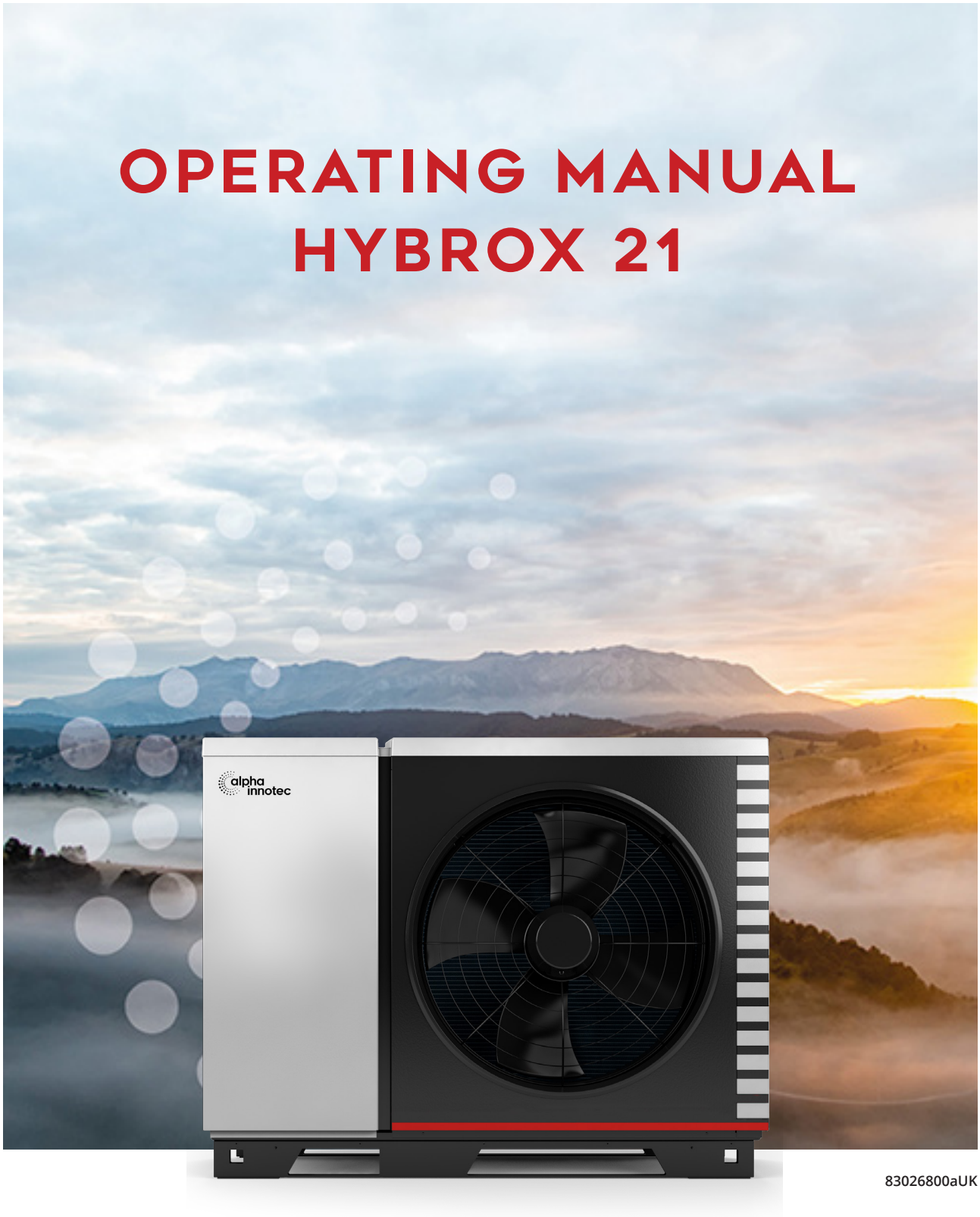
OPERATING MANUAL
HYBROX 21



83026800aUK

UK

Air/Water heat pumps
Outdoor installation

www.alpha-innotec.com

Table of contents

1 About this operation manual

This operation manual is an integral part of the unit.

- ► Before working on or with the unit, always read the operation manual carefully and follow it for all activities at all times, especially the warnings and safety instructions.
- ► Keep the operation manual at hand at the unit and hand it over to the new owner if the unit changes hands.
- ► If you have any questions or if anything is unclear, ask the local partner of the manufacturer or the factory's customer service.
- ► Observe all reference documents.

1.1 Validity

This operation manual refers solely to the unit identified by the nameplate (→ "Nameplate", page 7).

1.2 Reference documents

The following documents contain additional information to this operation manual:

- Heat pump guide, hydraulic integration
- Operating manual of the hydraulic unit or the wall-mounted controller
- Operation manual for the heating and heat pump controller
- Short description of the heat pump controller
- Operation manual for the extension board (accessory)
- Repair and service instructions for heat pumps with flammable (primary) refrigerant
- Safety instructions for flammable refrigerants

1.3 Symbols and markings

Identification of warnings

Symbol	Meaning
	Safety-relevant information. Warning of physical injuries.
	Safety-relevant information. Warning of physical injuries. Flammable materials / flammable (primary) refrigerant
	Safety-relevant information. Warning of physical injuries. Flammable materials / flammable (primary) refrigerant
	Safety-relevant information. Warning of physical injuries. Danger of fatal injury due to electric current.
DANGER	Indicates an imminent danger resulting in severe injuries or death.
WARNING	Indicates a potentially dangerous situation, which can result in severe injuries or death.
CAUTION	Indicates a potentially dangerous situation, which can result in moderate or minor injuries.
IMPORTANT	Indicates a potentially dangerous situation, which can result in material damage.

Symbols in the document

Symbol	Meaning
	Information for specialist
	Information for operator
	Parallel mode
✓	Prerequisite for an action
▶	Procedural instructions: Single-step instruction for action
1., 2., 3., …	Procedural instructions: Numbered step within a multi-step instruction for action. Adhere to the given sequence.
	Additional information, e.g. a note for making work easier, information on standards
→	Reference to further information elsewhere in the operating manual or in another document
●	List
	Secure connections against twisting

1.4 Contact

Addresses for purchasing accessories, for service cases or for answers to questions about the unit and this operating manual can be found on the internet and are kept up-to-date:

- www.alpha-innotec.com

2 Safety

Only use the unit if it is in perfect technical condition and only use it as intended, safely and aware of the hazards and under full observance of this operation manual.

2.1 Proper use

The unit is designed for household use and is solely intended for the following functions:

- Heating
- Domestic hot water preparation (optional, with accessories)
- Cooling, reversible

► Proper use includes complying with the operating conditions (→ “Technical data / scope of supply”, page 24) and the operation manual and observing the reference documents.

► When using the unit, observe local regulations: laws, standards and directives.

Any other use of the unit shall be considered improper use.

2.2 Personnel qualifications

The operating manuals supplied with the product are intended for all users of the product.

The operation of the product via the heating and heat pump control and work on the product which is intended for end customers / operators is suitable for all age groups of persons who are able to understand the activities and the resulting consequences and can carry out the necessary activities.

Children and adults who are not experienced in handling the product and do not understand the necessary activities and the resulting consequences must be instructed and, if necessary, supervised by persons experienced in handling the product and who are responsible for safety.

Children must not play with the product.

The product may only be opened by qualified personnel.

All procedural instructions in this operating manual are intended excusively for qualified and skilled personnel.

Only qualified and skilled personnel are able to carry out the work on the unit safety and correctly. Interference by unqualified persons can result in fatal injuries and material damage.

► Ensure that the personnel is familiar with the local regulations, especially those on safe and hazard-aware working.

► Ensure that the personnel are qualified to handle flammable (primary) refrigerant.

- Work on the refrigerating circuit may only be carried out by qualified personnel with appropriate qualifications for refrigeration system installation.
- Work on the electrics and electronics may only be carried out by electrical technicians.
- Any other work on the system may only be carried out by qualified personnel (heating installer, plumbing installer).

During the warranty and guarantee period, servicing and repair work may only be carried out by personnel authorised by the manufacturer.

2.3 Personal protective equipment

During transport and work on the unit, there is a risk of cuts due to the sharp edges of the unit.

► Wear cut-resistant protective gloves.

During transport and work on the unit, there is a risk of foot injuries.

► Wear safety shoes.

When working on liquid-conveying lines, there is a risk of injury to the eyes due to leakage of liquids.

► Wear safety goggles.

2.4 Residual risks

Injuries caused by electric current

Components in the unit are live with fatal voltage. Before working on the unit:

► Disconnect the unit from the power supply.

► Protect the unit against being switched back on again.

► Residual voltage at the inverter. Wait for 90 seconds before opening the unit.

Existing earthing connections within housings or on mounting plates must not be altered. If this should nevertheless be necessary in the course of repair or assembly work:

► Restore earthing connections to their original condition after completion of the work.

Risk of injury from moving parts

► Only switch on the unit when the covers and fan protection grille are fitted.

Injuries caused by high temperatures

► Before working on the unit, let it cool down.

Safety instructions and warning symbols

► Observe the safety instructions and warning symbols on the packaging and on and in the unit.

Injuries and environmental damage due to refrigerant

WARNING
The unit contains flammable (primary) refrigerant that is hazardous to health and the environment. If (primary) refrigerant leaks from the unit, there is a risk of an explosion.

If refrigerant leaks from the unit due to a leak, proceed as follows:

1. Switch off unit.
2. Ensure that all unauthorised persons leave the danger area immediately.
3. Remove possible ignition sources from the danger area and keep them away from the danger area.
4. Block access to the danger area for unauthorised persons.
5. Notify authorised after sales service.

If damage is visible on the outside of the unit, proceed as follows:

1. Switch off unit.
2. Notify authorised after sales service.

2.5 Disposal

Environmentally hazardous substances

Improper disposal of environmentally hazardous substances (e.g. refrigerant, compressor oil) damages the environment:

► Collect substances safely.

► Dispose of the substances in an environmentally-friendly manner according to the local regulations.

2.6 Avoid material damage

The ambient air at the heat pump's installation site and the air drawn in as a heat source must not contain any corrosive components!

Constituents such as

- Ammonia
- Sulphur
- Chlorine
- Salt
- Sewage gases, flue gases

can cause damage to the heat pump, which can even result in the complete failure/total loss of the heat pump.

Cooling

If the heating surfaces are used for heating and cooling, the control valves must be suitable for heating and cooling.

By cooling with low flow temperatures, condensate can be expected to form on the heat distribution system as the temperature falls below the dew point. If the heat distribution system is not designed for these operating conditions, it must be protected by appropriate safety devices, e.g. dew point monitor (purchasable accessory).

Decommissioning/draining the heating

If the system/heat pump is decommissioned or drained after already being filled, it must be ensured that the condenser and any heat exchangers have been drained completely in the event of freezing temperatures. Residual water in heat exchangers and condensers can result in damage to the components.

► Completely drain the system and the condenser, and open vent valves.

► Blow them clear with compressed air, if required.

Improper action

Requirements for minimum scale and corrosion damage in hot water heating systems:

- Professional planning and commissioning
- Closed system with regard to corrosion
- Integration of an adequately dimensioned pressure maintenance
- Use of demineralised heating water (VE water) or water corresponding to the VDI 2035 norm
- Regular servicing and maintenance

If a system is not planned, commissioned and operated in accordance with the given requirements, there is a risk of the following damage and malfunctions:

- Malfunctions and failure of components, e.g. pumps, valves
- Internal and external leaks, e.g. at heat exchangers
- Reduction in cross-section and blockages in components, e.g. heat exchangers, pipes, pumps
- Material fatigue
- Gas bubble and gas cushion development (cavitation)
- Negative effect on heat transfer, e.g. due to formation of deposits, and associated noises, e.g. boiling noises, flow noises

► Observe the information in this operation manual for all work on and with the unit.

Unsuitable quality of the water for filling and replenishing the heating circuit

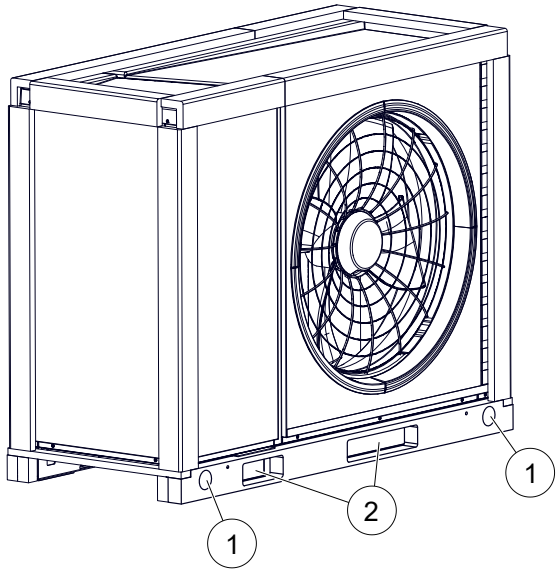
The efficiency of the system and the service life of the heat generator and the heating components depend decisively on the quality of the heating water.

If the system is filled with untreated drinking water, calcium and magnesium precipitate as mineral scale. Limescale deposits accumulate on the heat transfer surfaces of the heating. Efficiency is reduced and energy costs increase. In extreme cases, the heat exchangers will be damaged.

► Fill the system with deionised heating water (VE water) or with water corresponding to the VDI 2035 norm only (low-salt operation of the system).

3 Description

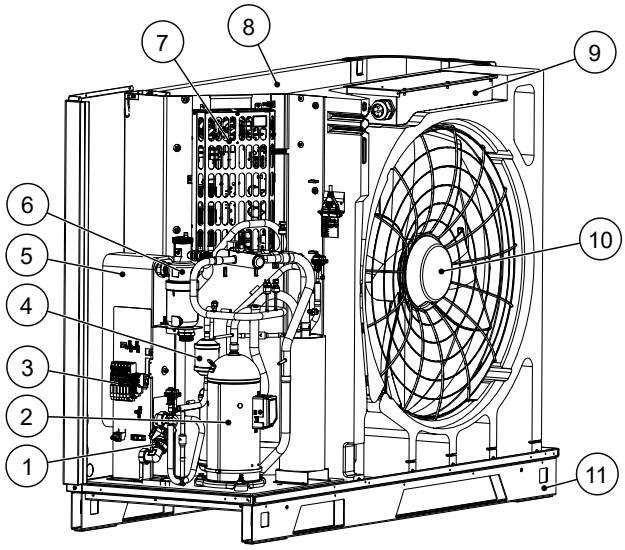
3.1 Delivery condition



Base of the device packed in wooden construction and wrapped all around with Styrofoam corner strips and plastic film. One bag on the device and accessories in the device.

1 Holes for round slings
2 Cut-outs for transport with a forklift or crane fork

3.2 Design



1 Shut-off device with dirt trap
2 Compressor
3 Connection terminal
4 Filter-dryer
5 Condenser
6 Microbubble separator with vent and safety valve
7 Inverter
8 Evaporator
9 Switch box
10 Fan
11 Base

Nameplate

The nameplate is attached at the following position on the unit

- on the rear and inside of the unit

It contains the following information at the very top:

- Unit type, item number
- Serial number

The nameplate also contains an overview of the most important technical data.

3.3 Functionally necessary accessories

Only use genuine accessories made by the manufacturer of the unit.

- Wall-mounted controller WR 21

3.4 Additional accessories

The following accessories are available for the unit via the manufacturer's local partner:

- Electrical connection kit EVSK
- Hydraulic connection line HVLD
- Installation package IPWHF for hydraulic connection line HVLD
- Installation package IPWVF for hydraulic connection line HVLD
- Transition ÜG HVLD 5/4" for hydraulic connection line HVLD
- Air / magnetic sludge separator
- Buffer tank
- Overflow valve
- Extension board
- Room control unit to control the main functions at the living quarters
- Room thermostat for switching the cooling function
- Dew point monitor for protecting a system with cooling function at low flow temperatures

3.5 Function

Liquid refrigerant is evaporated (evaporator). The energy for this process is ambient heat coming from the outside air. The gaseous refrigerant is compressed (compressor), which increases the pressure and thus also the temperature. The gaseous refrigerant at high temperature is liquefied (condenser).

In the process, the high temperature is transferred to the heating water and used in the heating circuit. The liquid refrigerant at high pressure and high temperature is expanded (expansion valve). The pressure and temperature drop and the process restarts.

The heated heating water can be used for domestic hot water or for heating the building. The temperatures required and the use are controlled by the heat pump controller. Any required reheating, support in screed drying or increase in the domestic hot water temperature can be carried out using an electric heating element, which is activated by the heat pump controller as required.

The vibration decoupling (accessory) for the hydraulic system prevents structure-borne sound and vibrations from being transferred to the fixed pipes and thus to the building.

Cooling

The cooling function is integrated in the units. The following options are possible for the cooling function (→ operating manual of the heating and heat pump controller):

- Active cooling
  Cooling in combination with wall-mounted controller up to a minimum flow temperature of 7 °C
  Cooling below 18 °C is only possible in the case of hydraulic integration with separation buffer tank
- The cooling function is controlled via the heating and heat pump controller
- Switching over between heating and cooling mode

4 Operation and care

NOTE
The unit is operated via the control panel of the heating and heat pump controller (→ Operation manual for the heating and heat pump controller).

4.1 Energy and environmentally aware operation

The generally applicable requirements for energy and environmentally aware operation of a heating system also apply to the use of a heat pump. The most important measures include:

- No unnecessarily high flow temperature
- No unnecessarily high domestic hot water temperature
- Do not open windows with a gap/in a tilted position (continuous ventilation), but instead open them wide for a short time (shock ventilation).
- Always ensure that the controller setting is correct

4.2 Care

Wipe off the outside of the unit only using a damp cloth or cloth with mild cleaning agent (washing-up liquid, neutral cleaning agent). Do not use any aggressive, abrasive, acid or chlorine-based cleaning agents.

5 Delivery, storage, transport and installation

IMPORTANT
Damage to the housing and the unit components due to heavy objects.

► Do not place any objects on the unit.

5.1 Scope of delivery

► Check the delivery immediately on receipt for visible signs of damage and for completeness.

► Notify the supplier of any complaints immediately.

The bag on the unit contains

- Documents (operation manuals, ERP data and labels)

The separate package inside the unit contains

- 1 condensate drain pipe nozzle
- 2 screws for strain relief
- 1 bracket clamp
- Logo sticker for control unit
- Cover plate
- Sealing plate

NOTE
The outdoor sensor is included in the scope of delivery for the hydraulic unit.

5.2 Storage

WARNING
Only store the unit in rooms without ignition sources. Do not drill or torch!

► Store the unit in its packaging.

► Store the unit protected against:

- Moisture
- Frost
- Dust and dirt

5.3 Transport and unpacking

This section describes how to lift and position the heat pump using a crane with a crossbeam or crane fork. The heat pump is transported to a prepared substructure at the installation site and only then unpacked.

DANGER
Falling or suspended loads. Risk of death due to falling loads or pendulum movements. Do not stand under suspended loads!

DANGER
Risk of falling if unsuitable or improperly used slings are used. Never attach to hydraulic connections, pipes, cladding or other components!

WARNING
Pay attention to the centre of gravity of the device during transport! (Pay attention to the centre of gravity sticker!)

WARNING
Weather conditions! In case of strong wind (≥ 10 m/s), rain or poor visibility, stop the process immediately!

ATTENTION
Transport the device to the installation site in its packaging.

ATTENTION
Do not tilt the heat pump more than 45°.

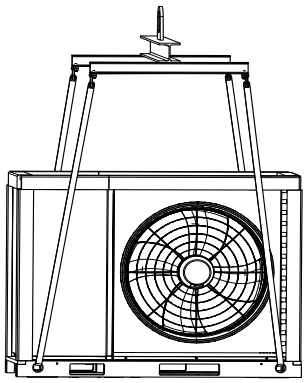
Prerequisites

- ✓ Put up barrier tape and warning signs to mark the danger zone
- ✓ Put on PPE (helmet, gloves, safety shoes)
- ✓ Crossbeam system, suitable for symmetrical load bearing (rectangular crossbeam with 4 attachment points))
- ✓ Slinging equipment: 2 large round slings, 2 t min. 5 m long, tested
- ✓ Connecting elements: 4 shackles DIN 82101
- ✓ Determine load weight and centre of gravity
- ✓ Visually inspect lifting and slinging equipment
- ✓ Check permissible load capacities (crossbeam system and slings)
- ✓ Determine attachment points on the heat pump

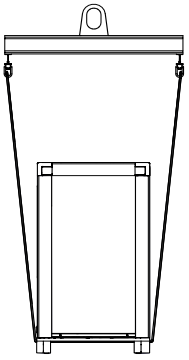
Secure workspace

1. Keep crane runway clear and cordoned off (put up warning signs, cordon off danger zone)
2. Check support surfaces (crane)
3. Ensure communication between the signalman and crane operator (standardised hand signals)

Perform lifting operation with crossbeam



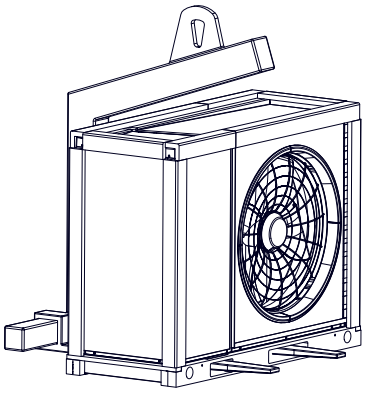
1. Thread 2 round slings (as shown in the illustration) through the bottom of the heat pump frame.
2. Attach the ends of the round slings to each attachment point on the crossbeam using shackles.



3. Ensure that the round slings are attached in a slight V-shape so that no pressure is exerted on the heat pump housing.

4. Lift the load slightly (approx. 10 cm) and check that it is securely attached.
5. Check the position of the load. Balance the centre of gravity if necessary.
6. Continue to lift slowly and evenly, watching out for pendulum movements.
7. Move the load slowly to its destination.
8. Slowly and carefully lower the heat pump onto the substructure at the destination.
9. Ensure that the base frame of the device rests flat on the substructure.
10. Relieve the load on the crossbeam and remove the slings.
11. Check the heat pump for damage.

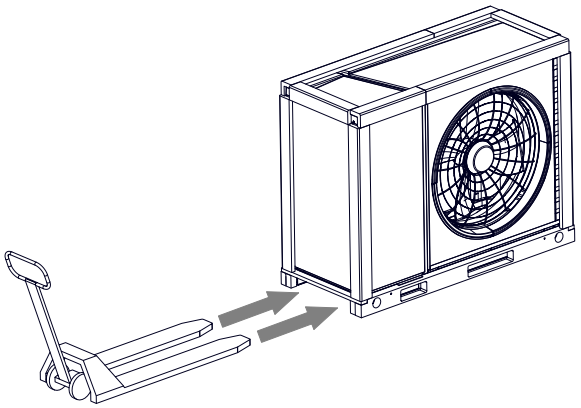
Perform lifting operation with crane fork

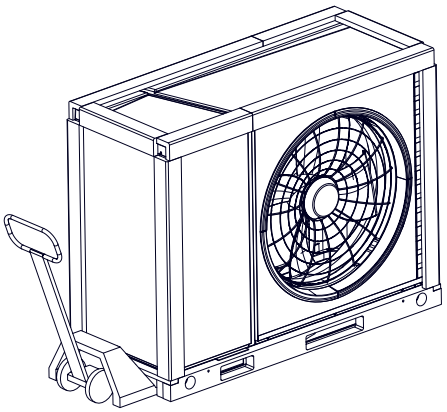


1. Insert the crane fork into the two recesses in the frame at the bottom.
2. Secure the heat pump against slipping and falling.
3. Lift the load slightly (approx. 10 cm) and check that it is securely attached.
4. Check the position of the load. Balance the centre of gravity if necessary.
5. Continue to lift the load slowly and evenly
6. Move the load slowly to its destination.
7. Slowly and carefully lower the heat pump onto the substructure at the destination.
8. Ensure that the base frame of the device rests flat on the substructure.
9. Remove the fuses and check the heat pump for damage.

Transport with a pallet truck

ATTENTION
Move the pallet truck completely under the unit.

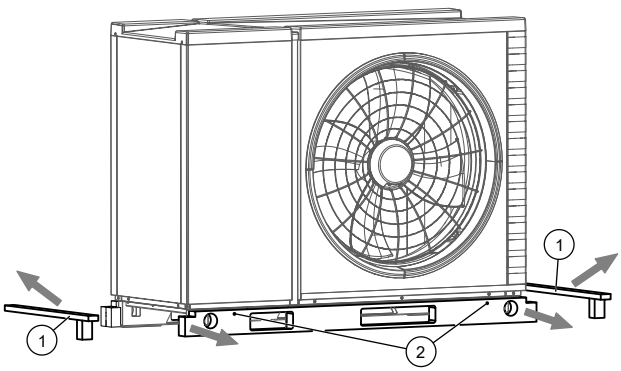




► Transport the unit to the installation site whilst still packaged.

Unpacking

1. Remove plastic films and styrofoam angle strips. Remove the wooden construction by loosening the screws. Make sure that you do not damage the unit when doing this.



2. Dispose of the transport and packaging material in an environmentally sound manner and in accordance with local regulations.

5.4 Installation

CAUTION
In the air outlet area the air temperature is approx. 5 K below the ambient temperature. Under certain climatic conditions, an ice layer can therefore develop in the air outlet area.
Install the heat pump so that the air coming from the air outlet opening is not discharged into footpath areas.

NOTE
Always comply with the installation plan for the respective unit type. Observe the minimum clearances and protected zones.

→ Installation plan, dimension drawings and scopes of protection for the respective unit type.

NOTE
The noise immissions of the heat pumps must be taken into account in the respective installation plans for air/water heat pumps. The respective regional regulations must be complied with.

NOTE
The bus cable and the load cable must be laid on site using two separate protective conduits.

Installation site requirements

The unit can be installed near a wall or as a free field installation.

✓ The installation site is located outdoors

✓ The installation site is protected from wind or the unit is installed parallel to the main wind direction (= fan must not be positioned in the main wind direction – air flow rotated 90° to the main wind direction)

✓ Clearance dimensions were complied.

→ “Installation plans”, from page 29

✓ Free air intake and blowing air are possible without any air short-circuit.

✓ The surface is suitable for installation of the unit:

- The foundation is level, solid and horizontal
- The foundation has no structure-borne sound contact with the building
- The surface and the foundation have a load-bearing capacity sufficient for the unit’s weight

✓ Ground surface in the air outlet area of the heat pump is permeable to water

Mounting the unit

► Place the unit directly on the substructure.

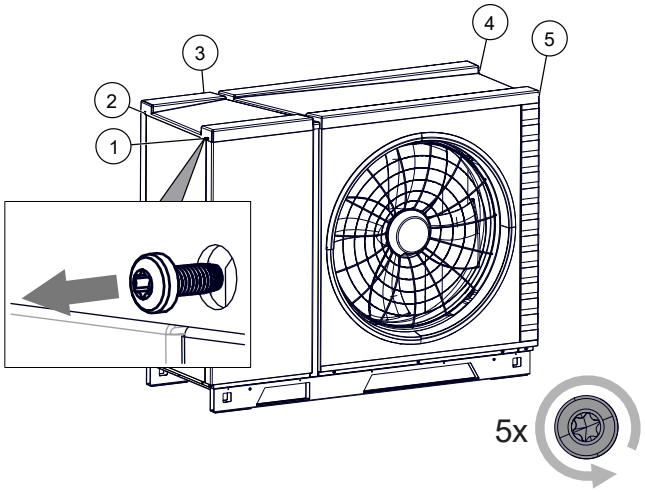
→ The manufacturer recommends a fixed connection to the foundation.

→ Recommended components: 4 screws 10 x 80 mm (DIN 571) + universal dowels 12 x 70 mm + 4 washers DIN 125

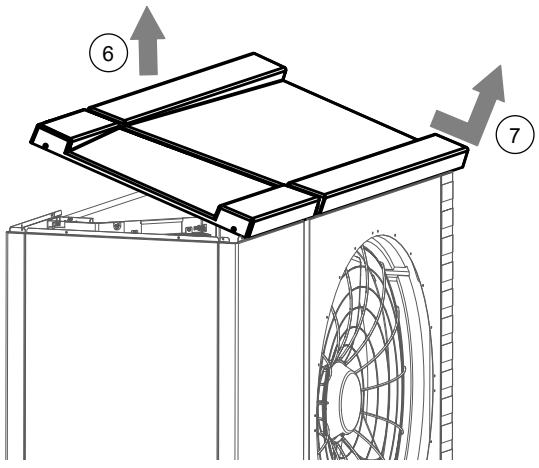
→ Observe installation plans (Drill holes in the foundation)

→ Hydraulic connection line HVLD installation instruction

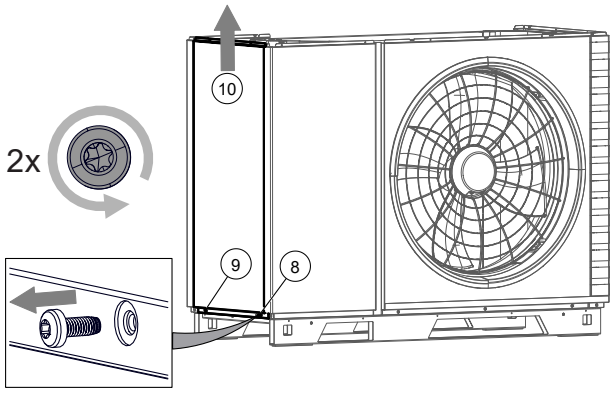
5.5 Opening and closing the unit



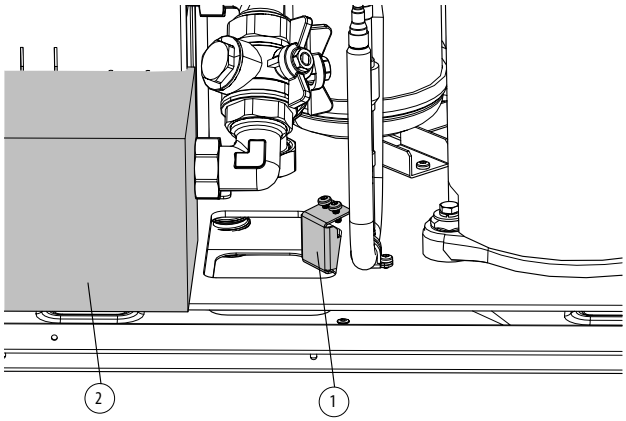
1. Loosen, remove and keep the screws.



2. Remove the unit cover.



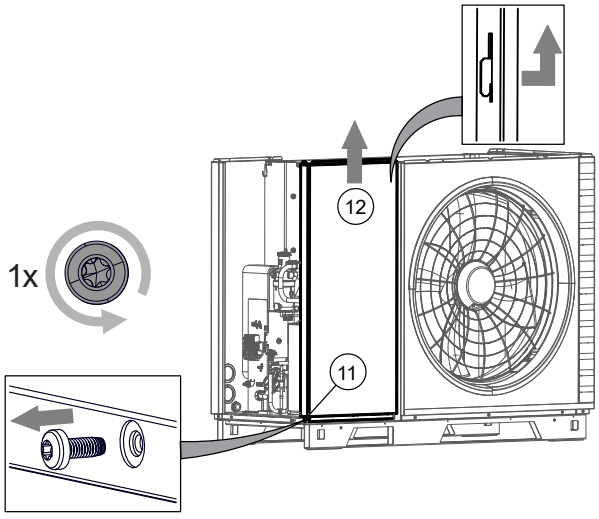
3. Remove the left side panel of the unit.



4. Remove the transport lock ① and take out the accessory box ②.

→ Package leaflet

NOTE
Remove the maintenance door if necessary.



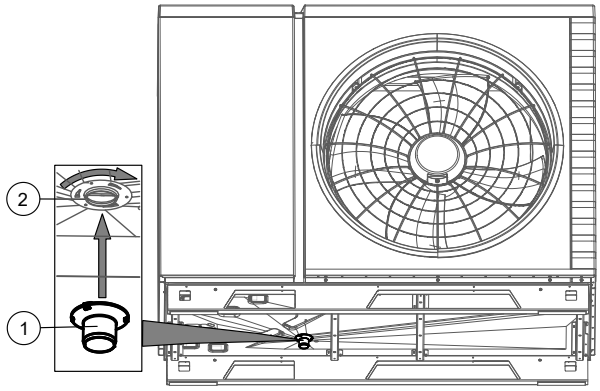
► Close the unit in reverse order after finishing the installation work.

6 Installation of hydraulic system

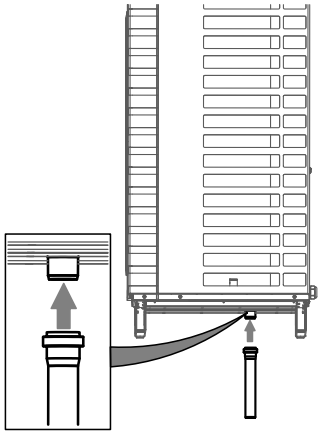
6.1 Condensate drain

The condensate precipitated from the air must be removed frost-free via a plastic condensate pipe with a minimum diameter of 40 mm. If surfaces are water permeable, it is sufficient for the condensate drain pipe to be routed vertically into the ground to a depth of at least 90 cm.

1. Install the condensate pipe nozzle ① included with the device on the condensate drain ② at the bottom of the unit.



2. Connect the condensate pipe to the condensate pipe nozzle.



The condensate pipe must not be inserted into the ground on its own, it must first be inserted into a second pipe that is suitable for installation in the ground (such as a waste water pipe).
It must be possible to compensate the length. The pipe on the unit must not press against the ground, it must be possible to slide it.

Sufficient drainage of the condensate into the ground must be ensured!

→ “Hybrox 21”, page 43

Into the building

A wall duct into the building and the condensate pipe must be provided on site.

→ “Internal condensate line connection“, page 43

6.2 Connection to the heating circuit

IMPORTANT
Avoid open heating systems and / or heating systems that are not oxygen diffusion-tight.
If this is not possible, a system separation must be installed.

Depending on the dimensioning of the heat exchanger and the additionally required circulation pump, the system separation worsens the energy efficiency of the system.

IMPORTANT
Dirt and deposits in the (existing) hydraulic system can cause damage to the heat pump.

► Ensure that a air / magnetic sludge separator is installed in the heating circuit.

► Rinse the hydraulic system thoroughly prior to establishing the hydraulic connection of the heat pump.

IMPORTANT
Damage to the copper pipes due to impermissible load!

► Secure all connections against twisting.

✓ Cross-sections and lengths of the pipes for the heating circuit (including the ground lead between the heat pump and the building) are adequately dimensioned.

✓ The residual head of the circulation pumps in the heating circuit at least results in the throughput required for the unit type (→ “Technical data / scope of supply”, page 24).

✓ The hydraulic system must be equipped with a buffer tank, the required volume of which depends on your unit type.

→ “Technical data / scope of supply”, page 24

✓ The lines for the heating are fastened to the wall or ceiling via a fixed point.

► Make sure that the working overpressure (→ “Technical data / scope of supply”, page 24) is complied with.

Connection from behind (variant 1)

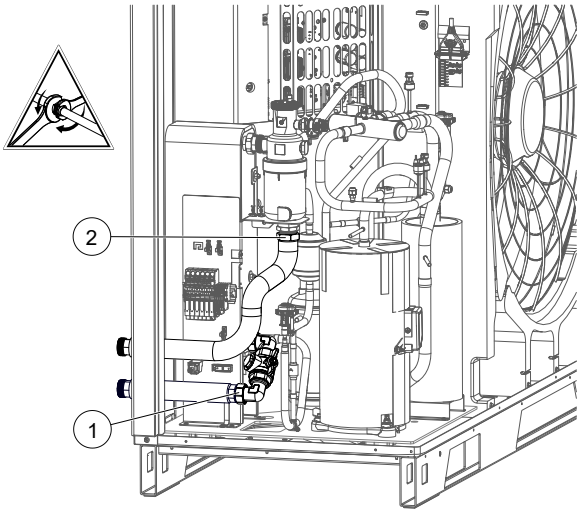
→ Operating manual installation package IPWHF

1. Route the fixed piping of the heating circuit outdoors below the frost line or with appropriate insulation and UV protection.
2. Insert the vent at the highest point of the heating circuit.
3. Close the recess in the base of the unit using the enclosed cover plate.
4. Break out the pre-punched openings (4x) in the rear wall of the heat pump with some pressure.
5. Use the grommets and cable glands supplied with the IPWHF
6. With this connection variant, ‘7 Electrical installation’, page 15, can be brought forward at this point.
7. Connect the unit to the fixed piping of the heating circuit via vibration decouplings/ corrugated pipes (accessory IPWHF). You must install them to prevent the transfer of structurally borne sound to the fixed piping.

NOTE
If an existing system is being replaced, the old vibration decoupling may not be reused.

7.1. Route vibration decouplings/corrugated pipes through the installed grommets in the rear wall of the heat pump.

7.2. Screw the vibration decouplings/ corrugated pipes onto the hydraulic connection line. Connect the heating water inlet (return) ① first, then the heating water outlet (flow) ②.

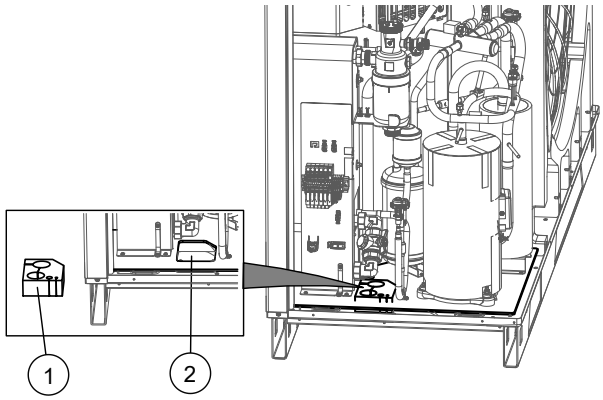


8. If no further connection work is carried out afterwards, mount the side facade and cover of the unit.

Connection from below (variant 2)

→ Operating manual installation package IPWVF

1. Route the fixed piping of the heating circuit outdoors below the frost line.
2. Insert the vent at the highest point of the heating circuit.
3. Attach the enclosed sealing plate ① into the recess ② in the floor of the unit.

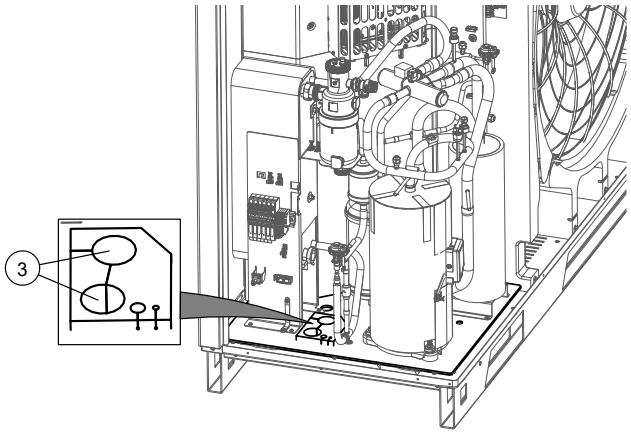


4. Connect the unit to the fixed piping of the heating circuit via vibration decouplings/ corrugated pipes (accessory IPWVF). You must install them to prevent the transfer of structurally borne sound to the fixed piping.

NOTE
If an existing system is being replaced, the old vibration decoupling may not be reused.

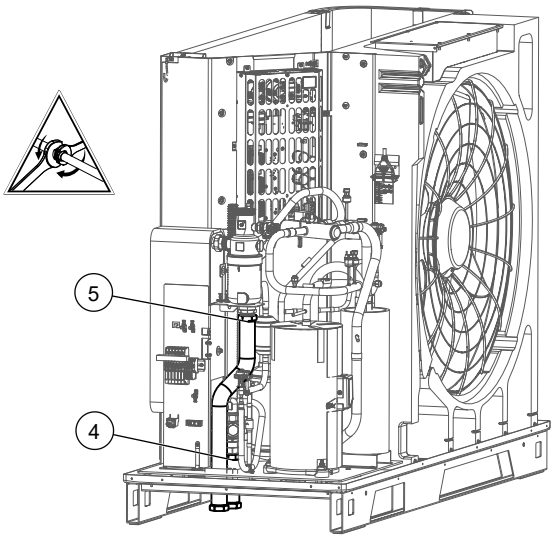
4.1. Replace shut-off device with dirt trap (angled) with shut-off device with dirt trap (straight) from the IPWVF accessories.

4.2. Route the vibration decouplings/ corrugated pipes through the feed-through ③ in the sealing plate.



4.3. Screw the vibration decouplings/ corrugated pipes onto the two pipes of the hydraulic connection line.

Connect the heating water inlet (return) ④ first, then the heating water outlet (flow) ⑤.



5. If no further connection work is carried out afterwards, mount the side facade and cover of the unit.

6.3 Pressure safety

Equip the heating circuit with a safety valve and diaphragm expansion vessel in accordance with local standards and guidelines.
Also install filling and draining devices, shut-off devices and non-return valves in the heating circuit.

7 Electrical installation

7.1 Establishing the electrical connections

IMPORTANT
Irreparable damage to the compressor due to wrong rotating field (only applies to unit with 400 V compressor).

► Ensure a clockwise rotating field for the compressor's load supply.

Basic information relating to the electrical connection

- Any specifications by the local energy supply company apply to electrical connections
- Equip the power supply for the heat pump with an all-pole miniature circuit-breaker with at least 3 mm contact spacing (IEC 60947-2)
- Note the tripping current level (→ "Technical data / scope of supply", page 24)
- Comply with the electromagnetic compatibility regulations (EMC regulations)
- Comply with current EMC requirements for household appliances
- Install unshielded power supply cables and shielded cables (bus cables) sufficiently far apart (> 100 mm)

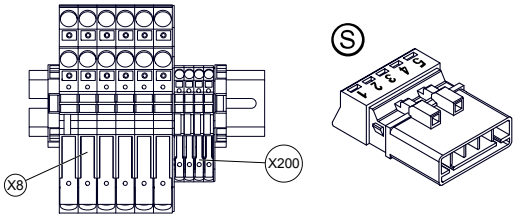
The electrical connection of the heat pump with the wall-mounted controller is established using the EVSK accessory.

- Plug for bus cable in EVSK accessory
- Bus cable on site, maximum cable length of 30 m.

  The bus cable must be a shielded cable of at least 4 x 0.5 mm².
- Load cable on site

  A 5 x 4.0 mm² cable with protective conductor, Diameter of the sheath of the electric cable 9–13 mm²

► On the side of the heat pump, connect the load and bus cable directly to the X8 and X200 terminals provided. On the side of the wall-mounted controller, connect the load cable directly to the sub-distribution board and the bus cable using the plug X200 Ⓢ.



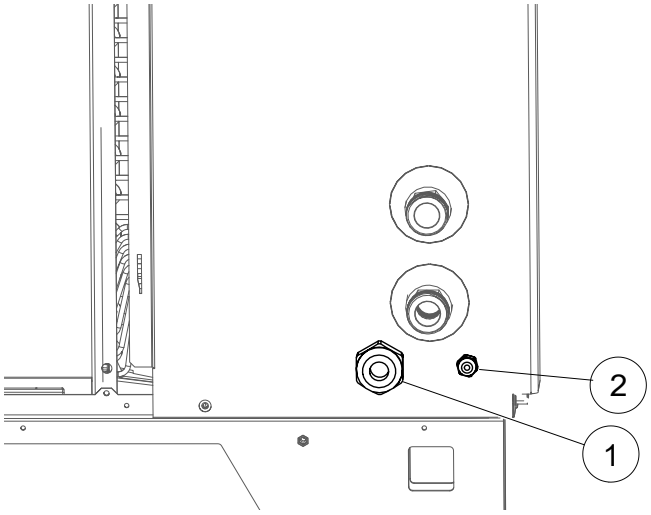
Mounting EVSK (accessory)

1. If the unit is closed, open the unit.

→ "5.5 Opening and closing the unit", page 11

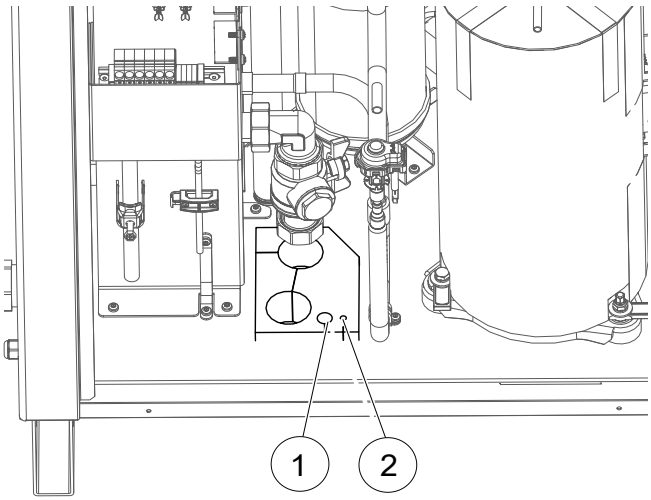
2. Routing of the load and bus cables

2.1. Variant 1:



► Route the load ① and bus ② cables into the device from the rear through the cable glands in the rear panel of the housing.

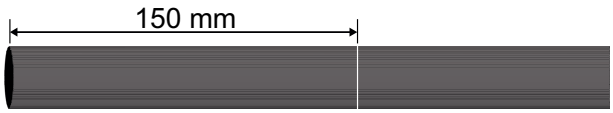
2.2. Variant 2:



► Route the load ① and bus ② cables into the unit from below through the cable feed-throughs in the sealing plate.

3. Connect the load cable to the terminals X8

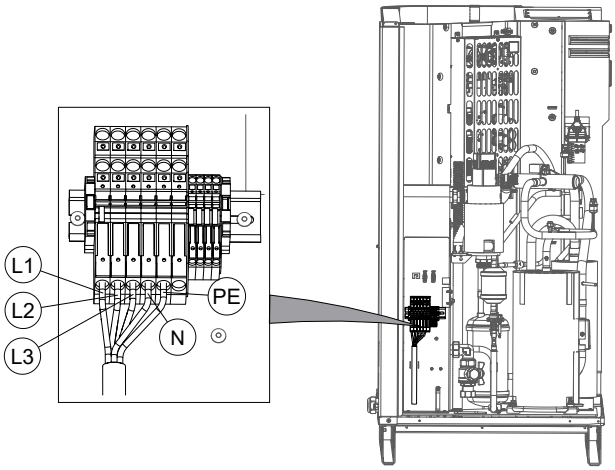
3.1. Strip the load cable 150 mm.



3.2. Shorten the live wires so that the PE conductor has a lead of 8 mm.

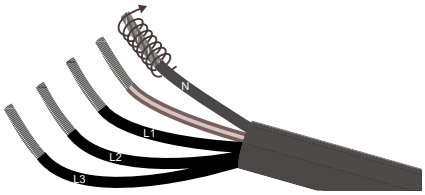
3.3. Strip each wire 18 mm.

3.4. Insert the stripped wires N, PE, L1, L2 and L3 into the corresponding connection terminal.

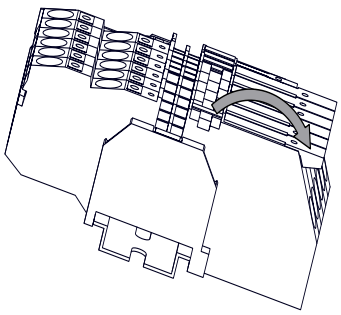


► If the load cable has single wires, insert each of them as far as they will go:

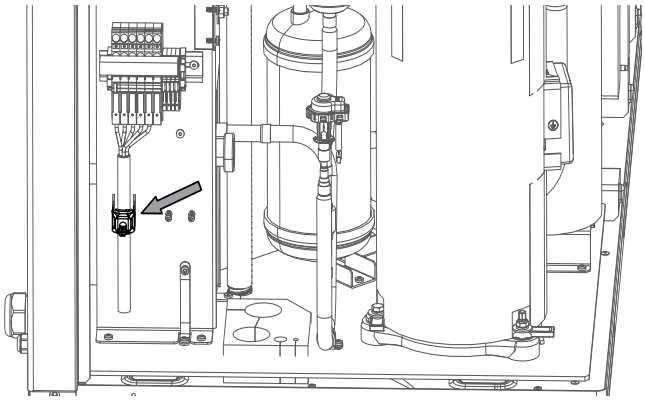
► If the load cable has fine wire strands, twist the strands of each wire.



3.5. Close the levers of the terminal block.



3.6. Attach strain relief.

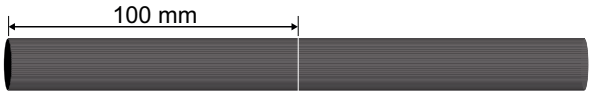


NOTE
The second PE terminal can be connected as additional external potential equalization if required.

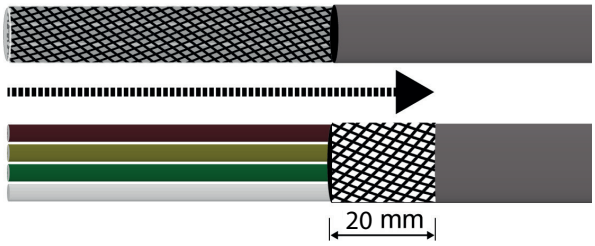
IMPORTANT
Check each inserted wire for tight fitting in its plug pin.

4. Connect bus cable (communication) to the terminal block X200.

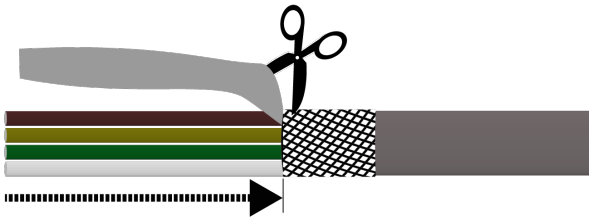
4.1. Strip the bus cable 100 mm.



4.2. Push the shielding braid back 20 mm over the sheath.

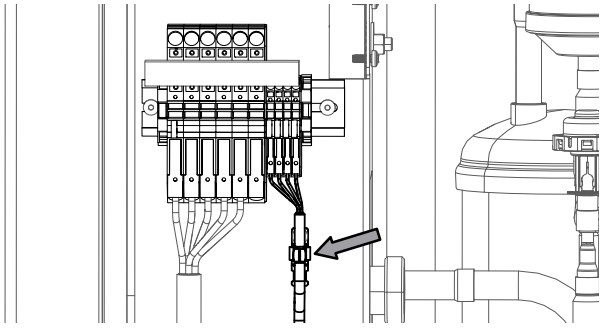


4.3. Pull back the shielding foil up to the shielding braid and cut off.

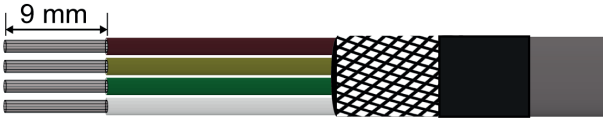


4.4. Fix the pushed back shielding braid at the end with insulating tape or shrink tubing.

4.5. Clamp shielding braid into the shield clamp.

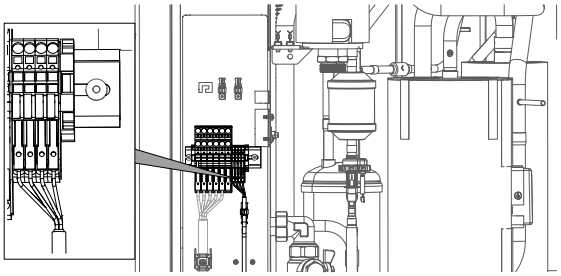


4.6. Strip each core by 9 mm.



4.7. Twist the strands of each wire.

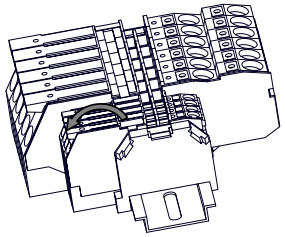
4.8. Insert the stripped wires into the terminal block.



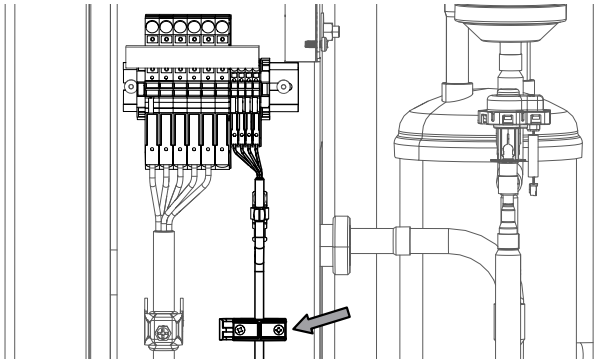
Assignments of the pins

white wire of the bus cable	connection 1	Mod A
green wire of the bus cable	connection 2	Mod B
yellow wire of the bus cable	connection 3	+12 V
brown wire of the bus cable	connection 4	GND

4.9. Close the levers of the terminal block.

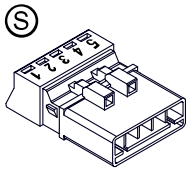


4.10. Attach strain relief.

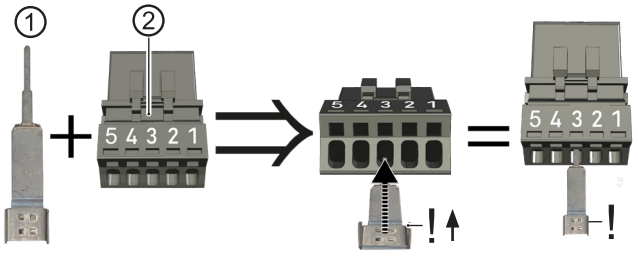


IMPORTANT
Check each inserted wire for tight fitting in its plug pin.

5. Guide the load and bus cable in cable conduits from the heat pump up to the building feed-through, and from there to the wall-mounted controller inside the building.
6. Connect the other end of the bus cable (communication) to the bus cable plug.

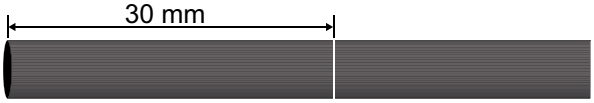


6.1. Insert the contact spring ① into pin 3 ② up to the limit stop.
The lugs on the broad end of the contact spring must point upwards (in the direction of the numbers on the socket).

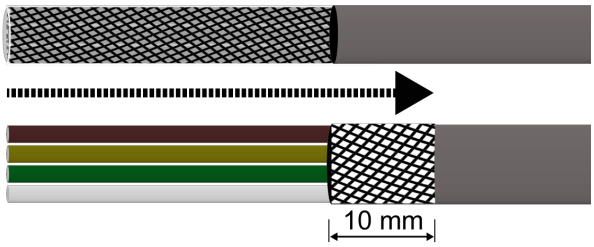


NOTE
If the contact spring is in the way when subsequently inserting the wires of the bus cable, it can be disconnected and re-connected after inserting the wires.

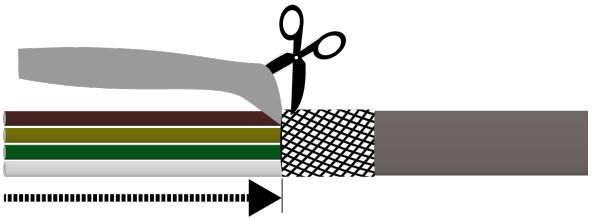
6.2. Strip the bus cable 30 mm.



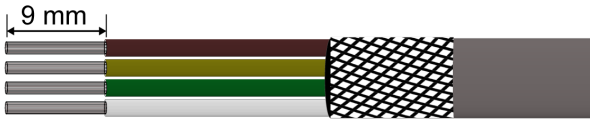
6.3. Push the shielding braid back 10 mm over the sheath.



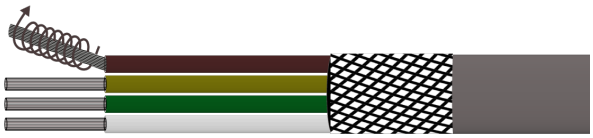
6.4. Pull back the shielding foil up to the shielding braid and cut off.



6.5. Strip each core by 9 mm.

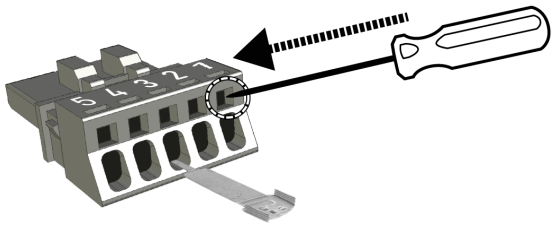


6.6. Twist the strands of each wire.

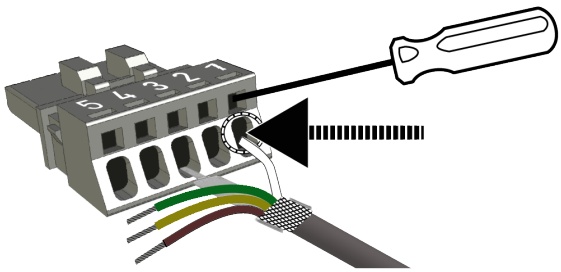


6.7. Insert the stripped wires into the pins.

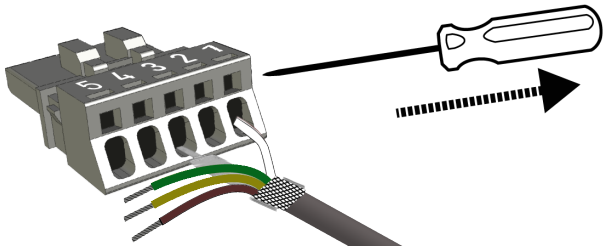
6.7.1. Insert an operating tool or screwdriver (blade 2.5 x 0.4 mm) in the connection lock on pin 1 to unlock connection lock.



6.7.2. Place the cable with shielding braid onto the contact spring from above and insert the white wire into pin 1 up to the limit stop.



6.7.3. Pull the operating tool or screwdriver out of the connection lock pin to lock the connection.



6.7.4. Insert the three other wires in the same way into the corresponding pins.

Assignments of the pins

white wire of the bus cable	pin 1	Mod A
green wire of the bus cable	pin 2	Mod B
Shielding braid on contact spring	pin 3	Shield
yellow wire of the bus cable	pin 4	+12 V
brown wire of the bus cable	pin 5	GND

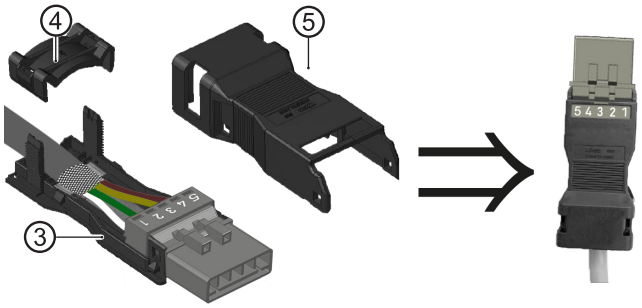
IMPORTANT
The wire assignment of the bus cable plug must match the wire assignment of the terminal block X200.

IMPORTANT
Check each inserted wire for tight fitting in its plug pin.

6.8. Place the shielding braid on the contact spring and, if necessary, shorten it so that it does not go beyond the contact spring.

7. Assemble the strain relief housing.

7.1. Snap the wired socket into the lower part ③ of the strain relief housing.



7.2. Fit the strain relief ④ and clip into place until the bus cable is clamped firmly.

IMPORTANT
The shielding braid must have a direct and firm contact with the contact spring.

7.3. Snap the upper part of the housing ⑤ fully onto the lower part.

8. Mount the side facade and the cover of the unit.

9. Insert the bus cable plug up to the limit stop into the corresponding sockets on the underside of the electrical switch box of the wall-mounted controller. The load cable must be connected directly to the sub distribution board.

→ Operating manual of the wall-mounted controller

8 Flushing, filling and venting

8.1 Heating water quality

NOTE
For detailed information refer, among other things, to the VDI Guidelines 2035 “Vermeidung von Schäden in Warmwasserheizanlagen” (preventing damage in hot water heating systems).

1. Ensure that the ph-value of the heating water is between 8.2 – 10, for aluminium materials between 8.2 – 9.
   Ideally, the pH value should already be in the required range after filling. After 6 weeks at the latest, it must have adjusted to the required range.
2. Ensure that the electrical conductivity is < 100 µS/cm.

NOTE
If the required water quality is not achieved, consult a company specialising in the treatment of heating water.

3. Fill the system with deionised heating water (VE water) or with water corresponding to the VDI 2035 norm only (low-salt operation of the system).
   Advantages of low-salt operation:
   - Low corrosion-promoting properties
   - No formation of mineral scale
   - Ideal for closed heating circuits
4. Keep a system log for hot water heating systems in which relevant planning data and the water quality are entered (VDI 2035).

Antifreeze in the heating circuit

It is not permitted to fill an antifreeze or a water/antifreeze mixture into the heating circuit.
The heat pumps have safety devices that prevent the water from freezing, even when the heating is switched off. A prerequisite is that the heat pump remains switched on and is not disconnected from the mains. Should there be a risk of frost, the circulation pumps are activated.

8.2 Flushing, filling and venting the heating circuit

✓ The outlet pipe of the safety valve is connected.

► Ensure that the response pressure of the safety valve is not exceeded.

IMPORTANT
Flush the heating circuit only in its flow direction.

NOTE
The venting programme on the controller can also be used to support the flushing and venting process. It is possible to control individual circulation pumps and even the changeover valve via the venting programme. As a result it is not necessary to remove the valve motor.

1. Vent the system at the highest point.
2. Vent the heat pump at the hydraulic connection set.

9 Insulation of hydraulic connections

Insulate hydraulic lines in accordance with the local regulations.

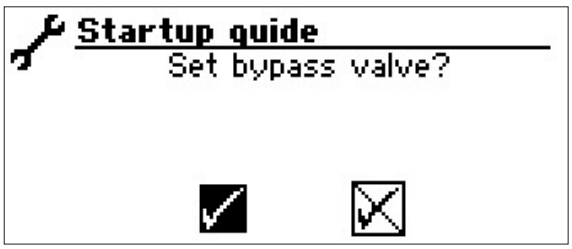
1. Open shut-off devices.
2. Perform a pressure test and check for leaks.
3. Insulate external piping on site.
4. Insulate all connections, fittings and pipes.
5. Insulate the condensate drain in a frost-proof manner.
6. The unit must be completely closed on all sides to ensure rodent protection.

10 Overflow valve

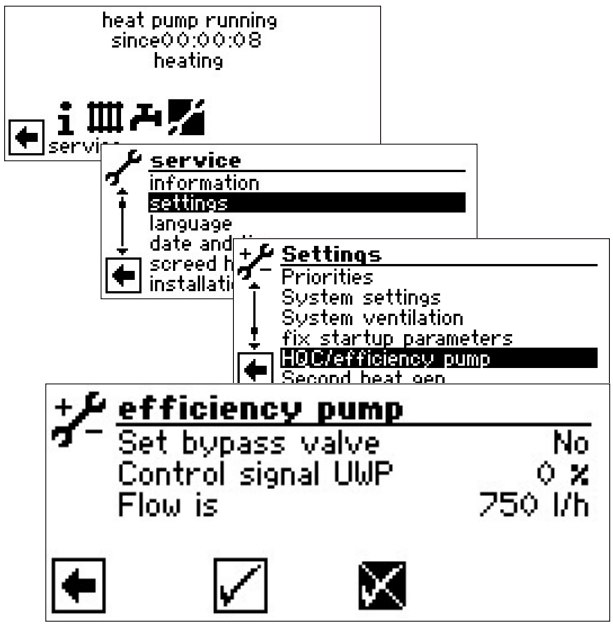
NOTE
- The activities in this section are only necessary for the integration of storage tanks in series
- Complete the work steps quickly, otherwise the maximum return temperature may be exceeded and the heat pump switches to high-pressure fault
- Turn the adjusting knob at the overflow valve to the right to increase the temperature difference (the temperature drop), turn it to the left to reduce it

✓ System is running in heating mode (ideally in cold condition).

The IBN assistant already provides the option, in the event of the integration of the storage tank in series to adjust the overflow valve according to to the hydraulic system.



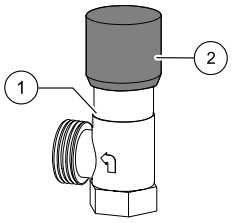
Confirm the IBN assistant or:



The “Set bypass valve” menu item is set by default to “No”. The overflow valve adjustment function is deactivated.

- The UWP control signal is the indication of the currently required pump capacity in %
- If the flow rate is the current flow rate (measuring accuracy +/- 200 l/h)

1. Fully open the overflow valve (①) with the rotary button (②), close the heating circuits.



2. If the “Set bypass valve” menu item is set from “No” to “Yes”, the circulation pump is activated with 100% – and the pump starts up.
3. If the control signal UWP reaches 100%, close the overflow valve to the extent that the maximum flow rate (→ “Technical data / scope of supply”, page 24) can be ensured.
4. If you exit the “Set bypass valve” menu or at the latest after one hour, the circulation pump switches back to standard regulation
5. Open valves to heating circuit.

11 Commissioning

CAUTION
Prior to commissioning the unit, the facing panels must be closed and the fan protection grille must be mounted.

- ✓ The relevant planning and design data of the system is documented in full
- ✓ The relevant energy supply company has been notified of the operation of the heat pump system
- ✓ The system is air-free
- ✓ Installation check using the rough checklist has been completed successfully
- ✓ Clockwise rotating field is present for the load supply at the compressor (only applies to unit with 400 V compressor)
- ✓ The system is installed and mounted according to this operation manual
- ✓ The electrical installation has been carried out properly according to this operation manual and the local regulations
- ✓ The power supply for the heat pump is equipped with an all-pole circuit-breaker with at least 3 mm contact spacing (IEC 60947-2)
- ✓ The tripping current is complied with
- ✓ The heating circuit has been flushed and vented
- ✓ All shut-off devices of the heating circuit are open
- ✓ The pipe systems and components of the system are tight

1. Carefully fill in and sign the notice of completion for the heat pump systems.
2. In Germany: Send the notice of completion for heat pump systems and rough checklist to the manufacturer’s factory customer service department.
   In other countries: Send the notice of completion for heat pump systems and rough checklist to the manufacturer’s local partner.
3. Arrange for the heat pump system to be commissioned by the manufacturer’s authorised after sales service for a fee.

→ “12.2 Maintenance after commissioning“, page 22

12 Maintenance

NOTE
We recommend that you conclude a maintenance agreement with your specialist heating company.

NOTE
Water accumulations resulting from extreme weather conditions, or from condensation in, on and under the unit which do not flow away via the condensate discharge are normal and do not constitute a heat-pump malfunction or defect.

12.1 Basic principles

The cooling circuit of the heat pump does not require any regular maintenance.

Local regulations require, among other things, leak checks beforehand and/or for a logbook to be kept for certain heat pumps.

► Ensure compliance with local regulations with regard to the specific heat pump system.

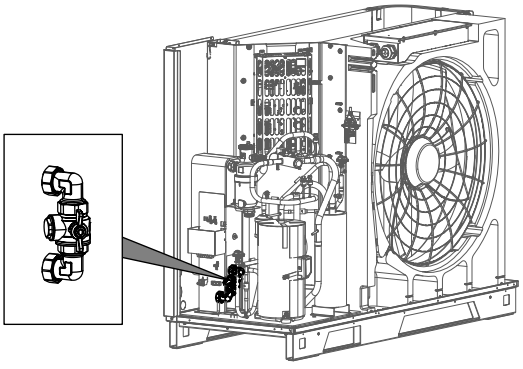
12.2 Maintenance after commissioning

Check all installed dirt traps for dirt at the latest one week after commissioning and clean them if necessary.

► Switch off the system while the check and cleaning is being carried out.

Next checking and cleaning at the latest 2 weeks after commissioning.

Cleaning the shut-off device with dirt trap



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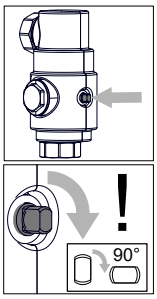

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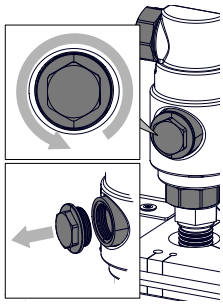

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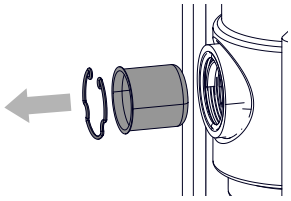

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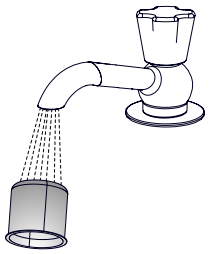

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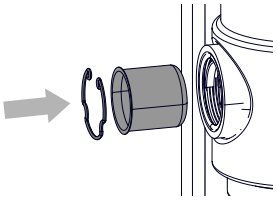

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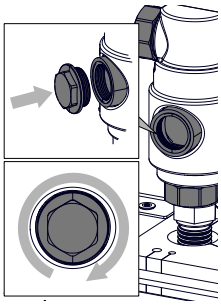

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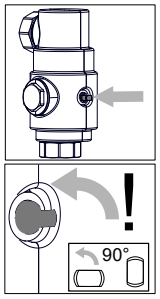


12.3 Maintenance as required

► Check and clean the components of the heating circuit, e.g. valves, diaphragm expansion vessels, circulation pumps, filters, dirt traps.

► Always regularly control for unimpeded air infeed accordingly. Constrictions or even blockages which, for example occur

- when applying house insulation with polystyrene balls
- through packaging material (foils, films, cartons etc.)
- through foliage, snow, icing or similar weather-related deposits
- through vegetation (bushes, tall grass etc.)
- through air shaft covers (fly protection screens etc.)

and which must be prevented and/or removed immediately.

► Check at regular intervals that the condensate can drain out of the unit freely, without obstruction. To this end, check the condensate pan in the unit regularly for dirt/clogging and clean as necessary. Also check the evaporator from all sides and clean if necessary.

NOTE
Icing on air infeed and outfeed openings is weather-related and normal. Do not remove icing thermally.

►Wear protective gloves and carefully remove the icing with your hands.

12.4 Cleaning and flushing the condenser

1. Clean and flush the condenser according to the manufacturer's instructions.
2. After flushing the condenser with chemical cleaning agent: neutralise any residues and flush the condenser thoroughly with water.

12.5 Annual maintenance

► Determine the quality of the heating water by analysis. In the event of deviations from the specifications, take suitable measures without delay.

► Check all installed dirt traps for dirt and clean them if necessary.

► Test the function of the safety valve for the heating circuit.

13 Malfunctions

1. Read out the cause of the malfunction via the diagnostic programme of the heating and heat pump controller.

NOTE
In the event of a high pressure or flow fault, check the dirt trap of the shut-off device and clean if necessary.

2. Consult the manufacturer's local partner or the factory's customer service. Have the fault message and unit number ready at hand.

14 Dismantling and disposal

14.1 Dismantling

✓ The disposal equipment is suitable for flammable refrigerants.

✓ The locally applicable regulations for handling flammable refrigerants are complied with.

► Keep away from sources of ignition.

► Collect all substances safely.

► Separate components according to their materials.

14.2 Disposal and recycling

► Dispose of environmentally hazardous substances (e.g. refrigerant, compressor oil) according to the local regulations.

► Ensure the correct recycling or disposal of unit components and packaging materials in accordance with the local regulations.

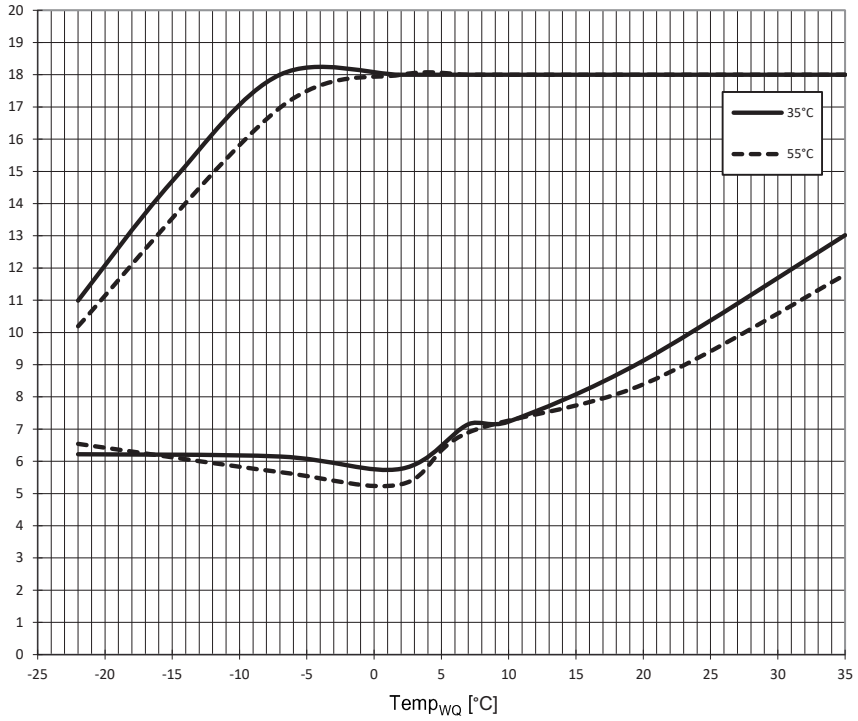
Technical data / scope of supply

Performance data				Hybrox 21
Heating capacity | COP	for A10/W35 acc. to DIN EN 14511-x	Partial load operation	kW | COP	7,23 | 5,68
	for A7/W35 acc. to DIN EN 14511-x	Partial load operation	kW | COP	7,15 | 5,31
	for A7/W55 acc. to DIN EN 14511-x	Partial load operation	kW | COP	6,90 | 2,05
	for A2/W35 acc. to DIN EN 14511-x	Partial load operation	kW | COP	5,77 | 4,32
	for A-7/W35 acc. to DIN EN 14511-x	Full load operation	kW | COP	18,00 | 2,95
	for A-7/W55 acc. to DIN EN 14511-x	Full load operation	kW | COP	16,97 | 2,17
Heating capacity	for A10/W35	min. I max.	kW | kW	7,23 | 18,00
	for A7/W35	min. I max.	kW | kW	7,15 | 18,00
	for A7/W55	min. I max.	kW | kW	6,90 | 18,00
	for A2/W35	min. I max.	kW | kW	5,77 | 18,00
	for A-7/W35	min. I max.	kW | kW	6,12 | 18,00
	for A-7/W55	min. I max.	kW | kW	5,66 | 16,97
Cooling capacity | EER	for A35/W18	Partial load operation	kW | EER	7,23 | 4,71
	for A35/W7	Partial load operation	kW | EER	5,33 | 3,46
Cooling capacity	for A35/W18	min. I max.	kW | kW	7,23 | 16,00
	for A35/W7	min. I max.	kW | kW	5,33 | 16,00
Heating capacity domestic hot water preparation			kW	18
Operating limits				
Heating circuit return min. | Heating circuit flow max. Heating		within heat source min./max.	°C	20 | 65
Heat source, heating		min. I max.	°C	-22 | 35
Additional operating points			...	A0/W78
Bivalence temperature according to DIN EN 14825		average/low | average/medium	°C	-7 | -7
Sound				
Sound power level inside		min. | Night | max.	dB(A)	– | – | –
Sound power level outside [1)]	combined	min. | Night | max.	dB(A)	51 | 58 | 65
Sound power level outside [1)]	Air inlet	min. | Night | max.	dB(A)	– | – | –
Sound power level outside [1)]	Air outlet	min. | Night | max.	dB(A)	– | – | –
Sound power level acc. to DIN EN 12102-1		inside | outside	dB(A)	– | 53
Tonality | Low-frequency			dB(A) | • yes – no	– | –
Heat source				
Air flow rate at maximum external pressing | Maximum external pressure			m³/h | Pa	9000 | –
Heating circuit				
Flow rate (pipe dimensioning) I Min. volume buffer tank in series I Min. volume separation buffer tank			l/h | l | l	3300 | 180 | 180
Residual head | Pressure loss | Flow rate			bar | bar | l/h	- | 0,28 | 3300
Max. allowable operating pressure			bar	3
Circulation pump control range		min. I max.	l/h	–
General unit data				
Data of the standards according to version			EN14511-x I DIN EN 12102-1	2022 | 2022
Total weight			kg	264,00
Weight of heat pump module | Compact module | Fan module			kg | kg | kg	–
Max. allowable operating pressure refrigerating circuit		high pressure I low pressure	MPa (g) | MPa (g)	3,15 | 3,0
Refrigerant type | Refrigerant capacity			... | kg	R290 | 2,30
Electrics				
Voltage code | all-pole fuse protection for heat pump *)**)			... | A	3~N/PE/400V/50Hz | B20
Voltage code | Control voltage fuse protection **)			... | A	3~N/PE/400V/50Hz | B10
Voltage code | Electric heating element fuse protection **)		1 phase	... | A	– | –
Voltage code | Electric heating element fuse protection **)		3 phases	... | A	– | –
HP*): effect. power consumption A7/W35 (partial load operation) DIN EN 14511-x I Electric consumption I cosφ			kW | A | ...	1,35 | 1,95 | 0,96
HP*): effective power consumption A7/W35 acc. to DIN EN 14511-x: min. I max.			kW | kW	1,35 | 3,82
HP*): max. machine current I max. power consumption within the operating limits			A | kW	15 | 11
Starting current: direct | with soft starter			A | A	– | –
Degree of protection			IP	24
Zmax			Ω	-
Residual current circuit breaker		if required	type	B
Electric heating element output		3 | 2 | 1 phase	kW | kW | kW	– | – | –
Circulation pump power consumption. heating circuit		min. I max.	W	– | –
Other unit information				
Safety valve heating circuit | Response pressure			included in scope of supply: • yes – no | bar	• | 3
Buffer tank | Volume			included in scope of supply: • yes – no | l	– | –
Heating circuit expansion vessel | Volume | Prepressure			incl. in scope of supply: • yes – no | l | bar	– | –
Overflow valve | Changeover valve, heating - domestic hot water			integrated: • yes – no	–
Heating circuit vibration decoupling			incl. in scope of supply or integrated: • yes – no	–
Controller I Heat quantity recording I Extension board			incl. in scope of supply or integrated: • yes – no	– | – | –

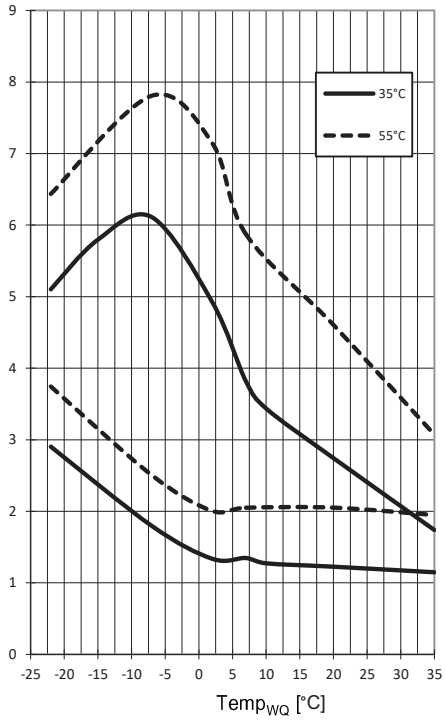
*) compressor only, **) note local regulations 1) Indoor and outdoor installation.

The performance data and the operating limits apply to clean heat exchangers I Index: p

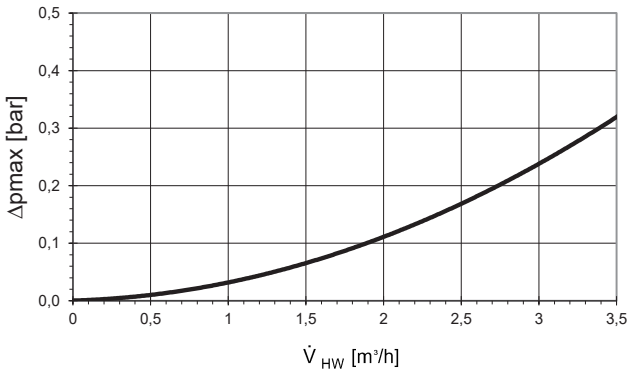
Qh min/max [kW]

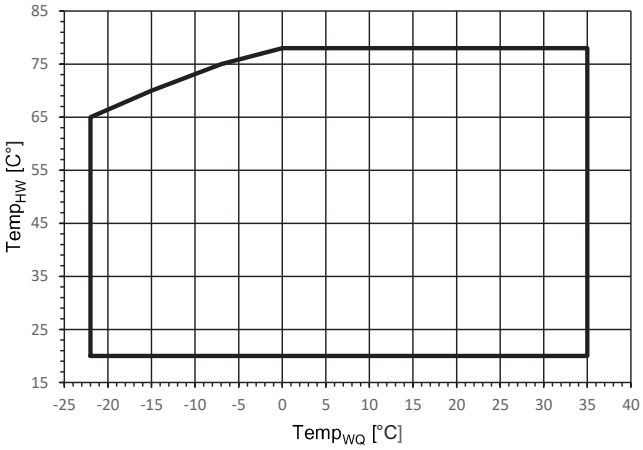


Pel min/max [kW]



Δpmax [bar]



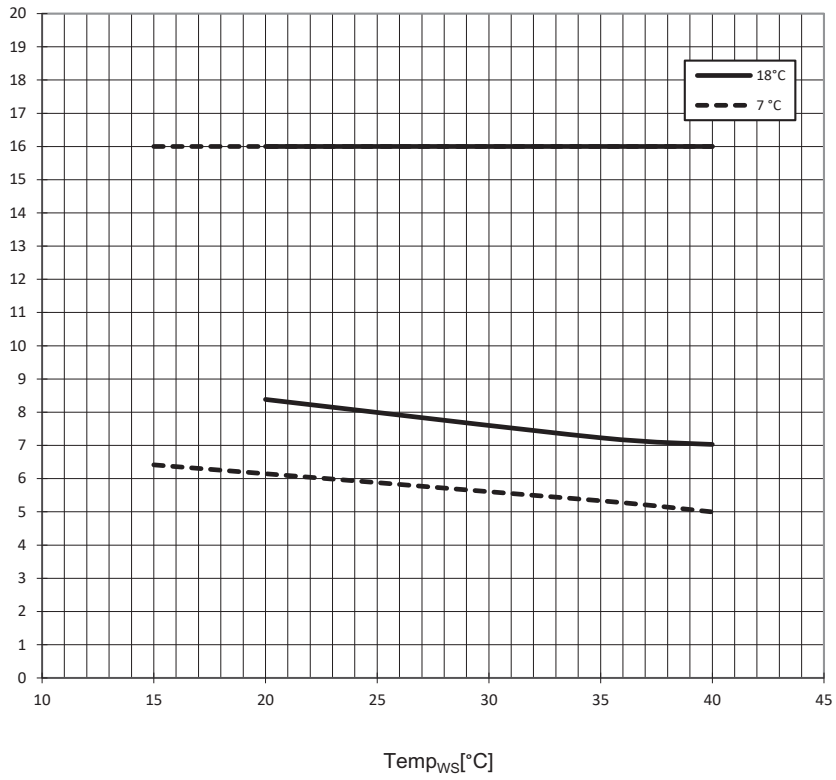


Keys:	UK823350
$\dot{V}_{HW}$	Volume flow heating water
$Temp_{HW}$	Temperature heating water
$Temp_{WQ}$	Temperature heat source
Qh min/max	minimum / maximum eating capacity
Pel min/max	minimum / maximum power consumption
Δpmax	maximum power loss

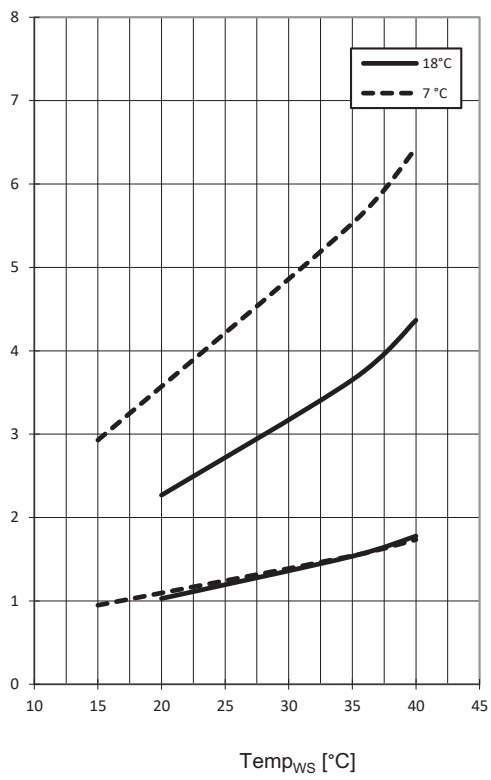
Performance curves

Hybrox 21 Cooling mode

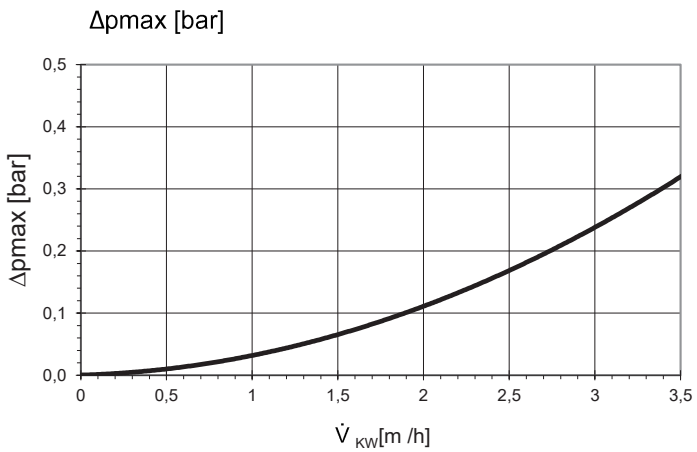
Q0 min/max [kW]

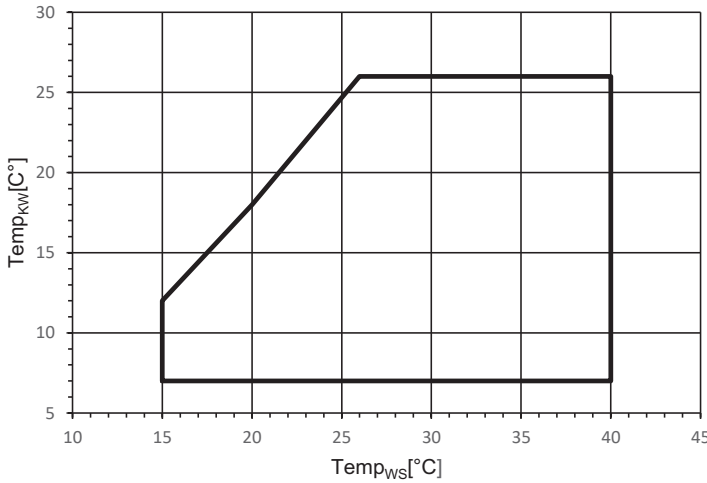


Pel min/max [kW]



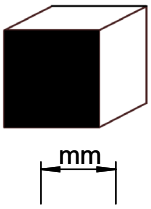
Δpmax [bar]

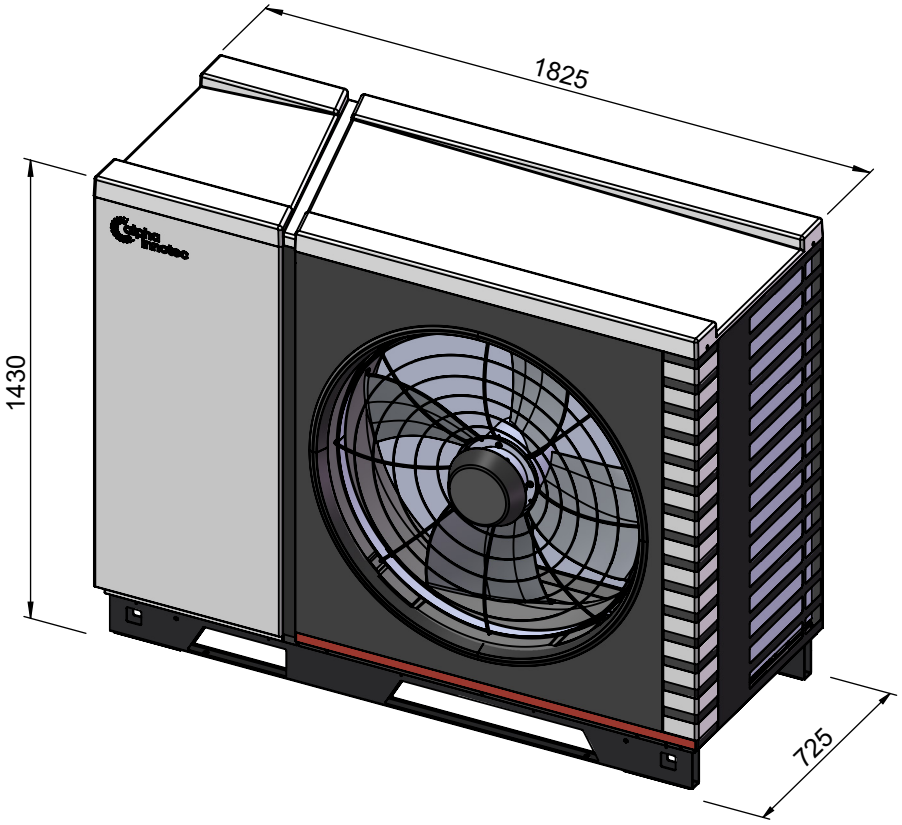


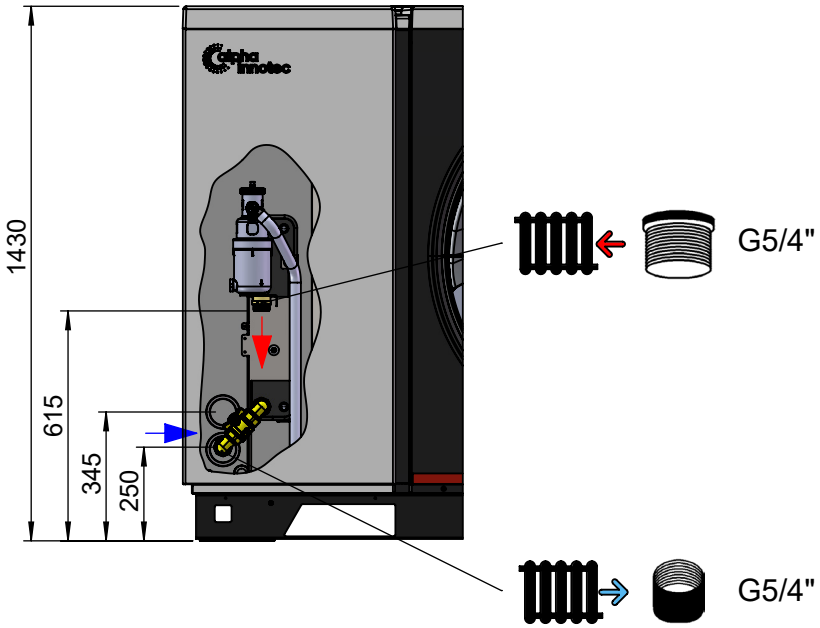


Keys:	UK823350
$\dot{V}_{KW}$	Volume flow cooling water
$Temp_{KW}$	Temperature cooling water
$Temp_{WS}$	Temperature heat sink
Q0 min/max	minimum / maximum cooling capacity
Pel min/max	minimum / maximum power consumption
Δpmax	maximum power loss

819565-1b

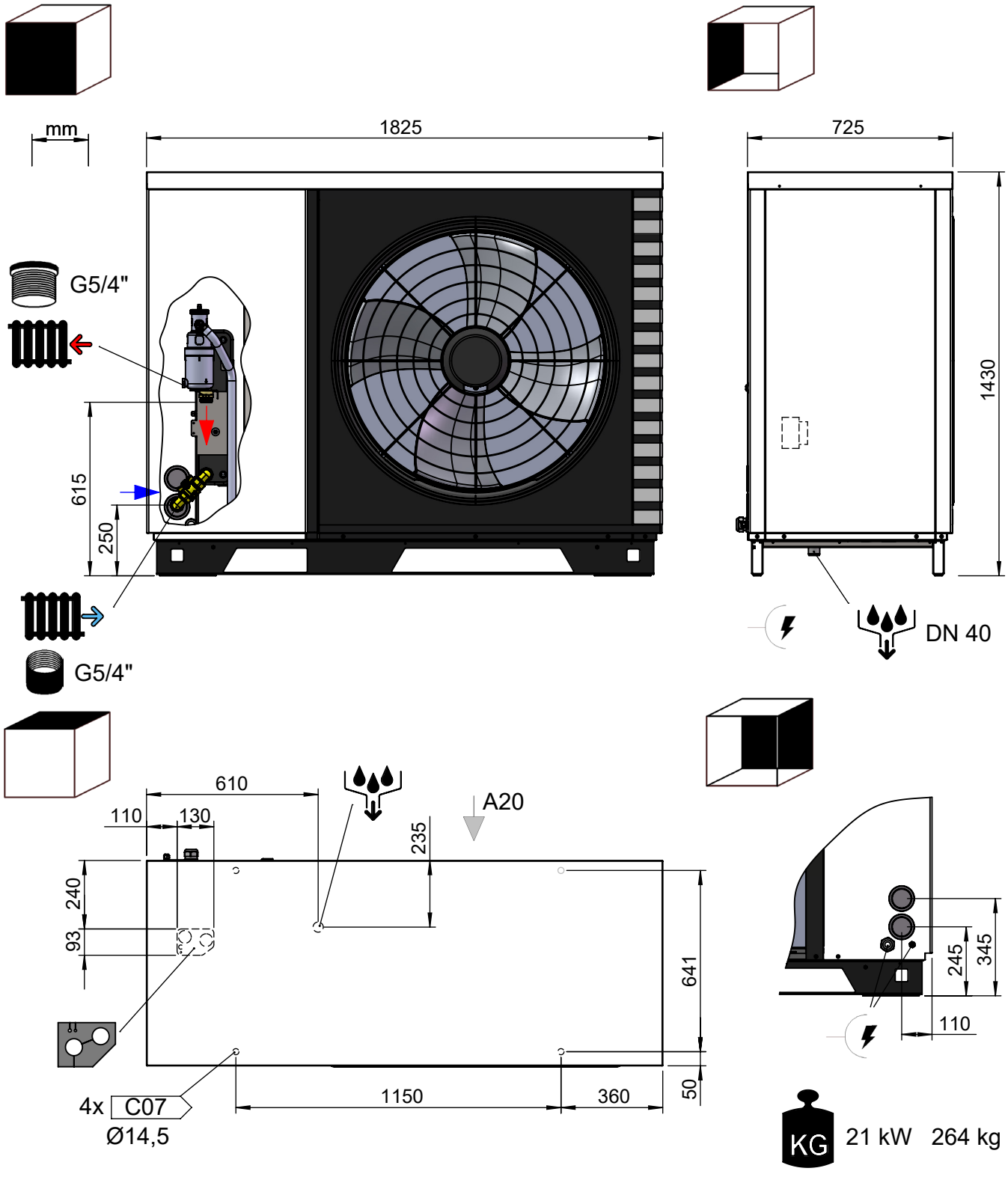




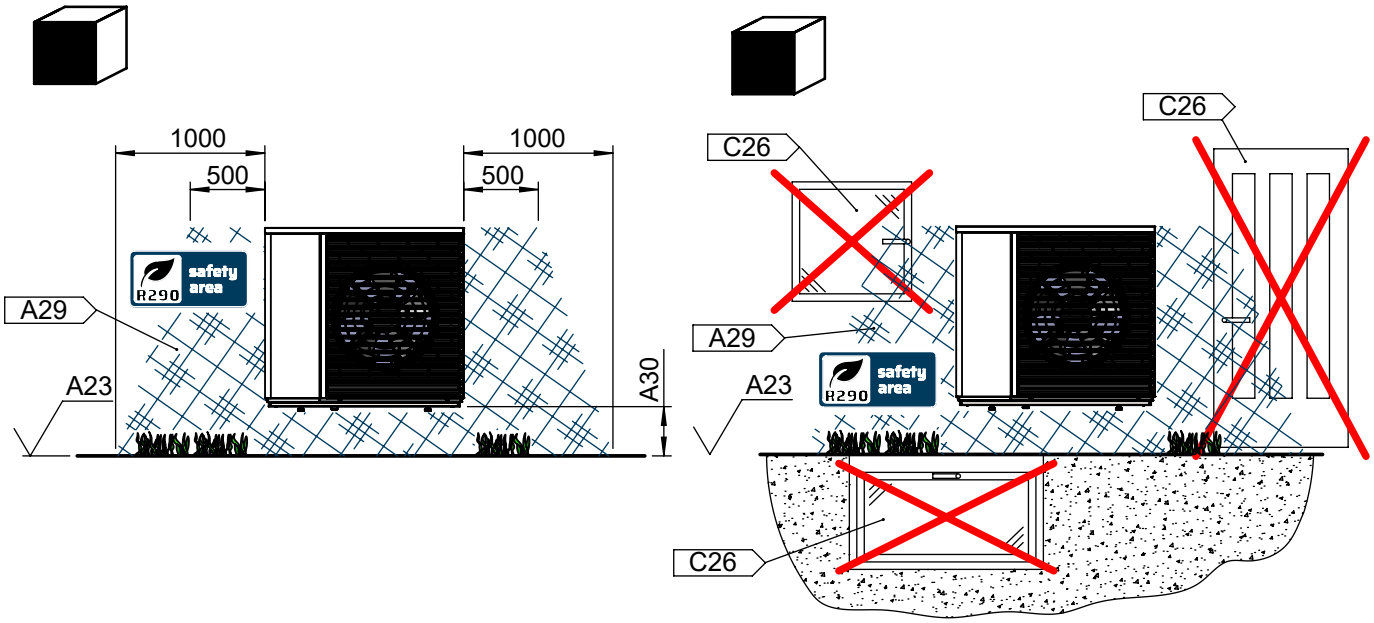


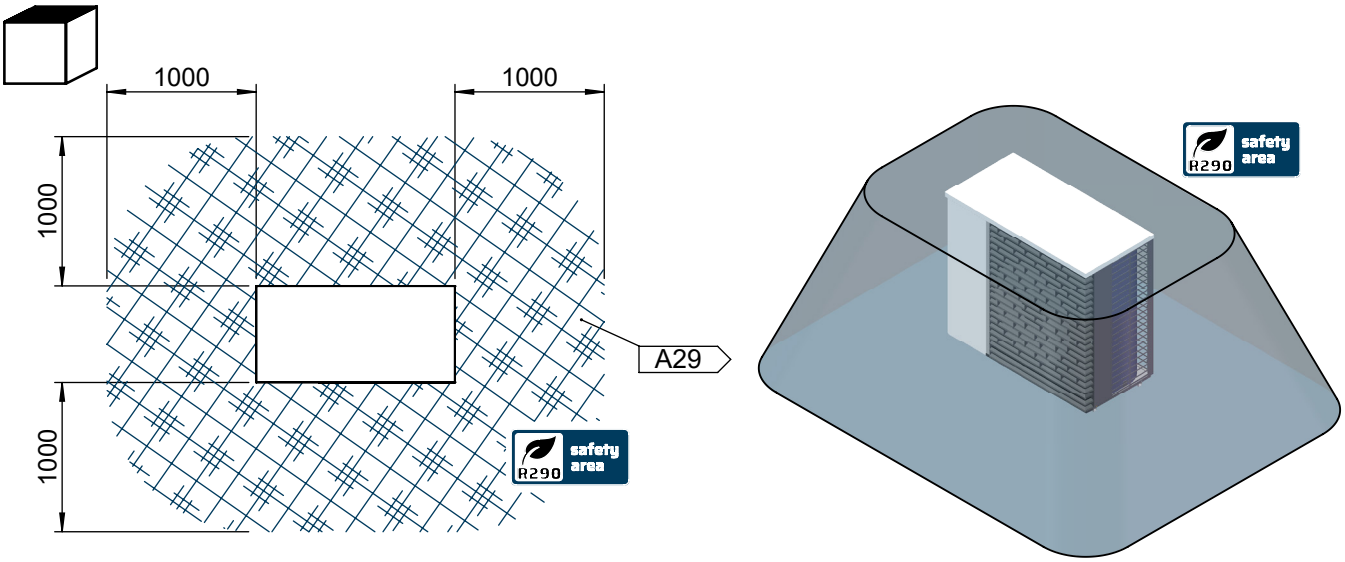
KG Hybrox 21 264 kg

819565-3b


mm
1825
725
1430
G5/4"
615
250
DN 40
G5/4"
610
110
130
A20
235
240
93
641
4x C07
Ø14,5
1150
360
50
245
345
110
KG
21 kW 264 kg

819401b





DANGER

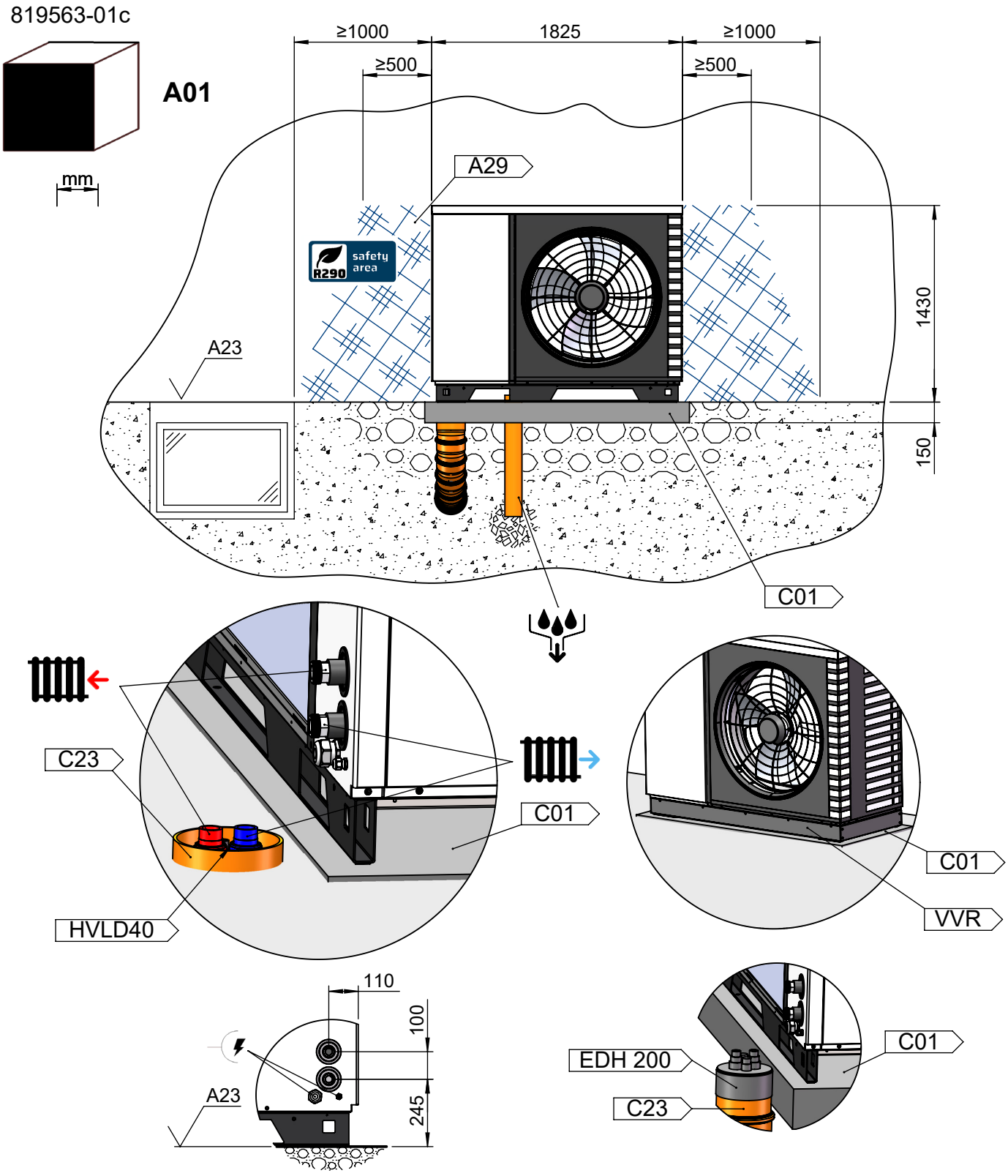
Risk of suffocation/explosion! The heat pump must only be installed outdoors! Do not install the heat pump in depressions or in places where refrigerant can accumulate in the event of a leak. Position the unit so that the refrigerant cannot enter the building or endanger people in any other way in the event of a leak.

DANGER

Risk of suffocation/explosion! There must be no ignition sources, windows, doors, ventilation openings, light wells or similar in the protection area (see illustration) between the top edge of the unit and the floor. The protection area must not extend to neighbouring properties or public traffic areas. The wall penetration through the building envelope must be gas-tight.

Installation with connection from behind with hydraulic connection line 1/4

Hybrox 21



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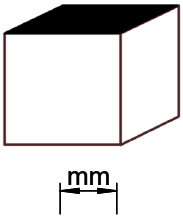
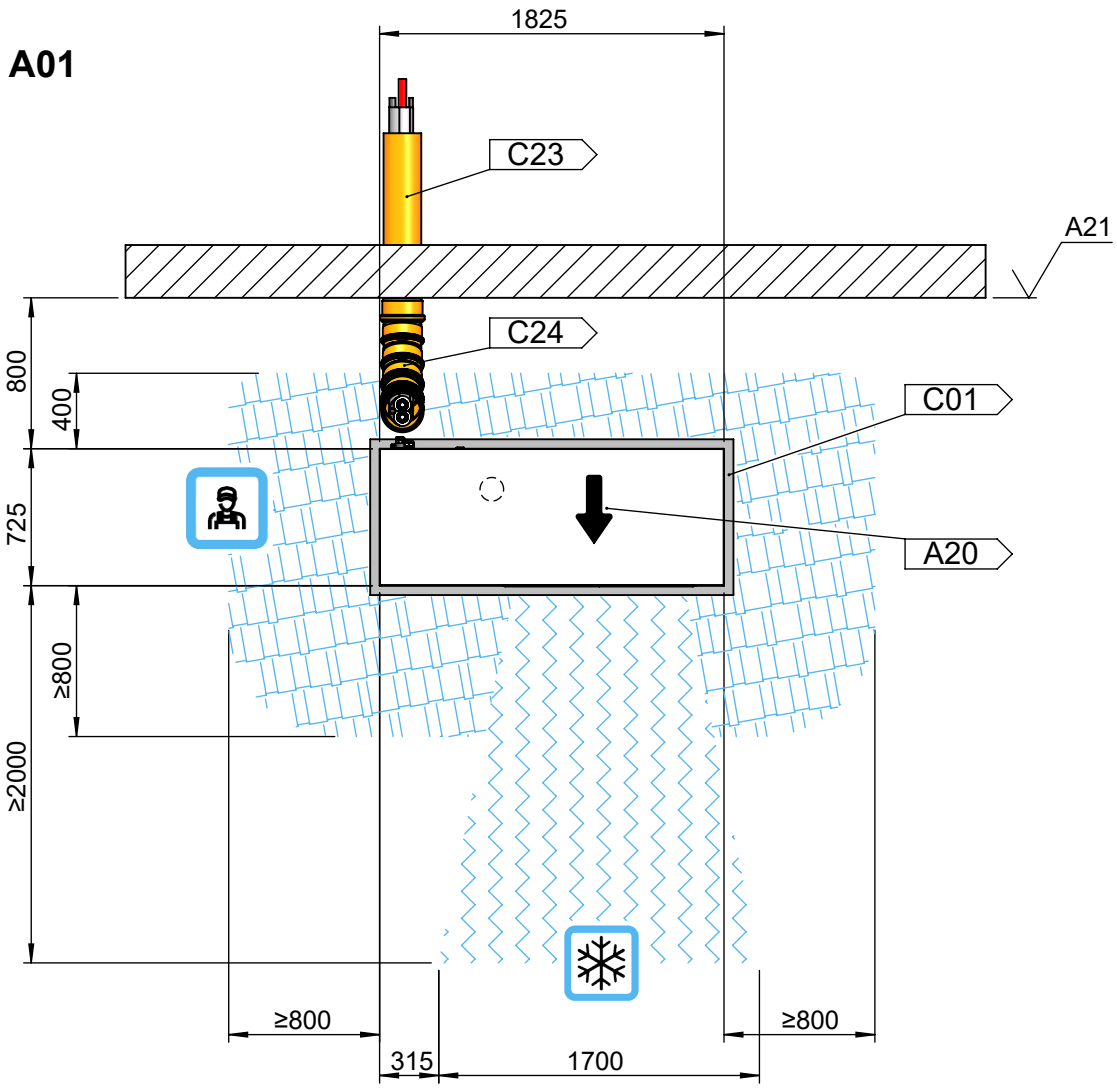


A01

mm



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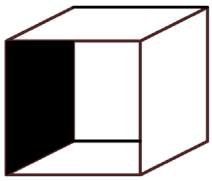

A01

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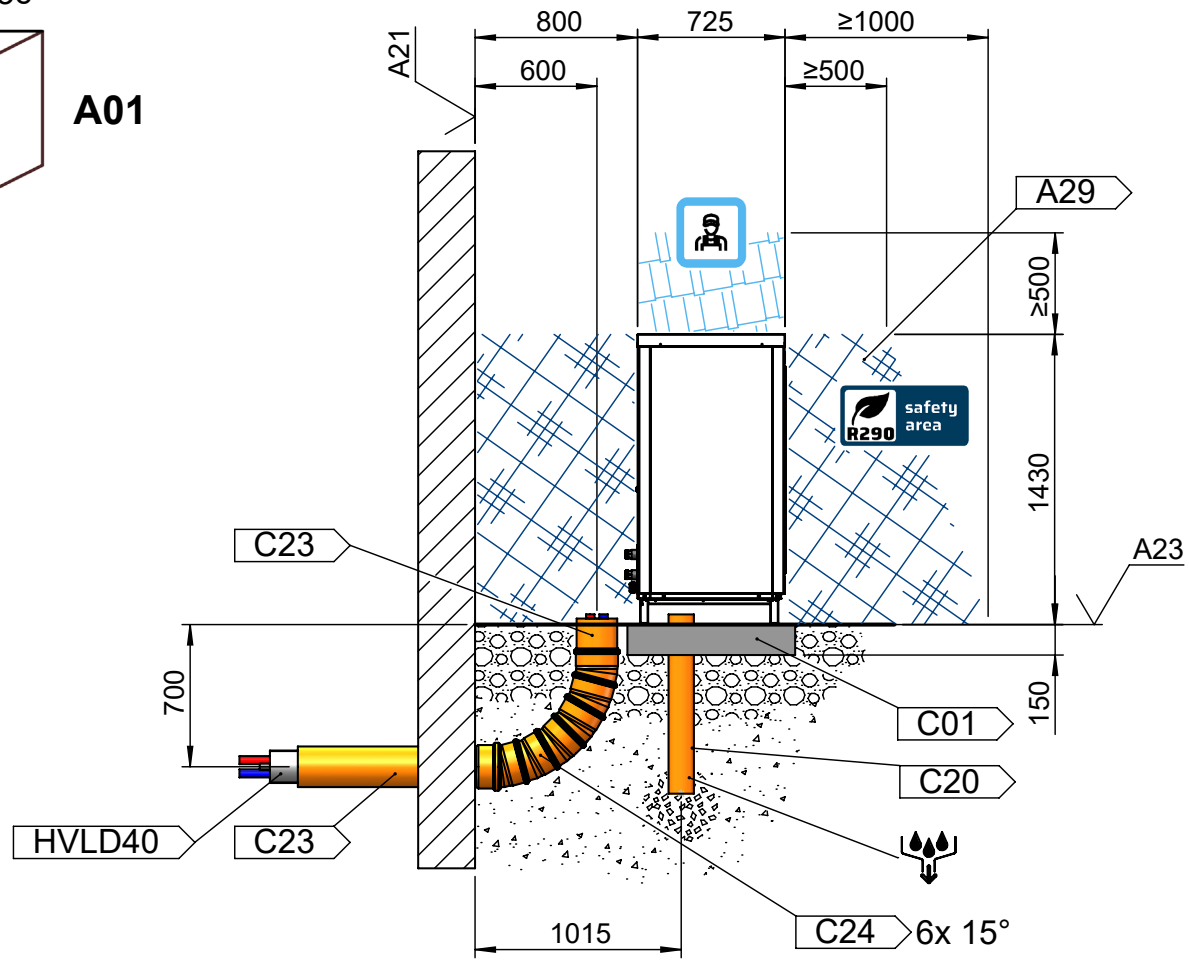

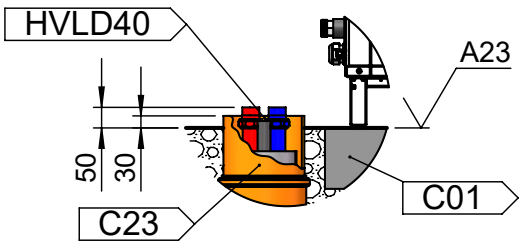

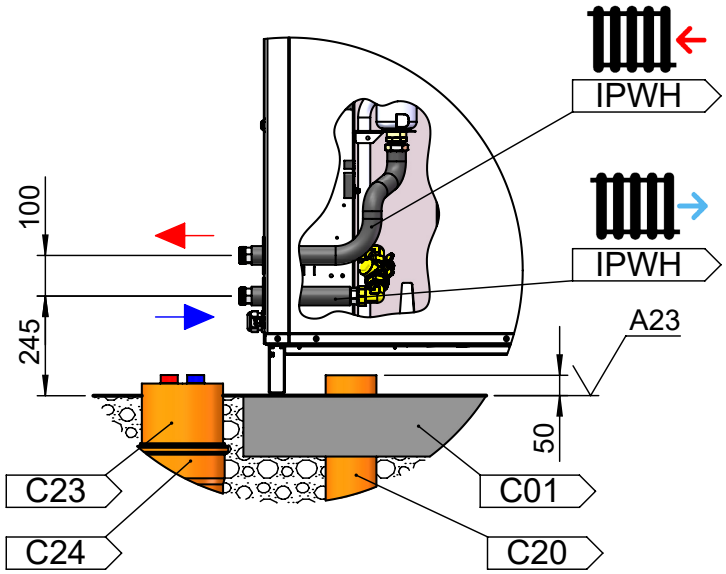

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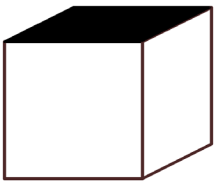

A01

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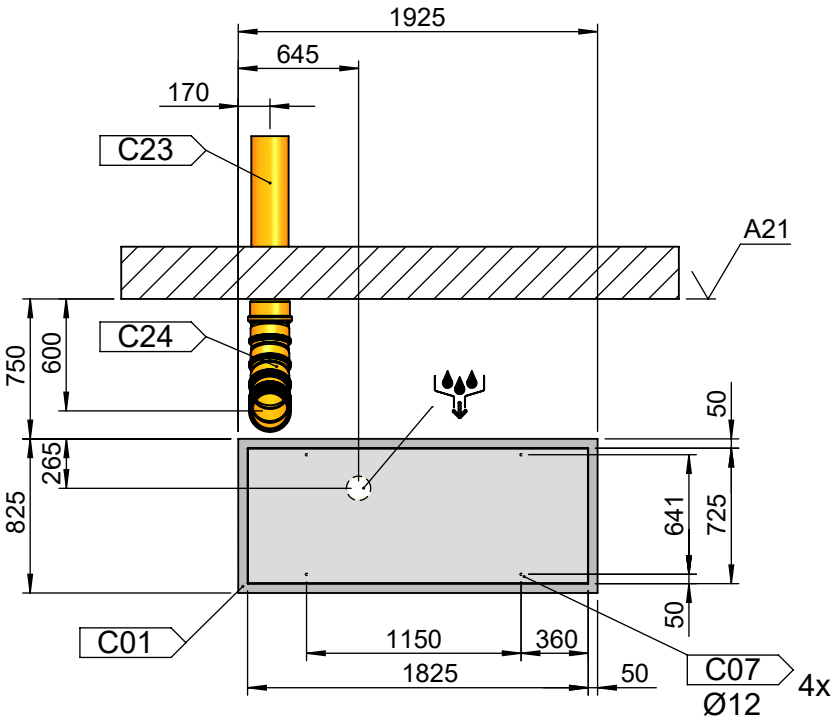
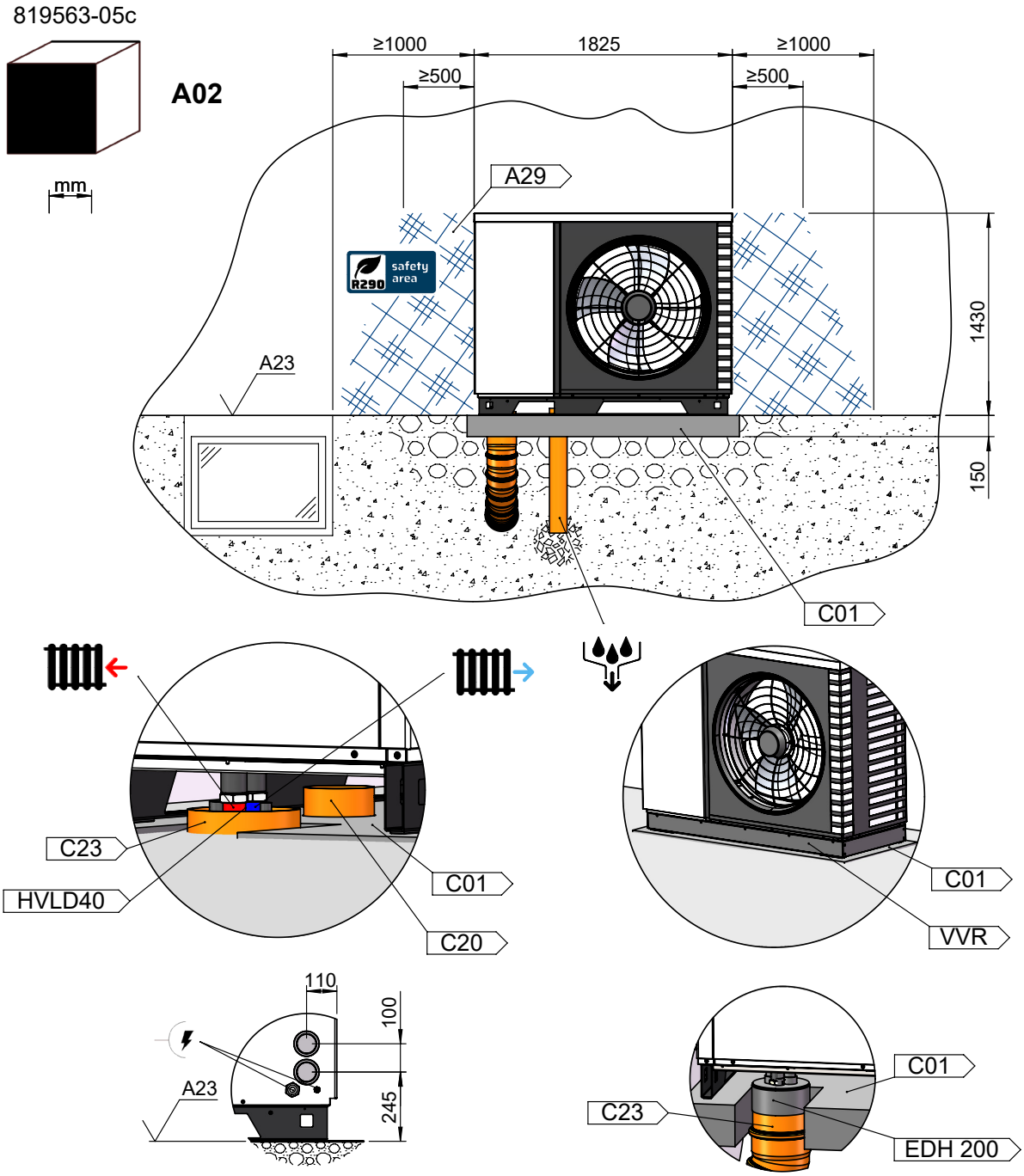


Installation with connection from below with hydraulic connection line 1/4

Hybrox 21



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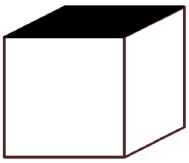

A02

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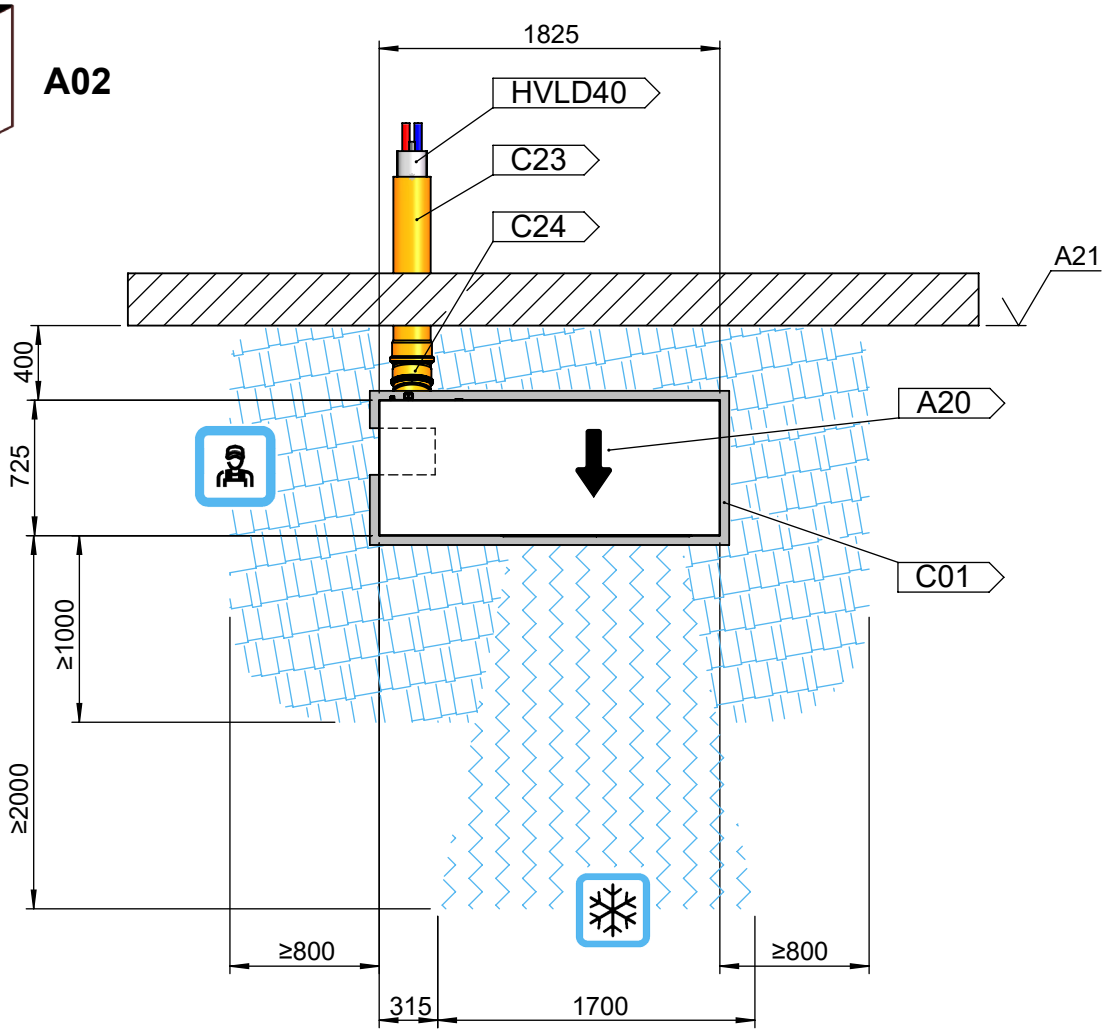

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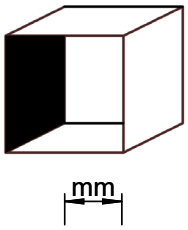

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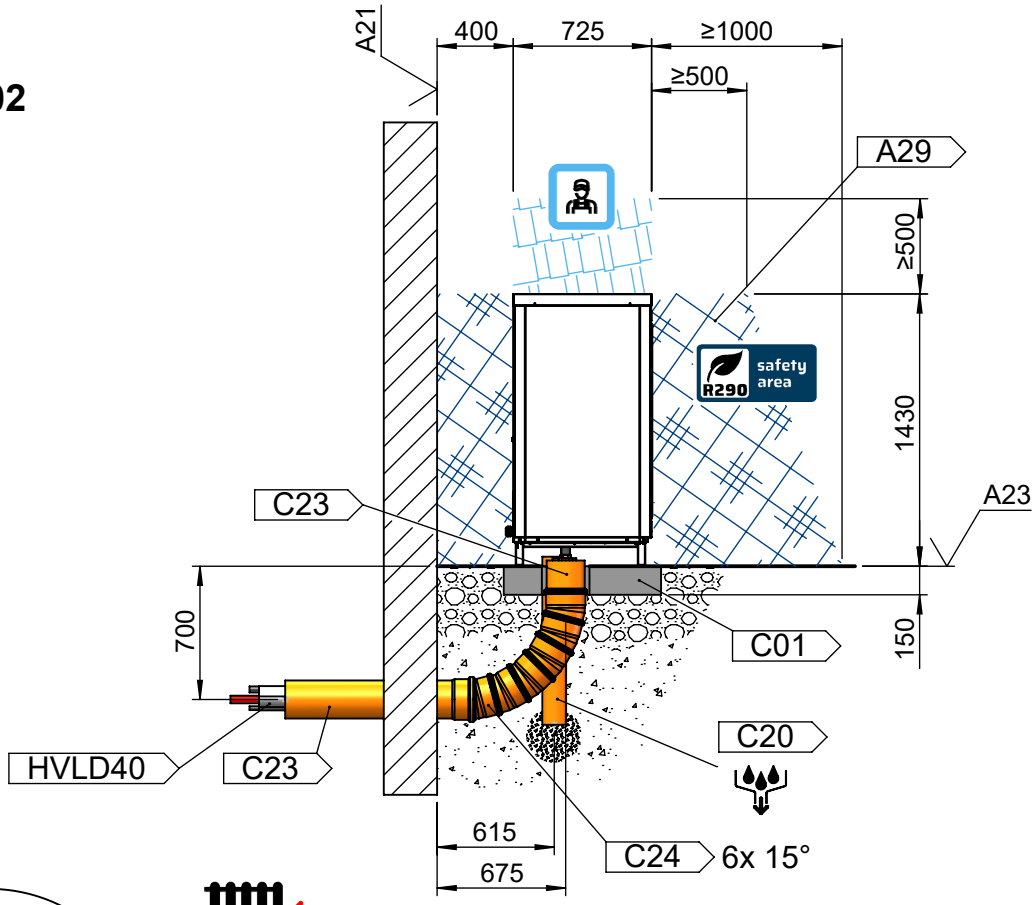

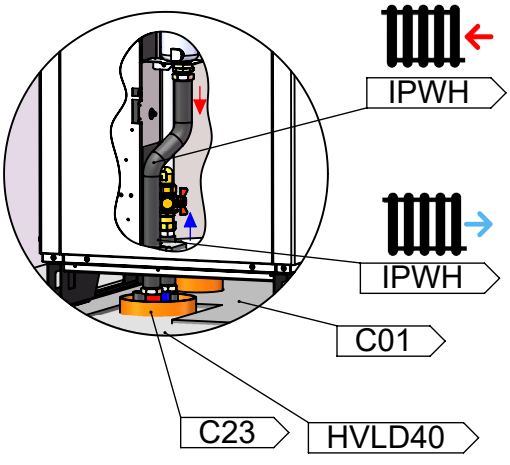

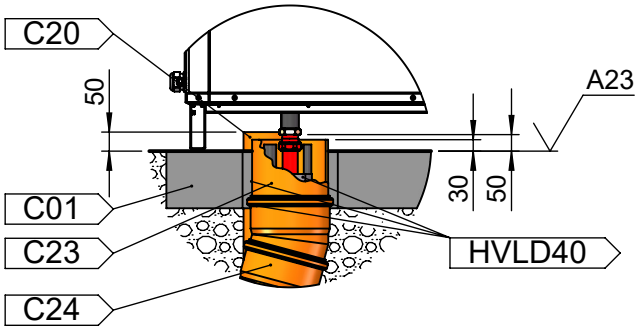

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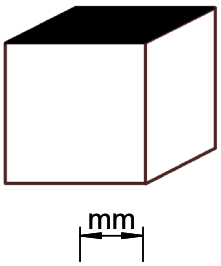
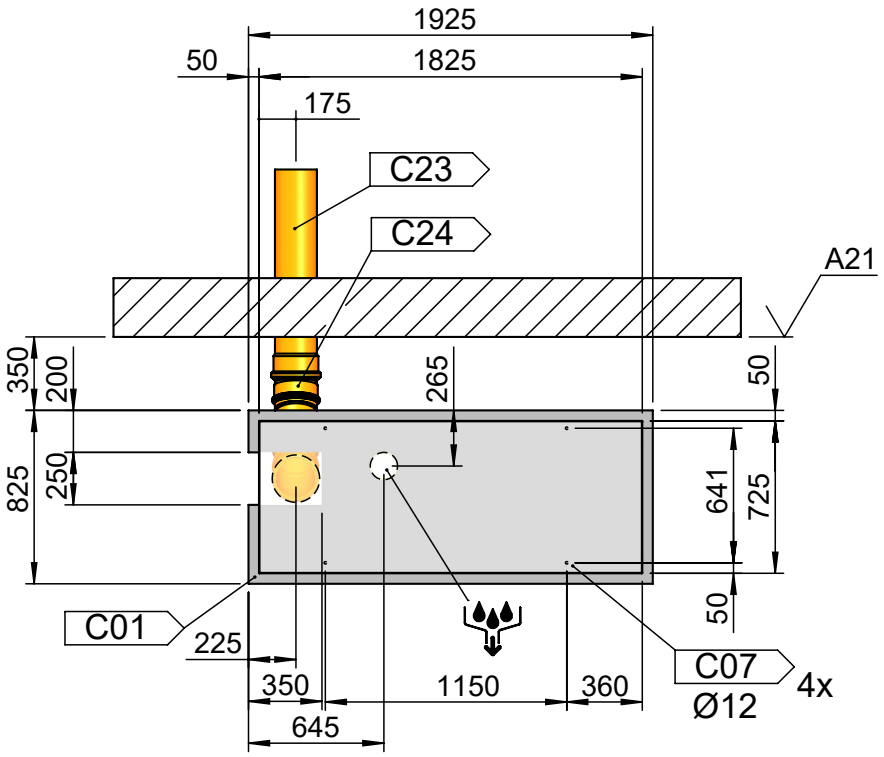


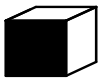
A02

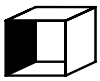
mm



Keys
dimensional drawings / installation plans

819556-d


Front view


Side view from left


Top view


Heating water outlet (supply)


Risc of ice forming


Heating water inlet (return)


Clearance for servicing

R290 protection area


Penetration for flow & return and cables
(in extra box)


Electrical connection


condensate drain (in extra box)
DN40 connection to heat pump


Internal thread


External thread


Flow direction


Collar nut

BKS	Floor bracket (accessory)
BKS-L	Floor bracket (accessory)
EDH 200	End cuff 200 mm (accessory)
HVLD32	Hydraulic connection line 32 mm (accessory)
HVLD40	Hydraulic connection line 40 mm (accessory)
IPWH	Installation package horizontal (accessory)
IPWV	Installation package vertical (accessory)
A01	Installation variant 1
A02	Installation variant 2
A03	Installation variant 3
A20	Direction of air
A21	Complete external facade
A23	Upper edge of ground
A24	Lower edge of unit
A29	Protection zone
A30	Distance between lower edge of unit and upper edge of ground
A31	Wind protection, functional area for the heat pump
C01	Foundation
C02	Insulate connections, fittings and pipes (on site)
C03	Mounting bores for wall bracket
SFS	Safety catch for adjustable feet (accessory)
TV BKS-L	Partial cladding of floor bracket (accessory)
VBKS	Cladding floor bracket (accessory)
VV BKS-L	Full cladding of floor bracket (accessory)
VWKS	Cladding wall bracket (accessory)
WDF	Wall duct (accessory)
WDF-O	Wall duct overground (accessory)
WKS	Bracket for wall attachement (accessory)
VVR	Full cladding frame (accessory)
C04	Mounting bores for floor bracket
C06	Concrete shaft
C07	Mounting bores
C08	Adjustable machine foot
C20	Empty sewer conduit KG DN 125, Ø external 125 (shorten on site)
C21	Empty sewer conduit KG DN 160, Ø external 160 (accessory, shorten on site)
C22	Empty sewer conduit 15° bend KG DN 160, Ø external 160 (shorten on site)
C23	Empty sewer conduit KG DN 200, Ø external 200 (accessory, shorten on site)
C24	Empty sewer conduit 15° bend KG DN 200, Ø external 200 (shorten on site)
C26	Doors, windows, light wells etc.into the building

Basic information

The parallel mode makes it possible to connect up to four Hybrox heat pumps of the same kW capacity class so that they work together in a common heating system.

Each individual Hybrox heat pump must be connected to a wall-mounted controller.
Parallel mode requires the integration of a stratified buffer tank.

Minimum volume of the stratified buffer tank:

2x Hybrox 21	3x Hybrox 21	4x Hybrox 21
310 l	389 l	418 l

NOTE
If only 2 Hybros heat pumps (1 master plus 1 slave) are connected to each other for parallel mode, it is also possible to integrate a multi-functional domestic hot water storage tank instead of a stratified buffer tank.
If a multi-functional domestic hot water storage tank is integrated, the operating mode “heating” and the operating mode “cooling” are always blocked for the entire system as long as the slave is preparing domestic hot water.

IMPORTANT
Special hydraulic integrations apply to heat pumps in parallel mode. These are available on the manufacturer’s website.

IMPORTANT
Make sure that the connections of a heat pump are only made to the wall-mounted controller intended for this heat pump.

Further information on the connection of the heat pumps as well as on functions of parallel mode and settings that must be made on the heating and heat pump controller:

→ Operation manual for the heating and heat pump controller, part 2, program area “Parallel mode“

Increase of sound level in parallel mode

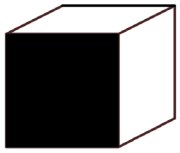
In parallel mode of several heat pumps installed in close proximity to each other, the sound pressure level of the individual heat pumps increases to a sum sound level.
The maximum sum sound level for parallel mode in full load operation can be determined in this way:

1. Select the sound calculator on the manufacturer’s homepage.
2. Select the heat pump type in the sound calculator or enter “Sound power level outside combined max.” from the technical data.
3. Carry out the calculation with the heat pump whose installation is the most unfavourable from a sound engineering point of view.
   Carry out the calculation based on the respective installation situation and the required distance.
4. Add to the calculated sound pressure level dB(A) the value of the sound level increase dB that applies to the number of equally loud heat pumps installed:

Number of equally loud heat pumps	Sound level increase dB
2	3,0
3	4,8
4	6,0

Protection zones / safety distances for parallel mode

Hybrox 21



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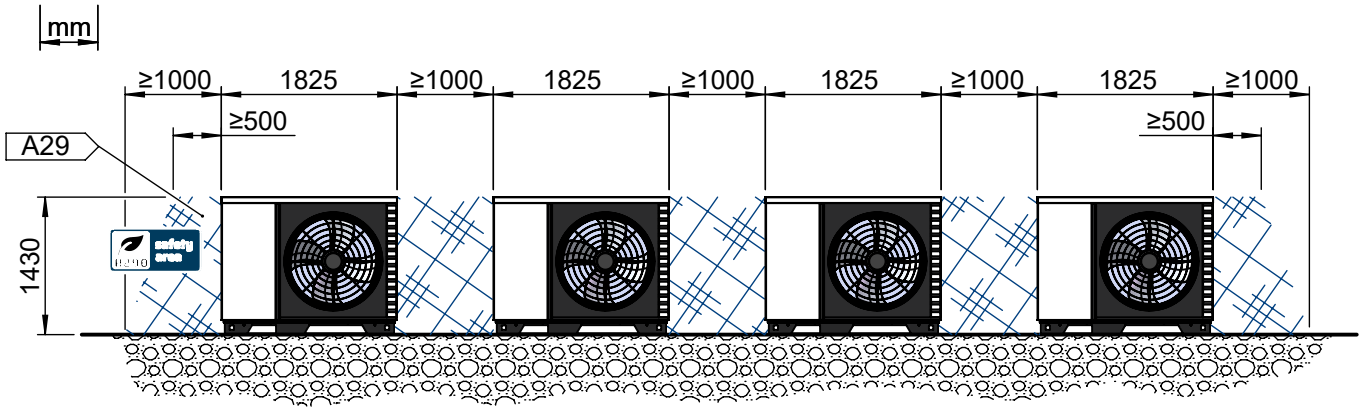
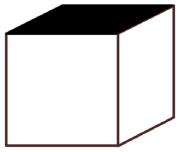
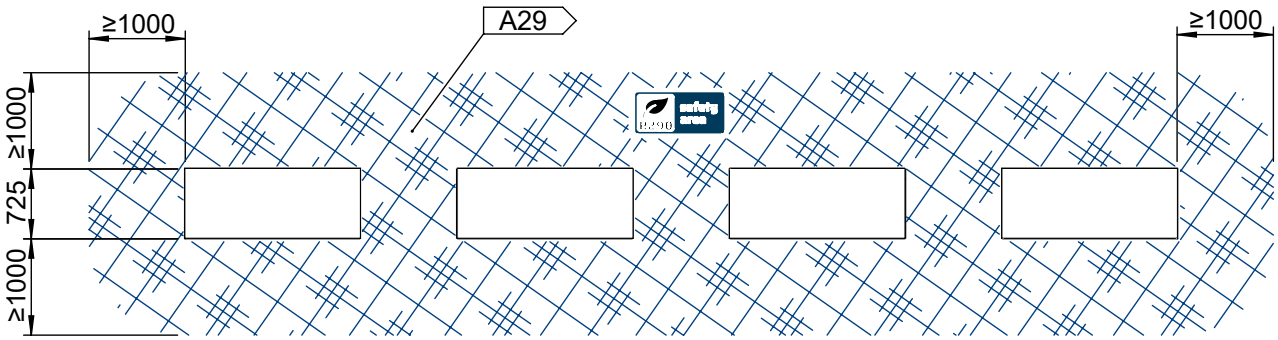




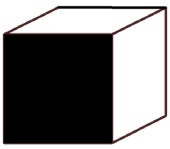


DANGER

Risk of suffocation/explosion! The heat pump must only be installed outdoors! Do not install the heat pump in depressions or in places where refrigerant can accumulate in the event of a leak. Position the unit so that the refrigerant cannot enter the building or endanger people in any other way in the event of a leak.

DANGER

Risk of suffocation/explosion! There must be no ignition sources, windows, doors, ventilation openings, light wells or similar in the protection area (see illustration) between the top edge of the unit and the floor. The protection area must not extend to neighbouring properties or public traffic areas. The wall penetration through the building envelope must be gas-tight.



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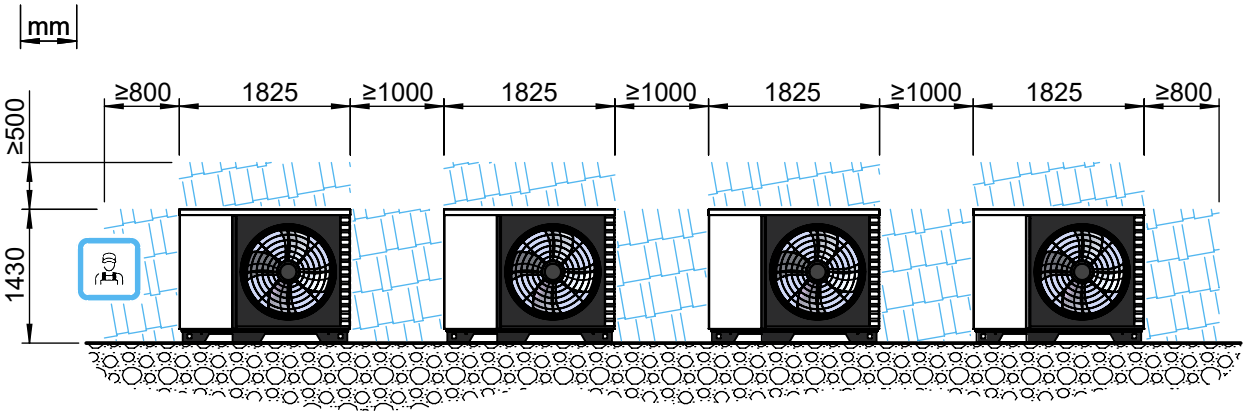
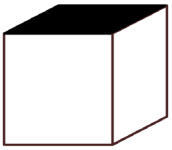
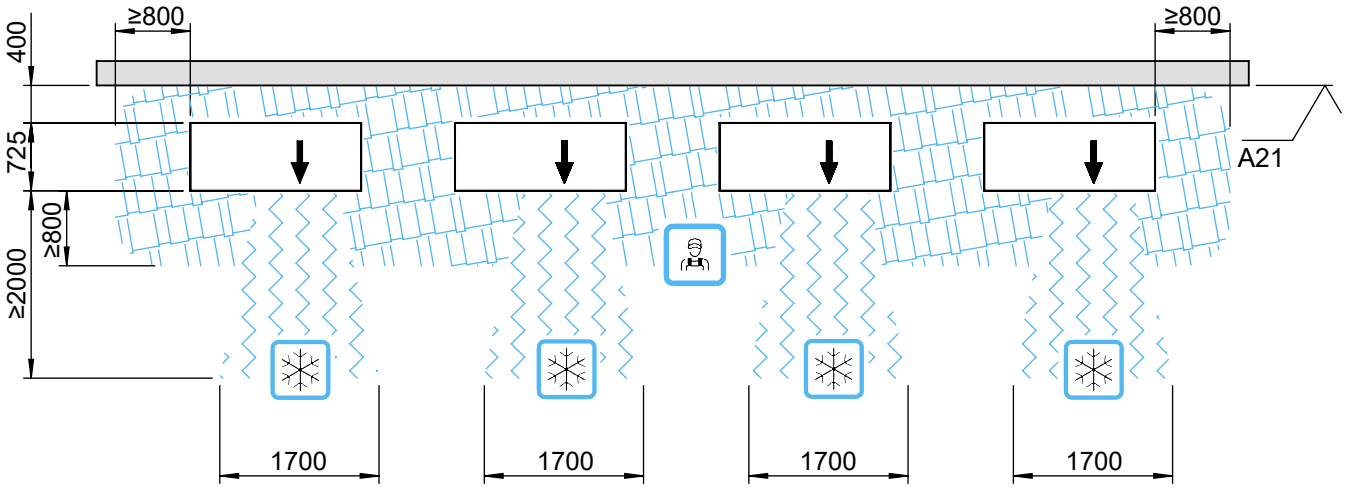
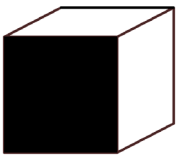






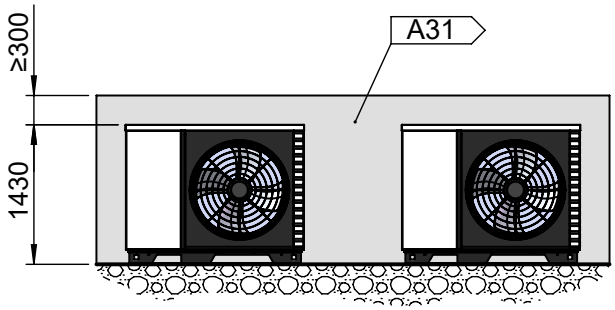
IMPORTANT
The air directions of the heat pumps must not cross.



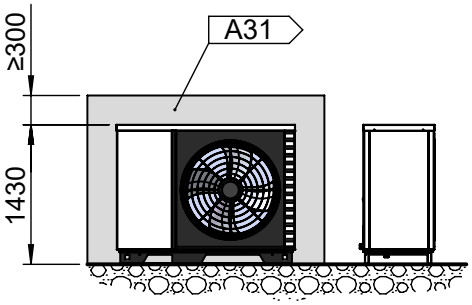
819566-03a

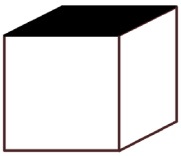
mm

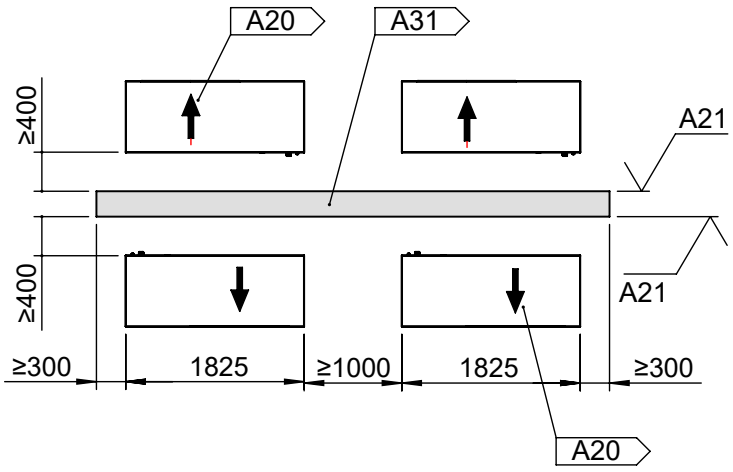
A01

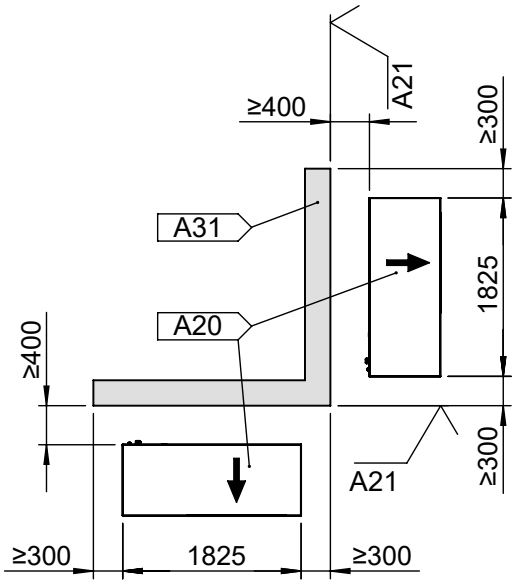


A02

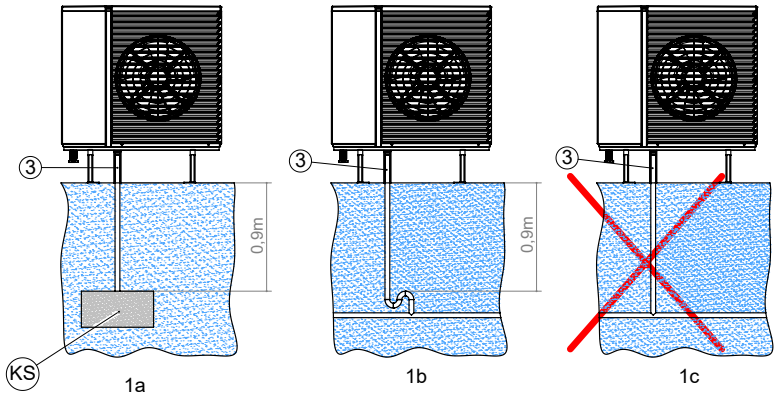








External condensate line connection



Keys: 819554-1

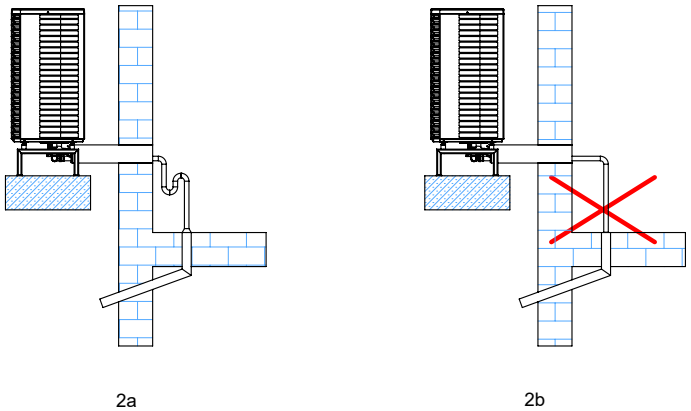
Pos.	Name
KS	Gravel bed for holding up to 150 l condensate per day as buffer zone for seepage
3	Condensate drain pipe DN 40 (on site)

Important: If the condensate is discharged directly into the ground (figure 1a), the condensate drain pipe ③ must be insulated between the ground and the heat pump.

Important: If the condensate is discharged directly into a sewage or rainwater pipe, a waste trap must be applied (figure 1b).
A vertically installed, insulated plastic pipe must be used above the ground. In addition, no non-return valves or similar must be installed in the drain pipe. The condensate drain pipe must be connected in such a way that the condensate drain pipe can flow freely into the main pipe. If the condensate is discharged into drains or the sewage system, ensure installation with a gradient.

It must be ensured that the condensate is discharged frost-free in all cases (figure 1a and figure 1b).

Internal condensate line connection



Keys: 819554-2

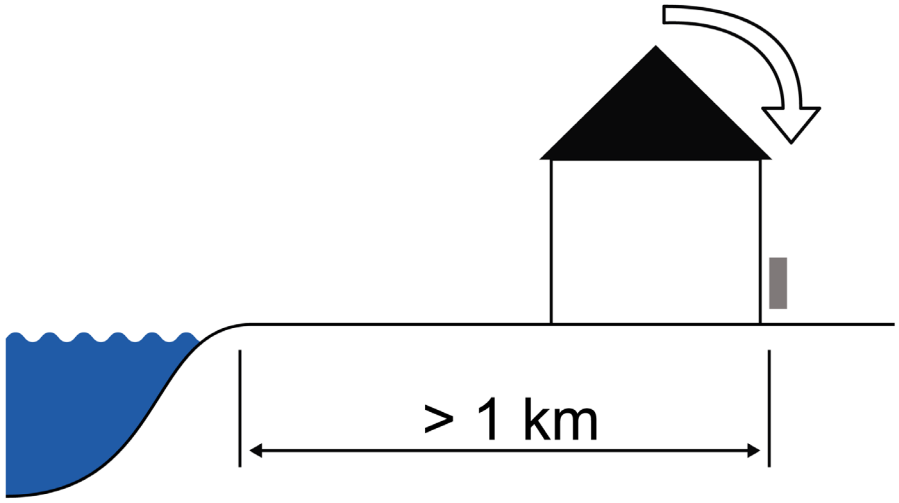
Important: If the condensate line is connected inside a building, a waste trap must be installed with an airtight connection to the drain pipe (see figure 2a).
No additional drain pipes may be connected to the condensate drain pipe of the heat pump. The drain pipe into the sewage system must be clear, i.e. neither a non-return valve nor a waste trap must be installed downstream of the heat pump's connection cable.

It must be ensured that the condensate is discharged frost-free in all cases (figure 2a).

IMPORTANT
The minimum distances necessary for correct and safe operation as well as any service work must be observed.

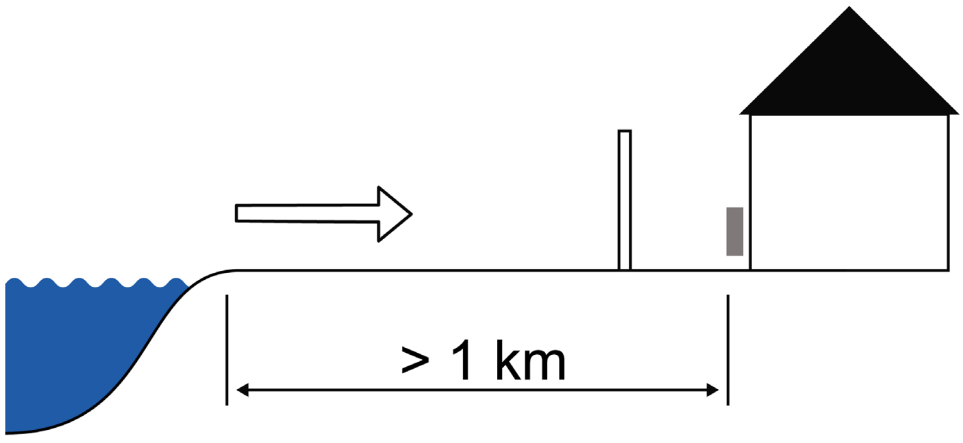
- facing away from the coast / prevailing wind direction

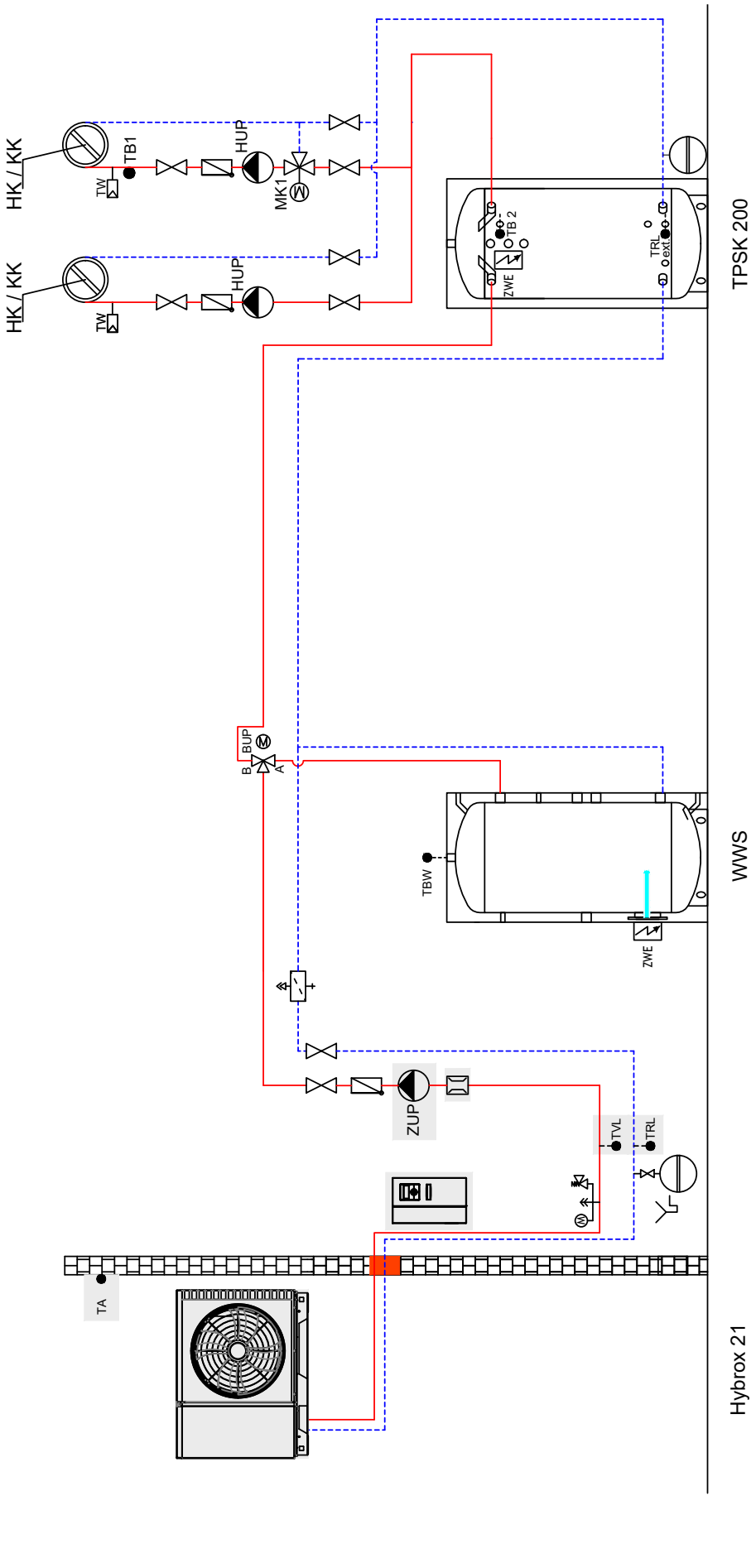
✓ in a sheltered area near a wall
✓ not in open areas
✓ not in sandy surroundings (to avoid the influx of sand)



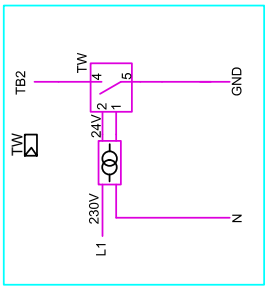
- on the seaward side

✓ in an area near a wall
✓ an impermeable windbreak resistant to onshore winds is installed
✓ Height and width of the windbreak ≥ 150 % of the unit dimensions
✓ not in sandy surroundings (to avoid the influx of sand)





Hybrox21_21336712a



NOTE

This schematic diagram is an example of a system without shut-off and safety devices, and it does not replace the technical planning and design on site. All regional standards, laws and regulations must be observed.
The pipe dimensions must be carefully planned and designed.

Vibration isolation


Shut-off device and drainage


Shut-off device with dirt trap


Safety group


Shut-off device


Circulation pump


Non return valve/ one way valve

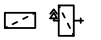

Overflow valve


Membrane expansion vessel


Second heat generator (ZWE)


3-way mixing valve / switching valve


4-way mixing valve / switching valve


Dirt-trap


Wall breakthrough


Brine manifuld


Ground slinkies


Ground collector

Flow switch


Groundwater spring pump with flow direction groundwater


Buffer tank:
- TPS Stratified storage tank
- RPS Series buffer tank
- TPSK Stratified storage tank (cooling)
- WTPSK Stratified storage tank, wall-mounted (cooling)


Multifunction tank


Domestic hot water tank


Volume flow meter

Heat meter

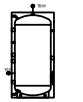

Gas- or oil-boiler


Wood boiler


Brine pressure switch


Swimming pool heat exchanger


Separation heat exchanger / intermediate heat exchanger


Solar domestic hot water tank


Pipe lead-in


Fresh water station (TWS)

Room control unit


Dew-point monitor


Supply heat pump

BUP	Circulation pump / switching valve domestic hot water
MK1/2/3	Mixer circuit 1/2/3 (heating or cooling function)
HUP	Circulation pump heating circuit
FP1/2/3	Circulation pump / switching valve
ZUP	Feed circulating pump
ZIP	Circulation pump
BLP	Domestic hot water charging pump
VBO	Heat source circulation pump
TA	Outdoor temperature sensor
TBW	Sensor domestic hot water
TFB/TB	Sensor mixer circuit
TRL ext.	Sensor external return
TRL	Sensor return
TVL	Flow sensor
TEH	Sensor desuperheater
HK	Heating circuit
HMK	Heating mixing circuit
KK	Cooling circuit
KMK	Cooling mixing circuit
SPP	Safety package primary
SPS	Safety package secondary
Ent.	Circulation pump desuperheater
101	Controls supplied by customer

Split:

QN10	Switching valve domestic hot water / heating
QN12	Switching valve cooling / heating
QN11	Mixing valve additional heating
GP12	Circulation pump
BT1	Outdoor temperature sensor
BT7	upper domestic hot water (displayed value)
BT3	Sensor return
BT6	Sensor domestic hot water
BT64	Flow sensor cooling
BT15	Temperature sensor, liquid state
BT25	Flow temperature heating
BT71	Return temperature heating / cooling
BT52	Sensor heating boiler
BT50	Room temperature sensor
XL1	Flow heating
XL2	Return heating / cooling
XL3	Cold water
XL4	Domestic hot water
XL5	Circulation
XI10	Flow cooling
XL13	Liquid refrigerant
XL14	Gaseous refrigerant
XL18	Flow second heat generator
XL19	Return second heat generator
X2	Terminal second heat generator
EP Split	Expansion board Split (not included in scope of delivery)

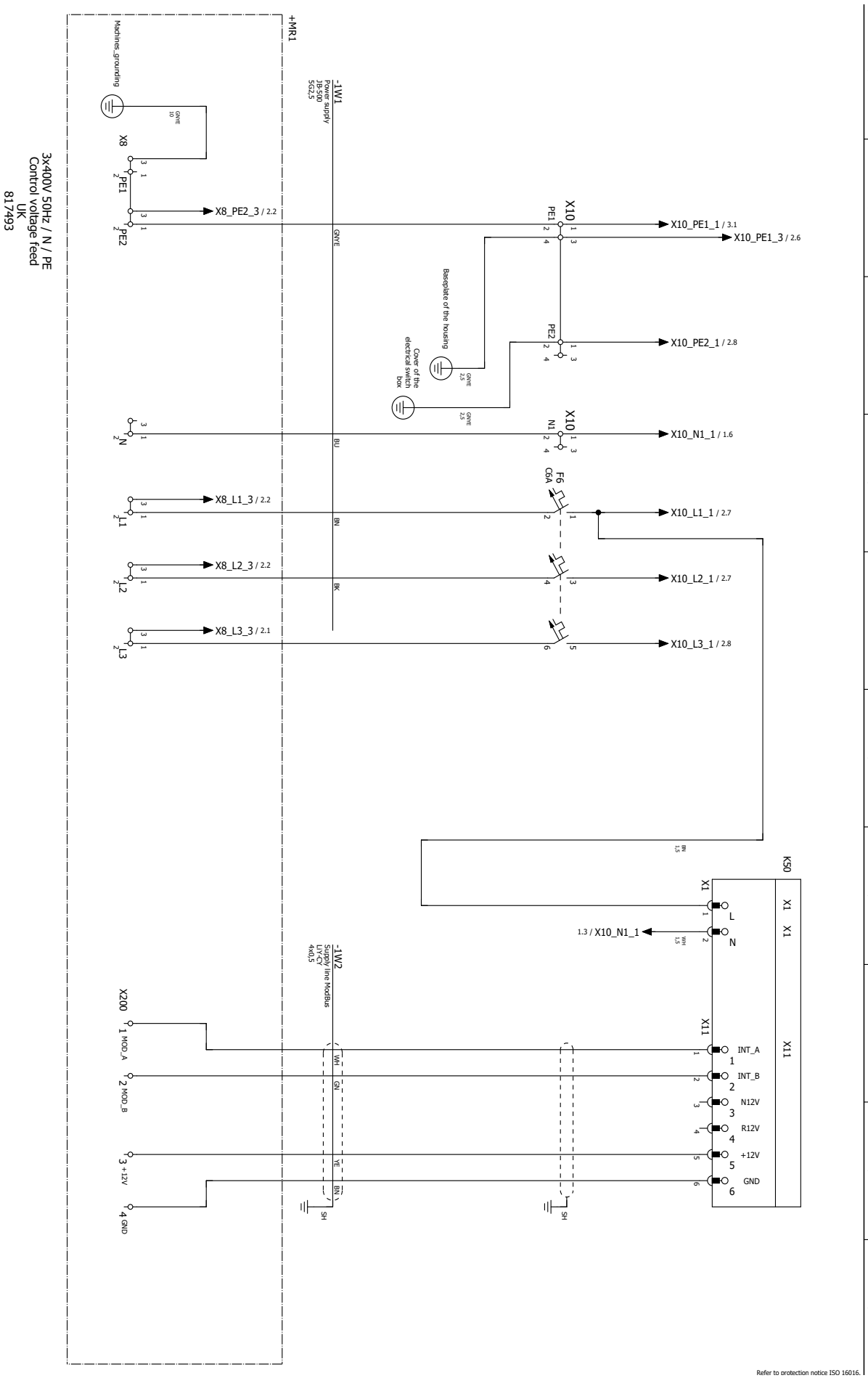
Controls supplied by customer / on-site components:

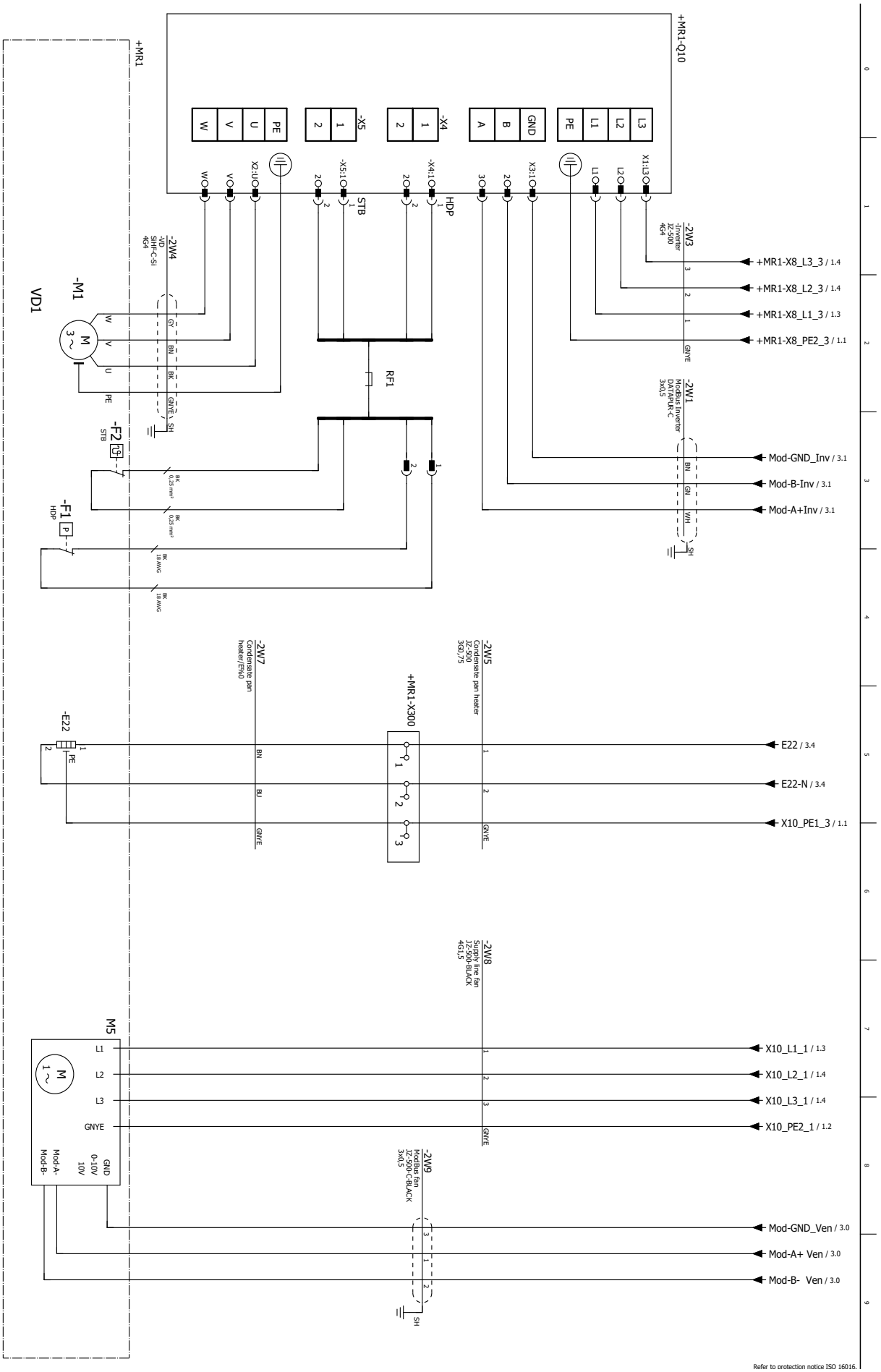
Parts and components shown in the colour "grey" must be provided by the customer and also operated with a regulation provided by the customer.
The temperature difference control SLP of the additional board is excepted from this.

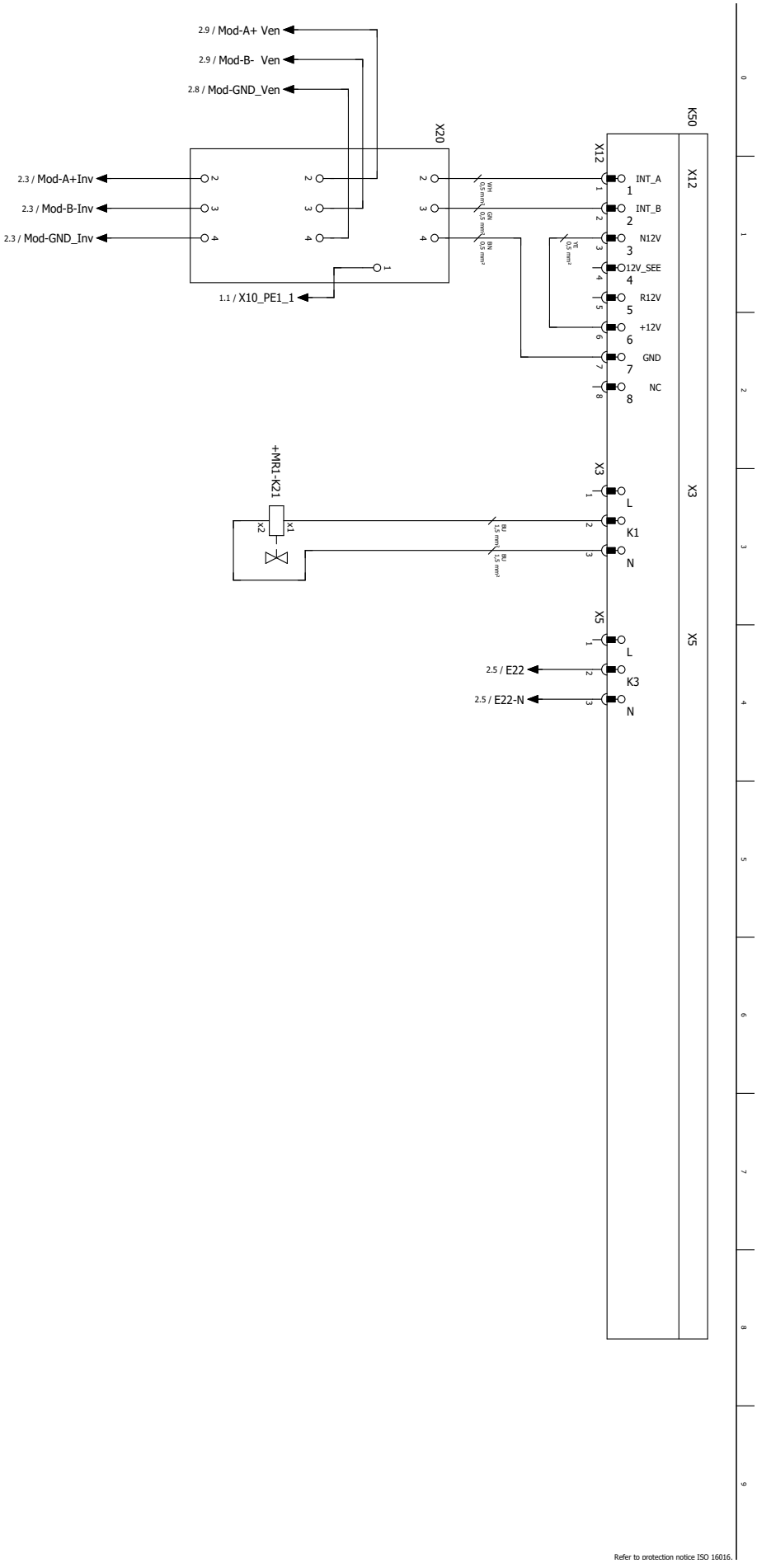
General:

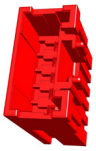
Pipes, fittings and fixtures must be designed and insulated in accordance with the current and valid standards, guidelines and recognised rules of technology (e.g.: vapour diffusion-tight insulation if the temperature falls below the dew point).

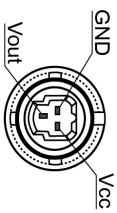
23092022_UK

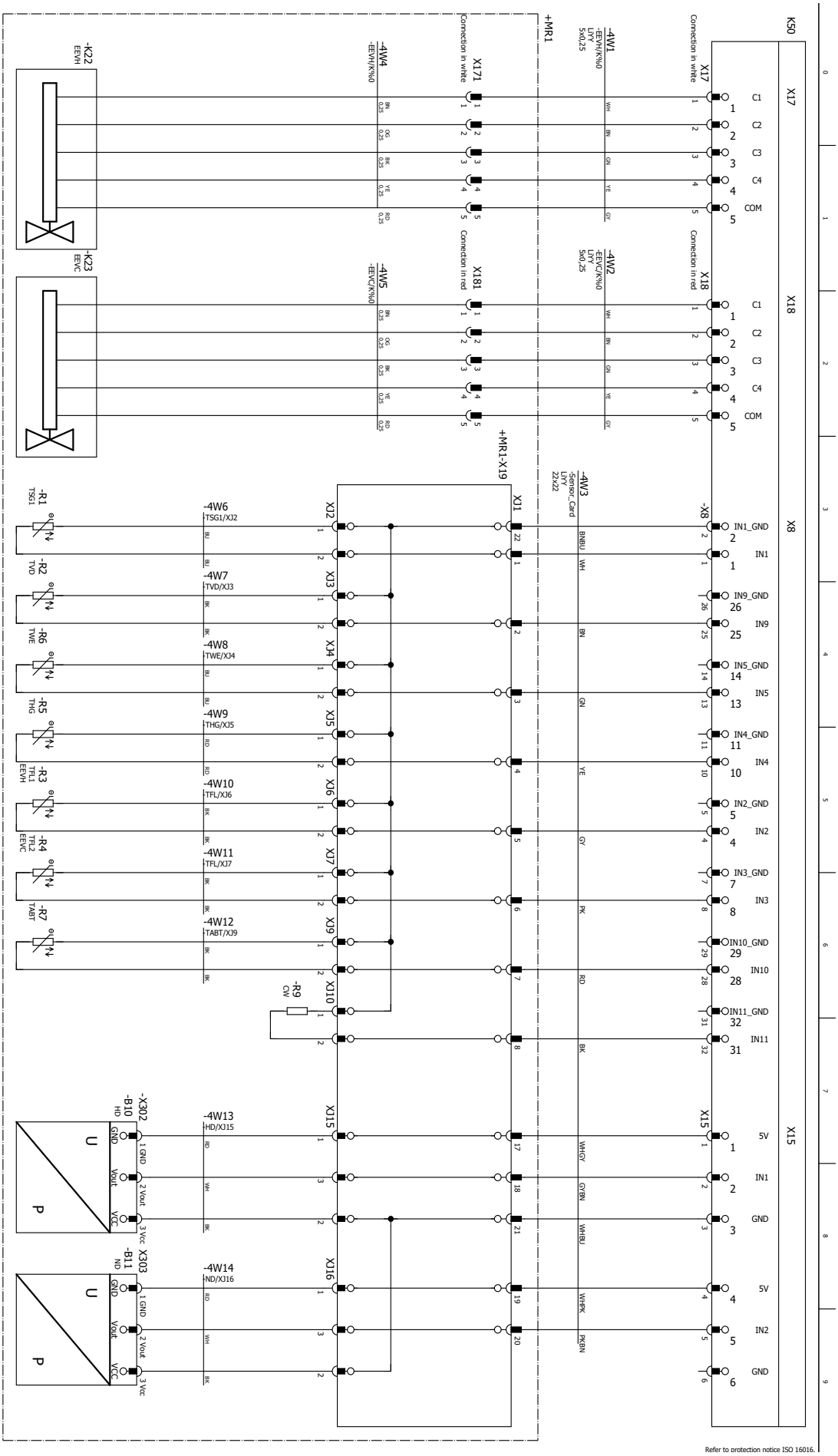

3x400V 50Hz / N / PE
Control voltage feed
UK
817493
+MR1
Machines_grounding
-1W1
Power supply
JB-500
5G2,5
X8
PE1
PE2
N
L1
L2
L3
X8_PE2_3 / 2.2
X8_L1_3 / 2.2
X8_L2_3 / 2.2
X8_L3_3 / 2.1
X10
X10_PE1_1 / 3.1
X10_PE1_3 / 2.6
X10_PE2_1 / 2.8
X10_N1_1 / 1.6
X10_L1_1 / 2.7
X10_L2_1 / 2.7
X10_L3_1 / 2.8
Baseplate of the housing
Cover of the electrical switch box
F6
C6A
K50
X1
L
N
1.3 / X10_N1_1
-1W2
Supply line ModBus
LiY-CY
4x0,5
X200
MOD_A
MOD_B
+12V
GND
X11
INT_A
INT_B
N12V
R12V
+12V
GND
Refer to protection notice ISO 16016.


+MR1
+MR1-Q10
-X5
-X4
PE
W
V
U
L1
L2
L3
A
B
GND
STB
HDP
RF1
-M1
VD1
-2W4
-2W3
-2W1
-2W7
-2W5
-2W8
-2W9
-F2
-F1
-E22
+MR1-X300
M5
+MR1-X8_L3_3 / 1.4
+MR1-X8_L2_3 / 1.4
+MR1-X8_L1_3 / 1.3
+MR1-X8_PE2_3 / 1.1
Mod-GND_Inv / 3.1
Mod-B-Inv / 3.1
Mod-A+Inv / 3.1
E22 / 3.4
E22-N / 3.4
X10_PE1_3 / 1.1
X10_L1_1 / 1.3
X10_L2_1 / 1.4
X10_L3_1 / 1.4
X10_PE2_1 / 1.2
Mod-GND_Ven / 3.0
Mod-A+ Ven / 3.0
Mod-B- Ven / 3.0
Refer to protection notice ISO 16016.


2.9 / Mod-A+ Ven
2.9 / Mod-B- Ven
2.8 / Mod-GND_Ven
X20
2.3 / Mod-A+Inv
2.3 / Mod-B-Inv
2.3 / Mod-GND_Inv
1.1 / X10_PE1_1
K50
X12
INT_A
INT_B
N12V
12V_SEE
R12V
+12V
GND
NC
+MR1-K21
X1
X2
X3
L
K1
N
X5
L
2.5 / E22
K3
2.5 / E22-N
N
Refer to protection notice ISO 16016.




GND
Vout
Vcc


K50
X17
X18
X8
X15
+MR1
+MR1-X19
-K22 EEVH
-K23 EEVC
-4W1 -EEVH/K%0 LiYY 5x0,25
-4W2 -EEVC/K%0 LiYY 5x0,25
-4W3 -Sensor_Card LiYY 22x22
-4W4 -EEVH/K%0
-4W5 -EEVC/K%0
X171 Connection in white
X181 Connection in red
X17 Connection in white
X18 Connection in red
C1
C2
C3
C4
COM
-R1 TSG1
-R2 TVD
-R6 TWE
-R5 THG
-R3 TFL1 EEVH
-R4 TFL2 EEVC
-R7 TABT
-R9 CW
-4W6 TSG1/XJ2
-4W7 TVD/XJ3
-4W8 TWE/XJ4
-4W9 THG/XJ5
-4W10 TFL/XJ6
-4W11 TFL/XJ7
-4W12 TABT/XJ9
-4W13 HD/XJ15
-4W14 ND/XJ16
X1
XJ2
XJ3
XJ4
XJ5
XJ6
XJ7
XJ9
XJ10
XJ15
XJ16
-X8
IN1_GND
IN1
IN9_GND
IN9
IN5_GND
IN5
IN4_GND
IN4
IN2_GND
IN2
IN3_GND
IN3
IN10_GND
IN10
IN11_GND
IN11
5V
GND
-X302 -B10 HD
-X303 -B11 ND
U
P
Vout
Vcc
Refer to protection notice ISO 16016.

Equipement	Description
B10	High-pressure sensor
B11	Low pressure sensor
E20	Compressor heating
E22	Condensate pan heater
F1	High-pressure switch
F2	Temperature switch
F6	Fuses ventilator
G1	Fan
K21	Defrost valve
K22	Electronic expansion valve heating
K23	Electronic expansion valve cooling
M1	Compressor
Q10	inverter
R1	Suction sensor, condenser
R2	Sensor compressor heating
R3	Liquid temperature heating
R4	Liquid temperature cooling
R5	Hot gas sensor
R6	Heat source input sensor
R7	Defrost temperature
R9	Coding resistance; Thor 18: 14,0kOhm;
RF	Ferrite sleeve
X8	Distribution box power supply output compressor
X10	Terminal strip in switchbox of heat pump; N/PE distribution for external 230V units
X20	MODBUS circuit board
X200	Control connector
X300	Connection box compressor heating
XSE	Sensorcard
XSH	Shield clamp Control unit
+MR1	Machine room

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