SysAqua

20 / 25 / 30 / 35 / 40 / 45 / 50 / 65 / 75 / 90 / 105 / 125
140 / 150 / 170 / 190 / 210

Air Cooled Water Chillers and Heat Pumps

R410A

19.5 ➔ 217.6kW

19.3 ➔ 208.8kW

CE

REGULATION MANUAL

MANUEL DE REGULATION

REGELUNGSHANDBUCH

MANUALE DI REGOLAZIONE

MANUAL DE REGULACIÓN

English

Français

Deutsch

Italiano

Español

English

CONTENTS

1. DESCRIPTION

1.1. ABBREVIATIONS

Abb.	Unit	Description
BP	bar	Evaporation pressure
BMS	-	Building Management System
CDT	°C	Compressor backflow temperature
CST	°C	Compressor aspiration temperature
EEV	-	Electronic pressure reducing valve
EWT	°C	Entering water temperature
HMI	-	Human-Machine interface = display
HP	bar	Condensation pressure
LWT	°C	Leaving water temperature
PME	-	Pressure switch for lack of water
OAT	°C	Outside air temperature
OCT	°C	Battery temperature
SPC	°C	Temperature setting in cool mode defined by the user
SPH	°C	Temperature setting in heat mode defined by the user
SP*	°C	Actual water temperature setting
WPT	-	Hydraulic pressure transducer

1.2. APPLICABLE UNITS

Temperature	°C
Pressure	gauge bar
Voltage	V
Current	A
Power	W

1.3. APPLICATION VERSIONS

This manual is intended for the software versions and electrical boards listed below.
Refer to the electrical schematics provided with the unit that incorporate subsequent developments and possible customizations.

1.3.1. SYSAQUA 20/25/30/35/40/45/55/65/75/90/105/125

Software version **203**

Equipment	Hardware	Firmware
Main regulator	P0L423	V10.32
Integrated HMI	P0L871	V9.12
Remote HMI	P0L895	TBD

Ventilation		SysAqua 20 to 55	SysAqua 65 to 75	SysAqua 90 to 125
PV/GV	Power	SE4629	SE4631	SE4633
	Command	SE4630	SE4632	SE4634
Modulating	Power	SE4635	SE4637	SE4639
	Command	SE4636	SE4638	SE4640

1.3.2. SYSAQUA 140/150/170/190/210

Software version **108**

Equipment	Hardware	Firmware
Main regulator	P0L687	V10.36
Extension	P0L96	V10.32
Extension	P0L98	V10.32
Integrated MMI	P0L871	V9.12
Remote IHM	P0L895	TBD
Communication BacNet MS/TP	P0L904	V10.30
Communication LON	P0L906	V9.26
Communication BacNet IP	P0L908	V10.30

Ventilation		SysAqua 140 to 210
PV/GV	Power	SE4595C / SE4596D
	Command	SE4597C / SE4598C
Modulating	Power	SE4605B / SE4606B
	Command	SE4607C / SE4608C

2. PURPOSE

2.1. INTRODUCTION

This document describes the functioning of the SIEMENS regulator for units of the **SysAqua** range. It is intended for the installation technician and the end user More complete information is available in the following documents:

- **EDM** : technical description of units and performances
- **IOM** : installation and maintenance recommendations, commissioning procedure
- **CM** : communications user manual
  - ✔ Modbus
  - ✔ BacNet
  - ✔ LON
  - ✔ cloud SYSTEMAIR (remote supervision)

2.2. APPLICATION

The SIEMENS regulatoris programmed to control a thermodynamic unit of the **SysAqua** range. This range is used for the production of chilled water (chiller) and / or hot water (heat pump) using the outside air as a primary source of energy..

2.3. OPERATING PRINCIPLE

The SysAqua range consists of:

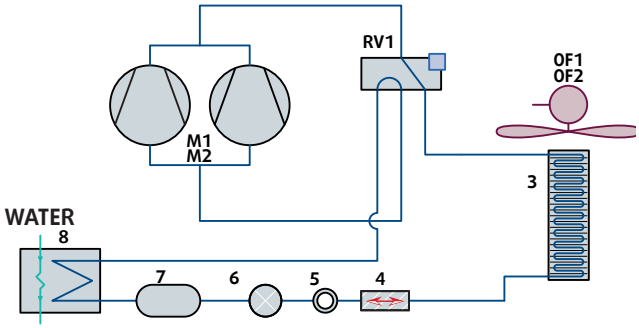
- **SysAqua 1** : single-circuit units - size 20 to 40
- **SysAqua 2** : single-circuit units - size 45 to 125
- **SysAqua 3** : dual-circuit units - size 140 to 210

SysAqua 1

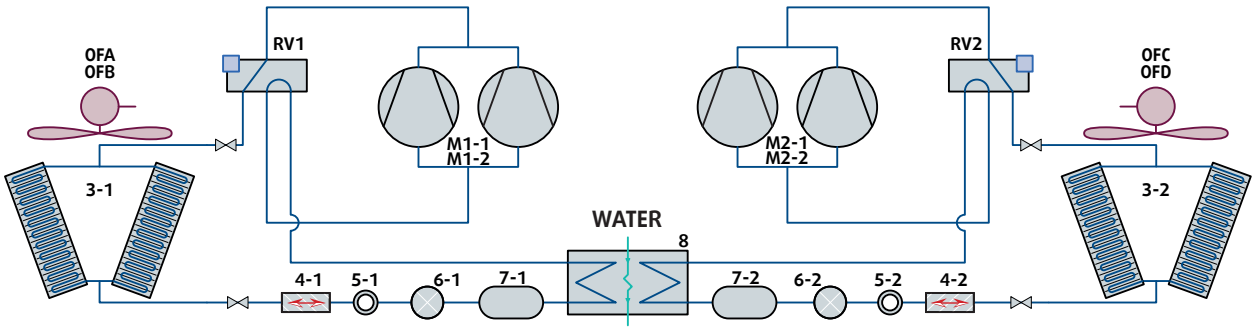
SysAqua 2

SysAqua 3

As illustrated by the block diagrams, the single-circuit units are equipped with two single-speed compressors mounted in tandem (M1 / M2), an air / refrigerant battery (3) swept by one or two axial fans (OF1 / OF2), a thermostatic expansion valve (6) and a water / refrigerant plate heat exchanger (8). The **SysAquaH** heat pump type units are equipped with a 4-way valve (RV1) enabling teh switchover beween the hot and cold modes.



The dual-circuit units are identical to the single-circuit units with the exception of the (electronic) expansion and the plate heat exchanger (dual type - common to both circuits).



The **SysAqua** range proposes as an option items of equipment adding features to the units:

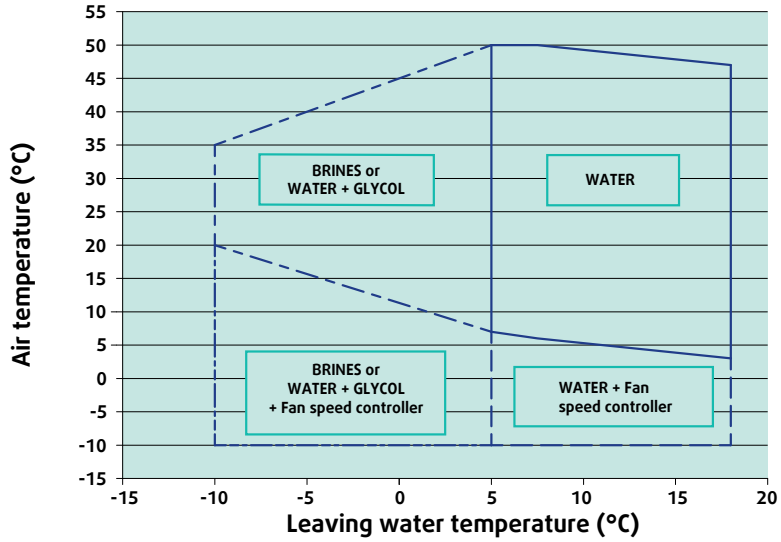
- "All Seasons" option: the axial fans are powered by one or two frequency inverters (depending on the size) to ensure the correct operation of the machine in cold mode at low outside temperatures (Refer to the § **"ALL SEASONS" OPTION**, page 20)
- "High Pressure Fans" option : the axial fans are of EC type and controlled analogically with the "All Seasons" option (Refer to the § **"HIGH PRESSURE FANS" OPTION**, page 21)
- "Hydraulic Pump" option : the units have one or several integrated pumps allowing them to ensure their water feed and distribution in the customer network.
- "Variable Primary Flow" option : a frequency converter enables the speed of the hydraulic pump to be modulated (Refer to the § **"VARIABLE PRIMARY FLOW" OPTION**, page 22)

2.4. OPERATING ENVELOPES

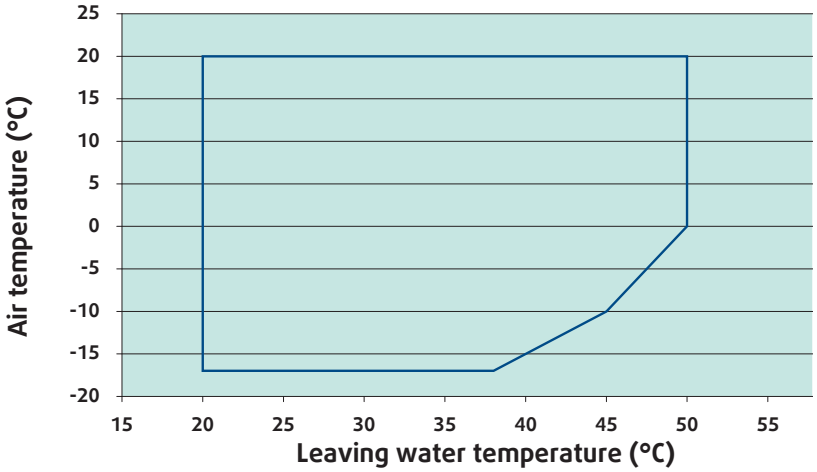
The **SysAqua** machines are thermodynamic machines,designed to operate within certain ranges of air and water temperature. The regulation sets up the security limits that guarantee units a correct operating point but also allow them to operate temporarily outside of this range in a secure manner (e.g. commissioning with a hot water loop in summer or a cold water loop in winter).

The following envelopes indicate the leaving water temperature, LWT, ranges as a function of outside air temperature, OAT, in both operating modes.

SysAquaL/SysAquaH in cooling mode

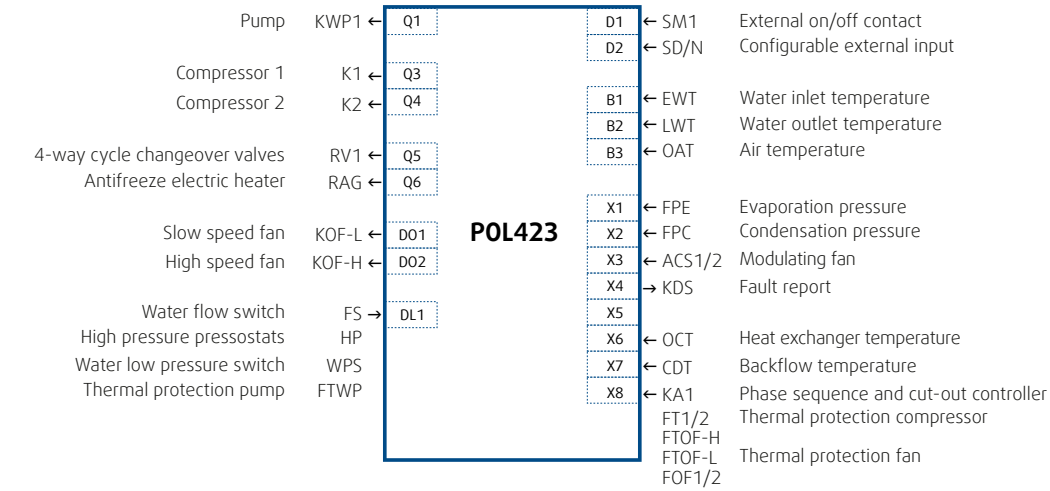


SysAquaH in heating mode

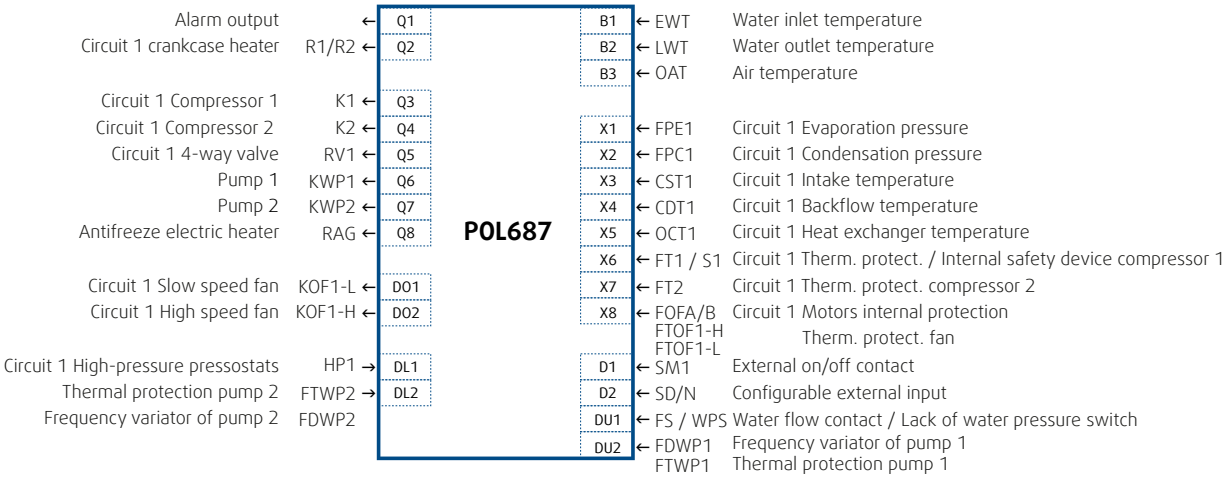


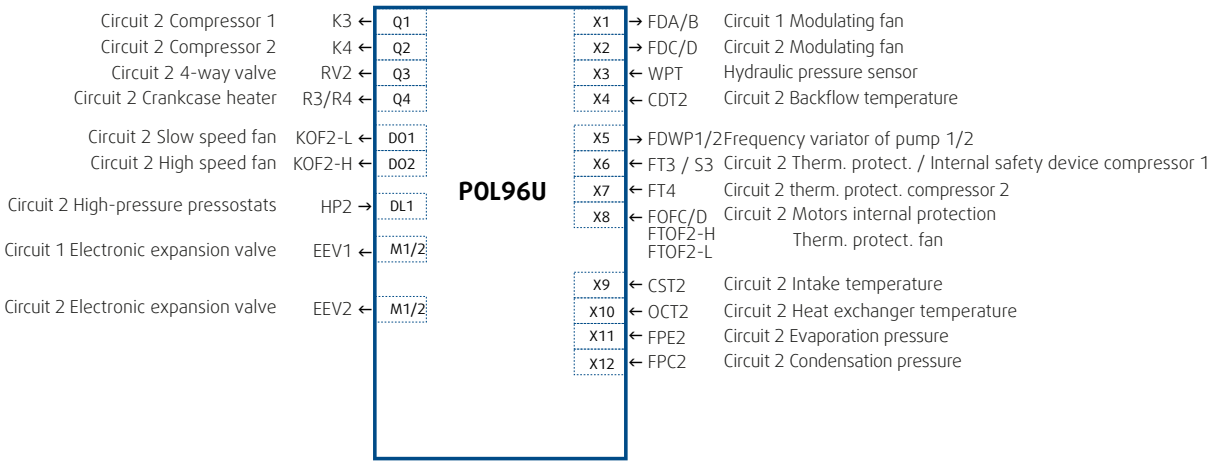
3. INTERFACES

3.1. INPUTS / OUTPUTS OF THE SYSAQUA CONTROLLER 20/25/30/35/40/45/55/65/75/90/105/125



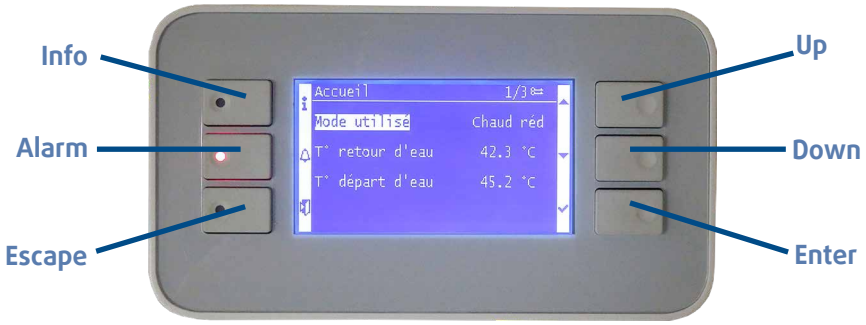
3.2. INPUTS / OUTPUTS OF THE SYSAQUA CONTROLLER 140/150/170/190/210





3.3. INTEGRATED DISPLAY

This user interface is a liquid crystal display with 6 buttons. It is connected to the "BSP BUS" port of the regulators POL423 and POL687 with an RJ45 cable (maximum distance 2.5m).



INFO	From any screen, this button returns the user to the main menu or home screen and, like the ESCAPE button, invalidates a current modification.
ALARM	When pressing the alarm button (the red LED flashes if an alarm is active), the alarm management menu is displayed. (see § alarms)
ESCAPE	Returns to the previous level in the menu tree. Pressing this button during modification invalidates the change being made and returns the user to the previous menu. This function is very important if a setting is inadvertently modified.
UP/DOWN	These buttons have two functions. 1. In a menu, they are used to move up and down the list of possible options. 2. They can change the value of a setting when it has been selected.
ENTER	This button has three functions 1. It is used to access a submenu 2. Activate the modification of a setting 3. Validate the modification of a setting

3.4. REMOTE DISPLAY

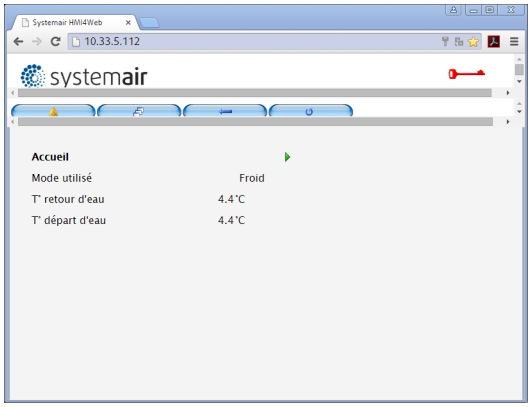
This user interface is a liquid crystal display with 3 buttons and a scroll wheel. It can be connected to the POL423 and POL687 regulators one of in 2 ways:

- to the “BSP BUS” port with an RJ45 cable: maximum distance 2.5m
- to the “PB BUS” port with 2-wire cable: maximum distance 100m. The display then accesses all of the regulators present on this bus.

INFO	From any screen, this button returns the user to the main menu or home screen and, like the ESCAPE button, invalidates a current modification.
ALARM	When pressing the alarm button (the red LED flashes if an alarm is active), the alarm management menu is displayed. (see § alarms)
ESCAPE	Returns to the previous level in the menu tree. Pressing this button during modification invalidates the change being made and returns the user to the previous menu. This function is very important if a setting is inadvertently modified.
OK	The scroll wheel has five functions: 1. In a menu, it is used to move up and down the list of possible options. 2. It can change the value of a setting when it has been selected. 3. It is used to access a submenu 4. Activate the modification of a setting 5. Validate the modification of a setting

3.5. WEB DISPLAY

This interface is available on dual-circuit units connected to an IP network. A Web browser enables access to a unit indicating its IP address and using the WEB account (password: SBTAdmin!).



3.6. COMMUNICATION PROTOCOLS

The available communication protocols depend on the unit regulator. Some are native to the regulator and others require an additional communication module.

Protocols	SysAqua 20 to 125		SysAqua 140 to 210
Standard regulator	POL423	POL688	POL687
RTU Modbus	Standard (by default)	Not available	Standard (by default)
TCP/IP modbus	Not available	Standard	Standard
BacNet MS/TP	Standard		Module POL904
BacNet IP	Not available	Standard	Module POL908
LON	Not available		Module POL906

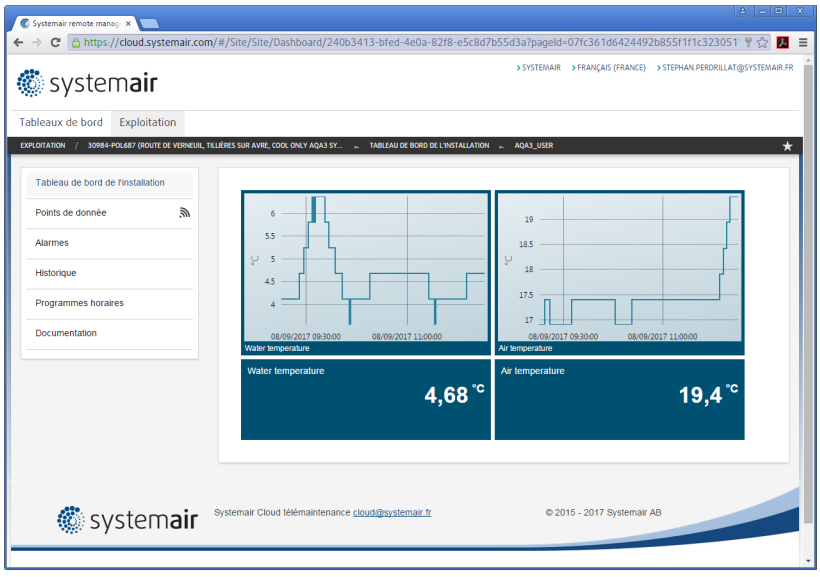
The connection specifications and the information made available by these protocols are discussed in the Communication Manual.

By default, the regulators are configured in RTU Modbus

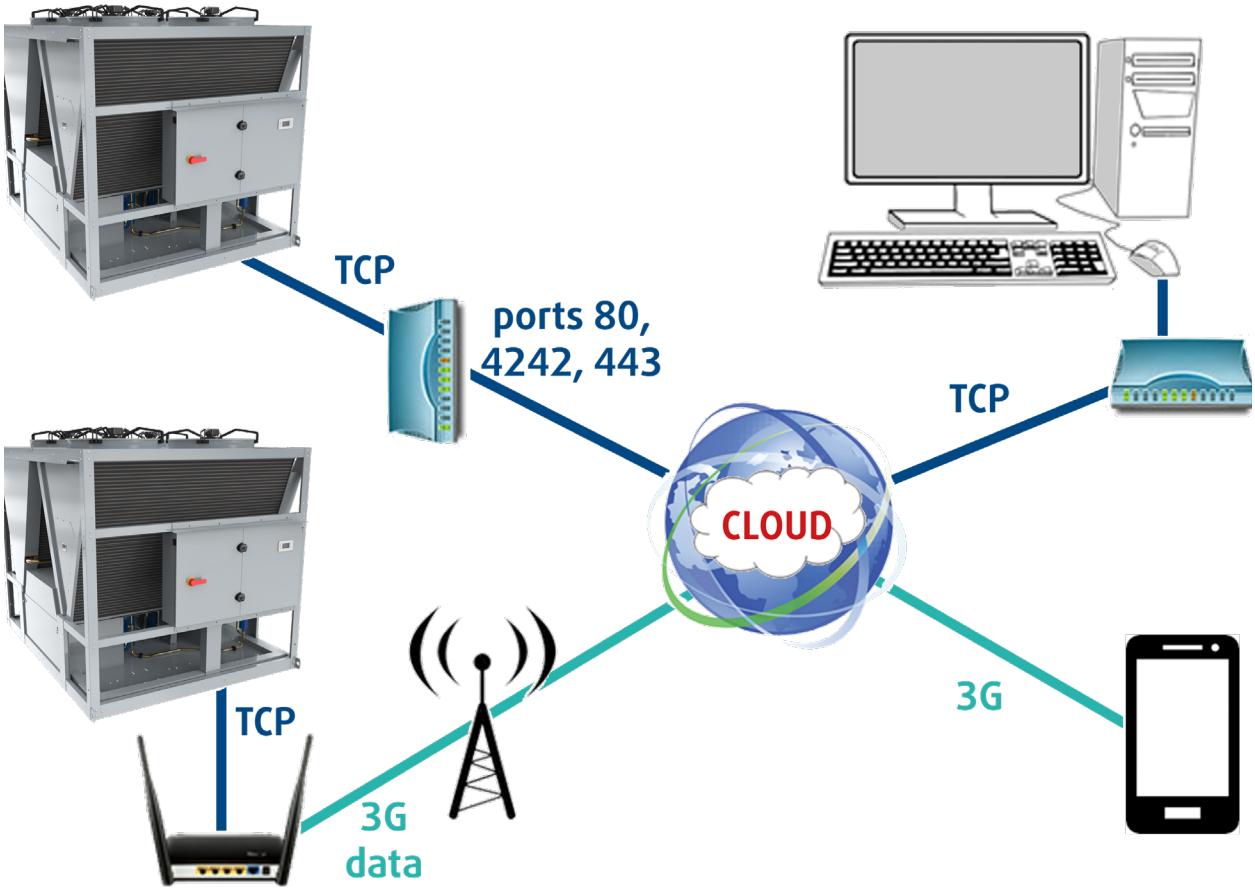
- address 1
- 9600 bauds
- without parity
- 1 bit of stop

3.7. SYSTEMAIR CLOUD

The SYSTEMAIR cloud allows the units to be remotely supervised. In particular, it gives access to the main unit parameters and alarms, saves the values sent by the regulator and enables updating of the entire application (temperature control, configuration, user interface, list of network variables).



The units are connected either via the customer intranet or independently of the customer intranet via an optional 3G router.



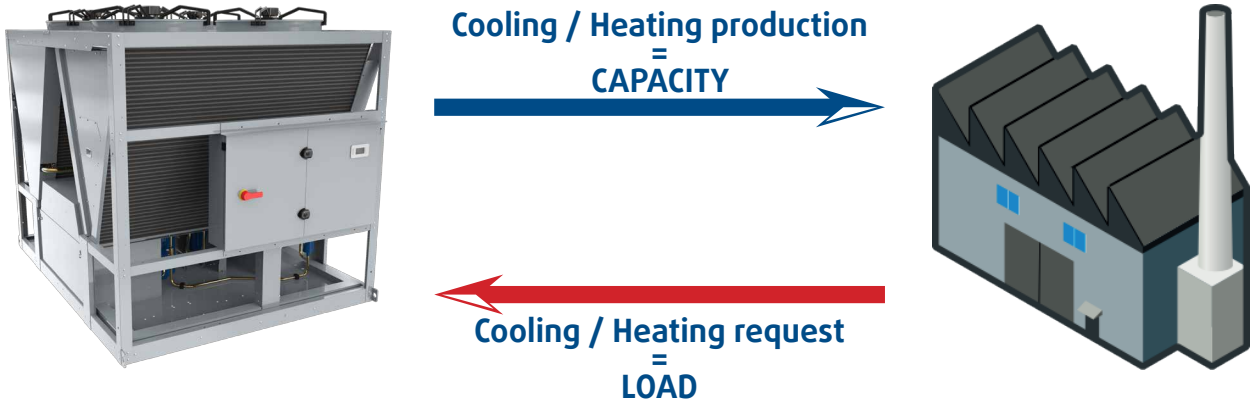
The connection specifications and the information made available on the cloud are detailed in the Communication Manual.

4. THERMAL CONTROL

4.1. INTRODUCTION

4.1.1. LOAD AND CAPACITY

The function of the **SysAqua** units is to maintain the client water circuit at the temperature specified by the client. The temperature of the water from the client network translates the client's "**charge**" to which the unit must respond. The temperature of the water delivered by the unit translates its "**capacity**".



4.1.2. CONTROL OF UNITS

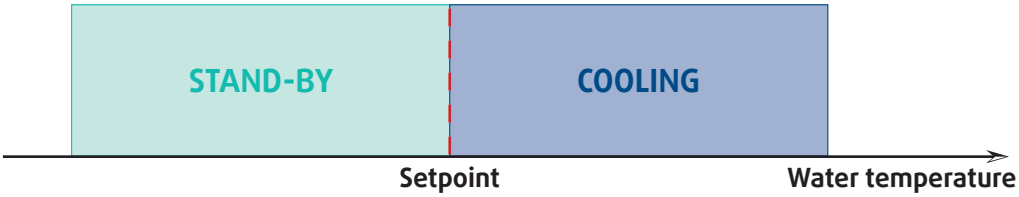
The **SysAqua** units are controlled in order of priority:

1. Timing programming: this scheduling is integrated in the regulator
2. The BMS : the remote supervision transmits it commands according to the communication protocols
3. The HMI: the commands are given by the user directly on the unit (integrated display) or remotely (remote display)
4. Digital inputs: the client can transmit commands electro-mechanically over 2 dry contacts:
   - ✔ Input D1: ON/OFF
   - ✔ Input D2: configurable

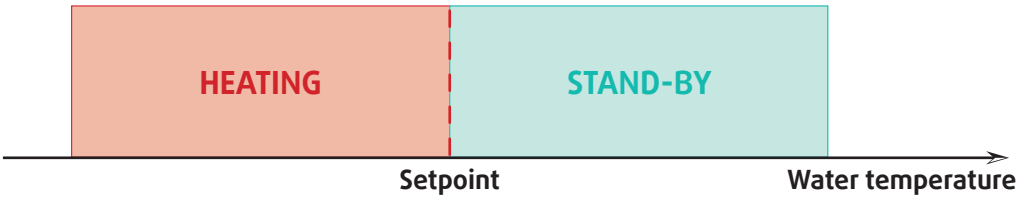
4.1.3. OPERATING MODES

The **SysAqua** units offer three operating modes:

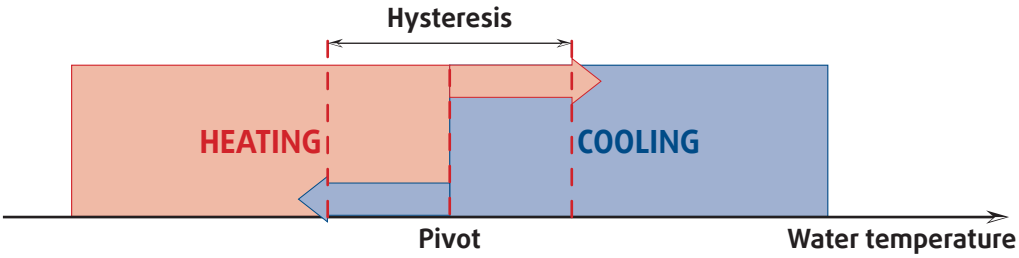
- Cooling mode = the unit cools the water circuit. The unit is regulated according to the water temperature sensor:
  - ✔ If the measurement is less than the set-point: the unit is on stand-by
  - ✔ If the measurement is above the set-point: the thermodynamic cycle operates



- Heating mode = the unit heats the water circuit. The unit is regulated according to the water temperature sensor:
  - ✔ If the measurement is below the set-point: the thermodynamic cycle operates
  - ✔ If the measurement is above the set-point: the unit is on stand-by



- Auto-changeover mode = the unit automatically switches between the cooling mode and the heating mode described above. The changeover is carried out according to the air temperature. A hysteresis is introduced to stabilize the air circuit.



4.2. WATER SETTINGS AND WATER ANTI-FREEZE PROTECTION

The user can definethe water temperature setting to control according to the range:

- **SysAqua** 20 to 125 (2 compressors) : either the entering water temperature EWT (par défaut), or the leaving water temperature LWT
- **SysAqua** 140 to 210 (4 compressors) : the leaving water temperature LWT

For each mode the user can define the temperature setting to be controlled:

- Heating mode SPH (by default 40°C) : between 25 and 50°C
- Cooling mode SPC (by default 8°C) : maximum value is 12°C, the minimum value depends on the water anti-freeze protection. By default, the water circuit is considered unprotected and the minimum value is set at +4°C. To define a lower set-point, it is mandatory to protect the water circuit against frost and to check the glycol level.

Glycol level	SPC minimum value
0%	+4°C
10%	0°C
20%	-3°C
> 30%	-10°C

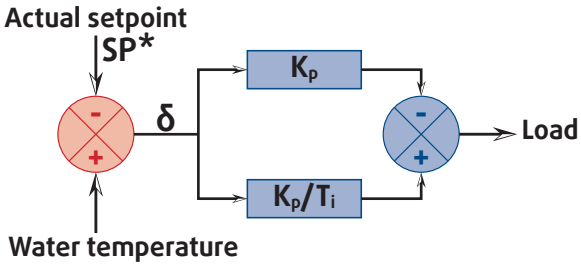
Regulation uses an actual set-point SP*, calculated automatically, that can differ from the SPC and SPH user settings in the case of water law being activated (Refer to the § **WATER LAW**, page 18) and for reduced modes (Refer to the § **REDUCED MODE**, page 19).

4.3. TEMPERATURE CONTROL

Temperature control ensures that the water sensor selected by the client (EWT or LWT) attains the actual set-point, SP*. To manage the compressors more efficiently, the control uses the concepts of load and capacity.

Load formulation

The load is calculated via an algorithm PI minimizing the difference between the unit measurement and the set-point.



The coefficients of PI depend on the range, the water temperature to be controlled and the operating mode. They can not be modified. They correspond to the minimum volumes of water circuits indicated in the IOM.

Range	Temperature to be controlled	Coefficient	Units	Cool mode	Heat mode
SysAqua 20 to 125	EWT	K_p	%/K	10	10
		T_i	s	60	60
	LWT	K_p	%/K	4	4
		T_i	s	50	50
SysAqua 140 to 210	LWT	K_p	%/K	4	5
		T_i	s	180	60

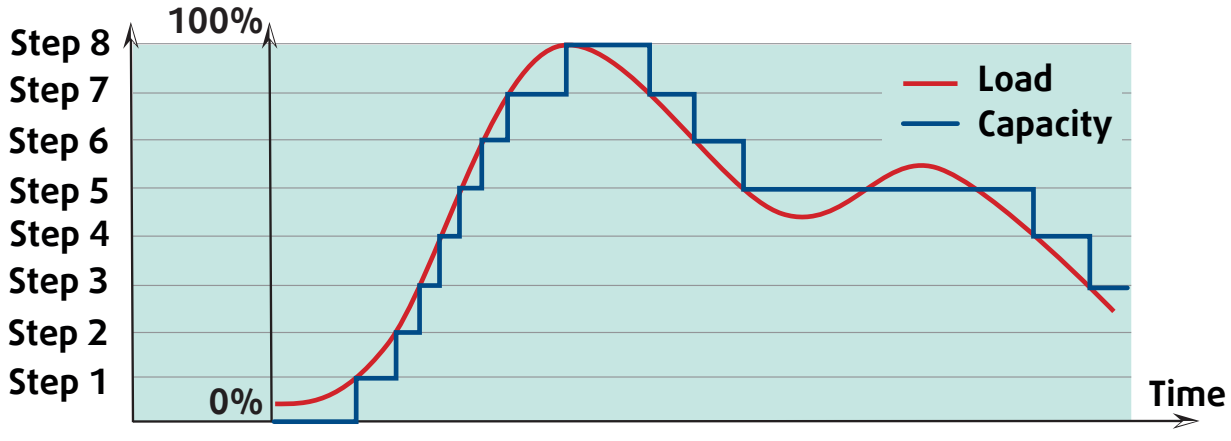
Capacity steps

The capacity of the unit is staged by combining the activations of the compressors. The capacity of a step is proportional to the power of the activated compressors as is shown in the following table for a **SysAqua 210** :

Compressor			Stepping								
Circuit	N°	Power	0	1	2	3	4	5	6	7	8
1	C2	39.7	OFF	ON	OFF	ON	ON	OFF	ON	OFF	ON
	C1	64.7	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	ON
2	C2	39.7	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON
	C1	64.7	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON
Capacity (%)			0	19	31	38	50	62	69	81	100

Response to the client load

The temperature control dynamically adapts to the stepping of the capacity of the unit to the load of the client water circuit.



5. EQUIPMENT MANAGEMENT

5.1. TEMPERATURE SENSORS

The temperatures are measured by CTN sensors 10kΩ. Resistance measurements are converted to temperature with coefficients scaled over the entire temperature range to ensure sufficient accuracy (<1 K) regardless of the operating point of the unit.

Specific case of outside air temperature (OAT)

The measurement of the CTN sensor undergoes several post-treatments.

- Stabilized operation: the temperature is equal to the sliding average over 5min.
- Defrost cycle: the temperature is fixed at its last value before the start of the cycle.
- Unit turned off: the temperature is not current.
- Unit is start-up phase after a stoppage:
  - ✔ Less than 15min : the temperature is not current
  - ✔ More than 15min : the temperature is current after 90 seconds of ventilation operation

5.2. PRESSURE SENSORS

Pressure transducers

The relative pressures of refrigerant (BP, HP) and water (WPT) are measured by ratiometric transducers. The voltage signal is converted into a pressure value by the regulation.

HP pressure switch

This normally closed pressure switch trips when the condensing pressure is too high.

PME pressure switch (lack of water)

This normally closed pressure switch trips when the hydraulic pressure is insufficient.

5.3. COMPRESSORS

The compressors are activated/deactivated according to the unit capacity stepping (Refer to the § **TEMPERATURE CONTROL**, page 15). The following anti short-cycles secure the duration of compressors:

- Minimum activation time = 90s
- Maximum activation time = 120s
- Maximum of 12 start-ups per hour

5.4. FANS

The regulator controls the speed of the fans according to the condensing pressure (cooling mode) or the evaporation pressure (heating mode):

- Dual-speed ventilation: obtained by supplying the AC motor with star or triangle
- Modulating ventilation: obtained by supplying the AC motor with a frequency converter or by using the EC motor

The speed is stabilized by hysteresis and, if there is modulation, by ramps.

Modulating ventilation is intrinsic to the option "All Seasons" (Refer to the § **"ALL SEASONS" OPTION**, page 20) and "High Pressure Fans" (Refer to the § **"HIGH PRESSURE FANS" OPTION**, page 21).

5.5. ELECTRONIC PRESSURE REDUCING VALVE

The electronic pressure reducing valve is controlled directly by the regulator. This enables the regulator to:

- Pre-position the pressure reducing valve at start-up according to the operating conditions
- Pre-position the pressure reducing valve before a chang in capacity
- Control the evaporation pressure
- Control over-heating
- Stabilize the opening of the pressure reducing valve during specific transients (e.g. defrosting)
- Close the pressure releasing valve when the circuit is stopped

5.6. 4-WAY VALVE

The 4-way valve enables switching between cooling mode (valve deactivated) and heating mode (valve activated). Switchover requires either stopping the tandem for more than a minute, or a gap of less than 4 bar between the BP and the HP.

5.7. CARTER RESISTANCE

5.7.1. SYSAQUA 20/25/30/35/40/45/55/65/75/90/105/125

The carter resistances are not controlled directly by the regulator but are coupled to the compressors:

- Compressor deactivated : resistance activated
- Compressor activated : resistance deactivated

5.7.2. SYSAQUA 140/150/170/190/210

The carter resistances are controlled directly by the regulator coupled to the circuit:

- The two compressors of the tandem are activated : resistances deactivated
- One compressor deactivated for over 15min : resistances activated

5.7.3. PREHEATING

If the unit has been powered off for more than 3 hours (e.g. power failure, 1st power up at start-up, etc.), the regulator requires a preheating phase of the compressors before starting the temperature control. By default this phase takes 30min

5.8. ANTI-FREEZE RESISTANCE

The antifreeze resistances are bonded to the plate heat exchanger and covered with thermal insulation. They participate in the protection of the hydraulic circuit when ambient conditions create a risk of freezing (Refer to the § **ANTIFREEZE PROTECTION OF THE PLATE EXCHANGER**, page 27).

5.9. HYDRAULIC PUMP

Units can optionally include 1 pump, 2 pumps mounted in parallel (**SysAqua** 20 to 125) or 1 double pump (**SysAqua** 140 to 210). In the latter two cases, only one motor operates at a time the other being a backup. The pumps are controlled in terms of:

- Fixed speed (standard) : directly by the regulator
- Modulating speed: the AC motor of the pump is powered by a variable frequency drive The "Variable Primary Flow" option offers the modulating speed (Refer to the § **OPERATING PRINCIPLE**, page 6).

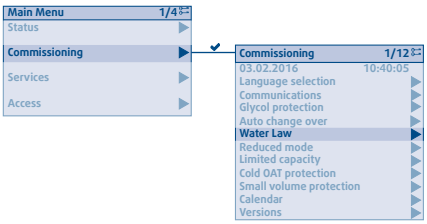
The regulator:

- Either powers or stops the pump when the unit is on stand-by
- In the case of a double pump, automatically switches to the second motor in the case of a problem with the first motor.
- Periodically restarts the pump in order to avoid any clogging due to inactivity. This functionality can be adjusted and is deactivated by default:
  - ✔ Restart frequency: 72h
  - ✔ Duration of restart: 120s

6. ADDITIONAL FUNCTIONALITIES

6.1. WATER LAW

The water law allows the temperature set-point to be adapted according to the exterior temperature. By default the water law is deactivated.



Caution

The water law is automatically activated if the unit is operating in auto-changeover mode.

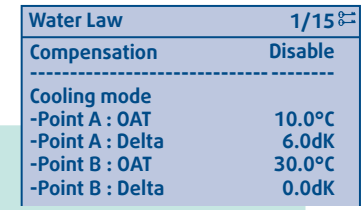
6.1.1. COOLING MODE

The water law adds to the set-point SPC defined by the user a temperature Δ offset function :

$$SP^* = SPC + \Delta(OAT)$$

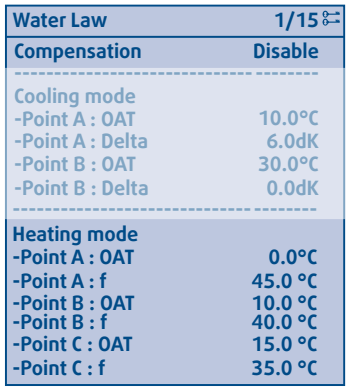
The offset is defined by the points A and B

Points	Coordinates	unit	Min.	Max.	default
A	OAT	°C	10	30	10
	Delta	K	Δ_B	8	6
B	OAT	°C	20	36	30
	Delta	K	0	Δ_A	0

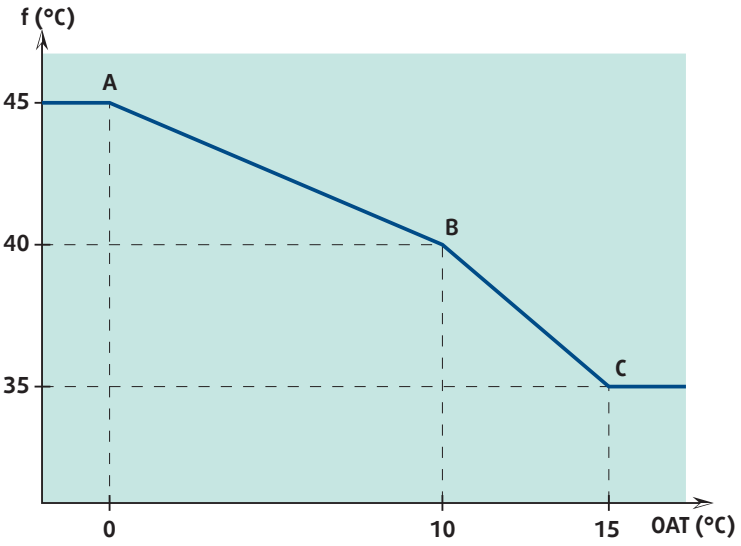


6.1.2. HEATING MODE

The water law recalculates the set-point according to the outside temperature. The function f is defined by the points A, B and C:



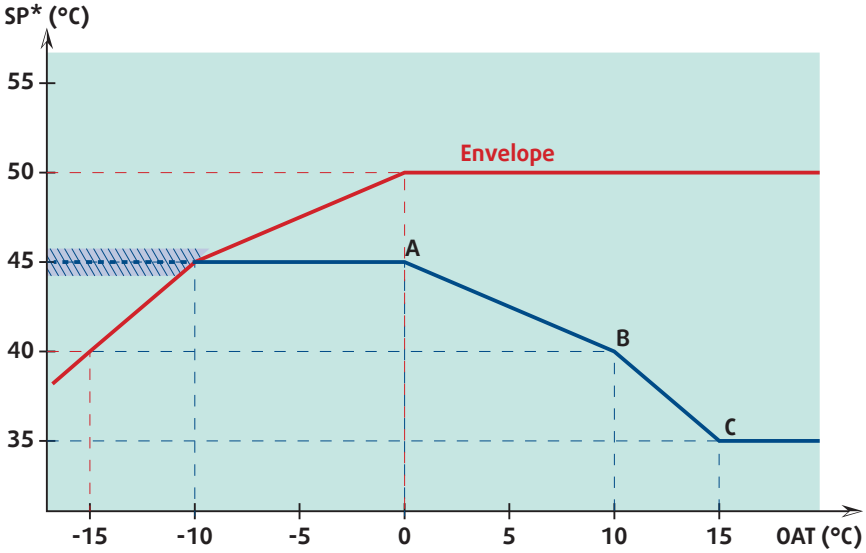
Points	Coordinates	unit	Min.	Max.	default
A	OAT	°C	-20	OAT_B	0
	f	°C	f_B	50	45
B	OAT	°C	OAT_A	OAT_C	10
	f	°C	f_C	f_A	40
C	OAT	°C	OAT_B	50	15
	f	°C	20	f_B	35



To secure the unit at low temperatures, the water law automatically limits the effective set-point to the operating envelope (Refer to the § **OPERATING ENVELOPES**, page 7) :

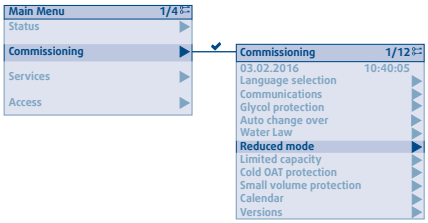
SP* = min [f(OAT), envelope heating mode]

In the example below, the water law substitutes the operating envelope for function f below OAT -10 ° C. The shaded part of teh function f is therefore not retained.



6.2. REDUCED MODE

The reduced modes enable the electrical consumption to be reduced and/or reduce the noise level. By default the reduced mode is deactivated.

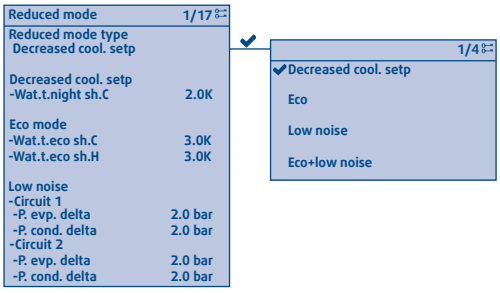


"Decreased cool. setp" (cooling mode only)

This mode offsets the set-point downward to accumulate cold in the water loop when electricity is cheaper:

SPC reduced = SPC - offset

The offset can be adjusted between 0 and 15 K and by default is at 2 K.



"Eco"

This mode enables the set-points to be relaxed that there is less stress on the compressors:

SPC reduced = SPC + cold offset

SPH reduced = SPH - heat offset

The offsets can be adjusted between 0 and 15 K and by default is at 3 K.

"Low noise"

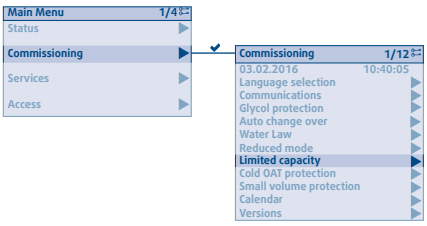
This mode enables the fans to be slowed down so that they make less noise. The slowdown is achieved by offsetting the pressure set-point:

SPPEvap reduced = SPPEvap – BP offset

SPPCnd reduced = SPPCnd + HP offset

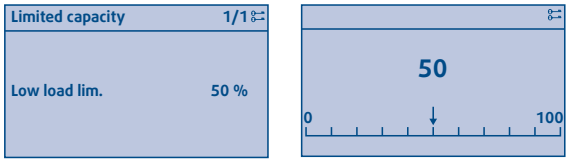
The offsets can be adjusted between 0 and 2 bar and by default is at 2 bar.

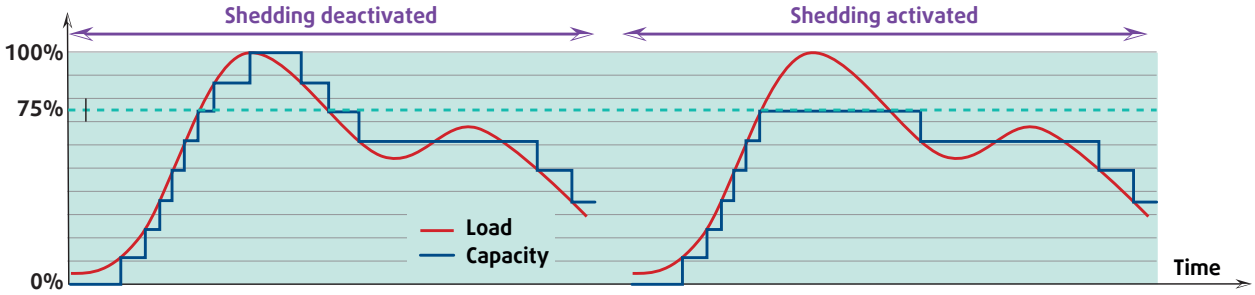
6.3. LOAD SHEDDING MODE



The load shedding mode limits the electrical power consumption of the unit by limiting its capacity. The amount limited is defined by a maximum value of capacity, setting between 0 and 100%. By default the load shedding mode is deactivated.

The example below illustrates the limiting of the unit to 75% of its capacity. As long as load shedding is not activated, the unit adjusts its capacity to respond to load. When load shedding is activated, the unit limits its capacity below the limiting value.

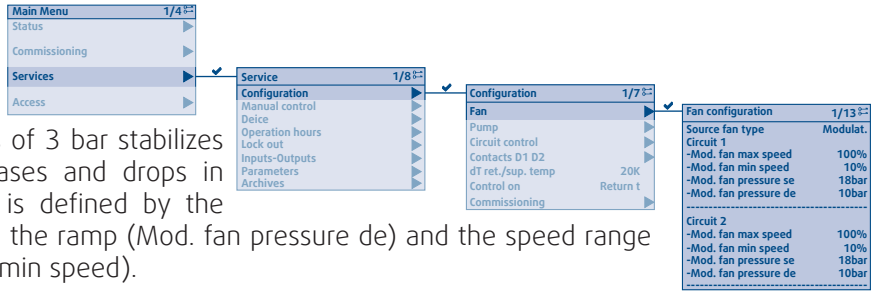




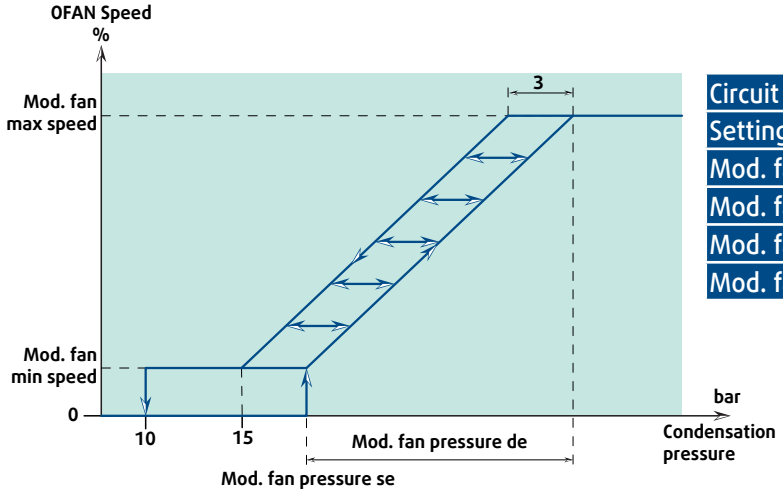
6.4. "ALL SEASONS" OPTION

The option "All Seasons" allows the exchanges of the battery with the outside air throughout the year to be adjusted by modulating the flow of air. This adjustment is obtained by powering the fans via the frequency inverters controlled by the regulator.

6.4.1. COOLING MODE

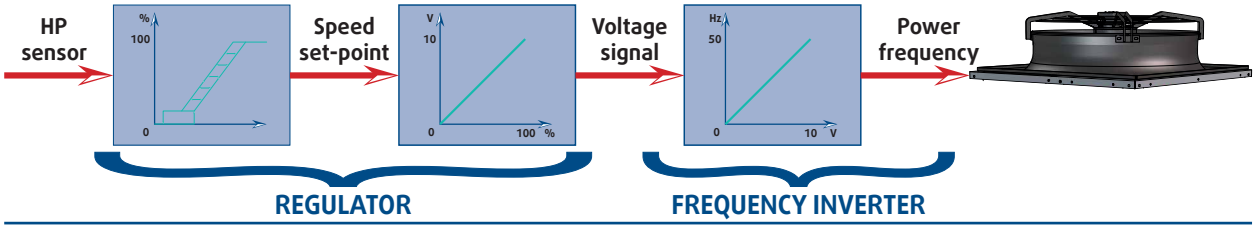


The regulator controls the condensation pressure, speeding up the fans as the pressure increases. A hysteresis of 3 bar stabilizes the fan speed, both for increases and drops in pressure. The speed set-point is defined by the setpoint (Mod. fan pressure se), the ramp (Mod. fan pressure de) and the speed range (Mod. fan max speed, Mod. fan min speed).



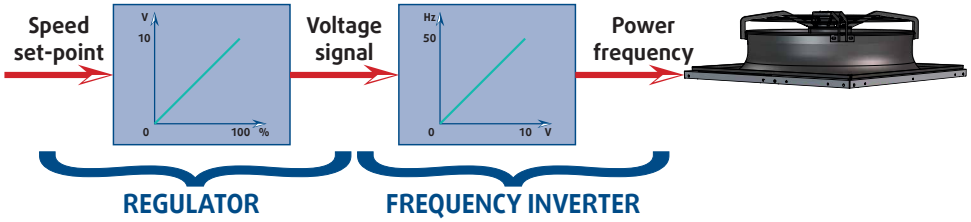
Circuit 1 / 2			
Setting	default	min	max
Mod. fan max speed	100%	0%	100%
Mod. fan min speed	10%	0%	100%
Mod. fan pressure se	18 bar	16 bar	20 bar
Mod. fan pressure de	10 bar	8 bar	10 bar

The regulator converts the speed set-point into a 0..10V signal and sends it to the frequency inverter. The inverter converts the 0..10V signal into a 0..50Hz fan power frequency.



6.4.2. HEATING MODE

The fans turn at a fixed speed, that can be regulated between 0 and 100%.

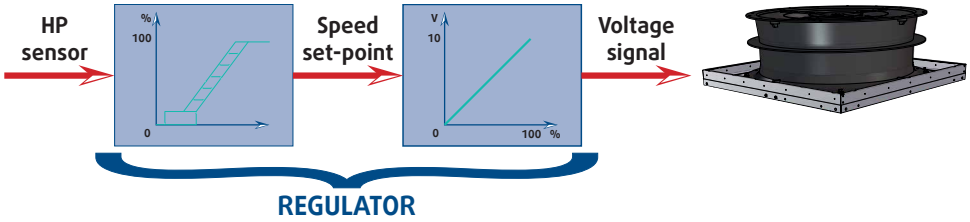


6.5. "HIGH PRESSURE FANS" OPTION

The "High Pressure Fans" option allows air rejected by the fans to be funneled. To meet the load drop due to the funneling, the fans deliver more pressure than the standard fans and are of EC type. These fans are controlled by the regulator, without frequency inverters.

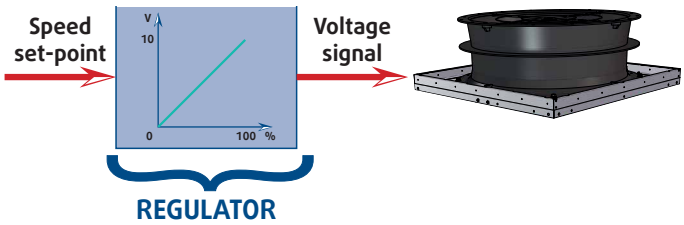
6.5.1. COOLING MODE

The principle for controlling the fans is identical to that of the "All Seasons" option

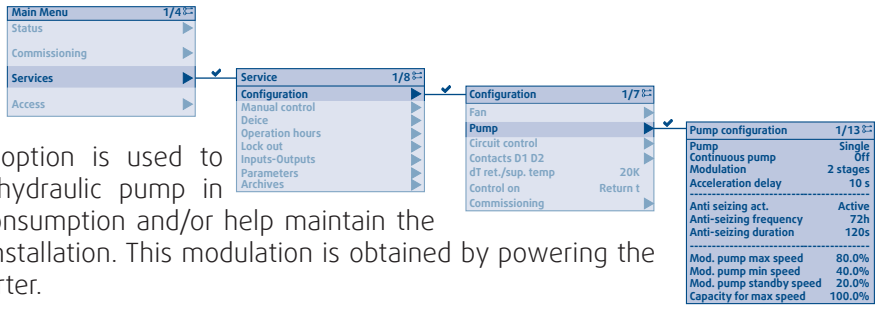


6.5.2. HEATING MODE

The principle for controlling the fans is identical to that of the "All Seasons" option



6.6. "VARIABLE PRIMARY FLOW" OPTION



The "Variable Primary Flow" option is used to modulate the power of the hydraulic pump in order to reduce its electrical consumption and/or help maintain the hydrostatic equilibrium of the installation. This modulation is obtained by powering the pump through a frequency inverter.

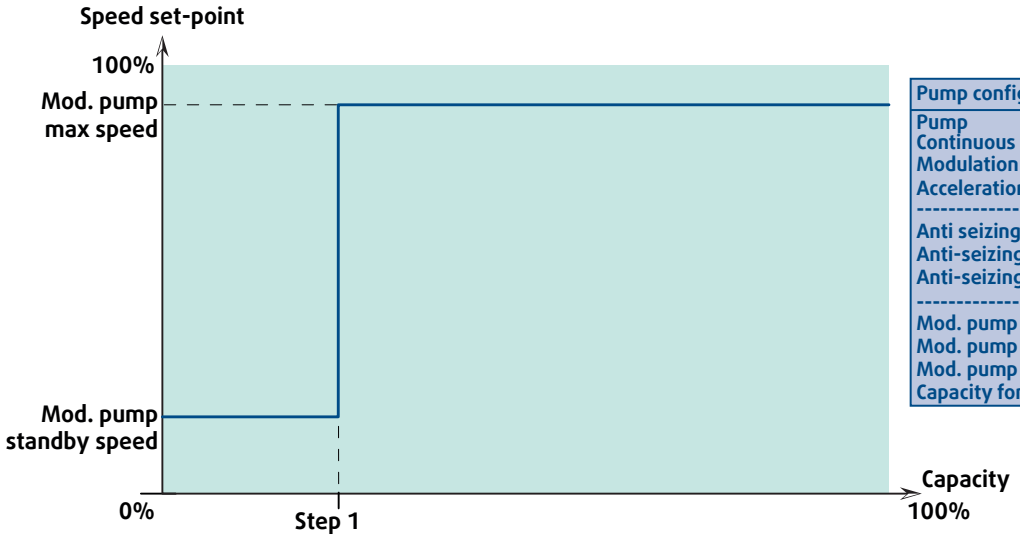
Caution

The minimum frequency of the pump must not be less than the manufacturer's recommendations (e.g. 30Hz) and must ensure a sufficient rate for teh unit (Voir § PHYSICAL CHARACTERISTIC in the Installation and maintenance manual).

6.6.1. CONSTANT SPEED MODE

The pump operates at a fixed speed whatever the unit capacity. This speed is determined during commissioning to adjust the power of the pump to the load drops of the installation.

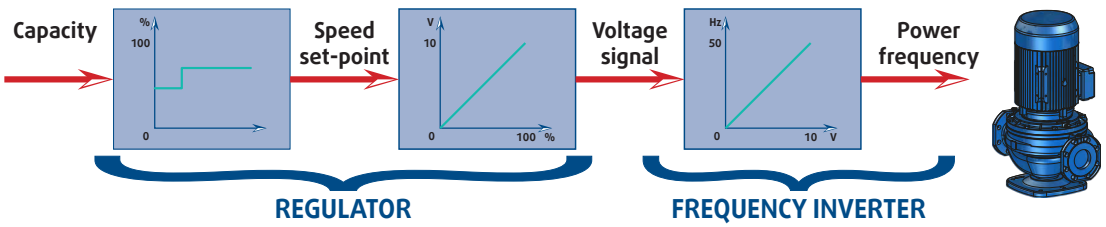
When the load is insufficient to activate the 1st stage of capacity, the pump runs at a reduced speed to limit the consumption of electricity.



Pump configuration	1/13
Pump	Single
Continuous pump	Off
Modulation	2 stages
Acceleration delay	10 s
Anti seizing act.	Active
Anti-seizing frequency	72h
Anti-seizing duration	120s
Mod. pump max speed	80.0%
Mod. pump min speed	40.0%
Mod. pump standby speed	20.0%
Capacity for max speed	100.0%

Setting	default	min	max
Mod. pump max speed	100%	0%	100%
Mod. pump standby speed	60%	0%	100%

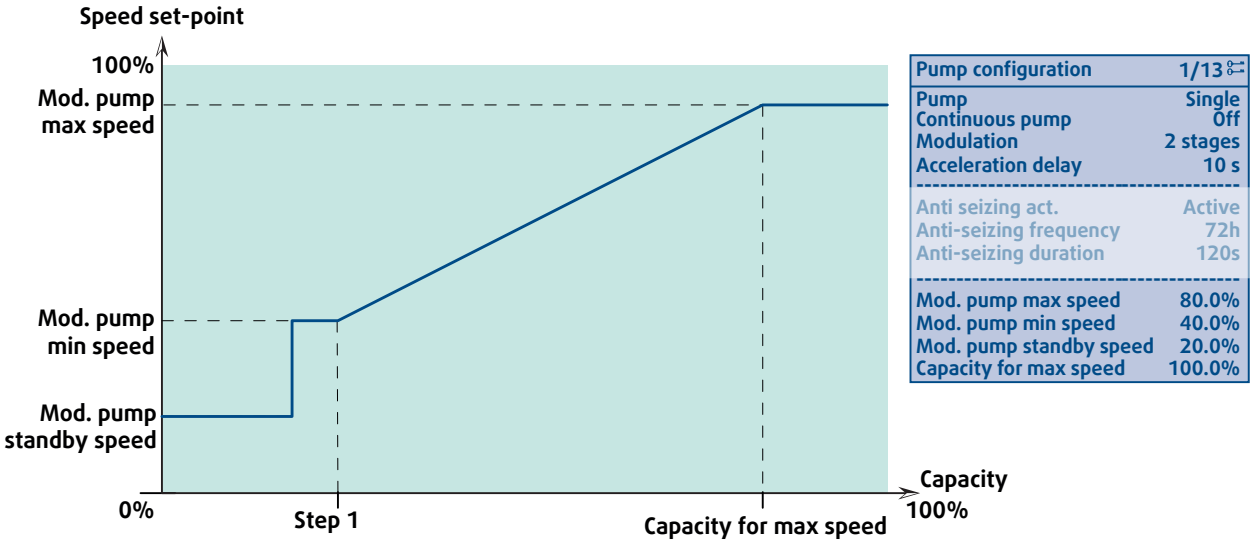
The regulator converts the speed set-point into a 0..10V signal and sends it to the frequency inverter. The inverter converts the 0..10V signal into a 0..50Hz frequency for the pump.



6.6.2. CONSTANT SPEED MODE VS CAPACITY

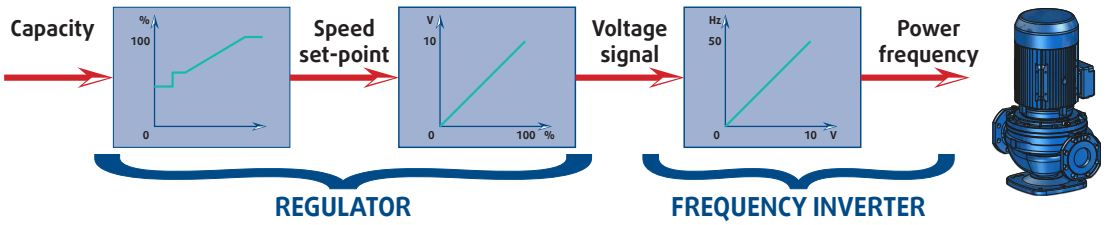
The speed of the pump depends on the capacity of the unit. This speed range is determined during commissioning to adjust the power of the pump to the load drops of the installation.

When the load is insufficient to activate the 1st stage of capacity, the pump runs at a reduced speed to limit the consumption of electricity.



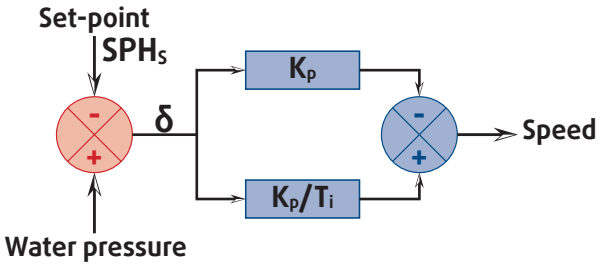
Setting	default	min	max
Mod. pump max speed	100%	0%	100%
Mod. pump min speed	70%	0%	100%
Mod. pump standby speed	60%	0%	100%
Capacity for max speed	100%	0%	100%

The regulator converts the speed set-point into a 0..10V signal and sends it to the frequency inverter. The inverter converts the 0..10V signal into a 0..50Hz frequency for the pump.



6.6.3. CONSTANT OUTPUT PRESSURE MODE

The pump modulates its speed to maintain constant water pressure at the unit output. This pressure is measured by a pressure transducer mounted on the outlet tube. The load is calculated via an algorithm PI minimizing the difference between the transducer measurement and the set-point.



The set-point depends on the installation. It can be adjusted during commissioning.

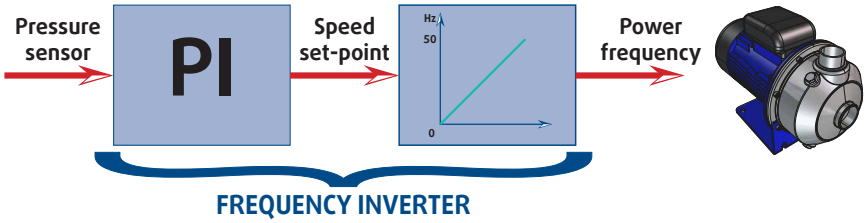
Setting	Units	Default	min	max
SPHs	bar	2.0	0	10

The PI coefficients depend on the range and the installation. They can be adjusted during commissioning.

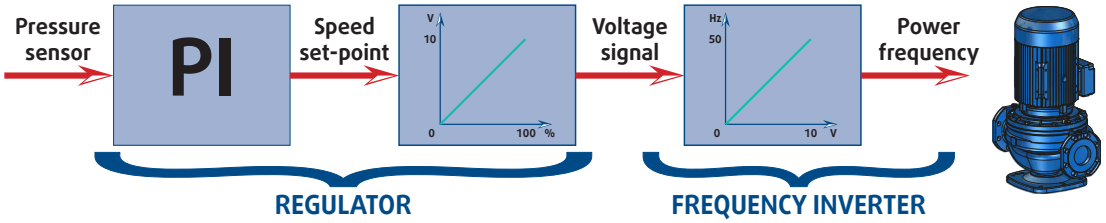
Range	Coefficient	Units	Default	min	max
SysAqua 20 to 125	K_p	Hz/%	1	0.1	100
	T_i	s	1	0	3,600
SysAqua 140 to 210	K_p	%/bar	0.25	0	50
	T_i	s	50	0	1,200

The PI algorithm is in the frequency inverter in the ranges **SysAqua** 20 to 125, and in the regulator in the range **SysAqua** 140 to 210. The pressure transducer is connected to the equipment in charge of the PI algorithm.

SYSAQUA 20/25/30/35/40/45/55/65/75/90/105/125

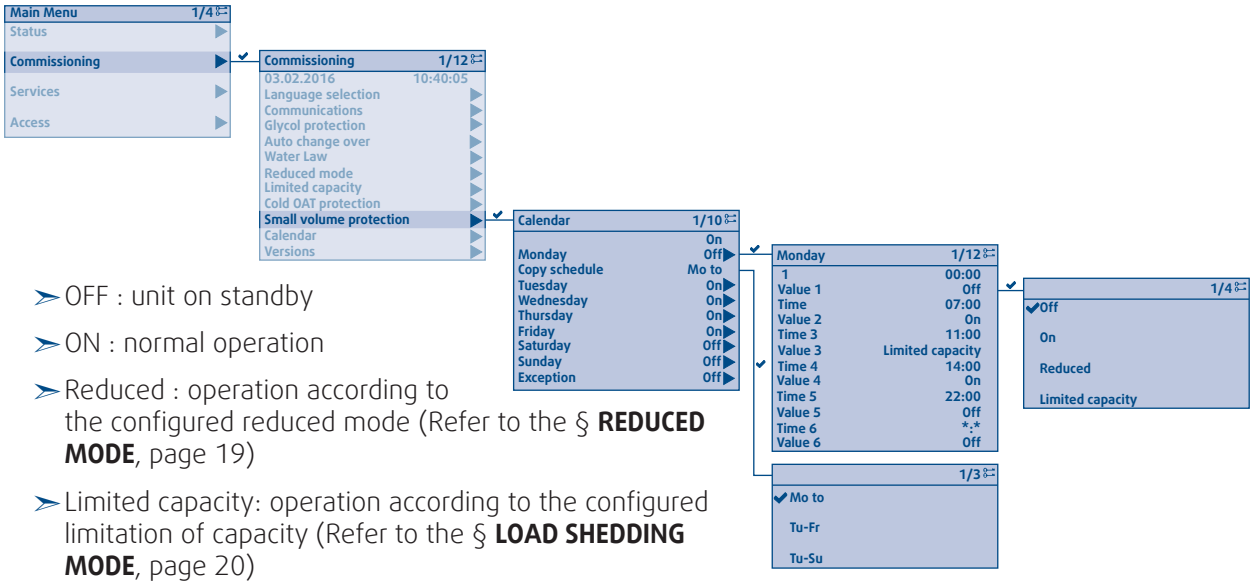


SysAqua 140/150/170/190/210



6.7. SCHEDULING

Scheduling enables operating commands to be programmed throughout the week:

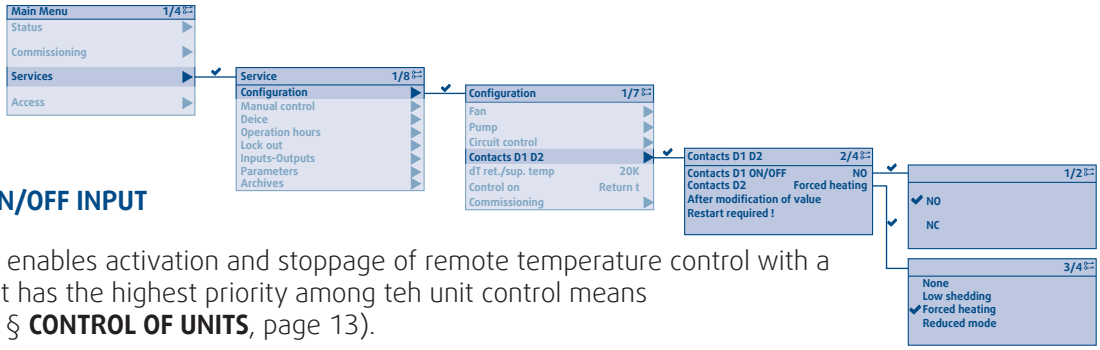


- OFF : unit on standby
- ON : normal operation
- Reduced : operation according to the configured reduced mode (Refer to the § **REDUCED MODE**, page 19)
- Limited capacity: operation according to the configured limitation of capacity (Refer to the § **LOAD SHEDDING MODE**, page 20)

Information

It is possible to program up to 6 command changes per day.

7. CLIENT DIGITAL INPUTS AND PRIORITIES



7.1. D1 ON/OFF INPUT

The input **D1** enables activation and stoppage of remote temperature control with a dry contact. It has the highest priority among teh unit control means (Refer to the § **CONTROL OF UNITS**, page 13).

The input **D1** can be configured as Normally Open (by default) and Normally Closed:

Configuration	Contact open	Contact closed
Normally Open	Operation order	Stop order
Normally Closed	Stop order	Operation order

7.2. D2 CONFIGURABLE INPUT

The input **D2** enables activation and stoppage of an option remotely with a dry contact. It ranks just after the input **D1** in the order of priorities (Refer to the § **CONTROL OF UNITS**, page 13).

The options available via the input **D2** are :

- Reduced mode (Refer to the § **REDUCED MODE**, page 19)
- Load shedding mode (Refer to the § **LOAD SHEDDING MODE**, page 20)
- Forcing in heating mode

The input **D2** is Normally Open:

Configuration	Contact open	Contact closed
Normally Open	Option activation	Option deactivation

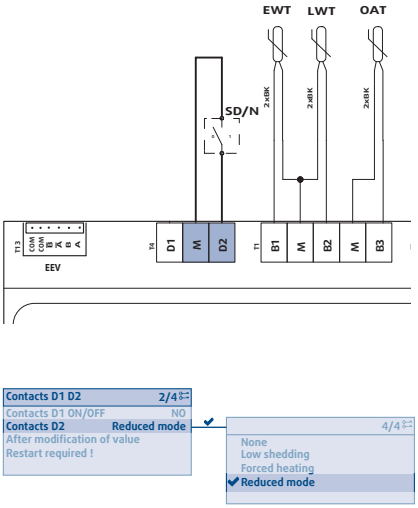
English

7.3. CASCADE OF PRIORITIES

The following tables indicate the operating order of the unit resulting from demands of various regulators according to their priority.

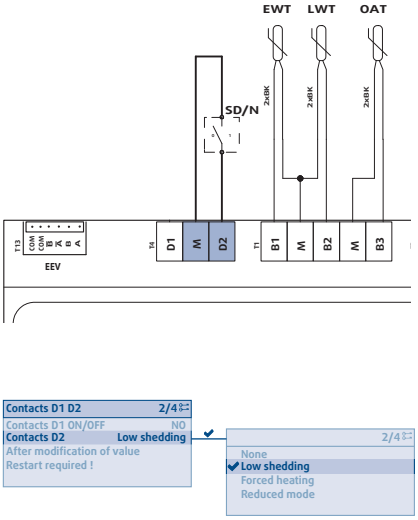
7.3.1. CAS D1 = ON / D2 CONFIGURED IN REDUCED MODE

Status D2	HMI	BMS	Scheduling	Resulting order
Activated	s.o.	s.o.	s.o.	Reduced mode
Deactivated	OFF	s.o.	s.o.	OFF
	ON	s.o.	s.o.	ON
	Reduced mode	s.o.	s.o.	Reduced mode
	Load shedding mode	s.o.	s.o.	Load shedding mode
	Delegation	OFF	s.o.	OFF
		ON	s.o.	ON
		Reduced mode	s.o.	Reduced mode
		Load shedding mode	s.o.	Load shedding mode
		Auto	OFF	OFF
			ON	ON
			Reduced mode	Reduced mode
			Load shedding mode	Load shedding mode



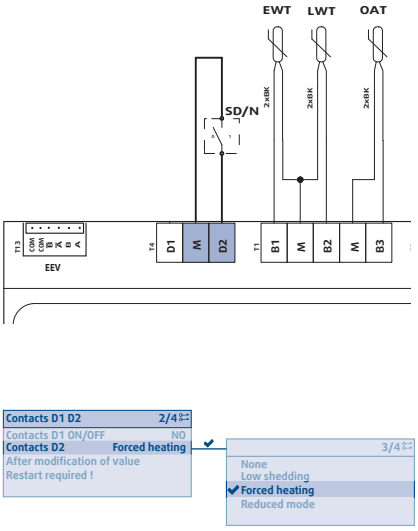
7.3.2. CAS D1 = ON / D2 CONFIGURED IN LOAD SHEDDING MODE

Status D2	MMI	BMS	Scheduling	Resulting order
Activated	s.o.	s.o.	s.o.	Load shedding mode
Deactivated	OFF	s.o.	s.o.	OFF
	ON	s.o.	s.o.	ON
	Reduced mode	s.o.	s.o.	Reduced mode
	Load shedding mode	s.o.	s.o.	Load shedding mode
	Delegation	OFF	s.o.	OFF
		ON	s.o.	ON
		Reduced mode	s.o.	Reduced mode
		Load shedding mode	s.o.	Load shedding mode
		Auto	OFF	OFF
			ON	ON
			Reduced mode	Reduced mode
			Load shedding mode	Load shedding mode



7.3.3. CAS D1 = ON / D2 CONFIGURED IN FORCE HEATING MODE

Status D2	MMI	BMS	Scheduling	Resulting order
Activated	s.o.	s.o.	s.o.	Heating
Deactivated	Cooling	s.o.	s.o.	Cooling
	Heating	s.o.	s.o.	Heating
	Auto changeover	Cooling	s.o.	Cooling
		Heating	s.o.	Heating
		Auto changeover	s.o.	Auto changeover



8. PROTECTIONS, WARNINGS AND ALARMS

The application has equipment protection procedures based on the sensors of the unit (temperature, pressure) and on the electromechanical safety devices (pressure switch, magneto-thermal circuit breaker, internal safety, etc.).

Some procedures may temporarily change the operation of the unit and give rise to a warning (e.g. preheating compressors, defrosting the battery, partial load operation, activation of antifreeze heaters, etc.) while others may stop a circuit or even the unit and lead to an alarm an alarm (e.g. HP cutoff, phase order regulator, etc.).

Most of the alarms are cleared automatically. In the case of repetition, they may cause the logging of a circuit or even the unit requiring a manual acknowledgment after inspection of the unit and installation.

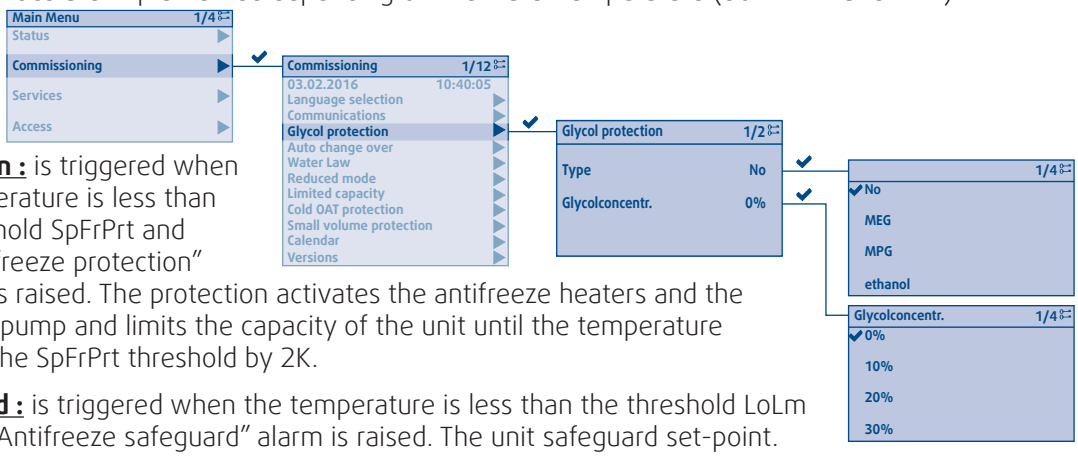
8.1. INTERNAL CLOCK

The date and time must be entered during commissioning otherwise the regulator logs the unit and raises the alarm "TiInvld" (invalid time). The alarm is automatically resolved by regulating the date and time.

8.2. WATER CIRCUIT

8.2.1. ANTIFREEZE PROTECTION OF THE PLATE EXCHANGER

If the water freezes (with or without glycol) the plate exchangers can be damaged. To prevent this risk, two protection methods are implemented depending on the water temperature (both EWT and LWT):



1. **<u>Protection :</u>** is triggered when the temperature is less than the threshold SpFrPrt and the "Antifreeze protection" warning is raised. The protection activates the antifreeze heaters and the hydraulic pump and limits the capacity of the unit until the temperature exceeds the SpFrPrt threshold by 2K.
2. **<u>Safeguard :</u>** is triggered when the temperature is less than the threshold LoLm and the "Antifreeze safeguard" alarm is raised. The unit safeguard set-point.

The threshold and limit values depend on the level of glycol:

	Cycle(s)	Glycol level			
		0%	10%	20%	> 30%
Threshold SpFrPrt	ON	4	-1	-5	-13
	OFF	4	0	-3	-10
Limit LoLm	ON	3	-2	-6	-14
	OFF	3	-1	-4	-11

8.2.2. WATER FLOW SENSOR

The triggering of the sensor (**FS**) translates a drop in water flow, below the minimum rate for the unit. The "water rate" alarm is displayed when the sensor remains open 3s and stops the unit. The alarm is automatically cleared when the sensor remains closed 30s.

8.2.3. "LACK OF WATER" PRESSURE SWITCH

Triggering of the pressure switch (**WPS**) results in a de-pressurization of the water circuit. A lack of pressure can damage the hydraulic pump.

The pressure switch being connected in series with the water flow sensor, triggering it is treated in the same way.

8.2.4. EWT-LWT DEVIATION

An abnormally high deviation between these sensors can signal the drift of a sensor or a lack of flow of water not detected by the flow sensor. The alarm "Delta T°water" is triggered when the deviation is greater than the limit ΔTmax (by default 10K) and is automatically resolved when it returns below 2K of the limit (adjustable value).

8.2.5. INSUFFICIENT VOLUME OF THE WATER CIRCUIT

The unit operates in concert with the installation water circuit. The coefficients of the PI algorithms and the delays governing the behavior of the equipment in the transient phases are adapted to the expected inertia of the circuit.

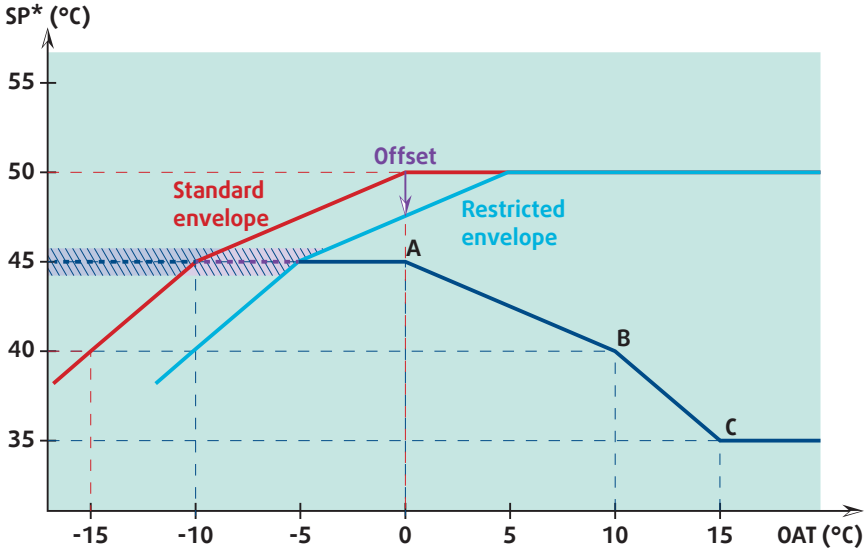
The inertia of the water circuit is a reflection of its volume. The IOM specifies the minimum volumes depending on the operating mode and the range:

Range	Coefficient	Units	Cooling	Heating
SysAqua 20 to 125	Application comfort	L/kW	3.5	12.5
	Application process	L/kW	10.0	12.5
SysAqua 140 to 210	Application comfort	L/kW	3.5	6.5
	Application process	L/kW	10.0	6.5

Insufficient volume of the water circuit can prevent the establishment of a stabilized coupling between the unit and installation. Unstable functioning can raise alarms that in the case of repetitions can restrict the unit.

In such a situation, it is recommended to notify this installation defect and note the actual volume, install a buffer tank and activate the "Low volume protection":

- adjustment of the coefficients Kp and Ti of the load calculation (Refer to the § **TEMPERATURE CONTROL**, page 15) to slow down teh capacity variations around the set-point
- restriction of the envelope in unit heating mode to further limit the set-point in heating mode (Refer to the § **HEATING MODE**, page 18)



8.3. COMPRESSORS

8.3.1. THERMAL PROTECTION

Compressors are protected from over-current by manual reset circuit breakers:

- **SysAqua 20 to 125 :** the contact circuit breaker is connected in series with that of the fans. The alarm "FltFan" is triggered and stops the circuit.
- **SysAqua 140 to 210 :** the alarm "FltCpr" is triggered and stops the circuit

The alarm is automatically acknowledged by reactivating the circuit breaker.

8.3.2. BACKFLOW TEMPERATURE

Excessive discharge temperature can damage the compressor. Two levels of protection are implemented:

1. Protection : triggered when the temperature reaches 120°C for5s and raises the alert "PrtTDcrg". Protection limits the circuit capacity to 50% until the temperature falls below 110°C.
2. Safeguard: triggered when the temperature reaches 130°C.

8.3.3. OVERHEATING

A minimum overheating is necessary to ensure that the compressors do not draw in liquid. The alarm "SH.LowLim" appears when the overheating is less than 1.3K for 30s and stops the circuit. The alarm is automatically acknowledged.

8.3.4. EVAPORATION PRESSURE

Too low or too high a pressure at the suction of the compressor can damage it.

Two levels of protection against too low pressure are implemented:

1. **Protection :** triggers when the pressure is too low and raises the alarm "LOPPrt". The protection limits the capacity of the circuit until the pressure rises above the protection threshold.
2. **Safeguard :** is triggered when the pressure drops despite being placed in protection, raises the alarm "LOP" and stops the circuit.. The alarm is automatically acknowledged after 3 minutes.

The alarm “MOP” is triggered when the pressure is too high and stops the circuit. The alarm is automatically acknowledged after 3 minutes.

8.3.5. CONDENSATION PRESSURE

Too low or too high a pressure on the compressor discharge can damage it.

The alarm “HPmin” is triggered when the pressure is too low and stops the circuit. The alarm is automatically acknowledged after 3 minutes.

Two levels of protection against too high pressure are implemented:

1. **Protection :** triggers when the pressure is too great and raises the alarm "HPmaxPrt”. The protection limits the capacity of the circuit until the pressure returns below the protection threshold.
2. **Safeguard :** is triggered when the pressure increases despite being placed in protection, raises the alarm "HPmax" and stops the circuit. The alarm is automatically acknowledged after 5 minutes.
3. **Electro-mechanical safeguard:** is triggered when the pressure increases despite the safeguard. The HP pressure switch cuts off the 230V supply of the compressor relays (SysAqua 20 to 125): 42 barg, SysAqua 140 to 210 : 45 barg). The "HPdet" alarm is raised and error logs the circuit.

8.3.6. PRESSURE RATIO

A ratio of (condensing pressure) / (evaporation pressure) too low or too high can damage the compressor:

- The alarm “PRmin” is triggered when the ratio is too low and stops the circuit. The alarm is automatically acknowledged after 3 minutes.
- The alarm “PRmax” is triggered when the pressure is too high and stops the circuit. The alarm is automatically acknowledged after 4 minutes.

8.4. FANS

The fans are protected from over-current by manual reset circuit breakers: In the case of modulating speed, the inverter fault report is wired in series. The alarm "FltFan" is triggered and stops the circuit.

The alarm is automatically acknowledged by reactivating the circuit breaker.

8.5. HYDRAULIC PUMPS

The pumps are protected from over-current by manual reset circuit breakers:

- **SysAqua 20 to 125 :** the circuit breaker contact (**FTWP**) is wired in series with the flow sensor and the "Lack of Water" pressure switch. Triggering is treated in the same way.
- **SysAqua 140 to 210 :**the circuit breaker contact (**FTWP**) is wired separately (in the case of modulating speed, the inverter fault report is wired in series). The “Pump” alarm is triggered and stops the unit (no consignment). The alarm is automatically acknowledged by reactivating the circuit breaker.

8.6. TEMPERATURE AND PRESSURE SENSORS

When an analog sensor fails, the regulator disables a circuit or stops the unit and raises the alarm "open loop" (e.g. sensor disconnected, broken wire) or the alarm "short circuit" (e.g. bad connection). These alarms consign the circuit or the complete unit.

8.7. MISCELLANEOUS PROTECTIONS

8.7.1. ORDER CONTROLLER AND PHASE BREAKER

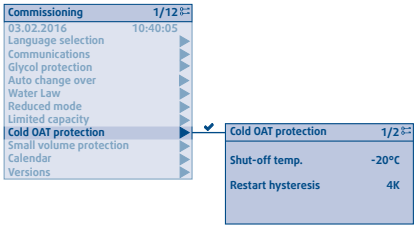
The controller, installed in the electrical panel at the head of the distribution of the phases to the equipment, ensures the correct direction of rotation of compressors, fans and hydraulic pumps. In the case of incorrect power supply, the application logs the unit and raises the alarm "3PhDet".

8.7.2. COOLANT LEAK

If the BP and HP are less than 1 barg, the alarm "RfgLoLvl" is triggered and the unit is locked.

8.7.3. FALL IN OUTSIDE TEMPERATURE

This protection enable the unit to be stopped before other protections if the outside temperature is too cold. The protection is activated when the temperature drops to -20 ° C (adjustable stop value) and is deactivated when the temperature rises to -16 ° C (adjustable hysteresis).



8.7.4. STATE OF DIGITAL AND ANALOG OUTPUTS

The regulator can detect some hardware faults on its digital and analog outputs. The regulator raises the remote alarm type "*.inAlarm" and stops the circuit or unit depending on the controlled equipment.

8.8. ERROR LOGGING OF THE UNIT

The repeated occurrence of an alarm after a certain lapse of time may reflect a problem with a unit's equipment or at the installation level. To safeguard the equipment, the regulation loggs the unit / the circuit:

➢ **the unit / circuit is stopped and requires a human intervention.**

Error logging is triggered by the following incidents:

Alarm	Incident	Logging
water flow (flow sensor or lack of water pressure switch)	3 alarms in 1 hour	Unit
coolant leak	1 alarm	Circuit
date/time not set	1 alarm	Unit
antifreeze safeguard	1 alarm	Unit
flowswitch	5 alarms in 1 hour	Unit
Delta T water	3 alarms in 15 min	Unit
sensor EWT (circuit open, short-circuit)	1 alarm	Unit
sensor LWT (circuit open, short-circuit)	1 alarm	Unit
sensor OAT (circuit open, short-circuit)	1 alarm	Unit
sensor CST (circuit open, short-circuit)	1 alarm	Circuit
sensor CDT (circuit open, short-circuit)	1 alarm	Circuit
sensor BP (circuit open, short-circuit)	1 alarm	Circuit
sensor HP (circuit open, short-circuit)	1 alarm	Circuit
compressor circuit breaker	1 alarm	Circuit
backflow temperature	3 alarms in 1 hour	Circuit
LOP (minimum evaporation pressure)	3 alarms in 1 hour	Circuit
MOP (maximum evaporation pressure)	3 alarms in 1 hour	Circuit
HPmin (HPmini)	3 alarms in 1 hour	Circuit
HPDet (pressure switch HP)	1 alarm	Circuit
PRmin (minimum pressure ratio)	3 alarms in 1 hour	Circuit
PRmax (maximum pressure ratio)	3 alarms in 1 hour	Circuit
fan circuit breaker	1 alarm	Circuit
pump circuit breaker	1 alarm	Unit

8.9. ALARM SNAPSHOT

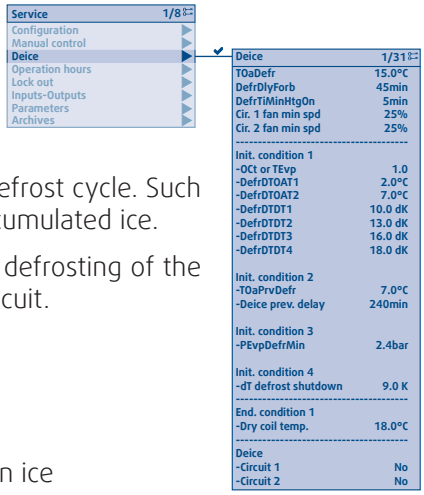
The Alarm Snapshot save the unit state at the instant the alarm appears. The main elements saved are:

- **Unit** EWT, LWT, OAT
- **Circuit 1 :** BP, HP, SH, CDT, EEV, OFAN
- **Circuit 2 :** BP, HP, SH, CDT, EEV, OFAN

8.10. DEFROST CYCLE

8.10.1. PRINCIPLES

When the unit is operating in heating mode and the outdoor temperature is cool, air humidity may freeze on contact with the fins. Over time, frost accumulates on the batteries, preventing proper heat transfer. These operating conditions degrade the performance of the unit and stress the compressors.



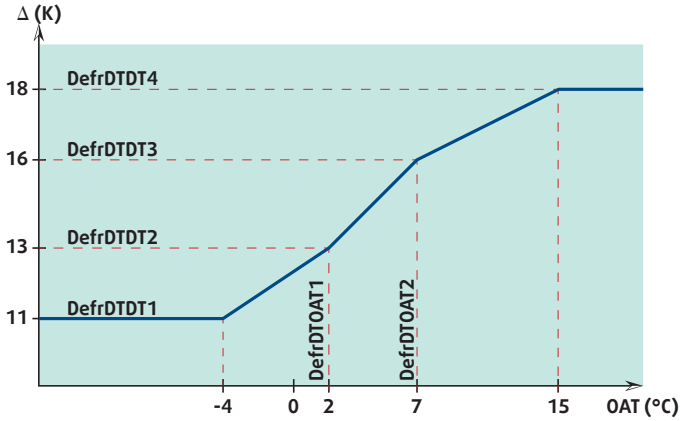
The regulator prevents excessive icing of the batteries by initiating a defrost cycle. Such a cycle consists in operating the unit in cooling mode to liquefy the accumulated ice.

On the **SysAqua** 140 to 210, the regulator prevents the simultaneous defrosting of the circuits. Thus the second circuit provides heat for defrosting the first circuit.

8.10.2. DEFROST CYCLE INIATIATION CONDITIONS

Four conditions can initiate the defrosting cycle:

1. **Difference in air / battery temperature (normal condition) :** when ice accumulates, the difference in outside temperature and battery temperature diverges. The regulator starts the cycle when the difference reaches a threshold value Δ and raises the alert "DefrDTReq".
   The difference is calculated between the sensor **OAT** and, one of, evaporation temperature (by default) or the sensor **OCT**.
   The threshold value Δ depends on the outside temperature. The values DefrDTDT* and DefrDTOAT* can be adjusted.



2. **Delay between 2 cycles :** when air humidity is low, frost accumulates slowly but still creates stressful conditions for the compressors. The regulator starts the cycle if the circuit has run for 240min combined with an outside temperature lower than 7 ° C and raises the warning "TOAPrevDefrReq"
3. **Fall in evaporation pressure (protection condition) :** some ice accumulations can lead to a rapid fall in evaporation pressure. The regulator starts the cycle if the evaporation pressure drops to 2.4 bar and raises the warning "DefrPEvpReq"
4. **Drying prior to circuit stop :** when a circuit is about to stop because the unit is close to the set-point and the batteries are slightly frosted (temperature difference with outside air equal to 10 ° C), the regulator starts the cycle so that the batteries are dry for the next start.

8.10.3. CYCLE STOPPAGE CONDITIONS

Three conditions can stop the defrosting cycle:

1. **Dry battery (normal condition) :** the battery is considered to be dry when the temperature reaches 18°C (adjustable between 16 and 20°C)
2. **Cycle too long :** the regulator stops the cycle after 8 min and raises the warning "DefrTiOut"
3. **Water temperature too low (protection condition) :** the regulator stops the cycle if the water flow temperature drops to 10 ° C and raises the warning "DefrFnsTSu"

9. USER INTERFACE

9.1. ORGANIZATION OF INFORMATION AND LEVEL OF ACCESS

The HMI allows the state of the unit to be visualized and certain adjustments to be made. The information displayed depends upon:

- the configuration of the unit: information not related to the unit do not appear
- the access level: information requiring a higher access level are not displayed

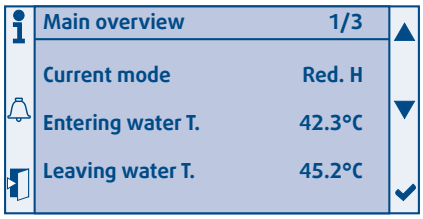
The information is organized into 5 menus.

Access level	Final user	Installer	Maintenance
Menu “Access”	✔	✔	✔
Menu “Status”	✔	✔	✔
Menu “Commissioning”	✘	✔	✔
Menu “Service”	✘	✘	✔
Menu “Alarms”	✔	✔	✔

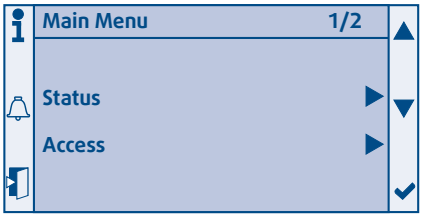
9.2. HOME PAGE AND MAIN MENU

The home page is used quickly display the state of the unit:

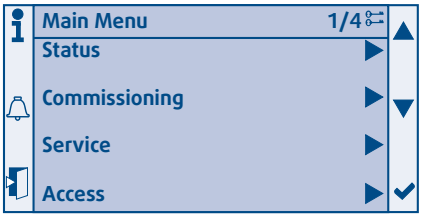
- Operating mode
- Water inlet temperature
- Water outlet temperature



The "Info" button i is used to alternate between the home page and the main menu, as well as to return to the main menu at any time. The main menu gives access to other menus depending on access level.



Final user



Maintenance

9.3. MENU “ACCESS”

The “Access” menu enables entry of the password corresponding to the desired level. A pictogram then shows the level of access.

Access level	Final user	Installer	Maintenance
Password	0000	0534	3260
Pictogram		⊶	⊶

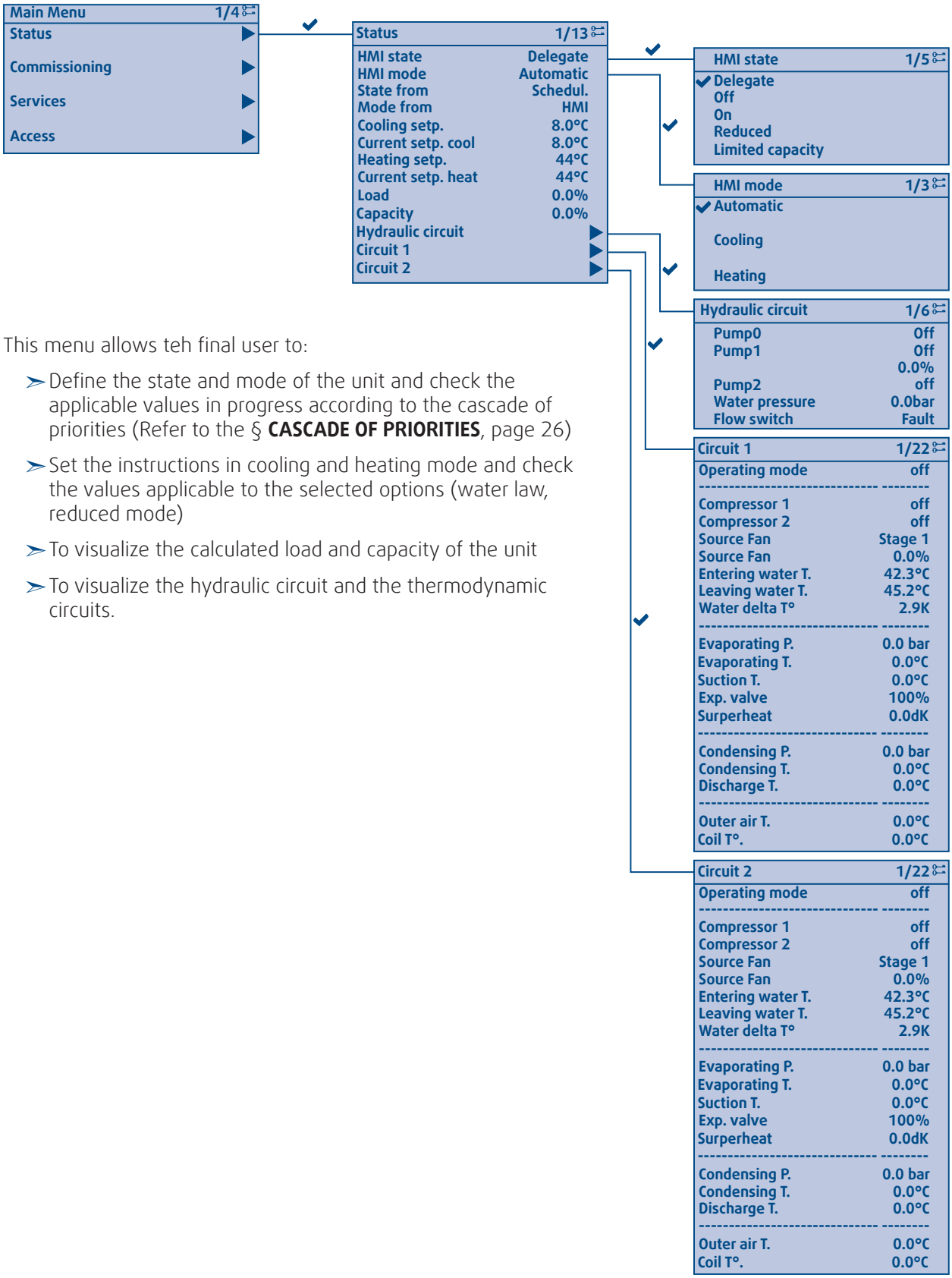
Caution

When the maintenance or installation phase is finished, set the access level to that of the “Final user” so as not to leave access to the information that are restricted.

Information

The access level is automatically reset to “Final user” level after a few minutes of inactivity.

9.4. STATUS MENU

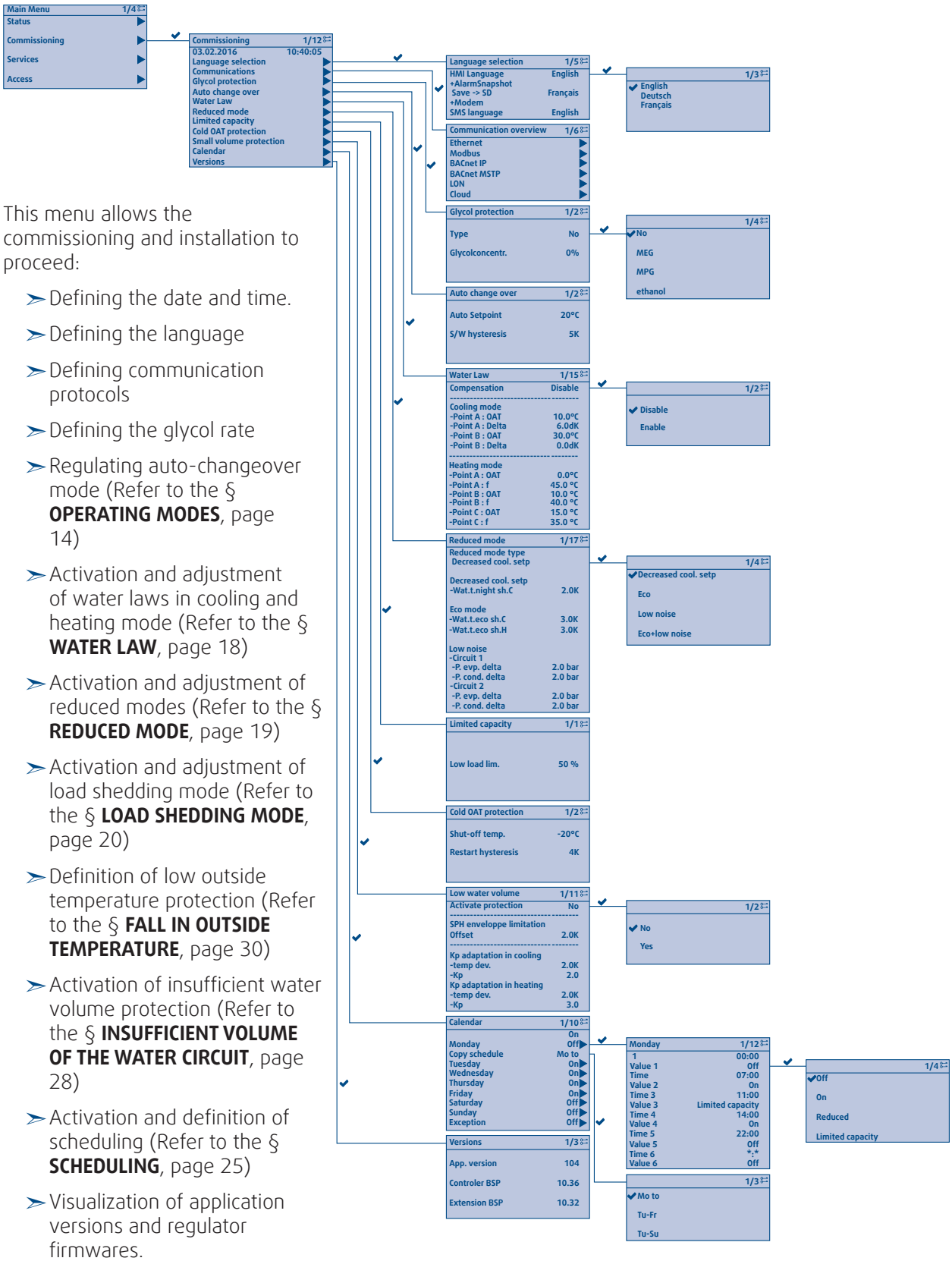


This menu allows teh final user to:

- Define the state and mode of the unit and check the applicable values in progress according to the cascade of priorities (Refer to the § **CASCADE OF PRIORITIES**, page 26)
- Set the instructions in cooling and heating mode and check the values applicable to the selected options (water law, reduced mode)
- To visualize the calculated load and capacity of the unit
- To visualize the hydraulic circuit and the thermodynamic circuits.

9.5. INSTALLATION MENU

Limited access with the "Installer" or "Maintenance".

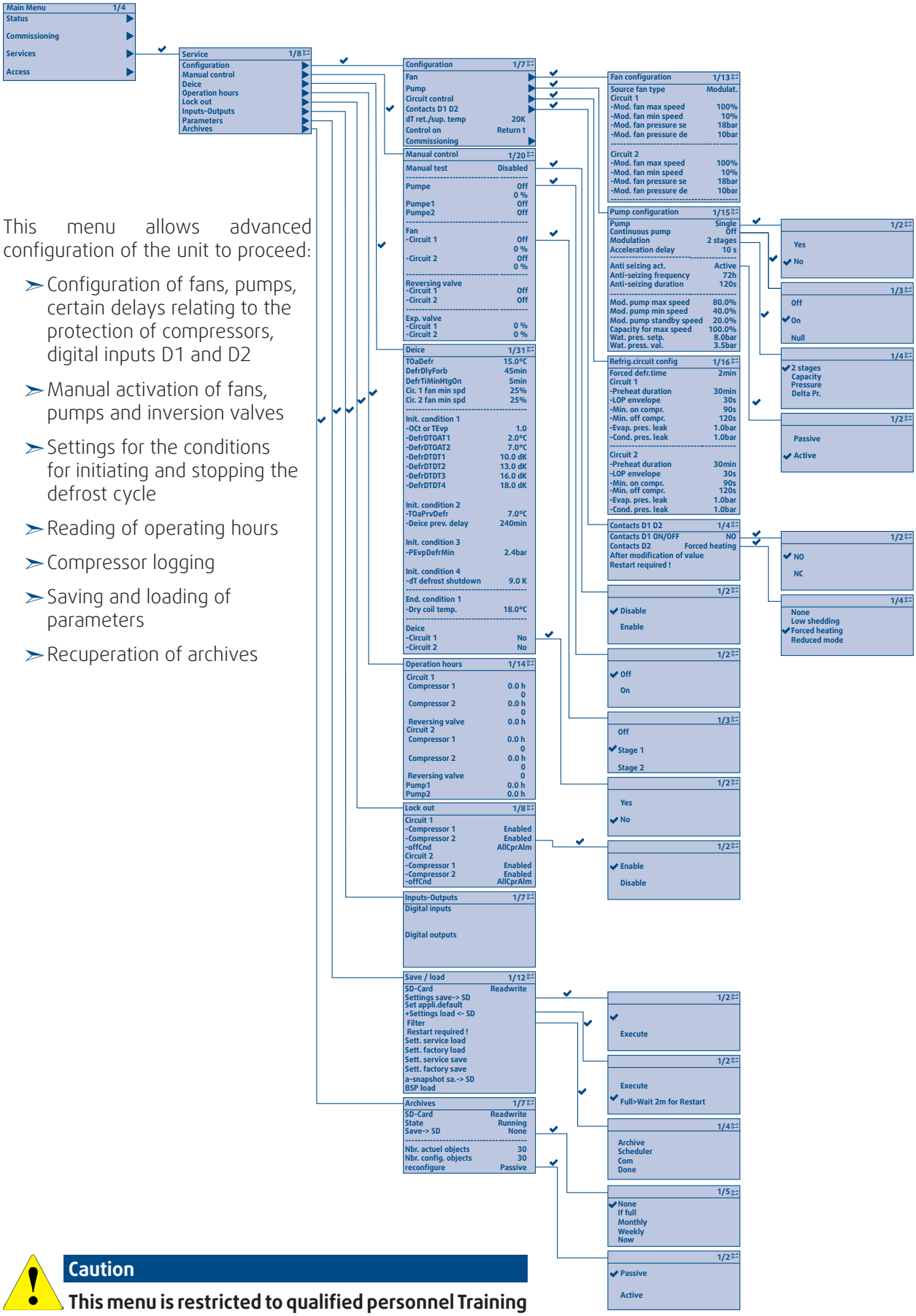


This menu allows the commissioning and installation to proceed:

- Defining the date and time.
- Defining the language
- Defining communication protocols
- Defining the glycol rate
- Regulating auto-changeover mode (Refer to the § **OPERATING MODES**, page 14)
- Activation and adjustment of water laws in cooling and heating mode (Refer to the § **WATER LAW**, page 18)
- Activation and adjustment of reduced modes (Refer to the § **REDUCED MODE**, page 19)
- Activation and adjustment of load shedding mode (Refer to the § **LOAD SHEDDING MODE**, page 20)
- Definition of low outside temperature protection (Refer to the § **FALL IN OUTSIDE TEMPERATURE**, page 30)
- Activation of insufficient water volume protection (Refer to the § **INSUFFICIENT VOLUME OF THE WATER CIRCUIT**, page 28)
- Activation and definition of scheduling (Refer to the § **SCHEDULING**, page 25)
- Visualization of application versions and regulator firmwares.

9.6. MAINTENANCE MENU

Limited access with the "Maintenance" profile.



This menu allows advanced configuration of the unit to proceed:

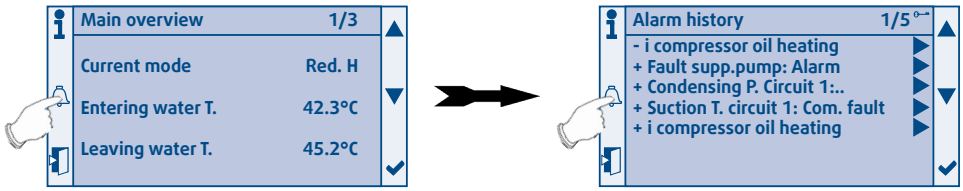
- Configuration of fans, pumps, certain delays relating to the protection of compressors, digital inputs D1 and D2
- Manual activation of fans, pumps and inversion valves
- Settings for the conditions for initiating and stopping the defrost cycle
- Reading of operating hours
- Compressor logging
- Saving and loading of parameters
- Recuperation of archives

Caution

This menu is restricted to qualified personnel Training on SysAqua units and regulation is recommended before using this menu

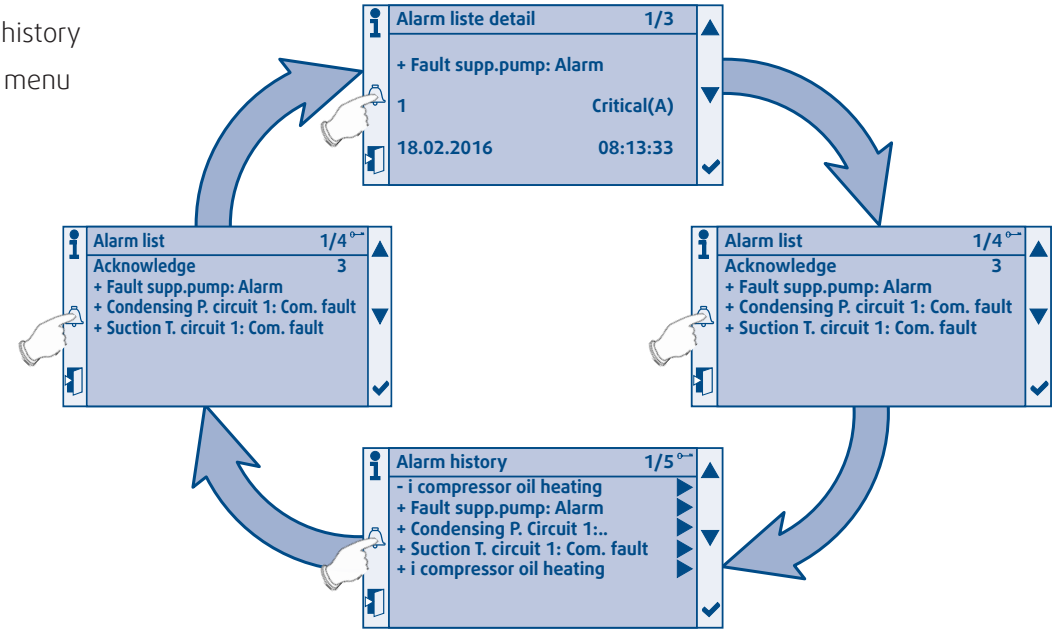
9.7. ALARMS MENU

If no alarm is active, pressing the "Alarm" button takes you to the alarm history



If at least one alarm or warning is active, the alarm button flashes. Pressing the "alarm" button, will display successively :

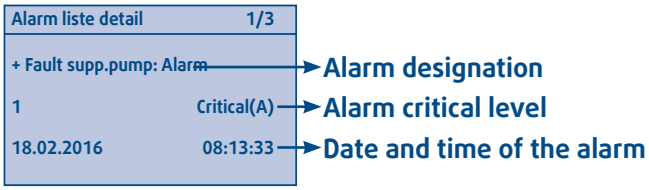
- The last active alarm
- The list of active alarms
- The alarms history
- The Alarms menu



9.7.1. ALARM DETAILS

This page is displayed :

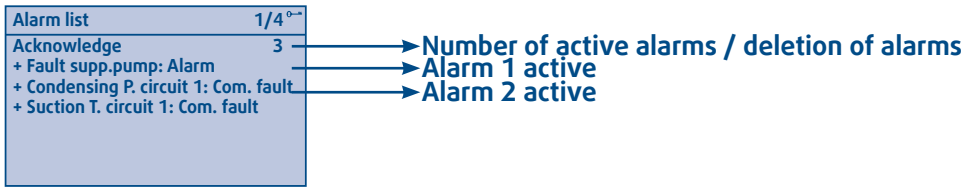
- Details of the last active alarm
- If you request the details of an alarm in the list of active alarms
- If you request the details of an alarm in the alarms history



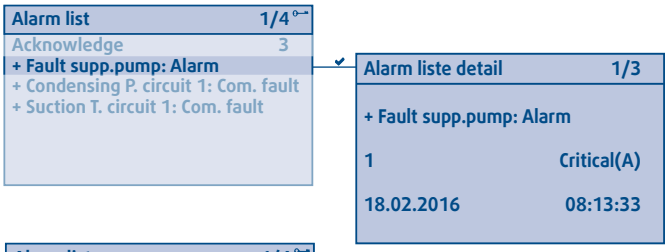
9.7.2. THE LIST OF ACTIVE ALARMS

The list of active alarms allows visualization of current alarms

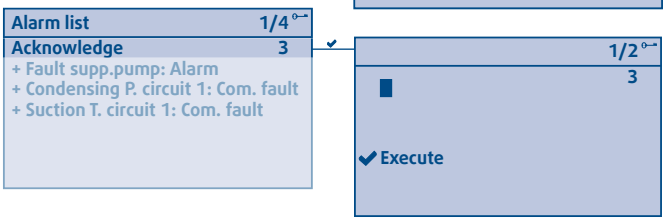
The first line shows the number of active alarms (3 in the example below)



You can access the alarm details by selecting an alarm and pressing the "Enter" button ✔.



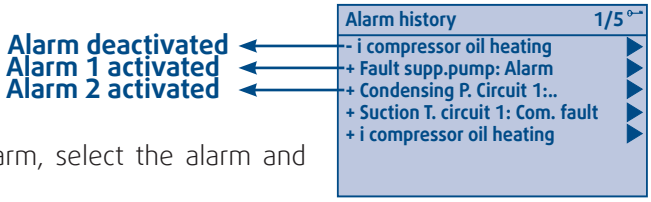
With installation or maintenance level access, you can acknowledge active blocking alarms. To do this select delete, confirm and select "Execute". Only the alarms that are no longer active will be deleted from the list.



9.7.3. ALARMS HISTORY

This history reports the 50 most recent activation and deactivation of alarms:

- Activation of an alarm will be indicated by a "**+**"
- Deactivation of an alarm will be indicated by a "**-**"



For the activation and deactivation time of an alarm, select the alarm and press the "enter" button ✔.

9.7.4. ALERTS HISTORY

This history allows visualization of the alerts that placed the unit in safeguard. It has the same structure as the alarms history

9.7.5. ALARMS MENU

The information displayed in the alarms menu depend on the access level

User	Installer	Maintenance	Alarms		
		✘	EventHistory	0	Display the events history
	✘	✘	AlarmSnapshot	12	Display unit state in the case of alarms
✘	✘	✘	+Alarm list:	11	Access the list of active alarms
	✘	✘	Sort order 1	Time	Primary classification of active alarms
	✘	✘	Sort order 2	Time	Secondary classification of active alarms
	✘	✘	Descending order	Passive	Classification direction of active alarms
✘	✘	✘	+Alarm history		Access the alarms history
		✘	Reset	50	Reset the alarms history
	✘	✘	Sort order 1	Time	Primary classification of the alarms history
	✘	✘	Sort order 2	Time	Secondary classification of the alarms history
	✘	✘	Descending order	Passive	Classification direction of the alarms history
		✘	+Eventhistory		Access the events history
		✘	Reset	0	Reset the events history
		✘	Sort order 1	Time	Primary classification of the events history
		✘	Sort order 2	Time	Secondary classification of the events history
		✘	Descending order	Active	Classification direction of the events history

10. AUTOMATIC ARCHIVING

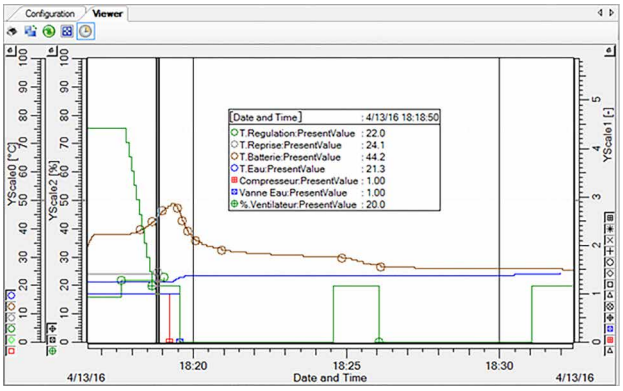
10.1. SAVING ARCHIVES

The regulator registers the main variables of the unit. The values are recorded according to the principle of the circular buffer.

The software "Scope Light" allows recovery of the records, to display them in graphical form and to export them in csv format.

To maximize the duration of the archived period, variables are recorded separately and only when their value changes by a certain amount (shown below as VOC - Change Of Value).

The variable saved are:



Variable	Unit	COV	Archive filename	ObjectID	
				SysAqua 20 to 125	SysAqua 140 to 210
Number of active alarms	-	1	AlarmList-CountEntries.csv		0x0025 0x00000002
Alarms report : Alarm bit 1 : time invalid bit 2 : flowswitch & pumps circuit beaker bit 5 : frost protection Lock-out bit 6 : flowswitch	enum	1	AlmUnit-PresentValue.csv		-
Alarms report : Alarm bit 1 : time invalid bit 2 : flowswitch bit 3 : pump 1 circuit breaker bit 4 : pump 2 circuit breaker bit 5 : frost protection Lock-out bit 6 : flowswitch	enum	1	AlmUnit-PresentValue.csv	-	0x230A 0x028CAE77
Digital input D1: 0 = OFF 1 = ON	enum	1	Cmn.SwiMn-PresentValue.csv		0x2204 0x89288CAA
Digital input D2: 0 = OFF 1 = ON	enum	1	Cmn.SwiHtg-PresentValue.csv		0x2204 0x8928E10D
HMI operating status: 0 = auto 1 = OFF 2 = ON 3 = Reduced mode 4 = Load shedding	enum	1	OpModHMI-PresentValue.csv		0x2302 0x028C18D0
HMI operating mode: 0 = auto-changeover 1 = cooling 2 = heating	enum	1	ChoHMI-PresentValue.csv		0x2302 0x028C7307
BMS operating status: 0 = auto 1 = OFF 2 = ON 3 = Reduced mode 4 = Load shedding	enum	1	OpModCom-PresentValue.csv		0x2302 0x028CEC43
BMS operating mode: 0 = auto-changeover 1 = cooling 2 = heating	enum	1	ChoCom-PresentValue.csv		0x2302 0x028C8794
control of operating status: 0 = time scheduler program 1 = HMI emergency OFF 2 = D1 input 3 = D2 reduced mode 4 = D2 load shedding 5 = HMI 6 = BMS	enum	1	OpModRsn-PresentValue.csv		0x230B 0x028CEE6D
control of operating mode: 0 = time scheduler program 1 = D2 input 2 = HMI 3 = BMS	enum	1	ChoRsn-PresentValue.csv		0x230B 0x028C85BA

Variable	Unit	COV	Archive filename	ObjectID	
				SysAqua 20 to 125	SysAqua 140 to 210
actual operating status: 0 = auto 1 = OFF 2 = ON 3 = Reduced mode 4 = Load shedding	enum	1	CapCtl.OpMCmd-PresentValue.csv		0x230B 0x549F00A5
actual operating mode: 0 = OFF 1 = cooling 2 = cooling reduced mode 3 = cooling load shedding 4 = heating 5 = heating reduced mode 6 = heating load shedding	enum	1	CmnOpMod-PresentValue.csv		0x230B 0x028C88A7
Preheat phase: 0 = over 1 = on-going			Dsp.Htr-PresentValue.csv		0x2207 0x89285092
Load	%	10	CapCtl.Req-PresentValue.csv		0x230A 0x549F42E2
Capacity	%	10	PdcMgmt.PrCap-PresentValue.csv		0x230A 0x549F1E45
Unit					
Outer Air Temperature	°C	2	Cmn.TOa-PresentValue.csv		0x2203 0x8928D53C
Entering Water Temperature	°C	1	Dsp.TRt-PresentValue.csv		0x2203 0x8928AA16
Leaving Water Temperature	°C	1	Dsp.TSu-PresentValue.csv		0x2203 0x89288906
Cooling mode setpoint	°C	1	CapCtlSet.TSuC-PresentValue.csv		0x2301 0x028CF3B4
Heating mode setpoint	°C	1	CapCtlSet.TSuH-PresentValue.csv		0x2301 0x028C42DF
Flowswitch state: 0 = NOK 1 = OK	enum	1	Dsp.FlDet(Cnt)-PresentValue.csv		0x2204 0x8928AD74
Circuit 1					
Alarms report:					
Alarm bit 0 : refrigerant leakage bit 1 : comp.1 circuit breaker bit 2 : comp.2 circuit breaker bit 3 : fans circuit breaker bit 4 : HP switch					
Lock-out bit 5 : fans circuit breaker bit 6: LOP bit 7 : MOP bit 8 : HPmin bit 9 : PRmin bit 10 : PRmax bit 11 : deice for low BP bit 12 : discharge temp.	enum	1	AlmPdc-PresentValue.csv		0x230A 0x028C4FBD
Mode: 1 = OFF 2 = cooling 3 = heating 4 = deice	enum	1	RfCrt.OpMCmd-PresentValue.csv		0x230B 0x738A0BB3
Transition: 0 = inactive 1 = startup 2 = shutdown 3 = rapid shutdown 4 = capacity increase 5 = capacity decrease 6 = auto-changeover switch 7 = deice cycle start 8 = deice cycle end	enum	1	RfCrt.TraCmd-PresentValue.csv		0x230B 0x738AEE6A
Priority: 2 = OFF 5 = protection, deice 15 = normal operation	enum	1	RfCrt.OpMCmdPrio-PresentValue.csv		0x230C 0x738A5618
Compressor 1 state: 0 = OFF 1 = ON	enum	1	Pdc.Cpr1-PresentValue.csv		0x2207 0x8928E4DA
Compressor 2 state: 0 = OFF 1 = ON	enum	1	Pdc.Cpr2-PresentValue.csv		0x2207 0x8928D4B9
EEV position	%	5	Pdc.ExpsVlv.PrVal-PresentValue.csv		0x2203 0x89287D3E
Crankcase heater state: 0 = OFF 1 = ON	enum	1	Pdc.OilHtr-PresentValue.csv		0x2207 0x892874A8
Condensing pressure	bar	2	Pdc.PCdn-PresentValue.csv		0x2203 0x8928FA9B
Evaporating pressure	bar	0.5	Pdc.PEvp-PresentValue.csv		0x2203 0x8928DED5

Variable	Unit	COV	Archive filename	ObjectID	
				SysAqua 20 to 125	SysAqua 140 to 210
Reverse valve state: 0 = OFF 1 = ON	enum	1	Pdc.RvrVlv-PresentValue.csv		0x2207 0x89286A0D
Superheat	K	2	Pdc.SHFil-PresentValue.csv		0x2203 0x8928F983
Fan state: 1 = OFF 2 = Stage 1 3 = Stage 2	enum	1	Pdc.SrcFan-PresentValue.csv		0x2208 0x89286DBE
Condensing temperature	°C	2	Pdc.TCdn-PresentValue.csv		0x2203 0x8928306A
Discharge temperature	°C	2	Pdc.TDcrgGas-PresentValue.csv		0x2203 0x8928C81A
Evaporating temperature	°C	2	Pdc.TEvp-PresentValue.csv		0x2203 0x89281424
Coil temperature	°C	2	Pdc.TSrcExg-PresentValue.csv		0x2203 0x8928A075
Suction temperature	°C	2	Pdc.TSuctGas-PresentValue.csv		0x2203 0x89285F30
Circuit 2					
Alarms report:					
Alarm bit 0 : refrigerant leakage bit 1 : comp.1 circuit breaker bit 2 : comp.2 circuit breaker bit 3 : fans circuit breaker bit 4 : HP switch					
Lock-out bit 5 : fans circuit breaker bit 6: LOP bit 7 : MOP bit 8 : HPmin bit 9 : PRmin bit 10 : PRmax bit 11 : deice for low BP bit 12 : discharge temp.	enum	1	AlmPdc2-PresentValue.csv		0x230A 0x028C123A
Mode: 1 = OFF 2 = cooling 3 = heating 4 = deice	enum	1	RfCrt.OpMCmd-PresentValue.csv	N.A.	0x230B 0xD2E50BB3
Transition: 0 = inactive 1 = startup 2 = shutdown 3 = rapid shutdown 4 = capacity increase 5 = capacity decrease 6 = switch 7 = deice cycle start 8 = deice cycle end	enum	1	RfCrt.TraCmd-PresentValue.csv	N.A.	0x230B 0xD2E5EE6A
Priority: 2 = OFF 5 = protection, deice 15 = normal operation	enum	1	RfCrt.OpMCmdPrio-PresentValue.csv	N.A.	0x230C 0xD2E55618
Compressor 1 state: 0 = OFF 1 = ON	enum	1	Pdc2.Cpr1-PresentValue.csv	N.A.	0x2207 0x8928E9D3
Compressor 2 state: 0 = OFF 1 = ON	enum	1	Pdc2.Cpr2-PresentValue.csv	N.A.	0x2207 0x8928D9B0
EEV position	%	5	Pdc2.ExpsVlv.PrVal-PresentValue.csv	N.A.	0x2203 0x89287A04
Crankcase heater state: 0 = OFF 1 = ON	enum	1	Pdc2.OilHtr-PhysicalValue.csv	N.A.	0x2207 0x892893DD
Condensing pressure	bar	2	Pdc2.PCdn-PresentValue.csv	N.A.	0x2203 0x8928F792
Evaporating pressure	bar	0.5	Pdc2.PEvp-PresentValue.csv	N.A.	0x2203 0x8928D3DC
Reverse valve state: 0 = OFF 1 = ON	enum	1	Pdc2.RvrVlv-PresentValue.csv	N.A.	0x2207 0x89288D78
Superheat	K	2	Pdc2.SHFil-PresentValue.csv	N.A.	0x2203 0x8928212E
Fan state: 1 = OFF 2 = Stage 1 3 = Stage 2	enum	1	Pdc2.SrcFan-PresentValue.csv	N.A.	0x2208 0x89288ACB
Condensing temperature	°C	2	Pdc2.TCdn-PresentValue.csv	N.A.	0x2203 0x89283D63
Discharge temperature	°C	2	Pdc2.TDcrgGas-PresentValue.csv	N.A.	0x2203 0x89286F0D
Evaporating temperature	°C	2	Pdc2.TEvp-PresentValue.csv	N.A.	0x2203 0x8928192D
Coil temperature	°C	2	Pdc2.TSrcExg-PresentValue.csv	N.A.	0x2203 0x892858BC
Suction temperature	°C	2	Pdc2.TSuctGas-PresentValue.csv	N.A.	0x2203 0x8928F827

10.2. FORMAT OF CSV ARCHIVES FILES

Csv archive files are of ASCII type and use the ";" as separator.

The first line of the file contains the characteristics of the saved file:

Field	Description
1	Internal variable of the record
2	Internal name of the record
3	Engineering unit system enumeration: 2 = Metric, 3 = Imperial
4	Engineering unit system string

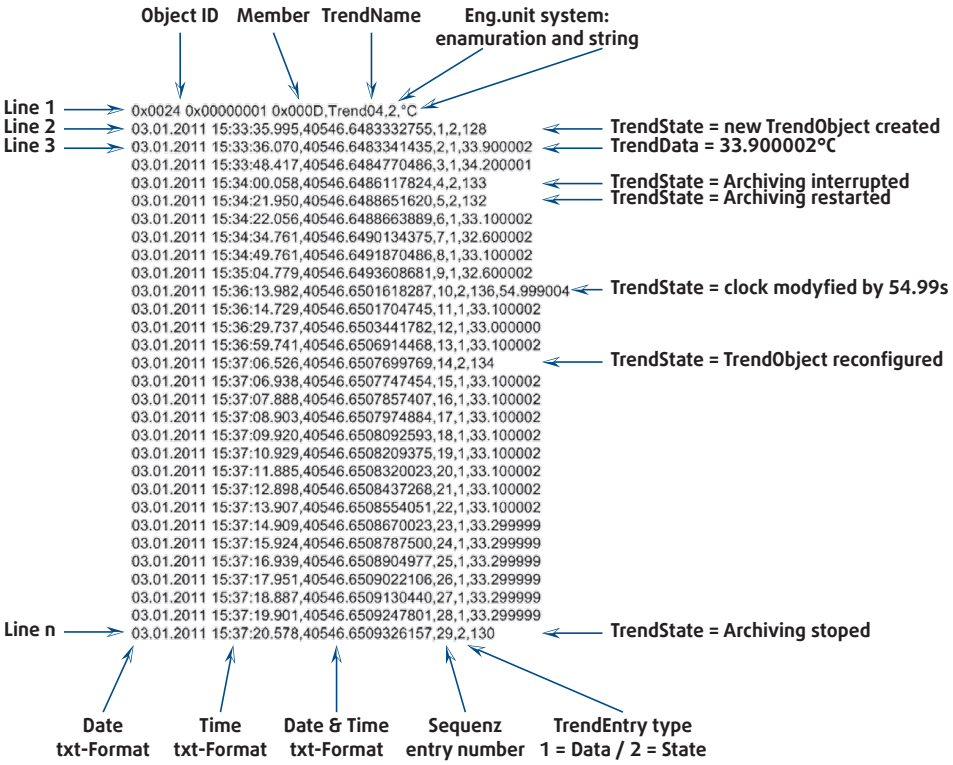
The following lines contain the values:

Field	Description
1	Time in the format YYYY-MM-DD HH: MM: SS, mmm
2	Time in the format OLE
3	Record number (starts at 1)
4	Record type : 1 = TrendData, 2 = TrendState
5	Value of the record

If the record is of type 1 (TrendData), field 5 contains a decimal value expressed in the specified unit system.

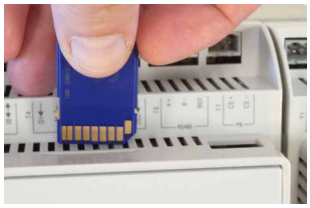
If the record is of type 2 (TrendState), field 5 contains coded information:

Value	Description
128	Creation of a new Trend object
129	Start of archiving
130	End of archiving
131	Deletion of archives
132	Re-start of the regulator following interruption (recommencement of archiving)
133	Stoppage of archiving due to a power failure or reset of the regulator.
134	Archiving reconfigured
135	Invalid input
136	Regulator clock was modified. The value indicates the offset in seconds

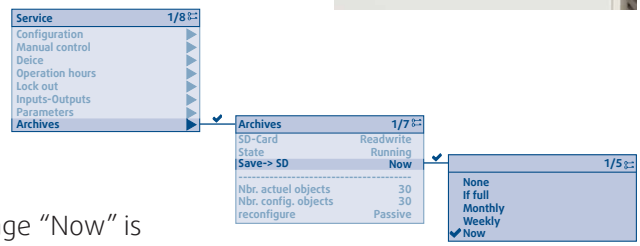


10.3. RECOVERY OF ARCHIVES WITH SD CARD

The saved archives can be recovered with a standard SD card. The procedure is:



1. Put the SD card in read / write mode
2. Insert the SD card into the regulator
3. Access "Maintenance" then go to the menu "Maintenance ➤ Archives ➤ Save -> SD".
4. Press on “Now”
5. During the recuperation, the message “Now” is displayed.
6. When the recuperation has finished, the message “Now” is deleted.
7. Recover the SD card



The archive files are in csv. format The files are arranged in a chronological tree:

11. MANAGEMENT OF SITE AND APPLICATION PARAMETERS

11.1. SAVING OF PARAMETERS ON AN SD CARD

The unit parameters can be recovered with a standard SD card. This conserves a copy of he settings made during commissioning or after an intervention. The procedure is specific according to the regulator type.

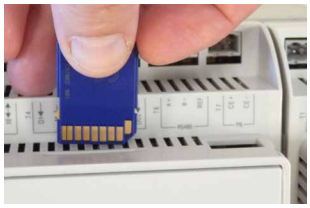
11.1.1. SYSAQUA 20/25/30/35/40/45/55/65/75/90/105/125

1. Prepare an unlocked SD card.
2. With the regulator in operation (LED BSP lit continuously in green) insert the SD card, remove it and reinsert it (wait 1s between each movement and less than 5s for the whole procedure).

3. Wait 5s and recover the SD card. The parameter file is on the SD card.

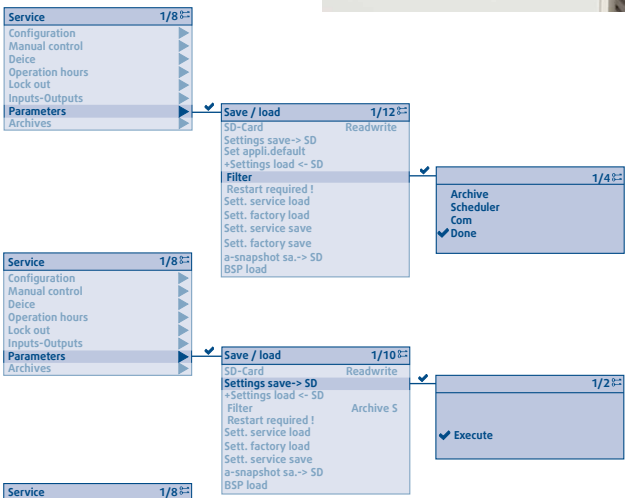
11.1.2. SYSAQUA 140/150/170/190/210

1. Insert the unlocked SD card into the regulator

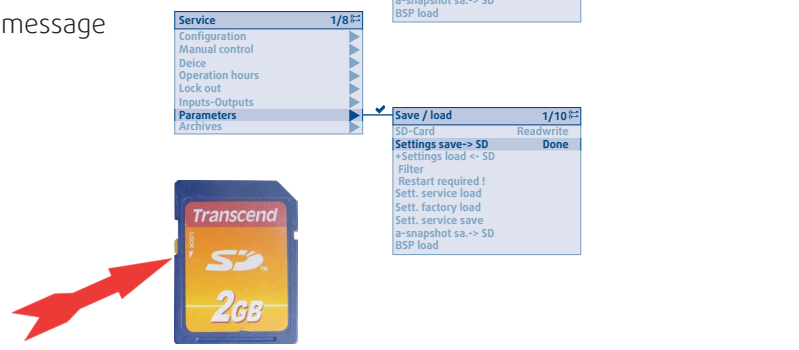


2. Access "Maintenance" then go to the menu "Service" ➤ Parameters ➤ Filter". Select the archives, the scheduling and the communication and press **Done**

3. Select “Settings save -> SD"
4. Press “Execute”



5. When the save is completed, the message “Done” is displayed
6. Recover the SD card
7. Put the SD card in read only



11.2. RELOADING PARAMETERS FROM AN SD CARD

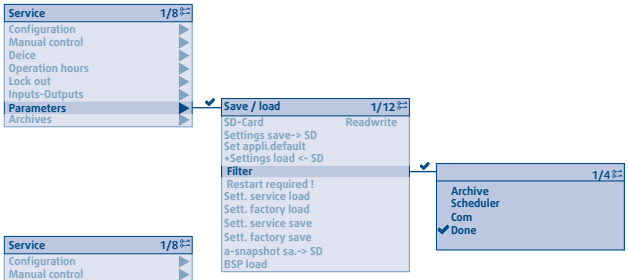
The unit parameters contained on an SD card can be re-injected into the regulator.

Caution

The SD card must contain only one parameters file

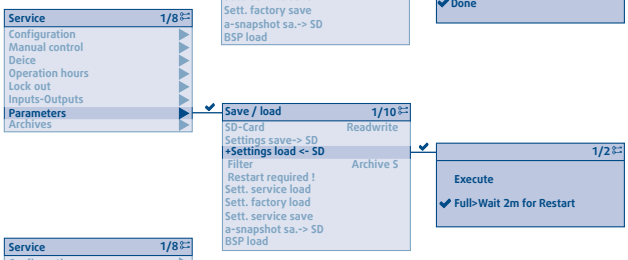
1. Insert the **locked** SD card into the regulator

2. Access "Maintenance" then go to the menu "Maintenance" ➤ Parameters ➤ Filter". Select the archives, the scheduling and the communication and press **Done**

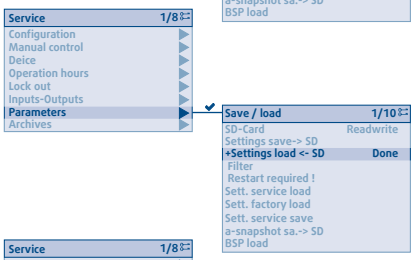


3. Access "Maintenance" then go to the menu "Maintenance" ➤ Save / load ➤ Setting Load <- "

4. Press "Full>Wait 2m for Restart"

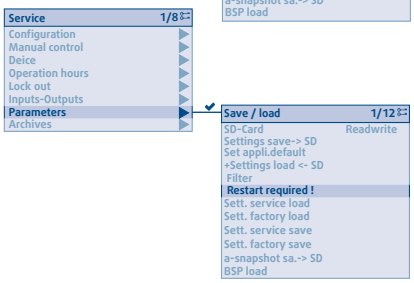


5. When the loading is completed, the message "Done" is displayed



6. Wait 2min then press "Restart required"

7. Recover the SD card



11.3. REPROGRAMMING THE REGULATOR WITH AN SD CARD

It is possible to re-program all or part of the regulator using an SD card. It should contain the following files depending on the intended reprogramming:

Reprogramming	File
Heat control (principal program)	MBRTcomp.ucf
Languages dictionary and network variables	OBHcomp.ucf
Loaded and remote display	HMIcomp.ucf
Display web version	HMI4Web.ucf
Projet ScopeLight	ScopeConfig.ucf

Caution

It is recommended to use 2 SD cards:

- **Card SD N°1** : in read and writte, intended for reprogramming
- **Card SD N°2** : in read only, intended for reloading parameters

Caution

Reprogramming overwrites previous configuration Prior to reprogramming it is recommended to save the parameter settings on an SD card (Refer to the § **SAVING OF PARAMETERS ON AN SD CARD**, page 43

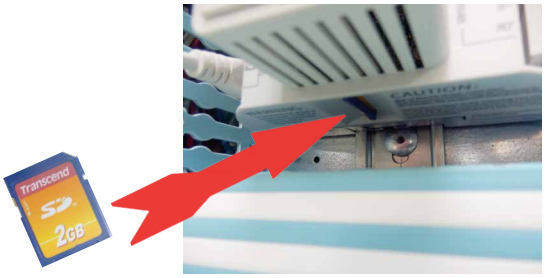
The procedure is specific according to the regulator type.

11.3.1. SYSAQUA 20/25/30/35/40/45/55/65/75/90/105/125

The reprogramming procedure:

1. Put the SD card SD N°1 in read / write mode
2. Switch on the regulator and wait until the LED is green

3. Insert the SD card N ° 1 for 1sec, remove it, then insert it again. The red / green flashing indicates that the controller is reprogramming.
4. Wait until the LED is orange then switch off the regulator.
5. Switch on the regulator again and recover the SD card N°1
6. Insert the SD card N°2 and load the parameters using the password 6000 (Refer to the § **RELOADING PARAMETERS FROM AN SD CARD**, page 44)

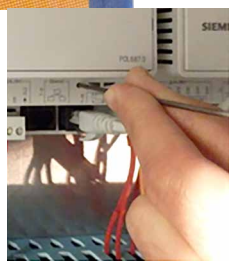


11.3.2. SYSAQUA 140/150/170/190/210

The reprogramming procedure:

1. Put the SD card SD N°1 in read / write mode
2. Switch on the regulator and insert the SD card N°1

3. Press the reset button with a rod



4. Press and hold and turn on the regulator. The red / green flashing indicates that the controller is reprogramming. The reset button can be released.

5. Wait until the LED is orange then switch off the regulator.
6. Switch on the regulator and recover the SD card N°1
7. Insert the SD card N°2 and load the parameters using the password 6000 (Refer to the § **RELOADING PARAMETERS FROM AN SD CARD**, page 44)

12. OVERVIEW OF THE HMI

12.1. SYSAQUA 20/25/30/35/40/45/55/65/75/90/105/125

Main overview

Current mode	Red. H
Entering water T.	42.3°C
Leaving water T.	45.2°C

Main Menu

Status
Commissioning
Services
Access

Status

HMI state	Delegate
HMI mode	Automatic
State from	Schedul.
Mode from	HMI
Cooling setp.	8.0°C
Current setp. cool	8.0°C
Heating setp.	44°C
Current setp. heat	44°C
Load	0.0%
Capacity	0.0%
Hydraulic circuit	
Circuit 1	

Commissioning

03.02.2016	10:40:05

Language selection
Communications
Glycol protection
Auto change over
Water Law
Reduced mode
Limited capacity
Cold OAT protection
Small volume protection
Calendar
Versions

Service

Configuration
Manual control
Deice
Operation hours
Lock out
Inputs-Outputs
Parameters
Archives

HMI state

✔ Delegate
Off
On
Reduced
Limited capacity

HMI mode

✔ Automatic
Cooling
Heating

Hydraulic circuit

Pump0	Off
Pump1	Off
	0.0%
Pump2	off
Water pressure	0.0bar
Flow switch	Fault

Circuit 1

Operating mode	off
Compressor 1	off
Compressor 2	off
Source Fan	Stage 1
Source Fan	0.0%
Entering water T.	42.3°C
Leaving water T.	45.2°C
Water delta T°	2.9K
Evaporating P.	0.0 bar
Evaporating T.	0.0°C
Suction T.	0.0°C
Exp. valve	100%
Superheat	0.0dK
Condensing P.	0.0 bar
Condensing T.	0.0°C
Discharge T.	0.0°C
Outer air T.	0.0°C
Coil T°.	0.0°C

Language selection

HMI Language	English
+AlarmSnapshot	
Save -> SD	Français
+Modem	
SMS language	English

Communication overview

Ethernet
Modbus
BACnet IP
BACnet MSTP
LON
Cloud

Glycol protection

Type	No
Glycolconcentr.	0%

Auto change over

Pivot temperature	20°C
Pivot hysteresis	5K

Water Law

Compensation	Disable
Cooling mode	
-Point A : OAT	10.0°C
-Point A : Delta	6.0dK
-Point B : OAT	30.0°C
-Point B : Delta	0.0dK
Heating mode	
-Point A : OAT	0.0°C
-Point A : f	45.0 °C
-Point B : OAT	10.0 °C
-Point B : f	40.0 °C
-Point C : OAT	15.0 °C
-Point C : f	35.0 °C

Reduced mode

Reduced mode type	
Decreased cool. setp	
Decreased cool. setp	
-Wat.t.night sh.C	2.0K
Eco mode	
-Water t.eco sh.C	3.0K
-Water t.eco sh.H	3.0K
Low noise	
-Circuit 1	
-P. evp. delta	2.0 bar
-P. cond. delta	2.0 bar

Limited capacity

Low load lim.	50 %

Cold OAT protection

Shut-off temp.	-20°C
Restart hysteresis	4K

Low water volume

Activate protection	No
SPH enveloppe limitation	
Offset	2.0K
Kp adaptation in cooling	
-temp dev.	2.0K
-Kp	2.0
Kp adaptation in heating	
-temp dev.	2.0K
-Kp	3.0

Calendar

	On
Monday	Off
Copy schedule	Mo to
Tuesday	On
Wednesday	On
Thursday	On
Friday	On
Saturday	Off
Sunday	Off
Exception	Off

Versions

App. version	104
Controler BSP	10.36
Extension BSP	10.32

Configuration

Fan	
Pump	
Circuit control	
Contacts D1 D2	
dT ret./sup. temp	20K
Control on	Return t
Commissioning	

Manual control

Manual test	Disabled
Fan	
-Circuit 1	Off
	0 %
Pumpe	Off
Pumpe2	Off
	0 %
Pumpe2	Off
	0 %

Deice

TOaDefr	15.0°C
DefrDlyLimCap	5min
DefrDlyForb	45min
DefrTiMinHtgOn	5min
Init. condition 1	
-OCt or TEvp	1.0
-DefrDTOAT1	2.0°C
-DefrDTOAT2	7.0°C
-DefrDTDT1	10.0 dK
-DefrDTDT2	13.0 dK
-DefrDTDT3	16.0 dK
-DefrDTDT4	18.0 dK
Init. condition 2	
-TOaPrvDefr	7.0°C
-Deice prev. delay	240min
Init. condition 3	
-PEvpDefrMin	2.4bar
Init. condition 4	
-dT defrost shutdown	9.0 K
End. condition 1	
Sour.t.defr.fin.	18.0°C
Deice	
-Circuit 1	No

Operation hours

Circuit 1	
Compressor 1	0.0 h
	0
Compressor 2	0.0 h
	0
Reversing valve	0.0 h
Pump1	0.0 h
Pump2	0.0 h

Lock out

Circuit 1	
-Compressor 1	Enabled
-Compressor 2	Enabled
-offCnd	AllCprAlm

Save / load

SD-Card	Readwrite
Settings save-> SD	
Set appli.default	
+Settings load <- SD	
Filter	
Restart required !	
Sett. service load	
Sett. factory load	
Sett. service save	
Sett. factory save	
a-snapshot sa.-> SD	
BSP load	

Archives

SD-Card	Readwrite
State	Running
Save-> SD	None
Nbr. actuel objects	30
Nbr. config. objects	30
reconfigure	Passive

Fan configuration

Source fan type	Modulat.
Circuit 1	
-Mod. fan max speed	100%
-Mod. fan min speed	10%
-Mod. fan pressure se	18bar
-Mod. fan pressure de	10bar

Pump configuration

Pump	Single
Continuous pump	Off
Modulation	2 stages
Acceleration delay	10 s
Anti seizing act.	Active
Anti-seizing frequency	72h
Anti-seizing duration	120s
Mod. pump max speed	80.0%
Mod. pump min speed	40.0%
Mod. pump standby speed	20.0%
Capacity for max speed	100.0%

Refrig.circuit config

Forced defr.time	2min
Circuit 1	
-Preheat duration	30min
-LOP envelope	30s
-Min. on compr.	90s
-Min. off compr.	120s
-Evap. pres. leak	1.0bar
-Cond. pres. leak	1.0bar

Contacts D1 D2

Contacts D1 ON/OFF	NO
Contacts D2	None
After modification of value	
Restart required !	

English

12.2. SYSAQUA 140/150/170/190/210

Main overview

Current mode	Red. H
Entering water T.	42.3°C
Leaving water T.	45.2°C

Main Menu

Status
Commissioning
Services
Access

Status

HMI state	Delegate
HMI mode	Automatic
State from	Schedul.
Mode from	HMI
Cooling setp.	8.0°C
Current setp. cool	8.0°C
Heating setp.	44°C
Current setp. heat	44°C
Load	0.0%
Capacity	0.0%
Hydraulic circuit	
Circuit 1	
Circuit 2	

Commissioning

03.02.2016	10:40:05

Language selection
Communications
Glycol protection
Auto change over
Water Law
Reduced mode
Limited capacity
Cold OAT protection
Small volume protection
Calendar
Versions

Service

Configuration
Manual control
Deice
Operation hours
Lock out
Inputs-Outputs
Parameters
Archives

HMI state

✔Delegate
Off
On
Reduced
Limited capacity

HMI mode

✔Automatic
Cooling
Heating

Hydraulic circuit

Pump0	Off
Pump1	Off
	0.0%
Pump2	off
Water pressure	0.0bar
Flow switch	Fault

Circuit 1

Operating mode	off
Compressor 1	off
Compressor 2	off
Source Fan	Stage 1
Source Fan	0.0%
Entering water T.	42.3°C
Leaving water T.	45.2°C
Water delta T°	2.9K
Evaporating P.	0.0 bar
Evaporating T.	0.0°C
Suction T.	0.0°C
Exp. valve	100%
Surperheat	0.0dK
Condensing P.	0.0 bar
Condensing T.	0.0°C
Discharge T.	0.0°C
Outer air T.	0.0°C
Coil T°.	0.0°C

Language selection

HMI Language	English
+AlarmSnapshot	
Save -> SD	Français
+Modem	
SMS language	English

Communication overview

Ethernet
Modbus
BACnet IP
BACnet MSTP
LON
Cloud

Glycol protection

Type	No
Glycolconcentr.	0%

Auto change over

Pivot temperature	20°C
Pivot hysteresis	5K

Water Law

Compensation	Disable
Cooling mode	
-Point A : OAT	10.0°C
-Point A : Delta	6.0dK
-Point B : OAT	30.0°C
-Point B : Delta	0.0dK
Heating mode	
-Point A : OAT	0.0°C
-Point A : f	45.0 °C
-Point B : OAT	10.0 °C
-Point B : f	40.0 °C
-Point C : OAT	15.0 °C
-Point C : f	35.0 °C

Reduced mode

Reduced mode type	
Decreased cool. setp	
Decreased cool. setp	
-Wat.t.night sh.C	2.0K
Eco mode	
-Wat.t.eco sh.C	3.0K
-Wat.t.eco sh.H	3.0K
Low noise	
-Circuit 1	
-P. evp. delta	2.0 bar
-P. cond. delta	2.0 bar
-Circuit 2	
-P. evp. delta	2.0 bar
-P. cond. delta	2.0 bar

Limited capacity

Low load lim.	50 %

Cold OAT protection

Shut-off temp.	-20°C
Restart hysteresis	4K

Low water volume

Activate protection	No
SPH enveloppe limitation	
Offset	2.0K
Kp adaptation in cooling	
-temp dev.	2.0K
-Kp	2.0
Kp adaptation in heating	
-temp dev.	2.0K
-Kp	3.0

Calendar

	On
Monday	Off
Copy schedule	Mo to
Tuesday	On
Wednesday	On
Thursday	On
Friday	On
Saturday	Off
Sunday	Off
Exception	Off

Versions

App. version	104
Controler BSP	10.36
Extension BSP	10.32

Configuration

Fan	
Pump	
Circuit control	
Contacts D1 D2	
dT ret./sup. temp	20K
Control on	Return t
Commissioning	

Manual control

Manual test	Disabled
Pumpe	Off
	0 %
Pumpe1	Off
Pumpe2	Off
Fan	
-Circuit 1	Off
	0 %
-Circuit 2	Off
	0 %
Reversing valve	
-Circuit 1	Off
-Circuit 2	Off
Exp. valve	
-Circuit 1	0 %
-Circuit 2	0 %

Deice

TOaDefr	15.0°C
DefrDlyForb	45min
DefrTiMinHtgOn	5min
Cir. 1 fan min spd	25%
Cir. 2 fan min spd	25%
Init. condition 1	
-OCt or TEvp	1.0
-DefrDTOAT1	2.0°C
-DefrDTOAT2	7.0°C
-DefrDTDT1	10.0 dK
-DefrDTDT2	13.0 dK
-DefrDTDT3	16.0 dK
-DefrDTDT4	18.0 dK
Init. condition 2	
-TOaPrvDefr	7.0°C
-Deice prev. delay	240min
Init. condition 3	
-PEvpDefrMin	2.4bar
Init. condition 4	
-dT defrost shutdown	9.0 K
End. condition 1	
-Dry coil temp.	18.0°C
Deice	
-Circuit 1	No
-Circuit 2	No

Operation hours

Circuit 1	
Compressor 1	0.0 h
	0
Compressor 2	0.0 h
	0
Reversing valve	0.0 h
Circuit 2	
Compressor 1	0.0 h
	0
Compressor 2	0.0 h
	0
Reversing valve	0
Pump1	0.0 h
Pump2	0.0 h

Lock out

Circuit 1	
-Compressor 1	Enabled
-Compressor 2	Enabled
-offCnd	AllCprAlm
Circuit 2	
-Compressor 1	Enabled
-Compressor 2	Enabled
-offCnd	AllCprAlm

Save / load

SD-Card	Readwrite
Settings save-> SD	
Set appli.default	
+Settings load <- SD	
Filter	
Restart required !	
Sett. service load	
Sett. factory load	
Sett. service save	
Sett. factory save	
a-snapshot sa.-> SD	
BSP load	

Archives

SD-Card	Readwrite
State	Running
Save-> SD	None
Nbr. actuel objects	30
Nbr. config. objects	30
reconfigure	Passive

Fan configuration

Source fan type	Modulat.
Circuit 1	
-Mod. fan max speed	100%
-Mod. fan min speed	10%
-Mod. fan pressure se	18bar
-Mod. fan pressure de	10bar
Circuit 2	
-Mod. fan max speed	100%
-Mod. fan min speed	10%
-Mod. fan pressure se	18bar
-Mod. fan pressure de	10bar

Pump configuration

Pump	Single
Continuous pump	Off
Modulation	2 stages
Acceleration delay	10 s
Anti seizing act.	Active
Anti-seizing frequency	72h
Anti-seizing duration	120s
Mod. pump max speed	80.0%
Mod. pump min speed	40.0%
Mod. pump standby speed	20.0%
Capacity for max speed	100.0%
Wat. pres. setp.	8.0bar
Wat. press. val.	3.5bar

Refrig.circuit config

Forced defr.time	2min
Circuit 1	
-Preheat duration	30min
-LOP envelope	30s
-Min. on compr.	90s
-Min. off compr.	120s
-Evap. pres. leak	1.0bar
-Cond. pres. leak	1.0bar
Circuit 2	
-Preheat duration	30min
-LOP envelope	30s
-Min. on compr.	90s
-Min. off compr.	120s
-Evap. pres. leak	1.0bar
-Cond. pres. leak	1.0bar

Contacts D1 D2

Contacts D1 ON/OFF	NO
Contacts D2	None
After modification of value	
Restart required !	

13. LIST OF WARNING AND ALARMS

Message	Type	Definition	Desc.
3phdet	alarm	Phase controller	§8.7
Cpr1.inAlarm	alarm	fault in the digital output of compressor 1	§8.7
Cpr2.inAlarm	alarm	fault in the digital output of compressor 2	§8.7
DefrDTReq	warning	Defrosting by delta T	§8.10
DefrDTShdnReq	warning	Defrosting prior to circuit stop	§8.10
DefrFnsTSu	warning	Defrosting stopped due to cold water temperature	§8.10
DefrPEvpReq	warning	defrosting by low evaporation pressure	§8.10
DefrPEvpReqCnt	lock-out	defrosting by low evaporation pressure	§8.10
DefrTiOut	warning	Defrosting stopped because overlong	§8.10
ExpsVlv.inAlarm	alarm	fault of the analog output of the regulator	§8.7
FlDet/FlDet1/FlDet2	alarm	flowswitch	§8.2
FlDetCnt	lock-out	flowswitch	§8.2
FltCpr1	alarm	compressor 1 circuit breaker	§8.3
FltCpr2	alarm	compressor 2 circuit breaker	§8.3
FltDeltaT	warning	offset (LWT-EWT)	§8.2
FltSrcFan	alarm	fan circuit breaker	§8.4
FltSrcFanCnt	lock-out	fan	§8.4
FltSuPu	alarm	Single pump circuit breaker	§8.5
FltSuPu1	alarm	Dual pump n°1 circuit breaker	§8.5
FltSuPu2	alarm	Dual pump n°2 circuit breaker	§8.5
FrPrt	alarm	Anti-freeze protection	§8.2
FrPrtWarn	warning	Anti-freeze protection	§8.2
HPDet	alarm	HP pressure switch	§8.3
HPMax	warning	Max. condensation pressure	§8.3
HPmaxPrt	warning	Max. condensation pressure protection	§8.3
HPMin	warning	Min. condensation pressure	§8.3
HPMinCnt	lock-out	Min. condensation pressure	§8.3
LOP	warning	Min. evaporation pressure	§8.3
LOPCnt	lock-out	Min. evaporation pressure	§8.3
LOPPrt	warning	Min. evaporation pressure	§8.3
MOP	warning	Max. evaporation pressure	§8.3
MOPCnt	lock-out	Max. evaporation pressure	§8.3
NoCprAvl	warning	No compressor available	
OilHtr.inAlarm	alarm	fault of the digital output of the carter resistors	§8.7
OllHtrStup	warning	Unit preheating	§5.7
PCdn.inAlarm	alarm	Fault in the sensor analog input	§8.6
PCdn.openLoop	alarm	Sensor in open loop	§8.6
PCdn.shortedLoop	alarm	sensor shorted	§8.6
PEvp.inAlarm	alarm	Fault in the sensor analog input	§8.6
PEvp.openLoop	alarm	Sensor in open loop	§8.6
PEvp.shortedLoop	alarm	sensor shorted	§8.6
PRmax	warning	Max. pressure ratio	§8.3
PRMaxCnt	lock-out	Max. pressure ratio	§8.3
PRmin	warning	Min. pressure ratio	§8.3
PRMinCnt	lock-out	Min. pressure ratio	§8.3
RfgLoLvl	alarm	coolant leak	§8.7
RvrVlv.inAlarm	alarm	fault in the analog output of the inverter valve	§8.7
SH.LowLim	warning	low overheating	§8.3

Message	Type	Definition	Desc.
SrcFan.inAlarm	alarm	fault of the digital output of the fans	§8.7
TDcrgGas.inAlarm	alarm	Fault in the sensor analog input	§8.6
TDcrgGas.openloop	alarm	Sensor in open loop	§8.6
TDcrgGas.shortedloop	alarm	sensor shorted	§8.6
TDcrHiAlmCnt	lock-out	backflow temperature	§8.3
TiInvld	warning	invalid time	§8.1
TOa.inAlarm	alarm	Fault in the sensor analog input	§8.6
TOa.openloop	alarm	Sensor in open loop	§8.6
TOa.shortedLoop	alarm	sensor shorted	§8.6
TOAPrevDefrReq	warning	delayed defrosting	§8.10
TRt.inAlarm	alarm	Fault in the sensor analog input	§8.6
TRt.openloop	alarm	Sensor in open loop	§8.7
TRt.shortedLoop	alarm	sensor shorted	§8.6
TSrcExg.inAlarm	alarm	Fault in the sensor analog input	§8.6
TSrcExg.openloop	alarm	Sensor in open loop	§8.6
TSrcExg.shortedloop	alarm	sensor shorted	§8.6
TSu.inAlarm	alarm	Fault in the sensor analog input	§8.6
TSu. openloop	alarm	Sensor in open loop	§8.6
TSu.shortedLoop	alarm	sensor shorted	§8.6
TSuctGas.inAlarm	alarm	Fault in the sensor analog input	§8.6
TSuctGas.openloop	alarm	Sensor in open loop	§8.6
TSuctGas.shortedloop	alarm	sensor shorted	§8.6
FltHyCrt	alarm	Hydraulic	
FltHyCrtCnt	lock-out	Hydraulic	

As part of our ongoing product improvement programme, our products are subject to change without prior notice. Non contractual photos.

Systemair AC SAS
Route de Verneuil
27570 Tillières-sur-Avre
FRANCE
✆ : +33 (0)2 32 60 61 00
🖷 : +33 (0)2 32 32 55 13

J581604GB

UM AQA 01-N-4GB
Part number : **J581604GB**
Supersedes : **UM AQA 01-N-3GB**