

# **Programming instructions**



References : CEN0000, CEN0001 and CEN0005

## Parts of the general documentation

- Part 1 : Installation and starting instructions
- ► Part 2 : Programming instructions

# General details:

#### SYCLOPE Electronique 2015® Notice of the 01/12/2015 Rev 2

Controller for semi publics swimming pools. Range INDIG'O<sup>®</sup>

Part 2 : Programming instructions

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.



### 2) <u>Storage and transport</u>



It is important to store and transport your **SYCLOPE INDIG'O**<sup>®</sup> 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) <u>Packaging</u>



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.

Content of the packaging:

- ✓ One analyser/controller SYCLOPE INDIG'O®
- $\checkmark$  Installation and starting instruction notice
- ✓ Programming notice

#### 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 behavior 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 INDIG'O**<sup>®</sup> system has been designed to measure and control Chlorine, Bromine, pH, Redox potential, Ozone, 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.

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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 INDIG'O**<sup>®</sup> 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 INDIG'O**<sup>®</sup> 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 cut 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 INDIG'O**<sup>®</sup> 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 label





#### 5) Disposal and conformity

The recyclable packaging of the **SYCLOPE INDIG'O**<sup>®</sup> 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 INDIG'O**<sup>®</sup> 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. Human/Machine interface

1) <u>Keyboard</u>





#### Display 128x128



Key "Menu" : Allow to go in the different menu or to valid a setting



Key "START/STOP" : Allow to start or stop the control. Allow also to acquit the alarms



Key "Esc" : Allow to return at the permanent display



Key ``+'' : Allow to increment a value or change a setting

Key "-": Allow to decrement a value or change a setting

## 2) Permanent display, pictograms and messages

On this display, you can see all the working of your controller:

- > The measuring value
- > The set point
- > The dosing value
- > The parameter and his unit
- The status of the relay
- Pictograms and messages for alarms



Visualisation	Signification			
Value	Measuring value and unity			
Parameter	Showing the measured parameter			
Status of relay Showing status of the relay. Checkmark means that relay is activated				
Alarms	Showing the actives alarms			
M/A Indicator	Showing status of the control. Auto 🏬 or STOP 🔛			
Set point	Value to reach			
Dosage	Percent of control on the metering unit			
Output Value sent to the PLC				

Visualisation	Signification	Menu of modification	Value	Action
$\overline{\mathbb{Z}}$	Polarization time	Configuration Menu Sensor Page	Time	Stop dosing
<b>1</b> 79	Incorrect flow	Configuration Menu Flow switch Page	NO or NC	Stop dosing
2	Sensor Maintenance -		-	Calibration Limit
<u> </u>	Low alarm threshold	Settings Menu Alarms Page	Value	Activate R1 relay
~ <del>*</del> *	High alarm threshold	Settings Menu Alarms Page	Value	Activate R1 relay
U	Overdosing delay	Settings Menu Alarms Page	Time	Stop dosing Activate R1 relay
Polarization in progress or defective sensor I<3,7 mA	Polarization or default of the sensor	-	-	Stop dosing
Sensor out of range or short circuit. I>20 mA	Sensor out of range or short circuit	-	-	Stop dosing
Disconnected or defective sensor	Bad connection or sensor in default	-	-	Stop dosing

# 3) <u>Alarms</u>

4) Internal connections

Reference: CEN0000 with 4-20 mA analog input



References: CEN0001 and CEN0005 with pH or ORP input



# IV. Navigation into the menus

## 1) Accessing to the menus

The programming interface of the **SYCLOPE INDIG'O**<sup>®</sup> is based on 3 differents levels:

- > **Setting** Menu: to program the working settings such set point, alarms...
- > Configuration Menu: to configure the machine such flow switch, analog output...
- > Factory Menu: to configure the language, the parameter and the range

Each Menu contains several pages allowing to set or configure the unit.

This table describe the composition of each menu and how to reach them.

Menu	Key	Action	Page
			Calibration
Setting	Menu	Simple Press	Control
			Alarms
			Dosage
		Press for 5 sec	Control relay
Configuration	Menu		Analog output
Configuration			Flow switch
			Sensor (Polarization)
			Test
Factory	START STOP	Press for 5 sec during switching on power	Language Sensor (parameter) Range

# 2) Navigation into the Menu

Once the Menu is reached:



: Permit to scroll the cursor and to valid a modification



: Permit to scroll the setting or the value selected

# V. Starting

1) Starting display

Once the controller is switched on, this screen appears.



Line	Signification	Setting	Default value
Name	Name of the product	Indigo mA or mV	Depend of the reference
ID	Embedded software name	INDMA or INDMV	Depend of the reference
Version	Embedded software version	X.XX	Depend of the reference

2) Adjust the contrast display

To adjust the contrast of the display, press on the arrow "TOP" or "BOTTOM" from the permanent screen.



3) Starting the control

To start the control, press the key "START/STOP"



Programming instructions of the SYCLOPE INDIG'O®

# VI. Setting Menu

The Setting Menu permit to set all the working parameter. Press the key "**MENU**" to reach this menu and press again the key "**MENU**" to go over the 3 different screens of this level.

Menu	Key	Action	Page
	Menu		Calibration
Setting		Simple press	Control
			Alarms

1) Calibration of the sensor : Screen "Calibration"

This screen allow to make two operations regarding the calibration of the sensor.

Buffer : to calibrate the sensor to the standard value measured with your reference device or a buffer solution. Adjust the value with arrow keys "TOP" or "BOTTOM" then valid this value pressing the "MENU" key.

Depending of the value set, the controller automatically adjust the slope or the offset.

Erasing : to reset the calibration and return to factory properties (Slope and offset). In this screen, press the "MENU" key for 5 sec to do this operation.



Name	Signification
Sensor	Raw current or mV gives by the sensor without calibration
Raw value	Raw value (in mg/l or mV) following the raw mA or mV signal
Buffer	Value to set with the reference device or buffer solution
Slope	Slope after calibration in mA/mg/I or in mV/pH
@Standard (Version mA)	Correcting factor after calibration %
Offset (Version mV)	Offset after calibration in mV

After calibrating, a message appears to tell you the calibration status.

Messages and signification after calibrating.

Message	Message Signification		Action	า	Fig.	
Slope OK	Calibration correct. Slope changed			Calibration	done	1
Offset OK	Calibr	Calibration correct. Offset changed		Calibration	done	-
Slope LIMIT The ca Out out slope<		The calculated slope after calibration is out of normal value. (Calculated slope<> 33250% of standard slope)		Calibration done. Display of the pictogram key of maintenance on the permanent screen		2+6
Offset LIMIT Check the probe	The cal	culated slope after out of normal	er calibration is value.	Calibration done. the pictogram maintenance permanent s	Display of key of on the creen	-
Slope error p=25300% (Version 4-20 mA)	The cale out of	culated slope after acceptable value and 300%	er calibration is as between 25	Calibration re	efused	3
Offset error Delta (max) = ±90 mV (Version pH)	The cal	culated offset aft out of acceptable	er calibration is e values	Calibration re	efused	
Calibration error Delta (max) = $\pm$ 70 mV (Version ORP)	The cal	culated offset after calibration is out of acceptable values		Calibration refused		
Can't be calibrated during polarization	Im	npossible calibration during polarization		Calibration refused		4
Reset with factory calibration	Reset	calibration (slope and offset) values		Back to factor	y value	5
			2	(	3	
Calibration Control A	larms₽	Calibration C	ontrol Alarms	Calibration C	ontrol Alar	rms⊾
Sensor: 6,50	06 mA	Sensor:	6,506 mA	Sensor:	6,506 r	nA
Raw value: 2,0	8 mg/l	Raw value:	2,08 mg/l	Raw value:	2,08	mg/l
Buffer: 2,09	mg/l	Buffer:	2,09 🔶 mg/l	Buffer:	2,09	mg/l
Slope : 1,19 m/	4/mg/l	Slope :	1,19 mA/mg/l	Slope :	1,19 mA/r	ng/l
Slope OK		Slope LIMIT Check the probe		Slope error p=25300%		
(4)			5		6	
Calibration Control Alarms		Calibration C	Control Alarms	■ REG ■ A	LR	Ý
Sensor: 6,50	)6 mA	Sensor:	6,506 mA	Free Cl		
Raw value: 2,0	)8 mg/l	Raw value:	2,08 mg/l			
Buffer: 2,09 🔶 mg/l		Buffer:	2,09 🔶 mg/l		19	ma/l
Slope : 1,19 m	A/mg/l	Slope :	1,19 mA/mg/l	Cotur	pint - 2.00	mall-
Can't be calibrated during polarization		Res factory	set with calibration	Dosag	ie : 58% it : 4,187	mg/i

2) <u>Control settings : Page "Control"</u>

This page allow you to set:

- > The set point: value to control in your water
- > The Xp value: value for the proportional action on the metering unit

Version 4-20 mA		Version pH	Version ORP	
Calibration Control Alarms		Calibration Control Alarms	Calibration Control Alarms	
Set point :	2,00 🔶 mg/l	Set point : 7,20 (pH)	Set point : 460 🔶 mV	
Xp :	1,00 🔶 mg/l	Xp: 0,30 🔶 (pH)	Xp : 30 🔶 mV	
Name	Signification	Setting range	Default value	
Set point	Set point value for control	4-20 mA : 10% to 85%* pH : 2 to 12 ORP : 300 à 850	4-20 mA:20%* pH:7,2 ORP:460 mV	
Хр	Value of the proportional action	4-20 mA : 10% to 500%* pH : 0,1 to 70 ORP : 1 to 100	4-20 mA:10%* pH:7,2 ORP:460 mV	

(\*) : In % of the measured full scale set for the sensor

Details :

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

-XP value : Difference between the measuring value and the setpoint for which the regulation is at the maximum. (Controlling value\* at 100%).

\*Controlling value : It represent the proportional action on the dosing unit (For example, a dosing pump) to reach the setpoint. This value is displayed on the main screen and call "**Dosage : xx %**" (See picture)



Example : Setpoint is 2 mg/l and Xp is 1 mg/l

If difference is 1.5 (> to 1) then Controlling value = 100%If difference is 1.0 (= to 1) then Controlling value = 100%If difference is 0.5 (< to 1) then Controlling value = 50%If difference is 0.25 (< to 1) then Controlling value = 25% 3) Alarms configuration : Page "Alarms"

This page allow you to define :

- Upper alarm threshold : value for the upper alarm threshold with activation of the Alarm relay after overpassing the value
- Lower alarm threshold : value for the lower alarm threshold with activation of the Alarm relay after overpassing the value
- Overdosing delay : Maximum delay (in sec) to reach the setpoint. If overpassing of this delay, activation of the Alarm relay + stop control + display of the pictogram on the main screen



(\*) : Expressed in % of the measuring range



# VII. Configuration Menu

The Configuration Menu allow you to configure the machine. Keep pressing during 5 sec the "**MENU**" key to access to this level. Then, press again the Menu key to drive into the different steps.

Menu	Key	Action	Page
			Dosage
	ration	Press during 5 sec	Control relay
Configuration			Analog output
Configuration			Flow switch
			Sensor (Polarization)
			Test

1) Dosing mode : Page "Dosage"

According to the version of the product, this page allow to set :

Additional load : This value, expressed in %, permit to keep a minimum dosing action even once the setpoint reached.

Then, according to the version of the machine :

- In 4-20 mA version, the dosing mode : Proportional mode (Prop.) or On/Off with hysteresis (Hyst.)
- > In pH version, the direction : Direction of the dosing (Acid or pH-) or (Alkali or ph+)
- > In ORP version, the direction : Oxidant or Reducer

The direction in the 4-20 mA version is always a rising action. The value should be below the setpoint to have an action of the dosing unit.





In the 4-20 mA version, if the Hysteresis dosing mode is set, the control range should be set in the "Control" page of the Setting Menu instead of the Xp value in proportional dosing mode. This value is also expressed in the measuring unity (For example, mg/l).

Name	Signification	Setting range	Default value
Additional load	Minimum dosing action	0 to 30 %	0 %
Dosage mode	Proportional control or Hysteresis threshold	Prop. or Hyst.	Prop.
Direction Version pH	Control direction	Acid or Alkali	Acid
Direction Version Redox	Control direction	Reducer or Oxidant	Oxidant

Control chart according to the dosing mode set Proportional or Hysteresis.



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2) <u>Control cycle time : Page "Control relay"</u>

This page allow you to define, according to the version of the machine:

- > Period : complete duration of a dosing cycle (Only for Proportional mode)
- ➢ Min. Time : Minimum time of an action on the relay. If the action to do on the dosing unit is lower than this value, the controller make an addition of the time and apply the action after.

Example :

- If : Period = 20 sec, Min. Time = 3 sec, Controlling value = 10 %
- <u>Then</u>: Activation time should be 2 sec. This time is lower than the minimum time set. The controller will make an addition on 2 periods to exceed the minimum time set. So, the controller will make an action of 4 sec (2x2 sec) on 2 periods, so 4 sec on 40 sec period.
- <u>If</u> : Period = 20 sec, Min. Time = 5 sec, Controlling value = 10 %
- <u>Then</u>: Activation time should be 2 sec. This time is lower than the minimum time set. The controller will make an addition on 3 periods to exceed the minimum time set. So, the controller will make an action of 6 sec (3x2 sec) on 3 periods, so 6 sec on 60 sec period.

In the 4-20 mA version, you can define also :

> R1 Relay : this setting allow to invert the assignment of the two relays. In this case, the powered relay is used for alarm and the dry contact relay, for control.



Name	Signification	Setting range	Default value
Periode	Duration of the dosing cycle	101800 s	20 s
Min. time	Minimum time of an action on the dosing unit	05 s	3 s
R1 relay	R1 set = <b>P</b> 1Dosage is for control R2 set = <b>R</b> 1Alarme is for control	R1 or R2	R1

3) Range for 4-20 mA analog output : Page "Analog output"

This page allow you to set the range of the analog output  $I_{OUT1}$ :

Range : define the range of the analog output. This ouput allow to transfer the measuring value to a PLC.



Name	Signification	Setting range	Default value
Range	Working range of the output	0-20 mA or 4-20 mA	4-20 mA

4) Flow switch input : Page "Flow switch"

This page allow you to define the type of the input  $K_{1pause}$ . When the condition is not checked, the controller put in stand-by the control and display a pictogram on the main screen.

> Type : define the type of the input NO or NC

NO : Normally open



5) <u>Polarization time : Page "Sensor"</u>

This page allow you to define the polarization time of the sensor. After the power supply or after a default on the sensor, the controller wait during the time set before controlling. During this time, a pictogram is displayed on the main screen:

> Polarization : define the duration before launching the control

	Flow switch Polarization :	Sensor 2  min	REG Free Cl Setu Setu Dose Outp	ALR 👿 099 mg/l oint : 2.00 mg/l age : 0,00% out : 5,750 mA	
Name	Signific	ation	Setting range	Default value	Action
Polarization	Delay before launc	ching the control	015 min	2min	Stop control Display picto
6)	Output testing : P	age "Test"			

This page allow you to check manually the working of the output :

- > R1 relay : Activation of the powered relay P1Dosage
- > R2 relay : Activation of the dry contact relay R1Alarme
- > Output I : Sending a defined current on the analog output **I**ouT1



Name	Signification	Setting value	Default value
R1 relay	Working test of <b>P<sub>1Dosage</sub></b>	Open or Close	Open
R2 relay	Working test of <b>R1Alarme</b>	Off or On	Off
Output I	Working test of <b>Iout1</b>	020 mA	0,00

# VIII. Factory Menu

The Factory Menu allow you to configure some general parameters of the controller. While you switch on the power supply, keep pressing the "**START/STOP**" key during 5 sec to access to this menu. Then, press the Menu key to navigate.

Menu	Key	Action		Page
Factory	START STOP	Keep pressing f 5 sec while swit on power supp	or ch ly	Language Sensor (Parameter) Range
	Version 4-2	20 mA		Version pH et Redox
La	anguage :		La	inguage :
	Français			Français
	English			English
S	ensor :		Se	ensor:
	Free Cl			рН
R	ange '			ORP
	010	Ð		

1) <u>Selection of the language</u>

This area allow you to choose de language of the HMI:

Name	Signification	Setting range	Default value
Language	Select your language	Français or English	Français

2) Selection of the sensor

This area allow you to choose the measuring sensor. Refer to the version, to see the possibilities:

Name	Signification	Version	Setting range	Default value
Sensor	Choice of the sensor	Version 4-20 mA	Free Chlorine Active Chlorine Total Chlorine CLO2 BCDMH Bromine DBDMH Bromine Free Bromine Ozone Turbidity	Free Chlorine
		pН	pH ORP	рН
		ORP	pH ORP	ORP

## 3) <u>Selection of the range</u>

This area allow you to define the range of the sensor. The ranges available change according to the measuring sensor. The range is only changeable for 4-20 mA version :

Name	Signification	Settings	Ranges	Default value
Range	Range of the sensor	Free Chlorine Active Chlorine Total Chlorine CLO2 BCDMH Bromine DBDMH Bromine Free Bromine Ozone Turbidity	0 à 1 /2 / 10 / 20 ppm 0 to 1 /2 ppm 0 to 50/100/200/500/1000 NTU	0-10 ppm

### IX. CE Compliance certificate





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