i-NRG

0061
16,3 kW

Air-to-water reverse-cycle units with DC inverter-driven compressor for production of hot water up to 60°C and domestic hot water with total heat recovery. Indoor and outdoor installation.

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

- DC inverter-driven compressor
- EC pumps with low power consumption, Class A
- Modulating EC fan with low power consumption
- High efficiency
- Adaptability
- Indoor and outdoor installation.
- Silent operation
- Heat pump function
- Domestic hot water production with total heat recovery

Detrazione fiscale del 55% D.M. 7 aprile 2008

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CE

ISO 14001 TÜV SÜD ISO 9001

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certified to UNI EN ISO 9001
and environmental certification
UNI EN ISO 14001

Waiver of liability

This document cannot be considered comprehensive for the purposes of: installation, operation, precautions against risks, handling and transport. See the “General installation manual” for further information.
This document refers to standard configurations, in particular regarding dimensions, weights, electrical, refrigerant, water and air duct connections (where applicable). For further information, drawings and diagrams contact the Climaveneta Sales Office.
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The data contained in this publication may be changed without prior notice.

1. DESCRIPTION OF THE UNIT

High efficiency range
The i-NRG heat pump features high seasonal efficiency in both heating and cooling mode, using DC inverter technology to modulate compressor operation and deliver the exact amount of energy based on the actual needs of the building.
This excellent result has been achieved by carefully sizing all the components. Special attention has been paid to all heat exchange surfaces and the fans.
The use of newly designed condensing coils, with larger surfaces and special layout, new asymmetrical evaporators with better and more efficient refrigerant distribution, both in the liquid and gas phase, and high efficiency fans are some of the important innovations included with this product.
Careful sizing of the systems this series of units are used with can mean significant savings in energy consumed and consequently a major reduction in running costs.
Domestic hot water production is provided by a specific heat exchanger with total or partial heat recovery, and is stored in the domestic hot water storage tank.

Smart Defrost (Climaveneta patent)
The heat pumps come with an innovative and patented self-adaptive defrost system that optimises defrost times, improving overall unit efficiency.
The strength of this new logic is the ability to automatically adjust parameters used by the algorithms in each cycle, based on the outside conditions.
Controlling the evaporation pressure, outside air temperature and defrost time, give an excellent estimate of ice on the coil, thus guaranteeing an effective and efficient defrost cycle.

Air-water heat pump
Reverse-cycle air-water heat pump.
Unit supplied complete with non-freezing oil and refrigerant charge, and factory tested. Only water and electrical connections are required on site. Unit charged with R410A ecological refrigerant.

COMPOSITION OF STANDARD UNIT
Structure
Structure and base made from hot galvanised sheet metal, ensuring excellent mechanical properties and resistance to corrosion.

Structure
Decorative panels made from hot galvanised sheet metal and painted with epoxy powder coat. Lined on the inside with textured heat insulation and sound-proofing material. The panels are only fastened at the bottom and are easy to remove for quick and easy access to the inside components from either side of the unit.

Compressor
DC inverter-driven scroll compressor with linear control of capacity delivered. All compressors come complete with sump heater, electronic thermal overload protection with centralised manual reset.

Utility-side heat exchanger
Braze-welded AISI 316 steel plate heat exchanger with high efficiency and low pressure drop. he heat exchangers are lined on the outside with a layer of closed-cell neoprene to prevent condensation. When the unit is not operating, the heat exchangers are protected against frost on the inside by an electric heater with thermostat, while, when the unit is operating, protection is ensured by a water differential pressure switch.

Domestic hot water heat exchanger
Braze-welded AISI 316 steel plate heat exchanger with high efficiency and low pressure drop, can operate either with total heat recovery or as a desuperheater. The heat exchangers are lined on the outside with anti-condensate closed-cell neoprene lagging. When the unit is not operating, these are protected against formation of ice on the inside by an electric heater with thermostat.

Source-side heat exchanger
Finned coil heat exchanger made from copper tubes and aluminium fins, spaced apart so as to guarantee maximum heat exchange efficiency

Fans
Axial-flow fans with IP 54 index of protection, external impeller, with pressed plate blades, housed in aerodynamic tubes with accident prevention grill. EC motor with low power consumption, DC power supply, with built-in thermal protector. Fans with continuous speed control by pressure transducer.

Refrigerant circuit
Main components in the refrigerant circuit:
- refrigerant R410A
- dewatering filter,
- liquid flow indicator with moisture signal,
- electronic thermostatic valve,
- high and low safety pressure switches,
- liquid receiver,
- 4-way reversing valve.
- liquid separator
- oil separator
- high and low pressure transducers

Power and control electrical panel
Electrical control panel built in compliance with EN 60204-1/IEC 204-1, complete with:
- Radio interference suppresser
- Compressor driver
- EMC filter
- Electronic board
- System water pump protection fuse
- Domestic hot water pump protection fuse
- Fan protection fuse
- Inverter electrical panel cooling fan protection fuse
- Auxiliary circuit protection fuse
- Electronic board protection fuse
- Remote alarm relay / dehumidifier / high temperature zone actuator
- Compressor ON indicator light relay
- Phase sequence control relay (i-NRG 0061t only)
- Compressor relay
- Mixed zone pump relay
- DHW recirculation / dehumidifier contact
- Inverter alarm relay
- Compressor contact
- Heater step 1 contact
- Boiler contact
- DHW storage electric heater contact
- Compressor circuit breaker
- Door interlock disconnect switch

- 230/24 VAC transformer
- Compressor oil sump heater
- System heat exchanger frost protection heater
- DHW heat exchanger frost protection heater
- ON/OFF remote contact input
- Cooling-heating contact input
- System/DHW priority contact input
- Demand limit contact input
- Reduced electricity rate contact input
- Flow switch contact

The water circuit is completed by:
- EC pump with low power consumption, class A, on system and DHW circuits.
- Differential pressure switch system
- Expansion vessel (10 litres)
- Safety valve (3 bar)
- Manual fill assembly
- Pressure gauge
- Vent valve
- Plate heat exchanger frost protection heater

VERSIONS AVAILABLE

i-NRG 0061 Reverse-cycle heat pump with DC inverter-driven compressor, high temperature, total heat recovery, air-source, indoor/outdoor installation.

SUPPLIED AS STANDARD

- N-THC remote control complete with backlit display, temperature probe, humidity probe, knob and 4 buttons (must be installed)
- Outside air temperature probe for climate compensation (must be installed)
- Domestic hot water probe
- Storage tank probe
- 4 x 1"1/4 M flexible vibration damper joints and 4 flat gaskets
- Insulation L=2000 for flexible joints
- Non-return valve for domestic hot water circuit

ACCESSORIES

- N-THC wired room timer thermostat with backlit display, complete with temperature and humidity probe for system configuration.
- N-EM1 expansion module for system configuration.
- Supplementary electric heater for the heating system.
- DHW storage electric heater, as supplementary heat source and for Legionella prevention.
- 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.
- 85 litre storage tank to be installed under the unit.
- RDK rectangular air ducting kit for indoor installation.
- RFK rectangular flange kit for connecting air ducts (not supplied by Climaveneta).
- ACO soundproofing covers, COMPULSORY for outdoor installation.

2. 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 remote keypad supplied with the unit can be used to freely set the room temperature, humidity, operating mode, domestic hot water production and operating times for each zone.
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 15 different types of pre-configured system for quick and easy installation, with the possibility to manage up to 5 remote keypads for controlling thermal load in likewise zones.
The advanced PRANA controller also allows integration of solar panels for the domestic hot water production, giving priority to direct solar energy, if available, and increasing the use of renewable sources while also managing traditional sources, such as electric heaters or boilers.
The controller can manage up to four 4 heat pumps connected in cascade to increase 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, with the master unit responsible for processing the information and sending it to the slave units.
This ensures fine control over the capacity delivered, without decreasing performance, and more precise system sizing.
NADISYSTEM 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.
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:
la remotazione di alcuni comandi come:
- on/off
- cooling/heating operation
- heating system/domestic hot water priority
- shutdown due to electricity rate

Main functions

- Wired remote keypad with backlit display, complete with temperature and humidity probe
- Calculation of dew point and increase in water outlet temperature for underfloor systems, possibility to enable a dehumidifier
- Operating parameters with dedicated user and installer menus to configure the type of system
- Weekly timer for setting 6 daily time bands
- 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, automatic mode changeover
- 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
- Cascaded management of up to 4 heat pumps
- Different systems solutions by configuring the controller and using dedicated expansion modules (accessories), up to 5 zones with the possibility to control different temperature according to the selected compensation curves.
- Alarm signals
- Frost protection management based on inside or outside air temperature or water temperature, to protect the system pipes and heat exchangers inside the unit.

3. OPERATING CHARACTERISTICS

HIGH EFFICIENCY AND REDUCED CONSUMPTION

The i-NRG reverse-cycle air-to-water heat pump is fitted with DC inverter-driven compressor and EC fan with low energy consumption.
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.

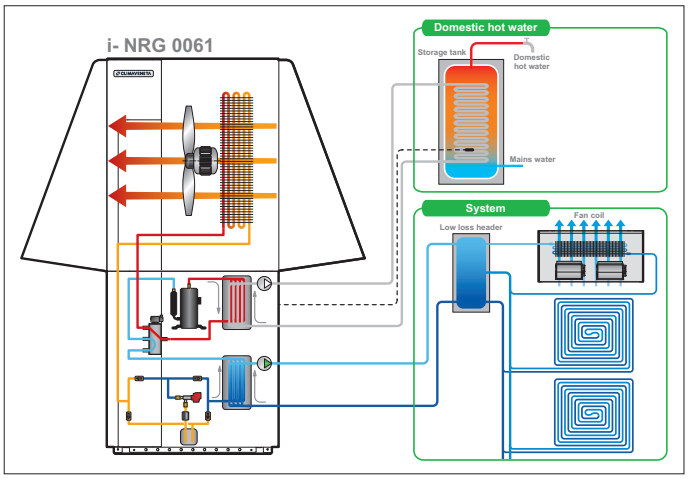
This unit completely incorporates the full inverter concept, all components are designed for maximum efficiency and maximum savings in running costs. The system and domestic hot water pumps also have EC motors, with low power consumption, Class A energy rating, for sustainable energy usage.

OPERATING PRINCIPLE

i-NRG is the new generation heat pump that can work all year round, in any operating mode, both single cycle (cooling, heating, domestic hot water) and combined cycle (domestic hot water together with cooling).

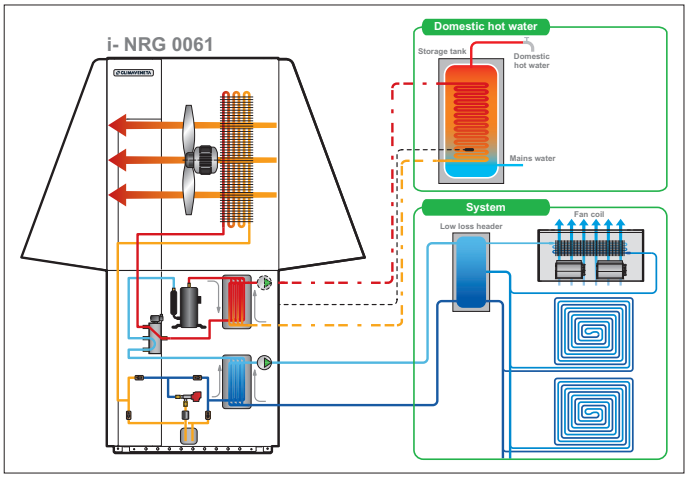
COOLING

The heat pump cools the water in the system circuit, which absorbs heat from the rooms, thus cooling them, via the system terminals (underfloor, fan coils, radiators).
The system pump runs until the set point is reached, and then works intermittently so as to measure the water temperature.



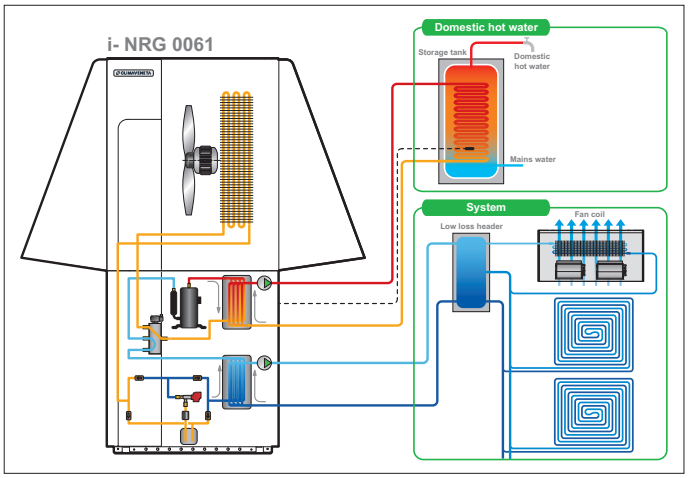
COOLING with PARTIAL heat recovery

When the domestic hot water set point has been reached and the compressor is on to cool the system water, the pump on the domestic hot water heat exchanger is activated intermittently, thus achieving partial heat recovery.
The heat is transferred to the domestic hot water storage tank, allowing the water temperature to rise above the set point.
The temperature reached varies depending on how long the compressor operates in order to meet system demand.
If domestic hot water consumption increases significantly, the unit will work in total heat recovery mode, using all of the unit's heating capacity to heat the domestic hot water.



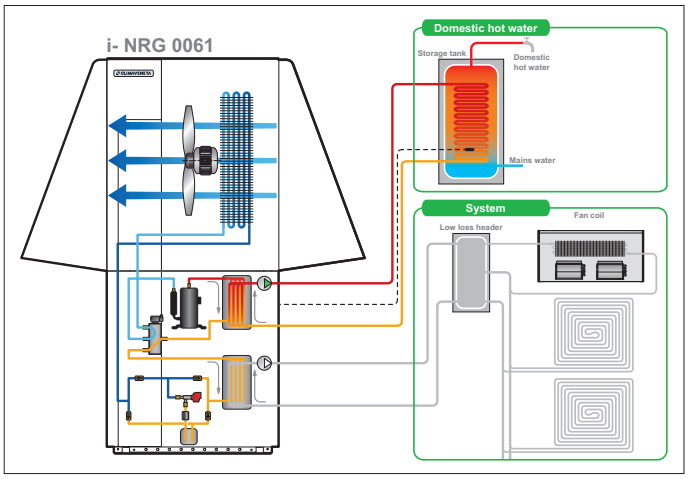
COOLING WITH TOTAL HEAT RECOVERY

In cooling operation, whenever a fluid is cooled (water, in hydronic systems), heat needs to be transferred to another fluid, in this case outside air.
It is possible to avoid wasting this heat and recover it so as to heat the domestic hot water for free.
In total heat recovery mode, the unit can meet demand for chilled water to the system and hot water to the DHW storage tank, both at the same time.
The heat transferred to the domestic hot water is completely free, as it would normally be wasted by discharging it into the outside environment.



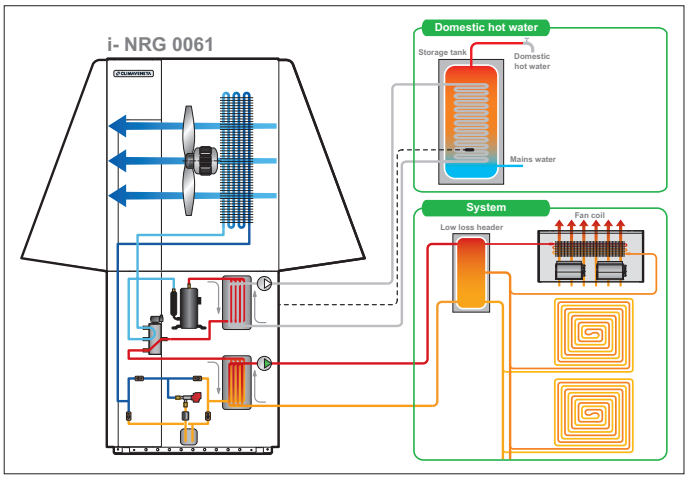
DOMESTIC HOT WATER ONLY

The unit operates in heat pump mode to heat the water in the domestic hot water storage tank.
This operating mode is available both in winter and summer, even with outside temperatures up to +45°C (see the operating limits).
In “domestic hot water only” mode, the unit’s heating capacity goes completely to heating water in the domestic hot water storage tank.



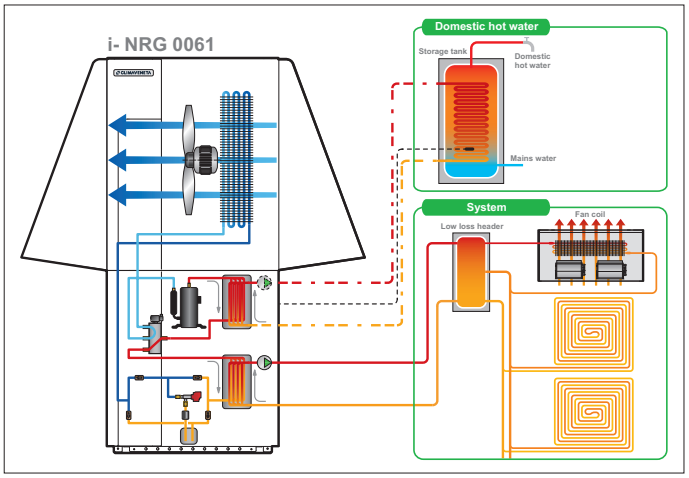
HEATING

The heat pump heats the water in the system circuit, which in turn heats the rooms via the system terminals (underfloor, fan coils, radiators).
The system pump runs until the set point is reached, and then works intermittently so as to measure the water temperature.



HEATING with PARTIAL heat recovery

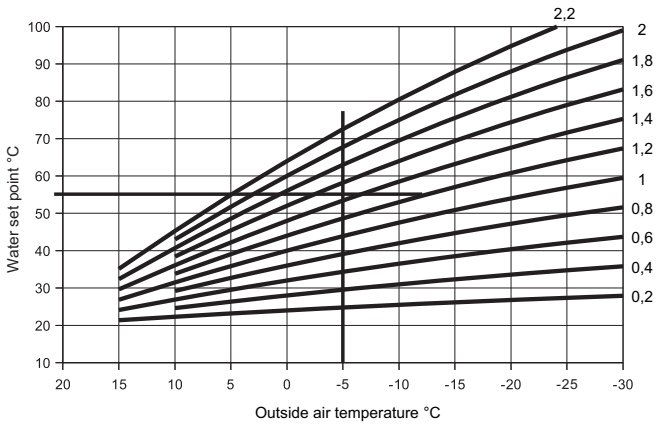
When the domestic hot water set point has been reached and the compressor is on to heat the system water, the pump on the domestic hot water heat exchanger is activated intermittently, thus achieving partial heat recovery.
The heat is transferred to the domestic hot water storage tank, allowing the water temperature to rise above the set point.
The temperature reached varies depending on how long the compressor operates in order to meet system demand.
If domestic hot water consumption increases significantly, the system pump will stop and the domestic hot water pump will be activated, using all of the unit’s heating capacity to heat the domestic hot water.



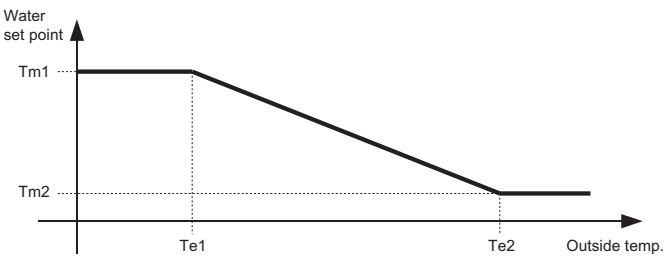
TEMPERATURE CONTROL

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. Delivering water at different temperatures to the terminals based on the outside air temperature achieves high seasonal efficiency ratios and brings 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.
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

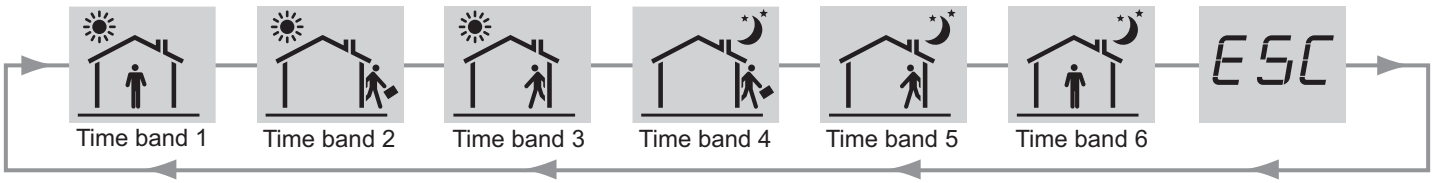


Cooling compensation curve



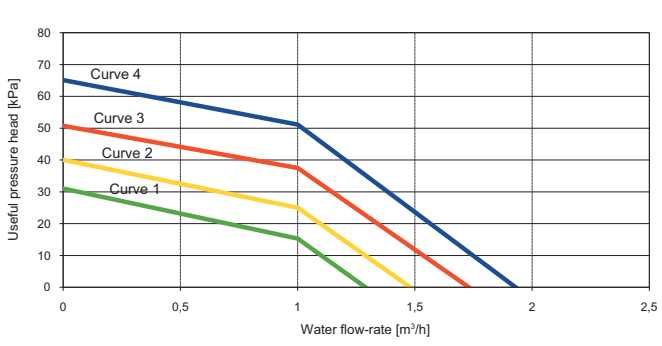
PROGRAMMING THE TIME BANDS

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 sniffing 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".
Up to four operating curves can be selected, depending on the pressure drop in the system, so as to optimise pump operation and reduce power consumption.
The pumps are class A with EC motors.



FAN SPEED CONTROL

To enable the unit to function correctly at different outside temperatures, a microprocessor with pressure reading via pressure transducer controls fan rotation speed. This allows the exchange of heat to be increased and/or decreased, maintaining condensing or evaporation pressures essentially constant.
The fan operates independently of the compressor.

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

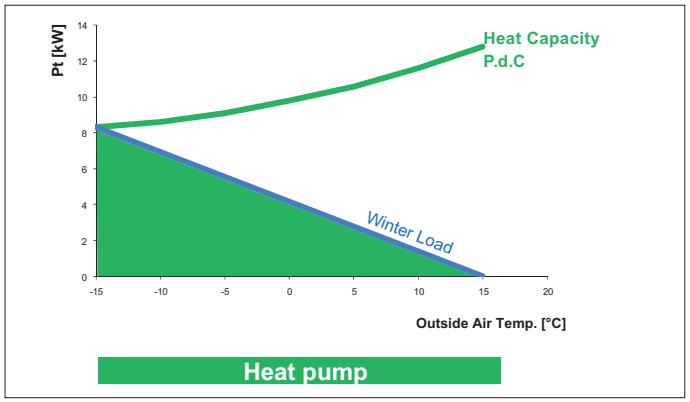
The Legionella prevention cycles are managed directly by the controller, enabling the heater in the domestic hot water storage tank domestic, with the possibility to set the duration, temperature, day and time.

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.

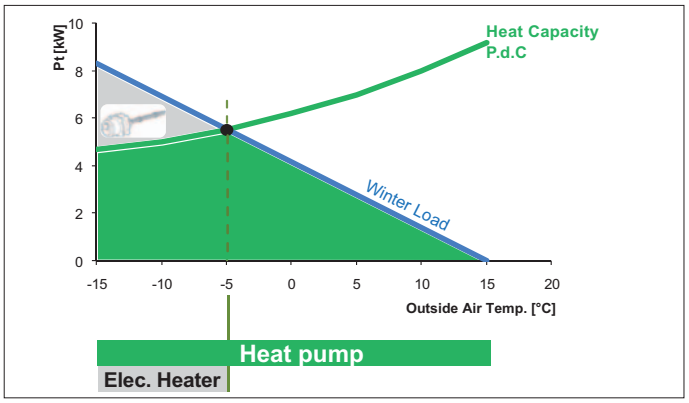
Monovalent operation

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.



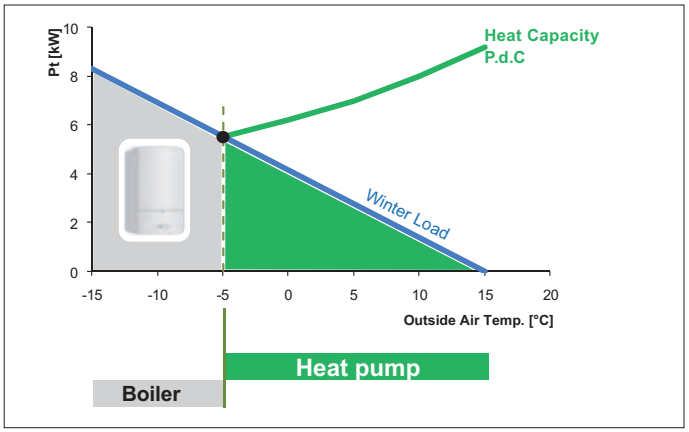
All-electric operation

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

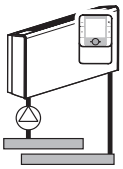
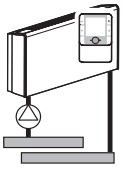
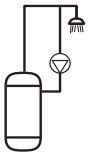
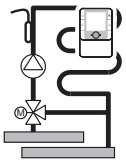
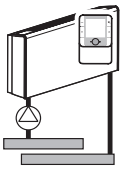
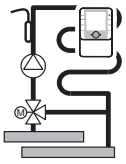
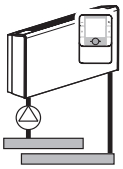
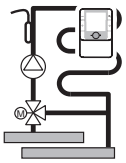
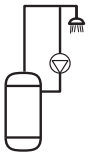
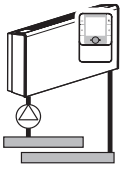
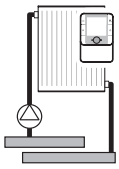
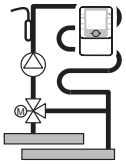
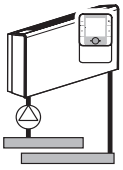
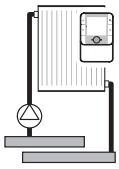
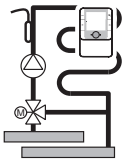
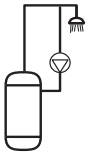
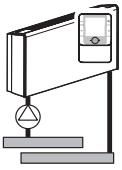
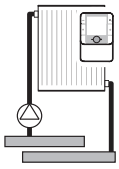
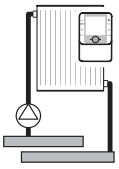
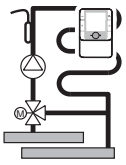
The NADISYSTEM control system for residential applications gives high operating flexibility by controlling the secondary circuits, that is, activating zone pumps and valves depending on the room temperature set on the remote keypad, and by controlling mixing valves to ensure the correct water temperature in radiant systems according to the climate conditions set for each circuit.

There are 15 different types of pre-configured system for quick and easy installation, with the possibility to manage up to 5 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	Expansion Module N-EM1	High Temp. Zone (ex. Radiator/ Fan Coil)	High Temp. Zone (ex. Radiator/ Fan Coil)	High Temp. Zone (ex. Radiator/ Fan Coil)	Low Temp. Zone (ex. Floor Heating)	Low Temp. Zone (ex. Floor Heating)	Low Temp. Zone (ex. Floor Heating)	DHW Recirculation
0	x1 standard								
1	x1 standard								
2	x1 standard								
3	x1 standard + x1 optional								
4	x1 standard + x1 optional	x1 							
5	x1 standard + x2 optional	x1 							
6	x1 standard + x2 optional	x1 							
7	x1 standard + x3 optional	x1 							

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 (maximum three).
Depending on the type and complexity of the system, expansion modules are required for connection of the components managed by the system (pumps, valves, probes etc.), as indicated in the table.
Simple installation by serial connection of the components making up the NadiSystem.

N. System Configuration	Remote Keypad N-THC	Expansion Module N-EM1	High Temp. Zone (ex. Radiator/ Fan Coil)	High Temp. Zone (ex. Radiator/ Fan Coil)	High Temp. Zone (ex. Radiator/ Fan Coil)	Low Temp. Zone (ex. Floor Heating)	Low Temp. Zone (ex. Floor Heating)	Low Temp. Zone (ex. Floor Heating)	DHW Recirculation
8	x1 standard + x3 optional	x1							
9	x1 standard + x1 optional	x1							
10	x1 standard + x1 optional	x1							
11	x1 standard + x2 optional	x1							
12	x1 standard + x3 optional	x2							
13	x1 standard + x4 optional	x2							
14	x1 standard + x2 optional	x2							

Key

- Mixing valve floor heating
- Circulation Zone pump or motorized valve
- Water probe
- DHW pump circulation
- Ambiente thermostat

* N.1 ambiente thermostat available with the heat pump
** Configurations from 4 to 14 are required additional N-THC as accessories

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 if the water temperature, measured by sensor BT8, is less than +5°C, and is deactivated at +8°C.

PRIMARY CIRCUIT FROST PROTECTION SYSTEM

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

SECONDARY CIRCUIT FROST PROTECTION SYSTEM

The pumps on the system's secondary circuit are activated together with the primary pump, according to the criterion described in the previous paragraph.

FROST PROTECTION BASED ON OUTSIDE AIR TEMPERATURE

The system and domestic hot water pumps are 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

The heat pump and/or supplementary heat sources (outlet heater or boiler) are activated if the inside temperature falls below 14°C, 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.

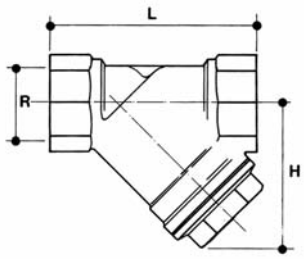
4. ACCESSORI

The accessories listed below are supplied separately.

METAL MESH WATER FILTER

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	2 mm
Inscribed hole diameter	500 micron
Number of holes per cm^2	80



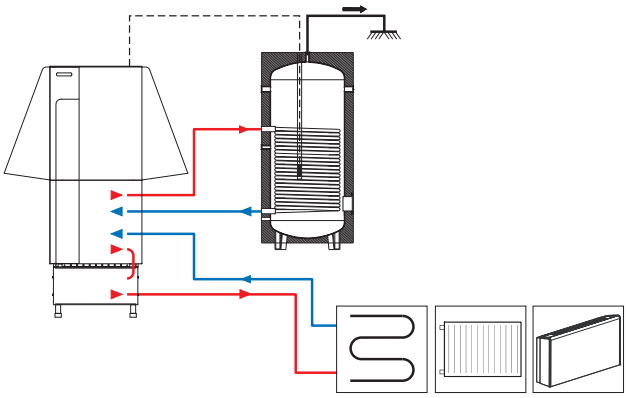
Dimensions		
DN		50
R	inch	2
L	mm	126
H	mm	90

Pressure drop		
R	inch	2
Kv		36

i-BT85 STORAGE TANK

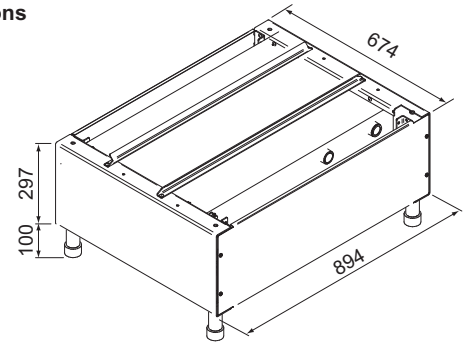
85 litre storage tank to be installed underneath the heat pump and connected using the pipe kit supplied together with the storage tank.

This accessory is essential for guaranteeing correct unit operation when there is an insufficient volume of water available in the system circuit (see "Water circuit data").

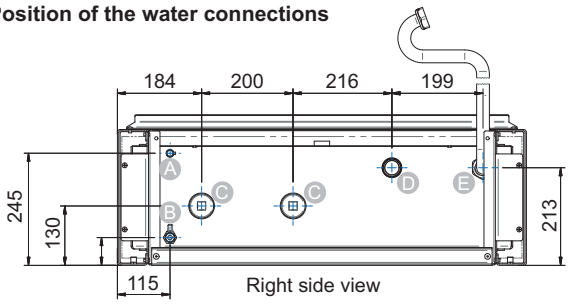


The diagram shown is purely indicative.

Dimensions



Position of the water connections

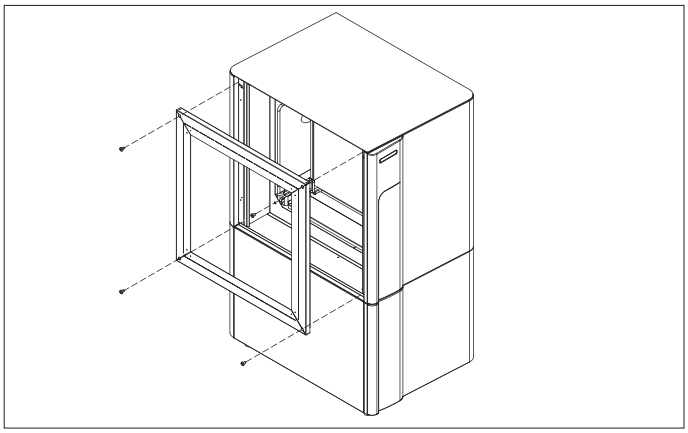


Right side view

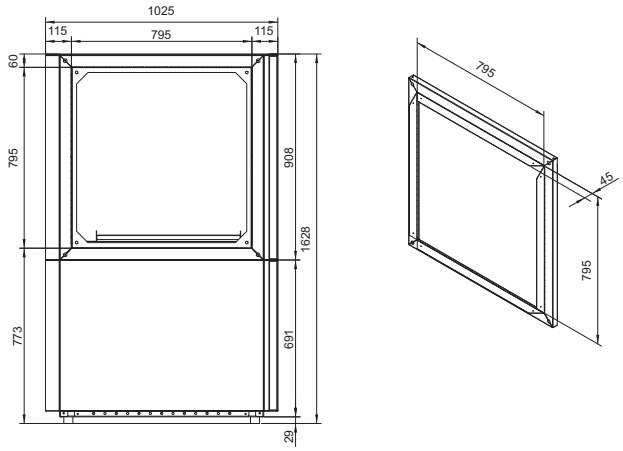
- A Manual air vent valve
- B Drain valve1/2"
- C Ready for electric heater with 2" attachment
- D Outlet 1"1/4
- E Inlet 1"1/4

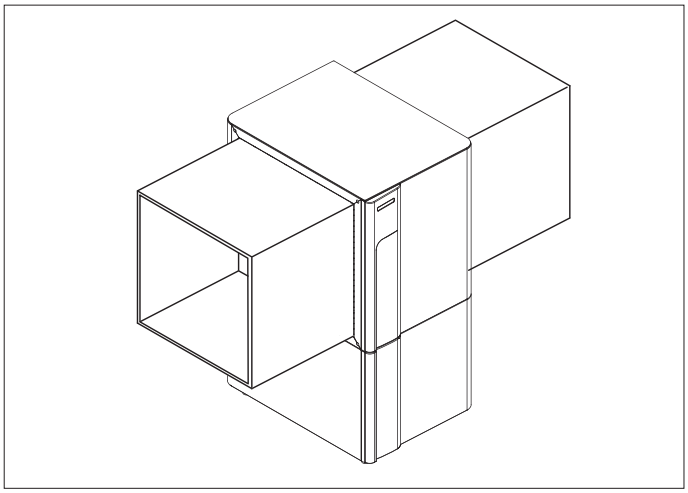
RFK FLANGE FOR RECTANGULAR DUCTS

The i-NRG heat pump can be installed internally and ducted.
The RFK flange is used to connect rectangular ducts to the i-NRG heat pump when the Climaveneta RDK kit is not used.
Make sure the functional clearances shown at the end of this bulletin are guaranteed, so as to allow maintenance and correct unit operation.



Dimensions



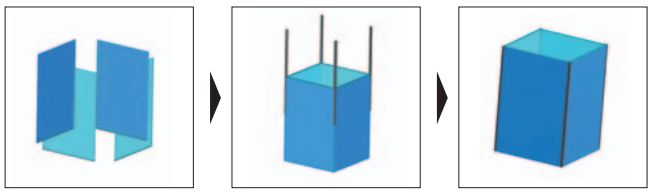


RDK RECTANGULAR DUCTING KIT

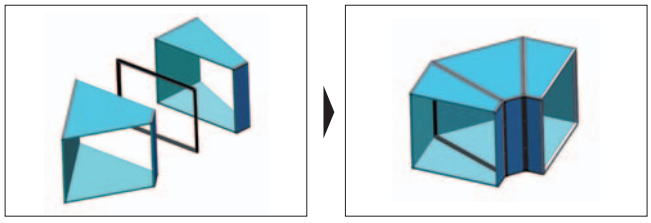
The i-NRG heat pump can be installed internally, with suitable ducting for air intake and outlet.
Climaveneta has made a suitably-sized rectangular ducting kit to guarantee correct heat pump operation.
The RDK kit is supplied with components to be assembled on site to avoid excessively large packages for shipping and storage.
The ducts are made from polyurethane foam sandwich panels (water-blown, without using greenhouse gases), covered by aluminium sheet for exceptional thermal insulation, rigidity and lightness, low pressure drop and a pleasant exterior surface finish of the aluminium sheet, which can be painted in different colours or with scratch finish or other wall coatings (standard blue finish).

The sections of ducting are assembled using a bayonet coupling system, for straight sections, and 'T' brackets for corners.

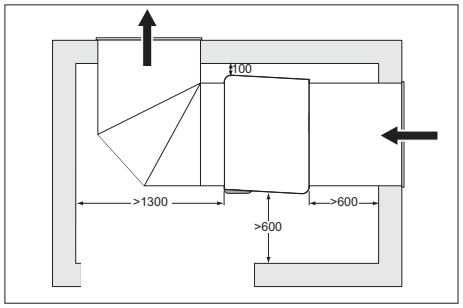
Straight duct

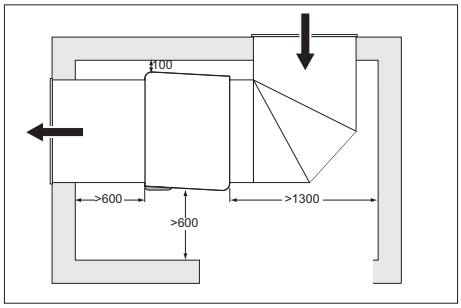


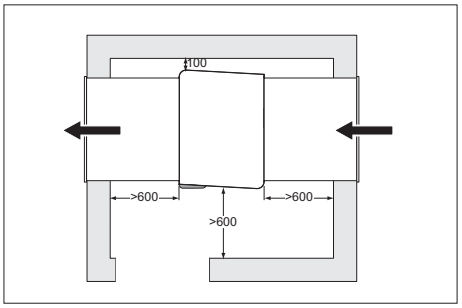
Corner



The kit comes with one straight section, 1200 mm long, and a corner piece. These can be used separately to achieve the configuration shown in the figure, thus guaranteeing the specified clearances.

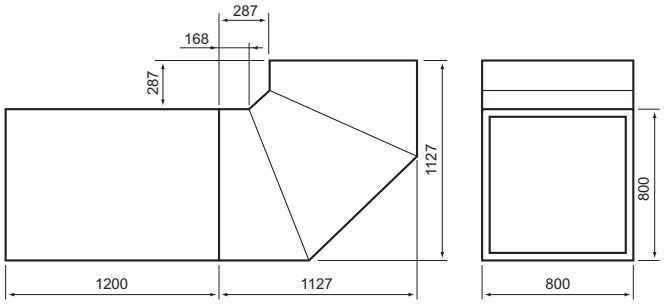






The length of the straight section of ducting can be adjusted using a simple cutter, cutting the panels to the desired length and applying the special 'F' bayonet at the ends of the duct.
If heat pump installation requires ducting of both the intake and outlet air at 90°, two RDK kits will need to be ordered.
The kit is also supplied with a grill that provides a decorative finish and protects the duct against the elements, as well as stopping small animals and leaves from entering.
The grill supplied has been specially developed for use with heat pumps to achieve lower pressure drop than traditional grills available on the market.

Dimensions

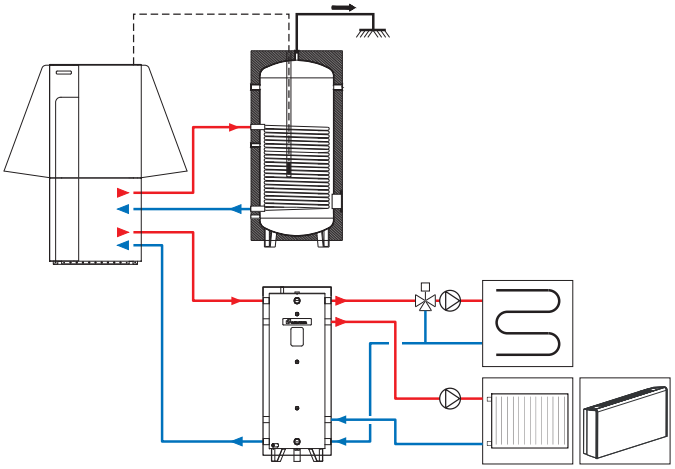


BT AND PT STORAGE TANKS

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.

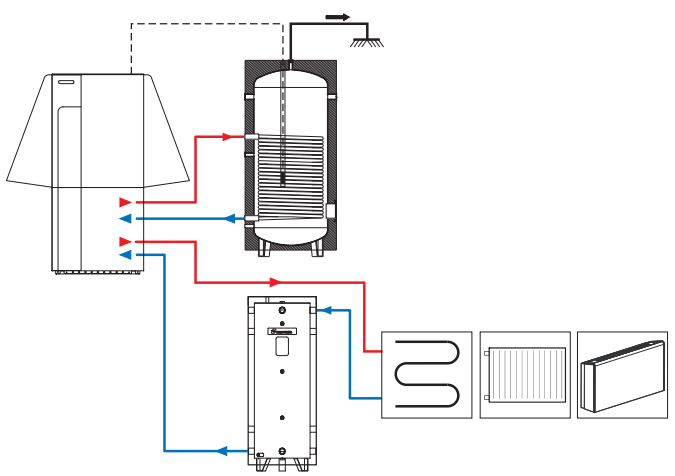
Models available	Volume
BT35	35 litres
BT100	100 litres
BT200	200 litres
TP300	300 litres

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.

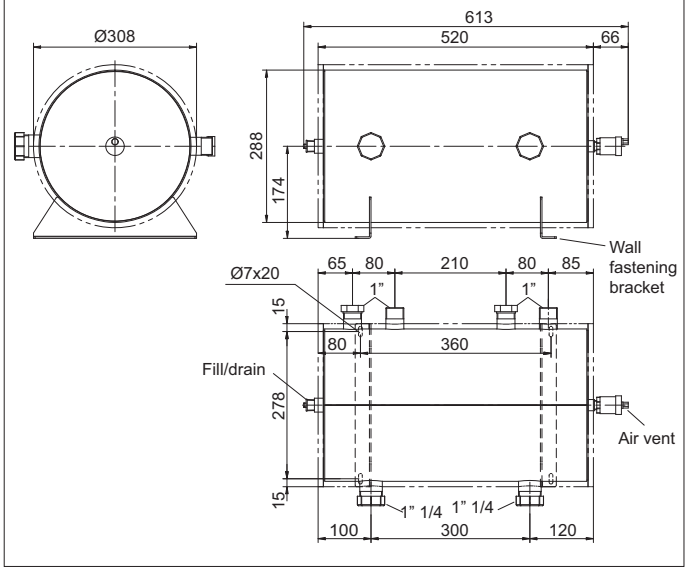
Technical specifications

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

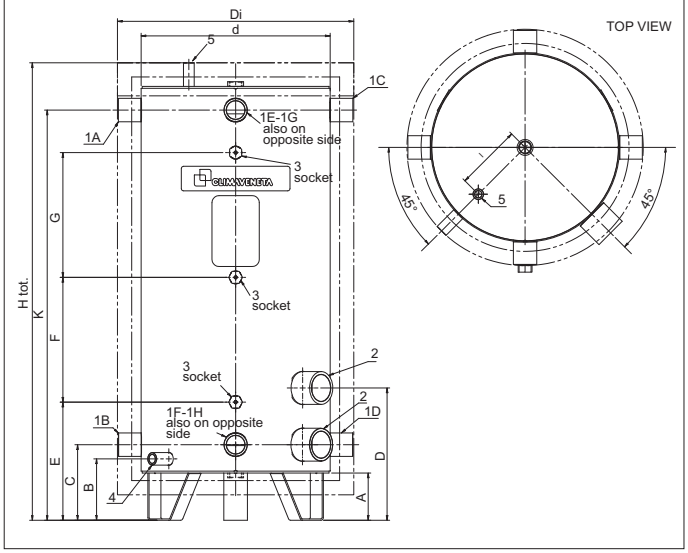


Volume	Storage tank dimensions											
	Di	d	Htot	A	B	C	D	E	F	G	K	I
litres	mm											
100	500	400	970	100	130	160	280	250	264	264	868	140
200	550	450	1410	100	130	160	280	430	374	386	1298	170
300	700	600	1235	100	130	160	280	320	321	332	1133	200

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"

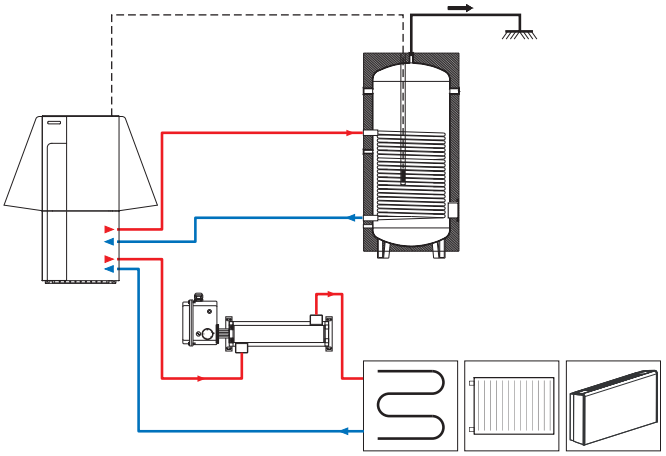
Pos.	Description
1A	Heat pump outlet
1B	Heat pump return
1C	System outlet
1D	System return
1E- G	Supplementary source outlet
1F-1H	Supplementary source return
2	Electric heater attachment
3	Probe socket
4	Drain/load
5	Vent

Dimensions - Model BT100, BT200, TP300



OUTLET ELECTRIC HEATER

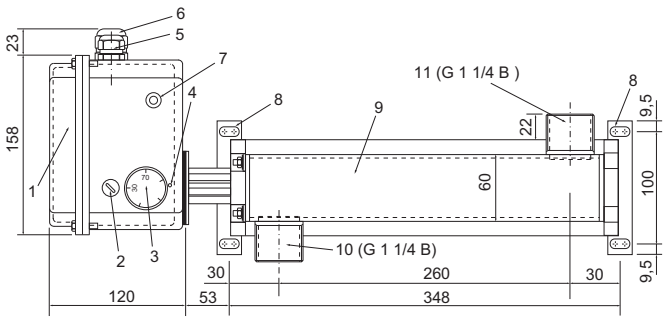
The outlet electric heaters are available with power ratings of 3 kW single-phase and 3, 6 and 9 kW three-phase.
Used on the system outlet, these guarantee the heating demand of the building at low outside temperatures by supplementing the heating capacity of the heat pump.
The electric heaters are deactivated 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



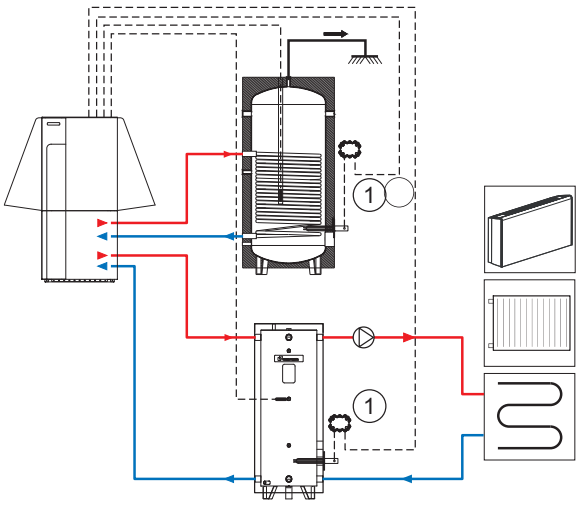
1 Terminal block cover
2 Safety thermostat manual reset
3 Control thermostat knob
4 Reference for knob full scale
5 Cable gland for control cable
6 Cable gland for power cable
7 Red light, on when the heater is operating
8 Wall fastening brackets
9 Heater body
10 Water inlet
11 Water outlet

IMMERSION ELECTRIC HEATER

The single-phase immersion electric heater can deliver 1 kW, 2k W or 3 kW depending on the electrical connections, and must only be used in immersion, via the water connections provided on the HWC storage cylinders or the BT, TP and TPS storage tanks.

The electric heater guarantees Legionella prevention or works to supplement domestic hot water production at low outside temperatures.

If used inside the TP storage tanks it can help meet building heating demand in the event of operation outside of the heat pump operating limits.

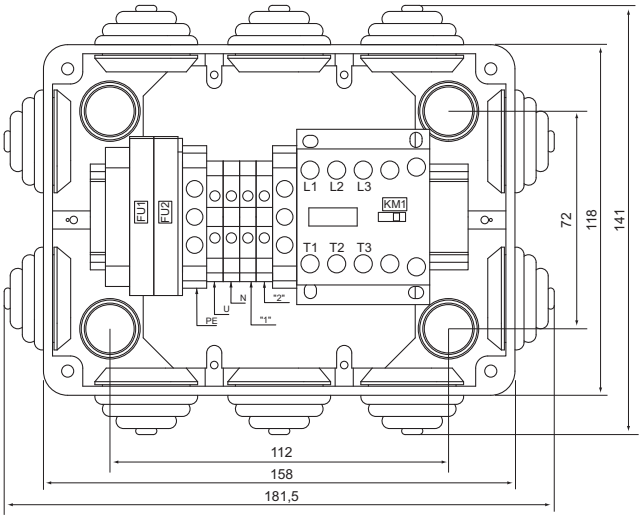


1 Immersion electric heater

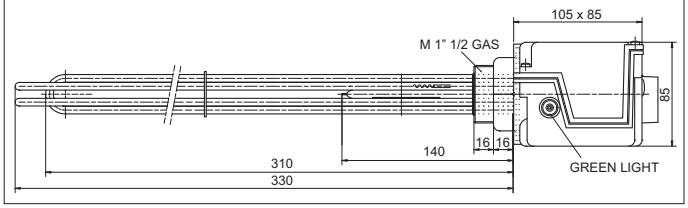
The diagram shown is purely indicative.

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



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
HWC300	300 litres
HWC500	500 litres

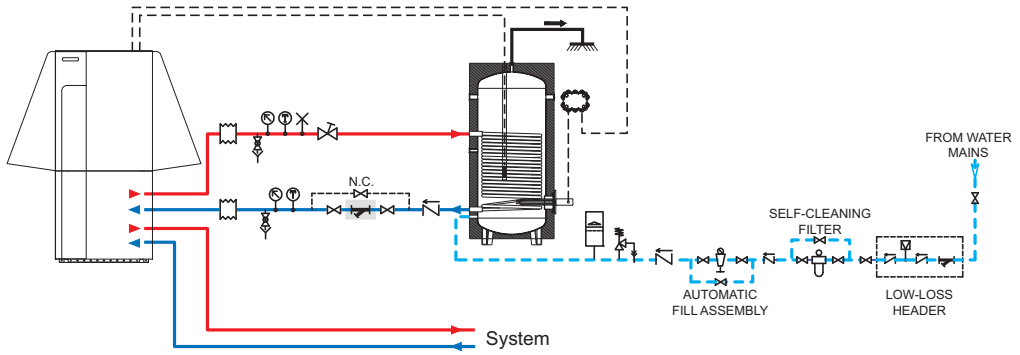
Storage cylinder and heat pump combinations									
Storage cylinder	Coil water content	Coil surface area	Combined heat pumps						
	(l)	(m^2)	11	25	31	41	51	61	91
HWC 300	22,3	3,5	x	x	x			N.A	N.A
HWC 500	38,5	5,9	x	x	x	x	x	N.A	N.A

The combinations proposed exclude the 0061 and 0091 heat pumps, which require the TPS series storage tanks.

Technical specifications

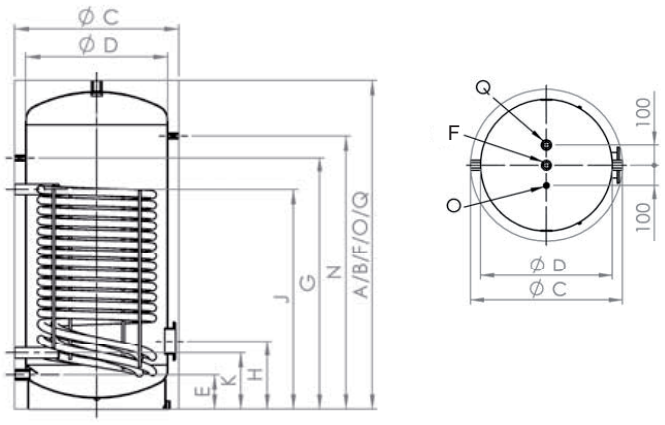
The cylinders are made from S275JR steel plate in accordance with DIN 4753 and undergo strict water pressure tests (9 bars, allowing an operating pressure of 6 bars). Lined on the inside with double layer of enamel in accordance with DIN 4753.
Protection against corrosion guaranteed by the magnesium 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

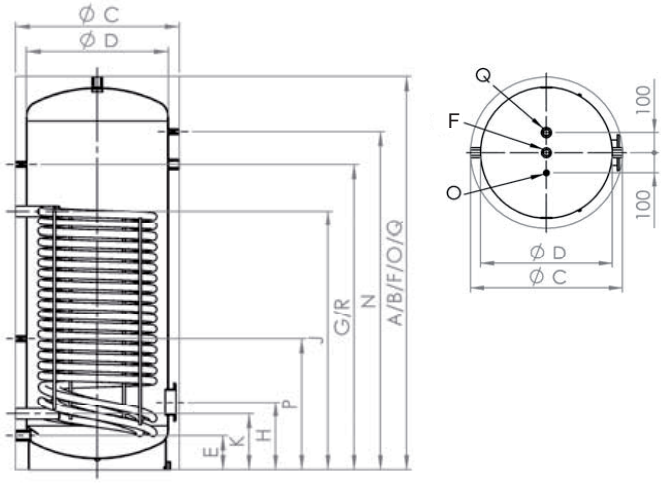


The diagram shown is purely indicative.

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

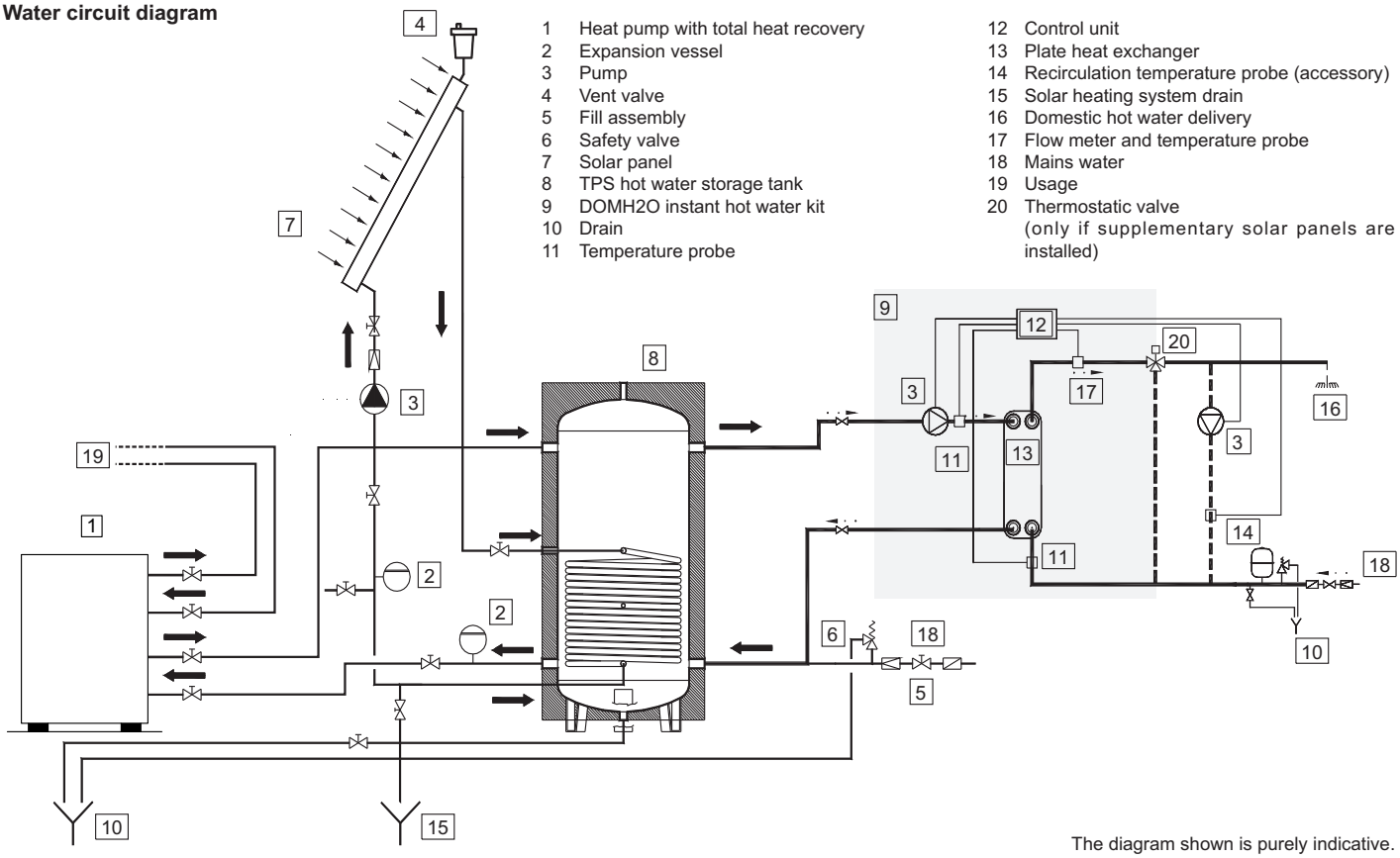
TPS STORAGE TANKS AND DOMH2O INSTANT DOMESTIC HOT WATER PRODUCTION KIT

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).

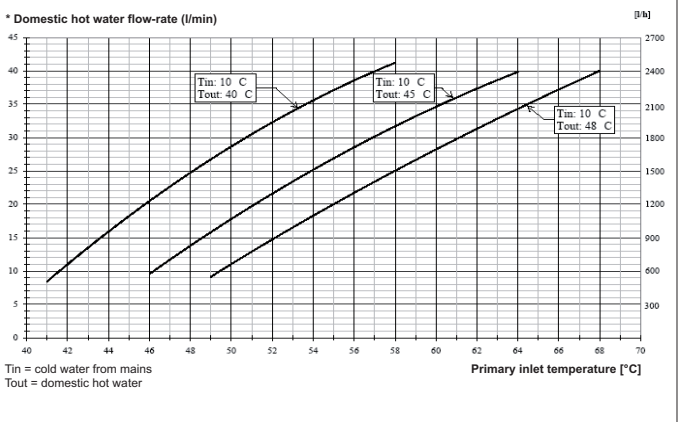
Typical combinations

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

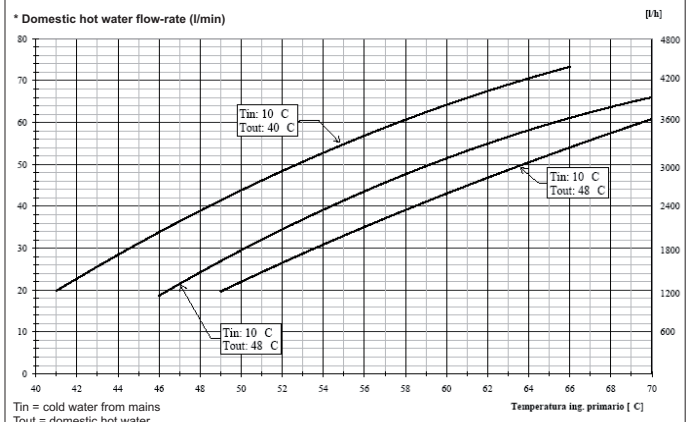
Type of home	no. of people	no. of bathrooms	Heat pump heat output	Storage tank volume	DOMH20 model
Single home	<3	1	4 - 6 kW	300	15
Single home	4 - 5	2	6 - 8 kW	500	15
Single home	5 - 6	2	10 - 13 kW	1000	24
Single home	6 - 7	3	15 - 18 kW	1000	24
2 apartments	4 - 5	2	6 - 8 kW	500	15
2 apartments	7 - 8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



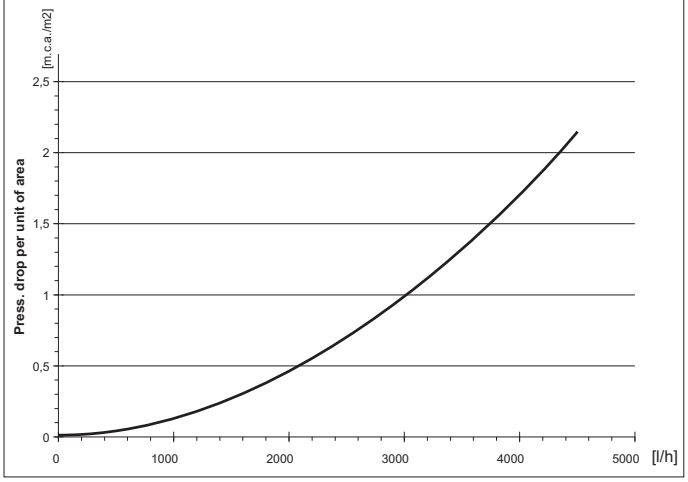
* The domestic hot water flow-rate shown on the performance curves remains constant for a variable time, depending on the volume of the storage tank. Also see the instructions in the "Selection guide".

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

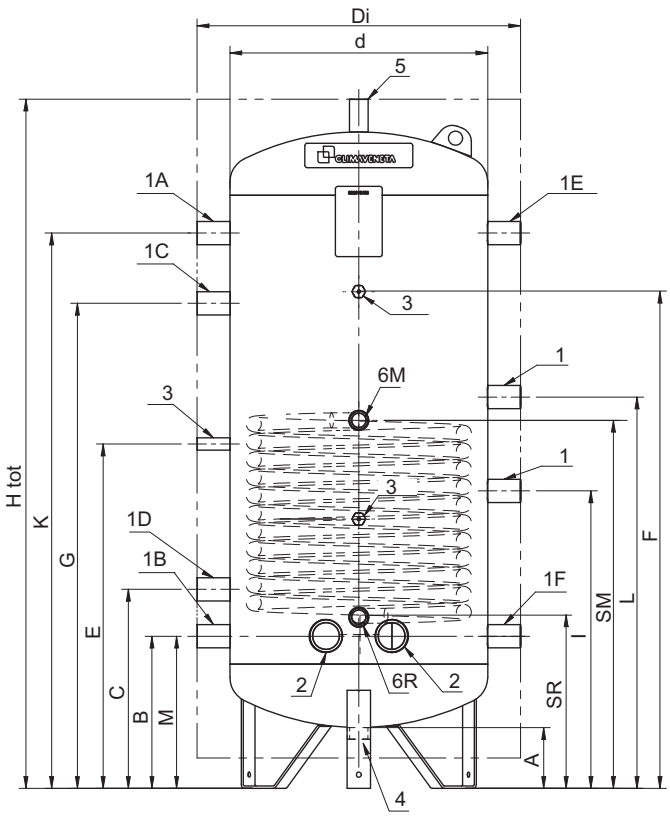
Volume	Fittings						Fixed coil	
	1	2	3	4	5	6	Surface area	Internal volume
litres	inch						m^2	l
300	1"1/4	2"	1/2"	1"1/4	1"	1"	1,5	9
500	1"1/4	2"	1/2"	1"1/4	1"	1"	2,1	13
1000	1"1/4	2"	1/2"	1"1/4	1"	1"	4	25

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

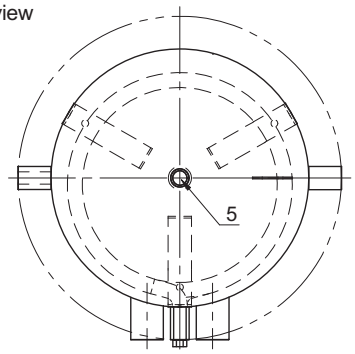
Solar heating coil pressure drop in TPS storage tanks



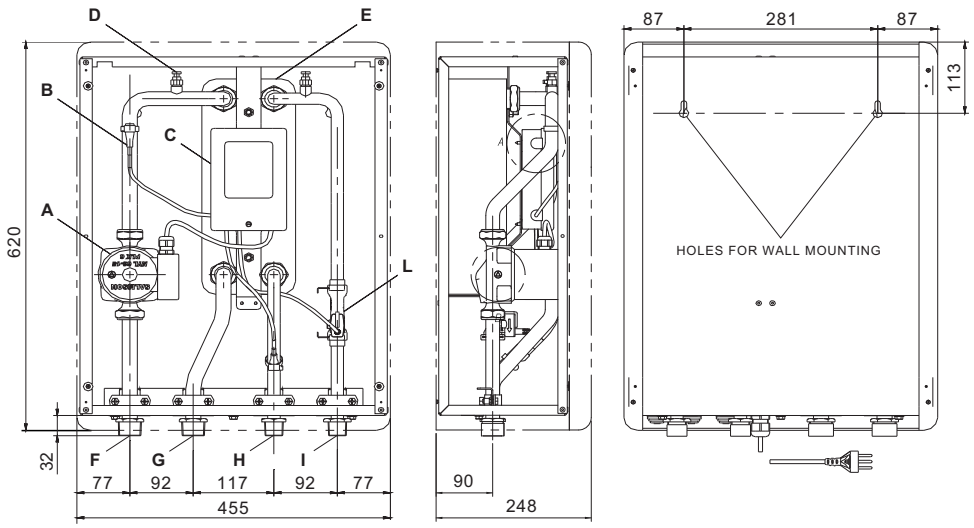
Dimensions - TPS storage tank



Top view



Dimensions - DOMH2O instant domestic hot water production kit



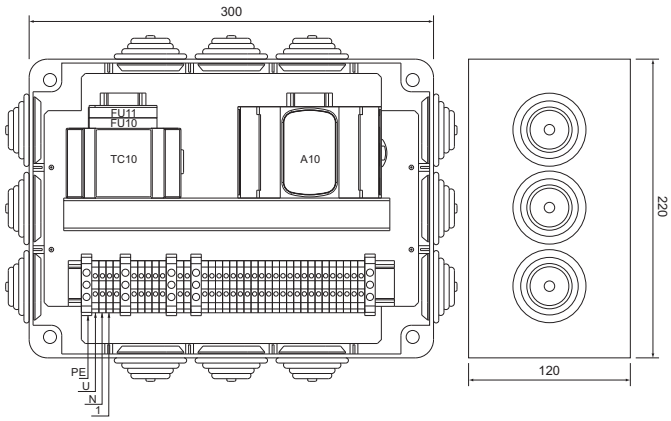
Pos.	Description
A	Primary circuit pump
B	Primary circuit temperature probe
C	Control unit
D	Manual vent valve
E	Plate heat exchanger
F	Primary circuit outlet
G	Primary circuit return
H	Mains water inlet
I	Domestic hot water outlet
L	Flow meter and temperature probe

N-EM1 EXPANSION MODULE FOR SYSTEM CONFIGURATION

The NADISYSTEM control system for residential applications gives high operating flexibility, activating zone pumps and valves depending on the set room temperature, and controlling mixing valves to ensure the correct water temperature in radiant systems according to the climate conditions set for each circuit.
With NADISYSTEM there up to 15 different types of system pre-configurations for quick and easy installation, and up to 5 remote keypads for controlling thermal load in likewise zones.

The N-EM1 expansion module is used to connect the secondary circuit components and corresponding zone thermostats depending on the selected configuration.
Up to 3 expansion modules can be used to create more complex systems.
The meaning of the terminals may change based on the selected configuration, the connections are shown on the instruction sheet provided with the expansion module.

Dimensions - N-EM1 expansion module



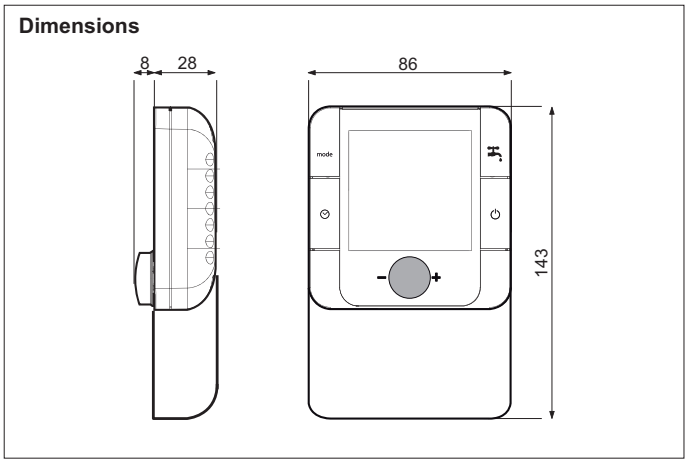
A10	Expansion module
FU10	10A fuse
FU11	1.25A fuse
TC10	230V/24V transformer

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 5 different 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 and humidity setting (temperature and humidity probe supplied as standard)
- Operating mode setting: heating, cooling, automatic mode changeover
- Enable domestic hot water production
- Served zone on/off
- Program time bands
- Wall-mounted installation (maximum distance 500 metres)

Dimensions



N-CM CASCADE MANAGEMENT KEYPAD

The N-CM keypad allows cascaded connection of up to 4 heat pumps to increase capacity delivered in applications with multiple occupied areas, such as hotels, schools, apartment blocks, offices and shopping centres.

The units are managed in master-slave mode, with the master unit responsible for processing the information and sending it to the slave units.

This ensures fine control over the capacity delivered, without decreasing performance, and more precise system sizing.

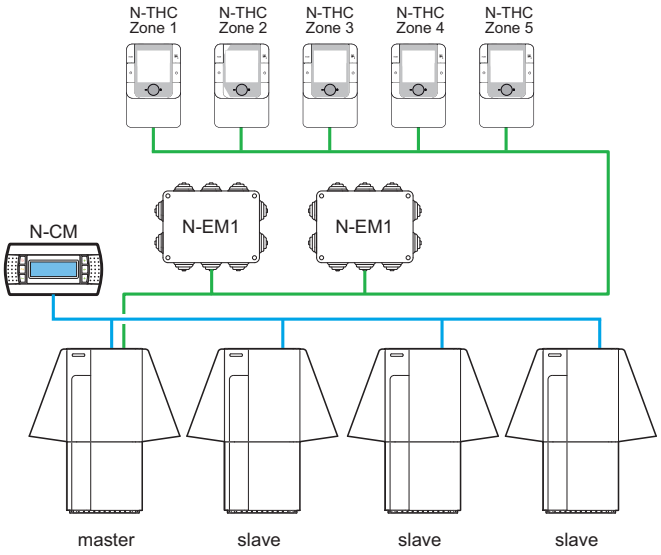
NADISYSTEM can determine how many cascaded units are needed to guarantee domestic hot water production, all or just one, according to requirements.

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.

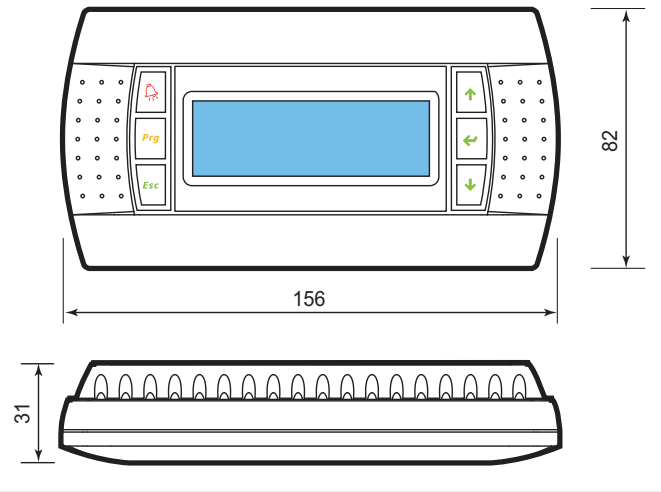
If the malfunctioning unit is the master, the operating parameters are transferred to another unit in the cascade, thus restoring partial operation.

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 5 zones.

System architecture

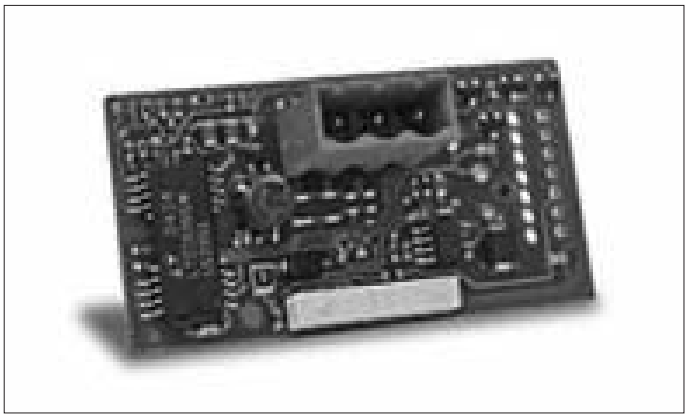


Dimensions



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.



5. GENERAL TECHNICAL DATA

HYDRONIC TERMINAL APPLICATION i-NRG XE 230V

SIZE		0061						
i-NRG/230 /B								
COOLING	(1)							
Cooling capacity	**kW**	**14,7**						
Total power input (unit)	kW	5,14						
EER		2,88						
ESEER		4,47						
Heat exchanger water flow	m³/h	2,53						
Heat exchanger pressure drop	kPa	24,7						
i-NRG/230 /B								
HEATING	(2)							
Heating capacity	**kW**	**15,7**						
Total power input (unit)	kW	4,80						
COP		3,27						
Heat exchanger water flow	m³/h	2,73						
Heat exchanger pressure drop	kPa	28,9						
i-NRG/230 /B								
COOLING WITH TOTAL RECOVERY	(3)							
Cooling capacity	kW	13,8						
Total power input (unit)	kW	4,43						
Heat exchanger water flow	m³/h	2,53						
Heat exchanger pressure drop	kPa	24,7						
Heat recovery thermal capacity	**kW**	**17,9**						
Heat exchanger recovery water flow	m³/h	3,11						
Plant side heat exchanger recovery pressure drop	kPa	37,6						
i-NRG/230 /B								
TOTAL RECOVERY ONLY	(4)							
Total heat recovery capacity	**kW**	**15,7**						
Total power input (unit)	kW	4,20						
Heat exchanger recovery water flow	m³/h	2,73						
Heat exchanger recovery pressure drop	kPa	28,9						
COMPRESSORS								
Number	N°.	1						
Number of capacity	N°.	-						
Number of circuits	N°.	1						
Type of regulation		STEPLESS						
Minimum capacity steps	%	33						
Type of refrigerant		R410A						
Refrigerant charge	kg.	6,55						
Oil charge	kg.	1,4						
FANS								
Number	N°.	1						
Air flow	m³/s	2,22						
Singol power input	kW	0,6						
NOISE LEVELS	(5)							
Total sound power	dB(A)	68						
Total sound pressure	dB(A)	52						
DIMENSIONS AND WEIGHTS	(6)							
Length	mm.	750						
Width	mm.	1050						
Height	mm.	1600						
Weight	kg.	260						

1 Plant (side) cooling exchanger water (in/out) 12/7 °C
Heat exchanger air (in) 35 °C
2 Plant (side) heating exchanger water (in/out) 40/45 °C
Source (side) heat exchanger air (in) 7 °C 87% R.H.
3 Plant (side) cooling exchanger water (in/out) 12/7 °C
Heat exchanger air (in) 35 °C
Plant (side) heat exchanger recovery water (in/out) 40/45 °C
4 Plant (side) heat exchanger recovery water (in/out) 40/45 °C
Source (side) heat exchanger air (in) 7 °C
5 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units
Average sound pressure level, at 1 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level
6 Standard configuration
- Not available

HYDRONIC TERMINAL APPLICATION i-NRG 400V

SIZE		0061						
i-NRG /B								
COOLING	(1)							
Cooling capacity	**kW**	**14,7**						
Total power input (unit)	kW	5,08						
EER		2,88						
ESEER		4,33						
Heat exchanger water flow	m³/h	2,53						
Heat exchanger pressure drop	kPa	24,9						
i-NRG /B								
HEATING	(2)							
Heating capacity	**kW**	**15,7**						
Total power input (unit)	kW	4,75						
COP		3,34						
Heat exchanger water flow	m³/h	2,73						
Heat exchanger pressure drop	kPa	28,9						
i-NRG /B								
COOLING WITH TOTAL RECOVERY	(3)							
Cooling capacity	kW	13,8						
Total power input (unit)	kW	4,38						
Heat exchanger water flow	m³/h	2,53						
Heat exchanger pressure drop	kPa	24,9						
Heat recovery thermal capacity	**kW**	**17,9**						
Heat exchanger recovery water flow	m³/h	3,11						
Plant side heat exchanger recovery pressure drop	kPa	37,6						
i-NRG /B								
TOTAL RECOVERY ONLY	(4)							
Total heat recovery capacity	**kW**	**15,7**						
Total power input (unit)	kW	4,15						
Heat exchanger recovery water flow	m³/h	2,73						
Heat exchanger recovery pressure drop	kPa	28,9						
COMPRESSORS								
Number	N°.	1						
Number of capacity	N°.	-						
Number of circuits	N°.	1						
Type of regulation		STEPLESS						
Minimum capacity steps	%	33						
Type of refrigerant		R410A						
Refrigerant charge	kg.	6,55						
Oil charge	kg.	1,4						
FANS								
Number	N°.	1						
Air flow	m³/s	2,22						
Singol power input	kW	0,6						
NOISE LEVELS	(5)							
Total sound power	dB(A)	68						
Total sound pressure	dB(A)	52						
DIMENSIONS AND WEIGHTS	(6)							
Length	mm.	750						
Width	mm.	1050						
Height	mm.	1600						
Weight	kg.	260						

1 Plant (side) cooling exchanger water (in/out) 12/7 °C
Heat exchanger air (in) 35 °C
2 Plant (side) heating exchanger water (in/out) 40/45 °C
Source (side) heat exchanger air (in) 7 °C 87% R.H.
3 Plant (side) cooling exchanger water (in/out) 12/7 °C
Heat exchanger air (in) 35 °C
Plant (side) heat exchanger recovery water (in/out) 40/45 °C
4 Plant (side) heat exchanger recovery water (in/out) 40/45 °C
Source (side) heat exchanger air (in) 7 °C
5 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units
Average sound pressure level, at 1 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level
6 Standard configuration
- Not available

RADIANT PANEL APPLICATION i-NRG 230V

SIZE		0061						
i-NRG/230 /B								
COOLING	(1)							
Cooling capacity	**kW**	**19,6**						
Total power input (unit)	kW	5,42						
EER		3,63						
ESEER		4,47						
Heat exchanger water flow	m³/h	3,39						
Heat exchanger pressure drop	kPa	44,5						
i-NRG/230 /B								
HEATING	(2)							
Heating capacity	**kW**	**16,3**						
Total power input (unit)	kW	4,02						
COP		4,08						
Heat exchanger water flow	m³/h	2,82						
Heat exchanger pressure drop	kPa	30,8						
i-NRG/230 /B								
COOLING WITH TOTAL RECOVERY	(3)							
Cooling capacity	kW	17,9						
Total power input (unit)	kW	4,94						
Heat exchanger water flow	m³/h	3,39						
Heat exchanger pressure drop	kPa	44,5						
Heat recovery thermal capacity	**kW**	**22,6**						
Heat exchanger recovery water flow	m³/h	3,93						
Plant side heat exchanger recovery pressure drop	kPa	59,8						
i-NRG/230 /B								
TOTAL RECOVERY ONLY	(4)							
Total heat recovery capacity	**kW**	**15,4**						
Total power input (unit)	kW	4,66						
Heat exchanger recovery water flow	m³/h	2,69						
Heat exchanger recovery pressure drop	kPa	28,0						
COMPRESSORS								
Number	N°.	1						
Number of capacity	N°.	-						
Number of circuits	N°.	1						
Type of regulation		STEPLESS						
Minimum capacity steps	%	33						
Type of refrigerant		R410A						
Refrigerant charge	kg.	6,55						
Oil charge	kg.	1,4						
FANS								
Number	N°.	1						
Air flow	m³/s	2,22						
Singol power input	kW	0,6						
NOISE LEVELS	(5)							
Total sound power	dB(A)	68						
Total sound pressure	dB(A)	52						
DIMENSIONS AND WEIGHTS	(6)							
Length	mm.	750						
Width	mm.	1050						
Height	mm.	1600						
Weight	kg.	260						

1 Plant (side) cooling exchanger water (in/out) 23/18 °C
Heat exchanger air (in) 35 °C
2 Plant (side) heating exchanger water (in/out) 30/35 °C
Source (side) heat exchanger air (in) 7 °C 87% R.H.
3 Plant (side) cooling exchanger water (in/out) 23/18 °C
Heat exchanger air (in) 35 °C
Plant (side) heat exchanger recovery water (in/out) 45/50 °C
4 Plant (side) heat exchanger recovery water (in/out) 45/50 °C
Source (side) heat exchanger air (in) 7 °C
5 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units
Average sound pressure level, at 1 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level
6 Standard configuration
- Not available

RADIANT PANEL APPLICATION i-NRG 400V

SIZE		0061						
i-NRG /B								
COOLING	(1)							
Cooling capacity	**kW**	**19,7**						
Total power input (unit)	kW	5,37						
EER		3,65						
ESEER		4,33						
Heat exchanger water flow	m³/h	3,40						
Heat exchanger pressure drop	kPa	44,7						
i-NRG /B								
HEATING	(2)							
Heating capacity	**kW**	**16,3**						
Total power input (unit)	kW	4,00						
COP		4,08						
Heat exchanger water flow	m³/h	2,82						
Heat exchanger pressure drop	kPa	30,8						
i-NRG /B								
COOLING WITH TOTAL RECOVERY	(3)							
Cooling capacity	kW	18,0						
Total power input (unit)	kW	4,88						
Heat exchanger water flow	m³/h	3,40						
Heat exchanger pressure drop	kPa	44,7						
Heat recovery thermal capacity	**kW**	**22,6**						
Heat exchanger recovery water flow	m³/h	3,93						
Plant side heat exchanger recovery pressure drop	kPa	59,8						
i-NRG /B								
TOTAL RECOVERY ONLY	(4)							
Total heat recovery capacity	**kW**	**15,4**						
Total power input (unit)	kW	4,60						
Heat exchanger recovery water flow	m³/h	2,68						
Heat exchanger recovery pressure drop	kPa	27,9						
COMPRESSORS								
Number	N°.	1						
Number of capacity	N°.	-						
Number of circuits	N°.	1						
Type of regulation		STEPLESS						
Minimum capacity steps	%	33						
Type of refrigerant		R410A						
Refrigerant charge	kg.	6,55						
Oil charge	kg.	1,4						
FANS								
Number	N°.	1						
Air flow	m³/s	2,22						
Singol power input	kW	0,6						
NOISE LEVELS	(5)							
Total sound power	dB(A)	68						
Total sound pressure	dB(A)	52						
DIMENSIONS AND WEIGHTS	(6)							
Length	mm.	750						
Width	mm.	1050						
Height	mm.	1600						
Weight	kg.	260						

1 Plant (side) cooling exchanger water (in/out) 23/18 °C
Heat exchanger air (in) 35 °C
2 Plant (side) heating exchanger water (in/out) 30/35 °C
Source (side) heat exchanger air (in) 7 °C 87% R.H.
3 Plant (side) cooling exchanger water (in/out) 23/18 °C
Heat exchanger air (in) 35 °C
Plant (side) heat exchanger recovery water (in/out) 45/50 °C
4 Plant (side) heat exchanger recovery water (in/out) 45/50 °C
Source (side) heat exchanger air (in) 7 °C
5 Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units
Average sound pressure level, at 1 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level
6 Standard configuration
- Not available

COOLING PERFORMANCE i-NRG 230V

0061																		
Ta	**20**	**25**	**30**	**35**	**40**	**45**	**20**	**25**	**30**	**35**	**40**	**45**	**20**	**25**	**30**	**35**	**40**	**45**
Tev			**7**						**9**						**12**			
Pf	**17,2**	**16,4**	**15,6**	**14,7**	**13,7**	**12,6**	**18,2**	**17,4**	**16,5**	**15,6**	**14,5**	**13,4**	**19,8**	**18,9**	**18,0**	**16,9**	**15,8**	**14,6**
Pat	3,93	4,29	4,69	5,14	5,63	6,18	3,96	4,33	4,74	5,20	5,71	6,26	3,98	4,38	4,81	5,29	5,82	6,38
Qev	2,96	2,83	2,68	2,53	2,36	2,18	3,14	3,00	2,85	2,68	2,50	2,31	3,41	3,26	3,09	2,92	2,73	2,52
Dpev	33,9	31,0	27,9	24,7	21,5	18,3	38,2	34,9	31,4	27,9	24,3	20,8	45,1	41,2	37,1	33,0	28,8	24,7
Tev			**13**						**15**						**18**			
Pf	**20,3**	**19,4**	**18,4**	**17,4**	**16,2**	**15,1**	**21,4**	**20,4**	**19,4**	**18,3**	**17,1**	**15,9**	**23,0**	**22,0**	**20,8**	**19,6**	**18,4**	**17,1**
Pat	3,98	4,39	4,83	5,32	5,85	6,42	3,98	4,40	4,86	5,36	5,90	6,48	3,96	4,41	4,90	5,42	5,97	6,57
Qev	3,51	3,35	3,18	3,00	2,80	2,60	3,69	3,52	3,34	3,15	2,95	2,74	3,98	3,79	3,59	3,39	3,17	2,95
Dpev	47,6	43,4	39,1	34,8	30,4	26,1	52,8	48,1	43,3	38,5	33,7	29,0	61,3	55,6	50,0	44,5	39,1	33,8

COOLING PERFORMANCE i-NRG 400V

0061																		
Ta	**20**	**25**	**30**	**35**	**40**	**45**	**20**	**25**	**30**	**35**	**40**	**45**	**20**	**25**	**30**	**35**	**40**	**45**
Tev			**7**						**9**						**12**			
Pf	**17,2**	**16,5**	**15,6**	**14,7**	**13,7**	**12,7**	**18,3**	**17,5**	**16,6**	**15,6**	**14,6**	**13,5**	**19,9**	**19,0**	**18,0**	**17,0**	**15,9**	**14,7**
Pat	3,92	4,26	4,65	5,08	5,57	6,11	3,94	4,30	4,70	5,15	5,65	6,20	3,96	4,34	4,77	5,24	5,76	6,32
Qev	2,97	2,84	2,69	2,53	2,36	2,18	3,15	3,01	2,85	2,69	2,51	2,32	3,42	3,27	3,10	2,92	2,73	2,53
Dpev	34,1	31,1	28,1	24,9	21,7	18,4	38,4	35,1	31,6	28,0	24,4	20,9	45,4	41,4	37,3	33,1	29,0	24,8
Tev			**13**						**15**						**18**			
Pf	**20,4**	**19,5**	**18,5**	**17,4**	**16,3**	**15,1**	**21,5**	**20,5**	**19,4**	**18,3**	**17,1**	**15,9**	**23,1**	**22,0**	**20,9**	**19,7**	**18,4**	**17,2**
Pat	3,96	4,35	4,79	5,27	5,79	6,35	3,95	4,37	4,82	5,31	5,84	6,41	3,93	4,37	4,86	5,37	5,91	6,49
Qev	3,52	3,36	3,18	3,00	2,81	2,60	3,70	3,53	3,35	3,16	2,96	2,75	3,99	3,80	3,60	3,40	3,18	2,96
Dpev	47,9	43,6	39,3	34,9	30,6	26,3	53,1	48,3	43,5	38,7	33,9	29,2	61,6	55,9	50,2	44,7	39,3	34,0

Ta [°C] - Air temperature
Tev [°C] - Plant (side) cooling exchanger output water temperature
Pat [kW] - Total power input
Qev [m³/h] - Plant (side) heat exchanger water flow
Dpev [kPa] - Plant (side) cooling exchanger pressure drop

Pf [kW] - Cooling capacity
'-' Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

HEATING PERFORMANCE i-NRG 230V

0061																		
Ta	**-15**	**-10**	**-5**	**0**	**2**	**7**	**-15**	**-10**	**-5**	**0**	**2**	**7**	**-15**	**-10**	**-5**	**0**	**2**	**7**
Tcd			**30**						**35**						**45**			
Pt	**9,48**	**10,7**	**12,1**	**13,8**	**14,5**	**16,5**	**8,95**	**10,3**	**11,9**	**13,6**	**14,3**	**16,3**	**8,31**	**9,82**	**11,4**	**13,1**	**13,9**	**15,7**
Qcd	1,64	1,85	2,10	2,39	2,51	2,86	1,55	1,79	2,05	2,35	2,48	2,82	1,44	1,71	1,99	2,29	2,41	2,73
Pcd	10,4	13,3	17,1	22,1	24,5	31,6	9,31	12,4	16,3	21,4	23,8	30,8	8,08	11,3	15,3	20,2	22,5	28,9
Pat	3,20	3,37	3,52	3,62	3,65	3,71	3,54	3,70	3,83	3,93	3,96	4,02	4,35	4,48	4,59	4,69	4,72	4,80
Ta	**-15**	**-10**	**-5**	**0**	**2**	**7**	**-15**	**-10**	**-5**	**0**	**2**	**7**	**-15**	**-10**	**-5**	**0**	**2**	**7**
Tcd			**50**						**55**						**60**			
Pt	**8,21**	**9,71**	**11,3**	**13,0**	**13,6**	**15,4**	**8,25**	**9,69**	**11,2**	**12,8**	**13,4**	**15,1**	**-**	**-**	**11,2**	**12,6**	**13,2**	**14,8**
Qcd	1,43	1,69	1,97	2,26	2,38	2,69	1,44	1,69	1,95	2,23	2,34	2,64	-	-	1,95	2,21	2,31	2,58
Pcd	7,91	11,1	15,0	19,7	21,9	28,0	8,02	11,1	14,8	19,3	21,3	26,9	-	-	14,7	18,8	20,7	25,9
Pat	4,83	4,94	5,05	5,14	5,18	5,26	5,34	5,45	5,55	5,65	5,68	5,77	-	-	6,10	6,20	6,23	6,33

HEATING PERFORMANCE i-NRG 400V

0061																		
Ta	**-15**	**-10**	**-5**	**0**	**2**	**7**	**-15**	**-10**	**-5**	**0**	**2**	**7**	**-15**	**-10**	**-5**	**0**	**2**	**7**
Tcd			**30**						**35**						**45**			
Pt	**9,39**	**10,6**	**12,1**	**-**	**14,5**	**16,5**	**8,90**	**10,3**	**11,8**	**-**	**14,3**	**16,3**	**8,30**	**9,80**	**11,4**	**-**	**13,8**	**15,7**
Qcd	1,62	1,84	2,10	-	2,52	2,86	1,54	1,78	2,05	-	2,48	2,82	1,44	1,70	1,98	-	2,41	2,73
Pcd	10,2	13,1	17,0	-	24,5	31,7	9,21	12,3	16,3	-	23,8	30,8	8,06	11,2	15,2	-	22,4	28,9
Pat	3,15	3,34	3,50	-	3,65	3,70	3,50	3,67	3,80	-	3,93	4,00	4,31	4,44	4,55	-	4,67	4,75
Ta	**-15**	**-10**	**-5**	**0**	**2**	**7**	**-15**	**-10**	**-5**	**0**	**2**	**7**	**-15**	**-10**	**-5**	**0**	**2**	**7**
Tcd			**50**						**55**						**60**			
Pt	**8,19**	**9,69**	**11,3**	**-**	**13,6**	**15,4**	**8,21**	**9,65**	**11,2**	**-**	**13,4**	**15,1**	**-**	**-**	**11,1**	**-**	**13,2**	**14,8**
Qcd	1,43	1,69	1,96	-	2,37	2,68	1,43	1,68	1,95	-	2,34	2,63	-	-	1,94	-	2,30	2,58
Pcd	7,88	11,0	14,9	-	21,8	27,9	7,94	11,0	14,7	-	21,2	26,8	-	-	14,6	-	20,6	25,8
Pat	4,77	4,89	4,99	-	5,12	5,20	5,26	5,38	5,48	-	5,62	5,71	-	-	6,03	-	6,18	6,27

Ta [°C] - Air temperature
Tcd (°C) - Source (side) heat exchanger output water temperature
Pt (kW) - Heating capacity
Pat (kW) - Total power input
Qcd (m³/h) - Source (side) heat exchanger water flow

Dpcd (kPa) - Source (side) heat exchanger pressure drop
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T
NOTE: Data on grey background: unit switched to non-silenced operation

COOLING PERFORMANCE WITH TOTAL HEAT RECOVERY i-NRG 230V

0061																		
Tre	**50**	**55**	**60**	**50**	**55**	**60**	**50**	**55**	**60**	**50**	**55**	**60**	**50**	**55**	**60**	**50**	**55**	**60**
Tev		**7**			**9**			**12**			**13**			**15**			**18**	
Pf	12,8	11,8	10,8	13,7	12,7	11,6	15,1	14,0	12,8	15,6	14,4	13,3	16,5	15,3	14,1	17,9	16,7	15,5
Qev	2,53	2,53	2,53	2,68	2,68	2,68	2,92	2,92	2,92	3,00	3,00	3,00	3,15	3,15	3,15	3,39	3,39	3,39
Dpev	24,7	24,7	24,7	27,9	27,9	27,9	33,0	33,0	33,0	34,8	34,8	34,8	38,5	38,5	38,5	44,5	44,5	44,5
Pat	4,94	5,49	6,10	4,96	5,52	6,14	4,97	5,55	6,17	4,97	5,55	6,18	4,97	5,55	6,19	4,94	5,53	6,18
Ptre	**17,5**	**17,0**	**16,5**	**18,4**	**17,9**	**17,4**	**19,8**	**19,2**	**18,6**	**20,2**	**19,7**	**19,1**	**21,2**	**20,6**	**19,9**	**22,6**	**21,9**	**21,3**
Qre	3,04	2,97	2,89	3,20	3,12	3,03	3,44	3,35	3,26	3,52	3,43	3,33	3,69	3,59	3,49	3,93	3,82	3,72
Dpre	35,9	34,1	32,3	39,7	37,7	35,7	45,9	43,5	41,1	48,1	45,6	43,1	52,6	49,9	47,1	59,8	56,7	53,6

COOLING PERFORMANCE WITH TOTAL HEAT RECOVERY i-NRG 400V

0061																		
Tre	**50**	**55**	**60**	**50**	**55**	**60**	**50**	**55**	**60**	**50**	**55**	**60**	**50**	**55**	**60**	**50**	**55**	**60**
Tev		**7**			**9**			**12**			**13**			**15**			**18**	
Pf	12,9	11,9	10,8	13,8	12,7	11,6	15,1	14,0	12,9	15,6	14,5	13,3	16,5	15,4	14,2	18,0	16,8	15,5
Qev	2,53	2,53	2,53	2,69	2,69	2,69	2,92	2,92	2,92	3,00	3,00	3,00	3,16	3,16	3,16	3,40	3,40	3,40
Dpev	24,9	24,9	24,9	28,0	28,0	28,0	33,1	33,1	33,1	34,9	34,9	34,9	38,7	38,7	38,7	44,7	44,7	44,7
Pat	4,88	5,43	6,04	4,90	5,46	6,07	4,92	5,49	6,10	4,92	5,49	6,11	4,91	5,49	6,11	4,88	5,47	6,10
Ptre	**17,5**	**17,0**	**16,5**	**18,4**	**17,9**	**17,3**	**19,8**	**19,2**	**18,6**	**20,2**	**19,6**	**19,0**	**21,2**	**20,6**	**19,9**	**22,6**	**21,9**	**21,2**
Qre	3,04	2,96	2,88	3,20	3,12	3,03	3,44	3,35	3,25	3,52	3,43	3,33	3,68	3,58	3,48	3,93	3,82	3,71
Dpre	35,8	34,0	32,2	39,7	37,6	35,6	45,9	43,5	41,0	48,1	45,5	43,0	52,6	49,8	47,0	59,8	56,6	53,4

Tre (°C) - Plant (side) heat exchanger recovery output water temperature
Tev (°C) - Plant (side) cooling exchanger output water temperature
Pf (kW) - Cooling capacity
Qev (m^3/h) - Plant (side) heat exchanger water flow
Dpev (kPa) - Plant (side) cooling exchanger pressure drop
Ptre (kW) - Heat recovery thermal capacity
Pat (kW) - Total power input
Qre (m^3/h) - Plant side heat exchanger recovery water flow
Dpre (kPa) - Plant side heating exchanger recovery pressure drop
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T

COOLING PERFORMANCE WITH TOTAL HEAT RECOVERY i-NRG 400V

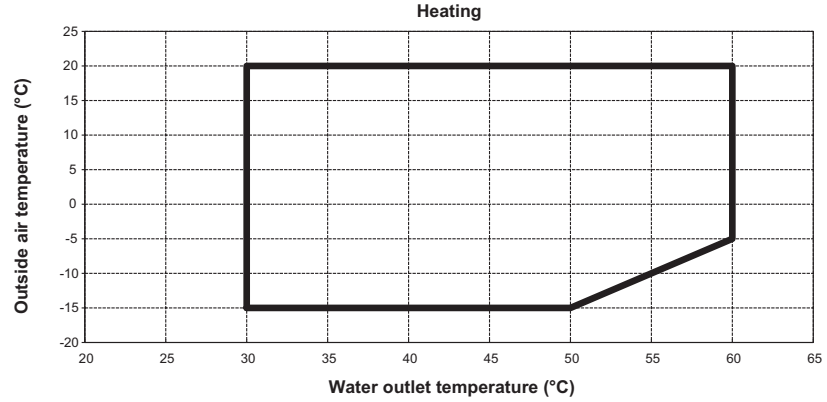
0061																		
Ta	**7**	**9**	**12**	**13**	**15**	**18**	**7**	**9**	**12**	**13**	**15**	**18**	**7**	**9**	**12**	**13**	**15**	**18**
Tre			**30**						**35**						**45**			
Ptre	**-**	**-**	**-**	**-**	**-**	**-**	**16,3**	**17,1**	**18,4**	**18,9**	**19,8**	**21,2**	**15,7**	**16,5**	**17,7**	**18,1**	**18,9**	**20,2**
Qre	-	-	-	-	-	-	2,82	2,96	3,19	3,27	3,43	3,67	2,73	2,87	3,07	3,14	3,29	3,51
Dpre	-	-	-	-	-	-	30,8	34,0	39,4	41,4	45,5	52,3	28,9	31,9	36,6	38,3	41,9	47,7
Pat	-	-	-	-	-	-	4,02	4,04	4,05	4,06	4,06	4,05	4,80	4,82	4,86	4,87	4,89	4,91
Tre			**50**						**55**						**60**			
Ptre	**15,4**	**16,2**	**17,3**	**17,7**	**18,4**	**19,6**	**15,1**	**15,8**	**16,9**	**17,2**	**17,9**	**19,1**	**14,8**	**15,4**	**16,4**	**16,7**	**17,4**	**18,4**
Qre	2,69	2,81	3,01	3,08	3,21	3,42	2,64	2,76	2,94	3,00	3,13	3,32	2,58	2,70	2,87	2,93	3,04	3,22
Dpre	28,0	30,7	35,1	36,7	40,0	45,3	26,9	29,4	33,5	35,0	38,0	42,8	25,9	28,1	31,8	33,2	35,9	40,3
Pat	5,26	5,29	5,33	5,34	5,37	5,40	5,77	5,80	5,85	5,87	5,90	5,94	6,33	6,36	6,42	6,43	6,47	6,52

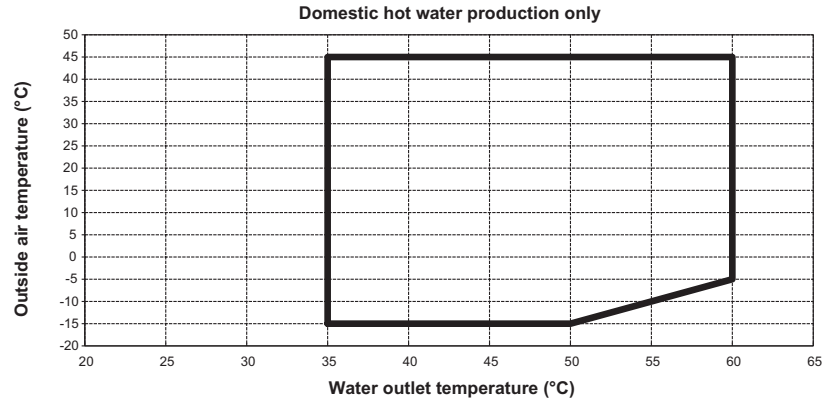
HEATING PERFORMANCE FOR HEAT RECOVERY (DHW only) i-NRG 400V

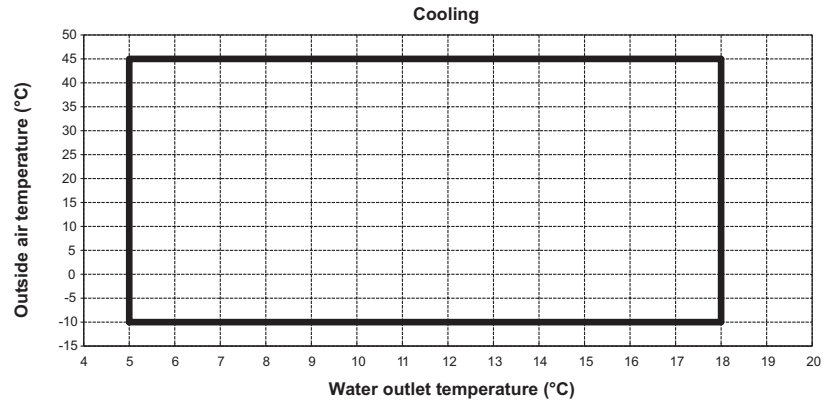
0061																		
Ta	**7**	**9**	**12**	**13**	**15**	**18**	**7**	**9**	**12**	**13**	**15**	**18**	**7**	**9**	**12**	**13**	**15**	**18**
Tre			**30**						**35**						**45**			
Ptre	**-**	**-**	**-**	**-**	**-**	**-**	**16,3**	**17,1**	**18,4**	**18,9**	**19,8**	**21,2**	**15,7**	**16,5**	**17,7**	**18,1**	**18,9**	**20,2**
Qre	-	-	-	-	-	-	2,82	2,96	3,19	3,27	3,43	3,68	2,73	2,86	3,07	3,14	3,29	3,51
Dpre	-	-	-	-	-	-	30,8	34,1	39,5	41,4	45,5	52,4	28,9	31,8	36,6	38,3	41,8	47,7
Pat	-	-	-	-	-	-	4,00	4,01	4,03	4,03	4,03	4,02	4,75	4,77	4,81	4,82	4,84	4,86
Tre			**50**						**55**						**60**			
Ptre	**15,4**	**16,1**	**17,3**	**17,7**	**18,4**	**19,6**	**15,1**	**15,8**	**16,8**	**17,2**	**17,9**	**19,0**	**14,8**	**15,4**	**16,4**	**16,7**	**17,4**	**18,4**
Qre	2,68	2,81	3,01	3,07	3,21	3,42	2,63	2,75	2,94	3,00	3,13	3,32	2,58	2,69	2,86	2,92	3,04	3,22
Dpre	27,9	30,6	35,0	36,6	39,9	45,2	26,8	29,3	33,4	34,9	37,9	42,7	25,8	28,1	31,8	33,1	35,8	40,2
Pat	5,20	5,23	5,27	5,29	5,31	5,35	5,71	5,75	5,79	5,81	5,84	5,88	6,27	6,31	6,36	6,38	6,41	6,45

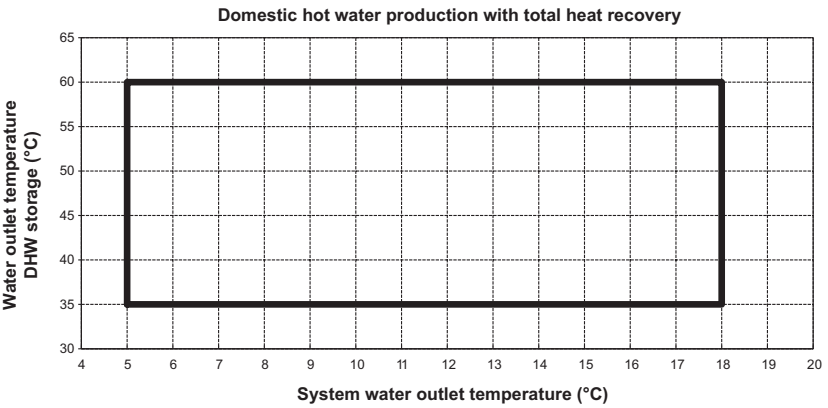
Ta (°C) - Air temperature
Tre (°C) - Plant (side) heat exchanger recovery output water temperature
Ptre (kW) - Heat recovery thermal capacity
Qre (m^3/h) - Plant side heat exchanger recovery water flow
Dpre (kPa) - Plant side heating exchanger recovery pressure drop
Pat (kW) - Total power input
'-' - Conditions outside the operating range
Waterflow and pressure drop on heat exchangers calculated with 5°C of delta T

6. OPERATING LIMITS









System water temperature head in cooling = 3/8°C
System water temperature head in heating = 3/10°C
Domestic hot water temperature head = 3/10°C
Min/max water circuit pressure = 1/3 bar
Maximum percentage of glycol 40%

7. 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.

8. 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 (m² °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

9. HYDRAULIC DATA

Water flow and pressure drop

Water flow in the heat exchangers is given by: Q=Px0,86/Dt
Q: water flow (m³/h)
Dt: difference between inlet and outlet water temp. (°C)
P: heat exchanger capacity (kW)

Pressure drop is given by: Dp= K x Q2/1000
Q: water flow (m³/h)
Dp: pressure drop (kPa)
K: unit size ratio

	PLANT SIDE COLD HEAT EXCHANGER					PLANT SIDE HOT HEAT EXCHANGER				AUXILIARY SIDE HEAT EXCHANGER			
SIZE	K	Q min m³/h	Q max m³/h	C.A.S. dm³	C.a. min m³	K	Q min m³/h	C.A.S. dm³	Q max m³/h	K	Q min m³/h	C.A.S. dm³	Q max m³/h
i-NRG 0061m 230V	3875	1,58	5,62	-	0,051	3875	-	-	-	3875	1,58	-	5,62
i-NRG 0061t 400V	3875	1,58	5,62	-	0,051	3875	-	-	-	3875	1,58	-	5,62

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, using traditional control logic
C.A.S.: heat exchanger water content

- - -

10. MINIMUM AND MAXIMUM SYSTEM WATER CONTENT

Minimum system water content
The minimum water content for the system shown in table 1 allows the number of compressor starts and stops to be limited.

Tab. 1	Size		0061
	Minimum water content	l	40

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		0061
	Expansion vessel	l	10

Tab. 3	Size		0061
	System safety valve	bar	3

Tab. 4	Size		0061
	Domestic hot water safety valve	bar	3

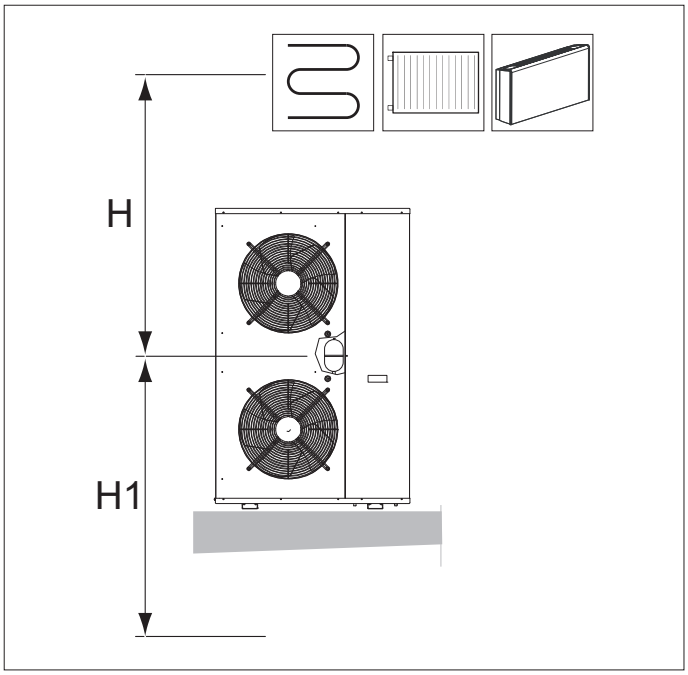
Table 5 shows an example of the maximum water content in the specified normal operating conditions.
If the volume of water in the system is higher, an additional, correctly sized expansion vessel is required.

Tab. 5							
	System water temperature	**°C**	**20**				
	Hydraulic head	m	30	25	20	>12,25	>12,25
	Expansion vessel pre-charge	bar	3,2	2,8	2,3	1,8	1,5
	Maximum water content	l	-	346	1025	1700	2080
	System water temperature	**°C**	**35**				
	Hydraulic head	m	30	25	20	15	>12,25
	Expansion vessel pre-charge	bar	3,2	2,8	2,3	1,8	1,5
	Maximum water content	l	-	107	315	525	640
	System water temperature	**°C**	**45**				
	Hydraulic head	m	30	25	20	15	>12,25
	Expansion vessel pre-charge	bar	3,2	2,8	2,3	1,8	1,5
	Maximum water content	l	-	60	185	310	380
	System water temperature	**°C**	**55**				
	Hydraulic head	m	30	25	20	15	>12,25
	Expansion vessel pre-charge	bar	3,2	2,8	2,3	1,8	1,5
	Maximum water content	l	-	40	125	210	255

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.

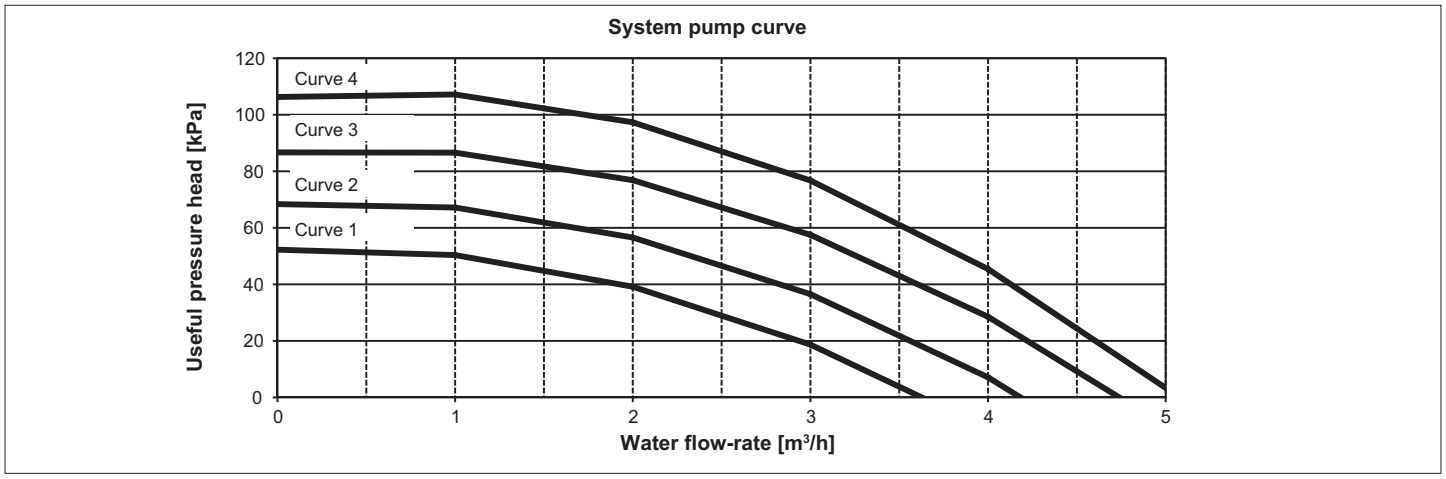
The maximum height must not exceed 25 metres due to the maximum vessel pre-charge pressure of 3 bars.

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



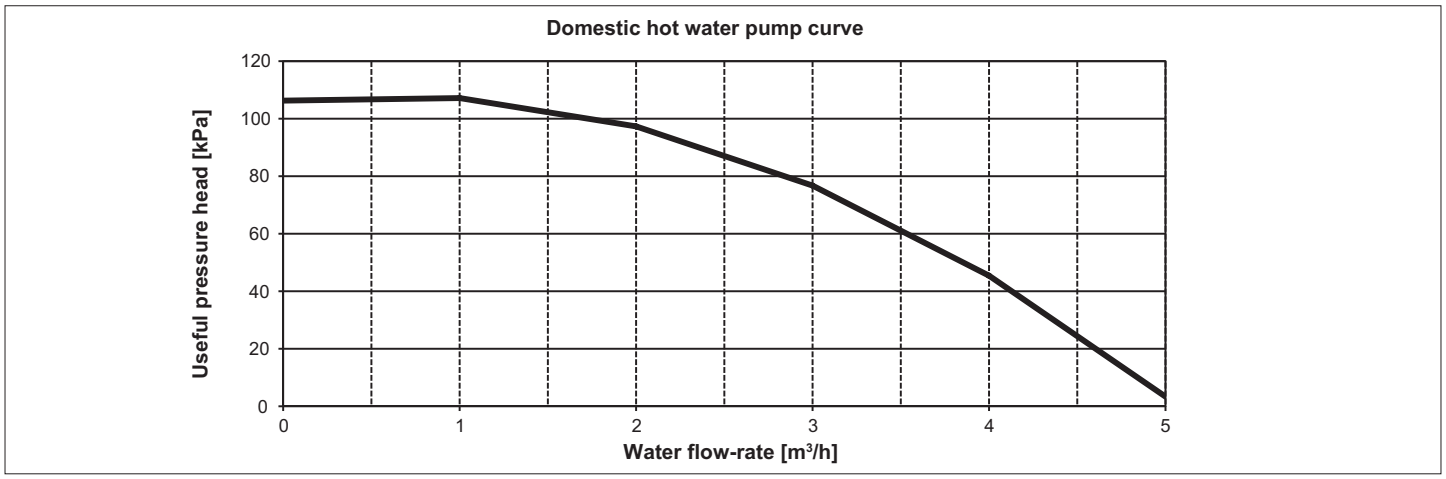
11. VARIABLE SPEED SYSTEM PUMP CURVES

SYSTEM PUMP CURVE



The pressure head refers to the values at the fittings.
The curves can be selected by parameter, see the paragraph on Control and operating characteristics.

DOMESTIC HOT WATER PUMP CURVE



The pressure head refers to the values at the fittings.

Standard system pump

Size	Pump power supply	Pf (1) kW	Q (1) m³/h	H (1) kPa	Pt (2) kW	Q (2) m³/h	H (2) kPa	F.L.I. kW	Pump
i-NRG 0061	230v-50Hz-1Ph	19,6	3,37	66	16,3	2,80	82	0,31	STRATOS PARA 30/1-12

Values refer to rated conditions:
Pf (1) Cooling capacity: System water temperature 23/18°C, outside air temperature 35°C DB
Pt (2) Heating capacity: System water temperature 30/35°C, outside air temperature 7°C DB/ 6°C WB
Q (1) (2) system flow-rate
H (1) (2) available pressure head in system circuit
F.L.I Maximum pump power consumption

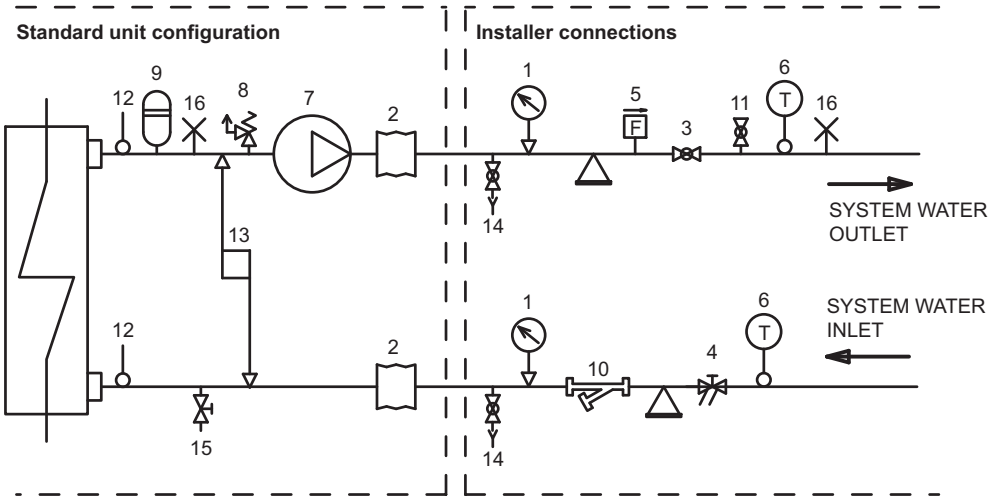
Standar domestic hot water pump

Size	Pump power supply	Pf (1) kW	Q (1) m³/h	H (1) kPa	Pt (2) kW	Q (2) m³/h	H (2) kPa	F.L.I. kW	Pump
i-NRG 0061	230v-50Hz-1Ph	17,9	3,08	75	22,6	3,89	49	0,31	STRATOS PARA 30/1-12

Values refer to rated conditions:
Pf (1) Cooling capacity: System water temperature 23/18°C, outside air temperature 35°C DB
Pt (2) Heating capacity in total heat recovery mode: Recovery water temperature 45/50°C, outside air temperature 35°C DB
Q (1) system flow-rate
H (1) available pressure head in system circuit
Q (2) domestic hot water flow-rate
H (2) available pressure head in DHW circuit
F.L.I Maximum pump power consumption

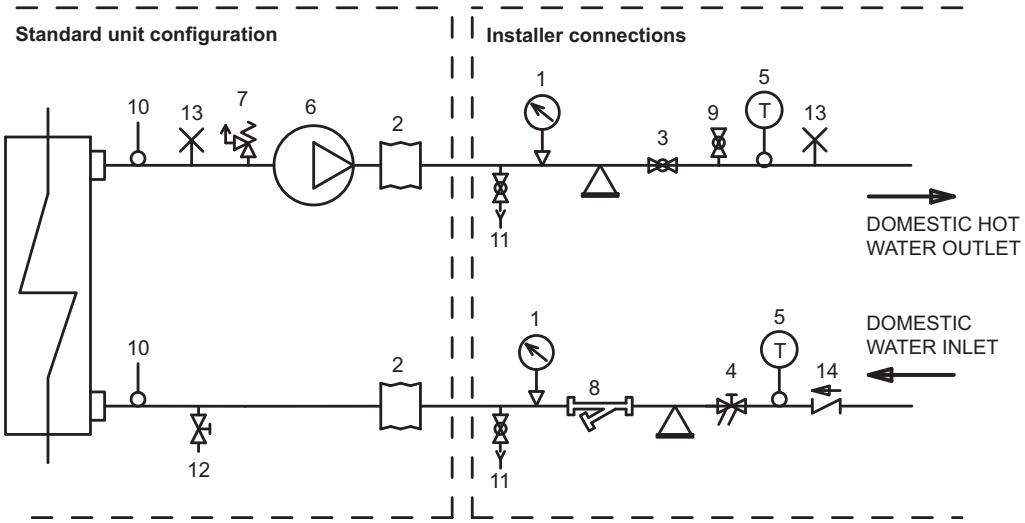
12. WATER CIRCUIT DIAGRAM

Water circuit system diagram



1 Pressure gauge
2 Vibration damper joint
3 Shut-off valve
4 Calibrating valve
5 Flow switch
6 Thermometer
7 Pump
8 Safety valve
9 Expansion vessel
10 Mesh filter
11 Fill/top-up
12 Temperature probe
13 Differential pressure switch
14 Drain/chemical washing valve
15 Drain valve unit
16 System vent

Domestic hot water circuit diagram



1 Pressure gauge
2 Vibration damper joint
3 Shut-off valve
4 Flow switch
5 Thermometer
6 Pump
7 Safety valve
8 Mesh filter
9 Fill/top-up
10 Temperature probe
11 Drain/chemical washing valve
12 Drain valve unit
13 System vent
14 Non-return valve (supplied)

13. ELECTRICAL DATA AT MAXIMUM CONDITIONS ALLOWED (FULL LOAD)

i-NRG	Power supply	Compressors				Fans (1)		Total (1) (2)		
		n.	F.L.I.	F.L.A.	L.R.A.	F.L.I.	F.L.A.	F.L.I.	F.L.A.	L.R.A.
	(V-Ph-Hz)		(kW)	(A)	(A)	(kW)	(A)	(kW)	(A)	(A)
0061m 230V	230~50	1	6,40	22,7	-	0,68	3,3	7,08	26,0	-
0061t 400V	230~50	1	6,32	15,5	-	0,68	3,3	7,00	18,8	-

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) (2) Safety values to be considered when cabling the unit for power supply and line-protections
(1) Values calculated referring to the version with the maximum number of fans working at the max absorbed current
Power supply: 230/1/50 - 400/3/50
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/m^2
- 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

14. FULL LOAD SOUND LEVEL

SOUND POWER									
SIZE	Octave band [H								Total sound level
	63	125	250	500	1000	2000	4000	8000	
	Sound power level dB(A)								
0061m 230V	77	76	70	65	61	55	50	42	68
0061t 400V	77	76	70	65	61	55	50	42	68

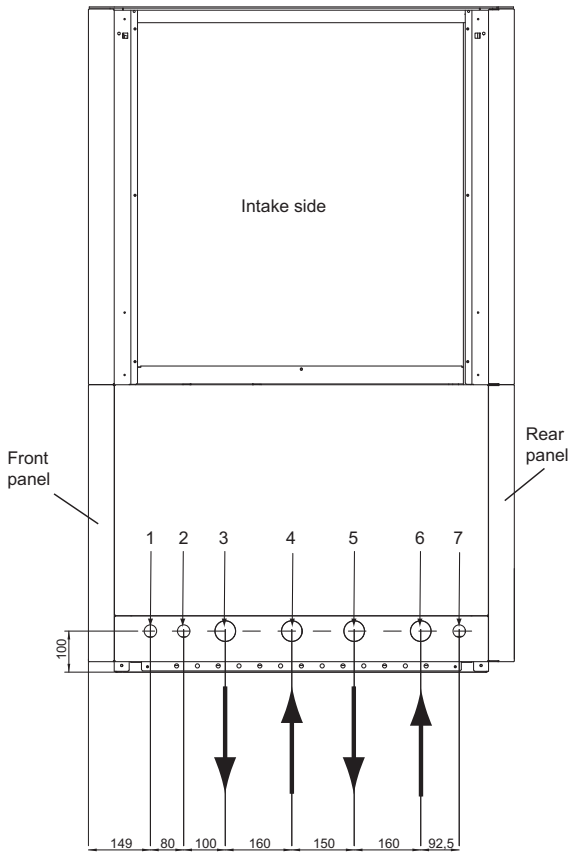
Working conditions
Plant (side) cooling exchanger water (in/out) 12/7 °C
Heat exchanger air (in) 35 °C
Sound power on the basis of measurements made in compliance with ISO 9614 and Eurovent 8/1 for Eurovent certified units; in compliance with ISO 3744 for non-certified units
Such certification refers specifically to the sound Power Level in dB(A). This is therefore the only acoustic data to be considered as binding.

SOUND PRESSURE LEVEL									
SIZE	Octave band [Hz] at 1 m								Total sound level
	63	125	250	500	1000	2000	4000	8000	
	Sound pressure level dB(A)								
0061m 230V	61	60	54	49	45	39	34	26	52
0061t 400V	61	60	54	49	45	39	34	26	52

Working conditions
Plant (side) cooling exchanger water (in/out) 12/7 °C
Heat exchanger air (in) 35 °C
Average sound pressure level, at 1 (m.) distance, unit in a free field on a reflective surface; non-binding value obtained from the sound power level.

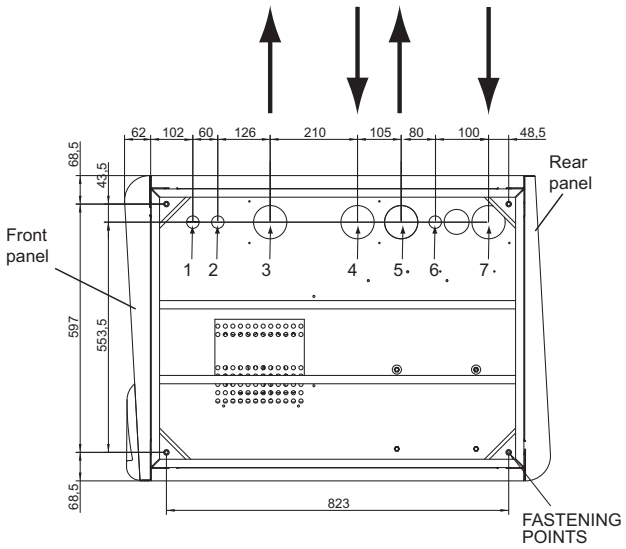
15. POSITION OF THE WATER CONNECTIONS

Side connection



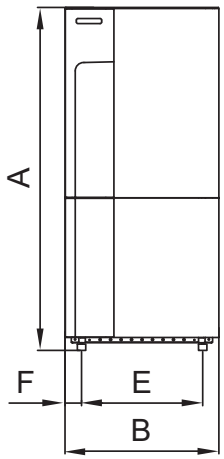
1 ELECTRICAL CONNECTION
2 ELECTRICAL CONNECTION
3 DHW OUTLET
4 DOMESTIC WATER INLET
5 SYSTEM OUTLET
6 SYSTEM INLET
7 CONDENSATE DRAIN

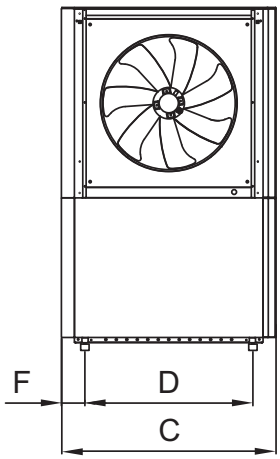
Connection from below

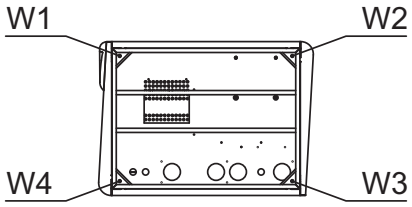


1 ELECTRICAL CONNECTION
2 ELECTRICAL CONNECTION
3 DHW OUTLET
4 DOMESTIC WATER INLET
5 SYSTEM OUTLET
6 CONDENSATE DRAIN
7 SYSTEM INLET

16. DIMENSIONAL DRAWINGS







Dimensions		
A	mm	1640
B	mm	735
C	mm	1025
D	mm	823
E	mm	553
F	mm	38,5
Water connections IN	Ø	1"1/4
Water connections OUT	Ø	1"1/4

Weight distribution		i-NRG 0061
W1	kg	67
W2	kg	77
W3	kg	62
W4	kg	54
Total	kg	260

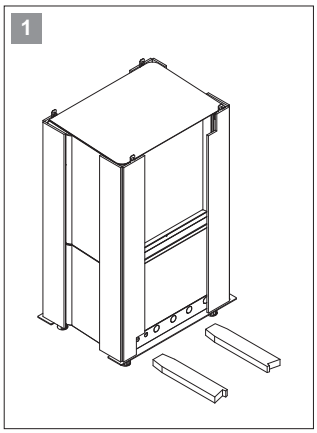
17. HOISTING INSTRUCTIONS

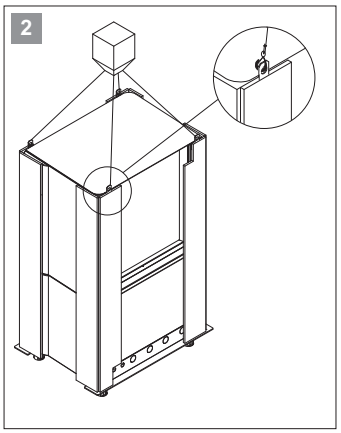
- Make sure all the panels are securely fastened before handling the unit.
- Before hoisting, check the weight of the unit on the CE rating label.
- Use all of the hoisting points indicated, and no others,
- Use equal length cables or slings.
- Use a spreader bar (not included)
- Handle the unit with care and without sudden or jerky movements.

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)**
  Use slings with hooks suitable for the weight being lifted.
  Secure the hook to the lifting bracket fixed to the unit, use always four equal length slings, as shown in the figure, to ensure the weight is balanced.



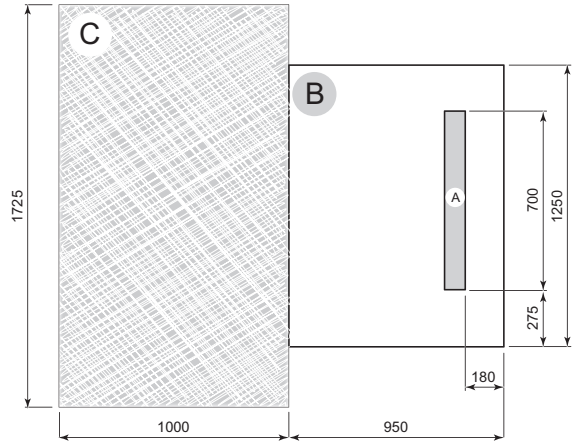


POSITIONING OUTDOORS

Base

- If installing outdoors, make a concrete base **B** suitable to support the weight of the unit
- Figure **(1)** shows the dimensions of the base **B**, average values that must be adapted to local regulations.
- Make an opening **A** in the base for the pipes, power cables and condensate drain, following the dimensions shown in the figure
- Make sure small animals cannot pass through openings or ducts connecting the outside to the inside of the building.

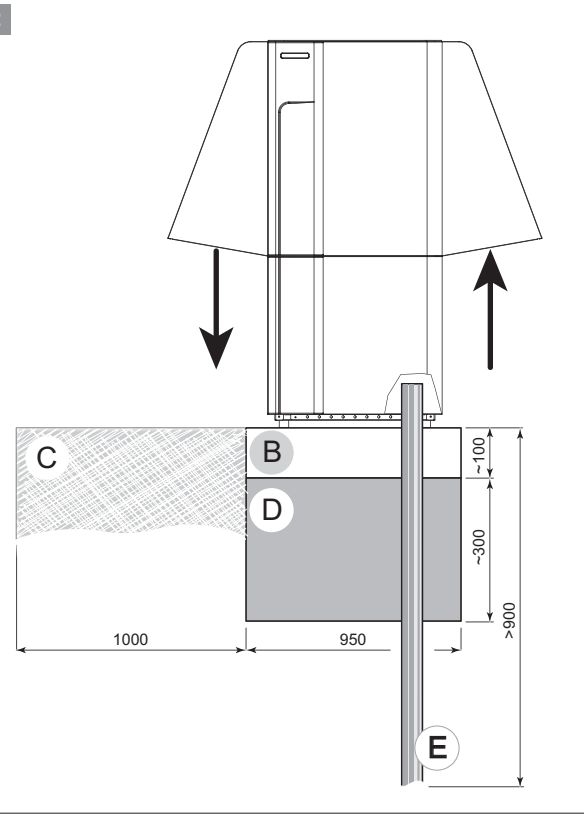
1



Plan view of the base

- Make an area **C** with the dimensions indicated in figures **(1)** and **(2)** using gravel or rubble where condensate will be drained, to prevent formation of ice during winter due to the release of cold air.
- The hole **E** in the ground for the outlet and return pipes, power cables and condensate drain must be below ground level by >900 mm, to protect against frost.

2

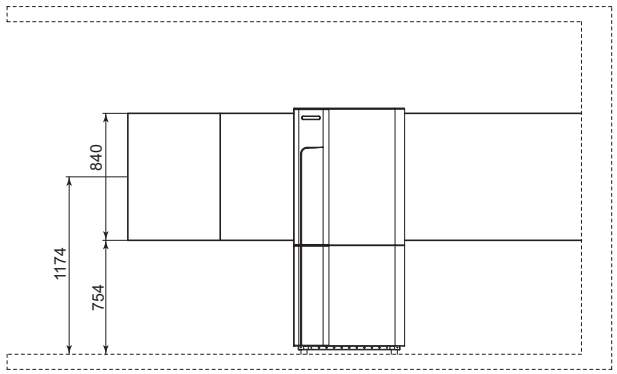


POSITIONING INDOORS

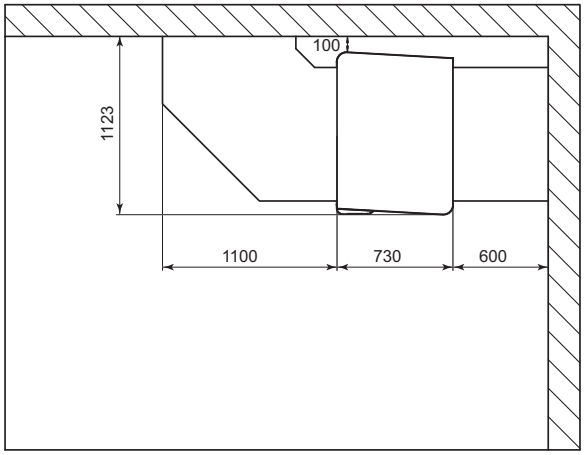
For indoor installation, ensure suitable ducting of the intake and outlet air according to the minimum dimensions shown in figures (1) and (2), if not using the Climaveneta ducting kits.

The heat pump fan at maximum flow provides a pressure gain of 60 Pa to the duct.

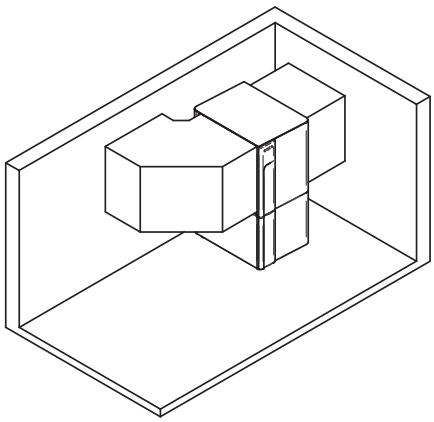
1



2



3

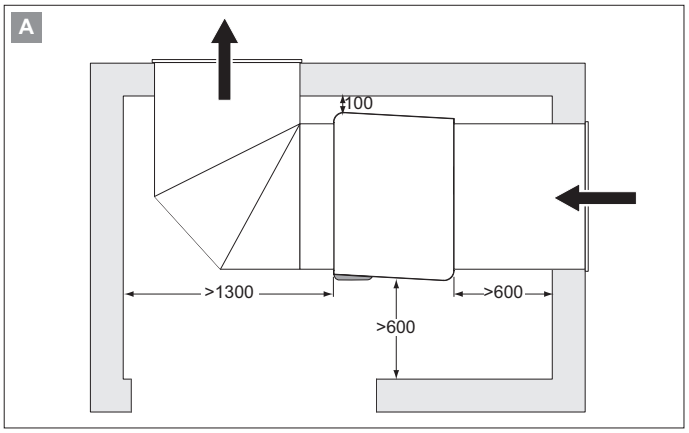


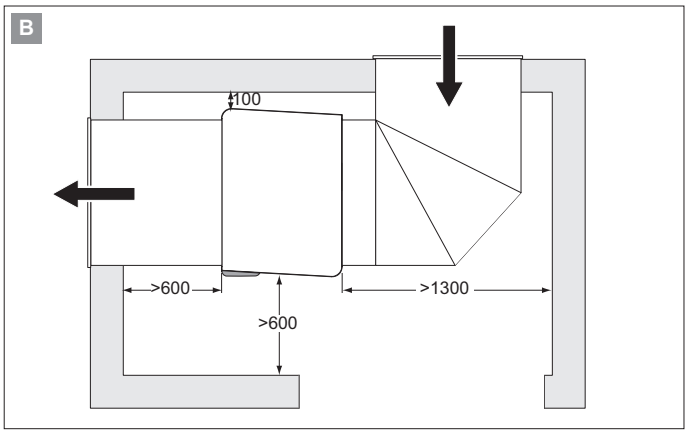
CLEARANCE

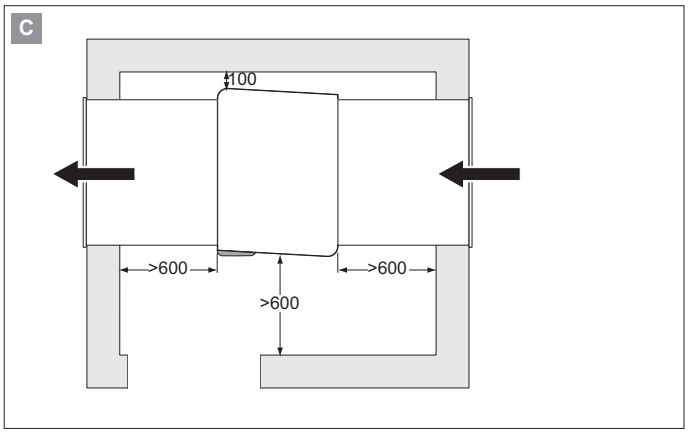
Follow the indications in the figure to allow clearance for maintenance and correct operation of the unit.

Indoor installation

- installation method A
- installation method B
- installation method C

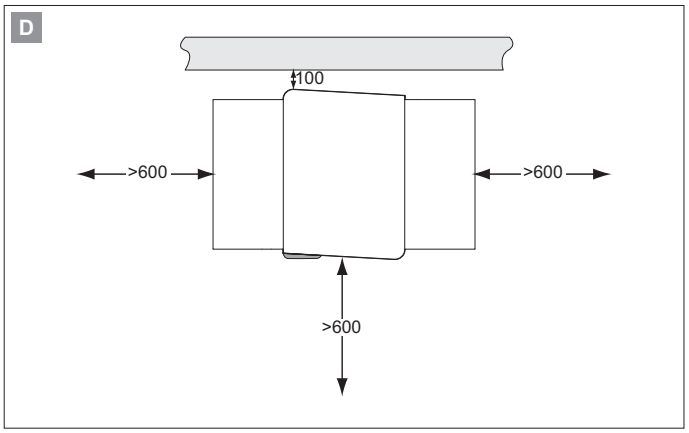






Outdoor installation

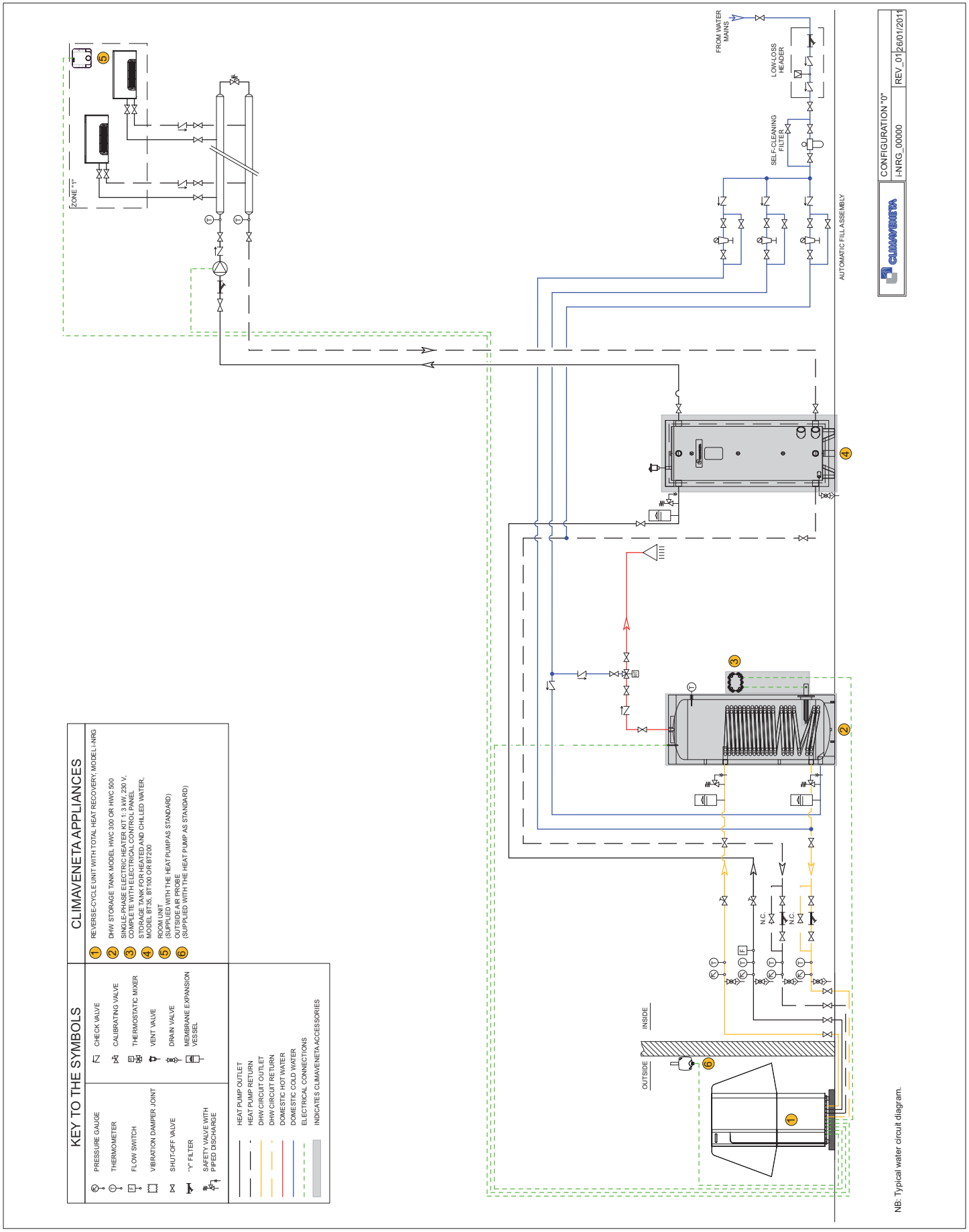
- installation method D



18. OPERATING DIAGRAMS

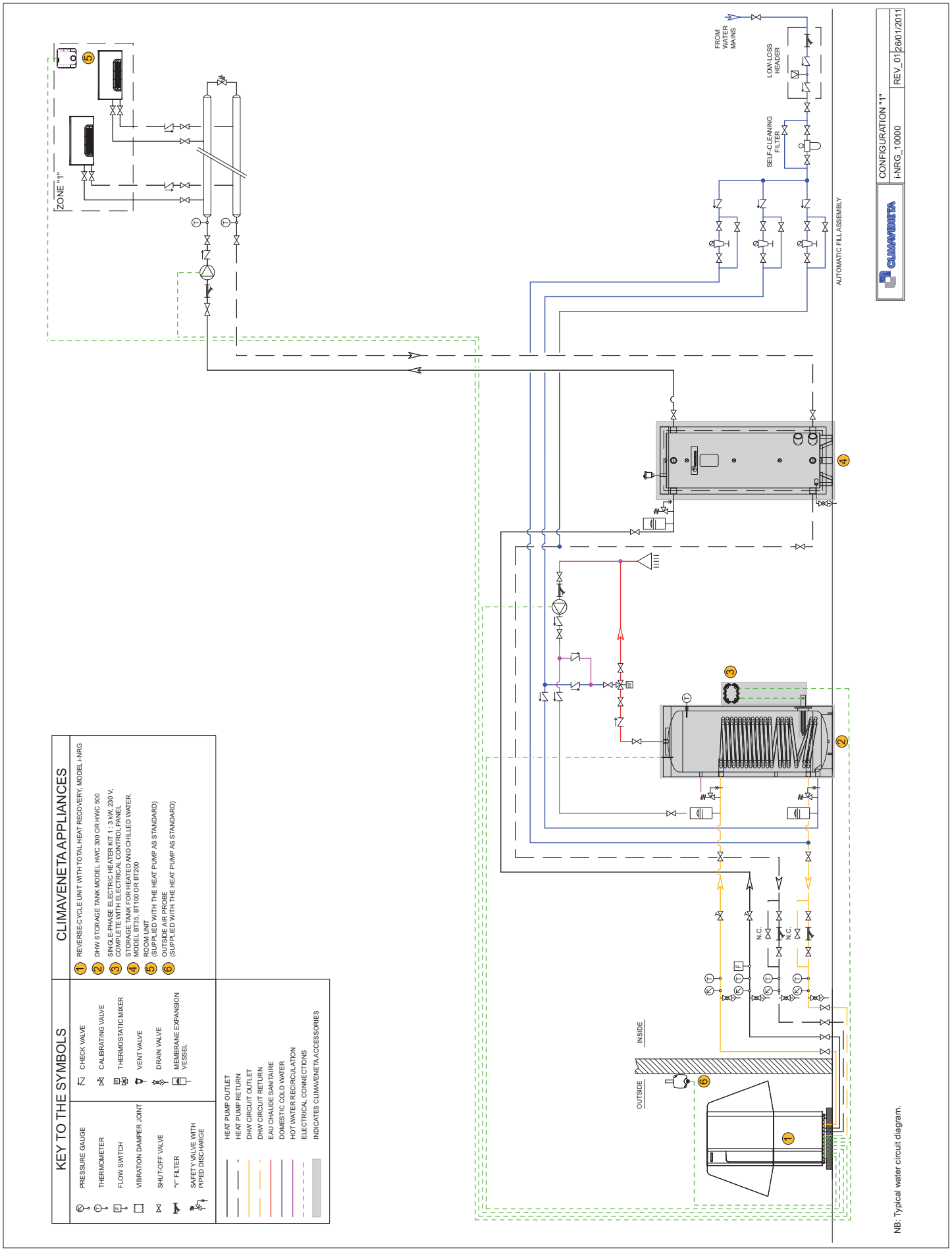
WATER CIRCUIT DIAGRAM

Configuration number 0



WATER CIRCUIT DIAGRAM

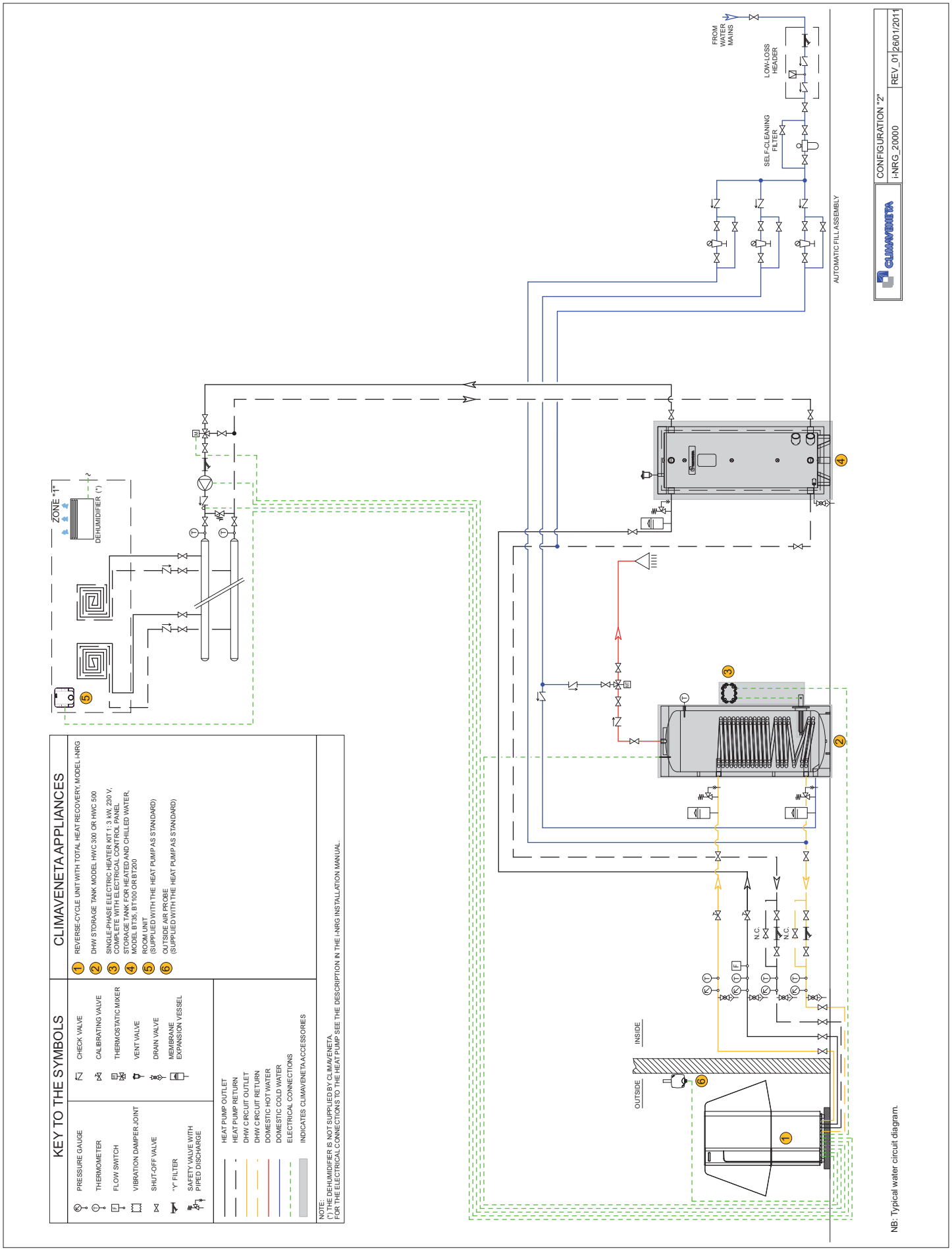
Configuration number 1



NB: Typical water circuit diagram.

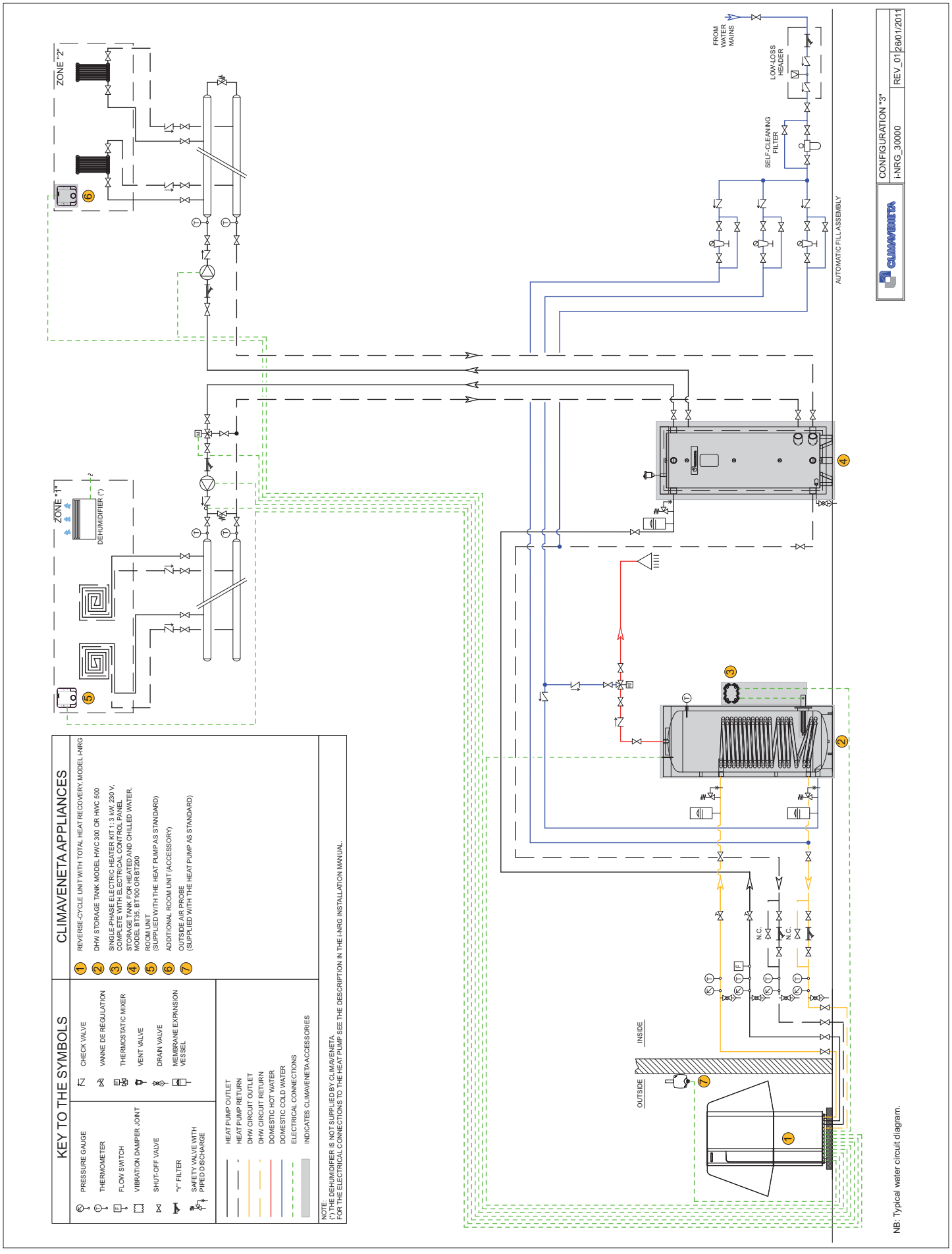
WATER CIRCUIT DIAGRAM

Configuration number 2



WATER CIRCUIT DIAGRAM

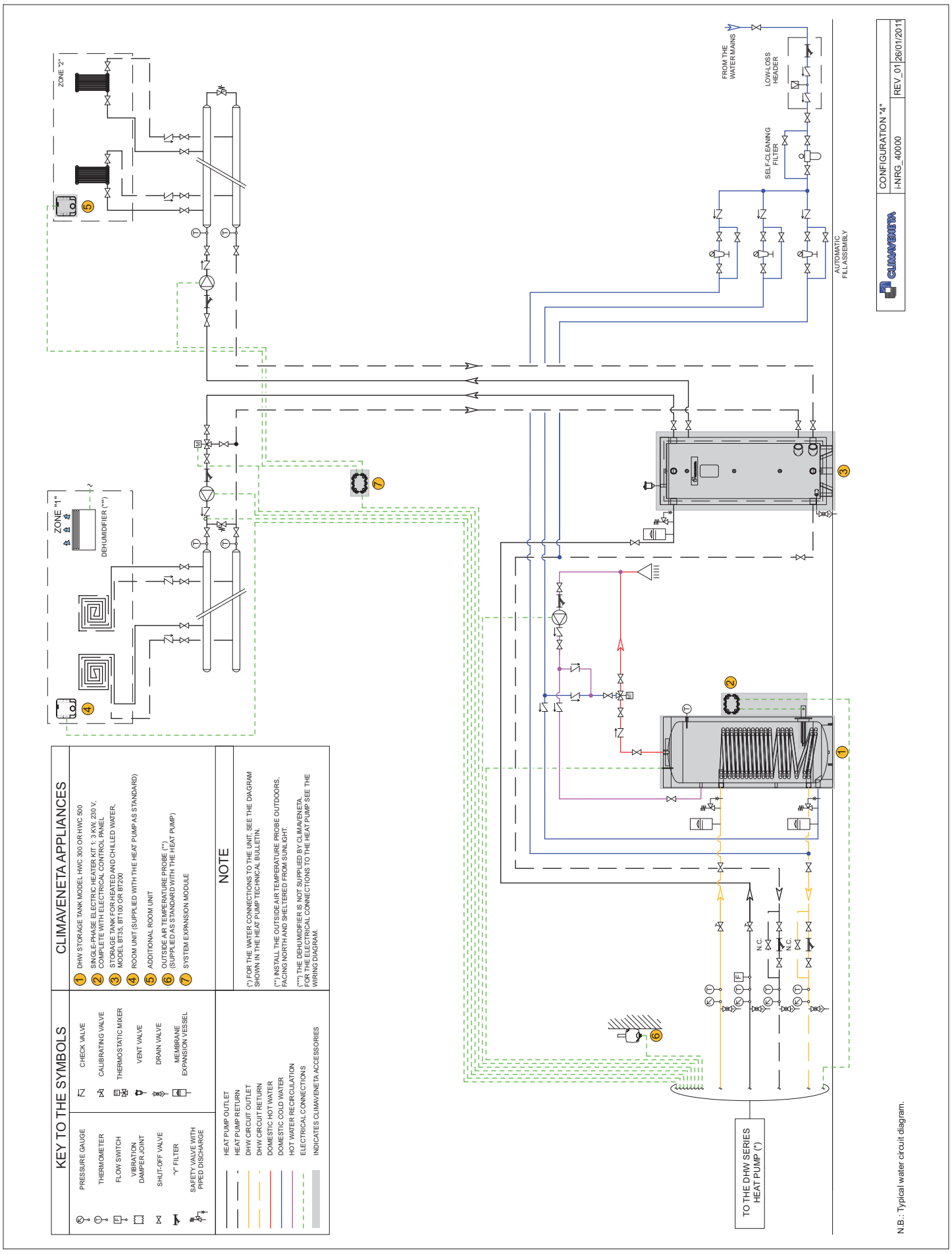
Configuration number 3



NB: Typical water circuit diagram.

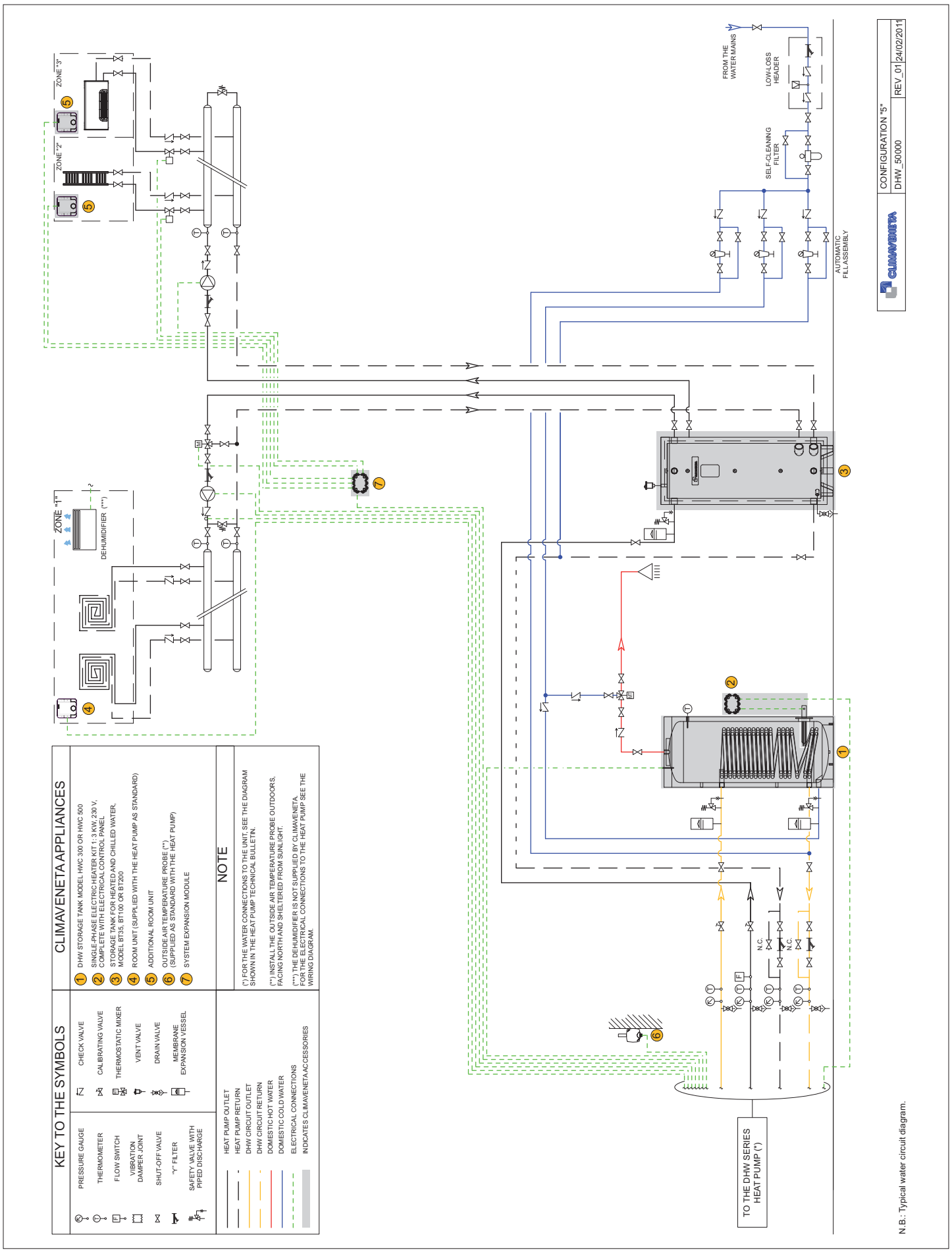
WATER CIRCUIT DIAGRAM

Configuration number 4



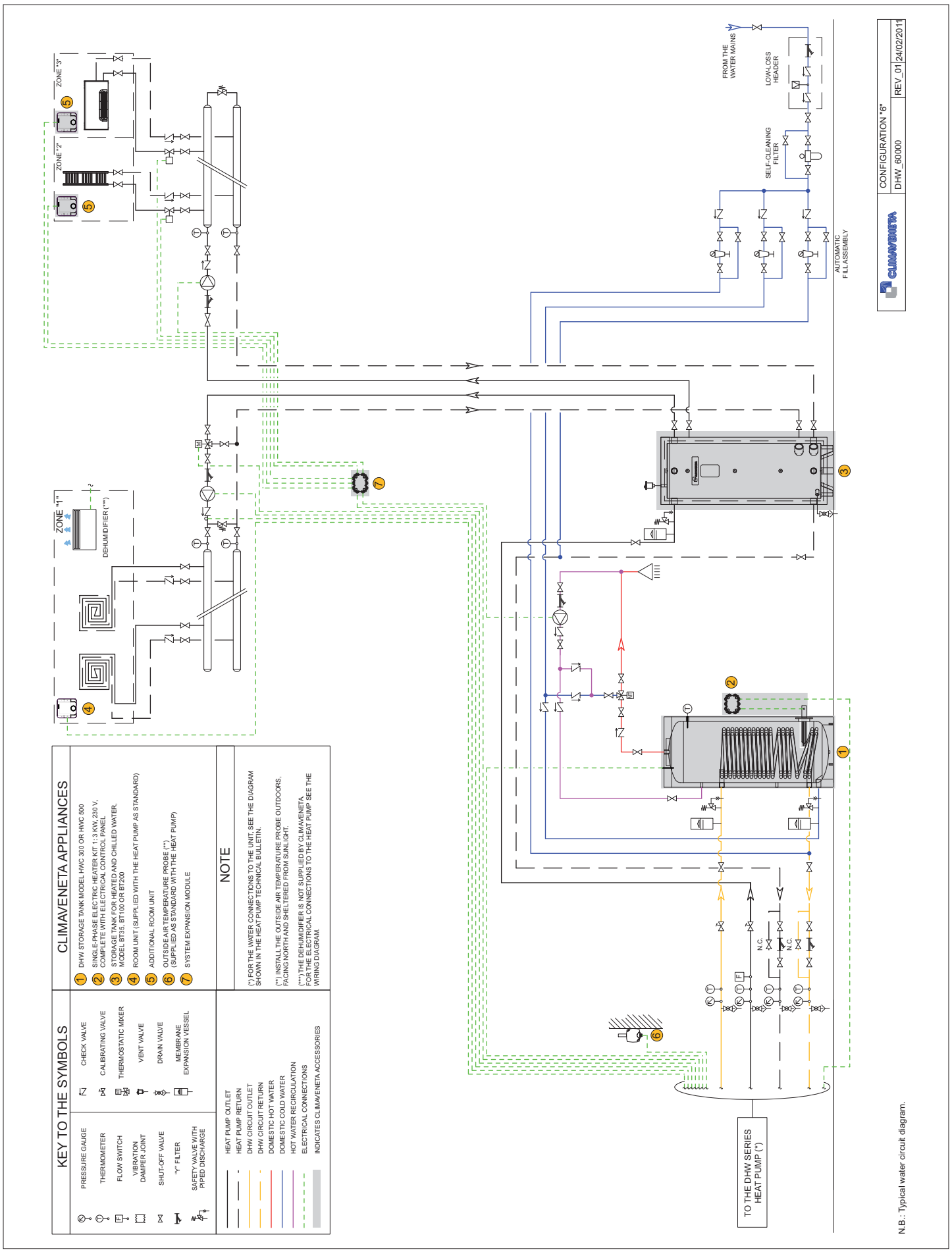
WATER CIRCUIT DIAGRAM

Configuration number 5



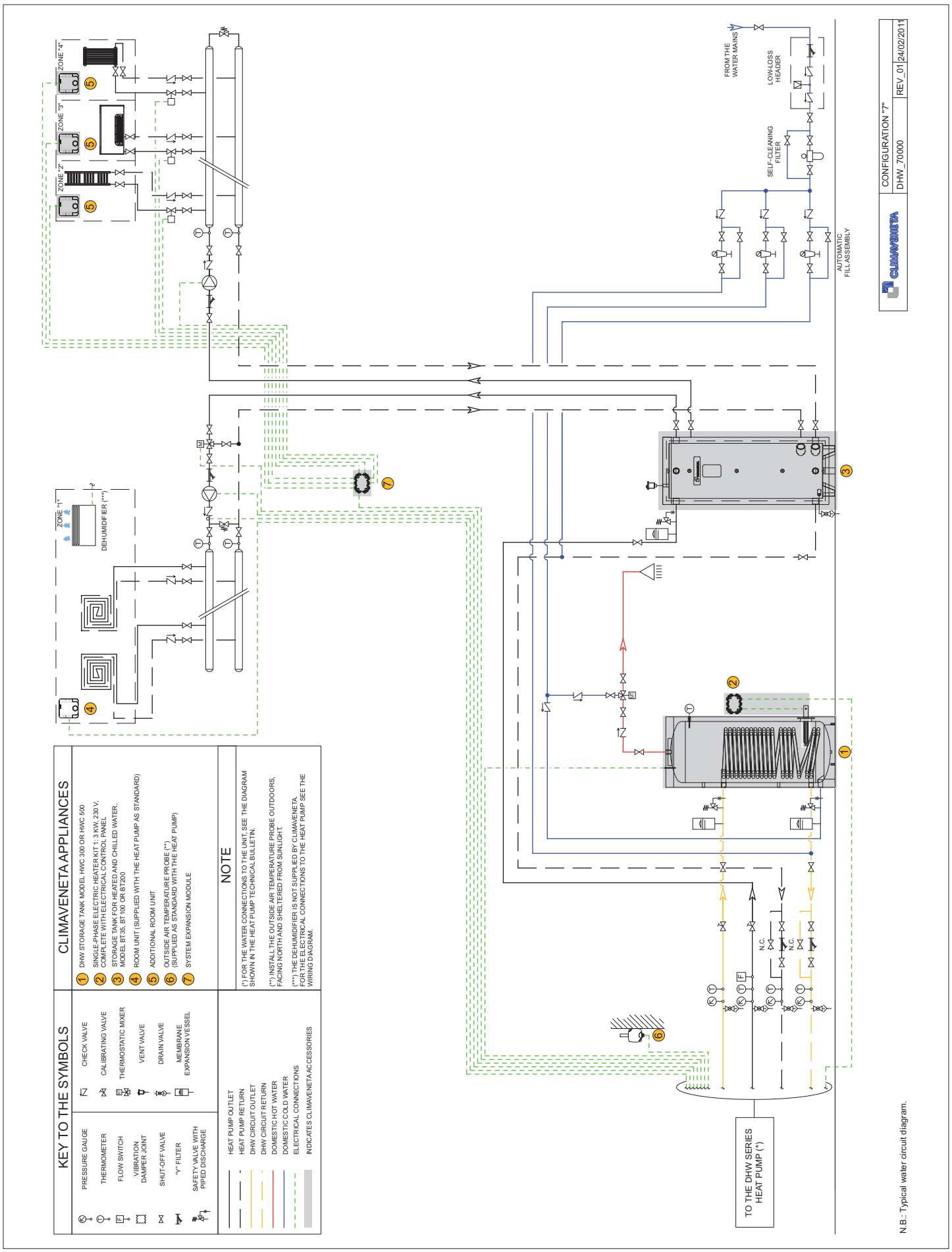
WATER CIRCUIT DIAGRAM

Configuration number 6



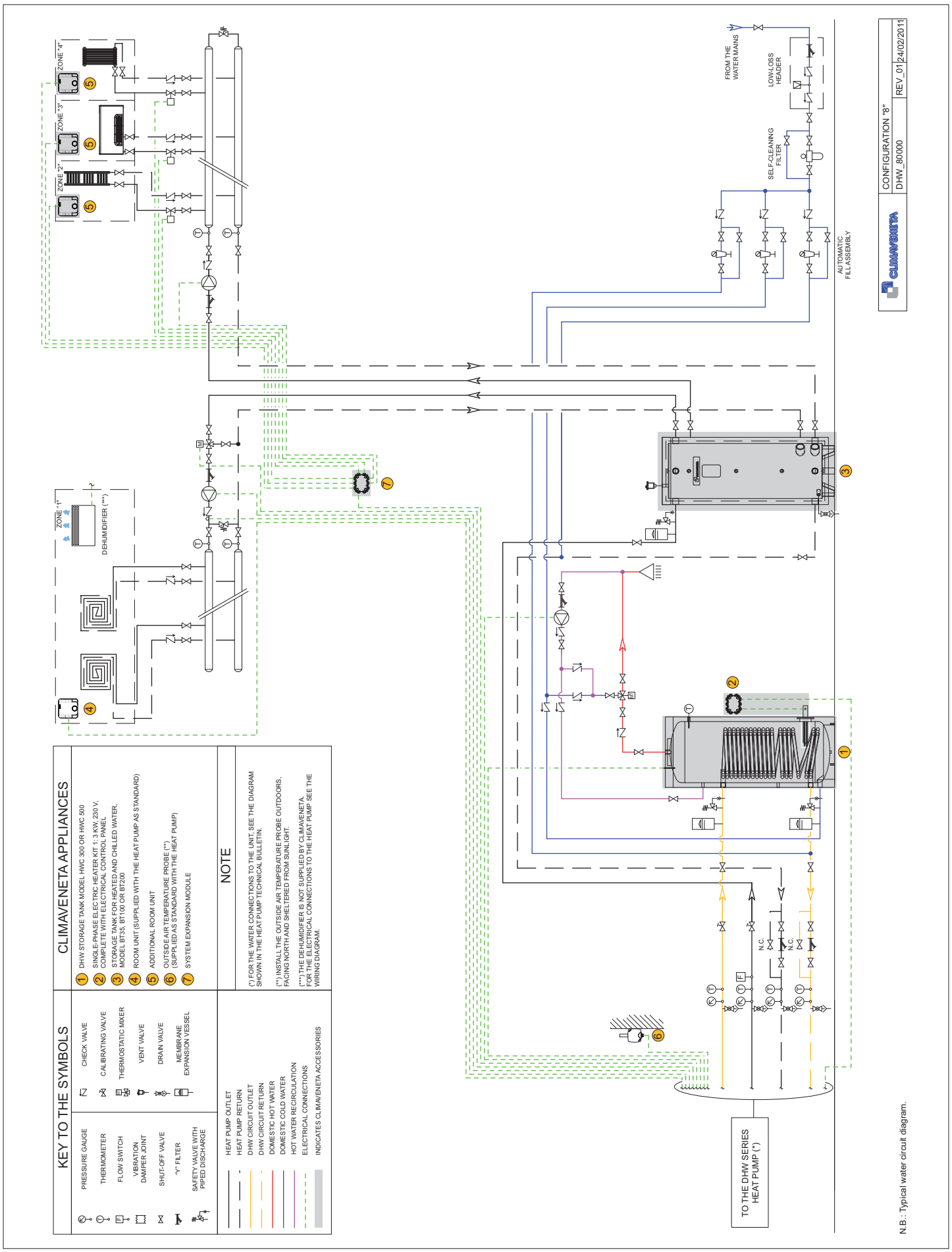
WATER CIRCUIT DIAGRAM

Configuration number 7



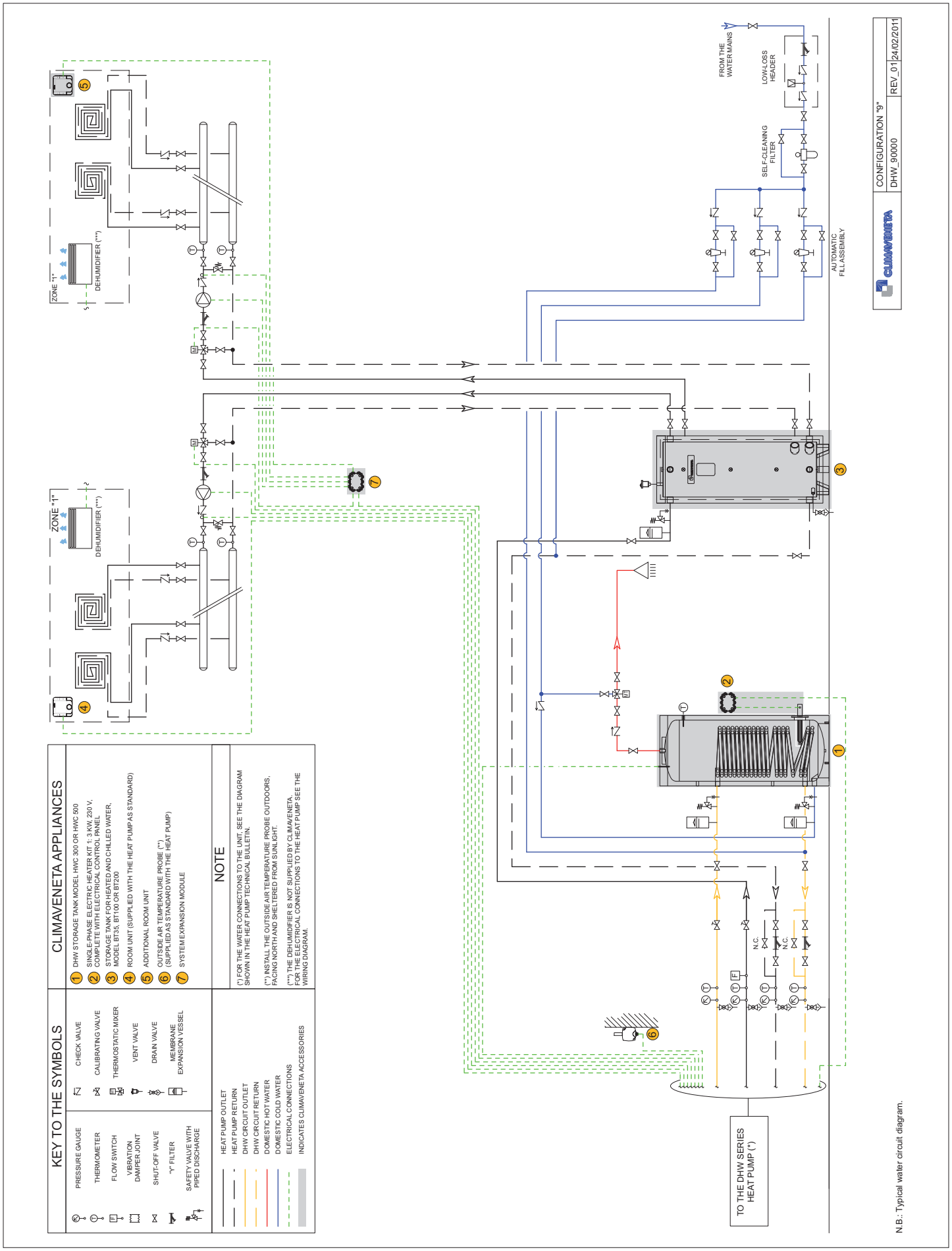
WATER CIRCUIT DIAGRAM

Configuration number 8



WATER CIRCUIT DIAGRAM

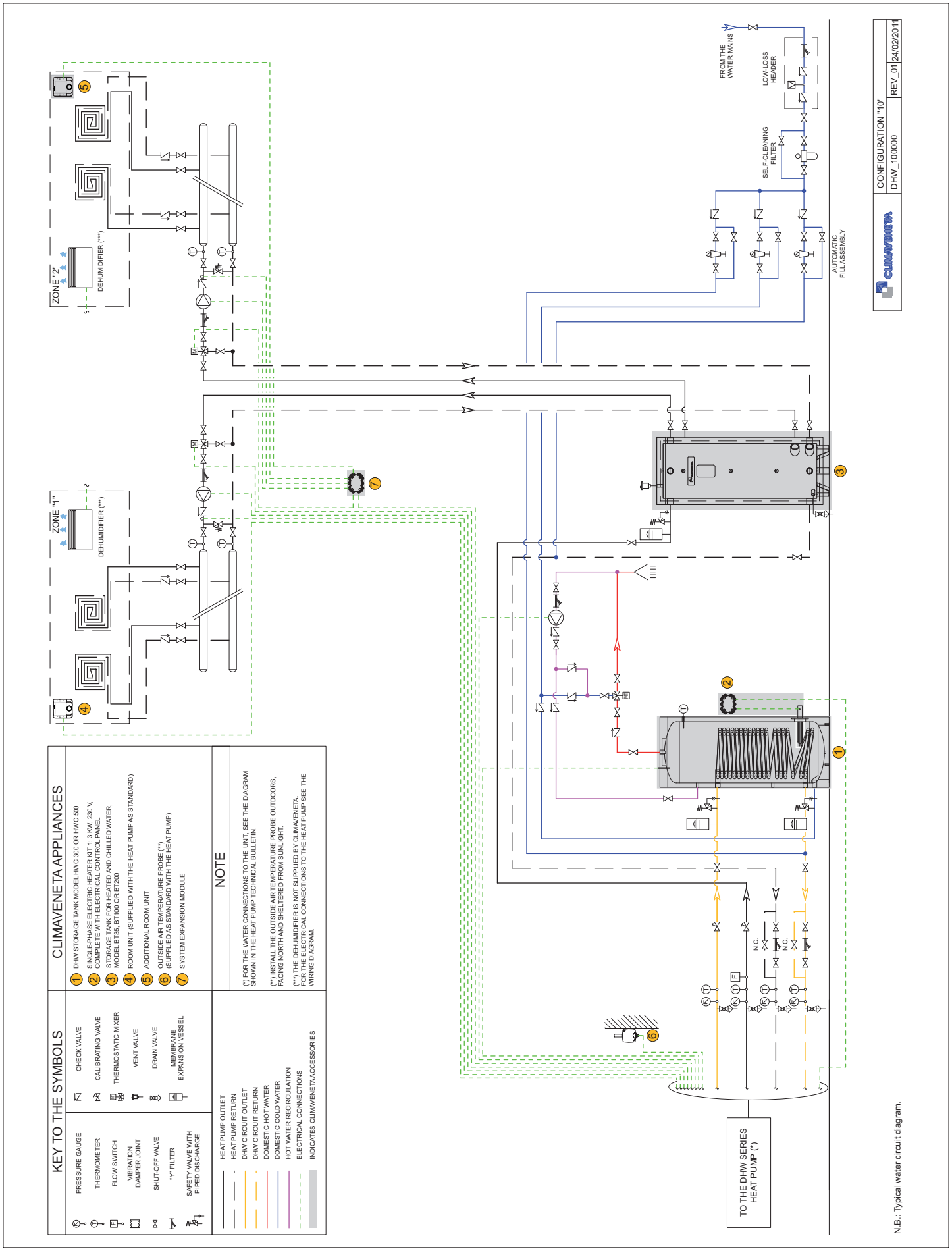
Configuration number 9



N.B.: Typical water circuit diagram.

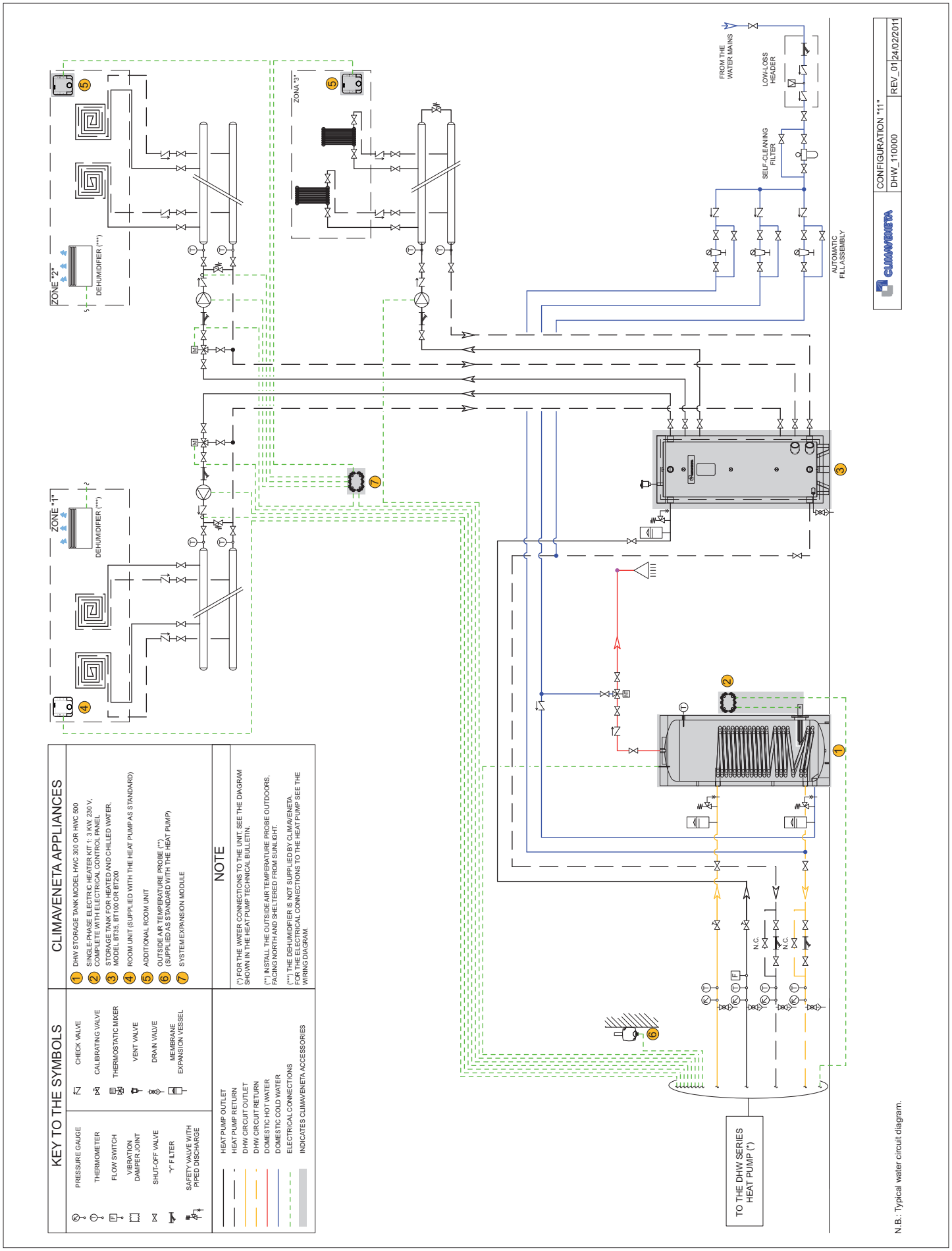
WATER CIRCUIT DIAGRAM

Configuration number 10



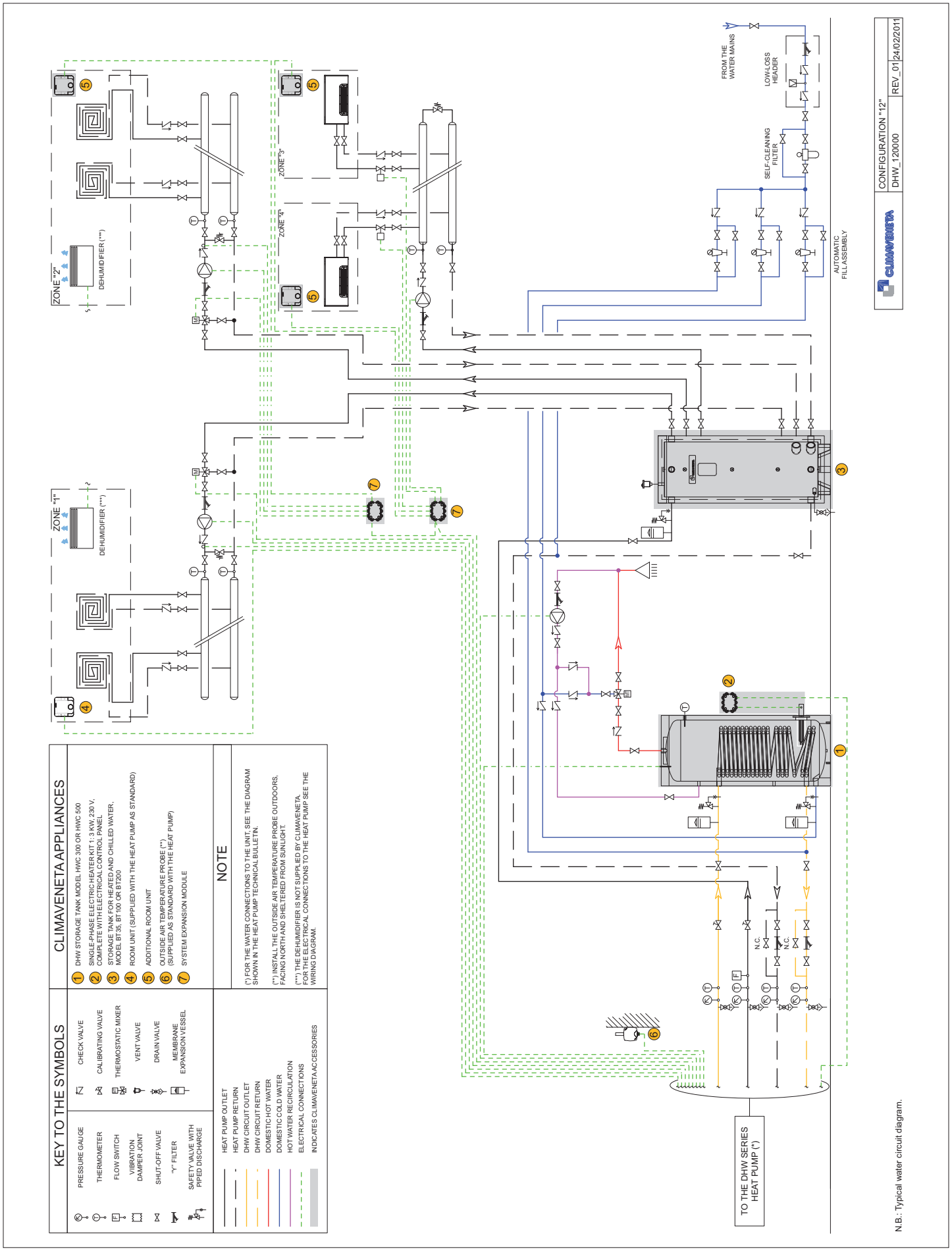
WATER CIRCUIT DIAGRAM

Configuration number 11



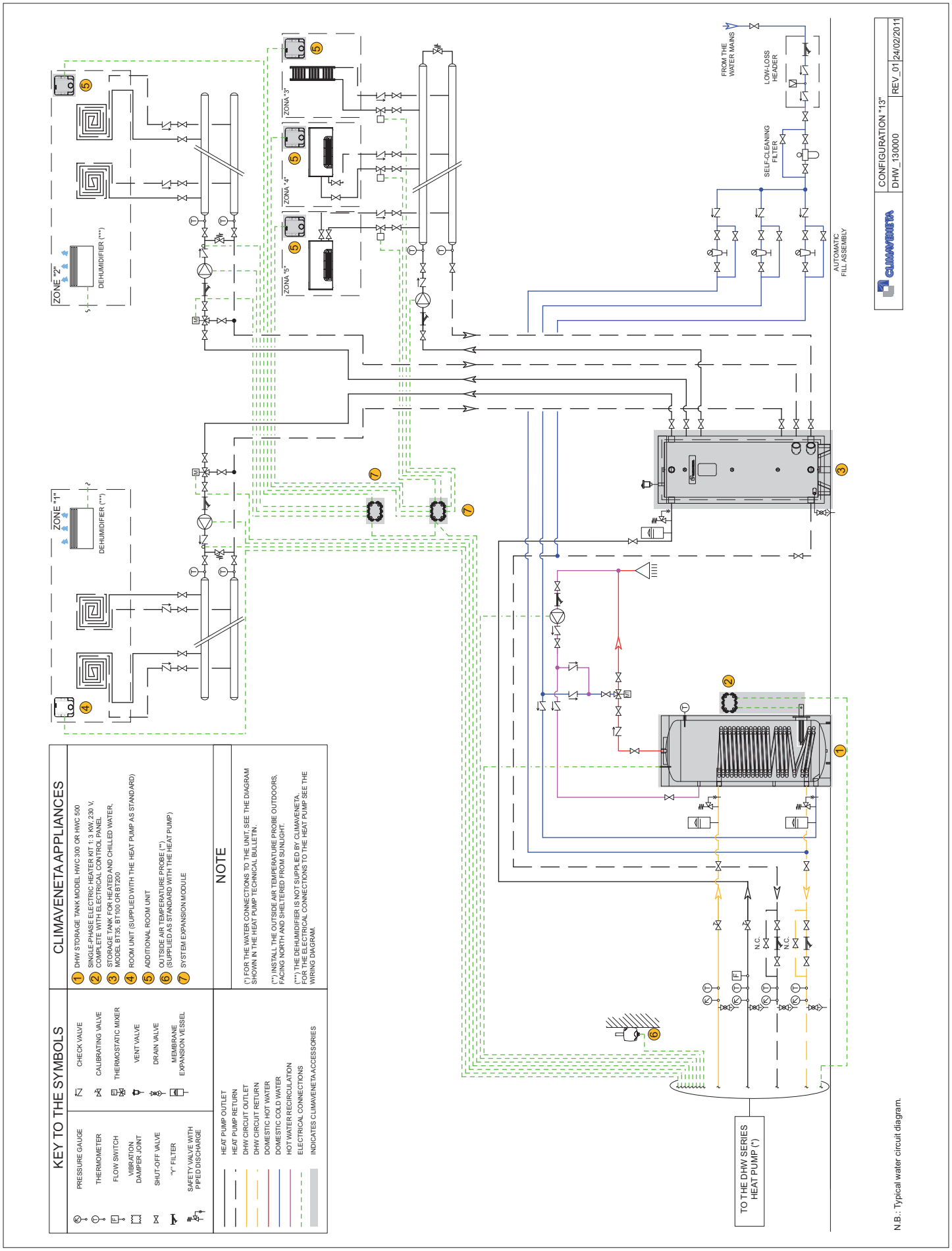
WATER CIRCUIT DIAGRAM

Configuration number 12



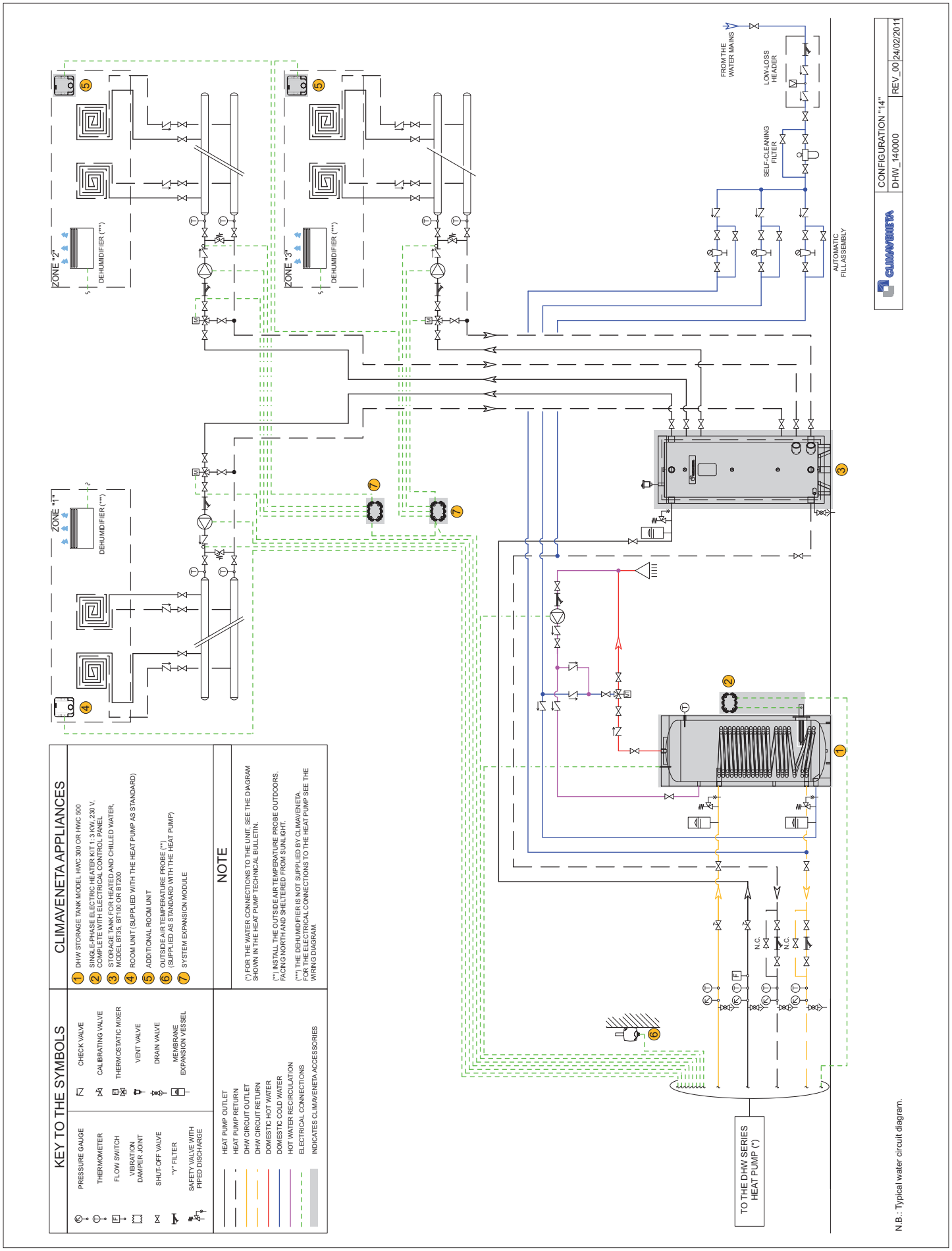
WATER CIRCUIT DIAGRAM

Configuration number 13



WATER CIRCUIT DIAGRAM

Configuration number 14



N.B.: Typical water circuit diagram.

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