



# Installation and operating manual

## Daikin Altherma 3 R ECH<sub>2</sub>O



EHSX(B)04P30D2  
EHSX(B)04P50D  
EHSX(B)04P30D2

EHSX(B)08P30D2  
EHSX(B)08P50D  
EHSX(B)08P30D2  
EHSX(B)08P50D

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English

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# 1 General safety precautions

## 1.1 Particular safety instructions



### WARNING

Devices that have not been set up and installed correctly can impair the function of the device and/or cause serious or fatal injury to the user.

- Work on the indoor unit (such as set-up, servicing, connection and initial commissioning) must only be carried out by persons who are authorised and who have successfully completed **qualifying technical or vocational training**, and who have taken part in advanced training sessions recognised by the relevant responsible authorities for the specific activity. These include, in particular, **certified heating engineers, qualified electricians and HVAC specialists** who, because of their **professional training and expert knowledge**, have experience in the professional installation and maintenance of heating, cooling and air conditioning systems as well as hot water storage tanks.



### WARNING

Disregarding the following safety instructions may result in serious physical injury or death.

- This device may only be used by **children** aged 8 and above and by persons with restricted physical, sensory or mental capabilities or with a lack of experience and knowledge if they are under supervision or if they have been instructed in the safe use of the equipment and understand the dangers arising from it. **Children** must not play with the device. Cleaning and **user maintenance** must not be carried out by **children** without supervision.

- Establish the power supply in accordance with IEC 60335-1, via a separate isolator that separates all poles with a contact opening distance and that provides full disconnection in accordance with overvoltage category III.
- All electrical work must only be carried out by electrically qualified experts and with consideration of the local and national regulations and the instructions in this manual. Ensure that a suitable electrical circuit is used. Insufficient load capacity of the electrical circuit or improperly executed connections can result in electric shock or fire.
- The customer must install a pressure relief device with a rated over-pressure of less than 1.0 MPa (10 bar). The connected drain line must have a continuous gradient and a free outlet in a frost-free environment (see "[3.3 Installing the heat pump](#)" [► 12]).
- Water may drip out of the drain line of the pressure relief device. The drain opening must be left open to the atmosphere.
- The pressure relief device must be operated regularly in order to remove scale deposits and to make sure it is not blocked.
- The storage tank and hot water circuit can be drained. The instructions in "Temporary decommissioning" in the reference manual for the fitter must be complied with.

### 1.1.1 Observing the instructions

- The original documentation is written in German. All other languages are translations.
- Please read this manual carefully and thoroughly before proceeding with the installation or modification of the heating system.

# 1 General safety precautions

- The precautionary measures described in this document cover very important topics. Follow them meticulously.
- The installation of the system, and all activities described in this manual and the applicable documents for the installer must be carried out by an approved installer.

## Documentation set

This document is part of a documentation set of other applicable documents. The complete set comprises:

- Installation manual for the indoor unit (format: paper – included in the indoor unit scope of delivery)
- Operating manual for the indoor unit (format: paper – included in the indoor unit scope of delivery)
- Operating manual for the heat pump (format: paper – included in the indoor unit scope of delivery)
- Installation manual for the outdoor unit (format: paper – included in the outdoor unit scope of delivery)
- Installation instructions for optional components (format: paper – included in the scope of delivery of the respective component)
- Installer reference guide of the indoor unit (format: digital)
- Installer reference guide of the outdoor unit (format: digital)

The reference guides contain the complete set of technical data, a detailed description of best practices and information on maintenance, troubleshooting and decommissioning.

The digital documents and the latest editions of the supplied documentation are available on the regional Daikin website or, on request, from your dealer. The Daikin website is easy to access using the QR code on your device.

### 1.1.2 Meaning of warnings and symbols

Warnings in this manual are classified according into their severity and probability of occurrence.



#### DANGER

Indicates an immediate danger.

Disregarding this warning can lead to serious injury or death



#### WARNING

Indicates a potentially dangerous situation

Disregarding this warning may result in serious physical injury or death.



#### CAUTION

Indicates a situation which may cause possible damage

Disregarding this warning can cause damage to property and the environment and result in minor injuries.



This symbol identifies user tips and particularly useful information, but not warnings or hazards

## Special warning signs

Some types of danger are represented by special symbols.



Electric current



Danger of explosion



Risk of burns or scalds



Risk of poisoning

## Validity

Some information in this manual has limited validity. The validity is highlighted by a symbol.



Heat pump outdoor unit



Heat pump indoor unit



FWXV-ATV3



Observe the specified tightening torque



Only applies to devices with unpressurised solar system connection (DrainBack).



Only applies to devices with a bivalent solar system connection (Biv).



Only applies to indoor units with cooling function

## Handling instructions

- 1 Handling instructions are shown as a list. Actions where the sequential order must be adhered to are numbered.

## 1.2 Safety instructions for installation and operation

### 1.2.1 General



#### WARNING

Devices that have not been set up and installed correctly can impair the function of the device and/or cause serious or fatal injury to the user.

- Work on the indoor unit (such as set-up, servicing, connection and initial commissioning) must only be carried out by persons who are authorised and who have successfully completed **qualifying technical or vocational training**, and who have taken part in advanced training sessions recognised by the relevant responsible authorities for the specific activity. These include, in particular, **certified heating engineers, qualified electricians and HVAC specialists** who, because of their **professional training and expert knowledge**, have experience in the professional installation and maintenance of heating, cooling and air conditioning systems as well as hot water storage tanks.
- Switch off the external main switch before starting any work on the indoor unit and secure against being switched on inadvertently.

- Do not leave any tools or other objects below the hood of the device after finishing installation or maintenance work.

## Avoid danger

The indoor unit conforms to the state of the art and meets all recognised technical requirements. However, improper use can lead to serious injuries or death, as well as causing material damage. To prevent such risks, only install and operate the devices:

- as stipulated and in perfect condition,
- with an awareness of the safety and hazards involved.

This assumes knowledge and use of the contents of this manual, the relevant accident prevention regulations and the recognised safety-related and occupational medical rules.

## Before working on the hydraulic system

- Work on the system (such as set-up, connection and initial commissioning, for example) must only be carried out by persons who are authorised, who have successfully completed qualifying technical or vocational training for the respective activity and who have taken part in advanced training sessions recognised by the relevant responsible authority.
- When carrying out any work on the system, switch off the main switch and secure against being switched on inadvertently.
- Seals must not be damaged or removed.
- Make sure that the safety valves comply with the requirements of EN 12828 when connecting on the heating side and with the requirements of EN 12897 when connecting on the domestic water side.



## 1.2.2 Intended use

The indoor unit may only be used for domestic hot water preparation, as a room heating system and, depending on its design, as a room cooling system.

The indoor unit must only be installed, connected and operated according to the indications in these instructions.

Only the use of a suitable outdoor unit approved by the manufacturer is permitted.

1-1 Permissible combinations

			
		EHSX04P30D27 EHSX04P50DA7 EHSXB04P30D27 EHSXB04P50DA7 EHSX04P30D27 EHSXB04P30D27	EHSX08P30D27 EHSX08P50DA7 EHSXB08P30D27 EHSXB08P50DA7 EHSX08P30D27 EHSX08P50DA7 EHSXB08P30D27 EHSXB08P50DA7
	ERGA04DAV3	✓	×
	ERGA06DAV3	×	✓
	ERGA08DAV3	×	✓
	ERGA04DAV3A	✓	×
	ERGA06DAV3A	×	✓
	ERGA08DAV3A	×	✓
	ERGA04DAV37	✓	×

Any other use or use beyond the intended use is considered improper use. The operator alone bears responsibility for any resulting damage.

Intended use also includes compliance with the maintenance and service conditions. Spare parts must at least satisfy the technical requirements defined by the manufacturer. This is the case, for example, with original spare parts.

## 1.2.3 Installation room



### WARNING

The plastic wall of the storage tank on the indoor unit can melt under the effects of external heat (>80°C) and, in the extreme case, can catch fire.

- Only install the indoor unit at a minimum clearance of 1 m from other heat sources (>80°C) (e.g. electrical heater, oil heater, chimney) and combustible materials.



### CAUTION


- Only install the indoor unit if sufficient load-carrying capacity of the ground of 1050 kg/m<sup>2</sup> plus safety margin is ensured. The ground must be flat, horizontal and level.
- Outdoor set up is not permissible.**
- Set-up in an explosion-risk environment is not permissible.
- The electronic control system must not be exposed to weather effects such as rain and snow under any circumstances.
- The storage tank may not be exposed to continuous direct sunlight, as the UV radiation and the effects of the weather will damage the plastic.
- The indoor unit must be installed protected from frost.
- Make sure that the supply company does not provide corrosive domestic water. Suitable water treatment may be required.

- Always ensure the minimum distances from walls and other objects ("3.1 Dimensions and connection dimensions" ▶ 11).
- Observe the special installation requirements of the R32 refrigerant (see "3.3.1 Selecting the installation site" ▶ 12).

# 1 General safety precautions



## CAUTION

-  If a DrainBack solar heating system is connected: Install the indoor unit far enough under the solar panels to allow complete emptying of the solar heating system. (Follow the instructions in the DrainBack solar heating system manual.) An insufficient height difference may lead to destruction of the DrainBack solar heating system.
- The indoor unit must not be operated in rooms with ambient temperatures of more than 40°C.

### 1.2.4 Electrical installation

- Electrical installations may only be carried out by electrical technicians and in compliance with valid electrical guidelines as well as the specifications of the responsible energy supply company.
- Compare the mains voltage indicated on the nameplate with the supply voltage before connecting to the mains.
- Before beginning work on live parts, disconnect them from the power supply (switch off main switch, remove fuse) and secure against unintentional restart.
- Device covers and service panels must be replaced as soon as the work is completed.

### 1.2.5 Requirements for heating and storage water

Damage due to deposits and corrosion: observe the relevant technical rules to avoid corrosion products and deposits.

Minimum requirements regarding the quality of filling and top-up water:

- Water hardness (calcium and magnesium, calculated as calcium carbonate):  $\leq 3$  mmol/l
- Conductivity:  $\leq 1500$  (ideal  $\leq 100$ )  $\mu\text{S}/\text{cm}$
- Chloride:  $\leq 250$  mg/l
- Sulphate:  $\leq 250$  mg/l
- pH value: 6.5 – 8.5

Measures for desalination, softening or hardness stabilisation are necessary if the filling and top-up water have a high total hardness ( $>3$  mmol/l – total of the calcium and magnesium concentrations, calculated as calcium carbonate). We recommend the use of Fernox KSK limescale and corrosion protector. For other properties deviating from the minimum requirements, suitable conditioning measures are necessary to maintain the required water quality.

Using filling water and top-up water which does not meet the stated quality requirements can cause a considerably reduced service life of the equipment. The responsibility for this lies solely with the operator.



## INFORMATION

If an optional external heat generator is connected, these minimum requirements also apply to the filling and supplementary water for this heating circuit.

### 1.2.6 Heating system and sanitary connection

- Create a heating system according to the safety requirements of EN 12828.
- The plumbing connection must comply with the requirements of EN 12897. The requirements of the following must also be observed:
  - EN 1717 – Protection against pollution of potable water installations and general requirements of devices to prevent pollution by backflow
  - EN 61770 – Electric appliances connected to the water mains – Avoidance of backsiphonage and failure of hose-sets
  - EN 806 – Specifications for installations inside buildings conveying water for human consumption
  - and, in addition, the country-specific legislation.

During operation of the indoor unit with an auxiliary heat source, the storage tank temperature may exceed 65°C, above all when solar energy is used.

- For this reason, some form of scalding protection needs to be included when you install the system (hot water mixing device, e.g. VTA32).



## INFORMATION

The domestic water quality must comply with the EU Guideline 98/83 EC and the regionally-applicable regulations.

If the indoor unit is connected to a heating system with steel pipes, radiators or non-diffusion-proof floor heating pipes, sludge and chips can enter the hot water storage tank and cause blockages, local overheating or corrosion damage.

- To prevent possible damage, install a dirt filter or sludge separator into the heating return flow of the system (SAS 1 or SAS 2).
- The dirt filter must be cleaned at regular intervals.

### 1.2.7 Operation

The indoor unit:

- Do not operate until all installation and connection work is completed.
- Only operate with a completely full storage tank (check level indicator) and heating circuit.
- Operate at a maximum pressure of 3 bar.
- Only connect with a pressure reducer on the external water supply (supply line).
- Only operate if the protective cover is installed.

The specified servicing intervals should be adhered to and inspection work must be carried out.

## 1.3 Maintenance, troubleshooting and decommissioning

Work for maintenance, troubleshooting and decommissioning must not be carried out without knowledge of the relevant safety precautions and in the event of disposal of the country-specific guidelines. Please refer to the corresponding information in the reference manual for the fitter.

### Recommendations for disposal

We designed the indoor unit in an environmentally friendly manner. During the disposal process, the only waste created is that which can be used for material or thermal recycling. The materials used that are suitable for recycling can be sorted into individual types.





Thanks to the environmentally friendly design of the indoor unit, we have established requirements to ensure environmentally friendly disposal. Proper disposal in compliance with the respective national regulations of the country of use is the responsibility of the user/owner.



The designation of the product means that electrical and electronic products may not be disposed of together with unsorted domestic waste.

Proper disposal in compliance with the respective national regulations of the country of use is the responsibility of the user/owner.

- Disassembly of the system, handling of refrigerant, oil and other parts may only be carried out by a qualified fitter.
- Disposal may only be carried out by an organisation that specialises in reuse, recycling and recovery.

Further information is available from the installation company or the responsible local authorities.

## 1.4 Warranty conditions

The legal guarantee conditions fundamentally apply. Our more extensive warranty conditions can be found in the Internet. Ask your suppliers if necessary.

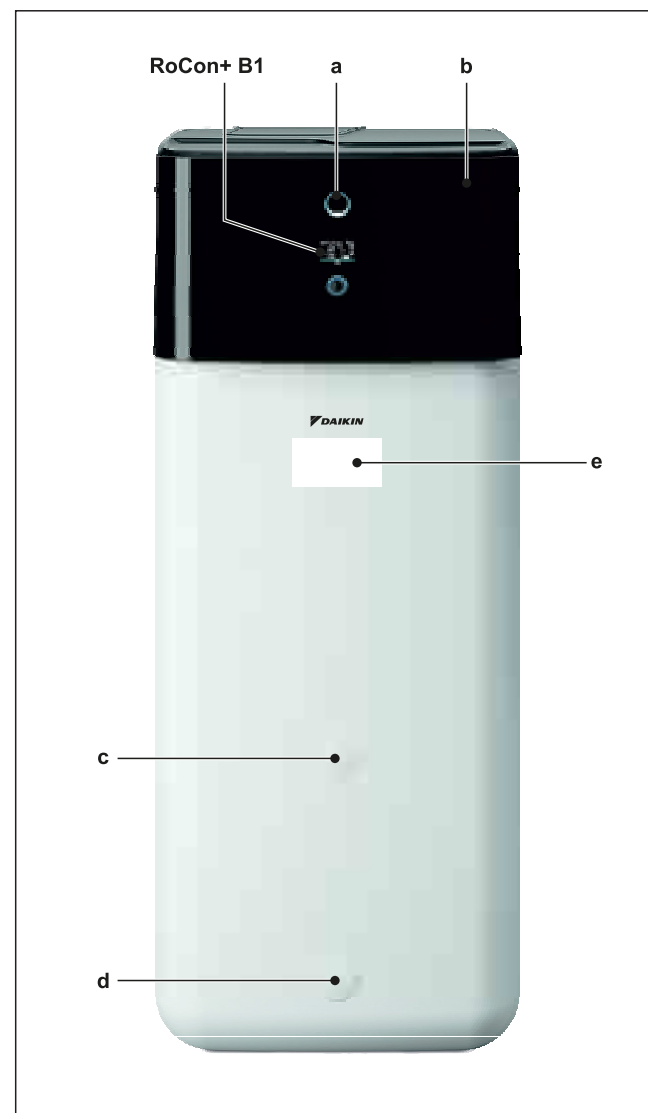
Incorrect installation, commissioning and maintenance will void the warranty. If you have any questions, please contact our customer service.

Warranty claims can only be made if the annual maintenance work is demonstrably carried out regularly according to the information in the installer reference guide.

## 2 Product description

### 2.1 Design and components

#### Outside of the device

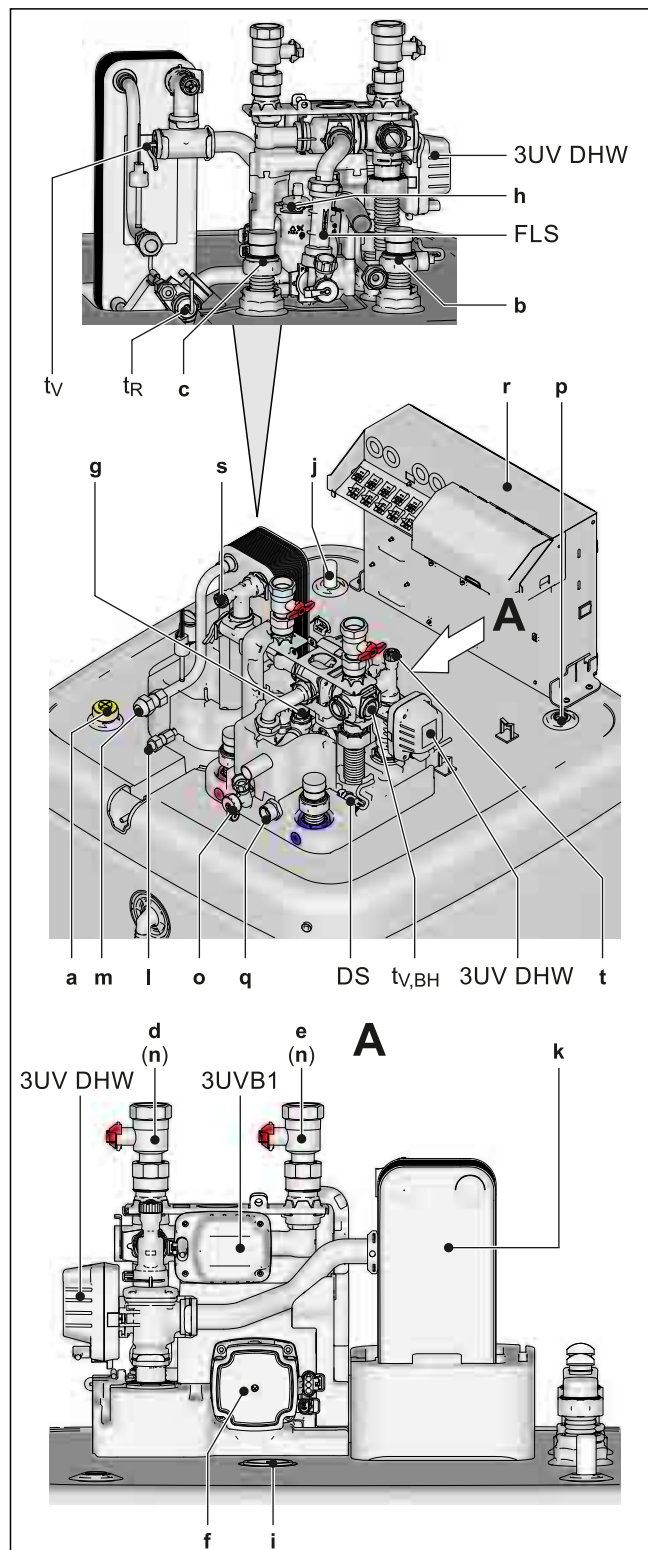


2-1 Design and components – Outside of the device

- a Status indicator
- b Protective cover
- c Mount for handle
- d Filling and draining connection or solar return flow connection
- e Type plate

## 2 Product description

### Upper side of the device



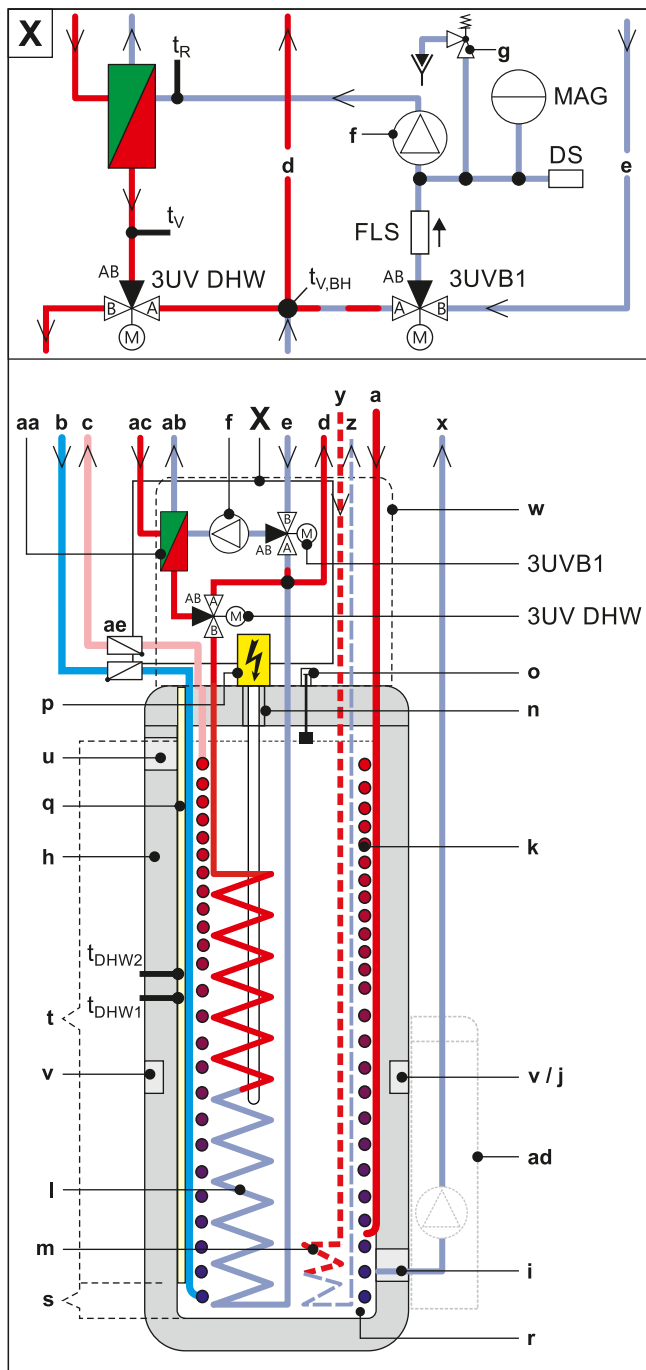
2-2 Design and components – Top of the device

- a Solar flow
- b Cold water connection
- c Hot water
- d Heating flow
- e Heating return flow
- f Circulation pump
- g Pressure relief valve
- h Automatic vent valve
- i Connection for optional electrical backup heater EKBUXx
- j Fill level indicator (tank water)
- k Plate heat exchanger
- l Connection for refrigerant fluid line
- m Connection for refrigerant gas line
- n Ball valve (heating circuit)

- o Combined filling and draining valve (heating circuit)
- p Storage tank temperature sensor
- q Expansion vessel connection
- r Switch box
- s, t Manual air purge valves

- 3UVB1 3-way changeover valve (internal heat generator circuit)
- 3UV DHW 3-way changeover valve (hot water/heating)
- DS Pressure sensor
- FLS FlowSensor
- $t_R$  Return temperature sensor
- $t_{V, BH}$  Backup heater inflow temperature sensor

### Internal structure...04P30D.../...08P30D...



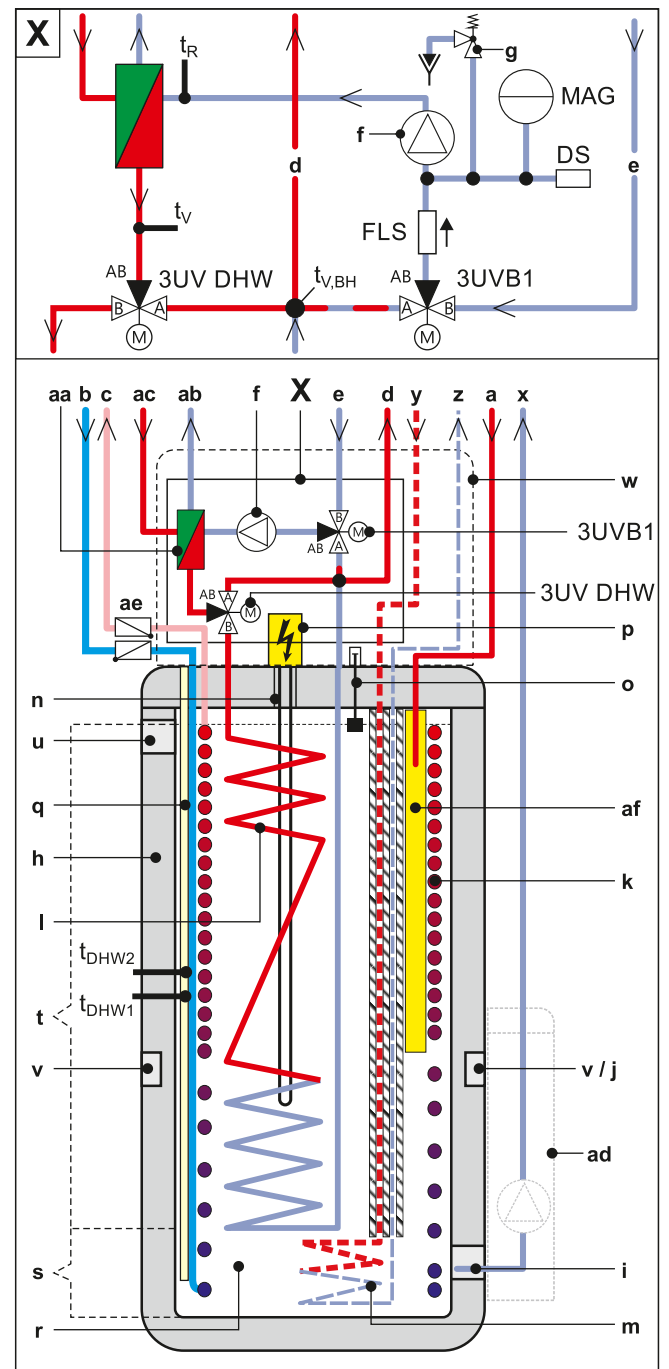
2-3 Design and components – Internal structure ...04P30D.../...08P30D... (Biv)

- a Solar flow
- b Cold water connection
- c Hot water
- d Heating flow
- e Heating return flow
- f Circulation pump
- g Pressure relief valve



- h** Storage tank (polypropylene, double-walled jacket with PUR hard foam heat insulation)
  - i** Filling and draining connection or solar return flow connection
  - j** Mount for solar controller or handle
  - k** Heat exchanger (stainless steel) for domestic hot water heating
  - l** Heat exchanger (stainless steel) for storage tank charging or heating support
  - m** Biv heat exchanger (stainless steel) for charging with external heat generator (e.g. pressurised solar system)
  - n** Connection for optional electrical backup heater EKBUXx
  - o** Fill level indicator (tank water)
  - p** Optional: electric backup heater (EKBUXx)
  - q** Submersible sensor sleeve for storage tank temperature sensor  $t_{DHW1}$  and  $t_{DHW2}$
  - r** Pressureless storage tank water
  - s** Solar zone
  - t** Hot water zone
  - u** Safety overflow connection
  - v** Mount for handle
  - w** Protective cover
  - x** Solar return flow
  - y** Biv flow
  - z** Biv return flow
  - aa** Plate heat exchanger
  - ab** Connection for refrigerant fluid line
  - ac** Connection for refrigerant gas line
  - ad** Optional: Solar control and pump unit
  - ae** Circulation stop valve (accessory)
- 
- 3UVB1** 3-way changeover valve (internal heat generator circuit)
  - 3UV DHW** 3-way changeover valve (hot water/heating)
  - DS** Pressure sensor
  - FLS** FlowSensor
  - MAG** Expansion vessel (on the building side)
  - $t_{DHW1}$ ,  $t_{DHW2}$  Storage tank temperature sensor
  - $t_R$  Return temperature sensor
  - $t_{V, BH}$  Backup heater inflow temperature sensor

Internal structure...04P50D.../...08P50D...



2-4 Design and components - Internal structure ...04P50D/...08P50D... (Biv)

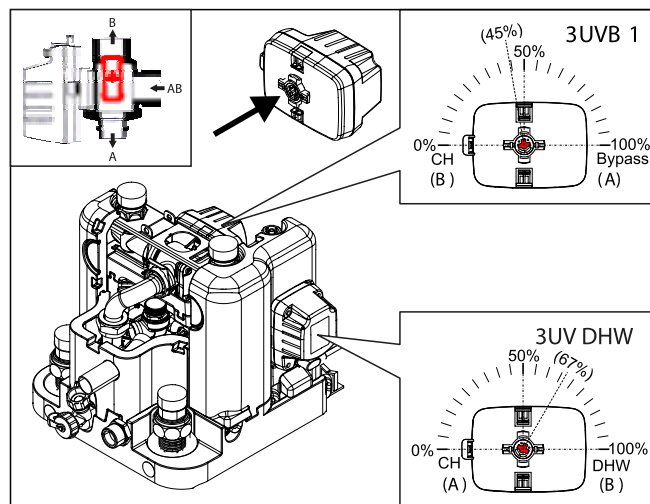
- a** Solar flow
- b** Cold water connection
- c** Hot water
- d** Heating flow
- e** Heating return flow
- f** Circulation pump
- g** Pressure relief valve
- h** Storage tank (polypropylene, double-walled jacket with PUR hard foam heat insulation)
- i** Filling and draining connection or solar return flow connection
- j** Mount for solar controller or handle
- k** Heat exchanger (stainless steel) for domestic hot water heating
- l** Heat exchanger (stainless steel) for storage tank charging or heating support
- m** Biv heat exchanger (stainless steel) for charging with external heat generator (e.g. pressurised solar system)
- n** Connection for optional electrical backup heater EKBUXx
- o** Fill level indicator (tank water)

## 3 Set-up and installation

- p Optional: electric backup heater (EKBUxx)
- q Submersible sensor sleeve for storage tank temperature sensor  $t_{DHW1}$  and  $t_{DHW2}$
- r Pressureless storage tank water
- s Solar zone
- t Hot water zone
- u Safety overflow connection
- v Mount for handle
- w Protective cover
- x Solar return flow
- y Biv flow
- z Biv return flow
- aa Plate heat exchanger
- ab Connection for refrigerant fluid line
- ac Connection for refrigerant gas line
- ad Optional: Solar control and pump unit
- ae Circulation stop valve (accessory)
- af Solar flow layering pipe

- 3UVB1 3-way changeover valve (internal heat generator circuit)
- 3UV DHW 3-way changeover valve (hot water/heating)
- DS Pressure sensor
- FLS FlowSensor
- MAG Expansion vessel (on the building side)
- $t_{DHW1}$ ,  $t_{DHW2}$  Storage tank temperature sensor
- $t_R$  Return temperature sensor
- $t_{V, BH}$  Backup heater inflow temperature sensor

### 2.2 Function of the 3-way changeover valves



2-5 Function of 3-way changeover valve

## 3 Set-up and installation



### WARNING

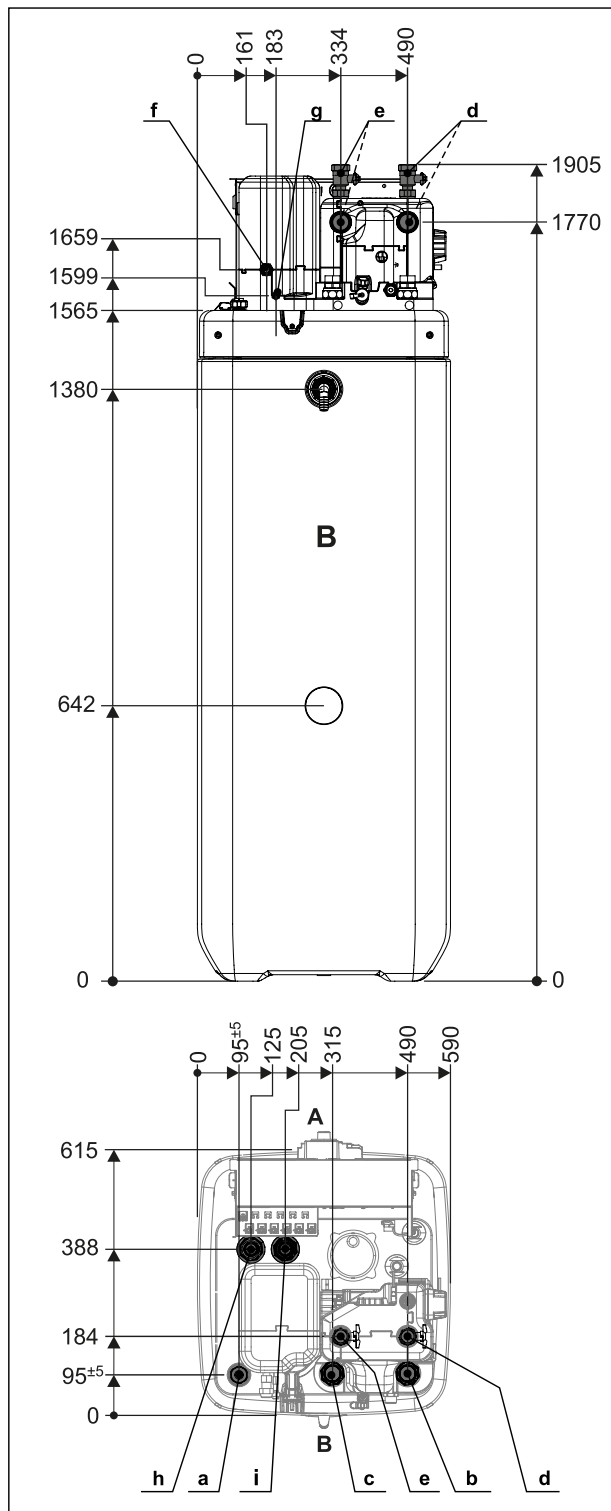
Cooling systems (heating pumps), climate control systems and heating devices that have been set up and installed incorrectly can both endanger human life and health and be impaired in their function.

- Work on the indoor unit (such as set-up, repair, connection and initial commissioning, for example) must only be carried out by persons who are authorised, who have successfully completed qualifying technical or vocational training for the respective activity and who have taken part in advanced training sessions recognised by the relevant responsible authority. These include, in particular, certified heating engineers, qualified electricians and HVAC specialists who, because of their professional training and expert knowledge, have experience in the professional installation and maintenance of heating, cooling and air conditioning systems and heat pumps.

Incorrect set-up and installation would render the manufacturer's guarantee for the unit void. If you have questions, please contact our Technical Customer Service.

### 3.1 Dimensions and connection dimensions

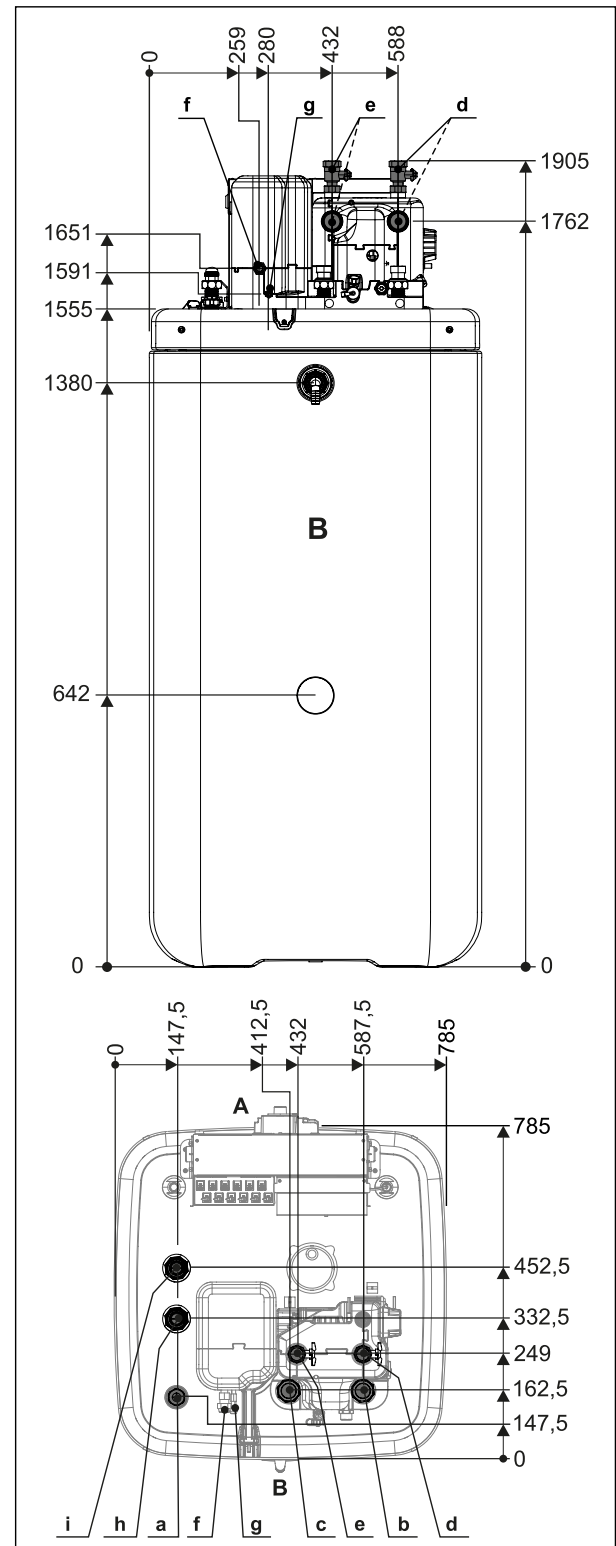
Dimensions ...04P30D.../...08P30D...



3-1 Dimensions ...04P30D.../...08P30D...

- a Solar flow
- b Domestic cold water
- c Hot water
- d Heating flow
- e Heating return flow
- f Connection for refrigerant gas line
- g Connection for refrigerant fluid line
- h Biv flow (...Biv type only)
- i Biv return flow (...Biv type only)
- A front
- B rear

Dimensions ...04P50D.../...08P50D...



3-2 Dimensions ...04P50D.../...08P50D...

- a Solar flow
- b Domestic cold water
- c Hot water
- d Heating flow
- e Heating return flow
- f Connection for refrigerant gas line
- g Connection for refrigerant fluid line
- h Biv flow (...Biv type only)
- i Biv return flow (...Biv type only)
- A front
- B rear

## 3 Set-up and installation

### 3.2 Transport and delivery



#### WARNING

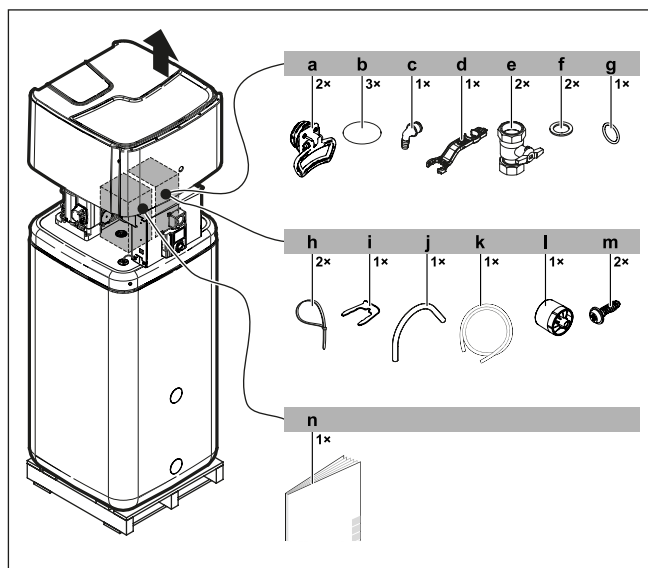
When unfilled, the indoor unit is top-heavy and could tip over during transport, which could put persons in danger or damage the device.

- Secure the indoor unit well, transport carefully, use the handles.

The indoor unit is delivered on a pallet. All industrial trucks, such as lifting trucks and forklift trucks, are suitable for transport.

#### Scope of delivery

- Indoor unit (pre-mounted),
- Bag of accessories,
- Document pack.



3-3 Scope of delivery

- a Handles (only required for transport)
- b Cover screen
- c Hose connecting piece for safety overflow
- d Fitting spanner
- e Ball valve
- f Flat gasket
- g O-ring
- h Cable tie
- i Securing clip
- j Venting hose
- k Condensate drain hose
- l Controller rotary switch
- m Hood screws
- n Document pack

For further accessories for the indoor unit, see price list.

### 3.3 Installing the heat pump

#### 3.3.1 Selecting the installation site



#### CAUTION

If the total refrigerant charge in the system is  $\geq 1.84$  kg, it is essential to comply with additional requirements for minimum footprint and minimum ventilation openings. Observe "6.4 Minimum floor area and ventilation openings" [p 34].

Information on the total refrigerant charge can be found on the type plate of the outdoor unit. Please follow the installation instructions.

The installation site of the indoor unit must meet the minimum requirements below (see also "1.2.3 Installation room" [p 5]).

#### Installation area

- The base must be level and smooth and have sufficient **ground load-bearing capacity** of **1050 kg/m<sup>2</sup>** plus safety factor. Install a pedestal if necessary.
- Observe the installation dimensions (see "3.1 Dimensions and connection dimensions" [p 11]).

#### Minimum distance



#### DANGER: RISK OF BURNING/SCALDING

The plastic wall of the storage tank on the indoor unit can melt under the effects of external heat ( $>80^{\circ}\text{C}$ ) and, in the extreme case, can catch fire.

- Only install the indoor unit at a minimum clearance of 1 m from other heat sources ( $>80^{\circ}\text{C}$ ) (e.g. electrical heater, oil heater, chimney) and combustible material.



#### CAUTION

If the indoor unit is not installed at a **sufficient distance below** the flat solar panels (the top edge of the storage tank is higher than the bottom edge of the solar panels), the unpressurised solar system in the outdoor area will not be able to drain completely.

- When a solar connection is used, install the indoor unit low enough under the flat solar panels (observe the minimum gradient of the solar connection lines).

#### Recommended minimum distances:

From the wall: (rear)  $\geq 100$  mm, (sides)  $\geq 500$  mm

From the ceiling:  $\geq 1200$  mm, at least 480 mm.

#### Distances from the outdoor unit:

When selecting the installation location, the data in the table "3-1" [p 12] must be taken into account.

3-1

Maximum refrigerant piping length between the indoor and outdoor units	30 m
Minimum refrigerant piping length between the indoor and outdoor units	3 m
Maximum height difference between the indoor and outdoor units	20 m

#### 3.3.2 Installing the device



#### WARNING

When unfilled, the indoor unit is top-heavy and could tip over during transport, which could put persons in danger or damage the device.

- Secure the indoor unit well, transport carefully, use the handles.

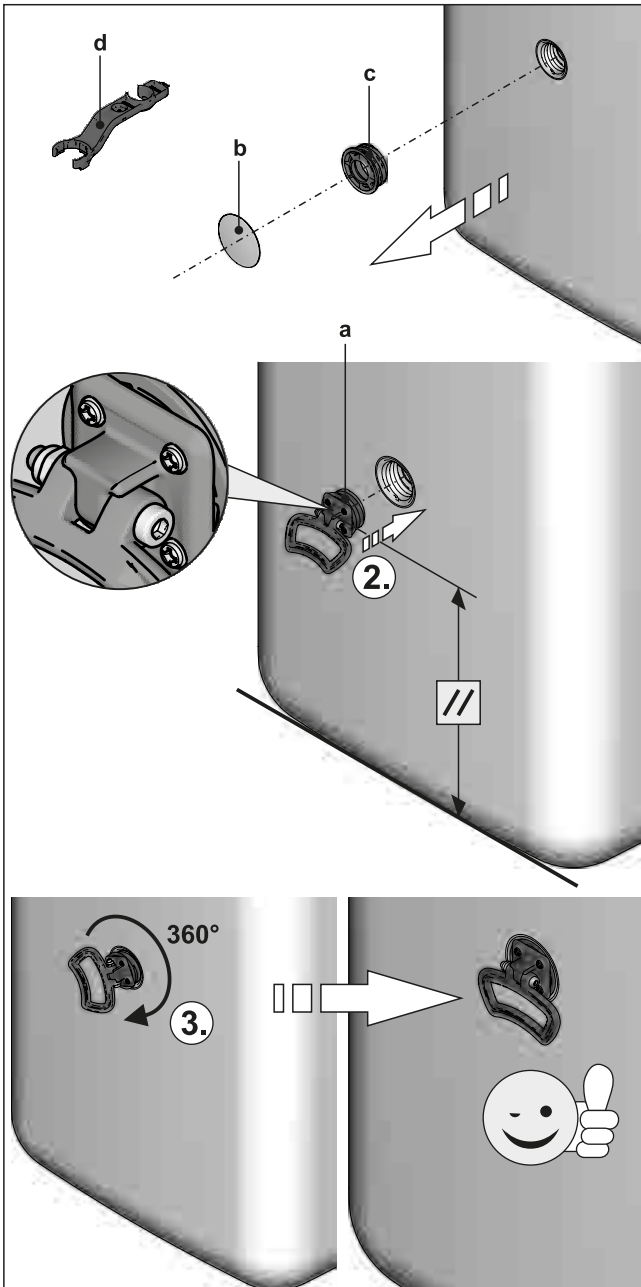
#### Precondition

- The installation site complies with applicable country-specific regulations and meets the minimum requirements described in "3.3.1 Selecting the installation site" [p 12].

#### Set-up

- Remove the packaging and dispose of it in an environmentally sound manner.
- Pull off the cover screens from the storage tank (item b) and unscrew the threaded fittings (item c) from the openings at which the handles are to be fitted.
- Screw the handles (item a) into the now uncovered threaded holes.

- 4 Carefully transport the indoor unit to the installation site, use the handles.



3-4 Installing the handles

- a Handle
- b Cover screen
- c Threaded piece
- d Fitting spanner

- 5 Install the indoor unit at the installation site.

- When setting up the unit in a cabinet, behind panels or in other restricted conditions, sufficient ventilation (e.g. using ventilation gratings) must be ensured. If the total refrigerant charge in the system is  $\geq 1.84$  kg, further requirements of the ventilation openings must be met (see "6.4 Minimum floor area and ventilation openings" [p 34]).

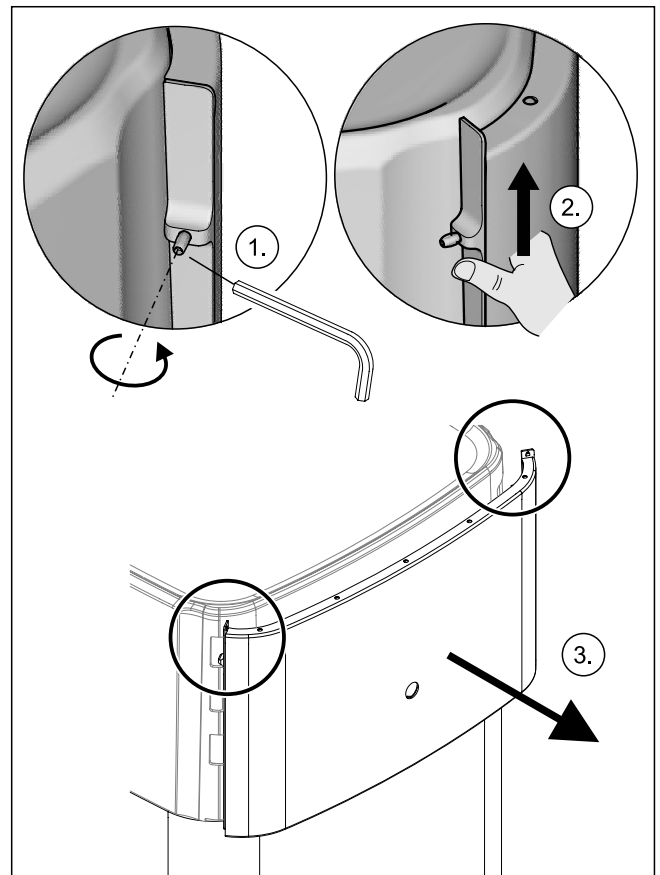
### 3.4 Preparing the device for installation

#### 3.4.1 Remove the front screen

- 1 Undo the screws (1.).

- 2 Press the lateral holding burls upwards with your fingers (2.), stem from above with the thumbs.

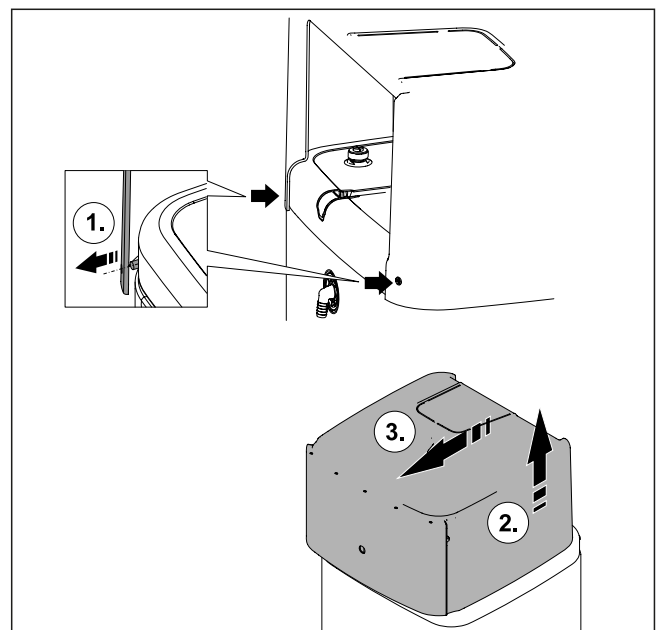
- 3 Remove the front screen to the front (3.).



3-5 Remove the front screen

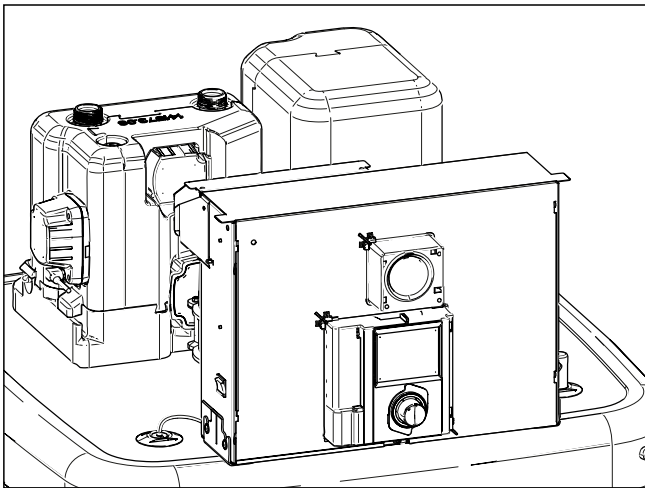
#### 3.4.2 Remove the protective cover

- 1 Unhook the protective cover from the rearward facing holding burls (1.), lift at the back (2.) and remove to the front (3.).



3-6 Remove the protective cover

### 3 Set-up and installation

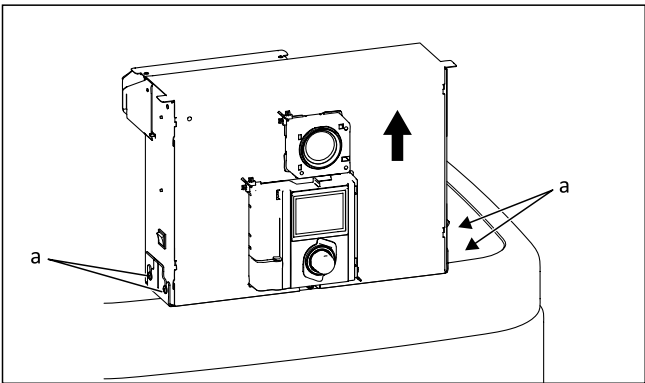


▲ 3-7 Without protective cover

#### 3.4.3 Moving the switch box to the service position

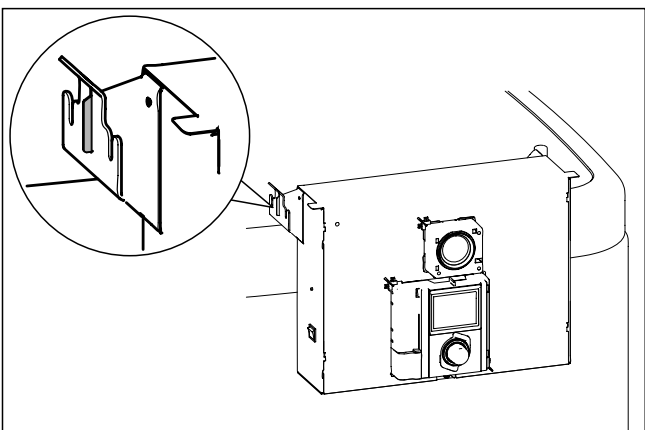
To facilitate work on the hydraulics of the indoor unit, the switch box can be moved to the service position.

- 1 Loosen the screws (a) of the holder of the switch box.



▲ 3-8 Moving the switch box to the service position

- 2 Remove the switch box from the front and insert it into the bracket with the hooks on the rear brackets.

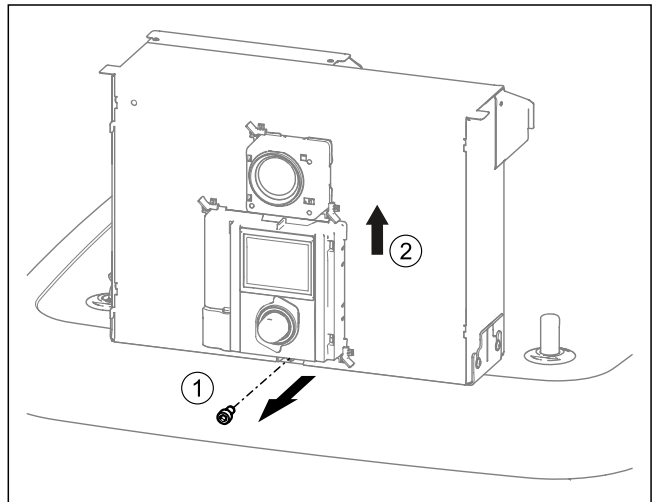


▲ 3-9 Switch box in the service position

#### 3.4.4 Open the switch box

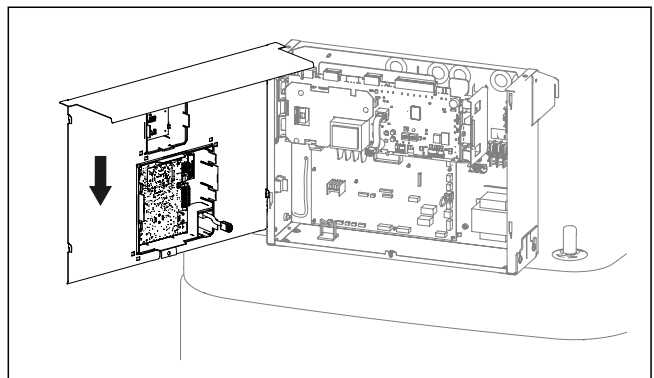
To make the electrical connections, the switch box itself must be opened. This can be done in both the normal and the service position.

- 1 Loosen the front screw.
- 2 Push the cover upwards and pull it away to the front.



▲ 3-10 Open the switch box

- 3 Hook in the cover on the switch box with the lateral hooks.



▲ 3-11 Hooking in the cover

#### 3.4.5 Removing the bottom thermal insulation



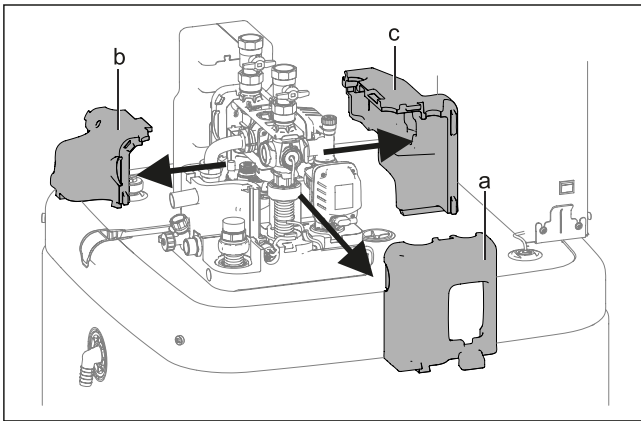
##### CAUTION

The thermal insulation consists of pressure-sensitive EPP moulded parts that can be easily damaged if not handled correctly.

- Only remove the thermal insulation in the order stated below and in the stated directions.
- Do not use force.
- Do not use tools.

- 1 Remove the thermal insulation in the following order:
  - Pull the side insulating element off horizontally (item a).
  - Pull the rear insulating element off horizontally (item b).
  - Pull the front insulating element off horizontally (item c).



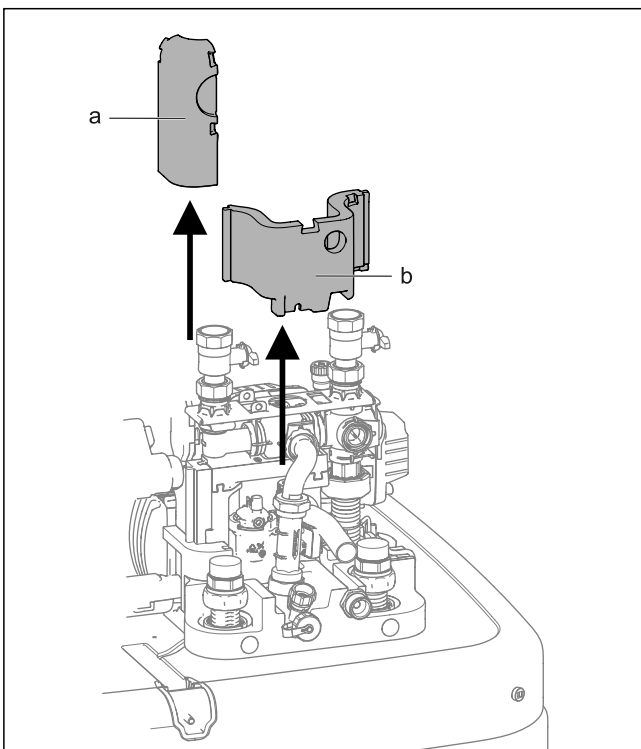


3-12 Removing the top thermal insulation

- a Side insulating element
- b Rear insulating element
- c Front insulating element

**2 As required:** Remove the bottom thermal insulation in the following order:

- Pull the side insulating element off vertically (item a).
- Pull the rear insulating element off vertically (item b).



3-13 Removing the bottom thermal insulation

- a Side insulating element
- b Rear insulating element

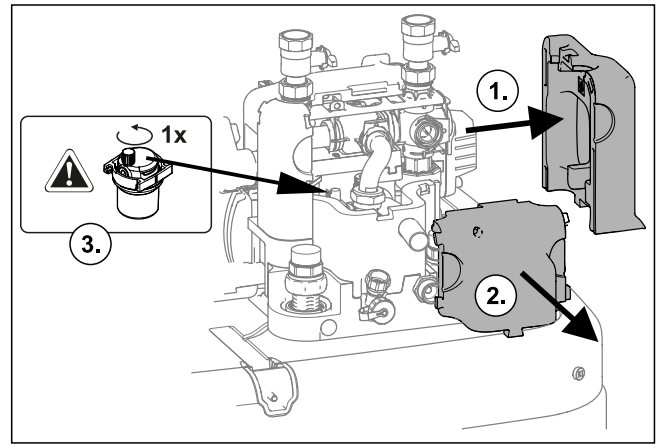


## INFORMATION

The thermal insulation is installed in reverse order.

### 3.4.6 Opening the air purge valve

- 1 Removing the thermal insulation (see "3.4.5 Removing the bottom thermal insulation" [p 14]).
- 2 Open the air purge valve on the pump by one turn.



3-14 Opening the air purge valve

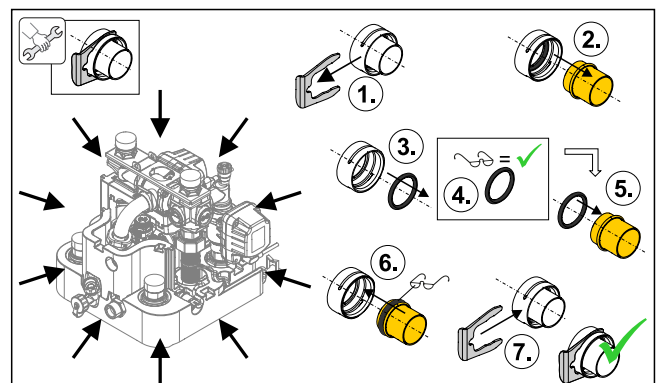
### 3.4.7 Aligning the connections of the heating inflow and return flow



## CAUTION

When working on the hydraulics, pay attention to the installation position of the O-rings to avoid damaging them and causing leaks.

- Always place O-rings on the part to be inserted after disassembly or before assembly (see "3-15 Hydraulic system plug connectors" [p 15]).
- The heating lines must be connected free of tension via the plug connectors. Establish a suitable strain relief especially when connecting with flexible lines (not open to diffusion!) (see "3-28 Supporting rear-facing hydraulic lines" [p 19]).



3-15 Hydraulic system plug connectors



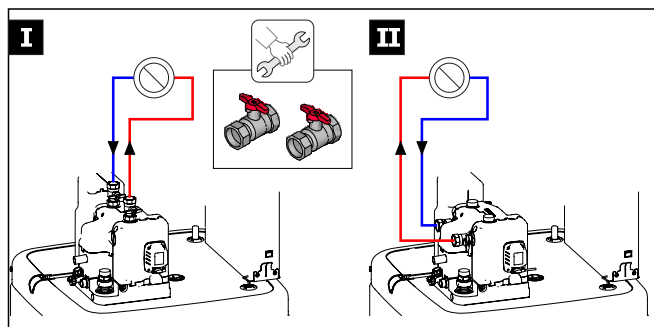
## CAUTION

If the securing clips cannot be put on properly, the couplings can be detached from their mountings to ensure a very strong or continuous escape of liquid can occur.

- Before putting on a securing clip, make sure that the securing clip engages in the coupling groove. To do so, insert the coupling far enough into the mounting that the groove is visible through the securing clip mounting.
- Insert the securing clip up to the end stop.

The connections of the heating inflow and return flow can be directed upwards or backwards in order to adapt it optimally to the structural conditions of the installation site.

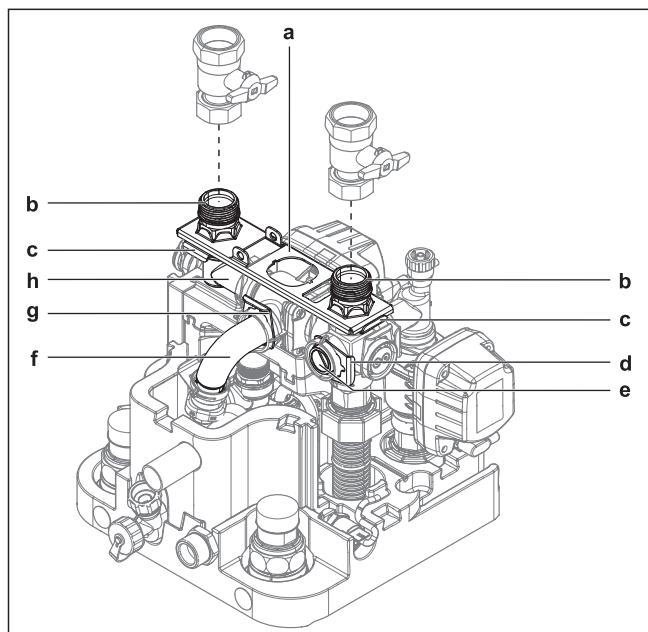
### 3 Set-up and installation



3–16 Variants for aligning the heating infeed and return flow

The device is supplied with upwards aligned connections as standard. The following conversion steps are required in order to direct the connections to the rear out of the device:

- 1 Remove the protective cover and top thermal insulation (see "3.4.2 Remove the protective cover" [p 13], "3.4.5 Removing the bottom thermal insulation" [p 14]).
- 2 Pull the two securing clips off the connection couplings (item c).
- 3 Pull off the two connection couplings (item b).
- 4 Remove the retaining plate (item a).
- 5 Pull off the sealing plug securing clip (item d).
- 6 Pull out the sealing plug (item e).
- 7 Turn the elbow (item h) 90° to the rear.
- 8 Pull the securing clip off the manifold (item g).

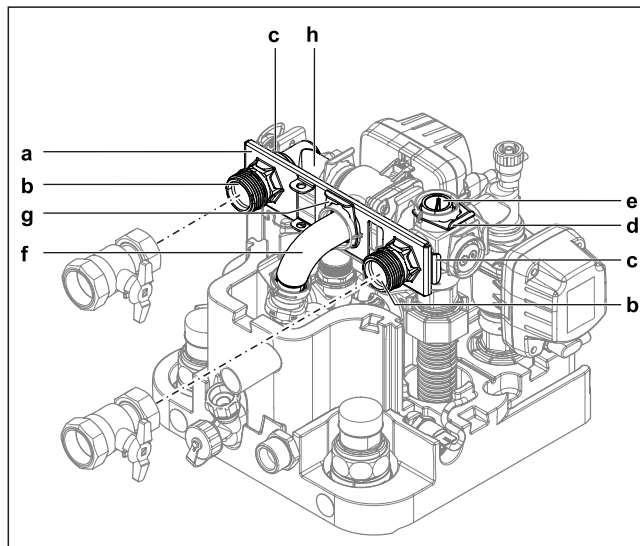


3–17 Aligning the heating inflow and return flow connections upwards

- a Retaining plate
- b Connection coupling
- c Securing clip of the connection couplings
- d Securing clip of the sealing plug
- e Sealing plug
- f Manifold
- g Securing clip of the manifold
- h Elbow

- 9 Carefully pull the manifold (item f) so far backwards out of its horizontal mounting that the retaining plate ("3–18 Heating inflow and return flow connections aligned to the rear" [p 16], item a) can be pushed vertically in between.
- 10 Slide the retaining plate between the manifold and its horizontal mounting, and insert the manifold (item f) back into its mounting through the middle hole of the retaining plate.

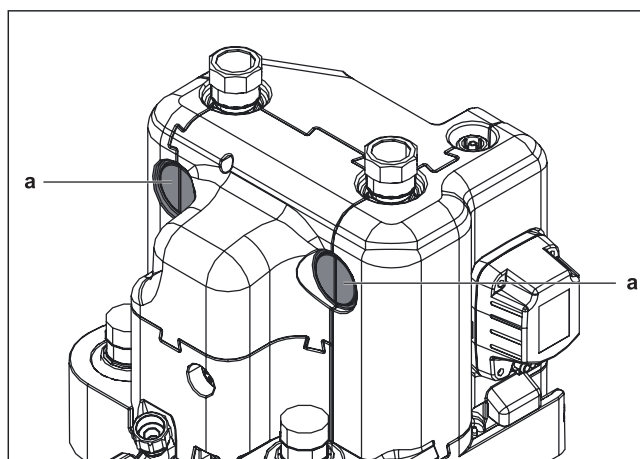
- 11 Secure the manifold with securing clip (item g) in its mounting again.
- 12 Insert the two connection couplings (item b) through the retaining plate into the lateral mountings.
- 13 Secure the two connection couplings with securing clips (item c) in their mountings.
- 14 Insert the sealing plug (item e) in the upper mounting.
- 15 Secure the sealing plug with securing clip (item d).



3–18 Heating inflow and return flow connections aligned to the rear

- a Retaining plate
- b Connection coupling
- c Securing clip of the connection couplings
- d Securing clip of the sealing plug
- e Sealing plug
- f Manifold
- g Securing clip of the manifold
- h Elbow

- 16 Cut out side openings in the thermal insulation (item a) using a suitable tool.

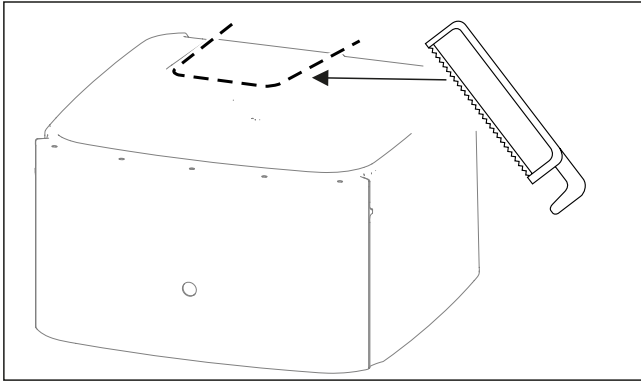


3–19 Cut-out in thermal insulation

- a Side openings in the thermal insulation

#### 3.4.8 Making the hood opening

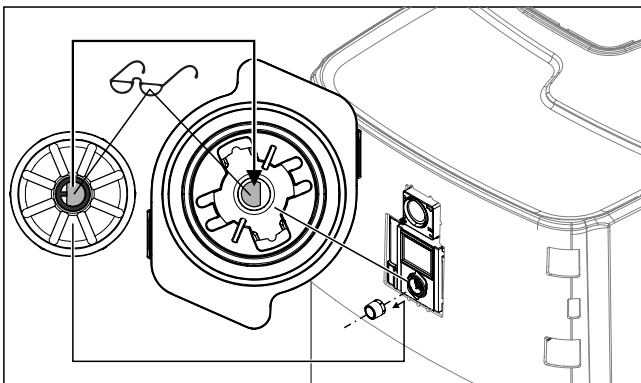
- 1 With the heating inflow and return flow directed upwards: Cut the hood along the perforation with a suitable tool.



3-20 Making the hood opening

## 3.4.9 Installing the rotary switch of the controller

- 1 Place the rotary switch on the rotary switch holder of the RoCon + HP1 and press it on.

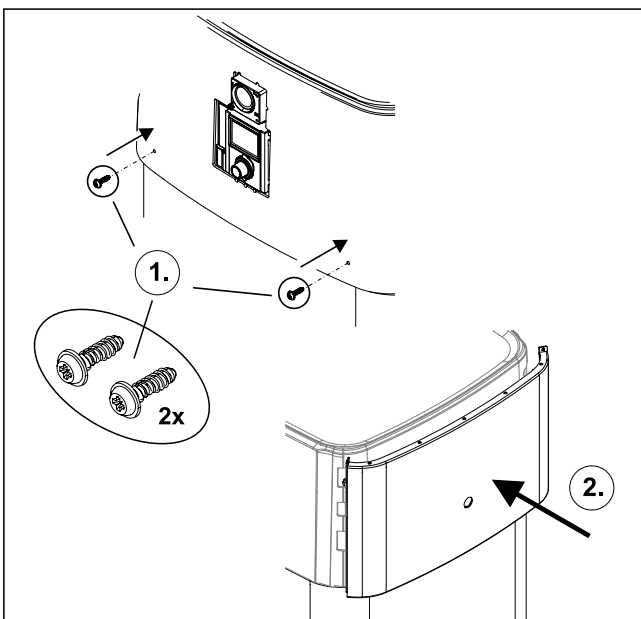


3-21 Putting on the rotary switch

## 3.4.10 Securing the hood

After the installation is fully completed:

- 1 Attach the screws for fixing the hood (accessory bag).
- 2 Place the front cover straight over the rotary switch of the RoCon+ HP1. Press on the top and bottom until the front screen is securely engaged again.



3-22 Securing the hood

## 3.5 Installing optional accessories

### 3.5.1 Installation of electric backup heater (EKBUxx)



#### INFORMATION

If the ceiling height is low, the storage tank must be tilted to install the backup heater when empty. This must be done before any further installation steps.

The indoor unit provides the option of installing an electrical auxiliary heater (backup heater EKBUxx). For example, renewable energy can be used as an additional heat source.



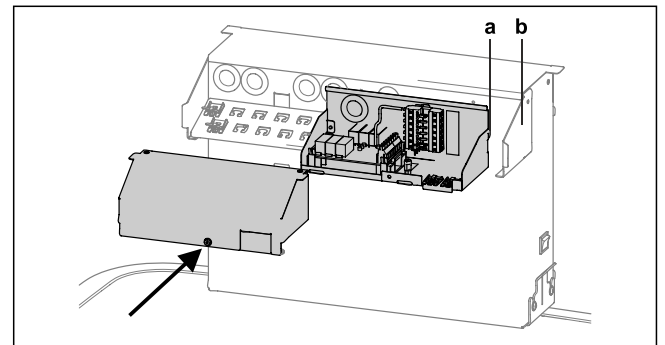
#### INFORMATION

A separate manual containing instructions about installation and operation is included with this component.

### 3.5.2 Installation of the external heat generator connection set (EKBUHSWB)

The connection set for external heat generators must be installed to control an electrical backup heater or another external heat generator.

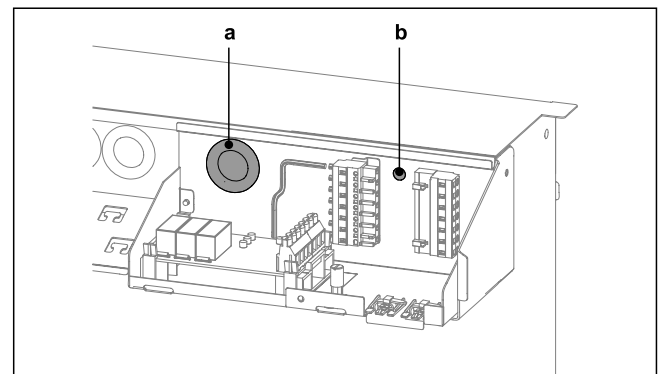
- 1 Open the housing by removing the screw.
- 2 Remove additional components from the housing (strain relief clip, cable tie, grommet).
- 3 Attach the connection set to the switch box of the indoor unit. To do this, insert the hooks (item a) of the connection set into the slots of the switch box (item b); then press the connection set downwards.



3-23 Fitting the connection set

- a Hooks
- b Slot

- 4 Attach the grommet (item a) to the bushing between the connection set and the switch box.
- 5 Attach the fastening rivet (item b).



3-24 Cable gland

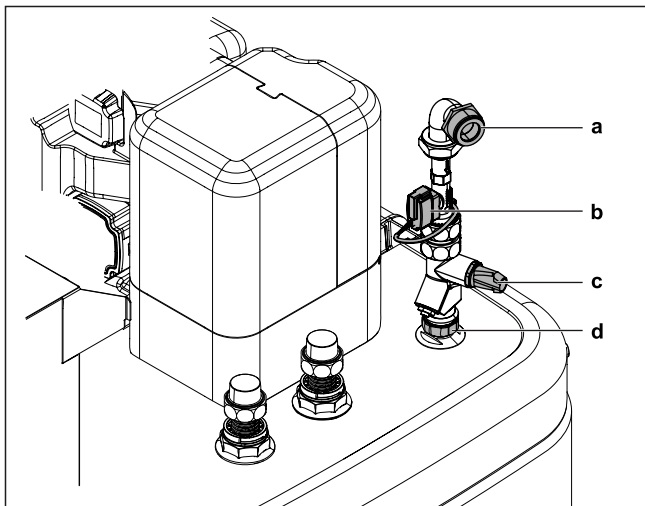
- a Grommet
- b Fastening rivet

## 3 Set-up and installation

- 6 Guide the cable of the Ultra EHS PCB through the cable grommet and connect it to the RoCon BM2C (see "3-38 Connection on the RTX-EHS PCB" ▶ 24]).
- 7 After the installation and the electrical connections (see "3.6 Water connection" ▶ 18] or "3.7 Electrical connection" ▶ 20]) have been completed, replace the cover and close it with the screw.

### 3.5.3 Installation of the DB connection kit

The optional DB connection kit allows better access for connecting the DrainBack pipe (solar feed).

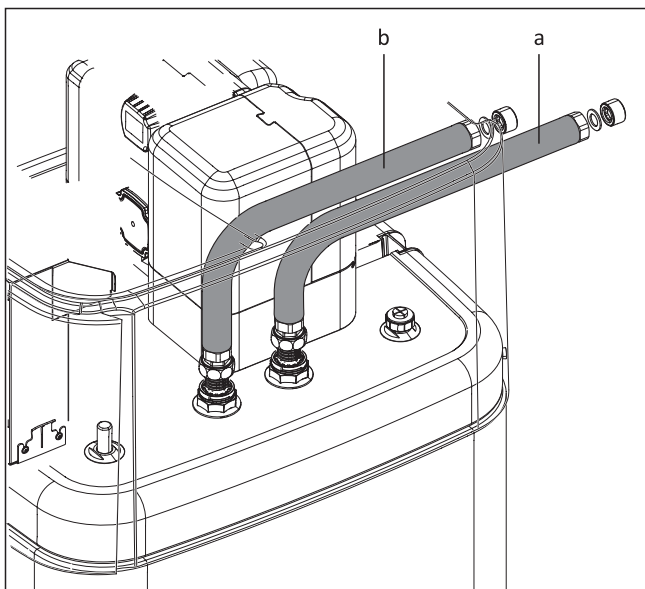


3-25 DB connection kit

- a DB pipe connection (solar flow)
- b FlowSensor (not part of the DB connection kit, but included with EKSRRPS4)
- c Flow rate limiter (FlowGuard)
- d Solar flow connection  $p=0$  on the storage tank

### 3.5.4 Installation of the P connection kit

The optional P connection kit for Biv device types allows better access for connecting the flow and return flow lines of a pressurised solar system or another external heat generator on the storage tank. The kit contains two thermally insulated corrugated pipes that are connected to the connections of the storage tank via a union nut. At the other end of the corrugated pipes there is an adapter for different connection sizes of the supply and return pipes.



3-26 P connection kit for Biv device types

- a Connection for flow (red)
- b Connection for return flow (blue)

## 3.6 Water connection

### Important information



#### CAUTION

If the indoor unit is connected to a heating system with **steel pipes**, radiators or non-diffusion-proof floor heating pipes, sludge and chips can enter the hot water storage tank and **cause blockages, local overheating or corrosion damage**.

- Rinse supply lines before filling the device.
- Rinse out the heat distribution network (in the existing heating system).
- Install a dirt filter or sludge separator in the heating return flow (see "1.2.6 Heating system and sanitary connection" ▶ 6]).



#### CAUTION

If the indoor unit is connected to a cold water line where steel pipes are used, chips can get into the stainless steel corrugated pipe heat exchanger and remain there. This can lead to contact corrosion damage and subsequently to leakage.

- Flush the feed pipes before filling the heat exchanger.
- Install the dirt filter in the cold water supply (e.g. SAS 1 or SAS 2).



#### CAUTION: BIV only

If the **heat exchanger** for pressurised **solar system** charging (see "3.1 Dimensions and connection dimensions" ▶ 11], items h + i) is connected to an **external heater** (e.g. wood burning boiler) the indoor unit can be damaged or destroyed due to an excessively high flow temperature at these connections.

- The **flow temperature** of the external heater should be **limited to max. 95°C**.



#### CAUTION

Corrosion may be caused by air entering the heating water network and by a quality of the heating water that does not comply with the requirements in accordance with "1.2.5 Requirements for heating and storage water" ▶ 6]. Corrosion products (particles) thus created may clog pumps and valves and cause malfunctions.

- Device may not be connected by permeable, flexible lines.



#### INFORMATION

Any steam or heating water escaping from the safety valve must be drained by a suitable blow-off line with constant gradient in a frost-protected, safe and observable manner.

A expansion vessel suitably sized and preset for the heating system must be connected to the Daikin Altherma 3 R ECH<sub>2</sub>O. There may not be any hydraulic blocking elements between the heat generator and the diaphragm expansion vessel.

We recommend installing a mechanical manometer for filling the heating system.

- For potable water lines, observe the provisions of EN 806, DIN 1988 and the additional applicable national regulations for potable water installation.
- Install the indoor unit close to the withdrawal point to dispense with the need for a circulation line. If a circulation line is permissible and mandatory according to local regulations, it must be installed according to the schematic diagrams in "Hydraulic System Connection" in the reference manual for the fitter.



## 3.6.1 Minimum water volume

A water volume of at least 5 litres must be ensured in the heating circuit. The internal water volume of the heat pump indoor unit is not included in this calculation.



### INFORMATION

In critical applications or in rooms with high heating loads, additional water volume may be required.



### CAUTION

If several heating circuits are connected to the heat pump indoor unit, it is important that the minimum water volume is guaranteed even if only one heating circuit is open.

## 3.6.2 Connecting hydraulic lines



### DANGER: RISK OF BURNING/SCALDING

There is a danger of scalding at hot water temperatures over 65°C. This is possible when using solar energy if an external heater is connected, the Legionella protection is activated, or the target hot water temperature is set to be greater than 65°C or if the Smart-Grid function is activated.

- Install scalding protection (hot water mixer device (e.g. VTA32)).



### INFORMATION

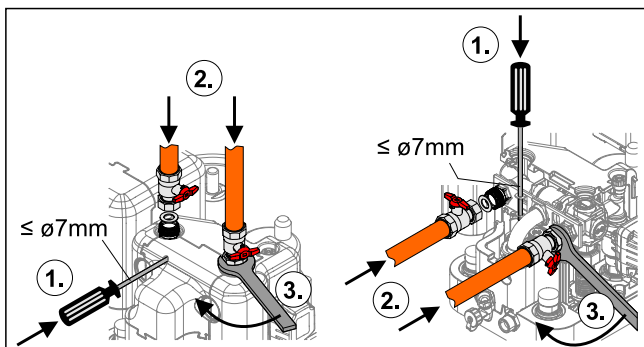
The indoor unit is equipped with a pressure sensor. The system pressure is monitored electronically and can be displayed with the device switched on.

Nevertheless, we recommend installing a mechanical manometer between the indoor unit and the expansion vessel, for example.

- Install the manometer so that it is easy to see when filling.

Prerequisite: Optional accessories (e.g. solar, backup heater) are mounted on the Daikin Altherma 3 R ECH<sub>2</sub>O as specified in the enclosed instructions.

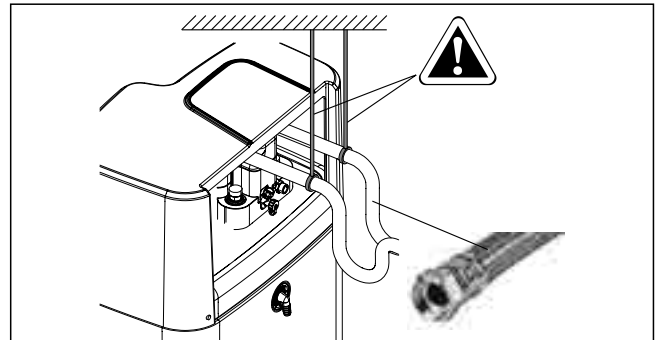
- Check the cold water connection pressure (maximum 10 bar).
  - At higher pressure in the drinking water line, a pressure reducer must be installed.
- Fix the hydraulic block in place with a screwdriver.



3-27 Fix the hydraulic block in place when connecting to the top (left) or to the rear (right)

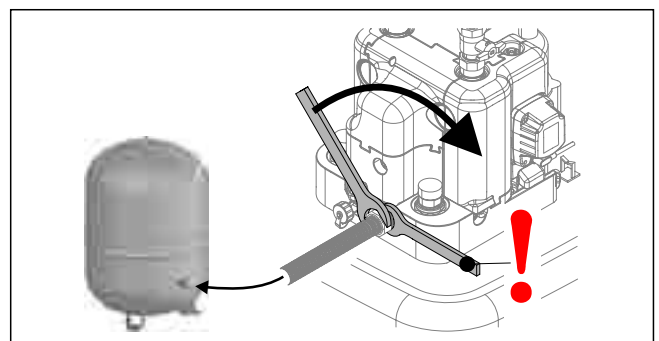
- Make the hydraulic connections on the indoor unit.

- Refer to "3.1 Dimensions and connection dimensions" [p 11] for the position and dimension of the heater connections.
- Pay attention to the stipulated tightening torque (see "6.3 Tightening torques" [p 34]).
- Install the line so that the sound insulation hood can be positioned easily after installation.
- Connect the water for filling or refilling the heating system as specified by EN 1717/EN 61770 to avoid contamination of drinking water by return flow.
- For rear-facing connections:** Support hydraulic lines suitably according to the spatial conditions.



3-28 Supporting rear-facing hydraulic lines

- Connect the blow-off line to the safety over-pressure valve and expansion vessel in accordance with EN 12828.
  - Any steam or heating water that may escape must be drained by a suitable blow-off line with constant gradient in a frost-protected, safe and observable manner.
  - Install the line in such a way that the protective cover is simple to put on after assembly.
  - Check the seat of the drain hose on the safety pressure relief valve. If necessary, connect and install a separate hose.
- Connecting an expansion vessel.
  - Connect a suitably dimensioned and preset expansion vessel for the heating system. There may not be any hydraulic blocking elements between the heat generator and the safety valve.
  - Position the expansion vessel in an easily accessible place (maintenance, parts replacement).



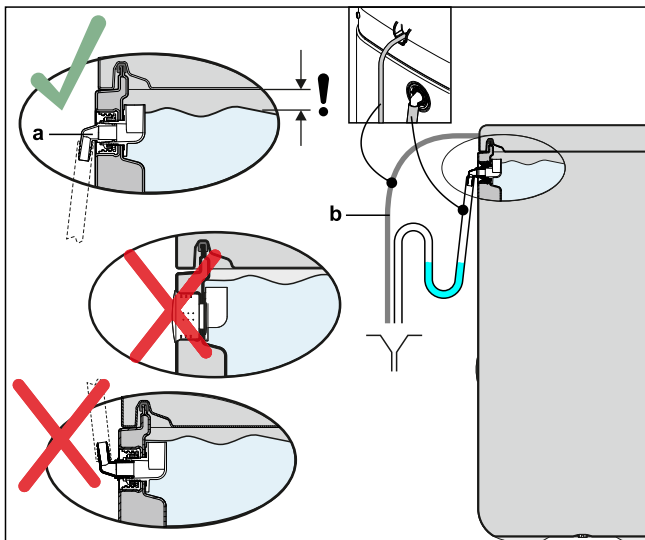
3-29 Mounting the expansion vessel

- Carefully insulate pipework against heat loss and to avoid condensation (insulation thickness at least 20 mm).
- Water shortage protection:** The pressure and temperature monitoring of the controller shuts off and locks the indoor unit safely if there is a shortage of water. No additional water shortage protection is needed in the construction.
- Avoid damage caused by deposits and corrosion:** see "1.2.5 Requirements for heating and storage water" [p 6]

## 3 Set-up and installation

### 3.6.3 Connecting the drain

- 1 Screw the hose connection piece for safety overflow (part of the accessory bag) into the intended connection ("2-3 Design and components – Internal structure ...04P30D.../...08P30D... (Biv)" [8], item u) and connect it with the drain hose.
- Use transparent drain hose (draining water must be visible).
- Connect the drain hose to an adequately dimensioned waste water installation.
- Drain should not be lockable.
- 2 Attach the condensate drain hose (part of accessory bag) to its connection on the cover.



3-30 Connection of the overflow hose

- a Hose connecting piece for safety overflow  
b Condensate drain hose

### 3.7 Electrical connection



#### DANGER: RISK OF ELECTROCUTION

Touching live parts can result in an **electric shock** and lead to potentially fatal injuries and burns.

- Before beginning work on live parts, disconnect all of the circuits of the system **from the power supply** (switch off external main switch, disconnect fuse) and secure against unintentional restart.
- Establishment of the electrical connection and work on electrical components should only be performed by **electrical technicians** in compliance with valid standards and guidelines as well as the specifications of the energy supply company and the instructions in this manual.
- The installation of earth leakage circuit breakers (GFCI) is mandatory, as shown in the pictures of this document.
- Never make constructional changes to connectors or other electrical equipment components.
- **Device covers and service panels must be replaced** as soon as the work is completed.



#### CAUTION

Increased temperatures can occur in the switch box of the indoor unit during operation. This can result in currently-carrying wires from reaching higher temperatures during operation due to self-heating. For this reason, these lines need to have a continuous use temperature of 90°C.

- For the following connections, only use cables with a long-term use temperature  $\geq 90^{\circ}\text{C}$ : Heat pump outdoor unit and optional: Electric backup heater (EKBUXx)



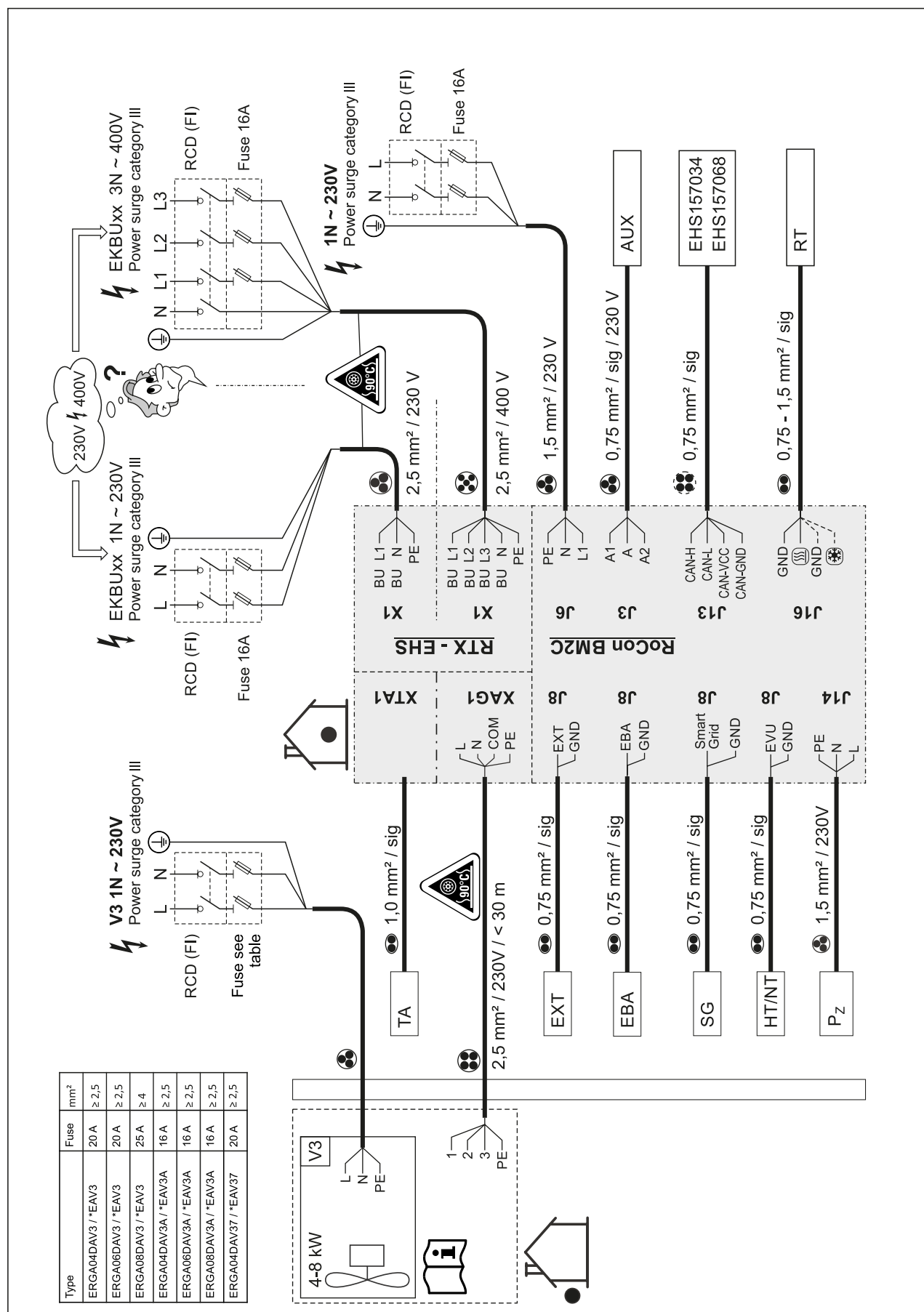
#### CAUTION

If the mains cable of the indoor unit is damaged, it must be replaced by the manufacturer or his customer service or a similarly qualified person to avoid hazards.

All electronic control and safety devices of the indoor unit are connected ready for use and tested. Modifications on the electrical installation are dangerous and prohibited. The operator alone bears responsibility for any resulting damage.



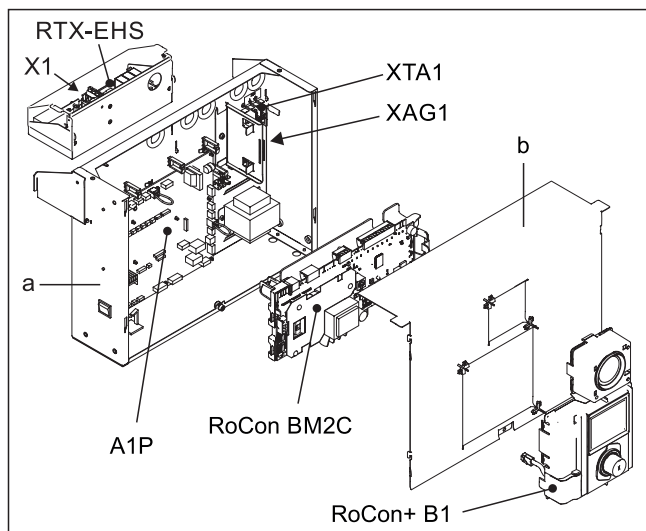
## 3.7.1 Overall connection diagram



3-31 Overall connection diagram – for the electrical connection during the device installation (for the legend and pin assignment of the PCB, see "6.5 Electrical connection diagram" ▶ 36)]

## 3 Set-up and installation

### 3.7.2 Position of the PCBs and terminal strips



3-32 Position of the PCBs and terminal strips

- a Switch box
- b Switch box cover
- A1P PCB (heat pump basic control)
- RoCon+ B1 Controller control panel
- RoCon BM2C PCB (basic controller module)
- RTX-EHS PCB (backup heater)
- X1 Terminal strip for backup heater mains connection
- XAG1 Heat pump outdoor unit plug connection
- XTA1 Outdoor temperature sensor terminal strip  $T_A$

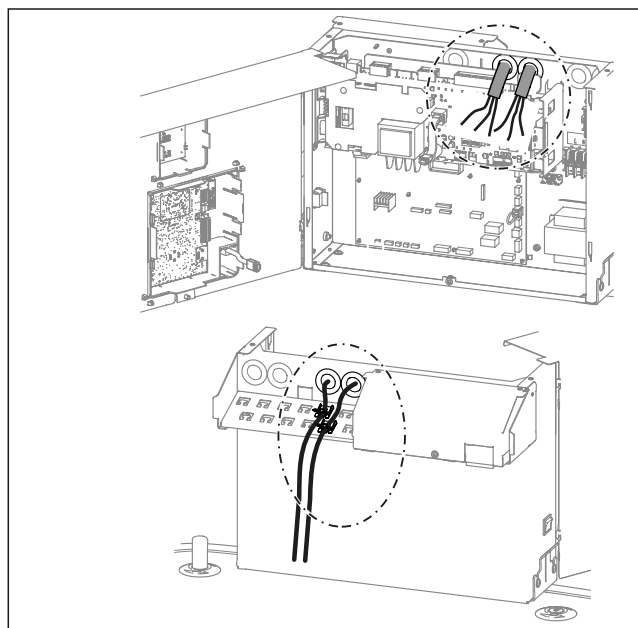
### 3.7.3 Mains connection

A flexible cable for the mains connection is already connected inside the device.

- 1 Check the supply voltage (~230 V, 50 Hz).
- 2 Disconnect the junction box of the domestic installation.
- 3 Connect the cable for connecting the indoor unit to the mains to the domestic installation's junction box (isolator according to EN 60335-1) via an all-pole separating main switch to be installed in the building. Ensure that the polarity is correct.

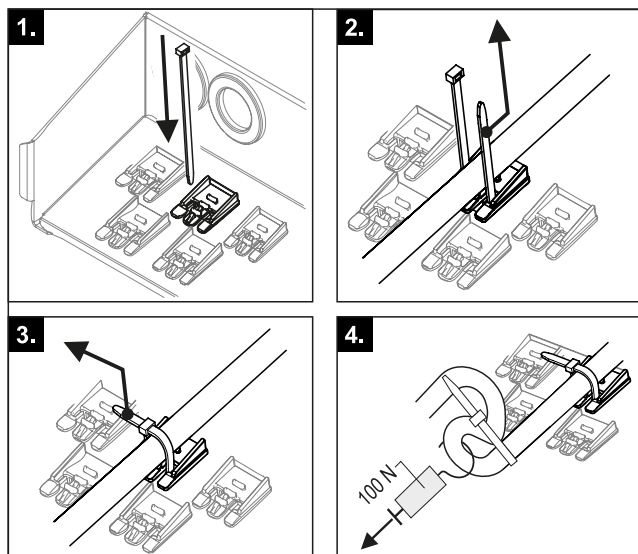
### 3.7.4 General information on the electrical connection

- 1 Check the supply voltage.
- 2 Set the mains switch to "Off".
- 3 Switch off the circuit breaker in the junction box of the domestic power supply.
- 4 Open the switch box (see "3.4.4 Open the switch box" [p 14]).
- 5 Insert the cable through one of the cable glands into the interior of the switch box. When cutting and laying cables to be connected, make sure that the switch box can be brought into the service position without any tension.



3-33 Cable gland

- 6 Make electrical connections according to "3.7.1 Overall connection diagram" [p 21] and the following sections.
- 7 Effective strain relief in the switch box by means of cable ties must be ensured for all cables connected to the indoor unit and their holding force checked.



3-34 Establishing and checking the strain relief

- 8 After the installation is complete: Close the switch box again and, if necessary, move it to the normal position.

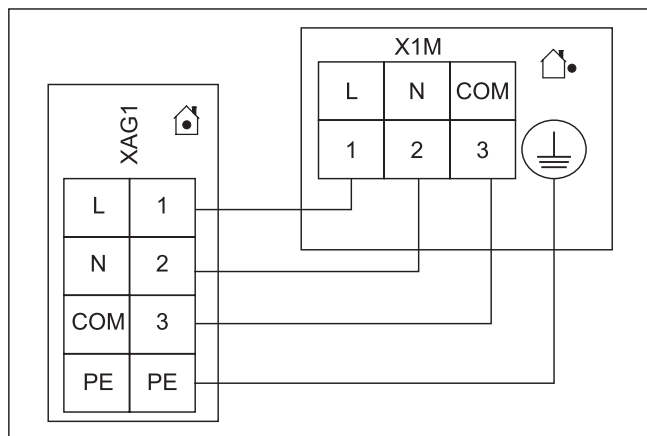
### 3.7.5 Connecting the heat pump outdoor unit



#### INFORMATION

A separate manual containing instructions about installation and operation is included with this component.

- 1 Follow the installation steps in "3.7.4 General information on the electrical connection" [p 22].
- 2 Connect the heat pump outdoor unit to the XAG1 terminal strip.



3-35 Connecting the heat pump outdoor unit



## INFORMATION

If the heat pump outdoor unit is shut off via a circuit specified by the utility company, the indoor unit is not shut off.

## 3.7.6 Connecting the outdoor temperature sensor (optional)

The heat pump outdoor unit has an integrated outdoor temperature sensor that is used for weather-compensated inflow temperature control with frost protection function. The weather-compensated inflow temperature control can be further optimised with the optional outdoor temperature sensor.

- Choose a location at about one third of the building height (minimum distance from floor: 2 m) on the coldest side of the building (north or north-east). Ensure that the location is not near any external heat sources (flues, air ducts) or subject to direct solar radiation.
- Place outdoor temperature sensors in such a way that the cable exit points face downwards (prevents the ingress of humidity).



## CAUTION

Laying the sensor and mains lines in parallel within an installation conduit can lead to major malfunctions during controlled operation of the indoor unit.

- Always lay the sensor line separately.

- Connect the outdoor temperature sensor to a twin-core sensor line (minimum diameter 1 mm<sup>2</sup>).
- Lay the sensor line to the indoor unit.
- Follow the installation steps in "3.7.4 General information on the electrical connection" [p 22].
- Connect the sensor line to terminal strip XTA1 (see "3.7.2 Position of the PCBs and terminal strips" [p 22]).
- In the controller RoCon+ HP1 set the [Outside temperature sensor] parameter to "On" [→ Main menu → Configuration → Sensors].

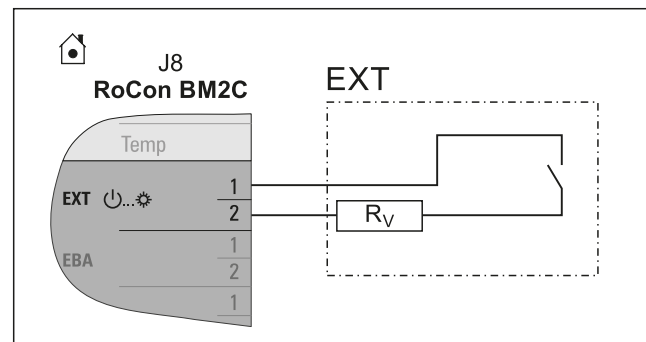
## 3.7.7 External switching contact

Connecting an external switching contact ("3-36 EXT switching contact connection" [p 23]) enables the operating mode of the indoor unit to be switched over.

The current operating mode is switched by a changing resistance value ("3-2 Resistance values for evaluating the EXT signal" [p 23]). The changeover of the operating mode is only effective for a long as the external switching contact is closed.

The operating mode has an effect on the direct circuit of the indoor unit as well as all other heating circuits connected to this device as an option.

When special functions (e.g. "Manual operation") are activated, the input is not evaluated.



3-36 EXT switching contact connection

## 3-2 Resistance values for evaluating the EXT signal

Operating mode	Resistance R <sub>v</sub>	Tolerance
Standby	<680Ω	±5%
Heating	1200Ω	
Reduce	1800Ω	
Summer	2700Ω	
Automatic 1	4700Ω	
Automatic 2	8200Ω	



## INFORMATION

The input is not considered for resistance values greater than the value for "Automatic 2".



## INFORMATION

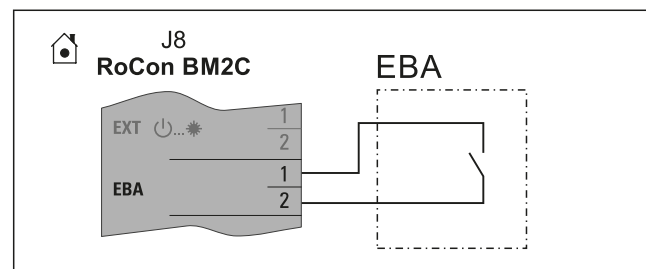
The [Heating support (HZU)] function integrated in the RoCon+ HP1 controller (see the controller operating instructions) makes it unnecessary to connect the EXT connection to the burner blocking contact connection of the solar system.

## 3.7.8 EBA (external requirement request)

By connecting the EBA switching contact to the indoor unit ("3-37 EBA switching contact connection" [p 23]) and corresponding parametrisation in its RoCon+ HP1 controller, an external switching contact can be used to generate a heat request. If the switching contact is closed, the indoor unit switches to heating operation. The flow temperature is regulated to the temperature set in the [Feed temperature, heating mode] parameter [→ Main menu → Configuration → Heating].

The EBA switching contact has priority over a request from the room thermostat.

The switching contact is not evaluated in cooling operation, standby, manual or summer mode. The heating limits are also ignored.



3-37 EBA switching contact connection

## 3 Set-up and installation

### 3.7.9 Connecting an external heat generator



#### INFORMATION

To connect an external heat generator, the connection set for external EKBUHSWB heat generators must be installed (see "3.5 Installing optional accessories" [p 17]).

For heating support or as an alternative to an electric backup heater, an external heat generator (e.g. gas- or oil-fired boiler) can be connected to the indoor unit. To connect an external heat generator, the connection set for external EKBUHSWB heat generators must be installed (see "3.5 Installing optional accessories" [p 17]).

The heat supplied by the external heat generator must be fed to the unpressurised storage tank water in the hot water storage tank of the indoor unit.

Implement the hydraulic connection according to one of the two following options:

- unpressurised via the connections (solar flow and solar return flow) of the hot water storage tank
- for ...Biv indoor unit device types, via the integrated pressurised solar heat exchanger.
- Comply with the instructions on hydraulic connections (see "1.2 Safety instructions for installation and operation" [p 4])
- Examples of hydraulic connection (see "Hydraulic connection" in the reference manual for the fitter).

The external heat generator request is connected on PCB RTX-EHS (see "3-38 Connection on the RTX-EHS PCB" [p 24]) via a relay. Electrical connection to the indoor unit is possible as follows:

- External heat generator has a potential-free switching contact connection for heat request:
  - Connection to K3 if the external heat generator is responsible for the domestic hot water preparation and the backup heating (setting of the [Config. ext. heat source] parameter = DHW + heating support [→ Main menu → Settings → Ext. source])

or

- Connection to K1 and K3 if two external heat generators are used (setting of the [Config. ext. heat source] parameter = Two external heat generators [→ Main menu → Settings → Ext. source]). In this case, K1 connects the external heat generator (e.g. gas-fired or oil-fired boiler) for heating support and K3 connects the external heat generator (EKBUxx) for domestic hot water preparation.

or

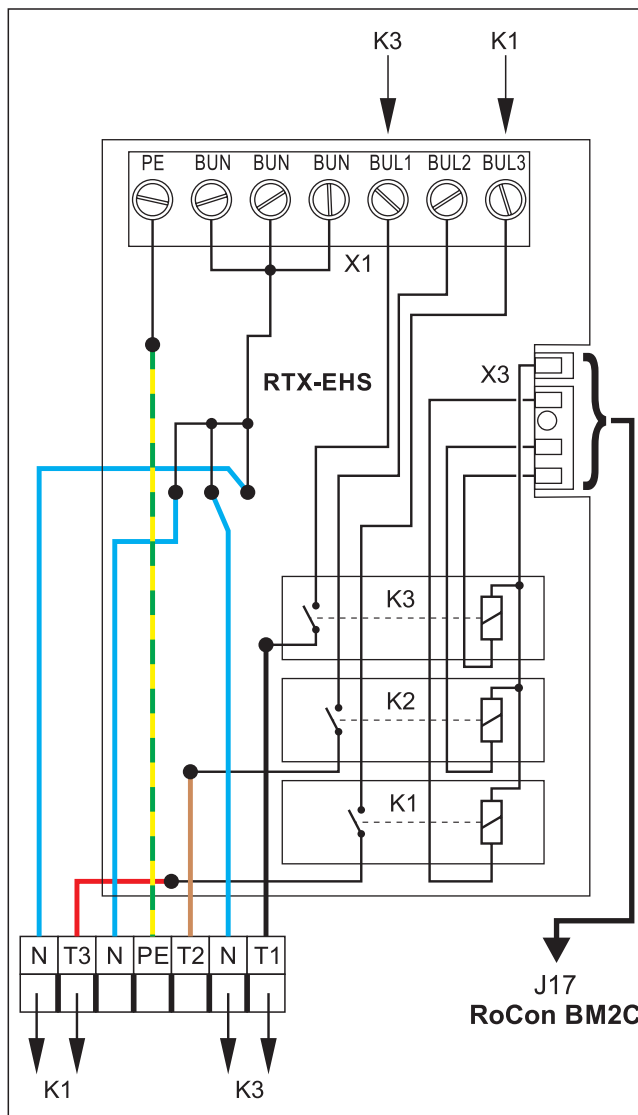
- Connection to AUX connection A (see "3.7.13 Connecting switching contacts (AUX outputs)" [p 26])
- External heat generator can only be connected via mains voltage: Connection (~230 V, maximum load 3000 W) to K1 and K3.



#### CAUTION

Danger of voltage flash-overs.

- The connections of the RTX-EHS PCB must not be used simultaneously for connecting mains voltage (~230 V) and SELV ("Safety Extra Low Voltage").



3-38 Connection on the RTX-EHS PCB

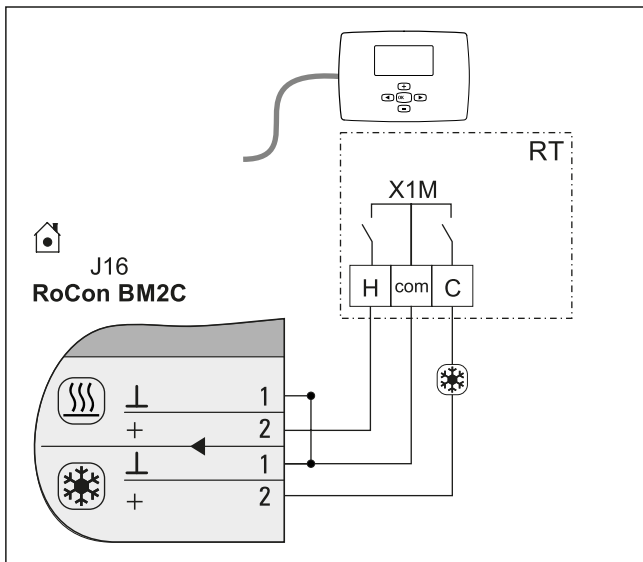
- 1 Refer to the external heat generator's respective installation instructions for a suitable electrical connection.
- 2 Installing the connection set for external EKBUHSWB heat generators (see "3.5 Installing optional accessories" [p 17]).
- 3 Make suitable connections on the RTX-EHS PCB of the connection set (see "3-38 Connection on the RTX-EHS PCB" [p 24]).
- 4 Fix cables that are fed into the connection set from the outside using the strain relief clips and cable ties included (see steps 7 and 8 in "3.7.4 General information on the electrical connection" [p 22]).

### 3.7.10 Connecting the room thermostat

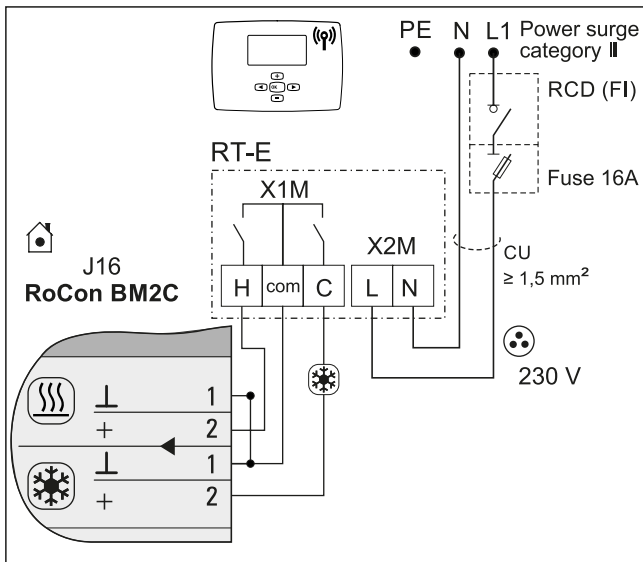


#### INFORMATION

A separate manual containing instructions about installation and operation is included with this component.



3-39 Connection with wired room thermostat (RT = Daikin EKRTW)



3-40 Connection with radio-controlled room thermostat (RT-E = Daikin EKRTTR)

#### 3.7.11 Connection of optional RoCon system components

The optional RoCon devices must be connected to the indoor unit via a 4-wire CAN bus cable (connection J13).

For this, we recommend shielded lines with the following characteristics:

- Standardisation according to ISO 11898, UL/CSA type CMX (UL 444)
- PVC outer sheath with flame retardancy according to IEC 60332-1-2
- Up to 40 m, minimum cross-section 0.75 mm<sup>2</sup>. Larger conductor cross-section necessary with increasing length.

Commercially available junction boxes can be used to connect CAN bus lines of several RoCon devices.

Ensure that mains, sensor and data bus lines are routed separately. Use only cable ducts with separators or separate cable ducts spaced at least 2 cm apart. Line crossings are permissible.

A maximum of 16 devices with a total line length of up to 800 m can be connected in the entire RoCon system.

#### EHS157034 room controller

A separate EHS157034 room controller can be connected for each heating circuit to enable remote adjustment of operating modes and room target temperatures from another room.



#### INFORMATION

Separate installation instructions are included with this component. See the enclosed control system manual for instructions on setting and operation.

#### EHS157068 mixer module

The EHS157068 mixer module can be connected to the indoor unit (J13 PCB connector) and is controlled by the electronic controller.



#### INFORMATION

Separate installation instructions are included with this component. See the enclosed control system manual for instructions on setting and operation.

#### EHS157056 Internet gateway

The controller can be connected to the internet with the optional EHS157056 gateway. This enables remote control of the indoor unit by mobile phones (by app).



#### INFORMATION

Separate installation instructions are included with this component. See the enclosed control system manual for instructions on setting and operation.

#### 3.7.12 Connecting the HP convector



#### INFORMATION

Only the EKRTCTRL1 and EKWHCTRL(0/1) convector controllers can be connected to the indoor unit.



#### INFORMATION

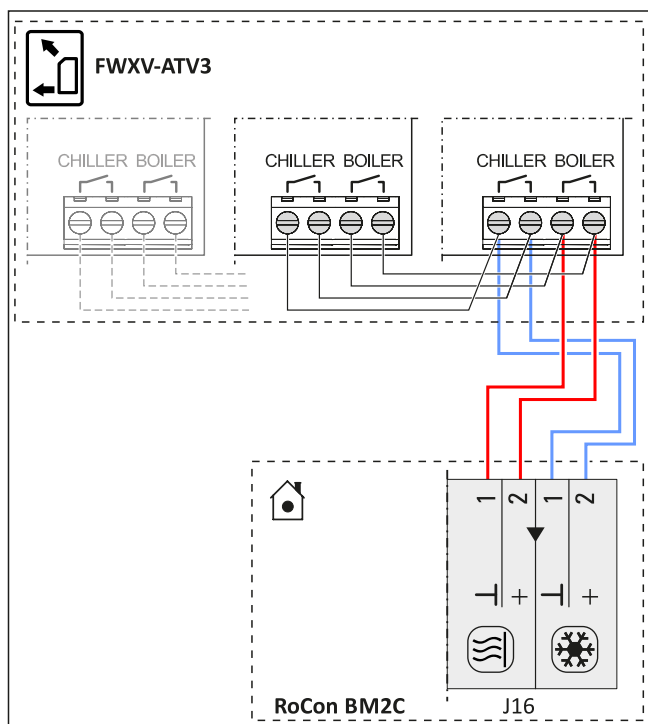
A separate manual containing instructions about installation and operation is included with this component.



#### INFORMATION

When changing the operating mode (Heating/Cooling) on a convector, all other convectors must either also be changed or deactivated.

## 3 Set-up and installation

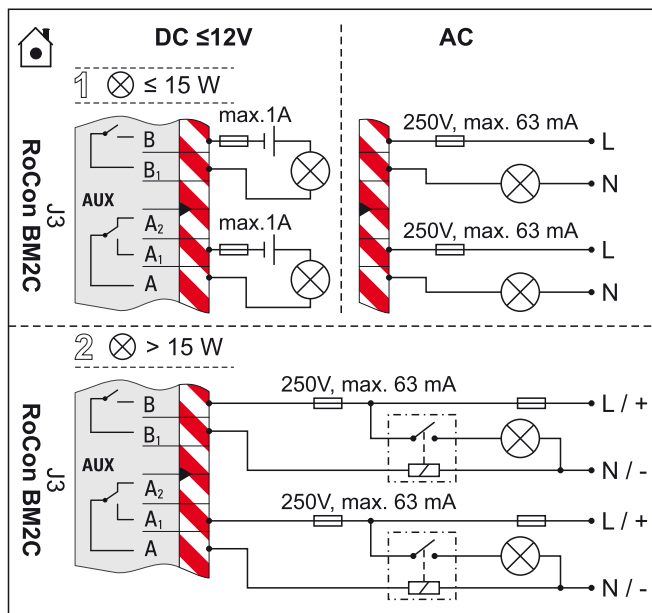


3-41 FWX(V/M)-AATV3 connection

### 3.7.13 Connecting switching contacts (AUX outputs)

The switching contacts (AUX outputs) can be used for various parametrisable functions.

Switchover contact A-A1-A2 switches under the conditions set in parameter [AUX switching function] [→ Main menu → Settings → Inputs/Outputs] (see controller operating instructions).



3-42 Connection of switching contact (AUX output)

Connection terminals B+B1 are not occupied for these devices or are available for additional functions.

The contacts in variant 1 (switched power ≤15 W) can be directly integrated as shown in "3-42 Connection of switching contact (AUX output)" [p 26].

The relays user for variant 2 (switched output >15 W) must be suitable for a 100 % power-on time.

Switchover contact A-A1-A2 can be used, for example, to control the heat generators in bivalent heating systems consisting of an indoor unit and an oil- or gas boiler. Examples of hydraulic system integration are described in "Hydraulic connection" in the reference manual for the fitter.



#### INFORMATION

If an A2 F or G-plus condensing boiler is connected, the [AUX switching function] and [AUX wait time] parameters must be set according to the desired function [→ Main menu → Settings → Inputs/Outputs].

See Operating instructions → chapter Parameter settings.

Precise information on the electrical connection and the required parameter settings for such bivalent heating systems are available on the Internet ([www.daikin.com](http://www.daikin.com)) or from your service partner.

### 3.7.14 Low rate mains connection (HT/NT)

If the outdoor unit is connected to a low rate mains connection, the potential-free switching contact S2S of the receiver, which evaluates the low rate input signal output from the utility company must be connected to plug J8, electricity supply company connection on the RoCon BM2C PCB (see "3-43 HT/NT contact connection" [p 27]).

When setting the [HT/NT function] parameter >0 [→ Main menu → Settings → Inputs/Outputs], certain system components are switched off during peak periods (see controller operating instructions).

The following types of low rate mains connection are common:

- Type 1: With this type of low rate mains connection, the power supply to the heat pump outdoor unit is not interrupted.
- Type 2: With this type of low rate mains connection, the power supply to the heat pump outdoor unit is interrupted after a certain period of time.
- Type 3: With this type of low rate mains connection, the power supply to the heat pump outdoor unit is interrupted immediately.

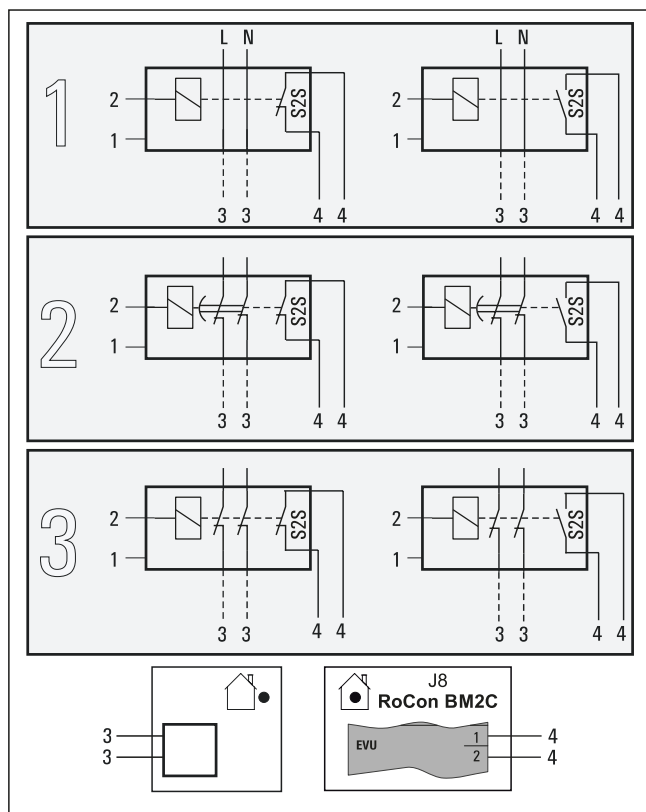
Potential-free switching contact S2S can be implemented as a normally closed or normally open switching contact.

- If implemented as a normally closed switching contact, the [HT/NT contact] parameter=1 must be set [→ Main menu → Settings → Inputs/Outputs]. When the EVU sends the off-peak signal, switching contact S2S is opened. The system switches to "Mandatory OFF". If the signal is sent again, potential-free switching contact S2S closes and the system resumes operation.
- If implemented as a normally open switching contact, the [HT/NT contact] parameter=0 must be set [→ Main menu → Settings → Inputs/Outputs]. When the EVU sends the off-peak signal, switching contact S2S is closed. The system switches to "Mandatory OFF". If the signal is sent again, potential-free switching contact S2S opens and the system resumes operation.



[HT/NT contact] = 1

[HT/NT contact] = 0



3-43 HT/NT contact connection

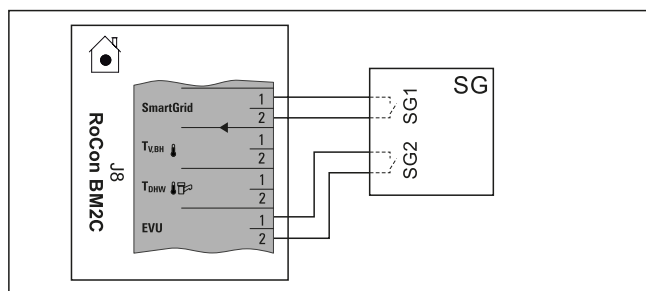
- 1 Mains connection box for low rate mains connection
- 2 Receiver for evaluating the HT/NT control signal
- 3 Power supply of the heat pump outdoor unit (see respective installation manual for the heat pump outdoor unit)
- 4 Potential-free switching contact for heat pump indoor unit

## 3.7.15 Connecting an intelligent controller (Smart Grid - SG)

If the [Smart grid] parameter=1, the function [→ Main menu → Settings → Inputs/Outputs] is activated (see controller operating instructions), the heat pump is switched to normal or a mode with higher temperatures depending on the utility company signal.

For this purpose, the SG1/SG2 floating switching contacts of the intelligent controller must be connected to the J8 connector, Smart Grid and electricity supply company connections on the RoCon BM2C PCB (see "3-44 Connecting the Smart Grid" [p 27]).

As soon as the Smart Grid function is active, the HT/NT function is automatically deactivated. Smart grid mode The heat pump is operated differently depending on the value of the parameter [→ Main menu → Settings → Inputs/Outputs] (see controller operating instructions).



3-44 Connecting the Smart Grid

## 3.8 Connection for refrigerant



### INFORMATION

Follow the installation instructions for the outdoor unit.

### 3.8.1 Laying refrigerant piping



### CAUTION

The use of refrigerant piping that has already been used may lead to damage to the unit.

- Do not reuse refrigerant piping that has been used with another refrigerant. Replace or carefully clean the refrigerant piping.

- Install lines with bending unit and an adequate clearance to electrical lines.
- Only solder with light nitrogen flow (hard soldering only).
- Do not apply thermal insulation to connection points until after commissioning (for purposes of leakage search).
- Make flared connections and connect to the devices (observe tightening torque, see "6.3 Tightening torques" [p 34]).

### 3.8.2 Pressure test and filling the refrigerant circuit



### WARNING

The overall heat pump system contains refrigerants with fluorinated greenhouse gases that are harmful to the environment when released.

Refrigerant type: R32

GWP\* value: 675

\*GWP = Global Warming Potential

- Enter the total filling quantity of refrigerant on the label supplied on the external heat pump unit (for notes, see Installation instructions for the heat pump outdoor unit).
- Never allow refrigerant to escape into the atmosphere - always extract and recycle with a suitable recycling device.

- 1 Perform pressure test with nitrogen.
  - Use nitrogen 4.0 or higher.
  - Maximum 40 bar.
- 2 After the leak search is complete, completely drain.
- 3 Vacuum lines.
  - Pressure to be reached: 1 mbar absolute.
  - Time: Minimum 1 h
- 4 Check whether additional refrigerant is needed for primer filling; fill if necessary.
- 5 Open the stop valves on the outdoor unit completely until the stop. Slightly tighten.
- 6 Reinstall the valve caps.
- 7 Check that the storage tank temperature sensors are inserted to a depth of  $t_{DHW1}$  80 cm and  $t_{DHW2}$  60 cm.

## 3 Set-up and installation

### 3.9 Filling the system

Only fill the indoor unit after all installation work is completed in the order shown below.

#### 3.9.1 Checking the water quality and adjusting the manometer

- 1 Comply with the instructions for the water connection (see ["3.6 Water connection"](#) [p 18]) and for the water quality.
- 2 Adjust the mechanical manometer (mounted on site in accordance with ["3.6.2 Connecting hydraulic lines"](#) [p 19] or temporarily installed with filling hose): Turn the pressure gauge glass so that the minimum pressure marking corresponds to the **system height +2 m** (1 m water column corresponds to 0.1 bar).


#### 3.9.2 Filling hot water heat exchangers

- 1 Open the shut-off valve for the cold water supply pipe.
- 2 Open the hot water tap connections so that the draw-off volume can be set as high as possible.
- 3 Once water has been discharged from the tap connections, do not interrupt the cold water flow to ensure that the heat exchanger will be fully vented and that any impurities or residue will be discharged.

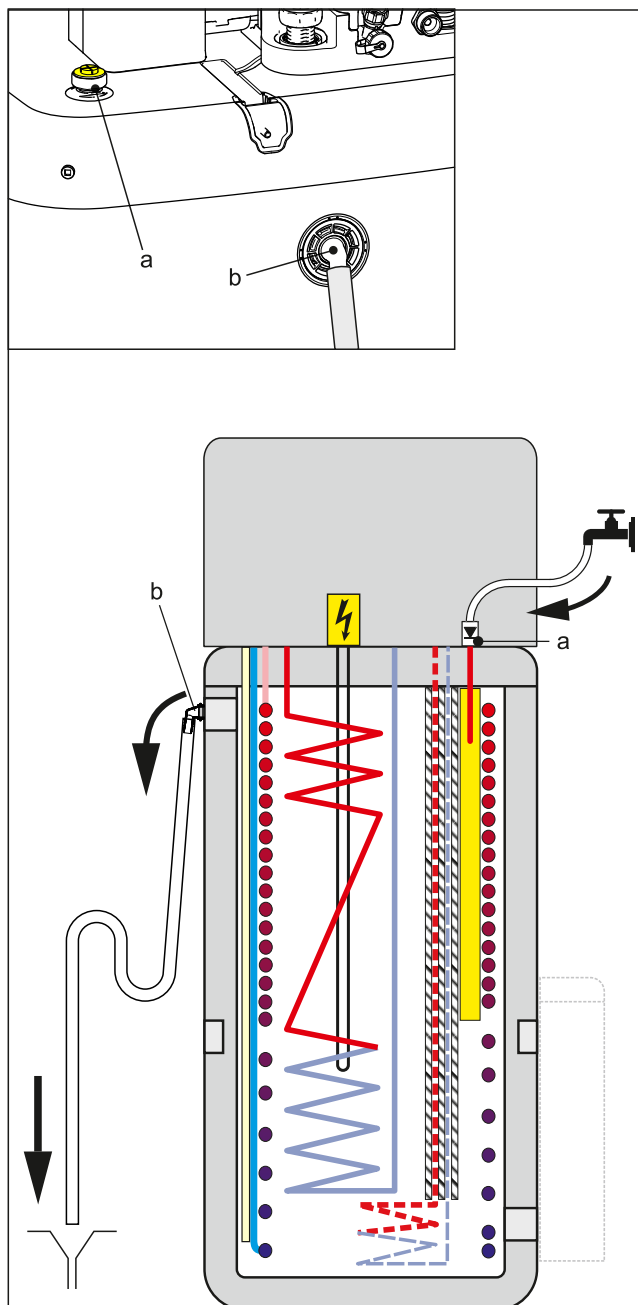
#### 3.9.3 Filling the storage tank


Without installed  solar system


- 1 Connect the **charge hose** with non-return valve (1/2") to the **"Solar flow"** connection (item a).
- 2 **Fill** the storage tank of the indoor unit **until water emerges at the overflow connection** (item b).
- 3 Disconnect the charge hose with backflow prevention (1/2") again.

With installed  solar system

- 1 Install the filling connection with combined filling and draining valve (accessory **combined filling and draining BA**) following the solar control and pump unit (EKS RPS4).
- 2 Connect the **charge hose** with non-return valve (1/2") to the previously installed combined filling and draining valve.
- 3 **Fill** the storage tank of the indoor unit **until water emerges at the overflow connection** (item b).
- 4 Disconnect the charge hose with backflow prevention (1/2") again.



 3-45 Filling the buffer tank - without connected DrainBack solar system

- a  Solar flow  
b Safety overflow

#### 3.9.4 Filling the heating system



##### **DANGER: RISK OF ELECTROCUTION**

During the filling process, water may escape from any leaking points that can cause an electric shock if it comes into contact with live parts.

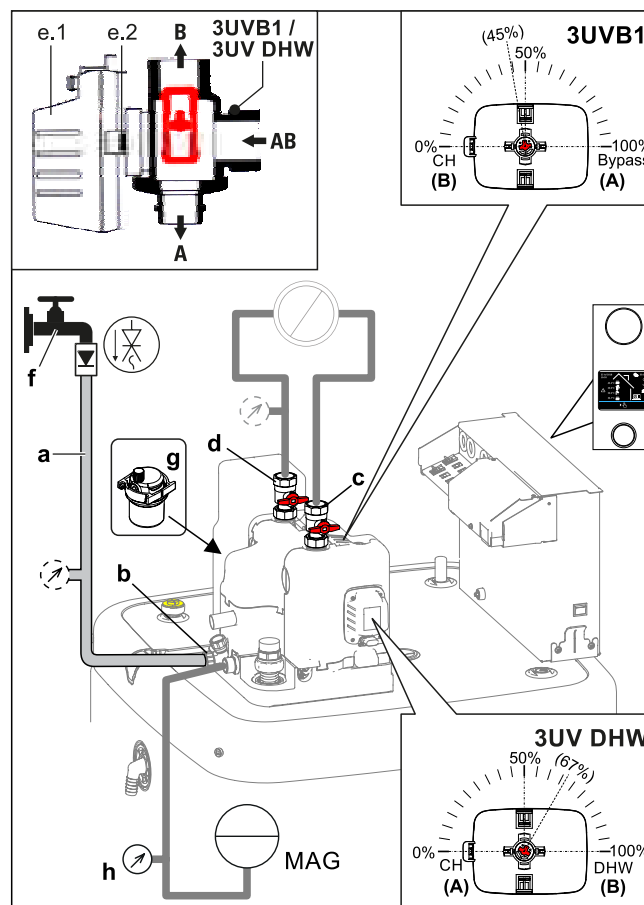
- Before the filling process, de-energise the indoor unit.
- After the first filling and before switching on the indoor unit at the mains switch, check that all electric parts and connection points are dry.



##### **INFORMATION**

Comply with the instructions for the water connection (see ["3.6 Water connection"](#) [p 18]) and water quality (see ["1.2.6 Heating system and sanitary connection"](#) [p 6]).

- 1 Connect the charge hose (item a) with the non-return valve (1/2") and an external manometer (on the building side) to the combined filling and draining valve (item b) and secure it against slipping off with a hose clamp.
- 2 Connect the drain hose to the air purge valve, and route it away from the device. Open the air purge valve with the hose connected; check to make sure that the other air purge valve is closed.
- 3 Open the water tap (item d) on the feed pipe.
- 4 Open the combined filling and draining valve (item b) and monitor the manometer.
- 5 Fill the system with water until the external manometer shows that the system target pressure is reached (system height +2 m; 1 m water column = 0.1 bar). The overpressure valve must not actuate!
- 6 Close the manual air purge valve as soon as water emerges free of bubbles.
- 7 Close the water tap (item d). The combined filling and draining valve must remain open in order to read off the water pressure on the external manometer.
- 8 Switch on the power supply of the indoor unit.
- 9 In the RoCon+ HP1 controller in the "Operating mode" menu, select the "Heating" operating mode [→ Main menu → Operating mode].
- After the start phase, the indoor unit runs in hot water heating operation.
- 10 Constantly check the water pressure on the external manometer during hot water heating mode, and top up water via the combined filling and draining valve (item b) if necessary.
- 11 Vent the entire heating system as described in "5.3 Bleeding the hydraulic system" [p. 30] (open the system's control valves. At the same time, the underfloor heating system can be filled and flushed by the underfloor distributor).
- 12 Again check the water pressure on the external manometer, and top up water via the combined filling and draining valve (item b) if necessary.
- 13 Remove the charge hose (item a) with backflow preventer from the combined filling and draining valve (item b).



3-46 Filling the heating circuit

- a Charge hose with non-return valve (and manometer <sup>(1)</sup>)
- b Combined filling and draining valve
- c Heater ball valve – flow
- d Heater ball valve – return flow
- e.1 Valve drive
- e.2 Unlocking key of the drive lock
- f Water tap
- g Automatic vent valve
- h Manometer
- 3UV DHW 3-way valve (distribution valve, hot water/heating/heating support)
- 3UVB1 3-way valve (mixing valve)
- MAG Expansion vessel (on the building side)

## 4 Configuration

If the system is not configured correctly, it may not work as expected.

The system is configured via the control panel of the controller. Please refer to the operating instructions.

If necessary, the configuration of optional components (such as the room thermostat or the solar system) must be carried out according to the respective instructions.

<sup>(1)</sup> if not already installed in the heating system

## 5 Check list for start-up

### 5 Check list for start-up



#### INFORMATION

Read chapter "General safety precautions" thoroughly before carrying out the steps described here.



#### INFORMATION

If the outdoor unit has been disconnected from the power supply for an extended period of time or the indoor unit was operated before the outdoor unit for an extended period of time, the indoor unit must be restarted to establish communication between the units. Without communication, the outdoor unit is not used to generate heat.

### 5.1 Requirements

- The indoor unit is fully connected.
- The refrigerant system is dehumidified and filled with the specified amount of refrigerant.
- The heating and hot water system has been filled and pressurised to the correct pressure (see "3.9.4 Filling the heating system" ▶ 28).
- The storage tank is filled up to the overflow (see "3.9.3 Filling the storage tank" ▶ 28).
- Optional accessories have been installed and connected up.
- The heating system's control valves are open.

### 5.2 Commissioning at low ambient temperatures

At low ambient temperatures, the safety settings of the indoor unit may prevent heat pump operation. In such cases, an external heat generator is required to temporarily raise both the storage and return temperatures of the heating network.

Minimum storage temperatures for heat pump operation:

Ambient temperature  $\leq -2^{\circ}\text{C}$ :  $30^{\circ}\text{C}$

Ambient temperature  $< 12^{\circ}\text{C}$ :  $23^{\circ}\text{C}$

The following steps must be performed:

#### With electrical backup heater:

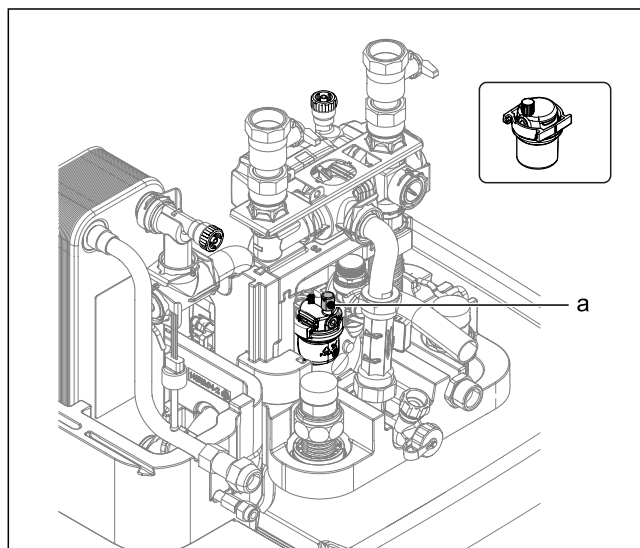
- 1 Parameter [Heating support (HZU)]: "On" select [→ Main menu → Settings → ISM]
- 2 Parameter [Config. ext. heat source]: "Backup heater BUH" select [→ Main menu → Settings → Ext. source]
- 3 Parameter [External power hot water]: Select maximum output of backup heater [→ Main menu → Settings → Ext. source]
- 4 Parameter [1 x hot water]: "On" select [→ Main menu → User → 1x load]

#### Without electrical backup heater:

- 1 Parameter [Heating support (HZU)]: "On" select [→ Main menu → Settings → ISM]
- 2 The storage water must be heated to the required minimum temperature by an external heat generator.

### 5.3 Bleeding the hydraulic system

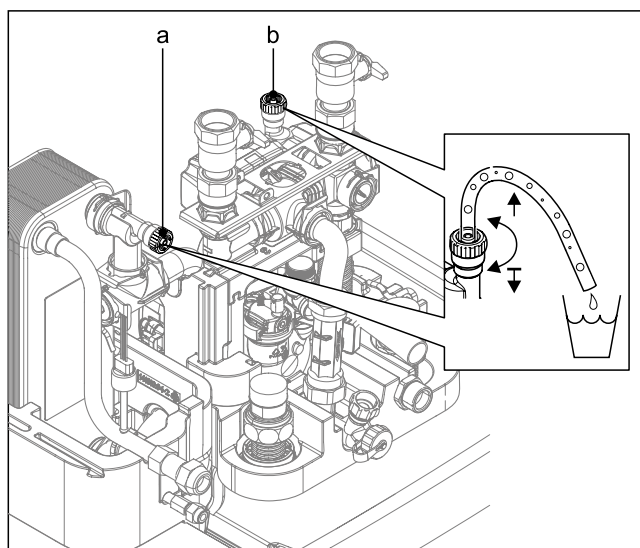
- 1 Make sure that the automatic vent valve cap is open (item a).



5-1 Automatic vent valve

a Automatic vent valve cap

- 2 Provide the manual air purge valve (item a) with a hose and direct it away from the unit. Open the valve until air no longer comes out.
- 3 Fit the second manual air purge valve (item b) with a hose and open until no more air escapes.



5-2 Manual air purge valves

a Manual air purge valve  
b Second manual air purge valve

- 4 Activating the ventilation function (see operating instructions RoCon+ HP1).

By activating the ventilation function, the RoCon+ HP1 controller starts a permanently defined sequence program with start/stop operation of the integrated heating circulation pump and various settings of the 3-way changeover valves integrated in the indoor unit.

Air present in the hydraulics and the connected heating circuits can escape via the automatic air purge valve during the venting function.



#### INFORMATION

The activation of this function does not replace correct venting of the heating circuit.

The heating circuit must be completely full before activating this function.

- 5 Check the water pressure and replenish water if necessary (see "3.9.4 Filling the heating system" ▶ 28).

- 6 Repeat the air purge, checking and replenishing process until:
- It is completely vented.
  - There is sufficient water pressure.

### 5.4 Checking the minimum flow

The minimum flow must be checked with the heating circuit closed.



#### INFORMATION

If the minimum flow is too low, an error message may appear and the heating system may shut down.

If the minimum flow rate is not sufficient, there may be air in the circulation pump or the valve drive of the 3-way changeover valves (3UVB1/3UV DHW) is defective.

- Vent the circulation pump.
- Check the function of the valve drives; replace the valve drive if necessary.

- 1 Close the valves and adjuster drives of all connected heat distribution circuits.
- 2 Set operating mode "Heating" on the indoor unit controller [→ Main menu → Operating mode].
- 3 Read information parameters [Volume flow] [→ Main menu → Information → Values].
  - The flow rate must be at least 480 l/h (see Controller operating instructions).



#### INFORMATION

The controller of the indoor unit constantly monitors the flow rate of the internal heat generator circuit. Different minimum flow rate values are required depending on the active operating mode:

"Heating" operating mode: 480 l/h

"Cooling" operating mode: 660 l/h

Automatic thawing function (Defrost) active: 780 l/h

If an error message regarding an inadequate minimum flow is displayed at a flow rate of more than 480 l/h, check the actual flow rate in the active operating mode and eliminate possible fault causes.


### 5.5 Start screed drying (only if required)

In the screed program, the flow temperature is controlled according to a pre-set temperature profile.

See the Controller operating instructions for further information on the screed program, its activation and sequence.

After the screed program has ended, the RoCon+ HP1 controller continues to work in the previously set operating mode.

### 5.6 Commissioning checklist

Commissioning checklist/Check off measures carried out <input checked="" type="checkbox"/>			Chapter	
1.	Supply indoor unit and outdoor unit (if present) with voltage	These instructions	"3.7 Electrical connection" [p 20]	<input type="checkbox"/>
2.	Enter "Expert code"	RoCon+ HP1	4.5.1	<input type="checkbox"/>
3.	Set the operating parameters [→ Configuration Wizard → Setting parameters] [Hot water temperature target 1] ▪ Do not set below 40°C during commissioning. ▪ Never set below 35°C after commissioning!	RoCon+ HP1	5.2	<input type="checkbox"/>
4.	Activate the ventilation function	RoCon+ HP1	4.5.7	<input type="checkbox"/>
	▪ Check the water pressure	These instructions	"5.3 Bleeding the hydraulic system" [p 30]	<input type="checkbox"/>
	▪ Checking the minimum flow		"5.4 Checking the minimum flow" [p 31]	<input type="checkbox"/>
5.	Activate the "Heating" operating mode Observe the waiting time (up to 5 min) Observe "5.2 Commissioning at low ambient temperatures" [p 30] at low ambient temperatures.	RoCon+ HP1	4.1	<input type="checkbox"/>
6.	Start-up is complete when the display shows the WW temperature above 40°C. 			<input type="checkbox"/>
7.	[Screed drying] (if necessary) Screed drying only after commissioning is complete. As soon as the temperature of the storage tank is at least 40°C, activate (also possible without outdoor unit).	RoCon+ HP1	4.5.7	<input type="checkbox"/>

## 5 Check list for start-up

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### 5.7 Handover to the operating company

Once the test run is finished and the unit operates properly, please make sure the following is clear for the user:

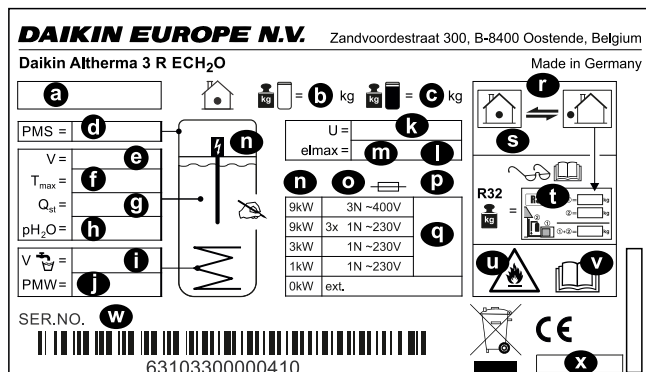
- Fill in the installer setting table (in the operation manual) with the actual settings.
- Make sure that the user has the printed documentation and ask him/her to keep it for future reference. Inform the user that he can find the complete documentation on the url as earlier described in this manual.
- Explain the user how to properly operate the system and what he/she has to do in case of problems.
- Show the user what he/she has to do in relation to maintaining the unit.
- Explain the user about energy saving tips as described in the operation manual.



## 6 Technical data

Part of the current technical data is available on the regional Daikin-website (publicly accessible). The complete technical data is available via the Daikin Business Portal (authentication required).

### 6.1 Information on the type plate



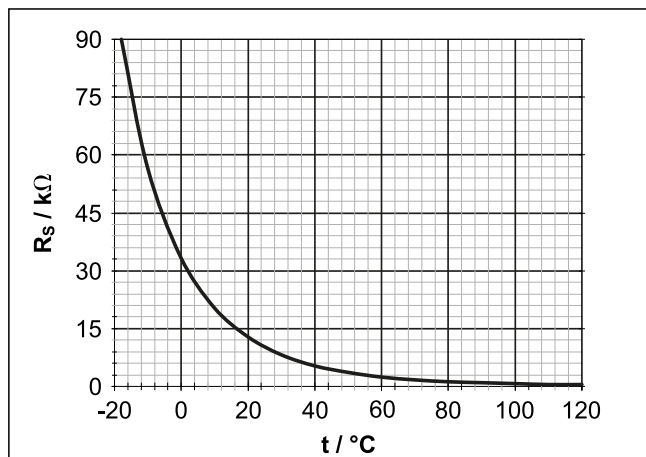
6-1 Type plate

## 6.2 Characteristic lines

### 6.2.1 Sensor characteristic lines

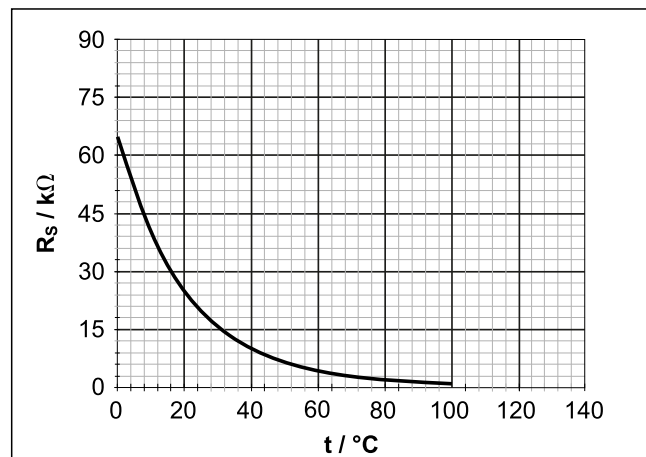
6-1 Temperature sensor

		Measured temperature in °C														
		-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
		Sensor resistance in kOhm according to standard or manufacturer's indications														
$t_{DHW1}$ , $t_{V, BH}$	NTC	98.66	56.25	33.21	20.24	12.71	8.20	5.42	3.66	2.53	1.78	1.28	0.93	0.69	0.52	0.36
$t_R$ , $t_V$ , $t_{DHW2}$ , $t_{DC}$	NTC	-	-	65.61	39.9	25	16.09	10.62	7.176	4.96	3.497	2.512	1.838	1.369	-	-



6-2 Characteristic of temperature sensor  $t_{DHW1}$ ,  $t_{V, BH}$

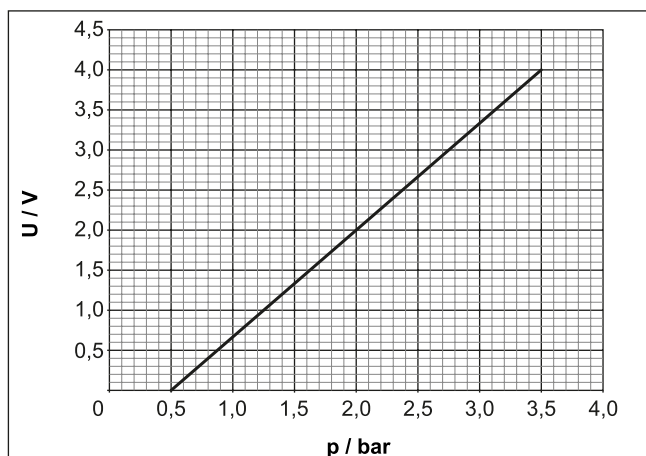
$R_s$  Sensor resistance (NTC)  
 $t$  Temperature  
 $t_{DHW1}$  Storage tank temperature sensor  
 $t_{V, BH}$  Backup heater flow temperature sensor



6-3 Characteristic of temperature sensor  $t_R$ ,  $t_V$ ,  $t_{DHW2}$ ,  $t_{DC}$

$R_s$  Sensor resistance (NTC)  
 $t$  Temperature  
 $t_{DC}$  Temperature sensor liquid line (refrigerant)  
 $t_{DHW2}$  Storage tank temperature sensor 2  
 $t_R$  Return temperature sensor  
 $t_V$  Flow temperature sensor

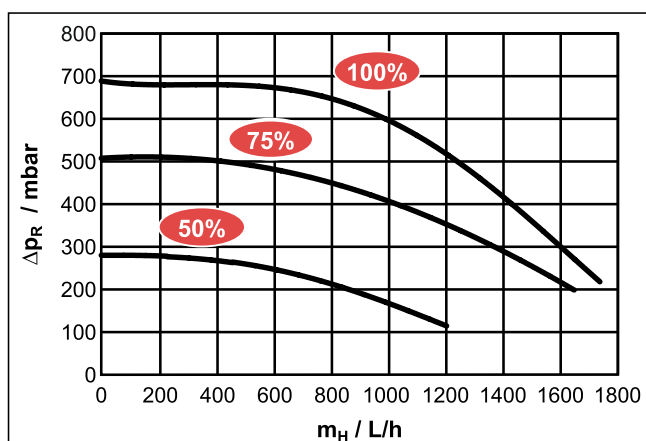
## 6 Technical data



6-4 Characteristic of the pressure sensor (DS)

p Water pressure  
U Voltage

### 6.2.2 Characteristic curves for pumps



6-5 Residual head of the internal heating circulation pump

Δp<sub>R</sub> Residual head of internal heating circulation pump  
m<sub>H</sub> Flow rate of heating system

## 6.3 Tightening torques



6-2 Tightening torques

Component	Thread size	Tightening torque in Nm
Temperature sensor	all	Max. 10
Hydraulic line connections (water)	1"	25 – 30
Gas line connections (refrigerant)	5/8"	63 – 75
Fluid line connections (refrigerant)	1/4"	15 – 17
Fluid line connections (refrigerant)	3/8"	33 – 40
Backup heater	1.5"	Max. 10 (handtight)

## 6.4 Minimum floor area and ventilation openings



### CAUTION

The use of refrigerant piping that has already been used can lead to damage to the unit.

- Do not reuse refrigerant piping that has been used with another refrigerant. Replace or carefully clean the refrigerant piping.

- If the total refrigerant charge in the system is <1.84 kg, there are no further requirements.
- If the total refrigerant charge in the system is ≥1.84 kg, other minimum floor space requirements must be met:

- Compare the total refrigerant charge in the system ( $m_c$ ) with the maximum refrigerant filling ( $m_{max}$ ) permitted for the installation room ( $A_{room}$ ), (see "6-3 Maximum refrigerant filling permitted in a room" [p 35]).

- If  $m_c \leq m_{max}$ : The device can be installed in this room without any further requirements.

- If  $m_c > m_{max}$ : Proceed with the following steps.

- Compare the minimum floor area ( $A_{min}$ ) from with the floor area of the installation room ( $A_{room}$ ) and the adjacent room ( $A_{room2}$ ) (see "6-4 Minimum floor area of indoor unit" [p 35]).

- If  $A_{min} \leq A_{room} + A_{room2}$ : Proceed with the following steps.

- If  $A_{min} > A_{room} + A_{room2}$ : Contact your local dealer.

- Calculate coolant quantity (dm):  $dm = 1.9 - m_{max}$  ( $m_{max}$  from "6-3 Maximum refrigerant filling permitted in a room" [p 35] the  $A_{room}$  for the given size of the installation room)

- For calculated dm, take the "6-5 Minimum area of the ventilation opening" [p 35] minimum area of the ventilation opening ( $VA_{min}$ ) for natural ventilation between the installation room and the adjacent room.

- The device can be installed if:

- 2 ventilation openings are provided between the installation room and adjacent room (1 each at top and bottom)
- Bottom opening: The bottom opening must meet the requirements for the minimum area of the ventilation opening ( $VA_{min}$ ). It must be as close to the ground as possible. If the ventilation opening starts on the floor, the height ≥ must be 20 mm. The bottom of the opening must be ≤100 mm above the floor. At least 50% of the required minimum area of the ventilation opening ( $VA_{min}$ ) must be <200 mm from the ground. The entire area of the opening must be <300 mm from the floor.
- Upper opening: The area of the upper opening must be larger or the same size as the lower opening. The bottom of the upper opening must be at least 1.5 m above the top edge of the lower opening.
- Ventilation openings to the outside are not considered suitable ventilation openings.

6-3 Maximum refrigerant filling permitted in a room

$A_{\text{room}}$ (m <sup>2</sup> )	Maximum refrigerant filling permitted in a room ( $m_{\text{max}}$ ) (kg)
1	0.14*
2	0.28*
3	0.41*
4	0.55*
5	0.69*
6	0.83*
7	0.90*
8	0.97*
9	1.02*
10	1.08*
11	1.13*
12	1.18*
13	1.23*
14	1.28*
15	1.32*
16	1.37*
17	1.41*
18	1.45*
19	1.49*
20	1.53*
21	1.56*
22	1.60*
23	1.64*
24	1.67*
25	1.71*
26	1.74*
27	1.77*
28	1.81*
29	1.84
30	1.87
31	1.90

\* Values are only required for step 3 (calculation of dm).

6-4 Minimum floor area of indoor unit

$m_c$ (kg)	Minimum floor area $A_{\text{min}}$ (m <sup>2</sup> )
1.84	28.81
1.86	29.44
1.88	30.08
1.90	30.72

6-5 Minimum area of the ventilation opening

dm (kg)	Minimum area of the ventilation opening ( $VA_{\text{min}}$ ) (cm <sup>2</sup> )
1.76	716
1.63	662
1.49	605
1.35	549
1.21	493
1.07	437
1.00	419
0.93	406
0.88	392
0.82	377
0.77	362
0.72	345
0.67	328
0.62	312
0.58	294
0.53	276
0.49	258
0.45	241
0.41	223
0.37	204
0.34	186
0.30	168
0.26	149
0.23	131
0.19	112
0.16	93
0.13	75
0.09	56
0.06	38
0.03	19

**Example: Total refrigerant charge 1.84 kg, installation room 15 m<sup>2</sup>**

6 From "6-3 Maximum refrigerant filling permitted in a room" [p 35]:  $m_c = 1.84$  kg,  $A_{\text{min}} = 29$  m<sup>2</sup>

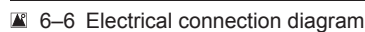
**Result:** Requirement for minimum room size NOT fulfilled, ventilation opening required

7 Check with "6-4 Minimum floor area of indoor unit" [p 35]:  $A_{\text{room}}$  (installation room) +  $A_{\text{room2}}$  (adjacent room)  $\geq A_{\text{min}}$ ? If so, continue:



8 From "6-3 Maximum refrigerant filling permitted in a room" [p 35]:  $A_{\text{room}} = 15$  m<sup>2</sup>  $\rightarrow m_{\text{max}} = 1.32$  kg

9  $dm = 1.9$  kg -  $1.32$  kg =  $0.58$  kg

10 From "6-5 Minimum area of the ventilation opening" [p 35]:  $dm = 0.58$  kg  $\rightarrow VA_{\text{min}} = 294$  cm<sup>2</sup>

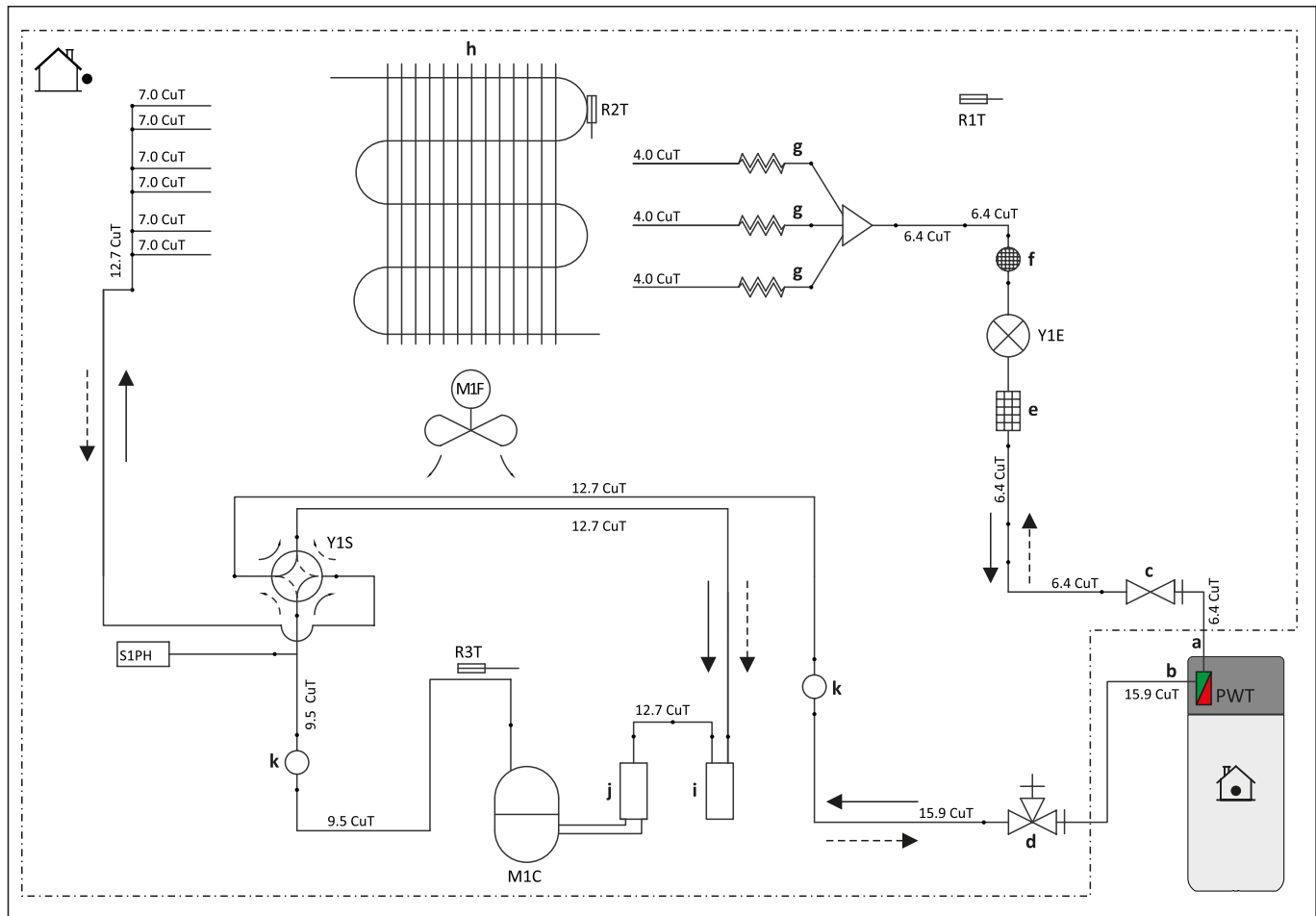


6-6 Key names for connection and wiring diagrams

Item	Name	Item	Name
	Heat pump outdoor unit	J2	Plug connection 3UVB1
	Heat pump indoor unit	J3	Plug connection AUX switching contacts and cooling output status output
3UVB1	3-way changeover valve (internal heat generator circuit)	J5	Pressure sensor plug connection
3UV DHW	3-way changeover valve (hot water/heating)	J6	Plug connection mains voltage
a	Switch box	J8	Plug connection for EXT
A1P	Printed PCB (heat pump basic control)		Plug connection for EBA
AUX	Switching contact outputs (A-A1-A2) + (B-B1)		Plug connection for Smart Grid EVU switching contacts
b	Switch box cover		Backup heater infeed temperature sensor plug connection $t_{V, BH}$
cooling output	Status output for "Cooling" operating mode (floor heating control connection cooling output)		Plug connection for storage tank temperature sensor $t_{DHW1}$
DS	Pressure sensor		Plug connection for HT/NT EVU switching contact
EBA	Switching contact for external requirement request	J10	Plug connection for internal wiring to X1A
EHS157034	Room station	J11	Plug connection for internal wiring to X18A (A1P)
EHS157068	Mixer module	J12	Plug connection 3UV DHW
EKBUXx	Backup heater	J13	System bus plug connection (e.g. room station)
EXT	Switching contact for external operating mode changeover	J14	Circulation pump $P_z$ plug connection
F1	Fuse 250 V T 2 A (RoCon BM2C)	J15	Mains switch plug connection
FLS	FlowSensor	J16	Room thermostat (EKTRT/EKRTW) plug connection
HT/NT	Switching contact for low rate mains connection	K1	Relay 1 for backup heater
P	Heating circulation pump (connected inside the device)	K2	Relay 2 for backup heater
$P_z$	Circulation pump	K3	Relay 3 for backup heater
PWM	Pump connection (PWM signal)	X1	Terminal strip for backup heater mains connection
RJ45 CAN	Internal wiring plug connection (RoCon BM2C) (to RoCon+ B1)	X3	Internal wiring plug connection to J17 (RoCon BM2C)
RoCon BM2C	Printed PCB (basic controller module)	X1A	Plug connection to J10 from RoCon BM2C
RoCon+ B1	Controller control panel	X3A	Plug connection for internal wiring (bridging plug)
RT	Room thermostat (EKRTW)	X4A	Plug connection for FLS flow sensor and $t_{DHW2}$
RT-E	Receiver for wireless room thermostat (EKTRT)	X5A	Plug connection for $t_V$ flow temperature sensor
RTX-EHS	Printed PCB (backup heater)	X7A	Plug connection for temperature sensor (refrigerant fluid) $t_{DC}$
SG	Switching contact for Smart Grid (intelligent mains connection)	X8A	Plug connection for return temperature sensor $t_R$
$T_A$	Outdoor temperature sensor	X16A	Plug connection for heating circulation pump
TRA1	Transformer	X18A	Plug connection to J11 from RoCon BM2C
$t_{DHW1}$	Storage tank temperature sensor 1 (RoCon BM2C)	X19A	Plug connection to XAG1
$t_{DHW2}$	Storage tank temperature sensor 2 (A1P)	X21A	Plug connection for internal wiring (bridging plug)
$t_R$	Return temperature sensor (A1P)	X22A	Plug connection for XTA1
$t_V$	Flow temperature sensor (A1P)	X26A	Plug connection to TRA1 (230 V)
$t_{V, BH}$	Backup heater flow temperature sensor	X31A	Plug connection to TRA1 (12 V)
		X2M6	HPc-VK-1 connection cable clamp
		X2M7	HPc-VK-1 connection cable clamp
		X11M	Terminal strip in FWXV-ATV3
		XAG1	Heat pump outdoor unit plug connection
		XBUH1	Backup heater plug connection (EKBUXx)
		XAG1	Heat pump outdoor unit plug connection
		XTA1	Outdoor temperature sensor terminal strip $T_A$

## 6 Technical data

### 6.6 Piping diagram for refrigerant circuit



6-7 Components in the heat pump circuit

- a Building-side piping (liquid: Ø6.4 mm flared coupling)
- b Building-side piping (liquid: Ø15.9 mm flared coupling)
- c Shut-off valve (liquid)
- d Shut-off valve with service port (gas)
- e Filter
- f Damper with filter
- g Capillary tube
- h Heat exchanger
- i Accumulator
- j Compressor accumulator
- k Damper
- M1C Compressor
- M1F Fan
- PWT Plate heat exchanger
- R1T Sensor (outside air)
- R2T Sensor (heat exchanger)
- R3T Sensor (compressor discharge)
- S1PH High pressure switch (automatic reset)
- Y1E Electronic expansion valve
- Y1S Solenoid valve (4-way valve)(ON: Cooling)
- > Heating
- > Cooling