



NOVELAN



OPERATING MANUAL

LAV-SERIES

**AIR/WATER
HEAT PUMPS**

Outdoor installation

www.novelan.com



Table of contents

1	About this operating manual	3	13	Faults	20
1.1	Validity	3	14	Dismantling and disposal	20
1.2	Reference documents	3	14.1	Dismantling	20
1.3	Symbols and markings	3	14.2	Disposal and recycling	20
1.4	Contact	4		Technical data / scope of supply	21
2	Safety	4		Performance curves	22
2.1	Intended use	4		LAV 8.2R1/3	22
2.2	Personnel qualifications	4		LAV 12.2R3	24
2.3	Personal protective equipment	4		Dimensional drawings	26
2.4	Residual risks	5		Installation plans	28
2.5	Disposal	5		Minimum clearances	28
2.6	Avoid material damage	5		Connection set IPWAV vertical	29
3	Description	6		Surface foundation	30
3.1	As-delivered condition	6		Strip foundation	31
3.2	Design	6		Connection set WDFAV horizontal	32
3.3	Accessories	7		Surface foundation	33
3.4	Function	7		Strip foundation	34
4	Operation and care	8		With condensate drain vertical	35
4.1	Energy and environmentally aware operation	8		Coastal installation	36
4.2	Care	8		Condensate line connection	37
5	Delivery, storage, transport and installation	8		External condensate line connection	37
5.1	Scope of supply	8		Internal condensate line connection	38
5.2	Storage	8		Hydraulic integration	39
5.3	Unpacking and transport	9		LAV with hydraulic station	39
5.4	Installation	10		LAV with buffer tank in series and hydraulic module	40
5.5	Attach the side panel, the rear panel, the cover and the front panel	11		LAV with separation buffer tank	41
6	Installation of hydraulic system	11		Keys hydraulic integration	42
7	Electrical installation	12		Circuit diagrams	43
8	Flushing, filling and venting	16		LAV 8.2R1/3	43
8.1	Heating water quality	16		LAV 12.2R3	48
8.2	Flushing, filling and venting the heating circuit	17			
9	Insulation of hydraulic connections	17			
10	Setting the overflow valve	17			
11	Commissioning	18			
12	Maintenance	19			
12.1	Basic principles	19			
12.2	Maintenance after commissioning	19			
12.3	Maintenance as required	19			
12.4	Cleaning and flushing the condenser	20			
12.5	Annual maintenance	20			



1 About this operating manual

This operating manual is an integral part of the unit.

- ▶ Before working on or with the unit, always read the operating manual carefully and follow it for all activities at all times, especially the warnings and safety instructions.
- ▶ Keep the operating 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 operating manual refers solely to the unit identified by the nameplate and unit sticker (→ "Nameplates", page 7).

1.2 Reference documents

The following documents contain additional information to this operating manual:

- Heat pump guide, hydraulic integration
- Operating manual of the heating and heat pump controller
- Short description of the heat pump controller
- Operating manual of the extension board (accessories)
- Log book

1.3 Symbols and markings

Identification of warnings

Symbol	Meaning
	Safety-relevant information. Warning of physical injuries.
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
▶	Single-step instruction for action
1., 2., 3., ...	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



1.4 Contact

Addresses for purchasing accessories, for servicing 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.novelan.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 operating manual.

2.1 Intended 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
- ▶ Intended use includes complying with the operating conditions (→ “Technical data / scope of supply”, page 21) and the operating manual and observing the reference documents.
- ▶ If local regulations apply, observe: laws, standards and directives.

All other use of the unit is interpreted as not 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 and skilled personnel are able to carry out the work on the unit safely and correctly. Interference by unqualified personnel can result in fatal injuries and material damage.

- ▶ Ensure that the personnel are familiar with the local regulations, especially those relating to working safely and in awareness of the hazard risks.
- ▶ Ensure that the personnel are qualified to handle 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, service work and repairs 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 opening the unit casing:

- ▶ Disconnect the unit from 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 with fan protection grilles 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

The unit contains harmful and environmentally dangerous refrigerant. If refrigerant leaks out of the unit:

1. Switch off the 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, as well as 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 for 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 will be 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 operating manual for all work on and with the unit.

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

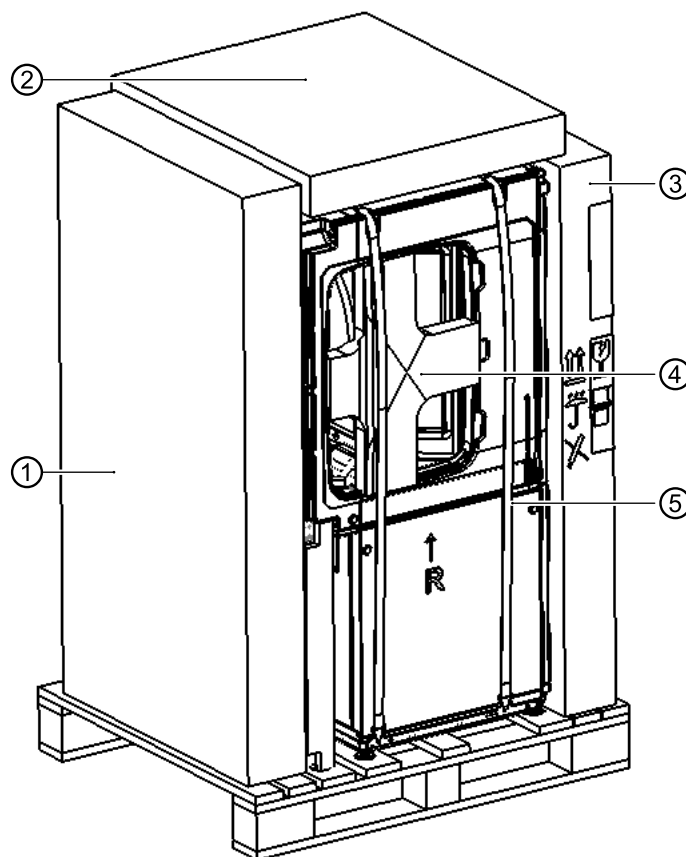
The efficiency of the system and the service life of the heat generator and the heating components depend decisively on the quality of the heating water.

If the system is filled with untreated drinking water, calcium and magnesium precipitate as mineral scale. Lime scale deposits accumulate on the heat transfer surfaces of the heating. The 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 As-delivered condition



- 1 Side panels with design grilles
- 2 Base frame, sheet metal supports for the fan module
- 3 Front panel, cover, rear panel
- 4 Supporting crosspiece (left and right; only remove after positioning at the final installation site!)
- 5 Carrying straps (with openings for carrying)

3.2 Design

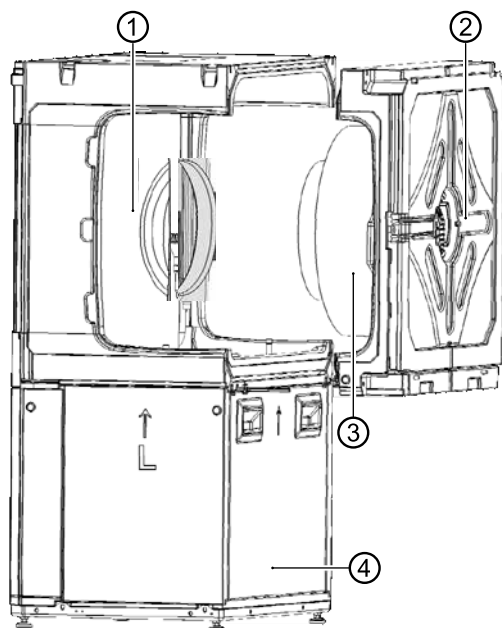


NOTE

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

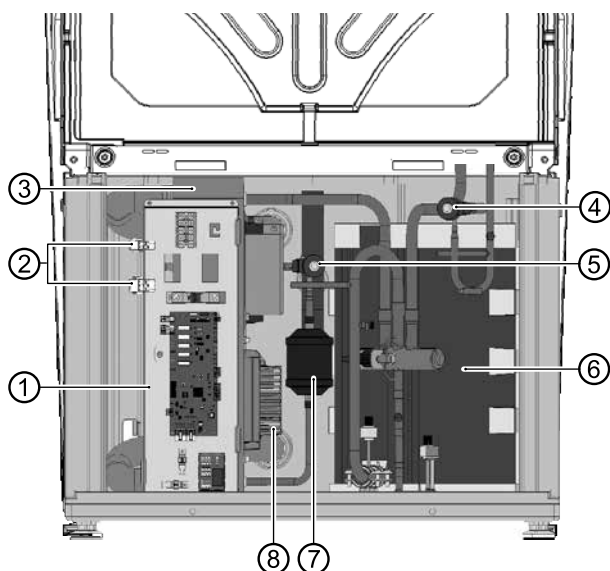


The heat pump module



- 1 Evaporator module
- 2 Fan module (can be removed if required)
- 3 Fan (radial)
- 4 Cooling circuit module

The cooling circuit module



- 1 Electrical switch box
- 2 Plug connection to the fan module
- 3 Condenser
- 4 Expansion valve (heating)
- 5 Expansion valve
- 6 Compressor (in insulation housing)
- 7 Filter dryer
- 8 Inverter unit

Nameplates

One nameplate is attached to the heat pump module in the rear facade cut-out at the factory.

Two further nameplates are included in the delivery.

- ▶ Stick one nameplate on the outside of the unit on the lower facade of the switch box side.
- ▶ Glue one nameplate into the logbook for heat pumps.

The nameplates contain the following information at the very top:

- Model, item number
- Serial number

The nameplates also contain an overview of the most important technical data.

3.3 Accessories

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

- Hydraulic connection set
- Electrical connection kit
- Air / magnetic sludge separator
- Domestic hot water tank
- Buffer tank
- Room thermostat for switching the cooling function
- Dew point monitor for protecting a system with cooling function at low flow temperatures
- Room control panel for controlling the main functions at the living quarters
- Extension board

3.4 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 with high temperature is liquefied (condenser).

Here, the high temperature is transferred to the heating water and used in the heating circuit. The liquid refrigerant with 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 the 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 integrated vibration decoupling for the hydraulic system prevents structure-borne sound and vibrations from being transferred to the fixed pipes and thus to the building.

Cooling

Cooling 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 hydraulic module or hydraulic station up to a minimum flow temperature of 18 °C. 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

Network connection on the control panel

The control panel can be connected to a computer or network via a network cable. The heating and heat pump controller can then be controlled from the computer or from the network. Furthermore, the manufacturer's internet-based service can also be used.

4 Operation and care



NOTE

The unit is operated via the control panel of the heating and heat pump controller (→ operating manual of 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 (observe local regulations)
- Do not open windows with gap/in tilt position (continuous ventilation), but instead open wide for a short time (shock ventilation)
- Always ensure that the controller setting is correct

4.2 Care

Wipe down 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 supply

- Check supplied packages immediately on receipt for visible signs of damage and completeness.
- Notify the supplier of any complaints immediately.

The separate package included contains:

- 3 flange seals, 5/4"
- 4 flange seals, 1"
- 1 tube anti-friction agent
- 1 HT sheet, DN 40 mm 87°
- 1 protective cover for plug
- 4 EPP screws
- Documents (operating manuals, ERP data and labels)
- Type stickers

In panel packages:

- Cover, front panel, rear panel, side panels

5.2 Storage

- If possible, do not unpack the unit until immediately before installation.
- Store the unit protected against:
 - Moisture
 - Frost
 - Dust and dirt



5.3 Unpacking and transport

Notes on safe transport

The unit is heavy (→ “Technical data / scope of supply”, page 21). There is a risk of injuries or material damage if the unit falls down or overturns.

The hydraulic connections are not designed for mechanical loads.

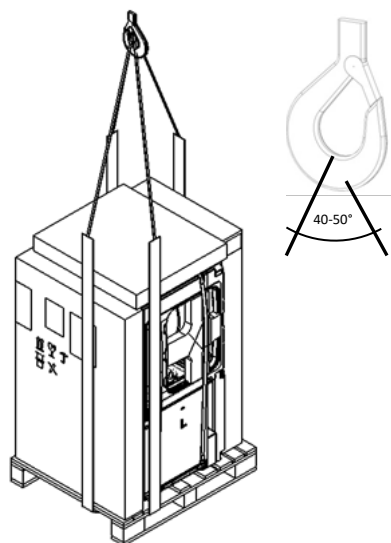
- ▶ Do not lift or transport the unit by the hydraulic connections.

Transport the unit preferably with a lift truck, alternatively with a handcart or by carrying it.

- ▶ Do not tilt the heat pump module by more than 45°.
- ▶ The tensioning straps on the heat pump module may only be used for carrying by hand.

Transport by crane

- ▶ Transport the unit to the installation site in packaged form and secured on a wooden pallet.



→ Package leaflet

Transport with a lift truck

- ▶ Transport the unit to the place of installation in packaged for, and secured on a wooden pallet.

Unpacking

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

Lift panels off the pallet and set them down

If the unit is not transported by a lift truck: Do not lift the unit off the pallet until the panels have been unpacked and lifted off the pallet.

- The cover, the front panel, the rear panel and the side panels are in the panel packages, in front of the unit, behind it and on the unit

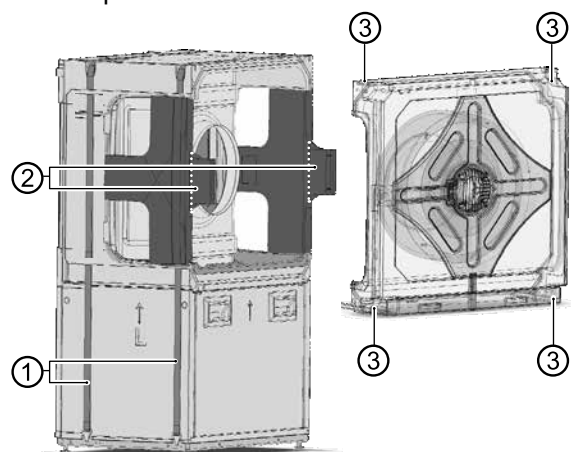
Optional separation of the fan module



NOTE

If required (tight passages), the fan module can be removed.

1. Disconnect the plug connections of the load and bus cables at the top left on the switch box of the cooling circuit for the fan module.
2. Remove the 4 screws from the fan module.
3. Remove the fan module and set it down safely.
4. Break off the protruding links on the polystyrene cross-pieces.



- 1 Tensioning straps with openings for carrying
- 2 Polystyrene links
- 3 Screws on the fan module



Carrying the unit, transport using handcart

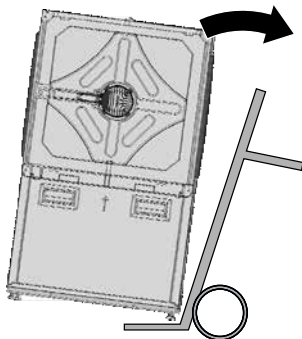
- ✓ The housing panels have been set down.

There are two circumferential tensioning straps on the heat pump module with openings at different heights that can be used for lifting and carrying.

Two support crosspieces are clamped into the recesses at the sides for the air ducts for stability – do not remove them both until after transport.

Transport of the heat pump module with a handcart

1. Only load the heat pump module on to the handcart with the narrow side, left or right.



2. Secure the heat pump module on the handcart with a tensioning strap.



3. Transport the heat pump module to the installation site.

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 blower does not discharge into footpath areas.



NOTE

Always comply with the installation plan for the respective model. Note the size and minimum clearances.

- Installation plan for the respective model, from Page 28



NOTE

Install the unit so that the switch box side (= control side) is accessible at all times.



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 site requirements

- Perform installation outdoors only
- ✓ Clearance dimensions were complied with
→ "Minimum clearances", page 28
- ✓ 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

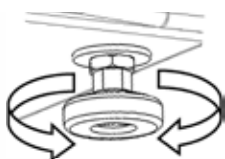


Unit installation

1. Align the unit base horizontally using the spirit level and attach it to a strip foundation or full-area foundation with 4 screws.



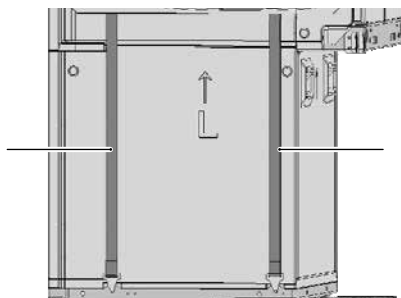
2. Unscrew the 4 levelling feet of the heat pumps by 2 turns.



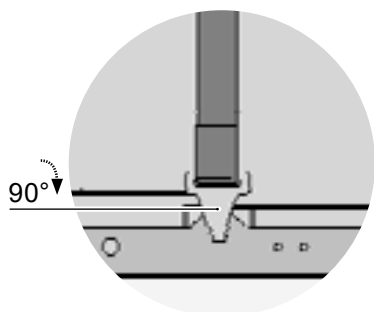
3. Lift the heat pump over the unit base and place it with the levelling feet in the holes provided in the unit base. Push the levelling feet under the constriction of the holes.
4. Tighten the lock screws on the levelling feet through the openings in the unit base using the wrench until the heat pump is tightened firmly on the unit base.

→ Heat pump installation instructions

5. Remove the two tensioning straps.



6. Open the tension lock, turn the hook on the base plate by 90°.



→ Heat pump installation instructions

7. Remove the two polystyrene crosspieces.

5.5 Attach the side panel, the rear panel, the cover and the front panel

→ Heat pump installation instructions

1. Fasten the rear panel.
2. Fit the cover.
3. Hook in the side panels. Fasten them in the front at the center using a screw.
4. Attach the front panel.
5. Remove the protective film from the logo on the front wall.
6. Remove the protective film from the logo on the front wall.

6 Installation of hydraulic system

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.
- ▶ Ensure that a dirt filter with a mesh size of 0.7 mm is installed as close as possible to the heating water inlet (return).
- ▶ Rinse the hydraulic system thoroughly prior to establishing the hydraulic connection of the heat pump.

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



NOTE

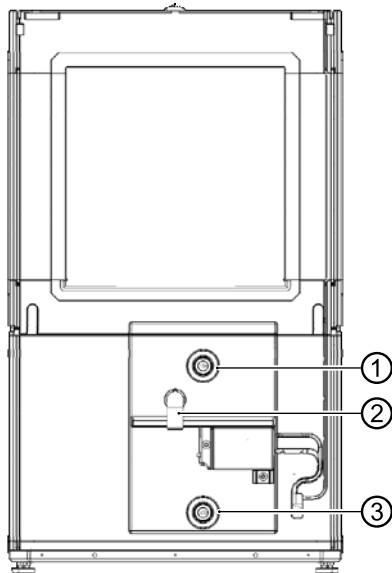
If an existing system is being replaced, the old vibration decoupling may not be reused.



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 are adequately dimensioned.
- ✓ The free pressing of the circulation pumps in the heating circuit at least results in the throughput required for the device type (→ “Technical data / scope of supply”, page 21).
- ✓ The hydraulic system must be equipped with a buffer tank, the required volume of which depends on your model.
- “Technical data / scope of supply”, page 21
- ✓ The lines for the heating are fastened to the wall or ceiling via a fixed point.



- 1 Heating water supply
- 2 Condensate fitting
- 3 Heating water return

2. Insert the vent at the highest point of the heating circuit.
3. Ensure that the operating overpressures (→ “Technical data / scope of supply”, page 21) are complied with.

Condensate connection

The heating water drained from the safety valve and the condensate that accumulates from the air must be discharged in compliance with the applicable standards and regulations. Discharge of the condensate and of the water drained from the safety valve into the sewage system is permitted only via a funnel waste trap, which must be accessible at all times.

- “Condensate line connection”, from page 37
- Heat pump installation instructions

Hydraulic connection to the unit

Mount the corresponding connection set.

- Installation instructions for connection set

7 Electrical installation

Establishing the electrical connections

IMPORTANT

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

- ▶ 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 circuit breaker with at least 3 mm contact spacing (according to IEC 60947-2)
- Note the tripping current level (→ “Technical data / scope of supply”, page 21)
- Comply with the electromagnetic compatibility regulations (EMC regulations)
- Install unshielded power supply cables and shielded cables (bus cables) sufficiently far apart (> 100 mm)

The electrical connection of the heat pump with the hydraulic unit or the wall-mounted controller is established using the EVS8 or EVS accessory.

- EVS 8: sockets and plugs for load and bus cables with 8m cable each.
Can be extended inside buildings with a maximum of 2 additional EVS 8.
- EVS 8 installation instructions
- EVS: sockets and plugs for load and bus cables.
Bus cable on site, maximum cable length of 30 m.

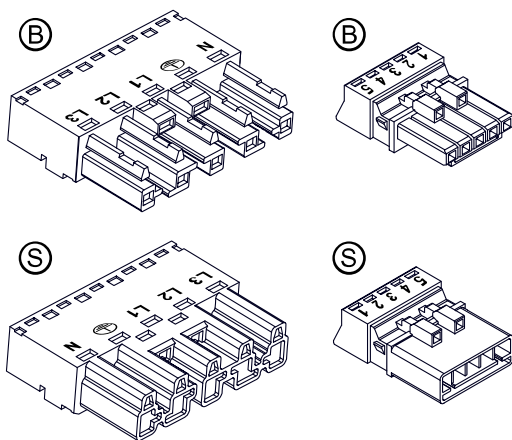


The bus cable must be a shielded cable of at least $4 \times 0.5 \text{ mm}^2$.

As load cable:

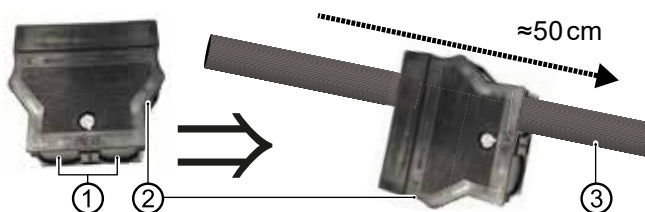
- For the 12 kW unit a $5 \times 2.5 \text{ mm}^2$ cable with protective conductor, Diameter of the sheath of the electric cable 9 – 13 mm²
- For the 8 kW unit a $3 \times 2.5 \text{ mm}^2$ cable with protective conductor, Diameter of the sheath of the electric cable 9 – 13 mm²

- Mount the sockets (Ⓑ) towards the heat pump, the plugs (Ⓢ) towards the hydraulic unit or the wall-mounted controller.

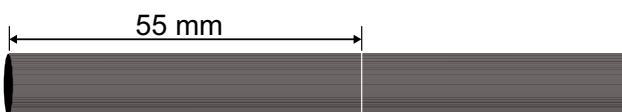


Mounting EVS 8 / EVS (accessories)

- Connect the compressor load cable to the five-pin load cable socket.
 - Break a lock of one of the cable bushings (①) carefully out of the pre-engaged strain relief housing (②) and push the strain relief housing approx. 50 cm over the load cable (③).



- Strip the load cable 55 mm.



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

Example of a five-wire load cable:



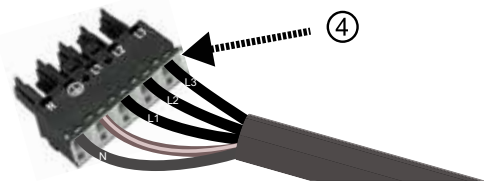
- Strip each wire 9 mm.

Example of a five-wire load cable:



- Insert the stripped wires into the pins (④).

Example of a five-wire load cable:



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

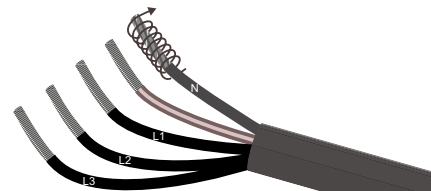
With a three-wire load cable (230 V compressor at 8 kW device), insert the N and PE conductor in the pins labelled accordingly and insert the L conductor in the L1 pin.

With a five-wire load cable (400 V compressor at 12 kW device), insert the N, PE, L1, L2 and L3 wires in the corresponding pins.

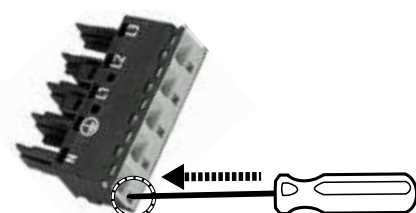
- If the load cable has fine wire strands:

- Twist the strands of each wire.

Example of a five-wire load cable:

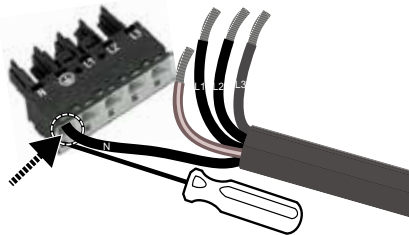


- 1.5.1. Insert an operating tool or screwdriver (2.5 mm blade width) in the connection lock of the neutral conductor pin to unlock the connection lock.

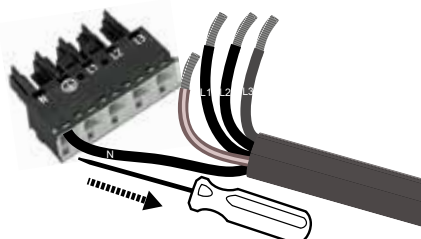




- 1.5.2. Insert the twisted wire of the neutral conductor as far as it will go into the neutral conductor pin.
Example of a five-wire load cable:



- 1.5.3. Pull the operating tool or screwdriver out of the connection lock pin to lock the connection.
Example of a five-wire load cable:



- 1.5.4. Insert the PE conductor and L conductor in the same way in the corresponding pins:

With a three-wire load cable (230V compressor at 8kW device), insert the PE conductor in the pin labelled accordingly and insert the L conductor in the L1 pin.

With a five-wire load cable (400V compressor at 12kW device), insert the L1, L2 and L3 wires in the corresponding pins.

IMPORTANT

Check each inserted wire for tight fitting in its pin.

- 1.6. Push the strain relief housing (②) onto the wired socket (④).
Example of a five-wire load cable:

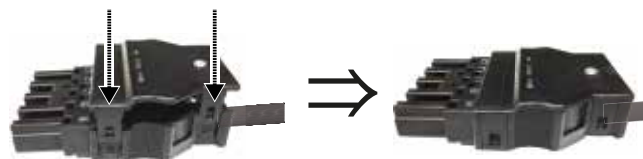


- 1.7. Align them correctly to each other: The top side of the socket and the top side of the strain relief housing are both marked with "TOP".

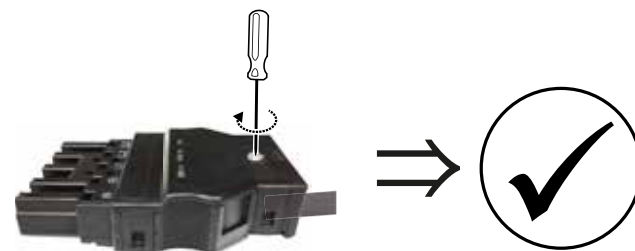
- 1.8. Push the socket as far as it will go into the strain relief housing.



- 1.9. Lock the top part of the strain relief housing firmly onto the bottom part.



- 1.10. Screw the strain relief screw tight.

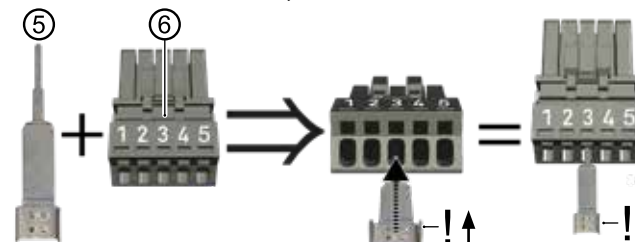


2. Connect the bus cable (communication) to the bus cable socket.



- 2.1. Insert the contact spring (⑤) into pin 3 (⑥) 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).

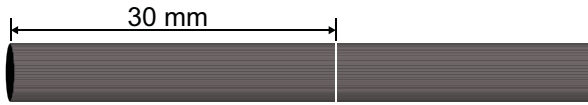


NOTE

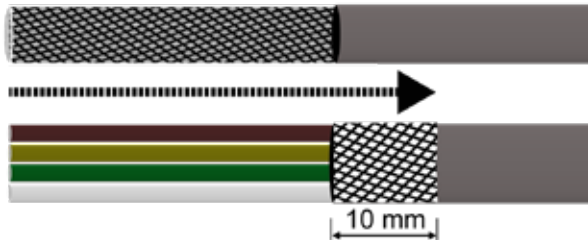
If the contact spring is in the way when subsequently inserting the wires of the bus cable, it can be disconnected and re-connected after inserting the wires.



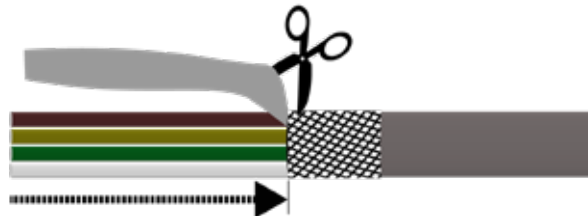
2.2. Strip the bus cable 30 mm.



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



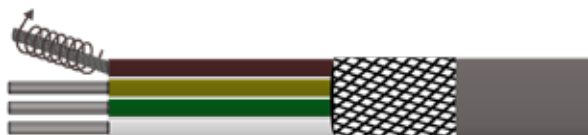
2.4. Pull back the shielding foil up to the shielding braid and cut off.



2.5. Strip each wire 9 mm.

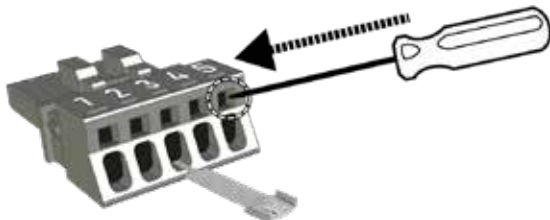


2.6. Twist the strands of each wire.

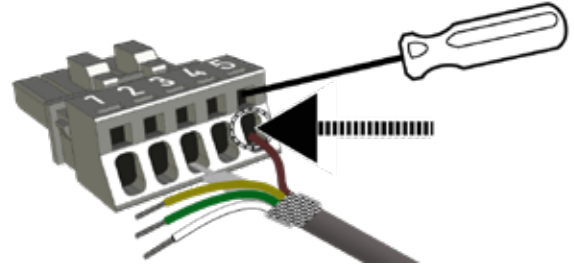


2.7. Insert the stripped wires into the pins.

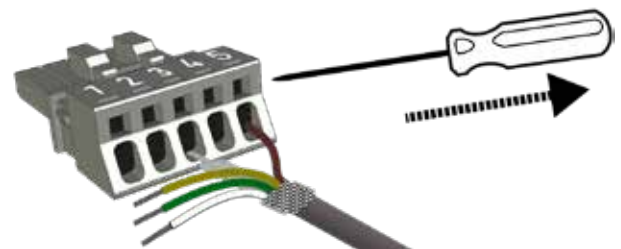
2.7.1. Insert an operating tool or screwdriver (blade 2.5x0.4 mm) in the connection lock on pin 5 to unlock connection lock.



2.7.2. Place the cable with shielding braid onto the contact spring from above and insert the brown wire into pin 5 up to the limit stop.



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



2.7.4. 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
green wire of the bus cable	pin 2
Shielding braid on contact spring	pin 3
yellow wire of the bus cable	pin 4
brown wire of the bus cable	pin 5

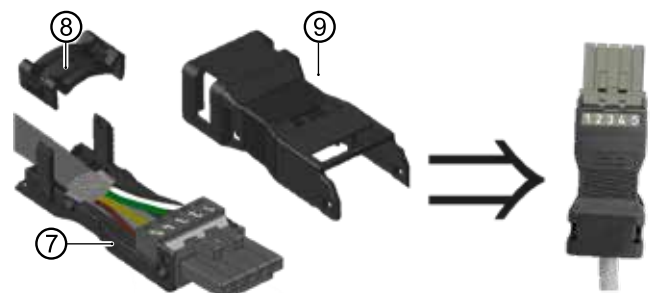
IMPORTANT

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

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

2.9. Assemble the strain relief housing.

2.9.1. Snap the wired socket into the lower part (7) of the strain relief housing.





- 2.9.2. Fit the strain relief (⑧) and clip into place until the bus cable is clamped firmly.

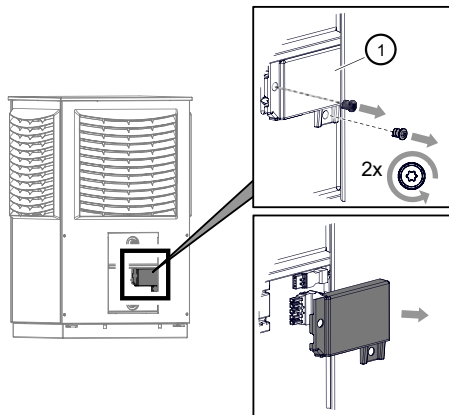
IMPORTANT

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

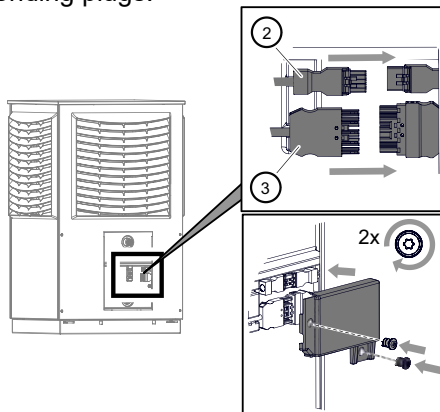
- 2.9.3. Snap the upper part of the housing (⑨) fully on to the lower part.

3. Connect the wired sockets of the load cable and the bus cable to the unit.

- 3.1. Remove the cover (①) for the plug-in connections on the back of the unit.



- 3.2. Open the strain reliefs on the unit.
- 3.3. Insert the load cable socket (③) and bus cable socket (②) up to the limit stop into the corresponding plugs.



- 3.4. Route both cables through the strain reliefs, close the strain reliefs and tighten the strain reliefs.
- 3.5. Mount the cover of the plug-in connections.
4. Guide the load and bus cable in cable conduits from the heat pump up to the building feed-through, and from there to the electrical switch box of the hydraulic unit or to the wall-mounted controller inside the building.
5. Mount the plugs on the load cable and the bus cable in the same way as the sockets.

IMPORTANT

The wire assignment of the bus cable plug must match the wire assignment of the bus cable socket.

→ “Assignments of the pins”, page 15

6. Insert the load cable plug and bus cable plug up to the limit stop into the corresponding sockets on the underside of the electrical switch box of the hydraulic unit or in the wall-mounted controller.

→ Operating manual of the hydraulic unit or

→ 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

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 response pressure of the safety valve is not exceeded.

IMPORTANT

Flush the heating circuit only in its flow direction.



NOTE

The venting program 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 programs. 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. If the device is used for cooling below 18°C, the insulation must be vapour diffusion-tight.
5. Insulate the condensate drain in a frost-proof manner.
6. Fit the cover hood on the connection set.
7. Close the device on all sides to ensure rodent protection.

10 Setting the overflow valve



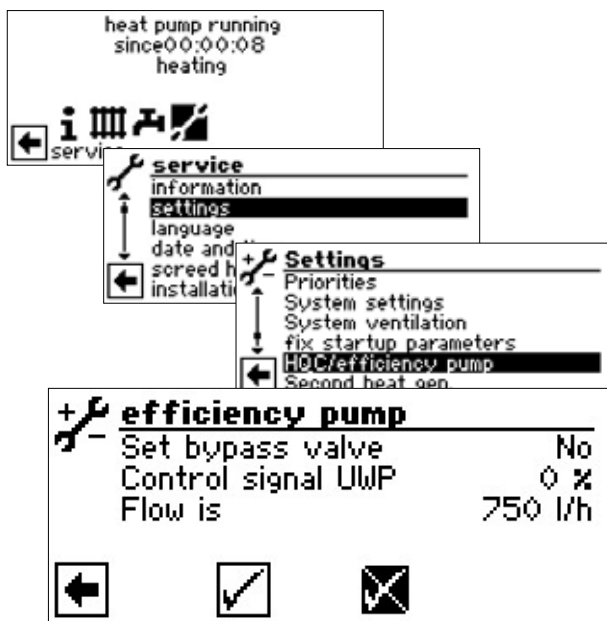
NOTE

- The activities in this section are only necessary for the integration of the storage tank in series.
 - Complete the work steps quickly, otherwise the maximum return temperature could be exceeded and the heat pump will switch to high-pressure fault.
 - Turn the rotary-push button on the overflow valve to the right to increase the temperature difference (the spread), turn it to the left to reduce it
- ✓ The 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 the hydraulic system.

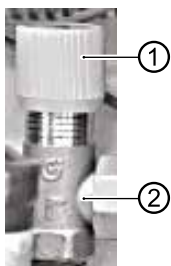


Confirm the IBN assistant or:



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, 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 21) can be ensured.



- 1 Rotary-push button
- 2 Overflow valve

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 fan protection grilles must be mounted and the facing panels closed.

- ✓ Relevant planning & design data of the system is documented in full
 - ✓ The competent energy supplier has been notified of operation of the heat pump system
 - ✓ System is air-free
 - ✓ Installation check using the rough checklist has been completed successfully
 - ✓ Clockwise rotating load infeed field is present at the compressor (only applies to units with 400V connection)
 - ✓ The system is installed and mounted in accordance with this operating manual
 - ✓ The electrical installation has been carried out properly in accordance with this operating manual and 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 level of the tripping current is compliant
 - ✓ Heating circuit is flushed and vented
 - ✓ All shut-off devices of the heating circuit are open
 - ✓ The pipe systems and components of the system are leak-tight
1. Carefully fill in and sign the notice of completion for the heat pump systems.
 2. In Germany: Send notice of completion for heat pump systems and general checklist to the manufacturer's factory customer service department. In other countries: Send notice of completion for heat pump systems and general 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 19



12 Maintenance



NOTE

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

12.1 Basic principles

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

Local regulations specify tightness checks beforehand and/or for a log book to be kept for certain heat pumps.

- Ensure compliance with the local regulations relating 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.

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 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.



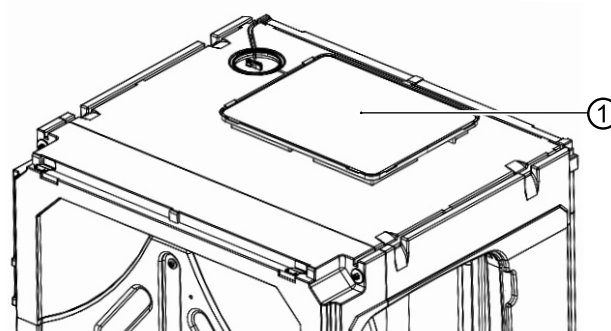
NOTE

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

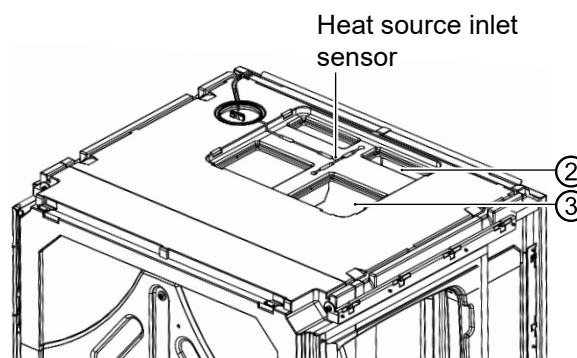
- Wear protective gloves and carefully remove the icing with your hands.

Check the evaporator and the condensate pan and clean them, if required

1. Remove the front panel, the side panels and the cover, thus gaining access to the cover of the cleaning opening (①).



2. After the cover is removed (①), the entire condensate pan area before (②) and after (③) the evaporator is visible and can be cleaned if necessary.



As an alternative, the fan module can be removed to obtain additional access.

→ "Optional separation of the fan module", page 9



12.4 Cleaning and flushing the condenser

- ▶ Clean and flush the condenser according to the manufacturer's instructions.
- ▶ 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 Faults

1. Read out the cause of the fault via the diagnostics program of the heating and heat pump controller.
 2. Contact the local partner of the manufacturer or the factory's customer service. Have the fault message and unit number to hand.
- "Nameplates", page 7

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 unit components and packaging materials in accordance with the local regulations.



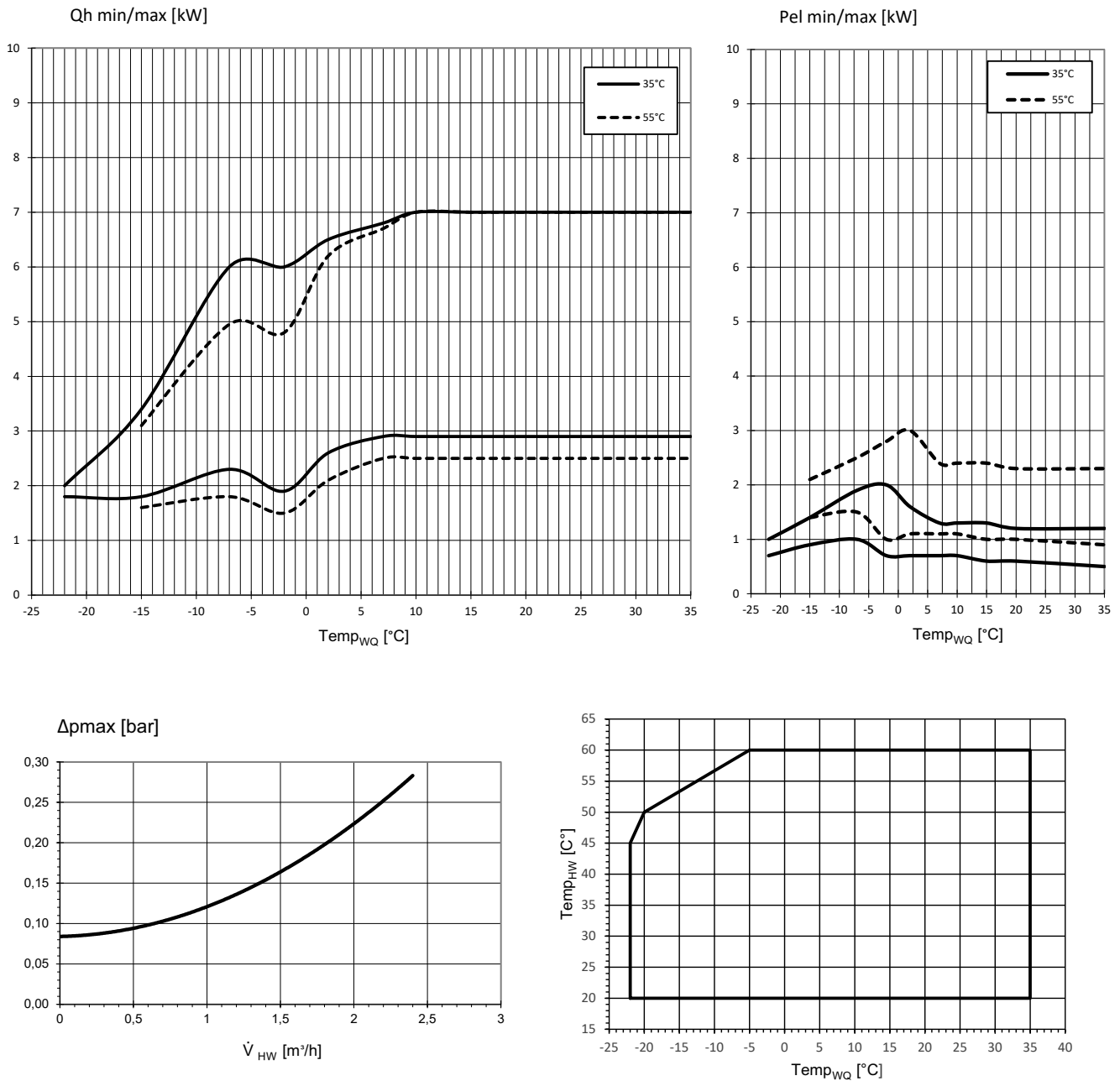
Performance data				Values in brackets: (1 Compressor)	LAV 8.2R1/3	LAV 12.2R3
Heating capacity COP	for A10/W35 acc. to DIN EN 14511-x: 2013	Partial load operation	kW COP		3.18 5.25	5.50 5.10
	for A7/W35 acc. to DIN EN 14511-x: 2013	Partial load operation	kW COP		2.81 5.03	5.29 4.71
	for A7/W55 acc. to DIN EN 14511-x: 2013	Partial load operation	kW COP		3.28 2.85	9.36 2.65
	for A2/W35 acc. to DIN EN 14511-x: 2013	Partial load operation	kW COP		3.82 4.19	5.00 4.01
	for A-7/W35 acc. to DIN EN 14511-x: 2013	Full load operation	kW COP		6.40 3.17	8.50 2.63
	for A-7/W55 acc. to DIN EN 14511-x: 2013	Full load operation	kW COP		4.93 2.20	8.46 2.05
Heating capacity	for A10/W35	min. max.	kW kW		2.90 7.00	5.40 11.0
	for A7/W35	min. max.	kW kW		2.80 6.60	5.40 11.0
	for A7/W55	min. max.	kW kW		2.50 6.40	4.50 11.0
	for A2/W35	min. max.	kW kW		2.60 6.40	4.60 10.3
	for A-7/W35	min. max.	kW kW		2.30 6.50	3.60 8.50
	for A-7/W55	min. max.	kW kW		1.80 4.95	2.80 8.50
Cooling capacity EER	for A35/W18	Partial load operation	kW EER		3.20 2.10	7.20 3.70
	for A35/W7	Partial load operation	kW EER		2.70 1.80	6.30 3.20
Cooling capacity	for A35/W18	min. max.	kW kW		2.00 4.60	4.70 8.50
	for A35/W7	min. max.	kW kW		1.50 4.00	3.70 8.50
Heating capacity domestic hot water preparation			kW		5	8
Operating limits						
Heating circuit return min. Heating circuit flow max.		Heating	within heat source min./max.	°C	20 45	20 45
Heat source, heating			min. max.	°C	-22 35	-22 35
Additional operating points				...	A-5 / W60	A-5 / W60
Sound						
Sound power level inside		min. Night max.		dB(A)	— — —	— — —
Sound power level outside 1)		min. Night max.		dB(A)	47 52 58	46 53 58
Sound power level acc. to DIN EN 12102-1:2017		inside outside		dB(A)	— 50	— 58
Tonality Low-frequency				dB(A) • yes – no	— —	— —
Heat source						
Air flow rate at maximum external pressing Maximum external pressure				m³/h Pa	2500 —	2900 —
Heating circuit						
Flow rate (pipe dimensioning) Min. volume buffer tank in series Min. volume separation buffer tank				l/h l l	1200 60 100	1900 100 200
Free pressing Pressure loss Flow rate				bar bar l/h	— 0.14 1200	— 0.2 1900
Max. allowable operating pressure				bar	3	3
Circulation pump control range		min. max.		l/h	— —	— —
General unit data						
Total weight				kg	132	148
Weight of heat pump module Compact module Fan module				kg kg kg	88 — 16	104 — 16
Refrigerant type Refrigerant capacity				... kg	R410A 3.00	R410A 3.60
Electrics						
Voltage code all-pole fuse protection for heat pump *)**				... A	1~N/PE/230V/50Hz B16	3~N/PE/400V/50Hz B16
Voltage code Control voltage fuse protection **)				... A	1~N/PE/230V/50Hz B10	1~N/PE/230V/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: 2013 Electric consumption cosφ				kW /	0.559 1.09 0.83	1.12 2.40 0.83
HP*): effective power consumption A7/W35 acc. to DIN EN 14511-x: 2013: min. max.				kW kW	0.5 —	1.12 —
HP*): Max. machine current Max. power consumption within the operating limits				A kW	16 3.5	13 6.0
Starting current: direct with soft starter				A A	< 5 —	< 5 —
Degree of protection				IP	24	24
Residual current circuit breaker		if required		type	B	B
Electric heating element output		3 2 1 phase		kW kW kW	— — —	— — —
Circulation pump power consumption, heating circuit		min. max.		W	—	—
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.					831581e	813582e

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



Performance curves / operating limits / heating

LAV 8.2R1/3



823290 c

Keys: 823290c

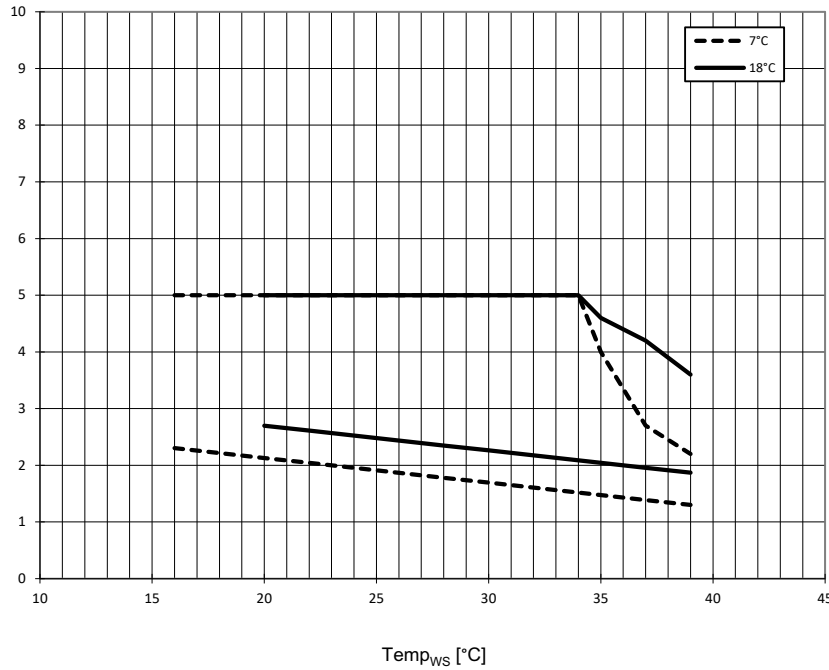
$\dot{V}_{HW}$	Volume flow rate heating water
Temp _{WQ}	Heat source temperature
Δpmax	max. free pressing
Qh min/max	min./max. heating power
Pel min/max	min./max. power consumption



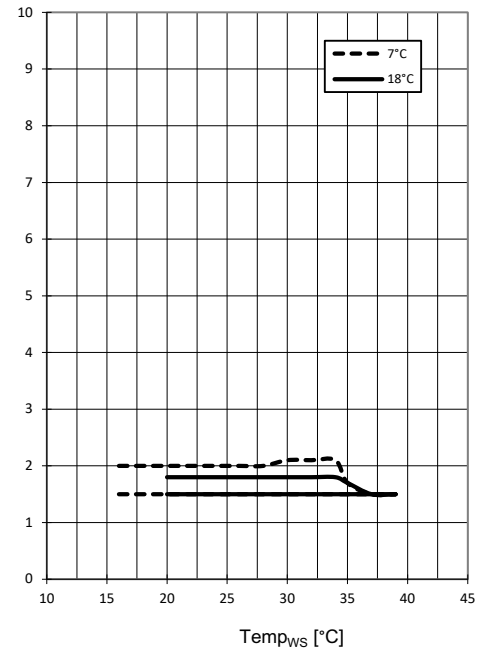
LAV 8.2R1/3

Performance curves / cooling

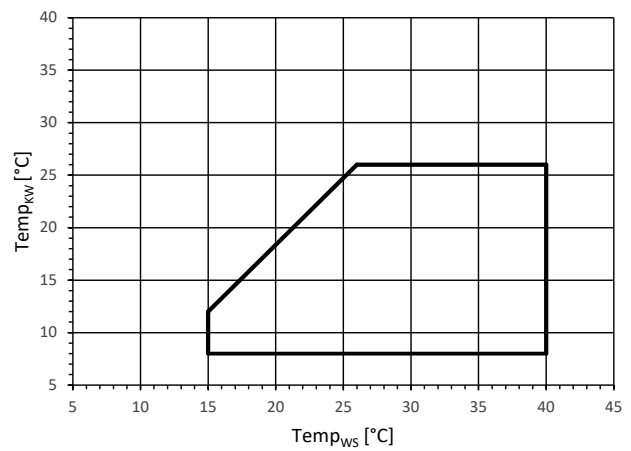
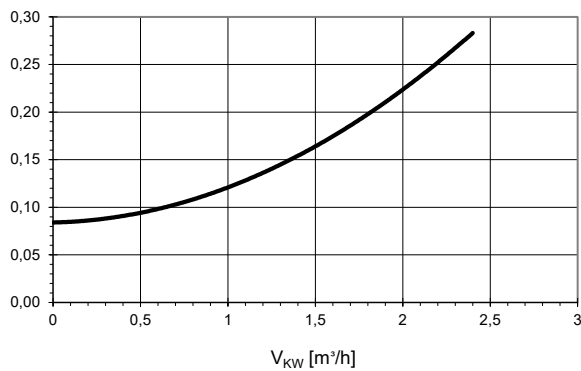
Q0 min/max [kW]



Pel min/max [kW]



Δpmax [bar]



823290 c

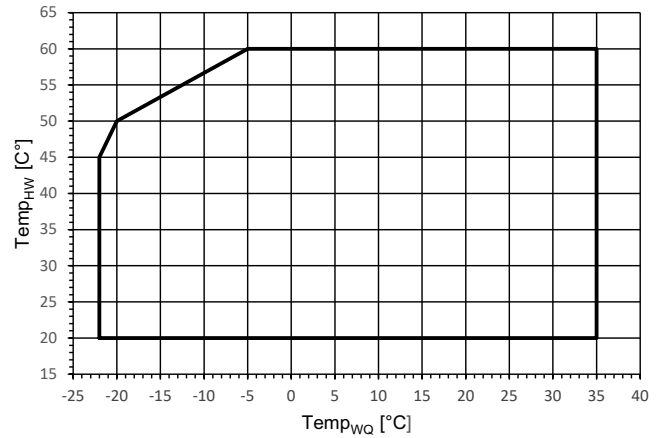
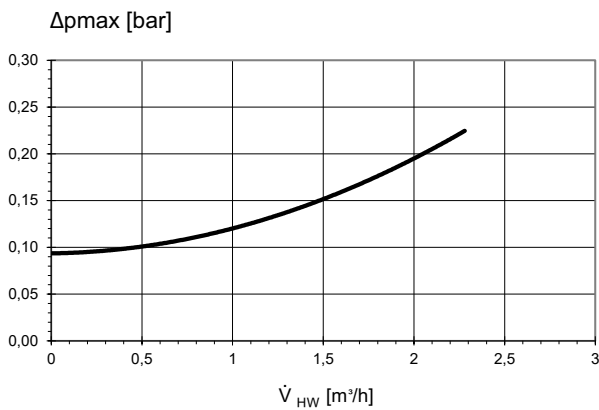
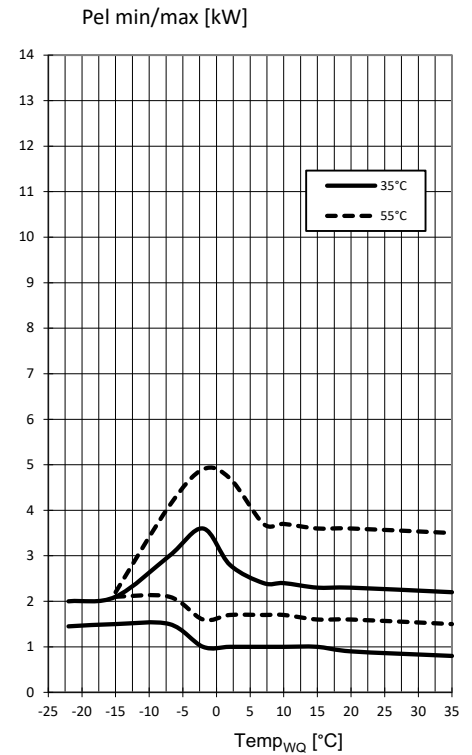
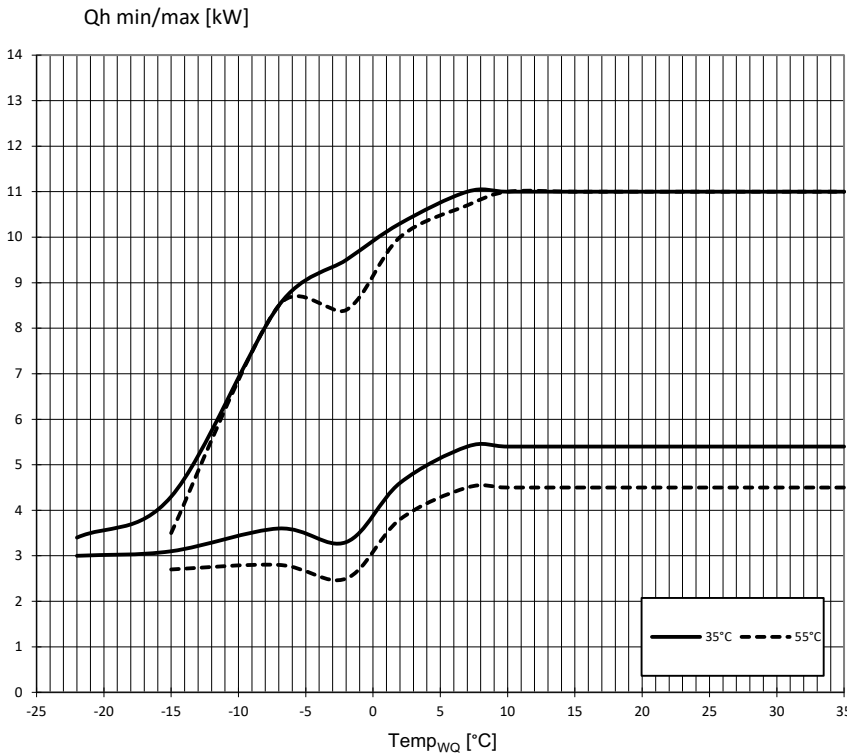
Keys: 823290c

$\dot{V}_{KW}$	Volume flow rate cooling water
Temp _{ws}	Heat sink temperature
Δpmax	max. free pressing
Q0 min/max	min./max. cooling capacity
Pel min/max	min./max. power consumption



Performance curves / operating limits / heating

LAV 12.2R3



823291 c

Keys: 823291c

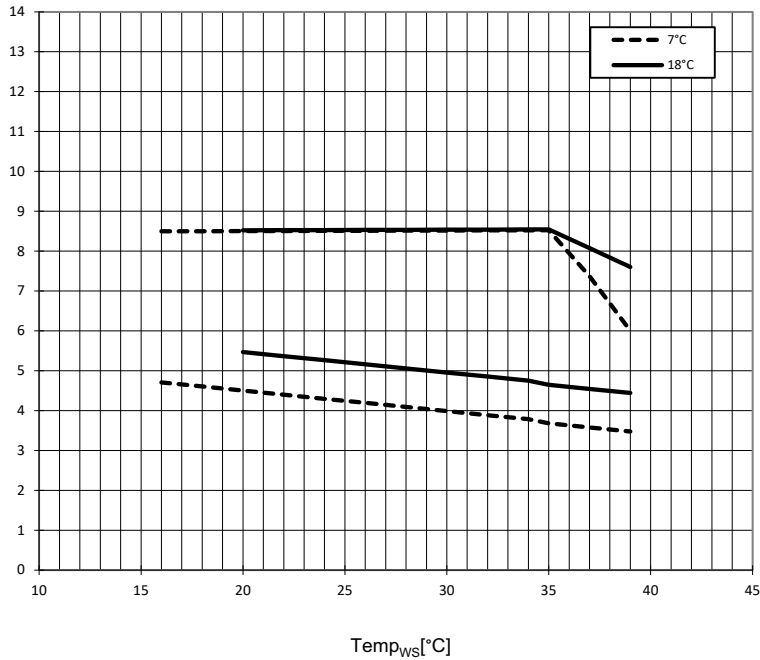
$\dot{V}_{HW}$	Volume flow rate heating water
Temp _{WQ}	Heat source temperature
Δpmax	max. free pressing
Qh min/max	min./max. heating power
Pel min/max	min./max. power consumption



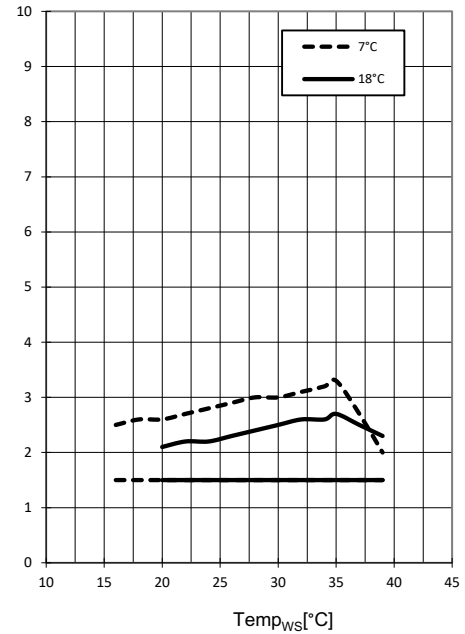
LAV 12.2R3

Performance curves / cooling

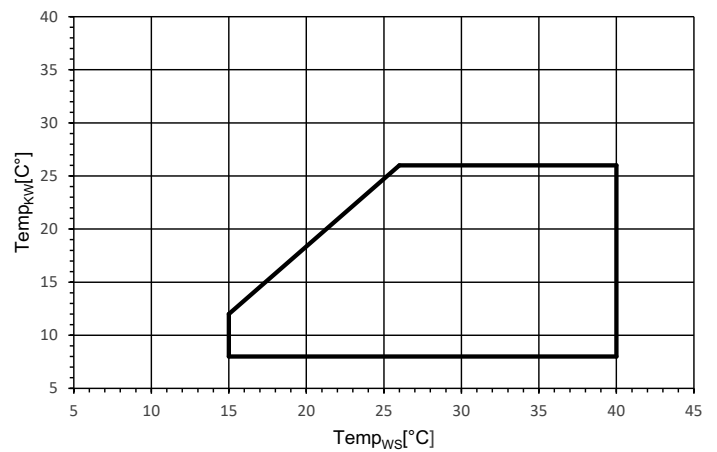
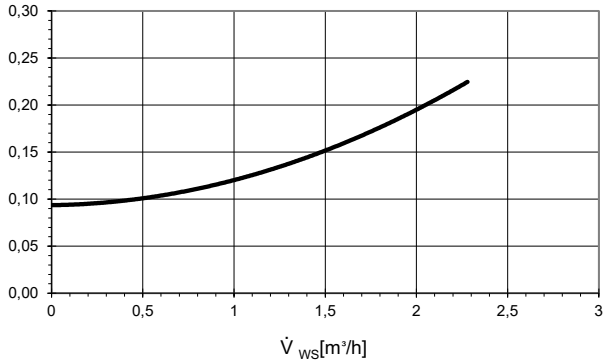
Q0 min/max [kW]



Pel min/max [kW]



Δpmax [bar]



823291 c

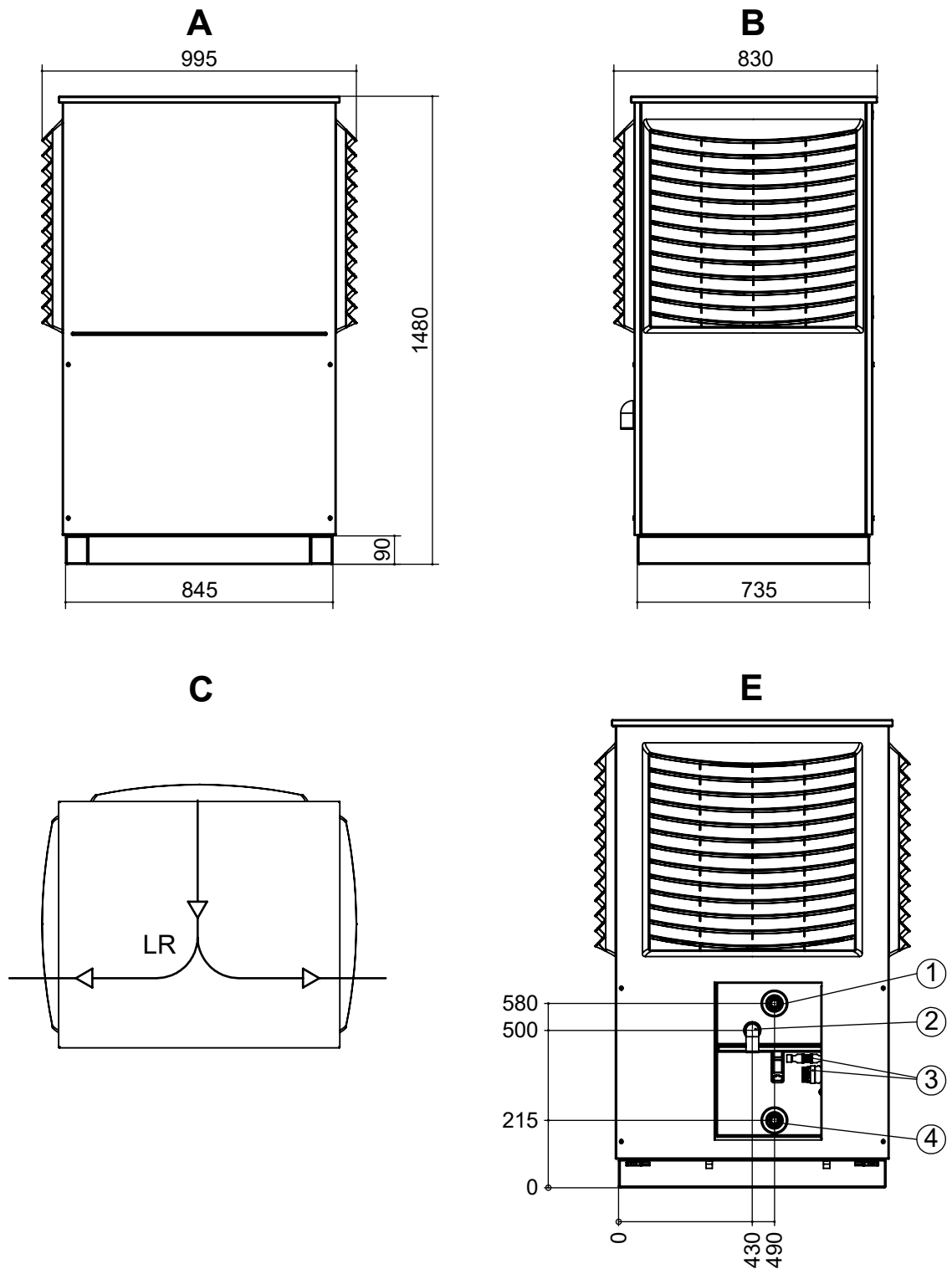
Keys: 823291c

$\dot{V}_{KW}$	Volume flow rate cooling water
Temp _{ws}	Heat sink temperature
Δpmax	max. free pressing
Q0 min/max	min./max. cooling capacity
Pel min/max	min./max. power consumption



Dimensional drawings 1

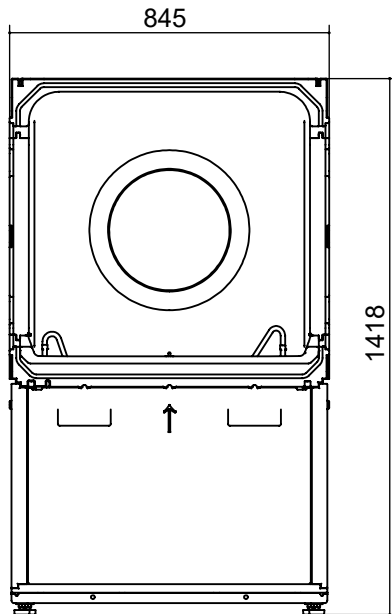
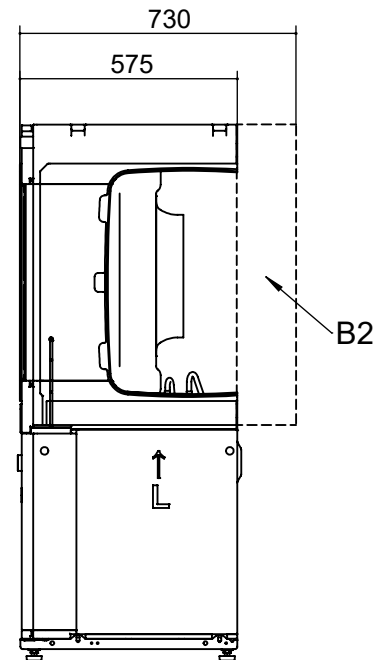
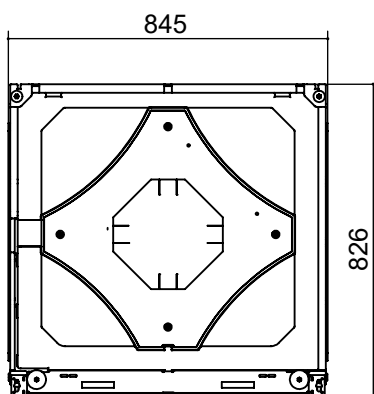
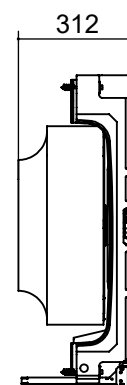
LAV



Keys: UK819495-1a

All dimensions in mm.

Pos.	Name	Item	Name	Dim. 12kW	Dim. 8kW
A	Front view				
B	Side view from left				
C	Top view				
E	Rear view without piping				
LR	Air direction				
		1	Heating water outlet (supply)	G 1" external thread	G 1" external thread
		2	Condensate drain HT pipe	DN40	DN40
		3	Plugs for load and Modbus cables	---	---
		4	Heating water inlet (return)	G 1" external thread	G 1" external thread

**A1****B1****A2****B2**

Keys: UK819495-2a

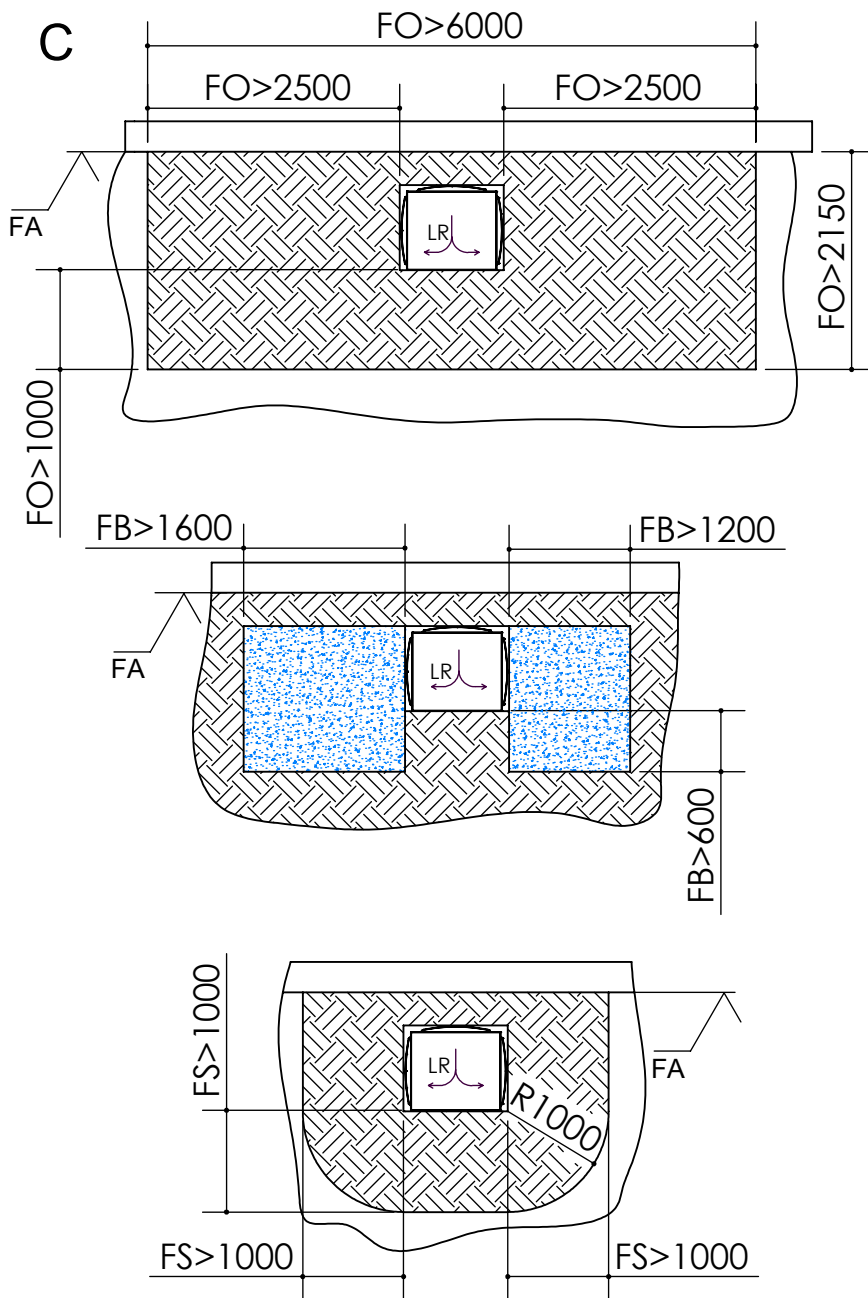
All dimensions in mm.

Pos.	Name
A1	Heat pump module front view
B1	Heat pump module side view from left
A2	Fan module, front view
B2	Fan module, side view from left



Minimum clearances

LAV



Keys: UK819496

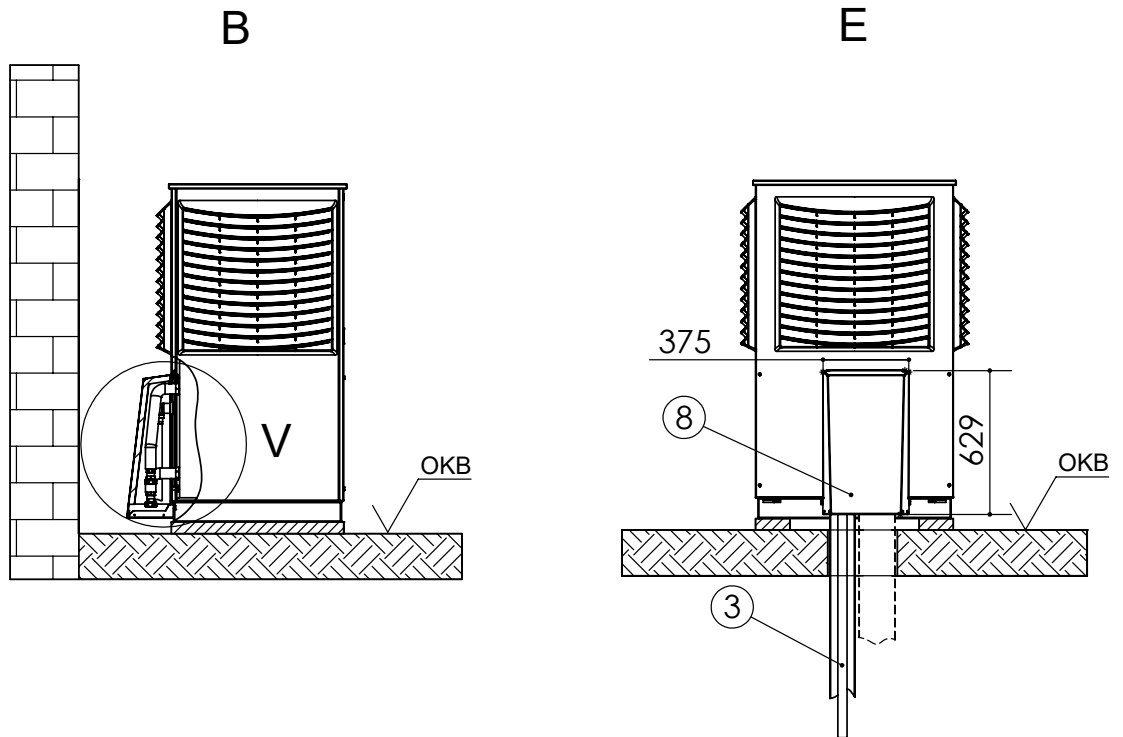
All dimensions in mm.

Pos.	Name
C	Top view
FA	Complete external panel
FB	Frost area (ice formation possible on cold days, no pipes conveying water, walkways, unsuitable plants)
FO	Free space up to the next object (no fixed obstacles, e.g. walls)
FS	Free space for servicing
LR	Air direction
OKB	Upper edge of ground
V1	Wall-mounted installation without covering heat pump
V2	Wall-mounted installation with covering heat pump

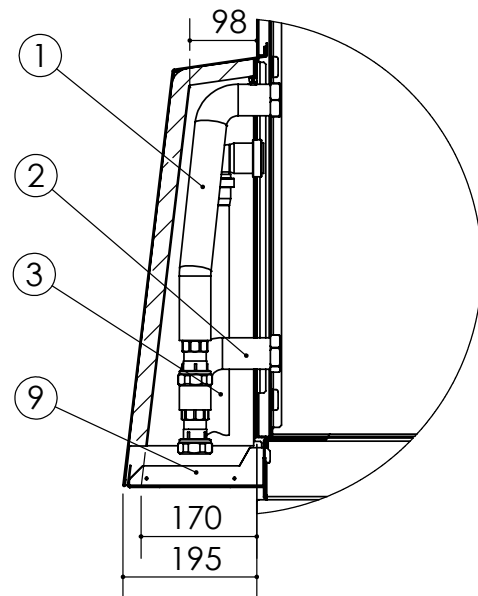


LAV

Connection set IPWAV vertical



V (1 : 10)



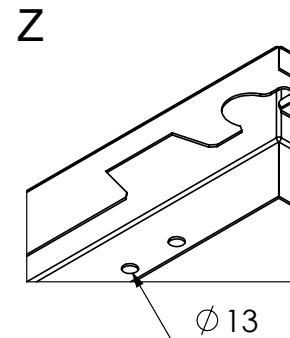
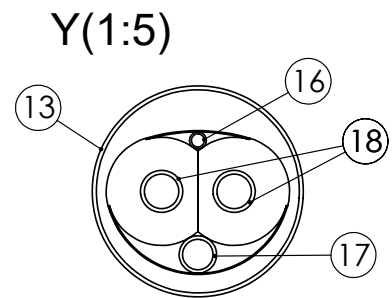
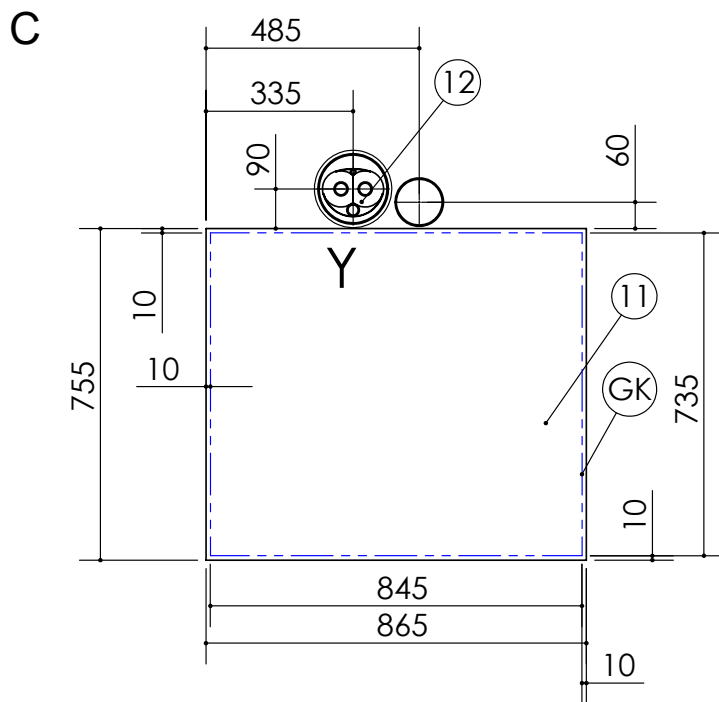
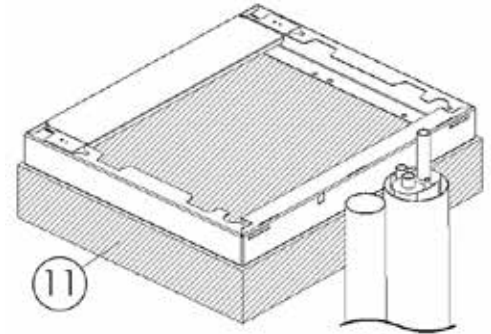
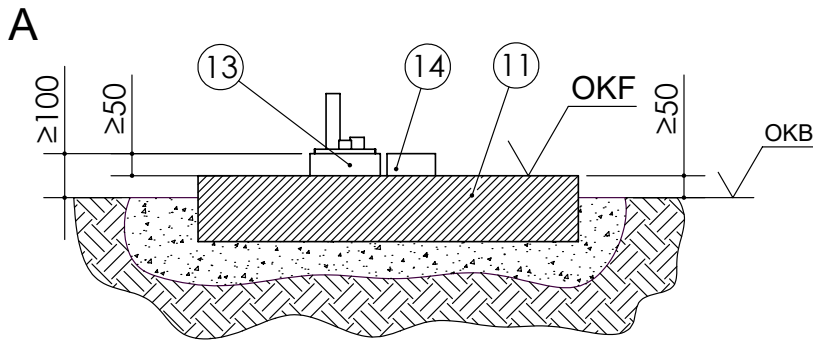
Keys: UK819497-1
All dimensions in mm.

Pos.	Name
B	Side view from left
E	Rear view
OKB	Upper edge of ground
V	Detailed view of vertical connection set
1	Heating water outlet (supply)
2	Heating water inlet (return)
3	Condensate drain pipe DN 40
8	Hood for vertical connection set
9	Hood ground section



Installation plan IPWAV vertical

Surface foundation LAV



Keys: UK819497-2

All dimensions in mm.

Pos.	Name
A	Front view
C	Top view
GK	Device contour
OKB	Upper edge of ground
OKF	Upper edge of foundation
Y	Detailed view Y
Z	Detailed view of floor attachment

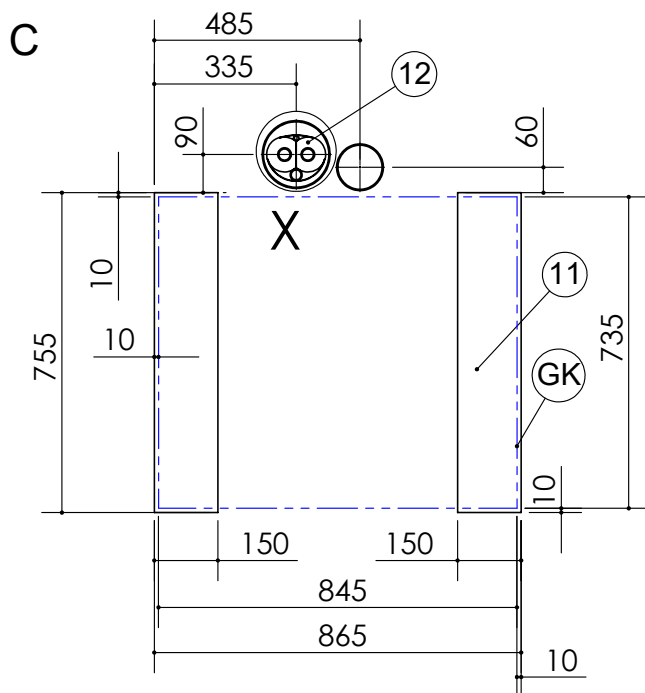
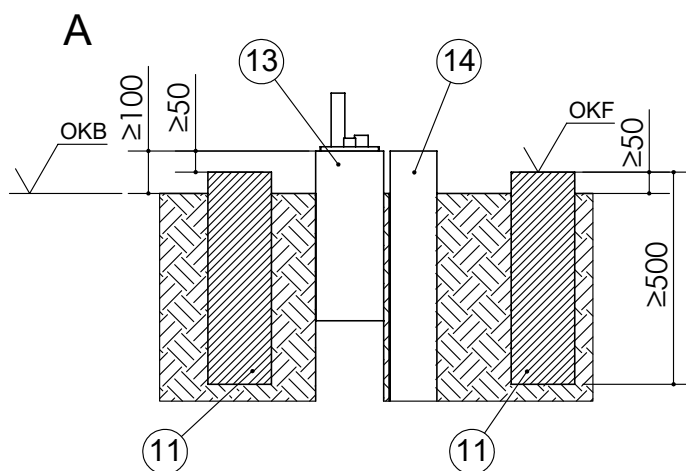
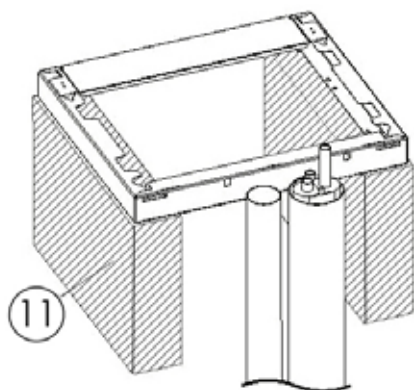
Pos.	Name
11	Foundation (frost-proof)
12	Hydraulic connection line
13	Empty conduit DN150/160 (on site)
14	Condensate drain pipe DN100/110 (on site)
16	Empty conduit for bus cable (Ø inside: 9.80)
17	Empty conduit for electric cable (Ø inside: 23.10)
18	Heating water supply and return lines (Ø inside: 26.20)

The foundation must not have any structure-borne contact with the building.

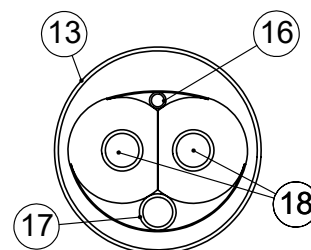


Strip foundation LAV

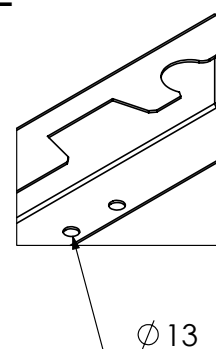
Installation plan IPWAV vertical



X (1 : 5)



Z



Keys: UK819497-3

All dimensions in mm.

Pos.	Name
A	Front view
C	Top view
GK	Device contour
OKB	Upper edge of ground
OKF	Upper edge of foundation
X	Detailed view X
Z	Detailed view of floor attachment

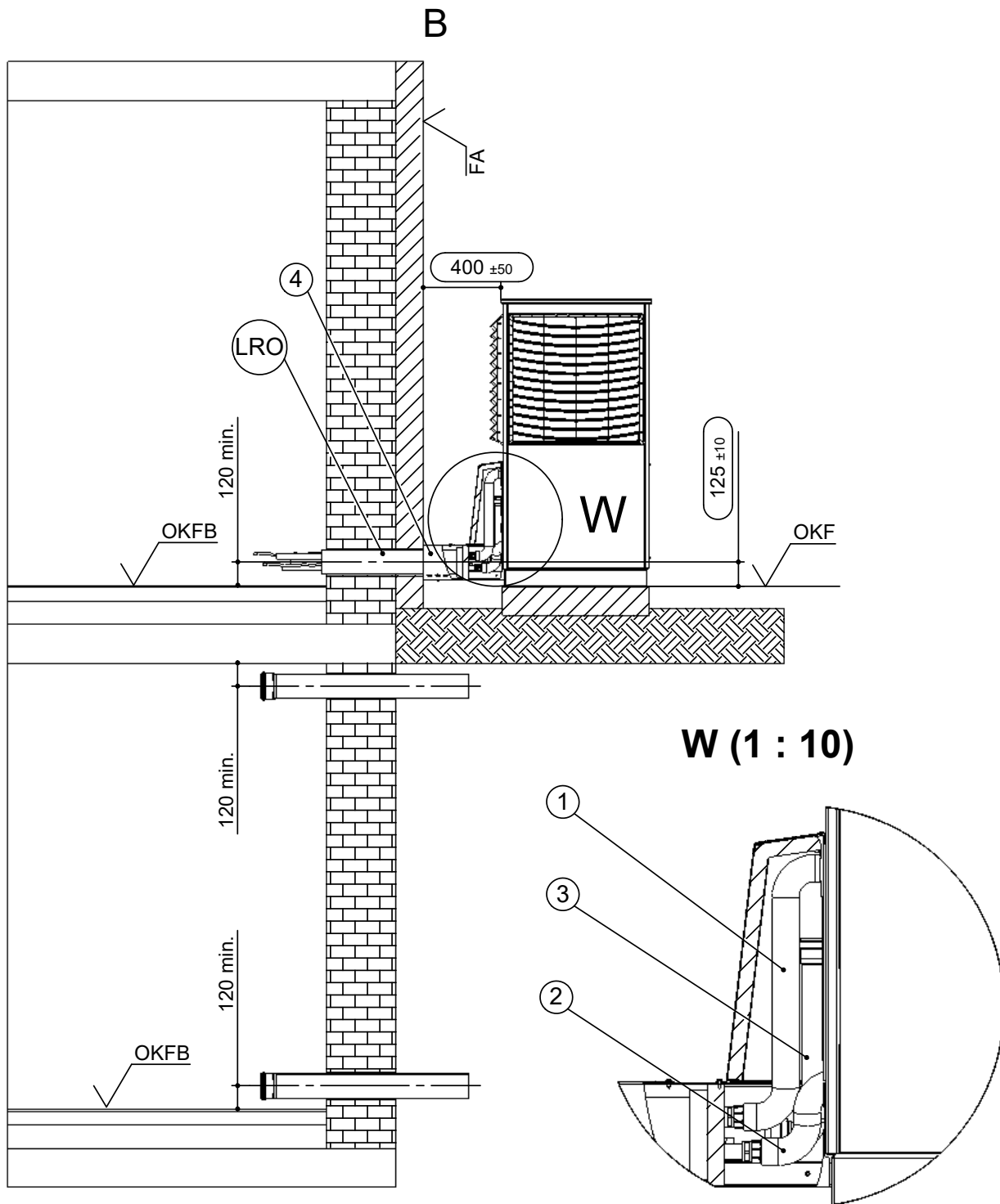
Pos.	Name
11	Foundation (frost-proof)
12	Hydraulic connection line
13	Empty conduit DN150/160 (on site)
14	Condensate drain pipe DN100/110 (on site)
16	Empty conduit for bus cable (Ø inside: 9.80)
17	Empty conduit for electric cable (Ø inside: 23.10)
18	Heating water supply and return lines (Ø inside: 26.20)

The foundation must not have any structure-borne contact with the building.



Connection set WDFAV horizontal

LAV



Keys: UK819498-1

All dimensions in mm.

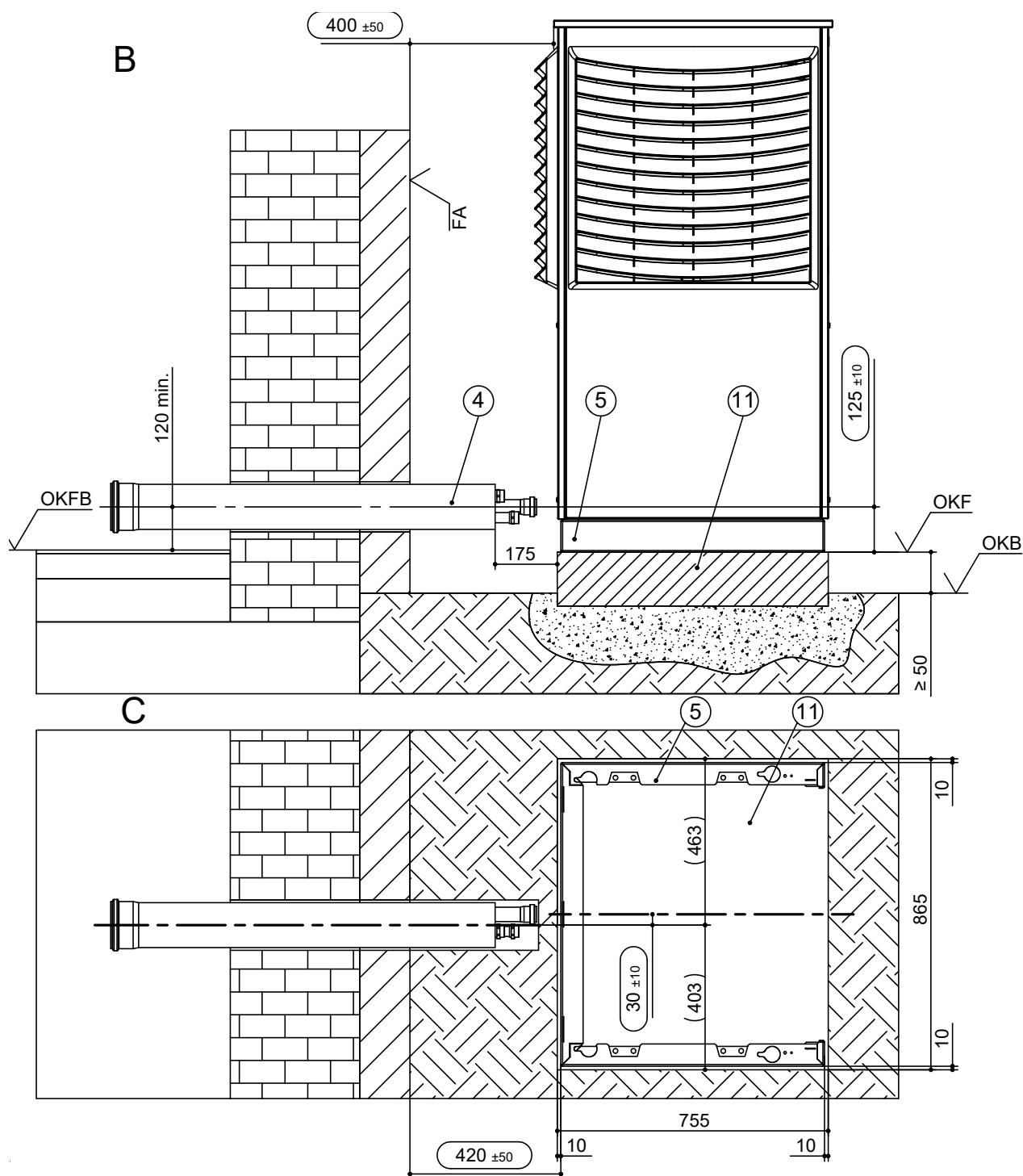
Pos.	Name
B	Side view from left
FA	Complete external panel
LRO	Empty conduit KG DN 125 (shorten on site)
OKF	Upper edge of foundation
OKFB	Top edge of finished floor
W	Detail view of horizontal connection set

Pos.	Name
1	Heating water outlet (supply)
2	Heating water inlet (return)
3	Condensate drain pipe DN 40
4	Wall duct



Surface foundation LAV

Installation plan WDFAV horizontal



Keys: UK819498-2

All dimensions in mm.

Pos.	Name
B	Side view from left
C	Top view
FA	Complete external panel
OKB	Upper edge of ground
OKF	Upper edge of foundation
OKFB	Top edge of finished floor

Pos.	Name
4	Wall duct
5	LAV base plate
11	Foundation (frost-proof)

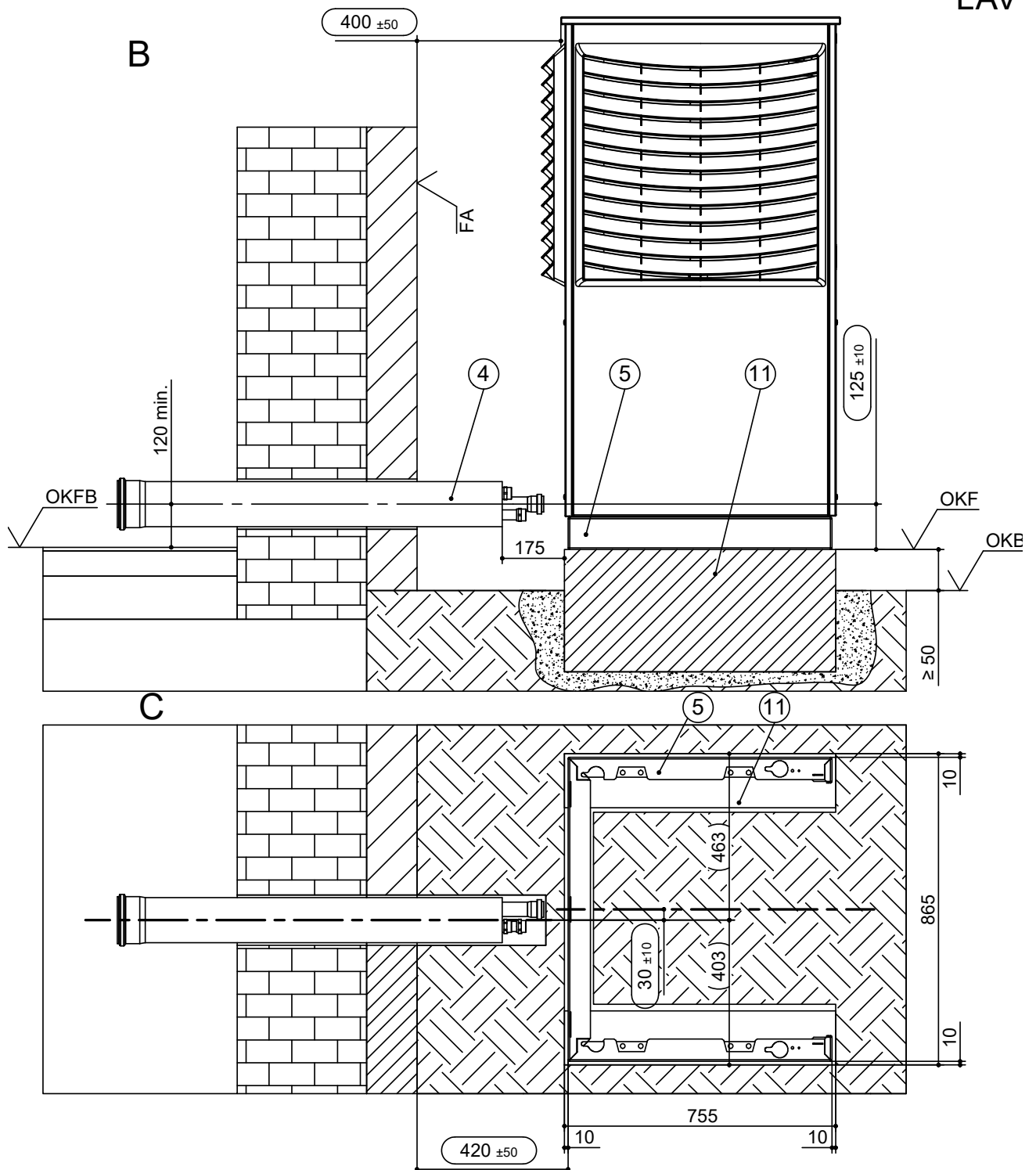
The foundation must not have any structure-borne contact with the building.

Factor in gradient in building for condensate.



Installation plan WDFAV horizontal

Strip foundation LAV



Keys: UK819498-3

All dimensions in mm.

Pos.	Name
B	Side view from left
C	Top view
FA	Complete external panel
OKB	Upper edge of ground
OKF	Upper edge of foundation
OKFB	Top edge of finished floor

Pos.	Name
4	Wall duct
5	LAV base plate
11	Foundation (frost-proof)

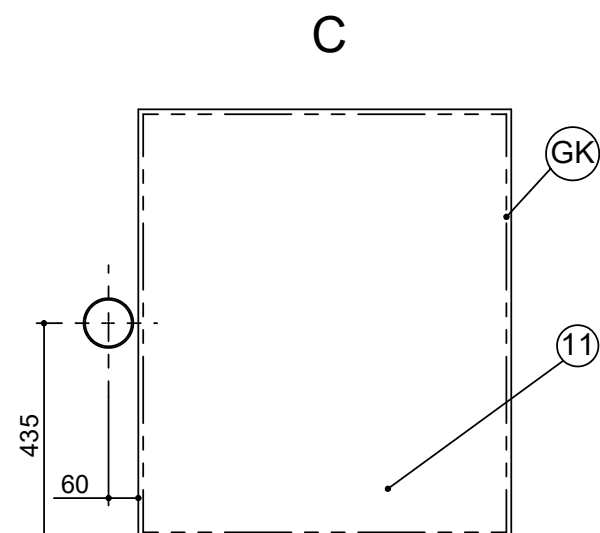
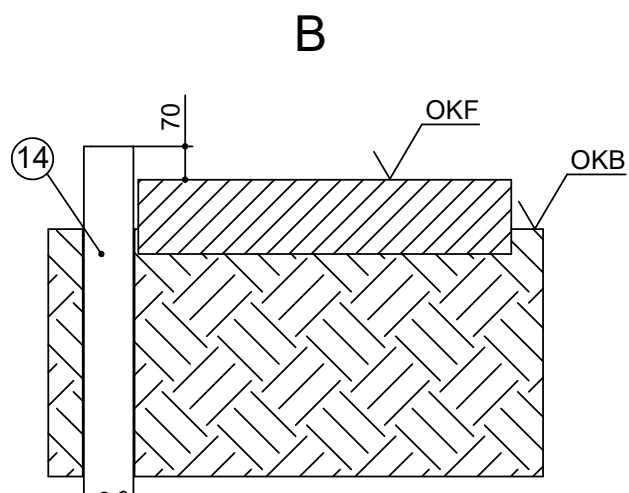
The foundation must not have any structure-borne contact with the building.

Factor in gradient in building for condensate.



With condensate drain vertical LAV

Surface foundation

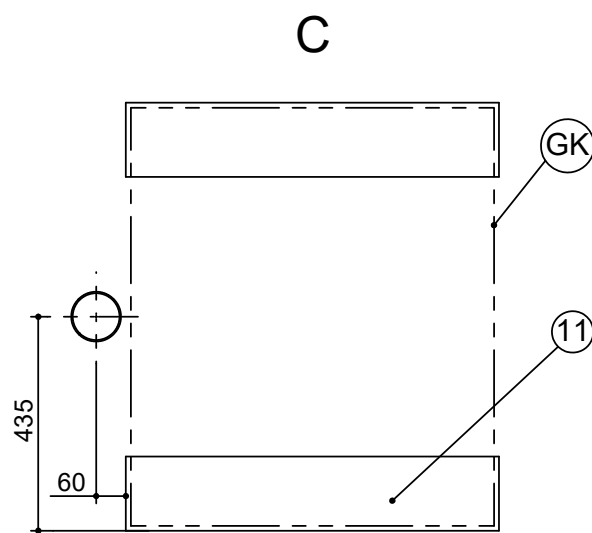
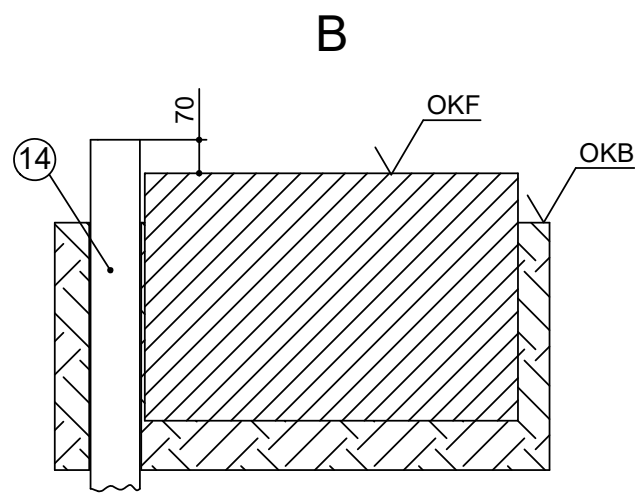


Keys: UK819498-4
All dimensions in mm.

Pos.	Name
B	Side view from left
C	Top view
GK	Device contour
OKF	Upper edge of foundation
OKB	Upper edge of ground

WDFAV horizontal

Strip foundation



Pos.	Name
11	Foundation (frost-proof)
14	Condensate drain pipe DN100 (on site)

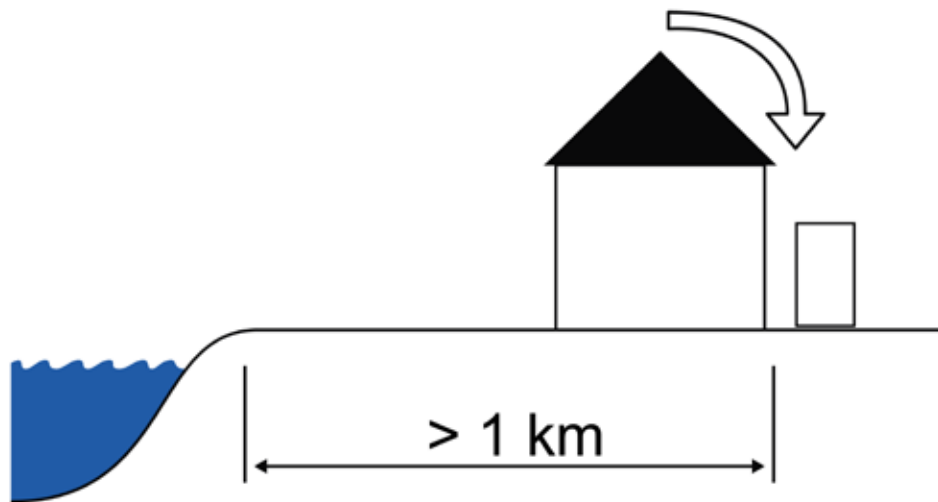
The foundation must not have any structure-borne contact with the building.



IMPORTANT

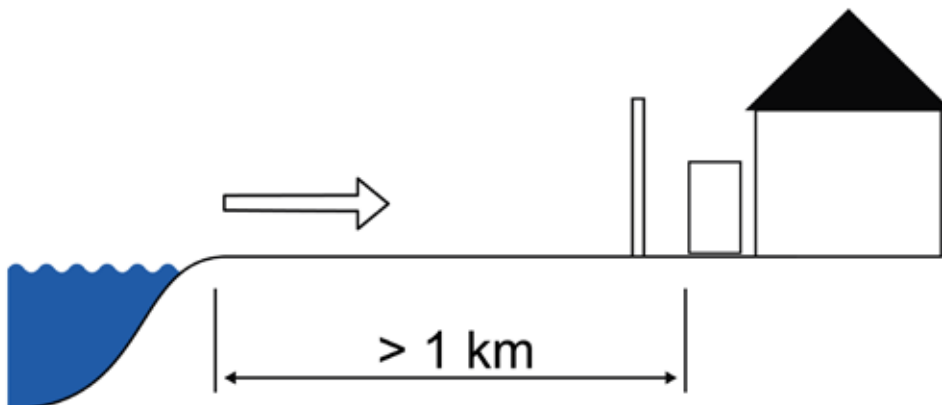
The minimum distances necessary for correct and safe operation as well as any service work must be observed.

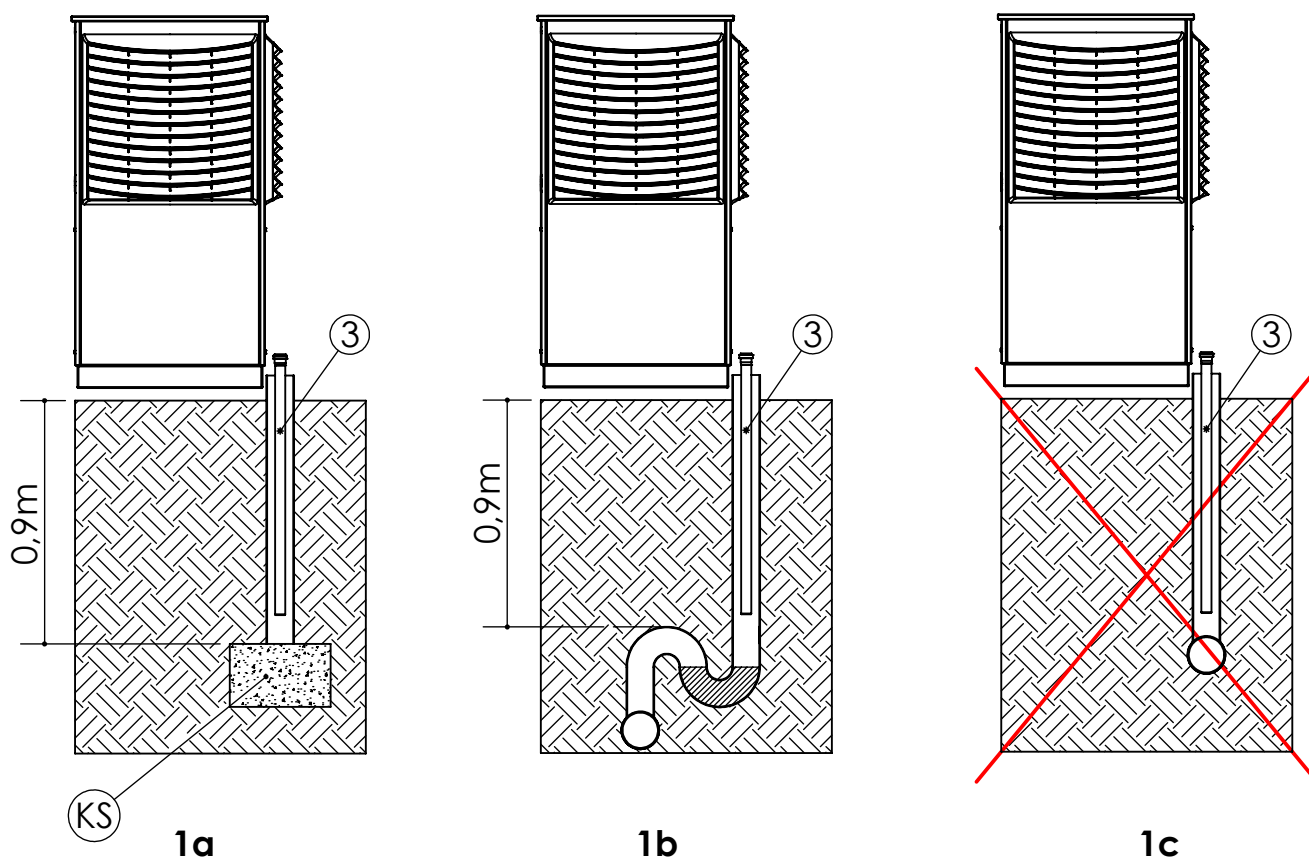
- facing away from the coast / prevailing wind direction
 - ✓ in a sheltered area near a wall
 - ✓ not in open areas
 - ✓ not in sandy surroundings (to avoid the influx of sand)



- 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)



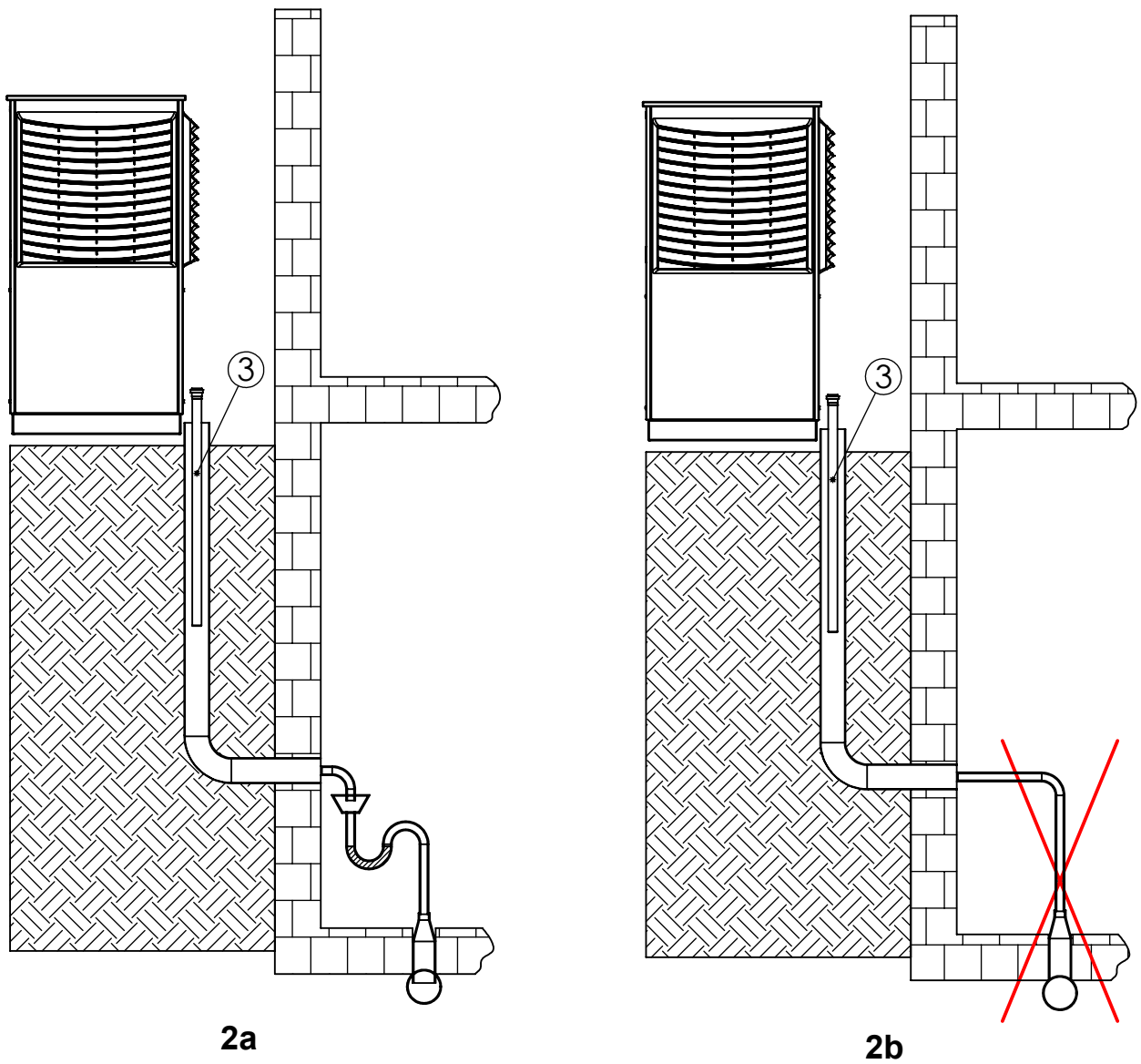


Keys: UK819497-4

Pos.	Name
KS	Gravel layer for holding up to 50 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 a sewage or rainwater pipe, a waste trap must be applied (figure 1b). A vertically installed 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.

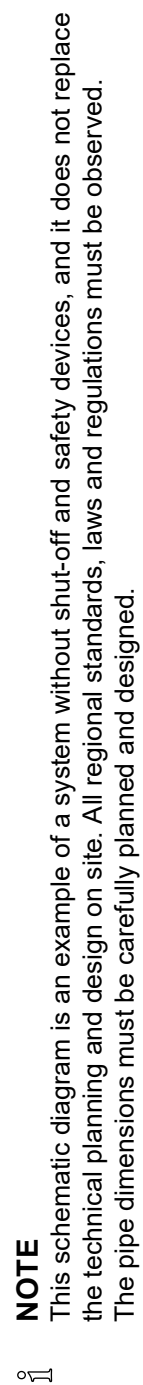
It must be ensured that the condensate is discharged frost-free in all cases (figure 1a and figure 1b).



Legende: 819497a-5

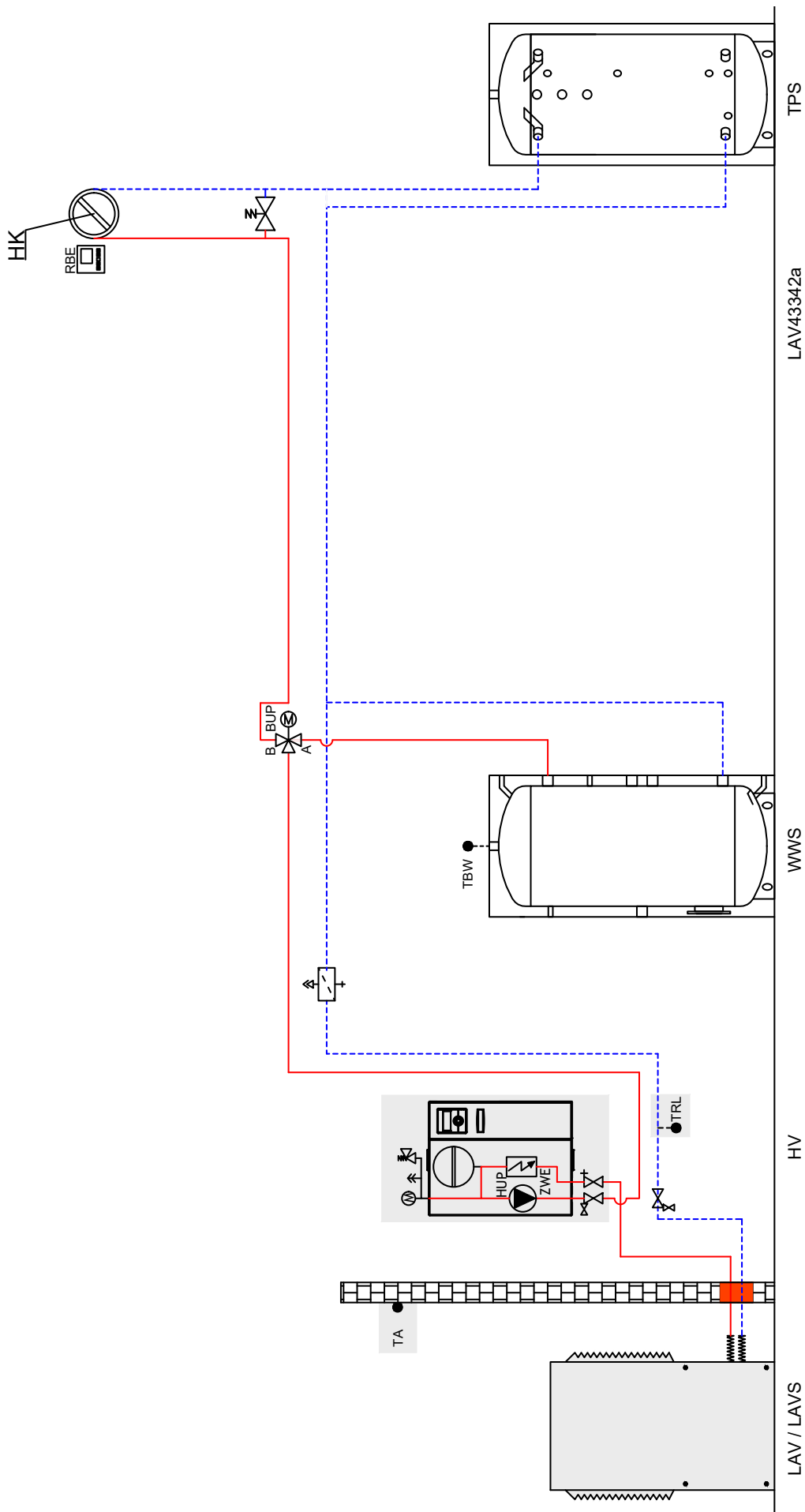
Pos.	Name
3	Condensate drain pipe DN 40

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).





LAV with buffer tank in series and hydraulic module

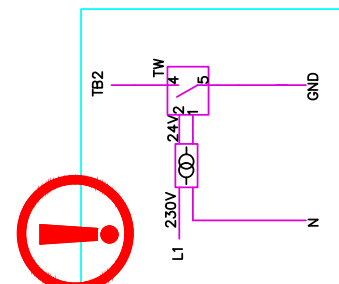
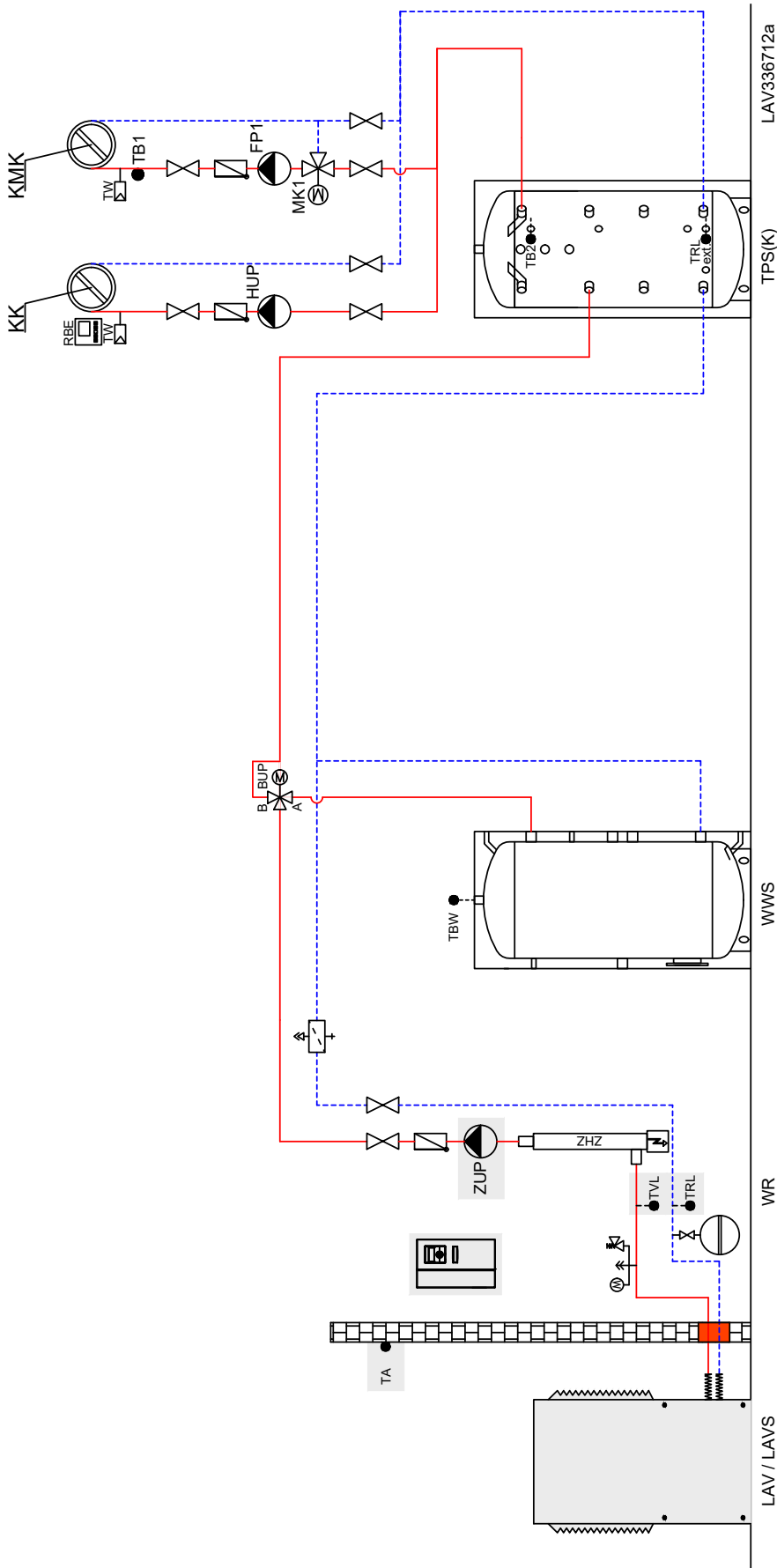


NOTE

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.



LAV with separation buffer tank

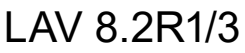


NOTE

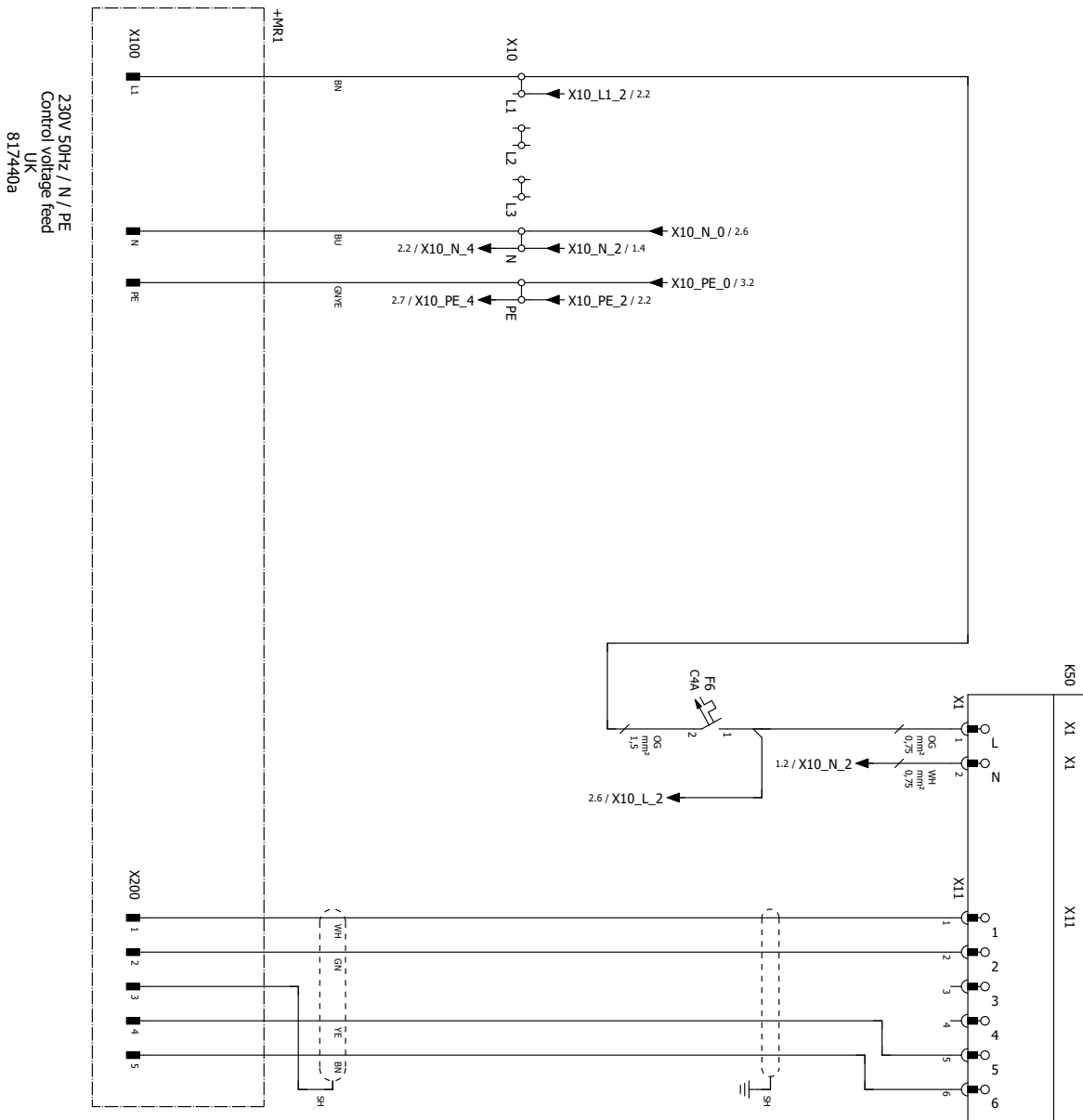
This schematic diagram is an example of a system without shut-off and safety devices, and it does not replace the technical planning and design on site. All regional standards, laws and regulations must be observed. The pipe dimensions must be carefully planned and designed.



Symbol	Component Name	Notes
	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 manifold	
	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	
	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	
	Circulation pump / switching valve domestic hot water	
	Mixer circuit 1/2/3 (heating or cooling function)	
	Circulation pump heating circuit	
	Circulation pump / switching valve	
	Feed circulating pump	
	Circulation pump	
	Domestic hot water charging pump	
	Heat source circulation pump	
	Outdoor temperature sensor	
	Sensor domestic hot water	
	Sensor mixer circuit	
	Sensor external return	
	Sensor return	
	Flow sensor	
	Sensor desuperheater	
	Heating circuit	
	Heating mixing circuit	
	Cooling circuit	
	Cooling mixing circuit	
	Safety package primary	
	Safety package secondary	
	Circulation pump desuperheater	
	Controls supplied by customer	



Circuit diagram 1/5

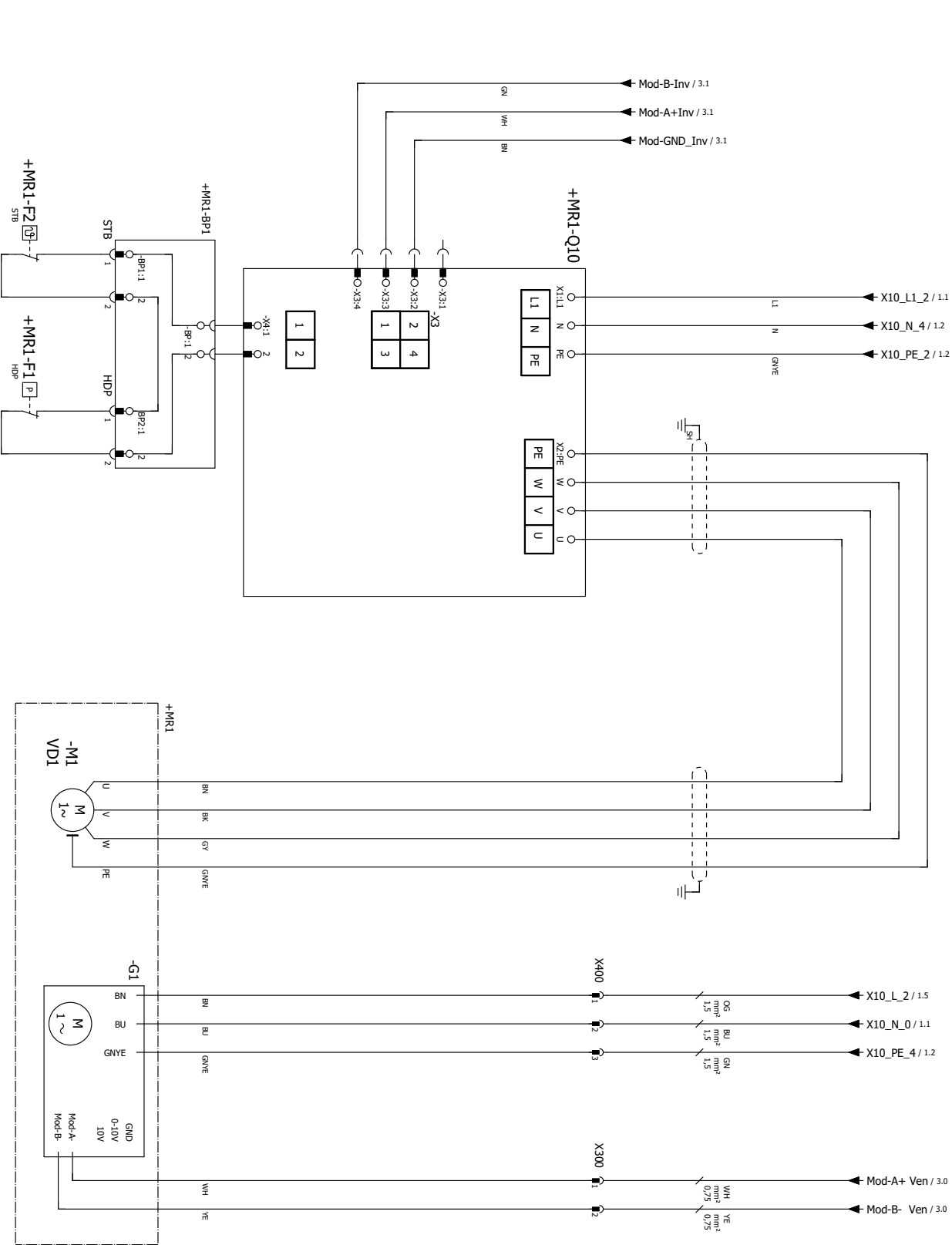


Refer to protection notice ISO 16016.

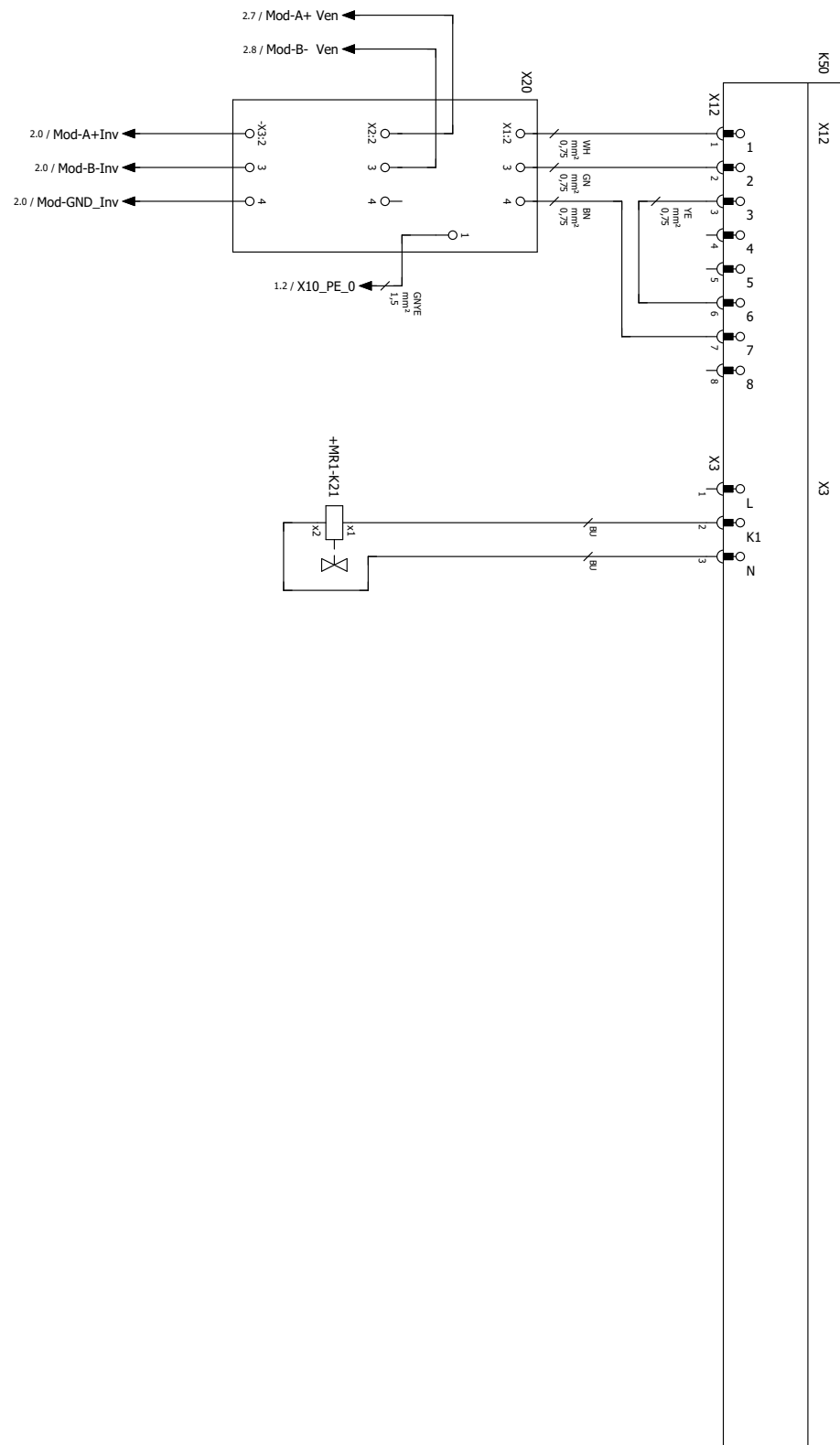


Circuit diagram 2/5

LAV 8.2R1/3



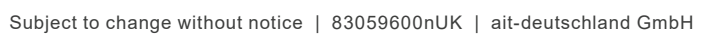
Refer to protection notice ISO 16016.



Refer to protection notice ISO 16016.



46



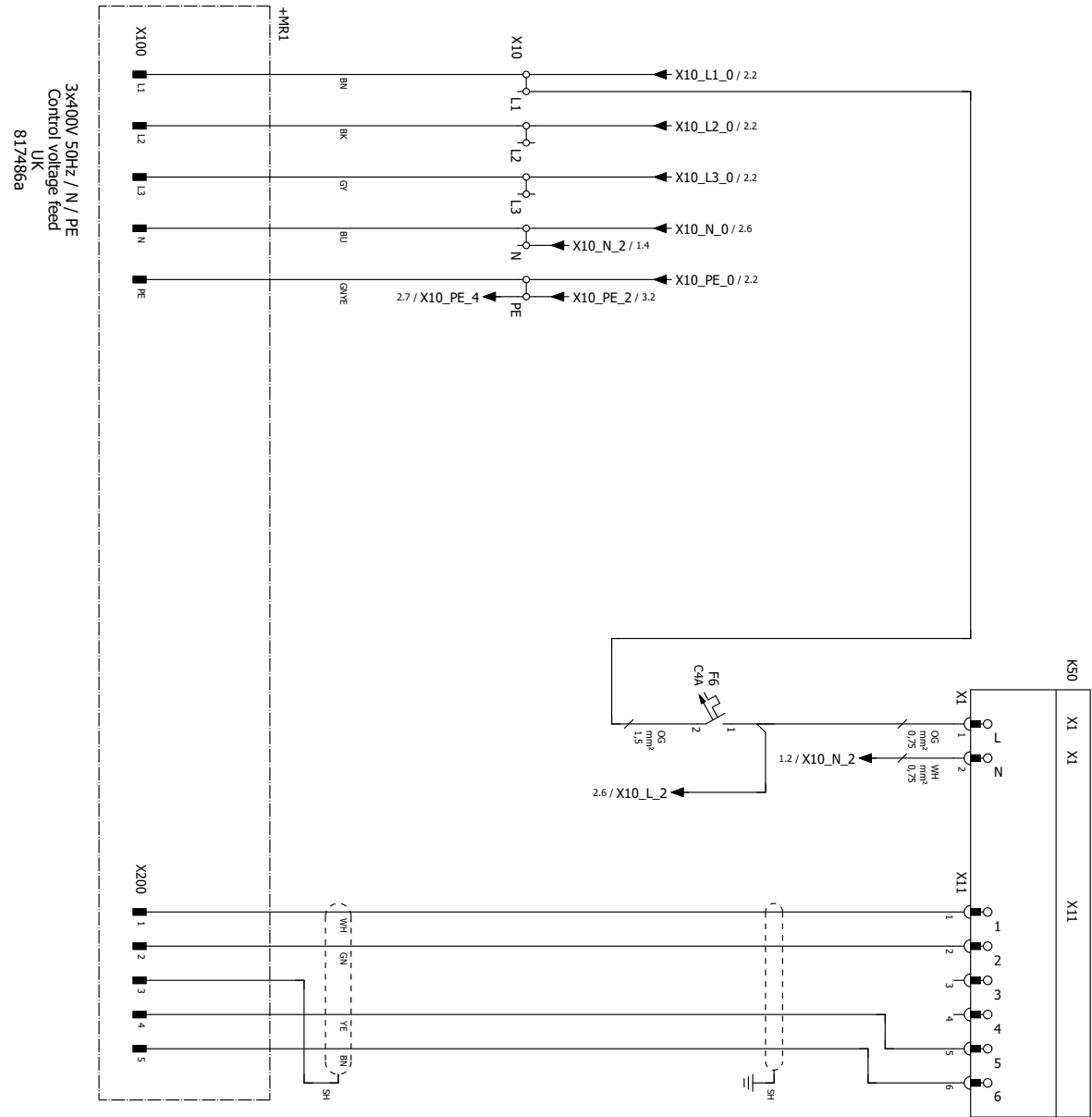


Equipment	Description
B2	Volumetric flow meter
B10	High-pressure sensor
B11	Low pressure sensor
E20	Compressor heating
F1	High-pressure switch
F2	Temperature switch
F6	Fuses ventilator
G1	Fan
K21	Defrost valve
K22	Electronic expansion valve heating
K23	Electronic expansion valve cooling
K50	ASB board
M1	Compressor
Q10	inverter
R1	Suction sensor , condenser
R3	Liquid temperature heating
R4	Liquid temperature cooling
R5	Hot gas sensor
R6	Heat source input sensor
RF1	Mains filter
X10	Distribution box power supply output compressor
X20	MODBUS circuit board
X200	Control connector
XSH	Shield clamp Control unit
XE / XF	Plug connector
	</



Circuit diagram 1/5

LAV 12.2R3

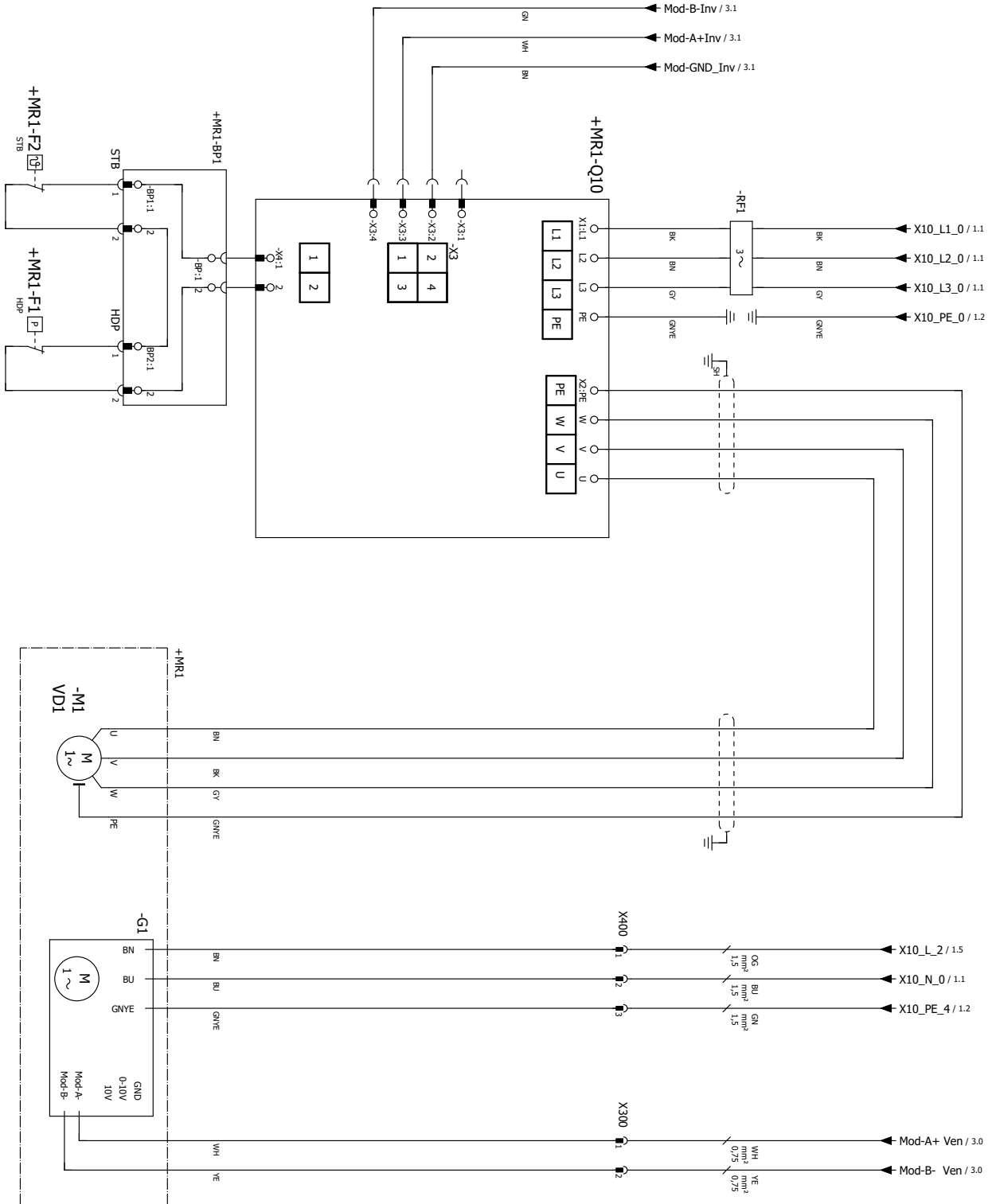


Refer to protection notice ISO 16016.



LAV 12.2R3

Circuit diagram 2/5

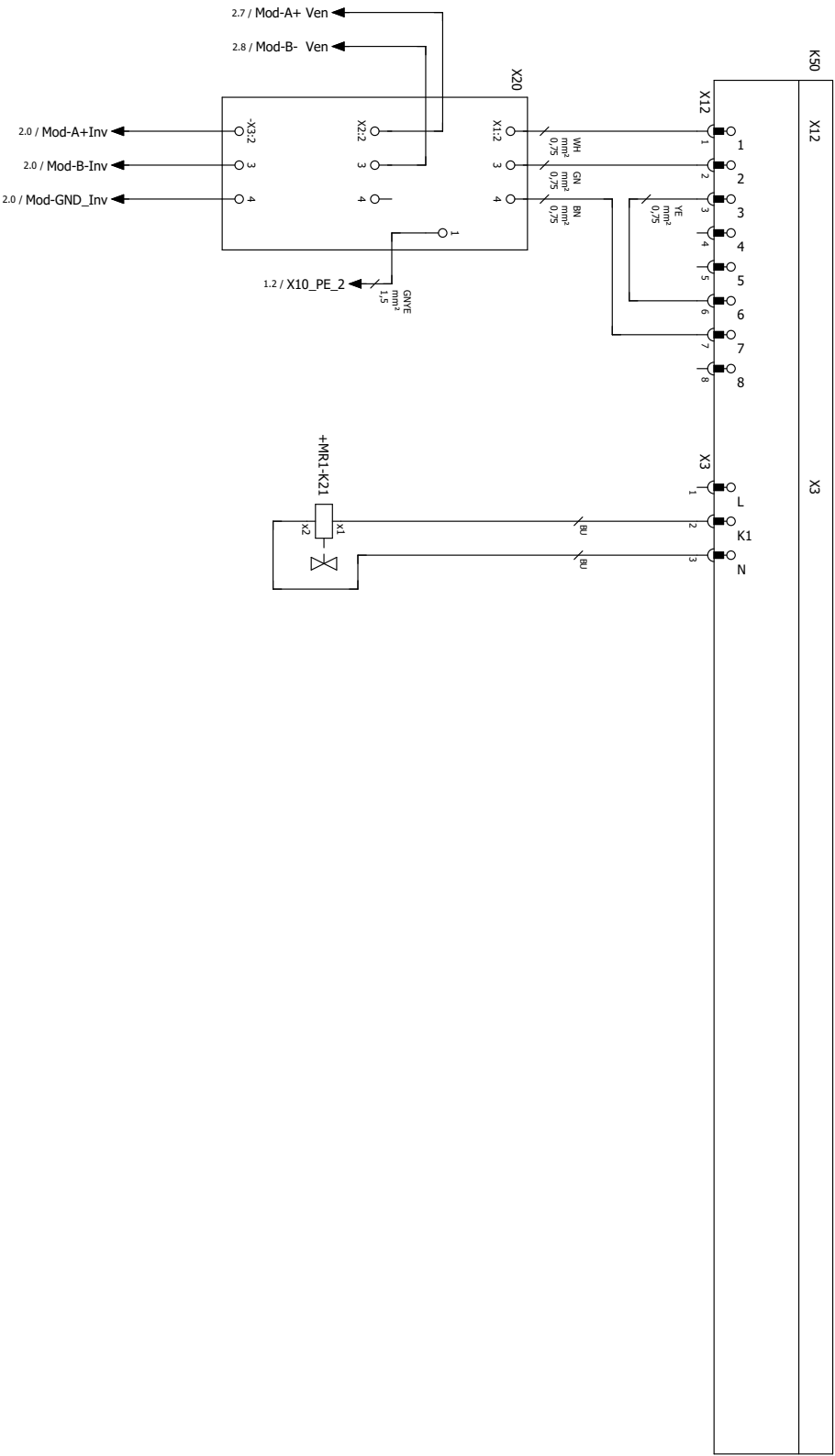


Refer to protection notice ISO 16016.

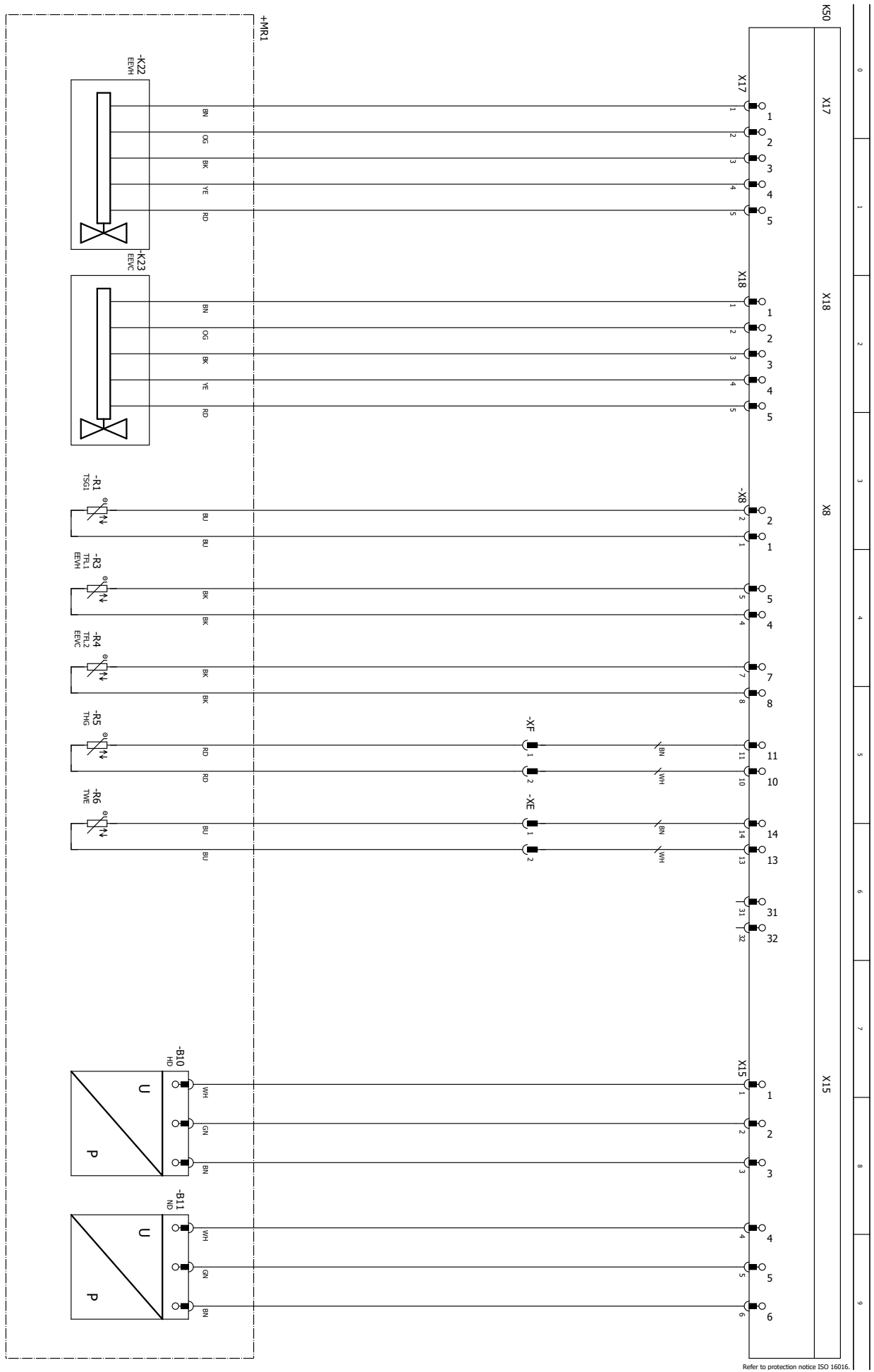


Circuit diagram 3/5

LAV 12.2R3



Refer to protection notice ISO 16016.





Circuit diagram 5/5

LAV 12.2R3

0123456789										
Equipment	Description									
B2	Volumetric flow meter									
B10	High-pressure sensor									
B11	Low pressure sensor									
E20	Compressor heating									
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									
K50	ASB board									
M1	Compressor									
Q10	inverter									
R1	Suction sensor, condenser									
R3	Liquid temperature heating									
R4	Liquid temperature cooling									
R5	Hot gas sensor									
R6	Heat source input sensor									
RF1	Mains filter									
X10	Distribution box power supply output compressor									
X20	MODBUS circuit board									
X200	Control connector									
XSH	Shield clamp Control unit									
XE / XF	Plug connector									
+MR1	Machine room									









NOVELAN

NOVELAN

ait-deutschland GmbH

Industriestraße 3 · 95359 Kasendorf

T +49 9228 / 99 607 - 0

F +49 9228 / 99 607 - 1099

info@novelan.com

www.novelan.com

An ait-deutschland GmbH brand

Subject to technical amendments without prior notice.

www.novelan.com