



For the qualified installer

*a member of **DAIKIN** group*

ROTEX

ROTEX HPSU compact (V5) Installation and maintenance manual

Solar tank with integrated interior heat pump unit



CE

For the types

HPSU compact 304
HPSU compact 308
HPSU compact 508
HPSU compact 516



GB

Edition 04/2016

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HP SU compact 308 H/C DB-5, HPSU compact 308 H/C Biv-5, HPSU compact 508 H/C DB-5, HPSU compact 508 H Biv-5,
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EN60335-1,
EN60335-2-40,
EN5014-1:2006 (+A1:2009+A2:2011),
EN5014-2:1997 (+A1:2001+A2:2008),
EN61000-3-2:2014,
EN61000-3-3:2003,
EN61000-6-2:2007 (+A1:2011),

EN14511,
EN14825,
EN16147

Commission regulation 81/3/2013
Commission regulation 64/12/2009

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- 09 с оговоренными сплохом:

Low Voltage 2014/35/EU
Electromagnetic Compatibility 2014/30/EU
Eco-design 2009/125/EC

- 10 under lagtagelise aastest mõlemaseni:
- 11 enligt Vilkonen:
- 12 gilt henhoft illes bestimmen:
- 13 noudatati määraväiski:
- 14 on dodžen iustavovem i přípise:
- 15 prema predpismama:
- 16 leviči uvođenju:
- 17 zgodno z postavljenim Direktivom:
- 18 in uma preevedor:

- 19 ob upoštevanju dokumenta:
- 20 vlastnosti nöutele:
- 21 çalıfakluk kriteriyu:
- 22 laikantis nustatytų, patikimum:
- 23 ierīcējot prasības, kas tiekšķas:
- 24 onriņķeļot iestādēm:
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- 25 (TR) tannan kend sonumluğunda ömrük izare bu bildirimi ligil olgunlu donanımın sağlığı gibi olduğunu beyan eder:

ROTEX

Georg Blümel
Managing Director

Güglingen, 20th of April 2016

ROTEX Heating Systems GmbH
Langwiesenstraße 10 · D-74363 Güglingen

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1 General Information

1.1 Observing instructions

Original Operating Instructions

These operating instructions are a >> *Translation of the Original Version* << in your language.

Please read this manual carefully and thoroughly before proceeding with the installation or modification of the heating system.

Target Group

These instructions are aimed at people who are authorised and who have successfully completed a qualifying technical or skilled manual training program for the particular work to be carried out and who have participated in professional development seminars recognised by the appropriate responsible authority. This, in particular, includes heating specialists and climate control technicians who have experience, as a result of their technical training and their knowledge of the subject, of proper and appropriate installation and maintenance of heating, climate control and cooling installations and heat pumps.

This manual provides all the necessary information for installation, start-up and maintenance, as well as basic information on operation and settings. All parameters needed for trouble-free operation have been configured at the factory. Please see the attached documents for a detailed description of operation and control.

Relevant documents

- ROTEX HPSU compact:
 - Operating instructions for the user/owner
 - Commissioning checklist
 - The operating manual for the user/owner
- Operating instructions for the RoCon HP control unit
- External unit for ROTEX HPSU compact; the associated installation and operating instructions.
- When connecting to a ROTEX solar system; the associated installation and operating instructions.
- If a ROTEX HP convector is connected; the associated installation and operating instructions.
- In the case of connection to a control component offered as an accessory (room controller, mixer module etc.); the associated installation and operating instructions.

The guides are included in the scope of supply for the individual units.

1.2 Warranty conditions

The legal guarantee conditions fundamentally apply. Our warranty conditions beyond that can be found online on your sales representative's webpage.

2 Safety

2 Safety

2.1 Warning signs and explanation of symbols

2.1.1 Meaning of the warnings

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



DANGER!

Draws attention to imminent danger.
Disregarding this warning can lead to serious injury or death.



WARNING!

Indicates a potentially dangerous situation.
Disregarding this warning can result in serious injury or death.



CAUTION!

Indicates a situation which may cause possible damage.
Disregarding this warning can lead to damage to property and the environment.



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 power



Risk of burning or scalding



Risk of environmental damage



Danger of local freezing up



Health impairing or irritant materials



Prescribed temperature for continuous use



Danger of explosion

2.1.2 Validity

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



Exterior heat pump unit RRLQ



Heat pump indoor unit HPSU compact



HP convector



Only valid for ROTEX HPSU compact with cooling function (see also section 2.3)



Pay attention to the stipulated tightening torque (See chapter 10.3 "Tightening torque")



Only applicable for the unpressurised solar system (drain-back)



Only applicable for the pressurised solar system.

2.1.3 Order number

Notes related to order numbers are identified by the shopping cart symbol

2.1.4 Handling instructions

- Instructions on actions are shown as a list. Actions of which the sequential order must be maintained are numbered.
 - Results of actions are identified with an arrow.
 - ⇨ Entry into a setting procedure
 - ⇨ Exit from a setting procedure

2.2 Avoid danger

The ROTEX HPSU compact is state-of-the-art and is built to meet all recognised technical requirements. However, improper use may result in serious physical injuries or death, as well as property damage.

To prevent such risks, install and operate ROTEX HPSU compact only:

- 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.



WARNING!

This equipment must 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 therefrom. **Children** must not play with the equipment. Cleaning or **user maintenance** must not be carried out by **children** without supervision.

2.3 Proper use

The ROTEX HPSU compact may only be used for preparation of warm water, as a room heating system, and depending on its design, as a room cooling system.

The ROTEX HPSU compact must be installed, connected and operated only according to the indications in this manual.

Only use of a suitable external unit approved by ROTEX is permitted. The following combinations are permissible in this respect:

Internal unit		External unit	
HPSU compact 304 H/C DB-5	14 15 73		
HPSU compact 304 H DB-5	14 15 81	RRLQ004CAV3	14 51 51
HPSU compact 304 H/C Biv-5	14 15 77		
HPSU compact 304 H Biv-5	14 15 85		
HPSU compact 308 H/C DB-5	14 15 74		
HPSU compact 308 H DB-5	14 15 82	RRLQ006CAV3	14 51 52
HPSU compact 308 H/C Biv-5	14 15 78	RRLQ008CAV3	14 51 53
HPSU compact 308 H Biv-5	14 15 86		
HPSU compact 508 H/C DB-5	14 15 75		
HPSU compact 508 H DB-5	14 15 83	RRLQ006CAV3	14 51 52
HPSU compact 508 H/C Biv-5	14 15 79	RRLQ008CAV3	14 51 53
HPSU compact 508 H Biv-5	14 15 87		
HPSU compact 516 H/C DB-5	14 15 76		
HPSU compact 516 H DB-5	14 15 84	RRLQ011CA(V3/W1)*	14 51 45/48
HPSU compact 516 H/C Biv-5	14 15 80	RRLQ014CA(V3/W1)*	14 51 46/49
HPSU compact 516 H Biv-5	14 15 88	RRLQ016CA(V3/W1)*	14 51 47/50

BIV - Additional heat exchanger for the bivalent connection

* Not all the equipment mentioned here is offered in some countries because of the various different country-specific connection conditions.

Tab. 2-1 Permissible combinations of ROTEX HPSU compact internal units and ROTEX heat pump external units

Any other use outside the intended use is considered as improper. The operator alone shall bear responsibility for any resulting damage.

Use as intended also involves compliance with maintenance and inspection conditions. Spare parts must at least satisfy the technical requirements defined by the manufacturer. This is the case, for example, with original spare parts.

2 Safety

2.4 Instructions for operating safety

2.4.1 Before working on the hydraulic system

- Work on the ROTEX HPSU compact (such as setup, servicing, connection and initial start-up) is only to 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 appropriate responsible authorities for the specific activity. This, in particular, includes heating specialists and climate control technicians who have experience, as a result of their technical training and their knowledge of the subject, of proper and appropriate installation and maintenance of heating, climate control and cooling installations and heat pumps.
- Switch off the external main switch before starting any work on the ROTEX HPSU compact and secure it against unintentional switch-on.
- 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.
- Only original ROTEX replacement parts may be used.
- When working on the hydraulics, you must first drain the water or release the pressure using the internal KFE valve. Otherwise hot water can jet out under pressure and result in injury.

2.4.2 Electrical installation

- Electrical installation may be carried out only by electrical engineers and in compliance with the valid electro-technical guidelines as well as the regulations of the relevant energy supply company (EVU).
- Compare the mains voltage (~230 V, 50 Hz or ~400 V, 50 Hz) indicated on the type plate with the supply voltage before connecting to the mains.
- Before beginning work on live parts, disconnect all of the systems circuits from the power supply (switch off main switch, disconnect fuse) and secure against unintentional restart.

- Equipment covers and service panels must be replaced as soon as the work is completed.

2.4.3 Working on cooling systems (heat pump)

The ROTEX HPSU compact requires fluorinated greenhouse gas for its function.



For work on stationary refrigeration systems (heat pumps) and air conditioning systems, proof of expertise is required in the European Community according to the F-Gases Directive (EC) No. 303/2008.

- up to 3 kg coolant fill quantity: Expert certificate category II
- 3 kg coolant fill quantity or over: Expert certificate category I

- Always wear safety goggles and protective gloves.
- When working on the refrigerant circuit, ensure that the workplace is well ventilated.
- Never carry out work on the coolant circuit in closed rooms or work pits.
- Do not let refrigerant come into contact with open fire, embers or hot objects.
- Never allow refrigerant to escape into the atmosphere (high pressure at the point of the leak).
- When removing the service pipes from the filling connections, never hold the connections in the direction of your body. Residual refrigerant could escape.
- Components and spare parts must at least satisfy the technical requirements defined by the manufacturer.

2.4.4 Site of installation

For safe and fault-free operation, it is necessary that the installation location of the ROTEX HPSU compact fulfills certain criteria. Related information can be found in chapter 4.2.

Information on the installation site of other components can be found in the associated documentation supplied with them.

2.4.5 Heating system and sanitary connection

- Create a heating system according to the safety requirements of EN 12828.
- With sanitary connection, you must observe;
 - EN 1717 - Protection of domestic water from contamination in domestic water installations and general requirements concerning safety equipment for the prevention of domestic water contamination by backflow
 - EN 806 - Technical regulations for domestic water installations (TRWI)
 - and, in addition, the country-specific legal regulations.

The connection of a solar installation, an electric heating rod or an alternative heat generator may cause the storage temperature to exceed 60 °C.

- For this reason you should fit scalding protection (e.g. VTA32 15 60 15 + Screw connection set 1" 15 60 16).

If the ROTEX HPSU compact is connected to a heating system with steel pipes, radiators or non-diffusion-proof floor heating pipes, slurry and swarf could enter the hot water storage tank and cause blockages, local overheating or corrosion.

- To prevent possible damage, fit a dirt filter or sludge separator into the heating return flow of the system.
 - SAS 1 (15 60 21)
- The dirt filter must be cleaned at regular intervals.

2 Safety

2.4.6 Requirements for the heating water

Observe the current technological regulations to prevent corrosion products and deposits.

Minimum requirements regarding the quality of filling and supplementary water:

- Water hardness (calcium and magnesium, calculated as calcium carbonate):
≤ 3 mmol/l
- Conductivity: ≤ 1500 (ideal ≤ 100) µS/cm
- Chloride: ≤ 250 mg/l
- Sulphate: ≤ 250 mg/l
- pH value (heating water): 6,5 - 8,5

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 is entirely that of the operator.

2.4.7 Operation

The ROTEX HPSU compact:

- Do not operate until all installation and connection work is completed.
- Only operate with a completely full storage tank (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 with the specified quantity of refrigerant and the type of refrigerant specified.
- Only operate if the protective cover is installed.

The prescribed maintenance intervals must be maintained and the inspection work must be carried out.

2.4.8 Instructing the user/owner

- Before you hand over the ROTEX HPSU compact, explain to the user/owner how to operate and check the system.
- Hand over the technical documentation (this document and all supporting documents) to the user and advise him that these documents must be made available at all times and be stored in the immediate vicinity of the unit.
- Make a record of the handover by filling out and signing the installation and instruction forms jointly with the user/owner.

3 Product description

3.1 Design and components

3.1.1 Top of unit

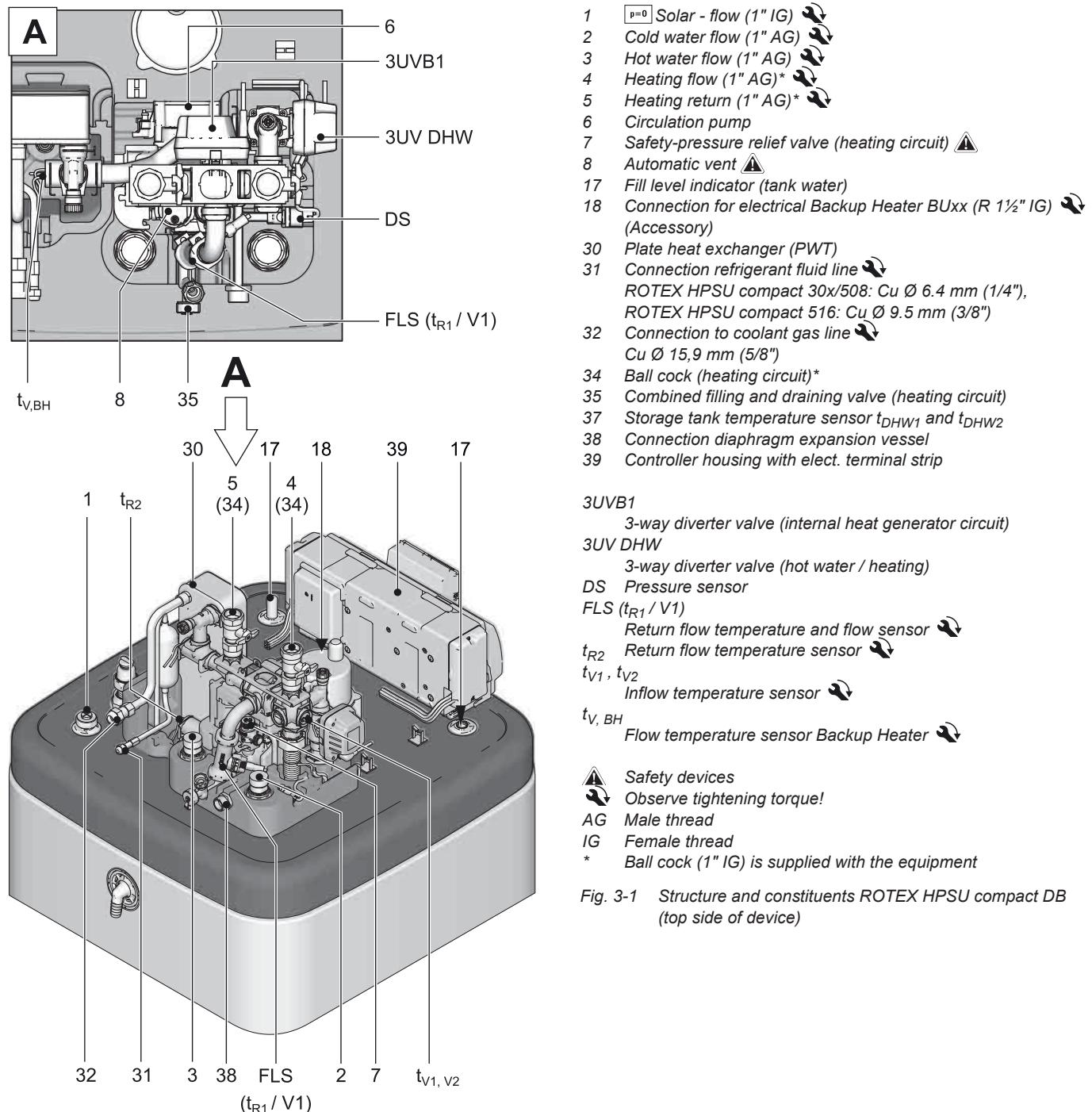


Fig. 3-1 Structure and constituents ROTEX HPSU compact DB (top side of device)

3 Product description

3.1.2 Equipment external and internal structure ROTEX HPSU compact 304/308 DB

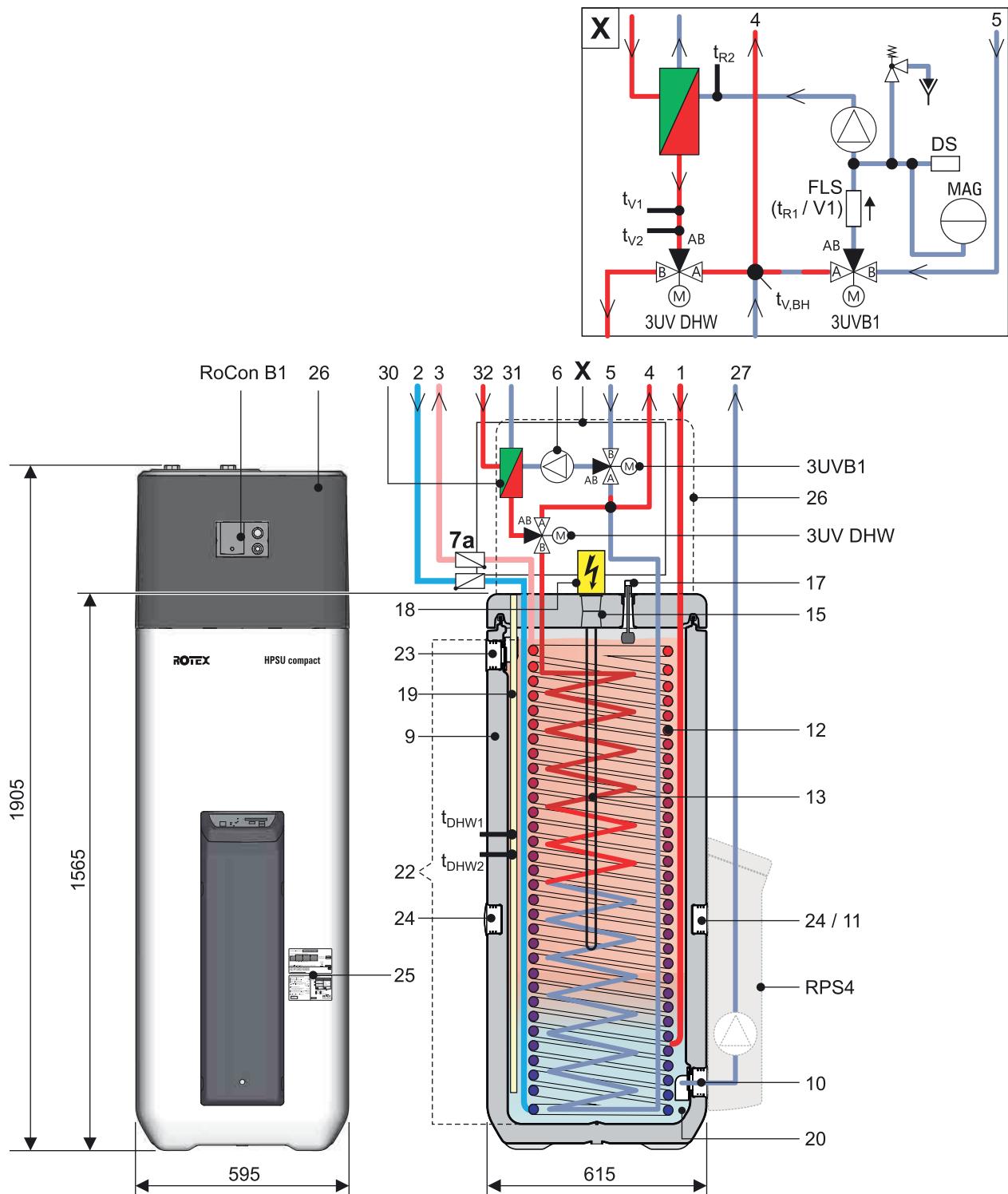


Fig. 3-2 Structure and constituents ROTEX HPSU compact 304/308 DB (External appearance and internal structure)
Designations of key see tab. 3-1

3.1.3 Equipment external and internal structure ROTEX HPSU compact 304/308 BIV

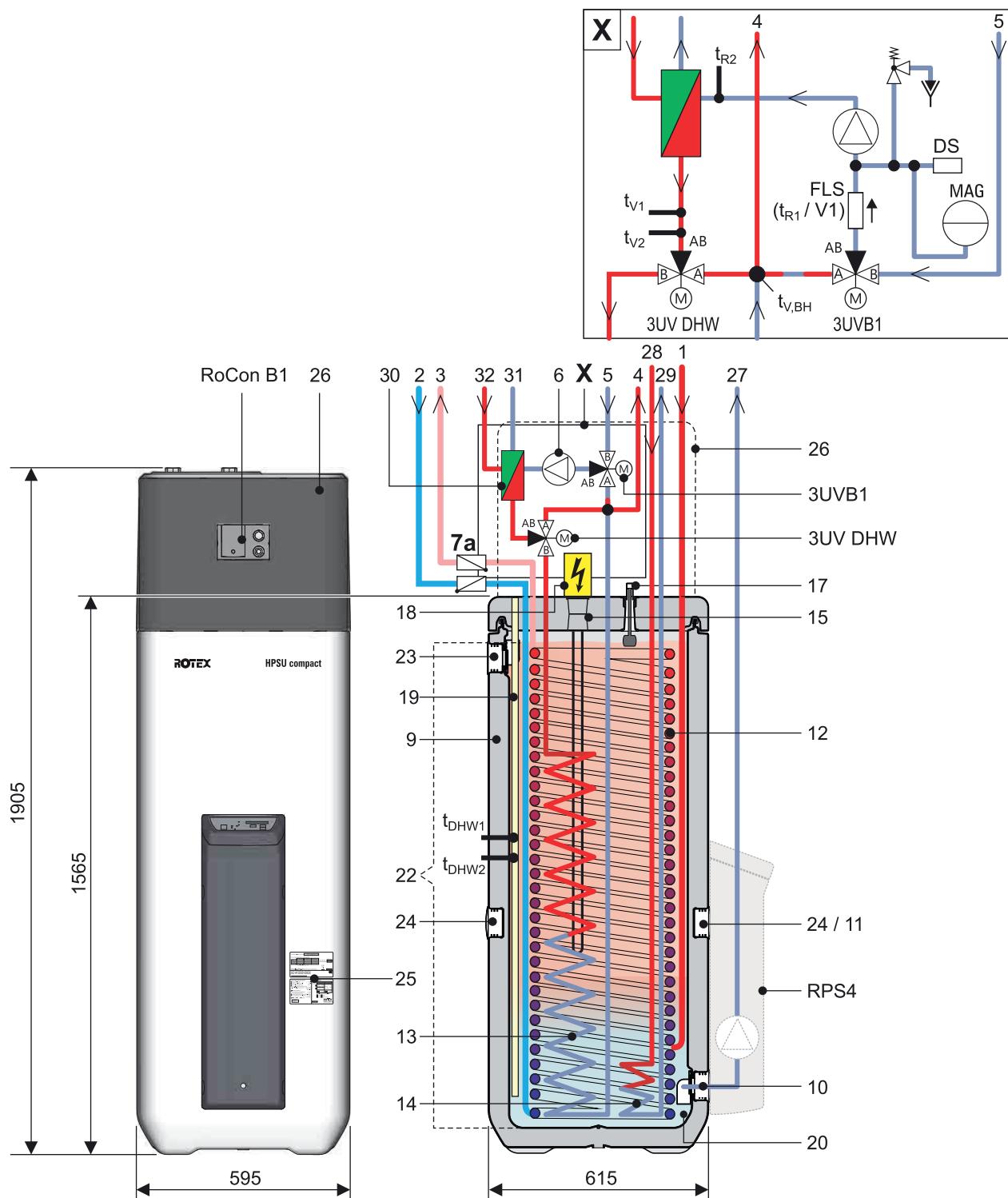
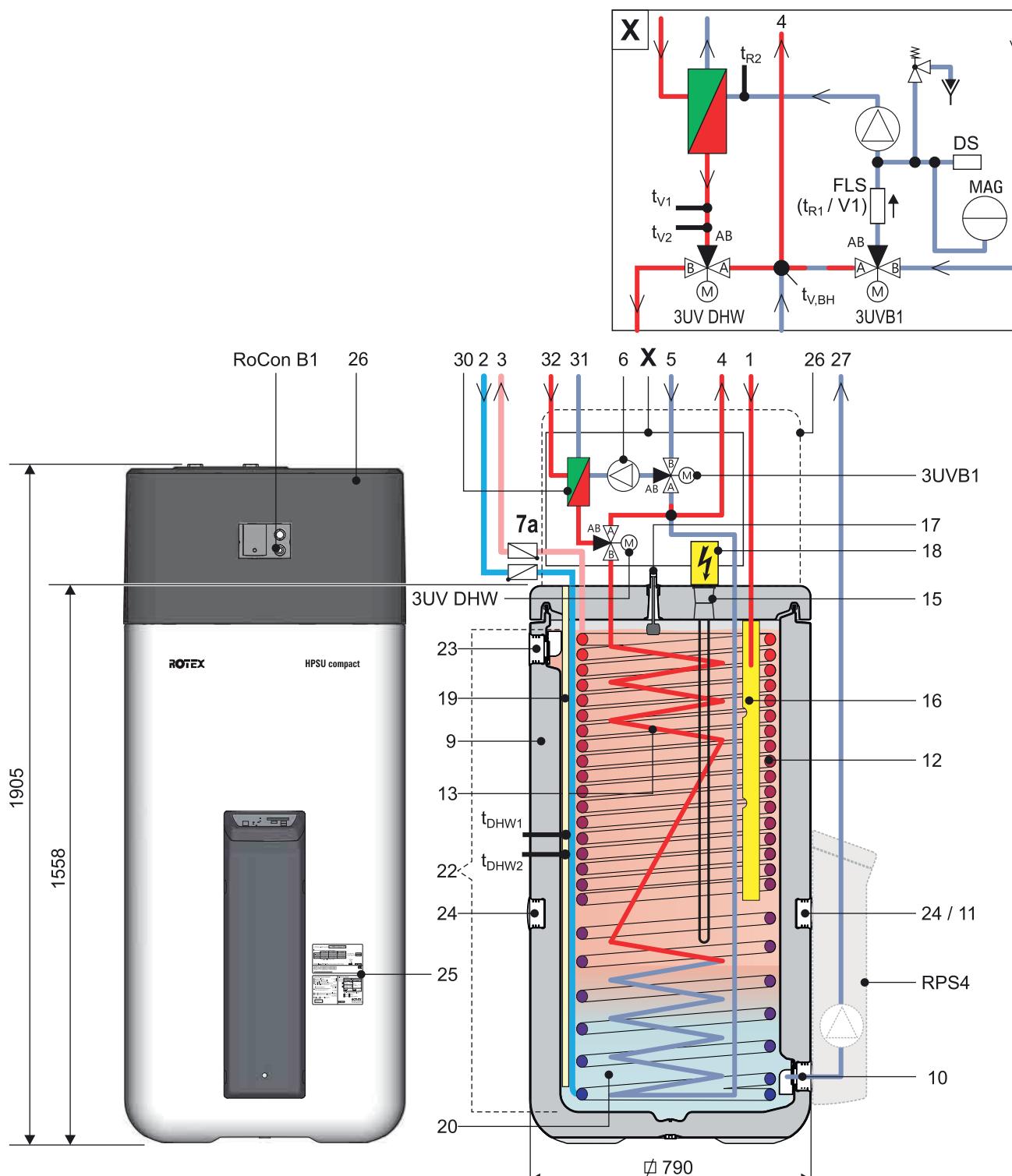


Fig. 3-3 Structure and constituents ROTEX HPSU compact 304/308 BIV (External appearance and internal structure)
Designations of key see tab. 3-1

3 Product description

3.1.4 Equipment external and internal structure ROTEX HPSU compact 508/516 DB



3.1.5 Equipment external and internal structure ROTEX HPSU compact 508/516 BIV

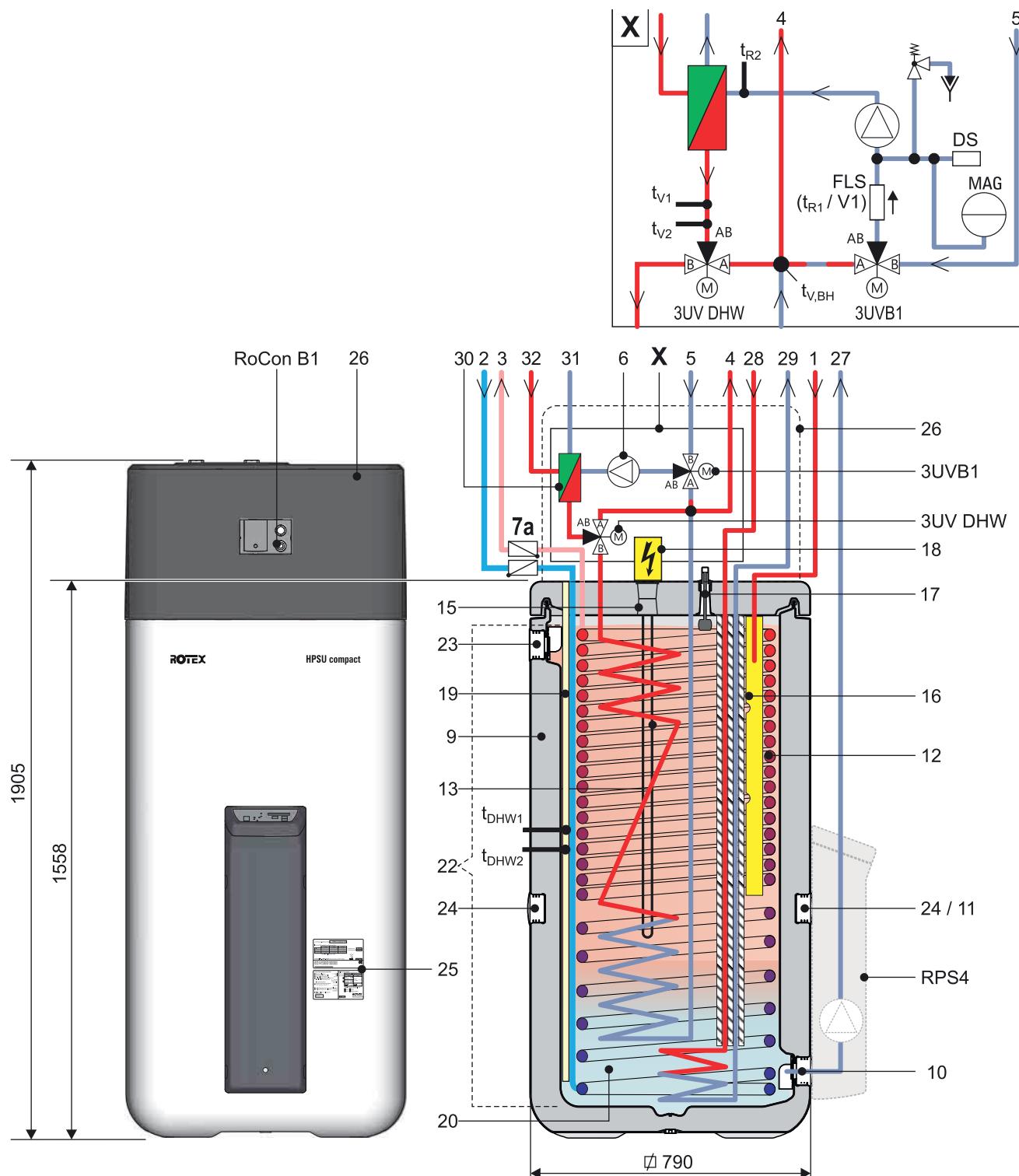


Fig. 3-5 Structure and constituents ROTEX HPSU compact 508/516 BIV (External appearance and internal structure)
Designations of key see tab. 3-1

3 Product description

1	 Solar - flow or connection for additional heat source (1" IG) 	19	Submersible sensor sleeve for storage tank temperature sensor t_{DHW1} and t_{DHW2}	DS	Pressure sensor
2	Cold water flow (1" AG) 	20	Unpressurised storage tank water	FLS (t _{R1} / V1)	Return flow temperature and flow sensor 
3	Hot water flow (1" AG) 	21	Solar zone	t_{DHW1} , t_{DHW2}	Storage tank temperature sensor 
4	Heating flow (1" AG)* 	22	Hot water zone	t_{R2}	Return flow temperature sensor 
5	Heating return (1" AG)* 	23	Safety overflow connection 	t_{V1} , t_{V2}	Inflow temperature sensor 
6	Circulation pump	24	Mount for handle	$t_{V, BH}$	Flow temperature sensor Backup Heater 
7a	Recommended accessories:	25	Type plate	RoCon B1	
9	Non-return valves (2 pcs.),  16 50 70	26	Protective cover	Operating section ROTEX HPSU compact control unit	
10	Storage tank (double walled jacket made of polypropylene with PUR hard foam heat insulation)	27	 Solar - return	RPS4	Optional:  ROTEX Solar regulation and pump unit
11	Filling and drainage connection or  Solar - return flow connection	28	 Solar - feed (3/4" IG + 1" AG) (only type ... Biv)	 Safety devices	
12	Mount for solar controller or handle	29	 Solar - return flow (3/4" IG + 1" AG) (only type ... Biv)	 Observe tightening torque!	
13	Heat exchanger (stainless steel) for drinking water heating	30	Panel heat exchanger	AG	Male thread
14	Heat exchanger (stainless steel) for pressurised solar storage tank charging	31	Fluid line for connection of refrigerant fluid 	IG	Female thread
15	Connection for optional electrical Backup Heater (R 1 1/2" IG) 	32	Connection to coolant gas line 	*	Ball cock (1" IG) is supplied with the equipment
16	 Solar inflow layering pipe	3UVB1	3-way diverter valve (internal heat generator circuit)		
17	Fill level indicator (tank water)	3UV DHW	3 way diverter valve (hot water/heating)		
18	Optional: Electrical backup heater (BUxx)				

Tab. 3-1 Legend from fig. 3-2 to fig. 3-5

4 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 life and health of people and be impaired in their function.

- Work on the ROTEX HPSU compact (such as setup, servicing, connection and initial start-up) is only to 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 and heat pumps.

4 Set-up and installation

4.1 Dimensions and connections

4.1.1 ROTEX HPSU compact 304/308

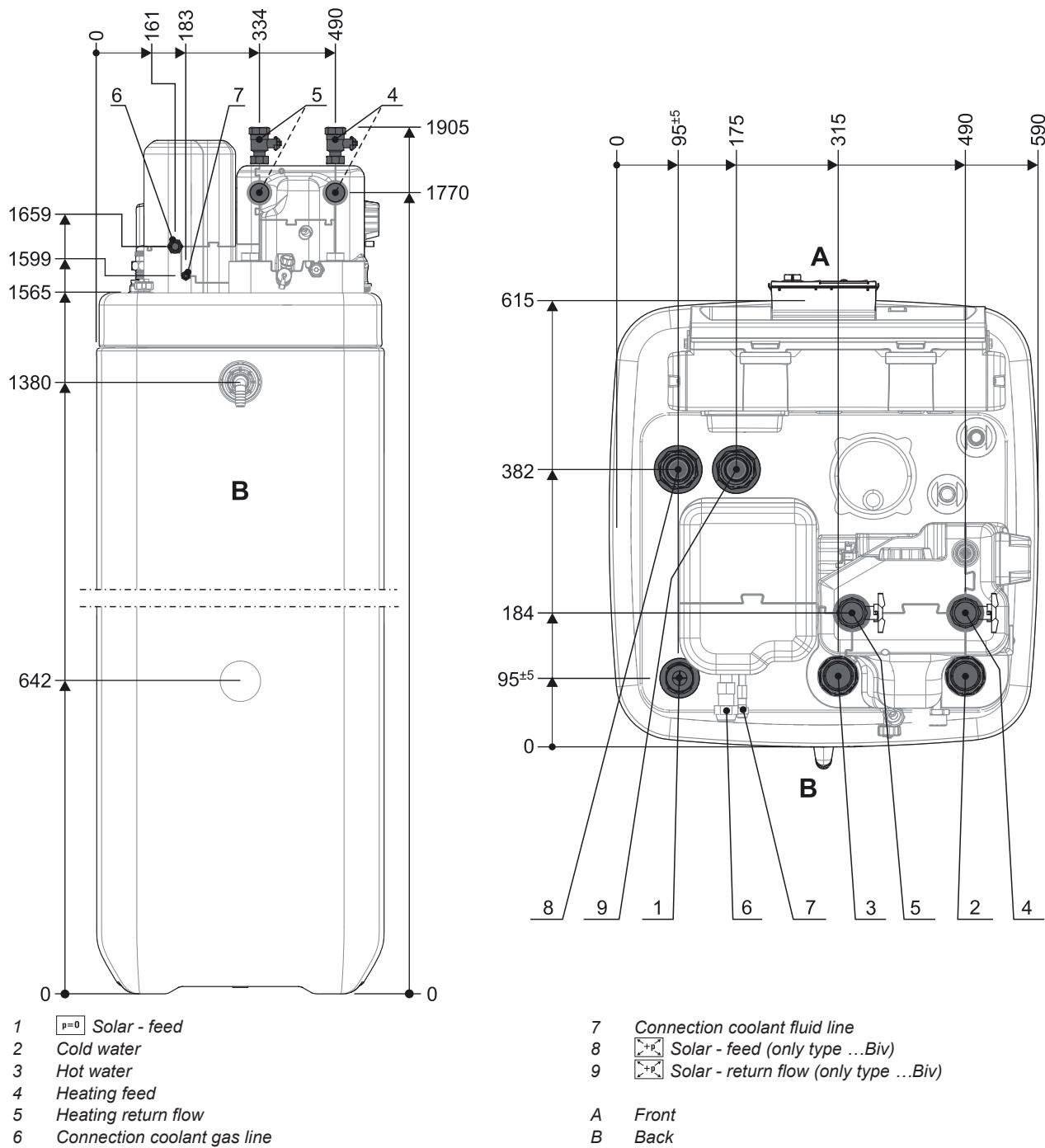


Fig. 4-1 Connections and dimensions ROTEX HPSU compact 304/308 (in general)

4.1.2 ROTEX HPSU compact 508/516

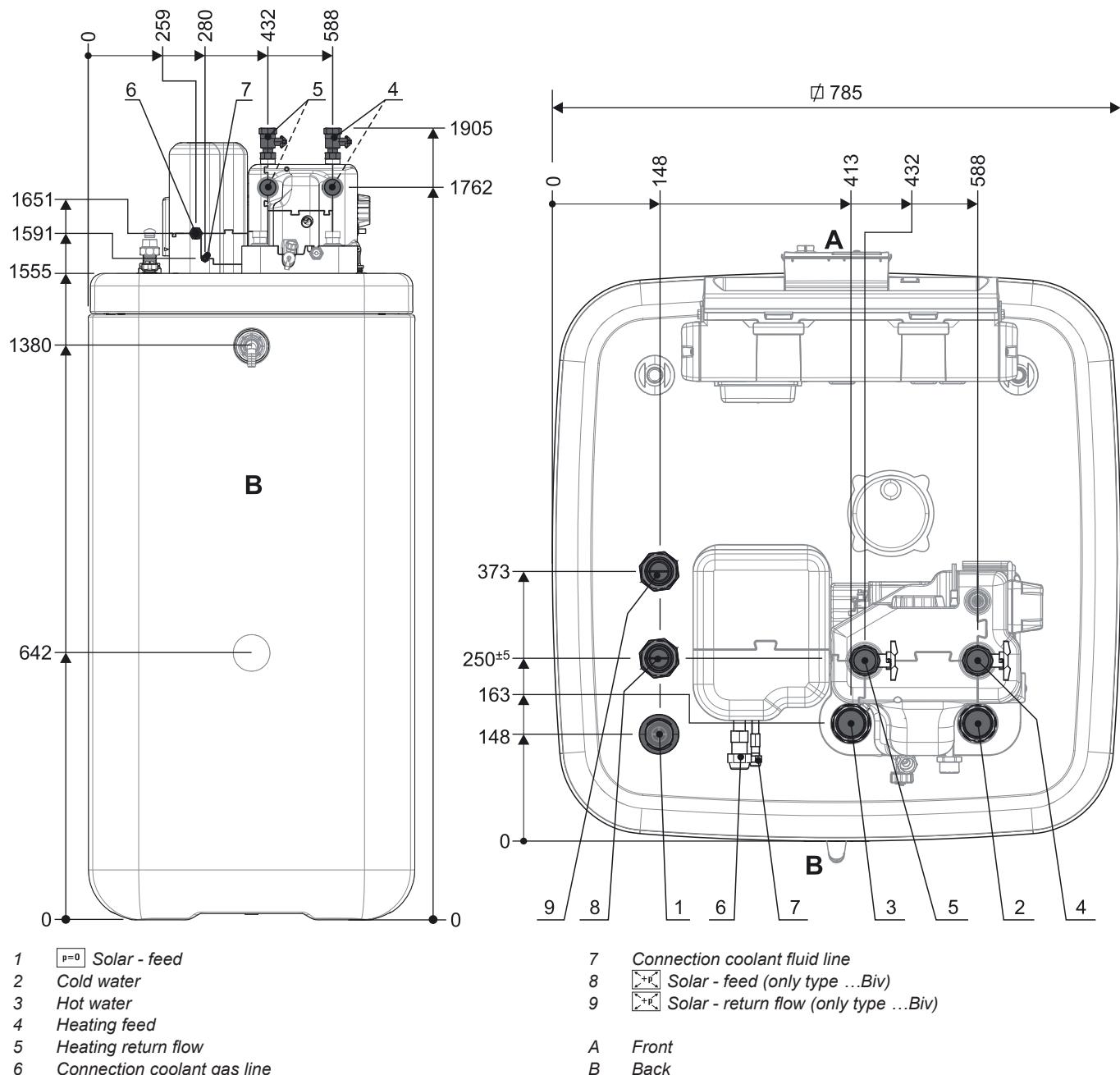
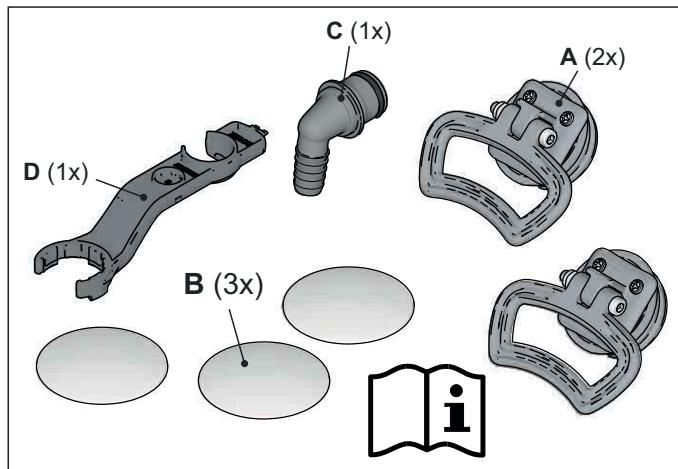


Fig. 4-2 Connections and dimensions ROTEX HPSU compact 508/516 (in general)

4 Set-up and installation

4.1.3 Scope of delivery

- ROTEX HPSU compact
- Bag of accessories (see fig. 4-3)



A Handles (only required for transport)
B Cover screen
C Hose connection piece for safety overflow
D Spanner

Fig. 4-3 Contents of bag of accessories

4.2 Set-up



CAUTION!

- Only erect the ROTEX HPSU compact when a sufficient **ground load-bearing capacity**, of **1050 kg/m²** plus safety margin, has been assured. The ground must be flat and level.
- Outdoor installation is not permitted.
- Erection in explosion-risk environments is not permitted.
- The electronic control system must not be subjected to atmospheric factors under any circumstances.
- The storage tank **must not be exposed to continuous direct solar radiation**, since the UV radiation and weather-influences will damage the plastic.
- The ROTEX HPSU compact must be installed in a manner **protected from frost**.
- Make sure that the supply company **does not provide corrosive domestic water**.
 - Suitable water treatment may be required.



WARNING!

The plastic wall of the storage tank on the ROTEX HPSU compact may melt due to the effects of external heat (>80 °C) and, in the extreme case, can catch fire.

- Erect the ROTEX HPSU compact only at a minimum distance of 1 m to other heat sources (>80 °C) (e.g. electric heater, gas heater, chimney) and flammable materials.

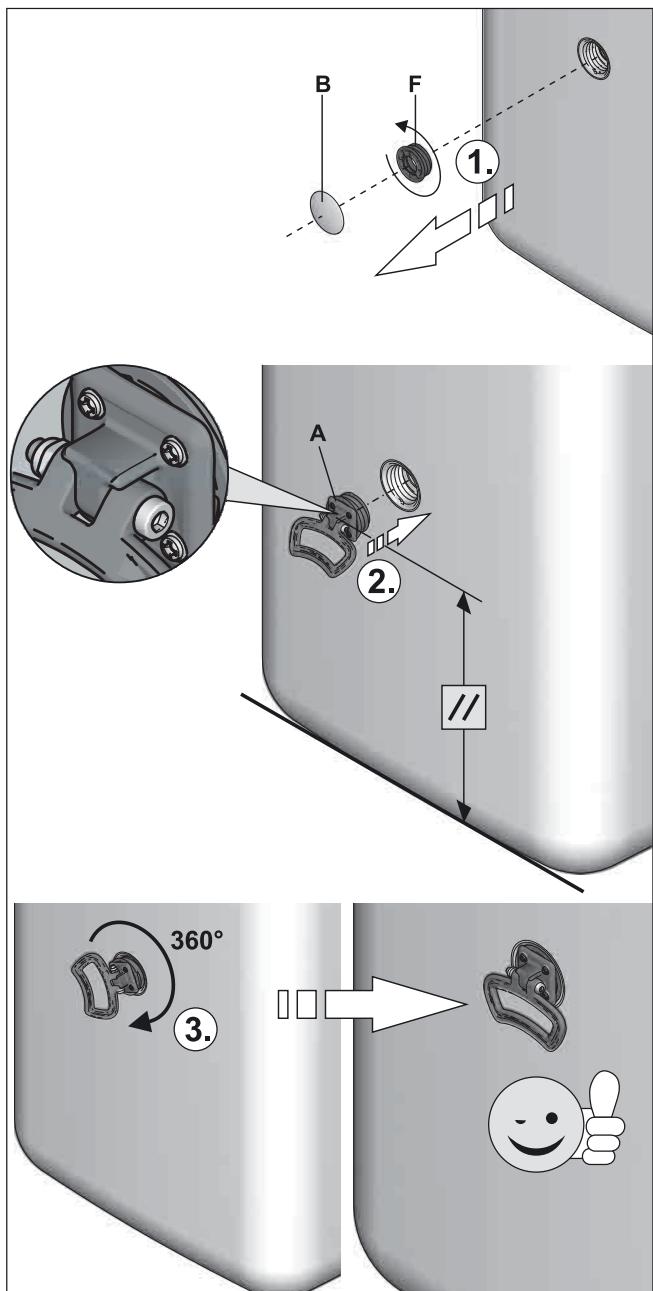


CAUTION!

ROTEX HPSU compact is not erected **adequately lower** 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 be unable to drain completely.

- Erect the ROTEX HPSU compact with a DrainBack solar connection at a sufficient depth to the flat solar panels (observe the minimum gradient in the solar connecting lines).

- Remove packing and dispose of it in an environment-friendly manner.
- Remove the cover plates on the storage tank (fig. 4-4, item B) and unscrew the threaded pieces (fig. 4-4, item F) from the apertures on which the handles are to be mounted (fig. 3-2 to fig. 3-5, item 24).
- Screw handles (fig. 4-4, item A) into the threaded holes that are now free.



A Handle *B Cover screen* *F Threaded piece*

Fig. 4-4 Attach handles

- Install the ROTEX HPSU compact at the installation site.
 - Recommended clearances (fig. 4-5):
To the wall: $(s1) \geq 100$ mm, $(s2) \geq 500$ mm.
From the ceiling (X): ≥ 1200 mm, minimum 480 mm.
 - Carefully transport the ROTEX HPSU compact, use the handles.
 - 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 necessary, install the optional Backup Heater (BUxx) in the ROTEX HPSU compact (fig. 4-5).
Observe the assembly and operating manual supplied with the accessory (☞ for tightening torque see chapter 10.3).

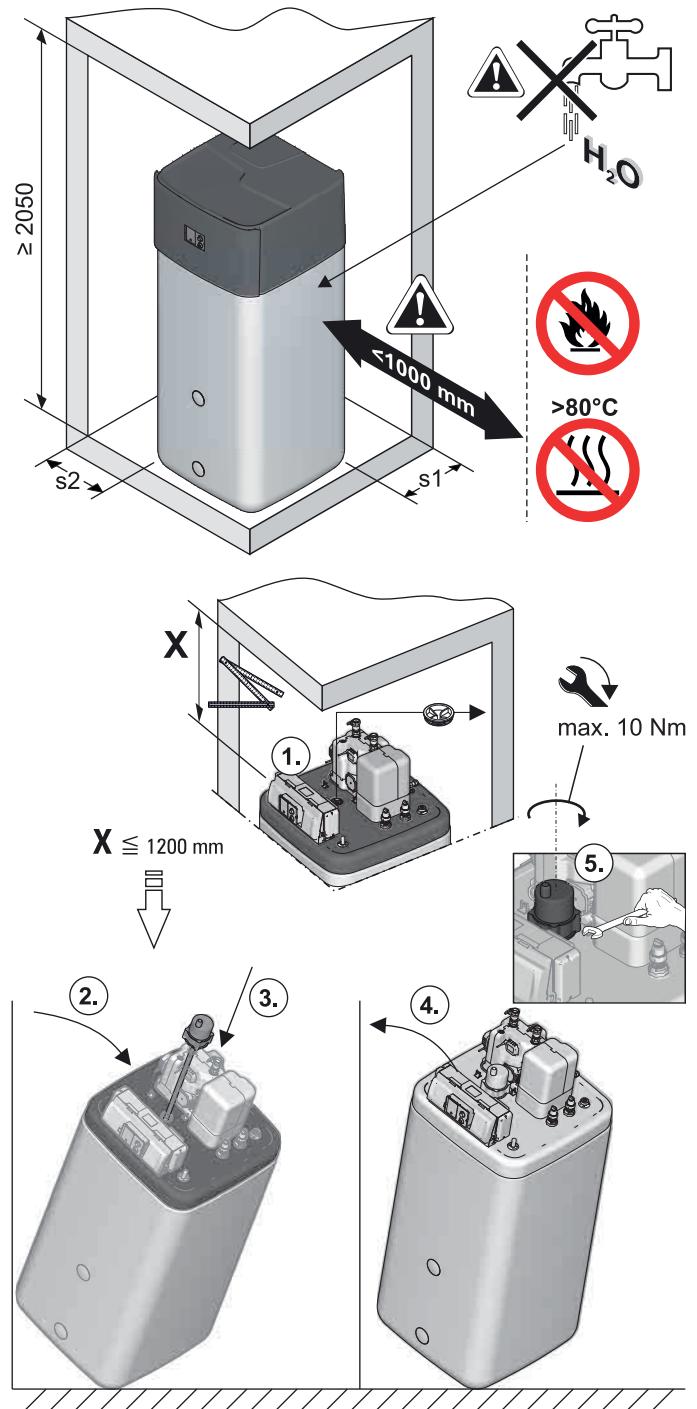


Fig. 4-5 Layout (shown on ROTEX HPSU compact 508/516 with incorporation of the optional Backup Heater)

4 Set-up and installation

4.3 Remove cover hood and heat insulation

- Lift the cover hood at the back and remove to the front.

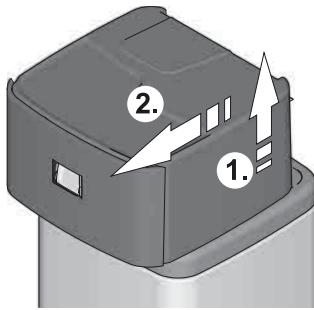


Fig. 4-6 Removing the protective cover

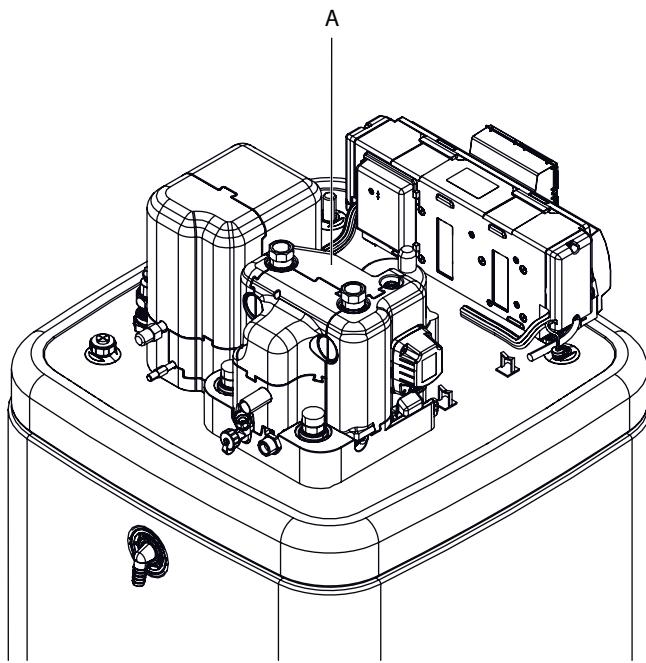


Fig. 4-7 ROTEX HPSU compact without cover hood



CAUTION!

The thermal insulation (fig. 4-7, item A) consists of pressure sensitive shaped EPP components that can easily be damaged by inappropriate handling.

- Carry out removal of the thermal insulation only in the sequence and in the directions quoted below.
- Do not use force.
- Do not use tools.

- Remove the top thermal insulation in the following order:
 - Pull away the side insulation element (fig. 4-8, item A) horizontally.
 - Pull away the rear insulation element (fig. 4-8, item B) horizontally.
 - Pull away the front insulation element (fig. 4-8, item C) horizontally.

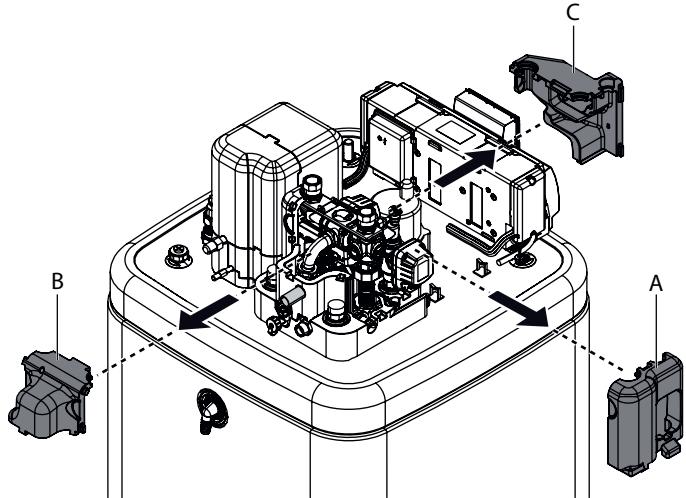


Fig. 4-8 Removing top thermal insulation

- If required: Remove the bottom thermal insulation in the following order:
 - Pull away the side insulation element (fig. 4-9, item A) vertically.
 - Pull away the rear insulation element (fig. 4-9, item B) vertically.

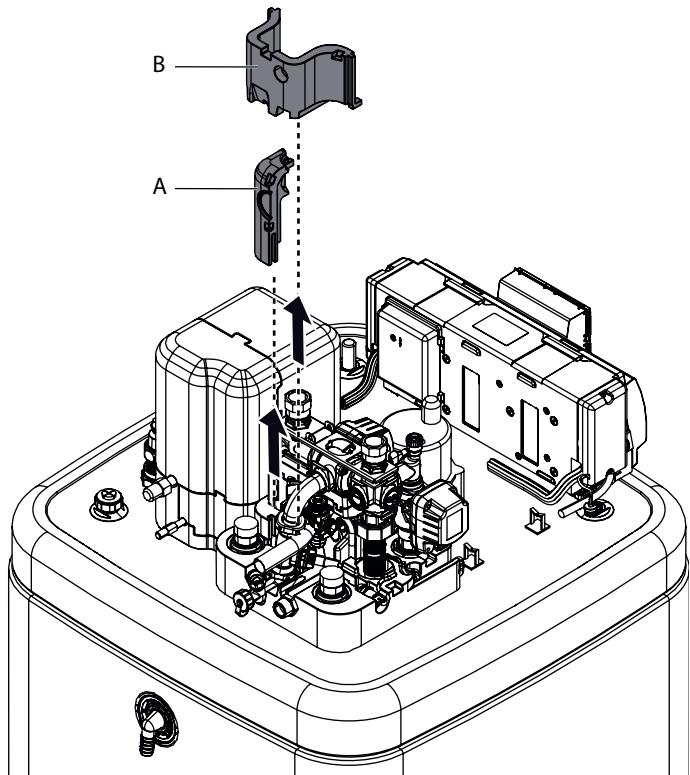


Fig. 4-9 Removing bottom thermal insulation



Installing the thermal insulation is carried out in the reverse order.

4.4 Water connection



CAUTION!

If the ROTEX HPSU compact is connected to a heating system with **steel pipes, radiators** or non-diffusion-proof floor heating pipes, slurry and swarf could enter the hot water storage tank and cause **blockages, local overheating or corrosion**.

- Flush the feed pipes before filling the heat exchanger.
- Rinse out the heat distribution network (in the existing heating system).
- Install the dirt filter or sludge separator into the heating return flow (see chapter 2.4.5).



CAUTION!

If the ROTEX HPSU compact is connected to a cold water line, where **steel pipes** are used, chips can enter the special 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 contamination filter in the cold water feed (see chapter 2.4.5).



ONLY ROTEX HPSU COMPACT ...BIV

CAUTION!

If the **heat exchanger** for charging the **pressurised solar system** (fig. 4-1 / fig. 4-2, item 8+9) has an **external heating unit** (e.g. wood-burning boiler) connected to it, an excessive flow temperature at these connections can damage or destroy the ROTEX HPSU compact.

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



In accordance with EN 12828 you must install a safety valve at or in the immediate vicinity of the heat exchanger, with which you can limit the maximum permissible operating pressure in the heating system. There should be no hydraulic blocking elements between the heat generator and the safety valve.

Any steam or heating water which may escape must be diverted by a suitable blow-off line with constant gradient in a frost-protected, safe and observable manner.

A diaphragm expansion vessel of adequate dimensions and pre-set for the heating system must be connected to the ROTEX HPSU compact. There should be no hydraulic blocking elements between the heat generator and the diaphragm expansion vessel.

ROTEX recommends integrating a mechanical manometer for the filling of the heating system.

- For drinking water lines, comply with the EN 806 and DIN 1988 stipulations.
- To avoid a circulation line, install ROTEX HPSU compact close to the draw-off location. If a circulation line is absolutely essential, it must be installed in accordance with the schematics in chapter 9 "Hydraulic system connection".

4.4.1 Aligning the connections of the heating feed and return flow

The connections for the heating feed and return flow can be directed out of the unit upwards or downwards in order to adapt to the on-site conditions in the most optimum manner.

The unit is delivered with the connections exiting upwards as standard. In order to direct the connections out from the back of the unit you must carry out the following conversion steps:

- Remove the cover hood and the upper thermal insulation (see chapter 4.3).

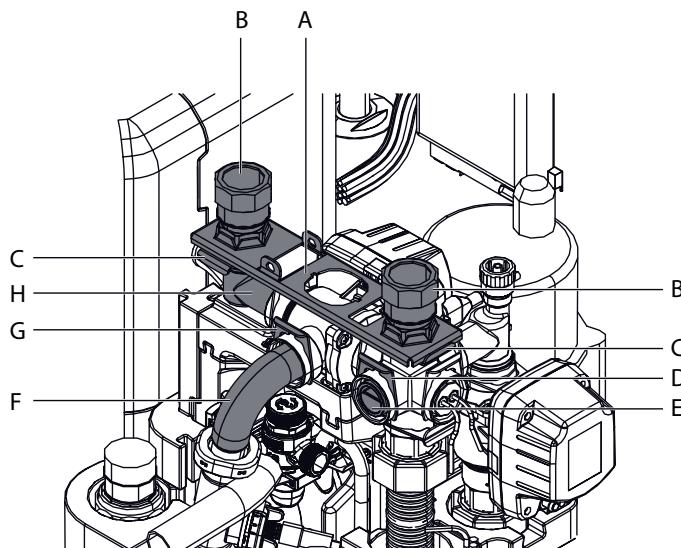


Fig. 4-10 Heating feed and return flow connections aligned upwards

- Pull off both the plug brackets on the connection couplings (fig. 4-10, item C).
- Pull off both connection couplings (fig. 4-10, item B).

4 Set-up and installation



CAUTION!

When working on the hydraulics you must take care of the mounting position of the O-rings to prevent damage to the O-rings and consequent leaks.

- Always place the O-rings in the mount after removing or installing a coupling and a mount.
 - Make sure that the O-ring is fully in the mount before inserting a coupling in the mount.
-
- Remove retainer plate (fig. 4-10, item A).
 - Pull off the plug bracket on the closing plug (fig. 4-10, item D).
 - Pull out the closing plug (fig. 4-10, item E).
 - Rotate the angular piece (fig. 4-10, item H) by 90° to the back.
 - Pull off the plug bracket on the elbow (fig. 4-10, item G).
 - Pull the elbow (fig. 4-10, item F) carefully to the rear out of its horizontal mount so that the retainer plate (fig. 4-11, item A) can be inserted in the gap vertically.

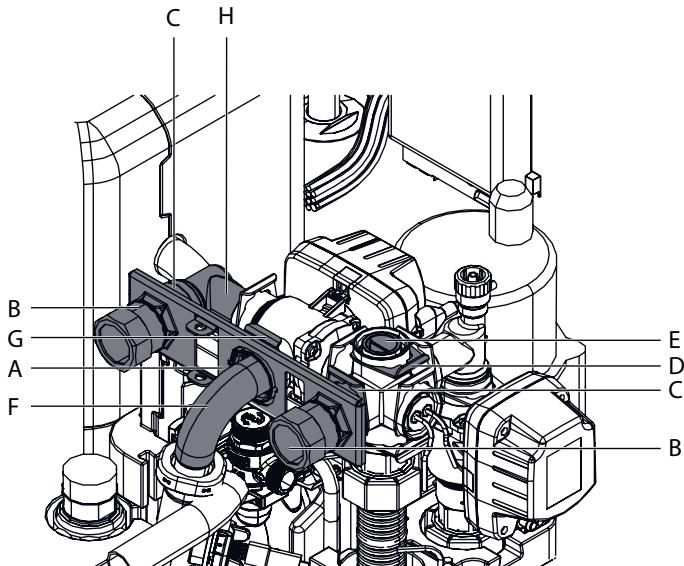


Fig. 4-11 Heating feed and return flow connections aligned to the rear

- Slide the retainer plate between the elbow and its horizontal mount and insert the elbow (fig. 4-11, item F) back in its mount through the central hole in the retainer plate.



CAUTION!

If the plug brackets are not inserted properly, the couplings can come loose in their mounts which may result in high levels of fluid escape and continuous fluid escape.

- Before plugging in a plug bracket, make sure that the plug bracket engages in the groove in the coupling. To do this, insert the coupling into the mount until the groove becomes visible through the plug bracket mount.
 - Insert the plug bracket up to the stop.
-
- Secure the elbow back into its mount with plug bracket (fig. 4-11, item G).
 - Insert both connection couplings (fig. 4-11, item B) through the retainer plate in the side mounts.
 - Secure both connection couplings in their mounts with the plug brackets (fig. 4-11, item C).
 - Insert the closing plug (fig. 4-11, item E) in the top mount.
 - Secure the closing plug with the plug bracket (fig. 4-11, item D).
 - Cut out the side transit points in the thermal insulation (fig. 4-12, item A) using a suitable tool.

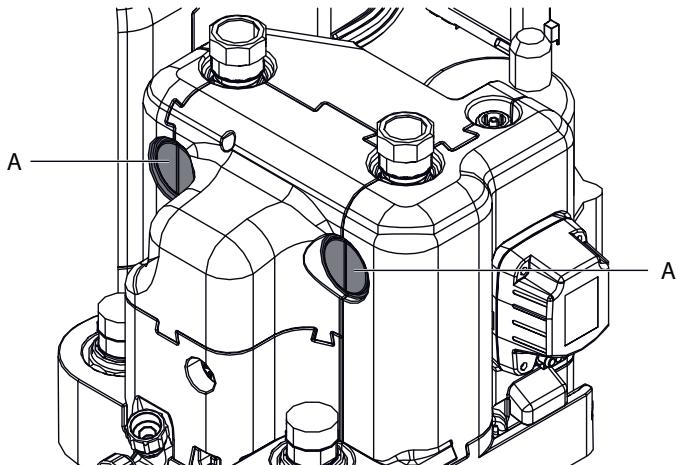


Fig. 4-12 Thermal insulation cut-out

4.4.2 Connecting hydraulic lines

Requirement: Optional accessories (e.g. Solar, backup heater) mounted on the ROTEX HPSU compact according to the specifications of the instructions included.

- Check cold water pressure (maximum 6 bar).
 - At higher pressure in the drinking water line, a pressure reducer must be installed.

- Establish hydraulic connections at the ROTEX HPSU compact.
 - Position and dimensions of the heating connections to be taken from fig. 4-1 / fig. 4-2 and from tab. 3-1.
 - Pay attention to the stipulated tightening torque (see chapter 10.3 "Tightening torque").
 - Design the lines as such that the sound attenuation cowl can be applied without any problem following assembly.
 - Connect the water for filling or refilling the heating system as specified by EN 1717 to avoid contamination of drinking water by backwash.
- Connect a drain line to the safety overpressure valve and connect a diaphragm drain container in accordance with EN 12828.
 - Check the seating of the drain hose on the overpressure valve.
 - If required, attach your own hose and route accordingly.
- Carefully insulate pipe lines against heat loss and so as to avoid the formation of condensation (insulation thickness at least 20 mm).
- Water shortage protection:** The pressure and temperature monitoring of the control unit safely switches off the ROTEX HPSU compact in the event of a water shortage. No additional water shortage protection is needed in the construction.
- Avoid damages caused by deposits and corrosion:** Observe the relevant regulations of technology to prevent creation of corrosion products and deposits. Minimum requirements regarding the quality of filling and supplementary water:
 - Water hardness (calcium and magnesium, calculated as calcium carbonate): $\leq 3 \text{ mmol/l}$
 - Conductivity: ≤ 1500 (ideal ≤ 100) $\mu\text{S/cm}$
 - Chloride: $\leq 250 \text{ mg/l}$
 - Sulphate: $\leq 250 \text{ mg/l}$
 - pH value (heating water): 6,5 - 8,5

In the case of filling and top-up water with a high overall hardness or other properties that deviate from the minimum requirements, measures for the desalination, softening, hardness stabilisation or other suitable conditioning measures are required to maintain the required water quality.



WARNING!

There is a danger of scalding at hot water temperatures over 60 °C. This is possible, when solar energy is used, with a connected external heating device, when the Legionella protection is activated or when the domestic hot water target temperature is set higher than 60 °C.

- Install a scald protection (domestic hot water mixing unit (e.g. VTA32 15 60 15)).

- Connect the drain hose to the connection piece for the safety overflow (fig. 3-2 to fig. 3-5, item 23).
 - 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.

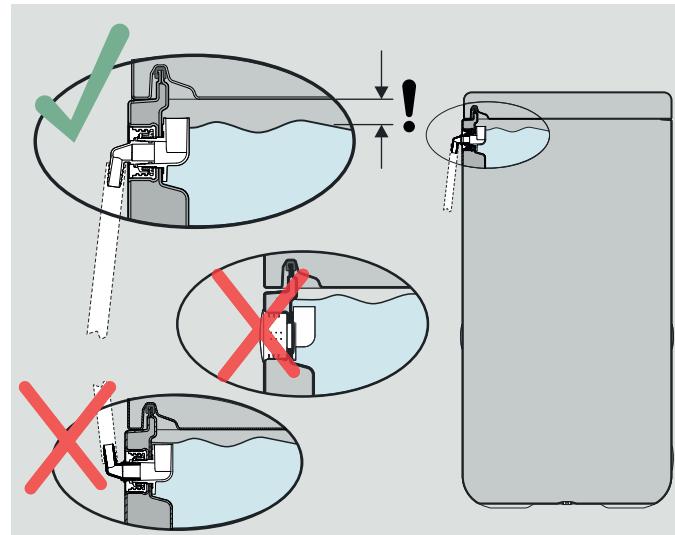


Fig. 4-13 Installation of drain hose at safety overflow

4.4.3 Installation of DB connection kit (141590)

The optional DB connection kit provides improved accessibility for connecting the DrainBack line (solar feed).

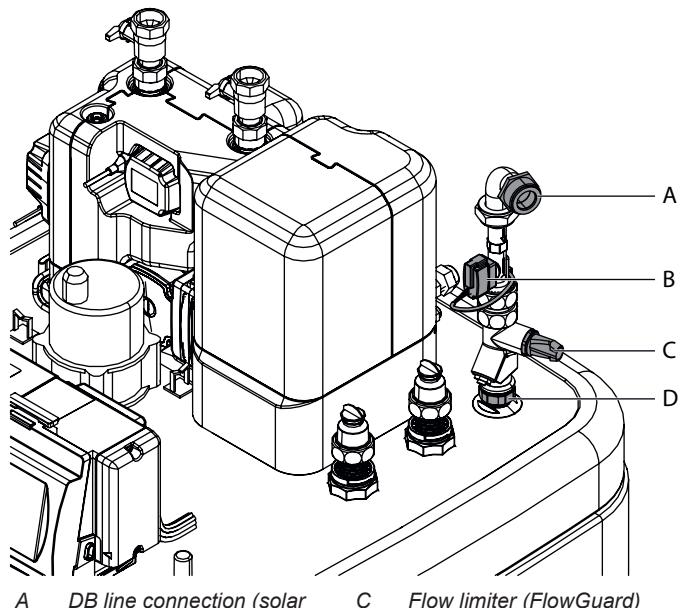
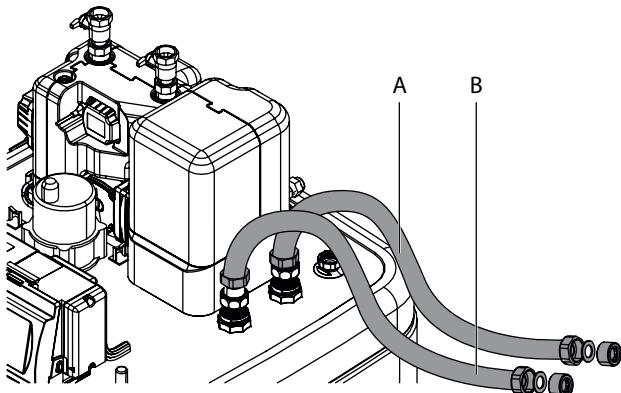


Fig. 4-14 DB connection kit

4 Set-up and installation

4.4.4 Installation of P connection kit (141589)

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



- A Flow connection (red)
B Return flow connection (blue)

Fig. 4-15 P connection kit for Biv equipment types

4.5 Electrical connection



WARNING!

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 systems circuits **from the power supply** (switch off main switch, disconnect fuse) and secure against unintentional restart.
- The electrical connection and working on the electrical components should only be performed by **electrical engineers** in compliance with valid standards and guidelines as well as the specifications of the energy supply company.
- The **equipment covers and maintenance opening covers** must be **re-fitted** immediately after completion of the work.

CAUTION!

 In the controller housing of the **ROTEX HPSU compact**, in continuous running, **elevated temperatures** can be generated. 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, use only cables with a long-term use temperature $\geq 90^{\circ}\text{C}$:
 - Exterior heat pump unit
 - Optional: Electrical Backup Heater (BUxx)

4.5.1 Overall connection plan ROTEX HPSU compact

Explanation of symbols and abbreviations in this chapter see tab. 4-2 and tab. 4-3.

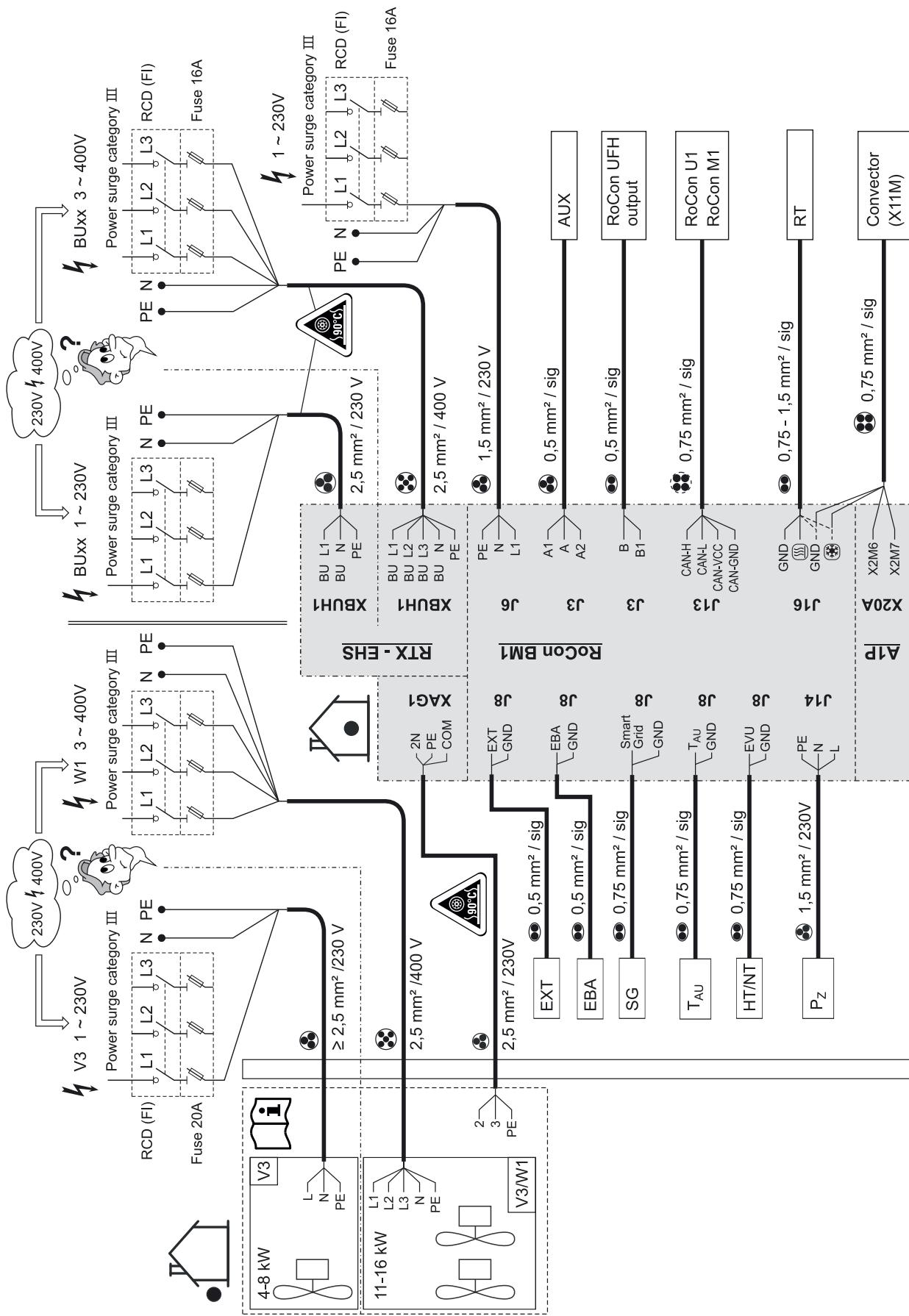


Fig. 4-16 Overall connection diagram - for electrical connection during device installation

4 Set-up and installation

4.5.2 Position of the circuit boards

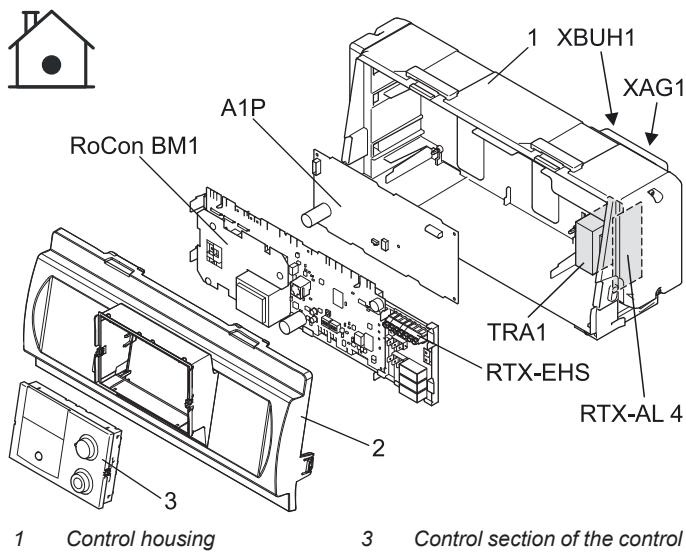


Fig. 4-17 Overview circuit boards (internal housing)

4.5.3 Connection assignment, circuit board A1P

The A1P circuit board comes pre-connected to the unit. No assembly or connection work is necessary on the A1P circuit board!

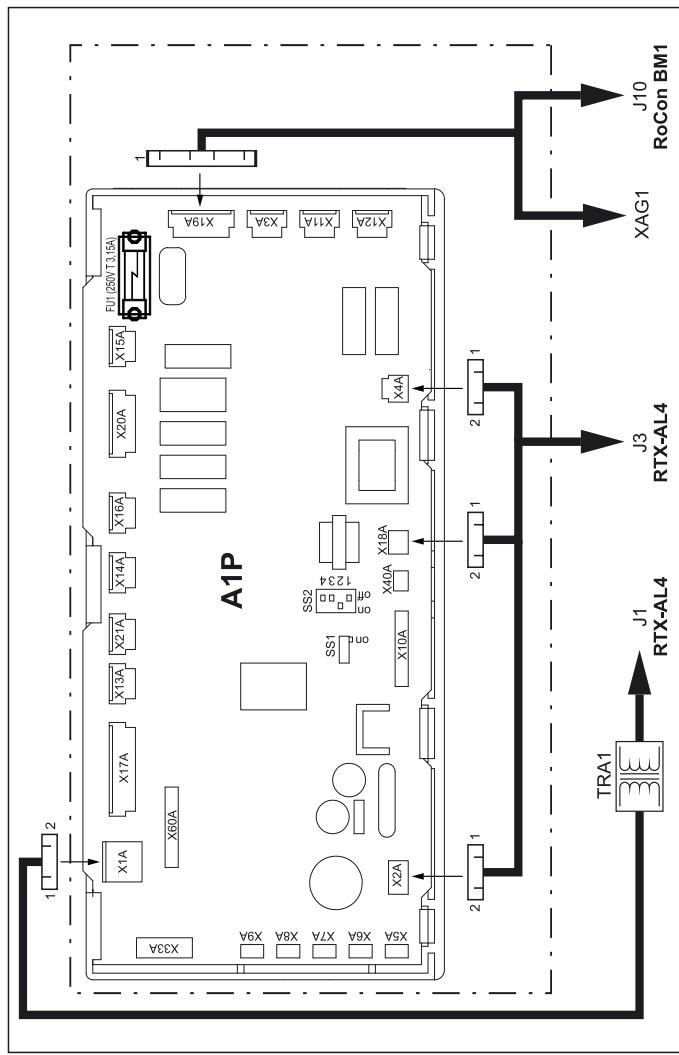


Fig. 4-18 Circuit board A1P (basic control of the heat pump)

4.5.4 Terminal assignment for the RTX-AL4 circuit board

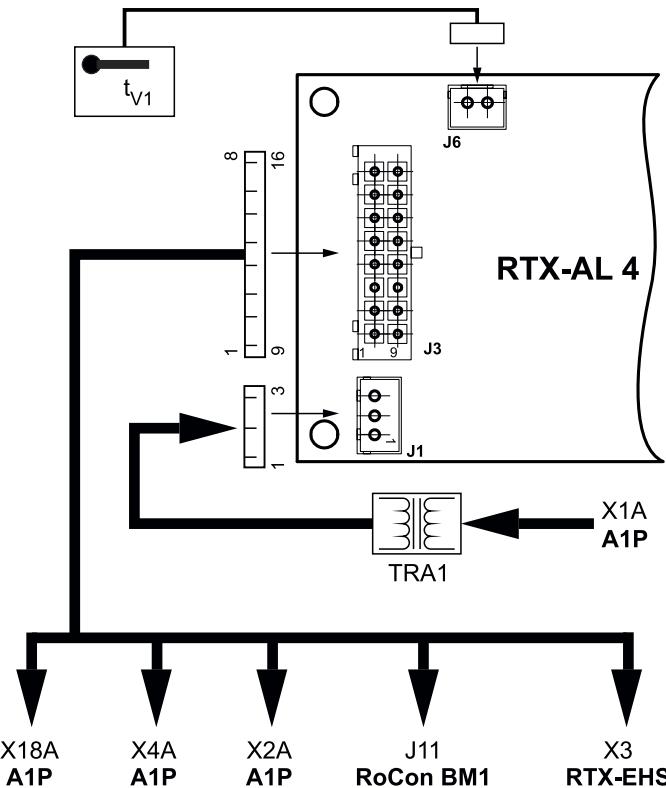


Fig. 4-19 Circuit board RTX-AL4 (interface)

4.5.5 Terminal assignment for the RTX-EHS circuit board

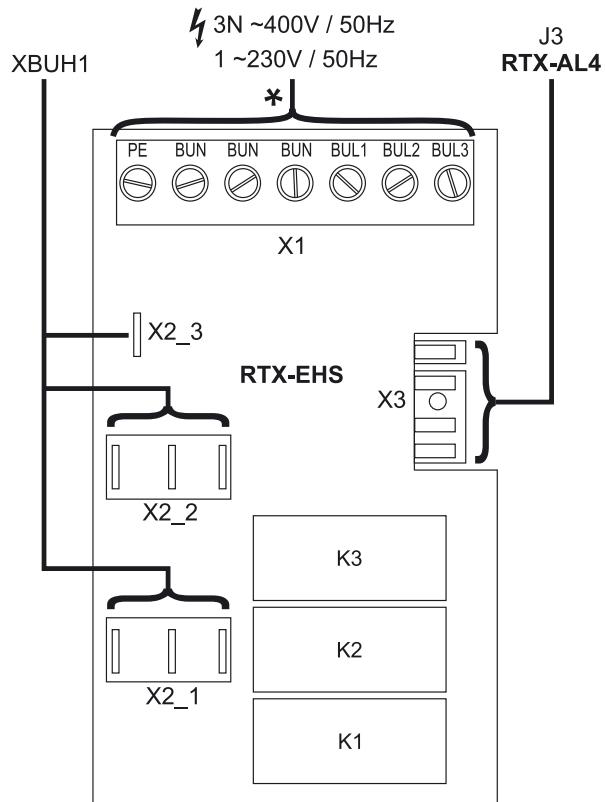


Fig. 4-20 Circuit board RTX-EHS (Backup Heater) - see section 4.5.13

4.5.6 Connection assignment, circuit board RoCon BM1

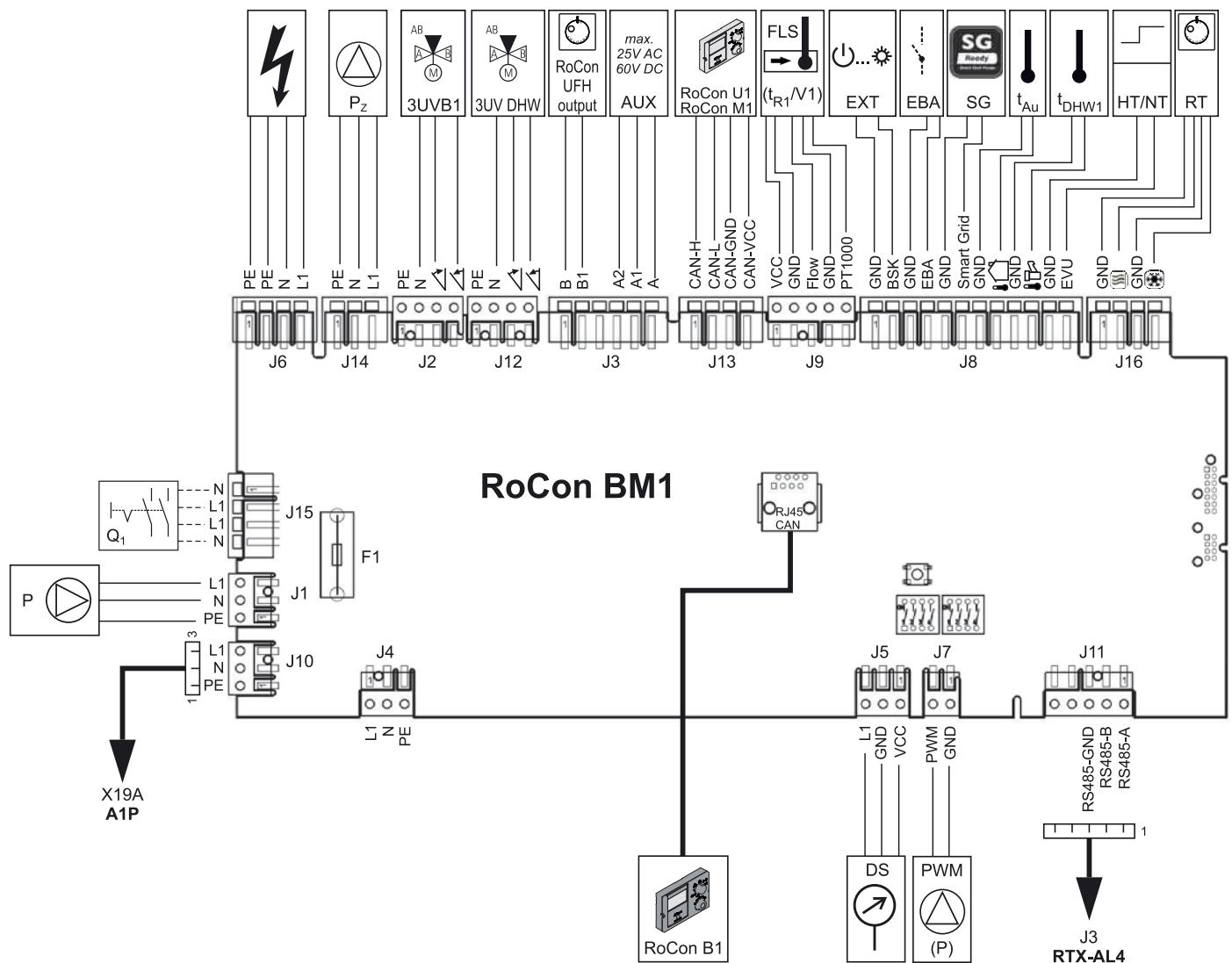


Fig. 4-21 Circuit board RoCon BM1 (basic control module)

Mains voltage 230 V, 50 Hz
(Connection plan in this instruction manual)

4.5.7 Mains connection ROTEX HPSU compact

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

- Check the supply voltage (~230 V, 50 Hz).
- Disconnect the junction box of the domestic installation.
- Connect the cable for the mains connection on the ROTEX HPSU compact to the junction box of the domestic installation via an all-pole disconnecting main switch to be installed by the customer (separate isolator according to EN 60335-1).
Ensure that the polarity is correct.

The exterior unit and optional accessories must be connected separately to the regulator on the ROTEX HPSU compact. To do so, the cover panel of the ROTEX HPSU compact must be removed (see section) and, if necessary, the control housing opened (see section 4.5.8).

4 Set-up and installation

4.5.8 Open controller housing and making the electrical connections

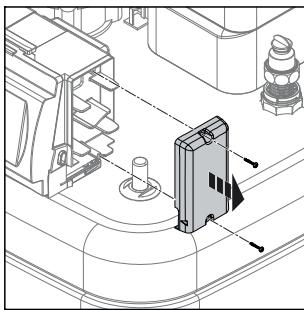


Fig. 4-22 Dismount right housing cover.

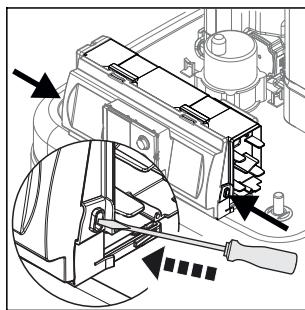


Fig. 4-23 Unlock front panel.

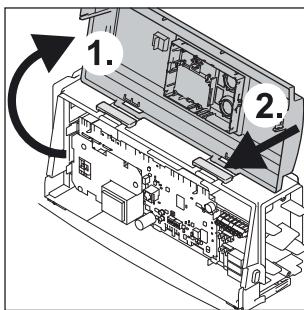


Fig. 4-24 Open front panel and place in assembly position.

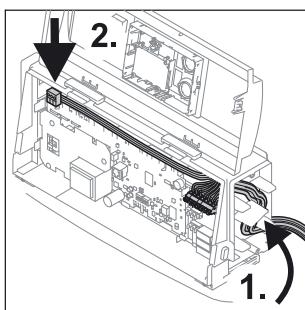


Fig. 4-25 Route cabling into the regulator and make the electrical connections.

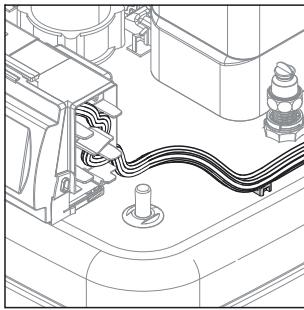


Fig. 4-26 Lay cables in the right housing cover.

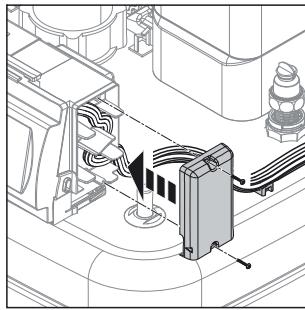


Fig. 4-27 Install the right housing cover.

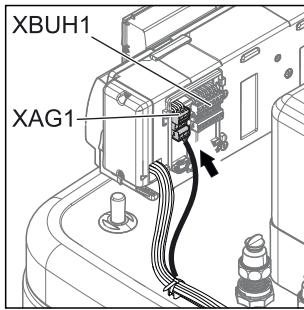


Fig. 4-28 Make the electrical connections to the rear of the housing (see section 4.5.1).

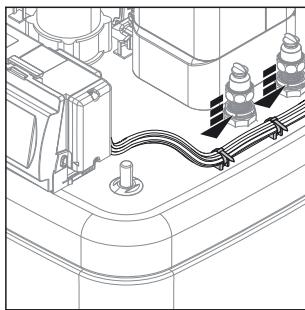


Fig. 4-29 Fasten cabling on the storage container.

4.5.9 Connection of exterior heat pump unit RRLQ



This component has a separate manual attached, including among other things instructions for installation and operation.

- Dismount the protective cover (see section).
- Connect the exterior heat pump unit to the terminal strip XAG1 (see fig. 4-28, fig. 4-30).

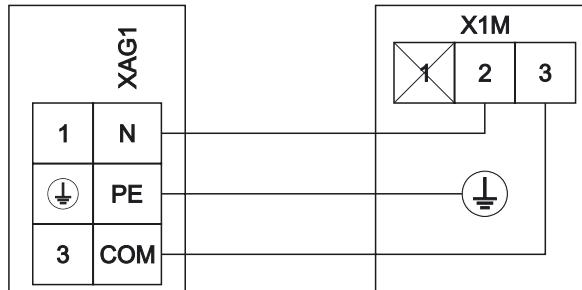


Fig. 4-30 Connection of exterior heat pump unit



When switching off the heat pump exterior unit using a switching system prescribed by the energy supply company (EVU), the internal ROTEX HPSU compact device is not disconnected (see section 4.5.19).

4.5.10 Connection of external temperature sensor RoCon OT1

The exterior heat pump unit of the ROTEX HPSU compact has a built-in exterior temperature sensor which is used to regulate the inflow temperature depending on the weather, with frost protection function.

With the optional outside temperature sensor RoCon OT1 (15 60 70), which is installed on the north side of the building, you can optimise the weather-dependent flow temperature control.



If the **ROTEX HPSU compact** is used in a CAN bus system **as a master** ("Terminal function" for the remote control of other data bus devices), the exterior temperature sensor **RoCon OT1** must be connected directly to the regulator **RoCon HP** on the master and not to the **remote controlled device** (mixer circuit module RoCon M1 or a different heat generator).

Choose a location at about one third of the building height (minimum distance from floor: 2 m) at the coldest side of the building (North or North-East). Thereby, exclude the proximity of external heat sources (chimney, air shafts) and direct sunshine.

- Place external temperature sensors in such a way that the cable exit points face downwards (prevents humidity ingress).



CAUTION!

The parallel routing of sensor and mains lines within an installation pipe can cause considerable malfunctioning in the regular operation of the ROTEX HPSU compact.

- Always lay the sensor line separately.

- Connect the exterior temperature sensor to a twin-core sensor line (minimum diameter 1 mm²).
- Install the sensor line to the ROTEX HPSU compact.
- Connect the sensor line to the plug connection J8 on the board RoCon BM1 (see fig. 4-31).

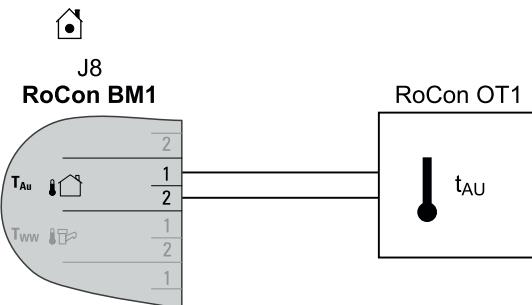


Fig. 4-31 Connection of the exterior temperature sensor RoCon OT1 to the ROTEX HPSU compact (operating as a single solution or master in a data bus)

After connecting the exterior temperature sensor RoCon OT1 to the regulator RoCon HP of the ROTEX HPSU compact, the parameter [Outside Config] must be set to "On".

4.5.11 Connection of an external switching contact

By connecting an external switching contact (fig. 4-32) the operating mode of the ROTEX HPSU compact can be changed.

The current operating mode can be switched thanks to a changing resistance reading (tab. 4-1). Changing the operating mode is only effective as long as the external switching contact is closed.

The operating mode has an effect on the direct circuit of the ROTEX HPSU compact, and on all other heating circuits that can be optionally connected to this device.

The operating mode shown in the controller display can deviate from the operating mode activated in the rotary switch setting .

An operating mode activated by an external switch contact is shown on the controller by "EXT.", followed by the symbol of the operating mode (see operating instructions for the controller).

If special functions, such as "Manual Operation" are activated, the input is not evaluated.

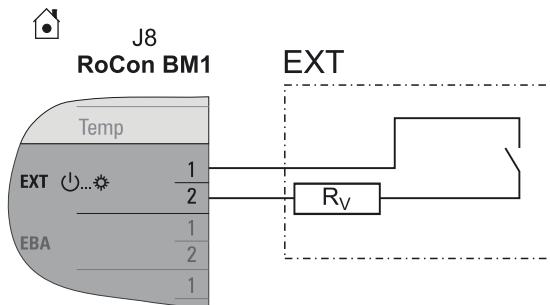


Fig. 4-32 Connection of the EXT switching contact

Operating mode	Resistance R _V	Tolerance
Standby	< 680 Ω	± 5 %
Heating	1200 Ω	
Reducing	1800 Ω	
Summer	2700 Ω	
Automatic 1	4700 Ω	
Automatic 2	8200 Ω	

Tab. 4-1 Resistance values for the evaluation of the EXT signal



When the resistance readings are greater than the value for "Automatic 2", the input will be ignored.



NOTE REGARDING THE CONNECTION OF A ROTEX SOLAR SYSTEM

By means of the function [HZU] integrated into the RoCon HP **HZU** control unit (see operating manual for the control unit) it is not necessary to connect the EXT connection with the connection of the burner blocking contact of the ROTEX solar system.

4.5.12 External demand signal (EDS)

By connecting the EDS switch contact to the ROTEX HPSU compact (fig. 4-33) and through the corresponding parameterisation in its RoCon HP control unit, a heating demand can be generated via an external switch contact. If the switch contact is closed, the ROTEX HPSU compact switches to the heating mode. The flow temperature is adjusted to the temperature that is set in the parameters [T-Flow Day].

The EDS switching contact has preference of a request via the room thermostat.

In Cooling, Stand-by, Manual and Summer mode, the switching contact is not evaluated. In addition, the heating limits are not taken into consideration.

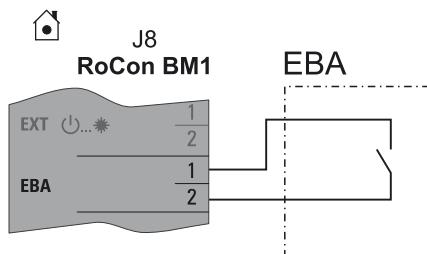


Fig. 4-33 Connection EBA switch contact

4 Set-up and installation

4.5.13 Connection of the electrical ROTEX Backup Heater (BU9c)

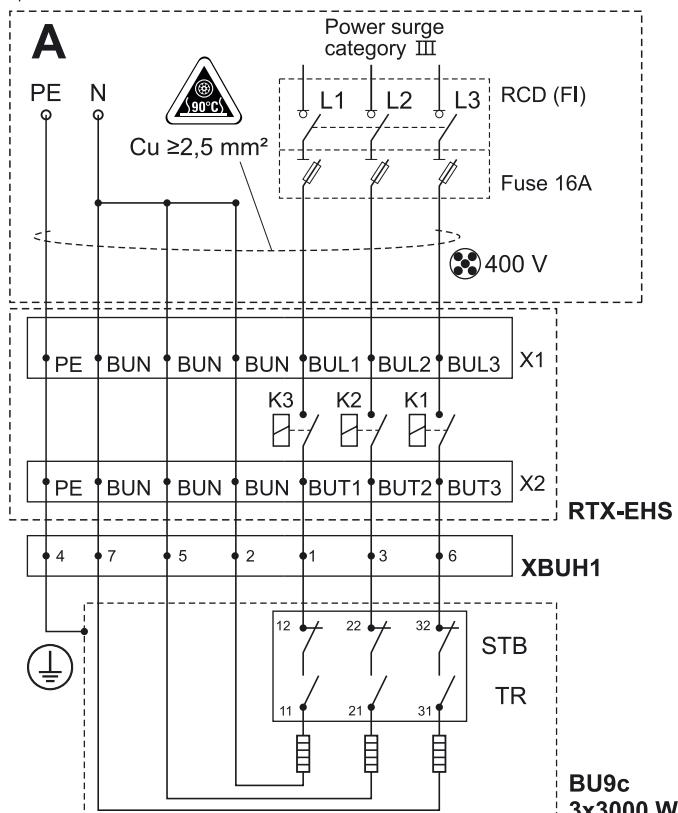


This component has a separate manual attached, including among other things instructions for installation and operation.

- Connect the power supply for the Backup Heater to the terminal rail X1 of the switch board RTX-EHS (fig. 4-20) in the regulation housing of the ROTEX HPSU compact.
- Insert the plug XBUH1 of the Backup Heater on the back of the regulation housing of the ROTEX HPSU compact.
- Set parameter [Function Heating] to "1" (see controller operating instructions RoCon HP).

Connection variant 1

3N ~400V / 50Hz BU9c



A Cabling provided by the customer (observe country-specific connection conditions - request from responsible power company (EVU))!

Fig. 4-34 3-phase connection, backup heater (BU9c)

Connection variant 2

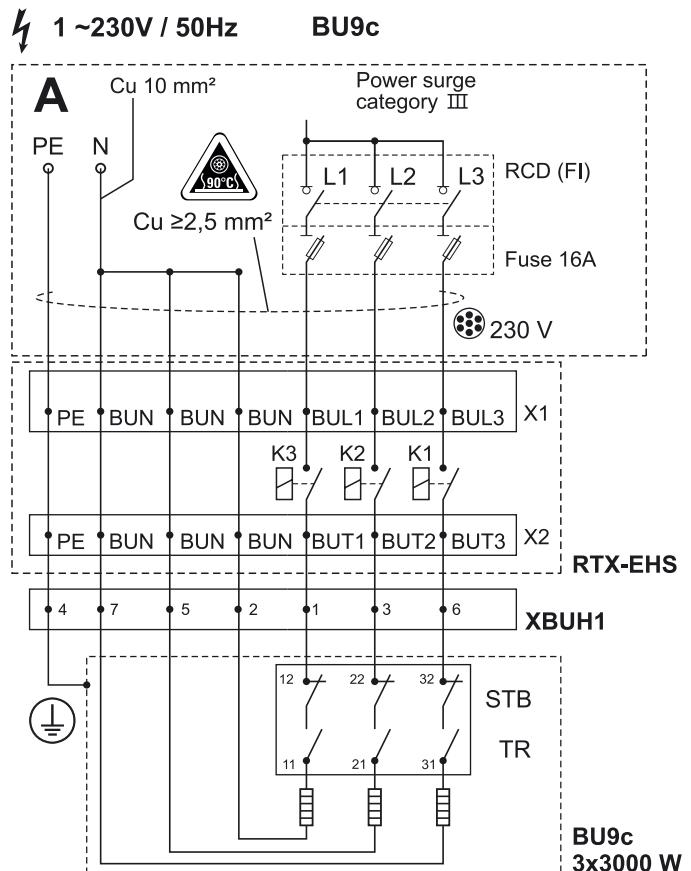


Fig. 4-35 Single phase connection Backup Heater (BU9c)
(for legend see fig. 4-34)

Connection variant 3



When connecting a Backup Heater with a heating element (BUH1 / BUH3), the parameter [Function Heating]=2 must be set.

⚡ 1 ~230V / 50Hz 1000 W BUH1 (1x 1000 W)
1 ~230V / 50Hz 3000 W BUH3 (1x 3000 W)

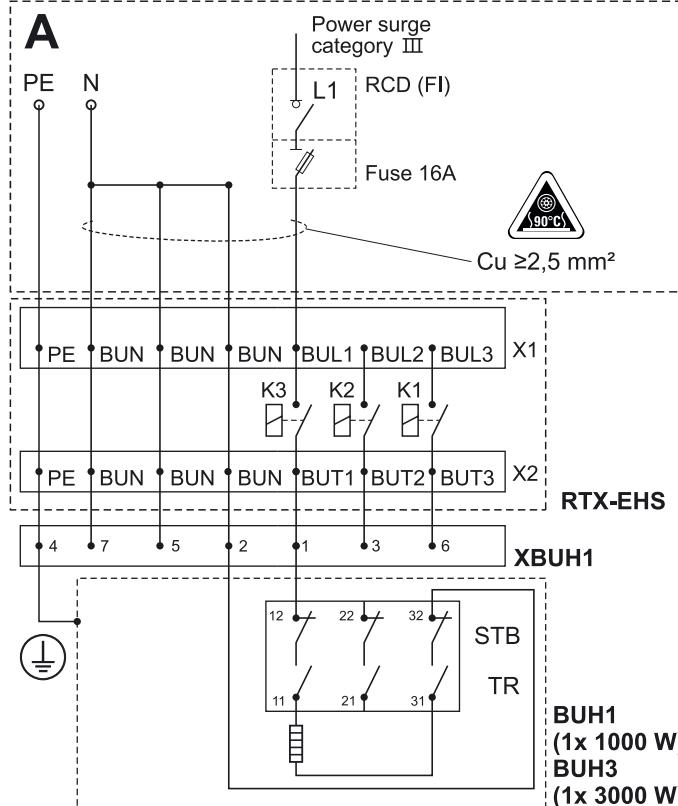


Fig. 4-36 Connection Backup Heater with a heating element (BUH1 / BUH3) (for legend see fig. 4-34)



Warning!

When contacting a **damaged connection cable** of the Backup Heater this can cause electrocution and thus cause life-threatening injury and burns.

- Do not repair the connection cable of the Backup Heater.
→ Always replace the complete Backup Heater.

4.5.14 Connection of an external heat generator

For heating support or as an alternative to an electrical Backup Heater (see section 4.5.13) you can connect an external heat generator (e.g. gas or oil boiler) to the ROTEX HPSU compact.

The heat supplied by the external heat generator must be added to the unpressurised storage tank water in the ROTEX HPSU compact hot water storage tank.

- Carry out hydraulic connection in accordance with one of the two following possibilities:
 - unpressurised via connections (solar infeed and solar return) of the hot water tank
or
 - on device types ROTEX HPSU compact ...Biv, via the integrated pressurised solar heat exchanger.
- Observe the instructions concerning hydraulic connections (see chapter 2.4)
- Examples of hydraulic connection (see chapter 9).

Demand from an external heat generator is switched to the RTX-EHS circuit board via a relay (see fig. 4-37). The electrical connection to the ROTEX HPSU compact is possible as follows;

- a) External heat generator has a potential-free switch contact connection for heat demand:
 - Connection to K3, if the external heat generator takes over the hot water generation and heating support (setting parameter [Function Heating]=2)
or
 - Connection to K1 and K3 if two external heat generators are being used (setting parameter [Function Heating]=3). Here K1 switches the external heat generator (e.g. gas or oil boiler) for heating support and K3 the external heat generator (BUxx) for hot water generation.
or
 - Connection on AUX connection A (see section 4.5.18)
- b) External heat generator can only be switched via the mains power supply:
Connection (~230 V, maximum load 3000 W) at K1 and K3.

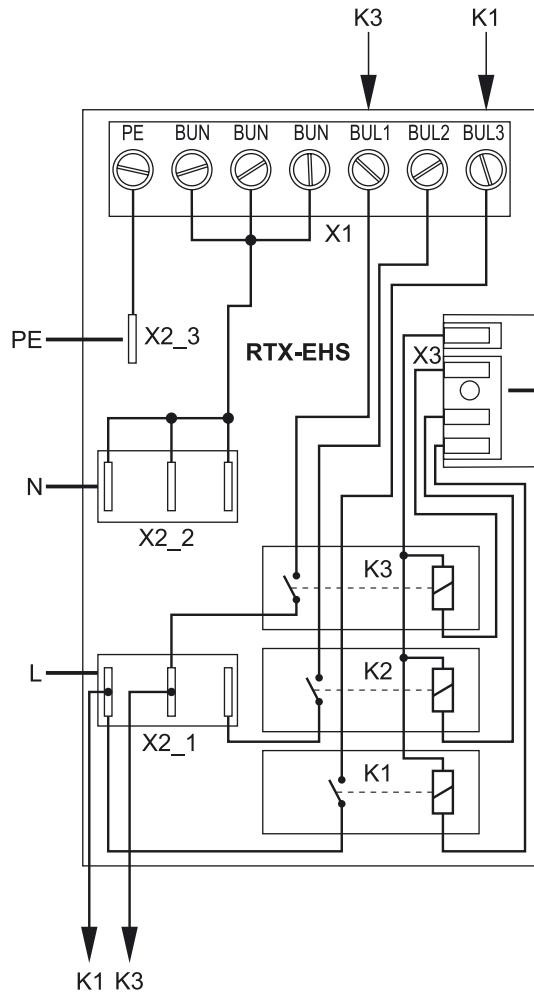


Caution!

Risk of voltage arcing.

- The connections on the RTX-EHS circuit board must not be used for switching the mains voltage (~230 V) and protective low voltage (SELV = "Safety Extra Low Voltage") at the same time.

- Suitable electrical connection from the relevant installation instructions for the external heat generation.
- Connect external heat generation to the ROTEX HPSU compact (fig. 4-37).
Connection X1 is a screw terminal.
Isolated 6.3 x 0.8 mm push-on receptacles are required for connections X2_1/2/3.



K1/2/3
 Relay for backup-heater
L Phase
N Neutral
PE Protective earth conductor
RTX-AL4
 Switch board (interface)
RTX-EHS
 Switch board (Backup heater)

Fig. 4-37 Connections on RTX-EHS circuit board

4.5.15 Connection of the ROTEX room thermostat



This component has a separate manual attached, including among other things instructions for installation and operation.

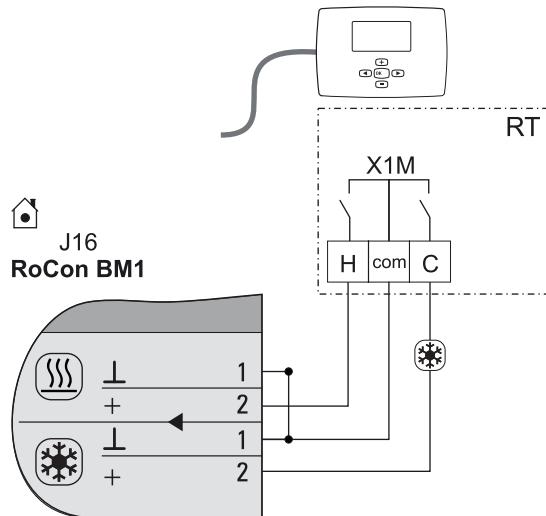


Fig. 4-38 Connection with cabled room thermostat
(RT = ROTEX RKRTW, 14 10 03)

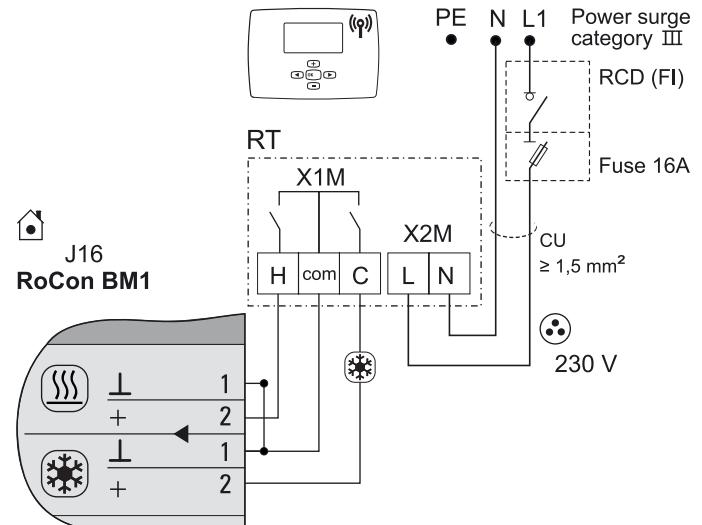


Fig. 4-39 Connection with radio room thermostat
(RT-E = ROTEX RKRTW, 14 10 04)

4.5.16 Connection optional ROTEX RoCon system components

The optional RoCon devices must be connected to the ROTEX HPSU compact using a 4-core CAN bus cable (connection J13).

ROTEX recommends screened cables with the following characteristics for this purpose:

- Standard to ISO 11898, UL/CSA type CMX (UL 444)
- PVC outer sheath with flame retardant to IEC 60332-1-2
- Up to 40 m, minimum cross-section area 0.75 mm².
For greater lengths, use larger cross-section areas.

Commercially available junction boxes can be used for connection of Can bus lines of several RoCon devices.

Ensure power cables, sensor cables and data bus cables are laid separately from each other. Use only cable trunking with separate trays or cable trunking with separators that ensure at least 2 cm spacing. Cable crossings are permissible.

The entire RoCon system can have a maximum of 16 devices connected with a total cable length up to 800 m.

ROTEX Room station RoCon U1

For the remote setting of operating modes and room target temperatures from a different room, a separate room station RoCon U1 can be connected for each heating circuit.



This component has a separate manual attached, including among other things instructions for installation and operation.

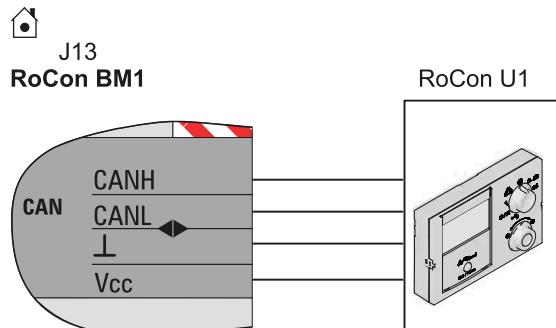


Fig. 4-40 Connection room station RoCon U1

ROTEX Mixer module RoCon M1

The ROTEX HPSU compact can be connected to the RoCon M1 mixer module, which is controlled via the RoCon HP electronic controller.

The connection of the CAN data bus lines is identical to the fig. 4-40 to connection J13 of the ROTEX HPSU compact.



This component has a separate manual attached, including among other things instructions for installation and operation.

Internet gateway ROTEX RoCon G1

The controller can be connected to the internet via the optional RoCon G1 gateway. This means that the ROTEX HPSU compact can be controlled remotely via mobile phone (using an App).



This component has a separate manual attached, including among other things instructions for installation and operation.

4.5.17 Connection of the ROTEX HP convector



This component has a separate manual attached, including among other things instructions for installation and operation.

- Electrical connection of the ROTEX HP convector with the following accessories in accordance with fig. 4-41 as a change-over contact (heating/cooling) on the basic module.
- Connect genuine ROTEX connection cable (HPc-VK-1 14 20 15) on ROTEX HPSU compact ... (H/C) ... (with cooling function), so that the ROTEX HP convector switches the operating mode (heating/cooling) together with the ROTEX HPSU compact.
- Install and connect 2-way valve (2UV) (HPC-RP 14 20 13) in ROTEX HP convector if necessary. Adjust its regulation so that the 2-way valve (2UV) provides isolation if there is no demand for this unit.



Mode (heating/cooling) can only be switched on the ROTEX HPSU compact.

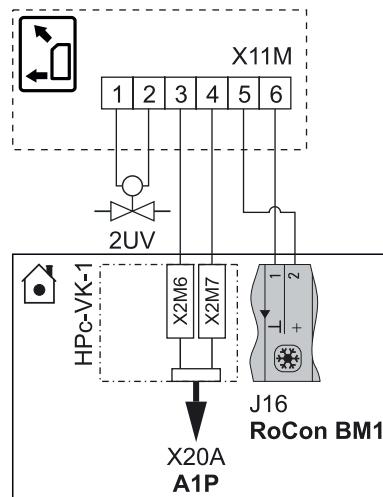


Fig. 4-41 Connecting the ROTEX HP convector to the ROTEX HPSU compact

4 Set-up and installation

4.5.18 Connection switch contacts (AUX outputs)

The switch contacts (AUX outputs) can be used for various different functions that can be parametrised.

If the ROTEX HPSU compact is in the [Cooling] operating mode, the switch contact B-B1 closes. The switch contact B-B1 is used, e.g. for connecting an external status display ("Cooling Mode Active") or as a changeover contact (heating/cooling) on the basic module of the underfloor heating regulation ROTEX RoCon UFH.



This component has a separate manual attached, including among other things instructions for installation and operation.

The switching contact A-A1-A2 switches as configured in the parameter [AUX Fct] (see operating manual for the control unit).

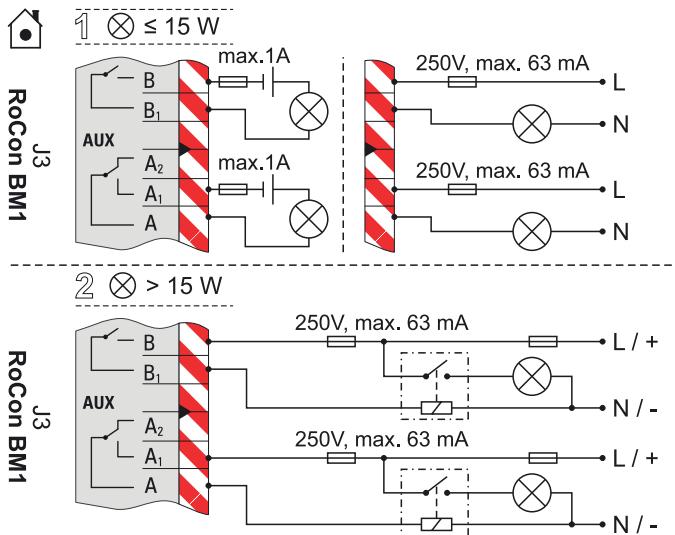


Fig. 4-42 Connection switching contact (AUX output)

The relays to be used for Variant 2 (switched power > 15 W) must be suitable for 100 % switch-on duration.

The switch-over contact A-A1-A2 can be used, for example, to control the heat generator in bivalent heating systems of ROTEX HPSU compact and oil or gas boiler. Examples of the hydraulic system incorporation are shown in chapter 9.



When the A1 or G-plus condensing boiler is connected, the parameter "AUX Fct" and the parameter "AUX time" must be set according to the desired function.

See operating instructions "ROTEX controller RoCon HP" > Section Parameter settings.

Detailed information for the electrical connection and the associated parameter settings for such bivalent heating systems can be taken from the internet or from your service partner.

4.5.19 Low tariff mains connection (HT/NT)

If the outdoor unit is connected to a reduced tariff mains connection, the **voltage-free switching contact S2S** of the receiver which evaluates the low tariff input signal emitted by the electricity supply company (EVU) must be connected to the **plug J8**, connection EVU on the **RoCon BM1 circuit board** (see fig. 4-43).

When the **parameter [HT/NT Function] > 0** is set, certain system components are switched off during peak tariff times (see operating manual of the control unit).

The following types of reduced tariff mains connection are standard:

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

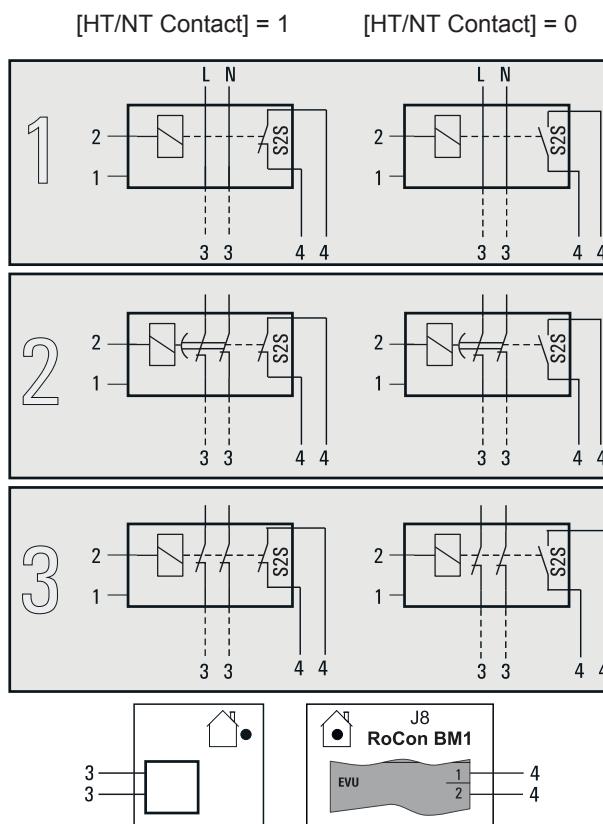
The potential-free switching contact **S2S** can be designed as a **normally-closed** or a **normally-open switching contact**.

- a) If it is **designed as an open** switching contact, then the **parameter [HT/NT Contact] = 1** must be set.

If the EVU transmits the reduced tariff signal, switching contact S2S is opened. The system switches to "Mandatory OFF". If the signal is sent again, the potential-free switching contact S2S closes and the system resumes operation.

- b) If it is **designed as an closed** switching contact, then the **parameter [HT/NT Contact] = 0** must be set.

If the EVU transmits the reduced tariff signal, switching contact S2S is closed. The system switches to "Mandatory OFF". If the signal is sent again, the potential-free switching contact S2S opens and the system resumes operation.



1 Mains connection boxes for reduced-tariff mains connection

2 Recipient for evaluation of the HT/NT control signal

3 Power supply to heat pump exterior unit (see relevant instruction manual for the heat pump exterior unit)

4 Potential-free switching contact for heat pump interior unit

Fig. 4-43 Connection HT/NT switching contact

4.5.20 Connection intelligent controller (Smart Grid - SG)

Once the function is activated by parameter [SMART GRID] = 1 (see operating manual for the control unit), depending on the signal from the energy supply company, the heat pump is switched to Stand-by, Normal or an operating mode with higher temperatures.

To do so, the **potential-free contacts SG1/SG2** of the intelligent controller must be connected to the **J8 plug**, connections Smart Grid and EVU, on the **RoCon BM1 circuit board** (see fig. 4-44).

As soon as the Smart Grid function is active, the HT/NT function is deactivated automatically. Depending on the value of the parameter [Mode SG] the heat pump operated in a different manner (see operating manual for the control unit).

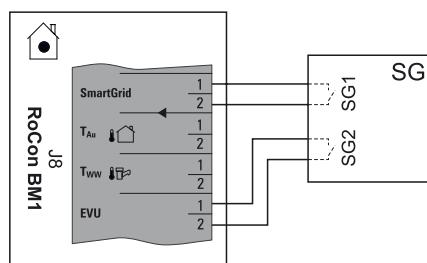


Fig. 4-44 Connection Smart Grid

4.5.21 Symbols and legend keys on connection and circuit diagrams

Symbols	Explanation	Symbols	Explanation
	Safety earthing		External cabling (number of individual cores and the mains voltage are partially quoted.)
	Low external voltage earthing		Pushbutton
	Connection terminal		DIP switch
	Plug connection		Optional component
	Terminal rail		Plug and socket connection
	2-core cabling (non-screened)		3-core cabling (non-screened)
	4-core cabling (non-screened)		5-core cabling (non-screened)
	6-core cabling (non-screened)		Shielded cabling (for example 3-strand)

Tab. 4-2 Symbol explanations for connection and circuit diagrams

4 Set-up and installation

Key names			
Short designation	Explanation	Short designation	Explanation
RRLQ	External unit for heat pump	FU1	Fuse 250 V T 3,15 A (A1P)
	Heat pump indoor unit	FLS	Flow sensor ($t_{R1}/V1$)
3UVB1	3-way diverter valve (internal heat generation circuit)	HPc-VK-1	Connecting cable between HPSU compact (with cooling function) and HP convector
3UV DHW	3 way diverter valve (hot water/heating)	HT/NT	Switching contact for reduced-tariff mains connection
A1P	Circuit board (basic control of the heat pump)	P	Heat circulation pump (device-internal)
X1A	Plug connection to TRA1	P_z	Circulation pump
X2A	Plug connection to J3 from RTX AL4	PWM	Pump connection (PWM signal)
X3A	Plug connection internal cabling (strapping plug)	RJ45 CAN	Plug connection (Rocon BM1) internal cabling (to RoCon B1)
X4A	Plug connection to J3 from RTX-AL4	RoCon B1	Operating section of the controller
X5A	Plug connection flow temperature sensor t_{V2}	RoCon BM1	Circuit board (basic control model)
X6A	Flow temperature sensor plug connection $t_{V, BH}$	RoCon BM1	J1 Plug connection for heat circulation pump P
X7A	Plug connection temperature sensor (fluid-side refrigerant) t_{L2}		J2 Plug connection 3UVB1
X8A	Return flow temperature sensor plug connection t_{R2}		J3 Plug connection AUX switching contacts
X9A	Storage tank temperature sensor plug connection t_{DHW2}		J4 Plug connection - Not occupied
X18A	Plug connection to J3 from RTX-AL4		J5 Plug connection pressure sensor
X19A	Plug connection to XAG1 + J10 from RoCon BM1		J6 Plug connection mains voltage
X21A	Plug connection internal cabling (strapping plug)		J7 Plug connection PWM - Signal for heat circulation pump P
AUX	Outputs switch contacts (A-A1-A2) + (B-B1)		J8 Plug connection EXT
BUxx	Backup heater		Plug connection EBA
DS	Pressure sensor		Plug connection Smart Grid switch contact EVU
EBA	Switching contact for external demand signal		Plug connection exterior temperature sensor t_{AU}
EXT	Switching contact for external operating mode switching		Storage tank temperature sensor plug connection t_{DHW1}
F1	Fuse 250 V T 2 A (RoCon BM1)		Plug connection HT/NT switching contact EVU

Tab. 4-3 Key names for connections and circuit diagrams - Part 1

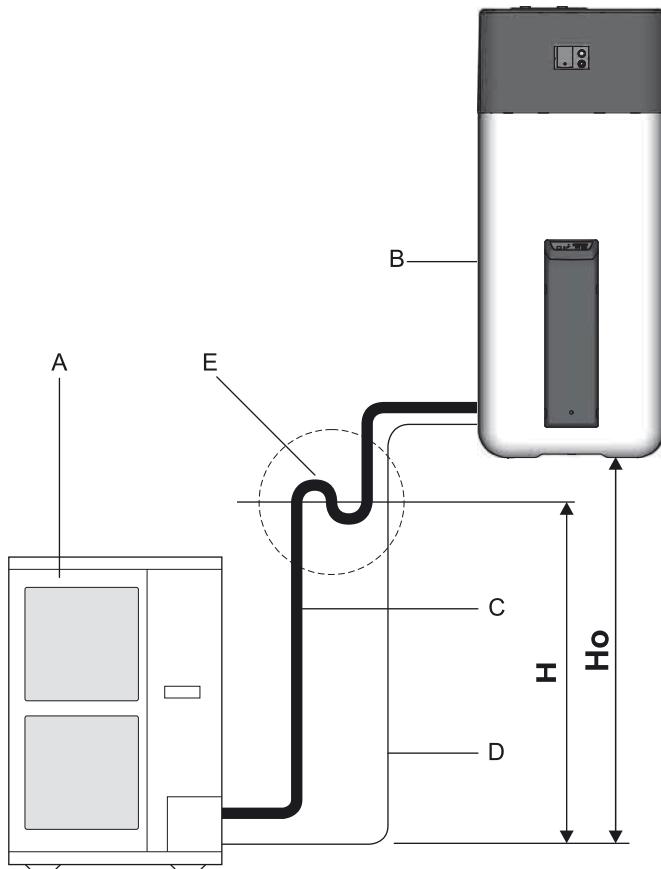
Key names				
Short designation	Explanation	Short designation	Explanation	
RoCon BM1	J9	Plug connection FLS ($t_{R1}/V1$)	SG	Switching contact for Smart Grid (intelligent mains connection)
	J10	Plug connection internal cabling (to A1P)	TRA1	Transformer
	J11	Plug connection internal cabling (to RTX-AL4)	t_{AU}	External temperature sensor (RoCon OT1)
	J12	Plug connection 3UV DHW	t_{DHW1}	Storage tank temperature sensor 1 (RoCon BM1)
	J13	Plug connection System-Bus (e.g. room station)	t_{DHW2}	2 (A1P) storage tank temperature sensor
	J14	Plug connection circulation pump P_Z	t_{R1}	Return flow temperature sensor 1 (FLS - RoCon BM1)
	J15	Plug connection internal cabling (strapping plug)	t_{R2}	2 (A1P) return flow temperature sensor
	J16	Plug connection room thermostat (RKRTTR / RKRTW)	t_{V1}	Flow temperature sensor 1 (RTX-AL4)
RoCon M1	Mixer module	t_{V2}	2 (A1P) flow temperature sensor	
RoCon U1	Room station	$t_{V, BH}$	Flow temperature sensor Backup Heater (A1P)	
RoCon UHF	Status output for operating mode "Cooling" (connection underfloor heating control RoCon UHF)	V1	Flow sensor (FLS - RoCon BM1)	
RT	Room thermostat (RKRTW)	XAG1	Plug connection exterior heat pump unit	
RT-E	Receiver for radio room thermostat (RKRTTR)	XBUH1	Plug connection Backup Heater (BUxx)	
RTX-AL4	Switch board (interface)	X2M6	Connecting cable clamp HPc-VK-1	
RTX-AL4	J1	Plug connection to TRA1	X2M7	Connecting cable clamp HPc-VK-1
	J3	Plug connection internal cabling (to A1P)	X11M	Terminal block in HP convector
	J6	Plug connection flow temperature sensor t_{V1}		
RTX-EHS	Switch board (Backup heater)			
RTX-EHS	K1	Relay 1 for backup heater		
	K2	Relay 2 for backup heater		
	K3	Relay 3 for backup heater		
	X1	Terminal block for mains connection to backup heater		
	X2_1			
	X2_2	Plug connection internal cabling (to XBUH1)		
	X2_3			
	X3	Plug connection internal cabling to J3 (RTX-AL4)		

Tab. 4-4 Key names for connections and circuit diagrams - Part 2

4 Set-up and installation

4.6 Laying coolant lines

- Check whether oil trap arc necessary.
 - Required if ROTEX HPSU compact is not installed at ground level with the heat pump exterior unit (fig. 4-45, $H_O \geq 10 \text{ m}$).
 - At least one oil trap arc must be installed every 10 m difference in height (fig. 4-45, H = clearance from oil trap arc to oil trap arc).
 - Oil trap arc only required in gas line.
- Install lines with bending unit and an adequate clearance to electrical lines.
- Only solder with light nitrogen flow (hard soldering only).
- Do not apply heat insulation to joins until after start-up (for purposes of leakage search).
- Establish flange connections and connect to the units.
(⚠ Pay attention to the tightening torque, see chapter 10.3 "Tightening torque").



- A Exterior heat pump unit (RRLQ)
B ROTEX HPSU compact
C Gas line
D Liquid line
E Oil trap arc
H height to 1st oil trap (max. 10 m)
 H_O Height difference between heat pump exterior unit and heat pump interior unit.

Fig. 4-45 Oil trap arc coolant line

4.7 Pressure test and filling the coolant circuit

RISK OF ENVIRONMENTAL DAMAGE!

Important information regarding the coolant used.

The entire heat pump system contains refrigerant with fluorinated greenhouse gases which damage the environment if released.

Coolant type: R410A
GWP* value: 2087,5

* GWP = Global Warning Potential

- Fill in the total coolant filling quantity on the supplied label on the heat pump exterior unit (for information consult the installation instructions for the heat pump exterior unit).
- Never allow coolant to be released into the atmosphere - always suction it off and recycle using a suitable recycling device.

- Perform pressure test with nitrogen.
 - Use nitrogen 4.0 or higher.
 - Maximum 40 bar.
- After leak search is complete, completely drain.
- Vacuum lines.
 - Pressure to be achieved: 1 mbar absolute.
 - Time: minimum 1 h
- Check whether additional refrigerant is needed for primer filling, fill where necessary.
- Open stop valve on exterior unit completely until the stop. Tighten loosely.
- Reassemble valve caps.
- Check whether the storage tank temperature sensors t_{DHW1} and t_{DHW2} are inserted to a depth of 80 cm.

4.8 Filling the system with water

Do not fill the ROTEX HPSU compact until all installation activities have been completed, in the order shown as follows.

4.8.1 Checking the water quality and adjusting the pressure gauge

- Observe the information on the water connection and water quality in accordance with section 4.4.

The correct minimum pressure marking must be set on the pressure gauge installed by the customer before filling the system for the first time:

- Rotate the pressure gauge glass in such a way that the minimum pressure mark corresponds to the **system height +2 m** (1 m water column = 0.1 bar).

4.8.2 Filling the hot water heat exchanger

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

4.8.3 Filling the storage tank

See chapter 7.3.

4.8.4 Filling the heating system

See chapter 7.4.

5 Start-up

5 Start-up



WARNING!

A ROTEX HPSU compact that is installed or started incorrectly may not operate properly and is dangerous for the health and safety of individuals.

- The ROTEX HPSU compact may only be started up by authorised and trained heating experts.



CAUTION!

A ROTEX HPSU compact not put into operation properly can lead to damage to property and the environment.

- Observe the relevant regulations of technology to prevent creation of corrosion products and deposits.
Minimum requirements regarding the quality of filling and supplementary water:
 - Water hardness (calcium and magnesium, calculated as calcium carbonate): $\leq 3 \text{ mmol/l}$
 - Conductivity: ≤ 1500 (ideal ≤ 100) $\mu\text{S/cm}$
 - Chloride: $\leq 250 \text{ mg/l}$
 - Sulphate: $\leq 250 \text{ mg/l}$
 - pH value (heating water): 6.5 - 8.5.We recommend Fervox limescale and corrosion protection agent **KSK** (⌚ 15 60 50).
- During system operation, the water pressure at the pressure gauge must be checked at regular intervals. If necessary, readjust by refilling

5.1 Initial start-up

After the ROTEX HPSU compact was installed and connected completely, it will need to be undergo a one-time adaptation to the installation environment to be carried out by technical personnel (configuration).

After this configuration is complete, the installation is ready for operation and the operator can make additional custom configurations on it.

The heating specialist must instruct the operator [on using the machine], must prepare the commissioning report, and fill out the operating manual.

The settings of the optional components such the room thermostat or ROTEX solar installation must be configured on the respective components themselves.

5.1.1 Requirements

- The ROTEX HPSU compact is fully connected.
- The coolant system is dehumidified and filled with the specified amount of coolant.
- The heating and hot water systems are filled and charged at the right pressure (see chapter 7.4).
- The storage tank is filled up to the overflow (see chapter 7.3).
- Optional accessories have been mounted on and connected up.
- The control valves of the heating system are open.

5.1.2 Start-up

- Turn power supply to ROTEX HPSU compact on.
→ After the start phase, the operating language selector is displayed.
- Use the rotary switch to select the desired language.



The operating language can be changed again at any time.

- Confirm the changes with a brief push of the rotary switch.
→ The ROTEX HPSU compact Basic Configuration is loaded.
→ The message "Starting Up" is displayed.
→ The message "Initialization" is displayed.
→ The standard display for the current rotary switch setting is displayed.

5.1.3 Set the commissioning parameters

To set the commissioning parameters, the heating expert must be logged into the controller.

- Technician login

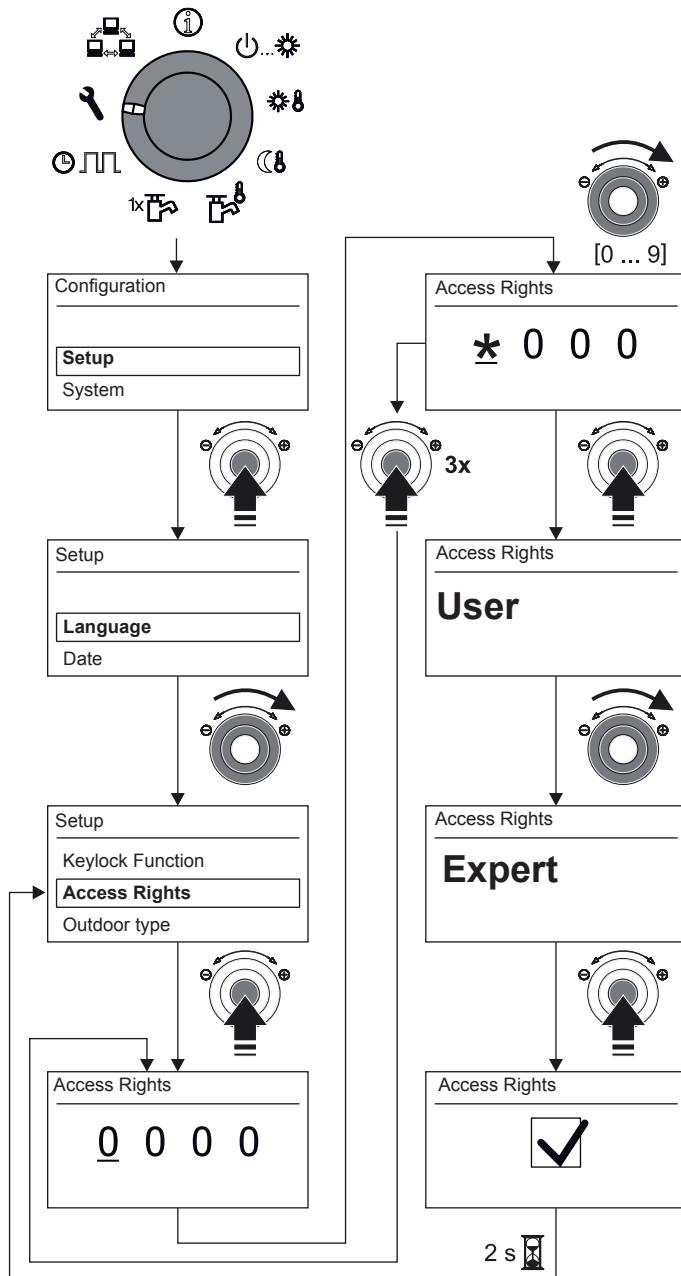


Fig. 5-1 Enter technician code

- Set required commissioning parameters. Here the supplied "Commissioning Checklist" is to be observed and completed.
 - **For clarification of the operating parameters, see Operating Manual of the Control Unit.**
 - Enter configuration values into the corresponding tables in the "Notes" chapter of the Operating Manual for the Control Unit.
 - Activate Legionella protection ([Anti-Legionella day] parameter) if required.
 - With connected external temperature RoCon OT1, set the parameter [Outside Config] to "On".
 - Configure additional commissioning parameters depending on the system requirements for the control unit of the ROTEX HPSU compact.

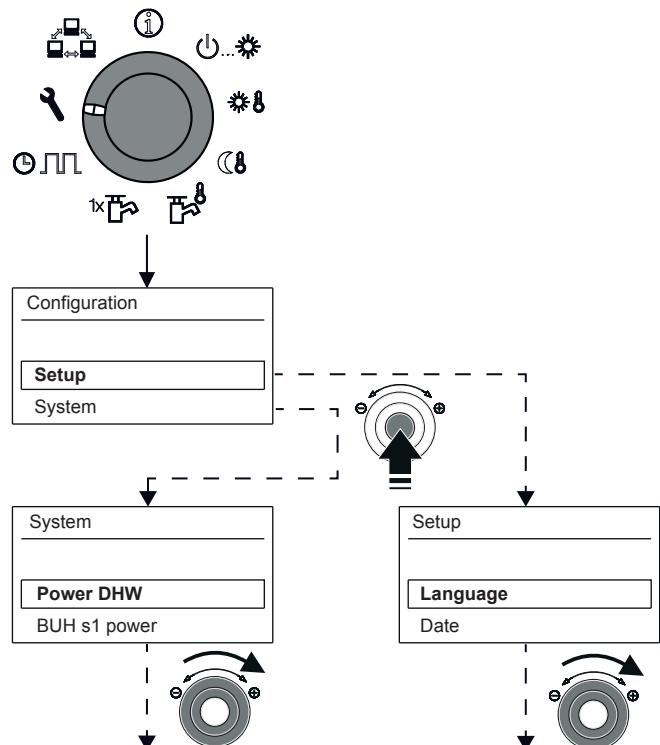


Fig. 5-2 Setting the commissioning parameters

5.1.4 Venting the hydraulics

If the storage temperature falls below a certain minimum value, the safety settings of the ROTEX HPSU compact prevent the operation of the heat pump in the case of low external temperatures:

- External temperature < -2°C, minimum storage temperature = 30°C
 - External temperature < 12°C, minimum storage temperature = 23°C.

Without Backup-heater:

The storage tank water must be heated to the minimum required storage temperature by an external heater.

With Backup Heater (BUxx):

With an outdoor temperature $< 12^{\circ}\text{C}$ and a storage tank temperature $< 35^{\circ}\text{C}$, the Backup Heater (BUxx) is switched on automatically in order to heat up the storage tank water to at least 35°C .

- In order to **accelerate the heating process with the back-up heater, temporarily**
 - Set parameter **[Function Heating]** = "1" and
 - Set parameter **[Power DHW]** to the **maximum value of the back-up heater**.
 - Switch the rotary switch to operating mode  and set the parameter **[1x Hot Water]** to "On". Following successful heating, reset the parameters to "Off".

5 Start-up

- Make sure that the cap on the automatic venting unit is open (fig. 5-3, item A).

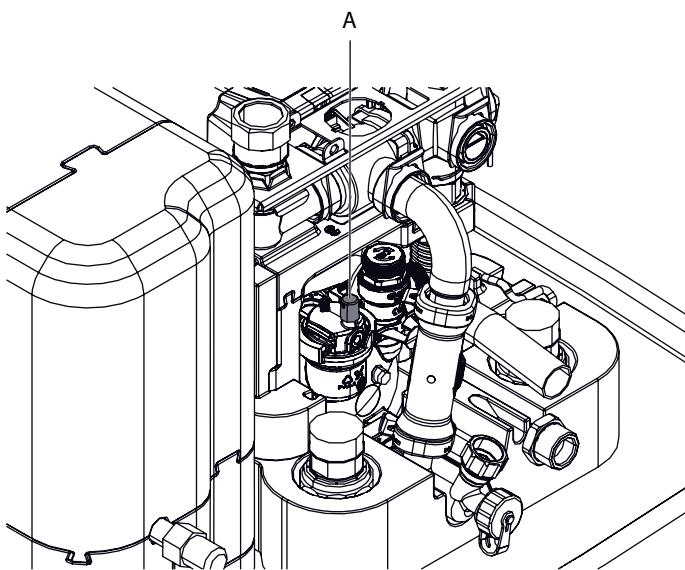


Fig. 5-3 Cap on the automatic venting unit

- Fit a hose to the manual venting valve (fig. 5-4, item B) and direct the hose away from the device. Open the valve until water comes out.
- Fit a hose to the second manual venting valve (fig. 5-4, item C) and open until water comes out.
- Activate the venting function (see FA RoCon HP).

By activating the Air Purge the RoCon HP control unit starts a defined sequence program with Start-Stop operation of the integrated heat circulation pump and various settings for the 3-way diverter valve integrated into the ROTEX HPSU compact.

Existing air can leak from the automatic venting valve during the venting function and the hydraulic circuit connected to the ROTEX HPSU compact is evacuated.



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

Prior to activating this function, the heating circuit must be completely filled.

- Check the water pressure and top up with water if necessary (see chapter 7.4).
- Repeat the venting, checking and topping-up process until:
 - venting is complete.
 - adequate water pressure is generated.

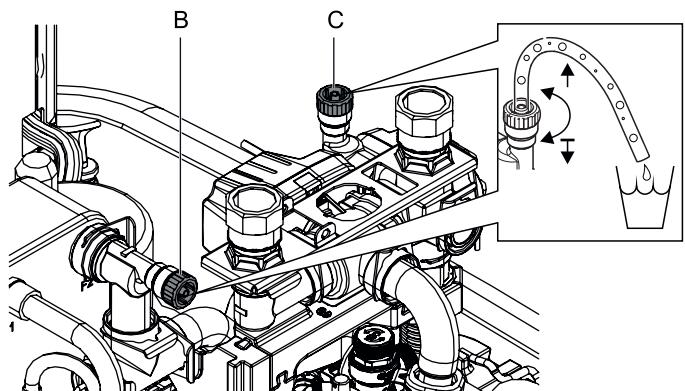


Fig. 5-4 Manual venting valves

5.1.5 Check the minimum flow rate

The **minimum flow must be checked with a closed heating circuit.**



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

If the minimum flow is insufficient:

- there may be air in the circulation pump.
→ Vent the circulation pump.
- the valve drive of the 3-way diverter valve (3UVB1 / 3UV DHW) is defective.
→ Check the function of the valve drive, if necessary, replace valve drive.

- Close valves and actuators of all closed heat distribution circuits.
- Set "Heating" operating mode on the control unit of the ROTEX HPSU compact.
- Read info parameter [Flow Rate].
→ The flow rate must be at least 600 l/h (see operating manual of the control unit).



The ROTEX HPSU compact controller permanently monitors the flow of the internal heat exchanger circuit. Various different minimum flow rates are required depending on the active operating mode:

- operating mode "Heating": 600 l/h
- operating mode "Cooling": 840 l/h
- Automatic defrosting function (氷) active: 1020 l/h

If, at a flow rate in excess of 600 l/h, an error message concerning inadequate minimum flow is displayed, you must check the actual flow rate in the active operating mode and rectify any possible causes of the error.

5.1.6 Configuring Screed Program parameters (only if necessary)

With the Screed Program the flow temperature is controlled on the basis of a pre-set temperature profile.

Further information on the Screed Program, its activation and expiry, see the operating manual of the control unit.

After expiry of the Screed Program the RoCon HP control unit continues to operate in the previously set operating mode. Unless configured previously, the following tasks need to be carried out in conclusion.

a) When connecting without a room station RoCon U1:

- Set the heating characteristic curve or the desired flow temperature.

b) When connecting with a room station RoCon U1:

- Activate the room station.
- Set the heating characteristic curve or the desired flow temperature. If required, activate the parameter [Room Influence] and set the preset room temperature.

5.2 Re-commissioning

5.2.1 Requirements



CAUTION!

Setting up in frosty conditions can result in damage to the entire heating system.

- Only commission at temperatures below 0 °C when a water temperature of at least 5 °C can be guaranteed in the heating system and storage tank.

ROTEX recommends that you avoid operating the system in extremely frosty conditions.

- The ROTEX HPSU compact is fully connected.
- The coolant system is dehumidified and filled with the specified amount of coolant.
- The heating and hot water systems are filled and charged at the right pressure (see chapter 7.4).
- The storage tank is filled up to the overflow (see chapter 7.3).

5.2.2 Start-up



If the storage temperature falls below a certain minimum value, the safety settings of the ROTEX HPSU compact prevent the operation of the heat pump in the case of low external temperatures:

- **External temperature < -2°C, minimum storage temperature = 30°C**
- **External temperature < 12°C, minimum storage temperature = 23°C.**

Without backup-heater:

The storage tank water must be heated to the minimum required storage temperature by an external heater.

With Backup Heater (BUxx):

With an outdoor temperature < 12°C and a storage tank temperature < 35°C, the Backup Heater (BUxx) is switched on automatically in order to heat up the storage tank water to at least 35°C.

- In order to **accelerate the heating process with the back-up heater, temporarily**
 - Set parameter **[Function Heating] = "1"** and
 - Set parameter **[Power DHW]** to the **maximum value of the back-up heater**.
 - Switch the rotary switch to operating mode  and set the parameter **[1x Hot Water]** to "On".
- Following successful heating, reset the parameters to "Off".

1. Check the cold water connection and, where necessary, fill the potable water heat exchanger.
2. Turn power supply to ROTEX HPSU compact on.
3. Wait for the start phase.
4. After the start phase has completed, in heating mode, vent the heating system, check the system pressure and adjust if necessary (max. 3 bar, see chapter 7.4).
5. Carry out a visual inspection for leaks on all joints internally. Seal any leaks that occur in a professional manner.
6. Set the dial on the controller to the required operating mode.

7. If a ROTEX  solar system is connected, commission this in accordance with instructions provided. After disconnecting the ROTEX  solar system, check the level in the buffer storage tank once again.

6 Decommissioning

6 Decommissioning



WARNING!

Danger of scalding and flooding when opening the solar return flow coupling or heating and hot water pipes due to escaping hot water.

- Only drain the storage tank container or heating system
 - when they have been left to cool sufficiently,
 - with a suitable device for the safe draining or catching of escaping water,
 - wearing appropriate protective clothing.

6.1 Temporary shutdown



CAUTION!

A heating system that is shut down can freeze in the event of frost and may suffer damage.

- If there is any risk of frost, drain any water from the decommissioned heating system.
- If the heating system is not drained and there is a risk of frost, the power supplies must be secured and the external main switch must remain switched on.

If the ROTEX HPSU compact is not needed for a long time, it can be temporarily decommissioned.

ROTEX therefore recommends that you do not disconnect the system from power supply, but rather only place it in "Stand-By Mode" (consult the operating manual for the control system).

The system is then protected from frost. The pumps and valve protection functions are active.

If it is not possible to guarantee the power supply when there is danger of frost,

- completely discharge the ROTEX HPSU compact on the water side, or
- suitable antifreeze measures must be taken for the connected heating system and hot water storage tank (e.g. draining).



If there is a danger of frost and the power supply cannot be guaranteed for just a few days, the unit's excellent heat insulation means that the ROTEX HPSU compact does not have to be drained, provided that the storage tank temperature is monitored regularly and does not fall below +3°C.

However, there is no frost protection for the connected heat distribution system through this.

6.1.1 Draining the storage tank

- Disconnect ROTEX HPSU compact from the power supply.
- Connect the drain hose to the **KFE filling connection** (**accessory KFE BA, 16 52 15**) (fig. 6-1, item A) and run to drainage point that is at least soil deep.



If no **KFE filling connection** is available, the connection piece (fig. 6-1, item C) can alternatively be removed from the safety overflow (fig. 6-1, item B) and used.

Once the draining process is complete, this must be replaced before the heating system can be started again.

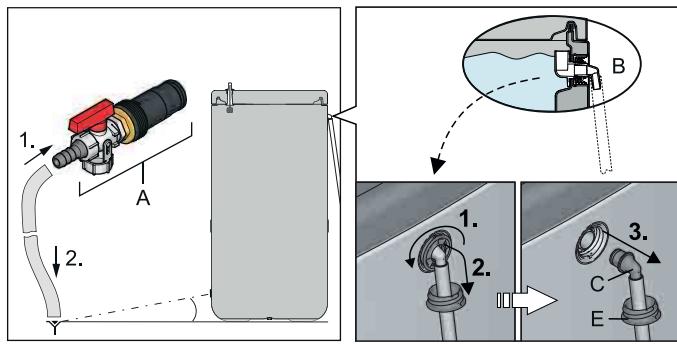


Fig. 6-1 Connecting the drainage hose

Optional: Removing the connection piece from the safety overflow

A	<i>KFE filling connection (accessory KFE BA, 16 52 15)</i>	E	<i>Threaded piece</i>
B	<i>Safety overflow</i>	F	<i>Sealing plug</i>
C	<i>Hose connection piece for safety overflow</i>	G	<i>Connecting angle</i>
D	<i>Clamping piece</i>	X	<i>Valve insert</i>

Tab. 6-1 Legend from fig. 6-1 to fig. 6-6

Without $p=0$ solar installation

- Remove the cover plate from the filling and emptying fitting.
- **When using the KFE filling connection** (**accessory KFE BA, 16 52 15**): Remove the cover plate from the handle and unscrew the threaded piece (fig. 6-2, item E) from the storage tank container.

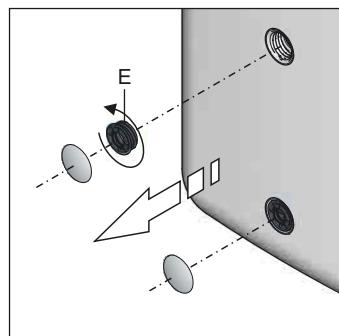


Fig. 6-2 Unscrew threaded piece

- Insert the **KFE filling connection** into the threaded piece (fig. 6-3, item E) and secure it using a clamping piece (fig. 6-3, item D).
- Place a suitable collection trough beneath the filling and emptying fitting.
- At the filling and emptying connection, unscrew the threaded piece (fig. 6-4, item E), remove the sealing plug (fig. 6-4, item F) and **immediately screw** the pre-assembled threaded insert with the **KFE filling connection** back into the filling and emptying connection (fig. 6-4).



CAUTION!

Storage water will gush out as soon as the sealing plug is removed.

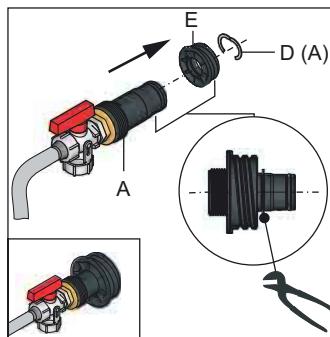


Fig. 6-3 Complete KFE filling connection

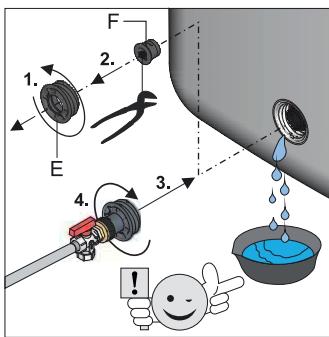


Fig. 6-4 Screw the KFE filling connection into the filling and draining fitting

- Open the **KFE cock** on the **KFE filling connection** and drain the water out of the storage tank.

Only for the $p=0$ solar installation

- Adjust the valve insert on the connecting angle so that the path to the blind plug is blocked off (fig. 6-5).
- Remove the blanking plug from the connecting elbow (fig. 6-5) and place a suitable collection trough beneath the unit.

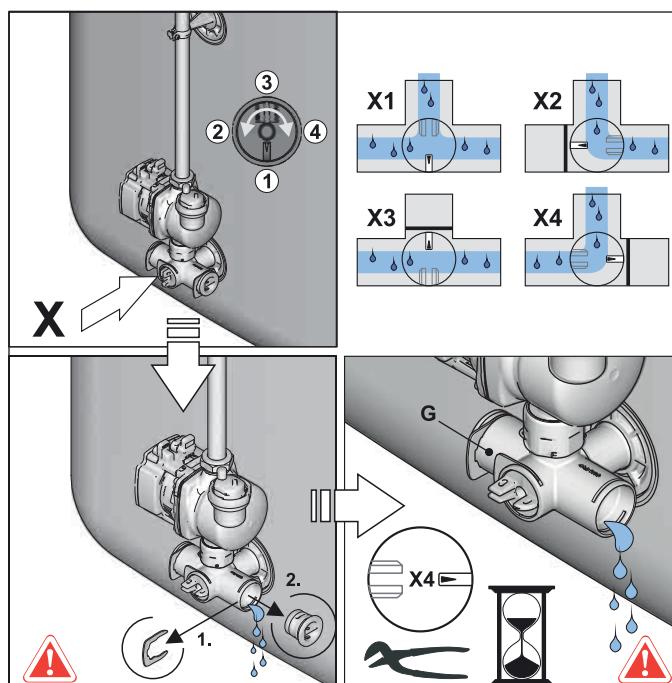


Fig. 6-5 Shutting off the valve insert and removing the blanking plug from the connecting angle

- Insert the **KFE filling connection** into the connecting elbow and secure using a retaining clamp (fig. 6-6).

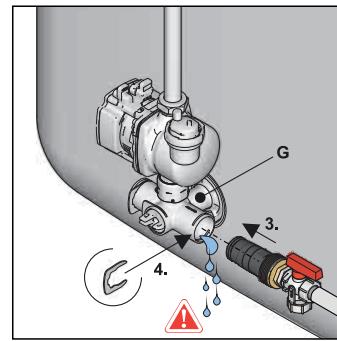


Fig. 6-6 Assembling the KFE filling connection in the connecting elbow

- Open the **KFE filling connection**.
- Adjust the valve insert on the connecting angle so that the flow to the drain hose is opened (also refer to fig. 6-5) and drain the water content of the storage tank.

6.1.2 Draining the heating circuit and hot water circuit

- Connect the drain hose to the combined filling and draining valve on the ROTEX HPSU compact.
- Open the combined filling and draining valve on the ROTEX HPSU compact.
- Allow the heating and hot water circuit to drain.
- Disconnect the heating flow and return flow as well as the cold water inflow and the hot water outflow from the ROTEX HPSU compact.
- Connect the discharge hose on the heating flow and return flow as well as the cold water inflow and hot water outflow so that the hose opening is at ground level.
- Allow the individual heat exchangers to run empty one after the other based on the suction lifter method.

6 Decommissioning

6.2 Final shutdown



WARNING!

Cooling systems (heating pumps), climate control systems and heating devices that are incorrectly dismantled can both endanger the life and health of people and exhibit impaired function during start-up.

- Work on the ROTEX HPSU compact (such as dismantling components, temporary or final shutdown of system) is only to be carried out by persons who are authorised and who have successfully completed **qualifying technical or vocational training** for the specific activity and who have taken part in advanced training sessions recognised by the relevant responsible authorities. These include, in particular, **certified heating engineers, qualified electricians and HVAC specialists**, who on account 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.
- You **must observe** the **warning and safety instructions** in the installation manual on working in the coolant system.

A final shutdown may be necessary if

- the system is defective and is being dismantled and disposed of.
- components of the system are defective, are being dismantled and replaced.
- the system or parts of the system are being dismantled and reassembled in another location.

The ROTEX HPSU compact is designed to be environmentally friendly and easy to install: the jobs described above can therefore be carried out in an efficient and environmentally-friendly manner.

When changing location or replacing parts on the coolant system in the pipe network:

- Pump the coolant back into the external heat pump unit (see installation and operating guide for the particular external heat pump unit).

When disposing of the machine or replacing parts in the coolant system:

- Suction the coolant from the machine and recycle (see installation and operating guide for the particular external heat pump unit).



CAUTION!

Coolant escaping from the system causes long-term damage to the environment.

Mixing different kinds of coolant can result in hazardous toxic gases being released. Mixing with oils when coolant escapes can lead to the soil being contaminated.

- Never allow coolant to be released into the atmosphere - always suction it off and recycle using a suitable recycling device.
- Always recycle coolant, in so doing keeping it separated from oils and other additives.
- Only keep each type of refrigerant separate in suitable pressure vessels.
- Dispose of coolants, oils and additives properly and in accordance with the applicable national regulations of the country it is being used in.

- Decommissioning a ROTEX HPSU compact (see section 6.1).
- Disconnect the ROTEX HPSU compact from all electrical connections, refrigerant and water connections.
- Dismantle the ROTEX HPSU compact or components in accordance with the installation guide in reverse order.
- ROTEX HPSU compact disposed off in a professional manner.

Recommendations for disposal

The ROTEX HPSU compact has an environmentally friendly design. During the disposal process, the only waste accrued 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.



ROTEX has complied with the standards for environmentally-friendly disposal as a result of the environmentally-friendly design of the ROTEX HPSU compact. 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 coolant, oil and other parts may only be carried out by a qualified fitter.
- Disposal may only be carried out by an organization that specialises in reuse, recycling and recovery.

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

7 Service and maintenance

7 Service and maintenance

7.1 General

Regular inspection and maintenance of the HPSU compact reduces energy consumption and ensures a long life and smooth operation.



RISK OF ENVIRONMENTAL DAMAGE!

Important information regarding the coolant used.

The entire heat pump system contains refrigerant with fluorinated greenhouse gases which damage the environment if released.

Coolant type: R410A
GWP* value: 2087,5

* GWP = Global Warming Potential

- Fill in the total coolant filling quantity on the supplied label on the heat pump exterior unit (for information consult the installation instructions for the heat pump exterior unit).
- Never allow coolant to be released into the atmosphere - always suction it off and recycle using a suitable recycling device.



The European statutory investigation period applies for heat pumps from a total system coolant filling quantity of 3 kg or, as of 01.01.2017 from a total filling quantity of 5 t CO₂-equivalent (in the case of R410A from 2.4 kg).

ROTEX nonetheless recommends the conclusion of a maintenance contract, including documentation of the work carried out in the operating manual in order to preserve the right to guarantee, including for systems for which there is not legal obligation to monitor impermeability.

- With a system coolant **total filling quantity of 3 kg – 30 kg** or from **6 kg** in hermetic systems and from 01.01.2017 with a total filling quantity of 5-50 t CO₂-equivalent or from 10 t CO₂-equivalent in hermetic systems:
→ **Inspections** carried out by certified personnel at intervals of no more than **12 months** and documentation of the work performed in accordance with valid regulations. This documentation must be retained for at least 5 years.



Certified people are those who have proof of expertise for the European Community for work on stationary refrigeration systems (heat pumps) and air conditioning systems, according to the F-Gases Directive (EC) No 303/2008.

- up to 3 kg coolant fill quantity: Expert certificate category II
- 3 kg coolant fill quantity or over: Expert certificate category I



Have the inspection and maintenance carried out by authorised and trained HVAC engineers once a year, ideally **before the heating period**. This can prevent faults during the heating period.

ROTEX recommends an inspection and maintenance contract to ensure regular inspection and maintenance.

Legal requirements

According to the F-Gases Directive (EC) No. 842/2006 Article 3, replaced on 01.01.2015 by (EC) No. 517/2014 Articles 3 and 4, Operators (or Owners) must perform regular maintenance on their fixed cooling systems, check impermeability and have any leaks repaired immediately.

All installation, maintenance and repair work on the cooling circuit must be documented e.g. in the operating manual.

Operators of ROTEX heat pump systems are subject to the following obligations:

7.2 Activities to be performed annually

**WARNING!**

Improperly carried out work on the ROTEX HPSU compact and its components that have been connected as an option can endanger human life and health and adversely affect the operation of these components.

- Work on the ROTEX HPSU compact (such as maintenance or servicing) is only to 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 appropriate responsible authorities. 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.

**WARNING!**

The gaseous refrigerant is heavier than air. **In pits or in badly ventilated rooms** it can collect in **high concentrations**. **Breathing in high concentrations** of gaseous **refrigerant** leads to **feelings of faintness and suffocation**. **Toxic gases** can be formed if **gaseous refrigerants** come into contact with **open fire or hot objects**.

- When working on the refrigerant circuit, ensure that the workplace is well ventilated.
- If necessary, before starting work, evacuate the refrigerant system completely.
- Never carry out work on the refrigerant circuit in closed rooms or work pits.
- Do not let refrigerant come into contact with open fire, embers or hot objects.
- Never allow coolant to escape into the atmosphere (forms high concentrations).
- After removing the service pipes from the filling connections, carry out a leakproof test on the refrigeration system. Refrigerant can escape through leaks.



WARNING!

At normal atmospheric pressure and ambient temperatures, **liquid refrigerant** vaporises so suddenly that on **contact with skin or eyes** it can cause the **tissue to freeze** (danger of going blind).

- Always wear safety goggles and protective gloves.
- Never allow refrigerant to escape into the atmosphere (high pressure at the point of the leak).
- When removing the service pipes from the filling connections, never hold the connections in the direction of your body. Residual refrigerant could escape.



WARNING!

Under the cover of the ROTEX HPSU compact **temperatures of up to 90°C** can arise during operation. During operation, **hot water temperatures > 60°C** arise.

- Touching components during or after operation leads to a **risk of burns**.
- Water discharged during maintenance and servicing work can cause **scalding** on contact with the skin.
- Before carrying out servicing and maintenance work, allow the ROTEX HPSU compact to cool down sufficiently.
- Wear protective gloves.



WARNING!

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 systems circuits **from the power supply** (switch off main switch, disconnect fuse) and secure against unintentional restart.
- Electrical connection and work on electrical components must only be carried out by **qualified electricians** in compliance with valid standards and guidelines as well as the specifications of the energy supply company.
- The **equipment covers and maintenance opening covers** must be **re-fitted** immediately after completion of the work.

1. Remove the cover hood and thermal insulation (see section 4.3).
2. Carry out a functional inspection of the ROTEX HPSU compact, as well as all installed accessory components (backup heater, solar installation) by checking the temperature display and the switching states in the individual modes.
3. If a ROTEX solar system of the DrainBack $p=0$ type is connected and in operation, switch this off and empty the solar panels.
4. When operating the ROTEX HPSU compact in a bivalent-alternative system; switch off all heat generators and deactivate the bivalent control unit.
5. Visual check of general condition of the ROTEX HPSU compact.
6. Visual check of the water storage tank level (filling level indicator)
→ Top up the water if necessary (see section 7.3), determine the reason for the low water level and remedy it.



The ROTEX HPSU compact is designed to be low-maintenance. No corrosion protection equipment is required (such as expendable anodes). This means there is no need for maintenance work such as changing the protective anodes or cleaning the inside of the storage tank.

7. Check the connection of the safety overflow and drain hose for leaks, free drainage and gradient.
→ If necessary, clean the safety overflow and drain hose and relay it; replace damaged parts.
8. Visual check of connections, lines and safety pressure relief valve. In the event of damage, determine the cause.
→ Replace defective parts.
9. Check all electrical components, connections, and cables.
→ Repair damaged parts or replace them.



If the connecting cable for the optional Backup Heater shows damage, the complete Backup Heater must be replaced.

The connecting cable cannot be replaced separately.

10. Check the water pressure of the cold water supply (<6 bar)
 - and if necessary the fitting or adjustment of the pressure reducer.
11. Check the system water pressure on the RoCon HP controller of the ROTEX HPSU compact.
 - Top up the water in the heating system if necessary, until the pressure display is within the permitted range (see section 7.4).
12. Check and clean filter/sludge separator.
13. Check minimum flow rate (see section 5.1.5).
14. Clean plastic surface of ROTEX HPSU compact **with a soft cloth and mild cleaning agent**. Do not use any cleaners with aggressive solvents (damage to the plastic surface may occur).
15. Refit the cover (see section 4.3).
16. Servicing of the external unit and other heating components connected to the ROTEX HPSU compact should be carried out as specified in the respective associated installation and operating manuals.
17. Complete the confirmation of servicing in the supplied operating manual of the ROTEX HPSU compact.

7.3 Filling and topping up the storage tank

CAUTION!

Filling the storage tank container with excessive water pressure or with too high a flow speed can cause damage to the ROTEX HPSU compact.

- Only fill with a water pressure <6 bar and a flow speed <15 l/min.



CAUTION!

UK only! If filling or topping up the storage tank is done by means of the boiler filling and drain valve, a temporary filling loop must be used with the appropriate backflow prevention device in accordance with clause G24.2, Guidance to the Water Supply (Water Fittings) Regulations 1999.



If the storage temperature falls below a certain minimum value, the safety settings of the ROTEX HPSU compact prevent the operation of the heat pump in the case of low external temperatures:

- External temperature < -2°C, minimum storage temperature = 30°C
- External temperature < 12°C, minimum storage temperature = 23°C.

Without backup-heater:

The storage tank water must be heated to the minimum required storage temperature by an external heater.

With Backup Heater (BUxx):

With an outdoor temperature < 12°C and a storage tank temperature < 35°C, the Backup Heater (BUxx) is switched on automatically in order to heat up the storage tank water to at least 35°C.

- In order to **accelerate the heating process with the back-up heater, temporarily**
 - Parameter [Function Heating] = "1" and
 - Set parameter [Power DHW] to the **maximum value of the back-up heater**.
 - Switch the rotary switch to operating mode and set the parameter [1x Hot Water] to "On". Following successful heating, reset the parameters to "Off".

7 Service and maintenance

Without installed solar system

- Connect the **filling hose** with backflush prevention (1/2") to the connection "DrainBack Solar - feed" (see fig. 7-1, item 1).
- **Fill** the storage tank on the ROTEX HPSU compact **until water comes out of the connection** (fig. 7-1, item 23), that has been connected as the **safety overflow**.
- Disconnect the filling hose with backflush prevention (1/2") again.

With KFE filling connection or with installed p=0 solar system (see also chapter 6.1)

- Without solar system: **KFE filling connection (accessory KFE BA 16 52 15)** to the filling and drain connection of the ROTEX HPSU compact (fig. 3-2 to fig. 3-5, item 10)
or
with the solar system: **KFE filling connection (accessory KFE BA, 16 52 15)** to the connecting elbow of the p=0 control and pump unit (RPS4).
- Connect the **filling hose** with backflush prevention (1/2") to the previously installed **KFE cock**.
- **Fill** the storage tank on the ROTEX HPSU compact **until water comes out of the connection** (fig. 7-1, item 23), that has been connected as the **safety overflow**.
- Disconnect the filling hose with backflush prevention (1/2") again.

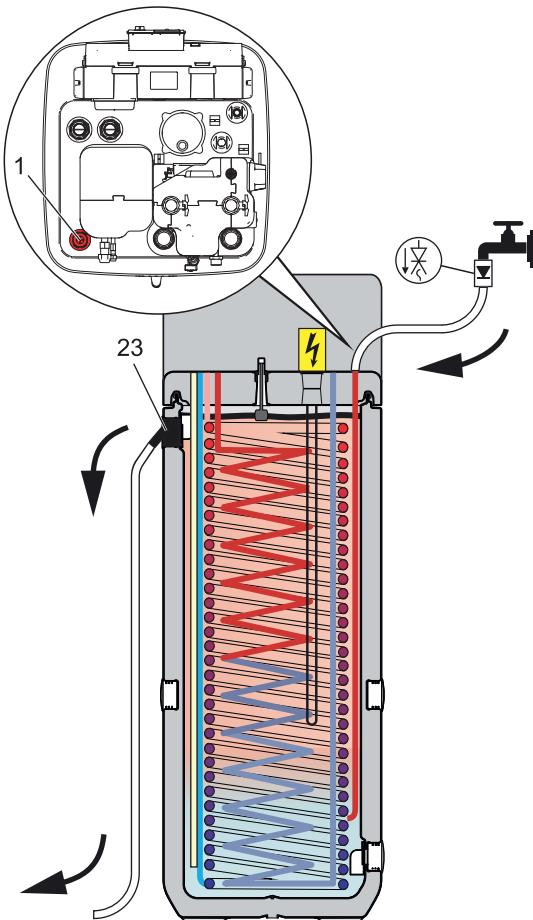


Fig. 7-1 Buffer storage filling - without solar system

7.4 Filling and topping up the heating system

DANGER!

During the filling procedure, water can leak from potential leaking sites, which, in the event of contact with live parts, can result in an electric shock.

- Prior to the filling procedure, disconnect the ROTEX HPSU compact from the power.
- After the initial filling, prior to switching on the power supply to the ROTEX HPSU compact, check whether all electronic parts and connection points are dry.

WARNING!

Contamination of the drinking water is damaging to health.

- When filling the heating system prevent any back-flow of heating water into the drinking water piping.



Observe the information on the water connection and water quality in accordance with chap. 2.4 and 4.4.

1. Connect the filling hose (fig. 7-2, item 1) with backflush prevention (1/2") and an external pressure gauge (on-site) to the KFE cock (fig. 7-2, item 2) and secure from slipping using a hose clamp.
2. Connect the drain hose to the venting valve and direct away from the unit. Open the venting valve with connected hose and check that the other venting valve is closed.
3. Open the water cock (fig. 7-2, item 4) in the supply line.
4. Open KFE cock (fig. 7-2, item 2) and watch the pressure gauge.
5. Fill the system with water until the system target pressure is reached on the pressure gauge (**System height +2 m**, whereby 1 m water column = 0.1 bar).
The overpressure valve must not be triggered!
6. Close manual venting valve as soon as bubble-free water comes out.
7. Close water stopcock (fig. 7-2, item 4). KFE valve must remain open so that the water pressure can be read off on the external pressure gauge.
8. Switch on the power supply of the HPSU compact.
9. Set rotary switch to position operating mode and select "Heating".
→ ROTEX HPSU compact runs in the hot water heating mode after the start phase.
10. During hot water heating mode, continuously check the water pressure on the external pressure gauge and, if necessary, top up the water via the KFE valve (fig. 7-2, item 2).

11. Vent the entire heating installation as described in chapter 5.1.4 (open the regulating valves on the installation. At the same time the underfloor heating system can be filled and flushed with the underfloor heating distributor.).



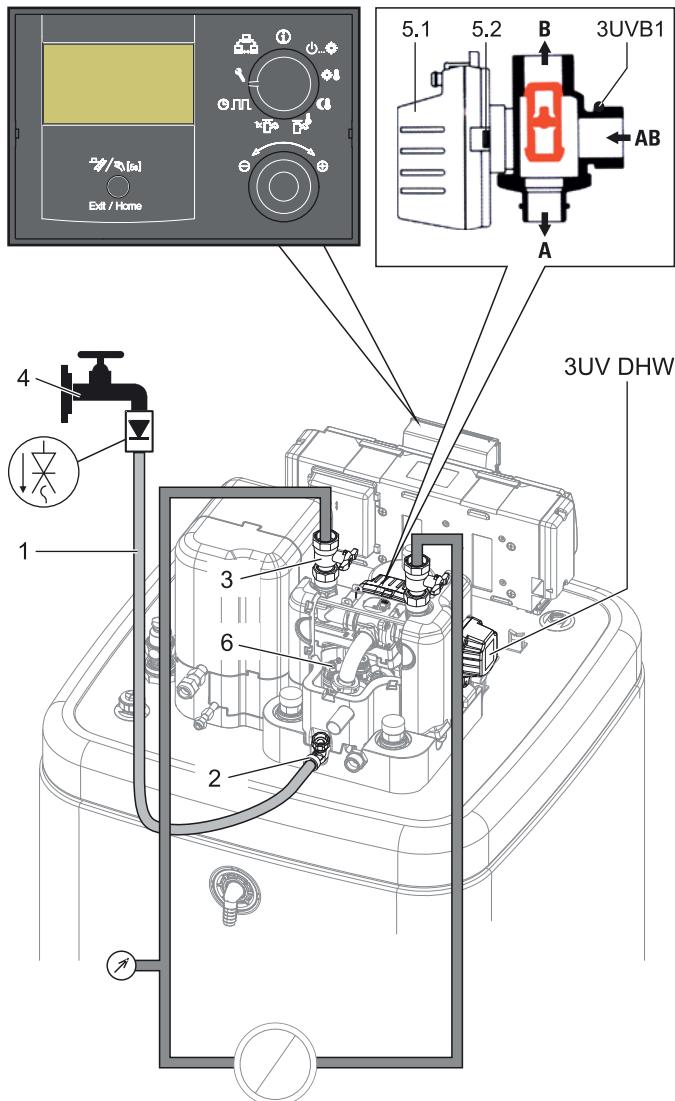
Air Purge



(see operating manual of the control unit)

12. Inspect the water pressure at the external pressure gauge again. Where necessary, refill with water via the KFE cock (fig. 7-2, item 2).

13. Disconnect the filler hose (fig. 7-2, item 1) with flow-back preventer from the KFE cock (fig. 7-2, item. 2).



- | | |
|-----------------|--|
| 1 Filler hose | 5.2 Unlocking button of the drive lock |
| 2 KFE cock | 6 Automatic bleeder |
| 3 Ball cock | 3UVB1, 3UV DHW |
| 4 Water cock | 3-way diverter valve |
| 5.1 Valve drive | |

Fig. 7-2 Filling the heating circuit

8 Errors, malfunctions and messages

8 Errors, malfunctions and messages



CAUTION!

Electrostatic charges can lead to voltage arcing that can destroy the electronic components.

- Ensure equipotential bonding before touching the switching field circuit board.

8.1 Recognising errors, correcting malfunctions

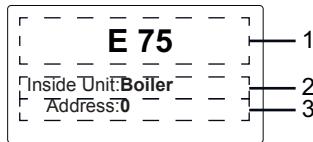
Electronic control of the ROTEX HPSU compact:

- signals an error by means of the background of the display lighting up red and shows an error code in the display (see tab. 8-2).
- shows information messages regarding the operating status, which is not signaled by red background lighting.

An integrated Protocol saves up to 15 error-related or other information messages regarding the operating status that last occurred.

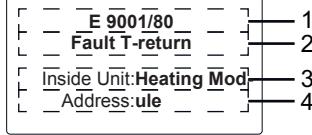
Depending on the operating mode, messages are also forwarded to connected room stations or room thermostats.

8.1.1 Current fault display



- 1 Fault message as code (see tab. 8-2)
- 2 Location information (equipment) of the detected fault
- 3 Bus address of the unit causing the fault

Fig. 8-1 Displays an active error message (controller fault)



- 1 Fault message as code (see tab. 8-2)
- 2 Fault message as clear text (see tab. 8-2)
- 3 Location information (equipment) of the detected fault
- 4 Bus address of the unit causing the fault

Fig. 8-2 Display of a current error message (heat pump fault)

8.1.2 Read Protocol

The report can be read out in the "Special Level" (see fig. 8-3).

The last received (latest) message is in the first position. All other previous messages are then pushed backwards by one place when a new entry is made. The 15th message will be deleted any time a new message is received.

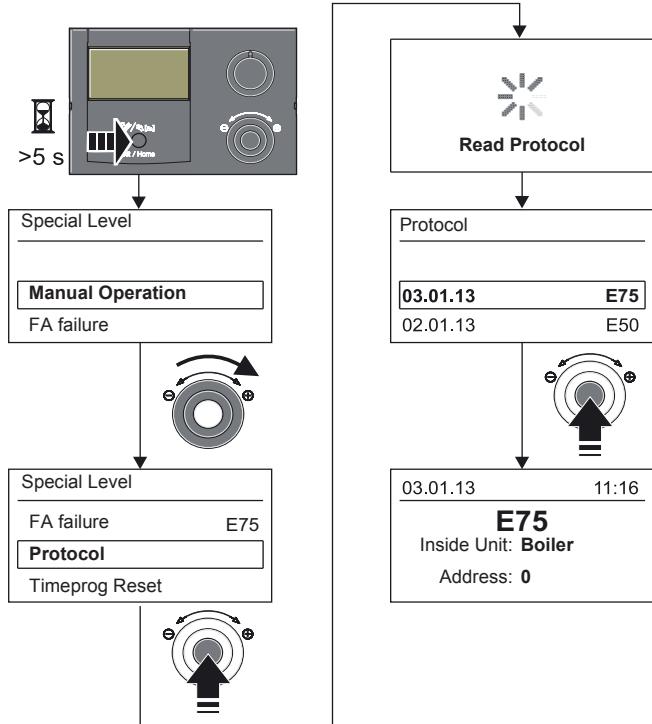


Fig. 8-3 Reading the protocol

8.1.3 Troubleshooting

Information messages, which are displayed **without red back-lighting**, normally result in **no permanent limitations** on the operation of the ROTEX HPSU compact.

Messages that are displayed **with an error code E.... and red back-lighting** required error correction by an **authorised and trained expert heating technician**.

For information on warning messages see section 8.3.

- Detecting and remedying the cause of the malfunction.
- Contactor triggered:
 - Nothing shown on the display in the controller. Ascertain cause of triggering the contactor and remedy fault. Start up system again.
 - ➔ Once the cause has been remedied, the system will resume operations as normal.
 - Contactor not triggered:
 - a) No fault codes are shown but the system is not working properly. Troubleshooting and eliminating faults (see section 8.2).
 - ➔ Once the cause has been eliminated, the system continues to work normally.
 - b) Fault codes are displayed as long as the fault conditions are present. Troubleshooting and eliminating faults (see section 8.3). If the fault message is still displayed after the cause of the fault has been corrected, the system must be disconnected from the power supply for at least 10 in order to unlock it.
 - ➔ Once the cause has been eliminated, the system continues to work normally.

8.2 Malfunctions

Malfunction	Possible cause	Possible solution
System not working (nothing on the display, operation LED on RoCon BM1 off)	No mains voltage	<ul style="list-style-type: none"> Switch on the external main switch of the machine. Switch on system fuse(s). Replace system fuse(s).
Switching time program is not working or programmed switching times are being carried out at the wrong time.	Date and time are not correctly set.	<ul style="list-style-type: none"> Set date. Set time. Check week day-switching time allocation.
	Incorrect operating mode set.	<ul style="list-style-type: none"> Set to operating mode "Automatic 1" or "Automatic 2".
	During a switching time the user made a manual setting (e.g. changed the target temperature, changed the operating mode)	<ol style="list-style-type: none"> Place the rotary switch in the "Info"  position. Place the rotary switch in the "Operating Mode"  position. Select correct operating mode.
Controller does not react to inputs	Operating system of control unit crashed.	<ul style="list-style-type: none"> Carry out RESET of control unit. To do so, disconnect the system from the power supply for at least 10 s and then switch on again.
Operating data are not updated	Operating system of control unit crashed.	<ul style="list-style-type: none"> Carry out RESET of control unit. To do so, disconnect the system from the power supply for at least 10 s and then switch on again.
Heating does not warm up	Heating request switched off (e.g. switching time program is in the setback phase, external temperature is too high, parameters for optional backup heater (BUxx) are set incorrectly, hot water request is active)	<ul style="list-style-type: none"> Check the operating mode setting. Check the request parameters. Check setting of the date, time and switching time program on the control unit.
	Coolant compressor is not working.	<ul style="list-style-type: none"> With installed backup heater (BUxx): Check whether the return flow temperature backup heater heats up to at least 15 °C (if the return flow temperature is low, the heat pump first uses the backup heater in order to reach this minimum return flow temperature). Check mains supply of the backup heater (BUxx). Thermal protection switch (STB) on backup heater (BUxx) was triggered. Unlock.
	 System is in the operating mode "Cooling".	<ul style="list-style-type: none"> Switch the operating mode to "Heating".
	Settings for off-peak mains connection do not correspond to settings for electrical connections.	<ul style="list-style-type: none"> HT/NT function is active and the parameter [HT/NT Contact] is set incorrectly. Other configurations are also possible. However, these must match the type of off-peak mains connection. The parameter [SMART GRID] is active and the connections are set incorrectly.
	The power company has sent the high-cost signal.	<ul style="list-style-type: none"> Wait for the repeat off-peak rate signal which reactivates the power supply.

8 Errors, malfunctions and messages

Malfunction	Possible cause	Possible solution
Heating does not warm up enough	Water flow too low.	<ul style="list-style-type: none"> Check that all stop valves of the water circuit are completely open. Check that the water filter is dirty. Check that the expansion tank is defective. Fully vent the heating system and device-internal circulation pump. On the control unit (rotary switch position "Info" ①) check that there is sufficient water pressure (>0.5 bar), if necessary, refill the heating water. Check that the resistance in the water circuit is not too high for the pump (see installation manual for "Technical Data").
	Target value range is too low.	<ul style="list-style-type: none"> Increase parameter [Heat-Slope]. Increase parameter [T vbh1 max]. Increase parameter [Max T-Flow].
	Weather-controlled flow temperature regulation.	<ul style="list-style-type: none"> Check the settings on the "HC Configuration" level of the parameters [T-Outside lim day], [Heat-Slope] and the settings in the "Set Temp Day" ☀️ rotary switch position.
	Optional backup heater (BUxx) or alternative heater not switched on.	<ul style="list-style-type: none"> Check mains supply of the backup heater (BUxx). Thermal protection switch (STB) on backup heater (BUxx) was triggered. Unlock. Check the parameters [Function Heating] and [BUH s1 power] and [BUH s2 power].
	Water quantity in heating system too low	<ul style="list-style-type: none"> Check the primary pressure in the expansion container and the water pressure, if necessary, refill the heating water and reset the primary pressure (see chapter 7.4).
	Hot water supply is taking too much of the output of the heat pump.	<ul style="list-style-type: none"> Check the settings of the parameter [Function Heating] in level "Configuration", sub-level "Setup". Check the settings of the parameter [Power DHW] in level "Configuration", sub-level "System".
Hot water does not warm up	DIP switch configured incorrectly	<ul style="list-style-type: none"> Check DIP switch setting on board A1P (see chapter 8.4).
	Hot water supply switched off (e.g. switching time program is in the economy phase, parameters for hot water supply have been set incorrectly).	<ul style="list-style-type: none"> Check the operating mode setting. Check the request parameters.
	Storage tank charging temperature too low.	<ul style="list-style-type: none"> Increase the target hot water temperature.
	Draw-off rate too high.	<ul style="list-style-type: none"> Reduce the draw-off rate, limit throughput.
	Output of heat pump too low.	<ul style="list-style-type: none"> Check the switching times for room heating and hot water supply for overlaps.
	Water quantity in heating system too low.	<ul style="list-style-type: none"> Check the primary pressure in the expansion container and the water pressure, if necessary, refill the heating water and reset the primary pressure (see chapter 7.4).
	Optional backup heater (BUxx) or alternative heater not switched on.	<ul style="list-style-type: none"> Check mains supply of the backup heater (BUxx). Thermal protection switch (STB) on backup heater (BUxx) was triggered. Unlock. Check the parameters [Function Heating] and [BUH s1 power] and [BUH s2 power].

8 Errors, malfunctions and messages

Malfunction	Possible cause	Possible solution
Room cooler does not cool	Water flow too low.	<ul style="list-style-type: none"> Check that all stop valves of the water circuit are completely open. Check that the water filter is dirty. Check that the expansion tank is defective. Fully vent the heating system and device-internal circulation pump. On the control unit (rotary switch position "Info (i)) check that there is sufficient water pressure (>0.5 bar), if necessary, refill the heating water. Check that the resistance in the water circuit is not too high for the pump (see installation manual for "Technical Data").
	"Cooling" switched off (e.g. room thermostat requires "Cooling", but switching time program is in economy phase, outside temperature too high).	<ul style="list-style-type: none"> Check the operating mode setting. Check the request parameters. Check setting of the date, time and switching time program on the control unit.
	Coolant compressor is not working.	<ul style="list-style-type: none"> With installed backup heater (BUxx): Check whether the return flow temperature backup heater heats up to at least 15°C (if the return flow temperature is low, the heat pump first uses the backup heater in order to reach this minimum return flow temperature). Check mains supply of the backup heater (BUxx). Thermal protection switch (STB) on backup heater (BUxx) was triggered. Unlock.
	System is in the operating mode "Heating".	<ul style="list-style-type: none"> Switch the operating mode to "Cooling".
	Outdoor temperature < 4 °C	The heat pump has automatically switched to the "Heating" operating mode so as to be able to guarantee frost protection should the external temperature drop further. Room cooling not possible.
Cooling effect of room cooling insufficient	Water flow too low.	<ul style="list-style-type: none"> Check that all stop valves of the water circuit are completely open. Check that the water filter is dirty. Check that the expansion tank is defective. Fully vent the heating system and device-internal circulation pump. On the control unit (rotary switch position "Info (i)) check that there is sufficient water pressure (>0.5 bar), if necessary, refill the heating water. Check that the resistance in the water circuit is not too high for the pump (see installation manual for "Technical Data").
	Water quantity in heating system too low.	<ul style="list-style-type: none"> Check the primary pressure in the expansion container and the water pressure, if necessary, refill the heating water and reset the primary pressure (see chapter 7.4).
	Quantity of coolant in the heating system too low or too high.	<ul style="list-style-type: none"> Determine the cause for the coolant being too low or too high in the coolant circuit. <ul style="list-style-type: none"> → If the quantity of coolant is too low, check the coolant circuit for leaks, repair and top up the coolant. → If the quantity of coolant is too great, recycle the coolant and refill the system with the correct volume.

8 Errors, malfunctions and messages

Malfunction	Possible cause	Possible solution
Device-internal circulation pump is excessively noisy while running	Air in the water circuit	<ul style="list-style-type: none"> Fully vent the heating system and device-internal circulation pump.
	Noises caused by vibrations.	<ul style="list-style-type: none"> Check the HPSU compact, its components and covers to ensure they are fastened correctly.
	Bearing damage in the device-internal circulation pump.	<ul style="list-style-type: none"> Reduce pump speed [Min Perform Pump] and [Max Perform Pump]. Replace device-internal circulation pump.
	Water pressure at pump inlet too low.	<ul style="list-style-type: none"> On the controller (rotary switch setting "Info" ) check whether there is adequate water pressure (>0.5 bar). Check that the pressure gauge is working correctly (connect an external pressure gauge). Check the primary pressure in the expansion container and the water pressure, if necessary, refill the heating water and reset the primary pressure (see chapter 7.4).
Safety pressure relief valve is leaking or always open.	Expansion tank is defective.	<ul style="list-style-type: none"> Replace expansion tank.
	Water pressure in the heating system is too high.	<ul style="list-style-type: none"> On the control unit (rotary switch position "Info" ) check that the water pressure lies beneath the stated maximum pressure. If necessary, bleed the water until the pressure lies in central permissible range.
	Safety pressure relief valve is stuck.	<ul style="list-style-type: none"> Check safety pressure relief valve and if necessary, replace it. <ul style="list-style-type: none"> Turn the red knob on the safety pressure relief valve counterclockwise. If you can hear a rattling noise, the safety pressure relief valve needs replacing.

Tab. 8-1 Possible malfunctions of the HPSU compact

8.3 Fault codes



In the case of all malfunctions / error messages due to possibly defective sensors, all associated connection cables, connection points (plug contacts correctly in place) and printed circuit boards must be checked before replacing the sensor.

Component allocation: see fig. 3-1 to fig. 3-5 and fig. 8-4

Code		Malfunction / Error message	Component/Designation	Causes and possible error correction
Display	Internal			
E9001	80	Fault T-return	Return flow temperature sensor t_{R2}	<p>Sensor or connection cable defective.</p> <ul style="list-style-type: none"> Check, replace.
E9002	81	Fault feed flow	Flow temperature sensor t_{V2} or $t_{V, BH}$	<p>Sensor or connection cable defective.</p> <ul style="list-style-type: none"> Check, replace.
E9003	89	Frost protection function error	Plate heat exchanger (PHE)	<p>Measured value $t_{V2} < 0^\circ\text{C}$</p> <ul style="list-style-type: none"> Failure of the frost protection function for the plate heat exchanger because the water flow is too low. See error code E9004 / 7H. Failure of the frost protection function of the plate heat exchanger because there is a lack of coolant in the system. See error code E9015 / E4.

8 Errors, malfunctions and messages

Code		Malfunction / Error message	Component/Designation	Causes and possible error correction
Display	Internal			
E9004	7H	Fault volume flow	Flow sensor FLS	<p>Water flow is too low or there is none at all. Minimum water flow required:</p> <ul style="list-style-type: none"> – Operating mode "Heating": 600 l/h – Operating mode "Cooling": 840 l/h – Automatic defrosting function (氷) active: 1020 l/h <p>Check the following items:</p> <ul style="list-style-type: none"> • All stop valves of the water circuit must be completely open. • Optional water filters must not be contaminated. • Heating system must run within its operating range. • Heating system and device-internal circulation pump must be completely bled. • On the controller (rotary switch setting "Info" ⓘ) check whether there is adequate water pressure (> 0.5 bar). • Check the function of the 3-way switching valve 3UVB1 (compare actual setting of 3UVB1 with BPV position [Overview] displayed in the parameter). • If this fault occurs during defrost operation in the operating mode room heating or hot water supply? With optional backup heater: check its power supply and fuses. • Check the fuses in the control housing of the ROTEX HPSU compact (pump fuse (FU1) on circuit board A1P and printed circuit board fuse (F1) on the RoCon BM1 circuit board). • Check flow sensor FLS for contamination and function, if necessary clean, replace.
E9005	8F	Flow temperature $t_{V, BH} > 75^\circ C$	Flow temperature sensor $t_{V, BH}$	Flow temperature of the backup heater ($t_{V, BH}$) is too high.
E9006	8H	Flow temperature $t_{V, BH} > 65^\circ C$	Flow temperature sensor $t_{V, BH}$	<p>– Flow temperature sensor sending incorrect values. Temperature sensor or connecting cable defective.</p> <ul style="list-style-type: none"> • Check, replace. <p>– Contact problem A1P-bridge on X3A.</p>
E9007	A1	IU main board def	Circuit board A1P	<p>Communication between the heat pump exterior equipment and heat pump interior equipment malfunctioning.</p> <ul style="list-style-type: none"> – Electromagnetic influences. <ul style="list-style-type: none"> • Perform reset. – Circuit board A1P defective. <ul style="list-style-type: none"> • Replace circuit board A1P.
E9008	A5	Coolant temperature outside of the valid range	Temperature sensor (liquid-side coolant) t_{L2}	<p>No heat absorption at the plate heat exchanger.</p> <ul style="list-style-type: none"> • Check flow. • If the flow is OK, then replace the coolant temperature sensor.
E9009	AA	STB fault	Optional: STL Backup Heater (BUxx)	<p>Thermal protection switch (STB) on Backup Heater (BUxx) was triggered.</p> <ul style="list-style-type: none"> • Check and unlock position of STL.
E9010	AC		Bridge on board A1P	<p>Bridge of connection socket "X21A" missing on board A1P.</p> <ul style="list-style-type: none"> • Plug in strapping plug.
E9011	C0	Fault flow sensor	Flow sensor FLS	<p>Flow sensor FLS defective.</p> <ul style="list-style-type: none"> • Replace flow sensor FLS.
E9012	C4	Fault feed flow	Flow temperature sensor t_{V2} or $t_{V, BH}$	<p>Measurement outside the permitted value range. Sensor or connection cable defective.</p> <ul style="list-style-type: none"> • Check, replace.
E9013	E1	OU main board def	Main board of the heat pump exterior unit	<ul style="list-style-type: none"> – Main board in the heat pump exterior unit defective. – Ventilator motor defective. <ul style="list-style-type: none"> • Check, replace.

8 Errors, malfunctions and messages

Code		Malfunction / Error message	Component/Designation	Causes and possible error correction
Display	Internal			
E9014	E3	Coolant over-	High pressure switch S1PH in the coolant system	<p>Pressure in refrigerant system is too high.</p> <ul style="list-style-type: none"> – High pressure switch S1PH or ventilator motor defective. <ul style="list-style-type: none"> • Check, replace. – Poor cable contact. – Flow in the heating system too low. – Filled coolant quantity too high. <ul style="list-style-type: none"> • Check, replace. – Service valve in the heat pump exterior unit not open. <ul style="list-style-type: none"> • Service valve open.
E9015	E4	Coolant under-	Pressure sensor S1NPH in the heat pump exterior unit	<p>Pressure in the coolant system is too low.</p> <ul style="list-style-type: none"> – Coolant quantity too low. <ul style="list-style-type: none"> • Check, correct cause, refill coolant. – Pressure sensor S1NPH in the heat pump exterior unit defective. – Temperature sensor lamella heat exchanger R4T in the heat pump exterior unit defective. – Solenoid valve in the heat pump exterior unit not open. – Main board in the heat pump exterior unit defective. <ul style="list-style-type: none"> • Check, replace.
E9016	E5	Load protec comp	Electronic overload protection in the coolant compressor	<p>Coolant compressor overload protection triggered. Pressure difference between the high and low pressure sides in the coolant circuit too high (> 26 bar).</p> <ul style="list-style-type: none"> – Coolant compressor defective. – Inverter board in the heat pump exterior unit defective. – Coolant compressor / inverter board cabling, poor contact. – Filled coolant quantity too high. <ul style="list-style-type: none"> • Check, replace. – Service valve in the heat pump exterior unit not open. <ul style="list-style-type: none"> • Service valve open.
E9017	E7	Fan blocked	Ventilator motor in the heat pump exterior unit	<ul style="list-style-type: none"> – A fan in the external heat pump device is blocked. <ul style="list-style-type: none"> • Check ventilator for the effects of contamination or blockages, if necessary clean and clear blockage. – Ventilator motor defective. – Ventilator motor, poor contact. – Overvoltage at the ventilator motor. – Fuse in the heat pump exterior unit defective. – Inverter board in the heat pump exterior unit defective. <ul style="list-style-type: none"> • Check, replace.
E9018	E9	Expansion valve	Electronic expansion valve	The electronic expansion valve in the external heat pump unit is defective, replace.
E9019	EC	Hot water temperature >85°C	Storage tank temperature sensor t_{DHW2}	<p>The storage tank temperature sensor t_{DHW2} delivers a temperature value > 85°C.</p> <p>Sensor or connection cable defective.</p> <ul style="list-style-type: none"> • Check, replace.
E9020	F3	Evaporator over-	Discharge temperature sensor (hot gas sensor) R2T on the coolant compressor of the heat pump exterior unit too high	<ul style="list-style-type: none"> – Discharge temperature sensor R2T at the coolant compressor or connection cable defective. – Coolant compressor defective. <ul style="list-style-type: none"> • Check, replace.
E9021	H3	HPS-System	High pressure switch S1PH in the heat pump exterior unit	<ul style="list-style-type: none"> – High pressure switch S1PH defective. – Main board in the heat pump exterior unit defective. – Cabling, poor contact. <ul style="list-style-type: none"> • Check, replace.

8 Errors, malfunctions and messages

Code		Malfunction / Error message	Component/Designation	Causes and possible error correction
Display	Internal			
E9022	H9	Fault AT sensor	External temperature sensor R1T in the heat pump exterior unit	Sensor or connection cable defective. ● Check, replace.
E9023	HC	Fault DHW sensor	Storage tank temperature sensor t_{DHW2}	
E9024	J1	Pressure sensor	Pressure sensor S1NPH in the heat pump exterior unit	
E9025	J3	Fault T-return	Discharge temperature sensor R2T in the heat pump exterior unit	
E9026	J5	Suction pipe sensor	Suction temperature sensor R3T in the heat pump exterior unit	
E9027	J6	Aircoil sensor Defrost	Temperature sensor of the lamella heat exchanger R5T in the heat pump exterior unit	
E9028	J7	Aircoil sensor temp	Temperature sensor of the lamella heat exchanger R4T in the heat pump exterior unit (only in 11-16 kW systems)	
E9029	J8	Fault cold sensor OU	Temperature sensor liquid-side R6T in the heat pump exterior unit	

8 Errors, malfunctions and messages

Code		Malfunction / Error message	Component/Designation	Causes and possible error correction
Display	Internal			
E9030	L4		Temperature sensor R10T on the inverter board in the heat pump exterior unit (only in 11-16 kW systems)	<p>Excess temperature in the heat pump exterior unit</p> <ul style="list-style-type: none"> Very high external temperature. Insufficient cooling of the inverter board. Air suction inlet contaminated / blocked. Inverter board in the heat pump exterior unit defective. Temperature sensor on inverter board defective, plug connection X111A not correct. <ul style="list-style-type: none"> Check, correct cause, replace. If necessary contact ROTEX service technician.
E9031	L5	Electrical defect	Overvoltage error in electrical components	<p>a) If the fault < 15x occurs, the functional safety of the HPSU compact still remains.</p> <p>➔ Sporadic message during the continuous self-monitoring of the unit.</p> <ul style="list-style-type: none"> No additional measures are required. <p>b) If the fault arises 15x, it acts as a lock and can have the following causes:</p> <ul style="list-style-type: none"> Current mains overvoltage. Coolant compressor blocked or defective. Inverter board in the heat pump exterior unit defective. Cabling, poor contact. Service valve in the heat pump exterior unit not open. Check, correct cause, replace. If necessary contact ROTEX service technician.
E9032	L8			<ul style="list-style-type: none"> Coolant compressor defective. Inverter board in the heat pump exterior unit defective. <ul style="list-style-type: none"> Check, replace. If necessary contact ROTEX service technician.
E9033	L9		Electrical components	<ul style="list-style-type: none"> Coolant compressor blocked or defective. Before starting the coolant compressor, pressure difference between the high and low pressure sides too high. Service valve in the heat pump exterior unit not open. <ul style="list-style-type: none"> Check, correct cause, replace. If necessary contact ROTEX service technician.
E9034	LC		Communication error - Internal communication in the heat pump exterior unit disrupted	<ul style="list-style-type: none"> Electromagnetic influences. <ul style="list-style-type: none"> Perform reset. Main board in the heat pump exterior unit defective. Inverter board in the heat pump exterior unit defective. Ventilator motor defective. Cabling, poor contact. <ul style="list-style-type: none"> Check, correct cause, replace. If necessary contact ROTEX service technician.
E9035	P1	OU main board def	Inverter board in the heat pump exterior unit	<ul style="list-style-type: none"> No supply voltage from the mains connection. Inverter board in the heat pump exterior unit defective. <ul style="list-style-type: none"> Check, correct cause, replace. If necessary contact ROTEX service technician.
E9036	P4	Electrical defect	Temperature sensor R10T on the inverter board in the heat pump exterior unit (only in 11-16 kW systems)	<p>Excess temperature in the heat pump exterior unit</p> <ul style="list-style-type: none"> Inverter board in the heat pump exterior unit defective. Temperature sensor on inverter board defective, plug connection X111A not correct. <ul style="list-style-type: none"> Check, correct cause, replace. If necessary contact ROTEX service technician.
E9037	PJ	Setting output	Power setting for the heat pump exterior unit incorrect	<ul style="list-style-type: none"> Contact a ROTEX service technician.

8 Errors, malfunctions and messages

Code		Malfunction / Error message	Component/Designation	Causes and possible error correction
Display	Internal			
E9038	U0	Coolant leak	Sensors and parameter settings in the heat pump exterior unit	<p>Loss of coolant.</p> <ul style="list-style-type: none"> – Coolant quantity too low. See error code E9015 / E4. – Block or leak in the coolant line. <ul style="list-style-type: none"> • Check, correct cause, refill coolant.
E9039	U2	Under/over voltage		<p>Mains voltage outside the permitted range</p> <ul style="list-style-type: none"> – Sporadic errors shortly after a power outage. <ul style="list-style-type: none"> • No error correction required. – Inverter board in the heat pump exterior unit defective. <ul style="list-style-type: none"> • Check, replace. • If necessary contact ROTEX service technician.
E9041	U4	Transmission fault	Electrical components	<p>Communication between the heat pump exterior equipment and heat pump interior equipment malfunctioning.</p> <ul style="list-style-type: none"> – Cabling or connections, poor contact. – No heat pump exterior unit connected. – Circuit board A1P defective. – Main board in the heat pump exterior unit defective. <ul style="list-style-type: none"> • Check, replace.
E9042	U5			<p>Communication between switch board A1P and RoCon BM1 disrupted.</p> <ul style="list-style-type: none"> • See error code E200.
E9043	U7			<p>Communication between main board and inverter board disrupted.</p> <ul style="list-style-type: none"> – Main board in the heat pump exterior unit defective. – Inverter board in the heat pump exterior unit defective. – Cabling, poor contact. <ul style="list-style-type: none"> • Check, correct cause, replace.
E9044	UA			<p>Configuration of switchboard A1P not suitable for the heat pump exterior unit</p> <ul style="list-style-type: none"> • Replace circuit board A1P. • If necessary contact ROTEX service technician.
E75	—	Error in external temperature sensor	External temperature sensor t_{AU} (RoCon OT1)	<p>Optional external temperature sensor RoCon OT1 defective or not connected.</p> <ul style="list-style-type: none"> • Check, replace. • If there is no external temperature sensor connected, check the parameter [Outside Config] configuration.
E76	—	Error storage tank temperature sensor	Storage tank temperature sensor t_{DHW1}	<p>Storage temperature sensor t_{DHW1} or connection cable defective or not connected.</p> <ul style="list-style-type: none"> • Check, replace. • Check configuration [Storage Config].
E81	—	Communication fault	Circuit board RoCon BM1	<p>Parameter store in EEPROM faulty.</p> <ul style="list-style-type: none"> • Contact a ROTEX service technician.
E88	—		Circuit board RoCon BM1	<p>Parameter store in external flash memory faulty.</p> <ul style="list-style-type: none"> • Contact a ROTEX service technician.
E91	—		Connected CAN modules	<p>Bus ID of a CAN module duplicated, set unique data bus address.</p>
E128	—	Error return flow temperature sensor	Return flow temperature sensor t_{R1}	<p>Return flow temperature sensor t_{R1} in the flow sensor FLS or connection cable defective.</p> <ul style="list-style-type: none"> • Check, replace.
E129	—	Pressure sensor error	Pressure sensor DS	<p>Pressure sensor DS defective.</p> <ul style="list-style-type: none"> • Check, replace.

8 Errors, malfunctions and messages

Code		Malfunction / Error message	Component/Designation	Causes and possible error correction
Display	Internal			
E198	—	Flow measurement not plausible	Flow sensor FLS, 3-way diverter valve 3UVB1	<p>Error occurs if the 3-way diverter valve 3UVB1 is in the Bypass position, the device-internal circulation pump is running, but the volumetric flow measurement is too low.</p> <p>Minimum water flow required:</p> <ul style="list-style-type: none"> – Operating mode "Heating": 600 l/h – Operating mode "Cooling": 840 l/h – Automatic defrosting function (氷) active: 1020 l/h <ul style="list-style-type: none"> – Air in heating system. <ul style="list-style-type: none"> • Vent. – Device-internal circulation pump not running. <ul style="list-style-type: none"> • Check electrical connection and control settings. If the circulation pump is defective, replace it. – Flow sensor FLS contaminated, blocked. <ul style="list-style-type: none"> • Check, clean. – Flow sensor FLS defective. – Valve drive for 3-way diverter valve 3UVB1 defective. <ul style="list-style-type: none"> • Check, replace.
E200	—	Communication fault	Electrical components	<p>Modbus communication between RoCon BM1 and switchboard A1P is disrupted.</p> <ul style="list-style-type: none"> – Check RTX-AL4 switch board. – Cabling or connections, poor contact. <ul style="list-style-type: none"> • Check, replace
E8005	—	Water pressure in the heating system too low	Pressure sensor DS	<p>Water pressure has fallen below the minimum permissible value.</p> <ul style="list-style-type: none"> – Too little water in the heating system. <ul style="list-style-type: none"> • Check heating system for leakage, refill water. – Pressure sensor DS defective. <ul style="list-style-type: none"> • Check, replace.
E8100	—	Communication	Electrical components	<p>Modbus initialisation also failed after heat pump start-up.</p> <p>Circuit board A1P defective.</p> <ul style="list-style-type: none"> • Check, replace.
E9000	—	Temporary internal message	—	Not relevant to proper system operation.
W8006	—	Pressure loss warning	Pressure sensor DS	<p>Warning message: Maximum permissible pressure drop exceeded.</p> <p>Too little water in the heating system.</p> <ul style="list-style-type: none"> • Check heating system for leakage, refill water.
W8007	—	Water pressure in the heating system too high		<p>Warning message: Water pressure has exceeded the permissible maximum value.</p> <ul style="list-style-type: none"> – Membrane expansion vessel defective or incorrect pressure set. <ul style="list-style-type: none"> • Check, replace. – Setting for the [Max Pressure] parameter too low. <ul style="list-style-type: none"> • If necessary, set parameter. If setting correct, – Drain water to reduce the system pressure.

Tab. 8-2 Error codes on the main control unit of HPSU compact



Respect the maximum tightening torque of the temperature sensor (see chapter 10.3 "Tightening torque").

8 Errors, malfunctions and messages

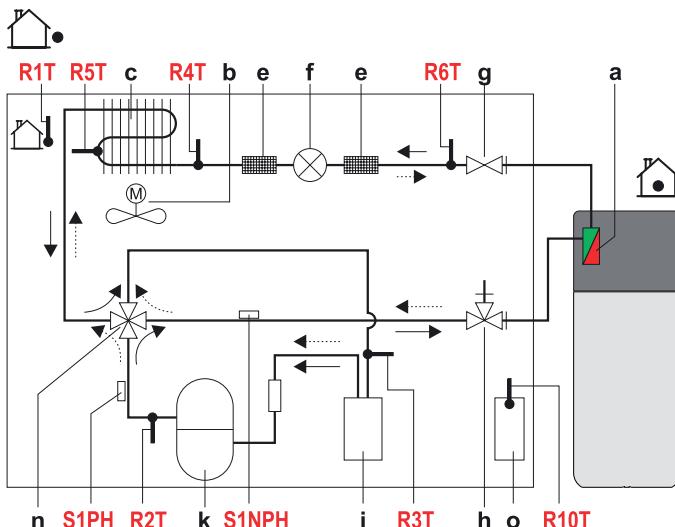


Fig. 8-4 Components in the heat pump circuit (simplified diagram)

a	Plate heat exchanger (condenser)
b	Ventilator motor
c	Lamella heat exchanger (evaporator)
e	Filter
f	Electronic expansion valve
g	Service valve (liquid line)
h	Service valve with maintenance connection (gas line)
i	Accumulator
k	Coolant compressor
n	4-way diverter valve (→ Heat,→ Cool)
o	Inverter board
R1T	External temperature sensor
R2T	Discharge temperature sensor (coolant compressor)
R3T*	Suction temperature sensor (coolant compressor)
R4T*	Temperature sensor lamella heat exchanger-input
R5T	Temperature sensor lamella heat exchanger-middle
R6T*	Temperature sensor liquid line (t_{L2})
R10T*	Temperature sensor on inverter board
S1PH	High pressure switch
S1NPH	Pressure sensor
*	Only with 11-16 kW heat pump external devices.

Tab. 8-3 Legend for fig. 8-4

8.4 Monitoring and configuration DIP Switch



WARNING!

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 systems circuits **from the power supply** (switch off main switch, disconnect fuse) and secure against unintentional restart.

- Disconnect the system from the power supply.
- Open the control housing and remove the RoCon BM1 board (see chapter 4.5.8).
- Check the DIP switch setting on the A1P circuit board of the ROTEX HPSU compact, adjust where necessary (see tab. 8-4).

The factory preset may only be changed if e.g. an optional accessory was connected.

- Replace the RoCon BM1 switch board, close the control housing and reconnect the power supply.



DIP switch settings are not recognised until a brief interruption to the power supply.

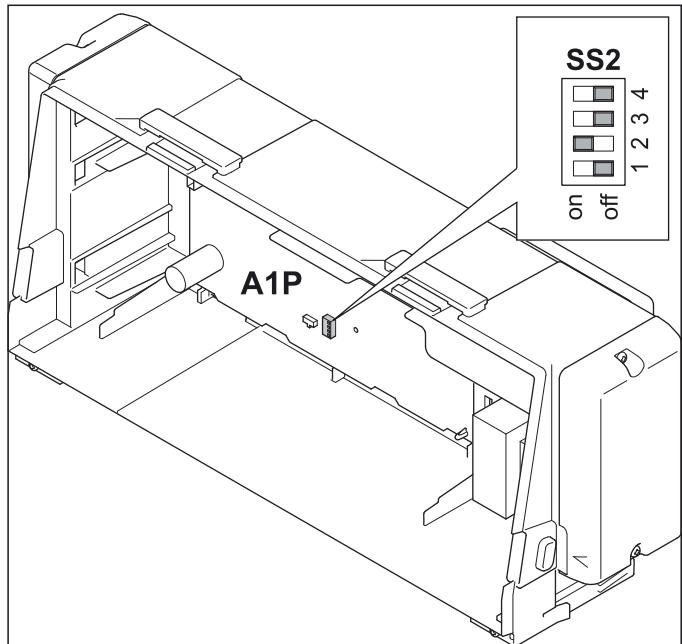


Fig. 8-5 Setting of DIP switch SS2

DIP switch	No.	Designation	Factory setting
SS2	1	Do not change.	OFF
	2	Domestic hot water generation	ON
	3	Pump continuous running*	OFF
	4	Do not change.	OFF

* If you intend to run the internal heating circulation pump continuously, it will need to be connected to the circuit board A1P, plug X17A, via a separate connection cable (E1400132).

Tab. 8-4 DIP switch settings

8.5 Emergency operation

In the case of incorrect setting in the electronic control system, emergency heating operation can be maintained by activating the special "Manual Operation" function on the control unit (see operating manual for the control unit).

If the 3-way valves are intact, the ROTEX HPSU compact switches to **Heating mode**. The necessary flow temperature can be adjusted with the rotary switch.

9 Hydraulic system connection

9 Hydraulic system connection



WARNING!

High temperatures can occur in the solar storage tank. Therefore, sufficient scalding protection must be included when the hot water system is installed (automatic hot water mixing device).



The ROTEX units can also be optionally fitted with gravity breaks (16 50 70) made of plastic to prevent thermal losses caused by gravity flow. These are suitable for operating temperatures of maximum 95°C and for fitting in all tank-side heat exchanger connections (except heat exchangers for pressurised solar tank charging).

The customer must install suitable circulation brakes for components connected to the heat exchanger for pressurised solar tank charging.



A selection of diagrams of the most common systems is shown below. The arrangements shown are only examples, and are no substitute for careful system planning. For more diagrams and further information about the electrical connection please see the ROTEX homepage.

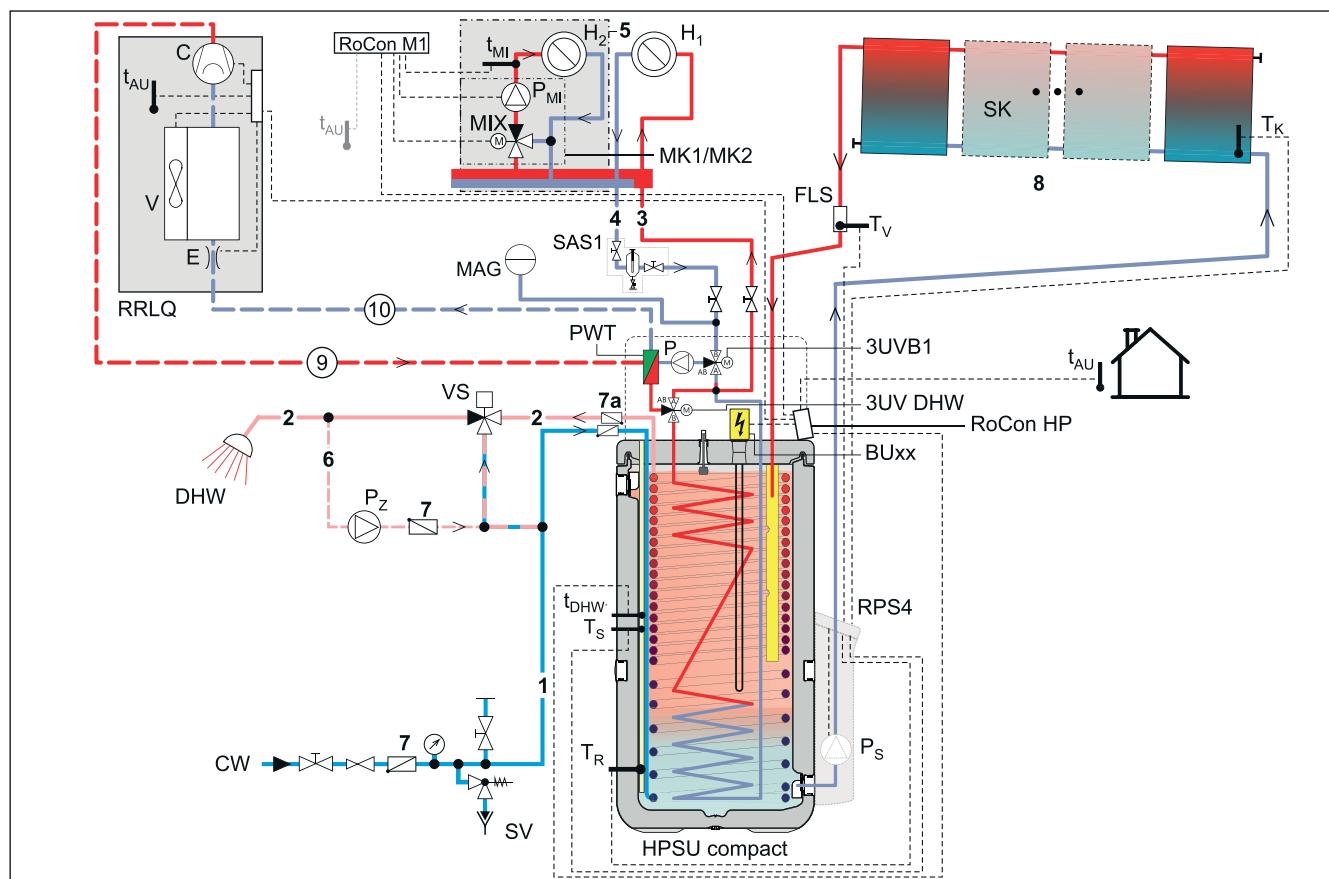


Fig. 9-1 ROTEX HPSU compact (all types) with DrainBack Solar p=0 (for legend see tab. 9-1)

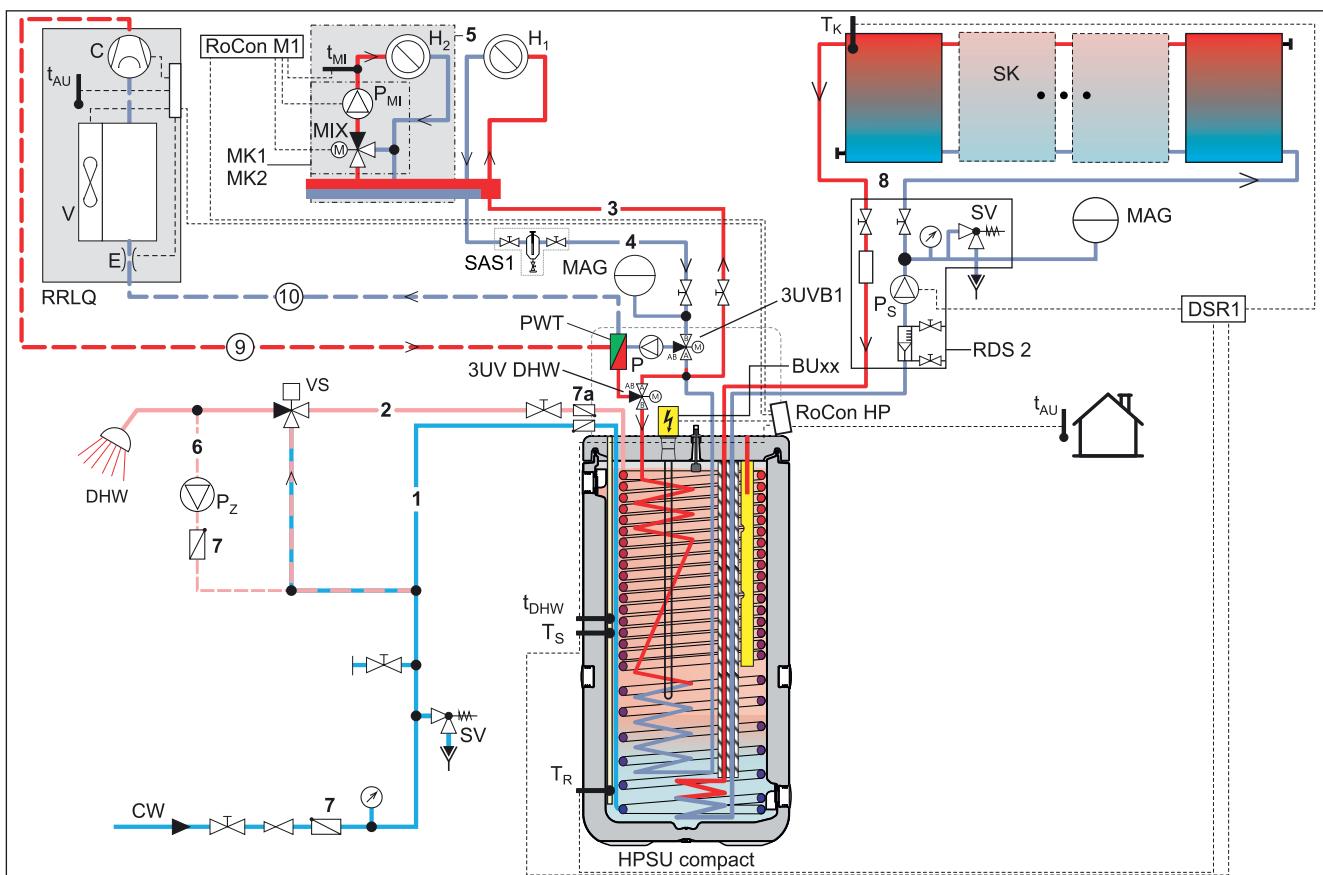


Fig. 9-2 ROTEX HPSU compact (B/V types) with pressurised solar $\square + p$ (for legend see tab. 9-1)

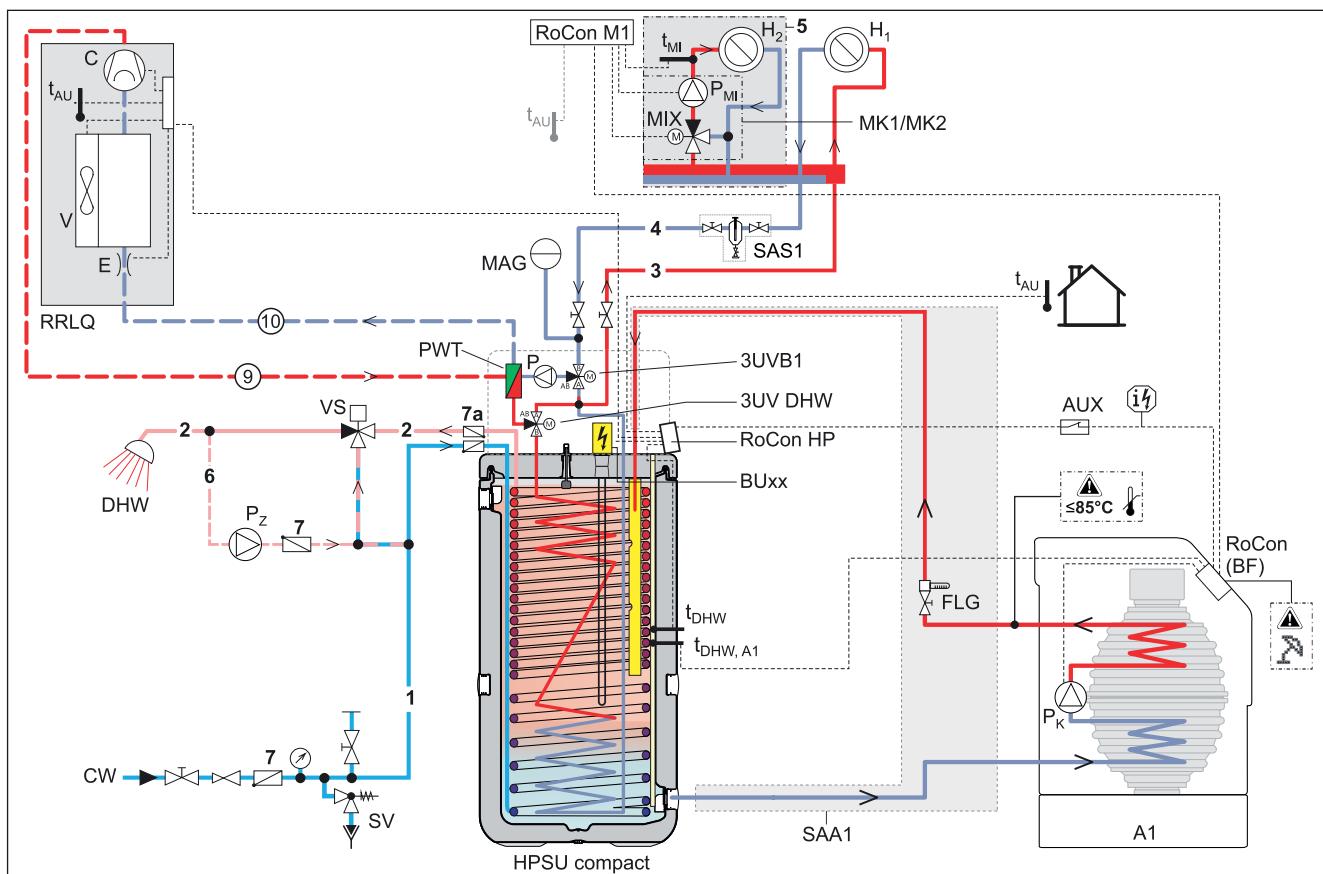


Fig. 9-3 HPSU compact (DB types) parallel bivalent with A1 boiler without solar support (for legend, see tab. 9-1)

9 Hydraulic system connection

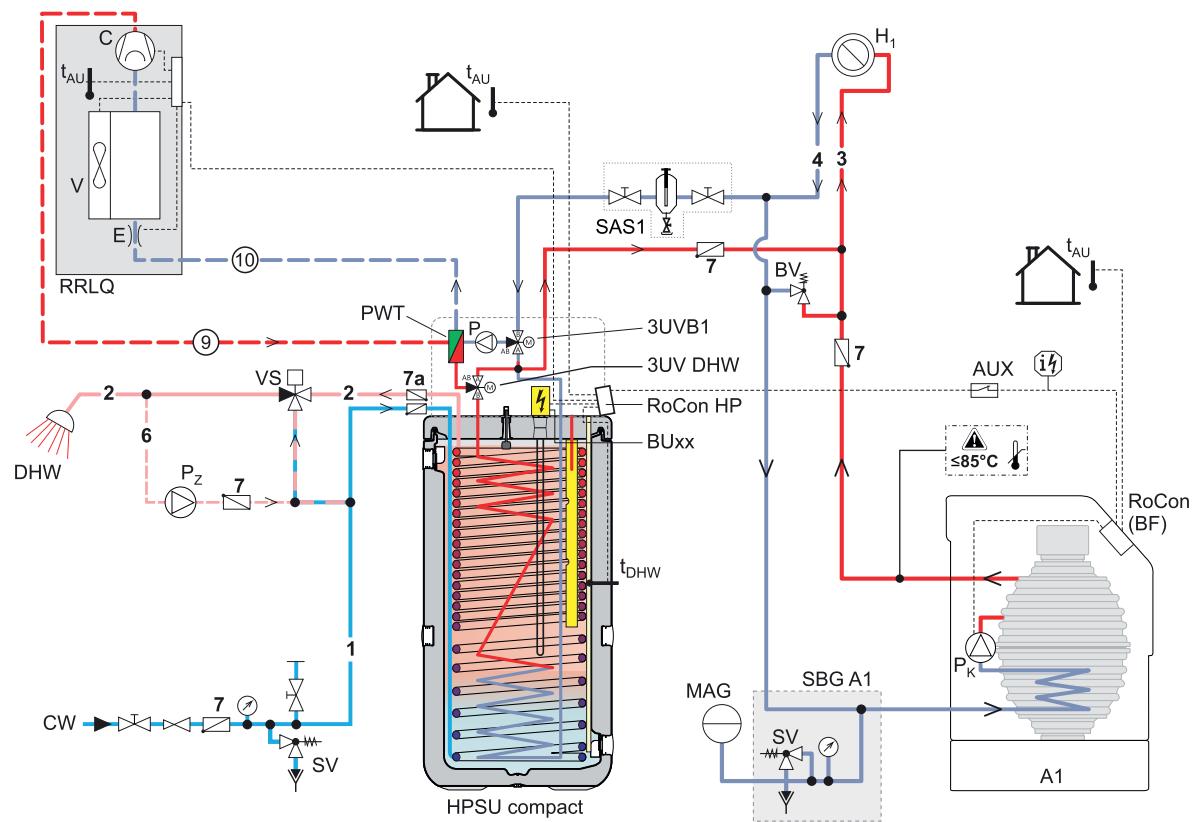


Fig. 9-4 HPSU compact (DB types) alternative bivalent with A1 boiler without solar support (for legend, see tab. 9-1)

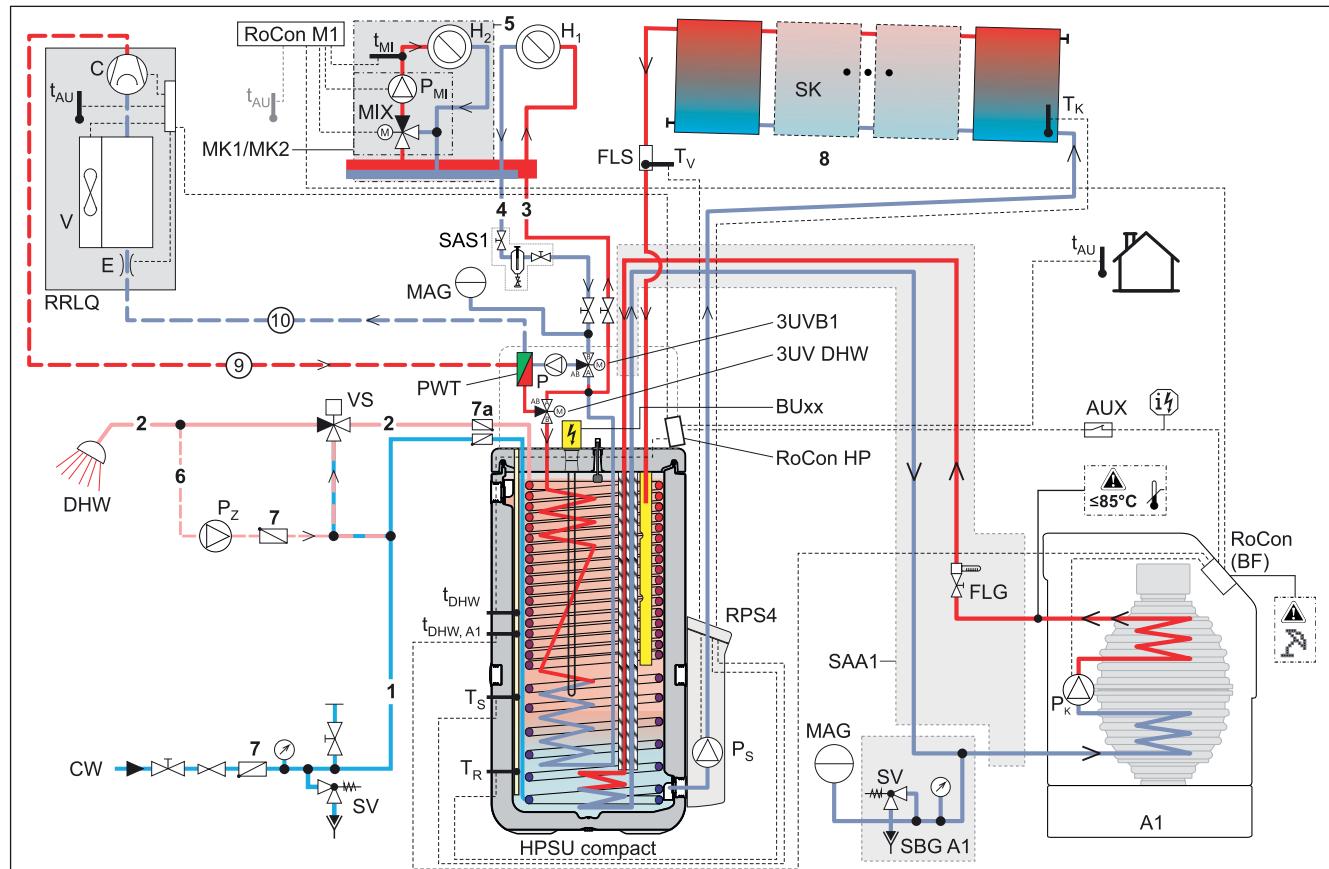


Fig. 9-5 HPSU compact (BIV types) parallel bivalent with A1 boiler and DrainBack Solar $p=0$ (for legend, see tab. 9-1)

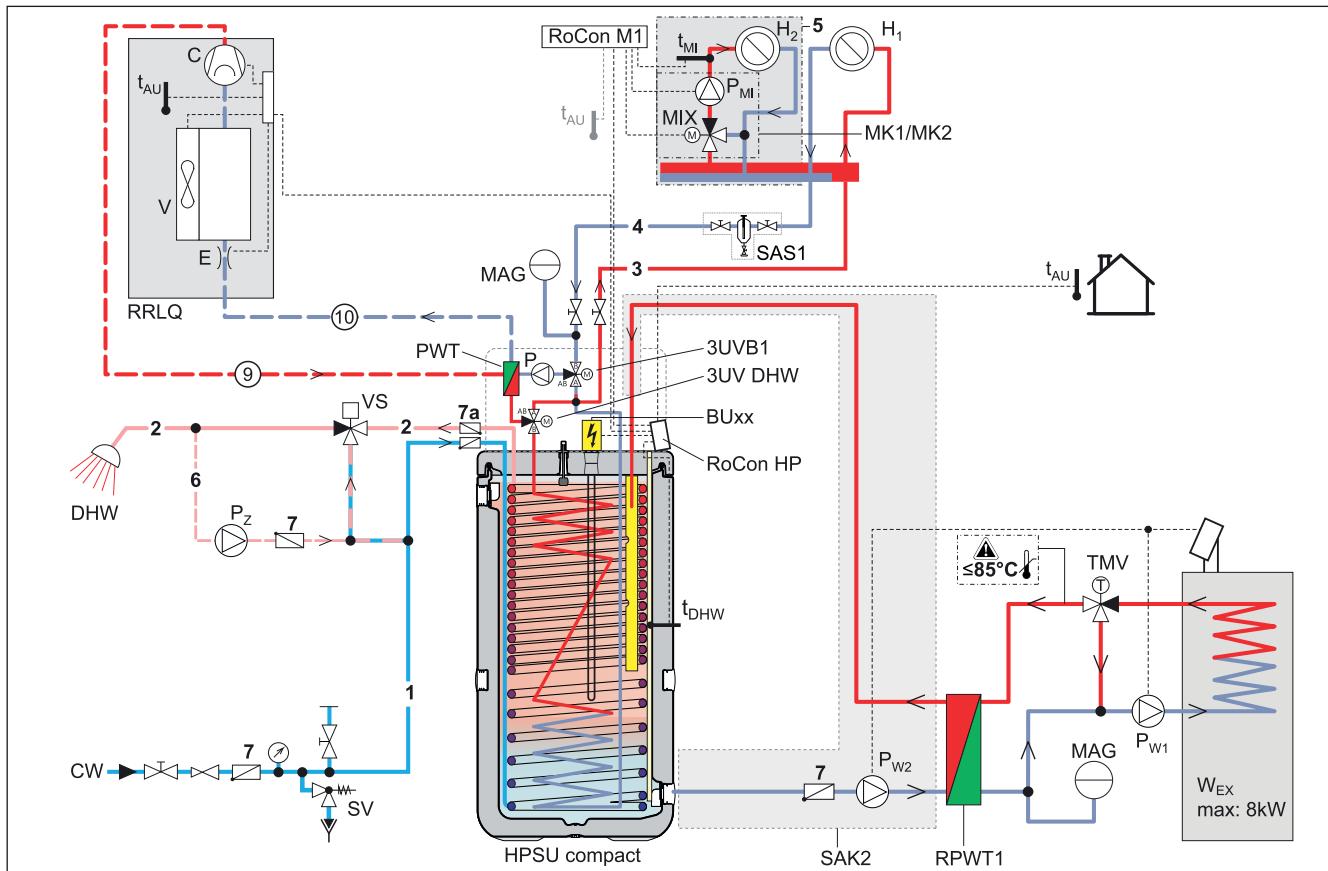


Fig. 9-6 ROTEX HPSU compact 508/516 (DB) with wood-burning boiler <8 kW without solar support (for legend, see tab. 9-1)

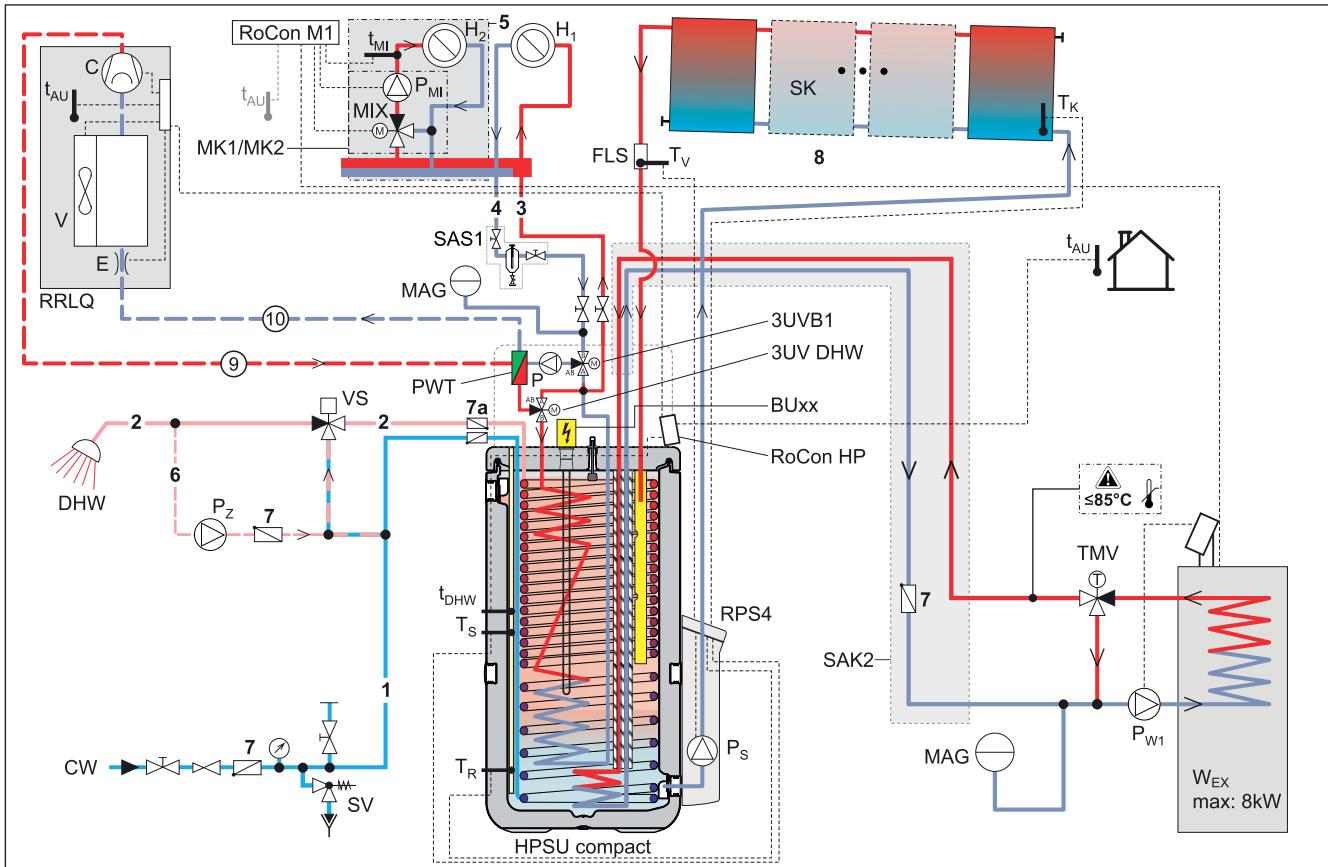


Fig. 9-7 ROTEX HPSU compact 508/516 BIV with wood-burning boiler <8 kW and Drain-Back solar (p=0) (for legend see tab. 9-1)

9 Hydraulic system connection

Short name	Meaning
1	Cold water distribution network
2	Hot water distribution network
3	Heating flow
4	Heating return flow
5	Mixer circuit (optional)
6	Circulation (optional)
7	Check valve, return valve
7a	Non return valves
8	Solar circuit
9	Gas pipe (coolant)
10	Fluid pipe (refrigerant)
3UVB1	3-way diverter valve (internal heat generation circuit)
3UV DHW	3 way diverter valve (hot water/heating)
A1	A1 oil or gas condensing boiler
AUX	Control cable AUX switch contact boiler demand (see section 4.5.18)
BUxx	Backup heater
BV	Bypass valve
C	Coolant compressor
CW	Cold water
DHW	Domestic hot water
DSR1	Solar differential temperature regulation 
E	Expansion valve
FLG	FlowGuard regulating valve with flow indicator
FLS	FlowSensor - solar flow and feed flow temperature measurement
H ₁ , H ₂ ... H _m	Heating circuits
MAG	Diaphragm expansion vessel
MIX	3-way-mixer with drive motor
MK1	Mixer group with high-efficiency pump
MK2	Mixer group with high-efficiency pump (PWM controlled)
P	High-efficiency pump
P _K	Boiler circuit pump
P _{Mi}	Mixing circuit pump
P _S	Solar operating pump  + 
P _{w1}	Primary circuit pump W _{EX}
P _{w2}	Secondary circuit pump W _{EX}
P _Z	Circulation pump
PWT	Panel heat exchanger (condenser)
RDS2	Pressure station 
RoCon BF	A1 condensing boiler
RoCon HP	Control unit for ROTEX HPSU compact
RoCon M1	Mixer circuit control
RPS4	Solar regulation and pump unit 
RPWT1	Plate heat exchanger
RRLQ	Exterior heat pump unit
SAA1	Storage tank incorporation (A1 condensing boiler)
SAK2	Storage tank connection (wood boiler)
SAS1	Sludge and magnetic separator

Short name	Meaning
SBG A1	Safety module for A1 condensing boiler
SK	Solar panel field
SV	Safety overpressure valve
t _{AU}	Outside temperature sensor RoCon OT1 (see chapter 4.5.10)
t _{DHW}	Storage tank temperature sensor (heat generator)
t _{DHW, A1}	Storage tank temperature sensor (A1 condensing boiler)
t _{Mi}	Mixer circuit flow temperature sensor
T _K	Solar collector temperature sensor
T _R	Solar return flow temperature sensor
T _S	Solar storage cylinder temp. sensor
T _V	Solar flow temperature sensor
TMV	Thermostatic 3-way valve for return temperature increase
V	Fan (vaporiser)
VS	Protection against scalding VTA32
W _{EX}	External heat generator
	Observe instructions concerning electrical connection (see chapter 4.5.14 and 4.5.18)!

Tab. 9-1 Short names in hydraulic drawings

10 Technical data

10.1 Equipment data

10.1.1 ROTEX HPSU compact 304/308

Type	ROTEX HPSU compact					
	304 DB	308 DB	304 BIV	308 BIV		
Can be used with an external heat pump unit	RRLQ004CA V3	RRLQ006CA V3/RRLQ008 CAV3	RRLQ004CA V3	RRLQ006CA V3/RRLQ008 CAV3		
Dimensions and weights	Unit					
Dimensions (H x W x D)	cm	180 x 61.5 x 59.5				
Empty weight	kg	84		89		
Main components						
Water heat circulation pump	Type	—	Grundfos UPM3K 25-75 CHBL RT			
	Speed rates	—	Continuously variable (PWM)			
	Voltage	V	230			
	Frequency	Hz	50			
	Protection type	—	IP 42			
	Maximum rated output	W	45			
Heat exchanger (water/coolant)	Type	—	Stainless steel underfloor heat exchanger			
	Heat insulation	—	EPP			
Storage tank						
Total storage capacity	litres	294				
Maximum permissible storage water temperature	°C	85				
Heat consumption at stand-by and at 60 °C	kWh/24h	1.3				
Domestic water heat exchanger (stainless steel 1.4404)	Water capacity heat exchanger	litres	27.1			
	Maximum operating pressure	bar	6			
	Domestic water heat exchanger surface	m ²	5.8			
Storage tank charging heat exchanger (stainless steel 1.4404)	Water capacity heat exchanger	litres	13.2			
	Heat exchanger surface area	m ²	2.7			
Pressurised solar heat exchanger (stainless steel 1.4404)	Water capacity heat exchanger	litres	—	4.2		
	Heat exchanger surface area	m ²	—	0.8		
Thermal performance data ¹⁾	Hot water quantity without re-heating at a flow rate of 8 l/min (12 l/min) (T _S =50 °C)	litres	184 (153)			
	Hot water quantity without re-heating at a flow rate of 8 l/min (T _S =60 °C)	litres	282 (252)			
	Hot water quantity without re-heating at a flow rate of 8 l/min (12 l/min) (T _S =65 °C)	litres	352 (321)			
	Re-heating time with a draw-off quantity of: 140 l = 5820 Wh (Ø bathtub) 90 l = 3660 Wh (Ø shower draw-off quantity)	min.	90	45		
			55	30		
Pipe connections	Cold and hot water	inches	1" AG			
	Heating flow and return flow	inches	1" IG			
	Solar connections	p=0	inches	1" IG		
		+	inches	—	3/4" IG + 1" AG	

10 Technical data

Type			ROTEX HPSU compact					
			304 DB	308 DB	304 BIV	308 BIV		
Refrigerant circuit								
Number of circuits			—	1				
Pipe connections	Number		—	2				
	Liquid line	Type	—	Flanged connection				
		External Ø	inches	1/4" AG				
	Gas lines	Type	—	Flanged connection				
		External Ø	inches	5/8" AG				
Operating data								
Operating range	Flow temperature for room heating/cooling function	Heating (min./max.)	°C	15 to 55				
		Cooling (min./max.)	°C	5 to 22				
	Hot water generation (with BUxx)	Heating (min./max.)	°C	25 to 80				
Noise level	Audibility		dBA	42				
	Noise pressure ²⁾		dBA	28				
Electrical data:								
Voltage supply	Phases		—	1				
	Voltage		V	230				
	Voltage range		V	Voltage ±10%				
	Frequency		Hz	50				
Mains connection ³⁾	Exterior heat pump unit for HPSU compact			4G				
	Exterior heat pump unit			3G				
	Option auxiliary heating	Backup Heater (BUxx)	—	3G (1-phase) / 5G (3-phase)				
Order number	Heating/cooling function 				14 15 30	14 15 34	14 15 31	14 15 35
	Heating function only				14 15 39	14 15 40	14 15 42	14 15 43

Type	ROTEX HPSU compact				308 BIV
	304 DB	308 DB	304 BIV	308 BIV	
Performance data					
Type exterior heat pump unit	RRLQ004CA V3	RRLQ006CA V3/RRLQ008 CAV3	RRLQ004CA V3	RRLQ006CA V3/RRLQ008 CAV3	
Nominal heat output A-7/W35	kW	4.26	5.29 / 5.53	4.26	5.29 / 5.53
Nominal heat output A2/W35	kW	3.47	4.6 / 5.51	3.47	4.6 / 5.51
Nominal heat output A7/W35	kW	4.53	6.06 / 7.78	4.53	6.06 / 7.78
Nominal heat output A10/W35	kW	5.2	6.6 / 8.4	5.2	6.6 / 8.4
Nominal cooling output A35/W18 	kW	4.42	5.22 / 5.22	4.42	5.22 / 5.22
Nominal cooling output A35/W7 	kW	4.03	4.46 / 4.64	4.03	4.46 / 4.64
Nominal COP A-7/W35		2.85	2.73 / 2.78	2.85	2.73 / 2.78
Nominal COP A2/W35		4.07	3.64 / 3.54	4.07	3.64 / 3.54
Nominal COP A7/W35		5.23	4.65 / 4.6	5.23	4.65 / 4.6
Nominal COP A10/W35		5.53	4.95 / 4.9	5.53	4.95 / 4.9
Nominal EER A35/W18 		4.21	3.65 / 3.65	4.21	3.65 / 3.65
Nominal EER A35/W7 		2.85	2.51 / 2.51	2.85	2.51 / 2.51
Max. heating output A-7/W35	kW	4.6	5.3 / 6.4	4.6	5.3 / 6.4
Max. heat output A2/W35	kW	4.8	6.4 / 7.7	4.8	6.4 / 7.7
Max. heat output A7/W35	kW	5.1	8.4 / 10.2	5.1	8.4 / 10.2
Max. heat output A10/W35	kW	5.2	8.8 / 10.5	5.2	8.8 / 10.5
Max. cooling output A35/W18 	kW	5.9	7.3 / 8.4	5.9	7.3 / 8.4
Max. cooling output A35/W7 	kW	4.5	5.5 / 6.4	4.5	5.5 / 6.4

1) T_{CW} Cold water input temperature = 10 °C
 T_{DHW} Hot water draw-off temperature = 40 °C
 T_S Storage target temperature
 (charge state before drawing off)

2) With a reference spacing of 1 m.
 3) Number of individual wires in the connection cable, including protective earth. The cross-section of the individual lines is dependent on the current load, the length of the connection cable and the respective legal provisions.

Tab. 10-1 Basic data ROTEX HPSU compact 304/308

10 Technical data

10.1.2 ROTEX HPSU compact 508/516

Type	ROTEX HPSU compact					
	508 DB	516 DB	508 BIV	516 BIV		
Can be used with an external heat pump unit	RRLQ006CA V3/RRLQ008 CAV3	RRLQ011CA (V3/W1)*/ RRLQ014CA (V3/W1)*/ RRLQ016CA (V3/W1)*	RRLQ006CA V3/RRLQ008 CAV3	RRLQ011CA (V3/W1)*/ RRLQ014CA (V3/W1)*/ RRLQ016CA (V3/W1)*		
Dimensions and weights	Unit					
Dimensions (H x W x D)	cm	180 x 79 x 79				
Empty weight	kg	111	116	113		
Main components						
Water heat circulation pump	Type	—	Grundfos UPM3K 25-75 CHBL RT			
	Speed rates	—	Continuously variable (PWM)			
	Voltage	V	230			
	Frequency	Hz	50			
	Protection type	—	IP 42			
	Maximum rated output	W	45			
Heat exchanger (water/coolant)	Type	—	Stainless steel underfloor heat exchanger			
	Heat insulation	—	EPP			
Storage tank						
Total storage capacity	litres	477				
Maximum permissible storage water temperature	°C	85				
Heat consumption at stand-by and at 60 °C	kWh/24h	1.4				
Domestic water heat exchanger (stainless steel 1.4404)	Water capacity heat exchanger	litres	29			
	Maximum operating pressure	bar	6			
	Domestic water heat exchanger surface	m ²	6.0			
Storage tank charging heat exchanger (stainless steel 1.4404)	Water capacity heat exchanger	litres	12.1	17.4	12.1	
	Heat exchanger surface area	m ²	2.5	3.5	2.5	
Pressurised solar heat exchanger (stainless steel 1.4404)	Water capacity heat exchanger	litres	—		12.5	
	Heat exchanger surface area	m ²	—		1.7	
Thermal performance data ¹⁾	Hot water quantity without re-heating at a flow rate of 8 l/min (12 l/min) (T _S =50 °C)	litres	364 (318) 328 ⁴⁾ (276 ⁴⁾)	324 (282) 288 ⁴⁾ (240 ⁴⁾)		
	Hot water quantity without re-heating at a flow rate of 8 l/min (T _S =60 °C)	litres	540 (494)		492 (444)	
	Hot water quantity without re-heating at a flow rate of 8 l/min (12 l/min) (T _S =65 °C)	litres	612 (564)		560 (516)	
	Re-heating rime with a draw-off quantity of: 140 l = 5820 Wh (Ø bathtub) 90 l = 3660 Wh (Ø shower draw-off quantity)	min.	45 30	25 17	45 30	
Pipe connections	Cold and hot water	inches	1" AG			
	Heating flow and return flow	inches	1" IG			
	Solar connections	p=0 	inches	1" IG		
			—		3/4" IG + 1" AG	

Type			ROTEX HPSU compact			
			508 DB	516 DB	508 BIV	516 BIV
Refrigerant circuit						
Number of circuits			—	1		
Pipe connections	Number		—	2		
	Liquid line	Type	—	Flanged connection		
		External Ø	inches	1/4" AG	3/8" AG	1/4" AG
Gas lines	Type	—	Flanged connection			3/8" AG
	External Ø	inches	5/8" AG			
Operating data						
Operating range	Flow temperature for room heating/cooling function	Heating (min./max.)	°C	15 to 55		
		Cooling (min./max.)	°C	5 to 22		
	Hot water generation (with BUxx)	Heating (min./max.)	°C	25 to 80		
Noise level	Audibility		dBA	42	46	42
	Noise pressure ²⁾		dBA	28	32	32
Electrical data:						
Voltage supply	Phases		—	1		
	Voltage		V	230		
	Voltage range		V	Voltage ±10%		
	Frequency		Hz	50		
Mains connection ³⁾	Exterior heat pump unit for HPSU compact		—	4G		
	Exterior heat pump unit		—	3G	3G / 5G	3G
	Option auxiliary heating	Backup Heater (BUxx)	—	3G (1-phase) / 5G (3-phase)		
Order number	Heating/cooling function 			14 15 32	14 15 33	14 15 36
	Heating function only			14 15 41	14 15 38	14 15 44
Performance data						
Type exterior heat pump unit			RRLQ006CA V3/RRLQ008 CAV3	RRLQ011CA (V3/W1)*/ RRLQ014CA (V3/W1)*/ RRLQ016CA (V3/W1)*	RRLQ006CA V3/RRLQ008 CAV3	RRLQ011CA (V3/W1)*/ RRLQ014CA (V3/W1)*/ RRLQ016CA (V3/W1)*
Nominal heat output A-7/W35			kW	5.29 / 5.53	6 / 8.3 / 8	5.29 / 5.53
Nominal heat output A2/W35			kW	4.6 / 5.51	7.7 / 9.6 / 10.1	4.6 / 5.51
Nominal heat output A7/W35			kW	6.06 / 7.78	11.8 / 14.8 / 15.3	6.06 / 7.78
Nominal heat output A10/W35			kW	6.6 / 8.4	11.5 / 14.5 / 16.1	6.6 / 8.4
Nominal cooling output A35/W18 			kW	5.22 / 5.22	15.1 / 16.1 / 16.8	5.22 / 5.22
Nominal cooling output A35/W7 			kW	4.46 / 4.64	11.7 / 12.6 / 13.1	4.46 / 4.64
Nominal COP A-7/W35				2.73 / 2.78	2.45 / 2.58 / 2.44	2.45 / 2.58 / 2.44
Nominal COP A2/W35				3.64 / 3.54	3.29 / 3.22 / 3.15	3.29 / 3.22 / 3.15
Nominal COP A7/W35				4.65 / 4.6	4.47 / 4.27 / 4.1	4.65 / 4.6
Nominal COP A10/W35				4.95 / 4.9	4.6 / 4.41 / 4.31	4.6 / 4.41 / 4.31

10 Technical data

Type	ROTEX HPSU compact				
	508 DB	516 DB	508 BIV	516 BIV	
Nominal EER A35/W18 	3.65 / 3.65	3.32 / 2.96 / 2.72	3.65 / 3.65	3.32 / 2.96 / 2.72	
Nominal EER A35/W7 	2.51 / 2.51	2.72 / 2.47 / 2.29	2.51 / 2.51	2.72 / 2.47 / 2.29	
Max. heating output A-7/W35	kW	5.3 / 6.4	8.8 / 11.7 / 12.3	5.3 / 6.4	8.8 / 11.7 / 12.3
Max. heat output A2/W35	kW	6.4 / 7.7	9.1 / 10.9 / 11.4	6.4 / 7.7	9.1 / 10.9 / 11.4
Max. heat output A7/W35	kW	8.4 / 10.2	11.4 / 14.6 / 16.1	8.4 / 10.2	11.4 / 14.6 / 16.1
Max. heat output A10/W35	kW	8.8 / 10.5	11.9 / 15 / 16.5	8.8 / 10.5	11.9 / 15 / 16.5
Max. cooling output A35/W18 	kW	7.3 / 8.4	15.1 / 16.1 / 16.8	7.3 / 8.4	15.1 / 16.1 / 16.8
Max. cooling output A35/W7 	kW	5.5 / 6.4	11.7 / 12.6 / 13.1	5.5 / 6.4	11.7 / 12.6 / 13.1

* Not all the equipment mentioned here is offered in some countries because of the various different country-specific connection conditions.

1) T_{CW} Cold water input temperature = 10 °C

T_{DHW} Hot water draw-off temperature = 40 °C

T_S Storage target temperature (charge state before drawing off)

2) With a reference spacing of 1 m.

3) Number of individual wires in the connection cable, including protective earth. The cross-section of the individual lines is dependent on the current load, the length of the connection cable and the respective legal provisions.

4) Hot water storage tank only to be charged using a heat pump, without a backup heater.

Tab. 10-2 Basic data ROTEX HPSU compact 508/516

10.2 Characteristic lines

10.2.1 Sensor characteristic lines

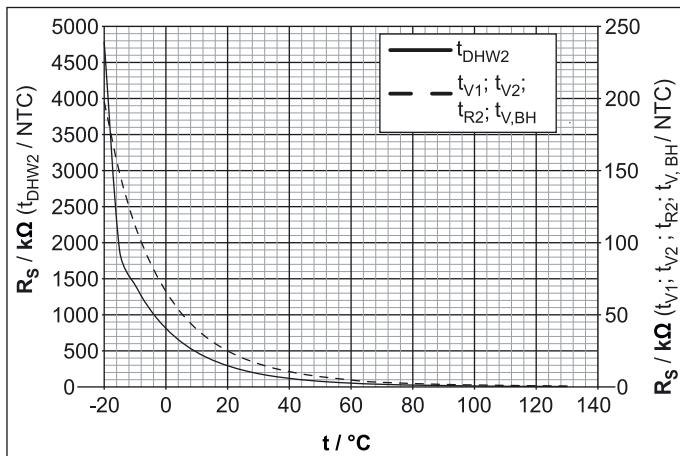
Temperature sensor																
		Measured temperature in °C														
		-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
Sensor resistance in kOhm according to standard or manufacturer's indications																
t_{DHW2}	NTC	—	—	811.5	480.6	293.2	183.8	118.2	77.7	52.3	35.8	25.1	17.8	12.9	9.5	7.1
t_{Au} (RoCon OT1), t_{DHW1}	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_{Au} (R1T)	NTC	197,8	112,0	65,8	40,0	25,0	16,1	10,6	7,2	5,0	3,5	2,5	—	—	—	—
t_{V1} , t_{V2} , $t_{V, BH}$, t_{R2} 	NTC	197.80	120.00	65.84	39.91	24.95	16.04	10.58	7.14	4.77	3.19	2.36	1.74	1.33	1.07	0.84

FLS Sensor (Flow/Temperature)

FLS (t_{R1} / $V1$)	V1	Measured flow in l/min									
		10.0	20.0	30.0	40.0	50.0	60.0	70,0	80.0	—	
		Sensor output frequency in Hz									
(14 - 229 Hz)		28	54	81	108	135	162	188	215	—	
t_{R1}	Measured temperature in °C										
		10.0	20.0	30.0	40.0	50.0	60.0	70,0	80.0	90.0	
	Sensor resistance in Ohm										
(Pt 1000)		1039	1077	1116	1155	1194	1232	1270	1308	1347	

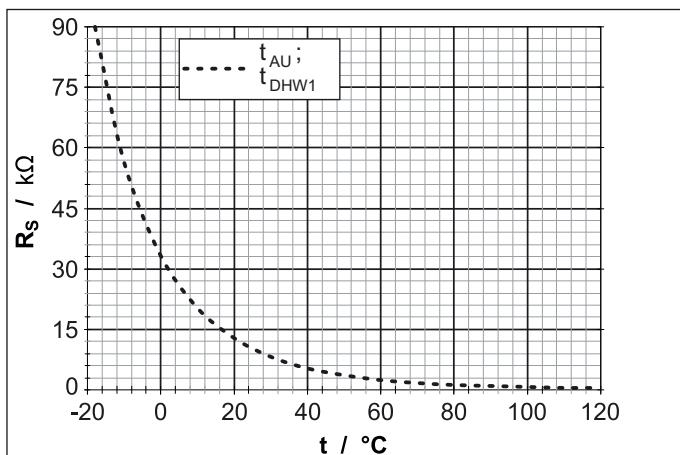
Tab. 10-3 Sensor Table ROTEX HPSU compact

 Maximum tightening torque of sensor = 10 Nm.



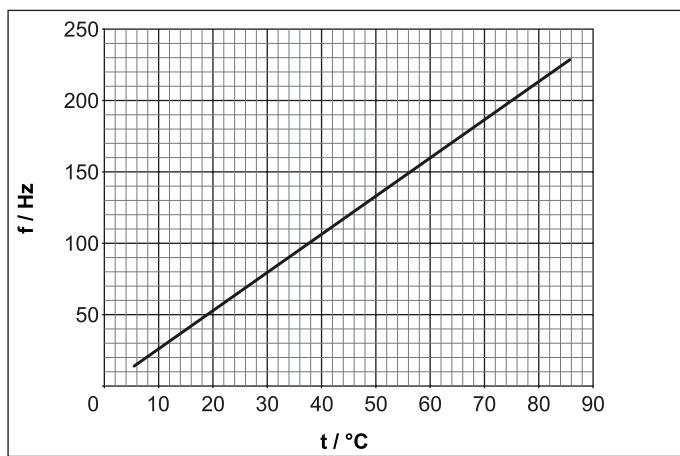
R_s Sensor resistance (NTC)
 t Temperature
 t_{DHW2} Storage tank temperature sensor
 t_{R2} Return flow temperature sensor
 t_{V1}, t_{V2} Flow temperature sensor
 $t_{V, BH}$ Flow temperature sensor Backup Heater

Fig. 10-1 Characteristics of the NTC temperature sensor ROTEX HPSU compact - part 1



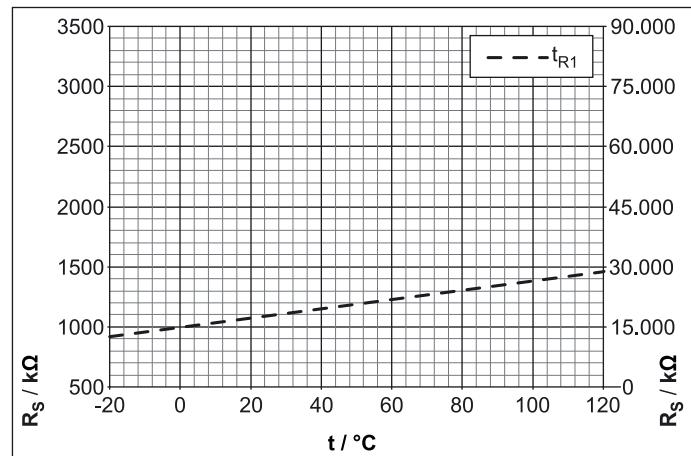
R_s Sensor resistance (NTC)
 t Temperature
 t_{AU} External temperature sensor RoCon OT1
 t_{DHW1} Storage tank temperature sensor

Fig. 10-2 Characteristics of the NTC temperature sensor ROTEX HPSU compact - Part 2



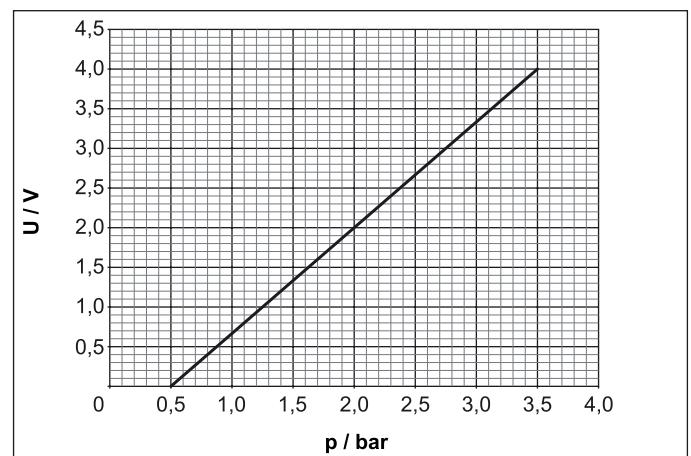
f Frequency
 m Flow

Fig. 10-3 Characteristics of the flow sensor FLS (V1) ROTEX HPSU compact



R_s Sensor resistance (Pt 1000)
 t Temperature
 t_{R1} Return flow temperature sensor in the flow meter

Fig. 10-4 Characteristics of the return flow temperature sensor in the flow sensor FLS (t_{R1}) ROTEX HPSU compact

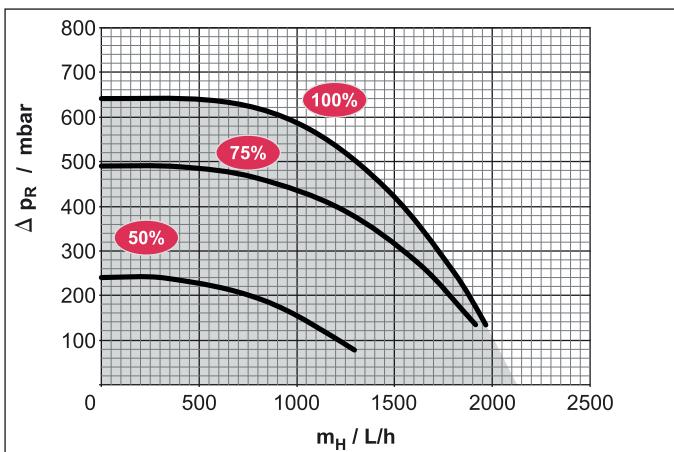


p Water pressure
 U Tension

Fig. 10-5 Characteristics of the pressure sensor (DS) ROTEX HPSU compact

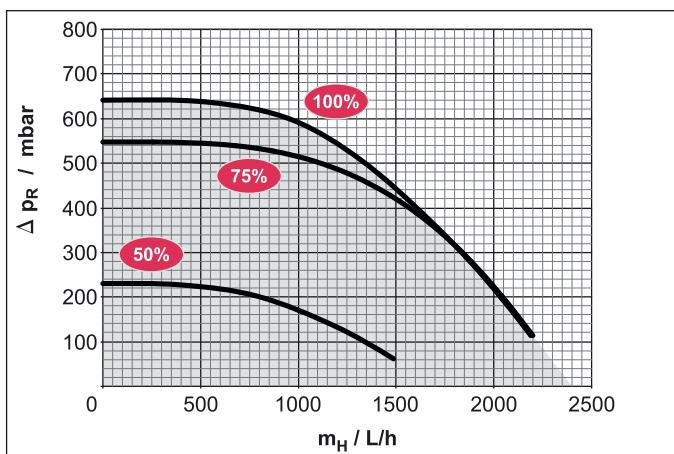
10 Technical data

10.2.2 Characteristic curves for pumps



Δp_R Residual pumping height of internal heat circulation pump
 m_H Flow rate of heating system

Fig. 10-6 Residual feed height of internal heating circulation pump
ROTEX HPSU compact 304/308/508 with heating support
heat exchanger



Δp_R Residual pumping height of internal heat circulation pump
 m_H Flow rate of heating system

Fig. 10-7 Residual feed height of internal heating circulation pump
ROTEX HPSU compact 516 with heating support heat ex-
changer

10.3 Tightening torque

Component	Thread size	Tightening torque
Temperature sensor	all	max. 10 Nm
Hydraulic line connections (Water)	1"	25 to 30 Nm
Gas line connections (refrigerant)	5/8"	63 to 75 Nm
Liquid line connections (Coolant)	1/4"	15 to 17 Nm
Liquid line connections (Coolant)	3/8"	33 to 40 Nm
Backup heater	1.5"	max. 10 Nm (hand-tight)

Tab. 10-4 Tightening torque

10.4 Circuit diagram ROTEX HPSU compact

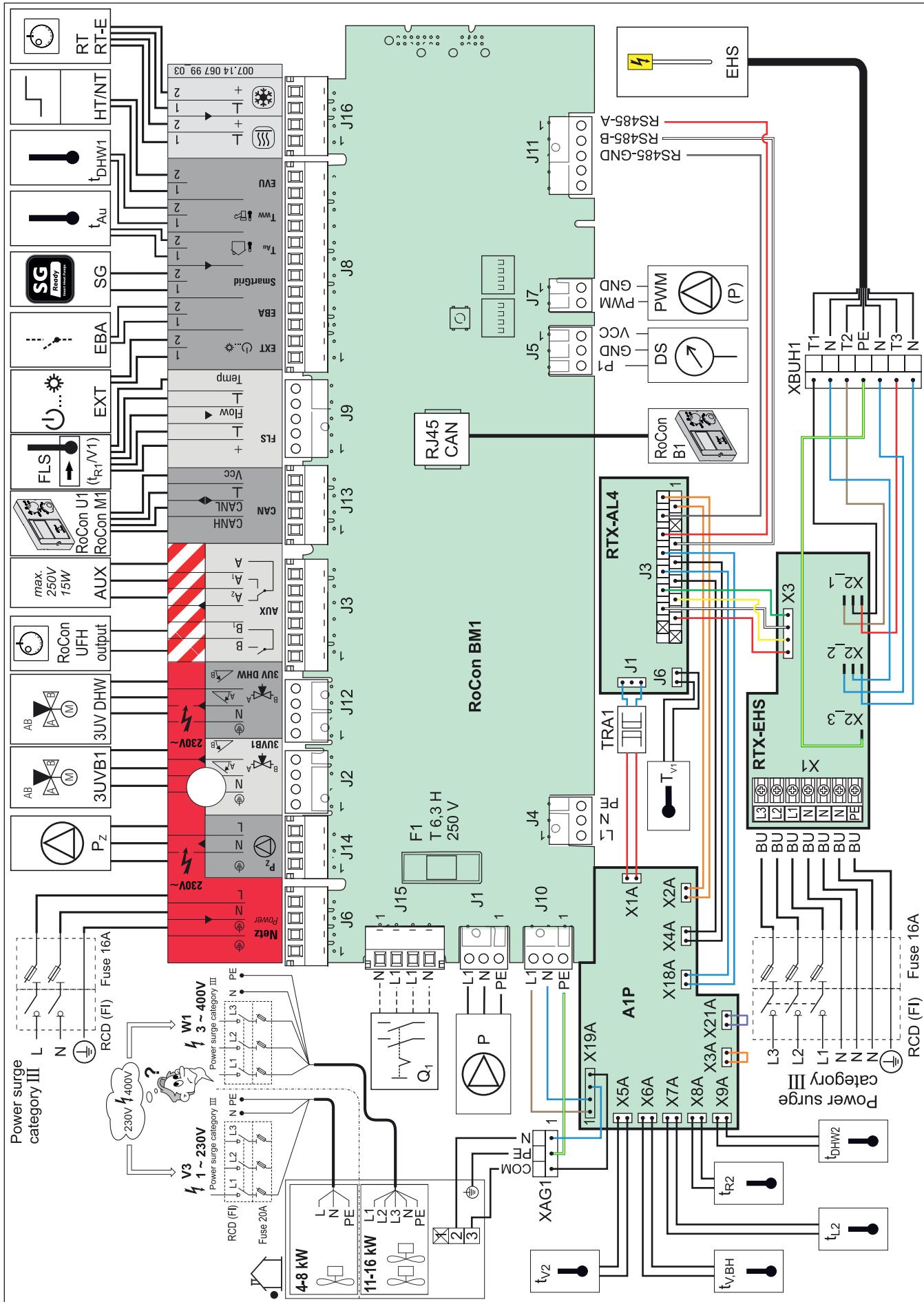


Fig. 10-8 Circuit diagram ROTEX HPSU compact - For legend see tab. 4-3

11 Notes

11 Notes

12 List of keywords

12 List of keywords

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ROTEX products distributed in UK:

DAIKIN AIR CONDITIONING UK Ltd.
The Heights, Brooklands, Weybridge
KT13 0NY Surrey
Fon +44 845 641 90 00
Fax +44 845 641 90 09
www.daikin.co.uk

ROTEX

ROTEX Heating Systems GmbH

Langwiesenstraße 10
D-74363 Göglingen
www.rotex-heating.com