Electronic Controller User Manual

Lync AEGIS Controller

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Contents

1. INTRODUCTION

The Aegis heat pump water heater comes equipped standard with an Eliwell PLC controller, Carel touchscreen interface, and an available LAN interface. Certain configurations depend on plant engineering choices and must not be changed in any way except by expert personnel.

The unit can be controlled in three ways:

1. Directly via the built-in display on the main electronic controller
2. Via remote terminal/touch screen
3. Via web interface via local network or remote VPN connection

The three control methods are equivalent, however there are different levels of access through dedicated passwords, to limit access to certain functions.

1.1. Supported Unit Types

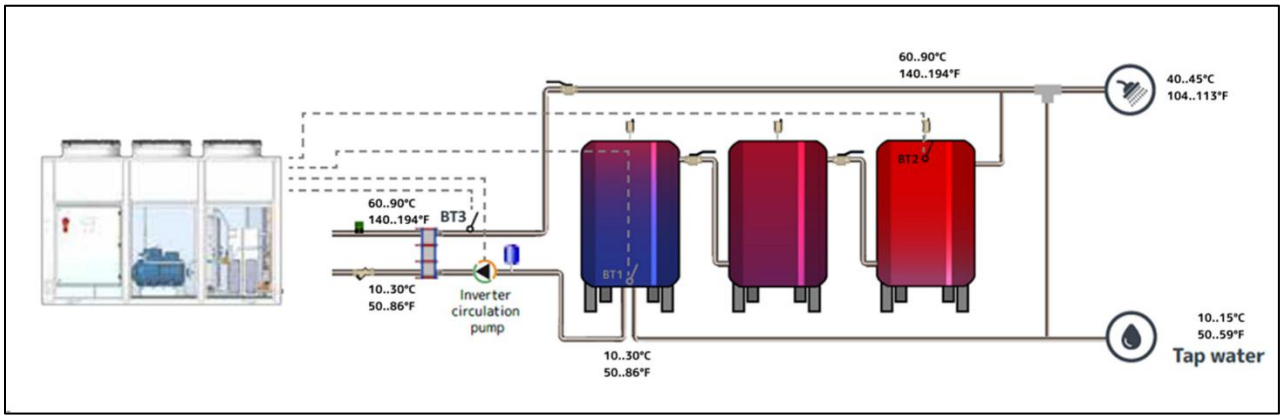


Figure 1-1: Air Source Heat Pump (A/W)

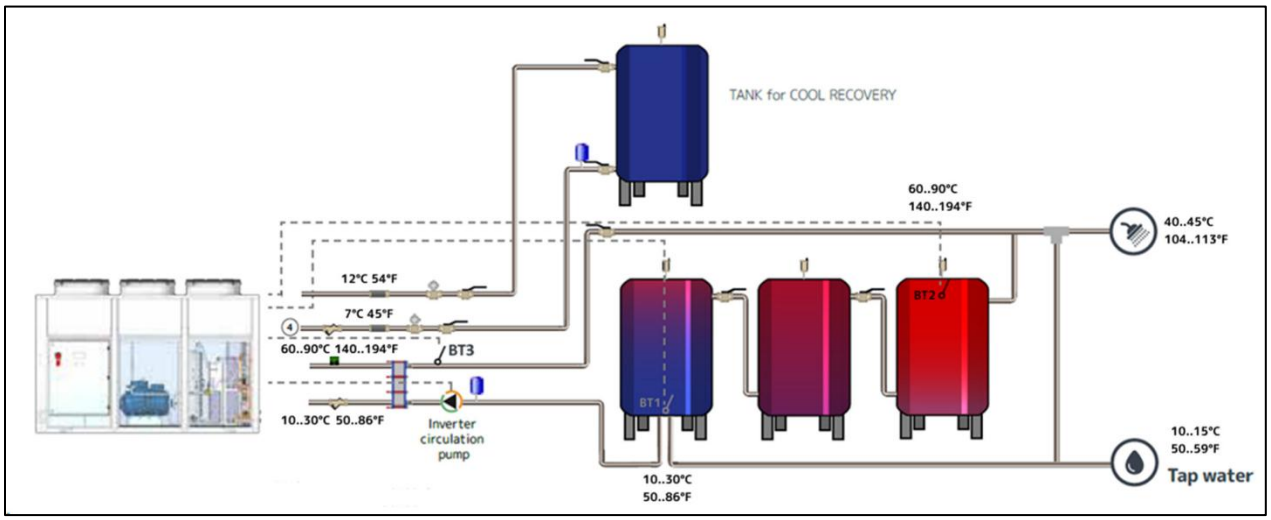


Figure 1-2: Air Source With Cool Recovery (A/W with CW recovery)

1.

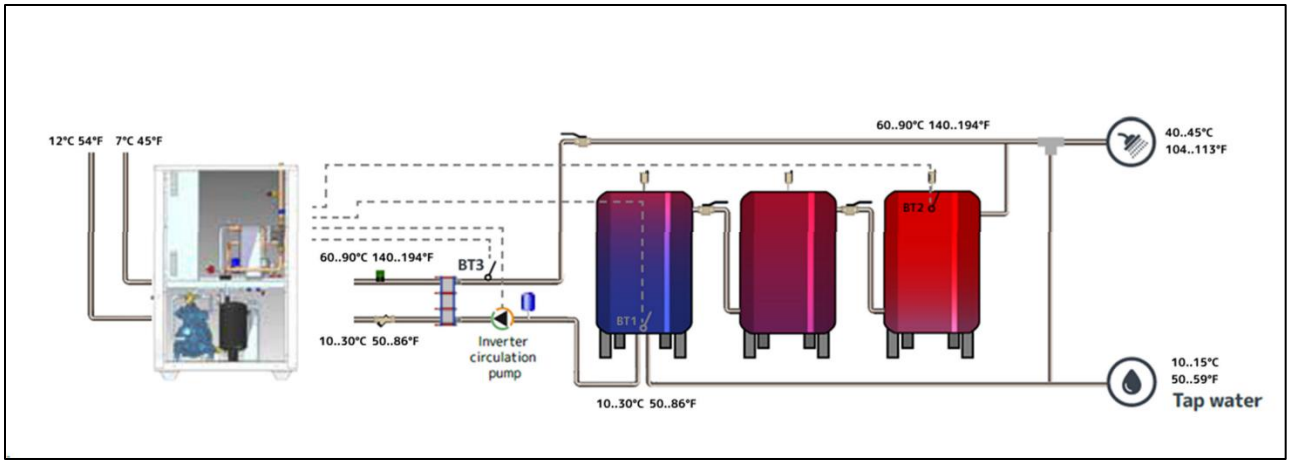


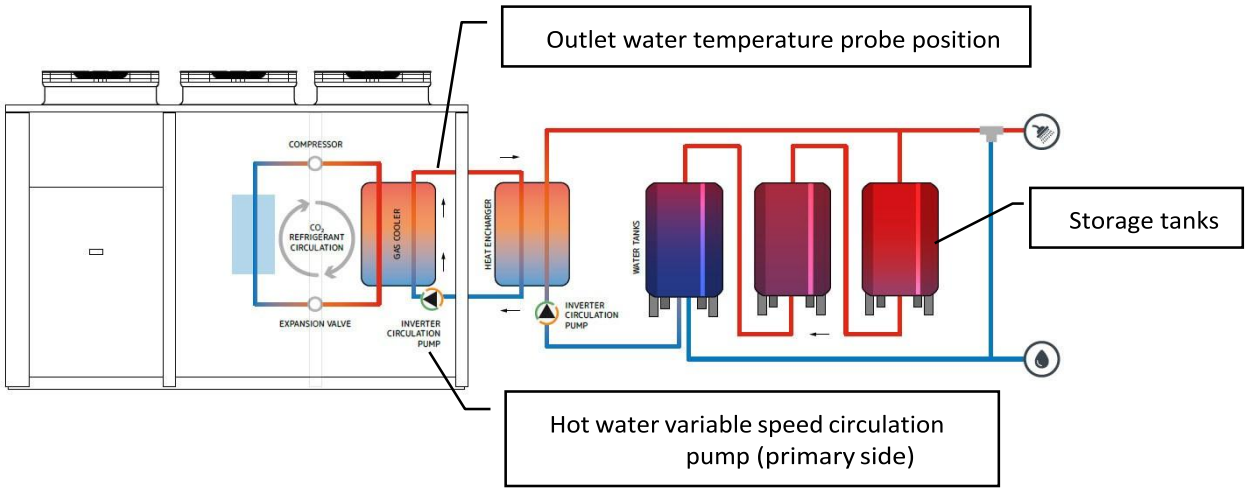
Figure 1-3: Water Source Heat Pump(W/W)

1.2. Operating Principle

The unit control software is responsible for regulating the outlet water temperature from the appliance. The parameter displayed as " ST01 Set Hot Water" is user adjustable.

Additionally, the unit control manages the circulation of water in order to ensure that the correct temperature rise in the system is maintained and will determine the need for hot water demand by monitoring the water temperature in the storage tanks.

Please note that the delivery temperature is regulated by modulating the pump, therefore the flow of hot water at the outlet is not constant.

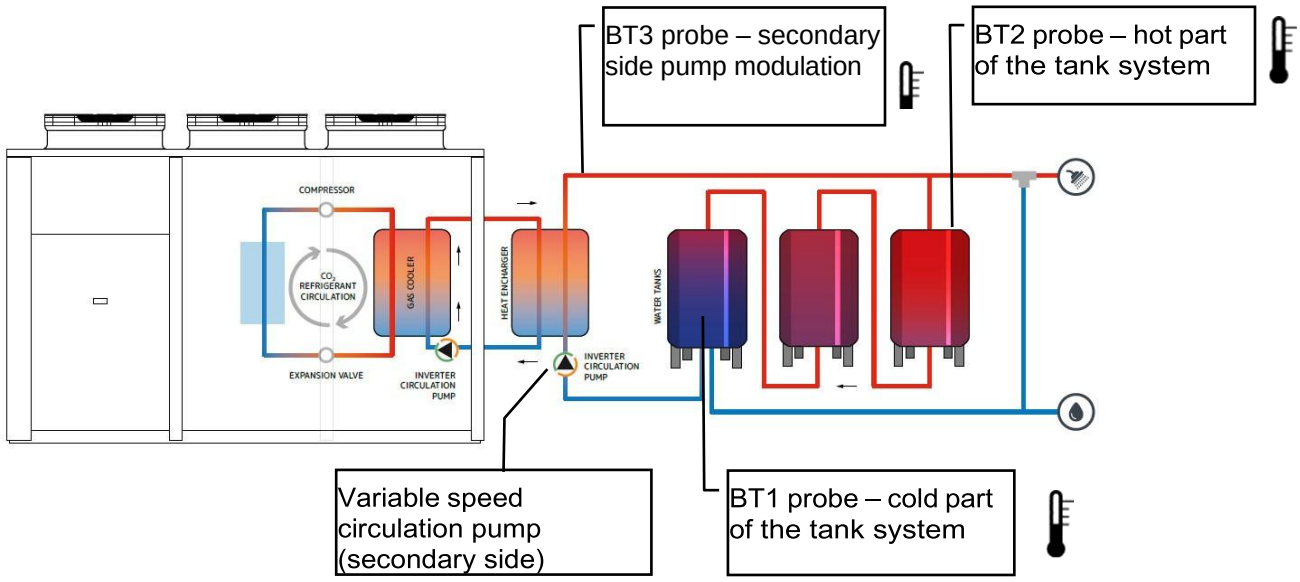


1.3. Sequence Of Operation

The hot water storage tanks used in this heating system must be equipped with the two provided temperature sensors, or other sensors meeting requirements for a NTC 10k sensor. The optional BT2 sensor (hot side probe) is located in the top of the last storage tank in the series, near the supply outlet. The (BT1) sensor (cold side probe) is placed in the bottom of the first storage, near cold return water connection.

The BT3 sensor is located on the outlet of the external heat exchanger (see dedicated section) and is needed to modulate the circulation pump placed between the heat exchanger and the storage tanks. Installation of BT1, BT2, and BT3 probes must be done by the installer prior to operation.

Note that the tanks must be hydraulically connected in series as shown below, not in parallel.



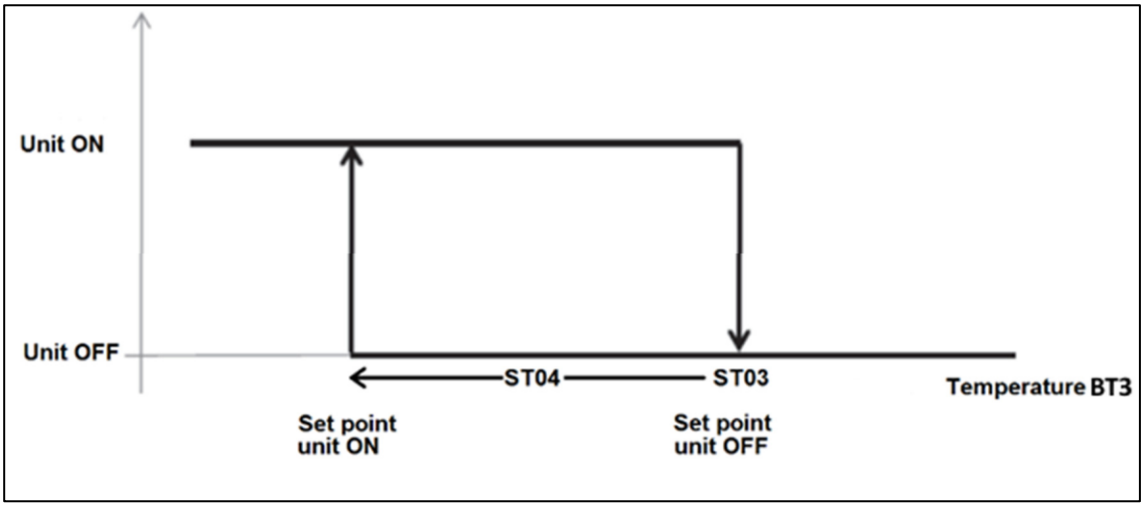
When the temperature probe BT1 reaches the value "Set point unit ON", (set point (ST03) minus differential (ST04)), the unit will be turned on. The unit will continue to heat the water to the set temperature as long as the temperature BT1 remains below the “Set point unit OFF” value (ST03). Once BT1 reaches "Set point unit OFF" the unit will be turned off.

To limit the possible discomfort that can be generated by excessive heat dissipation the probe BT2 may be used to operate a "comfort" function. In this case, even if the temperature BT1 is higher than the value of "Set point unit OFF", the unit operate when the BT2 is lower than a value of "Set point comfort ON".

Operation with only the BT1 probe is allowed, while the use of the BT2 probe requires the presence of the BT1 probe. The unit will turn off only when both the BT1 and BT2 temperatures are greater than the related set points.

IMPORTANT

The unit will begin to run with only the BT1 probe, regardless of BT2 probe. If the unit runs based on the BT2 probe, regulation with BT1 probe will also start automatically, even if the starting parameter (ST02) is OFF.



Please refer to Aegis Electronic Controller Manual (L-OMM-013) for information on enabling and choosing between local analog and remote digital input.

1.4. Version With Cool Recovery (Air Source Unit Only)

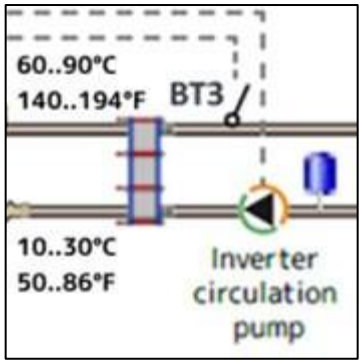
Using the cool recovery option, heat can be drawn from a water stream rather than the ambient air, thus providing cooling to a water loop. This can be used to not only increase the performance of the heat pump, but also increase the performance of water loops such as a central chilled water system. See section 0 for further details on how to activate and control this function.

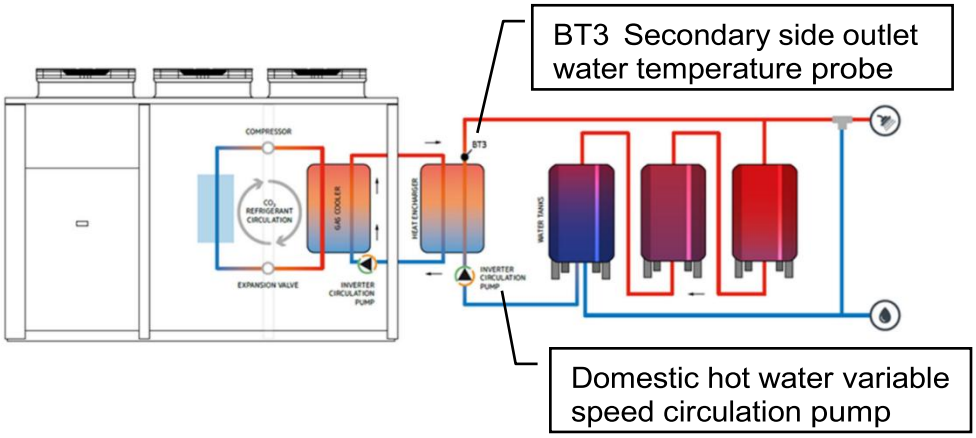
NOTE: This option is available only for the Air source unit.

1.5. Domestic Hot Water Pump Management

The software also manages the domestic hot water pump. The start, minimum and maximum speed can be adjusted separately for both pumps. The domestic hot water pump can be active when the unit is in standby, but this setting is strongly not recommended, to avoid the destratification of the temperature in the tanks.

Please note that the main unit pump and the domestic hot water pump operate with coordinated set points in the sense that an offset (that can be set by the user) is subtracted from the unit set point ST1 and it is used to regulate the domestic hot water pump referred to the BT3 probe. It is needed to apply a regulation offset (it must be negative) to adjust the secondary pump set point to take in consideration the temperature losses in the plate exchanger.

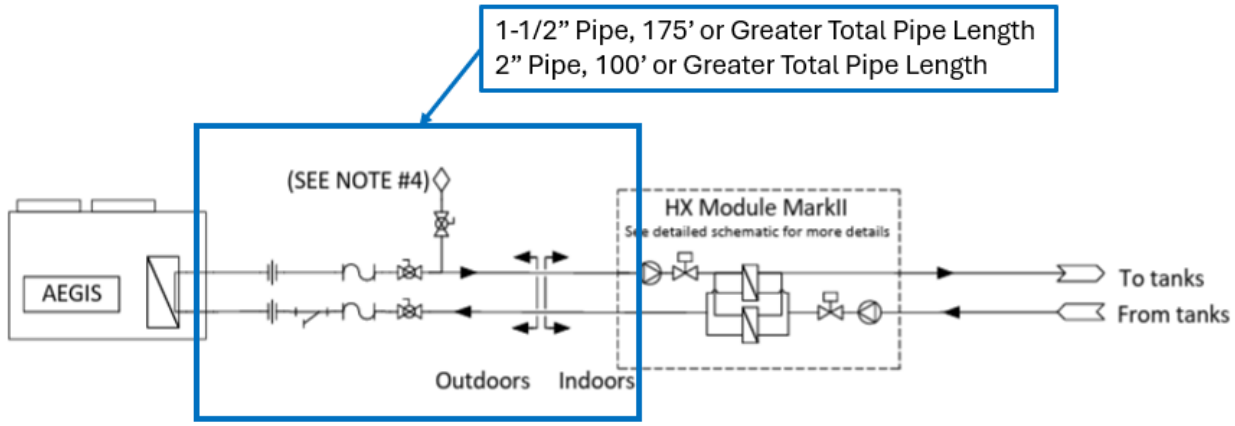




NOTE: Speed regulation of the domestic hot water pump is independent of the internal pump.

1.6. Extended Primary Loop, Secondary Pump Delay Function

For field configurations where the primary loop extends more than 175 feet of 1-1/2" pipe or 100 feet of 2" pipe, this function is recommended to be enabled. This function requires the installation of an ST4 sensor within 5 feet of the heat exchanger module with control wires running back to terminals inside the heat pump. Using the default Secondary Pump Delay Function settings will delay the activation of the secondary circulation pump until the primary loop supply water temperature reaches 120°F. This function prevents the potentially cold/tepid water within the secondary loop that has cooled since the last heating cycle from flowing through the primary loop until the heat exchanger module reaches the desired temperature of 120°F. Further installation details for the Secondary Pump Delay function can be found on the Watts Applied Solutions rep portal in document *2025-4-3 Aegis Extended Primary Loop, Secondary Pump Delay Function*.



1.7. Superheat Set Limit

For inlet water temperature > 86 °F (>30°C) the superheating is managed by 3-way bypass valve in combination to specific software improvements. The High Inlet Temperature (HIT) Function limits the superheat value with the use of the bypass valve, keeping in consideration both the compressor oil temperature and the compressor discharge temperature.

In order to optimize the cycle efficiency and at the same time avoid too high temperatures to the compressor, the target superheat value is not constant, but will be adjusted according to the compressor discharge temperature and compressor oil temperature.

This superheat limit should not be changed by a user except under direction from the manufacturer or an authorized manufacturer's representative.

1.8. High Inlet Temperature (HIT) Function

The HIT function (provided as an option) allows the heat pump to operate even with inlet water temperatures above the standard limits. It is utilized:

- for the anti-Legionella treatment (tank temperature > 60 °C (>140°F), see below)
- when domestic water recirculation is used with low water demand
- when heat pump stops for a long time and the tank thermally stratifies.

1.9. High Pressure Set Point Calculation

The high pressure set point is not fixed, but instead is calculated based on inlet water temperature, outlet water temperature, and evaporation temperature. The pressure is managed by the thermostatic valve.

The setpoint value is limited between a minimum and a maximum fixed value. Within these limit values is also active a compensation curve based on the evaporator temperature that keeps the compressor within the required operating envelope.

1.10. Anti-Legionella

Legionellosis is an infection caused by aerobic bacteria of the genus Legionella that mainly affects the respiratory system.

The proliferation of Legionella depends on the water temperature. As shown below, the disinfection is feasible through thermal shock.

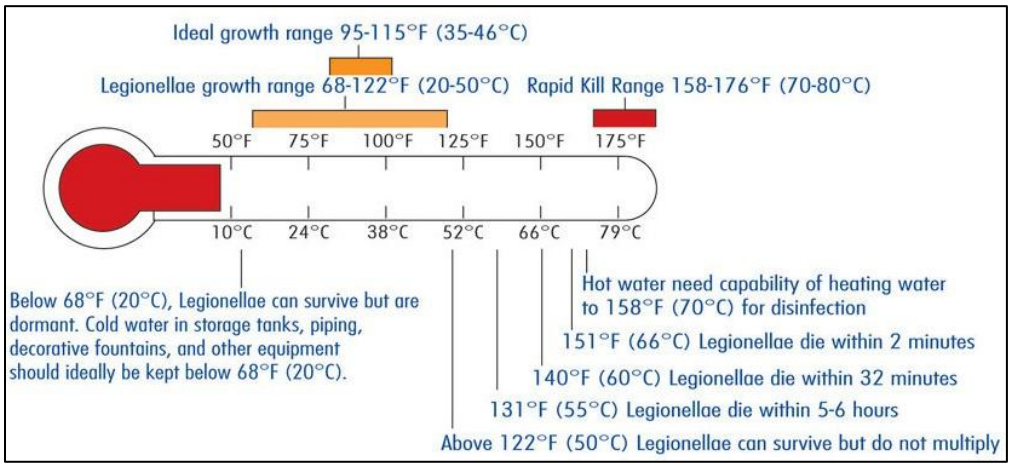


Figure 1-4: Legionella Growth Chart

The anti-Legionella function raises the water storage tanks to a high temperature and subsequently circulates to ensure complete disinfection of the system.

The anti-Legionella function, if enabled via “ALG01 Enable anti-Legionella” is activated based on a time band (if “ALG02 Enable scheduler” is set) or manually via web interface / BMS (“ALG16 Manual start” and ”ALG17 Manual stop”).

The conditions necessary to make the anti-Legionella function activable are:

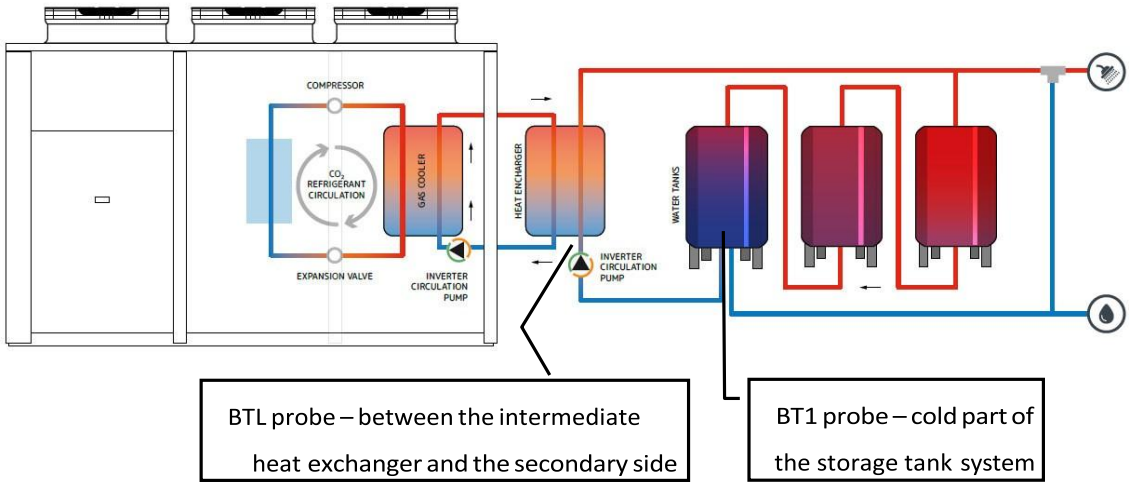
- anti-Legionella function enabled (parameter ALG01 set to ON)
- no BTL probe alarm
- no BT1 probe alarm
- absence of expansion # 1 offline alarm
- absence of expansion # 2 offline alarm

The anti-Legionella cycle consists of two phases - in phase 1 the compressor is active, and the pump modulates as per standard thermoregulation (on “ALG10 Unit anti-Legionella set”), while in phase 2 the compressor is inactive, and the pump forced to default speed (on “ALG11 Unit phase 2 pump set”):

PHASE 1

The "Anti-Legionella active" relay contact is closed. The set point “ALG10 Anti-Legionella unit set” is forced (e.g.176-194°F [80-90 ° C]);

Phase 1 ends when the BT1 probe rises above “ALG08 Phase 1 set BT1” (default = 140°F [60 ° C]) and at the same time the BTL probe reaches at least the “ALG09 Phase 1 set BTL” (default = 131°F [55 ° C]).



PHASE 2

The "Anti-Legionella active" relay contact remains closed. The "Anti-Legionella phase 1 completed" relay contact is closed

At the end of phase 1 the compressor switches off while the secondary pump is brought to a fixed speed “ALG11 Unit phase 2 pump set” until the BTL probe reaches the “ALG09 Phase 2 set BTL” (e.g. 70 ° C). The anti-Legionella cycle is considered concluded when this condition persists for a period of time “ALG12 Min. time phase 2” (e.g. 1 min).

At the end of the cycle, the "Anti-Legionella active" and "Anti-Legionella phase 1 completed" relay contacts are opened.

NOTE: The maximum time parameter of the anti-Legionella cycle “ALG06 Anti-Legionella max time” is provided (e.g. 120 min.) after which the unit returns to normal operation.

NOTE: In a defrost cycle, the defrost function has priority over the anti-Legionella function.

2. USER OPERATION VIA TOUCH SCREEN

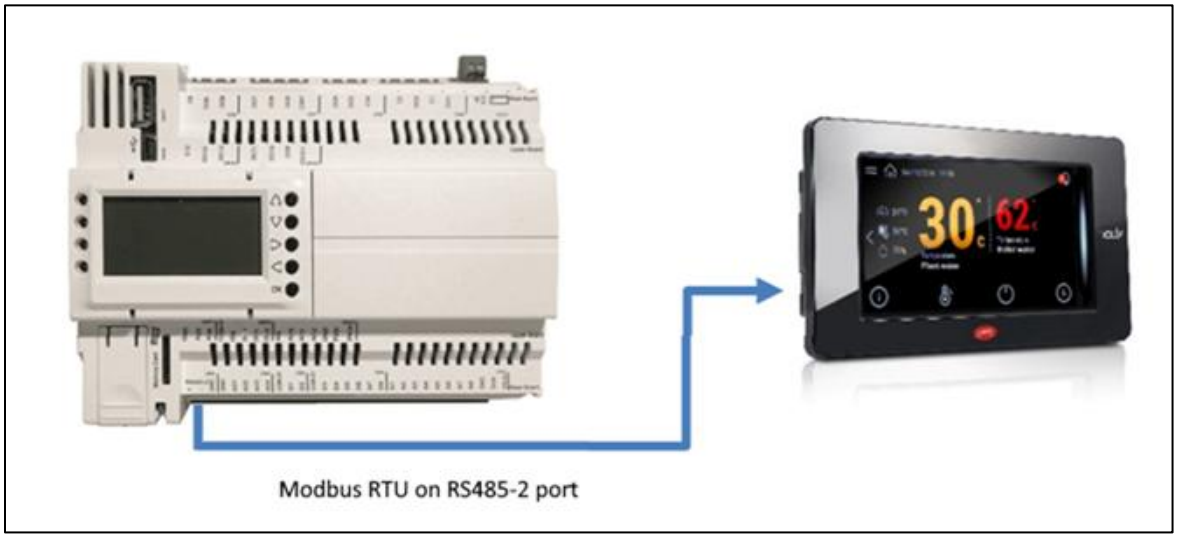
2.1. Touch Screen

The touch screen 4.3 inch graphic terminal is designed to simplify user interface with the unit. The electronic technology used and the 65K color display means high quality images and advanced functions are available for a superior appearance. The touchscreen panel makes unit operation much easier by simplifying navigation between the various screens.

2.2. Touch Screen Communivation

The touch user interface communicates with the internal controller to provide easy unit operation. This application gives the user an overview of the main parts and controls of the machine, visualization of the setpoints, the status of the main devices, and the control of the unit mode, without needing to open the unit electrical cabinet.

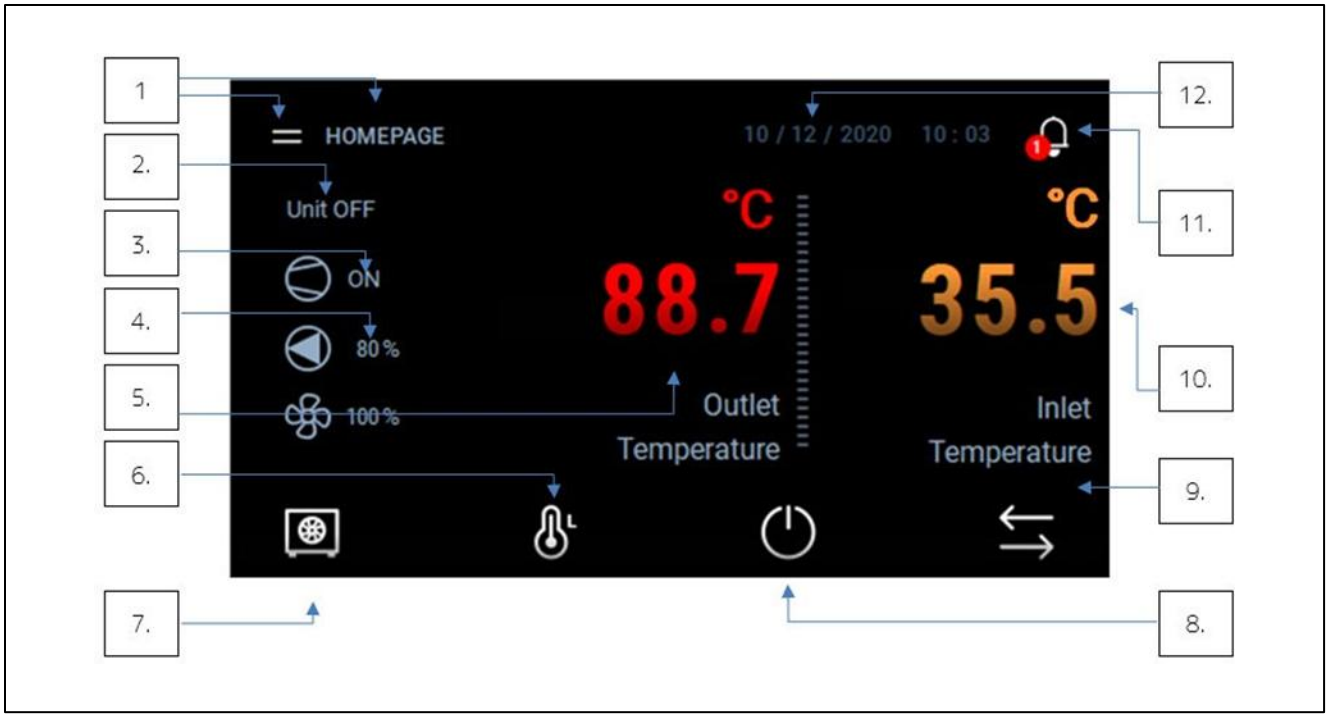
In order to communicate with the main control, the touch interface is connected through the RS485-2 serial port with the Modbus RTU protocol with a baud rate of 34800 and a communication set of 8N1.



2.3. Homepage

The homepage displays the main operating data of the unit: the unit ON / OFF status, the water inlet and outlet temperatures, as well as the status of the compressor, pump and fan speed.

At the bottom there are icons for accessing additional screens, explained in the next sections. In the presence of any alarms, their number is indicated in a red circle in the upper right corner. Press the bell icon to view its description.



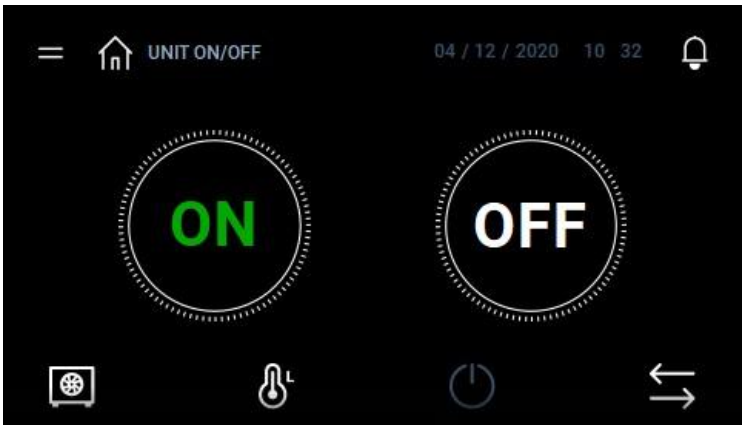
Legend

1. Main Menu and Homepage
2. Unit status
3. Compressor status
4. Primary water pump status
5. Outlet water temperature
6. Set point regulation
7. Unit Main Info
8. On/Off command
9. Input/Output list
10. Inlet water temperature
11. Alarms and warnings page
12. Date and time

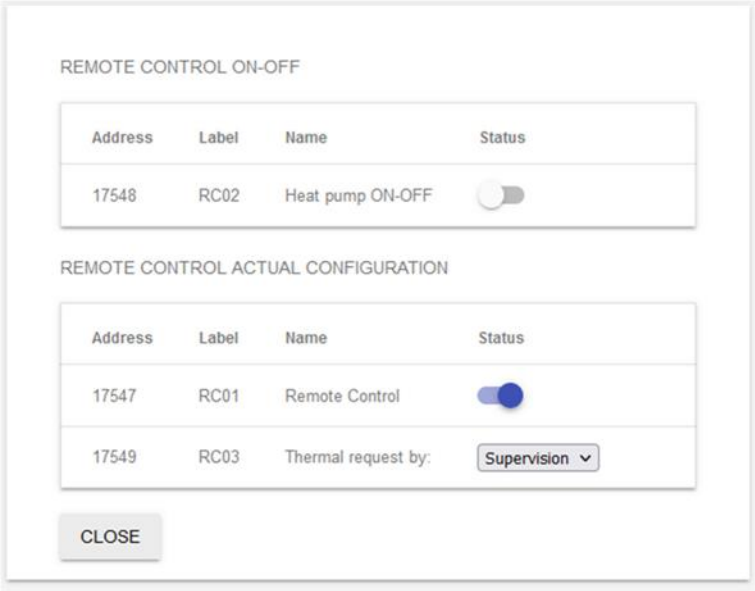
2.4. On/Off Command

The ON/OFF command is accessible from the homepage by pressing the icon:

The unit can be then turned ON or OFF via touch screen pressing the corresponding icon:



In order to use only the touch screen and no additional mechanical thermostats to switch the unit ON and OFF please access to the unit web server (see previous section), press the “REMOTE CONTROL” button located in the central area of the main screen, and set the parameters as follows:



The RC01 Remote control parameter needs to be enabled and RC03 Thermal request by set to “Supervision”. It will be still possible to use the internal web server to switch the unit ON/OFF, there is no priority between the two possibilities, the unit will execute the last issued command,

2.5. LED Bar

The led bar on the right side helps the user to recognize the status of the unit when the screen of is in stand-by mode. Three colors are used to identify the unit's status:

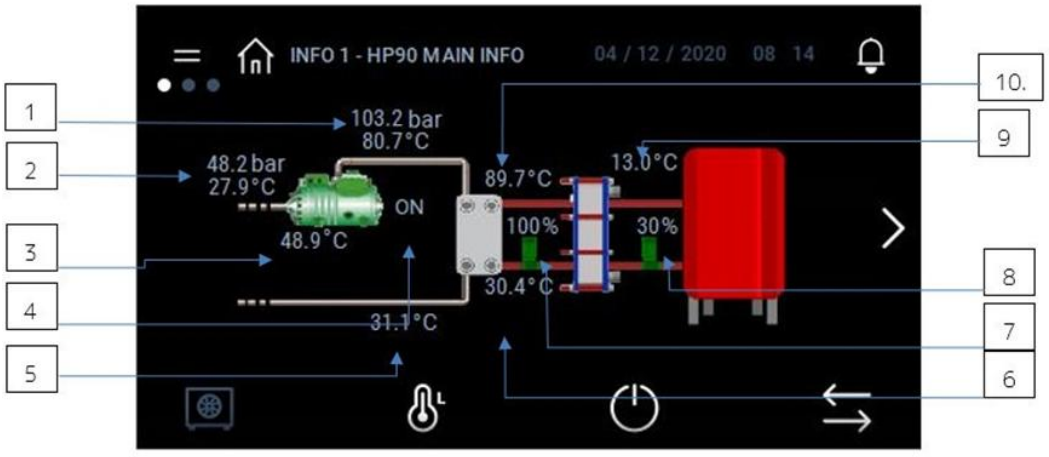
- Green → The unit is on and running
- White → The unit is on and in stand-by mode
- Red blinking → There is an alarm or warning active

2.6. Unit Main Info

Detailed unit information is accessible from the homepage by pressing the icon:

Click on the unit main info icon to see the screens showing the details about the current unit status. Move between info screens using the arrow keys.

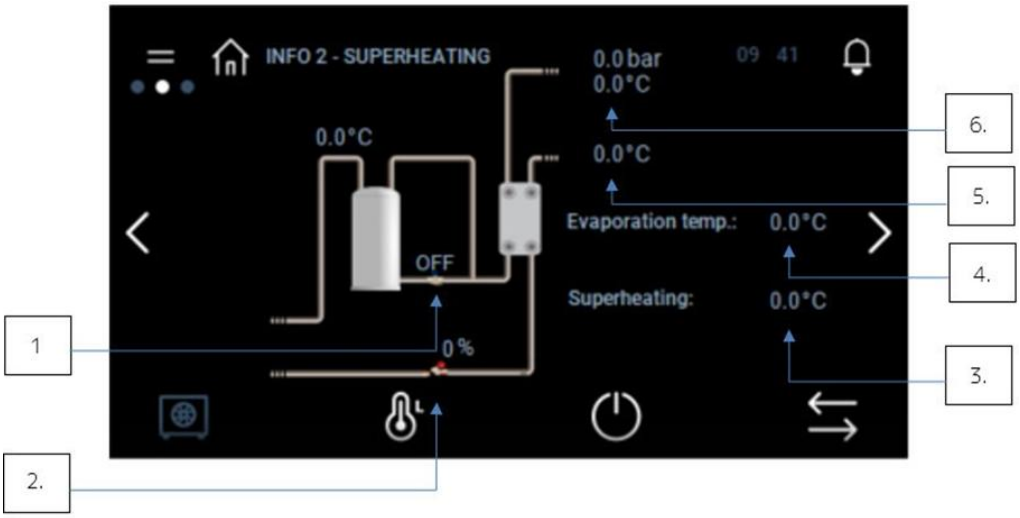
Unit Main Info 1 – Ref- Circuit Hot Side and User Water Side



Legend

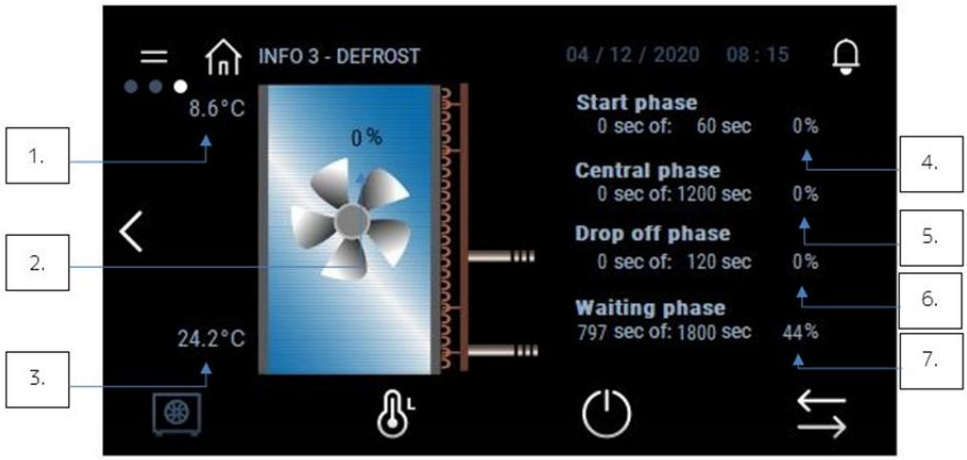
1. Refrigerant high pressure – discharge temperature
2. Low pressure – suction temperature
3. Compressor oil temperature
4. Compressor status (On/Off)
5. Refrigerant temperature after gas cooler
6. Utility hot water inlet
7. Primary water pump speed in percentage
8. Secondary water pump speed in percentage (optional/selectable)
9. Secondary side water temperature (optional/selectable)
10. Utility hot water outlet

Unit Main Info 2 – Superheating



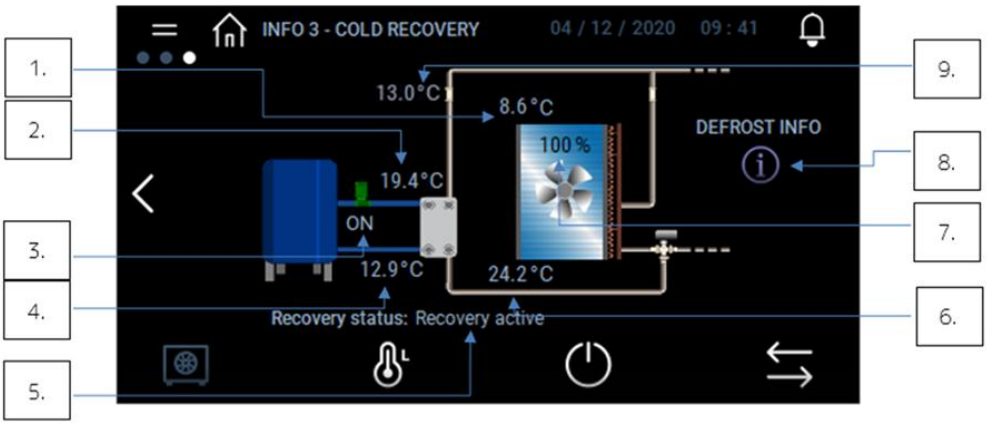
1. Oil valve status
2. Electronic expansion valve opening status (percent)
3. Superheating temperature
4. Evaporation temperature
5. Refrigerant temperature after gas cooler
6. Refrigerant low pressure / temperature before gas cooler

Unit Main Info – A/W Configuration Source Side



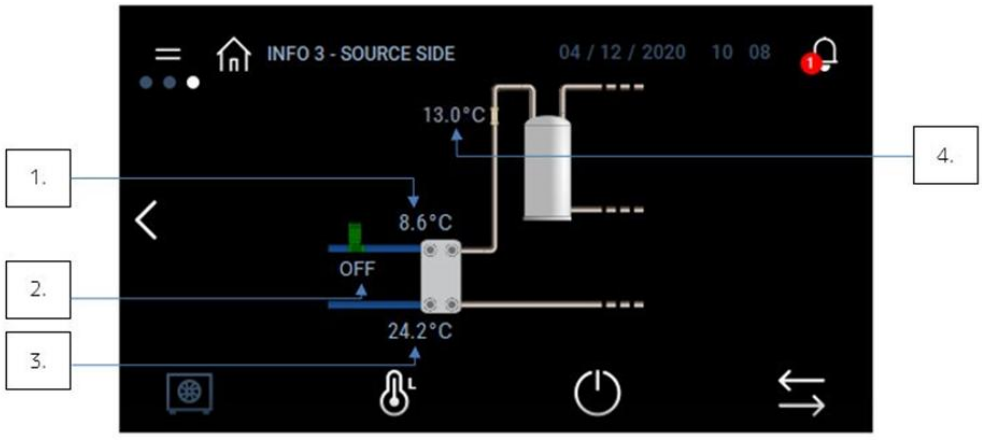
1. Source water inlet temperature
2. Condenser fan speed (percent)
3. Coil pack temperature
4. Defrost start phase (percent)
5. Defrost central phase (percent)
6. Drop off phase (percent)
7. Waiting phase (percent)

Unit Main Info – Cold Recovery Option Source Side



1. External air temperature
2. Source cold water inlet
3. Source water pump status (On/Off)
4. Source cold water outlet
5. Recovery system status
6. Coil pack temperature
7. Fan speed in percentage
8. Defrost phase info
9. Subcooling temperature

Unit Main Info – Water Source Side

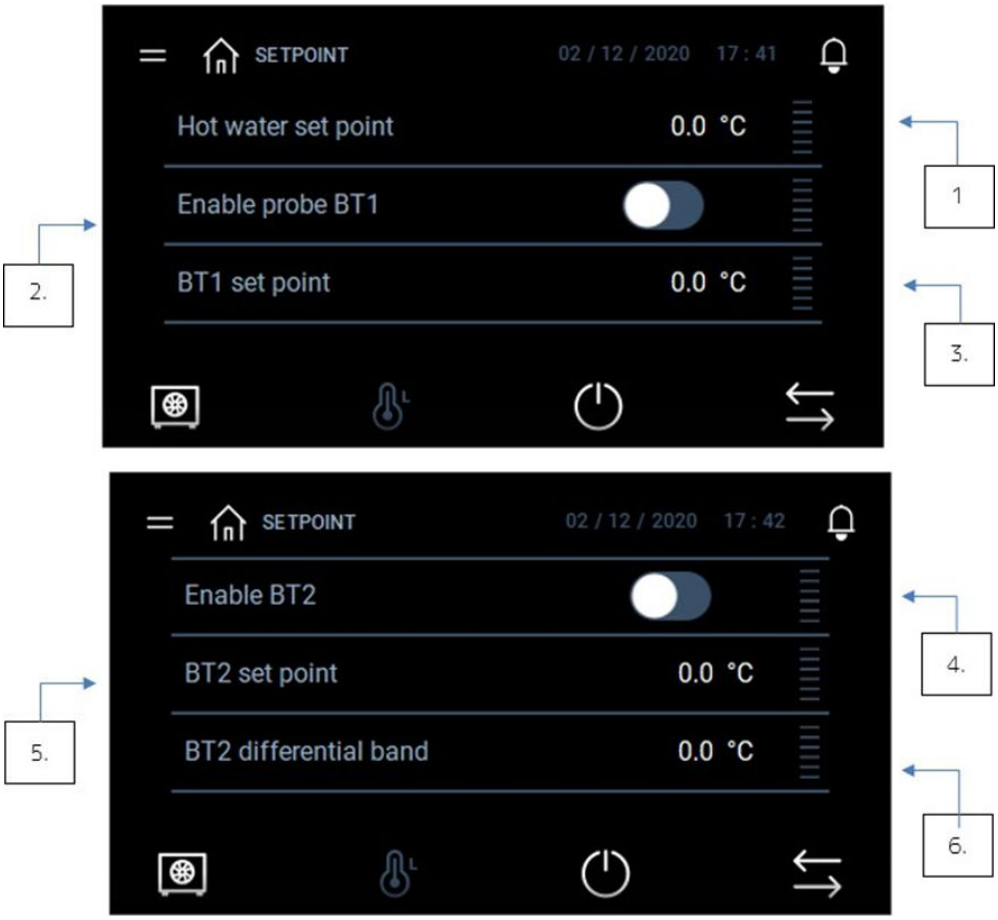


1. Source inlet water temperature
2. Source pump water status (On/Off)
3. Coil pack temperature
4. Subcooling temperature

2.7. Setpoint Menu

It is possible to modify the unit set points by pressing the Set icon from the homepage:

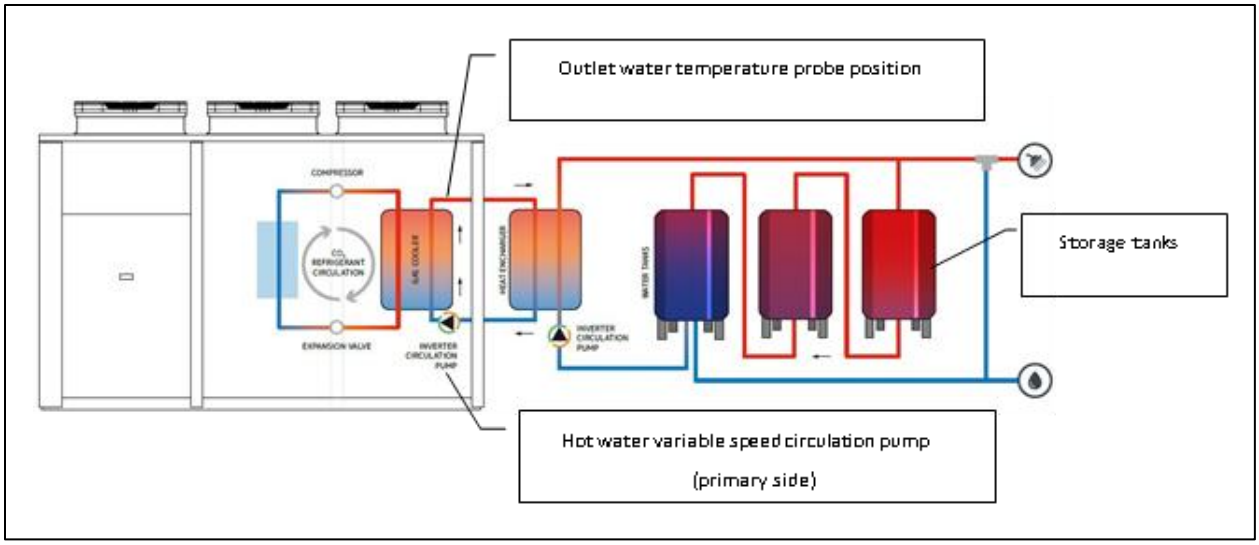
The user can set both the delivery water (Hot water set point) and the tank temperature sets BT1 and BT2.



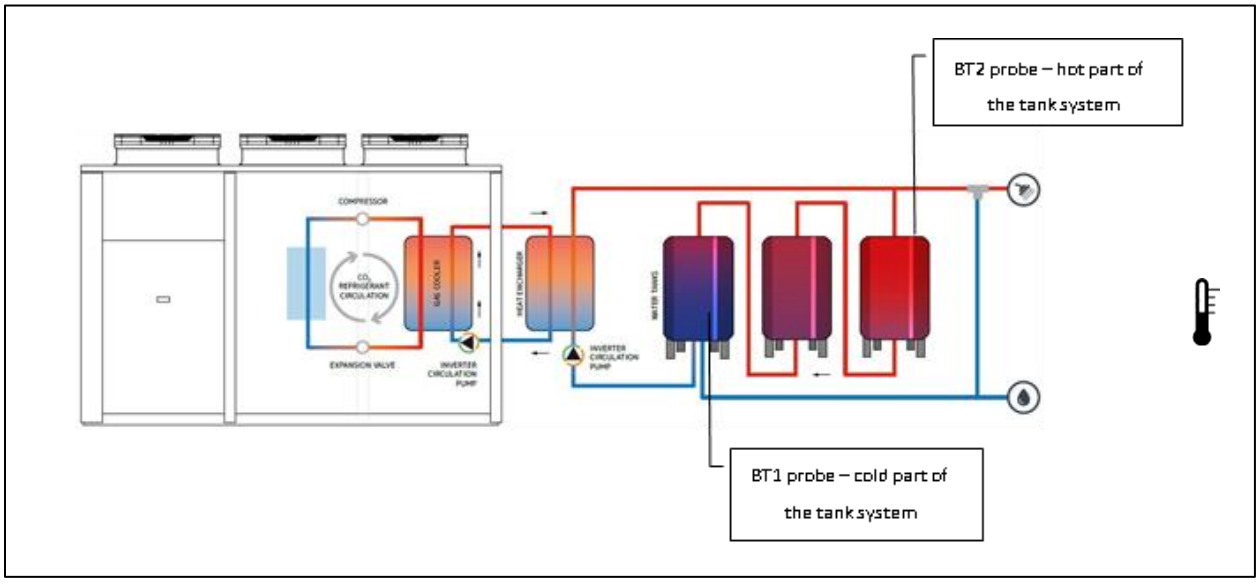
1. Domestic hot water temperature set point
2. Enable temp. probe on the first (coldest) tank
3. Setpoint of the temp. probe on the first (coldest) tank
4. Enable the temp. probe on the last (hottest) tank
5. Set point of the temp. probe on the last (hottest) tank
6. Temperature differential band of the probe on the second tank

Please note that the “Hot water set point” doesn’t directly influence the compressor ON/OFF status. The delivery temperature is regulated by modulating the primary side pump, therefore the flow of hot water at the outlet is not constant.

If the outlet temperature probe is below the set point the pump speed is decreased, while above the set temperature is increased.

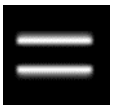


The set points BT1 and BT2 are referred to probes placed in the tanks. The BT2 sensor (hot side probe) is located in the top of the last storage tank in the series, near the supply outlet. The (BT1) sensor (cold side probe) is located in the bottom of the first storage, near cold return connection.



2.8. Main Menu

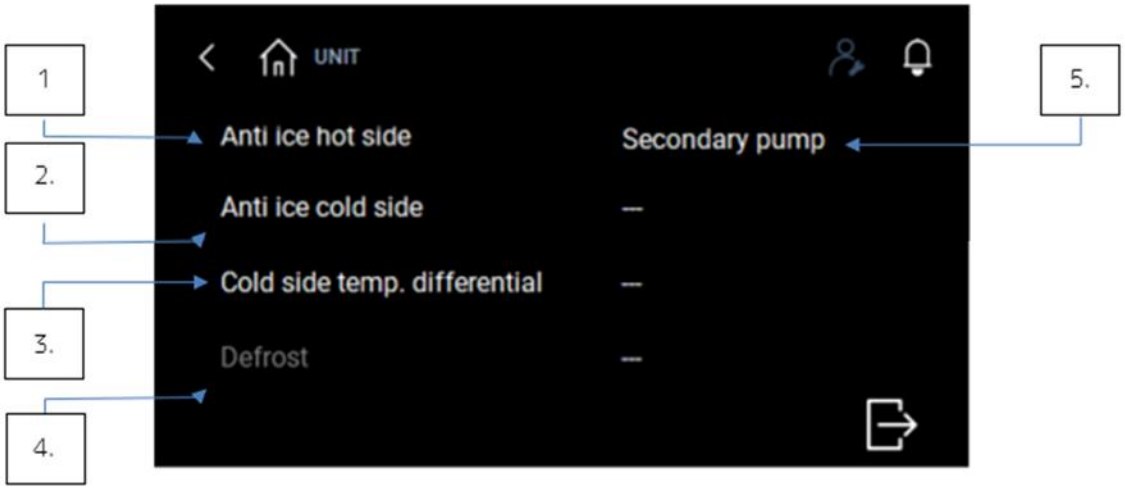
The display main menu is accessible from the homepage by pressing the icon:



1. Unit menu
2. Display settings
3. Reset alarms and parameters
4. Regulation menu

Main Menu – Unit Variables

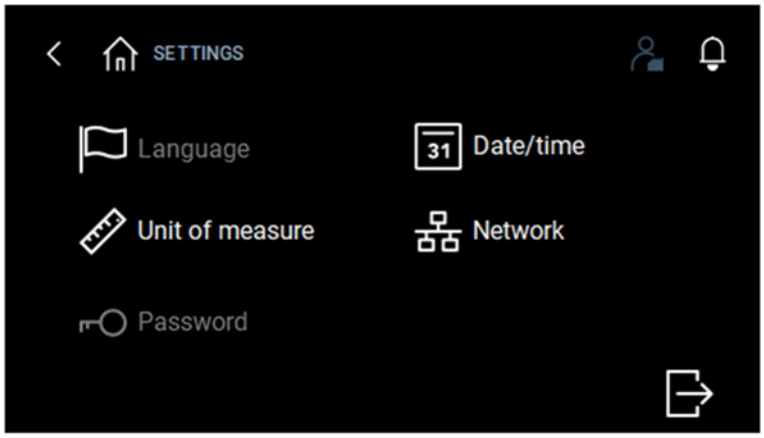
Here the user can manage the values of the anti-ice function on the heat exchangers and the values of the water pump on the secondary side



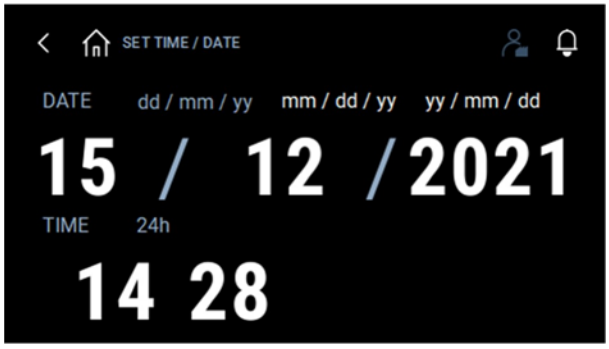
1. Anti-ice hot side management
2. Anti-ice cold side management
3. Cold side temperature differential band set
4. Defrost
5. Secondary water pump management

Main Menu – Display Settings

In the display settings it is possible to select the unit of measure and set the date/time. The other options are reserved.



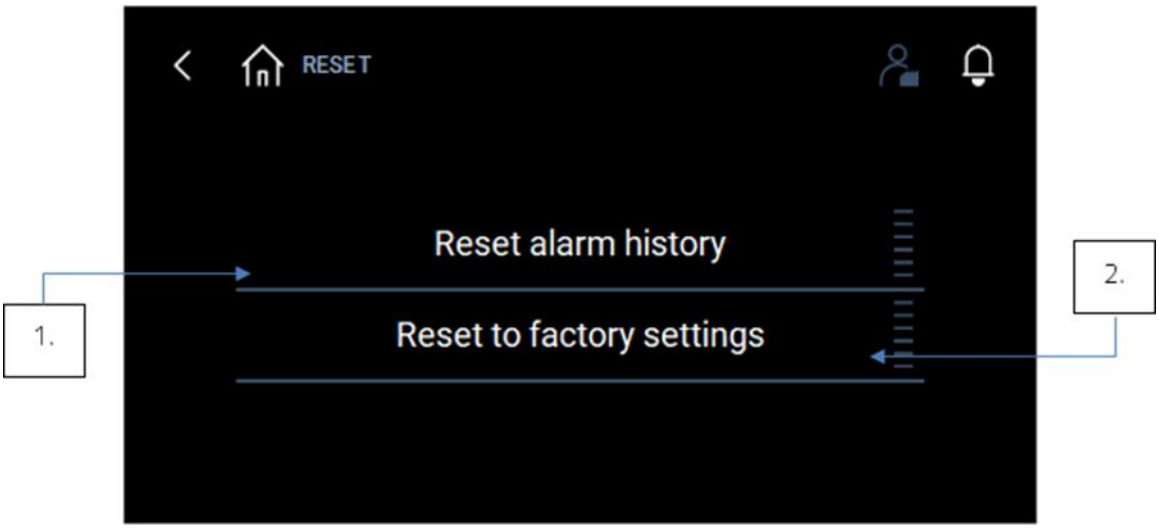
Unit of measure selection



Date and time settings

Main Menu – Initialization

In this menu it is possible to reset the alarm history. The Reset to factory settings command is reserved to users with Administrator access level.

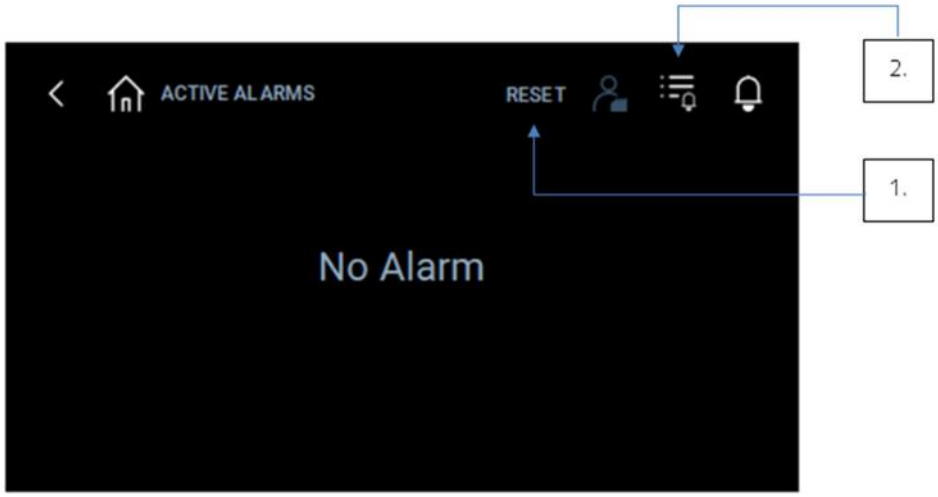


In this page the user can reset the alarm history [1.] or reset all the variables values to the factory defaults [2.]

2.9. Alarm Management

Active Alarms

To display the active alarms, if any, press the bell in the upper right corner. The *Reset alarms and Alarm history* functions will be also available.



Here the user can read and restore those alarms that do not automatically reset with the related command [1.] and access alarm history page [2].

Alarm History

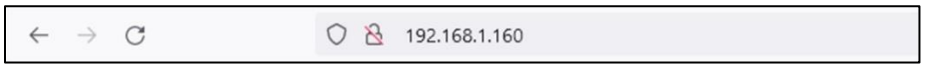
In Alarm history both the activation (START) and reset (STOP) times of past alarms are stored.

Here the user can read old alarms and understand when they were triggered

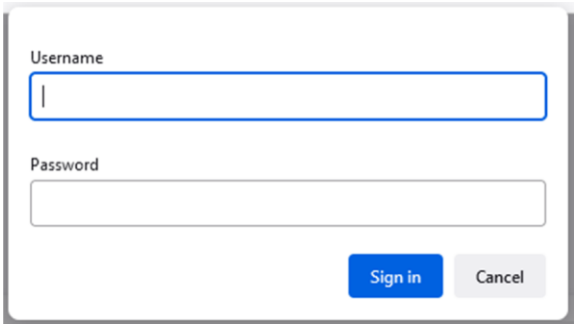
3. USER OPERATION VIA WEB INTERFACE

Web Server Main Page (Home)

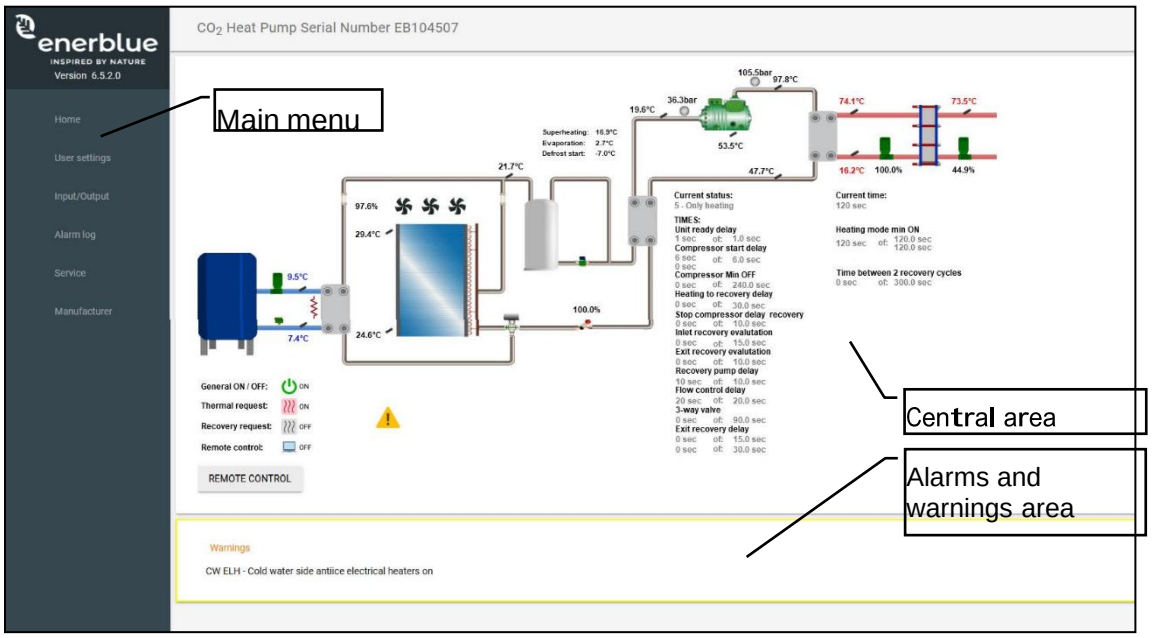
The web server can be accessed with direct ethernet connection to the unit. To access the internal web server, type the IP address of the unit in your internet browser (the factory default is 192.168.1.160 – please refer to Appendix C if you need to change your PC's IP address accordingly).



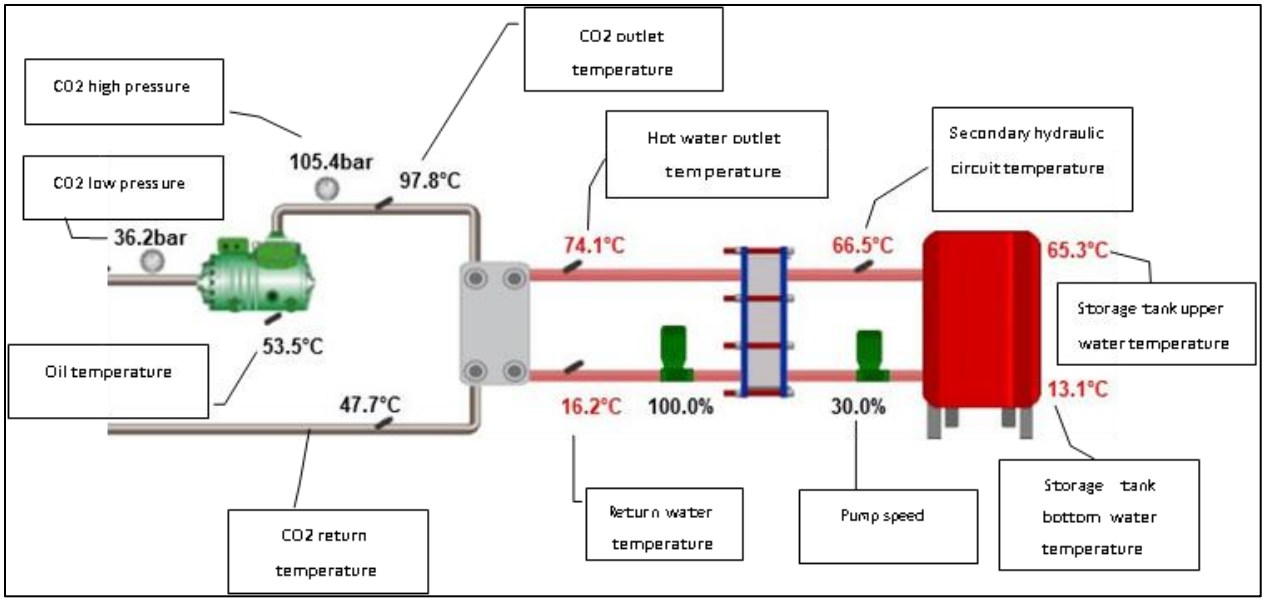
You will be prompted for the credentials:

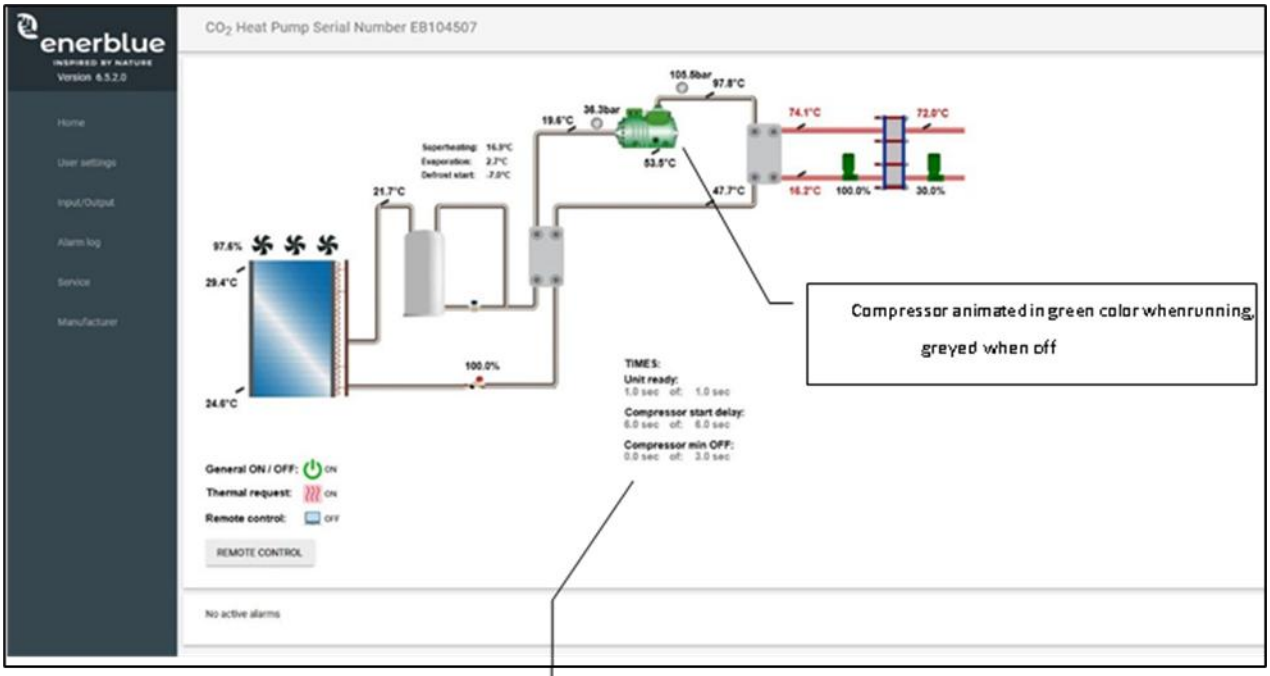


Use the username “user” and the password “1” to access with the lowest authorization level. Please refer to the “User management” section later on for additional details about the user access levels. After successful authentication the unit main screen will be displayed, showing the main menu on the right side and the unit current data in the central area. Alarm and warnings, if any, are shown at the bottom of the Home page:



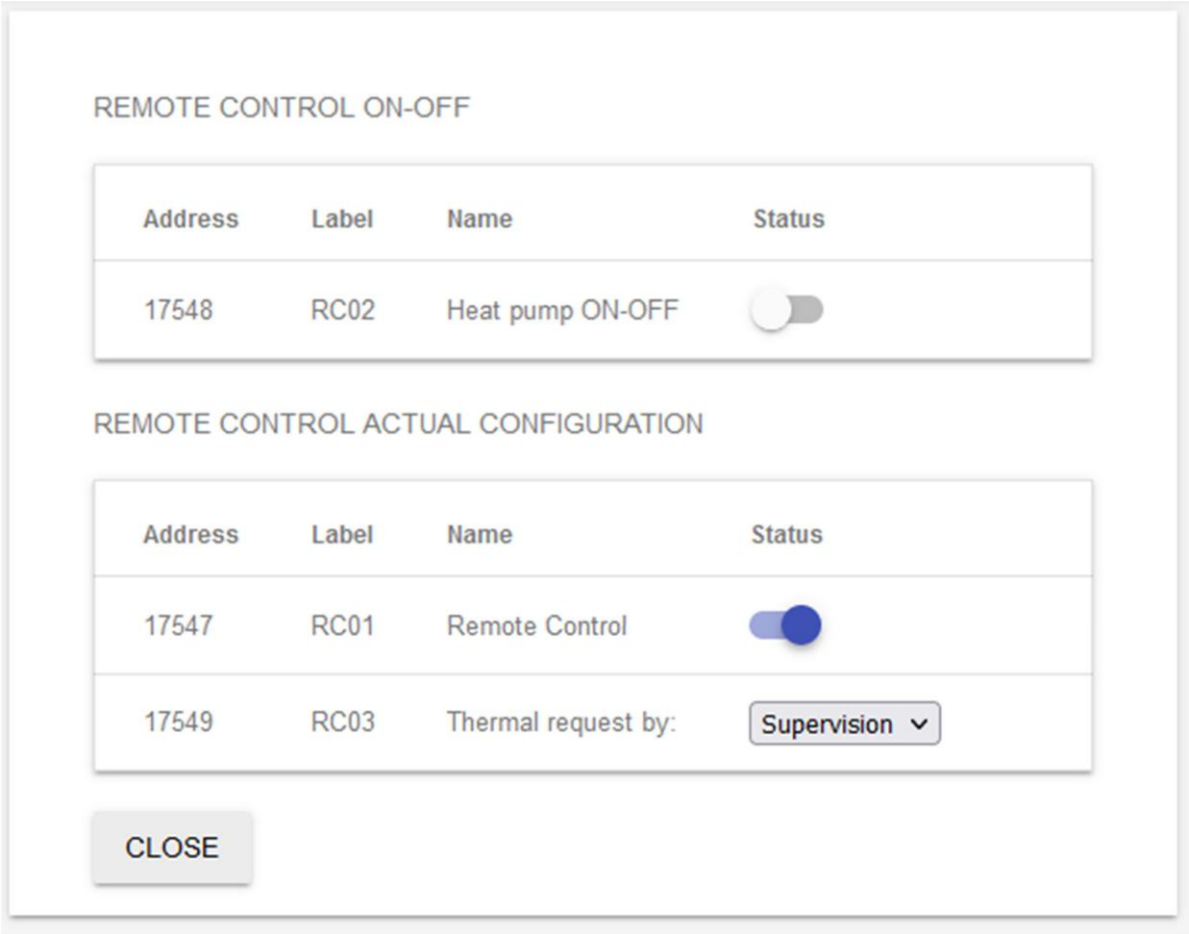
The unit probe values visible in the central area are updated in real time; both °C/bar and °F/psi unit of measure are supported. The operation of the compressor and the fans are displayed with animated icons. The hot water storage tank system is shown as a generalized single tank.


CO2 high pressure
CO2 outlet temperature
CO2 low pressure
105.4bar
97.8°C
Hot water outlet temperature
Secondary hydraulic circuit temperature
36.2bar
74.1°C
66.5°C
65.3°C
Storage tank upper water temperature
53.5°C
Oil temperature
47.7°C
16.2°C
100.0%
30.0%
13.1°C
CO2 return temperature
Return water temperature
Pump speed
Storage tank bottom water temperature


enerblue
CO2 Heat Pump Serial Number EB104507
Compressor animated in green color when running, greyed when off
Compressor timings (count-down before start due to pump delays or minimum timings)

Unit On/Off Via Web Interface (Or BMS) Only

In order to use the web interface or an external supervisor (e.g. BMS software or touch screen) to switch the unit ON and OFF please press the “REMOTE CONTROL” button located in the central area, and set the parameters as follows:

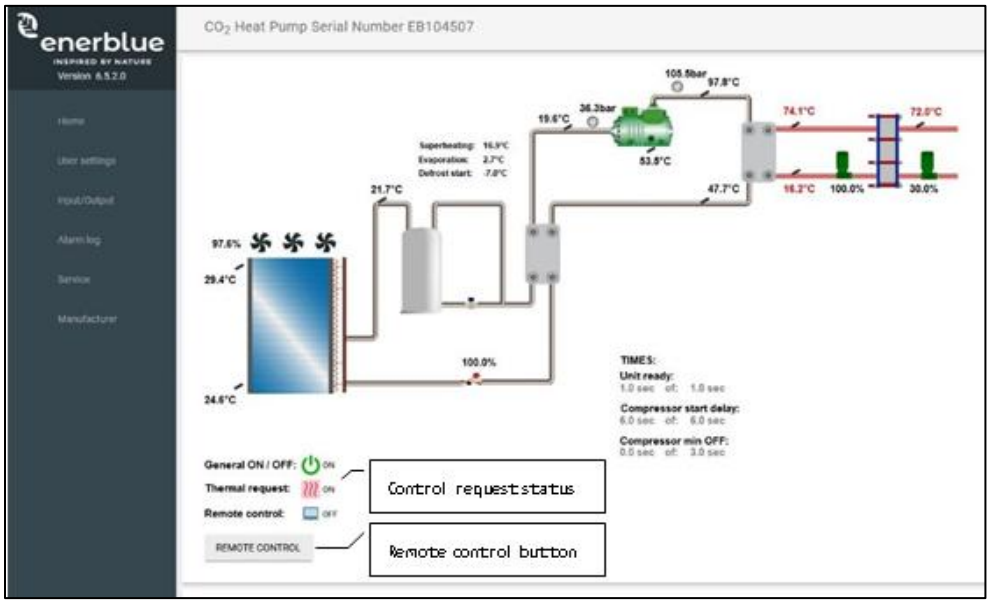


- “RC01 Remote control” ENABLED
- “RC03 Thermal request by:” Supervision

Now it is possible to use the “RC02 Heat pump ON-OFF” switch to enable or disable the unit:

Unit On/Off Management Via Web Server

The status of both the ON/OFF request and the hot water demand (Thermal request) is shown on the main menu.

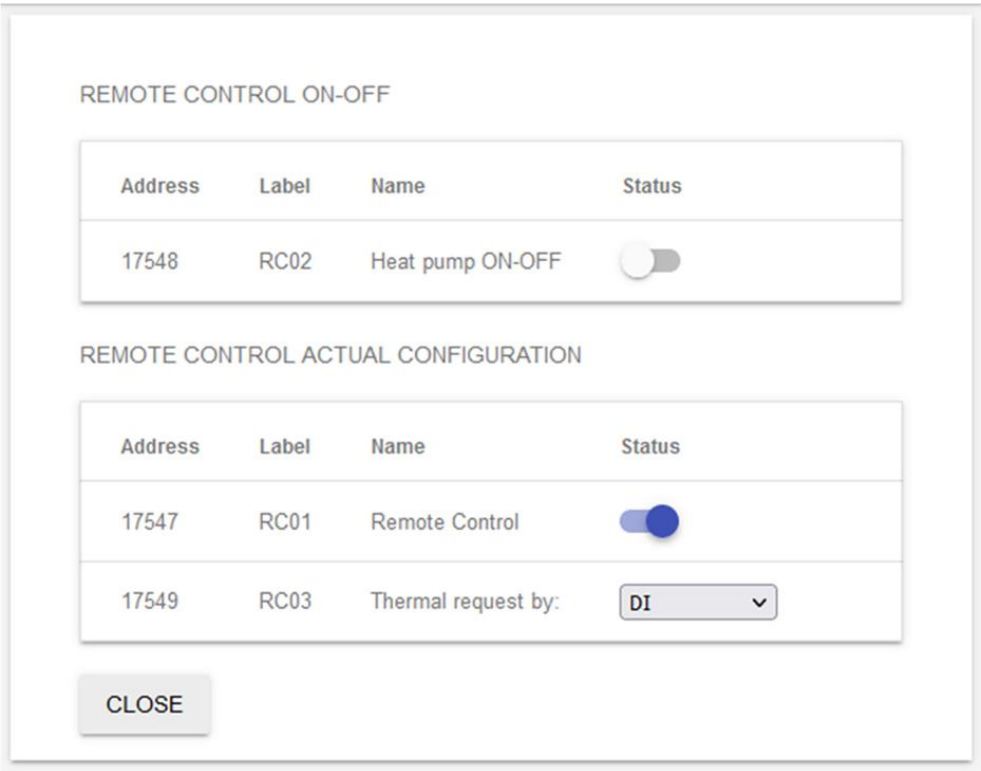


As previously mentioned, the “RC01 Remote supervision” parameter needs to be enabled. Please note that the physical main switch, located on the unit electrical panel, needs to be placed in “MAN” position.

The hot water demand (Thermal request) can be initiated by the user via web server, or still controlled via dedicated digital input (e.g. connected to an external mechanical thermostat or PLC) as shown in the next paragraphs.

Unit On/Off Via Web And External Thermal Request

In order to use the web interface, combined to an external mechanical thermostat or PLC switch the unit ON and OFF please press the “REMOTE CONTROL” button located in the central area, and set the parameters as follows:

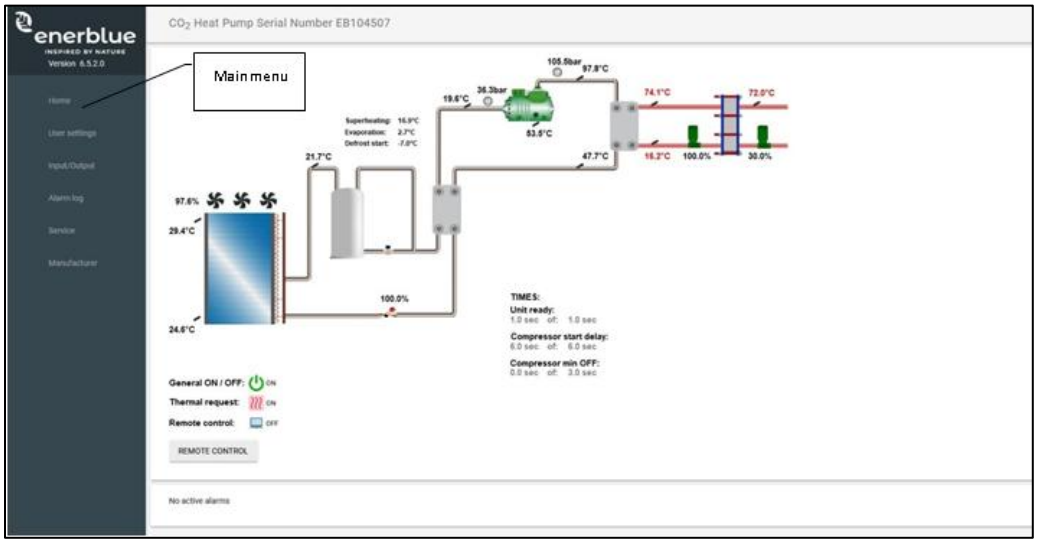


- "RC01 Remote control" ENABLED
- "RC03 Thermal request by: "DI"

Now the "RC02 Heat pump ON-OFF" parameter it is not enough to switch the unit ON/OFF. Digital input 2 of the controller needs to be closed by an external thermostat or PLC device as well in order to activate the unit.

Main Menu

The main menu is located on the left side of the web interface main screen. Click on the menu to enter the corresponding section. Some screens display a tab interface allowing the configuration of several sections.



The "Service" and "Manufacturer" menus are displayed only for the users with higher access level permissions (see later).

User Settings

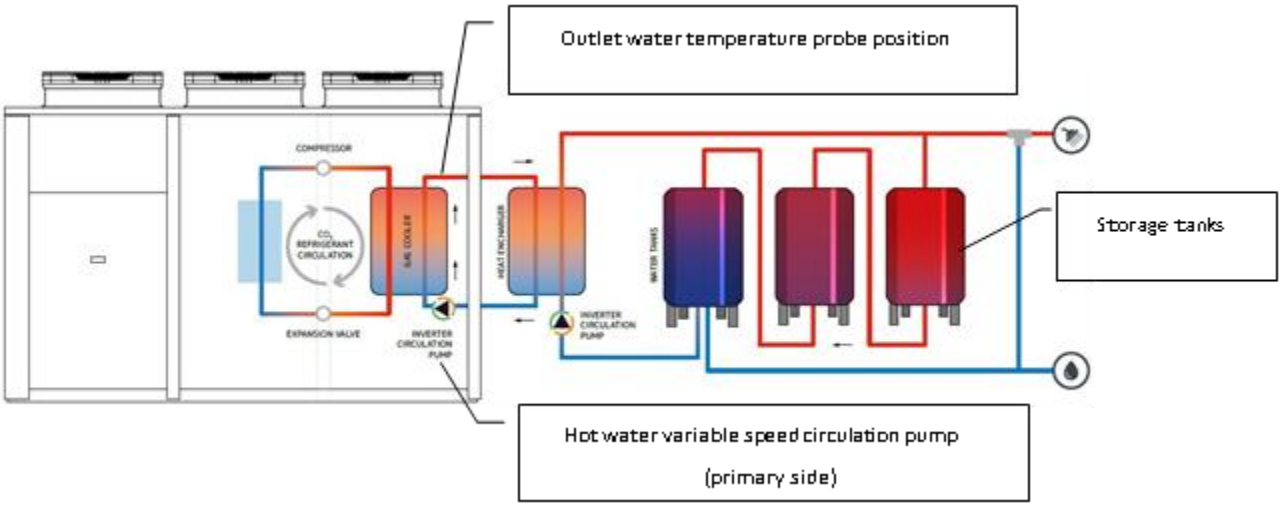
It is possible to set the unit hot water temperature via web interface in the menu *User setting – Hot water regulation.*

HOT WATER REGULATION

Address	Label	Name	Value	Um
16433	ST01	Hot Water out temperture set point	70.0	°C

Please note that the “ST01 Hot Water out temperature set point” doesn’t directly influence the compressor ON/OFF status. The delivery temperature is regulated by modulating the primary side pump, therefore the flow of hot water at the outlet is not constant.

If the outlet temperature probe is below the set point of the pump speed is decreased, while above set temperature ST01 is increased.



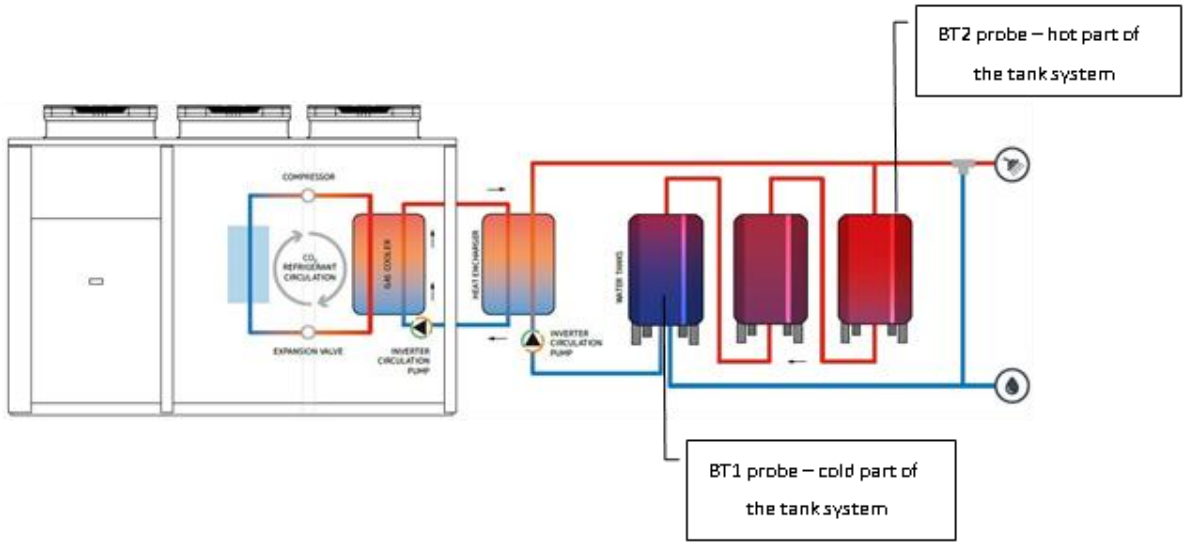
Double Probe

In the same menu it is possible to enable the BT1 and BT2 probes via the web interface in the *User setting – Double probe function* menu.

DOUBLE PROBE FUNCTION

Address	Label	Name	Value	Um
16633	ST02	Enable probe BT1		
16637	ST03	BT1 set point	30.0	°C
16639	ST04	BT1 differential band	5.0	°C
16641	ST05	Enable probe BT2 (enabling BT2, BT1 is automatically ON)		
16638	ST06	BT2 set point	65.0	°C
16640	ST07	BT2 differential band	10.0	°C

The BT2 sensor (hot side probe) is located in the top of the last storage tank in the series, near the supply outlet. The (BT1) sensor (cold side probe) is located in the bottom of the first storage, near cold return connection.



Cold Recovery Regulation

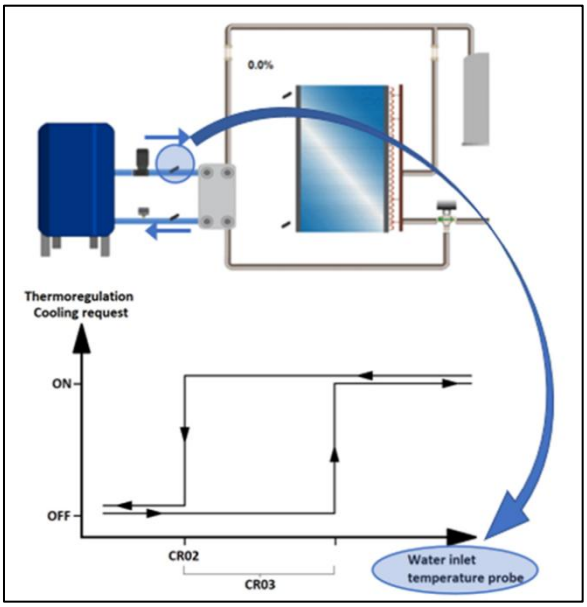
It is possible to manage the cold recovery via the web interface in the *User setting – Cold recovery regulation* menu

COLD RECOVERY REGULATION

Address	Label	Name	Value	Um
9638	CR01	Enable cold water recovery		
16807	CR02	Cold water recovery set point	10.0	°C
16808	CR03	Cold water recovery differential band	5.0	°C

Using the cool recovery option, heat can be drawn from a water stream rather than the ambient air, thus providing cooling to a water loop. This can be used to not only increase the performance of the heat pump, but also increase the performance of water loops such as a central chilled water system.

The function must be enabled (parameter CR01). The cooling request must be enabled via digital input (DI03). Once these two conditions are met, the controller checks the inlet water temperature in the recovery heat exchanger.



Input/Outputs

The input/output values are visible in the Input/Output menu. The I/O mappings depend on the unit type. Please note that the values are updated every 3 seconds.

The unit of measure is selectable in the Service menu (see later) between °C/bar and °F/psi.

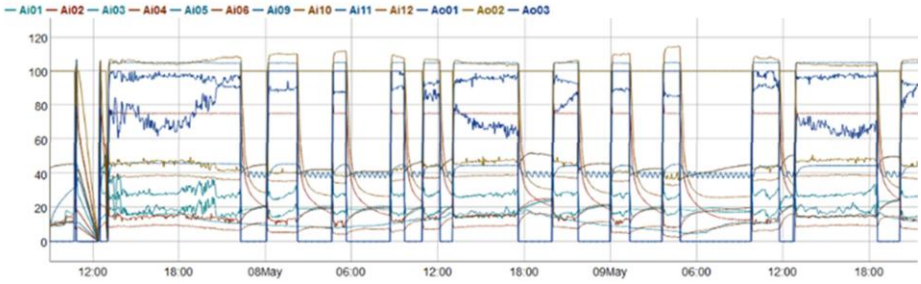
ANALOG INPUTS

Address	Label	Name	Value	Um
8336	AI01	Hot Water IN temperature	31.3	°C
8337	AI02	Hot Water OUT temperature	82.7	°C
8338	AI03	CO2 OUT Gas Cooler	31.1	°C
8339	AI04	Source water temperature IN	27.8	°C
8340	AI05	Source water temperature OUT	8.6	°C
8341	AI06	Evaporator coil temperature	38.2	°C
8342	AI07	Double probe function BT1	20.6	°C
8343	AI08	Double probe function BT2	54.9	°C
8344	AI09	High Pressure	102.7	bar
8345	AI10	Low Pressure	48.2	bar
8346	AI11	Crankcase oil temperature	41.5	°C
8347	AI12	Compressor discharge temperature	80.6	°C
9886	EXP_AI03	Secondary outlet water temperature probe	13.0	°C
9894	EXP_AI04	Subcooling	7.7	°C

Trend Log

The web interface provides also the possibility to display the data logged by the unit controller. In order to visualize the data stored in the internal SD card enter in the *Trend* page, select the desired month ant click on *Load Data* button. The dimension of the resulting chart can be selected via the *High* button (Default, Small, Mean, Big).

The log loading may require some time, depending on the amount of stored data.



The unit can select the data to be displayed checking the correspondent description:

ANALOG INPUTS

Label	Description	Check
Ai01	Hot Water IN temperature	☑
Ai02	Hot Water OUT temperature	☑
Ai03	CO2 OUT Gas Cooler	☑
Ai04	Suction temperature	☑
Ai05	External air temperature	☑
Ai06	Evaporator coil temperature	☑
Ai07	Double probe function BT1	☐
Ai08	Double probe function BT2	☐
Ai09	High Pressure	☑
Ai10	Low Pressure	☑
Ai11	Crankcase oil temperature	☑
Ai12	Compressor discharge temperature	☑

ANALOG OUTPUTS

Label	Description	Check
Ao01	Hot water pump speed control	☑
Ao02	High pressure electronic valve control	☑
Ao03	Fan speed control	☑
Ao05	not used	☐

STATUS

Label	Description	Check
State	Logger status	☐

Please check the “Service” menu section for further information regarding the configuration of sampling period and logger enabling/disabling.

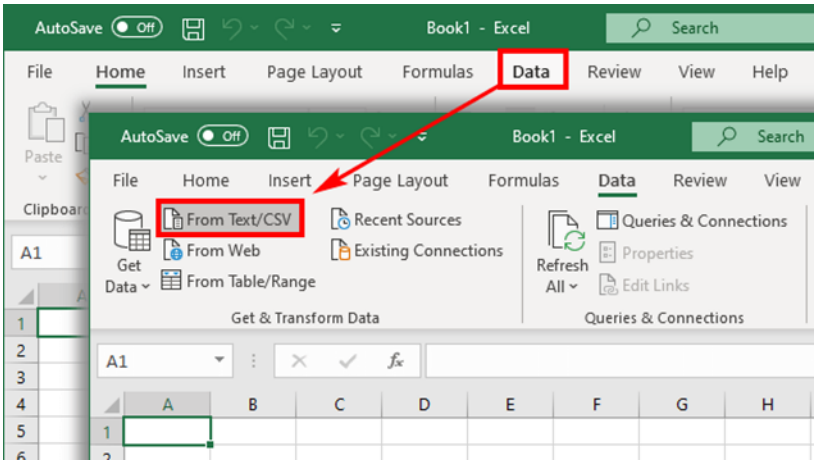
SD Data Stored

The logged data are stored in internal SD card as CSV (comma separated values) files. It is not necessary to remove the card for obtain the files, they can be download from browser by clicking on the correspondent filename.

SD DATA STORED

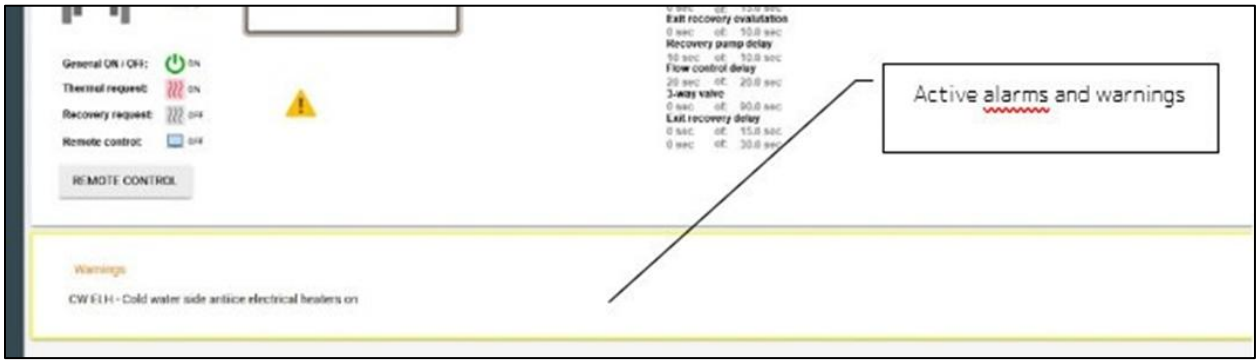
File name	Size [byte]
SEP21.CSV	2000077
OCT21.CSV	2000093
NOV21.CSV	2000164
JUL21.CSV	2000097
AUG21.CSV	2000168
DEC21.CSV	2000026
JAN21.CSV	2000008
FEB21.CSV	2000192
MAR21.CSV	2000104
APR21.CSV	2000150
MAY21.CSV	2000005
JUN21.CSV	2000200

The filename is composed by the log month (3 letters) and the year (2 numbers). It is possible to use the Excel *Data* function to easily import the log into a worksheet for subsequent analysis.

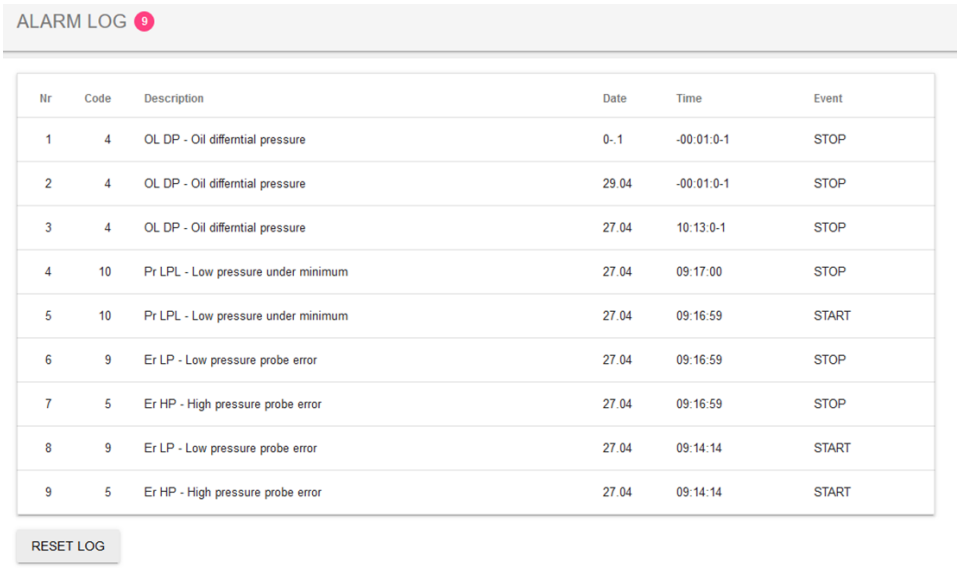


Alarm Log

The web server homepage displays only the active alarms and warnings.

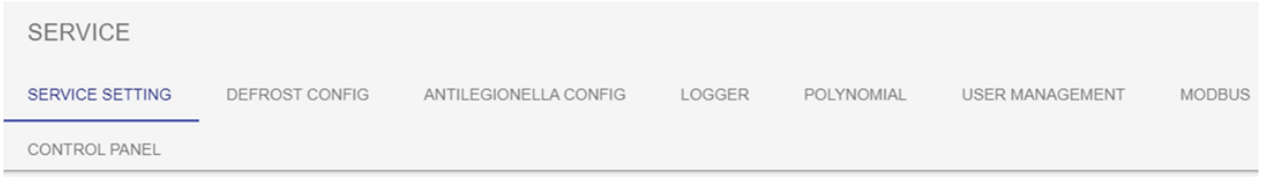


Entering the *Alarm log* menu it is possible to check both the activation (START) and reset (STOP) times of the historical alarms. Up to 100 events can be recorded. The same menu may be used to reset alarms, pressing the *Reset log* button.



3.1. Service

When accessed via web server the service menus are displayed as tabs:



Via web interface, scroll down the Service setting tab in Service menu in order to define the anti-ice settings.

Service Settings

The service settings menu contains some functions that are not normally needed by the user of the unit, which are preset in the factory or during start-up.

REMOTE CONTROL

Address	Label	Name	Value	Um
17547	RC01	Remote control enable	OFF	
17548	RC02	Main ON/OFF	OFF	
17549	RC03	Thermal regulation by ID or supevision	DI	
16557	RC04	Maximum duration before reset remote control (0=disabled)	10	min

UNIT OF MEASURE

Address	Label	Name	Value	Um
17264	UM01	Unit of measure	Fahrenheit	

TIMES

Address	Label	Name	Value	Um
16503	CO01	Delay - min time Heat Pump OFF to ON	10.0	sec
16417	CO02	Compressor start delay	60.0	sec
16418	CO03	Min. time between two compressor starts	300.0	sec
17313	CR24	Compressor running hours	0	hours

3.2. Defrost Config

The Defrost menu allows you to specify the temperature and pressure values that require defrosting, as well as the criteria for its exit. There are 2 different types of defrost, Fixed and Dynamic. This first choice impacts only the “START” – the entering phase.

Fixed Mode

This phase begins once Tevap<DF02.

A counter starts: every time Tevap>DF02, the counter resets.

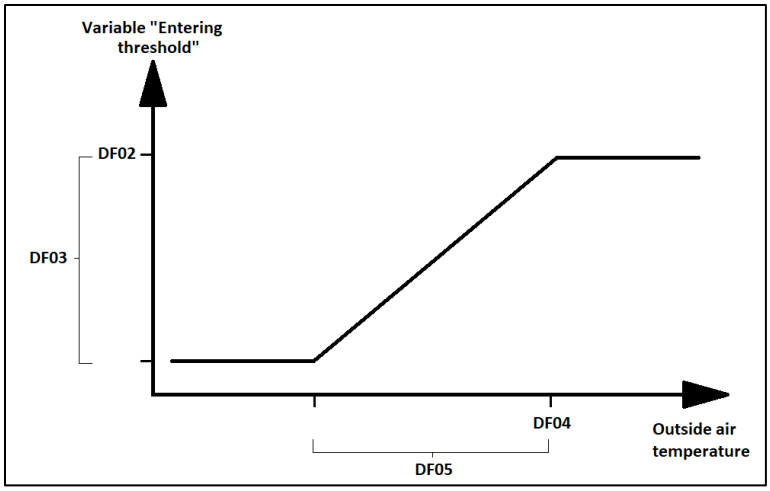
When the counter reaches DF06, “Enter phase” finishes.

Dynamic Mode

This phase begins once Tevap<“Entering threshold”, related to the outside air temperature.

A counter starts: every time Tevap> “Entering threshold”, the counter stops.

When the counter reaches DF06, “Entering phase” finishes.



START

Address	Label	Name	Value	Um
16665	DF01	Evaporation Temperature mode set	Dynamic	
16666	DF02	Evaporation temperature Set for start defrosting	-7.0	°C
16667	DF03	Evaporation temperature Dead Zone for start defrosting	18.0	°C
16668	DF04	Air Temperature set for start defrosting	5.0	°C
16669	DF05	Air Temperature Dead Zone of start defrosting	20.0	°C
16670	DF06	TIME: delay for start defrosting	60	sec

In central phase the electrical heaters on the evaporator are activated.

There are 3 possible exit condition for the defrost central phase:

- Pevap>DF09 for time DF08.
- Tfinned heat exc.>DF22 for time DF08. (DF20 and DF21 needs to be enabled)
- After time DF07 the central phase concludes anyway

CENTRAL PHASE

Address	Label	Name	Value	Um
16671	DF07	TIME: defrost max duration	1200	sec
16672	DF08	TIME: defrost min time with Lp > set stop defrosting	15	sec
16673	DF09	Suction Pressure (Lp) set stop defrosting	37.0	bar
16691	DF20	Enable Fins Probe	Enable	
16692	DF21	Enable Exit by Fins Probe	Enable	
16693	DF22	Fins probe Exit Set	25.0	°C

Once the central phase is finished, dripping phase starts and runs for time DF23. During drop off the compressor remains switched OFF.

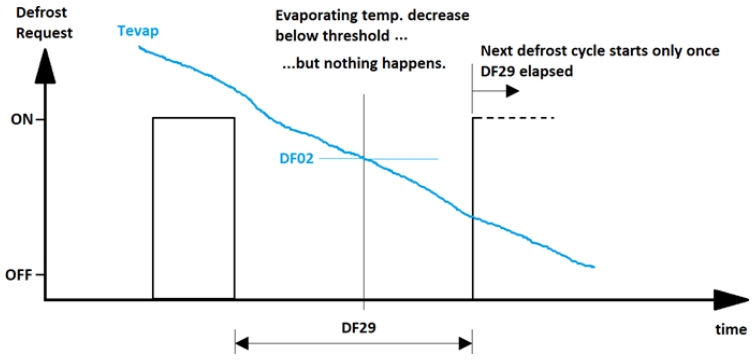
DROP OFF

Address	Label	Name	Value	Um
16674	DF23	TIME: Drop off duration	120	sec

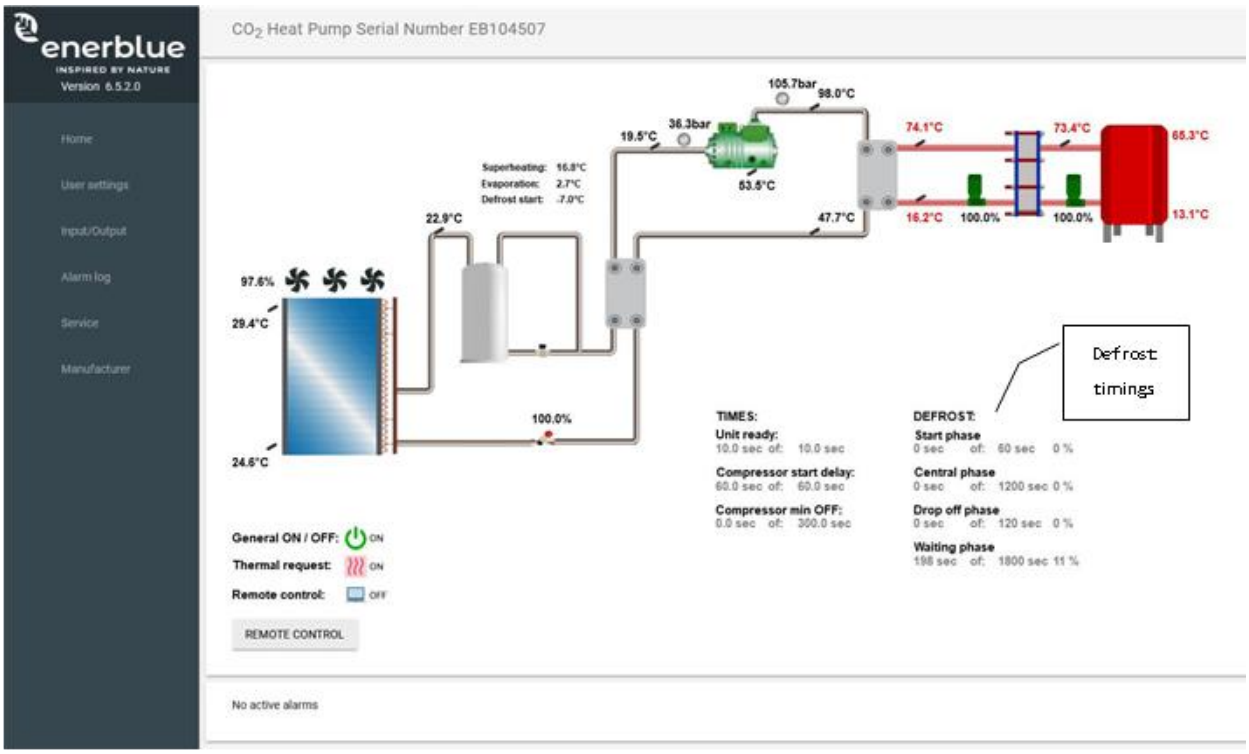
Once the drop off phase is finished, a counter starts. The aim of this counter is to evaluate the time between a defrost cycle and the next one. Independently from evaporating temperature, the next defrost cycle cannot start until the counter elapses (DF29).

WAITING

Address	Label	Name	Value	Um
16675	DF29	TIME: delay between two cycles	1800	sec



Please note that the defrost timings are also displayed on the web server homepage



3.3. Anti-Legionella Config

The anti-Legionella menu allows you to specify the anti-Legionella function entering conditions (OFF/ By scheduler / Manual), the set points of the two anti-Legionella phases and the exit conditions.

The anti-Legionella cycle consists of two phases - it is emphasized that in phase 1 the compressor is active, and the pump modulates as per standard thermoregulation (on “ALG10 Unit anti-Legionella set”), while in phase 2 the compressor is inactive, and the pump forced to default speed (on “ALG11 Unit phase 2 pump set”):

Phase 1

1. The " anti-Legionella active" relay contact is closed
2. The set point “ALG10 anti-Legionella unit set” is forced (e.g. 80-90 ° C);
3. Phase 1 ends when the BT1 probe rises above “ALG08 Phase 1 set BT1” (e.g. 60 ° C) and at the same time the BTL probe reaches at least the “ALG09 Phase 1 set BTL” (e.g. 55 ° C).

Phase 2

1. The " anti-Legionella active" relay contact remains closed
2. The " anti-Legionella phase 1 completed" relay contact is closed
3. At the end of phase 1 the compressor switches off while the secondary pump is brought to a fixed speed “ALG11 Unit phase 2 pump set” until the BTL probe reaches the “ALG09 Phase 2 set BTL” (e.g. 70 ° C). The anti-Legionella cycle is considered concluded when this condition persists for a period of time “ALG12 Min. time phase 2” (e.g. 1 min).
4. At the end of the cycle, the " anti-Legionella active" and " anti-Legionella phase 1 completed" relay contacts are opened.

The maximum time parameter of the anti-Legionella cycle “ALG06 anti-Legionella max time” is provided (e.g. 120 min.) after which the unit exits the cycle and returns to normal operation.

The Defrost function has priority over the anti-Legionella function.

ENABLING

Address	Label	Name	Value	Um
17386	ALG01	Enable antilegionella	OFF	
9950	ALG02	Current BTL probe value	37.6	°C

SCHEDULER

Address	Label	Name	Value	Um
17387	ALG03	Enable scheduler	ON	
17388	ALG04	Antilegionella start - day of week	Sunday	
17389	ALG05	Antilegionella start - hour	21	
17390	ALG06	Antilegionella start - minute	0	

PHASE 1

Address	Label	Name	Value	Um
17392	ALG07	Phase 1 set BT1	60.0	°C
17393	ALG08	Phase 1 set BTL	55.0	°C
17395	ALG09	Unit set point during antilegionella phase 1	80.0	°C

PHASE 2

Address	Label	Name	Value	Um
17394	ALG10	Phase 2 set BTL	70.0	°C
17396	ALG11	Unit secodary pump set during antilegionella phase 2	30.0	%
9948	ALG12	Phase 2 elapsed time	0	seconds
17397	ALG13	Min. time phase 2	1	seconds

TIMINGS

Address	Label	Name	Value	Um
9946	ALG14	Total elapsed time	0	minutes
17391	ALG15	Antilegionella function forced exit	120	minutes
9959	ALG16	Warning reset	OFF	

MANUAL

Address	Label	Name	Value
9942	ALG17	Manual start	OFF
9943	ALG18	Manual stop	OFF

3.4. Logger

In order to use the datalogging function the SD card needs to be inserted in the controller, the Enable log needs to be ON and Log cycle set. The SD card is automatically detected at unit startup; however a manual mount request can be performed.

SD CARD

Address	Label	Name	Value
16136	CF19	HTTP root	SD card
9849	CF20	SD Mout request	NO
9850	CF21	SD Unmout request	NO
8719		SD presence	
9851		SD mounted	

LOGGER COMMAND

Address	Label	Name	Value	Um
17257		Enable Log		
17258		Log cycle	00:01	min

3.5. Polynomial

In this menu it is possible to enable the Polynomial function that is used for the calculation of the optimal high pressure set taking in account the following physical quantities:

1. Inlet water
2. Outlet water
3. Evaporating temperature

The result is a high pressure set which will be managed by the thermostatic valve.

The set point value is in any case limited between a fixed minimum and maximum. Within these limit values, a compensation curve based on the evaporation temperature is also active which keeps the compressor within the envelope declared by the manufacturer.

ENABLING

Address	Label	Name	Value	Um
16488	PO01	Enable regulation HP set	OFF	
16556	PO02	Regulation band	10.0	°C

INPUT VALUES

Address	Label	Name	Value	Um
9155	PO03	Inlet water temperature	-----	°C
16433	PO04	Outlet temperature set	70.0	°C
8975	PO05	Evaporator temperature	-----	°C
9081	PO06	High pressure from analog input	-----	bar

RESULT

Address	Label	Name	Value	Um
16490	PO07	Minimum HP limit	80.0	bar
16489	PO08	Maximum HP limit	105.0	bar
9158	PO09	HP result set (unlimited)	0.0	bar
9169	PO10	HP result set (limited)	80.0	bar

CURRENT VALUES

Address	Label	Name	Value	Um
9891	PO11	Polynomial out	105.0	bar
9028	PO12	Gas cooler outlet water	-----	°C
16437	WP02	Outlet water proportional band	12.6	°C
16487	EV01	High Pressure default value set	100.0	bar
9027	PO13	High Pressure current set	100.0	bar

3.6. User Management

In this section it is possible to define the usernames and the passwords for the “User” and the “Service” level. By accessing the system with the user level password, it is not possible to change the service passwords.

Administrator username and password can be changed only by the manufacturer.

USER LEVEL

Address	Label	Name	Value
17401	UM01	Username	user
17409	UM02	Password	1

3.7. Modbus

In this section it is possible to modify the parameters relating to the protocols:

- Modbus RTU (port RS485-1)
- BACnet MS/TP (port RS485-1)
- BACnet IP

The Modbus RTU and BACnet MS/TP protocols, sharing the same serial port, cannot be activated at the same time. Modbus TCP protocol is always active.

MODBUS RS485 - 1

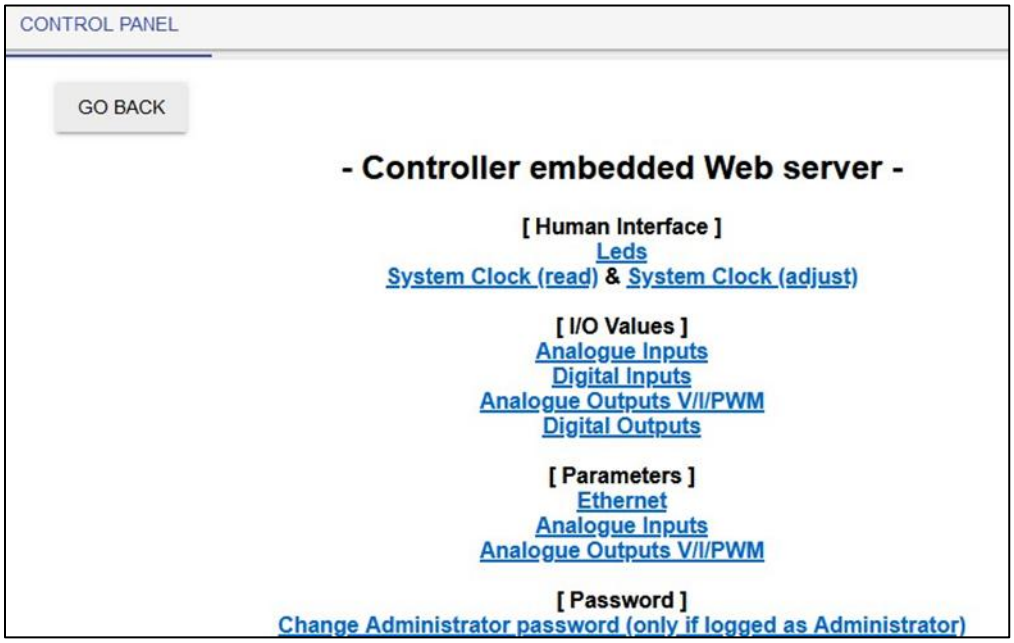
Address	Label	Name	Value
16124	MB01	Address (1 - 255)	1
16125	MB02	Protocol	3 = Modbus / RTU
16126	MB03	Data bit	8
16127	MB04	Stop bit	1
16128	MB05	Parity	2 = Even
16129	MB06	Baud rate	2 = 38400

BACnet

Address	Label	Name	Value
17284	BN01	BACnet IP enable	ON
17282	BN02	Device object istance	100
17283	BN03	BACnet Subnet	0
17285	BN04	BACnet IP Port	0
15766	BN05	Restore BACnet default Eprom parameter	NO
17286	BN06	BBMD IP01 (1 - 255)	0
17287	BN07	BBMD IP02 (1 - 255)	0
17288	BN08	BBMD IP03 (1 - 255)	0
17289	BN09	BBMD IP04 (1 - 255)	0
17290	BN10	BBMD port	0
17291	BN11	BBMD tmo	0

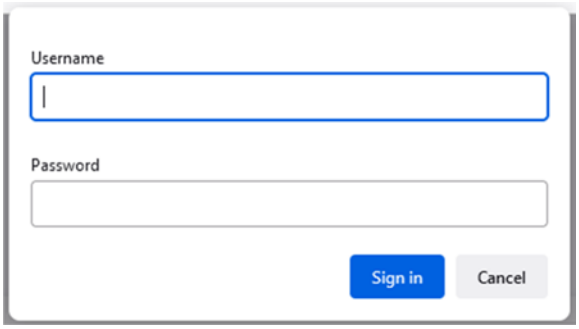
3.8. Control Panel

Some basic parameters of the electronic control can be accessed via the *Control panel*. In particular, the system clock can be set and the I/O configuration can be checked.



3.9. Logout

Press logout to disconnect the current user. You will be prompted for the new credentials:



You are now able to log-in again with the same or with a different user.

4. APPENDIX A - INTERNAL CONTROL SPECIFICATIONS & TECHNICAL DATA

The control board (PLC) is installed inside the electrical panel. The unit controller can work with the touch screen interface disconnected.

NOTE: To operate the PLC will require working inside the electrical enclosure while it is powered. All proper electrical safety precautions must be followed.

FEATURE	QUANTITY	TYPE
Digital inputs	12	Configurable
Probe inputs	12	Configurable
Analog outputs	6	Configurable
Digital outputs	12	Standard
RS485 Serial boards	2	Configurable
CAN output for keyboard and expansion	1	Standard
Ethernet port	1	Standard
USB port	1	Standard
Mini USB port	1	Standard
Internal clock	1	Standard

FEATURE	TYPE
Power supply	24 Vac 50-60 Hz / 20-38V DC not isolated
Absorbed power	35 VA / 15W
Insulation class	2
Operating temperature	-4 ..149°F [-20..65°C]
Storage temperature	-22 .. 158°F [-30..70°C]
Relative humidity	5..95% (without condensation)

IMPORTANT
Before starting the unit, some of the connections must be made by the installer

The terminal block for the unit contains some terminals for remote connections. The reference terminal block is indicated on the wiring diagram with X2. See the following chapters for detailed descriptions of their Meanings/use.

DIGITAL INPUTS

Type of connection by the installer	Terminal numbers	Voltage on the terminals	Meaning	A/W	A/W with CW recovery	W/W
Dry contact digital input	1 – 2	24 Vac	Digital input for switching the unit ON and OFF.	●	●	●
Dry contact digital input	24 – 8	24 Vac	Digital input for utility Hot Water request.	●	●	●
Dry contact digital input	24 – 5	24 Vac	Digital input for Cold Water recovery request.		●	
Dry contact digital input	24 – 71	24 Vac	Digital input for the secondary hydraulic circuit water pump circuit breaker	●	●	●

DIGITAL OUTPUTS

Type of connection by the installer	Terminal numbers	Voltage on the terminals	Meaning	A/W	A/W with CW recovery	W/W
Max voltage 230VMax current 2A	101 - 102	No voltage	Dry contact for alarms	●	●	●
Max voltage 230VMax current 2A	103 – 104	No voltage	Dry contact for signal warning	●	●	●
Max voltage 230VMax current 2A	105 – 106	No voltage	Dry contact for compressor status signal	●	●	●
Max voltage 230V Max current 2A	107 – 108	No voltage	Dry contact for enabling cold water recovery pump (if not installed on the unit)		●	
Max voltage 230V Max current 2A	107 – 108	No voltage	Dry contact for enabling cold water source pump (if not installed on the unit)			●
Max voltage 230V Max current 2A	110 -109	No voltage	Dry contact for enabling secondary hydraulic circuit water pump	●	●	●
Max voltage 230V Max current 2A	142 -143	No voltage	Dry contact for enabling antilegionella function	●	●	●

ANALOG INPUTS

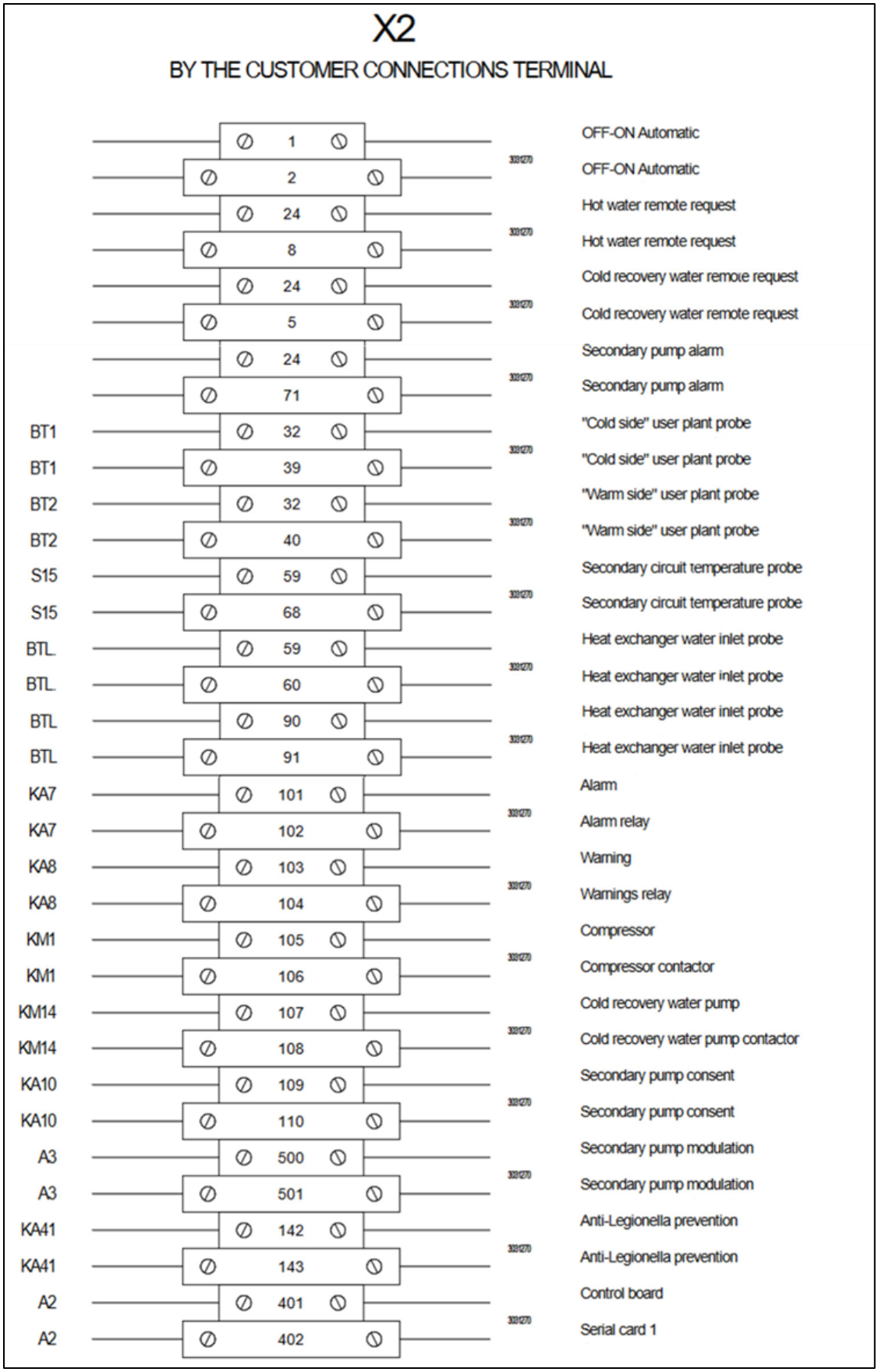
Type of connection by installer	Terminal numbers	Voltage on the terminals	Meaning	A/W	A/W with CW recovery	W/W
NTC probe 10kOhm at 25°C Beta 3435	39 - 32	No voltage	Analog input for BT1 probe double probe function	●	●	●
NTC probe 10kOhm at 25°C Beta 3435	40 – 32	No voltage	Analog input for BT2 probe double probe function	●	●	●
NTC probe 10kOhm at 25°C Beta 3435	68 - 59	No voltage	Analog input for BT3 secondary hydronic circuit temperature probe	●	●	●
NTC probe 10kOhm at 25°C Beta 3435	60 - 59	No voltage	Analog input for BTL antilegionella function control probe	●	●	●

ANALOG OUTPUTS

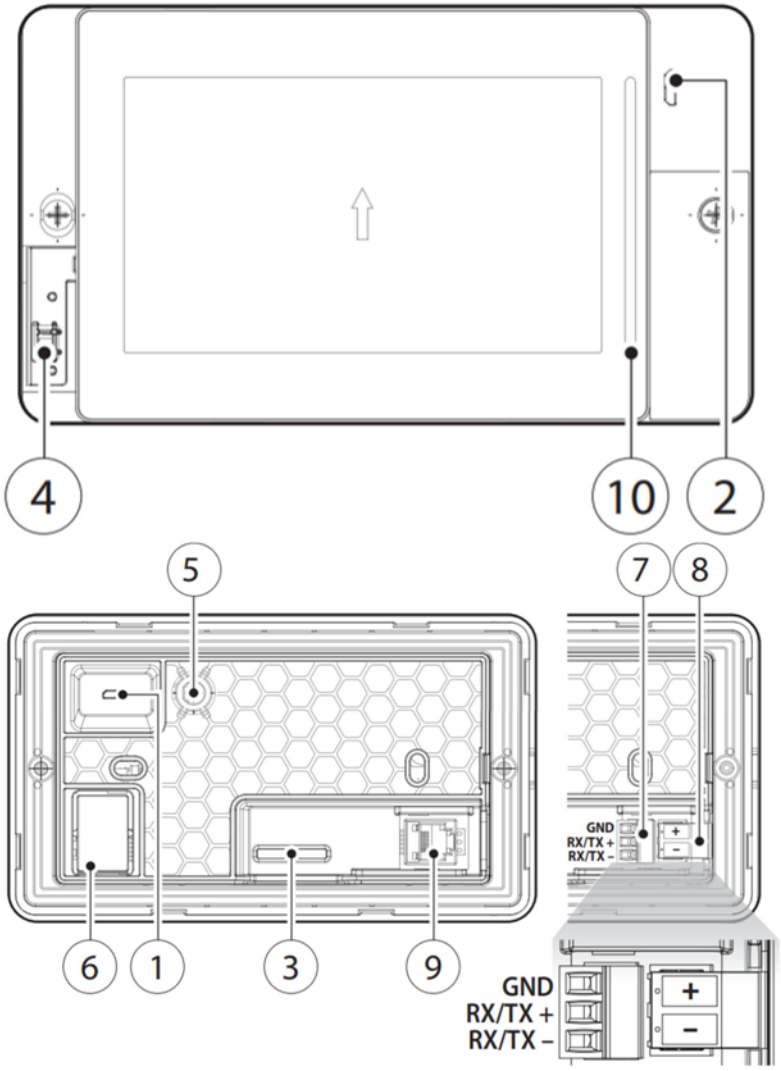
Type of connection by installer	Terminal numbers	Voltage on the terminals	Meaning	A/W	A/W with CW recovery	W/W
Analog signal	501 – 500	0-10 VCC	Secondary pump modulation	●	●	●

SERIAL CONNECTIONS

Type of connection by installer	Terminal numbers	Voltage on the terminals	Meaning	A/W	A/W with CW recovery	W/W
Serial connection	401-402- 403	RS-485	BMS connection	●	●	●


X2
BY THE CUSTOMER CONNECTIONS TERMINAL
1
2
24
8
24
5
24
71
BT1 32
BT1 39
BT2 32
BT2 40
S15 59
S15 68
BTL 59
BTL 60
BTL 90
BTL 91
KA7 101
KA7 102
KA8 103
KA8 104
KM1 105
KM1 106
KM14 107
KM14 108
KA10 109
KA10 110
A3 500
A3 501
KA41 142
KA41 143
A2 401
A2 402
OFF-ON Automatic
OFF-ON Automatic
Hot water remote request
Hot water remote request
Cold recovery water remote request
Cold recovery water remote request
Secondary pump alarm
Secondary pump alarm
"Cold side" user plant probe
"Cold side" user plant probe
"Warm side" user plant probe
"Warm side" user plant probe
Secondary circuit temperature probe
Secondary circuit temperature probe
Heat exchanger water inlet probe
Heat exchanger water inlet probe
Heat exchanger water inlet probe
Heat exchanger water inlet probe
Alarm
Alarm relay
Warning
Warnings relay
Compressor
Compressor contactor
Cold recovery water pump
Cold recovery water pump contactor
Secondary pump consent
Secondary pump consent
Secondary pump modulation
Secondary pump modulation
Anti-Legionella prevention
Anti-Legionella prevention
Control board
Serial card 1

5. APPENDIX B – TOUCH SCREEN ELECTRICAL CONNECTIONS



List of components

1	MicroUSB rear
2	MicroUSB front
3	External keypad connector
4	Temperature and humidity probe
5	Not available
6	Ethernet port
7	RS485 port
8	Power supply port
9	RJ12 Connector
10	Notification bar

6. APPENDIX C – TECHNICAL SPECIFICATIONS

Type	LCD TFT
Resolution	480x272 Wide
Active display area	4.3” [109 mm] diagonal
Colors	65 K
Backlighting	LCD - Lifetime 20,000 hrs @ 77°F [25 °C]
Brightness control	Yes - auto-off by default after 15 min
Visual angle (CR ≥10)	Up/Down (40/50 deg.) - Left/Right (50/50 deg.)
Contrast (typical)	350 (Φ=0°)
Brightness (typical)	200 cd/m^2
Touchscreen	Resistive
System signal LEDs	3-color notification bar
Ethernet port	Auto-MDIX 10/100 Mbit - RJ45 female STP CAT 5 cable Lmax = 328 ft [100 m]
USB port (1)	Host interface 2.0 - micro USB -B - 150 mA max (do not use to charge devices) - Lmax = 3.2 ft [1m]
Serial port with RJ12 connector	RS485 max 115.2 Kb/s 6-wire telephone cable Lmax = 6.5 ft [2m]
Serial port w/screw terminal (2)	RS485 max 115,2 Kb/s Removable screw connector 3,81mm pitch Shieldedtwisted pair cable AWG 20-22 for ± Lmax = 1640 ft [500m] - tightening torque 0.25Nm (2.2lbf x in)
Vector graphics	Yes, includes SVG 1.0 support
Dynamic objects	Yes Visibility, position, rotation
TrueType fonts	Yes
Multi-protocol	Yes
Alarms	Yes
Event list	Yes
Passwords	Yes
Real Time Clock (3)	Yes, with backup battery

ELECTRICAL STANDARDS

	UL	UL60730
	sch. CB	IEC60730-1
Safety	CE	EN61000-6-1 / EN61000-6-2 / EN61000-6-3 / EN61000-6-4 / EN55014-1 / EN55014-2
Radio TECH.CODE/MODEL PGDX04001/PGDX04002	Red	EN301489-1/EN301489-17
		EN300328
	FCC	Part.15 Subpart. B
	SRRC	CMIIT ID: 2019DJ11772 (for PGDX04001)
		2019DJ11773 (for pGDX04002)
	ANATEL	ID: 09607-19-05684 This equipment is not entitled to protection against harmful interference and may not cause interference in duly authorized systems

7. APPENDIX D - ACCESS TO THE WEB SERVER

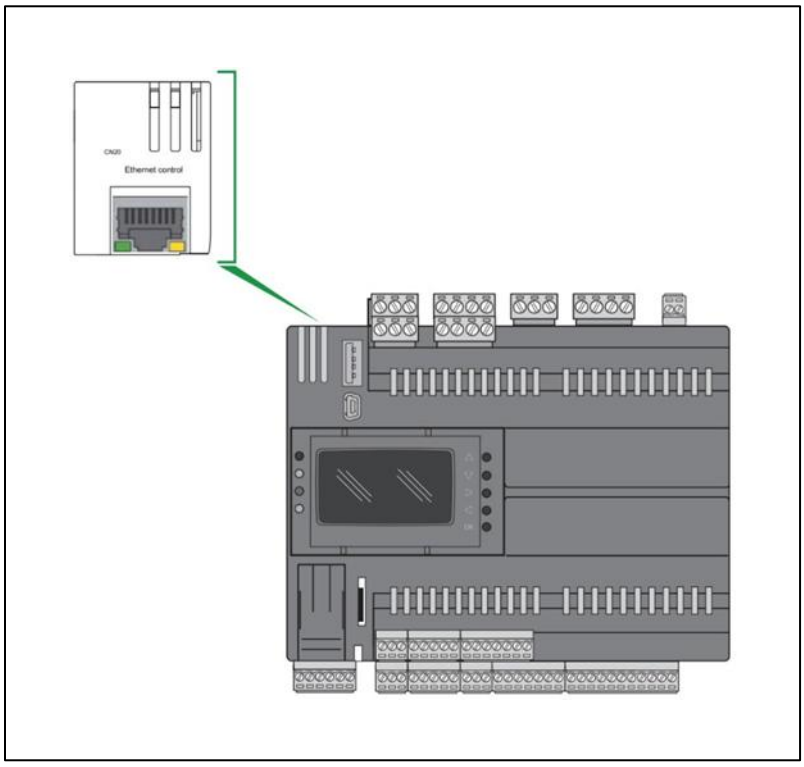
If not otherwise indicated on the controller, the standard IP address is 192.168.1.150.

The controller's IP address can be found on the ET sub-menu of the service menu. To connect to the website, the controller has to be connected to a LAN – local area network.

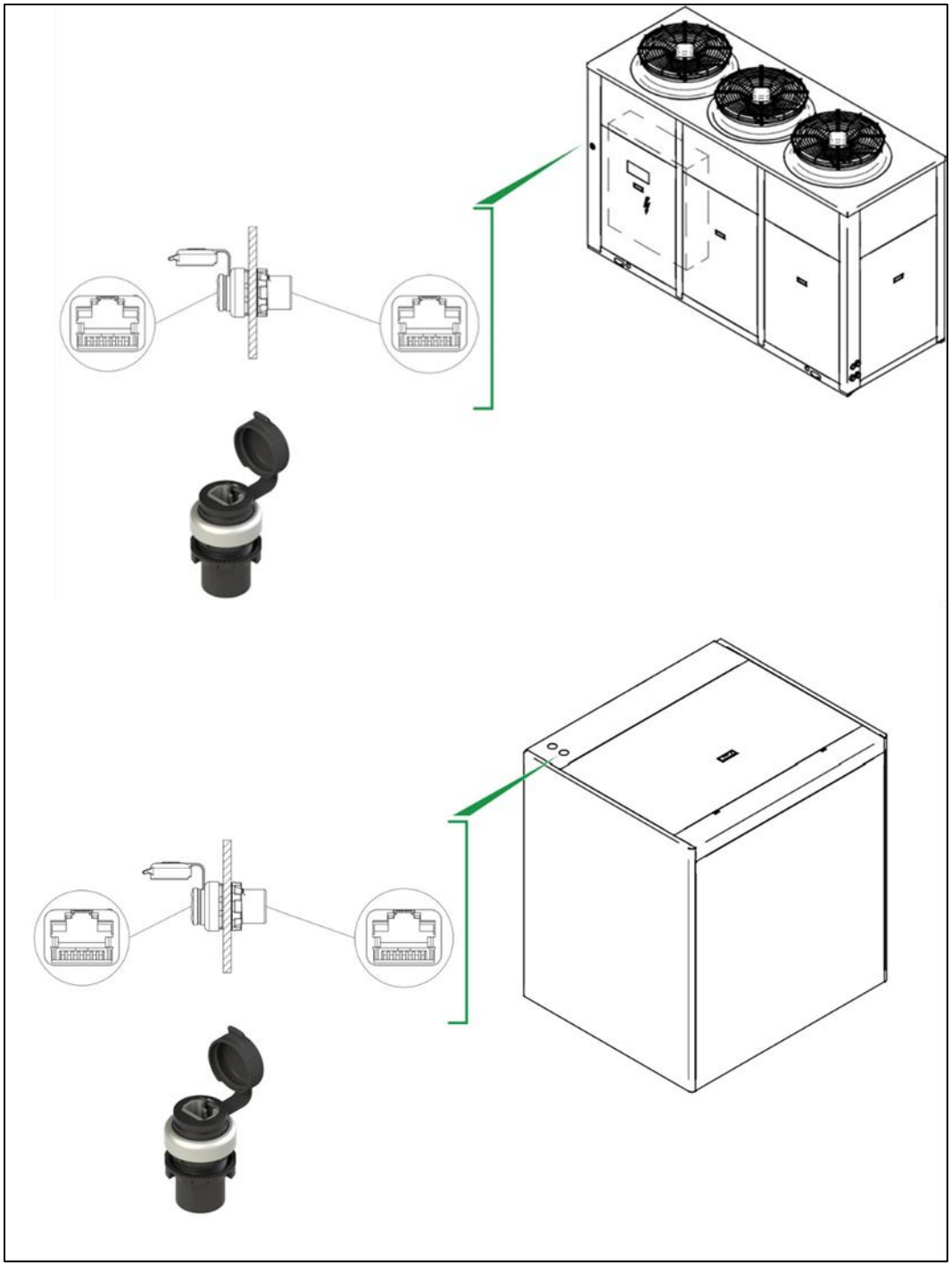
7.1. Ethernet Connection

Ethernet Port

The unit controller provides a single ethernet port, located on the upper side of the controller, as shown below. Please note that the ethernet port can be factory wired to an UMTS router (dedicated to remote maintenance) or to a multiport switch. An additional RJ45 socket to bring the Ethernet connection outside the unit is available, providing the option to connect to the controller without the need to open the door of the electrical panel. Please be aware that the declared socket IP67 degree protection is ensured only when the protection cap is fastened. This external socket is mainly intended for maintenance. If it is used for permanent network connections, make sure that the installation environment is protected from water and dust.



Controller Ethernet port

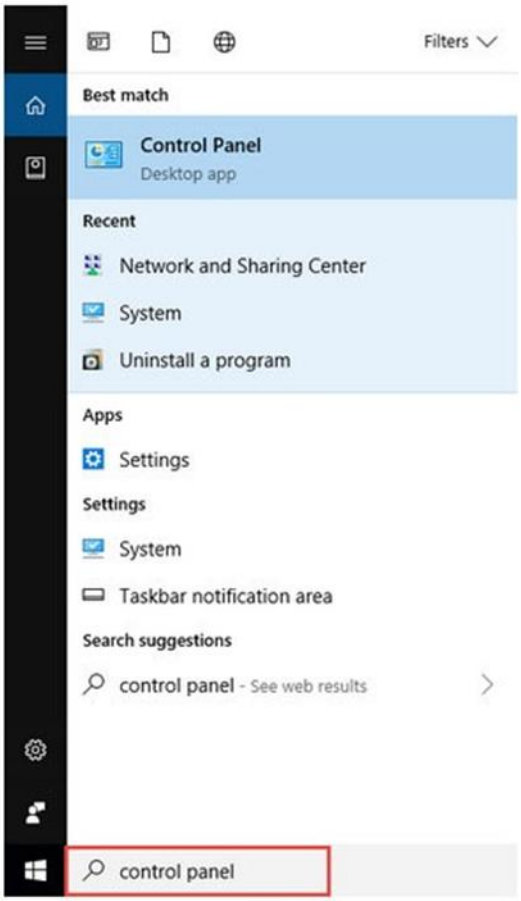


External Ethernet socket (air source and water source series)

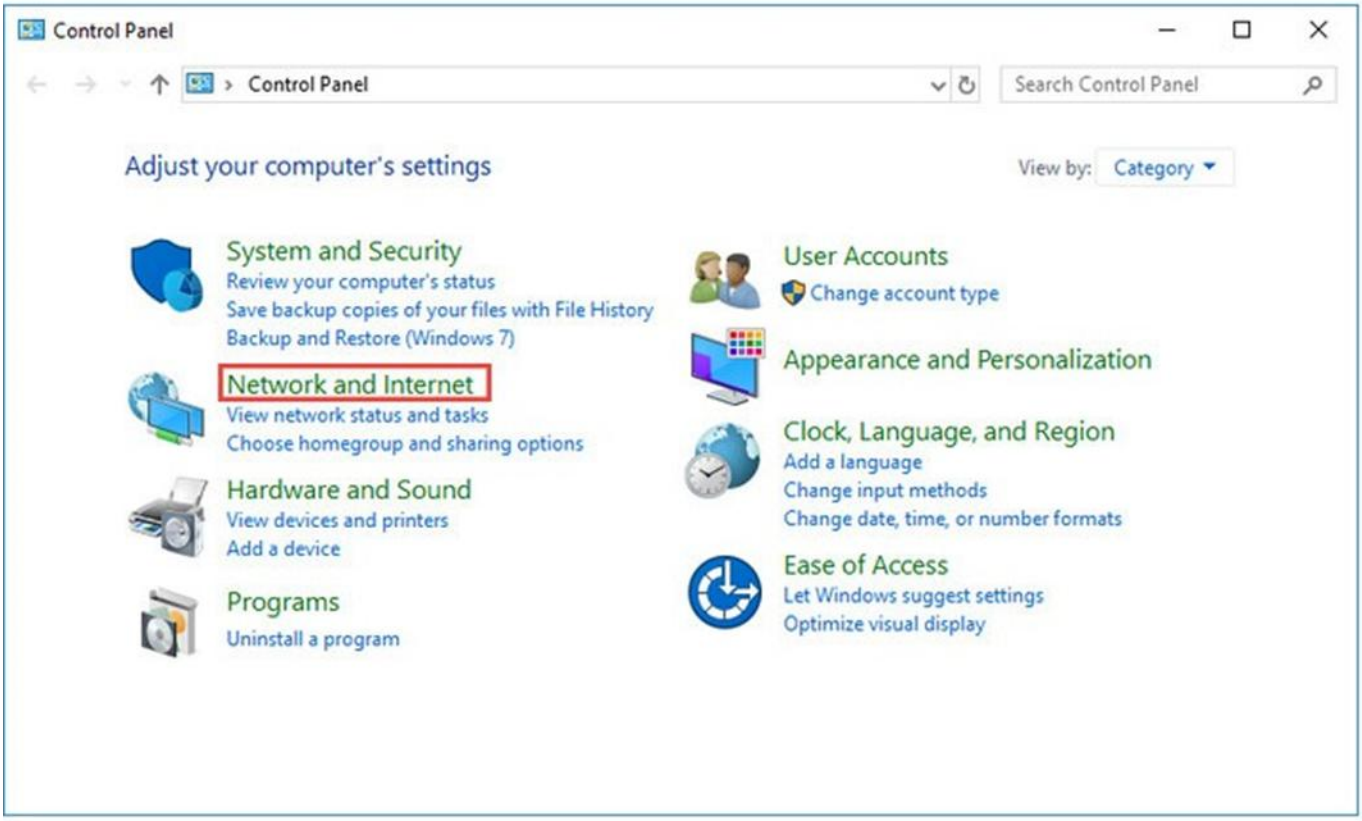
HOW TO CONFIGURE THE LOCAL AREA NETWORK (LAN)

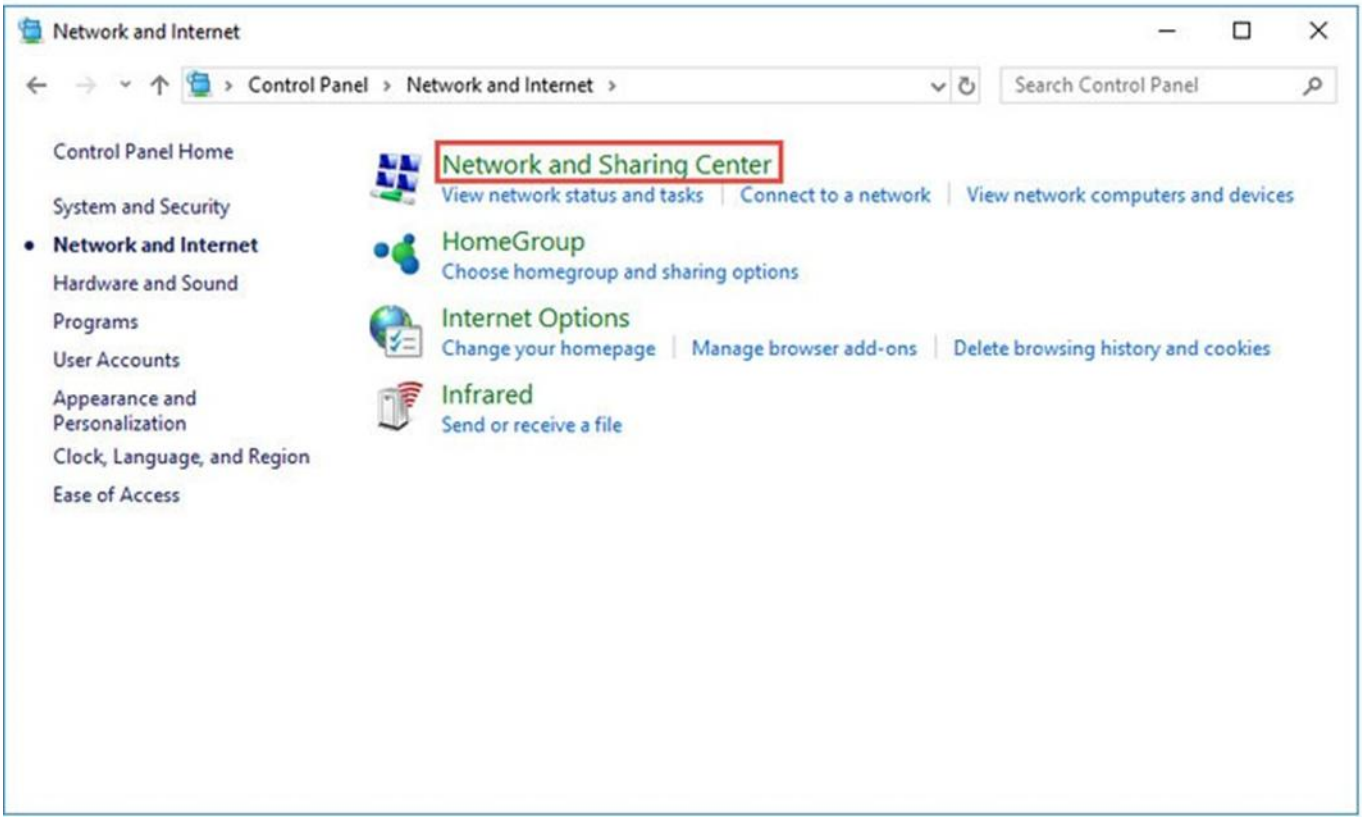
The default controller IP address is 192.168.1.160. For network interface controller configuration on a PC Use an Ethernet cable to connect the PC to the Ethernet socket on the front of the unit or directly to the Ethernet socket on the controller. Set the local area network by changing the Internet protocol version 4 (TCP/IPv4) proceeding as follows:

Type **control panel** in the search bar at the lower left of the screen and press **Enter** to open the control panel.

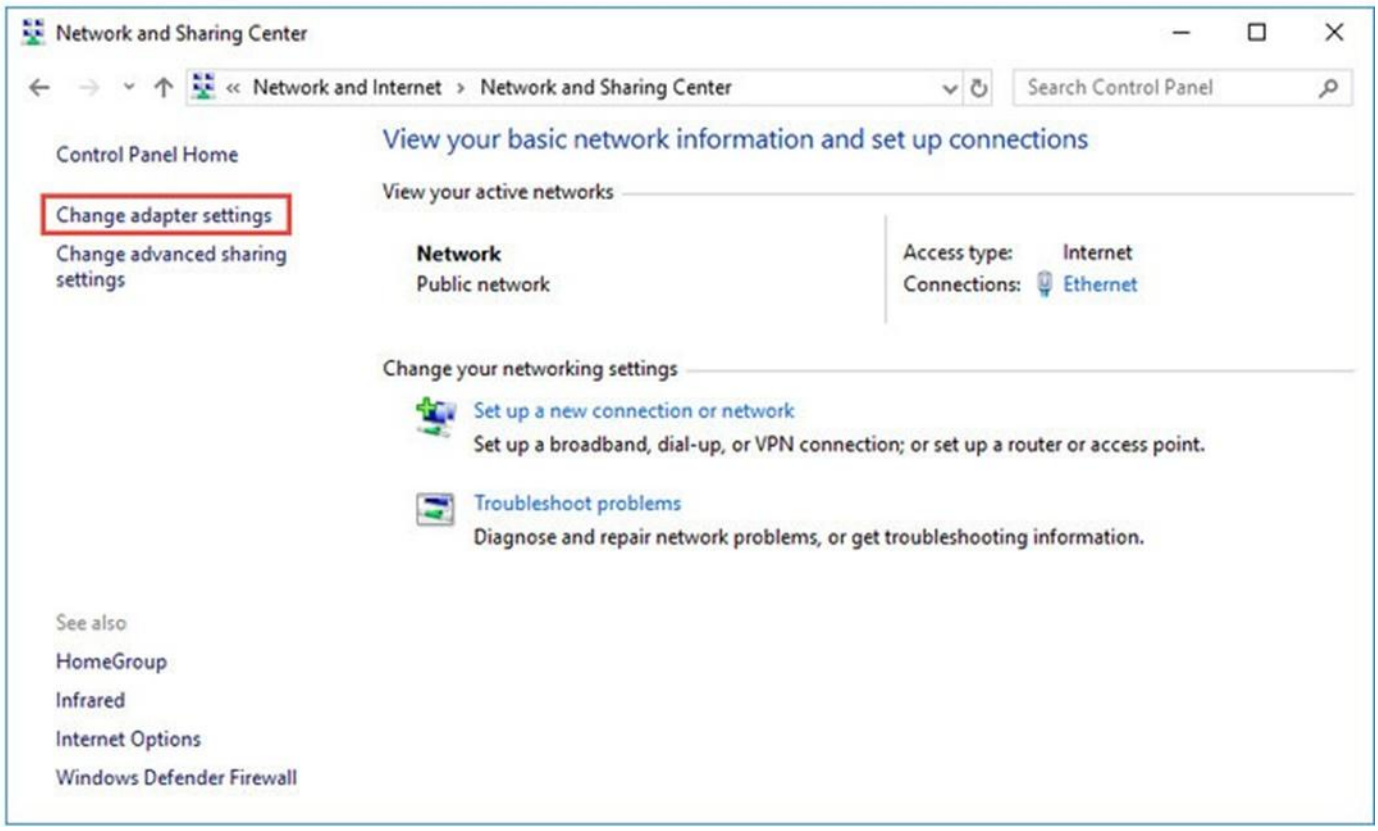


Go to Network and Internet > Network and Sharing Center.

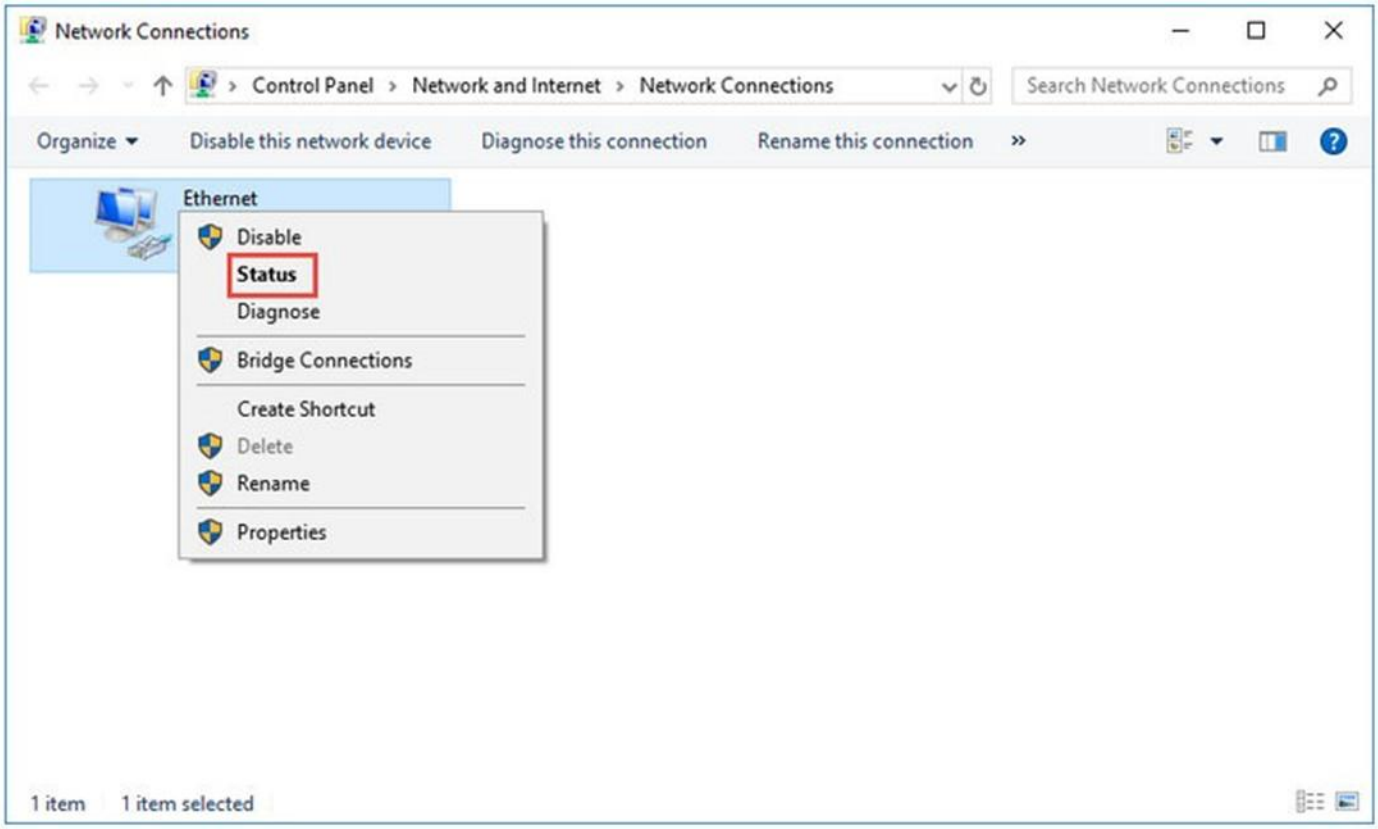




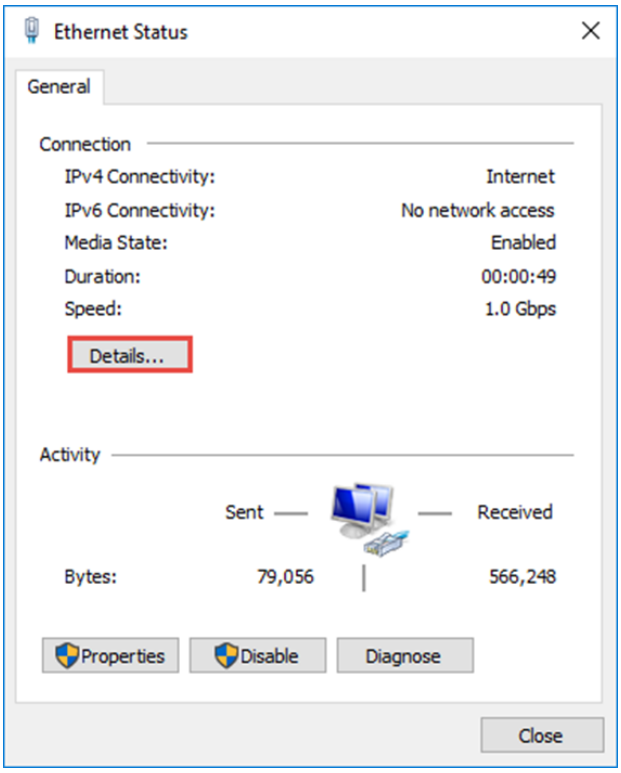
Select Change adapter settings on the left.

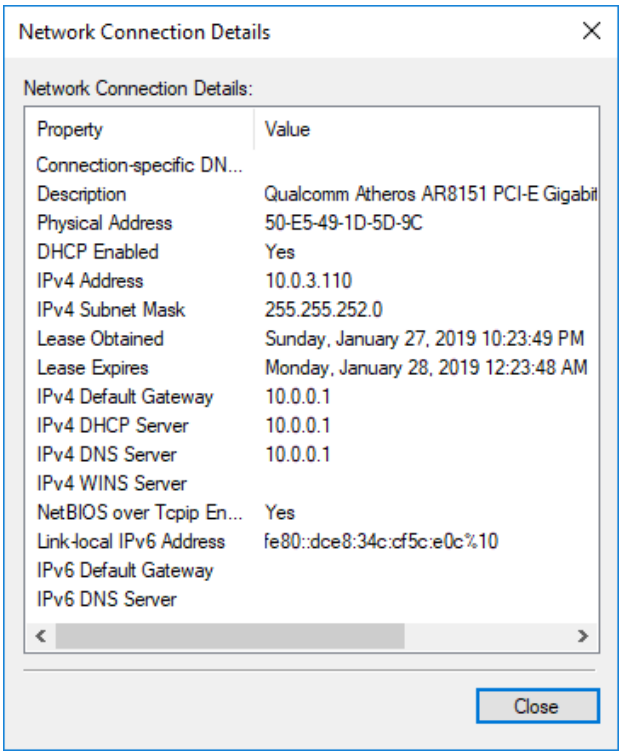


Right click the Ethernet icon and select **Status** from the context menu



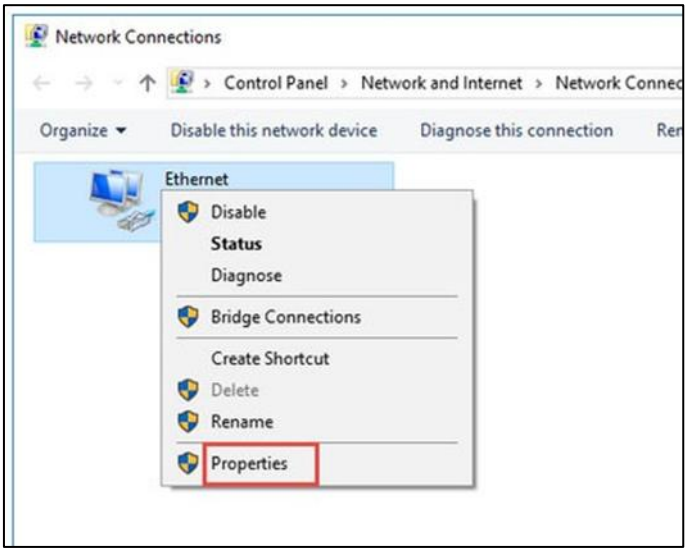
Then click **Details**... to view all detailed information of network connection.

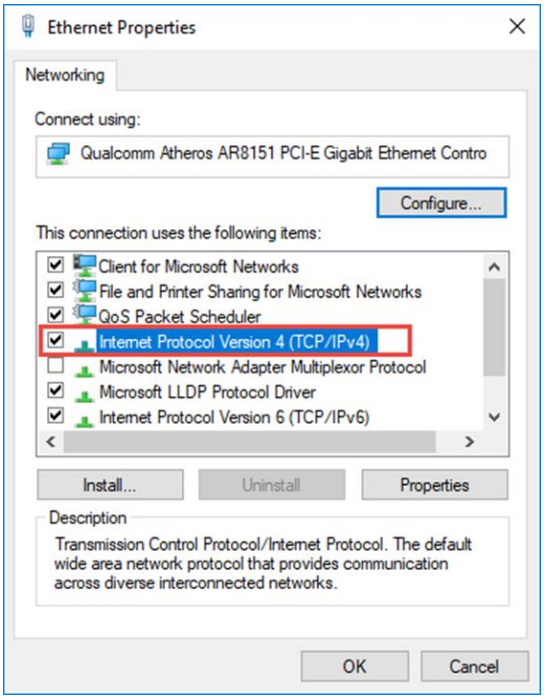




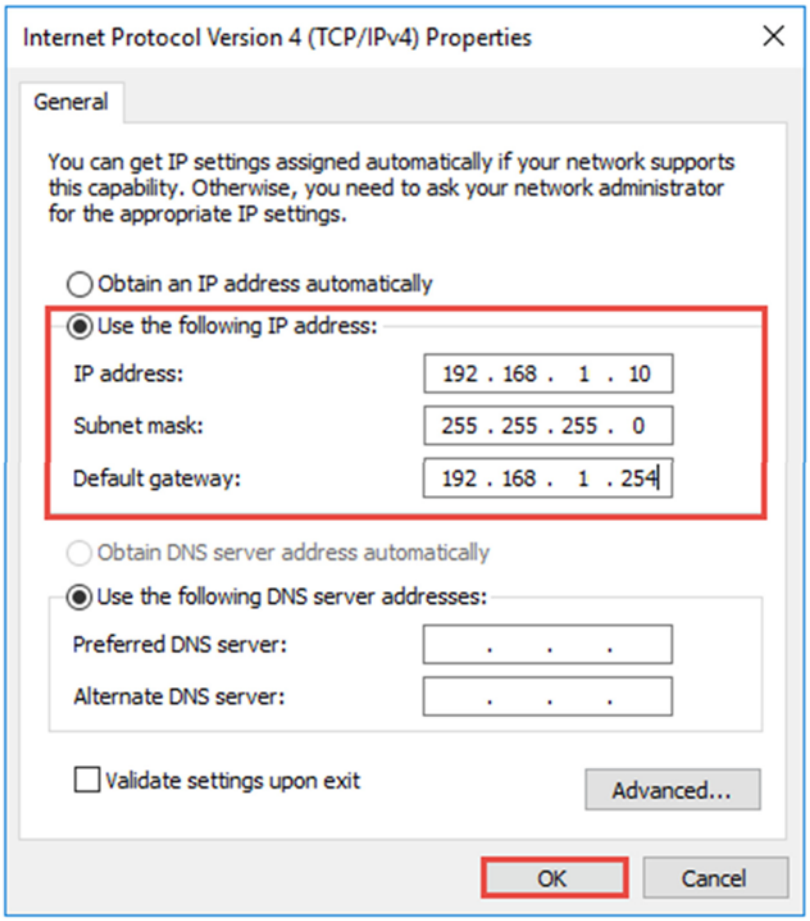
Set the IP address: right Click **Local Area Connection** and select **Properties**.

Then double click Internet Protocol Version 4 (TCP/IPv4).





Select Use the Following IP address: and type in the IP address, Subnet mask and Default gateway. Click OK to apply the settings.



Now will possible to connect to the unit web server typing the address 192.168.1.160 in your browser.

8. APPENDIX E

8.1. Operation With Built-In Display

The PLC that operates the Aegis has a built-in display. This is accessible from inside the electrical enclosure.

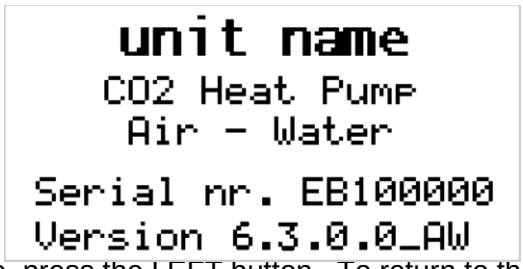
WARNING!
The electrical enclosure must be powered on to operate the PLC. This must be done by qualified personnel.

When the controller is started, the initialization page opens displaying the company logo.

8.2. General Information

After a short time, the following information about the unit is displayed:

- name of the unit
- type of unit
- serial number
- application version



To access this from the home page, press the LEFT button. To return to the home menu, press the OK button.

8.3. Key Function

UP (▲) When displaying: scrolls to previous parameter/ selects previous page.
When editing: increases the value.
DOWN (▼) When displaying: scrolls to next parameter/ selects next page.
When editing: decreases the value.
RIGHT (▶) When displaying: displays lower-level screen.
When editing: selects right number.
LEFT (◀) When displaying: returns to higher-level screen.
When editing: selects left number.
OK When displaying: confirmation key.
When editing: start/enter.

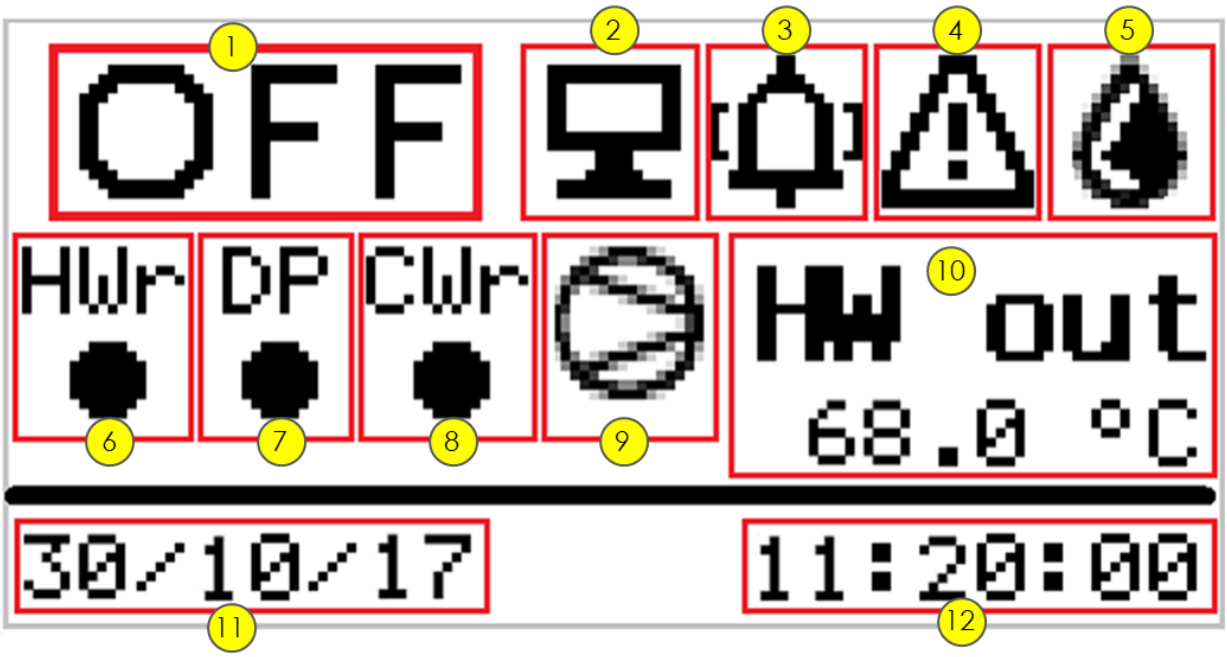
different service sub menus are displayed

8.4. Menu Navigation

Press the RIGHT key on the home page or on the general data screen to access the main menu, which can be scrolled through with the UP and DOWN keys.

8.5. Home Page

The home page displays the following parameters:



No.	Description	A/W	A/W with CW recovery	W/W
①	Unit's OFF-ON status	X	X	X
②	Activation of remote supervision	X	X	X
③	Alarms triggered	X	X	X
④	Warnings	X	X	X
⑤	Defrost status	X	X	X
⑥	"Hot water request" on status: HWr	X	X	X
⑦	"Double probe" on status: DP	X	X	X
⑧	"Cold water request" on status: CWr	X	X	X
⑨	Compressor status	X	X	X
⑩	Utility water outlet temperature: HW out	X	X	X
⑪	Current date	X	X	X
⑫	Current time	X	X	X

Press the BACK key to return to the general information page. The home page is automatically displayed again after a few seconds.

The icon is displayed when there is an alarm. When this icon is displayed, press the OK key to display the "CaAlarms" page containing the list of active alarms (see below for the description of the menu structure).

The icon is displayed when there is a warning. When this icon is displayed, press the OK key to display the "CaWarnings" page containing the list of active warnings The home page is automatically displayed after 5 minutes of inactivity.

8.6. General Data Screen

On the home screen press the UP and DOWN keys to scroll through the following operating parameters for theunit.

Modbus address	Code	Meaning	A/W	A/W with CW recovery	W/W	Units
9050	HW in	User side hot water inlet	●	●	●	°C
9028	HW out	User side hot water outlet	●	●	●	°C
9013	HP	Refrigerant high pressure	●	●	●	bar
9095	LP	Refrigerant low pressure	●	●	●	bar
9484	BT1	BT1 “Double probe function” temperature	●	●	●	°C
9485	BT2	BT2 “Double probe function” temperature	●	●	●	°C
9054	Pump sp	Pump speed	●	●	●	%
9151	Val op	Valve open	●	●	●	%
9071	GC	Refrigerant temperature after gas cooler	●	●	●	°C
9075	Suct	Refrigerant temperature in suction	●	●	●	°C
9109	Oil	Oil temperature	●	●	●	°C
8975	Evap	Evaporation temperature	●	●	●	°C
8974	SpHeat	Superheating	●	●	●	°C
9674	Disch	Compressor discharge temperature	●	●	●	°C
9079	Aext	External air temperature	●	●		°C
9588	Coil	Coil pack temperature	●	●		°C
9001	Fan sp	Fan speed	●	●		%
8994	RW in	Recovery cold water inlet		●		°C
8977	RW out	Recovery cold water outlet		●		°C
8994	SW in	Source cold water inlet			●	°C
8977	SW out	Source cold water outlet			●	°C
9886	BT3	Secondary hydraulic circuit outlet water temperature probe	●	●	●	°C
9887	2 Pmp	Secondary hydraulic circuit water pump speed	●	●	●	%

Press BACK to return to the home page.

The unit can be enabled and disabled via digital contacts, BMS, or web interface. NOTE: both the Enable and heating request status must be active in order to turn the unit ON.

8.7. Switching On/Off From Digital Input

General On/Off From Digital Input

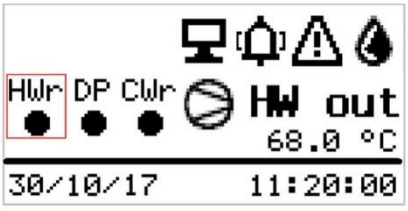
A three-position switch is already connected to this input on the unit:

- in the 0 or OFF position the unit is always OFF;
- in the “MAN” position the unit is ON but the control is bound to the state of the analog/digital inputs;
- in the “AUTO” position it is possible to initiate a hot water request control (see circuit diagram). The unit is ON if the remote control is ON but the unit start is bound to the state of the analog/digital inputs.

When the digital input is active, the word “ON” is displayed in the top left corner of the controller display, otherwise the word “OFF” is displayed if the input is not active.

Digital Input – “HW Request”

The controller switches the unit on and off according to the status of a dedicated digital input. The status of the digital input must be controlled by an external control system (PLC, clock, thermostat or similar). See next chapters for operating logic. When the digital input is active, a full dot appears on the display under “HWr”.



When the "double probe" function is activated, the status of this digital input is ignored.

8.8. Switching On/Off From Supervision System (Remote Control)

When switch-on/off of the unit is activated from the supervisory system, the symbol of a PC appears next toON-OFF on the built-in terminal.

By setting ON the “Enable supervision” variable (parameter RC01) the digital input ID1 (general ON-OFF) is ignored, and the unit ON/OFF switching can be controlled by the parameter RC02.

The variable "Hot water request by:" (parameter RC03) is used to select whether hot water demand for the user)is given by the status of the digital input ID2 or by the external supervising controller input.

The two typical situations are:

- Unit ON/OFF via BMS only: set RC01 = 1; RC03 = 1

Use the parameter RC02 to switch the unit ON and OFF

- Local hot water demand (mechanical thermostat or third-party PLC), BMS used for forced shutdown: setRC01=1; RC03=0.

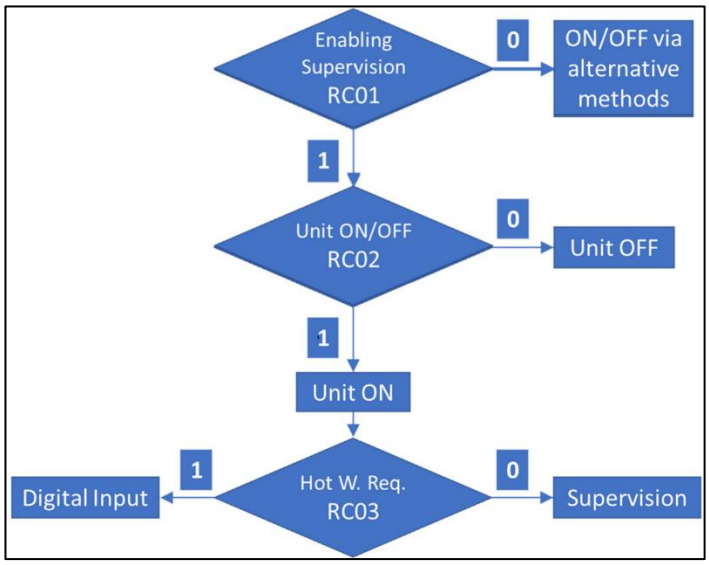
Use the parameter RC02 to switch the unit OFF. The start of the unit depends both on the parameter RC03 and the physical state of the digital input ID2.

NOTE: in the first case, when the controller is in remote control mode, it is no longer switched off by digital inputs. To prevent the machine from constant operation, there is a maximum operation time after which the remote switch-on control is disabled (RC04). To permanently control in remote mode, this time must be set to 0.

Modbus Address	Parameter	Description	Meaning	
17547	RC01	Enable supervision	Not enabled	Enabled
17548	RC02	General switch-on/off	OFF	ON
17549	RC03	“Hot Water request by”	Digital input	Supervision
16557	RC04	Maximum operating time under supervision	Supervision always enabled	If ≠0 indicates the time in minutes, after which supervision is disabled

When the two digital inputs are activated, both the word ON and the full dot under “HWr” will be shown on thecontroller.

To summarize:



8.9. Main Menu

The following sub-menus, which may be displayed or not depending on the operating mode, are enabled in this menu.

Index	Menu	Action	A/W	A/W with CW recovery	W/W
A	Settings	accesses user parameters settings: work set point, double probe function enable, and set point	●	●	●
B	I/O Values	displays the readings of the inputs and status of the outputs	●	●	●
C	Alarms	displays the active alarms	●	●	●
D	Warnings	displays the active warnings	●	●	●
E	Alarms log	displays the alarms logger	●	●	●
F	Defrost	displays the defrost status	●	●	
G	Clock set	accesses the date and time settings	●	●	●
H	Service	accesses the service advanced parameters (service level password required)	●	●	●
I	Manufacturer	accesses manufacturer advanced parameters (password required)	●	●	●

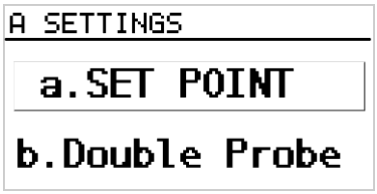
When the menu is selected, the character describing it is a capital letter and when the RIGHT key is pressed, the sub-menu is accessed.

When you have entered the sub-menu, press the BACK key to return to the main menu. To return directly to the home page, press and hold the BACK key.

From any menu or sub-menu page, press and hold the BACK key to return to the main page.

Menu - A Settings

On the main menu, with the A.SETTINGS menu selected, press the RIGHT key to access the sub-menu. More screens can be selected with the UP and DOWN keys



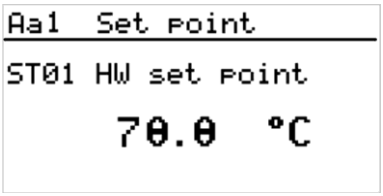
Index	Menu	Action	A/W	A/W with CW recovery	W/W
Aa	Set point	accesses the hot water set point settings.	•	•	•
Ab	Double probe	accesses the double probe function settings	•	•	•
Ac	CW recovery	accesses the cold water recovery settings, enabling commands, set point and differential.		•	

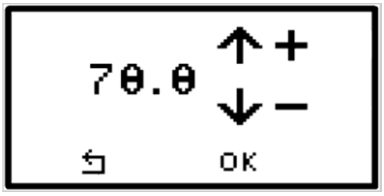
CAUTION!

Settings should be adjusted by taking into account the configuration of the system, the use for which the unit is designed, and the unit's operating limits. Entering parameters outside the operating limits could lead to malfunction of and/or serious damage to the unit.

MENU - AA SET POINT

On the A.Settings menu, with the a.SET POINT menu selected, press the RIGHT key to access the hot water set point setting screen.





Press OK to access the set point editing window. In this window:

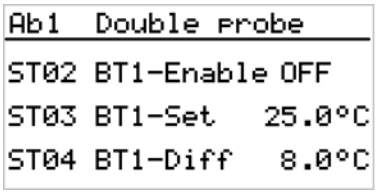
1. press the UP key to increase the value by 32.18°F (0.1°C)
2. long press the UP key to increase the value by 36.5°F (2.5°C)
3. press the DOWN key to reduce the value by 32.18°F (0.1°C)
4. long press the DOWN key to reduce the value by 36.5°F (2.5°C)
5. press the BACK key to close set point screen without confirming changes
6. press the OK key to confirm changes and close the set point screen

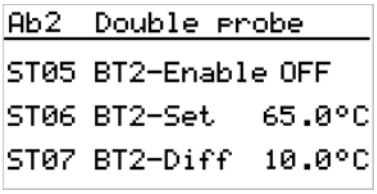
Modbus Address	Read Write	Code	Meaning	Min	Max	Unit of Measurement
16433	RW	ST01	Hot water set point setting	140°F (60°C)	194°F (90°C)	°Fahrenheit (°Celsius)

MENU - Ab DOUBLE PROBE

On the A.Settings menu, with the b.DOUBLE PROBE menu selected, press the RIGHT key to access the double probe function setting screen.

Select the following parameters with the UP and DOWN keys:





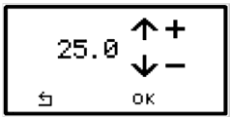
Modbus address	ReadWrite	Code	Meaning	Min	Max	Unit of measurement
16633	RW	ST02	Enables BT1 probe	OFF	ON	16633
16637	RW	ST03	BT1 probe set point	20	85 / 90 *	°C
16639	RW	ST04	BT1 probe differential	1	15	°C
16641	RW	ST05	Enables BT2 probe	OFF	ON	
16638	RW	ST06	BT2 probe set point	10	30	°C
16640	RW	ST07	BT2 probe differential	1	15	°C

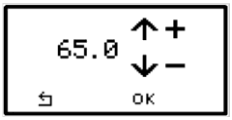
(*) the max value can be configured by parameter.

When the parameter is selected, press the OK key to edit the value in the enable/disable windows (parametersST02 – ST05):

- press the UP key to set the value ON;
- press the DOWN key to set the value OFF;
- press the BACK key to cancel the selection and return to the Ab.Double Probe menu;
- press the OK key to confirm the choice and return to the Ab.Double Probe menu

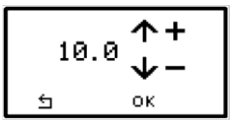
In the set point windows (parameters ST03 – ST06):





- press the UP key to increase the value by 0.1°C (32.1°F);
- long press the UP key to increase the value by 2.5°C (36.5°F);
- press the DOWN key to reduce the value by 0.1°C (32.1°F);
- long press the DOWN key to reduce the value by 2.5°C (36.5°F);
- press the BACK key to close the set point screen without confirming changes;
- press the OK key to confirm changes and close the set point screen.

In the differential temperature windows (parameters ST04 – ST07):

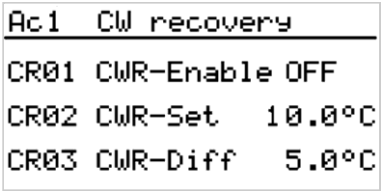


- press the UP key to increase the value by 0.1°C (32.1°F);
- long press the UP key to increase the value by 1°C (33.8°F);
- press the DOWN key to reduce the value by 0.1°C (32.1°F);

- long press the DOWN key to reduce the value by 1°C (33.8°F).
- press the BACK key to close differential adjustment screen without confirming changes;
- press the OK key to confirm changes and close the differential adjustment screen.

MENU - AC CW RECOVERY (COOL RECOVERY)

On the A.Settings menu, with the c.CW RECOVERY menu selected, press the RIGHT key to access the cold recovery function setting screen.



Select the following parameters with the UP and DOWN keys:

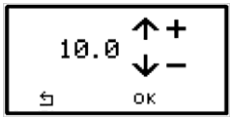
Modbus address	ReadWrite	Code	Meaning	Min	Max	Unit of measurement
9638	RW	CR01	Enable cold water recovery	OFF	ON	
16807	RW	CR02	Cold water recovery set point	-30	50	°C
16808	RW	CR03	Cold water recovery differential	0	30	°C

When the parameter is selected, press the OK key to access the window where it can be edited.

In the function enable/disable window (parameter CR01):

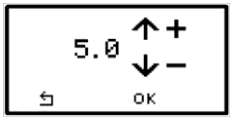
- press the UP key to set the value ON;
- press the DOWN key to set the value OFF;
- press the BACK key to cancel the choice and return to the Ac.CW Recovery menu;
- press the OK key to confirm the choice and return to the Ac.CW Recovery menu.

In the set point window (parameter CR02):



- press the UP key to increase the value by 0.1°C (32.1°F);
- long press the UP key to increase the value by 2.5°C (36.5°F);
- press the DOWN key to reduce the value by 0.1°C (32.1°F);
- long press the DOWN key to reduce the value by 2.5°C (36.5°F);
- press the BACK key to close the set point screen without confirming the changes;
- press the OK key to confirm the choice and close the set point adjustment screen.

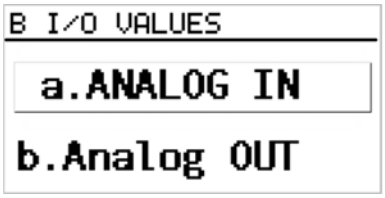
In the differential temperature window (parameter CR03):

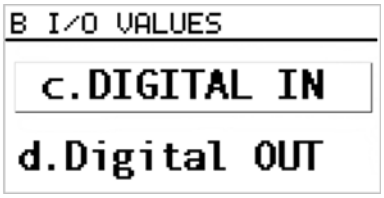


- Press the UP key to increase the value by 0.1°C (32.1°F);
- long press the UP key to increase the value by 1°C (33.8°F);
- press the DOWN key to reduce the value by 0.1°C (32.1°F);
- long press the DOWN key to reduce the value by 1°C (33.8°F).
- Press the BACK key to close differential adjustment screen without confirming changes;
- press the OK key to confirm changes and close the differential adjustment screen.

MENU - B I/O VALUES

On the main menu, with the B.I/O VALUES menu selected, press the RIGHT key to access the sub-menu where more screens can be selected with the UP and DOWN keys.





Index	Menu	Action	A/W	A/W with CW recovery	W/W
Ba	Analog IN	displays the analog inputs	●	●	●
Bb	Analog OUT	displays the analog outputs	●	●	●
Bc	Digital IN	displays the digital inputs	●	●	●
Bd	Digital OUT	displays the digital outputs	●	●	●

Access the selected menu with the RIGHT key to view the pages displaying the various IO. When accessing via Modbus the values are all read-only.

MENU - Ba Analog Inputs

Modbus address	Code	Description	Meaning	A/W	A/W with CW recovery	W/W	Unit of measurement
8336	AI1	HW in	Utility hot water inlet	●	●	●	°C
8337	AI2	HW out	Utility hot water outlet	●	●	●	°C
8338	AI3	GC	Refrigerant temp after gas cooler	●	●	●	°C
8339	AI4	Suct	Refrigerant temp in suction	●	●	●	°C
8340	AI5	AExt	External air temp	●	●		°C
8340	AI5	SW in	Source water inlet temp			●	°C
8341	AI6	Coil	Coil pack temp	●	●		°C
8341	AI6	SW out	Source water outlet temp			●	°C
8342	AI7	BT1	BT1 “Double probe function” temp	●	●	●	°C

8343	AI8	BT2	BT2 “Double probe function” temp	●	●	●	°C
8344	AI9	HP	Refrigerant high pressure	●	●	●	Bar
8345	AI10	LP	Refrigerant low pressure	●	●	●	Bar
8346	AI11	Oil	Oil temp	●	●	●	°C
8347	AI12	Disch	Compressor discharge temp	●	●	●	°C
9629	ExAI1	RW in	Source cold water inlet			●	°C
9630	ExAI2	RW out	Source cold water outlet			●	°C
9636	ExAI3	BT3	Secondary circ. water temp.	●	●	●	°C
9666	ExAI4	Subcool	Evaporator outlet temp (Only with secondary pump)	●	●	●	°C

MENU - Bb Analog Inputs

Modbus address	Code	Description	Meaning	A/W	A/W with CW recovery	W/W	Unit of measurement
8448	AO1	Pmp sp	Utility water pump speed %	●	●	●	%
8449	AO2	Val op	Thermostatic valve opening %	●	●	●	%
8450	AO3	Fan sp	Fan speed %	●	●		%
8451	AO4	--	Not used	●	●	●	%
8452	AO5	--	Not used	●	●	●	%
8453	AO6	--	Not used	●	●	●	%
9887	ExAO1	2Pmp sp	Secondary pump modulation	●	●	●	%

MENU - Bc Digital Inputs

Modbus address	Code	Description	Meaning	A/W	A/W with CW recovery	W/W
8192	DI1	ON-OFF	Remote ON-OFF	●	●	●
8193	DI2	HW Request	Hot utility request	●	●	●
8194	DI3	RW Request	Cold utility request		●	
8195	DI4	Force DF	Forced defrost	●	●	
8196	DI5	HP Switch	High pressure switch	●	●	●
8197	DI6	--	Not used	●	●	●
8198	DI7	Cmp Therm	Compressor thermal switch	●	●	●
8199	DI8	Oil DPres	Oil differential pressure switch	●	●	●
8200	DI9	--	Not used	●	●	●
8201	DI10	RW Flow sw	Recovery flow switch		●	
8201	DI10	SW Flow sw	Source flow switch			●
8202	DI11	CBrk Src	Circuit breaker source fan/pump	●	●	●
8203	DI12	Cmp state	Compressor return ON	●	●	●
9898	ExDI1	CBrk 2Pmp	Circuit breaker secondary pump	●	●	●
9899	ExDI2	SEC	Outlet water thermal switch	●	●	●
9900	ExDI3	HWout	Defrost heaters thermal switch	●	●	

MENU - Bd Digital Outputs

Modbus address	Code	Description	Meaning	A/W	A/W with CW recovery	W/W
8528	DO1	Compressor	Compressor	●	●	●
8529	DO2	Oil Heater	Compressor crankcase heater	●	●	●
8530	DO3	Oil Valve	Oil valve	●	●	●
8531	DO4	HW Pump	Utility hot water pump	●	●	●
8532	DO5	RW Pump	Recovery pump		●	
8532	DO5	SW Pump	Source pump			●
8533	DO6	HW Heater	Utility anti-ice heater	●	●	●
8534	DO7	RW Heater	Recovery anti-ice heater		●	
8534	DO7	SW Heater	Source anti-ice heater			●
8535	DO8	Defrost	Defrost	●	●	
8536	DO9	LR Heater	Receiver heaters		●	
8537	DO10	3W Valve	Recovery 3-way valve		●	
8538	DO11	Alarm	Alarm	●	●	●
8539	DO12	Warning	Warning	●	●	●
9910	ExDO1	En 2 Pmp	Secondary pump enable	●	●	●
9911	ExDO2	--	--			
9912	ExDO3	En CTH	Condenser tray resistors	●	●	

Menu - C Alarms

On the main menu, with the C.ALARMS menu selected, press the RIGHT key to access the list of active alarms that shut down the machine. Alarms are situations that prevent the unit from working. To restore operation, first clear the problem that triggered the alarm then reset the alarm. Below is a list of possible alarms. Next to the alarm code is the status of the alarm (active/resettable).

Modbus Address Alarm		Code	Meaning	A/W	A/W with CW recovery	W/W
Presence	Status: Active/Resettable					
9139	9139		Main alarm (visible only on the home page)	●	●	●
9598	9088	Pr HPH	High pressure (from pressure switch/transducer)	●	●	●
9601	9100	Pr LPL	Low pressure below minimum (from transducer)	●	●	●
9602	9101	Pr LPH	Low pressure above maximum (from transducer)	●	●	●
9625	9373	Rec LP	Recovery disabled from low pressure		●	
9603	9103	CO thr	Compressor thermal switch (from digital input)	●	●	●
9609	9675	CO HDis	High discharge temperature	●	●	●
9604	9079	CO HSuc	High suction temperature	●	●	●
9608	9074	GC HT	Maximum gas cooler temperature (from temperature probe)	●	●	●
9592	9123	OL Lev	Oil level low (from digital input)	●	●	●
9595	9106	OL DP	Oil differential pressure switch	●	●	●

9593	9119	OL HT	Maximum oil temperature (from temperature probe)	●	●	●
9594	9120	OL LT	Minimum oil temperature (from temperature probe)	●	●	●
9605	9673	HW HT	Inlet hot water alarm (user side)	●	●	●
9621	9488	AI HW	Hot side anti-ice alarm	●	●	●
9597	9039	AI CW	Recovery/source side anti-ice		●	●
9626	9042	FLW RW	Recovery side flow switch alarm		●	
9620	9042	FLW SW	Source flow switch			●
9628	9406	Rec AL	Recovery disabled by alarm		●	
9627	8977	Rec WHT	Recovery heat exchanger temperature too high alarm		●	
9627	9374	SW WHT	Inlet hot water alarm (user side)			●
9596	9090	Er HP	High pressure transducer error	●	●	●
9600	9102	Er LP	Low pressure transducer error	●	●	●
9599	9051	Er HWi	Inlet hot water probe error	●	●	●
9606	9031	Er HWo	Hot water outlet probe error	●	●	●
9610	9681	Er Disc	Discharge compressor probe error	●	●	●
9607	9032	Er GCo	Gas cooler outlet probe error	●	●	●
9622	9522	Er BT1	BT1 probe error (regulation with double probe)	●	●	●
9623	8999	Er CWi	Recovery side inlet probe alarm		●	●
9624	8981	Er CWo	Recovery side outlet probe alarm		●	
9612	8981	Er SWo	Source water outlet probe error			●
9170	9170	Er EXP	Communication error with expansion		●	
9908	9908	CBrk SecPmp	Circuit breaker secondary pump	●	●	●
9909	9909	CBrk SrcFan	Circuit breaker source fan/pump	●	●	●
9906	9906	STh HWout	Security thermostat outlet water	●	●	●
9907	9907	STh DEF	Security thermostat defrost resistors	●	●	
9922	9919	Er BT3	Alarm outlet water secondary pump	●	●	●

When the status of an alarm is active, it cannot be reset. When the status is resettable, it can be reset by pressing the RESET key at the bottom of the screen.

Menu - D Warnings

On the main menu, with the D.WARNINGS menu selected, press the RIGHT key to access the list of active warnings. Warnings do not prevent the unit from working but may need to be cleared to ensure full operation of the unit.Warnings reset themselves automatically when the cause that generated them has been cleared.

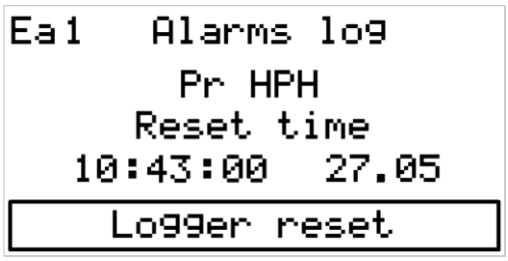
Modbus address	Code	Meaning	A/W	A/W with CW recovery	W/W
9142		Warnings (visible only on the home page)	●	●	●
9141	Pr HPL	High pressure below the minimum	●	●	●
9363	HW ELH	No frost heater switch on (hot side)	●	●	●
9004	CW ELH	No frost heater switch on (cold side)		●	●
8984	CW HD	Recovery/source side temperature difference above maximum		●	●
8989	CW LD	Recovery/source side temperature difference below minimum		●	●
9112	Er OL	Oil probe error	●	●	●
9080	Er Suc	Suction probe error	●	●	●
9070	Er Ext	External air probe error	●	●	
9589	Er Coil	Coil pack probe error	●	●	
9523	Er BT2	BT2 probe error (double probe function)	●	●	●
9919	Er BT3	BT3 probe error	●	●	●

Menu - E Alarms Log

Select the E.ALARMS LOG from the main menu by pushing the right button you can access to the list of the last 100 alarms.

For each event, the following information is reported:

- the alarm code
- the type of event, activation or reset
- alarm timestamp and date



To scroll the list of the reported events press the UP and DOWN buttons.

To delete the list of the events push the “Logger reset” button on the bottom of the display Please note that only alarms will be deleted, the other logged values (temperatures, pressures...) stored in the internal memory will be preserved.

Menu - F Defrost

On the main menu, with the F.DEFROST menu selected, press the RIGHT key to access the screens displaying the defrost status.

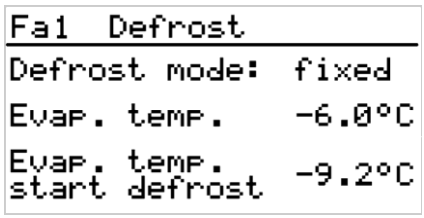
Defrosting is composed of 4 phases:

- enter phase
- central phase
- drop-off phase
- minimum interval before the next defrost operation

Defrosting starts when the evaporation temperature drops below the defrost starting threshold. Use the UP and DOWN keys to scroll through the three pages describing defrost operation.

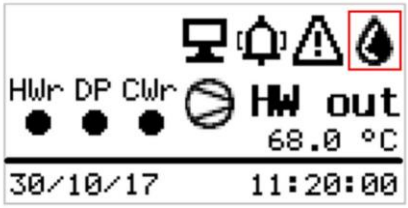
The first Fa1 page displays:

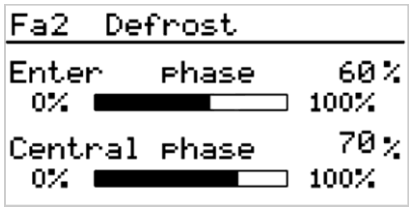
- the type of defrost: fixed or dynamic evaporation temperature; *the dynamic evaporation mode is strongly recommended*
- the actual evaporation temperature
- the evaporation temperature at which defrosting starts



The second Fa2 page displays:

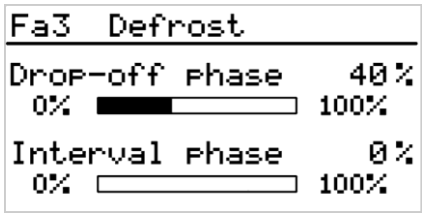
- progress of the defrost cycle request. When the evaporation temperature drops below the defrost starting threshold, the unit begins the “enter phase” and shows progress on the first “Enter phase” bar. In this situation, the icon is displayed in the top right-hand corner of the defrost status zone on the main page;
- progress of the defrost cycle central phase. Once the enter phase has finished, the defrost central phase starts. The central phase progress is shown on the second “Central phase” bar. In this situation, the icon is displayed in the top right-hand corner of the defrost status zone on the main page.





The third Fa3 page displays:

- progress of the defrost cycle drop-off phase. Once the central phase has finished, the drop-off phase starts. The drop-off phase progress is shown in the third “Drop-off phase” bar. In this situation, the icon is displayed in the top right-hand corner of the defrost status zone on the main page;
- progress of the minimum interval before the next defrost operation. Once the drop-off phase has finished, a small amount of time must pass before another defrost cycle can start. This interval phase progress is shown on the fourth “Interval phase” bar. In this situation, the icon is displayed in the top right-hand corner of the defrost status zone on the main page;



Modbus address	Read Write	Code	Meaning	Unit of measurement
9559	R		Enter phase (visible only on the home page)	
9560	R		Central phase (visible only on the home page)	
9561	R		Drop-off phase (visible only on the home page)	
9563	R		Interval phase between 2 defrost operations (visible only on the home page)	
16665	R		Type of Defrost (dynamic/fixed)	
8975	R		Actual evaporation temperature	°C
9564	R		Defrost start evaporation temperature	°C
9580	R		Defrost request phase progress	%
9581	R		Defrost central phase progress	%
9582	R		Defrost drop-off phase progress	%
9583	R		Interval between two defrost cycles progress	%

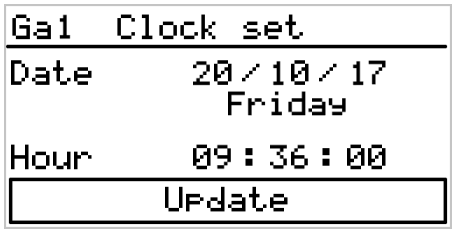
MENU - G CLOCK SET

On the main menu, with the G.CLOCK SET menu selected, press the RIGHT key to access the screen used to set the date and time.

Select the different parameters with the UP and DOWN keys. Once the parameter has been selected, press the OK key to edit the parameter.

When the parameter is in edit mode:

- press the UP key to increase the value;
- press the DOWN key to decrease the value;
- press the BACK key to select the left box;
- press the RIGHT key to select the right box;
- press the OK key to exit the parameter's edit mode.



Once the values have been edited press the UPDATE key and then OK to confirm the setting.

MENU - H SERVICE

On the main menu, with the H.SERVICE menu selected, press the RIGHT key to access the screens that require the "service" password to be entered for access to the maintenance operator's parameters.

MENU - I MANUFACTURER

On the main menu, with the I.MANUFACTURER menu selected, press the RIGHT key to access the screens that require the "Manufacturer" password to be entered for access to the manufacturer's parameters. Access is allowed only to the manufacturer's personnel.

8.10. Service Menu

CAUTION!

Only qualified staff should edit the service parameters. Changing these parameters may lead to malfunction and/or serious damage to the unit.

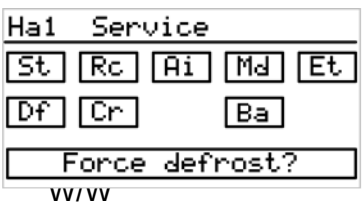
Press "Service" on the main menu to access the service menu. Press the RIGHT key to access the window where a password must be entered to access the sub-menus.

In this window:

- press the UP key to increase the password value by 1;
- long press the UP key to increase the password value by 10;
- press the DOWN key to reduce the password value by 1;
- long press the DOWN key to reduce the password value by 10;
- press the BACK key to close the password window and return to the main menu;
- press the OK key to confirm the password.

If the password is incorrect, a message appears indicating that it has been incorrectly entered; if the password is correct, the service menu is displayed. The presence of sub-menus depends on the operating mode.

AWW AWW with CW recovery



WWW

Code	Description	A/W	A/W with CW recovery	W/W
ST	Set point	●	●	●
RC	Remote control	●	●	●
AI	Anti ice settings	●	●	●
MD	Serial card RS485 configuration	●	●	●
ET	Ethernet configuration	●	●	●
DF	Defrost config	●	●	
CR	Cold recovery settings		●	
SW	Source water settings			●
BA	BACnet IP configuration	●	●	●
CTH	Condenser tray heaters settings	●	●	
SHC	Secondary hydraulic circuit settings	●	●	●
Force defrost		●	●	

Menu - St Set Point

On the service menu, with the ST key selected, press the OK key to access the screen used to set the hot water set point and enable the double probe function and its set points and differentials. See below for detailed explanations.

MENU - RC Remote control

On the service menu, with the RC key selected, press the OK key to access the screen used to set the remote control. See below for detailed explanations.

Menu - Ai Anti-Freeze

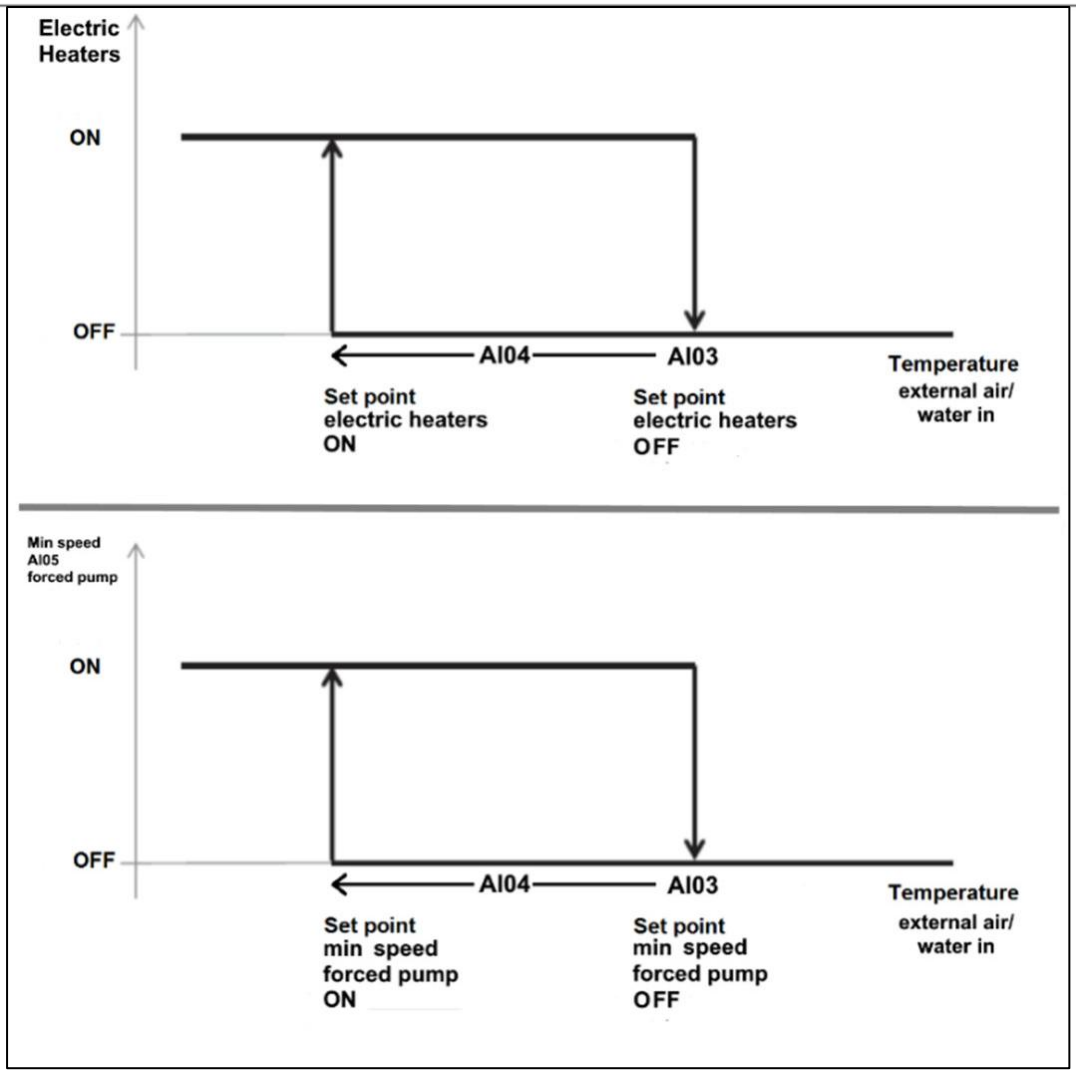
On the service menu, with the AI key selected, press the OK key to access the screen used to set the management parameters for the anti-freeze heaters and for the anti-freeze alarms.

Modbus Address	ReadWrite	Code	Meaning	Min	Max	Unit of measurement/ correspondence	A/W	A/W CWr	W/W
16645	RW	AI01	Anti-freeze probe selection	0	1	0 = air 1 = water	●	●	●
16535	RW	AI02	Hot water side anti-freeze protection: anti-freeze heaters and forced pump circulation enabling	0	1	0 = OFF 1 = ON	●	●	●
16500	RW	AI03	Hot water side anti-freeze protection: heaters and forced pump circulation activation set point	-10	15	°C	●	●	●
16501	RW	AI04	Hot water side anti-freeze protection: heaters and forced pump circulation activation differential	0	10	°C	●	●	●
16502	RW	AI05	Anti-freeze protection: minimum pump speed	0	100	%	●	●	●
16644	RW	AI06	Anti-freeze alarm enabling	0	1	0 = OFF 1 = ON	●	●	●
16642	RW	AI07	Hot water side anti-freezealarm: alarm activation setpoint	-15	10	°C	●	●	●

16643	RW	AI08	Hot water side anti-freeze alarm: alarm activation differential	0	10	°C	•	•	•
16524	RW	AI09	Cold water side anti-freeze heaters activation set point (regulation onoutlet probe)	-15	10	°C		•	•
16525	RW	AI10	Cold water side anti-freeze heaters activation differential (regulation onoutlet probe)	0	10	°C		•	•
16822	RW	AI11	Cold water side anti-freeze heaters activation set point (regulation oninlet probe)	-15	10	°C		•	•
16823	RW	AI12	Cold water side anti-freeze heaters activation differential (regulation oninlet probe)	0	10	°C		•	•
16820	RW	AI13	Cold water side anti-freeze alarm activation set point (regulation on outlet probe)	-15	10	°C		•	•
16821	RW	AI14	Cold water side anti-freeze alarm activation differential (regulation on outlet probe)	0	10	°C		•	•
16824	RW	AI15	Cold water side anti-freeze alarm activation set point (regulation on inlet probe)	-15	10	°C		•	•
16825	RW	AI16	Cold water side anti-freeze alarm activation differential (regulation on inlet probe)	0	10	°C		•	•

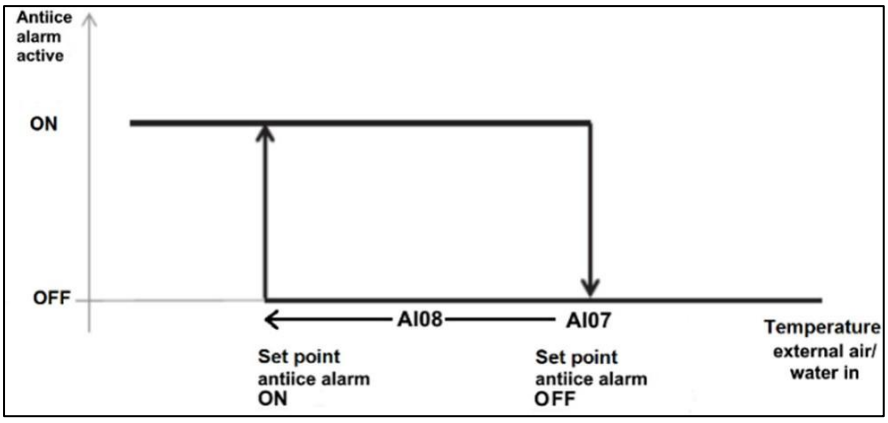
8.11. Hot Side Anti-Freeze

The hot side anti-freeze function is managed by parameters AI01-AI08. Parameter AI01 is used to select on which probe (external air or water inlet) the hot side anti-freeze heaters and the anti-freeze alarm are activated. Parameter AI02 is used to select whether to activate the hot side anti-freeze heater and forced hot water circulation for anti-freeze protection. If parameter AI02 = 1 (ON), the external air probe or utility water inlet value (depending on parameter AI01) is compared with the difference between the values of parameters AI03 and AI04. With values lower than (AI03-AI04), the anti-freeze heater is activated and pump circulation is forced at a speed no lower than parameter AI05. The icon is displayed. When the temperature rises above the value of parameter AI03, the heater is switched off and the pump resumes the speed set by the regulation.



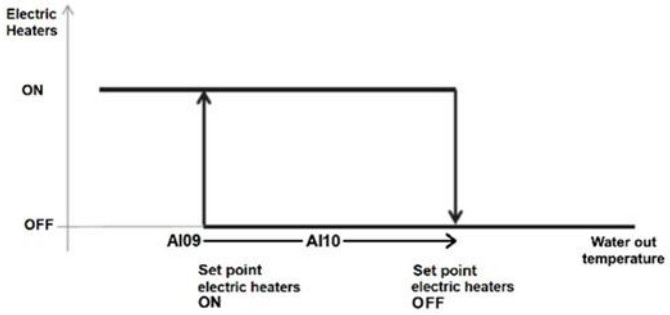
Parameter AI06 is used to select whether to activate the hot side anti-freeze alarm.

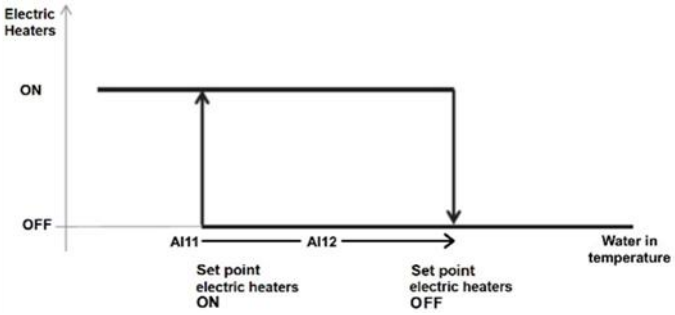
If parameter AI06 = 1 (ON), the external air probe or utility water inlet value (depending on parameter AI01) is compared with the difference between the values of parameters AI07 and AI08. With values lower than (AI07- AI08), the anti-freeze alarm is triggered, the unit is shut down and the icon is displayed. When the temperature rises above the value of parameter AI07, the alarm can be reset.



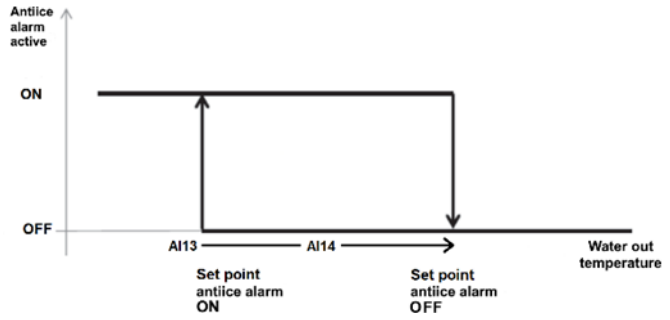
8.12. Cold Side Anti-Freeze (Recovery/Source)

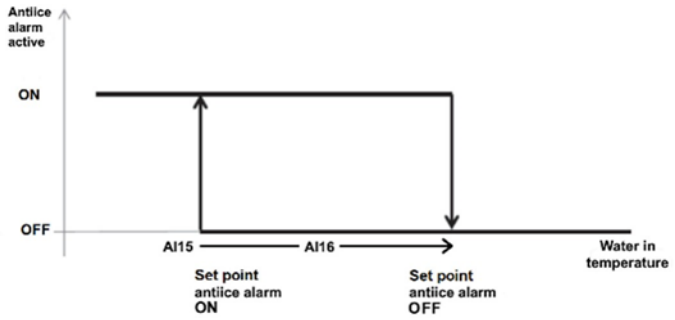
The cold side anti-freeze is managed by parameters AI09-AI16. The reference probe for operation of the anti- freeze heater and the anti-freeze alarm is the cold recovery heat exchanger water / source water outlet probe. Parameters AI09 and AI10 control activation of the cold water side anti-freeze heater on the outlet probe reading. If the water outlet probe is in alarm, the anti-freeze heater is adjusted by parameters AI11 and AI12 on the inlet probe reading.





Parameters AI13 and AI14 regulate activation of the cold water side anti-freeze alarm on the outlet probe reading. If the water outlet probe is in alarm, the anti-freeze alarm is adjusted by parameters AI15 and AI16 on the inlet probe reading.





MENU - MD RS485 -1 Config

On the service menu, with the MD key selected, press the OK key to access the screen used to set the RS485-1 serial port. The Modbus/RTU and the BACnet MS/TP protocols are available.

Modbus address	Read Write	Code	Meaning	Min	Max	Correspondence
16124	R/W	MD01	RS485 no. 1 - Address	1	255	
16125	R	MD02	RS485 no. 1 - Protocol	3	4	3 = Modbus/RTU 4 = BACnet MS/TP
16126	R	MD03	RS485 no. 1 - Data bit	8	8	
16127	R/W	MD04	RS485 no. 1 - Stop bit	1	2	
16128	R/W	MD05	RS485 no. 1 - Parity	0	2	0 = None 1 = Odd 2 = Even
						0 = 9600 1 = 19200

16129	R/W	MD06	RS485 no. 1 – Baud rate	0	5	2 = 38400 3 = 57600 4 = 76800 5 = 115200

Select the different parameters with the UP and DOWN keys. Once the parameter has been selected, press the OK key to edit the parameter.

When the parameter is in edit mode:

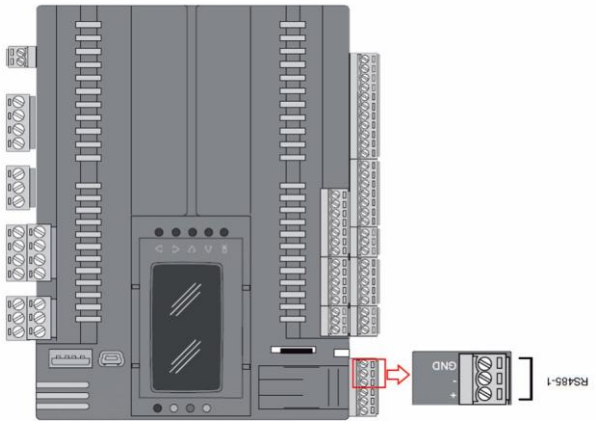
- press the UP key to increase the value;
- press the DOWN key to decrease the value;
- press the BACK key to select the left box;
- press the RIGHT key to select the right box;
- press the OK key to exit the parameter's edit mode.

The controller must be restarted in order for the changes to take effect. Once the settings have been changed, reboot the controller (switch it off and back on) to set the values.

The Modbus parameters can be changed in the Modbus tab of the Service menu. For Modbus parameter changes to take effect, the controller must be restarted.

The layout of the terminals for the two serial boards is shown in the figure below.

The connections are made in the terminal block of the machine's electrical control panel.



Warnings For The Realization Of Network Rs-485

- Perform all installation and maintenance work with the unit switched off;
- Use shielded wires for serial connections: 2 wires + shield; do not make star connections (use chain connections);
- Connect the shield to the GND clamp and insert the two termination resistors of 120 ohm ¼ Watt at the ends of the network (resistors are not supplied);
- The length and section of the wires must comply with the table below;
- We recommend the heading of the conductors with terminal pins of appropriate section to avoid possible short-circuits in the various conductors.

Characteristics Of The Serial Cable To Be Used

- Cable impedance: 120 Ohm (indispensable characteristic)
- Capacitance: approximately 40 pf/m (optional characteristic)
- Signal propagation time: 5 ns/m (optional characteristic)

A table is shown below with suggested shielded cables depending on the various installations. The Belden codes shown here comply with all the required specifications; cables produced by other manufacturers can be used provided they comply with the specifications shown below.

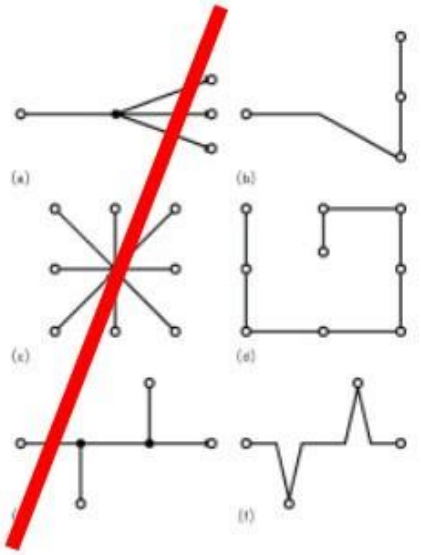
Section (AWG)	Section (mm²)	Resistance (Ω/km)	Max length (m)	Belden code (*)
16	1,50	13,7	1173	9860
18	1,00	22,6	711	3074F
22	0,50	48,2	333	3105A
24	0,22	78,7	204	9841 o 8103

(*) Suggested type of shielded cable

Depending on the presumed length of the network, you may use cable of a lesser section. For example, for a maximum length of 300 m, an AWG 22 cable is sufficient.

Lay down the cable in dedicated cable rails, as far as possible to power cables. In order to avoid disturbances, it has to be placed far from sources of electrical noise:

- Radio antennas
- Fluorescent lights
- Contactors and relays
- Other magnetic field generating devices
-



Never do “star” or “branch” connections. See next picture for some examples of correct (b-d-f) and wrong connections (a-c-e):

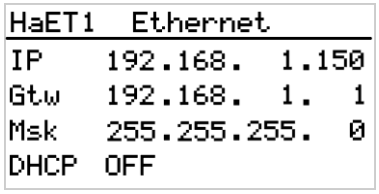
Menu - Et Ethernet

On the service menu, with the ET key selected, press the OK key to access the screen used to set the Ethernet port.

Select the different parameters with the UP and DOWN keys. Once the parameter has been selected, press the OK key to edit the parameter.

When the parameter is in edit mode:

- press the UP key to increase the value;
- press the DOWN key to decrease the value;
- press the BACK key to select the left box;
- press the RIGHT key to select the right box;
- press the OK key to exit the parameter’s edit mode.



Modbus address	Read Write	Meaning	Min	Max
15798	RW	IP address first part	0	255
15799	RW	IP address second part	0	255
15800	RW	IP address third part	0	255
15801	RW	IP address fourth part	0	255
15802	RW	Gateway first part	0	255
15803	RW	Gateway second part	0	255
15804	RW	Gateway third part	0	255
15805	RW	Gateway fourth part	0	255

15806	RW	Net Mask first part	0	255
15807	RW	Net Mask second part	0	255
15808	RW	Net Mask third part	0	255
15809	RW	Net Mask fourth part	0	255
15818	RW	DHCP enabling	0 = OFF	1 = ON

Reboot the controller (switch it off and back on) for the new values to take effect.

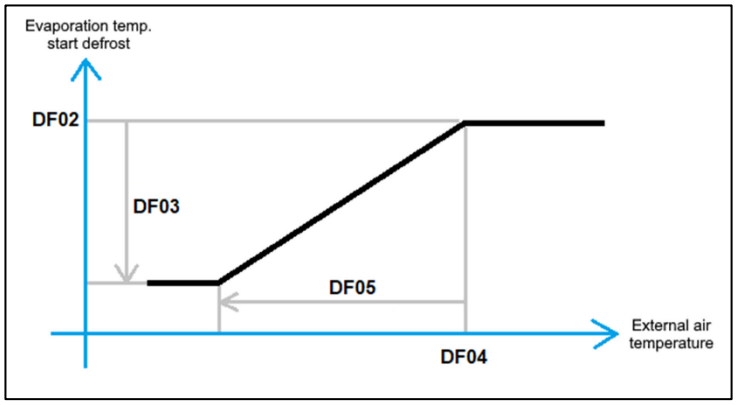
Menu - Df Defrost

On the service menu, with the DF key selected, press the OK key to access the screen used to set the defrost parameters. Select the different parameters with the UP and DOWN keys. Once the parameter has been selected, press the OK key to edit the parameter. The DF01 parameter defines whether defrost is performed at a fixed or dynamic evaporation temperature. The dynamic evaporation temperature mode is recommended.

Df01 = 0 - Defrost At A Fixed Evaporation Temperature

If DF01 = 0 the controller compares the evaporation temperature with parameter DF02. When the evaporation temperature drops below this value, the DF06 timer begins. After the DF06 time has elapsed, the defrost phase starts.

Df01 = 1 - Defrost At A Dynamic Evaporation Temperature (Default Setting)



If DF01 = 1 the controller compares the evaporation temperature with the dynamic evaporation temperature value. When the evaporation temperature drops below this value, the DF06 timer begins. After the DF06 time has elapsed, the defrost phase starts.

The dynamic evaporation temperature calculates a value that depends on the DF02 defrost starting set point, the DF04 external air temperature, and on the DF03 and DF04 differentials, according to the above graph.

Other parameters than can be set are:

- DF07: maximum duration of the defrost cycle
- DF29: minimum duration of the interval before the next defrost cycle

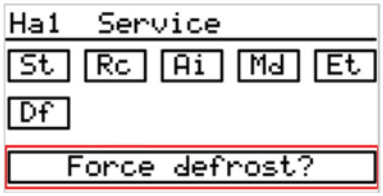
Modbus address	Read Write	Code	Meaning	Min	Max	Unit of measurement/ correspondence
16665	RW	DF01	Type of defrost	0	1	0 = fixed 1 = dynamic
16666	RW	DF02	Evaporation temperature for starting fixed defrost	-30	30	°C
16667	RW	DF03	Evaporation temperature differential for starting dynamic defrost	0	30	°C
16668	RW	DF04	External air temperature for starting dynamic defrost	-30	30	°C

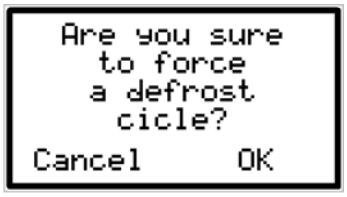
16669	RW	DF05	External air temperature differential for starting dynamic defrost	0	30	°C
16670	RW	DF06	Defrost start delay	0	1,200	sec
16671	RW	DF07	Maximum defrost duration	0	6,000	sec
16675	RW	DF29	Minimum time before the next defrost cycle	0	28,800	sec

Forced Defrost

If the unit is outside the four defrost cycle phases, a defrost cycle can be forced regardless of the evaporation temperature value.

Select the “Force defrost?” key on the Service menu with the UP and DOWN keys; press the OK key to open the window asking to confirm selection for forcing the defrost cycle.





- Press the OK key to confirm forcing the defrost cycle;
- press the BACK key to close the window without confirming selection for forcing the defrost cycle.

Menu - Cr Cold Recovery

On the service menu, with the CR key selected, press the OK key to access the screen used to set the cold recovery parameters. Select the parameters with the UP and DOWN keys. Once the parameter has been selected, press the OK key to edit the parameter. Parameters CR01, CR02, CR03 are used to enable the function, set the working set point and its differential.

Modbus address	Read Write	Code	Meaning	Min	Max	Unit of measurement
9638	RW	CR01	Enable cold water recovery	OFF	ON	
16807	RW	CR02	Cold water recovery set point	-30	50	°C
16808	RW	CR03	Cold water recovery differential	0	30	°C
16518	RW	CR07	High recovery water temperature difference warning set point	0	30	°C
16519	RW	CR08	Low recovery water temperature difference warning set point	-10	10	°C
16520	RW	CR09	Low recovery water temperature difference warning differential	0	30	°C
16827	RW	CR10	High/low recovery water temperature difference from compressor start-up warning delay	0	1,200	sec

Parameters CR07, CR08, CR09 are used to set the warnings that indicate if the difference between water inlet and outlet on the recovery heat exchanger is within certain limits. Parameter CR10 defines the warning delay from compressor start-up.

Menu - Sw Source Water

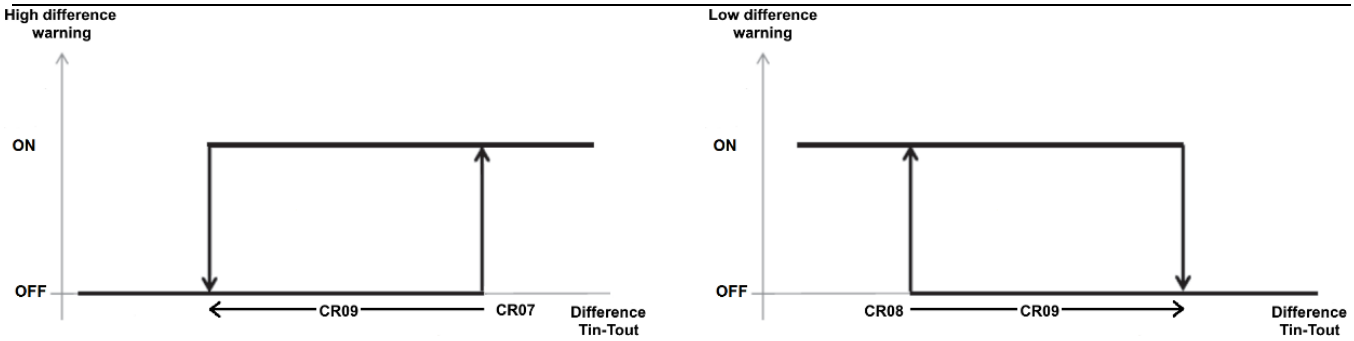
On the service menu, with the SW key selected, press the OK key to access the screen used to set the water source parameters.

Select the parameters with the UP and DOWN keys. Once the parameter has been selected, press the OK key to edit the parameter.

The available parameters are used to set the warnings that indicate if the difference between water inlet and outlet on the source heat exchanger is within certain limits. Parameter SW04 defines the warning delay from compressor start-up.

Modbus address	Read Write	Code	Meaning	Min	Max	Unit of measurement
16518	RW	SW01	High source water temperature difference warning set point	0	30	°C
16519	RW	SW02	Low source water temperature difference warning set point	-10	10	°C
16520	RW	SW03	Low source water temperature difference warning differential	0	30	°C
16827	RW	SW04	High/low source water temperaturedifference from compressor start-up warning delay	0	1,200	sec

Menu - Ba BACnet IP



On the service menu, with the BA key selected, press the OK key to access the screen used to set the BACnet IP parameters.

HaBA1 BACnet	HaBA2 BACnet	HaBA3 BACnet
BACnet IP enable	BN04 Subnet 0	BBMD IP:
BN01 OFF	BN05 IP port 0	0. 0. 0. 0
Device obj. instance	Restore Eprom param.	BBMD port: 0
BN02 100	BN05 OFF	BBMD tmo: 0

Use the RIGHT and BACK keys to move between the pages.

Modbus address	Read Write	Code	Meaning	Min	Max
17284	R/W	BN01	BACnet IP enable	OFF	ON
17282	R/W	BN02	Device instance		
17283	R/W	BN03	BACnet subnet	0	63
17285	R/W	BN04	BACnet IP port		
15766	R/W	BN05	Recall factory values from Eeprom	OFF	ON
17286	R/W	BN06	BBMD IP (first part)	0	255
17287	R/W	BN07	BBMD IP (second part)	0	255
17288	R/W	BN08	BBMD IP (third part)	0	255
17289	R/W	BN09	BBMD IP (fourth part)	0	255
17290	R/W	BN10	BBMD port		
17291	R/W	BN11	BBMD tmo		

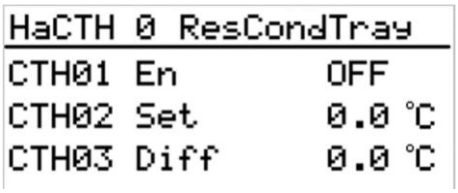
Select the parameters with the UP and DOWN keys. Press OK to edit the parameter.
When the parameter is in edit mode:

- press the UP key to increase the value;
- press the DOWN key to decrease the value;
- press the BACK key to select the left box;
- press the RIGHT key to select the right box;
- press the OK key to exit the parameter's edit mode.

Reboot the controller (switch it off and back on) to set the values.

Menu - Cth – Condenser Tray Heaters

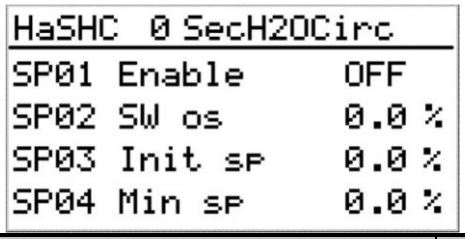
On the service menu, with the CTH key selected, press the OK key to access the screen used to set the Condenser tray heaters parameters.



Modbus Address	Read Write	Code	Meaning	Min	Max
17363	R/W	CTH01	Enable condenser tray heaters	OFF	ON
17364	R/W	CTH02	Activation temperature set point	0.0	20.0
17365	R/W	CTH03	Temperature differential band	0.0	5.0

MENU – SHC – Secondary hydraulic circuit

On the service menu, with the CTH key selected, press the OK key to access the screen used to set the secondary (domestic hot water) circuit parameters.



Modbus address	ReadWrite	Code	Meaning	Min	Max
17292	R/W	SP01	Enable secondary pump	OFF	ON
17293	R/W	SP02	Activation temperature setpoint	0.0	100.0
17294	R/W	SP03	Secondary pump initial speed	0.0	100.0
17295	R/W	SP04	Secondary pump minimum speed	0.0	100.0
17296	R/W	SP05	Secondary pump maximum speed	0.0	100.0
17297	R/W	SP06	Continuous secondary pump regulation (also with unit OFF)	OFF	ON
17367	R/W	SP07	Enable BT3 alarm	OFF	ON

9. APPENDIX F – BACnet

BACnet is a communications protocol for Building Automation and Control (BAC) networks that leverage the ASHRAE, ANSI, and ISO 16484-5 standard protocol.

BACnet was designed to allow communication of building automation and control systems for applications such as heating, ventilating, and air-conditioning control (HVAC) as well as lighting control, access control, and fire detection systems and their associated equipment.

The BACnet protocol provides mechanisms for computerized building automation devices to exchange information, regardless of the particular building service they perform.

The Aegis units support both BACnet IP and BACnet MS/TP. The integrated LCD display ensures fast commissioning via user-friendly menu-driven configuration.

9.1. BACnet MS/TP

The layout of the terminals for the BMS serial boards are configured as BACnet MS/TS is shown in the figures below.

Please note that the RS485-1 is port wired to the terminal block of the machine's electrical control panel, terminal blocks X2.401-402-403. Check the unit wiring diagram for details. The RS485-2 connection is used for the touch-screen interface and is not available for BAC communications.

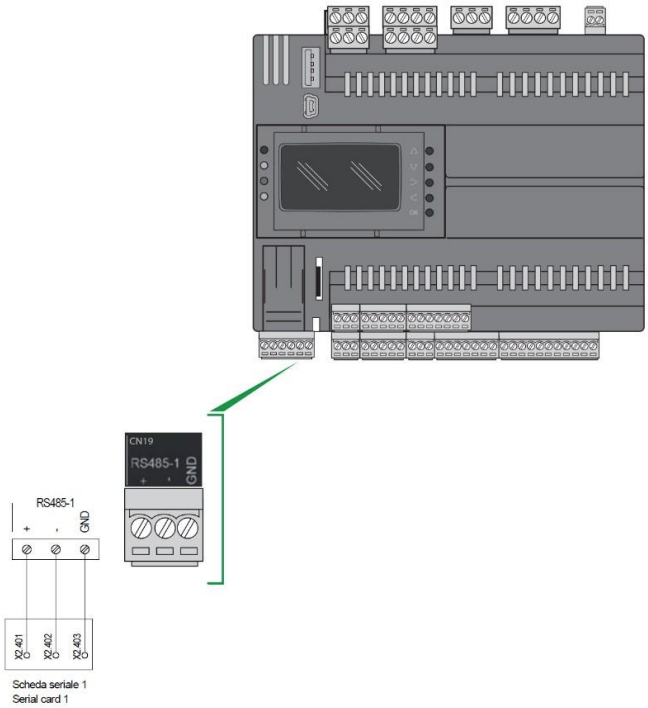


Figure 9.1: RS485 port and terminal blocks

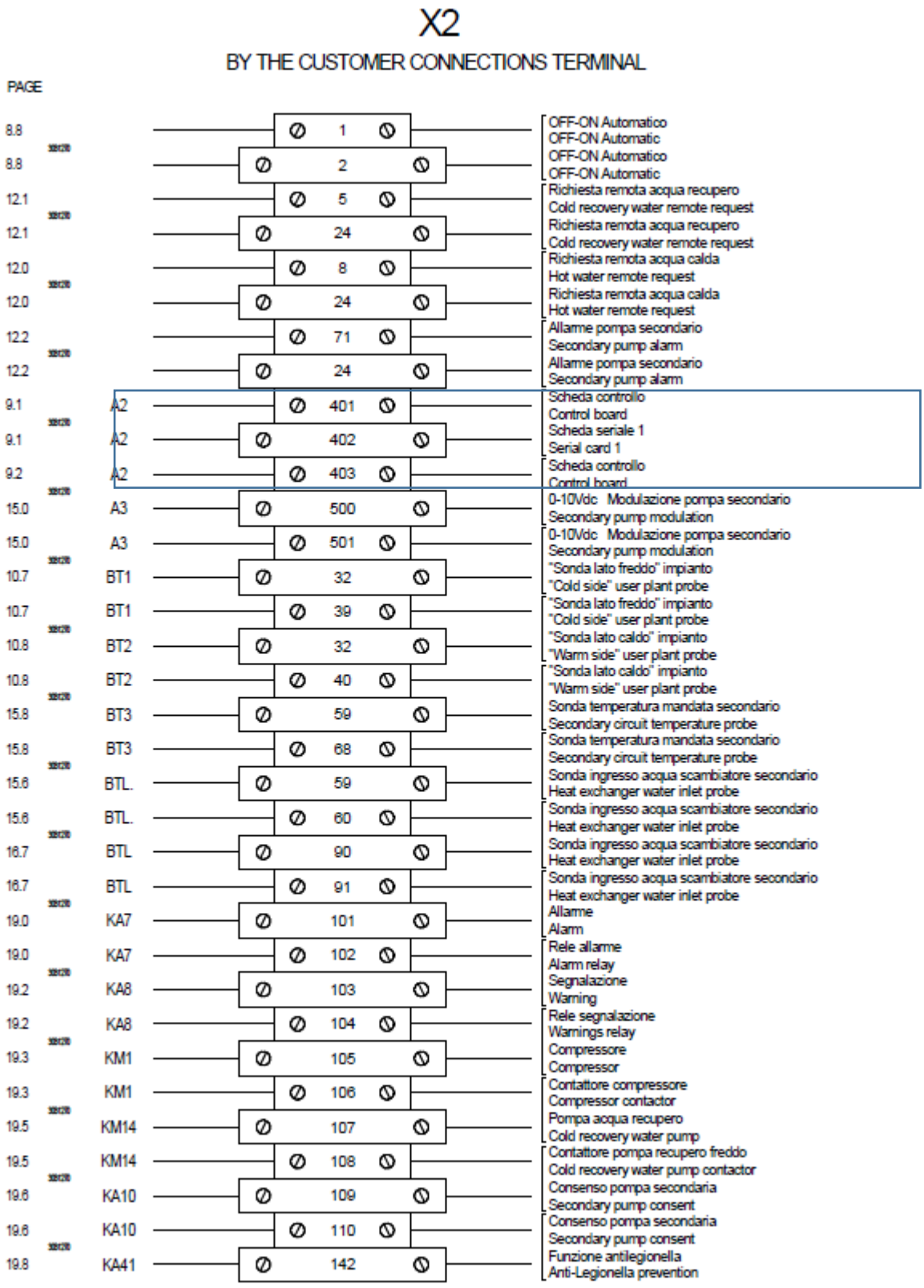


Figure 9.2: User Terminal Connections

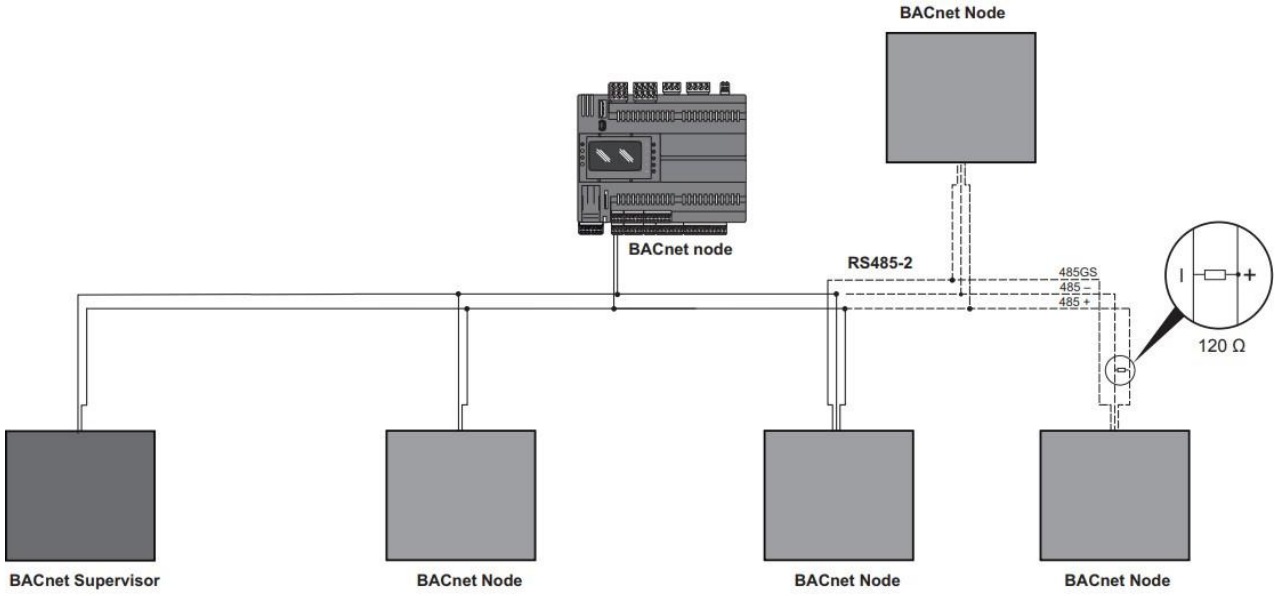


Figure 9.3: BACnet MS/TP network example

Below is a list of operational tips to achieve the best network reliability with RS485 serial connection:

- The serial line cable should be 2-wire with ground and shielding, with a minimum section of 0.5 mm2 (e.g. BELDEN 8772). This cable is recommended for its technical characteristics and because it maintains the quality of the electrical signal.
- The serial line cable must reach all the units: check the system's floor plan and the various distances that the cable needs to cover.
- The serial line cable can reach a maximum length of 3,281 feet [1000 m] (with suitable cable).
- Match the polarity marked on the unit with the polarity of the cable leading to the serial.
- Do not set up any branches on the line; always use a daisy chain connection.
- Keep the serial cable away from power cables and from any possible source of electromagnetic disturbance (e.g. solenoid valves, VFD drives, etc.).
- Do not connect the serial cable shielding to the earth connection of the electrical system.
- Draw a map of the installation that you are setting up, writing the assigned Modbus addresses: it may be useful in case of future problems or changes.
- To keep the RS485 line balanced, a 120Ω terminating resistor must be added at each end device as shown in Figure 9.3.

9.2. BACnet IP

The unit controller provides a single ethernet port, located at the electronic board upper side. Please note that the ethernet port can be field-wired to an UMTS router (dedicated to remote maintenance) or to a multiport switch. An additional RJ45 socket that brings the Ethernet connection outside the unit is available, ensuring the possibility to connect to the controller without the need to open the door of the electrical panel. Please be aware that the declared socket IP67 degree protection is ensured only when the protection cap is fastened. This external socket is mainly intended for maintenance – in case it is used for permanent network connections, make sure that the installation environment is protected from water and pollution.

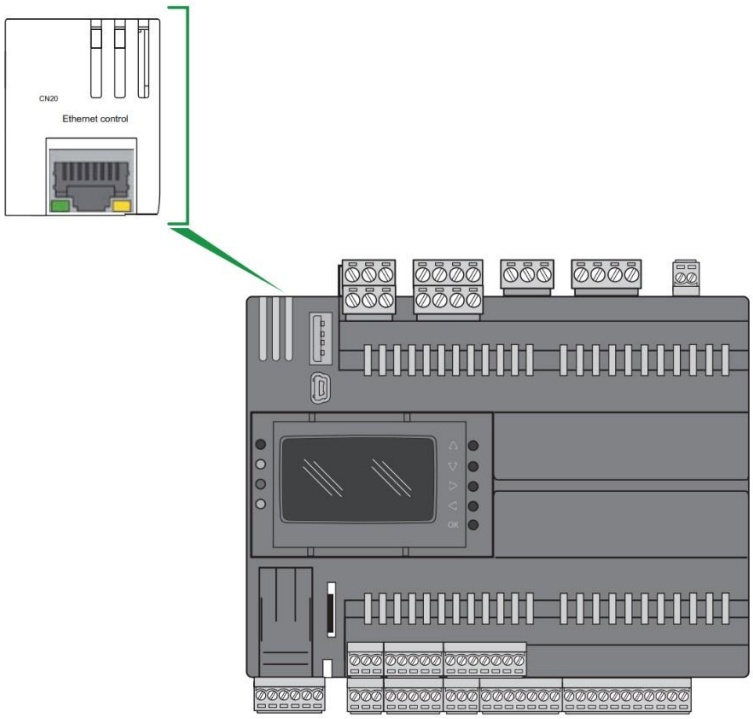


Figure 9.4: Controller Ethernet port

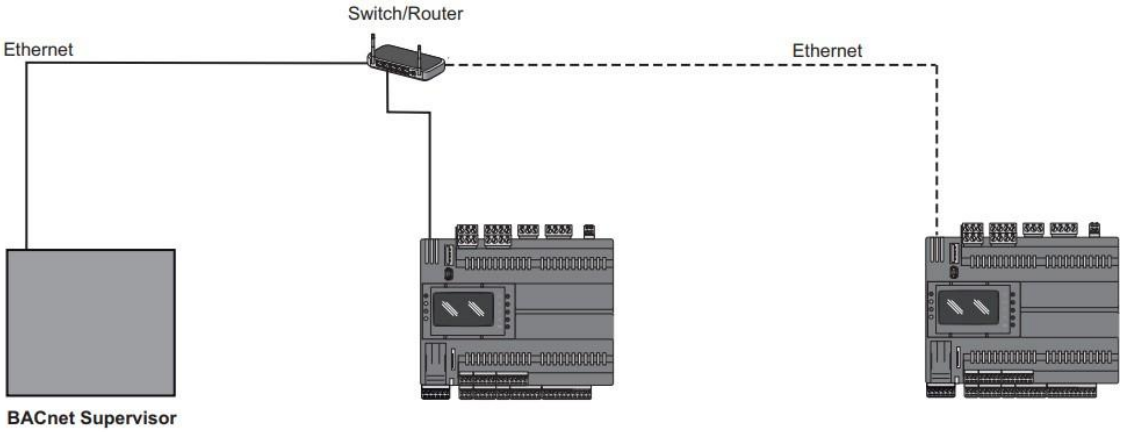


Figure 9.5: Ethernet network example

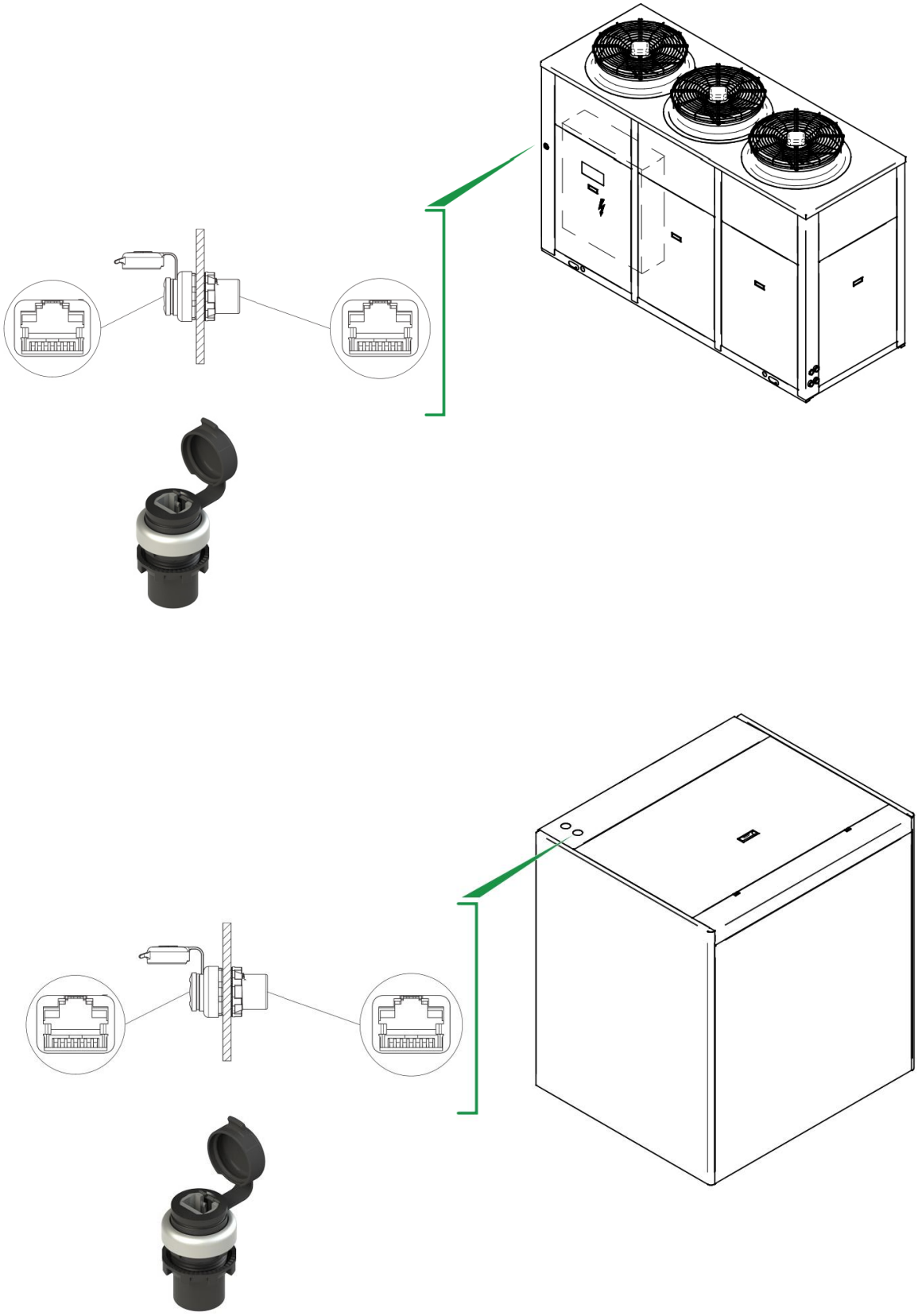


Figure 9.6: External Ethernet socket (Aegis A and Aegis W)

9.3. UNIT CONFIGURATION

Using the remote keyboard or the built-in display, the user can independently configure the BACnet parameters. No additional software is needed.

BMS (BACNET SIDE)

Press the RIGHT ARROW key to enter in the main menu.

The main menu tree will be displayed, allowing the selection of the various sub-menus.

Move to the H. Service menu using ARROW UP/DOWN keys, confirm pressing ENTER.

Insert the requested service password “77” using ARROW UP/DOWN keys, confirm pressing ENTER key.

If the password is incorrect, a message appears indicating that it has been incorrectly entered; if the password is correct, the service menu is displayed.

NOTE: Different service sub menus are displayed depending on operating mode and unit configuration.

Enter in the Et submenu.

In the mask HaET1 it is possible to define the network settings.

Mask	Description
IP	Device network address. Possible choices: *0.0.0.0-255.255.255.255*
Gtw	Gateway. Possible choices: *0.0.0.0-255.255.255.255*
Msk	Subnet mask. Possible choices: *0.0.0.0-255.255.255.255*
DHCP	Automatic addressing via DHCP server. Possible choices: *0 = OFF* *1 = ON*

Reboot the controller (switch it off and back on) to activate the new settings.

Enter in the BA submenu.

In the masks HaBA1- HaBA3 it is possible to define the settings concerning the BACnet IP protocol.

Mask	Description
BN01 BACnet IP enable	BACnet IP enabled or disabled. Possible choices: *0 = OFF* *1 = ON*
BN02 Device obj. instance	Device object instance. Possible choices: *0-4194303*
BN03 Subnet	BACnet subnet. Possible choices: *0-63*
BN04 IP port	BACnet IP port. Possible choices: *0=47808*
BN05 Restore EEPROM	Recall factory values from EEPROM. Possible *0 = OFF* *1 = ON*
BBMD IP	BACnet/IP broadcast management device address. Possible choices: *0.0.0.0-255.255.255.255*
BBMD port	BACnet/IP broadcast management device port. Possible choices: *0=47808*
BBMD tmo	BACnet/IP broadcast management device timeout.

Reboot the controller (switch it off and back on) to activate the new settings.

Enter in the Md submenu.

In the masks HaMd1- HaMd2 it is possible to define the settings of the RS485 BMS port.

Mask	Description
MD01 Address	Device address (Modbus protocol)
MD02 Protocol	Protocol configured on the BMS serial port. Possible choices: *3 = Modbus/RTU* *4 = BACnet MS/TP*
MD03 Data bit	Serial port data bit (fixed) *8*
MD04 Stop bit	Serial port sop bits. Possible choices: *1* *2*
MD05 Parity	Serial port parity. Possible choices: *0 = None* *1 = Odd* *2 = Even*
MD06 Baudrate	Serial port connection speed (bps). Possible choices: *0 = 9600* *1 = 19200* *2 = 38400* *3 = 57600* *4 = 76800* *5 = 115200*

Reboot the controller (switch it off and back on) to activate the new settings.

9.4. BACnet

Supported BACnet Object Types

NOTE: Based on unit configuration some BACnet objects may not be present. See tables for details.

Supported BACnet Object Types

Standard Object Type	Notes
Device	
Analog input	
Analog value	
Analog output	
Binary input	
Multistate input	
Multistate value	
Notification class	max 16 notification classes
Calendar	max 4 calendar objects
Schedule	max 16 schedulers

BACnet Object List Aegis A Configuration

Analog Inputs

Instance	Object name	Description	Notes
0	Hot water temperature IN	Hot water temperature IN	
1	Hot water temperature OUT	Hot water temperature OUT	
2	Gas cooler temperature	Gas cooler temperature	
3	Suction temperature	Suction temperature	
4	External air temperature	External air temperature	
5	Evaporator coil temperature	Evaporator coil temperature	
6	Remote probe BT1	Remote probe BT1	
7	Remote probe BT2	Remote probe BT2	
8	High pressure	High pressure	
9	Low pressure	Low pressure	
10	Oil temperature	Oil temperature	
11	Discharge temperature	Discharge temperature	
12	Recovery water temperature IN	Recovery water temperature IN	Recovery version only
13	Recovery water temperature OUT	Recovery water temperature OUT	Recovery version only
14	BT3 Secondary H2O circuit temperature	BT3 Secondary H2O circuit temperature	Optional
15	Evaporator outlet temperature	Evaporator outlet temperature	
16	Fan speed	Fan speed	
17	Valve opening	Valve opening	
18	Hot water pump speed	Hot water pump speed	
19	NOT USED	NOT USED	
20	NOT USED	NOT USED	
21	NOT USED	NOT USED	
22	Secondary H2O circuit water pump modulation	Secondary H2O circuit water pump modulation	
23	Not used	Not used	

Analog Values

Instance	Object name	Description	Notes
0	Heating_Set	Hot water set point	
1	BT1_Set_point	Double probe BT1 set point	
2	BT1_band	Double probe BT1 band	
3	BT2_Set_point	Double probe BT2 set point	
4	BT2_band	Double probe BT2 band	
5	CW_Set_point	Cold water recovery set point	Recovery version only
6	CW_band	Cold water recovery band	Recovery version only

Calendar

Instance	Object name	Description	Notes
0	Calendar	Calendar	

Notification Class

Instance	Object name	Description	Notes
0	Alarms	NC0	
1	Warnings	NC1	

NOTE: The unit alarms (BV5..BV34) are mapped to the Notification class “Alarms” – NC0.

Schedule

Instance	Object name	Description	Notes
0	Schedule	Schedule	

Binary Values

Instance	Object name	Description	Notes
0	Remote_control	Remote control	Disabled/enabled
1	Thermal_request_by	Thermal request by	Dig. in /supervision
2	Remote_control_ON_OFF	ON OFF by remote control	OFF/ON
3	BT1_Enable	Enabling double probe BT1	Disabled/enabled
4	BT2_Enable	Enabling double probe BT2	Disabled/enabled
5	NOT USED	NOT USED	
6	OL_HT	Oil high temperature alarm	
7	OL_LT	Oil low temperature alarm	
8	OL_DP	Oil differential switch alarm	
9	Er_HP	High pressure sensor alarm	
10	AI_CW	Cold water anti-ice alarm	Recovery version only
11	Pr_HPH	High pressure alarm	
12	Er_HWi	Hot water IN sensor alarm	
13	Er_LP	Low pressure sensor alarm	
14	Pr_LPL	Low pressure alarm	
15	Pr_LPH	High pressure alarm	
16	CO_thr	Thermal compressor alarm	
17	CO_HSuc	Compressor suction temp alarm	
18	HW_HT	Hot water high temp alarm	
20	Er_GCo	Gas cooler sensor alarm	
21	GC_HT	Gas cooler high temperature ala	
22	CO_HDis	Compressor suction alarm	
23	Er_Disc	Compressor discharge temp alarm	
24	CBrk_SecPmp	Circuit breaker secondary H2O circuit pump	
25	NOT USED	Cold water side outlet probe error	
26	NOT USED	NOT USED	
27	CBrk_SrcFan	Circuit breaker source fan	
28	SEC_Th_HWout	Security thermostat outlet water	
29	SEC_Th_DEF	Security thermostat defrost heater	
30	Er_BT3	Secondary circuit high temp alarm	
31	NOT USED	NOT USED	
32	NOT USED	NOT USED	
33	NOT USED	NOT USED	
27	AI_HW	Hot water anti ice alarm	
28	Er_BT1	BT1 sensor alarm	
29	Er_CWi	Cold water IN alarm sensor	
30	NOT USED	NOT USED	
31	NOT USED	NOT USED	
32	FLW_RW	Flow switch alarm	
33	SW WHT	Cold water high temp alarm	
34	NOT USED	NOT USED	
35	Main ON OFF	Main ON OFF	
36	Thermal request	Thermal request	
37	NOT USED	NOT USED	
38	NOT USED	NOT USED	
39	High pressure	High pressure	
40	NOT USED	NOT USED	
41	Thermal compressor	Thermal compressor	
42	Oil differential switch	Oil differential switch	
43	NOT USED	NOT USED	
44	Flow switch	Flow switch	
45	NOT USED	NOT USED	
46	Compressor status	Compressor status	
47	Compressor	Compressor	
48	Oil heater	Oil heater	
49	Oil valve	Oil valve	
50	User pump	User pump	
51	Source pump	Source pump	
52	Hot water anti ice heater	Hot water anti ice heater	
53	Source water anti ice heater	Source water anti ice heater	
54	NOT USED	NOT USED	
55	NOT USED	NOT USED	
56	NOT USED	NOT USED	
57	Alarm	Alarm	
58	Warnings	Warnings	

BACnet Object List Aegis W/Configuration

Analog Inputs

Instance	Object name	Description	Notes
0	Hot water temperature IN	Hot water temperature IN	
1	Hot water temperature OUT	Hot water temperature OUT	
2	Gas cooler temperature	Gas cooler temperature	
3	Suction temperature	Suction temperature	
4	Source water temperature IN	Source water temperature IN	
5	Source water temperature OUT	Source water temperature OUT	
6	Remote probe BT1	Remote probe BT1	
7	Remote probe BT2	Remote probe BT2	
8	High pressure	High pressure	
9	Low pressure	Low pressure	
10	Oil temperature	Oil temperature	
11	Discharge temperature	Discharge temperature	
12	NOT USED	NOT USED	
13	NOT USED	NOT USED	
14	NOT USED	NOT USED	
15	Recovery water temperature OUT	Recovery water temperature OUT	Recovery version only
16	BT3 Secondary H2O circuit temperature	BT3 Secondary H2O circuit temperature	Optional
17	Valve opening	Valve opening	
18	Hot water pump speed	Hot water pump speed	
19	NOT USED	NOT USED	
20	NOT USED	NOT USED	
21	NOT USED	NOT USED	
22	Secondary H2O circuit water pump modulation	Secondary H2O circuit water pump modulation	
23	Not used	Not used	

Analog Values

Instance	Object name	Description	Notes
0	Heating_Set	Hot water set point	
1	BT1_Set_point	Double probe BT1 set point	
2	BT1_band	Double probe BT1 band	
3	BT2_Set_point	Double probe BT2 set point	
4	BT2_band	Double probe BT2 band	
5	CW_Set_point	Disabled	
6	CW_band	Disabled	

Binary Values

Instance	Object name	Description	Notes
0	Remote_control	Remote control	Disabled/enabled
1	Thermal_request_by	Thermal request by	Dig. in /supervision
2	Remote_control_ON_OFF	ON OFF by remote control	OFF/ON
3	BT1_Enable	Enabling double probe BT1	Disabled/enabled
4	BT2_Enable	Enabling double probe BT2	Disabled/enabled
5	NOT USED	NOT USED	
6	OL_HT	Oil high temperature alarm	
7	OL_LT	Oil low temperature alarm	
8	OL_DP	Oil differential switch alarm	
9	Er_HP	High pressure sensor alarm	
10	AI_CW	Cold water anti-ice alarm	
11	Pr_HPH	High pressure alarm	
12	Er_HWi	Hot water IN sensor alarm	
13	Er_LP	Low pressure sensor alarm	
14	Pr_LPL	Low pressure alarm	
15	Pr_LPH	High pressure alarm	
16	CO_thr	Thermal compressor alarm	
17	CO_HSuc	Compressor suction temp alarm	
18	HW_HT	Hot water high temp alarm	
Instance	Object name	Description	
19	Er_HWo	Hot water sensor alarm	
20	Er_GCo	Gas cooler sensor alarm	
21	GC_HT	Gas cooler high temperature ala	
22	CO_HDis	Compressor suction alarm	
23	Er_Disc	Compressor discharge temp alarm	
24	CBrk_SecPmp	Circuit breaker secondary H2O circuit pump	
25	NOT USED	Cold water side outlet probe error	
26	NOT USED	NOT USED	
27	CBrk_SrcFan	Circuit breaker source fan	
28	SEC_Th_HWout	Security thermostat outlet water	
29	SEC_Th_DEF	Security thermostat defrost heater	
30	Er_BT3	Secondary circuit high temp alarm	
31	NOT USED	NOT USED	
32	NOT USED	NOT USED	
33	NOT USED	NOT USED	
27	AI_HW	Hot water anti ice alarm	
28	Er_BT1	BT1 sensor alarm	
29	Er_CWi	Cold water IN alarm sensor	
30	NOT USED	NOT USED	
31	NOT USED	NOT USED	
32	FLW_RW	Flow switch alarm	
33	SW WHT	Cold water high temp alarm	
34	NOT USED	NOT USED	
35	Main ON OFF	Main ON OFF	
36	Thermal request	Thermal request	
37	NOT USED	NOT USED	
38	NOT USED	NOT USED	
39	High pressure	High pressure	
40	NOT USED	NOT USED	
41	Thermal compressor	Thermal compressor	
42	Oil differential switch	Oil differential switch	
43	NOT USED	NOT USED	
44	Flow switch	Flow switch	
45	NOT USED	NOT USED	
46	Compressor status	Compressor status	
47	Compressor	Compressor	
48	Oil heater	Oil heater	
49	Oil valve	Oil valve	
50	User pump	User pump	
51	Source pump	Source pump	
52	Hot water anti ice heater	Hot water anti ice heater	
53	Source water anti ice heater	Source water anti ice heater	
54	NOT USED	NOT USED	
55	NOT USED	NOT USED	
56	NOT USED	NOT USED	
57	Alarm	Alarm	
58	Warnings	Warnings	

Calendar

Instance	Object name	Description	Notes
0	Calendar	Calendar	

Notification Class

Instance	Object name	Description	Notes
0	Alarms	NC0	
1	Warnings	NC1	

NOTE: The unit alarms (BV5..BV34) are mapped to the Notification class “Alarms” – NC0.

Schedule

Instance	Object name	Description	Notes
0	Schedule	Schedule	

Switching Unit On/Off From Supervision System (Remote Control)

When switch-on/off of the unit is activated from the supervision system, the symbol of a PC appears next to ON-OFF.

By setting ON the “Remote control” variable (parameter RC01) the digital input ID1 (general ON-OFF) is ignored and the unit ON/OFF switching can be controlled by the parameter RC02.

With the variable "Hot water request by:" (parameter RC03) it can be decided whether the heating request (hot water demand for the user) is given by the status of the digital input ID2 or by the supervision.

The two typical situations are:

1. Unit ON/OFF via BMS only: set RC01 = 1; RC03 = 1
   Use the parameter RC02 to switch the unit ON and OFF
2. Local demand consent (mechanical thermostat or third-party PLC), BMS used for forced shutdown: set RC01=1; RC03=0.

   Use the parameter RC02 to switch the unit OFF. The start of the unit depends both of the parameter RC03 and the physical state of the digital input ID2.

CAUTION: in the first case, when the controller is in total remote control mode, it is no longer switched off by digital inputs. To prevent the machine from staying turned on all the time, there is a maximum operation time after which the remote switch-on control is disabled. So that the machine can be permanently controlled in remote mode, this time must be set to 0.

Binary value	PARAMETER	DESCRIPTION	MEANING	
			0	1
0	RC01	Remote_control	Not enabled	Enabled
1	RC03	Thermal_request_by	Digital input	Supervision (BMS)
2	RC02	Remote_control_ON_OFF	OFF	ON

When the variables equivalent to the two digital inputs are activated, the word ON and the full dot under “HWr” both appear.