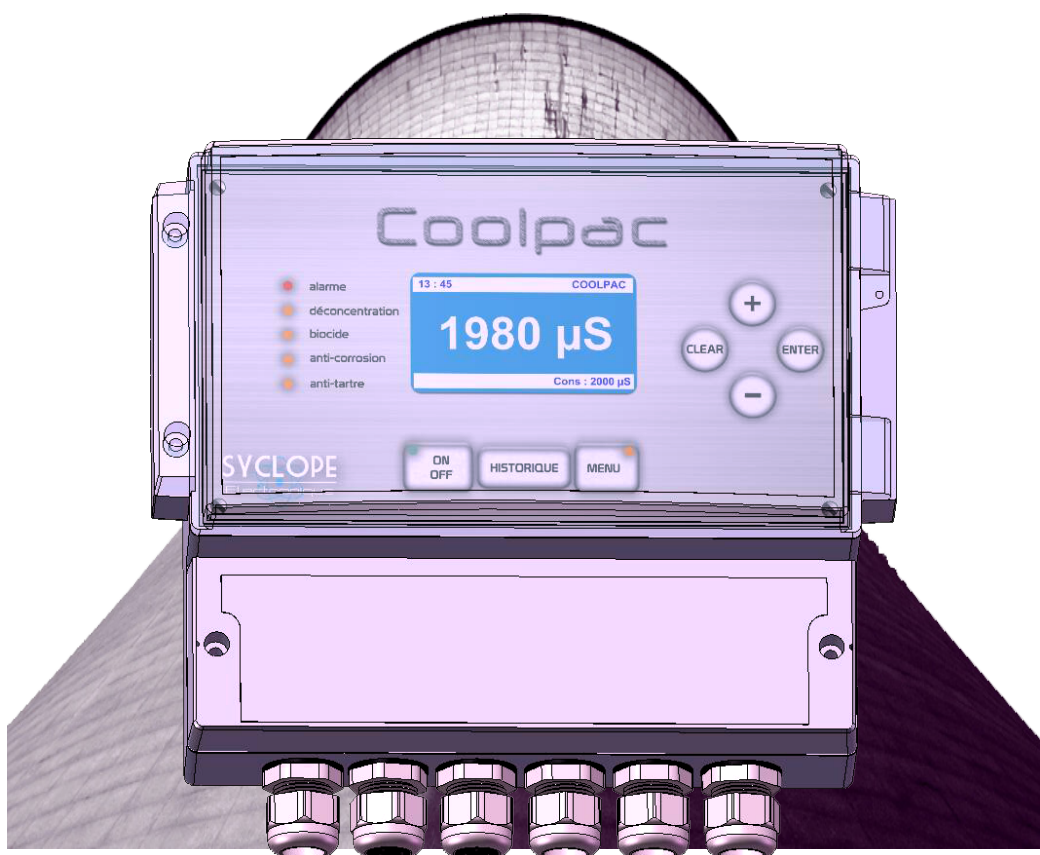


COOLPAC® Controller for Cooling tower managements (Part: 1)



Installation and commissioning instructions



Decomposition of documentation

- Part 1 : Installation and commissioning instructions manual.
- Part 2 : Programming and communication manual.

General information:

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Series: COOLPAC®

Part 1 : Installation and commissioning instructions manual (Ref. DOC0328)

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Subject to modifications

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1 General information

1.1 Scopes of application

The range of **COOLPAC®** controller you have just purchased is an electronic device for the complete management of a cooling tower (air/water coolers) and the risks related to the legionella.

Its remarkable adaptability to the various structures of cooling towers enables him to settle in all the difficult cases where the control of the process and the water treatment in a cooling tower are decisive.

Designed according to the needs of the customer, the **COOLPAC®** controller is equipped analogical and numeric inputs for specific sensors for treating water in a cooling tower and also include alarm functions and various controls with cyclic commands transmitted by means of programmable relays to control specific dosing systems used for chemical treatments.

Two ports, RS232 and RS485, for a printer and/or a computer link, allows communication by direct link or modem to a desktop computer (PC) for filing and graphic processing of the acquisition data.

The **COOLPAC Surveillor®** software application has been developed to perform these functions.

With the **COOLCom®** software also developed by SYCLOPE Electronique S.A.S., it will be possible to ensure the maintenance and the programming of the basic functions as well as the functions necessary to the communications by local RS485 port.

With an adequate interface carrying out internet connectivity (Q3 of 2017), the **COOLPAC®** controller will be connected in real-time to internet data website "**mysyclope.com**" thus ensuring a management and a total follow-up of all the parameters as well as a management of alarms by email or SMS in all circumstances. (Yearly subscription of access to be envisaged)

The simplicity of the **COOLPAC®** controller operations, the user friendliness and the remarkable technical aspects of these controllers, will ensure you benefit from their many options, guaranteeing you full control and supervision of the quality of the water.

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

- 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 S.A.S.**, either at the agency or at the office for your region, 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

1.2 Use of the document

Please read this entire document before starting to install, adjust or commission your controller 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

1.3 Signs and symbols



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

1.4 Storage and transport



It is important to store and transport the **COOLPAC**® controller 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 (14°F to 158°F)

Air humidity: Maximum of 90% without condensation

1.5 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:

- ✓ The **COOLPAC**® controller
- ✓ Installation and commissioning instructions manual
- ✓ Programming and communication manual.

1.6 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 these manuals.
- No modification 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.

2 Environment and safety instructions

2.1. Use conform to the normal use

- The **COOLPAC**® controller is a microprocessor equipment generating all necessary functions to control a cooling tower.



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.

2.2. User obligations

The user undertakes not to allow its employees to work with the **COOLPAC**® 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

2.3. Risks prevention



The installation and connection of the **COOLPAC**® controller should be only performed by a specialized and qualified personnel for this task.
The installation must comply with current safety standards and instructions!



Before switching the **COOLPAC**® 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 **COOLPAC**® 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.

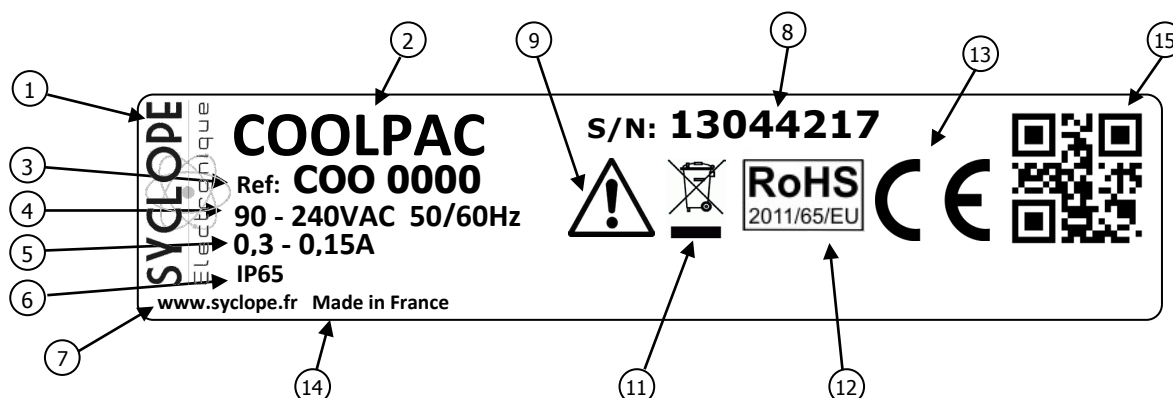


Make sure that the chemical sensors used with this device correspond well to the chemicals used. Refer to the individual technical note of each sensor. Chemistry of water is very complex, in case of doubt, contact immediately our engineering service or your approved installer/reseller.



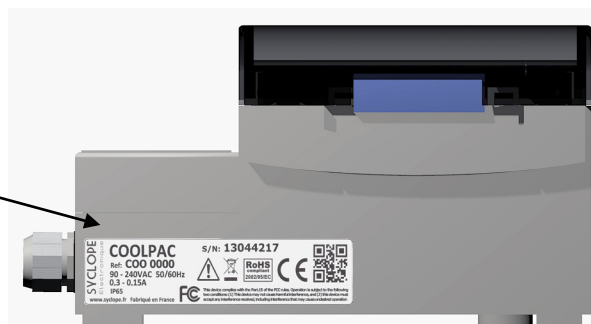
Chemical sensors are sensitive elements using consumable parts. They must be supervised, maintained and calibrated regularly using specific calibrator systems not-provided with this equipment. In the event of defect, a surplus possible hazard of chemical injections can be noted. In the doubt, a service 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.

2.4. Identification and localization of the identification plate



① Label of the manufacturer	⑧ Serial number
② Model of the product	⑨ Particular risks Read de manual
③ Reference of the product	⑪ Product which can be recycled
④ Range of the power supply	⑫ Limitation of dangerous substances
⑤ Values of the maimum current	⑬ EC compliance
⑥ Class of the protection	⑭ Country of the manufacturer
⑦ Identification of the manufacturer	⑮ Manufacturer Square code

Identification plate



2.5. Elimination et conformity

The recyclable packaging of the **COOLPAC®** equipment must be disposed 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 the 2012/19/EU European directive, this symbol means that as of 2012, July 4th, 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 the 2011/65/EU European directive, this symbol means that the **COOLPAC®** controller is designed in compliance with the restrictions on hazardous substances.



According to low-voltage directive (2014/35/EU), the electromagnetic compatibility directive (2014/30/EU) and the RoHS2 directive (2011/65/EU), this symbol means that the **COOLPAC®** controller has been designed in compliance with the previously cited directives.

3 Storage and Transport

It is important to store and transport the **COOLPAC®** 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.



After use, do not throw packing. Preserve it or recycle it in an approved center.

Environmental conditions for transport and storage:

- Temperature : -10°C à 60°C (14°F to 140°F)
- Air humidity : < 95% of relative humidity without condensation

4 Features and functions

4.1. Features

General characteristics		
Type	Specification (s)	Locate(s)
Consumption	0,3 to 0,15A Maxi. (Without external load)	-
Required Power supply	Between 90 - 240 VAC +/-10%	-
Electrical protection	Fuse 315mA, Time lag type TR5	F1
Operating Temperature	-5 °C to 45 °C (23°F to 113°F)	-
Storage Temperature	-10 °C to 60 °C (14°F to 140°F)	-
Humidity	Max. 95% without condensation	-
Altitude	2000m max.	-
Materials of the case	ABS or Polycarbonate (US and Canada)	-
Dimensions of the case	Length : 235 mm (9,3 inches)	-
	Width : 185 mm (7,3 inches)	
	Height : 119 mm (4,7 inches)	
Weight	1,5 Kg	-
Index of protection	IP 65	-
Display	LCD Screen 128x64 with back-light LED (Blue)	-
Entries		
Measurement inputs	1 Resistive conductivity entry	uS/mS
	1 4...20 mA entry (Powered 12VDC)	T°C
	1 4...20 mA passive entry or 24VDC powered (by switch)	A1
	1 4...20 mA entry (Powered 12VDC)	A2
Control entries	1 General conditional entry	CAD
	1 Flow-switch entry or tank level entry	DEB
Counter entry	1 Pulse entry for flowmeter or tank level entry	CPT
Outputs		
Relay outputs	For COO 000 version:	EV, BIO1, BIO2, DISP, INH et AUX IMP1 ; IMP2
	6 Auto-powered relays Max. 2A for bleed and 1A for others	
	For COO 0020 version:	
	1 Auto-powered relay Max. 2A for bleed	
Analogical outputs	For all versions:	IA1 ; IA2
	5 Free of potential relays - Max. 1A	
	2 Free of potential relays - low power signal	
Printer output	1 Printer serial output RS232 type	SV3
Communications		
Bus RS485	1 RS485 communication port for compatible softwares « MODBUS RTU » Supported protocol	RS485
Modem (Option)	1 RJ45 Modem phone line	Modem line dedicated

4.2. Main functions

Main functions		
Function	Specification (s)	Remark(s)
Controls	Bleed and biocides controls	According version
Type of actuators	Version COO 0000 : 6 Powered outputs relay 90~240V Version : COO 0020 : 1 Powered output relay 90~240V 5 Free of potential output relays	PWM or On/Off functions
Analogical outputs	2 0/4...20 mA programmable outputs	Copy or control functions
Purge	Bleed-off function	By setting conductivity or volumetric setpoints.
Biocides 1 and 2	Oxidizing or no-oxidizing biocides	Biocide processes by timers and conditional functions.
Corrosion inhibitor	Inhibitor control	Controlled by pules, timers or proportional volume counter.
Dispersant	Dispersant control	Controlled by pules, timers or proportional volume counter.
Alarms	Low, high and technical alarms	Exprimées en valeur réelles de mesure Commande de seuils haut et bas
Conditions	General condition entry Flow rate limit condition	General control of chemical product injections by external contact or flow-switch condition from measuring cell.
Tank levels	Low level detection	Control of chemical product injections to a low level switch. (DEB and CPT)
Timers	Programming of period of time according weather (Summer or Winter)	Possibility to program 4 period of time by week.
Counter	Volumetric counter	Volumetric counter function for bleed-off and other chemical products.
Communication	RS485 local port half-duplex	Communication port with "SysBus" supported and "ModBus" in new version.
Maintenance	Assistance à la maintenance	Controlling of actuators by away.
External access	External access by Modem	Maintenance, traceability of data and events.

5 Assembly and installation

In the "COO 0000" version, the bleed-off valve, the dosing pumps of biocides, the corrosion inhibitor pump and the dispersant pump are directly powered by the controller (90-240V 50/60Hz) and in the "COO 0020" version, only the bleed-off valve is directly powered by the controller. For each powered output, internal calibrated fuse are available.

The controller does not have internal power supply switch. It is directly powered when connected.

The **COOLPAC®** controller respects the rules for industrial equipments. An external circuit breaker must be installed near the controller and the user. The threshold fuse current must respect the maximum power use by the actuators and dosing systems.

5.1 Security instructions



WARNING:

- ⇒ Respect the general applicable procedures of safety for installing the equipment as well as the national procedures.
- ⇒ Make exclusively carry out the electrical installation of the equipment by qualified technicians having the **corresponding** certificates!
- ⇒ The values of connection indicated onto the controller must correspond to those of the **primary power supply!**
- ⇒ The cables use for power supply and the cables of data should not be installed together (Risks of disturbances). In this case, take suitable measurements of suppression! Excessive disturbances can involve dysfunctions and a **material** risk!

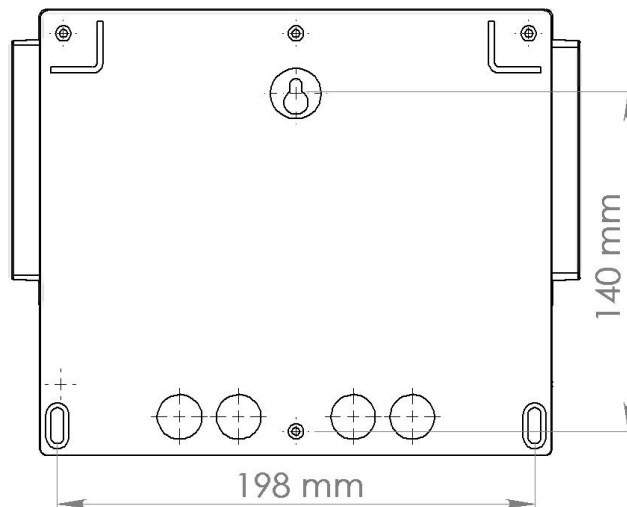
5.2 Description of the mechanical assembly

Remove the protection film on the LCD screen.

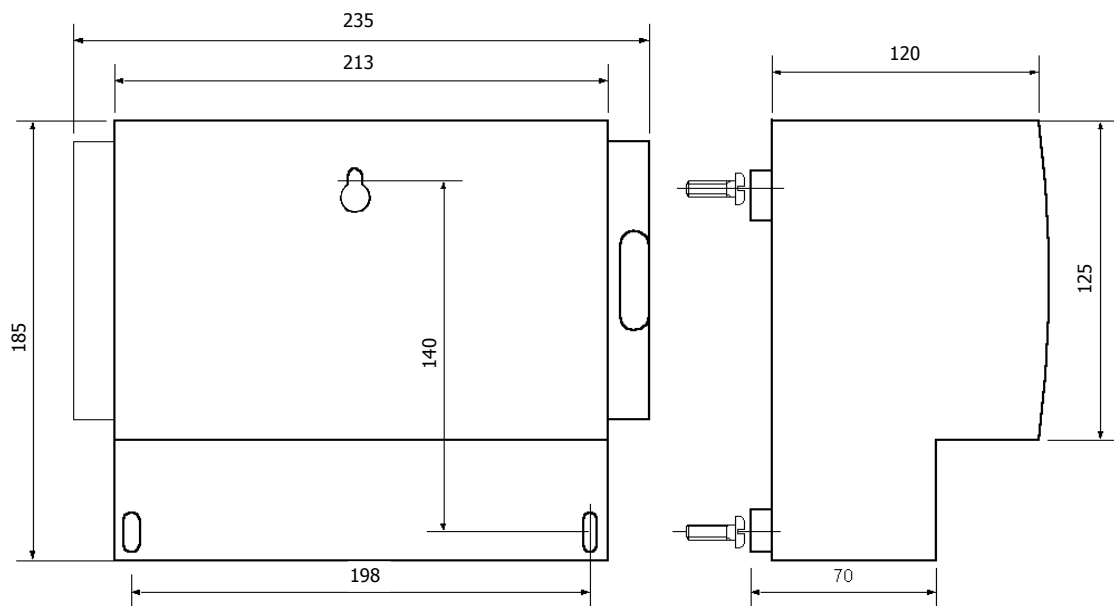


The controller must be installed in a favorable position of reading, if possible at the good height of the eyes.

The boring template below makes it possible to directly screw the **COOLPAC®** controller on a plane wall.



Boring template of the COOLPAC® box



Dimensions of the COOLPAC® box

To fix the controller, open the lower trap door of access to the connector blocks and fix the lower part of the box by the two oblong holes and partly superior by the external "hook" in the back of the controller.



To guarantee user safety and ensure correct operation of the **COOPAC**® controller, please observe the following installation instructions:

- ⇒ Install the controller in a dry location
- ⇒ The controller must be protected against rain, frost and direct sunlight
- ⇒ The room temperature must range between -5°C to 45°C, with no condensation.
- ⇒ Choose an installation location free from vibration, on a suitable support and with no deformation



If these instructions are not observed:

- ⇒ The controller is at risk of being damaged
- ⇒ The measurements can be disrupted
- ⇒ The warranty is not applicable!

5.3 Electrical installation

Open the controller:



Opening of the apparatus:

- ⇒ The controller should be open only by a qualified personnel!
- ⇒ Before performing the connections for installation or for maintenance, remember to turn off the power supply and be sure of no power applied on controller during operation!
- ⇒ The controller must be opened only when wall mounted!

For opening the box and for accessing to the terminal blocks, remove the two screws on the low part of the box.

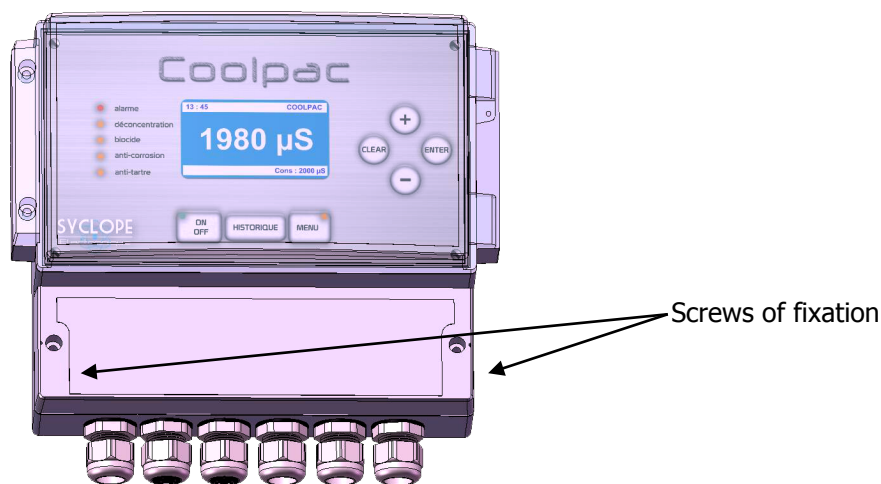
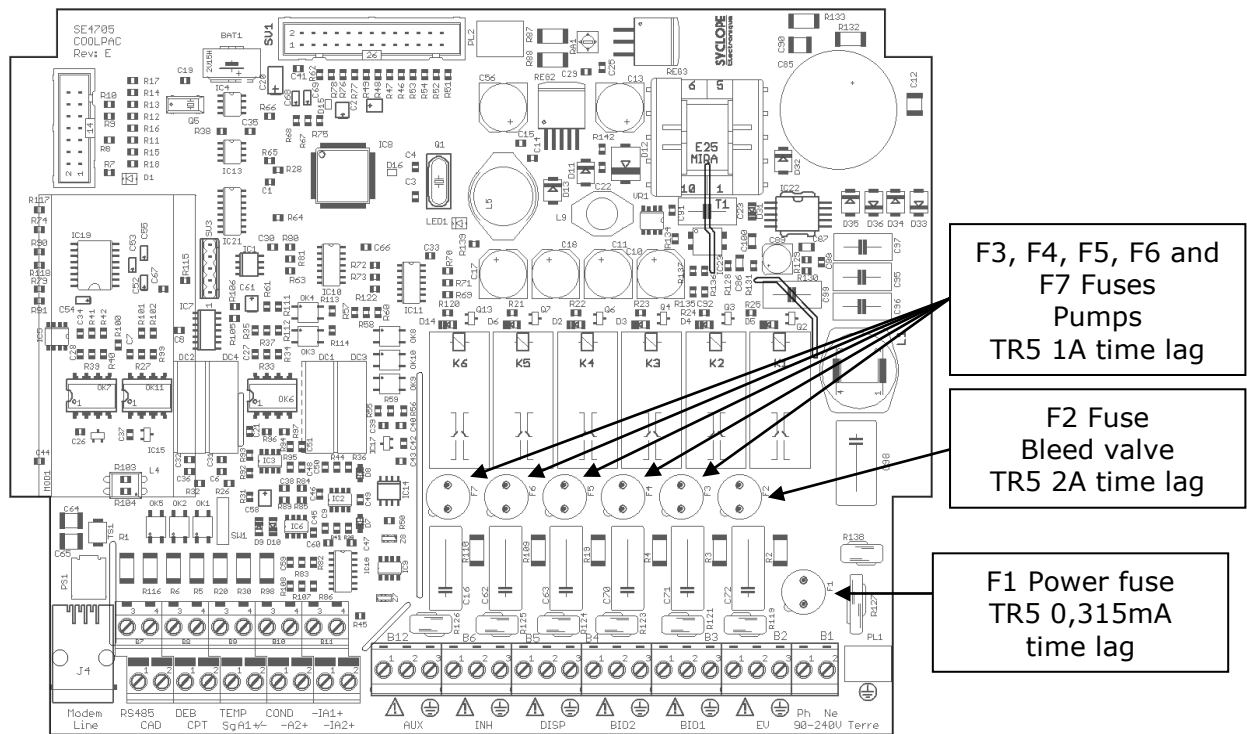


Plate of access to the terminal blocks

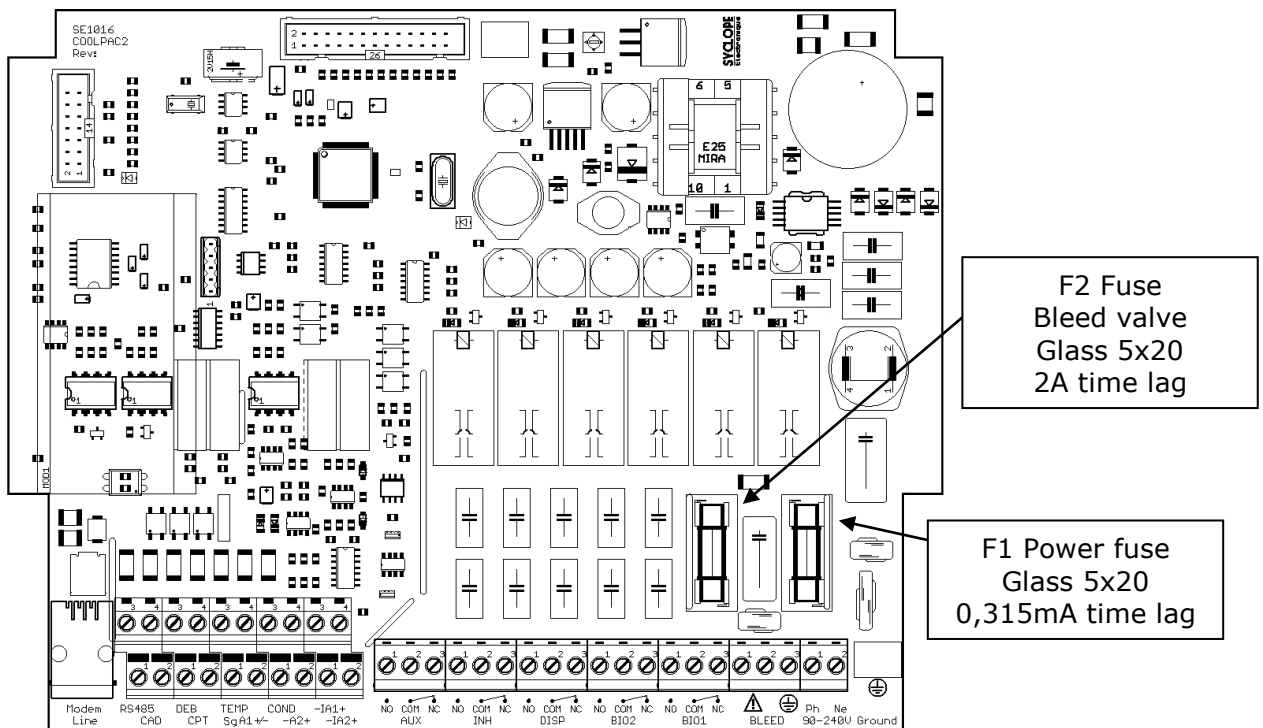
The fuses are accessible by the upper part by removing the front face. Unscrew the four screws and pose the complete face on the top of the box. In case of impossible manipulation, remove the screw of the electric braid of ground protection and remove the flat connector slowly from the bottom electronic plate. Place the complete front face in a safety area protected against humidity and chemical products.

Version : COO 0000



Localisation of fuses COOLPAC® "COO 0000" Version

Version : COO 0020



Localisation fuses COOLPAC® "COO 0020" Version

Electrical installation:

According to the quantity of cables, remove the protection cover inside the electrical glands. Some of them have passing holes for several cables. According to the diameter of the cable, use the corresponding passing hole.



The electrical installation must be performed in accordance with current standards by authorized personnel!

A 30 mA differential circuit breaker must be installed!

A breaker circuit of maximum 6A must be installed near the controller and easily accessible to stop the main power supply. It must be identified as a circuit-breaker for the controller!

Before performing the connections, remember to turn off the power!



Use multicore cables if possible!

If not possible, always use a special wiring tip to be sure that wires do not make a contact together!

Protect the wirings by using electrical clamps.



The **COOLPAC®** controller must be connected to the main recirculation pump system by the means of the "Direct Conditional Access" entry (CAD) to disallow functionality in the case of the main pump would be stopped.



In the "COO 0000" version, the controller is protected by time-lag fuse of 315mA (TR5 type) for internal electronic circuits and by a surge varistor against voltage over 275V.

The powered outputs are protected by internal time-lag fuses of 1A (TR5 type) for dosing systems and 2A (TR5 type) for bleed-off valve.

Reference	Fuses identification for "COO 0000" version
FUS1013	Fuse time-lag 315 mA miniature TR5 type
FUS1000	Fuse time-lag 1A miniature TR5 type
FUS1010	Fuse time-lag 2A miniature TR5 type

In the "COO 0020" version, the controller is protected by time-lag fuse of 315mA (Glass 5x20 type) for internal electronic circuits and by a surge varistor against voltage over 275V.

The powered output of the bleed-off valve is protected by internal time-lag fuses of 1A (Glass 5x20 type).

Reference	Fuses identification for "COO 0020" version
FUS5X20T315	Fuse time-lag 315 mA Glass type 5x20
FUS5X20T2000	Fuse time-lag 2A Glass type 5x20

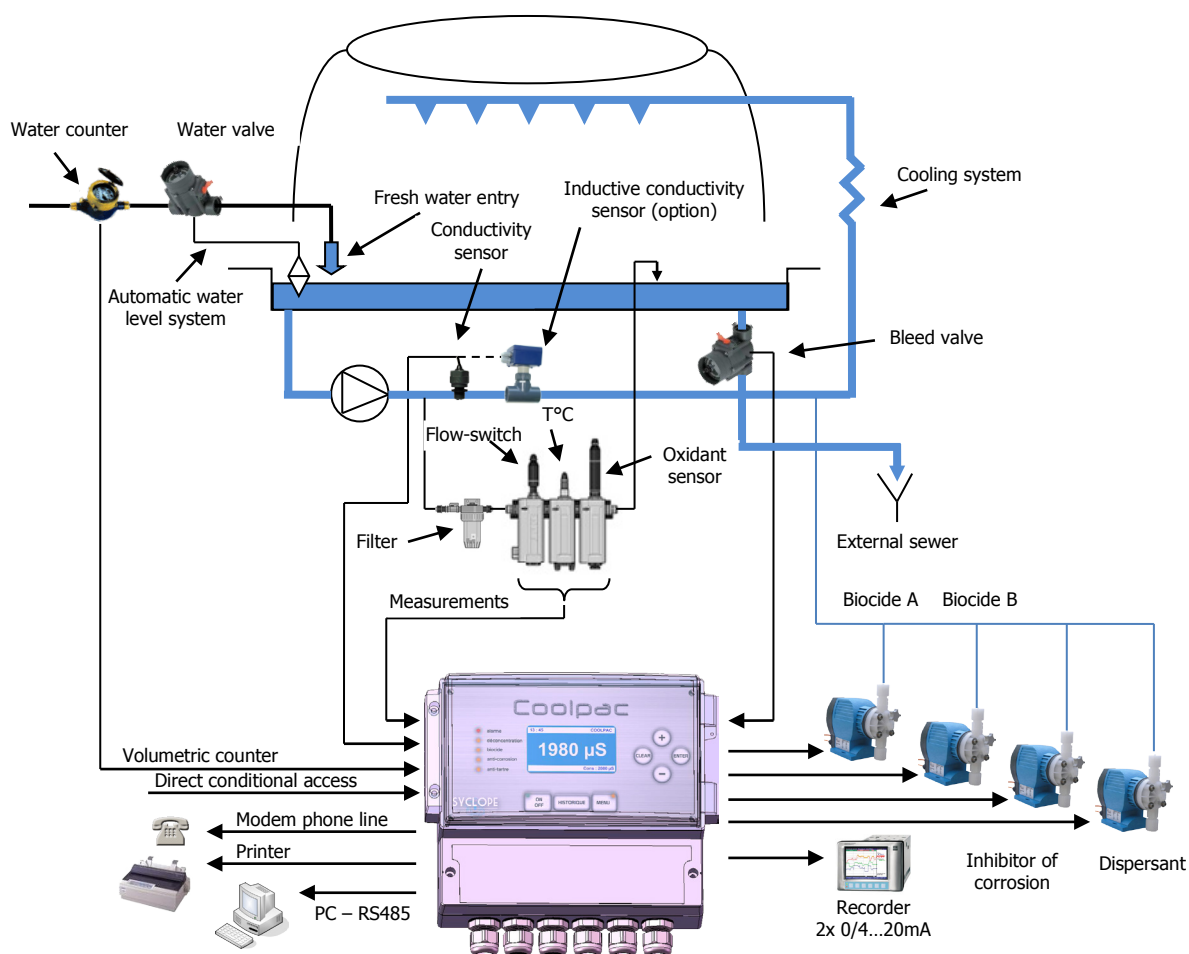


In case of fuse blown, check that the card is not burnt. If this is the case, the complete card must be changed!

In case of varistor burned, please return the controller to our technical after-sales department for repairing!

6 Functional description

6.1 Functional description of a cooling tower



Synoptic of a Cooling tower

The evaporated water of the cooling tower is supplemented by the contribution of new water. An automatic liquid level switch maintains the water to a constant level. These operations make increase the salt concentration of the water in circulation. To cause the drop in this concentration, it is necessary to open the bleed-off valve for decreasing the salt concentration. The missing water is compensated by fresh water.

In order to prevent corrosion and the tartar generation into the cooling tower, it is necessary to add corrosion inhibitor and dispersant chemical products according to a specific process. For protection against legionella or other virus, it is necessary to add biocides continuously. These biocides can be oxidant or non-oxidant reagents and should be injected according a precis processing.

6.2 Functional description of COOLPAC®

The COOLPAC® controller is a compact and economic comprehensive solution of various actuators for operating a cooling tower. It can provide all the necessary functions (bleed-off, biocides, inhibitor and dispersant injections) as well as functions of monitoring. (Recordings, phone line or network communications).

The COOLPAC® controller controls the bleed-off operation according to the resistive or inductive conductivity measurement of the water in circulation (conductivity Mode) or according to the volume of water introduced into the coolant circuit (volumetric Mode).

In autonomous mode and proportionally to the bleed-off valve opening or according to a water meter installed into the fresh water circuit of the tower, it controls the inhibitor and dispersant dosing pumps.

Weekly and daily clocks or cyclic and/or alternative volumes of added water allow to control up to two biocides pumps. The COOLPAC® controller has also some specific functions as the forced bleed-off before starting the biocide cycles or the locked bleed-off after biocide injections.

The COOLPAC® controller controls the conductivity measurement, displays the calculated value and controls the salt concentration into the cooling tower circuit by the mean of the bleed-off valve. It has also some compensation entries as well as for the temperature compensation of the conductivity measurement and two 0/4...20mA programmable entries for compatible pH converter and oxidant measurement. Two analogical 0/4...20mA outputs are available to transfer some specific measurements as the temperature or the conductivity or pH or oxidant values to a data recorder.

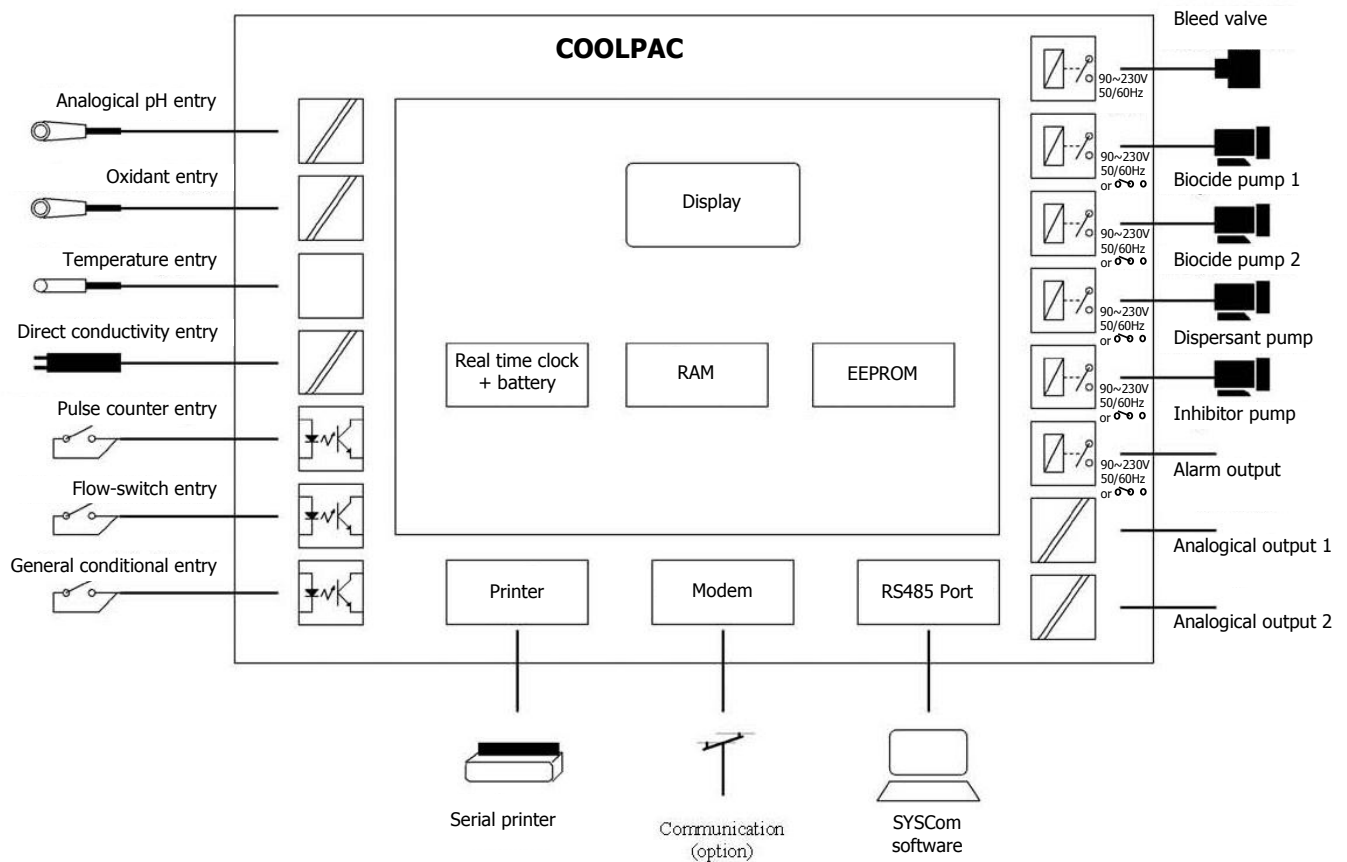
The COOLPAC® controller can communicate his informations by the means of the serial RS485 port or through his internal socket Modem. (Agreed socket Modem for phone line)

For example: If the cooling water process is pended, the COOLPAC® controller can be stopped by the means of the M/A key (On/Off key) or it can be paused by the "direct conditional access" entry with an external contact.

In case of fault and according his programming, it can generate an alarm. (by the mean of free of potential contact of internal relays).

The COOLPAC® controller is a very simple apparatus having all the necessary actuators for driving the bleed-off valve, the biocides, the pumps of dispersant and corrosion inhibitor by direct power supply or by simple free of potential contact. (See wiring schematics in this manual)

By judicious programming, the user is able to activate or deactivate the biocide controls and to modify the manner of working of the dispersant and the corrosion inhibitor.



Functional synoptic of COOLPAC

The “pulse counter” entry for flowrate measurement can be used to count the volume of water introduced into the cooling tower circuit in “volumetric mode” or for the biocides injections in volumetric or volumetric/alternated mode and to control the operation of the dispersant and corrosion inhibitor pumps. It can also be deactivated by the user.

The “flow-switch” entry allows to suspend the control functions of the COOLPAC® controller if water does not circulate any more in the sampling circuit.

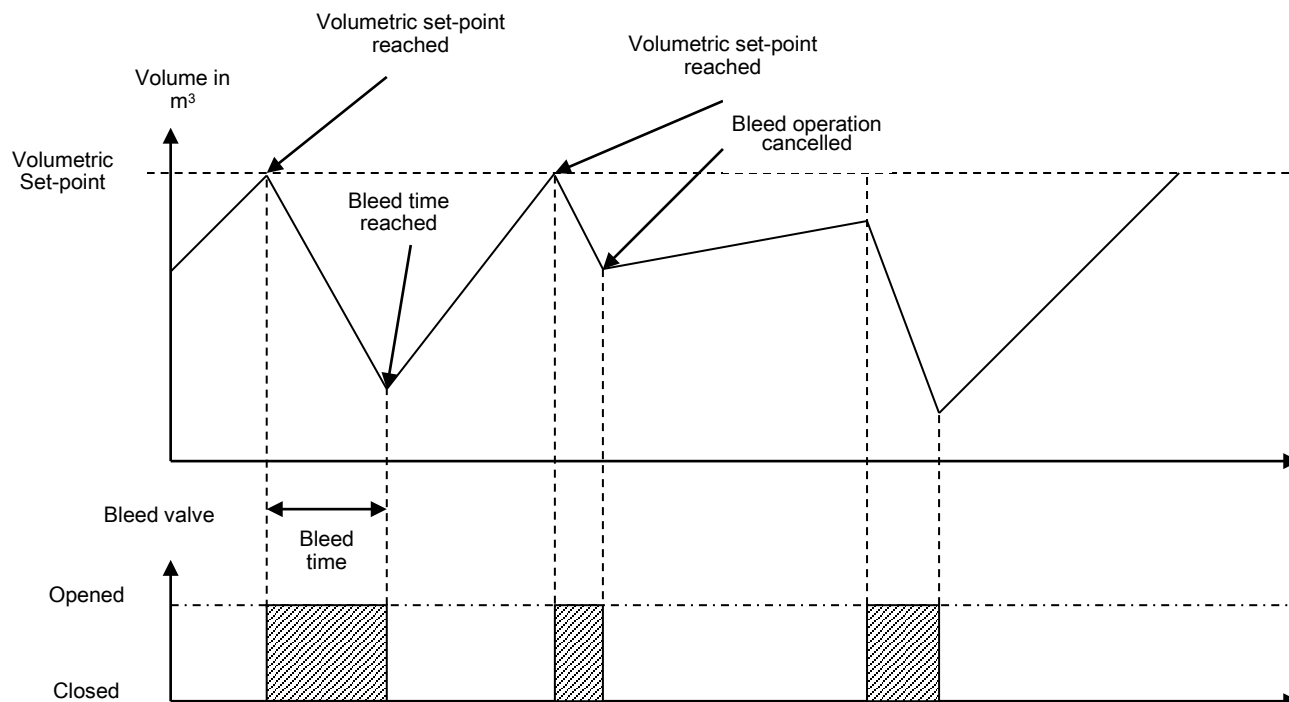
If activated, the 4...20mA entries are able to receive compatible sensors as inductive conductivity or pH (with 4...20mA converter) or chlorine, dichloride, ozone and perox sensors with several programmable ranges. If the pH function selected, it is possible to program the output relay as an acid or basic control according the needing of the cooling tower chemistry.



CAREFUL: The use of the auxiliary entry 1 with an inductive conductivity sensor prohibited automatically the use of the pH sensor!

Finely, by using “SYSCom” software, it is possible to supervise remotely, either by the telegraphic phone network or by local RS485 connection, all the programming parameters of the apparatus, to modify its operating process and to carry out a traceability of the general data of operation (Conductivity, bleeds, biocides, inhibitor...)

6.3 Deconcentrating in "volumetric mode"



The figure above visualizes various processes of deconcentrating in "volumetric mode". The bleed-off valve opens and is closed according to the programmed limiting values. It opens if the cumulated volume instruction in contribution of water in the circuit of the cooling tower is reached. The conductivity value decreases according to the opening time of the bleed-off valve. Note that the presence of the conductivity measurement is not necessary. This mode allows to carry out the deconcentrating of the cooling tower without having to control its salt concentration. This mode is thus a mode of help in the event of defect of the conductivity sensor. As of the normal closing of the valve, the share of the consigned volume is withdrawn from cumulated volume to the moment of closing.

If the closing of the bleed-off valve is stopped, its cycle is memorized, conductivity goes up according to the time of interruption and the cycle sets out again as soon as the controller is again in service in order to rise the remainder from the programmed time of opening.

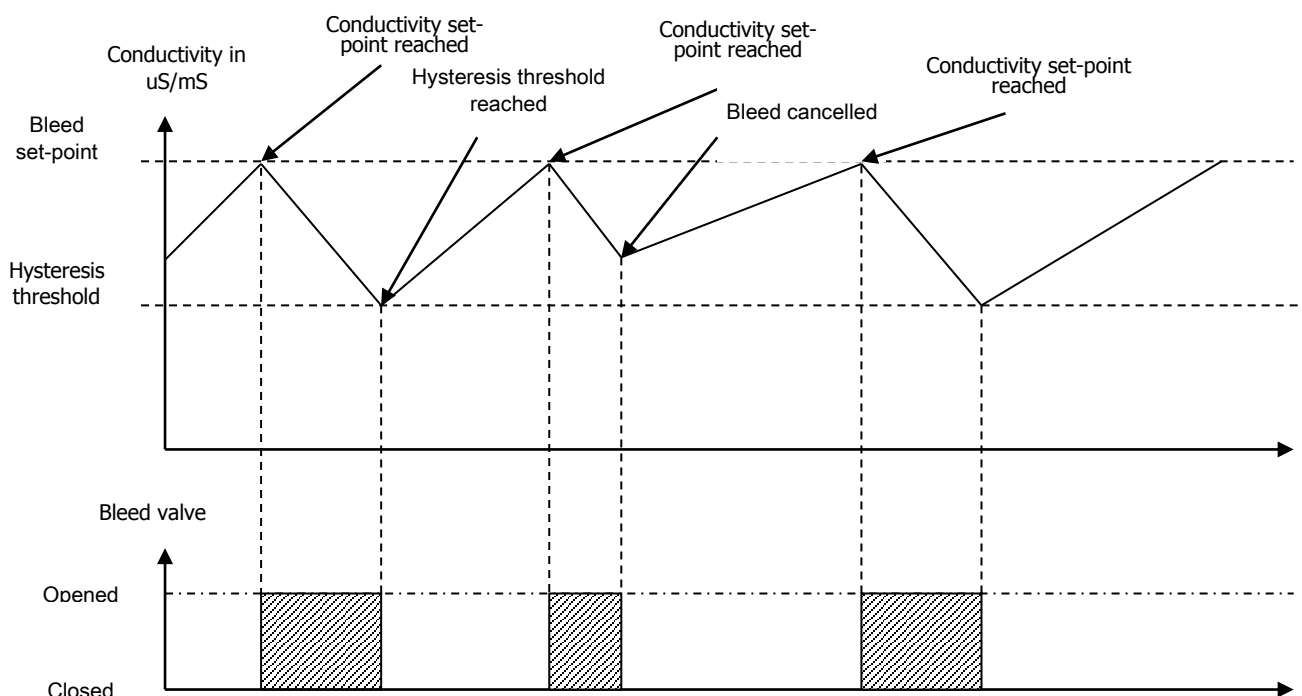
In this operating process, it is necessary to have a pulse water meter in order to enter cumulated volume. In this case, imperatively program the scale of the volumetric measurement (liters/minutes or m^3/hour) as well as the correspondence of the liters/impulse number of the water meter in the COOLPAC® controller.



According to the scale of the counter, the indications of volumetric maximum capacity of deconcentrating or volumetric cycles of biocides change!

Purged volume is function of the evacuation pipe diameter of the deconcentrating circuit. According to the volumetric instruction, determine the corresponding time of bleed-off so that the bleed time does not come to dangerously empty the volume of water of the cooling tower.

6.4 Deconcentrating in "conductivity mode"



The figure above visualizes various processes of deconcentrating in "conductivity mode". The bleed-off valve opens and is closed according to the programmed limiting values. It opens if conductivity reached or exceeds the "conductivity set-point". Conductivity decreases by introducing fresh water in the cooling tower circuit by the automatic system of water level. As soon as the conductivity reaches the "hysteresis threshold" or decreases under this value, the COOLPAC® closes the bleed-off valve. If the cycle is stopped manually or in the event of the circuit of the cooling tower stops, the COOLPAC® memorizes the state of the bleed cycle and takes again this cycle when the active mode returns.

6.5 Description of the biocide controls

The COOLPAC® controller can controls two different biocides. The biocides are controlled by a timer with several dosing possibilities of 8 dosages/cycle and differentiated cycles for periods of winter and summer for each day of the week and on a quantity from 1 to 9 weeks per cycle or the volumes programmed with programmable time-lag injections for each biocide.

It is thus possible to control 4x8 dosages according to the type of biocide, the period of winter or summer, the number of proportioning each day of the week on a programmable cycle from 1 to 9 weeks.

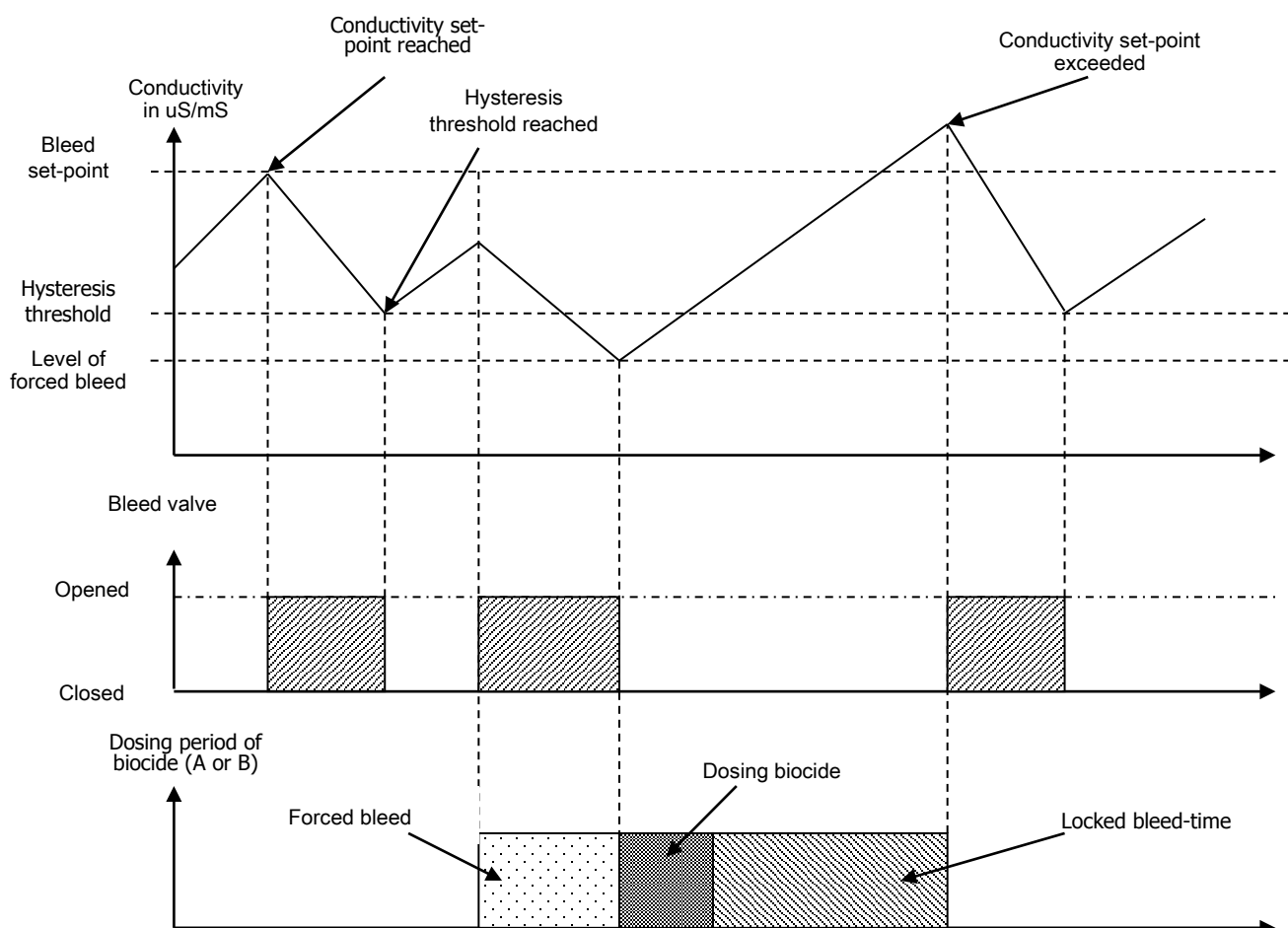
It is also possible to program the biocide injections in loop according to a passed volume and to alternate biocides when they are both programmed in volumetric mode.

For these two cases, it is also possible, for each period of winter or summer, to program a "bleed forced" before each biocide injection cycle and a locking time after each biocide injected.

The COOLPAC® can also work according to an automatic mode of the seasons to be programmed by the user according to his geographical location on the terrestrial sphere. It can also work in "winter mode" only or "summer mode" only.

The two biocides (A and B) can be activated or deactivated by the technician before starting the controller.

6.6 Synoptic of biocide dosages



6.7 Dosages of biocides (A and B) in "timer" mode

The COOLPAC® controller is equipped with a "timer" making it possible to program dosage sequences for biocides A and B.

When this function is programmed (see chronochart "activation or deactivation of biocides"), the injection of biocides A and/or B is possible only if the dosing period is activated by the timer. If the bleed-off (deconcentrating) is in progress, it is cancelled and will begin again following the cycle of biocide injection. Conversely, the bleed-off cannot be activated during the phase of biocides injection (A or B) managed by the timer of the COOLPAC® controller.

6.8 Dosages of biocide (A and B) in "volumetric and alternate/volumetric" modes

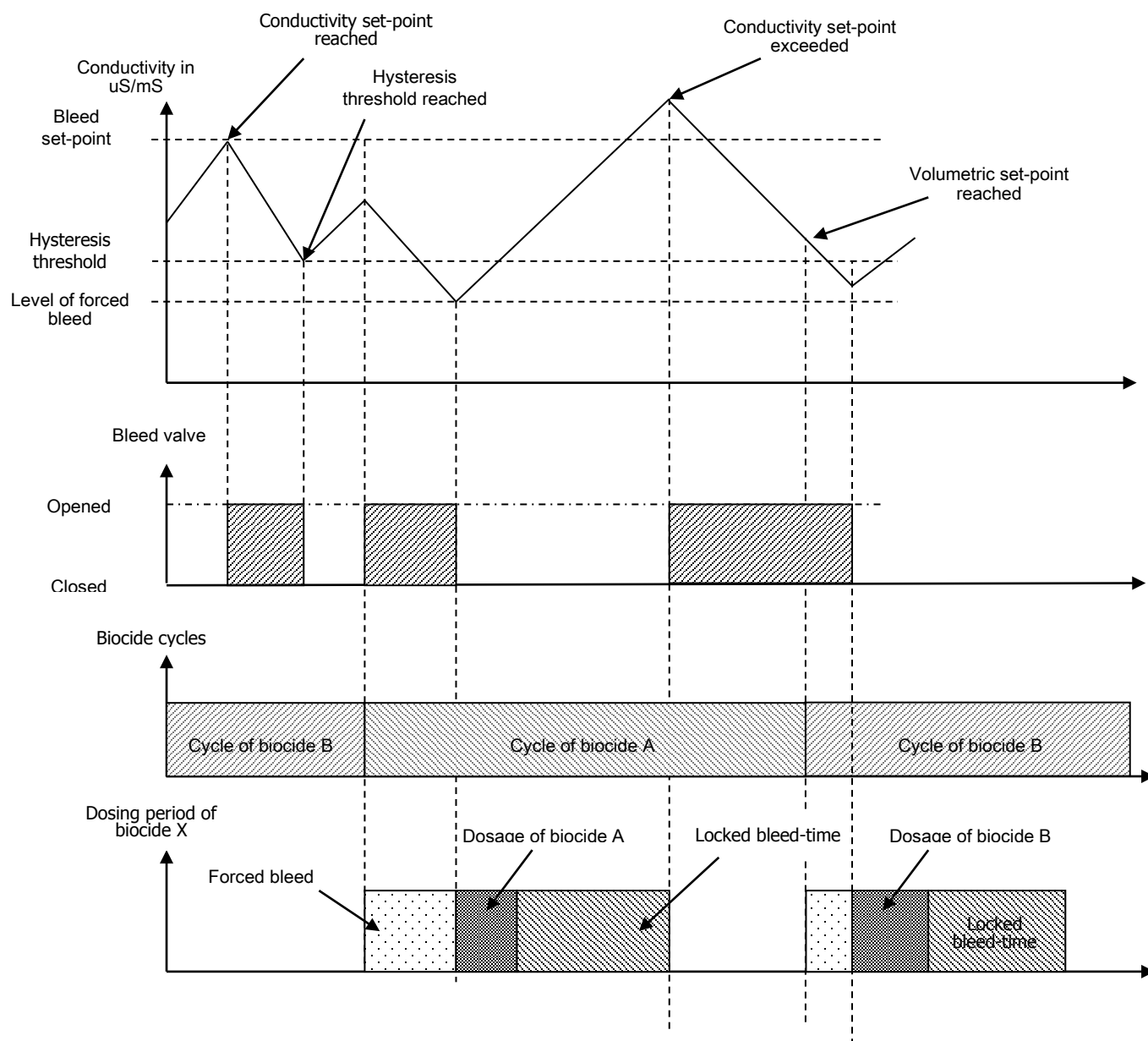
The function of biocide dosages in "volumetric" or "volumetric alternate" mode makes it possible to dose the biocides cyclically according to the programmed volume(s).

If the "volumetric" biocide function is programmed for the two biocides, an alternation of biocide dosages will be automatically activated.

Times of pre-bleed, biocides injections and locking will then be programmed independently for each biocide.

The internal timer is deactivated and the cycles are controlled only by counted volumes.

The "Winter/Summer/automatic" mode is always active and the parameters of volume and cycle times of biocides will have to be programmed for each season.



6.9 Dosage of biocide A in oxidant continuous mode

This function is available only on biocide A. The continuous oxidizing mode allows to carry out a control of the biocide according to the oxidant set-point and the hysteresis threshold defined by the user.

This continuous operating process (oxidizing) programmed for biocide A does not have any effect on operation of the biocide B and the opening of the bleed-off valve.

Example:

When the biocide A is operating, the biocide B can also operate when it is in timer mode (see timer mode above). The bleed-off will be carried out only if the biocide B is not in operation.

6.10 Dosage of biocide A in oxidant/timer mode

The COOLPAC® makes it possible to carry out a biocide injection controlled by an internal clock. This function gathers operations described above (timer and continuous oxidant).

When this mode is chosen and for one programmed period, the timer authorizes the biocide injection A according to the oxidant set-point. When the period defined on the timer is finished, the biocide injection stops until the next period.

The bleed-off and the injection of the biocide B are not influenced by the operation of the biocide A.

6.11 Forced bleed-off

If, at the starting time of biocide cycle, a time of pre-bleed is programmed, the COOLPAC® controller carries out a corresponding deconcentrating. The general time of the biocide injection cycle must take account of this additional time (mode "Timer" only). The biocide dosage is thus delayed but does not deteriorate its original cycle of dosing time.

6.12 Locking of the deconcentrating

The bleed-off valve remains closed during the biocide dosage cycle and more time later if "lock" function is activated (So that the biocide can have enough time to be efficient). This time is programmable by the user for each biocide.

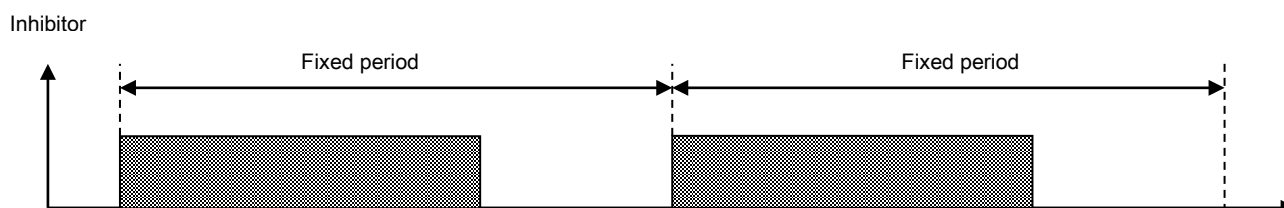
6.13 Description of the dosing operations for inhibitor and the dispersant

The COOLPAC® controller can control the dosage of the inhibitor and the dispersant in 3 different ways:

- Continuously or periodical mode
- % of bleed-time mode
- External contact mode

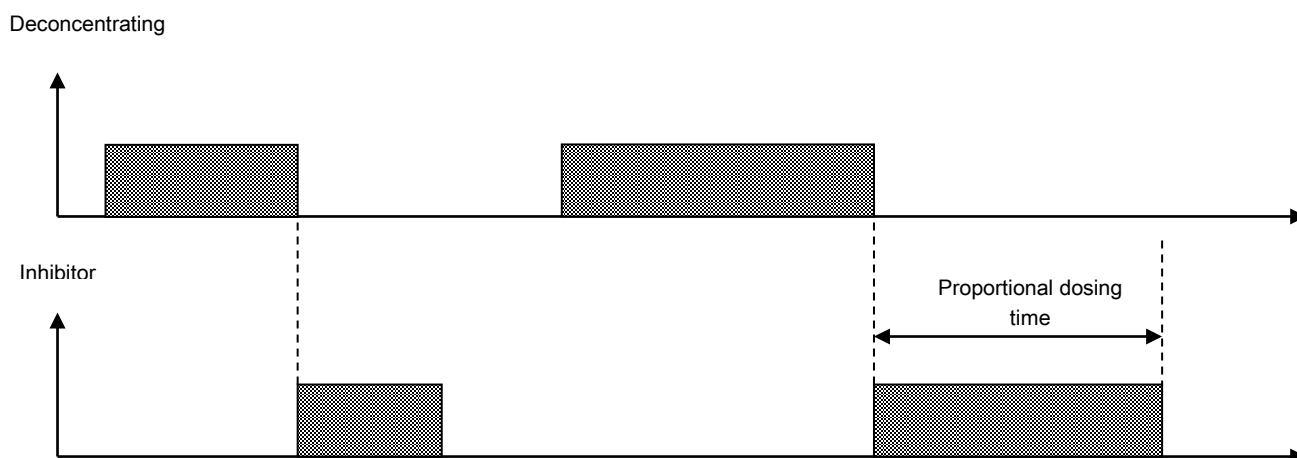
6.14 Continuously or periodical mode

Periodically, the COOLPAC® controller starts the inhibitor and dispersant dosing pumps. A proportional quantity of chemical product is injected at the beginning of each period of time. During bleed-off operation, the dosages of the inhibitor and/or dispersant are suspended.



6.15 % of bleed-time mode

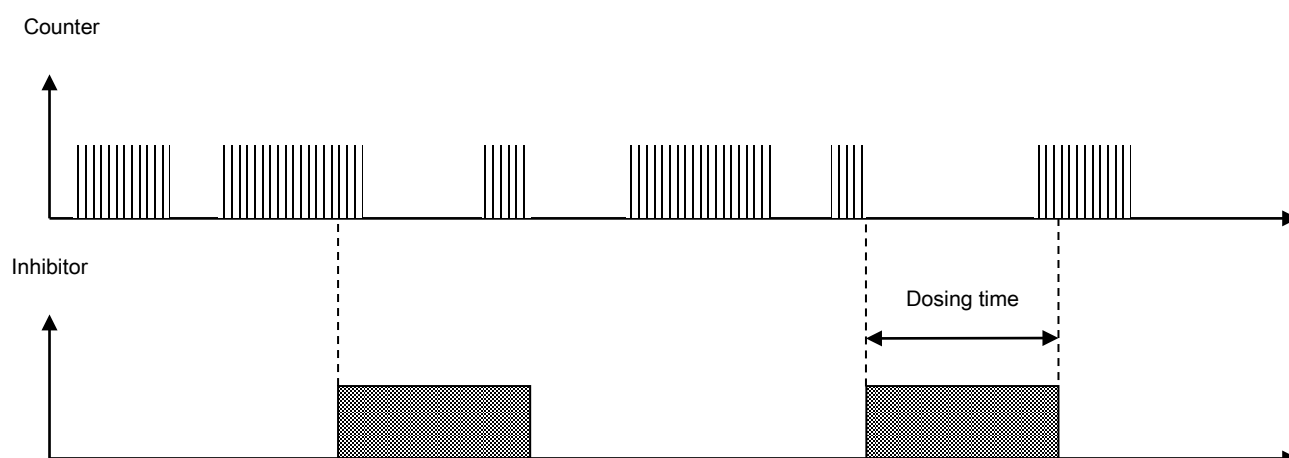
The inhibitor or the dispersant is dosed only after the bleed-off. However, the COOLPAC® controller determines the duration of deconcentrating and controls the chemical product proportionally to the duration of the deconcentrating set in %.



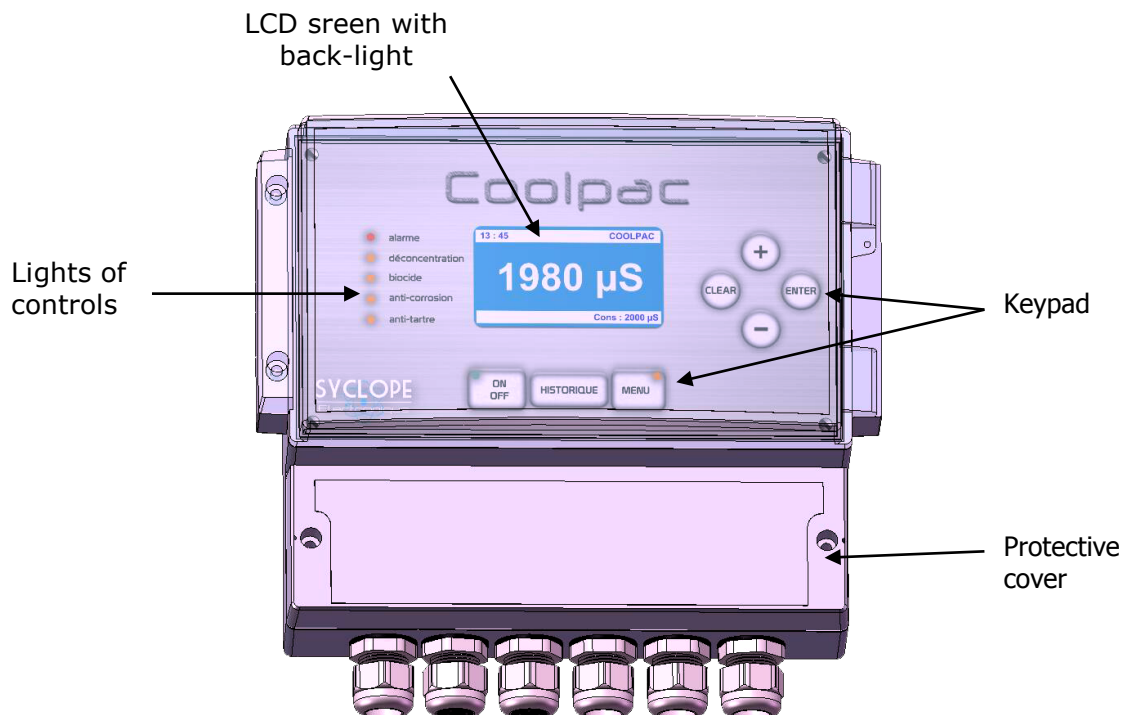
6.16 External contact mode

In "External contact" mode, the inhibitor or the dispersant is proportionally dosed to the fresh water introduced into the cooling tower circuit. A water meter with internal contact is placed into the fresh water line to measure the quantity of water and transmits the signal to the COOLPAC® controller. It is generally necessary to choose a water meter with a contact having impulse interval of 1-100 liters.

The pulse repetition frequency is counted until reaching the desired quantity and a dosing time is sent to the pumps (inhibitor and dispersant).



7 Presentation of the Human/Machine Interface (HMI)



7.1 Keys of the keyboard

- | | |
|--|--|
| | « MENU » Key - Allow to access to the menus of programming when the controller is Off. |
| | « HISTORIQUE » key – Allow to display the states and other activated timers. Show you the recorded values when the controller is stopped. |
| | « ON/OFF » key – Key with LED witch allow to activate or deactivate the controls. |
| | « CLEAR » key – Allow to quit the menus and to clear the current numeric value. |
| | « + » key – Allow to change the line into the menu and to increase a numeric value. |
| | « - » key - Allow to change the line into the menu and to decrease a numeric value. |
| | « ENTER » key – Allow to transfer or to confirm or to register a current value. |

7.2 Function keys

The "ON/OFF" key and the key "MENU" key are equipped each one with a control indicator fulfilling the following functions:

Green indicator Off:



No control function of the COOLPAC® controller is activated. The 4...20mA analogical outputs are active if they are not programmed as a control output. The dosages of biocides, inhibitor and dispersant are stopped or suspended.

This is an unconditional state for using the "MENU" key, to access to the programming menus of the COOLPAC® controller.

Green indicator ON:



All the control functions of the COOLPAC® controller are activated. If programmed, all the entries and outputs of the controller are activated. The using of "MENU" key is impossible. The others keys are deactivated except the "HISTORIQUE" key who's show you the states of the counters.

Green indicator blinking:



All the control functions of the COOLPAC® controller are suspended. The using of "MENU" key is impossible. The others keys are deactivated except the "HISTORIQUE" key who's show you the states of the counters.

This situation is caused if:

- ⇒ The "General conditional" entry (CAD) is activated.
- ⇒ The "Flow-switch" entry has detected a low level of sampling into the measurement circuit or a low level of water into the cooling tower circuit.
- ⇒ A general fault has been detected and the controller is automatically passed in safety mode.

Two indicators Off:



The COOLPAC® controller is in waiting mode. The general process is stopped. All dosing pumps and bleed-off valve are deactivated.

In this situation, the "ENTER" key allows to read the recorded values. The "CLEAR" key allows to return to the main screen. The "+" and "-" keys are used to change the reading of the recorded values.

Yellow indicator ON:

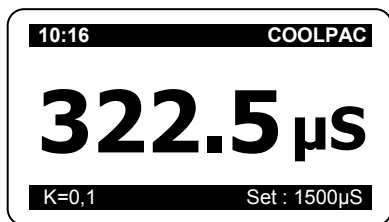


The access to the programming menus is in progress. The user must select a function to be programmed. If no instruction is given in a short time, the access to the programming menu is deactivated automatically after a short period.

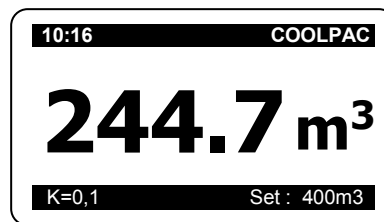
7.3 Permanent displays 1 and 2

Permanent displays according to the operating processes

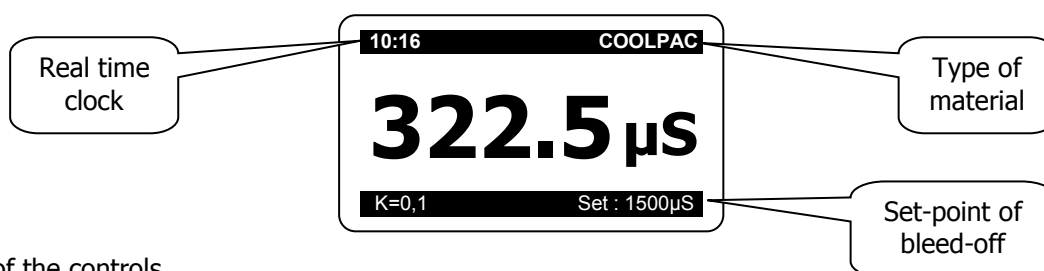
In mode 1 « Conductivity »



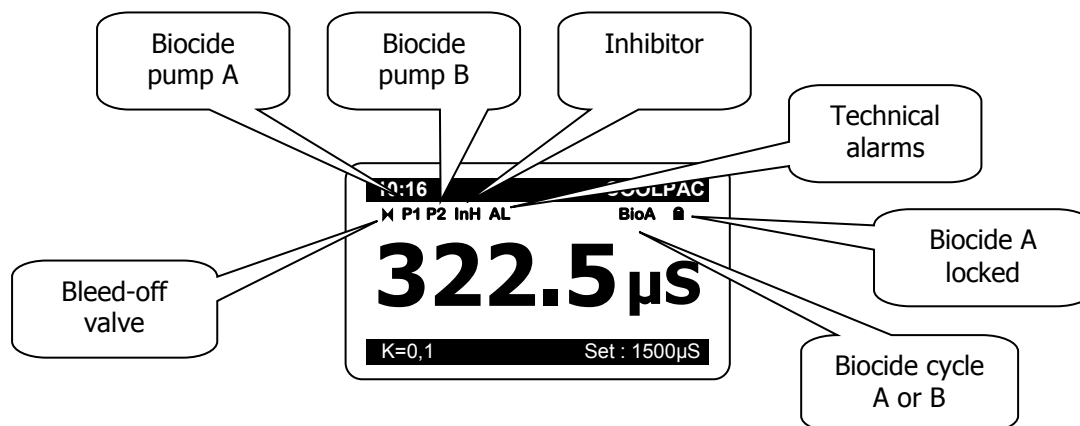
In mode 2 « Volumetric »



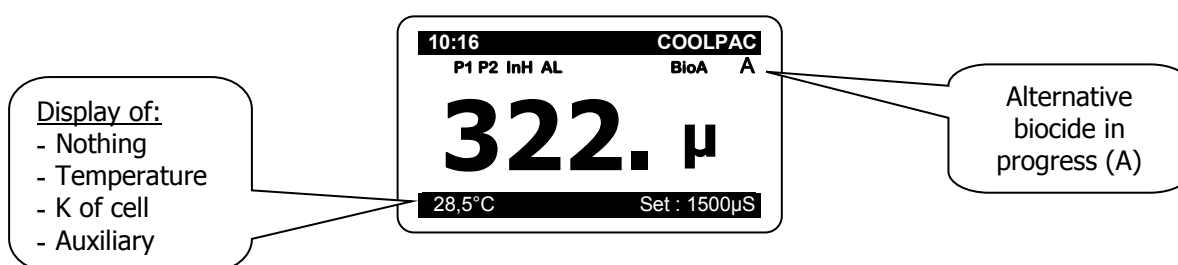
Displaying of the clock real-time, the model of the controller and the set-point of bleed-off.



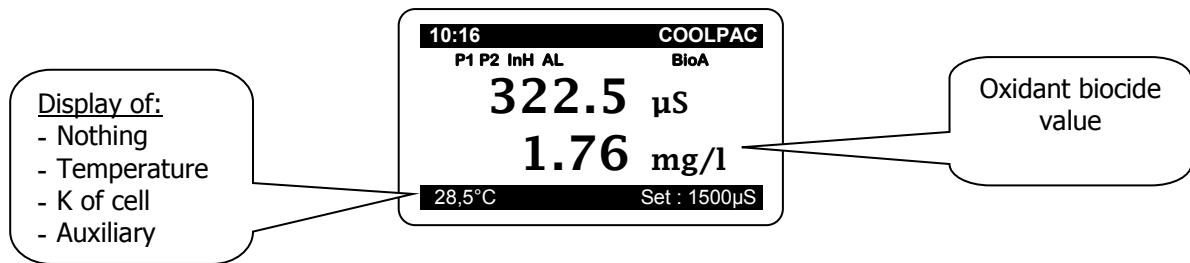
States of the controls.



Displaying of the auxiliary parameters (only if defined into the "FACTORY" Menu) and displaying of the volumetric biocide cycles...



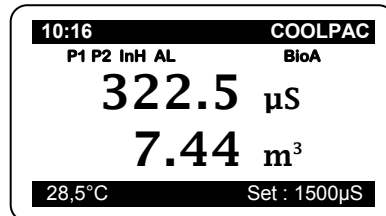
Multiple displays of analogical parameters:



REMARK: The displaying of the oxidant value appears only when the oxidizing biocide is active or at the time of the volumetric oxidizing cycle (biocide A).

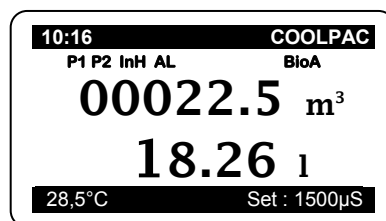
Multiple displays of volumetric parameters:

Displaying of the volume of the biocide cycle in progress ...



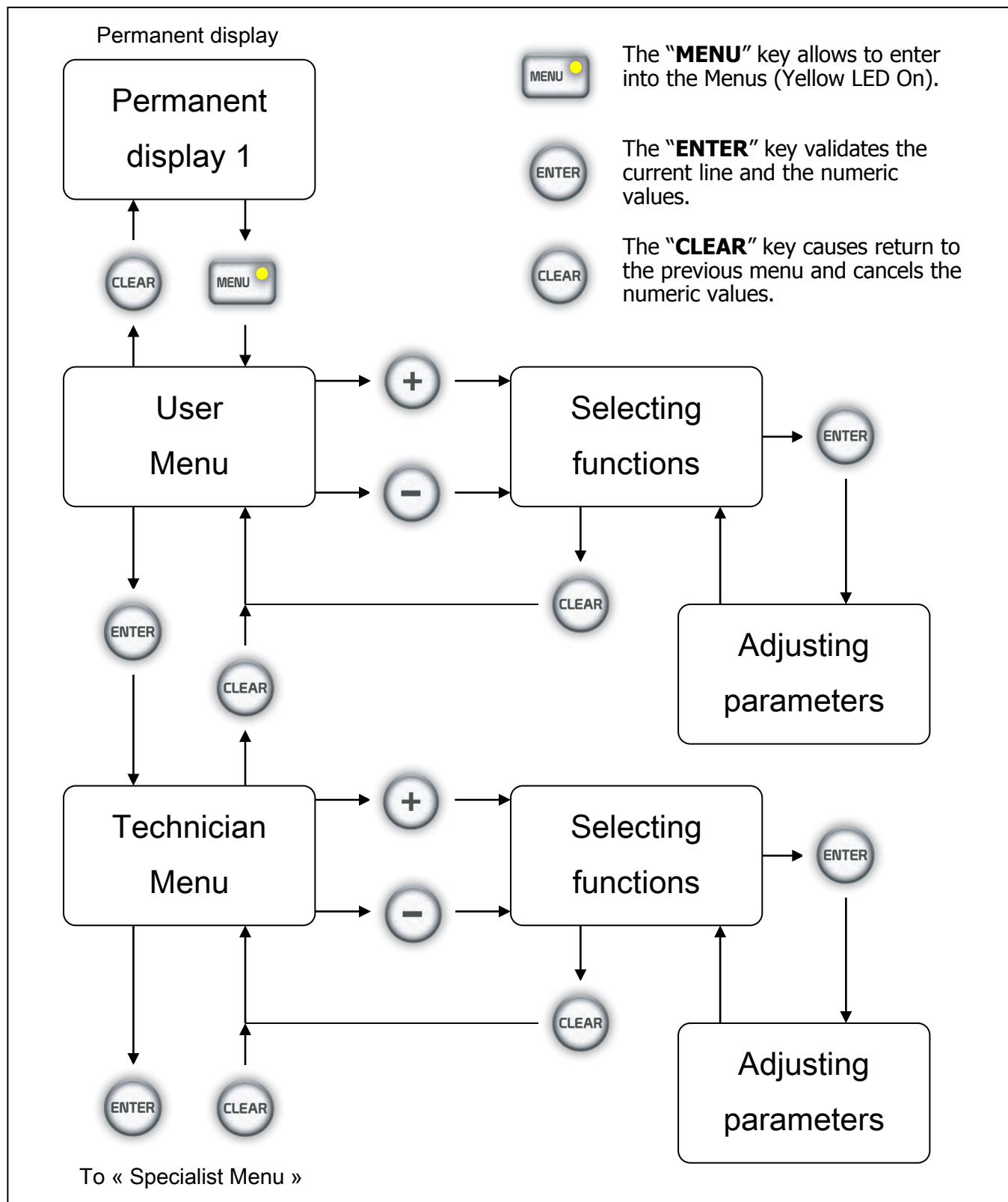
Multiple displays of volumetric parameters:

Displaying of the volumetric main meter ...



8 Programming instructions

8.1 Synoptic of the programming instructions

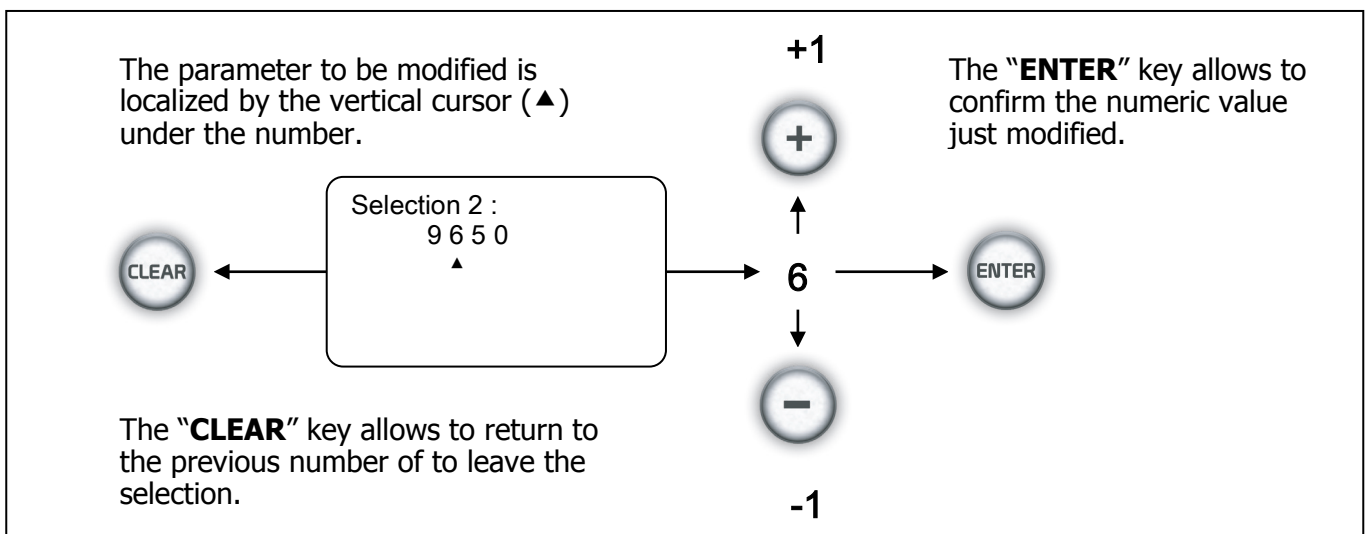
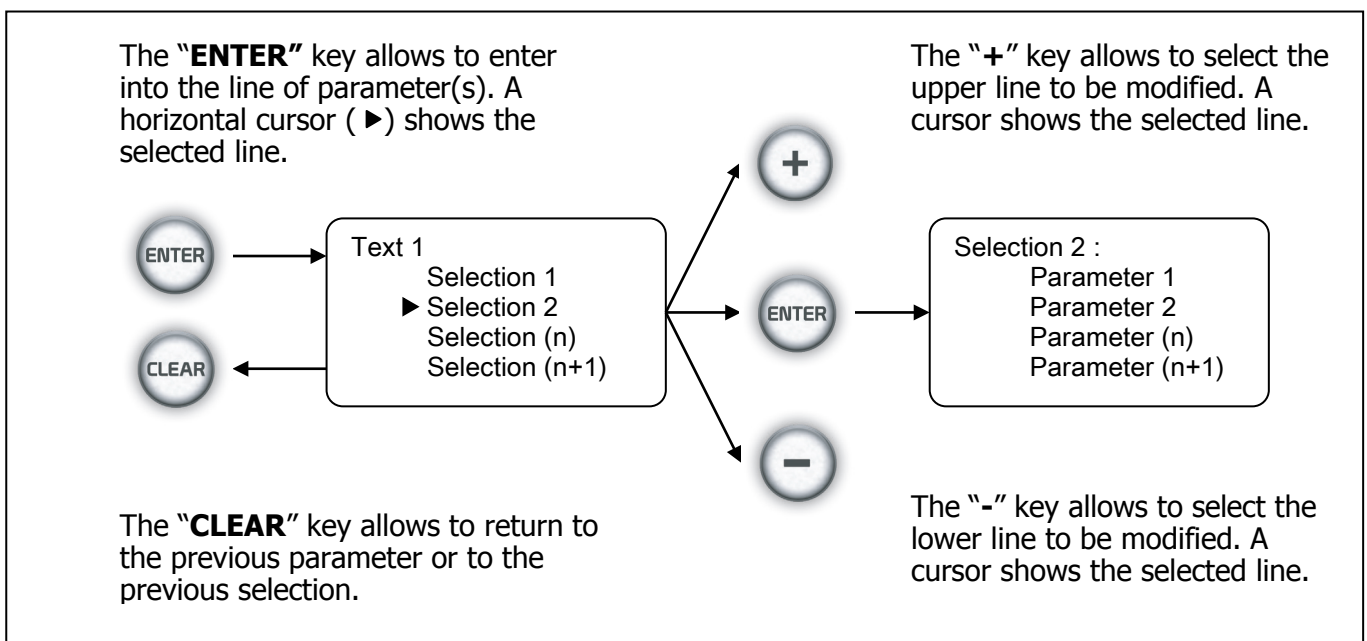




INFORMATION :

- ⇒ The accesses to the menus "Technician" and "Specialist" can be blocked by different access codes! The corresponding functions can then be blocked according to the various authorized levels.
- ⇒ The number of active functions depends on the functions chosen in the menu "Specialist". Their nature depends on the choices carried out.
- ⇒ To reach the "User" menu, it is necessary to deactivate the main control function of the controller by pressing on the "ON/OFF" key to OFF. (Green LED Off)
- ⇒ When into the menus, if the user does not press on any key during one minute, the controller leaves automatically the menus in progress without carrying out modification to return to the permanent display 1.

Adjusting parameters:



8.2 Menus of programming instructions

The COOLPAC® controller is equipped with various lines of operating menus. When initialized, all the values are preset to a standard values and can be modified by the user in the "User", "Technician" and "Specialist" menus. The COOLPAC® controller is delivered without access control to the various menus so that all the adjustable parameters can be modified during the commissioning.



It is important to read carefully the present manual before any modification of parameters into the "Specialist" and "Technician" menus.

8.3 Access codes

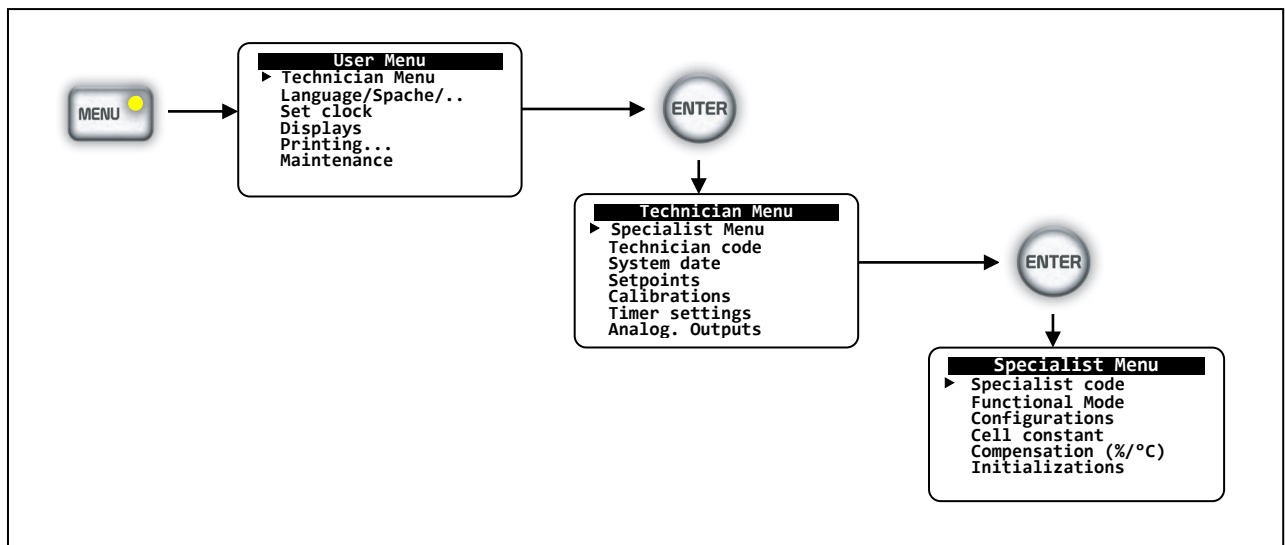
The access to the "Technician" and "Specialist" menus can be prohibited by using a different password for each menu. The COOLPAC® controller is delivered without any password thus allowing a free access to the various functions. In case of programming a password access, the access is then prohibited. By force, if the access to the "Technician" menu is prohibited means the access to the "Specialist" menu is also prohibited.



The programming of a password implies obligatorily its knowledge. In case of missing, the system is locked and you will have to call SYCLOPE Electronique for assistance.

9 Operating menus - Overview

9.1 Overview of the various successive menus



You will find the explanations of the various menus into the following chapters.

9.2 Factory reset

This procedure loads the basic parameters delivered within the controller into the memories.



Take care!! All the current configurations, calibrations, setpoints, etc... will be lost!

The main values of initialization are the following ones:

Parameter	Description of the parameter (Factory reset)	Value
Mode	Processing mode	Conductivity
Auxiliary	Auxiliary parameter	Nothing
Language	Basic language	French
Codes	Factory access codes for technician and specialist menus	0000
Display	LCD parameter	Nothing
Constant of cell	Constant of resistive cell for conductivity measurement	1.00
Bleed-off set-point	Conductivity set-point of bleed-off	1500 μ S
Flowmeter	Flowmeter Value of calibration in l/pulse Basic unit	Deactivated 100l/imp Liter/minute
Biocides	State of biocides	Deactivated
Seasons	Operating process of the seasons Month of reference - summer Month of reference - Winter	Automatic April October
Timers	4x8 Internal timers Days of activity Number of week in the cycle	00 None 1
Biocide cycle	Volume of the alternate biocide cycles	00
Inhibitor	Mode of the inhibitor	Continuous
Calibrations	Gains or Slopes of the calibration	1.00
Analogical outputs	Configuration of the analogical output I1 Mode of transfer I1 Configuration of the analogical output I2 Mode of transfer I2	Conductivity 0...20mA Nothing 0...20mA
Modem	No activation : Country code => France	061
ID number	Identification of the controller	00

9.3 Activation or deactivation of the Modem

This function allows to activate or deactivate the internal Modem.



Before activation of the modem, it is necessary to introduce a special "socket modem" into the COOLPAC® controller. The "socket modem" must be agreed for the local network of the country. Consult your reseller or SYCLOPE Electronique headquarter for information.

The main standard countries available are:

Country	Code	Country	Code	Country	Code
Australia	009	India	083	Portugal	139
Austria	010	Ireland	087	Singapore	156
Belgium	015	Italy	089	South Africa	159
Brazil	022	Japan	000	Spain	160
China	038	Korea	097	Sweden	165
Denmark	049	Malaysia	108	Switzerland	166
Finland	060	Mexico	115	Taiwan	254
France	061	Holland	123	United Kingdom	180
Germany	066	Norway	130	the United States	181
Greece	070	Poland	138		

9.4 Activation or deactivation of the maintenance

This function allows to activate the maintenance tools of the COOLPAC® controller. This maintenance gives you the possibilities to test internal equipment separately. (See Programming manual part 2)

10 Accessing to the "Histories"

The access to the histories and to the printing allows to analyze the past or present operations and last cycles and anomalies of the cooling tower or of the controller.

During the operating period, only the access to the "meters" is possible.

The data are registered in the volatile memory of the controller safeguarded by an internal battery used for memorizing the real-time clock.

These data can be read by the communication software "COOLPAC Surveillor®" thus making it possible to recover the continuous technical data on simple phone call by MODEM. (Option)

The histories of the cycles, alarms and analogical data can be printed in a chronological way under the form of a maintenance report.

Characteristics of the printer:

- Serial mode (RS232C) (Cord in option Ref :)
- Print speed : 1200 baud
- Length of the word : 8 bits
- Parity : without

Example of the printed report:

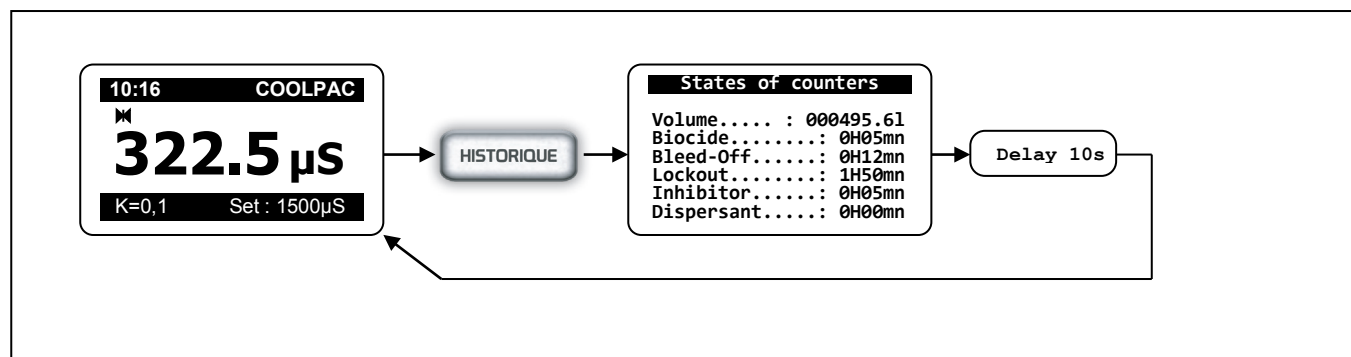
```

History of Data : 23/06/08 15H44

23/06/09 15H40 => Setting Out-off service
23/06/09 15H39 Cond. : 1244uS 2.84mg/l 7.88pH
23/06/09 15H34 Cond. : 1238uS 2,80mg/l 7.88pH
23/06/09 15H32 => End of biocide cycle A
23/06/09 15H29 Cond. : 1235uS 2,84mg/l 7,86pH
23/06/09 15H24 Cond. : 1230uS 2.85mg/l 7,84pH
23/06/09 15H19 Cond. : 1226uS 2.80mg/l 7,85pH
23/06/09 15H14 Cond. : 1224uS 2.84mg/l 7,84pH
23/06/09 15H09 Cond. : 1220uS 2.85mg/l 7,86pH
23/06/09 15H04 Cond. : 1218uS 2.86mg/l 7,84pH
23/06/09 14H59 Cond. : 1214uS 2.85mg/l 7,86pH
23/06/09 14H54 Cond. : 1212uS 2.82mg/l 7,85pH
23/06/09 14H49 Cond. : 1208uS 2.85mg/l 7,84pH
...

End of reading memory
  
```

10.1 Displaying values in normal operation



10.2 Displaying data recorded when controller stopped

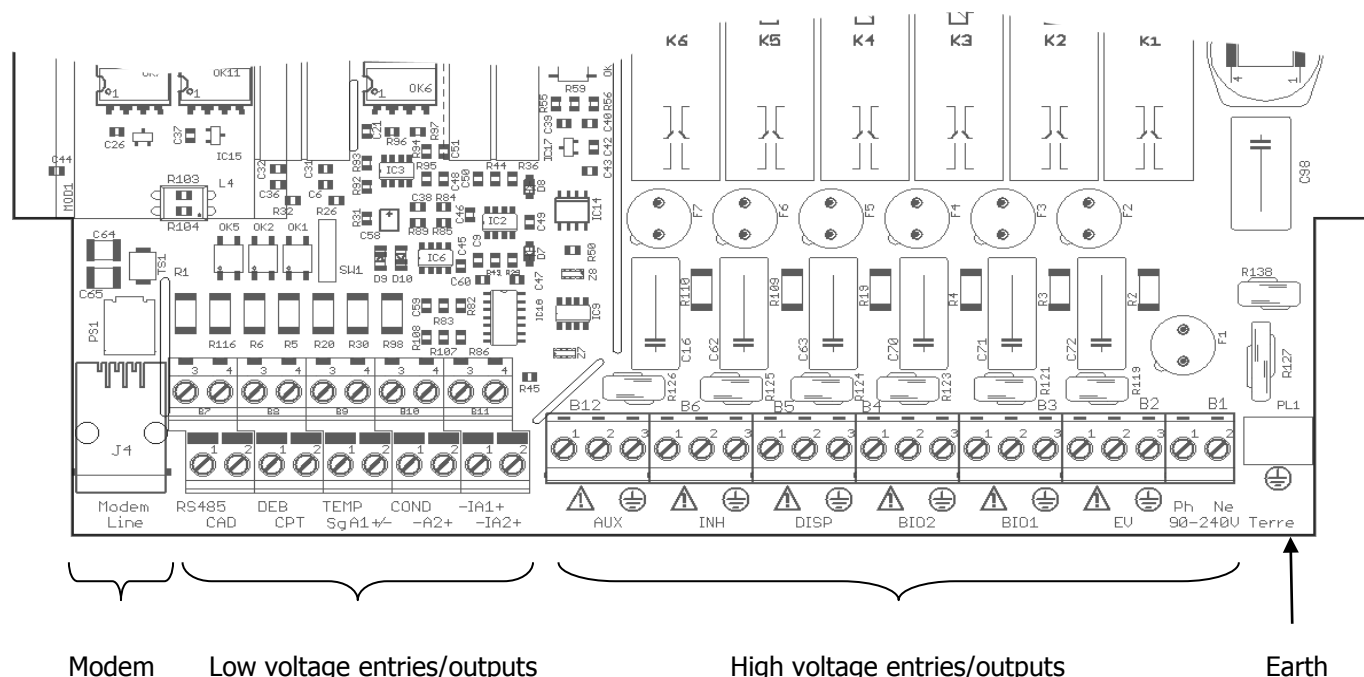
When the COOLPAC® controller is in "Stop" mode (green LED indicator Off), the access to the histories is full. The reading of the memories can be done separately between:

- Cycles of operations
- Technical alarms
- Analogical data

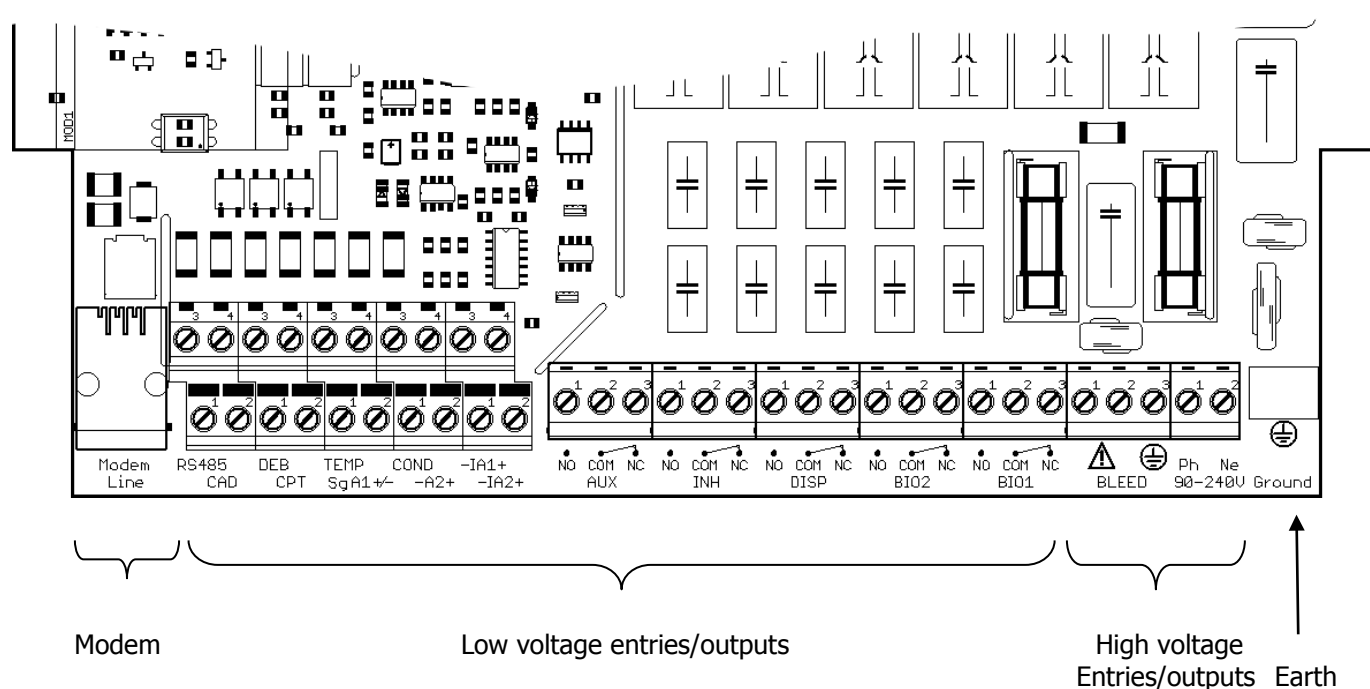
The memories can be also reset from this menu.

11 Connections and terminal blocks

Localisation of the terminals And internal connections of COOLPAC : Version COO 0000

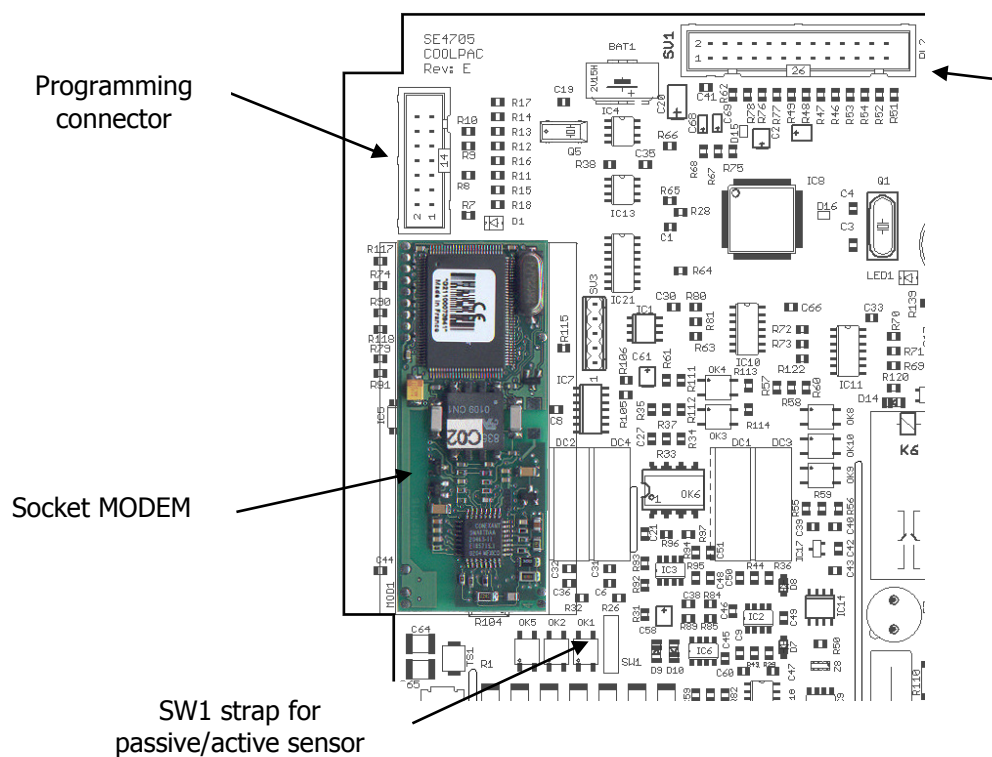


Localisation of the terminals And internal connections of COOLPAC : Version COO 0020



Programming
connector

Front face
connector



12 Diagrams of connections

Diagram of connections « High voltage entries / outputs » Version COO 0000

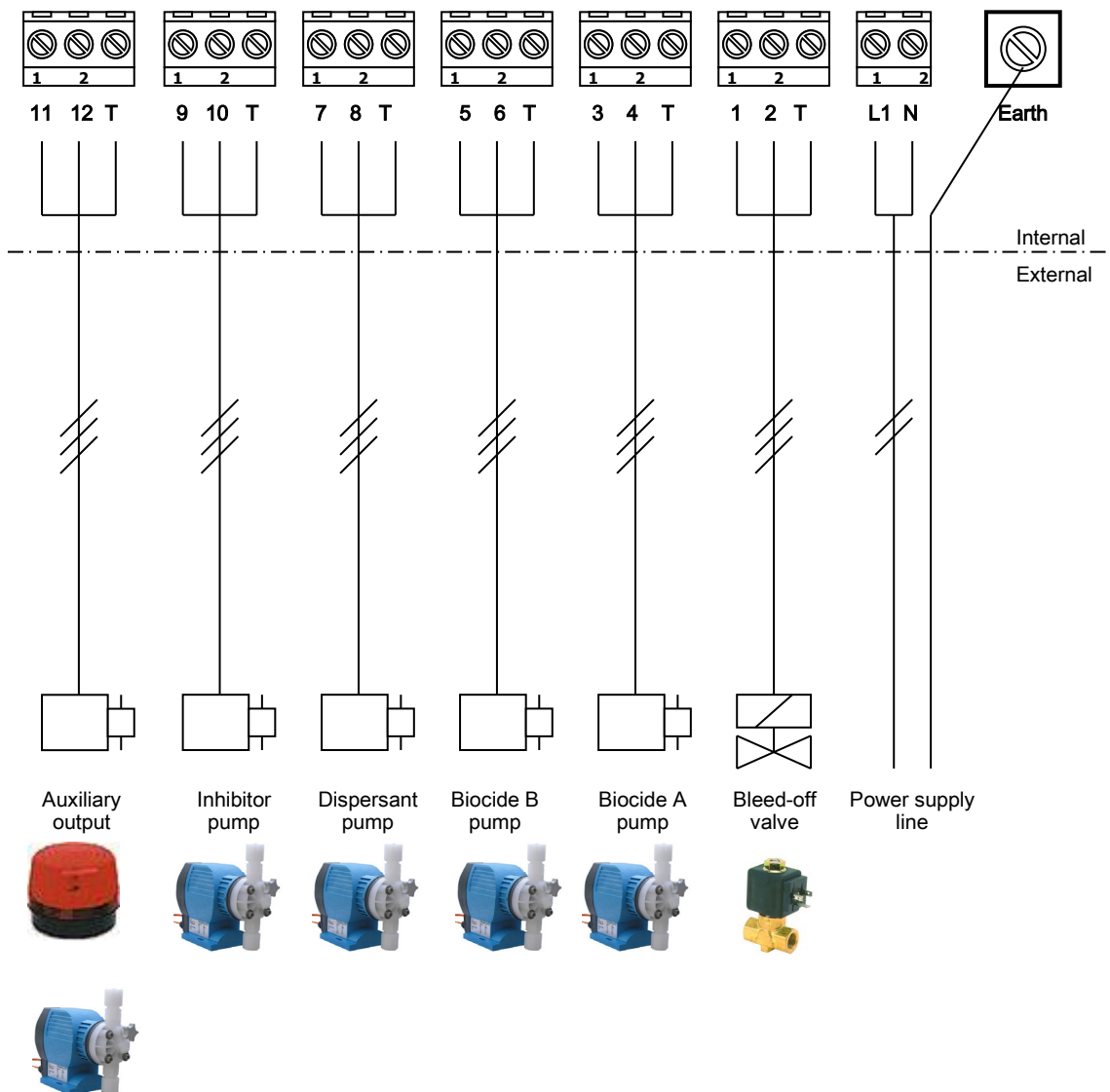


Diagram of connections « High voltage entries / outputs » Version COO 0020

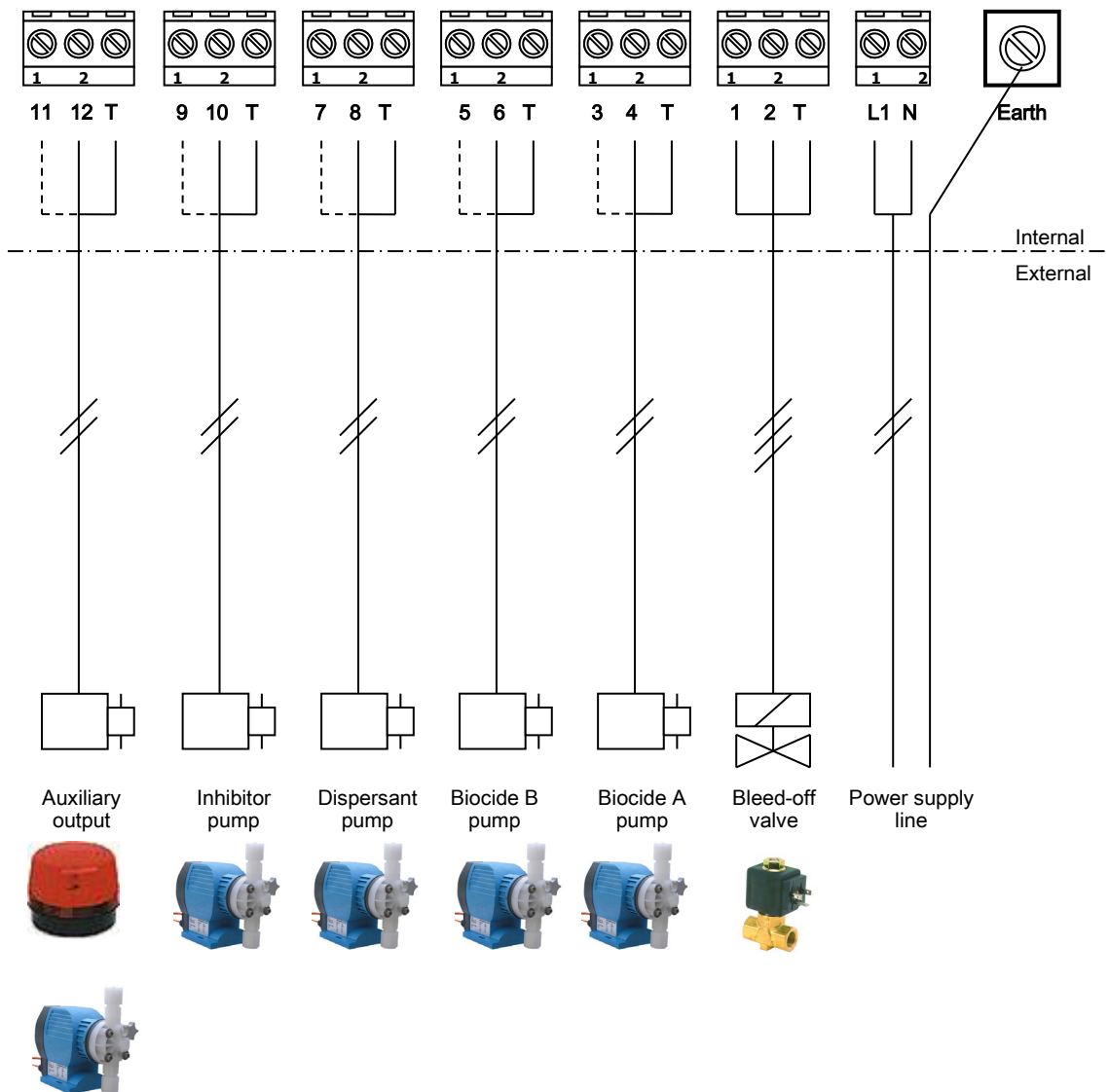
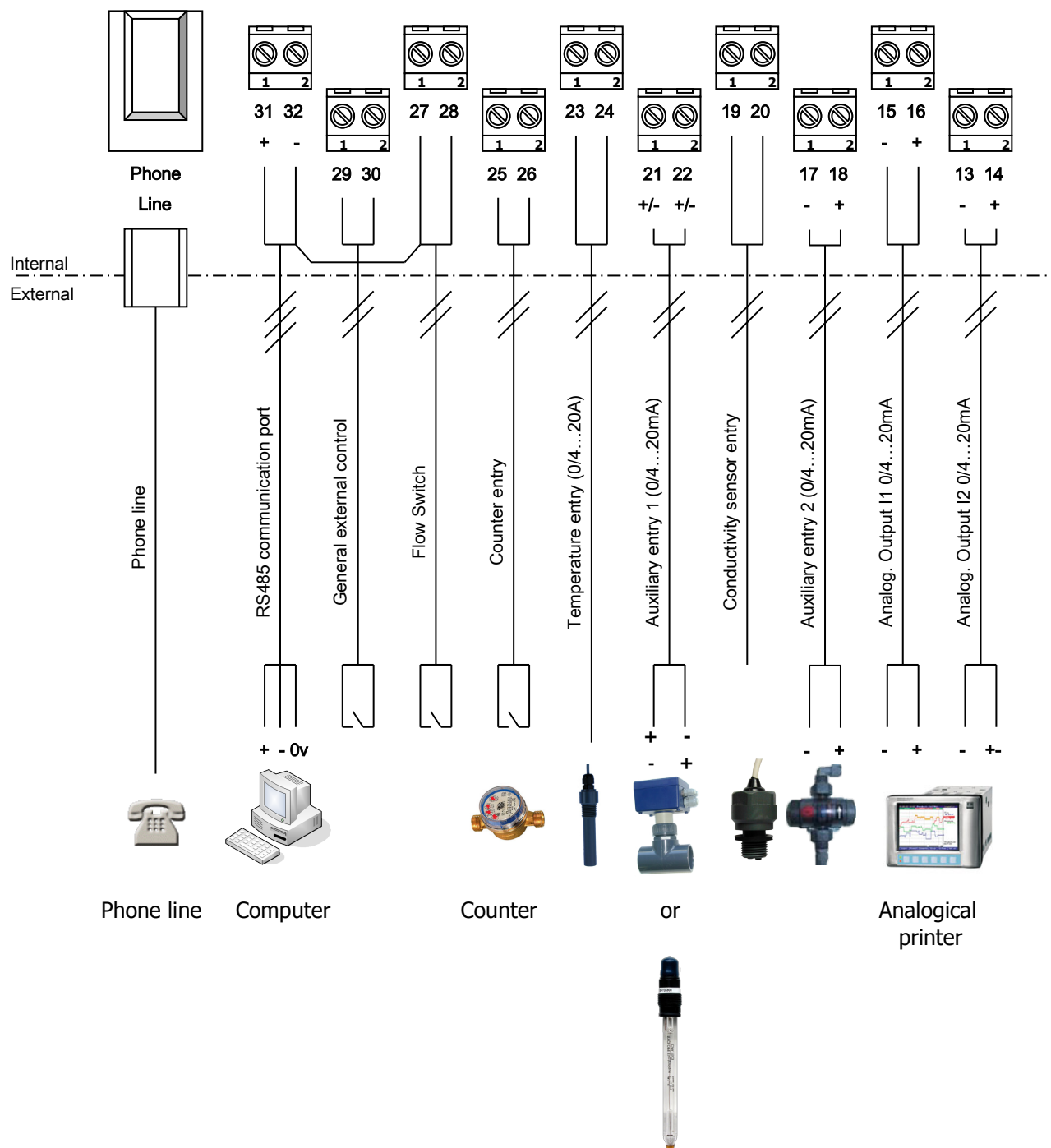


Diagram of connections « Low voltage Entries / outputs »



13 Repairs



Before opening for repair, switch off the power supply of the COOLPAC® controller.

Table of service repairs is in the last pages.
Eliminate the cause of fault before restarting the controller again.
Check that all actuators work again.



In case of pushing on « STOP » key (Green LED off), The COOLPAC® does the following states:

- It stops all the dosing processes,
- It closes the bleed-off valve,
- It commutates the output of pH control off (if necessary),
- It maintains the corresponding analogical outputs,
- It authorizes the data records,
- It gives access to the programming menu,
- It maintains data acquisitions (Conductivity and others...),
- It doesn't manage any more technical alarms.

14 Maintenance



WARNINGS :

- ⇒ Before any internal maintenance, switch off the power supply!
- ⇒ the controller doesn't have switch-off line. The power supply must be stopped by the external main circuit breaker or the main fuse!
- ⇒ If not possible, the general safety procedures must be applied!
- ⇒ Replace the fuses by original fuses!
- ⇒ Use only fuses provided by the reseller or by the producer!
- ⇒ The fuse are used as low current intensity (See on board)
- ⇒ The fuses are identified F1 to F7 on the printed board for the COO 0000 version!

The currents are the following ones:

- F1 : Processor fuse 0,315A Time-lag TR5 Reference : FUS1007
- F2 : Bleed-off valve 2A Time-lag TR5 Reference : FUS1010
- F3 : Biocide pump A fuse 1A Time-lag TR5 Reference : FUS1000
- F4 : Biocide pump B fuse 1A Time-lag TR5 Reference : FUS1000
- F5 : Dispersant pump fuse 1A Time-lag TR5 Reference : FUS1000
- F6 : Inhibitor pump fuse 1A Time-lag TR5 Reference : FUS1000
- F7 : Auxiliary output fuse 1A Time-lag TR5 Reference : FUS1000

Or, for the COO 0020 version:

- F1 : Processor fuse 0,315A Time-lag Glass 5x20 Reference : FUS5X20T315
- F2 : Bleed-off valve fuse 2A Time-lag Glass 5x20 Reference : FUS5X20T2000

Procedure for replacing the fuses into the controller:

- Take the safety procedures above before changing the internal fuses,
- Open the front face by the four screws and pose it on the upper part,
- Identify the fuse to be changed,
- Remove the fuse and replace it by an original other one,
- Close again the front face carefully.

15 Waste disposal

Eliminate wastes according to the rules of your country.



Respect the procedures of waste disposal!
(You will find the characteristics of each materials in the “features of the materials” !

16 Features

Constraints of temperature:

Operating temperature

-5°C to 45°C (23°F to 113°F)

Storage temperature

-10°C to 60°C (14°F to 140°F)

Material and chemical resistance:

Case and cover

ABS or Polycarbonate (US and Canada)

Key pad

Polyester film PET

Joint

Foam rubber CR

Screws

Stainless-steel A2

Chemical resistance

Standard atmosphere of the technical area

Dimensions and weight: (L x W x D)

235x185x125mm (92.5x72.8x49.2inches)

Mural mounting

Weight without packing

Around 1,3Kg

Gross weight with packing

Around 2Kg

Electric characteristics:

Nominal voltages

90-240 Volts, 50/60Hz +/-10%

Maximum currents supply

300mA at 90 Volts nominal

(Controller alone, without external elements)

150mA at 240 Volts nominal

Fusible protection (F1)

350mA, 250V, Time-lag

Maximum cumulated currents with external elements:

6A max. For the COO 0000 version

2,5A max. For the COO 0020 version

Analytical characteristics:

Resistive conductivity entry	All probes	K=0,01 to 10
4...20mA temperature entry	Temperature range	-5°C to 45°C or 0°C to 100°C
	Precision	+/- 0,5°C
	Resolution	0,1°C
0...20mA Auxiliary entry	All probes 2 wires	0...20mA
	4...20mA Loop	24V +/- 1V
	Maximum current	50mA
	Load	485Ω
	Insulation voltage	500V
	Galvanic insulation	10 ⁹ Ω
Numerical entries	Common potential of reference, but with galvanic separation of the other inputs/outputs	
	Insulation voltage	500V
	Disturbance	0 to 10Hz
Outputs of standardized signals	Galvanic insulation with the other inputs/outputs	
	Insulation voltage	500V
	Range of signal output	0/4...20mA
	Load	500Ω max.
	Precision	0,5% of the full scale
Powered relay outputs	Direct output	90-240V 50/60Hz
	Protected by fuse	
	Lifespan of the contacts	> 20 x 10 ⁶ actions
Standardized output RS232C	Printing output	RS232C rules
	Not isolated, differential	
	Speed of communication	1200 Baud fixed
	Computer In/Out	RS232C Rules
	Not isolated, differential	
	Speed of communication	19200 Baud fixed
Standardized output RS485	Half duplex mode	RS485 Rules
	2 wires, differential mode	
	Speed of communication	19200 Baud fixed
MODEM	Standard « socket MODEM » with connectors.	According CCITT And other rules.

Protection against the accidental contacts and moisture:

Controller closed	Degree of protection	IP65 according DIN VDE 0470
External joint	Degree of protection	IP54 according DIN VDE 0470
Alternating wet atmosphere		according FW DIN 50016

Declaration of conformity

Product description : COOLPAC – COOLPAC2

Product type : COO 0010 et COO 0012

Déclaration :

SYCLOPE Electronique SAS, Z.I. Aéroport Pyrénées in SAUVAGNON - France -, hereby certifies by the present that the following models "COOLPAC, controllers for the analysis and controls of cooling towers" are in conformity with the standards and safety as defined by the European directives 2014/35/EU (Low voltage directive), 2014/30/EU (Electromagnetic compatibility) and 2011/65/EU (RoHS2 directive).

This present declaration is valid for all of the specimens manufactured according to the original documents of manufacture from 2016, April 20th.

The following standards were used for the examination:

2014/35/EU : EN 61010-1 Ed.3 : 2010

Safety requirements for electrical equipment for measurement, control, and laboratory use.

2014/30/EU : EN61326-1 : 2013

EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN61000-3-2 et EN61000-3-3

Electromagnetic compatibilities EN 61326-1 of May 2013

2011/65/EU : EN 50581 : 2013

RoHS2 Directive (Products with respect to the restriction of hazardous substances)

Date of the first distribution : November 2013

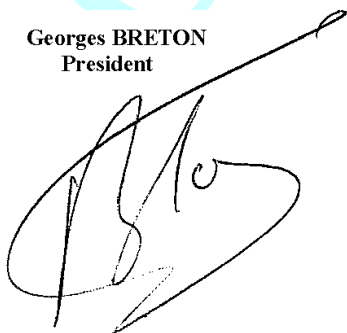
The present declaration engages the responsibility of :

SYCLOPE
Electronique

**SYCLOPE Electronique S.A.S.
Z.I. Aéroport Pyrénées
64 230 SAUVAGNON**

Represented by par :

Georges BRETON
President



Sauvagnon : 2016, February 30th





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