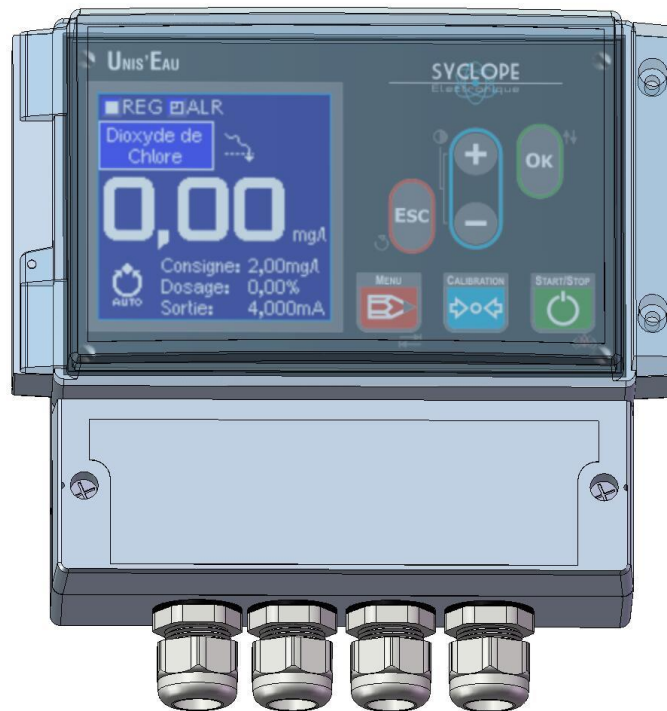


SYCLOPE UNIS'EAU® controller for industrial applications (Part 2)



Programming instructions



Parts of the general documentation

- Part 1: Installation and starting instructions
- Part 2: Programming instructions
- Part 3: Communication programming instructions

General informations :

SYCLOPE Electronique 2015[®] Notice of 02/04/2015 Rev 3.1

Professional controller for industrial applications **UNIS'EAU[®]**

Part 2 : Programming instructions (Ref : DOC0099_en)

Editor :



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I. Use of the document

Please read this entire document before starting to install, adjusting or commissioning your controller device, in order to ensure the safety of users, the processes and the equipment.

The information provided in this document must be strictly observed. SYCLOPE Electronique S.A.S. declines all responsibility in cases where failure to comply with the instructions of this documents is observed.

The following symbols and pictograms will be used to facilitate reading and understanding of these instructions.

- Information
- Action to be taken
- Item of a list or catalogue

1) Symbols and signs



Identification of a continue voltage or current



Identification of an alternative voltage or current



Protective ground



Functional ground



Risk of injury or accident. Identify a warning concerning a potentially dangerous risk. Documentation must be consulted by the user with each time the symbol is notified. If the instructions are not respected, that presents a risk of death, physical injuries or property damages.



Electric hazard. Identify a warning statement relative to a mortal electric danger. If the instructions are not strictly respected, that implies an inevitable risk of physical injuries or death.



Risk of incorrect operation or damage for the device.



Comment or particular information.



Recyclable element.

2) Storage, transport and packaging



It is important to store and transport your **SYCLOPE UNIS'EAU®** in its original packaging in order to minimize risk of damage. Furthermore, the package must be stored in an environment that is protected against humidity and exposure to chemical products.

Environmental conditions for transport and storage:

Temperature: -10 °C to 70 °C

Air humidity: Maximum of 90% with no condensation

3) Packaging



The controller is delivered without electrical power cable.

The pre-holes of the box are drilled and equipped with according electrical glands in compliance with IP65 level protection. Cables must be adapted to the electrical glands to respect the level of protection.

Grounded cables for connecting pH and ORP (Redox) sensors are not provided.

Content of the packaging :

- ✓ One analyser/controller **SYCLOPE ODISEA®**
- ✓ Installation and starting instruction notice
- ✓ Programming notice
- ✓ Communication notice (Option)

4) Warranty

The warranty is provided according to the terms of our general conditions of sale and delivery as long as the following conditions are met:

- Use of the equipment according to the instructions of this notice
- No modifications of the equipment which may modify its behaviour and no incorrect manipulation
- Respect for the electrical safety conditions



Consumable material is no longer covered by the warranty when in use.

II. Environment and safety procedures

Please:

- Read this manual carefully before unpacking, installing or commissioning this equipment
- Take into account all the hazards and recommended precautionary measures

Failure to respect these procedures can result in serious injury to users or damage the device.

1) Use of the equipment

The **SYCLOPE UNIS'EAU**® system has been designed to measure and regulate temperature, pH, Redox potential, chlorine (or bromine), conductivity, etc... by means of sensors and controls of suitable actuators in the context of the possible uses described in this manual.



All other uses are considered to be non-conforming and must therefore be forbidden. SYCLOPE Electronique S.A.S. will not be responsible in any case for any damages that result from such uses.



Any use of sensors or interfaces not-in conformity to the features defined in this handbook must also be proscribed.

2) User obligations

The user undertakes not to allow its employees to work with the **SYCLOPE UNIS'EAU**® equipment described in this manual unless they:

- Are aware of the fundamental instructions relating to work safety and prevention of accidents
- Are trained in the use of the device and its environment
- Have read and understood these instructions, warnings and manipulation rules

3) Risk prevention



The installation and connection of the **SYCLOPE UNIS'EAU**® equipment should only be performed by personnel specialized and qualified for this task.
The installation must comply with current safety standards and instructions!



Before switching on the controller or manipulating the relay outputs, remember always to off the primary power supply!
Never open the controller when it is powered on!
Maintenance operations and repairs should only be performed by trained, specialized personnel!



Take care when choosing the location for installing the equipment according to the environment!
The **SYCLOPE UNIS'EAU**® electronic box should not be installed in a hazardous environment and should be protected against splashing with water or chemical products. It should be installed in a dry, well-ventilated location, isolated from corrosive vapours.

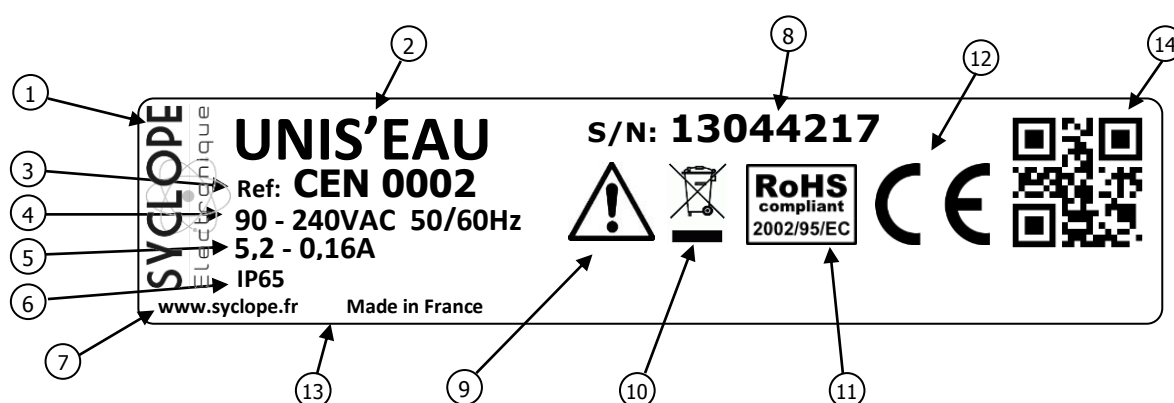


Make sure that the chemical sensors used with this device correspond well to the chemicals used. Refer to the individual technical note of each sensor. Chemistry of water is very complex, in case of doubt, contact immediately our engineering service or your approved installer/reseller.



Chemical sensors are sensitive elements using consumable parts. They must be supervised, maintained and calibrated regularly using specific calibrator systems not-provided with this equipment. In the event of defect, a surplus possible hazard of chemical injections can be noted. In the doubt, a service contract must be taken near your reseller/installer or failing this near our engineering services. Contact your approved installer/reseller or our business service for more information.

4) Identification and localization of the identification plate



① Label of the manufacturer	⑨ Particular risks. Read the notice
② Model of the product	⑩ Product which can be recycled
③ Reference of the product	⑪ Limitation of dangerous substances
④ Range of power supply	⑫ EC certified
⑤ Values of the maximum current	⑬ Country of origin
⑥ Classify protection	⑭ Manufacturer square code
⑦ Identification of the manufacturer	
⑧ Serial number	

Identification plate



5) Disposal and conformity

The recyclable packaging of the **SYCLOPE UNIS'EAU®** equipment must be disposed of according to current regulations.



Elements such as paper, cardboard, plastic or any other recyclable elements must be taken to a suitable sorting center.



According to European directive 2002/96/EC, this symbol means that as of 12 August 2005 electrical appliances cannot be thrown out together with household or industrial waste. According to current regulations, consumers within the European Union are required, as of this date, to return their used devices to the manufacturer, who will take care of disposing them at no extra expense.

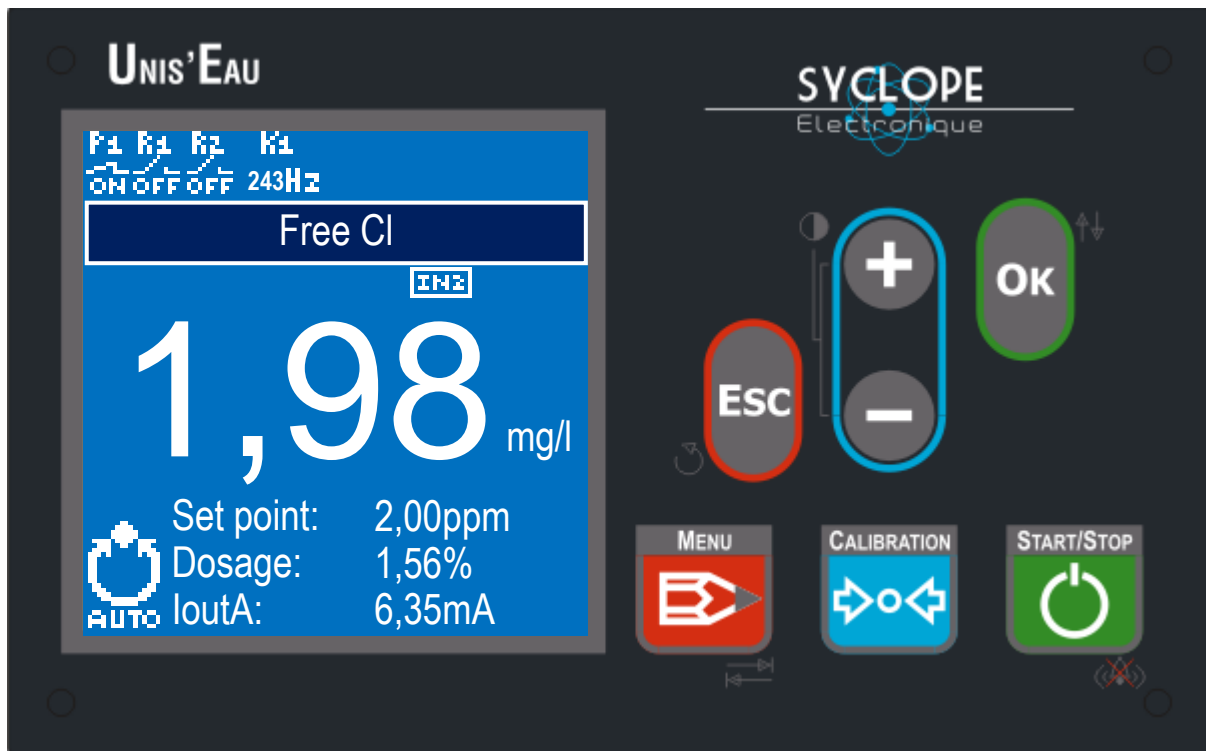


According to European directive 2002/95/EC, this symbol means that the **SYCLOPE UNIS'EAU®** controller is designed in compliance with the restrictions on hazardous substances



According to low-voltage directive (2006/95/EC) and the electromagnetic compatibility directive (2004/108/EC), this symbol means that the device has been designed in compliance with the previously cited directives

III. Presentation of the Human/Machine Interface (HMI)



Menu Key:

- A short touching allows you to access to the parameter menu (set-points, alarms, level of flow-rate ...).
- A long touching allows you to access to the configuration menu (Choices of entries, sensors, etc ...).



Calibration Key:

- A short touching allows you to calibrate the main controlled parameter.
- A long touching allows you to calibrate one of the sensors used.



START/STOP Key:

Allows you to activate or deactivate the controls and to clear alarms.



Esc Key:

- A short touching allows you to return from the menus.
- A long touching allows you to stop the waiting time for polarizing the sensors.



OK Key:

Allows you to validate an action or to move into the menus.

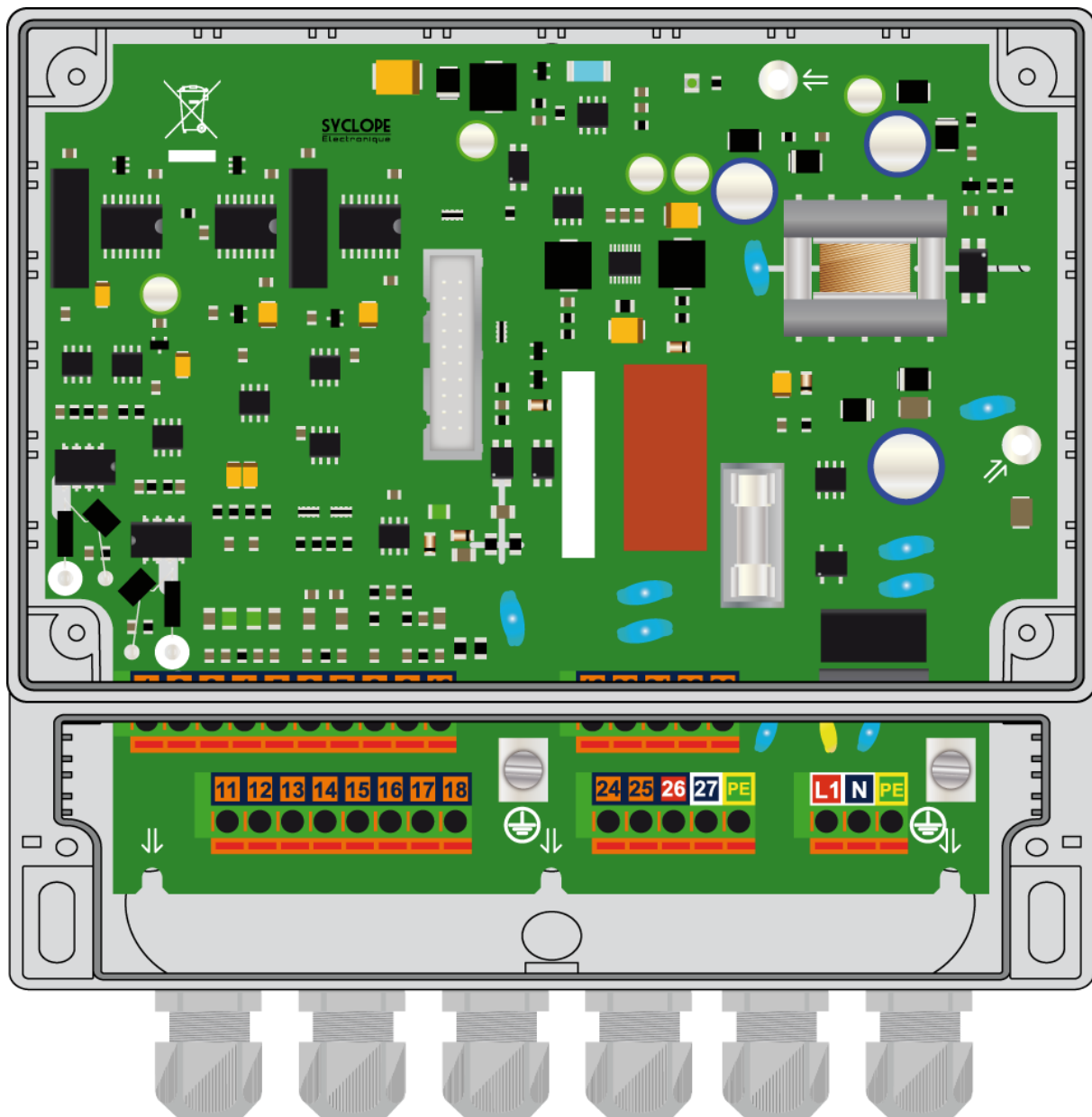
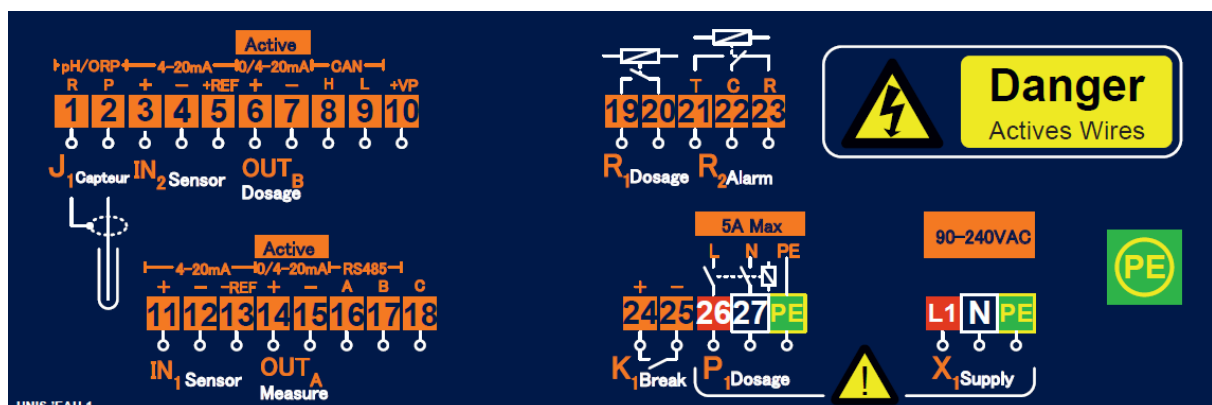


"+" Key:

Allows you to increase a value or to increase the contrast of the LCD screen.

"-" Key:

Allows you to decrease a value or to decrease the contrast of the LCD screen.

1) Internal connexions2) Terminal connections

IV. Structure and index of the programming menus

1) Structure of the menus


Programming of the **SYCLOPE UNIS'EAU®** controller is organized with only one level access. A direct calibration key allows you to perform a complete calibration without any risk of deprogramming to ensure safety of human people in case of mistake and to warranty your process.

- Calibration of the measurement.
- Calibration of the sensor.
- Programming menu for selecting reading parameter or for modifying set-point, thresholds, ...
- Configuration menu for programming entrees and general reset of the controller.


2) Tree structure and index of programming


Menu	Submenu	Function	Page
Calibration parameter		Calibration of the measured parameter.	
Sensor calibration		Calibration of one of the sensors.	
Programming menu	Control	Setting point, dosing power, PID.	
		Up or down regulation, dosing time.	
		Choice of the relay for control.	
	Alarm	Defining alarm thresholds.	
		Activation or deactivation of alarms.	
		Defining alarm relay.	
	Measurement	Selecting measured parameter	
	Analogical outputs	Defining low and high points to copy measured value to the analogical output.	
		Selecting range of the dosing output.	
	Flow-rate	Adjusting low and high thresholds to control the process and to pause the controller.	
	Information	General informations about the controller: Type, reference, version and parameters.	
	Communication	Protocol, addresses, speed, parity.	
Configuration menu	Test	Manual control for testing relays.	
		Manual simulation of 0...20mA outputs.	
		Screening of original values from entries.	
	Potentiometric entry J1	Defining type and range of pH or ORP sensors.	
	0/4-20mA IN1	Defining type and range of the probe connected	
	0/4-20mA IN2	Defining type and range of the probe connected	
	Contact K1	Defining function as contact or flowmeter.	
	Global	Defining power supplies of IN1 and IN2 entries. Selecting current language Resetting controller.	


V. Principe de navigation

The "Programming" and "Configuration" menus are accessible while pressing on the  key.

A short pressing time on this key will give you access to "Programming" menu and a long pressing time of up to 5s will give you access to the "Configuration" menu.




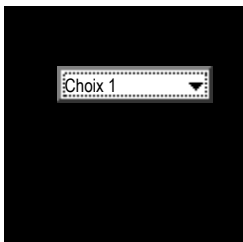
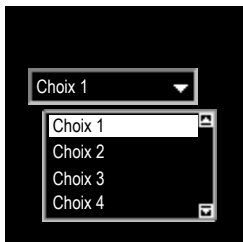
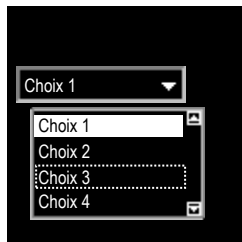
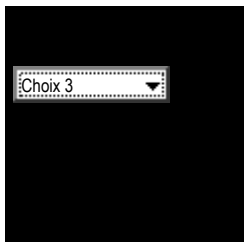
For the « Calibration » menu, a short pressing time on key  allows you to calibrate the current used parameter and a long pressing time allows you to calibrate one of the connected sensors.

Navigation into the menus is intuitive and is done by using  keys.






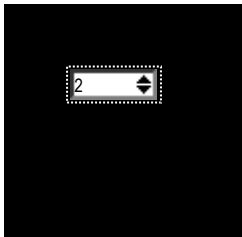
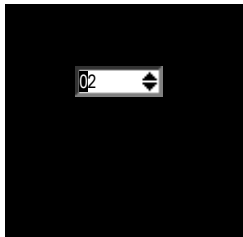
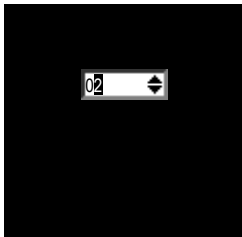
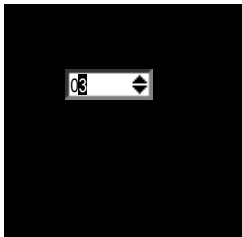
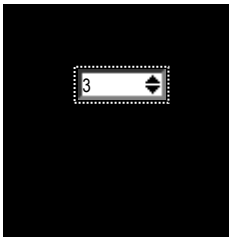
To enter into the submenu or to validate a value, it is necessary to press on the  key.

To leave from a menu, it is necessary to press on the  key.

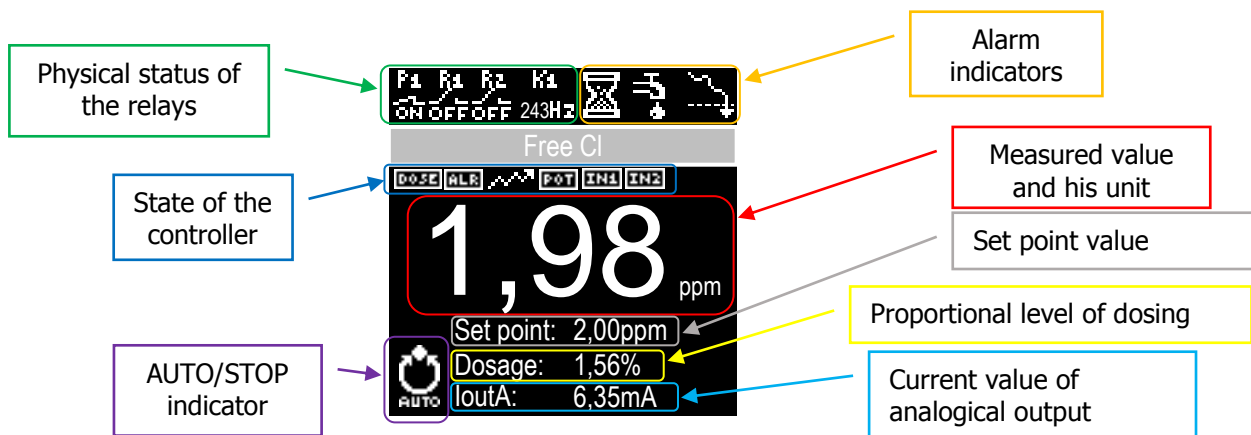
1) Modifying a list

<p>Click on  showing you the list of the possible choice.</p>	<p>The list of choice appears and the current selection is shown by intensified brightness line.</p>	<p>While pressing on  keys, you can select one of the choice in the list.</p>	<p>Click on  validating your choice.</p>
			

2) Modifying a value

<p>Click on  key for displaying the value.</p>	<p>The cursor appears on the first digit of the value.</p>	<p>Click on  key or  key to move from one digit to another one.</p>	<p>Click on  keys for modifying the value.</p>	<p>Click on  to validate the new value.</p>
				

VI. Main LCD screen










This screen allows you to display the good working of the process and to know :

- The reel value of the main measurement
- The set point of the process
- The level of dosage
- The states of the relays and of the pulse entry
- The alarms under drawing forms or messages.







1) Indicators of state

Display	Significance
	AUTO indicates you that the process and the alarms are actives STOP indicates that the controller is stopped.
	Dosing is activated
	One alarm is activated
	One of the measurements is unstable
	Indicate you that the entry is disconnected or in short-circuit or out of the range of measurement.

2) Physical states of the relays

Display	Significance
	The powered relay P1 is closed (Output generates power supply on connected peripheral)
	The powered relay P1 is opened and no power supply is generated
	Electronic relay R1 is closed
	Electronic relay R1 is opened.
	Mechanical relay R2 is closed (Free of potential)
	Mechanical relay R2 is opened
 K1 243Hz	Indicate the frequency input on K1

3) Details and alarms

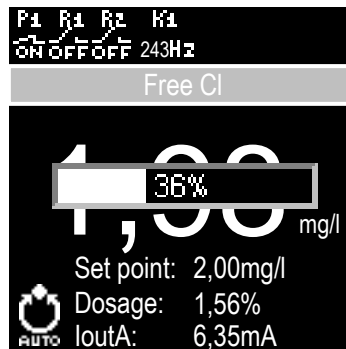
Display	Significance	Zone of modification	Modifiable value	Action
	Polarisation time of the sensor	Programming menu - Measurement	Timer	Blocking process
	Flowrate under limit or flow-switch contact off.	Programming menu – Flow water	Delay or flow-switch according K1 configuration	Blocking process
	Sensor needs maintenance	Calibration menu	Etalon	Impossible to calibrate
	Low threshold in excess	Programming menu - Alarms	Value	Alarm activated
	High threshold in excess	Programming menu - Alarms	Value	Alarm activated
	Dosing in time exceeded	Programming menu – Controls Programming menu - Alarm	Dosing time or overdose	Blocking process and alarm activated
Polarisation in progress or defective sensor.	One sensor is ongoing polarisation			Blocking process
Sensor out of range or short circuit.	One sensor is currently in short-circuit			Blocking process
Disconnected or defective sensor	One sensor is currently disconnected			Blocking process

4) Adjusting contrast

To adjust the LCD screen contrast, press on



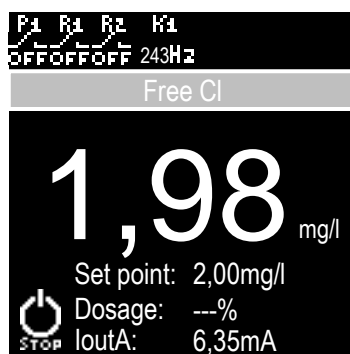
keys.

5) Starting controls

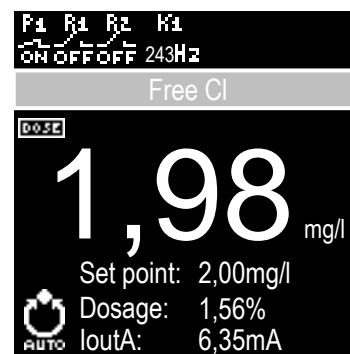
The user can decide to STOP or to START the process of the controller by using



key.




**Controller
STOPPED**



**Controller
ACTIVATED**

VII. Configuration

For accessing to the configuration menu, press a **long time** on  key.

This menu allows you to define which sensors are physically connected to the controller:

- Potentiometric sensors (pH or RedOx (ORP)).
- 4...20mA amperometric sensors.
- Flowmeter.

Available sensors « really connected » :

	0,01...0,5mg/L	0,1...1mg/L	0,02...2mg/L	0,1...5mg/L	0,2...10mg/L	0,4...15mg/L	0,2...20mg/L	0,5...50mg/L	1...100mg/L	2...200mg/L	20...2000mg/L	Client*
Free chlorine (DPD1)	•		•	•	•	•	•	•	•			•
Active chlorine (HOCl)			•		•							•
Total chlorine (DPD4)	•		•	•	•							•
Chlorite	•		•									•
Chlorine dioxide (ClO ₂)	•		•		•							•
Peroxide (H ₂ O ₂)								•		•	•	•
Bromine (BCDMH)			•		•	•						•
Bromine (DBDMH)		•		•	•							•
Free bromine		•		•	•							•
Peracetic acid (PAA)										•	•	•
Ozone (O ₃)			•									•
Dissolved oxygen (O ₂)					•		•					•
PHMB									•			•

(*) : The Client sensor can be define with a scale range from 0 to 2000.0 (ppb, ppm, µg/L, mg/L, g/L or %)

	0,2...100NTU	Client*
Turbidity	•	•

(*) : The Client sensor can be defined with a scale range from 0 to 2000.0 (NTU or FNU)

	0...5mS/cm	0...10mS/cm	0...20mS/cm	0...50mS/cm	0...100mS/cm	0...200mS/cm	Client*
Conductivity	•	•	•	•	•	•	•

(*) : The Client sensor can be defined with a scale range from 0 to 2000.0 (µS/cm² or mS/cm²)

	1)	-5...+45°C	Conv. PT100	Client*
Temperature	•	•	•	•

(*) : The Client sensor can be defined with a scale range from -100 to 1000 (Kelvin, °C, °F or °Ra)

	0...20l/min	0...50l/min	0...200l/min	0...10m3/H	Client*
Flow rate (4...20mA)	•	•	•	•	•
Flow rate (impulsion)	•	•	•	•	•

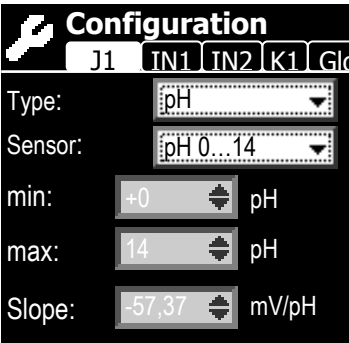
(*) : The Client sensor can be defined with a scale range from 0 to 2000.0 (L/min, L/H ou m3/H) through pulse or analog interface.

	pH 1...12	pH 0...14	Conv. PH_V1	Conv. ISOCAP	Conv. UNISO	Client*
pH (Direct entry)	•	•	•	•	•	•
pH (4...20mA)	•	•	•	•	•	•

(*) : The Client sensor can be defined with a scale range from de -1 to 15 (pH)

	+/- 1000mV	Conv. RH_V1	Conv. ISOCAP	Conv. UNISO	Client*
RedOx (Direct entry)	•	•	•	•	•
RedOx (4...20mA)	•	•	•	•	•

(*) : The Client sensor can be defined with a scale range from de -2000 to +2000 (mV)

2) Potentiometric entry **J1**


Configuration

J1 IN1 IN2 K1 Gl

Type: pH

Sensor: pH 0...14

min: +0 pH

max: 14 pH

Slope: -57,37 mV/pH

Name	Significance	Range	Factory value
Type	Selection of the potentiometric sensor	None, pH, RedOx	None
Sensor	Selection of customized sensor	Client, pH 1...12, pH 0...14, +/-1000mV	Client
Min	Minimum value of the sensor range	-1...5 (pH) -2000...0mV (RedOx)	+2
Max	Maximum value of the sensor range	9...15 (pH) 0...2000mV (RedOx)	+12
Slope	Slope of the sensor	-62...-50mV/[pH]	-59,16mV/[pH] (pH) 1mV/mV (RedOx)

To define a specific sensor which is not in the standard list, you must select "Client" to enter parameters according your sensor. (min, max and slope)

3) Analogical 0/4...20mA entries **IN1&IN2**

Configuration

J1 IN1 IN2 K1 Gl

Type: Free Cl

Sensor: Client

Min: 0,0

Max: 10,0

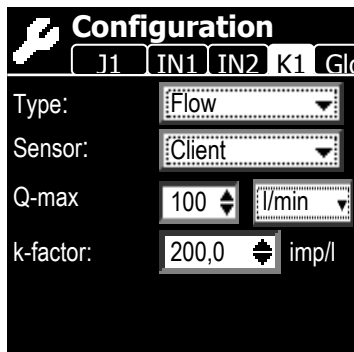
Interface: 4...20mA

Name	Significance	Range	Factory value
Type	Select type of sensor	None, Free Cl, Active Cl, Total Cl, Chloramines, Chlorite, Chlorine dioxide ClO ₂ , Peroxide H ₂ O ₂ , Bromine BCDMH, Bromine DBDMH, Free bromine, Peracetic acid PAA, Ozone O ₃ , Dissolved oxygen O ₂ , PHMB, Salinity, TDS, Turbidity, Conductivity, Temperature, Flow, pH, RedOx	Free Cl
Sensor	Selection of customized sensor	Refer to the list of sensors	Client
Min	Minimum value of the sensor range	-100...250 (Temperature) -1...5 (pH) -2000...0mV (RedOx) 0 (other types)	0,0mg/l
Max	Maximum value of the sensor range	-100...250 (Temperature) 9...15 (pH) 0...2000mV (RedOx) 0...2000 (other types)	10,0mg/l
Unit	Unit of measurement	Refer to the standard list of sensors	mg/l
Interface	Interface type or specific converter for corresponding sensor.	0...20mA 4...20mA PHV1 PT100V1 ISOCAP UNISO	4...20mA

To define a specific sensor which is not in the standard list, you must select "Client" to enter parameters according your sensor. (min, max, unit and interface)

4) Flow/switch entry **K1**

Use of a flowmeter



Configuration

J1 IN1 IN2 **K1** Gl

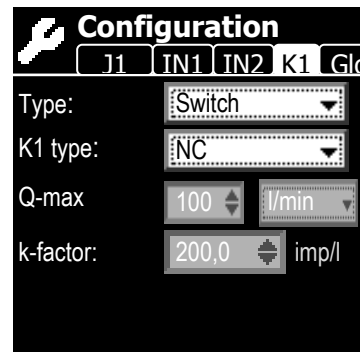
Type: Flow

Sensor: Client

Q-max: 100 l/min

k-factor: 200,0 imp/l

Use of a switch



Configuration

J1 IN1 IN2 **K1** Gl

Type: Switch

K1 type: NC

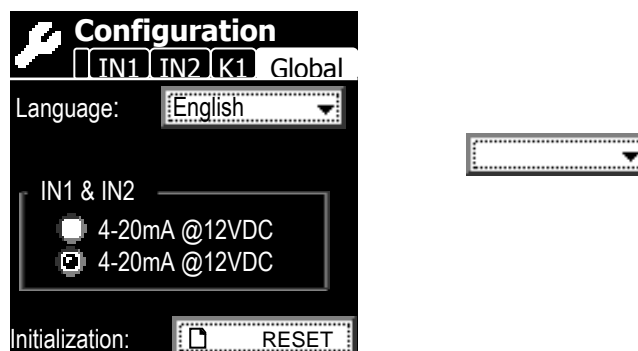
Q-max: 100 l/min

k-factor: 200,0 imp/l

Name	Significance	Range	Factory value
Type	Selection of sensor type connected to K1 entry	None, Flow, Switch	Switch
Sensor	Choice of the range	Client, 0...20l/min, 0...200l/min, 0...10m3/h	Client
K1 type	Direction	NO, NC	NC
Q-max	Maximum flow of the flowmeter	0...2000	100l/min
K-factor	Ration Volume/Impulse of the flowmeter	1...20000	200imp/l
Unit	Unit of measurement	l/min, l/h, m3/h	l/min

To calculate the "K-factor", refer to the notice of your flowmeter.

When **K1** entry is connected to a switch, you must select the state of the contact corresponding to the working position.


5) **Global** configuration

Name	Significance	Range	Factory value
Language	Selection of the language	Français, Deutsch, English, Español, Nederlands, Italiano	Français
IN1 & IN2	Selection of power supply for amperometric sensors connected to IN1 and IN2.	12VDC 24VDC	24VDC
Initialization	Allows you to reset the controller with factory values		



Power supply of the amperometric sensors must be selected before connecting the sensor to the controller to ensure against damage.

VIII. Programming menu

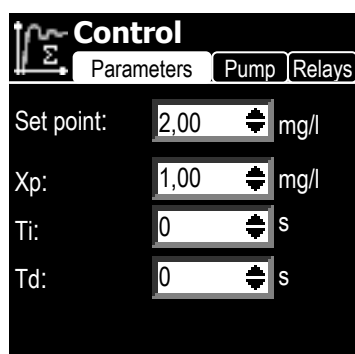
For accessing to the programming menu, press a **short time** on  key.

This menu allows you to define the working parameters of the controller:

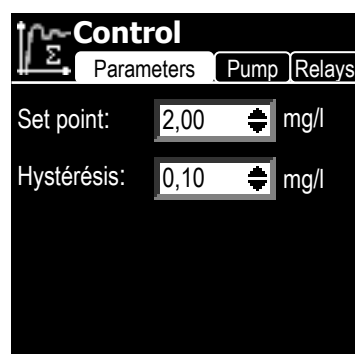
- Control (Set point, dosing time, ...)
- Alarm (alarm threshold, report relay, ...)
- Measurement (type of measurement, calculation of parameter, ...)
- Analogical outputs (transfer of value, control value)
- Flow parameters (level of flowrate, control of low flow)
- Informations (Identifier, version, ...)
- Communication (protocol, speed, ...)
- Test (test of the relays and analogical outputs, displaying of the values from entries)

1) Control - Calculator

When using relay with PWM or impulse function



When using relay as on/off function



Name	Significance	Range	Factory value
Set point	Value to be reached	10...85% of full scale	2,00mg/l (20% of full scale)
Xp	Proportional action value	0,5...700% of full scale	1mg/l (10% of full scale)
Ti	Compensation time	0...9999 s	0 s
Td	Derivative time	0...250 s	0 s
Hysteresis	Hysteresis value around set point.	0...20% of full scale	0,1mg/l (1% of full scale)

Detail:

-Set point : Means value to be reached and stabilized along processing time.

-Xp value : To influence proportional action in the process.

Ex : Xp is 0,5 mg/l corresponds to the differential action value of the "dosing value(*)" of 100% at 0,5 mg/l around set point.

If set point is 1,4 mg/l for a measuring value of 1,3 mg/l, the differential action will be ...

$$(1,4-1,3)/0,5 = 0,1/0,5 = 20\%$$

(*) The "dosing value" is a calculated value by the controller to drive the dosing equipment for adjusting the reading value to the set point. (When the "dosing value" is 100%, the dosing equipment works continuously and when it is 0%, the dosing equipment is stopped).

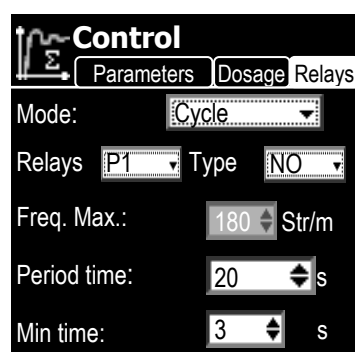
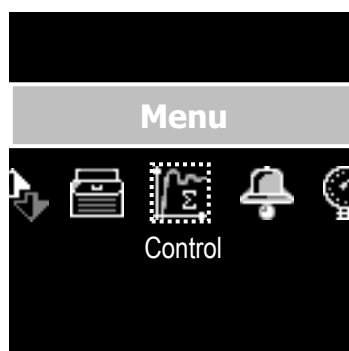
2) Control - Dosage

Name	Significance	Range	Factory value
Dosing action	Direction : - Up (to generate a dosing value when measurement value is under the set point value) - Down (to generate a dosing value when measurement value is over the set point value)	Oxidant/Reducer Up/Down	Oxidant
Checkout time	To control the maximum cumulative dosing time before stopping dosing When 0s is programmed, checking time is off.	0.....9999 s	0s
Additional load	Added dosing value if necessary	0...30%	0%

Detail :

-Checkout time: "Checkout time" value allows you to limit the risks of overdosing if a sensor is broken or if a tank is empty.

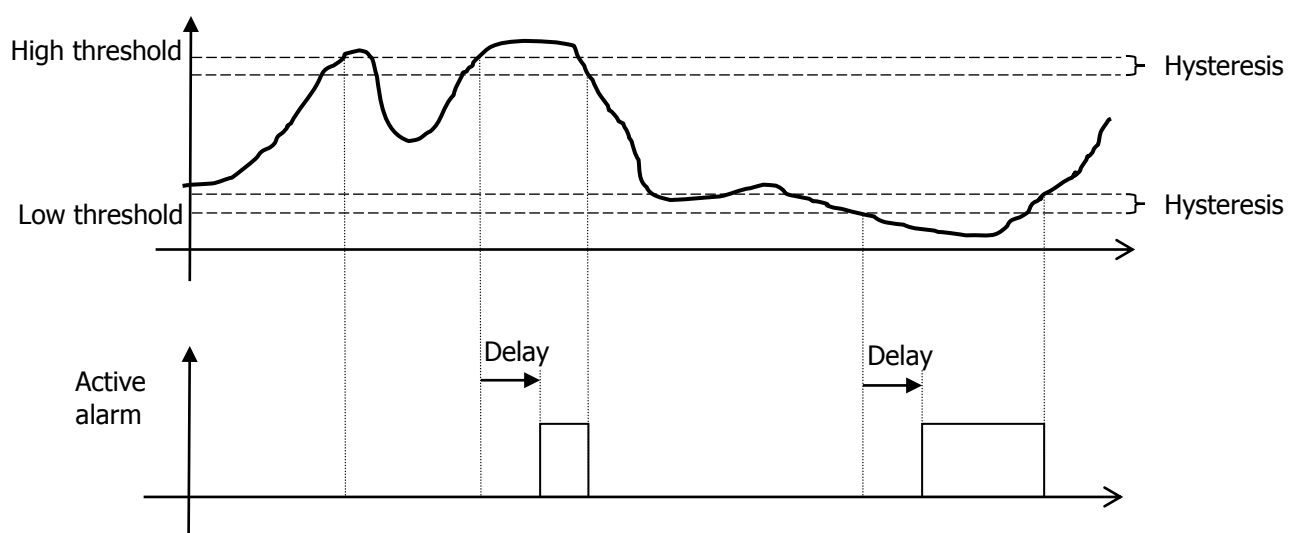
If the "dosing value" is over 90% (if PI or PID) or 40% (if on/off) during a continuous period over the "checkout time", the controller will stop and one alarm will appear.

3) Control – Relays

Name	Significance	Range	Factory value
Mode	Functional mode of the relay	ON/OFF, PWM, Impulse	PWM
Relay	Choice of the used relay for controlling.	P1, R1, R2	P1
Type	State of inactive position	NO, NC	NO
Max Freq.	Maximum frequency of the pulse relay output	1...500 Str/min	180 Str/min
Period time	Period of time for PWM cycle	10.....1800 s	20 s
Min. time	Minimum open time for the selected relay	0.....5 s	3 s

4) Alarms - Thresholds

Name	Significance	Range	Factory value
Upper	High threshold value	0...100% of full scale	9mg/l (90% of full scale)
Lower	Low threshold value	0...100% of full scale	1mg/l (10% of full scale)
Hysteresis	Band of value for changing state.	0% à 10% of full scale	0,5mg/l (5% of full scale)
Delay	Validation time to confirm alarm.	0...240 s	2s

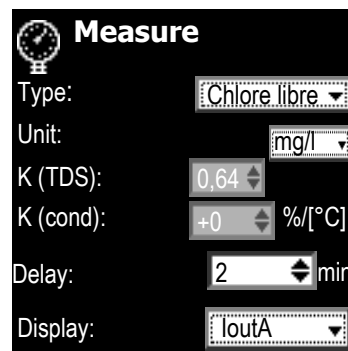
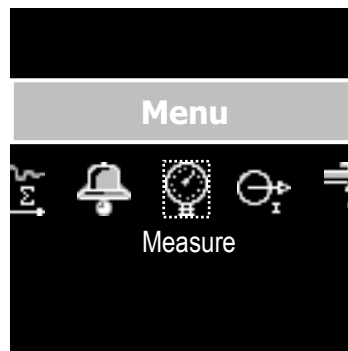


5) Alarms – Relay activation

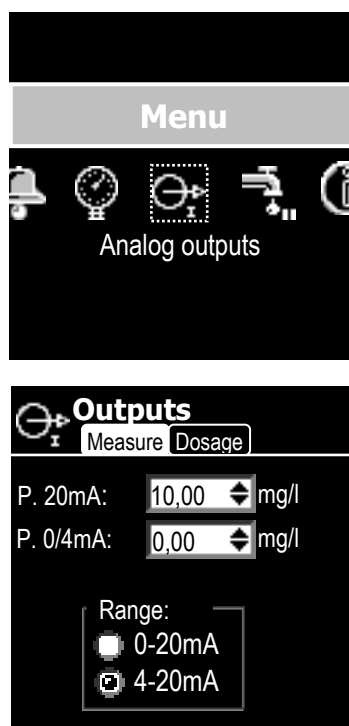
Name	Significance		Factory value
Upper	High threshold value validation.		Active
Lower	Low threshold value validation.		Active
Overdose	"Checking time" exceeded		Active
Disconnected sensor	One of the sensors is disconnected or missing.		Active
Sensor over range	One of the sensors is over full scale or in short-circuit.		Active
Pause	Flow-switch or low flow is detected.		Active

6) Alarms – Relays

Name	Significance	Range	Factory value
Relay	Choice of the relay for transmitting alarms	P1, R1, R2	R2
Type	State or the relay when off	NO, NC	NO

7) Measure – Relay

Name	Significance	Range	Factory value
Type	Choice of the controlled parameter.	According connected sensors	Free chlorine
Unity	Unity of measurement of the selected sensor.	Unity according the selected sensor.	mg/l
K (TDS)	Coefficient for TDS calculation using conductivity.	1...4,44	0,64
K (cond)	Temperature coefficient for conductivity compensation.	-10...+10 %/°C	0 %/°C
Delay	Delay time after power on before starting controls.	0...15min	2min
Display	Choice of the displayed parameter on main screen.	Measurement on entry J1, Measurement on entry IN1, Measurement on entry IN2, Flowrate value, Input voltage on entry J1, Input current on entry IN1, Input current on entry IN2, Input frequency on entry K1, Output current on OUTA, Output current on OUTB	

8) Analog outputs - Measure

Name	Significance	Range	Factory value
P.20mA	Measurement value of the main parameter for 20mA.	Full scale	10mg/l (full scale)
P. 0/4mA	Measurement value of the main parameter for 0 or 4mA according the selected current output.	Full scale	0mg/l (minimum scale)
Range	Choice of the type of current output.	0...20mA ; 4...20mA	4...20mA

These outputs allow you to transfer the main value to a recorder or a PLC.

On normal working, the value of the output current is sent between 0 (or 4) to 20mA according to the range selected. This output current is an image of the main measured value into the range of P.20mA and P.0/4mA.

Example : P.20mA = 10mg/l P.0/4mA = 5mg/l Range = 4...20mA Measure = 7mg/l

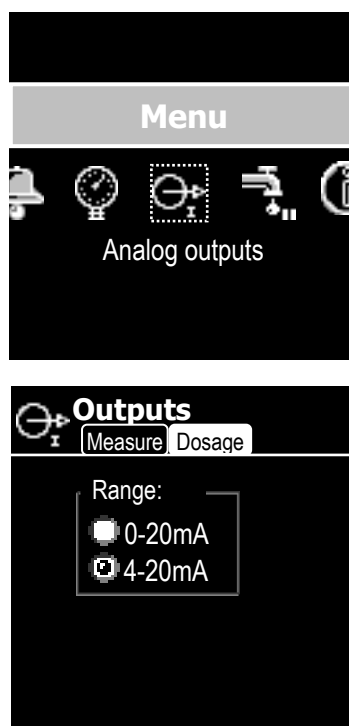
$$I_{out} = (((Measure - P.0/4mA)/(P.20mA - P.0/4mA)) * (20mA - 4mA)) + 4mA$$

$$I_{out} = (((7 - 5)/(10 - 5)) * (16)) + 4$$

$$I_{out} = 10,4mA$$

Particular value of the current output:

State	Range : 0-20mA	Range : 4-20mA
When flow control is activated	0mA	3.4mA
Lowest measured value of selected or computed entry	0mA	0mA
Highest measured value of selected or computed entry	22mA	22mA
Defective or missing sensor	0mA	2.6mA
Transfer value under P.0/4mA	0mA	3.8mA
Transfer value over P.20mA	20.8mA	20.8mA

9) Analog outputs - Dosage

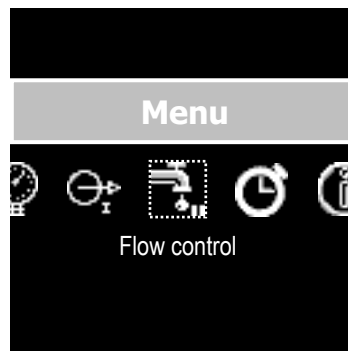
Name	Significance	Range	Factory value
range	Choice of the type of current output.	0...20mA ; 4...20mA	4...20mA

This current output allows you to connect a dosing equipment using a 0/4...20mA proportional input for dosing the active product.

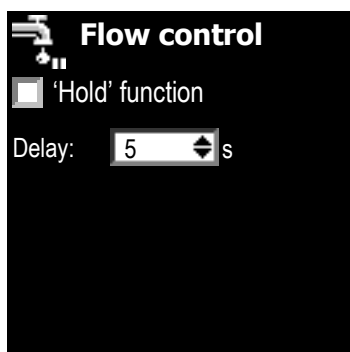
The 0 or 4 mA current correspond to 0% of "dosing value" and 20mA correspond to 100% of "dosing value".



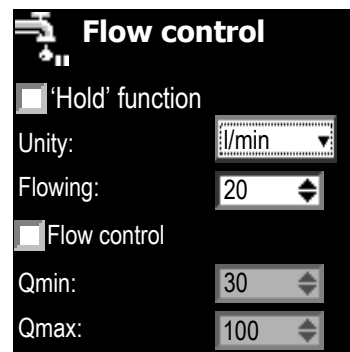
In case of stopping the controller by the means of the front key or due to an alarm, the minimum output current generated is 2.6mA (with 4...20mA range) and 0mA (with 0...20mA range).

10) Flow control

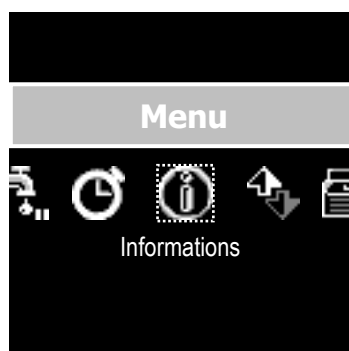
When using a flow switch
connected on K1 entry



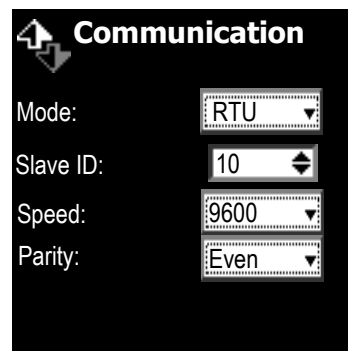
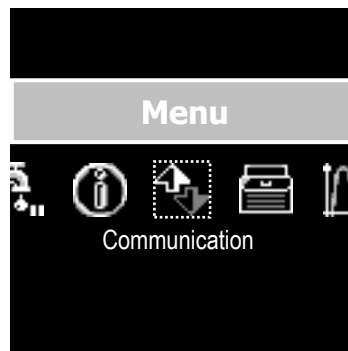
When using a flowmeter



Name	Significance	Range	Factory value
'Hold' function	This function allows the controller to keep the dosing values in memory when flow control is activated	Active/inactive	Inactive
Delay	Delay time before stopping the process when flow control is activated.	0...240s	2
Unity	Flowrate unity	l/min, l/h, m3/h	l/min
Flowing	Flowrate value for pausing the process.	Full scale of the connected flowmeter.	20l/min
Flow control	To select the function of the proportional dosing control flow.	Active/Inactive	Inactive
Qmin	Minimum flowrate value for 0% of "dosing value".	Full scale of the connected flowmeter.	30l/min
Qmax	Maximum flowrate value for 100% of "dosing value"	Full scale of the connected flowmeter.	100l/min

11) Informations

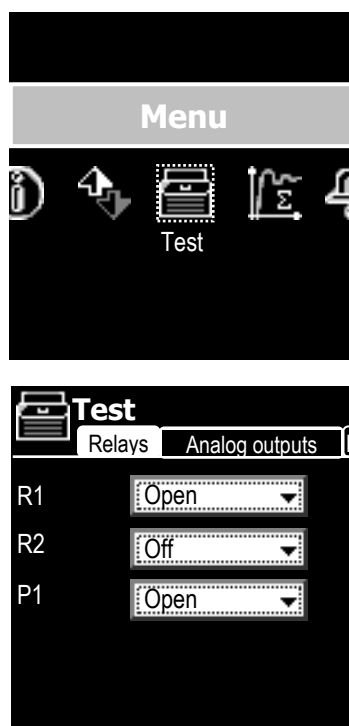
Name	Significance	Range	Factory value
Name	Name of the apparatus		Uniseau
ID	Serial number of the apparatus		
Software version	Software version of the apparatus		1.03
Type	Type of controlled parameter	None, Free chlorine, Active chlorine, Total chlorine, Chloramines, Chlorite, Chlorine dioxide ClO ₂ , Peroxide H ₂ O ₂ , Bromine BCDMH, Bromine DBDMH, Free bromine, Peracetic acid PAA, Ozone, Dissolved oxygen O ₂ , PHMB, Salinity, TDS, Turbidity, Conductivity, Temperature, Flow, pH, RedOx	Free chlorine
Sensor	Main sensor used to calculate the final measurement.		0.1...10mg/l
Language	Language of the apparatus	Français, Deutsch, English, Español, Nederlands, Italiano	Français

12) Communication

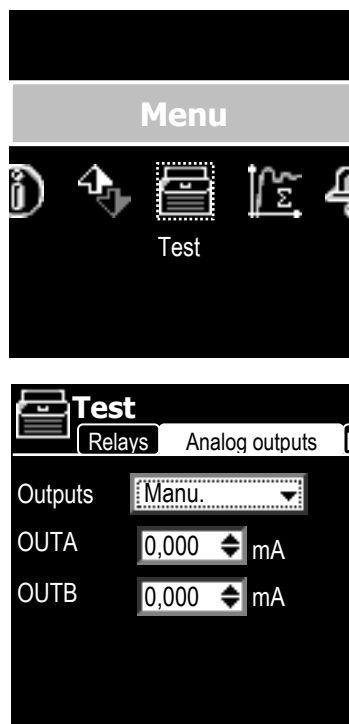
Name	Significance	Range	Factory value
Mode	Communication protocol used by the controller on RS485 port.	RTU/ASCII	RTU
Slave ID	Slave ID of the controller.	1...247	10
Speed	Communication speed	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	9600
Parity	Communication parity	None, Even, Odd	Even



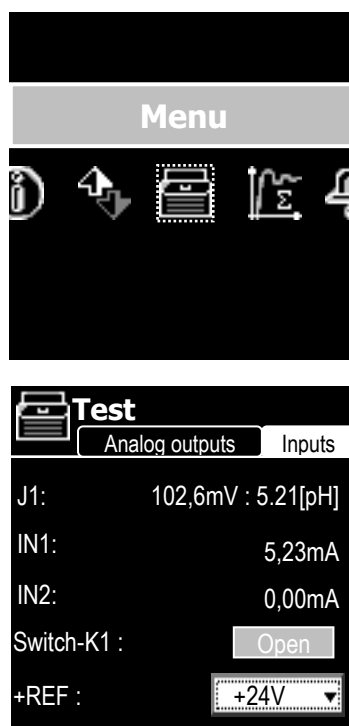
RS485 port of the apparatus supports the MODBUS[®] protocol.
Refer to the communication notice part 3 for more informations.

13) Test – Relays

Name	Significance	Range	Factory value
R1	Command of the electronic relay R1	Open/Closed	Open
R2	Command of the free of potential relay R2	Off/On	Off
P1	Command of the powered relay P1	Open/Closed	Open


14) Test – Analog outputs

Name	Significance	Range	Factory value
Outputs	Allows you to generate your own simulated current on corresponding output.	Manual, (Full programmable on OUTA and OUTB) 8<->14, (OUTA = 8mA and OUTB = 14mA) 14<->8 (OUTA = 14mA and OUTB = 8mA)	Manu.
OUTA	Simulated current value on OUTA	0...20,000mA	0,000mA
OUTB	Simulated current value on OUTB	0...20,000mA	0,000mA

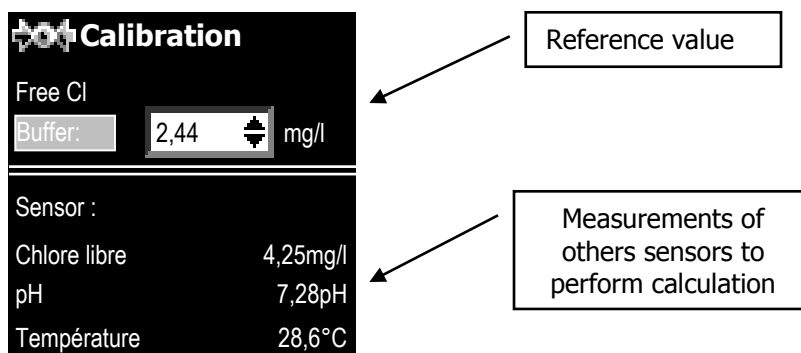
15) Test – Entries

Name	Significance	Setting range	Factory value
J1	Voltage on potentiostatic input and corresponding pH slope value - 57,6mV/[pH] with an offset of 0mV	-2000...+2000mV	
IN1	Current input value on IN1	0...20,000mA	
IN2	Current input value on IN2	0...20,000mA	
Contact-K1	State of input K1	Open/Closed	
+REF	Allows you to generate corresponding power supply to sensors connected on IN1 and IN2 inputs.	+12V, +24V	+24V

IX. Measurement calibration

For accessing to the programming menu, press a **short time** on  key.

This screen allows you to calibrate the selected parameter defined in "Parameter - Measure".



Be careful, for amperometric sensors or other specific sensors needing special working conditions like constant flowrate, without pressure, etc ..., the calibration must be performed under the good working conditions of the sensors.

This method allows to calibrate the measured value with only one reference.

Note that this procedure will calibrate the main sensor used to calculate the final measured value.

➤ Calibration of a direct measurement



If the sensor allows to measure directly the displayed value, the reference value will be used to perform the calibration of the corresponding sensor.

➤ Calibration of the calculated value

If you need more sensors to calculate the measured value, the procedure will perform the calibration of the main sensor.

Measure	Sensors used	Calibrated sensor
pH	pH, Temperature	pH
Conductivity	Temperature, Conductivity	Conductivity
Salinity	Temperature, Conductivity	Conductivity
TDS	Temperature, Conductivity	Conductivity
Free chlorine	pH, Temperature, Active chlorine (HOCl)	Active chlorine
Active chlorine	pH, Temperature, Free chlorine	Free chlorine
Chloramines	Total chlorine, Free chlorine	Free chlorine
Free bromine	pH, Temperature, Active bromine	Active bromine
Active bromine	pH, Temperature, Free bromine	Free bromine

1) Calibration procedure

To modify the buffer value using  keys and validate the reference by pressing  key.

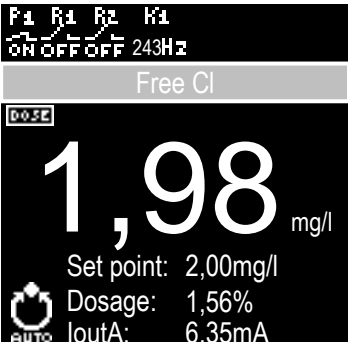
In case of failing procedure, a message will appear on the bottom of the screen:


Name	Significance	Action
Offset error, calibration out of range	The modification value of the sensor is out of authorised limits of offset.	Calibration refused
Slope error, calibration out of range	The modification value of the sensor is out of authorised limits of slope.	Calibration refused
Cannot be calibrated during polarisation	Calibration procedures are forbidden during polarisation time.	Calibration refused
Offset LIMIT check the probe	The calculated value of the offset is out of maintenance limits.	Calibration refused with displaying the key on the main screen
Slope LIMIT check the probe	The calculated value of the slope is out of maintenance limits. (Calculated slope \neq 33.....250% of the std slope of the sensor)	Calibration accepted with displaying the key on the main screen
Slope calibration OK	Calibration validated and slope modified	Calibration accepted
Offset calibration OK	Calibration validated and offset modified	Calibration accepted

2) Erasing calibrations

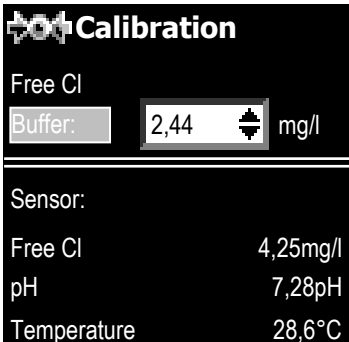
This procedure allows to erase all calibration parameters by using "factory values".


For erasing calibration, proceed as follow:



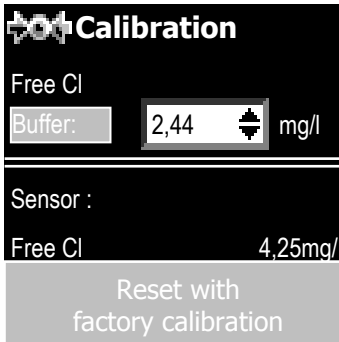


Short pressing






Press up to 3s

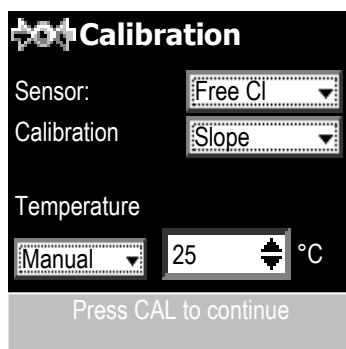


X. Sensor calibrations

For accessing to the programming menu, press a **long time** on  key.

This screen allows you to calibrate all sensors connected to the controller.

1) Select a sensor



Name	Significance	Range	Factory value
Sensor	Selection of the sensor for calibrating	The list of sensor corresponds to the sensors connected to the controller.	
Calibration	Method of calibration	Case for a pH sensor: 1 point, 2 points Case of an amperometric sensor using 4...mA signal: Slope, Zero Case for a RedOx sensor: Offset	
Temperature	Selection of the temperature sensor used for calibrating.	Auto : Using connected sensor. Manual : Selection of a temperature value from 5...45°C	

2) Calibration with 1 point

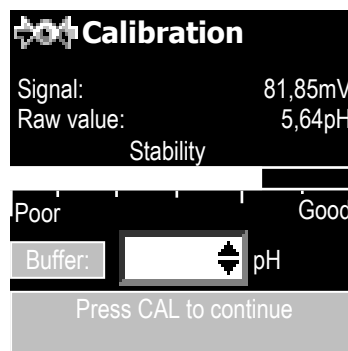
For specific sensors like pH or RedOx (ORP), this operation could be carried by placing it directly into the buffer reference.



Be careful, for amperometric sensors or other specific sensors needing special working conditions like constant flowrate, without pressure, etc ..., the calibration must be performed under the good working conditions of the sensor.

For calibrating a sensor with only 1 point:

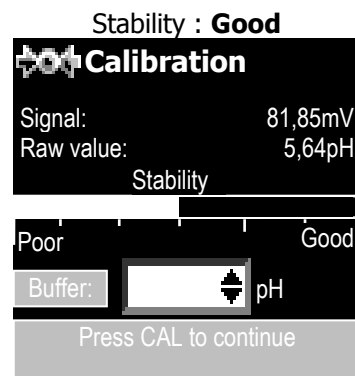
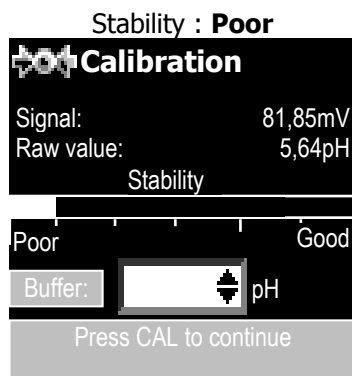
- Place the sensor into a reference buffer...
- Wait the stabilisation of the measure...
- Enter the corresponding value into the "buffer" field...
- Validate by pressing OK or CAL.



Name	Significance	Range
Signal	Indicate the present value in mV of the sensor	
Raw value	Actual value of the sensor without calibration	
Stability	This bargraph allows you to control the stability of the measurement during calibration procedure. In case of unstable value, calibration is impossible.	
Buffer	Calibration value of the sensor	Full scale of sensor



To ensure good calibration, be sure the value of measurement is stable.



3) Calibration with 2 points

For specific sensors like pH or RedOx (ORP), this operation could be carried by placing it directly into the buffer reference.

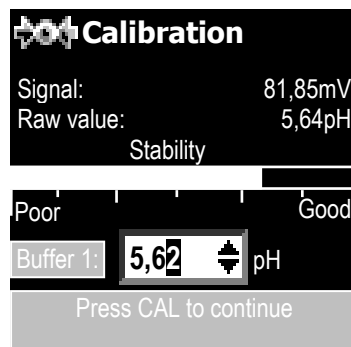


Be careful, for amperometric sensors or other specific sensors needing special working conditions like constant flowrate, without pressure, etc ..., the calibration must be performed under the good working conditions of the sensor.

This method allows you to calibrate a sensor with two different buffers.

For calibrating a sensor with 2 points:

- Place the sensor into the first buffer reference...
- Wait the stabilisation of the measure...
- Enter the first calibration value in the field "Point 1"...
- Validate by pressing OK or CAL.
- Place the sensor into the second buffer reference...
- Wait the stabilisation of the measure...
- Enter the second calibration value in the field "Point 2"...
- Validate by pressing OK or CAL.



Name	Significance	Range
Signal	Indicate the present value in mV of the sensor	
Raw value	Actual value of the sensor without calibration	
Stability	This bargraph allows you to control the stability of the measurement during calibration procedure. In case of unstable value, calibration is impossible.	
Buffer	Calibration value of the sensor	Full scale of sensor



The difference between the two buffers must be greater than 2pH.

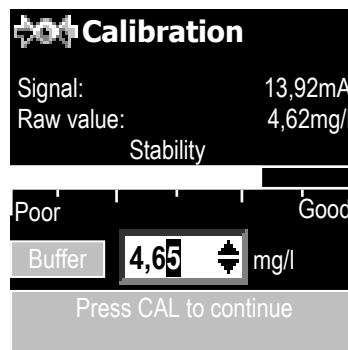
4) Calibration of the slope

Be careful, for amperometric sensors or other specific sensors needing special working conditions like constant flowrate, without pressure, etc ..., the calibration must be performed under the good working conditions of the sensor.

This method allows you to calibrate the slope of a 4...20mA sensor.

For calibrating the sensor, proceed as follow:

- Place the sensor into a reference value or into water where measured chemical product is present...
- Wait the stabilisation of the measure...
- Proceed to the external measurement of the chemical product with a reference tool.
- Enter the corresponding value into the "buffer" field...
- Validate by pressing OK or CAL.



Name	Significance	Range
Signal	Indicate the present value in mA of the sensor	
Raw value	Actual value of the sensor without calibration	
Stability	This bargraph allows you to control the stability of the measurement during calibration procedure. In case of unstable value, calibration is impossible.	
Buffer	Calibration value of the sensor	Full scale of the sensor



To perform a good calibration of the sensor, the calibration value must be greater than 25% of the full scale, that means 2,5 mg/l for a 0...10mg/l sensor.

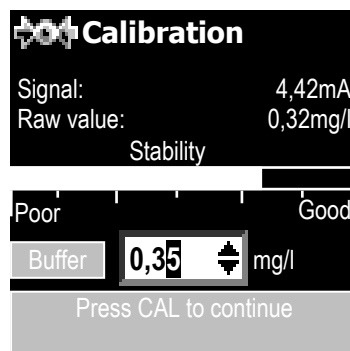
5) Calibration of the offset

Be careful, for amperometric sensors or other specific sensors needing special working conditions like constant flowrate, without pressure, etc ..., the calibration must be performed under the good working conditions of the sensor.

This method allows you to calibrate the offset of a 4...20mA sensor.

For calibrating the sensor, proceed as follow:

- Place the sensor into water where a very low measured chemical product is present...
- Wait the stabilisation of the measure...
- Proceed to the external measurement of the chemical product with a reference tool.
- Enter the corresponding value into the "buffer" field...
- Validate by pressing OK or CAL.



Name	Significance	Range
Signal	Indicate the present value in mA of the sensor	
Raw value	Actual value of the sensor without calibration	
Stability	This bargraph allows you to control the stability of the measurement during calibration procedure. In case of unstable value, calibration is impossible.	
Buffer	Calibration value of the sensor	Full scale of the sensor



To perform a good offset calibration of the sensor, the calibration value must be lower than 1% of the full scale, that means 0,1mg/l for a 0...10mg/l sensor.

6) Erasing calibrations

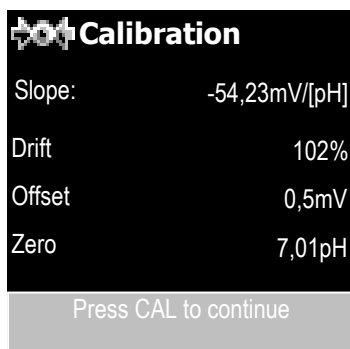
This procedure allows to erase all calibration parameters by using "factory values".

For erasing calibration, proceed as follow:



7) Informations

When calibration is done, a screen appears during some seconds to give you the new parameters of the calibration.




Name	Significance	Range
Slope	New slope of the sensor after calibration	pH sensor: -35...-78mV/[pH] 4-20mA sensor: 25...300% of full scale
Drift	Difference in % between the slope of the sensor without calibration and after doing calibration.	
Offset	Offset after calibration	pH sensor: +90...-90mV RedOx (ORP) sensor: +70...-70mV 4-20mA sensor: 3,6...4,4mA
Zero	New zero value of the sensor after calibration	

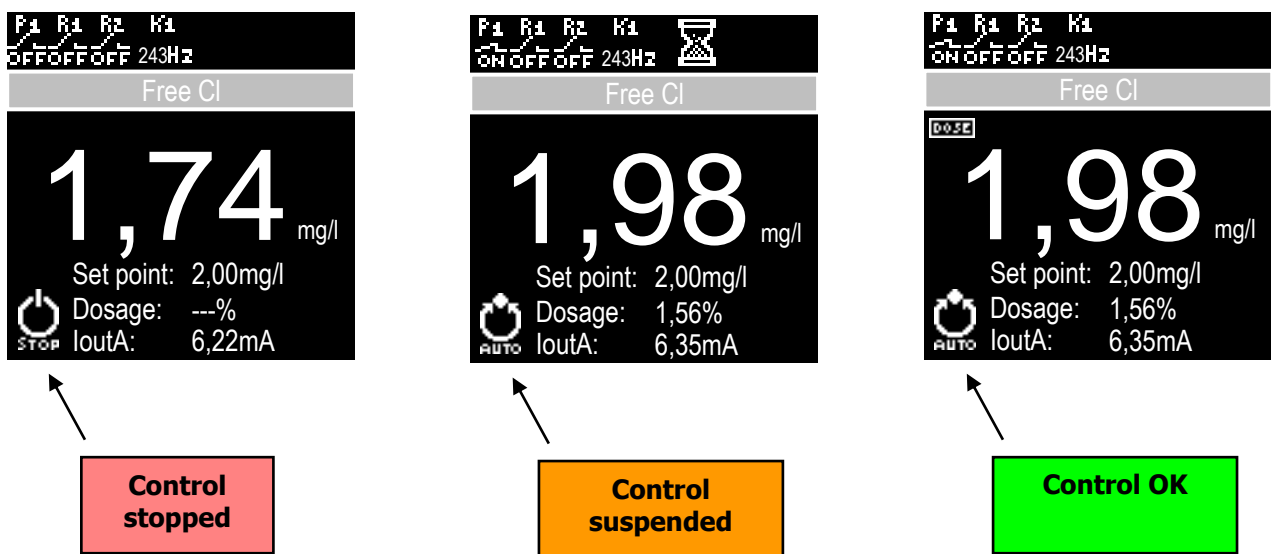
XI. Start dosing process

After checking all parameters, you are ready to start the dosing process of the **SYCLOPE UNIS'EAU®** controller.

A short pressing on  key engage the dosing process.

If the controller has just been connected to the power line, the "polarisation time" is started and the controller is in waiting state until duration is done.

The sand glass located in the top of the main screen indicates the latency... 



When polarization time done, the dosing control is activated.

XII. Maintenance.

No particular maintenance is needed.

Repairs must be carried out only by qualified technicians and must be carried out exclusively in our factory.

In any case concerning the controller or the using of sensors, don't hesitate to contact your reseller or our after sales service.

EC Certificate of conformity

Designation of the products: UNIS'EAU and INDIG'O

Declaration :

SYCLOPE Electronique SAS, Z.I. Aéroport Pyrénées in SAUVAGNON - France -, hereby certifies by the present that the following models "UNIS'EAU and INDIG'O", controllers for the analysis and controls of physicochemical measurements are in conformity with the standards and safety as defined by the European directives 2006/95/EC (Low voltage directive), 2004/108/EC (Electromagnetic compatibility) and 2002/95/CE (RoHS directive).

The present declaration is valid for all of the specimens manufactured after the date of this certificate and according to the original documents of manufacture.

The following standards were used for the examination:

2006/95/EC: Harmonized standards EN61010-1:2001

2006/95/EC Low voltage directive,
Safety requirements for electrical equipment for measurement, control, and laboratory use
Test report n° 2008-29 of 2008, 26th June.

2004/108/EC: Harmonized standards EN61326-1:2006

EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8,
EN61000-4-11, EN61000-3-2 and EN61000-3-3
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Test report n° 2008-24 of 2008, 8th June.

2002/95/CE: RoHS Directive (Limitation of dangerous substances).

Date of the first sale: 2008, July.

The present declaration engages the responsibility of :



SYCLOPE Electronique S.A.
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Represented by :

Georges BRETON
President and General Manager

Sauvagnon : 2008/09/09



NOTES

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