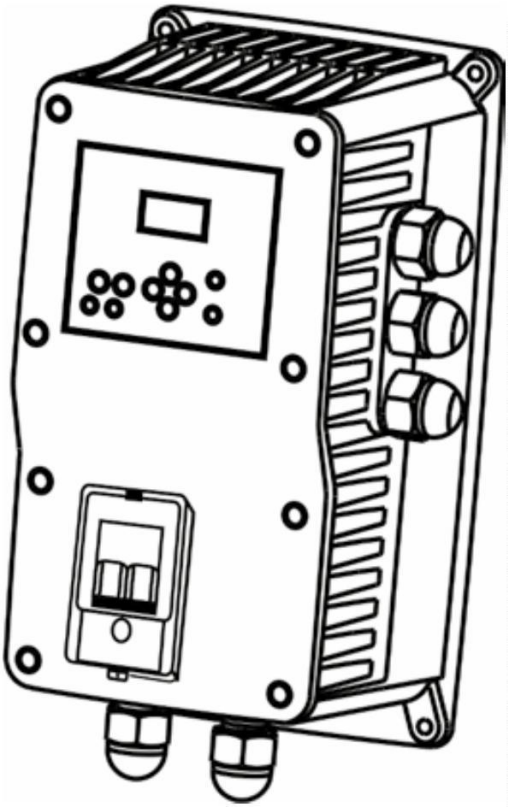
EN **INSTALLATION AND OPERATING INSTRUCTIONS**



SPEEDBOX SUB

1112 MM

Warning symbols contained in this service manual



Only applies to type MASTER.



Risk by electric shock.



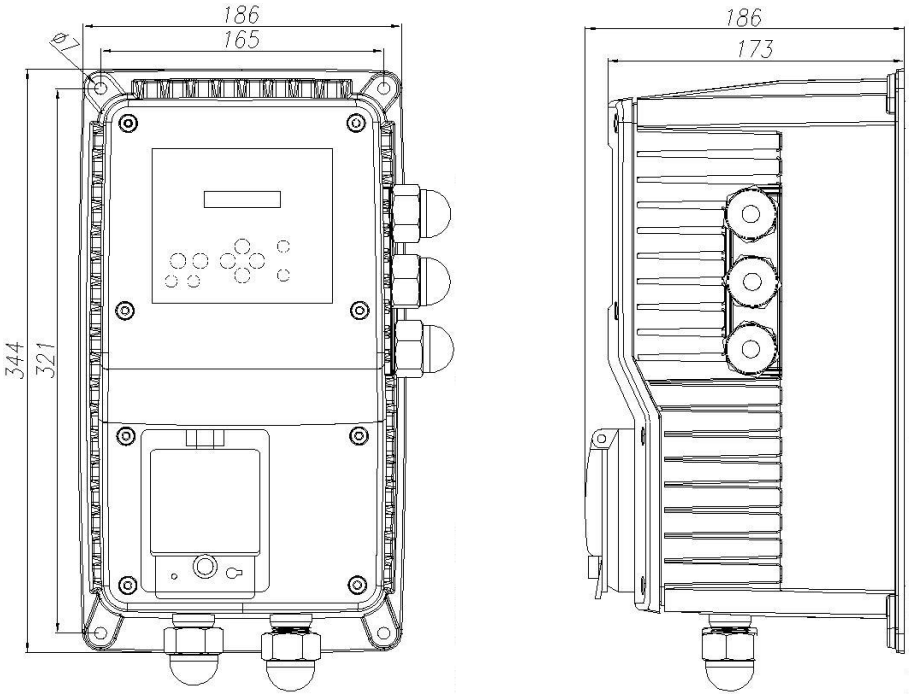
Risk for people and/or objects

EN

WARRANTY AND RECOMMENDATIONS

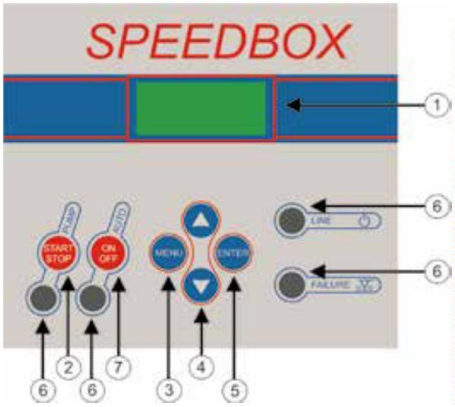
The product is guaranteed the first 2 years after its production date.
This guarantee does not include damages in case of an inadequate installation or manipulation.
Read carefully this instructions manual before installation.
Do not throw away this manual afer installation, it can be usefull for later modifications or for solving the different types of alarms.
Hydraulic and electrical installations must be set up by qualified personnel according to the safety prescriptions as well as the standards and legislation of every country.When carrying out the electrical connection it is recommended to use a differential switch of high sensitivity: IΔn = 30 mA (clase A o AC). It is recommended to use an independent electrical line, with the purpose of avoiding electromagnetic interferences that could create nonwished alterations in household electronic devices.
WARNING, before doing any maintenance inside the device, it must be unplugged from the electric supply and wait a minimum of 2 minutes after the disconnection to avoid electrical discharges.

FIG.0 DIMENSIONS



WEIGHT: 4,8 kg

FIG.1
CONTROL PANEL



EN

1- LCD screen. Shows the pressure in working mode.
2 - MANUAL START-STOP pushbutton.
3 - Pushbutton for ENTER or EXIT menu.
4 - With these pushbuttons we can change programming values showed in the LCD screen (1).
5 - ENTER for saving programmed values. Every pulsation is succeeded by a new field of the CONFIGURATION MENU. Whenever we want to quit the configuration sequence press MENU (3) accepting the changes.
6 - Led lights:
- LINE green: Electric supply, bright when it is connected.
- FAILURE red: Bright or intermittent depending on type of failure.
- PUMP yellow: When it is bright means pump working. It is lit with the pump stopped or when the device is not connected.
- AUTOMATIC green: it is bright in AUTOMATIC mode. When it is intermittent in MASTER&SLAVE mode it means that this device will be auxiliary in the following cycle.

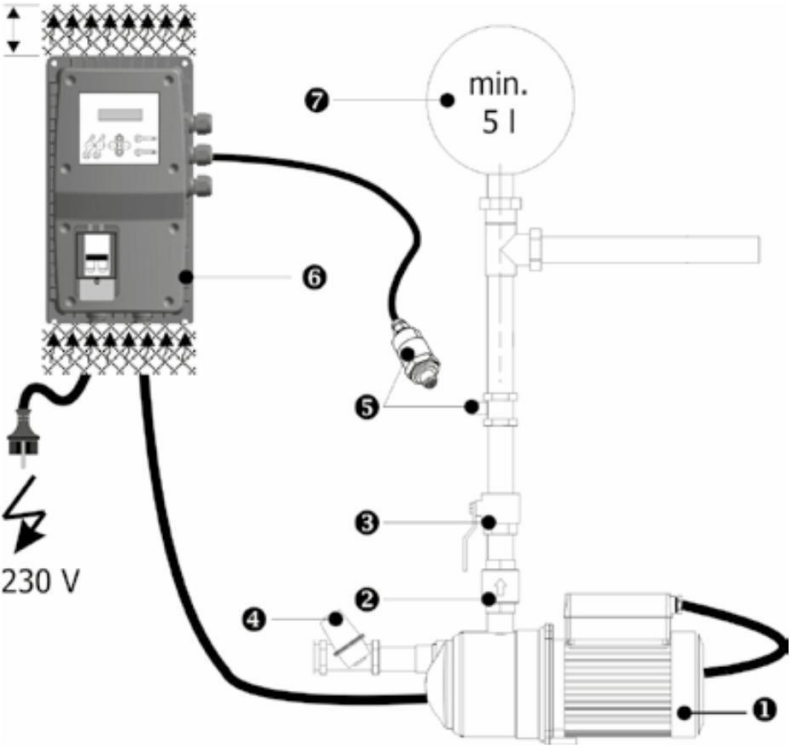
7- ON/OFF: It allows to change from AUTOMATIC to MANUAL mode or vice versa.

FIG.2 INSTALLATION SCHEME

OBSERVATIONS:
A) Accessories ❸ and ❹ are recommendable but not essential.

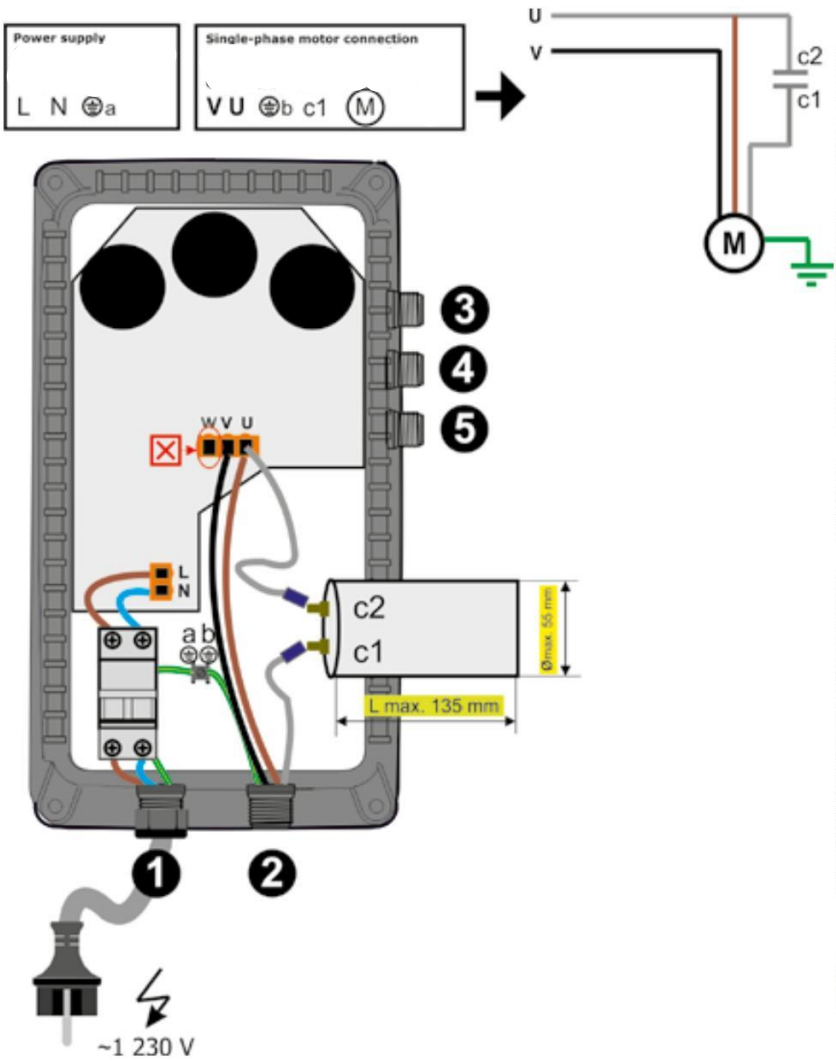
B) In the case of the hydropneumatic tank ❼, minimum capacity should be 5 l.

C) It must be installed a pressure transmitter ❺, otput 4-20 mA, with pressure range either 0-10 bar or 0-16 bar.



❶.- Pump
❷.- Check valve
❸.- Ball valve
❹.- Filter
❺.- Pressure transmitter
❻.- Device
❼.- Hydropneumatic tank

FIG.3 CONNECTIONS



❶ Power supply

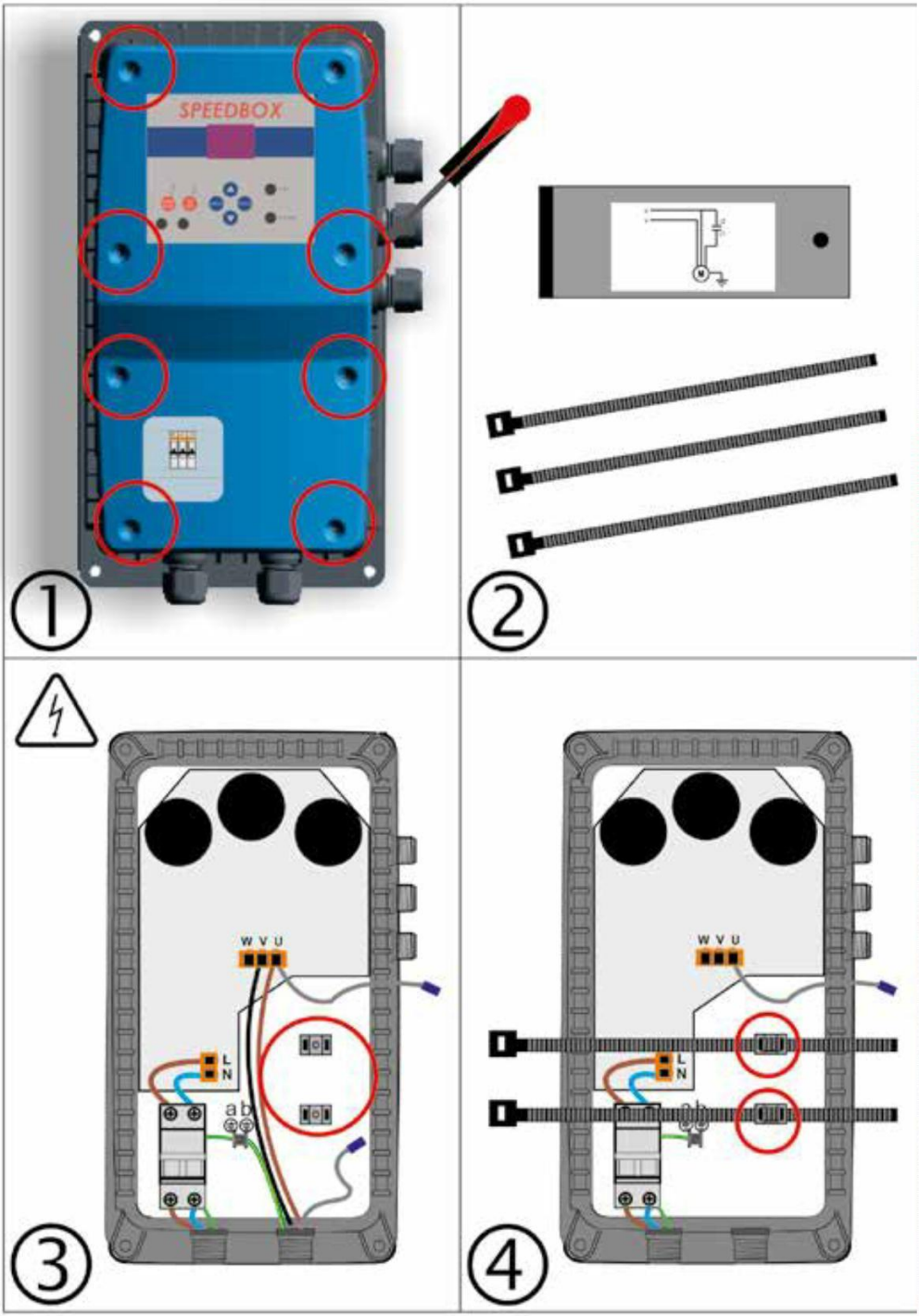
❷ Pump connection single-phase pumps

❸ O- Master&Slave communications cable

❹ External level probe (optional)

❺ Pressure transmitter

FIG.4 CAPACITOR ASSEMBLY



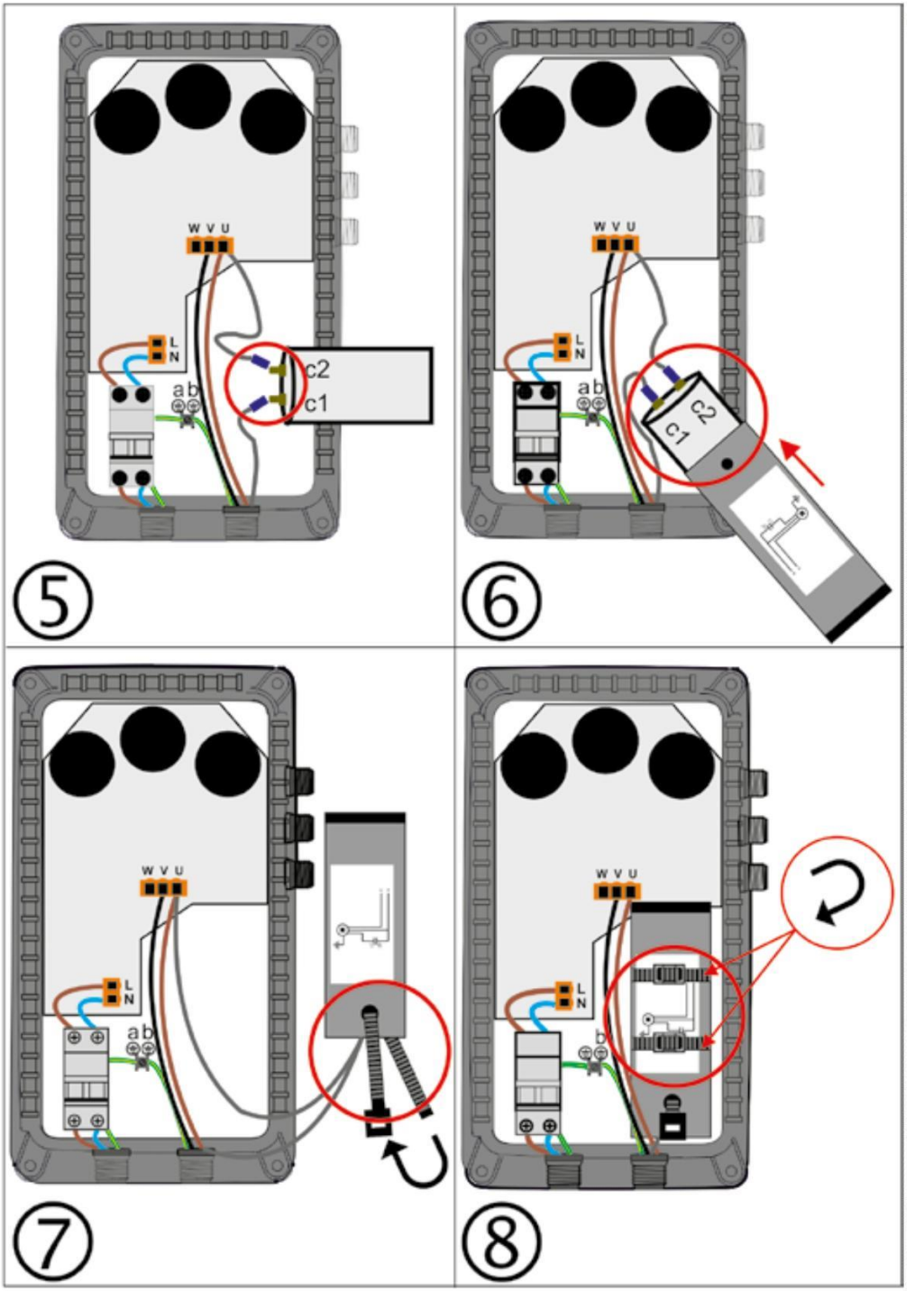
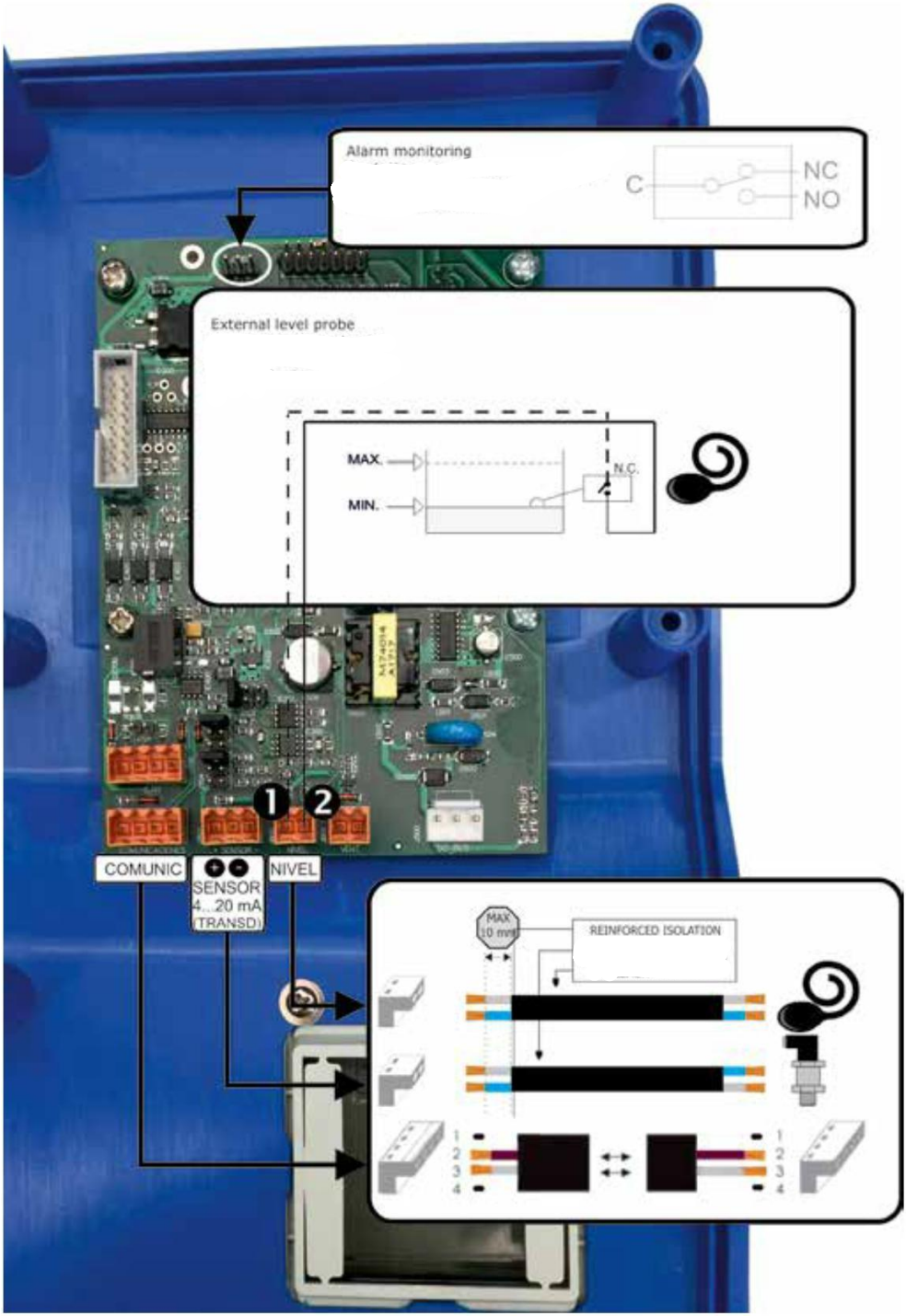

W V U
L N
a b
c2
c1
5
6
7
8

FIG.5 WIRING - CABLAGGIO - CABLEADO - CÂBLAGE



EN **BEFORE INSTALLATION AND USE READ THE FOLLOWING INSTRUCTIONS CAREFULLY. THE MANUFACTURER DECLINES ALL RESPONSABILITY IN THE EVENT OF ACCIDENT OR DAMAGE DUE TO NEGLIGENCE OR FAILURE TO OBSERVE THE INSTRUCTIONS DESCRIBED IN THIS MANUAL OR IN CONDITIONS THAT DIFFER FROM THOSE INDICATED ON THE DEVICE.**

OPERATION

Is a wall mounted automatic control device designed for the automation of single-phase borehole pumps. It includes a frequency inverter that modulates the speed of the pump in order to keep constant the pressure independently of the flow given.
The system incorporates an LCD screen where the parameters configuration is very easy and intuitive. Once the configuration parameters are set, the device manages the start-up of the pump and the frequency inverter. It assures a constant pressure and an important costs reduction because at any time the control will feed the system with the right and necessary output, obtaining a maximum energetic efficiency.
It is also integrated a 16A MCB in order to protect the pump and the unit against overcurrents. Finally are also included fixing and positioning elements to locate the capacitor of the submersible pump.

☏MASTER AND SLAVE OPERATION

The group MASTER-SLAVE is constituted by a device configured as MASTER - responsible of the group´s control - and another device configured as SLAVE controlled by the master device.
Due to the alternating sequence of operation, the device configured as MASTER began the first cycle as MAIN device - its pump is the first to start - but in the next cycle it becomes SECONDARY - its pump is the second to start - and so on. Therefore, the fact that a device is configured as MASTER involves control of the group but this fact does not avoid its operation alternately as SECONDARY device. Each device must be provided with its transmitter.

MAIN CHARACTERISTICS

- Wall mounted frequency inverter for the pump control.
- Integrated 16A MCB.
- Control and safety system against over-intensities.
- Control and safety system against dry operation.
- ART function (Automatic Reset Test). If the device has been stopped due to the action of the safety system against over-current, the ART tries to connect the pump, with a programmed periodicity because the water supply could have been restored
- Automatic restore system after an interruption of power supply. System is activated in AUTOMATIC mode keeping the configuration parameters (see "CONFIGURATION" chapter).
- External pressure transducer (4..20 mA) under demand.
- Possibility of communication with another device to operate in MASTER & SLAVE regime ☏.
- Control panel (Fig.1):
    - Display with back light for alarm menu with permanent pressure indication as digital gauge.
    - START/STOP, ENTER, MENU and ON/OFF push-buttons.
    - Keyboard for the access to programming menu.
    - Indication led-lights.
- Connections for detection of minimum water level in aspiration tank. This system is independent of the safety against dry operation. Is optional.
- Common alarm volt-free contact (under request).
- Register of operational controls: infomation about operating hours, counter of starts, counter of connections to the power supply.
- Register of alarms: information about type and number of alarms since the starting up of the device.

CLASSIFICATION AND TYPE

According to EN: 60730-1 and EN:60730-2-6 this unit is a control electronic device for pressure groups, with flexible cable for permanent assembly type Y, action type 1Y (transistor output). Operating value: flow 2.5 l/min. Degree of contamination 2 (clean environment). Software Class A.
Impulse rating voltage: cat II / 2500V. Applied temperature for the ball pressure test: enclosure (75ºC) and PCB (125ºC). Control circuit for AC motor with cos fi ≥ 0,6 (single-phase).
According to EN61800-3 this device is C2 class.

TECHNICAL CHARACTERISTICS

TYPE	1112 MM
Power supply voltage / Freq	~1x230 Vca ±20% / 50/60 Hz
Output	~1x230 Vca
Max. current - P max	12A (1500 W; cosfi ≥0,6)
Max. peak of current	20% 10 seconds
Range o set pressure	0,5-16 bar or 0,5-10 bar (adjustable)
Protection degree	IP54
Max. environment temperature	5-40ºC
Relative Humidity	Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40 °C
Cooling method	Forced convection

MECHANICAL INSTALLATION (fig.2, 3 and 4)

- Store in a clean and dry environment, do not remove the unit from its packaging until it must be used.
- The device must be installed in environments pollution grade 2 according to EN-60730-1.
- The protection degree is IP54 therefore must be mounted in places protected from the rain.
- Install the device in an upright wall, leaving at least 200 mm of space on it top and bottom to ease heat dissipation.
- The unit will be anchored in the wall using the 4 holes of 7 mm diameter located on its corners.

HYDRAULIC INSTALLATION (fig.2)

Before proceeding with hydraulic connection it is essential to install a non-return valve in the pump´s inlet.
In case of assembly in group, it must be mounted a collector for the communication of the devices water outputs. The inlet must proceed from a common origin.
For mounting the pressure sensor can be used any outlet G1/4 "at the pipe after the pump outlet.
It must be installed an hydropneumatic tank of at least 5 l to avoid problems caused by leakeages in the hydraulic net
The device is provided with an automatic system that stops the pump if there is no demand in the installation. If you are in an installation where the device does not stop the pump when there is no demand, this happens because there are leaks in the installation (tanks, faucet, check valves...). In these cases it can be used the frequency minimum value like a frequency stop. (see CONFIGURATION)
PROCEDURE: Open a faucet of the installation and set the desired minimum flow. With this flow, visualize in the screen the frequency at which the pump is rotating. Set the minimum frequency to the frequency displayed on the previous screen.

ELECTRIC CONNECTION (fig.3, 4 and 5)

The electrical installation must be performed by qualified personal in compliance with safety regulations and to regulations of each country.
Before doing manipulations inside the device, it should be disconnected of the electric supply and after disabling, wait for 2 minutes in order to avoid electrical discharges.
The basic unit is served with power cabling, motor cabling and pressure transmitter cabling. The power cord can be replaced only by the manufacturer or his accredited representative.Then the cabling is exposed as would be done to address any eventuality:

- Use cables type H07RN-F with section enough to the power installed:
  - Power supply: s ≥ 1.5 mm_2
  - Motor supply: s ≥ 1.5 mm_2
- Verify if the power supply is 220/240 V. Dismount the cover of the electronic circuit and carry out the connections according to the indications located on the connection strip base.
- Do the power supply connection (being sure there is a good earth connection): L1 L2 ⏚. Do the connection by mean of magnetothermic switch in OFF mode. The earth conductor must be longer than the others. It will be the first one to be mounted during the assembly and the last one to disconnect during disassembling.
- Do the pump connection (fig.3-4)using a properly dimensioned capacitor. Note that maximum size is Ø55mm x length 135 mm.
- Normally the device is served with the pressure transmitter connected with cable length of 1.5 m. Otherwise, connect the pressure transmitter (fig.4-5). H03VV 2x0, 5mm cable is used.
  If is necessary to increase the cable length, outer joint is performed following the guidelines of the regulations applicable to low voltage installation country - the cable length should not exceed 15 m.
  Do the pressure transmitter connection (fig.4 and 5). In case of M-S communication it will be connected a pressure transmitter in each unit.
- Do the connection of auxiliary devices:
  - Alarm monitoring: the device has a volt-free contact with 1 A maximum intensity for the transmission of diferent types of signal (optical, acoustics, etc) when detects some failure that previously has been displayed in the LCD screen. For its connection to see fig.5.
  - Min. level control (optional). There is an input for stopping the pump as soon as is disconnected the external switch of minimum level. See fig.5
- ☏ Min. level control in case of master-slave communication (optional): both units must be connected at the same level control. It is very important do not cross the polarity in both connectors. See fig.5.
- ☏ Connection of 2 devices (optional): for the communication of 2 devices it will be used a cable of 2x0.25 mm2, it will be inserted throw the PG cable gland located in the lateral of the device. See fig.5.

WARNING!. Wrong connections could spoil the electronic circuit. The manufacturer declines all responsability in damages caused by wrong connection.

START UP (SINGLE DEVICE).

- Be sure that the pump is correctly primed
- Connect the device to the electric supply with the magnetothermic switch, FAILURE led light will be ON. Wait for 10 seconds while the device is doing the autotest. Once it finishes, led light FAILURE is OFF and led light LINE is ON. The LCD screen will show message "SPEEDBOX SUB " and inmediately the language display of the configuration mode.
- The device is ready for being configured.

START UP (2 DEVICES ASSEMBLY).

If we wish to mount 2 devices for working in groups, previous point should be exactly followed - the order of connection is irrelevant. During the configuration process we will be able to choose which device is the MASTER.

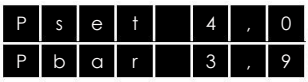
CONFIGURATION. Using ▲▼ we can change the values and press **ENTER** for validation. Whenever we want to quit the configuration sequence press **MENU**. After every **ENTER** it will appears automatically the different screens that constitute the configuration sequence.

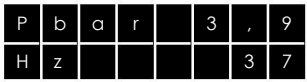
Pset 4,0 Pbar 3,9	To start the sequence of configuration press **MENU** during 3"	
LANGUAGE ENGLISH	By mean of keys ▲▼ we can choose the languages: "LANGUAGE ENGLISH", "LANGUE FRANÇAISE", "LINGUA ITALIANA" and "IDIOMA ESPAÑOL".	
MAX.INT 10 A	By mean of keys ▲▼ input the nominal current intensity value in A of the pump enabling the thermal protection. This value is located over the characteristics plate of the motor. Press **ENTER** for validation. **WARNING: this value is linked with the flow detection system, it is very important to enter the exact current consumption indicated on the name-plate.**	
MIN.FREQ 30 Hz	**MINIMUM FREQUENCY**. Using ▲ we can increase the lower frequency value, within 30-48 Hz for single-phase pumps. *The minimum frequency value will be used as frequency stop in installations where the automatic detection of hte device do not act due to leaks in the system. See hydraulic installation.	
LEVEL? NO	**EXTERNAL LEVEL SENSOR**. If the installation does not have level probe press **ENTER** to validate NO. If the installation has a level probe, use keys ▲▼ to change NO by YES.	
PRESSURE 03,0 bar	This will be the system operating pressure. Use keys ▲▼ for modify the initial value (2 bar). **WARNING ! The input pressure must be al least 1 bar lower than the maximum pressure of the pumps.** **NOTE**: In case of group assembly, all the system operates at the pressure set in the MASTER device, so that the configuration of set pressure in the slave device is superfluous.	
TYPE SINGLE?	The device is set by default as **SINGLE**. In case of individual assembly just confirm **SINGLE** by pushing **ENTER**. In case of group assembly (M-S), we will choose respectively **SLAVE** and **MASTER** in each unit pushing ▼.	
P.SENSOR 0-10 bar	The range of lecture of the pressure transmitter installed must be adjusted. If the range is within 0-10 bar confirm by mean of **ENTER**. If the range is within 0-16 bar change it by mean of ▲▼ and then confirm with **ENTER**.	
Pset 4,0 Pbar 3,9	After pressing **ENTER** pushbutton, the system is ready to operate. Press **AUTOMATIC** in order to quit manual mode. In case of group assembly press **AUTOMATIC** only in the device set as MASTER.	

In case of group assembly, after pressing AUTOMATIC in the MASTER device, the AUTOMATIC LED LIGHT of the SLAVE device will start to flash intermittently, indicating that communication between both devices is ready. If this does not happen verify the connection (fig 5).

SCREEN DISPLAY.
Being the unit in automatic mode (LED AUTO ON) by mean of the push-button ▲ can be displayed several operation parameters. Where:

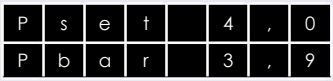
- Pset is the set pressure or target pressure in bar.
- Pbar is the instantaneous lecture of pressure in bar.
- Hz is the rotation frequency of the motor in Hz.
- A is the instantaneous current consumption in A.
- ºC is the module temperature in ºC.







EXPERT MENU. Particular configuration, there is no need to adjust these values, they are factory set.
Using ▲▼ we can change the values and press **ENTER** for validation. Whenever we want to quit the configuration sequence press **MENU**. After every **ENTER** it will be automatically displayed the messages of the configuration sequence.



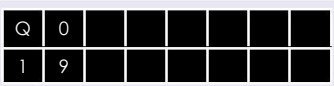
To start the sequence of configuration press **MENU + ENTER** during 3"





Press **ENTER**.





PID parameter, factory set. For any doubt contact with the manufacturer.









ACELERATION. Using ▲▼ it can be adjusted the desaceleration. Rank 5-20 (Hz/s). Press ENTER to confirm.





DECELERATION. Using ▲▼ it can be adjusted the desaceleration. Rank 5-20 (Hz/s). Press ENTER to confirm.





COMMUTATION FREQUENCY. Using ▲▼ it can be adjusted the commutation frequency 8KHz o 4KHz. Press ENTER to confirm.



ALARMS FOR SINGLE ASSEMBLY.
In case of simultaneous alarms, quit the automatic mode and go to manual mode, pressing the pushbutton **AUTOMATIC ON/OFF** (led light PUMP will turn off). Using key ▲▼ will be displayed the succesive alarms. Once visualized, for leaving the menu, press **ENTER** returning to **MANUAL** mode.

A1 DRY RUNNING (☼ Failure verification - ● Final failure)
DESCRIPTION: if the system detects dry running during more than 10 seconds, it will stop the pump and the ART (Automatic Reset Test) will be activated.
SYSTEM REACTION: after 5 minutes ART system will start again the pump during 30 seconds, trying to restore the system. In case of persistent lack of water, it will try it again every 30 minutes for 24 hours. If after all these cycles , the system still detects lack of water, pump will remain permanently out of order until the damage will be repaired.
SOLUTION: dry running, it has been activated the safety system: you should verify the feeding of the hydraulic network. The pumps can be primed using the push-button START/STOP (the led light AUTOMATIC should be off, if it is not, press the push-button to disable it).
Special case: if the pump cannot provide the programmed pressure (configuration mistake) the unit reacts as it was dry-running.
Special Case 2: this device manages the dry running control through the nominal current consumption of the pump. It must be verified the introduced current consumption in the setup menu.

A2 OVER-INTENSITY (☼ Failure verification - ● Final failure)
DESCRIPTION: the pump is protected against over currents by mean of the intensity values established in the installation menu. These over currents are produced generally by dysfunctions in the pump or in the electric supply.
SYSTEM REACTION: when detecting the thermal failure, the pump will be automatically stopped. The system will try again to restart the pump when the demand of consumption require it. The control system will carry out 4 attempts in this circumstances. If the system remain locked after the 4th attempt, the pump will remain definitively out of order.
SOLUTION: verify the state of the pump, for example the impeller could be blocked. Verify intensity values introduced in the configuration menu. Once the problem have been solved the operation will be restored going to the "SET UP" menu (see the chapter configuration) and configuring the adequated intensity values.

A3 DISCONNECTED P. (● Final failure)
DESCRIPTION: the device has an electronic safety system in case of no load detection.
SYSTEM REACTION: the device is disconnected..
SOLUTION: the wound of the motor and the pump consumption should be verified. Once the problem have been solved the operation will be restored going to the "SET UP" menu (see the chapter configuration) and introducing the adequate intensity values.

A5 TRANSDUCER (● Final failure)
DESCRIPTION: the transducer damages are showed in the device LCD screen.
SYSTEM REACTION: the device operation is interrupted.
SOLUTION: check the external pressure transmitter.

A6 EXCESSIVE TEMP (● Final failure)
DESCRIPTION: the system is cooled by the motor fan to keep the INVERTER in optimum working conditions.
SYSTEM REACTION: if an excessive temperature is reached the own system leaves the inverter out of service and as consequence the pump too.
SOLUTION: verify the temperature environment should be under 50 °C. Contact with technical service.

A7 SHORTCIRCUIT (● Final failure)
DESCRIPTION: the device has an electronic system for protection against short circuits as well as peaks of current.
SYSTEM REACTION: the pump stops and then it starts again -performing 4 successive attempts. If the problem is not solved, the pump will remain definitively out of order.
SOLUTION: check the pump, if the problem persists, contact the technical service.

A8 OVERVOLTAGE - A9 UNDERVOLTAGE (☼ Failure verification)
DESCRIPTION: the device has an electronic safety system against overvoltages and too low supply voltages.
SYSTEM REACTION: in case of overvoltage or undervoltage the system remains stopped until an adequate value of voltage is reached. In this case, the system is automatically restored.
SOLUTION: check the electric supply.

☏**ALARM INSTALLATION MASTER-SLAVE**
A10 COMUNICA (Failure verification)
DESCRIPTION: If you have configured a Master-Slave system and communication cable is disconnected or there is a bad connection, the system stops.
SYSTEM REACTION: The Master-Slave system stops and starts to operate individually.
SOLUTION: Check the cable connection and if this is OK, check the connection inside the unit. Check the configuration of the Master-Slave system (setup menu).

DESCRIPTION: blank screen.
SOLUTION: check the electric supply 230 V.

☏ALARMS FOR GROUP ASSEMBLY.

The alarms for assembled devices, are similar to those of the individual one with the specific particularities of operation with 2 communicated devices. Depending on the system´s reaction there are 3 types of alarm:

1 .- **COMMUNICATION FAILURE**: not any alarm is activated. Both devices continue operating independently as single. There will not be flashing led-light in any unit.

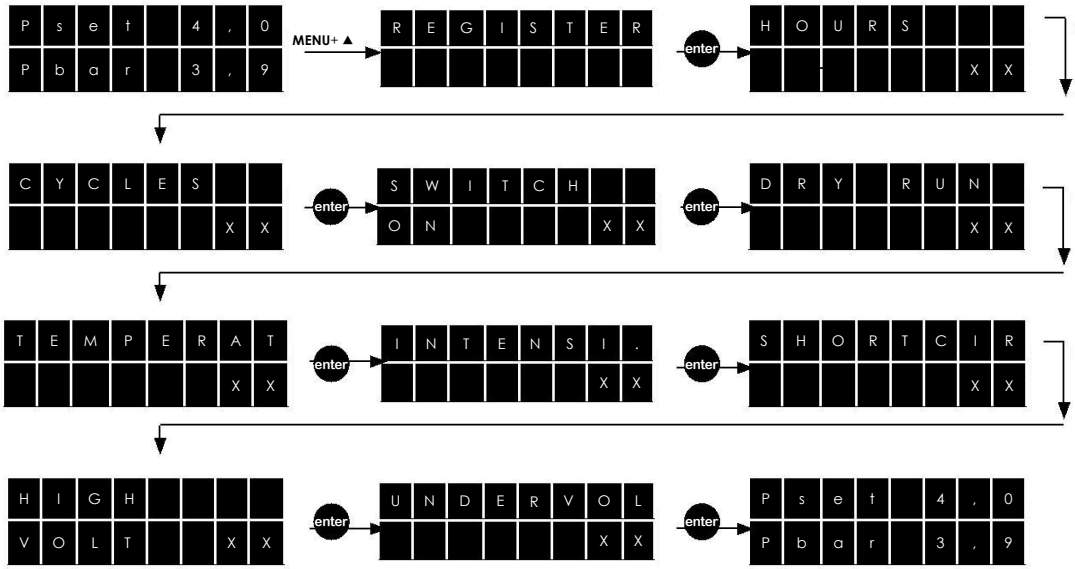
2 .- **DRY RUNNING OPERATION**: if there is a lack of water alarm in a single pump, the other one assumes the role of "main device", if there is an over-demand during next operating cycles, the system will try to restore the device in failure. If the device is restored in these conditions then it will be also restored the alternated operating mode. If there is lack of water on both devices, the system will activate the ART system in the MASTER unit.

3 .- **REST OF ALARMS**: If the alarm has occurred in a single device, the other will act as "main device". The system will try to restore the disabled device only in case of over demand, after 4 successive attempts without success the device is turned off, it should be restored manually. In case of alarms in both devices the system performs 4 restore attempts, if it does not succeed the system is disabled.

To restore manually a device disabled by an alarm push **AUTOMATIC ON/OFF** in **MASTER** device and then **ENTER** in the device with the alarm.

REGISTER OF OPERATION DATA AND ALARMS.

By using simultaneously **MENU** + ▲ during 3" is acceded to **register of operation data and alarms**, by mean of **ENTER** we can advance through the sequence, once finished the sequence it returns to the main display. This is all the sequence:



- REGISTER HOURS. Counter of total time that the pump has been operating.
- REGISTER CYCLES. Number of cycles of operation, a cycle is a start and a stop.
- REGISTER SWITCH. Number of connections to the electric supply.
- ALARM COUNT DRY RUN. Number of dry-running alarms. (A1)
- ALARM COUNT. TEMPERAT. Number of alarms by excessive temperature. (A6)
- ALARM COUNT INTENSI. Number of overload alarms. (A2)
- ALARM COUNT. SHORTCIRC. Number of short circuit alarms. (A7)
- ALARM HIGH VOLT. Number of high voltage alarms. (A8)
- ALARM UNDERVOL. Number of undervoltage alarms. (A9)

All the records are saved even if the device has been disconnected from the electric supply.