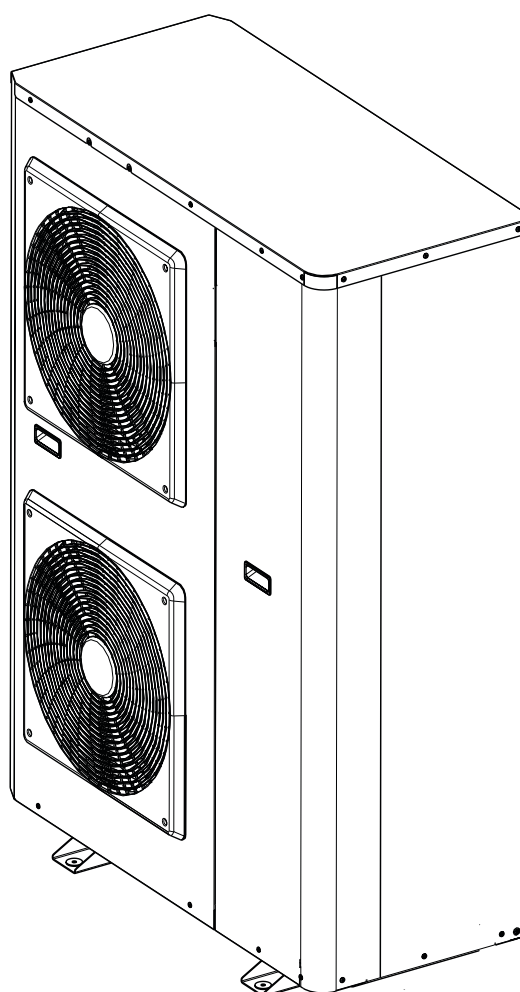


HYDRONIC UNIT B



HYDRONIC UNIT B

Dear Technician,

We would like to congratulate you on having recommended a **Beretta** unit: a modern product that is 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 more than sufficient, this booklet contains all the information that we have deemed necessary for the device's correct and easy installation.

Thank you again, and keep up the good work.

BERETTA

COMPLIANCE

Beretta HYDRONIC UNIT B heat pumps are compliant with the following European Directives:

- Electromagnetic Compatibility Directive 2004/108 / EC and subsequent changes
- Machinery Directive 2006/42 / CE and subsequent changes
- ErP Directive 2009/125/EC and Regulation (EU) 813/2013
- RoHS Directive 2011/65/EU
- F-Gas Regulation 2014/517/EU
- WEEE Directive 2012/19/EU



RANGE

Model	Code
HYDRONIC UNIT B HE 5	20161618
HYDRONIC UNIT B HE 7	20161619
HYDRONIC UNIT B HE 11	20161620
HYDRONIC UNIT B HE 15	20161621
HYDRONIC UNIT B HE 11T	20161622
HYDRONIC UNIT B HE 15T	20161623

ACCESSORIES

For the complete list of accessories and the information relating to their usage combinations, please refer to www.berettaclima.it.

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The following symbols are used in this publication:

 **WARNING** = actions requiring special care and appropriate training.

 **DO NOT** = actions that **MUST ON NO ACCOUNT** be carried out.

1 GENERAL INFORMATION

1.1 General Notices

-  When you get the product, check immediately that the contents are all present and undamaged. Contact the dealer **Beretta** if you notice any problems.
-  The product's installation must be carried out by an authorised 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, current National and Local regulations, and the indications provided by **Beretta** in the instruction booklet accompanying the device.
-  The product must be used for its intended purpose, as stated by **Beretta** for which it has been expressly manufactured. **Beretta** shall bear no responsibility, whether of a contractual or non-contractual nature, for any damage 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. **Beretta** shall bear no responsibility for any failure to comply with current safety and accident-prevention regulations.
-  Comply with the legislation in force on the country of deployment with regard to the use and disposal of packaging, of cleaning and maintenance products and for the management of the unit's decommissioning.
-  Any repair and maintenance interventions must be carried out by **Beretta** Technical Support Service, in accordance with the provisions contained in this publication. Do not modify or tamper with the unit as dangerous situations may arise and the unit manufacturer will not be liable for any damage caused.
-  The non-use of the appliance for a long period entails carrying out the operations described in the specific paragraph.
-  In the event of any functional anomalies or fluid leaks, set the system's main switch to its "off" position. Promptly contact your local **Beretta** Technical Support Service, and do not perform any interventions upon the device on your own.
-  The units contain refrigerant gas: operate carefully so as to avoid damaging the gas circuit and the fin bank.
-  Following the regulation EU UE n. 517/2014 on certain fluorinated greenhouse gases, is compulsory to indicate the refrigerant total amount in the installed system. >This information is indicated on the unit nameplate.
-  This unit contains fluorinated greenhouse gases covered by the Kyoto protocol. Maintenance and disposal activities must be carried out exclusively by skilled personnel.
-  This unit can be installed in systems that require heating cycles with anti-legionella function. It is mandatory to check every single installation and complete it, where necessary, with appropriate integration electric heaters in order to guarantee the completion of the required sanitation cycles.

-  This booklet is an integral part of the device, and must therefore be carefully preserved, and must ALWAYS accompany it, 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 to **Beretta** Technical Support Service in your Area.

1.2 Safety precautions

We remind you that the use of products that use electricity and water involves the observance of some fundamental safety rules such as:

-  Do not touch the unit while barefoot and/or partially wet.
-  Do not spray or throw water directly on the unit.
-  It is strictly forbidden to touch the coil fins, the moving parts, to place any body parts between them, or to insert pointy objects into the grilles.
-  It is forbidden to carry out any technical or cleaning work before disconnecting the appliance from the power supply by placing the main switch of the system and the main switch on the "OFF".
-  It is forbidden to modify the safety or regulation devices without the authorisation of the manufacturer.
-  Do not pull, detach or twist the electrical wires coming out of the unit, even when the unit is disconnected from the power grid.
-  The packing material must not be disposed of in the surrounding environment and must be kept out of children reach, as it can be dangerous. It must be disposed of according to the regulations in force.

1.3 Unit description

Beretta HYDRONIC UNIT B it is a range of heat pumps for the production of hot water for space heating, domestic hot water for domestic use (in combination with suitable boilers or exchangers) and cold water for cooling.

Designed to be placed outdoors, it is suitable for use in residential and commercial applications.

The compressor, of the Rotary (HYDRONIC UNIT 5) or Twin-Rotary (HYDRONIC UNIT 7-11-15) type, is regulated by the DC Inverter control with continuous power modulation. The compressor, working in combination with the electronic expansion valve, is therefore able to guarantee maximum environmental comfort while maintaining high energy standards.

The fans are driven by a permanent magnet synchronous motor and are continuously modulated to obtain maximum performance in all conditions of use, maximizing the silence of the installation. The hydronic module is always present and is supplied with a variable speed circulation pump, flow switch, safety valve and inlet and outlet water temperature probes.

The unit can be set and controlled by the remote control REC10CH, the interface WUI, the free potential contacts or, if available, by an existing modbus BMS.

1.4 Safety and adjustment devices

The safety and regulation of the appliance are obtained:

- on the cooling circuit with
 - refrigerant temperature sensor on the compressor discharge
 - refrigerant temperature sensor on the compressor suction
- on the hydraulic circuit with
 - water temperature sensors the detection of the water inlet and outlet temperature
 - flow switch to ensure unit operation with correct water flow
 - safety valve with intervention pressure 300 kPa
- The installer must necessarily provide in the system:
 - a suitably sized expansion vessel
 - a suitably sized technical water storage tank
 - a by-pass valve between the delivery and return of the appliance to allow the circulation of water in the unit even if the same is isolated from the system. This serves to make the antifreeze protection logics effective.
 - a water filter entering the unit
 - air vent valves in the highest points of the system

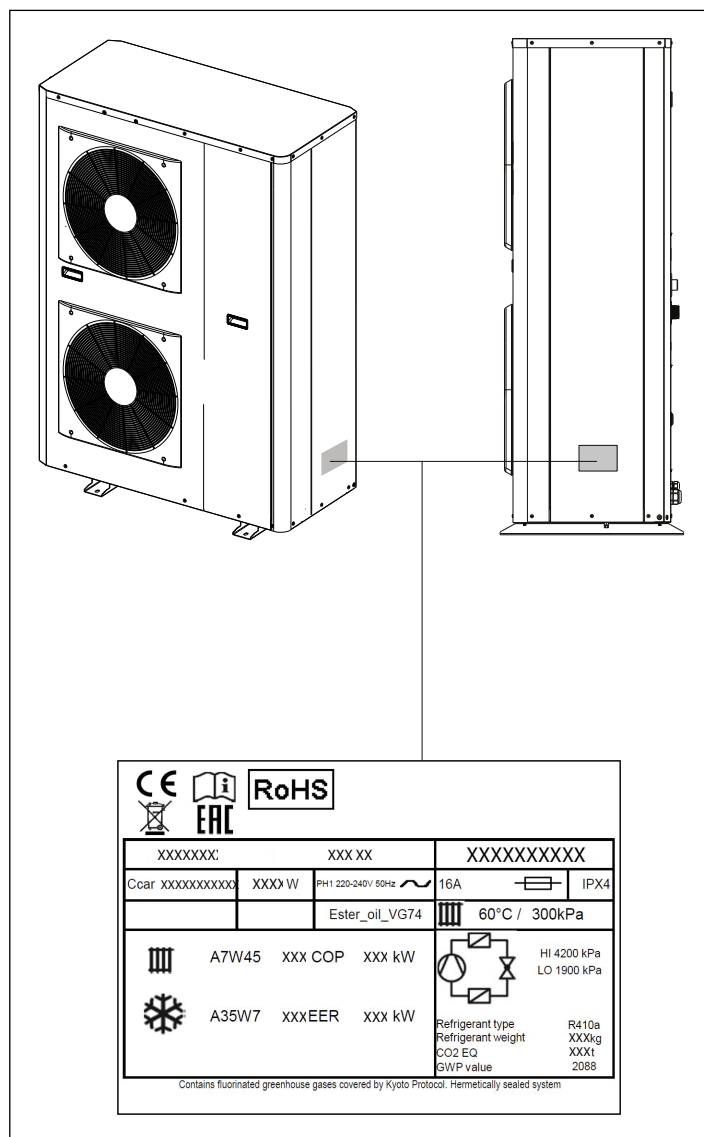
For further details refer to the chapter "Piping connections" *p. 20*

⚠ Safety device replacement must be carried out by **Beretta** Technical Support Service, using only original components. Please refer to the spare parts catalogue.

⊘ IT IS FORBIDDEN to operate the device with faulty safety systems.

1.5 Identification

The unit can be identified through the technical data plate:



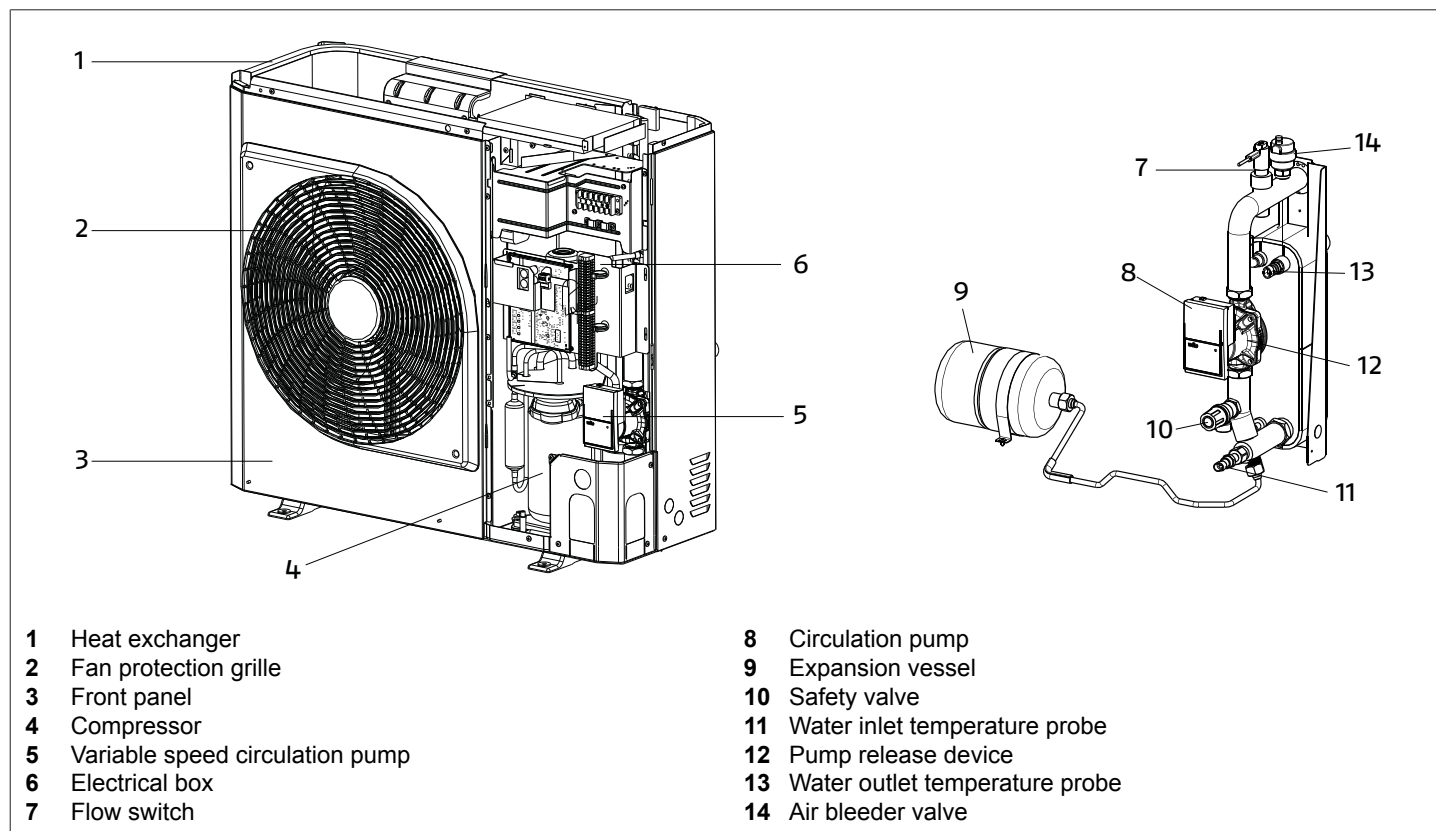
Technical data plate

Contains the device's technical and performance data.

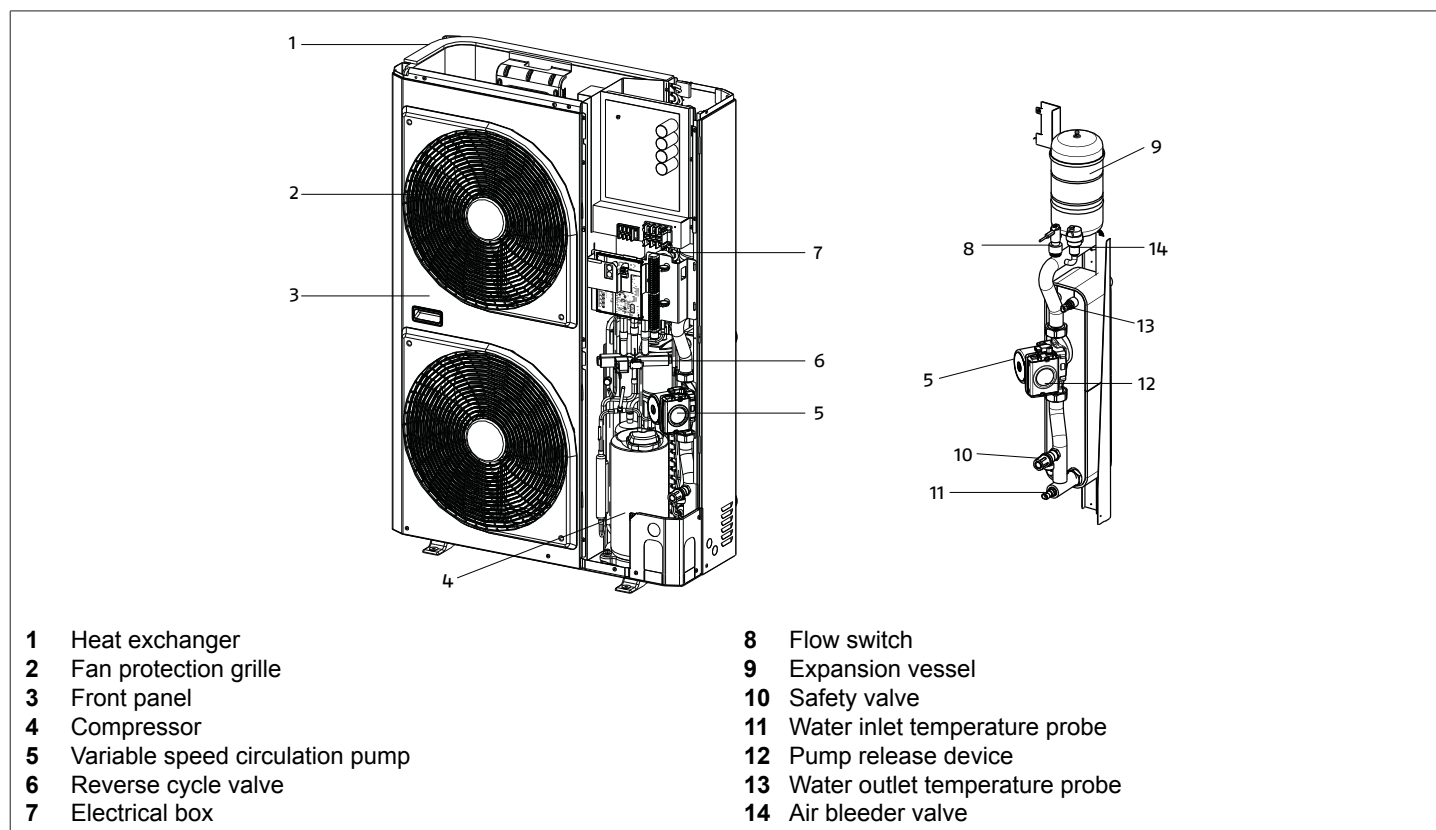
⚠ The tampering, removal, or absence of the identification plates will not allow the product to be properly identified by its serial number.

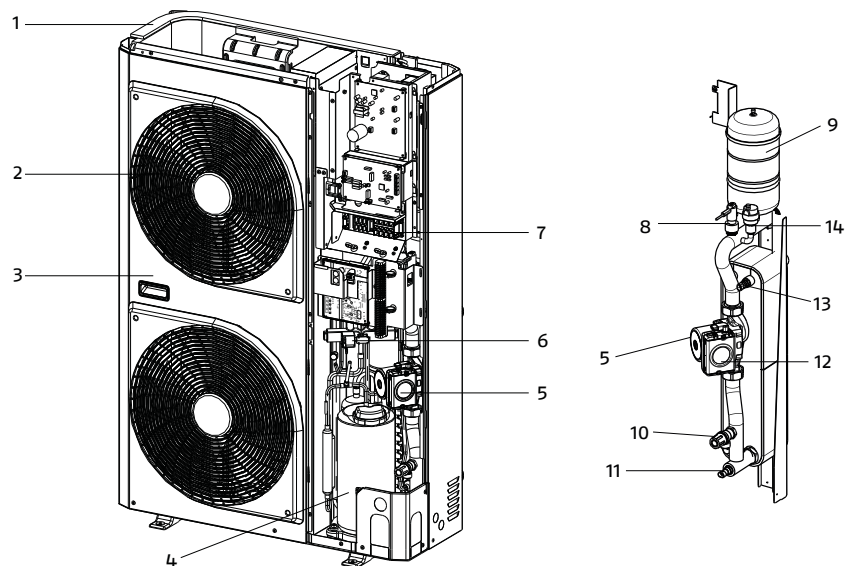
1.6 Layout

Model 5 - 7



Model 11 - 15



Model 11T - 15T

- 1 Heat exchanger
- 2 Fan protection grille
- 3 Front panel
- 4 Compressor
- 5 Variable speed circulation pump
- 6 Reverse cycle valve
- 7 Electrical box

- 8 Flow switch
- 9 Expansion vessel
- 10 Safety valve
- 11 Water inlet temperature probe
- 12 Pump release device
- 13 Water outlet temperature probe
- 14 Air bleeder valve

GENERAL INFORMATION

1.7 Technical specifications

Model		5	7	11	15	11T	15T
Cooling performance [A35 / W7] ⁽¹⁾							
Nominal capacity	kW	4,00	5,55	11,20	12,80	10,65	13,00
EER	kW/kW	3,10	3,10	3,40	3,10	3,40	3,20
SEER	kW/kW	4,85	5,75	5,15	5,00	5,40	5,25
Seasonal energy efficiency (ns)	%	191	227	203	197	212	208
Cooling performance [A35/W18] ⁽²⁾							
Nominal capacity	kW	4,85	8,00	13,70	16,00	13,75	17,00
EER	kW/kW	4,35	4,00	4,60	4,10	4,65	4,15
Heating performance [A7/W55] ⁽³⁾							
Nominal capacity	kW	4,45	6,75	11,20	11,65	10,25	11,80
COP	kW/kW	2,80	2,70	2,95	2,90	3,00	3,00
SCOP	kW/kW	3,32	3,36	3,35	3,45	3,34	3,40
Seasonal energy efficiency (ns)	%	130	131	131	135	131	133
Prated	kW	3,00	4,00	9,00	10,00	9,00	11,00
Seasonal energy efficiency class		A++					
Heating performance [A7/W45] ⁽⁴⁾							
Nominal capacity	kW	4,85	6,80	11,30	13,40	10,40	13,50
COP	kW/kW	3,40	3,20	3,60	3,40	3,60	3,50
Heating performance [A7/W35] ⁽⁵⁾							
Nominal capacity	kW	5,10	7,15	11,25	15,10	11,20	15,00
COP	kW/kW	4,40	4,10	4,70	4,25	4,60	4,35
SCOP	kW/kW	4,73	4,68	4,39	4,41	4,26	4,35
Seasonal energy efficiency (ns)	%	186	184	173	173	167	171
Electrical characteristics							
Power supply	V/ph/Hz+N	230/1/50				400/3/50	
Permitted voltage	V	220 - 240				380 - 415	
Total power input ⁽⁶⁾	kW	1,80	3,38	4,73	5,18	10,32	10,32
Full load current ⁽⁷⁾	A	8,90	16,70	23,30	25,60	16,80	16,80
Compressor							
Compressor	Type	Rotary					
Minimum step	%	23	20	20	17	20	17
Refrigerant	Type	R410A					
Refrigerant charge	kg	1,10	1,60	2,80	2,80	3,00	3,00
Adjustment	Type	Inverter modulating valve					
Fan							
Fan	Type	Axial					
Quantity	no.	1	1	2	2	2	2
Maximum air flow	m³/h	2880	2880	6480	6480	6480	6480
Maximum speed	rpm	560	660	820	820	820	820
Plant side heat exchanger							
Plant side heat exchanger	Type	With plates					
Water content	l	1,7	2,3	4,4	4,4	4,4	4,4
Noise levels							
Sound power level	dB(A)	64	65	68	69	69	69
Sound pressure level	dB(A)	33	34	37	38	38	38
Circulation pump							
Type		Variable speed centrifuge					
Maximum operating pressure	bar	3	3	3	3	3	3
Maximum power input	kW	0,075		0,14			
Max. current input	A	0,60	0,60	1,10	1,10	1,10	1,10

(1) OAT: 35 °C, Water in/out: 12 / 7 °C

(2) OAT: 35 °C, Water in/out: 23 / 18 °C

(3) OAT: 7 °C b.s., 6 °C b.u. Water in/out: 47 / 55 °C

(4) OAT: 7 °C b.s., 6 °C b.u. Water in/out: 40 / 45 °C

(5) OAT: 7 °C b.s., 6 °C b.u. Water in/out: 30 / 35 °C

(6) Power absorbed by the compressors and fans at the limit operating conditions (i.e. with a saturated inlet temperature of 15 °C and a condensation temperature equivalent to 68.3 °C) with a rated supply voltage of 400 V

(7) Maximum unit operating current

A Performance are declared according to standards EN 14511:2018 and EN 14825:2016

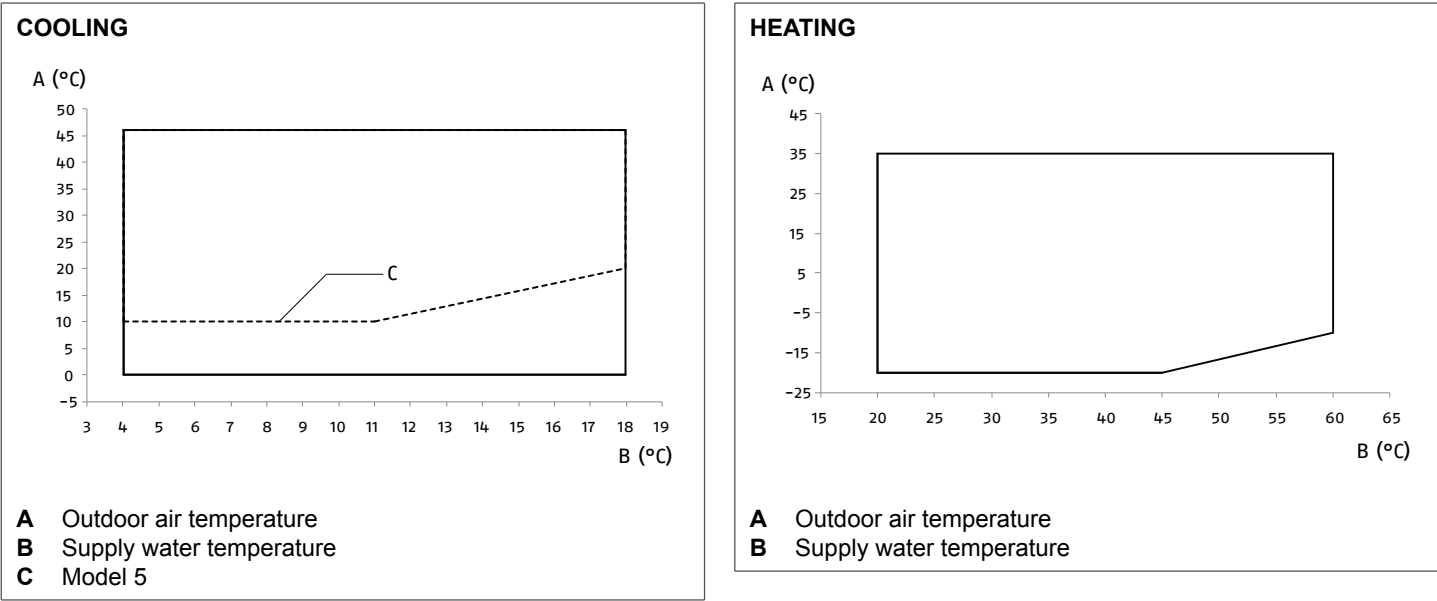
A The units are parameterized by default with limitation of the maximum power delivered to 75%. It is possible to modify this setting by acting on parameter 541 (adjustment range 50% -100%).

1.8 Performance based on the climatic zone

Model		5	7	11	15	11T	15T
Temperate zone - Average temperature [47 / 55 °C]							
Seasonal energy efficiency (ns)	%	130	131	131	135	139	133
SCOP	kW/kW	3,32	3,36	3,35	3,45	3,34	3,40
Pdesign _h -7 °C	kW	3,09	3,83	7,69	9,11	7,69	9,81
Pdesign _h at +2 °C	kW	1,88	2,37	5,42	5,55	5,36	5,13
Pdesign _h +7 °C	kW	1,21	1,42	3,66	3,63	3,63	3,99
Pdesign _h +12 °C	kW	1,12	0,94	4,22	4,15	4,14	4,01
Annual energy cons.	kWh/annum	2170	2651	5349	6159	5358	6734
Energy class					A++		
Sound power level	dB(A)	64	65	68	69	69	69
Cold zone - Average temperature [30 / 35 °C]							
Seasonal energy efficiency (ns)	%	186	184	173	173	167	171
Sound power level	dB(A)	64	65	68	69	69	69
SCOP	kW/kW	4,73	4,68	4,39	4,41	4,26	4,35
Pdesign _h -7 °C	kW	3,55	4,57	8,43	9,40	8,27	9,07
Pdesign _h at +2 °C	kW	2,16	2,72	5,39	5,28	4,97	4,97
Pdesign _h +7 °C	kW	1,40	1,84	3,56	3,77	2,99	3,54
Pdesign _h +12 °C	kW	1,30	1,12	4,11	4,26	4,17	2,79
Annual energy cons.	kWh/annum	1747	2273	4469	4967	4528	4858
Energy class			A+++			A++	
Warm zone - Average temperature [47 / 55 °C]							
Seasonal energy efficiency (ns)	%	163	152	164	156	178	162
SCOP	kW/kW	4,15	3,87	4,17	3,98	4,51	4,13
Pdesign _h -7 °C	kW	-	-	-	-	-	-
Pdesign _h at +2 °C	kW	3,30	3,83	7,59	7,59	9,43	10,24
Pdesign _h +7 °C	kW	2,15	3,36	3,42	6,12	5,39	6,18
Pdesign _h +12 °C	kW	1,01	1,51	4,28	3,93	4,33	10,24
Annual energy cons.	kWh/annum	1055	1317	2423	2539	2780	3300
Warm zone - Low temperature [30 / 35 °C]							
Seasonal energy efficiency (ns)	%	230	259	230	225	232	225
SCOP	kW/kW	5,83	6,54	5,83	5,73	5,87	5,71
Pdesign _h -7 °C	kW	-	-	-	-	-	-
Pdesign _h at +2 °C	kW	3,60	5,00	8,70	10,20	8,40	9,80
Pdesign _h +7 °C	kW	2,33	3,86	5,53	7,24	5,61	7,32
Pdesign _h +12 °C	kW	1,15	1,77	4,23	4,19	4,27	4,23
Annual energy cons.	kWh/annum	817	1013	1983	2376	1899	2283
Cold zone - Average temperature [47 / 55 °C]							
Seasonal energy efficiency (ns)	%	100	111	109	107	112	108
SCOP	kW/kW	2,57	2,84	2,80	2,75	2,86	2,78
Pdesign _h -7 °C	kW	3,35	5,06	7,85	8,32	8,06	8,51
Pdesign _h at +2 °C	kW	2,04	3,08	5,55	5,27	5,60	5,32
Pdesign _h +7 °C	kW	1,33	1,99	3,39	3,41	3,42	3,45
Pdesign _h +12 °C	kW	1,14	1,43	4,23	4,13	4,28	4,17
Annual energy cons.	kWh/annum	5078	6930	10922	11771	10951	11924
Cold zone - Low temperature [30 / 35 °C]							
Seasonal energy efficiency (ns)	%	148	153	140	138	136	135
SCOP	kW/kW	3,77	3,89	3,57	3,53	3,48	3,45
Pdesign _h -7 °C	kW	3,65	5,57	8,42	9,18	8,65	9,33
Pdesign _h at +2 °C	kW	2,22	3,39	5,65	5,65	5,21	5,21
Pdesign _h +7 °C	kW	1,44	2,18	3,40	3,58	3,43	3,62
Pdesign _h +12 °C	kW	1,26	1,56	4,24	4,21	4,28	4,26
Annual energy cons.	kWh/annum	3769	5566	9186	10118	9665	10527

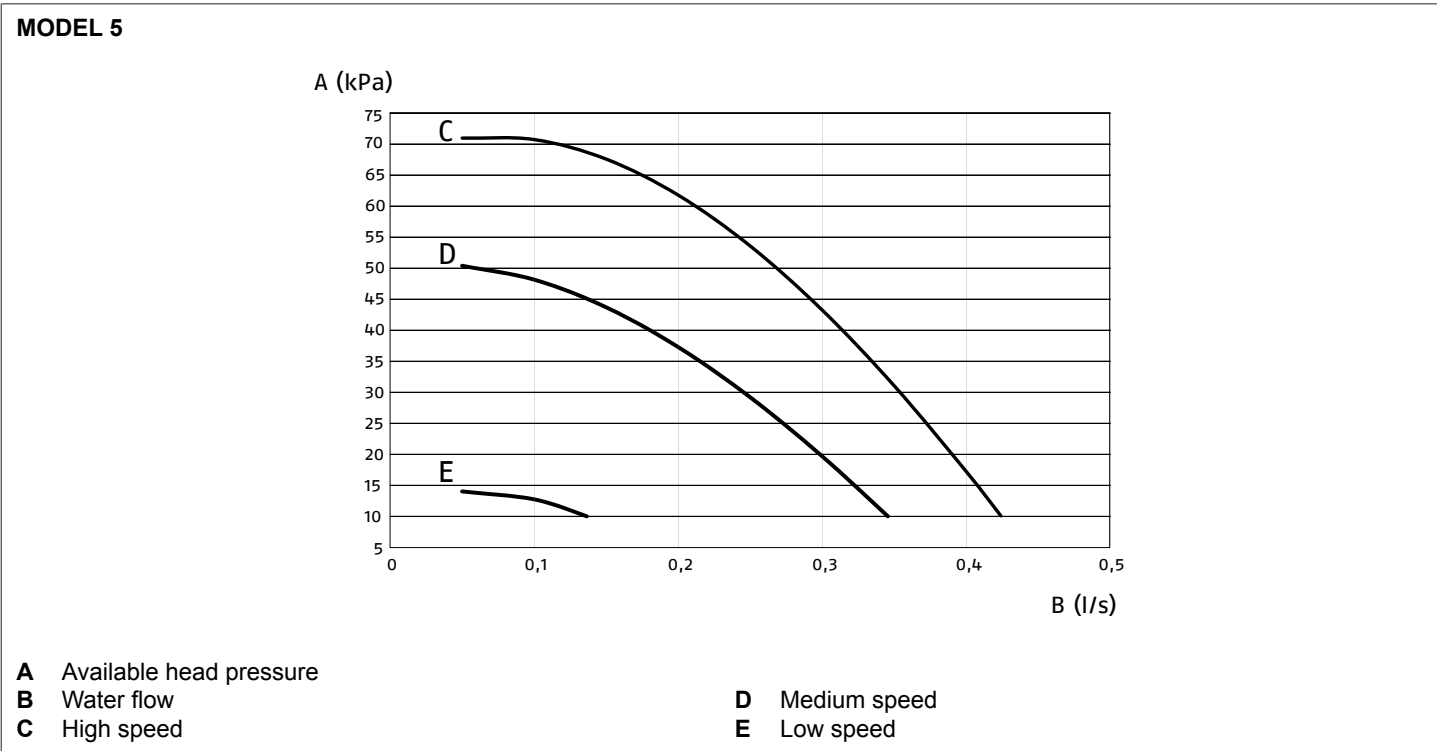
A Performance are declared according to standards EN 14511:2018 and EN 14825:2016

1.9 Operating limits

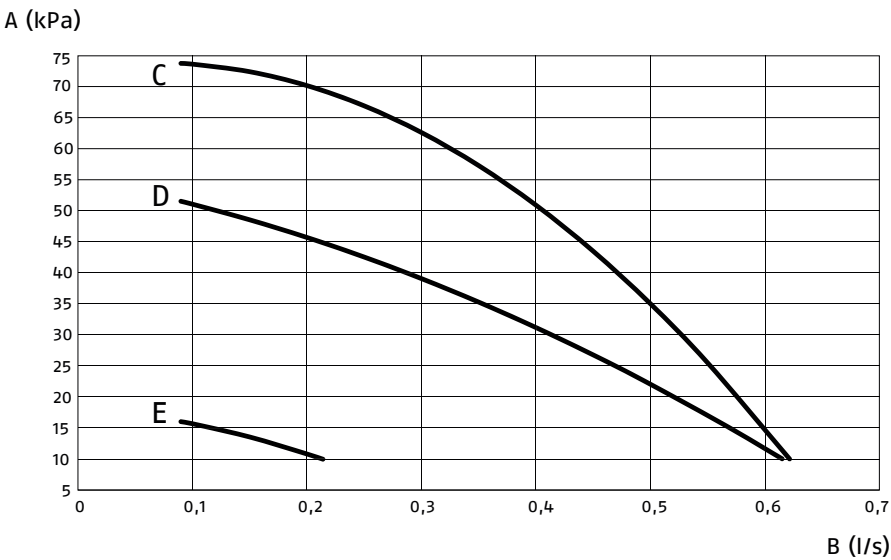


1.10 Available static pressure

HYDRONIC UNIT B it is equipped with a variable speed circulation pump. For sizing the system, consider the residual head, shown below in the graph.

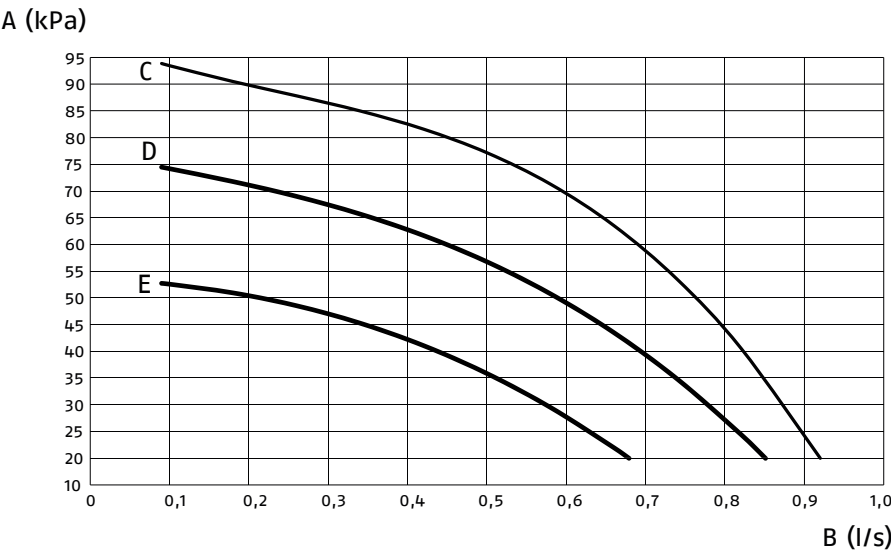


MODEL 7



- A** Available head pressure
B Water flow
C High speed
D Medium speed
E Low speed

MODEL 11 - 15



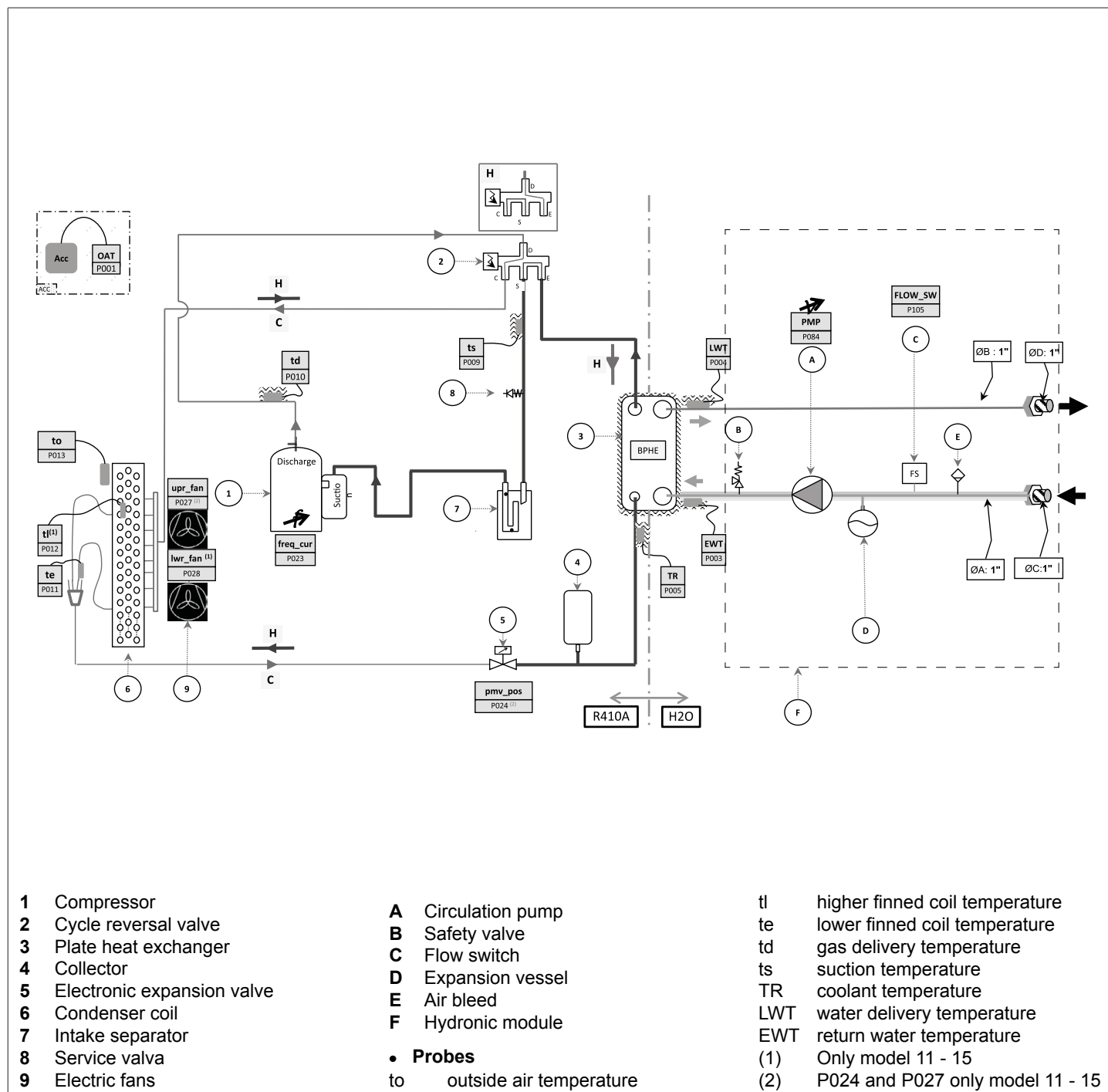
- A** Available head pressure
B Water flow
C High speed
D Medium speed
E Low speed

1.11 Refrigerant circuit and sensors positioning

The cooling circuit is of the heat pump type with cycle inversion on the refrigerant gas. The source fluid used is the external air while the user fluid is water possibly added with antifreeze liquid.

In winter the heat pump extracts the thermal energy from the outside air and transfers it to the user fluid by heating it, while in summer the cycle is inverted and the thermal energy is extracted from the water, which cools down, and is transferred to the air. external.

Depending on the type of system, the user fluid is sent to fan coil units, air treatment units, radiant panels for room air conditioning or to the boiler for the production of domestic hot water.



2 INSTALLATION

2.1 Receiving the product

Beretta HYDRONIC UNIT B it is supplied in a single package, positioned on a wooden pallet and protected by cardboard packaging, polystyrene panels and a polyethylene film.

The following material is attached to the canopy:

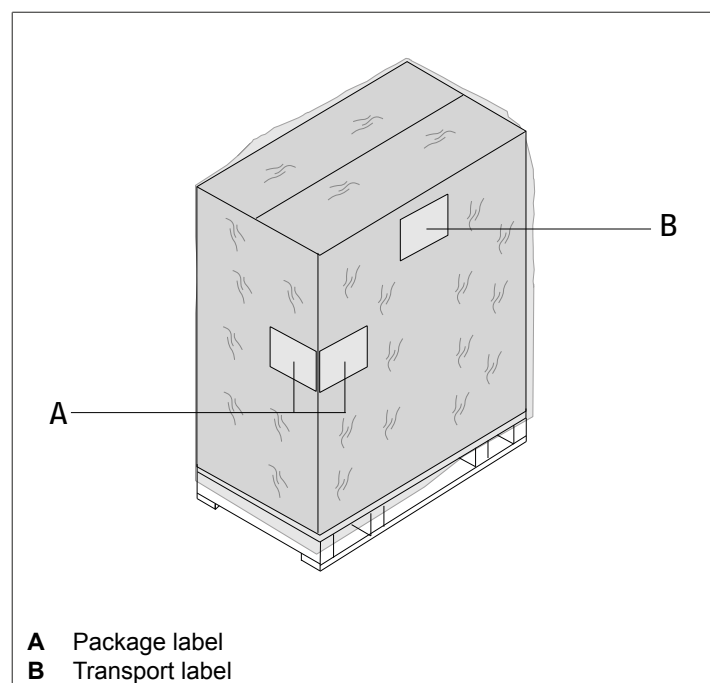
Document envelope:

- Instruction's book for the installer and for the Technical Service in Italian
- Instruction's book for the installer and for the Technical Service in English
- Warranty/Spare parts labels.
- dimensional drawing
- graphite rings to ensure EMC standards (see chapter "Electrical connections" p. 30)
- fairleads
- fairleads
- condensate drain connection

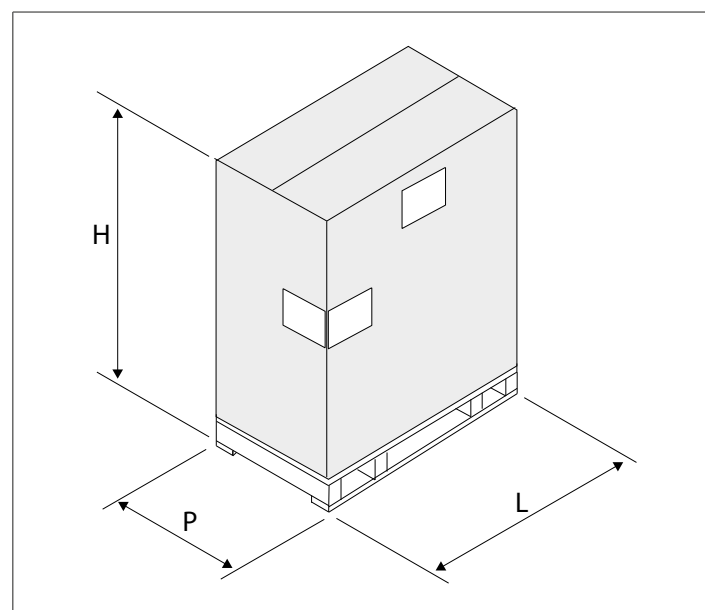
A The Instruction book comes with the equipment and it should be taken, read and kept carefully.

A The document envelope must be kept in a safe place. Any duplicate must be requested from Beretta S.p.A. which reserves to charge the cost.

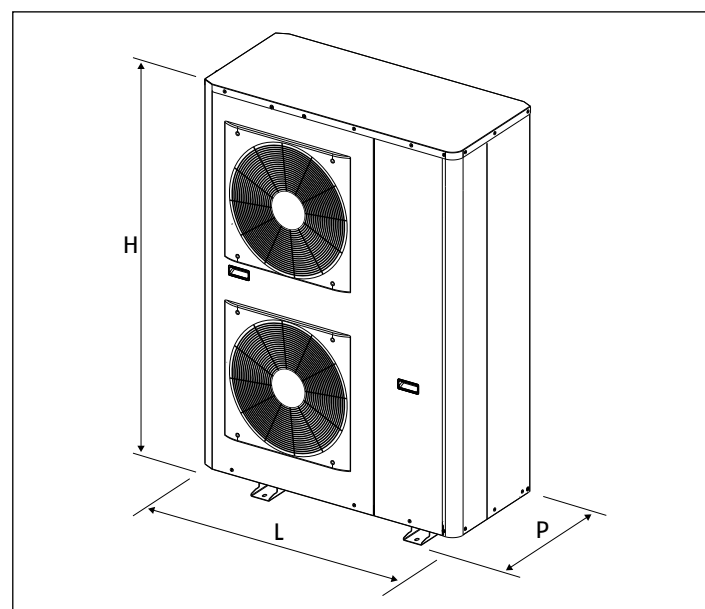
2.2 Labels positioning



2.3 Dimensions and weight



Model		5	7	11	15	11T	15T
Packaging dimensions							
L	mm	960	960	960	960	960	960
P	mm	451	451	451	451	451	451
H	mm	960	960	1500	1500	1500	1500
Weight	kg	64,0	76,0	122,0	122,0	128,0	128,0

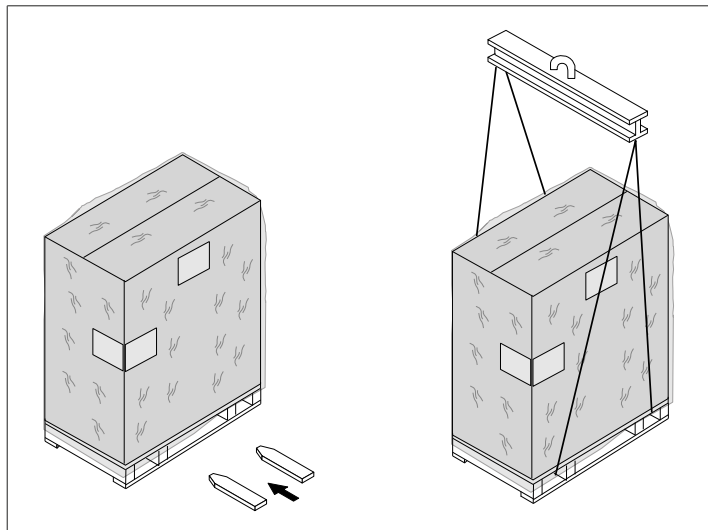


Model		5	7	11	15	11T	15T
Product dimensions							
H	mm	821	821	1363	1363	1363	1363
L	mm	908	908	908	908	908	908
P	mm	350	350	350	350	350	350
Weight	kg	57,0	69,0	115,0	115,0	121,0	121,0

2.4 Handling and removal of the packing

A Before unpacking, personal protective clothing should be worn and used transport means and tools suitable for the size and weight of the unit.

- The product can be handled in two ways:
 - using a hoist or a crane
 - using a fork lift or a transpallet which can bear its weight



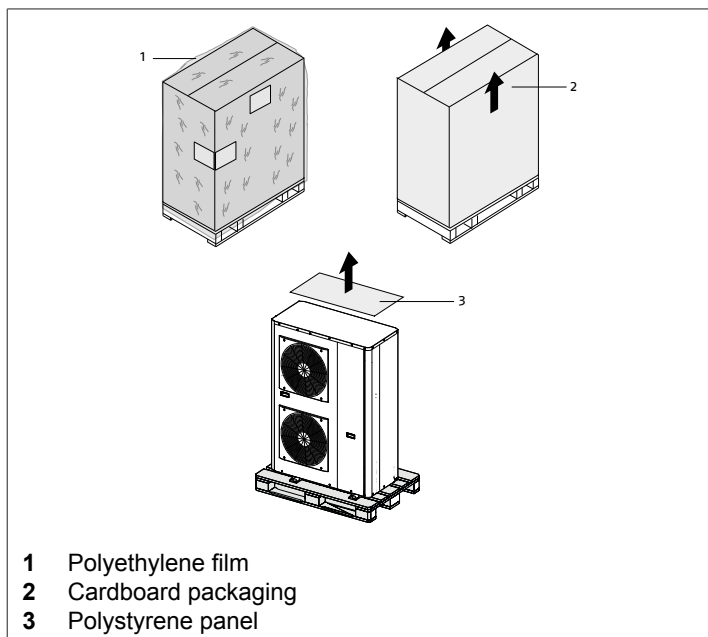
It should be noted that even if a forklift / pallet truck is used, the use of a hoist or crane is necessary to remove **Beretta HYDRONIC UNIT B** from the pallet and place it in the required place of installation.

A The equipment must always be handled vertically

A Use a small balance to prevent that the pressure of the belts damages the unit.

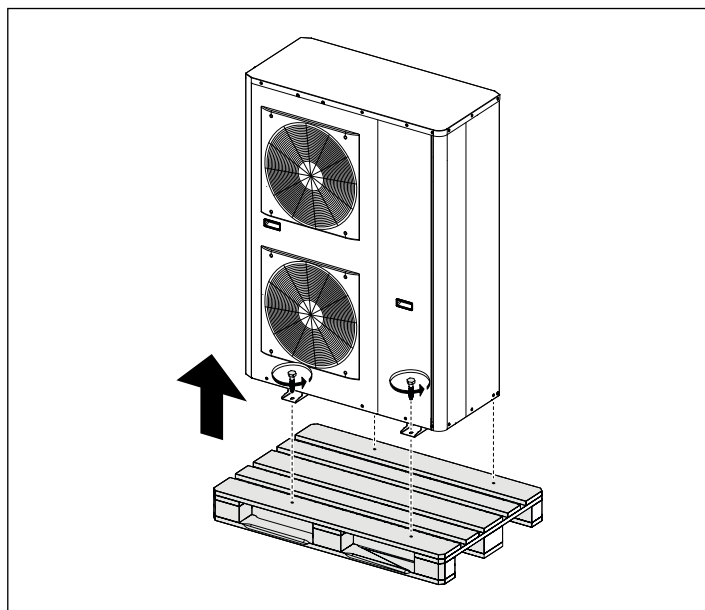
A Do not tilt the equipment over 15°

A The unit's weight is concentrated on the compressors side (electrical connections side).



- Follow the below instructions for packing removal:
 - transport the equipment in the installation place, using tools that can withstand the weight
 - remove the polyethylene film
 - remove the document envelope
 - remove the cardboard packaging
 - remove the polystyrene protection

E The packing material must not be disposed of in the surrounding environment and must be kept out of children reach, as it can be dangerous. It must be disposed of according to the regulations in force.



The equipment is fixed to the pallet by 4 screws: two at the front and two at the rear; these must be removed.

2.5 Place of installation

The location of **Beretta HYDRONIC UNIT B** 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.

Beretta HYDRONIC UNIT B is designed for outdoor installation.

Avoid:

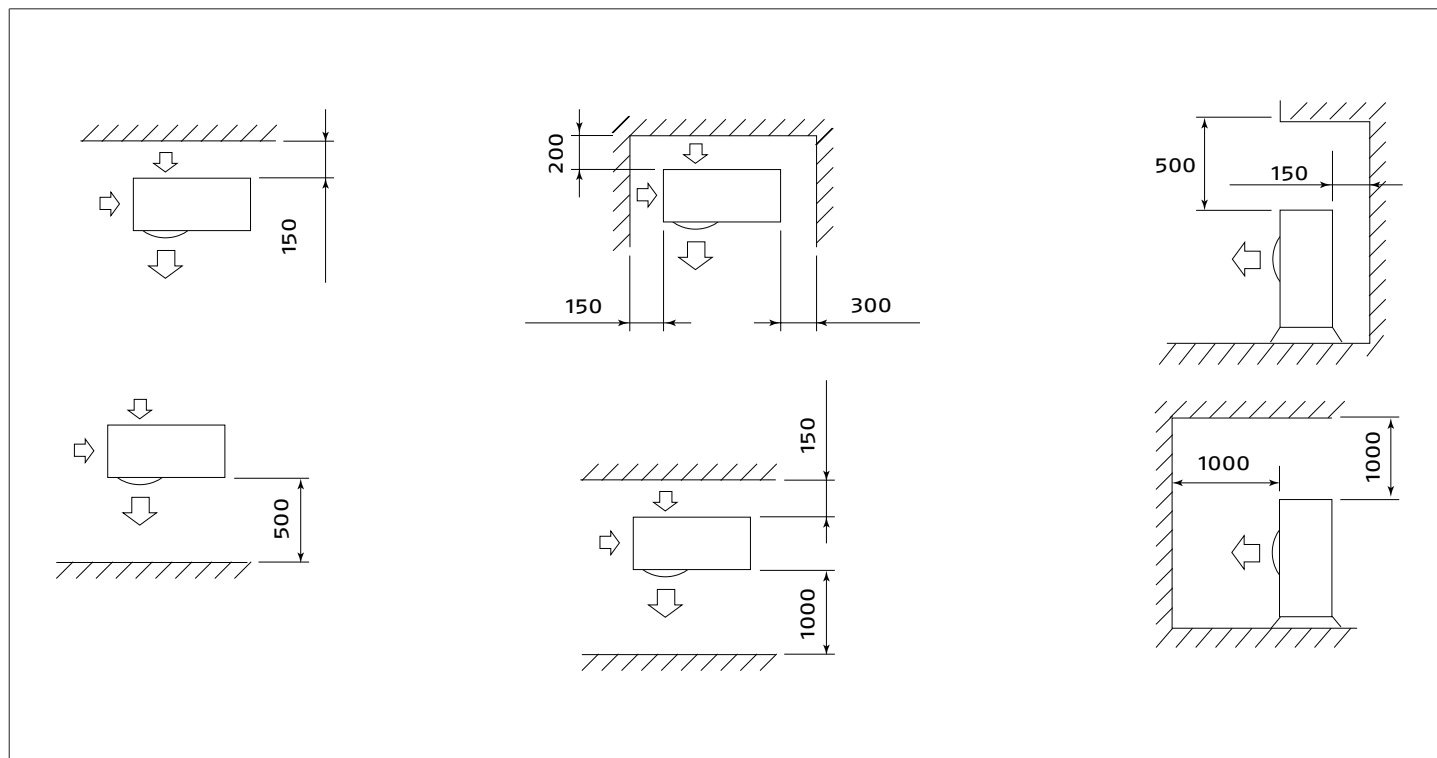
- positioning the unit in air shafts and/or basement window wells
- any obstacles or barriers that will cause the expelled air to recirculate
- places with the presence of aggressive atmospheres
- confined locations in which the device's sound levels might be compounded by reverberations or resonances
- proximity to bedrooms and rooms for resting
- positioning in corners where dust, leaves, or any other materials typically accumulate, which could compromise the device 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 unit is installed in a windy location, fit an anti-wind grille to protect the fan and check the correct functioning of the unit.

2.6 Recommended distances

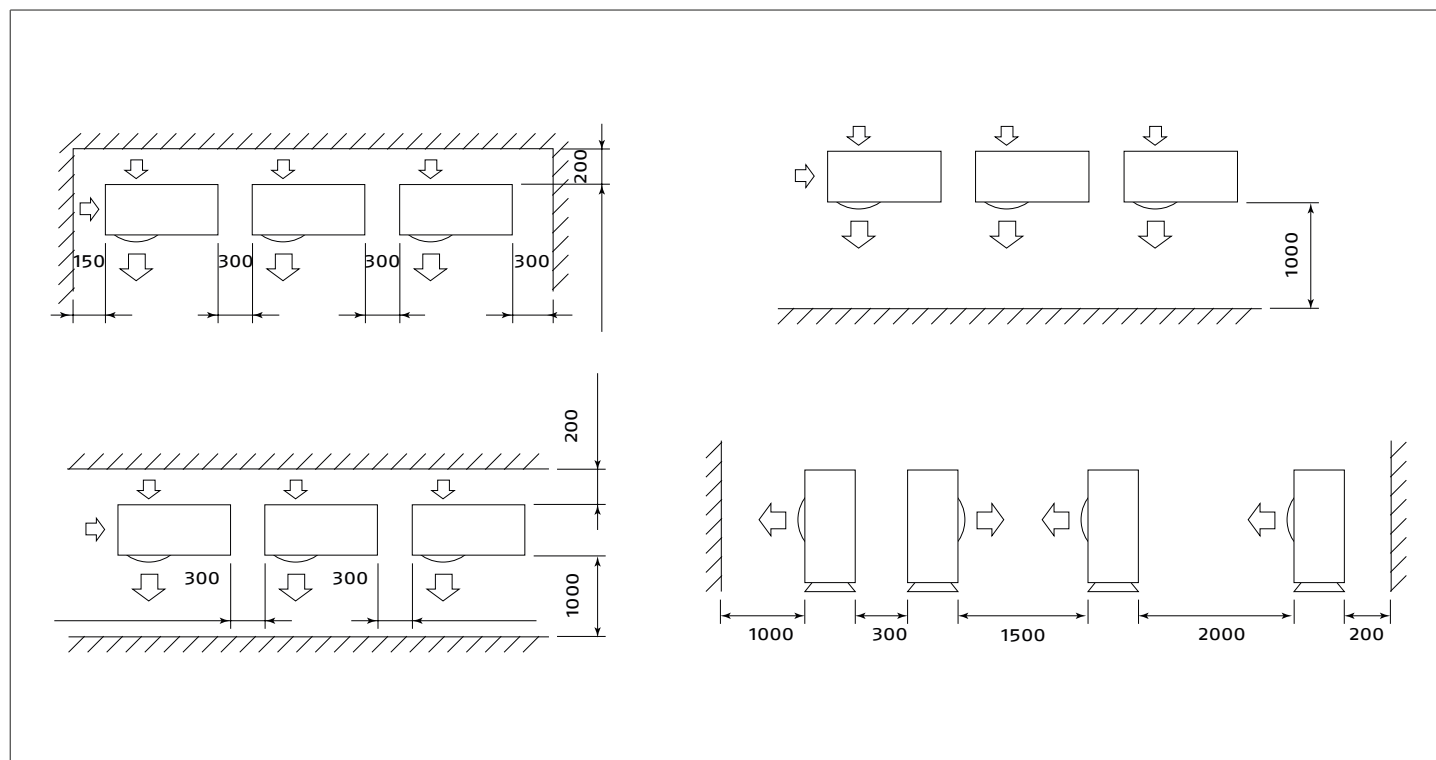
The distances for the device installation and maintenance are shown in the figure. The indicated spaces are necessary in order to prevent the airflow from being blocked, as well as to allow normal cleaning and maintenance operations to be carried out.

Single installations



⚠ Measurements in mm.

Multiple installations



⚠ Measurements in mm.

2.7 Positioning

Beretta HYDRONIC UNIT B devices must:

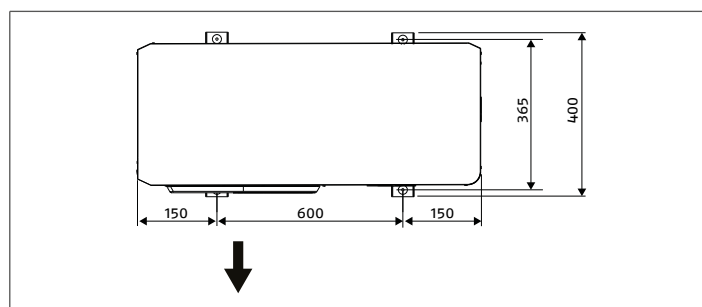
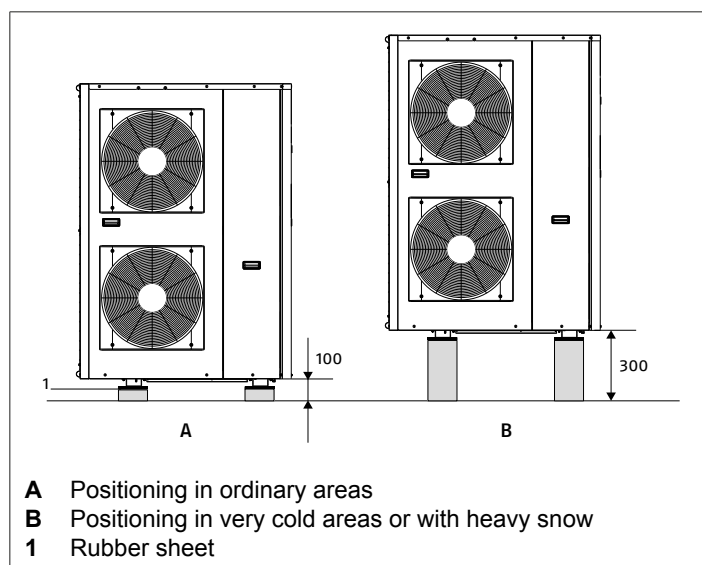
- be positioned on a level surface that is capable of supporting their weight
- be positioned on a sufficiently rigid surface that will not transmit any vibrations to the underlying or adjacent rooms

It is recommended to place a rubber sheet between the insole and the appliance (60 shore hardness, 10 mm thick) or use appropriately sized anti-vibration supports.

Provide for lifting of the unit from the floor:

- 100 mm in case of installation in ordinary areas
- 300 mm in case of installation in very cold areas or subject to heavy snow

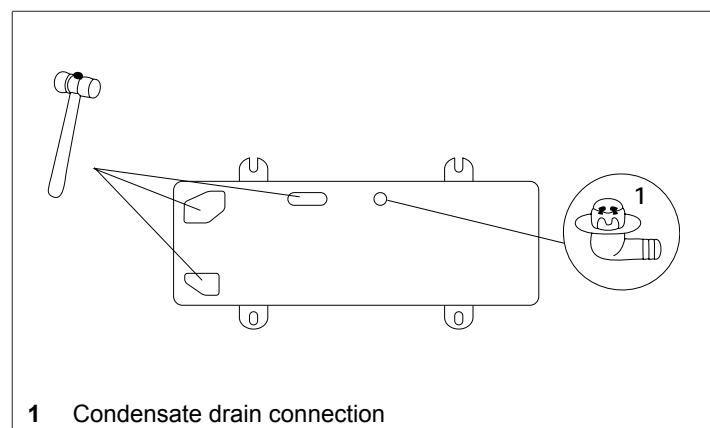
⚠ In case of installation in very cold areas or areas subject to heavy snowfall, where freezing out is a possibility, foresee appropriate antifreeze systems



Condensation discharge

During heating operation, the unit generates condensate. The condensate can be left to flow freely to the ground or conveyed to a

place suitable for drainage.



• **In case of free runoff:**

- before placing the unit, open the pre-cuts prepared on the base

A The condensation settles on the support surface. In case of sub-zero temperatures it can freeze and constitute a danger: provide suitable barriers to prevent people from approaching the unit.

• **In case of conveyed discharge:**

- insert a condensate drain fitting
- connect a drain hose
- direct to a place suitable for drainage

2.8 Installation on old systems or systems in need of upgrading

When **Beretta HYDRONIC UNIT B** 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 total absorption of the expansion of the fluid contained in the system
- the system is washed, cleaned of sludge, scale, deaerated and the seals have been checked
- a treatment system is provided when the feed / make-up water is particular (see chapter "Water quality characteristics" p. 21)

A 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 legislations and regulations.

A The manufacturer is not responsible for any damage caused by incorrect installation of the systems and failure to clean the hydraulic system.

2.9 Hydraulic schemes

Heat pumps require systems that guarantee a constant flow of fluid to the appliance, within minimum and maximum values and with sufficient volumes to avoid disturbances to the refrigerant circuits and to guarantee the correct degree of comfort.

⊘ IT IS FORBIDDEN to install the appliance in open vessel systems.

2.9.1 Plant water content

For correct operation of the appliance, a minimum volume of water must be guaranteed in the primary circuit of the system.

A The minimum volume is necessary to prevent the risk of ice formation during defrosting operations or the continuous modulation of the compressor frequency.

It also allows the following advantages:

- less wear on the appliance
- increase in system efficiency
- migliore stabilità e precisione della temperatura

• Il volume minimo è calcolato in base alla seguente formula:

• $V_{min} = C_{nom} \times N$

V_{min} better temperature stability and precision

C_{nom} Nominal cooling capacity under the conditions envisaged for the system in kW

N Multiplication factor

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

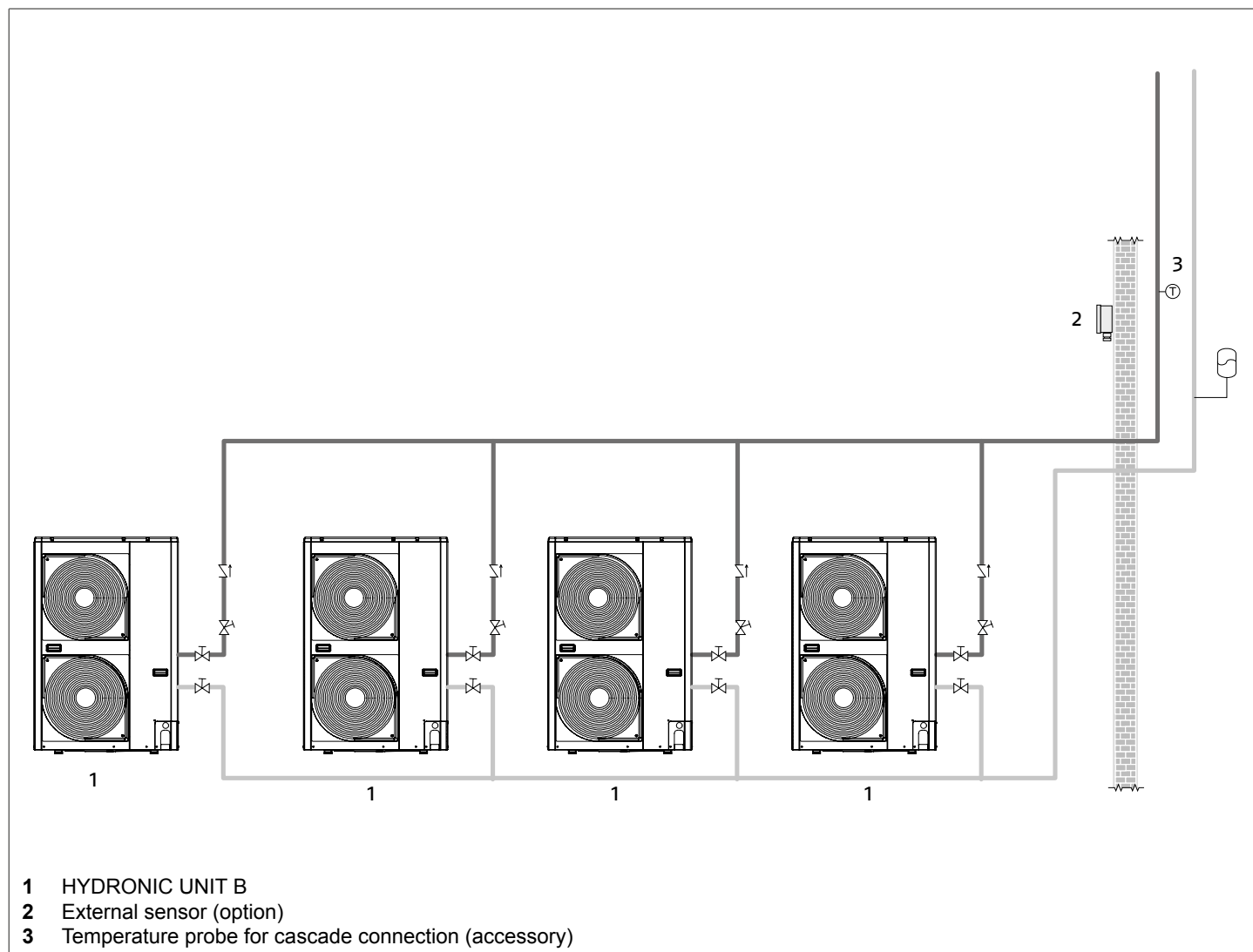
If the minimum volume is not reached, a suitably sized storage tank must be provided.

2.9.2 Water flow

The water flow rate must be kept constant during operation and must comply with the limits shown in the table:

Model		5	7	11	15	11T	15T
Hydraulic characteristics							
Minimum water flow	m³/h	0,2	0,4	0,6	0,6	0,6	0,6
Nominal water flow	m³/h	0,9	1,2	1,9	2,6	1,9	2,6
Maximum water flow	m³/h	4,3	4,3	7,0	7,0	7,0	7,0

System scheme for heat pumps cascade

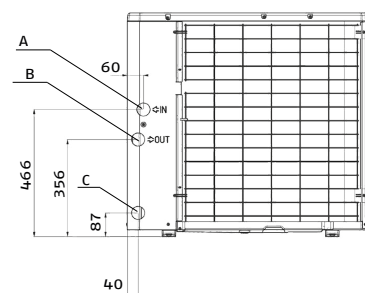


A Only units of the same model can be cascaded.

2.10 Hydraulic connections

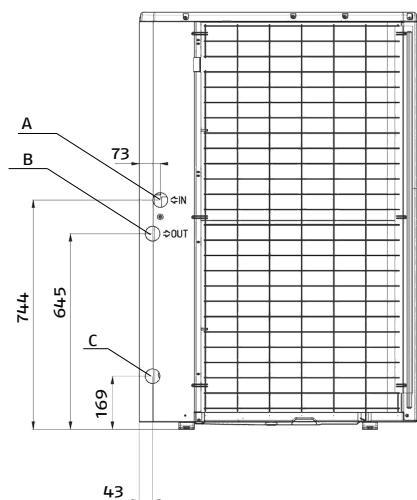
The size and positioning of the hydraulic connections of **Beretta HYDRONIC UNIT B** are shown in the following table. Before installation, it is advisable to wash all the pipes of the system thoroughly to remove any processing residues.

MODEL 5 - 7



- A** System return
- B** System delivery
- C** Discharging

MODEL 11 - 15



- A** System return
B System delivery
C Discharging

Model	System return	System delivery	Discharging
	Inches	Inches	Inches
5	1	1	3/4
7	1	1	3/4
11	1	1	3/4
15	1	1	3/4
11T	1	1	3/4
15T	1	1	3/4

! If the unit works in a system with a boiler >(parallel installation) when the boiler is working, make sure that the water temperature inside the heat pump does not exceed 60 °C.

Mandatory items:

- install a removable mesh water filter at the inlet to the appliance in an area accessible to maintenance, with characteristics of at least 10 meshes / inch², to protect the appliance from impurities in the water
- after the installation of the system and after each repair, it is essential to clean the entire system thoroughly, paying particular attention to the condition of the filter
- install a suitably sized expansion vessel
- install air vent valves in the highest points of the pipes
- install flexible elastic joints for connecting the pipes
- ensure that the quantity of water in the primary circuit is greater than the minimum volume indicated in the chapter "Plant water content" p. 17, ensure that the quantity of water in the primary circuit is greater than the minimum volume indicated in the chapter
- Foresee the pipes insulation, after the leakage verification, in order to minimize the heat loss and the condensate effect.
- Use anti freeze additives in order to prevent the wter freezing if the water circuit and pipes are exposed to ambient temperature below 0°C.

⊘ It is forbidden to run the unit without a clean water filter installed.

! The choice and installation of the system components is delegated to the installer, who will have to operate according to the rules of good technique and current legislation.

! The discharge of the installed safety valves must be connected to an adequate collection and evacuation system. The manufacturer of the appliance is not responsible for any flooding caused by the intervention of the safety valves.

! Is suggested to put a by-pass connection for the heat pump in order to allows the cleaning of the system pipes without disconnecting the unit.

! The connection tubes must have the appropriate diameter and must be supported, so as not to rest their weight on the unit.

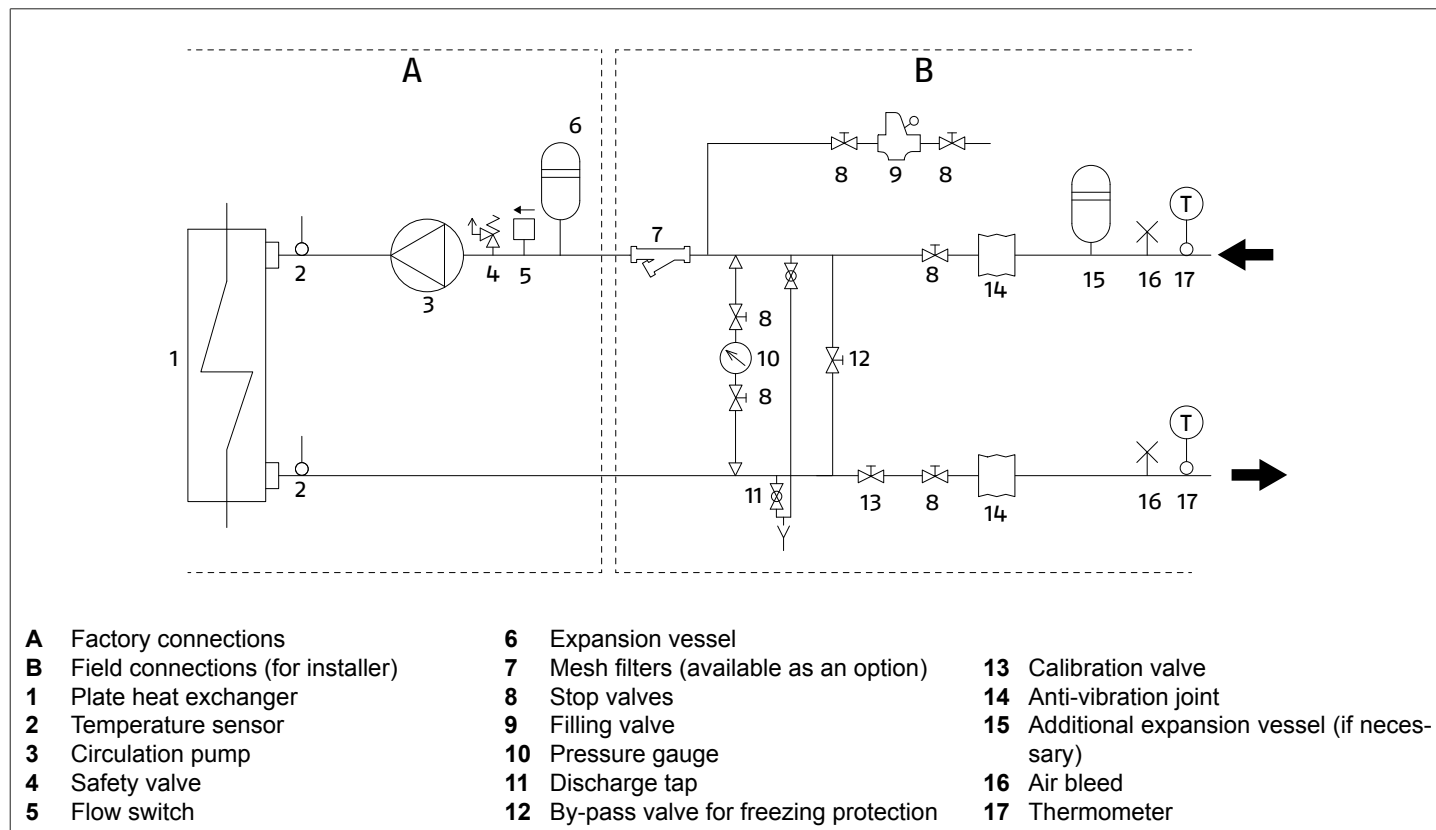
! The systems with anti freeze additives or specific local laws, require the installation of hydraulic backflow preventers.

! Check the pressure drops of the appliance, the system, and any other accessories mounted in line.

! Do not use the heat pump for treating industrial water, swimming pool water or domestic water. If water supplies of this kind are used, an intermediate heat exchanger must be used. Make sure to maintain the min. water content, possibly adding a storage.

2.10.1 Piping connections

HYDRONIC UNIT B

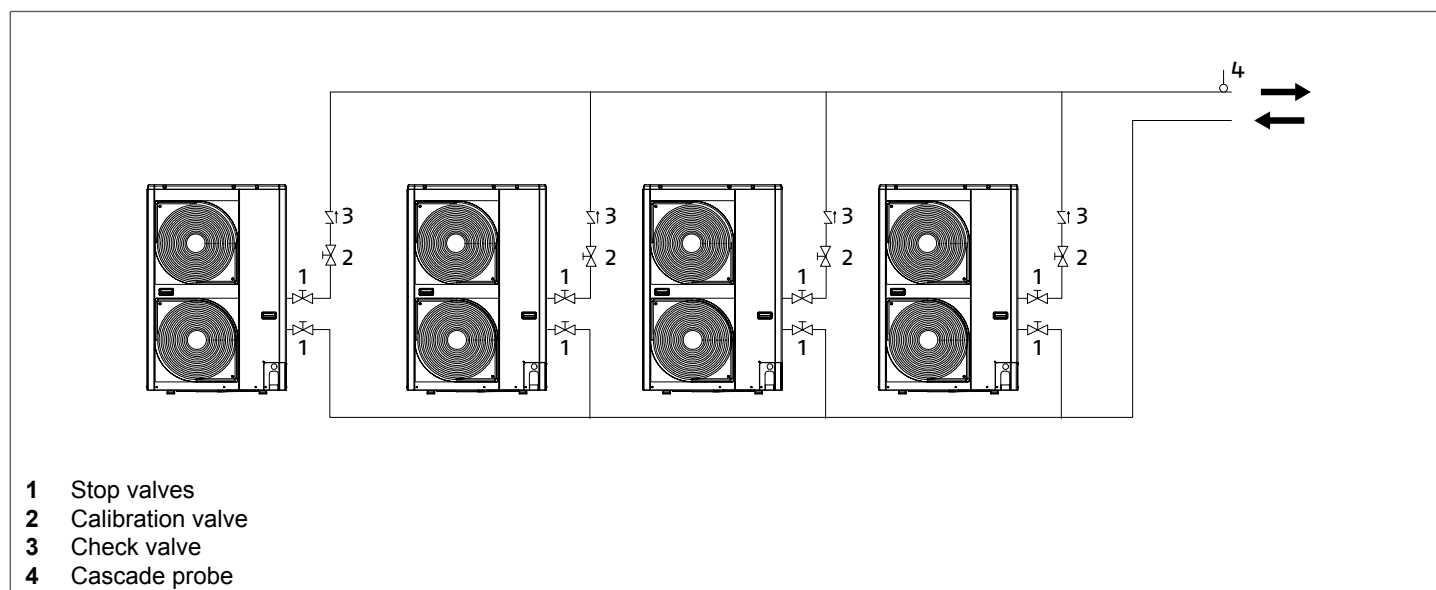


The hydraulic connections must be completed by installing:

- mesh filters (available as an option)
- Discharge tap
- additional expansion tank (if necessary)
- a suitably sized technical water storage tank
- filling group
- return and delivery thermometers

- air vent valves in the highest points of the pipes
- flexible elastic joints
- shut-off valves
- shut-off valves for chemical washing
- una valvola di by-pass tra mandata e ritorno dell'apparecchio, per protezione antigelo durante il periodo invernale

Cascade units

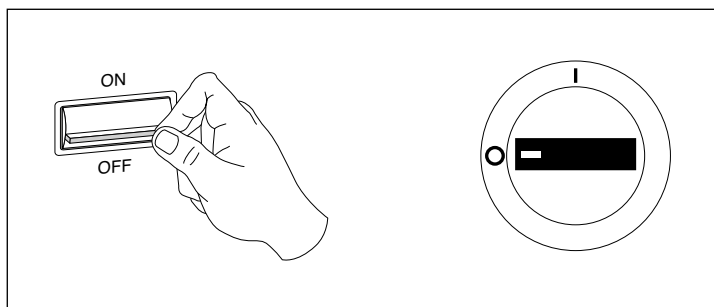


⚠ Only units of the same model can be cascaded.

2.11 System water filling and drainage

For the heat pump **Beretta HYDRONIC UNIT B** a loading system is required.

Before filling and emptying the system, set the main switch of the system and the main switch of the unit on "0" (off).



The filling pressure of the cold system must be 1.2 - 1.5 bar.

2.11.1 Water quality characteristics

In the heating / air conditioning system, water is used as heat transfer fluid.

The quality of the water used must comply with the requirements of the UNI 8065 standard, otherwise provide a treatment system.

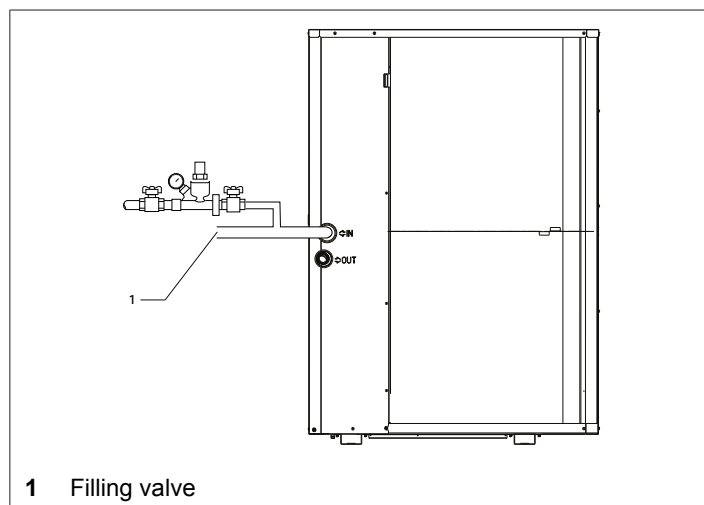
REFERENCE VALUES	
pH	7 ÷ 8
Electrical conductivity	10 ÷ 600 µS/cm
Chlorine ions	lower than 10 mg/l
Sulfuric acid ions	lower than 30 mg/l
Total iron	lower than 5 mg/l
Alkalinity M	lower than 100 mg/l
Total hardness	1 ÷ 2,5 mmol/l
Sulfur ions	none
Ammonia ion	none
Silicon ions	lower than 1 mg/l

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

⚠ An excessive water softening (total hardness <15°F) could generate corrosive effects on the metallic parts (pipes or generators parts). It is suggested to limit the conductivity value within 200 µS/cm.

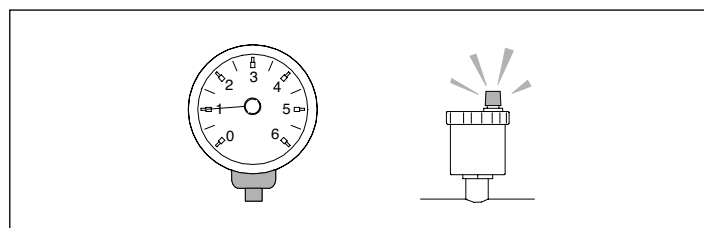
⊖ It is forbidden to top up the system constantly or frequently, as this can damage the heat exchanger of the appliance.

2.11.2 System filling-up



- before starting the loading check that the drain cock is closed
- check that the vents in the system are open
- aprire i dispositivi di intercettazione dell'impianto idrico
- caricare lentamente l'impianto
- close the system vents as soon as water comes out
- check that the filling pressure of the cold system reaches the value of about 1.2 - 1.5 bar

⚠ After a few hours of operation and some on / off cycles, check the pressure and if necessary top up if less than 1 bar. The make-up must be performed with the machine off (pump off).



2.11.3 Unit drainage

The units do not have a drain cock located inside. It must be provided outside near the appliance.

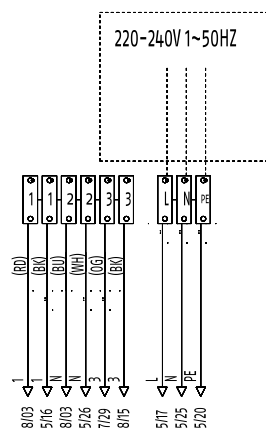
Before starting to empty the appliance:

- put the system main switch on "OFF" and the equipment main switch on "0" (off)
- close the shut-off devices of the water system
- connect a drain pipe to the connection on the system
- open the drain tap outside the unit

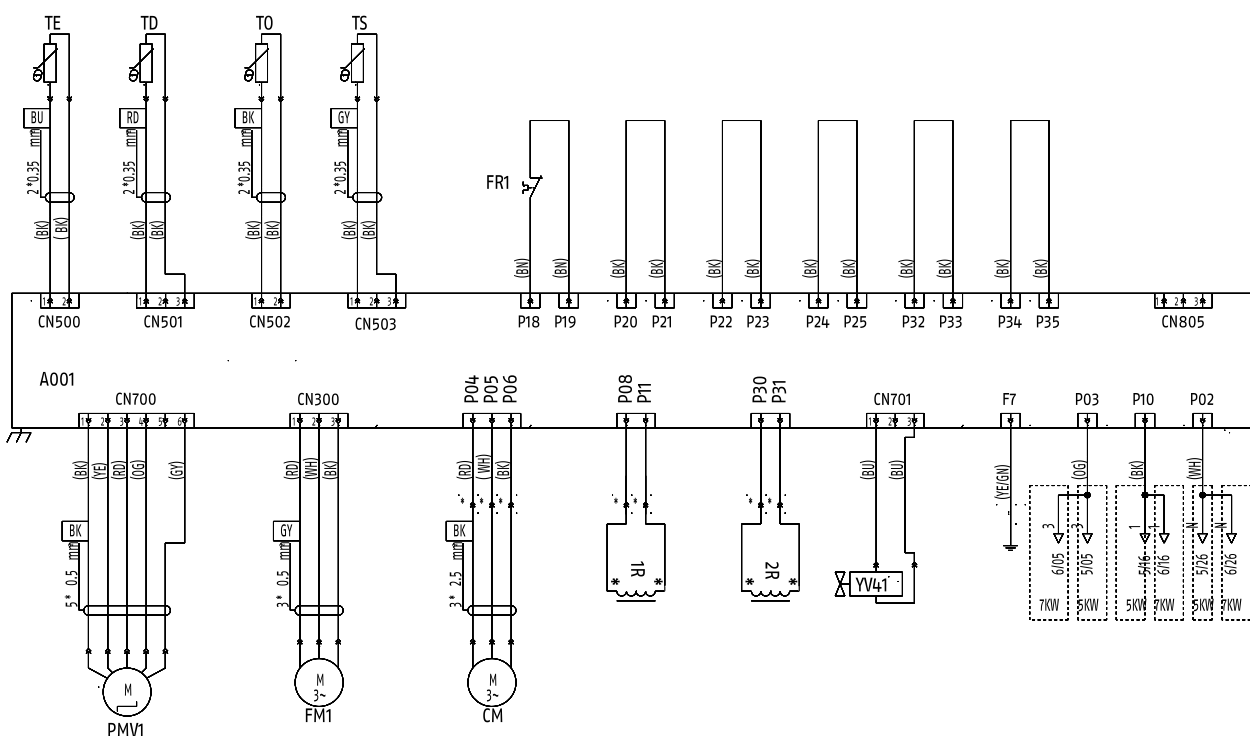
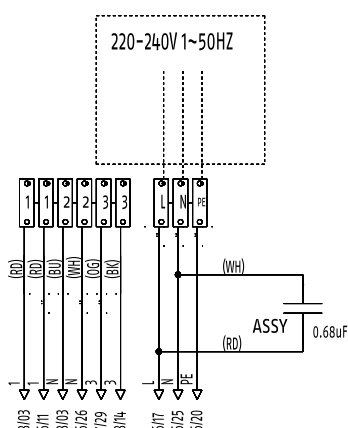
Once done:

- close the drain valve outside the unit

Model 5 - 7

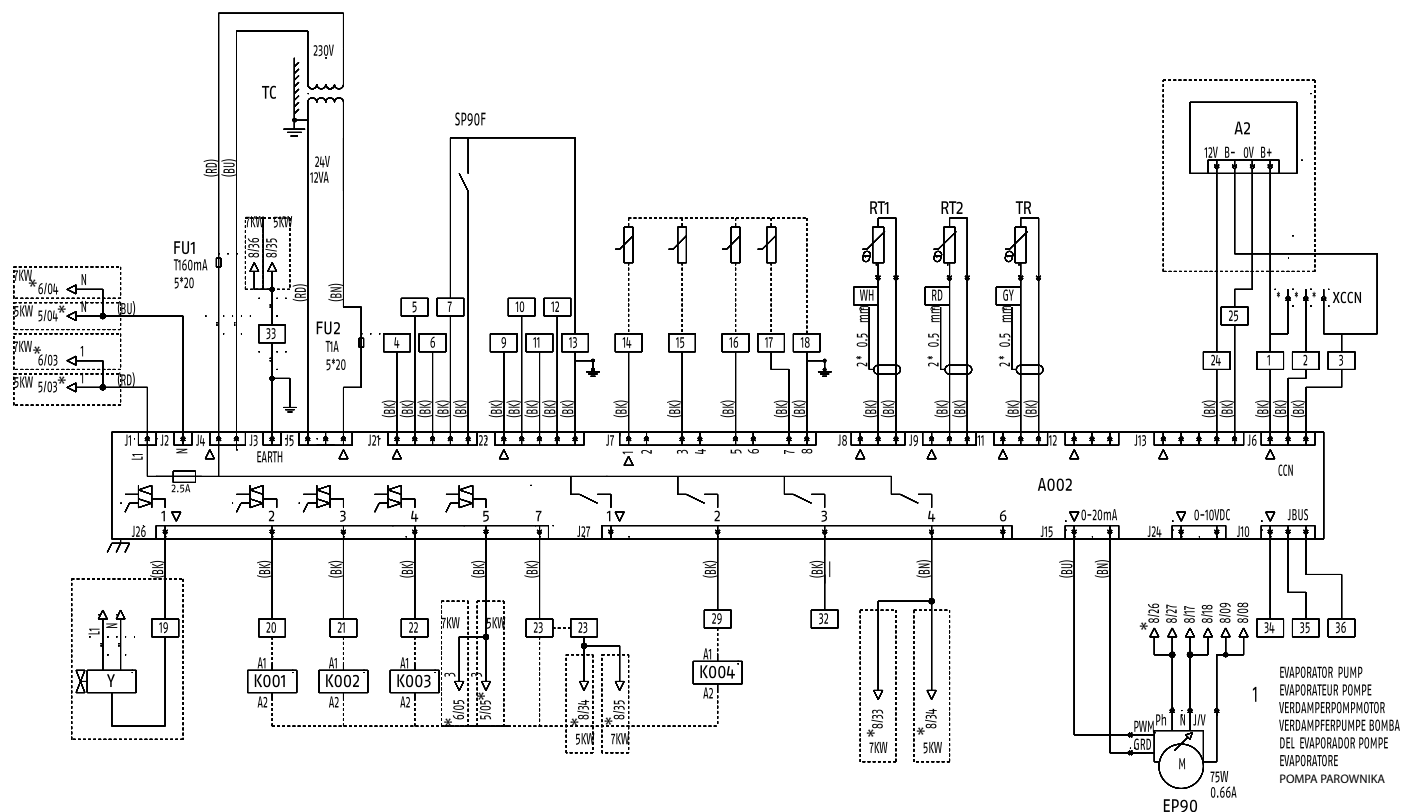
MOD. 005

MOD. 007



A001	Drive per variable speed	PMV1	Electronic expansion valve motor		
CM	Compressor	TD	Compressor discharge tempera- ture sensor	TO	Outdoor air temperature sensor
FM1	Fan motor			TS	Suction temperature sensor
FR1	Compressor thermal relay	TE	Condenser coil temperature sensor	YV41	Cycle inversion valve

CONTROL CIRCUIT



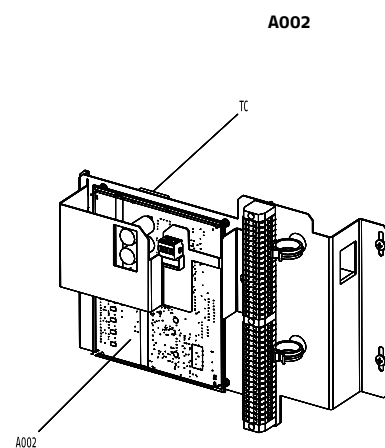
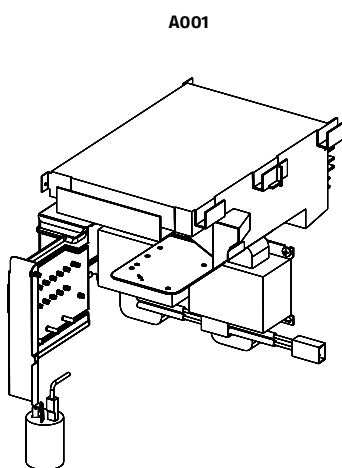
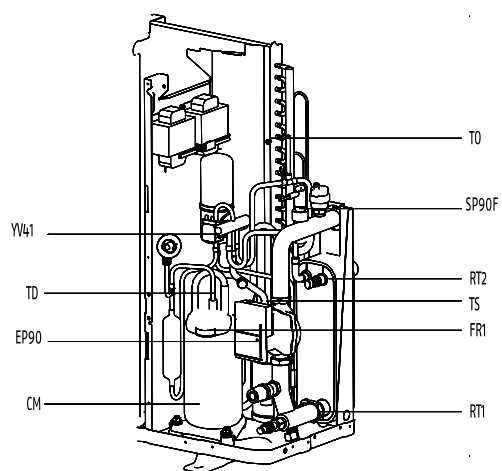
A002 Main electronic board
A2 Command interface
EP90 Water pump

RT1 System flow temperature sensor
RT2 System return temperature sensor
TR Refrigerant temperature sensor

SP90F Flussostato
TS Suction temperature sensor
YV41 Cycle inversion valve

* consult the wiring diagram supplied with the unit

ELECTRICAL COMPONENTS POSITION



A001 Drive per variable speed

A002 Main electronic board

CM Compressor

EP90 Water pump

FR1 Compressor thermal relay

RT1 System flow temperature sensor

RT2 System return temperature sensor

SP90F Flussostato

TD Compressor discharge temperature sensor

TE Condenser coil temperature sensor

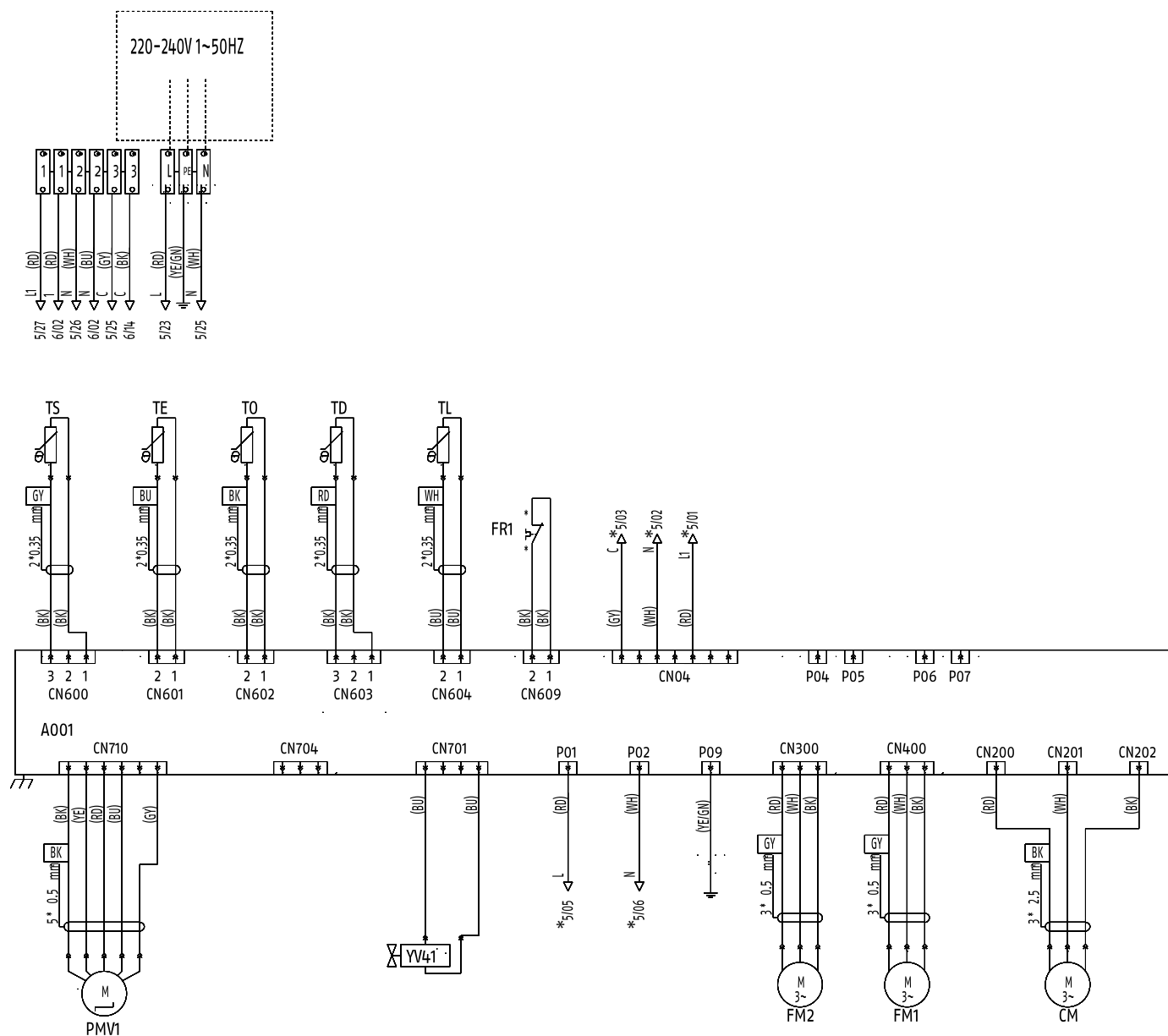
TO Outdoor air temperature sensor

TS Suction temperature sensor

YV41 Cycle inversion valve

Model 11 - 15

POWER CIRCUIT

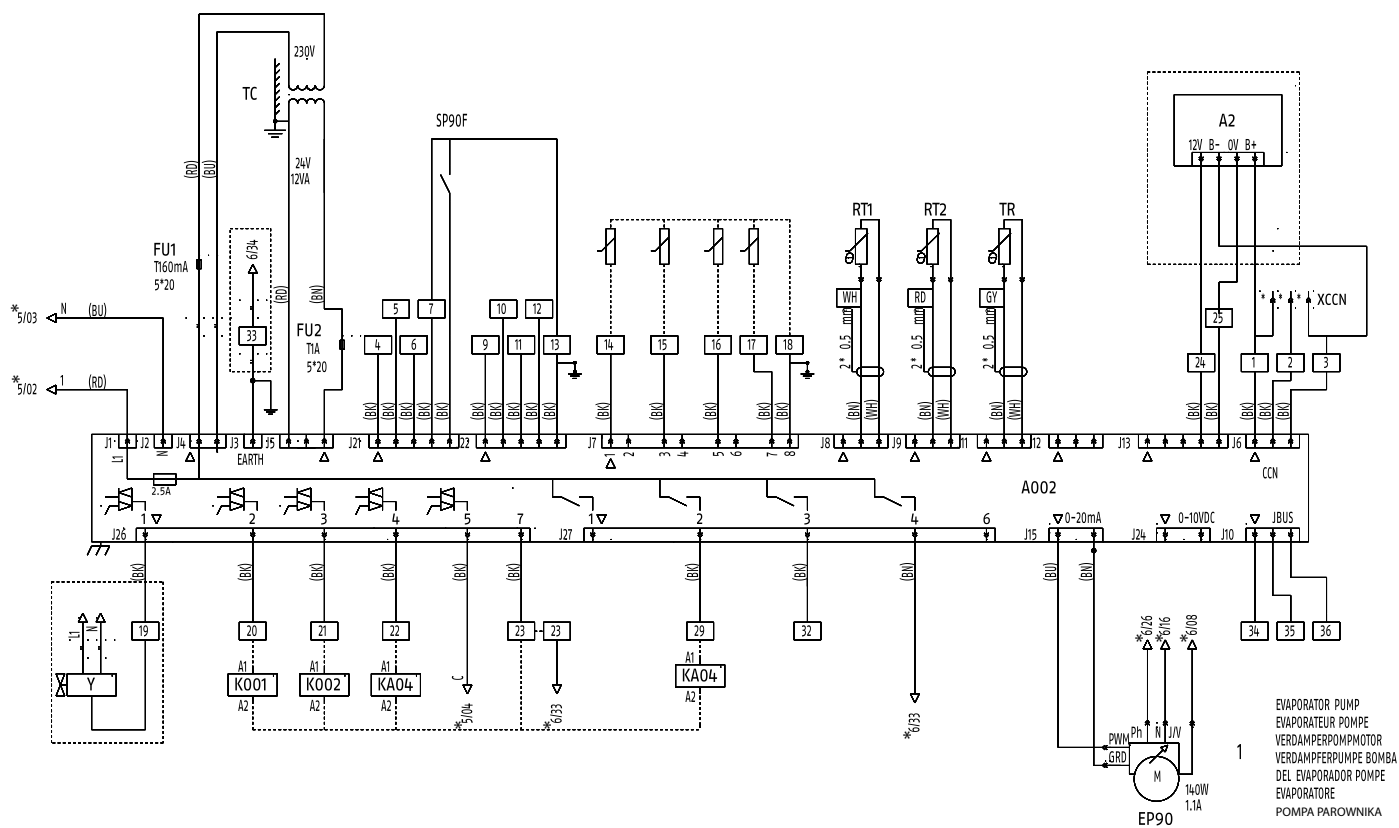


A001 Drive per variable speed
 CM Compressor
 FM1 Fan motor
 FM2 Fan motor
 FR1 Compressor thermal relay
 PMV1 Electronic expansion valve motor

TD Compressor discharge temperature sensor
 TE Finned coil temperature sensor 1
 TL Finned coil temperature sensor 2
 TO Outdoor air temperature sensor
 TS Suction temperature sensor
 YV41 Cycle inversion valve

* consult the wiring diagram supplied with the unit

CONTROL CIRCUIT



A002 Main electronic board

A2 Command interface

EP90 Water pump

RT1 System flow temperature sensor

RT2 System return temperature sensor

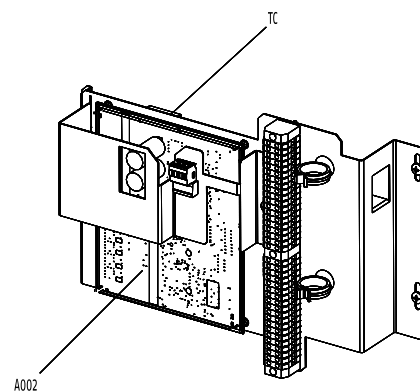
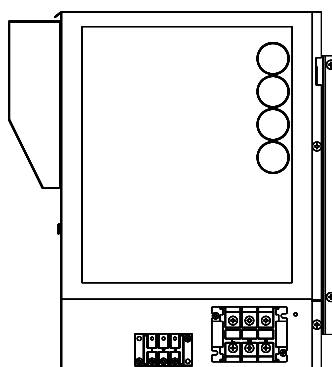
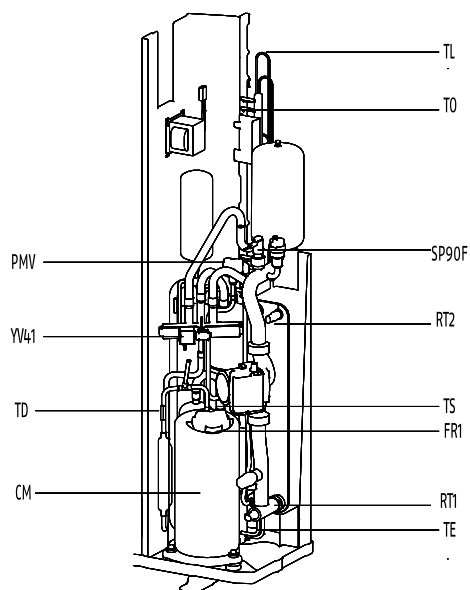
SP90F Flussostato

TC Trasformer

TR Refrigerant temperature sensor

TS Suction temperature sensor

* consult the wiring diagram supplied with the unit



A002 Main electronic board

CM Compressor

FR1 Compressor thermal relay

PMV1 Electronic expansion valve motor

RT1 System flow temperature sensor

RT2 System return temperature sensor

SP90F Flussostato

TC Trasformer

TD Compressor discharge temperature sensor

TE Finned coil temperature sensor 1

TL Finned coil temperature sensor 2

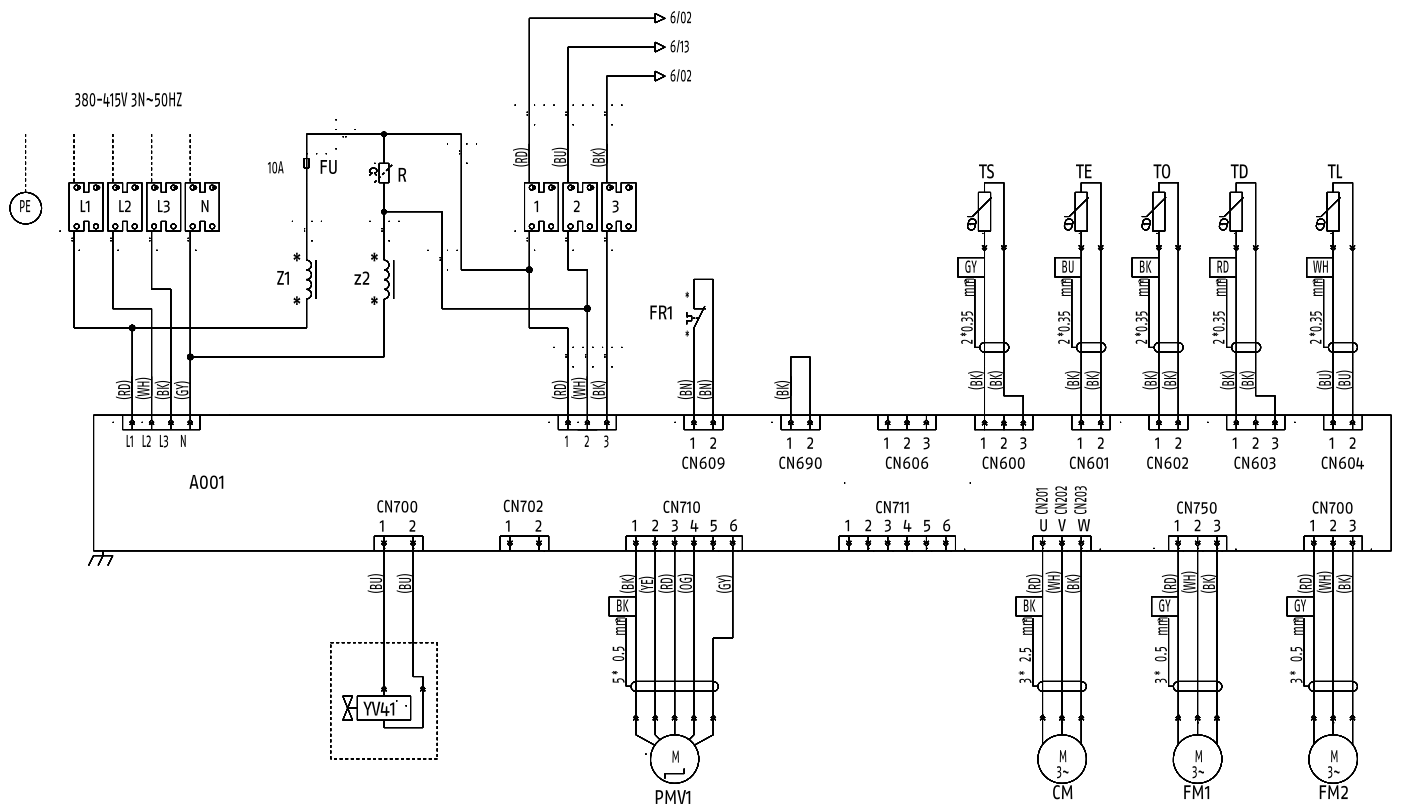
TO Outdoor air temperature sensor

TS Suction temperature sensor

YV41 Cycle inversion valve

Model 11T - 15T

POWER CIRCUIT



A001 Drive per variable speed

CM Compressor

EP90 Water pump

FM1 Fan motor

FM2 Fan motor

FR1 Compressor thermal relay

PMV1 Electronic expansion valve motor

TD Compressor discharge temperature sensor

TE Finned coil temperature sensor 1

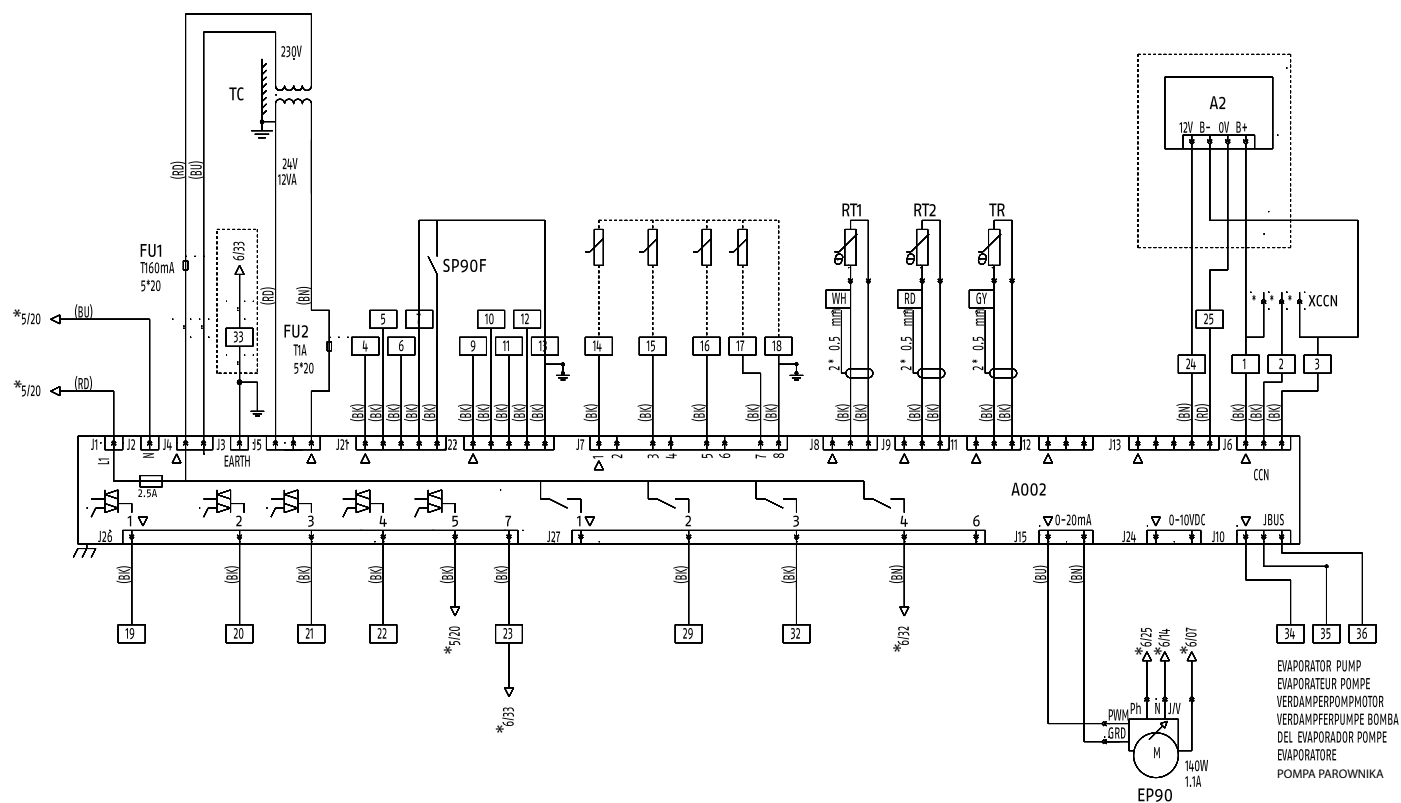
TL Finned coil temperature sensor 2

TO Outdoor air temperature sensor

TS Suction temperature sensor

YV41 Cycle inversion valve

CONTROL CIRCUIT



A002 Main electronic board

A2 Command interface

EP90 Water pump

RT1 System flow temperature sensor

RT2 System return temperature sensor

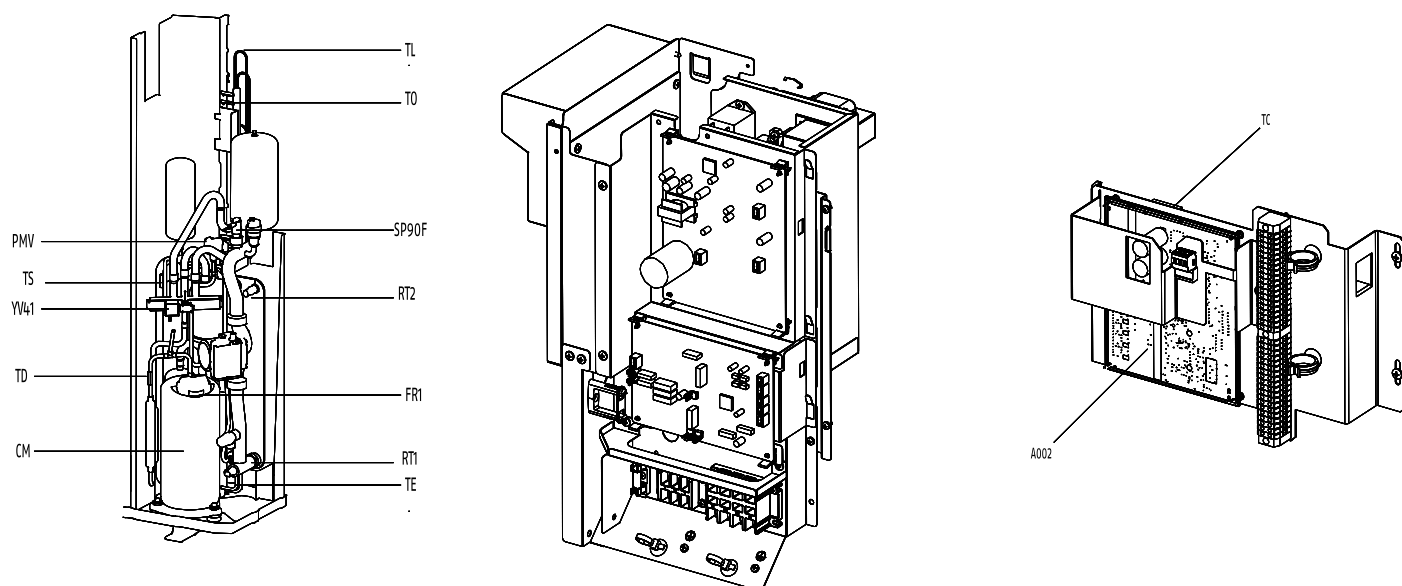
SP90F Flussostato

TC Trasformer

TR Refrigerant temperature sensor

* consult the wiring diagram supplied with the unit

ELECTRICAL COMPONENTS POSITION

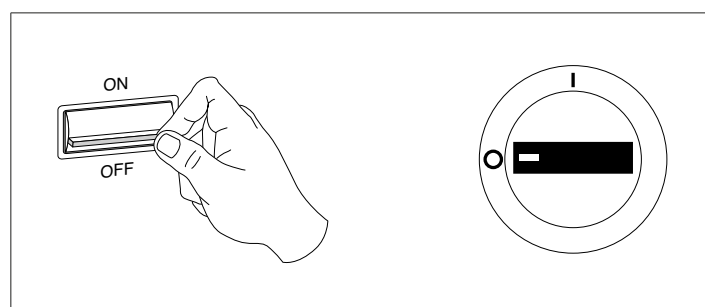


A002 Main electronic board
 CM Compressor
 FR1 Compressor thermal relay
 PMV1 Electronic expansion valve motor
 RT1 System flow temperature sensor
 RT2 System return temperature sensor
 SP90F Flussostato

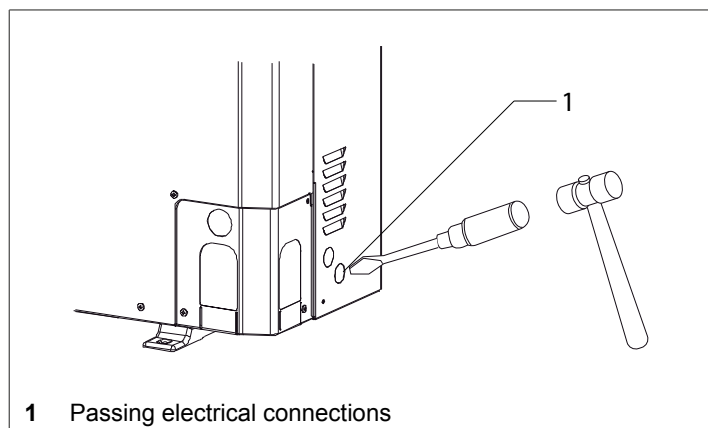
TC Trasformer
 TD Compressor discharge temperature sensor
 TE Finned coil temperature sensor 1
 TL Finned coil temperature sensor 2
 TO Outdoor air temperature sensor
 TS Suction temperature sensor
 YV41 Cycle inversion valve

2.13 Electrical connections

HYDRONIC UNIT B leave the factory completely wired and only requires connection to the power supply, installation of a padlock-able disconnecter and connection of any accessory components.
 Before proceeding:



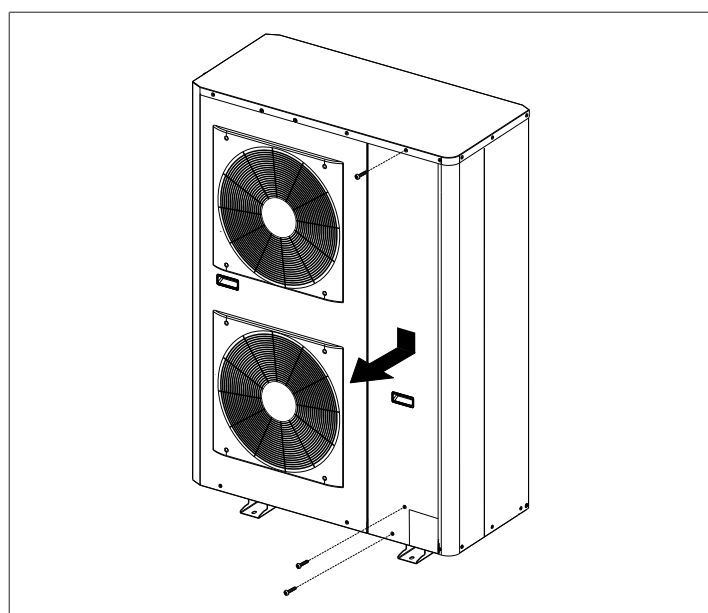
- put the system main switch on "OFF" and the equipment main switch on "0" (off)



- punch the connection points of the pre-cut part
- remove the pre-cut part
- remove the sharp edges from the hole
- insert the cable glands supplied
- insert the cable gland supplied (three-phase models)
- insert the cables from the outside guiding them in the direction of the electrical panel
- stop the cables with suitable cable clamps

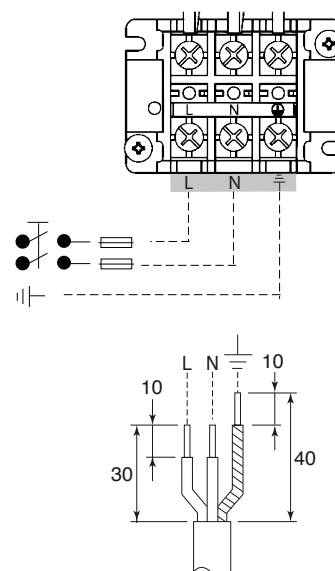
To access the control panel terminal blocks:

- unscrew the fastening screws
- remove the access panel

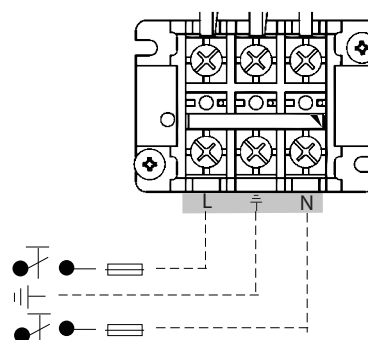


- pass the power cable through the cable gland and fix it
- pass the cables for the auxiliary connections through the cable glands and secure them
- make electrical connections according to the diagrams below

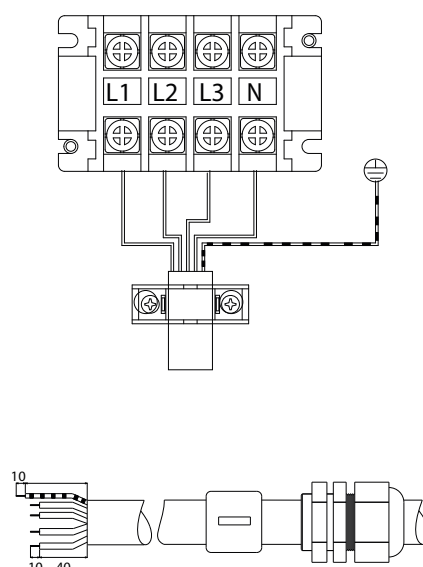
MODEL 5 - 7



MODEL 1PH 11 - 15



MODEL 3PH 11T - 15T



⚠ For three-phase models it is mandatory to respect the sequence of phases indicated on the terminal board. Otherwise the unit may be permanently damaged.

For the sizing of the electrical power cables and safety devices,

INSTALLATION

use the following table:

Model		5	7	11	15	11T	15T
Electrical characteristics							
Power supply	V/ph/Hz+N	230/1/50				400/3/50	
Permitted voltage	V	220 - 240				380 - 415	
Total power input ⁽¹⁾	kW	1,80	3,38	4,73	5,18	10,32	
Cos Phi at max. power absorbed		0,98					
Full load current ⁽²⁾	A	8,90	16,70	23,30	25,60	16,80	
Switch magnetermic	A	10	16	25		16	
Fuse	A	16	20	32		20	
Power cable	n. x mm²	3 x 2,5		3 x 4		5 x 2,5	
Power cable	Type	H07 RN-F					

- (1) Power absorbed by the compressors and fans at the limit operating conditions (i.e. with a saturated inlet temperature of 15 °C and a condensation temperature equivalent to 68.3 °C) with a rated supply voltage of 400 V
- (2) Maximum unit operating current

- apply the ferrite ring on the power supply cable to ensure compliance with EMC standards

Ferrite rings installation:

- The 5 - 7 models do not need ferrite rings.
- The models 11 and 15 with single phase electrical supply need a ferrite ring (supplied with the unit) installed on phase and neutrak cables (L*N), near the electrical supply terminal block.
- The 11T e 15T three phases models needs two ferrite rings (suppy with the unit), one installed near the electrical supply terminal block around the phases and neutral cables, the other on the same cables but just inside the unit frame, where the cables enter in the unit frame.
- Once the electrical connections are complete, reassemble all the components operating in reverse order.

Check that:

- the characteristics of the electrical network are adequate for the absorption of the appliance, also considering any other machinery in parallel operation
- the power supply voltage corresponds to the nominal value +/- 10%, with a maximum phase imbalance of 3%
- all disconnection devices from the power supply must have a contact opening (4 mm) to allow total disconnection in accordance with the conditions foreseen for overvoltage class III

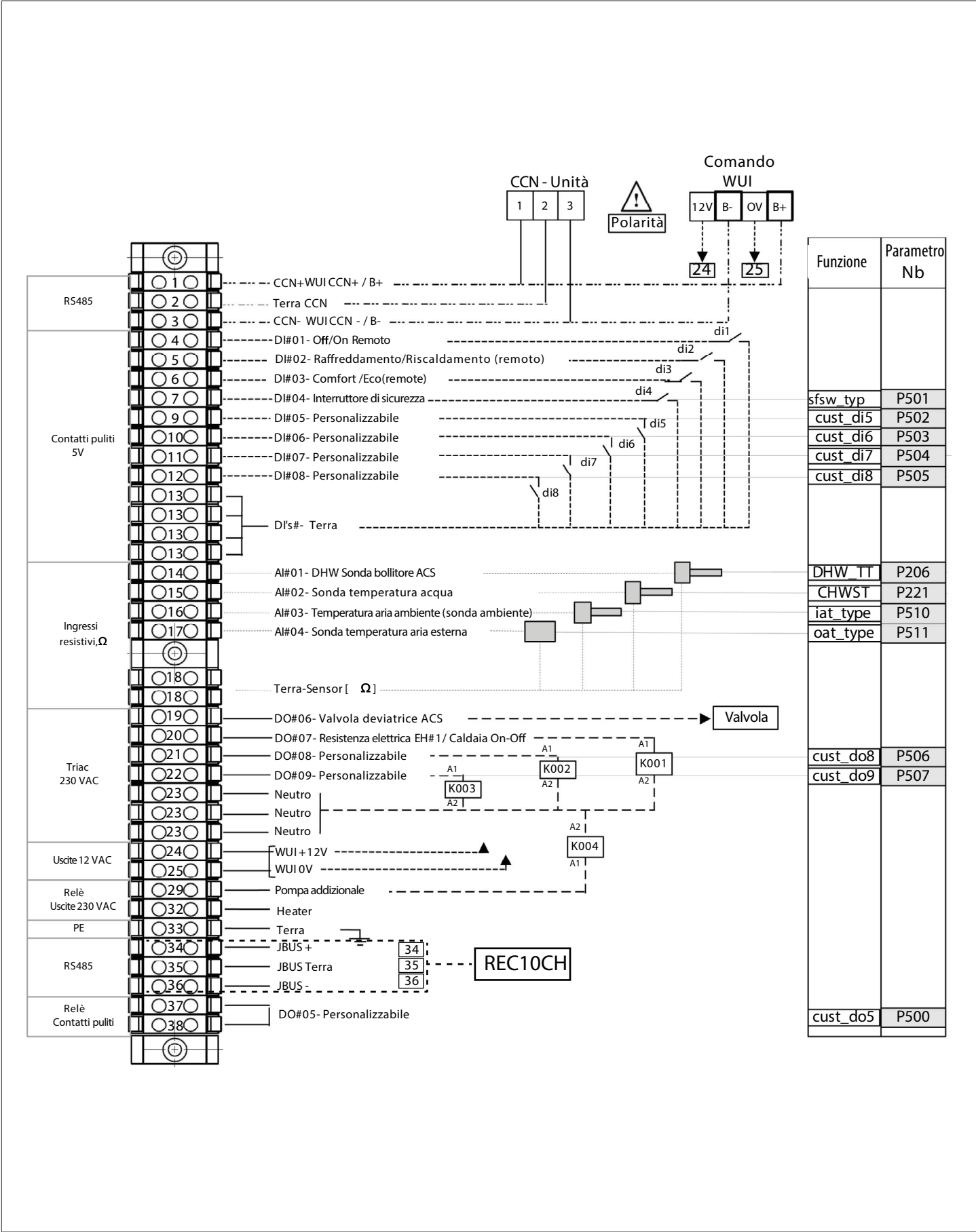
Mandatory items:

- the use of an omnipolar magneto-thermal switch, padlockable line disconnecter, compliant with CEI-EN Standards (contact opening of at least 4 mm), with adequate breaking capacity and differential protection, installed near the appliance
- 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 impedance is consistent with the unit's power consumption, as indicated on the unit's data plate
- for any electrical intervention, always refer to the wiring diagrams contained within this booklet

 Do not use gas and water pipes to ground the unit.

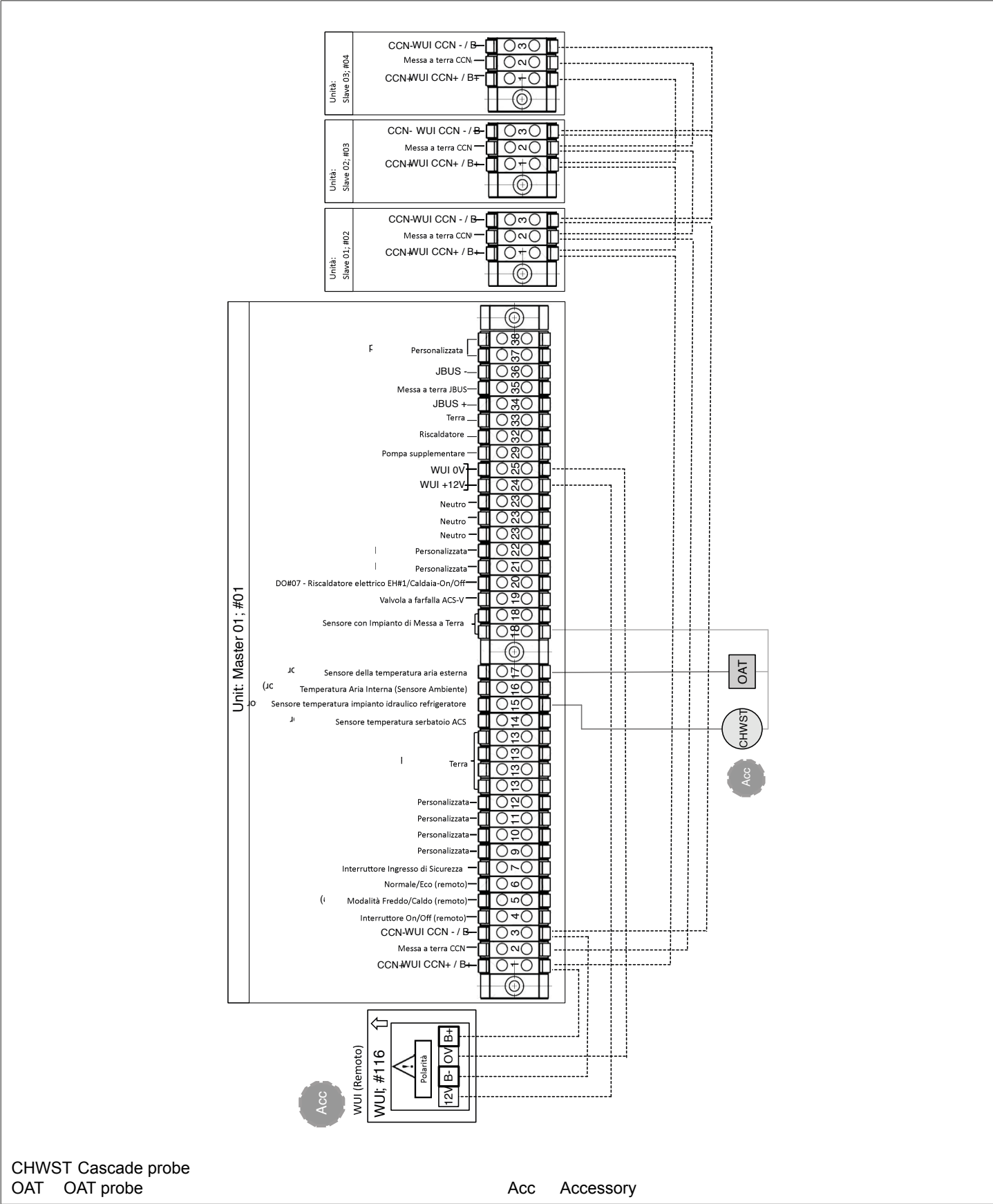
 It is forbidden to pass the power supply and room thermostat cables near hot surfaces (delivery pipes). If contact with parts above 50 ° C is possible, use a suitable type of cable.

2.13.1 Euxiliaries connections



INSTALLATION

Connections for cascade heat pumps



⚠ Only units of the same model can be cascaded.

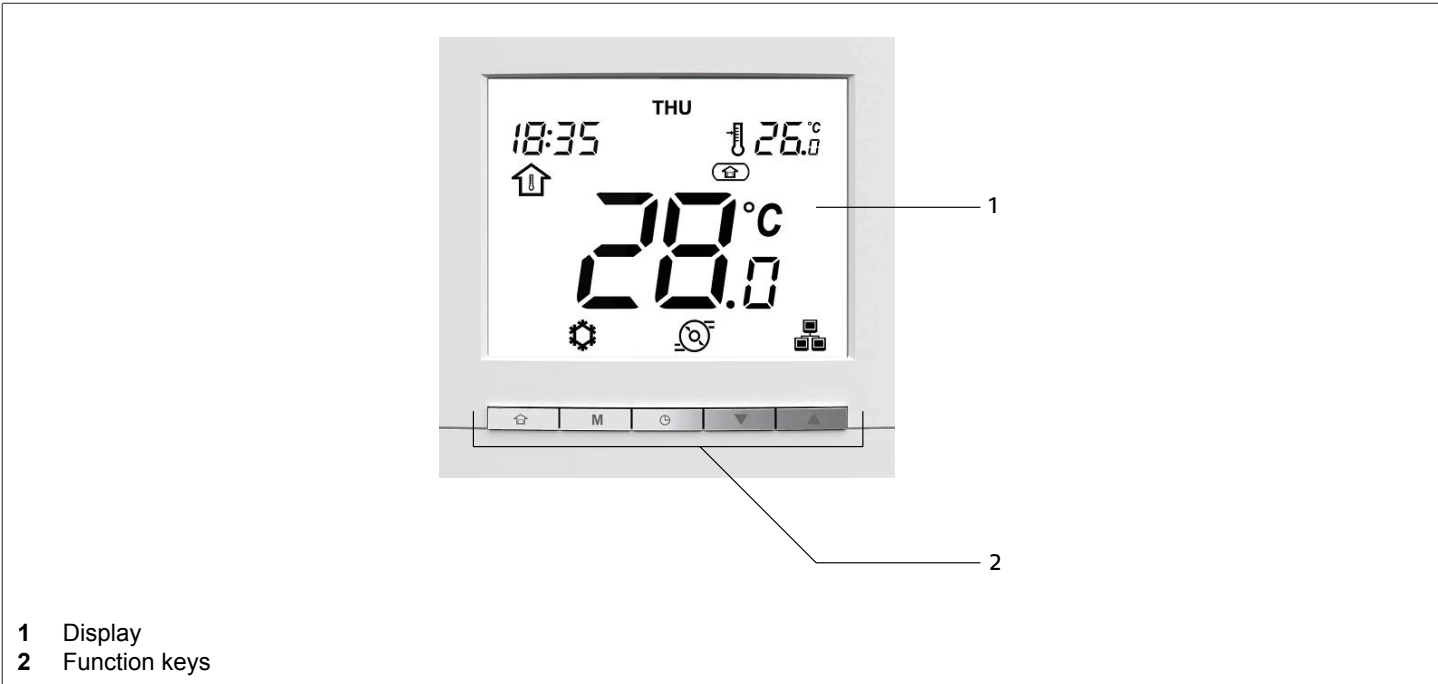
2.14 Control panel (ACCESSORY)

The control panel is the interface for the Installer and the User to carry out all the operations for setting the operating parameters and displaying the status of the components present in the appliance. Based on the temperatures detected by the probes present in the appliance and by those possibly installed in the domestic hot water tank, in the room and outdoors, the electronics modulate the operation of the appliance and the operating condition can be displayed

on the display.
The panel can be used to set the temperature required for the system and for domestic hot water.

- HYDRONIC UNIT B can be controlled through:
- Contro panel WUI
 - REC10CH control panel
 - External consents

Contro panel WUI

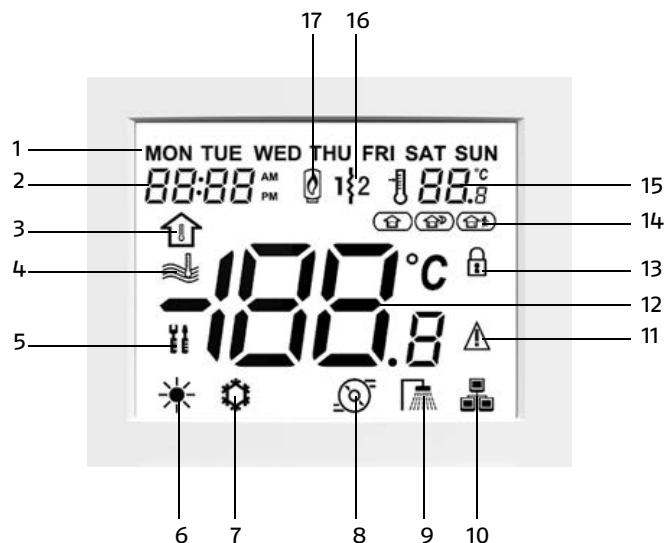


Button	Description
	Selection of the mode of occupation between: At home, Night, Away from home
M	Selection of the operating mode from: Off, Heating, Cooling, Domestic hot water
	Setting the date and time Time bands programming
	Scrolling the submenus down Decrease of the value of the selected parameter
	Scrolling the submenus upwards Increase the value of the selected parameter
+ M	Parameter display
+	Access to advanced settings
M +	Alarm display Alarm reset

INSTALLATION

Display

Displays all the information necessary to manage the appliance.



- | | |
|---|-------------------------------|
| 1 Days of the week | 13 Lock settings |
| 2 Clock | 14 Home, Night, Away mode |
| 3 Ambient temperature | 15 Setpoint |
| 4 Water temperature | 16 Electric heaters operation |
| 5 Advanced settings | 17 Boiler operation |
| 6 Heating mode | MON: Monday |
| 7 Cooling mode | TUE: Tuesday |
| 8 Circulation pump operation | WED: Wednesday |
| 9 Domestic Hot Water Mode | THU: Thursday |
| 10 Cascade operation | FRI: Friday |
| 11 Alarm presence | SAT: Saturday |
| 12 Temperature indicator, alarm code and messages | SUN: Sunday |

Display indication	Description
FRI	Indication of the current day of the week from Monday (MON) to Sunday (SUN)
88:88 AM/PM	Indication of the current time in 12h or 24h format
	Indication that system control is based on ambient temperature. In this case it is necessary to connect a room temperature probe or install the remote control panel available as an accessory
	Indication that system control is based on water temperature
	The icon flashes when the password is required
	Indication that the heating mode is active
	Indication that cooling mode is active
	Indication that the circulation pump is active
	Indication that the domestic hot water mode is active
	Fixed icon: indication of Master unit connected in cascade
	Fast flashing icon: indication of Slave unit connected in cascade
	Icon with slow flashing: indication of communication error between master and slave unit

Display indication	Description
	Temperature indication  Ambient temperature  Temperatura acqua Indication of parameter number and value Indication of the alarm code
	Indication that the occupation mode is blocked by the user. In this case, the time programming is deactivated.
	Indication that the mode "In casa" is active
	Indication that the mode "Notte" is active
	Indication that the mode "Fuori casa" is active
	Indication of the desired temperature value (setpoint)
	Indication that the integration electric heater is active. Numbers 1 and 2 refer to the activated stage
	Indication that the integration boiler is active
	Fixed icon: indication of intervention of an alarm that stopped the unit
	Flashing icon: indication of intervention of an alarm that has left the unit running

Displaying details

The figures below represent some of the most frequent displays.



Mode: >Heating
Mode home: At home
Control: Water temperature
Water temperature: 34°C
Setpoint: 35 °C



Alarm : C1
Alarm code: 16



Mode: Off

INSTALLATION

Fault codes

Operating anomalies are signaled on the control panel display.



Fixed icon: indication of intervention of an alarm that has stopped the unit



Flashing icon: indication of intervention of an alarm that has left the unit in operation

- Faults are represented with error codes.
- To display the codes:
 - press any key to activate the control panel
 - hold down the keys simultaneously **M** and  for 2 seconds
 - push  or  to scroll through the codes
- Two types of alarms are displayed:

CURRENT ALARM



Alarm : C1
Alarm code: 16

Access to parameters

This section includes an overview of all parameters that can be read or modified by the user.

The parameters are sorted as follows:

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

Legend:

No No access
RO Reading only
RW Reading/writing
RO/d Reading and display on the control panel
RO/F Parameter reading and forcing via CCN only

- Proceed as follows to access the filters:
 - press any key to activate the control panel
 - hold down the keys simultaneously  and  for 2 seconds

The display asks for the password for advanced settings.

PREVIOUS ALARM



Previous alarm: P1
Alarm code: 15

- To reset the alarms:
 - hold down the keys simultaneously **M** and  for 2 seconds

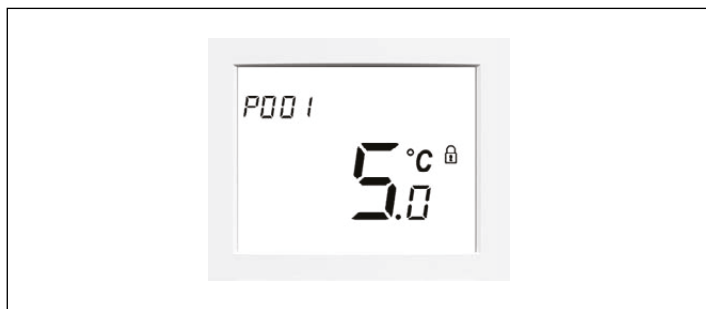


- push  or  to select **YES**
- hold down the keys simultaneously **M** and  for 2 seconds to confirm the selection
- keep the key pressed  for 2 seconds to exit



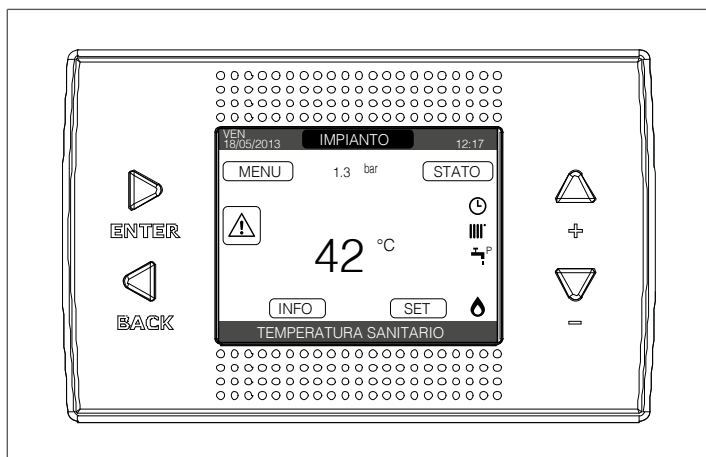
Enter your password(0120)

- push  or  to select the first number
- push  to confirm the selection and access the next item
- keep the key pressed **M** for 2 seconds to validate the password and log in



To select:

REC10CH user interface (ACCESSORY)



The unit user interface, also called the REC10CH interface, is installed remotely.

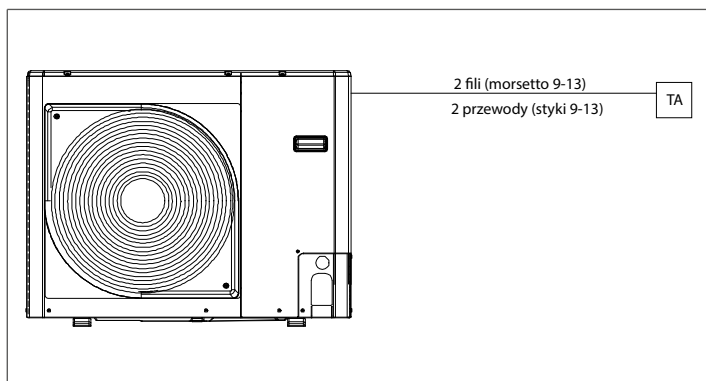
It is an extremely simple and intuitive interface and is designed to be used by the system user to set the operating temperatures of the heating, air conditioning and sanitary buffer tank.

A For the use of this control, please refer completely to the specific manual.

Heat request management from room thermostat.

In systems where the REC10CH remote control panel is provided, it is possible to manage the heat request to the heat pump directly from the room thermostat.

To activate this specific function, the room thermostat must be connected to the clean contact indicated below:



— push ▼ or ▲ to select the desired parameter

To change:

— keep the key pressed ⌚ for 2 seconds

— push ▼ or ▲ to change the value

— push ⌚ to confirm the selection and access the next item

— keep the key pressed **M** for 2 seconds to store the parameter

Finish the settings:

— keep the key pressed ⌚ for 2 seconds to exit

FAULT SIGNALS DESCRIPTION

The following tables include lists of alarm signals, their probable cause, effect on the unit and the type of reset.

Alarm Inverter	Alarm [P350] - [P354] or [P360] - [P364]	Description	Unit status	Reset type			Verifications
				Automatic	Feeding cycle	Comment	
-	1	EWT sensor failure	Continue	X		When the operating values return to the correct range.	1. Check the EWT sensor (EWT). 2. Check NHC card.
-	2	LWT sensor failure	Stop	X		When the operating values return to the correct range.	1. Check the LWT sensor (LWT). 2. Check NHC card.
-	3	Coolant temperature sensor (TR) failure	Stop cpr	X		When the operating values return to the correct range.	1. Check the TR sensor (TR). 2. Check NHC card.
-	4	OAT sensor failure	Continue	X		When the operating values return to the correct range.	1. Check the auxiliary OAT sensor (OAT). 2. Check NHC card.
-	5	DHW_ TT sensor failure	DHW failure	X		When the operating values return to the correct range.	1. Check the DHW sensor (DHW). 2. Check NHC card.
-	6	CHWSTEMP sensor failure		X		When the operating values return to the correct range.	1. Check the CHWSTEMP sensor (CHWSTEMP). 2. Check NHC card.
-	7	IAT sensor failure	Continue	X		When the operating values return to the correct range.	1. Check the IAT sensor (IAT). 2. Check NHC card.
-	8	Internal IU temperature faults	Continue	X		When the operating values return to the correct range.	1. Check the internal temperature sensor UI.
-	9	Replacement sensor failure	Continue	X		When the operating values return to the correct range.	2. Check NHC card.
	10	Inverter discharge temperature sensor failure (TD)	Stop cpr		X	This error becomes permanent after 4 attempts to complete the operation.	1. Check the discharge temperature sensor (TD).
102	11	Inverter air exchanger temperature sensor failure (TE)	Stop cpr		X	This error becomes permanent after 4 attempts to complete the operation.	1. Check the temperature sensor (TE).
103	12	Inverter liquid temperature sensor failure (TL)	Stop cpr		X	This error becomes permanent after 4 attempts to complete the operation.	1. Check the temperature sensor (TL).
						The operation of the unit continues in emergency mode.	
104	13	TO inverter sensor failure	Continue		X	The sensor value is set at 30 ° C in cooling, 10 ° C in heating.	1. Check the outdoor temperature sensor (TO).
						the emergency mode is canceled when any other value is detected by the TO sensor.	
108	14	Inverter suction temperature sensor failure (TS)	Stop cpr		X	This error becomes permanent after 4 attempts to complete the operation.	1. Check the suction temperature sensor (TS).
109	15	Inverter heatsink temperature failure	Stop cpr		X	This error becomes permanent after 8 attempts to complete the operation.	1. Check the correct functioning of the fan
111	16	TE and TS inverter sensors incorrectly connected	Stop cpr		X	This error becomes permanent after 4 attempts to complete the operation.	1. Check the temperature sensor (TE, TS).
-	20	Loss of communication with user interface	Continue	X		When a new message is received from the user interface	
-	21	Communication loss with inverter	Stop cpr	X		When a new message is received from the user interface	
221	22	Communication error between the inverter boards	Stop cpr		X	Simple delay in communication.	
-	23	Loss of communication with the slaves	Continue	X		Only the Master unit continues to work.	
-	24	Loss of communication with the Master	Stop	X			

Alarm Inverter	Alarm [P350] - [P354] or [P360] - [P364]	Description	Unit status	Reset type			Verifications
				Automatic	Feeding cycle	Comment	
	25	Loss of communication with the Master	Stop	X		When a new message is received from the Master	
-	31	Security entrance	Stop O Stop heating OR Stop cooling	X		When the security entrance is closed	
-	32	Flow switch failure	Stop cpr		X	This error becomes permanent after 5 attempts to complete the operation.	
-	50	Exchanger antifreeze protection based on water temperature (in cooling)	Cooling down	X		Ignition of antifreeze heaters, if present, when the alarm is active. The pump is forced to start.	
-	51	Exchanger frost protection based on the temperature of the refrigerant (in cooling)	Cooling down		X	Ignition of antifreeze heaters, if present, when the alarm is active. The pump is forced to start until the manual reset of the alarm is possible. The alarm becomes blocking when it is repeated 12 times in 2 hours.	
243	60	Reverse valve protection	Stop cpr		X	This error becomes permanent after 4 attempts to complete the operation.	1. Check the operation of the 4-way valve. 2. Check the intake temperature sensor (TE) of the air heat exchanger. 3. Check the BPHE sensor (TR). 4. Check the coil of the 4-way valve. 5. Check the PMV (pulse motor valve).
246	61	Fan error	Stop cpr		X	This error becomes permanent after 8 attempts to complete the operation.	1. Check the blocking of the fan motor. 2. Check the supply voltage between L2 and N.
250	62	Compressor short-circuit protection intervention	Stop cpr		X	Error detected in the following conditions: Compressor IPM short circuit at start-up Compressor IPM short circuit during oil heating	
253	63	Compressor motor position detection error	Stop cpr		X	This error becomes permanent after 8 attempts to complete the operation. Compressor motor position detection error Error detected when the voltage value of the current probe is abnormal before starting the compressor	
129	64	Compressor breakdown	Stop cpr		X	This error becomes permanent after 8 attempts to complete the operation. Error detected in the following conditions: Compressor overcurrent Compressor IPM short circuit Compressor motor control malfunction	1. Check the supply voltage.
130	65	The compressor does not rotate	Stop cpr		X	This error becomes permanent after 8 attempts to complete the operation. Error detected in the following conditions: Compressor motor locking IPM compressor overcurrent at start-up	2. Overload operation of the refrigeration cycle 1. Compressor problems (lockout, etc.): Replace the compressor. 2. Compressor wiring error (open phase)
132	70	Failure to release compressor thermal switch	Stop cpr		X	This error becomes permanent after 10 attempts to complete the operation.	1. Check the frame and connector of the thermostat. 2. Check for gas leaks, refill 3. Check the PMV (pulse motor valve). 4. Check for any broken pipes.

Alarm Inverter	Alarm [P350] - [P354] or [P360] - [P364]	Description	Unit status	Reset type			Verifications
				Automatic	Feeding cycle	Comment	
134	71	Suction pressure too low	Stop cpr		X	This error becomes permanent after 8 attempts to complete the operation.	1. Check the external PMV for clogging. 2. Check the coil of the 2-way valve. 3. Check the Ps sensor error(LP). 4. Check the refrigerant filter for clogging. 5. Check the refrigerant pipe for clogging. 6. Check the fan operation. (Heating mode) 7. Check for coolant decrease.
-	72	System high pressure error (pressure switch, compressor casing temperature, power supply)	Stop		X	This error becomes permanent after 10 attempts to complete the operation.	1. Check the temperature sensor (TL). 2. Check fan 3. Check the PMV (pulse motor valve). 4. Check external air exchanger clogging and air recirculation 5. Refrigerant overload
-	73	Current detection circuit malfunction	Stop cpr		X	This error becomes permanent after 8 attempts to complete the operation. Error detected in the following conditions: 1) Compressor current probe malfunction	
227	74	Discharge temperature too high	Stop cpr		X	This error becomes permanent after 4 attempts to complete the operation.	1. Check the refrigeration cycle (gas leak) 2. Electronic expansion valve problems 3. Check the discharge temperature sensor (TD).
229	75	Phase missing in the power cable	Stop cpr		X	This error becomes permanent after 8 attempts to complete the operation.	1. Check the supply voltage.
231	76	Inverter heatsink temperature too high	Stop cpr		X	This error becomes permanent after 4 attempts to complete the operation.	1. Check the explosion path of the heatsink.
-	78	Other Inverter errors	Continue		X		
-	79	Unknown errors Inverter	Continue		X		
-	80	RTC fault on NHC board	Continue	X			
-	81	EEPROM damaged on board NHC	Continue		X		
127	82	EEPROM inverter not readable or EEPROM number out of range	Stop		X	Simple delay in communication.	
-	90	Invalid configuration	Stop	X			
-	100	Invalid configuration	Stop	X		Automatic when[P055] is reset.	
-	200	External alarm	Continue	X		When the contact is closed	

PARAMETERS OVERVIEW

Displaying parameters

Par.	Modbus	Sigla	Description	Field	Default	Unit	Control panel	CCN	Table
001	0BBAH	OAT	Outdoor Air Temperature	-40.0÷115.6			RO	RO/No Force	GENUNIT
002		IAT	Indoor Air Temperature	-40.0÷115.6					GENUNIT
003	0BB8H	EWT	(Entering Water Temperature), inlet water temperature	-40.0÷115.6		1/10°C	RO	RO/No Force	GENUNIT
004	0BB9H	LWT	(Leaving Water Temperature), outlet water temperature	-40.0÷115.6		1/10°C	RO	RO/No Force	GENUNIT
005	189EH	REFR_T	Refrigerant Temperature	-40.0÷115.6		1/10°C	RO	RO/No Force	GENUNIT
006		SPARE_TEMP	Replacement temperature	-40.0÷115.6		1/10°C			GENUNIT
007		ROOM_TEMP	Ambient temperature	-40.0÷115.6		1/10°C			GENUNIT
008		SST	Saturated suction temp			1/10°C			GENUNIT
009	189DH	TS	Suction temperature			1/10°C	RO	RO/No Force	GENUNIT
010	189CH	TD	Discharge temperature			1/10°C	RO	RO/No Force	GENUNIT
011	189FH	TE	Air exchanger lower temperature			1/10°C	RO	RO/No Force	GENUNIT
012		TL	Air exchanger upper temperature			1/10°C			GENUNIT
013	18A0H	TO	Inv. Outdoor air temperature			1/10°C	RO	RO/No Force	GENUNIT
014		TH	Heat sink temperature			1/10°C			GENUNIT
015		SH	Superheating temperature			1/10 K			GENUNIT
016		SH_TARGET	Temp. target superheating			1/10 K			GENUNIT
017		INV_DC_VOLTAGE	High voltage CC inverter	0/1		V			GENUNIT
018		HV_COMM_STATUS	AT bus communication status	0÷22		-			GENUNIT
019		INV_CURRENT_MODE	Current inverter mode			-			GENUNIT
020		FREQ_MIN	Compressor min. frequency			1/10 Hz			GENUNIT
021	18A1H	FREQ_MAX	Compressor max. frequency			1/10 Hz	RO	RO/No Force	GENUNIT
022	18A2H	FREQ_REQ	Comp. requested frequency	0÷120		1/10 Hz	RO	RO/No Force	GENUNIT
023	18A3H	FREQ_CURRENT	Current compressor frequency			1/10 Hz	RO	RO/No Force	GENUNIT
024		PMV_POS	PMV position	0÷500		step			GENUNIT
025		2VALV_STAT	Equalization valve status	0/1		-			GENUNIT
026		4VALV_STAT	Reverse cycle valve status	0/1		-			GENUNIT
027		UP_FAN_SPEED	Higher fan speed	0÷1000		rpm			GENUNIT
028		LO_FAN_SPEED	Lower fan speed	0÷1000		rpm			GENUNIT
029		EXCH_HTR	BPHE heater	0/1		-			GENUNIT
030		BOILER	Boiler output	0/1		-			GENUNIT
031		EHS	Electric heating stages	03		-			STATUS
032		BACK_VLV	By-pass valve backup	0/1		-			STATUS
035		SPARE_PRESSURE	Additional pressure	100÷4700		KPa			STATUS
039		TO2	TO inverter correct			1/10°C			STATUS
041	0881H	OCCUPANCY_MODE	Employment mode	02		-	RW	RW/Supervisor	STATUS

HYDRONIC UNIT B

Par.	Modbus	Sigla	Description	Field	Default	Unit	Control panel	CCN	Table
042		SUMMER_MODE	Summer mode	0/1		-			STATUS
043		NIGHT_MODE	Night mode	0/1		-			STATUS
044	07D2H	SYSTEM_MODE_REQUEST	System operating mode required	0-9		-	RW	RW/Supervisor	STATUS
045	18A5H	SYSTEM_MODE_STATUS	System mode status	0-110		-	RO	RO/No Force	STATUS
046		WUI_STATUS_ICON	WUI status icon			-			STATUS
047		SYSTEM_MODE_OVERRIDE	System mode override	0-13		-			O MSL_STAT
048	08BBH	CURRENT_SETPOINT	Current setpoint	5.0-60.0		1/10°C	RO	RO/No Force	STATUS
049		USER_ADJUST_TEMP	Temperature adjusted by the user	-5.0-5.0		1/10 K			LOADFACT
050		IAT_OFFSET	Offset IAT	-4.0-4.0		1/10 K			LOADFACT
051	1906H	CTRL_PNT	Control point	5.0-60.0		1/10°C	RW	RW/Supervisor	LOADFACT
052		CTRL_TMP	Control temp.	-40.0-115.6		1/10°C			LOADFACT
053		UL_INIT_REQUEST	User interface initialization required	0.0-1.0		-			LOADFACT
061		COMPR_MODE_REQUEST	Compressor mode request	0-22		-			LOADFACT
062		COMPR_MODE_TO_INV	Rev. compressor mode	0-22		-			LOADFACT
063	0BDEH	COMPR_MODE_STATUS	Compressor mode status	0-110		-	RO	RO/No Force	LOADFACT
064		CAPACITY_OVERRIDE	Capacity override	0-204		-			LOADFACT
065		CAPACITY_TIMER	Capacity timer			s			PMP_STAT
066		CAPACITY_TOTAL	Total capacity	0-100		%			PMP_STAT
067		DEMAND_LIMIT	Demand limit	0-100		%			PMP_STAT
068	1807H	FREQ_RED_MODE	Frequency reduction mode	0/1		-	RO	RO/No Force	PMP_STAT
069		UNIT_RUNNING	Unit operating status	0/1		-			PMP_STAT
081		PMP_OVER	Pump override	-1-20		-			INPUT
082		FLOW_ERROR	Water flow failure	0/1		-			INPUT
083		CUR_DT_SETPOINT	Set point current			1/10 K			INPUT
084		WATER_DELTA_T	Water delta T			1/10 K			INPUT
085	0502H	PMP	Speed of the pump	0-100		%	RO	RO/No Force	PMP_STAT
088		ADD_PMP	Additional pump water flow	0/1		-			O INPUT
091		BACKUP_OVERRIDE	Backup override	-1-100		-			INPUT
092		BACKUP_FLAG	Backup authorization flag	0/1		-			INPUT
093		WARMUP_TIME	Heating booster timer	0-1800		s			INPUT
094		BACKUP_CAPACITY	Backup capacity	0-100		%			INPUT
101		ONOFF_SW	Selection switch status on/off	0/1		-			INPUT
102		HC_SW	Heating / cooling switch status	0/1		-			INPUT
103		ECO_SW	Eco switch status	0/1		-			INPUT
104		SAFETY_SW	Safety switch status	0/1		-			INPUT
105	18A6H	FLOW_SW	Flow switch status	0/1		-	RO	RO/No Force	INPUT OR
106	0710H	CUST_DI5_STATUS	Custom DI#5 status	0/1		-	RO	RO/No Force	DHW_STAT
107	0711H	CUST_DI6_STATUS	Custom DI#6 status	0/1		-	RO	RO/No Force	INPUT O
108	0712H	CUST_DI7_STATUS	Custom DI#7 status	0/1		-	RO	RO/No Force	DHW_STAT
109	0713H	CUST_DI8_STATUS	Custom DI#8 status	0/1		-	RO	RO/No Force	INPUT O

Par.	Modbus	Sigla	Description	Field	Default	Unit	Control panel	CCN	Table
110		POWER_LIMITATION_SW	Power limit switch	0/1		-			DHW_STAT
111		OFF_PEAK_SW	Shut-off switch during hours of high energy cost	0/1		-			INPUT OR
112		LOADSHED_SW	Load removal request switch	0/1		-			DHW_STAT
113		SOLAR_SW	Solar input switch	0/1		-			INPUT
114		DHW_REQUEST_SW	DHW request from the tank	0/1		-			DHW_STAT
115		DHW_PRIORITY_SW	DHW priority switch	0/1		-			DHW_STAT
116	0720H	DHW_ANTILEG_SW	DHW anti-legionella request	0/1		-	RW	RW/Supervisor	DHW_STAT
117		SUMMER_SW	Summer switch	0/1		-			DHW_STAT
120		EXTERNAL_ALARM_SW	External alarm switch	0/1		-			DHW_STAT
201	0730H	DHW_MODE	DHW mode	0-2		-	RO	RO/No Force	DHW_STAT
202		DHW_OVERRIDE	Override DHW	-1+100		-			DHW_STAT
203		DHW_DEMAND	DHW request from the tank	0/1		-			DHW_STAT
204		DHW_CONDITIONS	Conditions DHW	0/1		-			DHW_STAT
205		DHW_CONTROL_POINT	DHW control point	30.0+60.0		1/10°C			DHW_STAT
206	0800H	DHW_TT	DHW tank temperature	-40.0+115.6		1/10°C	RO	RO/No Force	DHW_STAT
207		SHC_TIMER	Current SHC runtime			min			DHW_STAT
208		DHW_TIMER	Current DHW runtime			min			MSL_STAT
209		DHW_EXCEPTION_TIMER	DHW exception timer	0+1440		min			MSL_STAT
210	0503H	DHW_VLV	DHW diverter valve	0/1		-	RO	RO/No Force	MSL_STAT
211		DHW_EHS	ACS electric heater stage	0/1		-			MSL_STAT
212		DHW_RUNNING	DHW operating status	0/1		-			MSL_STAT
221		CHWTEMP	Cooler water circuit temp	-40.0+115.6		1/10°C			MSL_STAT
222		MSL_CAPACITY	Overall Master / Slave capacity	0+100		%			
223		MST_REQUEST	Master capacity required	0+100		%			
224		SLV1_REQUEST	Slave capacity request no.1	0+100		%			
225		SLV2_REQUEST	Slave capacity request no.2	0+100		%			
226		SLV3_REQUEST	Slave capacity request no.3	0+100		%			
227		MSL_ICON_STATUS	Master / slave status icons	0-3		-			
228		MSL_ACTIVE_FLAG	Master / slave activation flag	0/1		-			
229		MSL_OVERALL_STATUS	Master / slave status	-1+22		-			
230		MAST_STATUS	Master status	-1+109		-			
231		SLV1_STATUS	Slave #1	-1+109		-			
232		SLV2_STATUS	Slave #2	-1+109		-			
233		SLV3_STATUS	Slave #3	-1+109		-			
234		MSL_DEMAND_LIMIT	Master / Slave capacity limitation	0+100	100	%			
235		MSL_ACTUAL_PRIORITY	Master/Slave Priority		0	-			
239		MSL_CTRL_PNT2	2nd Control Point water			°C			

Service parameters

Par.	Jbus	Sigla	Description	Field	Default	Unit	Control panel	CCN	Table
301		INV_MODEL	Model inverter			-		RO	Inverter
302		INV_PROGRAM_VERSION	Inverter program version			-		RO	Inverter
303		INV_PROGRAM_REVISION	Inverter program revision			-		RO	Inverter
304		INV_EEPROM_CODE	EEPROM inverter code			-		RO	Inverter
305		INV_SWITCH_SETTING	Inverter switch setting			-		RO	Inverter
306	050BH	INV_CDU_CAPACITY	Capacity CDU	0÷15		-	RO	RO	Inverter
307		INV_MCU_CODE	Code MCU			-		RO	Inverter
308		INV_CDU_CURRENT	CDU corrente			mA			Inverter
311		DEF_OVERRIDE	Override defrost	-4 = Not available		-			Inverter
				-3 = Old version inverter software					
				-2 = Hot optimization not configured					
				-1 = Free defrost disabled					
				0 = No override					
				1 = TO2 too low					
				2 = Conditions not met					
				3 = Waiting for the first mechanical defrost					
				10 = Mechanical defrost not completed					
				11 = Forced mechanical defrost request					
				12 = Mechanical defrost in progress					
				21 = Free defrost start					
312				22 = Free Defrost in progress		K			Inverter
				23 = Free Defrost stopped					
				24 = Free Defrost mode exit					
				0.0÷30.0					
				0.0÷30.0					
313		DEF_DELTA_T_REF_MD	Defrost Delta T (MD)			K			Inverter
314		DEF_DELTA_T_REF	Defrost Delta T			K			Inverter
315		DEF_DELTA_T	Current defrost delta T			K			Inverter
316		DEF_FROST_FACTOR	Frosting factor			%			Inverter
317		FREE_DEFROST_NB	Free defrost cycle number			-			Inverter
318		DEFROST_DURATION	Free defrost duration			s			Inverter
319		TIME_SINCE_LAST_MD	Time since last MD			min			Inverter
320		TIME_SINCE_LAST_FD	Time since last FD			min			Inverter
321		QCK_ENA	QT: Activation of the quick test mode	0-1 [No/yes]		-		RW/F	QCH_TEST

Par.	Jbus	Sigla	Description	Field	Default	Unit	Control panel	CCN	Table
322		HP_TEST	QT: Test pressure switch AP	0-8					
				0 = No test					
				1 = Test required					
				2 = Test in progress					
				3 = Test OK					
				4 = AP test failed due to timeout					
				5 = AP test failed due to flow switch failure					
323		RAT_MOD	QT: Evaluation mode	6 = AP test failed due to low water temperature					
				7 = AP test failed due to inverter failure					
				0-4					
				0 = Evaluation off					
				1 = Cooling evaluation					
				2 = Heating rating					
				3 = Cooling ramp					
324		RAT_FRQ	QT: Evaluation frequency	4 = Heating ramp					
				-120~120					
				0-999					
				0-999					
				0-999					
				0-1					
				0-1					
325		FAN_LOW	QT: Lower fan speed	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
326		FAN_UPP	QT: Higher fan speed	0-1					
				on/off					
				0-1					
				on/off					
				0-1					
				on/off					
				on/off					
327		PMV_POS	QT: PMV position	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
328		CMP_HTR	QT: compressor heater	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
329		2WAYVLV	QT: equalization valve	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
330		4WAYVLV	QT: reverse cycle valve	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
331	18CEH	PMP	QT: Water pump speed	0-1					
				0-1					
				on/off					
				on/off					
				0-1					
				on/off					
				on/off					
332		EXH_HTR	QT: BPHE heater	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
333	0701H	ADD_PMP	QT: Additional pump	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
334	0702H	SPR_REL	QT: Rel□□ (K5)	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
335		DHW_VLV	QT: Diverter valve DHW	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
336		BOILER	QT: Boiler or EHS1	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
320	0703H	CUSTDO5	QT: DO n.5 customized	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
337	0704H	CUSTDO8	QT: DO n.8 customized	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
338	0705H	CUSTDO9	QT: DO n.9 customized	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
339		HP_MAX	Maximum high pressure	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					
340		ALMRESET	Alarm reset	0-1					
				0-1					
				0-1					
				0-100					
				0-1					
				on/off					
				on/off					

HYDRONIC UNIT B

Par.	Jbus	Sigla	Description	Field	Default	Unit	Control panel	CCN	Table
341		ALM	Alarm status	0-1 Normal/Alarm		-		RW/F	ALARM
342		ALERT	Alert status	0-1 No/s□□		-		RO	ALARM
343		SHUTDOWN	State of arrest	0-1 No/s□□		-		RO	ALARM
344		INV_ERROR_CODE	Inverter error (code)	0-255		-		RO	ALARM
345		INV_ERROR_ALPHA	Inverter error (Alpha)	0-65535		-		RO	ALARM
346	18A7H	ALM_CODE_BITMAP1	Drive error code 1	0-65535		-	RO	RO	ALARM
347	18A8H	ALM_CODE_BITMAP2	Drive error code 2	0-65535		-	RO	RO	ALARM
348	18A9H	ALM_CODE_BITMAP3	Drive error code 3	0-65535		-	RO	RO	ALARM
349	18AAH	ALM_CODE_BITMAP4	Drive error code 4	0-65535		-	RO	RO	ALARM
350		ALM_01	Current alarm n.1	0-200		-		RO	ALARM
351		ALM_02	Current alarm n.2	0-200		-		RO	ALARM
352		ALM_03	Current alarm n.3	0-200		-		RO	ALARM
353		ALM_04	Current alarm n.4	0-200		-		RO	ALARM
354		ALM_05	Current alarm n.5	0-200		-		RO	ALARM
360		ALM_01P	Previous alarm n.1	0-200		-		RO	ALARM
361		ALM_02P	Previous alarm n.2	0-200		-		RO	ALARM
362		ALM_03P	Previous alarm n.3	0-200		-		RO	ALARM
363		ALM_04P	Previous alarm n.4	0-200		-		RO	ALARM
364		ALM_05P	Previous alarm n.5	0-200		-		RO	ALARM
370		RUNTIME1_KEY	Maintenance runtime key			-			RUNTIME1
371		COMP1_START_NB	Number of starts of the compressor			-		RO	RUNTIME1
372	18A4H	COMP1_RUNTIME	Hours of compressor operation			h	RO	RO	RUNTIME1
373		WATER_PUMP_START_NB	Number of starts of the water pump			-		RO	RUNTIME1
374		WATER_PUMP_RUNTIME	Hours of operation of the water pump			h	RO	RO	RUNTIME1
379	0BDAH	UNIT_WEAR_FACTOR	Wear factor			-			RUNTIME1
381		RUNTIME2_RESET	Restoration of the operating time made by the user	0-3		-		RW	RUNTIME2
382		COMP_RUNTIME	Hours of compressor operation			h		RO	RUNTIME2
383		BACKUP_RUNTIME	Hours of emergency operation			h		RO	RUNTIME2
384		COOLING_RUNTIME	Hours in cooling mode			h		RO	RUNTIME2
385		HEATING_RUNTIME	Hours in heating mode			h		RO	RUNTIME2
386		DHW_RUNTIME	Hours in DHW mode			h		RO	RUNTIME2
387		DEFROST_RUNTIME	Hours in antifreeze mode			h		RO	RUNTIME2
388		ENERGY_IN_HEATING	Energy consumed in heating			kWh		RO	RUNTIME2
389		ENERGY_IN_COOLING	Energy consumed in cooling			kWh		RO	RUNTIME2
391		CHIL_S_S	Start/stop unit□	0-1		-			
392		HC_SEL	Heating / Cooling selection	0-1		-			
393		EMSTOP	Invalid configuration	0-1		-			
394		CAPACITY_REQUEST	Required capacity	0-100		%			
399		RESETDEV	Device reset	0-1		-			

Setpoint parameters

Par.	Jbus	Sigla	Description	Field	Default	Unit	Control panel	CCN	Table
401		HEAT_OCC_WATER_STP	Home heating setpoint (water)	20,0 - 60,0	45,0	1/10°C	RW		WAT_STP
402		HEAT_UNO_WATER_OFFSE	Night heating offset (water)	=-10,0	0,0	1/10 K	RW		WAT_STP
403		HEAT_ECO_WATER_OFFSE	Offset heating away (water)	=-10,0	-5,0	1/10 K	RW		WAT_STP
404		DHW_ECO_STP	DHW setpoint ECO		45,0	1/10°C			
405		DHW_ANTI_LEGIONELLA	DHW anti-legionella setpoint	50,0 - 60,0	60,0	1/10°C	RW		WAT_STP
406		DHW_STP	Setpoint DHW	30,0 - 60,0	50,0	1/10°C	RW		WAT_STP
407		COOL_OCC_WATER_STP	Home cooling setpoint (water)	5,0 - 18,0	12,0	1/10°C	RW		WAT_STP
408		COOL_UNO_WATER_OFFSE	Night cooling offset (water)	0,0 - 10,0	0,0	1/10 K	RW		WAT_STP
409		COOL_ECO_WATER_OFFSE	Offset cooling away (water)	0,0 - 10,0	5,0	1/10 K	RW		WAT_STP
410		HEAT_HYSTERESIS	Heating hysteresis (water)	0,5 - 2,0	1,0	1/10 K	RW		WAT_STP
411		COOL_HYSTERESIS	Cooling hysteresis (water)	0,5 - 2,0	2,0	1/10 K	RW		WAT_STP
412		HEAT_CURV_MAX_STP_OF	Maximum heating curve setpoint offset	=-5-5	0,0	1/10 K	RW		WAT_STP
413		COOL_CURV_MIN_STP_OF	Minimum cooling curve setpoint offset	=-5-5	0,0	1/10 K	RW		WAT_STP
421		HEAT_OCC_AIR_STP	Home heating setpoint (air)	12,0 - 34,0	19,0	1/10°C	RW		AIR_STP
422		HEAT_UNO_AIR_OFFSET	Night heating offset (air)	=-10,0	-2,0	1/10 K	RW		AIR_STP
423		HEAT_ECO_AIR_OFFSET	Offset heating outside the home (air)	=-10,0	-4,0	1/10 K	RW		AIR_STP
424		COOL_OCC_AIR_STP	Home cooling setpoint (air)	20,0 - 38,0	26,0	1/10°C	RW		AIR_STP
425		COOL_UNO_AIR_OFFSET	Night cooling offset (air)	0,0 - 10,0	2,0	1/10 K	RW		AIR_STP
426		COOL_ECO_AIR_OFFSET	Offset cooling away from home (air)	0,0 - 10,0	4,0	1/10 K	RW		AIR_STP
427		HOME_ANTI_FREEZE_STP	Home antifreeze setpoint	6,0 - 12,0	6,0	1/10°C	RW		AIR_STP
428		AIR_DELTA_STP	Air delta setpoint	0,2 - 1,0	0,5	1/10 K	RW		AIR_STP
429		IAT_RESET_FACTOR	IAT recovery factor	0,0 - 2,0	0,0		RW		AIR_STP

Configuration parameters

Par.	Jbus	Mnemonic	Description	Field	Default	Unit	Control panel	CCN	Table
500	01F4H	CUST_DO5_TYPE	Config DO#5 customized	0÷13 0 = Disabilitato 1 = Unit in alarm (ancora funzionante) 2 = Unit in alarm (not running) 3 = Unit in Standby (request satisfied) 4 = Unit running (Cool, Heat, DHW, defrost) 5 = Unit running in cooling 6 = Unit running in heating 7 = Unit running DHW 8 = Unit in defrost 9 = IAT reached (FCU) 10 = Electric heater #2 (EH2) 11 = Electric heater #3 (EH3) 12 = Pool diverter valve 13 = User controlled output (via JBus/Modbus)	4	-	RW	RW/No Force	GEN_CONF
501		SAFETY_SW_TYPE	Type of safety switch	1÷3 1 = Off contact: unit stopped with open contact 2 = Safety switch for underfloor heating system: heating not allowed if the contact is open 3 = Safety switch for underfloor cooling: cooling not allowed if the contact is open	1	-	RW		GEN_CONF
502		CUST_DI5_TYPE	Config DI#5 customized	-15÷15 0 = Disabilitato	1	-	RW		GEN_CONF
503		CUST_DI6_TYPE	Config DI#6 customized	1 or -1 = Capacity limitation switch 2 or -2 = High consumption band operation switch 3 or -3 = Loadshed Request Switch 4 or -4 = Solar input switch 5 or -5 = DHW request from the DHW tank 6 or -6 = Priority button ACS 7 or -7 = Anti-Legionella cycle request button 8 or -8 = Summer switch 9 or -9 = Pool priority button 10 or -10 = Contact on swimming pool pump 11 or -11 = Energy Meter Input (1 kWh/pulse) 12 or -12 = Energy Meter Input (0.5 kWh/pulse) 13 or -13 = Energy Meter Input (0.2 kWh/pulse) 14 or -14 = Energy Meter Input (0.1 kWh/pulse) 15 or -15 = External alarm	0	-	RW		GEN_CONF
504		CUST_DI7_TYPE	Config DI#7 customized		0	-	RW		GEN_CONF
505		CUST_DI8_TYPE	Config DI#8 customized		0	-	RW		GEN_CONF
506	01FAH	CUST_DO8_TYPE	Config DO#8 customized		1	-	RW	RW/No Force	GEN_CONF
507	01FBH	CUST_DO9_TYPE	Config DO#9 customized		2	-	RW	RW/No Force	GEN_CONF
508		TR_TYPE	Type of coolant temperature	0÷2 0 = Mounted on the plate exchanger 1 = Mounted after the PMV less than 10m 2 = Mounted after the PMV at more than 10m	0	-	RW		GEN_CONF

Par.	Jbus	Mnemonic	Description	Field	Default	Unit	Control panel	CCN	Table
509		EWT_TYPE	Type of sensor EWT	0/1 0 = No sensor EWT 1 = Sensor EWT present	1	-	RW		GEN_CONF
510		IAT_TYPE	Type of sensor IAT	0-3 0 = No sensor IAT 1 = 10 KOHms Thermistor (accessory) 2 = 5 KOHms Thermistor 3 = 3 KOHms Thermistor	0	-	\		GEN_CONF
511	1933H	OAT_TYPE	Type of sensor OAT	0-3 0 = No OAT additional 1 = 10 KOHms Thermistor 2 = 5 KOHms Thermistor 3 = 3 KOHms Thermistor (accessorio)	0	-	RW	RW/No Force	GEN_CONF
512		IAT_BIAS	Type of sensor IAT	-5.0-5.0	0.0	1/10 K	RW		GEN_CONF
513		OAT_BIAS	Bias sensor OAT	-5.0-5.0	0.0	1/10 K	RW		GEN_CONF
514	0894H	OAT_MIN_HEATING	OAT minimum for heating	-20.0-10.0	-20.0	1/10°C	RW	RW/No Force	GEN_CONF
515		OAT_MAX_HEATING	OAT maximum for heating	5.0-99.0	99.0	1/10°C	RW		GEN_CONF
516		OAT_MIN_COOLING	OAT minimum for cooling	-10.0-40.0	0.0	1/10°C	RW		GEN_CONF
517	086DH	ANTI_FREEZE_DELTA_ST	Heat exchanger antifreeze setpoint	0.0-6.0	0.0	1/10 K	RW	RW/No Force	GEN_CONF
518		NIGHT_MODE_START	Night mode start time	00:00-23:59	00:00	hh:mm	RW		GEN_CONF
519		NIGHT_MODE_STOP	Night mode end time	0:00-23:59	00:00	hh:mm	RW		GEN_CONF
520		SPARE_SENSOR_TYPE	Replacement sensor type	0-5 0 = No 1 = 10 KOHms Thermistor 2 = 5 KOHms Thermistor 3 = 3 KOHms Thermistor 4 = Low pressure transducer 5 = High pressure transducer	0	-	RW		GEN_CONF
521	17D6H	UI_TYPE	Type of user interface	0-3 0 = No 1 = Clean contacts 2 = WUI remote control (Air Temp) 3 = command on board WUI (Water Temp)	0	-	RW	RW/No Force	UI_CONF
522		UI_ACCESS	Access to parameters from the UI	0-3 0 = Not allowed 1 = User parameters only 2 = User and service parameters 3 = All parameters	3	-	RW		UI_CONF
523		UI_COMM_TIMEOUT	Interface communication timeout	0-240	60	s	RW		UI_CONF

Par.	Jbus	Mnemonic	Description	Field	Default	Unit	Control panel	CCN	Table
524		UI_BACKLIGHT_TIMEOUT	Backlight timeout	0÷7 0 = Backlight always off 1 = 15 seconds 2 = 30 seconds 3 = 1 minute 4 = 2 minutes 5 = 5 minutes 6 = 30 minutes 7 = Always on	2	-	RW		UI_CONF
525		UI_BUZZER_ENABLE	Buzzer at the push of a button	0/1 [No/Yes]	No	-	RW		UI_CONF
526		UI_TIME_BROADCAST	Time transmission interface	0/1 [No/Yes]	Yes	-	RW		UI_CONF
527		SERVICE_PASSWORD	Service password	0-9999	120	-	RW		UI_CONF
528		USER_PASSWORD	User password	0-9999	0	-	RW		UI_CONF
541	1934H	POWER_LIMIT	Power limitation value	50÷100	75	%	RW	RW/No Force	CMP_CONF
542		NIGHT_LIMIT	Night limitation value	50÷100	75	%	RW		CMP_CONF
543		DHW_LIMIT	DHW limitation value	50÷100	100	%	RW		CMP_CONF
560		FLUID_TYPE	Fluid type	1÷2 1 = Water (minimum set point in cooling 5°C) 2 = Medium Brine (minimum set point in cooling 0°C)	1	-			
561		EXTERNAL_PUMP_CTRL	External main pump control	0/1 [No/Yes]	0 [No]	-	RW		PMP_CONF
562		FLOW_CHEK_PUMP_OFF	Flow controlled if pump off	0/1 [No/Yes]	1 [Yes]	-	RW		PMP_CONF
563		PUMP_ANTI_STICKING	Anti-adhesive function	0/1 [No/Yes]	1 [Yes]	-	RW		PMP_CONF
564		PUMP_SAMPLE_TIME	Standby pump sampling time	5÷240 1÷3 1 = Always on 2 = Sampling (WUI local, On/Off vs IAT) 3 = In accordance with the indoor ambient temperature (remote WUI / IAT sensor)	15	min	RW		PMP_CONF
565		MAIN_PUMP_LOGIC	Main pump logic	0 = Variable speed (according to the vsp_max parameter) 1 = Speed in accordance with the Delta T	1	-	RW		PMP_CONF
566		VAR_SPEED_PUMP_LOGIC	Variable speed pump logic	0/1	1	-	RW		PMP_CONF
567	0237H	MIN_SPEED_PUMP	Minimum pump speed	19÷100	19	%	RW	RW/No Force	PMP_CONF
568	0238H	MAX_SPEED_PUMP	Maximum pump speed	19÷100	100	%	RW	RW/No Force	PMP_CONF
569		WATER_DELTA_T_SETOI	Setpoint Delta T	2.0÷20.0	5.0	1/10 K	RW		PMP_CONF
570		PUMP_KP	Proportional Delta T Gain	-10000÷-0.001	-6000	-	RW		PMP_CONF
571		PUMP_TI	Integral time Delta T	10÷120	20	s	RW		PMP_CONF
572		PUMP_TS	Delta T sampling time	10÷120	10	s	RW		PMP_CONF

Par.	Jbus	Mnemonic	Description	Field	Default	Unit	Control panel	CCN	Table
573		ADD_PUMP_LOGIC	Additional pump logic	0-4 0 = No additional pump 1 = Always on 2 = In accordance with the ambient temperature (remote WUI) 3 = Always on, off when DHW mode is activated 4 = In accordance with room temperature (remote WUI), but off when in DHW mode	0	-	RW		PMP_CONF
581	0870H	HEAT_CURV	Heating climatic curve selection	-1 = No curve, fixed setpoint 0 = Custom curve Par.582/Par.585 1 = Heating curve #1 2 = Heating curve #2 3 = Heating curve #3 4 = Heating curve #4 ... 12 = Heating curve #12	-1	-	RW	RW/No Force	CLIMCURV
582	0876H	CUST_HEAT_MIN_OAT	Minimum OAT heating	-30.0-10.0	-7.0	1/10°C	RW	RW/No Force	CLIMCURV
583	0877H	CUST_HEAT_MAX_OAT	Maximum OAT heating	10.0-30.0	20.0	1/10°C	RW	RW/No Force	CLIMCURV
584	1902H	CUST_MIN_TEMP_HEAT	Minimum heating water setpoint	20.0-40.0	20.0	1/10°C	RW	RW/No Force	CLIMCURV
585	1904H	CUST_MAX_TEMP_HEAT	Maximum heating water setpoint	30.0-60.0	38.0	1/10°C	RW	RW/No Force	CLIMCURV
586	0875H	COOL_CURV	Cooling climatic curve selection	-1-2 -1 = No curve, fixed setpoint 0 = Custom curve Par.587/Par.590 1 = Cooling curve #1 2 = Cooling curve #2	-1	-	RW	RW/No Force	CLIMCURV
587	087BH	CUST_COOL_MIN_OAT	Minimum cooling OAT	0.0-30.0	20.0	1/10°C	RW	RW/No Force	CLIMCURV
588	087AH	CUST_COOL_MAX_OAT	Maximum cooling OAT	24.0-46.0	35.0	1/10°C	RW	RW/No Force	CLIMCURV
589	1903H	CUST_MIN_TEMP_COOL	Minimum cooling water setpoint	5.0-20.0	10.0	1/10°C	RW	RW/No Force	CLIMCURV
590	1905H	CUST_MAX_TEMP_COOL	Maximum cooling water setpoint	5.0-20.0	18.0	1/10°C	RW	RW/No Force	CLIMCURV
595		DRYING_START_SETPOIN	Drying start setpoint	20.0-40.0	20.0	1/10°C	RW		DRYING
596		DRYING_WARM_UP_DAYS	Heating drying days	0-99	3	-	RW		DRYING
597		DRYING_RAMP_UP_DAYS	Days ramp upward drying	0-99	4	-	RW		DRYING
598		DRYING_HOLD_UP_DAYS	Drying ramp maintenance days	0-99	4	-	RW		DRYING
599		DRYING_HOURS	Drying operation time		0.0		RW		DRYING

HYDRONIC UNIT B

Par.	Jbus	Mnemonic	Description	Field	Default	Unit	Control panel	CCN	Table
601	186AH	BCK_TYPE	Type of emergency addition	0÷10 0 = No backup 1 = Booster con 1 stage electrical heater 2 = Booster con 2 stage electrical heater 3 = Booster con 3 stage electrical heater with 2 output 4 = Booster con 3 stage electrical heater with 3 output 5 = Backup DHW 6 = Booster con 1 stage electrical heater + Backup DHW 7 = Booster con 2 stage electrical heater + Backup DHW 8 = Booster con 3 stage electrical heater with 2 output + Backup DHW 9 = Backup with boiler 10 = Backup with boiler + Backup DHW	0	-	RW	RW/No Force	BCK_CONF
602	186DH	BCK_WARMUP_TIME	Heating time of the additional heater	0÷120	30	min	RW	RW/No Force	BCK_CONF
603	1937H	BCK_DELTA_TEMP	Auxiliary delta temperature	1.0÷20.0	5.0	1/10°C	RW	RW/No Force	BCK_CONF
604	186CH	BCK_OAT	Additional heater OAT threshold	-20.0÷15.0	-7.0	1/10°C	RW	RW/No Force	BCK_CONF
605		EHS_PROP_GAIN	Proportional EHS Earnings	0.001÷10000	2000	-	RW		BCK_CONF
606		EHS_INTEG_TIME	Integral time EHS	10÷60	20	s	RW		BCK_CONF
607		EHS_SAMP_TIME	EHS sampling time	10÷120	30	s	RW		BCK_CONF
611		DEFROST_TYPE	Free defros enabled	0/1	1				BCK_CONF
612		DEF_OAT_THRESHOLD	Minimum OAT defrost threshold	2.0÷10.0	2.0				BCK_CONF
613		MAX_FD_NUMBER	Maximum number of free defrosts	1÷20	6				BCK_CONF
614		MAX_TIME_BETWEEN_MD	Maximum time between two mechanical defrosts	1÷18	6				BCK_CONF
615		MD_RECOVERY_SELECT	MD defrost recovery mode	0/1 Disabled/Enabled	1				BCK_CONF
641		CCN_ADDRESS	CCN element address	1÷239	1	-	RW		30RB/RQV
642		CCN_BUS	Bus element CCN	0÷239	0	-	RW		30RB/RQV
643		CCN_DEVICE_TYPE	CCN device	0÷3 0 = Non-Bridge 1 = Bridge 2 = Building Supervisor 3 = Broadcast Acknowledger	0				30RB/RQV
645		PRIMARY_BAUDRATE	Primary transmission speed	0÷2 0 = 9600 Baud 1 = 19200 Baud 2 = 38400 Baud	2 [38400]	-	RW		30RB/RQV
646		SECONDARY_BAUDRATE	Secondary transmission speed	0÷2 0 = 9600 Baud 1 = 19200 Baud 2 = 38400 Baud	2 [38400]	-	RW		30RB/RQV
648		LOCATION_DESCRIPTION	Location description			24 char			30RB/RQV
650		SERIAL_NB	Sedrial number		0	-	RO		30RB/RQV
651		REFERENCE_NB	Code number		0				30RB/RQV

Par.	Jbus	Mnemonic	Description	Field	Default	Unit	Control panel	CCN	Table
653	050DH	PIC_TYPE	PIC type		"30RV"	-	RO	RO/No Force	30RB/RQV
654		SOFT_VERSION_NB	Software number		0	-	RO		30RB/RQV
661		HOUR	Time	0÷23	0	-	RW		Time
662		MINUTE	Minute of the hour	0÷59	0	-	RW		Time
663		DAY_OF_WEEK	Day of the week	1÷7 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday 7 = Sunday	0	-	RW		Time
664		HOLIDAY_FLAGS	Flag vacancy	0-11111110 Bitmap.b7 : Monday b6 : Tuesday b5 : Wednesday b4 : Thursday b3 : Friday b2 : Saturday b1 : Sunday b0 : unused	0	-	RW		Time
665		DAY_OF_MONTH	Day of the month	1÷31 1÷12	0	-	RW		Time
666		MONTH	Month	1 = January ... 12 = December	0	-	RW		Time
667		YEAR	Year	0÷99	0	-	RW		Time
701		DHW_TYPE	Type of domestic hot water	0÷3 0 = No DHW 1 = NO 2-point diverter valve 2 = 2-point NC diverter valve 3 = Dedicated DHW circulator	0	-	RW		DHW_CONF
702		DWH_VALVE_RUNTIME	DHW 3-way valve operating time	0÷240	30	s	RW		DHW_CONF
703		DHW_PRIORITY	Priority DHWS	0/1 0 = Automatico 1 = DHW	0	-	RW		DHW_CONF
704		SHC_MIN_RUNTIME	Minimum operating time SHC	0÷720	20	min	RW		DHW_CONF
707		DHW_MAX_RUNTIME	Maximum DHW operating time	1÷720	240	min	RW		DHW_CONF
708		DHW_EXCEPTION_TIME	DHW exception time	1÷24	2	Time	RW		DHW_CONF
710		DHW_VSP_SPEED	Maximum pump speed in DHW mode	19÷100	100	%	RW		DHW_CONF

HYDRONIC UNIT B

Par.	Jbus	Mnemonic	Description	Field	Default	Unit	Control panel	CCN	Table
711		DHW_SCHEDULE_DAYS	DHW program days	0-11111110 Bitmap: b7 : Monday b6 : Tuesday b5 : Wednesday b4 : Thursday b3 : Friday b2 : Saturday b1 : Sunday b0 : unused	11111110	-	RW		DHW_CONF
712		DHW_START_TIME	DHW start time	00:00-23:59	21:00	hh: mm	RW		DHW_CONF
713		DHW_STOP_TIME	DHW stop time	00:00-23:59	06:00	hh: mm	RW		DHW_CONF
714		LEG_SCHEDULE_DAYS	Anti-legionella DHW start	0-11111110 Bitmap: b7 : Monday b6 : Tuesday b5 : Wednesday b4 : Thursday b3 : Friday b2 : Saturday b1 : Sunday b0 : unused	0	-	RW		DHW_CONF
715		LEG_STRT_TIME	Anti-legionella DHW start time	00:00-23:59	02:00	hh: mm	RW		DHW_CONF
716		SUM_MODE_OAT	Summer mode OAT threshold	15.0-30.0	20.0	1/10°C	RW		DHW_CONF
717		SUM_MODE_ON	Summer mode ignition delay	0-12	0	h	RW		DHW_CONF
718		SUM_MODE_OFF	Summer mode shutdown delay	0-12	0	h	RW		DHW_CONF
719		DHW_TT_SENSOR_TYPE	Type of DHW tank sensor	0-3 0 = DHW Thermostat (thermal switch) 1 = DHW Sensor (thermistor 10 K□□) 2 = DHW Sensor (thermistor 5 K□□) 3 = DHW Sensor (thermistor 3 K□□)	0	-	RW		DHW_CONF
720		DHW_TT_BIAS	Bias DHW tank sensor	-5.0-5.0	0.0	1/10 K	RW		DHW_CONF
721		DHW_DT_TO_START	Delta T AC tankS	2.0-10.0	5.0	1/10 K	RW		DHW_CONF
722		DHW_DT_TO_STOP	Delta T EWT (DHW shutdown)	0.0-5.0	1.0	1/10 K	RW		DHW_CONF
741		MSL_CODE_ACTIVATION	Activation code master/slave		0				MSL_CONF
742		MSL_SELECT	Master / slave enabling	0-2 0 = Disabilitato 1 = Master 2 = Slave	0	-	RW		MSL_CONF
743		SLAVE1_ADDR	Slave address n.1	0-239	0	-	RW		MSL_CONF
744		SLAVE2_ADDR	Slave address n.2	0-239	0	-	RW		MSL_CONF
745		SLAVE3_ADDR	Slave address n.3	0-239	0	-	RW		MSL_CONF
746		MSL_CAPACITY_START	Power to start the next unit at	30-75	75				MSL_CONF
747		MSL_CAPACITY_STOP	Power to stop the next unit at	1-25	25				MSL_CONF

Par.	Jbus	Mnemonic	Description	Field	Default	Unit	Control panel	CCN	Table
750		CHWSTEMP_TYPE	Tipo CHWSTEMP	0÷3 0 = No CHWSTEMP sensor 1 = 10 KOhms Thermistor 2 = 5 KOhms Thermistor 3 = 3 KOhms Thermistor	2				MSL_CONF
751		CASCADE_TYPE	Cascade type	0÷2 0 = Start master and follow slaves. Stop from the last slave to the master. 1 = Start and stop according to the operating hours (leveling) 2 = All units start and stop simultaneously	1	-	RW		MSL_CONF
752		MSL_HEAT_KP	Proportional heating M / S Gain	0.001÷10000	6000	-	RW		MSL_CONF
753		MSL_HEAT_TI	Tempo integrate riscaldamento M/S	10÷120	30	s	RW		MSL_CONF
754		MSL_HEAT_TS	Heating sampling time M / S	10÷120	30	s	RW		MSL_CONF
755		MSL_COOL_KP	Proportional cooling M / S Gain	-10000÷0.001	-6000	-	RW		MSL_CONF
756		MSL_COOL_TI	Integral time cooling M / S	10÷120	30	s	RW		MSL_CONF
757		MSL_COOL_TS	Cooling sampling time M / S	10÷120	30	s	RW		MSL_CONF
758		MSL_PUMP_TYPE	Pump type Master / slave	0÷3 0 = No pump control 1 = Common pump 2 = Internal pump: operation in accordance with the master and slave logic(Par.229) 3 = Internal plunger: stops when the unit is not on call	2	-	RW		MSL_CONF
761	02F9H	JBUS_SELECTION	Enable JBus control	0÷3 0 = JBus/Modbus disabled 1 = JBus enabled 2 = Modbus enabled 3 = JBus specific for user interface	3	-	RW	RW/No Force	JBUSCONF
762	0086H	JBUS_ADDRESS	Slave address JBus	1÷255	11	-	RW	RW/No Force	JBUSCONF
763	0085H	JBUS_BAUD_RATE	Jbus communication speed	0÷2 0 = 9600 Baud 1 = 19200 Baud 2 = 38400 Baud	0			RW/No Force	JBUSCONF
764	0087H	JBUS_FRAME_TYPE	JBus structure type	0÷5 0 = No parity, 1 stop bit 1 = Odd parity, 1 stop bit 2 = Even parity, 1 stop bit 3 = No parity, 2 stop bits 4 = Odd parity, 2 stop bits 5 = Even parity, 2 stop bits	0	-	RW	RW/No Force	JBUSCONF
765		JBUS_ACTIVATION_CODE			0				JBUSCONF
766	0600H	JBUS_COMM_TIMEOUT		0÷600	600			RW/No Force	JBUSCONF
767		MODBUS_DISPLAY_OFFSET		0÷1440	16384				JBUSCONF

Par.	Jbus	Mnemonic	Description	Field	Default	Unit	Control panel	CCN	Table
768		MODBUS_SETPPOINT_ OFFS		0÷61440	32768				JBUSCONF
769		MODBUS_CONFIG_ OFFSET		0÷61440	28672				JBUSCONF
770		MODBUS_SERVICE_ OFFSE		0÷61440	36864				JBUSCONF

3 COMMISSIONING

3.1 Preparation for first commissioning

The first commissioning must be carried out by the Technical Service.

Prior to commissioning, it is necessary to check that:

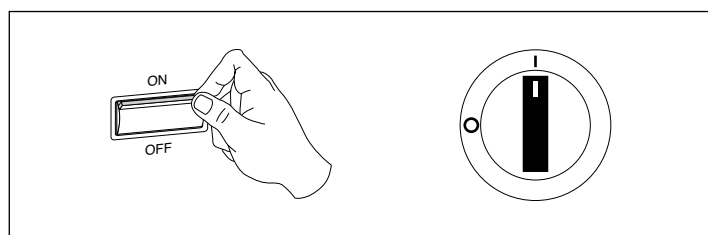
- all the safety conditions have been met
- the unit has been properly fixed to the support surface and positioned correctly
- installation distances and gaps have been respected
- the quantity of water in the primary circuit is greater than the minimum volume indicated in the chapter "Plant water content" p. 17, to prevent the risk of ice formation during defrosting operations or the continuous modulation of the compressor frequency
- the check valves on the hydronic circuit are opened
- the hydraulic circuit be air purged
- the mesh filter must be installed and carefully cleaned after the system filling up
- the electrical connections have been properly completed
- power supply values are correct.
- the earthing has been carried out correctly
- all the connections have been properly tightened
- the voltage value is within the preset limits and that for the three-phase units the phase imbalance does not exceed 3%
- the climatic curves have been set

⚠ Always wear the appropriate Personal Protective Equipments.

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

It is mandatory for the equipment to be under voltage (electrical supply) at least for eight hours before the first commissioning.

- put the system main switch on "ON" and the equipment main switch on "I" (on)



- check the presence of voltage from the control panel or, if it is not installed, by the flashing of the LED on the main electronic board

3.2 Putting into service

After carrying out the preparatory operations for the first start-up, to start the appliance proceed as indicated in the Installer Manual for the command you are using.

Checks during and after the first commissioning

After starting the heat pump, check that:

- In models with three-phase power supply, the compressor's noise level must not be abnormal (e.g. engine knocking).
- that the suction pressure does not exceed the discharge pressure, if so, invert a phase.

- 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 stop and start up again
- the pump water flow is included in the limits indicated in the chapter "Water flow" p. 17
- during the functioning at the maximum capacity (cooling or heating) the delta T between inlet water temperature and outlet water temperature must be about 5 °C

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

⚠ If the unit will be controlled by the free potential contacts: turn off the unit when all the terminals are switched off in order to avoid any energy waste.

⊖ It is forbidden to use the heat pump with reversed phase.

3.3 Temporary shutdown

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

- turn off the unit only using the selected interface
- close the check valves
- open the by pass valve to allow the anti freeze protection
- check chapter "Piping connections" p. 20

In this way the anti freeze logics and the compressor electric heater remain activated.

3.4 Stop for an extended period of time

If the unit is not working for a long period the following operations are compulsory:

- turn off the unit using the selected interface
- put the system main switch on "OFF" and the equipment main switch on "O" (off)
- turn off the terminal units positioning the main switch of each unit on "off"
- close all the check valve on the hydraulic system

⚠ The anti freeze logics and the compressor electric heater are disabled.

⚠ If there is a risk of frost, empty the entire system (see chapter "Unit drainage" p. 21) or add it with suitable antifreeze liquids.

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

⚠ If the unit works in a system with a boiler >(parallel installation) when the boiler is working, make sure that the water temperature inside the heat pump does not exceed 60 °C.

3.5 Functions

3.5.1 Acronyms

IAT	Indoor Air Temperature
BPHE	Plate heat exchanger
CHWS	(Chiller Water System), system water circuito
DHW	Domestic Hot Water
EHS	Electric heater stage
EWI	Entering Water Temperature
FCU	(Fan Coil Unit), 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
CHWSTEMP	DHW: (DHW) Domestic hot water
WUI	User Interface (Wall-mounted User Interface)

3.5.2 Setpoint

Depending on the unit configuration, the system control can be based on the water or air setpoint control.

To achieve greater comfort, you can adjust the room temperature setpoint (remote user interface) or the water temperature setpoint (local user interface) according to your needs. Please note that the temperature value can only be adjusted within the range defined for each occupation mode.

Possible configurations

Setpoint	WUI local	WUI remote
Room air probe	Water	Air

Default climatic curves

RAFFREDDAMENTO: If the climatic cooling curve[P586] ☐ ☐ impostata su "0", "1" o "2", the water set point will be calculated based on the selected cooling climatic curve. Two predefined cooling climatic curves are available:

Climatic curve	OAT min.	OAT max.	Temp. water min.	Temp. water max.
K1	20°C	40°C	5°C	10°C
K2	20°C	40°C	10°C	18°C

The calculation of the water setpoint can be based on:

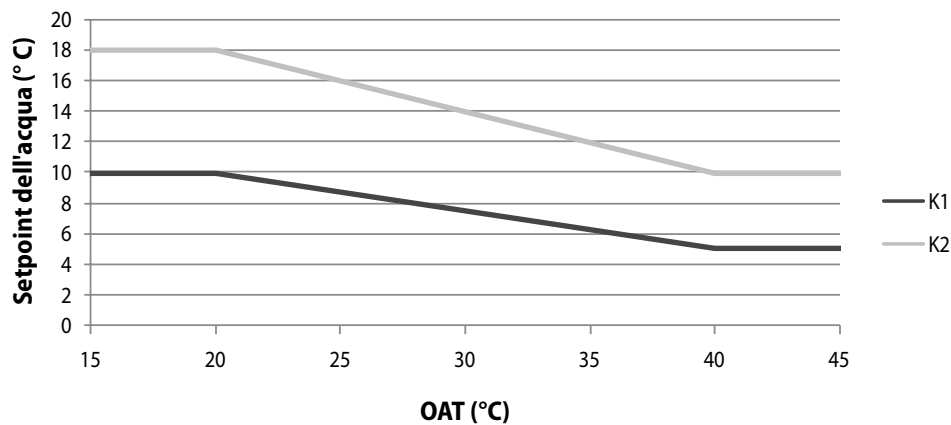
Predefined climatic curves based on the OAT: climatic curves already defined in the control logic.

Fixed water setpoint: by entering a fixed value for each occupation mode.

Custom climatic curve based on the OAT: defines climatic curves customized according to the application.

Offset on climatic curves (predefined and user-defined)

COOLING CLIMATIC CURVES

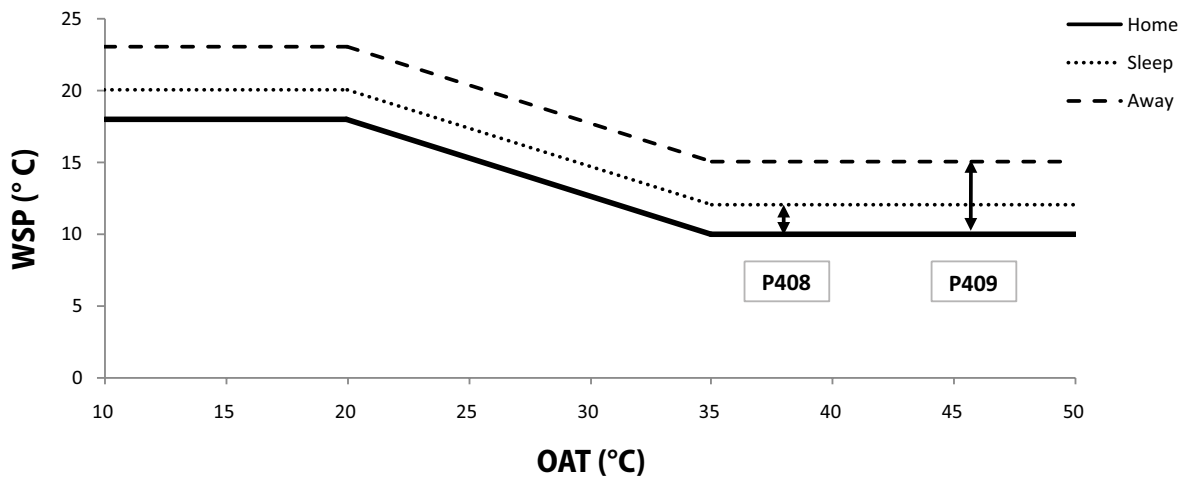


- If the OAT is valid (not transmitted by the inverter, value out of range, etc.), the water setpoint is equal to the current minimum water temperature.
- If the OAT is above the maximum current OAT threshold, the water setpoint is equal to the maximum current water tem-

perature.

The climatic curve corresponds to the water setpoint for the Home mode. To define the other occupancy modes, it is necessary to configure the Night cooling offset [P408] and the Away cooling offset[P409]:

COOLING CLIMATIC CURVES RELATED TO WORKING MODE HOME

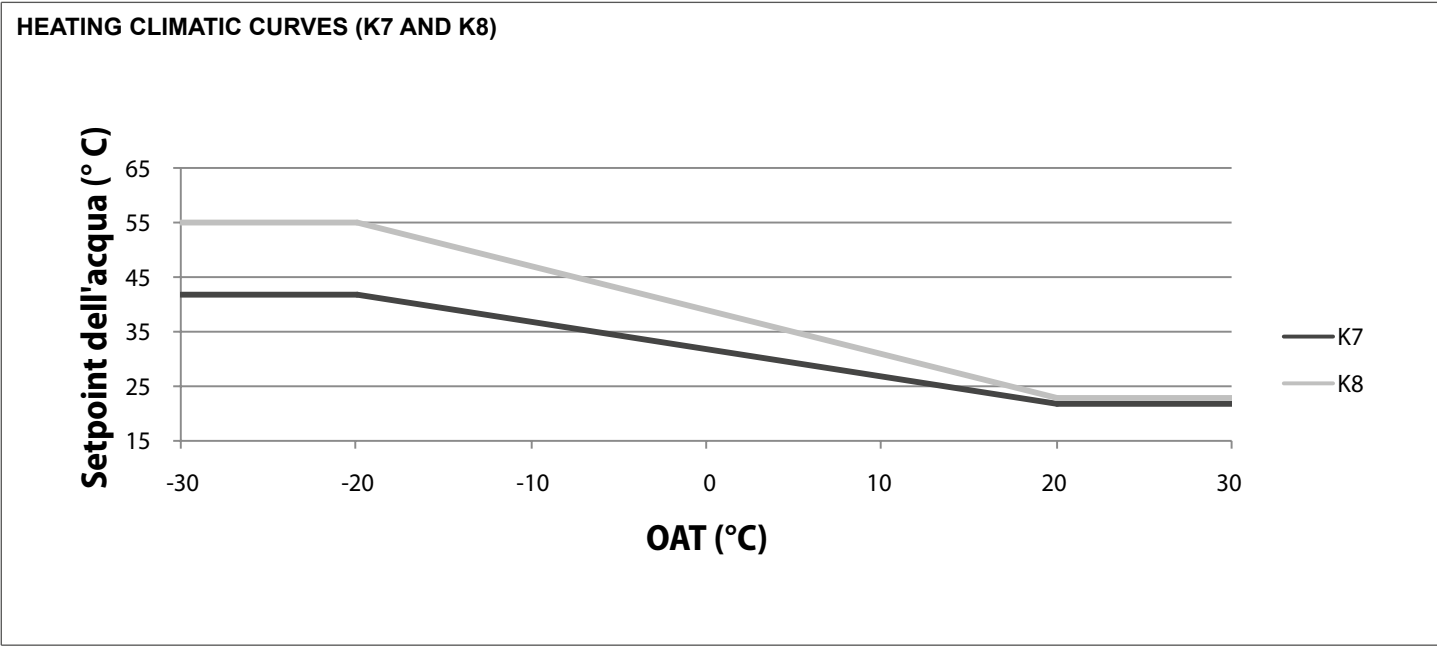


RISCALDAMENTO: If the climatic heating curve[P581] ☐ ☐ configurata da "0" a "12", the water set point will be calculated on the

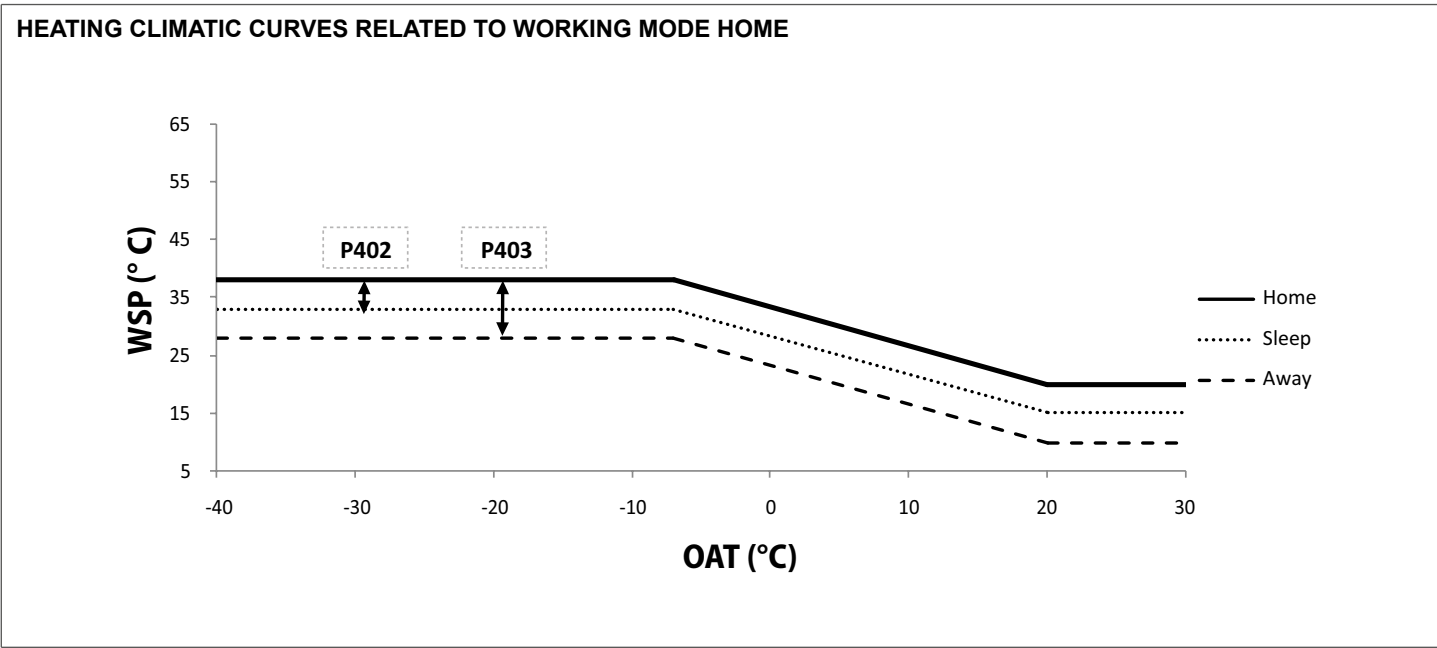
basis of the selected heating climatic curve.

Twelve predefined heating climatic curves are available:

Climatic curve	OAT min.	OAT max.	Temp. water min.	Temp. water max.
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



- If the OAT is valid (not transmitted by the inverter, value out of range, etc.), the water setpoint is equal to the maximum current water temperature.
 - If the OAT is above the maximum current OAT threshold, the water setpoint is equal to the minimum current water temperature.
- The climatic curve corresponds to the water setpoint for the Home mode. To define the other occupation modes, it is necessary to configure the Night heating offset [P402] and the Away heating offset[P403]:



Fixed water setpoint

If the cooling climate curve [P586] or the heating climate curve [P581] are configured 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 (refer to the user manual of the control panel)

COOLING

Control panel occupation	Water setpoint with direct access to the control panel	Field	Water setpoint from the parameter menu	Field
	Cooling setpoint home	5 - 18°C	Cooling setpoint home [P407]	5 - 18°C
	Cooling setpoint night	5 - 18°C	Cooling setpoint home [P407] + night cooling offset [P408]	0 - 10°C
	Cooling setpoint away	5 - 18°C	Cooling setpoint home [P407] + away cooling offset [P409]	0 - 10°C

HEATING

Control panel occupation	Water setpoint with direct access to the control panel	Field	Water setpoint from the parameter menu	Field
	Heating setpoint home	20 - 60°C	Heating setpoint home [P401]	20 - 60°C
	Heating setpoint night	20 - 60°C	Heating setpoint home [P401] + Offset heating night [P402]	-10 a 0°C
	Heating setpoint away	20 - 60°C	Heating setpoint home [P401] + Offset heating away [P403]	-10 a 0°C

Only DHW ACS (setpoints defined under the change, also setpoints for DHW mode)

Control panel occupation	Water setpoint with direct access to the control panel	Field	Water setpoint from the parameter menu	Field
	Setpoint DHW	30 - 60°C	Heating setpoint home [P401]	30 - 60°C
	DHW anti-legionella setpoint	50 - 60°C	Heating setpoint home [P401] + Offset heating night [P402]	50 - 60°C

Customized climatic curve

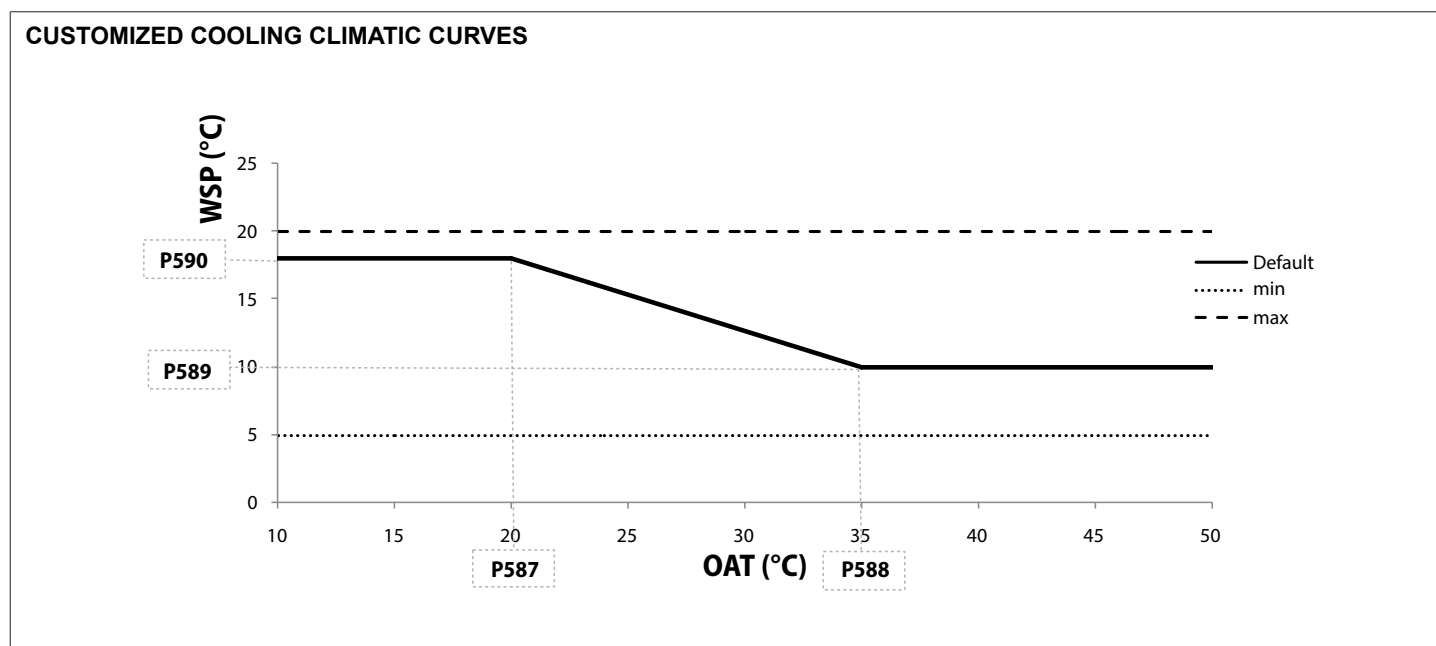
COOLING

If the cooling climate curve [P586] is configured to "0", the water setpoint will be calculated based on the customized cooling climate curve.

The customized cooling climate curve can be defined using the following parameters:

Parameter	Description	Default	Min.	Max.
P587	OAT min customized	20°C	0°C	30°C
P588	OAT max customized	35°C	24°C	46°C
P589	Personalized minimum water temperature	10°C	5°C	18°C
P590	Customized maximum water temperature	18°C	5°C	18°C

Example:



- If the OAT is not valid, the water setpoint is equal to the minimum personalized water temperature [P589].
- If the OAT is above the maximum current OAT threshold, the water setpoint is equal to the maximum personalized water

temperature [P590].

- If the minimum OAT is greater than or equal to the maximum current OAT threshold, the water setpoint is equal to the maximum customized water temperature [P590].

HEATING

- If the climatic curve heating [P581] configured on "0", the water set point will be calculated based on the customized

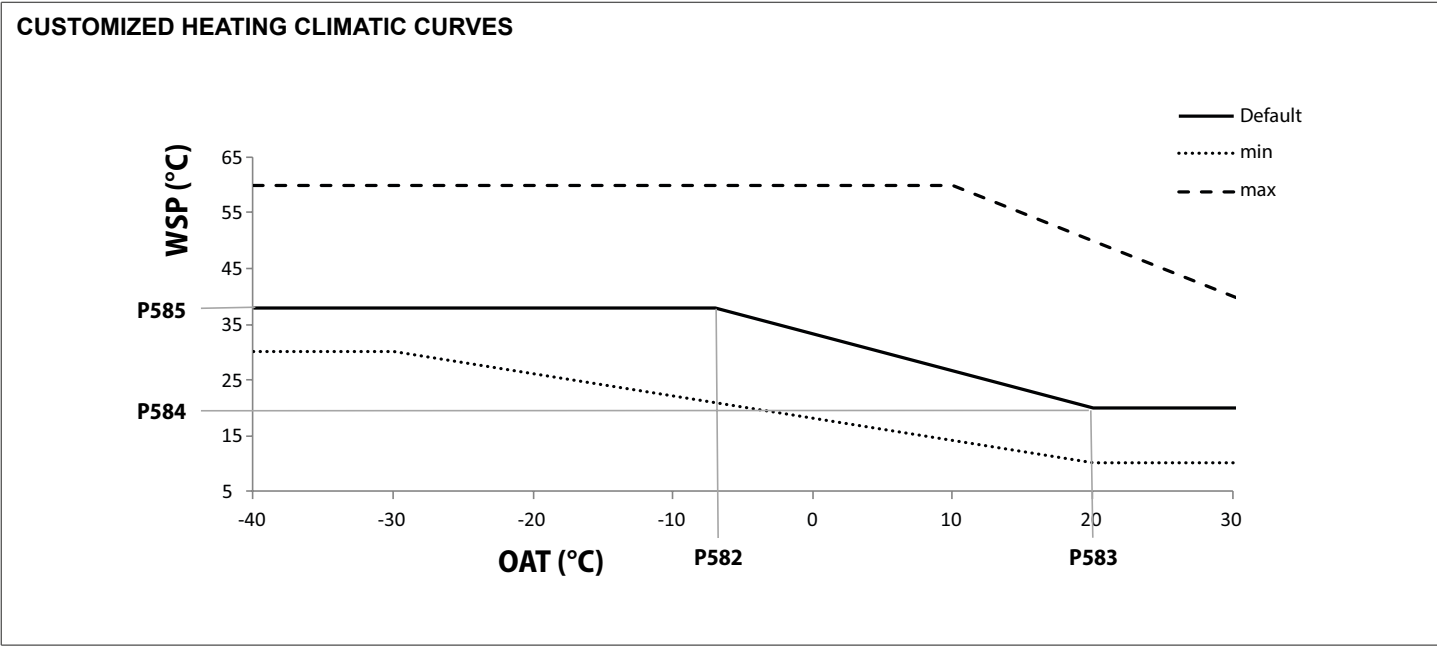
heating climate curve.

The customized heating climate curve can be defined using the following parameters:

Parameter	Description	Default	Min.	Max.
P582	OAT min customized	-7°C	-30°C	10°C
P583	OAT max customized	20°C	10°C	30°C
P584	Personalized minimum water temperature	20°C	20°C	40°C
P585	Customized maximum water temperature	38°C	30°C	60°C

FUNCTIONS

Example:



- If the OAT is not valid, the water setpoint is equal to the maximum personalized water temperature [P585].
- If the OAT is above the maximum current OAT threshold, the water setpoint is equal to the minimum personalized 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 customized minimum water temperature [P584].

Climatic curve offset (default and customized)

Two other parameters are configurable to adjust the water setpoint according to customer needs:

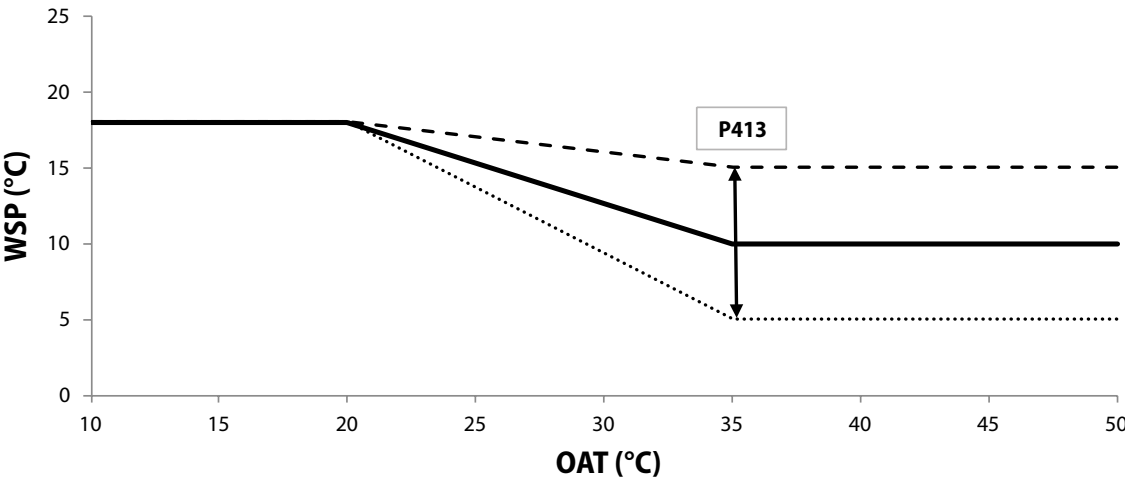
- for the cooling curve, the minimum cooling water setpoint[P589] can be changed by an offset at the foot of the

curve (minimum cooling curve setpoint offset[P413])

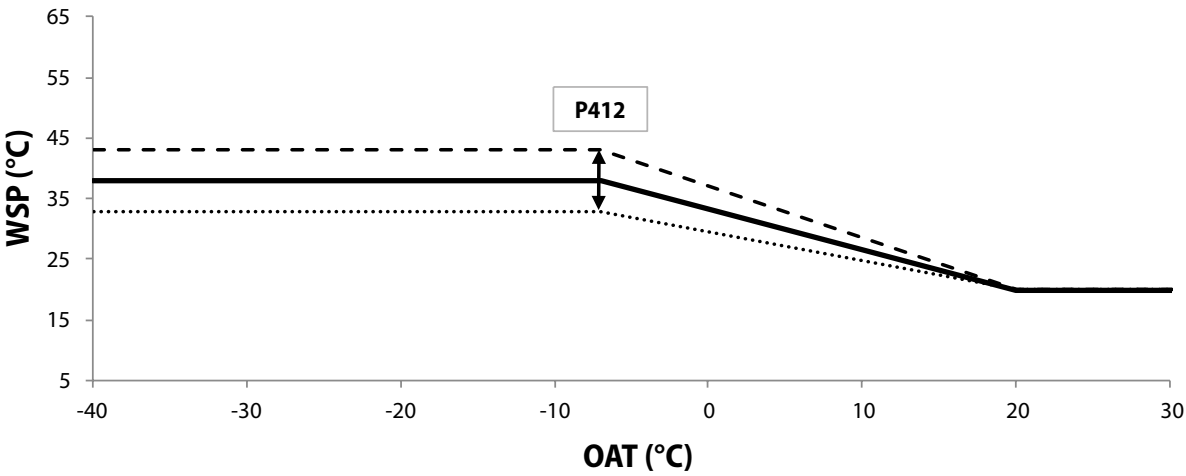
- and for the heating curve, the maximum heating water setpoint [P585] can be changed by an offset at the foot of the curve (maximum heating curve setpoint offset [P412])

Example:

COOLING CLIMATIC CURVES WITH OFFSET ON THE LOWER SIDE



HEATING CLIMATIC CURVES WITH OFFSET IN THE UPPER PART



4 MAINTENANCE

4.1 Ordinary maintenance

To ensure maximum efficiency and reliability of the units, it is recommended to establish a maintenance contract with your local service organization. The contract provides for regular inspections carried out by the service experts, so that any malfunction is detected and corrected quickly, and that no serious damage can occur.

A service maintenance contract is the best way to guarantee the maximum operating life of the equipment and, through the experience of the technicians, it is the ideal way to manage the system effectively also from a cost point of view.

Maintenance of air conditioning equipment must be carried out by professional technicians, while routine checks can be performed locally by specialized technicians. See EN 378-4 or ISO 5149 standard.

All refrigerant charge, removal and discharge operations must be carried out by qualified personnel and with the correct material for the unit. Any inadequate handling can lead to uncontrolled fluid or pressure losses.

A Before carrying out any work on the machine, make sure that the power supply is turned off. If a refrigerant circuit is opened, it must be completely discharged, refilled and tested to check for leaks. Before any operation on a refrigerant circuit, it is necessary to remove the full refrigerant load from the unit with a refrigerant recovery unit.

A simple preventive maintenance will allow to obtain optimal performance of the unit:

- better cooling and heating performance
- decrease in energy consumption
- prevention of accidental component failure
- prevention of the main interventions in terms of time and costs
- environmental protection

There are different levels of unit maintenance.

A Any deviation or non-compliance with these maintenance criteria will void the warranty conditions of the unit and the manufacturer can no longer be held responsible.

4.1.1 Maintenance level 1

See note in the paragraph "Maintenance level 3 (or higher)" p. 66. Simple procedures can be performed by the user on a weekly basis:

- Visual inspection for traces of oil (sign of a refrigerant leak)
- Cleaning the air heat exchanger
- Check for the presence of protective devices removed, and poorly closed doors or casings
- Check the unit's alarm report when the unit is not in operation (refer to the control panel user manual)
- General visual inspection for any signs of deterioration
- Check that the water temperature difference between the exchanger inlet and outlet is correct

4.1.2 Maintenance level 2

This level requires specific know-how in the electrical, hydronic and mechanical sectors.

The frequency of this maintenance level can be monthly or yearly depending on the type of verification.

Under these conditions, the following maintenance work is recommended.

Perform all level 1 operations, then perform:

Electrical checks

- At least once a year, tighten the electrical connections of the power circuit (see table "Tightening torque for main electrical connections" p. 67).
- If necessary, check and retighten all control / command connections (see table "Tightening torque for main electrical connections" p. 67).
- If necessary, remove the dust and clean the inside of the control units.
- Check the status of the contactors, switches and capacitors.
- Check the presence and condition of the electrical protection devices.
- Check the correct operation of all electric heaters.
- Check that no water has entered the control unit.

Mechanical checks

- Check the tightening of the fixing bolts of the fan column, the fan, the compressor and the control unit.

Checks on the water circuit

- Always be careful when working on the water circuit and make sure that the adjacent condenser is not damaged.
- Check the hydraulic connections.
- Check the expansion tank for signs of excessive corrosion or gas pressure drop and replace it if necessary.
- Drain the impurities from the hydraulic circuit.
- Clean the impurities of the water filter.
- Examine the fixed speed pump bearing after 17500 hours of water operation and the mechanical pump seal after 15000 hours. Check the operation of the low water flow safety device.
- Check the condition of the thermal insulation of the pipes.
- Check the concentration of the anti-freeze protection solution (ethylene or propylene glycol).

Cooling circuit

- Clean the air heat exchangers completely with a low pressure jet and a biodegradable detergent.
- Check the operating parameters of the unit and compare them with the previous values.
- Perform an oil contamination test. If necessary, replace the oil.
- Check the operation of the high pressure switch. Replace it if broken.
- Keep and maintain a maintenance sheet for each unit.
- **All these operations require strict observance of the safety measures: personal protective clothing, compliance with all sector regulations, compliance with applicable local regulations and use of common sense.**

4.1.3 Maintenance level 3 (or higher)

At this level, maintenance requires specific skills / approval / tools and know-how and only the manufacturer, its representative agent or authorized agent are authorized to carry out these operations. These maintenance operations concern for example:

- The replacement of main components (compressor, evaporator)
- Any intervention on the refrigerant circuit (handling of the refrigerant)
- The modification of the parameters set in the factory (change of application)
- Removal or disassembly of the unit
- Any intervention due to a planned maintenance intervention not carried out
- Qualsiasi intervento coperto dalla garanzia

- One to two leak checks per year performed with a certified leak detector and a qualified person
- To reduce waste, the refrigerant and the oil must be in compliance with current legislation, using methods that limit the losses of refrigerant and the pressure drops and with the materials suitable for the products.

Detected faults and leaks must be repaired immediately.

The compressor oil that is recovered during maintenance contains refrigerant and must be treated accordingly.

The coolant under pressure must not be drained in the open air. If a refrigerant circuit is opened, plug all openings, if the operation takes up to a day; for longer periods, load the circuit with nitrogen.

NOTA: Any deviation or non-compliance with the maintenance criteria will void the warranty conditions of the unit and the manufacturer can no longer be held responsible.

4.2 Tightening torque for main electrical connections

Component	Unit designation	Value (N.m)
Main switch (option 70)	L1 /L2 /L3/N/PE	2,00
Terminal X1	L1 /L2 /L3/N/PE	1,5 - 1,8
Terminal X3		0,6 - 0,8
Contactor (power and control)		1,50
Thermal relay		2,50
Transformer		1,70
Connections on the compressor		
Screw on phases (only for 21kW)		2,50
Compressor speed variator		
6 nuts M10	L1 /L2 /L3/N	1,20
2 nuts M10 or M8	PE	1,20
9 nuts M8 (with fuses and bars)	01/02/03	1,20

4.3 Tightening torque for main screws and nuts

Screw type	Use	Value (N.m)
Wood screw H M8	Assembly of the frame on the pallet	13,00
Nut H M8	Fixing the compressor on the base and fixing the plate exchanger and receiver	15,00
Self-tapping screw D=4,2mm	Sheet metal parts, plastic grid and electrical components	4,20
Self-tapping screw D=3mm	Mounting the deflector on the front panel	2,00
Self-tapping screw M6	Fan sub-assembly and assembly of the frame on the feet	7,00
Screw M8	Water pump unit on the partition panel	15,00
Gas nut D1" e D1"1/4"	Inlet and outlet group of heat pump pipes	70,00
Gas nut D1/2"	Water filling system and nut assembly on the suction pipe of the water pump	20,00
Nut H M6	Fan propeller assembly on the fan motor	7,00

4.4 Air side heat exchanger

It is advisable to regularly inspect the finned coils to verify their degree of soiling. It depends on the environment in which the unit is installed, and will be worse in urban and industrial installations and near deciduous trees.

For cleaning the finned coil, there are two maintenance levels:

- If the air heat exchangers are clogged, gently clean them vertically with a brush.
- Work on the air heat exchangers with the fan off.
- For this type of operation, turn off the unit if, having made all the appropriate service considerations, it is considered appropriate.
- Clean the air heat exchangers to ensure optimal unit operation. This cleaning is necessary when the air heat exchangers start to get dirty. The frequency of cleaning depends on the season and the location of the unit (area exposed to the wind, forest, dusty, etc.).
- Clean the finned coil with suitable products.

⚠ Never use pressurized water without a large diffuser. Do not use high pressure cleaners for Cu / Cu and Cu / Al coils.

Concentrated or rotating water jets are strictly prohibited. Never

use liquid with a temperature higher than 45 ° C to clean the air heat exchangers.

Proper and frequent cleaning (approximately every three months) will avoid 2/3 of the corrosion problems.

4.5 Plates heat exchanger maintenance

Check that:

- The insulating foam is intact and firmly in place.
- the BPHE and the electric pipe heaters are in operation, and correctly positioned securely.
- the connections on the water side are clean and do not show signs of leaks.

4.6 Maintenance

⚠ Before any intervention on the unit, make sure that the circuit is isolated and that there is no voltage. Note that it may take 5 minutes for the circuit capacitors to fully discharge after isolating the circuit. Only qualified personnel are authorized to work on the VFD.

In case of alarm or persistent problem related to the VFD, contact

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the assistance service.

VFDs equipped with units do not require an insulation test, even if they are replaced; they are in fact checked systematically before delivery. In addition, the filter components installed in the VFD can distort the measurement and can also be damaged. If there is a need to check the insulation of the components of the appliance (fan motors and pumps, cables, etc.), the VFD must be disconnected from the power circuit.

4.7 Refrigerant volume

The unit must be started in cooling mode to find out if the unit load is correct by checking the actual subcooling.

A small loss of refrigerant compared to the initial load will be evident in the cooling mode and will affect the subcooling value obtained at the outlet of the air heat exchanger (condenser), but will not be visible in heating mode.



It is therefore not possible to optimize the refrigerant charge in the heating mode after a leak. The unit will need to be started in cooling mode to check if an additional load is required.

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As the manufacturer is constantly improving its products, the aesthetic or dimensional features, the technical data, the equipment and accessories indicated could be subject to variations.

