MULTI PARAMETER INSTRUMENT



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Note: All the strings in the manual that represent the programming menus are purely indicative. The strings displayed on the instrument have been abbreviated to be displayed properly on the screen and for readability.

1 OVERVIEW

1.1 INFORMATION ON THE MANUAL

This document contains confidential proprietary information. It can modified and updated without prior notice.

This manual is an integral part of the instrument. Upon first installation of the device, the operator must thoroughly check the contents of the manual in order to verify its integrity and completeness.

Compliance with the operating procedures and warnings described in this manual is a basic requirement for the device to function properly and to ensure operator safety.

The manual must be read in all its parts, in front of the device, in preparation for use, for the operating modes, controls, connections to peripheral equipment and the precautions for correct and safe use to be clear.

The user manual must be kept in a secure place, intact and legible in all its parts, while also being readily accessible to the operator during installation, use and/or review of the installation.

1.2 CONVENTIONS

This user manual uses the following conventions:

NOTE

The notes contain important information that is to be highlighted with respect to the rest of the text. They generally contain useful information for the operator to perform the operating procedures of the device properly and in an optimal manner.

WARNING



Warning messages appear in the manual before any procedures or operations that must be followed to avoid possibly losing data or damaging the equipment.

ATTENTION



Cautionary messages appear in the manual next to the description of procedures or operations that could harm the operator or users if implemented incorrectly.

1.3 LIMITS OF USE AND SAFETY PRECAUTIONS

In order to ensure operator safety and that the device functions correctly, the following permitted limits must be observed and all the precautions adopted:

ATTENTION



Ensure that all the safety requirements are fulfilled before use. The device must not be powered or connected to other equipment until the safety conditions are met.

1.4 ELECTRICAL SAFETY

ATTENTION



All the connections on the control unit are isolated from the earthing system (non-isolated earth). Do NOT connect any of these connections to the earth.

It is recommended to follow all the instructions provided in this manual to guarantee maximum safe conditions for the operator.

- Power the device solely with mains voltage according to the specification (85÷265Vac 50/60Hz or 12÷32Vdc [24Vac±10%])
- **Replace damaged parts immediately.** Cables, connectors, accessories or other parts of the device that are damaged or do not work correctly must be replaced immediately. In which case, contact the nearest authorised Technical Support Centre.
- Only use accessories and peripherals specified by the supplier. To ensure all the safety requirements, only the accessories specified in this manual must be used, which have been tested in conjunction with the device. Using accessories and consumables of other manufacturers or not specifically indicated by the supplier does not guarantee device safety and proper operation. Only use peripherals that conform to the regulations within the relevant category.

1.5 OPERATING ENVIRONMENT SAFETY

The panel of the control unit is protected against fluid infiltration. Avoid placing the device at risk of dripping, splashing or immersion and using it in environments where such hazards are present. Devices in which liquids have accidentally penetrated must be immediately switched off, cleaned and checked by authorised skilled personnel.

Protection

- IP65 Complete
- EMI/RFI IEC EN55011

Use the device within the specified environmental temperature, humidity and pressure limits. The instrument is designed to operate in the following environmental conditions:

- working environment temperature
- storage and transport temperature
- relative humidity

0° ÷ +40°C -25°C ÷ +65°C 0% ÷ 95% Non-Condensing

ATTENTION

The device must be inserted perfectly into the system.

The system must be kept operational in full compliance with the intended safety rules.

The parameters set in the analyser control unit must conform to the intended mandatory requirements.



The failure messages of the Control unit must be directed to a room that is constantly monitored by operating or service personnel of the system.

Failure to comply with any of these conditions can also cause the "logic" of the control unit to operate in a potentially hazardous way for the service users.

Therefore, service and/or maintenance personnel are advised to work with utmost attention, promptly reporting any deviation from the safety parameters, so as to avoid potentially hazardous conditions.

Since the above considerations cannot be monitored by the product in question, the manufacturer cannot be held liable in any way for any damage that such malfunctions can cause to persons or property.



1.6 INFORMATION ON RECYCLING AND REUSING MATERIALS

In accordance with the specific EU Directives, the manufacturer is dedicated to the continuous improvement of the design and production procedures of its equipment in order to minimise the negative impact on the environment regarding the management of components, consumables, packaging and the device itself at the end of its life cycle.

The packaging is designed and made so that most materials are reused, recovered and/or recycled, and to minimise the amount of waste or residue to be disposed of. To ensure a proper environmental impact, the device is designed with the maximum possible circuit miniaturisation, with the minimum possible differentiation of materials and components, with select substances that guarantee maximum recyclability and maximum reuse of the parts and waste disposal with no ecological risks.

The device is built so as to ensure easy separation or disassembly of the materials containing pollutants from others, in particular during maintenance and when replacing parts.

ATTENTION



The packaging, consumables and the device itself at the end of its life cycle must be disposed of/recycled in accordance with the regulations and directives currently in force in the country where the device is used.

PARTICULAR ATTENTION TO CRITICAL COMPONENTS

The instrument is equipped with a liquid crystal display (LCD), which contains small amounts of toxic materials.

1.7 GENERAL DESCRIPTION

The analyser discussed in this manual consists of the Electronic Control Unit and the Technical Manual The control unit can be wall-mounted or installed in an electrical panel at a maximum distance of 15 metres from the Probe.

It is powered by the mains supply (100 ÷ 240 Vac 50-60 Hz) with 5W consumption, via a Switching power supply.

This equipment is designed for an ON-LINE analysis of the chemical characteristics in the following applications:

- Organic oxidation systems
- Industrial water treatment and drainage
- Fish farming
- Primary or potable water



Figure 1 – Multi-parameter instrument

1.8 PRINCIPLES OF MEASUREMENT

• PH METER

An instrument used to measure the acidity of a liquid, namely the capacity of a substance to send Hydrogen ions (H^+) to a solution. The unit of measurement of this property is pH (the abbreviation of Potential of Hydrogen) and represents the negative decimal logarithm of the H^+ ion concentration found in the solution. The value described above for pure water at room temperature is 7. Solutions with a pH value greater than 7 are defined as basic solutions and solutions with a pH value less than 7 are acidic solutions. The extremes of the scale are pH=0 for pure acids and pH=14 for pure bases.

Electrochemical systems, test strips, indicators or colourimeters are available to measure the pH value. Amongst all these methods, only an electrochemical reading provides well-defined results. This measurement is read by pH electrodes.

The pH electrode is an electrochemical sensor that consists of a measuring electrode and a reference electrode. The voltage on a membrane varies according to the pH value of the solution being tested.

The pH electrodes currently in use are built to indicate a pH value of 7 at a voltage of 0 mV on the membrane. The more the value deviates from pH=7, the higher the signal voltage. The pH meter determines the pH value according to this signal.

REDOX METER

An instrument used to measure the Oxidation Reduction Potential (ORP), which indicates the electron exchange capacity between a donor element (reducing agent) and an accepting element (oxidant) measured by the potential absorbed by an indifferent electrode (platinum/gold) immersed in the solution containing the oxidised or reduced form, with respect to an electrode chosen arbitrarily as a zero electrode. The unit of measurement is Volts but its submultiple, the millivolt, is commonly used (mV = V x 10^{-3}). A few applicative examples of this measure are: control of wastewater denitrification (determining oxidation numbers), monitoring the disinfection effect of drinking or pool water or also decontamination in galvanic processes.

The measurement is taken by means of a redox electrode. Just like the pH electrode, this sensor consists of a measuring electrode and a reference electrode. In this case, however, the measurement is not taken from a glass membrane but from a platinum (or gold) membrane. The tendency of the ions in solution to absorb or diffuse electrons determines the platinum potential and consequently, the electrode voltage. The normal electrodes currently in use have a reference silver/silver chloride electrode (UB) instead of a hydrogen electrode (UH), which means that the indicated voltage is relative to this system.

CHLORINE METER

The measurement of the amperometric chlorine determines the concentration in ppm of the hypochlorous acid (HCLO) present in the aqueous solution that guarantees the disinfection of bacterial charges. The chlorine measure is valid within the range of pH 4 and 11; refer to the following graph.



FLOW METER

The flow measurement expresses the amount of liquid that transits within a unit of time.

The volumetric flow rate in the International System is measured in cubic metres per second (m3/s).

Flow measurement is particularly used to measure water in urban or industrial distribution. Other applications are: wine bottling, drains for evaporative towers, filling swimming facilities (pools), food industries, sugar mills, the textile industry, automatic irrigation systems, etc.

The most common is the flow with a Turbine Meter, the channelled flow passes through a small hydraulic turbine, the rotation speed of which is proportional to the flow rate. The rotation of the turbine is measured by inserting a magnet into it, which is made to pass close to the specific sensor, thereby generating a pulse for each turn.

2 MAIN CHARACTERISTICS

- Power supply: •
- 100÷240 Vac 50/60 Hz, 15Watt (Class 1 Electrical Insulation) System duration: 24/7 for 5 years (43800 Hours) •
 - **Operating temperature:** 0÷40°C 0÷95% (non-condensing) relative humidity

7 Kevs

- Graphic display 240x128 pixels White and Blue characters Data display:
- Keyboard:

.

- Cable connection: Double row connectors
- Relays: 6 Relays 250 Vac 10 A, 4 Powered Relays 100÷240V, 2 Potential-free Relays

Measurements

- \checkmark 0.00÷14.00 pH (accuracy ±0.01 pH) pH:
- ±2000 mV (accuracy ±1 mV) ✓ Redox:
- ✓ Temperature: 0+105°C (accuracy 0.5 °C) (Set-up for sensor PT100 and PT1000)
- ✓ **Free chlorine**: 0.01÷5 ppm (accuracy ±0.01 ppm) (Amperometric Probe) or Bromine
- ✓ **Flow meter**: 1 to 1500Hz (4% FS)
- ✓ Conductivity: 1µS÷20mS

Probe	Min Value	Max Value
C0,01	1µS	200µS
C0,1	10µS	2000µS
C1	100µS	20000µS

- Output modules related to the chemical measurements
 - Current output 2 Channels 0/4÷20mA 500 Ohm maximum load (accuracy ± 0.01 mA) \checkmark
 - Freq. output 2 Channels (Open Collector NPN/PNP) 0+120 pulses/minute (accuracy 0.016 Hz)

Input Modules

- Flow (pull up) (input for Reed sensor) \checkmark
- ✓ Hold

Data transmission modules

✓ RS485 Serial Port (Standard ModBus Protocol)

Modules integrated in the motherboard

Clock module with backup battery.

2.1 **MECHANICAL INSTALLATION**





Mechanical Dimensions	
Dimensions (W x H x D)	300x290x143 mm
Installation depth	148 mm
Material	PP
Installation	Wall-mounted
Weight	2.45 Kg
Front Panel	UV resistant polycarbonate

Drill the instrument and secure it to the wall using the supplied bracket.

There are cable glands on the lower side of the control unit for the wiring, therefore other devices must be at a minimum distance of 15 cm so as to facilitate the connections.

During the programming or calibration stages, protect the instrument from dripping and/or splashing water from adjacent areas.

2.2 ELECTRICAL INSTALLATION

2.2.1 POWER CONNECTION

If possible, avoid other cables, with high power control, from being close to the instrument or along the connecting cable, (inductive interference may be generated, especially on the analogue part of the system).

Apply alternating voltage from 100Vac to 240Vac-50/60Hz and as stabilised as possible.

Strictly avoid connecting to an inverter and prevent the latter from supplying other systems, perhaps of inductive type, besides the control unit, as this will result in voltage interference that once irradiated is difficult to be blocked and/or eliminated.

ATTENTION



The electrical line must be fitted with an adequate circuit breaker, in accordance with proper installation standards.

In any case, it is always good practice to check the quality of the Earth connection, as it is common for Earth connections, mostly in industrial environments, to be carriers of interference rather than the contrary. In case of any doubt concerning the quality, it is preferable to connect to a pole dedicated only to the system of the control unit.

2.2.2 CONNECTIONS TO DOSING SYSTEMS

ATTENTION



When starting the connections between the analyser Control unit and the external Utilities, make sure that the electrical panel is switched off and that the wires from the Utilities are not live.

"Utilities" refer to the Relay outputs used in the control unit

- (SET1) for control or Dosing Pumps
- (SET2) for control or Dosing Pumps
- (ALARM) alarm command given by the instrument to the siren and/or flashing light
- (WASH) command for the wash device



WARNING

Each relay contact can support a maximum current of 5 amperes with 230V max on a resistive load.

2.2.3 ELECTRICAL CONNECTIONS TABLE

Terminal	Description
1	pH probe (+) if available
2	nH probe (_) if available
3-4	Not used
5	Rodov probo (+)if available
6	Redox probe (+) if available
0	
1	Amp Chlorine probe (+)If available
8	Amp Chlorine Probe (-)if available
9	Conductivity probe
10	Conductivity probe
11	+24 V
12	In mA 1
13	Gnd
14	+24 V
15	In mA 2
16	GND
17	Temperature Probe (Green)
18	Temperature Probe (Blue)
19	Temperature Probe (Yellow)
20	+5Vdc
21	Frequency input
22	
23	Freq Output (+) 1
24	Freq Output (-) 1
25	Freq Output (+) 2
26	Freq Output (-) 2
27	Freq Output (+)3
28	Freq Output (-) 3
29	Freq Output (+) 4
30	Freq Output (-) 4
31	CND Current Output () 1 2
32	GND Current Output (-) 1- 2
34	Current Output (+) 2
35	Current Output (1) 3
36	Current Output (+) 4
37	
38	RS 485 +
39	RS 485 GND
40	Notused
41	
42	HOLD -
43 ÷ 44	BEED
45 ÷ 46	Level 1 signal
47 ÷ 48	Level 2 signal
49 ÷ 50	Relay 1 Output (Potential-free contact)
51 ÷ 52	Relay 2 Output (Potential-free contact)
53	Relay Phase (100÷240Vac) powered relay output for ph
54	Earth
55	Relay Neutral (100 ÷ 240 Vac)
56	Relay Phase (100÷240Vac)
57	Earth
58	Relay Neutral (100 ÷ 240 Vac) powered relay output for cl/br/redox
59	Relay Phase (100÷240Vac)
60	Earth
61	Relay Neutral (100 ÷ 240 Vac)
62	Relay Phase (100÷240Vac)
63	Earth
64	Relay Neutral (100 ÷ 240 Vac)
65	Power phase (100 ÷ 240 Vac)
66	Earth
67	Power neutral (100 ÷ 240 Vac)



Alarm Relay Output	ALARM 49 50 Ø Ø
Instrument Power Input	Power Supply 65 66 67 ØØØØ L ÷ N

2.2.5 GENERAL SPECIFICATIONS

pH/ORP Specifications	
pH range	0.00 to 14.00 pH
mV range	–2000 to 2000 mV
pH resolution	0.01
pH accuracy	± 0.01 pH
mV resolution	1 mV
mV accuracy	± 1 mV
Input impedance	> 10 ¹²
Insulation	Functional
Specifications Pt100, Pt1000	-
Temperature input	Pt100/Pt1000
Recognition Pt100/Pt1000	Manual
Error Condition	Disconnected/damaged probe automatic recognition
Driving current	1 mA
Range of measured temperature	0°C÷105°C
Maximum sensor distance	10 to 20 m (33 to 65 ft) depending on the sensor
Temperature resolution	0.1°C (0.1°F)/Display 0.5°C
Temperature accuracy	Pt100: ± 0.5°C (± 0.9 °F) - Pt1000: ± 0.2°C (± 0.4 °F)
Insulation	Functional
Chlorine specifications	
Chlorine range	0.00 to 5.00 ppm
Chlorine resolution	0.01 ppm
Chlorine accuracy	± 1% at the measurement point
Maximum sensor distance	up to 2 m
Insulation	Functional
mA Input specifications	
Sensor Type	Two- or three-wire sensor
Sensor power 4/20mA 2-wire	(*)24Vdc ±5%, max 30mA
Short circuit protection	Enabled
Measuring Range	0 to 20 mA or 4 to 20 mA
Error Condition	OFF, 3.6 mA, 22 mA
Resolution	±1μA
Accuracy	± 0.2 %
Insulation	Functional
Specifications Input Conductivity	
Sensor Type	Two electrode sensors
Measuring Range	1 uS at 20 mS
Isolation	Functional

2.2.6 ELECTRICAL SPECIFICATIONS

Power supply (version 100÷240 VCA)	
Electrical requirements	100 to 240 VAC ±10%, 15 W
Frequency	50 to 60 Hz
Power fuse	1.5 A resettable
Short circuit protection	Enabled
Relay Outputs	
RL1÷RL4	mechanical 250 VAC/10A
Relay configuration RL1÷ RL4	Load activation
Cycle time	1sec to 3600sec
Delay time	1sec to 3600sec
Test mode	ON, OFF
Frequency Outputs	
Туре	Isolated Transistor Open Collector
Frequency range	0 to 120 pul/min
Outputs 4÷20 mA	
Analoguo output aignalo	2 outputs 4 to 20 mA, galvanically isolated from each other and from the
Analogue output signals	power supply.
Measuring error	+/– 0.01 mA
Load	max. 800 Ω
Error Condition	NAMUR: OFF, 3.6 mA, 22 mA
Test mode	3 to 23 mA
Digital Inputs	
Digital input FREQ1	(*) Input for external counter
HOLD Input	24 Vdc
REED digital input	Input for potential-free contact 5 VCC, max 6 mA
HOLD digital input	Powered input 12÷32 VCC, max 10 mA
Communication Ports	
RS485 digital communication	isolated MODBUS RTU
Output 5 Vdc	
Voltage	(**) 5 VCC ±2%, max. 20 mA
Short circuit protection	Enabled
User Interface	
Connection terminals	Removable terminal
Keyboard	7 tactile feedback keys
Display	Graphic Display 240x128 pixel Transflective, Back-lit
Display Update	500 msec
Backlight	White

* Function not currently used ** Do NOT exceed the maximum current limit allowed as there lies the RISK of damaging the equipment

Example of Connection Label on the instrument (connector pocket rear side).





CONNECTIONS LABEL

(review indications P1, P2 ...)

1 2 3	4	5 6	7	8	9	10	11	12	13	14	15	16				17	7 18	19	20	21 2	22	23 2	4 2	5 2	62	7 28	3 29	30	31	32	33	34	35	36
000	0	00	0	0	0	0	0	Ø	0	Ø	0	\oslash				Ø	0	0	0	0	0	00	00	00	00	00	0	0	0	0	0	0	0	0
ROBE 1 NOT (P1) USE		+ – PROBE (P2)	2 PRC (F	- DBE 3 P3)	PROI	BE 4 4)	+ 24V PR	IN mA c OBE (P5)		+ 24V I PR	IN mA G OBE ((P6)	6				L TE		NJ ROBE	+5V				- 1	OUT F		UT F3		JT F4	+ J O m	GNE UT C	DUT mA 2	+ 	GND JT O 3 m	+ UT A 4
	37	38	39 4	0 4	1 42	43	44	45	46	47	48	49	50	51	52	BUTT	ON	53	3 54	55	56	57	58	59	60	61	626	36	646	56	66	7		A
	0	0	00	00	0	0	0	0	0	0	0	0	0	0	0	TYPE CF	RY R2023	0	0	0	0	0	\oslash	0	0	0	00	00	00	00	00	3	1	14
	T-R-	T+R+ 0 RS485-		° + H			+ EED		+ VEL1		+ VEL2		الم RM	Lo/ R	لم_	+		L	() R1	N	L	⊕ R2	Ν	L	(R3	N	L	₽ I ₹4		- G			-	

2.3 PH REDOX

The Settings Menu is split into sub-menus with the following structure:

- 3 Settings •
 - **3A** pH

.

- 3A1 Relays .
 - 3A2 Frequency Output
 - 3A3 Current Output
- 3A4 Alarms
- 3B Input mA number 1 0
 - 3B1 Relays .
 - **3B2** Frequency Output .
 - 3B3 Current Output
 - 3B4 Alarms
 - **3B5** Range (range of the connected input probe: 0.5 ppm to 100000ppm)
 - 3B6 Measure associated with current input:
 - ✓ FCI (Free Chlorine)
 - ✓ TCI (Total Chlorine)
 - ✓ Br (Bromine)
 - ✓ H2O2 (Oxygenated Water)
 - ✓ PAA (Peracetic Acid)
 - ✓ O3 (Özone)
 - Custom (with the custom unit, you can enter a custom unit (max 4 letters), specifying it in entry 3C7)
 - 3B7 Custom unit of measurement
 - **3B8** Unity (expresses the representation of the measure)
 - ✓ ppm
 - ✓ mgl
 - ✓ NTU
- 3C Input mA number 2 0
 - 3C1 Relays .
 - 3C2 Frequency Output .
 - 3C3 Current Output
 - 3C4 Alarms
 - **3C5** Range (range of the probe connected in input: 0.5 ppm to 100000ppm)
 - 3C6 Measure associated with current input
 - ✓ FCI (Free Chlorine)
 - ✓ TCI (Total Chlorine)
 - ✓ Br (Bromine)
 - ✓ H2O2 (Oxygenated Water)
 - ✓ PAA (Peracetic Acid)
 - ✓ O3 (Ozone)
 - Custom (with the custom unit, you can enter a custom unit (max 4 letters), specifying it in entry 3C7)
 - 3C7 Custom unit of measurement
 - 3C8 Unit (expresses the representation of the measure)
 - ✓ ppm✓ mgl

 - ✓ NTU
- **3D** Redox 0
 - 3D1 Relays
 - **3D2** Frequency Output
 - 3D3 Current Output
 - 3D4 Alarms

- **3E** Temperature 0
 - 3E1 Relays •
 - **3E2** Frequency Output
 - 3E3 Current Output .
 - 3E4 Alarms .
 - 3E5 Type of Temperature Probe (PT 100, PT 1000 or manual) .
 - **3E6** Temperature manual value .
- o **3F** Time Relay
 - Status: Active / Inactive
 - Time ON: 1 (1 \div 999) minutes Time OFF: 1 (1 to 999) minute •
- 3G Flow 0
 - **3G1** Type: Rotor/Pulses **3G2** K Factor: 1.00

 - 3G3 Pulse: 1
 - 3G4 Litres: 1 .
 - 3G5 Flow unit: L/s .
 - 3G6 Total Unit: L .
 - 3G7 Tot Reset: Yes/No
- 0 3H Combined Chlorine
 - 3H1 Relay
 - 3H4 Alarms
- 3L Levels 0
 - Level 1: Enabled / Disabled •
 - Level 2: Enabled / Disabled .

2.4 PH CHLORINE/BROMINE

The **Settings Menu** is split into sub-menus with the following structure:

- 3 Settings •
 - **3A** pH 0
 - 3A1 Relays
 - 3A2 Frequency Output .
 - 3A3 Current Output .
 - 3A4 Alarms .
 - **3B** Chlorine/Bromine (if the item 3B8 is set as Br, the measurement and the settings (including the 0 ranges) will refer to the measurement of Bromine
 - 3B1 Relays
 - **3B2** Frequency Output
 - 3B3 Current Output
 - 3B4 Alarms
 - 3B5 Reference temperature to measure chlorine
 - 3B6 Chlorine measurement compensation according to the Conductivity in the water
 - 3B7 Ph Compensation

 - pH Comp: Enabled / disabled
 Compensation mode: Auto (via the value read by the pH probe) / Manual (via the value entered in the next parameter
 - ✓ Manual compensation value
 - 3B8 CI / Br: Set the reading measurement Bromo or Chlorine
 - 3C Input mA number 1 \cap
 - 3C1 Relay
 - 3C2 Frequency Output .
 - 3C3 Current output .
 - 3C4 Alarms .
 - **3C5** Range (range of the probe connected in input: 0.5 ppm to 100000ppm)
 - 3C6 Measure associated with current input: :
 - ✓ FCI (Free Chlorine)
 - ✓ TCI (Total Chlorine)
 - ✓ Br (Bromine)
 - ✓ H₂O₂ (Oxygenated Water)
 - ✓ PAA (Peracetic Acid)
 - \checkmark O₃ (Ozone)
 - ✓ Custom (with the custom unit, you can enter a custom unit (max 4 letters), specifying it in entry 3C7)
 - 3C7 Custom unit of measure
 - **3C8** Unit (expresses the representation of the measure)

 - ✓ ppm ✓ mal mgl
 - ✓ mgi✓ NTU
 - 3D Input mA number 2 0
 - 3D1 Relay
 - **3D2** Frequency Output
 - 3D3 Current output
 - 3D4 Alarms
 - **3D5** Range (range of the connected input probe: 0.5 ppm to 100000ppm)
 - 3D6 Measure associated with current input:
 - ✓ FCI (Free Chlorine)
 - ✓ TCI (Total Chlorine)
 - ✓ Br (Bromine)
 - ✓ H₂Ò₂ (Oxygenated Water)
 - ✓ PAA (Peracetic Acid)
 - ✓ O₃ (Ozone)
 - ✓ Custom (with the custom unit, you can enter a custom unit (max 4 letters), specifying it in entry 3C7)

- 3D7 Custom unit of measure
- 3D8 Unit (expresses the representation of the measure) .
 - ✓ ppm
 - ✓ mgl
 - ✓ NŤU
- **3E** Temperature 0
 - 3E1 Relays .
 - **3E2** Frequency Output •
 - 3E3 Current Output .
 - 3E4 Alarms
 - 3E5 Type of Temperature Probe (PT 100, PT 1000 or manual) •
 - 3E6 Temperature manual value
- 3F Time Relay 0
 - Status: Active / Inactive
 - .
 - Time ON: 1 (1 \div 999) minutes Time OFF: 1 (1 to 999) minutes
- o 3G Flow
 - 3G1 Type: Rotor/Pulses
 - 3G2 K Factor: 1.00
 - 3G3Pulse: 1 .
 - . 3G4 Litres: 1
 - 3G5 Flow unit: L/s
 - 3G6 Total Unit: L
 - 3G7 Tot Reset: Yes/No
- **3H** Combined Chlorine 0
 - 3H1 Relay
 - 3H2 Alarms •
- 3I Levels 0
 - Level 1: Enabled / Disabled
 - Level 2: Enabled / Disabled •

2.5 PH REDOX CHLORINE/BROMINE

The **Settings Menu** is split into sub-menus with the following structure:

3 Settings

 \cap

- **3A** pH 0
 - 3A1 Relays
 - 3A2 Frequency Output .
 - 3A3 Current Output .
 - 3A4 Alarms .
 - **3B** Chlorine/Bromine (if item 3B8 is set to Br, the measurement and settings (including ranges) will 0 be referred to the Bromine measurement)
 - 3B1 Relays
 - **3B2** Frequency Output
 - 3B3 Current Output
 - 3B4 Alarms
 - 3B5 Reference temperature to measure chlorine.
 - 3B6 Chlorine measurement compensation according to the Conductivity in the water
 - 3B7 Compensation referred to pH

 - pH Comp: Enabled / disabled
 Compensation mode: Auto (via the value read by the pH probe) / Manual (via the value entered in the next parameter)
 - Manual compensation value
 - 3B8 CI / Br: Set the reading measurement Bromine or Chlorine
 - 3C Input mA number 1
 - 3C1 Relay
 - 3C2 Frequency Output
 - 3C3 Current output .
 - 3C4 Alarms
 - **3C5** Range (range of the probe connected in input: 0.5 ppm to 100000ppm)
 - 3C6 Measure associated with current input: :
 - ✓ FCI (Free Chlorine)
 - ✓ TCI (Total Chlorine)
 - ✓ Br (Bromine)
 - ✓ H₂O₂ (Oxygenated Water)
 - ✓ PAA (Peracetic Acid)
 - \checkmark O₃ (Ozone)
 - ✓ Custom (with the custom unit, you can enter a custom unit (max 4 letters),
 - specifying it in entry 3C7)
 - 3C7 Custom unit of measure
 - **3C8** Unit (expresses the representation of the measure)

 - ✓ ppm
 ✓ mgl
 ✓ NTU
 - **3D** Input mA number 2 0
 - 3D1 Relay
 - 3D2 Frequency Output
 - 3D3 Current output
 - 3D4 Alarms
 - **3D5** Range (range of the probe connected in input: 0.5 ppm to 100000ppm)
 - **3D6** Measure associated with current input:
 - ✓ FCI (Free Chlorine)
 - ✓ TCI (Total Chlorine)
 - ✓ Br(Bromine)
 - ✓ H2O2 (Oxygenated Water)
 - ✓ PAA (Peracetic Acid)
 - ✓ O3 (Özone)
 - ✓ Custom (with the custom unit, you can enter a custom unit (max 4 letters), specifying it in entry 3C7)

- 3D7 Custom unit of measure
- **3C8** Unit (expresses the representation of the measure)
 - ✓ ppm
 - ✓ mgl
 - ✓ NTU
- o 3E Redox
 - 3E1 Relays
 - 3E2 Frequency Output
 - 3E3 Current Output
 - 3E4 Alarms
- o **3F** Temperature
 - 3F1 Relays
 - 3F2 Frequency Output
 - 3F3 Current Output
 - 3F4 Alarms
 - 3F5 Type of Temperature Probe (PT 100, PT 1000 or manual)
 - 3F6 Temperature manual value
- o 3G: Time relay
 - Status: Enabled/Disabled
 - ON Time: 1(1÷999) minutes
 - OFF Time: 1(1÷999) minutes
- o **3H** Flow
 - 3H1 Type: Rotor/Pulses
 - 3H2 K Factor: 1.00
 - 3H3 Pulse: 1
 - 3H4 Litres: 1
 - 3H5 Flow unit: L/s
 - 3H6 Total Unit: L
 - **3H7** Tot Reset: Yes/No
- o **3I** Combined Chlorine
 - 3L1 Relay
 - 3L2 Alarms
- o 3J Levels
 - Level 1: Enabled / Disabled
 - Level 2: Enabled / Disabled

2.6 CHLORINE/BROMINE

The **Settings Menu** is split into sub-menus with the following structure:

3 Settinas

0

- **3A** Chlorine / Bromine (if item 3B8 is set to Br, the measurement and settings (including ranges) 0 will be referred to the Bromine measurement
 - 3A1 Relays
 - 3A2 Frequency Output
 - 3A3 Current Output .
 - 3A4 Alarms
 - 3A5 Reference temperature to measure chlorine. .
 - **3A6** Chlorine measurement compensation according to the Conductivity in the water
 - 3A7 Compensation referred to pH
 - pH Comp: Enabled / disabled
 - ✓ Compensation mode: Auto (via the value read by the pH probe) / Manual (via the value entered in the next parameter)
 - Manual compensation value
 - 3A8 CI / Br: Set the reading measurement Bromo or Chlorine
 - **3B** input mA number 1:
 - 3B1 Relav
 - **3B2** Frequency Output
 - **3B3** Current output
 - 3B4 Alarms
 - **3B5** Range (range of the probe connected in input: 0.5 ppm to 100000ppm)
 - 3B6 Measure associated with current input: :
 - ✓ FCI (Free Chlorine)
 - ✓ TCI (Total Chlorine)✓ Br (Bromine)

 - ✓ H₂O₂ (Oxygenated Water)
 - ✓ PAA (Peracetic Acid)
 - ✓ O₃ (Ozone)
 - ✓ Custom (with the custom unit, you can enter a custom unit (max 4 letters),
 - specifying it in entry 3C7)
 - **3B7** Custom unit of measure
 - 3B8 Unit (expresses the representation of the measure)
 - ✓ ppm
 - v mgl
 - ✓ NTU

3C Input mA number 2 0

- 3C1 Relay
- 3C2 Frequency Output .
- 3C3 Current output
- 3C4 Alarms
- **3C5** Range (range of the probe connected in input: 0.5 ppm to 100000ppm)
- 3C6 Measure associated with current input
 - ✓ FCI (Free Chlorine)
 - ✓ TCI (Total Chlorine)✓ Br (Bromine)

 - ✓ H₂O₂ (Oxygenated Water)
 - ✓ PAA (Peracetic Acid)
 - ✓ O₃ (Ozone)
 - ✓ Custom (with the custom unit, you can enter a custom unit (max 4 letters), specifying it in entry 3C7)
- 3C7 Custom unit of measure
- 3C8 Unit (expresses the representation of the measure)
 - ✓ ppm
 - ✓ mgl
 - ✓ NTU

- **3D** Temperature
 - 3D1 Relays
 - 3D2 Frequency Output
 - 3D3 Current Output
 - 3D4 Alarms
 - **3D5** Type of Temperature Probe (PT 100, PT 1000 or manual)
 - **3D6** Temperature manual value
- o 3E: Time relay
 - Status: Enabled/Disabled
 - ON Time: 1(1÷999) minutes
 - OFF Time: 1(1÷999) minutes
- $\circ \quad \textbf{3F Flow}$
 - 3F1 Type: Rotor/Pulses
 - 3F2 K Factor: 1.00
 - 3F3 Pulse: 1
 - 3F4 Litres: 1
 - 3F5 Flow unit: L/s
 - 3G6 Total Unit: L
 - **3F7** Tot Reset: Yes/No
- o 3G Combined Chlorine
 - 3G1 Relay
 - 3G2 Alarms
- o 3I Levels
 - Level 1: Enabled / Disabled
 - Level 2: Enabled / Disabled

2.7 PH

The **Settings Menu** is split into sub-menus with the following structure:

- 3 Settings •
 - **3A** pH 0
 - 3A1 Relays
 - 3A2 Frequency Output .
 - 3A3 Current Output
 - 3A4 Alarms -
 - 3B Input mA number 1 0

- 3B1 Relays
- 3B2 Frequency Output
- 3B3 Current Output
- 3B4 Alarms
- **3B5** Range (range of the connected input probe: 0.5 ppm to 100000ppm)
 - 3B6 Measure associated with current input

 - ✓ FCI (Free Chlorine)
 ✓ TCI (Total Chlorine)
 ✓ Br (Bromine)
 ✓ H₂O₂ (Oxygenated Water)
 ✓ PAA (Peracetic Acid)
 ✓ (O2) (Occurac)

 - ✓ O3 (Ozone)
 - ✓ Custom (with the custom unit, you can enter a custom unit (max 4 letters), specifying it in entry 3B7)
- 3B7 Custom unit of measurement .
 - **3B8** Unity (expresses the representation of the measure)
 - ✓ ppm
 - ✓ mgl
 - ✓ NTU
- 3C Input mA number 2 0
 - 3C1 Relays
 - 3C2 Frequency Output
 - 3C3 Current Output .
 - 3C4 Alarms
 - **3C5** Range (range of the probe connected in input: 0.5 ppm to 100000ppm)
 - **3C6** Measure associated with current input

 - ✓ FCI (Free Chlorine)
 ✓ TCI (Total Chlorine)
 ✓ Br (Bromine)
 ✓ H2O2 (Oxygenated Water)
 ✓ PAA (Peracetic Acid)

 - ✓ O3 (Ozone)
 - ✓ Custom (with the custom unit, you can enter a custom unit (max 4 letters), specifying it in entry 3C7)
 - 3C7 Custom unit of measurement
 - **3C8** Unit (expresses the representation of the measure)
 - ✓ ppm
 - v mgl
 - ✓ NTU
- **3D** Temperature 0
 - 3D1 Relays
 - **3D2** Frequency Output
 - **3D3** Current Output
 - 3D4 Alarms
 - 3D5 Type of Temperature Probe (PT 100, PT 1000 or manual) •
 - 3D6 Temperature manual value

3E Time Relay 0

- Status: Active / Inactive
- Time ON: 1 (1 ÷ 999) minutes •
- Time OFF: 1 (1 to 999) minute •
- 3F Flow 0
 - **3F1** Type: Rotor/Pulses **3F2** K Factor: 1.00
 - •
 - 3F3 Pulse: 1 .
 - 3F4 Litres: 1 .
 - 3F5 Flow unit: L/s .
 - 3F6 Total Unit: L
 - 3F7 Tot Reset: Yes/No •
- 3H Combined Chlorine
 - 3H1 Relay
 - 3H2 Alarms .
- \circ 3L Levels
 - Level 1: Enabled / Disabled
 - Level 2: Enabled / Disabled

2.8 FULL MODE (***)

Before to start to use the FULL MODE feature, you must refer to the CONNECTIONS LABEL as specified below.

The **Settings Menu** is split into sub-menus with the following structure:

- 3 Settinas •
 - **3A** pH 0
 - 3A1 Relay 1
 - 3A2 Relay 2 .
 - 3A3 Frequency Output •
 - **3A4** Current Output
 - 3A5 Alarms
 - **3B** Chlorine/Bromine (if the item 3B9 is set as Br, the measurement and the settings (including the 0 ranges) will refer to the measurement of Bromine
 - 3B1 Relay 1
 - 3B2 Relay 2
 - 3B3 Frequency Output
 - 3B4 Current Output
 - 3B5 Alarms .
 - **3B6** Reference temperature to measure chlorine
 - . **3B7** Chlorine measurement compensation according to the Conductivity in the water
 - 3B8 Ph Compensation .

 - pH Comp: Enabled / disabled
 Compensation mode: Auto (via the value read by the pH probe) / Manual (via the value entered in the next parameter
 - Manual compensation value \checkmark
 - 3B9 CI / Br: Set the reading measurement Bromine or Chlorine
 - 3C Input mA number 1
 - 3C1 Relay 1 .
 - 3C2 Relay 2 .
 - 3C3 Frequency Output
 - 3C4 Current output
 - 3C5 Alarms
 - 3C6 Range (range of the probe connected in input: 0.5 ppm to 100.000ppm)
 - 3C7 Measure associated with current input: :
 - ✓ FCI (Free Chlorine)
 - ✓ TCI (Total Chlorine)
 - ✓ Br(Bromine)
 - ✓ H2O2 (Oxygenated Water)
 - ✓ PAA (Peracetic Acid)
 ✓ O3 (Ozone)

 - Custom (with the custom unit, you can enter a custom unit (max 4 letters),
 - specifying it in entry 3C7)
 - 3C8 Custom unit of measure
 - 3C9 Unit (expresses the representation of the measure)

 - ✓ ppm✓ mgl
 - ✓ NTU
 - **3D** Input mA number 2 0
 - 3D1 Relay 1
 - 3D2 Relay 2
 - 3D3 Frequency Output
 - 3D4 Current output
 - 3D5 Alarms
 - **3D6** Range (range of the connected input probe: 0.5 ppm to 100.000ppm)
 - 3D7 Measure associated with current input:
 - ✓ FCI (Free Chlorine)✓ TCI (Total Chlorine)

 - ✓ Br(Bromine)

- ✓ H2O2 (Oxygenated Water)
- ✓ PAA (Peracetic Acid)
- ✓ O3(Ozone)
- ✓ Custom (with the custom unit, you can enter a custom unit (max 4 letters), specifying it in entry 3D8)
- **3D8** Custom unit of measure
 - **3D9** Unit (expresses the representation of the measure)
 - ✓ ppm
 - ✓ mgl
 - ✓ NTU
- o **3E** Redox

- 3E1 Relay
- **3E2** Frequency Output
- 3E3 Current Output
- 3E4 Alarms
- **3F** Temperature
 - 3F1 Relay
 - **3F2** Frequency Output
 - 3F3 Current Output
 - 3F4 Alarms
 - 3F5 Type of Temperature Probe (PT 100, PT 1000 or manual)
 - **3F6** Temperature manual value
- **3G** Time Relay
 - 3G1 Status: Active / Inactive
 - 3G2 Time ON: 1 (1 ÷ 999) minutes
 - **3G3** Time OFF: 1 (1 to 999) minutes
- **3H** Flow
 - 3H1 Type: Rotor/Pulses
 - 3H2 K Factor: 1.00
 - 3H3 Pulse: 1
 - 3H4 Litres: 1
 - 3H5 Flow unit: L/s
 - 3H6 Total Unit: L
 - 3H7 Tot Reset: Yes/No
 - 3I Combined Chlorine
 - 311 Relay 1
 - 3l2 Alarms
- **3J** Cd

0

- 3J1 Relay
- 3J2 Frequency Output
- 3J3 Current Output
- 3J4 Alarms
- **3J5** C Factor: Custom-0.01-0.10-0.20-0.30-1.00-10.00
- **3J6** Custom: 0.00 10.00
- 3J7 Unit: ohm-Kohm-Mohm-uS-mS
- 3J8 TDS Factor: 0.01 2.00
- 3J9 T Rif: 18.0°C/20.0°C/25.0°/Off

(***) CONNECTIONS LABEL



3 SETTINGS AND OPERATION

3.1 INSTRUMENT DISPLAY

Using the right / left keys you can select the display between the various panels.

As far as the main screen is concerned, the display is customizable, i.e. it is possible, using the **5B10** menu, to select the measures we want to display.

The system provides 2 customizable screens, divided into 4 slots, in which to display the quantities relating to the selected inputs.



One of the two screens relating to the measures still to be customized

The display can be selected using the left / right buttons

 Main screen with display of the main measures and outputs (relay, frequency outputs, current outputs) Note: The output display (relay, current output, frequency output) are visible ONLY if in menu 5H, 5I and 5J these measures have been associated with the various outputs

15,20mA1 20p/mF1 9,80pH	4,28mA2 20p/mF2 0,09pm R2 R2
5,15mA4 20p/mF4 +14.9mV	0,00mA3 0p/mF3 25,0 °с мтс
Reed ON	R Time: R5 Disable

One of the two screens relating to the measurements already configured

Right button

2) Main screen n.2 similar to the previous screen

Right button

3) Display Free Chlorine, Total and Combined Chlorine (in case a free Chlorine and one for the Total and the corresponding formula for the calculation of Combined Chlorine are set up (menu 5G), the relative value and status of the outputs (if associated with them) related to these quantities)



Right button

4) Visualization of the graphs on the basis of the statistical data: by activating the statistical function it is possible to visualize the graphs with the progress of the various measures. To display the graph of the various measurements use the UP and DOWN keys

	Measu	re Trend(pH)
Statistics Disable	Маж	
Actual Yalue 12,26 pH	en	
SetPoint: 7,20pH	эн	
Min: OpH	Min-	1
Мах: 14рН		1 h

Right button

5) Enlarged display of two parameters: it is possible to display with large characters and relative representation to BARGRAPH, the main measurements of the instrument. To change the displayed measurements, use the UP and DOWN keys (main measures only)



Right button

6) Visualization of permanent and resettable totalizers and instantaneous flow connected to the possible flow meter connected to the instrument input



Right button

7) Synoptic display where the current configuration is summarized (measurements present in the system (in addition to Flow and Temperature) mapping of the outputs with the input measurements

	Sy	rstem Co	nfigurat	ion	
(P1)	H(P2)0	RP(P3)	CIA(P4))mA1(I	P5)mA2
R1:	pН	R2:	CI	R3:	Temp
R4:	ORP	R5:	Time	R6:	Alarm
mA1:	рН	mA2:	CI		
mA3:	Temp	m44:	ORP		
F1:	рН	F2:	CI		
F3:	Temp	F4:	ORP		

Right button

7) QR-Code display for download user manual



The opposite sequence of views (from 7 to 1) is obtained by pressing the left key instead of the right one

Note: Chemical measures not available will not be displayed.

Note: The programming, alarm display, calibration and mode screens have been developed so as to use a part of the screen, keeping in the lower part a REAL TIME MEASURE MONITOR, a SYNOPTIC SYNOPTIC OF RELAY SETTINGS.

As shown in the following example view.

----Setup-Uk Language Calibration Settings Statistics Advanced Cl: 0.09ppm Temp: 25.0'C 14.00PH -169mU PH: ORP: 0n/0ff 0n/0ff 0n/0ff 0n/0ff 7.20PPm -20PPm -20PC -20 Acid Low High R×+ 5: Disable

For convenience in the description that will follow for the calibrations, programming, alarms, mode, will be shown only the specific part of the display concerning the section under examination, avoiding to report each time the Real Time Monito and the Synoptic Summary of Relay Settings.

Note:

The new functions of associating relay outputs, current outputs and frequency outputs with the various measurements are available in menus 5H, 5I and 5J where it is possible for each output to indicate the associated measurement.

-Advanced------9 Delay 6 Formula: mA2-mA1 Dosing De Cl Cmb Fo Relay Map OutmA Map OutF Map E G E H J 0.09ppm 25.0'C Cl: Temp: PH: ORP: 14.00PH -235mV 7.20PH 1.20PPm 25.0°C +700mV Disable Acid 0n/0fRECERCE Low On/Off High On/Off Rx+ On/Off

As an example, the relay-measurement association section is shown

Relay Map-RRRRRR PH 5555555 * FC ORP Time 0.09ppm 25.0°C C1: 14.00PH -274mU PH: ORP Temp: 0n/0f 0n/0f 0n/0f 0n/0f 7.20PH 1.20PPm 25.0°C +700m Acid RECEIPTION 千千千 Low High R×+ f Disable

(RCA section added)

Generally the system allows to associate an output for measurement.

For some measurements (pH, Chlorine / Bromine, InmA1 and InmA2) it is possible to associate up to 2 relays per measurement; in this case, in menu 5H, we will select the measurements to make the desired measurement appear followed by the number "2"

Relay Map REERER 5H p 1111111 111111 PH InmA ClCmb .00ppm 5.0.0 PH: ORP: C1: 02 10.15PH ØmU Temp: ----7.20pH Acid 7.20pH Acid 0.50pPm Low 100000hm High 1.20ppm Low R 0n/0 0n/0 0n/0 f CARCINO CARCINO ++++ f f Ť Ōn∕Ōf

The effect on the main screen of the association of two relays to the same measurement (where possible) is as follows:



The system allows to associate an output for measurement.

To associate an output with a measurement already associated with another output, the measurement from this output must first be de-associated.

This is done by setting the measurement of this last output to "----" As in the attached photo



3.2 DESCRIPTION OF KEYS

Below is the description of the keys on the front panel:



By pressing both keys for at least 3 seconds you access the Programming and Settings Menus



By pressing the key for at least three seconds you access the Quick Calibration Menu



By pressing the key you select the various Menu items and confirm the changes made



By pressing the key you exit the various Menu items. By pressing it for at least 3 seconds when the instrument is in standby mode allows you to access the Setpoint quick change Menu



The two keys allow you to scroll through the various Menu items and to change parameters



In standby mode, the keys change the display screens. Within the Setpoint quick change menu, you select the items to change for each measurement

3.3 **MEASUREMENT CALIBRATION**

The Calibration can be done using the Menus shown on the display.

Access the Quick Calibration Menu by pressing the CAL key for 3 seconds.

For all possible Calibration modes, enter the programming mode and access the "Calibration" item.

	Calibration	
рН		
		Ļ
Temp		·

Use the Up and Down keys to select the pump to calibrate and press ENTER.



Note: unavailable chemical measurements will not be displayed.

PH PROBE CALIBRATION 3.3.1

- STANDARD MODE

Connect the pH probe to the instrument as shown in the electrical connections. Select the pH probe in the Calibration menu Select the first option (Standard Calibration) Select whether to Calibrate Automatically (AUTO) or Manually (MAN).

	Αυτο	
рН	CAL.	Type: Auto
рН 7.00рН	CAL. 25.0°C	Type: Auto
рН 7.00рН	CAL. 25.0°C	Type: Auto
Wait	60"	
рН 7.00рН	CAL. 25.0°C	Type: Auto
Quality	100%	
pH 7.00pH 4.00pH Wait	CAL. 100% 25.0° C 60"	Type: Auto
рН 7.00рН 4.00 рН	CAL. 100% 100%	Type: Auto

In the Automatic option (AUTO):

- Immerse the probe in the pH 7 solution and press Enter
- Wait 60 seconds, the instrument will then display the probe quality as a percentage (100% maximum quality, 25% minimum quality, below 25% the instrument displays the error screen \rightarrow replace probe)
- Immerse the probe in the pH 4 or pH 9.22 solution and press Enter
- Wait 60 seconds, the instrument will then display the probe quality as a percentage (100% maximum quality, 25% minimum quality, below 25% the instrument displays the error screen \rightarrow replace probe)
- At the end of the operation, a Calibration completion message will be displayed

At the end of each Calibration point, the instrument displays the electrode quality as a percentage.

	MAN	
рН	CAL.	Type: Man
рН 8.00рН	CAL. 25.0°C	Type: Man
рН 8.00рН	CAL. 25.0°C	Type: Man
Wait	60"	
рН 8.00рН	CAL. 25.0°C	Type: Man
Quality	100%	
рН 6.00рН	CAL. 25.0°C	Type: Auto
Wait	60''	
рН 8.00рН 6.00рН	CAL. 100% 100%	Type: Auto

In the Manual option (MAN):

- Immerse the probe in the first solution and enter its pH value and press **Enter**
- Wait 60 seconds, the instrument will then display the probe quality as a percentage (100% maximum quality, 25% minimum quality, below 25% the instrument displays the error screen → replace probe)
- Immerse the probe in the second solution and enter its pH value
- Wait 60 seconds, the instrument will then display the probe quality as a percentage (100% maximum quality, 25% minimum quality, below 25% the instrument displays the error screen → replace probe)
- At the end of the operation, a calibration completion message will be displayed

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

- REFERENCE MODE

Connect the pH probe to the instrument as shown in the electrical connections. Select the pH probe in the Calibration menu Select the second option (Calibration By Ref)



In the **ByRef** option:

- The read pH value is displayed, without calibration and flashing
- This value can be modified
- The actual pH value is set
- Confirm by pressing Enter
- Upon confirmation, the pH value appears and stops flashing whereas, "Wait" starts flashing below
- After a few seconds the system automatically returns to the previous menu (Calibration type selection)

This type of Calibration can be done WITHOUT extracting the probe from the probe holder, simply by reading the pH value to make the relevant correction on the read measurement. If a Standard Calibration is implemented, the value set in this Calibration By Ref is cancelled.

- STANDARD MODE

Connect the ORP probe to the instrument as shown in the electrical connections. Select the ORP probe in the Calibration menu Select the first option (Standard Calibration)

Select whether to Calibrate Automatically (AUTO) or Manually (MAN).

	AUTO	
ORP	CAL.	Type: Auto
ORP +475mV	CAL.	Type: Auto
ORP +475mV Wait	CAL. 60	Type: Auto ""
ORP +475mV	CAL. 100%	Type: Auto

In the Automatic option (AUTO):

- Immerse the probe in the +475mV solution and press **Enter**
- Wait 60 seconds, the instrument will then display the probe quality as a percentage (100% maximum quality, 25% minimum quality, below 25% the instrument displays the error screen → replace probe)
- At the end of the operation, a Calibration completion message will be displayed.

At the end of each Calibration point, the instrument displays the electrode quality as a percentage.

	MAN	
ORP	CAL.	Type: Man
ORP +475mV	CAL.	Type: Man
ORP +475mV Wait	CAL.	Type: Man 60"

г

In the Manual option (MAN):

- Immerse the probe in the solution and enter the value in mV of the solution in use and press **Enter**
- Wait 60 seconds, the instrument will then display the probe quality as a percentage (100% maximum quality, 25% minimum quality, below 25% the instrument displays the error screen → replace probe)
- At the end of the operation, a Calibration completion message will be displayed.

At the end of each Calibration point, the instrument displays the electrode quality as a percentage.

- REFERENCE MODE

Connect the ORP probe to the instrument as shown in the electrical connections. Select the ORP probe in the Calibration menu Select the second option (Calibration By Ref).



In the **ByRef** option:

- The read ORP value is displayed, without calibration and flashing
- This value can be modified
- Set the actual ORP value
- Confirm by pressing Enter
- Upon confirmation, the ORP value appears and stops flashing whereas, "Wait" starts flashing below
- After a few seconds the system automatically returns to the previous menu (Calibration type selection).

This type of Calibration can be done WITHOUT extracting the probe from the probe holder, simply by reading the ORP value to make the relevant correction on the read measurement. If a Standard Calibration is implemented, the value set in this Calibration By Ref is cancelled.

3.4 CL PROBE CALIBRATION (CHLORINE)

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



In the 2B1 One Point option:

- Take a chlorine reading with a reference instrument.
- Change the value shown on the display until it reaches the value read by the reference instrument and press **Enter**.
- Wait 10 seconds for the calibration to be completed.
- At the end of the operation, a calibration completion message will be displayed.

2B2 Two Points

First Point	Calibration
Enabled	
	O-likustisu
First Point	Calibration
0.00 > 1.80 ppm	> 5.00 ppm
Second Point	Calibration
0.00 < 0.30 ppm	> 1.80 ppm



In the 2B2 Two Points option:

- Take a chlorine reading with a reference instrument.
- Select the "First Point" item and change the value shown on the display until it reaches the value read by the reference instrument and press **Enter**.
- Wait 10 seconds for the calibration to be completed.
- Close the water input to the chlorine probe holder and wait 100 seconds.
- Select the "Second Point" item and change the value shown on the display (less than the first) until it reaches the value read by the reference instrument and press **Enter**.
- Wait 10 seconds for the calibration to be completed.
- Enable the calibration in the "Enable" menu to complete the calibration.

- A Calibration values entered and loaded manually
- **B** Values read by the amperometric cell during the Calibration stage

3.5 TEMPERATURE PROBE CALIBRATION

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

ТЕМР 25.0°С	CAL.	Type: MAN
CL 28.0°C	CAL.	Type: MAN
CL 28.0°C Wait	CAL. 10"	Type: MAN

In the Manual option (MAN):

- Take a temperature reading with a reference instrument.
- Change the value shown on the display until it reaches the value read by the reference instrument and press **Enter**.
- Wait 10 seconds for the calibration to be completed.
- At the end of the operation, a calibration completion message will be displayed.

3.6 FLOWMETER CALIBRATION

Connect the flow meter sensor to the instrument as shown in the electrical connections. Select the FLOW probe in the Calibration menu.



3.7 CONDUCTIVITY PROBE CALIBRATION

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

CD	CAL.	Tipo: MAN
120 uS		
CD	CAL.	Tipo: MAN
128 uS		
CD	CAL.	Tipo: MAN
128 uS Attendere		10"

- Press Enter when the sensor will be ready to read a flow and you will have a System to read the relative volume in litres
- Open the product flow (water). The sensor sends pulses to the instrument (as shown on the screen)
- Close the product flow (water). The system shows the sum of the pulses from the sensor
- When the pulses end, press Enter
- Then enter the litres equivalent to the pulses
- Press Enter and the calibration is completed.

In the Manual option (MAN):

- A conductivity reading is performed with a reference instrument.
- The value shown on the display changes until it reaches the value read by the reference instrument and press Enter.
- Wait 10 seconds for calibration to complete.
- At the end of the operation, an indication of completion of the calibration will be given.

3.8 ALARMS DISPLAY

To display the alarms recorded by the instrument, proceed via the menus shown on the display. Keep **ENTER** pressed for 3 seconds to access the ALARMS menu.

The items in the menu are:

ALARMS ALARMS DISPLAY RESET ALARMS LIST RESET ALARMS RELAY ALARMS RESET ALARMS LIST RESET ALARMS RELAY RESET OFA

↑

Display recorded Alarms
 Number of alarms in the list (1/14)
 Date
 List of Alarms with the recorded time,
 use the Up and Down keys to read the list

2) Reset Alarms list Use the Up and Down keys to select the No/Yes item and press ENTER

ALRM	01/14	12/12/11
05:59	PH HIGH	
06:00	RX LOW	
06:10	RX LOW	\downarrow

RESET ALARMS LIST

NO

3) Reset Alarms RelayUse the Up and Down keys to select theNo/Yes item and press ENTERThis function allows you to switch off the Alarms Relay

4) Reset OFA Use the Up and Down keys to select the No/Yes item and press ENTER **RESET ALARMS RELAY**

NO

RESET OFA

NO

3.9 MODE MENU QUICK SETTING

Display the rapid MODE menu by pressing **ESC/MODE** for 3 seconds.

Select the desired item using the **Up** and **Down** keys and press **ENTER** to modify (the "<" symbol appears on the right side) the Set Point value and confirm by pressing **ENTER**.

SP PH SP CL/BR SP ORP	MODE 7.20 pH 1.20 ppm +700 mV	P: OFF P: ON P: OFF
SP PH SP CL/BR SP ORP	MODE 7.20 pH 1.20 ppm +700 mV	P: OFF < P: ON P: OFF

Press ESC to exit the menu.

3.10 RESET PROCEDURE

There is a procedure in the instrument that allows you to reset the system.

Select the **RESET** menu by following the steps below:

- 1) Switch the instrument off
- 2) Press the **Up** and **Down** keys and switch on the instrument.

INITIAL. DEFAULT?

NO

The phrase at the side appears and use the **Up** and **Down** keys to select the No/Yes item and press ENTER.

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Implement this procedure only in case of an emergency!

4 PROGRAMMING

Upon start-up, the system is automatically set to dosing and measurement mode (RUN function).

By pressing **ESC** and **ENTER** simultaneously you will access the programming mode. Then press **ENTER** to access the various menus. By doing so, all the outputs will be disabled.

Use the **UP** and **DOWN** keys to scroll through the various menus and sub-menus and change the data. The **ENTER** key accesses the data entry sub-menus and confirms the changes made. The **ESC** key goes back to the previous menu or function and cancels any changes made.

Below are the displays of all the main menu items as shown in the instrument:

SETUP	SETUP
1 LANGUAGE	3 SETTINGS ↑
EN	4 STATISTICS
2 CALIBRATION	5 ADVANCED

4.1 LANGUAGE MENU

You can select the language of the Software from: English, French, German, Spanish, Italian, Polish, Czech and Turkish.

LANGUAGE ENGLISH FRENCH GERMAN	↓	GERMAN SPANISH > ITALIAN	LANGUAGE	↑
LANGUAGE > ITALIAN POLISH CZECH	¢			
The set language is highlighted with an	n arrow, such as:> E	nglish.		

4.2 CALIBRATION MENU

Refer to the previous paragraphs, in particular par. 3.2 MEASUREMENT CALIBRATION.

CALIBRATION	CALIBRATION
рН	ORP 1
ORP	CL/Br
CL/Br ↓	Temperature

4.3 SETTINGS MENU

(for pH, Br / CL, mA1 and mA2 it is possible to define up to two RELAYS for each measurement, as shown as an example on the pH measurement)

Select the menu item to be set and confirm by pressing ENTER.

SETTINGS pH CHLORINE/BROMINE REDOX SETTINGS TEMPERATURE 1 TIME RELAY FLOW

4.3.1 pH MEASUREMENT SETTINGS MENU

With the UP and DOWN keys (increase / decrease) select the Relay whose settings you want to change

Select Relay RELAY 1 RELAY 2 Then confirm with ENTER.

Use the **UP** and **DOWN** keys to scroll through the various menus and sub-menus and change the data. The **ENTER** key accesses the data entry sub-menus and confirms the changes made.

PH DOSINGRELAYON/OFFFMW(Frequency Output)OUTmA(Current Output)

PH DOSI	NG	
FWM	(Frequency Output)	↑
OUTmA	(Current Output)	
ALARMS		

4.3.1.1 pH Relay Menu

Below is the description of the various items of the sub-menus of the pH measurement:

PH RELAY >ON/OFF TIMED (Timed Dosing) PWM (Proportional Dosing) The settings of the pH Relay can vary:

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

Below is the description of the items of the pH Relay sub-menus in the various modes and with the various ranges and settings.

4.3.1.2 Frequency output proportional to the pH measurement (FWM PH) menu

FWM PH		FWM PH		
SET POINT:	7.20pH	DOSING TYPE:		
DOSING TYPE:	ACIDIC	PULSE:	20/min	
PULSE:	20/min ↓	PROP BAND:	0.30pH	

ltem	Default Value	Range
FWM Standard		
SetPoint:	7.20 pH	0÷14 pH
Dosing Type:	Acidic	Acid / Alka
Pulse:	20 pulses/minute	20÷150 pulses/minute
Proportional Band:	0.3 pH	0.3÷3pH

Through the frequency output (Open Collector circuit) we can control and drive the dosing of a remote system proportionally to the pH measurement.

4.3.1.3 Current output proportional to the pH measurement (OUT mA PH) menu

OUT mA PH RANGE: 4-20 START (4): 0 END (20): 14.00	mA .00рН рН ↓	OU ST EN HC	JT mA PH FART (4): D (20): DLD mA:	0.00pH 14.00pH 4.00mA	↑
Item	Default Value	9	Range	Note	
On/Off					
SetPoint:	7.20 pH		0÷14 pH		
Dosing Type:	Acidic		Acidic / Alkaline		
Hysteresis:	Off		0.10÷3 pH		
Hysteresis Time:	Off		1÷900 Seconds		
Start Delay:	Off		3÷900 Seconds		
End Delay:	Off		3÷900 Seconds		
Timed					
SetPoint:	7.20 pH		0÷14 pH		
Dosing Type:	Acidic		Acid / Alka		
Hysteresis:	Off		0.10÷3 pH		
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		
PWM (Proportional)					
SetPoint:	7.20 pH		0÷14 pH		
Dosing Type:	Acidic		Acid / Alka		
Hysteresis:	Off		0.10÷3 pH		
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:	0.3 pH		0.3÷3pH		

ltem	Default Value	Range
Out mA Standard		
Range 0/4÷20mA:	4÷20 mA	0÷20 mA o 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



Note: The value set in the **HOLD mA** item is automatically generated by the instrument when a Hold functional stop is present, example due to no water (Flow Alarm) or Input in active Voltage (HOLD).

4.3.1.4 pH Alarms menu

PH ALARMS		PH ALARMS		
MIN VAL.:	6.20pH	PERM RANGE:	OFF	1
MAX VAL.:	8.20pH	PERM TIME:	OFF	
OFA:	OFF ↓	LEVEL ALRM:	DISAB.	

Note: The Persistence Range and Persistence Time items must be used together.

The Persistence function, based on both parameters, analyses the chemical measurement and if it is within a range given by the measurement average (+/- the Persistence Range) for a time equal to the Persistence Time, it detects a possible anomaly in the relevant measurement.

This alarm could help prevent incorrect dosing for damaged probes.

For more details see Annex F.

4.3.2 CHLORINE/BROMINE MEASUREMENT SETTINGS MENU

Use the **UP** and **DOWN** keys to scroll through the various menus and sub-menus and change the data. The **ENTER** key accesses the data entry sub-menus and confirms the changes made.

CHLORINE/BROMINE DOSING	CHLORINE/BROMINE DOSING
RELAY	OUTmA 1
ON/OFF	ALARMS
FMW	REF. T.: 25.0°C

4.3.2.1 Chlorine Relay Menu

Below is the description of the various items of the sub-menus of the Chlorine measurement:

CHLORINE/BROMINE RELAY >ON/OFF TIMED PWM

The settings of the Chlorine Relay can vary:

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

Item	Default Value	Range
pH Alarms list		
Minimum alarm:	6.2 pH	0÷14 pH
Maximum alarm:	8.2 pH	0÷14 pH
OFA (Maximum dosing timer)	Off	10÷3600 Seconds
Persistence range:	Off	0.2÷3 pH
Persistence time:	Off	10÷3600 Seconds

Below is the description of the items of the Chlorine Relay sub-menus in the various modes and with the various ranges and settings:

4.3.2.2 CHLORINE/BROMINE (FWM) Frequency Output menu

FWM CHLORINE/BRO	OMINE		FWM CHLORINE/B	ROMINE
SET POINT:	1.20ppm		DOSING TYPE:	LOW 1
DOSING TYPE:	LOW		PULSE:	20/min
PULSE:	20/min	\downarrow	PROP BAND:	0.60ppm

Through the frequency output (Open Collector circuit) we can control and drive the dosing of a remote system proportionally to the Chlorine measurement.

Item	Default Value	Range
FWM Standard		
SetPoint:	1.2 ppm	0÷5 ppm (0-12ppm for Br)
Type Dose:	Low	High / Low
Pulse/minutes:	20 pulses/minute	20÷150 pulses/minute
Proportional Band:	0.6 ppm	0.3÷3 ppm (0.6-7.2 ppm for Br)

4.3.2.3 mA OUT CHLORINE/BROMINE menu

mA OUT CHLORINE/BROMINE		mA OUT CHLOR			
RANGE:	4-20 mA		START (4):	0.00ppm	1
START (4):	0.00ppm		END (20):	5.00ppm	
END (20):	5.00ppm	\downarrow	HOLD mA:	0.00mA	

ltem	Default Value Range		
On/Off			
SetPoint:	1.2 ppm	0÷5 ppm (0-12ppm for Br)	
Dosing Type:	Low	High / Low	
Hysteresis:	Off	0.01-3 ppm (0.01-7.2 ppm for Br)	
Hysteresis Time:	Off	1÷900 Seconds	
Start Delay:	Off	3÷900 Seconds	
End Delay:	Off	3÷900 Seconds	
Timed			
SetPoint:	1.2 ppm	0÷5 ppm (0-12ppm for Br)	
Dosing Type:	Low	High / Low	
Hysteresis:	Off	0.01-3 ppm (0.01-7.2 ppm for Br)	
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	
PWM (Proportional)			
SetPoint:	1.2 ppm	0÷5 ppm (0-12ppm for Br)	
Dosing Type:	Low	High / Low	
Hysteresis:	Off	0.01-3 ppm (0.01-7.2 ppm for Br)	
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:	0.6 ppm	0.3-3 ppm (0.6-7.2 ppm for Br)	

ltem	Default Value	Range
Out mA Standard		
Range 0/4÷20mA:	4÷20 mA	0÷20 mA o 4÷20 mA
Start (4): 0 pH	0 ppm	0÷5ppm (0-12ppm for Br)
End (20): 14 pH	5 ppm	0÷5ppm (0-12ppm for Br)
Hold Function mA value: 0/4 or 20	0 mA	0÷22 mA
mA		



Note: The value set in the **HOLD mA** item is automatically generated by the instrument when a Hold functional stop is present, example due to no water (Flow Alarm) or Input in active Voltage (HOLD).

A	LARMS			ALARMS	
MIN VAL.:	0.50ppm		PERM RANGE:	OFF	1
MAX VAL.:	1.80pppm		PERM TIME:	OFF	
OFA:	OFF	\downarrow	LEVEL ALARM:	DISABLED	

Item	Default Value	Range	
pH Alarms list			
Minimum alarm:	0.5 ppm	0-5ppm (0-12ppm for Br)	
Maximum alarm:	1.8 ppm	0-5ppm (0-12ppm for Br)	
OFA (Maximum dosing timer):	Off	1-240 minutes	
Persistence range:	Off	0.2-3 ppm (0.2-7.2 ppm for Br)	
Persistence time:	Off	10÷3600 Seconds	
Level Alarm: System block	Disabled	Enabled/Disabled	
or alarm display			



Note: the **Persistence Range** and **Persistence Time** items must be used together.

The Persistence function, based on both parameters, analyses the chemical measurement and if it is within a range given by the measurement average (+/- the Persistence Range) for a time equal to the Persistence Time, it detects a possible anomaly in the relevant measurement.

This alarm could help prevent incorrect dosing for damaged probes.

For more details see Annex F.

Reference temperature menu to measure CHLORINE/BROMINE

Select the reference temperature for the Chlorine measurement by selecting a setting from 18, 20, 25°C.

Chlorine/Bromine Compensation based on the water conductivity menu

Select the reference conductivity from Low (less than 9mS) and High (more than 9mS).

4.4 REDOX MEASUREMENT SETTINGS MENU

Use the **UP** and **DOWN** keys to scroll through the various menus and sub-menus and change the data. The **ENTER** key accesses the data entry sub-menus and confirms the changes made.

REDOX DOSING	REDOX DOSING
RELAY ON/OFF	FWM 1
FMW	OUTmA
OUTmA ↓	ALARMS



Note: This menu is available in the pH–Chlorine and pH-Chlorine-Redox System version.

4.4.1 REDOX RELAY MENU

Below is the description of the various items of the sub-menus of the Redox measurement:

	REDOX RELAY
>ON/OFF	
TIMED	
PWM	

The settings of the Redox Relay can vary:

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

Below is the description of the items of the pH Relay sub-menus in the various modes and with the various ranges and settings:

ltem	Default Value	Range
On/Off		
SetPoint:	700 mV	±2000 mV
Type Dose:	Low	High / Low
Hysteresis:	Off	10÷600 mV
Hysteresis Time:	Off	1÷900 Seconds
Delay Start:	Off	3÷900 Seconds
Delay End:	Off	3÷900 Seconds
Timed		
SetPoint:	700 mV	±2000 mV
Type Dose:	Low	High / Low
Hysteresis:	Off	10÷600 mV
Hysteresis Time:	Off	1÷900 Seconds
Delay Start:	Off	3÷900 Seconds
Delay End:	Off	3÷900 Seconds
On Time:	1	1÷1800 Sec
Off Time:	1	1÷1800 Sec
Proportional (PWM)		
SetPoint:	700 mV	±2000 mV
Type Dose:	Low	High / Low
Hysteresis:	Off	10÷600 mV
Hysteresis Time:	Off	1÷900 Seconds
Delay Start:	Off	3÷900 Seconds
Delay End:	Off	3÷900 Seconds
Period:	20 seconds	20÷1800
Proportional Band:	300 mV	20÷600 mV

4.4.2 REDOX (ORP) (FWM) FREQUENCY OUTPUT MENU

|--|

ltem	Default Value	Range
FWM Standard		
SetPoint:	700 mV	
Type Dose:	Low	High / Low
Pulse/minutes:	20 pulses/minute	20÷150 pulses/minute
Proportional Band:	200 mV	

Through the frequency output (Open Collector circuit) we can control and drive the dosing of a remote system proportionally to the Redox measurement.

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Note: This menu is available in the pH–Redox System version.

4.4.3 REDOX OUT CURRENT OUTPUT MENU

OUTmA pH		OUTmA pH		
RANGE:	4-20 mA	START (4):	0.00ppm ↑	
START (4):	000 mV	END (20):	900 mV	
END (20):	999 mV ↓	HOLD mA:	20.0 mA	

ltem	Default Value	Range
Out mA Standard		
Range 0/4÷20mA:	4÷20 mA	0÷20 mA o 4÷20 mA
Start (4): 0 pH	0 mV	
End (20): 14 pH	999 mV	
Hold Function mA value: 0/4 or 20 mA	0 mA	0÷20 mA



Note1: The value set in the **HOLD mA** item is automatically generated by the instrument when a Hold functional stop is present, example due to no water Flow Alarm or Input in active Voltage.

Note2: This menu is available in the pH–Redox System version.

CHLORINE ALARMS		CHLORINE ALARMS		
MIN VAL.:	100 mV	PERMRANGE:	OFF	↑
MAX VAL.:	800 mV	PERMTIME:	OFF	
OFA:	OFF	LEV.ALARM:	DISABL	ED

Item	Default Value	Range
pH Alarms list		
Minimum alarm:	100 mV	
Maximum alarm:	800 mV	
OFA (Maximum dosing timer):	Off	10÷3600 Seconds
Persistence range:	Off	0.2÷3 ppm
Persistence time:	Off	10÷3600 Seconds



Note: the **Persistence Range** and **Persistence Time** items must be used together. The Persistence function, based on both parameters, analyses the chemical measurement and if it is within a range given by the measurement average (+/- the Persistence Range) for a time equal to the Persistence Time, it detects a possible anomaly in the relevant measurement. This alarm could help prevent incorrect dosing for damaged probes.

For more details see Annex F.

4.5 TEMPERATURE MEASUREMENT SETTINGS MENU

Use the **UP** and **DOWN** keys to scroll through the various menus and sub-menus and change the data The **ENTER** key accesses the data entry sub-menus and confirms the changes made.

TEMPERATURE DOSING	ON/OFF	TEMPERATURE DOSING	↑
FMW	↓	TYPE PT:	PT 100
OUTmA		T.VAL.:	25°C



Note: the FMW and OUTmA items are not enabled.

4.5.1 TEMPERATURE RELAY MENU

TEMPERATURE RELAY	
>ON/OFF	
TIMED	
PWM	

The settings of the Temperature Relay can vary:

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

Below is the description of the items of the Temperature Relay sub-menus in the various modes and with the various ranges and settings:

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

4.5.2 TEMPERATURE ALARMS MENU

ALARMS			ALARMS		
MIN VAL.:	15°C		PERM RANGE:	OFF	↑
MAX VAL.:	50°C		PERM TIME:	OFF	
OFA:	OFF	\downarrow			

Item	Default Value	Range
Temperature Alarms List		
Minimum alarm:	15°C	0÷100°C
Maximum alarm:	50°C	0÷100°C
OFA (Activation Maximum Time):	Off	10÷3600 Seconds
Persistence range:	Off	5÷25 °C
Persistence time:	Off	10÷3600 Seconds



Note: the Persistence Range and Persistence Time items must be used together.

The Persistence function, based on both parameters, analyses the chemical measurement and if it is within a range given by the measurement average (+/- the Persistence Range) for a time equal to the Persistence Time, it detects a possible anomaly in the relevant measurement.

This alarm could help prevent incorrect dosing for damaged probes. For more details see Annex F.

Temperature Sensor Settings Menu

Use the keyboard to select the PT100 or PT1000 sensor

Manual Temperature Value Settings Menu

This menu is available if no temperature sensor is present

TEMP DOSING ALARMS		↑
	PT 100	
I.VAL.	25 6	

4.6 TIME RELAY SETTINGS MENU

Time Relay Menu

This item allows you to enable the Time Relay output with an ON-OFF time from 1 to 999 minutes.

Time relay Status:	Disab.
On Time:	1
Off Time:	1

4.7 FLOW SETTINGS MENU

Use the **UP** and **DOWN** keys to scroll through the various menus and sub-menus and change the data. The **ENTER** key accesses the data entry sub-menus and confirms the changes made.

FLOW TYPE: K FACTOR: PULSES:	ROTOR 1.00 1 ↓	FLOW PULSES: LITRES: FLOW UNIT:	L/s	1 1	↑ ↓
FLOW FLOW UNIT: L/s TOT UNIT: L TOT RESET	ſ				

Below is the description of the items of the FLOW menus in the various modes and with the various ranges and settings:

Item	Default Value	Range
Flow		
Type:	Rotor	Rotor/Pulses
K Factor:	1.00	(0.01÷99.99)
Pulse:	1	(1÷999)
Litres:	1	(1÷999)
Flow unit:	L/s	(L/s, L/m, L/h, M3/h, Gpm)
Total Unit:	L	(L, m3, Gal)
Tot Reset:	Yes/No	Note: reset the resettable totaliser – TR – and save the reset date

5 STATISTICS MENU

	STATISTICS	
STATUS:		STOP
MODE:		CIRC
RANGE:	1	\downarrow

STATISTICS			
RANGE:	1	↑	
DISPLAY STAT.			
RESET STAT.			

ltem	Default Value	Range	Note
Statistics			
Status:	Stop	Stop - Run	Enable/disable the statistics
Mode:	Circ	Circular - List	Different data acquisition modes
Range:	1	1÷24	Timed range during which the stat. are acquired
Display Statistic:	Stat. System	Display the status of the inputs HOLD REED Level 1 Probe Level 2 Probe	
	Stat. Measurements	Display the status of the chemical measurements	
	Stat. Detail	Display the details of the registered measurements	
Reset Stat .:		Reset all the saved statist. data	

6 **ADVANCED MENU**

ADVANCED

PASSWORD CONTROL PANEL NETWORK

ADVANCED MODIFY TEXT

↑

REED CONTROL DOSING DELAYS

	ltem	Default/Parameters	Range	Note
5A	Password	0000	0000÷9999	
5B	Control panel			
	5B1 Date/time	01/01/2000 - 00:00:00	00.00÷23.29	
	5B2 Calibration Key	Enabled	Enabled/Disabled	
	5B3 Mode Key	Enabled	Enabled/Disabled	
	5B4 Output Simulation	Belay simul		Manual activation of the outputs for simulation
	SB4 Output Simulation	Current output simul		
		Frequency simul		
	5B5 Input display	Measurement Inputs		
	565 mput display	Control Inputs		
	5B6 Reset	Calib Reset	Yes/No	
	300 110301	System Reset	103/10	
	5B7 Display	Contrast/Brightness	1÷10	
	5B8 Belay Logic		N O (normally open) /N:C	Change activation logic
	SBO Relay Logic	N.O. (normally open)	(normally closed)	Change activation logic
	5B9 Levels	Disabled	Enabled/Disabled	* only present for FULL MODE
	EB10 Viewing Config	To Do Defined		*arky present for FULL MODE
	5B10 Viewing Config	To Be Defined	All measurements	"Only present for FULL MODE
5C	Network (Serial Port)			
1	RS485	Enabled	Enabled/Disabled	
1	Transmission speed	19200	2400÷115000 Baud	
1	Address	1	1÷99	
1	Parity	Even	No / Even / Odd	
	Stop bit	1	0.5 / 1 / 1.5 / 2	
	Watchdog (WTD) time	Off	Off/ 1÷3600 sec	
	Watchdog (WTD) func	Alarm	Alarm/ Hold/ResetCom/Reset	
			Hw	
	DOA	Disable	Disable/Enable	
5D	Text	Empty area to write messages		
5E	REED control			Flow alarm activation delay time setting.
- T	EE1 DEED dolou	2	Time: 2:40 See	· · · · · · · · · · · · · · · · · · ·
-		2 Sec.	Chattan NO/NO	
	5E2 REED Logic	NO	Status: NC/NO	
5F	Dosing Delays			Dosing system activation delay time setting.
	5F1 START delay	OFF	OFF/1÷60 min	
	5F2 Calib Delay	OFF	OFE/1÷60 min	
50	Cl Cmb Formula	mA2-mA1	mA2-mA1	Select how the Combined Chlorine is
			mA1-mA2	calculated
			mA2-CuPt	
			mA1-CuPt	
5H	Relay Map	5H1 R1	All measurements	
		5H2 R2		
		5H3 R3		
		5H4 R4		
		5H5 R5		
51	OutmA Map	5I1 OutmA1	All measurements	
		5I2 OutmA2		
		5I3 OutmA3		
		5I4 OutmA4		
5J	Out F Map	5J1 Out F1	All measurements	
		5J2 Out F2		
		5J3 Out F3		
		5J4 Out F4		
5H	Output Map	Association of relays, current outputs	All measurements	*only present for FULL MODE
	5H1 Relay Map	and frequency output to the		
1	5H2 Out mA Map	measurements.		
	5H3 Out F Map			
51	Preset	Free	Free	*only present for FULL MODE
1			IRR	
1			WTD	
1			SWP	
I I				

Note: If in the Advanced Menu, item 5G is selected as Br, all references to the chlorine measurement refer to Bromine.

7 TROUBLESHOOTING GUIDE

- ...does not turn on
 - ✓ Verify that the power cables are connected properly
 - ✓ Verify that there is power
- The display does not turn on...
 - ✓ Adjust the display contrast
- The chemical measurement does not work...
 - \checkmark Verify the connection of the probe
 - ✓ Verify the connection of the probe holder
 - ✓ Calibrate as described in the manual
 - ✓ Replace the probe
- The mA output does not vary...
 - ✓ Verify the connection of the cables
 - ✓ Verify whether the output produces the desired effect via the "Manual Control" Main Menu
 - ✓ Check the electrical characteristics of the remote device (Maximum load 500 ohms)
- The Relays do not work...
 - ✓ Verify whether the instrument is powered correctly
 - Verify the settings in the main menu

• The voltage in the Vdc In port does not block the instrument...

- ✓ Verify the electrical connections
- ✓ Verify whether the remote generator is working

Note: In the event of a persistent anomaly, contact the supplier.

Annex A: ON/OFF Relay Settings

Below is an example of settings for the On Off Relay for pH adjustment with acidic chemical dosing with pause/work method (on/off).

Example:

RELAY PH	ON/OFF
SETPOINT:	7.20 pH
DOSING TYPE:	ACID
HYSTERESIS:	OFF
T. HYSTERESIS:	OFF
DEL. START:	OFF
DEL. END:	OFF



Note:

- **Relay Activation**: When the measurement (black line) surpasses the SetPoint, the Relay is activated and the status is maintained until the measurement decreases to the SetPoint value (see Relay).
- Activation with delay: By setting the DEL START and DEL END menu items, the Relay activation is delayed by the set time.

DOSING TYPE function: By setting the DOSING TYPE menu item with the ALKA variable (Alkaline), the Relay activations are inverted with respect to the above graph.

HYSTERESIS function: By setting the HYSTERESIS and T. HYSTERESIS menu items, the instrument maintains the relay activation status for the chemical measurement value as well as for the time (see example below).



Annex B: Timed Relay Settings

Below is an example of settings for the Relay for pH adjustment with acidic chemical product dosing with timed method.



Note:

- **Relay Activation**: When the measurement (black line) surpasses the SetPoint, the Relay is activated with ON/OFF cycles until the measurement decreases to the SetPoint value (see Relay).
- Activation with delay: By setting the DEL START and DEL END menu items, the Relay activation is delayed by the set time.

DOSING TYPE function: By setting the DOSING TYPE menu item with the ALKA variable (Alkaline), the Relay activations are inverted with respect to the above graph.

HYSTERESIS function: By setting the HYSTERESIS and T. HYSTERESIS menu items, the instrument maintains the relay activation status for the chemical measurement value as well as for the time (see example below).



Annex C: Proportional Relay Settings (PWM)

Below is an example of settings for the Relay for pH adjustment with acidic chemical product dosing with proportional method (PWM).

Example:



Note:

- **Relay Activation**: When the measurement (black line) exceeds the SetPoint, the Relay is activated by performing On/Off times, calculated according to the proportional band and the period. The status is maintained until the measurement decreases to the SetPoint value.
- Activation with delay: By setting the DEL START and DEL END menu items, the Relay activation is delayed by the set time.

DOSING TYPE function: By setting the DOSING TYPE menu item with the ALKA variable (Alkaline), the Relay activations are inverted with respect to the above graph.

HYSTERESIS function: By setting the HYSTERESIS and T. HYSTERESIS menu items, the instrument maintains the relay activation status for the chemical measurement value as well as for the time (see example below).



Annex D: FWM settings

Proportional frequency output with Setpoint and Independent Proportional Band.



Note:



• **Pulse:** The parameter indicates the maximum number of pulses per minute that are reached each time it is near the Proportional Band.

Annex E: Current Output Settings

Current output proportional to the measurement with a scale from 4 mA to 20 mA.



Note:

- Start (4): Minimum chemical measurement value associated to the 4 mA
- End (20): Maximum chemical measurement value associated to the 20 mA
- HOLD mA: In the alarm status the instrument freezes the mA output at the last calculated value.

Annex F: ON/OFF Relay settings with OFA Function and Persistence Time

Below is an example of settings for the Relay for pH adjustment with acidic chemical product dosing with pause/work method (on/off) with OFA timers and Measurement Persistence.



Example:

Note:

- OFA (Over Feed Alarm): By setting the OFA function with a minute timeout, a control timer is activated parallel to the Relay activation. The function checks the activated Relay persistence times and generates a visual pre-alarm at 70% of the set value and a block alarm (R') when the set time elapses (100%). Manual intervention is required to eliminate the block by resetting the OFA function via the alarms menu (see alarms section).
- **Measurement Persistence**: The yellow line in the graph represents the Persistence function. If the measurement remains within the yellow zone for a time equal to or longer than the set time, an instrument block alarm is generated. Manual intervention is required to eliminate the block by resetting the Persistence function via the alarms menu (see alarms section).

Annex G: Kontrol 800 ModBus Profile

MODBUS PROFILE

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				ſ
Address	Address			
(dec)	(hex)	Description	Property	Range
1000	3F8	pH Measure	Read	0 to 1400
1001	359	CLAmp Measure	Read	0 to 500
1001	364	Orn Measure	Read	$-2000 \text{ to } \pm 2000$
1002	358	Tomporature Measure	Read	0 to 1050
1003	250	Frog Mooguro	Read	0 to 15000
1004			Read	0 to 10000
1005	3ED	Conductivity Measure	Read	
1006	3EE	Poti Measure	Read	0 to 20000
1007	3EF	Pot2 Measure	Read	0 to 20000
1008	3F0	Status	Read	See Note 1
1009	3F1	Range CIPot 1	Read	0 to 6 (see note 2)
1010	3F2	pH Relè Type Dose	Read	0 Alca, 1 Acid
1011	3F3	CI Amp Relè Type Dose	Read	0 Low, 1 High
1012	3F4	Orp Relè Type Dose	Read	0 Low, 1 High
1013	3F5	Temp Relè Type Dose	Read	0 Low, 1 High
1014	3F6	CI Pot1 Relè Type Dose	Read	0 Low, 1 High
1015	3F7	CI Pot2 Relè Type Dose	Read	0 Low. 1 High
1016	3F8	Cd Relè Type Dose	Read	0 low 1 High
1017	3F9	Range CIPot 2	Read	0 to 6 (see note 2)
1018	3FA	Resettable Totalizer Low	Read	0 to 0 xffff Note 10
1010	358	Resettable Totalizer Low	Read	0 to 0xffff Note 10
1019	31.0		Read	
1020		Permanent Totalizer Low	Read	
1021	3FD	Permanent Totalizer High	Read	
1022			Read	
1023	3FF	vvater Meter Unit	Read	See note 9
1024	400	Flow Measure Low	Read	0 to 0xffff
1025	401	Flow Measure High	Read	0 to 0xffff
1026	402	Combined Chlorine	Read	0 to 0xffff
1027	403	Out mA 1 Value	Read	0 to 2000 (20,00 mA)
1028	404	Out mA 2 Value	Read	0 to 2000 (20,00 mA)
1029	405	Reserved	Reserved	Reserved
1030	406	Reserved	Reserved	Reserved
1031	407	Out Fred 1 Value	Read	0 to 120 (pulse/min)
1032	408	Out Freq 2 Value	Read	0 to 120 (pulse/min)
1032	400	Beconved	Read	Becomicd
1033	409	Reserved	Reserved	Reserved
1034	40A		Reserved	
1035	40B	Relay 1 status	Read	0 = OFF, 1 = ON
1036	40C	Relay 2 status	Read	0 = OFF, 1 = ON
1037	40D	Relay 3 status	Read	0 = OFF, 1 = ON
1038	40E	Relay 4 status	Read	0 = OFF, 1 = ON
1039	40F	Relay 5 status	Read	0 = OFF, 1 = ON
1040	410	Relay 6 status	Read	0 = OFF, 1 = ON
1100	44C	SetPoint pH	Read/Write	0 to 1400
1101	44D	SetPoint CI	Read/Write	0 to 500
1102	44E	SetPoint Orp	Read/Write	-2000 to +2000
1103	44F	SetPoint Temperature	Read/Write	0 to 1050
1104	450	SetPoint Cloro Pot 1	Read/Write	0 to 20000
1105	451	Alarm Min pH	Read/Write	0 to 1400
1106	452	Alarm Min Cloro Amp	Read/Write	0 to 500
1107	152	Alarm Min ORP	Read/Write	-2000 to +2000
1107	455	Alarm Min Tomp	Read/Write	0 to 1000
1100	454	Alarm Min Clara Dat 1	Read/Write	0 to 1000
1109	455		Read/Wille	0 to 1400
1110	450		Read/Write	0.10 1400
1111	407	Alarm Max Cloro Amp	Read/vvrite	
1112	458		Read/VVrite	-2000 to +2000
1113	459		Read/vVrite	
1114	45A	Alarm Max Cloro Pot 1	Read/Write	0 to 20000
1115	45B	pH Relè Mode	Read/Write	0 to 2 (see note 3)
1116	45C	CI Amp Relè Mode	Read/Write	0 to 2 (see note 3)
1117	45D	Orp Relè Mode	Read/Write	0 to 2 (see note 3)
1118	45E	Temp Relè Mode	Read/Write	0 to 2 (see note 3)
1119	45F	CI Pot1 Relè Mode	Read/Write	0 to 2 (see note 3)
1120	460	SetPoint Cloro Pot 2	Read/Write	0 to 20000
1121	461	SetPoint Cd	Read/Write	0 to 20000
1122	462	Alarm Min Cloro Pot 2	Read/Write	0 to 20000
1123	463	Alarm Min Freq	Read/Write	5 to 15000
1124	464	Alarm Min Cd	Read/Write	0 to 10000
1124	465	Alarm Max Cloro Pot 2	Read/M/rite	0 to 20000
1120	466	Alarm May Erog	Road Musite	5 to 15000
1120	467	Alarm Max Cd	Read/Write	0 to 10000
112/	407	CL Data Dalà Mada	Rood AV	0 to 2 (and mate 2)
1128	400			0 to \angle (see note 3)
1129	409		Read/vvrite	0 to 2 (see note 3)
1130	46A	Cd Cell Probe C Factor	Read/Write	U to 6 (see note 4)
1131	46B	Cd Custom C Factor Value	Read/Write	0 to 1000 (see note 5)
1132	46C	Cd Programming Measure	Read/Write	0 to 8 (see note 6)
1133	46D	Reset Tot Res	Write	1 = reset Tot

Note 1

STATUS (bit field 16 bit register)

1	LEVEL_0_ALARM
2	LEVEL_1_ALARM
3	HOLD_ALARM
4	REED_ALARM
5	Cl Pot 2 Under Current
6	Cl Pot 2 Over Current
7	Cl Pot 1 Under Current
8	ClPot 1 Over Current
9	Reserverd
10	Reserverd
11	Reserverd
12	Reserverd
13	Reserverd
14	OFA1 (Over Feed Alarm) 70% OFA Time
15	OFA2 (Over Feed Alarm) 100% OFA Time
16	PERMANECY (Permanency Allarm)

Note 2

Range CIPot

Value	Range ppm	Measure Value on Modbus	Means [ppm]
0	0-0,5	50	0,50
1	0-1	100	1,00
2	0-2	200	2,00
3	0-5	500	5,00
4	0-10	1000	10,00
5	0-20	2000	20,00
6	0-200	2000	200,0
7	0-500	5000	500,0
8	0-1000	10000	1000,0
9	0-2000	20000	2000,0
10	0-10000	10000	10000
11	0-20000	20000	20000
12	0-100000	10000	100000

Note 3

Relè Mode		
Value	Mode	
0	ON/OFF	
1	TIMED	
2	PWM	

Note 4

	Cd Cell Probe C Factor	
Value	Reference	
0	Custom (Use Cd Custom C F	actor Value
1	C 001	
2	C 01	
3	C 02	
4	C 03	
5	C 1	

Note 6

	Cd Programming Measure	
Value	Reference	
0	Ohm	Available
1	KOhm	Available
2	MOhm	Available
3	uS	Available
4	mS	Available
5	ppm	Available
6	mgl	Available
7	gl	Available

I s the unit measure set in program, that the system use in programming mode to realize any program setting(If is a submultiple of S (siemens), the measure is displayed in submultiple of S). (If is Ohm or Multiple of Ohm, the measure in visual is displayed in Ohm or Multiple).

Note 7 Available Only On Cooling Tower Version

	Cu Type Of Visual			
Value	Reference	Example		
xx 00	micro,ppm,mlg with 1 decimal value	2000,0 uS,ppm,mgl		
xx 01	micro,ppm,mgl with no decimal value	19500 uS,ppm,mgl		
xx 02	milli,gl with 2 decimal values	100,00 mS,gl		
xx 03	unit with no decimal value	15000 Ohm		
xx 04	Kilo with no decimal value	15000 KOhm		
xx 05	Kilo with 1 decimal value	1500,0 KOhm		
xx 06	Kilo with 2 decimal values	150,00 KOhm		
It's a integer number, but the highest part is a don't care part.				

Note 8

	Flow Unit
Value	Reference
0	L/sec
1	L/min
2	L/h
3	m3/h
4	Gpm

Note 9

Water Meter Unit		
Value	Reference	
0	L	
1	m3	
2	GAL	

Note 10 For Totalizer(HIGH and LOW) if the unit is CUBE METER on registers decimal part are not indicated For Totalizer(HIGH and LOW) if the unit is GAL the number is with 1 decimal For Totalizer(HIGH and LOW) if the unit is Liters the number is with 0 decimal

MODBUS FUNCTION READ HOLDING REGISTERS code: 0x03 WRITE MULTIPLE REGISTERS code: 0x10