SYCLOPE TERE'O Touch® Controller for swimming pools
(Partie 2)

Communication instructions

SYCLOPE
Electronique

Reference: DOC0418 Rev : 1.1

Parts of the general documentation

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

General information:

SYCLOPE Electronique 2019® Manual of the 29/05/2019 Rev 1.1

Professional Analyzers/Controllers for public swimming pools.
Product line TERE'O TOUCH®
Part 2: Communication instructions (Ref: DOC0418)

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Summary

I. General

1) Field application

The analyser/controller of the **SYCLOPE TERE'O Touch®** range you have just purchased is an electronic swimming-pool water management device. It has been carefully developed and manufactured to ensure your greatest pleasure and peace of mind.

Its remarkable capacity for adapting to different conditions and sizes of private or public swimming pools means it can be installed in the most difficult of environments where control of water treatment and swimming-pool water regulation processes are decisive.

The **SYCLOPE TERE'O Touch®** range are equipped with one temperature entry and two specific electronic card adaptors for pH, ORP or chlorine/bromine for measurements using specific sensors for treating swimming-pool water and also include regulations processes with cyclic commands transmitted by means of two relays to control pH and chlorine levels.

The simplicity of operation of the **SYCLOPE TERE'O Touch®**, the user friendliness and the remarkable technical aspects of these devices, will ensure you benefit from their many options, guaranteeing you full control and supervision of the quality of the water in your swimming pool.

The following instructions contain all the information required for the installation, use and maintenance of your new equipment.

- Packaging
- Installation
- Technical specifications
- Commissioning instructions
- Safety tips

If you would like to receive further information or if you encounter any difficulties not described in this manual, please contact your usual retailer or else directly contact the sales department of SYCLOPE Electronique in France, either at the agency or at the office for your region or country, or the technical/quality departments of our establishments. We will do everything in our power to help you and ensure you benefit from our advice and know-how in the field of measurement and treatment of swimming-pool water.

Contact : Service-technique@syclope.fr

2) FCC conformity

The **SYCLOPE TERE'O Touch®** controller complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference (2) this device must accept any interference received, including interference that may cause undesired operation FCC Regulations state that unauthorized changes or modifications to this equipment may void the user's authority to operate it.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect this equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes and modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

Remark : To ensure compliance with the FCC regulations on electromagnetic interference for a class B device, use cables properly shielded and connected to the ground as recommended in this manual. The use of a cable that is not properly shielded or earthed for risk of violating the FCC rules.

3) Use of this document

Please read this entire document before starting to install, adjust or commission your device, in order to ensure the safety of swimmers, users and 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

4) Signs and safety symbols

Identify a continuous voltage or a continuous current

Identify an alternative voltage or an alternative 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

5) Storage and transport

It is important to store and transport your **SYCLOPE TERE'O Touch®** 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

6) 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 analyzer/controller **SYCLOPE TERE'O Touch®**
- ✓ Installation and starting instruction notice
- ✓ Programming notice
- ✓ Communication notice (Option)

7) 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 instructions

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 TERE'O Touch®** system has been designed to measure and regulate pH, Redox (ORP), chlorine (or bromine) 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 TERE'O Touch®** 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 TERE'O Touch®** equipment should only be performed by personnel specialized and qualified for this task.
The installation must comply with current safety standards and instructions!

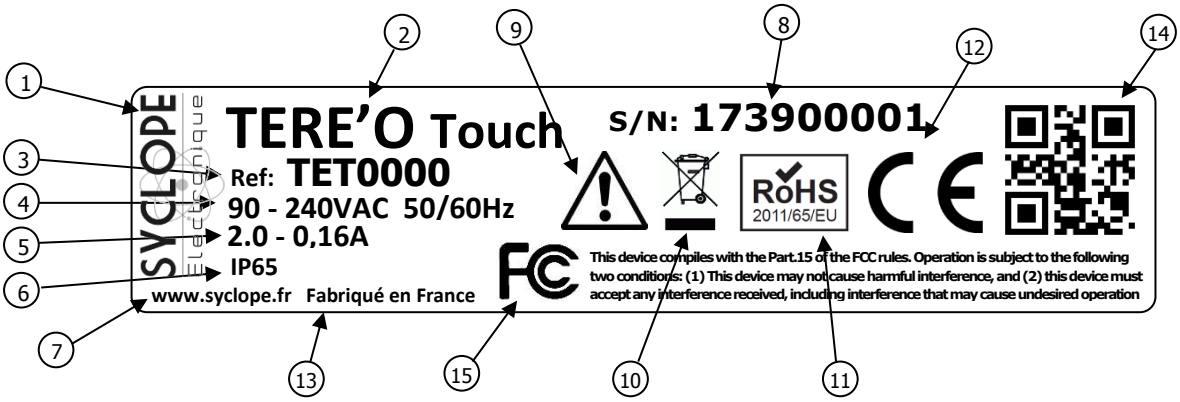
Before switching the controller on or manipulating the relay outputs, remember always to cut off the primary power supply!
Never open the controller when it is powered on!
Maintenance operations and repairs should only be performed by trained, specialized personnel!

Take care when choosing the location for installing the equipment according to the environment! The **SYCLOPE TERE'O Touch®** 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 vapors.

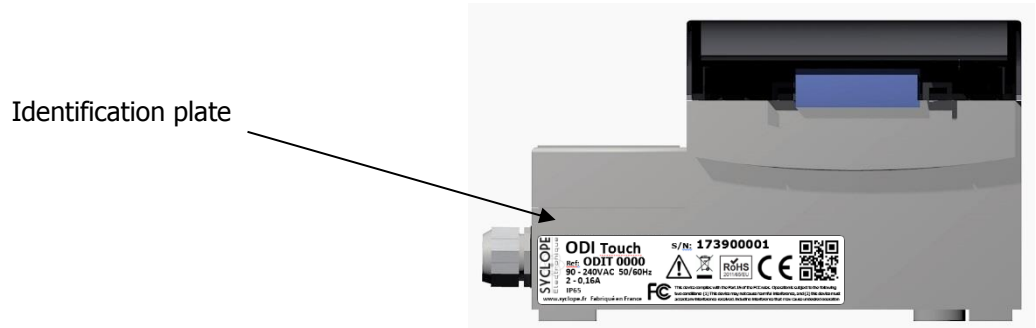
Make sure that the chemical sensors used with this device correspond well to the chemicals used. Refer to the individual technical note of each sensor. Chemistry of water is very complex, in case of doubt, contact immediately our engineering service or your approved installer/reseller.

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 compliance
(5) Values of the maximum current	(13) Country of the manufacturer
(6) Class of protection	(14) Manufacturer square code
(7) Identification of the manufacturer	(15) Conformity with the FCC part 15 Class B
(8) Serial number	



5) Disposal and conformity

The recyclable packaging of the **SYCLOPE TERE'O Touch®** 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 TERE'O Touch®** 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.

In accordance with part 15 of the FCC regulation (Federal communications commission), this symbol indicates that the device was tested and approved under the respect and the conditions of the limits for a Class B digital device.

III. Fundamental Synoptic of Communication

TERE'O Touch equipment has been designed to be connected to a RS485 bus with a ModBus RTU protocol or to the "mysyclope.com" website. Several devices can be connected to each other.

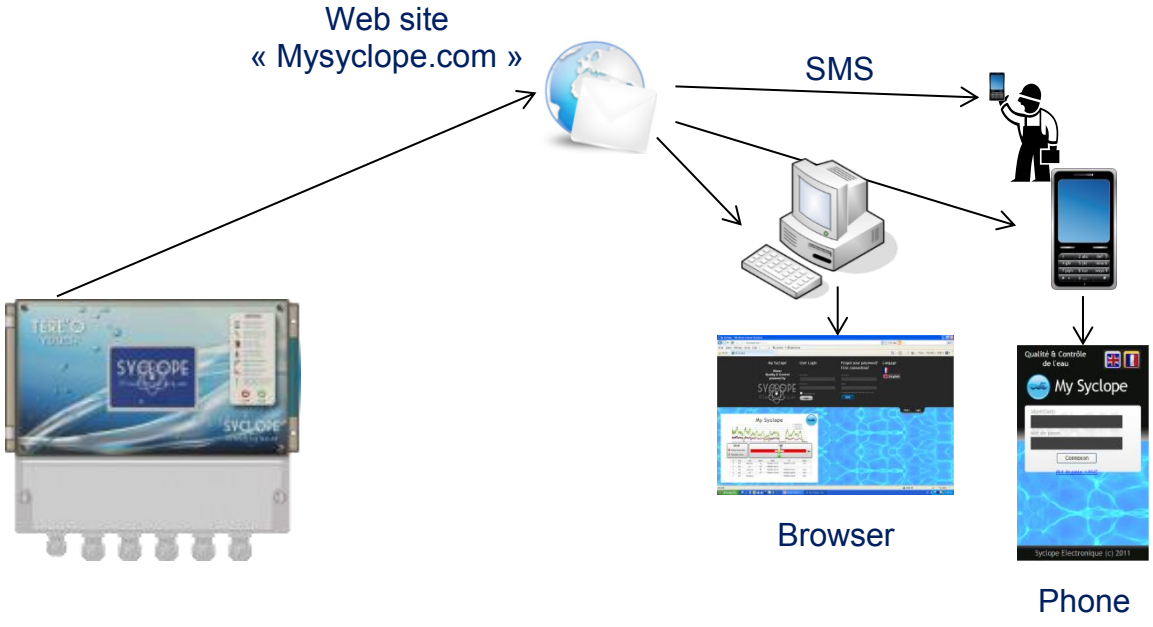
1) Local connection RS485

- Connection of one or more **TERE'O Touch** controllers via the RS485 BUS..

To connect your **TERE'O Touch** ® controller to your computer, we offer a USB / RS485 interface module.

Reference	Designation
INF1021	USB 485 converter

2) Remote connection to mysyclope.com



TERE'O Touch is connected using GPRS / IP /WIFI on the web site mysyclope.com

In order to connect your **TERE'O Touch** ® to the Internet we offer several connection KIT.

Reference	Designation
KMD0020	Internal MODEM GSM / GPRS kit with cable and local antenna
KMD0040	Internal Ethernet MODEM Kit
KMD0050	Internal WIFI MODEM with cable and local antenna

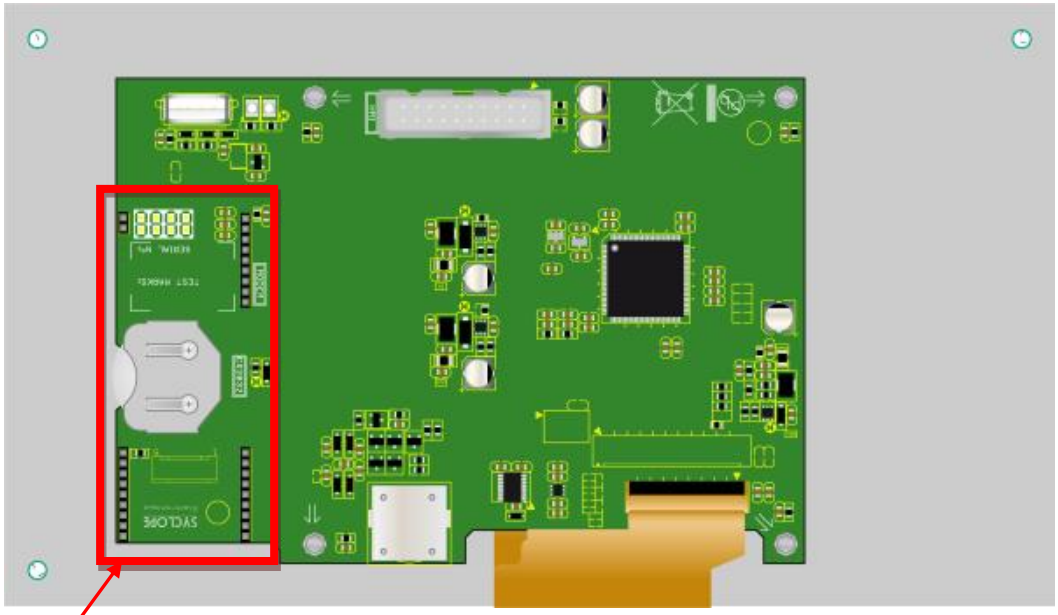
IV. Internal Modem Connections

1) Connections of MODEMS GSM, GPRS, Wifi and Ethernet

The **TERE'O Touch** ® can receive different types of modem to establish communications with the "mysyclope.com" website.
Depending on the type of modem and the connection to the Internet, the data are transmitted to the "mysyclope.com" site and thus allow real-time management of the operation of the **TERE'O Touch** ®. Alert messages can be sent to users via emails or SMS and a history of measurements and alerts is recorded.

2) MODEMS connections on the internal board

The "Modem Sockets" are sold as an option and must be inserted in the appropriate slot as shown in the diagram below. The wiring is dependent on the type of modem.
The modem is positioned on the front board, so open the front panel (display part) and return it to position the modem socket.

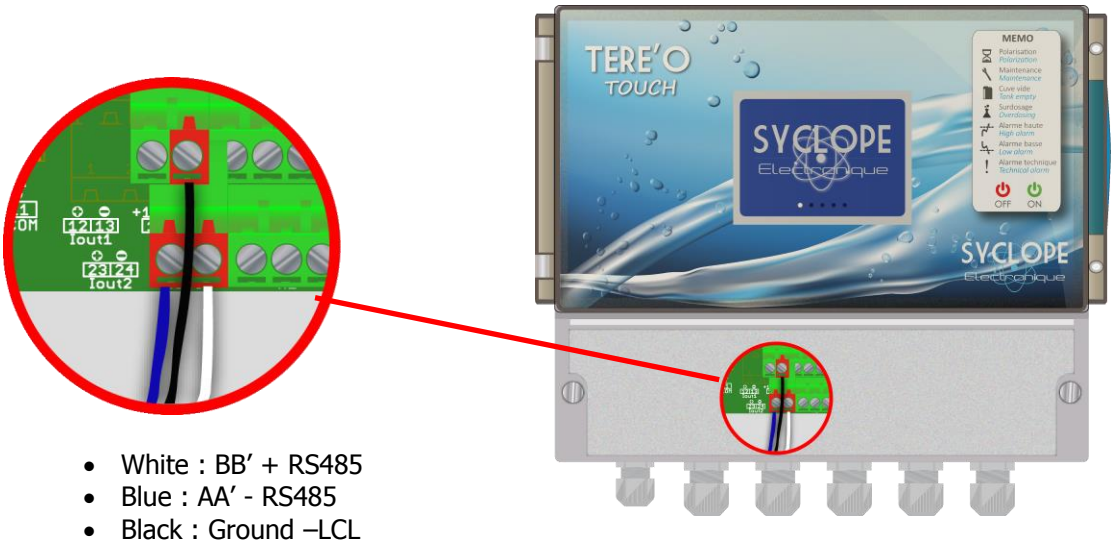


Socket Modem location for GSM, Wifi or Ethernet communication.

The view is represented front panel open, turning it towards the top of the case.

V. Wirings

1) Wiring of the internal RS485 port and the PC converter RS485/USB



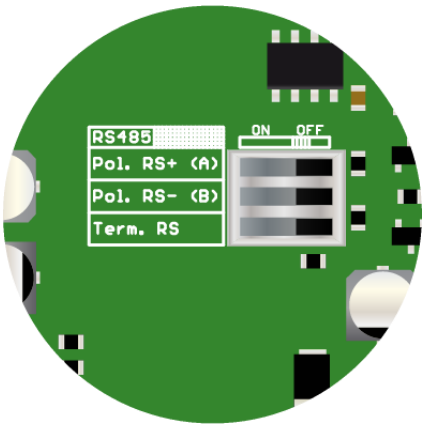
- White : BB' + RS485
- Blue : AA' - RS485
- Black : Ground –LCL

All units on the bus must be chained together.

Polarization and termination of the RS485 bus

The bus can be polarized from your device if needed. To do this you have to switch both micro-switches on the electronic card Pol. RS + (A) and Pol. RS- (B) on the ON position.

If your device is the last of the line on the RS485 bus you can switch the switch Term. RS ON to enable line termination.



For safety reasons, it is imperative to turn off the power of your TERE'O Touch® device before opening the case to switch the micro-switch!

On the computer side the connection is made using the RS485 / USB converter.

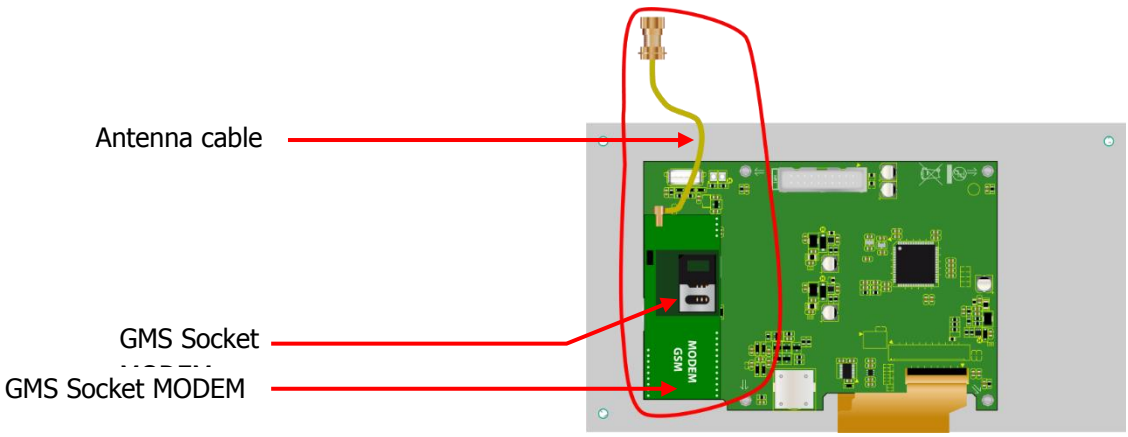
- Blue (terminal n°3): AA' RS485
- White (terminal n°4): BB' RS485
- Black (terminal n°5): Masse RS485

Configuration: All switches on **ON**

The converter comes with an installation CDROM. It is necessary to install the drivers of the converter on the computer before connecting it.

2) Connection of the internal GSM Modem

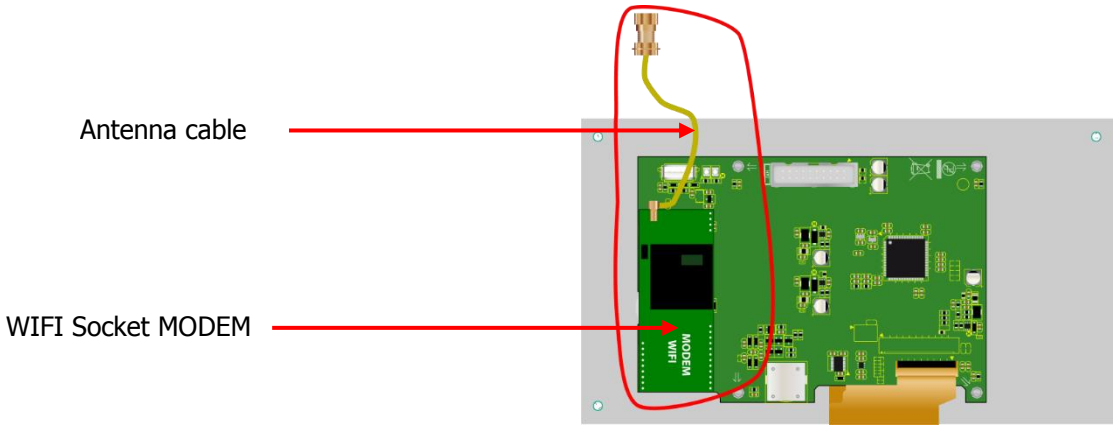
Install the GPRS modem socket in the designated slot. Position the antenna in a cable gland and connect the antenna to the circuit board using the supplied cable. Position the SIM card in the intended location.



The PIN code of the SIM card must be deactivated.

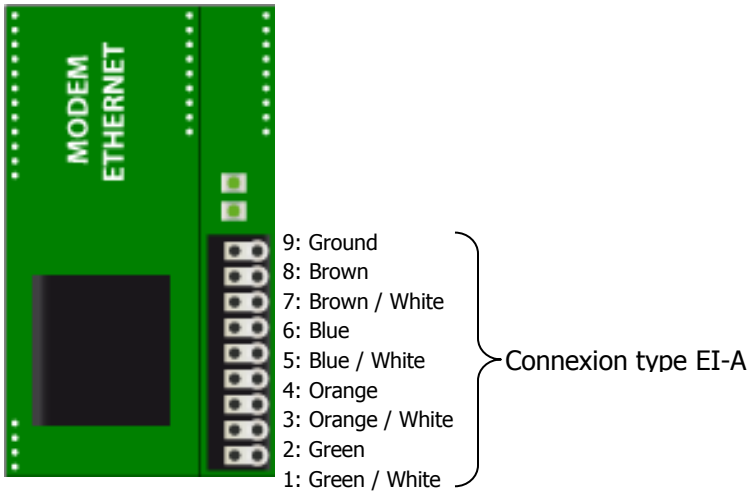
3) WIFI modem connection

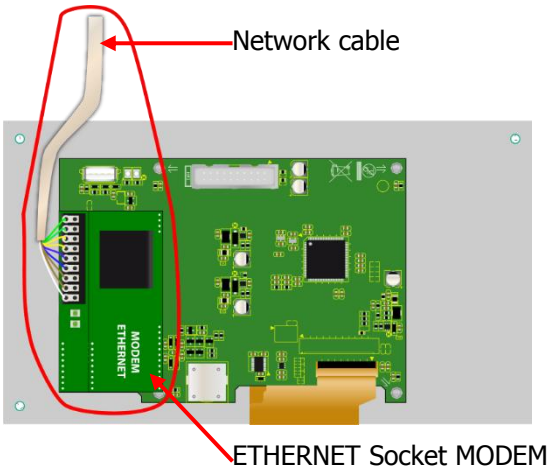
Install the modem WIFI socket in the space provided for this purpose. Position the antenna in a cable gland and connect the antenna to the circuit board using the cable provided.



4) Ethernet Modem (IP) Connection

Install the ETHERNET modem socket in the space provided, pass the network cable through a cable gland and connect the wires as shown below.



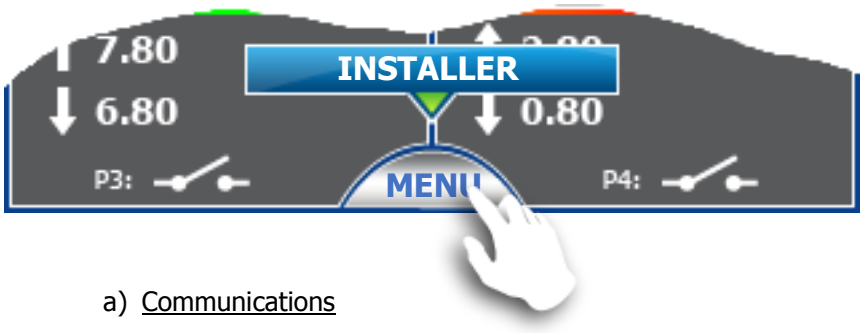


VI. Parameter setting TERE'O Touch

1) Programming Menu « Installer »

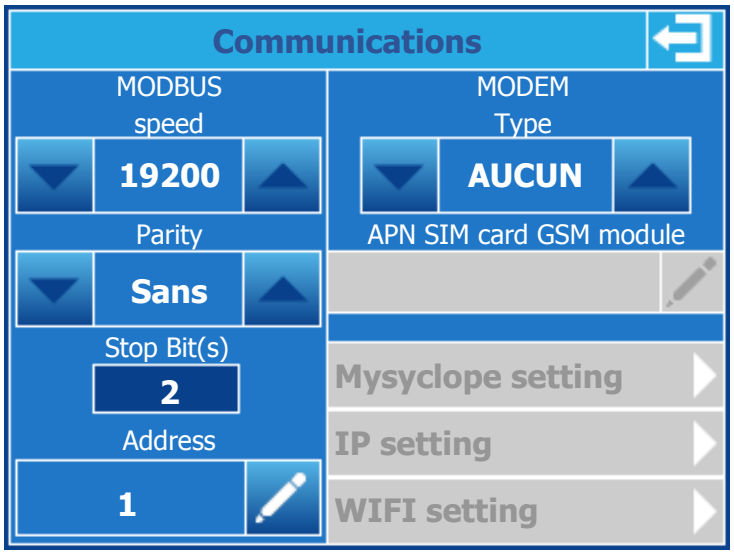
The installer programming menu allows the general programming of your **TERE'O Touch®** controller.

To open the programming menu, press the menu button for 3 seconds. When the message "INSTALLER" appears, you can release the button.



a) Communications

Pressing the « Communication » button opens the programming window.



MODBUS section (Local communication RS485 port)

- **Change MODBUS speed:**
  Use the buttons on either side of the selection area to scroll through the different speeds in one direction or the other (300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200).

- **Change MODBUS parity:**
  Use the buttons on either side of the selection box to scroll through the different parities in one direction or the other (None, Even, Odd).

- **Stop bit(s) information:**
  This part is not modifiable and is automatically configured according to the choice of parity that is made.
  - 2 for a communication without parity.
  - 1 for communication with even or odd parity.

➢ **Change MODBUS address:**

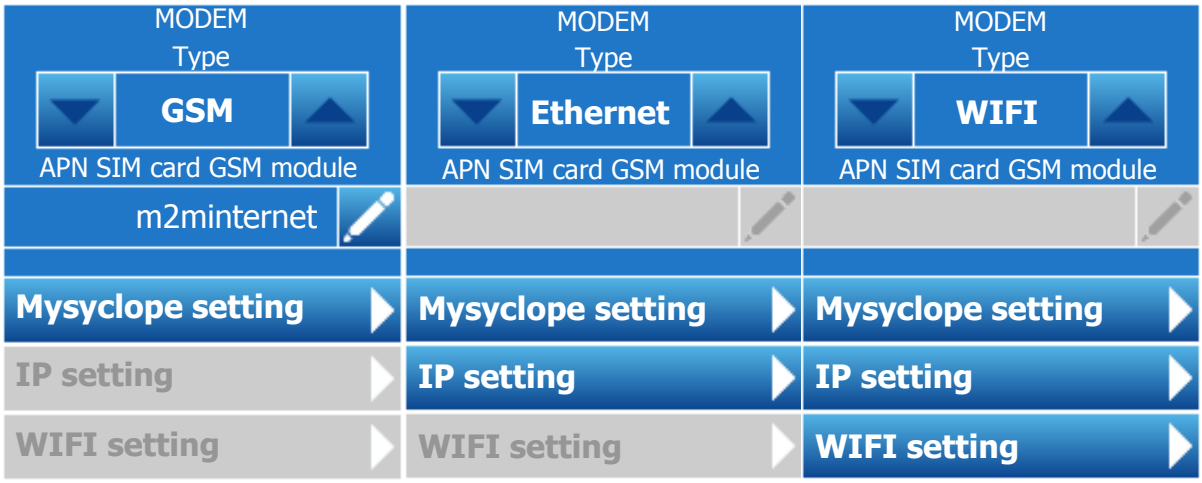
Press the button to open the numeric keypad and enter the new address.

Section MODEM (Communication avec site web mysyclope)

➢ **Change Modem type:**

Use the buttons on either side of the selection area to scroll through the different parities (NO, GSM, Ethernet, WIFI) in one direction or the other.

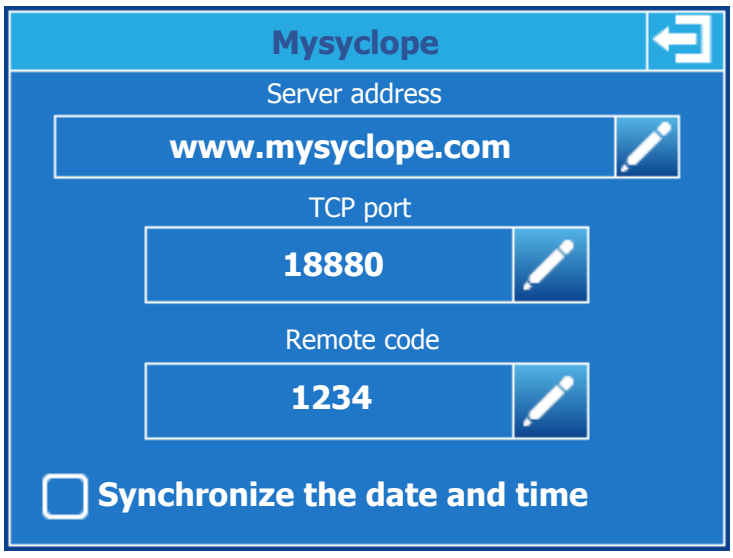
Depending on the type of modem selected, the shaded areas below become accessible in configuration.



➢ **Change SIM card APN in GSM mode:**

Press the button to open the keypad and enter the APN corresponding to your m2m GSM card provider. The maximum size is 30 characters.

➢ **MYSYCLOPE configuration**



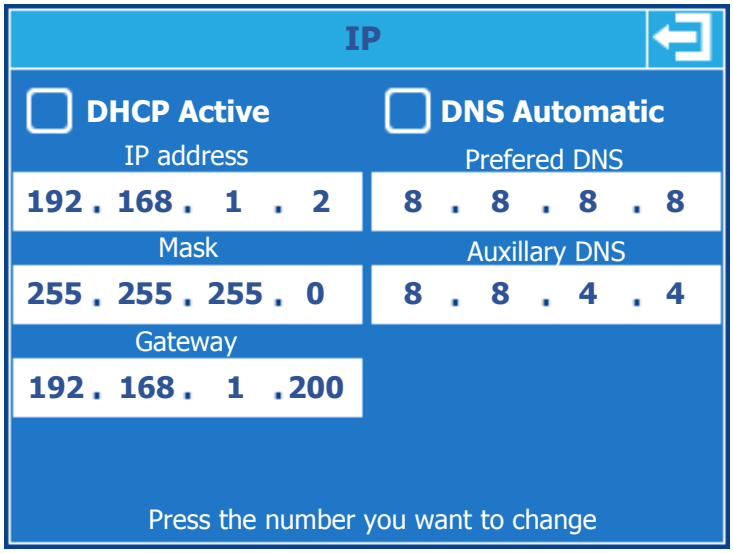
➢ **Change server address:**

Press the button to open the keyboard and enter the address of the mysyclope server. The maximum size is 30 characters.

- **Change TCP port:**
  Press the button to open the numeric keypad and enter the TCP port of the mysyclope server.

- **Change remote code:**
  Press the button to open the numeric keypad and enter the new remote code
- **Synchronize la date and timer:**
  When your system is connected, by ticking this box, the controller will be set automatically by the website as soon as necessary.

- **Ethernet configuration**



- **DHCP Active:**
  If the local Ethernet network on which the controller is connected has a DHCP that automatically distributes IP addresses, you must check this box. In this case the IP, Mask and Gateway configurations will be automatic.

- **IP address:**
  Address your controller on your local Ethernet network. Press the input box to open the numeric keypad and enter the IP provided by your IT manager.

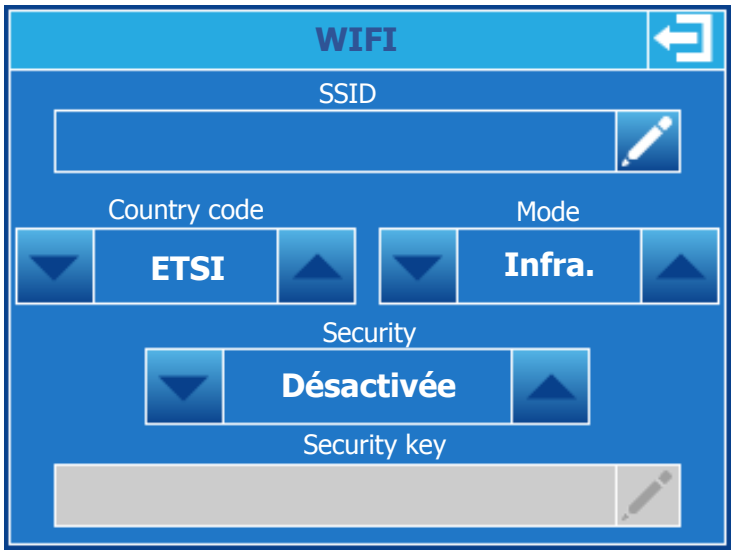
- **Mask & Gateway:**
  Same as previous.

- **DNS Automatic:**
  If the local Ethernet network on which the controller is connected is automatically distributing DNS you must check this box. In this case the DNS configurations will be automatic.

- **Prefered DNS:**
  DNS server address. Press the input box to open the numeric keypad and enter the IP provided by your IT manager.

- **Auxillary DNS:**
  Same as previous.

- **WIFI Configuration**



- **SSID:**

Name of the WIFI network you want to connect to. To change it, press the enter button to open the alpha numeric keypad and enter the name of your network.

- **Country code:**

Press the arrows to change the code to your country.

ETSI = Europe

- **Mode:**

Press the arrows to change the network mode.

- **Infra.** = Network on which multiple elements can connect.
- **Ad-Hoc =** Network on which only the regulator will be connected.

- **Security:**

Press the arrows to select the security mode of your WIFI network. Depending on the latter, you will have to enter the corresponding security key.

- **Security key:**

If the network is secure and you have selected the security type in the previous step, tap the entry box to open the alpha numeric keypad and enter the security key for your network.

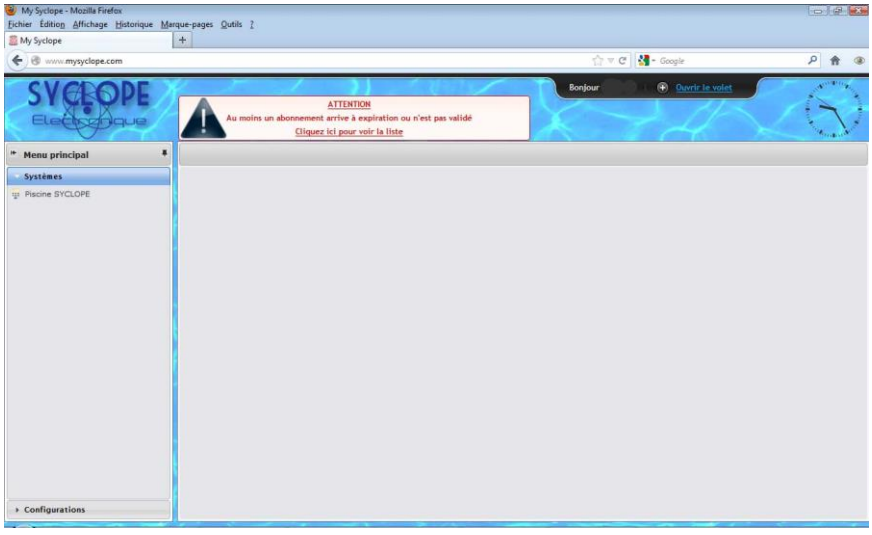
VII. Access to the website www.mysyclope.com

1) Activating your subscription

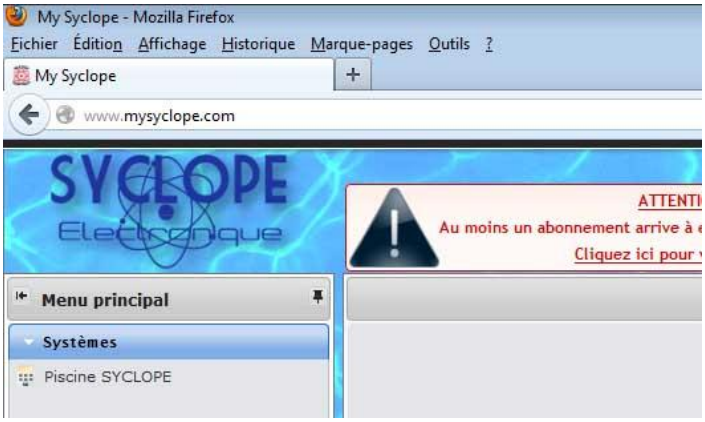
You must provide some information's to your dealer or to "SYCLOPE Electronique" technical service to activate your connection.

- Record the serial number of the device to be connected.
- Contact your dealer or the SYCLOPE Electronics technical service.
- Give the serial number of the device.
- Give the name of the person in charge of the communication system.
- Give your email address
- The technical service adds your controller on the website, activate your account and gives you your username
- Log in to www.mysyclope.com on your internet browser.

- Enter your username in the field "Username" in the column "Password forgotten or First connection" and enter your email address to receive your password.
- Click on the "Send" button.
- Read your emails.
- Enter your username and password in the column "User connection".



- Click on the "Systems" tab on the left side panel.
- Browse the sites and/or connected devices.



- The data sent by the device are now recorded on the website.

VIII. MODBUS communication registers

1.1 Address of Modbus Registers

The registers are numbered according to the MODBUS standard. These are "HOLDING REGISTER" on the range of registers from 40001 to 49999.

Some Modbus and PLC software uses an address from 0 to 65535.

The ModBus register 40001 corresponds to the Modbus address 0, the register 40002 corresponds to the address 1 and so on.

ModBus register	Number of register	Name	Access	Format	Description
Configuration					
40001	788	eeprom	rw	STRUCT	Memory
Interfaces					
41001	2	signal_POT_PH	r	REAL	Signal input POT PH [mV]
41005	2	signal_CL	r	REAL	Current input IN2 [mA]
41007	2	signal_TEMP	r	REAL	Current input IN1 [mA]
41016	1	signal_K1	r	BOOL	0=Open / 1=Close
41017	1	signal_K2	r	BOOL	0=Open / 1=Close
41018	1	signal_K3	r	BOOL	0=Open / 1=Close
41019	1	state_P2	r	BOOL	0=Open / 1=Close
41020	1	state_P3	r	BOOL	0=Open / 1=Close
41021	1	state_P4	r	BOOL	0=Open / 1=Close
41030	2	Timestamp Local	r	DWORD	Time since January 1, 1970 0h00 [s]
Values and states					
41101	1	device_state	rw	WORD	Bit 0: device running Bit 1: timer running Bit 2: device being started Bit 3: Device stopped due to a timer
41201	2	param_E1_(PH)_state	rw	DWORD	Bit 0: control and alarms running Bit 1: sensor being started Bit 2: temporary break Bit 3: Circulation contact and flowmeter (1 == circulation) Bit 4: necessary maintenance Bit 5: dosing in progress Bit 6: alarm (s) in progress Bit 7: control and alarm paused due to a timer Bit 8: off-scale or disconnected sensors Bit 9: sensors outside measurement range Bit 10: Unstable sensor value Bit 11: low alarm threshold crossed Bit 12: high alarm threshold crossed Bit 13: Not used

					Bit 14: Bottom of tank Bit 15: Max dosing time Bit 16: use of a timer Bit 17: Remote control in progress Bit 18: channel configuration error
41203	2	param_E1_(PH)_measure_value	r	REAL	Measurement value [unit of measure]
41205	2	param_E1_(PH)_control_w	rw	REAL	Setpoint of control [unit of measure]
41207	2	param_E1_(PH)_dosage_u	r	REAL	Dosing control [1/1]
41209	2	param_E1_(PH)_alarm_high	rw	REAL	Low alarm value [unit of measure]
41211	2	param_E1_(PH)_alarm_low	rw	REAL	High alarm value [unit of measure]
				DWORD	Bit 0: control and alarms running Bit 1: sensor being started Bit 2: temporary break Bit 3: Circulation contact and flowmeter (1 == circulation) Bit 4: necessary maintenance Bit 5: dosing in progress Bit 6: alarm (s) in progress Bit 7: control and alarm paused due to a timer Bit 8: off-scale or disconnected sensors Bit 9: sensors outside measurement range Bit 10: Unstable sensor value Bit 11: low alarm threshold crossed Bit 12: high alarm threshold crossed Bit 13: Not used Bit 14: Bottom of tank Bit 15: Max dosing time Bit 16: use of a timer Bit 17: Remote control in progress
41301	2	param_E2_(CL)_state	rw		Bit 18: channel configuration error
41303	2	param_E2_(CL)_measure_value	r	REAL	Measurement value [unit of measure]
41305	2	param_E2_(CL)_control_w	rw	REAL	Setpoint of control [unit of measure]
41307	2	param_E2_(CL)_dosage_u	r	REAL	Dosing control [1/1]
41309	2	param_E2_(CL)_alarm_high	rw	REAL	Low alarm value [unit of measure]
41311	2	param_E2_(CL)_alarm_low	rw	REAL	High alarm value [unit of measure]
41401	2	sensor_POT_PH_value	r	REAL	POT sensor measurement value (PH) [sensor unit]
41405	2	sensor_CL_value	r	REAL	IN2 sensor measurement value [sensor unit]
41407	2	sensor_TEMP_value	r	REAL	IN1 sensor measurement value [sensor unit]
Device					
42001	22	device	r	STRUCT	States and value of the device
Channels					
42101	124	param_E1_PH	r	STRUCT	States and value of channel E1
42301	124	param_E2_CL_BR	r	STRUCT	States and value of channel E
Sensors					
42501	34	sensor_POT_PH	r	STRUCT	States and value of sensor POT PH
42601	34	sensor_CL_value	r	STRUCT	States and value of sensor IN2
42651	34	sensor_TEMP_value	r	STRUCT	States and value of sensor IN1

Contacts					
42841	10	switch_K1	r	STRUCT	State of contact K1
42861	10	switch_K2	r	STRUCT	State of contact K 2
42881	10	switch_K3	r	STRUCT	State of contact K 3
Relay					
43101	56	relay_P2	r	STRUCT	States and value of P2 relay
43201	56	relay_P3	r	STRUCT	States and value of P3 relay
43301	56	relay_P4	r	STRUCT	States and value of P4 relay

1.2 Data formatting

BOOL
"bool" uses 1 register and can have two values 0 or 1.

Example:
Register 41018 is the state of relay P1.
REG (41018) = 0: open relay
REG (41018) = 1: closed relay

REAL
"real" uses 2 registers and allows to encode 32-bit floating point values.

Example:
Register 41102 is the measured value of channel E1, the unit of this value is the unit selected in the measurement menu of the device.
For a measured value of 1.94ppm, the hexadecimal encoding is 0x3FF851EC.
REG (41103) = 0x51EC
REG (41104) = 0x3FF8

WORD
"word" uses 1 register to encode a 16-bit integer or a bit field.

Example (bits):
Register 41101 contains the status indicators of the device.
REG (4101) = b0000000000000101

682/5000
REG (41101) (bit00) = 1: the device is running
REG (41101) (bit01) = 0: the timer is not running
REG (41101) (bit02) = 1: control and alarms of at least one measuring channel is being started
REG (41101) (bit03) = 0: there is no active timer
REG (41101) (bit04) = 0: not used
REG (41101) (bit05) = 0: not used
REG (41101) (bit06) = 0: not used
REG (41101) (bit07) = 0: not used
REG (41101) (bit08) = 0: not used
REG (41101) (bit09) = 0: not used
REG (41101) (bit10) = 0: not used
REG (41101) (bit11) = 0: not used

REG (41101) (bit12) = 0: not used
REG (41101) (bit13) = 0: not used
REG (41101) (bit14) = 0: not used
REG (41101) (bit15) = 0: not used

DWORD

"dword" uses 2 registers and allows to encode a 32bit integer or a bit field.

Example:
Register 41030 contains the local time of the device, this time is the number of seconds elapsed since January 1, 1970.
On April 27, 2015 at 3:35:19 sec corresponds to 1430141719 seconds since the reference date, the hexadecimal value is 0x553E3B17.
REG (41032) = 0x3B17
REG (41032) = 0x553E

STRUCT (device)
This block of data contains the states the values and configurations of the device.

Name	Size [Bytes]	Offset [Bytes]	Type	Description
dev	1	0	byte	Internal
name	12	1	string	Name of the device
align	3	13	--	Internal
fd	4	16	integer	Internal
flag	1	20	bits	bit0: regulation and alarm running bit1: timer running bit2: device being started bit3: device stopped due to a timer
align	3	21	--	Internal
device.calendar.flag	1	24	bits	bit0: timer processing running bit1: current timer event bit2: processing the timer in temporary pause
align	3	25	--	Internal
device.calendar.event_list	4	28	--	Internal
device.calendar.next	4	32	--	Internal
device.param.flag	3	36	bits	Bit 0: control and alarms running Bit 1: sensor being started Bit 2: temporary break Bit 3: Circulation contact and flowmeter (1 == circulation) Bit 4: necessary maintenance Bit 5: dosing in progress Bit 6: alarm (s) in progress Bit 7: control and alarm paused due to a timer Bit 8: off-scale or disconnected sensors Bit 9: sensors outside measurement range Bit 10: Unstable sensor value Bit 11: low alarm threshold crossed Bit 12: high alarm threshold crossed Bit 13: Not used Bit 14: Bottom of tank Bit 15: Max dosing time Bit 16: use of a timer Bit 17: Remote control in progress Bit 18: channel configuration error
align	1	39	--	Internal
next	4	40	--	Internal

Example:
To read the on / off status of the device the registry is REG (42001).

The offset of "flag" is (1 + 12 + 3 + 4) = 20 bytes
The shift in register is therefore 20/2 = 10
The flag register is REG (42001 + 20) = REG42021)

REG (42021) = 0x0100
The data is coded in "little endian" so the order of bytes is reversed.
Flag = 0x01 the device is running.

STRUCT (param)
This data block contains the states, values and configurations of the measurement channels.

Name	Size [Bytes]	Offset [Bytes]	Type	Description
par	1	0	byte	Internal
align	3	1	--	Internal
fd	4	4	integer	Internal
flag	3	8	bits	Bit 0: control and alarms running Bit 1: sensor being started Bit 2: temporary break Bit 3: Circulation contact and flowmeter (1 == circulation) Bit 4: necessary maintenance Bit 5: dosing in progress Bit 6: alarm (s) in progress Bit 7: control and alarm paused due to a timer Bit 8: off-scale or disconnected sensors Bit 9: sensors outside measurement range Bit 10: Unstable sensor value Bit 11: low alarm threshold crossed Bit 12: high alarm threshold crossed Bit 13: Not used Bit 14: Bottom of tank Bit 15: Max dosing time Bit 16: use of a timer Bit 17: Remote control in progress Bit 18: channel configuration error
align	1	11	--	Internal
decice	4	12	--	Internal
measure_sensor	16	16	--	Internal
measure_kind	1	32	byte	Type de voie de mesure: 0: Inactif 1: Chlore Type of measurement channel: 0: Inactive 1: Free chlorine 2: Active chlorine 3: Total chlorine 4: Chloramines 5: Chlorite 6: Chlorine dioxide 7: H2O2 8: BCDMH 9: DBDMH 10: Free brome 11: Active bromine

				12: Total bromine 13: PAA 14: Ozone 15: dissolved oxygen 16: Nitrate 17: PHMB 18: Salinity 19: TDS 20: Turbidity 21: Conductivity 22: Temperature 23: Flow 24: pH 25: RedOx 26: Chloride 27: Amonia 28: Fluoride 29: ISE 30: Volume
measure_unit	1	33	byte	Unit of measure 0: Inactive 1: none 2: decade 3: pH 4: ppb 5: ppm 6: µg / l 7: mg / l 8: g / l 9:% 10 µS / cm² 11: mS / cm² 12: NTU 13: FNU 14 ° K 15 ° C 16: ° F 17 ° R 18: mA 19: mV 20: Hz 21: str / min 22: ms 23: sec 24: min 25: h 26: l 27: m3 28: l / min 29: l / h

				30: m3 / h 31: imp / l 32: imp / m3 33: Ohm 34: mOhm 35: impulse
align	2	34	--	Internal
measure_min_value	4	36	float	Low value of measurement
measure_max_value	4	40	float	High value of measurement
measure_value	4	44	float	Measurement value
measure_m_factor	4	48	float	Correction factor of the measure [1/1]
measure_t_factor	4	52	float	Temperature correction [% / ° C]
alarm_flag	1	56	bits	Alarm indicators bit0: measured value higher than the high alarm bit1: measured value lower than the low alarm bit2: max. dosing time exceeded or tank bottom bit3: disconnected or off-scale sensors
alarm_threshold_delay	1	57	byte	Alarm delay time [s]
alarm_threshold_tick	1	58	byte	Internal
align	1	59	--	Internal
alarm_threshold_hyst	4	60	float	Hysteresis of alarm thresholds
alarm_threshold_low	4	64	float	Low threshold
alarm_threshold_high	4	68	float	High threshold
flow_sensor	4	72	--	Internal
flow_switch	16	76	--	Internal
flow.op	1	92	byte	Circulation condition 0: at least 1 1 = all
flow_unit	1	93	byte	Unit of flow: 28: l / min 29: l / h 30: m3 / h
align	2	94	--	Internal
flow_threshold	4	96	float	Flow threshold to indicate stoppage of traffic
flow_q_min	4	100	float	Flow value for regulation compensation x0%
flow_q_max	4	104	float	Flow value for regulation compensation x100%
flow_q	4	108	float	Current flow value
control_flag	1	112	bits	bit0: 0 = 1DOF 1 = 2DOF bit [1 ~ 3]: regulation mode 0 = inactive

				1 = hysteresis 2 = thresholds 3 = PID Bit4: active "hold" function
align	3	113	--	Internal
control_w	4	116	float	Regulation setpoint
control_x_dead	4	120	float	Dead band or hysteresis depending on the regulation mode.
control_xp	4	124	float	Reciprocal proportional value
control_ki	2	128	float	Coefficient of integral
control_kd	2	130	float	Derivative coefficient
control_kb	4	132	float	Loop return coefficient
control.threshold_low	4	136	float	Low regulation threshold
control.threshold_high	4	140	float	High regulation threshold
control_z_y	4	144	float	Control value
control_z_ex	4	148	float	Loop error or input depending on the number of degrees of freedom of regulation
control_z_dex	4	152	float	Derivative error
control_sum_e	4	156	float	Error of integral
dosage_flag	1	160	bits	bit [0 ~ 1]: direction of regulation 0 = amount 1 = descendant 2 = both bit2: flow compensation bit3: paused dosing
align	1	161	--	Internal
dosage.tick	2	162	short	Overdose time
dosage.control_time	2	164	short	Dosing time limit
align	2	166	--	Internal
dosage.control_threshold	4	168	float	Regulation threshold for overdose
dosage_u_bias	4	172	float	Base load
dosage_u	4	176	float	Dosage control
tank.switch_direct	4	180	--	Internal
tank.switch_invert	4	184	--	Internal
tank.sensor_direct	4	188	--	Internal
tank.sensor_invert	4	192	--	Internal
tank. threshold_direct	4	196	float	Bottom of the bottom of the product
tank. threshold_invert	4	200	float	Bottom floor threshold of the descending product
remolte.calendar.flag	1	204	bits	bit0: timer processing running bit1: current timer event bit2: processing the timer in temporary pause
align	3	205	--	Internal
remote.calendar.event_list	4	208	--	Internal
remote.calendar.next	4	212	--	Internal
remotre.flag	1	216	bits	bit [0 ~ 1]: remote control source 0 = inactive

				1 = timer 2 = sensor 3 = contact
align	3	217	--	Internal
remote.sensor	4	220	--	Internal
remote.control.w	4	224	float	Remote command reference in progress
remote.control.w_target	4	228	float	Remote control setpoint to be reached
remote.control.kv	1	232	byte	Setpoint speed
align	3	233	--	Internal
next	4	236	--	Internal

Example:
To read the rate value of channel E1 the register base is REG (42101).

The offset of "flow_q" is 108 bytes
So the shift in register is 108/2 = 54
The value is stored on 4 bytes so the registers where to read "flow_q" are REG (42101 + 54) = REG (42055) and REG (42056).

REG (42155) = 0xA470
REG (42156) = 0x4541
The data is coded as "little endian" so the value is 0x414570A4, which is 12.34 floating point 32bits

STRUCT (sensor)
This block of data contains the states values and configurations of the sensors.

Name	Size [Bytes]	Offset [Bytes]	Type	Description
sen	1	0	byte	Internal
ch	1	1	byte	Internal
def	1	2	byte	Internal
align	1	3	--	internal
fd	4	4	integer	Internal
flag	2	8	bits	bit0: error bit1: disconnected bit2: the value of the input has reached its high limit bit3: the value of the input has reached its low limit bit4: high measurement value bit5: low measurement value bit6: unstable measurement bit7: maintenance / calibration required bit8: being started
kind	1	10	byte	Type of measure: 0: Inactive 1: Free chlorine 2: Active chlorine 3: Total chlorine 4: Chloramines 5: Chlorite 6: Chlorine dioxide 7: H2O2 8: BCDMH 9: DBDMH 10: Free brome 11: Active bromine 12: Total bromine 13: PAA 14: Ozone 15: dissolved oxygen 16: Nitrate 17: PHMB 18: Salinity 19: TDS 20: Turbidity 21: Conductivity 22: Temperature 23: Flow 24: pH 25: RedOx 26: Chloride 27: Amonia

				28: Fluoride 29: ISE 30: Volume
unit	1	11	byte	Unit of measure 0: Inactive 1: None 2: Decade 3: pH 4: ppb 5: ppm 6: µg / l 7: mg / l 8: g / l 9:% 10 µS / cm² 11: mS / cm² 12: NTU 13: FNU 14 ° K 15 ° C 16: ° F 17 ° R 18: mA 19: mV 20: Hz 21: str / min 22: ms 23: sec 24: min 25: h 26: l 27: m3 28: l / min 29: l / h 30: m3 / h 31: imp / l 32: imp / m3 33: Ohm 34: mOhm 35: impulse
transducer	1	12	byte	Converter type: 0: None 1: 0 ... 20mA 2: 4 ... 20mA 3: pH -> 4 ... 20mA 4: RedOx -> 4 ... 20mA 5: pt100 -> 4 ... 20mA 6: fluoride -> 4 ... 20mA 7: fluoride (100) -> 4 ... 20mA 8: ISOCAP pH -> 4 ... 20mA

				9: ISOCAP RedOk -> 4 ... 20mA 10: UNISO P -> 4 ... 20mA 11: UNISO R1 -> 4 ... 20mA 12: UNISO R -> 4 ... 20mA 13: UNISO B -> 4 ... 20mA 14: 0 ... 2000mV 15: 0 ... -2000mV 16: (potentiometric) mV 17: impulse 18: PT100 19: PT1000
align	1	13	--	Internal
delay	2	14	short	Start time to realize (multiple of 0.5s)
tick	2	16	short	Start time counter (multiple of 0.5s)
fault_tick	1	18	byte	Error time (multiple of 0.5s)
align	1	19	--	Internal
min_value	4	20	float	Low value of the measurement scale
max_value	4	24	float	High value of the measurement scale
cal_slope	4	28	float	Slope of the sensor
cal_offset	4	32	float	Offset
std_slope	4	36	float	Slope before calibration
std_offset	4	40	float	Offset before calibration
z_dex	4	44	--	Internal
interface	4	48	float	Interface value
signal	4	52	float	Sensor signal value
std_value	4	56	float	Measurement value before calibration
value	4	60	float	Measurement value after calibration
next	4	64	--	Internal

Example:
To read the measurement unit of the sensor connected to IN1, the register base is REG (42601).

The offset of "unit" is 11 bytes
The shift in register is therefore 11/2 = 5
The register to read "unit" is REG (42601 + 5) = REG (42606)

REG (42606) = 0x0205
The data is coded in "little endian" so "unit" is on the low byte 0x05.
0x05 = [ppm]

STRUCT (switch)
This block of data contains states, values and configurations of contacts.

Name	Size [Bytes]	Offset [Bytes]	Type	Description
sw	1	0	byte	Internal
ch	1	1	byte	Internal
align	2	2	--	Internal
fd	4	4	integer	Internal
flag	1	8	bits	bit0: operational contact bit1: state of rest; NO = 0; NF = 1 bit2: internal bit3: physical state; ouvet = 0; closed = 1 bit4: delayed state; open = 0; closed = 1 bit5: active contact, depending on the state of rest and the delayed state
align	1	9	--	Internal
delay	2	10	short	Debounce time, ½ sec
tick	2	12	short	Bounce time
align	2	14	--	Internal
next	4	16	--	Internal

Example:
To read the debounce time of contact K1 the register base is REG (42841).

The tick offset is 12 bytes
The register shift is 12/2 = 6
The register where to read "tick" is REG (42841 + 6) = REG (42847)

REG (42847) = 0x0A00
The data is coded in "little endian" so the order of bytes is reversed.
tick = 0x000A
the "tick" unit is ½ second so the debounce time is 0xA x 0.5 sec = 5 sec.

STRUCT (relay)
This block of data contains the states the values and the configurations of the relays.

Name	Size [Bytes]	Offset [Bytes]	Type	Description
rel	1	0	byte	Internal
ch	1	1	byte	Internal
align	2	2	--	Internal
fd	4	4	integer	Internal
flag	1	8	bits	bit [0 ~ 2]: mode 0 = inactive 1 = regulation 2 = alarms of one way 3 = device alarms 4 = state of a contact 5 = state of a relay 6 = timer bit3: state of rest NO = 0; NC = 1 bit4: physical state, open = 0; closed = 1 bit5: relay active, active = 1 bit6: internal
align	3	9	--	Internal
param/device /switch/relay	4	12	--	Internal
alarm.delay	1	16	integer	Relay engagement delay in case of alarm
alarm.tick	1	17	integer	Time counter to delay the alarm
alarm.pending	1	18	bits	Alarm indicators in progress bit0: stop traffic bit1: low threshold of the measure bit2: high threshold of the measure bit3: sensor (s) off scale or disconnected bit4: sensor (s) off scale bit5: overdose (max time or bottom of tank) bit6: sensors being started
alarm.enable	1	19	bits	Alarm indicators in operation bit0: stop traffic bit1: low threshold of the measure bit2: high threshold of the measure bit3: sensor (s) off scale or disconnected bit4: sensor (s) off scale bit5: overdose (max time or bottom of tank) bit6: sensors being started
dosage.u_min	4	20	float	
dosage.u_max	4	24	float	

dosage.u	4	28	float	Dosing control [1/1]
dosage.period	4	32	integer	Duration of the cycle
dosage.min_width	2	36	integer	Relay state change time
align	2	38	--	Internal
dosage.compute_time	4	40	integer	Internal
dosage.tilt_time	4	44	integer	Internal
dosage.ref_time	4	48	integer	Internal
dosage.delay	4	52	integer	Internal
dosage.flag	1	56	bits	bits [0 ~ 1]: mode 0 = ON / OFF 1 = Cycle width 2 = Impulsive bit2: dosing direction, 0 = amount; 1 = descending bit3: internal bit [4 ~ 5]: action 0 = none 1 = rising 2 = descending
dosage.q_unit	1	57	bits	
align	2	58	--	Internal
timer.calendar.flag	1	60	bits	bit0: timer processing running bit1: current timer event bit2: processing the timer in temporary pause
align	3	61	--	Internal
timer.calendar.event_list	4	64	--	Internal
timer.calendar.next	4	68	--	Internal
timer.action	1	72	bits	
align	3	73	--	Internal
delay_on	1	76	integer	
delay_off	1	77	integer	
tick_active	2	78	integer	
timer.handler	4	80	--	Internal
timer.proc	4	84	--	Internal
timer.delay	4	88	integer	
timer.trig_time	4	92	integer	
timer.next	4	96	--	Internal
next	4	100	--	Internal

example:
To read the state of relay P1 the register base is REG (43001).
The flag shift is 8 bytes
The shift in register is 8/2 = 4
The register to read "flag" is REG (43001 + 4) = REG (43005)

REG (43005) = 0x3500
The data is coded in "little endian" so "flag" is in the high byte
flag = 0x35 = 0b00110110
The bit that indicates the state

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