

Chiller and air/water heat pumps with axial fans

Controller manual

Models

Chiller

HWA1-A/H 02106÷04349

Reversible heat pumps

HWA1-A/H 02109 ÷04345



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1. CONSERVATION OF THE MANUAL

The manual must always be kept together with the unit it refers to. It has to be placed in a safe place, away from dust and moisture, and easily accessible to the operator who shall consult it any time they are in doubt on how to use the machine.

The company reserves the right to modify its products and related manuals without necessarily updating previous versions of the reference material. We also decline any responsibility for possible inaccuracies in the manual if due to printing or transcription errors.

Any updates sent to the customer must be kept attached to this manual.

The company is available to give any detailed information about this manual and to give information regarding the use and the maintenance of its own machines.

1.1 GRAPHIC SYMBOLS USED IN THE MANUAL

	Indicates prohibited operations.
	Indicates operations that can be dangerous for people and/or disrupt the correct operation of the unit.
	Dangerous electrical voltage - Risk of electrocution.
	Indicates important information that the operator has to follow in order to guarantee the correct operation of the unit in complete safety. Also indicates some general notes.

- The company excludes all contractual and extra-contractual liability for damage caused to persons, animals or things, due to installation, adjustment and maintenance errors, improper use or partial or superficial reading of the information contained in this manual.
- These units are built for the heating and/or cooling of water. Any other use not expressly authorised by the manufacturer is considered improper and therefore not allowed. All the work must be executed by skilled and qualified personnel, competent on the existing regulations in country of installation.

2. PERMITTED USE

The company excludes all contractual and extra-contractual liability for damage caused to persons, animals or property or which causes malfunctions to the unit through incorrect parameterisation or improper use or through partial or superficial reading of the information contained in this manual. The software has been designed for use on chillers and heat pumps. A different application, not expressly authorised by the manufacturer, is to be considered improper and therefore not allowed.

3. GENERAL GUIDELINES

Before starting any type of operation on the unit, every user and operator must have perfect knowledge of operation of the machine and of its controls and have read and understood all of the information in this manual and in the user-installer manual.

3.1 PERSONAL PROTECTIVE EQUIPMENT

During operation and maintenance, it is necessary to use personal protective equipment such as:

	Protective clothing: Anyone carrying out maintenance or working with the installation must wear clothing that complies with the essential safety requirements in force. They must also wear safety shoes with non-slip soles, especially in environments with slippery floors.
	Gloves: During maintenance or cleaning operation protection gloves have to be used.
	Mask and goggles: A respiratory protection mask and protective goggles must be used during cleaning operations.
	

3.2 IMPORTANT INFORMATION



IT'S FORBIDDEN TO:

- Remove and/or tamper with any safety device.
- Touch the appliance when barefoot or parts of the body are wet or damp.
- Pull, remove or twist the appliance's electric cables.
- Tamper with the safety devices will invalidate the warranty.
- Tamper with or replace machine parts that have not been expressly authorised by the manufacturer. Such interventions relieve the manufacturer of any civil or penal responsibility.



WARNING:

- Refer to the user-installer manual which accompanies the unit before proceeding.
- All the operation described below must be done by **QUALIFIED PERSONNEL ONLY**.
- Any routine and/or extraordinary maintenance operation must be carried out with the machine stopped and disconnected.
- The person in charge of the machine and the maintenance technician must receive the appropriate training and instruction to carry out their duties in a safe situation.
- It is mandatory that operators are familiar with the personal protective equipment and accident prevention rules laid down by national and international laws and standards.



ELECTRIC CONNECTIONS:

- Ensure that the mains power supply specifications (voltage, phases and frequency) correspond to the voltage indicated on the data nameplate, the power supply of the auxiliary systems is derived from the main power through the transformer located inside the electrical panel of the unit.
- The supply voltage must not exceed $\pm 5\%$ and the imbalance between phases must be less than 2%. Otherwise the warranty will terminate immediately.
- Refer to the wiring diagram, which shows all the information for performing the electrical wiring.
- Respect the order in which the phase and earth conductors are connected, otherwise the unit will not operate.
- The unit must be connected to the power supply for a minimum of 12 hours before start up.
- The power supply cables (3-PH + PE) must be correctly sized according to the technical data of the system, and the environment where it is installed, using cables that comply with the regulations in force in the various countries.
- It is mandatory to install an adequate protection and disconnection device "QF" of the electric power with delayed characteristic curve and with adequate capacity of breaking and differential protection. The capacity of the magneto-thermic circuit breaker must conform to the electric consumption of the system; (is the installer's responsibility).



MAINTENANCE WORKS: Before working on the electrical panel, it is MANDATORY to:

- Turn off the unit from the on-board control panel ("OFF" displayed).
- Put the switch QF general differential on "OFF" position.
- Wait 15 seconds before accessing the electrical panel.
- Ensure grounding before carrying out operations.
- Be sure that you are well insulated from the ground, with dry hands and feet, or by using insulating platforms and gloves.
- Keep foreign materials away from the installations.
- During maintenance operations, make sure that the main switch QF on the unit is set to "OFF".
- **AFTER EACH MAINTENANCE OPERATION**
- After approximately 10 minutes of operation, make sure the screws on the power terminal board are well tightened.
- Check that the unit is working properly.



RISK OF ELECTROCUTION: If the electrocution risk is high, the unit must be protected, the risk assessment must be in accordance with the standard CEI EN 62305-2. If there is a possibility that a lightning can strike the area around the appliance, shut down the unit and disconnect the system upstream switch.

Insufficient grounding can result in electrocution.

Warning: Electrostatic discharges can damage electronic components. Before carrying out work, discharge the electrostatic charge to the ground by touching objects such as water or heating pipes.

4. PURPOSE AND CONTENTS OF THE MANUAL

The manual provides the essential information for the configuration of the control system.

The information contained in this manual is written for the installer and the operator who uses the machine: the operator, even if they have no specific knowledge, will find in these pages the indications that will enable them to use it effectively.

Not all the functions described are selectable and/or can be selected at the same time. For more information, please contact the head office.

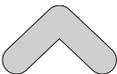
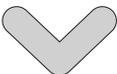
The manual describes the machine at the time it was placed on the market; it must therefore be considered adequate in relation to the state of the art in terms of potential, ergonomics, safety and functionality.

The company also makes technological improvements and does not consider itself obliged to update manuals for earlier versions of machines that may be incompatible. Therefore, be sure to use the manual provided with the installed unit.

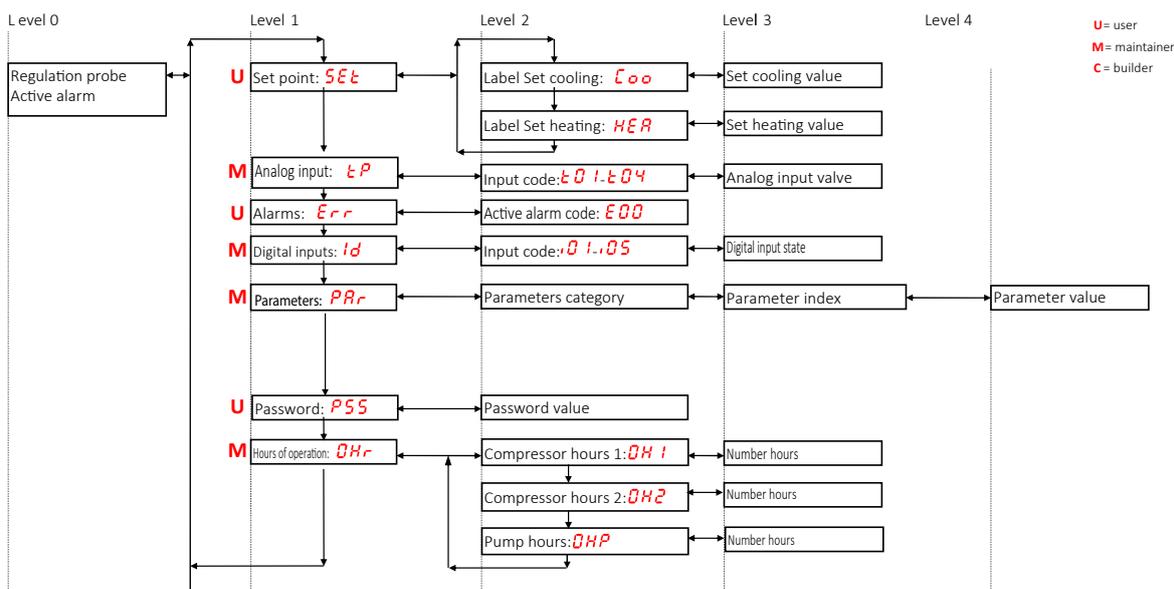
It's recommended that, the user must follow the instructions contained in this booklet, especially those concerning the safety and routine maintenance.

5. USER-CONTROL INTERFACE



BUTTONS	Description
MODE ESC	Selects operating mode, and resets manual reset alarms. By pressing this key, you will have the following sequence: OFF -> COOL -> HEAT -> OFF During the parameter setting it has the function of a BACK button by one level.
PRG	Allows you to enter in the parameters setting menu and set the summer and winter setpoint value.
	UP button. In the setting mode, this button allows you to move up to a higher menu or to increase the value of a parameter when you are in the "edit" mode.
	DOWN button. In the setting mode, this button allows you to shift to a lower menu or to decrease the value of a parameter when you are in the "edit" mode.

5.1 STRUCTURE MENU



- Level 0 (U) = always visible
- Level 1 (M) = visible if maintenance password or manufacturer password is entered
- Level 2 (C) = visible if manufacturer password is entered
- Level 3 (A) = visible only via Modbus

5.2 MENU

The main functionality of menu navigation is described below, particularly when there are non-obvious functionalities. The main menu manages the following items:

MENU	LABEL	PASSWORD LEVEL	OTHER CONDITIONS
Setpoint	Set	User	
Probe	tP	Installer	---
Alarms	Err	User	Only in case of active alarms
Digital inputs	Id	Installer	---
Parameters	Par	Installer	---
Password	PSS	User	---
Operating hours	oHr	Installer	---
USB	USB	Installer	Only if USB key is present

Access the password menu to enter the password to enable higher privilege access. Once you exit from the menu completely, you lose the password privilege and must enter it again.

5.2.1 Menu setpoint

You can display and change the various setpoint:

SETPOINT	DESCRIPTION	UNIT	DEFAULT	RANGE
Coo	First setpoint in Summer	°C	7.0	25.0°C ÷ Co2
Hea	First setpoint in Winter	°C	45.0	25.0°C ÷ 55.0°C
Coo2	Second setpoint in Summer	°C	18.0	Coo ÷ 25.0°C
Hea2	Second setpoint in Winter	°C	35.0	25.0°C ÷ Hea

5.2.2 Menu password

Enter the password for the desired access level. Confirming the value automatically activates the access level and the menu items enabled by that level will appear.

5.2.3 Probes menu

The detected value of the various sensors could be displayed of circuit 1:

PRG -> PSS -> PRG -> (Maintenance password) -> tp -> tpC1:

tP	DESCRIPTION	UNITS OF MEASUREMENT
t01	Water inlet temperature	°C
t02	Water outlet temperature	°C
t03	Compressor suction temperature circuit 1	°C
t04	Discharge temperature compressor circuit 1	°C
t05	Outdoor air temperature	°C
t06	System remote probe temperature (if enabled)	°C
t09	Low pressure circuit 1	bar
t10	High pressure circuit 1	bar

If present, it is possible to display the value read by the probes from circuit 2:

PRG -> PSS -> PRG -> (Maintenance password) -> tp -> tpC2:

tP	DESCRIPTION	UNITS OF MEASUREMENTS
t03	Compressor suction temperature circuit 2	°C
t04	Discharge temperature compressor circuit 2	°C
t09	Low circuit pressure 2	bar
t10	High circuit pressure 2	bar

Particular cases:

- Err = error probe
- --- = probe not to be used

5.2.4 Alarms menu

This menu appears only in case of active alarms. You can check all active alarms. For multi-circuit units, the alarms are divided regarding the circuits ALC1 and ALC2.

5.2.5 Digital inputs menu

You can check the status of the digital inputs.

0 = inactive input

1 = active input

5.2.6 PARAMETERS MENU

The parameters are collected in groups; each group is identified by a three-digit code, while a letter precedes the index of each parameter.

DESCRIPTION	GROUP IDENTIFICATION CODE	PARAMETER INDEX	VISIBILITY
Configuration	CnF	H-	USER/INSTALLER
Fan	FAn	F-	INSTALLER
Alarms	ALL	A-	INSTALLER
Regulation	Re	b-	INSTALLER
Pump	PUP	P-	INSTALLER
Electrical resistances	Fro	r-	INSTALLER
Defrosting	dFr	d-	INSTALLER
Electronic valve	EEu	U-	INSTALLER
Offset	OFF	o-	INSTALLER

5.2.7 Operating hours menu

You can display the number of operating hours of the compressors and of the pumps.

Press the ESC button for 3 seconds to rest the currently displayed count.

Notes: The menu can only be accessed with a password.

5.2.8 USB Menu

Below are indicated the functions that are available through the use of a USB that is connected to the board.

5.2.8.1 FIRMWARE UPDATE

In the case of a firmware update, it is possible to upgrade via USB key, using the USB port in the control unit.

For updating:

1. Copy the upgrade files in the main directory of a USB pendrive.
2. Place the unit in Standby mode turn it off, placing the main switch in OFF position.
3. Introduce the USB key in its port on the controller.
4. Power up the unit, by setting the main switch to the ON state.
5. Accessing parameters PRG -> PSS -> PRG -> (insert the maintenance password) -> PRG -> USB -> UPdF -> PRG.
6. Selecting this item starts the automatic firmware update procedure, a count indicating the number of Kbyte transferred appears on the display. At the end of the procedure, "boot" appears on the display and the 4 LEDs light up in sequence. Once the installation is complete, the board returns in normal operation and the machine is ready to be put back into operation.
7. Turn off the unit, by placing the main switch in OFF position.
8. Remove the USB key from its port.
9. Feed the unit, by placing the main switch on the ON state.

Perform the procedure for all controllers in the unit.

5.2.8.2 PARAMETERS UPDATE

In case of a parameter update, it is possible to upgrade via USB key, using the USB port in the control unit.

For updating:

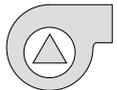
1. Copy the upgrade files in the main directory of a USB pendrive.
2. Place the unit in Standby mode turn it off, placing the main switch in OFF position.
3. Introduce the USB key in its port on the controller.
4. Power up the unit, by setting the main switch to the ON state.
5. Accessing parameters PRG -> PSS -> PRG -> (insert maintenance password) -> PRG -> USB -> UPPA -> PRG. The automatic firmware update process starts with the selection of this option, the display shows the transferred data in Kilobytes. When the update is completed, the display shows "boot" then the LEDs will light up in sequence.
6. Once the update is completed, turn off the unit by placing the main switch on OFF position.
7. Remove the USB key from its port.
8. Feed the unit, by placing the main switch on the ON state.

5.2.9 DISPLAY

In case of normal visualization, the display shows the return water temperature in tenths of degrees Celsius or the alarm code if at least one is active.

If multiple alarms are active, the display shows the first occurred one, while the second one will be displayed after resetting the first one and so on for the remain alarms.

In the menu mode, the display content is a function of the accessed level.

Icon	Led	Description
	Compressor led	<ul style="list-style-type: none"> ON if the compressor is active. OFF if the compressor is off. FLASHES if timings for waiting for compressor start are in progress.
	Defrosting led	<ul style="list-style-type: none"> ON if defrosting mode is active. OFF if defrosting disabled or terminated. FLASHES if defrost interval time is counting.
	Antifreeze resistance led	<ul style="list-style-type: none"> Led ON if the antifreeze resistance is active.
	Pump led	<ul style="list-style-type: none"> Led ON if the pump is active.
	Alarm led	<ul style="list-style-type: none"> Led ON if an alarm is active.
	Heating mode led	<ul style="list-style-type: none"> Led ON if the unit is in heating mode.
	Cooling mode led	<ul style="list-style-type: none"> Led ON if the unit is in cooling mode.

6. FUNCTIONALITY

The system's active or activatable functions are described below.

6.1 DIGITAL INPUTS

6.1.1 REMOTE ON/OFF

The function is factory enabled.

Terminal block XU	Type	Description
4.1/4.2	Voltage free digital input	Open contact: the system is in standby mode, the display of the on-board control shows "E00" Close contact: the system exits standby.

To deactivate the function, access the parameter PRG -> PSS -> PRG -> (insert maintenance password) -> PRG -> PAr -> PRG -> CnF -> H46=0.

Note: In case of remote Off during the defrosting cycle, the unit will terminate the defrosting cycle before going into OFF mode.

6.1.2 CHANGE OPERATING MODE FROM REMOTE

Possibility to remotely manage the heating or cooling mode of operation of the heat pump.

The function is not enabled by the factory.

To enable the function, access the parameters PRG -> PSS-> PRG -> (insert maintenance password)-> PRG -> PAr-> PRG -> CnF -> H46=3

Terminal block XU	Type	Description
3.1/3.2	Voltage free digital input	Open contact: the system is in cooling mode Close contact: the system in is heating mode

6.2 ANALOGIC INPUTS

6.2.1 SYSTEM REMOTE PROBE

The system remote probe adjusts the heat pump only during compressor start-up phase, the shutdown is ALWAYS managed by the outlet temperature probe of the heat pump. Conventions:

- Sreg = System water return probe
- Srem = System remote probe
- b22 = Parameter defining the hysteresis of the thermoregulation of the system probe (default = 5.0°C, to change the value see paragraph 19.4).

Operating mode		Active call of the system
	Cooling	At the same time, both of the following conditions must be met: 1. Sreg > setpoint Coo + 0.5°C 2. Srem < setpoint Coo + (b22 - 0.5°C)
	Heating	At the same time, both of the following conditions must be met: 1. Sreg > setpoint Hea - 0.5°C 2. Srem < setpoint Hea - (b22 - 0.5°C)

The function is factory enabled.

To enable the function, access the parameter PRG -> PSS -> PRG -> (insert maintenance password) -> PRG -> PAr -> PRG -> CnF -> **H28=41**

Terminal block XU	Type	Description
5.1/5.2	Analogic input	System remote probe

Note:

- **In case of a remote Off during the defrost cycle, the unit will terminate the defrost cycle before moving to Off.**
- **Probe characterisation: NTC-10kΩ a 25°C β 3435.**

6.3 DOUBLE SETPOINT

Possibility of remotely managing a double working setpoint in both cold and hot modes.

The function is not enabled by the factory.

To enable the function, access the parameter PRG -> PSS -> PRG -> (insert maintenance password) -> PRG -> PAr -> PRG -> CnF:

1. Set the parameter **H129** which defines the double setpoint mode (from the maintenance menu):

Value	OPERATION
0	Disabled function
2	Double setpoint active in summer
3	Double setpoint active in winter
4	Double setpoint active in summer and winter

2. Set the parameter **H87=25**, activates voltage output 230Vac, 50Hz, 5° resistive, 1 A inductive. To be connected to relay coil for dry contact cable section.

Terminal block XU	Type	Description
9.1 (N) 9.2 (L)	Voltage output	Voltage output for 3-way valve for radiant panels

Note: Voltage output 230Vac, 50Hz, 2A resistive.

3. Set the parameter **H52=26**, activates the digital input

Terminal block XU	Type	Description
6.1/6.2	Voltage free digital input	Open contact -> first setpoint Coo/Hea. Close contact -> second setpoint Co2/He2.

To set the setpoints, see chapter 5.2.1

6.4 SIGNALLING

6.4.1 SIGNALLING DEFROSTING IN PROCESS

Terminal block XU	Type	Description
12.1 (N) 12.2 (L)	Voltage output	Active signal when defrost cycle is in progress.

Note: Voltage output 230 Vac, 50Hz, 2A resistive.

6.4.2 SYSTEM SEASON SIGNALLING

An output can be configured to signal when the compressors are in operation.

Terminal block XU	Type	Description
13.1 (N) 13.2 (L)	Voltage output	Signalling is active in cooling mode, while in heating mode or in Off mode it is deactivated. During defrosting, the output maintains its original season setting

Note: Voltage output 230Vac, 50Hz, 2A resistive.

6.4.3 SIGNALLING COMPRESSORS IN OPERATION

An output can be configured to signal when the compressors are in operation.

Terminal block XU	Type	Description
8.1 (N) 8.2 (L)	Voltage output	Signalling active when at least one compressor is in operation

Note:

- **Voltage output 230Vac, 50Hz, 2A resistive.**
- **This signalling is not activated if the double setpoint is present.**

6.4.4 LOCKOUT/ALARM SIGNALLING

A voltage output can be configured to signal the presence of an alarm.

Terminal block XU	Type	Description
10.1 (N) 10.2 (L)	Voltage output	Active signalling when a system alarm is present

Note: Voltage output 230Vac, 50Hz, 2A resistive.

As an alternative to the alarm signal, it is possible to configure a voltage output that signals the blocking of the system.

To enable the function, access the parameters

PRG -> PSS -> PRG -> (insert maintenance password) -> PRG -> PAR -> PRG -> CnF -> H88=47

Terminal block XU	Type	Description
10.1 (N) 10.2 (L)	Voltage output	Active signalling when a system lockout alarm is present

Note: Voltage output 230Vac, 50Hz, 2A resistive.

6.5 SYSTEM VENTING FUNCTION

Function that allows the system venting function, by activating the pump for 5 minutes.

To enable the function:

1. Control in **OFF** mode
2. Access to the parameters PRG -> PSS -> PRG -> (insert maintenance password)
3. Press at the same time for **3 seconds** the buttons **UP** and **DOWN**.

It is possible to exit manually from the system venting cycle by pressing the **MODE/ESC** button.

Note: During this function the pressure switch alarm is disabled, the water content inside the system must be guaranteed by the installer/maintenance technician.

6.6 FORCING MANUAL DEFROSTING

If the machine is in On and in heating mode, you can force a defrost manually by pressing the **UP**, **DOWN** and **ENTER** buttons for 3 seconds.

7. TURN ON/OFF THE SYSTEM

The unit is turned on and off using the mode button on the on board controller machine, the compressors and fans will start and stop automatically and stop automatically when the setpoint is reached depending on the temperature of the return water system, while the pump (if present) will remain in continuous operation when the unit is not in OFF mode.

In the event of an alarm, the unit will partially or totally be blocked, signalling an error code on the display of the on board controller.

Before resetting the function, check that the cause of the blockage is eliminated.

Some alarms require an intervention on the safety device by re-arming it or an intervention by removing power from the system. Before disconnecting the system, set the on-board control to OFF.

Note: It's recommended to power the system and to set it in OFF mode, at least 12 hours before the start-up.

8. SEASONAL SHUTDOWN

If a system shutdown is expected, put the unit in Off mode from the on-board controller.

The unit's power supply must always be guaranteed so that the frost protection can operate and prevent breakage due to ice formation inside the unit.

If it is necessary to disconnect the unit from the power supply for a long time, check if the minimum temperature at which the unit may be subjected and if it is lower than the freezing point of the fluid contained in the hydraulic circuit and in the heat exchanger, so the system must be emptied. **In this case the company declines all responsibility in case of breakages.**

9. POWER SUPPLY FAILURE

In case of power supply failure, and when it is back, the device returns to the state before the power failure.

All the timings will be cancelled and if a defrost cycle was in progress, it will be also cancelled.

Note: In case of power supply failure for a long time, power on the system and set to OFF mode, and wait 12 hours before starting operation

in heating or cooling mode.

10. COMPRESSORS MANAGEMENT

The compressors are managed by the controller, which calculates the times of intervention of the compressors by switching them on and off according to the request of the thermoregulator, the controller chooses the activation and the shutdown of the compressors according to the hours of operation and their number of start-ups.

More precisely:

- The compressor that is selected to start-up will be the one with less number of operating hours or less number of start-ups hours.
- The compressor that is selected to stop operation will be the one (among all those in operation) with a maximum number of operating hours or with largest number of initializations.

Example of operation in heating mode of a dual circuit unit, each one of them is equipped with 2 compressors:

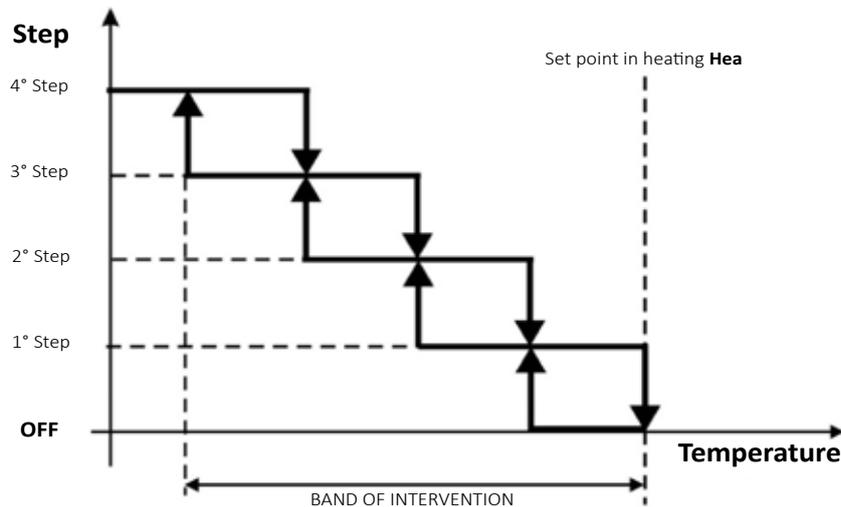
Startup:

If regulation requires 4 active compressors, the one with the lowest number of operating hours or the lowest number of starts hour is chosen from the two circuits.

If circuit n° 1 is chosen, choose between the two compressors of circuit n° 1, the one with the lowest number of operating hours or the lowest number of start ups/hours, then switch to circuit n° 2 and turn on the compressor with the lowest number of operating hours of the lower number of start ups/hours, then turn on the second compressor of circuit n° 1, then turn on the second compressor of circuit n° 2.

Shut off:

When the setpoint is reached with a relative hysteresis of 0.5°C, the circuit with the highest number of operating hours or the highest number of compressors starts/hour is chosen first. If circuit n° 1 is chosen, within circuit n° 1 the compressor with the highest number of operating hours or the lower number of start/hour is switched off, then switch to circuit n° 2 and switch off the compressor with the highest number of operating hours or the highest number of starts/hour, then switch off the second compressor of circuit 1, then switch off the second compressor of circuit 2.



Note: Each compressor must remain switched on for a minimum time after activation. Exceptions to this rule are shutdowns due to alarm, STAND-BY / OFF or defrosting or partialisation by NTC probe transducer.

11. COMPRESSOR CRANCKASE RESISTANCE

The compressor cranks resistance is active when the compressor is off.

The compressor cranks resistance is off when the compressor is on.

Note: It is recommended to power on the system and to set it in OFF, at least 12 before the start up.

12. VENTILATION CONTROL

The fan control is a function of the condensation pressure in chiller mode and is a function of the evaporation pressure in heat pump mode.

In cooling mode a pre-ventilation time is active, the fans start 5 seconds before the startup of the compressors of the circuit, and the fan speed is proportional to the condensation temperature.

13. DEFROSTING CYCLE

The defrost cycle function is available only in heat pump mode and is used to prevent the ice formation on the surface of the air/air coil. The ice formation on the evaporator, which occurs more frequently at very low outdoor ambient temperatures, in addition to considerably reducing the thermodynamic efficiency of the machine, it also leads to the risk of damage to the machine itself.

The maximum time of the defrosting cycle is around 8 minutes, once this time is reached, the unit is forced out of the defrost cycle and returns in heating mode.

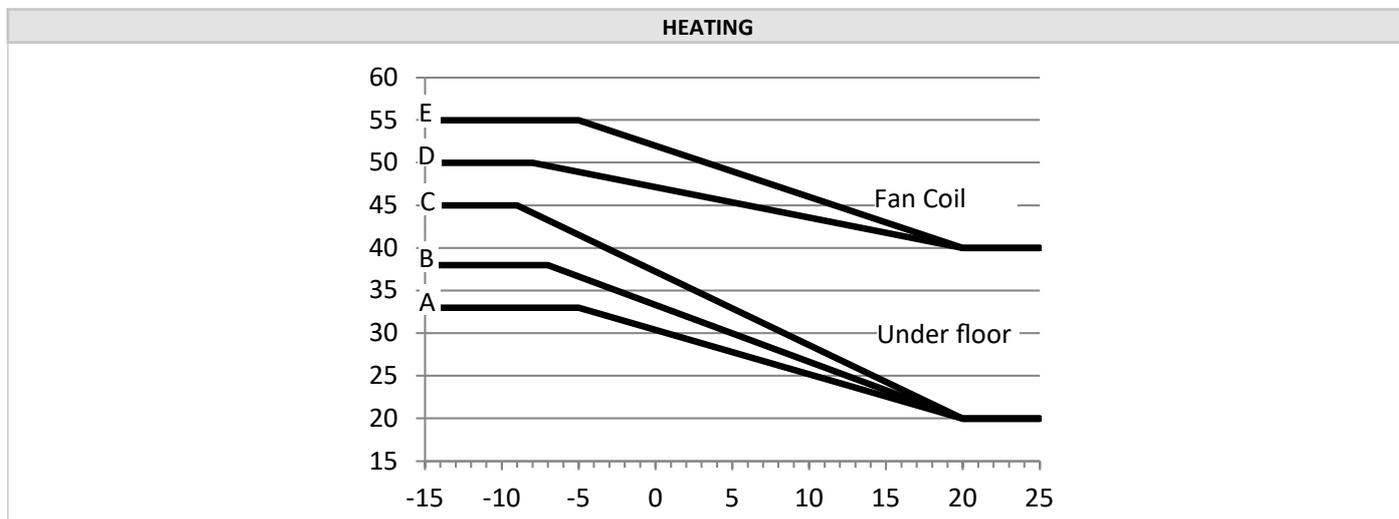
Note: In case of a remote Off during the defrosting cycle, the unit will end this cycle before switching to Off.

14. DYNAMIC SET POINT MODIFICATION

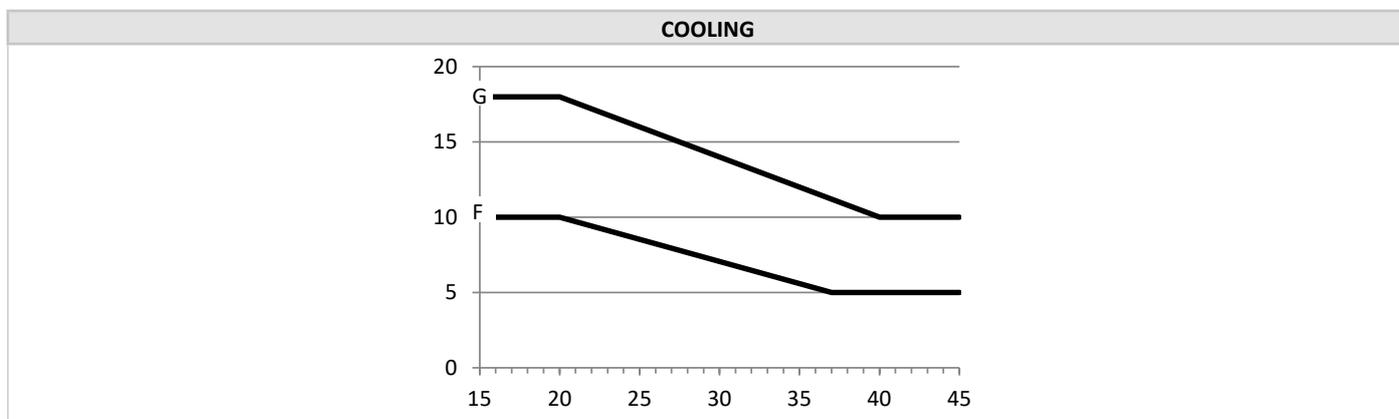
The regulator allows changing the setpoint by adding a value depending on the temperature of the outdoor air probe. For use this function, eventually change the parameter values, following the informations below (modifications by the installer).

- **b08** enable=1/disable=0
- **b09** = Maximum offset in cooling
- **b11** = Outdoor temperature set in cooling mode
- **b13** = Delta temperature in cooling mode

14.1 SETTINGS FOR STANDARD CLIMATE CURVES



	Setpoint Hea	b08	b10	b12	b14
A	20°C	1	18°C	20°C	-27°C
B	20°C	1	13°C	20°C	-25°C
C	20°C	1	25°C	20°C	-29°C
D	40°C	1	10°C	20°C	-28°C
E	40°C	1	15°C	20°C	-25°C



	Setpoint Coo	b08	b09	b11	b13
F	5°C	1	5°C	37°C	-17°C
G	10°C	1	8°C	40°C	-20°C

15. KA2 ACCESSORY-TANK RESISTANCE MANAGEMENT

Inside the tank there is an armoured resistance with control and probe for regulation. The purpose of the resistance is to prevent the temperature of the water inside the tank from dropping too low. The resistance is active when the probe inside the tank falls below 4°C and remains active until 8°C is reached. Depending on the version of the unit and the vector fluid, set the temperature values for switching on and off from the control on the resistance. Set parameters SET1 and SET2:

1. Press the "set" button once.
2. Use the arrows to scroll through the various parameters (in this case there are only 2, displayed in orange).
3. Once the desired parameter is selected press the set button again, the parameter will start to flash.
4. Use the arrows to modify the value (displayed in green).
5. Once the value is chosen press set to confirm, the parameter will stop flashing and the new value will then be set.
6. Press the fnc button to return to the starting menu. (You can also wait, the device will automatically return to the starting menu after a few seconds).

For setting all the other parameters:

1. Press the button for 5 seconds.
2. Use the same method shown above for set the other parameters.

N.B. Each time you finish to modifying the parameters, switch the device off and on again to ensure that the data is saved correctly. Resistance active at +4°C. Resistance off at +8°C.

Parameter	VALUE
HC1	H
HC2	H
df1	0.1
df2	4.0
SEt1	1.0
SEt2	8.0

Glycol 10%. Resistance active at +1°C. Resistance off at +5°C.

Parameter	VALUE
HC1	H
HC2	H
df1	0.1
df2	4.0
SEt1	-7.0
SEt2	0.1

Glycol 20%. Resistance active at -4°C. Resistance off at 0°C.

Parameter	VALUE
HC1	H
HC2	H
df1	0.1
df2	4.0
SEt1	-7.0
SEt2	0.1

Glycol 30%. Resistance active at -8°C. Resistance off at -4°C.

Parameter	VALUE
HC1	H
HC2	H
df1	0.1
df2	4.0
SEt1	-7.0
SEt2	-4.0

16. PUMP MANAGEMENT (IF PRESENT)

The pump can be set in the following operating modes:

- Thermoregulator call operator
- Operation on call from thermoregulator with periodic activation.
- Continuous operation (default)

The pump is switched off immediately if:

- Pump blockage alarm present including pressure switch alarm in manual reset.
- In stand-by or off from remote input the pump (in case it is switched on) is always switched off with a 60 seconds delay.

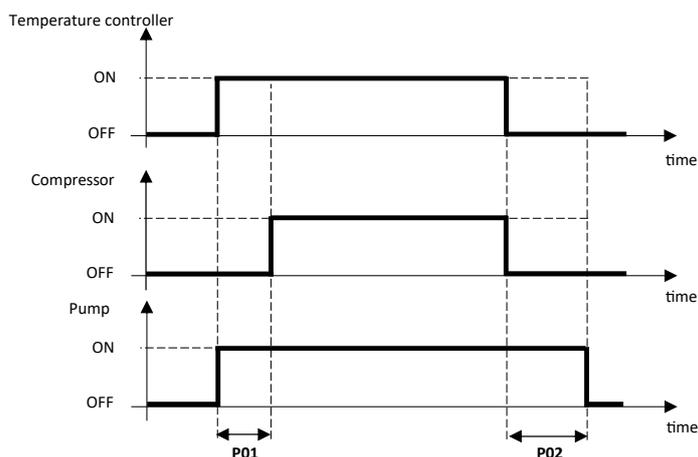
The pump is always switched on if the antifreeze resistors are working or if the hydraulic pump operation in antifreeze is activated. The pump can be configured with P03 to operate independently of the compressor or on call.

- 0= continuous operation in heating/cooling mode (DEFAULT)
- 1= operation on call of the thermoregulator

16.1 OPERATION ON CALL FROM THERMOREGULATOR

During this operating mode (P03=1), the pump is activated on request of the; after a timer delay of P01 seconds from the pump startup, the compressor also will turn ON. When switched off, instead, the pump is switched off with a delay time of P02 minutes from the call to off state of the thermoregulator (off state coinciding with the switching off of the compressor).

With the pressure switch alarm active in automatic reset, the pump is still switched on even if the compressor is off.



P01 = delay of start up between the pump and the compressor.
 P02 = delay of stop between the compressor and the pump.

16.2 PERIODIC

The function is disabled if **P17=0** (default). If the pump is set to operation on call from thermoregulator (**P03=1**), it is activated periodically for a time defined by the parameter **P17** (in seconds) after a countdown, the duration of which can be set by parameter **P16** (in minutes), activated when the pump is switched off when the temperature control is satisfied. With the pressure switch alarm active in automatic reset, the pump is still switched on even if the compressor is off. The periodic function is also suspended if the antifreeze regulator intervenes and forces the pump to activate.

16.3 CONTINUOUS OPERATION

The pump is in continuous operation from the factory. It only switches off when the unit is OFF mode.

16.4 PROPORTIONAL REGULATION

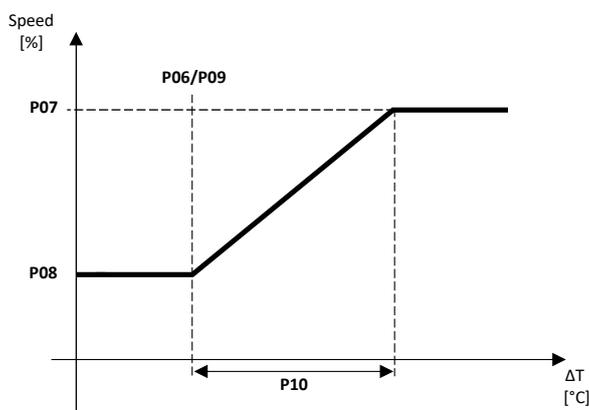
The analogue output is varied according to the temperature difference between the inlet water and the outlet water of the heat exchanger. The regulator is enabled by setting **P12 = 1** and is defined by the following parameter:

- **P06** set delta T water outlet/inlet of the modulating pump in heating mode.
- **P07** maximum speed of the modulating pump
- **P08** minimum speed of the modulating pump
- **P09** set delta T water inlet/outlet of the modulating pump in cooling mode.
- **P10** Modulating pump linear band
 - In cooling: [T in water] – [T out water]
 - In heating: [T out water] – [T in water]

If the temperature difference between inlet and outlet water is greater than **P09 + P10**, the pump operates at maximum speed.

If the temperature difference between inlet and outlet water is less than **P09 - 0.2°C** the pump runs at minimum speed.

In the other cases the pump modulates in an attempt to match the temperature difference with **P09**. For heating, the same considerations apply, only that **P06** is replaced by **P09**.



16.5 DOUBLE HYDRAULIC PUMP (IF PRESENT)

The logic regulation is identical to the one of a pump, except for the exceptions listed below. The type of logic for selecting which pump to use depends on **P13**:

- **P13 = 0**: The pump with the least operating hours is chosen. No pump changeover is managed during operation, i.e. the choice is only made when a pump needs to be started.
- **P13 = 1**: Priority choice on pump 1.

- **P13** = 2: Priority choice on pump 2.

If one of the pump is available due to a alarm, the other is chosen regardless of the value of **P13**.

Note: Each pumph as its own thermal protection.

16.6 HYDRAULIC PUMP IN ANTIFREEZE MODE

If the pump is off and the regulation temperature is below 5.0°C, the pump will be activated automatically. The pump turns off when the regulation temperature is above 7.0°C.

16.7 USE OF MIXTURES WITH WATER AND GLYCOL

Ethylene glycol mixed with circulating water is used to prevent the formation of ice in the exchangers and tanks of hydraulic circuits. The use of mixtures with a low freezing point produces thermodynamic changes and parameters must be modified according to the amount of glycol in the system. Contact the office to set the correct parameters.

17. REGULATOR OF WATER ANTIFREEZE RESISTANCE (IF PRESENT)

The water antifreeze resistance mounted on the plate exchangers faces turn ON when the regulating temperature sensor detects a water temperature around 4°C and turn OFF when the water temperature is 6°C. This request is added to the one of the normal antifreeze regulator described above.

18. ALARMS

Entering the **ERR** alarm menu it is possible to view the active alarms, grouped in the folders **ALL C1** for circuit 1 and **ALL C2** for the circuit 2, the lost of alarms reported below.

E001-HIGH PRESSURE

When the high pressure alarm is active, the compressors are inactive. This alarm can be associated with:

- **Manual reset high pressure switch:** The manual reset is necessary to eliminate the error.
- **High pressure transducer:** If the on-board pressure transducer detects a pressure value higher than 41.0 bar the alarm will go ON. The alarm is reset when the pressure drops below 31.0 bar. If the alarm occurs more than 3 times in an hour, manual intervention is required by removing power from the system.

E002-LOW PRESSURE

When the low pressure alarm is active, the compressor is active. This alarm can be associated with:

- **Manual reset high pressure switch:** The manual reset is necessary to eliminate the error.
- **Low pressure transducer:** The alarm is active if the pressure transducer on the machine detects a pressure lower than 3.5 bar (in cooling) and 1.5 bar (in heating). The alarm is reset when the pressure is greater than 5.5 bar (in cooling) and 3.5 bar (in heating). If the alarm occurs more than 3 times in an hour, manual intervention is required by removing power from the system.

E003-THERMAL COMPRESSOR CP1

The alarm is active in case of intervention of the compressor thermal protection, a manual intervention is necessary to reset the compressor thermal. With an active alarm, the compressor is blocked.

E004-FAN ALARM

The alarm is active in case of intervention of the thermal protection of at least one of the fans of the circuit. When the alarm is active, the circuit is blocked.

E005-ANTIFREEZE

If the control probe detects a value lower than 4°C the alarm is active. It is deactivated if the temperature recorded by the same probe is higher than +7°C.

E006-LACK OF WATER FLOW

The water-side pressure switch is already installed inside the unit and **MUST NOT** be tampered with or bypassed in any way. The pressure switch is bypassed for a time of 10 seconds from the start of the machine. The alarm is signalled after 5 seconds of persistent error (lack of water flow, air in the circuit, etc.). The alarm is automatically reset for the first 2 times and is deactivated after 5 seconds. If the alarm occurs more than 3 times per hour, it becomes manual reset. Alarm not active for 10 seconds after pump activation. With active alarm, the system is blocked. In the case of a dual pump system, in the event of a flow alarm, both pumps are forced ON. If the alarm returns within 60 seconds, the pump that was first activated will be switched off and the one that was activated with the alarm will continue to work. If the lack of flow remains, the flow alarm is reset manually and both pumps stop.

E009-HIGH DISCHARGE TEMPERATURE

If the discharge temperature associated with the compressor detects a temperature greater than 120.0°C, the alarm is activated and stops the compressor. The alarm is automatically reset when the discharge temperature falls below 110.0°C again. With an active alarm, the circuit is blocked.

E013-THERMAL COMPRESSOR CP2

The alarm is active in case of intervention of the compressor thermal protection, a manual intervention is necessary to reset the compressor thermal with active alarm the compressor is blocked.

E016-THERMAL PUMP 1 (IF PRESENT)

The alarm is active if the thermal protection is triggered with an active alarm, the pump in question is blocked. If there are no other resources to be used (only 1 pump used configured or both pumps unusable) the system is blocked.

E018-HIGH TEMPERATURE WATER SIDE

If the water outlet probe registers a value higher than 65°C for at least 50 seconds, the alarm is active. It is deactivated when the temperature returns below 62°C.

E026-THERMAL PUMP 2 (IF PRESENT)

If the thermal protection is triggered with an active alarm, the pump in question is blocked. If pump 1 is also in alarm, the system is blocked.

E611÷E671-ALARMS PROBES

The alarm is active in case any connected and enabled probe is short-circuited or interrupted.

The alarm is also active if the upper probe limit (100°C) or lower limit (-50°C) is exceeded.

Probe characterisation: NTC-10kΩ at 25°C β 3435.

19. CONFIGURATIONS TABLES ALLOWED TO USER AND INSTALLER

THE MODIFICATION OF THE INSTALLER LEVEL PARAMETERS MUST BE DONE ONLY BY QUALIFIED PERSONNEL AND AUTHORIZED BY THE COMPANY.

THE COMPANY DECLINES ALL LIABILITY IN THE CASE OF BREAKAGE OR MALFUNCTIONS CAUSED BY THE MODIFICATION OF THE FACTORY SET PARAMETERS BY THIRD PARTIES THAT ARE NOT EXPRESSLY AUTHORIZED.

THE PARAMETERS THAT ARE NOT EXPLAINED IN THIS MANUAL SHOULD NOT BE TAMPERED OTHERWISE THE WARRANTY WILL NO LONGER BE VALID.

OTHER VALUES DIFFERENT THAN THOSE OF DEFAULT ONES CAN ENSURE OPTIMAL OPERATION OF THE UNIT, IN CASE OF DOUBT ABOUT THE VALUES TO BE SET, YOU CAN CONTACT OUR OFFICE.

NOT ALL FUNCTIONS CAN BE SIMULTANEOUSLY ACTIVATED.

19.1 SETPOINT CONFIGURATION PARAMETERS

See paragraph 5.2.1

19.2 CONFIGURATION PARAMETERS

PRG-> PSS -> PRG -> (insert maintenance password) -> PRG -> PAr -> PRG -> CnF

Parameter	Description	Unit	Default	Range	Visibility	Admitted configurations	Note
H28	Analogic input configuration	/	0	/	INSTALLER	0 = Input not assigned 41= System remote probe	Terminals XU-5.1/5.2
H46	Digital input configuration	/	0	/	INSTALLER	0 = Input not assigned 3= Remote change of operating mode	Terminals XU-3.1/3.2
H47	Digital input configuration	/	2	/	INSTALLER	0 = Input not assigned 2= Remote On/Off	Terminals XU-4.1/4.2
H52	Digital input configuration	/	0	/	INSTALLER	0 = Input not assigned 26= Double set point call	Terminals XU-6.1/6.2
H86	Voltage output configuration	/	0	1÷47	INSTALLER	0 = Disabled output 13= Compressors in operation	Terminals XU-8.1/8.2
H87	Voltage output configuration	/	0	1÷47	INSTALLER	0 = Disabled output 25= Double setpoint valve comant	Terminals XU-9.1/9.2
H88	Voltage output configuration	/	0	1÷47	INSTALLER	0 = Disabled output 24= Unit alarm signalling 47= Blocked unit signalling	Terminals XU-10.1/10.2
H88	Voltage output configuration	/	0	1÷47	INSTALLER	0 = Disabled output 47= Blocked unit signalling (Only for unit HWA1-A/H)	Terminals XU-11.1/11.2
H91	Voltage output configuration	/	0	1÷47	INSTALLER	0 = Disabled output 21=Blocked unit signalling (Only for unit HWA1-A/H)	Terminals XU-12.1/12.2
H92	Voltage output configuration	/	0	1÷47	INSTALLER	0 = Disabled output 31=Seasonal signalling (Only for unit HWA1-A/H)	Terminals XU-13.1/13.2
H126	Serial address	/	1	1÷200	INSTALLER	In case of several units installed in cascade configuration, you have to assign different addresses for the controllers.	
H129	Double setpoint setting	/	0	1÷4	INSTALLER	See paragraph 6.3	

19.3 ALARM CONFIGURATION PARAMETERS

PRG -> PSS -> PRG -> (insert maintenance password) -> PRG -> PAr -> PRG -> All

Parameter	Description	Unit	Default	Range	Visibility	Admitted configurations	Note
A08	Antifreeze alarm activation setting	°C	2	-127÷127	INSTALLER		
A09	Antifreeze alarm hysteresis	°C	3.0	0.0÷25.5	INSTALLER		

19.4 REGULATION PARAMETERS

PRG -> PSS -> PRG -> (insert maintenance password) -> PRG -> PAR -> PRG -> rE

Parameter	Description	Unit	Default	Range	Visibility	Admitted configurations	Note
b05	Compressor cut-off hysteresis	°C	0.3	0.0÷25.5	CONSTRUCTOR		
b08	Enabling dynamic set	/	0	0÷1	INSTALLER		
b09	Maximum offset in dynamic cooling set	°C	3.0	-50.0÷80.0	INSTALLER		
b10	Maximum offset in dynamic heating set	°C	-3.0	-50.0÷80.0	INSTALLER		
b11	Outdoor temperature set in dynamic cooling set	°C	25	-127÷127	INSTALLER		
b12	Outdoor temperature set in dynamic heating set	°C	15	-127÷127	INSTALLER		
b13	Delta temperature in cooling	°C	-10.0	-50.0÷80.0	INSTALLER		
b14	Delta temperature in heating	°C	10.0	-50.0÷80.0	INSTALLER		
b22	Hysteresis cut-off thermoregulation system probe	°C	5.0	0.0÷25.5	INSTALLER		
b25	Compressor cut-on hysteresis	°C	1	0.0÷25.5	CONSTRUCTOR		

19.5 CONFIGURATION PARAMETER OF THE PUMP

PRG -> PSS -> PRG -> (insert maintenance password) -> PRG -> PAR -> PRG -> PUP

Parameter	Description	Unit	Default	Range	Visibility	Admitted configuration	Note
P03	Pump operation mode	/	1	0÷1	INSTALLER	0 = Continuous operation 1 = Thermoregulated operation	See paragraph 16
P04	Antifreeze pump set	°C	5	-127÷127	INSTALLER		
P05	Pump hysteresis in antifreeze	°C	2.0	0.0÷25.0	INSTALLER		
P09	Set delta T water inlet/outlet modulating pump	°C	5	-127÷127	INSTALLER		
P10	Modulating pump proportional band	°C	2.0	0.0÷25.0	INSTALLER		
P13	Pump selection	/	0	0÷2	INSTALLER	0 = Hours of operation 1 = Priority for pump 1 2 = Priority for pump 2	
P16	Interval between 2 activations of the pump in periodic mode	min	20	0÷600	INSTALLER		
P17	Time of operation of the pump in periodic mode	sec	90	0÷255	INSTALLER		

20. SIGNALLING

E000-REMOTE ON/OFF

If the machine is controlled by a remote digital input

21. TROUBLESHOOTING

In case of alarm, an error code appear on the machine control display.

Code	Description	Lockout
E001	High pressure alarm	Circuit
E002	Low pressure alarm	Circuit
E003	Thermal compressor 1	Compressor
E013	Thermal compressor 1	Compressor
E004	Thermal fan	Circuit
E005	Antifreeze alarm	System
E006	Flow switch alarm	System
E009	High discharge temperature alarm	Circuit

Code	Description	Lockout
E016	Pump thermal 1	Circuit /System
E020	Inverted transducers	Circuit
E026	Thermal pump 2	Circuit /System
E101	Communication time-out	System
E611	Inlet water temperature	System
E621	Outlet water temperature	System
E631	Compressor suction probe	Circuit
E641	Compressor discharge probe	Circuit
E651	High pressure transducer	Circuit
E661	Low pressure transducer	Circuit
E671	Outdoor air probe for climate control	System
E682	Remote system probe (if enabled)	Associated function

22. MODBUS VARIABLES

The control presents the following configuration by default:

BAUD RATE	9600
PARITY	EVEN
DATA BIT	8
STOP BIT	1
DEVICE ID	1

To configure Modbus communication according to your requirements, it is necessary to modify the below registers:

H124 : BAUD RATE	
0	4800
1	9600
2	19200
3	38400

H125 : PARITY, STOP BIT	
0	NONE, 2 bit
1	ODD, 1 bit
2	EVEN, 1 bit
3	NONE, 1 bit

H126 : DEVICE ID	1 ÷ 200
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Modbus comands:

READING	HOLDING REGISTER
WRITING	6-16

Register	Format	Bit	R/W	Range	Name	Description	Note
1	INT	-	R	-	Firmware infor- mations	Firmware version	
2	INT	-	R	-		Firmware release	
3	BYTE (H)	-	R	-		Firmware sub-release	
	BYTE (L)	-	R	-		Firmware creation day	
4	BYTE (H)	-	R	-		Firmware creation month	
	BYTE (L)	-	R	-		Firmware creation year	
80 ÷ 97	ASCII	-	R	-	Serial number	Serial number	
1089	INT	-	R/W	1 ÷ 200	Serial address	Modbus serial ID	

Register	Format	Bit	R/W	Range	Name	Description	Note	
200	INT	-	R	-	Machine setting	(0) Stand by	Reading value of the machine status	
		-	R	-		(1) Cooling		
		-	R	-		(2) Heating		
7201	BIT MASK	0	R/W	-		Enabling remote machine status writing	Necessary for the operation of the reg. 7200.	
7200	INT	-	W	-		(0) Stand by	The writing of non permitted values to this address can lead to unexpected operation, so observe only the permitted write values.	
		-	W	-		(1) Cooling		
		-	W	-		(2) Heating		
7201	BIT MASK	1	R/W	-		Enabling remote machine status writing	Necessary for operation of reg. 7203/7208.	
7203	°C/10	-	R/W	5.0 ÷ 23.0		Setpoint	Cooling	
7204	°C/10	-	R/W	25.0 ÷ 55.0			Heating	
7206	°C/10	-	R/W	5.0 ÷ 23.0	Second cooling			
7207	°C/10	-	R/W	25.0 ÷ 55.0	Second heating			
7208	°C/10	-	R/W	0.0 ÷ 80.0	ACS preparer			
7201	BIT MASK	2	R/W	-	Enabling switching to second setpoint		Necessary for operation of bit 0 of reg. 7202.	
7202	BIT MASK	0	W	-	Second setpoint	0 = Primary setpoint, 1 = Secondary setpoint	Writing value	
7217	BIT MASK	0	R	-		0 = Primary setpoint, 1 = Secondary setpoint	Reading value	
7201	BIT MASK	3	R/W	-	Ambient call	Enabling remote room call writing	Necessary for operation of bit 1 of reg 7202	
7202	BIT MASK	1	R/W	-		Remote room call forcing		
7201	BIT MASK	5	R/W	-	Anti-legionella ²	Enablement of anti-legionella cycle remotely	Necessary for the operation of the bit 3 of reg. 7202.	
7202	BIT MASK	3	R/W	-		Remote anti-legionella cycle request activation	It is necessary that the bit remains at 1 for the entire cycle time.	
7216	BIT MASK	5	R	-		Anti-legionella cycle in progress		
		6				Anti-legionella cycle failed or stopped	Remains at 1 until the next cycle, or reset to zero when the card is switched off	
7202	BIT MASK	5	R/W	-	System venting	Forced system venting	Only if the machine is in Stand By (0)	
7202	BIT MASK	7	R/W	-	Defrosting	Forced defrosting	Only if the machine is in heating mode (2-6)	
7214	BIT MASK	13	R	-		Defrosting on call		
		14				Defrosting in progress		
305	hour	-	R	-	Operating hours	Compressor 1		
307	hour	-	R	-		Compressor 2		
309	hour	-	R	-		Compressor 3		
313	hour	-	R	-		Compressor 1 Circuit 1		
315	hour	-	R	-		Compressor 2 Circuit 2		
317	hour	-	R	-		Compressor 3 Circuit 2		

Register	Format	Bit	R/W	Range	Name	Description	Note
253	°C/10	-	R	-	Temperature transducer	Evaporation	
254	°C/10	-	R	-		Condensation	
626	°C/10	-	R	-		Evaporation circuit 2	
627	°C/10	-	R	-		Condensation circuit 2	
400	°C/10	-	R	-	Temperature ³	Water inlet	
401	°C/10	-	R	-		Water outlet	
405	°C/10	-	R	-		DHW	
422	°C/10	-	R	-		Compressor suction	
428	°C/10	-	R	-		Outdoor	
433	°C/10	-	R	-		Compressor discharge 1	
434	°C/10	-	R	-		Compressor discharge 2	
435	°C/10	-	R	-		Compressor discharge 3	
437	°C/10	-	R	-		Solar collector	
438	°C/10	-	R	-		Solar accumulation	
440	°C/10	-	R	-		Remote system	
443	°C/10	-	R	-		Mixing flow radiant panels	
447	°C/10	-	R	-		DHW Preparer recirculation	
20422	°C/10	-	R	-		Compressor suction circuit 2	
20433	°C/10	-	R	-		Compressor 1 discharge circuit 2	
20434	°C/10	-	R	-		Compressor 2 discharge circuit 2	
20435	°C/10	-	R	-	Compressor 3 discharge circuit 2		
406	bar/100	-	R	-	Pressures ³	High	
414	bar/100	-	R	-		Low	
20406	bar/100	-	R	-		High circuit 2	
20414	bar/100	-	R	-		Low circuit 2	
7000	%/10	-	R	-	Analogic output	Condensation fan	
7001	%/10	-	R	-		Circulartor pupm	
627	%/10	-	R	-		Condensation fan circuit 2	
950	BIT MASK	0	R	-	Alarms ^{4 5}	High pressure	E001
		1				Low pressure	E002
		2				Thermal compressor	E003
		3				Thermal fan	E004
		4				Ice	E005
		5				Lack of flow	E006
		6				Low DHW temperature	E007
		7				Lack of lubrication	E008
		8				High discharge temperature Cp1	E009
		9				High temperature solar collector	E010
		12				Thermal compressor 2	E013
		13				Thermal fan 2	E014
15	Thermal pump	E016					

Register	Format	Bit	R/W	Range	Name	Description	Note
951	BIT MASK	1	R	-	Alarms ^{4 5}	High temperature	E018
		2				High discharge temperatureCp2	E019
		3				Inverted pressure transducers	E020
		6				Thermal compressor 3	E023
		7				Thermal fan 3	E024
		9				Thermal pump 2	E026
		11				Incongruent temperature	E041
		12				Insufficient heat exchanger ACS	E042
		13				High temperature DHW storage	E050
		14				Module I/O 1 disconnected	E101
		15				Module I/O 2 disconnected	E102
		952				BIT MASK	0
1	Probe error 2		E621				
2	Probe error 3		E631				
3	Probe error 4		E641				
4	Probe error 5		E651				
5	Probe error 6		E661				
6	Probe error 7		E671				
7	Probe error 8		E681				
8	Errore sonda 9		E691				
9	Probe error 10		E701				
10	Probe error11		E711				
11	Probe error 1 modul 1		E612				
12	Probe error 2 modul 1		E622				
13	Probe error 3 modul 1		E632				
14	Probe error 4 modul 1		E642				
15	Probe error 5 modul 1		E652				
953	BIT MASK	0	R	-	Alarms ^{4 5}	Probe error 6 modul 1	
		1				Probe error 7 modul 1	E672
		2				Probe error 8 modul 1	E682
		3				Probe error 9 modul 1	E692
		4				Probe error 10 modul 1	E702
		5				Probe error 11 modul 1	E712
		6				Probe error 1 modul 2	E613
		7				Probe error 2 modul 2	E623
		8				Probe error 3 modul 2	E633
		9				Probe error 4 modul 2	E643
		10				Probe error 5 modul 2	E653
		11				Probe error 6 modul 2	E663
		12				Probe error 7 modul 2	E673
		13				Probe error 8 modul 2	E683
		14				Probe error 9 modul 2	E693
		15				Probe error 10 modul 2	E703

Register	Format	Bit	R/W	Range	Name	Description	Note
954	BIT MASK	0	R	-	Alarmes ^{4 5}	Probe error 11 modulo 2	E713
		1				Link inverter 1	E801
		2				Link inverter 2	E802
		3				Link inverter 3	E803
		4				Hardware fault inverter 1	E851
		5				Hardware fault inverter 2	E852
		6				Hardware fault inverter 3	E853
		7				Overcurrent inverter 1	E861
		8				Overcurrent inverter 2	E862
		9				Overcurrent inverter 3	E863
		10				High temperature inverter 1	E871
		11				High temperature inverter 2	E872
		12				High temperature inverter 3	E873
		13				Bad voltage inverter 1	E881
		14				Bad voltage inverter 2	E882
		15				Bad voltage inverter 3	E883
955	BIT MASK	0	R	-	Alarmes ^{4 5}	Phase sequence inverter 1	E891
		1				Phase sequence inverter 2	E892
		2				Phase sequence inverter 3	E893
		3				Model error inverter 1	E901
		4				Model error inverter 2	E902
		5				Model error inverter 3	E903
		6				Overload error inverter 1	E911
		7				Overload error inverter 2	E912
		8				Overload error inverter 3	E913
		9				Overcurrent PFC inverter 1	E921
		10				Overcurrent PFC inverter 2	E922
		11				Overcurrent PFC inverter 3	E923
		12				Internal communication error inverter 1	E931
		13				Internal communication error inverter 2	E932
		14				Internal communication error inverter 3	E933
		15				Inverter PFC fault 1	E941

Register	Format	Bit	R/W	Range	Name	Description	Note
956	BIT MASK	0	R	-	Alarms ^{4 5}	Inverter PFC fault 2	E942
		1				Inverter PFC fault 3	E943
		2				Probe error inverter 1	E951
		3				Probe error inverter 2	E952
		4				Probe error inverter 3	E953
		5				Abnormal condition inverter 1	E961
		6				Abnormal condition inverter 2	E962
		7				Abnormal condition inverter 3	E963
		8				EEPROM inverter 1	E971
		9				EEPROM inverter 2	E972
		10				EEPROM inverter 3	E973
		11				High discharge temperature of Cp3	E029
		12				Anti-legionella performed correctly	E060
		13				Anti-legionella failed or stopped	E061

¹⁾ if enabled.

³⁾ if the read value is equal to 32766 the probe is not configured, if 32767 the probe is faulty.

⁴⁾ reset alarms, write the value 0 with the command 6 on any of the registers of the alarms area.

⁵⁾ the alarms of circuit 2 are mapped in the same way with an offset of 20000 (es. 20950).

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