



EN

i-KI MTD air/water heat pump, heating only, with DC inverter-driven compressors, domestic hot water production, axial-flow fans and hydronic unit for outdoor installation

i-KIR MTD reverse-cycle air/water heat pump with DC inverter-driven compressors, domestic hot water production, axial-flow fans and hydronic unit for outdoor installation



nadisystem

**i-KI MTD / i-EM2
i-KIR MTD / i-EMR2
0011m ÷ 0061m**

**r HFC
R-410A**

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The following symbols are used in this publication and inside the unit:



User



Important



Danger high temperatures



Installer



Prohibition



Assistance



Danger voltage



Eurovent certification program.

The manufacturer reserves the right to modify the data in this manual without warning.

⚠ These appliances have been designed to chill and/or heat water and must be used in applications compatible with their performance characteristics; these appliances are designed for residential or similar applications. Incorrect installation, regulation and maintenance or improper use absolve the **manufacturer** from all liability, whether contractual or otherwise, for damage to people, animals or things.

Only those applications specifically indicated in this list are permitted

Read this manual carefully. All work must be carried out by qualified personnel in conformity with legislation in force in the country concerned.

The warranty is void if the above instructions are not respected and if the unit is started up for the first time without the presence of personnel authorised by the Company (where specified in the supply contract) who should draw up a "start-up" report.

The documents supplied with the unit must be assigned to the owner who should keep them carefully for future consultation in the event of maintenance or service.

All repair or maintenance work must be carried out by the Company's Technical Service or qualified personnel following the instructions in this manual.

The air-conditioner must under no circumstances be modified or tampered with as this may create situations of risk. Failure to observe this condition absolves the manufacturer of all liability for resulting damage.

WAIVER OF LIABILITY

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This document has been prepared with maximum care and attention paid to the content shown. Nonetheless, **Manufacturer** waives all liability deriving from the use of such document.

Read this document carefully. All work must be performed, components selected and materials used in complete accordance with the legislation in force in material in the country concerned, and considering the operating conditions and intended uses of the system, by qualified personnel.

FUNDAMENTAL SAFETY RULES

Ricordiamo che l'utilizzo di prodotti che impiegano energia elettrica ed acqua, comporta l'osservanza di alcune regole fondamentali di sicurezza quali:

⊗ The unit must not be used by children or by unfit persons without suitable supervision.

Do not touch the unit with bare feet or with wet or damp parts of the body.

Never perform any cleaning operations before having disconnected the unit from the mains power supply.

Do not modify safety or control devices without authorisation and instructions from the manufacturer.

Do not pull, detach or twist the electrical cables coming from the unit, even when disconnected from the mains electricity supply.

Do not open doors or panels providing access to the internal parts of the unit without first ensuring that the switch QF1 is in the OFF position (see the wiring diagram).

Do not introduce pointed objects through the air intake and outlet grills.

Do not dispose of, abandon or leave within reach of children packaging materials (cardboard, staples, plastic bags, etc.) as they may represent a hazard.

⚠ Respect safety distances between the unit and other equipment or structures. Guarantee adequate space for access to the unit for maintenance and/or service operations.

Power supply: the cross section of the electrical cables must be adequate for the power of the unit and the power supply voltage must correspond with the value indicated on the respective units. All units must be earthed in conformity with legislation in force in the country concerned.

Terminals 6, 7, 9, 10, 11, 12, 13, 21, 22 on the inside module may be live even when the unit has been disconnected. Check for voltage before proceeding.

Water connections should be carried out as indicated in the instructions to guarantee correct operation of the unit. Add glycol to the water circuit if the unit is not used during the winter or the circuit is not emptied.

Handle the unit with the utmost care (see weight distribution table) to avoid damage.

VISUAL INSPECTION

When the items are consigned by the carrier:

- make sure that the goods delivered correspond to the description on the delivery note, comparing this against the data on the packaging label.
- make sure the packaging and the unit are intact.

If damage or missing components are noted, indicate this on the delivery note. A formal complaint should be sent via fax or registered post to the After Sales Department within eight days from the date of receipt of the items.

STORING THE UNITS

The units must be stored sheltered from direct sunlight, rain, wind or sand.

Avoid exposing the units to direct sunlight, as the pressure inside the refrigerant circuit may reach dangerous values and cause the activation of the safety valves, where fitted.

The units cannot be stacked.

⚠ The packaging should not be removed until the unit is located in the installation site.

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 far as possible.

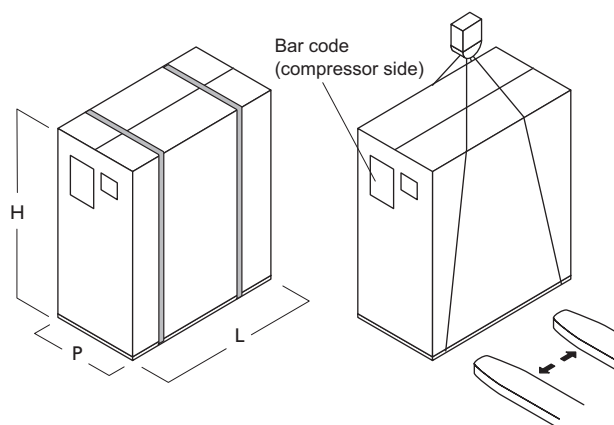
• Lifting by crane (2)

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.

⚠ The weight of the unit is biased towards the compressor side.

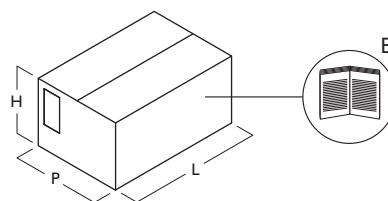
During transport, the unit should be kept in a vertical position.

1 HEAT PUMP



i-KI/i-KIR Dimensions		0011m	0031m	0061m
Dimension L	mm	985	1040	1120
Dimension P	mm	425	550	470
Dimension H	mm	865	940	1610
Gross weight	Kg	62	91	136

2 INSIDE MODULE



i-EM2/i-EMR2 Dimensions		0011m+0061m
Dimension L	mm	430
Dimension P	mm	350
Dimension H	mm	180
Gross weight	Kg	6,3

REMOVING THE PACKAGING

The packaging must be removed by the operator using suitable protective equipment (gloves, glasses, etc.). Take special care not to damage the unit. Observe the local standards in force as regards disposal of the packaging, using specialist collection or recycling centres.

Do not dispose of packaging materials in the environment or leave them within reach of children as they may represent a hazard.

Envelope B located in the inside module contains:

- user manual;
- CE declaration;
- installation - user - maintenance manual
- 2 fittings complete with probe socket;
- remote room control unit A5 (must be installed)

The following probes are already connected to the inside module and must be positioned in the system:

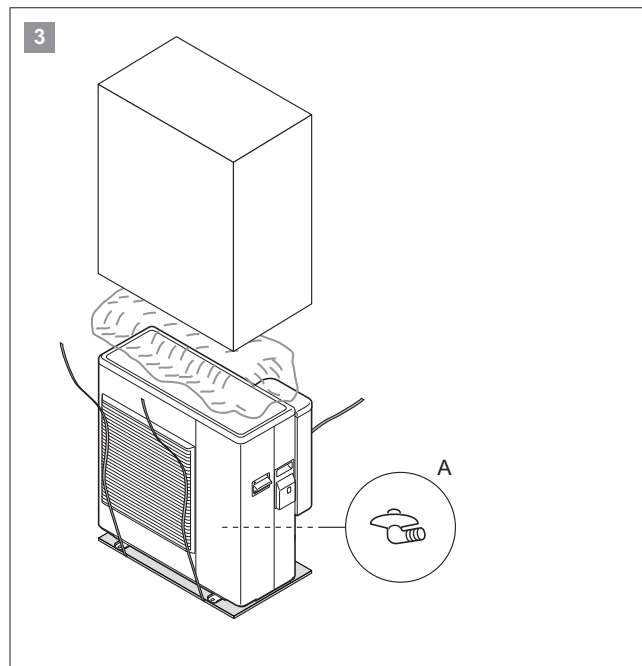
- DHW storage water temperature probe BT8
- outside air temperature probe BT11 (must be installed)
- probe BT9 only to be installed when supplementary source is available
- system return BT1 and outlet BT2 water temperature probes, to be placed in the probe socket on the fittings supplied

Envelope A located in the outside module contains:

- Condensate drain elbow fitting
- CE declaration

Make sure the components listed above are not lost or misplaced.

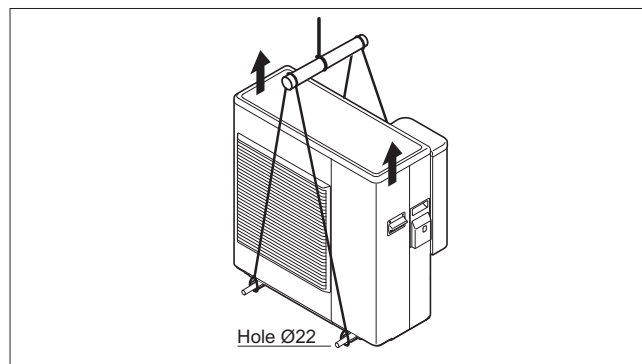
⚠ The installation - user - maintenance manual is an integral part of the unit and should therefore be read and kept carefully.



HANDLING UNPACKAGED UNITS

When the packaging has been removed:

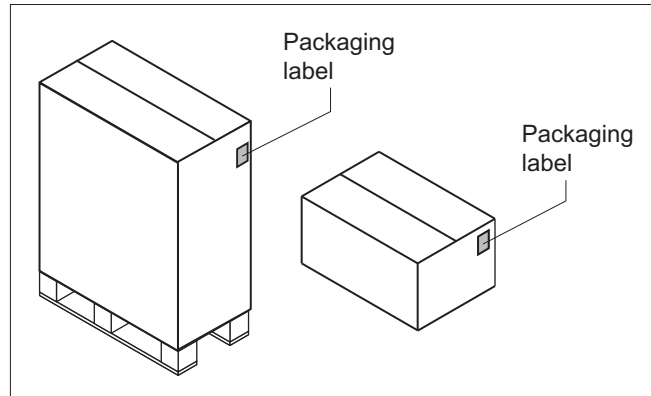
- Remove the base.
- Fit the vibration damping feet (accessories).
- Handle the unit using equipment that is suitable for its weight (forklift or crane), in compliance with the safety standards in force (and subsequent amendments).
- Do not drag the unit as the feet may be damaged or break.



The heat pump can be identified from:

PACKAGING LABEL

Describes the product identification data



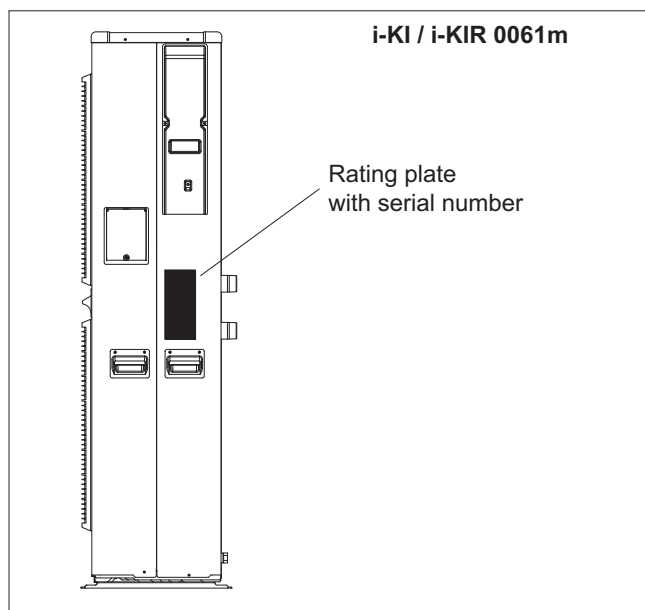
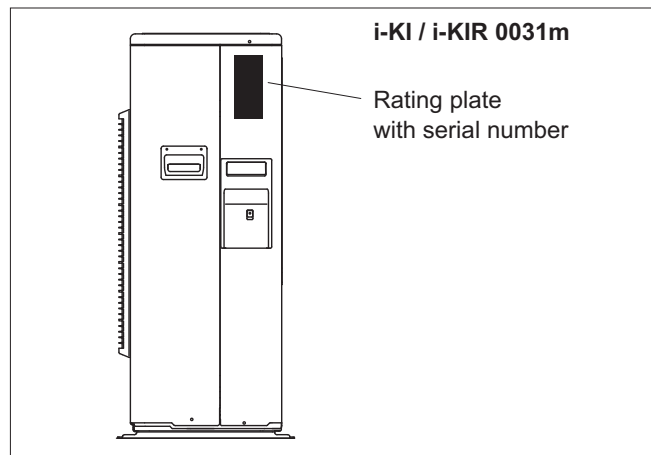
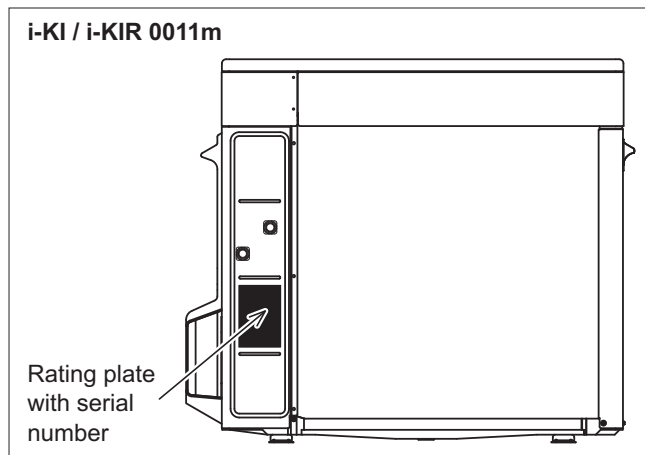
RATING PLATE

Describes the unit technical and performance specifications. Shows the serial number used to uniquely identify the unit. The serial number is also used to identify the unit's spare parts.

If service is required, the following information must be provided to the service centre:

Model, serial number, year of production.

⚠ Installation and maintenance operations are much more difficult if the identification plates or anything else needed to clearly identify the product are tampered with, removed or missing.



NOMENCLATURE

i-KI / i-KIR MTD	0011	m
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Model

size

Power supply voltage:
m = 230V/50Hz/1ph

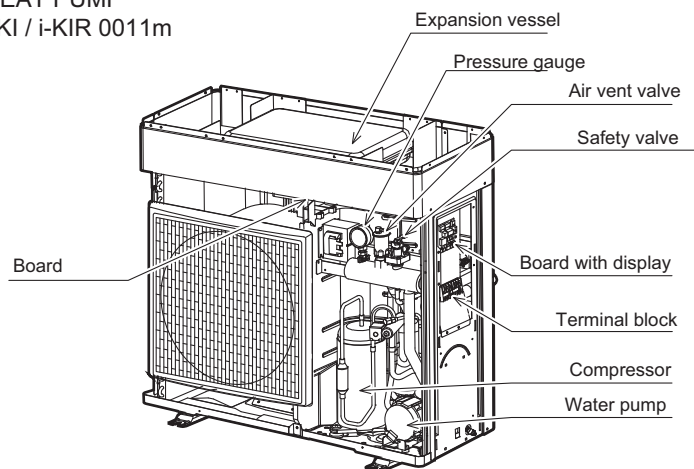
These air cooled reverse-cycle chillers with axial-flow fans operate with R410A refrigerant fluid and are suitable for outdoor installation.

The units are CE marked, as established by the EU direc-

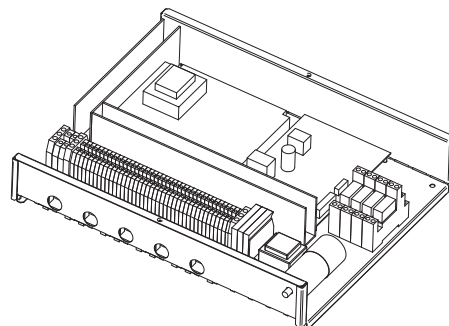
tives, including the latest amendments, and the corresponding approximated national legislation.

They are factory tested and on site installation is limited to water and electrical connections.

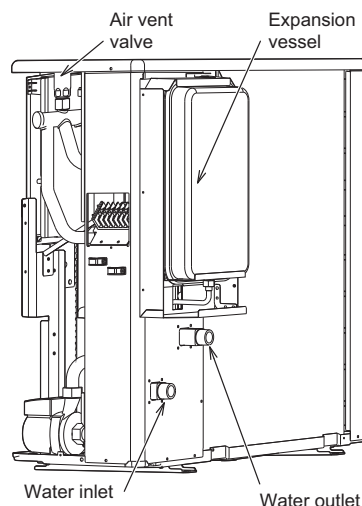
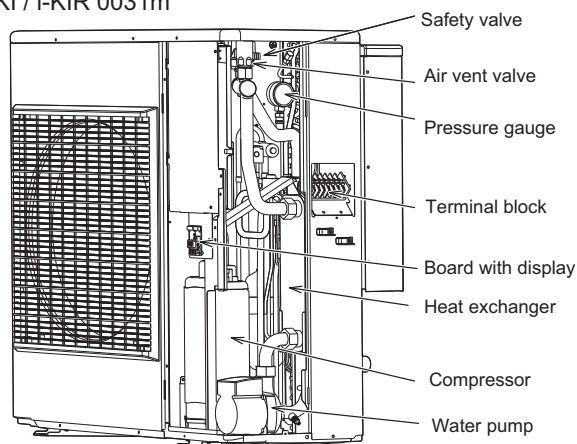
HEAT PUMP
i-KI / i-KIR 0011m



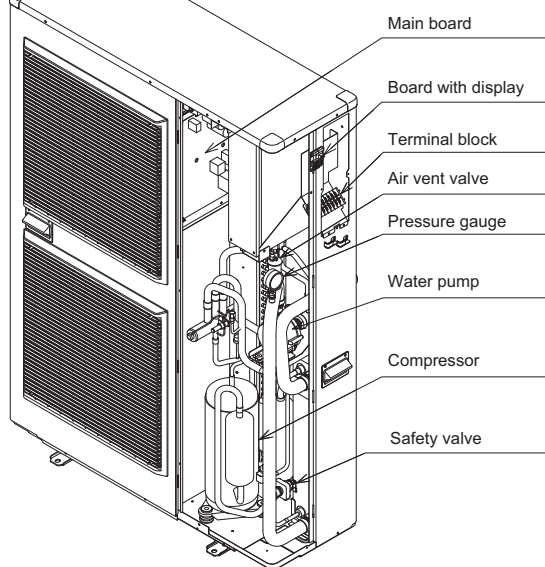
INSIDE MODULE
i-EM2 / i-EMR2



HEAT PUMP
i-KI / i-KIR 0031m



HEAT PUMP
i-KI / i-KIR 0061m



VERSIONS AVAILABLE



i-KI MTD air/water heat pump, heating only, with DC inverter-driven compressors, domestic hot water production, axial-flow fans and hydronic unit.



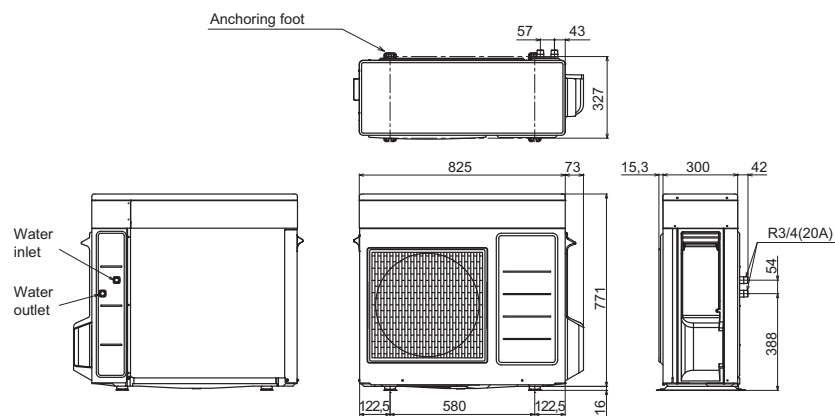
i-KIR MTD reverse-cycle air/water heat pump with DC inverter-driven compressors, domestic hot water production, axial-flow fans and hydronic unit.

The heat pump is supplied complete with an electronic module to be installed inside the home's boiler room. The i-EM2 module, for heating only units, and i-EMR2, for reverse-cycle units, must be supplied at 230V-50Hz and connected to the heat pump.

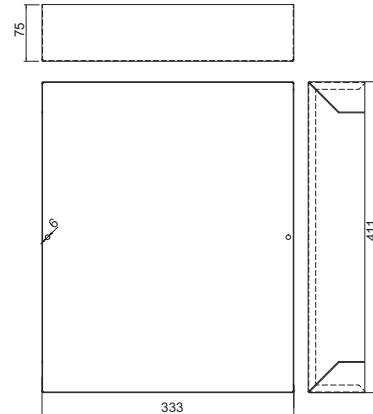
The i-EM2 and i-EMR2 modules come as standard with a remote display terminal, temperature/humidity probe and outside air temperature probe for system water outlet temperature set point compensation.

Further information and technical specifications are provided in the manual supplied with the electronic module.

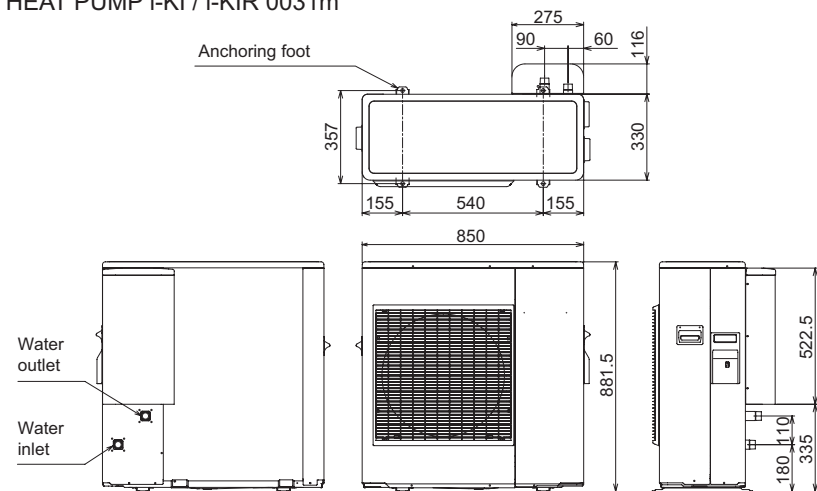
HEAT PUMP i-KI / i-KIR 0011m



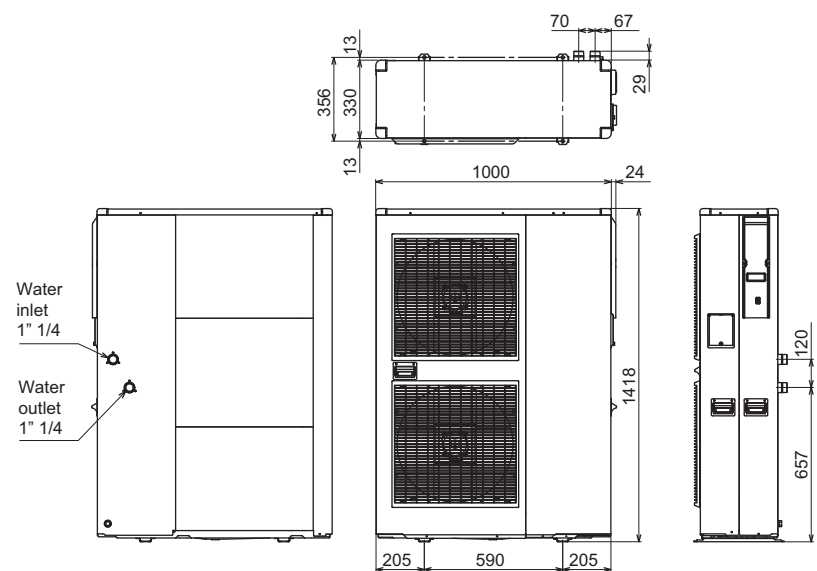
INSIDE MODULE i-EM2 / i-EMR2



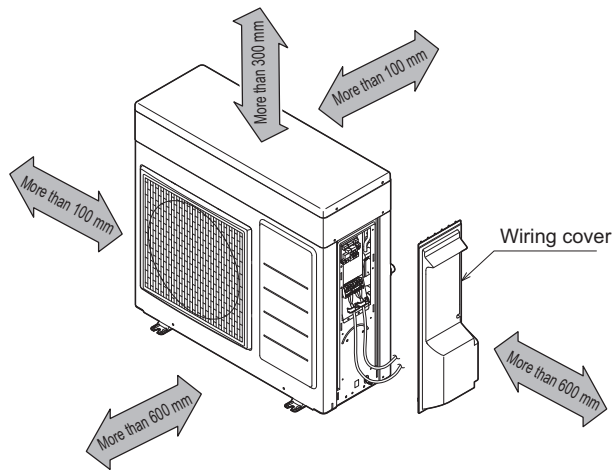
HEAT PUMP i-KI / i-KIR 0031m



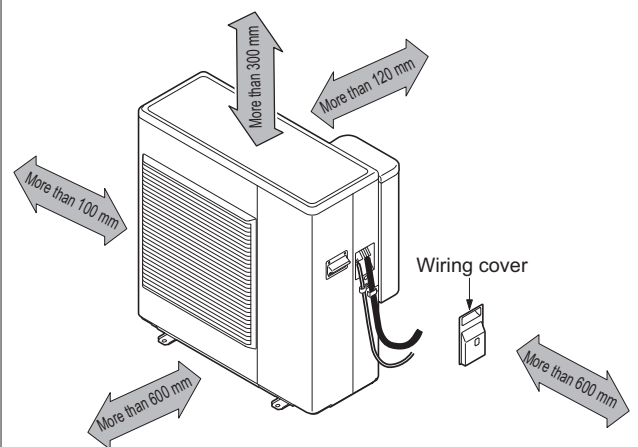
HEAT PUMP i-KI / i-KIR 0061m



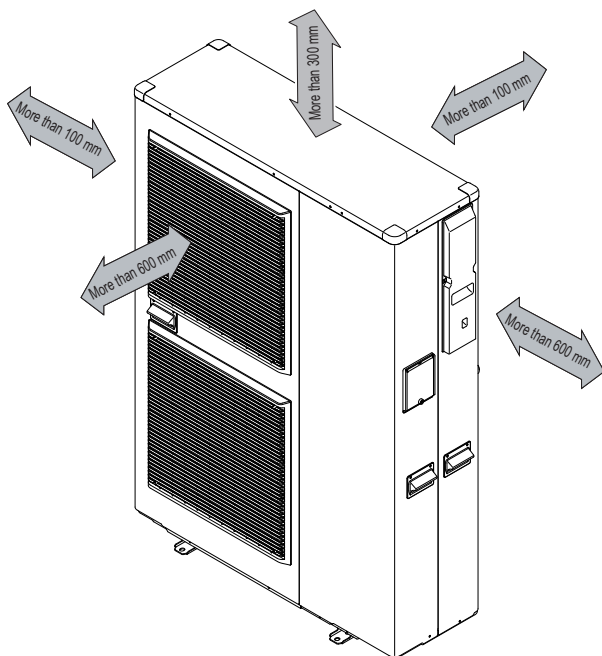
HEAT PUMP 0011m



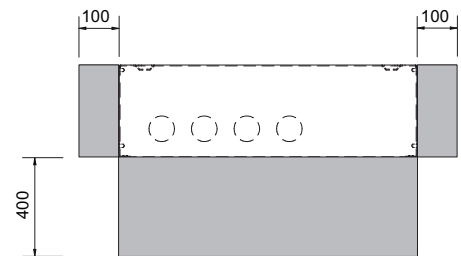
HEAT PUMP 0031m



HEAT PUMP 0061m



INSIDE MODULE i-EM2 / i-EMR2



CHOICE OF INSTALLATION SITE

Before installing the unit, agree with the customer the site where it will be installed, taking the following points into consideration:

- Check that the fixing points are adequate to support the weight of the unit;
- Pay scrupulous respect to safety distances between the unit and other equipment or structures to ensure that air entering the unit and discharged by the fans is free to circulate.

- Follow the instructions shown in the chapter on "Minimum clearances" to allow room for maintenance operations.
- Unit for outdoor installation

If installing multiple units the clearances must be doubled.

POSITIONING

- Before handling the unit, check the capacity of the lift equipment used, respecting the instructions on the packaging.
- To move the unit horizontally, make appropriate use of a lift truck or similar, bearing in mind the weight distribution of the unit.
- To lift the unit, insert tubes long enough to allow positioning of the lifting slings and safety pins in the special holes in the base of the unit.
- To avoid the slings damaging the unit, place protection between the slings and the unit.
- The unit should be installed on special vibration dampers.
- See the chapter on DIMENSIONAL DRAWINGS for the support positions and the corresponding weights for the correct sizing of the vibration dampers.
- Fix the unit, making sure it is level and that there is easy access to water and electrical components.
- If the site is exposed to strong winds, fix the unit adequately using tie rods if necessary.
- In heating mode the unit produces a significant quantity of condensate, which must be suitably drained. Condensate drainage must not cause problems to objects or people.

- If the outside air temperature is less than 0°C, the condensate may freeze; in these case fit a frost protection heater on the drain line.
- For correct operation of the unit, avoid the following:
 - obstacles to air flow
 - leaves that may block the heat exchange coil
 - strong winds that stop or reinforce air flow
 - sources of heat too close to the unit, recirculation or stratification of air

CHOICE OF INSTALLATION SITE

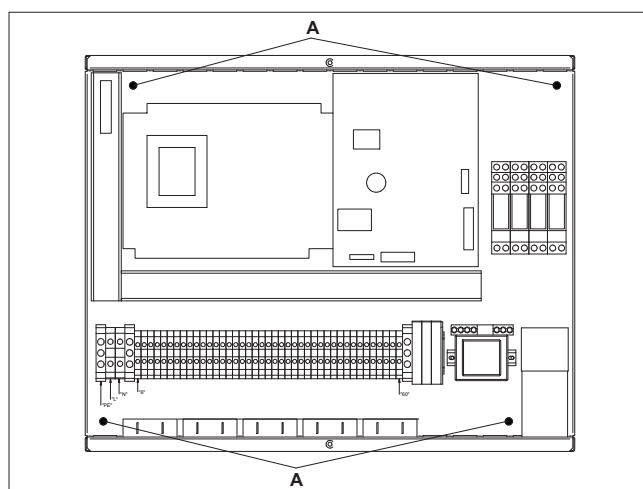
Before installing the unit, agree with the customer the site where it will be installed, taking the following points into consideration:

- the unit must be installed indoors;
- the unit must be installed by fastening to a vertical wall
- safety distances between the unit and other equipment
- careful attention must be paid to structures so as to ensure sufficient ventilation.
- Follow the instructions shown in the chapter on DIMENSIONED DRAWINGS to allow room for maintenance operations.
- The maximum length of the connection cable between i-KI/i-KIR and the i-EM2/i-EMR inside module is 30 m, making this also the maximum distance between the two modules.

If installing multiple units the clearances must be doubled.

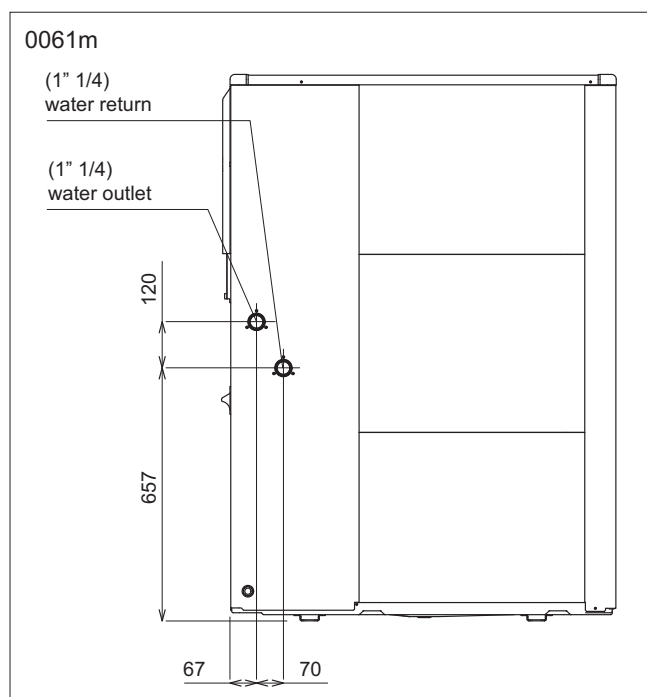
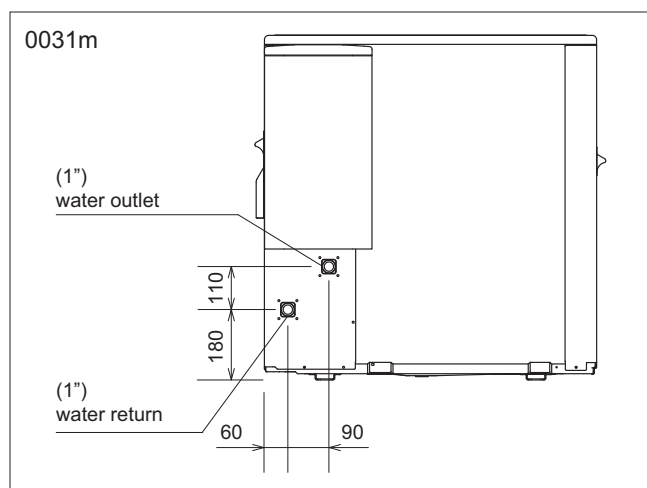
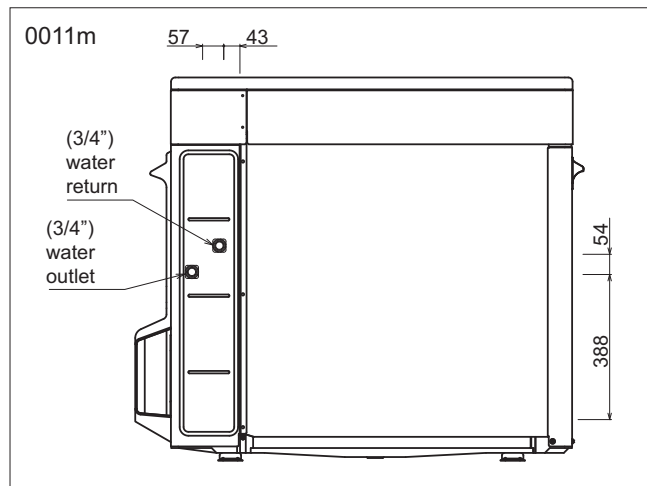
POSITIONING

- See the figure on the side for the points used to fasten the module **(A)** to the vertical wall and corresponding distances.
- Fix the unit, making sure there is easy access.



The choice and installation of components is the responsibility of the installer who should follow good working practice and current legislation. Before connecting the pipes, make sure they do not contain stones, sand, rust, dross or other foreign bodies which might damage the unit.

Water connection dimensions



Construction of a bypass is recommended to enable the pipes to be washed through without having to disconnect the unit (see drain valves). The connection piping should be supported in such a way as to avoid it weighing on the unit.

Required components

The following components must be installed in the water circuit:

1. **A flow switch (inlet).** The flow switch must be calibrated by the installer to a value equal to 70% of rated flow (obligatory).
2. **An intake filter must be installed as close as possible to the evaporator and positioned to allow easy access for routine maintenance.**

Recommended components

The following components should be installed in the water circuit:

1. Two pressure gauges with a suitable scale (intake and outlet);
2. Two vibration damper joints (intake and outlet);
3. Two shut off valves (normal in intake and calibrating in outlet);
4. Two thermometers (intake and outlet);
5. All the pipes must be insulated with suitable material to prevent the formation of condensate and heat loss. The insulating material must be a vapour barrier. Make sure that the control and shut off devices protrude from the insulation.
6. At the lowest points in the system, install drain valves for easy emptying.
7. At the highest points in the system, install automatic or manual air vent valves.
8. The unit is fitted as standard with an expansion vessel (8 liters); make sure this is correctly sized for the water content of the system and the expected operating temperature, otherwise install an additional expansion vessel.

⚠ Failure to install the flow switches will mean the heat exchangers are not protected in the event of no flow of liquid. The Manufacturer cannot be held liable for any damage to the unit and/or the system following the failure to install these devices or the filter.

⚠ The correct operation of the components that help ensure the safety of the appliance and the system should be checked regularly. Specifically, this involves cleaning the filters and checking the operation of the flow switches installed.

Make sure that the frost protection heaters on the heat exchanger are powered when the unit is off.

Water flow to the chiller unit must conform to the values shown in the section on "General Technical Data".

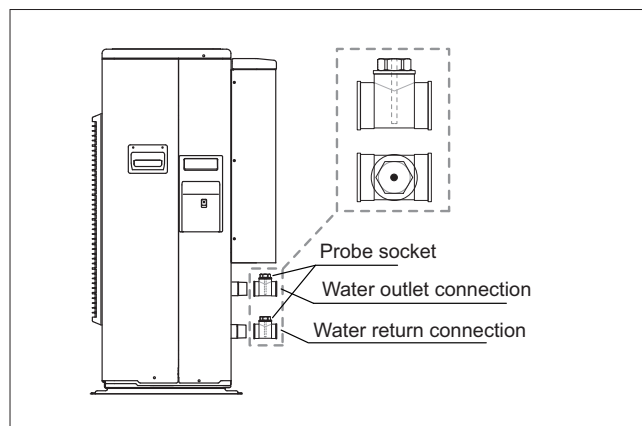
The flow of water must be maintained constant during operation. The water content of the unit must be such as to avoid disturbing operation of the refrigerant circuits.

Probe socket fittings

- Remove the protective caps from the water connections
- Install the probe socket fittings supplied on the system circuit inlet and return. **For i-KI/i-KIR 0011m units, install the 1"-3/4" reducers as standard between the probe socket fittings and water connections.** To fasten the probe socket fittings use two spanners. Place probe BT1 on the inlet connection and BT2 on the outlet connection.

Warnings: use conductive paste to improve the temperature reading.

Fasten the probes placed in the probe sockets to the fittings, using suitable ties.



Risk of freezing

The unit must be prevented from freezing at outside air temperatures around 0°C.

1. use suitable percentages of antifreeze (see "Ethylene glycol solutions")
2. protect the piping with heating sheaths,

In caso di unità ferma per un lungo periodo di tempo si consiglia di svuotare l'impianto verificando che non vi siano ristagni d'acqua nei punti più bassi dell'impianto o rubinetti chiusi nei quali si possa fermare dell'acqua.

It is recommended to use non-toxic food grade antifreeze, compliant with the standards in force in the countries where the unit is used, if domestic hot water production is also featured.

The antifreeze used must be corrosion inhibited and compatible with the water circuit components.

Ethylene glycol solutions

Water and ethylene glycol solutions used as a heat carrier in the place of water reduce the performance of the unit.

Multiply the performance figures by the values given in the following table.

⚠ The heat pumps must be fitted with a filling/top-up system connected to the return line and a drain valve in the lowest part of the system.

Systems filled with antifreeze or subject to special legislative requirements must be installed with low-loss headers.

Freezing point (°C)						
	0	-5	-10	-15	-20	-25
Percentage of ethylene glycol by weight						
	0	12%	20%	28%	35%	40%
cPf	1	0,985	0,98	0,974	0,97	0,965
cQ	1	1,02	1,04	1,075	1,11	1,14
cdp	1	1,07	1,11	1,18	1,22	1,24

cPf: cooling capacity correction factor

cQ: flow rate correction factor

cdp: pressure drop correction factor

Water quality

⚠ The manufacturer is not liable for obstruction, breakage or noise resulting from the **failure to install filters** or vibration dampers.

Particular types of **water used for filling or topping up** must be treated with appropriate treatment systems.

For reference values, see the table.

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

Fouling factors

The performance data given refer to conditions with clean evaporator plates (fouling factor = 1).

For different fouling factors, multiply the figures in the performance tables by the coefficient given in the following table.

Fouling factors (m ² °C/W)	Evaporator		
	f1	fk1	fx1
4,4 x 10 ⁻⁵	-	-	-
0,86 x 10 ⁻⁴	0,96	0,99	0,99
1,72 x 10 ⁻⁴	0,93	0,98	0,98

f1: capacity correction factor

fk1: compressor power input correction factor

fx1: total power input correction factor

System circuit connection

- Use a flat gasket to ensure tightness
- Connect the flexible joints to the probe socket fittings installed on the heat pump
- Connect the system pipes to the flexible joints
- Use two spanners to tighten the water connections
- Install the filter on the system return pipe

Maximum water content in the system

The heat pump is supplied with expansion vessel for the SYSTEM (NOT FOR DOMESTIC HOT WATER) and a 3 bar safety valve.

The expansion vessel is suitable for the radiant panel system, hydronic terminal system and radiator system with following **installation maximum water content** *:

Size		Radiant panel system	Hydronic terminal system	Radiator system
		Hot water at 35°C and cold water at 18°C	Hot water at 45°C cold water at 7°C	Up to 60°C
0011m	I	300	180	100
0031m	I	400	240	135
0061m	I	400	240	135

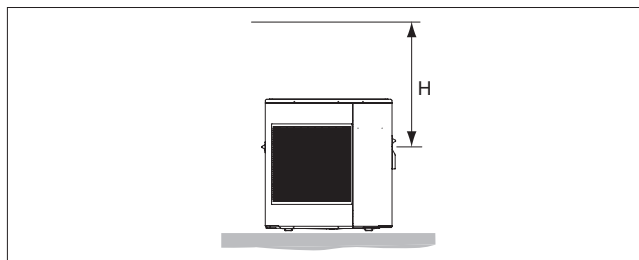
* expansion vessel pre-charged to 150 kPa (max 12 metre height difference)

The expansion vessel pre-charge pressure depends on the height the heat pump is installed at.

To determine the pre-charge value, proceed as follows:

$$\text{Vessel pre-charge} = H + 0.3$$

H in bars (10 metres ~ 1 bar)



For height differences exceeding 12 metres, the volume of water in the system as described above may decrease; evaluate whether the expansion vessel supplied is sufficient for each system, otherwise install an additional expansion vessel.

Water content in the system

The minimum system water content must be guaranteed at all times.

Size		0011	0031	0061
Minimum water content	I	26	26	60

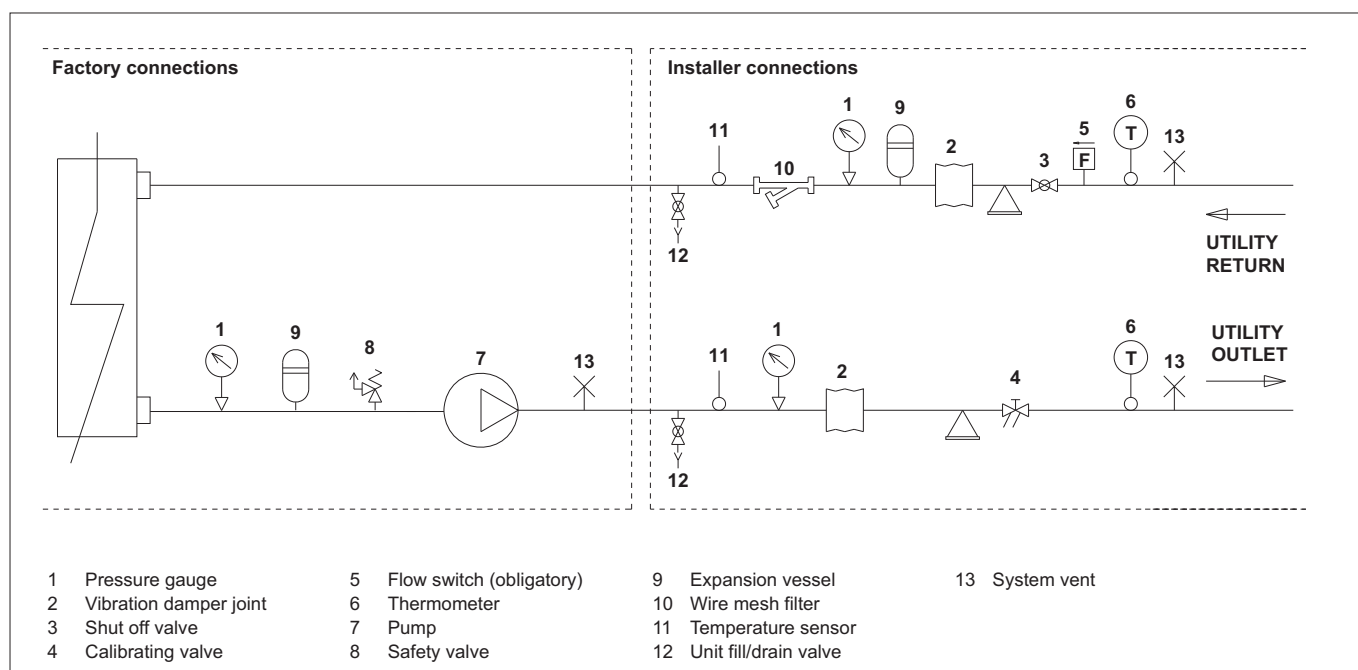
Expansion vessel size

Size		0011	0031	0061
Expansion vessel	I	6	8	8

Safety valve calibration

Size		0011	0031	0061
Safety valve	bar	3	3	3

Utility water circuit connection diagram



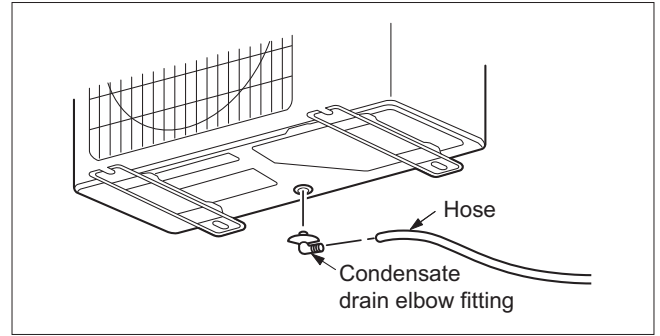
Condensate drain

The unit is fitted with condensate pan; this must be connected to a drain system to take away the water that forms, see the drawing.

In heating mode the unit produces a significant quantity of condensate, which must be suitably drained.

Proceed as follows:

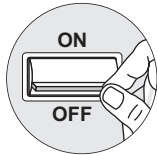
- Connect the unit condensate drain
- Make sure the drain hose has a incline of at least 2 cm/m, without obstructions or choking.
- Connect the condensate drain hose to a rainwater drain. Do not connect to the sewage system as odours may be sucked up if the water in the drain trap evaporates.
- After connecting, check correct drainage of the condensate by pouring water into the pan.
- If necessary, suitably insulate the condensate drain hose.
- Condensate drainage must not cause problems to objects or people.



If the outside air temperature is less than 0°C, the condensate drained from the collection pan may freeze.

The unit must be supported on a suitable structure or brackets to keep it off the ground, with a frost protection heater fitted on the drain line.

FILLING THE SYSTEM



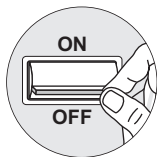
- Before starting to fill, place the unit mains switch QF1 in the OFF position.
- Before filling, check that the system drain valve is **closed**.
- Open all system and terminal air vents.
- Open system shut off valves.
- Start filling by slowly opening the system water fill valve outside the unit.
- When water begins to leak out of the terminal air vent valves, close them and continue filling until the pressure gauge indicates a pressure of 1.5 bar.

⚠ The system must be filled to a pressure of between 1 and 2 bars.

It is recommended that this operation be repeated after the unit has been operating for a number of hours. The pressure in the system should be checked regularly and if it drops below 1 bar, the water content should be topped-up.

Check the tightness of the joints.

EMPTYING THE SYSTEM



- Before starting to empty, place switch QF1 in the "OFF" position
- Make sure the system fill/top-up water valve is closed.
- Open the drain valve outside the unit and all the installation and terminal air vent valves..

⚠ If the fluid in the circuit contains antifreeze, it should not be allowed to drain freely, as it is pollutant. It should be collected for possible reuse.

When draining after heat pump operation, take care as the water may be hot (up to 50°).

The heat pumps must be installed downstream of a main switch (QF1, see wiring diagram), as required by the standards in force in the country where the unit is installed. Connection to the mains power supply and the connection of the flow switch to the corresponding terminals must be performed by authorised personnel in compliance with the standards in force.

For all electrical work, refer to the electrical wiring diagrams in this manual.

It is also recommended to check that:

- The characteristics of the mains electricity supply are adequate for the power ratings indicated in the electrical specifications below, also bearing in mind the possible use of other equipment at the same time.

⚠ Power to the unit must be turned on only after installation work (plumbing and electrical) has been completed.

All electrical connections must be carried out by qualified personnel in accordance with legislation in force in the country concerned

Respect instructions for connecting phase, neutral and earth conductors..

The power line should be fitted upstream with a suitable device to protect against short-circuits and leakage to earth, isolating the installation from other equipment.

⚠ Voltage must be within a tolerance of $\pm 10\%$ of the rated power supply voltage for the unit (for three phase units, the unbalance between the phases must not exceed 3%). If these parameters are not respected, contact the electricity supply company.

For electrical connections, use double insulation cable in conformity with legislation in force in the country concerned.

⚠ A thermal overload switch and a lockable mains disconnect switch, in compliance with the CEI-EN standards (contact opening of at least 3mm), with adequate switching and residual current protection capacity based on the electrical data table shown below, must be installed as near as possible to the appliance.

⚠ An efficient earth connection is obligatory.

The manufacturer cannot be held liable for any damage caused by the failure to correctly earth the unit.

In the case of three phase units, ensure the phases are connected correctly.

⚠ Do not use water pipes to earth the unit.

⚠ WARNING

- The power supply current rating must be equal to the sum of the current drawn by the air-water heat pump and the current drawn by any other electrical appliances.

If the contracted current rating is insufficient, make sure this is adapted accordingly.

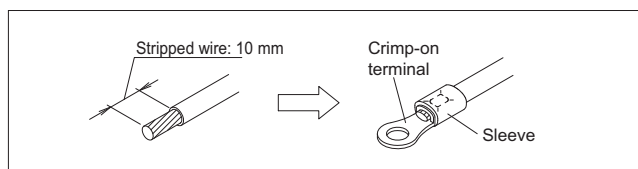
- If the voltage is low and the air-water heat pump has difficulty starting, contact your electricity supplier to have the voltage increased.

How to connect the cables to the terminal

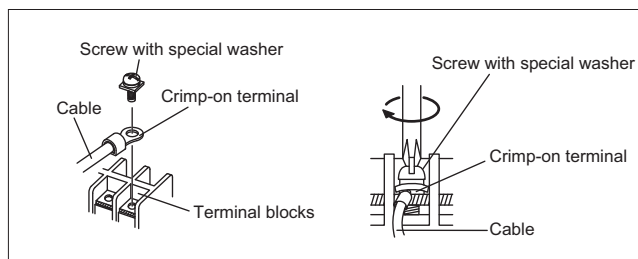
Pay attention during wiring operations

- When stripping a main cable, always use special tools such as wire strippers. If no specific tool is available, strip the wires carefully using a knife, etc.

- (1) Use crimp-on terminals with insulating sleeves as illustrated in the figure below for connecting the wires to the terminal block.
- (2) Securely fasten the crimp-on terminals to the wires using a special tool, so that the wires don't come free.



- (3) Use the cables specified, connect them securely and in such a way that they don't exert pressure on the terminals.
- (4) Use a suitable screwdriver to tighten the screws on the terminals. Don't use damaged screwdrivers, otherwise the screw heads may also be damaged and the screws cannot be tightened correctly.
- (5) Don't over-tighten the screws on the terminals, otherwise they may break.



Make sure a dedicated power supply with residual current circuit breaker is used.

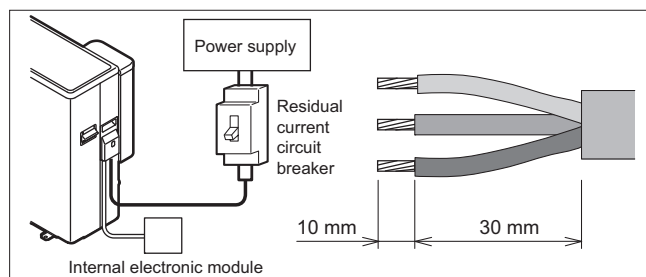
In accordance with the following designations, use cables with wire sizes as described in the table below.

The power cable must be approved in compliance with IEC 60245 IEC57(H05RN-F)

As concerns all-pole disconnection, the product requires a hard-wired overcurrent protection device in compliance with wiring standards and relevant national requirements. The classification of this device must be suitable for the product specifications.

Size	Power supply cable (mm ²)		Internal electronic module connection cable (mm ²)		Switch rating (A)
	MAX.	MIN.	MAX.	MIN.	
0011m	2,0	1,5	2,0	1,5	16
0031m	4,0	3,5	2,5	1,5	20
0061m	5,5	4,0	5,5	4,0	32

Strip the end of the connection cables according to the measurements shown in the following drawing.



⚠ WARNING

The connection cable must be stripped along a 10 mm section. If this section is shorter, contact may be defective. Longer sections may cause short-circuits.

- Use a residual current circuit breaker with a gap of around 3 mm between contacts.
- Poor wiring may not only cause malfunctions but also damage to the PC board.
- Suitably tighten all the screws.
- To check these are tight, tug the cable lightly.

Electrical data at maximum conditions allowed (full load)

Size	Power supply	Fuses (5x20T 250V)			
		F.L.A.	FU5	FU6	FU7
i-EM2 / i-EMR2	(V-Ph-Hz)	(A)	(A)	(A)	(A)
0011m+0061m	230-1-50	6	4	1,25	0,5

Maximum values for sizing the protection switches and power supply cables.

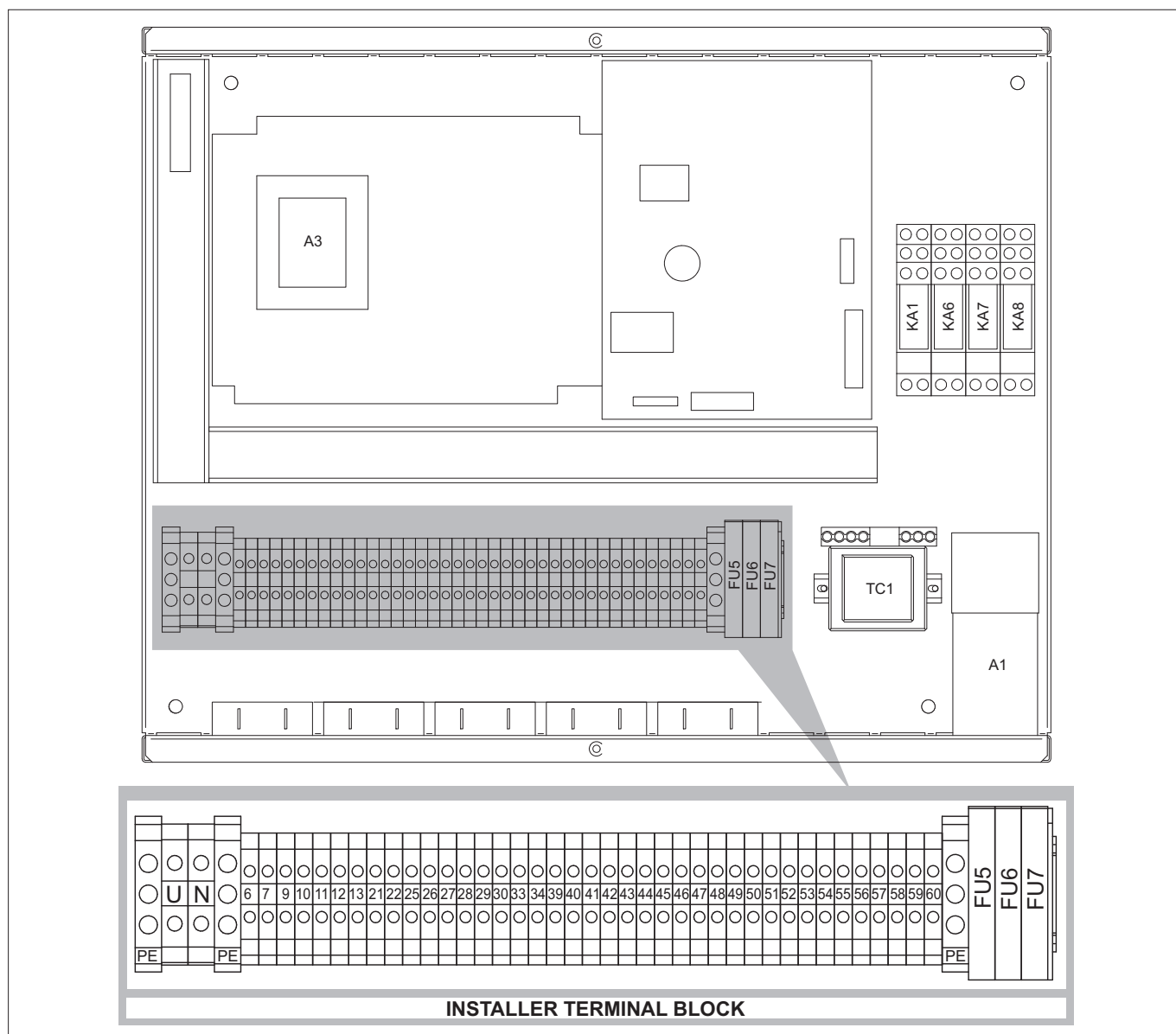
F.L.A. Maximum current input

F.L.I. Maximum power input

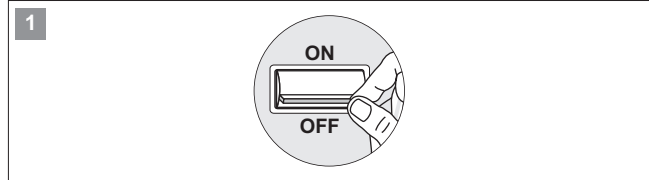
S.A. Start-up current

Size	Power supply	Total			Fan	Pump	Fuses (5x20T 250V)						
		F.L.A.	F.L.I.	S.A.			F.L.I.	F.L.I.	CF1	CF2	CF3	CF4	CF5
i-KI / i-KIR	(V-ph-Hz)	(A)	(kW)	(A)	(kW)	(kW)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
0011m	230-1-50	10,9	2,48	0,8	0,05	0,09	15	3,15	3	15	15	15	15
0031m	230-1-50	18,3	4,12	1,4	0,10	0,13	25	15	5	3,15	3,15	3,15	3,15
0061m	230-1-50	25,0	5,70	1,4	0,14	0,18	30	5	3	-	3	3,15	3,15

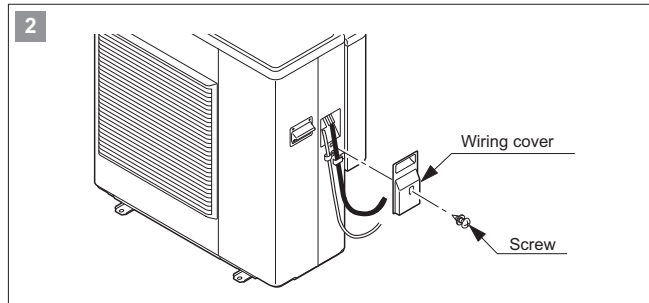
INSIDE MODULE ELECTRICAL PANEL LAYOUT



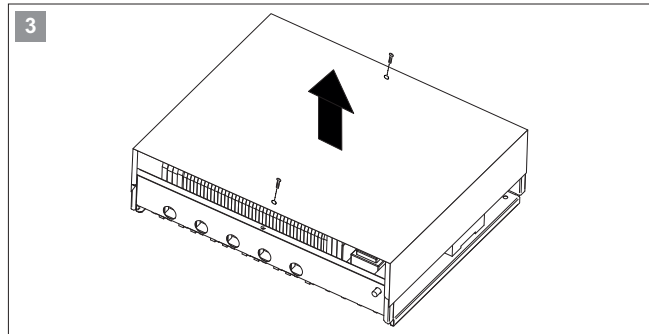
- Before connecting the unit to the mains power supply, make sure that for each connection to the mains power supply switch QF1 is open ("OFF").



- Remove the protective cover from the heat pump terminal block by unscrewing the fastening screw.

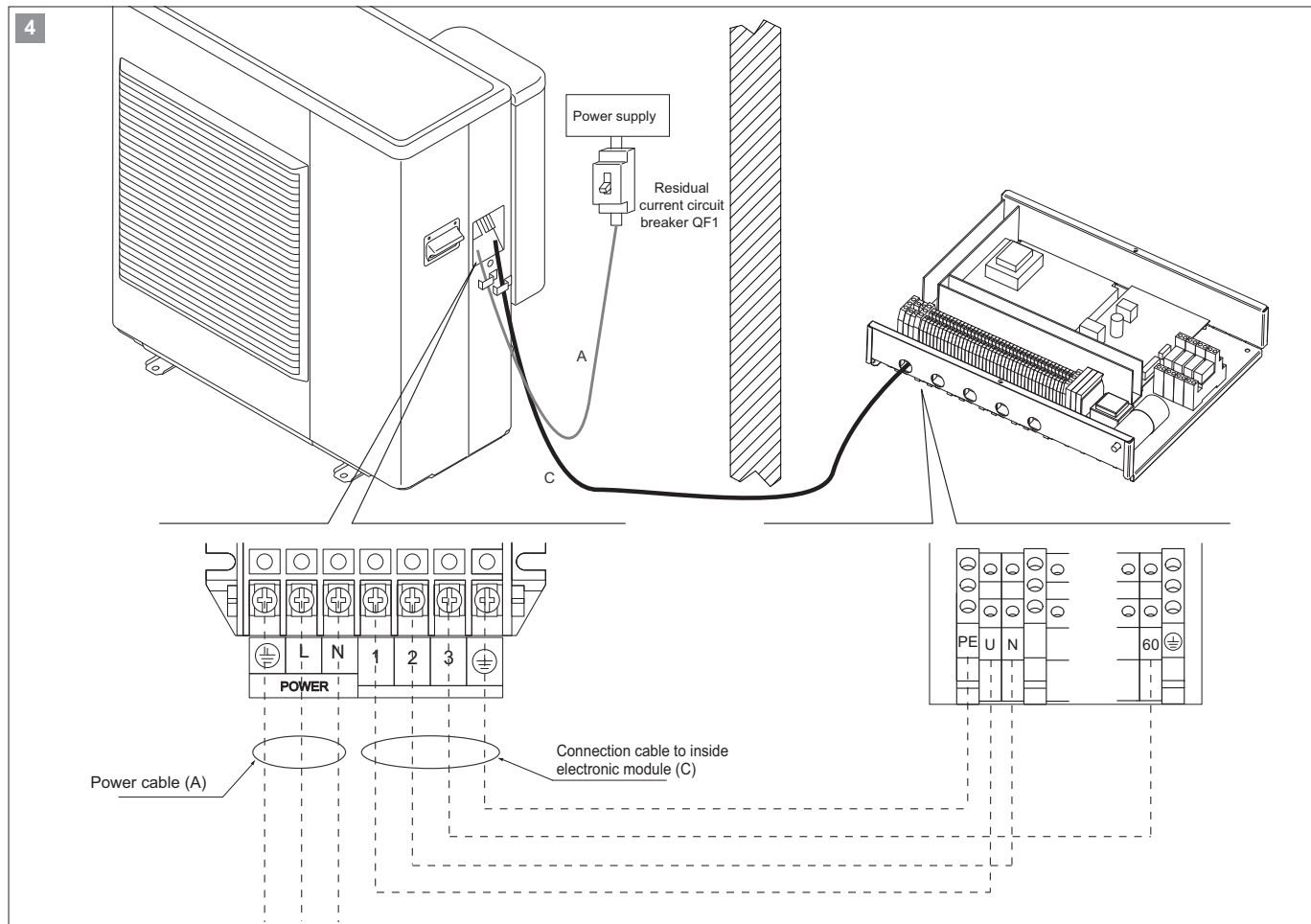


- Remove the protective cover from the electrical panel on the inside module by unscrewing the fastening screws and removing the cover.



INSIDE MODULE SUPPLIED WITH CONNECTION TO THE HEAT PUMP

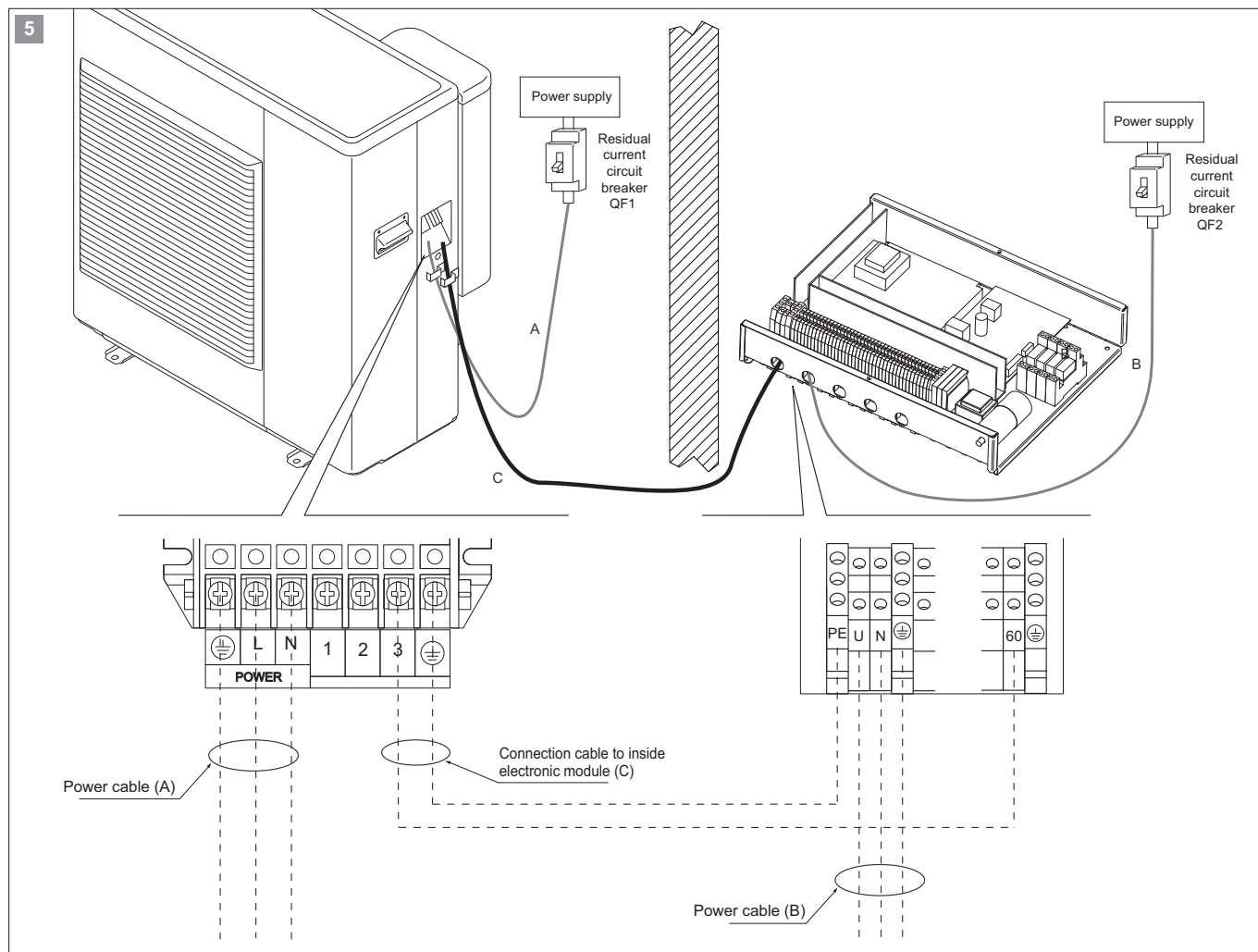
- If power is supplied to the inside module via a connection to the heat pump, connect power to the heat pump and the communication cable to the inside module as shown in figure 4.



- Make sure that all the protective devices removed to make the electrical connections have been repositioned before powering up the unit.
- Reposition the wiring cover on the heat pump and the cover on the inside module and fasten them to the unit
- For all mains power connections, move the main switch QF1 (outside the appliance) to "ON".

HEAT PUMP AND INSIDE MODULE POWERED SEPARATELY

- If power is supplied to the inside module separately from the heat pump, connect power to the heat pump, the communication cable from the heat pump to the inside module and power to the inside module, as shown in figure 5.



- Make sure that all the protective devices removed to make the electrical connections have been repositioned before powering up the unit.
- Reposition the wiring cover on the heat pump and the cover on the inside module and fasten them to the unit
- For all mains power connections, move the main switch QF1 (outside the appliance) to "ON".
- When connecting the circuit breakers and power cables to the inside and outside module make sure phase and neutral are connected correctly.

Below is a list of the electrical connections that the installer needs to complete for the INSIDE MODULE only.
The maximum length of probe cables is 100 m for 1 mm² cables, and 50 m for 0.5 mm² cables.

Outside air probe (BT11) connection

The outside air probe allows the system water temperature set point to be compensated during heating or cooling operation.

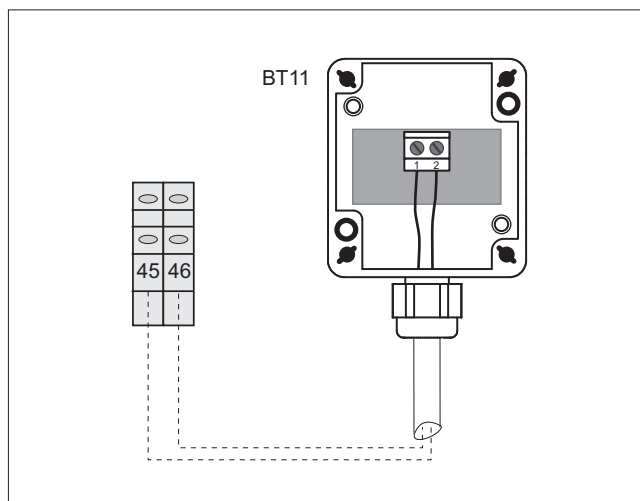
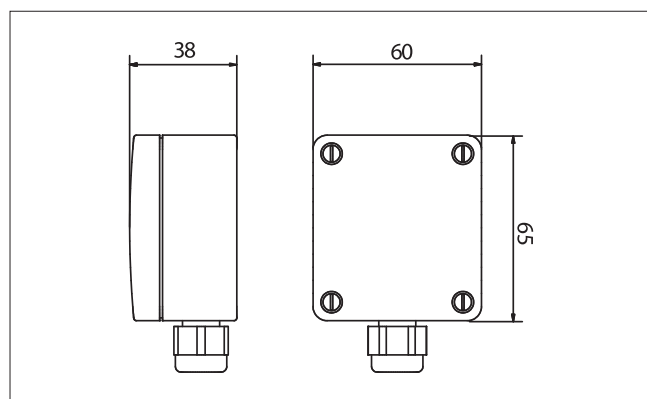
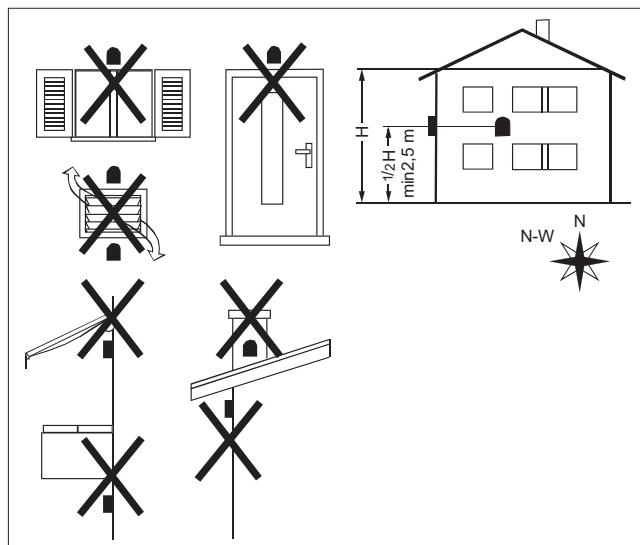
Installation instructions

The outside air probe must be installed:

- outside of the home
- not in direct sunlight, away from flue gas discharges, air outlets, or doors and windows.
- on a perimeter wall facing north/north-west
- at a minimum height of 2.5 metres above the ground or at most half way up the house.

Mounting method:

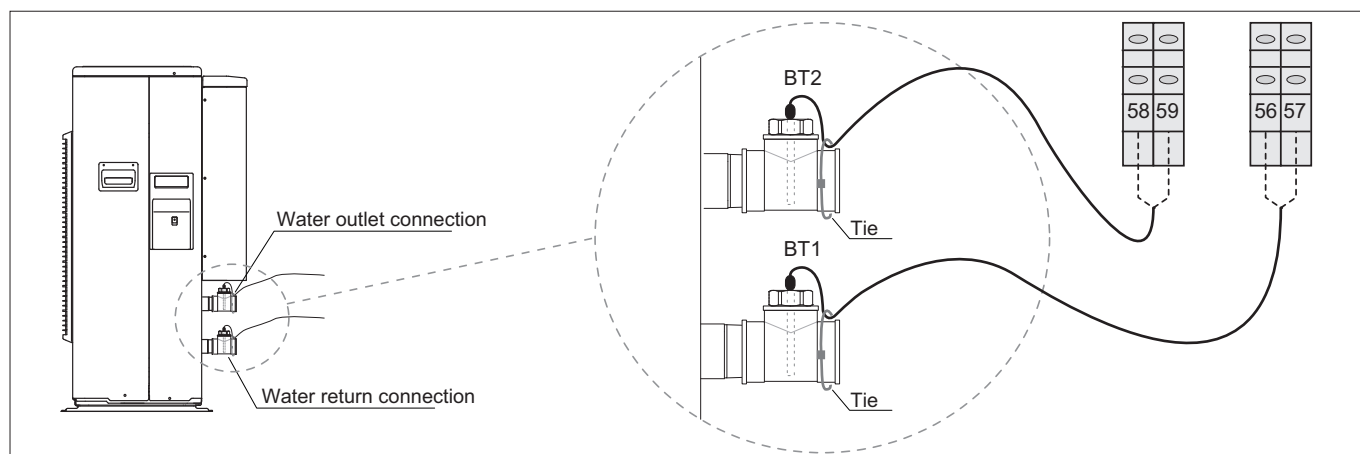
- Open the cover of the sensor by unscrewing the 4 screws.
- Attach a probe to the wall and the correct position as described above.
- For the electrical connections see "Connection diagram".
- Re-place the cover of the sensor.



Water outlet and return temperature probe BT1 and BT2 connection to heat pump

- Fit probes BT1 and BT2 in the probe sockets on the heat pump outlet and return fittings using super-conductive paste.
- Fasten the probes to the corresponding fittings using ties.
- Connect the probes to the inside module terminal block as shown in the figure.
- Carefully insulate the entire area of the probe socket fittings so as to prevent condensate or energy losses.
- If the probe cables need to be extended make sure the extensions are positioned indoors or inside the heat pump.

TECHNICAL DATA	
Sensing element	NTC 10Kohm $\pm$ 1% (25°C)
Degree of protection	IP65
Perm. ambient / carriage temperature	-50°C...+100°C
Measuring range	-50°C...+100°C
Materials	PA 15% GK, Colour RAL 9010



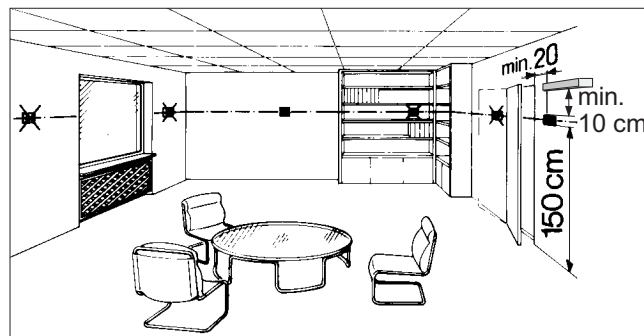
A5 room controller connection

Installation instructions

The room controller must be installed in the best reference position for temperature control.

Position the room controller as follows:

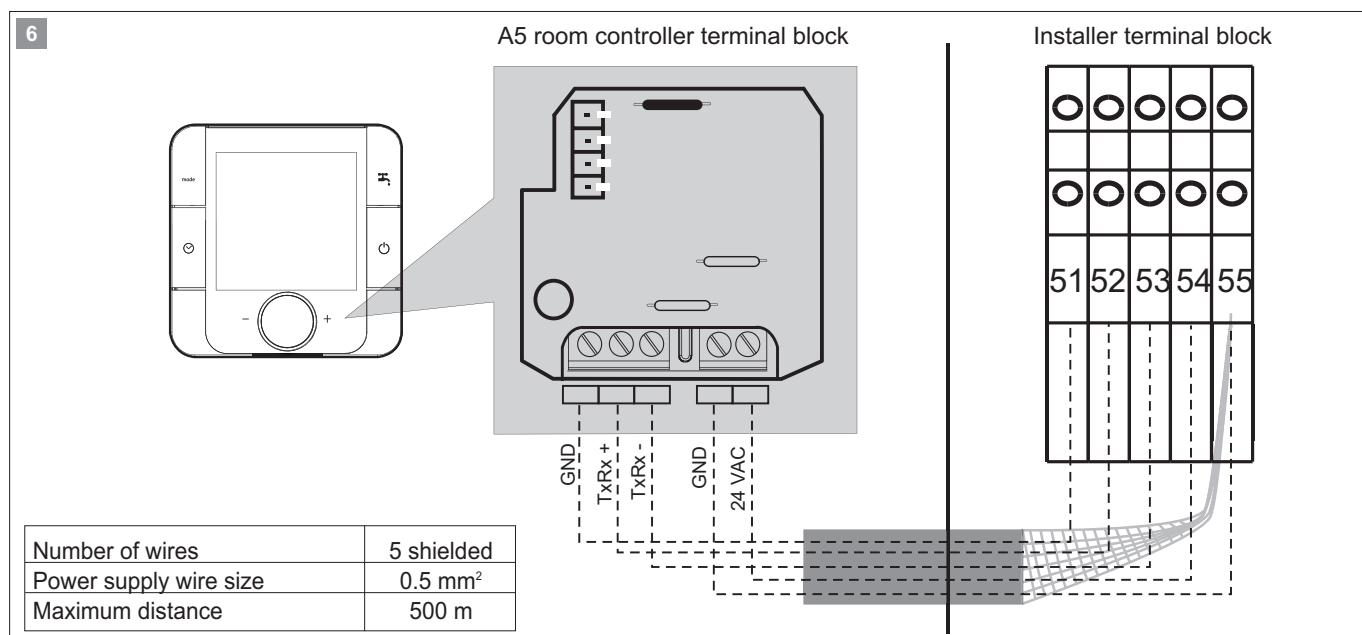
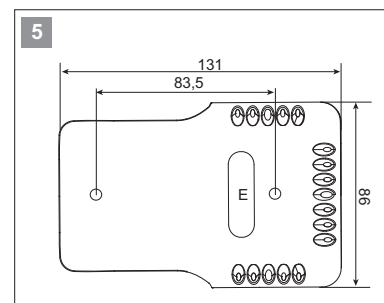
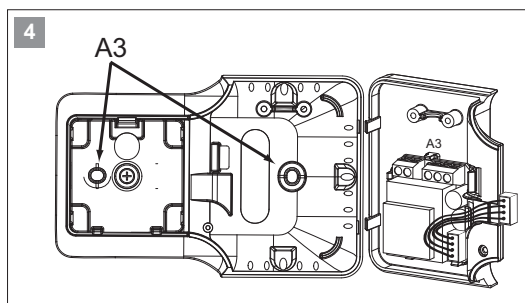
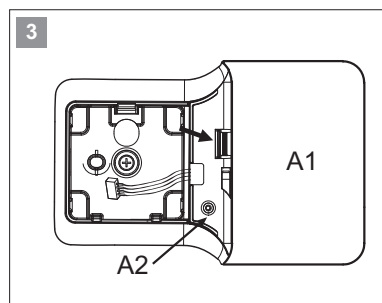
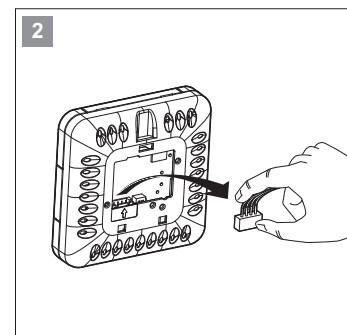
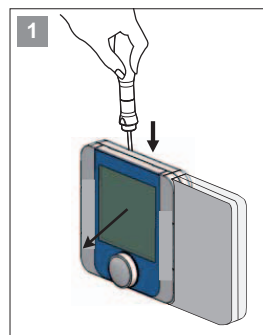
- around 1.5 metres from the floor, in a part of the room that allows the sensor to accurately measure the room temperature;
- away from cold air flows, sunlight or other sources of heat.
- leave enough space above the room controller to allow assembly and removal where necessary.
- If the room controller is removed from its base, it disconnects from the power supply and consequently is no longer operating.



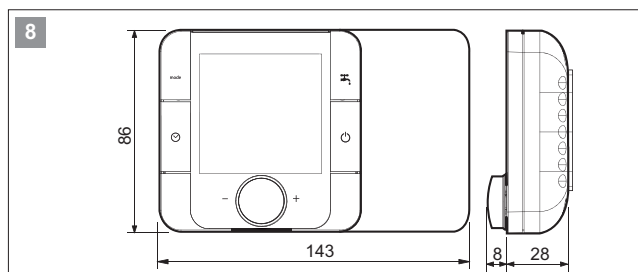
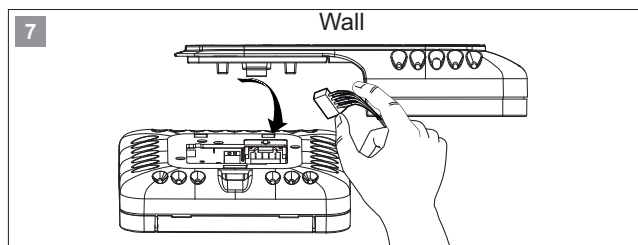
Installation procedure

Assembly

- Separate the front from the rear of the terminal using a screwdriver r (1)
- Disconnect the 4-pin connector from the front part (2)
- Remove the cover A1, unscrewing the screw A2 (3).
- Fix the controller support to the wall using the holes A3 (4). Support hole size and spacing in figure (5).
- Make the electrical connections as shown in the figure (6), also see the wiring diagram.



- Close the cover A1 and secure it with the screw A2
- Plug in the 4-pin connector, figure (7)
- Replace the terminal, starting with the lower tabs, applying a hinge movement. Make sure that the electrical wires are inside to ensure correct fastening (click on).
- Dimensions of A5 room controller figure (8).



YV5 3-way valve for domestic hot water production

The 3-way valve installed outside of the unit deviates the flow of hot water produced by the unit to the DHW storage tank.

During domestic hot water production, the cooling/heating demand is not satisfied.

Wire the three-way valve supplied as an accessory by Manufacturer following the instructions shown in the figure.

The valve is also fitted with a limit switch. The limit switch contact is either closed or open based on the position of the valve.

Limit switch (red and green wires):

Auxiliary contact closed = Valve open

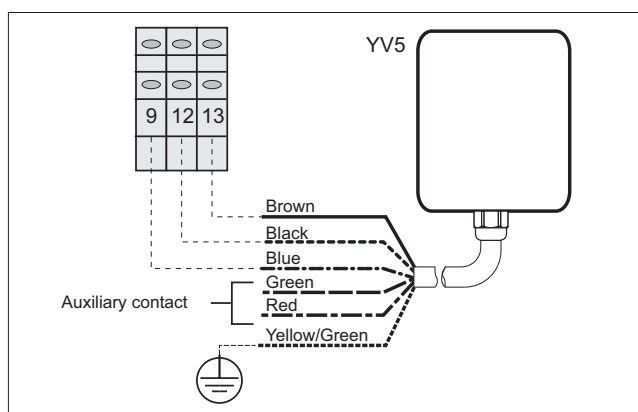
Auxiliary contact open = Valve closed

If not supplied by Manufacturer, the 3-way valve for domestic hot water production should have the following characteristics:

- Voltage 230V AC, 50/60 Hz
- Opening/closing time 10s.
- Delta P 500 kPa
- Fluid temperature 0°C to 90°C

Use three-way valves with pressure drop below 20 kPa.

For further details see the chapter “Operating characteristics”.



If three-way valves with a travel time greater than 10 seconds are used, modify the setting of parameter 0231

Description	Menu	Parameter no.	Default	Value to be set	UOM
Three-way valve travel time for domestic hot water production	Mn02	0231	12	Set the travel time for valves not supplied by the heat pump manufacturer	sec.

Optional connection

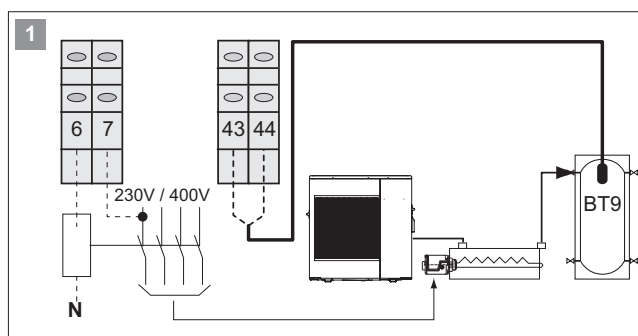
KM2 System outlet electric heater

An electric heater installed at the outlet can be activated as a supplementary heater for the system.

Solution 1

System with heat pump and electric heater with storage tank.

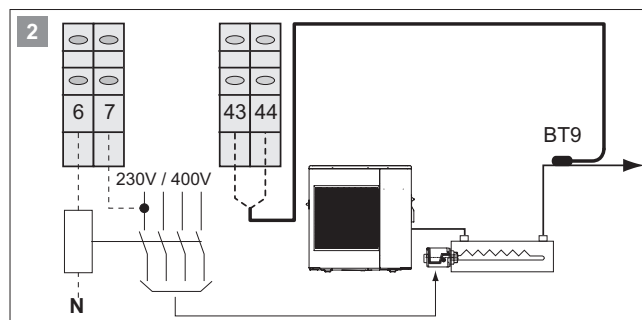
Position probe BT9 in the storage tank.



Solution 2

System with heat pump and outlet electric heater **WITHOUT** storage tank.

Position probe BT9 on the system outlet pipe.


Outlet electric heater control

A) REPLACEMENT: The electric heater is enabled when the outside temperature is less than the value of parameter 0304 and the compressor is off, figure 3.

To enable heater activation in REPLACEMENT mode set parameter 0303 = 1 and 010G = 1.

Electric heater operation reflects the trend in water outlet temperature, as shown on the graph in figure 4.

If the heat pump shuts down due to an alarm, the electric heater is activated automatically regardless of the outside air temperature.

In REPLACEMENT mode the electric heater activation delay time is ignored, and the device is activated immediately if necessary.

Outlet electric heater operating parameters in REPLACEMENT mode

Description	Menu	Parameter no	Value to be set	UOM
Activation electrical heater 0 = Electrical Heater not enabled 1 = Electrical Heater enabled	Mn03	0300	1	
Type of outlet electric heater operation 0 = Supplementary 1 = Replacement	Mn01	010G	1	
Enable boiler 0 = Boiler not enabled 1 = Boiler enabled	Mn03	0301	0	
Activation with low outside air temperature 0 = Function not enabled 1 = Function enabled	Mn03	0303	1	
Outside air temperature to enable electric heater	Mn03	0304	Example -5°C	°C
Integration time to activate outlet electric heaters	Mn06	0617	600	°C*sec

Set the parameters following the sequence described in the table

B) SUPPLEMENTARY: the electric heater operates in supplementary heating mode, together with the compressor, to satisfy the heating load.

Supplementary heating for low outside air temperature

The electric heater is enabled only when the outside temperature is less than the value of parameter 0304, figure 3. To enable supplementary heating for low outside air temperature set parameter 0303 = 1 and 010G = 0

Electric heater operation reflects the trend in water outlet temperature, as shown on the graph in figure 4.

Outlet electric heater operating parameters in SUPPLEMENTARY mode for OUTSIDE AIR TEMP.

Description	Menu	Parameter no	Value to be set	UOM
Activation electrical heater 0 = Electrical Heater not enabled 1 = Electrical Heater enabled	Mn01	0300	0	
Type of outlet electric heater operation 0 = Supplementary 1 = Replacement	Mn03	010G	1	
Enable boiler 0 = Boiler not enabled 1 = Boiler enabled	Mn03	0301	0	
Activation with low outside air temperature 0 = Function not enabled 1 = Function enabled	Mn03	0303	1	
Outside air temperature to enable electric heater	Mn03	0304	Example -5°C	°C
Minimum outside air temperature for heat pump operation (make sure the value set is the same as shown in the table)	Mn03	0311	-20	°C
Electric heater delay time (allows the heat pump to reach steady operation and thus avoid activating the heater when not needed)	Mn06	0616	60	min.
Integration time to activate outlet electric heaters	Mn06	0617	600	°C*sec

Set the parameters following the sequence described in the table

Supplementary heating always enabled

Supplementary heating with the electric heater is enabled for all outside air temperatures.

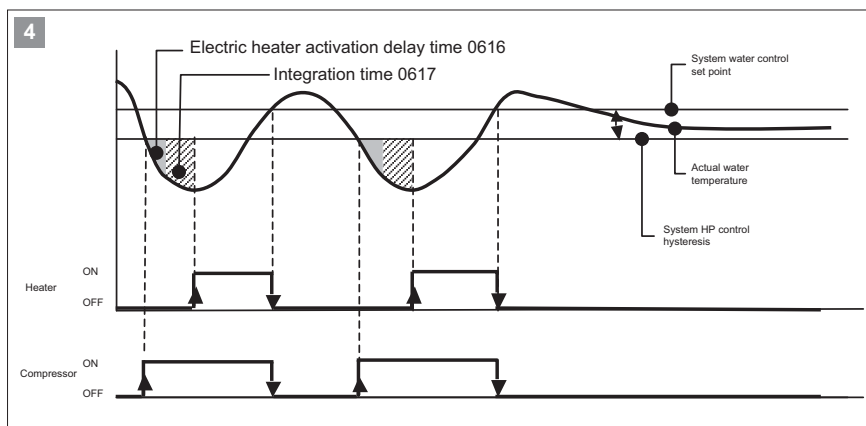
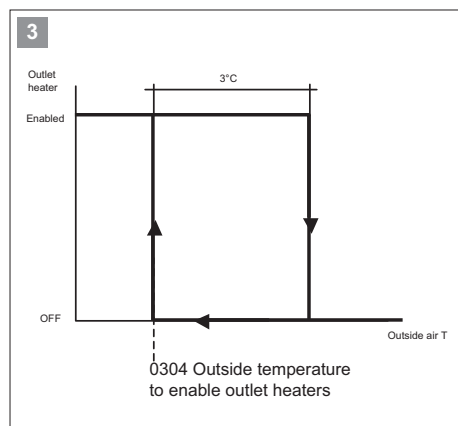
To enable heating at all times set parameter 0303 = 0 and 010G = 0

Electric heater operation reflects the trend in water outlet temperature, as shown on the graph in figure 4.

Outlet electric heater operating parameters in SUPPLEMENTARY mode when always ENABLED

Description	Menu	Parameter no	Value to be set	UOM
Activation electrical heater 0 = Electrical Heater not enabled 1 = Electrical Heater enabled	Mn03	0300	1	
Type of outlet electric heater operation 0 = Supplementary 1 = Replacement	Mn01	010G	0	
Enable boiler 0 = Boiler not enabled 1 = Boiler enabled	Mn03	0301	0	
Activation with low outside air temperature 0 = Function not enabled 1 = Function enabled	Mn03	0303	0	
Minimum outside air temperature for heat pump operation (make sure the value set is the same as shown in the table)	Mn03	0311	-15	°C
Electric heater delay time (allows the heat pump to reach steady operation and thus avoid activating the heater when not needed)	Mn06	0616	60	min.
Integration time to activate outlet electric heaters	Mn06	0617	600	°C*sec

Set the parameters following the sequence described in the table



Once the heater is enabled, supplementary heating is activated when the integration time set for parameter 0617 is reached and the delay time 0616 has elapsed. The delay time is ignored when the unit is first started.

Example:

Value 0617 = 600°C*sec

Outlet temperature set point= 50°C

Actual temperature = 40°C

$(50 - 40) \times 60 \text{ sec} = 600^\circ\text{Csec}$. ----> Electric heater ON

Low values of 0617 mean frequent activation of the heater.

Too high values of 0617 mean long delays in activating the heater

KM2 Boiler

A boiler can be used as a supplementary or replacement heat source for the system.

Solution 1

System with heat pump and boiler with storage tank.

Solution 2

System with heat pump and boiler without storage tank.

Boiler control

A) REPLACEMENT: the boiler is only enabled if the outside air temperature is less than the value of parameter 0307 and the compressor is off, figure 3.

To enable boiler activation in REPLACEMENT mode set parameter 0306=1 and 010H = 1

Boiler operation reflects the trend in water temperature, as shown on the graph in figure 4.

If the heat pump shuts down due to an alarm the boiler is activated automatically regardless of the outside air temperature.

In REPLACEMENT mode the activation delay time is ignored, and the boiler is activated immediately if necessary.

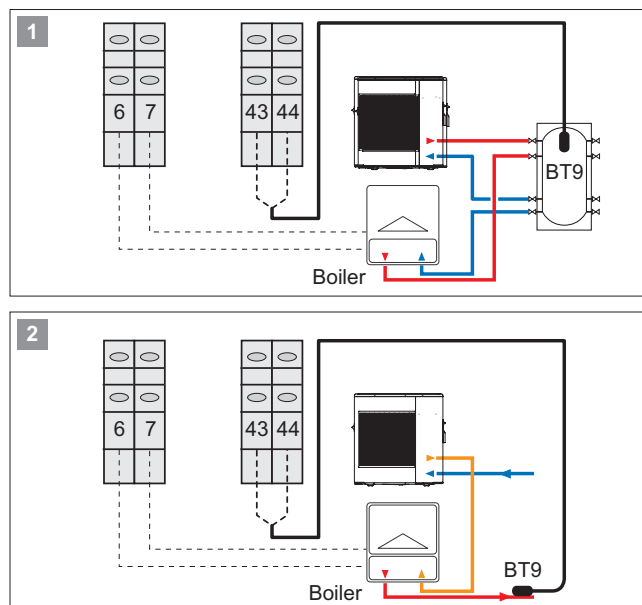
B) SUPPLEMENTARY: the boiler operates in supplementary heating mode, together with the compressor, to satisfy the heating load.

Supplementary heating for low outside air temperature

The boiler is enabled only when the outside air temperature is less than the value of parameter 0307, figure 3.

To enable the supplementary heating for outside air temperature set parameter 0306 = 1 and 010H = 0

Boiler operation reflects the trend in water temperature, as shown on the graph in figure 4.



Boiler operating parameters in REPLACEMENT mode

Description	Menu	Parameter no.	Value to be set	UOM
Enable electric heater 0 = Heater not enabled 1 = Heater enabled	Mn03	0300	0	
Activation Boiler 0 = Boiler not enabled 1 = Boiler enabled	Mn03	0301	1	
Type of boiler operation 0 = Supplementary 1 = Replacemen	Mn01	010H	1	
Activation with low outside air temperature 0 = Function not enabled 1 = Function enabled	Mn03	0306	1	
Outside air temperature to enable boiler	Mn03	0307	Example -5°C	°C
Integration time to activate boiler	Mn06	0619	600	°C*sec

Set the parameters following the sequence described in the table

Boiler operating parameters in SUPPLEMENTARY mode for outside temperature

Description	Menu	Parameter no.	Value to be set	UOM
Enable electric heater 0 = Heater not enabled 1 = Heater enabled	Mn03	0300	0	
Activation Boiler 0 = Boiler not enabled 1 = Boiler enabled	Mn03	0301	1	
Type of boiler operation 0 = Supplementary 1 = Replacemen	Mn01	010H	0	
Activation with low outside air temperature 0 = Function not enabled 1 = Function enabled	Mn03	0306	1	
Outside air temperature to enable boiler	Mn03	0307	Example -5°C	°C
Minimum outside air temperature for heat pump operation (make sure the value set is the same as shown in the table)	Mn03	0311	-20	°C
Boiler activation delay time (allows the heat pump to reach steady operation and thus avoid activating the boiler when not needed)	Mn06	0618	60	min.
Integration time to activate boiler	Mn06	0619	600	°C*sec

Set the parameters following the sequence described in the table

Supplementary heating always enabled

Supplementary heating by boiler is enabled for all outside air temperatures.

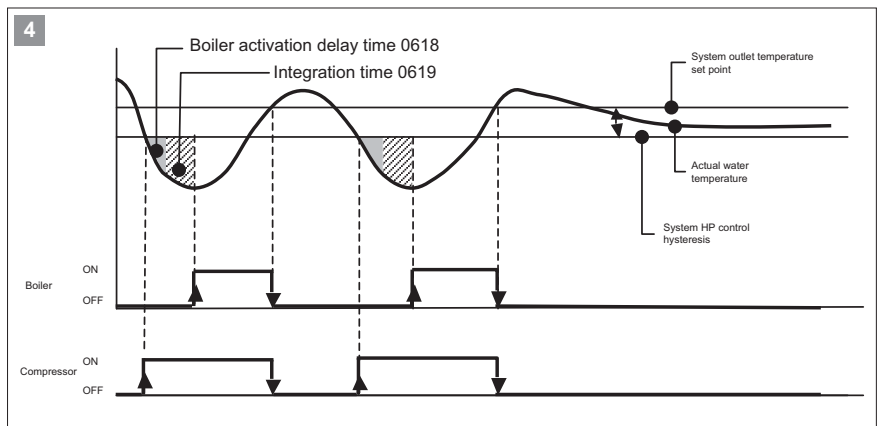
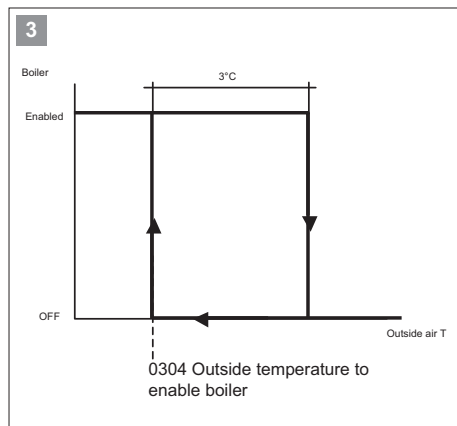
To enable heating at all times set parameter 0306 = 0 and 010H = 0

Boiler operation reflects the trend in water temperature, as shown on the graph in figure 4.

Boiler operating parameters in SUPPLEMENTARY mode when always ENABLED

Description	Menu	Parameter no.	Value to be set	UOM
Enable electric heater 0 = Heater not enabled 1 = Heater enabled	Mn03	0300	0	
Activation Boiler 0 = Boiler not enabled 1 = Boiler enabled	Mn03	0301	1	
Type of boiler operation 0 = Supplementary 1 = Replacement	Mn01	010H	0	
Activation with low outside air temperature 0 = Function not enabled 1 = Function enabled	Mn03	0306	0	
Outside air temperature to enable boiler	Mn03	0307	Example -5°C	°C
Minimum outside air temperature for heat pump operation (make sure the value set is the same as shown in the table)	Mn03	0311	-25	°C
Boiler activation delay time (allows the heat pump to reach steady operation and thus avoid activating the boiler when not needed)	Mn06	0618	60	min.
Integration time to activate boiler	Mn06	0619	600	°C*sec

Set the parameters following the sequence described in the table



Once the boiler has been enabled, supplementary heating is activated when the integration time set for parameter 0619 is reached and the delay time 0618 has elapsed. The delay time is ignored when the unit is first started.

Example:

Value 0619 = 600°C*sec

Outlet temperature set point= 50°C

Actual temperature = 40°C

$(50 - 40) \times 60 \text{ sec} = 600^\circ\text{Csec}$. ----> Boiler ON

Low values of 0619 mean frequent activation of the boiler.

Too high values of 0619 mean long delays in activating the boiler

KM4 DHW storage electric heater

An electric heater can be managed for heating the DHW storage.

DHW storage electric heater control

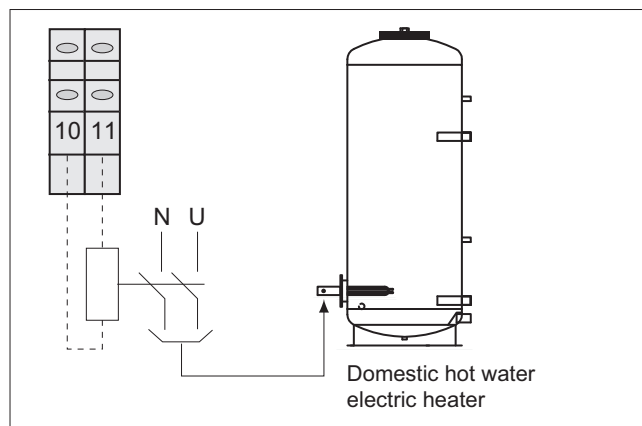
The electric heater is activated to reach a temperature value that the heat pump on its own is not able to reach.

Example:

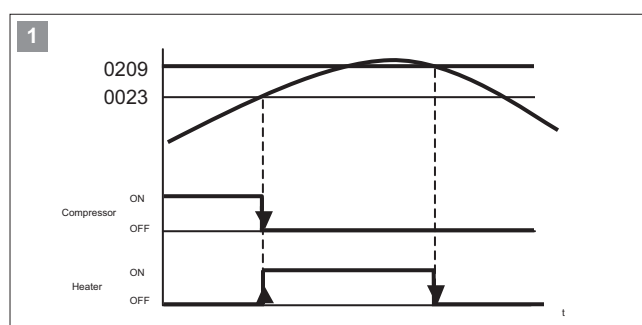
Domestic hot water temperature produced with heat pump 0023 = 55°C

Domestic hot water temperature produced with electric heater 0209 = 65°C.

The electric heater works so as to increase the DHW storage temperature from 55°C to 65°C, figure 1



Description	Menu	Parameter no.	Value to be set	UOM
Electric heater operating mode 0 = Heat pump only 1 = Electric heater only 2 = Heat pump + Electric heater	Mn02	0202	2	
Domestic hot water temperature set point with heat pump	Mn00	0023	Example 55	°C
Domestic hot water temperature set point with heater	Mn02	0209	Example 65	°C



Legionella prevention function with electric heater

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 are typically:

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

To enable the Legionella prevention function, set 0222=1

Description	Menu	Parameter no.	Value to be set	UOM
Domestic hot water heating 0 = heat pump only 1 = electric heater only 2 = heat pump + electric heater	Mn02	0202	2	
Legionella prevention function with: 0 = heat pump only 1 = electric heater only 2 = heat pump + electric heater	Mn02	0223	1	
Enable Legionella prevention function 0 = Not enabled 1 = Enabled	Mn02	0222	1	
Domestic hot water temperature set point for Legionella prevention	Mn02	0211	Example 65°C	°C
Legionella prevention cycle day MONDAY (0=no; 1=yes)	Mn02	0213	0	
Legionella prevention cycle day TUESDAY (0=no; 1=yes)	Mn02	0214	0	
Legionella prevention cycle day WEDNESDAY (0=no; 1=yes)	Mn02	0215	Example 1	
Legionella prevention cycle day THURSDAY (0=no; 1=yes)	Mn02	0216	0	
Legionella prevention cycle day FRIDAY (0=no; 1=yes)	Mn02	0218	0	
Legionella prevention cycle day SATURDAY (0=no; 1=yes)	Mn02	0219	0	
Legionella prevention cycle day SUNDAY (0=no; 1=yes)	Mn02	0220	0	
Legionella prevention cycle time	Mn02	0221	02	h
Maximum Legionella prevention function duration	Mn02	0225	20	min.

Set the parameters following the sequence described in the table

HL1 Configurable contact

This contact can be configured for the following functions:

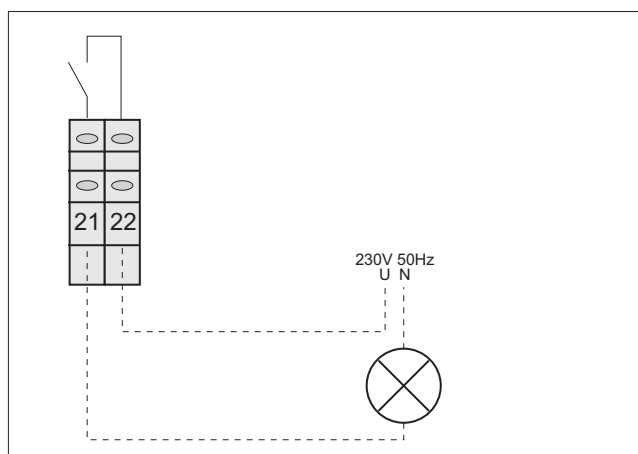
- Alarm signal
- Secondary circuit pump
- Dehumidifier

Alarm signal

A visual or audible signal device can be activated if the unit shuts down due to a malfunction.

Configure the contact, selecting the desired function by setting parameter 015A:

Description	Menu	Parameter no.	Value to be set	UOM
Enable the contact as: 0= Alarm signal 1= Dehumidifier 3= Secondary circuit pump	Mn01	015A	0	-

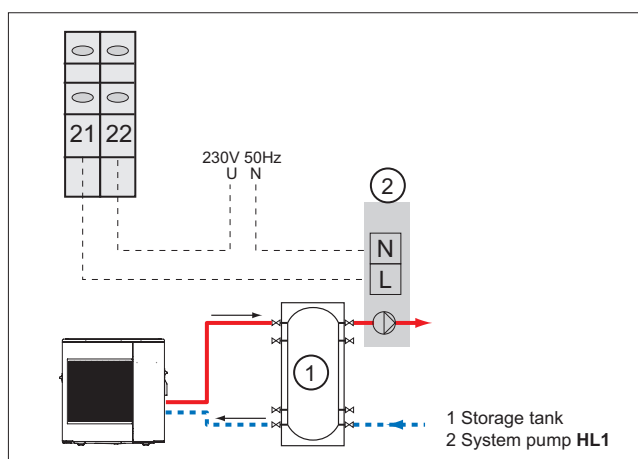


Secondary circuit pump

If the system features a low-loss header, contact HL1 can be used to activate the circulating pump on the secondary circuit.

Configure the contact, selecting the desired function by setting parameter 015A:

Description	Menu	Parameter no.	Value to be set	UOM
Enable the contact as: 0= Alarm signal 1= Dehumidifier 3= Secondary circuit pump	Mn01	015A	3	-



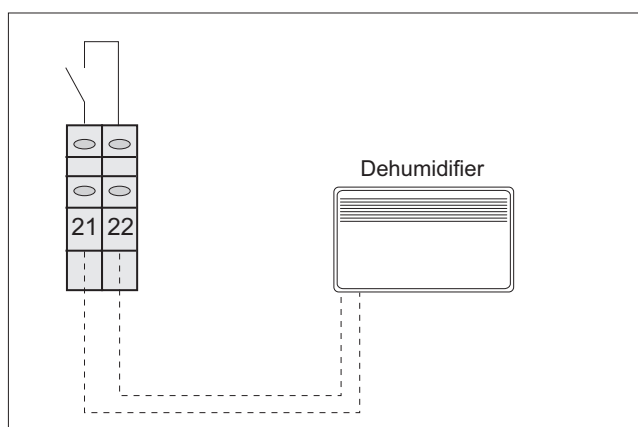
Dehumidifier

A dehumidifier can be activated in radiant panel systems to reduce humidity in cooling mode.

The contact closes and the dehumidifier is activated when the humidity measured by the probe on the A5 room controller exceeds the value set for parameter 0172.

Configure the contact, selecting the desired function by setting parameter 015A:

Description	Menu	Parameter no.	Value to be set	UOM
Enable the contact as: 0= Alarm signal 1= Dehumidifier 3= Secondary circuit pump	Mn01	015A	1	-



SA1 Remote ON/OFF

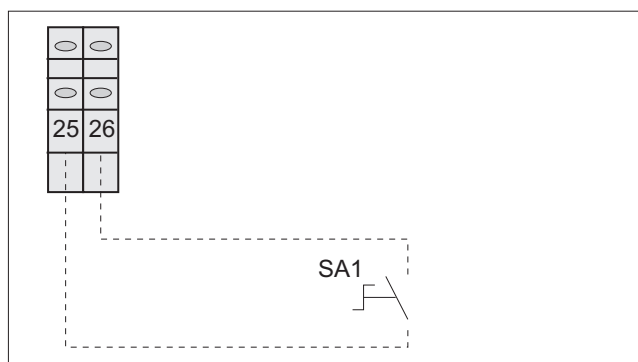
The unit can be switched on/off from a remote control unit, for example a timer or room thermostat.

The remote off function stops the compressor, fan and pumps, while frost protection remains active.

- The unit can be switched on/off from contact SA1 only when the unit has been switched on using the mode button on the A5 room controller

Contact closed = Heat pump ON

Contact open = Heat pump OFF



SA2 Remote cooling/heating

Cooling/heating operating mode can be managed from a remote control unit.

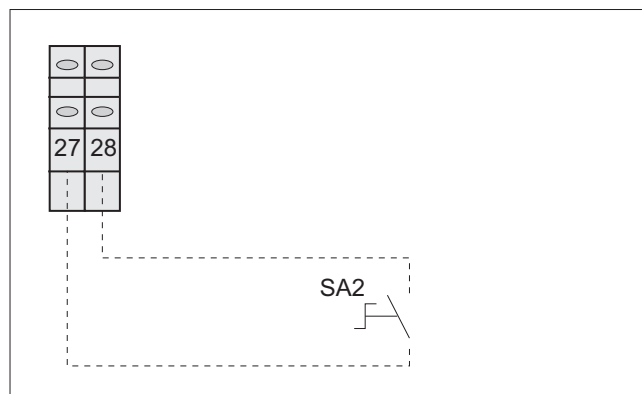
If remote cooling/heating changeover is enabled, the operating mode cannot be changed on the keypad.

Set the following parameters:

Description	Menu	Parameter no.	Value to be set	UOM
Enable remote contact 0= remote contact enabled 1= remote contact disabled (only from keypad)	Mn01	0100	0	-

Contact closed = Cooling

Contact open = Heating



SA3 Remote system/domestic water priority

The priority of heat pump operation can be selected using a remote contact.

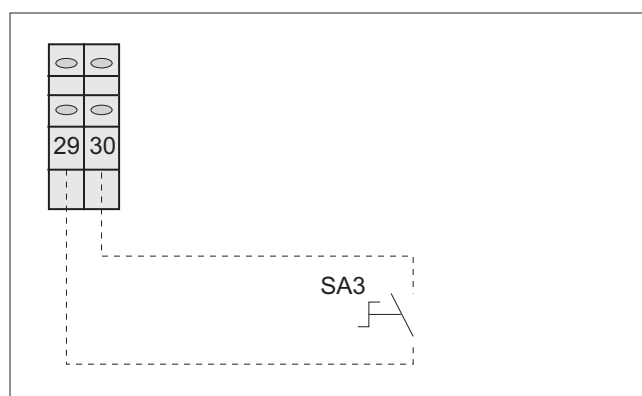
Use a switch to select the following functions:

Contact closed = Domestic hot water only

Contact open = Domestic hot water + System

Set the following parameters:

Description	Menu	Parameter no.	Value to be set	UOM
Enable remote contact 0= remote contact enabled 1= remote contact disabled (selection from keypad only)	Mn01	0100	0	-



SA5 Deactivation contact for excess power consumption

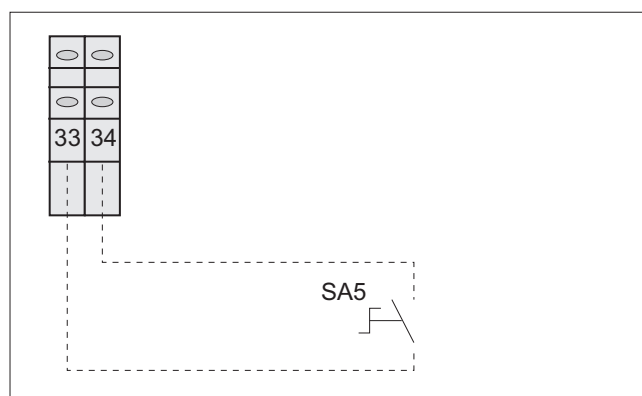
The heat pump accepts an external deactivation signal from contact SA5 if a power consumption management system is used to disconnect devices based on set priority, thus avoiding activation of the contactor on the power meter.

Configure the contact, selecting the desired function by setting parameter 015D:

Description	Menu	Parameter no.	Value to be set	UOM
Enable the contact as: 0=Reduced electricity rate 1=Stop operation due to excess power consumption	Mn01	015D	1	-

Contact closed: heat pump operation not allowed.

Contact open: heat pump operation allowed.



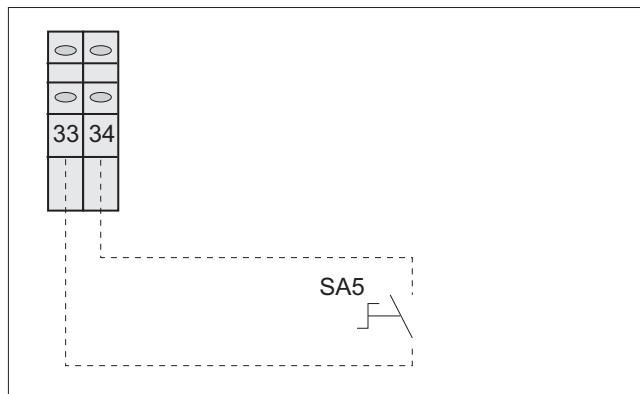
SA5 Reduced electricity rate contact

Forced refilling of the reserve storage tanks can be activated based on different electricity rates during the day.

During reduced rate periods, the heat pump can be forced on so as to heat the domestic hot water or system storage tank, where fitted.

Configure the contact, selecting the desired function by setting parameter 015D:

Description	Menu	Parameter no.	Value to be set	UOM
Enable the contact as: 0=Reduced electricity rate 1=Stop operation due to excess power consumption	Mn01	015D	0	-
Enable the set point as: 0= Economy 1= Comfort	Mn00	0015	0	-
Set the value of the domestic hot water ECONOMY set point	Mn00	0022	Example 47	°C
Set the value of the domestic hot water COMFORT set point	Mn00	0023	Example 50	°C



Contact closed: forced operation during the reduced rate period.

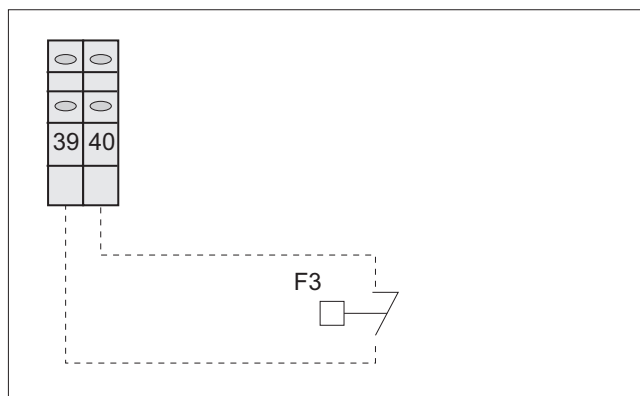
Contact open: heat pump operation at full electricity rate.

During operation at reduced electricity rate, contact closed, the domestic hot water set point is 50°C, as shown in the example, with the contact open it's 47°C.

This allows operation at a higher temperature, within the unit's operating limits, exploiting the lower electricity cost.

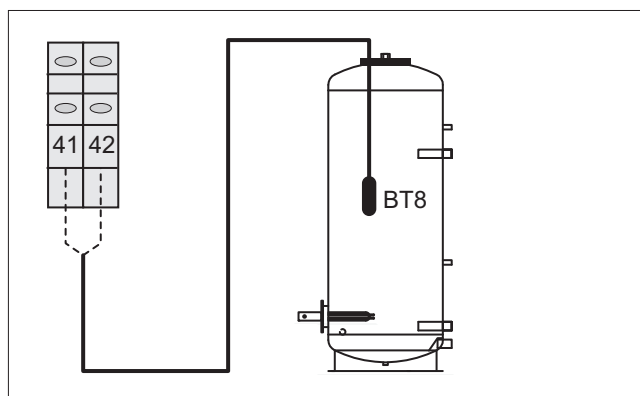
F3 System flow switch

System flow switch connection, compulsory component.



BT8 Domestic hot water storage temperature probe

The domestic hot water temperature inside the storage tank is measured using probe BT8

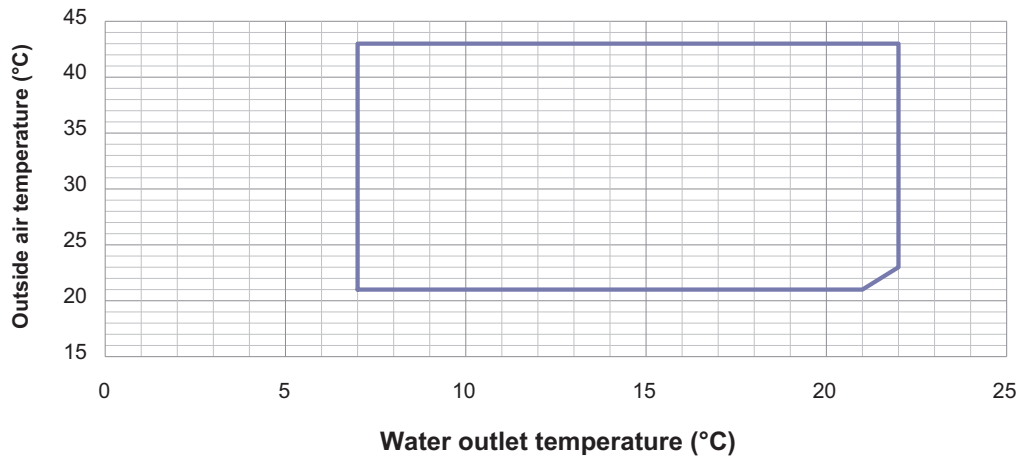


			i-KI			i-KIR		
			0011m	0031m	0061m	0011m	0031m	0061m
Rated heating capacity	1	kW	6,00	9,55	15,70	5,85	9,55	15,70
Total power consumption	1	kW	1,46	2,38	3,83	1,46	2,37	3,83
COP EN14511	1		4,11	4,02	4,10	4,01	4,02	4,10
Cooling capacity	2	kW				4,40	7,02	16,60
Total power consumption	2	kW				1,06	2,18	4,15
EER EN14511	2					4,15	3,22	4,00
Heating capacity	3	kW	5,30	9,00	14,70	5,30	9,00	14,70
Total power consumption	3	kW	1,74	2,90	4,55	1,74	2,90	4,55
COP EN14511	3		3,05	3,10	3,23	3,05	3,10	3,23
Cooling capacity	4	kW				4,00	4,92	12,30
Total power consumption	4	kW				1,03	2,01	3,77
EER EN14511	4					3,90	2,45	3,26
ESEER	4					4,00	3,26	3,90
Type of compressor			DC inverter-driven rotary	Scroll DC Inverter	Twin Rotary DC Inverter	DC inverter-driven rotary	Scroll DC Inverter	Twin Rotary DC Inverter
No. of compressors			1	1	1	1	1	1
Refrigerant			R410A	R410A	R410A	R410A	R410A	R410A
Quantity of refrigerant		kg	1,05	1,50	2,99	1,05	1,50	2,99
No. of fans			1	1	2	1	1	2
Type of system pump	5		Ci	Ci	Ci	Ci	Ci	Ci
Power supply		V-ph-Hz	230-1-50	230-1-50	230-1-50	230-1-50	230-1-50	230-1-50
Sound power	6	dB(A)	60	64	65	60	64	65
Sound pressure	7	dB(A)	46	50	51	46	50	51
OUTDOOR UNIT DIMENSIONS								
L		mm	825	850	1000	825	850	1000
P		mm	300	330	330	300	330	330
H		mm	787	882	1418	787	882	1418
Operating weight		kg	59	85	123	59	85	123
INSIDE MODULE DIMENSIONS								
L		mm	411	411	411	411	411	411
P		mm	75	75	75	75	75	75
H		mm	333	333	333	333	333	333
Operating weight		kg	5,3	5,3	5,3	5,3	5,3	5,3

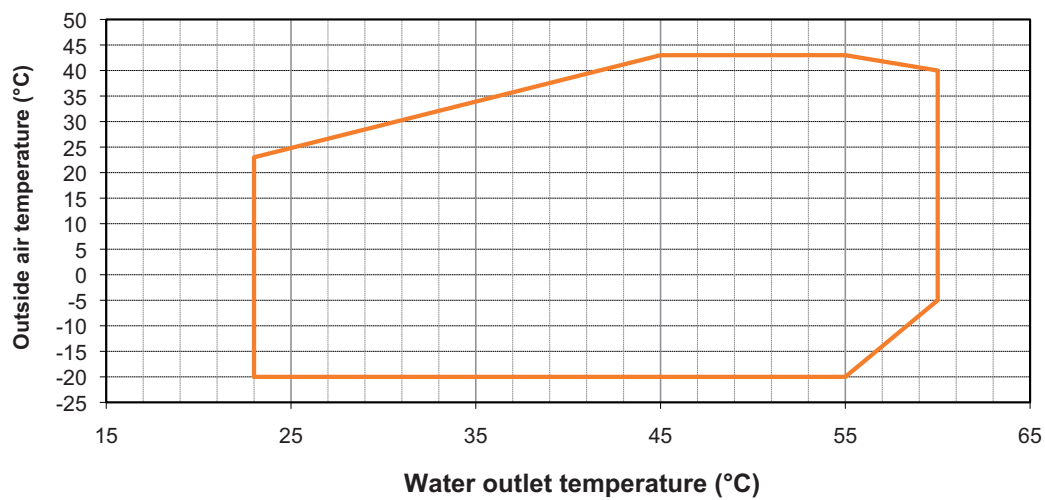
Notes

- 1 System water temperature 30/35°C, outside air temperature 7°C DB/ 6°C WB
- 2 System water temperature 23/18°C, outside air temperature 35°C DB
- 3 System water temperature 40/45°C, outside air temperature 7°C DB/ 6°C WB
- 4 System water temperature 12/7°C, outside air temperature 35°C DB
Total power consumption calculated by adding compressor and fan power consumption.
- 5 Ci=Circulating pump
- 6 Sound power in accordance with ISO 9614 and Eurovent 8/1
- 7 Average sound pressure on reflecting surface (Q=2) at a distance of 1 metre from the outside of the unit.

COOLING



HEATING



Min/max water temperature difference = 5/10 °C (in minimum flow conditions, 7 l/min)

MAX return temperature to heat pump = 55°C

MAX outlet temperature to heat pump for DHW production = 58°C

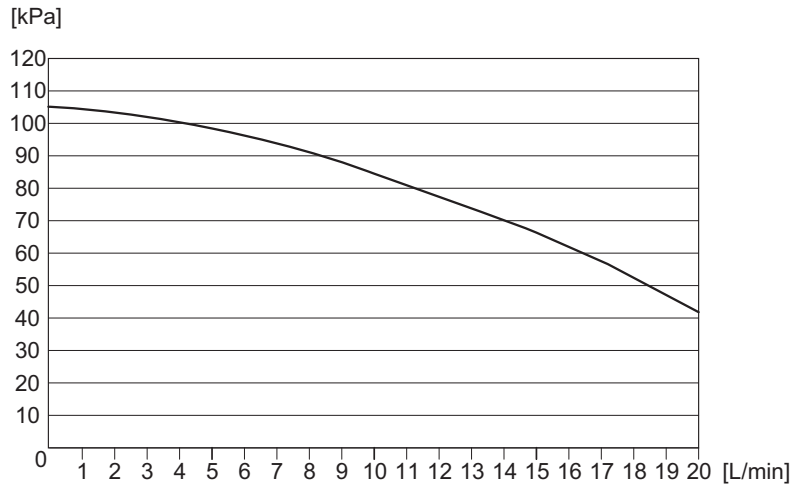
Water circuit pressure min/max = 1/3 bar

Maximum glycol percentage = 40%

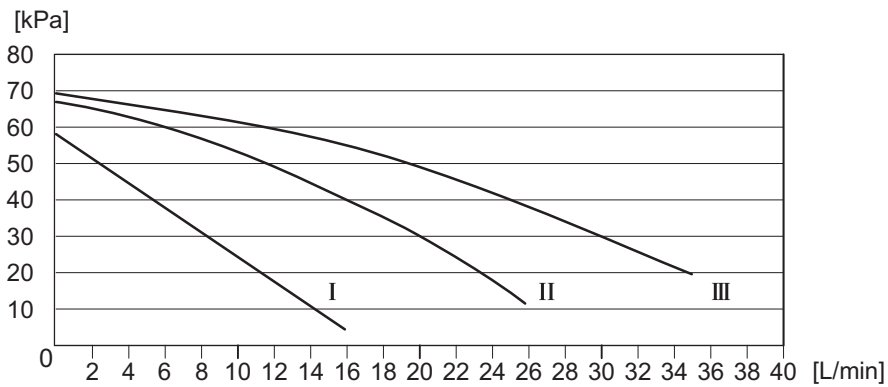
The temperature of the fluid leaving the unit must always be within the manufacturer's specified operating range, even during start-up and when first putting into heating mode. To ensure this, the water circuit can be fitted with a bypass valve and/or other solutions, such as electric heaters with temperature control inside the storage tank.

PUMP CHARACTERISTICS

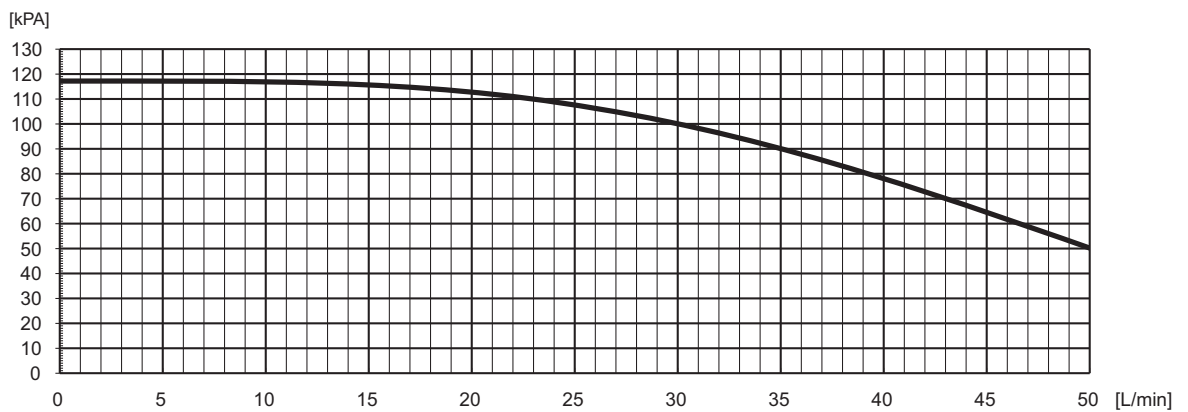
0011m



0031m



0061m



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

CHECKS BEFORE STARTING THE UNIT

- the vibration damping feet are fitted
- inlet filters are fitted on the system
- suitably-sized expansion vessel and safety valve installed on the DHW circuit
- an expansion vessel is installed if the expansion vessel on the unit is undersized
- make sure vibration damper joints are installed on water connections
- a low-loss header is installed if the water content is insufficient

- make sure the position of the outside air probe corresponds to the instructions shown in the manual
- make sure the position of the room control unit corresponds to the instructions shown in the manual
- make sure that the electrical power available is adequate for the unit installed
- make sure the non-return valve is installed on the DHW circuit

PREPARING FOR FIRST START UP

The unit must be started up for the first time by the **Technical Service**. Before starting up the unit, make sure that:

- the unit has been properly installed as described in this manual
- All safety conditions have been respected;;
- The unit is adequately fixed to the surface it rests on;
- Clearances have been respected;
- Water connections have been carried out as indicated in the instruction manual;
- All water connections are tight.
- Make sure the water circuit has been washed and drained.
- The water circuit is filled and vented.
- Make sure there is no air in the system. If necessary vent the system using the vent valve.

If venting after operation in heat pump mode, be careful as the water may be hot;

- The water valves are open;
- Electrical connections have been carried out correctly;

- Voltage is within a tolerance of 10% of the rated voltage for the unit;
- Make sure that unbalance between phases is less than 2%, for three-phase units.
- The unit is correctly earthed;
- All electrical connections are tight.
- make sure that the outside air and water temperature are within the unit operating limits shown in this manual.

Before starting up, power up the unit for at least two hours by switching QF1 and QS1 to ON (see the wiring diagram) to allow the oil in the compressor sump to heat up.

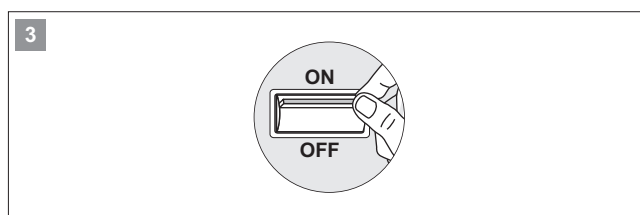
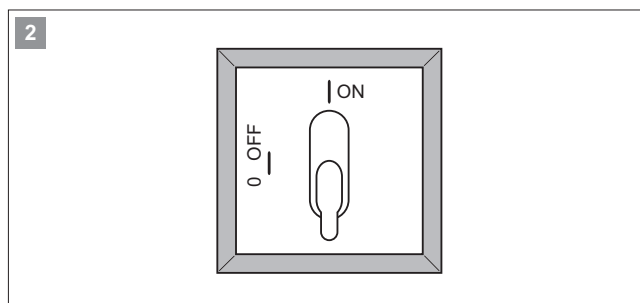
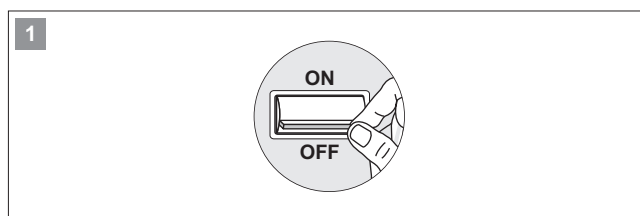
STARTING UP FOR THE FIRST TIME

Before starting the unit:

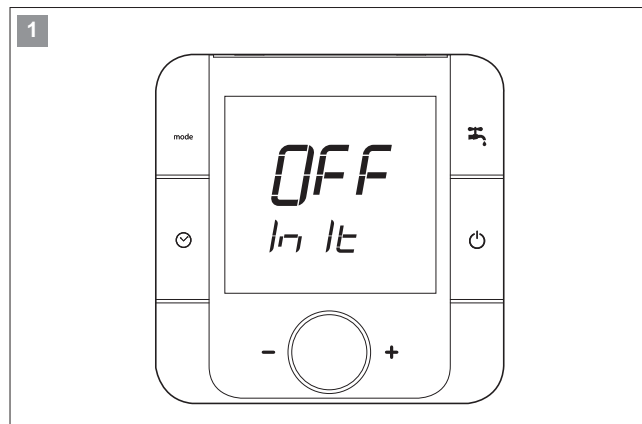
- Make sure the switch QF1 is in the OFF position, Fig. 1.
- Make sure the contact of the on/off device SA1 (see the wiring diagram) is open (if featured).
- Make sure the "A5" room controller is off.

- Position the main unit switch QS1 in the ON position, Fig. 2.

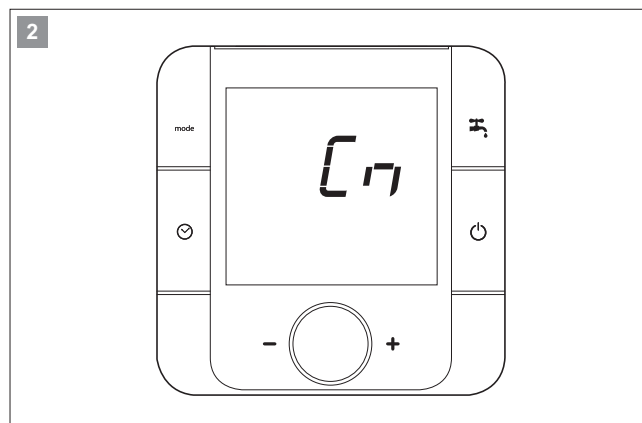
- Move switch QF1 (outside the unit) to "ON", Fig. 3.



- Once having powered up the heat pump, the display on the room control unit shows this message **(1)**:



- Followed by **(2)**:

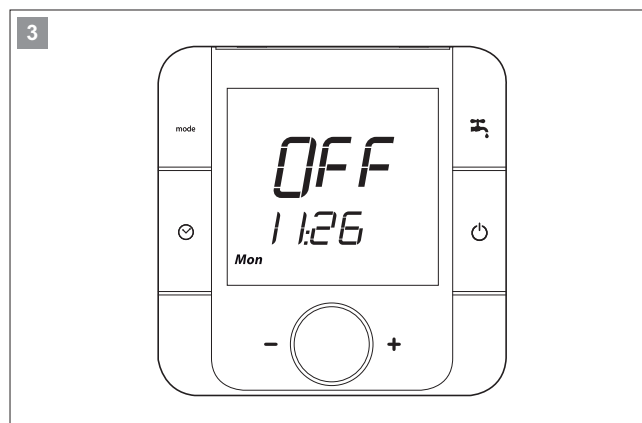


- Wait a few minutes, the unit is ready to operate when the display shows **(3)**:

⚠ Before starting up, power up the unit for at least two hours, with the compressor off, so as to allow the oil in the compressor sump to heat up.

When commissioning the heat pump, the user must configure the type of system.

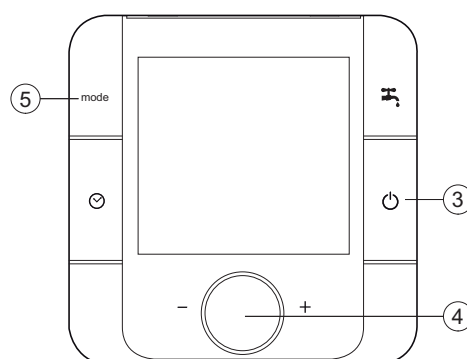
See the chapter "System configuration", check the application diagrams that the control unit is able to manage.



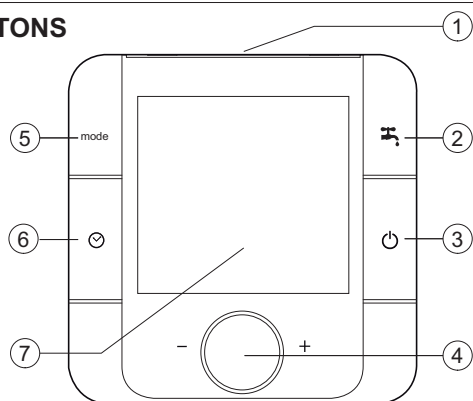
- Set the current date and time on the A5 room controller
- Configure the type of system and the number of A5 room controllers. See the chapter "System configuration".
- Switch on the unit by pressing button **3**
- Select the required operating mode by pressing button **5**
- Select the required room temperature by turning knob **4**

For further information on the operation and functions of the room controller, see "Operation and functions of the room controller".

A5 room controller

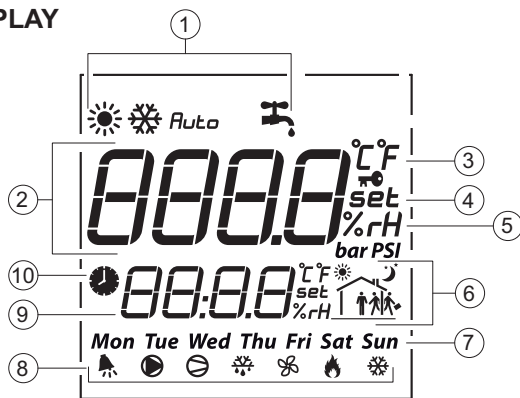


BUTTONS



NO.	Description
1	Temperature and humidity probe
2	Domestic hot water (DHW) production button
3	ON/OFF button ESC button in parameter programming mode
4	Knob - Turning: scroll room temperature values, parameters and menus - Pressing: Confirm settings
5	Select operating mode button
6	Set time bands button
7	Backlit display

DISPLAY



N°	Description	Symbol	Function
1	Operating mode		Heating
			Cooling
		<i>Auto</i>	automatic mode changeover based on outside air temperature
			Domestic hot water production enabled
2	Main field		Room temperature/humidity, room set point, parameter value display
3	Temperature unit of measure	<i>°C</i> <i>°F</i>	
4	Set point	<i>set</i>	On indicates room set point programming
5	Relative humidity	<i>%rH</i>	
6	Time band		Indicates the type of active time band
7	Day of the week	<i>Mon...</i>	
8	Actuator operating		error message
			system pump active
			- flashing: compressor timer, delay - fixed: compressor active
			Defrost active
			Fan active
			Boiler or electric heater active
			Frost protection active
9	Secondary field		Time, menu, parameter number display
10	Active time band		On indicates active time band

* Any delays in the "compressor" symbol switching off are due to the PI calculation of the compensation curve.

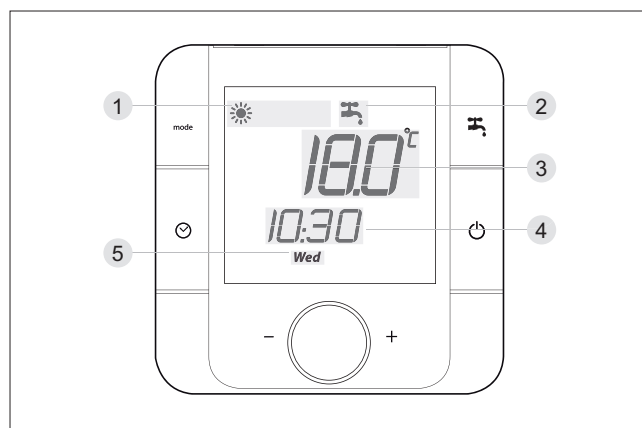
Meaning of the symbols

Symbol	Meaning
	Press and release
	Hold for 3 seconds
	Turn the knob

Display

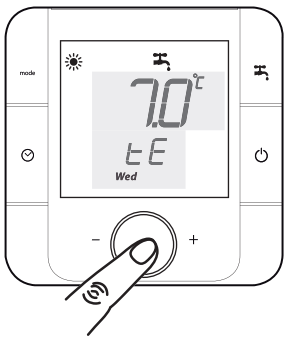
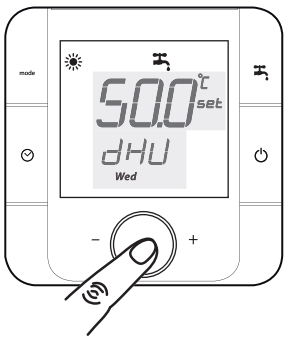
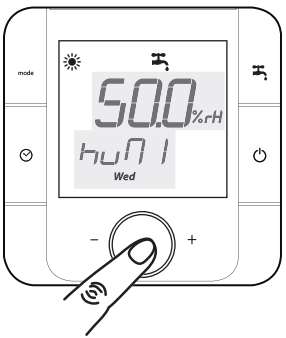
During normal operation of the unit, the display shows the following information:

1	operating mode selected
2	domestic hot water production enabled
3	room temperature
4	hour and minutes
5	day

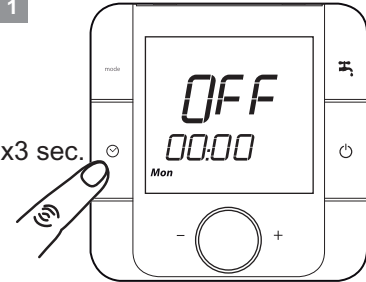
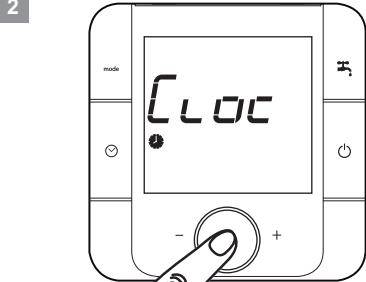
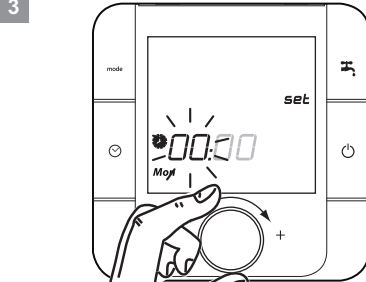
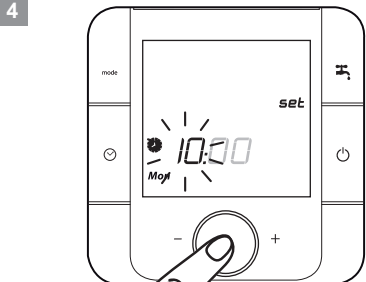
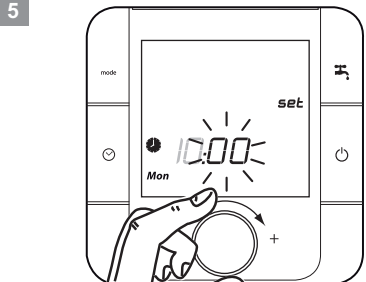
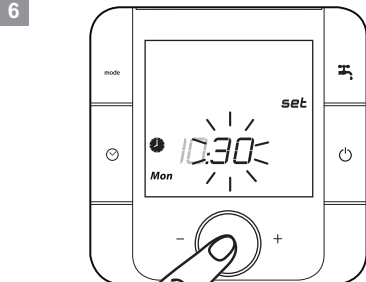
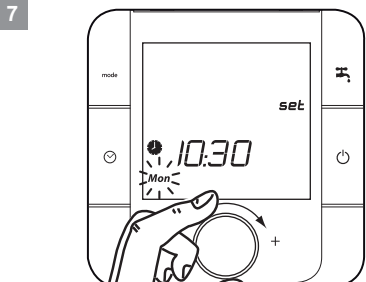
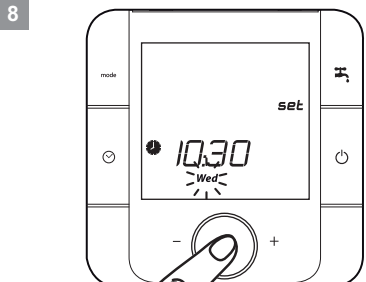
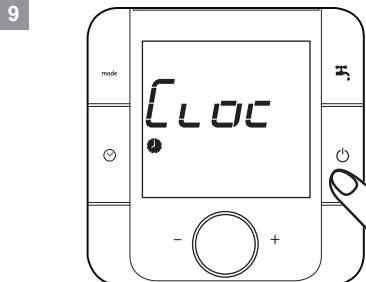
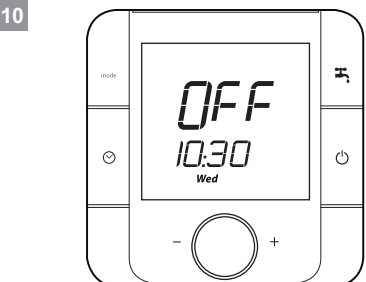


Additional information displayed

During operation of the unit, pressing the knob displays the information described below.

		
Press the knob	Room temperature set point Press the knob	Humidity set point Press the knob
		
Outside air temperature Press the knob	Domestic hot water set point Press the knob	Room humidity Press the knob

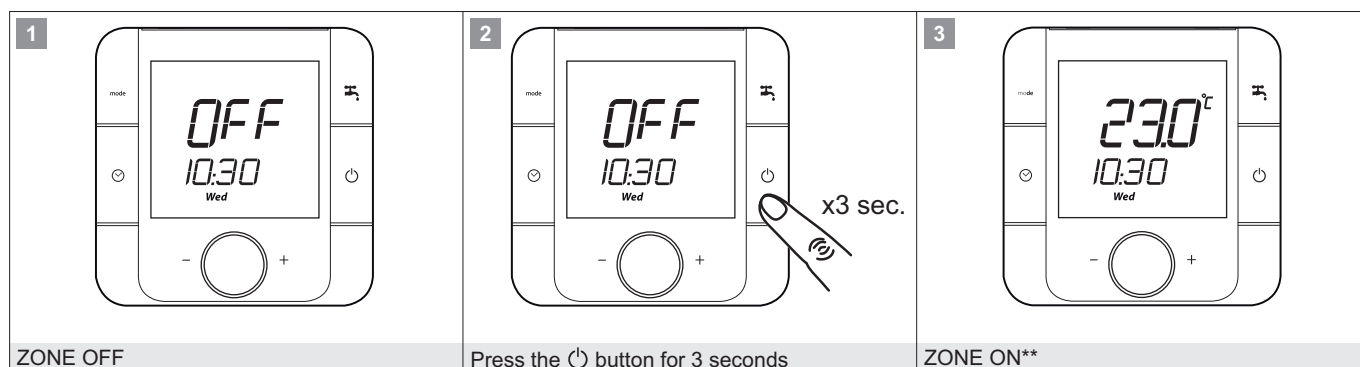
Setting the time and date

1  x3 sec. Press the ⌚ button for 3 seconds	2  Press the knob	3  • The hours flash • Turn the knob to select the hour value
4  • Press the knob to confirm	5  • The minutes flash • Turn the knob to select the minutes value	6  • Press the knob to confirm
7  • The day flashes • Turn the knob to select the day**	8  • Press the knob to confirm	9  • Press the ⏻ button to exit.
10  • Main display		

** Mon = Lunedì, Tue = Martedì, Wed = Mercoledì, Thu = Giovedì, Fri = Venerdì, Sat = Sabato, Sun = Domenica

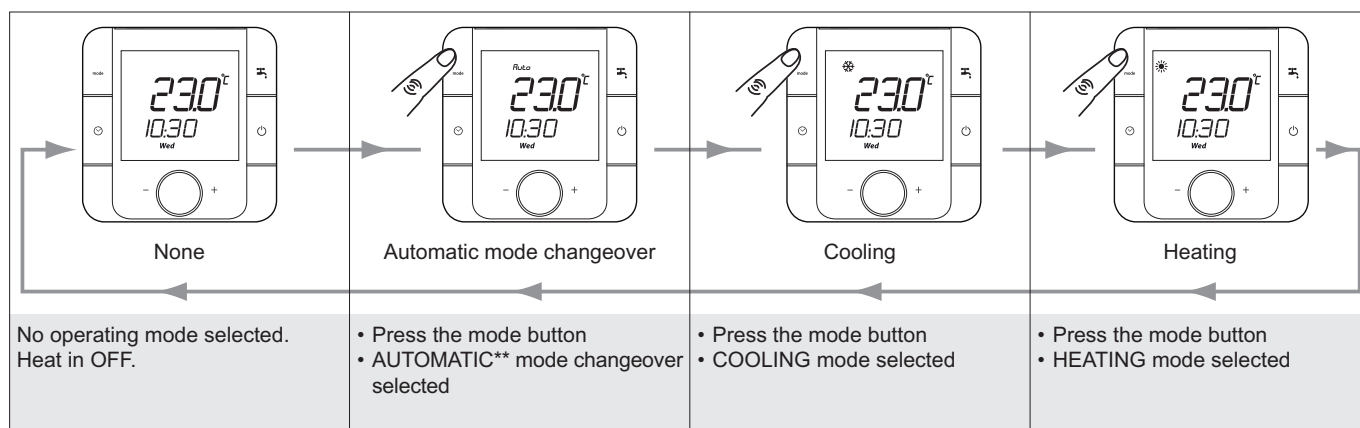
Switching ON

The  button enables operation of the pump or the zone valve controlled by the room controller, the heat pump is activated by selecting the operating mode using the  button, as shown below.



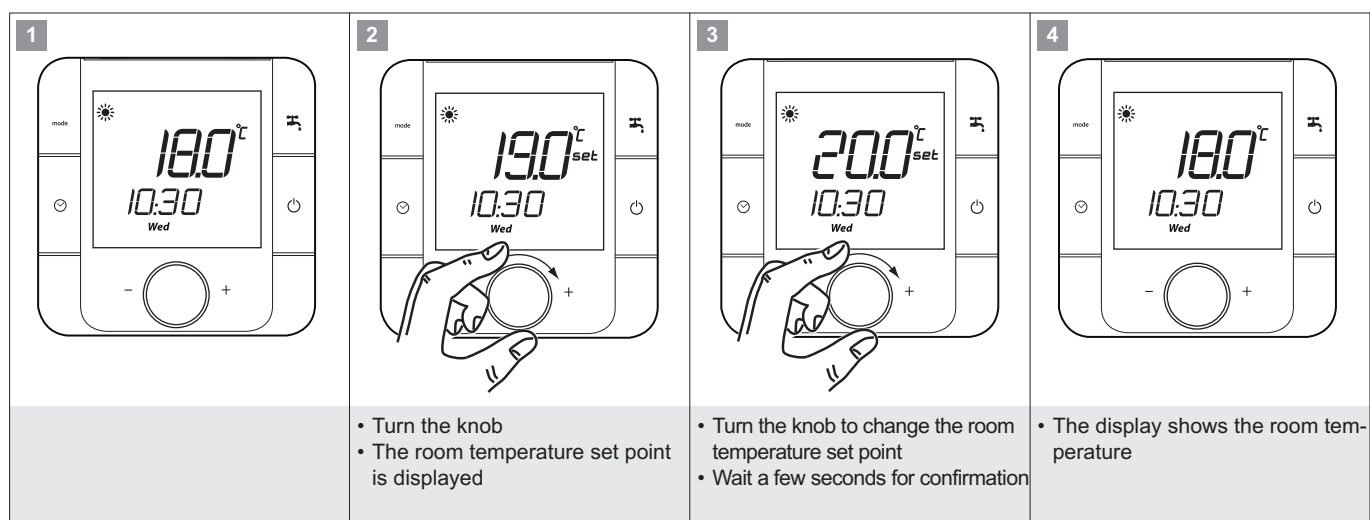
** The heat pump is not yet operating, the mode has to be selected: heating, cooling, auto or domestic hot water production.

Selecting the operating mode

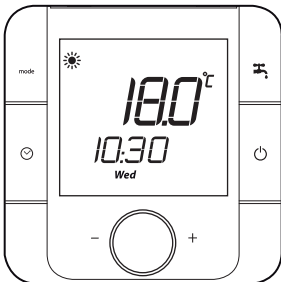
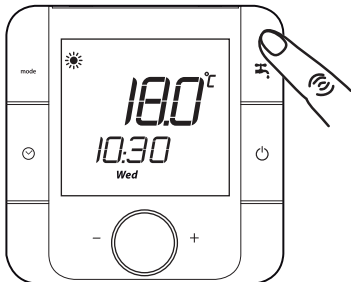
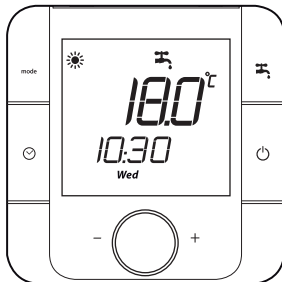


** AUTO automatic mode changeover based on the outside air temperature

Selecting the room temperature set point

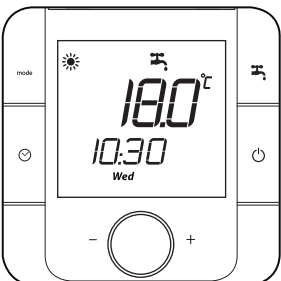
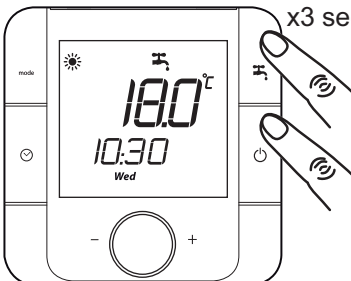
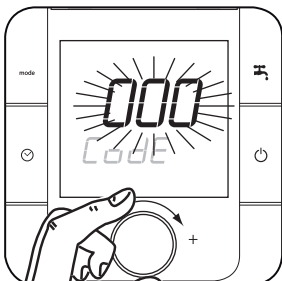
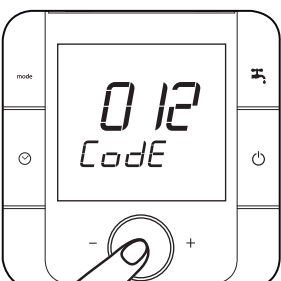
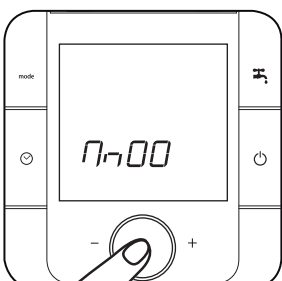
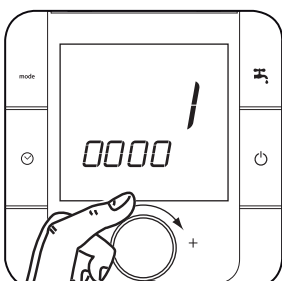
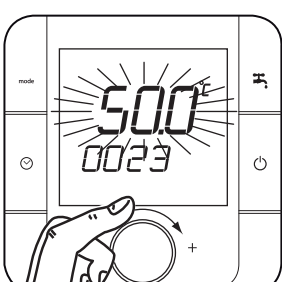


Domestic hot water production

1  Domestic hot water production not enabled	2  Press the .	3  - Domestic hot water production enabled - The  symbol is displayed
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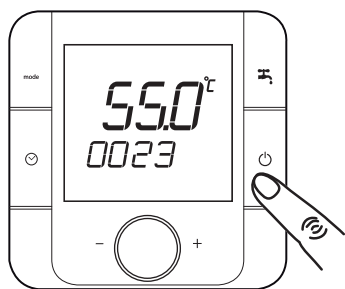
Selecting the domestic hot water set point

The domestic hot water temperature is measured by the probe installed inside the DHW storage tank.

1 	2  x3 sec. Press the  +  buttons together for 3 seconds	3  Turn the knob and select the value of parameter 012
4  Press the knob to confirm	5  Press the knob to confirm	6  Turn the knob and select parameter 0023
7  Press the knob	8  Turn the knob to select the domestic hot water set point	9  Press the knob to confirm

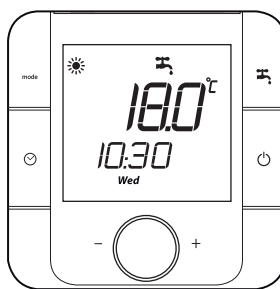


10



- Press the  button twice until reaching the main display.

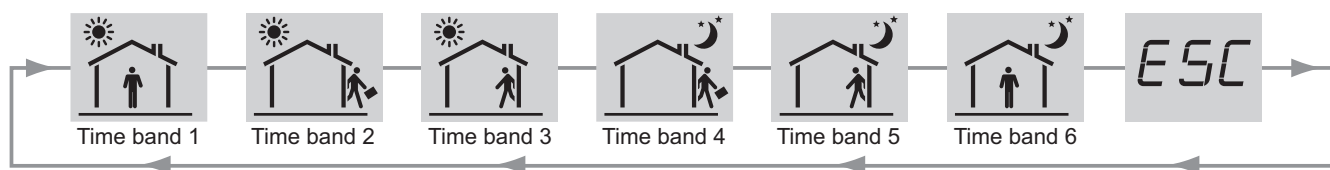
11



- Main display

Programming the time bands

The room controller can customise on/off times for each zone in the system, based on six time bands. The six time bands are identified by the following symbols, selected by turning the knob:



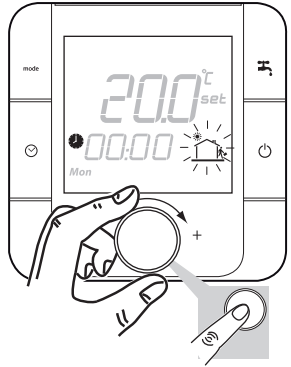
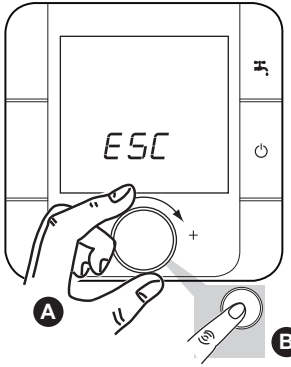
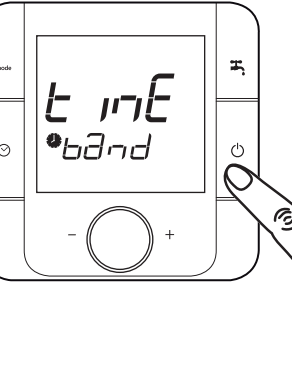
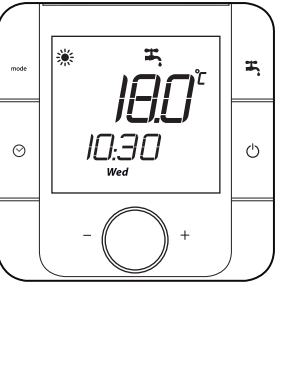
The time bands on systems with multiple zones, each of which is managed by its own room controller (maximum 6), must be programmed on each room controller.

For installations with heap pump connected directly to the system, without storage tanks and secondary pumps, **parameter 011D must be set to 0**. This means that heat pump operation will be managed based on the time bands.

1 • Press the button for 5 seconds	2 • Turn the knob	3 • Press to confirm
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The time bands can be programmed by selecting the days in preset groups or for each individual day.

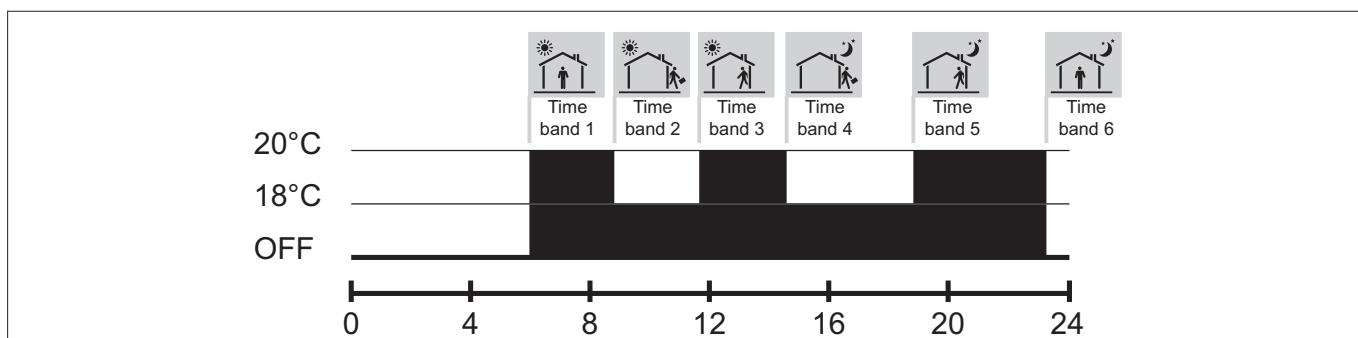
4 GROUP OF 7 DAYS A Turn the knob B Press the knob to confirm	5 GROUP OF 5 DAYS A Turn the knob B Press the knob to confirm	6 GROUP OF 2 DAYS A Turn the knob B Press the knob to confirm	7 INDIVIDUAL DAY A Turn the knob B Press the knob to confirm
8 Time band 1 • Press the knob to confirm	9 Time band 1 start hours A Turn the knob B Press the knob to confirm the hour value	10 Time band 1 start minutes A Turn the knob B Press the knob to confirm the minutes value	11 Time band 1 room temp. set point A Turn the knob B Press the knob to confirm

8 + 9 ... 10 ... 11 	12 	13 	14 
Time band 2 Press the knob to confirm Continue as described from step 8 to step 11 to set the hours, minutes and room temperature set point for the other time bands	Once the time bands have been set A Turn the knob and select ESC B Press to confirm	Press the  button twice until reaching the main display.	Main display

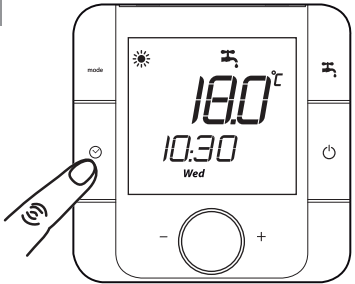
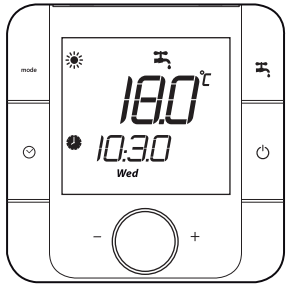
Press the  button to exit programming mode

Time band program example

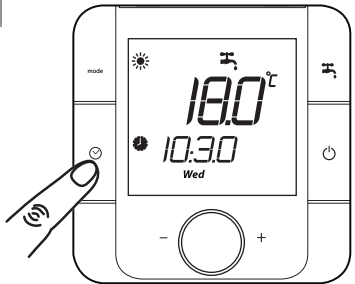
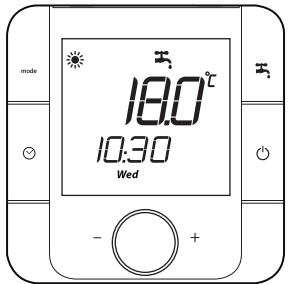
Below is an example of a time band program with two temperature levels, Comfort 20°C, Economy 18°C, and OFF.



Activating time bands

1 	2 
Press the  button.	- The  symbol is displayed - Time band ACTIVE

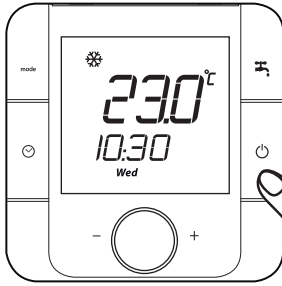
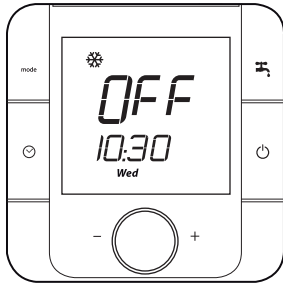
Deactivating time bands

1 	2 
Press the  button.	- The  symbol is no longer displayed - Time band DEACTIVATED

Once the time bands have been deactivated check that the room set point is at the required value, otherwise turn the knob to select the desired temperature.

Switching OFF

The  button disables operation of the pump or the zone valve controlled by the room controller, the heat pump is deactivated using the mode button, as shown in "Selecting the operating mode".

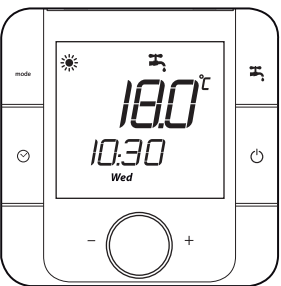
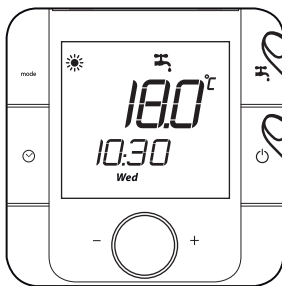
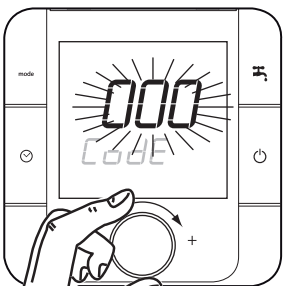
1  Unit ON - ZONE ON	2  x3 sec. • Press the  button for 3 seconds	3  Unit OFF - ZONE OFF
--	--	--

ACCESSING THE PROGRAMMING LEVELS

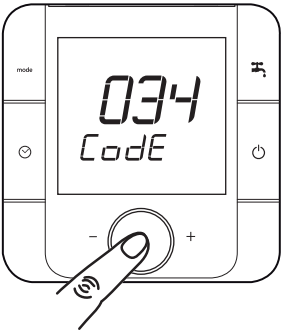
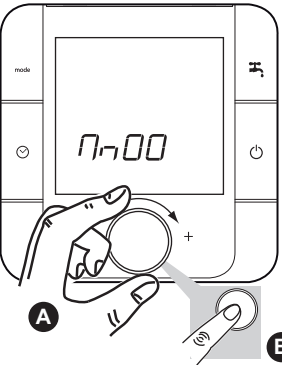
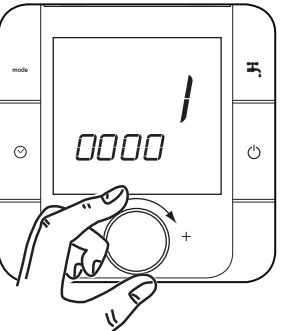
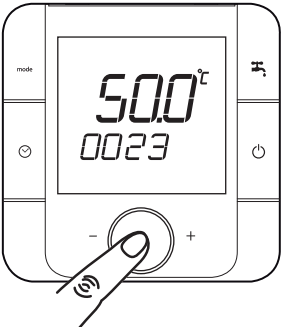
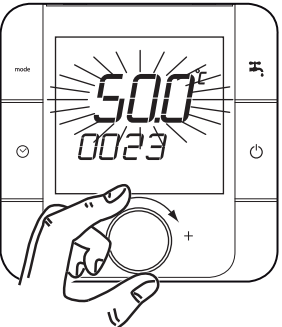
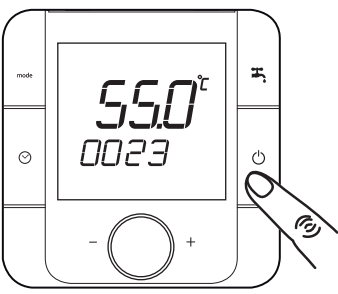
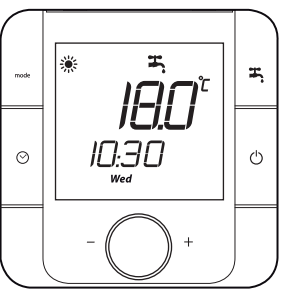
The room controller has a menu structure, divided into levels so as to allow access only to authorised users, as shown below:

Level	Password	Menu description	Menu code
User	012	Room unit	Mnu00
Installer	022	Zone room terminal address setting	Addr
	034	System configuration	Mnu01
		DHW	Mnu02
		Supplem. sources	Mnu03
		Cascade/Forced fan	Mnu04
		Primary and DHW exchanger	Mnu06
		input / output	Mnu09
Authorised technical service	Contact Manufacturer	Compressor	Mnu05
		Source heat exchanger	Mnu07
		Defrost	Mnu08
		Alarm log	Mnu11
		Serial protocol	Mnu12

Procedure for accessing the menu

1  • Main display	2  x3 sec. • Press the  +  buttons together for 3 seconds	3  • Turn the knob and select the password (as shown in the table)
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➔

4 	5 	6 
• Press the knob to confirm	- A Turn the knob to select the menu - B Press the knob to confirm	• Turn the knob and select the parameter to be set
7 	8 	9 
• Press the knob	• The parameter value flashes • Turn the knob to change the parameter value	• Press the knob to confirm
10 	11 	
• Press the  button twice until reaching the main display	• Main display	

Press the  button to exit programming mode

Temperature control

The heating or cooling circuit water outlet temperature is calculated by the controller and depends on the following factors:

- A) system outlet set point compensation in heating or cooling (see paragraph)
- B) room temperature influence (see paragraph)
- C) minimum and maximum outlet temperature limit (see paragraph)
- D) room temperature set point

A) System water outlet temperature set point compensation

The water outlet temperature set point in heating or cooling is calculated based on the outside temperature trend according to settable curves.

Water outlet set point compensation diagram in HEATING

The compensation curve in heating mode can be modified to allow correct heat pump operation depending on the heating system used (radiant panels, radiators, fan coils).

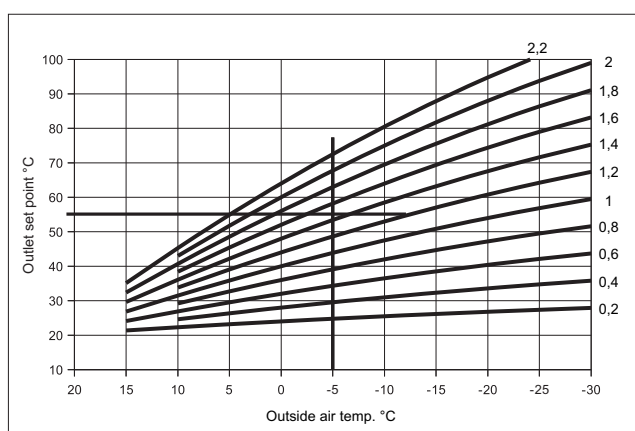
Example: Selecting heating curve 1,4 with an outside air temperature of -5°C gives a water outlet temperature of $+55^{\circ}\text{C}$.

A heating curve that is too high gives an excessive outlet temperature, a curve that is too low may mean the desired room temperature is not reached.

The curve can be set separately for each zone, depending on the type of room terminal.

The following compensation curves are recommended:

Type of terminal	Compensation curve number
Radiant panels	0,25÷0,7
Fan coils	0,9÷1,1
Radiators	1,2÷1,5



The compensation curves in HEATING are divided into:

- SYSTEM curve determines the general water outlet temperature to the terminal units.
- ZONE curve determines the water outlet temperature in the mixed circuit.

For systems configured with mixed zones, the SYSTEM curve and ZONE curve must be selected.

The system and zone curve work in cascading, the mixed zone curve may therefore not request a higher value than the one supplied by the system curve.

Description	Menu	Parameter no.	Default	UOM
Enable SYSTEM compensation curve 0= Disabled 1= Enabled	Mn01	0152	0	
SYSTEM compensation curve number	Mn01	0159	1	
Enable compensation curve zone LT1 0= Disabled 1= Enabled	Mn01	0167	0	
Compensation curve number zone LT1	Mn01	0174	0,7	
Enable compensation curve zone LT2 0= Disabled 1= Enabled	Mn01	0182	0	
Compensation curve number zone LT2	Mn01	0189	0,7	
Enable compensation curve zone LT3 0= Disabled 1= Enabled	Mn01	015E	0	
Compensation curve number zone LT3	Mn01	012A	0,7	

B) Room temperature influence in HEATING

The compensation curve determines the water outlet temperature in heating; this may then be corrected based on the difference between the desired room set point and the actual room temperature.

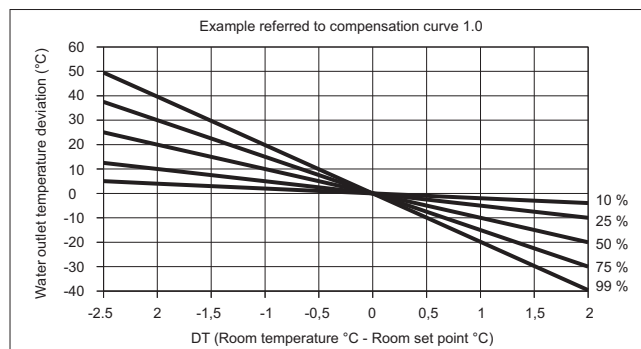
The correction made to the outlet temperature depends on the "Room Authority" coefficient.

The higher the value of the Room Authority the higher the correction to the system outlet temperature, and vice-versa.

This allows the outlet temperature to adapt quickly to changes in the conditions inside the room.

The function can only be ENABLED if the A5 room controller is positioned in the room and used to measure the reference temperature.

Set authority values for the SYSTEM equal to or greater than those for zones LT1, LT2, LT3.



Description	Menu	Parameter no.	Default	UOM
Enable room temperature influence on SYSTEM 0= Disabled 1= Enabled	Mn01	0163	0	
SYSTEM Room Authority	Mn01	0164	30	%
Enable Room temperature influence on LT1 0= Disabled 1= Enabled	Mn01	0178	0	
LT1 Room Authority	Mn01	0179	30	%
Enable Room temperature influence on LT2 0= Disabled 1= Enabled	Mn01	0193	0	
LT2 Room Authority	Mn01	0194	30	%
Enable Room temperature influence on LT3 0= Disabled 1= Enabled	Mn01	012D	0	
LT3 Room Authority	Mn01	012E	30	%

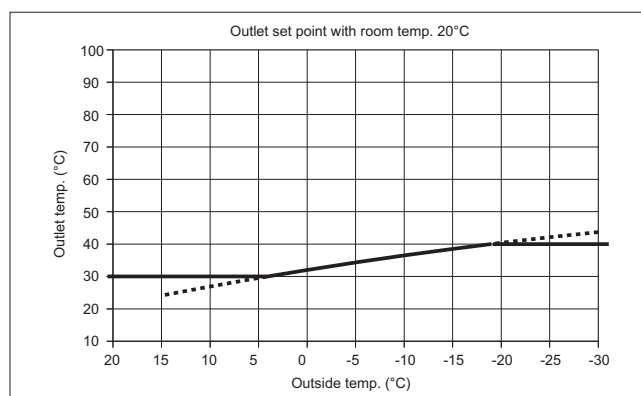
C) System outlet temperature limits in HEATING

These define the temperature limits (minimum and maximum) that can be requested from the circuit and never exceeded.

In the figure the minimum limit is 30°C and the maximum is 40°.

Between 30 and 40°C the outlet temperature will be able to vary based on the trend in outside temperature.

For systems configured with mixed zones, the limits for the SYSTEM curve and ZONE curve must be selected.

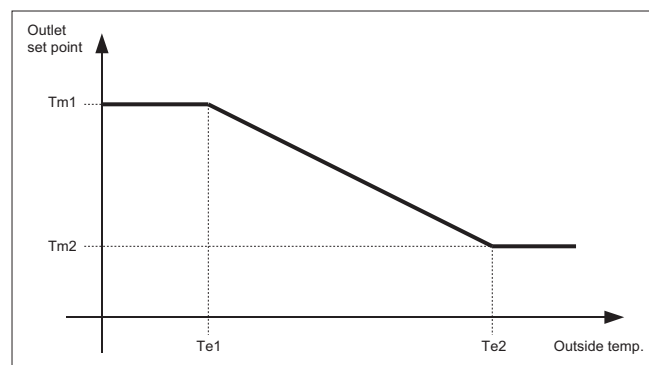


Description	Menu	Parameter no.	Default	UOM
MINIMUM outlet set point limit for SYSTEM curve	Mn01	0165	30	°C
MAXIMUM outlet set point limit for SYSTEM curve	Mn01	0166	48	°C
MINIMUM outlet set point limit for compensation curve in zone LT1	Mn01	0180	23	°C
MAXIMUM outlet set point limit for compensation curve in zone LT1	Mn01	0181	45	°C
MINIMUM outlet set point limit for compensation curve in zone LT2	Mn01	0195	23	°C
MAXIMUM outlet set point limit for compensation curve in zone LT2	Mn01	0196	45	°C
MINIMUM outlet set point limit for compensation curve in zone LT3	Mn01	012F	23	°C
MAXIMUM outlet set point limit for compensation curve in zone LT3	Mn01	012G	45	°C

Water outlet set point compensation diagram in COOLING

The compensation curve in cooling mode can be modified to allow correct heat pump operation depending on the cooling system used (radiant panels, fan coils).

Points T1 and T2 correspond to two outside temperature values that respectively identify the maximum and minimum system outlet temperature.



The compensation curves in COOLING are divided into:

- **SYSTEM** curve determines the general water outlet temperature to the terminal units.
- **ZONE** curve determines the water outlet temperature in the mixed circuit.

For systems configured with mixed zones, the **SYSTEM** curve and **ZONE** curve must be selected.

The system and zone curve work in cascading, the mixed zone curve may therefore not request a higher value than the one supplied by the system curve.

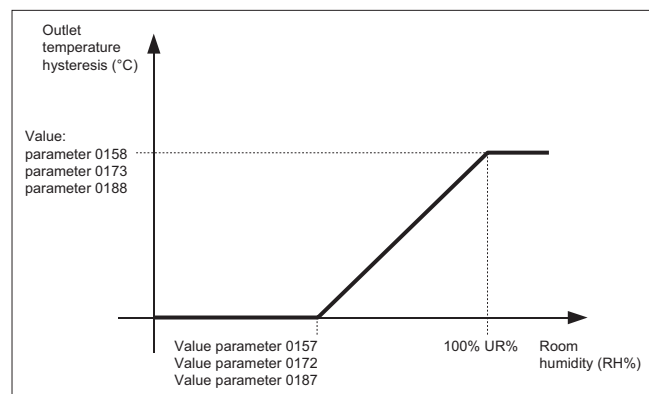
Maximum room humidity compensation

The water outlet temperature set point, calculated based on the compensation curve, can be compensated according to the maximum relative humidity in the room.

The water outlet temperature value can increase so as to avoid possible formation of condensate in the radiant cooling systems (underfloor, ceiling, wall, etc.).

If the relative humidity measured by the A5 room unit A5 exceeds the value set for parameter 012P, 0172, 0187, the water outlet temperature set point increases until reaching the maximum outlet temperature.

The maximum outlet temperature is the set point calculated according to the compensation curve in cooling mode plus the value set for parameter 0158, 0173, 0188.



Description	Menù	Parameter no.	Default	UOM
Enable SYSTEM compensation curve 0= Disabled 1= Enabled	Mn01	0154	0	
Maximum outlet temperature set point limit in cooling mode (Tm1)	Mn01	0128	20	°C
Minimum outside temperature corresponding to max. outlet temperature (Te1)	Mn01	0129	23	°C
Minimum outlet temperature set point limit in cooling mode (Tm2)	Mn01	0130	18	°C
Maximum outside temperature corresponding to min. outlet temperature (Te2)	Mn01	0131	36	°C
Enable compensation curve zone LT1 0= Disabled 1= Enabled	Mn01	0169	0	
Maximum outlet temperature set point limit in cooling mode (Tm1)	Mn01	0132	20	°C
Minimum outside temperature corresponding to max. outlet temperature (Te1)	Mn01	0133	23	°C
Minimum outlet temperature set point limit in cooling mode (Tm2)	Mn01	0134	18	°C
Maximum outside temperature corresponding to min. outlet temperature (Te2)	Mn01	0135	36	°C
Enable compensation curve zone LT2 0= Disabled 1= Enabled	Mn01	0184	0	
Maximum outlet temperature set point limit in cooling mode (Tm1)	Mn01	0136	20	°C
Minimum outside temperature corresponding to max. outlet temperature (Te1)	Mn01	0137	23	°C
Minimum outlet temperature set point limit in cooling mode (Tm2)	Mn01	0138	18	°C
Maximum outside temperature corresponding to min. outlet temperature (Te2)	Mn01	0139	36	°C
Enable compensation curve zone LT3 0= Disabled 1= Enabled	Mn01	011T	0	
Maximum outlet temperature set point limit in cooling mode (Tm1)	Mn01	012H	20	°C
Minimum outside temperature corresponding to max. outlet temperature (Te1)	Mn01	012J	23	°C
Minimum outlet temperature set point limit in cooling mode (Tm2)	Mn01	012L	18	°C
Maximum outside temperature corresponding to min. outlet temperature (Te2)	Mn01	012M	36	°C

Description	Menu	Parameter no.	Default	UOM
Enable compensation for room humidity, SYSTEM 0= Disabled 1= Enabled	Mn01	0156 *	0	
Room relative humidity value to start increasing water outlet temperature set point SYSTEM	Mn01	0157 *	70	%
Maximum outlet temperature hysteresis corresponding to 100% relative humidity	Mn01	0158 *	15	°C
Enable compensation for room humidity, ZONE LT1 0= Disabled 1= Enabled	Mn01	0171	0	
Room relative humidity value to start increasing water outlet temperature set point ZONE LT1	Mn01	0172	70	%
Maximum outlet temperature hysteresis corresponding to 100% relative humidity	Mn01	0173	15	°C
Enable compensation for room humidity, ZONE LT2 0= Disabled 1= Enabled	Mn01	0186	0	
Room relative humidity value to start increasing water outlet temperature set point ZONE LT2	Mn01	0187	70	%
Maximum outlet temperature hysteresis corresponding to 100% relative humidity	Mn01	0188	15	°C
Enable compensation for room humidity, ZONE LT3 0= Disabled 1= Enabled	Mn01	012N	0	
Room relative humidity value to start increasing water outlet temperature set point ZONE LT2	Mn01	012P	70	%
Maximum outlet temperature hysteresis corresponding to 100% relative humidity	Mn01	012R	15	°C

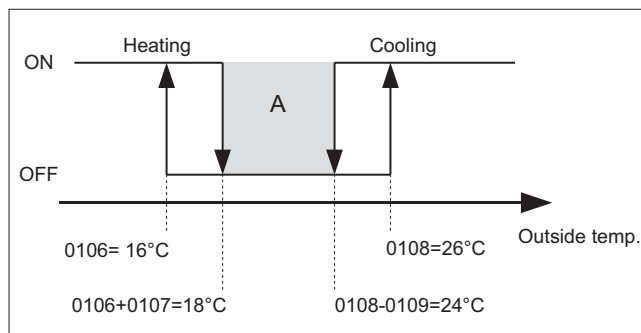
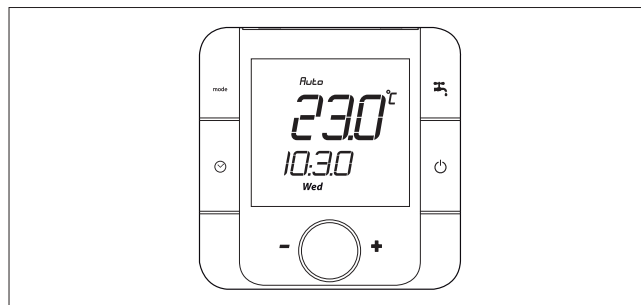
* Parameters to be set only when the heat pump is connected directly to the system, without storage tank on the outlet.

Automatic mode changeover based on outside temperature

In *Auto* mode, the operating mode (heating / cooling) changes automatically, avoiding the need for the user to change the mode manually.

Mode changeover is based on the diagram shown in the figure.

The centre zone A corresponds to an area of inactivity, as the outside climate conditions mean neither heating nor cooling is required.



Description	Menu	Parameter no.	Default	UOM
Automatic mode changeover set point in HEATING	Mn01	0106	16	°C
Automatic mode changeover differential in HEATING	Mn01	0107	2	°C
Automatic mode changeover set point in COOLING	Mn01	0108	24	°C
Automatic mode changeover differential in COOLING	Mn01	0109	2	°C

System pump operation

When reaching the system water set point, the compressor stops and the system pump is activated periodically, so as to minimise energy consumption.

Pump operating time can be selected using parameter 0147, while the interval between one sniffing cycle and the next is set using parameter 0148.

Intermittent activation of system pump operation can be selected using parameter 0143 (0= system pump always on to, 1=system pump activated at intervals).

In systems with fan coils, the time between one sniffing cycle and the next should be reduced in order to avoid cooling excessive of the water, and if the system water content is equal to the minimum value shown in the paragraph on "water connections", parameter 0143 should be set to 0.

Heat pump operation with fixed set point

Outlet water set point compensation using the compensation curves can be disabled.

To enable fixed set point operation, set parameter 0152=0 and 0154=0

The heat pump will operate based on the fixed outlet set point defined by parameters 0153 (Heating) and 0155 (cooling).

Description	Menu	Parameter no.	Default	UOM
Enable outlet set point in HEATING 0= Fixed set point in heating ENABLED 1= Fixed set point in heating DISABLED	Mn01	0152	0	-
Fixed water outlet temperature set point in HEATING	Mn01	0153	57	°C
Enable outlet set point in COOLING 0= Fixed set point in cooling ENABLED 1= Fixed set point in cooling DISABLED	Mn01	0154	0	-
Fixed water outlet temperature set point in COOLING	Mn01	0155	8	°C

FROST PROTECTION

Frost protection based on system water temperature

The frost protection function is active even if the controller is in standby. To prevent the water freezing and damaging the plate heat exchanger, the microprocessor shuts down the compressor and activates the system heat exchanger heater if the temperature measured by the heat exchanger outlet temperature probe is than +4°C. The frost prevention temperature set point can only be modified by an authorised service centre, and only after verifying that the water circuit contains antifreeze. Tripping of this alarm shuts down the compressor but not the pump, which remains active.

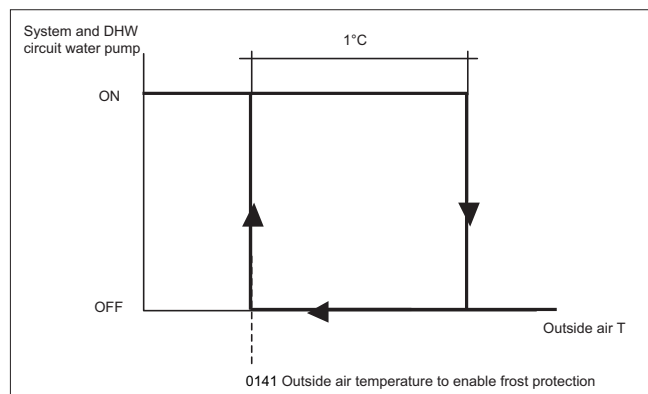
To reset normal operation, the water outlet temperature must rise to more than: +7°C on the system side. Reset is automatic.

Frost protection based on outside air temperature

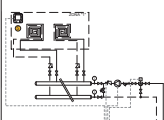
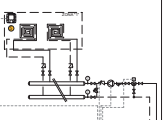
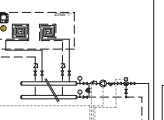
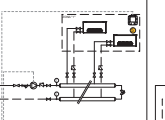
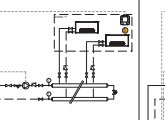
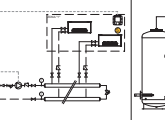
Frost protection on the heating and domestic hot water circuits based on outside air temperature is always active, even when the heat pump is off.

The system and domestic hot water pumps are activated when the outside air temperature falls below the value set for parameter 0141.

Description	Menu	Parameter no.	Default	UOM
Outside temperature to enable frost protection	Mn01	0141	4	°C



The heat pump controller can select configurations for 15 different types of system by setting parameter 0101.
The following table describes the system configurations available.

Menu	Parameter 0101	Mixed zone 1	Mixed zone 2	Mixed zone 3	High temperature zone 1 (fan coils / radiators)	High temperature zone 2 (fan coils / radiators)	High temperature zone 3 (fan coils / radiators)	DHW recirculation	N-EM1 expansion module
									n°
Mn01	0				X				0
Mn01	1				X			X	1
Mn01	2	X							1
Mn01	3	X			X				1
Mn01	4	X			X			X	2
Mn01	5	X			X	X			2
Mn01	6	X			X	X		X	2
Mn01	7	X			X	X	X		2
Mn01	8	X			X	X	X	X	2
Mn01	9	X	X						2
Mn01	10	X	X					X	2
Mn01	11	X	X		X			X	2
Mn01	12	X	X		X	X		X	3
Mn01	13	X	X		X	X	X	X	3
Mn01	14	X	X	X				X	3

Configuration 0 does NOT require additional expansion modules

Configurations from 1 to 3 require 1 additional N-EM1 expansion module

Configurations from 4 to 11 require 2 additional N-EM1 expansion modules

Configurations 12, 13 and 14 require 3 additional N-EM1 expansion modules

The water connection and wiring diagrams for configurations from 1 to 14 are shown on the instruction sheet enclosed with the N-EM1 expansion module.

The parameters required for correct system operation can be set on the A5 room controller supplied with the heat pump.

The next few pages are divided into the following sections:

Section 1 WATER CIRCUIT DIAGRAM

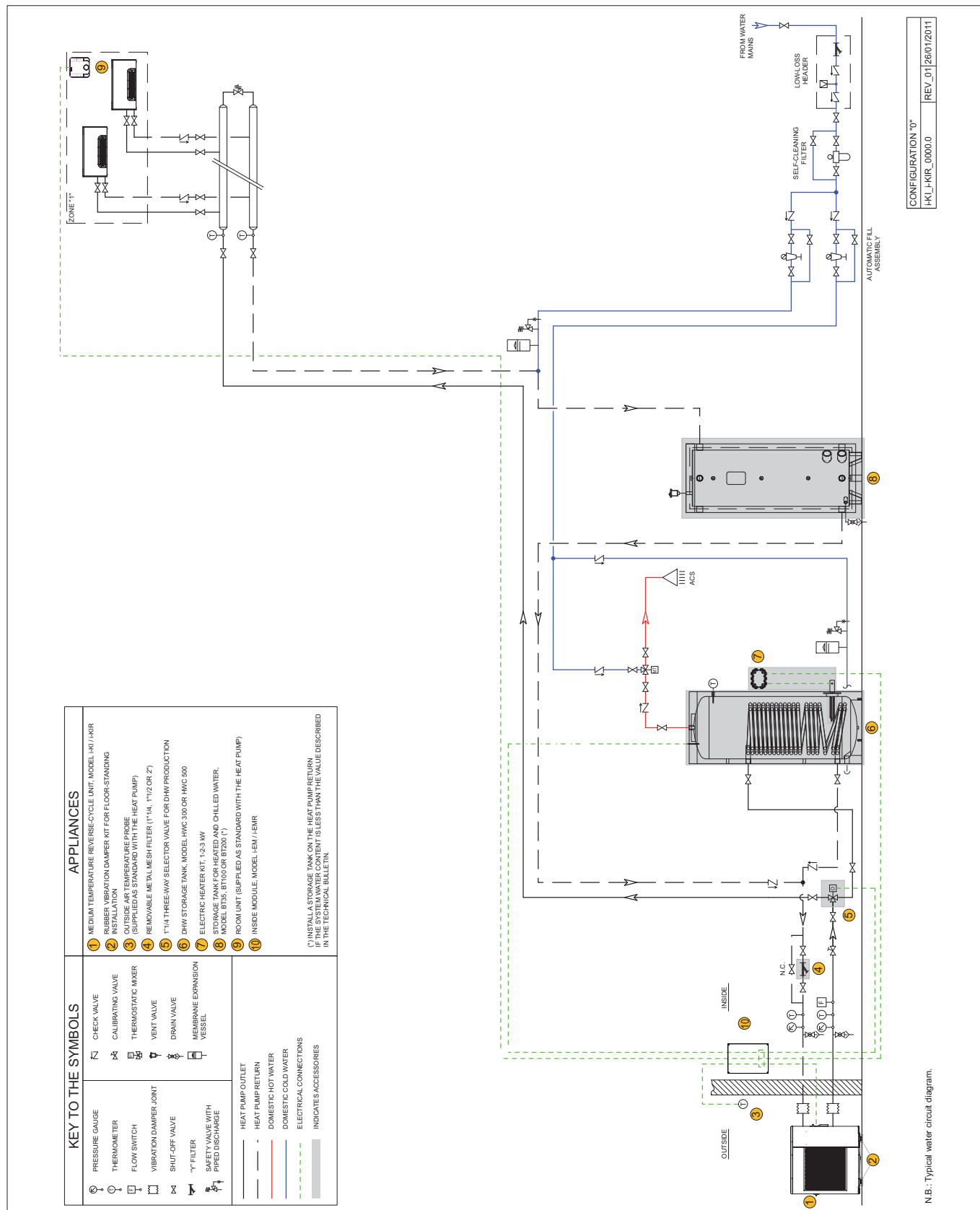
Section 2 WIRING DIAGRAM

Section 3 PARAMETER CONFIGURATION

Heat pump connection to the system without low-loss header. Make sure the useful pressure head of the circulating pump on the unit is sufficient for the pressure drop in the system. If the minimum system content does not reach values shown in this manual, install an additional storage tank on the heat pump return pipe. No system configurations are required.

For installations with heap pump connected directly to the system, without storage tanks and secondary pumps, parameter 011D must be set to 0. This means that heat pump operation will be managed based on the time bands.

Water circuit diagram



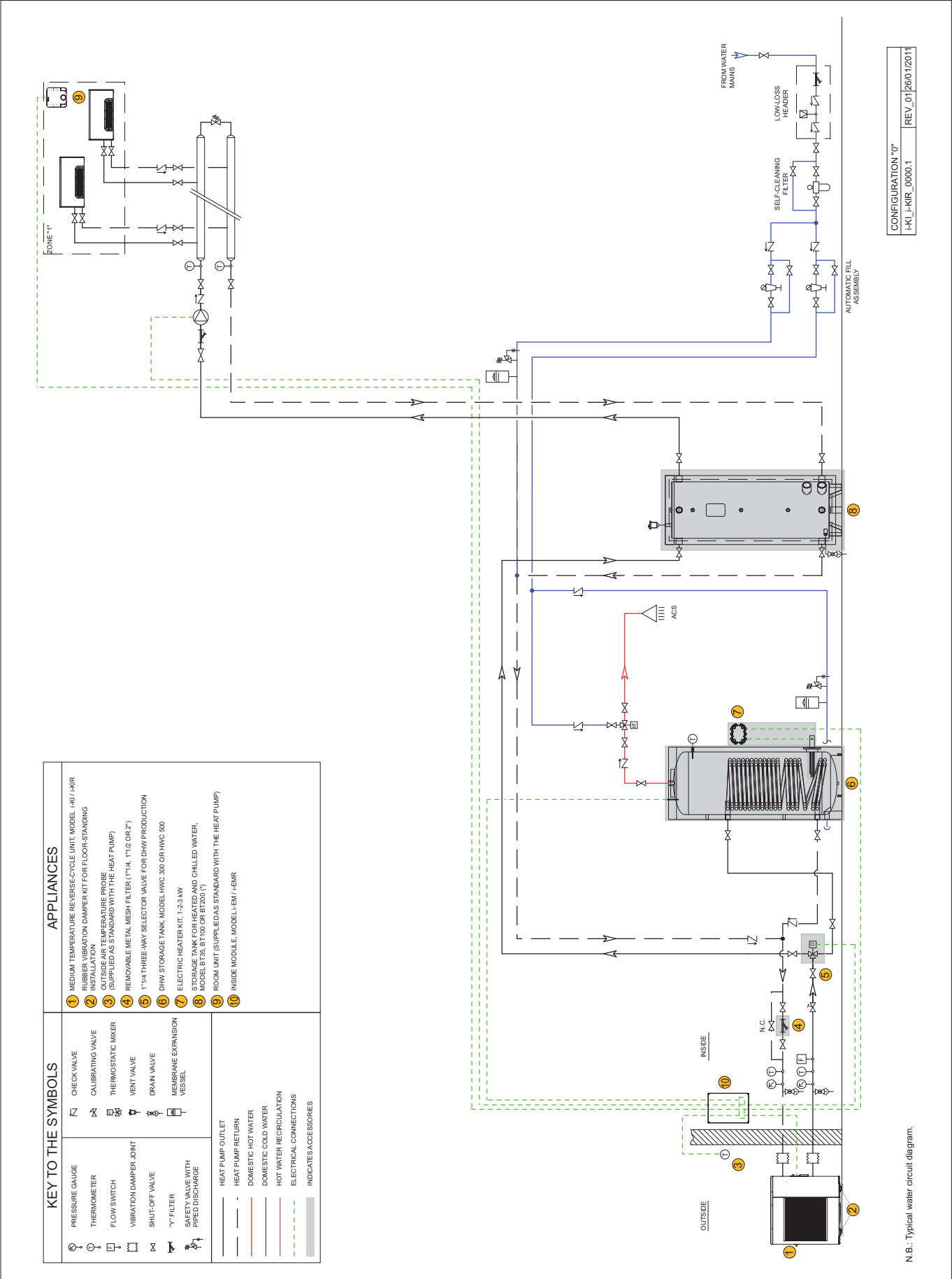
Water circuit diagram (not a working drawing)

Parameter configuration

Description	Menu	Parameter no.	Default	Write set value	UOM
SYSTEM compensation curves in heating mode					
Enable SYSTEM compensation curve 0= Disabled 1= Enabled	Mn01	0152	0		-
SYSTEM compensation curve number	Mn01	0159	1		-
Enable room temperature influence on SYSTEM 0= Disabled 1= Enabled	Mn01	0163	0		-
SYSTEM Room Authority	Mn01	0164	30		%
MINIMUM return set point limit for SYSTEM curve	Mn01	0165	30		°C
MAXIMUM return set point limit for SYSTEM curve	Mn01	0166	48		°C
SYSTEM compensation curves in cooling mode					
Enable SYSTEM compensation curve 0= Disabled 1= Enabled	Mn01	0154	0		-
Maximum outlet temperature set point limit in cooling mode (Tm1)	Mn01	0128	20		°C
Minimum outside temperature corresponding to max. outlet temperature (Te1)	Mn01	0129	23		°C
Minimum outlet temperature set point limit in cooling mode (Tm2)	Mn01	0130	18		°C
Maximum outside temperature corresponding to min. outlet temperature (Te2)	Mn01	0131	36		°C

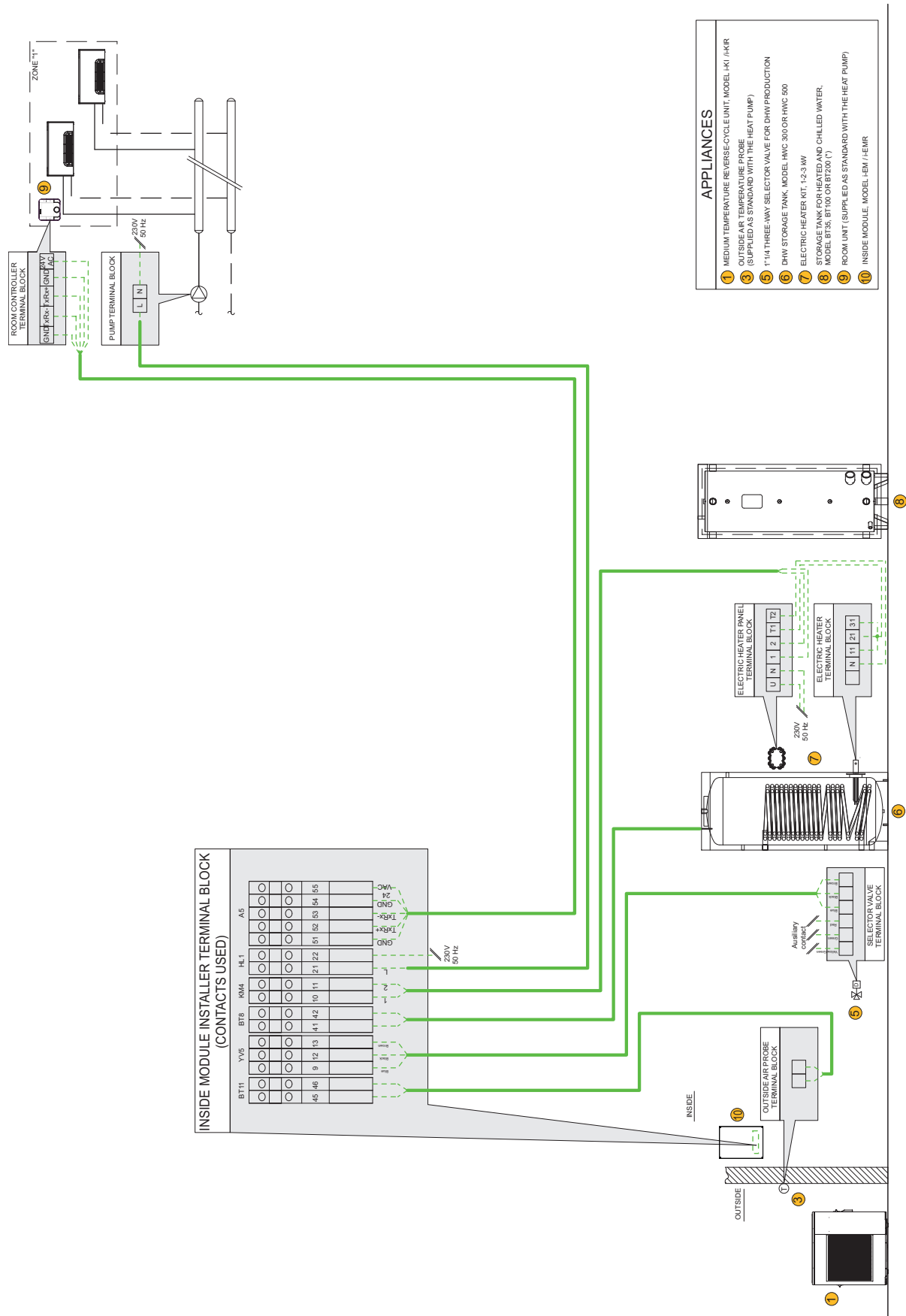
System number 0

Water circuit diagram



N.B.: Typical water circuit diagram.

Wiring diagram



System number 0

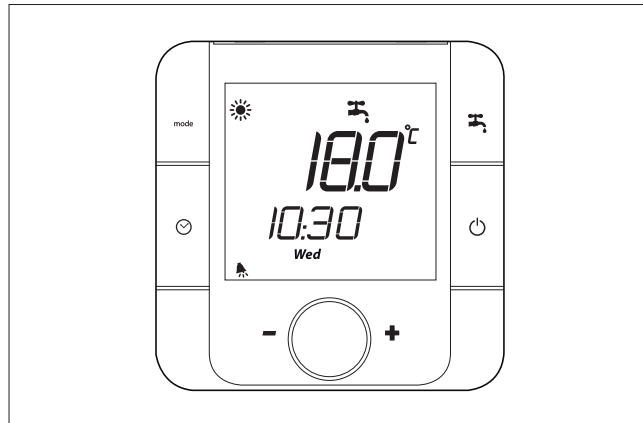
Parameter configuration

Description	Menu	Parameter no.	Default	Write set value	UOM
System type (table 1)	Mn01	0101	0	0*	-
SYSTEM compensation curves in heating mode					
Enable SYSTEM compensation curve 0= Disabled 1= Enabled	Mn01	0152	0		-
SYSTEM compensation curve number	Mn01	0159	1		-
Enable room temperature influence on SYSTEM 0= Disabled 1= Enabled	Mn01	0163	0		-
SYSTEM Room Authority	Mn01	0164	30		%
MINIMUM return set point limit for SYSTEM curve	Mn01	0165	30		°C
MAXIMUM return set point limit for SYSTEM curve	Mn01	0166	48		°C
SYSTEM compensation curves in cooling mode					
Enable SYSTEM compensation curve 0= Disabled 1= Enabled	Mn01	0154	0		-
Maximum outlet temperature set point limit in cooling mode (Tm1)	Mn01	0128	20		°C
Minimum outside temperature corresponding to max. outlet temperature (Te1)	Mn01	0129	23		°C
Minimum outlet temperature set point limit in cooling mode (Tm2)	Mn01	0130	18		°C
Maximum outside temperature corresponding to min. outlet temperature (Te2)	Mn01	0131	36		°C
Contact HL1 configuration, secondary circuit pump					
Enable contact HL1 HIGH TEMPERATURE ZONE (The contact closes and the pump or motor-driven shut-off valve is activated)	Mn01	015A	0	3*	

* obligatory values for the present configuration

Alarm signals

When an alarm is activated, the  symbol comes on.



Displaying alarms

1 x3 sec. Press the  and mode buttons for 3 seconds	2 - Turn the knob - Display the alarm codes	3 - Press the knob to confirm - Resolve the problem and then reset the alarms using the procedure described in "Resetting alarms"
--	--	--

Resetting alarms

1 x3 sec. Press the  and mode buttons for 3 seconds	2 - Turn the knob - Select 	3 - Press the knob to confirm - Alarms reset
--	---	---

Alarm log

The alarm log can only be displayed using the service keypad. Contact an authorised service centre.

The room controller can display the most recently activated alarm code from Mn11:

- parameter 1100 = no. of alarms saved in the log (visible only with service keypad)
- parameter 1101= code of last alarm activated

- parameter 1102= alarm activation hour
- parameter 1103= alarm activation minutes
- parameter 1104= alarm activation day
- parameter 1105= alarm activation month
- parameter 1106= alarm activation year

TABLE OF REMOTE KEYPAD ALARMS

Alarms displayed on the remote keypad.

Alarm code	Cause	Solution
A001	BT1 System heat exchanger water inlet temperature probe	Probe faulty or disconnected
A002	BT2 System heat exchanger water outlet temperature probe	Probe faulty or disconnected
A003	BT8 DHW storage temperature probe	Probe faulty or disconnected
A005	BT9 Storage tank temperature probe	Probe faulty or disconnected
A006	BT11 Outside air temperature probe	Probe faulty or disconnected
A013	F1 High pressure switch	Check connection Check refrigerant circuit pressure
A019	Difference between low and high pressure in refrigerant circuit too low	Check refrigerant circuit pressure Check refrigerant charge
A022	Operation outside of limits	Make sure outside air temperature and water temperature set point are inside the specified operating limits
A025	Differential pressure switch / system flow switch F3 activated	Make sure filters are clean Check water flow Check for air in the system
A030	Compressor operating hours reached	Scheduled maintenance
A033	System pump operating hours reached	Scheduled maintenance
A034	Domestic hot water pump operating hours reached	Scheduled maintenance
A035	Mixed zone pump operating hours reached	Scheduled maintenance
A036	Fan operating hours reached	Scheduled maintenance
A038	System heat exchanger frost prevention alarm	Scheduled maintenance
A041	DHW storage temperature too high	
A042	Inside frost prevention alarm	
A030	Compressor operating hours reached	Scheduled maintenance
A033		
A034		
A035		
A036		
A038		
A041		
A054	Legionella prevention alarm	
A055	Temperature probe N-THC n.1	Check connections Probe faulty or disconnected
A056	Address setting error on remote terminal supplied with the unit	Check connections Check address
A057	Address setting error on expansion module 2	Check connections Check address, must be 1
A058	Temperature probe in low temperature zone LT2, expansion 2	Probe faulty or disconnected
A063	Address setting error on expansion module 3	Check connections Check address, must be 2
A064	Temperature probe in low temperature zone LT3, expansion 3	Probe faulty or disconnected
A075	Water temperature too high in mixed circuit, expansion module 1	
A077	Water temperature too high in mixed circuit, expansion module 2	
A094	End defrost due to maximum time	
A095	Temperature probe N-THC n.2	Check connections Probe faulty or disconnected
A096	Address setting error on zone remote terminal	Check connections Check address
A097	Temperature probe N-THC n.3	Check connections Probe faulty or disconnected
A098	Address setting error on zone remote terminal	Check connections Check address
A099	Temperature probe N-THC n.4	Check connections Probe faulty or disconnected
A100	Address setting error on zone remote terminal	Check connections Check address
A101	Temperature probe N-THC n.5	Check connections Probe faulty or disconnected
A102	Address setting error on zone remote terminal	Check connections Check address
A103	Address setting error on expansion module 1	Check connections Check address, must be 1
A104	Low temperature zone LT1 temperature probe, expansion 1	Probe faulty or disconnected
A109	Low pressure alarm from low pressure switch	Check connection Check refrigerant circuit pressure
A114	Solar/pool module address setting error	Check connections Check address
A115	Solar/pool module general alarm	
A116	Master unit not connected, cascade control	
A117	Slave unit not connected, cascade control	
A120	Water temperature too high in mixed circuit, expansion module, expansion module 3	
A121	Temperature probe N-THC n.6	Check connections Probe faulty or disconnected
A122	Address setting error on zone LT3 remote terminal	Check connections Check address
A123	i-KI/i-KIR general alarm - Problems relating to the heat pump	See alarms on the heat pump display and check these against the table on the following page
A124	Humidity probe N-THC n.1	Check connections Probe faulty or disconnected
A125	Humidity probe N-THC n.2	Check connections Probe faulty or disconnected
A126	Humidity probe N-THC n.3	Check connections Probe faulty or disconnected
A127	Humidity probe N-THC n.4	Check connections Probe faulty or disconnected
A128	Humidity probe N-THC n.5	Check connections Probe faulty or disconnected
A129	Humidity probe N-THC n.6	Check connections Probe faulty or disconnected

TABLE OF ALARMS ON HEAT PUMP DISPLAY

Alarms shown on the board display (PCB Display) located in the compressor compartment.

ERROR CODE	FEATURES, PARTS, COMPONENTS MALFUNCTIONING		CHECKS	SOLUTION	SIZE
-	-	POWER SUPPLY	Check the power supply	Verify the power supply	0011-0031
-	-	FUSE CF3 (250V T5A)	Check electrical continuity using a tester	If CF3 is blown, replace it and check if there is a short-circuit on a connector on the 4-way valve, frost protection heater, expansion vessel or circulating pump. If a short-circuit is found, replace the components.	0031
-	-	FUSE CF2 (250V T5A)	Check electrical continuity using a tester	If CF2 is blown, replace it and check if there is a short-circuit on a connector on the 4-way valve, frost protection heater or expansion vessel. If a short-circuit is found, replace the components.	0061
-	-	FUSE CF1 (250V T25A)	Check electrical continuity using a tester	If CF1 is blown, replace the CONTROL BOARD on the unit (PCB-CONTROLLER) and check resistance between the pink-grey and orange-blue wires on the POWER SUPPLY MODULE (PCBPOWER MODULE) connector. If these values are below 100kΩ, replace the POWER SUPPLY MODULE.	0031
-	-	CONTROL BOARD (PCB-CONTROLLER)	Other than described above.	Replace the CONTROL BOARD (PCB-CONTROLLER)	0061
A0	DC voltage error	FAN MOTOR	Unplug connector 9 and measure the resistance between the red and black wires on the connector. The correct resistance value is above 100kΩ.	If the resistance is less than 100kΩ, replace the fan motor. Check electrical continuity of fuse CF4 using a tester. If CF4 is blown, replace it.	0011-0031
		FUSE CF4 (250V T3.15A)			
		POWER SUPPLY MODULE	Disconnect the terminals (orange and blue) and check the resistance between orange-blue. If the resistance is greater than 100kΩ, the POWER SUPPLY MODULE is normal.	If the resistance is less than 100kΩ, replace the POWER SUPPLY MODULE.	0031
		POWER SUPPLY	Check power supply	Verify the power supply	0011-0031
A1	Outlet temperature error	COMPRESSOR DISCHARGE TEMPERATURE PROBE	Check resistance using a tester [see table 2]	Replace the probe	0011-0031
		COMPRESSOR SUCTION TEMPERATURE PROBE	Check resistance using a tester [see table 1]	Replace the probe	0031
		REFRIGERANT GAS LEAK	Check the service valve and the refrigerant circuit.	Collect all the refrigerant and then recharge to the specified mass	0011-0031
		COMPRESSOR DISCHARGE TEMPERATURE PROBE	Check resistance using a tester [see table 4]	Replace the probe	0061
		COMPRESSOR SUCTION TEMPERATURE PROBE	Check resistance using a tester [see table 3]	Replace the probe	
		REFRIGERANT GAS LEAK	Check the service valve and the refrigerant circuit.	Collect all the refrigerant and then recharge to the specified mass	
A2	Overcurrent protection	ABNORMAL CURRENT DRAW	Check the installation position (intake and outlet air blocked) Check for excessive gas	Make sure the position doesn't block the air intake and outlet If excessive gas is evident, collect all the refrigerant and then recharge in accordance with rated data.	0011-0031
		POWER SUPPLY VOLTAGE DROP	Check power supply voltage (230V)	Confirm power supply voltage (230V)	0031
	Direct current (DC) measurement	MODULE DI POWER	Operate without connecting the compressor connector.	If the same error appears again, replace the POWER SUPPLY MODULE.	0011-0031
		FUSE CF2 (250V T15A)	Check electrical continuity of FUSE CF2 (250V T15A) using a tester	If CF2 is blown, replace the CONTROL BOARD (PCB-CONTROLLER)	
		COMPRESSOR	Other not specified above	Replace the COMPRESSOR	
A3	Current transformer disconnected	CONTROL BOARD (PCB-CONTROLLER)	-	Replace the CONTROL BOARD (PCB-CONTROLLER)	0031
A4	Overcurrent protection	ABNORMAL CURRENT DRAW	Check the installation position (intake and outlet air blocked) Check for excessive gas	Make sure the position doesn't block the air intake and outlet If excessive gas is evident, collect all the refrigerant and then recharge in accordance with rated data.	0011-0031
		POWER SUPPLY VOLTAGE DROP	Check power supply voltage (230V)	Confirm power supply voltage (230V)	
	Alternating current (AC) measurement	MOMENTARY POWER CUT (IN THE EVENT DI LIGHTNING)	-	Restart operation	
A5	Abnormal COMPRESSOR rotation	INCORRECT OPERATION IN OVERLOAD	Check the installation position (intake and outlet air blocked) Check for excessive gas	Make sure the position doesn't block the air intake and outlet If excessive gas is evident, collect all the refrigerant and then recharge in accordance with rated data.	0011-0031
		WATER PUMP BLOCKED WATER CIRCUIT BLOCKED	Check the pump and the water circuit.	Remove any obstructions, clean the water filter, unblock the pump.	0011
		POWER SUPPLY VOLTAGE DROP	Check power supply voltage (230V)	Confirm power supply voltage (230V)	0011-0031
		FUSE CF4 (250V T15A)	Check electrical continuity of FUSE CF4 (250V T15A) using a tester	If CF4 is blown, replace the CONTROL BOARD (PCB-CONTROLLER)	0011
		FUSE CF2 (250V T15A)	Check electrical continuity of FUSE CF2 (250V T15A) using a tester	If CF2 is blown, replace the CONTROL BOARD (PCB-CONTROLLER)	0031
		POWER SUPPLY MODULE	Check the resistance of the POWER SUPPLY MODULE using a tester. Unplug the connector from the compressor and measure the resistance at the ends of the connector six times: between white-black, black-red, red-white respectively and then reversing polarity => If all the measurements are above 100kΩ, the POWER SUPPLY MODULE is working normally	If one of these values is less than 100kΩ, replace the POWER SUPPLY MODULE	0011-0031
		COMPRESSOR	Other not specified above	Replace the COMPRESSOR	

ERROR CODE	FEATURES, PARTS, COMPONENTS MALFUNCTIONING		CHECKS	SOLUTION	SIZE
A6	Return temperature probe error	COMPRESSOR SUCTION TEMPERATURE PROBE	Check resistance using a tester [see table 1]	Replace the probe if faulty	0031
			Check resistance using a tester [see table 3]		0011
A7	Defrost temperature probe error	DEFROST PROBE	Check resistance using a tester [see table 1]	Replace the probe if faulty	0031
			Check resistance using a tester [see table 3]		0011
A8	Outlet temperature probe error	COMPRESSOR DISCHARGE TEMPERATURE PROBE	Check resistance using a tester [see table 2]	Replace the probe if faulty	0031
			Check resistance using a tester [see table 4] (*2)		0011
C0	Power supply module error	POWER SUPPLY MODULE	-	Replace the POWER SUPPLY MODULE	0011-0031
C2	Outside temperature probe error	OUTSIDE TEMPERATURE PROBE	Check resistance using a tester [see table 1]	Replace the probe if faulty	
C1	Upper fan motor error (*1)	FUSE CF7 (250V T3.15A)	Check electrical continuity of FUSE CF7 (250V T15A) using a tester	If CF7 is blown, replace the fan motor. If CF7 is not blown, check fan motor voltage. If the voltage is within the standard values, replace the fan motor. If the voltage is not within the standard values, replace the CONTROL BOARD (PCB-CONTROLLER).	0061
		FAN MOTOR (*1)			
		CONTROL BOARD (PCB-CONTROLLER)			
C3	Lower fan motor error (*1)	FUSE CF6 (250V T3.15A)	Check electrical continuity of FUSE CF6 (250V T15A) using a tester	If CF6 is blown, replace the fan motor. If CF6 is not blown, check fan motor voltage. If the voltage is within the standard values, replace the fan motor. If the voltage is not within the standard values, replace the CONTROL BOARD (PCB-CONTROLLER).	0061
		FAN MOTOR (*1)			
		CONTROL BOARD (PCB-CONTROLLER)			
C3	Fan motor error (*1)	FUSE CF4 (250V T3.15A)	Check electrical continuity of FUSE CF4 (250V T15A) using a tester	If CF4 is blown, replace the fan motor. If CF4 is not blown, check fan motor voltage. If the voltage is within the standard values, replace the fan motor. If the voltage is not within the standard values, replace the CONTROL BOARD (PCB-CONTROLLER).	0031
		FAN MOTOR (*1)	Check FAN MOTOR voltage	If the voltage is correct, replace the FAN MOTOR. If the voltage is not correct, replace the CONTROL BOARD (PCB).	0011
		CONTROL BOARD (PCB-CONTROLLER)			
C4	POWER MODULE temperature increase (above 110°C)	INCORRECT INSTALLATION	Check the installation position (intake and outlet air blocked)	Make sure the position doesn't block the air intake and outlet	
		TEMPERATURE PROBE POWER SUPPLY MODULE		Replace the POWER SUPPLY MODULE	
C5	Power supply module temperature probe error	TEMPERATURE PROBE POWER SUPPLY MODULE	-	Replace the POWER SUPPLY MODULE	
C6	CONTROL BOARD (PCB-CONTROLLER) error	CONTROL BOARD (PCB-CONTROLLER)	-	Replace the CONTROL BOARD (PCB-CONTROLLER)	
C7	PCB serial interface error	INCORRECT CONTROL BOARD (PCB-CONTROLLER) - WIRING LOOSE PCB INTERFACE CONNECTION CABLE OR CONTACTS	Check loose cable connections and contacts	After having corrected the wiring, restart operation	0011-0031
		PCB INTERFACE	Other not specified above	Replace the PCB interface	
		CONTROL BOARD (PCB-CONTROLLER)	Other not specified above	Replace the CONTROL BOARD (PCB-CONTROLLER)	
C8	Printed circuit board (PCB) serial converter error	CONNECTOR 13 INCORRECT CONTACT or POWER SUPPLY MODULE and PRINTED CIRCUIT BOARD (PCB)	Power down, wait around 3 minutes Unplug connector 13 and plug it back in, then power up again	If the same error appears again, replace the POWER SUPPLY MODULE.	
			After having replaced the POWER SUPPLY MODULE, restart operation	If the same error appears again, replace the printed circuit board (PCB).	
CC	Heat pump PCB controller serial error	INCORRECT WIRING [PCB INTERFACE – HEAT PUMP CONTROLLER] OR LOOSE CONTACTS	Check loose cable connections and contacts	Check loose cable connections and contacts. Then restart operation	
		PCB INTERFACE	Other not specified above	Replace the PCB interface	
		HEAT PUMP CONTROLLER	Other not specified above	Replace heat pump PCB controller	
E4	Water outlet temperature probe error	WATER OUTLET TEMPERATURE PROBE	Check resistance using a tester [see table 1]	Replace the probe if faulty	0031
			Check resistance using a tester [see table 5]		0011
E5	Water return temperature probe error	WATER RETURN TEMPERATURE PROBE	Check resistance using a tester [see table 1]	Replace the probe if faulty	0031
			Check resistance using a tester [see table 5]		0011
FU	High pressure switch activated	AIR CIRCULATION INSUFFICIENT	Check the installation position (intake and outlet air blocked)	Make sure the position doesn't block the air intake and outlet	0061
		WATER CIRCULATION INSUFFICIENT	Check the temperature difference between water intake and outlet. If the difference is high it means that water flow-rate is too low.	Remove obstructions, clean the water filter and unblock the pump.	

(*1) While fan motor and/or pump control is active, disconnect the power supply completely and touch the corresponding terminals or connectors.

(*2) If an open circuit is measured on the discharge temperature thermistor, the error screen is displayed 10 minutes after operation commences.
If an open circuit is measured on the discharge temperature thermistor, the error screen is displayed immediately.

ERROR CODE	FEATURES, PARTS, COMPONENTS MALFUNCTIONING		CHECKS	SOLUTION	SIZE
P1	Circulating pump error	CIRCULATING PUMP PRINTED CIRCUIT BOARD (PCB) (*1)	Check pump voltage	If the voltage is within the standard values, the pump does not need to be replaced. If the voltage is not within the standard values, replace the printed circuit board (PCB).	0011-0031
		WATER PUMP BLOCKED WATER CIRCUIT BLOCKED	Check the pump and the water circuit.	Remove any obstructions, clean the water filter, unblock the pump.	
P3	High pressure switch error	High pressure switch	Check loose cable connections and contacts	if the same error appears again replace the high pressure switch	0061
U5	Below-normal temperature measured	THE OUTSIDE TEMPERATURE FALLS BELOW -20°C	The unit should not be operated below -20°C to protect the various components	When the temperature increases again, the unit automatically resumes operation	0031
		OUTSIDE TEMPERATURE PROBE	Check resistance using a tester [see table 1]	Replace the probe if faulty	
No cooling No heating		4-WAY VALVE	Check resistance using a tester	If the value is not within the standard range, replace the coil	0011-0031
		OUTSIDE AIR RECIRCULATION	Check air blockages at intake and outlet	Make sure the position doesn't block the air intake and outlet	
		WATER CIRCULATION OUTLET AND RETURN TEMPERATURE PROBE	Check resistance using a tester [see table 1]	If one of these probes is faulty, replace it	0031
			Check resistance using a tester [see table 5]		0011
		GAS LEAK	Check the service valve and the refrigerant circuit.	After having repaired the leak, collect all the refrigerant and then recharge to the specified mass	0011-0031
		WATER CIRCUIT BLOCKED	Check the temperature difference between water outlet and return. If the difference is high it means that water flow-rate is too low.	Remove obstructions, clean the water filter and unblock the pump.	

Heat pump display

To display the data measured by the probes on the outdoor unit, set switch 4 on the display to the ON position.

Then scroll the data shown in the table using the PUMP SW button.

Monitor	Data Display Monitor Description	Unit
d0	Water return temperature	1 °C
d1	Compressor operating frequency	1 Hz
d2	Discharge temperature	1 °C
d3	Power consumption	100 W
d5	Defrost thermistor temperature	1 °C
d6	Room air temperature	1 °C
d8	Suction temperature	1 °C
d9	Water outlet temperature	1 °C

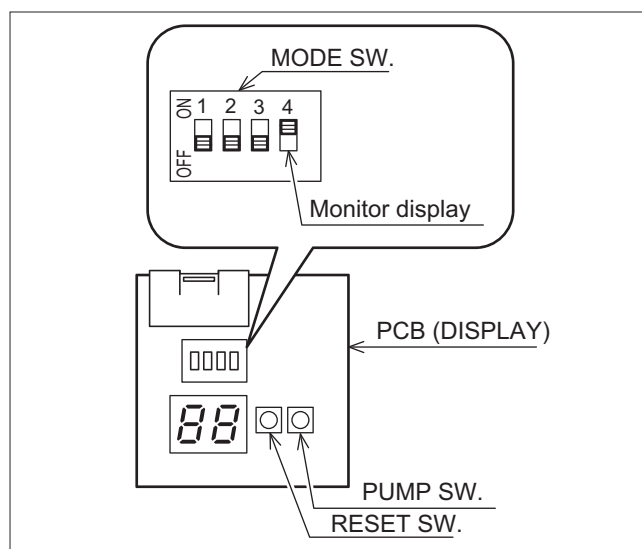


Table 1

Defrost temperature probe (0031m)

Outside temperature probe

Suction temperature probe (0031m)

Water circulation outlet temperature probe

TEMPERATURE (°C)	Resistance (kΩ)
0	31
5	24
10	19
15	15
20	12
25	10
30	8
35	6,7
40	5,5
45	4,6
50	3,8
55	3,2

Table 2

Discharge temperature probe (0031m)

TEMPERATURE (°C)	Resistance (kΩ)
10	1000
20	600
35	300
40	250
50	160
80	50

Table 3

Defrost temperature probe (0011m, 0061m)

Suction temperature probe (0011m, 0061m)

TEMPERATURE (°C)	Resistance (kΩ)
0	29
5	23
10	19
15	15
20	12
25	10
30	8,3
35	6,9
40	5,7
45	4,8
50	4,1
55	3,4

Table 4

Discharge temperature probe (0011m, 0061m)

TEMPERATURE (°C)	Resistance (kΩ)
10	100
20	64
35	33
40	27
50	18
80	6,4

Table 5

Circuit water outlet and return temperature probe (0011m)

TEMPERATURE (°C)	Resistance (kΩ)
0	31
10	19
20	12
30	8,1
40	5,5
50	3,8

Resetting alarms displayed by the board on the unit

Press the PUMP SW and RESET SW buttons at the same time for 5 seconds to reset the alarm.

The alarms are reset automatically no operations are carried out for 5 minutes.

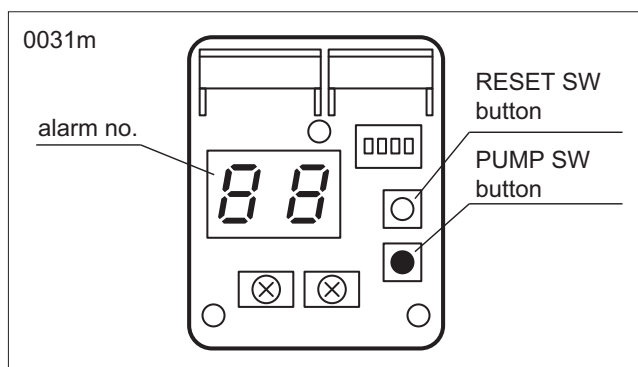
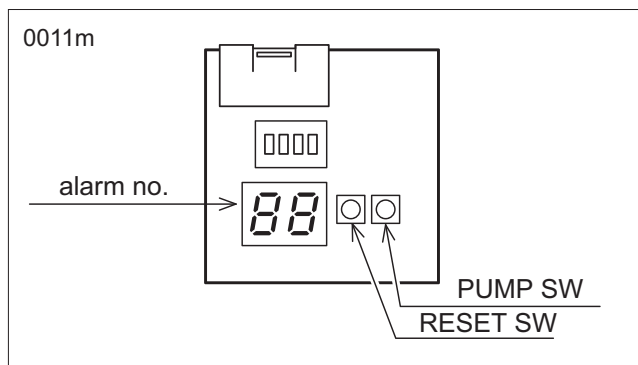
While an error code is being displayed, holding the reset button for 10 seconds or more resets the alarm log.

Alarm log shown by the board on the unit

Press and hold the PUMP SW and RESET SW buttons together for 5 seconds until the log of error codes and the sequential number is shown.

The PUMP SW button is used to select a maximum of 8 past error codes on the display.

If there are no errors saved, the display shows "--".



SYSTEM emergency operation

If the heat pump is not working correctly or the compressor has shut down, emergency operation can be activated.

Emergency operation involves heating the water using the electric heaters available on the system (outlet, storage tank).

The compressor remains off.

To enable manual operation of system heaters, set parameter 0620 = 1 (manual)

Description	Menu	Parameter no.	Default	UOM
Type of outlet electric heater operation 0 = Supplementary 1 = Replacement	Mn01	010G	1	
Enable manual heater operation	Mn06	0620	1	

Set the parameters following the sequence described in the table

DOMESTIC HOT WATER emergency operation

If the heat pump is not working correctly or the compressor has shut down, emergency operation can be activated.

Emergency operation involves heating the domestic hot water using the electric heater inside the storage tank.

To enable manual operation of DHW storage heaters, set parameter 0202 = 1

Description	Menu	Parameter no.	Valore da impostare	UOM
Electric heater operating mode 0 = heat pump only 1 = electric heater only 2 = heat pump + electric heater	Mn02	0202	1	

SHUTTING DOWN FOR LONG PERIODS

After deactivating the heat pump:

- Disconnect the unit from the power supply.
- Make sure the remote keypad is in the "OFF" position.
- Place QF1 in the OFF position (see wiring diagram).
- Deactivate the indoor terminal units by placing the switch of each unit in the "OFF" position.
- Close the water valves.

⚠ If the outside temperature may fall below zero; there is the risk of freezing.

The water circuit **MUST BE EMPTIED AND CLOSED** (if draining after operation in heat pump mode, beware that

the water may be hot), or antifreeze must be added in the proportion recommended by the manufacturer.

It is recommended to use non-toxic food grade antifreeze, compliant with the standards in force in the countries where the unit is used, if domestic hot water production is also featured.

If the mains switch is turned to "off" for more than four hours, after turning it on and before reactivating the unit, leave the power on but the unit deactivated for at least two hours to preheat the oil in the compressor sump.

Never perform any cleaning operations before having disconnected the unit from the mains power supply. Make sure power is not connected before proceeding. Control maintenance is fundamental to maintain the efficiency of the unit both in terms of operation and energy consumption. The Technical Service maintenance plan must be observed, with an annual service which includes the following operations and checks:

- Filling of the water circuit;
- Presence of air bubbles in the water circuit;
- Efficiency of safety devices;
- Power supply voltage;
- Electrical power input;
- Tightness of electrical and water connections;

- Condition of the compressor contactor;
- Efficiency of the plate heat exchanger resistor;
- Verification of operating pressure, superheating and subcooling
- Efficiency of the compressor heater
- Cleaning of the finned coil every three months
- Cleaning of the fan grills
- Cleaning of condensate drain pan.
- Cleaning of water filters.
- Checking the ventilation openings on the base are free of leaves, bushes or anything else that may obstruct air flow.

For units installed near the sea, the intervals between maintenance should be halved.

UNSCHEDULED MAINTENANCE

Never perform any cleaning operations before having disconnected the unit from the mains power supply. Make sure power is not connected before proceeding.

CHEMICAL WASHING

It is recommended to chemically flush the plate heat exchanger after every 3 years of operation. To perform this operation, contact a specialist technician.

REFRIGERANT GAS CHARGE

The chillers are filled with R410A refrigerant gas and tested in the factory. In normal conditions, there should be no need for the Technical Service to intervene to check the refrigerant gas. However, over time, small leaks may develop at the joints leading to loss of refrigerant and draining of the circuit, causing the unit to function poorly.

In this case, the leaks of refrigerant must be identified and repaired and the refrigerant circuit recharged.

Proceed as follows:

- Empty and dry the entire refrigerant circuit using a vacuum pump connected to the low and high pressure tap until the vacuumometer reads about 10 Pa.
Wait a couple of minutes and check that this value does not rise to more than 50 Pa.
- Connect the refrigerant gas cylinder or a filling cylinder to the low pressure line pressure gauge connection
- Charge the quantity of refrigerant indicated on the unit's rating plate.

- Always check the superheating and subcooling values, which should be between 5 and 10°C and 4 and 8°C.
- After a couple of hours operation, check that the liquid indicator indicates a dry circuit (dry-green).

⚠ In the event of partial leaks, the circuit must be completely emptied before being recharged.

The R410A refrigerant must only be charged in the liquid state.

Operating conditions other than rated conditions may produce considerably different values.

Tightness testing or identification of leaks must only be carried out using R410A refrigerant gas, checking with a suitable leak detector.

The refrigerant circuit **must not be charged** with a refrigerant other than that indicated on the rating plate and in this manual.

The use of a different refrigerant may cause serious damage to the compressor.

⊘ Oxygen, acetylene or other flammable or poisonous gases **must never be used** in the refrigerant circuit as they may cause explosion or poisoning.

Oils other than those indicated **must not be used**.

The use of different oil may cause serious damage to the compressor.

DISPOSAL

The unit must be disposed of according to the legislation in force in the country concerned

USEFUL INFORMATION

For information on technical assistance and obtaining spare parts, contact

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Description	Menu	Parameter no.	UOM
Enable domestic hot water set point: 0 = Economy, 1 = Comfort	Mn00	0015	
Domestic hot water Economy set point	Mn00	0022	°C
Domestic hot water Comfort set point	Mn00	0023	°C
User password	Mn00	0036	
Enable remote contact: 0= remote contact enabled, 1= remote contact disabled (selection from keypad only)	Mn01	0100	
Automatic mode changeover set point in HEATING	Mn01	0106	°C
Automatic mode changeover differential in HEATING	Mn01	0107	°C
Automatic mode changeover set point in COOLING	Mn01	0108	°C
Automatic mode changeover differential in COOLING	Mn01	0109	°C
Type of outlet heater operation: 0 = Supplementary , 1 = Replacement	Mn01	010G	
Type of boiler operation: 0 = Supplementary , 1 = Replacement	Mn01	010H	
Maximum return set point limit in cooling mode (Tm1)	Mn01	0128	°C
Outside minimum temperature corresponding to max. return temperature (Te1)	Mn01	0129	°C
Enable compensation for room humidity, ZONE LT3: 0= Disabled , 1= Enabled	Mn01	012N	
Room relative humidity value to start increasing water outlet temperature set point, ZONE LT3	Mn01	012P	%
Maximum outlet temperature hysteresis corresponding to 100% relative humidity	Mn01	012R	°C
Minimum return set point limit in cooling mode (Tm2)	Mn01	0130	°C
Maximum outside temperature corresponding to min. return temperature (Te2)	Mn01	0131	°C
Maximum outlet temperature set point limit in cooling mode (Tm1)	Mn01	0132	°C
Minimum outside temperature corresponding to max. outlet temperature (Te1)	Mn01	0133	°C
Minimum outlet temperature set point limit in cooling mode (Tm2)	Mn01	0134	°C
Maximum outside temperature corresponding to min. outlet temperature (Te2)	Mn01	0135	°C
Maximum outlet temperature set point limit in cooling mode (Tm1)	Mn01	0136	°C
Minimum outside temperature corresponding to max. outlet temperature (Te1)	Mn01	0137	°C
Minimum outlet temperature set point limit in cooling mode (Tm2)	Mn01	0138	°C
Maximum outside temperature corresponding to min. outlet temperature (Te2)	Mn01	0139	°C
Inside temperature to enable frost protection	Mn01	0140	°C
Outside air temperature for frost protection	Mn01	0141	°C
Enable SYSTEM compensation curve 0= Disabled 1= Enabled	Mn01	0152	
Fixed return water temperature set point in HEATING	Mn01	0153	°C
Enable SYSTEM compensation curve: 0= Disabled, 1= Enabled	Mn01	0154	
Fixed return water temperature set point in COOLING	Mn01	0155	°C
Enable compensation for room humidity, SYSTEM: 0= Disabled , 1= Enabled	Mn01	0156	
Room relative humidity value to start increasing SYSTEM return water set point	Mn01	0157	%
Maximum return temperature hysteresis corresponding to 100% relative humidity	Mn01	0158	°C
SYSTEM compensation curve number	Mn01	0159	
Enable contact as: 0= Alarm signal, 1= Dehumidifier, 3= Secondary circuit pump	Mn01	015A	
Enable compensation curve for zone LT3 0= Disabled 1= Enabled	Mn01	015E	
Enable room temperature influence on SYSTEM 0= Disabled 1= Enabled	Mn01	0163	
SYSTEM Room Authority	Mn01	0164	%
Minimum set point limit for SYSTEM curve	Mn01	0165	°C
Maximum set point limit for SYSTEM curve	Mn01	0166	°C
Enable compensation curve for zone LT1 0= Disabled 1= Enabled	Mn01	0167	
Enable compensation curve for zone LT1: 0= Disabled, 1= Enabled	Mn01	0169	
Enable compensation for room humidity, ZONE LT1: 0= Disabled , 1= Enabled	Mn01	0171	
Room relative humidity value to start increasing water outlet temperature set point, ZONE LT1	Mn01	0172	%
Maximum outlet temperature hysteresis corresponding to 100% relative humidity	Mn01	0173	°C
Zone LT1 compensation curve number	Mn01	0174	
Enable room temperature influence on LT1 0= Disabled 1= Enabled	Mn01	0178	
LT1 Room Authority	Mn01	0179	%
MINIMUM outlet set point limit for compensation curve in zone LT1	Mn01	0180	°C
MAXIMUM outlet set point limit for compensation curve in zone LT1	Mn01	0181	°C
Enable compensation curve for zone LT2 0= Disabled 1= Enabled	Mn01	0182	
Enable compensation curve for zone LT2: 0= Disabled, 1= Enabled	Mn01	0184	
Enable compensation for room humidity, ZONE LT2: 0= Disabled , 1= Enabled	Mn01	0186	
Room relative humidity value to start increasing water outlet temperature set point, ZONE LT2	Mn01	0187	%
Maximum outlet temperature hysteresis corresponding to 100% relative humidity	Mn01	0188	°C
Zone LT2 compensation curve number	Mn01	0189	
Enable room temperature influence on LT2 0= Disabled 1= Enabled	Mn01	0193	
LT2 Room Authority	Mn01	0194	%
MINIMUM outlet set point limit for compensation curve in zone LT2	Mn01	0195	°C
MAXIMUM outlet set point limit for compensation curve in zone LT2	Mn01	0196	°C
Electric heater operating mode: 0 = heat pump only, 1 = electric heater only, 2 = heat pump + electric heater	Mn02	0202	
Domestic hot water set point with heater	Mn02	0209	°C

Description	Menu	Parameter no.	UOM
Domestic hot water temperature set point for Legionella prevention	Mn02	0211	°C
Legionella prevention cycle day MONDAY (0=no 1=yes)	Mn02	0213	
Legionella prevention cycle day TUESDAY (0=no 1=yes)	Mn02	0214	
Legionella prevention cycle day WEDNESDAY (0=no 1=yes)	Mn02	0215	
Legionella prevention cycle day THURSDAY (0=no 1=yes)	Mn02	0216	
Legionella prevention cycle day FRIDAY (0=no 1=yes)	Mn02	0218	
Legionella prevention cycle day SATURDAY (0=no 1=yes)	Mn02	0219	
Legionella prevention cycle day SUNDAY (0=no 1=yes)	Mn02	0220	
Legionella prevention cycle time	Mn02	0221	h
Enable Legionella prevention function 0 = Not enabled 1 = Enabled	Mn02	0222	
Legionella prevention function with: 0 = heat pump only 1 = electric heater only 2 = heat pump + electric heater	Mn02	0223	
Maximum Legionella prevention function duration	Mn02	0225	min.
Enable electric heater: 0 = Heater not enabled, 1 = Heater enabled	Mn03	0300	
Enable boiler: 0 = Boiler not enabled, 1 = Boiler enabled	Mn03	0301	
Activation for low outside air temperature: 0 = Function not enabled, 1 = Function enabled	Mn03	0303	
Outside air temperature to enable electric heater	Mn03	0304	°C
Activation for low outside air temperature: 0 = Function not enabled, 1 = Function enabled	Mn03	0306	
Outside air temperature to enable boiler	Mn03	0307	°C
Minimum outside air temperature for heat pump operation (make sure the value shown in the table is set)	Mn03	0311	°C
Electric heater activation delay time (allows the heat pump to reach steady operation and thus avoid activating the heater when not needed)	Mn06	0616	min.
Integration time to activate outlet electric heaters	Mn06	0617	°C*sec
Boiler activation delay time (allows the heat pump to reach steady operation and thus avoid activating the boiler when not needed)	Mn06	0618	min.
Integration time to activate boiler	Mn06	0619	°C*sec
Enable manual heater operation	Mn06	0620	
Domestic hot water set point	Mn00	0023	
User password	Mn00	0036	
Relationship between plant and ambient: 0 = Unit work on ambient request, 1 = Unit work independent	Mn01	011D	
Installer password	Mn01	011G	
Enable compensation curve for LT3 in HEATING 0= Disabled (fixed set point operation) 1= Enabled	Mn01	011R	
Enable compensation curve for zone LT3: 0= Disabled, 1= Enabled	Mn01	011T	
Fixed water outlet temperature set point for LT3 in HEATING	Mn01	011U	°C
Zone LT3 compensation curve number	Mn01	012A	
Enable room temperature influence on LT3 0= Disabled 1= Enabled	Mn01	012D	
LT3 Room Authority	Mn01	012E	%
MINIMUM outlet set point limit for compensation curve in zone LT3	Mn01	012F	°C
MAXIMUM outlet set point limit for compensation curve in zone LT3	Mn01	012G	°C
Maximum outlet temperature set point limit in cooling mode (Tm1)	Mn01	012H	°C
Minimum outside temperature corresponding to max. outlet temperature (Te1)	Mn01	012J	°C
Minimum outlet set point limit in cooling mode (Tm2)	Mn01	012L	°C
Minimum outside temperature corresponding to min. outlet temperature (Te2)	Mn01	012M	°C
Activation of system pump operation at intervals: 0= system pump always on, 1=system pump operation at intervals	Mn01	0143	
System pump operating time in sniffing mode	Mn01	0147	
System pump off time between one sniffing cycle and the next	Mn01	0148	
Enable contact as: 0 =Reduced electricity rate, 1=Stop operation due to excess power consumption	Mn01	015D	
Enable compensation curve for LT1 in HEATING 0= Disabled (fixed set point operation) 1= Enabled	Mn01	0168	
Fixed water outlet temperature set point for LT1 in HEATING	Mn01	0170	°C
Enable compensation curve for LT2 in HEATING 0= Disabled (fixed set point operation) 1= Enabled	Mn01	0183	
Fixed water outlet temperature set point for LT2 in HEATING	Mn01	0185	°C
Minimum heat pump operating time for system	Mn02	0226	
Maximum heat pump operating time to reach domestic hot water set point	Mn02	0227	
Three-way valve travel time for domestic hot water production	Mn02	0231	sec.
BT1 Heat exchanger water inlet temperature probe	Mn09	0900	°C
BT2 Heat exchanger water outlet temperature probe	Mn09	0901	°C
BT8 Domestic hot water probe	Mn09	0902	°C
BT7 Unit control air temperature probe	Mn09	0903	°C
BT9 Storage tank probe	Mn09	0904	°C
BT11 Outside air temperature probe for set point management	Mn09	0905	°C

Installer: _____ Designer: _____

Type of application: _____

Street _____ number _____

City/town _____ Postcode/ZIP code _____ Province/State _____

Unit model installed _____ Serial number _____

Is there a system design? **YES** ☐ **NO** ☐ If YES, has the system been developed completely in accordance with the design? **YES** ☐ **NO** ☐

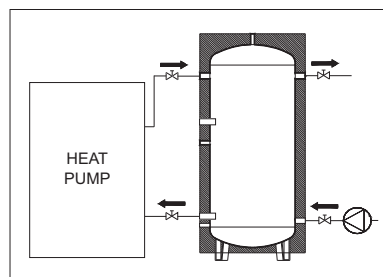
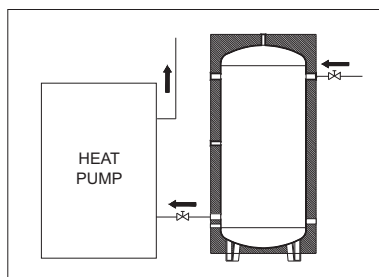
Installation date: _____

Systems included:

- | | | | |
|--------------------------------------|--------------------------|---------------------------|--------------------------|
| • Winter heating AT (radiators) | ☐ | • Summer cooling | ☐ |
| • Winter heating MT (fan coil) | ☐ | • DHW production | ☐ |
| • Winter heating BT (radiant panels) | ☐ | • Solar thermal installed | ☐ |

Mark the type of system installed and describe the components in the corresponding tables

Heating system circuit

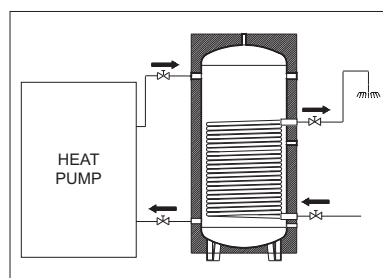
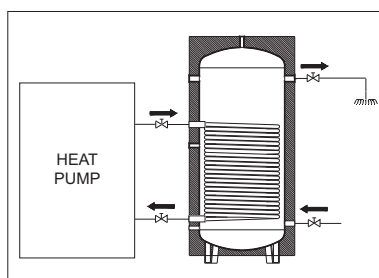
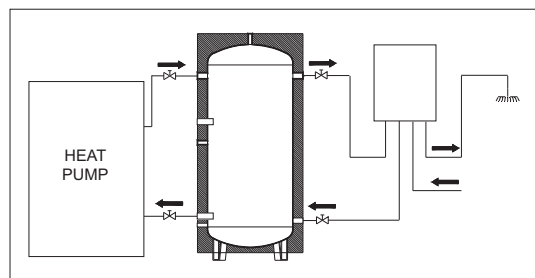

☐

☐

	Storage tank	Additional expansion vessel
Volume [l]		
Type/model		
	Secondary pump	
Installed?		
Type/model		

Hot water set point: _____ °C

Cold water set point: _____ °C

Domestic hot water circuit


☐

☐

☐

	Storage tank with coil	Storage cylinder	Expansion vessel
Volume [l]			
Type/model			
Coil water volume [l]			
Coil heat exchange area [m²]			

Domestic hot water set point: _____ °C

CONCERNING UNIT INSTALLATION OPERATIONS AND SETUP FOR COMMISSIONING

HAVE THE FOLLOWING CHECKS BEEN COMPLETED?

Components installed (as described in the paragraph on "Water circuit connections")	YES	NO
• Two pressure gauges with a suitable scale are installed on the inlet and outlet	☐	☐
• Shut-off valves are installed on the heating system circuit and domestic hot water circuit inlet and outlet	☐	☐
• Two thermometers are installed, on the inlet and outlet	☐	☐
• All pipes are insulated with suitable vapour barrier material to prevent formation of condensate and heat loss, with control and shut-off devices protruding from the insulation	☐	☐
• Drain valves are installed at the lowest points in the system	☐	☐
• Automatic or manual air vent valves are installed at the highest points in the system	☐	☐
• An additional expansion vessel is installed on the system if the standard vessel is insufficient	☐	☐
• Vibration damper joints are installed on the inlet and outlet water pipes	☐	☐
• A low-loss header is installed if the water content is insufficient	☐	☐
• Vibration damper supports are installed on the unit	☐	☐
• The domestic hot water production system is installed	☐	☐
• The safety valve is installed and suitably sized	☐	☐
• The domestic hot water expansion vessel is installed and suitably sized	☐	☐

Checks (as described in the paragraph on "Checking and starting up the unit")	CHECKED
• Two pressure gauges with a suitable scale are installed on the inlet and outlet	☐
• The unit is positioned as described in the chapter on "Positioning" in this manual	☐
• The filter is installed on the system return/inlet as close as possible to the unit and in a position that is easy to access for maintenance. REQUIRED component, this must be installed before water circulates through the heat exchanger otherwise the warranty will be void	☐
• The filter is installed on the domestic hot water return/inlet as close as possible to the unit and in a position that is easy to access for maintenance. REQUIRED component, this must be installed before water circulates through the heat exchanger otherwise the warranty will be void	☐
• (Water-to-water units only) The filter is installed on the source return/inlet as close as possible to the unit and in a position that is easy to access for maintenance. REQUIRED component, this must be installed before water circulates through the heat exchanger otherwise the warranty will be void	☐
• The flow switch is installed on the unit's outlet to the heating system circuit and is electrically connected. REQUIRED component, this must be installed before water circulates through the heat exchanger otherwise the warranty will be void	☐
• (Water-to-water units only) The flow switch is installed unit's outlet to the source circuit and is electrically connected. REQUIRED component, this must be installed before water circulates through the heat exchanger otherwise the warranty will be void	☐

Checks (as described in the paragraph on "Checking and starting up the unit")
CHECKED

- The connection pipes are suitably supported so that these do not weigh on the appliance ☐
- Correct sizing of the expansion vessel has been verified according to the system water content and the expected operating temperature ☐
- The position of the outside air temperature probe complies with the information provided in the installation manual ☐
- The position of the room controllers installed complies with the information provided in the installation manual ☐
- The position of the DHW storage tank probe complies with the information provided in the installation manual ☐
- (Units with heat recovery only) The non-return valve is fitted on the domestic hot water circuit ☐
- All safety conditions have been respected ☐
- The unit is fixed to the surface it rests on ☐
- Water connections have been carried out as indicated in the installation manual ☐
- All water connections are tight ☐
- All electrical connections are tight ☐
- Make sure the water circuit has been washed and drained ☐
- There is no air in the system (vent if necessary) ☐
- The valves on the water circuit are open ☐
- Electrical connections have been carried out correctly ☐
- Voltage is within a tolerance of 10% of the rated voltage for the unit ☐
- Unbalance between phases is less than 2%, for three-phase units ☐
- Maintenance clearances comply with the specifications in the Installation manual under the section on POSITIONING ☐
- Power supply electrical complies with the data on the rating plate and specified in the Installation manual under the section on MAINS POWER SUPPLY CONNECTION ☐
- The system water content complies with the specifications in the Installation manual under the section on WATER CONNECTIONS ☐
- Suitable water flow-rate for operation of the entire unit is guaranteed as specified in the Installation manual under the section on WATER CONNECTIONS ☐
- (Air-to-water units only) The system has been protected with antifreeze, respecting the quantities shown in the Installation manual under the section on WATER CONNECTIONS ☐
- The DHW storage tank has been fitted with an electric heater for Legionella prevention ☐

It is hereby declared that the site and access to the site where the unit to be operated or serviced is installed has been made safely accessible in compliance with all safety standards specified by Italian law 81/08 in force. A supervisor must be present on site to inform workers of residual risks in the workplace.

WARNING:

Failure to complete commissioning due to causes not attributable to the unit will require a second visit, to be charged to the customer directly by the local service centre.

Installer's signature _____

Date _____

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