

TOP MULTI, TOP MULTI-AD, TOP MULTI-EVO, TOP MULTI-TECH, TOP MULTI-EVOTECH, UP, UPm, UPm-GE, NK, NKm, NKm-GE

IT ISTRUZIONI ORIGINALI PER L'INSTALLAZIONE ED USO
EN INSTALLATION AND USE INSTRUCTIONS

ITALIANO 1
ENGLISH 17



MADE IN ITALY



1 GENERAL INFORMATION

1.1 PURPOSE OF THE MANUAL

The purpose of this manual is to provide the necessary information for correctly and safely performing operations such as: installation, use and maintenance of the product.



This manual is an integral part of the product. It is recommended to keep a hard copy available at the place of installation until final dismantlement of the product.



Before installation, use and maintenance of the product, carefully read the following instructions.

The Manufacturer disclaims all responsibility in the event of any accident or damage due to negligence or failure to observe the instructions described in this manual or in conditions other than those stated on the nameplate. The Manufacturer also disclaims all responsibility for any damage caused by improper use of the electric pump (Ref."4.2 IMPROPER USE").

1.2 COMPANY NAME AND ADDRESS OF THE MANUFACTURER

PEDROLLO S.p.A.
Via Enrico fermi, 7
37047 San Bonifacio (VR) – ITALY
www.pedrollo.com

1.3 WARRANTY

For product warranty, please refer to the general conditions of sale (24 months from the date of purchase). Warranty includes replacement or repair of the defective parts FREE OF CHARGE provided that the manufacturing defect is recognized.

Product warranty is voided:

- if its use is not in keeping with the instructions and requirements described in this manual;
 - in the event of any changes or modifications made arbitrarily without the Manufacturer's authorisation;
 - in the event of any work not performed according to good engineering practice even if contemplated in this manual;
 - in the event of using non-genuine spare parts;
 - in the event of any technical or special maintenance work performed by personnel who do not belong to a Manufacturer Authorised Service Centre;
 - in the event of not carrying out the checks envisaged in this manual.
- The following parts, since they are normally subject to wear, have a limited warranty (which is not definable as it depends on the conditions of use):
- bearings;
 - impellers;
 - wear rings;
 - mechanical seal and lip seal ring (if present);
 - capacitor (single-phase models);
 - built-in check valve (if present).

2 SAFETY

2.1 TERMINOLOGY AND SYMBOLS

Meaning of symbols and indications used in this manual for easier understanding.



DANGER

Identifies a dangerous situation that, if not avoided, will cause severe personal injury or death.



WARNING

Identifies a dangerous situation that, if not avoided, may cause severe personal injury or death.



CAUTION

Identifies a dangerous situation that, if not avoided, may cause personal injury to a light or medium extent.



Indications of **DANGER** or **WARNING** of an electrical nature.



Indication of **WARNING** or **CAUTION** for danger of contact with hot surfaces or liquids.



Indication of **WARNING** or **CAUTION** for danger of contact with cold surfaces or liquids.



Indication of **WARNING** or **CAUTION** for danger of release of contaminants.



Identifies a dangerous situation that, if not avoided, may cause damage to the product or cause irregular operation.



Indicates the obligation to read the instruction manual.



Specific information for the end users of the product.



Specific information for specialized technicians.

2.2 QUALIFIED PERSONNEL



WARNING

The product is intended solely for qualified personnel. Qualified personnel mean people who are able to recognize and avoid dangers during installation, use and maintenance of the product.

Qualified personnel is divided into:

- End user of the product.
- Specialized technician.
- Technician of the Manufacturer Authorised Service Centre.



WARNING

It is prohibited for the end user to perform operations restricted to specialized technicians.

The Manufacturer is not liable for damages resulting from failure to comply with this prohibition.

2.3 UNSKILLED USERS

WARNING

The appliance can be used by children (aged from 8 years and above) and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children must be supervised so that they do not play with the appliance. Cleaning and maintenance intended for being done by the user shall not be done by children without supervision.

2.4 GENERAL SAFETY WARNINGS

WARNING

Always use personal protective equipment at the stage of unpacking, handling, installation, maintenance and uninstallation of the product.

WARNING

While lifting and handling the product, people must keep a safe distance.

DANGER

Do not underestimate the risk of drowning if the installation takes place in a well of a certain width and depth.

DANGER

Before any installation or checks with the pump stationary, maintenance, uninstallation, cut off the electric power supply and make sure it cannot accidentally be restored.

DANGER

If the electric pump is connected to a frequency converter (Inverter), once the power supply has been disconnected, wait 10 minutes to discharge the residual voltage before intervening.

DANGER

Before accessing to the terminal board of the electric panel, check that the terminals are free of voltage.

WARNING

During start-up, adjustment and maintenance, pay particular attention that there are no liquid leaks capable of causing injury to people.

2.5 PREVENTIVE MEASURES BY THE USER

The user must strictly observe the accident prevention regulations in force in the country where the electric pump is installed. He must also take into account the characteristics of the electric pump itself.

DANGER

User must not perform, under his own initiative, any operations or interventions that are not permitted in this manual.

DANGER

When starting the electric pump, avoid doing it when barefoot or, even worse, standing in water and having wet hands.

WARNING

Stop operation in the event of any malfunction of the electric pump.

2.6 RESIDUAL RISKS

Electric pumps equipped with thermal protection incorporated in the motor may restart unexpectedly following the automatic reset of the protection, if it was tripped due to motor overheating.

3 PRODUCT IDENTIFICATION

3.1 PRODUCT DESCRIPTION

This manual refers to multi-impeller mono-block submersible pumps in the series:

- TOP MULTI, TOP MULTI-TECH
- TOP MULTI-EVO, TOP MULTI-EVOTECH
- NK, NK-GE
- UP, UP-GE

They are equipped with closed impellers with floating wear-rings and a very small passage for any solid bodies which makes them suitable for clean water.

The delivery port is threaded: male in all TOP, female in UP and NK, according to ISO 228/1.

The TOP MULTI and MULTI-EVO are equipped with a sleeve with a built-in clapet valve applicable on the delivery port.

They are electric pumps cooled by the pumped liquid and so the immersion can go down to the minimum emptying level DL, from the support surface, indicated in "12 TECHNICAL DATA".

Due to their internal construction, the UP electric pumps, compared to the NK, require a high minimum starting level as indicated in "12 TECHNICAL DATA". The TOP MULTI-EVO and EVOTECH electric pumps, having a threaded lateral suction port, do not necessarily need to be submersed in the liquid to be pumped.

The delivery port is threaded: male for TOP, female for the other models, as per ISO 228/1.

The single-phase electric pumps have incorporated in the motor:

- the starting/running capacitor;
- thermal protection.

3.2 NAMEPLATE

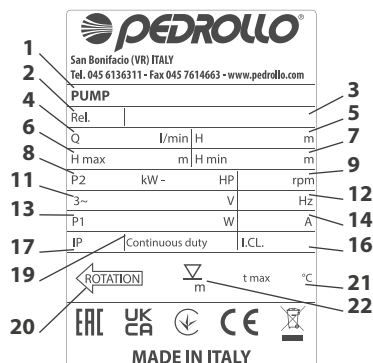
Example of single-phase electric pump nameplate.



San Bonifacio (VR) ITALY
Tel. 045 6136311 - Fax 045 7614663 - www.pedrollo.com

1 PUMP		3
2 Rel.		5
4 Q	l/min H	m
6 H max	m H min	m
8 P2	kW - HP	rpm
10 ~	V	Hz
13 P1	W	A
15 C	C _u F - VL I.C.L.	16
17 IP	Thermally protected - Continuous duty	19
18 ROTATION	Δ m t max °C	21
20		22





- 1) Model
- 2) Model revision index
- 3) Serial number
- 4) Min-max flow rate range
- 5) Heads corresponding to the min-max flow rates
- 6) Maximum head
- 7) Minimum head
- 8) Rated output power of the motor in kW end HP
- 9) Rated rotation speed
- 10) Symbol of single-phase supply and voltage range
- 11) Symbol of three-phase supply and voltage range
- 12) Frequency
- 13) Input power of the electric pump at full load
- 14) Rated current at full load
- 15) Capacity and voltage of the capacitor
- 16) Insulation class
- 17) Protection degree
- 18) Thermal protection inside the motor
- 19) For continuous duty
- 20) Impeller rotation direction
- 21) Maximum liquid temperature
- 22) Maximum submersion depth

4 USE AND OPERATING LIMITS

4.1 INTENDED USE

These electric pumps are recommended for supplying clean, clear or slightly dirty water from tanks, basins and wells.

They also accept the presence of small solids or sand, with the limits given in "12 TECHNICAL DATA". They are used for the distribution of water in the civil sector and for the irrigation of vegetable plots and gardens.

They can also pump other clean liquids provided that these liquids are not aggressive to the materials they are made of and with a density and viscosity close to the water ones.

They are designed for fixed installations but the TOP MULTI pump series can also be used in portable installations with a flexible delivery pipe.

However, they are all equipped with a 10 m long power cable covered in "H07 NR-F" grade rubber (Denomination 245 IEC 66).

DANGER

Electric pumps intended for cleaning and other maintenance work on swimming pools, for being used in outdoor fountains, in garden ponds and similar places must not be used when there are people in the water and must be powered through a residual current device, with a rated operating residual current not exceeding 30 mA.



Their use is always subject to the directives of local legislation.

4.2 IMPROPER USE

DANGER

It is forbidden to use the product to pump flammable or potentially explosive liquids.



WARNING

Improper use of the electric pump can create dangerous situations for people and things.



Improper use may refer to both the type of liquid pumped and the type of installation. Some examples of improper use:

- liquids not compatible with the construction materials of the pump;
- liquids with dense and filamentous substances;
- hazardous liquids such as toxic, corrosive, flammable or potentially explosive liquids;
- seawater;
- liquids intended for human consumption;
- liquids with a temperature above the specified limits;
- installations without adequate frost protection;
- water circulation in swimming pools;
- installation in potentially explosive or corrosive atmosphere.

Do not use the electric pump for flow rates greater than the maximum flow rate stated on the nameplate.

WARNING

It is forbidden to pump water for human consumption after use with other liquids.



WARNING

The electric pumps equipped with a cable shorter than 10m cannot be used in an outdoor environment.



4.3 OPERATING LIMITS

Maximum liquid temperature and maximum depth of submersion are stated on the nameplate.

Maximum density of the pumped liquid = 1000 kg/m³.

Power supply voltage and frequency: as stated on the nameplate and on the packaging.

Permitted voltage variation: $\pm 5\%$ (if a range of rated values is specified, these are to be understood as the permissible limit values).

The electrical data on the motor nameplate refer to the motor rated power.

Number of hourly starts: maximum 20 at regular intervals.

Overall dimensions and weights: see the data shown in the catalogue or on the internet website (Ref. "1.2 COMPANY NAME AND ADDRESS OF THE MANUFACTURER").

4.4 AIRBORNE NOISE DATA

When electric pumps operate fully submerged in the liquid, the noise is not detectable.

When operating partially submerged and for TOP MULTI-EVO and EVO-TECH, the average sound pressure level at a 1m distance, in a free field, is less than 60 dBA.

4.5 SPECIAL USES AND CONDITIONS

For any use other than as permitted in this manual, please refer to your local Dealer. For example: in the case of liquids with a temperature above 40°C or a density greater than 1100 kg/m³.

5 RECEIVING AND STORING



5.1 PRODUCT INSPECTION

Check that the received product complies with the order. In particular, check the motor number of phases voltage and frequency.

Check there are no obvious signs of damage on the outside of the packaging. If the product and any accessories show any sign of damage, accept the goods with reservation, reporting the reason on the carrier's copy of the transport document, or refuse the goods.

In any case, inform the Dealer within 8 days from the delivery date.

5.2 PRODUCT UNPACKAGING

Remove the packaging materials, paying attention to any metal staples, and free the electric pump.

The additional identification nameplate supplied with the electric pump must be kept for attaching on the electrical control equipment in fixed installations.

Check that the electric pump is intact, complete with all parts and that there are no signs of oil leakage. Otherwise inform the Dealer within 8 days from the delivery date.

If the product is not installed immediately, repackage it to prevent any environmental contamination.



WARNING

If in any doubt about the safety of the product, do not use it.

Dispose of all the packaging materials in accordance with local procedures and Regulations.

5.3 HANDLING



CAUTION

Although the product, with or without packaging, does not exceed the weight of 25 kg, use suitable means of lifting and transport and take the due precautions to avoid personal injury and material damage during handling.

Depending on the gross weight, stated on the packaging, the product can be handled manually or with the aid of specific equipment or adequate means of lifting and transport. Take care not to knock or drop the electric pump. Lift and transport the TOP MULTI electric pumps **solely by using its handle**.



DANGER

The electric pump must absolutely not be lifted by the float or the power supply cable. During transport and installation, be careful to not damage the cable and to avoid its end getting wet.

5.4 STORING AFTER DELIVERY

The packaged product must be stored in a covered and dry place, protected from heat and frost. Protected from dirt, vibrations and any mechanical damage. The cables and any exposed rubber parts must be protected from direct sunlight.

Do not place heavy objects on top of the packaging and do not stack multiple packages. If the product is stored for a long time, every 12 months, open the packaging, take out the electric pump and check the free rotation of the shaft as described in "6.2 PREPARING FOR INSTALLATION".

Finally, disconnect the electric pump and put it back into the packaging.

6 INSTALLATION



6.1 GENERAL INFORMATION AND PRECAUTIONS

Before starting the work, make sure that these instructions have been read.



WARNING

All the hydraulic and electrical connections must be carried out by specialized technicians who meet the requirements established by the regulations in force in the country of installation.

The specialized technicians must comply with the rules and directives of the installation country, with reference to:

- accident prevention procedures and use of personal protective equipment;
- selection of electric pump installation site;
- connection to the hydraulic network;
- connection to the electric network.



WARNING

Use suitable work tools.

Take the product out of its packaging.

6.2 PREPARING FOR INSTALLATION

To lift heavier electric pumps together with part of the coupled delivery pipe, special equipment may be necessary. With this, it must be possible to lift and lower the electric pump into the tank.

When installing the NK and UP pumps, use the special lifting eye, or pair of lifting eyes, "R" near the delivery mouth to **attach the safety rope** (Fig. 6.1).

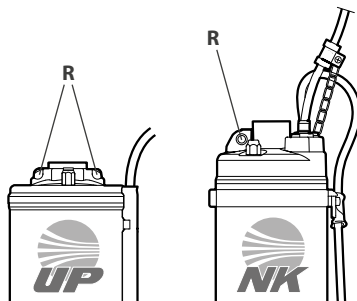


Fig. 6.1

Following the recommendations given in "6.6 ELECTRICAL CONNECTION", check the free rotation of the shaft. With the electric pump upright hanging, by the handle or by the safety hooks, perform a brief dry start test to rotate the shaft. You should perceive the reaction stroke of the motor.



If the shaft does not rotate, do not force it to try to unblock the pump, but look for the cause of the blockage or contact an Authorized Service Center.



Ensure at least 3 m of free cable above the liquid level.



Make sure that the supports and anchors for the delivery piping are adequate for its length and weight.

The electric pump may contain a small amount of residual liquid from factory testing. To avoid contamination of the liquid to be pumped, it is recommended to rinse it with clean water before final installation.

6.3 PLACEMENT OF THE ELECTRIC PUMP

Check the status of the installation site.



Make sure that the plant in which the pump will be installed has been designed for the maximum pressure it can generate.



DANGER

Do not install the electric pump in places with a potentially explosive atmosphere or in the presence of explosive powders.

If the electric pump is installed in a sump, it must have the minimum dimensions stated in "12 TECHNICAL DATA".

In any case, the size of the well or tank must be such as to be able:

- to accumulate a volume of liquid that allows the desired service;
- the start and stop cycles occurring with a frequency not greater than the maximum recommended (Ref. "4.3 OPERATING LIMITS").

All pumps are designed to be placed in a vertical position with the delivery port at the top. The NK and UP electric pumps can also be installed horizontally. In detail, a specific support kit is available for the UP only (fig. 6.2).

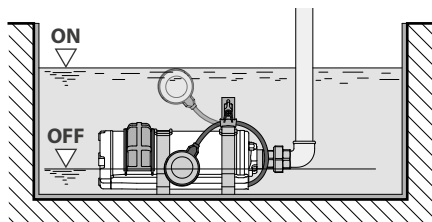


Fig. 6.2



WARNING

The maximum immersion depth of the electric pump, under maximum level conditions, must be within the limits indicated on its nameplate.



DANGER

Never hang the electric pump by the power supply or float switch cable.

The TOP MULTI-EVO and EVO-TECH electric pumps can also be placed in the air outside the tank (fig. 6.3).

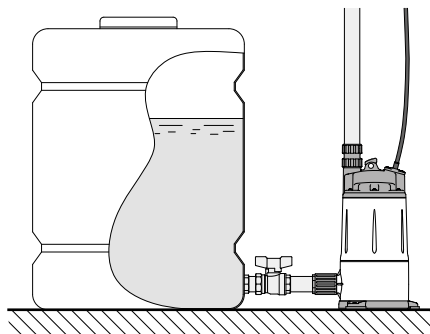


Fig. 6.3

6.4 CONTROL TYPE

Considering typical applications, these electric pumps are intended to be controlled by using a combination of one or more elements such as:

- pressure switch or pressure sensor,
- flow switch or flow sensor,
- level switches or sensors on the loading tank,
- automatic control device.

These may or may not be connected to an appropriate electrical control panel. The TOP MULTI-TECH and MULTI-EVOTECH electric pumps have the automatic control system located inside. The pump starts when there is a certain drop of pressure in the delivery line and stops when the flow drops below a minimum value, as indicated in "6.5.3 Self-supporting fixed installations - Pumps with the internal automatic control system".

For three-phase and single-phase pumps that do not have a built-in float, a minimum level sensor must be provided and connected to the panel to protect them against dry running.

The built-in float, when present, serves as a control only in applications where it is required to control the level of the tank in which the electric pump is immersed, in portable or fixed installations. Otherwise, the built-in float switch serves as a possible protection against dry running and for starting when a certain amount of water is available.

6.5 HYDRAULIC INSTALLATION



WARNING

To ensure the system safety against failure, use pipes, valves and accessories suitable for the maximum working pressure.



WARNING

The free side of the power supply cable must not be submerged otherwise water can get into the motor through the cable itself.

6.5.1 Delivery pipe

The delivery pipe must not have a size smaller than that of the pump port, even when using flexible pipes. It must not be excessively large so as not to have too low speeds that would not allow the possible elimination of air bubbles.

Recommended minimum speed of the liquid: 1 m/s.

6.5.2 Self-supporting fixed installations - Pumps without the internal automatic control system

In this installation the electric pump stands on the bottom of the tank supported by its suction filter or base and with the delivery circuit firmly anchored to the structure. Make the following provisions:

- a shut-off valve (5) to isolate the delivery circuit during inspection or maintenance;
- a three-piece joint (4) to facilitate disassembly and reinstallation;
- a check valve (3) the plate or clapet type.

It is suggested to place the check valve before the three-piece joint so that it can be easily inspected and, when necessary, cleaned with the pump dismantled from the installation.

If there is a possibility of dirt, mud, sand or other materials accumulating, create a rise with a flat support base (11).

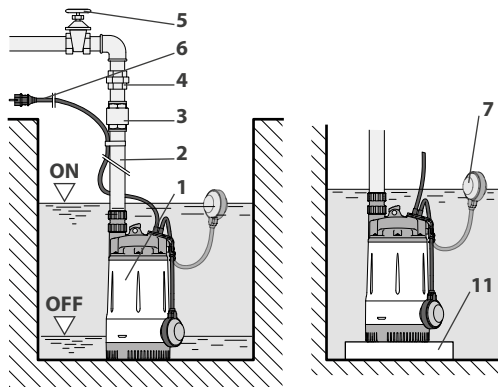


Fig. 6.4 - Installation of TOP MULTI pump.

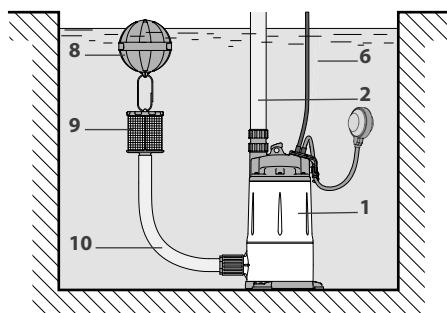


Fig. 6.5 - Installation of TOP MULTI -EVO pump.

1 = electric pump	7 = oscillating float switch
2 = delivery pipe	8 = floating for filter
3 = check valve	9 = suction filter
4 = three-piece joint	10 = suction flexible pipe
5 = shut-off valve	11 = flat base for raising
6 = power supply cable	

When there is a risk that the sump will dry out, adopt one of the following arrangements to let the air escape when the liquid level rises again. This will allow the liquid to reach the first impeller of the pump.

- Place the check valve away from the delivery port (at least 1 m);

- apply a small manual vent tap before the check valve (Fig.6.6-A);
- drill a 3mm hole on the delivery pipe just after the pump port (Fig.6.6-B). Position it close to the discharge port so that, when the pump is running, the small water jet escaping from it remains inside the sump.

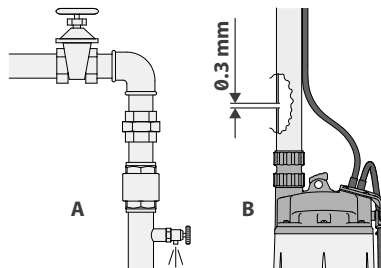


Fig. 6.6 - Venting arrangements.

The NK and UP pumps do not require any measures because they are already equipped with an automatic vent valve "V" (Fig.6.7) placed near the delivery port.

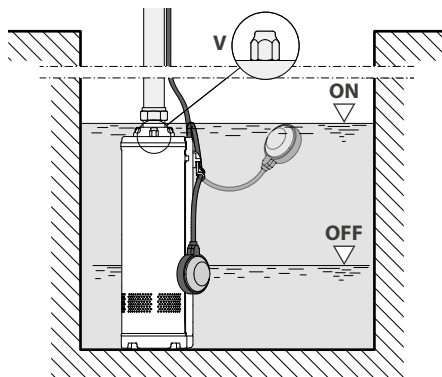


Fig. 6.7 - Automatic vent valve.

The TOP MULTI-TECH pumps also have an automatic vent valve, but it is internally located in the upper part.

If there is no risk of the sump drying out and if the required pressures are relatively low, TOP MULTI pumps can use the sleeve with built-in clapet valve included in the supply as a check valve (Fig. 6.8).

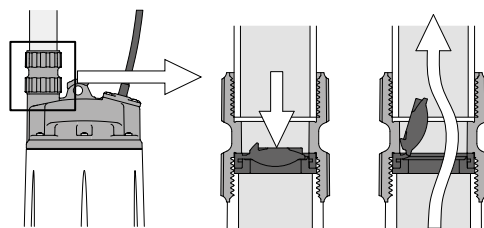


Fig. 6.8 - Use of the clapet valve for TOP MULTI.

6.5.3 Self-supporting fixed installations - Pumps with the internal automatic control system

The TOP MULTI-TECH and MULTI-EVOTECH are equipped with an internal electronic device that:

- starts the electric pump when there is a drop in the system pressure (for example when a tap is opened) below the restart pressure SP (Ref. "12 TECHNICAL DATA"),
 - stops it when the flow rate drops below 3 l/min for more than 10 s.
- The device also acts as protection:
- against dry running,
 - against blockage due to long periods of inactivity,
 - against too frequent starts.

It is also associated with an internal check valve, so, to operate properly, **it is not necessary to apply an additional check valve** on the delivery pipe.

For proper operation, **it is essential to install an expansion vessel** "ET" (minimum capacity 1 litre) with an appropriate pre-charge suited to the maximum height "Hu" of the highest user. Pre-charge pressure and maximum height are indicated in "12 TECHNICAL DATA".

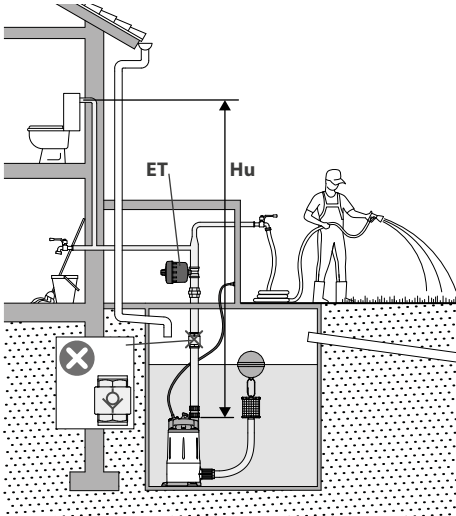


Fig. 6.9 – Installation of pumps with an internal electronic device.

6.5.4 Fixed installations not self-supporting

The NK and UP pumps can be kept suspended by the metal delivery pipe (Fig. 6.10). Tighten the threaded joints of the pipe carefully to avoid loosening.

When installing the pump in a well, it must be positioned at least 0.5 m from the bottom to avoid sucking up sand.

It is recommended to always attach a safety rope or chain, in stainless steel, or non-perishable material, to the pump so that it does not remain under tension.

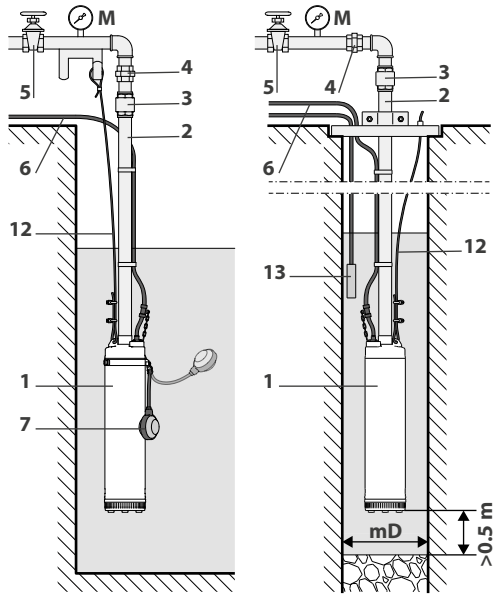


Fig. 6.10 – Fixed installations not self supporting

1 = electric pump	6 = power supply cable
2 = delivery pipe	7 = oscillating float switch
3 = check valve	12 = safety rope
4 = three-piece joint	13 = minimum level sensor
5 = shut-off valve	M = manometer

6.5.5 Portable installation (for TOP-MULTI)

This installation is characterized by the use of a flexible delivery pipe that is not fixed but positioned at the time of use.

Make sure that the pipe does not bend or twist due to the motor reaction torque. It is recommended to use pipes with an internal reinforcement spiral.

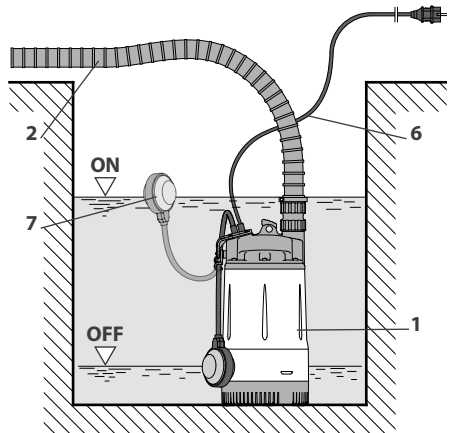


Fig. 6.11 – Portable installation.

1 = electric pump	6 = power supply cable
2 = delivery pipe	7 = oscillating float switch

For installations in deep tanks, a rope is needed to lower, anchor and lift the electric pump. The power cable must also be secured to this rope.

6.6 ELECTRICAL CONNECTION

6.6.1 Power supply line

Check that the voltage and frequency of the power supply line correspond to those indicated on the nameplate of the electric pump.



DANGER

Check that the power supply line has efficient earthing in compliance with the regulations.



DANGER

If not already present, install an adequate protection system against direct and indirect contact to avoid lethal electric shocks.



DANGER

Check that the power supply line is equipped with a switch that disconnects all the poles, with a contact gap of at least 3 mm, and that provides full disconnection under category III overvoltage conditions.



DANGER

The power supply line for electric pumps used in outdoor fountains, garden ponds and similar places, as protection against indirect contact, must use a residual current device with a rated operating residual current not exceeding 30mA.

Check that the electric wires are protected against vibration, impacts and excessive temperatures.

6.6.2 Portable installations

The TOP MULTI single-phase electric pumps, when used in portable installations, having the power cable equipped with plug, must be connected to a socket with its own switch. The thermal protection is incorporated in the motor.

6.6.3 Fixed installations

If not already present in the power supply line upstream of the electrical panel, as protection against indirect contacts, it is recommended to install a residual current device with a rated operating residual current not exceeding 30mA.

Single-phase electric pumps, with a cable equipped with a plug but without a built-in float switch, must be connected to an electrical power supply panel comprising:

- a single-phase socket;
- a main switch;
- an input for a float switch to control the start and stop.

Single-phase electric pumps, with a cable without a plug, with or without a built-in float, must be connected to an electrical power supply panel comprising:

- a bipolar switch disconnecter;
- if there is no built-in float, an input for a float switch or level sensors for the start and stop command;
- a possible input for the alarm signal to connect to a minimum level switch or sensor.

For these single-phase electric pumps, even though the thermal protection is incorporated into the motor, it is recommended to add fuses or a thermal-magnetic protection that intervenes in the event of a blocked rotor or strong overload.

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Three-phase electric pumps must be connected to a power supply panel comprising:

- a three-pole switch disconnecter;
- a motor overload cutout with manual reset, whose trip current can be set based on the motor's rated current;
- an automatic start and stop system by connecting to the control elements provided in the installation (Ref. "6.4 CONTROL TYPE");
- a possible input for the alarm signal to connect to a minimum level switch. Calibrate the amperometric protection on the rated current increased by 15%.

The panel must be adequate for the rated values of the electric pump. In the case of three-phase motors, it is advised to equip the panel with protection against phase faults.

Always refer to the instructions accompanying the electric panel.



The panel must be adequate for the rated values of the electric pump.



In the case of three-phase motors, it is advised to equip the panel with protection against phase faults.



Always refer to the instructions accompanying the electric panel.

Attach the additional adhesive nameplate with the pump data on the electric panel.

6.6.4 Connecting cables to the panel

It is recommended to leave 0.3 to 0.5 meters of extra cable to facilitate un-installation and any re-connections without a plug. However, this excess part should not be rolled up into a coil because it could overheat.



DANGER

First connect and secure the earth wire. It must be the last one to be disconnected in the event of uninstallation.



WARNING

Keep the earth wire longer than the phase wires. In the event of any accidental detachment of the phase wires, the earth wire must be the last to be disconnected.

Connect and secure the power supply wires, according to the wiring diagram inside the panel or in the relevant instructions.

Any extensions of the power supply cable must have wires of an adequate cross-section for the length and in any case no less than the wires of the electric pump cable.



WARNING

The junction between the extension cord and the power supply cable must be appropriate for its environment, and must be absolutely waterproof in the event of immersion or high humidity.

6.7 POWER SUPPLY WITH FREQUENCY CONVERTER (INVERTER)

Electric pumps with three-phase motors can be connected to a frequency converter for rotation speed regulation.

In order not to excessively reduce performance, the minimum working frequency must not fall below 60% of the motor rated frequency. In addition, the following recommendations must be observed.



The motor absorbed current must not exceed the current specified on the nameplate at the rated voltage and frequency.



Overload protection must be of the fast type and set no more than 15% above the rated current indicated on the nameplate.



The frequency may vary continuously from the minimum value up to the rated frequency of the motor, but not more.



The starting ramp must last at least 1 second from standstill to the minimum frequency value.



For subsequent starts, wait at least 1 minute before restarting the motor.



Make sure to limit the voltage peaks that occur when operating with the frequency converter at the values stated in EN 60034 standard (peak of 1000 V with a maximum gradient of 500 V/ μ s).

Furthermore, bear in mind that:

- avoid cable lengths between the frequency converter and the motor exceeding 15 m, otherwise the installation of additional filters is required;
- when sizing any extension cable, take into account the voltage drop due to the filters, if installed;
- if the modulation frequency can be selected, adopt a low frequency (4 to 8 kHz);
- prefer converters that allow keeping the Voltage/Frequency ratio constant and equal to that derived from the rated values on the nameplate.

7 PUTTING IN OPERATION AND SET-UP



7.1 PRELIMINARY CHECKS

Check:

- free movement of the floats or level switches,
 - the range of action with particular reference to the stop level.
- In addition, make sure that the difference between start and stop levels prevents the electric pump from starting more frequently than as specified in "4.3 OPERATING LIMITS".



Dry running is allowed only for the few moments necessary to check the rotation direction.

7.2 CHECKING THE ROTATION DIRECTION

In the case of three-phase motors, before finally lowering the pump into the tank or well, check the rotation direction.

With the pump vertically hanging by the specific lifting-eyes, start and immediately stop the motor observing the reaction stroke that must be:

- anticlockwise for NK pumps,
- clockwise for UP pumps.

If the rotation direction is incorrect, swap the connection of any two phases of the power supply cable in the panel.

If it is necessary to check the rotation direction of an already installed three-phase electric pump (for example after maintenance on the electric line), perform a start-up, with the shut-off valve open, for a short period sufficient to observe its behaviour.

Check the pressure (with a pressure gauge) or the flow rate (visible flow) in the two connection conditions of the power cable.

An opposite rotation direction causes a decline in hydraulic performance and an increase in noise and vibrations.



An incorrect rotation direction, maintained for long periods, can cause damage to the electric pump.

7.3 STARTING AND ADJUSTING

Place the shut-off valve 5 completely open, then check that the level in the tank or reservoir is such as to bring the built-in float or the level sensor to the ON position, otherwise let the liquid flow into the suction.

Check that the float switch or the level sensors do not encounter obstacles to their free movement and floating. If necessary, adjust the length of the float cable or the position of the sensors so that the minimum level condition against dry running is still guaranteed.

Place the main switch of the socket or of the electrical panel in the ON position so that the electric pump is free to start.

Typically, open the tap of the circuit of use or act in such a way as to activate the control element set up to give consent to the start of the electric pump. Check that:

- the electric pump is operating and there is a flow of liquid;
- the system pressure is increased;
- the absorbed current does not exceed the value stated on the nameplate.

Let it run for a sufficient time to verify:

- that the level of the liquid in the suction does not decrease below the minimum level to avoid dry running;
- that the electric pump is not required to start more frequently than specified in "4.3 OPERATING LIMITS"; otherwise, act on the system settings.

If the hydraulic performance is not achieved, there may be air inside the pump (unprimed condition). Perform a vent action.



If when starting it is thought that the electric pump is working abnormally, stop it immediately and seek the cause of the fault.

Under the expected operating conditions, the pump must work silently and regularly.

8 STOPPING AND DOWNTIME

8.1 STOPPING



The electric pump must be stopped in any case in which operating anomalies occur (Ref. "10 TROUBLESHOOTING").

- Gradually close the shut-off valve on the delivery side or act so that the control element that allows the electric pump to stop is activated.

NOTE: The internal electronic device of the TOP MULTI-EVO and MULTI EVO-TECH commands the stop after approximately 10 seconds.

In these pumps, to avoid blocking after long periods of inactivity, the electronic device commands a start every 48 hours, lasting 10 seconds.

- Turn-off the power supply and, in portable installations, remove the plug.
- Slowly open the shut-off valve, until it is completely open, and verify that the check valve is sealing.



Never remove the electric pump from the water when it is still working.

8.2 STOPPAGE FOR LONG PERIODS OR FOR FROST



In the event of stoppage for long periods of time or when there is a frost risk, disconnect and take the electric pump out of the tank, wash it with clean water and leave it to dry. Once dry, put it into its packaging or the equivalent. Proceed as indicated in "5.4 STORING AFTER DELIVERY".

Before subsequent reinstallation, check that there has been no oil leakage from the seal chamber.

With the exception of TOP MULTI-TECH and EVOTECH, if the electric pump has been stopped for more than 2 years, check the insulation resistance as indicated in "9.5.3 Measurement of Insulation resistance".

9 MAINTENANCE AND CHECKS

9.1 SAFETY PRECAUTIONS



WARNING

Always observe the provisions of paragraph: "2.4 GENERAL SAFETY WARNINGS".



WARNING

Maintenance, troubleshooting and remedies are intended only for specialized technicians who have the prerequisites required by the directives in effect.

They must also follow the accident prevention procedures specified by these directives.



WARNING

Always wear the personnel protective equipment and use suitable work tools.



WARNING

Use genuine spare parts, otherwise the warranty will be void. Furthermore, Pedrollo S.p.A. shall not be held liable for any damage to persons or property resulting from the use of non-genuine spare parts.

WARNING

Observe the instruction to contact the Authorised Service Centres, otherwise the warranty will be void.



Furthermore, Pedrollo S.p.A. shall not be held liable for any damage to persons or property resulting from any maintenance work or fault remedy not performed by the above-mentioned centres.

Since the lubricant contained in the electric pump is "non-toxic" (NSF rated H3), any leakage will not harmfully pollute the pumped liquid.

9.2 PERIODIC CHECKS



During normal operation, several times a year, it is advisable to carry out the following periodic checks on the electric pump in order to detect any anomalies:

- absence of starting difficulties;
 - verify the flow rate based on the characteristics of the installation system;
 - check the status of the level sensors or the float and their unimpeded movement;
 - check the absence of abnormal vibrations or noise;
 - check the cleanliness of the sump, tank or reservoir.
- In the event of anomalies, have a specialized technician promptly make more in-depth checks.

It is advised to note down the dates when the checks were made.

9.3 ROUTINE MAINTENANCE



The electric pump does not require routine maintenance provided that the precautions described in this manual have been taken. However, in order to promptly identify the need for special maintenance work, for demanding use, the following is recommended.

If not for anomalies, every 2000 operating hours or every 2 years, on reaching the first of the two limits, in addition to what is provided for in the periodic checks, perform:

- check the absorbed current;
- check the pressure with open delivery and closed delivery;
- remove the pump from the well, tank or reservoir (Ref. "9.5.1 Removing the electric pump from the tank");
- clean the filter or the suction grid, wash the electric pump;
- clean the level switches or the built-in float;
- check the condition of the power cables and cable glands.

If the content of solid substances is close to the limit, perform the checks at shorter intervals.

If problems arise, move on to special maintenance.

9.4 SPECIAL MAINTENANCE

Unless there are unexpected faults, the need for special maintenance is due to the achievement of a certain number of working hours that determines a certain state of wear related to the operating conditions.

It is not necessary until the pump significantly loses performance compared to the first start-up:

- flow rate below 50%,
- shut-off head below 80%,
- absorbed current increased by more than 8%.

Special maintenance of the electric pump, after proper cleaning (Ref. "9.5.2 Electric pump cleaning"), must be assigned to one of our Authorised Service Centres.

9.5 CHECK OPERATIONS



9.5.1 Removing the electric pump from the tank



DANGER

First of all, cut off the power supply and make sure that it cannot be accidentally restored.

If during removal there may be a risk of damaging the power supply cable of the electric pump, disconnect it from the panel and, in case of three-phase motors, note down the position of the phases. Secure this part of the cable appropriately to prevent it from falling into the well or tank.

Completely close the shut-off valve on the delivery and suction side, if present. Slowly open the three-piece joint to allow the internal pressure to discharge and then completely disconnect the pump delivery pipe. The TOP MULTI-EVO and EVOTECH electric pumps, if installed in the air, also require disconnecting the suction pipe. Remove the electric pump from the installation and disassemble the part of pipe still attached to the ports.

9.5.2 Electric pump cleaning

If the pump is used occasionally, typically in portable installations, it is advisable to clean it after each service by pumping clean water, to avoid deposits and encrustations.

In other cases, cleaning depends on the ordinary maintenance plan and the liquid pumped. On NK and UP pumps, the vent valve for priming must also be cleaned.

In TOP MULTITECH and EVOTECH pumps, if it is necessary to clean and replace the check valve inside the pump, it can be easily removed by unscrewing the sleeve on the delivery port.

9.5.3 Measurement of Insulation resistance



The TOP MULTI-TECH and EVOTECH electric pumps cannot be subjected to insulation resistance measurement because the test voltage would irreparably damage the internal electronic board.

With the pump uninstalled, at the ends of the plug or power cable, between the earth conductor and:

- single-phase motor: the contacts of the plug or the phase ends of the cable,
 - three-phase motor: one of the phase ends;
- connect a specific instrument capable of applying a voltage of 500 V DC for 1 minute. If necessary, remove the wires from the terminal block of the panel, noting their position so that they can be later reconnected in the same order. The resistance value, with the motor cold, must exceed 4 MΩ.



9.6 SPARE PARTS

To request spare parts, please refer to your local Dealer or Authorized Service Centre.

10 TROUBLESHOOTING



10.1 INTRODUCTION



WARNING

Always observe the safety instructions given in the paragraphs:
"2.4 GENERAL SAFETY WARNINGS"
"9 MAINTENANCE AND CHECKS"



WARNING

If it is not possible to eliminate a fault or for situations that are not contemplated, contact your local Authorised Service Centre.

Operations that must be performed by an Authorised Service Centre are marked with: "ASC".

10.2 TROUBLESHOOTING TABLE

TROUBLE	POSSIBLE CAUSES	REMEDY
The pump is not running	Unsuitable electric power supply	Check that the voltage and frequency correspond to what is shown on the duplicate nameplate.
	Loose or oxidized electrical connections	Clean and restore the connections.
	Lack of voltage (on all phases)	Check the panel with the related protections and/or the upstream part. Check the fuses and replace them if blown.
	Missing phase (three-phase motors)	Check the power supply and restore the missing phase.
	Single-phase motor with faulty capacitor	Replace the capacitor (ASC).
	Tripping of the incorporated thermal protection (when present)	Wait for the motor to cool.
	Lack of consent from the switches or level sensors	Check the operation of the switches or sensors.
	Jammed shaft	Uninstall the electric pump and send it to an ASC .
	Electric motor failure (broken phases, ...)	Repair or replace the motor (ASC).
Residual current device tripping	The motor has leakage	Repair or replace the motor (ASC).
	Power supply cable damaged.	Check the cable and, if necessary, have it replaced by an ASC .
	Residual current device RCD of an unsuitable type	Check the RCD type and replace it if necessary.
The thermal protection or the fuses trip immediately after starting	Phase fault (three-phase motors)	Check the electric power supply and restore the missing phase
	Power supply cable damaged.	Check the cable and, if necessary, have it replaced by an ASC .
	Protection contacts in the panel deteriorated or dirty	Clean and restore the contacts or replace the protection if necessary.
	Trip values of the protection or fuses not adequate for the motor current	Check the trip values of the components, modify or replace them if necessary.
	Electric motor faulty (short circuit, ...)	Repair or replace the motor (ASC).
	Excessive request of mechanical torque	Uninstall the electric pump and check the cleanliness of the suction grid. If there are many deposits or filaments, have the electric pump cleaned and checked by an ASC .

Continued ►

TROUBLE	POSSIBLE CAUSES	REMEDY
The thermal protection or the fuses trip after a few minutes or too frequently. High absorbed current	Trip values of the protection or fuses not adequate for the motor current	Check the trip values of the components, modify or replace them if necessary.
	Unsuitable supply voltage or not balanced	Ensure the voltage is within the motor operating limits and balanced over the three phases.
	High temperature of the pumped liquid	Act on the liquid supply to reduce its temperature.
	The pump works over the maximum flow rate, in the overload zone	Reduce the flow rate request within the flow rate range stated on the nameplate.
	The viscosity and density of the pumped liquid are higher than those used in the selection phase	Reduce the flow rate by partially closing the delivery valve or contact the local Dealer or Authorized Service Centre.
	Excessive request of mechanical torque	Uninstall the electric pump and check the cleanliness of the suction grid. If there are many deposits or filaments, have the electric pump cleaned and checked by an ASC .
	Excessive number of starts per hour	Take action on the system to reduce pump interventions.
	Electric motor deteriorated	Repair or replace the motor (ASC).
	If present, frequency converter (Inverter) incorrectly settled	Consult the instruction manual of the frequency converter.
The electric pump runs but the flow rate is poor or null	Wrong rotation direction of the three-phase motor	Check the rotation direction as described in 7.2
	Suction level too low with consequent formation of vortices and air ingresses	Adjust the built-in float switch or level sensors to increase the minimum level in the tank.
	Unprimed pump	For NK and UP electric pumps, remove it from the tank or well and check that the vent valve is clean. For other electric pumps, make sure that the instructions in 6.5 have been applied and that they work.
	Gas presence in the pumped liquid	Increase the dimensions of the tank or vessel and provide for degassing devices.
	Obstructed or jammed check valve	Clean and unjam the valve or replace it if necessary.
	Obstructed or broken shut-off valve.	Clean the valve or replace it if necessary.
	Obstructed pipes or components	Remove obstructions.
	Manometric head calculated erroneously	Check the calculations again and replace the electric pump with a more suitable one.
	Wrong rotation direction of the three-phase motor	Check the rotation direction as described in 7.2
The electric pump vibrates with noisy operation	Pump worn out or clogged	Uninstall the electric pump and check the cleanliness of the filter or suction grid and, if necessary, send it to an ASC for maintenance.
	Suction level too low with consequent formation of vortices and air ingresses	Adjust the built-in float switch or level sensors to increase the minimum level in the tank.
	Gas presence in the pumped liquid	Increase the dimensions of the tank or vessel and provide degassing devices.
	Pump worn out or unbalanced	Remove the electric pump from the tank and send it to an ASC for maintenance.
	The pump works over the maximum flow rate	Reduce the flow rate by partially closing the delivery valve.
	Electrical power supply unbalanced	Check that the main voltage is correct in each of the three phases.
	If present, frequency converter (Inverter) incorrectly settled	Consult the instruction manual of the frequency converter.

TROUBLE	POSSIBLE CAUSES	REMEDY
The electric pump starts too frequently (automatic start/stop)	Storage or surge tank of insufficient capacity	Replace the tank with one of greater capacity.
	Surge tank empty or faulty	Pre-charge or repair the surge tank.
	Starting device (pressure switch, sensor, etc.) incorrectly adjusted or faulty	Adjust the device or replace it if necessary.
	Level switches or sensors incorrectly installed	Check the levels of the storage tank and reposition the switches or sensors.
	Leaks from delivery pipe	Locate the leaks and repair the piping.
	Oversized electric pump	Reduce the flow rate by partially closing the delivery valve or contact the local Dealer or Authorized Service Centre.
The electric pump never stops (automatic start/stop)	The actual required flow rate is greater than the one used to select the pump	Reduce the requested flow rate or replace the pump with one of a greater flow rate.
	The electric pump runs but the flow rate is poor or null	See the specific section.
	Starting or stopping device (pressure switch, sensor, etc.) incorrectly adjusted or faulty	Adjust the device or replace it if necessary.
	Leaks from the delivery pipe	Locate the leaks and repair the pipe.

11 DISPOSAL

11.1 GENERAL INFORMATIONS



CAUTION

Electric pump demolition must be assigned to authorized companies specialized in the identification and scrapping of the different type of material (cast iron, steel, copper, plastic, etc.)



CAUTION

Do not disperse polluting parts (harmful liquids, oils, greases, etc.) in the environment.

For disposal, in addition to international laws for environmental protection, the regulations and laws in force in the country where this occurs must be followed.

11.2 EUROPEAN DIRECTIVE 2012/19/EU (WEEE)

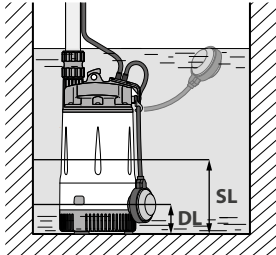


The crossed out rubbish bin symbol on the product indicates that, at the end of its useful life, it must be disposed of separately from household waste, by delivering it to a collection centre designated by local authorities for disposal, or by contacting the local Dealer.

The product is not potentially hazardous for human health and the environment as it contains no harmful substances as per Directive 2011/65/EU (RoHS), but if dumped in the environment it would negatively impact the ecosystem.

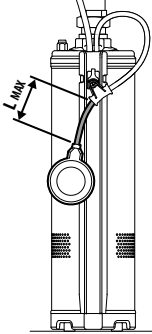
12 TECHNICAL DATA

For overall dimensions, weights and other data not specified here, please refer to the catalogue or product sheets available on the website (Ref.1.2).

Electric pumps		Solid bodies in suspension		Minimum starting level SL [mm]	Minimum emptying level DL [mm]	
		Dimension Ømax	Concentration SCmax			
TOP MULTI 1		1.2 mm	60 g/m3	100	25	
TOP MULTI 2, 3, 4, 5				110	35	
TOP MULTI-TECH 2, 3, 4, 5				110	35	
TOP MULTI-EVO 1		1.2 mm	60 g/m3	--	--	
TOP MULTI-EVO 2, 3, 4, 5				--	--	
TOP MULTI-EVOTECH 2, 3, 4, 5				--	--	
NK, vertical installation		1.2 mm	150 g/m3	95	35	
UP - 50Hz	UP - 60Hz	1.2 mm	150 g/m3			
2/2, 2/3, 4/3	2/2, 4/2			310	113	
2/4, 2/5	2/3			340	113	
4/4, 4/5, 8/3	4/3, 8/2					
2/6, 4/6, 8/4	2/4, 4/4, 8/3			360	113	

Electric pumps	Starting pressure SP [bar]	Max. hight of operation Hu [m]	Pre-charge of expansion vessel ET [bar]
"TOP MULTI-TECH 2, 3, 5 TOP MULTI-EVOTECH 2, 3, 5"	1,5	10	1,2
"TOP MULTI-TECH 4 TOP MULTI-EVOTECH 4"	2,5	20	2,2

Electric pumps	Minimum sump size [mm]
TOP MULTI 1	□ 350 x 350
TOP MULTI 2, 3, 4, 5	□ 500 x 500
TOP MULTI-TECH 2, 3, 4, 5	□ 500 x 500
NK without its float switch, vertical installation	Ø 200
UP without its float switch, vertical installation	Ø 200

UP Model	L _{max}	
2/2 4/2	50 mm	
2/3 4/3 8/3	75 mm	
2/4 4/4 8/4	100 mm	
2/5 4/5	125 mm	
2/6 4/6	150 mm	

Handwriting practice lines consisting of multiple sets of three horizontal dotted lines for tracing and writing practice.



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