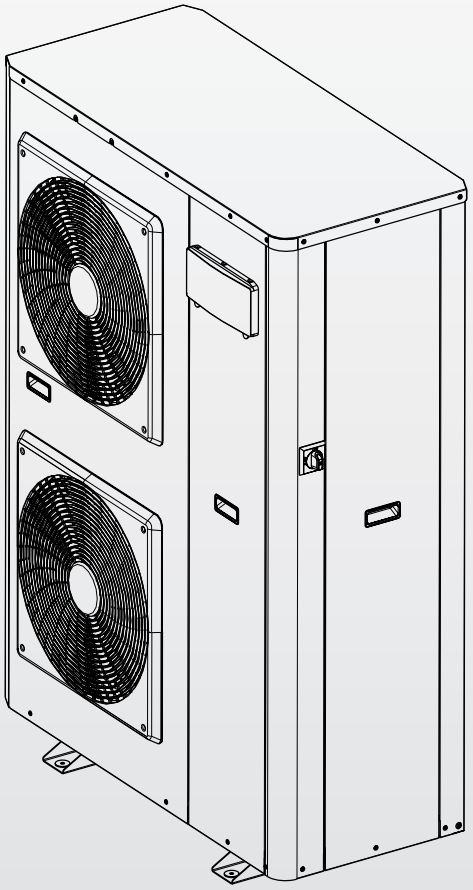
cod. Doc-0083125 rev. 5 08/2018



NexPolar

EN INSTALLATION AND TECHNICAL SERVICE INSTRUCTIONS

RIELLO

Dear Technician,
We would like to congratulate you on having recommended a ***RIELLO*** *unit: a modern product that's capable of ensuring maximum comfort at length, with a high degree of reliability, efficiency, quality and safety. While your technical skills and knowledge will certainly be required, this booklet contains all the information that we have deemed necessary for the device's correct and simplified installation.*

Thank you again, and keep up the good work.

RIELLO

COMPLIANCE

The **RIELLO NexPolar** heat pumps **are compliant** with the following European Directives:
- The Electromagnetic Compatibility Directive 2004/108/EC, as amended
- The Machinery Directive 2006/42/EC, as amended
- The ErP Directive 2009/125/EC

CE

At the end of its life, the product should be not be disposed of as solid urban waste, but rather it should be handed over to a differentiated waste collection centre.

PRODUCT RANGE

Model	Code
NexPolar 017 TE	20102834
NexPolar 022 TE	20102838

ACCESSORIES
For the complete list of accessories and the information relating to their usage combinations, please refer to the catalogue.

CONTENTS

Certain parts of the booklet make use of the following symbols:

⚠ ATTENTION = for activities that require particular caution and suitable preparation.

⛔ PROHIBITION = for activities that must not be performed under any circumstances.

This booklet code Doc-0083125 - rev. 5 (08/2018) consists of 72 pages.

1 GENERAL INFORMATION

1.1 General warnings

⚠ Upon receiving the product, be sure to verify the integrity and the completeness of the consignment, and contact the **RIELLO** agency from which the device was purchased if any discrepancies are encountered.

⚠ The product' s installation must be carried out by an authorized company that will issue a declaration of the installation's conformity to the product's owner once the work has been completed, indicating that the work has been carried out in accordance with the standards of good practice, the current National and Local regulations, and the indications provided by **RIELLO** in the instruction booklet accompanying the device.

⚠ The product must be used for its intended purpose, as stated by **RIELLO**, for which it has been expressly manufactured. **RIELLO** shall bear no responsibility, whether of a contractual or non-contractual nature, for any damages caused to people, animals, or property due to incorrect installation, adjustments, or maintenance, or improper use.

⚠ Suitable clothing, instrumentation, and accident-prevention devices must be utilized during the installation and/or maintenance operations. **RIELLO** shall bear no responsibility for any failure to comply with current safety and accident-prevention regulations.

⚠ The current laws in the Country in which the machine is installed regarding the use and disposal of the packaging materials, the products used for cleaning and maintenance, and the disposal of the unit itself at the end of its service life, must be respected.

⚠ Any repair and maintenance interventions must be carried out by the **RIELLO**, Technical Support Service, in accordance with the provisions contained in this publication. Do not modify or tamper with the device, as this could lead to hazardous situations, and the device's manufacturer shall bear no responsibility for any resulting damages.

⚠ The non-use of the device for an extended period of time will result in the need to perform the operations described in the dedicated section.

⚠ In the event of any functional anomalies or liquid leaks, set the system's main switch to its "off" position and close the shut-off valves. Promptly contact your local **RIELLO** Technical Support Service, and do not perform any interventions upon the device on your own.

⚠ The devices contain refrigerant gas: work with caution in order to avoid damaging the gas circuit and the finned coil.

⚠ According to EU Regulation no. 517/2014 regarding certain fluorinated greenhouse gases, the total amount of refrigerant gas contained within the installed system must be indicated. This information can be found on the unit's technical data plate.

⚠ This unit contains fluorinated greenhouse gases covered by the Kyoto Protocol. The maintenance and disposal operations must only be carried out by qualified personnel.

⚠ This booklet is an integral part of the device, and must therefore be carefully preserved, and must ALWAYS accompany the boiler, even in the event that it is sold to another Owner or User, or is transferred to another system. If it is damaged or lost, another copy can be requested from the **RIELLO** Technical Support Surface in your Area.

1.2 Essential safety regulations

It should be noted that the use of products that employ the use of electrical power and water require certain essential safety regulations to be respected, including the following:

⊖ It is forbidden to touch the device while barefoot or with wet body parts.

⊖ It is forbidden to douse or spray water directly onto the device.

⊖ It is strictly forbidden to touch the moving parts, to place any body parts between them, or to insert pointy objects into the grilles.

⊖ It is forbidden to perform any technical interventions or cleaning operations before having disconnected the device from its electrical power supply, by setting the system's main switch and the device's main switch to their "OFF" positions.

⊖ It is forbidden to modify the safety or adjustment devices without the manufacturer's authorization.

⊖ It is forbidden to pull, detach, or twist the electrical cables protruding from the device, even if it is disconnected from its electrical power supply.

⊖ It is forbidden to disperse the packaging materials into the environment or to leave them within the reach of children, as they could pose a potential hazard. These must be disposed of in accordance with the current legislation.

⊖ Children cannot perform any maintenance and/or cleaning on the device without adult supervision.

⊖ This device is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge.

⊖ Make sure that children do not play or come into contact with the device.

1.3 Description of the device

The **RIELLO NexPolar** device is a heat pump designed to produce cold water for cooling purposes, hot water for heating purposes, and hot water for domestic use. Designed to be installed outdoor, the device meets the needs of residential and commercial buildings.
The use of high quality parts and components guarantees the unit's overall quality and reliability: these include a high-yield and anti-corrosion plate heat exchanger, an electronic expansion valve that electronically optimizes the flow of refrigerant gas within the circuit, a vibration-free DC fan motor that improves performance and sound comfort, and a PAM and PWM modulation DC-Inverter control that provides the Twin-Rotary compressor with continuous modulation from 30% to 120%, thus ensuring high standards in terms of energy savings. The heat pump comes complete with a hydronic module consisting of: a fixed speed circulation pump, a flow switch, a mesh filter, a safety valve, anti-freeze electric heating elements, and a discharge valve. The simple and intuitive control panel allows for the management of the device and its main accessories.

1.4 Safety and adjustment devices

The boiler's safety and adjustment functions are managed:

- on the cooling circuit, with a
  - — high pressure-switch, which is triggered in the event of excessive pressure (41.5 bar), and is automatically re-engaged once the pressure drops below 32 bar
  - — by a low pressure transducer, which is triggered in the event of excessively low refrigerant gas pressure
  - — a safety valve, which is triggered in the event of excessive pressure (37 bar) in the refrigerant gas circuit
  - — a safety valve, which is triggered in the event of excessive pressure (45 bar) in the refrigerant gas circuit
- on the water circuit with
  - — probes for detecting the water's delivery and return temperatures, which intervene on the compressor's operation
  - — a minimum water temperature safety device, with an automatic reset function, which is triggered when the water delivery probe detects a temperature below 4 °C
  - — an freeze protection device (which is triggered using the various water probes, and activates the circulation pump and the electric heating elements in order to prevent ice from forming while the unit is not in function)
  - — a safety valve, which is triggered in the event of excessive pressure (3 bar) in the water circuit
  - — a flow switch, which is triggered in the event that the flow of water is absent
- The installer must equip the system with the following:
  - — an appropriately sized expansion tank
  - — an appropriately sized technical water accumulation tank
  - — a by-pass valve between the device's delivery and return lines, in order to prevent freezing during the wintertime
  - — air vents at the system's highest points

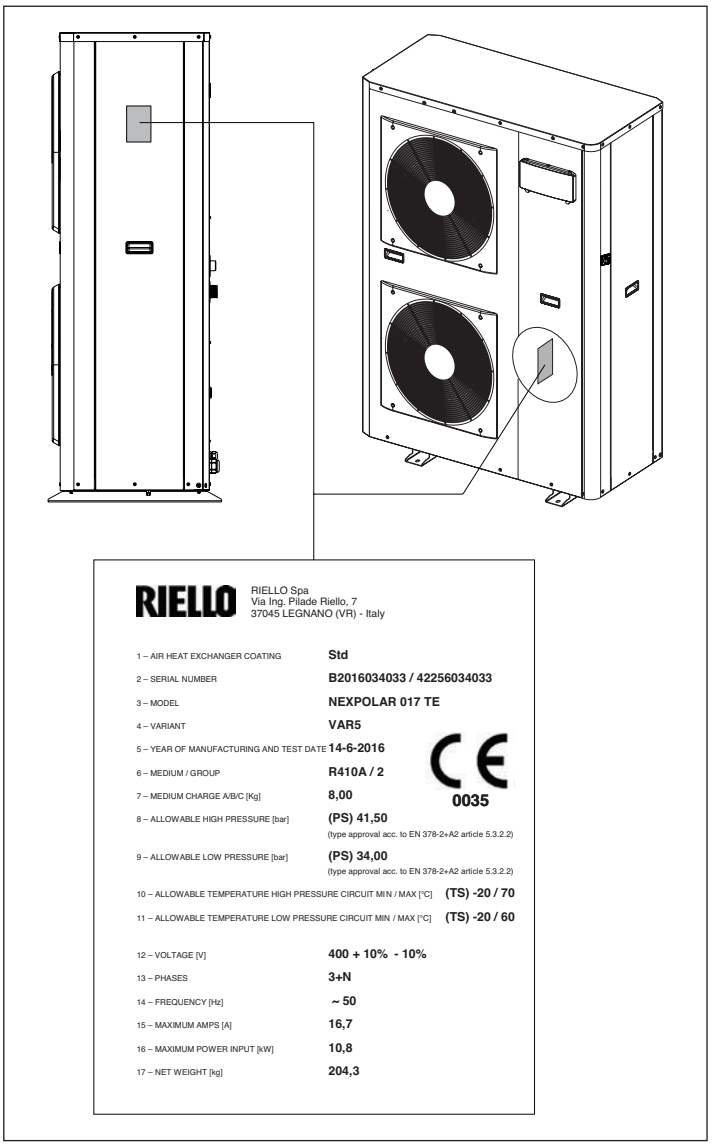
For more information, please refer to the "Connection diagram" chapter on page *p. 19*

⚠ The safety devices must only be replaced by the **RIELLO** Technical Support Service, using original components. Please refer to the spare parts catalogue.

⛔ IT IS FORBIDDEN to operate the device with the safety devices malfunctioning.

1.5 Identification

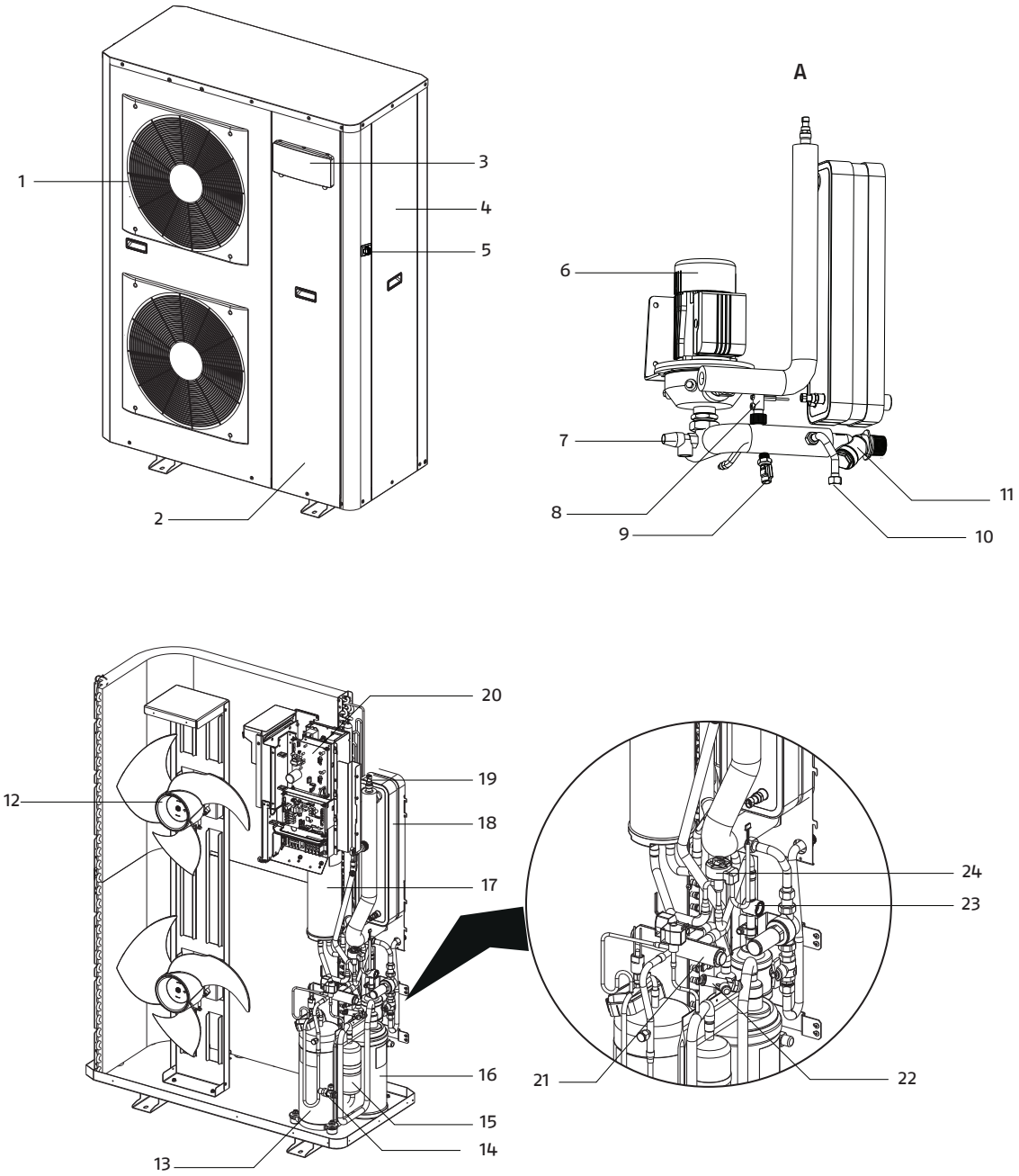
The device can be identified by the following:



Technical data plate
Contains the device's technical and performance data.

⚠ The tampering, removal, or absence of the identification plates will not allow the product to be properly identified by its serial number.

1.6 System layout



A Hydronic module
1 Fan protection grille
2 Front service panel
3 Control panel
4 Lateral service panel
5 Main disconnecting switch
6 Fixed speed circulation pump
7 Safety valve
8 Flow Switch
9 Discharge valve
10 System filling
11 Mesh filter
12 Electric fan
13 Compressor
14 Refrigerant safety valve
15 Suction receiver
16 Suction separator
17 Fluid receiver
18 Brazed plate heat exchanger
19 Air vent valve
20 Electrical panel
21 Cycle reversal valve
22 Refrigerant safety valve
23 Fluid passage indicator
24 Electronic expansion valve

1.7 Technical specifications

Model	017 TE	022 TE	
Cooling performance [A35 / W7] (1)			
Rated Capacity	14,90	18,60	kW
EER	3,00	3,10	kW/kW
Cooling performance [A35 / W18] (2)			
Rated Capacity	20,20	25,80	kW
EER	3,80		kW/kW
ESEER	4,01	3,85	kW/kW
Eurovent Class	A		
Heating performance [A7 / W55] (3)			
Rated Capacity	15,20	21,10	kW
COP	2,70	2,50	kW/kW
SCOP	3,10	2,90	kW/kW
Efficiency (ns)	121	113	%
Prated	9,50	15,43	kW
Annual energy consumption	6269	10980	kWh/annum
Seasonal energy class	A+		
Heating performance [A7 / W45] (4)			
Rated Capacity	16,90	20,00	kW
COP	3,30		kW/kW
Heating performance [A7 / W35] (5)			
Rated Capacity	17,10	21,10	kW
COP	4,10		kW/kW
Electrical characteristics			
Electrical power supply	400/3/50+N+PE		V/Ph/Hz+N
Permitted voltage	360 - 440		V
Maximum total power consumption	10,80	12,40	kW
Maximum total current consumption	16,70	19,20	A
Cos Phi at maximum power consumption	0,93		
Compressor			
Compressor	Twin Rotary		Type
Minimum capacity control	33	41	%
Refrigerant	R410A		Type
Refrigerant load	8,00		kg
Adjustment	Modulating Inverter		Type
Fan			
Fan	Axial		Type
Rated air flow	7200	8640	m³/h
Quantity	2		n.
System side heat exchanger			
System side heat exchanger	Plate type		Type
Water contents	1,5	1,9	l
Sound levels			
Sound power level (6)	71	74	dB(A)
Sound pressure (7)	40	43	dB(A)
Circulation pump (8)			
Type	Centrifuge		
Nominal residual head	3		bar
Nominal power consumption	0,55		kW
Maximum power consumption	0,82		kW
Nominal current consumption	1,58		A
Maximum height above sea level (9)	< 1000		m

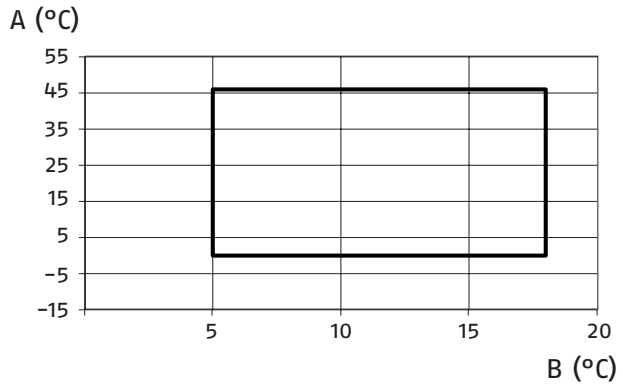
(1) External air: 35 °C, Utility water in/out: 12 / 7 °C (EN 14511:2013)
(2) External air: 35 °C, Utility water in/out: 23 / 18 °C (EN 14511:2013)
(3) External air: 7 °C, Utility water in/out: 47 / 55 °C (EN 14511:2013)
(4) External air: 7 °C, Utility water in/out: 40 / 45 °C (EN 14511:2013)
(5) External air: 7 °C, Utility water in/out: 30 / 35 °C (EN 14511:2013)
(6) Sound power in dB ref = 10 W, weighting (A). Noise emission values declared in accordance with ISO 4871 (with an associated uncertainty of +/-3 dB(A). Measurements in accordance with ISO 9614-1.
(7) Sound pressure at 10 m in dB ref=20 | jPa, weighting (A). Noise emission values declared in accordance with ISO 4871 (with an associated uncertainty of +/-3 dB(A)
(8) The circulation pump's power consumption data must be combined with those of the base unit.
(9) Beyond 1000 metres and for a interval of 500 metres, there is a 3% performance loss.

1.8 Yield levels based on the climatic zone

Model	017 TE	022 TE	
Temperate zone – Average temperature [47 / 55 °C]			
Seasonal energy efficiency (ns)	118	111	%
SCOP	3,03	2,85	kW/kW
Pdesignh	9,11	15,07	kW
Annual energy consumption	6189	10869	kWh/annum
Energy class	A+		
Sound power level	71	74	dB(A)
Hot zone – Low temperature [30 / 35 °C]			
Seasonal energy efficiency (ns)	225	192	%
SCOP	5,71	4,87	kW/kW
Pdesignh	14,67	21,06	kW
Annual energy consumption	3425	5764	kWh/annum
Temperate zone – Low temperature [30 / 35 °C]			
Seasonal energy efficiency (ns)	144	139	%
Sound power level	71	74	dB(A)
SCOP	3,68	3,56	kW/kW
Pdesignh	9,25	16,64	kW
Annual energy consumption	5169	9625	kWh/annum
Energy class	A+		
Hot zone – Average temperature [47 / 55 °C]			
Seasonal energy efficiency (ns)	149	143	%
SCOP	3,80	3,65	kW/kW
Pdesignh	12,50	16,37	kW
Annual energy consumption	4383	5983	kWh/annum
Cold zone – Average temperature [47 / 55 °C]			
Seasonal energy efficiency (ns)	108	92	%
SCOP	2,78	2,37	kW/kW
Pdesignh	16,41	22,77	kW
Annual energy consumption	13894	22602	kWh/annum
Cold zone – Low temperature [30 / 35 °C]			
Seasonal energy efficiency (ns)	121	117	%
SCOP	3,09	3,01	kW/kW
Pdesignh	13,65	24,47	kW
Annual energy consumption	10390	19152	kWh/annum

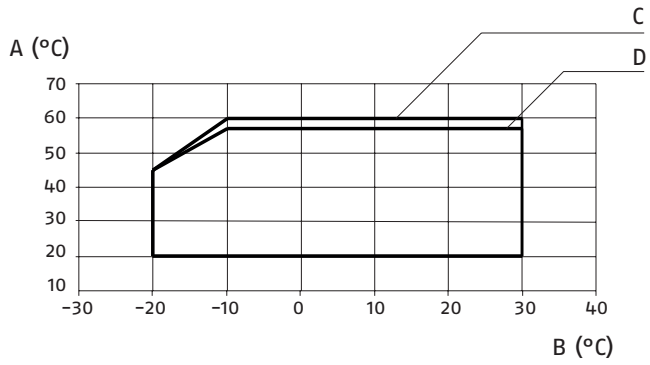
1.9 Operation Limits

COOLING



A External air temperature
B Water delivery temperature

HEATING



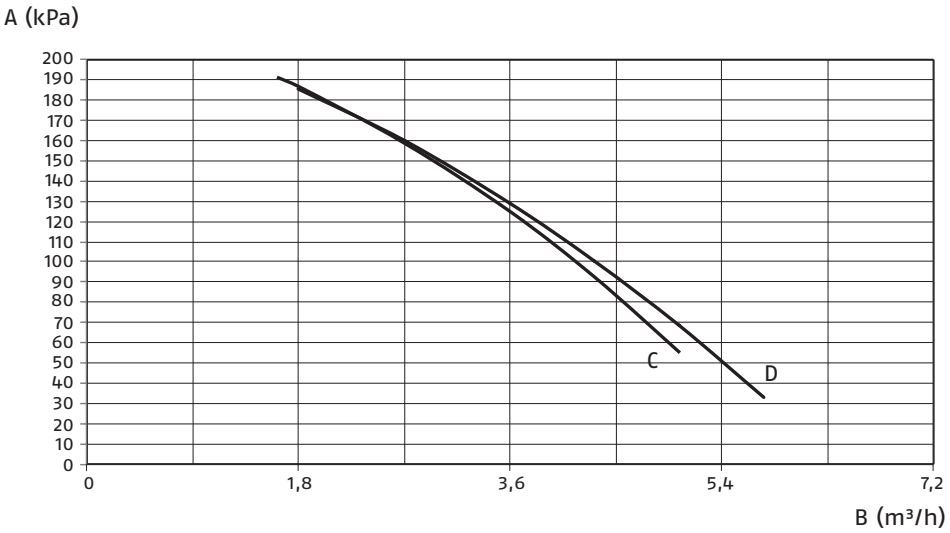
A Water delivery temperature
B External air temperature
C Model 017
D Model 021

1.10 Residual head

The **NexPolar** unit is equipped with a circulation pump.

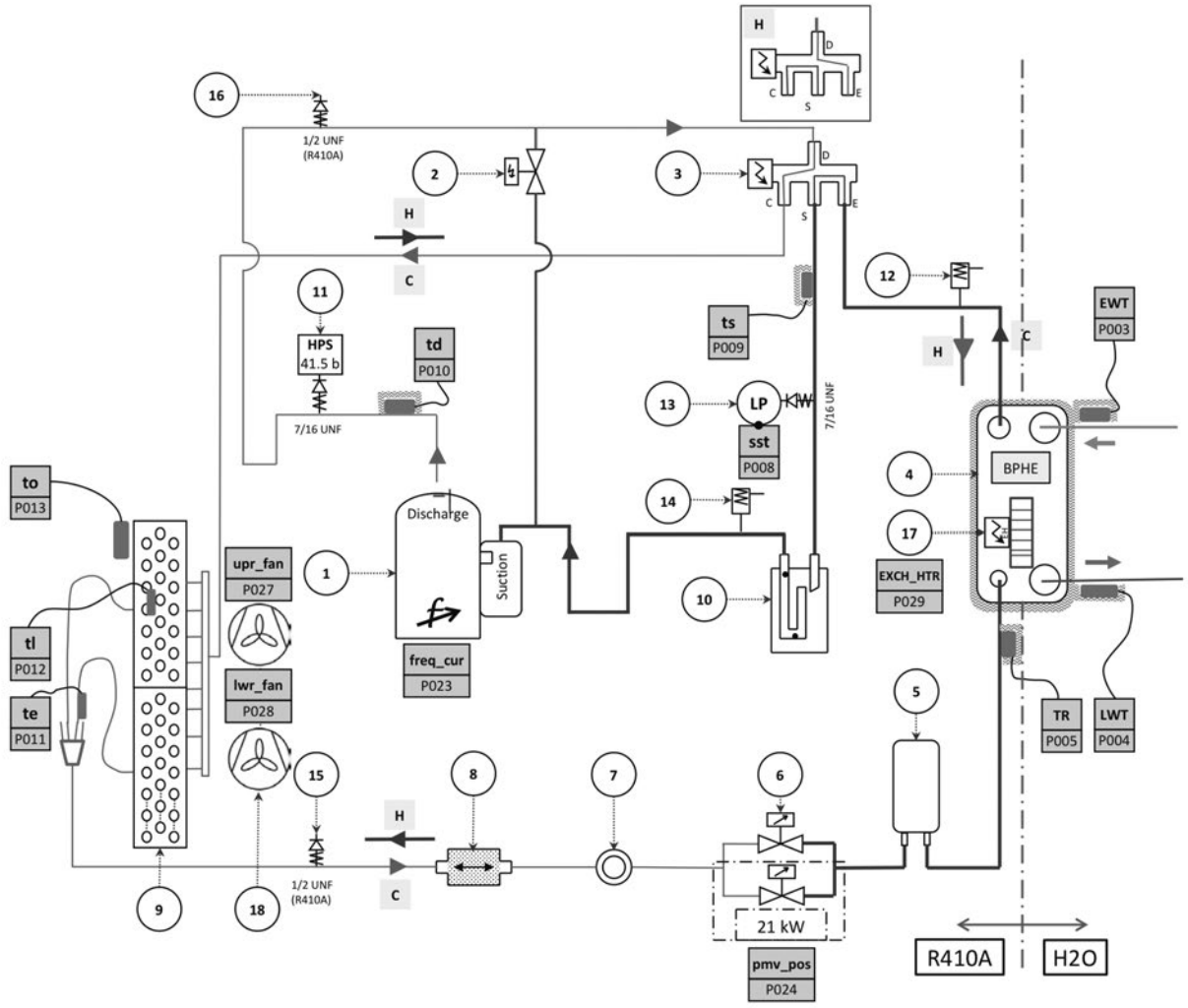
For the system's proper sizing, the residual head must be taken into account, as shown in the following graph.

A Residual static head
B Water flow rate
C Model 017
D Model 021



1.11 Cooling circuit and probe positioning

The cooling circuit is of the heat pump type with a refrigerant gas reversal cycle. The source fluid utilized is the external air, while the utility fluid is water, with the possible inclusion of a antifreeze liquid.
During the wintertime, the heat pump extracts the thermal energy from the external air and delivers it to the utility fluid, thereby heating it. During the summertime the cycle is reversed, and the thermal energy is extracted from the water, which is cooled, and is delivered to the external air.
Based on the type of system, the utility fluid is delivered to the fan coils, the air treatment unit, the radiant panels for heating or cooling the rooms, or the boiler in order to produce domestic hot water.



1 Compressor
2 2-way solenoid valve
3 Cycle reversal valve
4 Brazed plate heat exchanger
5 Receiver
6 Electronic expansion valve
7 Flow indicator
8 Dehydration filter
9 Finned coil
10 Suction separator
11 High pressure-switch
12 Safety valve
13 Low pressure transducer
14 Safety valve
15 Service valve
16 Service valve
17 Electric freeze-protection electric heating element for heat switch
18 Electric fans

- **Probes**

to external air temperature
tl finned coil temperature upper
te finned coil temperature lower
td gas delivery temperature
ts suction temperature
sst suction saturation relay
TR refrigerant temperature
LWT water delivery temperature
EWT water return temperature

2 INSTALLATION

2.1 Upon receiving the product

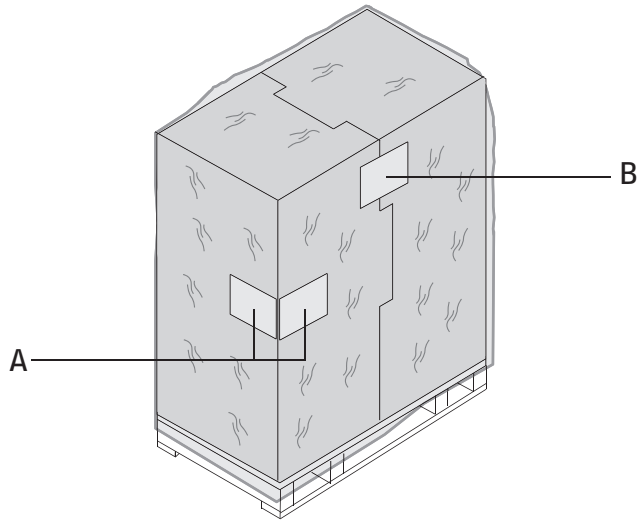
The **RIELLO NexPolar** unit comes in a single package positioned on a wooden pallet, and is protected by 2 cardboard covers, a polystyrene panel on the unit cover, and a polyethylene film.
The following materials can be found inside the compressor compartment: The document envelope, containing:

- The user instruction booklet in Italian
- The user instruction booklet in English
- The instruction booklet for the installer and the Technical Support Service in Italian
- The instruction booklet for the installer and the Technical Support Service in English
- The warranty/spare parts labels
- The wiring diagram
- The dimensional drawing
- The graphite ring to ensure EMC standards (see chapter "Electrical Connection", *p. 24*)

⚠ The instruction booklet is an integral part of the device, and should therefore be carefully read and stored in a safe location.

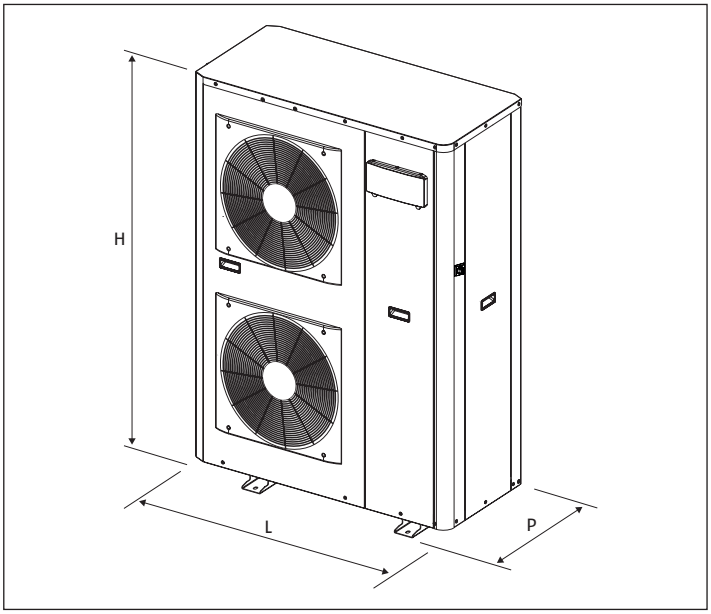
⚠ The document envelope must be stored in a safe location. Additional copies can be requested from Riello S.p.A., which reserves the right to charge the customer for the relative costs.

2.2 Label positioning



A Packaging label
B Shipping label

2.3 Dimensions and weight

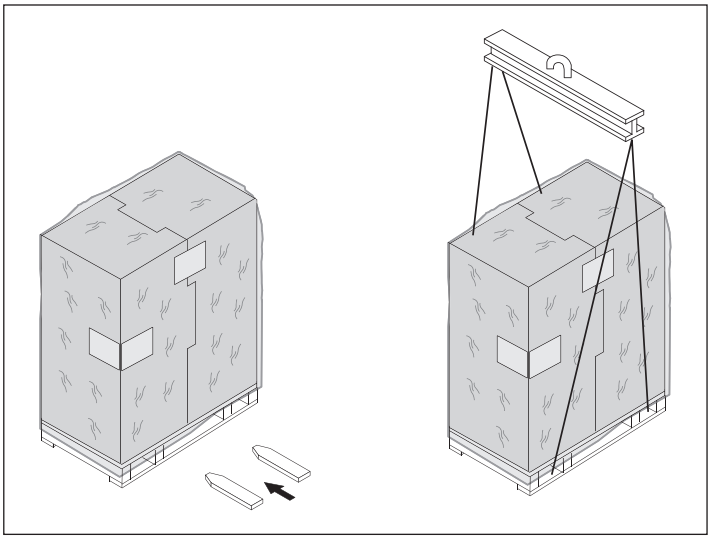


Model	017 TE	022 TE	
Product dimensions			
H	1579	1579	mm
L	1141	1141	mm
P	584	584	mm
Weight	189,0	208,0	kg

2.4 Handling and unpacking

⚠ Always put on appropriate personal protective equipment before handling and unpacking the device, and be sure to use tools and equipment that are suitable for the device's weight and dimensions.

- The product can be handled using two methods:
  - using a hoist or crane
  - using a forklift or a pallet jack that is suitable for its weigh



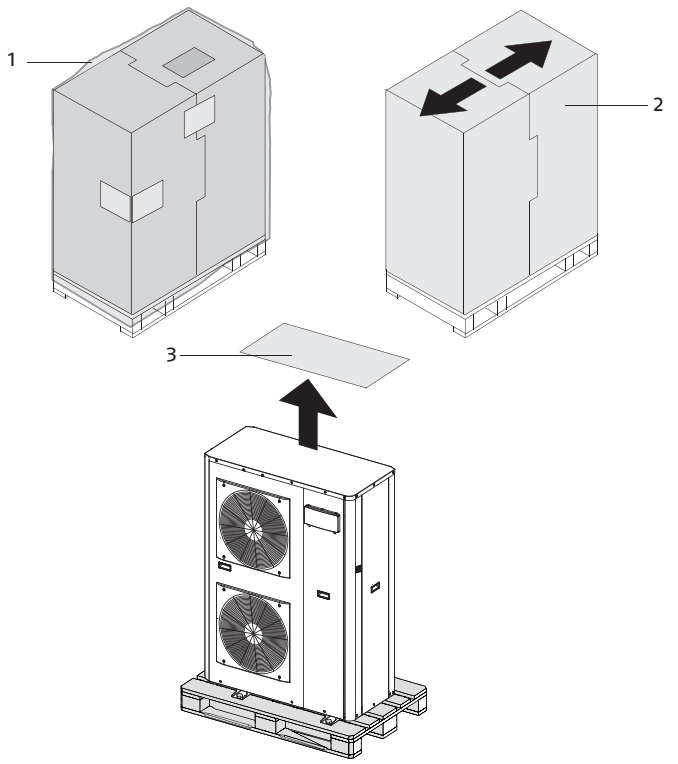
It should be noted that, even if the user decides to use a forklift or pallet jack, a hoist or crane will nevertheless be required in order to remove the **RIELLO NexPolar** unit from the pallet and position it in the foreseen place of installation.

⚠ The device must always be handled and moved in an upright position.

⚠ Use a lifting bar in order to prevent the pressure exerted by the straps from damaging the unit.

⚠ Do not tilt the device by more than 15°.

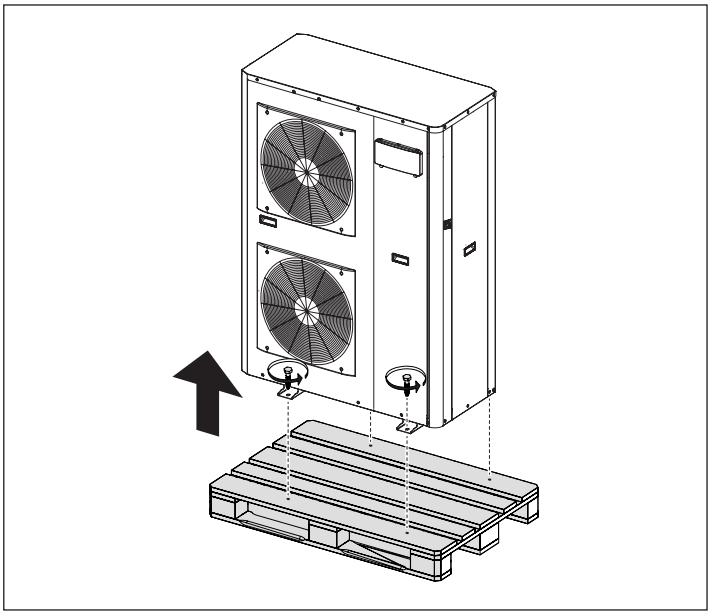
⚠ The device is heavier on the compressor side (where the electrical connections are present).



1 Polyethylene film
2 Cardboard covers
3 Polystyrene panel

- The handling and unpacking operations are described below:
  — transport the device to the installation zone using tools that are suitable for its weight
  — remove the polyethylene film
  — remove the document envelope
  — removed the cardboard covers
  — remove the polystyrene protection element on the cover of the unit

⛔ It is forbidden to disperse the packaging materials into the environment or to leave them within the reach of children, as they could pose a potential hazard. These must be disposed of in accordance with the current legislation.



The device is secured to the pallet by 4 screws (two at the front, and two at the back), which must be removed.

2.5 Place of installation

The location of the **RIELLO NexPolar** devices must be determined by the system's designer or by another competent person, and must take into account the technical requirements, as well as any current local regulations that require specific permits to be obtained (e.g.: zoning, architectural, environmental protection, etc.).
It is therefore recommended to obtain all the necessary permits before installing the device.
The **RIELLO NexPolar** unit is designed for outdoor installation.

It is recommended to avoid

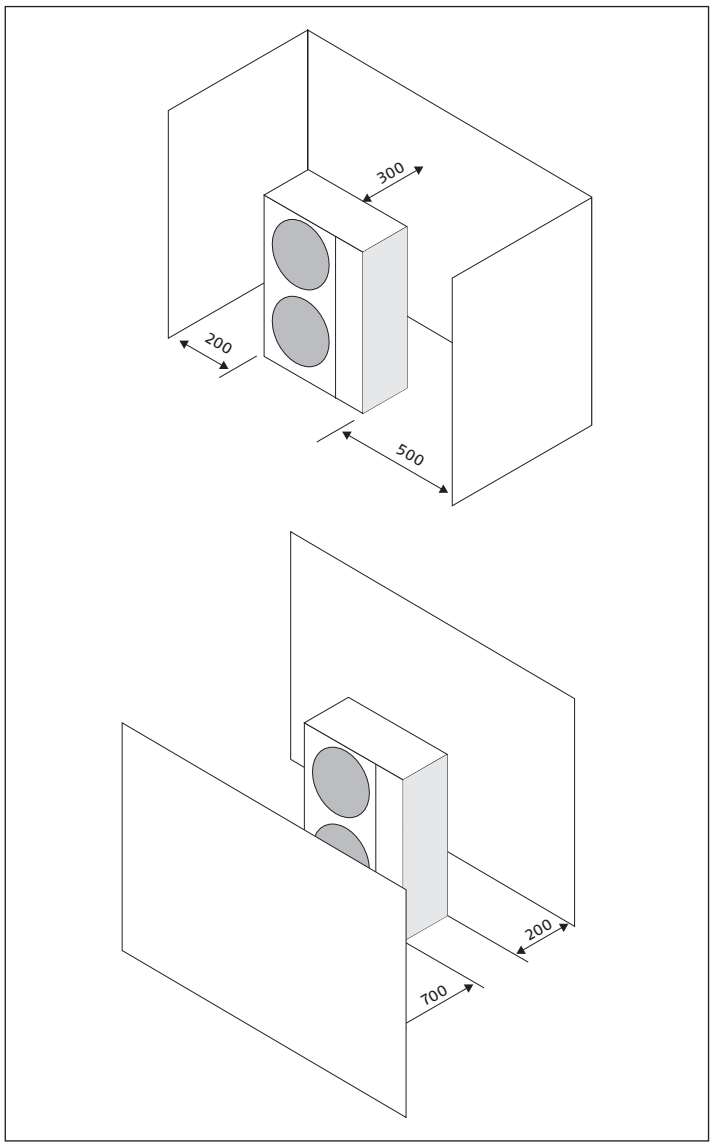
— Positioning the unit in air shafts and/or basement window wells.
— Any obstacles or barriers that will cause the expelled air to recirculate.
— Locations in which aggressive atmospheres are present.
— Confined locations in which the device's sound levels might be compounded by reverberations or resonances.
— Positioning in corners where dust, leaves, or any other materials typically accumulate, which could compromise the device's efficiency by obstructing the airflow.
— Situations in which the air expelled from the device might enter the habitation through doors or windows, thus creating an inconvenience for the people inside.
— Situations in which the air expelled from the device will encounter resistance from opposing winds.
— Direct exposure to sunlight and proximity to heat sources

⚠ If the device is to be positioned in a windy location, the fan must be protected by a wind-proof screen, and the unit's proper operation must be verified.

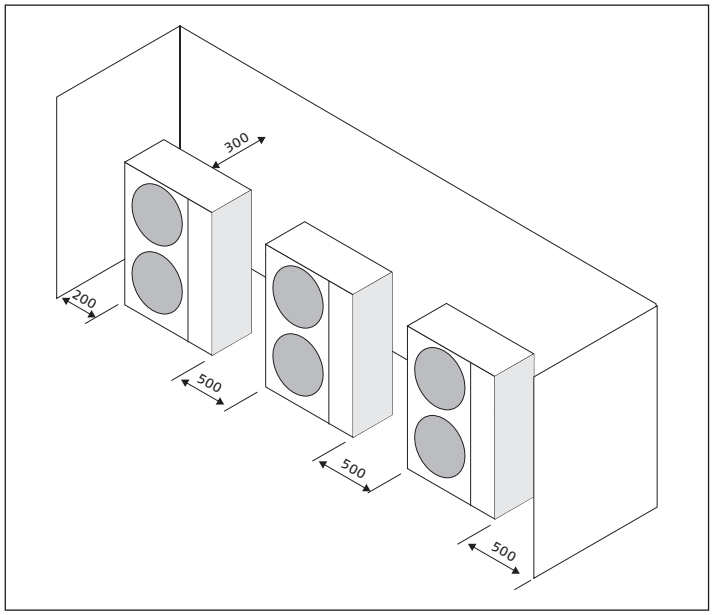
2.6 Recommended compliant zones

The compliant zones for the device's installation and maintenance are shown in the figure. The indicated spaces are necessary in order to prevent the airflow from being blocked, as well as to allow normal cleaning and maintenance operations to be carried out.

Single installations



Multiple installations



2.7 Positioning

The **RIELLO NexPolar** devices must:

— be positioned on a level surface that's capable of supporting their weight

— be positioned on a sufficiently rigid surface that will not transmit any vibrations to the underlying or adjacent rooms

It is recommended to place a rubber slab (hardness 60 shore, thickness 10 mm.) or properly sized anti-vibration supports between the device and its support surface.

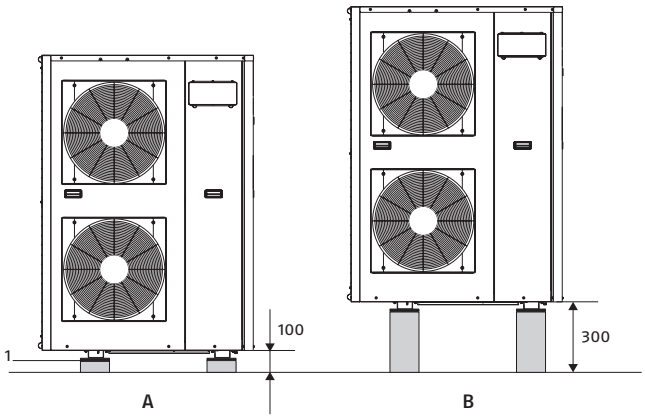
The unit should be raised off the ground, as follows:

— 100 mm for installations in ordinary zones.

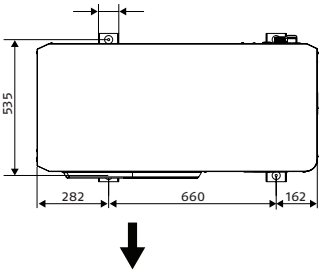
— 300 mm for installations in zones that are extremely cold or subject to heavy snowfall

⚠ Adequate antifreeze systems should be used for installations in zones that are extremely cold or subject to heavy snowfall, where the possibility of freezing is present.

⚠ While operating in heating mode, the unit generates condensation, which will be deposited on the support surface. This could freeze if the outdoor temperatures are below zero, thus creating a hazard. In this case, appropriate barriers should be installed in order to prevent people from approaching the unit.



A Positioning in ordinary areas
B Positioning in very cold areas or with heavy snowfalls
1 Rubber slab



2.8 Installation on old systems or systems in need of upgrading

When the **RIELLO NexPolar** unit is installed on old systems or systems in need of upgrading, it is recommended to ensure that:

— the electrical system is compliant with the applicable regulations and has been installed by qualified professionals

— the expansion tank ensures the complete absorption of the expansion fluid contained within the system

— the system has been washed, cleaned of any sludge or limescale deposits, and deaerated, and that all the seals have been checked
— an adequate treatment system has been installed if the supply/reintegration water has particular characteristics (see the chapter titled "Water quality requirements" on page *p. 20*)

⚠ In the event of a replacement, the system must be inspected by the designer or by another competent person, and must be compliant with the technical requirements, as well as the current legislation and regulations.

⚠ The manufacturer shall bear no responsibility for any damages caused by incorrect system installation and/or the failure to properly clean the water system.

2.9 Source water systems

The heat pumps require systems that guarantee a constant flow of fluid to the device, within the minimum and maximum values, and with volumes that are sufficient for preventing any imbalances in the cooling circuits and are capable of ensuring the necessary comfort levels.

⛔ The device MAY NOT be installed on open tank systems.

2.9.1 System water content

In order to ensure the device's proper operation, a minimum volume of water must be guaranteed within the system's primary circuit.

⚠ This minimum volume is necessary in order to prevent the formation of ice during defrosting operations, or the continuous modulation of the compressor's frequency.

It also provides for the following advantages:
— decreased wear to the device
— increased system yield
— improved temperature stability and precision

- The minimum volume is calculated based on the following formula:
- **Vmin = Cnom x N**

Vmin Minimum system volume in litres
Cnom Nominal capacity in cooling mode under the conditions foreseen for the system, in kW N
N Multiplication factor

Application	N
Cooling	3,5
Heating or domestic hot water	6

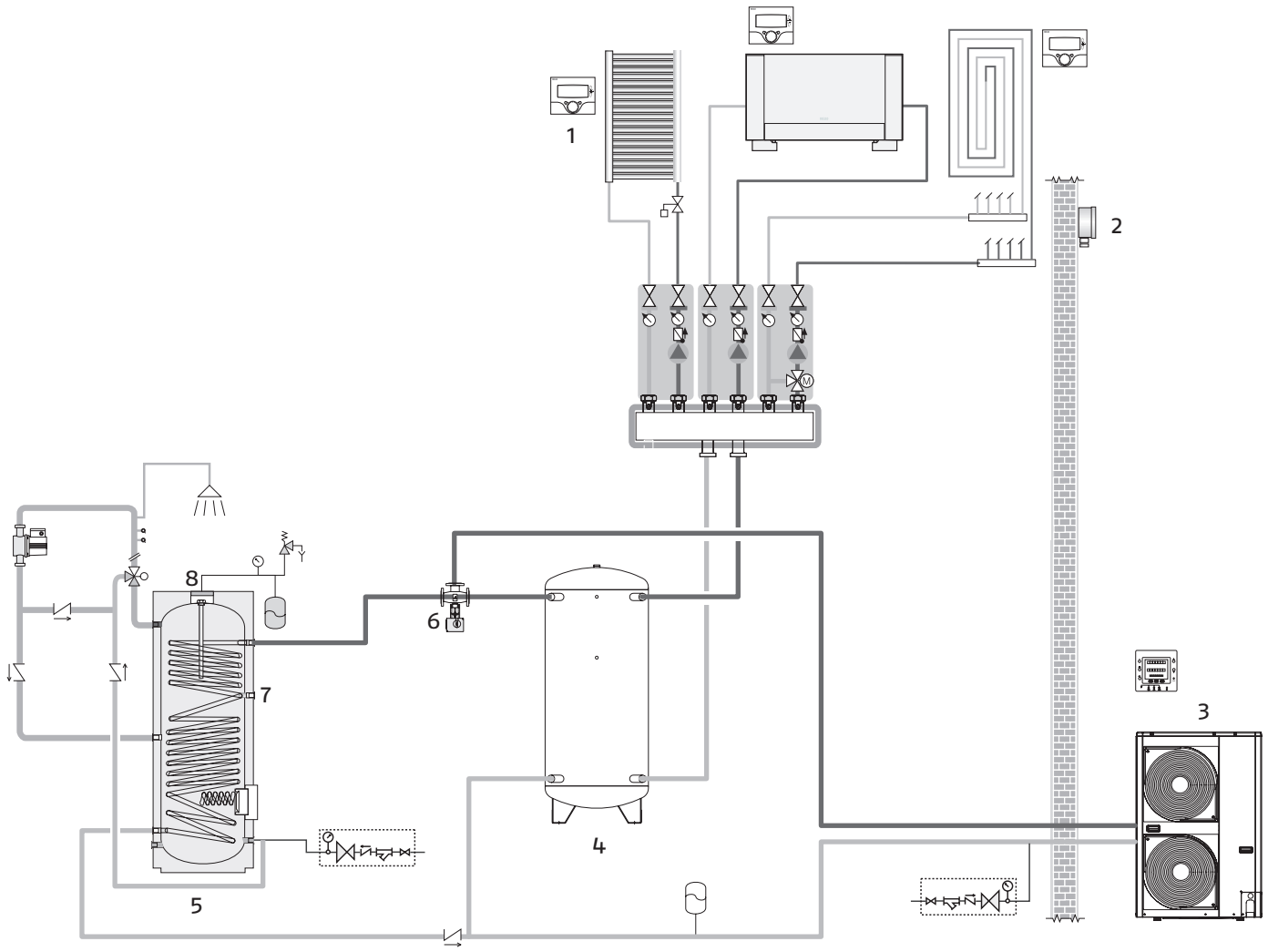
If the minimum volume is not reached, a properly sized accumulation tank must be installed.

2.9.2 Water flow rate

The water flow rate must be maintained constant while the device is in operation, and must respect the limit values indicated in the following table:

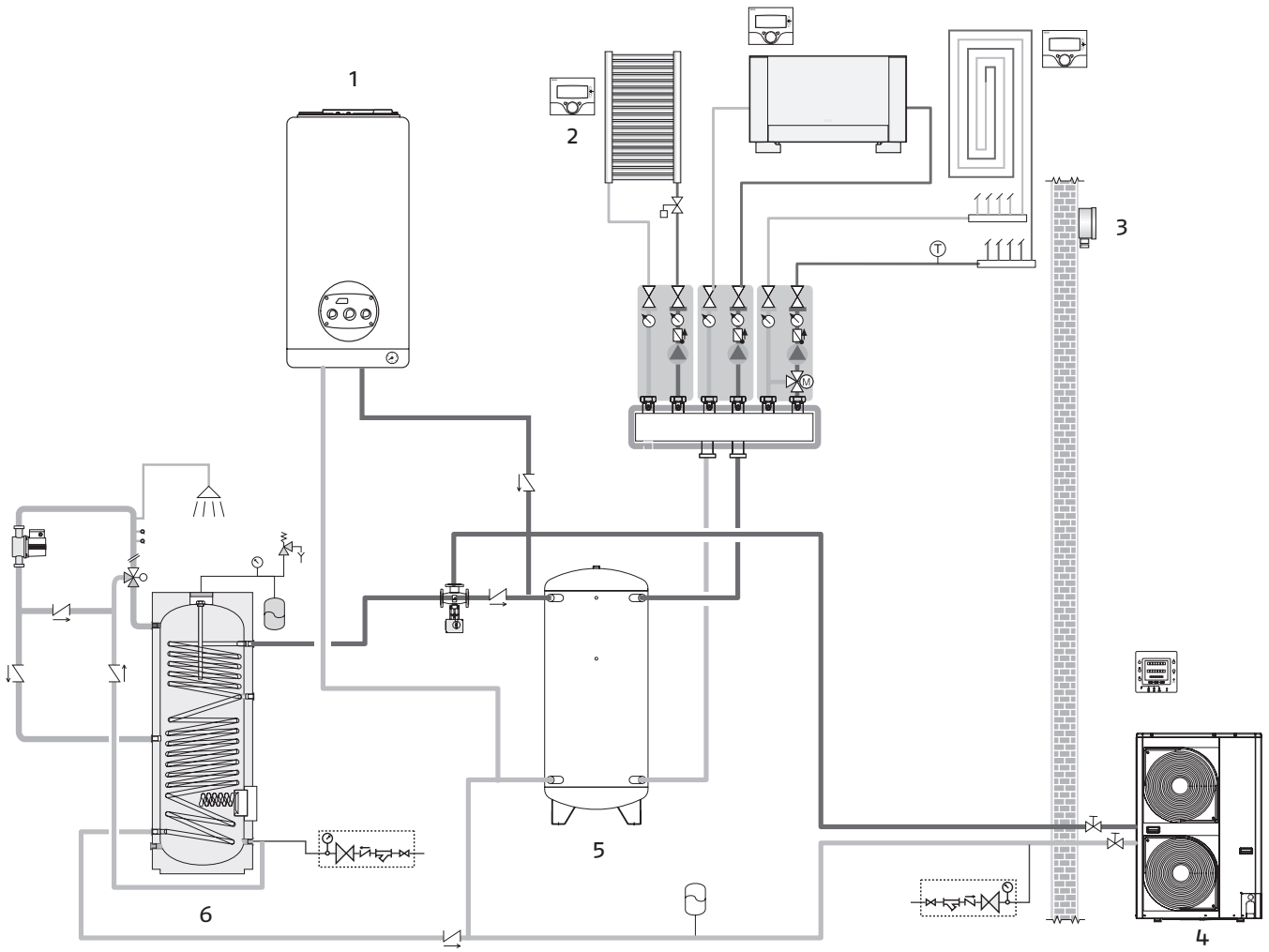
Model	017 TE	022 TE	
Plumbing characteristics			
Minimum water flow rate	1,6	2,0	m³/h
Maximum water flow rate	5,0	5,8	m³/h

System diagram for heat pump and DHW production



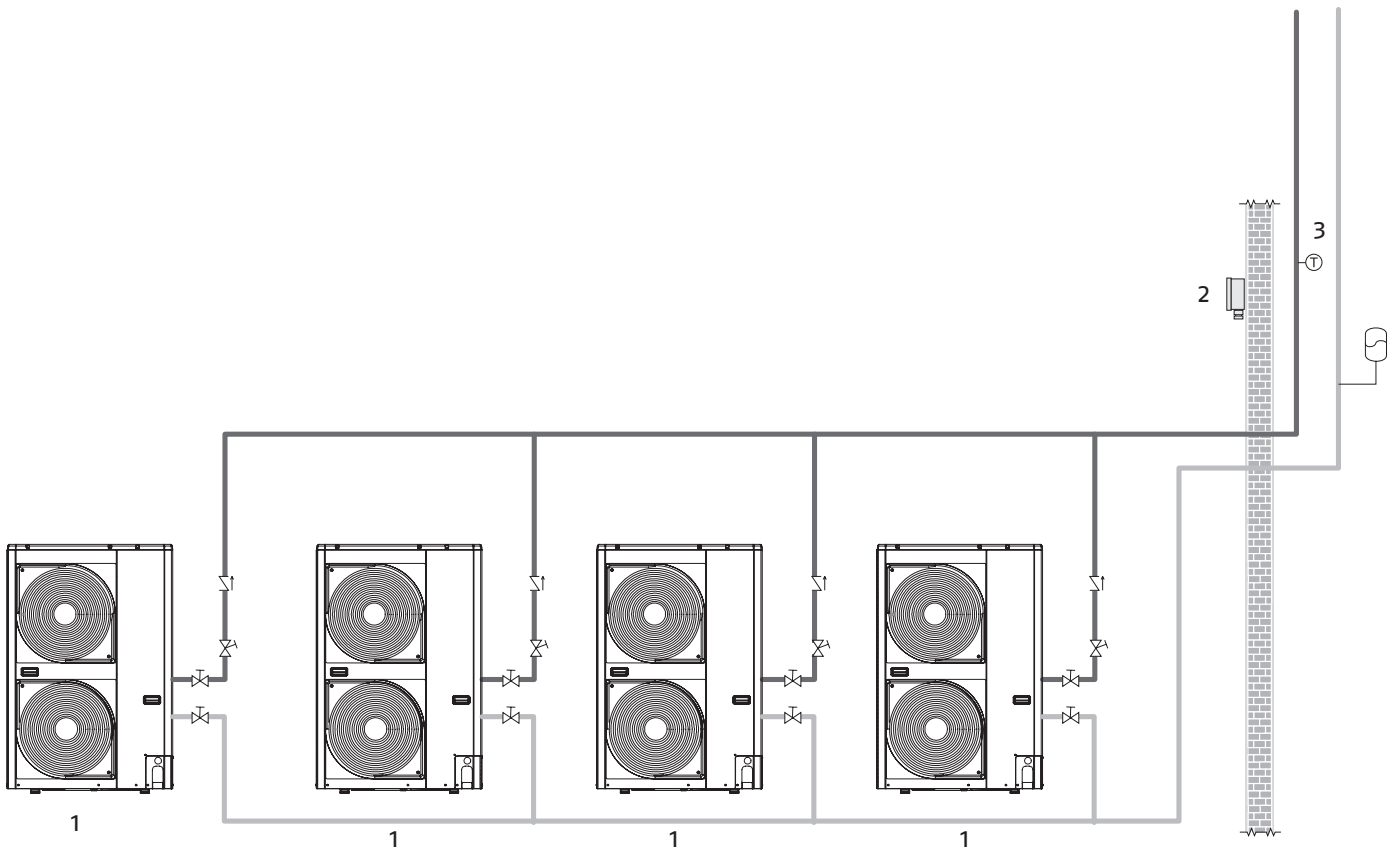
1 Remote Panel or room thermostat
2 External probe (accessory)
3 NexPolar
4 Riello ACI type puffer
5 Riello 7200 HP type domestic hot water boiler
6 3-way DHW valve
7 DHW integration resistor
8 DHW probe

System diagram for heat pump, DHW production and integrated boiler



1 Boiler
2 Remote Panel or room thermostat
3 External probe (accessory)
4 NexPolar
5 Riello ACI type puffer
6 Riello 7200 HP type domestic hot water boiler
7 3-way DHW valve
8 DHW integration resistor
9 DHW probe
10 Additional pump

System diagram for cascade heat pump

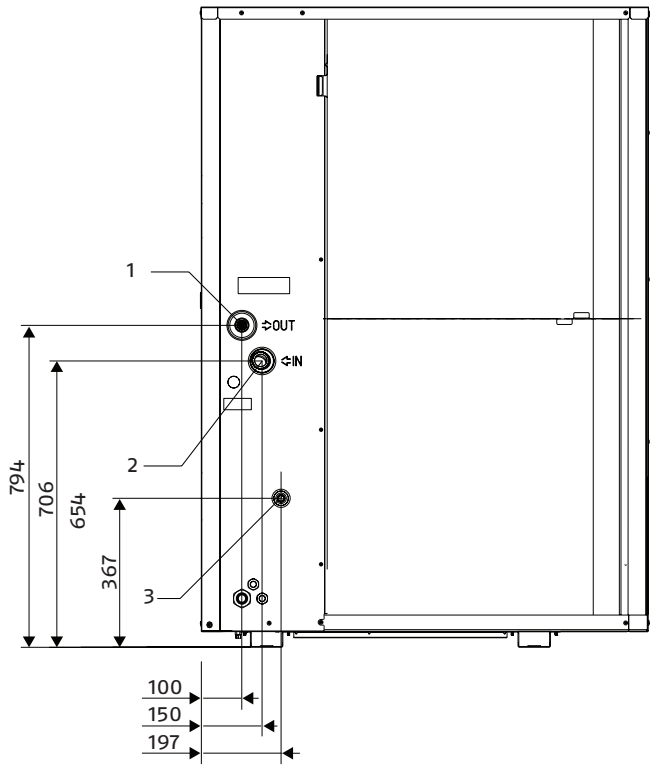


1 NexPolar
2 External probe (accessory)
3 Temperature probe for cascade connection (accessory

⚠ Only units of the same model can be connected in cascade configuration.

2.10 Water connections

The dimensions and positions of the **RIELLO NexPolar** unit's water connections are shown in the following table.
Prior to installation, it is recommended to thoroughly wash all the system's pipes in order to eliminate any processing residues.



1 System delivery
2 System return
3 Safety valve drain

Model	017 TE	022 TE	
Connections			
System return	1-1/4	1-1/4	Inches
System delivery	1	1	Inches
Discharge	1/2	1/2	Inches

⚠ The selection and installation of the system's components are the responsibility of the system's Installer, and must be carried out in accordance with the standards of good practice, as well as the current Legislation.

⚠ The safety valves' discharge must be connected to an adequate collection and evacuation system. The device's manufacturer is not responsible for any flooding caused by the safety valves' intervention.

⚠ It is recommended to install a by-pass line in order to allow the pipes to be washed without having to disconnect the device.

⚠ The connection pipes must be of an adequate diameter, and must be supported in such a way that their weight will not be borne by the device.

⚠ Systems filled with antifreeze or other particular substances required by law require the use of water backflow preventers.

⚠ For the calculation of the required glycol percentage, refer to the table in chapter "Shutdown for extended periods", *p. 41*.

⚠ Check the load losses of the device, the system, and of any other accessories mounted on the line.

⚠ Do not use the heat pump to treat industrial process water, swimming pool water, or domestic water. In each of these cases, an intermediate heat exchanger must be installed. In this case, be sure to respect the minimum water contents by incorporating an accumulation tank if necessary.

⚠ If the device is to be connected in parallel to a boiler while it is in function, make sure that the temperature of the water circulating inside the heat pump does not exceed 60°C.

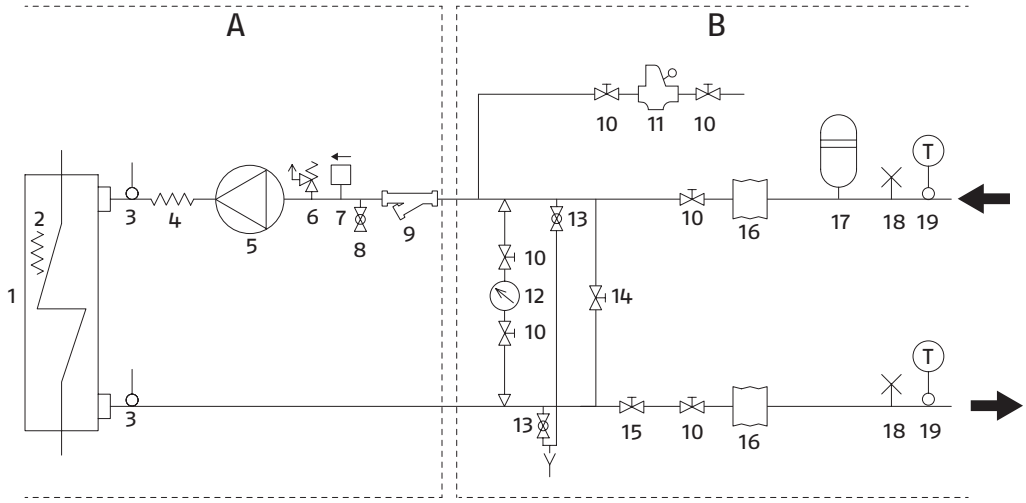
It is mandatory:

— To install a properly sized expansion tank.
— For models without water module, install an extractable mesh water filter at the device's intake in a zone that's accessible for maintenance, with characteristics of at least 10 mesh/inch , in order to protect the device against any impurities that may be present within the water.
— Following the system's installation and after each repair, the entire system must be thoroughly cleaned, paying particular attention to the status of the filter.
— Install air vent valves at the highest points of the pipes.
— Install flexible elastic joints to connect the pipes.
— In order to prevent the formation of ice during defrosting operations, or the continuous modulation of the compressor's frequency, make sure that the amount of water in the primary circuit is greater than the minimum volume indicated in the chapter titled "System water content" on *p. 14*.

⛔ It is forbidden to operate the unit without the water filter installed and properly cleaned.

2.10.1 Connection diagram

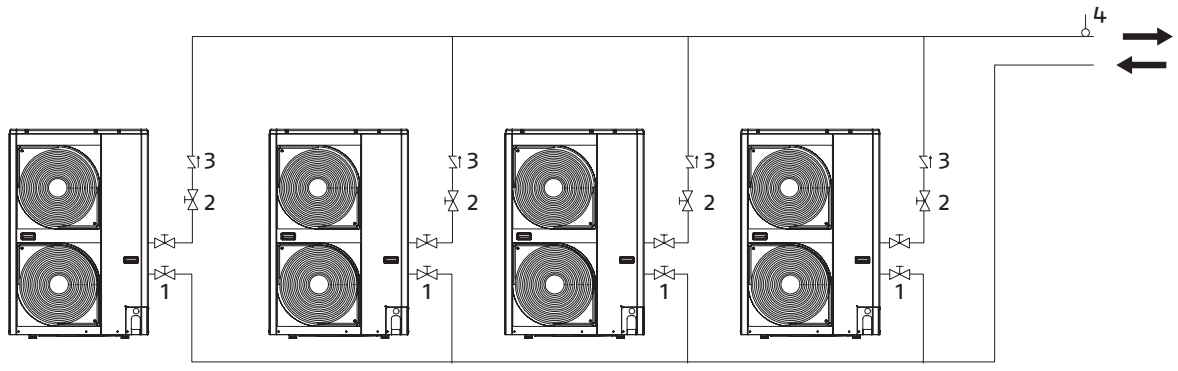
NexPolar



A Factory connections
B Connections to be made by the installer
1 Brazed plate heat exchanger
2 Heat exchanger electric heating element
3 Temperature probe
4 Pipe electric heating element
5 Circulation pump
6 Safety valve
7 Flow Switch
8 Discharge valve
9 Mesh filter
10 Shut-off valve
11 Filling unit
12 Pressure gauge
13 Discharge valve
14 By-pass valve for protection against
15 freezing
16 Balancing valve
17 Anti-vibration joints
18 Expansion tank
19 Air vent
20 Thermometer

The water connections must be completed by installing:
- expansion tank
- an appropriately sized technical water accumulation tank
- filling unit
- pressure gauges on the return and delivery lines
- air vent valves at the pipes' highest points
- flexible elastic joints
- shut-off valves
- shut-off valves for chemical washing
- a by-pass valve between the device's delivery and return lines, in order to prevent freezing during the wintertime

Cascade units

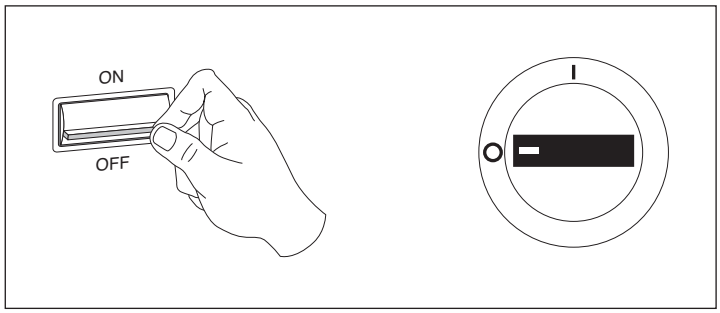


1 Shut-off valve
2 Balancing valve
3 Check valv2
4 Cascade probe

⚠ Only units of the same model can be connected in cascade configuration.

2.11 Filling and emptying the system

The **RIELLO NexPolar** heat pump unit requires a filling system.
Before filling or emptying the system, set the system's main switch and the device's main switch to their "0" (off) positions.



The system's cold filling pressure must be between 1.2 and 1.5 bar.

2.11.1 Water quality requirements

Water is used as a heat transfer fluid within the heating/cooling system.
The quality of the water utilized must be compliant with the requirements indicated in the UNI 8065 standard, otherwise an appropriate treatment system must be installed.

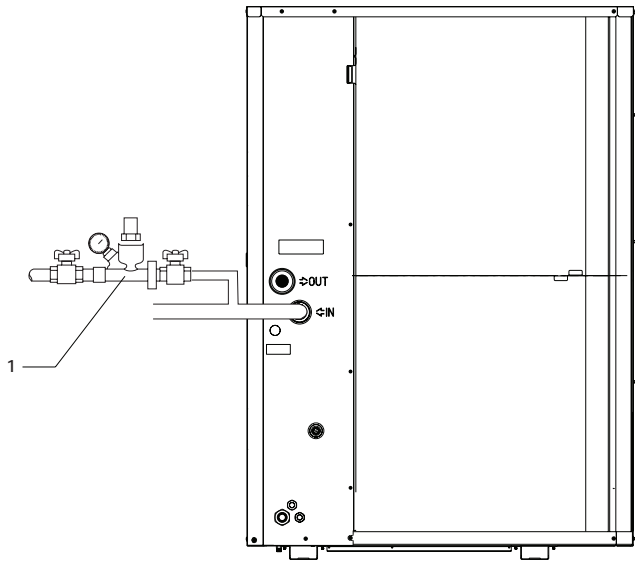
REFERENCE VALUES	
PH	6-8
Electrical conductivity	less than 200 mV/cm (25°C)
Chlorine ions	less than 50 ppm
Sulphuric acid ions	less than 50 ppm
Total iron	less than 0.3 ppm
M Alkalinity	less than 50 ppm
Total hardness	less than 25 °F
Sulphur ions	none
Ammonium ions	none
Silicon ions	less than 30 ppm

If the hardness of the initial water exceeds the value indicated in the table, a water softening system must be utilized.

⚠ Excessive water softening (total hardness <15 °F) could result corrosion phenomena wherever contact is made with metallic elements (pipes or boiler components). The conductivity value must also be kept within 200 |µS/cm.

⛔ It is forbidden to frequently or continuously top-up the heating system, as this could damage the boiler's heat exchanger.

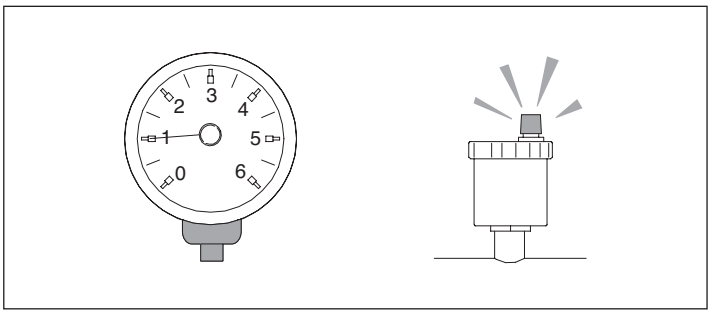
2.11.2 Filling the system



1 Filling unit

- Prior to initiating the filling operation, check that the discharge valve is closed
- check that the system's air vents are open
- open the water system's shut-off devices
- slowly fill the system
- close the system's air vents as soon as water starts to come out
- check that the system's cold filling pressure reaches a value of 1.2 to 1.5 bar
- allow the system to cool, and bring the water pressure back up to 1.2 - 1.5 bar if necessary

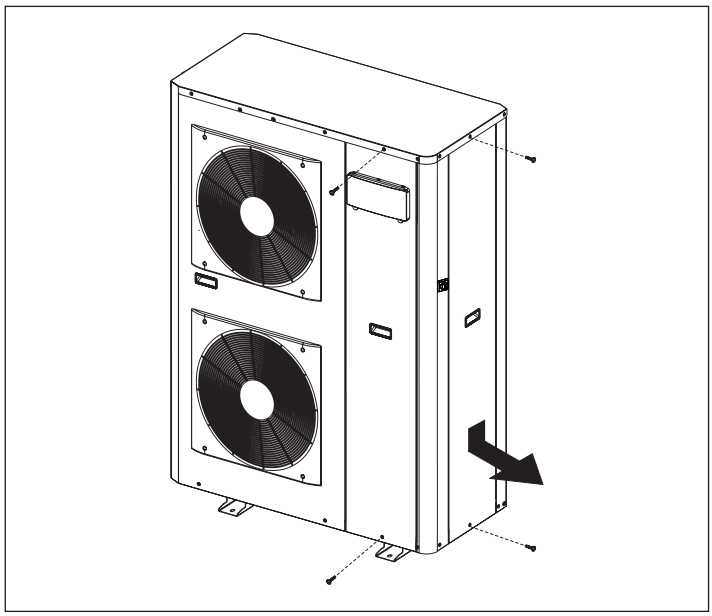
⚠ After few hours of operation and few turning on / off cycles, check the pressure and reintegrate it if lower than 1 bar. Reintegration must be carried out with machine off (pump off).



2.11.3 Emptying the device

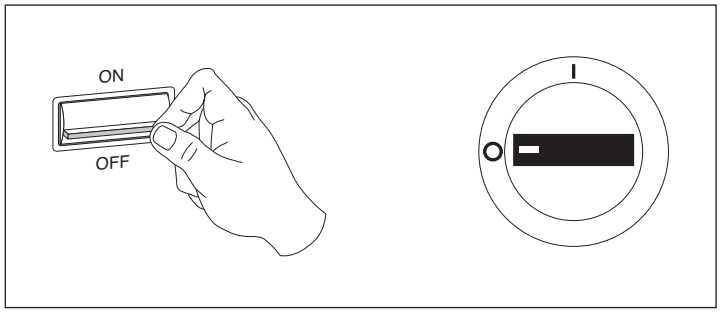
The **NexPolar** units are equipped with an internal discharge valve. In order to access the discharge valve, the side panel must be removed.

- unscrew the fastening screws
- slide the panel downward
- pull the panel towards you



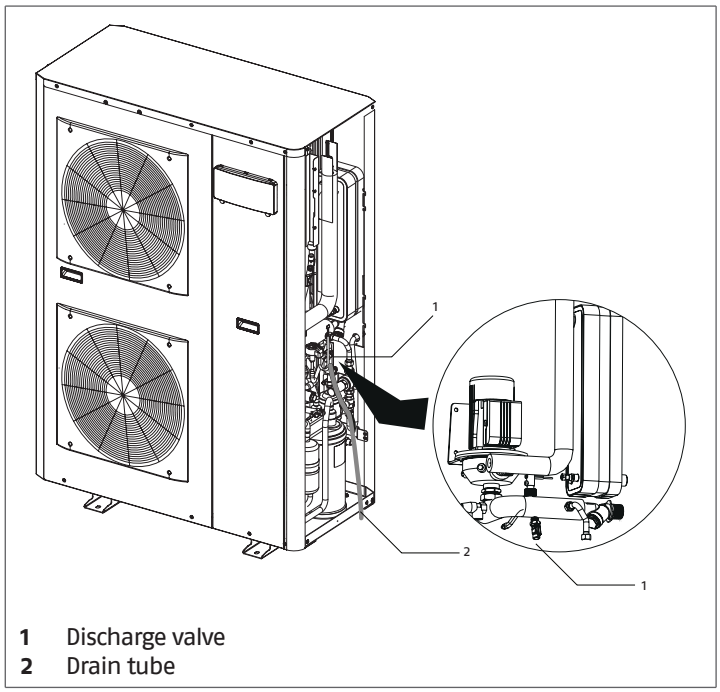
Before emptying the device:

— set the system's main switch to its "0FF" position, and the device's main switch to its "0" (off) position



— close the water system's shut-off devices

— connect a hose to the device's discharge, bring it to an appropriate collection well, and open the valve

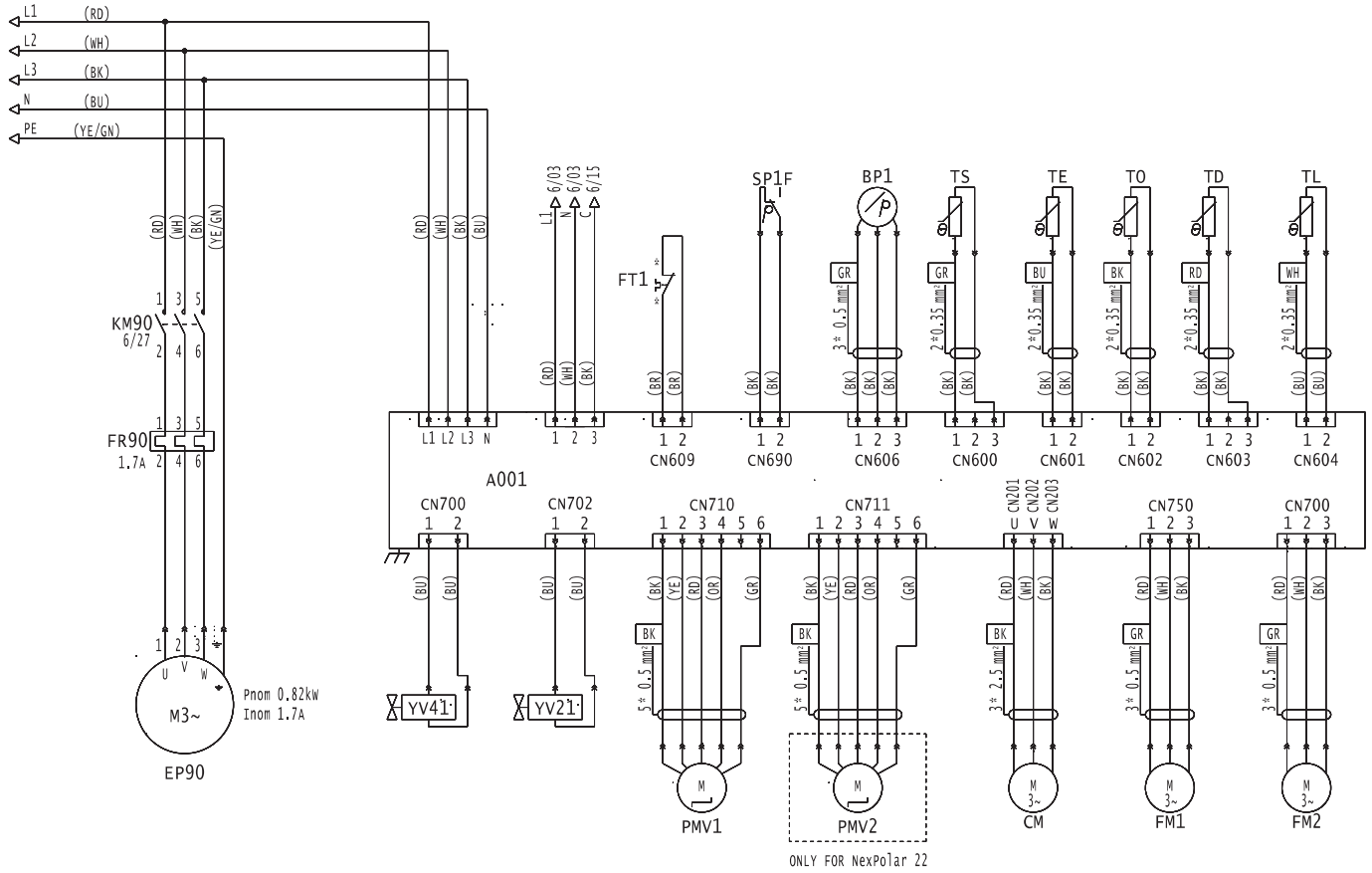


1 Discharge valve
2 Drain tube

— close the discharge valve once the operation has been completed

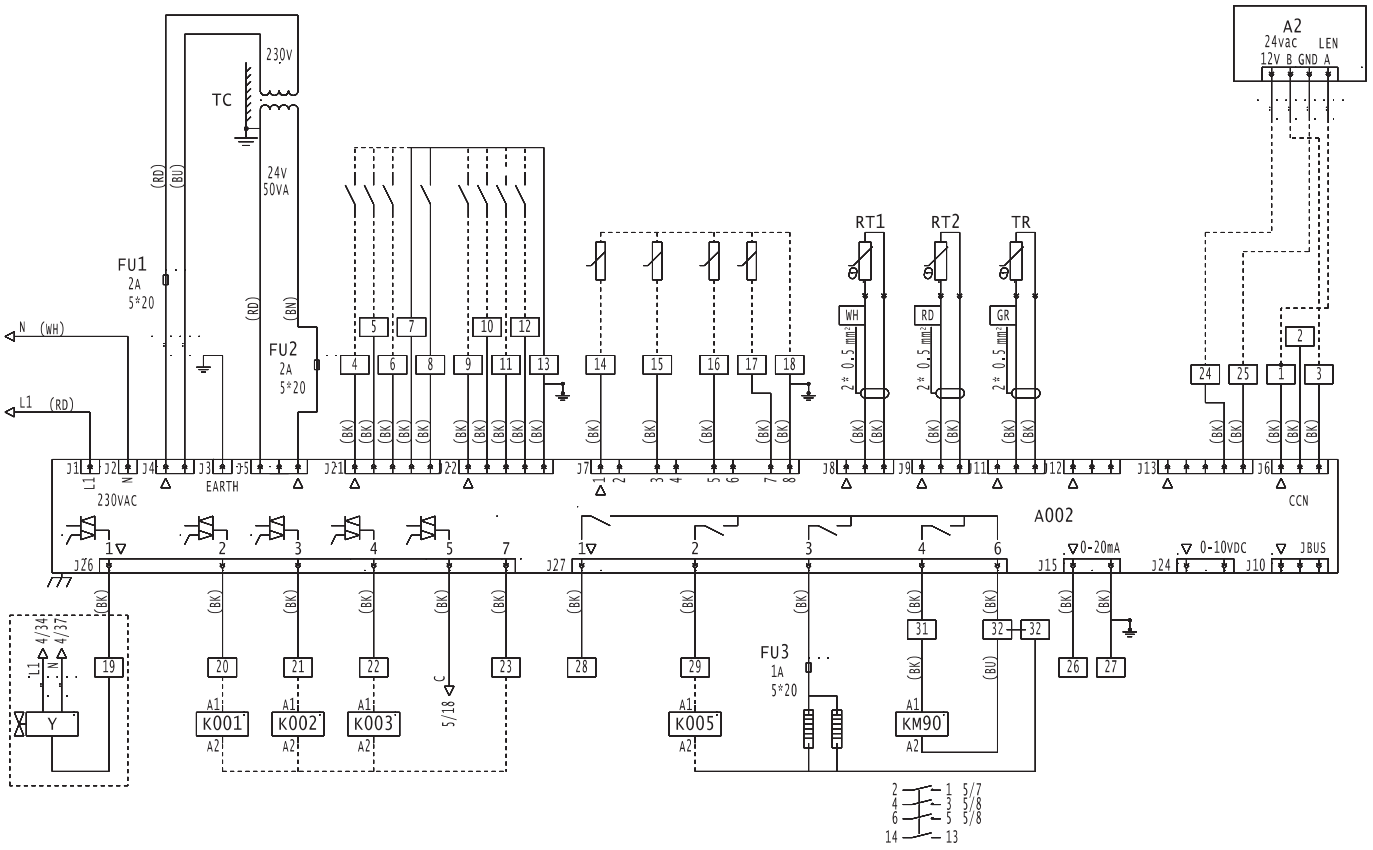
2.12 Wiring diagrams

POWER CIRCUIT



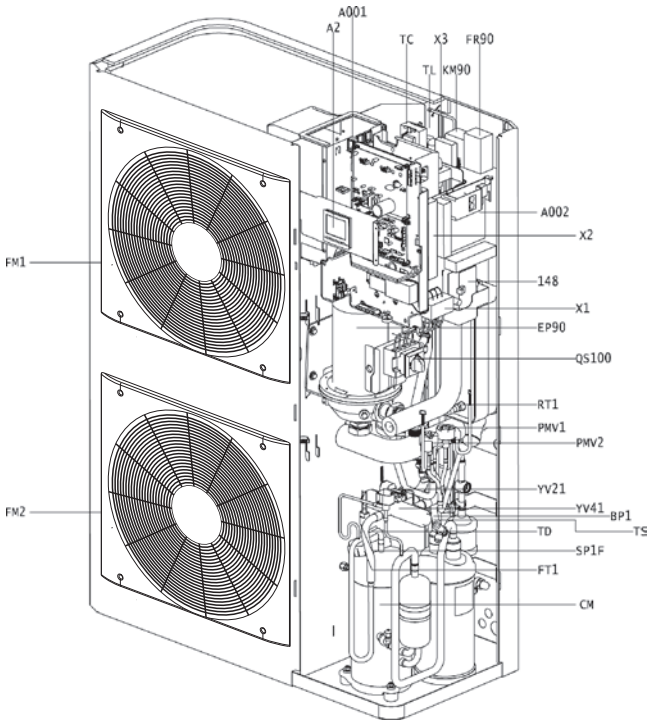
A001	Variable speed drive	KM90	Circulation pump probe	TE	Finned coil temperature probe
A002	Main electronic board	PMV1	Expansion valve motor electronic	LT	Finned coil temperature probe
A2	Control panel	PMV2	Expansion valve motor electronic	T0	External air temperature probe
BP1	Low pressure probe	QS100	Main disconnect switch	TR	Refrigerant temperature probe
CM	Compressor	RT1	Delivery temperature probe system	TS	Suction temperature probe
EH1	Plate exchanger heating element	RT2	System return temperature probe	YV21	2-way solenoid valve
EH90	Hydronic module heating element	SP1F	High pressure-switch	YV41	Cycle reversal valve
EP90	Circulation pump	TC	Transformer	148C/D	Not available
FM1	Fan motor	TD	Delivery temperature probe failure	Y	3-way valve for DHW
FM2	Fan motor				
FR90	Circulation pump thermal relay				
FT1	Compressor casing thermostat				

CONTROL CIRCUIT



A001 Variable speed drive
A002 Main electronic board
A2 Control panel
BP1 Low pressure probe
CM Compressor
EH1 Plate exchanger heating element
EH90 Hydronic module heating element
EP90 Circulation pump
FM1 Fan motor
FM2 Fan motor
FR90 Circulation pump thermal relay
FT1 Compressor casing thermostat
KM90 Circulation pump probe
PMV1 Expansion valve motor electronic
PMV2 Expansion valve motor electronic
QS100 Main disconnect switch
RT1 Delivery temperature probe system
RT2 System return temperature probe
SP1F High pressure-switch
TC Transformer
TD Delivery temperature probe failure
TE Finned coil temperature probe
LT Finned coil temperature probe
T0 External air temperature probe
TR Refrigerant temperature probe
TS Suction temperature probe
YV21 2-way solenoid valve
YV41 Cycle reversal valve
148C/D Not available
Y 3-way valve for DHW

POSITION ELECTRICAL COMPONENTS

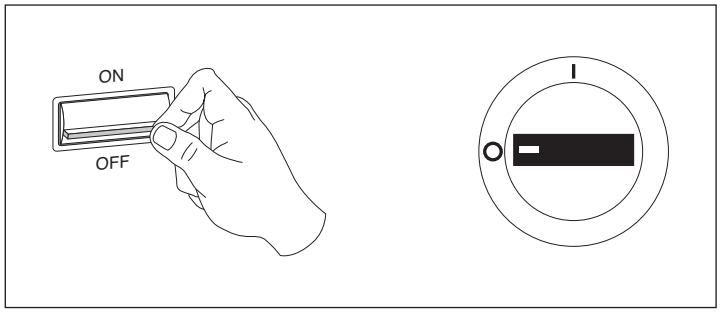


X1	Terminal block for power connections	FM1	Fan motor	SP1F	High pressure-switch
X2	Terminal block for auxiliary connections	FM2	Fan motor	TC	Transformer
A001	Variable speed drive	FR90	Circulation pump thermal relay	TD	Delivery temperature probe failure
A002	Main electronic board	FT1	Compressor casing thermostat	LT	Finned coil temperature probe
A2	Control panel	KM90	Circulation probe	TS	Suction temperature probe
BP1	Low pressure probe	PMV1	Expansion valve electronic	YV21	2-way solenoid valve
CM	Compressor	PMV2	Expansion valve electronic	YV41	Cycle reversal valve
EP90	Circulation pump	QS100	Main disconnect switch		
		RT1	Delivery temperature probe system		

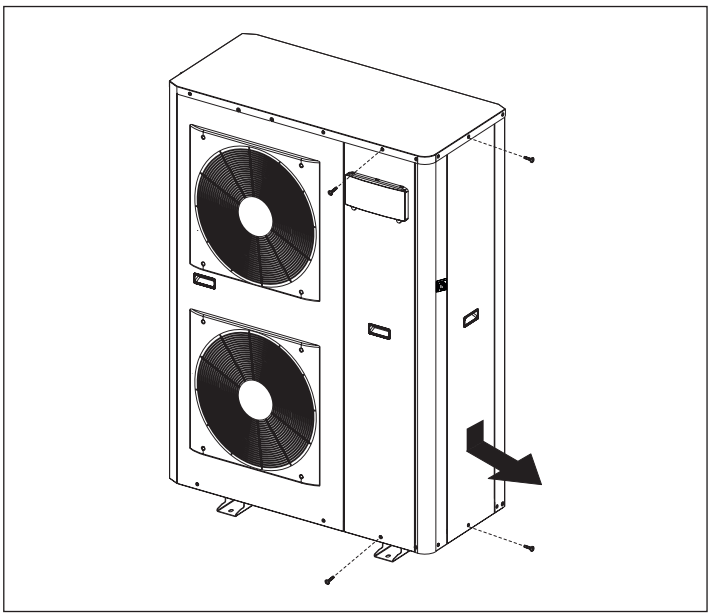
2.13 Electrical Connection

The **NexPolar** unit leaves the factory completely wired, and only requires a connection to the electrical power grid, the installation of a padlockable disconnecting switch, and connections to any accessory components.
In order to access the control panel's terminal blocks:

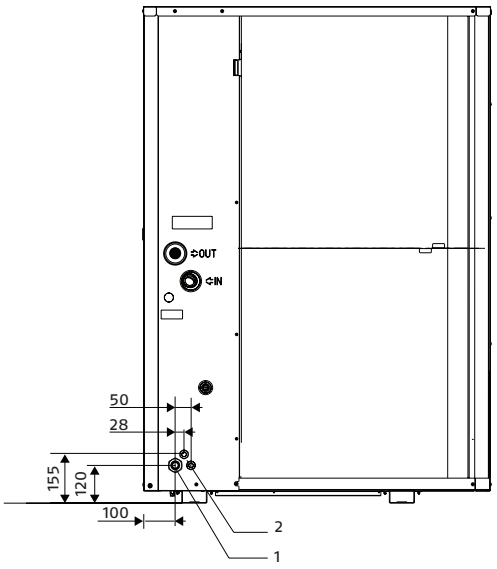
— set the system's main switch to its "OFF" position, and the device's main switch to its "0" (off) position



— unscrew the fastening screws
— remove the side panel



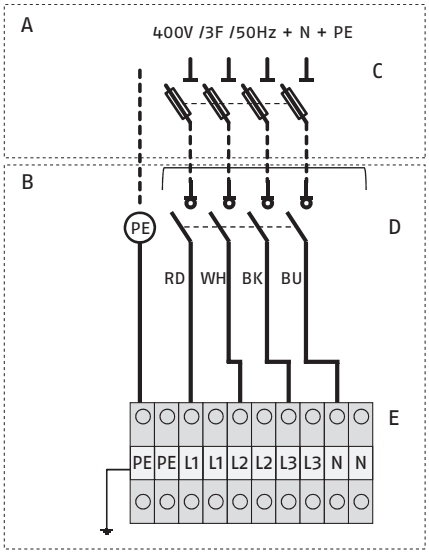
— route the power cable through the cable gland and fasten it
— route the cables for connecting the auxiliary components through the cable glands and fasten them



1 Auxiliary connection inputs
2 Power connection input

— make electrical connections according to the diagrams hereunder.

ELECTRICAL POWER CONNECTION



A Connections to be performed by the installer
B Factory connections
C Main system switch
D Main disconnecting switch
E Power terminal block X1
RD Red L1
WH White L2
BK Black L3
BU Blue N

For the sizing of the electrical power cables, use the following table:

Model	017 TE	022 TE	
Electrical characteristics			
Electrical power supply	400/3/50+N+PE		V/Ph/Hz+N
Permitted voltage	360 - 440		V
Maximum total power consumption	10,80	12,40	kW
Maximum total current consumption	16,70	19,20	A
Power cable	5 x 4		n. x mm²
Power cable	H07RNF		Type

— apply the ferrite ring to the electrical power cable in order to ensure compliance with EMC standards

Once the electrical connections have been completed, reassemble all the components by performing the described operations in the reverse order.

Check that:

— the characteristics of the electrical network are suitable for the device's usage values, also taking into account any other machinery that will be operating alongside it
— the power supply voltage corresponds to the nominal value +/- 10%, with a maximum phase imbalance of 3%
— All of the power network disconnect devices must be equipped with contact openings (4 mm) in order to allow for complete disconnection, in accordance with the conditions required for overvoltage class III

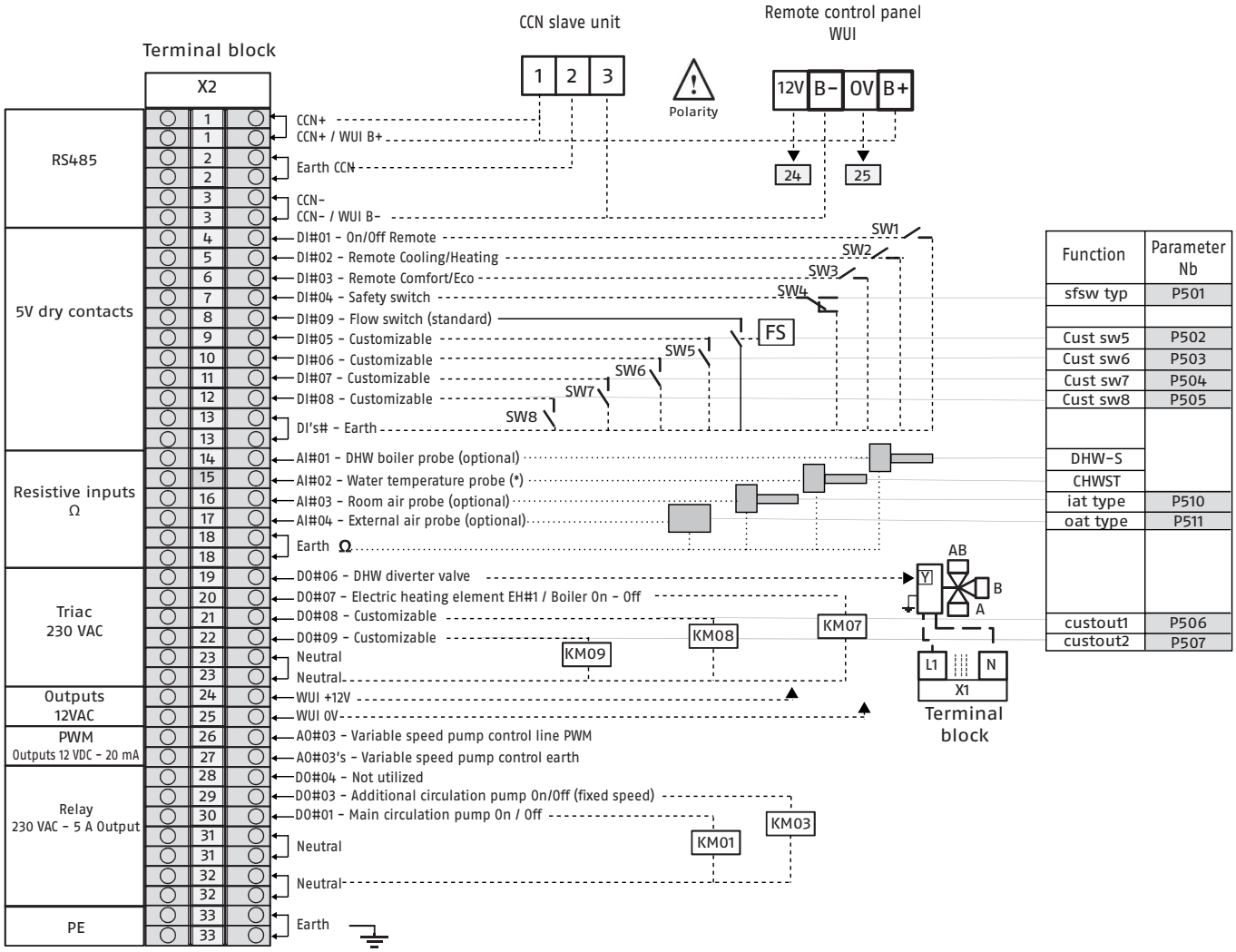
It is mandatory:

— To have an omnipolar magneto-thermal circuit breaker and a padlockable disconnecting switch compliant with the CEI-EN Standards (contact opening of at least 4 mm), with adequate breaking and leakage protection, installed near the equipment
— Connect the device to a properly functioning earthing system
— Make sure that the electrical power supply system is compliant with the current national safety standards
— Make sure that the power supply line's impedance is consistent with the unit's power consumption, as indicated on the unit's data plates
— For any electrical intervention, always refer to the wiring diagrams contained within this booklet

It is forbidden to use gas or water pipes to earth the device.It is forbidden to lay the power supply and room thermostat cables in the vicinity of any hot surfaces (delivery pipes). If there is a risk of contact with hot parts, with temperatures exceeding 50 °C, a suitable type of cable must be utilized.

2.13.1 Auxiliary connections

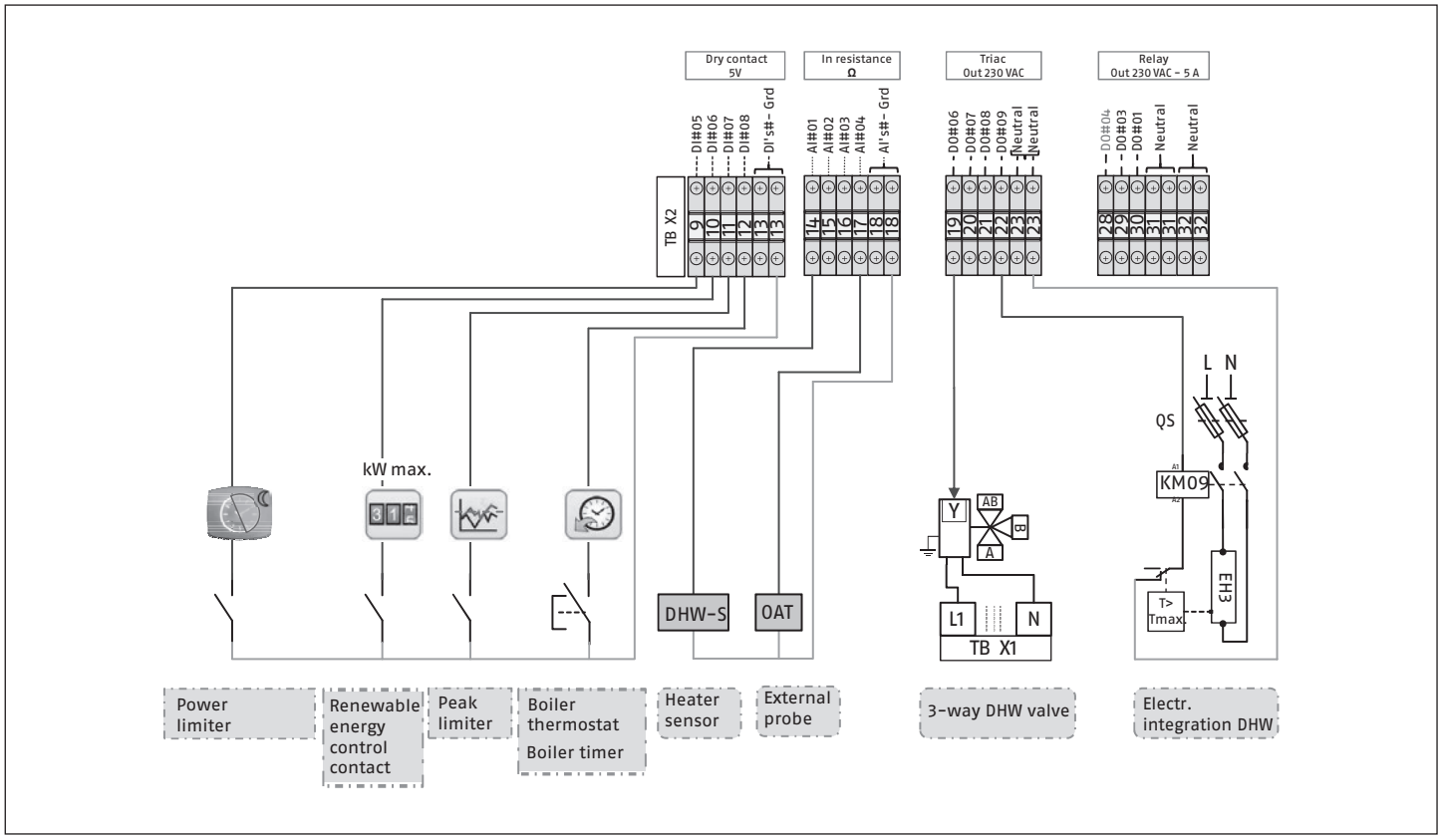
TERMINAL BLOCK X2



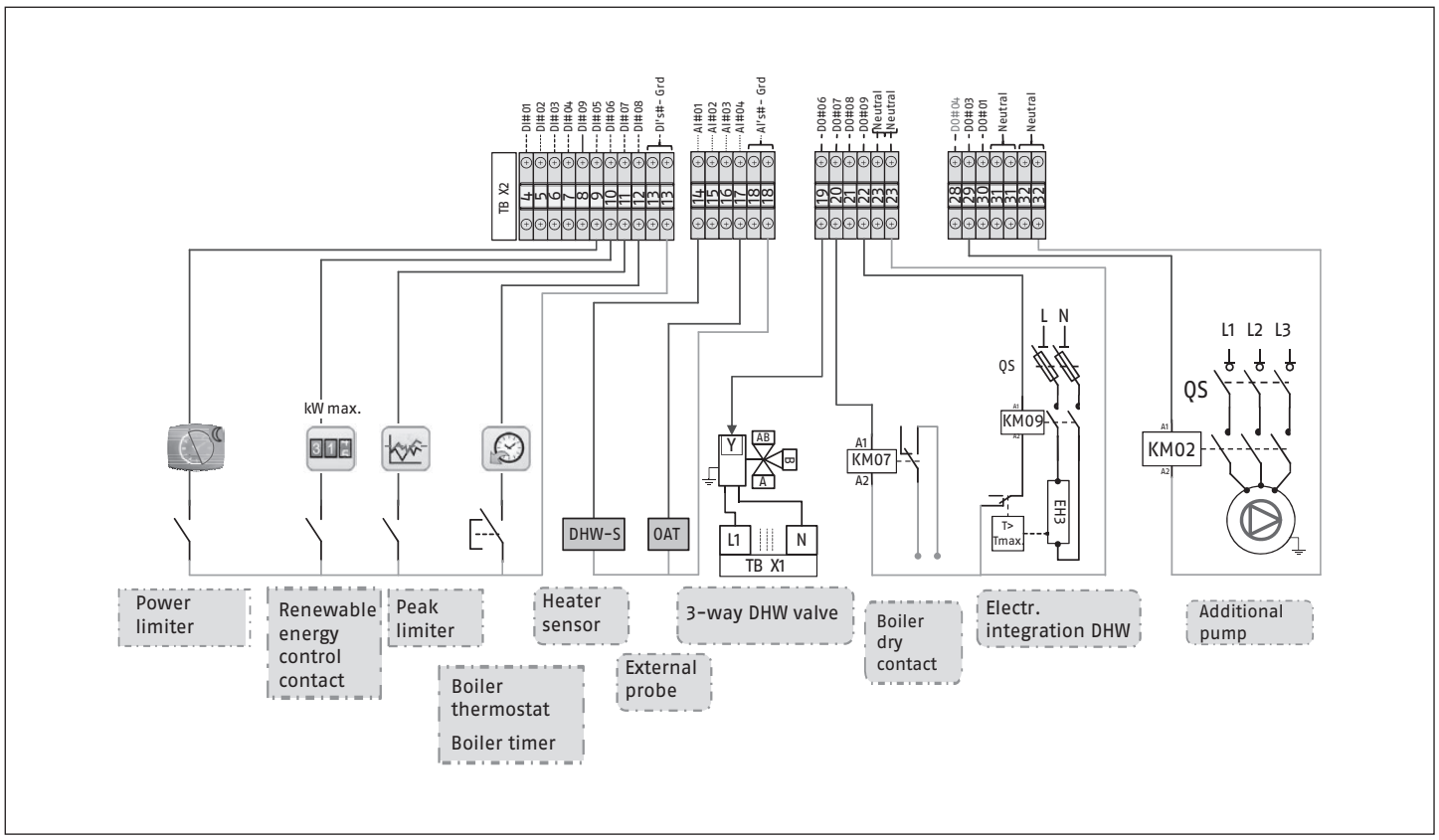
(*) optional, to be used in case of cascade operation of the units.

Initials	Description
Digital inputs	
DI#01	Remote On/Off: this contact cannot be configured. If open the unit is on, if closed the unit is off.
DI#02	Remote Cooling/Heating: this contact cannot be configured. If open the unit is in Cooling mode, if closed it is in Heating mode.
DI#03	Remote Comfort/Eco: this contact cannot be configured. If open the unit is in Home mode, if closed it is in Away mode.
DI#04	Safety switch: this contact is normally closed. It is configured with parameter 501 (for further details, see parameter list).
DI#05	Customisable contact: it is configured with parameter 502 (for further details, see parameter list).
DI#06	Customisable contact: it is configured with parameter 503 (for further details, see parameter list).
DI#07	Customisable contact: it is configured with parameter 504 (for further details, see parameter list).
DI#08	Customisable contact: it is configured with parameter 505 (for further details, see parameter list).
Digital outputs	
DO#08	Digital output configurable with parameter 506 (for further details, see parameter list).
DO#09	Digital output configurable with parameter 507 (for further details, see parameter list).

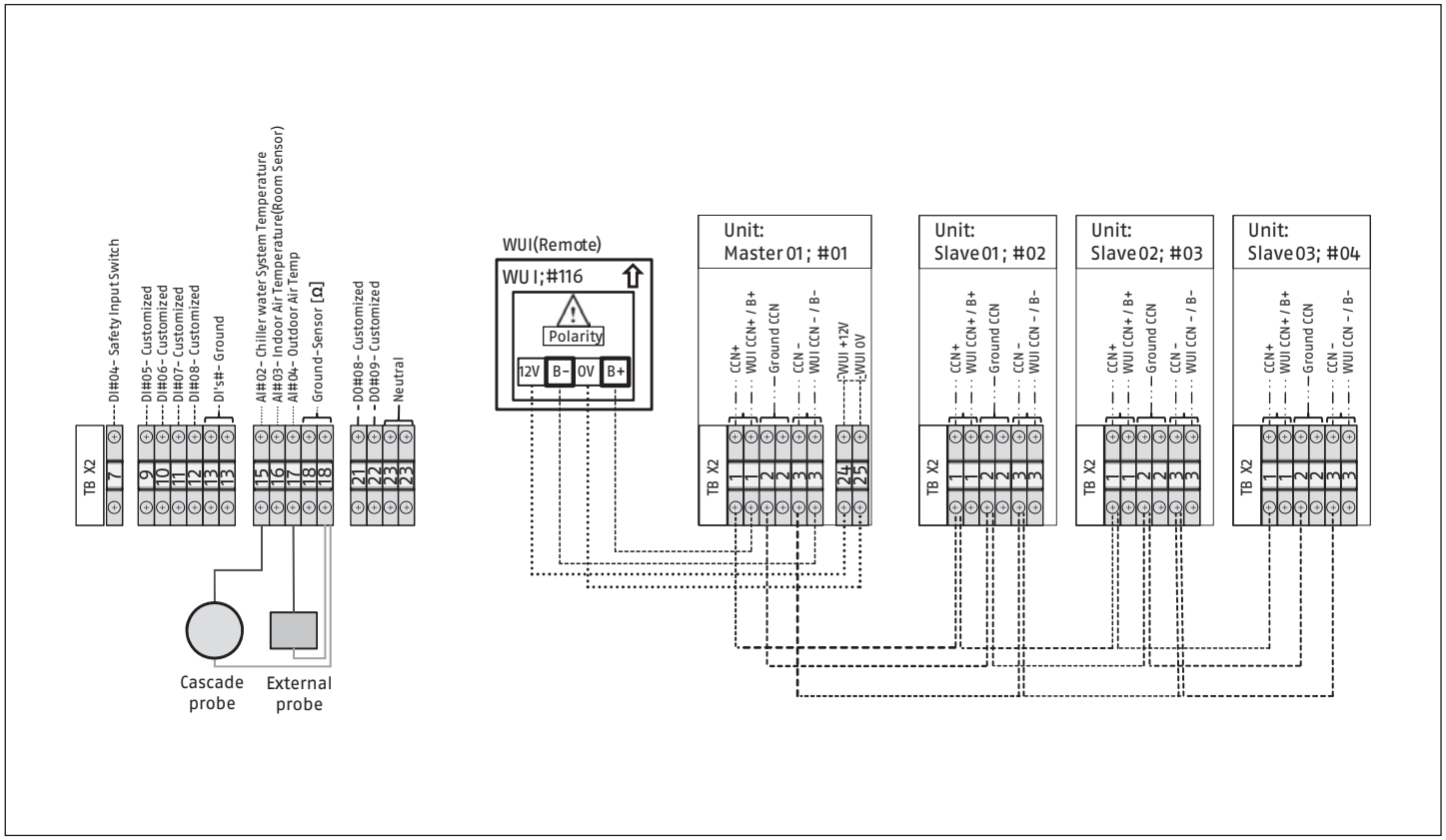
Typical connections for system configurations with heat pump and DHW production



Typical connections for system configurations with heat pump, DHW production and integrated boiler



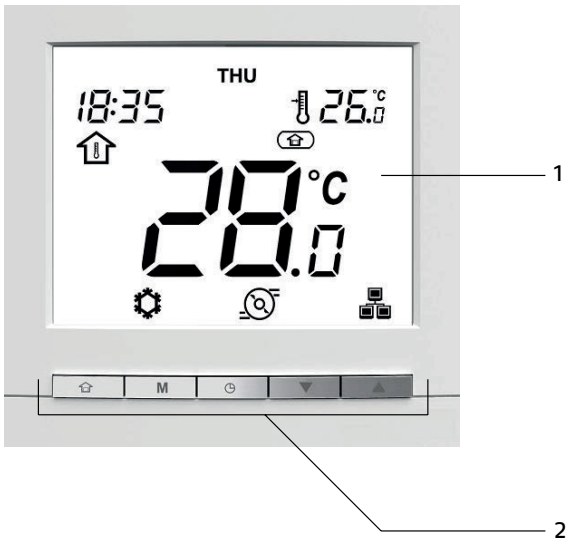
Connections for cascade heat pumps



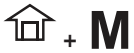
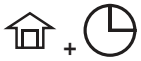
⚠ 0nly units of the same model can be connected in cascade configuration.

2.14 Control panel

The control panel is the interface used by the Installer and the User to set all the operating parameters and to view the status of the components installed on the device.
Based on the temperatures detected by the probes present within the device, and those installed in the hot water boiler, within the rooms, and outdoors, the electronics modulate the device's operation, and the display shows the relative operating conditions.
The panel can be used to set the temperature required for the system and for the domestic hot water.

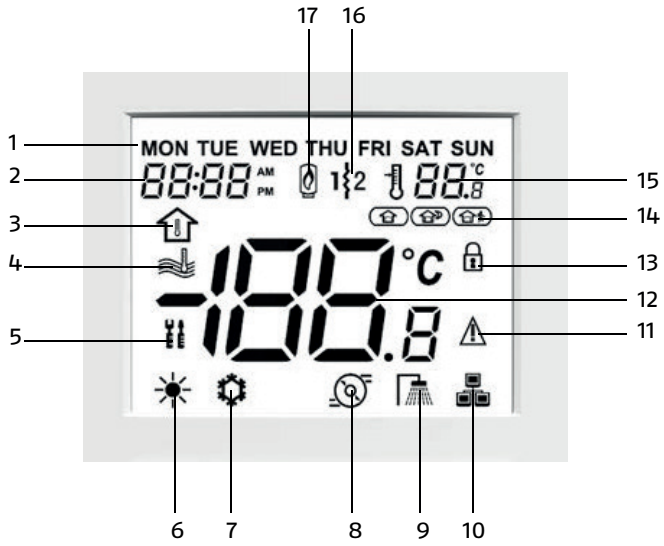


1 Display
2 Function keys

Key	Description
	Selection of the occupation mode, from among the following options: At home, Night time, Away from home
M	Selection of the operating mode, from among the following options: Off, Heating, Cooling, Domestic hot water
	Hourly programming
	Sub-menu scrolling downwards Reduction of the selected parameter's value
	Sub-menu scrolling upwards Incrementation of the selected parameter's value
	Parameter display
	Access to advanced settings
	Alarm display Alarm reset

Display

It displays all the information necessary for the device's proper management.



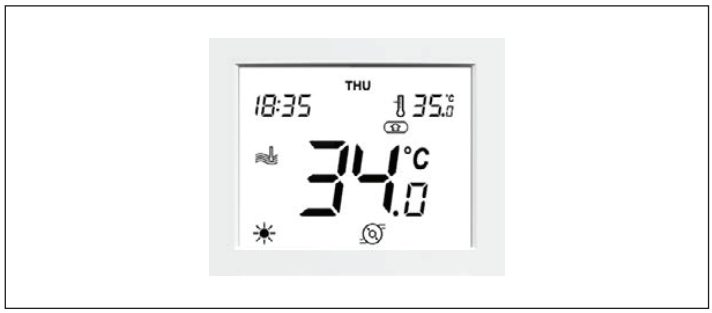
1 Days of the week
2 Clock
3 Room temperature
4 Water temperature
5 Advanced settings
6 Heating mode
7 Cooling mode
8 Circulation pump operation
9 Domestic hot water mode
10 Cascade operation
11 Alarm in progress
12 Temperature indicator, alarm and message code
13 Block settings
14 Home mode
15 Setpoint
16 Electric heating element operation
17 Boiler operation

Display indication	Description
FRI	Indication of the current day of the week, from Monday (MON) to Sunday (SUN)
88:88	Indication of the current time in 12 or 24-hour format
	Indication that the system's control is based on the room temperature. In this case, a room temperature probe must be connected, or the remote control panel (available as an accessory) must be installed
	Indication that the system's control is based on the water's temperature
	The icon flashes when the password needs to be entered
	Indication that the heating mode is enabled
	Indication that the cooling mode is enabled
	Indication that the circulation pump is enabled
	Indication that the domestic hot water mode is enabled
	Fixed icon: indication that the Master unit is connected in cascade configuration
	Icon flashing rapidly: indication of a Slave unit connected in cascade configuration
	Icon flashing slowly: indication of a communication error between the master and slave units

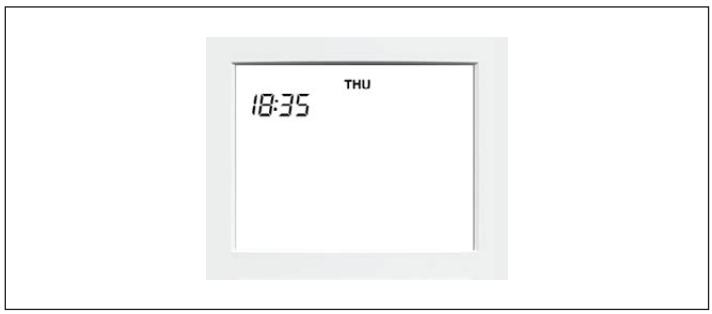
Display indication	Description
-188.8 °C	Temperature indication Room temperature Water temperature Indication of the parameter number and value Indication of the alarm code
	Indication that the occupation mode has been blocked by the user. In this case, the hourly programming is disabled.
	Indication that the "At home" mode is enabled
	Indication that the "Night time" mode is enabled
	Indication that the "Away from home" mode is enabled
188.8 °C	Indication of the desired temperature value (setpoint)
1 2	Indication that the integrated electric heating element is enabled. The numbers 1 and 2 refer to the activated stage
	Indication that the integrated boiler is enabled
	Fixed icon: indication that an alarm has been triggered, which caused the unit to shut off
	Flashing icon: indication that an alarm has been triggered, which allowed the unit to remain in function

Display screens

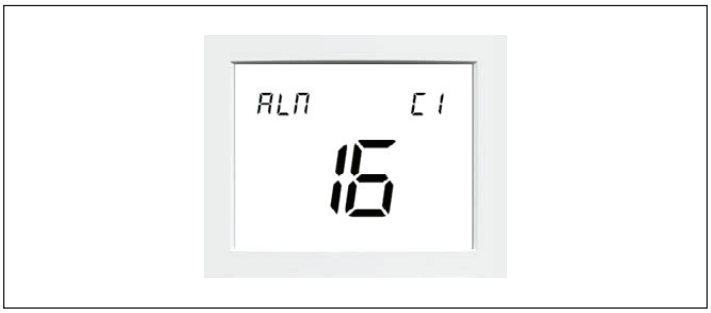
The following figures show some of the display's most common screens.



Mode: Heating
Home mode: At home
Check: Water temperature
Water temperature: 34°C
Setpoint: 35 °C



Mode: Off



Current alarm: C1
Alarm code: 16

3 COMMISSIONING AND MAINTENANCE

3.1 Preparation for first commissioning

The boiler's first commissioning must be carried out by the Technical Support Service.
Prior to commissioning, it is necessary to check that:

- all the safety conditions have been met
- the required distances have been respected
- the amount of water in the primary circuit is greater than the minimum volume indicated in the chapter titled "System water content" on page 14, in order to prevent the formation of ice during defrosting operations, or the continuous modulation of the compressor's frequency.
- the water system's shut-off devices are open
- the water circuit has been deaerated
- the mesh filter has been installed and was properly cleaned after the system was filled
- the electrical connections have been properly completed
- the electrical power supply's values are correct
- the earthing has been carried out correctly
- all the connections have been properly tightened.

The operations indicated below must be subsequently carried out using the control panel or the external controls, with the device powered on:

- set the day and time
- set the device's parameters

Successivamente devono essere effettuate le operazioni sotto riportate, agendo sul pannello di comando o sui consensi esterni e con l'apparecchio alimentato elettricamente:

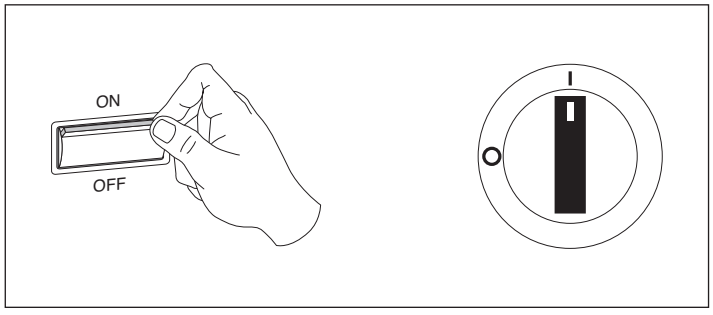
- impostazione giorno e ora
- impostazione parametri dell'apparecchio

⚠ Always wear suitable Personal Protective Equipment.

⚠ The device must always be powered electrically in order to allow for the compressor's oil to be properly pre-heated.

The device must receive electrical power for at least eight hours before being started up for the first time.

- Set the system's main switch to its "ON" position, and the device's main disconnecting switch to its "I" (on) position.



Set the following parameters on the control panel:

Day and time

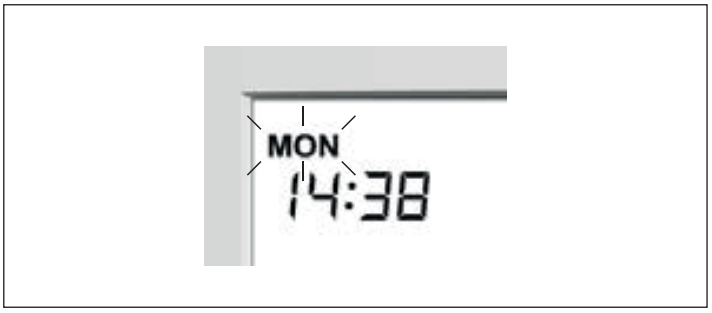
The current day and time must be set before using the control panel:

- press any key to activate the control panel

Setting the day of the week

- hold down the ◷ button for 2 seconds

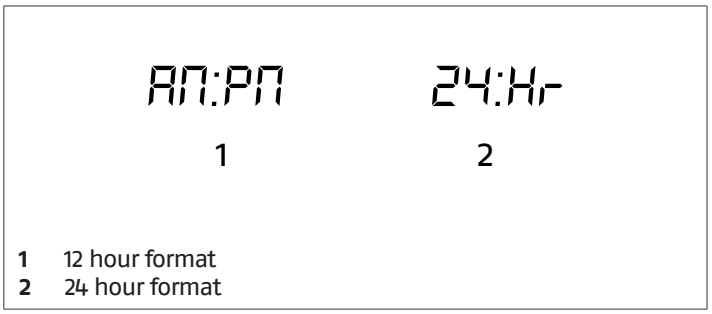
The currently set day of the week will flash on the display.



- press ▼ or ▲ to select the current day
- press ◷ to confirm the selection and move on to the next item

Time format setting
After having set the day of the week

- press ▼ or ▲ to select the desired time format



1 12 hour format
2 24 hour format

- press ◷ to confirm the selection and move on to the next item

Time setting
After having set the time format.
For 12 hour format:

- press ▼ or ▲ to select the current time

For 24 hour format:

- press ▼ or ▲ to select the current time
- press ◷ to confirm the selection and move on to the next item
- premere ▼ or ▲ to select the current minutes

After having completed the settings:

- hold down the ◷ per 2 secondi per memorizzare
- hold down the ◷ button for 2 seconds to exit

Parameters

The control panel can be used to modify the heat pump's management parameters, in order to adapt its operation to the configuration of the system to which it is connected.
In order to view the configurations, see the chapter titled "Parametrisation depending on system configuration" *p. 35*.
In order to gain access:

- press any key to activate the control panel
- hold down the ⌂ and ◷ buttons simultaneously for 2 seconds

The password prompt for accessing the advanced settings will appear on the display.

Enter the password (**0120**)

— press ▼ or ▲ to select the first number

— press ◷ to confirm the selection and move on to the next item

— hold down the **M** button for 2 seconds to validate the password and gain access.

To select:

— press ▼ or ▲ to select the desired parameter

To modify:

— hold down the ◷ button for 2 seconds

— press ▼ or ▲ to modify the value

— press ◷ to confirm the selection and move on to the next item

— hold down the **M** button for 2 seconds to save the parameter.

After having completed the settings:

— hold down the ◷ button for 2 seconds to exit.

Control logics

The **RIELLO NexPolar** is managed by an electronic platform, which can be controlled through:

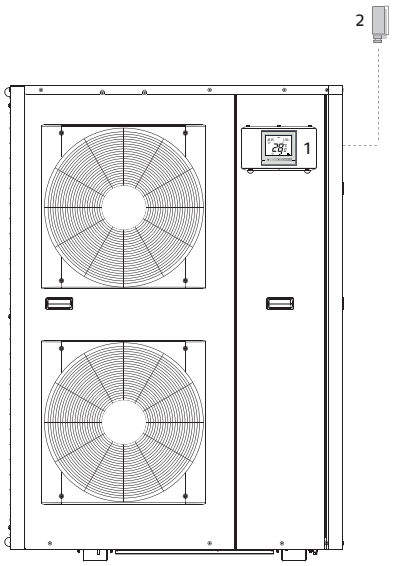
— the control panel on board the unit

— external controls, which can be connected to the dry contacts available on the unit's terminal block

— the remote control panel installed inside the room (accessory).

The machine's parameters must be properly configured based on the control method to be utilized.

CONTROL PANEL ON BOARD (PARAMETER 501: 3)



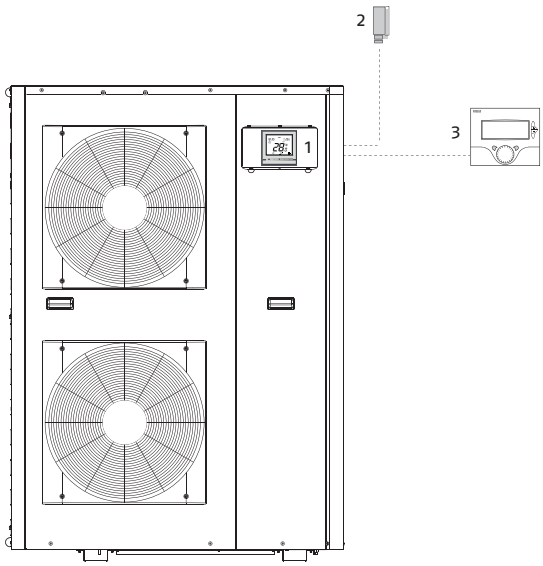
1 Control panel on board the unit (standard)
2 External air probe (accessory)

The water temperature can be controlled using two methods:

— fixed point

— with the temperature curves (external air probe recommended).

EXTERNAL CONTROLS (PARAMETER 501: 1)



1 Control panel on board the unit (standard)
2 External air probe (accessory)
3 External controls (on/off, heating/cooling selector, comfort/eco)

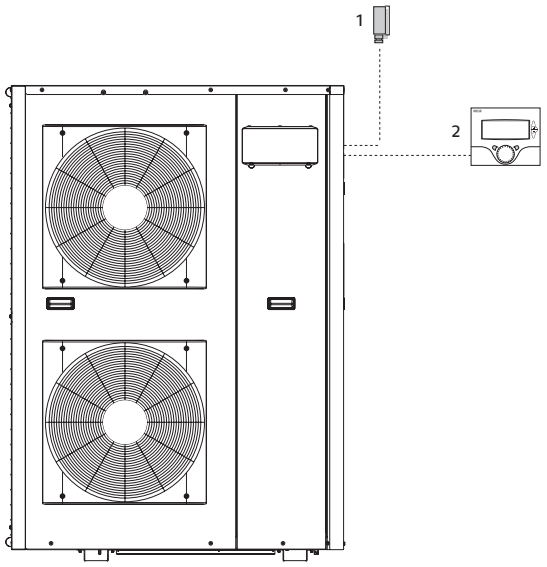
The water temperature can be controlled using two methods:

— fixed point

— with the temperature curves (external air probe recommended)

The room temperature is controlled by external devices.

REMOTE CONTROL PANEL (PARAMETER 501: 2)



1 External air probe (accessory)
2 Remote control panel (accessory)

The water temperature can be controlled using two methods:
— fixed point
— with temperature curves (external air probe recommended)
The room temperature (1 zone) is controlled by the remote control panel.

Parametrisation depending on system configuration

Hereunder you can find the parameters to be set depending on the system configuration (see chapter "Source water systems", p. 15).

Heat pump and DHW production

N°	Operation	Function	Par.	Name	Description	Range	Default	Udm
1	DHW mode configuration	DHW_CONF	701	Domestic hot water type	0 = DHW not managed 1 = Diverter valve in 2 points - NO contact (valve NC energized in DHW position) 2 = Diverter valve in 2 points - NO contact (valve NC de-energized in DHW position) 3 = Not utilized	0 ÷ 3	0	-
			719	DHW tank probe type	0 = DHW Thermostat (thermal switch) 1 = DHW probe (10 KΩ thermistor) 2 = DHW probe (5 KΩ thermistor) 3 = DHW probe (3 KΩ thermistor) Note: If no probe is selected ("0"), the request for domestic hot water is always true, and the heating/cooling switch-over function is managed by the timer.	0 ÷ 3	0	-
2	DHW setpoint configuration	WAT_STP	406	DHW setpoint	DHW setpoint	30 ÷ 60	50	°C
			405	DHW Anti-legionella setpoint	Water anti-legionella setpoint	50 ÷ 60	60	°C
3	Backup electric heating element setting	GEN_CONF	507	DO n. 9 custom configuration	0 = Disabled 10 = Electric heater stage no.2 11 = Electric heater stage no.3 1 - 9 and 12 = not used in this configuration	0 ÷ 12	1	-
		BCK_CONF	601	Type of integration	0 = None 5 = DHW integration (EH3) 6 = 1 stage electric heating booster (EH1) + DHW integration (EH3) 7 = 2 stage electric heating booster (EH1+EH2) + DHW integration (EH3) 8 = 3 stage electric heating booster with 2 outputs (EH1+EH2) + DHW integration (EH3) 1 - 4 and 9 = Not utilized in this configuration	0 ÷ 9	0	-
			604	Booster OAT threshold	The booster's activation is only permitted if the OAT drops below this threshold (with 1 K of hysteresis).	-30 ÷ +15	-7	°C
4	DHW program configuration	DHW_CONF	711	DHW program days	Select the days for operation in DHW mode Monday - Tuesday - Wednesday - Thursday - Friday - Saturday - Sunday	Yes ÷ No	Yes	-
			712	DHW start time	DHW mode start time	00:00 - 23:59	21:00	hh: mm
			713	DHW stop time	DHW mode stop time	00:00 - 23:59	06:00	hh: mm
5	Anti-legionella program configuration	DHW_CONF	714	Anti-legionella cycle days	Select the days for operation in anti-legionella mode Monday - Tuesday - Wednesday - Thursday - Friday - Saturday - Sunday	Yes ÷ No	No	
			715	anti-legionella start time	anti-legionella mode start time	00:00 - 23:59	02:00	hh: mm
6	DHW start/stop criteria setting	DHW_CONF	721	DHW tank Delta T (start)	DHW mode is requested if the water tank's temperature drops below the DHW setpoint [P406] minus the DHW tank Delta T [P721] (start).	2,0 ÷ 10,0	5	K
			722	EWT Delta T (stop)	The DHW mode is stopped if the EWT is higher than the DHW setpoint [P406] minus EWT Delta T [P722] (DHW stop).	0,0 ÷ 20,0	10	K
7	Configuration of the operating time between DHW mode and heating/cooling mode	DHW_CONF	704	Minimum SHC operating time	Minimum operating time in SHC mode	0 ÷ 720	20	min
			705	Maximum SHC operating time	Maximum operating time in SHC mode If this parameter is set to -1, the maximum SHC or the DHW operating time is ignored. Note: If the maximum operating time is set, the maximum SHC operating time must also be set. Otherwise the unit will never return to DHW mode.	-1 ÷ 720	60	min
			706	Minimum DHW operating time	Minimum operating time in DHW mode	0 - 720	20	min
			707	Maximum DHW operating time	Maximum operating time in DHW mode If this parameter is set to -1, the maximum SHC or the DHW operating time is ignored. Note: If the maximum operating time is set, the maximum SHC operating time must also be set. Otherwise the unit will never return to DHW mode.	-1 ÷ 720	60	min

Nº	Operation	Function	Par.	Name	Description	Range	Default	Udm
8	Summer mode configuration	DHW_CONF	716	Summer mode OAT threshold	The summer mode is set when the summer mode switch is closed.	15 ÷ 30	20	°C
			717	Summer mode activation delay	The summer mode is set to "On" if the OAT is greater than the OAT threshold [P716] for at least the summer mode's deactivation delay time [P718].	0 ÷ 12	5	h
			718	Summer mode deactivation delay	The summer mode is reset if the OAT drops below the OAT threshold [P716] by eight minus 2 K at least for the summer mode's the deactivation delay time.	0 ÷ 12	5	h
9	DHW mode limit settings	CMP_CONF	543	DHW mode limit value	The compressor's frequency is limited to this percentage of the maximum permitted frequency if the unit is operating in domestic hot water mode.	50 ÷ 100	100	%

EWT Water intake temperature
OAT External air temperature
SHC Heating/cooling mode

Integrated boiler

Nº	Operation	Function	Par.	Name	Description	Range	Default	Udm
1	DHW mode configuration	Please refer to the system diagram for heat pump and DHW production						
2	Setting the boiler	BCK_CONF	601	Type of integration	0 = none 9 = integration with diesel or gas boiler 1 - 8 = not utilized for this configuration	0 / 9	0	-
			514	OAT threshold in heating	The pump cannot function in heating mode if the OAT drops below this threshold.	-20 / 10	-20	°C
3	Setting an additional pump	PMP_CONF	573	Additional pump logic	With the control panel on board the machine This parameter defines the additional pump's functionality in stand-by mode: 0 = No additional pump 1 = Pump always on except in Off mode 3 = Pump always on except in Off mode or when DHW mode is enabled	0 / 4	0	-
					With the remote control panel This parameter defines the additional pump's functionality in stand-by mode: 0 = No additional pump 2 = Based on the room temperature: pump off, except with the demand is derived from the room temperature 4 = Pump off, except when the demand is derived from the room temperature and the DHW is not enabled	0 / 4	0	-

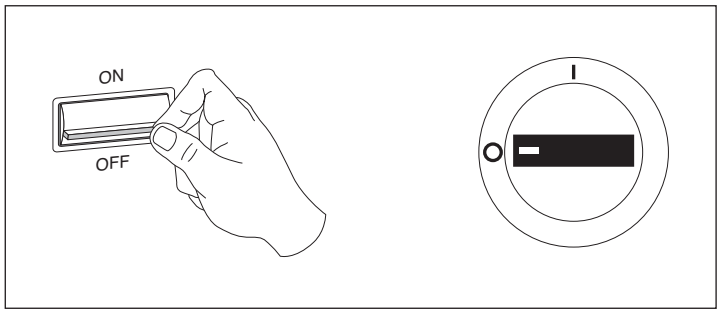
OAT External air temperature

Parametrisation for cascade connection

Example of configuration of a system composed of three units (one master and two slave units).

Preliminary operations

— set the system's main switch to its "OFF" position, and the device's main switch to its "0" (off) position



— make bus connection between all machines (terminals 1, 2 and 3)

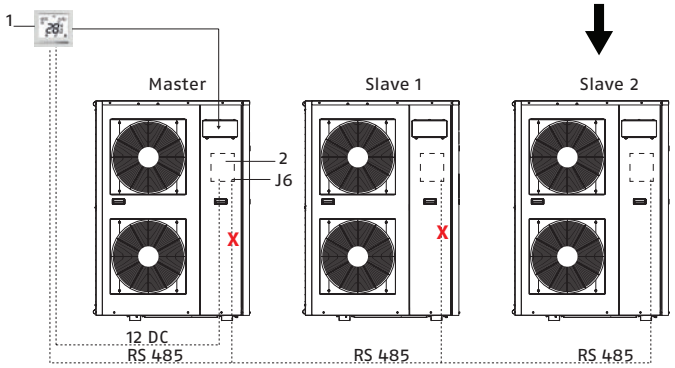
— electrically disconnect the control panel on board the Slave units by operating on terminals 24 and 25

⚠ Refer to chapter "Auxiliary connections", p. 26.

set the system's main switch to its "ON" position, and the device's main disconnecting switch to its "I" (on) position

The following actions must be performed in the given sequence.

Changing address on Slave unit no.2.



1 Control panel on board Master unit
2 NHC electronic board

— disconnect the green connector J6 on the NHC electronic board
— of Master unit and Slave unit no.1
— leave it connected to the electronic board of Slave unit no.2
— access the control panel of Master unit
— press any key to activate the control panel
— access the advanced settings and enter the password **0120**

⚠ Refer to chapter "Parameters", p. 32.

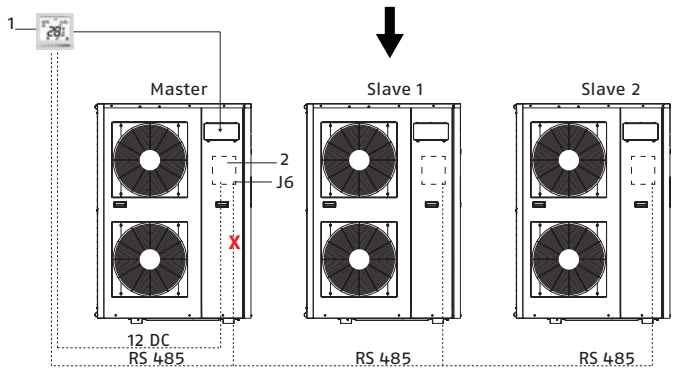
— change according to the following table

Parameter Parameter	description	Range	Default	Value to be set	Notes
641	CCN address	0/239	0	**3**	Parameter that sets the CCN address of the machine. It must be different from the one of the other units.

— wait 30 seconds for the confirmation of the value insertion

⚠ During this time, error E1 could appear. Ignore it.

Changing address on Slave unit no.1



1 Control panel on board Master unit
2 NHC electronic board

⚠ connect the green connector J6 on Slave unit no.1

⚠ Do not disconnect the one of Slave unit no.2.

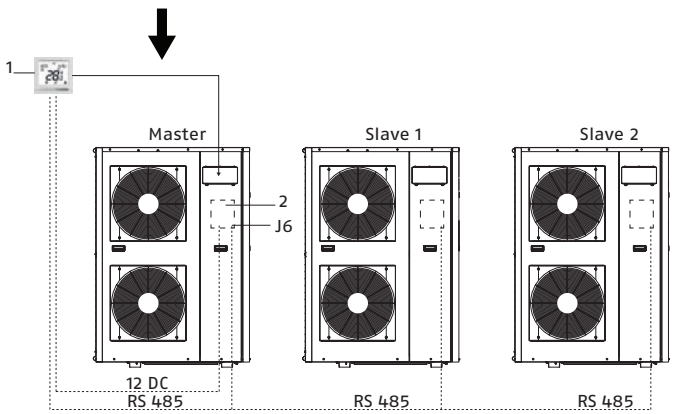
— change according to the following table

Parameter	Parameter description	Range	Default	Value to be set	Notes
641	CCN address	0/239	0	**2**	Parameter that sets the CCN address of the machine. It must be different from the one of the other units.

— wait 30 seconds for the confirmation of the value insertion

⚠ During this time, error E1 could appear. Ignore it.

Changing address on Master unit and setting unit addresses



1 Control panel on board Master unit
2 NHC electronic board

— connect the green connector J6 on Master unit

⚠ Do not disconnect the one of Slave units no.1 and no.2.

— change according to the following table

Parameter	Parameter description	Range	Default	Value to be set	Notes
743	Slave no.1 address	0/239	0	**2**	Address definition for Slave unit no.1
744	Slave no.2 address	0/239	0	**3**	Address definition for Slave unit no.2
742	Select Master unit	0/2	0	**1**	Parameter that sets the unit as Master or Slave (0=Disabled, 1=Master, 2=Slave)

Choosing the method for controlling the compressor

— change according to the following table

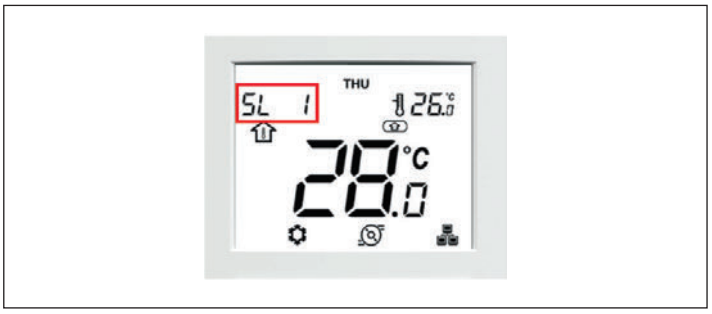
Parameter	Parameter description	Range	Default	Value to be set	Notes
751	Cascade type	0/2	1	**1**	0=Avvio Master, poi 0= Start Master, then Slave no.1, then Slave no.2 Stop sequence is Slave no.2, Slave no.1 and Master. 1= Start the units depending on their wear factor. 2= All units start and stop at the same time (Sequence).
746	load % for Slave start	0/100	75	**75**	Set parameter 751 to values 0 or 1 to define the % beyond which the following unit activates..

— wait 30 seconds for the confirmation of the value insertion

Slave no.1 configuration

— access the control panel of Master unit
— press any key to activate the control panel
— hold down the buttons ⌂ ▲ simultaneously for 2 seconds

The unit on which you are operating is displayed in the top left corner.



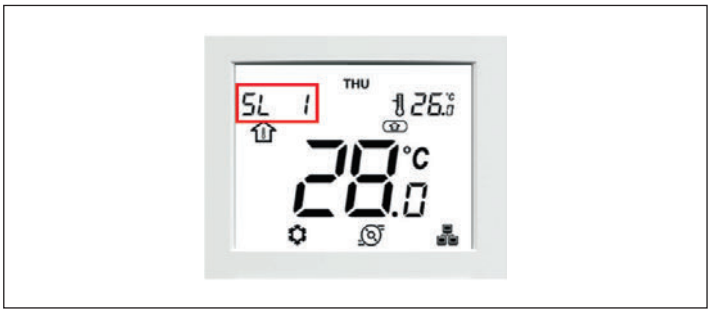
— press ▼ or ▲ to select Slave unit no.1
— change according to the following table

Parameter	Parameter description	Range	Default	Value to be set	Notes
742	Selection of Master unit	0/2	0	**2**	Parameter that sets the unit as Master or Slave (0=Disabled, 1=Master, 2=Slave)
521	Interface selection	0/3	0	**1**	Control type definition (0= No interface, 1= Remote control with contacts, 2= Control with remote control panel, 3= Control with control panel on board the unit).

Slave no.2 configuration

— access the control panel of Master unit
— press any key to activate the control panel
— hold down the buttons ⌂ ▲ simultaneously for 2 seconds.

The unit on which you are operating is displayed in the top left corner.



— press ▼ or ▲ to select Slave unit no.2
— change according to the following table

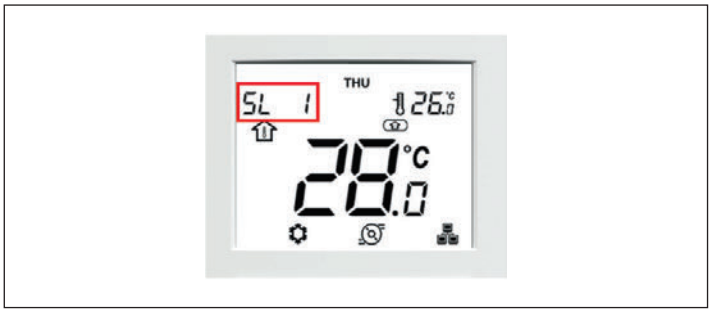
Parameter	Parameter description	Range	Default	Value to be set	Notes
742	Selection of Master unit	0/2	0	**2**	Parameter that sets the unit as Master or Slave (0=Disabled, 1=Master, 2=Slave)
521	Interface selection	0/3	0	**1**	Control type definition (0= No interface, 1= Remote control with contacts, 2= Control with remote control panel, 3= Control with control panel on board the unit).

Setting pump control on Master unit

The pump control must be set before starting the cascade.
Define if you want to control each pump installed in the single units or one single pump installed in the system,
or if no pump is to be controlled
via the control panel because another control system is in place.
The parameter that governs such control is parameter 758, which is to be set on
all three units as follows:

- make sure that all pumps except the one of
- Master unit are switched off
- access the control panel of Master unitpress any key to activate the control panel
- hold down the buttons ⌂ ▲ simultaneously for 2 seconds

The unit on which you are operating is displayed in the top left corner.



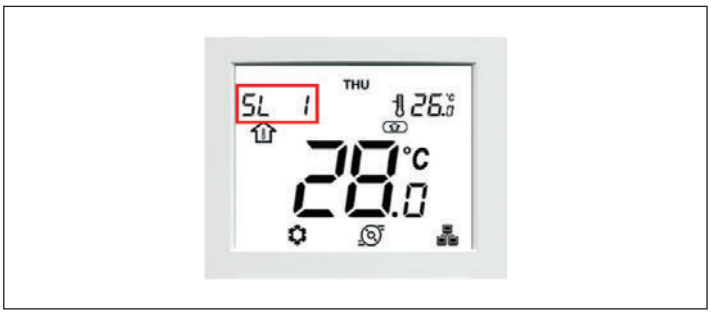
- press ▼ or ▲ to select Master unit
- change according to the following table

Parameter	Parameter description	Range	Default	Value to be set	Notes
758	Control mode	0/3	2	**2**	0= No pump control 1= Control of a single pump (installed in the system) 2= Control of pump on the unit (start according to parameter 229 setting) 3= Control of pump on the unit (stop when unit has reached setpoint)

Setting pump control on Slave unit no.1

- make sure that all pumps except the one of Slave unit no.1 are switched off
- access the control panel of Master unit
- press any key to activate the control panel
- hold down the buttons ⌂ ▲ simultaneously for 2 seconds

The unit on which you are operating is displayed in the top left corner.



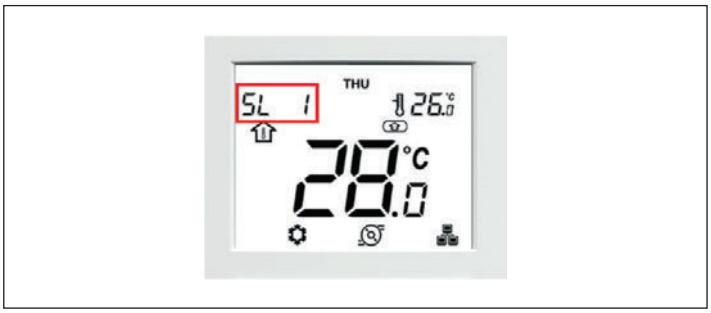
- press ▼ or ▲ to select Slave unit no.1
- change according to the following table

Parameter	Parameter description	Range	Default	Value to be set	Notes
758	Control mode	0/3	2	**2**	0= No pump control 1= Control of a single pump (installed in the system) 2= Control of pump on the unit (start according to parameter 229 setting) 3= Control of pump on the unit (stop when unit has reached setpoint)

Setting pump control on Slave unit no.2

- make sure that all pumps except the one of Slave unit no.2 are switched off
- access the control panel of Master unit
- press any key to activate the control panel
- hold down the buttons ⌂ ▲ simultaneously for 2 seconds

The unit on which you are operating is displayed in the top left corner.



- press ▼ or ▲ to select Slave unit no.2
- change according to the following table

Parameter	Parameter description	Range	Default	Value to be set	Notes
758	Control mode	0/3	2	**2**	0= No pump control 1= Control of a single pump (installed in the system) 2= Control of pump on the unit (start according to parameter 229 setting) 3= Control of pump on the unit (stop when unit has reached setpoint)

Calibrations and pump controls

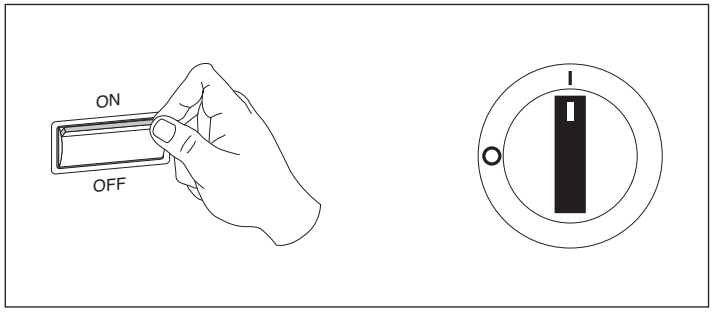
Perform calibrations and controls on each single unit by operating on the parameters indicated in the table.

Activity		Table	Par.	Abbreviation	Description	Field	Default	Ex.	Unit
Cleaning procedu		QCK_TEST	321	Enabling quick test	Access to quick test mode	0 ÷ 1	0	1	-
			331	Pump speed Pump activation	Attivazione pompa	0 ÷ 100	0	100	%
			Wait about 2 hours before cleaning the hydraulic circuit						
			331	Pump speed	Pump deactivation	0 ÷ 100	0	0	%
			321	Enabling quick test	Exiting quick test mode	0 ÷ 1	0	0	-
Deaeration procedure		MOD_REQ	44	System operation mode request	8= Deaeration (the pump operates constantly to vent the circuit) 0 ÷ 6 and 9=not used	0 ÷ 9	-	8	-
			Wait for the circuit to be vented						
			44	System operation mode request	To exit the vent mode, change parameter P044 into one of the required modes	0 ÷ 9	-	0 / 1 / 2 / 4	-
Water flow rate check procedure	Fixed speed pump (internal or external)	QCK_TEST	321	Enabling quick test	Access to quick test mode	0 ÷ 1	0	1	-
			331	Pump speed	Pump activation	0 ÷ 100	0	100	%
			Use the calibration valve to set the nominal capacity (refer to chart "Residual head", p. 9)						
			331	Pump speed	Pump deactivation	0 ÷ 100	0	0	%
			321	Enabling quick test	Exiting quick test mode	0 ÷ 1	0	0	-

3.2 Initial startup

After having completed all the operations required to prepare for first commissioning, do the following to activate the device:

— – Set the system's main switch to its "ON" position, and the device's main disconnecting switch to its "I" (on) position



The device must receive electrical power for at least eight hours before being started up for the first time.

- **To activate the system from the control panel**
  — Check that the control panel's display is on, thus indicating that electrical power is present
  — activate the unit following the indications contained in the User's Manual
- **To activate the system using external controls**
  — Check that the control panel's display is on, thus indicating that electrical power is present
  — activate the unit by setting the remote On/Off switch to its On position, and by following the instructions provided along with the thermostat being utilized

Checks to be performed during and after the first commissioning

After having activated the heat pump, check that:

— the compressor's noise level is not abnormal (knocking sound)
— the suction pressure is not greater than the discharge pressure; in this case, invert one of the phases
— the current consumed by the compressor is less than the maximum permitted
— the device is operating under the recommended operating conditions
— the unit is able to be stopped and started back up again
— the circulation pump's water flow falls within the limits indicated in the chapter titled "Water flow" on page 14
— When operating at maximum power (whether in cooling or heating mode) the temperature difference of approximately 5 °C between delivery and return is respected.

⚠ Should any of the above-listed controls have problems: turn the device off and call the Technical Service immediately.

⚠ If the unit is being controlled through the dry contacts, it is recommended to shut off the unit when all the terminals are shut off in order to avoid wasting energy unnecessarily.

⛔ It is forbidden to operate the device with a phase inverted.

3.3 Temporary shutdown

In order to shut down the unit for periods of brief absences:

— deactivate the unit using the on-board control panel only
— close the shut-off valves
— open the by-pass valve for anti-freeze protection
— see chapter "Connection diagram", *p. 19*

In this manner, the anti-freeze logics and the compressor's electric heating element will remain enabled.

3.4 Shutting down for long periods

Not using the device for an extended period of time requires user to carry out the following operations:

— deactivate the unit using the on-board control panel
— set the system's main switch to its "OFF" position, and the device's main switch to its "O" (off) position
— deactivate the internal terminal units by setting each device's switch to its "off" position
— close the water system's shut-off valve

⚠ The compressor's electric heating element and the antifreeze logics are deactivated.

⚠ If there is a risk of freezing, empty the entire system or integrate it with an appropriate antifreeze liquids.

Percentage of ethylene glycol in weight	0	12	20	28	35	40	%
Freezing temperature	0	-5	-10	-15	-20	-25	°C

⚠ If the device is to be connected in parallel to a boiler while it is in function, make sure that the temperature of the water circulating inside the heat pump does not exceed 60°C.

4 FUNCTIONS

4.1 Acronyms

IAT	Indoor Air Temperature
BPHE	Brazed plate heat exchanger
CHWS	Chiller Water System
DHW	Domestic Hot Water
EHS	Electric heater stage
EWT	Entering Water Temperature
FCU	Fan Coil Unit
LWT	Leaving Water Temperature
NHC	New Hydronic Control
OAT	Outdoor Air Temperature
PMV	Pulse Modulating Valve
SHC	Space Heating/Cooling Control
TR	Refrigerant Temperature
UFC	Underfloor Cooling
UFH	Underfloor Heating
WUI	Wall-mounted User Interface

4.2 Setpoint

Depending on the unit's configuration, the system's control can be based on the water or air setpoint control. In order to achieve greater comfort, the room temperature setpoint (remote user interface) or the water temperature setpoint (local user interface) can be adjusted to meet the specific requirements. It should be noted that the temperature value can only be adjusted within the range defined for each occupation mode.

Possible configurations

Setpoint	Local WUI	Remote WUI
Room air probe	Water	Air

The water setpoint calculation can be based on:
Predefined temperature curves based on the OAT: temperature curves already defined in the control logic.
Fixed water setpoint: by entering a fixed value for each occupation mode.
Custom temperature curve based on the OAT: defines custom temperature curves based on the application.
Temperature curve offsets (predefined and defined by the user)
The unit features a local user interface (on board the unit), which only allows for the water temperature setpoint to be controlled.

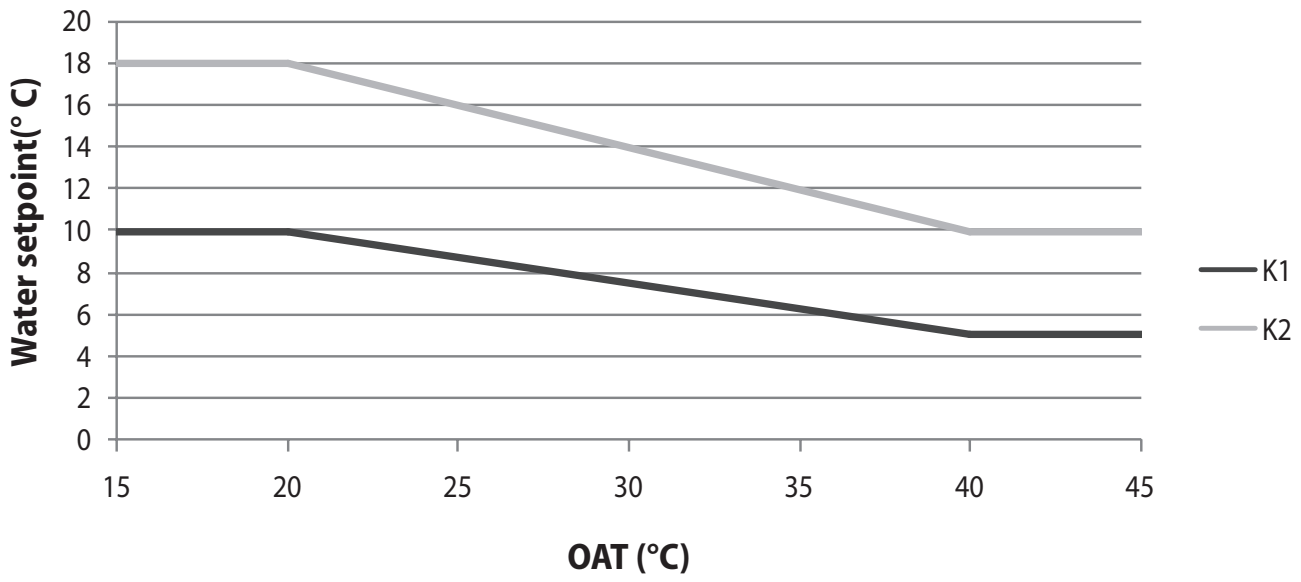
Predefined temperature curves

COOLING: If the cooling temperature curve [P586] is set to "1" or "2", the water setpoint will be calculated based on the selected cooling temperature curve.

There are two predefined cooling temperature curves available:

Temperature curve	Min. OAT	Max. OAT	Min. water temp.	Max. water temp.
K1	20°C	40°C	5°C	10°C
K2	20°C	40°C	10°C	18°C

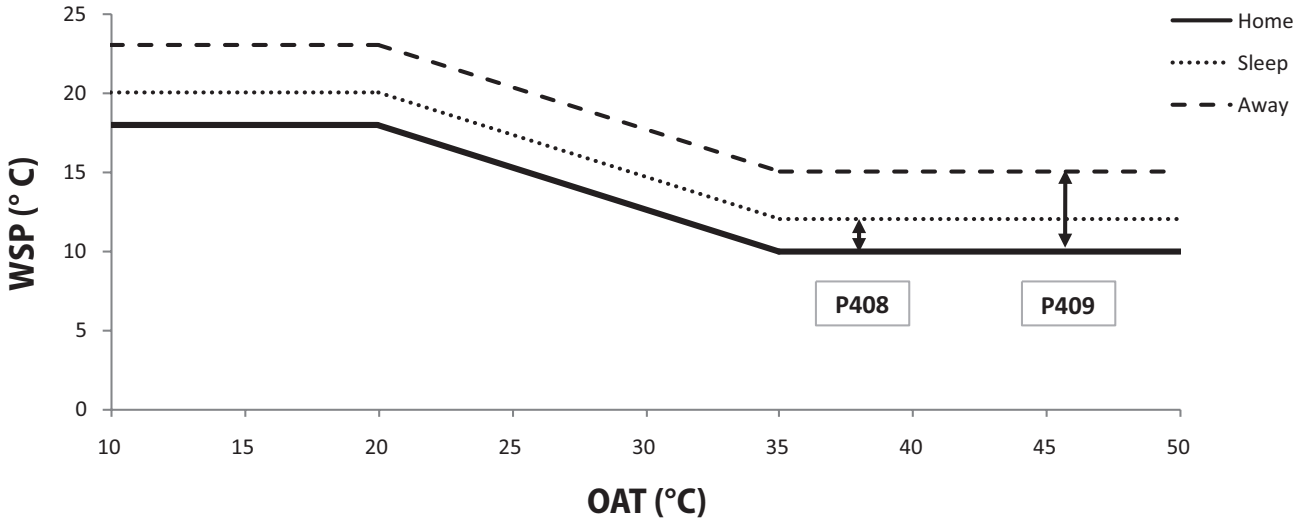
COOLING TEMPERATURE CURVES



— If the OAT is valid (not transmitted by the inverter, value out of range, etc.), the water setpoint is equal to the current minimum water temperature.
— If the OAT is greater than the current maximum OAT threshold, the water setpoint is equal to the current maximum water temperature.

The temperature curve corresponds to the water setpoint for home mode. In order to define the other occupation modes, it is necessary to configure the sleep cooling offset [P408] and the away cooling offset [P409]:

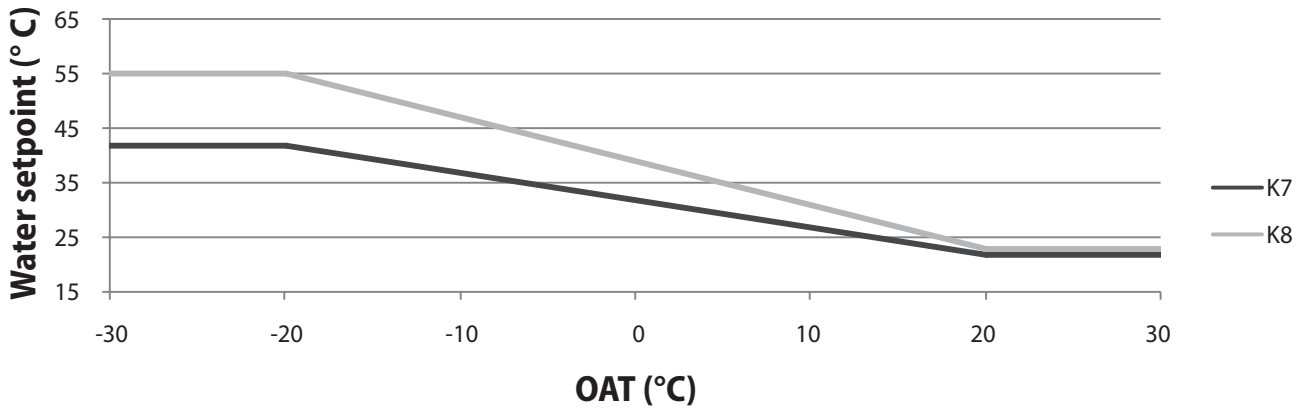
COOLING TEMPERATURE CURVES BASED ON HOME MODE



HEATING: If the heating temperature curve [P581] is set to "1" or "2", the water setpoint will be calculated based on the selected heating temperature curve.
There are twelve predefined heating temperature curves available:

Temperature curve	Min. OAT	Max. OAT	Min. water temp.	Max. water temp.
K1	-7°C	20°C	20°C	38°C
K2	-5°C	20°C	20°C	33°C
K3	-9°C	20°C	20°C	45°C
K4	-8°C	20°C	40°C	50°C
K5	-5°C	20°C	40°C	55°C
K6	0°C	20°C	40°C	60°C
K7	-20°C	20°C	22°C	42°C
K8	-20°C	20°C	23°C	55°C
K9	-12,7°C	20°C	24°C	60°C
K10	-5,9°C	20°C	25°C	60°C
K11	-1,5°C	20°C	26°C	60°C
K12	3,5°C	20°C	27°C	60°C

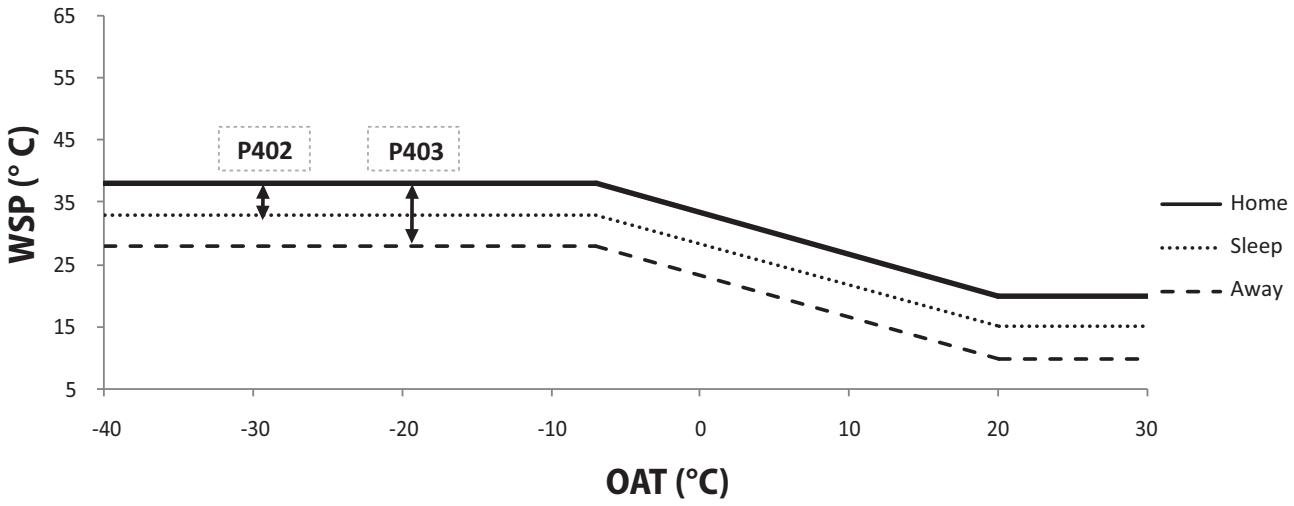
HEATING TEMPERATURE CURVES (K7 E K8)



— If the OAT is valid (not transmitted by the inverter, value out of range, etc.), the water setpoint is equal to the current maximum water temperature.
— If the OAT is greater than the current maximum OAT threshold, the water setpoint is equal to the current minimum water temperature.

The temperature curve corresponds to the water setpoint for home mode. In order to define the other occupation modes, it is necessary to configure the sleep heating offset [P402] and the away heating offset [P403]:

HEATING TEMPERATURE CURVES BASED ON HOME MODE



Fixed water setpoint

If the cooling temperature curve [P586] or the heating temperature curve [P581] are set to "-1", the water control point will be determined based on the occupation mode, with direct access to the Control panel.

The water setpoint with direct access to the control panel (please refer to the Control Panel's user manual).

COOLING

Control panel Occupation	Water setpoint with direct access to the control panel	Range	Water setpoint from the parameters menu	Range
	Home cooling setpoint	5 – 18°C	Home cooling setpoint [P407]	5 – 18°C
	Sleep cooling setpoint	5 – 18°C	Home cooling setpoint [P407] + Sleep cooling offset [P408]	0 – 10°C
	Away cooling setpoint	5 – 18°C	Home cooling setpoint [P407] + Away cooling offset [P409]	0 – 10°C

HEATING

Control panel Occupation	Water setpoint with direct access to the control panel	Range	Water setpoint from the parameters menu	Range
	Home heating setpoint	20 – 60°C	Home heating setpoint [P401]	20 – 60°C
	Sleep heating setpoint	20 – 60°C	Home heating setpoint [P401] + Sleep heating offset [P402]	-10 a 0°C
	Away heating setpoint	20 – 60°C	Home heating setpoint [P401] + Away heating offset [P403]	-10 a 0°C

DHW only (setpoints defined under the change, even the setpoints for DHW mode)

Control panel Occupation	Water setpoint with direct access to the control panel	Range	Water setpoint from the parameters menu	Range
	DHW setpoint	30 – 60°C	Home heating setpoint [P401]	30 – 60°C
	DHW Anti-legionella setpoint	50 – 60°C	Home heating setpoint [P401] + Sleep heating offset [P402]	50 – 60°C

CUSTOM TEMPERATURE CURVES

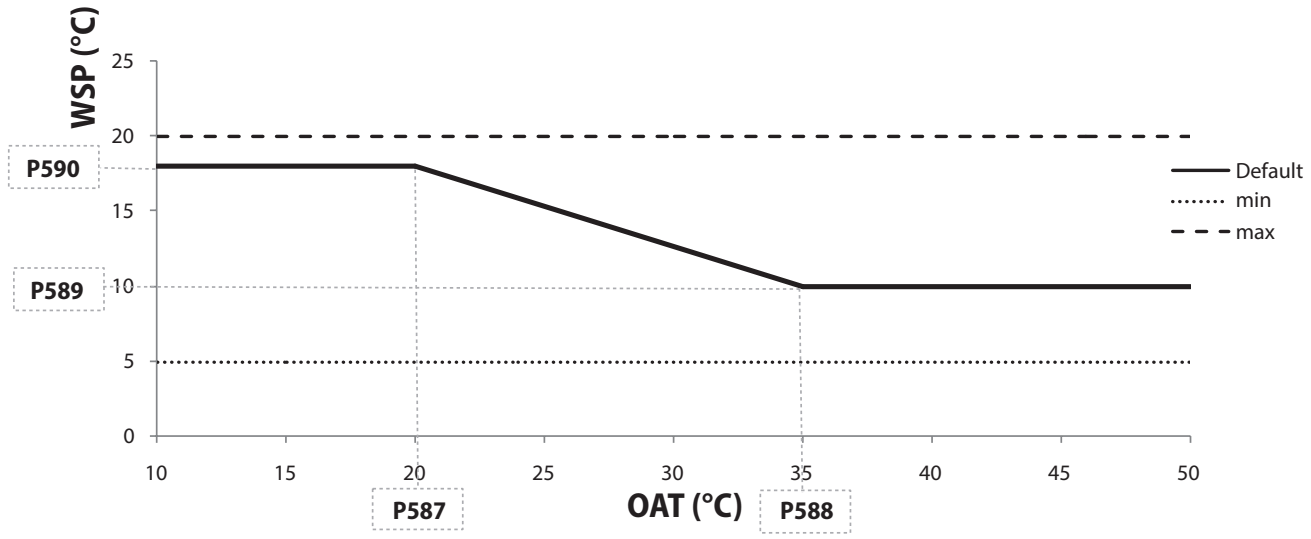
If the cooling temperature curve [P586] is set to "0", the water setpoint will be calculated based on the custom cooling temperature curve.

The custom cooling temperature curve can be defined using the following parameter:

Parameter	Description	Default	Min.	Max.
P587	Minimum custom OAT	20°C	0°C	30°C
P588	Maximum custom OAT 1212	35°C	24°C	46°C
P589	Minimum custom water temperature	10°C	5°C	18°C
P590	Maximum custom water temperature	18°C	5°C	18°C

Example:

CUSTOM COOLING TEMPERATURE CURVES



— If the OAT is not valid, the water setpoint is equal to the minimum custom water temperature [P589].
— If the OAT is greater than the current maximum OAT threshold, the water setpoint is equal to the maximum custom water temperature [P590].
— If the minimum OAT is greater than or equal to the current maximum OAT threshold, the water setpoint is equal to the maximum custom water temperature [P590].

HEATING

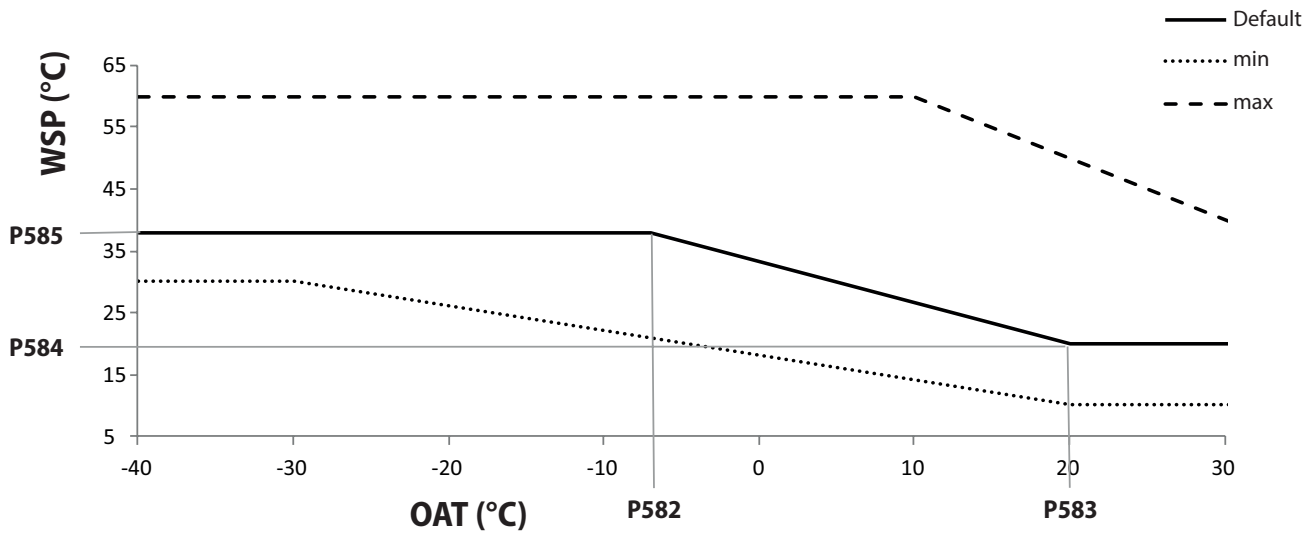
If the cooling temperature curve [P581] is set to "0", the water setpoint will be calculated based on the custom heating temperature curve.

The custom heating temperature curve can be defined using the following parameters:

Parameter	Description	Default	Min.	Max.
P582	Minimum custom OAT	-7°C	-30°C	10°C
P583	Maximum custom OAT	20°C	10°C	30°C
P584	Minimum custom water temperature	20°C	20°C	40°C
P585	Maximum custom water temperature	38°C	30°C	60°C

Example:

CUSTOM HEATING TEMPERATURE CURVES



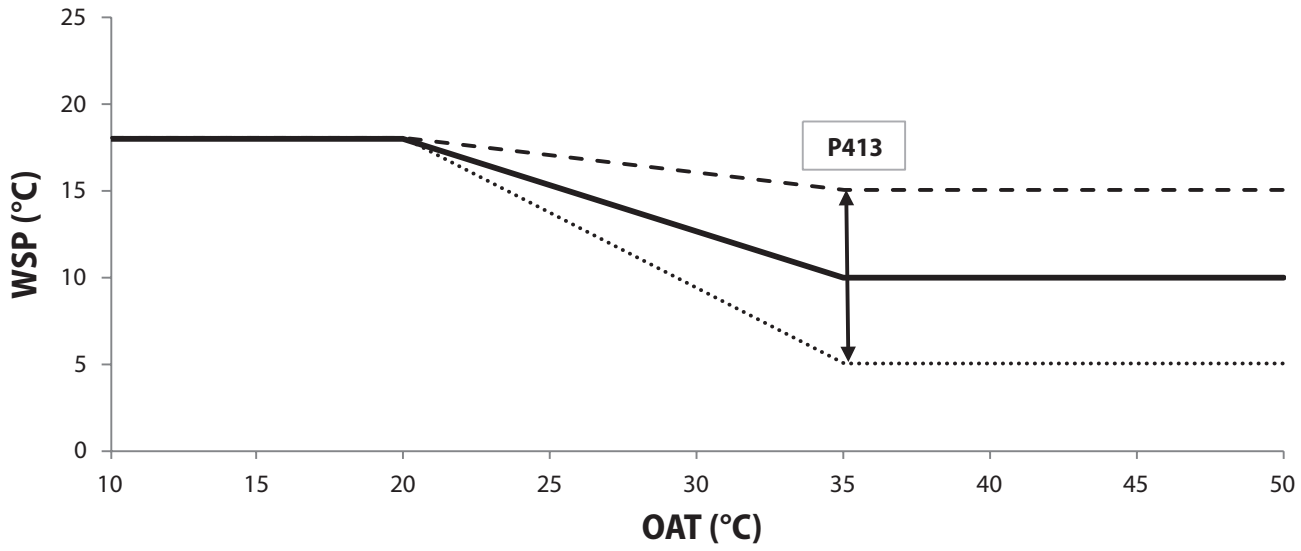
— If the OAT is not valid, the water setpoint is equal to the maximum custom water temperature [P585].
— If the OAT is greater than the current maximum OAT threshold, the water setpoint is equal to the minimum custom water temperature [P584].
— If the minimum OAT is greater than or equal to the current maximum OAT threshold, the water setpoint is equal to the maximum custom water temperature [P584].

Temperature curve offsets (predefined and defined by the user)

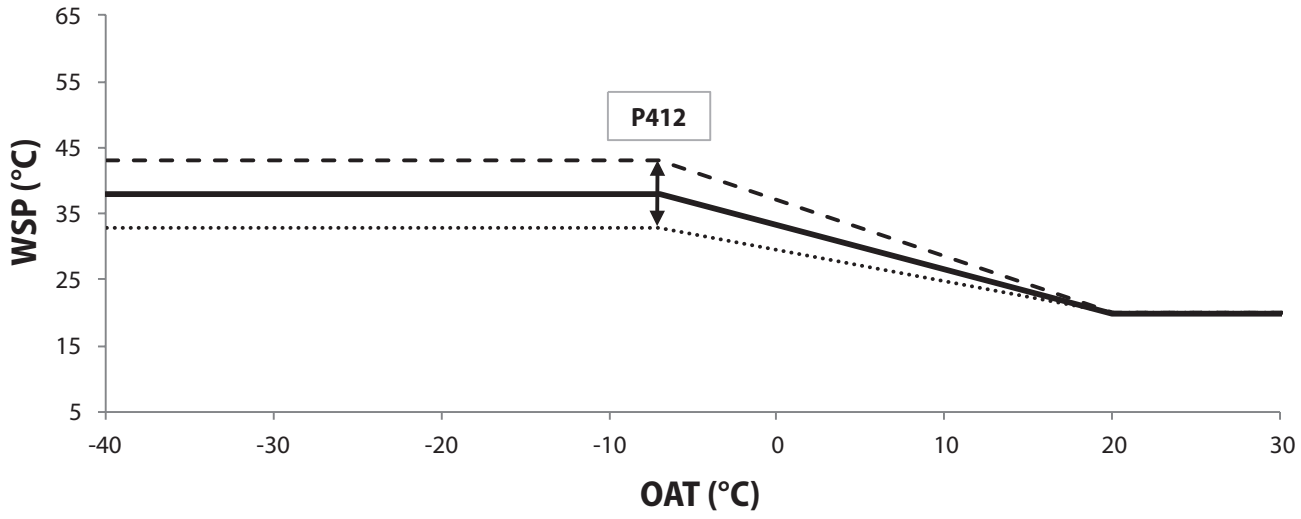
Another two parameters can be configured in order to adjust the water setpoint based on the customer's needs:
— for the cooling curve, the minimum cooling water setpoint [P589] can be modified by an offset at the foot of the curve (minimum heating curve setpoint offset [P413])
— for the heating curve, the maximum heating water setpoint [P585] can be modified by an offset at the foot of the curve (maximum heating curve setpoint offset [P412])

Example:

COOLING TEMPERATURE CURVES WITH OFFSETS AT THE BOTTOM



COOLING TEMPERATURE CURVES WITH OFFSETS AT THE TOP



Installation with remote user interface

When the device is equipped with a remote user interface, the control can be based on the air setpoint.
Based on the occupation mode and the heating/cooling/DHW mode, the air setpoint varies as indicated below.
The air setpoint is configured with direct access to the Control Panel (please refer to the Control Panel's final user manual).

COOLING

Control panel Occupation	Water setpoint with direct access to the control panel	Range	Water setpoint from the parameters menu	Range
	Home cooling setpoint	20 – 38°C	Home cooling setpoint [P424]	20 – 38°C
	Sleep cooling setpoint	20 – 38°C	Home cooling setpoint [P424] + Sleep cooling offset [P425]	0 – 10°C
	Away cooling setpoint	20 – 38°C	Home cooling setpoint [P424] + Away cooling offset [P426]	0 – 10°C

HEATING

Control panel Occupation	Water setpoint with direct access to the control panel	Range	Water setpoint from the parameters menu	Range
	Home cooling setpoint	21 – 34°C	Home cooling setpoint [P421]	21 – 34°C
	Sleep cooling setpoint	21 – 34°C	Home cooling setpoint [P421] + Sleep cooling offset [P422]	-10 a 0°C
	Away cooling setpoint	21 – 34°C	Home cooling setpoint [P421] + Away cooling offset [P423]	-10 a 0°C

Once the air setpoints have been defined, the water setpoints must be configured.

4.3 Home freeze protection

This protection function is used in units equipped with remote user interfaces only, and serves to maintain a default minimum room temperature of 6°C. When the room temperature drops below the home freeze protection setpoint [P427], the unit is activated in heating mode until the room temperature increases: [P427] + 2°C.

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Units
Set the minimum room temperature	AIR_STP	**427**	Home freeze protection setpoint	This is the minimum room temperature permitted. If the room temperature drops below this nominal value, the unit will begin functioning in heating mode.	6,0 – 12,0	6	10	°C

⚠ Never shut off the unit, otherwise the home freeze protection function cannot be guaranteed. For this reason, the disconnecting switch for the main machine or the client must always be left closed.

4.4 Water freeze protection

When the OAT is low (and the pump is stopped), there is a high risk of the water heat exchanger and the water pipes freezing. The pump must be activated regularly, or else in continuation, in order to circulate the water and reduce this risk. The BPHE and the pipes of the electric heaters present on the hydronic kit are likewise activated in certain cases.

The pump is controlled as follows:

- If the OAT drops below the heat exchanger's setpoint* [P517] + 3°C, the pump is activated at minimum speed for 1 minute every 15 minutes.
- If the OAT drops below the heat exchanger's setpoint* [P517] + 3°C and the EWT or the LWT drop below the heat exchanger's setpoint* [P517], the pump operates continuously at minimum speed.
- In order to exit from these two conditions, a hysteresis of 1K is applied.

The electric heaters are controlled as follows:

- The electric heaters are switched on during the defrosting function, and for 1 minute after the defrosting has been completed.
- The electric heaters are switched on if the OAT is below the heat exchanger's setpoint* [P517] and if the EWT or the LWT are below the heat exchanger's setpoint* [P517].
- The electric heaters are switched off if the OAT is above the heat exchanger's setpoint* [P517] + 0.5°C and if the EWT (if configured) and the LWT are above the heat exchanger's setpoint* [P517] + 0.5°C.

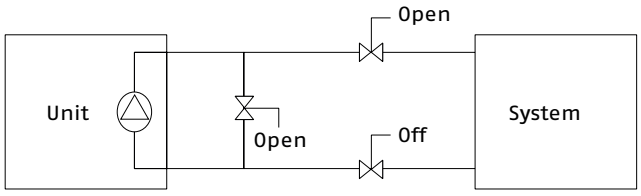
*** The user is responsible for modifying the configurable value.**

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Units
Defines the criteria for activating the water freeze protection function	GEN_ CONF	**517**	Heat exchanger setpoint	Criteria according to which the external air temperature triggers the water freeze protection function	3,0 – 5,0	3	3	°C

Never shut off the unit, otherwise the freeze protection function cannot be guaranteed. For this reason, the disconnecting switch for the main machine and the client must always be left closed.

If a shut off valve is installed, a bypass must also be installed, as shown below.

WINTER POSITION FOR UNIT WITH HYDRONIC MODULE



⚠ When the unit switches to winter mode, based on the local atmospheric conditions, it is necessary to do the following:

- Add ethylene glycol or propylene glycol in a concentration suitable for protecting the system down to a temperature 10 K lower than the lowest temperature likely to occur at the installation site.
- If the unit is not expected to be utilized for an extended period of time, it is recommended to empty it, and to load ethylene glycol or propylene glycol into the heat exchanger as a safety precaution, using the connection for the water intake's impurity discharge valve.
- At the start of the next season, fill the unit with water and add an inhibitor.
- In order to install auxiliary equipment, the installer must comply with the basic standards, particularly with regard to the minimum and maximum flow rates, which must fall within the values indicated in the operating limits table (application data).
- In order to prevent corrosion due to differential aeration, the drained heat transfer circuit must be entirely filled with nitrogen for a month. If the heat transfer fluid is not compliant with the manufacturer's indications, the nitrogen load must be added immediately.

⚠ It should be noted that the "water freeze protection" function and the "home freeze protection" function are two different modes. The water freeze protection function is used to reduce the risk of the water heat exchanger and water pipes freezing, while the home freeze protection function is used to maintain the minimum temperature within the rooms.

4.5 Domestic hot water mode

The main components necessary for the production of domestic hot water are the following:

a. DHW diverter valve
The units are able to control a diverter valve in order to manage applications such as domestic hot water tanks. When domestic hot water is required, the operating logic activates a diverter valve, which directs the hot water into the accumulation tank.
For the valve's characteristics and electrical connections, please refer to the instructions furnished along with the accessory.

b. DHW temperature sensor or a thermostat
Based on the configuration, the DHW option can be controlled with a temperature sensor or thermostat.
DHW can be produced when:

- The DHW only mode is selected and there are no DHW requirements (temperature conditions)
- The DHW program is enabled and there are DHW requirements (temperature conditions), and the operating time in this mode is less than the DHW's maximum operating time [P707]

c. DHW electric heater
When the unit's operation in DHW mode is requested (if configured), the DHW electric heater can be utilized to provide domestic hot water. The discrete output is capable of controlling a contactor (not provided).
The electric heater is activated when the tank's temperature is below the DHW setpoint and the following conditions are met:

- the OAT is below the added OAT threshold [P604]
- the OAT is above the maximum OAT for heating [P515]
- Anti-legionella mode is enabled
- Defrost mode is enabled
- In the event that the unit should experience a fault or malfunction

⚠ The electric heating function is deactivated when the high energy cost or load reduction modes are enabled, or in the event of a DHW thermistor fault of malfunction.

d. Domestic water tank protection
The water inside the domestic water tank must be constantly monitored in order to minimize the risk of contamination, even by the bacteria responsible for legionella. It is therefore essential that the user is notified of the importance of monitoring the water's temperature.

- **Water tank protection system**

The system is programmed to heat the water in the domestic hot water tank in such a way as to kill the existing bacteria, and to eliminate the potential spread of legionella.
Legionella cannot survive at temperatures above 50°C. The risk of contamination is practically non-existent when the water temperature is set to 60°C.

- **Water tank protection settings**

In order to protect the domestic water tank against legionella bacteria, the following parameters must be set:

- Anti-legionella start week day [P714]
- Anti-legionella start time [P715]
- Anti-legionella water setpoint [P405] (the anti-legionella protection is interrupted once the water temperature reaches the preset temperature)

e. DHW limitation mode
DHW limitation mode [P543] provides for greater sound comfort by reducing the compressor's frequency when DHW mode is enabled.

4.6 Master/slave up to 4 units

a. installation
Master/slave installation allows for up to four units to be connected in parallel: one master unit is capable of controlling up to three slave units.
This type of installation must be performed using units of the same type (only cold or reversible) and the same size (mod. 17 or 22), equipped with hydronic kits (variable or fixed speed kits). Master/slave operation is not compatible with domestic hot water production.
The remote control panel can only be connected to the master unit.

⚠ A delivery water temperature probe (accessory) must be installed on-site, on the common pipes. For the probe characteristics and electrical connections, please refer to the instructions furnished along with the accessory.

⚠ An RS485 communication cable (not provided) must be connected to each unit.

b. Temperature
All the units installed in the same master/slave group have the same operating mode and the same setpoint.
The master unit is connected to a user interface that can be installed on-site or in a remote location. The "master" user interface is a point in which decisions are made for all the other units in the same master/slave group. This means that the operating mode (cooling/heating) and the water setpoint defined on the master unit will be distributed to the other "slave" units.
If the control panel's display is connected to a slave unit, any changes to the operating mode or the setpoint will be ignored.
When there are at least two units configured in the master/slave assembly, it is possible to define how the compressors will be activated. There are three different methods for controlling the compressor.

- **The compressors can be activated:**

Based on the configuration of the addresses: The master unit is activated first. Afterwards, the slave units are activated in sequence (starting with slave no. 1, and finishing with slave no. 3, for example). Upon shutdown, the last slave available on the network shuts down first, and the master is the last unit to be shut down.
Based on the wear factor: The units are activated in sequence based on the wear factor. When the flow rate is increased, the unit with the lowest wear factor is activated first, and when the flow rate is decreased, the unit with the highest wear factor is shut down first.
Simultaneously: All the units are activated and shut down simultaneously. The compressor's frequency is increased or decreased simultaneously on all the units.
For more information about the master/slave icon displayed on the Control Panel, please refer to the Control Panel's manual.

⚠ In the event of a master/slave communication error, the master unit will either begin to operate in stand-alone mode, or else will continue to operate with the other slave units that have remained connected. The functions of the slave unit concerned will be interrupted.

4.7 Pump configuration

The circuit's water pump can be configured in different ways:
— Unit with hydronic module (internal main pump included),
— Unit without hydronic module (an external main pump must be added),
— If the installation includes a secondary water circuit, an additional pump can be mounted on this circuit.

Possible pump configurations	Internal main pump	External main pump (not provided)	Auxiliary pump (not provided)
	Fixed speed pump	Fixed speed pump	Fixed speed pump
Internal main pump		no	yes
External main pump	no		yes
DHW installation	yes	yes	yes
Master/slave installation	yes	no	yes (only on the master unit)

⚠ The installer is responsible for protecting the auxiliary pumps against low water flow (no flow switch can be managed by the unit's control).

⚠ The main pump's status (on/off) depends on the type of installation (options, accessories, applications). In the compatibility table shown below, and the various control logics for the main pump are shown based on the installation:

Logica della pompa principale [P565]	Local control panel	Remote control panel	Mode off	Cooling/heating mode		Boiler	
				Request met	Request	On	Off
Always on	yes	yes	Off	On	On	Off	N.A.
Water sampling	yes	N.A.	Off	Off (on for sampling)	On	Off	N.A.
Based on the room temperature	N.A.	yes	Off	Based on IAT vs air setpoint	On	Off	N.A.

The additional pump's status (on/off) depends on the type of installation (options, accessories, applications). In the compatibility table shown below, the various control logics for the main pump are shown based on the installation:

Auxiliary pump logic [P573]	Local control panel	Remote control panel	Mode off	Cooling/heating mode		Boiler		DHW	
				Request met	Request	On	Off	Enabled	Disabled
No auxiliary pump	yes	yes	Off	Off	Off	Off	N.A.	N.A.	N.A.
Always on	yes	yes	Off	On	On	On	N.A.	N.A.	N.A.
Based on the room temperature	N.A.	yes	Off	Based on IAT vs air setpoint	On	On	N.A.	N.A.	N.A.
Always on, except when DHW is enabled	yes	yes	Off	On	On	On	N.A.	Off	N.A.

Auxiliary pump logic [P573]	Local control panel	Remote control panel	Mode off	Cooling/heating mode		Boiler		DHW	
				Request met	Request	On	Off	Enabled	Disabled
Based on the room temperature, but off when DHW is enabled	N.A.	yes	Off	Based on IAT vs air setpoint	On	On	N.A.	Off	N.A.

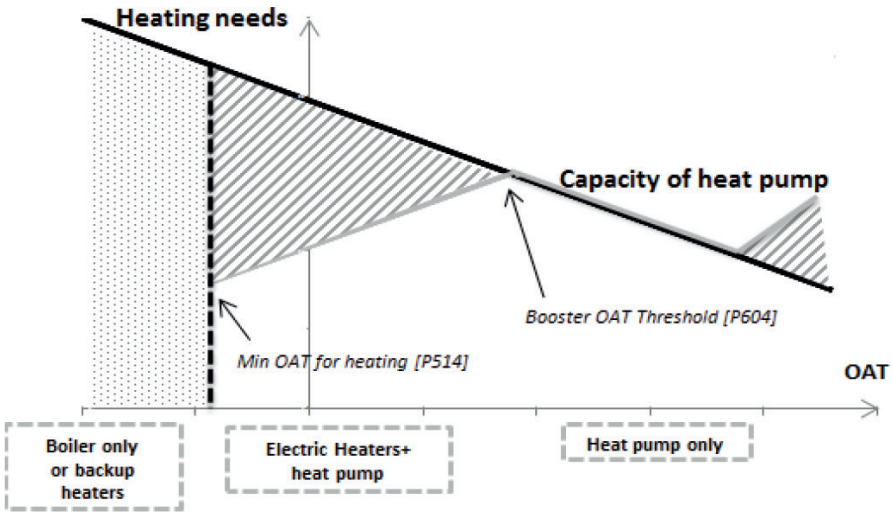
4.8 Electric heaters

⚠ The installer is responsible for ensuring the system's compliance with the applicable requirements in terms of electrical and thermal safety.

Electric heaters can be mounted on the water circuit in order to ensure heating in the event of a low OAT, or if the heat pump is experiencing a fault or malfunction.

When the OAT is below the additional threshold [P604], the auxiliary electric heaters can be activated. The auxiliary electric heaters can be made to operate in conjunction with the heat pump. When the OAT is below the minimum heating threshold [P514], the heat pumps are stopped and the auxiliary electric heaters can be activate.

4.11 AUXILIARY AND EMERGENCY FUNCTIONS



Once the configuration has been completed, it is possible to control up to three electric heaters or three electric heating stages:

- One electric heating stage with one custom output only: EH1
- Two electric heating stages with two custom outputs: EH1 and EH2
- Three electric heating stages with two custom outputs: EH1 and EH2
- Three electric heating stages with three discrete outputs: EH1, EH2 and EH3. This configuration cannot be activated if a DHW heater is present.

4.9 Boiler

In order to meet the heating capacity requirements at extremely low room temperatures, a boiler can be installed. The boiler is considered an emergency device: when it is activated the heat pump cannot function. The boiler is activated when the OAT is lower than the minimum OAT for heating [P514], or in the event of a heat pump fault or malfunction.

4.10 Defrost cycle

When the external air temperature is low and the room humidity is high, there is a greater risk of ice forming on the coils' external surfaces. The frost covering the external coil can reduce the flow of air through the same, thus decreasing the unit's performance. The control unit activates the defrost cycle whenever necessary in order to eliminate the frost from the coil.
During the defrost cycle, the circuit is forced into cooling mode. In order to prevent the water circuit from cooling, the BPHEs and the pipes' electric heaters can be activated.

⚠ It should be noted that "defrost" and "home freeze protection" are two different modes. The defrost function is used to eliminate the frost covering the external coil, while the home freeze protection function is used to maintain the minimum temperature within the rooms.

4.11 Capacity control in night mode

The night period is defined by a start time and a stop time can be set by the user. Night mode allows the user to configure the unit in such a way that it operates with specific parameters within a certain period of time, for example night period. In particular, this mode allows the compressor's frequency to be decreased during a certain time frame.

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Units
Night mode settings	CMP_CONF	**541**	Power limitation value	The compressor's frequency is limited by this percentage of the maximum permitted frequency	50 – 100	75	50	%
	GEN_CONF	**518**	Night mode start time	Night mode activation time	00:00 – 23:59	0:00	23:00	hh: mm
		519	Night mode end time	Night mode stop time	00:00 – 23:59	0:00	7:00	hh: mm

5 MAINTENANCE

5.1 Standard maintenance

In order to ensure the unit's maximum efficiency and reliability, it is recommended to stipulate a maintenance contract with your local support centre. The contract includes regular inspections performed by the service's experts, so that any malfunctions will be promptly detected and corrected, without any serious consequences.
With a maintenance contract, our experienced technicians will be able to ensure that the devices will last as long as possible, and the system will be managed in the most effective manner, even in terms of costs.
The air-conditioning devices must be serviced by authorized professional technicians, while routine checks can be carried out locally by specialized technicians. See the EN 378-4 or ISO 5149 standards.
All the refrigerant filling, removal, and discharging operations must be performed by qualified personnel, using the correct materials for the unit in question. Any inadequate handling could result in fluid leaks or uncontrolled pressure values.

⚠ Prior to performing any interventions upon the machine, always make sure that the power supply is turned off. If a cooling circuit is opened, it must be completely drained, refilled, and tested to check for any leaks. Prior to performing any operations upon a cooling circuit, the entire refrigerant load must be drained from the unit itself using a refrigerant recovery unit.

Simple preventive maintenance operations can ensure the unit's excellent performance:
- improved heating and cooling performance
- reduced energy consumption
- prevention of accidental component functions
- prevention of major interventions, thus ensuring savings in terms of time and costs
- protection of the environment

The units require five different levels of maintenance.

⚠ Any deviations or failures to observe these maintenance criteria will nullify the unit's warranty conditions, thus absolving the manufacturer of any responsibility.

5.1.1 Maintenance level 1

See the notes contained in the section titled "Maintenance level 3 (or higher)" on page *p. 54*.
Simple procedures can be performed by the user on a weekly basis:
- Visually check for any traces of oil (indication of a refrigerant leak),
- Clean the air heat exchanger,
- Check for any protection devices that may have been removed, and any doors or cover that may not have been closed properly,
- Check the unit's alarms report while the unit is not in function (refer to the Control Panel's user manual),
- Visually check for any signs of deterioration,
- Check the load on the level indicator
- Check that the difference in water temperature between the heat exchanger's intake and delivery is correct.

5.1.2 Maintenance level 2

This level requires a specific know-how in the electrical, hydronic, and mechanical fields.
This level of maintenance can be carried out on a monthly or annual basis, depending on the type of check to be carried out.
Under these conditions, it is recommended to perform the following maintenance interventions.
Perform all the level 1 operations, and then perform the following:

Electrical checks
- Tighten the power circuit's electrical connections at least once a year (see the table containing the tightening torques).
- If necessary, check and tighten all the connections for the controls/commands (the table containing the tightening torques).
- Dust and clean the inside of the control units, if necessary.
- Check the status of the contactors, switches, and capacitors.
- Verify the presence and check the conditions of the electrical protection devices.
- Check that all the electric heaters are functioning properly.
- Check that no water has penetrated into the control unit.

Mechanical checks
- Check the tightness of the fastening bolts of the fan column, the fan, the compressor, and the control unit.

Water circuit checks
- Always use caution when working on the water circuit, and take care to avoid damaging the adjacent capacitor.
- Check the water connections.
- Check whether the expansion tank shows any signs of excessive corrosion or gas leaks, and replace it if necessary.
- Drain the impurities from the water circuit.
- Clean the impurities from the water filter.
- Check the fixed speed pump's bearing after 17,500 hours of operation with water, and the seal of the mechanical pump after 15,000 hours. Check the operation of the low water flow safety device.
- Check the status of the pipes' thermal insulation.
- Check the concentration of the anti-freeze solution (ethylene glycol or propylene glycol).

Cooling circuit
- Thoroughly clean the air heat exchangers with a low pressure jet and a biodegradable detergent.
- Check the unit's operating parameters and compare them with the previous values.
- Perform an oil contamination test. Change the oil if necessary.
- Check the operation of the high-pressure switch. Replace it if faulty.
- Check the cleanliness of the dehydration filter. Replace it if necessary.
- Keep and maintain a maintenance sheet for each unit.

All of these operations must be performed in strict accordance with the required safety measures: personal protective equipment, compliance with all the industry regulations, compliance with the applicable local regulations, and the use of common sense.

5.1.3 Maintenance level 3 (or higher)

Maintenance at this level requires specific skills, permissions, instruments and know-how, and the relative operations may only be carried out by the manufacturer, its representatives, or other authorized agents. These maintenance operations involve the following interventions, for example:
- – The replacement of major components (the compressor, evaporator, etc.),
- Any interventions upon the cooling circuit (handling of the refrigerant),

— The modification of the parameters set at the factory (application changes),
— The removal or disassembly of the HVAC unit,
— Any intervention resulting from a scheduled maintenance intervention that was not performed.
— Any interventions covered by warranty.
— One or two leak checks per year, performed by a qualified person using a certified leak detector.

In order to reduce waste, the refrigerant and the oil must be compliant with the current regulations, and the relative usage methods must limit the refrigerant and load losses, and must be carried out using materials suitable for the products.

Any faults and leaks detected must be immediately repaired. The oil recovered from the compressor during maintenance activities contains refrigerant, and must be handled accordingly.
The pressurized refrigerant must never be discharged into the open air.
If a cooling circuit is opened, plug all the openings if the operation is expected to last up to one full day; for longer periods, fill the circuit with nitrogen.
NOTE: Any deviations or failures to observe these maintenance criteria will nullify the HVAC unit's warranty conditions, thus absolving the manufacturer of any responsibility.

5.2 Tightening torques for the main electrical connections

Component	Designation of the unit	Value (Nm)
Disconnecting switch (option 70)	L1 /L2 /L3/N/PE	2,00
Terminal block XI	L1 /L2 /L3/N/PE	1,5 – 1,8
Terminal block X3		0,6 – 0,8
Contactor (power and control)		1,50
Thermal relay		2,50
Transformer		1,70
Connections on the compressor		
Phase wire screw (only for 21kW)		2,50
Compressor speed variator		
six M10 nuts	L1 /L2 /L3/N	1,20
two M10 or M8 nuts	PE	1,20
9 M8 nuts (with fuses and bars)	01/02/03	1,20

5.3 Tightening torques for the main bolts and screws

Screw type	Use	Value (Nm)
H M8 wood screw	Frame mounting on the pallet	13,00
H M8 nut	Fastening of the compressor onto the base and BPHE and receiver fastening	15,00
Self tapping screw D=4.2mm	Sheet metal parts, plastic grille and electrical components	4,20
Self tapping screw D=3mm	Installation of the deflector on the front panel	2,00
M6 Self tapping screw	Fan sub-unit and installation of the frame on the feet	7,00
M8 screw	Water pump on divider panel assembly	15,00
D1" and D1"1/4" gas nut	Heat pump pipe unit intake and delivery	70,00
D1/2" gas nut	Water filling system and unit nut on water pump suction pipe	20,00
H M6 nut	Fan blade unit on fan motor	7,00

5.4 Air heat exchanger

It is recommended to regularly inspect the finned coils in order to check their level of cleanliness. This depends on the environment in which the unit is installed, and the conditions will be worse in industrial and urban environments, and around deciduous trees.
Two levels of maintenance are required in order to clean the finned coil:

— If the air heat exchangers are clogged, use a brush to gently clean them in a vertical direction.
— The fan must be off when working on the air heat exchangers.
— The unit should be shut off for this type of operation if deemed necessary, taking into account all the appropriate maintenance considerations.
— Clean the air heat exchangers in order to ensure the unit's optimal operation. This cleaning operation is required once the air heat exchangers start to get dirty. The frequency of the cleaning operations depends on the season and the unit's location (presence of wind, dust, plants, etc.).

Clean the finned coil with appropriate products.

⚠ Never use pressurized water without a large diffuser attachment. Never use high-pressure detergents for Cu/Cu and Cu/Al coils.

Concentrated or rotating jets of water are strictly prohibited. Never use liquids with temperatures greater than 45° C to clean the air heat exchangers.
2/3 of corrosion problems can be prevented with proper and frequent cleaning (approximately every three months).

5.5 Water heat exchanger maintenance

Check that:

- The insulating foam is intact and remains firmly in position.
- The BPHEs and the electric pipe heaters are functioning properly and are correctly positioned in a secure manner.
- The connections on the water side are clean and do not show any signs of leaks.

5.6 Unit maintenance

⚠ Prior to performing any intervention upon the unit, make sure that the circuit has been isolated and that no electrical voltage is present. It should be noted that the circuit's condensers could take up to 5 minutes to completely discharge after the circuit has been isolated. Work upon the VFD must only be carried out by qualified personnel.

In the event of an alarm or a persistent problem relating to the VFD, contact the technical support service.
VFDs equipped with units do not require an isolation test, even if they are replaced; in fact, they are systematically inspected prior to delivery. Furthermore, the filtering components installed in the VFD can distort the measurements and can also be damaged. If the isolation of the device's components (fan and pump motors, cables, etc.) needs to be verified, the VFD must be disconnected from the power circuit.

5.7 Refrigerant volume

The unit must be activated in cooling mode in order to determine whether the unit load is correct, by checking the actual subcooling. A small refrigerant leak with respect to the initial load will be evident in cooling mode, and will affect the subcooling value obtained at the output of the air heat exchanger (capacitor), but will not be visible in heating mode.

⚠ It is therefore not possible to optimize the refrigerant load in heating mode following a leak. The unit must be activated in cooling mode in order to determine whether an additional load is required.

6 ALARM CODES

The operating errors are indicated on the control panel's display.

Fixed icon: indication that an alarm has been triggered, which caused the unit to shut off

Flashing icon: indication that an alarm has been triggered,which allowed the unit to remain in function

- Faults are indicated by an error code.
- In order to view the codes:
  - — press any key to activate the control panel
  - — hold down the buttons simultaneously **M** and ◷ for 2 seconds
  - — press ▼ or ▲ to scroll through the codes
- Two types of alarms are displayed:

CURRENT ALARM

Current alarm: C1
Alarm code: 16

PREVIOUS ALARM

Previous alarm: P1
Alarm code: 15

- To reset the alarms:
  - — hold down the buttons **M** and ◷ simultaneously for 2 seconds

  - — press ▼ or ▲ to select **YEs**
  - — simultaneously hold down the buttons **M** and ◷ for 2 seconds to confirm the selection
  - — hold down the button ⌂ for 2 seconds to exit

7 DESCRIPTION OF THE ALARM SIGNALS

The following tables include lists of alarm signals, together with the probable causes, the effects upon the unit, and the reset type.

Alarm [P344]	Alarm [P345]	Current alarm [P346] - [P349]	Description	Unit status	Reset type			Assessment and measurement
					Automatic	Cycle	Comment	
-	-	1	EWT sensor malfunction	Continuous	X			1. Check the EWT sensor (EWT). 2. Check the NHC board.
-	-	2	LWT sensor malfunction	Stopped	X			1. Check the LWT sensor (LWT). 2. Check the NHC board.
-	-	3	Inverter liquid Compressor malfunction (TR)	Cpr stop	X			1. Check the TR sensor (TR). 2. Check the NHC board.
-	-	4	OAT sensor malfunction	Continuous	X			1. Check the auxiliary OAT sensor (OAT). 2. Check the NHC board.
-	-	5	DHW TT sensor malfunction	Guasto ACS	X			1. Check the DHW sensor (DHW). 2. Check the NHC board.
-	-	6	Inverter liquid CHWSTEMP		X			1. Check the CHWSTEMP sensor (CHWSTEMP). 2. Check the NHC board.
-	-	7	IAT sensor malfunction	Continuous	X			1. Check the IAT sensor (IAT). 2. Check the NHC board.
-	-	8	Malfunctions UI internal temperature	Continuous	X			1. Check the UI internal temperature sensor. 2. Check the NHC board.
-	-	9	Spare sensor malfunction	Continuous	X			1. Check the spare sensor. 2. Check the NHC board.
100	6	10	Inverter discharge temperature sensor malfunction (TD)	Cpr stop		X	This error becomes definitive after 4 attempts to complete the operation.	1. Check the discharge temperature sensor (TD).
102	8	11	Inverter liquid compressor protection malfunction (TE)	Cpr stop		X	This error becomes definitive after 4 attempts to complete the operation.	1. Check the temperature sensor (TE).
103	-	12	Inverter liquid compressor sensor (TL) malfunction	Cpr stop		X	This error becomes definitive after 4 attempts to complete the operation.	1. Check the temperature sensor (TL).
104	-	13	Inverter T0 sensor malfunction	Continuous		X	The unit continues to function in emergency mode. The sensor's value is fixed at 30°C in cooling mode, and 10°C in heating mode The emergency mode is cancelled when any other value is detected by the T0 sensor.	1. Check the external temperature sensor (T0).
108	-	14	Inverter suction temperature sensor malfunction (TS)	Cpr stop		X	This error becomes definitive after 4 attempts to complete the operation.	1. Check the suction temperature sensor (TS).
109	-	15	Inverter compressor temperature malfunction	Cpr stop		X	This error becomes definitive after 8 attempts to complete the operation.	1. Check the fan's proper operation.
111	-	16	Inverter TE and TS sensors connected incorrectly	Cpr stop		X	This error becomes definitive after 4 attempts to complete the operation.	1. Check the temperature sensor (TE, TS).
119	13	17	Inverter suction pressure sensor malfunction (PS)	Cpr stop		X	This error becomes definitive after 2 attempts to complete the disconnect detection operation, and 4 attempts to detect high pressure.	1. Check the suction pressure sensor (LP).
-	-	20	Loss of communication with user interface	Continuous	X		When a new message is received by the user interface	
-	-	21	Loss of communication with inverter	Cpr stop	X		When a new message is received by the user interface	
221	-	22	Communication error between inverter boards	Cpr stop		X	Simple communication delay.	
-	-	23	Loss of communication with slave units	Continuous	X			
-	-	24	Loss of communication with master unit	Stopped	X			

Alarm [P344]	Alarm [P345]	Current alarm [P346] - [P349]	Description	Unit status	Reset type			Assessment and measurement
					Automatic	Cycle	Comment	
-	-	31	Safety input	Stoppage OR Heating Stoppage OR Cooling Stoppage	X		When the safety input is closed	
-	-	32	Inverter malfunction	Cpr stop		X	This error becomes definitive after 5 attempts to complete the operation.	
228	-	33	Inverter high-pressure discharge malfunction	Cpr stop			Simple communication delay.	1. Check the operation of the external fan. 2. Check the external fan motor's error 3. Check the clog status of the external PMV 4. Check the clog status of the heat exchanger 5. Air suction/discharge short circuit status
-	-	50	Heat exchanger freeze protection based on the temperature of the water (cooling)	Interruption of the cooling	X			
-	-	51	Heat exchanger freeze protection based on the compressor of the refrigerant (cooling)	Interruption of the cooling		X	This error becomes definitive after 5 attempts to complete the operation within the span of 2 hours.	
-	-	52	Heat exchanger compressor protection	Stopped	X			
243	-	60	Reversal valve protection	Cpr stop		X	This error becomes definitive after 4 attempts to complete the operation.	1. Check the operation of the 4-way valve. 2. Check the air heat exchanger's suction temperature sensor (TE). 3. Check the BPHE sensor (TR). 4. Check the 4-way valve's coil. 5. Check the PMV (Pulse Motor Valve).
246	7	61	Fan error	Cpr stop		X		1. Check the fan motor's block. 2. Check the power supply voltage between L2 and N.
132	-	70	Compressor thermal switch release failure	Cpr stop		X	This error becomes definitive after 10 attempts to complete the operation.	1. Check the frame and the thermostat connector. 2. Check for gas leaks, refill 3. Check the PMV (Pulse Motor Valve). 4. Check for any breaks in the pipes.
134	-	71	Suction pressure too low	Cpr stop		X	This error becomes definitive after 8 attempts to complete the operation. Error detected in the following conditions; 1) PS <0.2 detected continuously for 30s in cooling mode 2) PS <0.2 detected continuously for 10 minutes in heating mode	1. Check the clog status of the external PMV. 2. Check the 2-way valve's coil. 3. Check the PS sensor error (LP). 4. Check the clog status of the refrigerant filter. 5. Check the clog status of the refrigerant pipe. 6. Check the fan's operation. (In heating mode) 7. Check the decrease in refrigerant.
-	10	72	The compressor does not turn	Cpr stop		X		1. Compressor problems (blockage, etc.): Replace the compressor. 2. Compressor wiring error (open phase)
-	12	73	Compressor breakdown	Cpr stop		X		1. Check the power supply voltage. 2. Cooling cycle overload.

DESCRIPTION OF THE ALARM SIGNALS

Alarm [P344]	Alarm [P345]	Current alarm [P346] - [P349]	Description	Unit status	Reset type			Assessment and measurement
					Automatic	Cycle	Comment	
227	11	74	Discharge temperature too high	Cpr stop		X	This error becomes definitive after 4 attempts to complete of the operation.	1. Check the cooling cycle (gas leak) 2. Electronic expansion valve problems 3. Check the discharge temperature sensor (TD)
229	-	75	Phase missing in the power cable	Cpr stop		X	This error becomes definitive after 8 attempts to complete the operation.	1. Check the power supply voltage.
231	-	76	Inverter heat sink temperature too high	Cpr stop		X	This error becomes definitive after 4 attempts to complete the operation.	1. Check the heat sink's explosion pathway.
-	-	80	RTC malfunction on NHC board	Continuous	X			
-	-	81	EEPROM damaged on NHC board	Continuous		X		
127	-	82	Inverter EEPROM not legible of EEPROM number out of range	Stopped		X	Simple communication delay.	
-	-	90	Configuration not valid	Stopped	X			
-	-	100	Emergency stop					
-	-	200	Alarm external	Continuous	X		When the contact is closed	
-	1	-	Activation of the inverter's overcurrent protection circuit (brief period).	Stopped				
-	2	-	Not utilized	Stopped				
-	3	-	Position detection circuit error or short circuit between the coils of the compressor.	Stopped				
-	4	-	Current detection circuit error	Stopped				
-	5	-	Out of place,	Stopped				
-	9	-	Compressor temperature, compressor error (blocked, missing, etc.). Breakdown.	Stopped				
-	14	-	High pressure system error (pressure switch, compressor frame temperature, power supply)	Stopped				
-	15	-	Not utilized					
-	16	-	Not utilized					
244	-	-	High pressure system error (pressure switch, compressor frame temperature, power supply)	Stopped				

8 OVERVIEW OF THE PARAMETERS

This section contains an overview of all the parameters that can be read or modified by the user.
The parameters are ordered as follows:

— 001 - 299 Display parameters
— 301 - 399 Maintenance parameters
— 401 - 499 Setpoint parameters
— 501 - 799 Configuration parameters

Legend:

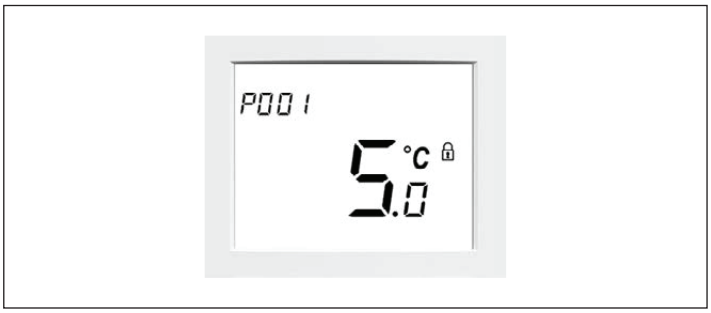
No	No access
RO	Read only
RW	Read/write
RO/d	Read and display on the Control Panel
RO/F	Read only and forcing of the parameters via CCN

- In order to gain access:
  — press any key to activate the control panel
  — hold down the ⌂ and ◷ buttons simultaneously for 2 seconds

The password prompt for accessing the advanced settings will appear on the display.

Enter the password **(0120)**

— press ▼ or ▲ to select the first number
— press ◷ to confirm the selection and move on to the next item
— hold down the **M** button for 2 seconds to validate the password and gain access



To select:

— press ▼ or ▲ to select the desired parameter

To modify:

— hold down the ◷ button for 2 seconds
— press ▼ or ▲ to modify the value
— press ◷ to confirm the selection and move on to the next item
— hold down the **M** button for 2 seconds to save the parameter.

After having completed the settings:

— hold down the ◷ button for 2 seconds to exit

Display parameters

Par.	Jbus	Code	Description	Range	Default	Units	Control panel	CCN	Table
1	0001H	OAT	Outdoor Air Temperature			1/10°C	RO/d	RO/F	GENUNIT
2	0002H	IAT	Indoor Air Temperature			1/10°C	RO/d	RO/F	GENUNIT
3	0003H	EWT	Entering Water Temperature			1/10°C	RO	RO/F	GENUNIT
4	0004H	LWT	Leaving Water Temperature			1/10°C	RO	RO/F	GENUNIT
5	0005H	TR	Refrigerant Temperature			1/10°C	RO	RO/F	GENUNIT
6	0006H	SPARE_T	Spare temperature			1/10°C	RO	RO/F	GENUNIT
7	0007H	roomtemp	Room temperature			1/10°C	RO	RO/F	GENUNIT
8	0008H	sst	Saturated suction temp.			1/10°C	RO	RO	GENUNIT
9	0009H	ts	Suction temperature			1/10°C	RO	RO	GENUNIT
10	000A	td	Discharge temperature			1/10°C	RO	RO	GENUNIT
11	000B	te	Air heat exchanger lower temperature			1/10°C	RO	RO	GENUNIT
12	000C	tl	Air heat exchanger upper temperature			1/10°C	RO	RO	GENUNIT
13	000D	to	Inv. External air temperature			1/10°C	RO	RO	GENUNIT
14	000E	th	Heat sink temperature			1/10°C	RO	RO	GENUNIT
15	000F	sh	Overheating temperature			1/10 K	RO	RO	GENUNIT
16	0010H	sh_targ	Overheating target temp.			1/10 K	RO	RO	GENUNIT
17	0011H	cc_volt	DC High-voltage inverter			V	RO	RO	GENUNIT
18	0012H	hv_stat	HV bus communication status	0/1 [Normal/alarm]		-	RO	RO	GENUNIT
19	0013H	inv_mod	Inverter current mode			-	RO	RO	GENUNIT

Par.	Jbus	Code	Description	Range	Default	Units	Control panel	CCN	Table
20	0014H	freq_min	Min. current compressor freq			1/10 Hz	R0	R0	GENUNIT
21	0015H	freq_max	Max. current compressor freq			1/10 Hz	R0	R0	GENUNIT
22	0016H	FREQ_REQ	Compr. req. Freq			1/10 Hz	R0	R0/F	GENUNIT
23	0017H	freq_cur	Current compressor frequency			1/10 Hz	R0	R0	GENUNIT
24	0018H	pmv_pos	PMV position	0 - 500		step	R0	R0	GENUNIT
25	0019H	N.A.							
26	001A	N.A.							
27	001B	upr_fan	Upper fan speed	0 - 1000		rpm	R0	R0	GENUNIT
28	001C	lwr_fan	Lower fan speed	0 - 1000		rpm	R0	R0	GENUNIT
29	001D	EXCH_HTR	Heat exchanger heater	0/1 [Off/On]		-	R0	R0/F	GENUNIT
30	001E	CALDAIA	Boiler flow rate	0/1 [Off/On]		-	R0	R0/F	GENUNIT
31	001F	EHS	Electrical heating stages	0 - 3		-	R0	R0/F	GENUNIT
35	0023H	SPARE_P	Additional pressure			KPa	R0	R0/F	GENUNIT
41	0029H	CHIL_OCC	Occupation mode	0 - 2 [Away/ sleep/ home]		-	RW/d	RW/F	STATO
42	002A	sum_mode	Summer mode	0/1 [No/yes]		-	R0	R0	STATO
43	002B	nightmod	Night mode	0/1 [No/yes]		-	R0	R0	STATO
44	002C	MOD_REQ	System mode request	0 - 9 0 = Off 1 = Cooling 2 = Heating 4 = Domestic hot water 5 = Cooling booster 6 = Heating booster 8 = Deaeration (pump operates continuously to remove air from the hydraulic circuit) 9 = Dehumidification (slow water temperature increase in heating mode)		-	RW/d	RW/F	STATO
45	002D	MOD_STAT	System mode status	0 - 109		-	R0/d	R0	STATO
46	002E	N.A.							
47	002F	mod_ovr	System mode override	0 - xxx		-	R0	R0	STATO
48	0030H	Setpoint	Current setpoint	5,0 - 60,0		1/10°C	RW/d	R0	STATO
49	0031H	RESET	Temperature regulated by the user	=-5 - 5		1/10 K	R0	R0/F	STATO
50	0032H	IAT_OFF	IAT Offset	=-4 - 4		1/10 K	R0	R0/F	STATO
51	0033H	CTRL_PNT	Control point	5,0 - 60,0		1/10°C	R0/d	R0/F	STATUS 0 MSL_STAT
52	0034H	CTRL_TMP	Control temperature	=-40 - 115		1/10°C	R0/d	R0/F	STATO
53	0035H	CHIL_S_S	Unit start/stop	0/1 [Start/stop]		-	R0	R0/F	AQUASMRT
54	0036H	HC_SEL	Heating/cooling selection	0/1 [heating/pcooling]		-	R0	R0/F	AQUASMRT
55	0037H	EMSTOP	Emergency stop	0/1 [Disable/Enable]		-	R0	R0/F	AQUASMRT
61	003D	cmp_req	Compressor mode request			-	R0	R0	LOADFACT
62	003E	cmp_inv	Inv. compressor mode			-	R0	R0	LOADFACT
63	003F	cmp_stat	Compressor mode status			-	R0	R0	LOADFACT
64	0040H	cap_ovr	Capacity override			-	R0	R0	LOADFACT
65	0041H	cap_tmr	Capacity timer			s	R0	R0	LOADFACT
66	0042H	CAP_T	Total capacity	0 - 100		%	R0	R0/F	LOADFACT
67	0043H	DEM_LIM	Demand limit	0 - 100		%	R0	R0/F	LOADFACT

Par.	Jbus	Code	Description	Range	Default	Units	Control panel	CCN	Table
68	0044H	FREQ_RED	Frequency reduction mode	0/1 [No/yes]		-	R0	RO/F	LOADFACT
69	0045H	FUNZIONAMENTO	Unit operation status	0/1 [No/yes]		-	R0	RO/F	LOADFACT
81	0051H	pmp_ovr	Pump override	=-1 - 16		-	R0	R0	PMP_STAT
82	0052H	flow_err	Water flow rate malfunction	0/1 [Normal/alarm]		-	R0	R0	PMP_STAT
83	0053H	delta_t	Water Delta T			1/10 K	R0	R0	PMP_STAT
84	0054H	PMP	Water pump speed	0 - 100		%	R0	RO/F	PMP_STAT
85	0055H	ADD_PMP	Auxiliary pump flow rate	0/1		-	R0	RO/F	PMP_STAT
101	0065H	ONOFF_SW	On/off selection switch status	0/1 [open/closed]		-	R0	RO/F	INPUT
102	0066H	HC_SW	Heating/cooling switch status	0/1 [open/closed]		-	R0	RO/F	INPUT
103	0067H	ECO_SW	Eco switch status	0/1 [open/closed]		-	R0	RO/F	INPUT
104	0068H	SAFE_SW	Safety switch status	0/1 [open/closed]		-	R0	RO/F	INPUT
105	0069H	FLOW_SW	Flow switch status	0/1 [open/closed]		-	R0	RO/F	PMP_STAT 0 INPUT
106	006A	CUST_DI5	Custom DI#5 status	0/1 [open/closed]		-	R0	RO/F	INPUT
107	006B	CUST_DI6	Custom DI#6 status	0/1 [open/closed]		-	R0	RO/F	INPUT
108	006C	CUST_DI7	Custom DI#7 status	0/1 [open/closed]		-	R0	RO/F	INPUT
109	006D	CUST_DI8	Custom DI#8 status	0/1 [open/closed]		-	R0	RO/F	INPUT
110	006E	RED_SW	Power limitation switch	0/1 [open/closed]		-	R0	RO/F	INPUT
111	006F	OPEAK_SW	Shut down switch at high energy cost times	0/1 [open/closed]		-	R0	RO/F	INPUT
112	0070H	LSHED_SW	Load elimination request switch	0/1 [open/closed]		-	R0	RO/F	INPUT
113	0071H	SOLAR_SW	Solar input switch	0/1 [open/closed]		-	R0	RO/F	INPUT
114	0072H	DHW_REQ	DHW request from tank	0/1 [open/closed]		-	R0	RO/F	INPUT OR DHW_STAT
115	0073H	DHW_PRIO	DHW priority switch	0/1 [open/closed]		-	R0	RO/F	INPUT 0 DHW_STAT
116	0074H	DHW_ANTI	DHW anti-legionella request	0/1 [open/closed]		-	R0	RO/F	INPUT 0 DHW_STAT
117	0075H	SUMM_SW	Summer switch	0/1 [open/closed]		-	R0	RO/F	INPUT OR
118	0076H	N.A.							
119	0077H	N.A.							
120	0078H	EXALM_SW	External alarm switch	0/1 [open/closed]		-	R0	RO/F	INPUT
201	00C9	DHW_MODE	DHW mode	0 - 2 [Eco/ Anti-Leg. /Regolar]		-	RW	RO/F	DHW_STAT
202	00CA	dhw_ovr	Override DHW	=-1 - 100		-	R0	R0	DHW_STAT
203	00CB	dhw_dem	DHW request from tank	0/1 [No/yes]		-	R0	R0	DHW_STAT
204	00CC	dhw_cond	DHW conditions	0/1 [True/false]		-	R0	R0	DHW_STAT
205	00CD	DHW_CTLP	DHW control point	20,0 - 60,0		1/10°C	R0	RO/F	DHW_STAT
206	00CE	DHW_TT	DHW tank temperature			1/10°C	R0	RO/F	DHW_STAT
207	00CF	shc_time	Current SHC runtime			min	R0	R0	DHW_STAT
208	00D0	dhw_time	Current DHW runtime			min	R0	R0	DHW_STAT
209	00D1	DHW_EXCP	DHW exception timer	0 - 1440		min	R0	RO/F	DHW_STAT
210	00D2	DHW_VLV	DHW diverter valve	0/1 [Off/On]		-	R0	RO/F	DHW_STAT
211	00D3	DHW_EHS	DHW electric heater stage	0/1 [Off/On]		-	R0	RO/F	DHW_STAT

Par.	Jbus	Code	Description	Range	Default	Units	Control panel	CCN	Table
212	00D4	DHW_RUN	DHW operation status	0/1 [No/yes]		-	RO	RO/F	DHW_STAT
221	00DD	CHWSTEMP	Chiller water circuit temp.			1/10°C	RO	RO/F	MSL_STAT
222	00DE	msl_cap	Master/slave total capacity	0 - 100		%	RO	RO	MSL_STAT
223	00DF	Mst_req	Master request capacity	0 - 100		%	RO	RO	MSL_STAT
224	0000H	slv1_req	Slave no.1 request capacity	0 - 100		%	RO	RO	MSL_STAT
225	0000H	slv2_req	Slave no.2 request capacity	0 - 100		%	RO	RO	MSL_STAT
226	0000H	slv3_req	Slave no.3 request capacity	0 - 100		%	RO	RO	MSL_STAT
227	0000H	N.A.							
228	0000H	mast_sta	Master status	=-1 - 101		-	RO	RO	MSL_STAT
229	0000H	slv1_sta	Slave no.1 status	=-1 - 101		-	RO	RO	MSL_STAT
230	0000H	slv2_sta	Slave no.2 status	=-1 - 101		-	RO	RO	MSL_STAT
231	0000H	slv3_sta	Slave no.3 status	=-1 - 101		-	RO	RO	MSL_STAT
241	00F1	N.A.							
242	00F2	N.A.							
243	00F3	N.A.							
244	00F4	N.A.							
245	00F5	N.A.							

Maintenance parameters

Par.	Jbus	Code	Description	Range	Default	Units	Control panel	CCN	Table
301	012D	model	Inverter model			-	RO	RO	Inverter
302	012E	prg_ver	Inverter program version			-	RO	RO	Inverter
303	012F	prg_rev	Inverter program revision			-	RO	RO	Inverter
304	0130H	eep_cod	Inverter EEPROM code			-	RO	RO	Inverter
305	0131H	sw_set	Inverter switch setting			-	RO	RO	Inverter
306	0132H	cdu_cap	CDU capacity	0 - 15		-	RO	RO	Inverter
307	0133H	mcu_code	MCU code			-	RO	RO	Inverter
321	0141H	QCK_ENA	QT: Quick test mode activation	0/1 [No/yes]		-	RW	RW/F	QCH_TEST
322	0142H	_HP_TEST	QT: HP pressure switch test	0 - 7 [No test/ Request test/ Test in progress/ Test OK/ HP test failed due to time-out HP test failed due to flow switch malfunction HP test failed due to low water temperature HP test failed due to inverter malfunction		-	RW	RW/F	QCH_TEST
323	0143H	_RAT_MOD	QT: Evaluation Mode	0 - 4 [Evaluation off/ Cooling evaluation/ Heating evaluation/ Cooling ramp/ Heating ramp]		-	RW	RW/F	QCH_TEST
324	0144H	_RAT_FRQ	QT: Evaluation frequency	0 - 120		1/10 Hz	RW	RW/F	QCH_TEST

Par.	Jbus	Code	Description	Range	Default	Units	Control panel	CCN	Table
325	0145H	_FAN_LOW	QT: Lower fan speed	0 - 1000		rpm	RW	RW/F	QCH_TEST
326	0146H	_FAN_UPP	QT: Upper fan speed	0 - 1000		rpm	RW	RW/F	QCH_TEST
327	0147H	_PMV_POS	QT: PMV position	0 - 1000		-	RW	RW/F	QCH_TEST
331	014B	_PMP	QT: Water pump speed	0 - 100		%	RW	RW/F	QCH_TEST
332	014C	_ADD_PMP	QT: Auxiliary pump	0/1 [Off/On]		-	RW	RW/F	QCH_TEST
333	014D	_EHS_PMP	QT: EHS auxiliary pump	0/1 [Off/On]		-	RW	RW/F	QCH_TEST
334	014E	_EXH_HTR	QT: Water heat exchanger heater	0/1 [Off/On]		-	RW	RW/F	QCH_TEST
335	014F	_DHW_VLV	QT: DHW diverter valve	0/1 [Off/On]		-	RW	RW/F	QCH_TEST
336	0150H	_BOILER	QT: Boiler or EHS1	0/1 [Off/On]		-	RW	RW/F	QCH_TEST
337	0151H	_CUSTD08	QT: Custom DO no.8	0/1 [Off/On]		-	RW	RW/F	QCH_TEST
338	0152H	_CUSTD09	QT: Custom DO no.9	0/1 [Off/On]		-	RW	RW/F	QCH_TEST
340	0154H	_HP_MAX	Maximum high Pressure			1/10KPa	RO	RO	QCH_TEST
341	0155H	ALMRESET	Alarm reset	0/1 [no/yes		-	RW	RW/F	ALARM
342	0156H	ALM	Alarm status	0/1 [Normal/alarm]		-	RO/d	RO	ALARM
343	0157H	inv_err	Inverter error (code)	0 - 255		-	RO	RO	ALARM
344	0158H	inv_erra	Inverter error (Alpha)	"Normal"/"Xnn"		-	RO	RO	ALARM
345	0159H	drv_cod	Drive error code	0 - 14		-	RO	RO	ALARM
346	015A	N.A.							
347	015B	N.A.							
348	015C	N.A.							
349	015D	N.A.							
350	015E	alm_01	Current alarm no.1	0 - 100		-	RO	RO	ALARM
351	015F	alm_02	Current alarm no.2	0 - 100		-	RO	RO	ALARM
352	0160H	alm_03	Current alarm no.3	0 - 100		-	RO	RO	ALARM
353	0161H	alm_04	Current alarm no.4	0 - 100		-	RO	RO	ALARM
354	0162H	alm_05	Current alarm no.5	0 - 100		-	RO	RO	ALARM
360	0168H	alm_01p	Previous alarm no.1	0 - 100		-	RO	RO	ALARM
361	0169H	alm_02p	Previous alarm no.2	0 - 100		-	RO	RO	ALARM
362	016A	alm_03p	Previous alarm no.3	0 - 100		-	RO	RO	ALARM
363	016B	alm_04p	Previous alarm no.4	0 - 100		-	RO	RO	ALARM
364	016C	alm_05p	Previous alarm no.5	0 - 100		-	RO	RO	ALARM
371	0173H	comp1_st	Number of compressor start-ups			-	RO	RO	RUNTIME1
372	0174H	comp1_hr	Compressor runtime			h	RO	RO	RUNTIME1
373	0175H	pmp_st	Number of water pump start-ups			-	RO	RO	RUNTIME1
374	0176H	pmp_hr	Water pump runtime			h	RO	RO	RUNTIME1
379	017B	N.A.							
381	017D	RUN2_RST	Runtime reset performed by the user	0 - 3	0	-	RW	RW	RUNTIME2
382	017E	comp_hr	Compressor runtime			h	RO	RO	RUNTIME2
383	017F	back_hr	Emergency runtime			h	RO	RO	RUNTIME2
384	0180H	cool_hr	Runtime in cooling mode			h	RO	RO	RUNTIME2
385	0181H	heat_hr	Runtime in heating mode			h	RO	RO	RUNTIME2
386	0182H	dhw_hr	Runtime in DHW mode			h	RO	RO	RUNTIME2
387	0183H	dfrt_hr	Runtime in defrost mode			h	RO	RO	RUNTIME2
388	0184H	nrg_heat	Energy consumed in heating mode			kWh	RO	RO	RUNTIME2
389	0185H	nrg_cool	Energy consumed in cooling mode			kWh	RO	RO	RUNTIME2

Setpoint parameters

Par.	Jbus	Code	description	Range	default	Units	Control panel	CCN	Table
401	0191H	hwoccstp	Home heating setpoint (water)	20,0 - 60,0	45	1/10°C	RW	RW	WAT_STP
402	0192H	hwunooff	Sleep heating offset (water)	=-10 - 0	0	1/10 K	RW	RW	WAT_STP
403	0193H	hwecooff	Away heating offset (water)	=-10 - 0	-5.0	1/10 K	RW	RW	WAT_STP
404	0194H	N.A.							
405	0195H	leg_stp	DHW Anti-legionella setpoint	50,0 - 60,0	60	1/10°C	RW	RW	WAT_STP
406	0196H	dhw_stp	DHW setpoint	30,0 - 60,0	50	1/10°C	RW	RW	WAT_STP
407	0197H	cwoccstp	Home cooling setpoint (water)	5,0 - 18,0	12	1/10°C	RW	RW	WAT_STP
408	0198H	cwunooff	Sleep cooling offset (water)	0,0 - 10,0	0	1/10 K	RW	RW	WAT_STP
409	0199H	cwecooff	Away cooling offset (water)	0,0 - 10,0	5	1/10 K	RW	RW	WAT_STP
410	019A	hw_hyst	Heating hysteresis (water)	0,5 - 2,0	0	1/10 K	RW	RW	WAT_STP
411	019B	cw_hyst	Cooling hysteresis (water)	0,5 - 2,0	0	1/10 K	RW	RW	WAT_STP
412	019C	hcurvoff	Heating curve maximum setpoint offset	=-5 - 5	0	1/10 K	RW	RW	WAT_STP
413	019D	ccurvoff	Cooling curve minimum setpoint offset	=-5 - 5	0	1/10 K	RW	RW	WAT_STP
421	01A5	htoccstp	Home heating setpoint (air)	12,0 - 34,0	19	1/10°C	RW	RW	AIR_STP
422	01A6	htunooff	Sleep heating offset (air)	=-10 - 0	-2	1/10 K	RW	RW	AIR_STP
423	01A7	htecooff	Away heating offset (air)	=-10 - 0	-4	1/10 K	RW	RW	AIR_STP
424	01A8	cloccstp	Home cooling setpoint (air)	20,0 - 38,0	26	1/10°C	RW	RW	AIR_STP
425	01A9	clunooff	Sleep cooling offset (air)	0,0 - 10,0	2	1/10 K	RW	RW	AIR_STP
426	01AA	clecooff	Away cooling offset (air)	0,0 - 10,0	4	1/10 K	RW	RW	AIR_STP
427	01AB	freezstp	Home freeze protection setpoint	6,0 - 12,0	6	1/10°C	RW	RW	AIR_STP
428	01AC	deltastp	Air delta setpoint	0,2 - 1,0	0	1/10 K	RW	RW	AIR_STP
429	01AD	iat_fact	IAT reset factor	0,0 - 2,0	0	42644,00	RW	RW	AIR_STP

Configuration parameters

Par.	Jbus	Mnemonic	Description	Range	Default	Units	Control panel	CCN	Table
501	01F5	sfsw_typ	SAFETY SWITCH 1 = the unit stops when the contact is open 2 = floor system safety in heating mode (heating disabled with open contact) 3 = floor system safety in cooling mode (cooling disabled with open contact)	1 - 3	1	-	RW	RW	GEN_CONF
502	01F6	cust_di5	0 = not used 1 = Frequency reduction (night mode) 2 = expensive electric power, heating element stop (off-peak) 3 = machine stop for renewable energy use (loadshed) 4 = machine stop in DHW heating mode for solar energy use 5 = boiler thermostat DHW request 6 = absolute priority to DHW production 7 = anti-legionella cycle activation 8 = switching to summer mode 9 = not used 10 = not used 11,12,13 and 14 = external pulse energy meter (1kw/pulse; 0.5kw; 0.2kw; 0.1kw) 15 = not used	0 - 15	1	-	RW	RW	GEN_CONF
503	01F7	cust_di6		0 - 15	0	-	RW	RW	GEN_CONF
504	01F8	cust_di7		0 - 15	0	-	RW	RW	GEN_CONF
505	01F9	cust_di8		0 - 15	0	-	RW	RW	GEN_CONF

Par.	Jbus	Mnemonic	Description	Range	Default	Units	Control panel	CCN	Table
506	01FA	Cust_do8	Warning: output voltage 230 Vac! 0 = not used 1 = volatile alarm (anomaly that does not block the operation) 2 = definite alarm (locked operation) 3 = standby unit 4 = operating unit (heating, cooling, DHW or defrosting) 5 = operating in cooling mode 6 = operating in heating mode 7 = working unit in DHW 8 = operating in defrosting mode 9 = ambient temperature reached 10 = Activation by stage electric resistances 11 = activation of the third stage electric resistances 12 = not used	0 - 12	1	-	RW	RW	GEN_CONF
507	01FB	Cust_do9		0 - 12	2	-	RW	RW	GEN_CONF
508	01FC	tr_type	Refrigerant temperature type	0 - 2	0	-	RW	RW	GEN_CONF
509	01FD	ewt_type	EWT sensor type	0 - 2	1	-	RW	RW	GEN_CONF
510	01FE	iat_type	IAT sensor type	0 - 3	0	-	RW	RW	GEN_CONF
511	01FF	oat_type	OAT sensor type	0 - 3	0	-	RW	RW	GEN_CONF
512	0200H	iat_bias	IAT sensor type	=-5 - 5	0	1/10 K	RW	RW	GEN_CONF
513	0201H	oat_bias	OAT sensor bias	=-5 - 5	0	1/10 K	RW	RW	GEN_CONF
514	0202H	oat_min	Minimum OAT for heating	=-20 - 10	-20	1/10°C	RW	RW	GEN_CONF
515	0203H	oat_max	Maximum OAT for heating	5,0 - 30,0	30	1/10°C	RW	RW	GEN_CONF
516	0204H	oat_minc	Minimum OAT for cooling	0,0 - 40,0	0	1/10°C	RW	RW	GEN_CONF
517	0205H	clhtrstp	Heat exchanger setpoint	3,0 - 5,0	3	1/10°C	RW	RW	GEN_CONF
518	0206H	nghtstrt	Night mode start time	00:00 - 23:59	0	hh: mm	RW	RW	GEN_CONF
519	0207H	nghtstop	Night mode end time	00:00 - 23:59	0	hh: mm	RW	RW	GEN_CONF
520	0208H	sparetyp	Spare sensor type	0 - 5	0	-	RW	RW	GEN_CONF
521	0209H	ui_type	User interface type	0 - 3	0	-	RW	RW	UI_CONF
522	020A	ui_accss	UI parameter access	0 - 3	3	-	RW	RW	UI_CONF
523	020B	ui_tmt	Interface communication time-out	0 - 240	10	s	RW	RW	UI_CONF
524	020C	ui_back	Backlight time-out	0 - 7	2	-	RW	RW	UI_CONF
525	020D	ui_buzz	Buzzer upon pressing a button	0/1 [No/yes]	No	-	RW	RW	UI_CONF
526	020E	timebrod	Interface time transmission	0/1 [No/yes]	Sì	-	RW	RW	UI_CONF
527	020F	ser_pass	Service password	0 - 9999	120	-	RW	RW	UI_CONF
528	0210H	usr_pass	User password	0 - 9999	0	-	RW	RW	UI_CONF
541	021D	powr_lim	Power limitation value	50 - 100	75	%	RW	RW	CMP_CONF
542	021E	nght_lim	Night limitation value	50 - 100	75	%	RW	RW	CMP_CONF
543	021F	dhw_lim	DHW limitation value	50 - 100	100	%	RW	RW	CMP_CONF
561	0231H	pmp_ext	External main pump control	0/1 [No/yes]	0 [No]	-	RW	RW	PMP_CONF
562	0232H	flw_chko	Controlled flow if pump off	0/1 [No/yes]	1 [Sì]	-	RW	RW	PMP_CONF
563	0233H	pmp_stck	Anti-adhesive function	0/1 [No/yes]	1 [Sì]	-	RW	RW	PMP_CONF
564	0234H	campionamento	Pump sampling time standby	5 - 240	15	min	RW	RW	PMP_CONF
565	0235H	pmp_log	Main pump logic	42430,00	1	-	RW	RW	PMP_CONF
566	0236H	vsp_log	Variable speed pump logic	0 - 1	1	-	RW	RW	PMP_CONF
567	0237H	vsp_min	Minimum pump speed	30 - 50	30	%	RW	RW	PMP_CONF
568	0238H	vsp_max	Maximum pump speed	50 - 100	100	%	RW	RW	PMP_CONF
569	0239H	dt_stp	Delta T setpoint	2,0 - 20,0	5	1/10 K	RW	RW	PMP_CONF
570	023A	dt_kp	Proportional Gain Delta T	=-10 - -0.001	-2000	-	RW	RW	PMP_CONF
571	023B	dt_ti	Delta T integral time	10 - 120	20	s	RW	RW	PMP_CONF

Par.	Jbus	Mnemonic	Description	Range	Default	Units	Control panel	CCN	Table
572	023C	dt_ts	Delta T sampling time	10 - 120	10	s	RW	RW	PMP_CONF
573	023D	add_pmp	Additional pump logic	0 - 4	0	-	RW	RW	PMP_CONF
581	0245H	ht_curv	Heating temperature curve selection	=-1 - 12	-1	-	RW	RW	CLIMCURV
582	0246H	ht_min_a	Minimum heating OAT	=-30 - 10	-7	1/10°C	RW	RW	CLIMCURV
583	0247H	ht_max_a	Maximum heating OAT	10,0 - 30,0	20	1/10°C	RW	RW	CLIMCURV
584	0248H	ht_min_w	Minimum water setpoint in heating mode	20,0 - 40,0	20	1/10°C	RW	RW	CLIMCURV
585	0249H	ht_max_w	Maximum water setpoint in heating mode	30,0 - 60,0	38	1/10°C	RW	RW	CLIMCURV
586	024A	cl_curv	Cooling temperature curve selection	=-1 - 2	-1	-	RW	RW	CLIMCURV
587	024B	cl_min_a	Minimum cooling OAT	0,0 - 30,0	20	1/10°C	RW	RW	CLIMCURV
588	024C	cl_max_a	Maximum cooling OAT	24,0 - 46,0	35	1/10°C	RW	RW	CLIMCURV
589	024D	cl_min_w	Minimum water setpoint in cooling mode	5,0 - 20,0	10	1/10°C	RW	RW	CLIMCURV
590	024E	cl_max_w	Maximum water setpoint in cooling mode	5,0 - 20,0	18	1/10°C	RW	RW	CLIMCURV
595	0253H	dry_stp	Drying start setpoint	20,0 - 40,0	20	1/10°C	RW	RW	DRYING
596	0254H	drystep1	Drying heating days	0 - 99	3	-	RW	RW	DRYING
597	0255H	drystep2	Drying ascending ramp days	0 - 99	4	-	RW	RW	DRYING
598	0256H	drystep3	Drying ramp maintenance days	0 - 99	4	-	RW	RW	DRYING
599	0257H	N.A.							
601	0259H	bck_type	Backup type in emergency mode	0 - 9	0	-	RW	RW	BCK_CONF
602	025A	bck_warm	Backup heater heating time	5 - 120	30	min	RW	RW	BCK_CONF
603	025B	bck_delt	Auxiliaries delta temperature	1,0 - 20,0	5	1/10°C	RW	RW	BCK_CONF
604	025C	bck_oat	Backup heater OAT threshold	=-30 - 15	-7	1/10°C	RW	RW	BCK_CONF
605	025D	ehs_kp	Gain EHS Proportional	0,001 - 10,000	2	-	RW	RW	BCK_CONF
606	025E	ehs_ti	EHS integral time	22190,00	20	s	RW	RW	BCK_CONF
607	025F	ehs_ts	EHS sampling time	10 - 120	30	s	RW	RW	BCK_CONF
641	0281H	ccn_bus	CCN element address	1 - 239	1	-	RW	RW	30RBVRQV
642	0282H	ccn_elm	CCN element bus	0 - 239	0	-	RW	RW	30RBVRQV
645	0285H	ccn_bdr	Primary transmission speed	0 - 2 [9600/19200/ 38400]	2 [38400]	-	RW	RW	30RBVRQV
646	0286H	jbus_bdr	Secondary transmission speed	0 - 2 [9600/19200/ 38400]	2 [38400]	-	RW	RW	30RBVRQV 0 JBUSCONF
650	028A	serialnb	Serial number			-	RO	RO	30RBVRQV
653	028D	pic_type	PIC type			-	RO	RO	30RBVRQV
654	028E	soft_ver	Software version number		-	-	RO	RO	
661	0295H	hod	Hour of the day	0 - 23	N.A.	-	RW	RW	HOUR
662	0296H	mod	Minute of the hour	0 - 59	N.A.	-	RW	RW	HOUR
663	0297H	dow	Day of the week	42552,00 [Monday~ Sunday]	N.A.	-	RW	RW	HOUR
664	0298H	hol_flag	Holiday flag	0 - 15	N.A.	-	RW	RW	HOUR
665	0299H	dom	Day of the month	11324,00	N.A.	-	RW	RW	HOUR
666	029A	mese	Month	42705,00	N.A.	-	RW	RW	HOUR
667	029B	anno	Year	0 - 99	N.A.	-	RW	RW	HOUR
701	02BD	dhw_type	Domestic hot water type	0 - 3	0	-	RW	RW	DHW_CONF
702	02BE	dhw_vlvr	3-way DHW valve operating time	0 - 240	30	s	RW	RW	DHW_CONF
703	02BF	dhw_prio	DHW priority	0 - 2	0	-	RW	RW	DHW_CONF
704	02C0	shc_min	Minimum SHC operating time	0 - 720	20	min	RW	RW	DHW_CONF
705	02C1	shc_max	Maximum SHC operating time	=-1 - 720	60	min	RW	RW	DHW_CONF

Par.	Jbus	Mnemonic	Description	Range	Default	Units	Control panel	CCN	Table
706	02C2	dhw_min	Minimum DHW operating time	0 - 720	20	min	RW	RW	DHW_CONF
707	02C3	dhw_max	Maximum DHW operating time	=-1 - 720	60	min	RW	RW	DHW_CONF
708	02C4	dhw_excp	DHW exception time	45292,00	2	hour	RW	RW	DHW_CONF
709	02C5	N.A.							
710	02C6	vsp_max	Maximum pump speed in DHW mode	30 - 100	100	%	RW	RW	DHW_CONF
711	02C7	dhw_dow	DHW program days	0000 0000 - 1111 1110	1111 1110	-	RW	RW	DHW_CONF
712	02C8	dhw_strt	DHW start time	00:00 - 23:59	1	hh: mm	RW	RW	DHW_CONF
713	02C9	dhw_stop	DHW stop time	00:00 - 23:59	0	hh: mm	RW	RW	DHW_CONF
714	02CA	leg_dow	Anti-legionella DHW start	0000 0000 - 1111 1111	0	-	RW	RW	DHW_CONF
715	02CB	leg_time	DHW anti-legionella start time	00:00 - 23:59	0	hh: mm	RW	RW	DHW_CONF
716	02CC	sum_oat	Summer mode OAT threshold	15,0 - 30,0	20	1/10°C	RW	RW	DHW_CONF
717	02CD	sum_on	Summer mode activation delay	0 - 12	5	h	RW	RW	DHW_CONF
718	02CE	sum_off	Summer mode deactivation delay	0 - 12	5	h	RW	RW	DHW_CONF
719	02CF	dhw_sens	DHW tank sensor type	0 - 3	0	-	RW	RW	DHW_CONF
720	02D0	dhw_bias	DHW tank sensor bias	=-5 - 5	0	1/10 K	RW	RW	DHW_CONF
721	02D1	dhw_dt	DHW tank Delta T	2,0 - 10,0	5	1/10 K	RW	RW	DHW_CONF
722	02D2	ewt_dt	EWT Delta T (DHW stop)	0,0 - 20,0	10	1/10 K	RW	RW	DHW_CONF
741	200000H	msl_cod	Master/slave activation code	"XXXXXXXX"	0	-	RW	RW	MSL_CONF
742	2000000H	msl_ena	Master/slave activation	0/1 [No/yes]	0 [No]	-	RW	RW	MSL_CONF
743	20000000H	slv1_add	Slave no.1 address	0 - 239	0	-	RW	RW	MSL_CONF
744	200000000H	slv2_add	Slave no.2 address	0 - 239	0	-	RW	RW	MSL_CONF
745	2000000000H	slv3_add	Slave no.3 address	0 - 239	0	-	RW	RW	MSL_CONF
750	02EE	chws_typ	CHWSTEMP type	0 - 1	1	-	RW	RW	MSL_CONF
751	02EF	casc_typ	Cascade type	0 - 2	1	-	RW	RW	MSL_CONF
752	02F0	mslh_kp	Gain M/S heating proportional	0,001 - 10,000	1	-	RW	RW	MSL_CONF
753	02F1	mslh _ti	M/S heating integral time	10 - 120	30	s	RW	RW	MSL_CONF
754	02F2	mslh _ts	M/S heating sampling time	10 - 120	30	s	RW	RW	MSL_CONF
755	02F3	mslc_kp	Gain M/S proportional cooling	-10,000 a -0,00	-0,9	-	RW	RW	MSL_CONF
756	02F4	mslc _ti	M/S cooling integral time	10 - 120	30	s	RW	RW	MSL_CONF
757	02F5	mslc _ts	M/S cooling sampling time	10 - 120	30	s	RW	RW	MSL_CONF
758	02F6	msl_pmp	Master/slave pump type	0 - 2	0	-	RW	RW	MSL_CONF
761	02F9	jbus_ena	JBus control activation	0 - 3	0	-	RW	RW	JBUSCONF
762	02FA	jbus_add	JBus slave address	1 - 255	11	-	RW	RW	JBUSCONF
764	02FC	jbus_frm	JBus structure type	0 - 5	0	-	RW	RW	JBUSCONF
765	02FD	jbus_cod	JBus activation code	"XXXXXXXX"	0	-	RW	RW	JBUSCONF
766	02FE	jbus_tmt	JBus communication time-out	0 - 600	600	s	RW	RW	JBUSCONF
771	0303H	N.A.							
772	0304H	N.A.							
773	0305H	N.A.							
774	0306H	N.A.							
775	0307H	N.A.							
776	0308H	N.A.							

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