# MULTI-PARAMETRIC INSTRUMENT
## FOR THE MEASUREMENT OF
## PH – REDOX – CHLORINE – TEMPERATURE

# 1 GENERAL INFORMATION

## 1.1 INFORMATION REGARDING THE MANUAL

This document contains confidential information. This information may be subject to modifications and updates without any prior notice.

This manual is an integral part of the instrument. At the time of the device's first installation, the operator must carefully check the contents of the manual in order to verify its integrity and completeness.

In order to guarantee the device's proper functionality and operator safety, it is fundamental that the operative procedures and precautions described in this manual be respected.

Before using the device, the manual must be read in all of its parts, in the presence of the device 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.

## 1.2 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.

## 1.3 ELECTRICAL SAFETY

**ATTENTION:** All of the control unit's connections are isolated from the grounding system (non-insulated grounding conductor).
DO NOT connect any of these connections to the grounding connector.

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

- **Only power the device using a mains power supply that complies with the device's specifications (85-265Vac 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 in conjunction with the accessories specified in this manual, which have been tested for use with the device itself.

## 1.4 SAFETY OF THE OPERATING ENVIRONMENT

- The instrument is resistant to liquids. 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 authorised and qualified personnel.
- If present, the transparent panel should be closed once the device has been programmed.

- **Protection**

– IP65

- **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°C to +40°C |
| – | Storage and transport temperature | -25°C to +65°C |
| – | Relative humidity | 00% to 95% - (without condensation) |

**ATTENTION:** The device must be perfectly inserted into the system.

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

The parameters set on the analyser's 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 fashion.

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

## 2. GENERAL DESCRIPTION

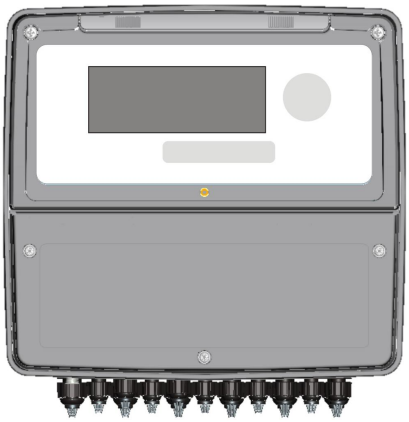
The analyser described in this manual is comprised of the instrument itself as well as the Technical Manual.

The device may be installed upon the electrical panel or else wall-mounted at a maximum distance of 15 metres from the probe.

It is powered by the mains electrical system (100-240Vac-50/60Hz), with 10W consumption, through a switching Power Supply.

This device has been designed for the ON-LINE analysis of chemical characteristics in the following applications:

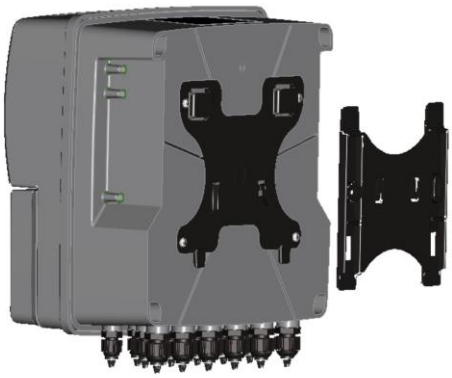
- Biological oxidation systems
- Industrial wastewater drainage and treatment
- Fish farming
- Primary or drinking water systems



## 2.1 MAIN CHARACTERISTICS

- Power Supply**:** **100-240 Vac 50/60 Hz, 10Watt (Class 1 Electrical Insulation)**
- System duration**:** **24 hours a day, 7 days a week for 5 years (43800 Hours)**
- Operating temperature**: 0 to 40°C, relative humidity 0 to 95% (without condensation)**
- Data display**:** **4-line display with 20 large White and Blue characters.**
- Keyboard: **6 Keys**
- Cable connections: **Dual row connectors**
- Relays: **Six (250 Vac 10 A); Four 100 to 240V Power relays and Two dry contact relays**
- Measurements**:**
  - pH**: 0.00 to 14.00 pH (precision ±0.01 pH)**
  - Redox**: ±2000 mV (precision ±1 mV)**
  - Temperature**: -15 to 150°C (precision 0.01 °C) (Predisposition for PT100 and PT1000 sensor)**
  - Free chlorine**: 0.01 to 5 ppm (precision ±0.01 ppm) (Amperometric Probe)**
- Output Modules associated with the chemical measurements**:**
  - **2 channel current output, 4 to 20mA, 500 Ohm maximum load (precision ± 0.01 mA)**
  - **2 channel Frequency Output (Open Collector NPN/PNP) 0 to 120 pulses per minute (precision 0.016 Hz)**
- Input Modules:
  - **Flow (pull up) (input for Reed sensor)**
  - **Hold**
- Data transmission modules:
  - **RS485 Serial Port (ModBus Standard Protocol)**
- Modules integrated upon the mother board:
  - **Clock module with backup battery.**

## 2.2 MECHANICAL INSTALLATION



| Mechanical Dimensions | |
|---|---|
| **Dimensions (L x H x D)** | 300x290x143 mm |
| **Installation depth** | 148 mm |
| **Material** | ABS |
| **Installation typology** | Wall-mounted |
| **Weight** | 2.45 Kg |
| **Front Panel** | UV resistant polycarbonate |

Drill the necessary holes and fasten the instrument to the wall using the support provided.

The cable glands for the electrical connections are located on the lower portion of the control unit. In order to facilitate the connections, therefore, any other devices must be positioned at least 15 cm away.

Protect the device against any drips and/or sprays of water from adjacent areas during the programming and calibration phases.

## 2.2 ELECTRICAL INSTALLATION

### 2.2.1 CONNECTION TO THE POWER SUPPLY

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

Use an alternating 100Vac to 240Vac-50/60Hz power supply. The power supply must be as stabilised 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 best to connect the control unit's electrical system to a dedicated grounding rod.

### 2.2.2 CONNECTIONS TO DOSING SYSTEMS

**ATTENTION:** Before connecting the instrument to the external utilities (outputs and relays), make sure that the electrical panel is off and that the wires from the Utilities are not live.

**WARNING:** With a resistive load, each relay contact can sustain a maximum current of 1 amp, at max. 230V, and therefore a total power of 230 VA.

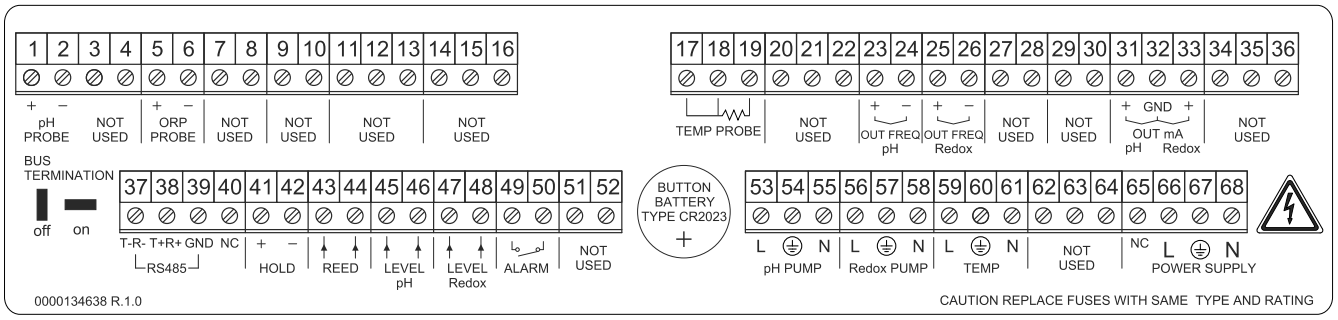
### 2.2.3 ELECTRICAL CONNECTIONS TABLE

| Terminal | Description | Chlorine | PH-Redox | PH - Chlorine | PH-CL-Redox |
|---|---|---|---|---|---|
| 1 | pH probe (+) | Not Used | PH probe input | | |
| 2 | pH probe (-) | | | | |
| 3 - 4 | Not used | | | | |
| 5 | Redox probe (+) | Not Used | Redox probe input | Not Used | Redox probe input |
| 6 | Redox probe (-) | | | | |
| 7 | Amp Chlorine Probe (+) | Chlorine probe input (CU-PT) | Not Used | Chlorine probe input (CU-PT) | Chlorine probe input (CU-PT) |
| 8 | Amp Chlorine Probe (-) | | | | |
| 9-16 | Not used | | | | |
| 17 | Temperature Probe (Green) | PT100 or PT1000 Temperature Probe Input | | | |
| 18 | Temperature Probe (Blue) | | | | |
| 19 | Temperature Probe (Yellow) | | | | |
| 20 - 22 | Not used | | | | |
| 23 | Freq. output (+) | Not Used | pH | pH | pH |
| 24 | Freq. output (-) | | | | |
| 25 | Freq. output (+) | Not Used | Redox | Chlorine | Chlorine |
| 26 | Freq. output (-) | | | | |
| 27 - 30 | Not used | | | | |
| 31 | Current output (+) | Not Used | PH | PH | PH |
| 32 | Gnd Current output (-) | Output current GND connector | | | |
| 33 | Current output (+) | Chlorine | Redox | Chlorine | Chlorine |
| 34 - 36 | Not used | | | | |
| 37 | RS 485 - | RS485 Serial Port with ModBus RTU protocol | | | |
| 38 | RS 485 + | | | | |
| 39 | RS 485 GND | | | | |
| 40 | Not used | | | | |
| 41 | HOLD + | 15 to 30 Vdc voltage input | | | |
| 42 | HOLD - | | | | |
| 43 - 44 | REED | REED sensor input | | | |
| 45 - 46 | Level 1 Signal | Not Used | PH | PH | PH |
| 47 - 48 | Level 2 Signal | Chlorine | Redox | Chlorine | Chlorine |
| 49 - 50 | Relay 1 output (dry contact) | Alarm | Alarm | Alarm | Alarm |
| 51 - 52 | Relay 2 output (dry contact) | Not Used | Not Used | Not Used | Redox |
| 53 | Relay phase (100 to 240Vac) | Not Used | pH relay | pH relay | pH relay |
| 54 | Ground | | | | |
| 55 | Relay neutral (100 to 240 Vac) | | | | |
| 56 | Relay phase (100 to 240Vac) | Chlorine | Redox relay | Chlorine relay | Chlorine relay |
| 57 | Ground | | | | |
| 58 | Relay neutral (100 to 240 Vac) | | | | |
| 59 | Relay phase (100 to 240Vac) | Temperature Relay | | | |
| 60 | Ground | | | | |
| 61 | Relay neutral (100 to 240 Vac) | | | | |
| 62 - 65 | Not used | | | | |
| 66 | Power supply phase (100 to 240 Vac) | 100 to 240 Vac 50/60 Hz Power Supply Connector | | | |
| 67 | Ground | | | | |
| 68 | Power supply neutral (100 to 240 Vac) | | | | |

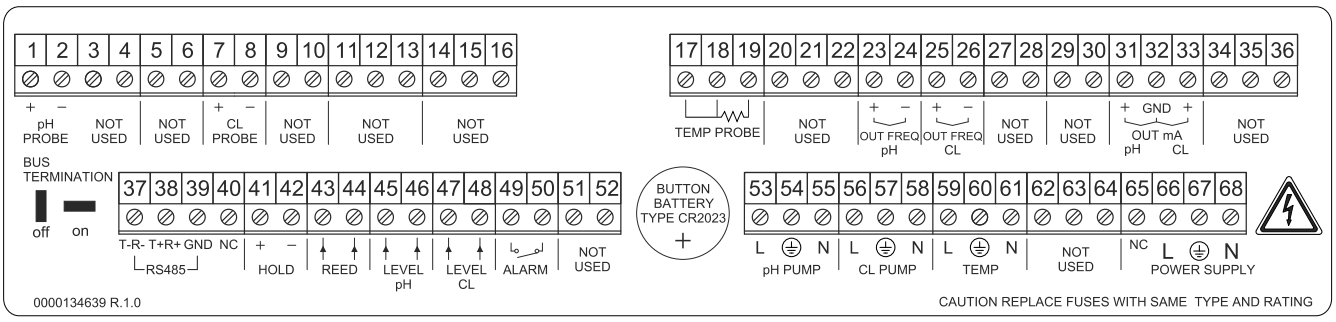
Example of the Connections Label affixed to the back of the instrument's connections compartment.

**LABELS**

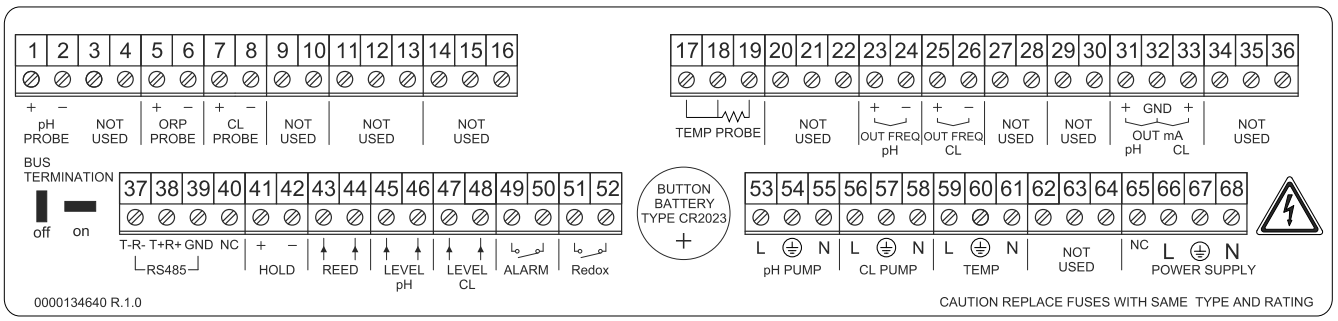
PR



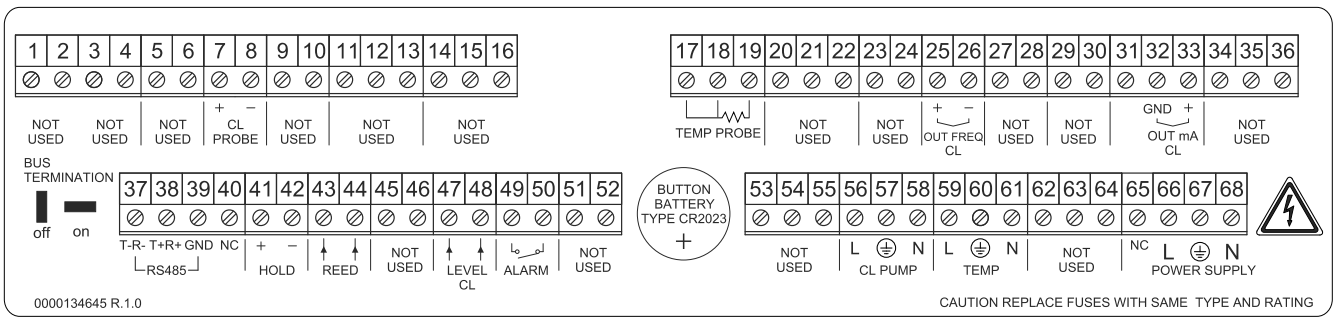

PC




PRC




CL

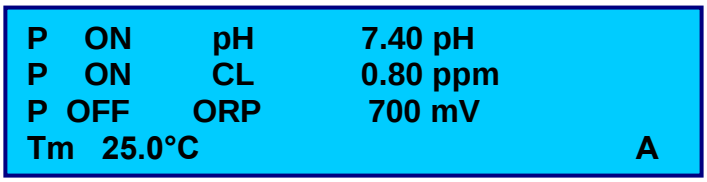


## 3.0 SETTINGS AND FUNCTIONALITY

### 3.1 INSTRUMENT DISPLAY

A

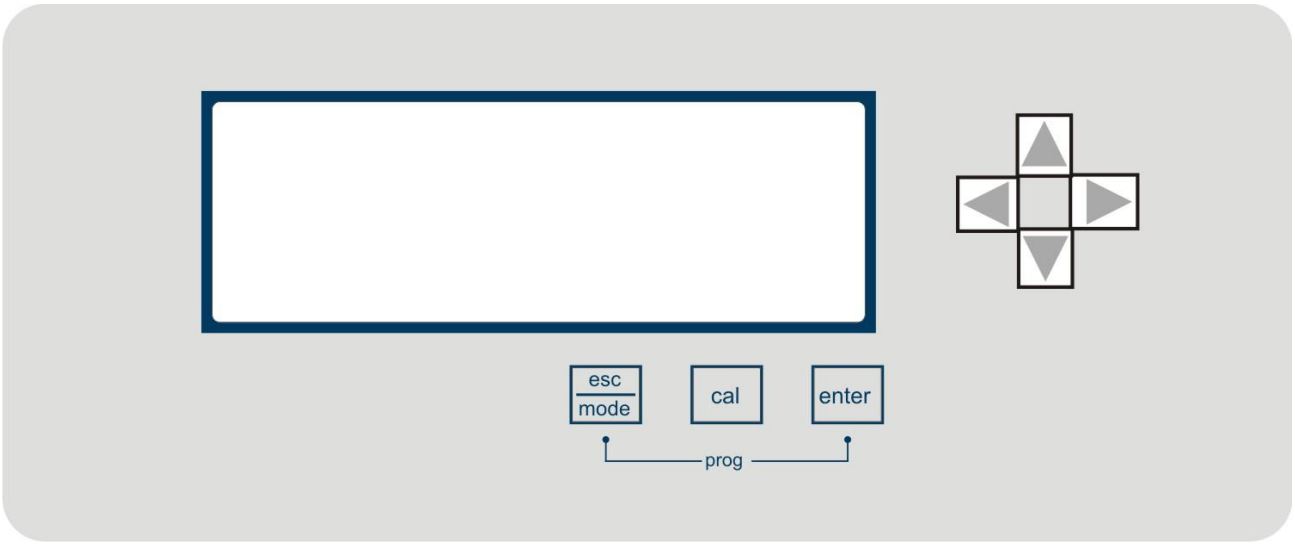

B




The right/left keys can be used to select display modes A and B
**Note:** Any unavailable chemical measurements will not be displayed.

***Mode A***
**Line 1** = Time; system water flow status
**Line 2** = pH measurement display; Temperature measurement display.
**Line 3** = Chlorine display; Network connection through RS485 serial port (∝ symbol)
**Line 4** = ORP (Redox) display; Available Alarms list display.

***Mode B***
**Line 1** = pH dosing pump status, pH measurement display
**Line 2** = Chlorine dosing pump status, Chlorine measurement display
**Line 3** = ORP (Redox) dosing pump status, ORP (Redox) measurement display
**Line 4** = Temperature measurement display; Available Alarms list display.




### 3.2 INSTRUMENT KEYBOARD

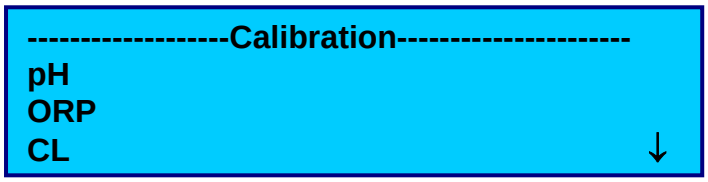
**Esc/Mode** = Dual function key
**Esc**= Exits the menu
**Mode**= Displays the measurement SetPoints (hold down for 3 seconds)

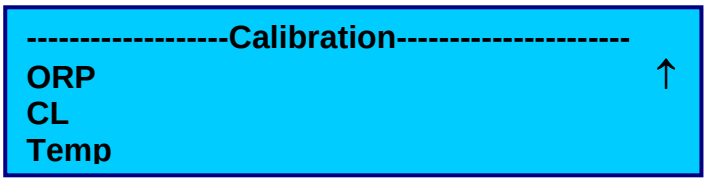
**Cal** = Accesses the calibration menu (hold down for 3 seconds)
**Enter** = Confirms the function, Displays the alarms list (hold down for 3 seconds)
**Esc+Enter =** Key combination for accessing the programming menu (hold down for 3 seconds)
**Navigation keys=** Up, Down, Right, Left for selecting parameters and navigating the menus

### 3.3 CALIBRATING THE OPERATING PARAMETERS

**Note:** Any unavailable chemical measurements will not be displayed.

Calibration can be carried out using the menus shown on the display. Hold down the **CAL** key for 3 seconds to access the Calibration menu.



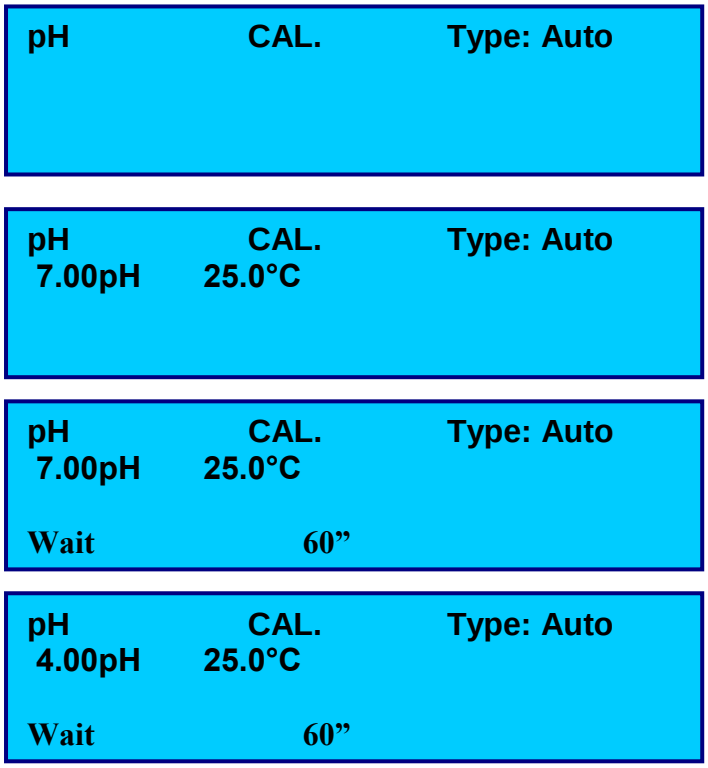




Use the **Up** and **Down** keys to select the probe to be calibrated and press **ENTER**.

### 3.3.1 PH PROBE CALIBRATION

Connect the pH probe to the instrument as indicated in the electrical connections.
Select the pH probe from the Calibration menu.
Select whether to perform the calibration in Automatic (**AUTO**) or Manual (**MAN**) mode.

**AUTO**

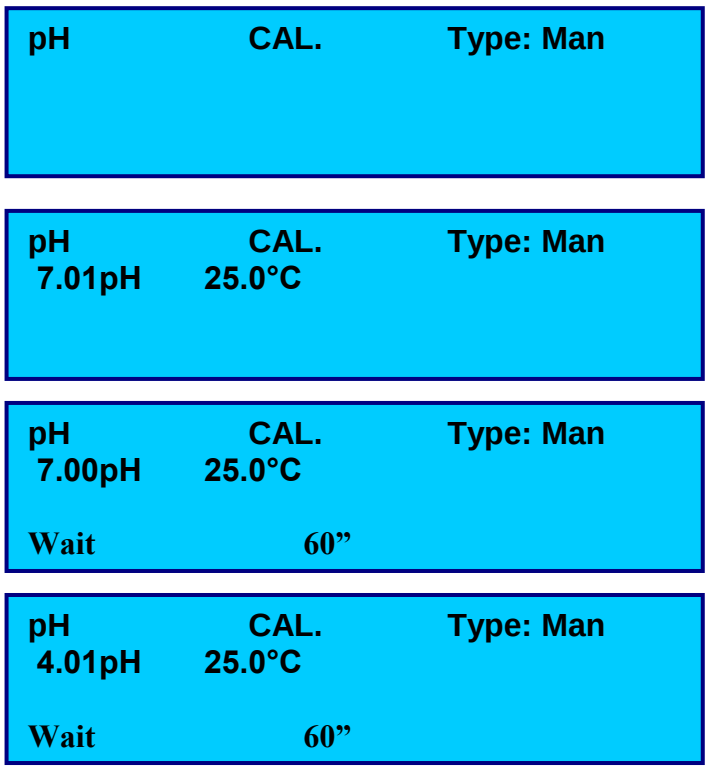



In Automatic (**AUTO**) mode:

- Immerse the probe in the 7 pH solution and press **Enter**
- Wait 60 seconds. When finished, the instrument will display the probe’s quality as a percentage value.
- Immerse the probe in the 4 pH or 9.22 pH solution and press **Enter**
- Wait 60 seconds. When finished, the instrument will display the probe’s quality as a percentage value.
- Once the operation has concluded, a message will appear indicating that the calibration has been carried out successfully.

At the end of each calibration point, the instrument will display the quality of the electrode as a percentage.

**MAN**




In Automatic (**MAN**) mode:

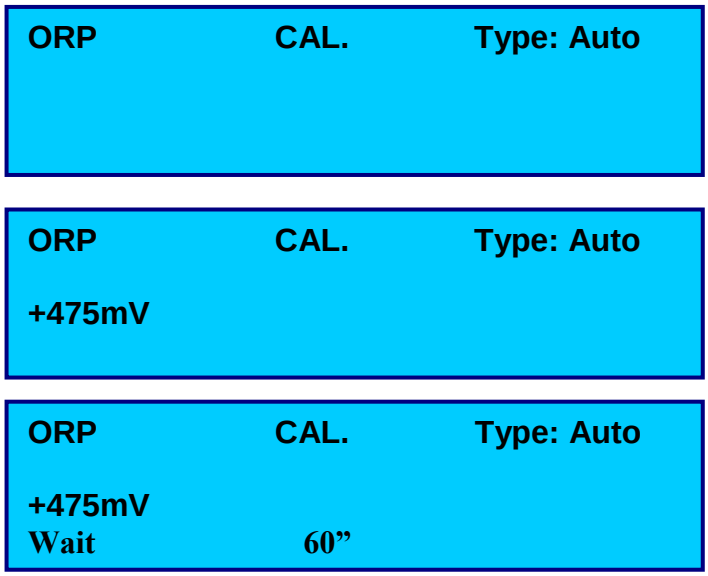
- Immerse the probe in the first solution, insert the solution’s pH value and press **Enter**
- Wait 60 seconds. When finished, the instrument will display the probe’s quality as a percentage value.
- Immerse the probe in the second solution and insert the solution’s pH value..
- Wait 60 seconds. When finished, the instrument will display the probe’s quality as a percentage value.
- Once the operation has concluded, a message will appear indicating that the calibration has been carried out successfully.

At the end of each calibration point, the instrument will display the quality of the electrode as a percentage.

### 3.3.2 ORP (REDOX) PROBE CALIBRATION

Connect the ORP probe to the instrument as indicated in the electrical connections.
Select the ORP probe from the Calibration menu.
Select whether to perform the calibration in Automatic (**AUTO**) or Manual (**MAN**) mode.

**AUTO**

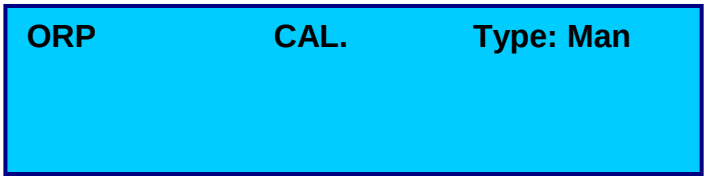


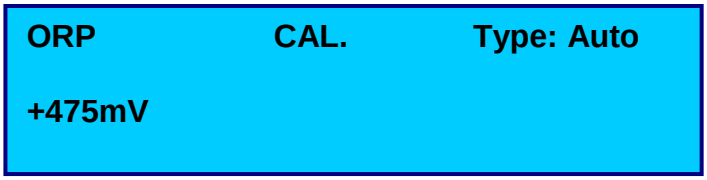

In Automatic (**AUTO**) mode:

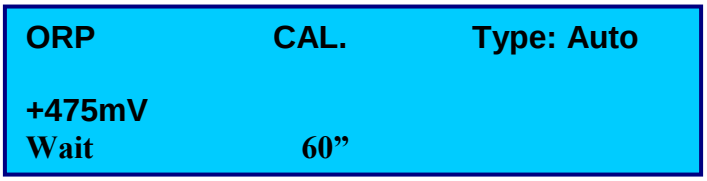
- Immerse the probe in the +475mV solution and press **Enter**
- Wait 60 seconds. When finished, the instrument will display the probe’s quality as a percentage value.
- Once the operation has concluded, a message will appear indicating that the calibration has been carried out successfully.

At the end of each calibration point, the instrument will display the quality of the electrode as a percentage.

**MAN**



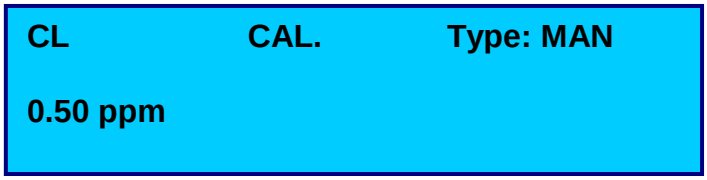

In Automatic (**MAN**) mode:

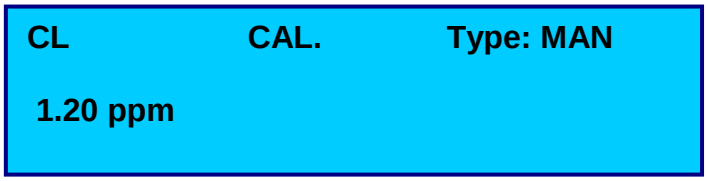
- Immerse the probe in the solution, insert the solution’s mV value and press **Enter**
- Wait 60 seconds. When finished, the instrument will display the probe’s quality as a percentage value.
- Once the operation has concluded, a message will appear indicating that the calibration has been carried out successfully.

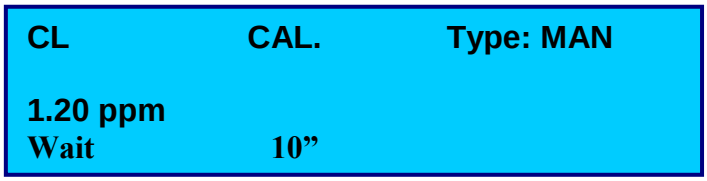
At the end of each calibration point, the instrument will display the quality of the electrode as a percentage.

### 3.3.3 CL (CHLORINE) PROBE CALIBRATION

Connect the probe to the instrument as indicated in the electrical connections.
Select the CL probe from the Calibration menu.



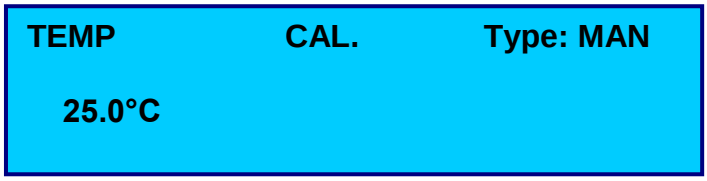



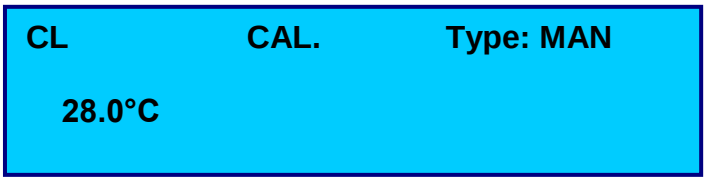

In Automatic (**MAN**) mode:

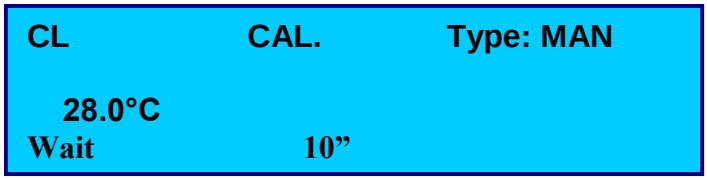
- Use a reference instrument to read the chlorine value.
- Adjust the value shown on the display to match the value read by the reference instrument. Press **Enter** to confirm.
- Wait 10 seconds for the calibration to complete.
- Once the operation has concluded, a message will appear indicating that the calibration has been carried out successfully.

### 3.3.4 TEMPERATURE PROBE CALIBRATION

Connect the probe to the instrument as indicated in the electrical connections.
Select the TEMP. probe from the Calibration menu.




In Automatic (**MAN**) mode:

- Use a reference instrument to read the temperature value.
- Adjust the value shown on the display to match the value read by the reference instrument. Press **Enter** to confirm.
- Wait 10 seconds for the calibration to complete.
- Once the operation has concluded, a message will appear indicating that the calibration has been carried out successfully.

### 3.4 VIEWING ALARMS

The alarms recorded by the instrument can be viewed using the menus shown on the display. Hold down the **ENTER** key for 3 seconds to access the ALARMS menu.

**The menu contains the following items:**

| ALARMS |
|---|
| VIEW ALARMS |
| RESET ALARMS LIST |
| RESET ALARMS RELAY |

| ALARMS | |
|---|---|
| RESET ALARMS LIST | ↑ |
| RESET ALARMS RELAY | |
| RESET OFA | |

**1) <u>View recorded alarms</u>**
**Number of alarms present in the list (1/14)**
**Date**
**List of Alarms with time of recording,**
**use the up and down keys to scroll through the list.**

| ALRM | 01/14 | 12/12/11 |
|---|---|---|
| 05:59 | PH HIGH | |
| 06:00 | RX LOW | |
| 06:10 | RX LOW | ↓ |

**2) <u>Reset Alarms list</u>**
**Use the up and down keys to select No/Yes and press ENTER**

| RESET ALARMS LIST |
|---|
| NO |

**3) <u>Reset Alarms Relay</u>**
**Use the up and down keys to select No/Yes and press ENTER**
**This function can be used to shut off the alarms relay.**

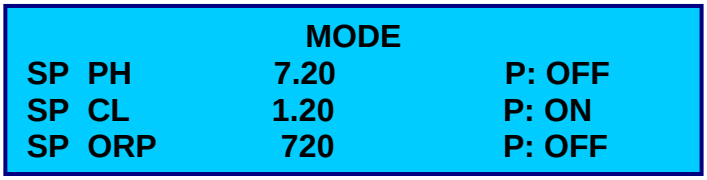
| RESET ALARMS RELAY |
|---|
| NO |

**4) Reset OFA**
**Use the up and down keys to select No/Yes and press ENTER**

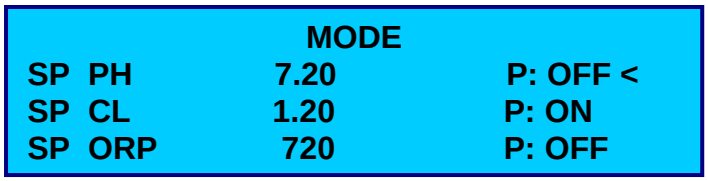
| RESET OFA |
|---|
| NO |

### 3.5 QUICK MODE MENU SETTINGS.

In order to display the quick MODE menu, hold down the **ESC/MODE** key for 3 seconds to access the MODE menu




Use the up and down keys to select the desired item and press ENTER to modify the Set Point value (the symbol "<" will appear on the right). Press ENTER again to confirm.



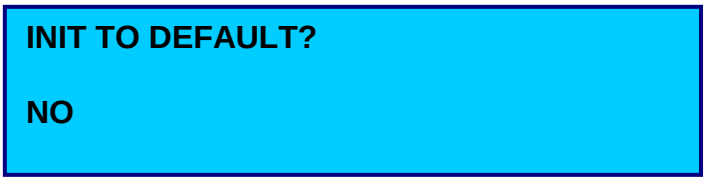

Press *ESC* to exit the menu.

### 3.6 HIDDEN MENUS

The instrument contains the following hidden menus:

Reset DEFAULT parameters
To access this menu, do the following:

1) Shut off the instrument
2) Hold down the Up and Down keys and turn on the instrument.




The message shown to the side will appear. Use the up and down keys to select No/Yes and press ENTER

Reset DEFAULT parameters
To access this menu, do the following:

3) Shut off the instrument
4) Hold down the Right and Left keys and turn on the instrument.


The message shown to the side will appear. Press the ESC key

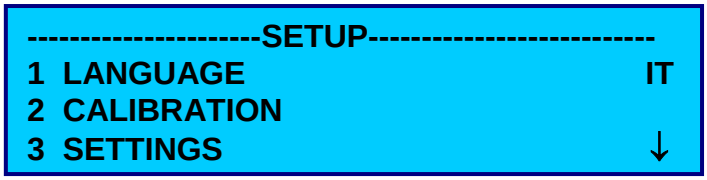
## 4 PROGRAMMING

When turned on, the system automatically goes into measurement and dosing mode – RUN function.

Press the **ESC** and **ENTER** keys simultaneously to enter the programming mode. Next, press **ENTER** to access the various menus. In this manner, all of the outputs will be disabled.

Use the **UP** and **DOWN** keys to scroll through the various menus and submenus and to modify the data (increase/decrease).
Use the **ENTER** key to access the data insertion submenus and to confirm any modifications.
Use the **ESC** key to return to the previous menu or function without saving any changes.

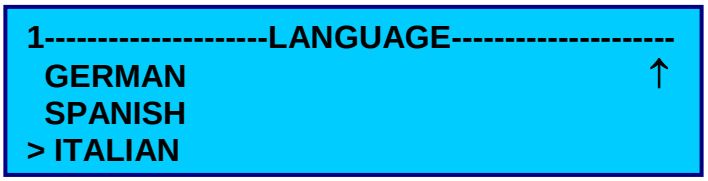
All of the instrument's main menu items are shown below:





### 4.1 LANGUAGE MENU (menu navigation index = 1)

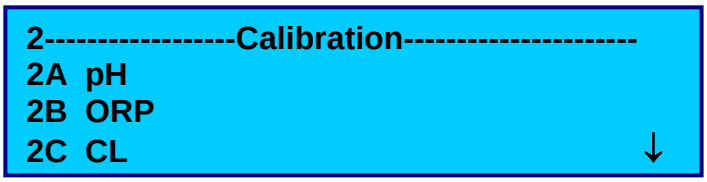
This function allows for the software's interface language to be selected from amongst: English, French, German, Spanish and Italian.

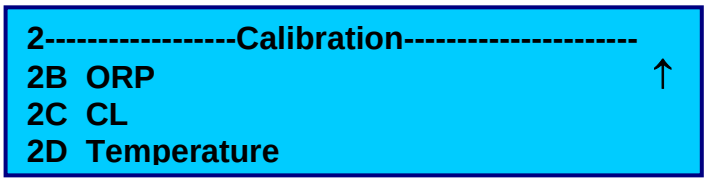




**The set language is indicated with an arrow, for example: > Italian.**

### 4.2 CALIBRATION MENU (menu navigation index = 2)

Please refer to the previous sections, in particular section **3.3 CALIBRATING THE OPERATING PARAMETERS.**



### 4.3 SETTINGS MENU (menu navigation index = 3)

Select the menu item to be set and press **ENTER** to confirm.



**Using the following structure, the settings menu is divided into levels in order to allow for the easy identification of the sub-menus**

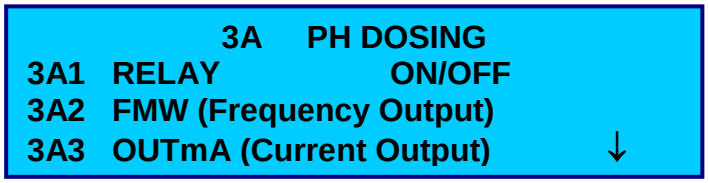
- **3** Settings
  - **3A** pH
    - **3A1** Relays
      - ON/OFF Settings
      - Timed Settings
      - Proportional Settings
    - **3A2** Frequency Output
    - **3A3** Current Output
    - **3A4** Alarms
  - **3B** Chlorine
    - **3B1** Relays
      - ON/OFF Settings
      - Timed Settings
      - Proportional Settings
    - **3B2** Frequency Output
    - **3B3** Current Output
    - **3B4** Alarms
    - **3B5** Reference temperature for chlorine measurement.
  - **3C** Redox
    - **3C1** Relays
      - ON/OFF Settings
      - Timed Settings
      - Proportional Settings
    - **3C2** Frequency Output
    - **3C3** Current Output
    - **3C4** Alarms
  - **3D** Temperature
    - **3D1** Relays
      - ON/OFF Settings
      - Timed Settings
      - Proportional Settings
    - **3D2** Frequency Output
    - **3D3** Current Output
    - **3D4** Alarms

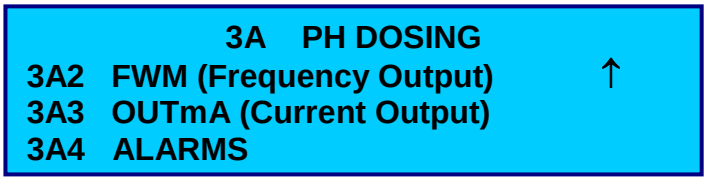
Detailed instructions for setting the parameters are provided below.

### 4.3.1 pH MEASUREMENT SETTINGS MENU (menu navigation index = 3A)

Use the **UP** and **DOWN** keys to scroll through the various menus and submenus and to modify the data (increase/decrease).

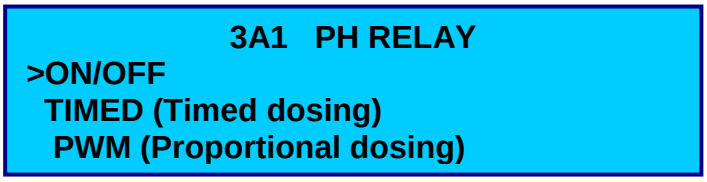
Use the **ENTER** key to access the data insertion submenus and to confirm any modifications.




The various items contained within the pH measurement sub-menus are described below:

- **Menu index "3A1" PH RELAY**



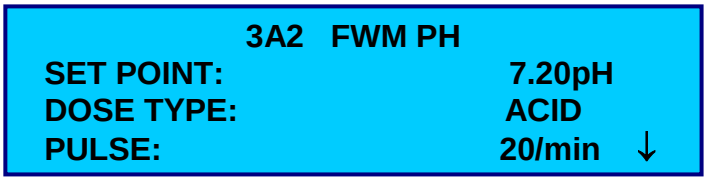

The pH relay's settings can be varied as follows:

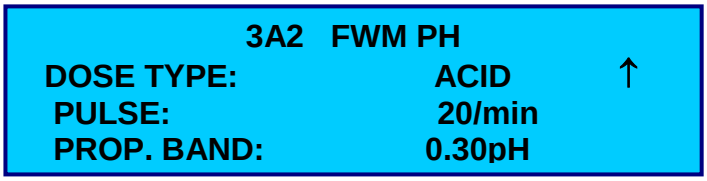
- **ON/OFF (SetPoint threshold dosing)**
- **TIMED (Timed dosing)**
- **PWM (Proportional dosing)**

The various items contained within the pH relay's sub-menus are described below, with their various modes, ranges and settings:

| Item | Default Value | Range | Note |
|---|---|---|---|
| ***On/Off*** | | | |
| SetPoint: | 7.20 pH | 0-14 pH | |
| Dose Type: | Acid | Acid / Alka | |
| Hysteresis: | Off | 0.10-3 pH | |
| Hysteresis Time: | Off | 1-900 Seconds | |
| Start Delay: | Off | 3-900 Seconds | |
| Stop Delay: | Off | 3-900 Seconds | |
| | | | |
| ***Timed*** | | | |
| SetPoint: | 7.20 pH | 0-14 pH | |
| Dose Type: | Acid | Acid / Alka | |
| Hysteresis: | Off | 0.10-3 pH | |
| Hysteresis Time: | Off | 1-900 Seconds | |
| Start Delay: | Off | 3-900 Seconds | |
| Stop Delay: | Off | 3-900 Seconds | |
| ***On Time:*** | ***1*** | ***1-1800 Sec*** | |
| ***Off Time:*** | ***1*** | ***1-1800 Sec*** | |
| | | | |
| ***PWM (Proportional)*** | | | |
| SetPoint: | 7.20 pH | 0-14 pH | |
| Dose Type: | Acid | Acid / Alka | |
| Hysteresis: | Off | 0.10-3 pH | |
| Hysteresis Time: | Off | 1-900 Seconds | |
| Start Delay: | Off | 3-900 Seconds | |
| Stop Delay: | Off | 3-900 Seconds | |
| ***Period:*** | ***20 seconds*** | ***20-1800*** | |
| ***Proportional Band:*** | ***0.3 pH*** | ***0.3-3pH*** | |

- **Menu index "3A2" Frequency output proportional to pH measurement (FWM PH)**

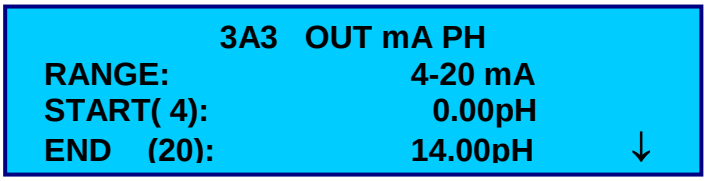


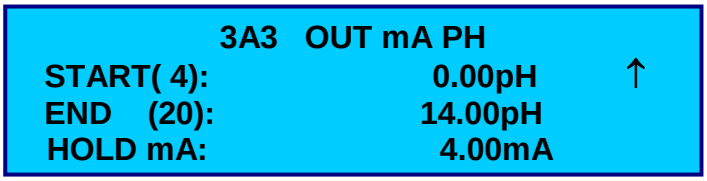




| Item | Default Value | Range |
|---|---|---|
| **Standard FWM:** | | |
| SetPoint: | 7.20 pH | 0-14 pH |
| Dose Type: | Acid | Acid / Alka |
| Pulse: | 20 pulses/minute | 20-150 pulses/minute |
| Proportional Band: | 0.3 pH | 0.3-3pH |

**The frequency output (Open collector circuit) can be used to control and guide the dosing of a remote system in proportion to the pH measurement.**

- **Menu index "3A3" Current output proportional to pH measurement (OUT mA PH)**

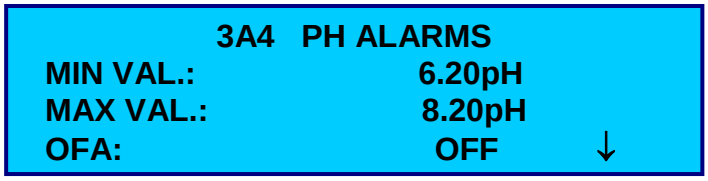


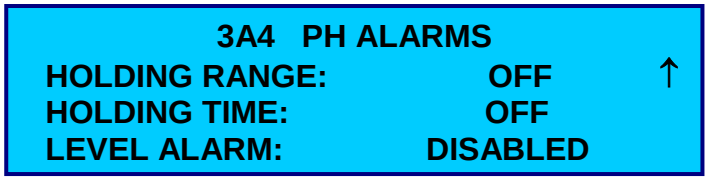




**Note:** The value set under the **HOLD mA** item is automatically generated by the instrument when a functional Hold is present, for example due to a lack of water Flow Alarm or an enabled Voltage Input.

| Item | Default Value | Range |
|---|---|---|
| **Standard Out mA:** | | |
| Range 0/4-20mA: | 4-20 mA | 0-20 mA or 4-20 mA |
| Start (4mA): | 0 pH | 0.00 - 14.00 pH |
| End (20mA): | 14 pH | 14.00 - 0.00 pH |
| Hold mA: | 4 mA | 0-20 mA |

- **Menu index "3A4" PH ALARMS**



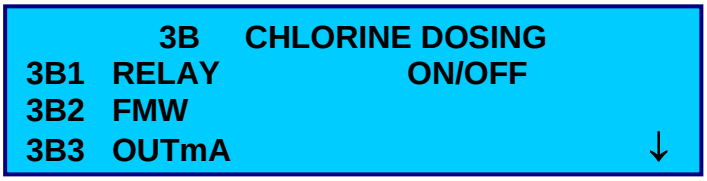



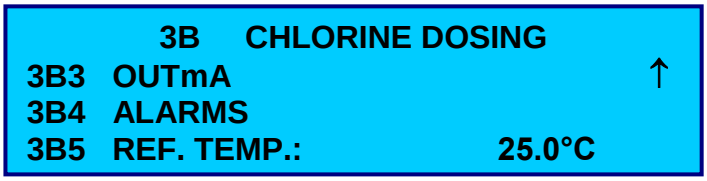

| Item | Default Value | Range |
|---|---|---|
| **pH Alarms List** | | |
| Alarm minimum: | 6.2 pH | 0-14 pH |
| Alarm Maximum: | 8.2 pH | 0-14 pH |
| OFA (Maximum dose timer) | Off | 10-3600 Seconds |
| Holding range: | Off | 0.2-3 pH |
| Holding time: | Off | 10-3600 Seconds |
| Level Alarm: System stop or alarm display | Disabled | Enabled/Disabled |

**Note:** The **Holding Range** and **Holding Time** items must be used together.
The indicated function controls the chemical measurement at a constant value for long periods of time. This alarm can help to prevent incorrect dosing as a result of damaged probes.

### 4.3.2 CHLORINE MEASUREMENT SETTINGS MENU (menu index 3B)

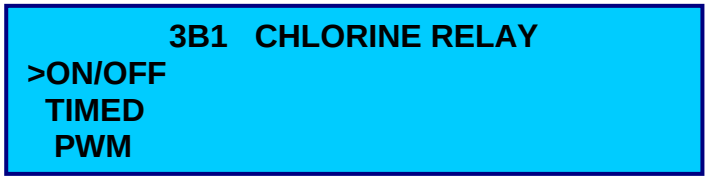
Use the **UP** and **DOWN** keys to scroll through the various menus and submenus and to modify the data (increase/decrease).
Use the **ENTER** key to access the data insertion submenus and to confirm any modifications.




The various items contained within the Chlorine measurement sub-menus are described below:

- **Menu index "3B1" CHLORINE RELAY**




The Chlorine relay's settings can be varied as follows:

- **ON/OFF (SetPoint threshold dosing)**
- **TIMED (Timed dosing)**
- **PWM (Proportional dosing)**

The various items contained within the Chlorine relay's sub-menus are described below, with their various modes, ranges and settings:

| Item | Default Value | Range |
|---|---|---|
| ***On/Off*:** | | |
| SetPoint: | 1.2 ppm | 0-10 ppm |
| Dose Type: | Low | High / Low |
| Hysteresis: | Off | 0.1-3 ppm |
| Hysteresis Time: | Off | 1-900 Seconds |
| Start Delay: | Off | 3-900 Seconds |
| Stop Delay: | Off | 3-900 Seconds |
| ***Timed*** | | |
| SetPoint: | 1.2 ppm | 0-10 ppm |
| Dose Type: | Low | High / Low |
| Hysteresis: | Off | 0.1-3 ppm |
| Hysteresis Time: | Off | 1-900 Seconds |
| Start Delay: | Off | 3-900 Seconds |
| Stop Delay: | Off | 3-900 Seconds |
| **On Time:** | **1** | **1-1800 Sec** |
| **Off Time:** | **1** | **1-1800 Sec** |
| ***PWM (Proportional)*** | | |
| SetPoint: | 1.2 ppm | 0-10 ppm |
| Dose Type: | Low | High / Low |
| Hysteresis: | Off | 0.1-3 ppm |
| Hysteresis Time: | Off | 1-900 Seconds |
| Start Delay: | Off | 3-900 Seconds |
| Stop Delay: | Off | 3-900 Seconds |
| **Period:** | **20 seconds** | **20-1800** |
| **Proportional Band:** | **0.6 ppm** | **0.3-3 ppm** |

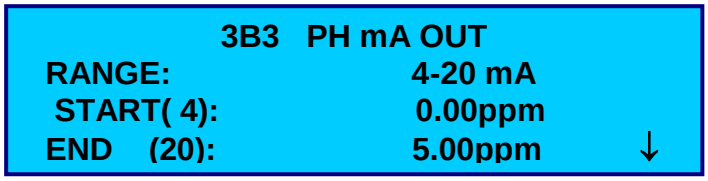
- **Menu index "3B2" CHLORINE FREQU OUT**

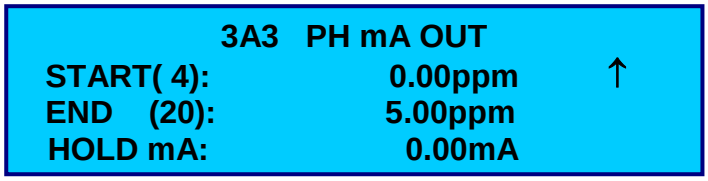


| Item | Default Value | Range |
|---|---|---|
| **FWM Standard:** | | |
| SetPoint: | 1.2 ppm | 0-10 ppm |
| Dose Type: | Low | High / Low |
| Pulses/minute: | 20 pulses/minute | 20-150 pulses/minute |
| Proportional Band: | 0.6 ppm | 0.3-3 ppm |

**The frequency output (Open collector circuit) can be used to control and guide the dosing of a remote system in proportion to the Chlorine measurement.**

- **Menu index "3B3" CHLORINE mA OUT**

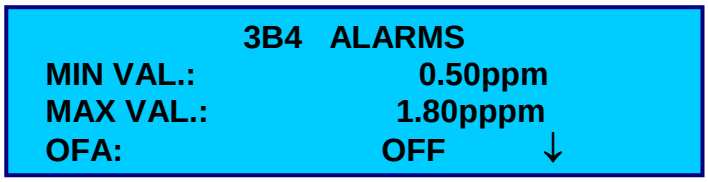


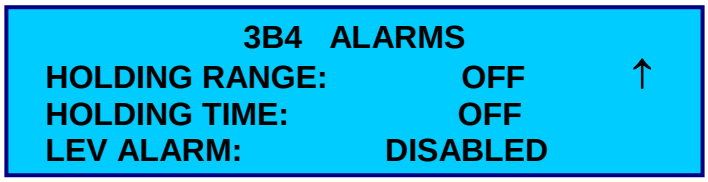




**Note:** The value set under the **HOLD mA** item is automatically generated by the instrument when a functional Hold is present, for example due to a lack of water Flow Alarm or an enabled Voltage Input.

| Item | Default Value | Range |
|---|---|---|
| **Standard Out mA:** | | |
| Range 0/4-20mA: | 4-20 mA | 0-20 mA or 4-20 mA |
| Start (4): 0 pH | 0 ppm | 0-10ppm |
| End (20): 14 pH | 10 ppm | 0-10ppm |
| Hold Function mA Value: 0/4 or 20 mA | 0 mA | 0-20 mA |

- **Menu index "3B4" CHLORINE ALARM**




| Item | Default Value | Range |
|---|---|---|
| **pH Alarms List** | | |
| Alarm minimum: | 0.5 ppm | 0-10ppm |
| Alarm Maximum: | 1.8 ppm | 0-10ppm |
| OFA (Maximum dose timer): | Off | 10-3600 Seconds |
| Holding range: | Off | 0.2-3 ppm |
| Holding time: | Off | 10-3600 Seconds |
| Level Alarm: System stop or alarm display | Disabled | Enabled/Disabled |

**Note:** The **Holding Range** and **Holding Time** items must be used together.
The indicated function controls the chemical measurement at a constant value for long periods of time.
This alarm can help to prevent incorrect dosing as a result of damaged probes.

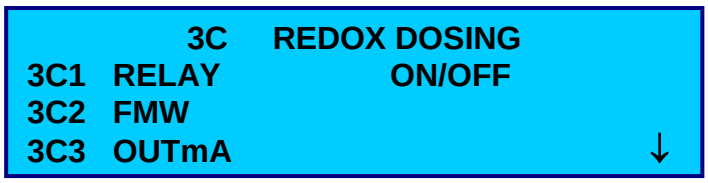
- **Menu index "3B5" Reference temperature for CHLORINE measurement**

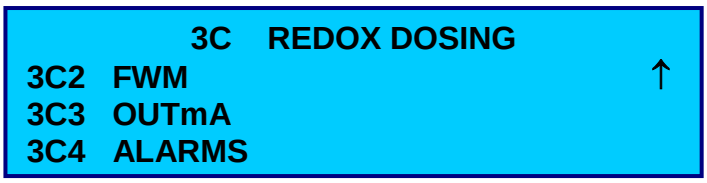
Select 18, 20 or 25°C as the reference temperature for the chlorine measurement.

### 4.3.3 REDOX MEASUREMENT SETTINGS MENU (menu index 3C)

*"This menu is available on the pH–Chlorine and pH–Chlorine–Redox System version"*

Use the **UP** and **DOWN** keys to scroll through the various menus and submenus and to modify the data (increase/decrease).
Use the **ENTER** key to access the data insertion submenus and to confirm any modifications.




The various items contained within the Redox measurement sub-menus are described below:

- **Menu index "3C1" REDOX RELAY**


The Redox relay's settings can be varied as follows:

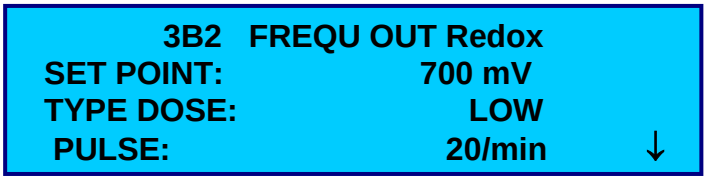
- **ON/OFF (SetPoint threshold dosing)**
- **TIMED (Timed dosing)**
- **PWM (Proportional dosing)**

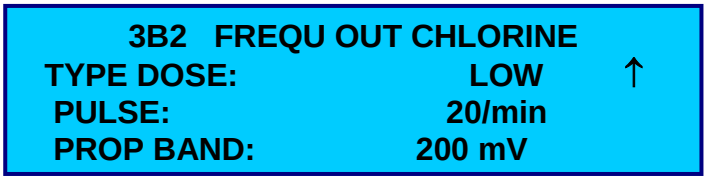
The various items contained within the pH relay's sub-menus are described below, with their various modes, ranges and settings:

| Item | Default Value | Range |
|---|---|---|
| ***On/Off*:** | | |
| SetPoint: | 700 mV | ±1500 mV |
| Dose Type: | Low | High / Low |
| Hysteresis: | Off | 10-600 mV |
| Hysteresis Time: | Off | 1-900 Seconds |
| Start Delay: | Off | 3-900 Seconds |
| End Delay: | Off | 3-900 Seconds |
| ***Timed*** | | |
| SetPoint: | 700 mV | ±1500 mV |
| Dose Type: | Low | High / Low |
| Hysteresis: | Off | 10-600 mV |
| Hysteresis Time: | Off | 1-900 Seconds |
| Start Delay: | Off | 3-900 Seconds |
| End Delay: | Off | 3-900 Seconds |
| **On Time:** | **1** | **1-1800 Sec** |
| **Off Time:** | **1** | **1-1800 Sec** |
| ***Proportional (PWM)*** | | |
| SetPoint: | 700 mV | ±1500 mV |
| Dose Type: | Low | High / Low |
| Hysteresis: | Off | 10-600 mV |
| Hysteresis Time: | Off | 1-900 Seconds |
| Start Delay: | Off | 3-900 Seconds |
| End Delay: | Off | 3-900 Seconds |
| **Period:** | **20 seconds** | **20-1800** |
| **Proportional Band:** | **300 mV** | **20-600 mV** |

- **Menu index 3C2 Redox (ORP) FREQU OUT**

*"This menu is available on the pH–Redox System version"*



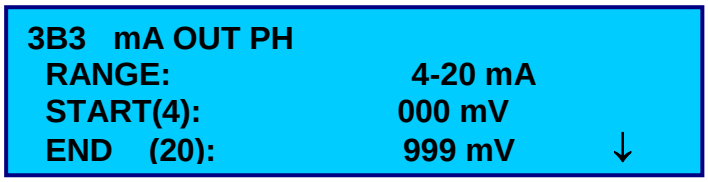



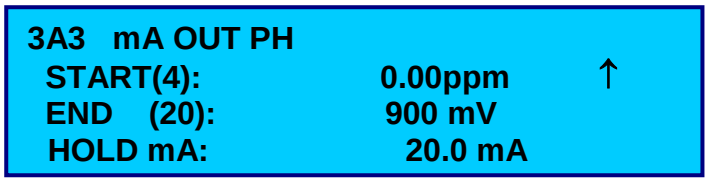

| Item | Default Value | Range |
|---|---|---|
| **FWM Standard:** | | |
| SetPoint: | 700 mV | To be verified |
| Dose Type: | Low | High / Low |
| Pulses/minute: | 20 pulses/minute | 20-150 pulses/minute |
| Proportional Band: | 200 mV | To be verified |

**The frequency output (Open collector circuit) can be used to control and guide the dosing of a remote system in proportion to the Redox measurement.**

- **Menu index 3B3 Redox OUT Current Output**

*"This menu is available on the pH–Redox System version"*

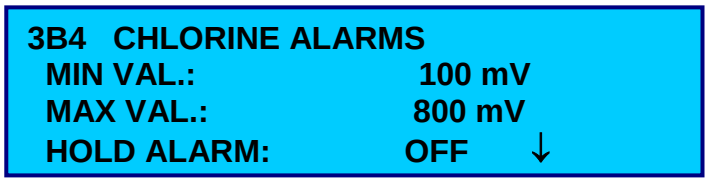



| Item | Default Value | Range |
|---|---|---|
| **Standard Out mA:** | | |
| Range 0/4-20mA: | 4-20 mA | 0-20 mA or 4-20 mA |
| Start (4): 0 pH | 0 mV | Review |
| End (20): 14 pH | 999 mV | Review |
| Hold Function mA Value: 0/4 or 20 mA | 0 mA | 0-20 mA |

**Note:** The value set under the **HOLD mA** item is automatically generated by the instrument when a functional Hold is present, for example due to a lack of water Flow Alarm or an enabled Voltage Input.

- **Menu index 3B4 Redox ALARMS** (level probe alarm only available on pH and Redox systems)



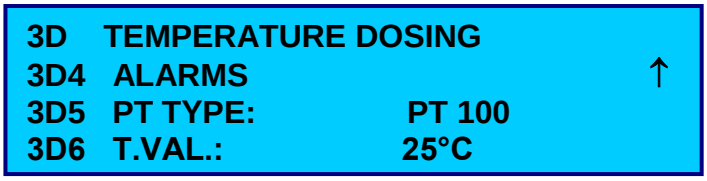


| Item | Default Value | Range |
|---|---|---|
| **pH Alarms List** | | |
| **Alarm minimum:** | **100 mV** | **Review** |
| **Alarm Maximum:** | **800 mV** | **Review** |
| **OFA (Maximum dose timer):** | **Off** | **10-3600 Seconds** |
| **Holding range:** | **Off** | **0.2-3 ppm** |
| **Holding time:** | **Off** | **10-3600 Seconds** |
| **Level Alarm: System stop or alarm display** | **Disabled** | **Enabled/Disabled** (Available with the pH-Redox System version) |

**Note:** The **Holding Range** and **Holding Time** items must be used together.
The indicated function controls the chemical measurement at a constant value for long periods of time.
This alarm can help to prevent incorrect dosing as a result of damaged probes.

### 4.3.4 TEMPERATURE MEASUREMENT SETTINGS MENU (menu index 3D)

Use the **UP** and **DOWN** keys to scroll through the various menus and submenus and to modify the data (increase/decrease).
Use the **ENTER** key to access the data insertion submenus and to confirm any modifications.


**Note:** items **3D2** and **3D3** are not available.

The various items contained within the Redox measurement sub-menus are described below:

- **Menu index "3C1" TEMPERATURE RELAY**


The Redox relay's settings can be varied as follows:

- **ON/OFF (SetPoint threshold dosing)**
- **TIMED (Timed dosing)**
- **PWM (Proportional dosing)**

The various items contained within the pH relay's sub-menus are described below, with their various modes, ranges and settings:

| Item | Default Value | Range |
|---|---|---|
| ***On/Off*:** | | |
| SetPoint: | 25 °C | 0-100 °C |
| Dose Type: | High | High / Low |
| Hysteresis: | Off | 1-20°C |
| Hysteresis Time: | Off | 1-900 Seconds |
| Start Delay: | Off | 3-900 Seconds |
| End Delay: | Off | 3-900 Seconds |
| ***Timed*** | | |
| SetPoint: | 25 °C | 0-100 °C |
| Dose Type: | High | High / Low |
| Hysteresis: | Off | 1-20°C |
| Hysteresis Time: | Off | 1-900 Seconds |
| Start Delay: | Off | 3-900 Seconds |
| End Delay: | Off | 3-900 Seconds |
| **On Time:** | **1** | **1-1800 Sec** |
| **Off Time:** | **1** | **1-1800 Sec** |
| ***Proportional (PWM)*** | | |
| SetPoint: | 25 °C | 0-100 °C |
| Dose Type: | High | High / Low |
| Hysteresis: | Off | 1-20°C |
| Hysteresis Time: | Off | 1-900 Seconds |
| Start Delay: | Off | 3-900 Seconds |
| End Delay: | Off | 3-900 Seconds |
| **Period:** | **20 seconds** | **20-1800** |
| **Proportional Band:** | **6 °C** | **3-30°C** |

- **Menu index “3D4” TEMPERATURE ALARMS**

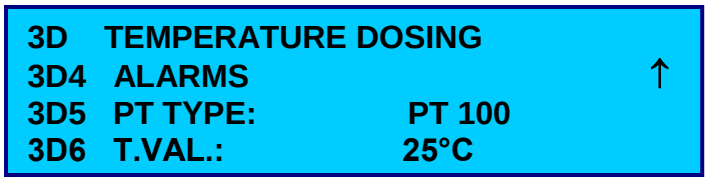


| Item | Default Value | Range |
|---|---|---|
| **Temperature Alarms List** | | |
| **Alarm minimum:** | **15°C** | **0-100°C** |
| **Alarm Maximum:** | **50°C** | **0-100°C** |
| **OFA (Maximum Activation Time):** | **Off** | **10-3600 Seconds** |
| **Holding range:** | **Off** | **5-25 °C** |
| **Holding time:** | **Off** | **10-3600 Seconds** |

**Note:** The **Holding Range** and **Holding Time** items must be used together.
The indicated function controls the chemical measurement at a constant value for long periods of time.
This alarm can help to prevent incorrect dosing as a result of damaged probes.

Menu index “3D5” Settings
Temperature probe
Use the keyboard to select
the PT100 or PT1000 probe

Menu index “3D6” Settings
Manual temperature value
This menu is available in the absence
of a temperature probe



### 4.4 STATISTICS MENU (4)



| Item | Default Value | Range |
|---|---|---|
| **Statistics** | | |
| Status: | Stop | Stop - Run |
| Mode: | Circ | Circular – List |
| Interval: | 1 | 1-24 |
| View Statistic: | System Stat. | Displays the status of the inputs<br>HOLD<br>REED<br>Level Probe 1<br>Level Probe 2 |
| | Measurement Stat. | Displays the status of the chemical measurements |
| | Stat. Details | Displays the details of the recorded measurements |
| Reset Stat.: | | Resets all of the parameters |

### 4.5 ADVANCED MENU (5)



| Item | Default | Range | Note |
|---|---|---|---|
| 5A Password | 0000 | 0000-9999 | |
| 5B Control panel | | | |
| 5B1 Date/time | 00:00:00 | 00:00-23:59 | |
| 5B2 Calibration key | Enabled | Enabled/Disabled | |
| 5B3 Mode key | Enabled | Enabled/Disabled | |
| 5B4 Output simulation | Relay Sim.<br>Current output Sim.<br>Frequency Sim. | | |
| 5B5 Input display | Measurement inputs<br>Control inputs | | |
| 5B6 | Reset | | |
| 5B7 | Display | Adjustment | |
| 5B8 | Relay logic | Change activation logic | |
| 5C Network (Serial Port) | Transmission speed | 19200 | 2400-115000 Baud |
| | Address | 1 | 1-99 |
| | RS485 | Enabled/Disabled | |
| 5D Text | Free area for writing messages | | |
| 5E REED Management | 5E1 REED delay: 2 sec.<br>5E2 REED logic: NC | Time: 2-40 Sec.<br>Status: NC/NO | Flow alarm activation delay time setting. |
| 5F Dose Management | 5F1 START delay: OFF<br>5F2 Calib. delay: OFF | Time: OFF/1-60 min<br>Time: OFF/1-60 min | Dosing system activation delay time setting. |

### 4.6 ModBus RTU protocol

The list of commands for data transmission using the RS485 RTU Serial Port is found below

ModBus profile table Address

| **Description** | **Property** | **Range** | **Operating state** |
|---|---|---|---|
| 1000 | pH Measure | Read 0 to 1400 | Full Operating |
| 1001 | Cl Measure | Read 0 to 500 | Full Operating |
| 1002 | Orp Measure | Read -1500 to +1500 | Full Operating |
| 1003 | Temperature Measure | Read 0 to 1000 | Full Operating |
| 1004 | Frequency Measure | Read 5 to 15000 | Readable but not active |
| 1005 | Conductivity Measure | Read 0 to 10000 | Readable but not active |
| 1006 | Pot1 Measure | Read 0 to 20000 | Readable but not active |
| 1007 | Pot2 Measure | Read 0 to 20000 | Readable but not active |
| 1008 | Status | Read See Note 1 | Full Operating |
| 1100 | SetPoint pH | Read/Write 0 to 1400 | Full Operating |
| 1101 | SetPoint Cl | Read/Write 0 to 500 | Full Operating |
| 1102 | SetPoint Orp | Read/Write -1500 to +1500 | Full Operating |
| 1103 | SetPoint Temperature | Read/Write 0 to 1000 | Full Operating |

dlf

*Note1: STATUS (bit field 16 bit register)*

| | |
|---|---|
| 1 | LEVEL_0_ALARM |
| 2 | LEVEL_1_ALARM |
| 3 | HOLD_ALARM |
| 4 | REED_ALARM |
| 5 | Reserved |
| 6 | Reserved |
| 7 | Reserved |
| 8 | Reserved |
| 9 | Reserved |
| 10 | Reserved |
| 11 | Reserved |
| 12 | Reserved |
| 13 | STAT (Wieving statistics Mode) |
| 14 | Reserved |
| 15 | OFA (Over Feed Alarm) |
| 16 | PERMANENCY (Permanency Alarm) |

## 5 TROUBLESHOOTING GUIDE

- **The device does not turn on…**
  - Check that the power cables are properly connected

    - Verify that the mains electrical power is functioning
- **The display does not light up…**
    - Adjust the display's brightness and contrast
- **Chemical measurement is not working…**
    - Check the connection of the probe
    - Check the connection of the probe support
    - Perform the calibration procedure as described in the manual
    - Replace the probe
- **The mA output does not change…**
    - Check the connections of the cables
    - Use the "Manual Control" Main Menu to check whether the output produces the desired effect.
    - Check the electrical characteristics of the remote device (Maximum load 500 ohms)
- **The relays do not work…**
    - Check that the instrument is properly powered
    - Check the settings in the main menu
- **The voltage at the DC input does not block the instrument…**
    - Check the electrical connections
    - Check whether the remote generator is functioning properly.

**Note:** If any malfunction should persist, please contact your supplier.