



EVOLUTION EW

Single Parameter Control Units
with mV/mA or Conductivity Input
Wall-Mounting Version

TECHNICAL MANUAL FOR INSTALLATION AND USE

Man. 071EW1 v.04

WARNINGS



This manual is dedicated to the technical personnel responsible of the installation, management, and maintenance of the plants. The manufacturer assumes no responsibility for damages or malfunctions occurring after intervention by non-authorized personnel, or not compliant with the instructions prescribed in this manual.

PRIOR TO PERFORM ANY OPERATION IT IS MANDATORY TO READ THE WHOLE MANUAL!

The manufacturer declares that the information contained in this manual is consistent with technical and safety specifications of the device to which the manual refers.

The manual must be kept by the user and/or personnel responsible for the management and maintenance of the device. In the event of deterioration or loss, a copy may be requested from the manufacturer.



Based on its design and construction, this instrument complies with the essential safety requirements and the following EC directives: 2014/35/UE; 2014/30/UE; CEE 93/68.
The relevant harmonized standards on Safety, Immunity and emission have also been applied.

HEALTH AND SAFETY

The manufacturer cannot be held responsible for accidents or damage resulting from inappropriate use of the device, as well as from even partial failure to comply with the safety regulations and intervention procedures described in this manual.

During the configuration and subsequent use of the device, incorrect operating situations may occur that are not foreseen in this manual. These anomalies can sometimes be caused by environmental factors or by fortuitous failures that cannot be foreseen by the manufacturer.



All maintenance or repair must be performed with the system isolated both electrically and hydraulically.

WASTE DISPOSAL



Disposal of the electronic device and consumables must be carried out in compliance with current local regulations.

The manufacturer can modify the instrument or the technical manual without advanced notice.

Warranty

All STEIEL products are warranted for a period of 12 months from the delivery date.

Warranty is not valid if all instructions of installation, maintenance, and use, are not strictly followed by the user. Local regulations and applicable standards have also to be followed.

The warranty does not extend to any damage caused by incompetence or negligence in the use of the device or by poor or omitted maintenance.

Any repair or modification made to the device by the user or unauthorized technicians will result in the forfeiture of the warranty. Failure to comply with the methods of intervention and use of the device described in this manual will result in the forfeiture of the warranty.

TABLE OF CONTENTS

	INTRODUCTION	Page 4
	PACKING LIST	5
	PRODUCT LABEL	5
	DESCRIPTION OF THE INSTRUMENT	6
	TECHNICAL DATA	7
	INSTALLATION	8
	WIRING INSTRUCTIONS	9
	POWER-ON	11
	DESCRIPTION OF THE DISPLAY INTERFACE	13
	CONFIGURATION	14
	TABLES OF PARAMETERS	25
	CALIBRATION	33
APPENDIX	PASSWORD PROTECTION LEVELS	41



INTRODUCTION



- Input for Pt100 or Pt1000 sensor, with **automatic detection** of sensor type, for temperature measurement and compensation
- **User-friendly interface** with intuitive menus and four multi-function softkeys
- Three-level configuration protected by **three different passwords**
- Large graphic display with **backlight colour changing** according to instrument status
- **Four adjustment outputs** (2x On-Off / PWM and 2x PFM)
- One **analog output** (0/4-20 mA), configurable for adjustment or signal repetition
- Two **level inputs**; the first one can be configured at one or two stages
- Input to **monitor sample water flow**
- **Pause** (external consent) **digital input** to disable all outputs
- Frequency digital **input** for the connection of a **volumetric Water meter**
- Eco/Boost Mode input
- **Alarm** relay
- **Internal RTC** for time schedule setting and data saving with date/time label
- Easily accessible **USB port**, protected by a watertight cover; can be used for the parameters' configuration, data downloading and system updating
- Connectivity: **RS485** serial port with **Modbus RTU communication protocol** (standard) or **TCP/IP**; alternatively, **integrated SteieLynx gateway** (upon request)
- Power supply: **100-240 V~** (standard), **24 V-/~ / 12 V-** (upon request)
- Watertight IP65 casing, suitable for installation in damp technical rooms.
- Extremely fast and easy installation, with attachment to a wall bracket.
- **Can be combined with the exclusive and patented STEIEL easy+fix system**, for a compact assembly of the sensor-holder, directly attached to the instrument case.

AVAILABLE MODELS

- **EW mV/mA** with measurement input **configurable via software** for pH electrode / ORP electrode / CLE or CAC amperometric sensor / active or passive mA signal.
- **EW CO** with measurement input for two-electrode **conductivity probe** (CCK series), with cell constant and measurement range configurable via software.

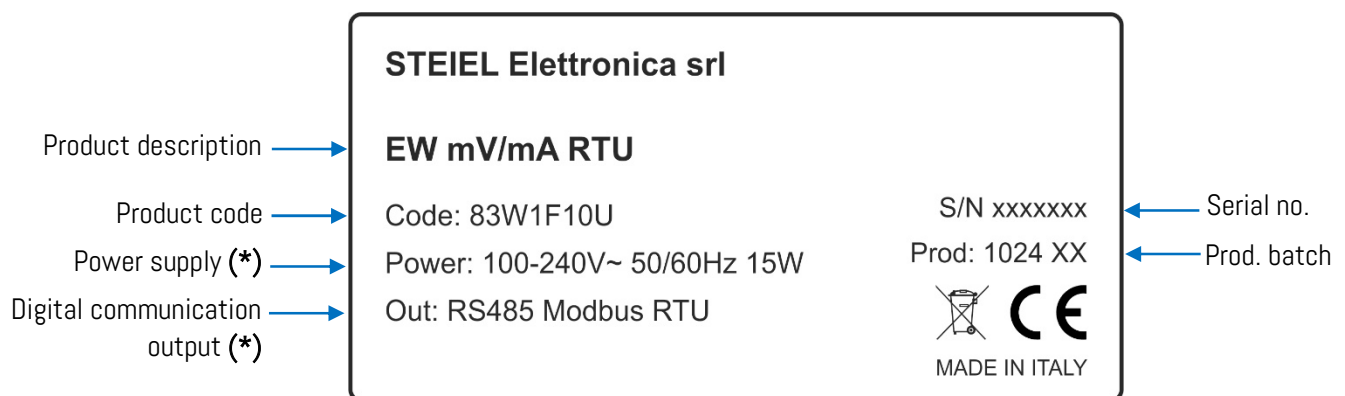


PACKING LIST

The instrument is supplied complete with:

- Wall-mounting bracket with screws and dowels
- Instruction manual

PRODUCT LABEL (example)



- (*) Power supply options: 100-240V~ or 12/24V
Communication options: RS485 Modbus RTU (standard) / SteieLynx WiFi/LAN / SteieLynx 3G/4G.



Do not remove the instrument label! It is in fact necessary to communicate the product code and/or serial number for correct identification of the spare parts.

Removing or tampering with the label completely invalidates the warranty!



DESCRIPTION OF THE INSTRUMENT





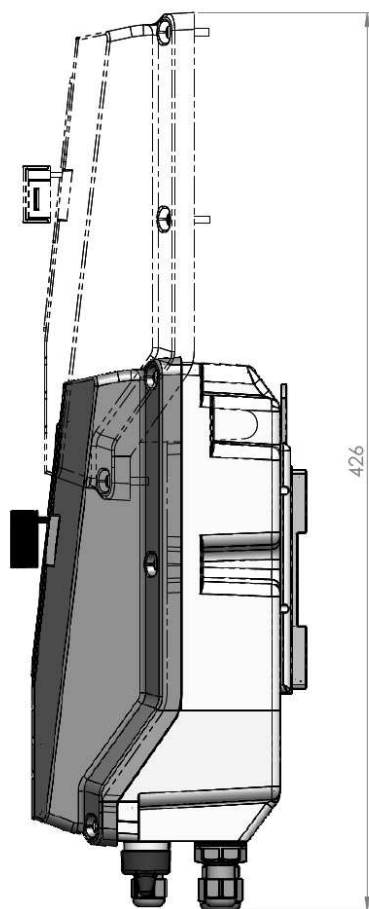
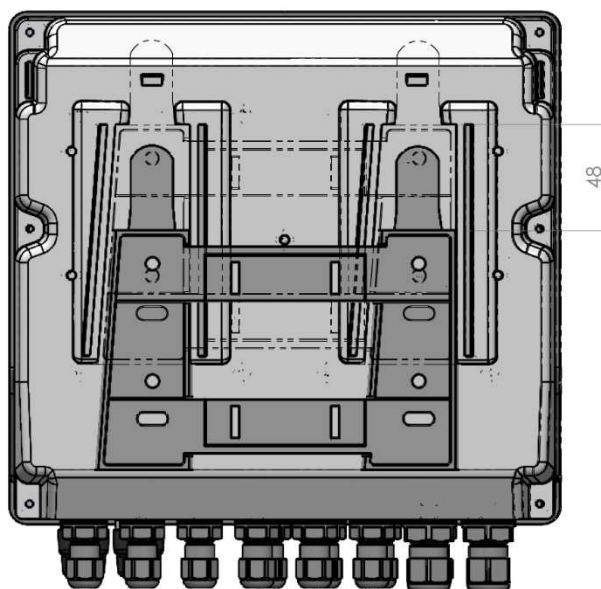
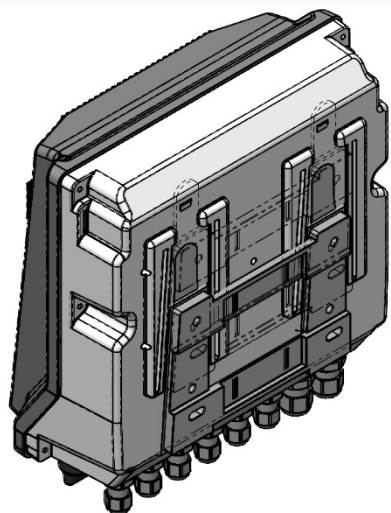
TECHNICAL DATA

Power supply	standard: 100-240 V~ / 50/60 Hz / 15 W standard cable with Schuko plug (other options on request)	
	optional, available on request: 12 V- / 24 V~- version	
Protection fuse	T 10A	
Measurement input	mV/mA	Input for pH electrode, ORP electrode, amperometric sensor, or active / passive mA signal, configurable via software; precision 0.3% FS / repeatability 0.2% FS
	CO	Input for two-electrode conductivity probe; measurement range and cell constant user-selectable via software, auto-ranging option; precision 0.3% FS / repeatability 0.2% FS
Temperature input	Input for PT100 / PT1000 sensor, with automatic detection; precision < 0.3% FS / repeatability 0.2% FS	
Adjustment outputs	2x contact, 12V 2A a 250V~, for On-Off / PWM adjustment	
	2x pulse type, max 3 Hz, for PFM control	
Alarm relay	1x normally energized / de-energized contact, 12V 10A @ 250V~	
Analog output	1x 0/4-20 mA, configurable for repetition or adjustment, max 500 Ohm	
Digital inputs	2x NO/NC contact inputs for level sensors; the first one configurable at 1 or 2 stages	
	1x EXT.CONST, NO/NC contact, for external consent / pause	
	1x sample water flow, NO/NC contact	
	1x Eco/Boost Mode, NO/NC contact	
	1x frequency input (max 200 Hz, duty cycle 50%), for pulse-emitting Water Meter	
Timer	Inbuilt RTC, with CR2032 buffer battery	
Communication	1x USB port for configuration uploading / saving, datalogger downloading and FW updating. Note: the USB key must be formatted with FAT filesystem.	
	1x RS485 serial port with Modbus RTU protocol (standard) or TCP/IP; alternatively, integrated SteieLynx gateway	
Datalogger	Storage capacity: max 8000 data (measurements, events, alarms), complete with date / time label	
Protection rate	IP65	
Dimensions	250 x 231 x 101 mm (cable-glands not included)	
Weight	Approx. 1 kg	



INSTALLATION

The instrument has been designed for an extremely quick wall vertical installation, thanks to the supplied bracket. You just need to drill four holes for the bracket fixing screws, then attach the instrument.



Please refer to the indicated overall dimensions, to allow the opening of the case to easily perform wiring or other operations, as the addition of a SteieLynx module for the remote control of the system.

The instrument's casing can be opened by unscrewing the closing screws and the front part is firmly hanged to the back casing.

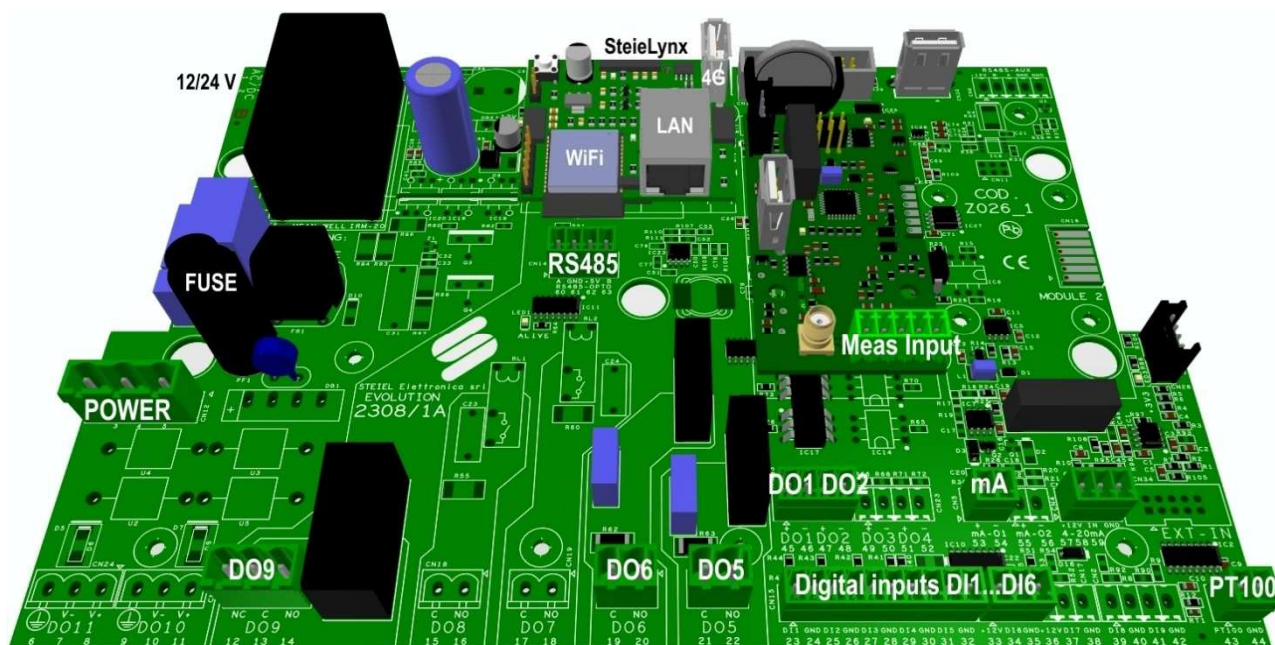




WIRING INSTRUCTIONS



The electronic board is suitably protected according to high safety standards; anyway, it is recommended to unplug the instrument before any intervention on the terminal blocks!



Block	Pin - nr.	Pin - name	Function
POWER	3	PE (earth)	Power supply, 100-240 V~
	4	L (phase)	
	5	N (neutral)	
D09	12	NC (normally closed)	Contact type output, alarm relay
	13	C (common)	
	14	NO (normally open)	
D06	19	C (common)	OUT1 output, configurable for On-Off / PWM adjustment or working range mode
	20	NO (normally open)	
D05	21	C (common)	OUT2 output, configurable for On-Off / PWM adjustment or working range mode
	22	NO (normally open)	
DI1	23	Digital input 1	Level input 1
	24	GND	
DI2	25	Digital input 2	Level input 2
	26	GND	
DI3	27	Digital input 3	Ext.Cons. digital input, configurable as NO/NC
	28	GND	
DI4	29	Digital input 4	Eco/Boost Mode digital input, configurable as NO/NC
	30	GND	

Notes:

- For pin **numbering**, refer to the silkscreen on the electronic board.
- **12/24V** terminal block: provided only for low-voltage version, available upon request.
- **SteieLynx**: integrated gateway board (optional).



Block	Pin - nr.	Pin - name	Function	
DI5	31	+ (positive)	Digital input for volumetric Water Meter	
	32	- (negative)		
DI6 (*)	33	+12V	Brown wire	Sample Water digital input (NPN sensor), to monitor sample water flow.
	34	Digital input 6	Black wire	
	35	GND	Blue wire	
PT100	43	PT100 (probe signal)	Input for Pt100 / Pt1000 sensor. <i>Note: In case of 3-wire sensor, connect the two wires of the same colour to pin 43.</i>	
	44	GND		
DO1	45	+ (positive)	OUT3 pulse output, for PFM adjustment	
	46	- (negative)		
DO2	47	+ (positive)	OUT4 pulse output, for PFM adjustment	
	48	- (negative)		
mA	53	mA +	0/4-20 mA Output	
	54	mA -		
RS485 (**)	60	A	Green wire	Serial port with Modbus RTU protocol (alternatively, integrated SteieLynx board can be mounted, including Wi-Fi module, LAN port and USB plug for 4G modem).
	61	GND	/	
	62	+5V	/	
	63	B	Yellow wire	

(*) In case of contact type flow sensor (2 wires), connect it to pins 34 and 35.

(**) The wire colours refer to STEIEL serial cables.

MEASUREMENT INPUT

Measurement input	Sensor / signal	5-pin terminal block, from left to right:				
		Pin 5	4	3	2	1
mV/mA Version	pH / ORP Electrode	Cable core	/	Cable shield	/	/
	CAC mV probes	Brown wire	White wire	/	Yellow wire	Green wire
	CAC mA probes	/	/	mA-	/	mA+
	CLE cells (Cu/Pt)	/	/	Brown wire	Blue wire	/
	Passive mA signal	/	/	mA+	mA-	/
	Active mA signal	/	/	IN (signal)	/	+V
Cond. Version	CCK Probe	Cell (*)	Cell (*)	Cable shield	NTC / Pt100 (**)	NTC / Pt100 (**)

(*) Electrodes of the CCK cell → brown and blue (or green) wires of the connection cable.

(**) Temperature sensor integrated in the CCK cell → yellow and black (or white) wires of the probe cable.



POWER-ON

At **first power-on**, the instrument asks to select the display interface language and to set the internal clock to the current date and time, also selecting the preferred visualization format for the date.

- **Language** → Italiano / English / Français / Español
- **Date / time** → Format → dd-mm-yyyy / mm-dd-yyyy / yyyy-mm-dd

Once completed these operations, you need to **set the measurement input** accordingly with the used sensor.

- **Version mV / mA:**
 - pH: range 0 ... 14.00 pH
 - ORP: range -2000 ... +2000 mV
 - CLE: range 0 ... 5 ppm Cl / Br / ClO₂
 - CAC mV: chose the specific model from the provided list (*)
 - CAC mA: chose the specific model from the provided list (*)
 - mA (**):
 - 0-20 mA (with measure unit selectable from a list)
 - 4-20 mA (with measure unit selectable from a list)
 - Custom (enter start and full-scale values, with measure unit selectable from a list)

(*) List of CAC probes:

PROBE MODEL		MEASURE RANGE	MEASURED PARAMETER	
		ppm	Description	Visualization
CAC-CLI	XB	0.01 ... 0.5	Active free chlorine	Cl
	B	0.02 ... 2.0		
	SW	0.1 ... 10.0		
CAC-CLO	B	0.02 ... 2.0	Available free chlorine	Cl
	M1	0.1 ... 10.0		
CAC-CTO	M1	0.05 ... 5.0	Total chlorine	ClT
	M2	0.1 ... 10.0		
CAC-CDX	B	0.02 ... 2.0	Chlorine dioxide	ClO ₂
CAC-BRO	M	0.1 ... 10.0	Total bromine	Br
CAC-HYP	XB	0.5 ... 50	Hydrogen peroxide	H ₂ O ₂
	B	2 ... 200		
	M	20 ... 2000		
CAC-PAA	B	1...200	Peracetic acid	PAA
	M	10...2000		
CAC-OX3	B	0.02 ... 2.0	Ozone	O ₃
CAC-CLT	XB	0.01 ... 0.5	Chlorites	CLT
	B	0.02 ... 2.0		
CAC-HT	B	0.02 ... 2.0	Chlorine and chlorine dioxide in hot water	Cl or ClO ₂

- (**) Measure unit for 0/4-20 mA input:
pH, mV, °C, ppm, µS/cm, mS/cm, %, mA, mbar, bar, FTU, NTU, l/h, m³/h, cm, m, l, g, kg



- **Version Cond.:**
- Measure unit: $\mu\text{S/cm}$, mS/cm , ppm (TDS), $\Omega\text{ cm}$, $\text{M}\Omega\text{ cm}$
 - Cell constant K: 0.1, 1, 5, 10 cm
 - Resolution: 0, 1, 2 decimals
 - Auto-range: yes / no (function which automatically adjusts the measure range to display the measurement with the maximum available resolution)

Measured parameter	Measure unit	Range
Electrical conductivity	$\mu\text{S/cm}$	0.00 ... 20,000.00
	mS/cm	0.00 ... 20.00
TDS	ppm	0.00 ... 10,000.00
Resistivity	$\Omega\text{ cm}$	0.00 ... 1,000,000.00
	$\text{M}\Omega\text{ cm}$	0.00 ... 100.00

Upon next power-ups, the display first shows the company name (STEIEL) and then a screen indicating the instrument model/version and the hardware (HW) / firmware (FW) revisions of the electronic boards, before switching to the stand-by screen.



EVOLUTION		
EW mV/mA		
	Main B.	Meas. B.
Rev. HW	0.0.1	0.0.1
Rev. FW	99.9.9	0.0.1

Main board

Input board

Note: For quick restoration of the unit's configuration, it is recommended to save it on a USB flash drive before performing a reset of the instrument.



DESCRIPTION OF THE DISPLAY INTERFACE

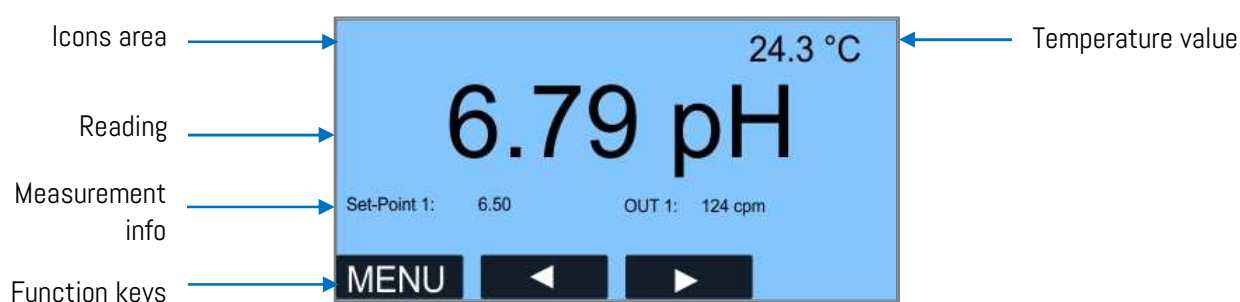
The EVOLUTION EW unit features a graphic display with RGB backlight, changing colour according to the instrument status.

Moreover, up to 4 virtual keys are provide, changing function depending on the menu / mode and defining the action of the corresponding buttons on the front command panel of the instrument.

At the top left, graphic icons or short texts are displayed for a quick indication of the instrument status or the active functions.

At the top right, the temperature measurement detected by the connected Pt100 (or Pt1000) sensor is shown or the reference value set via software (with the indication "man"), in case of missing or not functioning sensor.

Stand-by screen (example)



Graphic icons (or texts) at the top left of the display and related RGB backlight

No text or icon	→ Normal operation	→ blue backlight
ECO MODE	→ Indicates active EcoMode input	→ blue backlight
	→ Indicates active Timer function	→ blue backlight during TIMER ON → orange backlight during TIMER OFF
OFF	→ Indicates instrument in manual STOP due to START/STOP button pressed	→ orange backlight
EXT. CONS.	→ Indicates instrument in pause status due to the activation of Ext. Cons. contact	→ orange backlight
	→ Active alarm (with related msg.) → Alarm automatically reset	→ red backlight → blue backlight



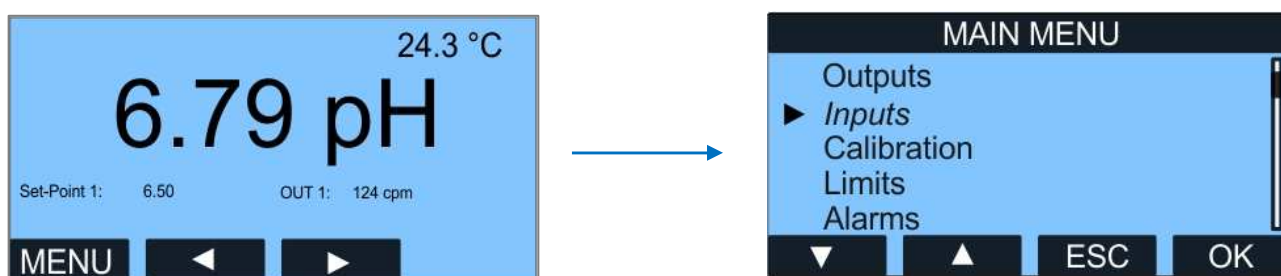
CONFIGURATION

To access the instrument configuration menus, from the stand-by screen, press the keys corresponding to the virtual MENU button.

If a protection password has been set, the instrument will ask for inserting it to access the configuration mode and will enable only the levels unlocked by the entered password (see the Appendix section for more details).

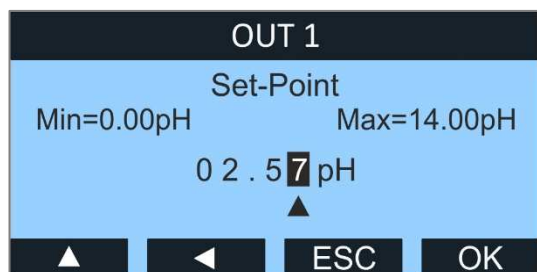
Now, select the desired option scrolling the available ones with the arrow keys ▲▼, confirm with OK and proceed through the various submenus to configure the instrument.

If no key is pressed for 2 minutes, the system automatically returns to the starting screen (stand-by); the instrument will remain in OFF status (outputs disabled and display with orange backlight) and it will have to be reactivated by the operator pressing the START/STOP button.



Command sequence to enter / edit values

Example:



Once selected and confirmed an editable parameter, a screen will activate with the highlighted editable field indicated by a cursor.

Please note that:

The up-arrow key ▲ increases the value.

The left-arrow key ◀ moves the cursor to the next position.

The OK key saves the modifications and quits the editing mode.

The ESC key quits the editing screen without saving the modifications.



MAIN MENU

- **OUTPUTS**
 - Configuration of the adjustment outputs
 - Configuration of the OUT mA analog output
 - Other settings (startup delay, status of the instrument at startup, status of outputs in editing)
- **INPUTS**
 - LEV1 and LEV2 inputs
 - EXT.CONS. (External consent) input
 - Sample Water (flow sensor)
 - Eco / Boost Mode
 - Temperature
 - Water Meter
 - Parameters for thermo-compensation of conductivity measurements (CO input)
- **CALIBRATION**
 - Comparison and / or buffer solutions procedure, depending on measurement
 - Calibration reset and read-only info
- **LIMITS**
 - Setting of min and max alarm thresholds for measurement
- **ALARMS**
 - Control of alarm conditions and alarm relay
- **DISPLAY**
 - Info to be displayed for the measurement channel
- **USB**
 - Datalogger
 - Operations via USB port
- **TIMER**
 - Setting of switching on / off times and outputs / functions to drive
- **CONNECTIVITY**
 - Control of the digital communication
- **SERVICE**
 - Alarm list
 - Functions reserved to technical personnel
 - Reset
- **SYSTEM**
 - Password setting
 - Selection of display language
 - Date/time setting
 - FW updating
 - Read-only technical info



OUTPUTS

➤ OUT1 / OUT2 / OUT3 / OUT4 adjustment outputs

When connecting pumps or other dosing devices, the corresponding control output must be enabled and configured with the desired operating mode.

Depending on the device type to be controlled, two different wirings are available (also see the "Wiring instructions" section for more details):

Output	Terminal block	Type	Adjustment
OUT1	D06	Voltage-free contact	On-Off / PWM / Working range
OUT2	D05	Voltage-free contact	On-Off / PWM / Working range
OUT3	D01	Pulse signal	PFM
OUT4	D02	Pulse signal	PFM

Configuration options for the adjustment outputs, with their specific parameters, are listed below:

Output **Disabled**

Output **OUT1 (D06) / OUT2 (D05) Enabled**

→ **On-Off:**

Adjustment with constant dosage till the set-point.

Parameters to be set:

- **Setpoint** (adjustment end point)
- **Hysteresis** (tolerance range around the set-point, within which the output status does not change)
- **Direction** of the dosage
- **Max dosage** (max time within which the regulation must reach the set-point; if the output remains active for longer than the set time, the dosage is stopped, and an alarm is generated)
- **Delay ON / Delay OFF** of the relay (time tolerance range to avoid relay commutations due to irrelevant fluctuations)

Output **OUT1 (D06) / OUT2 (D05) Enabled**

→ **PWM:**

Proportional adjustment on time base.

Parameters to be set:

- **Setpoint** (adjustment end point)
- **Proportional band** (measurement range within which the duty cycle adjusts the activation T_{ON} and deactivation T_{OFF} times proportionally to the distance between the real time reading and the set-point to reach)
- **Direction** of the dosage
- **Max dosage** (max time within which the regulation must reach the set-point; if the output remains active for longer than the set time, the dosage is stopped, and an alarm is generated)
- **Duty cycle** (sets the overall time of the proportional band, to be sized according to the specific installation)



- **T min.** (minimum T_{ON} and/or T_{OFF} period to avoid too fast commutations of the output, which could damage the connected dosing device)

Output **OUT1** (D06) / **OUT2** (D05) Enabled

→ **Working range:** Active adjustment only for measurement within a set range.

Parameters to be set:

- **Threshold 1** (minimum value of the working range)
- **Threshold 2** (maximum value of the working range)
- **Status in the range** (the output contact can be configured as NO or NC when measurement is within the set range)
- **Delay ON/OFF** of the relay (time tolerance range to avoid relay commutations due to irrelevant fluctuations)

Output **OUT3** (D01) / **OUT4** (D02) Enabled

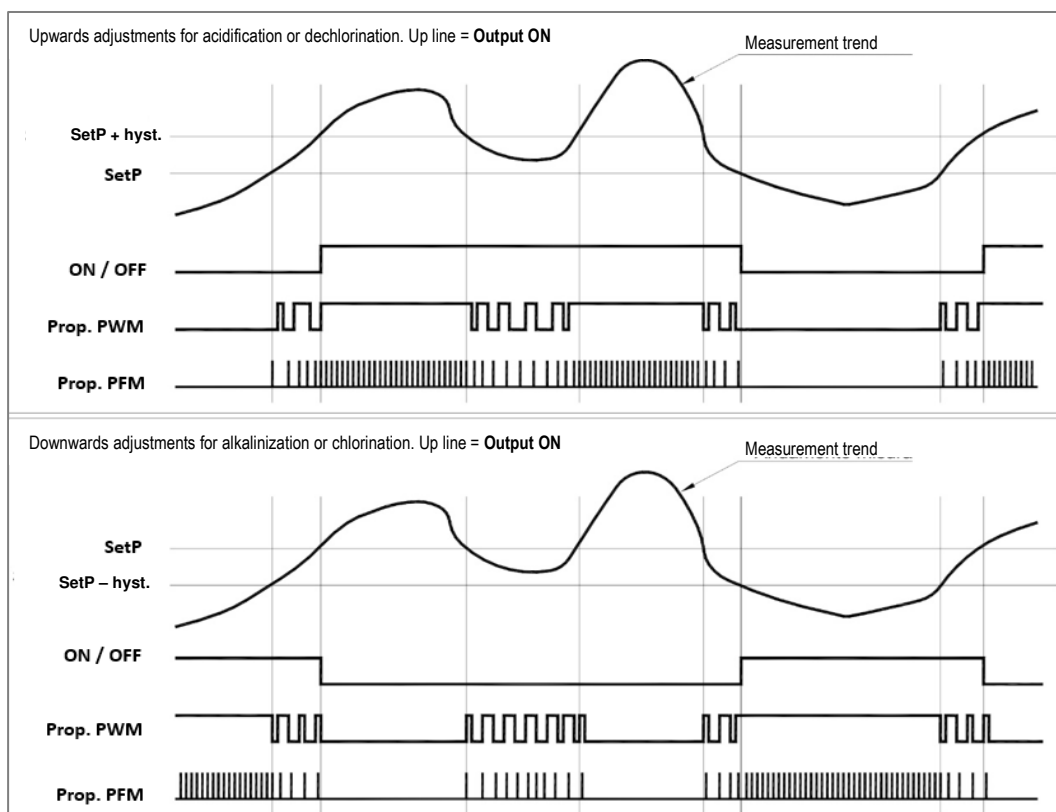
→ **PFM:** Proportional adjustment with pulse signal which controls a dosing pump with pulse input.

Parameters to be set:

- **Setpoint** (adjustment end point)
- **Proportional band** (measurement range within which the output is modulated from the set "Frequency MIN" value to the "Frequency MAX" one, proportionally to the distance between the real time reading and the set-point to reach)
- **Direction** of the dosage
- **Max dosage** (max time within which the regulation must reach the set-point; if the output remains active for longer than the set time, the dosage is stopped, and an alarm is generated)
- **Frequency MIN / Frequency MAX** (these values limit the frequency range within which the output pulses are modulated, depending on the distance between the real time reading and the set-point to reach)



Graphical representation of the three adjustment modes: On-Off, PWM and PFM



➤ OUT mA Output

If used, this output must be enabled and configured according to the connected device.

You can have only the measurement repetition or set them for proportional adjustment if the dosing device features an analog input.

Output **Disabled (default)**

- | | | | |
|-----------------------|--------------|---|--|
| Output Enabled | → Repetition | → | Range (0-20 or 4-20 mA) |
| | | → | Value at 0 or 4 mA |
| | | → | Value at 20 mA |
| | | → | Value upon error (mA output signal when in alarm) |
| Output Enabled | → Adjustment | → | Range (0-20 or 4-20 mA) |
| | | → | Setpoint (adjustment end point) |
| | | → | Proportional band (measurement range within which the output signal is modulated from 0/4 to 20 mA, proportionally to the distance between the real time reading and the set-point to reach) |
| | | → | Value upon error (mA output signal when in alarm) |
| | | → | Direction of the dosage |
| | | → | Max dosage (max time within which the regulation must reach the set-point; if the output remains active for longer than the set time, the dosage is stopped, and an alarm is generated) |



➤ Other settings

Start-up delay

→ Enter value (5" ... 30')

This parameter allows to enter a stand-by time at the instrument power-on, during which all outputs are disabled to avoid errors due to unreliable readings by not correctly polarized sensors.

Status at start-up

→ Remember (**default**) / Always ON / Always OFF

This parameter allows to set the instrument status in case of reboot. You can decide to resume the status before the shut-down ("Remember"), or to have the instrument active ("Always ON") or disabled ("Always OFF").

Status of outputs in editing

→ Disabled (**default**) / Enabled

This parameter allows to set the status of all adjustment outputs during the unit configuration. It is recommended to keep them disabled to avoid anomalous dosages due to transient settings.

INPUTS

➤ LEV1 (DI1) / LEV2 (DI2)

These inputs, with a specific sensor connected, allow to monitor the liquid level in the suction tank and stop the corresponding output in case of liquid lack.

If used, these inputs must be enabled and configured according to the connected sensor.

Note: *the mono-stage sensors only monitor the minimum level, while those double-stage also provide an alert level before the alarm.*

Input **Disabled (default)**

Input **Enabled**

→ Contact

→ NO / NC

→ Type

→ Mono / Double stage (only for LEV1)

➤ EXT.CON.S. External consent (DI3)

Digital pause / external consent input, to be connected, for example, to the contactor of the filtration / recirculation pump of the swimming pool. If used, it must be enabled and appropriately configured.

Input **Disabled (default)**

Input **Enabled**

→ Type

→ NO / NC (**default**)

→ Delay ON / Delay OFF (time tolerance for the instrument answer on the opening / closing of the input contact)

➤ Sample Water (DI6)

Input to be connected to an NPN proximity sensor to monitor the sample water flow. Upon flow lack, an alarm is generated. **If used, the input must be enabled and appropriately configured.**

Input **Disabled (default)**

Input **Enabled**

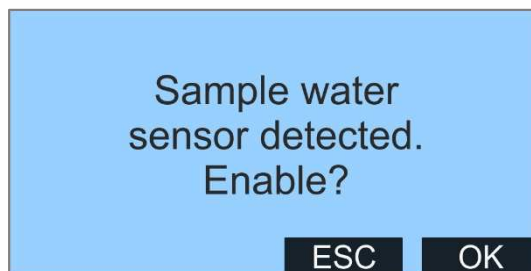
→ Type

→ NO / NC (**default**)

→ Delay ON / Delay OFF (time tolerance for the instrument answer on the opening / closing of the input contact)



Note: In case of restoration of default settings, if a flow sensor is connected to this input, the instrument will automatically detect it and ask to confirm if enabling it.



➤ **Eco/Boost Mode (DI4)**

This function allows decrease the dosage and save chemicals when the swimming pool is not used, dynamically moving the Measure 2 set-point to a lower value, set in this menu.
This mode can be activated by a timed command (see "TIMER" section).

Note: *The Eco/Boost Mode input command always takes priority over the timed configuration.*

Input **Disabled (default)**

Input **Enabled** → Type → NO / NC (**default**)
 → Setpoint OUT1 / OUT2 / OUT mA

➤ **Temperature (PT100)**

Parameters related to the temperature reading are set.

Mode can be automatic when a PT100 (or PT1000) sensor is connected, while with no sensor the unit requires that a reference value is manually entered.

You can also set the measurement unit for the temperature reading displaying.

Mode → Auto (**default**) / Manual (enter value)
Range (meas. unit) → °C (**default**) / °F

➤ **Water Meter (DI5)**

Digital input for direct connection of a volumetric pulse-emitting water meter. If used, this input must be enabled and properly configured in accordance with the water meter characteristics.

The displaying of the total volume detected is available within the secondary screen of the measurement information (accessible from the stand-by screen using the arrow keys ◀ / ▶).

The totalizer can be reset by activating the appropriate function in the "Service" menu

Input **Disabled (default)**

Input **Enabled** → K [l/pulse] → Choose a value from the proposed list
 → Meas. unit → Measure unit of the totalizer (litres, m³, UK gallons)



➤ **CO T. comp. → Thermo-compensation parameters, for EQ-CO version only**

This submenu includes two parameters (Alpha T coefficient and Reference temperature), which allow setting the thermo-compensation of conductivity measurements.

Alpha T → Enter value (0.0 ... 4.0)

The Alpha T coefficient is expressed in %/°C and is a characteristic value of the analysed liquid.

Setting Alpha T to zero means excluding thermo-compensation.

Alpha T typical values are:

1.0 ... 1.6 %/°C	for acids
1.8 ... 2.2 %/°C	for alkalis
2.2 ... 3.0 %/°C	for salts
2.0 %/°C (approx.)	for water

In case of unknown Alpha T value, you can calculate it as follows:

1. Set Alpha T = 0.0 (no thermo-compensation)
2. Read the conductivity of the analysed liquid at the reference temperature (e.g. 25 °C)
3. Have the liquid at the working temperature
4. Read the conductivity value at the working temperature
5. Calculate Alpha T using the following formula:

$$\text{Alpha T} = [(\text{Cond}(T) - \text{Cond}(T_{\text{ref}})) / (T - T_{\text{ref}})] \times [100 / \text{Cond}(T_{\text{ref}})]$$

T = working temperature (measured value)

T_{ref} = set reference value

Cond(T) = conductivity reading at the working temperature (T)

Cond(T_{ref}) = conductivity reading at the reference temperature

T. Ref. → Enter value (0.0 ... 100.0 °C)

Reference temperature for thermo-compensation of readings, typically 25 °C.

Once set these two parameters, the instrument automatically calculates the thermo-compensated conductivity value, using the following formula:

$$\text{Cond}(T) = \text{Cond}(T_{\text{ref}}) \times [(1 + \text{Alpha T}/100) \times (T - T_{\text{ref}})]$$

CALIBRATION (See specific section)

This menu allows to calibrate the measurement sensor, delete previous calibration data and get information on the sensor status.

LIMITS

You can set MIN and MAX measurement thresholds. If the measured value falls below the minimum threshold or exceeds the maximum one, an alarm is generated.

- | | |
|------------------------|-------------------------------|
| ➤ Threshold MIN | → Disabled (default) |
| | → Enabled (enter value) |
| ➤ Threshold MAX | → Disabled (default) |
| | → Enabled (enter value) |



ALARMS

➤ Alarm conditions

This menu lists all events which can generate an alarm condition of the instrument, resulting in blocking of the adjustment outputs.

See “Tables of parameters” section for the full list of available alarms and related factory settings.

For each event, three settings are available:

OFF = The event does not generate an alarm.

AUT = The event generates an alarm and, once the alarm is reset, the instrument automatically resumes to normal operations

MAN = The event generates an alarm and resuming the normal operation requires the operator to confirm.

➤ **OUT Alarm**

If used, this output must be enabled and configured according to the connected device. Moreover, you can choose which events should cause the alarm relay to switch.

See "Tables of parameters" section for the full list of available alarms".

Output **Disabled** (default)

Output **Enabled** → Type → Relay (normally) energized (**default**)

→ Relay (normally) de-energized

→ **Alarm conditions** (list of alarm events → Yes / No)

DISPLAY

This menu allows to customize some visualizations on the stand-by screen.

In fact, you can select for which enabled outputs to show the relative information, by flagging the corresponding item in the proposed list.

USB

This menu sets the functionality of the USB port and datalogger.

Note: the USB key must be formatted with FAT filesystem.

➤ **Datalogger**

Data and events (complete with date, time and device ID) are saved in the datalogger and can be exported as file.csv.

These are: measurement values, switches of the START/STOP button, sensor calibrations, reset requests, access to password-protected menus, access attempts with wrong password, instrument power-ons / power-offs due to voltage drops, list of occurred alarms.

→ Sampling time (set the time interval between two measurement savings: measure 1. measure 2. temperature)

→ Export data (file csv) (with USB key inserted, asks to confirm before exporting the datalog file)

→ Device ID (enter the ID code of the instrument)

The following actions can be performed only with USB key inserted and after operator confirmation:

- **Save conf.** Save current configuration on the USB key (file.csv)
- **Load conf.** Load current configuration from USB key (file.csv)
- **FW updating**



TIMER

The unit features an internal clock, which allows to schedule timed actions through 25 independent and fully configurable timers.

For each timer you can set the switching on / switching off times and choose in which day(s) of the week to enable it.

- **TIMER 1 / TIMER 2 / TIMER 3 / TIMER 4 / ... / TIMER 25**
 - Timer ON (activation time)
 - Timer OFF (switching off time)
 - Enable Timer (day of the week selection)
 - Mode
 - **Instrument** (adjustment outputs)
 - **Eco/Boost Mode** (this function can also be activated by an external contact, which always takes priority over time schedule)

CONNECTIVITY

This menu controls the possibly communication of the unit.

You can use the RS485 serial line with Modbus RTU communication protocol (standard), by setting the communication speed and the instrument ID code, or TCP/IP.

Alternatively, the **SteieLynx** gateway is available as an integrated board for remote control via web app.

- Disabled
- Enabled
 - Modbus
 - RTU
 - TCP/IP
 - Baud rate / ID
 - SteieLynx

SERVICE

This menu is reserved for qualified and authorized technical personnel.

- **Alarm list** Allows to display the list of last alarms, complete with date and time.
- **Inputs test** Allows to force all inputs to check their functioning.
- **Outputs test** Allows to force all outputs (digital and analog), to check the functioning of the connected devices (e.g., dosing pumps); during this operation all controls are disabled.
- **Meas. simulation** Allows to force the measurement channel to check the operation of the adjustment outputs
- **Reset**
 - Alarm history (Delete the saved list of alarms)
 - Datalogger (Delete saved list of measurements)
 - Calibrations (Delete the offset and/or slope data, restoring factory values)
 - Water Meter (Resets the volume totalizer detected by the counter)
 - Measure autoset (Function reserved for the repair technician, in case of replacement of the input board or measurement sensor type)
 - Factory reset (Full restoring of factory settings; the instrument will need to be reconfigured)



SYSTEM

This menu is reserved for qualified and authorized technical personnel.

- **Password**

Allows to enter three different passwords, for three different access levels to the instrument menus, to prevent interventions by unauthorized personnel.
***Note:** For further details about the different protection levels of the three passwords, see the "Appendix" section at the end of this manual.*

 - Disabled (**default**)
 - Enabled
 - Technician
 - Operator
 - Calibration

- **SOFTKEY 4**

Allows to customize the function of the fourth virtual key to directly access to the calibration of the two measurement channels, to the USB port control menu or to the check of inputs/outputs status.

 - Disabled (**default**)
 - Enabled
 - CAL
 - USB
 - I/O

- **Set date/time**

Allows to set current date / time and choose the displaying format for the date, exactly as at first power-on of the unit.

- **Language**

Allows to change the language of display interface.

- **FW updating**

With USB key inserted, you can update the instrument FW.

- **Info**

Read-only displaying of the following technical info: FW and HW version / Instrument mode / S/N of power board and input boards / POWER ON and operating time hour-counter / Log nr. of alarms / Internal temperature



TABLES OF PARAMETERS

OUTPUTS

pH Meas.			Valid values
Adjustment outputs	Disabled		
	Enabled (OUT1, OUT2) On-Off	Setpoint	0.00 ... 14.00 pH
		Hysteresis	0.05 ... 6.00 pH
		Direction	Acidification / Alkalinization
		Max dosage	00 :00 ... 08 :00 hh : mm
		Delay ON	00 :00 ... 10 :00 mm : ss
		Delay OFF	00 :00 ... 10 :00 mm : ss
	Enabled (OUT1, OUT2) PWM	Setpoint	0.00 ... 14.00 pH
		Proportional band	0.05 ... 14.00 pH
		Direction	Acidification / Alkalinization
		Max dosage	00 :00 ... 08 :00 hh : mm
		Duty cycle	00 :30 ... 10 :00 mm : ss
		T.min	0 ... 5 sec
	Enabled (OUT3, OUT4) PFM	Setpoint	0.00 ... 14.00 pH
		Proportional band	0.05 ... 14.00 pH
		Direction	Acidification / Alkalinization
		Max dosage	00 :00 ... 08 :00 hh : mm
		Frequency MIN	0 ... Freq. max cpm
		Frequency MAX	Freq. min ... 180 cpm
	Enabled (OUT1, OUT2) Working range	Threshold 1 (min.)	0.00 ... Threshold 2
		Threshold 2 (max.)	Threshold 1 ... 14.00 pH
		Status in the range	NO / NC
		Delay ON/OFF	00 :00 ... 10 :00 mm : ss
mA Output	Disabled		
	Enabled / Repetition	Range	0-20 or 4-20 mA
		Value at 0/4 mA	0.00 ... 14.00 pH
		Value at 20 mA	0.00 ... 14.00 pH
		Value upon error	0 ... 21 mA
	Enabled / Adjustment	Setpoint	0.00 ... 14.00 pH
		Range	0-20 or 4-20 mA
		Proportional band	0.05 ... 14.00 pH
		Value upon error	0 ... 21 mA
		Direction	Acidification / Alkalinization
		Max dosage	00 :00 ... 08 :00 hh : mm



ORP Meas.			Valid values
Adjustment outputs	Disabled		
	Enabled (OUT1, OUT2) On-Off	Setpoint	-2000 ... +2000 mV
		Hysteresis	5 ... 500 mV
		Direction	Oxidation / Reduction
		Max dosage	00 :00 ... 08 :00 hh : mm
		Delay ON	00 :00 ... 10 :00 mm : ss
		Delay OFF	00 :00 ... 10 :00 mm : ss
	Enabled (OUT1, OUT2) PWM	Setpoint	-2000 ... +2000 mV
		Proportional band	5 ... 2000 mV
		Direction	Oxidation / Reduction
		Max dosage	00 :00 ... 08 :00 hh : mm
		Duty cycle	00 :30 ... 10 :00 mm : ss
		T.min	0 ... 5 sec
	Enabled (OUT3, OUT4) PFM	Setpoint	-2000 ... +2000 mV
		Proportional band	5 ... 2000 mV
		Direction	Oxidation / Reduction
		Max dosage	00 :00 ... 08 :00 hh : mm
		Frequency MIN	0 ... Freq. max
		Frequency MAX	Freq. min ... 180 cpm
	Enabled (OUT1, OUT2) Working range	Threshold 1 (min.)	-2000 ... Threshold 2
		Threshold 2 (max.)	Threshold 1 ... +2000 mV
		Status in the range	NO / NC
		Delay ON/OFF	00 :00 ... 10 :00 mm : ss
mA Output	Disabled		
	Enabled / Repetition	Range	0-20 o 4-20 mA
		Value at 0/4 mA	-2000 ... +2000 mV
		Value at 20 mA	-2000 ... +2000 mV
		Value upon error	0 ... 21 mA
	Enabled / Adjustment	Setpoint	-2000 ... +2000 mV
		Range	0-20 o 4-20 mA
		Proportional band	5 ... 2000 mV
		Value upon error	0 ... 21 mA
		Direction	Oxidation / Reduction
		Max dosage	00 :00 ... 08 :00 hh : mm



CAC / CLE			Valid values
Adjustment outputs	Disabled		
	Enabled (OUT1, OUT2) On-Off	Setpoint	0.00 ... FS ppm
		Hysteresis	0.00 ... 50% FS ppm
		Direction	Chlorination / Dechlorination
		Max dosage	00 :00 ... 08 :00 hh : mm
		Delay ON	00 :00 ... 10 :00 mm : ss
		Delay OFF	00 :00 ... 10 :00 mm : ss
	Enabled (OUT1, OUT2) PWM	Setpoint	0.00 ... FS ppm
		Proportional band	0.05 ... FS ppm
		Direction	Chlorination / Dechlorination
		Max dosage	00 :00 ... 08 :00 hh : mm
		Duty cycle	00 :30 ... 10 :00 mm : ss
		T.min	0 ... 5 sec
	Enabled (OUT3, OUT4) PFM	Setpoint	0.00 ... FS ppm
		Proportional band	0.05 ... FS ppm
		Direction	Chlorination / Dechlorination
		Max dosage	00 :00 ... 08 :00 hh : mm
		Frequency MIN	0 ... Freq. max
		Frequency MAX	Freq. min ... 180 cpm
	Enabled (OUT1, OUT2) Working range	Threshold 1 (min.)	0.00 ... FS ppm
		Threshold 2 (max.)	Soglia 1 ... FS
		Status in the range	NO / NC
		Delay ON/OFF	00 :00 ... 10 :00 mm : ss
mA Output	Disabled		
	Enabled / Repetition	Range	0-20 o 4-20 mA
		Value at 0/4 mA	0.00 ... FS ppm
		Value at 20 mA	0.00 ... FS ppm
		Value upon error	0 ... 21 mA
	Enabled / Adjustment	Setpoint	0.00 ... FS ppm
		Range	0-20 o 4-20 mA
		Proportional band	0.05 ... FS ppm
		Value upon error	0 ... 21 mA
		Direction	Chlorination / Dechlorination
		Max dosage	00 :00 ... 08 :00 hh : mm



mA Signal			Valid values
Adjustment outputs	Disabled		
	Enabled (OUT1, OUT2) On-Off	Setpoint	Measurement range
		Hysteresis	0 ... FS
		Direction	→ Setpoint / Setpoint ←
		Max dosage	00 :00 ... 08 :00 hh : mm
		Delay ON	00 :00 ... 10 :00 mm : ss
		Delay OFF	00 :00 ... 10 :00 mm : ss
	Enabled (OUT1, OUT2) PWM	Setpoint	Measurement range
		Proportional band	0 ... FS
		Direction	→ Setpoint / Setpoint ←
		Max dosage	00 :00 ... 08 :00 hh : mm
		Duty cycle	00 :30 ... 10 :00 mm : ss
		T.min	0 ... 5 sec
	Enabled (OUT3, OUT4) PFM	Setpoint	Measurement range
		Proportional band	0 ... FS
		Direction	→ Setpoint / Setpoint ←
		Max dosage	00 :00 ... 08 :00 hh : mm
		Frequency MIN	0 ... Freq. max
		Frequency MAX	Freq. min ... 180 cpm
	Enabled (OUT1, OUT2) Working range	Threshold 1 (min.)	Measurement range
		Threshold 2 (max.)	Threshold 1 ... FS
		Status in the range	NO / NC
		Delay ON/OFF	00 :00 ... 10 :00 mm : ss
mA Output	Disabled		
	Enabled / Repetition	Range	0-20 or 4-20 mA
		Value at 0/4 mA	Measurement range
		Value at 20 mA	Starting value ... FS
		Value upon error	0 ... 21 mA
	Enabled / Adjustment	Setpoint	Measurement range
		Range	0-20 or 4-20 mA
		Proportional band	0 ... FS
		Value upon error	0 ... 21 mA
		Direction	→ Setpoint / Setpoint ←
		Max dosage	00 :00 ... 08 :00 hh : mm



Cond.			Valid values
Adjustment outputs	Disabled		
	Enabled (OUT1, OUT2) On-Off	Setpoint	Measurement range
		Hysteresis	0 ... 50% FS
		Direction	→ Setpoint / Setpoint ←
		Max dosage	00 :00 ... 08 :00 hh : mm
		Delay ON	00 :00 ... 10 :00 mm : ss
		Delay OFF	00 :00 ... 10 :00 mm : ss
	Enabled (OUT1, OUT2) PWM	Setpoint	Measurement range
		Proportional band	0 ... 50% FS
		Direction	→ Setpoint / Setpoint ←
		Max dosage	00 :00 ... 08 :00 hh : mm
		Duty cycle	00 :30 ... 10 :00 mm : ss
		T.min	0 ... 5 sec
	Enabled (OUT3, OUT4) PFM	Setpoint	Measurement range
		Proportional band	0 ... 50% FS
		Direction	→ Setpoint / Setpoint ←
		Max dosage	00 :00 ... 08 :00 hh : mm
		Frequency MIN	0 ... Freq. max
		Frequency MAX	Freq. min ... 180 cpm
	Enabled (OUT1, OUT2) Working range	Threshold 1 (min.)	Measurement range
		Threshold 2 (max.)	Threshold 1 ... FS
		Status in the range	NO / NC
		Delay ON/OFF	00 :00 ... 10 :00 mm : ss
mA Output	Disabled		
	Enabled / Repetition	Range	0-20 or 4-20 mA
		Value at 0/4 mA	Measurement range
		Value at 20 mA	Measurement range
		Value upon error	0 ... 21 mA
	Enabled / Adjustment	Setpoint	Measurement range
		Range	0-20 or 4-20 mA
		Proportional band	0 ... 50% FS
		Value upon error	0 ... 21 mA
		Direction	→ Setpoint / Setpoint ←
		Max dosage	00 :00 ... 08 :00 hh : mm

OUTPUTS

		Valid values
Other settings	Start-up delay	5 sec ... 30 min
	Status at start-up	Remember / Always ON / Always OFF
	Outputs status in editing	Disabled / Enabled



INPUTS

			Valid values
LEV1 / LEV2	Disabled		
	Enabled	Contact	NO / NC
		Type (LEV1 only)	Mono / Double stage
EXT. CONS.	Disabled		
	Enabled	Contact	NO / NC
		Delay ON	2 ... 10 sec
		Delay OFF	2 ... 10 sec
Sample Water	Disabled		
	Enabled	Contact	NO / NC
		Delay	0 ... 10 sec
Eco/Boost Mode	Disabled		
	Enabled	Contact	NO / NC
		Set-point ECO OUT1	0 ... Set-point OUT1
		Set-point ECO OUT2	0 ... Set-point OUT2
		Set-point ECO OUT mA	0 ... Set-point OUT mA
Temperature	Mode		Auto / Manual
	Range (meas. unit)		°C / °F
Water Meter	Disabled		
	Enabled	K [l/pulse]	0.25 / 1 / 2.5 / 10 / 25 / 100 / 250 / 1000
		Measure unit	L / m ³ / UK gallon
CO T. comp. (*)	Alpha T		0.0 ... 4.0 %/°C
	T. Rif.		0.0 ... 100.0 °C

(*) For EW-CO model only (conductivity measurements).

LIMITS

		Valid values
Threshold MIN	Disabled	
	Enabled	Measurement range
Threshold MAX	Disabled	
	Enabled	Measurement range

ALARMS

			Valid values
Alarm conditions	Events that can generate an alarm (*)		OFF / AUT / MAN
OUT Alarm	Disabled		
	Enabled	Type	Relay normally energized / normally de-energized
		Alarm conditions (*)	Yes (flag) / No (no flag)

(*) List of events that can generate an alarm condition and trigger alarm relay switching:

- MIN threshold / MAX threshold exceeded
- Level 1 / Level 2
- Under Range / Over Range
- Max dosage time
- Sample Water (lack of water flow)



DISPLAY

DISPLAY	List of enabled outputs to be displayed on the stand-by screen
---------	--

USB

			Valid values
USB	Datalogger	Sampling time	1.5, 15, 30, 60 min
		Export data	File .csv
		Device ID	0 ... 250
	Save current config on USB (insert USB key)		File .csv
	Load config file from USB (insert USB key)		File.csv
	Update FW (insert USB key)		

Notes:

- The USB key must be formatted with FAT filesystem
- All data / events are saved complete with date / time / temperature
- The data / events saved in the datalogger are:
 - Measurements read according to the set sampling time
 - Switches of the START/STOP button
 - Sensor calibrations
 - Reset requests
 - Access to menus protected by technician / operator / calibration passwords
 - Access attempts with wrong password
 - Power-ons / offs of the unit
- Alarms are saved with the codes listed here below, complete with date / time indication:
 - AL01: Threshold min | AL02: Threshold max
 - AL03: Level 1 | AL03: Level 2
 - AL05: Under Range | AL06: Over Range
 - AL07: T. max dosage
 - AL17: ...
 - AL18: No flow

TIMER

		Action	
TIMER 1	TIMER ON	Enter activation time	
	TIMER OFF	Enter switching off time	
	Enable Timer	Choose the day or series of days of the week for Timer 1	
	Mode	Apply timer to:	Instrument (adjustment outputs) Eco/Boost Mode

Note: The unit features 25 independent TIMERS, each one functioning as described here above for TIMER 1.

CONNECTIVITY

				Valid values
CONNECTIVITY	Disabled			
	Enabled / Modbus	RTU	Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115400
			ID	00 ... 31
		TCP/IP		
	Enabled / SteieLynx			



SERVICE

		Action
SERVICE	Alarm list	List of the occurred alarm events
	Inputs test	Functioning test of all inputs
	Outputs tests	Functioning test of dosing heads
	Meas. simulation	Forcing the measurement channel to check the behaviour of related dosing heads, without the measurement sensor necessarily being connected to the instrument
	Reset	Alarm history / Datalogger / Calibrations / Measurement autoset / Factory reset

SYSTEM

			Valid values
Password	Disabled		
	Enabled	Technician	0000 ... 9999
		Operator	0000 ... 9999
		Calibration	0000 ... 9999
Softkey 4	Disabled		
	Enabled		CAL / USB / I/O
Set date / time		Date / time setting for the internal clock and selection of the date displaying format	
Language		Italiano / English / Français / Español	
FW Updating		With USB key inserted, the unit asks confirmation to update the FW	
Info (read-only)		FW and HW version / Instrument model / S/N of power board and input boards / Hour-counter of POWER ON and operating time / Log nr. of alarms / Internal temperature	



CALIBRATION

MEASURE pH

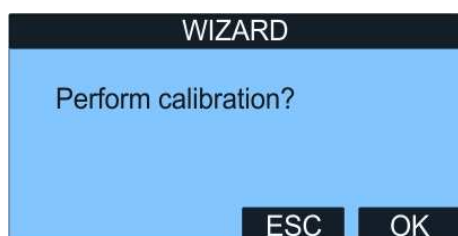
Available options:

- Wizard (2 points)
- Comparison (1 point)
- Buffer solutions (1 or 2 points)
- Reset calibrations
- Info

WIZARD PROCEDURE

Messages are displayed which guide the operator with step-by-step instructions to perform a two-point pH calibration, with pH7 and pH4 (or pH9) buffer solutions.

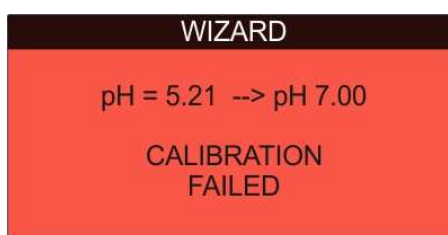
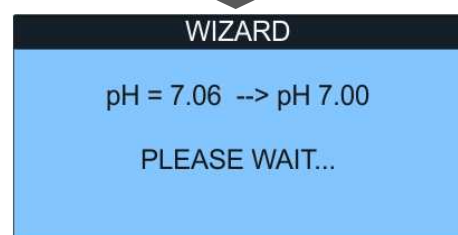
This procedure is recommended when precise measurement is required, also suitable for unskilled personnel.



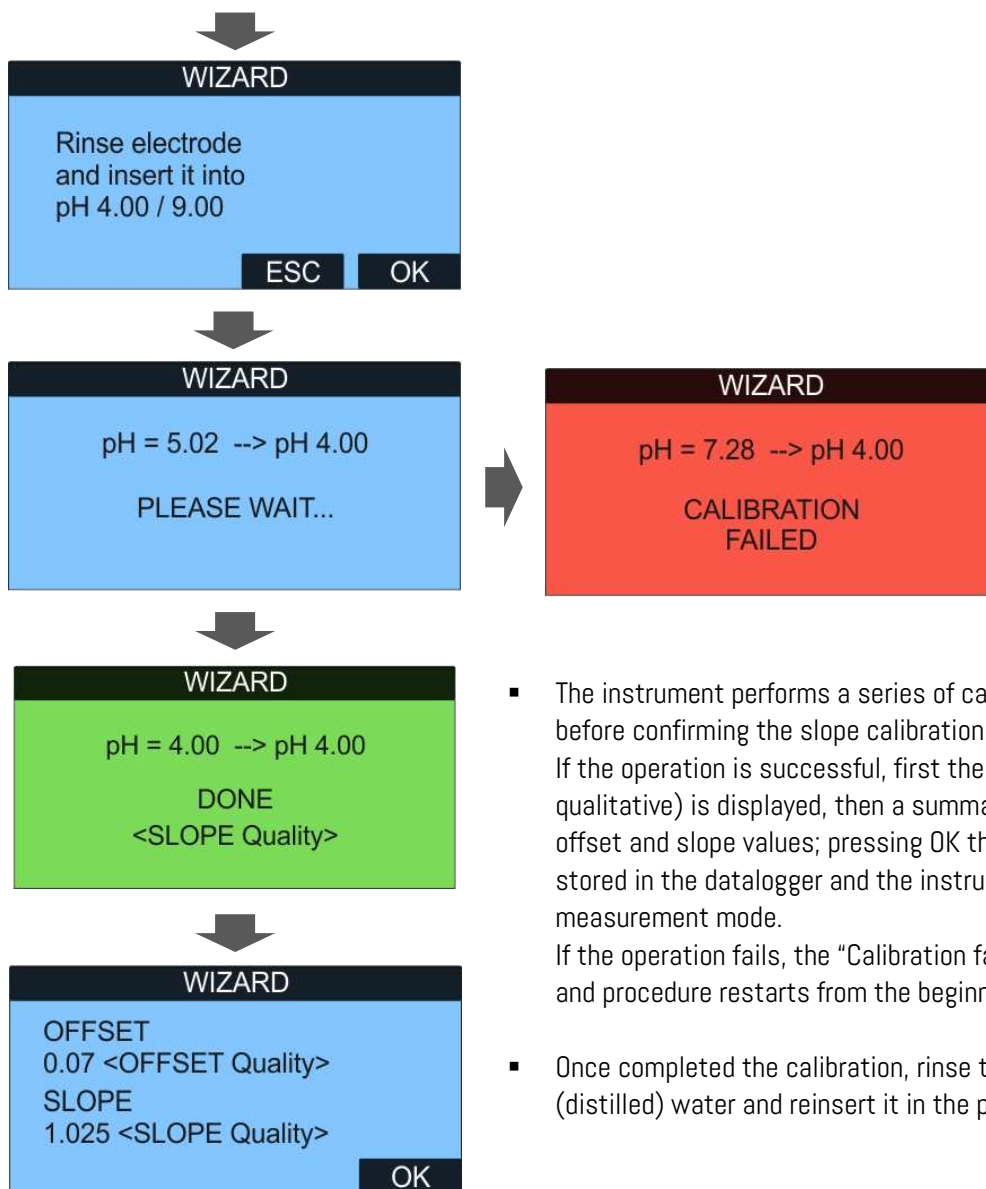
- Remove sensor from probe-holder.
- Rinse it with clean (distilled) water and let it drip dry, without rubbing it with paper or rags.
- Press OK.



- Follow display instructions.



- The instrument performs a series of calculations and checks before confirming the offset calibration. If the operation is successful, the offset value (numeric and qualitative) is displayed, and the unit automatically moves to the second point (slope). If it fails, the "Calibration failed" error is generated and procedure restarts from the beginning.



- The instrument performs a series of calculations and checks before confirming the slope calibration. If the operation is successful, first the slope value (numeric and qualitative) is displayed, then a summary screen of the new offset and slope values; pressing OK the calibration data are stored in the datalogger and the instrument resumes to normal measurement mode. If the operation fails, the "Calibration failed" error is generated and procedure restarts from the beginning.
- Once completed the calibration, rinse the sensor with clean (distilled) water and reinsert it in the probe-holder.

COMPARISON CALIBRATION PROCEDURE

One-point calibration via comparison with a reference instrument.

This procedure is recommended for a quick check / adjustment of the sensor.

- Leave the sensor in the probe-holder.
- Take a water sample from the probe-holder (through the dedicated outlet).
- Measure the pH value with a reliable reference instrument (not photometer).
- Adjust the value with the arrow keys and confirm.
- The calibration data are stored in the datalogger and the instrument resumes to normal measurement mode. If the operation fails, the "Calibration failed" error is generated and procedure restarts from the beginning.

CALIBRATION PROCEDURE WITH BUFFER SOLUTIONS

One or two-point calibration, with pH7 and pH4 (or pH9) buffer solutions.

The two-point procedure is recommended when a precise measurement is required, while the faster one-point calibration is suitable for a quick check / adjustment of the sensor.

- Remove sensor from probe-holder.
- Rinse it with clean (distilled) water and let it drip dry, without rubbing it with paper or rags.





- Select Offset calibration and confirm.
- Immerse the sensor in pH7 solution and wait for stable reading.
- Press OK to confirm.
- If the operation is successful, the offset value (numeric and qualitative) is displayed, and the unit automatically moves to the second point (slope).
If it fails, the "Calibration failed" error is generated and procedure restarts from the beginning.
- Rinse it with clean (distilled) water and let it drip dry, without rubbing it with paper or rags.
- Select Slope calibration and confirm.
- Immerse the sensor in pH4 (or pH9) solution and wait for stable reading.
- Press OK to confirm.
- If the operation is successful, first the slope value (numeric and qualitative) is displayed, then a summary screen of the new offset and slope values; pressing OK the calibration data are stored in the datalogger and the instrument resumes to normal measurement mode.
If the operation fails, the "Calibration failed" error is generated and procedure restarts from the beginning.
- Once completed the calibration, rinse the sensor with clean (distilled) water and reinsert it in the probe-holder.

Notes after sensor calibration

Qualitative indication about the electrode status:

Excellent / Good	Discrete	Calibration failed
Electrode properly working.	Have a new spare electrode available.	See note. *

* A calibration error can be due to the following causes:

- 1) Wrong or polluted buffer solution.
- 2) Dirty electrode; clean it properly.
- 3) During cleaning, the electrode was rubbed with paper or cloths and charged electrostatically; immerse it in pH4 buffer for approx. 20 minutes.
- 4) Air bubble in the sensitive bulb, due to the electrode wrong (horizontal or upside down) position for too long; place it vertically and wait for the air to go upwards.
- 5) The electrode bulb has been left drying; immerse it in pH4 buffer for 1 hour.
- 6) The electrode cable is damaged or oxidized; replace it.
- 7) The cable connector is moist or oxidized; dry and clean it.
- 8) The electrode is exhausted and must be replaced with a new one.

Note: Buy your pH electrode shortly before the replacement time, avoiding long storage; store it in a fresh area, with the bulb always immersed in storage solution.



MEASURE ORP

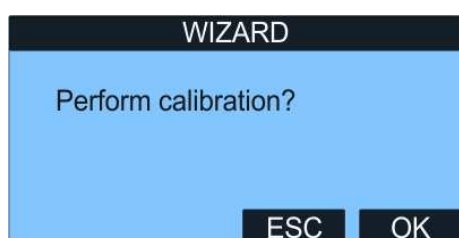
Available options:

- Wizard (1 point)
- Comparison (1 point)
- Reset calibrations
- Info

WIZARD PROCEDURE

Messages are displayed which guide the operator with step-by-step instructions to perform one-point (offset) ORP calibration, with a standard solution, e.g., 220 mV.

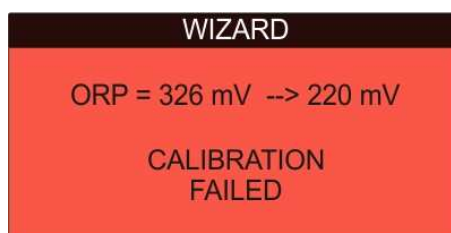
This procedure is recommended when precise measurement is required, also suitable for unskilled personnel.



- Remove sensor from probe-holder.
- Rinse it with clean (distilled) water and let it drip dry, without rubbing it with paper or rags.
- Press OK.



- Follow display instructions.



- The instrument performs a series of calculations and checks before confirming the offset calibration. If the operation is successful, the offset value (numeric and qualitative) is displayed, calibration data are stored in the datalogger, and the unit resumes to normal measurement mode. If the operation fails, the "Calibration failed" error is generated and procedure restarts from the beginning.
- Once completed the calibration, rinse the sensor with distilled water and reinsert it in the probe-holder.



COMPARISON CALIBRATION PROCEDURE

One-point (offset) calibration via comparison with a known value. This procedure is recommended for a quick check / adjustment of the sensor.

The comparison can be done using a reference instrument or a standard calibration solution.

1. Procedure with reference instrument:
 - Leave the sensor in the probe-holder.
 - Take a water sample from the probe-holder (through the dedicated outlet).
 - Measure the ORP value with a reliable reference instrument.
 - Adjust the value with the arrow keys and press OK to confirm.
 - The calibration data are stored in the datalogger and the instrument resumes to normal measurement mode. If the operation fails, the "Calibration failed" error is generated and procedure restarts from the beginning.
2. Procedure with standard calibration solution:
 - Remove sensor from probe-holder.
 - Rinse it with clean (distilled) water and let it drip dry, without rubbing it with paper or rags.
 - Immerse the sensor in the calibration solution and wait for stable reading.
 - If necessary, adjust the value with the arrow keys and press OK to confirm.
 - If the operation is successful, the offset value (numeric and qualitative) is displayed, the calibration data are stored in the datalogger, and the unit automatically resumes to normal measurement mode.
 - If the operation fails, the "Calibration failed" error is generated and procedure restarts from the beginning.
 - Once completed the calibration, rinse the sensor with clean (distilled) water and reinsert it in the probe-holder.

Notes after sensor calibration

Qualitative indication about the electrode status:

Excellent / Good	Discrete	Calibration failed
Electrode properly working.	Have a new spare electrode available.	See note. *

* A calibration error can be due to the following causes:

- 1) Wrong or polluted buffer solution.
- 2) Dirty electrode; clean it properly.
- 3) Air bubble in the sensitive bulb, due to the electrode wrong (horizontal or upside down) position for too long; place it vertically and wait for the air to go upwards.
- 4) The electrode bulb has been left drying; immerse it in pH4 buffer for 1 hour.
- 5) The electrode cable is damaged or oxidized; replace it.
- 6) The cable connector is moist or oxidized; dry and clean it.
- 7) The electrode is exhausted and must be replaced with a new one.

Note: Buy your ORP electrode shortly before the replacement time, avoiding long storage; store it in a fresh area, with the bulb always immersed in storage solution.



MEASURE WITH CAC or CLE SENSOR (ppm)



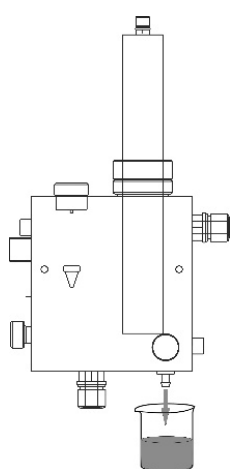
Available options:

- Calibration
- Reset calibrations
- Info

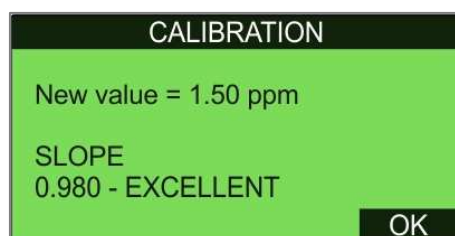
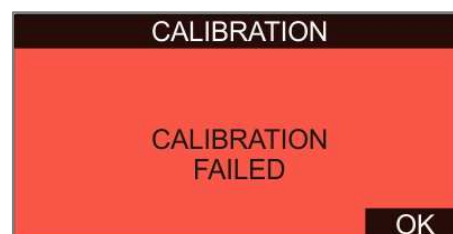
CALIBRATION PROCEDURE

One-point (slope) calibration, for comparison with a reference instrument (e.g., chlorine analysis with DPD method).

The zero point (offset) calibration is performed at the factory and generally does not require any intervention.



- Leave the sensor in the probe-holder.
- Take a water sample from the probe-holder (through the dedicated outlet).
- Perform the analysis with a reliable reference photometer.
- Use the arrow keys to adjust the display value to that measured by the photometer, then confirm with OK.



- Calibration data is stored in the datalogger, and the unit automatically resumes to normal measurement mode.



Notes after sensor calibration

Qualitative indication about the probe status:

Excellent / Good	Discrete	Calibration failed
Sensor properly working.	The probe will need to be serviced shortly; procure standard spare parts.	See note. *

* A calibration error can be due to the following causes:

- 1) The DPD method has been performed incorrectly.
- 2) There are interferences in water.
- 3) The flow rate of sample water is unstable and / or out of the recommended range; check that the flow sensor is correctly installed in the probe-holder and that measure conduct walls are clean.
- 4) Dirty sensor; clean it properly.
- 5) The sensor needs maintenance (e.g. replacement of the membrane/electrolyte for CAC probe or damaged platinum electrode to be replaced in CLE cell).

Warning! For sensors maintenance, always refer to the specific technical manual.

- 6) The sensor is exhausted and must be replaced with a new one.

Notes for CLE (Cu/Pt) sensor:

This cell provides no thermo-compensated chlorine readings and, therefore, gives different signals depending on water temperature and conductivity. If these two parameters are stable over time, they are compensated with the calibration procedure.

To have thermo-compensated measurements you need to connect a temperature sensor to the control unit.

The cell in ideal working conditions (temperature 25 °C and water conductivity 400 µS/cm) has a slope of 1. In the case of water temperature and conductivity values significantly different from the ideal ones, the sensor slope increases, up to a maximum value of 5, with consequent decrease of the measurement range, as shown in the table here below.

Sensor slope	Measure full scale [ppm]
1.0	5.00
2.0	2.5
3.0	1.6
4.0	1.2
5.0	1

It may therefore happen that an O.R. (Over Range) error message is displayed, even if the measurement does not exceed 5 ppm (nominal full-scale value of the cell). This occurs due to an increase in the slope value, automatically calculated after a sensor calibration, and consequent reduction of the measurement range.

If the probe works at low temperature / conductivity values or in the event of oxidation of the electrodes, the slope can decrease up to 1/3 of the ideal value, but the measurement range does not change.

Notes for CAC sensors:

- If the sensor displays unstable or too low values, check that the electrolyte gel has not been consumed, especially if the water temperature is above 30 °C; if necessary, top up.
- If sensor cannot be calibrated, replace the membrane and repeat the procedure.
- If these operations do not solve the problem, contact the technical support service.



Warning! For correct operations of the CAC sensor, replace the membrane every 6 months (see specific manual for details).



0/4-20 mA INPUT

Available options:

- Calibration
- Reset calibrations
- Info

CALIBRATION PROCEDURE

One-point (offset) calibration, for comparison with a reference instrument.

CONDUCTIVITY INPUT

Available options:

- Calibration
- Reset calibrations
- Info

CALIBRATION PROCEDURE

The zero point is electrically calibrated at the factory and does not need to be adjusted by the user.

Only perform the one-point "Standard" procedure to adjust the slope value.

It is a comparison procedure with a reference instrument.

- Measure the conductivity with a reliable reference instrument.
- Adjust the value with the arrow keys, then confirm pressing OK.
- The calibration is stored in the internal datalogger and the instrument resumes to normal measurement mode. If it fails, the "Calibration failed" warning message is generated and the procedure restarts from the beginning.

RESET CALIBRATIONS

Input calibrations are deleted, and factory calibration data are restored.

INFO

The unit displays the date/time of last calibration, and the offset and/or slope values related to the sensor status.

PASSWORD PROTECTION LEVELS

The instrument configuration menu is structured on three access levels, which can be protected by three different passwords, to prevent incorrect configurations by unauthorized personnel.

- The **TECHNICIAN password** allows complete access to all the menus and submenus of the unit; level reserved for the installer / system engineer.
- The **OPERATOR password** allows to set a series of parameters for customizing the adjustments based on the needs of the specific system; level reserved for the system manager.
- The **CALIBRATION password** allows limited access to non-critical parameters; level reserved for personnel in charge of ordinary maintenance.

Outputs	Adjustment output	Disabled		
		Enabled	On-Off (OUT1, OUT2)	Setpoint
				Hysteresis
				Direction
				Max dosage
				Delay ON / OFF
			PWM (OUT1, OUT2)	Setpoint
				Proportional band
				Direction
				Max dosage
				Duty cycle
			T.min	
			PFM (OUT3, OUT4)	Setpoint
				Proportional band
				Direction
				Max dosage
				Frequency MIN / MAX
			Working range (OUT1, OUT2)	Threshold 1 / 2
				Status in the range
				Delay ON / OFF
	OUT mA	Disabled		
		Enabled	Repetition	
			Adjustment	Range
				Setpoint
				Proportional band
				Value upon error
				Direction
				Max dosage
	Other settings			
Inputs	Levels			
	EXT.CONS			
	Sample Water			
	Eco/Boost Mode			
	Temperature			
	Water Meter			
Calibration	Wizard			
	Comparation			
	Buffer solutions			
	Reset calibrations			
	Info			

Limits		
Alarms	Alarm conditions	
	OUT Alarm	
Display		
USB	Datalogger	Sampling time
		Export data
		Device ID
	Save config.	
	Load config.	
	FW updating	
Timer		
Connectivity		
Service	Alarm list	
	Outputs test	
	Inputs test	
	Measure simulation	
	Reset	Alarm history
		Datalogger
		Calibrations
		Water Meter
		Measure autoset
		Factory reset
System	Password	Technician
		Operator
		Calibration
	Softkey 4	
	Set date/time	
	Language	
	FW updating	
	Info	