

VIGILEC®

V10plus

INSTALLATION AND OPERATION MANUAL

toscano



**Pump controller for Single-phase pumps or
Three-phase pumps.
Multicontrol**

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Front configuration

A **MOTOR ON Led (green).**

It will turn on during automatic operation. During manual operation it will be flashing.

B **MOTOR ALARM Led.**

- **Red led flashing:** Motor current is higher than the overload current setting. (OvLd).
- **Red led on:** Overload alarm.
- **Amber led flashing:** Motor current is lower than the underload current set (UnLd).
- **Amber led on:** Underload alarm.

C **OPERATING MODE selector.**

- **MANUAL.** Motor starts, overload and underload protections are working. The parameter "AS_{to}" (Auto stop time) is the maximum working time in manual mode.
- **O - RESET.** In this position, pump operation is not allowed. The current alarm is also reset and buzzer stops.
- **AUTO.** The device works automatically according to the current conditions established.

D **Display.**

It shows several information of the system operations

E **LOW/HIGH LEVEL Led (amber).**

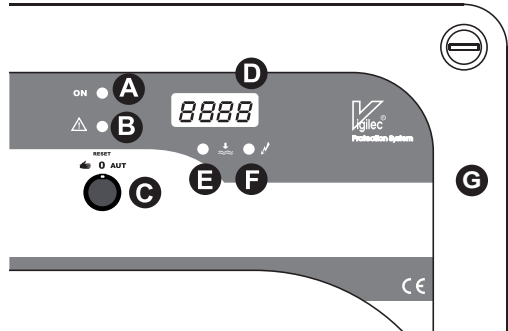
It turns on when we have no water level or flashes while waiting for re-start. HIGH LEVEL led will light on if overflow float option is selected.

F **POWER ON Led (green).**

It lights on when there is power supply.

G **Internal buzzer.**

This buzzer emits short beeps when setting keys are pressed. It is also activated in case of motor thermal failure (1 beep every second) or activation of the overflow float (4 beeps every second).



Display Messages

xx.xA	Pump is running . Measured current in Amps.
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StoP	Pump is stopped
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Etrn	StoP	Stop by External ON/OFF signal.
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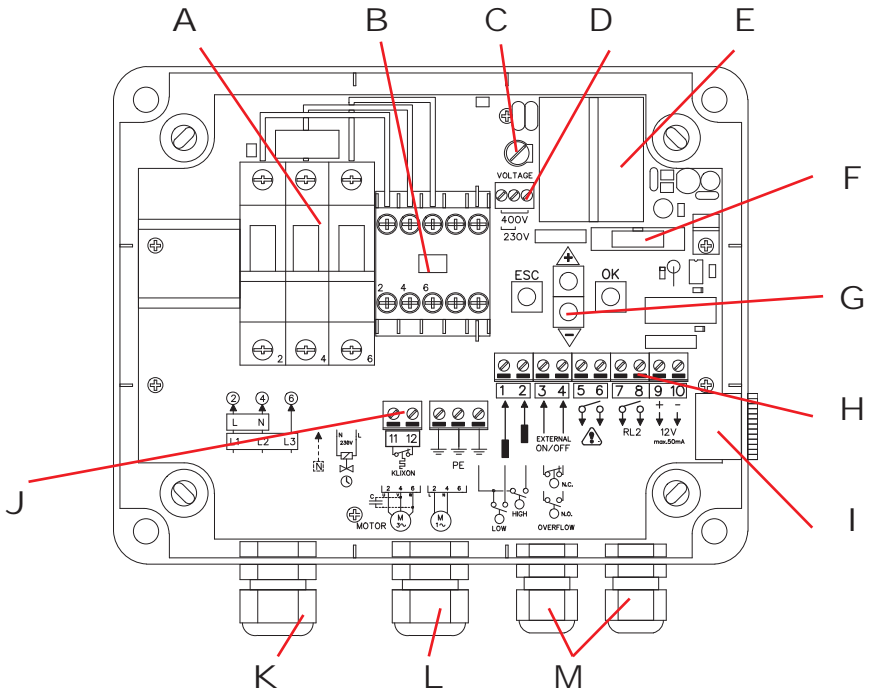
OFL	StoP	Overflow float switch activated while pump is stopped.
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0vld	xx.x A	Overload alarm / Overload trip current.
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OFL	xx.x A	Overflow float switch activated while pump is running.
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unLd	xx.x A	Underload alarm / Underload trip current.
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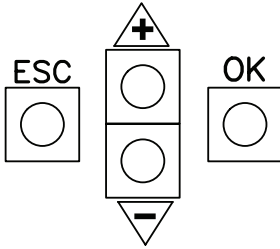
Internal configuration



- A **Circuit breaker.**
- B **Motor contactor.**
- C **Control fuse (0.1 A)**
- D **Voltage selection.**
- E **Current transformer.**
- F **Flat cable connector.**
- G **Settings keys +, -, ESC, OK.**
- H **Terminal blocks.**
- I **External buzzer.**
- J **Motor temperature probe input (Klixon).**
- K **Power supply cable gland.**
- L **Motor output cable gland.**
- M **Control signals cable glands.**

Setting keys.

Each time you press a key you will hear a short beep.



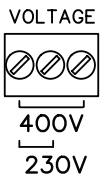
(+) Goes up one level through the setting menu or increases the selected value.

(-) Goes down one level through the setting menu or decreases the selected value.

(OK) Validates and saves a setting change.

(ESC) Exit to main menu.

Voltage selection.

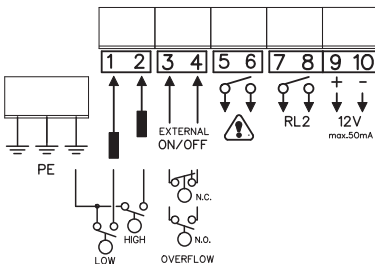


This controller can work with both 230Vac and 400Vac.

To work with 400Vac, place the jumper wire between both two end terminals, as indicated.

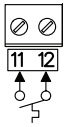
To work with 230Vac, place the jumper wire between both two left terminals, as indicated.

Terminal blocks.



There is a collection of inputs and outputs, available to connect several external devices.

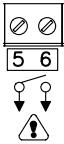
Motor Temperaturfühler Eingang (Klixon).



Input to connect an overheating Klixon cutout, if the pump has one. If the contact is open, the thermal fault protection is active.

If not used, must be bypassed with a jumper.

General alarm output.



This relay output is activated after voltage failure, underload, overload or phase failure alarms.

External buzzer.

The unit is supplied with a built-in 90dB buzzer, connected to control terminals 9-10 (12VDC, 50mA max.).

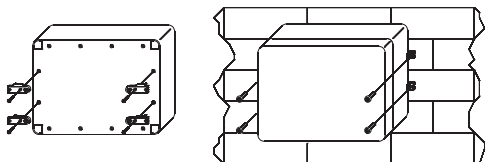
If not used, the buzzer may be disconnected, removing the RED wire from terminal 9 and the BLACK wire from terminal 10.

Mounting & wiring

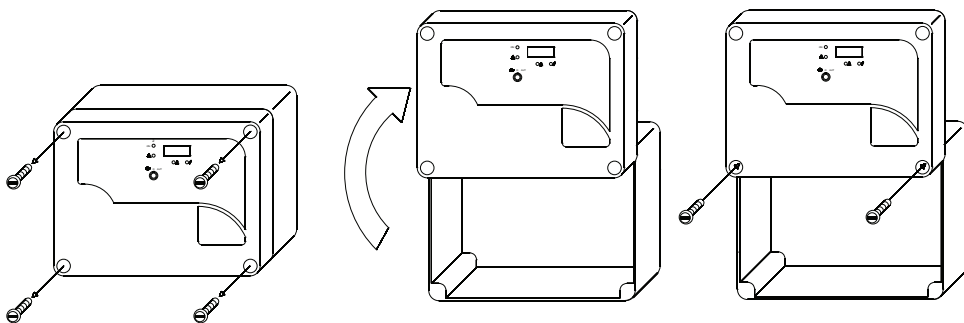
Mounting the controller.

There are 4 points in each of the corners on the back side. You can drill these points and screw the box through to the wall or stand.

The distance between drills is 194mm in horizontal and 140mm in vertical.

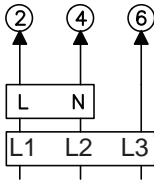
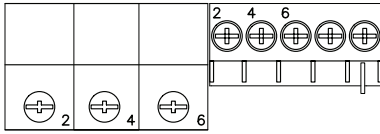


It can also be mounted with 4 clamps screwed on the back side (optional).



The front panel can be removed and screwed on the box top for wiring and setting.

Power supply wiring.



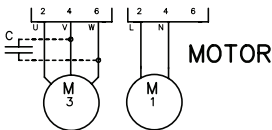
Single-phase.

Connect the live wire “L” (brown) to terminal 2 of the circuit breaker, and the neutral wire “N” (blue) to terminal 4. The earth wire (yellow-green) must be connected to the left terminal of the earth terminal block.

Three-phase.

Connect the three phase wires L1, L2, L3 to terminals 2, 4, 6 of the circuit breaker respectively. The earth wire (yellow-green) must be connected to the left terminal of the earth terminal block.

Motor wiring.



Single-phase.

Motor with built-in starting capacitor: Connect the live wire “L” (brown) to terminal 2 of the contactor and the motor neutral wire “N” (blue) to terminal 4 of the contactor. The motor earth wire (yellow-green) must be connected to the central terminal of the earth terminal block.

Motor with external starting capacitor: Connect the motor wires U, V, W to terminals 2, 4, 6 of the contactor respectively. The capacitor is connected among terminals 4 and 6 of the contactor. The motor earth wire (yellow-green) must be connected to the central terminal of the earth terminal block.

Three-phase.

Connect the motor wires U, V, W to terminals 2, 4, 6 of the contactor respectively. The motor earth wire (yellow-green) must be connected to the central terminal of the earth terminal block.

Auto-tune

Automatic method for motor current adjustment. It allows to set the maximum and minimum current values.

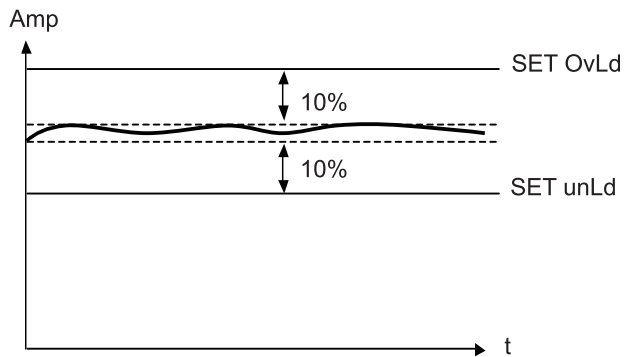
If the (OK) key is held for more than 5 seconds, the auto-tune mode starts. A small beep is heard and the motor current starts to flash on the display.

After a short time, the letter "A" on the display remains fixed, while the current value is flashing. At this moment, the controller is reading the motor current, recording the maximum and minimum values for some time.

Once this time ends, the device adds 10% to the maximum read current value and this new value is recorded.

Similarly, the minimum read current value is reduced by 10%, and then recorded.

Finally, the controller beeps, indicating the end of the process.



System settings

There is a number of setting parameters to configure the controller. Keys (+) and (-) can select any of them. When a parameter is selected, its setting value is presented alternately.

To change a parameter value, press the (OK) button and the set value starts to flash. Then the value can be modified by using the keys (+) and (-). Once modified, press the (OK) key and the new value is recorded. A long beep indicates that the new parameter value is saved.

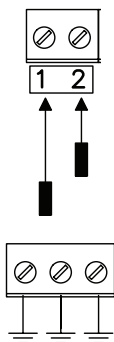
Press the (ESC) key on any moment to return to the main screen, as well as if no key is pressed for more than 3 minutes.

Motor settings

<i>OLd</i>	<p>Overload current: 1.2-13A (according to the model: 17A, 25.5A).</p> <p>If the motor current exceeds this value, a current overload will be detected. The alarm pilot will be flashing red for up to 7 seconds and then, if the overload continues, the pump will be stopped. The overload trip current will be showed on the display and the alarm pilot will keep red fixed.</p>
<i>uLd</i>	<p>Underload current: 1.2-13A (according to the model: 17A, 25.5A).</p> <p>If the current consumed by the pump goes below this value, the pump will stop by underload. The alarm pilot will warn the underload by flashing amber for up to 4 seconds, and then will remain lit amber fixed after stopping by underload.</p>
<i>inhb</i>	<p>Inhibition mode.</p> <p><i>uLd</i> : Underload inhibition. When the pump starts, especially after a long stop, some time is necessary to fill the water pipes. During this initial period of operation, the current drawn by the pump will be less than the nominal. To prevent a stop by underload during inhibition time after startup, the controller does not stop by underload, allowing time enough for the pipes to be filled.</p> <p><i>OLd</i> : Overload inhibition. Sometimes an extra effort during pump starting is required. In such cases, the overload during startup must be inhibited to avoid unwanted stops by overload.</p> <p><i>OLL</i> : Overload and underload inhibition If you select this option, both initial overload and underload will be inhibited.</p>
<i>inh.t</i>	<p>Start Inhibition time (0"-200"). After starting, the pump current detection is inhibited during this time. If you do not want to have any inhibition, select "0" here.</p>

Level control

LEu



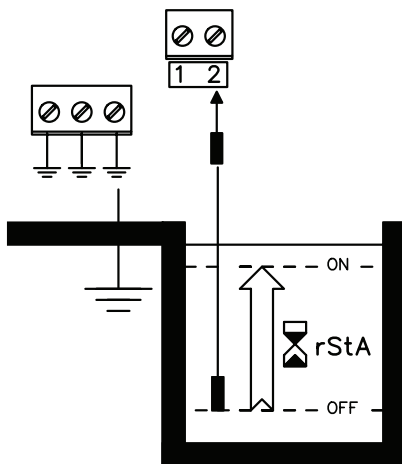
Level control.

Select among different level control modes to prevent pump dry running.

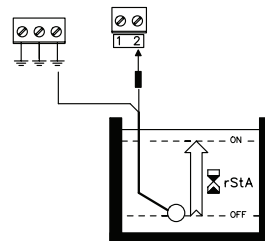
iP : One probe mode (* 1).

This mode uses just one probe for level control. The low level probe is connected to terminal 2.

The pump remains in operation until the water level falls below the low level probe. The level pilot lights and the pump stops. Once the water level gets back above the minimum level probe, and after a timeout, the pump is started again. This timeout can be set with the (rStA) parameter.

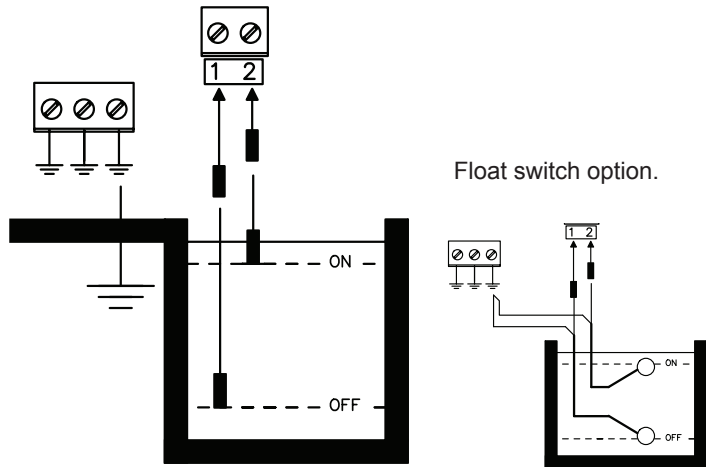


Float switch option.



2P Two probes mode (* 1).

It uses two probes for level control. The maximum level probe is connected to terminal 2, and the low level probe is connected to the terminal 1. When the water level reaches the level probe will start up the pump and will remain running until the level falls below the minimum level probe. When water is depleted, the level pilot lights fixed.

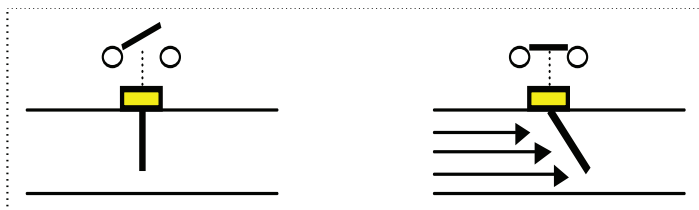


(* 1) Probes installation.

The wires should be properly insulated. The maximum length for probe wiring is 200 meters, with minimum section of 0.5 mm². For a proper operation, a **CORRECT EARTHING CONNECTION is essential**. Connect this wire to any part of the metallic pipe or through a third probe submerged in the bottom of the container, in case of using an insulating tank (fiber cement, fiberglass and plastics in general).

FLU: Flow switch.

The flow switch has an internal blade that moves with the water flow.

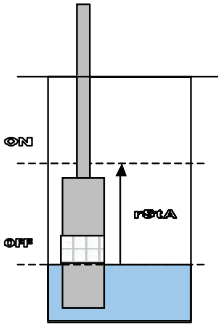


When there is no water flow, the contact remains open. If the flow begins, the blade moves and the flow detector closes its contact. If the flow stops, the blade moves back to the inactive position and the contact opens.

Connect one of the wires of the flow switch to the earth connection and the other one to the terminal 2 of the control terminal block.

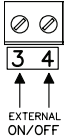
During the first moments of pump operation, the water takes some time in activating the flow switch. It is therefore necessary not to pay attention to the flow switch status for a while. This time is called inhibition time and can be set in parameter (Inhb).

When the water stops flowing through the pipe, the system will wait for some time before re-starting again. During this time the remaining time is presented on the display while level pilot is flashing. This re-start time can be adjusted in the parameter (rStA).

	<p>uLd : Underload detection.</p> <p>This position should be selected to work without probes.</p> <p>The low level control for a borehole pump can be controlled using underload detection, without level probes.</p> <p>When all the water is aspirated from the well and the pump stops, the current consumed by the pump decreases. This decrease in current can be detected by using the pump itself as a sensor, and thus avoiding its running out of water.</p> <p>It is imperative that the underload setting is done correctly. If we close the output valve of the pump, the current consumption must drop below underload current.</p> <p>The controller will wait for the (rStA) time before starting the pump again, allowing enough time for the well to be refilled.</p> 
<p>rStA</p>	<p>Re-Start-Time (5'-240').</p> <p>When the pump stops after the low level water detection, the controller will wait for some time before re-starting again. During this time, the count down time will be displayed. The low level pilot will flash during this temporization.</p>

External control

Etrn



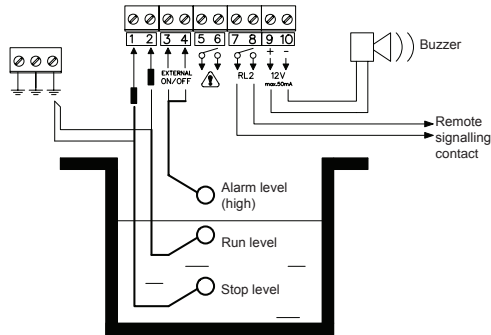
EXTERNAL ON/OFF input. This input allows the controller to start and stop the pump by using different external control systems such as pressure switches, irrigation programmers, Press Control equipment, etc...

n. c. : Normally closed contact. Pump stops if the contact opens.

n. o. : Normally open contact. Pump stops if the contact closes.

OF_{nc} : Overflow float switch. Normally closed.

Connect an overflow level float on the top of the tank. It will work as a security system for wastewater lifting stations. When the overflow float switch opens its contact, the system activates the pump regardless of the level control. To warn about this situation, the buzzer beeps (4 per second), the level pilot starts flashing, and the screen displays a flashing OFL message. The buzzer may be muted by switching the MAN-0-AUT control to the "RESET" position for a few seconds.

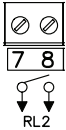


OF_{no} : Overflow float switch. Normally open.

Same as above, but in this case the activation occurs by closing the float switch contact.

Output relay configuration

RL2



Auxiliary relay. This relay can be configured to close its contact on these cases:

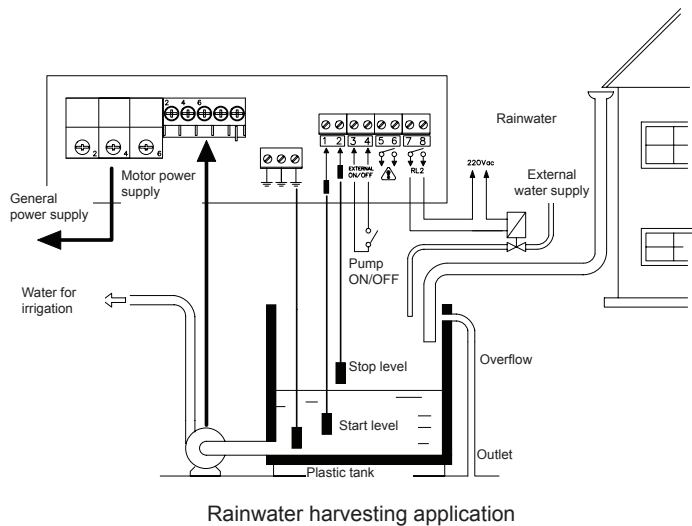
P_{on} : **Pump ON.** The pump is working.

P_{of} : **Pump OFF.** The pump is stopped.

LEU : **Low Level.** The water height is lower than the minimum level.

Rainwater harvesting

The RL2 output can be used to activate an external refill electro-valve for a rain application.



In this application, rain water normally fills the tank. If the water level is too high, an overflow output discharges excessive water.

If there is no rain for a long time, the tank must be refilled using an external water supply.

With the incorporated water level control, an automatic refill system can be easily implemented, by using the RL2 as “LEV” output.

	<p>The level control system can be chosen as 1 temporized probe or two probes (see "LEV" parameter). The maximum refill time is set by the "rL2.t" parameter.</p> <p>i nh : Inhibition time. The controller is in inhibition after the pump start.</p> <p>OFFL : Overflow. The overflow float switch is activated ("OFnc" and "OFno" options of setting "Etrn").</p> <p>Air : Air chamber loss. When it detects the loss of the air chamber. The controller checks the operating frequency of the pump. In case of excessive loss of the air chamber in the tank, this frequency increases as the pressure drops rapidly whenever some water is removed from the tank. If the frequency is increased to 30 starts per hour (less than 2 minutes between starts) this alarm is activated while the pump is running. This output can be used to control the activation of an air compressor to refill the air chamber, so that when the pump starts fewer times (more than 3 minutes between starts) the alarm output will be deactivated.</p>
rL2t	<p>Auxiliary relay activation time (1...240 sec - On).</p> <p>With this parameter, the maximum activation time for the auxiliary relay RL2 can be set. To get this output to be active indefinitely, the parameter must be increased until the value "On" is showed.</p>
RSto	<p>AUTO-STOP delay (15 sec - 240 min).</p> <p>This parameter sets the time that the pump will operate in manual mode. After this time, the pump stops and the operating mode selector must be positioned to "O-Reset" before re-activating the pump again in manual mode.</p> <p>If this value is set to the maximum, the OFF value will become active and the pump will operate indefinitely in manual mode.</p>

Additional settings

<i>RbL</i>	<p>Jammed impeller preventive system</p> <p>In some applications the pump is stopped for long periods of inactivity. This may cause a mechanical block of the pump impeller. To prevent this problem the controller can start the pump just for a second each 23 hours of inactivity in automatic mode.</p> <p><i>On</i> : Jammed impeller preventive system working.</p> <p><i>oFF</i>: Jammed impeller preventive system not operative.</p>
<i>StAtUs</i>	<p>System status.</p> <p>It shows a moving message with this information:</p> <p><i>St.BBB.BBB</i> : Number of pump starts (0 - 999.999).</p> <p><i>hr.BBB.BBB</i> : Run hours of the pump (0 – 999.999).</p> <p><i>UErBB.B</i> : Software version.</p> <p>Only with this parameter, when we choose STATUS, the display will not return to the main screen after some seconds. This lets the user time read or take note of this information.</p>

Specifications

Voltage	230/400V AC selectable
Permissible voltage variation	±20% (auto-disconnection over +30%)
Maximum motor current	12A AC(16A, 25A, according to model)
Minimum motor current	1.2A AC
Overload current setting	1.2-13A (17A, 25.5A, according to model)
Overload trip time	7 s
Underload current setting	1.2-13A (17A, 25.5A, according to model)
Underload trip time	4 s
Level probes voltage	24V AC
Level probes sensitivity	9 kΩ
External ON/OFF input	Dry contact or applied voltage from 6 to 400V AC/DC
Relay outputs	AC1: 2 A/250V AC AC11: 1A /230V AC
Supply connection	Direct to circuit breaker
Motor connection	Direct to contactor
Control terminal blocks	4mm ²
Mounting method	Directly to the wall or using 4 mounting brackets
Size / Weight / IP / Temperature	255 x 195 x 95 mm / 1.5Kg / IP56 / -10°...+55° C

EC DECLARATION OF COMPLIANCE WITH "LOW VOLTAGE" & "ELECTROMAGNETIC COMPATIBILITY" DIRECTIVES.

TOSCANO LINEA ELETTRONICA, S.L. declares that the equipment described in this manual complies with the provisions of the modified "LOW VOLTAGE" directive (Directive DC 2004/108/CE) and with the modified "ELECTROMAGNETIC COMPATIBILITY" directive (Directive DC 2006/95/CE) and with national legislation based upon them. It also complies with the provisions of the following European standards and draft standards:

NF EN 60.439-1 / EN 50.081-1 / EN 50.082-2.



Settings menu

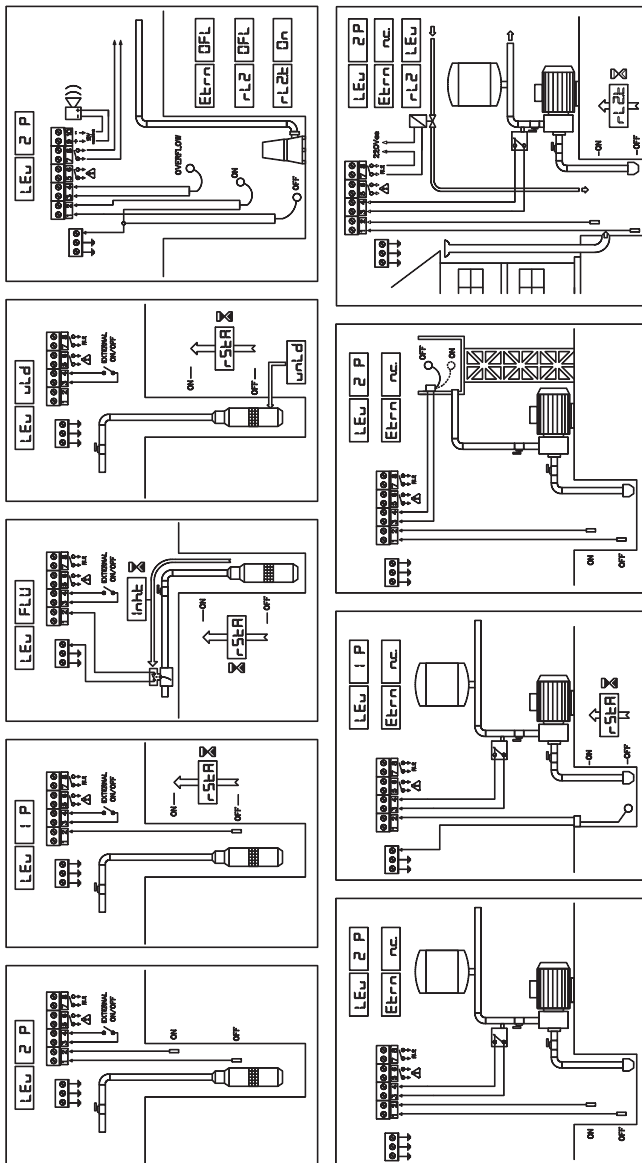
The sequence (ESC)(ESC)(OK)(OK)(ESC)(ESC)(OK)(OK) will go back to the factory settings.

The overload current can be set up to 13A for the 12A version (17A for the 16A version and 25.5A for the 25A version).

If no key is pressed in 60 seconds, it will go back to the main display.

Factory settings	Parameter	Value	Description
130A	Motor current	000A	Measured motot current (Amps)
12A	Overload	0uLd 130A 12A	Overload current
uLd	Underload	uNLd 130A 12A	Undeload current
10'	Inhibition mode	inhb uLd 0Ld	Underload is inhibited on startup. Overload is inhibited on startup
2 P	Inhibition time	inht 200' 0'	Overload and underload are inhibited on startup. After pump start, current is inhibited for this time.
15'	Level control	LEu 1 P 2 P FLU uLd	1 probe (minimum) with re-start after the "rStA" time. 2 probes (maximum probe starts, minimum probe stops) Flow switch with inhibition time at start "Inh.t" Without probes. Stop by underload current detection.
nc	Re-start time	rStA 240' 5'	The pump will re-start after this re-start time.
inh	External ON/OFF	ExtOn nc no OFno OFnc	N.C. input (the pump stops if the contact opens) N.O. input (the pump stops if the contact closes). Overflow float switch (buzzer and pump on when it closes) Overflow float switch (buzzer and pump on when it opens)
On	Relay 2 mode	rL2 Pon PoF LEu inh OFL Rr	The pump is ON. The pump is OFF. Low water level. Start inhibition time running Overload float switch is activated. Air loss detected and pump running.
15'	RL2 time	rL2t On 240' 1'	Activated while function is set (maximum setting). Activated for this set time only. Activated for this set time only.
OFF	Auto stop time	ASto OFF 240' 15'	Pump will not stop on manual mode (maximum setting) Maximum working time on manual mode. Minimum working time on manual mode.
	Anti-block	AbL On OFF	Pump runs 1" every 23 hours of inactivity (in AUTO mode) Pumps will keep stopped
	Status	StArLS St000000 hr000000 UEr000	Number of pump starts Run hours of the pump Software version

Common applications



VIGILEC®

V10plus



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