Instructions Manual

Atlanta 100

Contents

Note*:* All the strings representing programming menus in this manual are indicative only. The strings displayed by the instrument have been shortened for proper readability and viewing on the display.

1 GENERAL INFORMATION REGARDING THE MANUAL

Compliance with the operative procedures and the precautions described in this manual is an essential requirement for the correct operation of the instrument and to guarantee total operator safety.

The official version of the manual, for which the supplier is directly responsible, is the one in English.

For countries of different languages from the one indicated above, the official manual will remain the one in English. The supplier will not be held responsible for any possible translations in different languages made by distributors or users themselves.

Before using the instrument, the manual must be read in all of its parts, in the presence of the instrument itself, in order to ensure that the operating modes, the controls, the connections to the peripheral equipment and the precautions for safe and correct use are clearly understood.

The user manual must be stored, integral and legible in all parts, in a safe place which can be quickly and easily accessed by the operator during installation, use and/or installation revision operations.

CONVENTIONS

The present user manual uses the following conventions:

NOTE

The notes contain important information to be highlighted in comparison to the rest of the text. These generally contain information that is useful to the operator to carry out and optimize operating procedures of the equipment in a correct manner.

WARNING

Warning messages appear in the manual before procedures or operations that must be observed in order to avoid any possible losses of data or damages to the equipment.

ATTENTION

Attention messages appear in the manual in correspondence to description of procedures or operations which, if carried out incorrectly, may cause damages to the operator or users.

1.1 LIMITATIONS OF USE AND SAFETY PRECAUTIONS

In order to guarantee operator safety and correct device functionality, all of the usage limitations and precautions listed below must be respected:

ATTENTION

Make sure that all the safety requirements have been met before using the device. The device must not be powered on or connected to other devices until all of the safety conditions have been met.

ELECTRICAL SAFETY

In order to guarantee maximum conditions of safety for the operator, it is recommended to follow all of the indications listed in this manual.

- **Power up the device using exclusively power supplies that comply with the device technical specifications (230Vac ±10% @50/60Hz).**
- **Replace any damaged parts immediately.** Any cables, connectors, accessories or other parts of the device which are damaged or not functioning properly must be replaced immediately. In such cases, contact your nearest authorized technical assistance centre.
- **Only use specified accessories and peripherals.** In order to guarantee all of the safety requirements, the device must only be utilized along with the accessories specified in this manual, which have been tested for use with the device itself. The use of accessories and consumption

materials from other manufacturers or not specifically recommended by supplier will not guarantee the safety and correct operation of the equipment. Only use peripherals that comply with the regulations of their specific categories.

SAFETY OF THE OPERATING ENVIRONMENT

- The control panel of the equipment is resistant to liquid. The device must be protected against drips, sprays and/or immersion and should not be used in environments where such risks are present. Any devices into which liquids may have accidentally penetrated must be immediately shut off, cleaned and inspected by authorized and qualified personnel.

- Protection:
  - IP55

- The device must be utilized within the specified environmental temperature, humidity and pressure limits. The instrument is designed to operate under the following environmental conditions:
  - Temperature of the working environment: 0 ÷ 40°C
  - Storage and transport temperature: -20°C ÷ 60°C
  - Temperature of the liquid to be dosed: 0 ÷ 80°C (40°C with PVC head, 60°C with PP head)
  - Relative humidity: up to 95%

ATTENTION

The system must be maintained operational in full compliance with the foreseen safety regulations.

The parameters set on the control unit must comply with the current regulations.

The control unit's malfunction signals must be located in an area that is constantly supervised by the system's maintenance personnel or operators.

Failure to respect even just one of these conditions could cause the control unit's "logic" to operate in a potentially dangerous manner for the users of the service.

In order to avoid any potentially dangerous situations, therefore, the system's service and/or maintenance personnel are advised to work with the utmost care and to signal any alterations in the safety parameters in a timely manner.

As the above issues cannot be monitored by the equipment, the manufacturer shall bear no responsibility for any property damage or personal injury which may result from such malfunctions.

ATTENTION SYMBOL

The symbol illustrated below represents the **ATTENTION** symbol and reminds the operator that he should read the user manual for important information, advice and suggestions regarding the correct and safe use of the equipment.

In particular, when it is positioned close to connection points to cables and peripherals, the symbol in question refers to careful reading of the user manual for instructions related to the nature of such cables and peripherals and the methods for correct and safe connection.

The illustrations of equipment panels, with relative commands, connections, symbols and labels are provided in this chapter. Each attention symbol is accompanied by a detailed explanation of its meaning.

2 GENERAL DESCRIPTION OF THE SYSTEM

The system treated in this manual consists of a metering pump and an electronic control unit. It is able to regulate the flow rate of the pump using a regulation knob for the stroke length and the electronic control unit in order to regulate the speed of the motor and consequently the flow rate.

NOTE

This product is intended for professional use, by trained people only.

2.1 APPLICATIONS

Metering pump is a process component capable to transfer defined volumes of liquid with high accuracy, moreover it is possible to vary the flow rate by acting on the stroke length knob and on the electronic control unit.

To obtain the best performances, select the pump considering the duty required and the compatibility of the construction materials of the contact parts.

Before using a pump for a duty different from the original one, please contact our Technical Dept. for information.

2.2 SYSTEM DESCRIPTION

The metering pump is a reciprocating positive displacement pump; basic components are: the prime mover, the gearbox, the mechanism, the stroke length adjustment, the liquid end and the electronic control unit.

1	Pump head
2	Mechanism
3	Stroke length adjustment
4	Motor
5	Electronic control unit

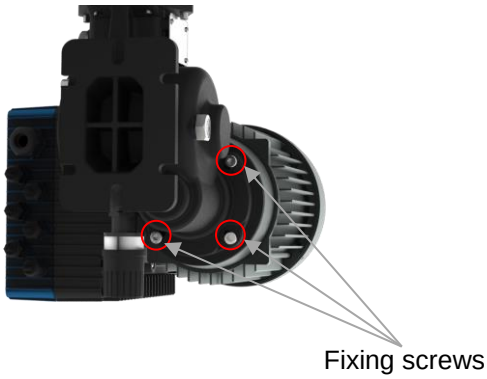
The pump is delivered with the electronic control unit in a standard position, as seen in the picture below:

a. Side view

b. Top view

If necessary, the electronic control unit's position can be changed by rotating the motor from its standard position. To do this, follow the steps below:

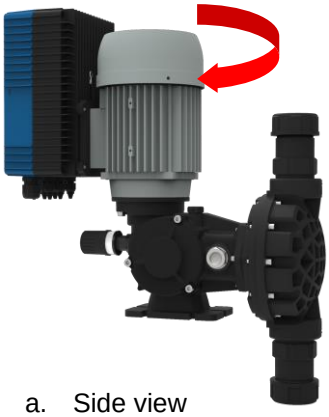
- Disconnect the motor from the power supply
- Unscrew the 4x70 fixing screws on the lower side of the motor with an Allen wrench



ATTENTION

Do not turn the pump upside down or the inserted oil may come out of the filling cap. Do not lift, for any reason, the motor from the mechanism and do not use positions not explained.

- Rotate the motor unit clockwise by 90º while taking care not to pull the power cable excessively



a. Side view

b. Top view

- Fix the motor unit in the rotated position with the 4x70 fixing screws
- Reconnect the motor to the power supply

ATTENTION

Exceeding the maximum allowed operating pressure must be prevented (e.g. by using a pressure relief valve)

Before starting to work on the metering pump verify carefully the following:

- the electronic control unit is disconnected from the power source
- parts such as pump head and piping are depressurized
- parts in contact with aggressive substances are washed before handling
- personnel protection is carried out according to local regulations

2.3 SYSTEM HANDLING

If the pump is assembled on a baseplate with lifting lugs, use them for handling.

⇨ **IN ANY CASE NOTE THE FOLLOWING INSTRUCTIONS:**

- **Do not sling, pull, push** the pump head nozzles or flanges
- **Do not sling, pull, push** the adjustment knob
- **Do not sling, pull, push** the plunger
- **Do not sling, pull, push** the electronic control unit

⇨ **WHEN LIFTING LOADS PAY ATTENTION TO THE FOLLOWING:**

- Wear helmet, accident protective shoes and gloves
- Do not stand under hanging loads
- Do not hand lift overload
- When hand lifting load do not assume position that can be dangerous for the spinal column and dorsal muscles

The correct way to handle the pump is shown on the drawings here below:

ATTENTION

During transportation the system must be protected against moisture, salt water, rain, sand storm and direct sunlight.

2.4 CONNECTION TO THE POWER SUPPLY

If possible, keep any high-power cables away from the instrument and its connection cable (these could cause inductive disturbances, especially for the analogical part of the system.

Use an alternating 230Vac ±10% power supply @50/60Hz – or as specified on the plate. The power supply must be as stabilized as possible.

Absolutely avoid connecting the device to rebuilt power supplies, using transformers for example, where the same power supply is also used to power other systems (perhaps of an inductive typology); this could lead to the generation of high voltage spikes which, once emitted, are difficult to block and/or eliminate.

ATTENTION

The electrical line must be equipped with an appropriate circuit breaker, in compliance with the proper installation standards

It is nevertheless always a good idea to check the quality of the grounding connector. In industrial facilities, it is not uncommon to find grounding connectors that cause electrical disturbances instead of preventing them; wherever doubts should arise regarding the quality of the facility's grounding connectors, it is better to connect the control unit's electrical system to a dedicated grounding rod.

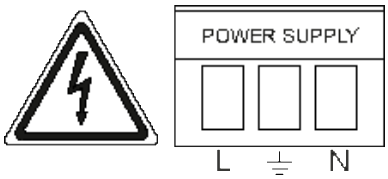
ATTENTION

Electrical components should be connected in accordance with local regulations and by qualified personnel only.
In hazardous areas special regulations must be applied.

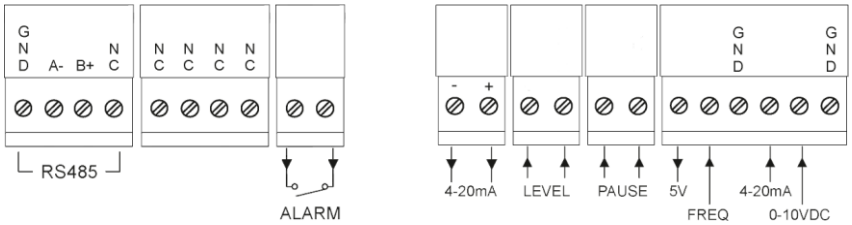
Electrical Specifications		Note
Power Supply	230Vac ±10% @50/60Hz	Power supply class I, with ground connection
Fuse	replaceable 10A F	Replace the fuse with the same type
Battery Type	3V CR 2032	Replace with the same type

CONNECTION TERMINAL BLOCK:

- POWER AND GROUNDING CONNECTORS



- INPUT AND OUTPUT CONNECTORS



Connector	Description	Note
Power Supply	230Vac ±10% @50/60Hz	The power and grounding connectors are located on the power board of the electronic control unit.
RS485	Serial Port for Data Communication	The I/O connectors are located on the interface board of the electronic control unit.
Alarm	Alarm Relay, dry contact	
4-20mA	Current Output 4÷20mA (500 ohm)	
Level	Liquid Level Sensor Input, dry contact	
Pause	Pause Input, dry contact	
5V	5V Voltage Source Max. 200mA	
Freq	Flow Meter Input, Max frequency 1kHz, dry contact	
4-20mA	Current Input 4÷20mA,	
0-10VDC	DC Input	

3 PUMP DESCRIPTION AND INSTALLATION

3.1 PLUNGER METERING PUMP

3.1.1 MECHANISM AND GEARBOX

Mechanism is the device that permits to transform the electric motor rotary movement in alternate and to actuate the plunger.

3.1.2 ADJUSTMENT OF THE STROKE LENGTH

To obtain high accuracy performances pump must operate at ideal conditions: constant speed, pressure, viscosity.

Before turning the adjustment knob, release the adjustment by rotating of 1/4 of turn the lock screw.

The variation from 0 to 100% of the maximum flow rate is obtained by rotating the adjustment knob counter clockwise; each revolution of the adjustment knob corresponds to a variation of 1/10 of the maximum capacity; moreover, the knob edge is subdivided in 10 parts each one corresponding to a variation of 1/100 of the maximum flow rate.

ATTENTION

Right after a manual stroke adjustment, a calibration is required in order to have an accurate flow rate in the electronic control unit.

3.1.3 PUMP HEAD

OPERATING PRINCIPLE

The packing (5) on the piston (4) seals the pump head. Suction (1) and discharge (2) valves are operated by positive and negative pressure.

SUCTION STROKE

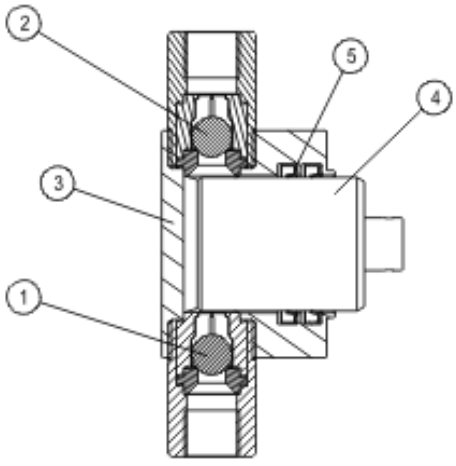
During the suction stroke the difference between the suction pressure and the pressure inside the pump head (3) causes the opening of the suction valve (1).

The process liquid is sucked from the suction line into the pump head (3).

DISCHARGE STROKE

During the discharge stroke the suction valve (1) is closed and the discharge valve (2) will open due to the positive pressure inside the pump head (3).

The process liquid is discharged from the pump head (3) into the discharge line.



1	Suction valve
2	Discharge valve
3	Pump head
4	Plunger
5	Packing

PACKING

Plunger pumps can be equipped with packing consisting of lip seals that don't require any adjustment.

3.2 DIAPHRAGM METERING PUMP

3.2.1 MECHANISM AND GEARBOX

Mechanism is the device that permits to transform the electric motor rotary movement in alternate and to actuate the plunger.

3.2.2 MANUAL ADJUSTMENT OF THE FLOW RATE

To obtain high accuracy performances pump must operate at ideal conditions: constant speed, pressure, viscosity.

All pumps having manual adjustment are delivered with the adjustment positioned at 100%.

Before turning the adjustment knob, release the adjustment by rotating of 1/4 of turn the lock screw.

The variation from 0 to 100% of the maximum flow rate is obtained by rotating the adjustment knob counter clockwise; the knob edge is subdivided in 10 parts each one corresponding to a variation of 1/4 of the maximum flow rate.

ATTENTION

Right after a manual stroke adjustment, a calibration is required in order to have an accurate flow rate in the electronic control unit.

3.2.3 PUMP HEAD

OPERATING PRINCIPLE

The piston (5) is mechanically connected to the diaphragm (4). The diaphragm (4) is actuated by the piston (5) and separates the pump head (3) from the atmosphere. Suction (1) and discharge (2) valves are operated by positive and negative pressure.

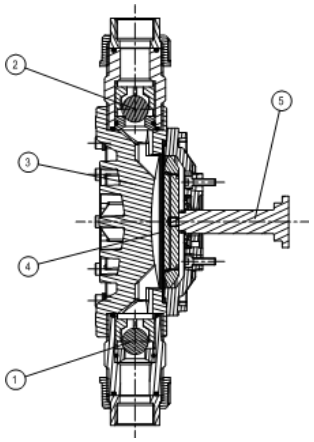
SUCTION STROKE

During the suction stroke the difference between the suction pressure and the pressure inside the pump head (3) causes the opening of the suction valve (1).

The process liquid is sucked from the suction line into the pump head (3).

DISCHARGE STROKE

During the discharge stroke the suction valve (1) is closed and the discharge valve (2) will open due to the positive pressure inside the pump head (3). The process liquid is discharged from the pump head (3) into the discharge line.



	Mechanical diaphragm
1	Suction valve
2	Discharge valve
3	Pump head
4	Diaphragm
5	Piston

3.3 PUMP INSTALLATION

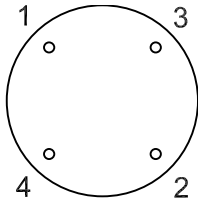
3.3.1 SAFETY PRECAUTIONS

- Don’t work alone
- Install a magnetic starter with overload protection
- When working on the pump verify that electronic control unit is not connected to mains.
- Using electric tools in hazardous areas, pay attention to special regulations
- Keep available a first aid kit
- Observe local law safety regulations

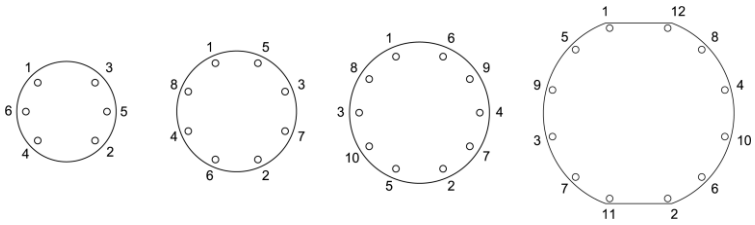
3.3.2 INSTALLATION

- Foundation height should be so as to facilitate maintenance operation, handling, oil refill and drain, easy disassembling of pump head
- Install the pump **free of strain** on its base, pump head connections and foundation
- Install the pump levelling the piston axis horizontally and the valve axis vertically
- Make sure that the pump casing’s tightening torque of the screws is of 6Nm, otherwise retighten as shown below:

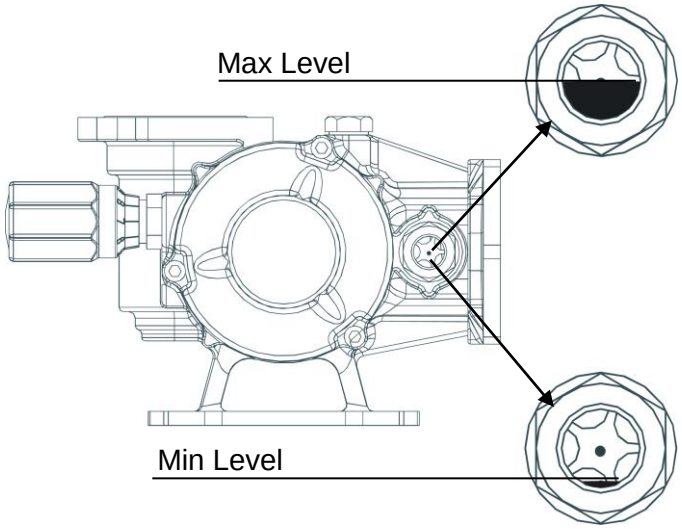
FOR PLUNGER METERING PUMPS:



FOR DIAPHRAGM METERING PUMPS:



Check the oil level and, if required, restore the correct level using the same oil; check also for possible leakages through the lip seal on the piston rod and if necessary replace the lip seal.



ATTENTION!

Please use only oil with these features: **ISO VISCOSITY GRADE 320**

3.3.3 HYDRAULIC CONNECTIONS

For a good operation, the correct installation of the pump is fundamental:

- Before carrying out hydraulic connections, make sure that the inside of pipes, tanks, etc. have been thoroughly cleaned/washed. However, we recommend the installation of a temporary filter near the suction nozzle in order to stop plant residues and slags.
- Connect pipes avoiding nozzles stretching
- Install pipes correctly sized for the maximum flow rate of the pump, avoid necks and tortuosity where air or gas could be entrapped.
- Check valves and cross fittings should be installed both in the suction and discharge lines, this will permit to disassemble the pump without draining the plant and/or to install accessories such as pressure gauges, dampers and so on.
- For the diaphragm metering pumps, in case of plastic head, install flexible joints both on suction and discharge sides.

ATTENTION

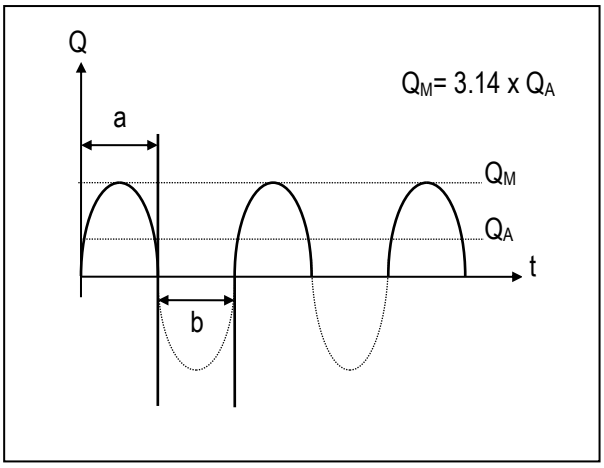
To prevent serious damages, suction and discharge lines must be properly designed, sized and connected to the pump.

3.3.4 SUCTION LINE

NOTE

See ANNEX B: INSTALLATION SUGGESTIONS TABLE for fig. 1 – 13.

- Install pipe as short as possible (fig. 1) and avoid tortuous paths (fig. 2)
- Pipe should be sized considering that the ratio between the maximum instantaneous flow rate and the average flow rate is 3.14.
- Indicatively the installed pipe should have a diameter equal to 1.5 times the diameters of the pump nozzles.
- For your guidance the recommended flow speed inside the pipes should be 0.5÷0.8 m/sec with liquids having viscosity near water and specific gravity up to 1200 Kg/m^3.
- A permanent suction filter must be installed. The filter should have a filtering cartridge of 150 µm giving a pressure drop less than 0.2 m.w.c. (calculated according to the a.m. coefficients). The filter should be easily accessible and periodically checked and washed.
- In case of long lines and in order to avoid cavitation problems, install, near the pump, an expansion tank or a damper (fig. 3).
- To prevent suction of impurities don't connect suction line to the bottom of the tank (fig. 4)
- Suction from a vacuum tank can be achieved by connecting pipes as per fig. 5. Open check valve 2 and verify the filling through the window 3, close the check valve 2, start the pump; the non-return valve 4 prevents liquid to flow-back when pump is stopped.



Q	Flow rate
Q_A	Medium Flow rate
Q_M	Maximum flow rate
a	Discharge stroke
b	Suction stroke
t	Time

3.3.5 DISCHARGE LINE

NOTE

See ANNEX B: INSTALLATION SUGGESTIONS TABLE for fig. 1 – 13.

- Verify that between suction and discharge there is a positive pressure of at least 50÷100 Kpa; if the plant conditions don't permit a positive pressure difference, install a back-pressure valve on pump discharge (fig. 6) or lower suction tank (fig. 7) or raise discharge pipe (fig. 8)
- For safety reasons it is mandatory to install a pressure relief valve in order to prevent dangers as consequence of unexpected overpressure; the pressure relief valve discharge should be visible and/or piped back to the tank or to a drain
- We do not recommend to pipe the pressure relief valve discharge to the pump suction line (fig. 9)
- In case a back-pressure valve is installed, the pressure relief valve must be installed as shown in fig. 10
- It is recommended the installation of pressure gauges having a range of 20% higher than the pressure relief valve setting.
- To reduce flow pulsation, the installation of a pulsation damper near the discharge valve of the pump is highly recommended.

The most used dampers are:

- Dampers with direct contact between process liquid and gas/air cushion (air chamber); this type is of simple concept but it needs frequent checks and restoring of the atmospheric air cushion.
- Dampers with diaphragm or bag which separates gas/air from process liquid; they are generally pre-charged at a pressure equal to 60÷75% of the maximum operating pressure of the pump when installed on the discharge side of the pump

These dampers require periodic checks to verify diaphragm/bag integrity and correct pre-charge pressure; they must be selected considering the chemical compatibility of the construction material of diaphragm/bag.
If the pump discharges into a pressurized line, the installation of a non-return valve is recommended.

NOTE

When installing pump and accessories it is recommended the installation of check valves in order to facilitate maintenance operations. See fig. 13 on ANNEX B: INSTALLATION SUGGESTIONS TABLE for a typical installation.

Please observe the following instructions when pumping liquids that tend to crystallize or suspensions that tend to sediment:

- Keep suspension correctly agitated in order to prevent sedimentation
- Avoid installation of vertical lines over the pump discharge nozzle
- Before stopping the pump start a washing cycle of the pump and pipes
- Design suction and discharge lines should permit complete emptying

4 ELECTRONIC CONTROL UNIT DESCRIPTION AND USAGE

The electronic control unit allows to set different dosing functions, like: Manual, mA Mode, V Mode, ppm Mode, Batch Mode and Timed. The dosing reproducibility is 2% in continuous mode under constant backpressure condition and with water temperature around 23°C and constant aspiration height less than 1.5 m.

4.1 GRAPHIC DISPLAY

The graphic display allows a series of views for the various menus, for programming and for viewing device parameters during operation (**Run**).

CONTROLS, INDICATORS AND CONNECTIONS

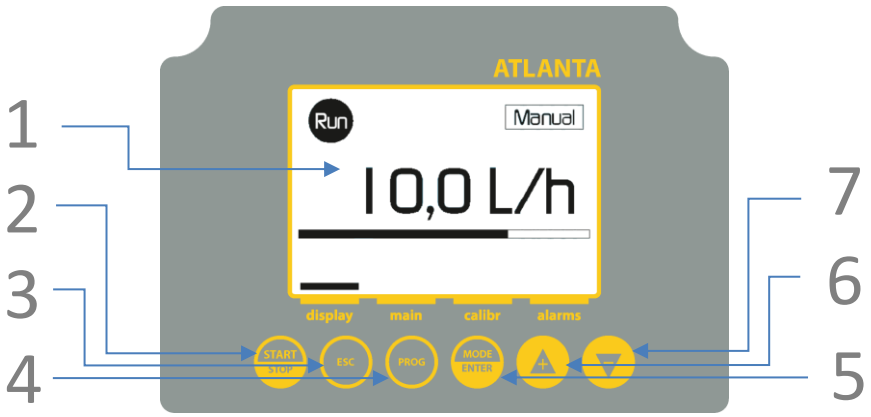


Figure 1 – Electronic Control Unit Interface

1.		Graphic Display
2.		Enables and disables the pump
3.		Used to **exit** the various menu levels. Before definitively exiting the programming phase, you will be asked to save the changes. When pressed from the standard display mode, you can enter the user manual download menu
4.		Access to the programming menu.
5.		When pressed during the pump operation phase, it displays a summary of the settings of the current operating mode. During programming, it carries out an **enter** function, meaning that it allows to access the various menu levels and to confirm modifications within each menu item
6.		Used to run upwards through the menu or increase the numerical values to be changed. Can be used to start dosage in Batch mode.
7.		Used to run downwards through the menu or decrease the numerical values to be changed.

4.1.1 GRAPHIC DISPLAY SUBDIVISION AREAS IN RUN MODE

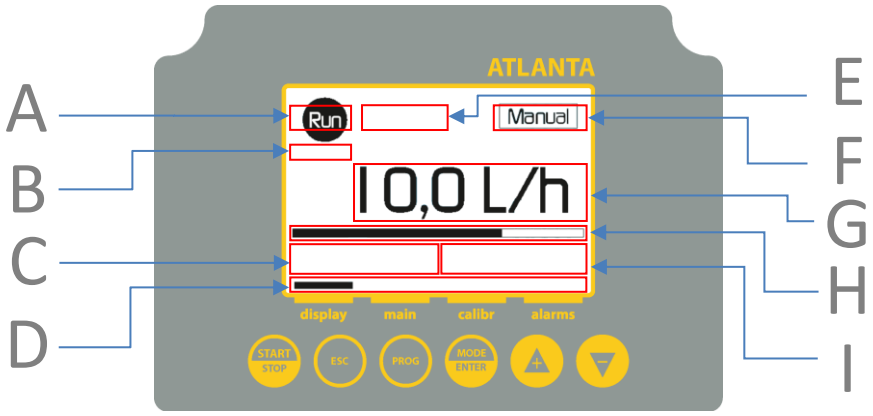


Figure 2 – Graphic Display - Subdivision Areas

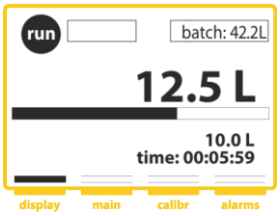
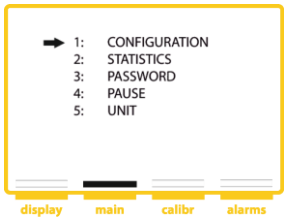
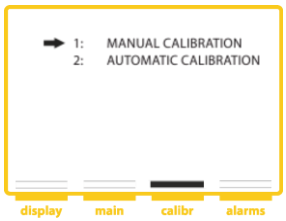
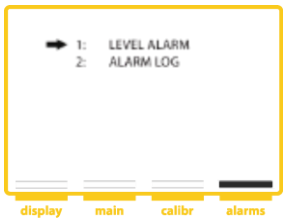
In display mode, the following information are shown:

A. Icons displaying the operating status of the pump (RUN, STOP)
B. Secondary information about the pump operation, depending on the programmed operating mode
C. Warning information, depending on the programmed operating mode
D. Menu name highlight (DISPLAY, MAIN, CALIBR or ALARMS)
E. Alarm status display area
F. Text box showing the current operating mode (MANUAL, mA, V, PPM, BATCH or TIMED)
G. Main information about the pump operation (FLOW RATE, QUANTITY or some other parameter), depending on the programmed operating mode
H. Bar showing the current percentage of maximum flow
I. Secondary information about the pump operation, depending on the programmed operating mode

4.1.2 VIEW MENU

LIST OF THE MAIN MENUS

The following table shows the screens visualized on the display representing the different menus.

VISUALIZATION ON THE GRAPHIC DISPLAY	DESCRIPTION	VISUALIZATION ON THE GRAPHIC DISPLAY	DESCRIPTION
	DISPLAY VIEW MODE System operation status		MAIN MENU System configuration
	CALIBRATION MENU System calibration		ALARMS MENU Alarms display

Note: The system returns automatically to DISPLAY mode after 1 minute of inactivity, without saving data.

4.2 START-UP

ATTENTION

Don’t start the pump with the suction and/or discharge check valves closed.
Don’t close check valves while the pump is in operation.

Before starting the pump check the following points:

- Check mechanism for the correct oil filling
- Check metering pump for overpressure protection (pressure relief valve installation)
- Verify that all hydraulic connections are correctly tight
- Position adjustment knob at “zero” flow rate
- Start the pump without discharge pressure and increase progressively the flow rate up to 100%
- Keep the pump in operation for few minutes

ATTENTION

DON’T EXCEED THE MAXIMUM PERFORMANCE STENCILLED ON THE PUMP LABEL.
If no pressure gauge is fitted on the plant, the installation of a temporary pressure gauge is recommended in order to check that the actual pressure at the start-up doesn’t exceed the maximum allowable pressure.

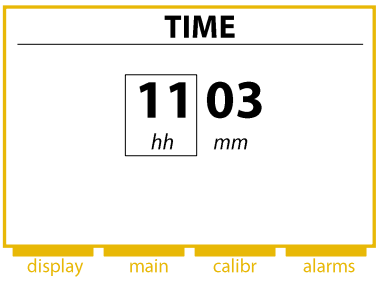
ATTENTION

Pumps are self-priming; however, some priming problem could be encountered with pumps having very low flow rate, small plunger diameter, with back pressure valves installed and in presence of high discharge pressure. In these cases, it could be necessary to aid priming purging air from pump head and suction line.

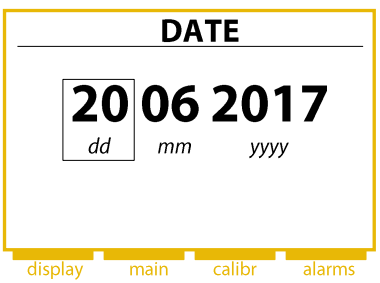
ATTENTION

If the pumped liquid is toxic, poisonous, aggressive, flammable or for any reason dangerous, use particular care avoiding accidental leakages through gaskets or pipes during start-up or maintenance operations.
Moreover, follow all the recommendations of the manufacturer for handling and the local laws relevant to safety during handling and disposal of dangerous substances

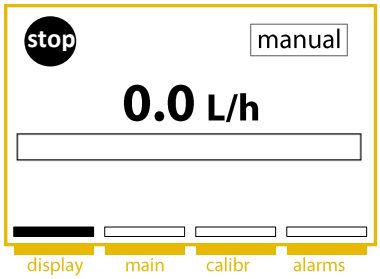
Every time the device is switched on, it performs a hardware test of the internal memory.
At the first start of the pump, the user has to set up the real time and date.



Use  and to set the time and date.



When time and date have been set, the pump enters the **DISPLAY** mode.

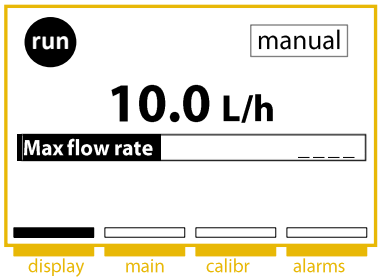


NOTE

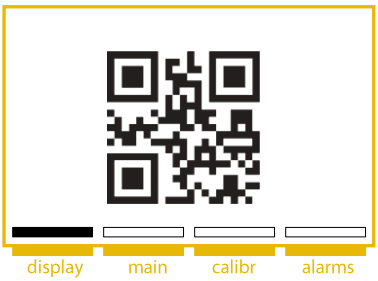
Always set the correct system time and date at the first start-up of the pump.

4.3 DISPLAY MENU

After the start-up, the user can run through **DISPLAY**, **MAIN**, **CALIB** and **ALARMS** menus by pressing the PROG and then the MODE/ENTER key.



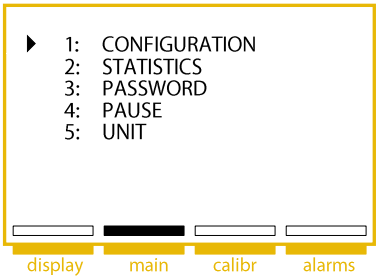
While in **DISPLAY** mode, press ESC to access the **Info** page and then MODE/ENTER to download the user manual by scanning the QR code displayed on the screen.



4.4 MAIN MENU (SETUP MENU)

The **MAIN** menu includes the following items:

1. **Configuration** (Index menu 1)
2. **Statistics** (Index menu 2)
3. **Password** (Index menu 3)
4. **Pause** (Index menu 4)
5. **Unit** (Index menu 5)

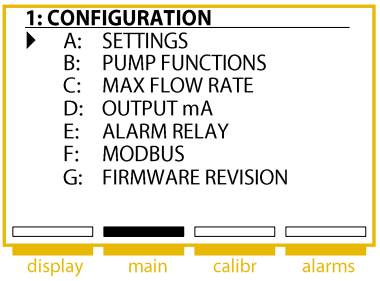


Use ▲ ▼ to select a menu item or an option and confirm with MODE/ENTER.
Use ESC to discard the changes made or to return to the previous menu.
When returning to **DISPLAY** mode, a prompt message will advise to save the changes made.
The pump automatically returns to **DISPLAY** mode after 1 minute of inactivity.

4.4.1 CONFIGURATION (INDEX MENU 1)

The **Configuration** menu includes the following options:

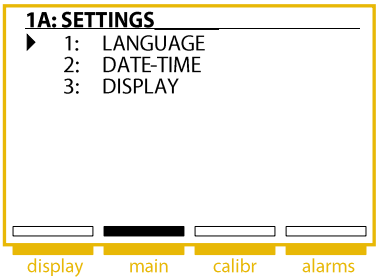
A. **Settings** (Index menu 1A)
B. **Pump functions** (Index menu 1B)
C. **Max flow rate** (Index menu 1C)
D. **Output mA** (Index menu 1D)
E. **Alarm relay** (Index menu 1E)
F. **ModBus** (Index menu 1F)
G. **Firmware revision** (Index menu 1G)



4.4.1.1 SETTINGS (INDEX MENU 1A)

The **Settings** menu includes the following options:

1A1: Language (Index menu 1A1)
1A2: Date-Time (Index menu 1A2)
1A3: Display (Index menu 1A3)



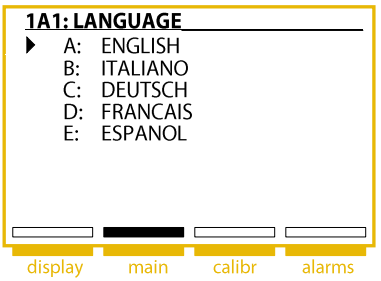
4.4.1.1.1 LANGUAGE (INDEX MENU 1A1)

Press PROG then MODE ENTER to enter the **MAIN** menu.

From the **MAIN** menu, use ▲ ▼ and MODE ENTER to select the item **1: Configuration** > **1A: Settings** > **1A1: Language**.

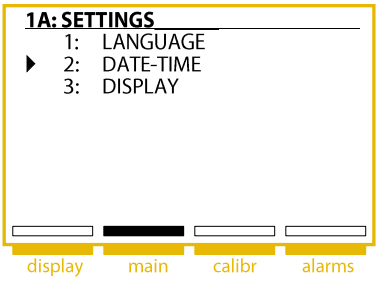
Use ▲ ▼ and MODE ENTER to select the language. Choose between: **English**, **Italian**, **German**, **French** and **Spanish**. The active option will be highlighted in **reverse mode**.

Press MODE ENTER to confirm and ESC to return to the previous menu.

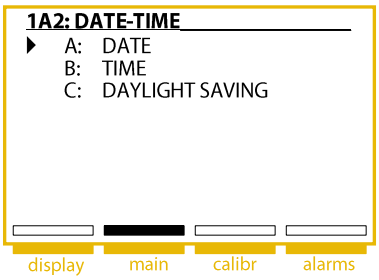


4.4.1.1.2 DATE AND TIME (INDEX MENU 1A2)

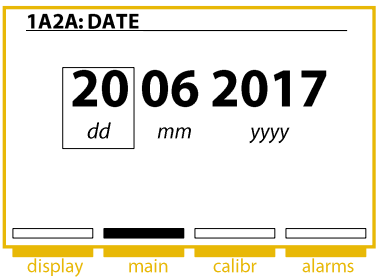
Use ▲ ▼ and MODE ENTER to select the item **1: Configuration** > **1A: Settings** > **1A2: Date-Time**.



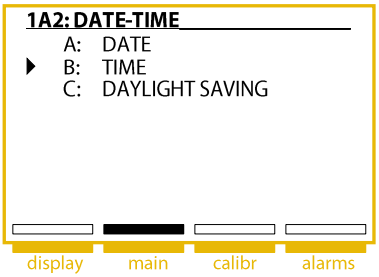
To set the date, use ▲ ▼ and MODE ENTER to select the item **1A2A: Date**.



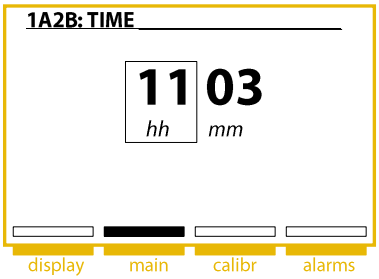
Use ▲ ▼ to set the **DAY** and press MODE/ENTER; use ▲ ▼ to set the **MONTH** and press MODE/ENTER; use ▲ ▼ to set the **YEAR** and then press MODE/ENTER to confirm. Press ESC to return to the previous menu.



To set the time, use ▲ ▼ and MODE/ENTER to select the item **1A2B:Time**.

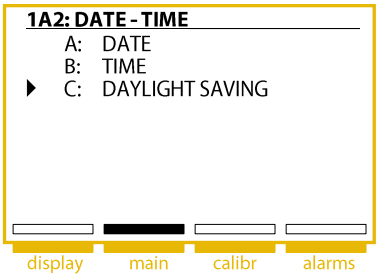


Use ▲ ▼ to set the **HOURS** and press MODE/ENTER; use ▲ ▼ to set the **MINUTES** and then press MODE/ENTER to confirm. Press ESC to return to the previous menu.



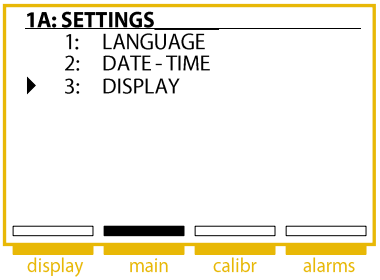
To set the daylight-saving time, use ▲ ▼ and MODE/ENTER to select the item **1A2C: Daylight Saving**.

Use ▲ ▼ to select **ON** or **OFF** and press MODE/ENTER to confirm. Press ESC to return to the previous menu.

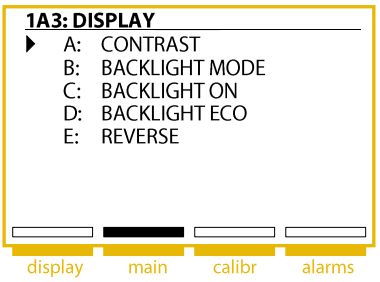


4.4.1.1.3 DISPLAY (INDEX MENU 1A3)

The **Display** setup menu includes the following options:
1A3A: Contrast
1A3B: Backlight Mode
1A3C: Backlight On
1A3D: Backlight Eco
1A3E: Reverse

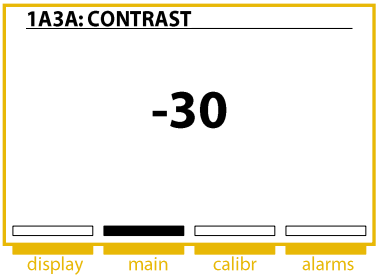


From the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **1: Configuration** > **1A: Settings** > **1A3: Display**.



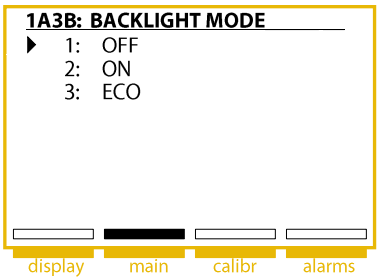
Use ▲ ▼ and MODE/ENTER to select the item **1A3A: Contrast**.

Use ▲ ▼ to adjust the contrast to a value between **-30** and **+30** then press MODE/ENTER to confirm.
Press ESC to return to the previous menu.



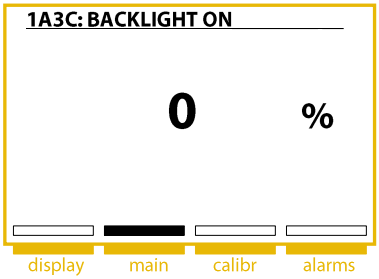
Use ▲ ▼ and MODE/ENTER to select the item **1A3B: Backlight Mode**.

Use ▲ ▼ to set the **Backlight Mode** to **OFF**, **ON** or **ECO** and press MODE/ENTER to confirm.
Press ESC to return to the previous menu.



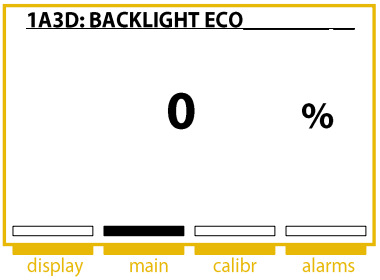
Use ▲ ▼ and MODE/ENTER to select the item **1A3C: Backlight ON**.

Use ▲ ▼ to set the **Backlight ON** to the desired value and press MODE/ENTER to confirm.
Press ESC to return to the previous menu.



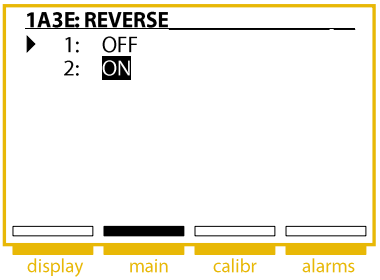
Use ▲ ▼ and MODE/ENTER to select the item **1A3D: Backlight ECO**.

Use ▲ ▼ to set the **Backlight ECO** to the desired value and press MODE/ENTER to confirm.
Press ESC to return to the previous menu.



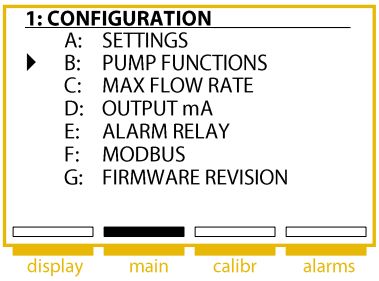
Use ▲ ▼ and MODE/ENTER to select the item **1A3E: Reverse**.

Use ▲ ▼ to set the **Reverse** mode to **OFF** or **ON** and press MODE/ENTER to confirm.
Use this function to invert the writings on the display in order to obtain a high contrast.
Press ESC to return to the previous menu.



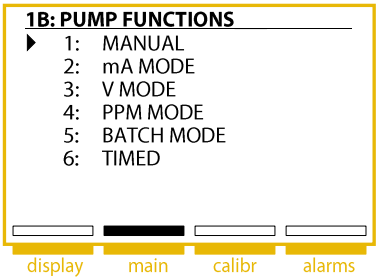
4.4.1.2 PUMP FUNCTIONS (INDEX MENU 1B)

4.4.1.2.1 MANUAL DOSAGE (INDEX MENU 1B1)



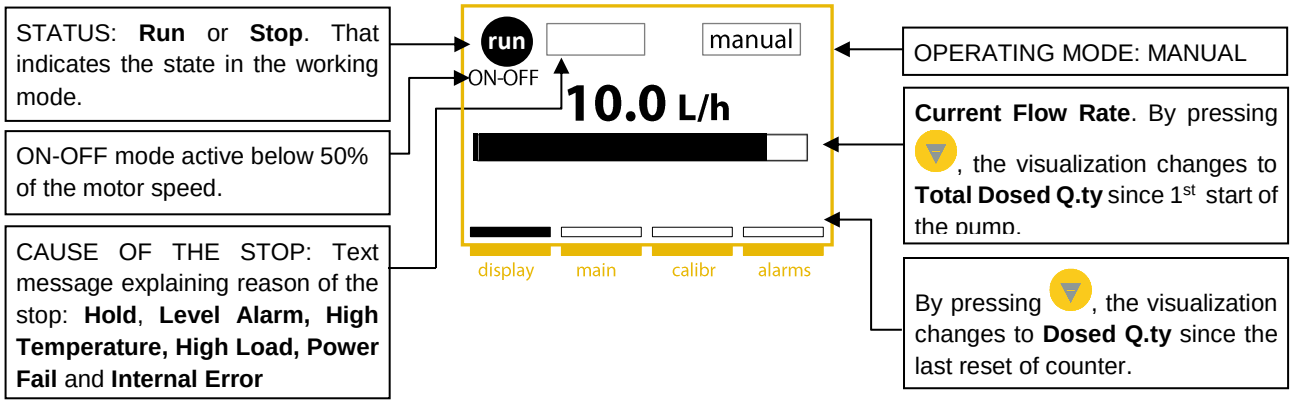
To set the manual dosage, press PROG then MODE ENTER to enter the **MAIN** menu.

From the **MAIN** menu, use ▲ ▼ and MODE ENTER to select the item **1: Configuration** > **1B: Pump Functions** > **1B1: Manual**.



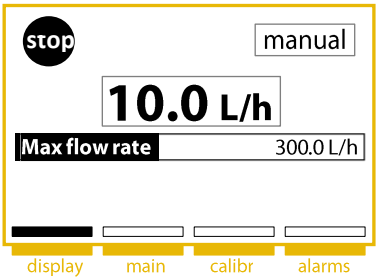
The pump operates in CONSTANT mode. It is possible to adjust the flow rate by pressing MODE ENTER then ▲ to increase the flow, or ▼ to decrease it. The flow rate can be adjusted even with the pump running. Press MODE ENTER to confirm and MODE ENTER to return to the previous menu. The display will show the new flow rate value.

During operation the display will show the following information:



In **DISPLAY** mode, by pressing MODE ENTER, a value table will be shown (Max Flow Rate). The main value corresponds to the actual Flow rate of the pump.

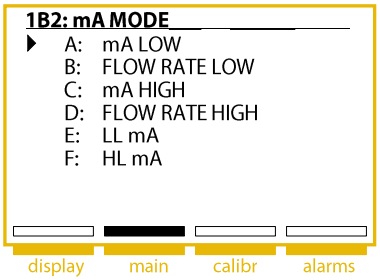
The value can be changed with ▲ ▼. Press MODE ENTER to confirm and ESC to return to the previous menu.



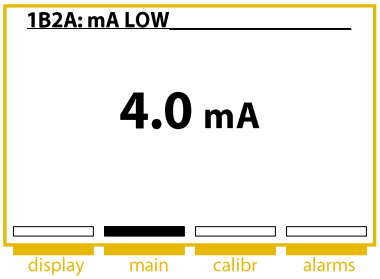
4.4.1.2.2 DOSAGE PROPORTIONAL TO A mA SIGNAL (INDEX MENU 1B2)

The pump doses proportionally to a mA signal. It stops dosing at 4 mA (default value) and doses at the maximum frequency at 20 mA. In order to set the mA values for minimum and maximum dosage frequency, press PROG then MODE ENTER to enter the **MAIN** menu.

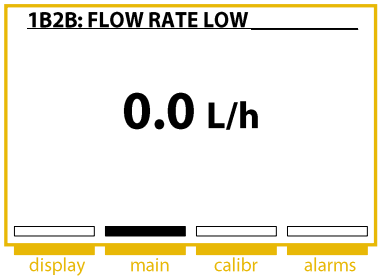
From the **MAIN** menu, use ▲ ▼ and MODE ENTER to select the item **1: Configuration** > **1B: Pump Functions** > **1B2: mA Mode**. Press MODE ENTER to confirm or ESC to return to the previous menu.



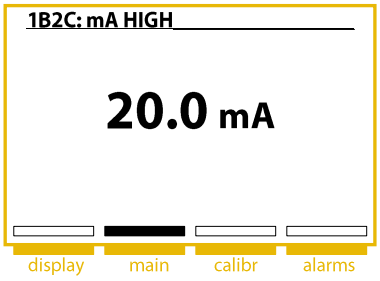
Use ▲ ▼ and MODE ENTER to set the **mA LOW** value for the minimum dosage frequency. The value can be set with a 0.1 step. Press MODE ENTER to confirm or ESC to return to the previous menu.



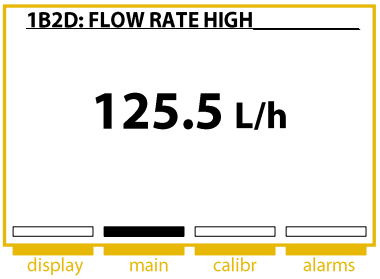
Use ▲ ▼ and MODE ENTER to set the **FLOW RATE LOW** (F1) corresponding to the current mA LOW value. Press MODE ENTER to confirm or ESC to return to the previous menu.



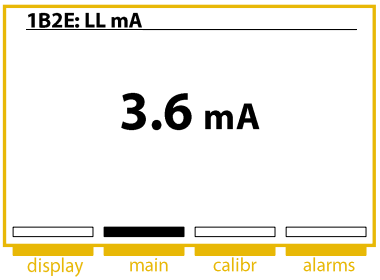
Use ▲ ▼ and MODE ENTER to set the **mA HIGH** value for the maximum dosage frequency. The value can be set with a 0.1 step. Press MODE ENTER to confirm or ESC to return to the previous menu.



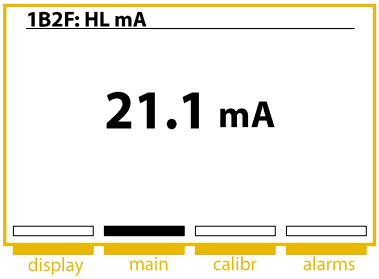
Use ▲ ▼ and MODE ENTER to set the **FLOW RATE HIGH** (F2) corresponding to the current mA HIGH value. Press MODE ENTER to confirm or ESC to return to the previous menu.



Use ▲ ▼ and MODE ENTER to set the mA value below which the pump will stop the dosing. The value can be set with a 0.1 step. Press MODE ENTER to confirm or ESC to return to the previous menu.



Use ▲ ▼ and MODE/ENTER to set the mA value above which the pump will stop the dosing. The value can be set with a 0.1 step. Press MODE/ENTER to confirm or ESC to return to the previous menu.

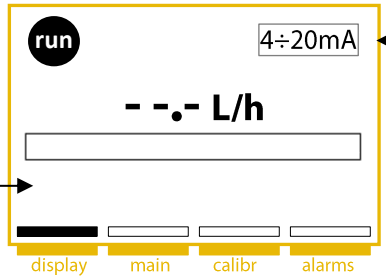


NOTE

For more information about the mA dosage functioning, see ANNEX C: mA DOSING.

During operation the display will show the following information:

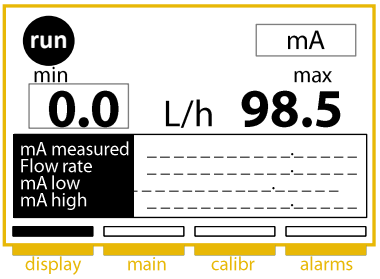
If the mA input value is over the maximum set value in **mA High**, a message will appear **High mA In**, if the mA input is lower than the value set in **mA Low** a message will appear **Low mA In**.



Programmed Value: programmed interval value (default: 4-20 mA)

In **DISPLAY** menu, by pressing MODE/ENTER, a value table will be shown (measured value of mA, low mA value and high mA value). The two main values correspond to the min Flow rate at Low mA and max Flow rate at max mA.

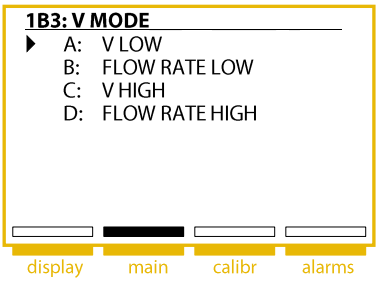
The values can be changed with ▲ ▼. Press MODE/ENTER to confirm or ESC to discard the changes.



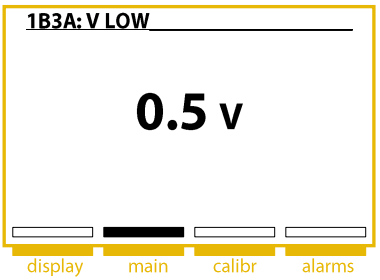
4.4.1.2.3 DOSAGE PROPORTIONAL TO V SIGNAL (INDEX MENU 1B3)

The pump doses proportionally to a 0-10 Vdc signal. It stops dosing at 0 Vdc (default value) and doses at the maximum frequency at 10 Vdc. In order to set the V value for minimum and maximum dosage frequency, press MODE/ENTER to enter the **MAIN** menu.

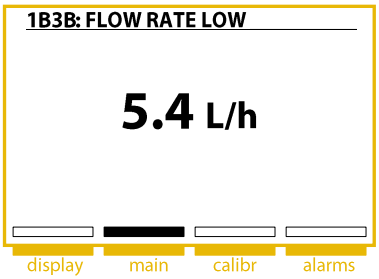
From the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **1: Configuration** > **1B: Pump Functions** > **1B3: V Mode**. Press MODE/ENTER to confirm or ESC to return to the previous menu.



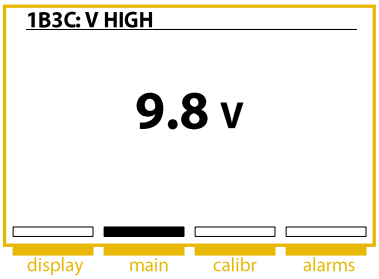
Use ▲ ▼ and MODE/ENTER to set the **V** value for the minimum dosage flow rate. The value can be set with a 0.1 step. Press MODE/ENTER to confirm and ESC to return to the previous menu.



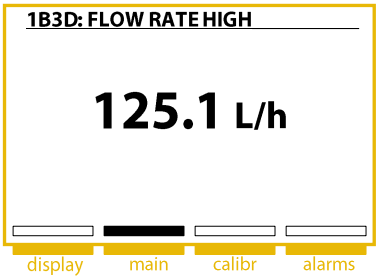
Use ▲ ▼ and MODE/ENTER to set the **FLOW RATE LOW** corresponding to the V LOW value. Press MODE/ENTER to confirm and ESC to return to the previous menu.



Use ▲ ▼ and MODE/ENTER to set the **V** value for the maximum dosage flow rate. The value can be set with a 0.1 step. Press MODE/ENTER to confirm and ESC to return to the previous menu.

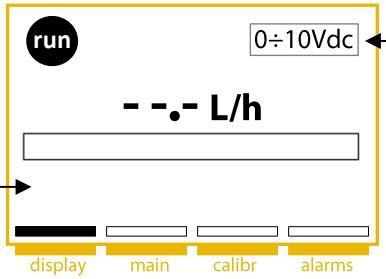


Use ▲ ▼ and MODE/ENTER to set the **FLOW RATE HIGH** corresponding to the V HIGH value. Press MODE/ENTER to confirm and ESC to return to the previous menu.



During operation the display will show the following information:

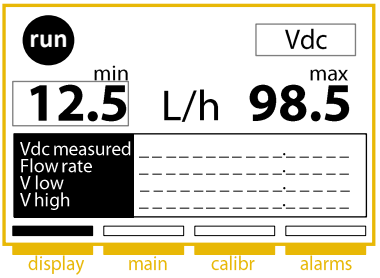
If the Vdc input value is over the maximum set value in V High, the message **High V In** will appear.
If the V input is lower than the value set in V Low the message **Low V In** will appear.



Programmed Value: programmed interval value (default: 0÷10 Vdc)

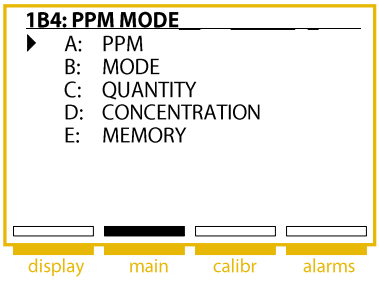
In **DISPLAY** menu, pressing MODE/ENTER, a value table will be shown (Measured value of Vdc, Low Vdc value and High Vdc value). The two main values correspond to the min Flow rate at Low V and max Flow rate at max V.

The values can be changed with ▲ ▼. To switch between values, press PROG. Press MODE/ENTER to confirm or ESC to discard the changes.



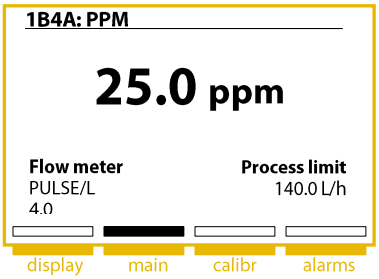
4.4.1.2.4 DOSAGE PROPORTIONAL TO EXTERNAL IMPULSES (ppm DOSAGE) (INDEX MENU 1B4)

The pump doses in proportion to an external digital signal, calculating the relationship between incoming signals and pump flow rate on the basis of the programmed ppm desired value. The system must know, as inputs, the ppm value, the pulse/litre value and the concentration of the product to be dosed. Press PROG then MODE ENTER to enter the **MAIN** menu.

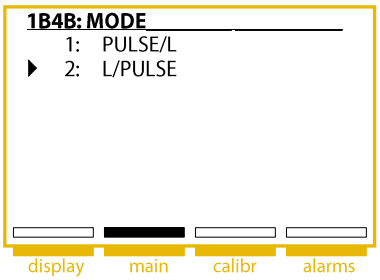


From the **MAIN** menu, use ▲ ▼ and MODE ENTER to select the item **1: Configuration** > **1B: Pump Functions** > **1B4: PPM Mode**. Press MODE ENTER to confirm or ESC to return to the previous menu.

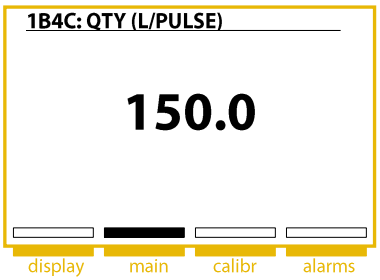
Use ▲ ▼ and MODE ENTER to set the **PPM** value, from 0.1 to 60000.0. The value can be set with a step of 0.1ppm. Press MODE ENTER to confirm or ESC to return to the previous menu. From the menu is possible to have information about the setting of the **Flow meter** and about the maximum flowrate that the process can have - **Process limit**.



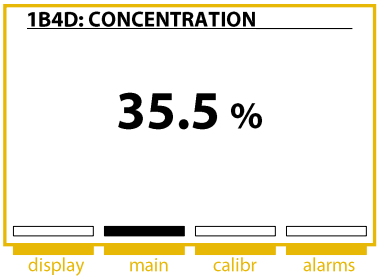
Use ▲ ▼ and MODE ENTER to choose the desired option to set the pulse counter (**pulse/L** or **L/pulse)**. Press MODE ENTER to confirm and ESC to return to the previous menu.



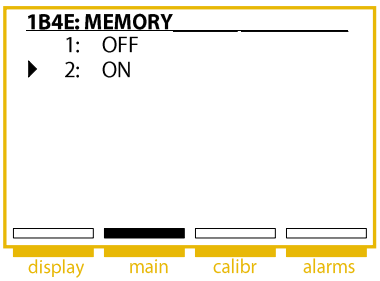
Use ▲ ▼ and MODE ENTER to increase or decrease the value (between 0.1 and 1000.0 with step of 0.1). Press MODE ENTER to confirm and ESC to return to the previous menu.



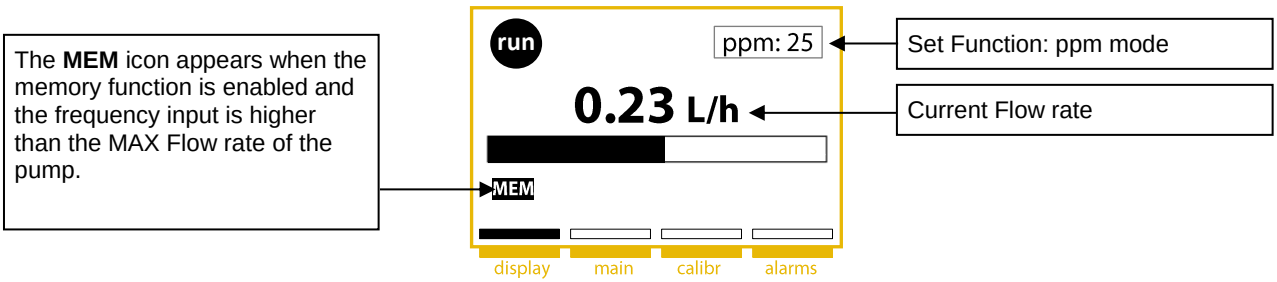
Use ▲ ▼ and MODE ENTER to set the **CONCENTRATION** value (from 0.1 to 100.0% with step of 0.1%). Press MODE ENTER to confirm and ESC to return to the previous menu.



Use ▲ ▼ and MODE ENTER to switch **ON** or **OFF** the Memory of the pulses. Press MODE ENTER to confirm and ESC to return to the previous menu.

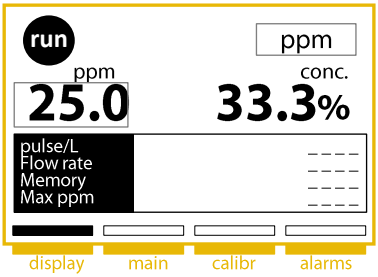


During operation the display will show the following information:



In **DISPLAY** menu, by pressing MODE/ENTER, a value table will be shown (pulses/L quantity or L/pulses quantity, the actual flow rate of the pump and the memory setting). The two main values correspond to ppm and concentration.

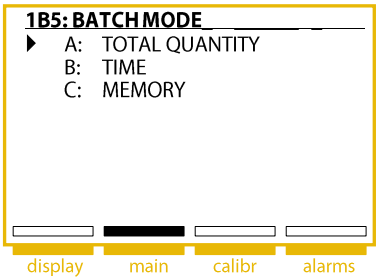
The values can be changed with ▲ ▼. To switch between values, press PROG. Press MODE/ENTER to confirm or ESC to discard the changes.



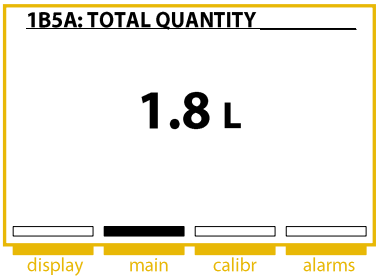
4.4.1.2.5 DOSAGE PROPORTIONAL TO EXTERNAL IMPULSES (BATCH DOSAGE) (INDEX MENU 1B5)

The pump doses in proportion to an external digital signal (impulse launch counter). It is possible to set the total quantity to be dosed and the time within which to complete the dosage. Press PROG then MODE/ENTER to enter the **MAIN** menu.

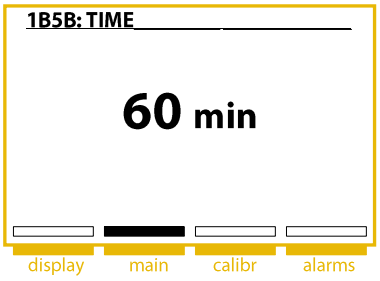
From the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **1: Configuration** > **1B: Pump Functions** > **1B5: Batch Mode**.



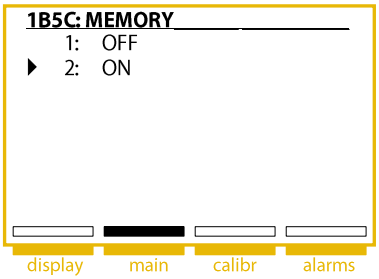
Use ▲ ▼ and MODE/ENTER to set a **quantity**, from 0.1L to 9999.9L. The value can be set with a step of 0.1L. Press MODE/ENTER to confirm and ESC to return to the previous menu.



Use ▲ ▼ and MODE/ENTER to set the period of **time** needed to complete the dosage. The pump will automatically calculate the time to complete the dosage at the maximum speed, from min time to 999 minutes, with step of 1 minute. Press MODE/ENTER to confirm and ESC to return to the previous menu.

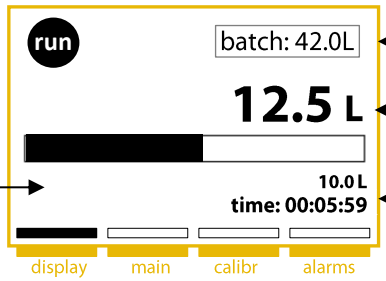


Use ▲ ▼ and MODE/ENTER switch ON or OFF the **Memory** of the pulses.
Press MODE/ENTER to confirm and ESC to return to the previous menu.



During operation the display will show the following information:

The **MEM** icon appears when the memory function is enabled and the frequency input is higher than the MAX Flow rate of the pump.

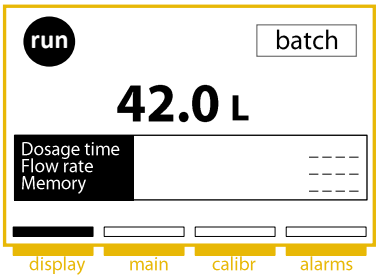


Set Function: batch mode and set amount

Current quantity dosed

Current remaining quantity and current remaining time in hh:mm:ss

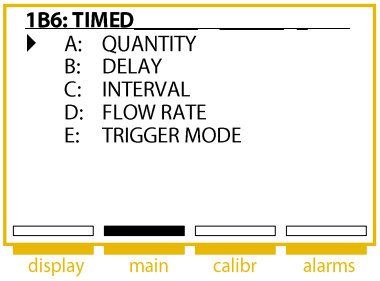
The dosage can be started manually by pressing ▲, or by the pulse input. The START/STOP interrupts the dosage. To resume the dosage, press START/STOP again to return to **Run** state and then ▲ to dose.
If the user presses START/STOP, a message will ask to restart the timers and the dosage or to resume them.



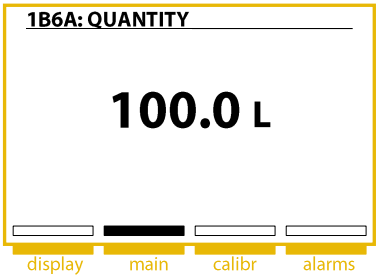
In **DISPLAY** menu, by pressing MODE/ENTER, a value table will be shown (Dosage time, flow rate and memory). The main value corresponds to the total quantity of the batch dosage.
The values can be changed with ▲ ▼. Press MODE/ENTER to confirm or ESC to discard the changes.

4.4.1.2.6 TIMED DOSING (INDEX MENU 1B6)

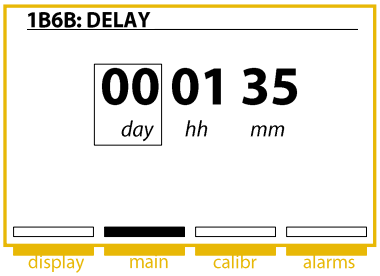
Follow the steps below to set the quantity, delay time, interval time, flow rate and trigger mode.
Press PROG then MODE/ENTER to enter the **MAIN** menu.
From the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **1: Configuration** > **1B: Pump Functions** > **1B6: Timed**.



Use ▲ ▼ and MODE/ENTER to set the **quantity**, from 0.1L to 9999.9L. The value can be set with a step of 0.1L. Press MODE/ENTER to confirm and ESC to return to the previous menu.

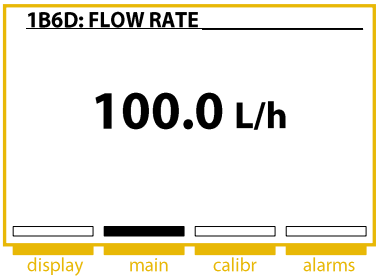


Use ▲ ▼ and MODE/ENTER to set the delay: **DAY** (from 0 to 30, step of 1), **HOUR** (from 0 to 23, step of 1) and **MINUTES** (from 0 to 59 for minutes, step of 1). Press MODE/ENTER to confirm and ESC to return to the previous menu.

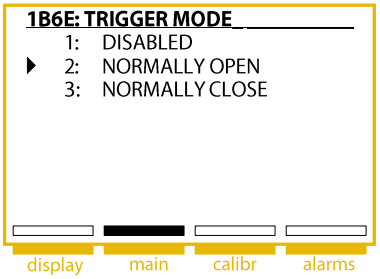


Use ▲ ▼ and MODE/ENTER to set the interval: **DAY** (from 0 to 30, step of 1), **HOUR** (from 0 to 23, step of 1) and **MINUTES** (from 0 to 59 for minutes, step of 1). Press MODE/ENTER to confirm and ESC to return to the previous menu.

Use ▲ ▼ and MODE/ENTER to set the **FLOW RATE** from 0L to 999L. Press MODE/ENTER to confirm and ESC to return to the previous menu.



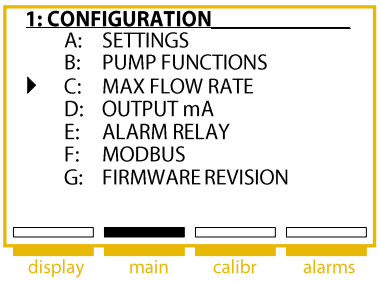
Use ▲ ▼ and MODE/ENTER to set the **TRIGGER** input as **NORMALLY OPEN**, **NORMALLY CLOSE** or **DISABLED.** Press MODE/ENTER to confirm and ESC to return to the previous menu.



NOTE

For more information about the timed dosing functioning with or without signal input trigger, see ANNEX D: TIMED DOSING.

4.4.1.3 MAX FLOW RATE (INDEX MENU 1C)



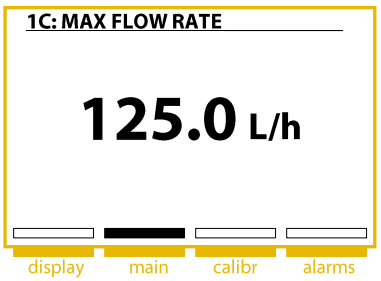
Press PROG then MODE ENTER to enter the **MAIN** menu.

From the **MAIN** menu, use ▲ ▼ and MODE ENTER to select the item **1C: Max Flow Rate**.

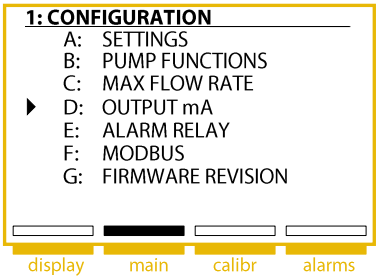
Use ▲ ▼ and MODE ENTER to set max flow rate, according to UNIT OF MEASUREMENT selected in menu **5: Unit**.

Changes can be made by pressing MODE ENTER, then using the ▲ ▼ to set the new value.

Press MODE ENTER to confirm and ESC to return to the previous menu.



4.4.1.4 OUTPUT MA (INDEX MENU 1D)

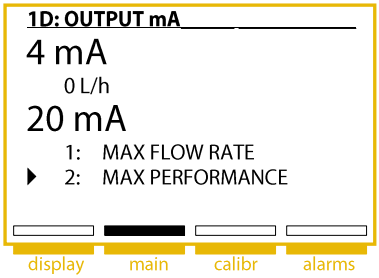


Press PROG then MODE ENTER to enter the **MAIN** menu.

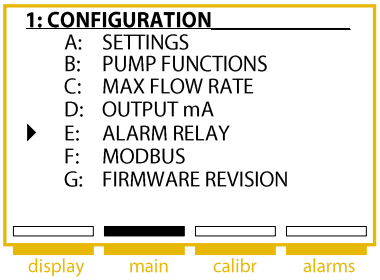
From the **MAIN** menu, use ▲ ▼ and MODE ENTER to select the item **1D: Output mA**.

Use ▲ ▼ and MODE ENTER to match the reference value of 20 mA. It is possible to select between **Max Flow Rate** and **Max Performance**.

Press ESC to return to the previous menu.



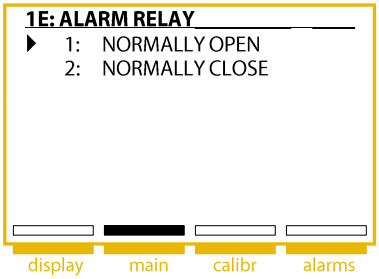
4.4.1.5 ALARM RELAY (INDEX MENU 1E)



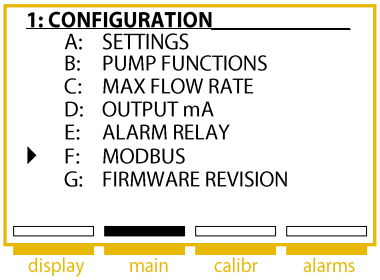
Press PROG then MODE ENTER to enter the **MAIN** menu.

From the **MAIN** menu, use ▲ ▼ and MODE ENTER to select the item **1E: Alarm Relay**.

Use ▲ ▼ and MODE ENTER to set the ALARM RELAY as NORMALLY OPEN (default) or NORMALLY CLOSE. Press ESC to return to the previous menu.



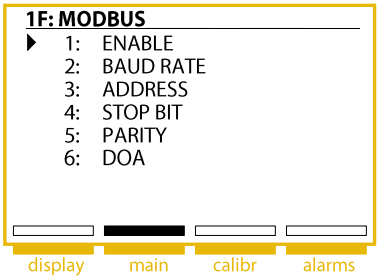
4.4.1.6 MODBUS (INDEX MENU 1F)



In order to use this communication function, you have to enable it and to configure its corresponding menu options.

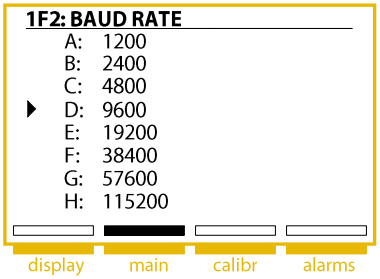
Press PROG then MODE ENTER to enter the **MAIN** menu.

From the **MAIN** menu, use ▲ ▼ and MODE ENTER to select the item **1: Configuration** > **1F: ModBus**.

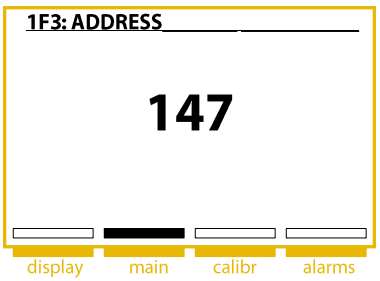


To enable/disable the communication port, use ▲ ▼ and MODE ENTER to select the option **1F1: ENABLE**.

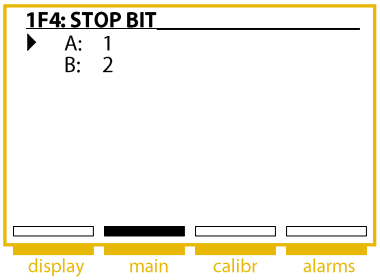
Use ▲ ▼ to select **ON** or **OFF** and press MODE ENTER to confirm. Press ESC to return to the previous menu.



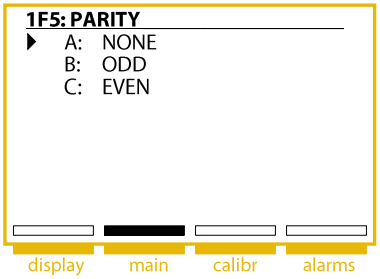
Use ▲ ▼ and MODE ENTER to set the **BAUD RATE**. Press ESC to return to the previous menu.



Use ▲ ▼ and MODE ENTER to set the **ADDRESS** device on the Network. Press ESC to return to the previous menu.

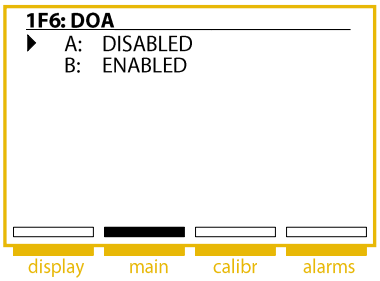


Use ▲ ▼ and MODE ENTER to set the **STOP BIT**. Press ESC to return to the previous menu.



Use ▲ ▼ and MODE ENTER to set the correct parameter of **PARITY**. Press ESC to return to the previous menu.

Use ▲ ▼ and MODE/ENTER to enable or disable **DOA** function. Press ESC to return to the previous menu.



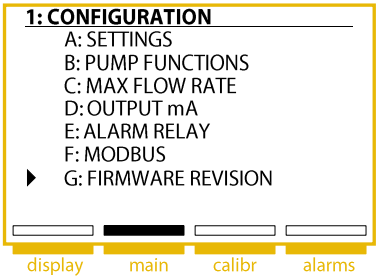
NOTE

For more information regarding the ModBus function, see ANNEX E: MODBUS PROFILE.

4.4.1.7 FIRMWARE REVISION (INDEX MENU 1G)

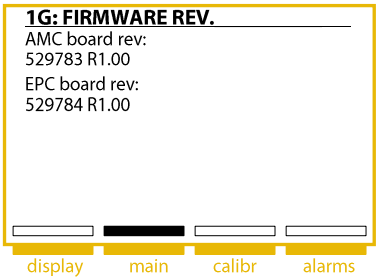
Press PROG then MODE/ENTER to enter the **MAIN** menu.

From the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **1: Configuration** > **1G: Firmware revision**.



The information contained in this menu item is **READ-ONLY**.

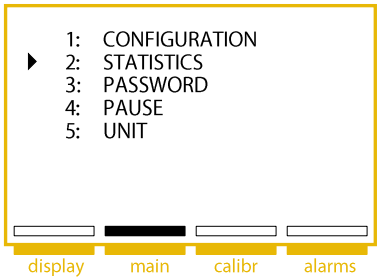
Press ESC to return to the previous menu.



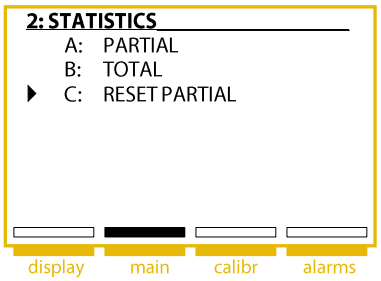
4.4.2 STATISTICS (INDEX MENU 2)

In this menu the user can see the **operating system statistics**:

- WORKING TIME: operating time of the system (dd.hh.mm)
- DOSED QUANTITY: quantity dosed by the pump in the selected measurement unit
- POWER ON: number of pump start-ups

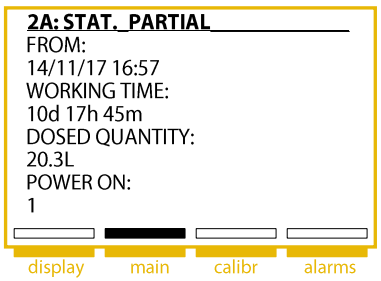


The **Statistics** menu includes the following options:
2A: Partial
2B: Total
2C: Reset Partial



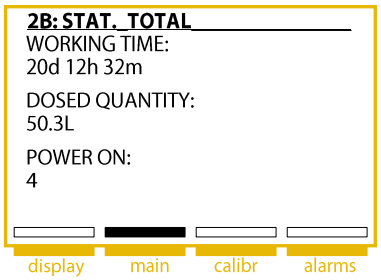
Press PROG then MODE/ENTER to enter the **MAIN** menu.

From the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **2: Statistics** > **2A: Partial**. The information contained in this menu regards the statistics from last reset.



Press ESC to return to the previous menu.

From the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **2: Statistics** > **2B: Total**. The information contained in this menu is about the total statistics since the first usage of the device. These statistics cannot be reset.

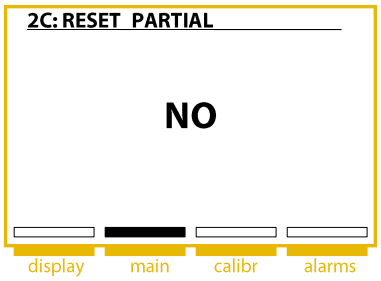


Press ESC to return to the previous menu.

To reset the partial statistics, from the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **2: Statistics** > **2C: Reset Partial**.

Use ▲ ▼ to select **YES** or **NO** and press MODE/ENTER to confirm.

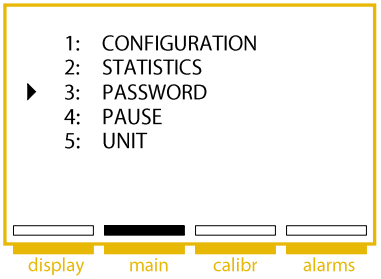
Press ESC to return to the previous menu.



4.4.3 PASSWORD (INDEX MENU 3)

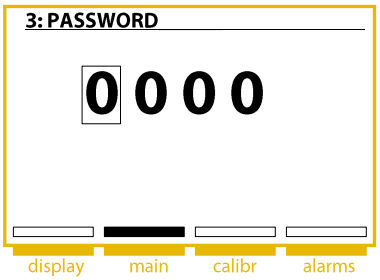
If the password is set, by entering the password you have access to the programming menu, calibration, quick menu and alarms.
The password must be entered only once and the programming menu remains accessible and the parameters can be edited until you exit the programming menu.

Press PROG then MODE/ENTER to enter the **MAIN** menu.



From the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **3: Password**.
The selected digit will indicate the number than can be modified. Use ▲ ▼ to select a number (from 0 to 9) and press MODE/ENTER to confirm and move to the next digit you want to change. When finished, press MODE/ENTER to confirm. Press ESC to return to the previous menu.

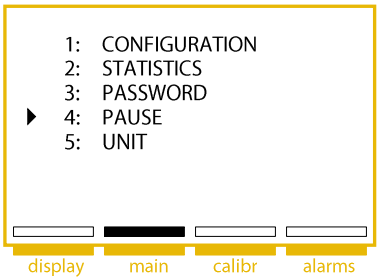
By setting **0000** (default), the password is removed.

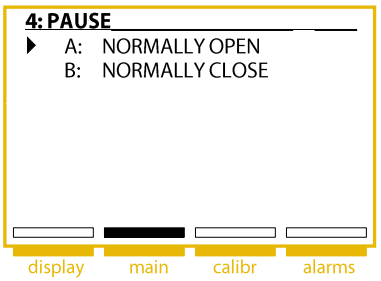


4.4.4 PAUSE (INDEX MENU 4)

The pump can be paused by remote input. The default setting is **NORMALLY OPEN**.
Press PROG then MODE/ENTER to enter the **MAIN** menu.
From the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **4: Pause**.

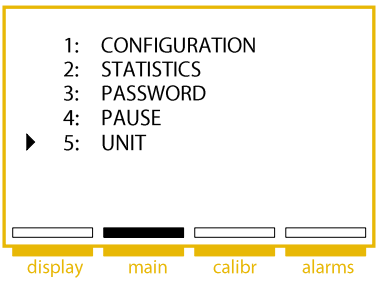
Use ▲ ▼ and MODE/ENTER to set the pause status. Press ESC to return to the previous menu.

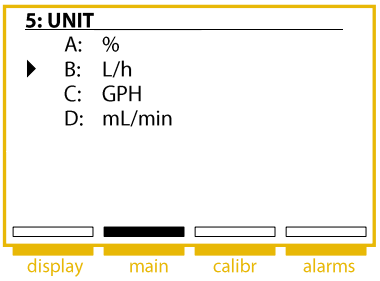




4.4.5 UNIT (INDEX MENU 5)

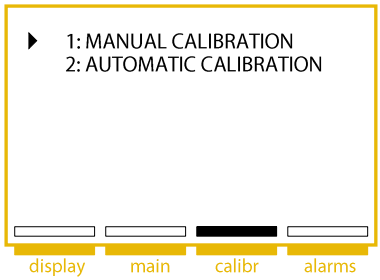
It is possible to set the **dosage unit of measurement** to be displayed.
Press PROG then MODE/ENTER to enter the **MAIN** menu.
From the **MAIN** menu, use ▲ ▼ and MODE/ENTER to select the item **5: Unit.**
Use ▲ ▼ and MODE/ENTER to set the flow measurement unit. It is possible to choose between: **%** (percentage), **L/h** (litres/hour), **GPH** (Gallons/hour) and **mL/min** (millilitres/minute).
Press ESC to return to the previous menu.





4.5 CALIBRATION MENU

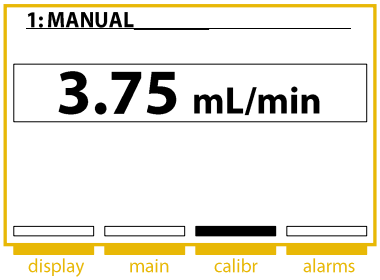
There are two different modes to perform the calibration: **Manual Calibration** and **Automatic Calibration**.



Press PROG until **CALIBRATION** menu is select then press MODE ENTER to confirm.
Use ▲ ▼ and MODE ENTER to select the calibration mode.

4.5.1 MANUAL CALIBRATION

Use ▲ ▼ and MODE ENTER to select **Manual Calibration**.
The stored mL/min value appears in the main menu.
Use ▲ ▼ to set the flow rate value in mL/min or oz/min (american fluid ounce) depending on the selected measure unit and press MODE ENTER to confirm.
Press ESC repeatedly to exit the calibration menu: a prompt message will ask to save the changes.
Use ▲ ▼ to select **YES** or **NO** and press MODE ENTER to confirm.



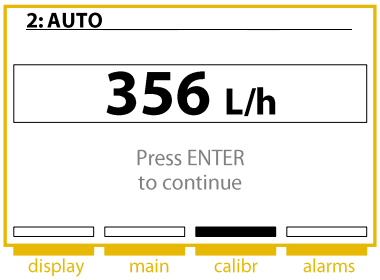
4.5.2 AUTOMATIC CALIBRATION

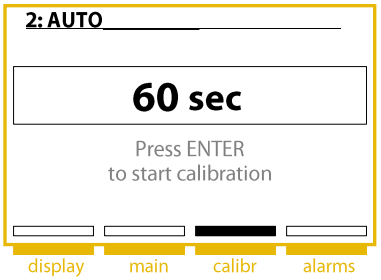
Use ▲ ▼ and MODE ENTER to select **Automatic Calibration**.

Use ▲ ▼ to set the **dosing speed** and press MODE ENTER to continue.

The calibration time is automatically calculated according to the set dosing speed.

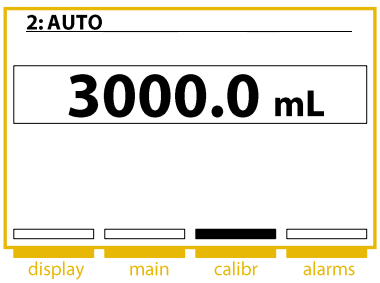
If necessary, use ▲ ▼ to change the **calibration time** and press MODE ENTER to start the calibration.





At the end of this process, if the calibration has been correctly performed, the system shows the dosed quantity and the display **backlight** turns to **GREEN** color. Press MODE ENTER to confirm. If the dosed quantity does not equal to the value displayed, it is possible to adjust the dosed quantity value on the device using ▲ ▼. Press MODE ENTER to confirm.

The entered value will be used in flow calculations.

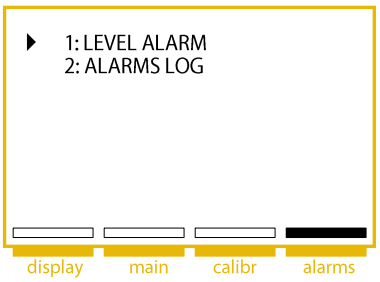


Press ESC repeatedly to exit the calibration menu: a prompt message will ask to save the changes.
Use ▲ ▼ to select **YES** or **NO** and press MODE ENTER to confirm.

NOTE: Perform the calibration every time the stroke length adjustment is performed through the regulating handle.

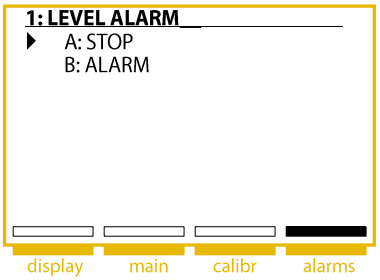
4.6 ALARMS MENU

Press PROG until the **ALARMS** menu is select, then press MODE ENTER to confirm.



From the **ALARMS** menu, use ▲ ▼ and MODE ENTER to select the item **1: Level Alarm**.
When a level alarm occurs, it is possible to let the pump in run status, allowing dosage, or to set the pump in stop status. Alarm signal is activated in any case.

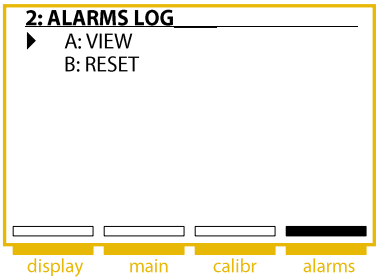
Use ▲ ▼ to choose whether to **STOP** dosage and activate the ALARM or simply activate the **ALARM** signal without stopping the dosage.
Press MODE ENTER to confirm and ESC to return to the previous menu.

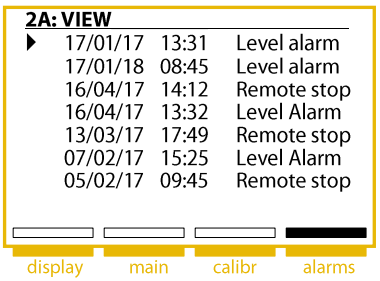


From the **ALARMS** menu, use ▲ ▼ and MODE ENTER to select the item **2: Alarms.**

To view the list of events, use ▲ ▼ and MODE ENTER to select the item **2A: View**. A list of max. 48 alarm events, ordered by date, will be displayed. During an alarm event, the display **backlight** turns to **RED** color.

Press MODE ENTER to confirm and ESC to return to the previous menu.

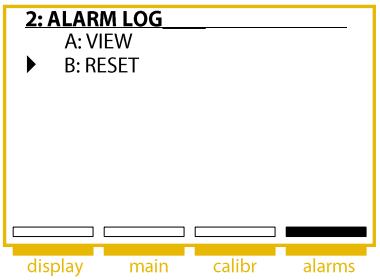


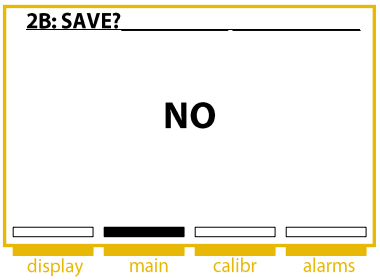


To reset the list of events, use ▲ ▼ and MODE ENTER to select the item **2B: Reset**.
Use ▲ ▼ to select **YES** or **NO** and press MODE ENTER to confirm.

Press ESC repeatedly to exit the alarm menu: a prompt message will ask to save the changes.

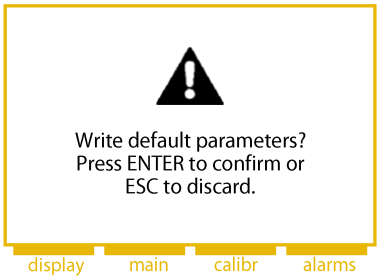
Use ▲ ▼ to select **YES** or **NO** and press MODE ENTER to confirm.





4.7 RESET TO DEFAULT PARAMETERS

To reset the device to default parameters, with the pump disconnected, press PROG and ESC simultaneously while connecting the pump to the power supply.



The pump will display a confirmation message.

Press MODE ENTER to confirm the reset or ESC to start the pump without resetting.

This operation will set to default the following parameters: configuration, total and partial statistics, password, unit of measure and alarms.

NOTE

For more information regarding the default parameters, see ANNEX F: FACTORY DEFAULT VALUES.

5 MAINTENANCE

5.1 PRECAUTIONS

- Before proceeding to operate on the pump or the whole system, verify that all electric connections have been disconnected.
- Depressurize completely pump and pipes and drain the section in which maintenance is required
- Always work wearing the required safety protections.
- Don't pour in the ambient polluting substances such as pumped chemicals, hydraulic liquid, lubricating oil and so on
- Before proceeding to operate on the pump or the whole system read carefully the technical specifications of the fluids dosed and treated, to be aware about the risks and the actions that have to be done in case of accidental contact with a dangerous fluid.

5.2 MECHANISM

Pumps are generally supplied complete with the first oil filling; replace oil after 1500 operation hours and afterwards every 4000 hours.

However, replace oil every year.

Check weekly the oil level and, when required, restore the correct level using the same oil; check also for possible leakages through the lip seal on the piston rod and if necessary replace the lip seal.

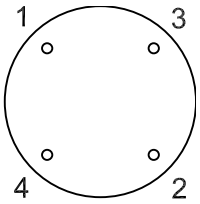
5.3 PUMP HEAD

Don't let the pump running without process liquid.

As minimum every six months, dismount the pump head and carry out the operations described below:

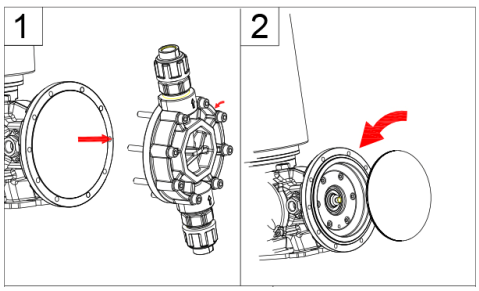
FOR THE PLUNGER METERING PUMP:

- Disconnect suction and discharge pipes
- Drain process liquid from pump head and pipes
- Unscrew bolts fixing the pump head to mechanism
- Dismount suction and discharge valves
- Wash thoroughly the suction and discharge valves and verify whether any part is worn or scratched; replace them if required
- Replace plunger packing in case it is worn; grease new seals before assembling
- Check the plunger sliding surface where seals operate; the surface should be without scoring or scratches; When damaged replace the plunger
- Retighten the screws of the pump casing with a torque of 3 Nm as shown below; repeat the crisscross pattern with a torque of 6 Nm

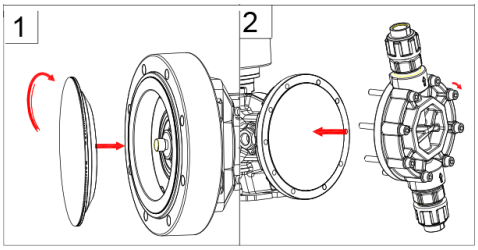


FOR THE DIAPHRAGM METERING PUMP:

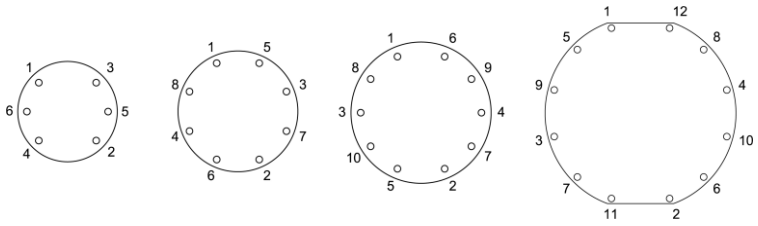
- Dismount as shown in the picture:



- Wash thoroughly the suction and discharge valves and verify whether any part is worn or scratched; replace them if required
- Replace plunger packing in case it is worn; grease new seals before assembling
- Check the plunger sliding surface where seals operate; the surface should be without scoring or scratches; when damaged replace the plunger and the membrane if worn.
- Mount as shown in the picture:



- Retighten the screws of the pump casing with a torque of 3 Nm as shown below; repeat the crisscross pattern with a torque of 6 Nm



5.4 ELECTRONIC CONTROL UNIT

Don't put in contact the power cord of the control unit with the motor while cabling, the high temperatures of the motor can heat up the cable.

5.5 RECOMMENDED SPARES

In order to provide ordinary maintenance and to avoid possible waste of time, it is recommended to keep in stock a small supply of the following spares:

FOR THE PLUNGER METERING PUMP:

- One plunger
- Two sets of plunger packing
- One suction valve complete
- One discharge valve complete

FOR THE DIAPHRAGM METERING PUMP:

- Suction valve complete
- Discharge valve complete
- One set of diaphragms
- Complete pump head

NOTE

When ordering spares, please indicate always model and serial number of the pump.

6 TROUBLESHOOTING

6.1 PUMP TROUBLESHOOTING

Trouble	Possible cause	Remedy
Flow rate too low or no flow rate	Tank sealed without vent	Install vent or open tank cover
	Suction of air through fittings, gaskets, etc.	Tighten connections
	Air/gas pockets into the pump or in the pipes	Facilitate air exit
	Suction filter or suction line clogged	Wash filter and/or remove occlusion
	Check valves closed	Open valves
	Excessive suction head	Reposition pump at the correct elevation
	Vapour pressure too high, liquid temperature too high	Cool liquid
	Viscosity too high, liquid temperature too low	Heat or dilute the liquid
	Pump valves dirty or worn	Wash valves or replace them
	Suction pipe diameter too reduced	Check suction line for length and diameter
	Pressure relief valve set at a value lower than the maximum discharge pressure	Check pressure relief valve setting and actual operating pressure
	Wrong stroke length	Check stroke length and adjust if required
	Pressure relief valve in operation or leaking	Check for correct setting and/or clean pressure relief valve
	For plunger metering pumps	
	Integral relief valve or replenishing valve are leaking	Check or clean valves
	Excessive leakage through packing	Tighten seal, check plunger and seal for wear; replace worn parts
	For diaphragm metering pumps	
	Loose of empty pressure inside diaphragm	Check fitting tightening and make again empty
Flow rate too high	Discharge pressure lower than suction pressure	Install a back-pressure valve
	Wrong stroke length	Check stroke length and adjust if required
	Back pressure valve faulty or setting pressure inadequate	Reset back pressure valve or replace it
Electric motor overheating	Discharge pressure too high	Check pressure relief valve setting
	Discharge line incorrectly sized	Check discharge line length and diameter
Noisy operation	Lack of lubricant in the mechanism/gearbox	Refill with the correct lubricant
	Excessive wear of the mechanism/gearbox	Overhaul mechanism/gearbox
Pipes vibrations	Pipe diameter too small	Enlarge pipe diameter
	Pulsation damper out of operation or too small	Repair or recalculate damper volume

6.2 ELECTRONIC CONTROL UNIT TROUBLESHOOTING

Display message	Possible cause	Remedy
Level	Level probe detected a low level in the dosing product	Restore the level of chemical product
Hold (Remote)	Remote stop from the Pause input	Change the state of the Remote device
H Temp	High temperature of the motor	Leave to cool the pump
H Load	Abnormal back pressure values or abnormal motor operations	Regulate the backpressure in accord to the max value allowed by the pump
Pwr Er	Error in the power line, line in voltage too low	Set the power line in a value of 230Vac +/- 10% at 50/60 Hz
Int Er	Internal communication lost	Check electrical connection and try to restart the pump
System Failure	Failure of the electronic control unit	Contact the supplier for support

7 STORAGE

ATTENTION

During transportation and during storage the system must be protected against moisture, salt water, rain, sand storm and direct sunlight.

In case of a long-time storage, proceed according to following instructions:

7.1 STORAGE IN A DRY AND VENTILATED PLACE

Pump can be stored for a period of one year without taking any special precaution

7.2 STORAGE IN PLACES WITH HIGH HUMIDITY

Pump must be hermetically sealed and protected against perspiration using an adequate quantity of silica gel; then storage for one year is possible.

7.3 STORAGE OUTDOOR

Additional protection against rain, sand, dust, dirty and direct sunlight is required.

7.4 PRECAUTION AFTER INSTALLATION OF A PUMP

Before start-up check that mechanism is correctly filled in. If the put in operation is delayed, the metering pump should be started for one hour approx. every month with the stroke length at "zero".

However, the lubricant oil of the mechanism must be changed every year.
Replace again the lubricant oil in the mechanism before the actual start in operation.

Should the pump be out of operation for a long period after installation, the additional following precautions must be taken:

- disassemble pump head completely and wash all parts carefully
- disassemble, clean and grease the packing; reassemble it without tightening the packing gland
- grease all machined parts
- pour protective lubricant into the movement and gearbox; operate the pump for some minute
- when restarting, drain protective lubricant and refill with suitable lubricant
- keep the pump in a dry place and adequately protected from dust

7.5 LITHIUM BATTERY STORAGE

Store in a cool (preferably below 30ºC) and ventilated area away from moisture, sources of heat, open flames, food and drink.

Keep adequate clearance between walls and batteries.

Temperature above 100ºC may result in battery leakage and rupture.

Since short circuit can cause burn, leakage and rupture hazard, keep batteries in original packaging until use and handle them with care.

ATTENTION

Before storing the pump make sure that all the inputs and outputs from/to the electronic control unit are disconnected.

8 ANNEX A: DISPOSAL CONSIDERATIONS

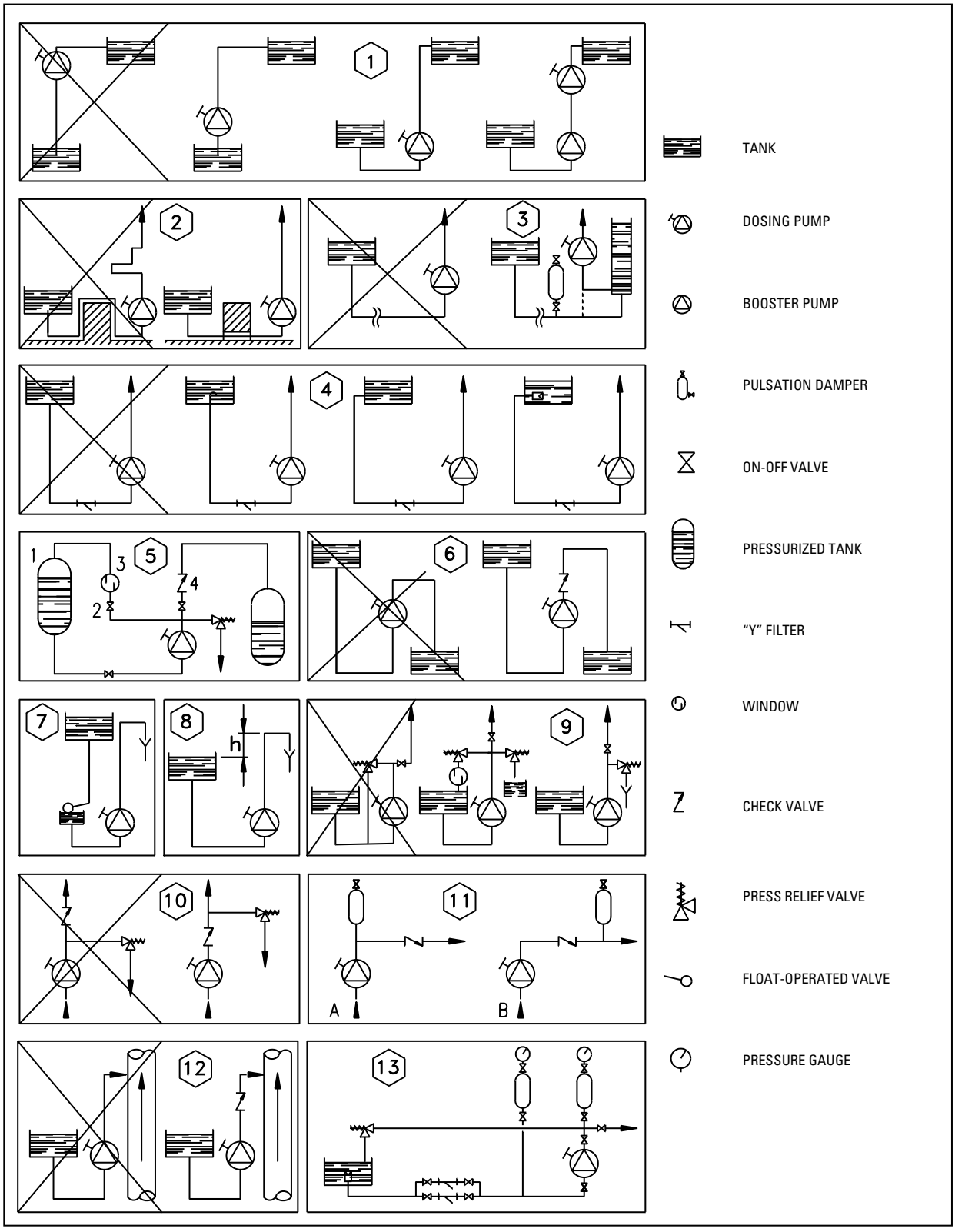
Dispose batteries and other electronic or toxic materials in accordance with applicable regulations which vary from country to country.

In most countries, the self-disposal of used batteries is forbidden and the end-users are invited to dispose them properly, eventually through non-profit organizations, mandated by local governments or organized on a voluntary basis by professionals.

Lithium batteries should have their terminals insulated prior to disposal.

- Incineration: Incineration should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment.
- Landfilling: According to the proper laws and regulations in different countries or areas, the battery should be buried deeply in the specified place.
- Recycling: Send to authorized recycling facilities, eventually through licensed waste carrier.

9 ANNEX B: INSTALLATION SUGGESTIONS TABLE



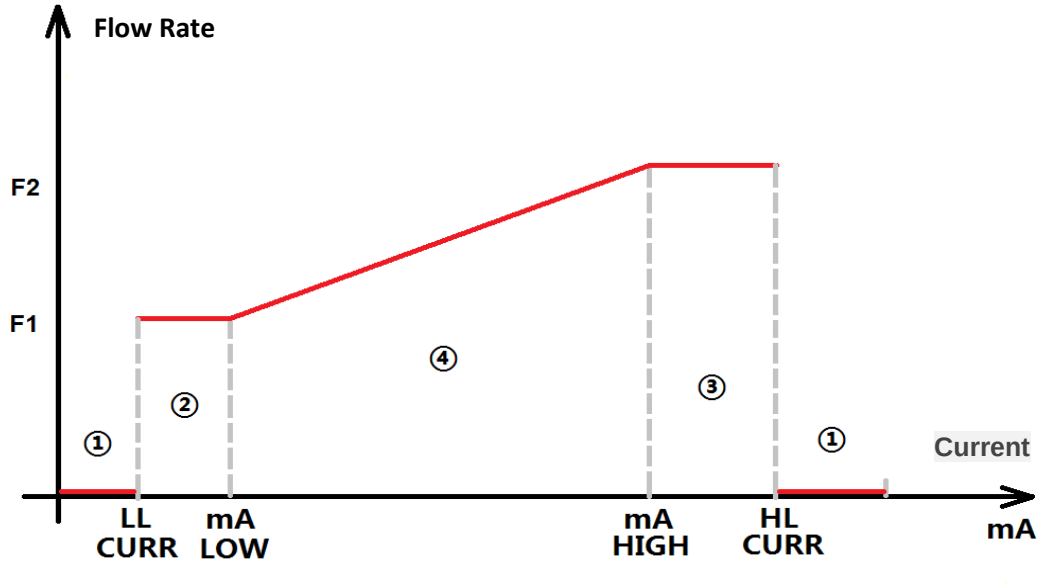
10 ANNEX C: mA DOSING

In case the menu item **1B: Pump functions** is set to **mA MODE**, it is necessary to set the following parameters:

Sequence	Parameter	Instructions
1	**mA LOW 4.0 mA**	Set the LOW current value in mA
2	**Flow Rate Low** (F1)	Set the flow rate (F1) corresponding to the LOW current value
3	**mA HIGH 20.0 mA**	Set the HIGH current value in mA
4	**Flow Rate High** (F2)	Set the flow rate (F2) corresponding to the HIGH current value
5	**LL CURR in mA**	Set the current low limit in mA
6	**HL CURR in mA**	Set the current high limit in mA

After setting these parameters, the pump will enter the mA dosing mode.

The following chart summarizes the dosing conditions according to the preset parameters:

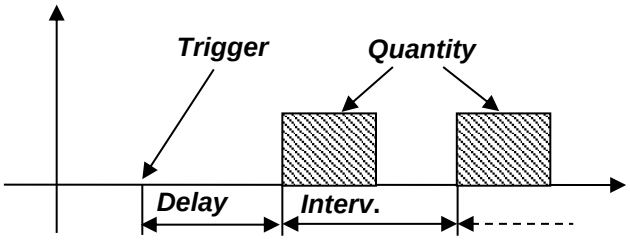


- When the current input is lower than the minimum current limit (**LL CURR**) or higher than the maximum current limit (**HL CURR**), the metering pump stops the dosage;
- When the current input is between **LL CURR** and **mA LOW**, the metering pump operates at **F1** flow rate;
- When the current input is between **mA HIGH** and **HL CURR**, the metering pump operates at **F2** flow rate;
- When the current input is between **mA LOW** and **mA HIGH**, the metering pump flow rate is determined in a linear fashion by the sensor current.

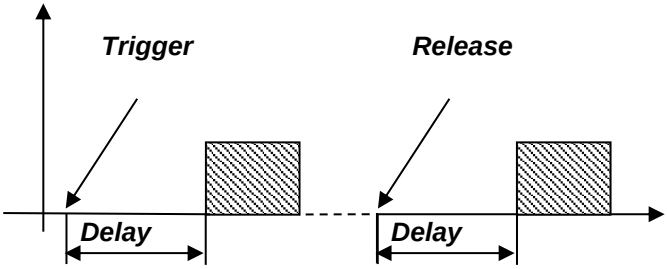
11 ANNEX D: TIMED DOSING

11.1 TIMED DOSING WITH SIGNAL INPUT “TRIGGER” ACTIVATED

In case the menu item **1B6E: Trigger mode** is set to **NORMALLY OPEN** or to **NORMALLY CLOSE**, the pump will function as follows:
After receipt of the **TRIGGER** signal set, the pump doses a quantity that can be programmed in litres. It is possible to set a delay time before the dosing (**DELAY**) and the interval between subsequent dosages (**INTERVAL**) as illustrated in the diagram:

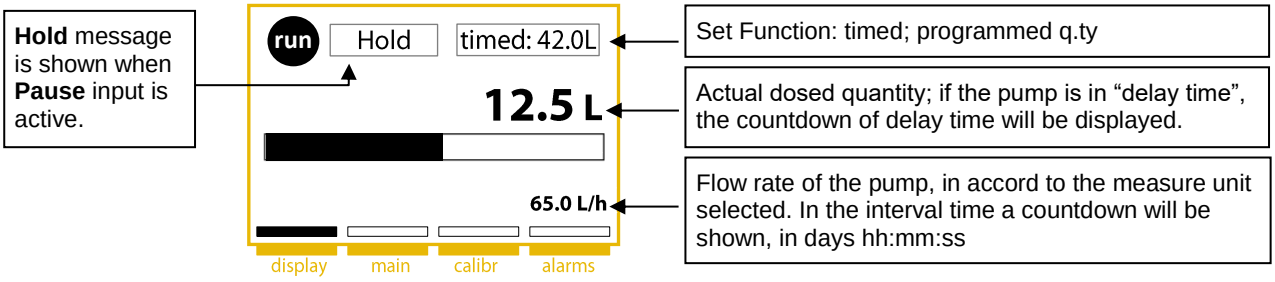


By setting for example an **INTERVAL** time=0, a system is obtained in which the programmed quantity is dosed after each **TRIGGER** signal (with any delay that has been set):



It is possible to start the dosing by pressing the key, which, in practice, simulates the **TRIGGER** signal.
The **TRIGGER** signal can be set to **N. OPEN** (it is activated when the input passes from the open to the closed mode) or to **N. CLOSE** (it is activated when the input passes from the closed to the open mode).
The **TRIGGER** signal is locked during dosing (its receipt is neither stored nor managed).
The **PAUSE** (**Remote input**) input cannot be programmed and its activation stops the dosing, while its further deactivation makes the system wait again for the **TRIGGER** signal for a new dosing.

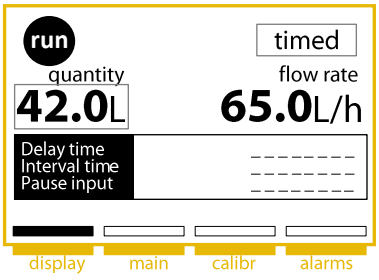
The display will show the following information:



In **DISPLAY** menu, pressing , a value table will be shown (Delay time, Interval time, Trigger mode / Pause input mode). Main values correspond to quantity to be dosed and pump flow rate.

The values can be changed with . To switch between values, press . Press to confirm or to discard the changes.

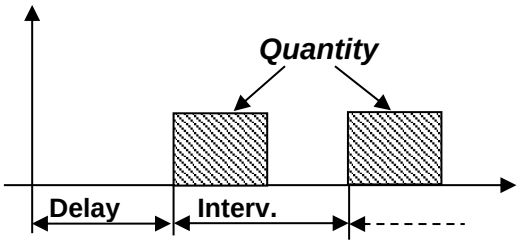
If the user presses , a message will ask to resume timer and dosage counter. If NO is selected, timer and dosage counter will be reset.



11.2 TIMED DOSING WITH SIGNAL INPUT “TRIGGER” DISABLED

In case the menu item **1B6E: Trigger mode** is set to **DISABLED**, the pump will function as follows:

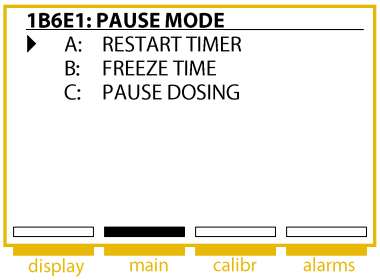
After receipt of the **TRIGGER** signal set, the pump doses a quantity that can be programmed in litres. It is possible to set a delay time before the dosing (**DELAY**) and the interval between subsequent dosages (**INTERVAL**) as illustrated in the diagram:



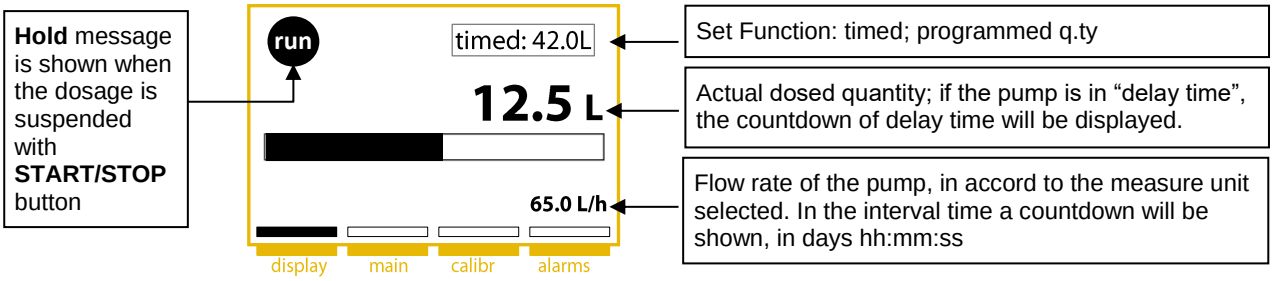
The **DELAY** and **INTERVAL** timers are represented as dd.hh.mm (days, hours, minutes).

The **PAUSE** input can be programmed in three different modes:

1. **RESTART TIMER**: when the pause is activated, the system stops the dosing and when the pause is deactivated the count starts again from the beginning.
2. **FREEZE TIME:** when the pause is activated, the system cuts out the current time count and restarts it when the pause is deactivated.
3. **PAUSE DOSING:** with the pause activated, the system continues to count the time and stops the dosing.



The display will show the following information:



In **DISPLAY** menu, by pressing MODE/ENTER, a value table will be shown (Delay time, Interval time, Trigger mode / Pause input mode). Main values correspond to quantity to be dosed and pump flow rate.

The values can be changed with ▲ ▼. To switch between values, press PROG. Press MODE/ENTER to confirm or ESC to discard the changes.

If the user presses START/STOP, a message will ask to restart the timers and the dosage or to resume them.

12 ANNEX E: MODBUS PROFILE

Explanation for registers that are read or write according to the unit set.
This is applied to the following registers:

1008 – Instant Flow rate
1100 – Max performance flow
1202 – Manual Flow rate
1204 – Flow rate LOW mA
1206 – Flow rate HIGH mA
1210 – Flow rate LOW V
1212 – Flow rate HIGH V
1225 – Flow rate TIMED
1230 – Max Flow rate

Example:
Register 1008 (Instant Flow rate) Register read value = **100**.

The following table summarizes the interpretation of the **100** for different units.

Register 1235 - Unit		Register 1008 – Instant Flow rate
Value	Reference	Interpretation
0	%	100 % (no decimal points)
1	L/h	10.0 L/h (one decimal point)
2	GPH	10.0 GPH (one decimal point)
3	mL/min	100 mL/min (no decimal points)

Example for Registers 1004, 1005 – Total dosed quantity and 1006, 1007 – Dosed quantity.
Value read: 100.

Register 1235 - Unit		Register 1004-1005 – Total dosed quantity
Value	Reference	Interpretation
0	%	10.0 L (one decimal point)
1	L/h	10.0 L (one decimal point)
2	GPH	10.0 U.S. gal (one decimal point)
3	mL/min	10.0 L (one decimal point)

Example for Registers 1105-1106 – Calibration quantity.
Value read: 57460

Register 1235 - Unit		Register 1105-1106 – Calibration quantity
Value	Reference	Interpretation
0	%	5746.0 mL/min (one decimal point)
1	L/h	5746.0 mL/min (one decimal point)
2	GPH	57.460 U.S. ounce/min (three decimal points)
3	mL/min	5746.0 mL/min (one decimal point)

Input Registers

Address (dec)	Address (hex)	Description	Min Range	Max Range	Range
1	1	Level Alarm	0	1	0-OFF/1-ALR
2	2	Remote Alarm, Hold	0	1	0-OFF/1-ALR
3	3	High Temperature Alarm Motor	0	1	0-OFF/1-ALR
4	4	High Temperature Alarm IGBT	0	1	0-OFF/1-ALR
5	5	High Load Alarm	0	1	0-OFF/1-ALR
6	6	Power Fail Alarm	0	1	0-OFF/1-ALR
7	7	Internal Error Alarm	0	1	0-OFF/1-ALR
8	8	Modbus WDG Alarm	0	1	0-OFF/1-ALR
9	9	High mA In	0	1	0-OFF/1-ALR
10	A	Low mA In	0	1	0-OFF/1-ALR
11	B	High V In	0	1	0-OFF/1-ALR
12	C	Low V In	0	1	0-OFF/1-ALR
40	28	Level	0	1	0-OFF/1-ON
41	29	Hold	0	1	0-OFF/1-ON
80	50	Motor	0	1	0-OFF/1-ON
81	51	Relay	0	1	0-OFF/1-ON
1000	3E8	mA Input	0	240	mA input measure (24.0 mA)
1001	3E9	V Input	0	1050	V input measure (10.5V)
1002	3EA	Freq Input	0	10000	Frequency input measure (1000.0Hz)
1003	3EB	mA Output	40	200	mA output, proportioned to the flow rate of the pump (20.0mA)
1004	3EC	Total dosed quantity LOW	0	0xFFFF FFFF	Total dosed quantity, in accord to measure unit lt or gallon (one decimal point)
1005	3ED	Total dosed quantity HIGH			
1006	3EE	Dosed quantity LOW	0	0xFFFF FFFF	Dosed quantity, in accord to measure unit lt or gallon (one decimal point)
1007	3EF	Dosed quantity HIGH			
1008	3F0	Instant Flow rate	0	0xFFFF	Instant Flow rate, in accord to measure unit (one decimal point for L/h, GPH and no decimal point for % and mL/min)
1009	3F1	Working time LOW Permanent	0	0xFFFF FFFF	Working time in statistics permanent, in seconds
1010	3F2	Working time HIGH Permanent			
1011	3F3	Power ON LOW Permanent	0	0xFFFF FFFF	Power on counter in statistics permanent
1012	3F4	Power ON HIGH Permanent			
1013	3F5	Working time LOW Resettable	0	0xFFFF FFFF	Working time in statistics resettable, in seconds
1014	3F6	Working time HIGH Resettable			
1015	3F7	Power ON LOW Resettable	0	0xFFFF FFFF	Power on counter in statistics resettable
1016	3F8	Power ON HIGH Resettable			

Holding Registers

Address (dec)	Address (hex)	Description	Min Range	Max Range	Range	Type
1	1	Level Alarm	0	1	0-OFF/1-ALR	Read/Write
2	2	Remote Alarm, Hold	0	1	0-OFF/1-ALR	Read/Write
3	3	High Temperature Alarm	0	1	0-OFF/1-ALR	Read/Write
4	4	High Temperature Alarm IGBT	0	1	0-OFF/1-ALR	Read/Write
5	5	High Load Alarm	0	1	0-OFF/1-ALR	Read/Write
6	6	Power Fail Alarm	0	1	0-OFF/1-ALR	Read/Write
7	7	Internal Error Alarm	0	1	0-OFF/1-ALR	Read/Write
8	8	Modbus WDG Alarm	0	1	0-OFF/1-ALR	Read/Write
9	9	High mA In	0	1	0-OFF/1-ALR	Read/Write
10	A	Low mA In	0	1	0-OFF/1-ALR	Read/Write
11	B	High V In	0	1	0-OFF/1-ALR	Read/Write
12	C	Low V In	0	1	0-OFF/1-ALR	Read/Write
1000	3E8	mA Input	0	240	mA input measure (24.0 mA)	Read Only
1001	3E9	V Input	0	1050	V input measure (10.5V)	Read Only
1002	3EA	Freq Input	0	10000	Frequency input measure (1000.0Hz)	Read Only
1003	3EB	mA Output	40	200	mA output, proportioned to the flow rate of the pump (20.0mA)	Read Only
1004	3EC	Total dosed quantity LOW	0	0xFFFFFFFF	Total dosed quantity, in accord to measure unit lt or gallon (one decimal point)	Read Only
1005	3ED	Total dosed quantity HIGH				Read Only
1006	3EE	Dosed quantity LOW	0	0xFFFFFFFF	Dosed quantity, in accord to measure unit lt or gallon (one decimal point)	Read Only
1007	3EF	Dosed quantity HIGH				Read Only
1008	3F0	Instant Flow rate	0	0xFFFF	Instant Flow rate, in accord to measure unit (one decimal point for L/h, GPH and no decimal point for % and mL/min)	Read Only
1009	3F1	Working time LOW Permanent	0	0xFFFFFFFF	Working time in statistics permanent, in seconds	Read Only
1010	3F2	Working time HIGH Permanent				Read Only
1011	3F3	Power ON LOW Permanent	0	0xFFFFFFFF	Power on counter in statistics permanent	Read Only
1012	3F4	Power ON HIGH Permanent				
1013	3F5	Working time LOW Resettable	0	0xFFFFFFFF	Working time in statistics resettable, in seconds	Read Only
1014	3F6	Working time HIGH Resettable				
1015	3F7	Power ON LOW Resettable	0	0xFFFFFFFF	Power on counter in statistics resettable	Read Only
1016	3F8	Power ON HIGH Resettable				
1100	44C	Max performance flow	0	0xFFFFFFFF	The max performance of the pump in accord to measure unit (one decimal point for L/h, GPH and no decimal point for % and mL/min)	Read Only
1101	44D	min time (BATCH) LOW	0	0xFFFFFFFF	The min time calculated as limit, in BATCH by the set measure unit, max flow rate, batch quantity	Read Only
1102	44E	min time (BATCH) HIGH				
1103	44F	max time (BATCH) LOW	0	0xFFFFFFFF	The max time calculated as limit, in BATCH by the set measure unit, max flow rate, batch quantity	Read Only
1104	450	max time (BATCH) HIGH				
1105	451	calibration quantity LOW	0	0xFFFFFFFF	Calibration factor, in accord to measure unit mL/min with one	Read Only

1106	452	calibration quantity HIGH			decimal point or fl oz/min (US) with 3 decimal points	
1107	453	Current Qty (BATCH) LOW	0	0xFFFFFFFF	Current quantity dosed in batch mode Current remaining quantity in batch mode, in accord to measure unit	Read Only
1108	454	Current Qty (BATCH) HIGH				
1109	455	Current remaining Qty (BATCH) LOW	0	0xFFFFFFFF	Current remaining time in batch mode Current quantity dosed in time mode, in seconds	Read Only
1110	456	Current remaining Qty (BATCH) HIGH				
1111	457	Current remaining Time (BATCH) LOW	0	0xFFFFFFFF	Current remaining Interval Time in Timed mode, in seconds	Read Only
1112	458	Current remaining Time (BATCH) HIGH				
1113	459	Current Qty (Timed) LOW	0	0xFFFFFFFF	Current quantity dosed in batch mode Current remaining quantity in batch mode, in accord to measure unit	Read Only
1114	45A	Current Qty (Timed) HIGH				
1115	45B	Current Interval Time (Timed) LOW	0	0xFFFFFFFF	Current remaining time in batch mode Current quantity dosed in time mode, in seconds	Read Only
1116	45C	Current Interval Time (Timed) HIGH				
1117	45D	Current Delay Time (Timed) LOW	0	0xFFFFFFFF	Current remaining Interval Time in Timed mode, in seconds	Read Only
1118	45E	Current Delay Time (Timed) HIGH				
1200	4B0	Pump function	0	5 (see note 5)	PUMP FUNCTION, from 0 to 5	Read/Write
1201	4B1	Pump Status	0	4 (see note 6)	To Start or stop the set dosing function, pausing or resuming (just for BATCH and TIMED)	Read/Write
1202	4B2	Manual Flow rate (Manual)	0	Max Flow rate (Reg. 1231)	Manual Flow rate (MANUAL), in accord to measure unit	Read/Write
1203	4B3	mA LOW (mA)	0	0xC8 (0 to 20.0 mA)	mA LOW (mA)	Read/Write
1204	4B4	Flow rate LOW mA	0	Max Flow rate (Reg. 1231)	Flow rate LOW (mA), in accord to measure unit	Read/Write
1205	4B5	mA HIGH	0	0xC8 (0 to 20.0 mA)	mA HIGH (mA)	Read/Write
1206	4B6	Flow rate HIGH (mA)	0	Max Flow rate (Reg. 1231)	Flow rate HIGH (mA), in accord to measure unit	Read/Write
1207	4B7	LL mA (mA)	0	0xE6 (0 to 23.0 mA)	LL mA (mA)	Read/Write
1208	4B8	HH mA (mA)	0	0xE6 (0 to 23.0 mA)	HH mA (mA)	Read/Write
1209	4B9	V LOW (V)	0	0x64 (0 to 10.0 V)	V LOW (V)	Read/Write
1210	4BA	Flow rate LOW (V)	0	Max Flow rate (Reg. 1231)	Flow rate LOW (V), in accord to measure unit	Read/Write
1211	4BB	V HIGH (V)	0	0x64 (0 to 10.0 V)	V HIGH (V)	Read/Write
1212	4BC	Flow rate HIGH (V)	0	Max Flow rate (Reg. 1231)	Flow rate HIGH (V), in accord to measure unit	Read/Write
1213	4BD	PPM Value LOW (PPM)	0x1	0x927C0 (0.1 to 60000.0 ppm)	PPM Value (PPM)	Read/Write
1214	4BE	PPM Value HIGH (PPM)				
1215	4BF	Mode flowmeter (PPM)	0	0x1 (Pulse/l to l/pulse)	Flow sensor mode from 0 to 1 (PPM), in accord to measure unit (l/imp or gal/imp)	Read/Write
1216	4C0	Quantity for flowmeter (PPM)	0x1	0x2710 (0.1 to 1000.0 pulses)	Quantity of the flow meter (PPM)	Read/Write
1217	4C1	Concentration (PPM)	0x1	0x3E8 (0.1 to 100.0 %)	Concentration of the dosing product (PPM)	Read/Write
1218	4C2	Memory (PPM)	0	0x1 (OFF to ON)	Memory, from 0 to 1 (PPM)	Read/Write

1219	4C3	Total quantity LOW (BATCH)	0x1	0x1869F for Reg. 1235 (Unit) = 0, 1, 3; or 0x6731 for Reg. 1235 (Unit) = 2	Total quantity (BATCH), in accord to measure unit lt or gallon	Read/Write
1220	4C4	Total quantity HIGH (BATCH)				
1221	4C5	Time LOW (BATCH)	Min time (BATCH) (Reg. 1101 & 1102)	Max time (BATCH) (Reg. 1103 & 1104)	Time (BATCH), automatically calculated in accord to quantity	Read/Write
1222	4C6	Time HIGH (BATCH)				
1223	4C7	Memory (BATCH)	0	0x1 (OFF to ON)	Memory, from 0 to 1 (BATCH)	Read/Write
1224	4C8	Total quantity LOW (TIMED)	0x1	0x1869F for Reg. 1235 (Unit) = 0, 1, 3; or 0x6731 for Reg. 1235 (Unit) = 2	Total quantity (TIMED)	Read/Write
1225	4C9	Total quantity HIGH (TIMED)				
1226	4CA	Flow rate (Timed)	0	Max Flow rate (Reg. 1230)	Flow rate of the pump (TIMED), in accord to measure unit	Read/Write
1227	4CB	Delay	0	0xAE5F	Delay (TIMED)	Read/Write
1228	4CC	Interval	0	0xAE5F	Interval (TIMED)	Read/Write
1229	4CD	Trigger mode	0	0x2 (see note 8)	Trigger mode, from 0 to 2 (TIMED)	Read/Write
1230	4CE	Trigger mode disable	0	0x2 (see note 9)	Trigger mode disable, from 0 to 2 (TIMED)	Read/Write
1231	4CF	Max Flow rate	90% Max performance Flow (Reg. 1100)	Max performance Flow (Reg. 1100) in base of Reg. 1235 (Unit)	Max flow rate of the pump, example on the manual	Read/Write
1232	4D0	Output mA	0	0x1 (Max flow rate or Max performance)	Value at 20mA for mA output, from 0 to 1	Read/Write
1233	4D1	Alarm relay	0	0x1 (Normally open or Normally close)	Status of the Alarm relay, from 0 to 1	Read/Write
1234	4D2	Pause input	0	0x1 (Normally open or Normally close)	Status of Pause input signal, from 0 to 1	Read/Write
1235	4D3	Unit	0	0x3 (see note 4)	Measure unit selection, from 0 to 3	Read/Write
1236	4D4	Reset partial statistics	0	0x1 (NO or YES)	To reset the partial statistics, from 0 to 1	Read/Write
1237	4D5	Level Alarm	0	0x1 (Stop or Alarm)	action of the Level alarm input signal, from 0 to 1	Read/Write

Note 4

Flow Unit

Value	Reference
0	%
1	L/h
2	GPH
3	mL/min

Note 5

Pump Function list

Value	Pump Function
0	Manual
1	mA Mode
2	V Mode
3	ppm Mode
4	BATCH Mode
5	Timed

Note 6

Device status

Value	Mode
0	Stop
1	Run
2	Pause (only in BATCH and TIMED)
3	Start (only in BATCH and TIMED)
4	Resume (only in BATCH and TIMED)

Note 8

Trigger mode

Value	Mode
0	Disabled
1	Normally Open
2	Normally Close

Note 9

Trigger mode disable

Value	Mode
0	Restart Timer
1	Freeze Timer
2	Pause Dosing

13 ANNEX F: FACTORY DEFAULT VALUES

No.	Parameter	Default value
1.	**Language**	English
2.	**Daylight saving**	OFF
3.	**Contrast**	0
4.	**Backlight mode**	ON
5.	**Brightness**	100%
6.	**Brightness ECO**	50%
7.	**Reverse**	OFF
8.	**Pump functions**	Manual
9.	**Flow rate Manual**	Max Flow rate
10.	**mA LOW**	4.0 mA
11.	**Flow rate LOW mA**	0.0 L/h
12.	**mA HIGH**	20.0 mA
13.	**Flow rate HIGH mA**	Max Flow rate
14.	**LL ma**	3.6 mA
15.	**HL mA**	22.0 mA
16.	**V LOW**	0.0 V
17.	**Flow rate LOW V**	0.0 L/h
18.	**V HIGH**	10.0 V
19.	**Flow rate HIGH V**	Max Flow rate
20.	**ppm**	100.0 ppm
21.	**ppm Mode**	Pulse/L
22.	**ppm Quantity**	1.0 Pulse/L
23.	**ppm Concentration**	100.0%
24.	**Memory**	OFF
25.	**Batch Total Quantity**	Max Flow (litres)
26.	**Batch Time**	60 min
27.	**Timed Quantity**	Pump dependent
28.	**Timed Delay time**	00:00:00 (day:hh:mm)
29.	**Timed Interval time**	00:00:00 (day:hh:mm)
30.	**Timed Flow rate**	Max Flow rate
31.	**Trigger Mode**	Disabled
32.	**Pause mode**	Restart Timer
33.	**Max Flow rate**	Pump dependent
34.	**Output mA**	Max performance
35.	**Alarm relay**	Normally Open
36.	**Modbus Enable**	OFF
37.	**Modbus Baud rate**	19200
38.	**Modbus Address**	1
39.	**Modbus Stop bit**	1
40.	**Modbus Parity**	Even
41.	**Modbus DOA**	DISABLED
42.	**Statistics Partial – Working time**	0d 0h 0m
43.	**Statistics Partial – Dosed quantity**	0.0 L
44.	**Statistics Partial – Power on**	0
45.	**Statistics Total - Working time**	0d 0h 0m
46.	**Statistics Total – Dosed quantity**	0.0 L
47.	**Statistics Total – Power on**	0
48.	**Password**	0000
49.	**Pause**	Normally Open
50.	**Unit**	L/h
51.	**Manual calibration**	Pump dependent
52.	**Level alarm**	Stop
53.	**Alarms Log**	No alarms