MITSUBISHI ELECTRIC
HYDRONICS & IT COOLING SYSTEMS S.p.A.

Climaveneta Technical Bulletin
i-BX-N 004 - 035_201810_EN HFC R410A

COOLING
HEATING
HOT WATER

i-BX-N 004 - 035

NEW!

4,20-35,1 kW

Reversible heat pump, air source for outdoor installation

HFC R410A
SCROLL
ROTATIVE
AXIAL
PLATES
EUROVENT CERTIFIED PERFORMANCE
INV.COMP.
EEV

(The photo of the unit is indicative and may vary depending on the model)

- ErP READY
- SYSTEM EFFICIENCY
- HIGH EFFICIENCY AT PARTIAL LOAD
- HIGH EFFICIENCY COMPONENTS
- EXTENSIVE OPERATING LIMITS
- INTEGRATED HYDRONIC MODULE

CLIMAVENETA®

CERTIFICATIONS

Product certifications

Voluntary product certifications

Check ongoing validity of certificate:
www.eurovent-certification.com
or
www.certiflash.com

System certifications

MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

Quality System complying with the requirements of UNI EN ISO 9001:2008 regulation
Environmental Management System complying with the requirements of UNI EN ISO 14001:2004 regulation
Occupational Health and Safety Management System complying with the requirements of BS OHSAS 18001:2007

INDEX

The units highlighted in this publication contain HFC R410A [GWP_{100} 2088] fluorinated greenhouse gases.

LEGEND

Functions

Cooling

Heating up 60°C

Domestic Hot Water production

Refrigerant

R-410A

Compressors

Scroll compressor

Rotary compressor

Fan

Axial fan

Exchangers

Plates

Other features

Eurovent

Inverter Driven Compressor

Electronic Expansion Valve

1. PRODUCT PRESENTATION

1.1 GREEN CERTIFICATION RELEVANT

Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., as a major player in the world HVAC market and a leading manufacturer of energy efficient, sustainable HVAC solutions, recognizes and supports the diffusion of green certification systems, as an effective way to deliver high performance buildings and improve the quality and the sustainability of the built environment.

Since the first certification system was introduced at the beginning of the 1990s, the demand for certified buildings has grown considerably, as well as the number of standards, rating and certification programs.
Operating worldwide Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., has extensive experience with many of them and is active member of Green Building Council Italy.

Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A., commitment to develop responsible and sustainable HVAC solutions, is reflected by a full range of premium efficiency products and systems, designed with special care to improve building energy performance ratings, according to major certification protocols, including LEED, BREAM, GREENSTAR, BCA, NABERS, DNGB, HQE and BEAM.

To find out more about how our products contribute to enhanced green certification rating and energy performance of a building, please refer to:
https://www.melcohit.com/GLOBAL/Company/Green-Certifications/QR%20code/

1. PRODUCT PRESENTATION

1.2 NOMENCLATURE

1	2	3	4	5	6	7	8	9
i	-	BX	-	N	-	004	M	H	A	N	R	V

Code	Descriptions	Extensions	
1	Model	i-BX	Chiller
		i-BX-N	Heat pump
2	Segment	-	Comfort
		Y	Process
3	Nominal capacity [kW]	004-006-008-010-013-015-020-025-030-035	
4	Power supply	M	230/1/50
		T	400/3/50
5	Hydronic Module	N	Without hydronic module
		H	Withhydronic module
6	Tube & Fin coil	A	Cu/Al regular coil
		B	Cu/Cu tube & fin coill
		E	Epoxy pre-painted fins
7*	Basement electric heater	N	Without basement electric heater
		S	With basement electric heater
8	Coil protection grill	N	Without protection grill
		R	With protection grill
9	Structure & Panelling	V	All parts polyester-powder painted

*Not available for i-BX

Outdoor unit for cold / hot water and domestic hot water production, with hermetic rotary compressors with variable speed (Inverter Driven) in a single-circuit configuration using R410A refrigerant, air side heat exchanger with copper tubes and aluminum fins, water side steel brazed plate heat exchanger. The unit is equipped with electronic expansion valve and integrated hydraulic module as standard.
Flexible and reliable unit that adapts to the actual load conditions thanks to the accurate temperature control combined with the use of inverter technology. The high performance at both full and partial load, is achieved due to the accurate design of the unit and the use of variable speed motor (inverter).
The i-BX-N heat pumps provide for heating, cooling and domestic hot water production. Particular care is taken for winter mode, that thanks to the Inverter technology is guaranteed beyond traditional units working limits.

1.3 ErP READY

The high level of efficiency of i-BX-N at partial load meets and exceeds the minimum seasonal efficiency for heating, SCOP, according with the eco-sustainable design requirements for all products using energy.

1.4 SYSTEM EFFICIENCY

The unit is designed with a system approach: all components are set in sinergy according to a proprietary logic to obtain the highest efficiency.

1.5 HIGH EFFICIENCY AT PARTIAL LOAD

High seasonal efficiency thanks to the modulation of the compressor with DC inverter technology so that the unit provides the exact thermal power in correspondence with the actual needs of the building. High efficiency which translates into reduced energy consumption throughout the unit's working period.

1.6 HIGH EFFICIENCY COMPONENTS

In terms of improving performance and reducing power consumption, the electronic thermostatic valve is a key component that maximises system efficiency, as well as the hydronic kit with inverter water pump and the modulating the fans speed as standard equipments.

1.7 EXTENSIVE OPERATING LIMITS

Particular care is taken for winter mode, that thanks to inverter technology is guaranteed beyond traditional units working limits, supplying hot water up to 60°C and down to -20°external air.

1.8 INTEGRATED HYDRONIC MODULE

The integrated hydronic include all the water circuit components (anti-freeze electrical heater on plate heat exchanger, air release valve, flow switch, water filter, safety valve, EC water pump

2. UNIT STANDARD CONFIGURATION

2.1 Reversible heat pump, air source for outdoor installation
Outdoor unit for cold / hot water and domestic hot water production, with hermetic rotary compressors with variable speed (Inverter Driven) in a single-circuit configuration using R410A refrigerant, air side heat exchanger with copper tubes and aluminum fins, water side steel brazed plate heat exchanger. The unit is equipped with electronic expansion valve and integrated hydraulic module as standard.
I-BX-N adapts to the actual load conditions thanks to the accurate temperature control combined with the use of inverter technology. The precise design and the use of innovative variable speed motors (inverters) ensures a high level of energy efficiency both at full and partial loads.
The i-BX-N heat pumps provide for heating, cooling and domestic hot water production. Particular care is taken for winter mode, that thanks to the Inverter technology is guaranteed beyond traditional units working limits.

2.2 Structure
Structure in hot-galvanised shaped sheet steel with a suitable thickness. All parts polyester-powder painted RAL 7035. The self-supporting frame is built to guarantee maximum accessibility for servicing and maintenance operations.

2.3 Panelling
The external paneling made from hot galvanised metal plate and painted with epoxy powder coat RAL 7035. The panels are easy to remove for quick and easy access to the inside components from either side of the unit.

2.4 Variable-speed compressor
The inverter scroll compressor uses a brushless Interior Permanent Magnet (IPM) design to give you higher efficiency across a wider range of applications and with an oil sump heater.
Inverter logic ensures a soft start that reduces inrush current. The frequency converter is designed with built-in harmonic filters, making it easy to install in the electrical panel while complying with industry standards.

2.5 Utility-side heat exchanger
Braze welded AISI 316 steel plate heat exchanger. The heat exchangers are lined on the outside with a layer of closed-cell neoprene to prevent condensation.
When the unit is operating, the heat exchangers are protected against no flow conditions by a flow switch. The unit is also ready to operate using non-freezing fluid mixes, down to heat exchanger outlet temperatures of -8° and with a frost protection heater on the heat exchanger.

2.6 Source-side heat exchanger
Finned coil heat exchanger made of copper tubes and aluminium fins, spaced apart so as to guarantee maximum heat exchange efficiency. The unit is fitted as standard with protection grills on the coil.

2.7 Electric frost protection heater for the base
Modulating electric frost protection heater for the base, positioned between the finned heat exchanger and the base to improve and assist drainage of water (accessory).

2.8 Fans
Axial-flow fans with IP 54 ingress protection, external impeller, pressed metal blades, housed in aerodynamic tubes, complete with accident prevention grill. Six-pole electric motor with integrated thermal protector. Continuous fan speed control by pressure transducer.

2.9 Refrigerant circuit
Main components in the refrigerant circuit:
- refrigerant R410A
- electronic thermostatic valve,
- 4-way reversing valve.
- filter-drier,
- high safety pressure switches,
- liquid receiver,
- liquid separator
- low and high pressure transducers.

2.10 Power and control electrical panel:
Power and control electrical panel built in compliance with EN 60204-1/IEC 204-1, complete with:
- Compressor circuit breaker,
- Electronic controller,
- Numbered control circuit cables,
- Continuous fan speed control,
- Pump enabling relay,
- Compressor and fan start capacitor,
- System water pump protection fuse,
- Auxiliary circuit protection fuse,
- Fan protection fuse,
- Board power supply protection fuse,
- Spring terminal blocks for the control circuits,
- Remote ON/OFF terminals,
- Remote COOL/HEAT terminals,
- DHW/SYSTEM priority terminals
- Demand limit /night mode terminals
- Reduced electricity rate terminals
- Alarm/secondary pump/dehumidifier terminals,
- System supplementary heater terminals
- Supplementary source terminals
- DHW storage heater terminals
- DHW, system storage and low temperature zone probe terminals
- DHW 3-way valve terminals
- 3-way mixing valve terminals

2.11 Water circuit:
Standard configuration includes the hydronic module with the following components: EC water pump, expansion tank, safety valve, air vent, anti-freeze electric heater, flow switch, water filter (delivered with the unit).
The configuration without hydronic module includes the following components: safety valve, air release valve, anti-freeze electric heater, flow switch, water filter (delivered with unit).

2.12 Versions

- **Basic version**
  Standard unit

2.13 Configurations

- **Standard unit**
  Reversible standard unit for production of chilled/hot water according to the selected operation mode.peration mode.

2.14 Accessories

- N-THC wired room timer thermostat with backlit display, complete with temperature and humidity probe for system configuration.
- 3-way selector valve for domestic hot water production.
- Supplementary electric heater for the heating system.
- DHW storage electric heater, as supplementary heat source and for Legionella prevention
- Base frost protection heater
- N-CM kit for managing heat pumps in cascade.
- N-RS RS485 serial card for ModBus protocol.
- Low-loss header: 35, 100 or 200 litres.
- Domestic hot water cylinder, 300 or 500 litres.
- Domestic hot water storage tank, 300 litres, to be combined with the DOMH2O instant domestic hot water production kit.
- Domestic hot water storage tank, 300, 500 and 1000 litres with solar heating coil, to be combined with the DOMH2O instant domestic hot water production kit.
- DOMH2O15 and DOMH2O24 instant domestic hot water production kit.
- Rubber vibration dampers
- Copper-Aluminum heat exchanger coils with epoxy treatment
- Copper-Copper heat exchanger coils

3. ELECTRONIC CONTROLLER

The NADISYSTEM electronic controller is based on an innovative and efficient approach to building air-conditioning.
Energy is only consumed when necessary and the energy sources are used based on availability, efficiency and cost, giving priority to renewable sources, where available.
The first significant advantage of introducing a single integrated control system is optimisation of energy savings through coordination between the different system components, eliminating inefficiencies in communication, simplifying installation and reducing the number of controllers.
NADISYSTEM ensures dynamic control of water outlet temperature according to real needs in the building and the outside air temperature, optimising comfort and reducing wasted energy.
The NADISYSTEM control system for residential applications gives high operating flexibility by controlling the secondary circuits, that is, activating zone pumps and valves depending on the room temperature set on the remote keypad, and by controlling mixing valves to ensure the correct water temperature in radiant systems according to the climate conditions set for each circuit.
Moreover, the controller modulates fan operation for optimum condensation or evaporation, depending on the operating mode, allowing domestic hot water production even in summer with outside temperatures up to 45°C, and reducing noise at night.
NADISYSTEM also allows easy service, being interfaceable to supervision systems for remote maintenance by specialist technicians, as well as remote control of certain functions, such as:
- on/off
- cooling/heating operation
- heating system/domestic hot water priority
- shutdown due to electricity rate

The controller can manage up to four 4 heat pumps connected in cascade, by means of the remote keypad kit N-CM (optional). This configuration increases the capacity in applications with multiple occupied areas, such as hotels, schools, apartment blocks, offices and shopping centres. The units are managed in master-slave mode: the master unit processes the information and sends it to the slave units.
This ensures fine control over the capacity delivered, without decreasing performance, and more precise system sizing.
The controller can determine how many cascaded units are needed to guarantee domestic hot water production, all or just one, according to requirements. The controller also balances compressor operating hours based on time logic, activating the units in rotation, and where necessary excluding any units that are momentarily out of service, without interrupting operation of the cascade as a whole.

Main functions
- Operating parameters with dedicated user and installer menus to configure the type of system
- Outside air temperature probe to control the system water temperature set point based on heating and cooling compensation curves. Fixed point operation also available.
- Cooling, heating operating modes.
- Domestic hot water production
- Supplementary electric heater management for domestic hot water storage and Legionella prevention cycle
- Domestic hot water recirculation by timer or flow switch
- External resource (boiler or electric heater) management as supplementary or sole source of heat
- Alarm signals
- Frost protection management based on outside air temperature or water temperature, to protect the system pipes and heat exchangers inside the unit.
- Night mode: is a system setting to limit maximum noise level of the unit. Noise level is reduced limiting maximum compressor frequency and fan speed.
- Wired remote keypad with backlit display for zone management, complete with temperature and humidity probe, weekly timer for setting 6 daily time bands (N-THC, option).
- Calculation of dew point and increase in water outlet temperature for underfloor systems, possibility to enable a dehumidifier (N-THC, option).
- Different systems solutions by configuring the controller, up to 2 zones with the possibility to control different temperature according to the selected compensation curves (N-THC, option).
- Cascaded management of up to 4 heat pumps (option).

4. OPERATING CHARACTERISTICS

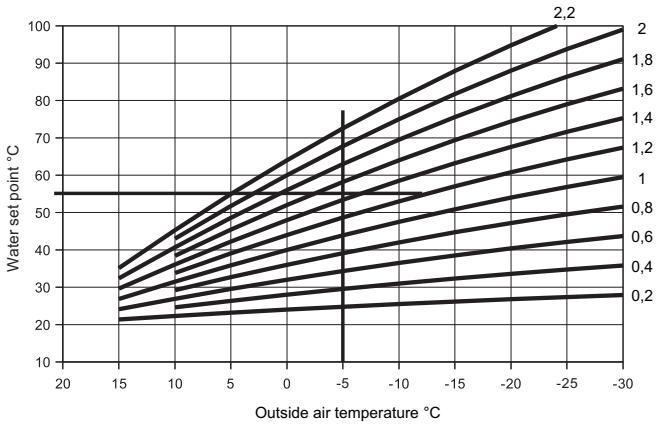
HIGH EFFICIENCY AND REDUCED CONSUMPTION

The i-BX-N reverse-cycle air-to-water heat pump is fitted with DC inverter-driven compressor.
Inverter technology continuously controls compressor speed to ensure perfect adaptation to system load, modulating the heating or cooling capacity delivered and consequently reducing power consumption and achieving the highest seasonal coefficients currently available on the market.
The seasonal coefficient of performance faithfully reflects the advantages in energy and economic terms of using the heat pump all year around, being the ratio between energy delivered and power consumed.
In terms of improving performance and reducing power consumption, the electronic thermostatic valve is an important component that maximises system efficiency.
Quick and effective adaptation by the electronic thermostatic valve to variations in load allows the compressor to always work at optimum efficiency, as well as extending compressor life.

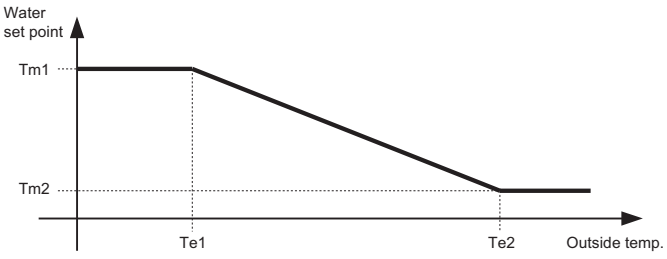
TEMPERATURE CONTROL

The water temperature delivered to the heating and cooling circuit is calculated by the controller and depends on the selected cooling and heating compensation curve.
A building's thermal requirements do not remain constant throughout the day or the year, but rather increase or decrease based on the outside air temperature.
It's therefore a waste of energy to keep the water at a constant temperature. The delivering of water at different temperatures to the terminals according to the outside air temperature allows to achieve high seasonal efficiency ratios and considerable savings in running costs. The compensation curve in heating and cooling mode can be adjusted to allow correct heat pump operation according to the system (radiant panels, radiators, fan coils).
Example: Selecting heating curve 1.4 with an outside air temperature of -5°C gives a water temperature of +55°C.
Dedicated compensation curves can be set for each zone, depending on the type of terminal unit, or alternatively a fixed point temperature can be selected.
A function called "room temperature influence" is available to quickly adapt the water temperature by modifying the compensation curve when the indoor conditions change, for example when there are more occupants in the room.
This function is only available in heating mode and if available the remote controls N-THC
In cooling operation during summer, the controller calculates the dew point using temperature and humidity probe on the remote terminal, which determines an increase in the water temperature to deliver to the radiant system and activation of the dehumidifier (one dehumidifier contact only for all zones).

Heating compensation curve

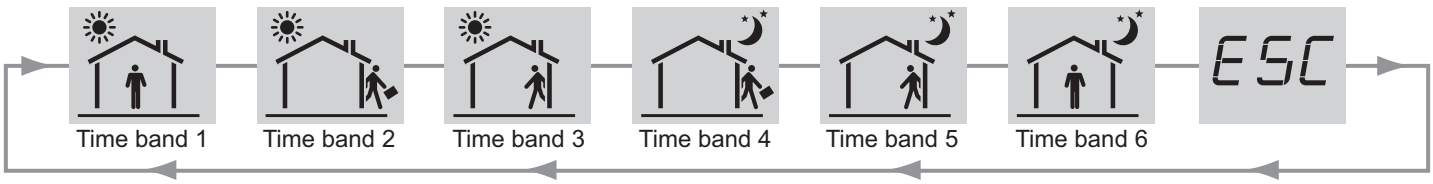


Cooling compensation curve



PROGRAMMING THE TIME BANDS WITH N-THC (OPTIONAL)

A timer is available to customise differentiated activation and deactivation for each individual zone of the system, creating an operating profile with up to 6 daily time bands.



SYSTEM PUMP OPERATION

When reaching the system water temperature set point, the compressor stops and the system pump is activated periodically, so as to minimise energy consumption and ensure correct measurement of the water temperature. The pump on and off times can be set using a parameter, according to the type of system.
In systems with fan coils, the time between one ON/OFF cycle and the next should be reduced in order to avoid excessive cooling of the water, in heating operation, and if and if the system water content is equal to the minimum value shown in the paragraph on “Minimum and maximum system water content”.

DOMESTIC HOT WATER PRODUCTION

The controller manages domestic hot water production using a 3-way valve installed outside of the unit, deviating the flow of hot water to the DHW storage tank, which must be suitably sized according to the type of usage.
Production is enabled when the water temperature inside the DHW storage tank (probe BT8) is less than the DHW set point.
The production of domestic hot water is guaranteed in both summer and winter, according to the operating limits shown in this manual. If heat pump operation is expected outside of the limits, consider using a supplementary source of heat, managed directly by the controller.
An electric heater should be installed inside the DHW storage tank to ensure the temperature does not fall below 10°C in the event of extended periods of heat pump inactivity (standby).

LEGIONELLA PREVENTION FUNCTION

The Legionella prevention function ensures the elimination of the Legionella bacteria that reside in domestic water storage tanks. The temperature and duration of the Legionella prevention cycles to eliminate bacteria are typically:

- 2 minutes > 70°C
- 4 minutes > 65°C
- 60 minutes > 60°C

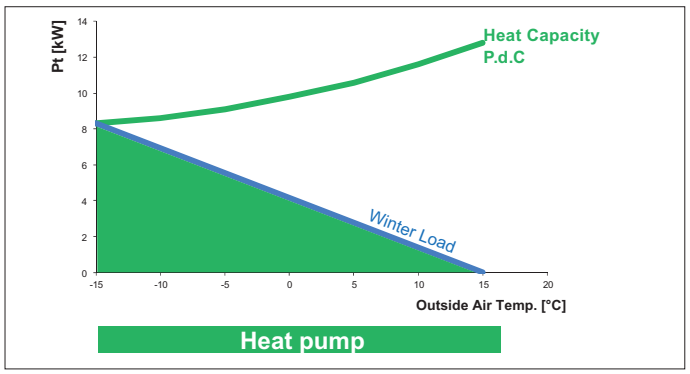
The Legionella prevention cycles are managed directly by the controller, enabling the heater in the domestic hot water storage tank domestic, with the possibility to set the duration, temperature, day and time.

AUXILIARY RESOURCES

System operation can be distinguished as monovalent, all-electric or bivalent. The controller can activate the external source to achieve one of the functions listed above.

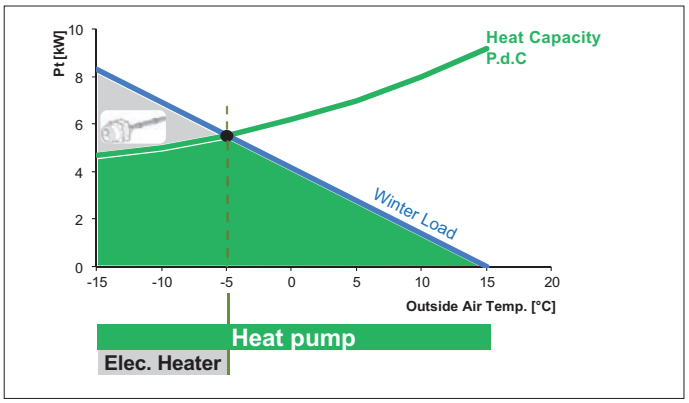
Monovalent operation

For monovalent operation, the heat pump has to meet the entire demand of the building. There may be excessive heating capacity of the heat pump above all when the outside air temperature is above zero, as well as high power consumption.
Make sure the home’s energy meter is correctly sized.
Solution suggested for new homes.



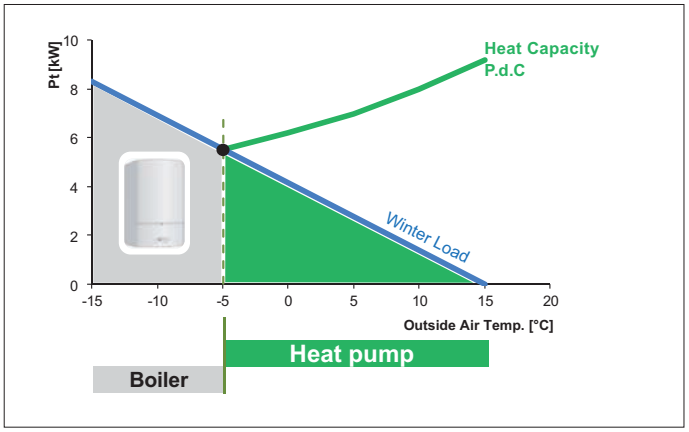
All-electric operation

In all-electric operation the heat pump is integrated with an electric heater to meet the entire demand of the building.
The electric heater is activated below certain outside temperatures so as to satisfy demand in the building that the heat pump cannot manage on its own.
Considering the reduced number of hours of heat pump operation at low outside temperatures during the winter period, operation of the supplementary heater will also be reduced, and consequently power consumption will be negligible.
Therefore the system’s seasonal energy efficiency remains unchanged.
This solution is suggested for new homes and lower investments than monovalent heat pumps.



Bivalent operation

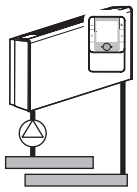
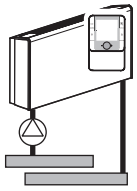
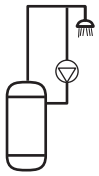
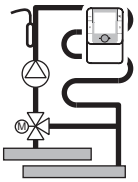
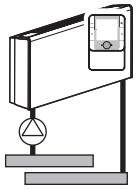
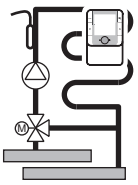
In the case of bivalent operation the heat pump meets the needs of the building down to a certain outside temperature, called the bivalence point.
Below the bivalence point the heat pump switches off and only the auxiliary source (e.g. boiler) provides heat for the building.
This solution is ideal for traditional systems and renovations.



SYSTEM MANAGEMENT

The NADISYSTEM control system for residential applications gives high operating flexibility by controlling the secondary circuits, that is, activating zone pumps and valves depending on the room temperature set on the remote keypad, and by controlling mixing valves to ensure the correct water temperature in radiant systems according to the climate conditions set for each circuit.
There are 4 different types of pre-configured system for quick and easy installation, with the possibility to manage up to 2 remote keypads for controlling thermal load in likewise zones.

If the radiant system also needs to meet cooling demand, humidity control is guaranteed by activating the dehumidifier contact, while calculation of the dew point, measured by the N-THC controller, ensures the correct water outlet temperature defined by the cooling compensation curve, thus avoiding formation of condensate on the floor.
Remember to suitably insulate the pipes in contact with the air, if air-conditioning in used inn summer.
The following table indicates the different type of systems that can be controlled directly by the NadiSystem.

N. System Configuration	Remote Keypad N-THC	High Temp. Zone (ex. Radiator/ Fan Coil)	Low Temp. Zone (ex. Floor Heating)	DHW Recirculation
0	x1 optional			
1	x1 optional			
2	x1 optional			
3	x1 optional + x1 optional			

Key

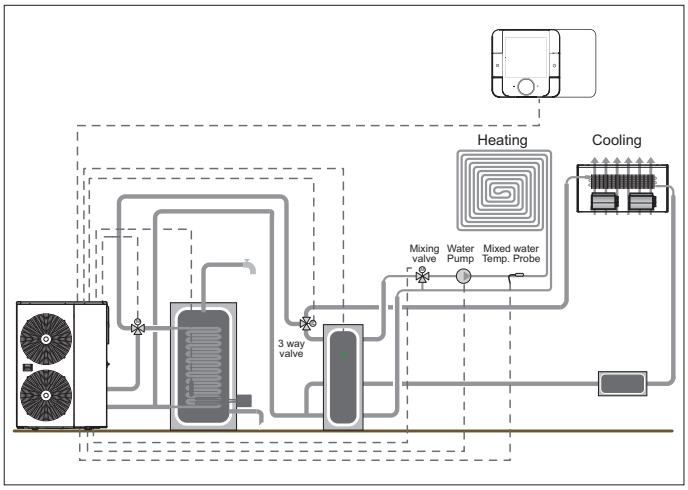
- Mixing valve floor heating
- Circulation Zone pump or motorized valve
- Water temperature probe (one for each LT zones)
- DHW pump circulation
- Ambiente thermostat

The controller can manage the valves in each individual zone or alternatively pumps, depending on the set temperature.
The system decides whether to activate the unit or the most energy efficient resources to meet demand.
NadiSystem manages different temperature levels based on the terminal units used.
The heat pump directly produces water at the right temperature for the system terminals connected to the high temperature circuits (e.g. fan coils, radiators, towel rails in bathrooms), while low temperature radiant panels are controlled by the mixing valves according to the specific compensation curves.

This means a compensation curve can be applied to the high temperature zones and different compensation curves for each low temperature zone.
Simple installation by serial connection of the components making up the NadiSystem.

HEATING/COOLING MODE OUTPUT

Digital output KM2, SA8 and SA9 can be set as “Heating /Cooling mode output”. The contact is activated based on of heat pump operating mode selected on the keypad or by the remote cooling/heating contact.
This contact can be used to control system valves or pumps, so as to disable part of the system based on the operating mode. This allows management of mixed systems, for example, radiant panels for heating and fan coils for cooling.



FROST PROTECTION

The frost protection function is active even when the heat pump is OFF.

DOMESTIC HOT WATER FROST PROTECTION STORAGE

The domestic hot water frost protection function is only active if an auxiliary resource is installed for the domestic hot water storage tank.
The additional heater is activated when the water temperature, measured by probe BT8, is less than the set point (see the unit installation manual), and is deactivated with a hysteresis of +3°C.

PRIMARY CIRCUIT FROST PROTECTION SYSTEM

The frost protection function is guaranteed by activation of the electric heater on the heat exchanger and the system pump. The pump and electric heater are activated when the water temperature (measured by the probe on the heat exchanger outlet) is less than 4.5°C, and are deactivated when the water temperature reaches +7°C.

SECONDARY CIRCUIT FROST PROTECTION SYSTEM

The system secondary circuit pumps are activated together with the pumps on the primary circuit, according to the criterion described in the previous paragraph, when management by Nadisystem is enabled.

FROST PROTECTION BASED ON OUTSIDE AIR TEMPERATURE

The system pump is activated according to the outside air temperature to prevent ice forming in the pipes.
The pump is activated if the outside air temperature is less than 4°C and deactivated when it rises back over 5°C.

FROST PROTECTION BASED ON INSIDE AIR TEMPERATURE (with N-THC)

The heat pump and/or supplementary heat sources (outlet heater or boiler) are activated if the room temperature falls below 5°C (value selectable by parameter), to prevent the pipes inside the home from freezing.

ALARM SIGNALS

Correct unit operation and any alarms are displayed on the room thermostat, the latter by the symbol.
The diagnostics functions include complete alarm management, with an alarm log (via service keypad) for more detailed analysis of unit behaviour.

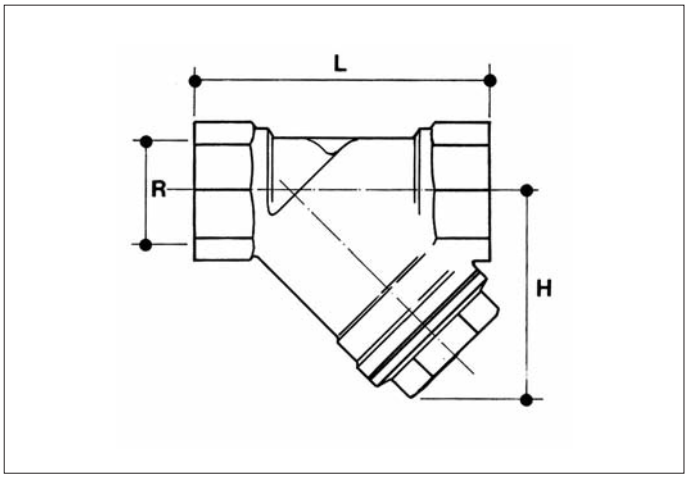
5. ACCESSORIES

The accessories listed below are supplied separately.

METAL MESH WATER FILTER (standard with the unit)

This filter MUST be installed on the heat pump return pipe to trap any impurities in the water circuit that may damage the unit's heat exchanger.

Characteristics	
Body	Brass
Finish	Sanded
Body gasket	Betaflex 71
Thread	ISO 228/1
Filter	AISI 304 stainless steel micro-perforated sheet metal
Hole pitch	DN25=1,5mm - DN32=2mm
Inscribed hole diameter	DN25=400micron - DN32=500micron
Number of holes per cm^2	DN25=150 - DN32=80

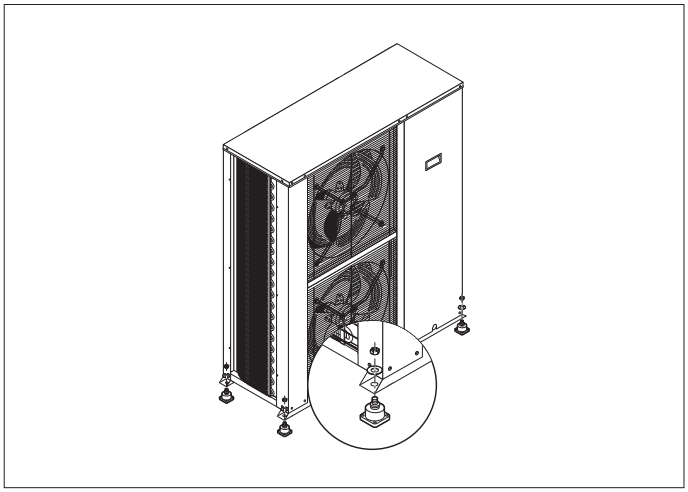


Dimensions			
DN		25	32
R	inch	1"	1" 1/4
L	mm	87	96
H	mm	60	68

Pressure drop			
R	inch	1"	1" 1/4
Kv		11,08	17,00

VIBRATION DAMPERS

Used between the heat pump and the support plane.
Vibration dampers made from rubber, elastomer and aluminium alloy casing for fastening to the floor.



BTB STORAGE TANK

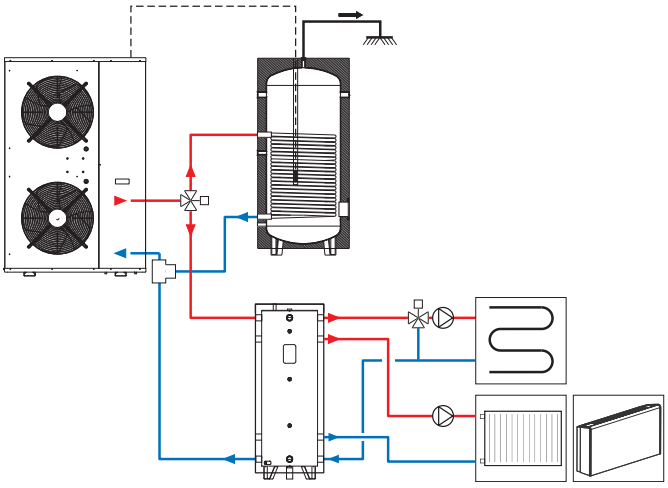
Storage tanks to be used in heating and cooling systems, to ensure minimum heat pump operating time in all operating conditions and avoid excessive starts and stops.
To be install under the unit on the heat pump return pipe.
In this case, make sure the available pressure head of the pump on the unit is sufficient to guarantee correct system operation.
Installing the storage tank may result in an increase in the overall dimensions of the unit. In particular, the overall height could increase by about 280 mm for BTB30 and 190mm for BTB60.

BT AND PT STORAGE TANKS

Storage tanks to be used in heating and cooling systems, to ensure minimum heat pump operating time in all operating conditions and avoid excessive starts and stops.
It can also be used to isolate the water circuit from the heat pump and to partially meet energy demand during periods in which the unit is shutdown due to the electricity rate.
For indoor installation.

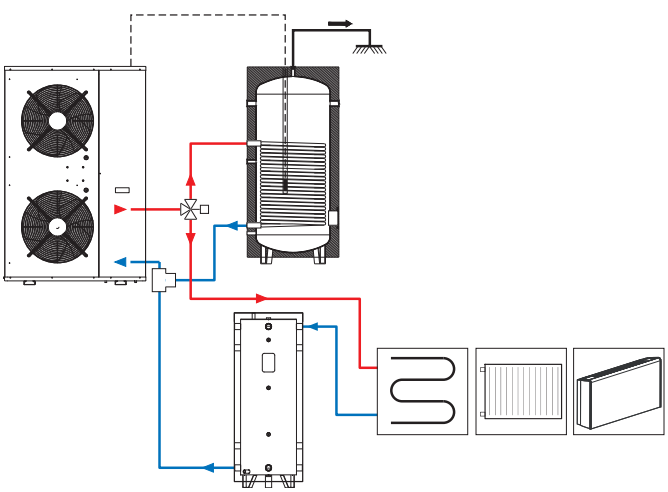
Models available	Volume
BT35	35 litres
BT100	100 litres
BT200	200 litres
TP300	300 litres

The diagram illustrates the use of the BT/TP storage tank as a low-loss header to separate the heat pump primary circuit from the secondary circuit to the terminal units.
This allows different flow-rates and temperatures to be managed depending on the type of terminal used.
Correctly sized, it guarantees the minimum water volume required by the heat pump.



The diagram shown is purely indicative.

The diagram illustrates the use of the BT/TP storage tank as a storage tank on the heat pump return pipe so as to increase the volume of water available in the system, avoiding excessive starts and stops.
In this case, make sure the available pressure head of the pump on the unit is sufficient to guarantee correct system operation.



The diagram shown is purely indicative.

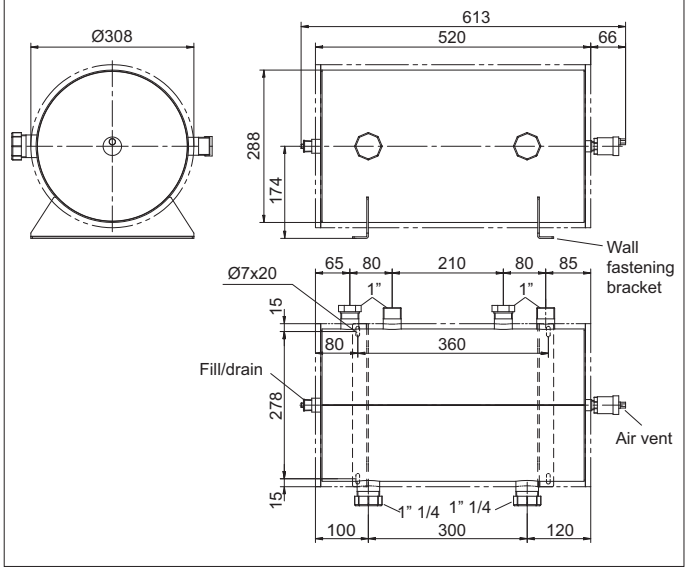
Technical specifications

The storage tanks are made from carbon steel plate welded using the best technology and undergo strict water pressure tests (9 bars, allowing an operating pressure of 6 bars).

Being a container of water for heating and cooling, this product does not require internal treatment, while the outside is coated with rustproof paint.

The tanks are protected on the outside with a closed cell elastomeric foam lining, 50 mm thick, with soft blue PVC exterior finish, for models BT 100/200 and TP300; polyethylene foam insulation, 10 mm thick, with metallic exterior finish for models BT35.

Dimensions - Model BT35

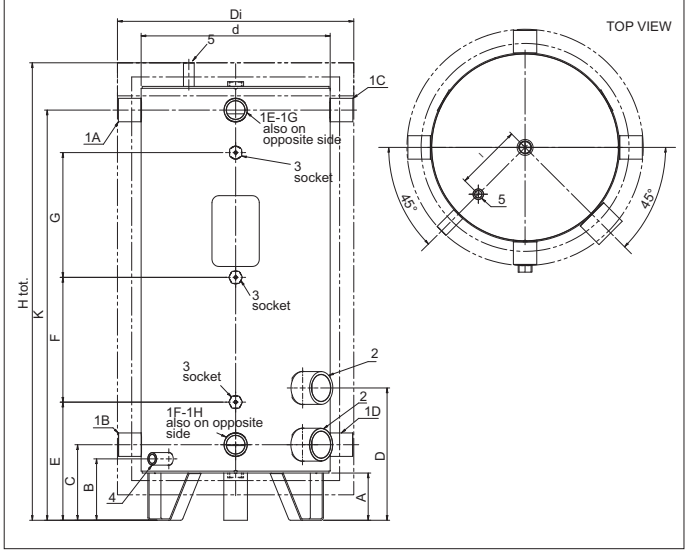


Volume	Storage tank dimensions											
	Di	d	Htot	A	B	C	D	E	F	G	K	I
litres	mm											
100	500	400	970	100	130	160	280	250	264	264	868	140
200	550	450	1410	100	130	160	280	430	374	386	1298	170
300	700	600	1235	100	130	160	280	320	321	332	1133	200

Volume	Fittings				
	1	2	3	4	5
litres	inch				
100	1"1/4	2"	1/2"	1/2"	3/8"
200	1"1/4	2"	1/2"	1/2"	3/8"
300	1"1/4	2"	1/2"	1/2"	3/8"

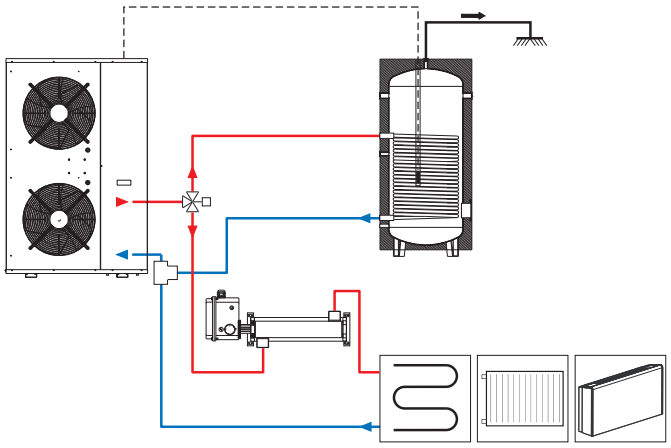
Pos.	Description
1A	Heat pump outlet
1B	Heat pump return
1C	System outlet
1D	System return
1E- G	Supplementary source outlet
1F-1H	Supplementary source return
2	Electric heater attachment
3	Probe socket
4	Drain/load
5	Vent

Dimensions - Model BT100, BT200, TP300



OUTLET ELECTRIC HEATER

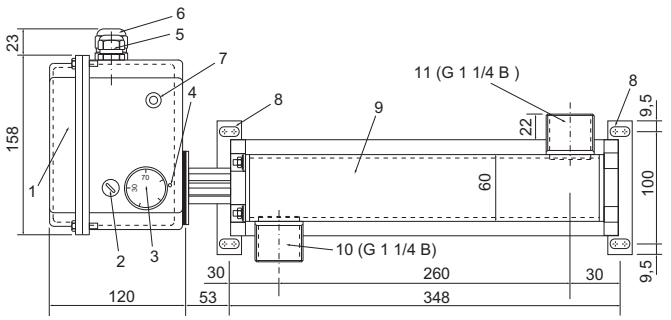
The outlet electric heaters are available with power ratings of 3 kW single-phase and 3, 6 and 9 kW three-phase.
Used on the system outlet, these guarantee the heating demand of the building at low outside temperatures by supplementing the heating capacity of the heat pump.
The electric heaters are deactivated as soon as the heat pump alone can meet heating demand.
Considering that normally the heat pump operates only a short time at low outside temperatures, operation of the supplementary heater is also reduced and consequently power consumption is negligible.
Therefore, the system's seasonal efficiency ratio remains unchanged.
Wall-mounted installation using the fastening brackets.



The diagram shown is purely indicative.

Technical specifications		
Power supply	230V/50Hz	400V/50Hz
Power	3000 W	3000-6000-9000 W
Maximum pressure	6 Bar	
Min/max operating temperature	5...90°C	
Safety thermostat	90 +/- 5°C	
Adjustable thermostat	30...70°C	
Heating element material	Incoloy 800	
Threaded attachment	1" 1/4 M GAS	
Index of protection	IP 55	
Indicator light	Red; on when heater operating	

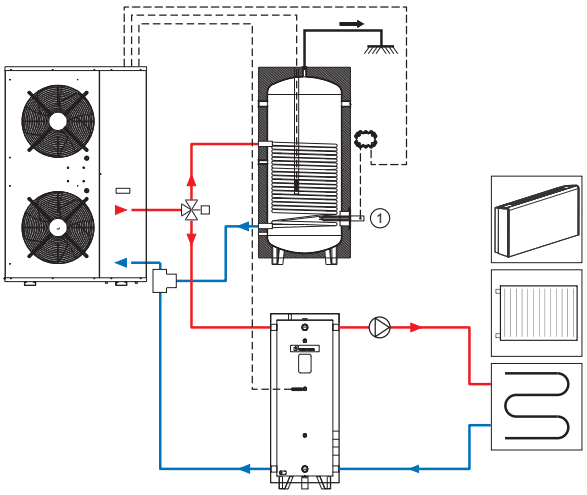
Dimensions



1 Terminal block cover
2 Safety thermostat manual reset
3 Control thermostat knob
4 Reference for knob full scale
5 Cable gland for control cable
6 Cable gland for power cable
7 Red light, on when the heater is operating
8 Wall fastening brackets
9 Heater body
10 Water inlet
11 Water outlet

IMMERSION ELECTRIC HEATER FOR DHW

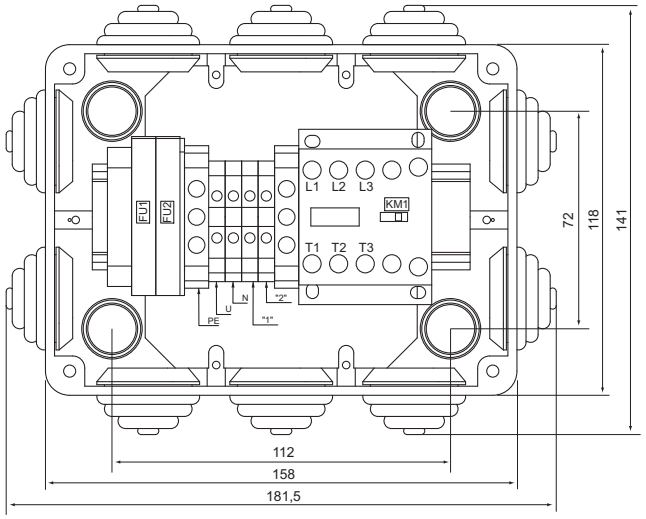
The single-phase immersion electric heater can deliver 1kW, 2kW or 3kW depending on the electrical connections, and must only be used in immersion, via the water connections provided on the HWC storage cylinders or the TPS storage tanks.
The electric heater guarantees Legionella prevention or works to overboost.



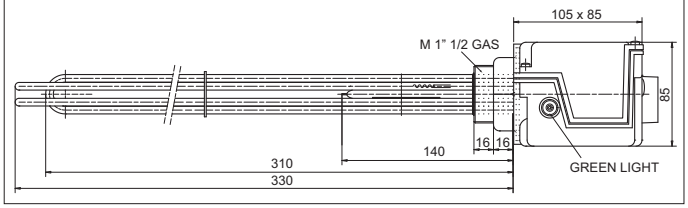
(1) Immersion electric heater
The diagram shown is purely indicative.

Technical specifications	
Power supply	230V/50Hz
Power	1000, 2000, 3000 W (+5%/ -10%); power in relation to the electrical connection.
Maximum pressure	6 Bar
Max temperature, heating area	300°C
Max temperature, seal area	120°C
Adjustable safety thermostat	9….75°C
Heating element material	Incoloy 800
Terminal block protection material	PVC
Threaded attachment	1" ½ M GAS
Gasket	ASBERIT 60*48*3
Index of protection	IP 44
Indicator light	Green; on when heater operating

Dimensions - Electrical panel



Dimensions - Immersion electric heater



1”¼ 3-WAY VALVE FOR DOMESTIC HOT WATER PRODUCTION:

The 3-way valve deviates the flow of water to the domestic hot water storage tank when the temperature read by probe BT8 falls below the set point.
The servomotor is also fitted with an auxiliary contact.
Contact closed when the valve is open and contact open when the valve is closed. The 3-way selector valve for domestic hot water production must have the following characteristics for correct heat pump operation:

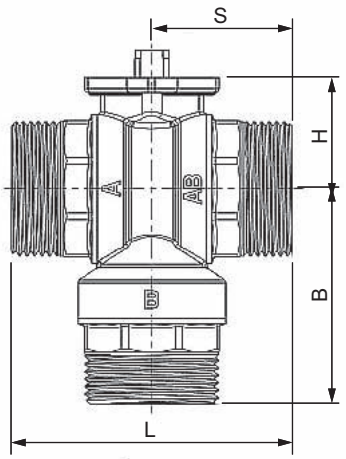
- Voltage 230V AC, 50/60 Hz
- If valve rotation takes more than 10 s, the time can be set by parameter.
- Delta P 500 kPa
- Fluid temperature 0°C to 90°C
- Pressure drop below 20 kPa.

In the total height of the valve (body + servo control) also take into account 40 mm for the extension supplied with the kit, required for correct insulation of the pipes.

Technical specifications - Valve body	
Operating pressure	PN16 for water at 90°C. PN20 for chilled water
Leaks	None
Fluid temperature	Water 0°C to 90°C
Angle of rotation	90°
Thread	Gas UNI ISO 228
Valve body and fitting	Brass OT58, UNI575/65
Stem	Brass
Gasket	PTFE seat, EPDM O-ring
Ball	Chrome-plated brass
Weight	1,28 Kg

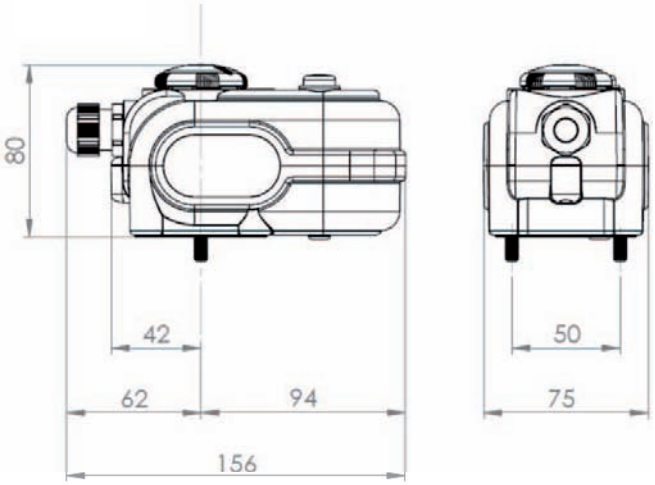
Technical specifications - Servomotor	
Power supply	230VAC, +10% - 15%
Frequency	50Hz
Power consumption	4 VA
Travel time (open/close)	10s
Free auxiliary contact (end travel)	230V - 1A (resistive)
Allowable operating temperature	0 ... + 50 °C
Allowable transport and storage temperature	- 10 ... + 80 °C
Allowable humidity	Class G, DIN 40040
Index of protection	IP 54
Connection cable	6 x1 mm², 0.8 m long
Manual control	manual open/close control
Weight	0,45 Kg

Dimensions - Valve body

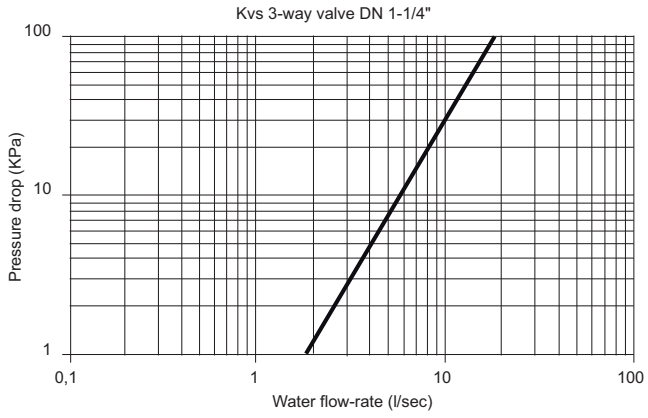


Fittings	inch	1”1/4 G
L	mm	102,6
B	mm	76,8
H	mm	51,3
S	mm	39,8

Dimensions - Servo control



Graph of valve pressure drop



HWC DOMESTIC HOT WATER CYLINDER

The HWC storage cylinders are made especially for domestic hot water production in combination with heat pumps, thanks to the inside coil with large heat exchange area.
The heat pump is connected to the inside coil that heats the domestic hot water contained in the storage tank.
Legionella prevention cycles are managed by an electric heater that can be installed in the fitting provided on the flange.
The Legionella prevention cycles are managed by the NadiSystem controller on the heat pump.

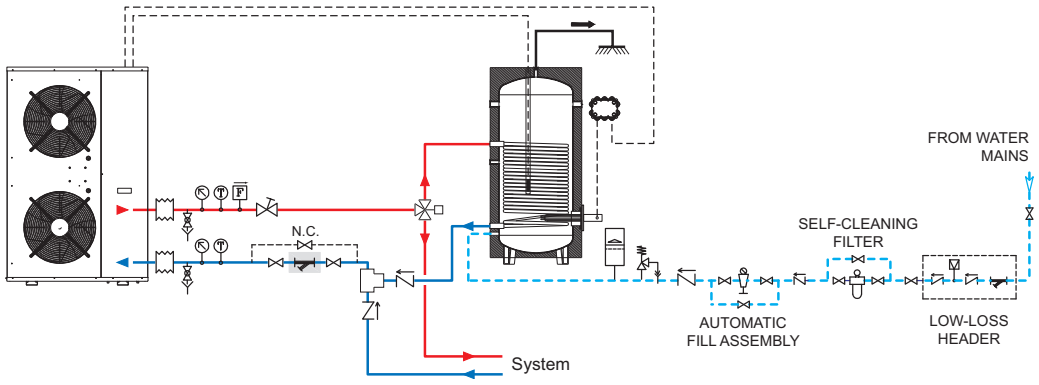
Models available	Volume
HWC500	500 litres

Storage cylinder and heat pump combinations			
Storage cylinder	Coil water content	Coil surface area	Combined heat pumps
	(l)	(m^2)	0075
HWC 500	38,5	5,9	x

Technical specifications

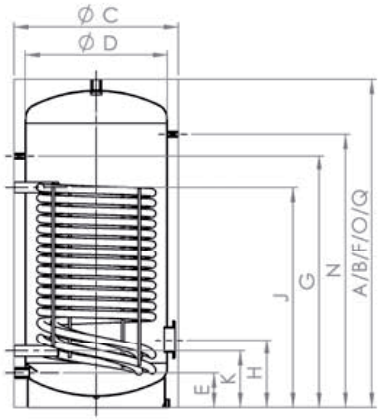
The cylinders are made from S275JR steel plate in accordance with DIN 4753 and undergo strict water pressure tests (9 bars, allowing an operating pressure of 6 bars). Lined on the inside with double layer of enamel in accordance with DIN 4753.
Protection against corrosion guaranteed by the magnesium anode, provided with the accessories supplied as standard with the storage cylinder. The cylinders are protected on the outside by 50 mm rigid CFC-free PUR lining with white skai casing.

Water circuit diagram

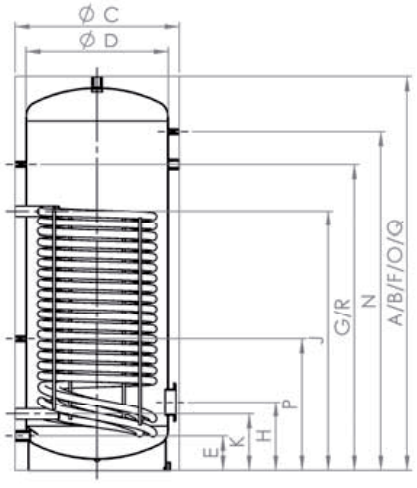


The diagram shown is purely indicative.

Dimensions - Model HWC300



Dimensions - Model HWC500



	Use	Dimensions	300	500
A	Height	with insulation - mm	1570	1800
B		without insulation - mm	-	-
C	Diameter	with insulation - mm	650	750
D		without insulation - mm	550	650
E	Cold water	height - mm	140	155
		fitting - R"	1 ¼"	1 ¼"
F	Hot water	height - mm	1570	1800
		fitting - R"	1 ¼"	1 ¼"
G	Recirculation	height - mm	1200	1400
		fitting - R"	½"	½"
H	Flange with 2" bushing for electric heater	height - mm	295	310
		Ø - mm	180/120	180/120
		fitting - R"	2"	2"
J	Heat pump outlet	height - mm	920	1185
		fitting - R"	1 ¼"	1 ¼"
K	Heat pump return	height - mm	240	255
		fitting - R"	1 ¼"	1 ¼"
N	Thermometer	height - mm	1350	1550
		fitting - R"	½"	½"
O	Probe socket	height - mm	1570	1800
		fitting - R"	½"	½"
P	Probe socket	height - mm	-	600
		fitting - R"	-	½"
Q	Magnesium anode	height - mm	1570	1800
		fitting - R"	1 ¼"	1 ¼"
R	Magnesium anode	height - mm	-	1400
		fitting - R"	-	1 ¼"

Weight with insulation	kg	145	220
Water content heat exchange	l	22,3	38,5
Surface area heat exchanger	m^2	3,5	5,9

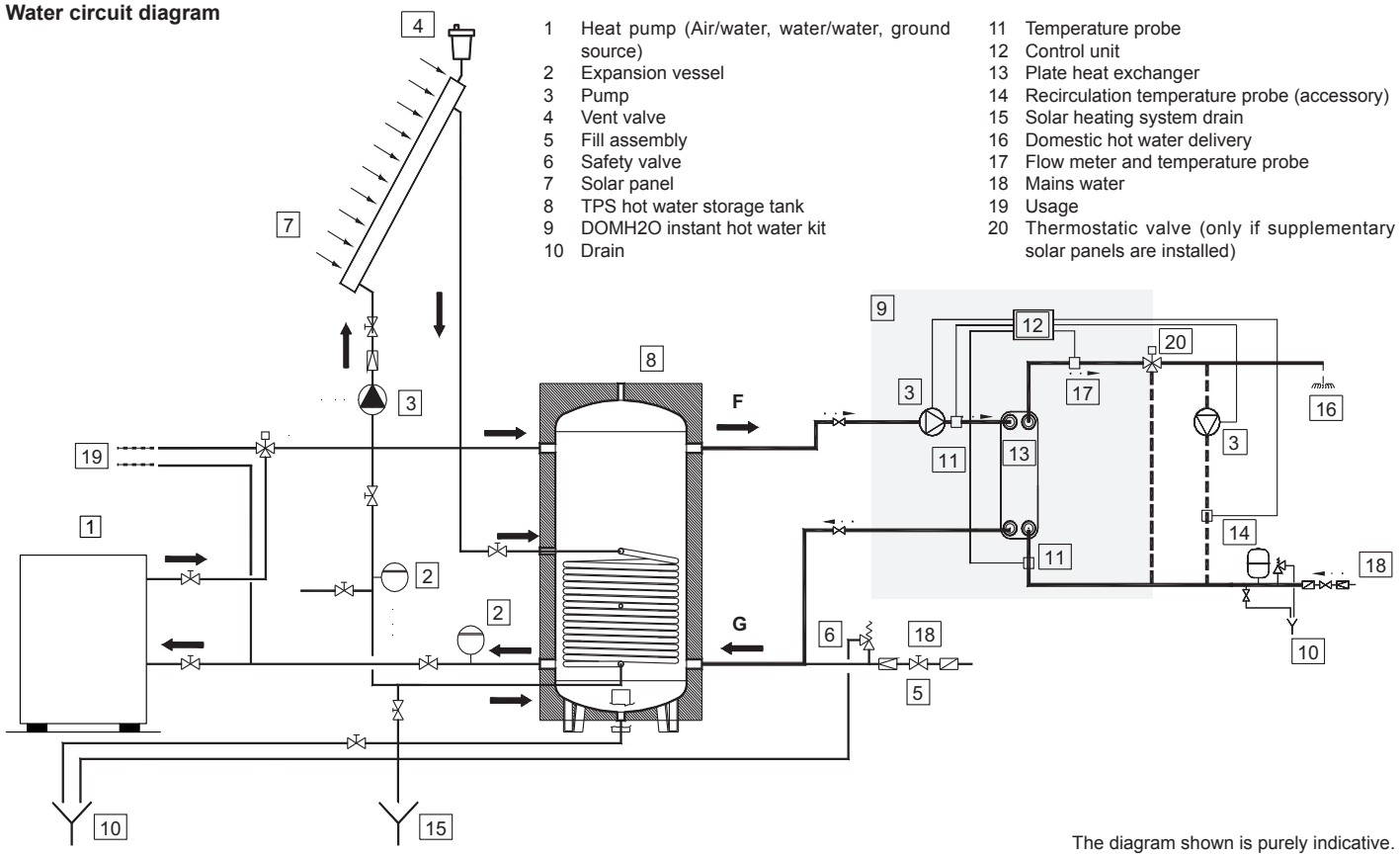
TPS STORAGE TANKS AND DOMH2O INSTANT DOMESTIC HOT WATER PRODUCTION KIT

The TPS storage tank is used to store water heated by a heat pump, and allow further supplementary heat from the solar heating coils fitted inside. In addition, tank connections are also available for other sources of heating, for example gas- or wood-fired appliances. Two electric heaters can be installed using the 2" fittings provided.
Domestic hot water production is guaranteed by the DOMH2O15 and DOMOH2O24 instant kits combined with the storage tanks.
The instant domestic hot water production kit draws energy from the storage tank and via heat exchange with the plate heat exchanger ensures the correct domestic hot water temperature, controlled by modulation of the primary circuit pump.
The control unit with graphic display allows the user to monitor operation, as well as set the set point and operating parameters.

Storage tank model available	Volume
TPS300	300 Litres
TPS500	500 Litres
TPS1000	1000 Litres

Instant domestic hot water production kit model available
DOMH20 15
DOMH20 24

Water circuit diagram



The diagram shown is purely indicative.

Technical specifications

TPS storage tanks

The storage tanks are made from carbon steel plate welded using the best technology and undergo strict water pressure tests (9 bars, allowing an operating pressure of 6 bars).
Being a container of hot and cold water, this product does not require internal treatment, while the outside is coated with rust-proof paint.
The tanks are protected on the outside with a closed cell elastomeric foam lining, 70 mm thick, with soft blue PVC exterior finish.

DOMH2O instant domestic hot water production kit

The instant domestic hot water production kit features the following components:
- AISI 316 stainless steel plate heat exchanger, insulated
- Circulating pump with low power consumption and electronic speed control
- Control unit with graphic display indicating the temperature and heat delivered
- Insulated copper pipes and connectors
- Sheet metal structure and thermoformed RAL panels, wall-mounted installation.

The control unit adjusts the speed of the primary circuit pump to maintain the set domestic hot water temperature, adjustable from 30°C to 65°C. If the domestic hot water temperature leaving the heat exchanger reaches Tmax (between 60°C and 75°C) the primary circuit pump is switched off.
When the temperature falls below the threshold (Tmax) the pump is started again.
For systems with supplementary solar heating, the primary circuit temperature may exceed the maximum limit of 65°C and pump speed modulation may not guarantee the DHW set point.

In this case, a thermostatic valve should be used at the instant domestic hot water production kit outlet to avoid excessive domestic hot water temperatures.
The DHW recirculating pump can be managed (maximum power 185 W) by setting the water temperature in the recirculation circuit.
When the temperature falls below the set point the recirculating pump is activated, and vice-versa.
In addition, on and off times can be set for the recirculation circuit and a custom program created for each day of the week.

Selection guide

To choose the best system made up of storage tank and external instant hot water production unit, the following three parameters need to be verified:

1. Tank volume is sufficient to produce the DHW required by the system.
2. Instant flow-rate of the external unit is higher than peak delivery flow-rate.
3. Storage tank volume is higher than the minimum recommended volume for correct heat pump operation (based on heat output).
   This condition is normally verified as the volume is quite low.

1. Storage tank volume

Tank volume and the characteristics of the primary source (heat output and outlet temperature) are the parameters that determine the amount of water that can be delivered in a certain unit of time. The following equation can be used to size the tank in terms of volume.

$$V = [Wf*(Tout-Tin)/(T0-Tf)] - [(P*tm*1000)/(Cp*(T0-Tf)]$$

Where:

V: Required storage tank volume in litres
Wf: Amount of domestic hot water required in the peak period, in litres
Tm: Duration of the peak period in minutes
T0: Temperature inside the storage tank [°C]
Tf: Minimum usable storage tank temperature [°C]
Tin: Mains water inlet temperature [°C]
Tout: DHW delivery temperature [°C]
Cp: Specific heat of water 4.186 kJ/kg °K
P: Primary source heat output [kW]

2. Instant DHW production

The amount of domestic hot water required at the points of delivery must be less than the amount produced by the unit.
The graphs on the previous pages illustrate the amount of water produced by the units as the primary circuit temperature changes.

3. Thermal inertia

The storage tank, as well as accumulating energy to be used when necessary, also acts as a buffer for the primary source of energy, reducing the number of starts and stops.
The volume of the storage tank must therefore be greater than the value recommended by the manufacturer of the primary source (heat pump or other appliance).

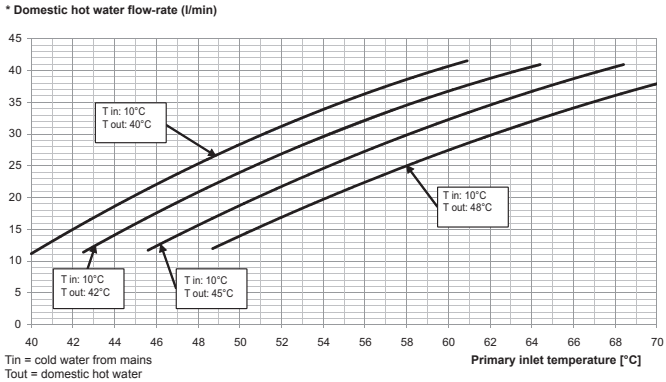
Typical combinations

Below are some combinations for typical residential applications with heat pumps.

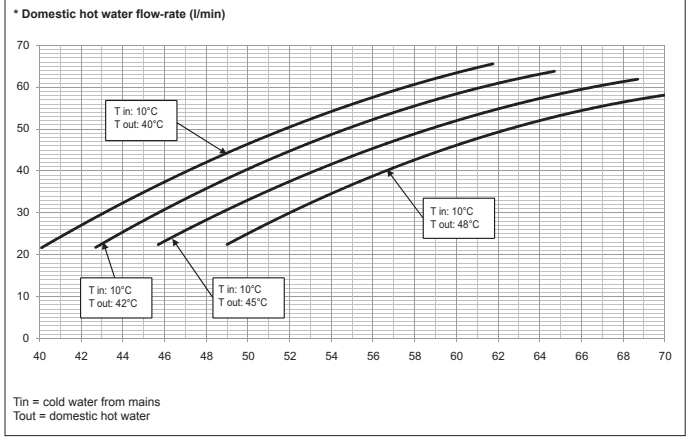
Type of home	no. of people	no. of bathrooms	Heat pump heat output	Storage tank volume	DOMH20 model
Single home	<3	1	4 - 6 kW	300	15
Single home	4 - 5	2	6 - 8 kW	500	15
Single home	5 - 6	2	10 - 13 kW	1000	24
Single home	6 - 7	3	15 - 18 kW	1000	24
2 apartments	4 - 5	2	6 - 8 kW	500	15
2 apartments	7 - 8	5	15 - 18 kW	1000	24
3 apartments	7 - 8	3	15 - 18 kW	1000	24
3 apartments	9 - 12	6	20 - 22 kW	1000	24

The combinations are calculated based on the following peak consumption:
- 60 l per person in single homes,
- 250 l per apartment with one bathroom,
- 350 l per apartment with two bathrooms,
- Simultaneous use factor

DOMH20 15 heating performance



DOMH20 24 heating performance



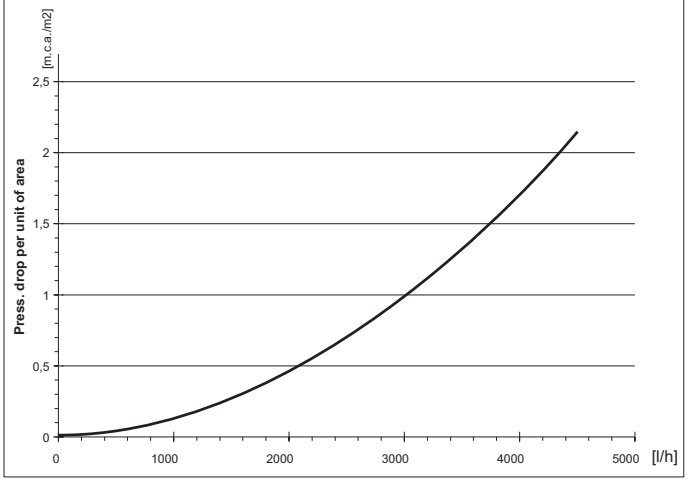
* The domestic hot water flow-rate shown on the performance curves remains constant for a variable time, depending on the volume of the storage tank. Also see the instructions in the "Selection guide".

Volume	Storage tank dimensions															
	Di	d	Htot	A	B	C	D	E	F	G	K	I	L	M	SR	SM
litres	mm															
300	690	550	1470	130	325	425	575	735	1060	1035	1185	635	835	325	370	785
500	790	650	1755	135	375	685	630	880	1336	1295	1445	780	980	330	375	870
1000	1050	850	2100	120	410	950	765	1105	1476	1560	1710	950	1150	380	425	1105

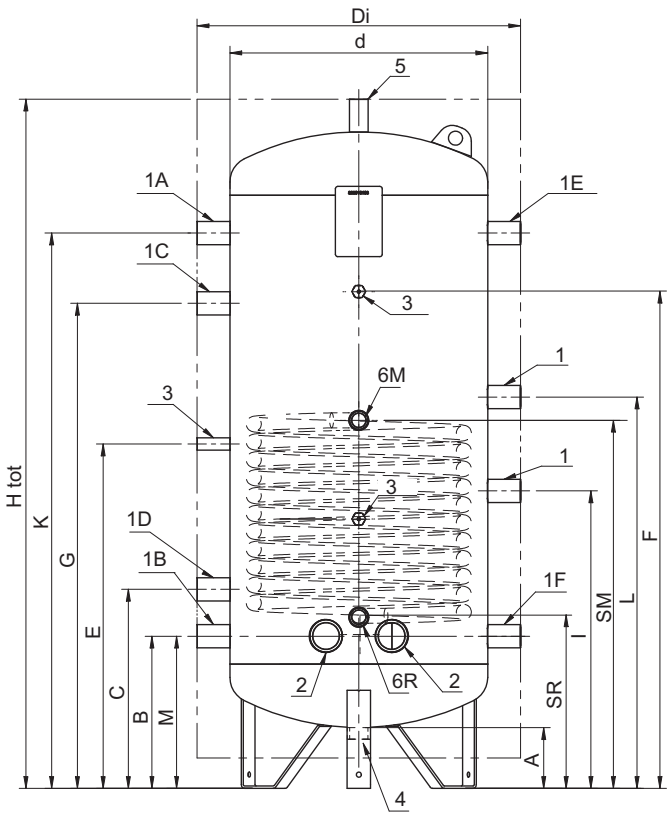
Volume	Fittings						Fixed coil	
	1	2	3	4	5	6	Surface area	Internal volume
litres	inch						m^2	l
300	1"1/4	2"	1/2"	1"1/4	1"	1"	1,5	9
500	1"1/4	2"	1/2"	1"1/4	1"	1"	2,1	13
1000	1"1/4	2"	1/2"	1"1/4	1"	1"	4	25

Pos.	Description
1A	Heat pump outlet
1B	Heat pump return
1C	Supplementary source outlet
1D	Supplementary source return
1E	Instant DHW kit outlet
1F	Instant DHW kit return
2	Electric heater attachment
3	Probe socket
4	Drain/fill
5	Vent
6M	Solar collector circuit outlet
6R	Solar collector circuit return

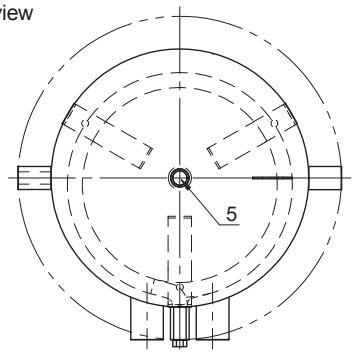
Solar heating coil pressure drop in TPS storage tanks



Dimensions - TPS storage tank

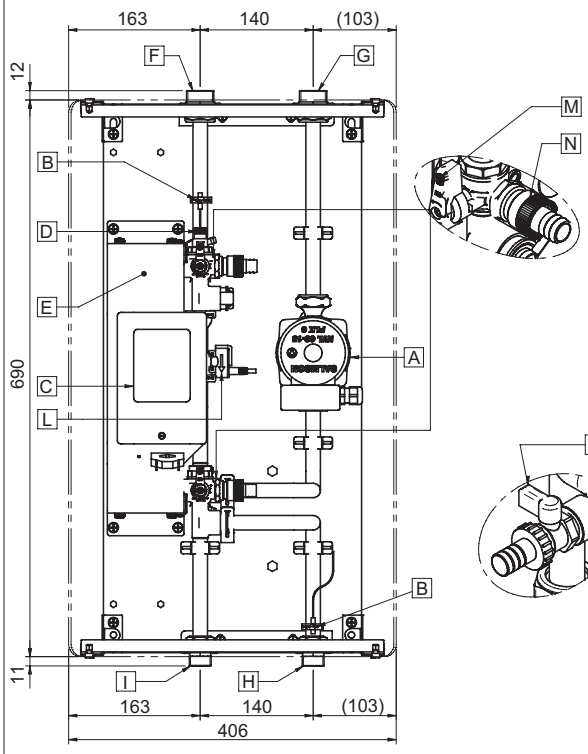


Top view

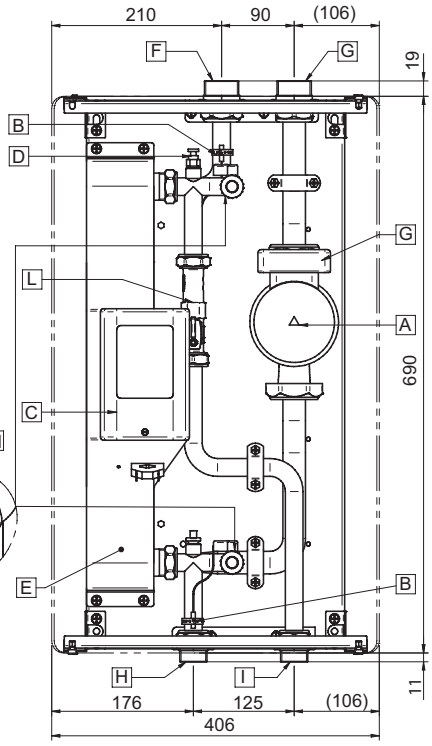


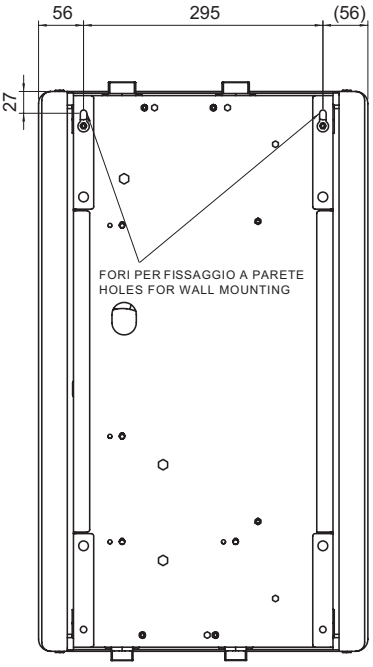
Dimensioni - Preparatore istantaneo DOMH2O

DOMH2015_N



DOMH2024_N





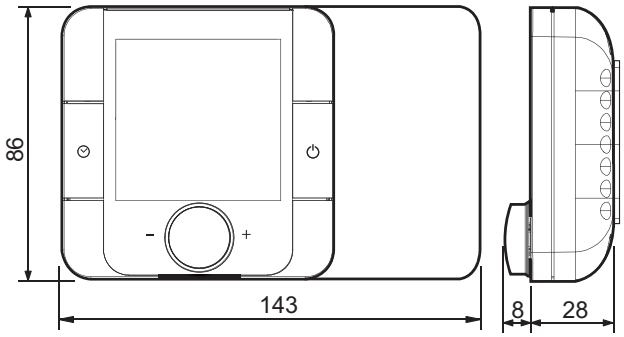
Pos.	Description
A	Primary circuit pump
B	PT1000 temperature probe
C	Control unit
D	Manual vent valve
E	Plate heat exchanger
F	Primary circuit outlet
G	Primary circuit return
H	Mains water inlet
I	Domestic hot water outlet
L	Flow meter and temperature probe
M	Taps for washing exchanger
N	Hose connection (solo modello DOMH2O15_N)

N-THC ROOM TIMER THERMOSTAT

The temperature and humidity settings are simple and intuitive using the knob on the front, while the operating mode and time bands can be selected using the 4 buttons.
The N-THC thermostat is fitted as standard with temperature and humidity probe for correct control of the temperature-humidity conditions inside the room.
By using the N-THC thermostat in the system, NadiSystem can control zones, managing temperature, humidity and time bands independently.
The simple and functional backlit display allows rapid viewing of the settings and environmental conditions.

The main settings are:
- Room temperature (temperature and humidity probe supplied as standard)
- Served zone on/off
- Program time bands
- Wall-mounted installation (maximum distance 500 metres)

Dimensions

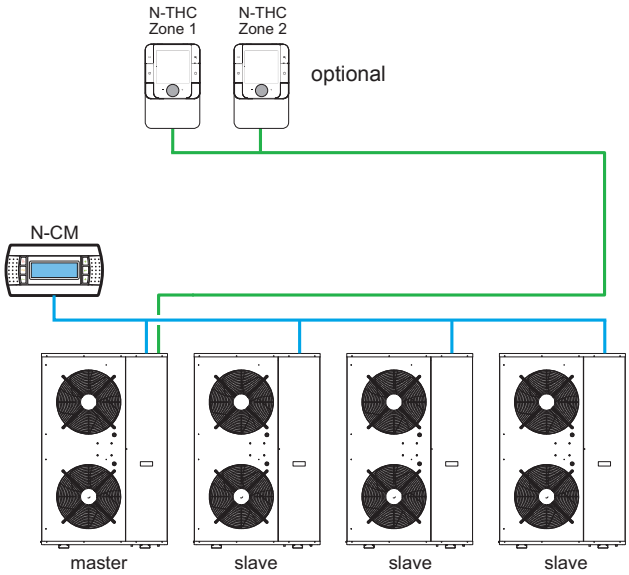


N-CM CASCADE MANAGEMENT KEYPAD

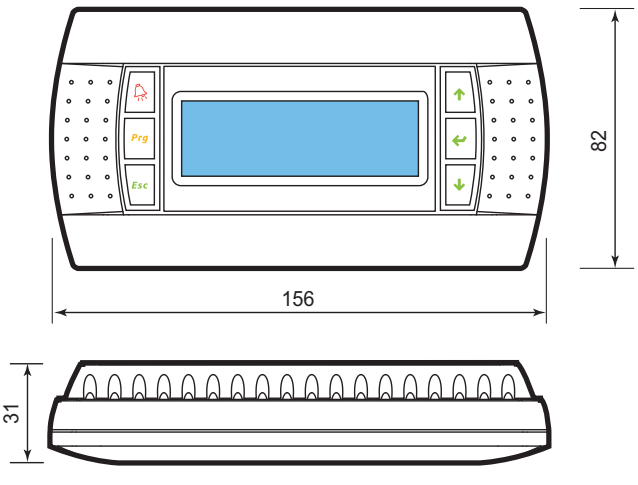
The N-CM remote keypad allows cascaded connection of up to 4 heat pumps. This configuration increases the capacity in applications with multiple occupied areas, such as hotels, schools, apartment blocks, offices and shopping centres.
The cascade configuration is viable if the units have the same capacity and if the control software release is the same on each unit.
The units are managed in master-slave mode: the master unit processes the information and sends it to the slave units. This ensures fine control over the capacity delivered, without decreasing performance, and more precise system sizing.
The controller can determine how many cascaded units are needed to guarantee domestic hot water production, all or just one, according to requirements.
The controller also balances compressor operating hours based on time logic, activating the units in rotation, and where necessary excluding any units that are momentarily out of service, without interrupting operation of the cascade as a whole.
If the malfunctioning unit is the master, the operating parameters are transferred to another unit in the cascade, thus restoring partial operation. The N-CM keypad can also display the operation of each heat pump connected to the cascade and the N-THC room terminals assigned to the zone in question, up to a maximum of 2 zones.
The N-CM keyboard can be used for remote control of a single unit.

NOTE: For cascade configuration, the N-CM kit must be coupled with:
- The kit n° 2 temperature probes (code 7390049100) for units when connected to a buffer tank and to a domestic hot water tank;
- The kit n° 1 temperature probe (code 7390049200) for units when connected exclusively to a buffer tank.

System architecture

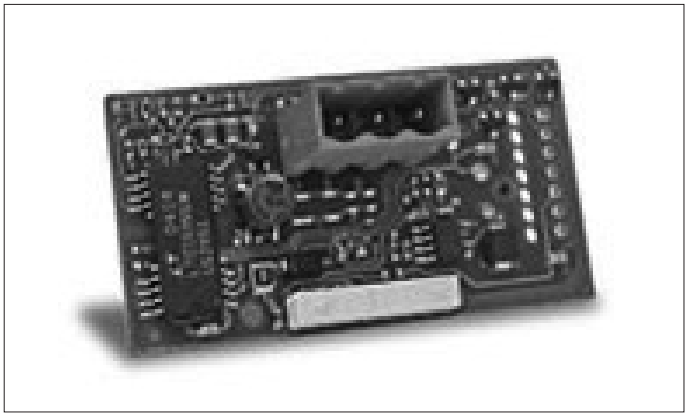


Dimensions



N-RS RS485 SERIAL CARD

The N-RS is an optional card for directly interfacing the heat pumps to an RS485 network.
The card guarantees opto-isolation of the controller from the RS485 serial network.
The maximum baud rate available is 19200 baud.
The optional card is fitted in the comb connector on the unit's board.



6. GENERAL TECHNICAL DATA

i-BX-N			004	006	008	010	013	010	013	015	020	025
Power supply		V/ph/Hz	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
PERFORMANCE												
COOLING ONLY (GROSS VALUE)												
Cooling capacity	(1)	kW	4,20	5,90	7,50	9,90	12,4	10,5	12,8	14,7	18,7	24,7
Total power input	(1)	kW	1,55	2,08	2,72	3,64	4,54	3,64	4,54	5,24	7,00	8,99
EER	(1)	kW/kW	2,71	2,84	2,76	2,72	2,73	2,88	2,82	2,81	2,67	2,75
ESEER	(1)	kW/kW	4,24	4,32	4,45	4,21	4,24	4,24	4,49	4,31	3,88	3,93
COOLING ONLY (EN14511 VALUE)												
Cooling capacity	(1)(2)	kW	4,20	5,90	7,51	9,91	12,4	10,5	12,8	14,7	18,7	24,7
EER	(1)(2)	kW/kW	2,76	2,88	2,81	2,73	2,75	2,89	2,84	2,82	2,70	2,77
ESEER	(1)(2)	kW/kW	4,61	4,56	4,83	4,26	4,37	4,29	4,58	4,38	3,99	4,03
Cooling energy class			C	C	C	C	C	C	C	C	C	C
HEATING ONLY (GROSS VALUE)												
Total heating capacity	(3)	kW	4,63	6,36	8,51	11,0	14,3	11,4	14,7	17,2	21,7	26,1
Total power input	(3)	kW	1,51	2,03	2,65	3,65	4,53	3,66	4,55	5,15	6,90	8,31
COP	(3)	kW/kW	3,07	3,13	3,21	3,01	3,16	3,11	3,23	3,34	3,14	3,14
HEATING ONLY (EN14511 VALUE)												
Total heating capacity	(3)(2)	kW	4,62	6,37	8,50	11,0	14,3	11,4	14,7	17,2	21,7	26,1
COP	(3)(2)	kW/kW	3,12	3,19	3,26	3,02	3,19	3,12	3,24	3,36	3,16	3,16
Cooling energy class			B	B	A	B	B	B	A	A	B	B
EXCHANGERS												
HEAT EXCHANGER USER SIDE IN REFRIGERATION												
Water flow	(1)	l/s	0,20	0,28	0,36	0,47	0,59	0,50	0,61	0,70	0,89	1,18
Available unit's head	(1)	kPa	51,4	39,8	66,5	57,7	56,6	53,3	53,0	78,7	74,6	61,5
HEAT EXCHANGER USER SIDE IN HEATING												
Water flow	(3)	l/s	0,22	0,31	0,41	0,53	0,69	0,55	0,71	0,83	1,05	1,26
Available unit's head	(3)	kPa	47,9	35,4	57,9	54,1	50,2	47,1	71,5	60,3	55,0	80,5
REFRIGERANT CIRCUIT												
Compressors nr.		N°	1	1	1	1	1	1	1	1	1	1
Number of capacity steps		N°	0	0	0	0	0	0	0	0	0	0
No. Circuits		N°	1	1	1	1	1	1	1	1	1	1
Regulation			STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS	STEPLESS
Min. capacity step		%	25	25	25	25	25	25	25	25	25	25
Refrigerant			R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge		kg	1,47	2,20	3,70	3,95	4,45	3,95	4,45	5,10	6,70	8,10
Oil charge		kg	0,35	0,35	0,40	0,87	1,40	0,87	1,40	1,40	1,40	1,40
Rc (ASHRAE)	(4)	kg/kW	0,35	0,38	0,50	0,40	0,36	0,38	0,35	0,35	0,39	0,31
FANS												
Quantity		N°	1	1	1	2	2	2	2	2	1	2
Air flow		m³/s	1,02	0,98	0,99	1,80	1,70	1,78	1,71	1,80	2,33	3,76
Fans power input		kW	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,12	0,60	0,40
NOISE LEVEL												
Sound Pressure	(5)	dB(A)	50	51	51	54	55	54	55	59	59	59
Sound power level in cooling	(6)(7)	dB(A)	64	65	66	69	70	69	70	74	74	75
Sound power level in heating	(6)(8)	dB(A)	64	65	66	69	70	69	70	74	74	75
SIZE AND WEIGHT												
A	(9)	mm	900	900	900	900	900	900	900	1450	1450	1450
B	(9)	mm	370	370	420	420	420	420	420	550	550	550
H	(9)	mm	940	940	1240	1240	1390	1240	1390	1200	1200	1700
Operating weight	(9)	kg	80	85	100	115	135	115	135	180	205	265

Notes:
1 Plant (side) cooling exchanger water (in/out) 12,0°C/7,0°C; Source (side) heat exchanger air (in) 35,0°C.
2 Values in compliance with EN14511-3:2013.
3 Plant (side) heat exchanger water (in/out) 40,0°C/45,0°C; Source (side) heat exchanger air (in) 7,0°C - 87% R.H.
4 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
5 Average sound pressure level at 1m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
6 Sound power on the basis of measurements made in compliance with ISO 9614.
7 Sound power level in cooling, outdoors.
8 Sound power level in heating, outdoors.
9 Unit in standard configuration/execution, without optional accessories.
- Not available
Certified data in EUROVENT

i-BX-N			030	035
Power supply		V/ph/Hz	400/3+N/50	400/3+N/50
PERFORMANCE				
COOLING ONLY (GROSS VALUE)				
Cooling capacity	(1)	kW	29,4	35,1
Total power input	(1)	kW	10,5	12,7
EER	(1)	kW/kW	2,80	2,76
ESEER	(1)	kW/kW	3,89	3,93
COOLING ONLY (EN14511 VALUE)				
Cooling capacity	(1)(2)	kW	29,5	35,2
EER	(1)(2)	kW/kW	2,83	2,78
ESEER	(1)(2)	kW/kW	4,00	4,01
Cooling energy class			C	C
HEATING ONLY (GROSS VALUE)				
Total heating capacity	(3)	kW	32,3	38,1
Total power input	(3)	kW	10,3	12,0
COP	(3)	kW/kW	3,14	3,17
HEATING ONLY (EN14511 VALUE)				
Total heating capacity	(3)(2)	kW	32,2	38,0
COP	(3)(2)	kW/kW	3,13	3,19
Cooling energy class			B	B
EXCHANGERS				
HEAT EXCHANGER USER SIDE IN REFRIGERATION				
Water flow	(1)	l/s	1,41	1,68
Available unit's head	(1)	kPa	91,3	73,5
HEAT EXCHANGER USER SIDE IN HEATING				
Water flow	(3)	l/s	1,56	1,84
Available unit's head	(3)	kPa	80,5	61,8
REFRIGERANT CIRCUIT				
Compressors nr.		N°	1	1
Number of capacity steps		N°	0	0
No. Circuits		N°	1	1
Regulation			STEPLESS	STEPLESS
Min. capacity step		%	25	25
Refrigerant			R410A	R410A
Refrigerant charge		kg	10,00	11,00
Oil charge		kg	2,30	2,30
Rc (ASHRAE)	(4)	kg/kW	0,29	0,26
FANS				
Quantity		N°	2	2
Air flow		m³/s	4,20	4,93
Fans power input		kW	0,55	0,55
NOISE LEVEL				
Sound Pressure	(5)	dB(A)	60	61
Sound power level in cooling	(6)(7)	dB(A)	76	77
Sound power level in heating	(6)(8)	dB(A)	76	77
SIZE AND WEIGHT				
A	(9)	mm	1450	1700
B	(9)	mm	550	650
H	(9)	mm	1700	1700
Operating weight	(9)	kg	290	325

Notes:
1 Plant (side) cooling exchanger water (in/out) 12,0°C/7,0°C; Source (side) heat exchanger air (in) 35,0°C.
2 Values in compliance with EN14511-3:2013.
3 Plant (side) heat exchanger water (in/out) 40,0°C/45,0°C; Source (side) heat exchanger air (in) 7,0°C - 87% R.H.
4 Rated in accordance with AHRI Standard 550/590 (2011 with addendum 1).
5 Average sound pressure level at 1m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.
6 Sound power on the basis of measurements made in compliance with ISO 9614.
7 Sound power level in cooling, outdoors.
8 Sound power level in heating, outdoors.
9 Unit in standard configuration/execution, without optional accessories.
- Not available
Certified data in EUROVENT

7. TECHNICAL DATA SEASONAL EFFICIENCY IN HEATING (EN14825 VALUE)

i-BX-N - LOW TEMPERATURE application			004	006	008	010	013	010
Power supply		(V/ph/Hz)	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	400/3+N/50
WEATHER CONDITIONS - WARMER								
Rated heat output at Tdesignh	(1)(2)	kW	4	5	7	9	11	9
Bivalent temperature	(1)(2)	°C	2	2	2	2	2	2
SCOP	(1)(2)		4,58	5,13	5,80	4,37	4,86	4,49
Seasonal space heating energy efficiency	(1)(2)	%	180	202	229	172	191	177
Seasonal space heating energy efficiency class	(1)(2)		-	-	-	-	-	-
WEATHER CONDITIONS - AVERAGE								
Rated heat output at Tdesignh	(1)(2)	kW	3	5	6	8	10	8
Bivalent temperature	(1)(2)	°C	-7	-7	-7	-7	-7	-7
SCOP	(1)(2)		3,59	3,89	4,15	3,54	3,81	3,64
Seasonal space heating energy efficiency	(1)(2)	%	140	153	163	139	149	142
Seasonal space heating energy efficiency class	(1)(2)		A+	A++	A++	A+	A+	A+
WEATHER CONDITIONS - COLDER								
Rated heat output at Tdesignh	(1)(2)	kW	2	2	2	5	11	8
Bivalent temperature	(1)(2)	°C	-15	-15	-15	-15	-15	-15
SCOP	(1)(2)		2,97	3,18	3,93	2,98	3,43	3,28
Seasonal space heating energy efficiency	(1)(2)	%	116	124	154	116	134	128
Seasonal space heating energy efficiency class	(1)(2)		-	-	-	-	-	-

1 Seasonal space heating energy efficiency class LOW TEMPERATURE [REGULATION (EU) N. 813/2013]
2 Type of calculation with fixed flow and variable temperature.
Certified data in EUROVENT

i-BX-N - MEDIUM TEMPERATURE application			004	006	008	010	013	010
Power supply		(V/ph/Hz)	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	400/3+N/50
WEATHER CONDITIONS - WARMER								
Rated heat output at Tdesignh	(1)(2)	kW	4	5	6	9	11	9
Bivalent temperature	(1)(2)	°C	2	2	2	2	2	2
SCOP	(1)(2)		3,44	3,86	4,16	3,35	3,59	3,47
Seasonal space heating energy efficiency	(1)(2)	%	135	151	163	131	141	136
Seasonal space heating energy efficiency class	(1)(2)		-	-	-	-	-	-
WEATHER CONDITIONS - AVERAGE								
Rated heat output at Tdesignh	(1)(2)	kW	4	5	7	9	11	9
Bivalent temperature	(1)(2)	°C	-7	-7	-7	-7	-7	-7
SCOP	(1)(2)		2,81	3,12	3,23	2,82	2,93	2,92
Seasonal space heating energy efficiency	(1)(2)	%	110	122	126	110	114	114
Seasonal space heating energy efficiency class	(1)(2)		A+	A+	A++	A+	A+	A+

1 Seasonal space heating energy efficiency class MEDIUM TEMPERATURE [REGULATION (EU) N. 813/2013]
2 Type of calculation with fixed flow and variable temperature.
Certified data in EUROVENT

i-BX-N - LOW TEMPERATURE application			013	015	020	025	030	035
Power supply		(V/ph/Hz)	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
WEATHER CONDITIONS - WARMER								
Rated heat output at Tdesignh	(1)(2)	kW	12	13	18	21	26	30
Bivalent temperature	(1)(2)	°C	2	2	2	2	2	2
SCOP	(1)(2)		5,18	4,40	4,32	4,67	5,10	4,78
Seasonal space heating energy efficiency	(1)(2)	%	204	173	170	184	201	188
Seasonal space heating energy efficiency class	(1)(2)		-	-	-	-	-	-
WEATHER CONDITIONS - AVERAGE								
Rated heat output at Tdesignh	(1)(2)	kW	11	12	16	22	25	28
Bivalent temperature	(1)(2)	°C	-7	-7	-7	-7	-7	-7
SCOP	(1)(2)		3,99	3,67	3,56	3,77	3,80	3,70
Seasonal space heating energy efficiency	(1)(2)	%	157	144	139	148	149	145
Seasonal space heating energy efficiency class	(1)(2)		A++	A+	A+	A+	A+	A+
WEATHER CONDITIONS - COLDER								
Rated heat output at Tdesignh	(1)(2)	kW	9	11	14	21	21	26
Bivalent temperature	(1)(2)	°C	-15	-15	-15	-15	-15	-15
SCOP	(1)(2)		3,53	3,22	3,11	3,39	3,30	3,29
Seasonal space heating energy efficiency	(1)(2)	%	138	126	122	132	129	128
Seasonal space heating energy efficiency class	(1)(2)		-	-	-	-	-	-

1 Seasonal space heating energy efficiency class LOW TEMPERATURE [REGULATION (EU) N. 813/2013]

2 Type of calculation with fixed flow and variable temperature.

Certified data in EUROVENT

i-BX-N - MEDIUM TEMPERATURE application			013	015	020	025	030	035
Power supply		(V/ph/Hz)	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
WEATHER CONDITIONS - WARMER								
Rated heat output at Tdesignh	(1)(2)	kW	11	13	17	20	25	30
Bivalent temperature	(1)(2)	°C	2	2	2	2	2	2
SCOP	(1)(2)		3,72	3,41	3,43	3,59	3,96	3,74
Seasonal space heating energy efficiency	(1)(2)	%	146	133	134	140	155	147
Seasonal space heating energy efficiency class	(1)(2)		-	-	-	-	-	-
WEATHER CONDITIONS - AVERAGE								
Rated heat output at Tdesignh	(1)(2)	kW	11	14	17	21	25	32
Bivalent temperature	(1)(2)	°C	-7	-7	-7	-7	-7	-7
SCOP	(1)(2)		3,01	2,98	2,91	2,95	2,97	3,01
Seasonal space heating energy efficiency	(1)(2)	%	117	116	113	115	116	117
Seasonal space heating energy efficiency class	(1)(2)		A+	A+	A+	A+	A+	A+

1 Seasonal space heating energy efficiency class MEDIUM TEMPERATURE [REGULATION (EU) N. 813/2013]

2 Type of calculation with fixed flow and variable temperature.

Certified data in EUROVENT

7.1 TECHNICAL DATA SEASONAL EFFICIENCY IN COOLING (Reg. EU 2016/2281)

Space cooling

i-BX-N			004	006	008	010	013	010	013	015	020	025	030	035
Prated,c	(1)	kW	4,2	5,9	7,51	9,91	10,5	12,4	12,8	14,7	18,7	24,7	29,5	35,2
SEER	(1)(2)		4,42	4,44	4,71	4,37	4,33	4,46	4,65	4,53	4,14	4,22	4,22	4,2
Performance	(1)(3)		174	175	185	172	170	175	183	178	163	166	166	165

Notes:

(1) Seasonal energy efficiency of space cooling [REGULATION (EU) N. 2016/2281]

(2) Seasonal energy efficiency index

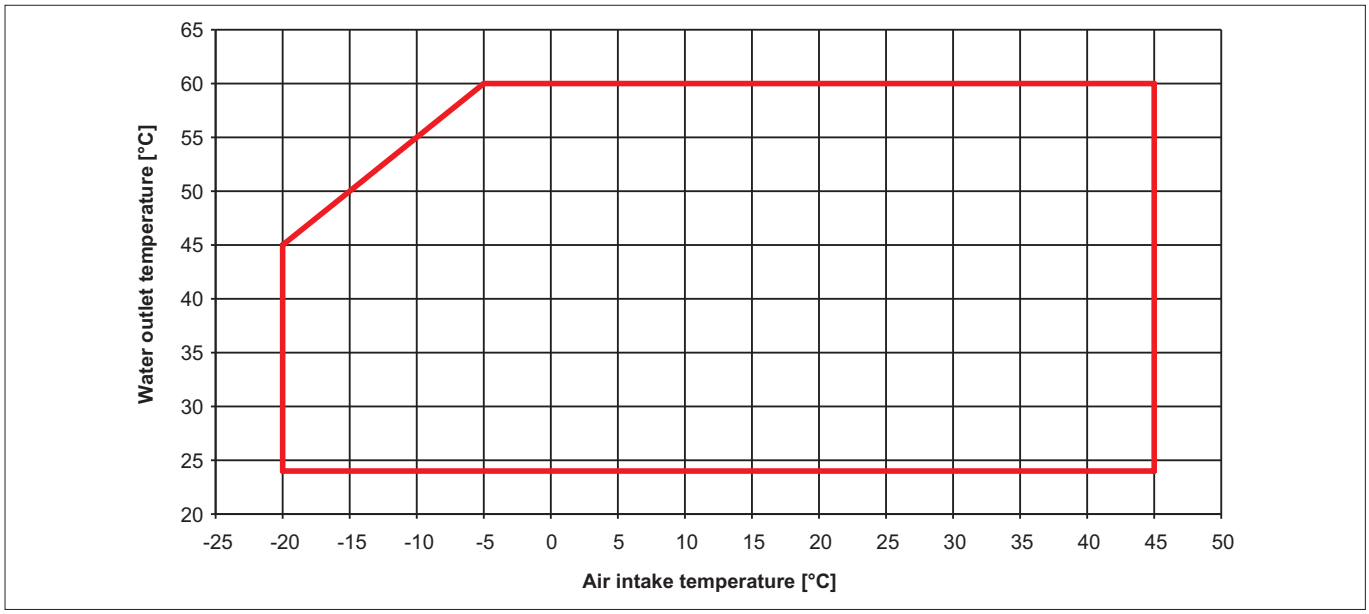
(3) Seasonal energy efficiency of space cooling

The units highlighted in this publication contain HFC R410A [GWP100 2088] fluorinated greenhouse gases.

Certified data in EUROVENT

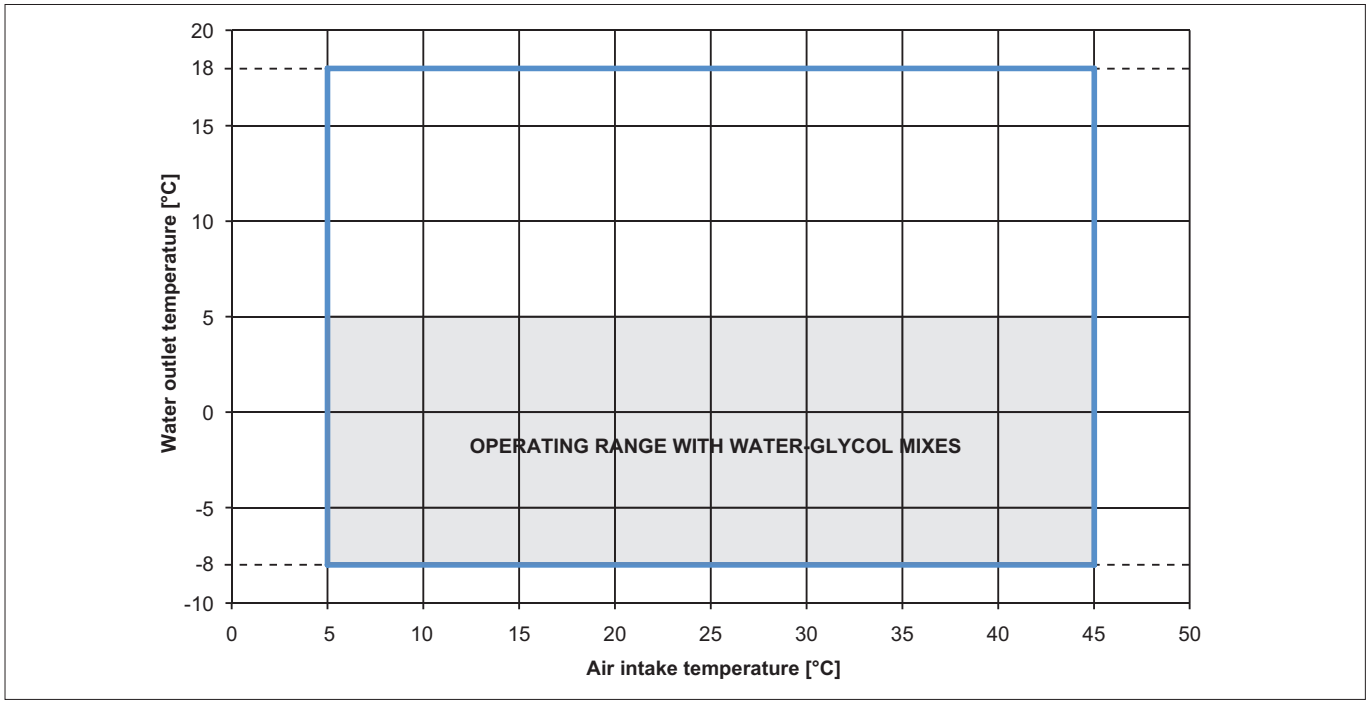
8. OPERATING LIMITS

HEATING AND DOMESTIC HOT WATER PRODUCTION



Operation in heating mode:
System circuit temperature difference, minimum 4°K, maximum 10°K
Maximum glycol content 40%
Maximum water inlet temperature at plate heat exchanger +50°C with temperature difference of 10°K
Minimum water inlet temperature at plate heat exchanger +20°C

COOLING



Operation in cooling mode:
System circuit temperature difference, minimum 3°K, maximum 8°K
Maximum glycol content 40%

9. ETHYLENE GLYCOL MIXTURE

Ethylene glycol and water mixture, used as a heat-conveying fluid, cause a variation in unit performance. For correct data, use the factors indicated in the following tabel.

	Freezing point (°C)							
	0	-5	-10	-15	-20	-25	-30	-35
	Ethylene glycol percentage by weight							
	0	12%	20%	30%	35%	40%	45%	50%
cPf	1	0,985	0,98	0,974	0,97	0,965	0,964	0,96
cQ	1	1,02	1,04	1,075	1,11	1,14	1,17	1,2
cdp	1	1,07	1,11	1,18	1,22	1,24	1,27	1,3

cPf: cooling power correction factor
cQ: flow correction factor
cdp: pressure drop correction factor

For data concerning other kind of anti-freeze solutions (e,g, propylene glycol) please contact our Sale Department.

10. FOULING FACTORS

Performances are based on clean condition of tubes (fouling factor = 1). For different fouling values, performance should be adjusted using the correction factors shown in the following table.

FOULING FACTORS	EVAPORATOR			CONDENSER/RECOVERY			DESUPERHEATER
ff (m^2 °CW)	F1	FK1	KE [°C]	F2	FK2	KC [°C]	R3
0	1,000	1,000	0,0	1,000	1,000	0,0	1,000
1,80 x 10^{-5}	1,000	1,000	0,0	1,000	1,000	0,0	1,000
4,40 x 10^{-5}	1,000	1,000	0,0	0,990	1,030	1,0	0,990
8,80 x 10^{-5}	0,960	0,990	0,7	0,980	1,040	1,5	0,980
13,20 x 10^{-5}	0,944	0,985	1,0	0,964	1,050	2,3	0,964
17,20 x 10^{-5}	0,930	0,980	1,5	0,950	1,060	3,0	0,950

ff: fouling factors
f1 - f2: potential correction factors
fk1 - fk2: compressor power input correction factors
r3: capacity correction factors

KE: minimum condenser outlet temperature increase
KC: maximum condenser outlet temperature decrease

11. HYDRAULIC DATA

Water flow and pressure drop

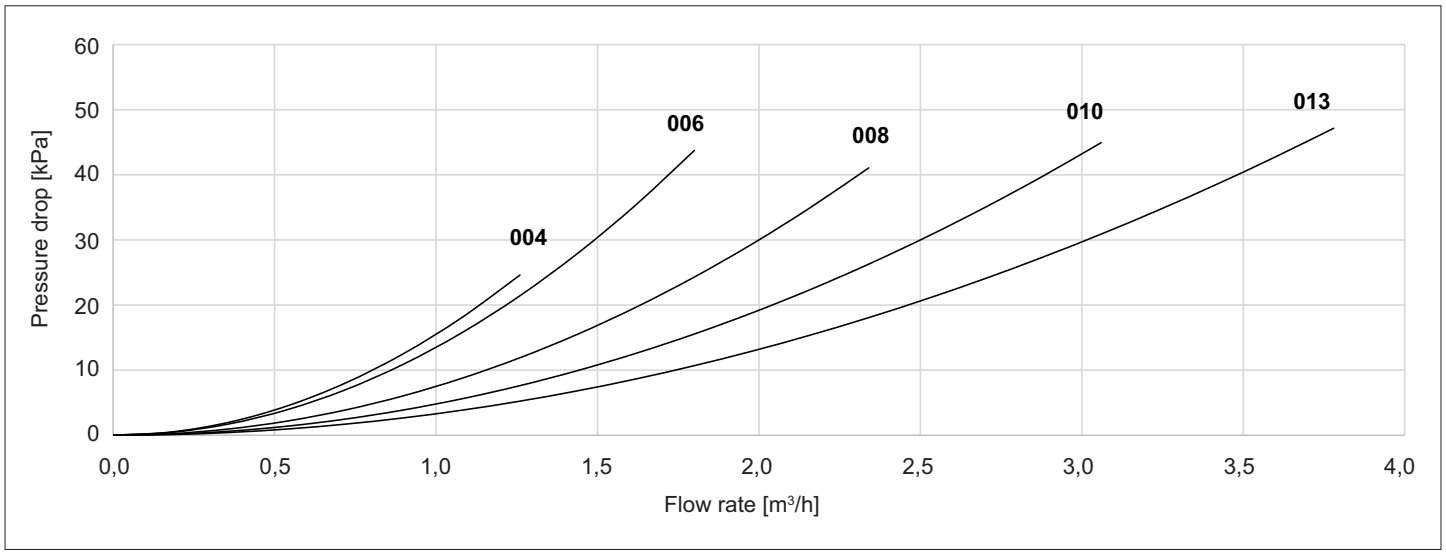
Water flow in the plant (side) exchanger is given by:
Q=P/(4,186 x Dt)
Q: water flow (l/s)
Dt: difference between inlet and outlet water temp. (°C)
P: heat exchanger capacity (kW)

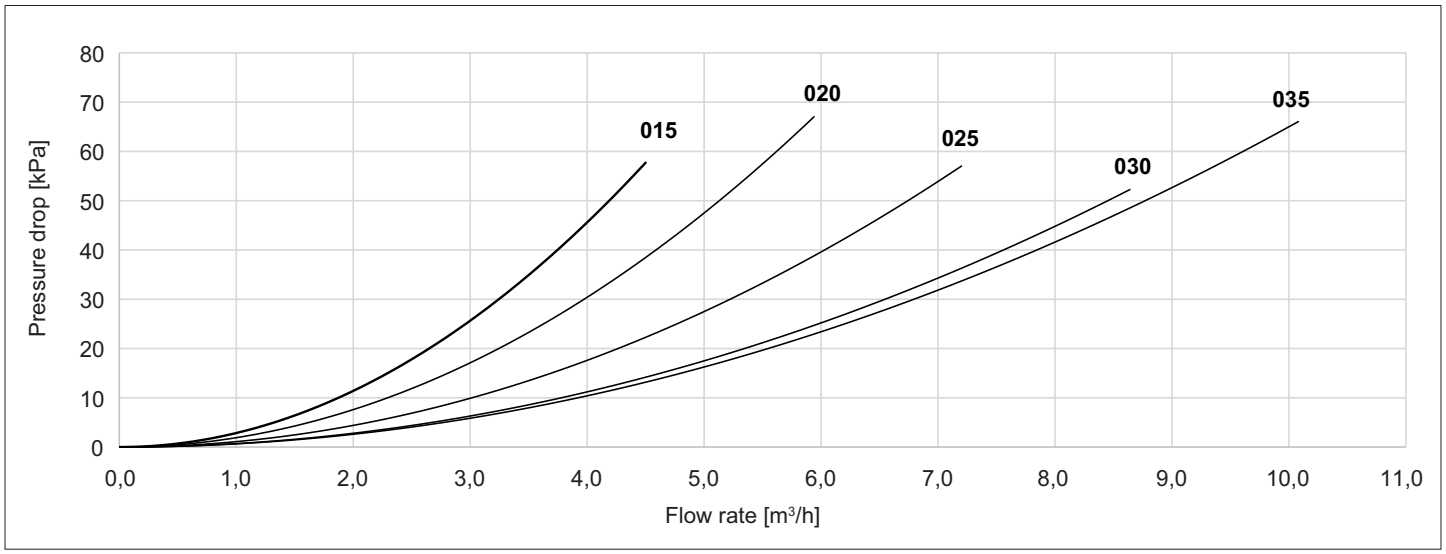
Pressure drop is given by:
Dp= K x (3,6 x Q)^2/1000
Q: water flow (l/s)
Dp: pressure drop (kPa)
K: unit size ratio

SIZE	Power supply V/ph/Hz	HEAT EXCHANGER USER SIDE				
		K	Q min l/s	Q max l/s	C.A.S. l	C.a. min l
i-BX-N /004	230/1/50	15500	0,13	0,35	1,00	10,0
i-BX-N /006	230/1/50	13500	0,19	0,49	1,00	15,0
i-BX-N /008	230/1/50	7500	0,24	0,64	1,50	19,0
i-BX-N /010	230/1/50	4800	0,30	0,80	1,80	24,0
i-BX-N /013	230/1/50	3300	0,39	1,05	2,00	31,0
i-BX-N /010	400/3+N/50	4800	0,28	0,84	1,80	110
i-BX-N /013	400/3+N/50	3300	0,36	1,02	2,00	126
i-BX-N /015	400/3+N/50	2850	0,42	1,17	2,10	142
i-BX-N /020	400/3+N/50	1900	0,55	1,57	2,50	182
i-BX-N /025	400/3+N/50	1100	0,65	1,97	3,10	235
i-BX-N /030	400/3+N/50	700	0,79	2,35	4,20	287
i-BX-N /035	400/3+N/50	650	0,93	2,80	4,90	337

Q min: minimum water flow admitted to the heat exchanger
Q max: maximum water flow admitted to the heat exchanger
C.a. min: minimum water content admitted in the plant
C.A.S.: Exchanger water content

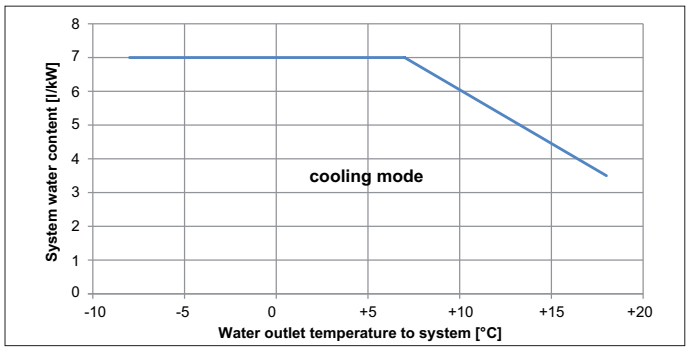
PRESSURE DROP, VERSION WITHOUT PUMP

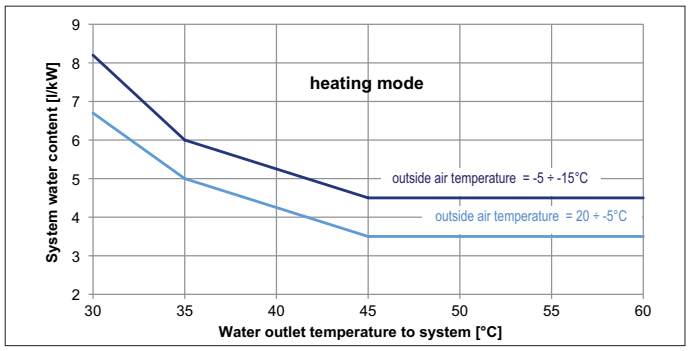




12. MINIMUM AND MAXIMUM SYSTEM WATER CONTENT

Minimum system water content





Minimum water content: in the case of i-BX-N units (heat pump, reversible), the highest value between refrigeration and heating operation must be considered. Use water / glycol mixture for water temperature below + 5°C.

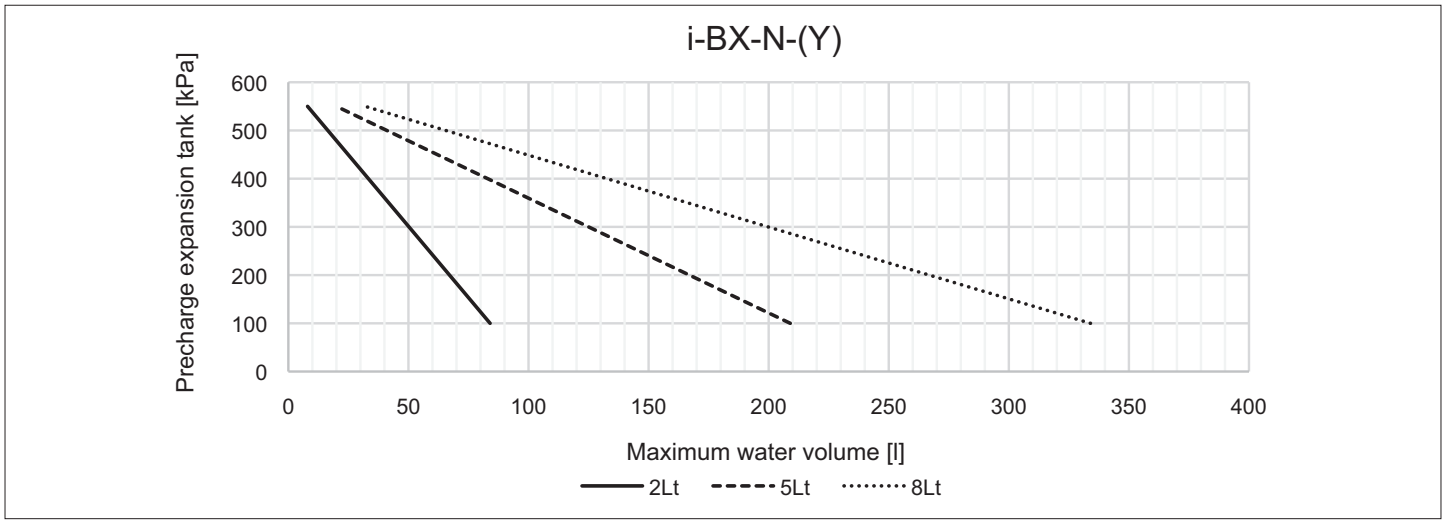
Maximum system water content

The heat pumps are fitted as standard with an expansion vessel and safety valve. The maximum system water content depends on the capacity of the expansion vessel (see **table 2**) and the calibration of the safety valve (see **table 3**).

Tab. 2	**Size**		**004**	**006**	**008**	**010**	**013**	**015**	**020**	**025**	**030**	**035**
	Expansion vessel	Lt	2					5			8	

Tab. 3	**Size**		**004**	**006**	**008**	**010**	**013**	**015**	**020**	**025**	**030**	**035**
	Safety valve	kPa	600									

The expansion vessel is suitable for the radiant panel system, hydronic terminal system and radiator system with following **installation maximum water content**.
If the volume of water in the system is higher, an additional, correctly sized expansion vessel is required.

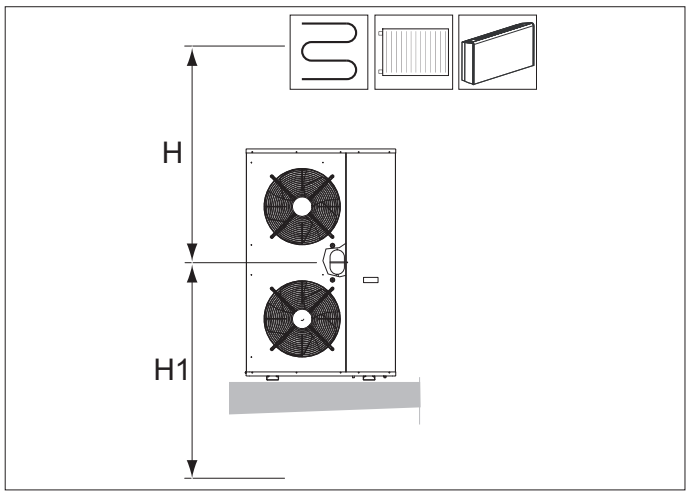


Expansion vessel calibration

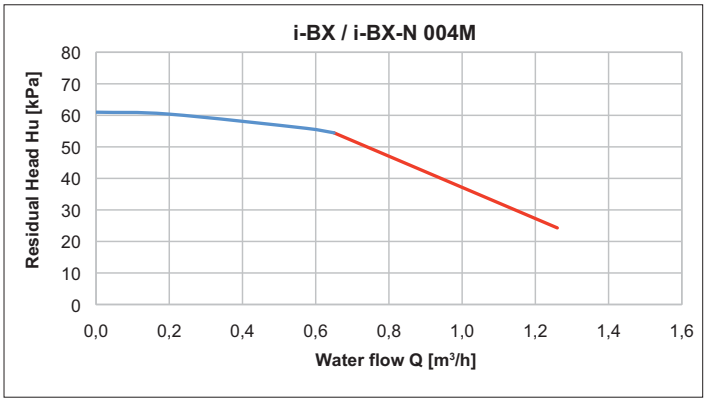
The expansion vessels are pre-charged to a standard pressure of 1 bar.
The pre-charge pressure is chosen depending on the maximum difference in height between the system terminal and the heat pump, as shown in the figure.

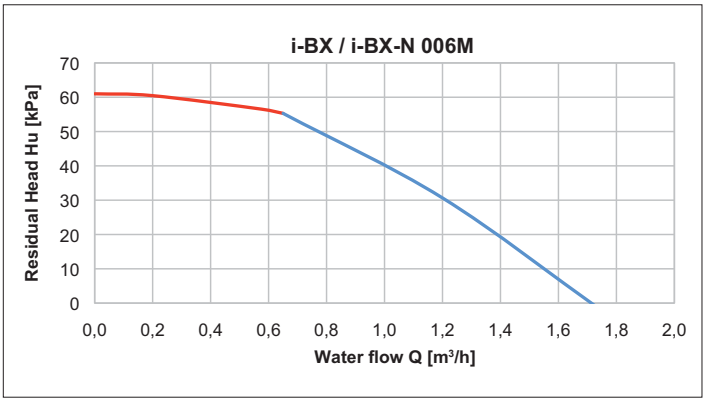
The maximum height must not exceed 55 metres due to the maximum vessel pre-charge pressure of 6 bars.

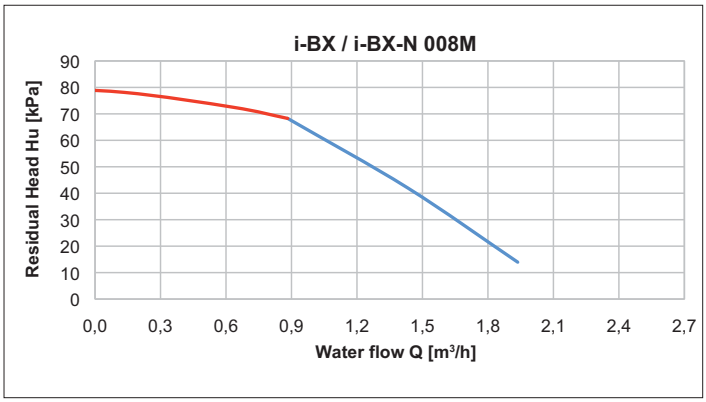
Make sure that the system terminal at the lowest point H1 can withstand the pressure of the water column at that point.

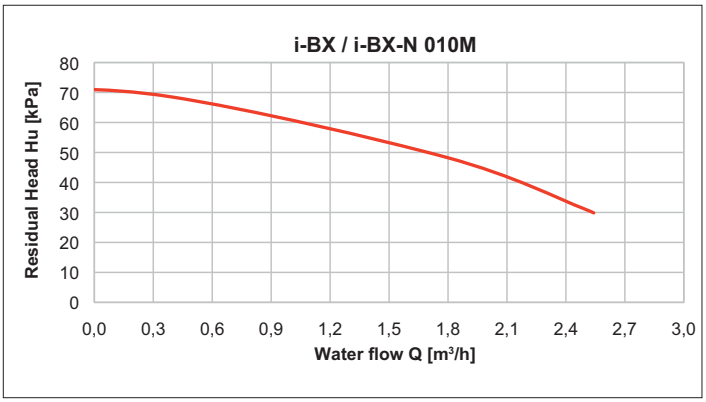


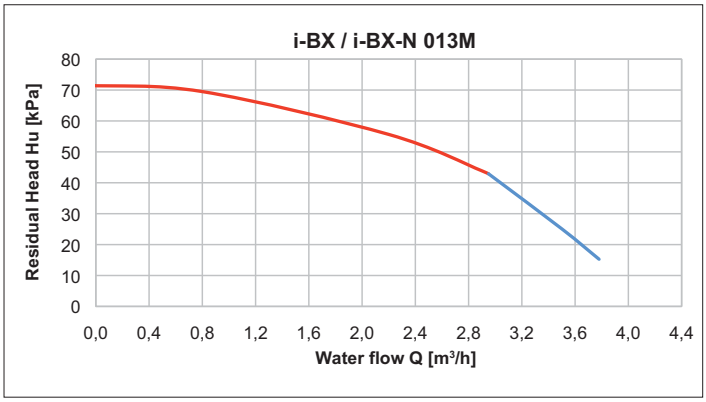
13. SYSTEM PUMP CURVES



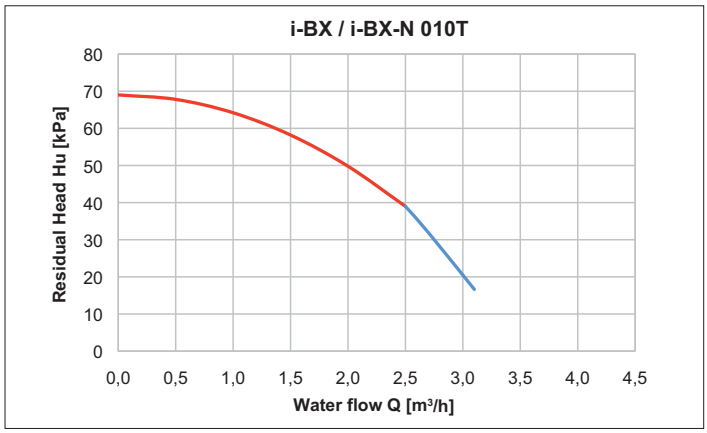


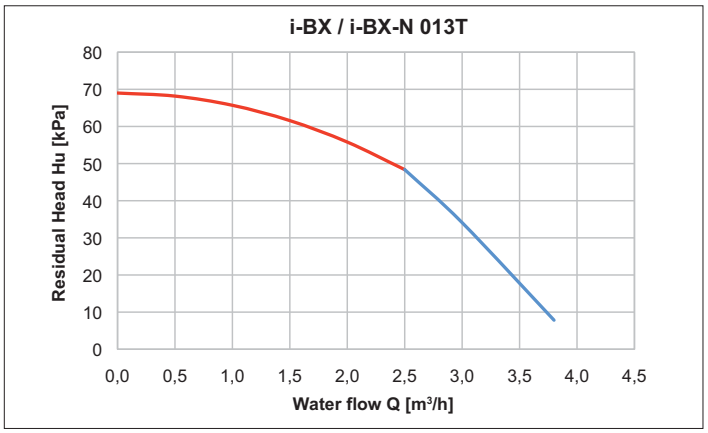


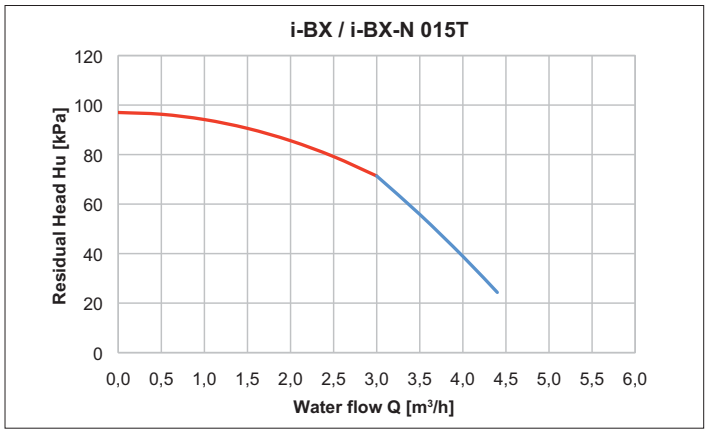


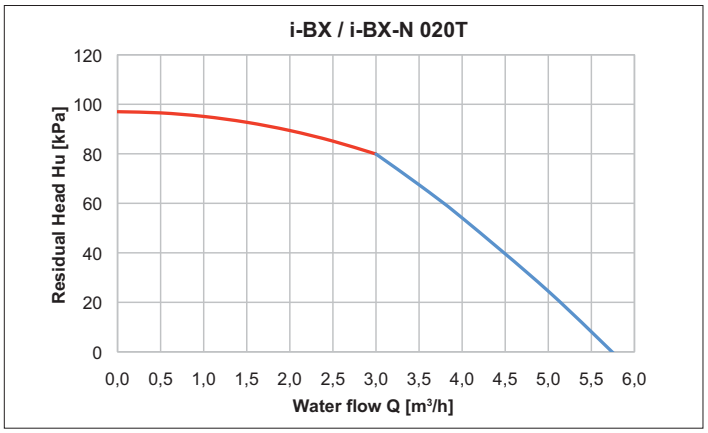


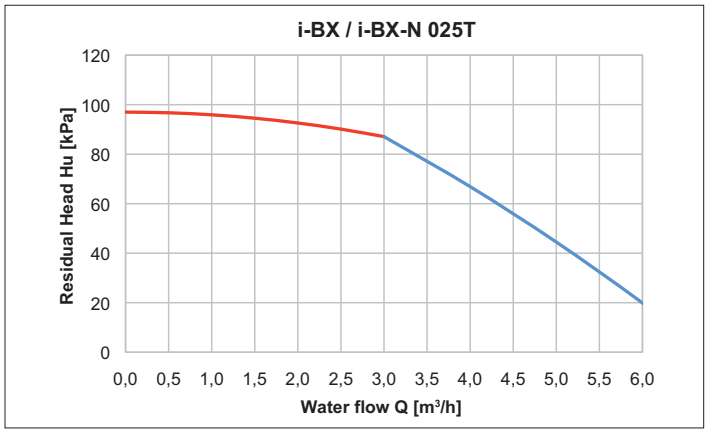
The pressure head values refer to the pressure available at the connections to the unit.

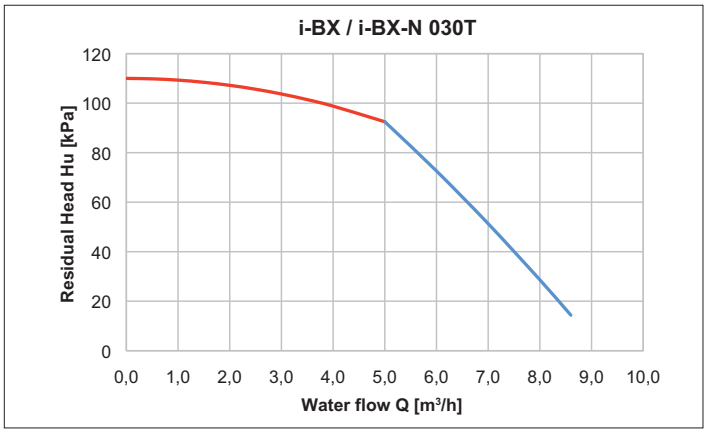


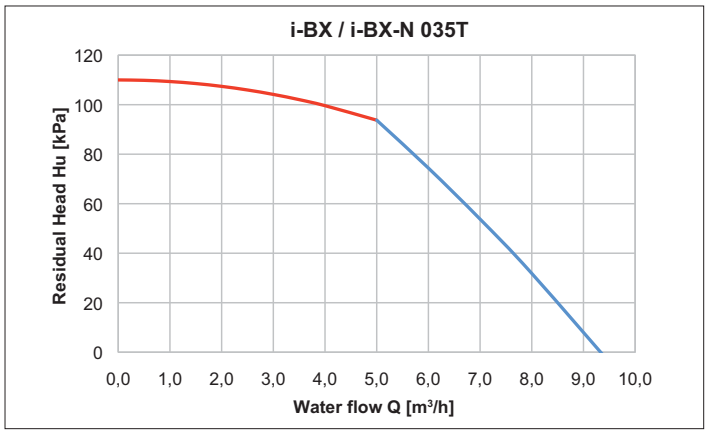












The pressure head values refer to the pressure available at the connections to the unit.

14. HYDRONIC GROUP

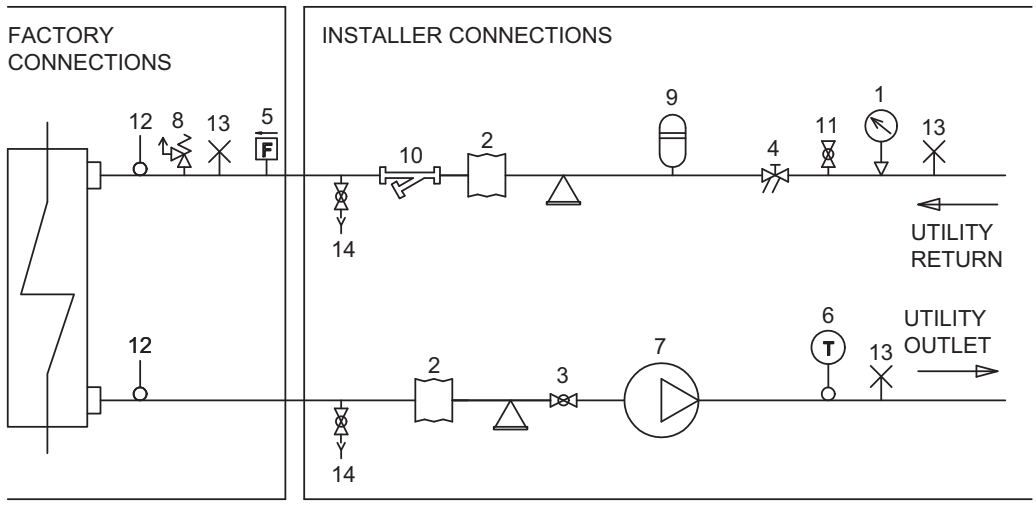
(HEAT EXCHANGER USER SIDE - HYDRONIC KIT 1 PUMP 2 POLES LH)

SIZE		CH		HP		PUMP					CH	HP
		Pfgross	Qfgross	Ptgross	Qcdgross	Rif.	Model	N.	F.L.A.	F.L.I.	HU	HU
		[kW] (1)	[l/s] (1)	[kW] (1)	[l/s] (1)			Pole	[A]	[kW]	[kPa]	[kPa]
004		4,20	0,20	4,63	0,22	A1	YONOS CS 6	0	0	0,04	51,4	47,9
006		5,90	0,28	6,36	0,31	A2					39,8	35,4
008		7,50	0,36	8,51	0,41	B1	YONOS CS 8	0	0	0,08	66,5	57,9
010		9,90	0,47	11,0	0,53	D1	YONOS PARA HIGH FLOW 7	0	1	0,12	57,7	54,1
		10,5	0,50	11,4	0,55		YONOS PARA HF /7	0	1	0,12	53,3	50,2
013		12,4	0,59	14,3	0,69	F1	YONOS PARA HIGH FLOW 7	0	1	0,12	56,6	51,1
		12,8	0,61	14,7	0,71		YONOS PARA HF /7	0	1	0,12	53,0	47,1
015		14,7	0,70	17,2	0,83	G1	YONOS PARA HF /10	0	1	0,19	78,7	71,5
020		18,7	0,89	21,7	1,05	G2					74,6	60,3
025		24,7	1,18	26,1	1,26	G3					61,5	55,0
030		29,4	1,41	32,3	1,56	H1	YONOS PARA HF /12	0	1	0,31	91,3	80,5
035		35,1	1,68	38,1	1,84	H2					73,5	61,8

(1) Values refer to nominal conditions
CH Cooling mode
HP HP mode
Pf Cooling capacity unit (Cooling mode)
Pt Heating capacity unit (Heating mode)
Q Plant (side) exchanger water flow
F.L.I. Pump power input
F.L.A. Pump running current
HU Pump residual pressure head (Units with hydronic group without mains filter)

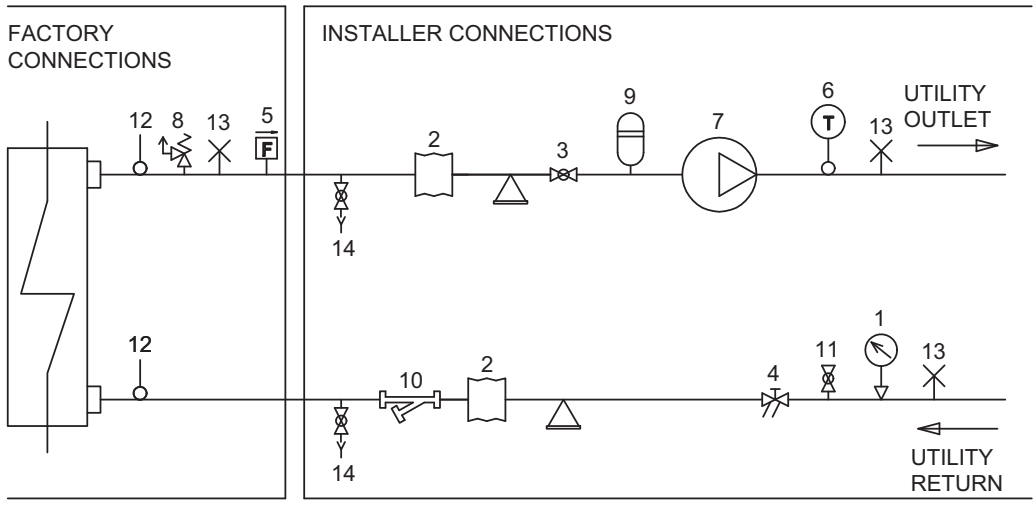
15. UTILITY WATER CIRCUIT CONNECTION DIAGRAM

System water circuit connection diagram, i-BX version without pump



1	Pressure gauge	5	Flow switch	9	Expansion vessel	13	System vent
2	Vibration damper joint	6	Thermometer	10	Wire mesh filter	14	Drain / chemical washing valve
3	Shut-off valve	7	Circulating pump	11	Fill – Refill		
4	Calibrating valve	8	Safety valve	12	Temperature sensor		

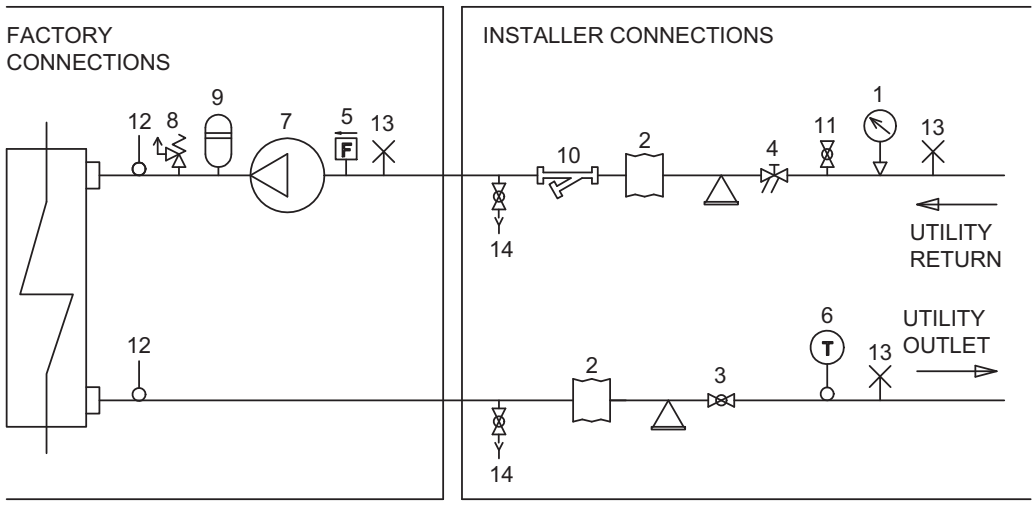
System water circuit connection diagram, i-BX-N version without pump



1	Pressure gauge	5	Flow switch	9	Expansion vessel	13	System vent
2	Vibration damper joint	6	Thermometer	10	Wire mesh filter	14	Drain / chemical washing valve
3	Shut-off valve	7	Circulating pump	11	Fill – Refill		
4	Calibrating valve	8	Safety valve	12	Temperature sensor		

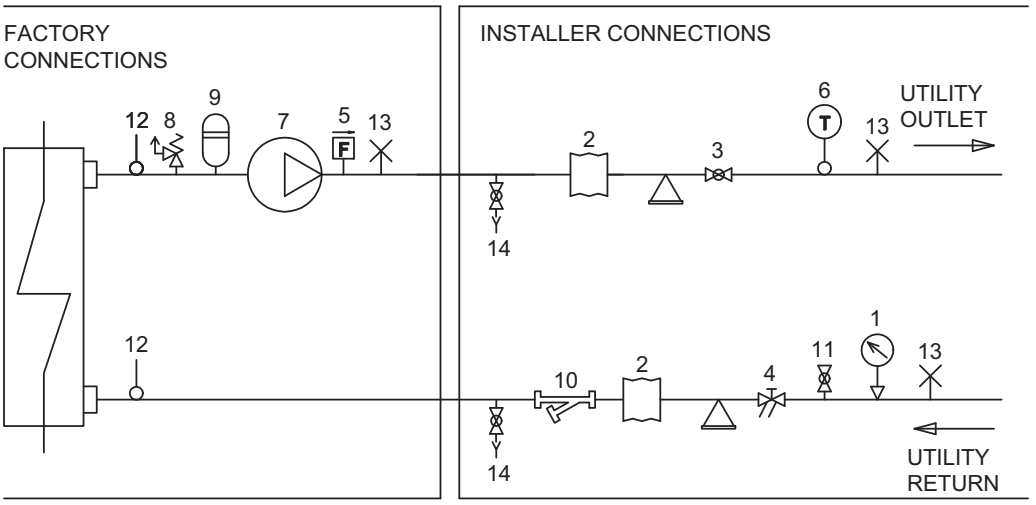
15. UTILITY WATER CIRCUIT CONNECTION DIAGRAM

System water circuit connection diagram, i-BX with pump



1	Pressure gauge	5	Flow switch	9	Expansion vessel	13	System vent
2	Vibration damper joint	6	Thermometer	10	Wire mesh filter	14	Drain / chemical washing valve
3	Shut-off valve	7	Circulating pump	11	Fill – Refill		
4	Calibrating valve	8	Safety valve	12	Temperature sensor		

System water circuit connection diagram, i-BX-N with pump



1	Pressure gauge	5	Flow switch	9	Expansion vessel	13	System vent
2	Vibration damper joint	6	Thermometer	10	Wire mesh filter	14	Drain / chemical washing valve
3	Shut-off valve	7	Circulating pump	11	Fill – Refill		
4	Calibrating valve	8	Safety valve	12	Temperature sensor		

16. ELECTRICAL DATA

SIZE	Power supply V/ph/Hz	Maximum values								
		Compressor				Fans (1)		Total (1)(2)		
		n	F.L.I. [kW]	F.L.A. [A]	L.R.A. [A]	F.L.I. [kW]	F.L.A. [A]	F.L.I. [kW]	F.L.A. [A]	S.A. [A]
004	230/1/50	1	1,877	8,05	0	0,12	1	1,94	8	0
006	230/1/50	1	2,734	11,65	0	0,12	1	2,74	12	0
008	230/1/50	1	3,563	15,45	0	0,12	1	3,67	16	0
010	230/1/50	1	4,843	21,6	0	0,12	1	4,93	23	1
013	230/1/50	1	6,4	24,3	0	0,12	1	6,53	25	1
010	230/1/50	1	4,843	21,6	0	0,12	1	4,93	23	1
013	230/1/50	1	6,4	24,3	0	0,12	1	6,53	25	1
015	400/3+N/50	0	7,0	15,1	0	0,12	1	7,39	18	1
020	400/3+N/50	0	8,6	16,5	0	0,60	3	9,39	20	1
025	400/3+N/50	0	10,1	22,9	0	0,40	2	11,3	29	1
030	400/3+N/50	0	12,2	22,2	0	0,55	3	13,7	29	1
035	400/3+N/50	0	14,5	32,4	0	0,52	3	16,0	39	1

F.L.I.: Full load power
F.L.A.: Full load current
L.R.A.: Locked rotor amperes for single compressor
S.A.: Inrush current

(1) Values calculated referring to the version with the maximum number of fans working at the max absorbed current
(1)(2) Safety values to be considered when cabling the unit for power supply and line-protections

Data valid for standard units without any additional option.

Plant (side) cooling exchanger water (in/out) 12,0°C/7,0°C; Source (side) heat exchanger air (in) 35,0°C.

Voltage tolerance: 10%
Maximum voltage unbalance: 3%

Give the typical operating conditions of units designed for outdoor installation, which can be associated (according to reference document IEC 60721) to the following classes:
- climatic conditions class 4K4H: air temperature range from -20 up to 55°C (*), relative humidity range from 4 up to 100%, with possible precipitations, at air pressure from 70 and 106 kPa and a maximum solar radiation of 1120 W/m2
- special climatic conditions negligible
- biological conditions class 4B1 and 4C2: locations in a generic urban area
- mechanically active substances class 4S2: locations in areas with sand or dust representative of urban areas
- mechanical conditions class 4M1: locations protected from significant vibrations or shocks

The required protection level for safe operation, according to reference document IEC 60529, is IP43XW (protection against access, to the most critical unit's parts, of external devices with diameter larger than 1 mm and rain).
The unit can be considered IP44XW protected, i.e. protected against access of external devices (with diameter larger than 1 mm) and water in general.

(*) for the unit's operating limits, see "selection limits" section

17. FULL LOAD SOUND LEVEL

SOUND POWER LEVEL IN COOLING									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB								
004	64	65	63	62	57	56	52	41	**64**
006	64	65	64	62	58	59	53	42	**65**
008	67	68	65	66	59	56	52	48	**66**
010	70	71	68	69	62	59	55	49	**69**
013	71	72	69	70	63	60	56	50	**70**
010	70	71	68	69	62	59	55	49	**69**
013	71	72	69	70	63	60	56	50	**70**
015	73	74	63	74	67	65	64	52	**74**
020	73	74	63	74	67	65	64	52	**74**
025	73	74	65	75	68	66	65	52	**75**
030	74	75	66	76	69	67	66	53	**76**
035	75	76	67	77	70	68	67	54	**77**

Working conditions

Plant (side) cooling exchanger water (in/out) 12,0°C/7,0°C; Source (side) heat exchanger air (in) 35,0°C.

Sound power on the basis of measurements made in compliance with ISO 9614.

Such certification refers specifically to the sound Power Level in dB(A). This is therefore the only acoustic data to be considered as binding.

Sound power level in cooling, outdoors.

SOUND PRESSURE LEVEL									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB								
004	50	51	49	48	43	42	38	27	**50**
006	50	51	50	48	44	45	39	28	**51**
008	52	53	50	51	44	41	37	33	**51**
010	55	56	53	54	47	44	40	34	**54**
013	56	57	54	55	48	45	41	35	**55**
010	55	56	53	54	47	44	40	34	**54**
013	56	57	54	55	48	45	41	35	**55**
015	58	59	48	59	52	50	49	37	**59**
020	58	59	48	59	52	50	49	37	**59**
025	57	58	49	59	52	50	49	36	**59**
030	58	59	50	60	53	51	50	37	**60**
035	59	60	51	61	54	52	51	38	**61**

Working conditions

Plant (side) cooling exchanger water (in/out) 12,0°C/7,0°C; Source (side) heat exchanger air (in) 35,0°C.

Average sound pressure level at 1m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.

SOUND POWER LEVEL IN HEATING									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB								
004	64	65	63	62	57	56	52	41	**64**
006	64	65	64	62	58	59	53	42	**65**
008	67	68	65	66	59	56	52	48	**66**
010	70	71	68	69	62	59	55	49	**69**
013	71	72	69	70	63	60	56	50	**70**
010	70	71	68	69	62	59	55	49	**69**
013	71	72	69	70	63	60	56	50	**70**
015	73	74	63	74	67	65	64	52	**74**
020	73	74	63	74	67	65	64	52	**74**
025	73	74	65	75	68	66	65	52	**75**
030	74	75	66	76	69	67	66	53	**76**
035	75	76	67	77	70	68	67	54	**77**

Working conditions

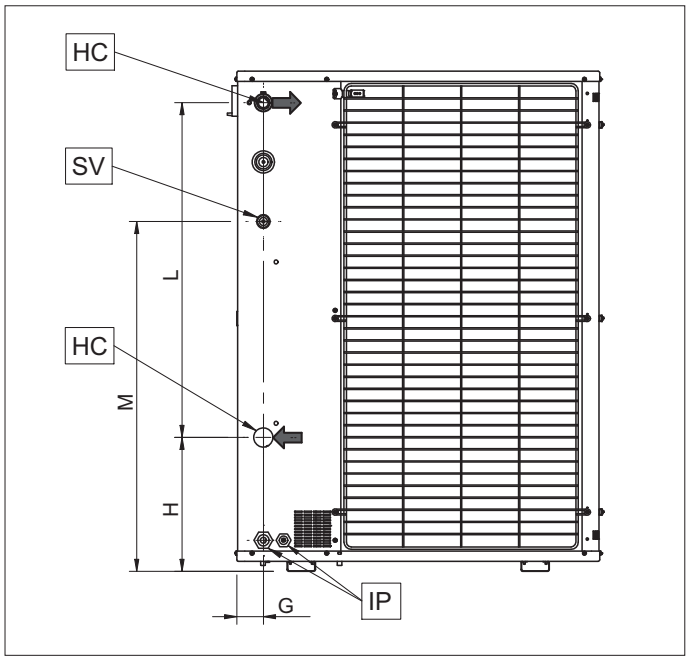
Sound power on the basis of measurements made in compliance with ISO 9614.
Such certification refers specifically to the sound Power Level in dB(A). This is therefore the only acoustic data to be considered as binding.
Sound power level in heating, outdoors.

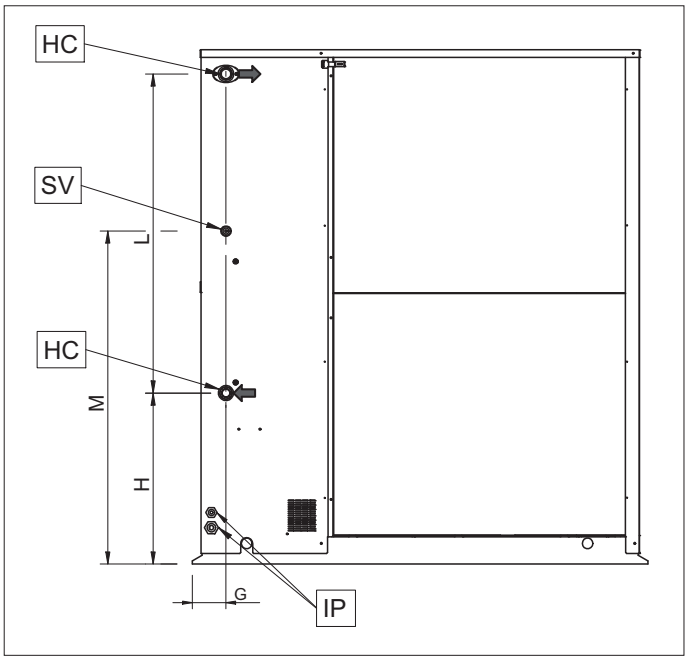
SOUND PRESSURE LEVEL									
SIZE	Octave band [Hz]								Total sound level dB(A)
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB								
004	50	51	49	48	43	42	38	27	**50**
006	50	51	50	48	44	45	39	28	**51**
008	52	53	50	51	44	41	37	33	**51**
010	55	56	53	54	47	44	40	34	**54**
013	56	57	54	55	48	45	41	35	**55**
010	55	56	53	54	47	44	40	34	**54**
013	56	57	54	55	48	45	41	35	**55**
015	58	59	48	59	52	50	49	37	**59**
020	58	59	48	59	52	50	49	37	**59**
025	57	58	49	59	52	50	49	36	**59**
030	58	59	50	60	53	51	50	37	**60**
035	59	60	51	61	54	52	51	38	**61**

Working conditions

Average sound pressure level at 1m distance, unit in a free field on a reflective surface; non-binding value calculated from the sound power level.

18. POSITION OF THE WATER CONNECTIONS



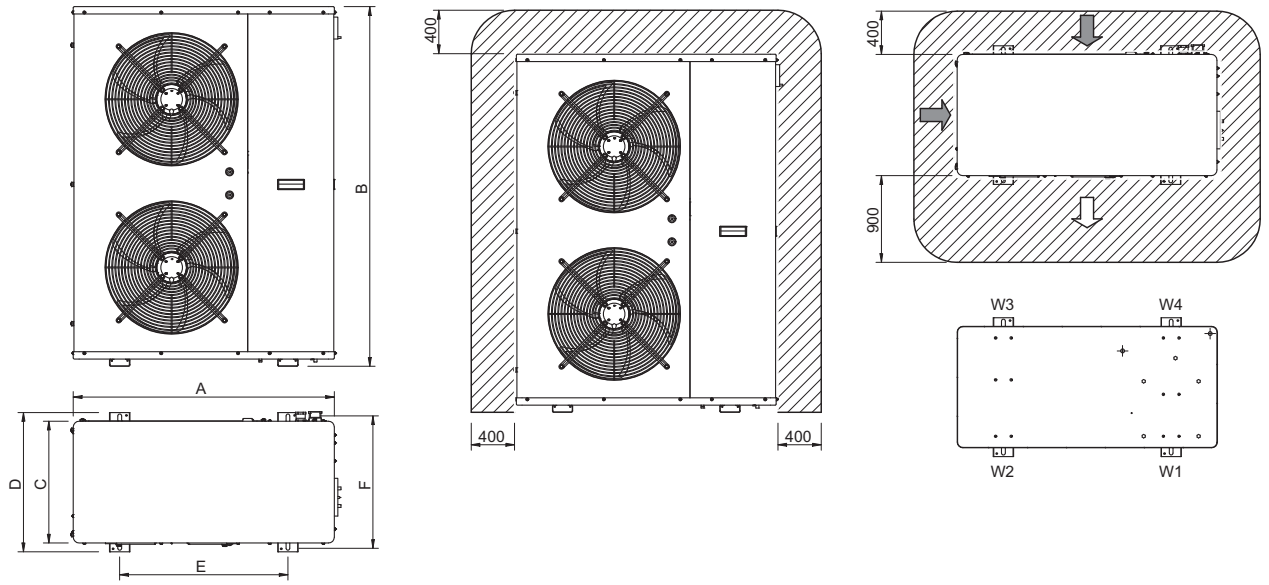


HC HYDRAULIC CONNECTIONS
SV SAFETY VALVE DISCARGE
IP POWER SUPPLY INLET
OC CONDENSATE DRAIN OUTLET

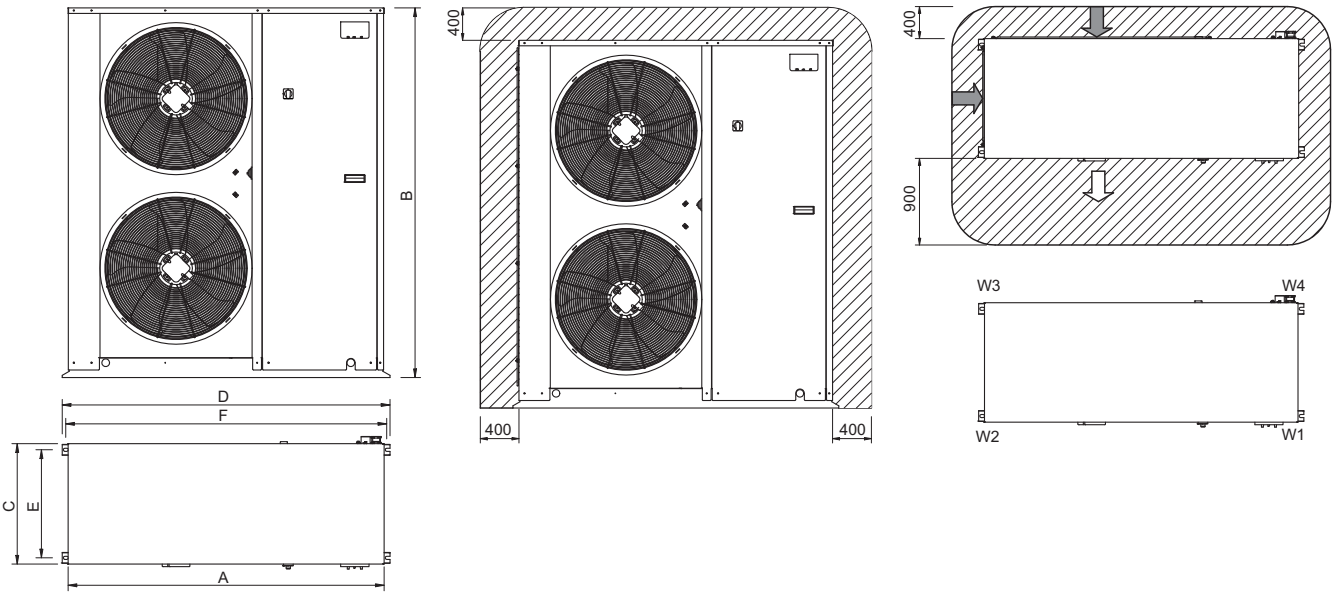
Dimensions	G	H	L	M	HC
	[mm]	[mm]	[mm]	[mm]	Ø
i-BX-N-(Y) 004	66	142	720	676	1"
i-BX-N-(Y) 006	66	142	720	676	1"
i-BX-N-(Y) 008	66	332	830	868	1"
i-BX-N-(Y) 010	66	332	830	868	1"
i-BX-N-(Y) 013	66	482	830	1018	1" 1/4

Dimensions	G	H	L	M	HC
	[mm]	[mm]	[mm]	[mm]	Ø
i-BX-N-(Y) 015	112	295	830	830	1" 1/4
i-BX-N-(Y) 020	112	295	830	830	1" 1/4
i-BX-N-(Y) 025	112	565	1055	1100	1" 1/4
i-BX-N-(Y) 030	112	565	1055	1100	1" 1/2
i-BX-N-(Y) 035	112	565	1055	1100	1" 1/2

19. DIMENSIONAL DRAWINGS



Size	A	B	C	D	E	F	W1	W2	W3	W4	Weight
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]	[kg]	[kg]	[kg]	[kg]
i-BX-N-(Y) 004	900	940	370	430	580	405	26	12	13	28	80
i-BX-N-(Y) 006	900	940	370	430	580	405	28	13	14	30	85
i-BX-N-(Y) 008	900	1240	420	480	580	455	36	20	16	28	100
i-BX-N-(Y) 010	900	1240	420	480	580	455	41	18	17	39	115
i-BX-N-(Y) 013	900	1390	420	480	580	455	48	16	18	53	135

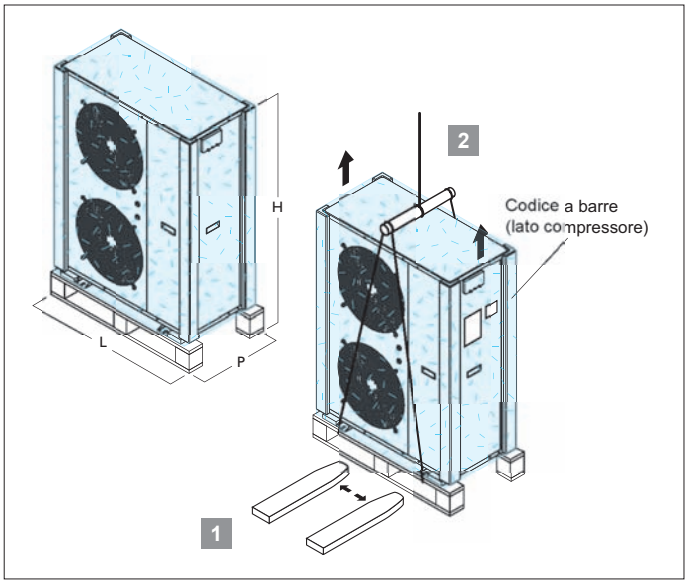


Size	A	B	C	D	E	F	W1	W2	W3	W4	Weight
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]	[kg]	[kg]	[kg]	[kg]
i-BX-N-(Y) 015	1450	1200	550	1510	500	1480	65	21	71	24	180
i-BX-N-(Y) 020	1450	1200	550	1510	500	1480	73	24	81	27	205
i-BX-N-(Y) 025	1450	1700	550	1510	500	1480	94	31	105	35	265
i-BX-N-(Y) 030	1450	1700	550	1510	500	1480	103	34	115	38	290
i-BX-N-(Y) 035	1700	1700	650	1760	600	1730	115	38	129	43	325

HANDLING PACKAGED UNITS

The unit should always be handled by qualified personnel using equipment adequate for the weight of the unit, in compliance with the safety standards in force (and subsequent amendments).

- **Lifting by forklift (1)**
  Insert the forks under the long side of base, opening the forks as fare as possible.
- **Lifting by crane (2)**
  To lift the unit, insert tubes long enough to allow positioning of the lifting slings and safety pins in the special feet on the unit. For the sizes of these tubes, see the figures shown in the corresponding section. To avoid the slings damaging the unit, place protection between the slings and the unit.



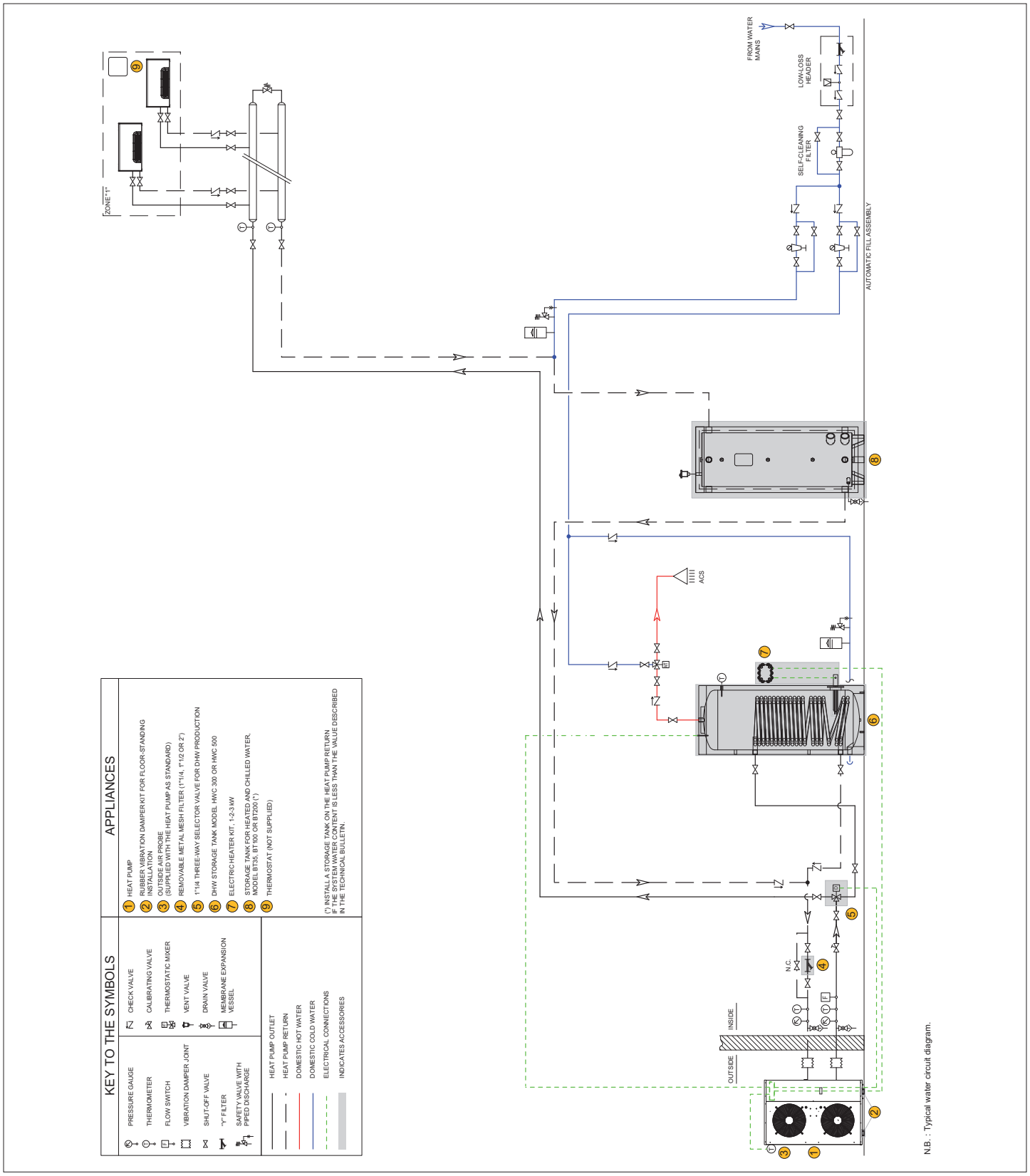
i-BX-N Dimensions and weight with standard packaging											
Size		**04**	**06**	**08**	**10**	**13**	**15**	**20**	**25**	**30**	**35**
Dimension L	mm	990	990	990	990	990	1530	1530	1530	1530	1780
Dimension P	mm	490	490	540	540	540	700	700	700	700	800
Dimension H	mm	1090	1090	1390	1390	1540	1400	1400	1900	1900	1900
Weight	Kg	95	100	115	130	150	200	225	285	310	345
Max stackable units	n°	1	1	1	1	1	1	1	1	1	1

i-BX-N Dimensions and weight with wooden crate											
Size		**04**	**06**	**08**	**10**	**13**	**15**	**20**	**25**	**30**	**35**
Dimension L	mm	1040	1040	1040	1040	1040	1630	1630	1630	1630	1880
Dimension P	mm	545	545	595	595	595	750	750	750	750	850
Dimension H	mm	1170	1170	1470	1470	1620	1450	1450	1950	1950	1950
Weight	Kg	120	125	145	160	185	240	265	335	360	400
Max stackable units	n°	1	1	1	1	1	1	1	1	1	1

20. OPERATING DIAGRAMS

Heat pump connection to the system without low-loss header. Make sure the useful pressure head of the circulating pump on the unit is sufficient for the pressure drop in the system.
If the minimum system content does not reach values shown in this manual, install an additional storage tank on the heat pump return pipe. No system configurations are required.
For installations with heap pump connected directly to the system, without storage tanks and secondary pumps, **parameter 011D must be set to 0**.
It is recommended to enable operation of the pump on the unit by setting parameter "0143=0 system pump always on".

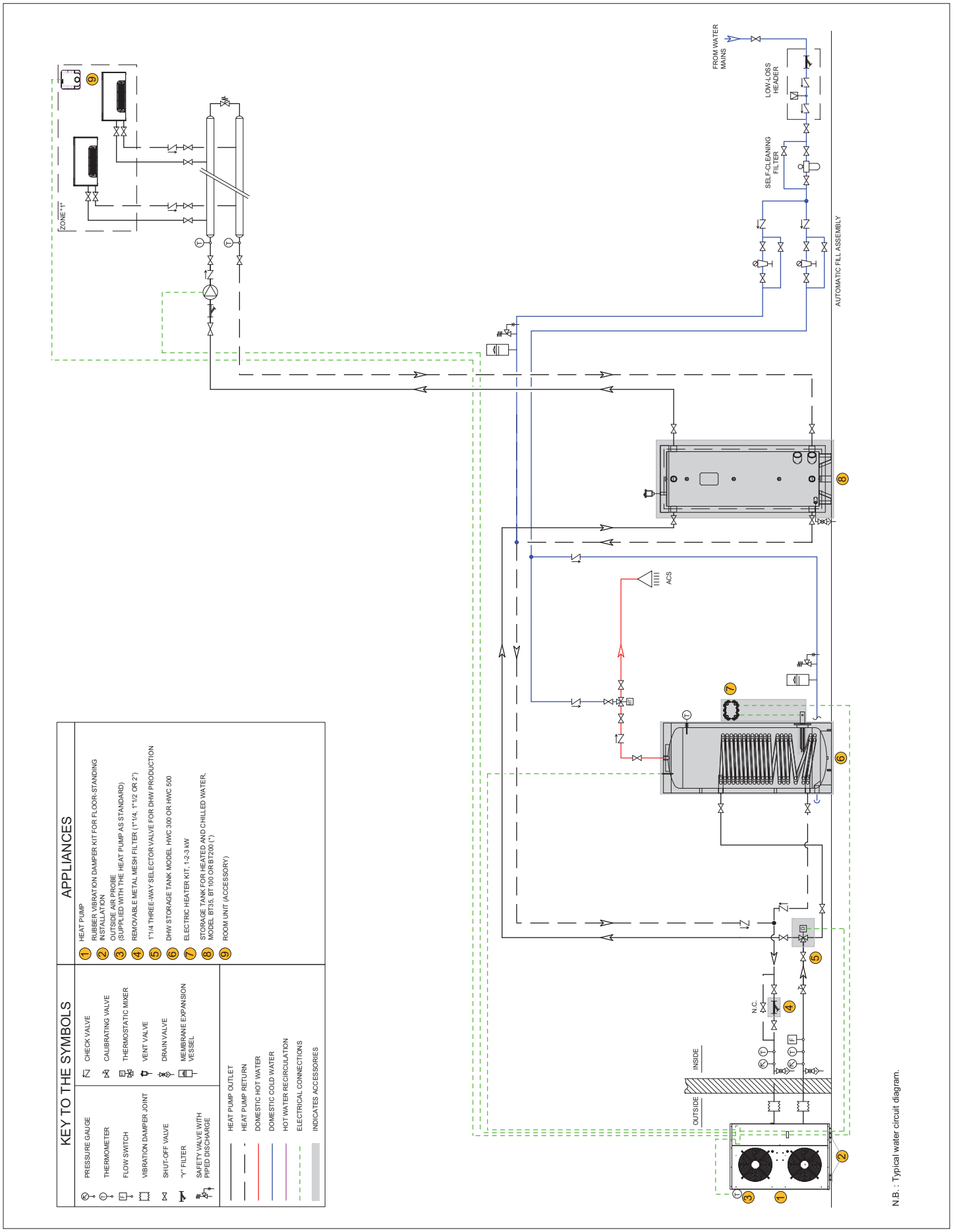
Water circuit diagram



Water circuit diagram (not a working drawing)

System number 0

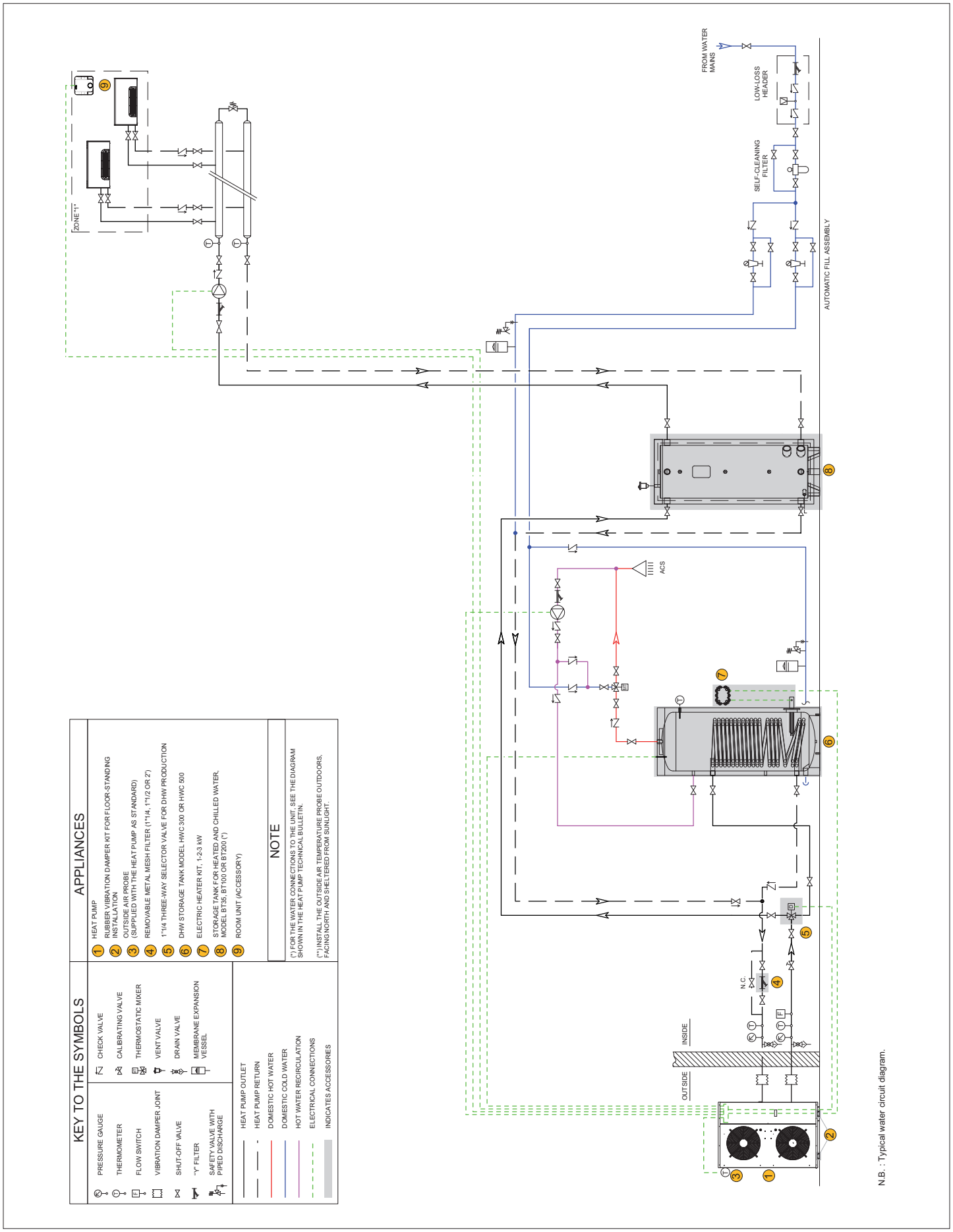
Water circuit diagram



Water circuit diagram (not a working drawing)

System number 1

Water circuit diagram

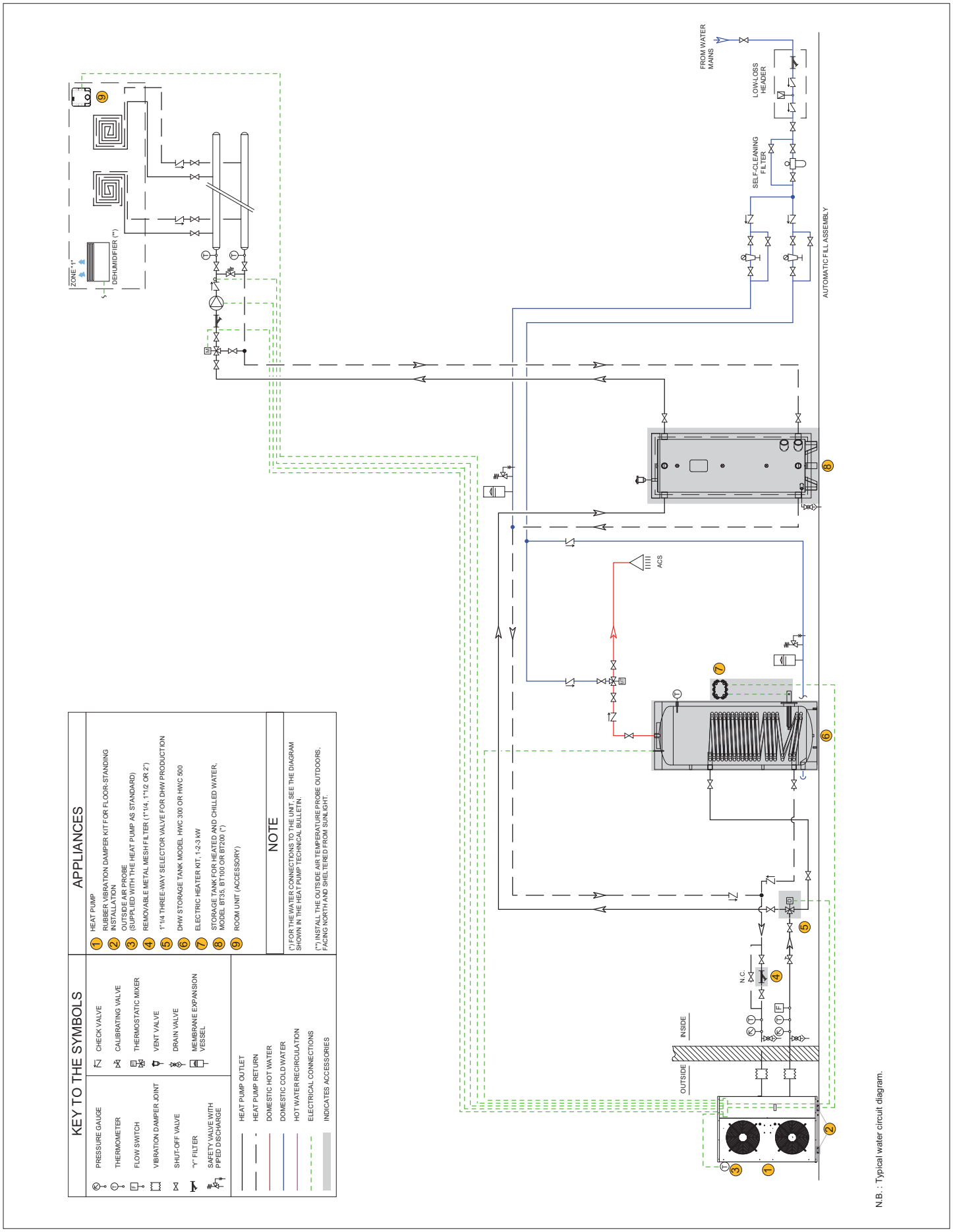


N.B. : Typical water circuit diagram.

Water circuit diagram (not a working drawing)

System number 2

Water circuit diagram

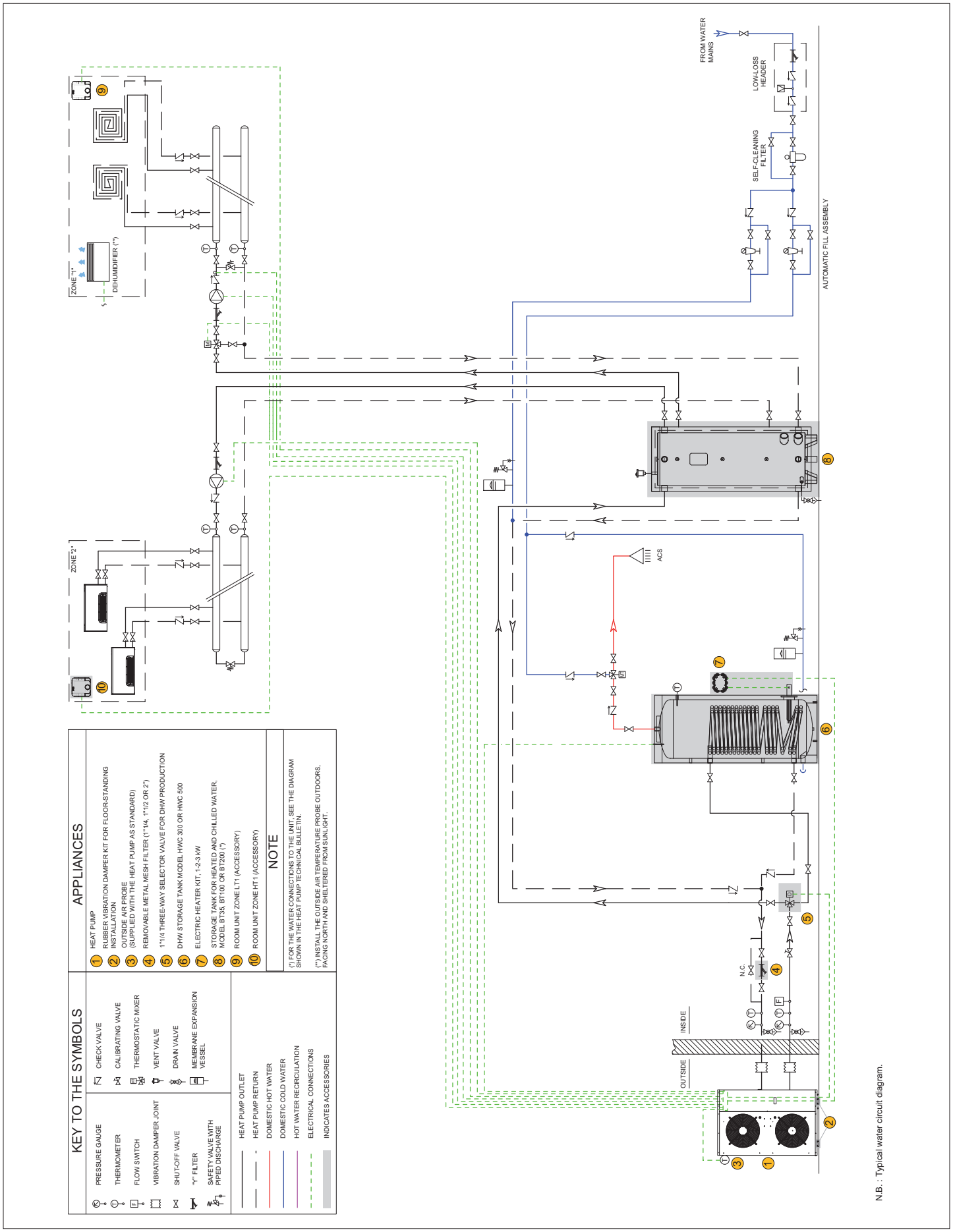


N.B. : Typical water circuit diagram.

Water circuit diagram (not a working drawing)

System number 3

Water circuit diagram



N.B. : Typical water circuit diagram.

Water circuit diagram (not a working drawing)

CLIMAVENETA®

MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

Head Office: M11 - Via Caduti di Cefalonia 1 - 36061 Bassano del Grappa (VI) - Italy
Tel (+39) 0424 509 500 - Fax (+39) 0424 509 509
www.climaveneta.com
www.melcohit.com