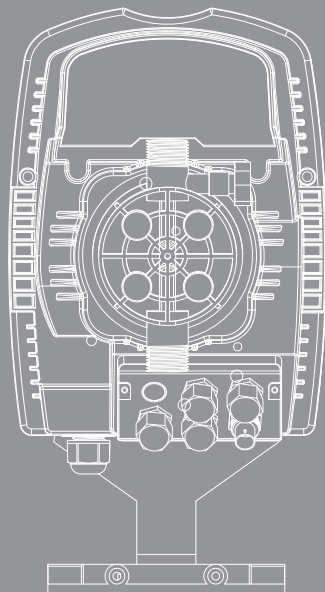




EMAUX CTRL SERIES



USER MANUAL



Model: Ctrl Series

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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

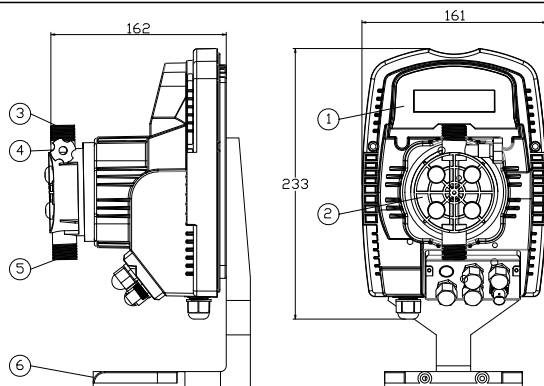
- Manual dosing pump: CTRL4/ CTRL 7/ CTRL 2
- Automatic dosing pump: CTRL4-pH/ CTRL 7-pH / CTRL 20-pH/ CTRL4-ORP/ CTRL 7-ORP / CTRL 20-ORP

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		

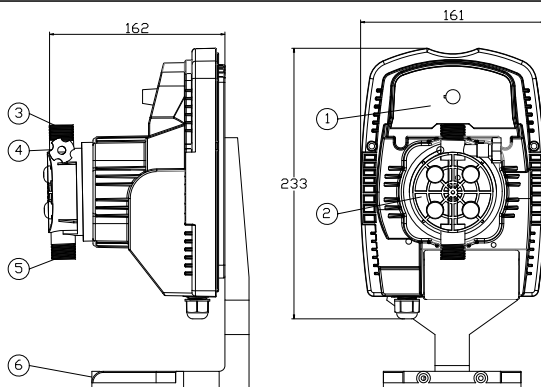
The dosing pump is comprised of a control unit that houses the electronics and the magnet, and a hydraulic part in contact with the liquid to be dosed.

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



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

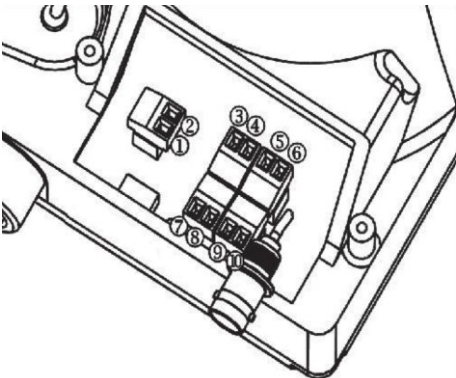
WARNING:

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

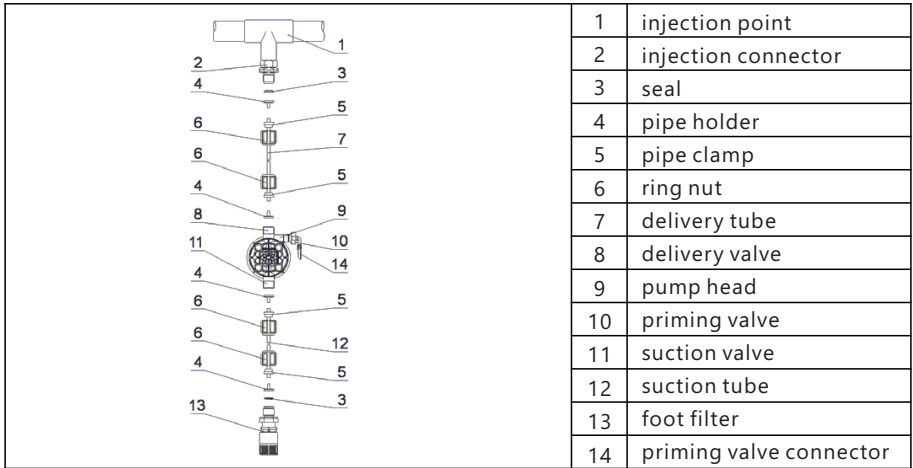
- H₂SO₄ SULPHURIC ACID Our pumps are tested with water before ex-factory. Before dosing chemicals that may react with water. It is necessary dry out internal parts of the plumbing thoroughly.
- Install the pump in an area where the environment temperature does not exceed 40°C and the relative humidity 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



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:

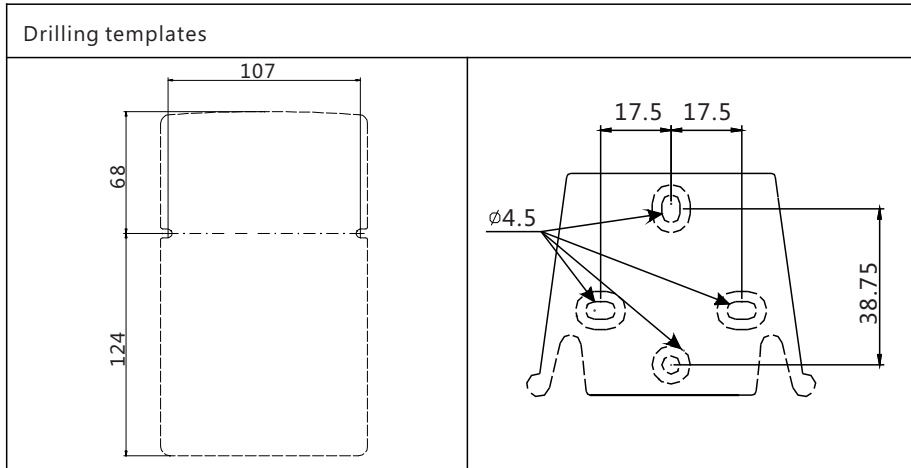
- The FOOT FILTER must be installed so that it is always positioned 5-10 cm from the bottom, in order to prevent any deposits from blocking it and damaging the hydraulic part of the pump;
- The pumps come as standard with inlet and outlet pipe that are sized to suit the plumbing characteristics of the 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.



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 40°C 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.

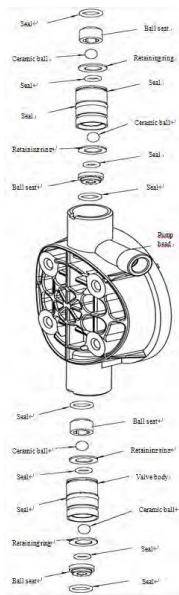


Fig 1: Exported diagram of the pump base

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.

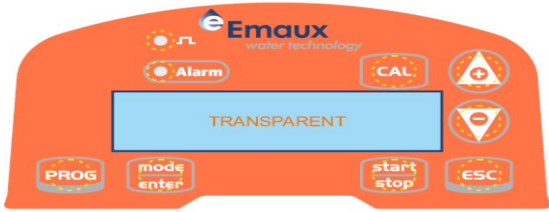











Flow rate setting: due to the difference on operating condition, the actual flow rate during use would be different to the value on rating plate. If you need to have a very accurate flow rate control, measure the actual liquid level change in the tank during the pump is operating. Calculate the actual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

	
	Access to the programming menu
	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.
	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.
	Used to "exit" the various menu levels. Before definitively exiting the programming phase, you will be asked if you wish to save any changes.
	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.
	Red LED that lights up in various alarm situations

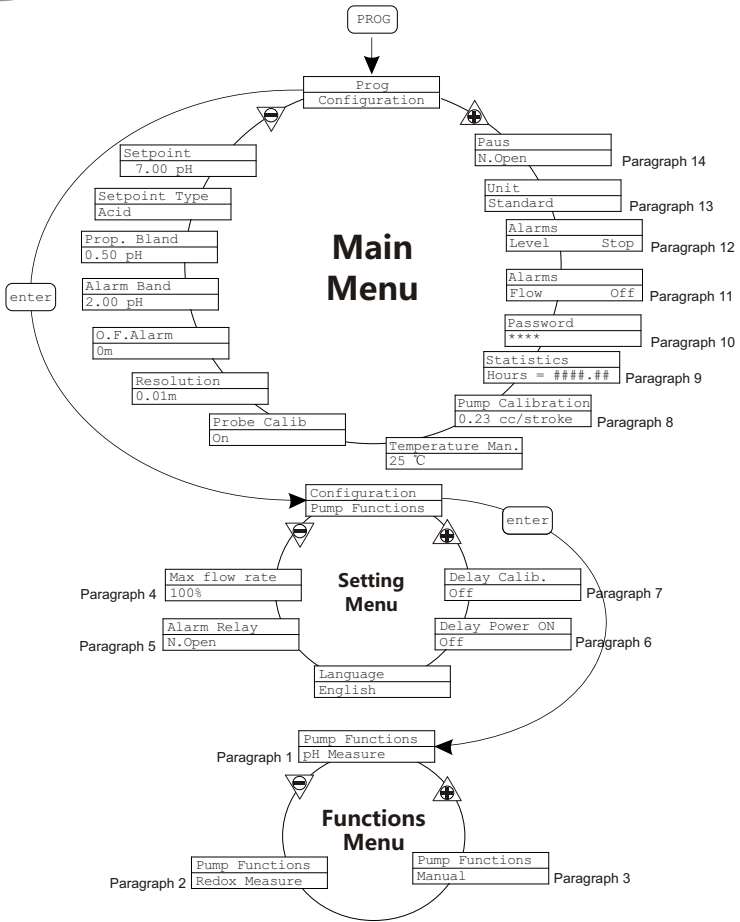
4.2 Programming menu

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:



Press **mode enter** to confirm the selection.



4.2.1 Setting the Language

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

4.2.2 Functional setting

4.2.2.1 Paragraph 1 – Manual Dosage

Programming	Operation
	<p>The pump operates in constant mode.</p> <p>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.</p>

Display during Operation	Display during Setting (MODE key)

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






Programming	Operation
<p>The programming sequence is as follows:</p> <ul style="list-style-type: none"> PROG PROG Configuration Configuration Pump Functions Pump Functions pH Measure Setpoint: 7.00 pH Setpoint Type: Acid Prop. Band: 0.50 pH Alarm Band: 2.00 pH O.F. Alarm: 0m Resolution: 0.01 Probe Calib.: On Temperature Man.: 25 Temperature Man.: 77 	<p>The pump measures and controls the pH of a solution, programming in sequence: set-point, set-point type, proportional band and alarm band.</p> <p>Set-point type: acid</p> <p>Set-point type: alkaline</p> <p>It is also possible to program:</p> <ul style="list-style-type: none"> 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 <p>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.</p>

Display during Operation	Display during Setting (MODE key)
<p>The main display shows:</p> <ul style="list-style-type: none"> Setpoint type: Acid/Alka Flow sensor status pH measurement value Alca E 7.00pH Lev Stop P100% Alarms and statuses: <ul style="list-style-type: none"> Cal = calibration not completed Lev = Level alarm Flw = Flow alarm Alm = Measurement outside Alarm Band OFA = O.F.A. alarm Pump status: <ul style="list-style-type: none"> Empty = pump in start Stop = pump stationary Paus = pump in pause 	<p>Displays in sequence:</p> <ul style="list-style-type: none"> SP = Setpoint value BP = Proportional band value BA = Alarm band value OFA = O.F.A. value Temp = Temperature value <p>The sequence shows:</p> <ul style="list-style-type: none"> Sp 4.50pH 7.00pH P100% Measurement value Maximum set dosage value (depends on the selected unit of measurement): <ul style="list-style-type: none"> Percentage, Frequency, l/h, Gph, ml/m




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

Programming	Operation
<p> (PROG) PROG Configuration (enter) Configuration Pump Functions (enter) Pump Functions Redox Measure (enter) Setpoint 650 mV (enter) (enter) Setpoint Type Low (enter) (enter) Prop. Band 50 mV (enter) (enter) Alarm Band 200 mV (enter) (enter) O.F.Alarm 0 m (enter) (enter) O.F.Alarm On (enter) (enter) [] </p>	<p>The pump measures and controls the pH of a solution, programming in sequence: set-point, set-point type, proportional band and alarm band.</p> <p>Set-point type: maximum</p> <p>Set-point type: minimum</p> <p>It is also possible to program:</p> <ul style="list-style-type: none"> • 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 <p>The maximum frequency can be modified during operation, by pressing the keys at the same time to increase the flow, or the keys to decrease it.</p>
<h4>Display during Operation</h4> <p> • Setpoint type; High/Low Flow sensor status Potential Redox measurement value Low E 560mV Lev Stop P100% Current dosage value (depends on the selected unit of measurement) • Percentage, Frequency, 1/h, Gph, ml/m Pump status • Empty = pump in start • Stop = pump stationary • Paus = pump in pause Alarms and statuses • Cal = calibration not completed • Lev = Level alarm • Flw = Flow alarm • Alm = Measurement outside alarm band • OFA=O.F.A.alarm </p>	<h4>Display during Setting (MODE key)</h4> <p>Displays in sequence</p> <ul style="list-style-type: none"> • SP = Setpoint value • BP = Proportional band value • BA=Alarm band value • OFA=O.F.A.value <p> SP 560mV 450mV P100% ← Measurement value Maximum set dosage value (depends on the selected unit of measurement) • Percentage, Frequency, 1/h, Gph, ml/m </p>

4.2.2. 9 Paragraph 9 - Statistics

Programming	Operation
	<p>The main menu displays the pump operation times. By pressing the  key you can access other statistics:</p> <ul style="list-style-type: none"> • 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  key. <p>Pressing the  key will take you back to the main menu.</p>

4.2.2. 10 Paragraph 10 – Password

Programming	Operation
	<p>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.</p> <p>The flashing line indicates the number than can be modified.</p> <p>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  key. By setting “0000” (default), the password is eliminated.</p>

4.2.2. 11 Paragraph 11 – Flow Alarm

Programming	Operation
	<p>This makes it possible to activate (deactivate) the flow sensor.</p> <p>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 key, and you can then use the keys to set the value. Confirm by pressing the key. Press to return to the main menu.</p>

4.2.2. 12 Paragraph 12 – Level Alarm

Programming	Operation
	<p>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.</p> <p>Changes can be made by pressing the , then using the keys to set the alarm type.</p> <p>Confirm by pressing the key. Press to return to the main menu.</p>

4.2.2. 13 Paragraph 13 – Flow Display Unit

Programming	Operation
	<p>This makes it possible to set the dosage unit of measurement on the display.</p> <p>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.</p>

4.2.2. 14 Paragraph 14 – Setting the Pause

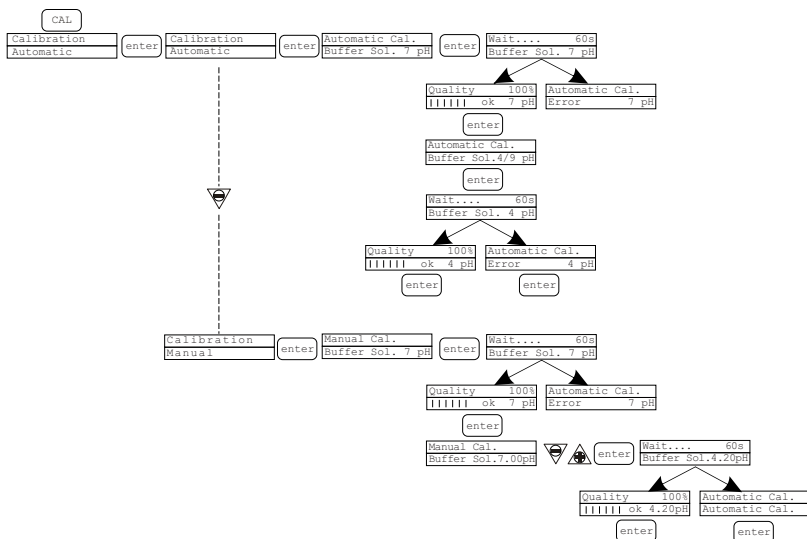
Programming	Operation
	<p>The pump can be paused by remote input.</p> <p>The factory setting is Normally Open.</p> <p>Changes can be made by pressing the mode enter key, then using the keys to set the new value (N.OPEN or N. CLOSED).</p> <p>Press to confirm and return to the main menu.</p>

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:

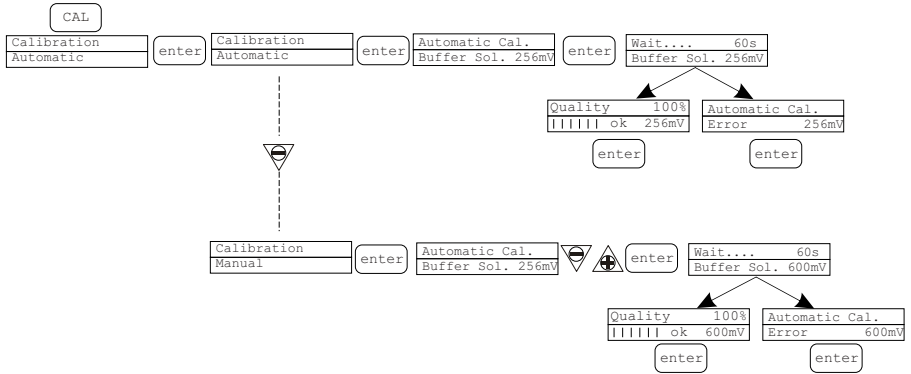
when the buffer solution value appears on the display, insert the probe in the bottle and press the **mode enter** key. A 60 second countdown necessary to complete calibration will appear on the display. If the alignment quality is below 50%, an error message appears on the display and you should press **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:




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 


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 

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 

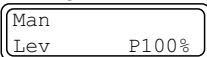

- Manual calibration:

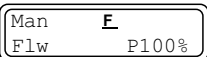

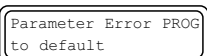

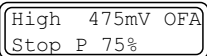

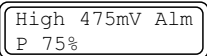
The buffer solution value appears on the display. Insert the probe in the bottle and press the 

key. The value of 465 mV should now flash on the display. Insert the probe in your solution and use the  

the  key and begin the calibration procedure as before.

4.2.5 Alarm

Display	Cause	Interruption
Fixed alarm LED Flashing word "Lev" 	End of level alarm, without interrupting pump operation	Restore the liquid level.
Fixed alarm LED Flashing words "Lev" and "stop" 	End of level alarm, with interruption to pump operation	Restore the liquid level.

Fixed alarm LED Flashing word "Flw" 	Active flow alarm. The pump has not received the programmed number of signals from the flow sensor.	Press the  key
	Communication error with the eeprom.	Press the  key to restore the default parameters
Flashing word "OFA" Flashing word "stop" 	O.F.A. alarm	Press the  key to stop the flashing word "stop". Press the key again to start up the pump again.
Flashing word "Cal" 	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

As original purchaser of this equipment have purchased from Emaux Water Technology Co Ltd, through Authorized International Distributor or Dealer, warrants its products free from defects in materials and workmanship under normal use during warranty period. The warranty period begins on the day of purchase and extends only to the original purchaser. It is not transferable to anyone who subsequently purchases the product from you. It excludes all expendable parts. During the warranty period, Emaux authorized reseller will repair or replace defective parts with new parts or, at the option of Emaux, serviceable used parts that are equivalent or superior to new parts in performance.

This Limited Warranty extends only to products purchased from Emaux authorized reseller. This Limited Warranty does not extend to any product that has been damaged or rendered defective

- (a) as a result of accident, misuse or abuse;
- (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
- (g) as a result of service by anyone other than Emaux authorized reseller or authorized agent.

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