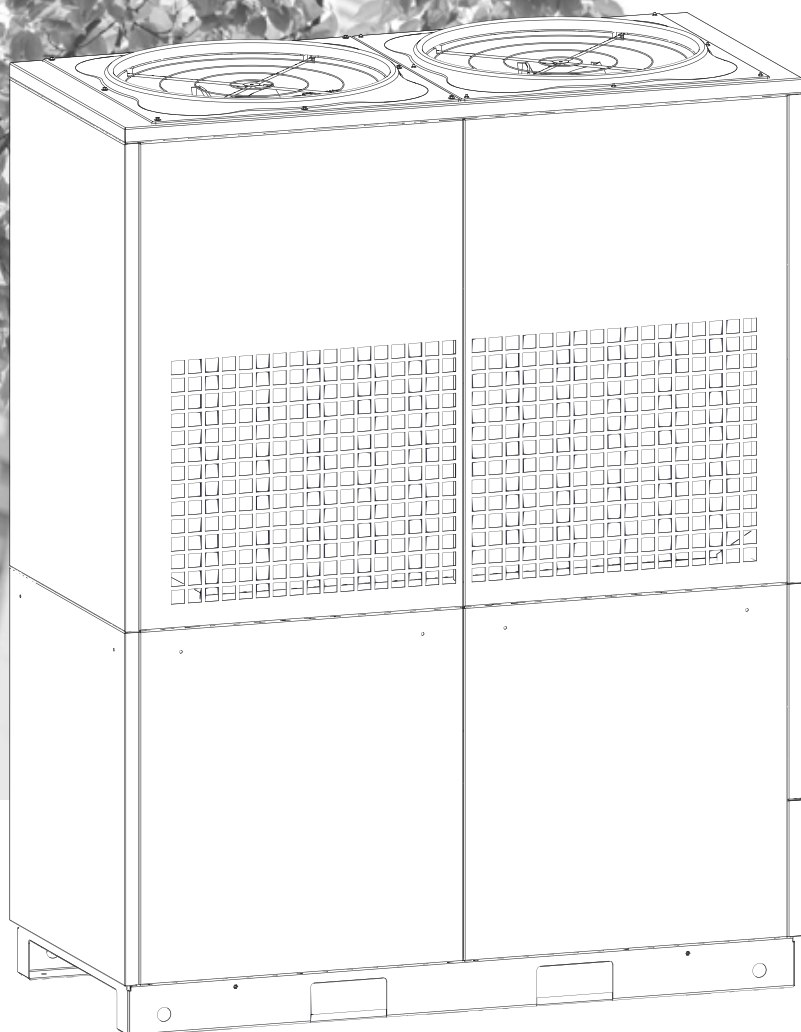


the better way to heat



Air/Water Heat Pumps
Outdoor installation

Operating Manual

LWP





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1 About this operating manual

This operating manual is part of the device.

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

1.1 Validity

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

1.2 Other applicable documents

The following documents contain additional information for this operating manual:

- Planning & design manual, hydraulic integration
- Operating manual of the heating and heat pump controller
- Brief description of the heat pump controller
- Operating manual of the expansion board
- Log book

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

Symbol	Meaning
	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
✓	Prerequisite for an action
▶	Procedural instruction: 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 device and this operating manual can be found on the internet and are kept up-to-date:

- Germany: www.alpha-innotec.de
- EU: www.alpha-innotec.com

2 Safety

Only use the device when it is in flawless technical condition and only use it as intended, safely and aware of the hazards, and follow this operating manual.

2.1 Intended use

The device is solely intended for the following functions:

- Heating
- Domestic hot water preparation (option, with accessories)
- Cooling, reversible
- ▶ Proper use includes complying with the operating conditions (→ "Technical data / scope of supply", page 20) as well as the operating manual and any other applicable documents.
- ▶ Observe local regulations during use: laws, standards, guidelines, directives.

All other uses of the device are not as intended.

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 exclusively for qualified and skilled personnel.

Only qualified, skilled personnel are able to carry out the work on the unit safely and correctly. Interference by unqualified personnel can cause life-threatening injuries and damage to property.

- ▶ Ensure that personnel are familiar with local regulations, especially those on safe and hazard-aware working.
- 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

Electric shock

Components in the device are energised with life-threatening voltage. Before work is performed on the unit:

- ▶ Disconnect the device from the power supply.
- ▶ Protect the device from being switched back on again.

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.



Injuries caused by moving parts

- ▶ Only switch on the unit once outer panels and fan protection grille have been fitted.

Injuries due to high temperatures

- ▶ Before working on the unit, let it cool down.

If desuperheating is used, very high temperatures can arise at the desuperheater and the desuperheater lines. Contact can result in burns.

- ▶ Do not touch the desuperheater or its lines when operating or afterwards.

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

The unit contains harmful and environmentally dangerous refrigerant. Proceed as follows if refrigerant leaks from the unit due to a leak:

1. Switch off unit.
2. 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 damage to property

The ambient air at the heat pump installation site, as well as the air drawn in as a heat source, must not contain any corrosive constituents!

Constituents such as

- Ammonia
- Sulphur
- Chlorine
- Salt
- Sewer gasses, flue gasses

can cause damage to the heat pump, which could lead to the complete failure / destruction 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/emptying heating

If the system / heat pump is decommissioned or emptied, after it has been filled already, it is necessary to ensure that the condenser and any heat exchangers present have been completely emptied in the event of frost. Residual water in heat exchangers and condensers can result in damage to components.

- ▶ Empty system and condenser completely, open vent valves.
- ▶ Blast out with compressed air if necessary.

Improper action

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

- Proper planning, design and commissioning
- Closed system with regard to corrosion
- Integration of an adequately dimensioned pressure maintaining device
- 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, designed, started up and operated in accordance with the given requirements, there is a risk that the following damage and faults will occur:

- Malfunctions and the failure of components, e.g. pumps, valves
 - Internal and external leaks, e.g. from heat exchangers
 - Cross-section reduction and blockages in components, e.g. heat exchangers, pipes, pumps
 - Material fatigue
 - Gas bubbles and cushion gas formation (cavitation)
 - Negative effect on heat transfer, e.g. formation of coatings, deposits and associated noises, e.g. boiling noises, flow noises
- Note and follow the information in this operating manual for all work on and with the device.

Unsuitable quality of the fill and make-up water in the heating circuit

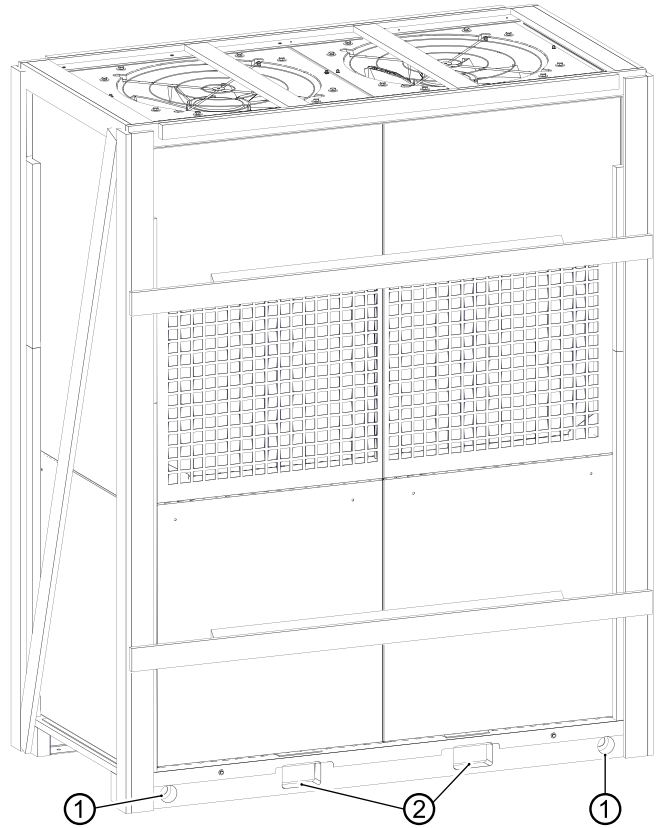
The efficiency of the system and the service life of the heat generator and the heating components depend decisively on the quality of the heating water.

When the system is filled with untreated drinking water, calcium and magnesium precipitate as mineral scale. Lime scale deposits accumulate on the heat transfer surfaces of the heating. The efficiency drops and energy costs rise. 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



Unit packed in a wooden strip with styrofoam / PE angle strips and wrapped in plastic film

- 1 Holes for steel pipes (→ "Transport with a crane", page 9)
- 2 Cut-outs for transport with a forklift

IMPORTANT

Only transport the unit to the installation location in its original packaging.

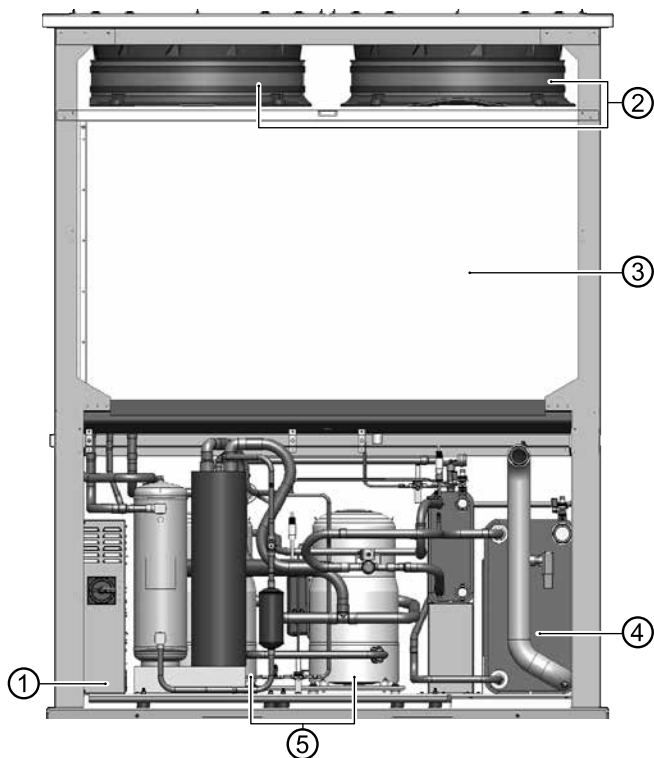


3.2 Layout



NOTE

This section essentially names the components relevant for fulfilling the tasks described in this operating manual.

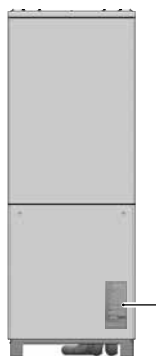


- 1 Switch box cover
- 2 Fans
- 3 Evaporator
- 4 Condenser
- 5 Compressors

Nameplate

The nameplate is attached at the following point on the unit:

- On the switch box side (left) bottom right



3.3 Accessories

The following accessories are available for the device through the manufacturer's local partner:

- Domestic hot water tank
- Air / magnetic sludge separator
- Buffer tank
- Room thermostat to switch the cooling function
- Dew point monitor to protect a system with cooling function at low flow temperatures
- Recirculating pumps
- Switching valves
- Connection kit with vibration decoupling for heating circuit
- Connection kit with vibration decoupling for desuperheater

3.4 Function

Liquid refrigerant is evaporated (evaporator), the energy for this process is environmental heat and comes from the outside air. The gaseous refrigerant is compressed (compressor), this causes the pressure to rise and therefore the temperature too. The gaseous refrigerant at a high temperature is liquefied (condenser).

The high temperature is hereby discharged to the heating water and is used in the heating circuit. The liquid refrigerant at a high pressure and high temperature is depressurised (expansion valve). The pressure and temperature drop and the process begins again.

The heated heating water can be used for the domestic hot water charging or for the building heating. The temperatures required and use are controlled by the heat pump controller. Reheating, drying out screed or increasing the domestic hot water temperature can be carried out by using an electric heating element, which is activated by the heat pump controller as and when necessary.

The vibration decouplers (accessories) for the hydraulics prevent structure-borne sound and vibrations from being transferred into the fixed pipes and therefore into the building.



Cooling

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

- Active cooling
- Cooling below 18 °C is only possible in the case of hydraulic integration with separation buffer tank
- Control of the cooling function via the heating and heat pump controller
- Changeover between heating and cooling operation

4 Operation and care



NOTE

The device is operated via the control panel of the heating and heat pump controller (→ operating manual for the heating and heat pump controller).

4.1 Energy and environmentally conscious operation

The generally accepted requirements for energy conscious and environmentally conscious 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 gap / tilt open (continuous ventilation), but instead open wide for a short time (shock ventilation).
- Always ensure that the controller settings are correct.

4.2 Maintenance

Wipe down the outside of the device only using a damp cloth or cloth with mild cleaning product (washing up liquid, neutral cleaning product). Do not use any harsh, abrasive, acid or chlorine-based cleaning products.

5 Delivery, storage, transport and installation

IMPORTANT

Damage to the housing and the device components due to heavy objects.

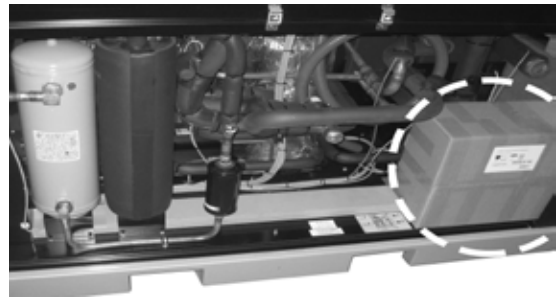
- ▶ Do not place any objects on the device.

5.1 Scope of supply

- ▶ Check delivery immediately after receipt for externally visible damage and completeness.
- ▶ Notify supplier of any defects immediately.

The accompanying parts package (2 boxes) contains

- the wall-mounted controller and the outdoor sensor
- shut-off device with dirt trap



- A mailing envelope with 4 anti-slip mats for setting down is attached to the outside of the device

5.2 Storage

- ▶ Do not unpack the unit until directly before installation at the installation location.
- ▶ Store unit protected against
 - Moisture/damp
 - Frost
 - Dust and dirt

5.3 Transport and unpacking

Notes on safe transport

The device is heavy (→ "Technical data / scope of supply", page 20). There is a risk of injuries or damage to property if the device falls or overturns.



The hydraulic connections are not designed for mechanical loads.

- ▶ Do not lift or transport the device by the hydraulic connections.

Ideally, the device should be transported with a lift truck.

- ▶ Do not tilt the heat pump by more than 45°.

Transport with a crane

Variant 1



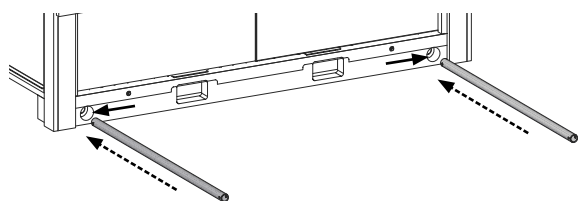
Variant 2



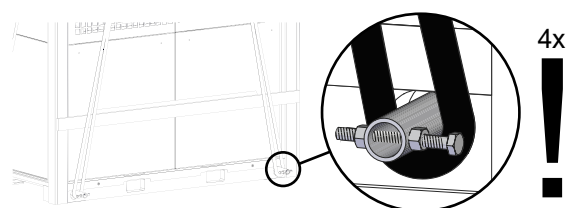
Appropriate lifting equipment with a load capacity corresponding to the weight of the unit must be available on site.

This includes:

- ✓ 4 slings with sufficient load capacity (length per item ≥ 4 m)
 - ✓ 2 steel tubes with sufficient load capacity (length per item 1.1 m, $\varnothing \leq 35$ mm)
1. Slide the steel tubes left and right through the side holes of the packed device base.



2. Hook the slings into the steel tubes and secure them against slipping.



The slings must be attached so that the device cannot tilt!

3. Lift the unit with the crane and place it on the base.
4. Make sure that the unit's base frame is in full contact with the base.

Transport with a pallet truck

- ▶ Transport the device to the installation site whilst still packaged.

Unpacking

1. Remove plastic films. Ensure that you do not damage the device.
2. Dispose of the transport and packaging material in an environmentally friendly way and in accordance with local regulations.

5.4 Installation

Installation site requirements

- ▶ Perform installation outdoors only.
- ✓ Clearance dimensions are met
→ "Installation plans", from page 25
- ✓ 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 and horizontal
 - 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



NOTE

The unit must be placed in a position where no masses of water, snow or ice can fall onto the unit from building roofs and/or via blocked gutter.



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.



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 form in the air outlet area. Install the heat pump such that the air blower does not discharge into footpath areas.

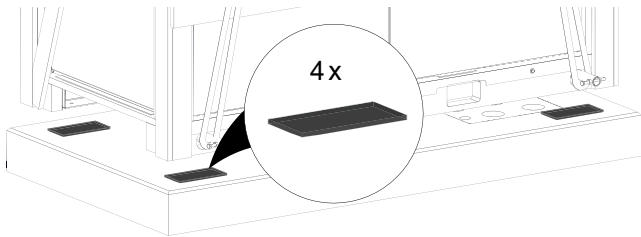


NOTE

Install the unit so that the switch box side is accessible at all times.

1. Position the unit according to the installation plans and place it onto the 4 anti-slip mats.

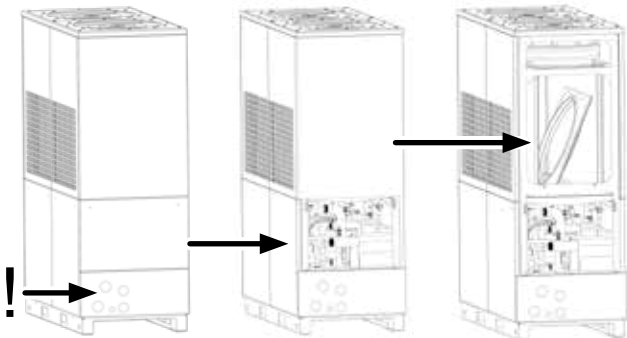
→ "Installation plans", from page 25



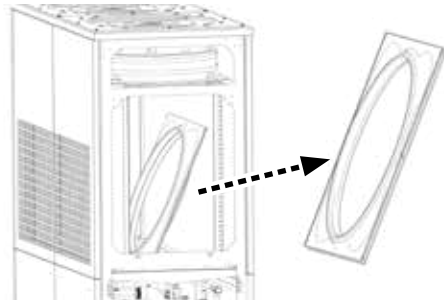
IMPORTANT

In the delivery state, two water protection barriers together with mounting material are deposited in the unit. These must be removed from inside the unit and mounted on the unit roof.

2. Remove the facing panels of the unit on the hydraulic connection side.



3. Carefully lift the water protection barriers out of the interior of the unit. Do not damage any components when lifting out.

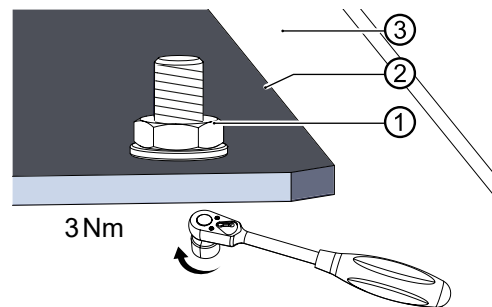


4. Reattach the facing panels of the unit to the hydraulic connection side.

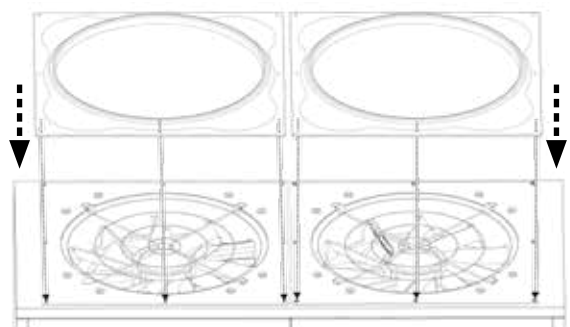
IMPORTANT

Use a stepladder for the following assembly steps. Do not place a ladder against the unit. Do not climb on the unit.

5. Tighten all nuts (①) of the total of 16 fastening screws on the two ventilator ring plates (②) on the top of the unit (③).
Tightening torque: 3 Nm.

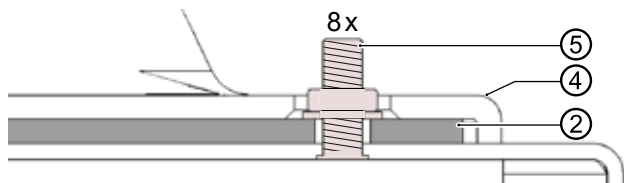


6. Place the water protection barriers onto the ventilator ring plates. When doing so, guide the screw threads protruding from the ventilator ring plates through the fastening holes of the water protection barriers.



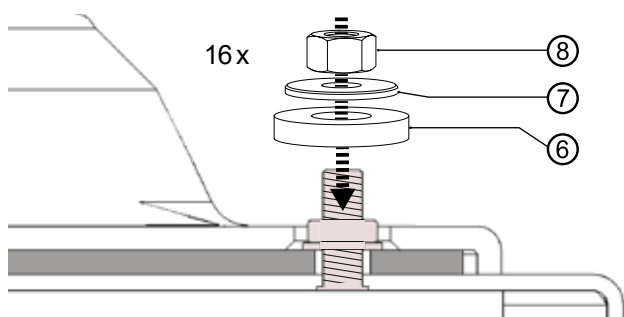


After correct placement on the ventilator ring plates (2), 8 screw threads (5) protrude from each water protection barrier (4).



7. Use the mounting material from the accessory pack to screw down the water protection barriers:

- 16x PE foam washer (6)
- 16x metal washer (7)
- 16x nut M5 (8)

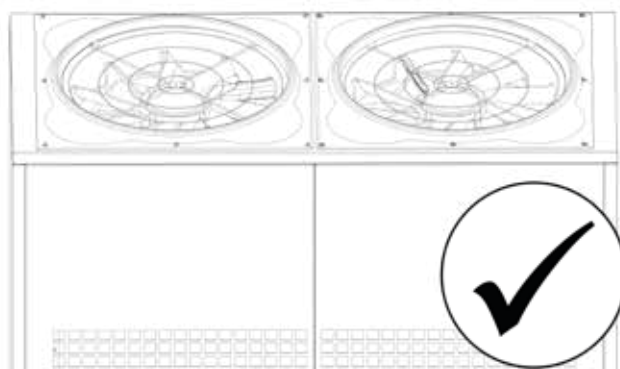
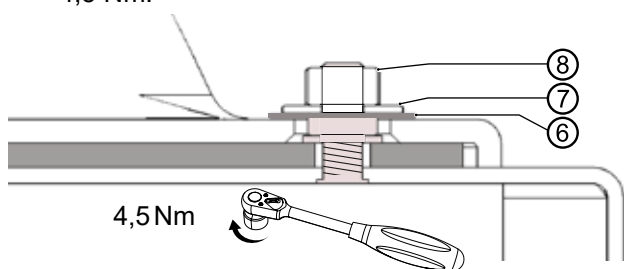


7.1. First put a PE foam washer (6) over a screw thread.

7.2. Place a metal washer (7) over this PE foam washer.

7.3. Place a nut (8) on the screw thread and screw it on only lightly at first.

8. Finally tighten all 16 nuts. Tightening torque: 4,5 Nm.



6 Hydraulic installation

IMPORTANT

Components and lines for desuperheating must be able to withstand temperatures up to 90°C.

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 to prevent twisting.
- ✓ Cross-sections and lengths of the pipes for the heating circuit are adequately dimensioned. The connection line between the heat pump and the building is also taken into account.
- ✓ The recirculating pump and piping system are dimensioned so that the required flow rates can be achieved.
- "Technical data / scope of supply", Page 20
- ✓ The hydraulic system is equipped with a buffer tank whose required volume is suitable for the unit type of the heat pump.
- "Technical data / scope of supply", "Heating circuit" section, Page 20
- ✓ The lines for the heating are fastened to the wall or ceiling via a fixed point.



► Make sure that the working overpressure is complied with.

→ "Technical data /scope of supply", Page 20

1. Install the outside pipes of the heating circuit beneath the frost line.

2. Insert the vent at the highest point of the heating circuit.

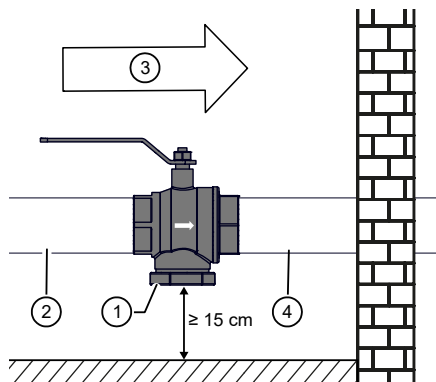
3. Integrate the unit as shown in the hydraulic diagram for the respective unit model.

→ "Hydraulic integrations", from page 31

4. Install the shut-off device with dirt trap (included in the scope of supply) inside the building as close as possible to the transition to the outdoors.

4.1. Observe the flow direction of the shut-off device with dirt trap.

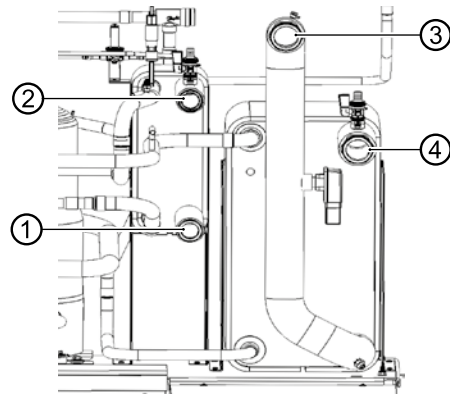
4.2. Position the cleaning cap (①) of the shut-off device with dirt trap at the bottom.



- 1 Cleaning cap (provide free space ≥ 15 cm below for dirt trap removal)
- 2 Hydraulik pipe coming from the heating water (return flow) of the heating circuit
- 3 Heating water return flow direction
- 4 Hydraulik pipe leading to the heating water inlet (return flow) of the heat pump

4.3. Attach the hydraulic pipes to the right and left of the shut-off device with dirt trap via a fixed point to the wall or ceiling at a maximum distance of 20 cm from the shut-off device.

5. Connect the unit to the fixed piping of the heating circuit via vibration decouplers. You must install them to prevent the transfer of structurally borne sound to the fixed piping (accessory).



- 1 Desuperheating return
- 2 Desuperheating supply
- 3 Heating circuit return
- 4 Heating circuit supply flow

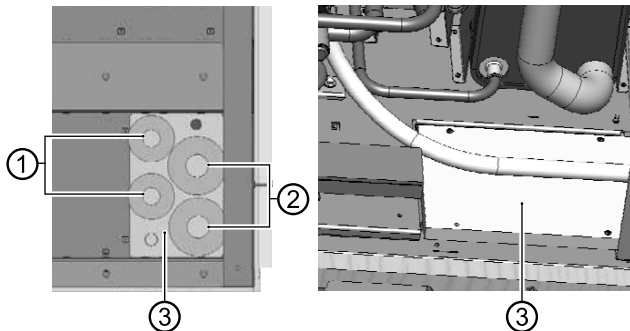
Hydraulic connection is possible from below or at the side.



6.1 Vertical connection

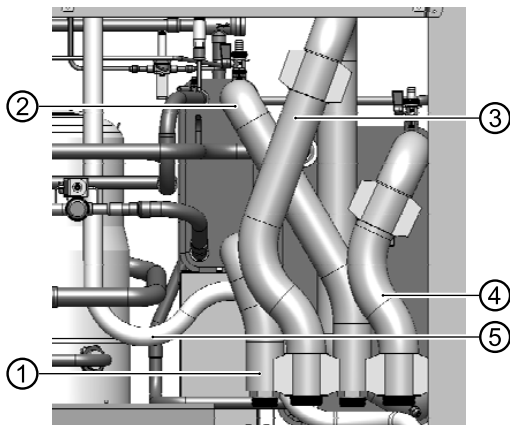
View from below:

View from inside:



- 1 Desuperheating connections
- 2 Heating circuit connections
- 3 Styrodur cover

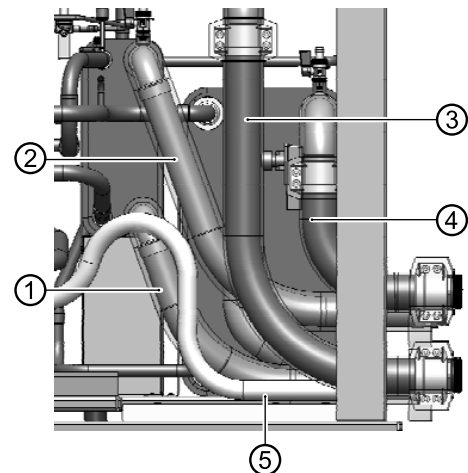
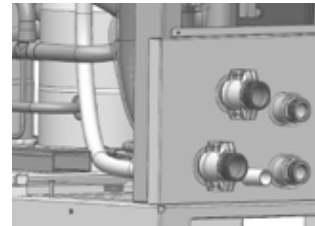
1. Unscrew and remove the Styrodur cover and then cut out the holes for the 4 pipes and the condensate drain.
2. Trim the 4 hoses (accessories) to length if required. Likewise the condensate hose inside the unit, which hangs loose from the condensate pan.
3. Attach the hoses and feed down through the holes. The condensation hose too.



- 1 Desuperheating return
- 2 Desuperheating supply
- 3 Heating circuit return
- 4 Heating circuit supply flow
- 5 Condensation hose

6.2 Horizontal connection

1. Open break-outs on the right sidewall
2. Trim the 4 hoses (accessories) to length if required. Likewise the condensate hose inside the unit, which hangs loose from the condensate pan.
3. Attach the hoses and the condensation hose and lead out on the right side.



- 1 Desuperheating return
- 2 Desuperheating supply
- 3 Heating circuit return
- 4 Heating circuit supply flow
- 5 Condensation hose

6.3 Condensate drain

The condensate precipitated from the air must be removed frost-free via a condensate pipe with minimum 40 mm diameter. If surfaces are water permeable, it is sufficiency for the condensate water pipe to be laid vertically in the ground to a depth of at least 90 cm. If the condensate is discharged into the sewer system, ensure frost-free laying with a gradient.

Discharge of the condensate into the sewers is permitted only via a funnel waste trap, which must be accessible at all times.



7 Electrical installation

7.1 Connect the electrical cables

IMPORTANT

Irreparable damage to the compressor due to wrong rotating field!

- ▶ Ensure that there is a clockwise rotating field for the compressor load infeed.

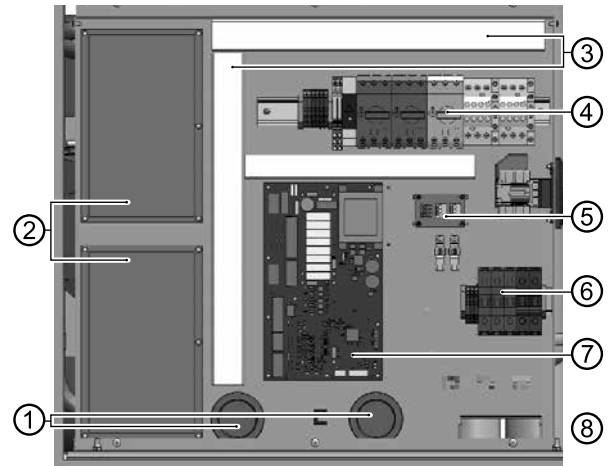
Basic information about the electrical connection

- The specifications of the local energy supply companies may apply to electrical connections
- Fit the power supply for the heat pump with an all-pole circuit breaker with at least 3 mm contact spacing (acc. to IEC 60947-2)
- Note the level of the tripping current (→ "Technical data / scope of supply", page 20)
- Comply with the electromagnetic compatibility regulations (EMC regulations)
- Lay unshielded power supply cables and shielded cables (bus cable) sufficiently far apart (> 100 mm)
- Maximum line length: 30m.
Permissible type of bus cable:
3x0,5 mm², Standard shielded Ölflex

Pull in the cables and conductors and create the connections

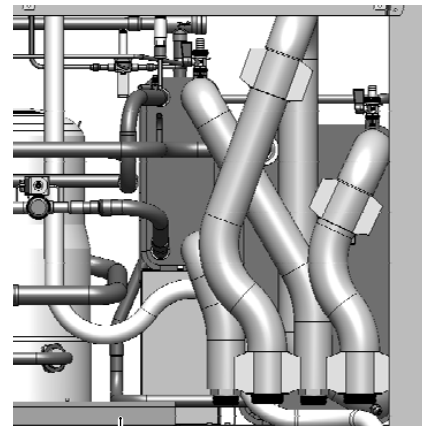
1. Strip the sheathing of all cables to the external loads before laying in the cable gland of the switch box.
2. Open electrical switch box.
3. Feed the control/sensor cables and unit supply cable into the housing.

4. Connect cables to the respective terminals (→ "Terminal diagrams", from page 34).



- 1 Feed-through glands
- 2 Soft starter
- 3 Cable glands
- 4 3 motor protection switches
- 5 Bus distributor
- 6 Connection terminal
- 7 Main board
- 8 Control cabinet fan

5. Lay the power cable in a cable conduit up to the cable entry into the building and from there continue to lay it up to the fuse box.



- 1 Cable gland for mains connection and BUS lines

6. Connect the power cable to the power supply.
7. Seal empty pipes on the unit side.
8. Screw the facing panels onto the heat pump.



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

For air/water heat pumps installed outdoors, it is not necessary to fill 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.

The following points must be observed if antifreeze is added, depending on the concentration of the mixture:

- Heat output of the heat pump is reduced
- COP value becomes worse

- In the case of on-site circulating pumps, the delivery rate is reduced; in the case of integrated circulating pumps, the specified free pressure drops
- The compatibility of the material of the components used with the antifreeze mixture must be ensured

8.2 Flushing, filling and venting the heating circuit

- ✓ Outlet pipe of the safety valve is connected.
- ▶ Ensure that the set pressure of the safety valve is not exceeded.

IMPORTANT

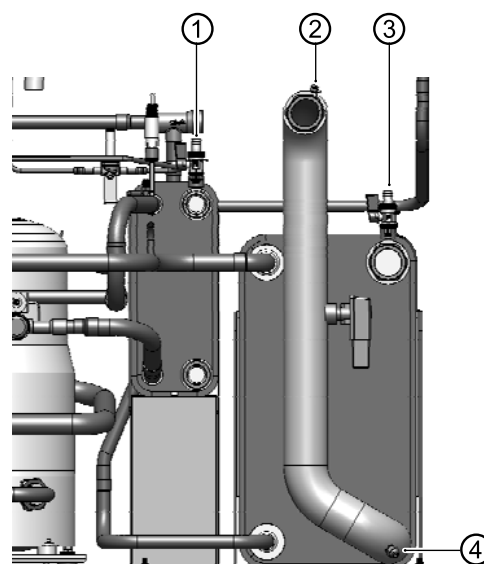
Flush the heating circuit only in its flow direction.



NOTE

The venting programme on the controller can also be used to support the flushing and venting process. It is possible to control individual recirculating pumps and also the switchover valve via the venting programme.

1. Vent system at the respective highest point.
2. Vent heat pump on the condenser and on the desuperheater if installed.



- 1 Desuperheater venting
- 2 Condenser venting
- 3 Condenser venting
- 4 Condenser emptying

→ "12.2 Maintenance after commissioning", page 17



9 Insulate hydraulic connections

Insulate hydraulic lines in accordance with 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. If the device is used for cooling below 18°C, make the insulation vapour diffusion-tight.

IMPORTANT

If desuperheating is used on the device, the insulation on the corresponding lines and components must be able to withstand temperatures up to 90°C.

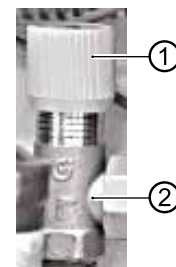
6. Isolate the cones drain in a frost-proof manner
7. Close the unit on all sides to ensure rodent protection.

10 Set the 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 spread), turn it to the left to reduce it.
- ✓ System is running in heating mode (ideally in cold condition).
1. In case of low heating curve: Set the system to "Forced heating" (→ operating manual of the heating and heat pump controller).
 2. Shut off valves to the heating circuit.
 3. Ensure that the total flow is routed via the overflow valve.
 4. Read out the flow and return temperature at the heating and heat pump controller (→ operating manual of the heating and heat pump controller).
 5. Turn the adjusting knob (①) of the overflow valve (②) until the spread between the flow and return temperature is set as follows:

Outdoor temperature	Recommended setting
-10 °C	4 K
0 °C	5 K
10 °C	8 K
20 °C	9 K
30 °C	10 K



- 1 Rotary-push button
- 2 Overflow valve

6. Open valves to heating circuit.
7. Reset the heating and heat pump controller.



11 Commissioning



CAUTION

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

- ✓ 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
 - ✓ 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 17

12 Maintenance



NOTE

We recommend that you conclude a maintenance agreement with an accredited 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.

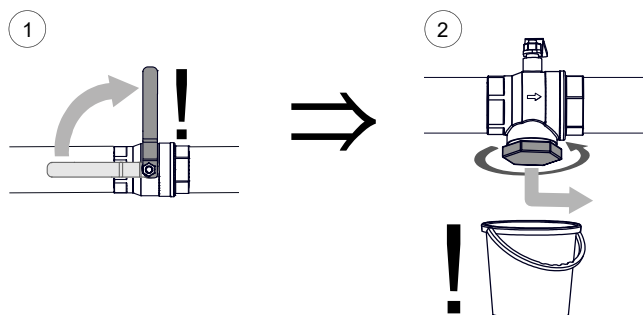
12.2 Maintenance after commissioning

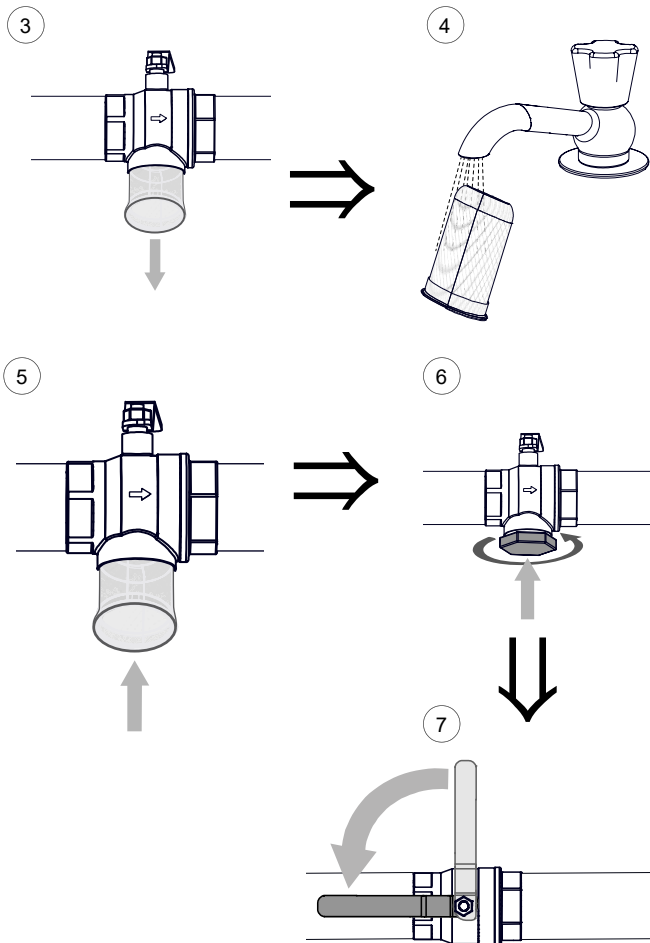
Immediately after commissioning, check all installed dirt traps for dirt and clean them if necessary.

- ▶ 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

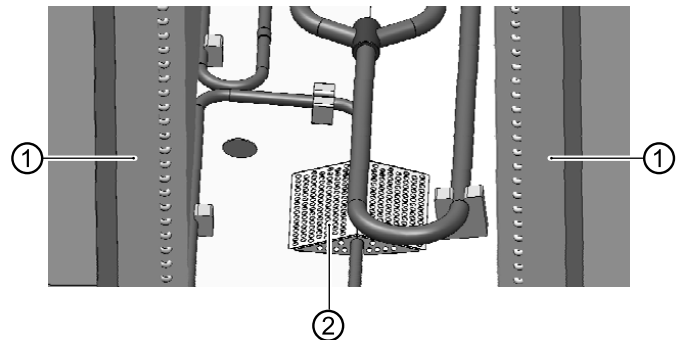




12.3 Maintenance as required

- Checking and cleaning the components of the heating circuit, e.g. valves, expansion vessels, recirculating pumps, filters, dirt traps
- Test the function of the safety valve for the heating circuit
- Always regularly control for unimpeded air infeed and outfeed 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 whether the evaporator and the leaf guard need to be cleaned



- 1 Evaporator (left, right)
- 2 Leaf guard

1. Unscrew both top sidewalls for best possible access.
 2. If necessary remove leaves and contaminants.
 3. Reattach sidewalls.
- Check at regular intervals that the condensate can drain out of the device freely, without obstruction. To this end, check the condensate pan in the device 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 Clean and flush condenser

1. Clean and flush the condenser in accordance with the manufacturer's instructions.
2. After flushing the condenser with chemical cleaning product: Neutralise any residues and flush the condenser thoroughly with water.



12.5 Yearly maintenance

- ▶ Record the quality of the heating water analytically. In case of deviations from the specifications, take suitable measures without delay.
- ▶ Check all installed dirt traps for dirt and clean them if necessary.

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 device number ready at hand.

14 Dismantling and disposal

14.1 Dismantling

- ▶ 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 device components and packaging materials in accordance with the local regulations.



Technical data / scope of supply

Performance data		Values in brackets: (1 Compressor)		LWP450AR3	
Heating capacity COP	for A7/W35 acc. to DIN EN 14511-x	kW COP	47.8 (31.03) 3.57 (4.58)		
	for A7/W45 acc. to DIN EN 14511-x	kW COP	— (39.56) — (3.42)		
	for A2/W35 acc. to DIN EN 14511-x	kW COP	45.5 (27.17) 3.50 (3.83)		
	for A10/W35 acc. to DIN EN 14511-x	kW COP	— (33.38) — (4.68)		
	for A-7/W35 acc. to DIN EN 14511-x	kW COP	38.92 (23.5) 2.95 (2.79)		
	for A-15/W65 acc. to DIN EN 14511-x	kW COP	— —		
	for A-7/W55 acc. to DIN EN 14511-x	kW COP	36.09 (—) 2.09 (—)		
Cooling capacity EER	for A35/W18	kW EER	55.0(32.4) 2.5 (3.05)		
	for A35/W7	kW EER	— (24.7) — (2.56)		
Operating limits					
Heating circuit return min. Heating circuit flow max.	Heating	within heat source min./max.	°C	20 60	
Heating circuit return min. Heating circuit flow max.	Cooling	within heat source min./max.	°C	10 (7) 35	
Heat source heating		min. max.	°C	-22 35	
Heat source cooling		min. max.	°C	10 40	
Additional operating points				...	A-10/W65
Installation location (only valid for indoor installation)					
Room temperature		min. max.	°C	— —	
Relative humidity maximum (non-condensing)				%	—
Sound					
Sound pressure level at 1 m distance from edge of unit inside		min. Night max.	dB(A)	— — —	
Sound pressure level at 1 m distance from edge of unit outside		min. Night max.	dB(A)	50 50 58	
Sound power level inside		min. Night max.	dB(A)	— — —	
Sound power level outside ¹⁾		min. Night max.	dB(A)	63 63 72.4	
Sound power level acc. to DIN EN 12102-1		inside outside	dB(A)	— 63	
Tonality Low-frequency			dB(A) • yes - no	— — —	
Heat source					
Air flow rate at maximum external pressing Maximum external pressure			m ³ /h Pa	15000 (9000) —	
Heating circuit					
Flow rate (pipe dimensioning) Min. volume buffer tank in series Min. volume separation buffer tank			l/h l l	5500 — —	
Free pressing Pressure loss Flow rate			bar bar l/h	1.000 0.055 5500	
Max. allowable operating pressure			bar	6	
Circulation pump control range			min. max.	l/h	—
Hot gas use					
Flow rate (pipe dimensioning)			l/h	2000	
Free pressing Pressure loss Flow rate			bar bar l/h	— 0.952 (0.045) 2000	
General unit data					
Data of the standards according to version		EN14511-x DIN EN 12102-1		2013 2017	
Total weight			kg	680	
Weight of individual components			kg kg kg	— — —	
Max. allowable operating pressure refrigerating circuit			high pressure low pressure	MPa (g) MPa (g)	
				28.0 45.0	
Refrigerant type Refrigerant capacity			... kg	R410A 23.0	
Electrics					
Voltage code all-pole fuse protection for heat pump *)**)			... A	3~PE/400V/50Hz C50	
Voltage code all-pole fuse protection for heat pump *) + electric heating element **)			... A	—	
Voltage code Control voltage fuse protection **)			... A	1~N/PE/230V/50Hz B16	
Voltage code Electric heating element fuse protection **)			... A	—	
HP*): effect. power consumption A7/W35 DIN EN 14511-x Electric consumption cosφ			kW A ...	13.7(7.0) 27.2(13.9) 0.73(0.73)	
HP*): max. machine current max. power consumption within the operating limits			A kW	45.3 —	
Starting current: direct with soft starter			A A	< 142 85	
Degree of protection			IP	14B	
Zmax			Ω	—	
Residual current circuit breaker			if required	type	
				—	
Electric heating element output			3 2 1 phase	kW kW kW	
				— — —	
Circulation pump power consumption, heating circuit			min. max.	W	
				— 310	
Other unit information					
Safety valve heating circuit Response pressure			included in scope of supply: • yes - no bar		— —
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 Heat quantity recording Extension board			incl. in scope of supply or integrated: • yes - no		• • •

*) compressor only, **) note local regulations

¹⁾ Indoor and outdoor installation

813576d

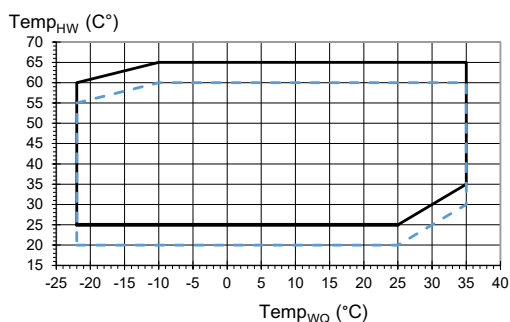
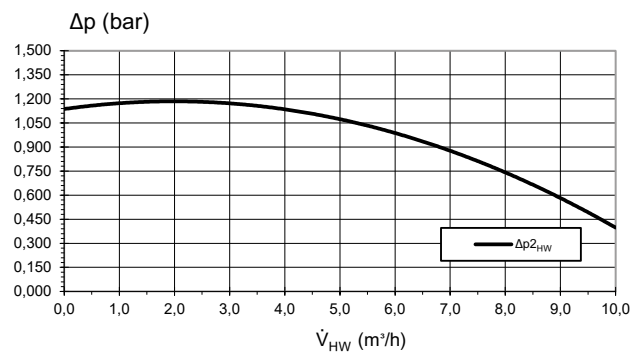
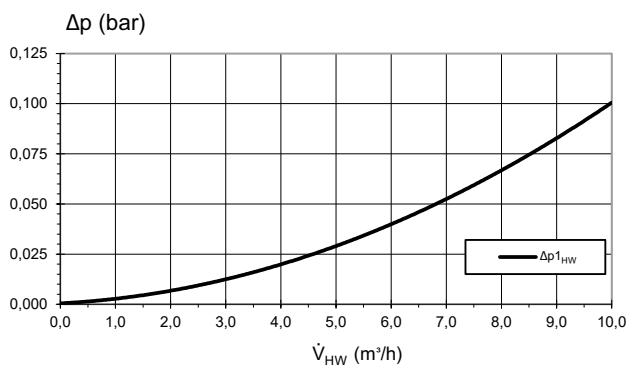
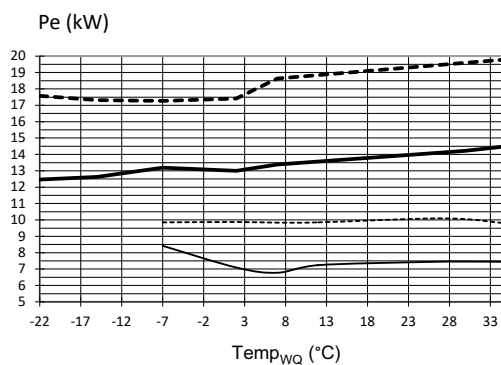
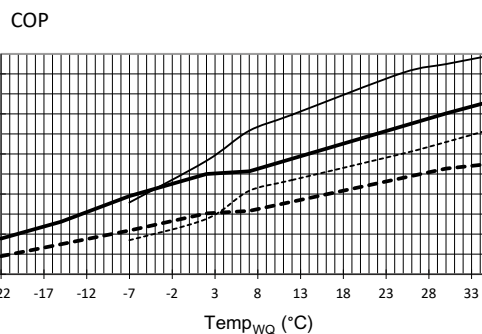
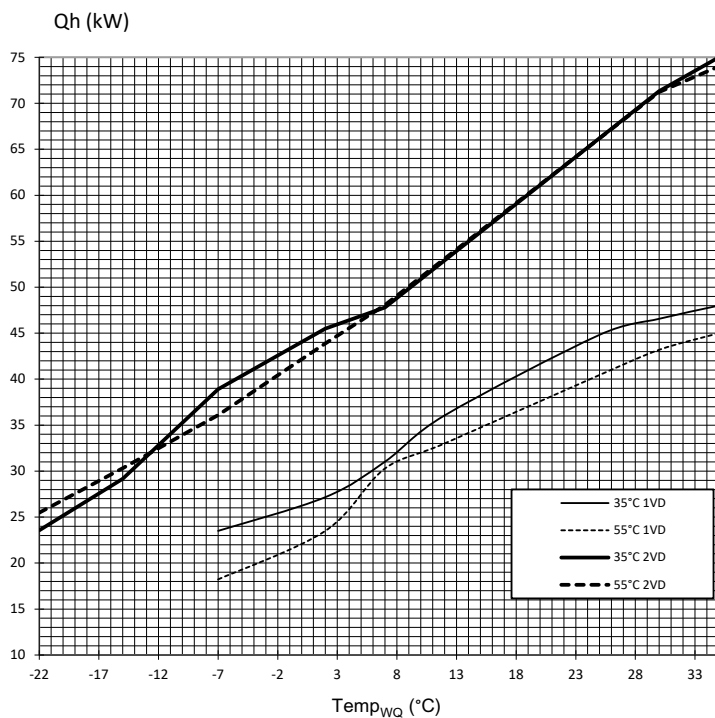
For indoor installation: Intake 1.5m air duct, Blow-out 1.5m air duct + air duct bend (original accessories)

The performance data and the operating limits apply to clean heat exchangers | Index: n



Performance curves / operating limits / heating

LWP 450AR3



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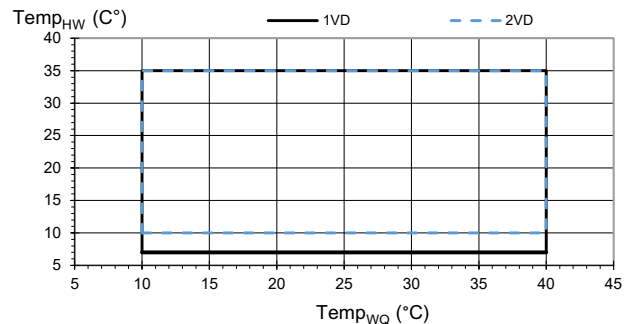
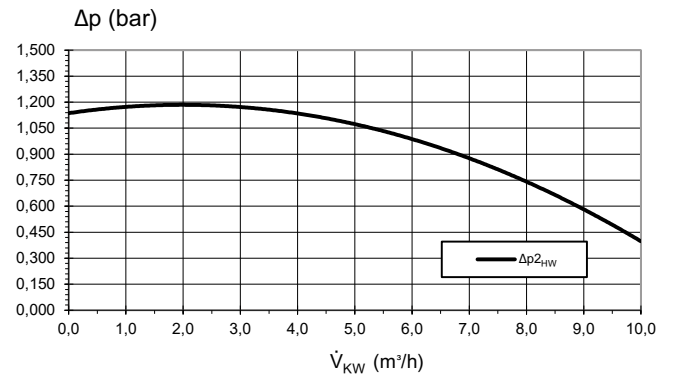
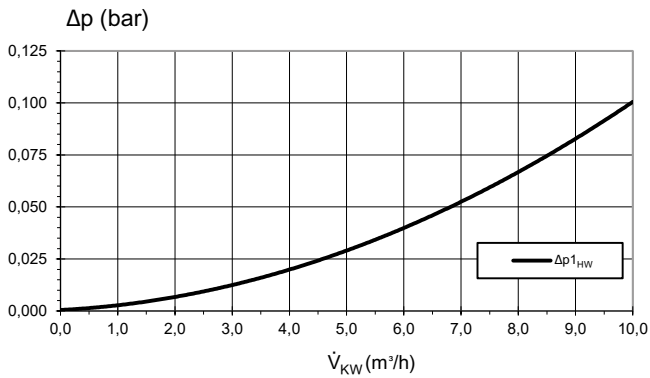
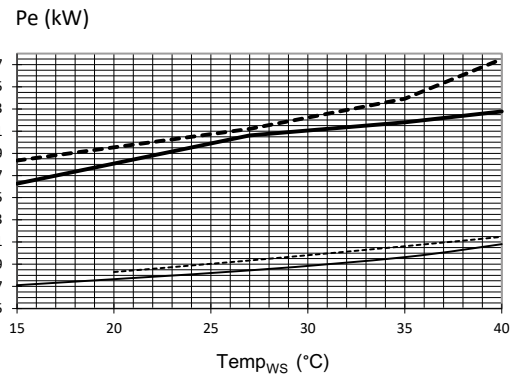
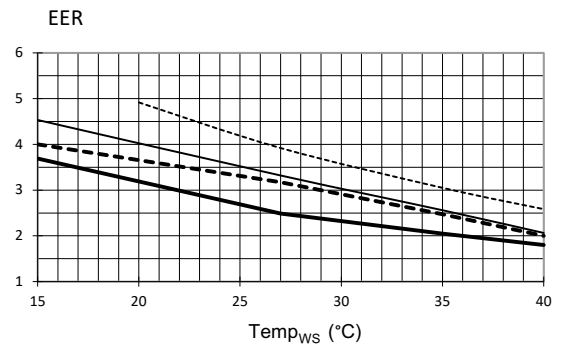
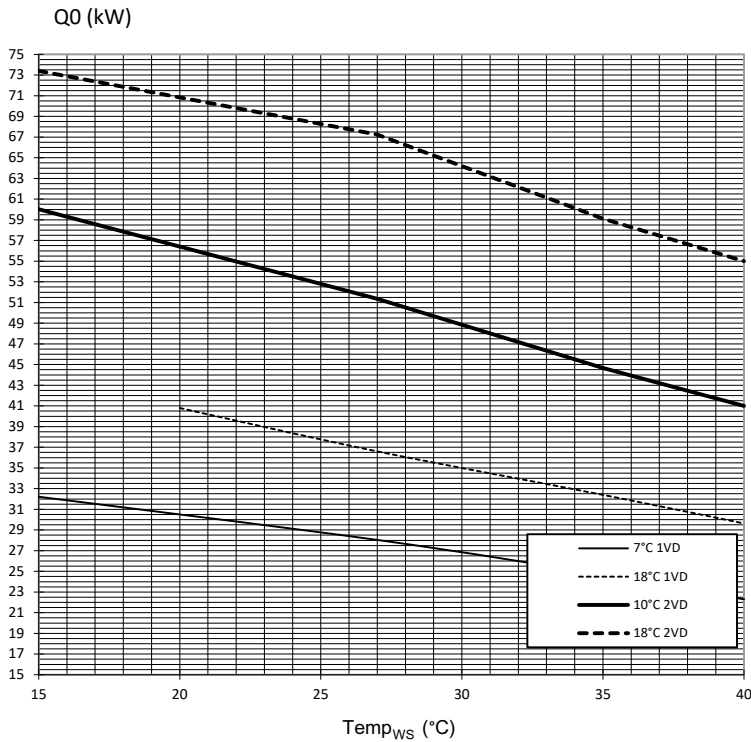
Keys UK823279d

\dot{V}_{HW}	Hot water volume flow rate
$Temp_{WQ}$	Heat source temperature
Q_h	Heating capacity
Pe	Power consumption
COP	Coefficient of performance
Δp_{1HW}	Pressure loss heat pump
Δp_{2HW}	Maximum free pressure heat pump
VD	Compressor
$Temp_{HW}$	Hot water temperature
—	Flow
- - -	Return



LWP 450AR3

Performance curves / operating limits / cooling



823279d

Keys UK823279d

\dot{V}_{KW}	Cooling water volume flow rate
$Temp_{WS}$	Heat sink temperature
Q0	Cooling capacity
Pe	Power consumption
EER	Energy efficiency ratio / cooling capacity index
Δp_{1HW}	Pressure loss heat pump
Δp_{2HW}	Maximum free pressure heat pump
VD	Compressor

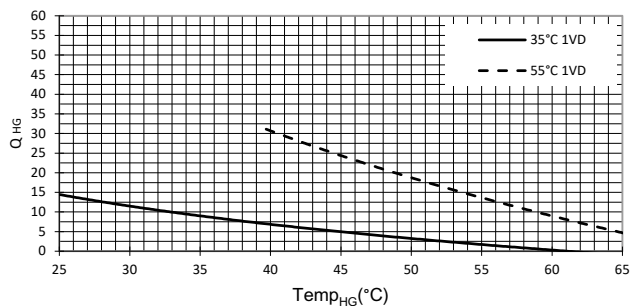
$Temp_{HW}$	Hot water temperature
$Temp_{WQ}$	Heat source temperature
—	Flow
- - -	Return



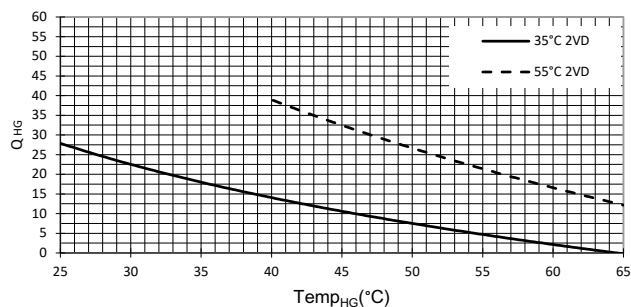
Performance curves / Heißgasnutzung

LWP 450AR3

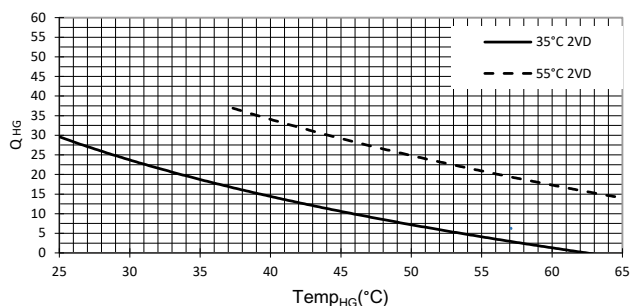
Hz A7



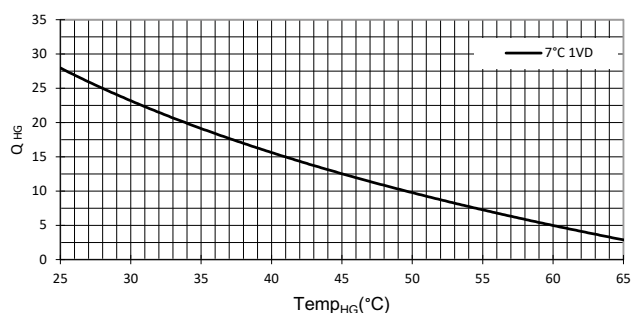
Hz A2



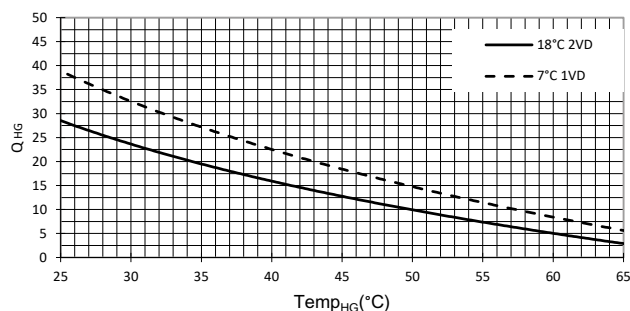
Hz A-7



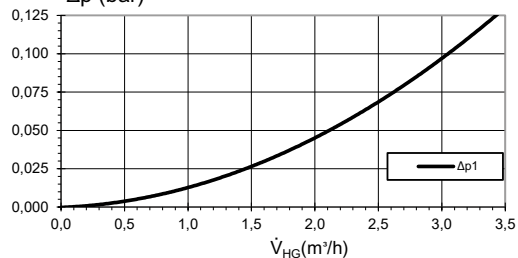
Kh A27



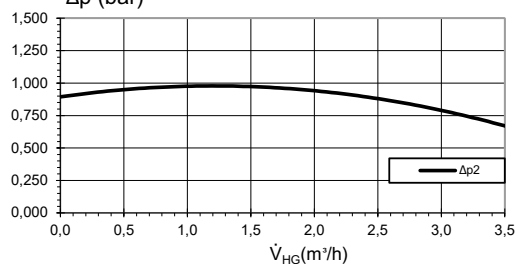
Kh A35



Δp (bar)



Δp (bar)



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Keys UK823279d

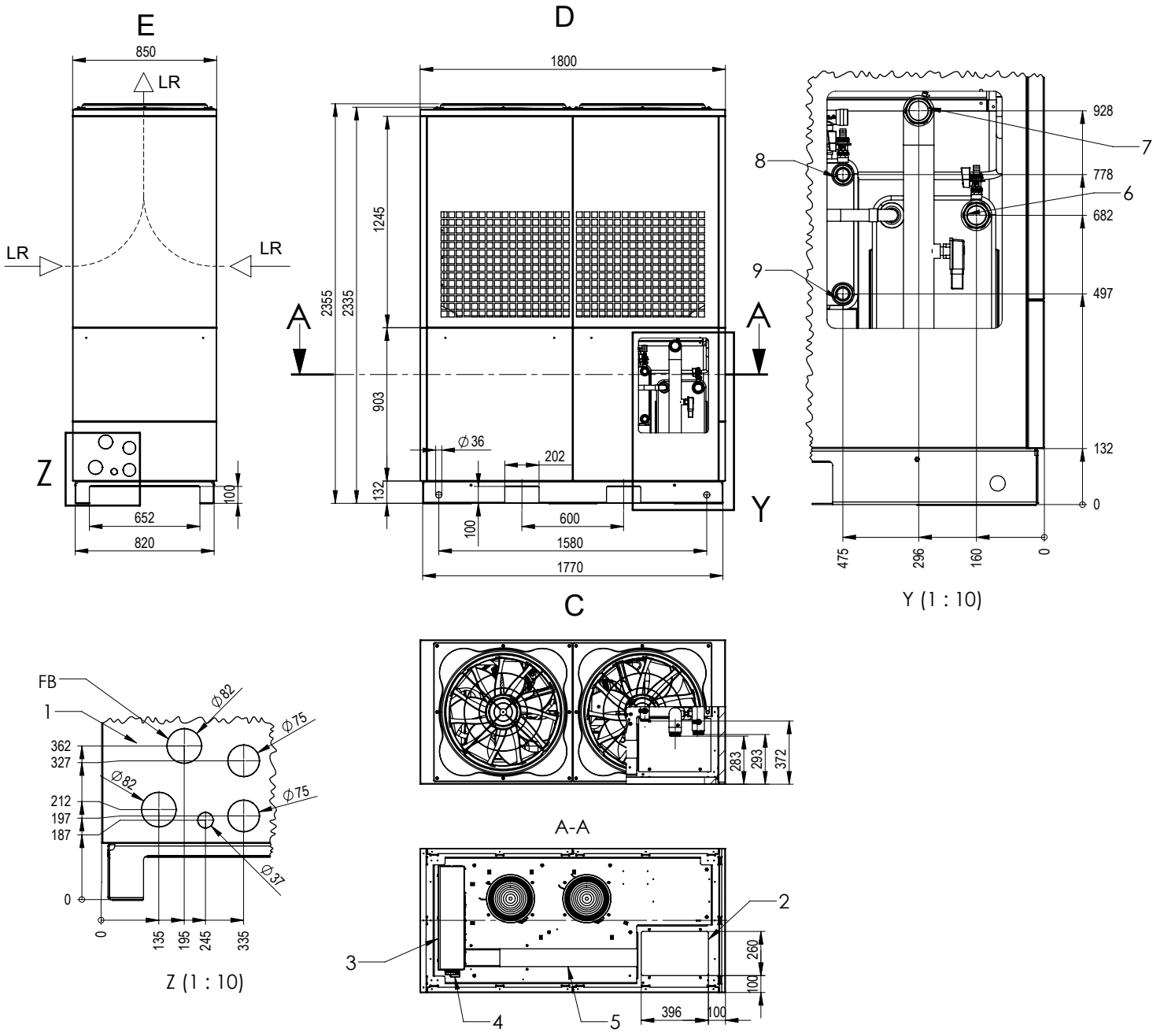
\dot{V}_{HG}	Volume flow rate hot gas use
$Temp_{HG}$	Temperature hot gas use
Q_{HG}	Capacity hot gas use
Δp_1	Pressure loss hot gas use
Δp_2	Free pressing max. hot gas use
VD	Compressor
Hz	Heating operation
Kh	Cooling operation

Data at nominal flow rate



LWP 450AR3

Dimensional drawings



Keys: 819491b

All dimensions in mm.

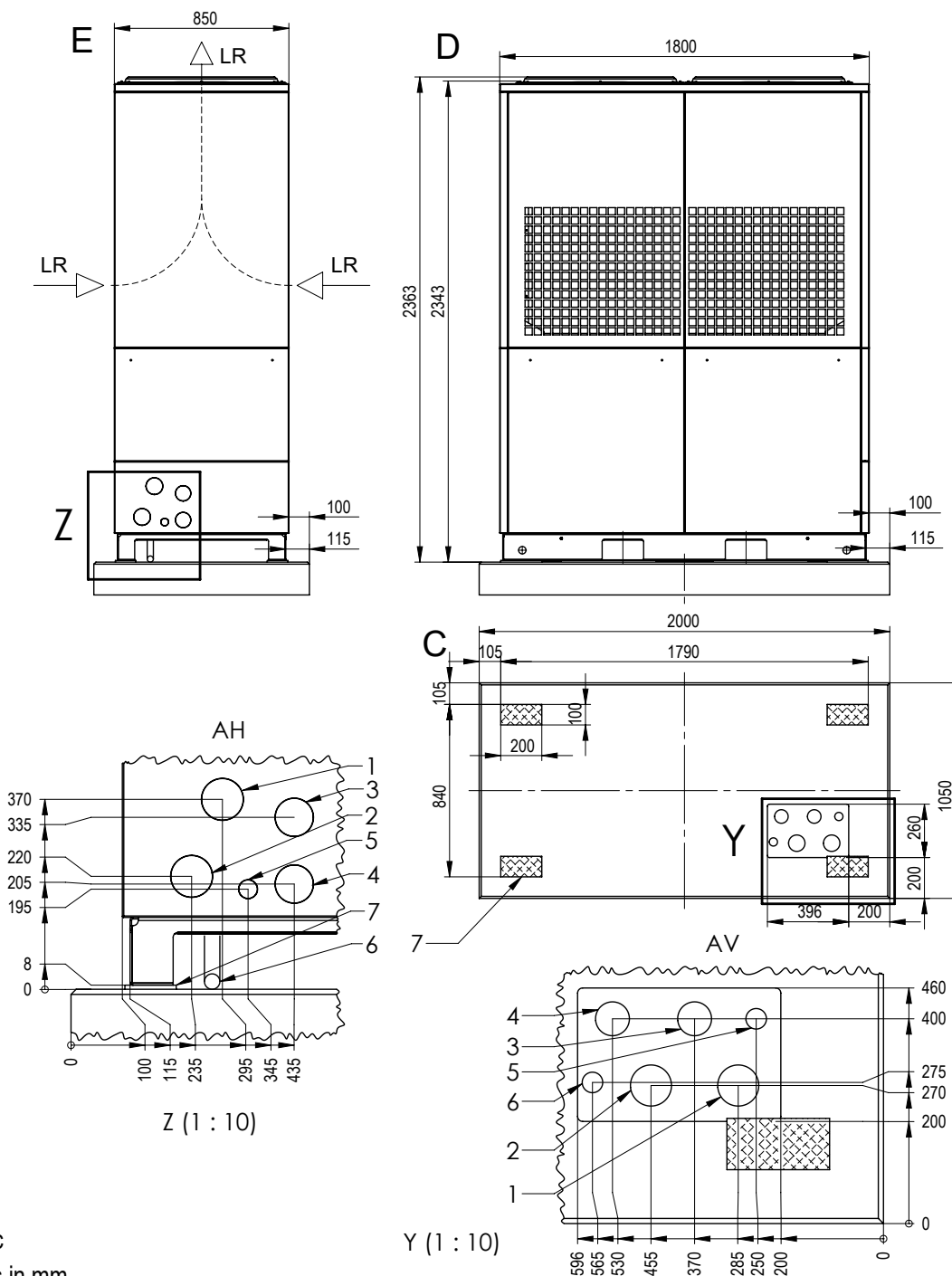
Pos.	Name
A	Cut A-A
E	Rear view
D	Side view from the right
C	Plan view
FB	Facing panel (break-out openings)
LR	Air direction
Y	Detailed view Y
Z	Detailed view Z

Pos.	Name
1	Horizontal connection area: water + condensate
2	Vertical connection area: water + condensate + feed-through electrical connections
3	Control cabinet
4	Main switch
5	Cable gland
6	Heating water outlet (flow) G 2" External thread, flat sealing
7	Heating water inlet (return) G 2" External thread, flat sealing
8	Hot water (hot gas) outlet (supply) G 1½" External thread, flat sealing
9	Hot water (hot gas) inlet (return) G 1½" External thread, flat sealing



Installation plan / base plan

LWP 450AR3



Keys: 819492c

All dimensions in mm.

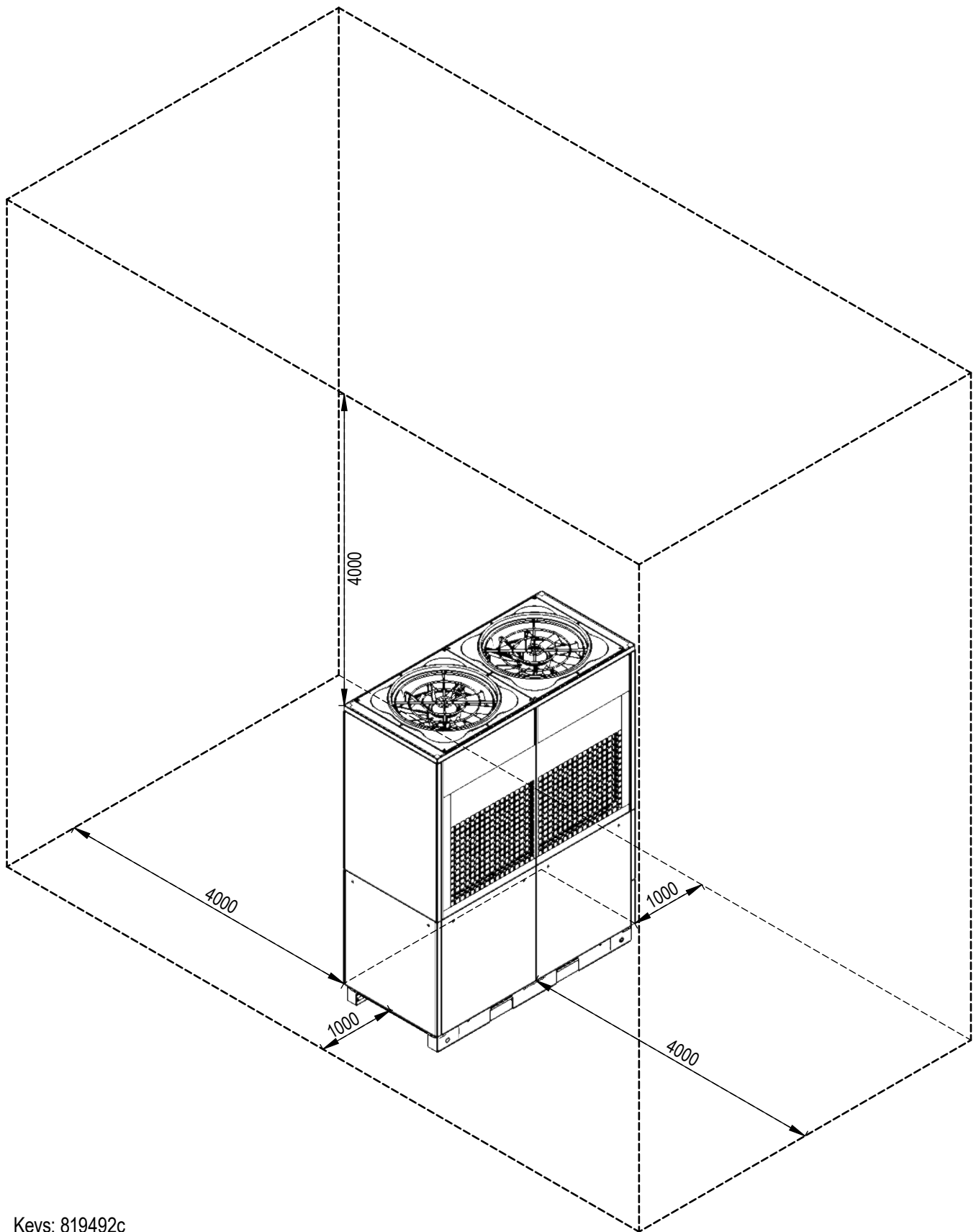
Pos.	Name
AH	Horizontal connection
AV	Vertical connection
E	Rear view
D	Side view from the right
C	Plan view of installation area
LR	Air direction
Y	Detailed view Y
Z	Detailed view Z

Pos.	Name
1	Hot water outlet (supply flow) DN 50 + insulation
2	Hot water inlet (return flow) DN 50 + insulation
3	Hot water HG outlet (supply flow) DN 40 + insulation
4	Hot water HG inlet (return flow) DN 40 + insulation
5	Condensation hose, external-Ø36x3 + insulation
6	Pass-through of electrical connection lines
7	Device installation surface, on anti-slip mats (4 off)



LWP 450AR3

Minimum clearances

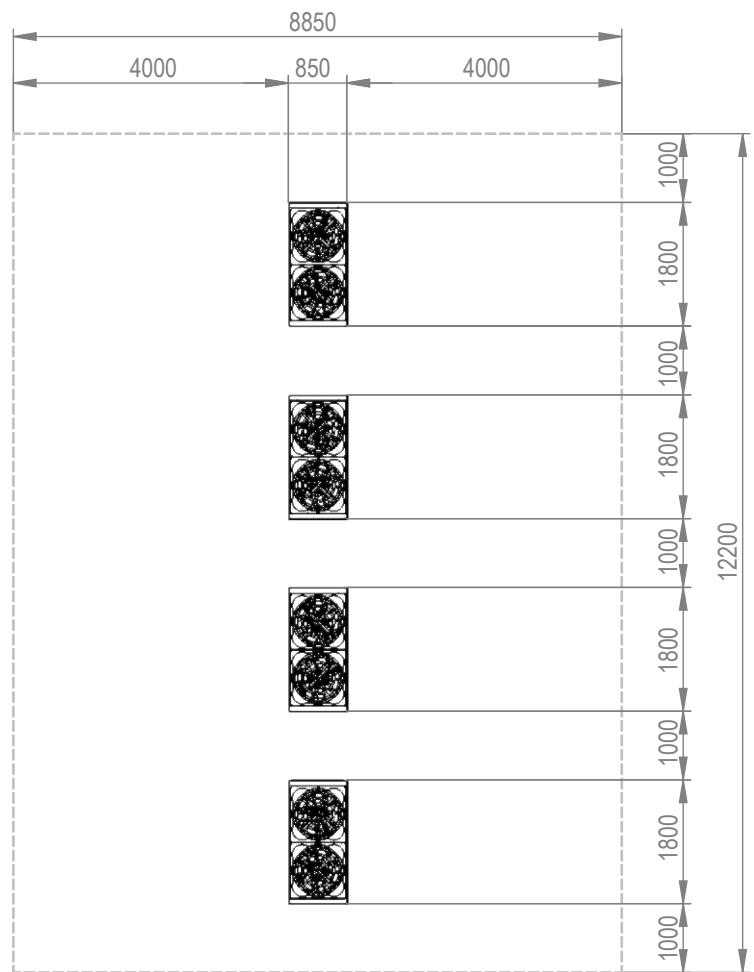
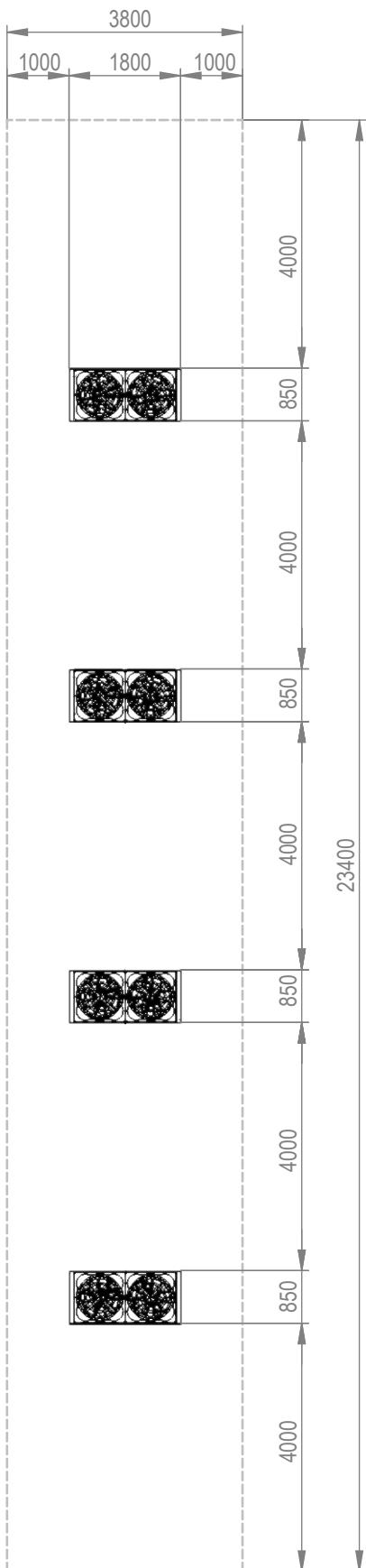


Keys: 819492c
Minimum clearances
All dimensions in mm.



Minimum clearances parallel connection

LWP 450AR3



Preferred installation variant air side

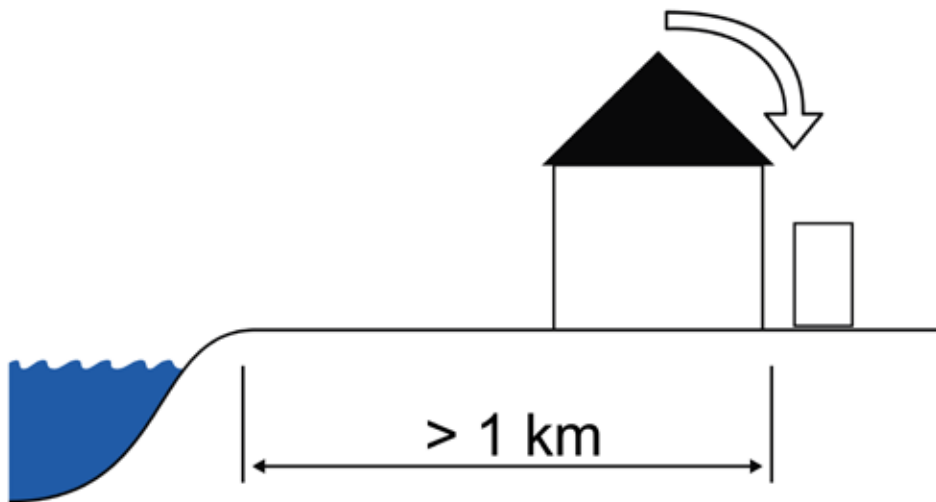
Keys: 819492c
Parallel connection: 4 devices.
Minimum clearances
All dimensions in mm.



IMPORTANT

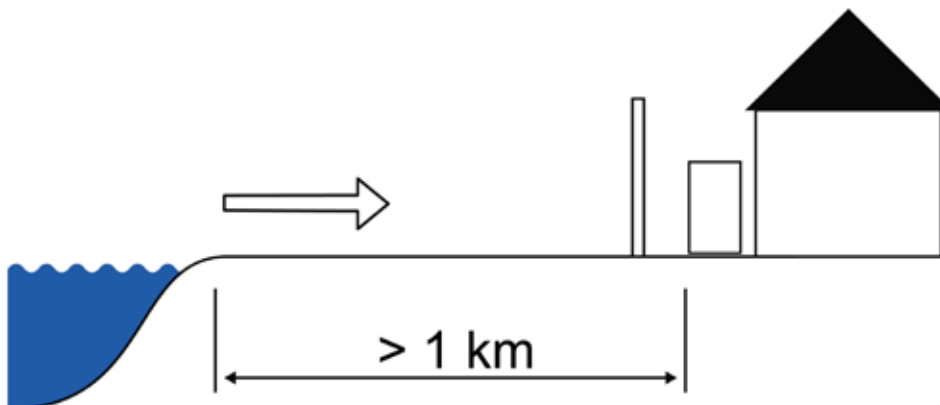
The minimum distances necessary for correct and safe operation as well as any service work must be observed.

- 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

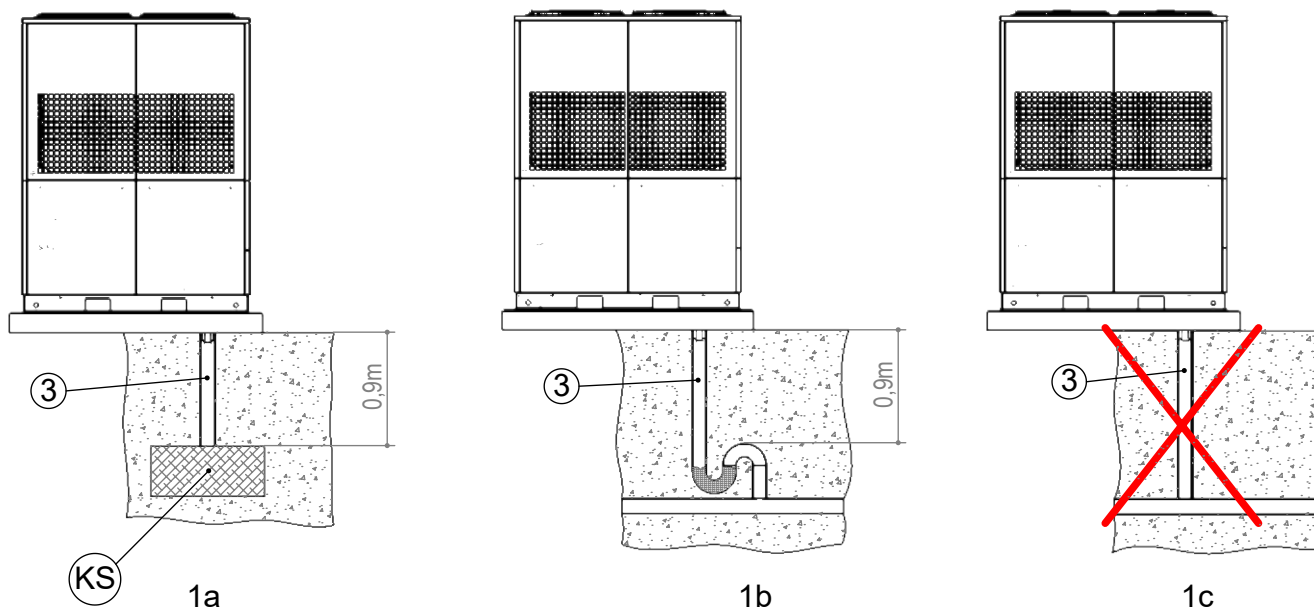
- ✓ in an area near a wall
- ✓ an impermeable windbreak resistant to onshore winds is installed
- ✓ Height and width of the windbreak $\geq 150\%$ of the device dimensions
- ✓ not in sandy surroundings (to avoid the influx of sand)





External condensate line connection

LWP 450AR3



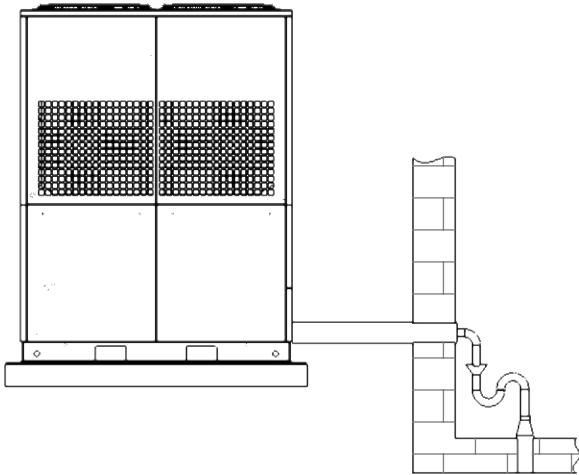
Keys: 819492c

Pos.	Name
KS	Gravel layer for accepting up to 700 l of condensate water per day to seep away as a buffer zone
3	Condensate drain pipe DN40 (to be provided on site by the customer)

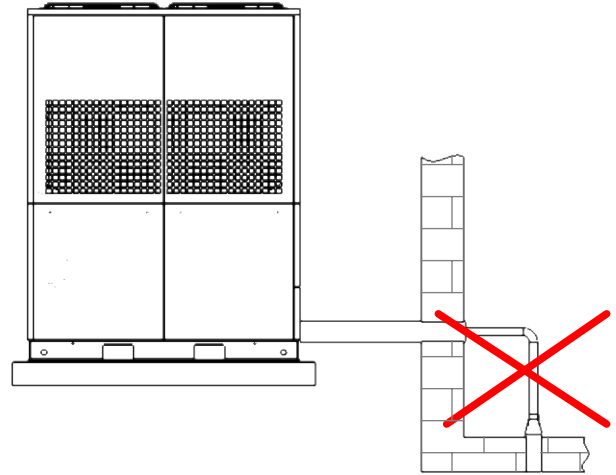
Important: If the condensate water is directly introduced to the earth (illustration 1a), the condensate drain pipe (3) must be insulated between the ground and the heat pump.

Important: If the condensate water is directly introduced to a waste water or rainwater line, a trap must be used (illustration 1b). An insulated plastic pipe must be laid vertically above ground. Furthermore, no non-return valves or similar devices may be installed in the drain pipe. The condensate drain pipe must be connected such that the condensate can flow freely into main line. If the condensate is discharged into drains or sewers, ensure laying with a gradient.

In all cases (illustrations 1a and 1b), it is necessary to ensure that the condensed water is routed in such a way as to be protected from frost.



2a



2b

Keys: 819492c

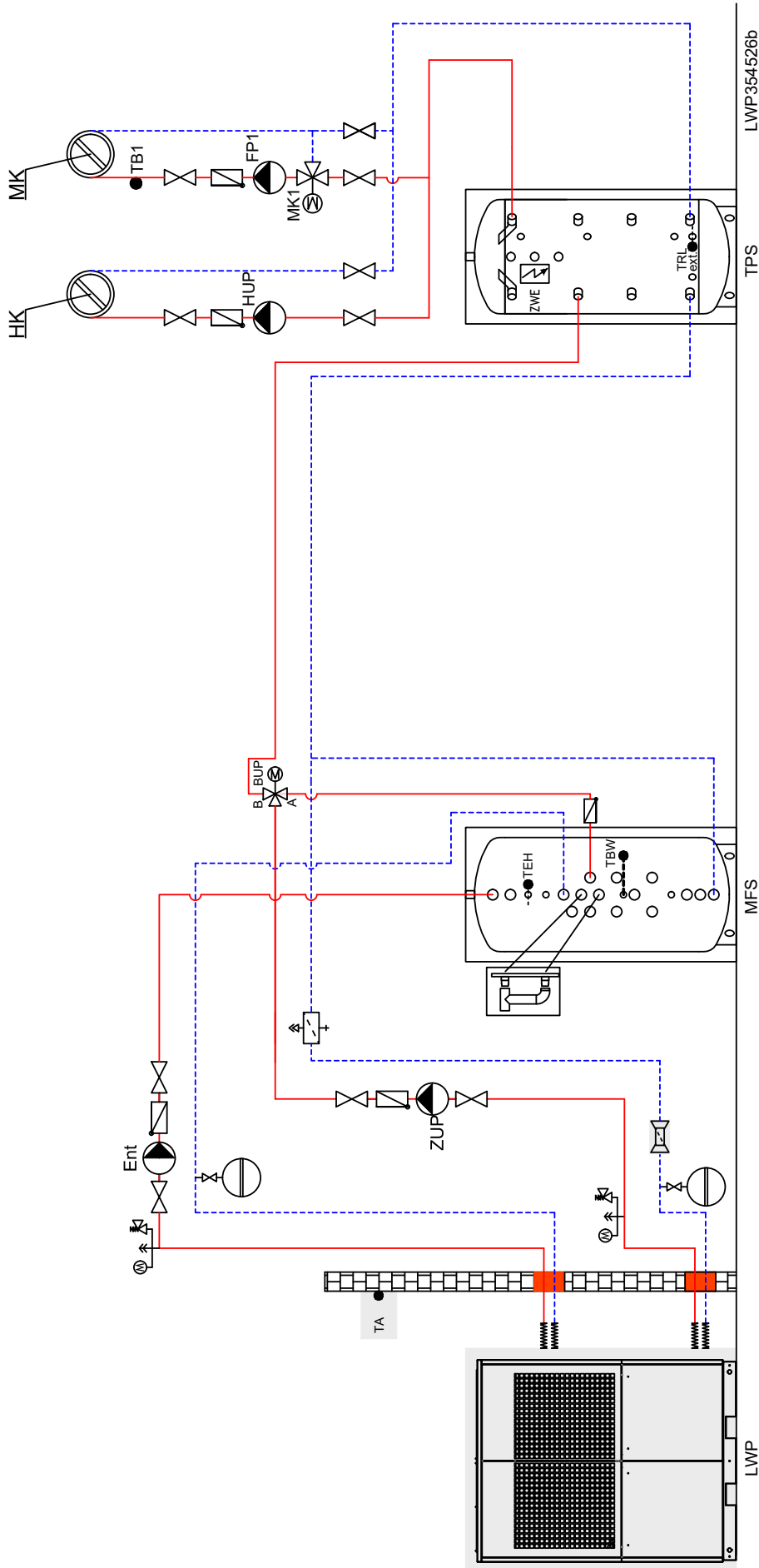
Important: If the condensate line is connected inside a building, a waste trap must be installed (see figure 2a).

No additional drain pipes may be connected to the condensate drain pipe of the heat pump.

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



LWP 450AR3 with multifunction tank as domestic hot water tank Heating



NOTE

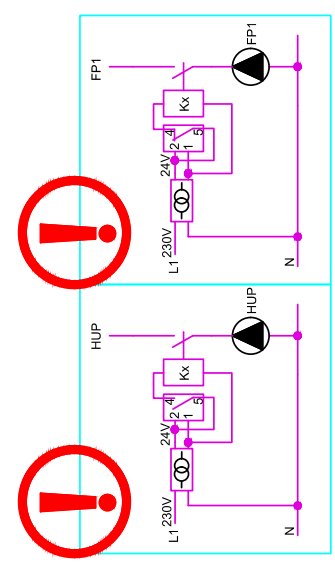
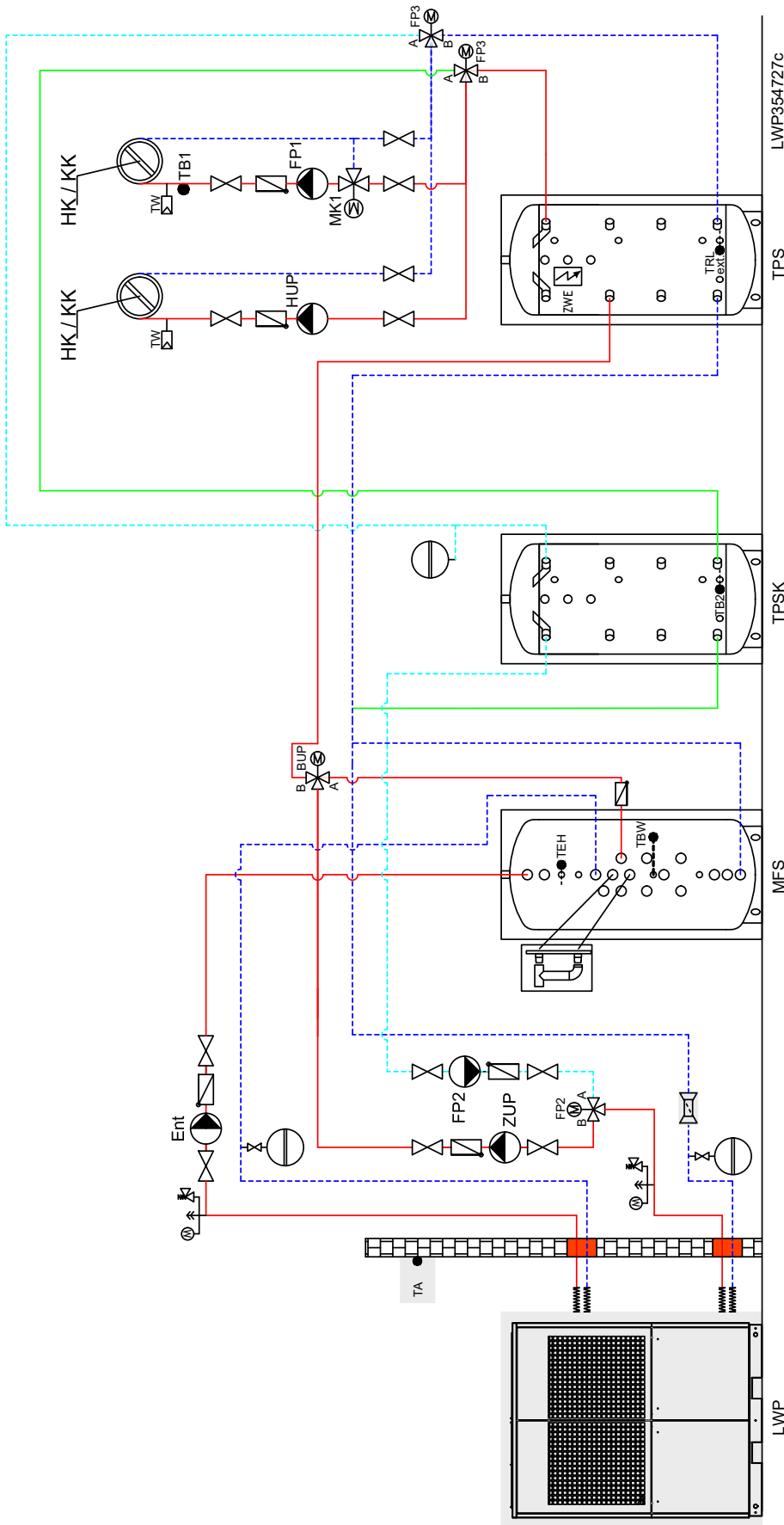


This schematic diagram is an example of a system without shut-off and safety devices, and it does not replace the technical planning and design on site. All regional standards, laws and regulations must be observed. The pipe dimensions must be carefully planned and designed.



LWP 450AR3 with multifunction tank as domestic hot water tank

Heating and cooling



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		Gas- or oil-boiler
	Shut-off device and drainage		Wood boiler
	Shut-off device with dirt trap		Brine pressure switch
	Safety group		Swimming pool heat exchanger
	Shut-off device		Separation heat exchanger / intermediate heat exchanger
	Circulation pump		Solar domestic hot water tank
	Non return valve/ one way valve		Pipe lead-in
	Overflow valve		Fresh water station (TWS)
	Membrane expansion vessel		Room control unit
	Second heat generator (ZWE)		Dew-point monitor
	3-way mixing valve / switching valve		Supply heat pump
	4-way mixing valve / switching valve		Circulation pump / switching valve domestic hot water
	Dirt-trap (max. 0.6 mm mesh)		Mixer circuit 1/2/3 (heating or cooling function)
	Wall breakthrough		Circulation pump heating circuit
	Brine manifold		Circulation pump / switching valve
	Ground slinkies		Feed circulating pump
	Ground collector		Circulation pump
	Flow switch		Domestic hot water charging pump
	Groundwater spring pump with flow direction groundwater		Heat source circulation pump
	Buffer tank:		Outdoor temperature sensor
	- TPS Stratified storage tank		Sensor domestic hot water
	- RPS Series buffer tank		Sensor mixer circuit
	- TPSK Stratified storage tank (cooling)		Sensor external return
	- WTPSK Stratified storage tank, wall-mounted (cooling)		Sensor return
	Multifunction tank		Flow sensor
	Domestic hot water tank		Sensor desuperheater
	Volume flow meter		Heating circuit
	Heat meter		Heating mixing circuit
			Cooling circuit
			Cooling mixing circuit
			Safety package primary
			Safety package secondary
			Circulation pump desuperheater
			Controls supplied by customer

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

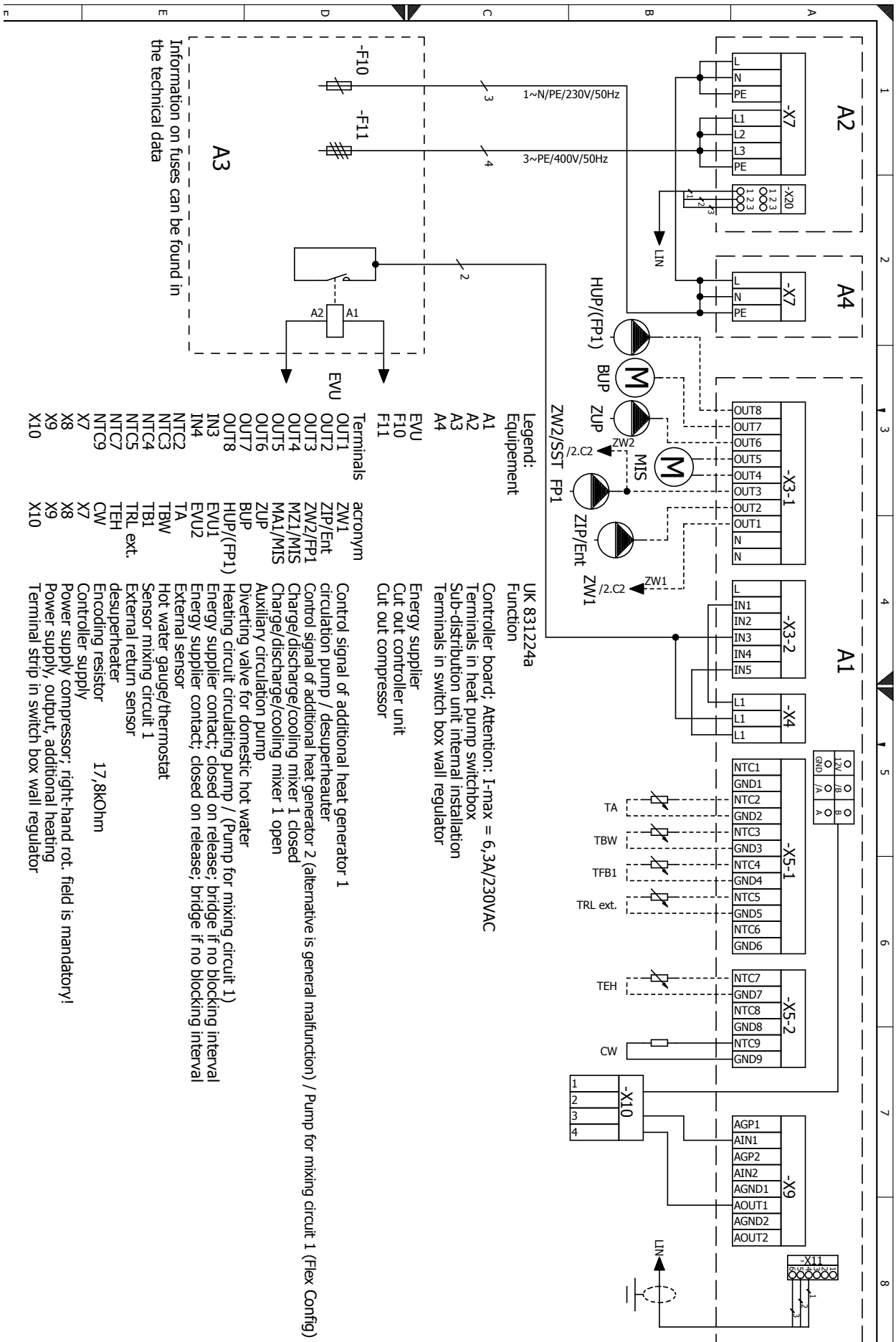
Controls supplied by customer / on-site components:
 Parts and components shown in the colour "grey" must be provided by the customer and also operated with a regulation provided by the customer.
 The temperature difference control SLP of the additional board is excepted from this.

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).



Wall-mounted controller

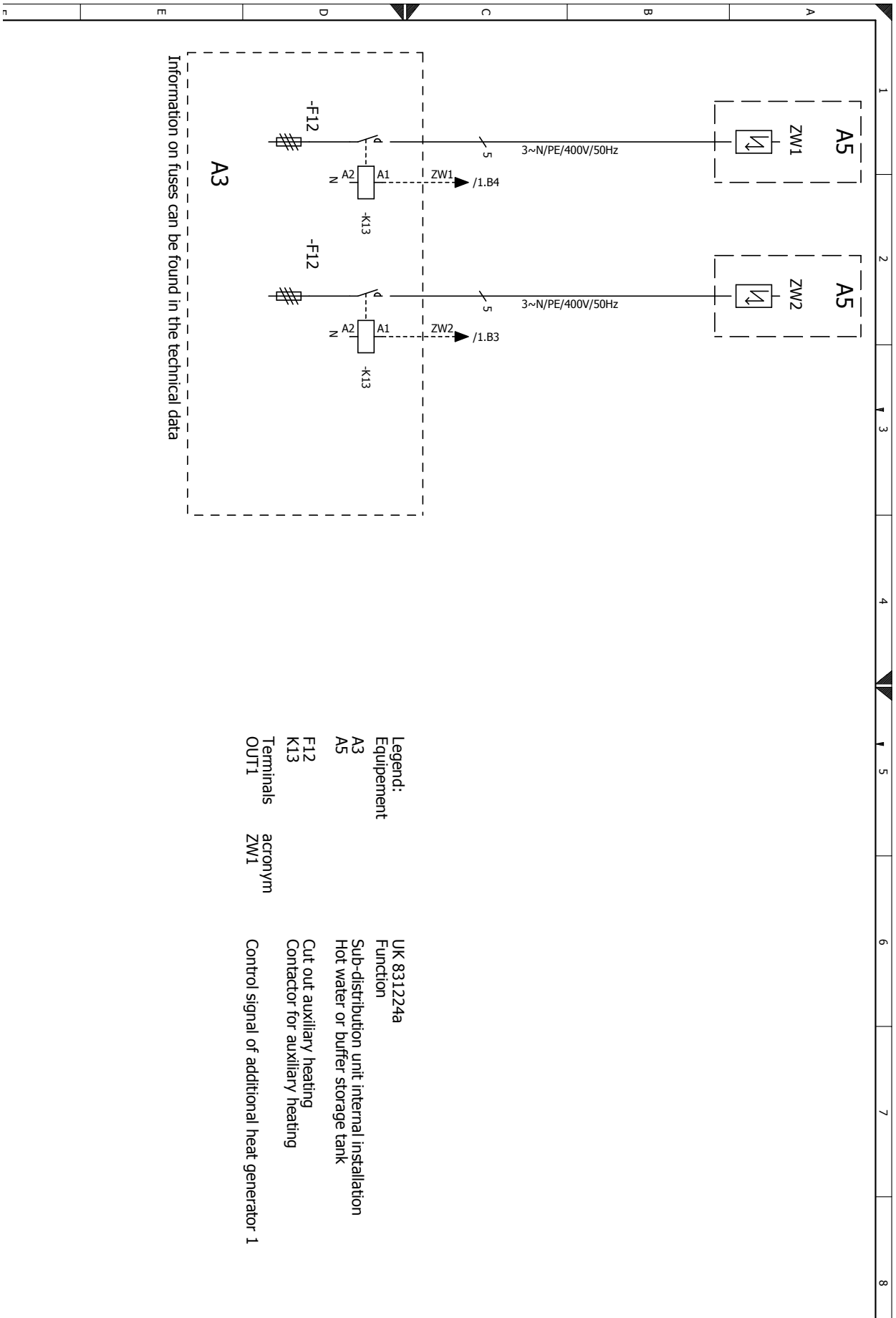
LWP 450AR3 Terminal diagram 1/2





LWP 450AR3 Terminal diagram 2/2

Wall-mounted controller

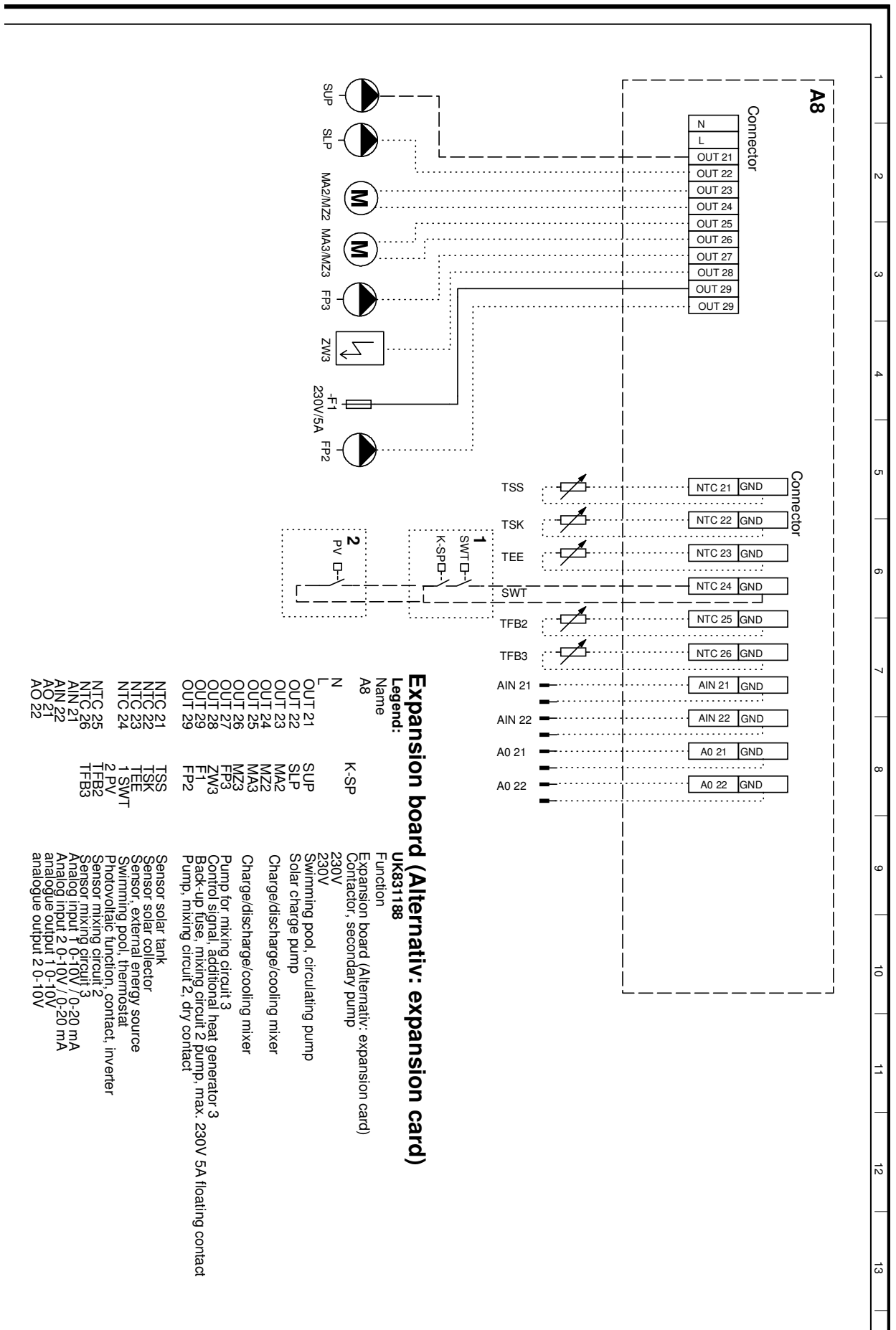


- | | |
|-----------|---|
| Legend: | UK 831224a |
| Equipment | Function |
| A3 | Sub-distribution unit internal installation |
| A5 | Hot water or buffer storage tank |
| F12 | Cut out auxiliary heating |
| K13 | Contact for auxiliary heating |
| Terminals | Control signal of additional heat generator 1 |
| OUT1 | |
| ZW1 | acronym |



Expansion board

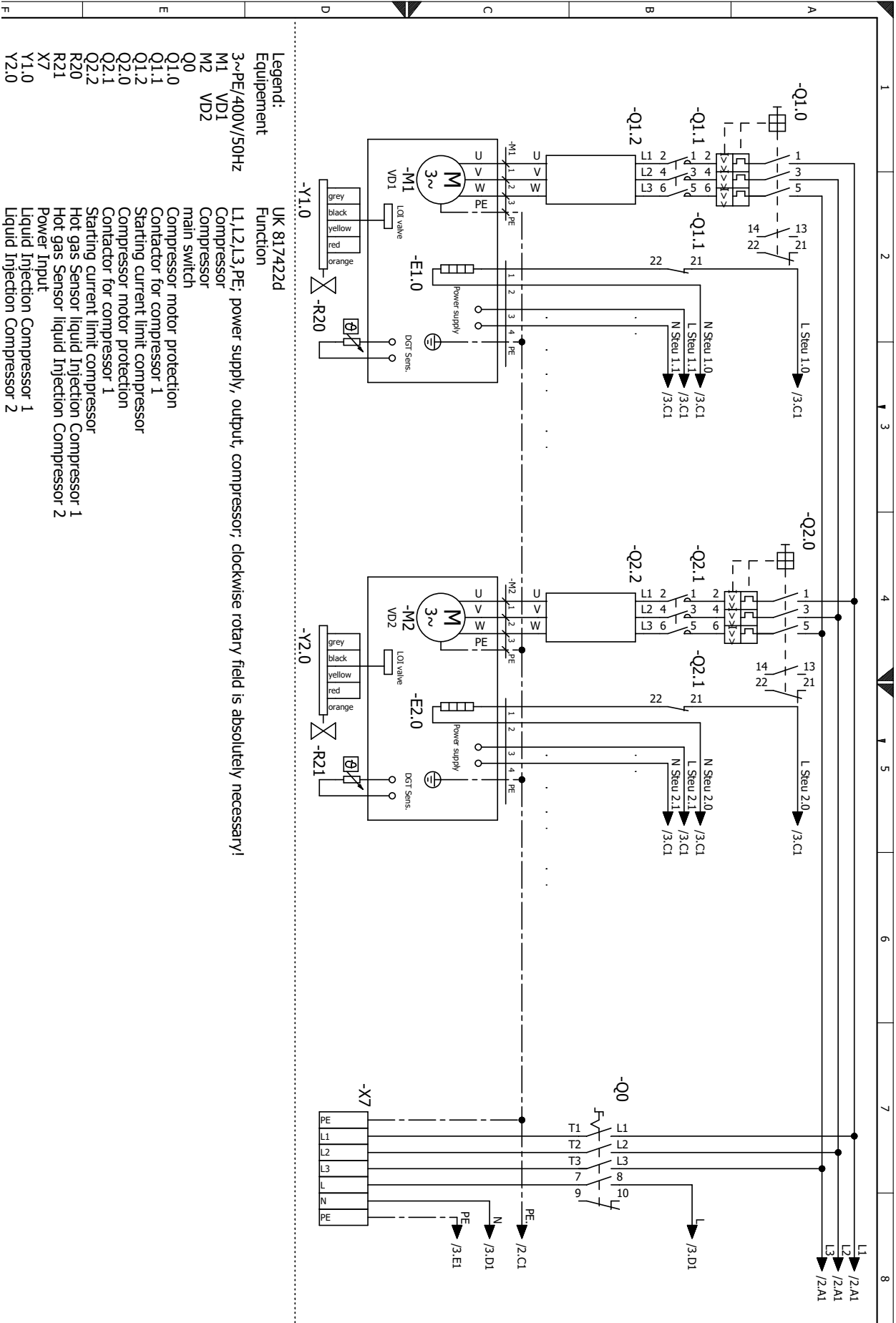
LWP 450AR3 Terminal diagram

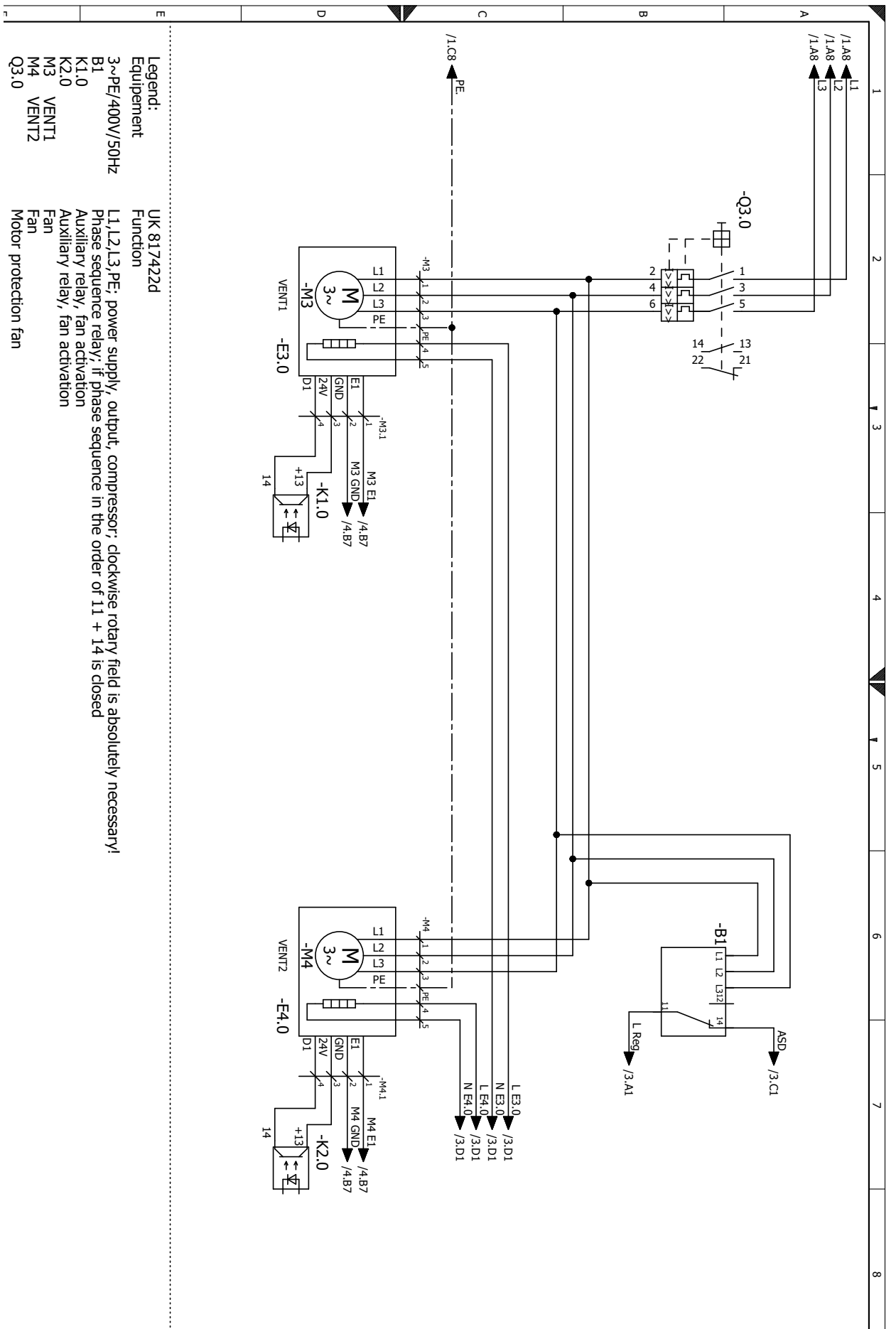




Circuit diagram 1/4

LWP 450AR3

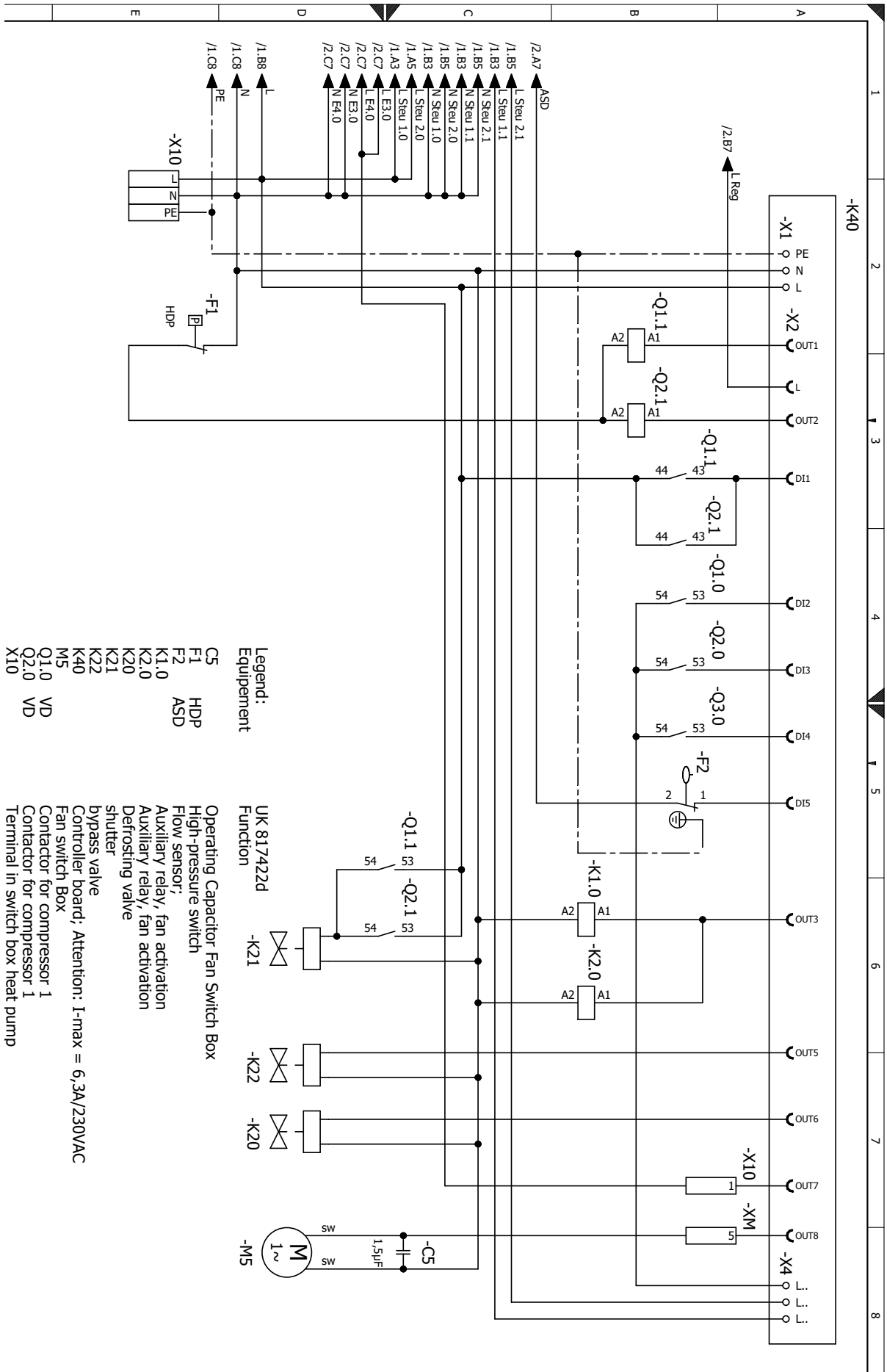




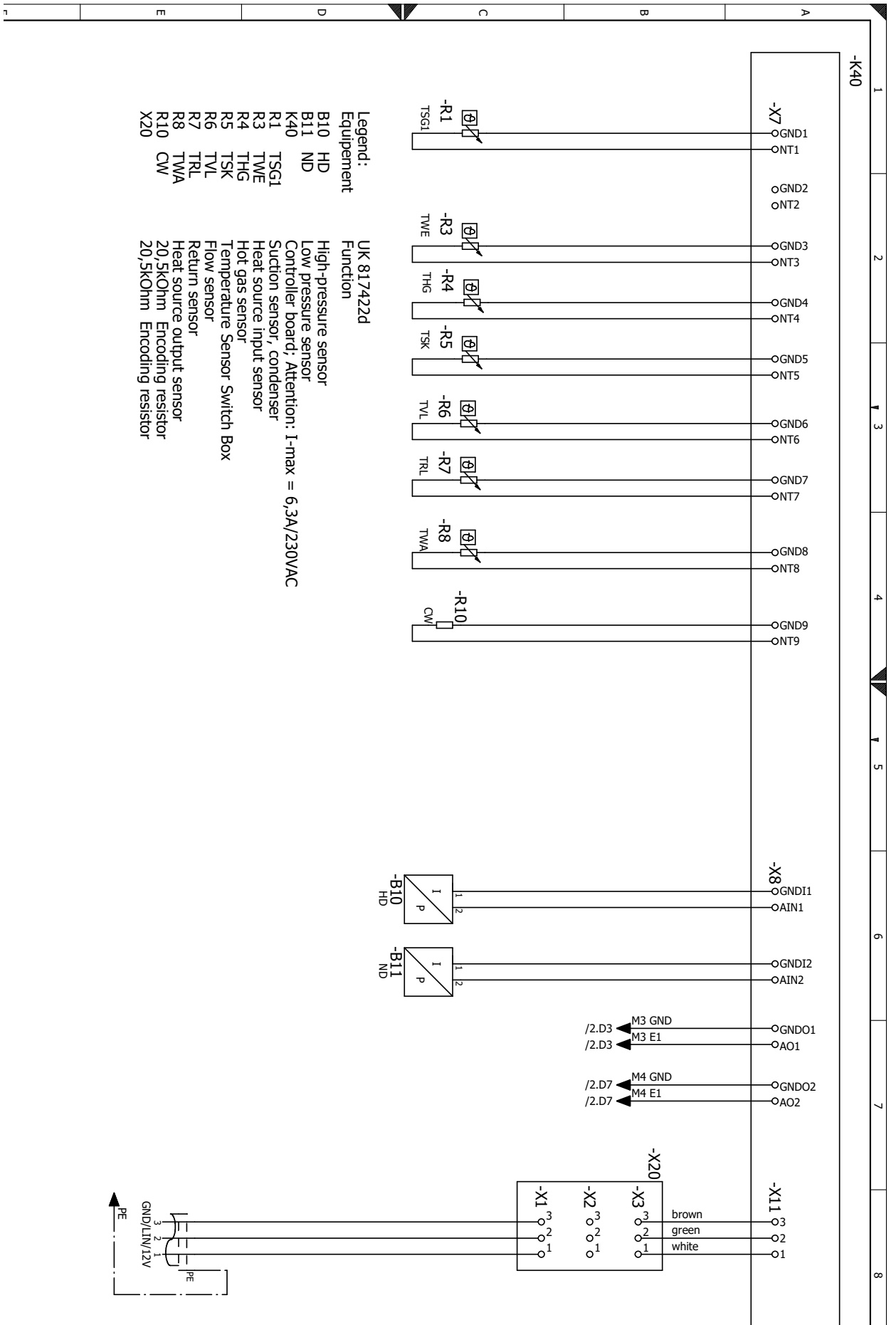


Circuit diagram 3/4

LWP 450AR3



- Legend:**
- | | | |
|-----------|------------|--|
| Equipment | UK 817422d | Function |
| C5 | | Operating Capacitor Fan Switch Box |
| F1 | | High-pressure switch |
| F2 | | Flow sensor |
| K1.0 | | Auxiliary relay, fan activation |
| K2.0 | | Auxiliary relay, fan activation |
| K20 | | Defrosting valve |
| K21 | | shutter |
| K22 | | bypass valve |
| K40 | | Controller board; Attention: I-max = 6,3A/230VAC |
| M5 | | Fan switch Box |
| Q1.0 | | Contactor for compressor 1 |
| Q2.0 | | Contactor for compressor 1 |
| VD | | Terminal in switch box heat pump |
| X10 | | |











ait-deutschland GmbH
Industriestraße 3
D-95359 Kasendorf

E info@alpha-innotec.de
W www.alpha-innotec.de

alpha innotec – an ait-deutschland GmbH brand