of flexible hose to avoid transmitting the pulsations of the pump to the rest of the system.



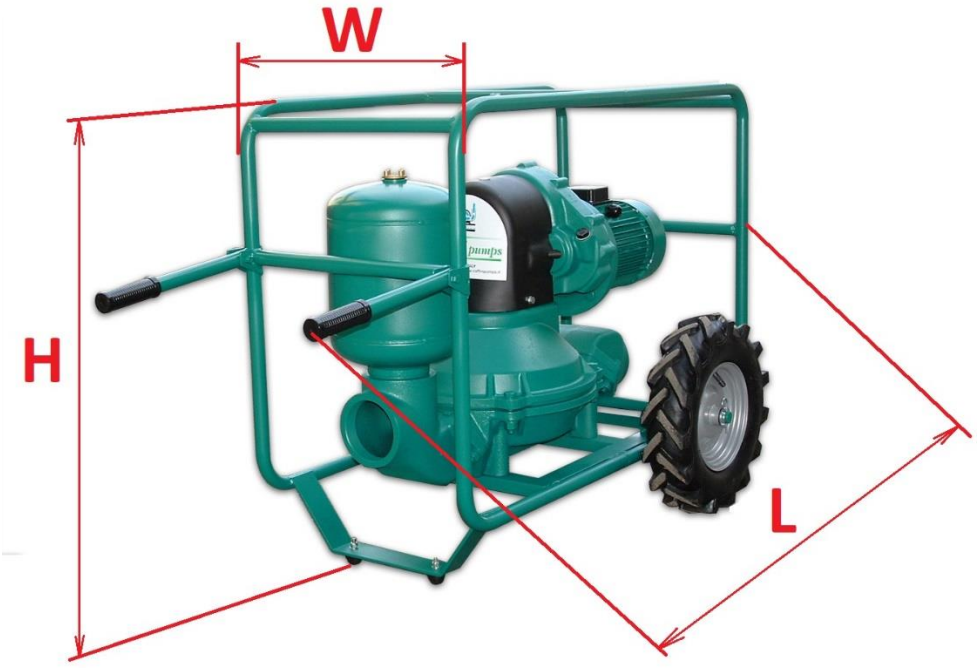
2 Construction



Main pump elements:
1 – Frame, 2 – Handle, 3 – Air chamber, 4 – Suction flange, 5 – Pump case, 6 – Tyre, 7 – Delivery flange, 8 – Electric motor, 9 – Gear box case

3 Specification and dimensions

Model	Libellula 1-3”	Libelulla 1-4”
Connection Dia	DN100 PN100	DN100 PN100
Maximum flow rate	18 m3/h	32 m3/h
Total head	15m	15m
Priming time	20 sec	20sec
Max. suction head	7m	7m
Engine type	Electro motor	Electro motor
Motor rotation speed	1400 rpm	1400 rpm
Motor power	2,2 kW	3,0 kW
Starting method	Electric switch	Electric switch
Net weight	79 kg	107 kg
Dimensions LxWxH (mm)	681x352x614 mm	1100x900x760 mm
Solids Handling	50mm	60mm



4 Use

4.1 Intended use

The pump is suitable for handling liquids or muds with solid parts in suspension. The pump has dry functioning possibility at indeterminate time. The Libellula can also be suitable for the transfer of food liquids; in this case, the user must ascertain that the materials in contact with the product are compliant to the relative Directives. The machine is designed and manufactured so that the parts in contact with the product to be pumped can be cleaned before each use; all coupling elements are smooth, without roughness or spaces where organic materials can be stored; the surfaces in contact with food products can be easily cleaned and disinfected.

4.2 Non – intended use

The pump is not suitable for pumping dangerous, flammable liquids or that can generate a potentially explosive atmosphere, except for the ATEX certified version. Should the pump be used for pumping particularly dangerous chemical products for contact with persons or things, it will be necessary to check with the supplier, the correct choice of the metal materials and of the elastomers of the pump parts that come into contact with the fluid. It will, however, be necessary for the installer to create a suitable basin in the operational area for containing the fluid that might leak due to accidental breaking of the pumping diaphragm and install remove controls for the machine start-up and switch-off and draining pipes of the fluids collection basin to enable maintenance operations.

5 Safety instruction

This manual contains warning and safety symbols. Do not ignore the instructions. They are provided for the benefit of your health and safety and to prevent damage to the environment and the pump unit.

DANGER
When the danger symbol with the text DANGER is shown, it is accompanied by information that is of great importance for the safety of everyone concerned. Ignoring the information can result in injury (possibly severe) or even death.

WARNING
When the warning symbol with the text WARNING is shown, it is accompanied by information that is of great importance for everyone concerned with the pump unit. Ignoring the information can result in injury or damage (possibly severe) to the pump unit.

The pump unit conforms to the European Machinery Directive. However, this does not exclude the possibility of accidents if used incorrectly.
Use of the pump for an application and/or deployment of the pump in an environment other than defined at the time of purchase is strictly prohibited and can result in a hazardous situation.
This is particularly true for corrosive, toxic or other hazardous liquids. The pump unit may only be installed, operated and maintained by persons who have received appropriate training and are aware of the associated dangers.
The installer, operator and maintenance personnel must comply with the local safety regulations. The company management is responsible for ensuring that all work is performed by qualified personnel in a safe manner. It is not permitted to make changes to the pump unit without written permission from Caffini pump.

Ensure that hot/cold and rotating parts of the pump are shielded adequately to prevent unintentional contact.

It is not permitted to start the pump if such guards are missing or damaged.

The company management must ensure that everyone who works with/on the pump unit is aware of the type of liquid that is being pumped. These persons must know what measures are to be taken in the event of leakage.
Dispose of any liquids that have leaked, in a responsible manner. Observe local regulations.

Never allow the pump unit to run with a blocked discharge line. The heat build-up could lead to an explosion

WARNING
Only appropriate fire extinguishers (e.g. carbon dioxide) are to be used in case of fire or any other situation where open flames appear inside or outside the equipment. It is strictly prohibited to use water to put out the flames

THE FOLLOWING ACTIONS ARE STRICTLY FORBIDDEN:

- **Using the pumps in a potentially explosive atmosphere.**
- **Carrying out maintenance with the engine running.**
- **Climbing on top of the engine-driven pump to perform work of any kind.**
- **Do not use the engine-driven pump indoors.**

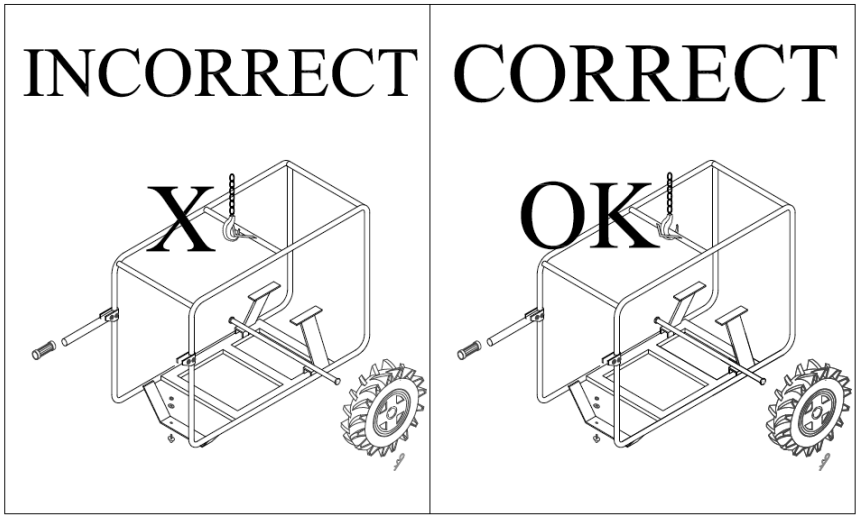
	**Suspended loads danger**
	**It is forbidden to stand under the loads**
	**It is forbidden to remove safety protections**
	**ATTENTION, do not open with the engine running**

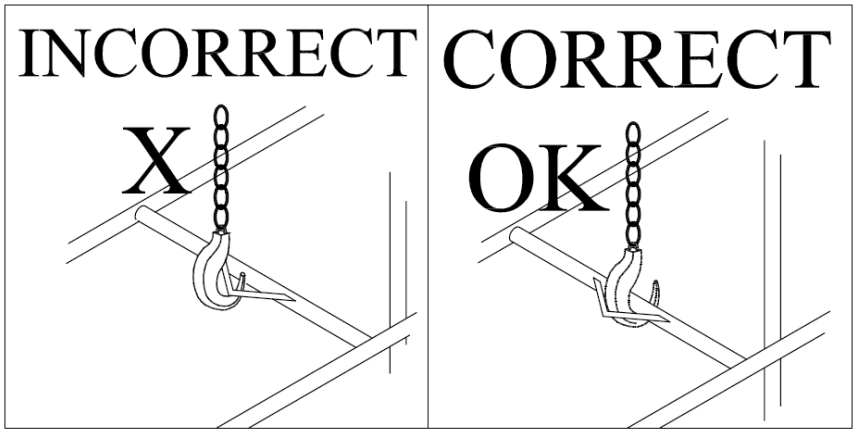
6 Transportation and lifting

The machine can only be handled with the suction and delivery piping disconnected and with the power supply motor still or disconnected. The machines installed on frame can be handled with lifting appliances that can be connected to the lifting hook envisioned on the same machine, using suitable safety systems.

The machine must be transported in horizontal position and in optimal safety conditions. Lift the unit using only the lifting points. Before handling the machine, check dimensions and weights on the plate. Do not stand within the action range during handling of the machine. During the start-up and maintenance interventions, envision a safe transport of all components using appropriate harness. Handling must be carried out by specialised staff to avoid damaging the machine and causing accidents to staff. The lifting points of the various components must only be used to lift the components for which they were supplied. Do not stand or transit underneath and near-by the machine when it is lifted from the ground. To anchor the machine to the transport surface, block the same using ropes or chains.

N.B. No additional accessory can be connected to the motor pump or electric pump unit during the lifting or the handling.



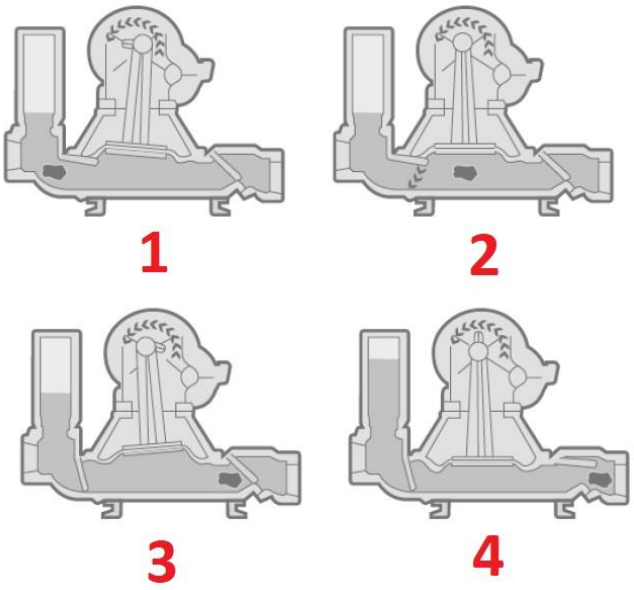


7 Pipework and installation

With regard to the use of engines coupled with pump, reference is made and the Standards given by the manufacturers of the same engines are expressly recalled, attached to this use and maintenance manual. Install the electric pump or motor pump units provided with metal frame on stable foundations and well anchored to the ground. The connection piping to the pump must be of flexible type or provided with flexible rubber bolt to dampen the vibrations due to the button flow rate. It is a good rule to prevent entry of large solids (max dimension 50 mm for 1-3" and 60mm for 1-4"), that might break the diaphragm or the connecting rod, by mounting a protective film at suction, supplied upon request. The suction and delivery piping must have a diameter equal or above that of the suction and delivery ports of the pump. Avoid curves, elbows or bottlenecks as much as possible that might limit the inflow or flow rate of the liquid to or from the pump.

Do not assemble shut - down valves: the pump is provided with clapet valves that work as check valves. In some cases it may be useful to install a pressure relief valve. Do not assemble flow choking valves on the delivery; to reduce the flow rate, envision a by - pass piping on the delivery, with return to suction basin, adjusted by ball or shutter valve.

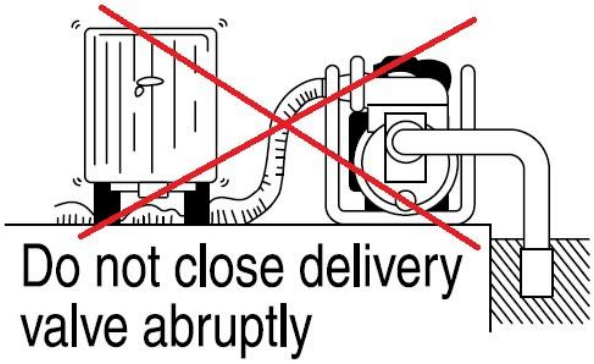
Ensure all joints are perfectly air sealed: check the threads, the gaskets of the adapters, of the ports, and of the quick couplings. Install the pump as close as possible to the fluid to be pumped, trying to decrease the length of the suction piping as much as possible (the maximum suction height is of 7 meters); in this way, the priming time decreases and greater flow rate is obtained. The maximum head of the pump is of 15 meters of water column; greater hydraulic loads negatively influence the functioning of the pump and limit the life - span of the diaphragm. For continuous uses, the total manometric head must not exceed the 10 meters of water column. The correct installation of the suction and delivery piping is assured by observing the flow direction recalled in most versions using directional arrows on the suction and delivery nozzles or, however, verifying that suction is on the nozzle with plug or air case. In installing units with endothermic engine, ensure maximum inclination of the engine does not exceed the 35° in transversal or longitudinal direction, in order to guarantee a correct lubrication value.

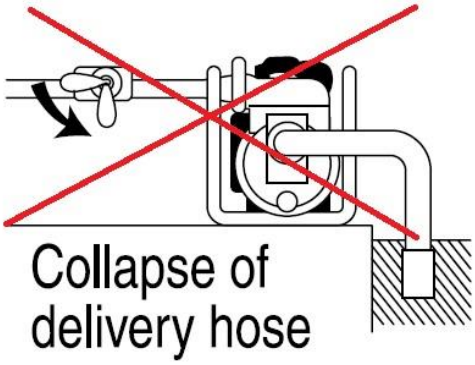


Beware of water hammering

WARNING

Do not allow any vehicle to run over the delivery hose.
Do not close the delivery valve abruptly because water-hammer may occur.
This may result in heavy damage to the pump.

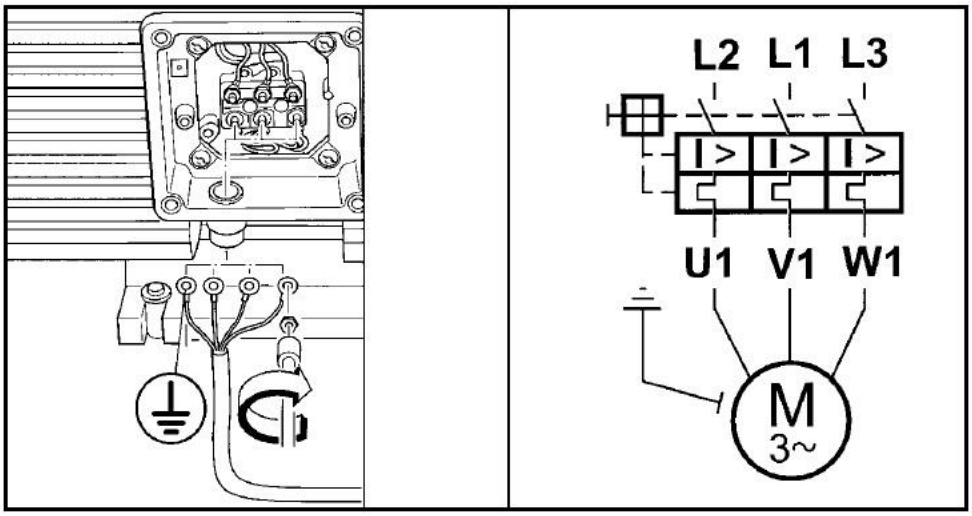




8 Electric connection

For versions with electric motor, the pump must be connected to an electric plant provided with earth system according to local technical Standards in force. For the single - phase version, keep to the current technical Standards. Ensure the plate voltage corresponds to that of the power supply network. Ensure the electric pump is disconnected from the electric power supply before carrying out any installation or maintenance operation.

Do not use the power supply cable of the pump to lift it or transport it. It is advised to install a differential switch with high sensitivity as additional protection against electric shocks in case of insufficient earthing. In the three - phase version, connect the earth wire (yellow - green) of the power supply cable to the earthing system of the power supply network. The installer has the responsibility of assuring that the earth system of the power supply network is in accordance with Standards. In the three - phase version, connect the pump to the feeder using a magneto thermal motor protector or a contactor with thermal relay. Every time the pump with a three - phase engine is connected to a different feeder, there are equal opportunities it turns in one direction or the other. The incorrect rotation direction causes a significant reduction of the flow rate and an incorrect functioning of the reducer. The correct rotation direction is that indicated with an arrow on the reducer body. If the engine does not turn in the right direction, invert the two phases between them after having disconnected the line.



9 Preparation for starting

1. Open recuctor oil level plug (1)

2. Visually inspect oil level, level must be approximately 1-2 cm below to oil checking hole edge (2)

10.Preparation for starting

DANGER

Before operating the pump, check that all parts of the system have been correctly installed and that all safety devices are operative.

1. Check pump of any leakage.
2. Checking wiring and electric components
3. Checking safety and environmental risks
4. Checking visual inspection
5. Check of any cracks.
6. Check if not missing or damaged parts.
7. Suction and discharge ports are not damaged.
8. Ensure not obstacle is at delivery hose side.
9. Etc.
10. Check all piping.

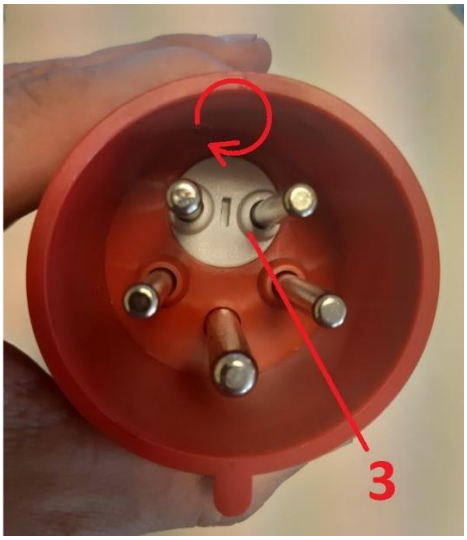
11.Starting

1. Check the pump type (type plate) and the characteristics of the pump unit, such as: rpm, operating pressure, power consumption, operating temperature, direction of rotation, NPSH, etc.
2. Check whether the pump unit is placed in accordance with the instructions. Pay particular attention to the area around the pump unit. Make sure the pump unit can draw adequate fresh air.
3. Check whether the prescribed safety provisions are in place.
4. Connect the hoses
5. Ensure strainer (suction filter) at the end of suction hose is in water
6. Perform preparation for starting
7. Connect pump plug with switch in socket.

8. Turn the plug switch (1) to position 1, pump motor will start.

If appears indicator light (2) then its mean motor rotation is in wrong direction.

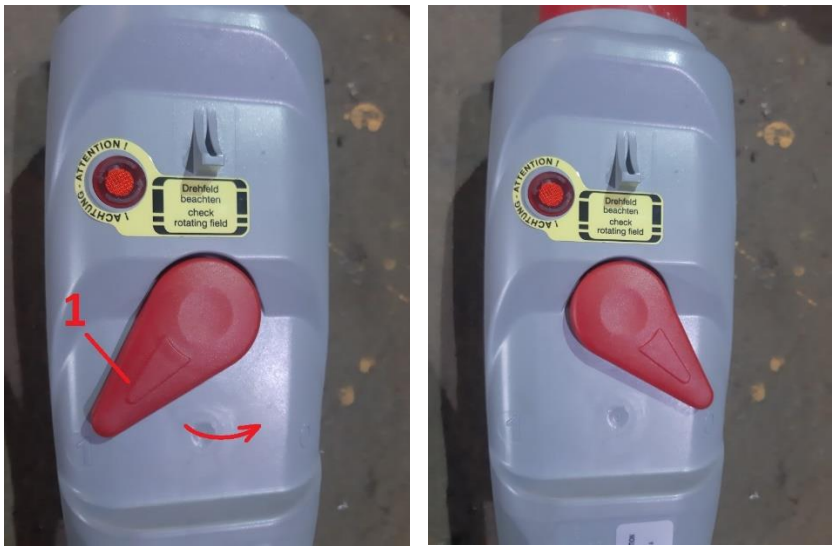
Turning phase reversal plug (3) its possible to change electric motor rotation direction. Warning light must extinguish.



WARNING
If vibration occurs during starting, stop the pump immediately and eliminate the cause before starting again.

12.Stopping

1. Turn the plug switch (1) to position 0, pump motor will stop.



2. When you suspect that the liquid is beginning to freeze, drain the pump while the medium is still in the liquid state

13. Draining the pump when there is danger of freezing

WARNING

If there is a danger of freezing, a pump used to pump a liquid that may freeze **must be drained** (while at a standstill).

1. Turn off the engine, disconnect all pipes and lift pumps suction side up around 45 degrees, wait till all water is drained out.

2. Lift back pump to horizontal position.

14. Troubleshooting

WARNING

In the event of a malfunction or abnormal operation, shut off the pump or pump unit immediately to prevent a dangerous situation and/or damage (possibly severe) to the pump or pump unit.
Inform to responsible persons. Determine the cause of the malfunction. Resolve the problem before restarting the pump

Problem	Possible cause	Verifications and solutions
The pump works but does not supply	Excessive suction height	Reduce the suction height
	The suction piping is not airtight	Restore seal of all gaskets of the piping
	Blocking of the pump	Remove any blocking bodies inside the pump
	The suction pipe is not fully submerged inside the liquid to be pumped	Fully submerge the suction pipe so it does not suck air
	The suction filter is blocked	Clean the suction filter
	The suction and/or delivery valves have remained in open position for the presence of a solid body	Remove the solid body
Low flow rate	The rotation speed is too low	Increase engine rotation speed, if possible
	The delivery pipe is undersized or blocked	Replace the pipe or clean it
	Too many curves or delivery pipe too long	Amend the delivery line
	Use of non-reinforced collapsible sleeve	Shorten or install a reinforced pipe
	Damaged pipes	Replace
Excessive noise	Damaging of reducer of speed	Repair of reducer by means of intervention of staff authorised by the Manufacturer
	The pump is not safely fastened to the parking stand	Ensure the parking stand is blocked by means of the fixing pin with insertion of the safety pin
	Suction is blocked	Clean piping
There is water above the diaphragm	The diaphragm is broken	Replace the diaphragm
	The screws tightening the diaphragm are loose	Tighten the screws

WARNING

If appear some pump defect and cannot find fault immediately contact Uprent technical department.