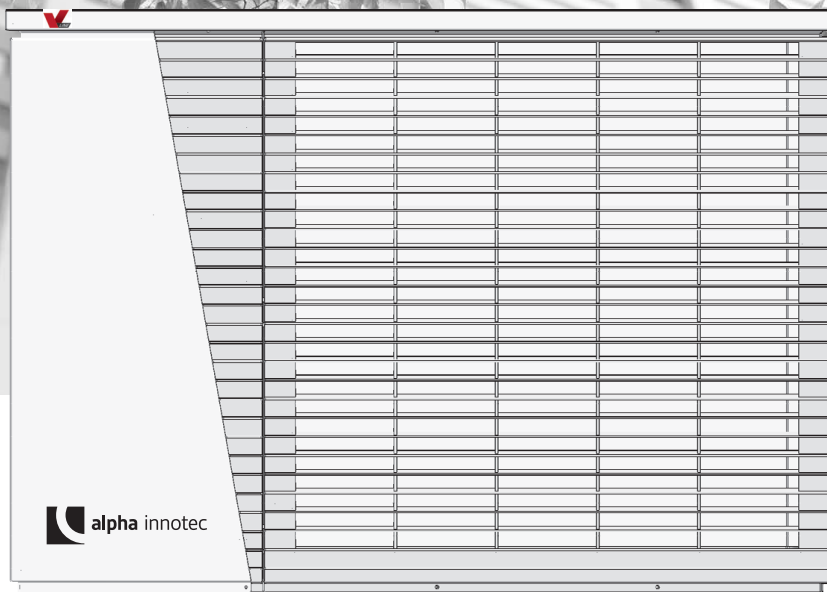


the better way to heat



Air/Water Heat Pumps
Dual / outdoor installation

Operating Manual

LWDV – series





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1 About this operation manual

This operation manual is an integral part of the device.

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

1.1 Validity

This operation manual refers solely to the device identified by the nameplate (→ "Nameplate", page 6).

1.2 Reference documents

The following documents contain additional information to this operation manual:

- Heat pump guide, hydraulic integration
- Operation manual for the heating and heat pump controller
- Short description of the heat pump controller
- Operation manual for the extension board (accessory)
- Operation manual for the hydraulic unit

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

2.1 Proper use

The device is intended exclusively for the following functions:

- Heating
 - Domestic hot water preparation (optional, with accessories)
 - Proper use includes complying with the operating conditions (→ “Technical data / scope of supply”, page 17) and the operation manual and observing the reference documents.
- ▶ When using the device, observe local regulations: laws, standards and directives.

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

2.2 Personnel qualifications

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

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

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

Children must not play with the product.

The product may only be opened by qualified personnel.

All instructions and information in this operation manual are intended exclusively for qualified and skilled personnel.

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

- ▶ Ensure that personnel are familiar with local regulations, especially those relating to working safely and in awareness of the hazard risks.
- ▶ Have work on the electrical and electronic components carried out only by qualified personnel with training in the field of “electrical components”.
- ▶ Have any other work on the system carried out by qualified and skilled personnel only, e.g.
 - Heating installers
 - Plumbers
 - Refrigeration plant manufacturers (maintenance work)

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

There is a risk of cutting your hands on sharp edges of the device.

- ▶ Wear cut-resistant protective gloves during transport.

2.4 Residual risks

Injuries caused by electric current

Components in the device are live with fatal voltage. Before opening the device casing:

- ▶ Disconnect the device from the power supply.
- ▶ Protect the device against being switched back on again.
- ▶ Residual voltage at the inverter. Wait for 90 seconds before opening the device.

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 device when the covers and fan protection grille are fitted.

Injuries and environmental damage due to refrigerant

The device contains flammable, harmful and environmentally dangerous refrigerant. If refrigerant leaks out of the device, there is a risk of explosion:

1. Switch off the device.
2. Notify an authorised after sales service.
3. Keep away from sources of ignition.

2.5 Disposal

Environmentally hazardous media

Improper disposal of environmentally hazardous media (refrigerant) will damage the environment:

- ▶ Collect media safely.
- ▶ Dispose of the media in an environmentally sound manner in accordance with the local regulations.

2.6 Avoid material damage

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

Constituents such as

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

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

Decommissioning/draining the heating

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

- ▶ Completely drain the system and the condenser, and open vent valves.
- ▶ Blow them clear with compressed air, if required.

Improper action

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

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

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

- Malfunctions and failure of components, e.g. pumps, valves
 - Internal and external leaks, e.g. at heat exchangers
 - Reduction in cross-section and blockages in components, e.g. heat exchangers, pipes, pumps
 - Material fatigue
 - Gas bubble and gas cushion development (cavitation)
 - Negative effect on heat transfer, e.g. due to formation of deposits, and associated noises, e.g. boiling noises, flow noises
- ▶ Observe the information in this operation manual for all work on and with the device.

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

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

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

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

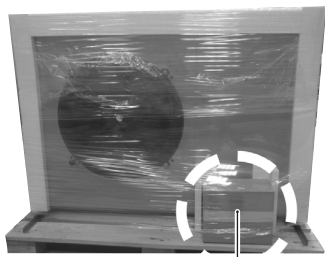


3 Description

3.1 Condition on delivery

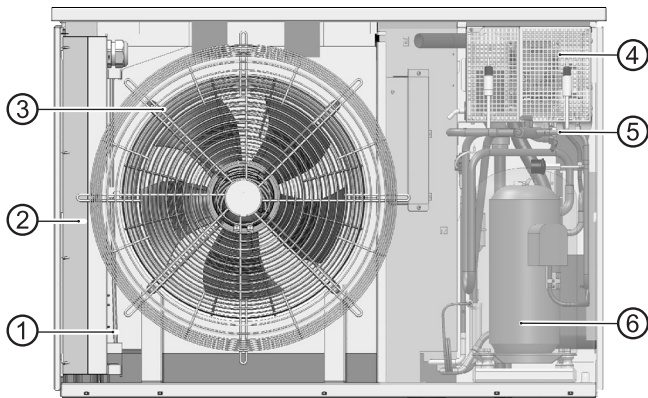


Packaged heat pump.



Separate package

3.2 Design



- | | |
|--------------|--------------|
| 3 Fan | 4 Inverter |
| 2 Switch box | 5 Condenser |
| 1 Evaporator | 6 Compressor |

Nameplate

The nameplate is attached at the following position on the device

- on the rear

It contains the following information at the very top:

- Device type, item number
- Serial number

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

Functionally necessary accessories

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

- Hydraulic station
- Hydraulic module

Additional accessories

- Wall duct with vibration decoupling
- Wall bracket
- Floor bracket
- Vibration decoupling
- Buffer tank
- Overflow valve
- Cladding for wall bracket
- Cladding for floor bracket
- Hydraulic connection line
- Extension board
- Room control panel

If the cable is not long enough for free field installation, an extension set can be ordered.

3.3 Function

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

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

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

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



4 Operation and care



NOTE

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

4.1 Energy and environmentally aware operation

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

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

4.2 Care

Wipe off the outside of the device 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 device components due to heavy objects.

- ▶ Do not place any objects that are heavier than 30 kg on the device.

5.1 Scope of delivery

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

The separate package included contains

- Documents (operation manuals, ERP data and labels)
- Type stickers
- 1 condensate drain pipe nozzle
- 3 fastening screws
- 1 sealing plate for floor duct
- 1 long torx bit for panel screws
- Load compressor plug for connection to hydraulic unit
- Bus line plug (communication) for connection to hydraulic unit
- Control voltage plug for connection to hydraulic unit
- Logo sticker for hydraulic unit



NOTE

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

5.2 Storage

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



5.3 Unpacking and transport

Notes on safe transport

The device is heavy (→ “Condensate line”, page 30). There is a risk of injuries or material damage if the device falls down or overturns.

There is a risk of cutting your hands on sharp edges of the device.

- ▶ Wear cut resistant protective gloves.

The hydraulic connections are not designed for mechanical loads.

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

Transport the device with a pallet truck if possible, or alternatively carry it

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

Transport with a pallet truck

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

Unpacking:

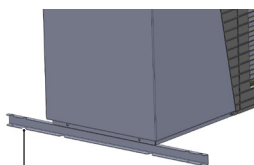
1. Remove plastic films. Make sure that you do not damage the device when doing this.
2. Dispose of the transport and packaging material in an environmentally sound manner and in accordance with local regulations.

Carrying the device



NOTE

The device is delivered on a pallet with mounting rails. The mounting rails can be used for transport.



Mounting rail

5.4 Installation

Preparation for installation, together with the wall duct

To connect the outdoor unit to the indoor part (hydraulic unit), there must be a suitable opening for the wall duct (accessory) or an opening has to be cut out in order to insert the Ø125 mm waste water pipe (= wall duct accessory).

If the wall duct is not yet present, you can also use a commercially available waste water pipe, length 1 m, DN 125 in advance.



NOTE

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

- Installation plan, dimension drawings and scopes of protection for the respective device type.



CAUTION

In the air outlet area the air temperature is approx. 5 K below the ambient temperature. Under certain climatic conditions, an ice layer can therefore develop in the air outlet area.

Install the heat pump so that the air coming from the air outlet opening is not discharged into footpath areas.



NOTE

The surface in the air outlet area of the heat pump must be permeable to water.

If the wall duct is not used, the bus cable must be routed through a separate cable conduit, separated from the other cables.

The other two cables also have to be routed using empty conduits on site.



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

- Only install outdoors
- ✓ Clearance dimensions were complied.
- “Minimum clearances”, page 29
- ✓ Free air intake and blowing air are possible without any air short-circuit.
- ✓ The surface is suitable for installation of the unit:
 - The foundation is level 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

5.5 Installation with a wall bracket

- “Wall bracket installation instruction”
- “Wall duct installation instruction”
- “Installation plans/minimum clearances/drill template”

The wall bracket is only suitable for solid, load-bearing walls. In a timber-frame construction with facing, the floor bracket should be used due to the possible transfer of structurally borne sound to the interior.

5.6 Installation on a floor bracket

The device can be installed near a wall or as a free field installation. Ideally, the heat pump should be installed where it is protected from wind. If this is not possible, we recommend installing it at right angles to the prevailing direction of wind or air ducting in the main wind direction.

Place the device on a load-bearing, firm and horizontal foundation. The foundation must not be connected to the building. Make sure that the foundation is designed for the weight of the heat pump.

- “Floor bracket installation instruction”
- “Wall duct installation instruction”
- “Installation plans/minimum clearances/view of foundation”



NOTE

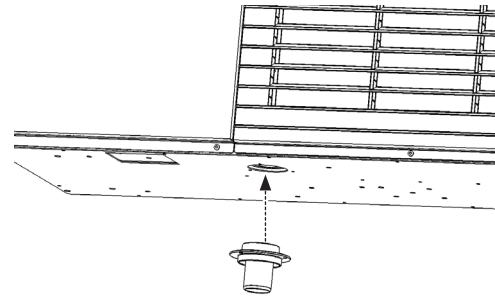
When installing with a wall duct, make sure the wall clearance is correct.

6 Installation of hydraulic system

6.1 Condensate drain

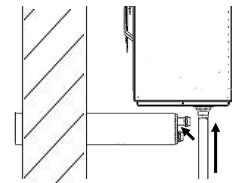
The condensate precipitated from the air must be removed frost-free via a plastic condensate pipe with a minimum diameter of 40 mm. If surfaces are water permeable, it is sufficient for the condensate drain pipe to be routed vertically into the ground to a depth of at least 90 cm.

Install the condensate pipe nozzle on the condensate drain, which is included in the scope of delivery for the device, on the underside of the device using the enclosed screws:



Outdoors

Connect the condensate pipe (wall duct accessory) to the condensate pipe nozzle.



- “Wall duct installation instruction”

The condensate pipe must not be inserted into the ground on its own, it must first be inserted into a second pipe that is suitable for installation in the ground (such as a waste water pipe).

The connection between the pipes must be sealed. It must be possible to compensate the length. The pipe on the device must not press against the ground, it must be possible to slide it.

Sufficient seepage of the draining condensate into the ground must be ensured.

- “External condensate line connection“, page 30



Towards the inside of the building

Insert the condensate pipe (wall duct accessory) through the wall duct (accessory) (using lubricant) and connect it to the condensate nozzle using the enclosed plastic elbows.

→ “Wall duct installation instruction”

If the condensate pipe is not routed inwards, the front and rear openings in the wall duct have to be sealed with the enclosed plugs.

→ “Internal condensate line connection“, page 30

6.2 Connection to the heating circuit

1. If no wall duct is used, route the fixed piping of the heating circuit outdoors below the frost line.
2. Flush the heating circuit thoroughly before connecting it to the heating system.

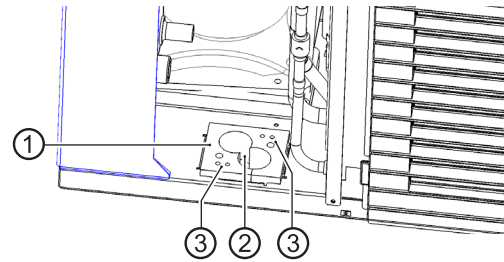
IMPORTANT

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 at least results in the minimum throughput required for the device type (→ “Technical data / scope of supply“, page 17).
 - ✓ The hydraulic system must be equipped with a buffer tank, the required volume of which depends on your device type.
- “Technical data / scope of supply“, page 17
- ✓ The lines for the heating are fastened to the wall or ceiling via a fixed point.

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

Make sure that the working overpressure (→ “Technical data / scope of supply“, page 17) is complied with. Attach the enclosed sealing plate into the recess in the housing floor.



- 1 Sealing plate
- 2 Heating water feed-throughs
- 3 Electric cable feed-throughs

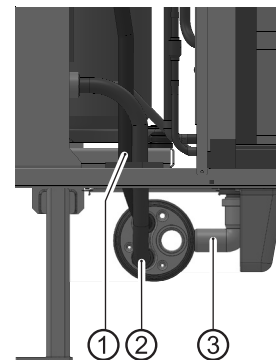
4. Connect the device to the fixed piping of the heating circuit via vibration decoupling (stainless steel corrugated pipes, accessory). You must install them to prevent the transfer of structurally borne sound to the fixed piping.



NOTE

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

→ “Vibration decoupling installation instruction”



- 1 Heating water outlet connection (flow)
- 2 Heating water inlet connection (return)
- 3 Condensate drain pipe

Route the stainless steel corrugated pipes through the feed-through in the housing floor and screw them onto the two pipes in the wall duct. Connect the supply line first, then the return line.

6.3 Pressure safety

Equip the heating circuit with a safety valve and diaphragm expansion vessel in accordance with local standards and guidelines.

Also install filling and draining devices, shut-off devices and non-return valves in the heating circuit.



7 Electrical installation

7.1 Establishing the electrical connections

IMPORTANT

Irreparable damage to the compressor due to wrong rotating field!

- ▶ Ensure a clockwise rotating field for the compressor's load supply (for 400 V connection only).

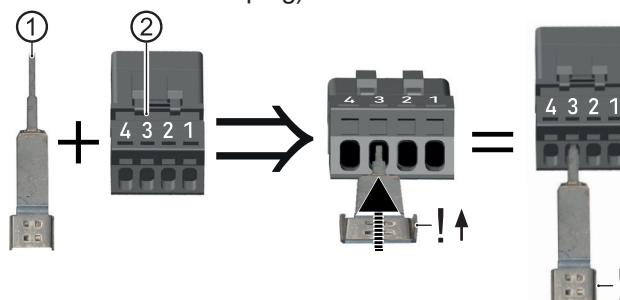
Basic information relating to the electrical connection

- Any specifications by the local energy supply company apply to electrical connections
- Equip the power supply for the heat pump with an all-pole miniature circuit-breaker with at least 3 mm contact spacing (IEC 60947-2)
- Note the tripping current level (→ "Technical data / scope of supply", page 17)
- Comply with the electromagnetic compatibility regulations (EMC regulations)
- Comply with current EMC requirements for household appliances
- Install unshielded power supply cables and shielded cables (bus cables) sufficiently far apart (> 100 mm)
- Maximum line length: 30m.
Permissible type of bus cable:
3x0,5 mm², Standard shielded ÖLFLEX

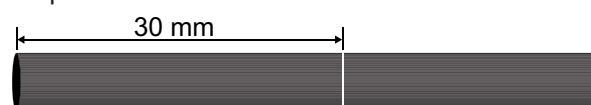
Pull in the cables and conductors and create the connections

1. Route the pre-assembled 8 m cable for the heat pump inside the building to the hydraulic unit.
2. Connect the compressor load cable to the hydraulic unit using the 5-pin plug included in the heat pump scope of delivery, "Load connection to L1".
→ See "Terminal diagram/circuit diagram for hydraulic unit"
3. Route the bus cable in a cable conduit up to the building feed-through and from there on to the hydraulic unit.
4. Connect the bus cable (communication) to the pink-coloured bus plug included in the scope of delivery of the heat pump.
- 4.1. Insert the contact spring (①) into pin 3 of the bus plug (②) up to the limit stop.

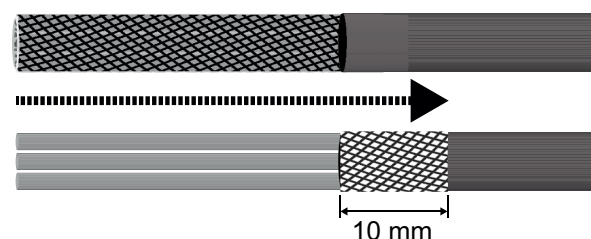
The lugs on the broad end of the contact spring must point upwards (in the direction of the numbers on the bus plug).



4.2. Strip the bus cable.



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



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



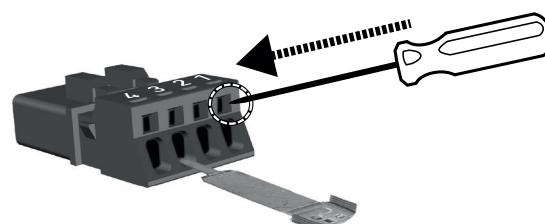
4.5. Strip each core by 9 mm.



4.6. Twist the strands of each core.

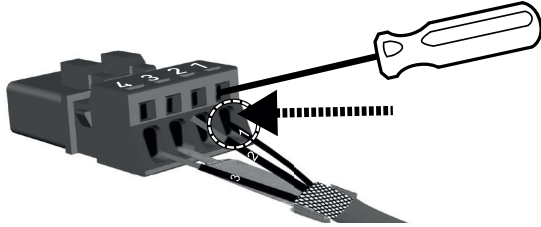


4.7. Insert an operating tool or screwdriver (blade 2.5x0.4 mm) into the latch device on plug pin 1 to unlock it.

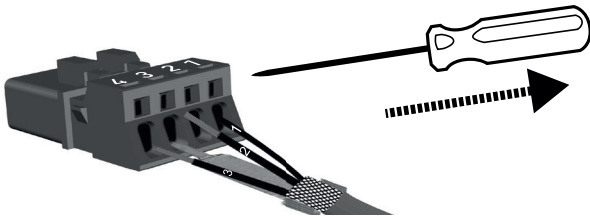




- 4.8. Place the cable with shielding braid onto the contact spring from above and insert the stripped core marked 1 into the connector pin 1 up to the limit stop.



- 4.9. Pull the operating tool or screwdriver out of the bus plug and thereby lock the connection of plug pin 1.

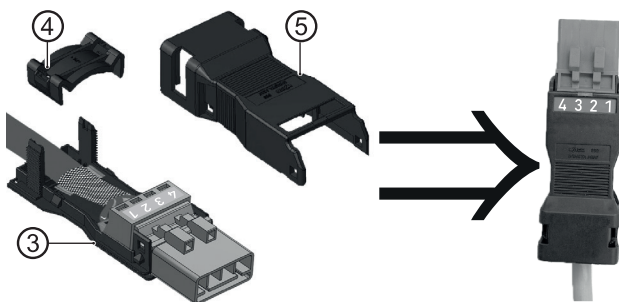


- 4.10. Insert the core marked 2 into the plug pin 2 and the core marked 3 into the plug pin 4 in the same way.

Bus cable core marking 1	Plug pin 1
Bus cable core marking 2	Plug pin 2
Shielding braid on contact spring	Plug pin 3
Bus cable core marking 3	Plug pin 4

Shorten the shielding braid if necessary so that it does not protrude beyond the contact spring.

5. Assemble the plug housing.



- 5.1. Snap the wired plug into the lower part of the housing (③).
5.2. Fit the strain relief (④) and clip into place until the bus cable is clamped firmly

IMPORTANT

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

- 5.3. Snap the upper part of the housing (⑤) fully onto the lower part.
6. Connect the bus plug to the hydraulic unit.

7. Connect the control voltage to the hydraulic unit using the plug included in the heat pump scope of delivery.

- Operating manual "Hydraulic unit".
→ "Terminal diagram/circuit diagram for hydraulic unit"

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)
 - Required pH value: 8.2 ... 10;
for aluminium materials:
pH value: 8.2 ... 8.5
- ▶ 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
 - Ideal pH value due to self-alkalisation after filling the system
- ▶ If the required water quality is not achieved, consult a company specialising in the treatment of heating water.
- ▶ Keep a system log for hot water heating systems in which relevant planning data is 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

- ✓ The outlet pipe of the safety valve is connected.
- ▶ Ensure that the response pressure of the safety valve is not exceeded.



NOTE

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

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

9 Insulation of hydraulic connections

Insulate hydraulic lines in accordance with the local regulations.

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

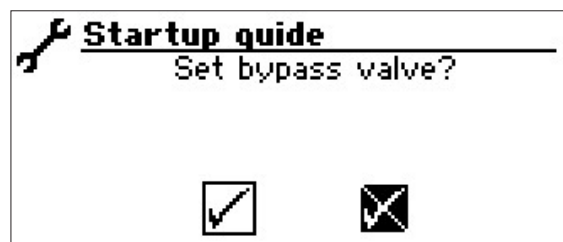
10 Setting the overflow valve



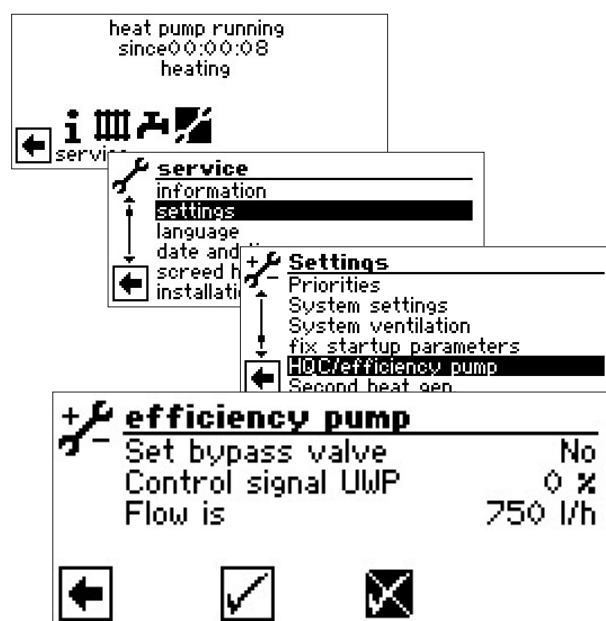
NOTE

- The activities in this section are only necessary for 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).

If the storage tank is integrated in series, the IBN – assistant allows you to adjust the overflow valve according to the hydraulic system.



Confirm the IBN – assistant or:

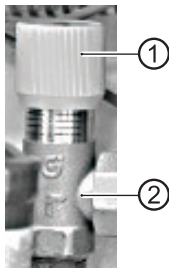


The “Set bypass valve” menu item is set by default to “No”. The overflow valve adjustment function is deactivated.



- The UWP control signal is the indication of the currently required pump capacity as a %
- The actual 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 to 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 17) 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 facing panels must be closed and the fan protection grille must be mounted.

- ✓ The relevant planning and design data of the system is documented in full.
 - ✓ The relevant energy supply company has been notified of the operation of the heat pump system.
 - ✓ The system is air-free.
 - ✓ Installation check using the rough checklist has been completed successfully.
1. Ensure that the following points are fulfilled completely:
 - Clockwise rotating field is present for the load supply at the compressor (for 400 V connection only)
 - 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
 2. Carefully fill in and sign the notice of completion for the heat pump systems.
 3. 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.
 4. Arrange for the heat pump system to be commissioned by the manufacturer’s authorised after sales service for a fee.



12 Maintenance



NOTE

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



NOTE

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

12.1 Basic principles

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

Local regulations— e.g. EU Regulation (EC) 517/2014 – among other things, require 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 as required

- Check and clean the components of the heating circuit, e.g. valves, diaphragm expansion vessels, circulation pumps, filters, dirt traps
- Test the function of the safety valve for the heating circuit
- Always regularly control for unimpeded air in-feed 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 and the evaporator regularly for dirt/clogging and clean as necessary

12.3 Cleaning and flushing the condenser

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

12.4 Annual maintenance

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

13 Malfunctions

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

- ✓ The device is disconnected from the power supply and protected against being switched back on again.
- ✓ The installer is qualified to work on the cooling circuit and has the relevant certification.
- ✓ The installer is qualified to handle flammable refrigerant.
- ✓ The disposal equipment is suitable for flammable refrigerants.
- ▶ The locally applicable regulations for handling refrigerants are complied with.
- ▶ The locally applicable regulations for handling flammable refrigerants are complied with.
- ▶ Keep away from sources of ignition.
- ▶ Collect all media safely.
- ▶ Separate components according to their materials.

14.2 Disposal and recycling

- ▶ Dispose of environmentally hazardous media according to the local regulations (e.g. refrigerant, compressor oil).
- ▶ Ensure the correct recycling or disposal of device components and packaging materials in accordance with the local regulations.



Technical data / scope of supply

LWDV

Performance data		Values in brackets: (1 Compressor)		LWDV 91-1/3
Heating capacity COP	for A10/W35 acc. to EN14511	Partial load operation	kW COP	3,01 6,03
	for A7/W35 acc. to EN14511	Partial load operation	kW COP	2,77 5,41
	for A7/W55 acc. to EN14511	Partial load operation	kW COP	4,23 3,35
	for A2/W35 acc. to EN14511	Partial load operation	kW COP	5,08 4,61
	for A-7/W35 acc. to EN14511	Full load operation	kW COP	8,11 3,14
	for A-7/W55 acc. to EN 14511	Full load operation	kW COP	6,55 2,13
Heating capacity	for A10/W35	min. max.	kW kW	2,95 8,20
	for A7/W35	min. max.	kW kW	2,74 8,20
	for A7/W55	min. max.	kW kW	2,39 8,20
	for A2/W35	min. max.	kW kW	2,33 8,20
	for A-7/W35	min. max.	kW kW	3,06 8,11
	for A-7/W55	min. max.	kW kW	2,80 6,55
Cooling capacity EER	for A35/W18	Partial load operation	kW EER	- -
	for A35/W7	Partial load operation	kW EER	- -
Cooling capacity	for A35/W18	min. max.	kW kW	- -
	for A35/W7	min. max.	kW kW	- -
Operating limits				
Heating circuit return min. Heating circuit flow max. Heating		within heat source min./max.	°C	20 70
Heat source, heating		min. max.	°C	-22 35
Additional operating points			...	A-10/W65
Sound				
Sound power level inside		min. Night max.	dB(A)	- - -
Sound power level outside 1)		min. Night max.	dB(A)	49 53 59
Sound power level acc. to EN12102		inside outside	dB(A)	- 54
Tonality Low-frequency			dB(A) • yes – no	- -
Heat source				
Air flow rate at maximum external pressing Maximum external pressure			m³/h Pa	3500 -
Heating circuit				
Flow rate (pipe dimensioning) Min. volume buffer tank in series Min. volume separation buffer tank			l/h	1600 60 60
Free pressing Pressure loss Flow rate			bar bar l/h	- 0,07 1150
Max. allowable operating pressure			bar	3
Circulation pump control range		min. max.	l/h	- -
General unit data				
Total weight			kg	141,00
Weight of heat pump module Compact module Fan module			kg kg kg	- - -
Refrigerant type Refrigerant capacity			... kg	R290 1,05
Electrics				
Voltage code all-pole fuse protection for heat pump *)**)			... A	1~N/PE/230V/50Hz B16
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 (partial load operation) EN14511 Electric consumption cosφ			kW A ...	1,38 2,11 0,8
HP*): effective power consumption A7/W35 acc. to EN14511: min. max.			kW kW	0,53 1,6
HP*): max. machine current max. power consumption within the operating limits			A kW	16 3,5
Starting current: direct with soft starter			A A	< 5 —
Degree of protection			IP	24
Residual current circuit breaker		if required	type	B
Electric heating element output		3 2 1 phase	kW kW kW	- - -
Circulation pump power consumption, heating circuit		min. 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 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		- - -

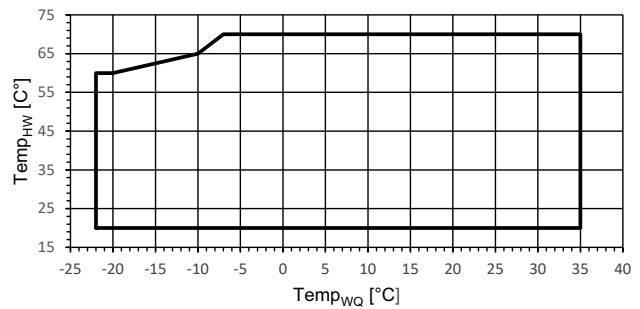
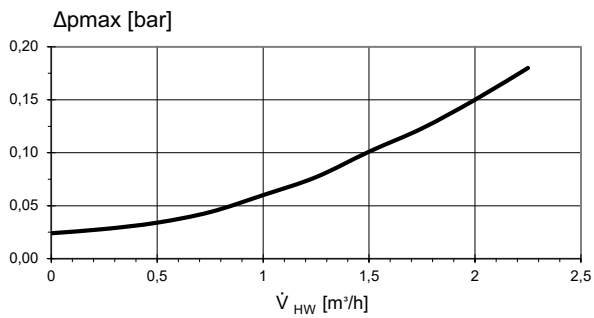
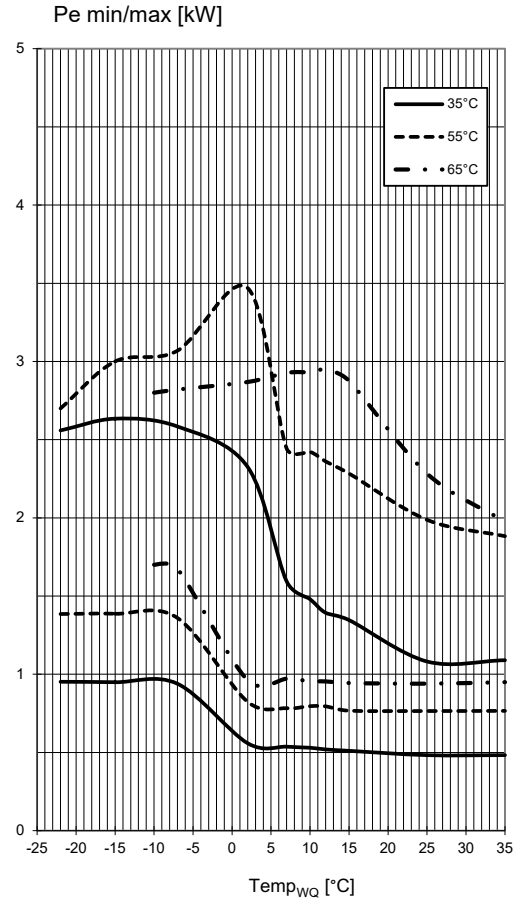
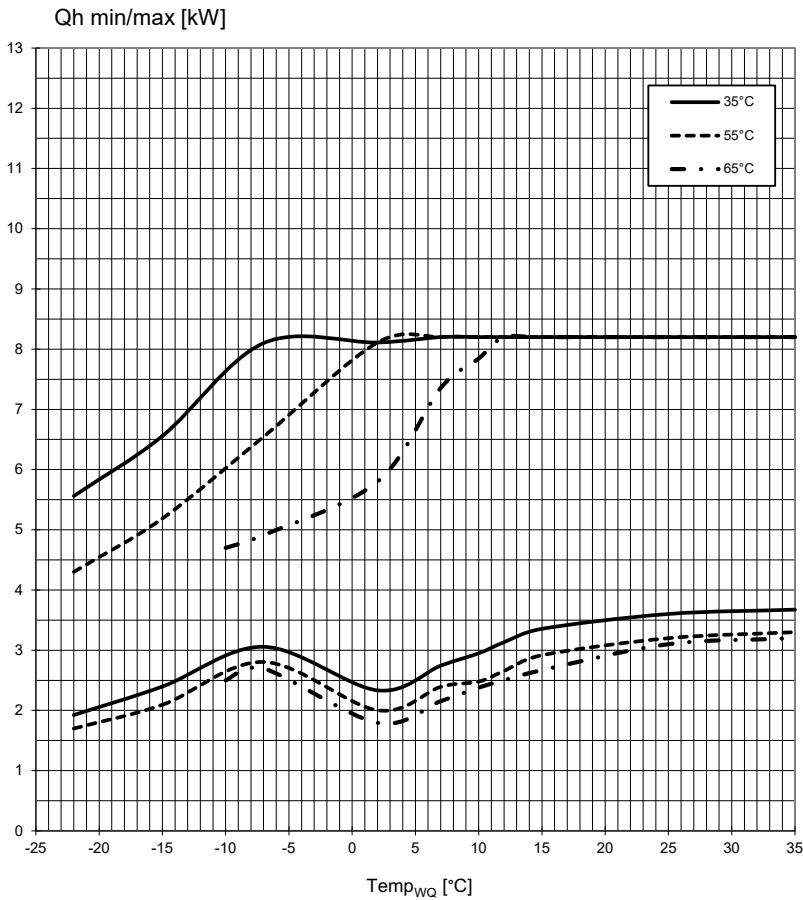
*) compressor only, **) note local regulations 1) Indoor and outdoor installation
For indoor installation: Intake 1.5m air duct, Blow-out 1.5m air duct + air duct bend (original accessories)

813585c



Performance curves

LWDV



823296a

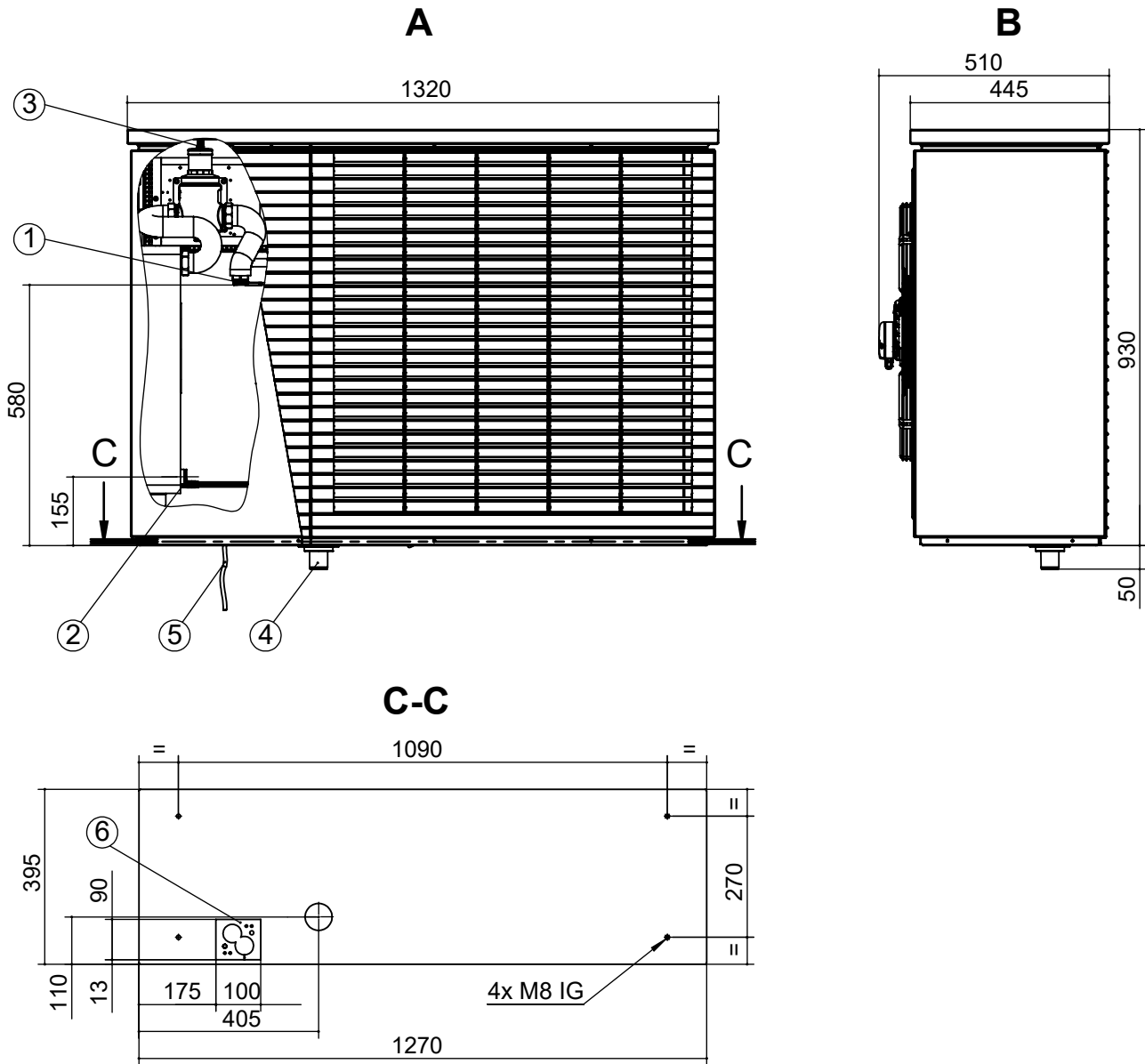
Keys: UK823296a

\dot{V}_{HW}	Heating water flow rate
Temp _{wQ}	Heat source temperature
Temp _{HW}	Heating water temperature
Δpmax	Maximum pressure loss
Qh min/max	Minimum/maximum heating load
Pe min/max	Minimum/maximum power consumption



LWDV

Dimensional drawings



Keys: UK819504

All dimensions in mm.

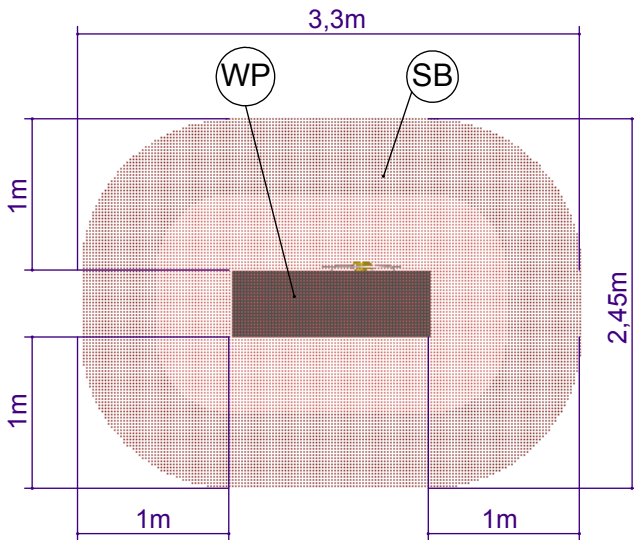
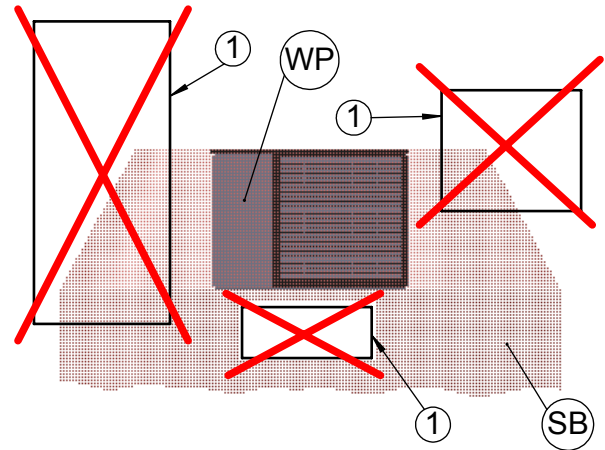
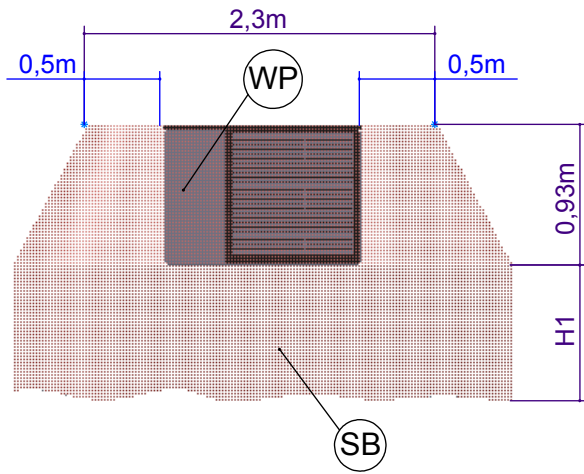
Pos.	Name
A	Front view
B	Side view
C-C	Cross-section baseplate

Pos.	Name
1	Heating water outlet (supply) G 1" external thread
2	Heating water inlet (return) G 1" external thread
3	Vent
4	Nozzle (in separate package) for condensate drain pipe
5	Cable for power, control, BUS, length ~8 m from device
6	Feed-through for supply and return and cable (in separate package)



Protection zones / safety distances

LWDV



Keys: UK819401

Pos.	Name
WP	Heat pump
SB	Protection zone
H1	to the floor
1	Doors, windows, light wells etc. into the building

Important: The heat pump must be installed outdoors!

The device should be positioned so that, in the event of a leak, no refrigerant can enter the building or endanger persons in any other way.

In the protection zone (see illustration) between the upper edge of the device and the floor, there must not be any sources of ignition, windows, doors, ventilation openings, light wells or similar.

The protection zone must not reach into neighbouring properties or public traffic areas.

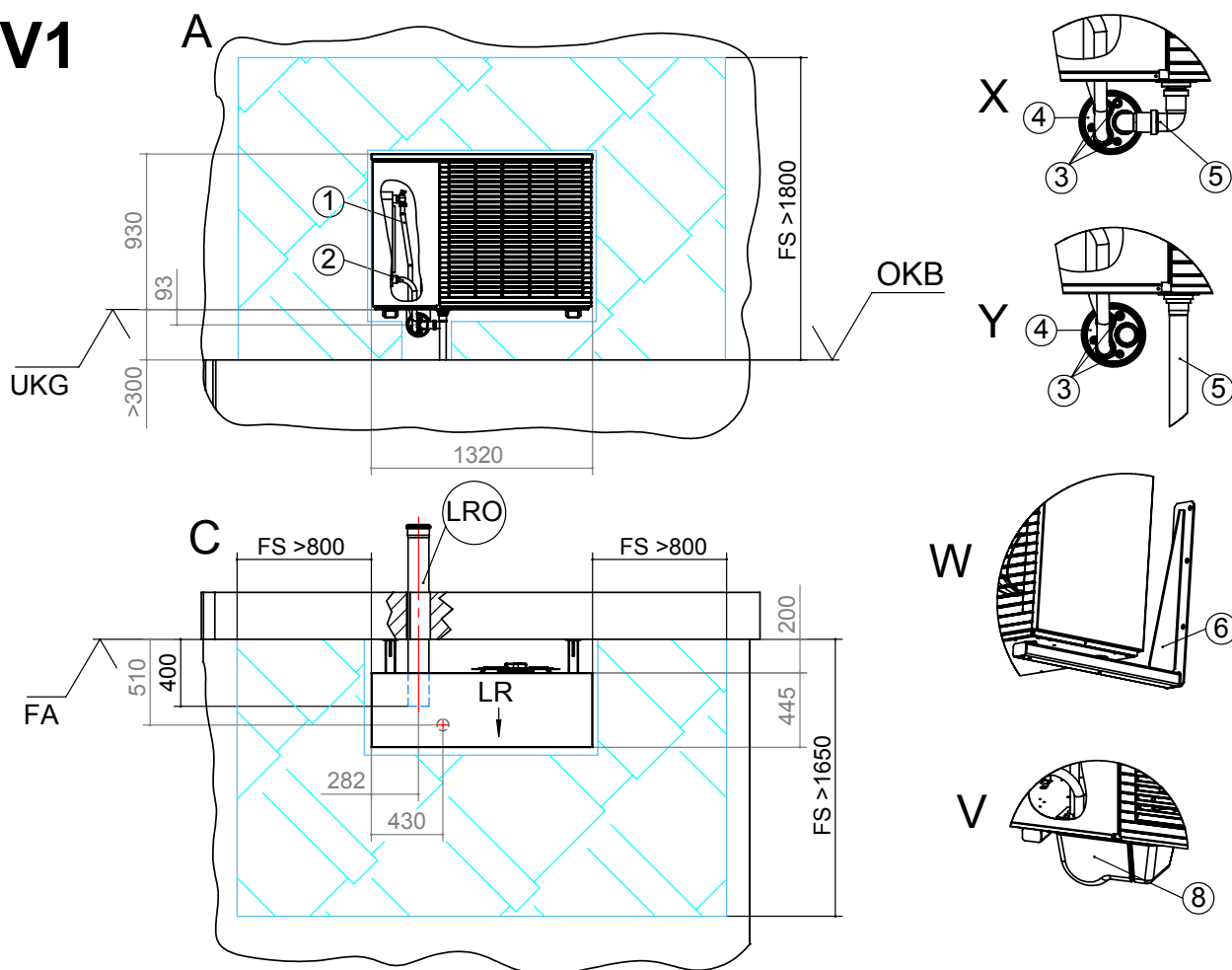
The wall duct through the building envelope should be designed to be airtight.



LWDV

Wall bracket
with wall duct

V1



Keys: 819393-1c

All dimensions in mm.

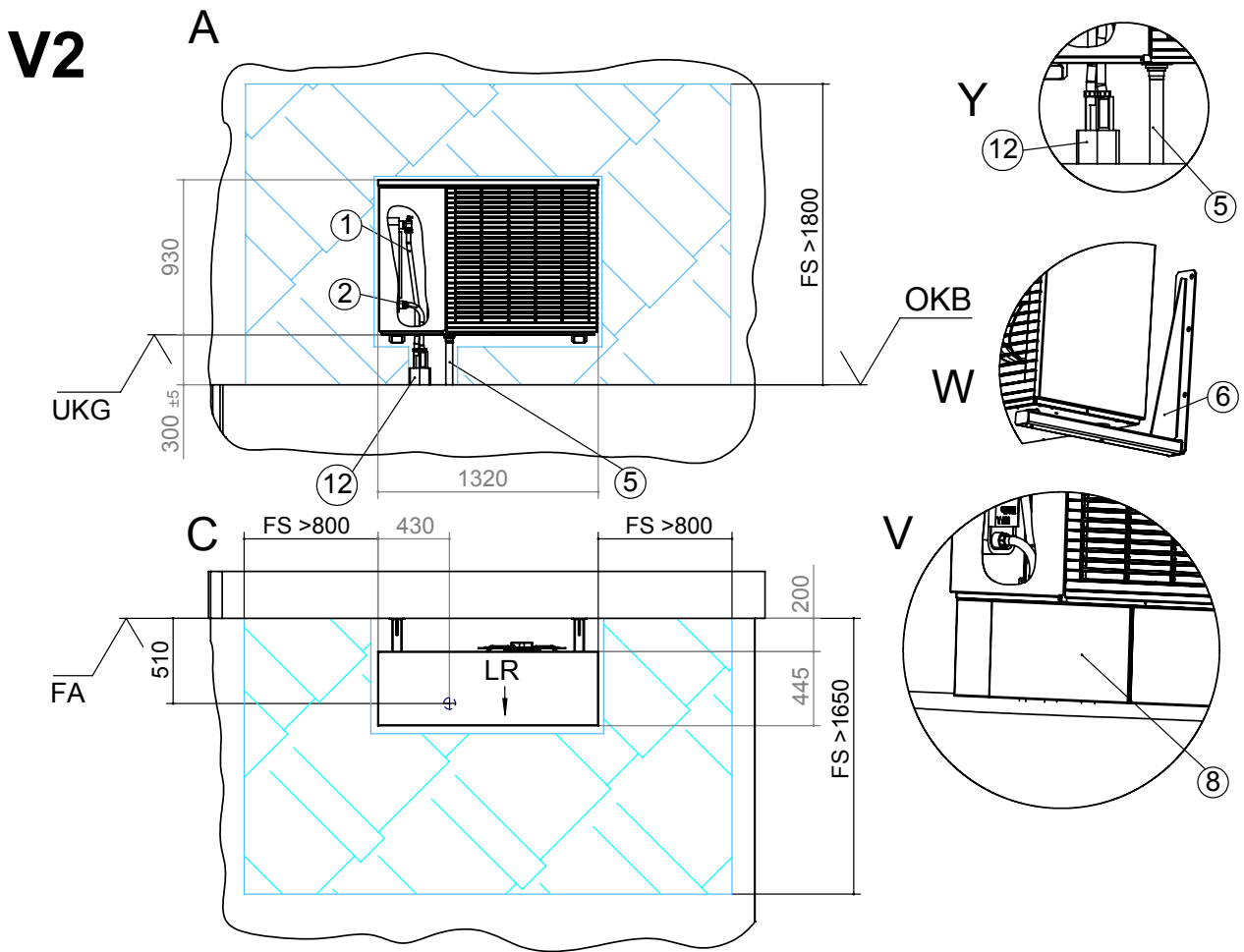
Pos.	Name
V1	Variant 1
A	Front view
C	Top view
V	Detailed view of cladding
W	Detailed view of wall attachment
X	Detailed view of condensate line inside building
Y	Detailed view of condensate line outside building
FA	Complete external facade
UKG	Lower edge of device
OKB	Upper edge of ground
LRO	Empty sewer conduit DN 125, Øa 125 (shorten on site)
LR	Direction of air
FS	Clearance for servicing

Pos.	Name
1	Heating water supply (accessory)
2	Heating water return (accessory)
3	Cable bushing
4	Wall duct (accessory)
5	Condensate drain / waste trap
6	Bracket for wall attachment (accessory)
8	Cladding of wall duct (accessory)



Wall bracket with hydraulic connection line

LWDV



Keys: 819393-2c

All dimensions in mm.

Pos.	Name
V2	Variant 2
A	Front view
C	Top view
V	Detailed view of cladding
W	Detailed view of wall attachment
Y	Detailed view of condensate line outside building
FA	Complete external facade
UKG	Lower edge of device
OKB	Upper edge of ground
LR	Direction of air
FS	Clearance for servicing

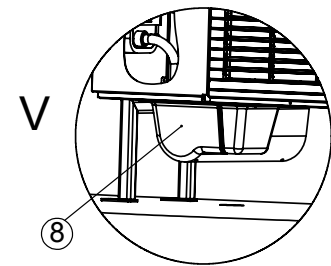
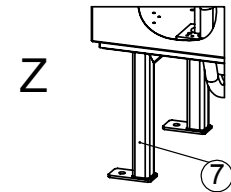
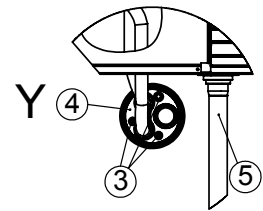
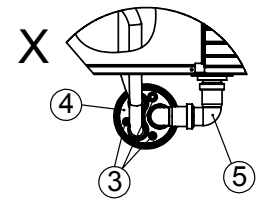
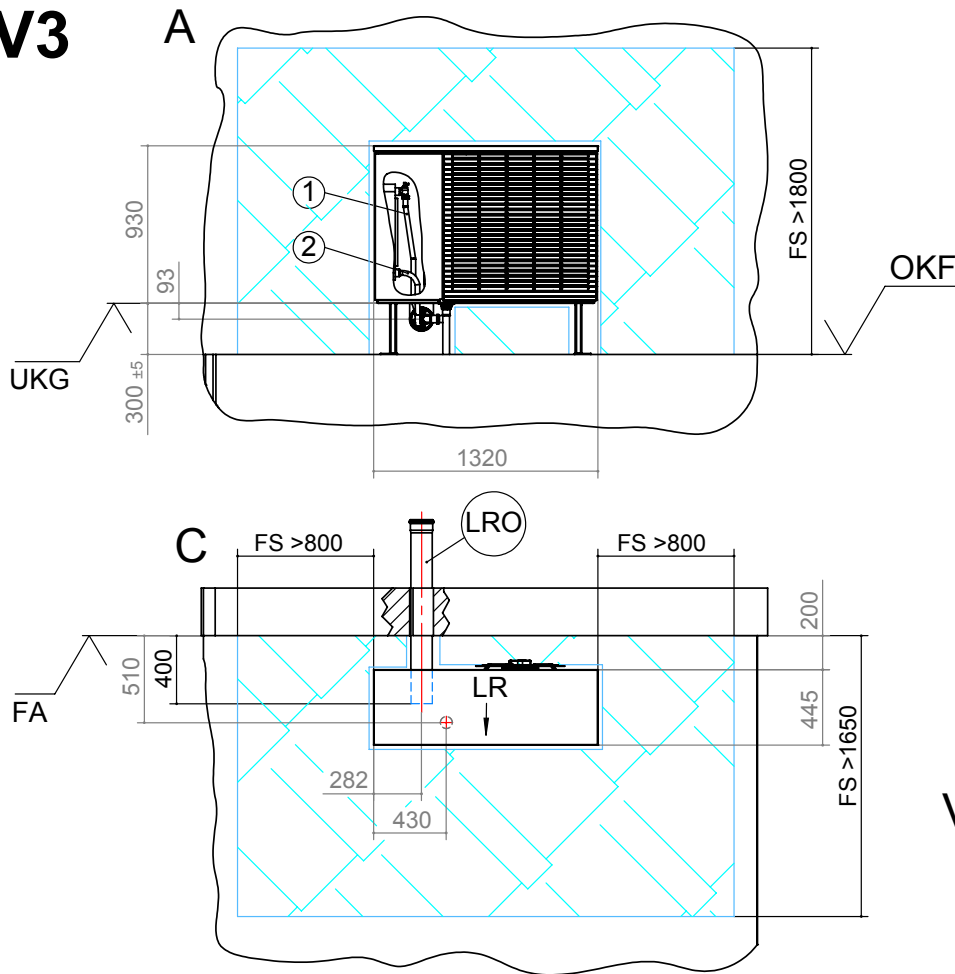
Pos.	Name
1	Heating water supply (accessory)
2	Heating water return (accessory)
5	Condensate drain/waste trap
6	Bracket for wall attachment (accessory)
8	Cladding of wall duct (accessory)
12	Hydraulic connection line



LWDV

Floor bracket
with wall duct

V3



Keys: 819393-3c

All dimensions in mm.

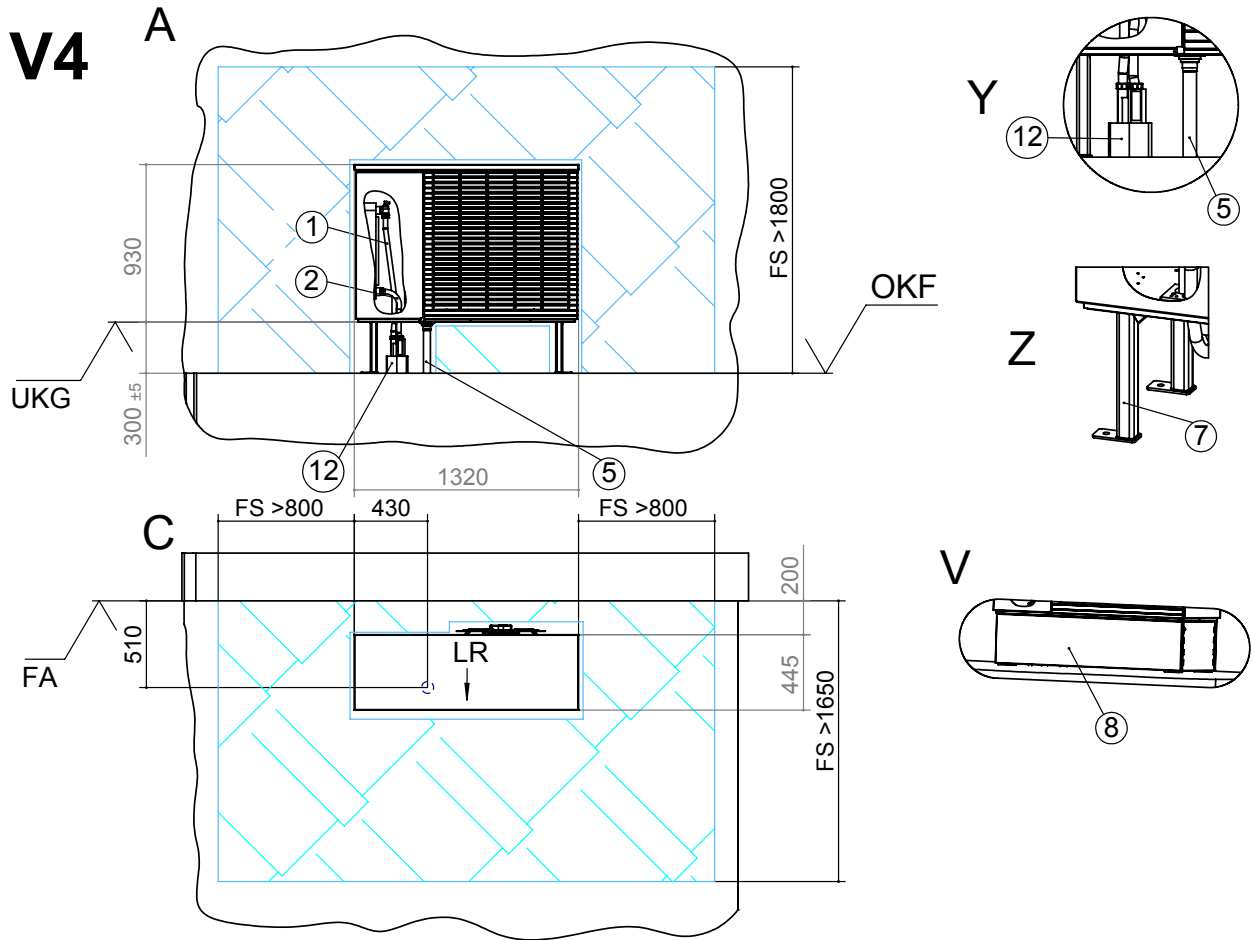
Pos.	Name
V3	Variant 3
A	Front view
C	Top view
V	Detailed view of cladding
X	Detailed view of condensate line inside building
Y	Detailed view of condensate line outside building
Z	Detailed view of floor attachment
FA	Complete external facade
UKG	Lower edge of device
OKF	Upper edge of foundation
LRO	Empty sewer conduit DN 125, Øa 125 (shorten on site)
LR	Direction of air
FS	Clearance for servicing

Pos.	Name
1	Heating water supply (accessory)
2	Heating water return (accessory)
3	Cable bushing
4	Wall duct (accessory)
5	Condensate drain/waste trap
7	Bracket for floor attachment (accessory)
8	Cladding of wall duct (accessory)



Floor bracket with hydraulic connection line

LWDV



Keys: 819393-4c

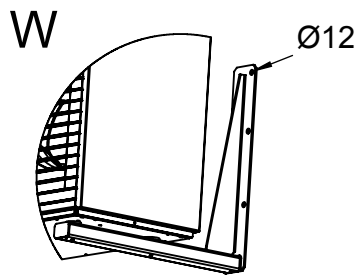
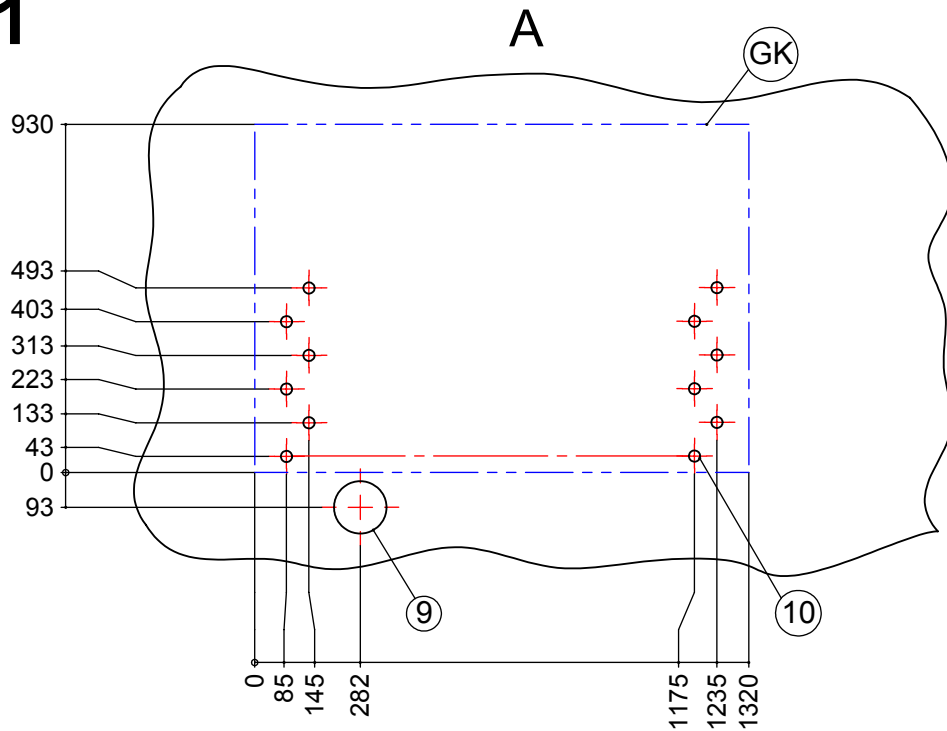
All dimensions in mm.

Pos.	Name
V4	Variant 4
A	Front view
C	Top view
V	Detailed view of cladding
Y	Detailed view of condensate line outside building
Z	Detailed view of floor attachment
FA	Complete external facade
UKG	Lower edge of device
OKF	Upper edge of foundation
LR	Direction of air
FS	Clearance for servicing

Pos.	Name
1	Heating water supply (accessory)
2	Heating water return (accessory)
5	Condensate drain/waste trap
7	Bracket for floor attachment (accessory)
8	Cladding of floor bracket (accessory)
12	Hydraulic connection line



BB1



Keys: 819393-5c

All dimensions in mm.

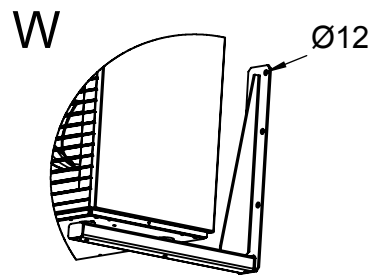
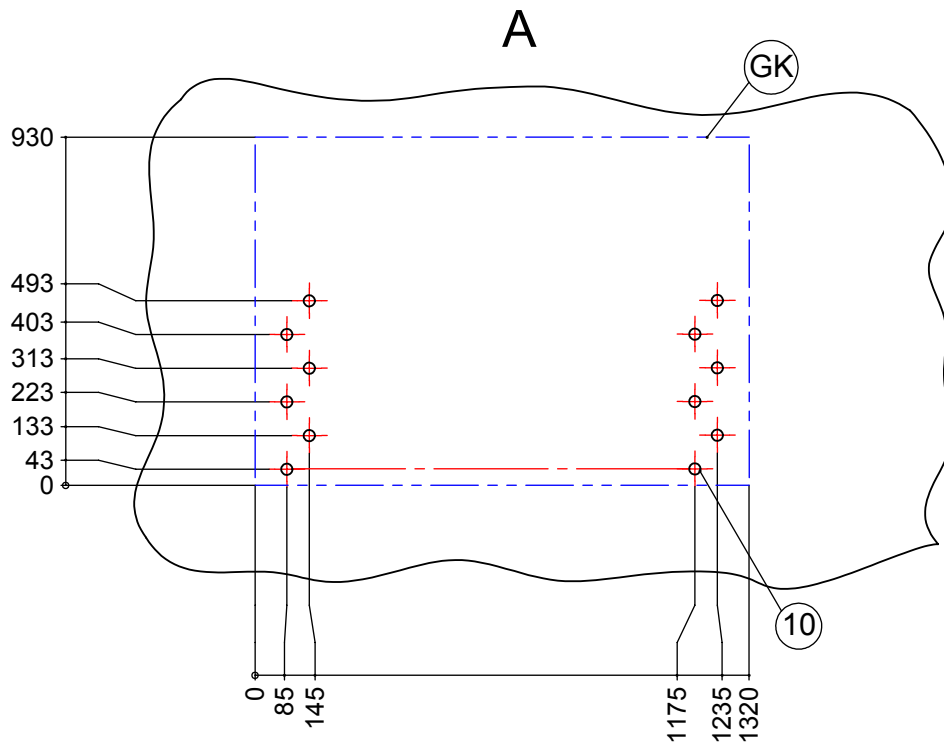
Pos.	Name
BB1	Drill template for wall bracket (accessory) on mounting wall for V1
A	Front view
W	Detailed view of wall attachment
GK	Device contour
9	Bore for empty sewer conduit KG DN125, Øa 125
10	Mounting bores for wall brackets



Drill template for wall bracket with hydraulic connection line

LWDV

BB2



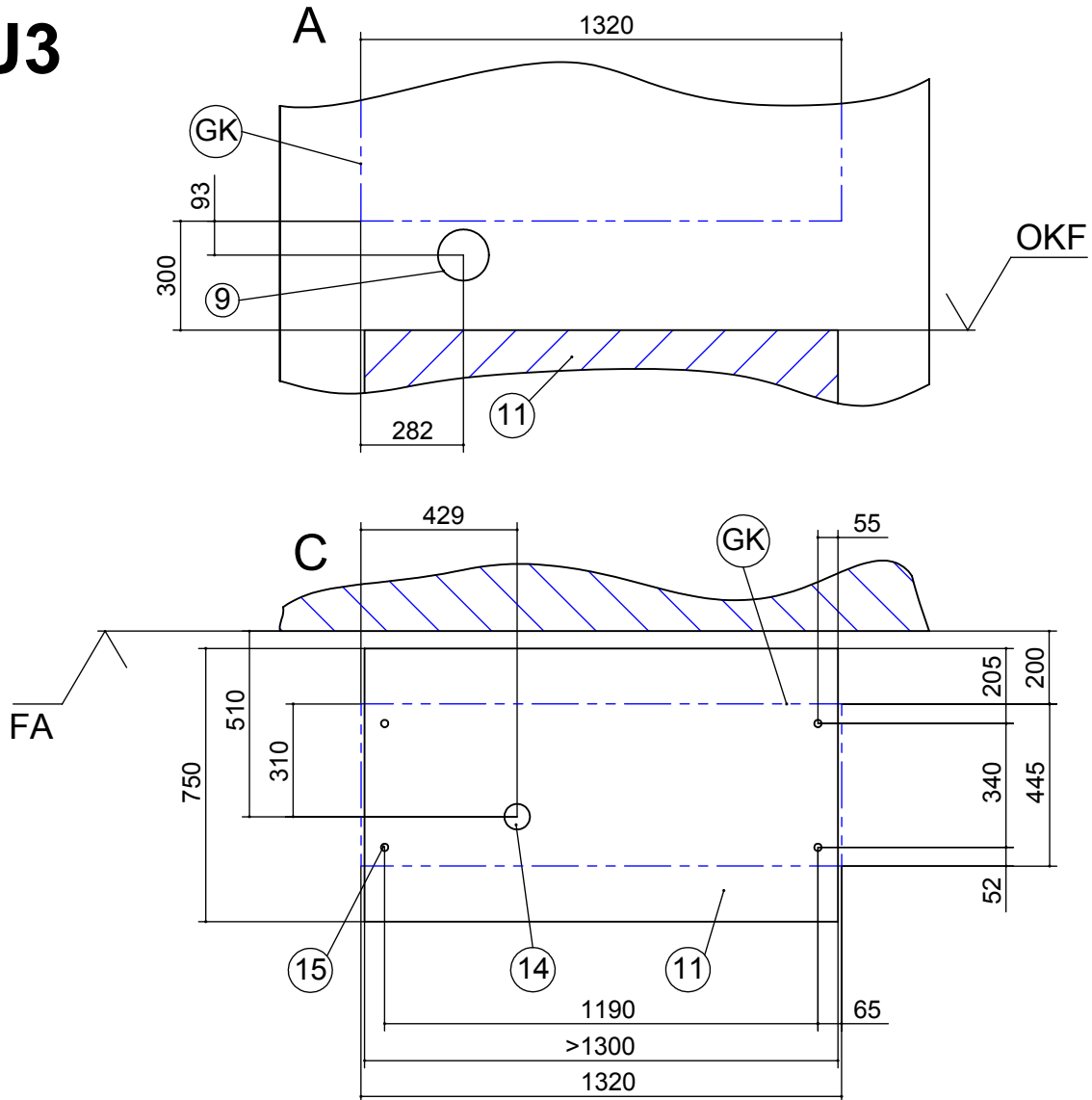
Keys: 819393-6c

All dimensions in mm.

Pos.	Name
BB2	Drill template for wall bracket (accessory) on mounting wall for V2
A	Front view
W	Detailed view of wall attachment
GK	Device contour
10	Mounting bores for wall brackets



FU3



Keys: 819393-7c

All dimensions in mm.

Pos.	Name
FU3	View of foundation for V3
A	Front view
C	Top view
FA	Complete external facade
OKF	Upper edge of foundation
GK	Device contour

Pos.	Name
9	Bore for empty sewer conduit KG DN125, Øa 125
11	Foundation
14	Condensate drain pipe $\geq \text{Ø}50$
15	Mounting bores for floor bracket

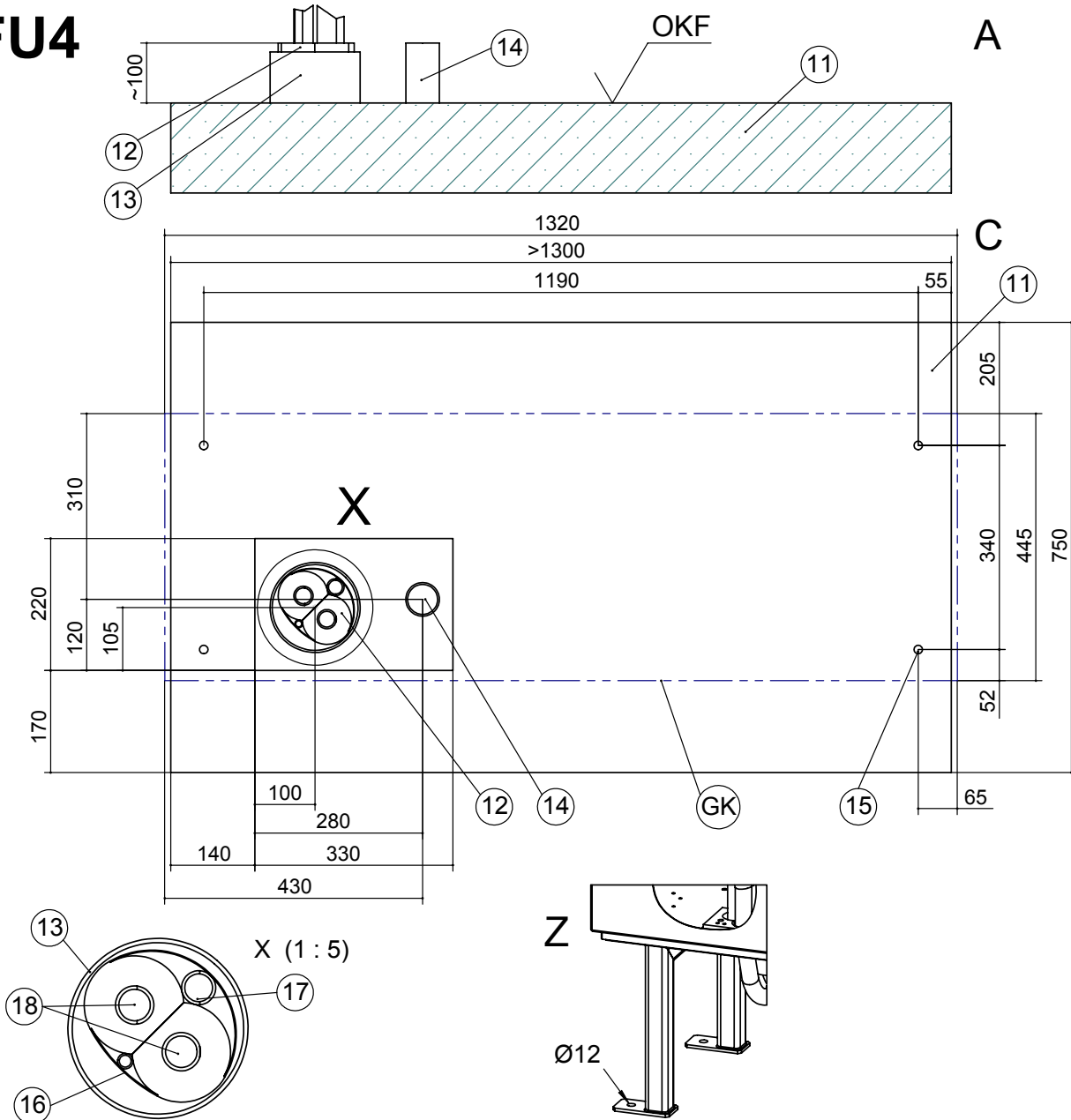
The foundation must not have any structure-borne sound contact with the building.



Foundation for V4 with hydraulic connection line

LWDV

FU4



Keys: 819393-8c

All dimensions in mm.

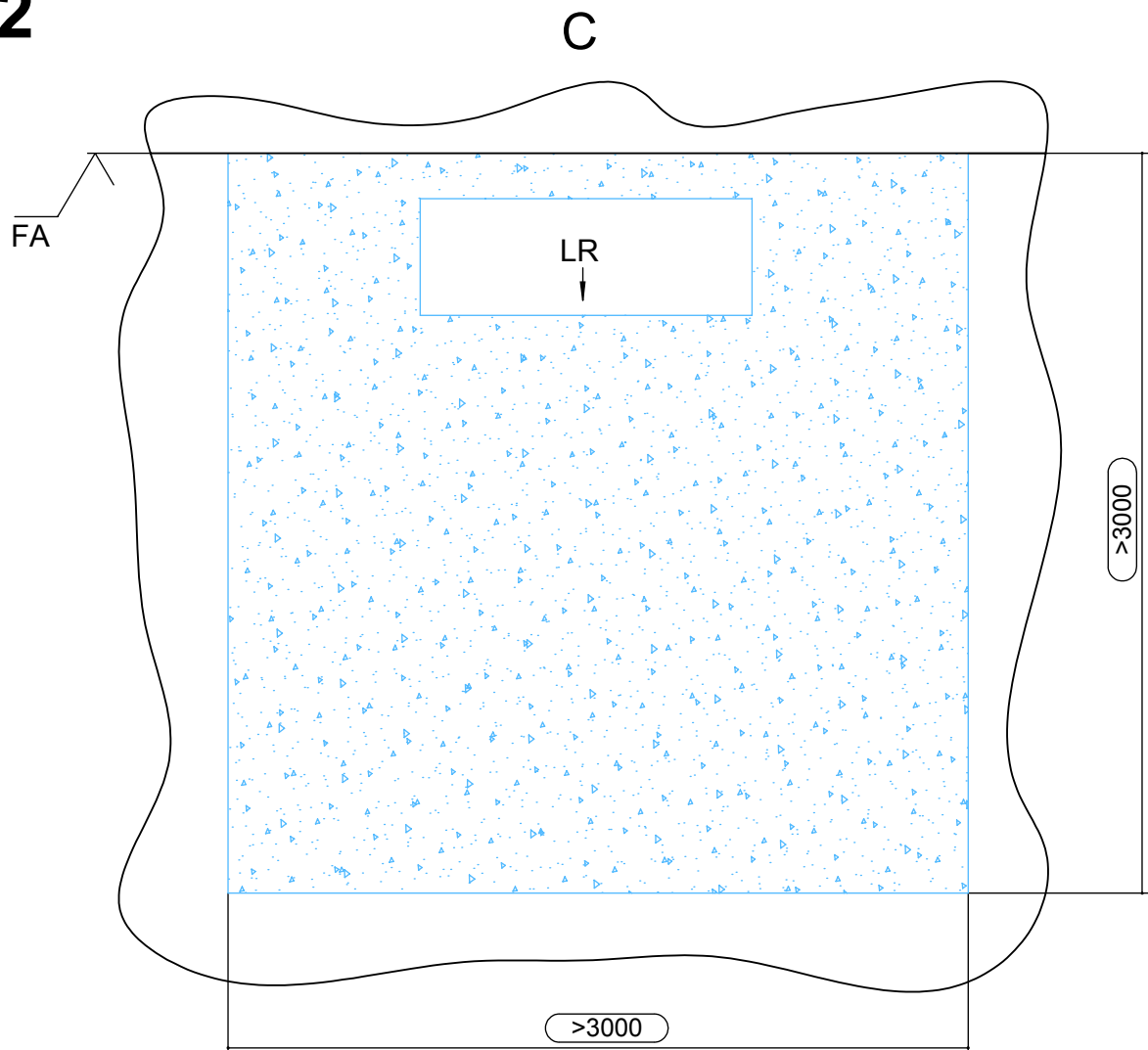
Pos.	Name
FU4	View of foundation for V4
A	Front view
C	Top view
X	Detailed view X
Z	Detailed view of floor attachment
OKF	Upper edge of foundation
GK	Device contour

Pos.	Name
11	Foundation
12	Hydraulic connection line
13	Empty conduit DN 150 (on site)
14	Condensate drain pipe $\geq \text{Ø}50$
15	Mounting bores for floor bracket
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 sound contact with the building.



FW2



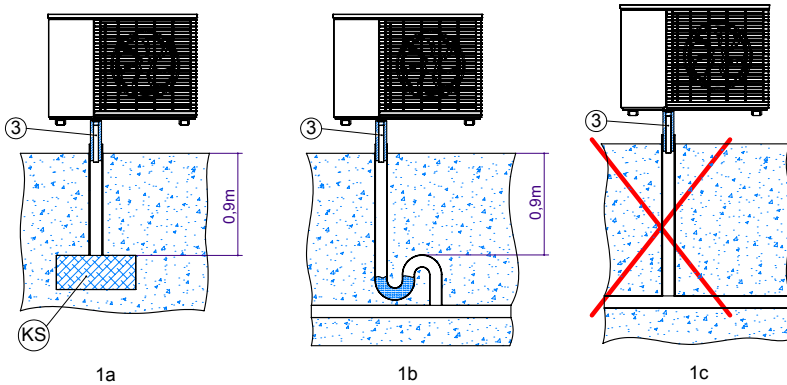
Keys: 819393-10c
All dimensions in mm.

Pos.	Name
FW2	Functionally necessary minimum clearances
C	Top view
FA	Complete external facade
LR	Direction of air
>	Minimum clearances



External condensate line connection

LWDV



Keys: 819400-1

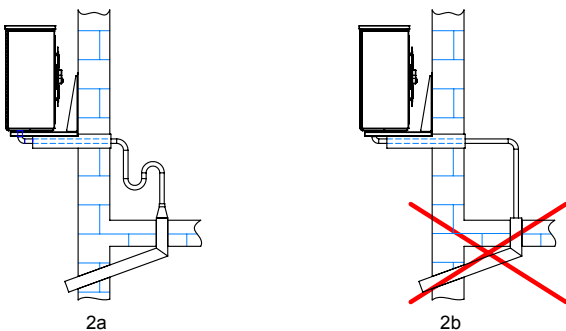
Pos.	Name
KS	Gravel bed for holding up to 50 l condensate per day as buffer zone for seepage
3	Condensate drain pipe DN 40 (on site)

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

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

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

Internal condensate line connection



Keys: 819400-2

Important: If the condensate line is connected inside a building, a waste trap must be installed with an airtight connection to the drain pipe (see figure 2a).

No additional drain pipes may be connected to the condensate drain pipe of the heat pump. The drain pipe into the sewage system must be clear, i.e. neither a non-return valve nor a waste trap must be installed downstream of the heat pump's connection cable.

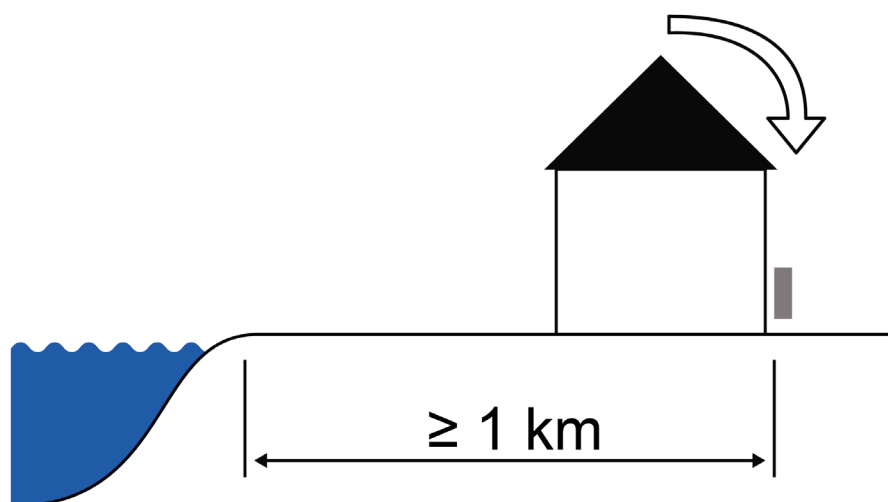
It must be ensured that the condensate is discharged frost-free in all cases (figure 2a).



IMPORTANT

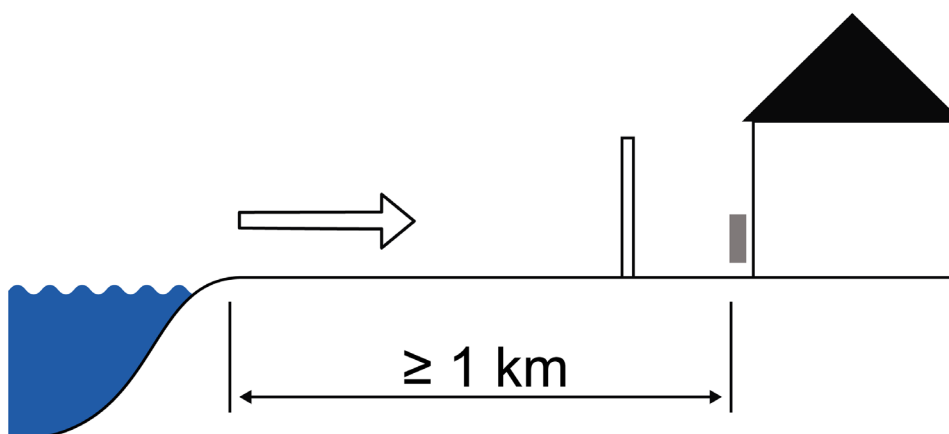
The minimum distances necessary for correct and safe operation as well as any service work must be observed.

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



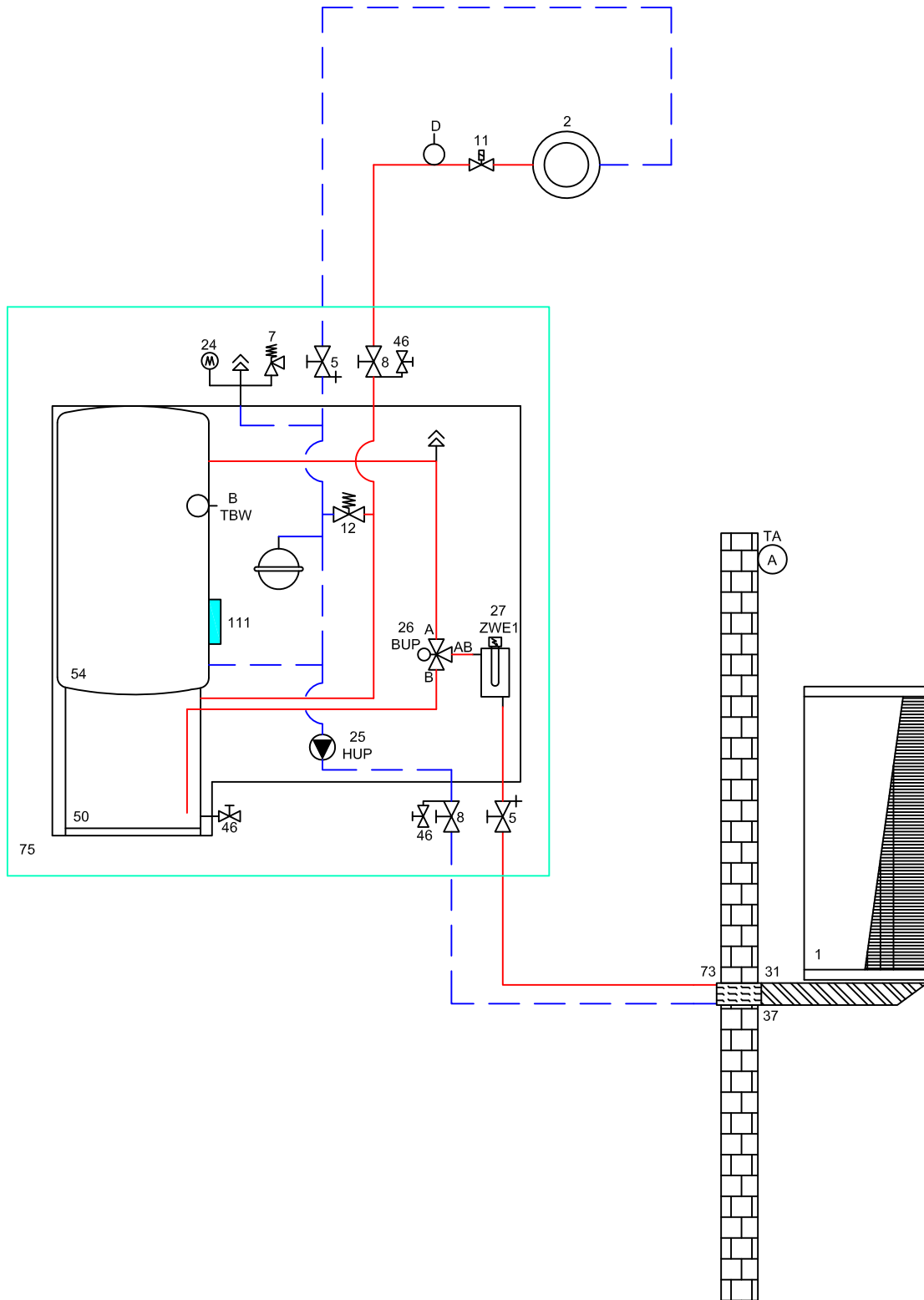
- on the seaward side

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



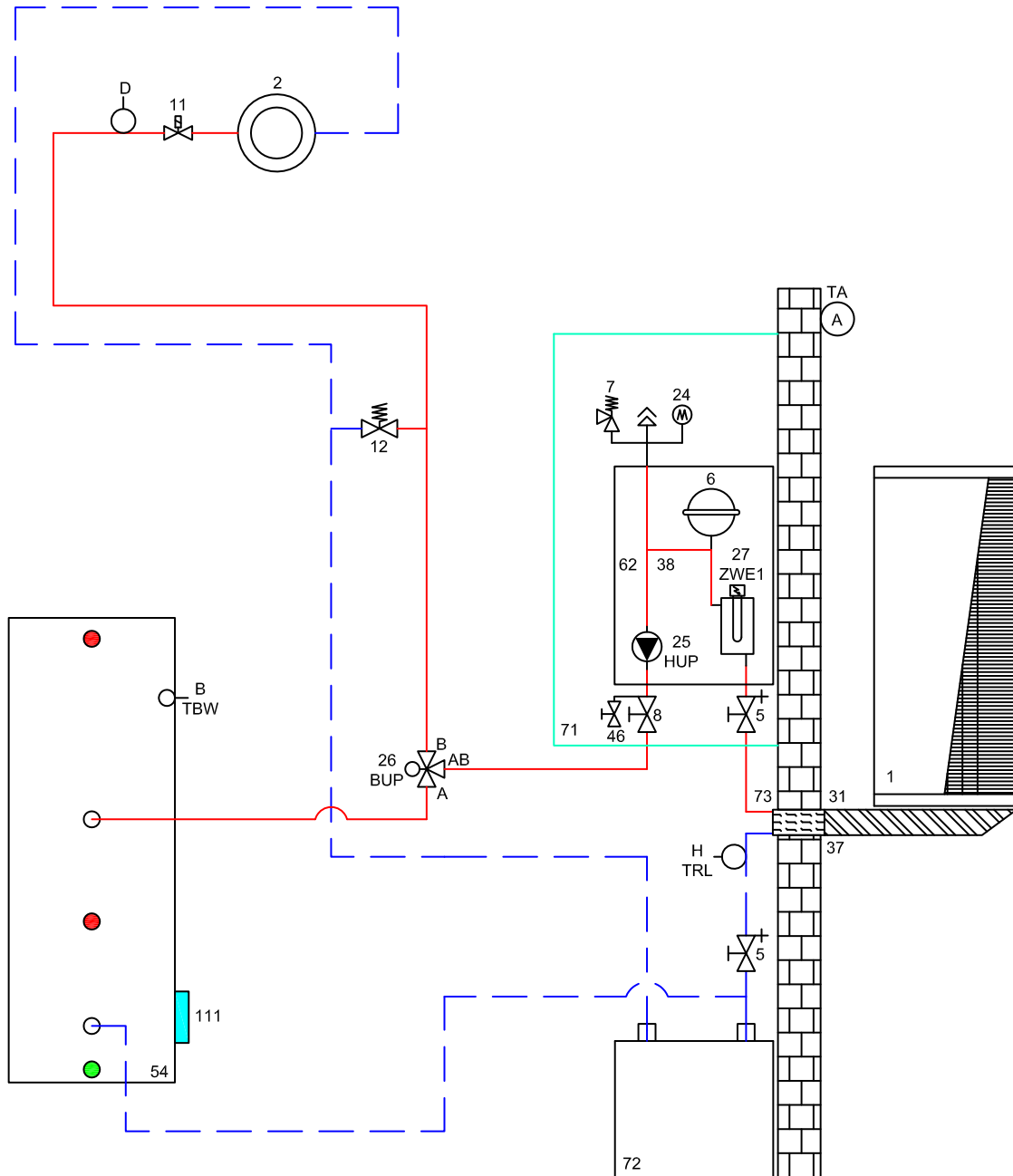


LWDV with hydraulic station



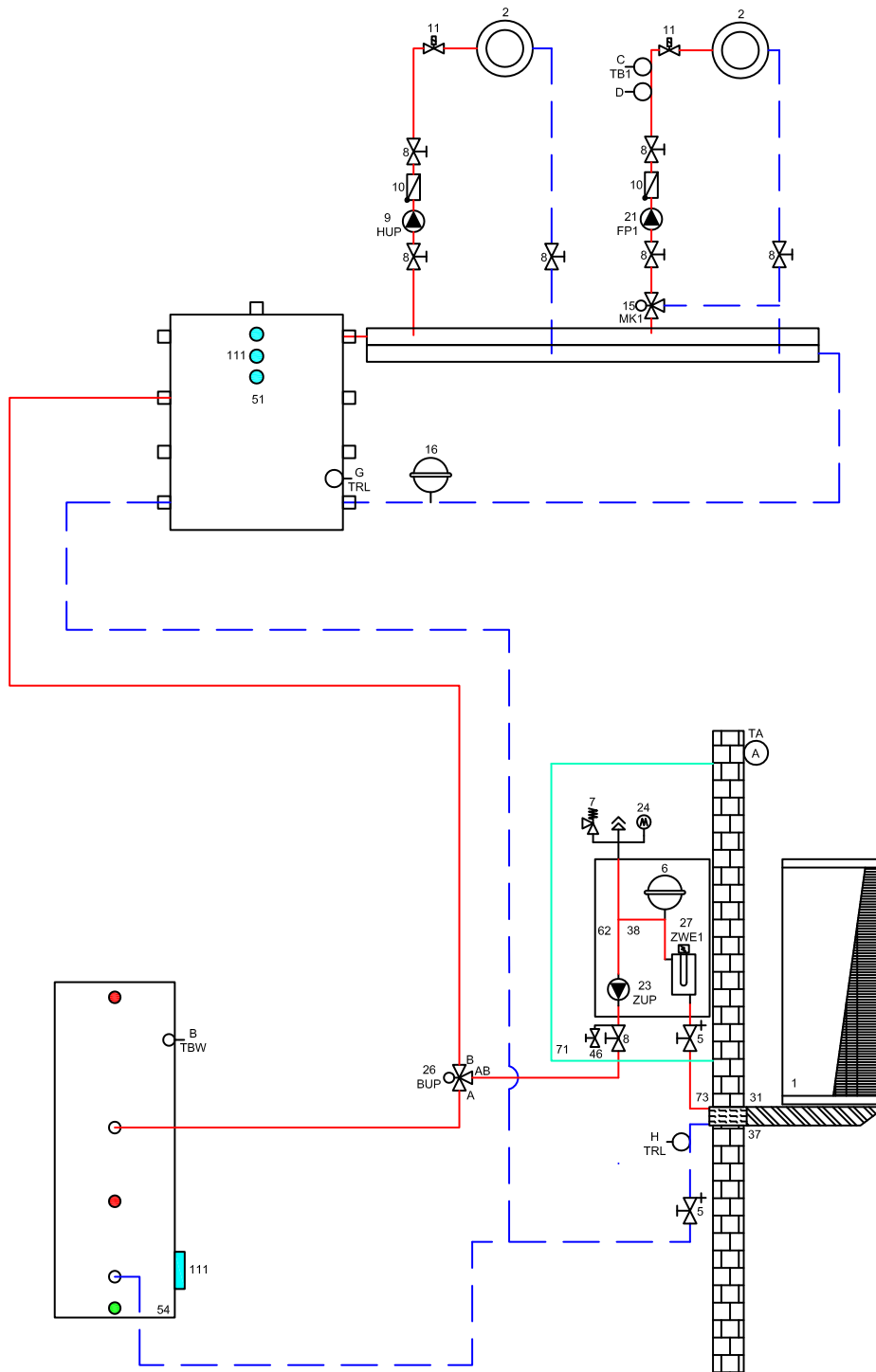


LWDV with buffer tank in series and hydraulic module





LWDV with separation buffer tank and hydraulic module



Legend hydraulic diagramm

1	Heat pump
2	Underfloor heating / radiators
3	Vibration isolation
4	Sylomer strip machine underlay
5	Closure and drainage
6	Expansion vessel packing list
7	Safety valve
8	Closure
9	Heating circulation pump
10	Non return valve/ one way valve
11	Individual room regulation
12	Overflow valve
13	Steamtight insulation
14	Service water circulation pump
15	Mixer circuit three-way mixer (MK1 discharge)
16	Expansion vessel supplied by customer
18	Heating rod (heating)
19	Mixer circuit four-way mixer (MK1 charge)
20	Heating rod (SW)
21	Mixer circuit circulation pump (FP1)
23	Feed circulating pump (reconnect the integrated circulating pump in the heat pump)
24	Manifold
25	Heating circulation pump
26	Switching valve (heating/service water)(B = normally open)
27	Heating element
28	Brine circulation pump
29	Dirt-trap 0.6 mm mesh
30	Spill-tray für brine mix
31	Wall breakthrough
32	Inlet pipe
33	Brine manifold
34	Ground collector
35	Ground slinkies
36	Groundwater spring pump
37	Wall bracket
38	Flow switch
39	Suction well
40	Inverted well
41	Rinse fitting heating circuit
42	Circulation pump
43	Brine / Water heat exchanger (cooling function)
44	Three-way mixer valve (cooling function MK1)
45	Cap valve
46	Filler and drainage valve
48	Domestic hot water charging pump
49	Direction of groundwater flow
50	Buffer storage

51	Separation tank	TAVA	External sensor
52	Gas- or oil-boiler	TBW/B	Domestic hot water sensor
53	Wood boiler	TB1/C	Feedwater sensor mixer circuits 1
54	Hot water cylinder	D	Floor temperature limiter
55	Brine pressure switch	TRL/G	Sensor external return
56	Swimming pool heat exchanger	STA	Line pressure regulator valve
57	Geothermal heat exchanger	TRL/H	Sensor return (hydraulic module, dual)
58	Ventilation system	79	Motor valve
59	Plate heat exchanger	80	Mixing valve
61	Cooling cylinder	81	Split heat pump outdoor unit
65	Compact distributor	82	Split heat pump indoor unit
66	Fancoils	83	Circulation pump
67	Solar/ service water cylinder	84	Switching valve
68	Solar/ service water cylinder	113	Connection 2nd heat generator
69	Multifunction tank	BT1	Outdoor temperature sensor
71	Dual hydraulic module	BT2	Flow temperature sensor
72	Buffer tank wall mounted	BT3	Return temperature sensor
73	Pipe lead-in	BT6	Domestic hot water temperature sensor
74	Venttower	BT12	Flow temperature liquefier
75	Scope of delivery, hydraulic tower, dual	BT19	Temperature sensor immersion heater
76	Fresh water station	BT24	Temperature sensor 2nd heat generator
77	Scope of supply water/water booster		
78	Accessories water/water booster optional		

100	Room thermostat for cooling (optional)
101	Controls supplied by customer
102	Dew-point monitor (optional)
103	Room thermostat for reference space in packing list
104	Supply heat pump
105	Cooling circuit module box removeable for installation
106	Specific glycole mixture
107	Scald protection / thermostatic mixer valve
108	Solar pump assembly
109	Overflow valve must be closed
110	Packing list hydraulic tower
111	Mounting for additional heating element
112	Minimum distance to thermal decoupling of the mixing valve

Comfort board / Expansion board:	
15	Mixer circuit three-way mixer (MK2-3 discharge)
17	Temperature difference regulator
19	Mixer circuit four-way mixer (MK2 charge)
21	Mixer circuit circulation pump (FP2-3)
22	Swimming pool circulating pump
44	Three-way mixer valve (cooling function MK2)
47	Changeover valve swimming bath preparation(B = normally open)
60	Changeover valve cooling operation(B = normally open)
62	Heat meter (optional)
63	Changeover valve solar circuit(B = normally open)
64	Cooling circulation pump
70	Solar separation module
TB2-3/C	Feedwater sensor mixer circuits 2-3
TSS/E	Sensor, temperature difference control (low temperature)
TSK/E	Sensor, temperature difference control (high temperature)
TEE/F	Sensor external energy source

Important notice!

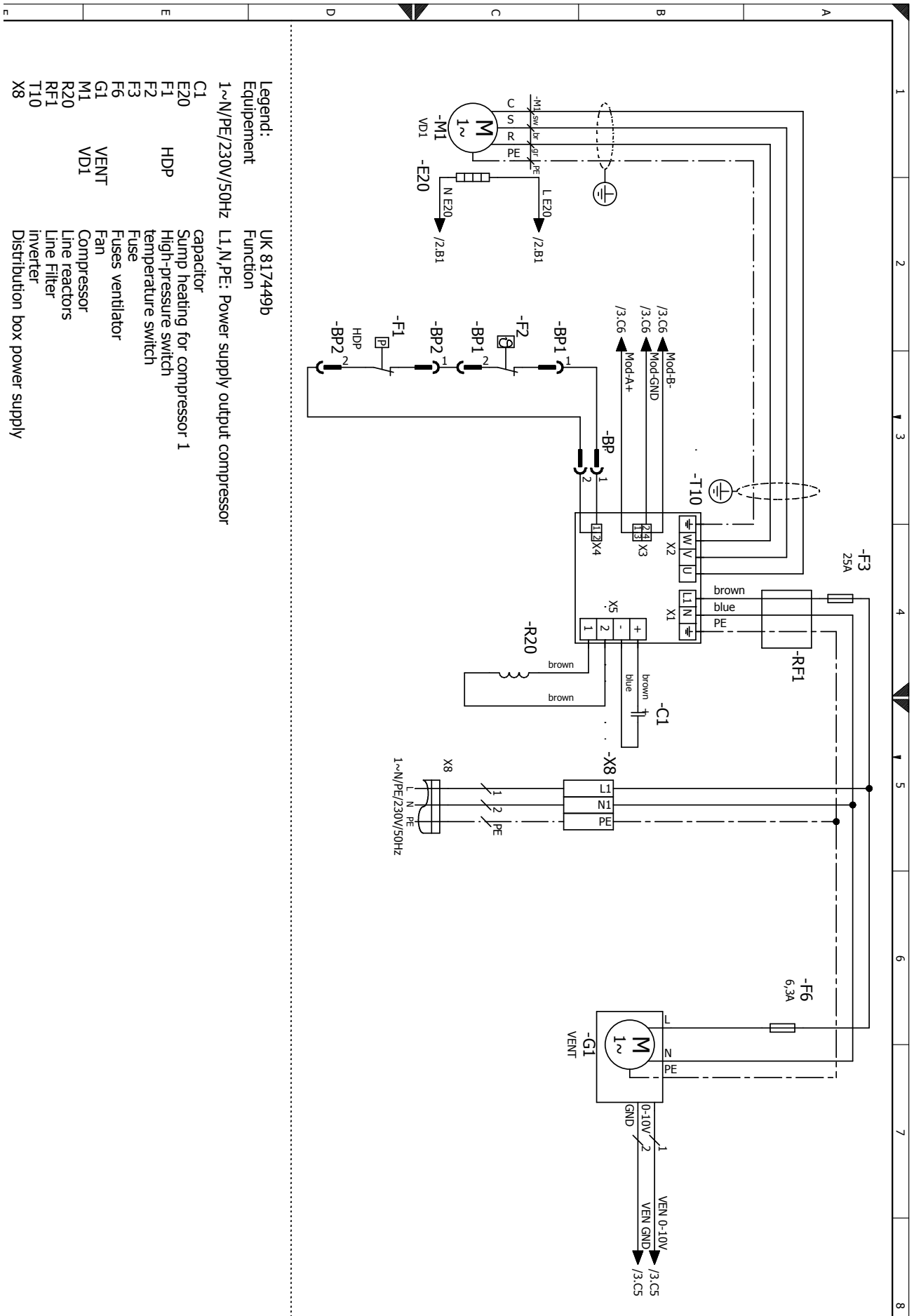
These hydraulic diagrams are schematic representations and are for assistance only. They do not relieve of the obligation to carry out appropriate planning! They do not include all necessary shut-off valves, ventilator fittings or safety devices. These must be incorporated in accordance with the standards and regulations applicable to the respective installation. All country-specific standards, laws and regulations must be observed! The tubes have to be dimensioned according to the nominal volume flow of the heat pump resp. the free pressing of the integrated circulating pump. For detailed information and advice please contact our local sales partner!



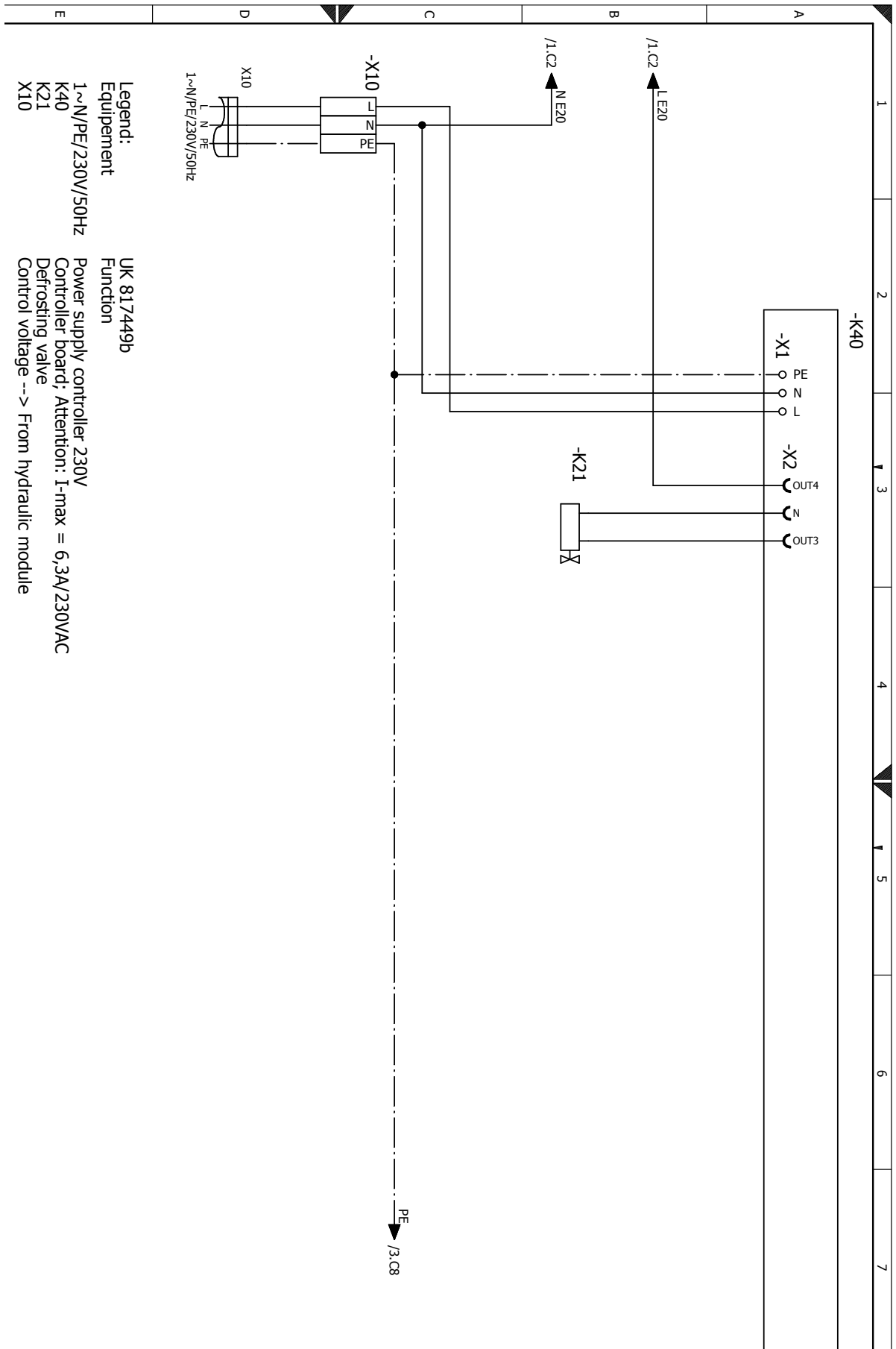


Circuit diagram 1/3

LWDV



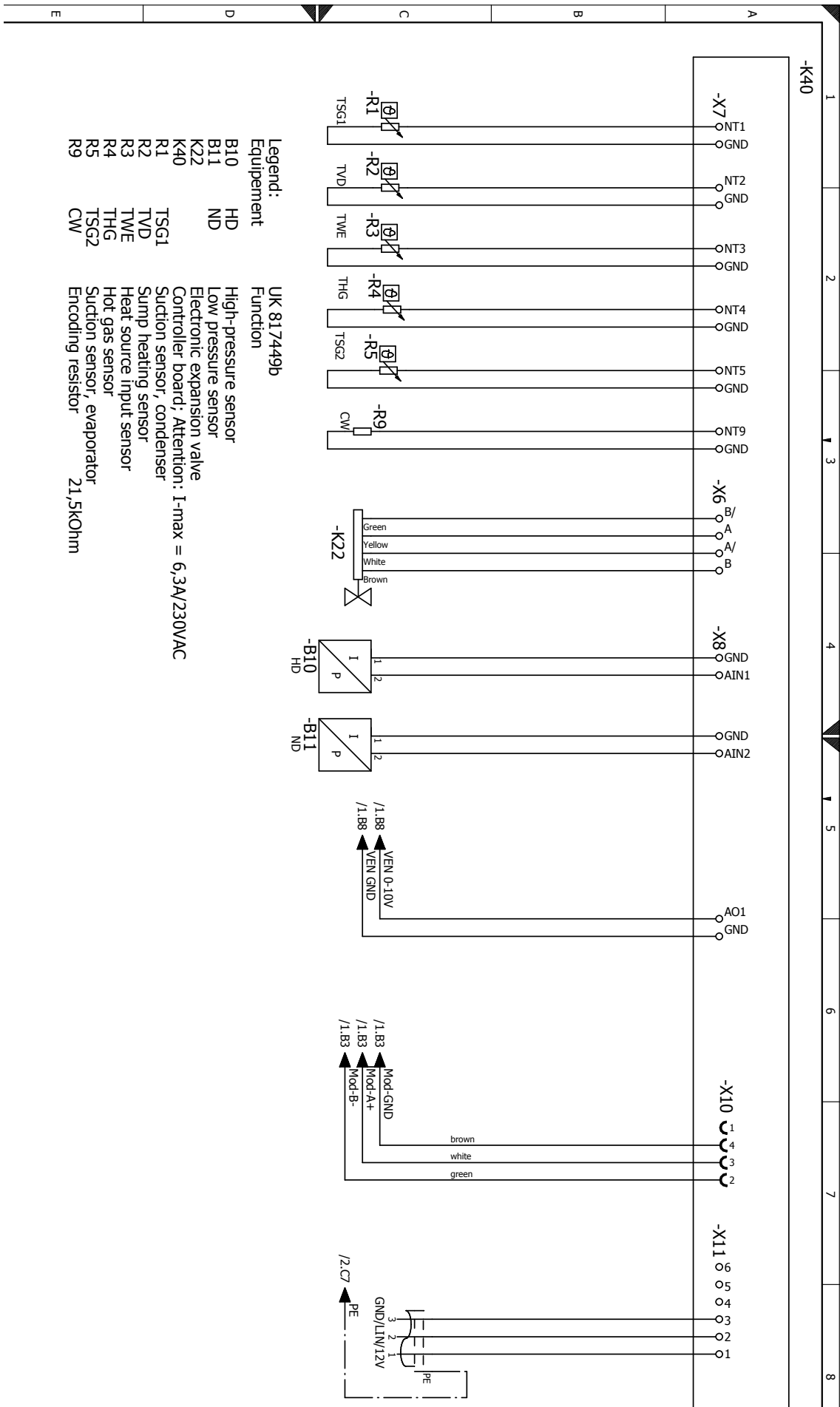
Legend:
Equipment: UK 817/449b
Function: L1,N,PE: Power supply output compressor
 1~N/PE/230V/50Hz
 C1 capacitor
 E20 Sump heating for compressor 1
 F1 High-pressure switch
 F2 temperature switch
 F3 Fuse
 F6 Fuses ventilator
 G1 Fan
 M1 Compressor
 R20 Line reactor
 RF1 Line filter
 T10 inverter
 X8 Distribution box power supply





Circuit diagram 3/3

LWDV





EC Declaration of Conformity



The undersigned confirms that the following designated device(s) as designed and marketed by us fulfill the standardized EC directives, the EC safety standards and the product-specific EC standards.
 In the event of modification of the device(s) without our approval, this declaration shall become invalid.

Designation of the device(s)

Heat Pump



Unit model	Order number	Item number 1	Item number 2
LWDV 91-1/3-HDV 9-1/3	100699HDV901	100 699 01	152 065 41
LWDV 91-1/3-HDV 12-3	100699HDV1201	100 699 01	152 066 41
LWDV 91-1/3-HSDV 9M1/3	100699HSDV901	100 699 01	152 067 41
LWDV 91-1/3-HSDV 12M3	100699HSDV1201	100 699 01	152 068 41
LWDV 91-1/3-HSDV 12.1M3	100699HSDV12101	100 699 01	152 132 41

EC Directives

2014/35/EU 813/2013
 2014/30/EU 814/2013
 2011/65/EG 517/2014
 *2014/68/EU

EN..

EN 378-2:2018 EN 60335-1:2012
 EN ISO 12100:2010 EN 60335-2-40:2014
 EN 12102-1:2018 EN 55014-1:2018
 EN 61000-3-11:2001 EN 55014-2:2016
 EN 61000-3-12:2012

Pressure equipment component

Category II
 Module A1
 Designated position:
 TÜV-SÜD
 Industrie Service GmbH (Nr.:0036)

Company:

ait-deutschland GmbH
 Industrie Str. 3
 93359 Kasendorf
 Germany

Place, date: Kasendorf, 31.01.2020

Signature:

Jesper Stannow
 Head of Heating Development

UK818186c



ait-deutschland GmbH
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D-95359 Kasendorf

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