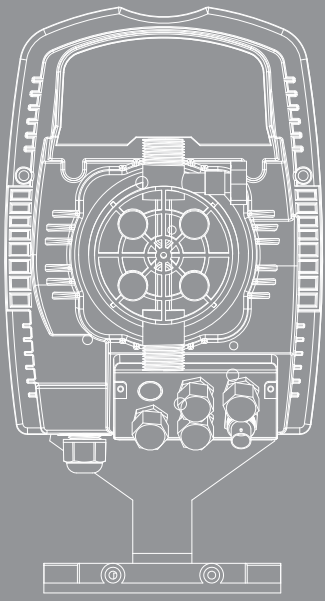
Emaux

EMAUX CTRL SERIES



USER MANUAL

CE

Model: Ctrl Series

EMPU22071140

EMAUX CTRL SERIES

USER MANUAL

TABLE OF **CONTENT**

PAGE

2 .... INTRODUCTION

1.1 WIRING

1.2 PLUMBING

5 .... START UP

6 .... PRECAUTIONS FOR USER

8 .... Automatic Dosing pump

4.1 Control panel

4.2 Programming menu

4.2.1 Setting the Language

4.2.2 Functional setting

4.2.3 pH calibration Menu

4.2.4 Potential Redox Calibration Menu (O.R.P.)

4.2.5 Alarm

4.2.6 Factory Reset

20 .... Trouble Shooting

21 .... TERMS OF THE WARRANTY

SAFETY WARNINGS

WARNING: IMPORTANT: The instruction manual you are holding includes essential information on the safety measures to be implemented for installation and start-up of this appliance. Therefore, the installer as well as the user must read the instructions before beginning installation and start-up. Keep this manual for future reference.

WARNING: This device is intended for swimming pools and spas only; do not use it for potable water sanitation (drinking water).

This electricity supply must be connected through a residual current device (RCD) or Ground Fault Circuit Interrupter (GFCI) with a rated residual operating current not exceeding 30 mA, otherwise could result in electrical shock causing serious bodily injuries, including death.

1. INTRODUCTION

INSTALLATION and Start-Up MANUAL FOR CTRL SERIES DOSING PUMP

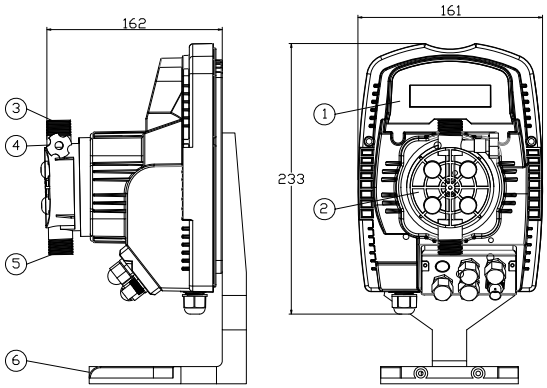
- Manual dosing pump: CTRL4/ CTRL 7/ CTRL 2
- Automatic dosing pump: CTRL4-pH/ CTRL 7-pH / CTRL 20-pH/ CTRL4-ORP/ CTRL 7-ORP / CTRL 20-ORP

Your pump is part of the pump family listed in the following table:

Model	Pressure	Flow rate	Stroke Capacity	Connection	Frequency max
	[bar]	[l/hour]	[cc/stroke]	[mm]	[stroke/min]
CTRL4/ CTRL4-pH/ CTRL4-PRP	12	4	0.42	4/6	160
	10	5	0.52		
	8	6	0.63		
	2	8	0.83		
CTRL7/ CTRL7-pH/ CTRL7-PRP	16	6	0.33	4/6	300
	10	10	0.55		
	5	15	0.83		
	1	18	1		
CTRL20/ CTRL20-pH/ CTRL20-PRP	5	20	1.11	8/12	300
	4	25	1.39		
	2	38	2.11		
	0.1	54	3		

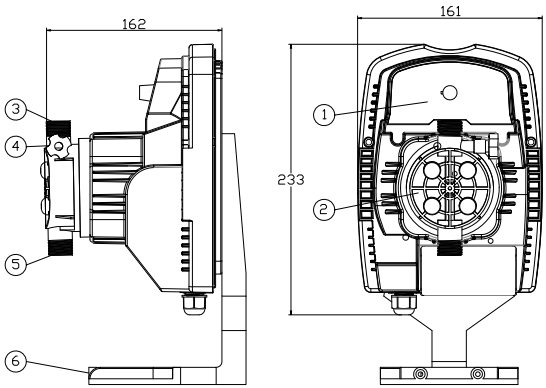
The dosing pump is comprised of a control unit that houses the electronics and the magnet, and a hydraulic part in contact with the liquid to be dosed.

CTRL4/ CTRL 7/ CTRL 20



1.Regulation area
2.Dosing head
3.Delivery connector
4.Priming valve
5.Base support
(Optional)

CTRL4-pH/ CTRL 7-pH / CTRL 20-pH/ CTRL4-ORP/ CTRL 7-ORP / CTRL 20-ORP



1.Regulation area
2.Dosing head
3.Delivery connector
4.Priming valve
5.Base support
(Optional)

The parts in contact with the liquid have been chosen in order to guarantee perfect compatibility with most chemical products normally in use. Given the range of chemical products available on the market, we recommend checking the chemical compatibility of the dosed product and contact materials.

MATERIALS USED IN THE PUMP HEAD (STANDARD)
BODY : PVDF
BALL VALVES : PVDF
SPHERES : CERAMIC
DIAPHRAGM : PTFE

The pumps are supplied complete with the indispensable accessories for their correct installation. You will find the following in the packaging:

Foot filter (PVDF), injection valve (PVDF), transparent suction tube (PVC), transparent tube for priming valve (PVC), opaque delivery tube (PE), Pump fixing inserts, bracket for wall mounting, level sensor connector and instruction manuals.

PRECAUTIONS

WARNING:

READ THE FOLLOWING PRECAUTIONS CAREFULLY BEFORE PROCEEDING WITH PUMP INSTALLATION OR MAINTENANCE

CAUTION! PRODUCT INTENDED FOR PROFESSIONAL USE, BY SKILLED PEOPLE

CAUTION! ALWAYS DISCONNECT THE POWER SUPPLY BEFORE INSTALLING OR CARRYING OUT MAINTENANCE ON THE PRODUCT

CAUTION! FOLLOW THE SAFETY PROCEDURES RELATIVE TO THE DOSED PRODUCT

• H2SO4 SULPHURIC ACID Our pumps are tested with water before ex-factory. Before dosing chemicals that may react with water. It is necessary dry out internal parts of the plumbing thoroughly.

• Install the pump in an area where the environment temperature does not exceed 40ºC and the relative humidity is below 90%. The pump has an IP65 protection level. Avoid installing this pump directly exposed to sunlight.

• Install the pump so that any inspection and maintenance operations are easy to carry out, then secure the pump firmly in order to prevent excessive vibrations.

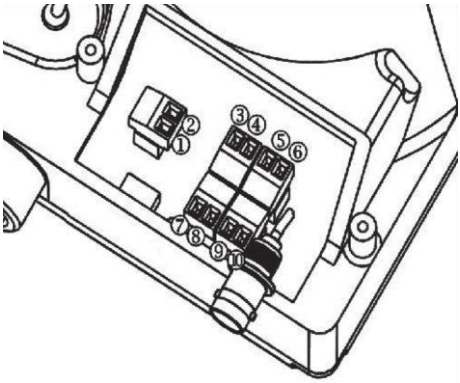
• Check that the power supply available in the network is compatible with that indicated on the pump label.

• If you are injecting in pressurized pipes, always make sure that the system pressure does not exceed the maximum working pressure indicated on the dosing pump label before starting up the pump.

1.1 WIRING

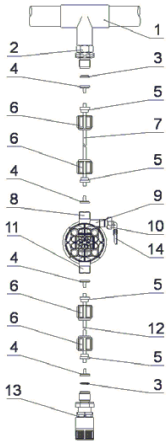
The pump must be connected to a power supply that complies with that indicated on the label on the side of the pump. Failure to respect these limits may cause damage to the pump itself. Operating voltage range: 220-240V AC.

Electrical connections



1	Alarm relay	
2		
3	Pole +	4-20 mA
4	Pole -	500Ω max load
5	Remote control input (start-stop)	
6		
7	Temperature probe input	
8		
9	Flow sensor input	
10		
B	Input level control	
BNC	pH/Redox BNC connector	

1.2 PLUMBING



1	injection point
2	injection connector
3	seal
4	pipe holder
5	pipe clamp
6	ring nut
7	delivery tube
8	delivery valve
9	pump head
10	priming valve
11	suction valve
12	suction tube
13	foot filter
14	priming valve connector

After around 800 hours of work, tighten the bolts in the pump body, applying a tightening torque of 4 Nm.

When making the plumbing connections, make sure that you follow the instructions below:

- The FOOT FILTER must be installed so that it is always positioned 5-10 cm from the bottom, in order to prevent any deposits from blocking it and damaging the hydraulic part of the pump;
- The pumps come as standard with inlet and outlet pipe that are sized to suit the plumbing characteristics of the pump. If you need to use longer pipes, it is important that you use pipes of the same dimensions as those supplied with the pump.
- For external applications in which the DELIVERY PIPE may be exposed to the sun's rays, we recommend using a black pipe able to withstand ultraviolet rays;
- It is advisable to position the INJECTION POINT higher than the pump or tank;
- The INJECTION VALVE, supplied with the pump, must always be installed at the end of the dosage flow delivery line.

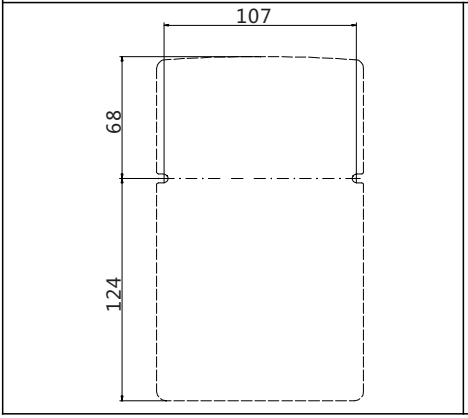
2. START UP

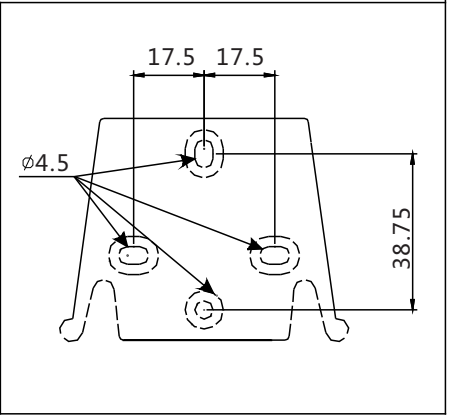
Once all the aforementioned operations have been completed, the pump is ready to be started.

Priming

- Start the pump
- Open the priming connector valve by turning the knob in an anticlockwise direction and wait for liquid to come out of the pipe connected to it.
- Once you are sure that the pump is completely full of liquid, you can close the connector and the pump will begin to dose.

Drilling templates





3. PRECAUTIONS FOR USER

WARNING: The operating voltage of the pump is 220V-240V AC. It is not allowed to connect to 380V 3-phase AC, otherwise, the circuit board will be burnt out. Voltage surge and electric shock can damage the pump, prevent connect the pump together with surge/ shock generated device to the same power line.

The grounding for the pump must be well connected. The rubber cap of the pump head bolt should be well covered. Converter and adaptor for electric socket cannot be used.

Prohibited empty run the pump for long term.

The pump has small amount of water in the pump chamber when ex-factory. Chemicals to be added may react with water, such as concentrated sulfuric acid. The pump chamber must be drained before starting the pump.

The pump rated maximum operating pressure is marked on the rating plate of the pump. The unit is in bar (1 bar = 1 kgf/ cm2 = 14.5 psi). The pump will damage if operate excess the rated pressure.

Install the pump in a zone where the environment temperature does not exceed 40ºC and the relative humidity is below 90%. The pump has an IP65 protection level. Avoid installing the pump directly exposed to sunlight.

Install the pump so that any inspection and maintenance operations are easy to carry out, then secure the pump firmly in order to prevent excessive vibrations.

The installation support provided by our company must be used, and the pump body cannot be installed horizontally or obliquely. The inlet / outlet valve of the pump head must be vertical to the horizontal plane.

To install the pump, the bracket provided by Emaux must be used. The pump cannot be installed horizontally or inclined; the inlet/outlet valve of the pump head must be kept perpendicular to the horizontal plane.

Make sure that the direction of the inlet and outlet pipes of the pump is installed correctly, the inlet valve of the pump is vertically downward, and the outlet valve is upward, which cannot be reversed. Refer to Fig. 1, Exported diagram of the pump base, to disassemble and install. If any part of the pump is lost, the pump cannot not work normally.

To keep the pump function correctly, make sure the inlet and outlet valve are clean.

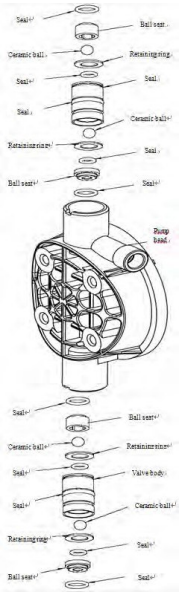


Fig 1: Exported diagram of the pump base

To ensure dosing function accurately, a complete set of pump which provide by Emaux (foot filter, injection valve and transparent tubes) must be used. The foot filter must be placed 5-10cm over the bottom of chemical container so to avoid being blocked by chemical precipitate and damage the pump.

If possible, install a safety valve at the outlet to avoid damage to the pump when the pump is blocked.

Suction tube and priming valve Tube connection: make sure the tube is well connected with pipe holder so to prevent liquid leakage and gas leakage (which will cause idling). Check the condition of tubes regularly. If the tube (especially the connection) is aging, replace a new tube immediately.

Manual gas release: when gas is inside suction tube or opaque delivery tube which will affect the pumping performance. To release gas inside tubes:

- Prepare a small container to contain leaking.
- Connect the transparent tube for priming to priming valve connector (on the right hand side of dosing head), and the other end to the container.
- Open the priming valve by turning the priming valve knob in anticlockwise direction, run the pump until gas in tubes are released with liquid leaking.
- Close the valve by turning the priming valve knob in clockwise.

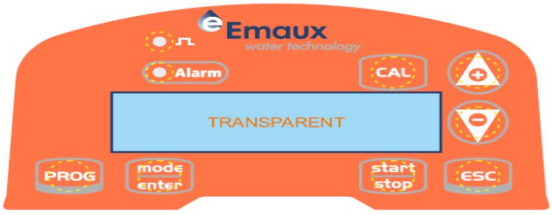
Flow rate setting: due to the difference on operating condition, the actual flow rate during use would be different to the value on rating plate. If you need to have a very accurate flow rate control, measure the actual liquid level change in the tank during the pump is operating. Calculate the actual flow rate and adjusted to your target flow by proportional.

After around 800 hours of work, tighten the bolts in the pump body, applying a tightening torque of 4 Nm

4. Automatic Dosing pump

Models: CTRL4-pH/ CTRL 7-pH / CTRL 20-pH/ CTRL4-ORP/ CTRL 7-ORP / CTRL 20-ORP

4.1 Control panel



PROG	Access to the programming menu
mode enter	When pressed during the pump operating phase, it cyclically displays the programmed values on the display. When pressed at the same time as the ⊕ ⊖ keys, it increases or lowers a value dependent on the selected operating mode. During programming it carries out an "enter" function, meaning that it confirms entry to the various menu levels and modifications within the same.
start stop	Starts and stops the pump. In the event of a level alarm (alarm function only), flow alarm and active memory alarm, it deactivates the signal on the display.
ESC	Used to "exit" the various menu levels. Before definitively exiting the programming phase, you will be asked if you wish to save any changes.
CAL	Access to the pump calibration menu. If in Off mode, the calibration menu is not activated.
⊕	Used to run upwards through the menu or increase the numerical values to be changed. Can be used to start dosage in Batch mode.
⊖	Used to run downwards through the menu, or decrease the numerical values to be changed.
	Flashing green LED during dosage.
Alarm	Red LED that lights up in various alarm situations

4.2 Programming menu

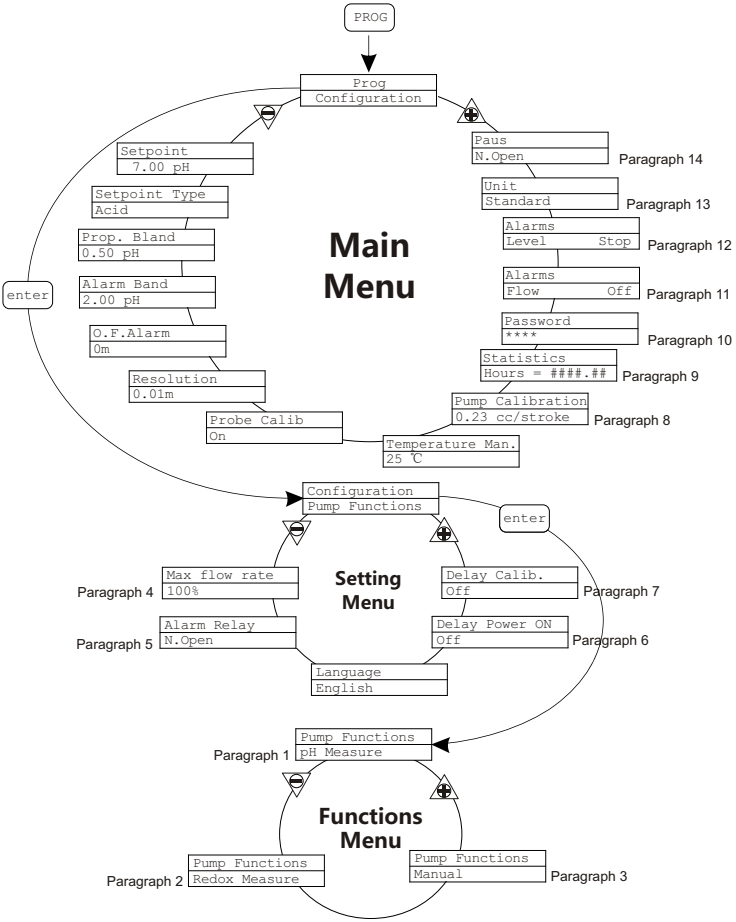
You can access the programming menu by pressing the PROG key for over three seconds. The keys can be used to run through the menu items, with the mode enter key being used to access changes.

The pump is programmed in constant mode in the factory. The pump automatically returns to the operating mode

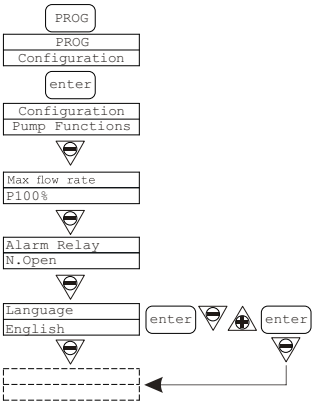
after 1 minute of no activity. Any data entered in these circumstances will not be saved. The key ESC can be used to exit the various programming levels. Upon exiting programming, the display will show:

Exit	▽ △	Exit
No Save		Save

Press mode enter to confirm the selection.

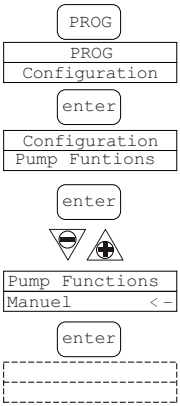


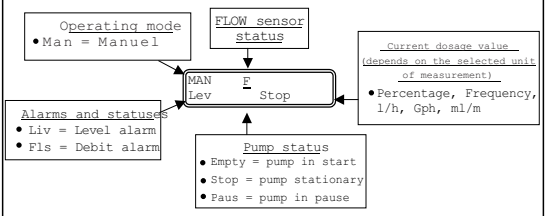
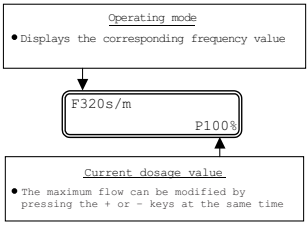
4.2.1 Setting the Language

Programming	Operation
	Makes it possible to select the language. The pump is set in English in the factory. Changes can be made by pressing the mode enter key, then using keys to set the new value. Press mode enter to confirm and return to the main menu

4.2.2 Functional setting

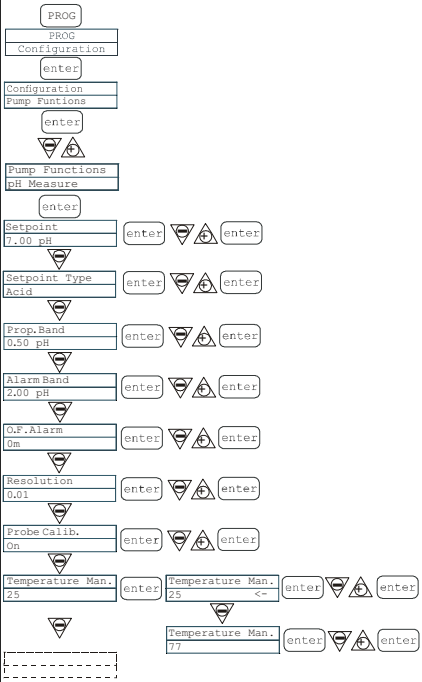
4.2.2. 1 Paragraph 1 – Manual Dosage

Programming	Operation
	The pump operates in constant mode. The flow can be manually regulated by pressing the mode enter keys at the same time to increase the flow, or the mode enter keys to decrease it.

Display during Operation	Display during Setting (MODE key)
	

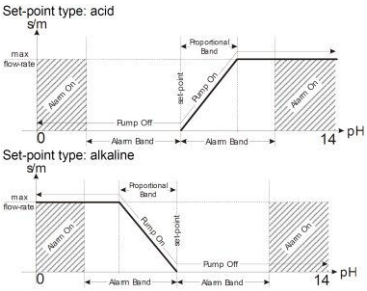
4.2.2. 2 Paragraph 2 – Dosage Proportional to the pH (factory setting)

Programming



Operation

The pump measures and controls the pH of a solution, programming in sequence: set-point, set-point type, proportional band and alarm band.

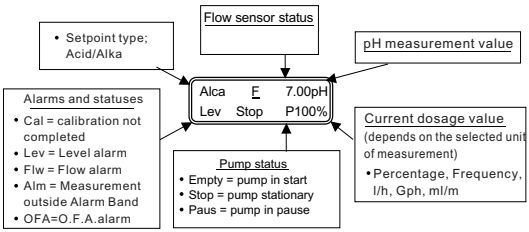


It is also possible to program:

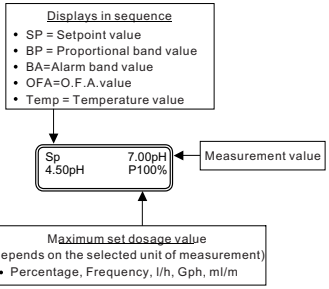
- the O.F.A. (Over Feed Alarm) time in minutes, or rather a time beyond which an alarm signal is triggered if the pH value does not reach the set-point.
- The measurement resolution (1 or 2 decimal points)
- Deactivation/activation of the calibration procedure
- Manual temperature value in ºC (default) or ºF

The maximum frequency can be modified during operation, by pressing the mode enter keys at the same time to increase the flow, or the mode enter keys to decrease it.

Display during Operation



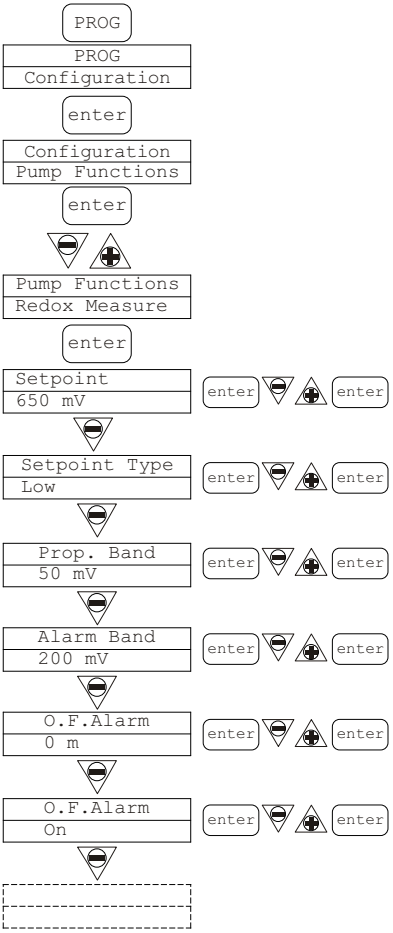
Display during Setting (MODE key)



4.2.2. 3 Paragraph 3 – Dosage Proportional to the Potential Redox Measurement (O.R.P.)

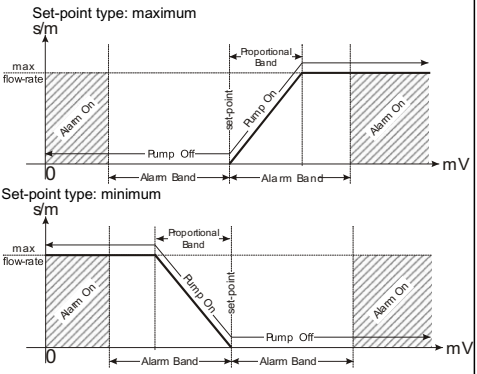
Programming	Operation

Programming



Operation

The pump measures and controls the pH of a solution, programming in sequence: set-point, set-point type, proportional band and alarm band.

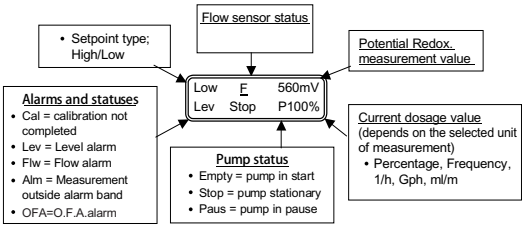


It is also possible to program:

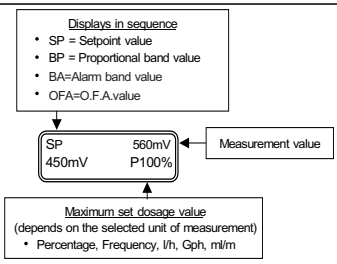
- the O.F.A. (Over Feed Alarm) time in minutes, or rather a time beyond which an alarm signal is triggered if the pH value does not reach the set-point.
- The measurement resolution (1 or 2 decimal points)
- Deactivation/activation of the calibration procedure
- Manual temperature value in °C (default) or °F

The maximum frequency can be modified during operation, by pressing the mode enter keys at the same time to increase the flow, or the mode enter keys to decrease it.

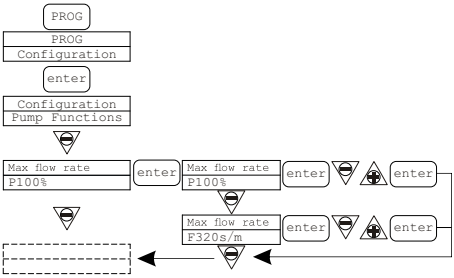
Display during Operation



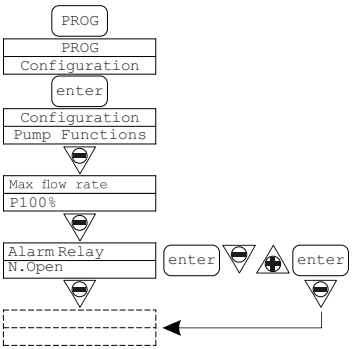
Display during Setting (MODE key)



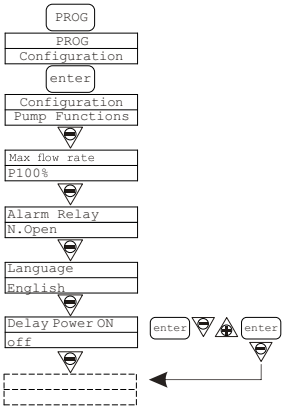
4.2.2. 4 Paragraph 4 – Setting the Maximum Flow

Programming	Operation
	This makes it possible to set the maximum flow offered by the pump, and the programmed mode (% or frequency) is used as the standard unit of measurement when displaying the flow. Changes can be made by pressing the mode enter key, then using the keys to set the new value. Press mode enter to confirm and return to the main menu.

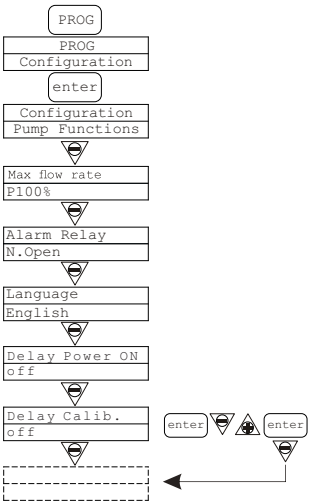
4.2.2. 5 Paragraph 5 – Setting the Alarm relay

Programming	Operation
	This is used to set the alarm relay in the absence of an alarm situation, if open (default) or closed. Changes can be made by pressing the mode enter key, then using the keys to set the new value. Press to confirm and return to the main menu

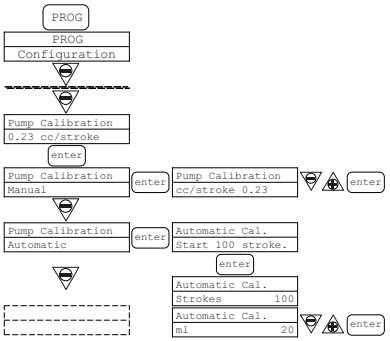
4.2.2. 6 Paragraph 6 – Power On Delay Setting

Programming	Operation
	Allows the user to set a pump activation delay time when turning on the pump itself. This delay will only take effect if the pump is turned off and then on again by disconnecting its electrical power supply. The setting can be disabled (Off - factory default) or else can be set to a delay time ranging from 1 to 60 minutes. The alarm and pulse LED indicators will flash while the delay time is in progress (1 sec ON - 1 sec Off) and the countdown will be shown on the display in seconds. If the pump is in Stop mode, the LEDs alone will be flashing. While the time delay is in progress, the function can be disabled by accessing the menu and setting the time to Off. Press mode enter to access the modification option and use the and buttons to set the desired value. Press mode enter to confirm and return to the main menu.

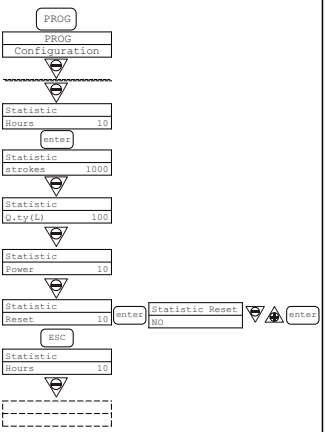
4.2.2. 7 Paragraph 7 – Delay calibration Setting

Programming	Operation
	Used to set a pump operation delay after calibration of the probe (Redox or pH). The setting can be disabled (Off - factory default) or else can be set to a delay time ranging from 1 to 60 minutes. The alarm and pulse LED indicators will flash while the delay time is in progress (1 sec ON - 1 sec Off) and the countdown will be shown on the display in seconds. If the pump is in Stop mode, the LEDs alone will be flashing. While the time delay is in progress, the function can be disabled by accessing the menu and setting the time to Off. Press mode enter to access the modification option and use the and buttons to set the desired value. Press mode enter to confirm and return to the main menu.

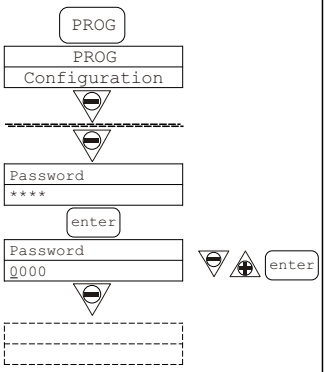
4.2.2. 8 Paragraph 8 – Flow Calibration

Programming	Operation
	The memorised cc value per strike appears in the main menu. It can be calibrated in two different ways: MANUAL – manually enter the cc value per strike using the keys and confirm by pressing the mode enter key. AUTOMATIC – the pump makes 100 strikes, which are started by pressing the mode enter key. At the end of this process, enter the quantity sucked up by the pump using the keys and confirm by pressing the mode enter key. The entered figure will be used in flow calculations.

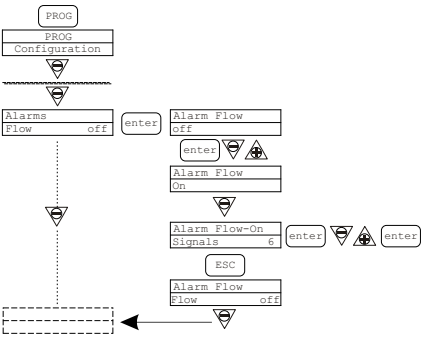
4.2.2. 9 Paragraph 9 - Statistics

Programming	Operation
	The main menu displays the pump operation times. By pressing the mode enter key you can access other statistics: • Strokes = number of strokes made by the pump • Q.ty (L) = quantity dosed by the pump in litres; this figure is calculated on the basis of the memorised cc/stroke value • Power = number of pump starts • Reset = use the ⊕ ⊖ to reset the counters (YES) or otherwise (NO), then confirm by pressing the mode enter key. Pressing the ESC key will take you back to the main menu.

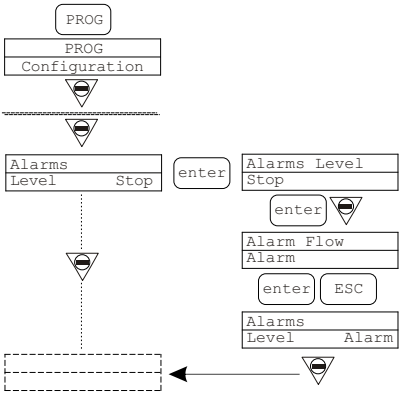
4.2.2. 10 Paragraph 10 – Password

Programming	Operation
	By entering the password, you can enter the programming menu and see all the set values. The password will be requested whenever you seek to modify them. The flashing line indicates the number than can be modified. Use the ⊕ key to select the number (from 1 to 9), and the ⊖ key to select the number to be modified. Confirm by pressing the mode enter key. By setting "0000" (default), the password is eliminated.

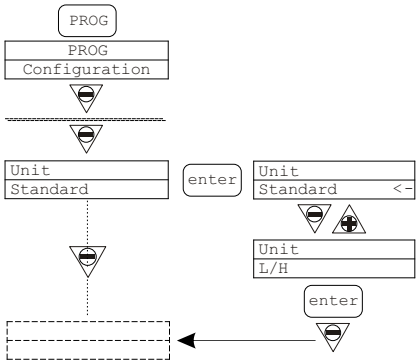
4.2.2. 11 Paragraph 11 – Flow Alarm

Programming	Operation
	This makes it possible to activate (deactivate) the flow sensor. When activated (On), press the key to access the request for the number of signals that the pump waits for before an alarm is triggered. The number flashes when you press the mode enter key, and you can then use the keys to set the value. Confirm by pressing the mode enter key. Press ESC to return to the main menu.

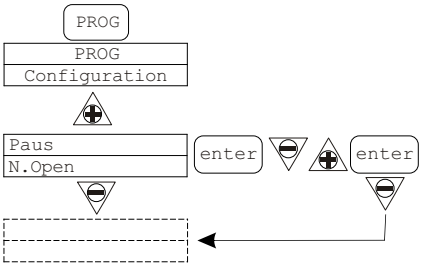
4.2.2. 12 Paragraph 12 – Level Alarm

Programming	Operation
	This makes it possible to set the pump when the level sensor alarm is activated. In other words you can decide whether to stop dosage (Stop) or simply activate the alarm signal without stopping dosage. Changes can be made by pressing the mode enter key, then using the keys to set the alarm type. Confirm by pressing the mode enter key. Press ESC to return to the main menu.

4.2.2. 13 Paragraph 13 – Flow Display Unit

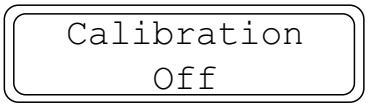
Programming	Operation
	This makes it possible to set the dosage unit of measurement on the display. Changes can be made by pressing the mode enter key, then using the keys to set the unit of measurement, choosing between L/h (litres/hour), Gph (Gallons/hour), ml/m (millilitres/minute) or standard (% or frequency, depending on settings). Press mode enter to confirm and return to the main menu.

4.2.2. 14 Paragraph 14 – Setting the Pause

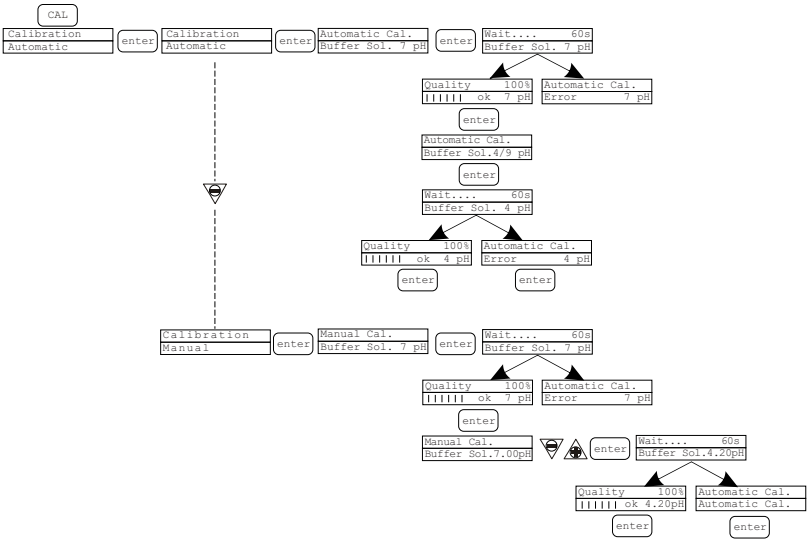
Programming	Operation
	The pump can be paused by remote input. The factory setting is Normally Open. Changes can be made by pressing the mode enter key, thenusing the keys to set the new value (N.OPEN or N. CLOSED). Press to confirm and return to the main menu.

4.2.3 pH calibration Menu

Pressing the CAL key for 3 seconds takes you into the calibration menu. If calibration was excluded during programming, the following appears on the display:



If calibration is active : It is possible to select automatic or manual mode. In both cases, it is automatically calibrated to pH 7.



It is possible to select automatic or manual mode. In both cases, it is automatically calibrated to pH 7.

- Automatic calibration:
  The buffer solution value appears on the display. Enter the probe in the bottle and press the mode enter key. A 60second countdown necessary to complete calibration will appear on the display. If the alignment quality is below 50%, an error message appears on the display and you should press mode enter to exit calibration (the pump exits automatically after 4 seconds). If the quality is above 50%, the value is shown on the display and, after pressing the mode enter key, the buffer solution at pH 4 or 9 will be requested. At this point the procedure is the same as above.

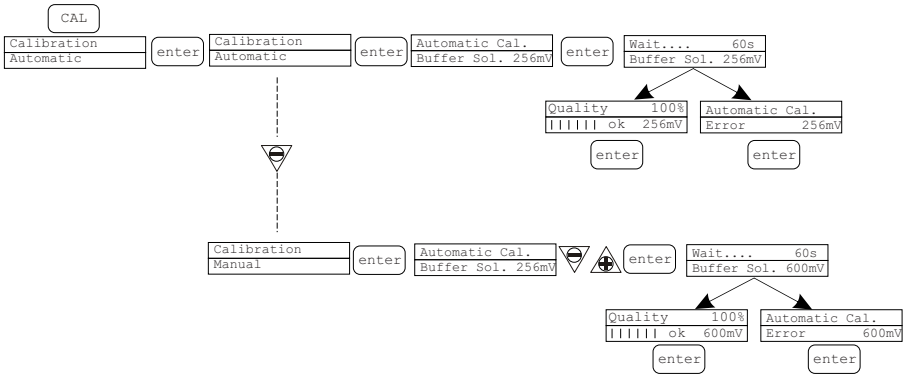
- Manual calibration:
  when the buffer solution value appears on the display, insert the probe in the bottle and press the mode enter key. A 60 second countdown necessary to complete calibration will appear on the display. If the alignment quality is below 50%, an error message appears on the display and you should press mode enter to exit calibration (the pump exits automatically after 4 seconds). If the quality is above 50%, the value is shown on the display and, after pressing the mode enter key, the value of pH 7.00 flashes on the display. Use the keys to enter the value of the solution in your possession, then press mode enter to confirm and start the calibration procedure as before.

4.2.4 Potential Redox Calibration Menu (O.R.P.)

Pressing the CAL key for 3 seconds takes you into the calibration menu. If calibration was excluded during programming, the following appears on the display:

```
Calibration
Off
```

If calibration is active:



It is possible to select automatic or manual mode.

- Automatic calibration:

  The buffer solution value appears on the display. Insert the probe in the bottle and press the mode enter key. A 60 second countdown necessary to complete calibration will appear on the display. If the alignment quality is below 50%, an error message appears on the display and you should press mode enter to exit calibration (the pump exits automatically after 4 seconds). If the quality is above 50%, the value is shown on the display and you should press the mode enter key to complete the procedure.

- Manual calibration:

  The buffer solution value appears on the display. Insert the probe in the bottle and press the mode enter key. The value of 465 mV should now flash on the display. Insert the probe in your solution and use the keys to display the value of the solution in your possession, then confirm by pressing the mode enter key and begin the calibration procedure as before.

4.2.5 Alarm

Display	Cause	Interruption
Fixed alarm LED Flashing word “Lev Man Lev P100%	End of level alarm, without interrupting pump operation	Restore the liquid level.
Fixed alarm LED Flashing words “Lev” and “stop” Man Lev Stop P100%	End of level alarm, with interruption to pump operation	Restore the liquid level.

Fixed alarm LED Flashing word "Flw" Man F Flw P100%	Active flow alarm. The pump has not received the programmed number of signals from the flow sensor.	Press the start stop key
Parameter Error PROG to default	Communication error with the eeprom.	Press the PROG key to restore the default parameters
Flashing word "OFA" Flashing word "stop" High 475mV OFA Stop P 75%	O.F.A. alarm	Press the start stop key to stop the flashing word "stop". Press the key again to start up the pump again.
Flashing word "Cal" High 475mV Alm P 75%	Probe not calibrated alarm	Calibrate the probe

4.2.6 Factory Reset

Turn off the power of pump, Press "PROG" and "ESC" key together, turn on the power at the same time. Wait two second and loosen the key, the following appears on the display: Model and Version, then "Parameter" "Reset", factory reset successful.

5. Trouble Shooting

Problem	Possible Cause	Solution
The pump is working properly but the dosage is interrupted	Valve blockage	Clean the valves or replace them if it is not possible to remove the build-ups
	Excessive suction height	Position the pump or tank so as to reduce the suction height (pump under water head)
	Excessively viscous liquid	Reduce the suction height or use a pump with a bigger flow capacity
Insufficient flow capacity	Valve leakage	Check that the ring nuts are properly tightened
	Excessively viscous liquid	Use a pump with a bigger flow capacity or reduce the suction height (pump under water head)
	Partial valve blockage	Clean the valves or replace them if it is not possible to remove the build-ups
Excessive or irregular pump flow capacity	Siphon effect on delivery	Check the injection valve installation. Insert a back-pressure valve if insufficient.
	Transparent PVC pipe on delivery	Use an opaque PE pipe on delivery
	Pump not calibrated correctly	Check the pump flow capacity relative to the system pressure.

Broken diaphragm	Excessive backpressure	Check the system pressure. Check whether the injection valve is blocked. Check whether there are any blockages between the delivery valves and the injection point.
	Operation without liquid	Check the presence of the foot filter (valve). Use a level probe that stops the pump when the chemical product in the tank has run out.
	Membrane not secured correctly	If the membrane has been replaced, make sure that the same is correctly tightened.
The pump does not come on	Insufficient power supply	Check whether the pump plate data corresponds to that of the electricity network.

6. TERMS OF THE WARRANTY

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(b) as a result of an act of God;
(c) by operation outside the usage parameters stated herein;
(d) by the use of parts not manufactured or sold by Emaux;
(e) by modification of the product;
(f) as a result of war or terrorist attack; or
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