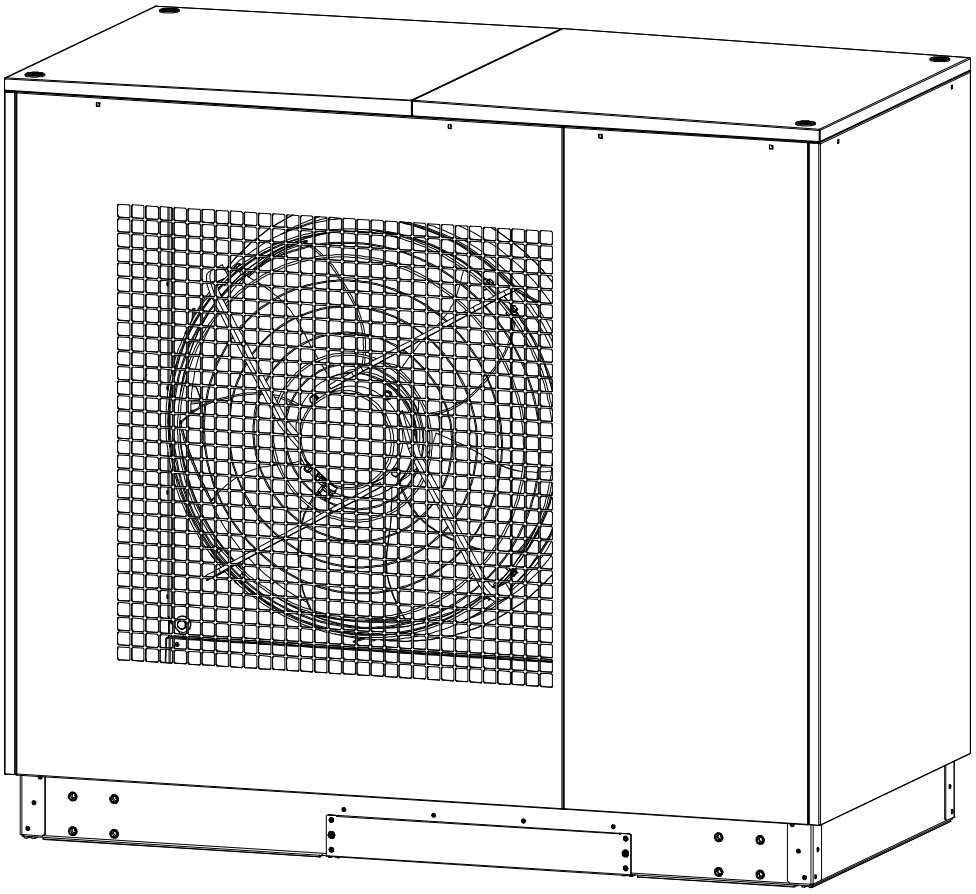
Dimplex®

System C ®

LA 4060CP



Installation and Operating Instruction

Original language: German

Air-to-Water Heat Pump for Outdoor Installation

Order no.: 452173.66.03h

EN • FD 0605

Subject to errors and technical changes. Read these instructions carefully.

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1 About these operating instructions

1.1 Purpose

These operating instructions are part of the heat pump and contain all information necessary to ensure proper use of the heat pump.

Store the operating instructions in an easily accessible and identifiable location for the entire service life of the heat pump. If the heat pump is passed on to a third party, the operating instructions must be transferred to the next user. Work on the heat pump may only be carried out after the operating instructions have been fully read and understood.

1.2 Target group

These operating instructions are aimed at professionally and technically trained personnel (fitters, installation engineers, maintenance personnel) and end users.

1.3 Structure and identification of warning notices

Warning notices in the text in a particular section and before the instructions for a specific action indicate possible hazards. Warning notices have the following structure:

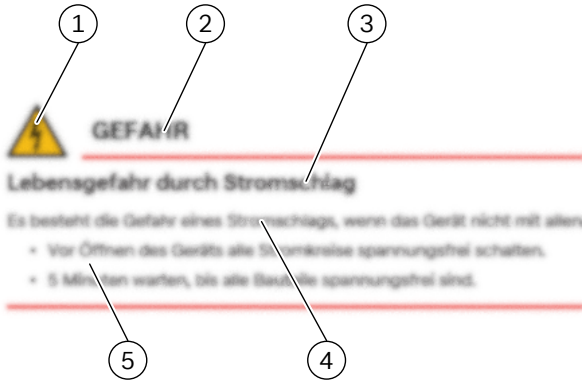


Fig. 1: Structure of warning notices

1	Hazard-specific symbol	4	Potential consequences of non-observance
2	Signal word	5	Procedure for avoiding hazard
3	Nature and source of hazard		

The following signal words are used in these instructions:

Signal word	Meaning, consequence of non-avoidance
DANGER	Warns of an immediate hazardous situation that will cause fatal or serious injury.
WARNING	Warns of a potential hazardous situation that may cause fatal or serious injury.
CAUTION	Warns of a potential hazardous situation that may cause moderate or minor injury.
NOTE	Warns of a hazardous situation that may cause damage to property.

Table 1: Meaning of signal words

The following warning symbols are used in these instructions:

Symbol	Meaning
	General warning of hazard point
	Warning of dangerous electrical voltage
	Warning of ignition sources

The following mandatory signs are used in these instructions:

Symbol	Meaning
	Wear hand protection
	Wear foot protection
	Wear eye protection
	Wear protective clothing
	Disconnect before maintenance or repair
	Observe instruction manual

Table 2: Mandatory signs

2 Safety

2.1 General safety notes



The heat pump is a state of the art product and is equipped with the necessary safety equipment. It has been designed, manufactured and documented in accordance with the valid EU directives and in compliance with the associated harmonised standards. This is documented by the ▸ *CE declaration of conformity [2.3.1, p. 8]*.

However, the heat pump can cause hazards if the safety notes are warning notices in these operating instructions and on the warning signs are not observed. The safety notes in this section help to prevent injury and damage.

The operator must ensure that all safety notes and warning notices are understood and observed. They must ensure that all persons who work on or with the heat pump have fully read and understood the operating instructions before starting work.

Work on the heat pump is only to be performed by qualified personnel ▸ *Personnel requirements [2.4, p. 8]*.

When working on the heat pump, wear personal protective equipment consisting of protective gloves, safety shoes, safety glasses and long-sleeved clothing that fully covers the body. Comply with the applicable local regulations for personal protective equipment (in Germany: DGUV regulation 100-500 Chap. 2.35).

The applicable local accident prevention regulations must be observed. The product must not be used without the safety features.

2.1.1 Specific hazards and residual risks






- Residual energy
  - Hot surfaces on parts of device
  - Electric voltage in switch box despite the main switch being switched off
  - Refrigerant circuit is pressurised
- Substances hazardous to health
  - The legal regulations and directives must be followed when handling refrigerant
  - Only qualified personnel are permitted to handle refrigerant
  - Wear personal protective equipment consisting of safety gloves, safety shoes, safety glasses and long-sleeved clothing that fully covers the body.
  - Refrigerant and system parts no longer used must be properly disposed of by the operator of the heat pump
- Hydraulic system
- Sound pressure
- Heat
- Risk of explosion and fire
- Risk of injury due to modification of device
- Risk of injury due to wear or damage to device
- Risk of injury due to trip hazards and leaked operating materials.
  - Avoid trip hazards caused by cables, pipes and hoses.
  - Soak up leaked operating materials using suitable binding agents and dispose of in accordance with the hazard class.

2.1.2 Work on electrical connections and components



In all life phases, work on electrical connections or components may only be carried out by trained electricians. Observe national and regional regulations for accident prevention and carrying out electrical installations.

Before starting any work on electrical connections or components, observe the five safety rules for electrical engineering:

- Disconnect
- Secure against being switched on again
- Ensure that there is an absence of voltage at all poles
- Earth and short-circuit
- Cover or cordon off adjacent live parts

After disconnecting, wait five minutes to ensure that all components are de-energised.

2.1.3 Hazards due to incorrect use

Only use the heat pump for its intended purpose. Incorrect use can include:

- Operation of the heat pump without protective equipment (casing, grating)
- Performance of work with appropriate qualification/specialist knowledge
- Structural modifications to the heat pump that have not been specified by the manufacturer

2.2 Intended use

This device is only intended for use as specified by the manufacturer ▸ *Intended use of the heat pump [3, p. 9]*. Any other use beyond that intended by the manufacturer is prohibited.

Refer to the relevant planning documents under www.dimplex.eu/projektierung for further details.

Do not make any modifications or alterations to the device.

2.3 Legal regulations and directives

The heat pump was designed and manufactured in compliance with EU directives, EN, DIN and VDE regulations ▸ *CE declaration of conformity [2.3.1, p. 8]*. When connecting the heat pump to the electrical power supply, the relevant VDE, EN and IEC standards must be complied with. Any further connection requirements stipulated by local utility companies must also be observed.

When connecting the heating system, all applicable regulations must be adhered to. The heat pump is filled with flammable refrigerant R290 (propane) and is only intended for outdoor installation. Appropriate safety measures must be implemented for assembly, installation, operation and disposal.

NOTICE

When operating or maintaining a heat pump, it is essential to comply with the legal requirements of the country where the heat pump is operated.

2.3.1 CE declaration of conformity

The current CE declarations of conformity with digital signature are available to download at www.dimplex.eu.

2.4 Personnel requirements

Work on the heat pump must only be carried out by persons with the following knowledge. Use by untrained persons is not permissible.

Activity	Trained person	Qualified specialist	Authorised and qualified after-sales service engineer
Transportation, storage		X	X
Installation		X	X
Assembly		X	X
Commissioning			X
Operation	X	X	X
Cleaning work		X	X
Care	X	X	X
Faults / troubleshooting / repair		X	X
Decommissioning/disposal			X

Table 3: Heat pump phases and authorised persons

This heat pump can be used by children aged 8 and over and by persons with limited physical, sensory or mental aptitude or a lack of experience and/or knowledge, providing they are supervised or have been instructed in safe use of the heat pump and understand the associated potential dangers.

Children must not play with the device. Cleaning and user maintenance must not be carried out by children without supervision.

3 Intended use of the heat pump

3.1 Area of application

The heat pump is to be used exclusively for the heating and cooling of heating water in a standard domestic setting. It is thus also intended for use by non-professionals for heating shops, offices and other similar working environments, agricultural establishments and hotels, guest houses and other residential buildings.

It can be used in new or existing heating systems.

The heat pump is designed exclusively for outdoor installation ▸ *Installation [6, p. 14]*.

The circulating pump(s) must be controlled using the heat pump manager. If pump functions relevant to the overall functioning or to safety are not supported, e.g. due to integration of the heat pump into a building management system, this results in the warranty being void and can lead to damage to the heat pump.

The circulating pump(s) and the heat pump controller including the refrigerant gas sensor must always be ready for operation.

The specifications in the technical documents must be observed, particularly limit values for the minimum and maximum warm / cold water volume flow.

The heat pump is suitable for mono energy and bivalent operation at an outside air temperatures of up to -22 °C. Proper defrosting of the evaporator is guaranteed by maintaining a heating water return temperature of more than 18 °C during continuous operation. The maximum water outlet temperature must not exceed 70 °C with a safeguard on the system side so that, if the temperature is exceeded, all additional heat sources are switched off safely.

The heat pump is not designed for the increased heat consumption required when a building is being dried out. For this reason the additional heat consumption should be met using special equipment provided by the customer. For drying out a building in autumn or winter, it is advisable to install a suitable 2nd heat generator (e.g. an electric heating element available as an accessory).

In cooling operation, the heat pump is suitable for air temperatures ranging from 10 °C to 45 °C. It can be used for silent and dynamic cooling. The minimum cooling water outlet temperature is 7 °C.

NOTICE

Damage due to use of an external 4-way valve

Use of a 4-way valve to reverse the direction of flow at the plate heat exchanger can cause damage to the device.

- **Do not** use a 4-way valve on the heating water side.

3.2 Operating principle

Heating with air as the heat source

Surrounding air is drawn in by the fan and fed through the evaporator (heat exchanger). The evaporator cools the air, i.e. extracts heat from it. This extracted heat is then transferred to a working medium (refrigerant) in the evaporator.

The electrically powered compressor raises the temperature level of the heat is by increasing the pressure. It is then transferred to the heating water via the liquefier (heat exchanger).

Electrical energy is used to raise the temperature level of the heat from the environment. Because the energy extracted from the air is transferred to the heating water, this type of device is referred to as an air-to-water heat pump.

The main components of the air-to-water heat pump are the evaporator, fan and expansion valve, as well as the compressors, the liquefier and the electrical control system.

At low ambient temperatures, humidity accumulates on the evaporator in the form of frost, reducing the transfer of heat. Uneven accumulation during this process does not indicate a fault. The evaporator is defrosted automatically by the heat pump as required. Under certain atmospheric conditions, steam may be emitted from the air outlet.

Cooling

The functions of the evaporator and the liquefier are reversed in "Cooling" operating mode. The heating water transfers its heat to the refrigerant via the liquefier, which in this case functions as an evaporator. The refrigerant is brought to a higher temperature level using the compressor. Heat is transferred to the surrounding air via the liquefier (which, in heating operation, functions as an evaporator).

3.3 Energy-efficient use of the heat pump

Correct design of the heat source system and the heating system is a prerequisite for energy-efficient operation of the heat pump.

The efficiency of the heat pump depends to a great extent on its operating parameters. Simple changes to user behaviour and the settings on the device can have a positive influence on efficiency. Here are just a few examples:

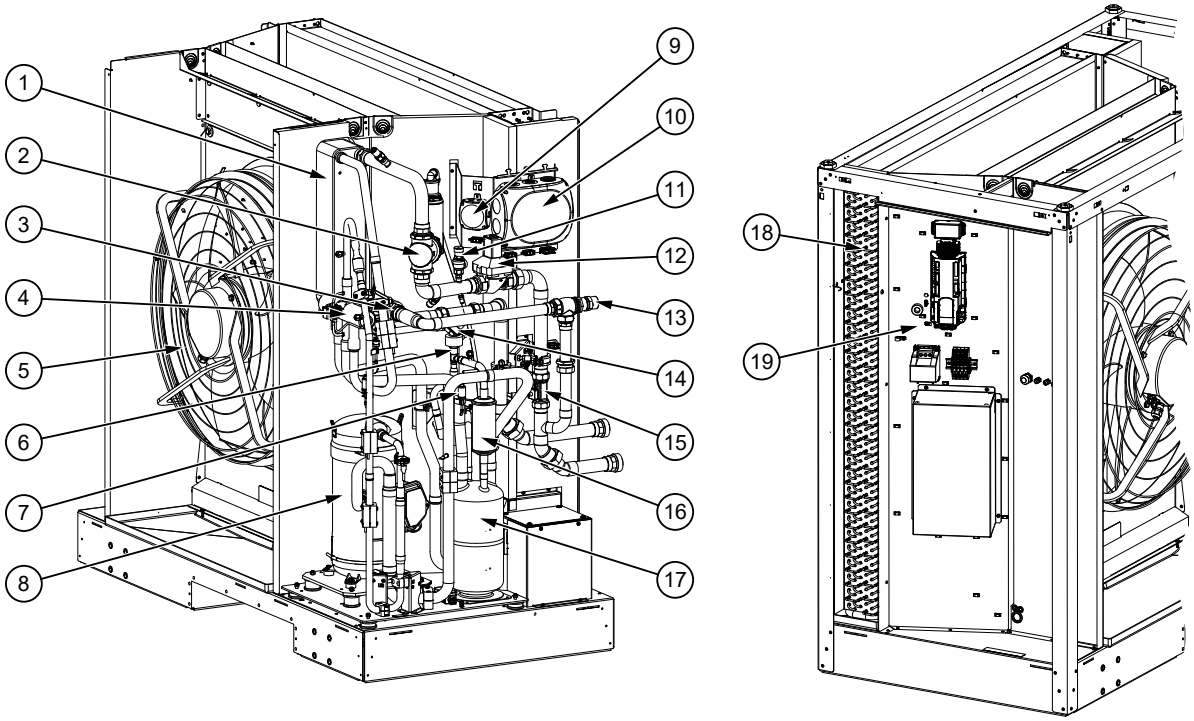
- Reduction of system temperature. For example, a 1 degree reduction in the flow temperature cuts the required electrical energy by around 2.5 %
- Adjustment of temperature in domestic hot water cylinder
- Demand-controlled circulation pump (e.g. pulse regulation)
- Regular maintenance

4 Scope of supply

4.1 Basic device

The heat pump contains the components listed below.

R290 (propane) is used as refrigerant.



1	Liquefier	11	Safety valve
2	Ventilator	12	Solenoid valve
3	Check valve	13	Overflow valve
4	4-way reversing valve	14	Dirt trap
5	Fan	15	Flow rate sensor
6	Expansion valve	16	Filter dryer
7	Collector	17	Liquid separator
8	Compressor	18	Evaporator
9	Connection box M16	19	Switch box
10	External connection box		

4.2 Heat pump manager

Use the heat pump manager (controller -N1) to operate the heat pump.

The heat pump manager is a convenient electronic regulation and control unit. It controls and monitors the entire heating system based on the outside temperature, as well as domestic hot water preparation and operating limits.

The external temperature sensor to be mounted on-site is included in the heat pump manager scope of supply together with the necessary fixing accessories.

The functions and use of the heat pump manager are described in the operating instructions supplied with it.

Building management system

The heat pump manager can be connected to a building management system network by installing the relevant interface plug-in card. The supplementary installation instructions for the interface card must be consulted for details of the exact connection and configuration of the interface.

The following protocols are available:

- Modbus TCP
- MQTT

Other protocols (Modbus RTU, KNX) can be used with an expansion available as a special accessory.

4.3 External connection box

The external connection box contains the supply connection terminals (load/control voltage) and the connecting terminals for the communication line.

NOTICE

Connection work should only be carried out on the external connection box and the connection box M16.

4.4 Connection box M16

The connection box M16 contains the supply connection terminals (load/control voltage) for the secondary pump M16.

5 Transportation

DANGER

Risk of death due to fire and explosion

If there is a leakage of the propane refrigerant during transportation, an ignitable atmosphere can form in the transport vehicle.

- An adequate air supply must be ensured during transportation.
- For transportation in a small transporter connected to the passenger compartment, avoid ignition sources such as sparks or smoking and ensure adequate ventilation.

DANGER

Risk of death due to fire and explosion

If a leakage occurs during transportation or storage, an ignitable atmosphere can form.

- Do not store the device in rooms in which there are any permanent ignition sources.
- Where possible, store the heat pump above ground and ensure adequate ventilation.
- Keep the casing closed.

DANGER

Risk of death due to fire and explosion

Flammable refrigerant may leak if the heat pump falls or is subject to impact load during transportation.

- Protect the device against mechanical damage during transportation.
- Avoid setting down the device heavily.
- If outflow noises can be heard, if oily surfaces form or if a leakage can be detected with a detector, the refrigerant must be drained off by a person trained in handling of propane.
- Avoid ignition sources in the surrounding area until safe drainage has been completed and set up a safety zone of 5 m around the heat pump. If the leakage occurs inside a building, the affected area must be ventilated immediately.
- The heat pump must be returned to the manufacturer for repair if it not possible to remedy the leakage on site. To this end, remove the propane refrigerant correctly, fill the refrigerating circuit with nitrogen and document this with a note on the device.

DANGER

Risk of lightning

During thunderstorms, do not stand in the immediate vicinity of the heat pump.

WARNING

Risk of injury due to tipping

- Secure the heat pump to prevent tipping.
- When transporting on a pallet, observe the centre of gravity.

WARNING

Risk of injury

Working on the device without protective equipment can result in injuries such as cuts.

- Wear personal protective equipment consisting of safety gloves, safety shoes, safety glasses and long-sleeved clothing that fully covers the body.

Only transport the device to the final installation location in its original transport packaging. The basic device can be transported with a lift truck or a crane.

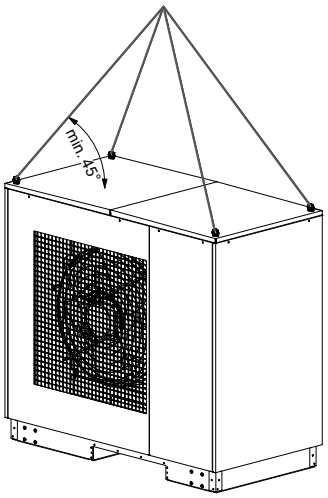
(!) When transporting the heat pump, ensure that it is not tilted by more than 45° (in any direction).

(!) Transportation, including all related activities such as lifting, loading, lowering, unloading and unpacking, must be carried out by trained personnel.

(!) Only use suitable transport equipment. Observe the load capacity of the load suspension device.

1. The transport routes must be cleared and suitable agents must be spread if necessary (for defrosting or deadening)
2. Where possible, transport the device to the final installation location on a pallet.
3. Transport the basic device with a lift truck or crane.

   (!) **CAUTION! Observe off-centre centre of gravity! If the crane hook is positioned centrally, the device will be out of balance when lifting.**



4. After transportation by crane, unscrew the transport eye bolts and close the openings with the rubber grommets supplied.

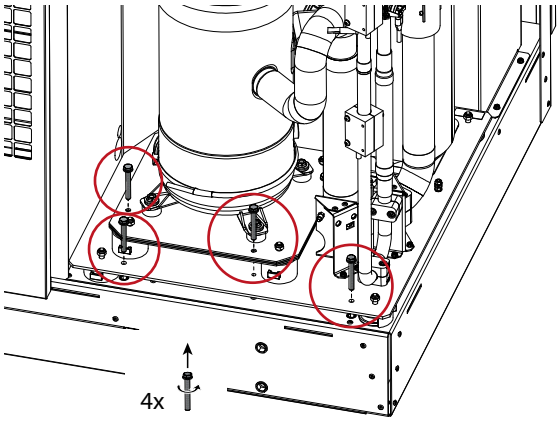
DANGER

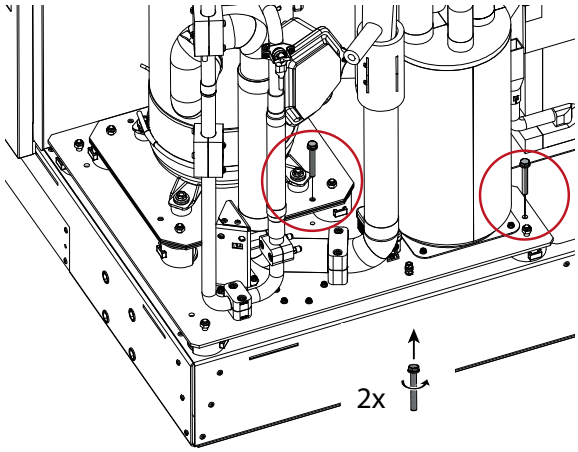
Electric shock hazard due to unsealed casing

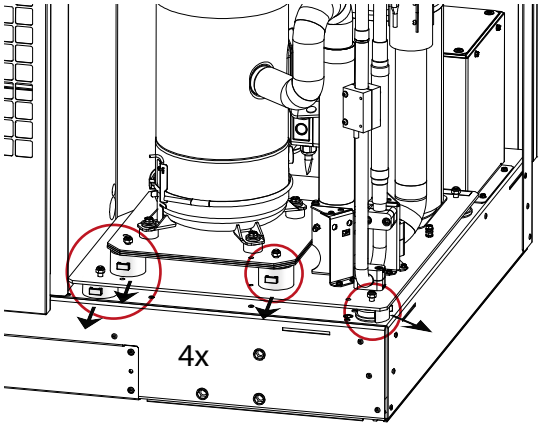
Risk of electric shock and damage due to ingress of moisture into device.

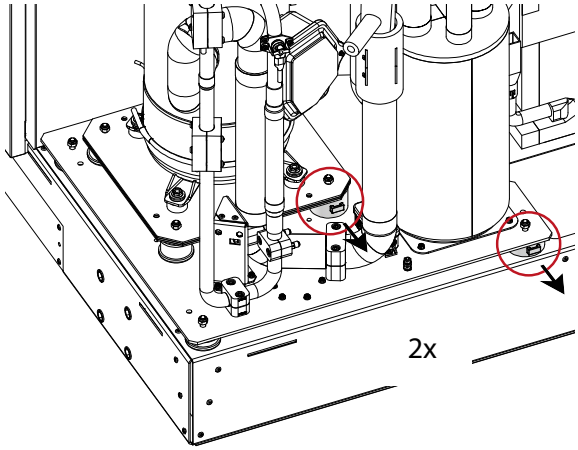
- Remove the crane eyelets from the heat pump after transportation and make sure the device is sealed with rubber grommets supplied.

5. After transportation, remove the 6 screws and then remove the associated transportation safety devices.









Transport damage

In case of damage to the device during transportation, the propane refrigerant must be properly removed from the refrigeration circuit to return the damaged device. If the service engineer determines that the refrigeration circuit is undamaged, the refrigerant must also be completely removed and the refrigeration circuit filled with nitrogen.

6 Installation

6.1 General

The heat pump has been designed for areas that are accessible to the general public, as well as for areas that are not accessible to the general public.

The following specifications have priority during installation and operation of the system and must be complied with.

The specialist company constructing the system is responsible for installation of the heat pump. Observe country-specific building regulations.

Once the heat pump has been commissioned by an authorised and qualified after-sales service engineer, the operator is responsible for proper operation of this heat pump.

The heat pump, especially the refrigeration circuit, must be protected against damage (e.g. drilling, burning etc.) during installation and other construction activities.

DANGER

Risk of death due to fire and explosion

If there is a leakage of the propane refrigerant due to a fault, an ignitable atmosphere can form.

- Avoid ignition sources and fire loads in the protection zone.
- Keep the casing closed.

The heat pump is not an ignition source.

DANGER

Risk of death due to fire and explosion

If there is a leakage of the propane refrigerant due to a fault, an ignitable atmosphere can form, especially in hollows, shafts or areas with no free air outflow or air exchange.

- Installation in hollows, shafts or areas with no free outflow or air exchange is not permitted.
- Install the heat pump in such a way that in the event of a leakage no refrigerant can get into the building.
- Empty conduits, openings etc. that lead into the building, shafts etc. must be fitted with an air tight seal.

NOTICE

The heat pump is not intended for use above 2000 metres (mean sea level).

6.2 Requirements for heat pumps installed outdoors

Always consider the circumstances at the installation location, such as local building regulations, static load of the building, wind exposure, lightning protection etc.

Observe the following requirements for outdoor installation of the heat pump:

Installation location and alignment

- Always install the heat pump on a suitable load-bearing foundation.
- The heat pump can be installed at floor level or raised by 400 mm, for example via strip foundation.
- Air must be able to flow under the heat pump from all directions. Therefore, do not raise up the device by placing something underneath it that covers its entire surface.
- The heat pump should be installed so that the air outlet direction of the fan is perpendicular to the main wind direction to allow proper defrosting of the evaporator in the event of high wind exposure.

- Depending on the wind load zone, installation on the roof is permitted up to the following heights:
  Wind load zone 1: Max. roof height = 24 m
  Wind load zone 2: Max. roof height = 10 m
  Wind load zone 3: Max. roof height = 3.8 m

  If the maximum permitted roof height for the relevant wind load zone is exceeded, the customer must make structural alterations to facilitate installation. Observe the specified protection zone.
- For rooftop installation in an area exposed to wind, prevent the wind from influencing the fan area. Strong wind can interfere with the air flow through the air heat exchanger.
- Do not restrict the air intake and air outlet area of the fan.
- The heat pump is not intended for use above 2000 metres (mean sea level).
- Installation in garages is not permitted.
- Do not install the heat pump in depressions or courtyards. If the heat pump takes in cooled air close to the ground, this can cause damage or reduced efficiency.

Installation close to walls

- Due to air flow in the air inlet and air outlet area, installation close to walls can result in increased dirt deposits. For energy efficiency reasons, ensure that the heat pump can blow out air freely.
- Structural influences must be observed for installation close to walls. No windows or doors should be present in the area surrounding the air outlet of the fan.
- The colder outside air outlet should discharge in such a way as to not increase the heat losses in heated neighbouring rooms.

Impact protection

- To protect the heat pump against mechanical damage, provide fixtures such as impact protection for balls or fences to prevent vandalism.
- Heat pumps with safety group A3 refrigerants on traffic routes must be fitted with ram protection. The design of this ram protection must prevent impact by a vehicle at the relevant maximum speed from damaging the refrigeration circuit.

Sound insulation

- For installation on a foundation with direct contact to the building, vibration insulation must be ensured to avoid transmission of solid-borne noise to the building.

Lightning protection

- Assess whether lightning protection is required and, if necessary, install it.

Service and protection zone

- Observe the service and protection zone around the heat pump according to the installation type.
- To carry out maintenance work a service zone (S) with the clearances shown must be kept freely accessible.

Surrounding air

- When using heat pumps close to the sea, the high salt content in the air may lead to increased corrosion. The use of heat pumps is safe at a distance of more than 12 km from the sea with a maximum salt content of 3.5 %. At shorter distances, refer to the detailed distance calculation in the planning manual.
- Do not expose the device to any corrosive or permanently dusty air (e.g. close to stables). The air containing dust and / or ammonia can cause permanent damage to the device.

Covers

- Covers and covering panels on the heat pump must be sealed to ensure optimum soundproofing and to protect the interior of the device from small animals.
- Crane eyelets must be removed and the openings in the casing sealed with the rubber grommets supplied.



DANGER

Danger due to unsealed casing

Small animals such as rodents getting into the device can cause damage.

- The cover plate on the water connection box in the heat pump must be sealed at the rear when connected (standard configuration).
- For vertical connection of the heat pump, all panels on the installation shaft must be fitted after completion of assembly work.
- All covering panels on the heat pump must be fitted.

6.3 Protection zone

A protection zone must be maintained around the heat pump according to the installation type (see figures).

The following are not permitted in the protection zone:

- Ignition sources such as sockets, light switches, lamps, electrical switches and other permanent ignition sources
- Windows and doors
- Ventilation openings, light wells, openings for sewage pipes and similar

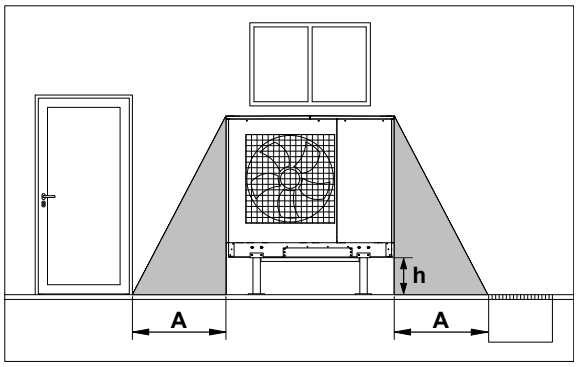
Further protection zone requirements:

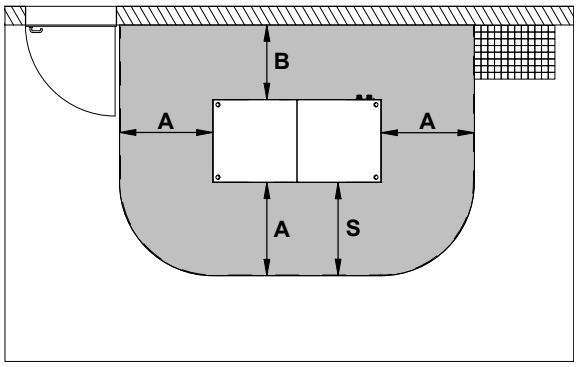
- Smoking is prohibited in the protection zone of the heat pump.
- Fire loads in the protection zone must be avoided.
- If other devices are installed within the protection zone these components must not constitute a source of ignition or fire load.
- A second heat pump may only be installed in the protection zone of another heat pump if it does not constitute a source of ignition as set out in the installation and operating instructions. The protection zone is made up of the combined protection zones for the individual devices. The required service zones must be maintained.
- Open drains to a lower level are permitted providing there are no outlets into the sewer system in the protection zone.
- Building openings must be made airtight within the protection zone.
- The protection zone must not protrude onto neighbouring property or public traffic areas.
- The device must be positioned in such a way that, in the event of a leakage, no refrigerant can get into neighbouring buildings.
- No structural modifications are to be made in the protection zone that could violate the integrity of the protection zone.
- The protection zone must not extend into parking areas for cars or trucks.
- Devices and vehicles may only be located in the protection zone if the manufacturer's documentation clearly shows that they do not constitute a source of ignition and the protection zone around the heat pump is maintained.

6.3.1 Protection zone for raised installation

The service area **(S)** for performing maintenance work must be freely accessible at all times.

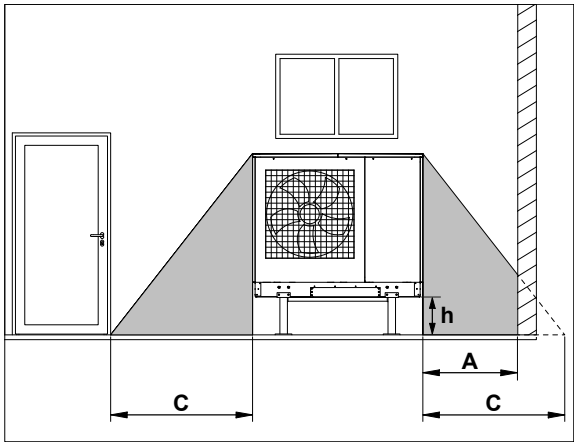
Protection zone for installation close to walls

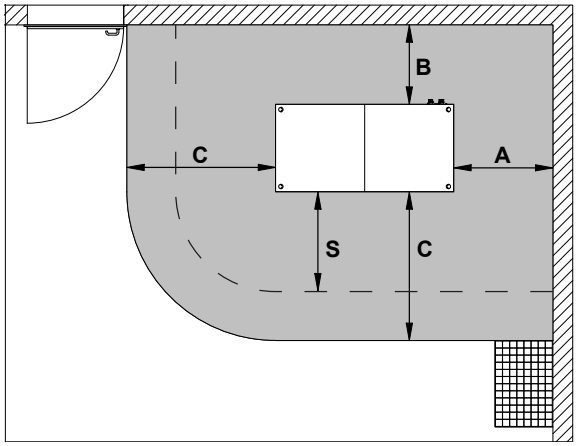




A	1,0 m	h	0,4 m
B	0,8 m	S	1,0 m

Protection zone for installation in a corner

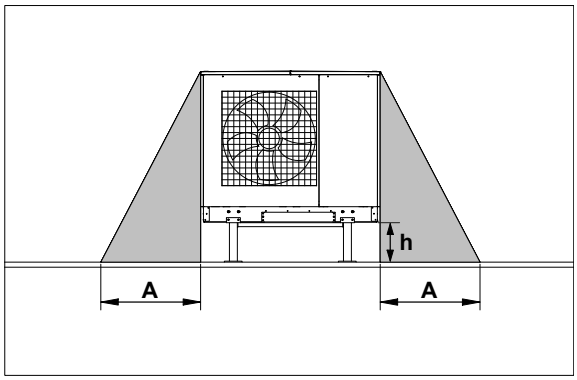


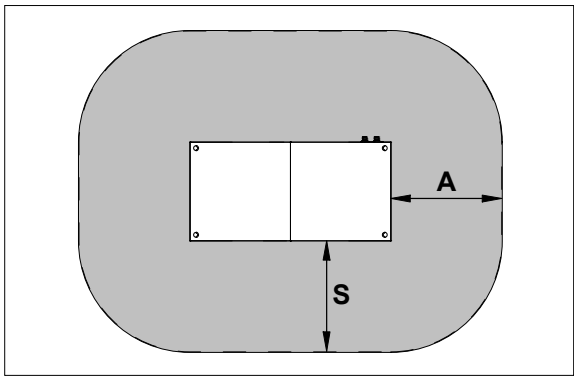


A	1,0 m	h	0,4 m
B	0,8 m	S	1,0 m
C	1,5 m		

(!) The installation type shown in a right or left corner requires a protection zone of 1,5 m.

Protection zone for free field installation



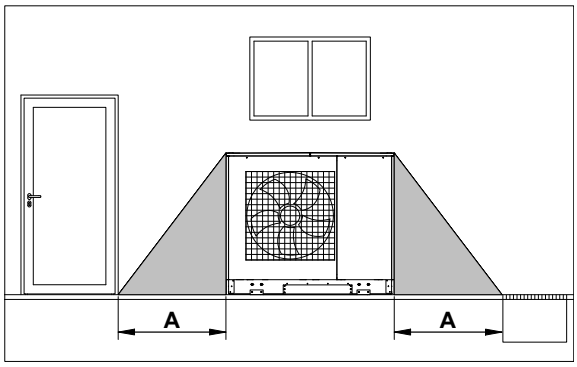


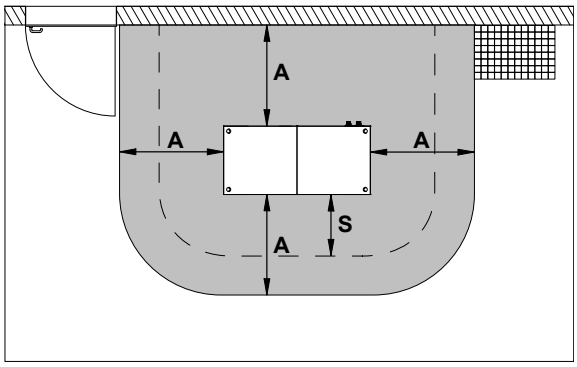
A	1,0 m	h	0,4 m
		S	1,0 m

6.3.2 Protection zone for floor level installation

The service area **(S)** for performing maintenance work must be freely accessible at all times.

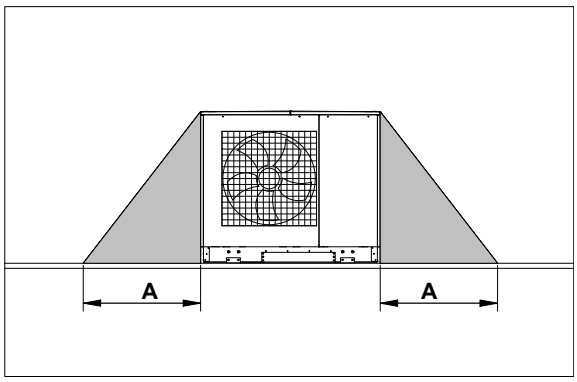
Protection zone for installation close to walls

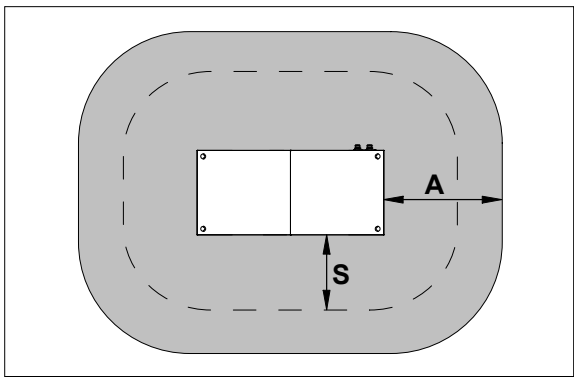




A	2,0 m	S	1,0 m

Protection zone for free field installation





A	2,0 m	S	1,0 m

6.4 Condensate pipe for heat pumps with flammable refrigerant

Frost-free condensate discharge must be guaranteed. To ensure proper drainage, the heat pump must be mounted horizontally.

NOTICE! The frost line can vary depending on the climatic region. Observe the regulations in the relevant countries.

NOTICE! Drainage of condensate into the building is not permitted

③ Frost line

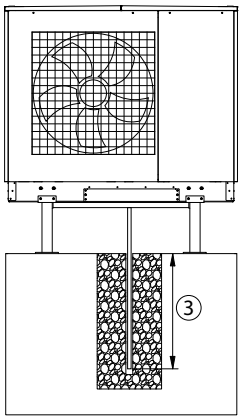
Variant 1: Condensate drain in gravel

The condensate that accumulates during operation is drained vertically into a base filled with gravel.

Requirements:

- Daily percolation of rate of at least 1.5 litre per kW of heat pump heat output
- Diameter of condensate water pipe minimum 50 mm
- Condensate water pipe installed vertically to prevent freezing in winter

NOTICE! If the condensate pipe is at risk from frost, provide the associated condensate drain heating from the list of accessories for the device.

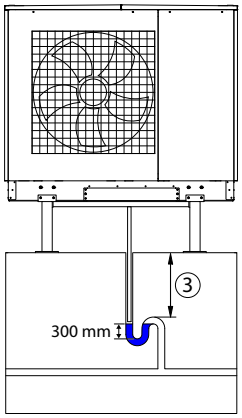


Variant 2: Discharge into sewage, rainwater or drainage channel

The condensate is channelled into a sewer, rainwater or drainage channel through a condensate pipe in the ground.

Requirements:

- Siphon in condensate pipe below frost line. The water level in the siphon prevents the refrigerant from getting into the channel if there is a leakage.
- The siphon must have a minimum sealing liquid level of 300 mm
- Pumping systems are not permitted.



Variant 3: Free discharge

Free discharge is only recommended in climate zones with short frost periods. In colder climate zones, the condensate pipe in areas at risk from frost must be fitted with appropriately dimensioned and regulated electrical trace heating on the insulated condensate pipe.

7 Assembly

Make the following connections on the heat pump:

- Heating system flows and returns
- Condensate drain
- Communication line to the heat pump manager (controller -N1)
- Power supplies (load/control voltage)



DANGER

Danger due to damage to heat pump casing

Manipulation and misuse of the heat pump casing results in a risk of injury.

- During installation and assembly of the heat pump system, always ensure the integrity of the heat pump casing.
- Refrain from any manipulation of the heat pump casing.
- Refrain from any misuse of the heat pump housing (e.g. as a mounting or similar).



DANGER

Risk of lightning

During thunderstorms, do not stand in the immediate vicinity of the heat pump.



DANGER

Risk of fatal electric shock

There is a risk of death when working on the electrical equipment or live components in wet weather conditions (precipitation, snow, etc.).

- In case of precipitation such as rain, snow etc., keep the heat pump casing properly closed.



WARNING

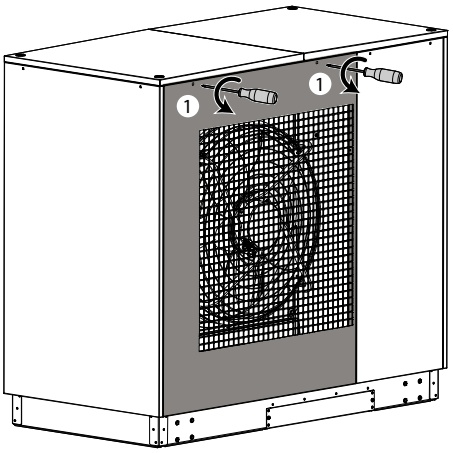
Risk of injury

Working on the device without protective equipment can result in injuries such as cuts.

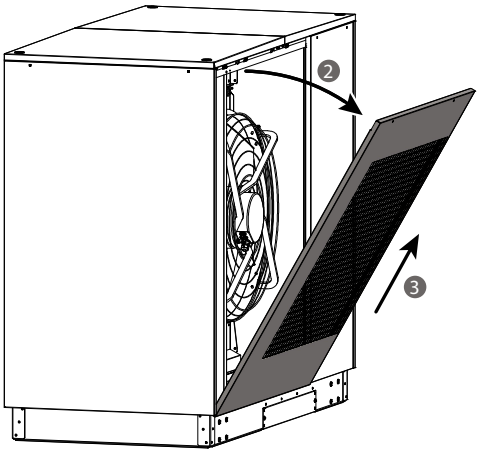
- Wear personal protective equipment consisting of safety gloves, safety shoes, safety glasses and long-sleeved clothing that fully covers the body.

7.1 Opening the covering panels

7.1.1 Removing the gratings on the front and rear

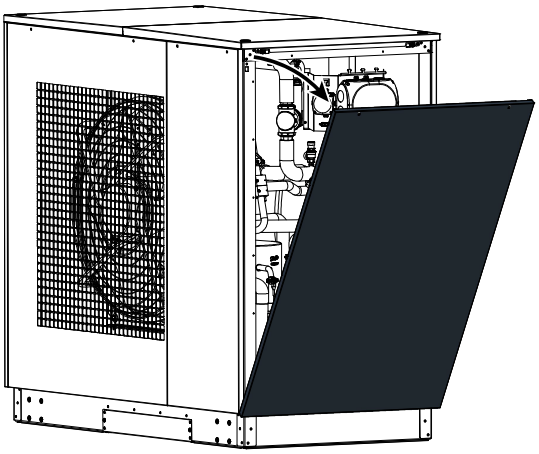


1. Loosen the screws at the top of the corresponding panel.

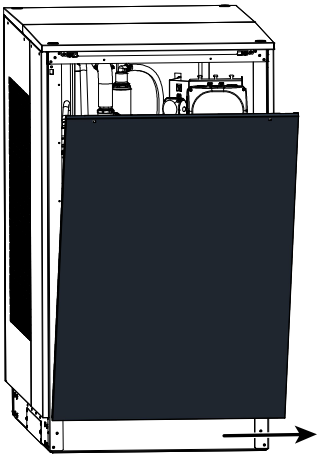


2. Tilt the upper panel forwards by approx. 30°.
3. Pull the panel diagonally upwards out of the base.

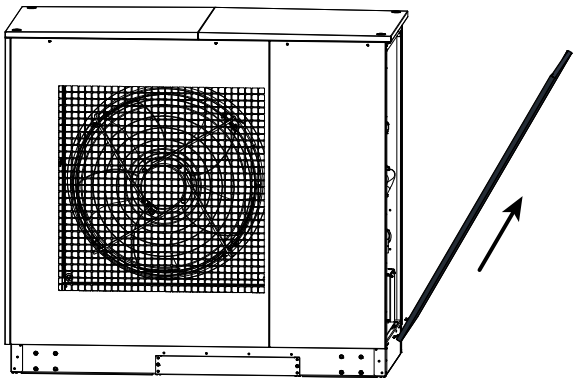
7.1.2 Removing the side covering panels



1. Loosen the screws at the top of the corresponding panel.
2. Tilt the upper panel forwards by approx. 30°.

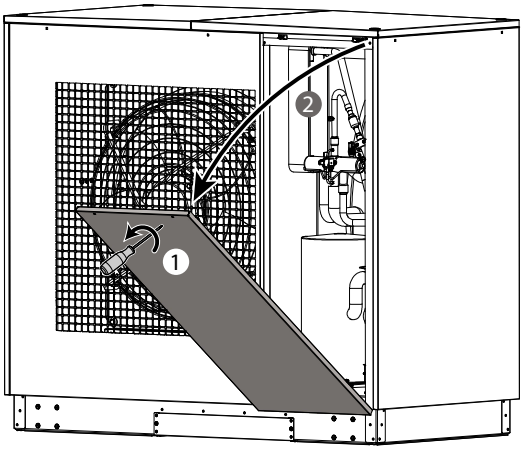


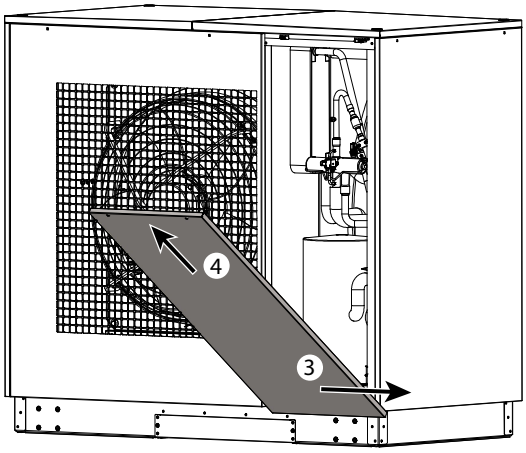
3. In the tilted position, slide the panel approx. 40 mm to the right as far as it will go.



4. In this position, pull the panel diagonally upwards out of the base.

7.1.3 Removing the covering panels on the front and rear of the machine room



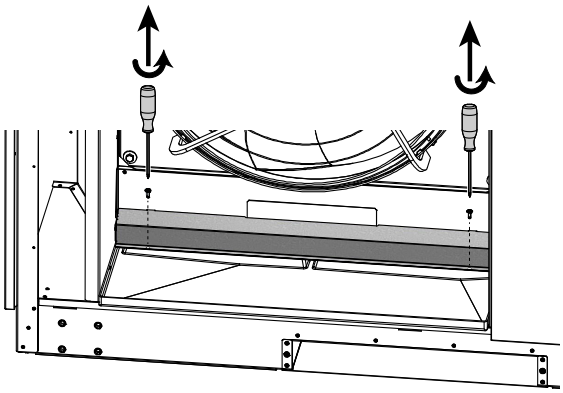


1. Loosen the screws at the top of the corresponding panel.
2. Tilt the upper panel approx. 55° forwards, to enable it to be pushed past the adjacent side covering panels.
3. In the tilted position, slide the panel approx. 40 mm to the right as far as it will go.
4. In this position, pull the panel diagonally upwards out of the base.

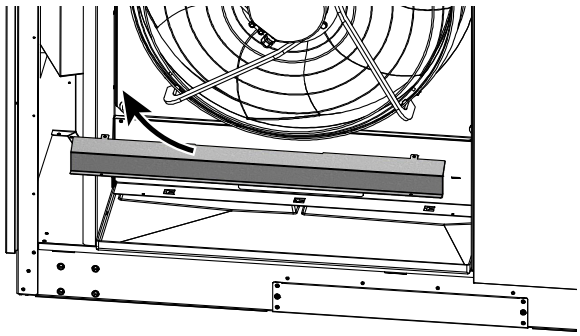
7.1.4 Removing the inspection cover

Open the inspection cover to access the area between the evaporator and the fan.

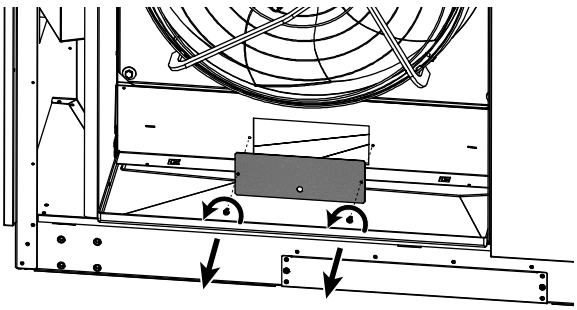
Prerequisite: Grating on the fan side has been removed ▸ *Removing the gratings on the front and rear [7.1.1, p. 21]*



1. Loosen and remove the screw-in blind rivets with a screwdriver.



2. Remove the cable cover.



3. Loosen and remove the screw-in blind rivets.
4. Remove the inspection cover.

7.2 Connection on heating side

- Refer to the ▸ *Device information [12, p. 38]* for the relevant connection specifications.
- During installation, observe the trip pressure of the installed safety valve of 5.4 bar!
- When filling the heating circuit, pay attention to the frost protection valves.
  The device is equipped with frost protection valves in the heating circuit. If the device is filled at outside temperatures below 4 °C and there is no flow, it is possible the heating water is being drained through the frost protection valves. Therefore, when filling the heating circuit make sure that the temperature and the heating water flow are sufficiently high.
  ▸ *Filling the system at outside temperatures below 4 °C (frost risk) [7.2.1, p. 23]*
- After assembly on the heat pump, seal the empty conduits gas tight.
- **After installation on the heating side, fill, purge and pressure test the heating system!**

NOTICE

Damage due to leakage from hydraulic circuit

Leakage from the hydraulic circuit can result in damage due to escaping water.

- Ensure permanent sealing of the entire hydraulic network.

NOTICE

Damage due to impurities

If the heating system is not flushed, impurities, sealing material residue or similar can cause damage to the liquefier and thus result in complete failure.

- Flush the heating system adequately before connecting the heat pump.

NOTICE

Damage due to incorrect distribution

Pump assemblies with check valves guarantee defined flow directions.

- If there is incorrect distribution or a fall in the volume flow, check these assemblies, particularly the check valves.
- With multiple heating circuits or parallel connection of heat pumps, fitting check valves is mandatory to prevent incorrect distribution.

7.2.1 Filling the system at outside temperatures below 4 °C (frost risk)

Before filling the system, check the outside temperature. If it is below 4 °C, there is a risk of frost. In this case, the frost protection valves are open.

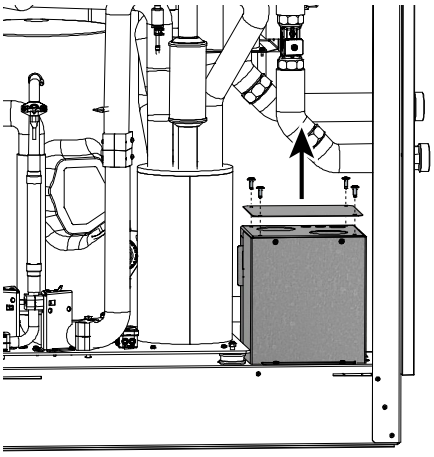
Procedure at outside temperatures below 4 °C:

1. Slide the enclosed hoses (x 3) over the frost protection valves.
2. Run the ends of the hoses out of the device to ensure that escaping water is safely drained.
   ▷ When the frost protection valves are open, the water automatically runs out of the device through the hoses. This prevents water freezing inside the device and causing damage.
3. Start filling the system.
4. During filling, check the water temperature regularly.
   Important: If the water is too cold, provide heating, e.g. pre-heating the water or mixing with warmer water. Below 4 °C, the frost protection valves are open.
   A water temperature of more than 4 °C leads to automatic closure of the frost protection valves.
5. After filling, detach the hoses and remove them from the heat pump.

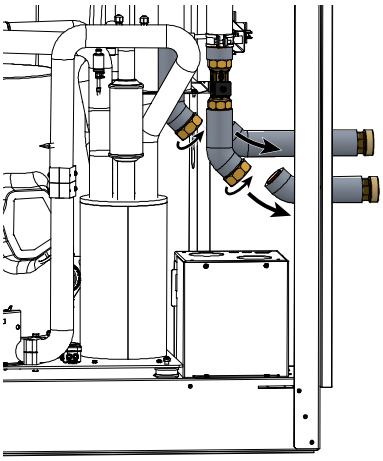
7.2.2 Modifying the water connection

If necessary, the heat pump water connection can be changed from a connection on the rear of the device to a connection underneath the device:

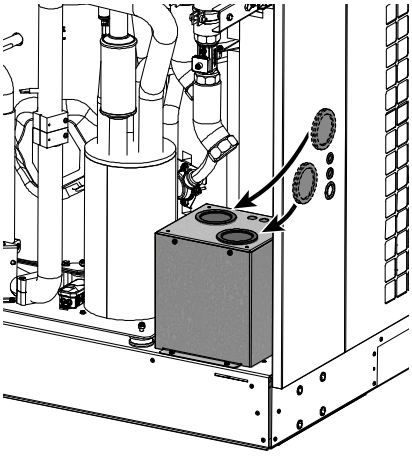
✓ Side covering panel has been removed. ▸ *Removing the side covering panels [7.1.2, p. 21]*



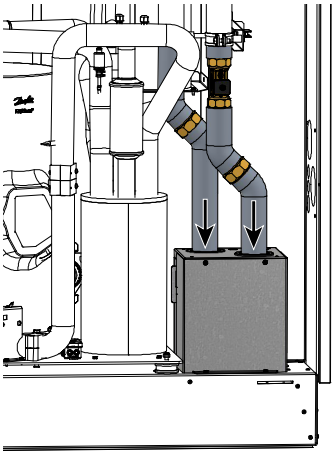
1. Remove the cover plate on the water connection box.



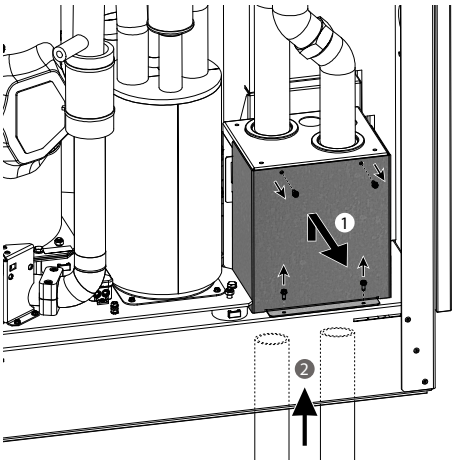
2. Loosen the water pipe by opening the fitting.



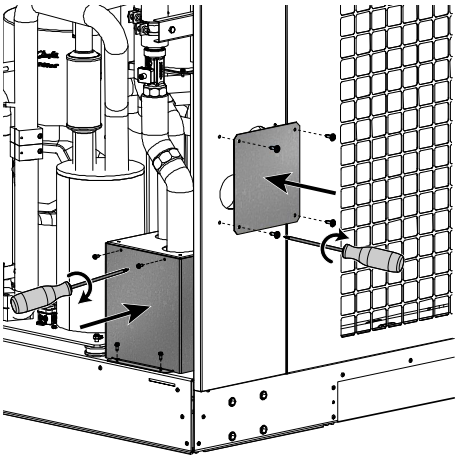
3. Remove the sleeves from the rear covering panel and insert in the water connection box.



4. Insert the water piping downwards into the water connection box and close the screw connection again.



5. Remove the front panel on the water connection box.
6. Install the water connection for the heat pump.



7. Re-seal the water connection box.
8. Seal the rear covering panel with the cover plate from the water connection box.
9. Fit the other covering panels on the heat pump.

7.2.3 Water quality in heating systems

NOTICE

Damage due to unsuitable filling and additional water

Unsuitable filling and additional water can lead to deposits and corrosion. This can reduce the performance of the heat pump or cause damage to the system.

The system installer is responsible for the water quality.

NOTICE! Do not use antifreeze (e.g. water / glycol mixture) in the heating water!

Flush the heating system before filling.

The filling water must meet drinking water standards and must comply with VDI 2035. The following limit values must also be observed:

Evaluation characteristic	Unit	Concentration range	
Electrical conductivity (saline operation)	µS/cm	100 - 500	1
Electrical conductivity (low-salt operation)	µS/cm	< 100	1
pH value		8.2 - 9.5	1 2 3
Total hardness	°dH	3.5 - 8.4	
Chloride ions (Cl^-)	mg/l or ppm	< 20	
Iron (Fe)	mg/l or ppm	< 0.2	1
Hydrogen carbonate/sulphate (HCO_3^-/SO_4^{2-})		> 1.0	
Filterable materials	mg/l	< 30	

1. Values stipulated in VDI2035 are applicable
2. When using demineralised water, ensure that the pH value is above the minimum permissible value of 8.2. Failure to comply with this value can result in the heat pump being destroyed.
3. Check operation after 12 weeks at the latest.

Before filling the system, obtain information about the drinking water quality from the local water supply company. In many regions the local water supply company's website provide an insight into water hardness, pH value and a range of other constituent substances.

Check the water quality 10 to 12 weeks after filling / commissioning.

Document the filling water conditioning, water quality and any actions taken in the system handbook.

7.2.4 Minimum and maximum heating water flow rate

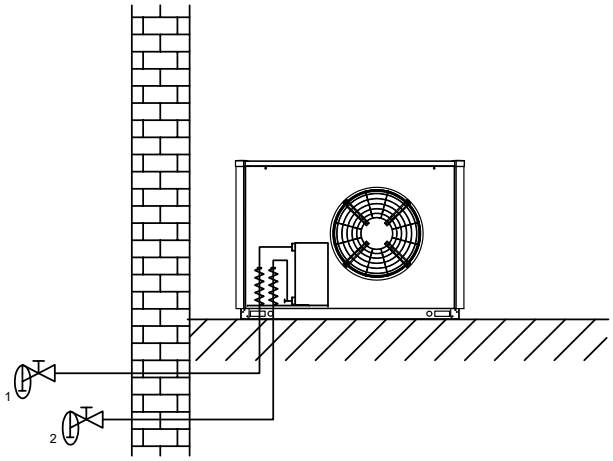
The minimum heating water flow of the heat pump must be ensured for every heating system operating status, e.g. by installation of a double differential pressureless manifold. The maximum flow rate must not be exceeded. Guarantee the specified nominal flow rate for every operating status ▸ *Device information [12, p. 38]*. A built-in flow rate sensor monitors the necessary minimum flow rate.

7.2.5 Frost protection

In heat pump systems where freedom from frost cannot be guaranteed, there must be an option for draining the system (see figure). The frost protection function of the heat pump manager is active whenever the heat pump manager and the heat circulating pump are ready for operation. The system must be drained if the heat pump is taken out of service or in the event of a power failure.

The device is equipped with frost protection valves in the heating circuit. When filling the heating circuit, pay attention to the information provided under ▸ *Connection on heating side [7.2, p. 23]*.

NOTICE! The device is not approved for operation with glycol antifreeze!



7.2.6 Integration of heat pumps into existing systems (renovations)

The existing heat distribution network (pipe materials, connection types, etc.) and the existing heating systems (e.g. radiators, underfloor heating, etc.) can impact the quality of the water in existing systems. Particularly when welded steel pipes or pipes that are not oxygen diffusion proof are used, deposits, scaling, silting or similar may be present and can cause damage to the heat pump system. This can result in a total failure of the heat pump.

The following measures must be observed to avoid this:

- Compliance with the water properties and water quality
- Flushing of the hydraulic system
- If impurities in the heating water are anticipated during operation, arrange for a qualified specialist to define a suitable maintenance interval for the dirt trap and ensure that this is adhered to.
- If silting or ferromagnetic particles are to be expected in the hydraulic network, dirt separators or magnetite separators must be installed on-site before the medium enters the heat pump. The cleaning intervals must be defined by a suitably qualified person.
- Ensure that no oxygen gets into the heating circuit of the heat pump. If oxygen ingress is to be expected, isolation, e.g. using an isolating exchanger (plate heat exchanger) is recommended.

7.3 Temperature sensors

The following temperature sensors are already installed or must be installed additionally:

- Outside temperature (R1; NTC-2), supplied with the heat pump manager
- Secondary circuit return temperature (R2; NTC-10), installed
- Flow rate monitoring (R3.1; PT1000), installed

7.3.1 Sensor characteristic curves

The temperature sensors (NTC-10) to be connected to the heat pump manager (controller -N1) must correspond to the illustrated sensor characteristic curve ▸ *Fig. 2 [Sensor characteristic curve NTC-10, p. 28]*. The only exception is the outside temperature sensor included in the scope of supply of the heat pump (NTC-2) ▸ *Fig. 3 [Sensor characteristic curve NTC-2 in accordance with DIN 50350 Outside temperature sensor, p. 28]*.

Temperature in °C	NTC-2 in kΩ	NTC-10 in kΩ	PT1000 in kΩ
-20	14.6	67.7	0.92
-15	11.4	53.4	0.94
-10	8.9	42.3	0.96
-5	7.1	33.9	0.98
0	5.6	27.3	1.0
5	4.5	22.1	1.02
10	3.7	18.0	1.04
15	2.9	14.9	1.06
20	2.4	12.1	1.08
25	2.0	10.0	1.10
30	1.7	8.4	1.12
35	1.4	7.0	1.14
40	1.1	5.9	1.16
45	1.0	5.0	1.17
50	0.8	4.2	1.19
55	0.7	3.6	1.21
60	0.6	3.1	1.23
70			1.27
80			1.31
90			1.35
100			1.39
110			1.42
120			1.46
130			1.50
140			1.54

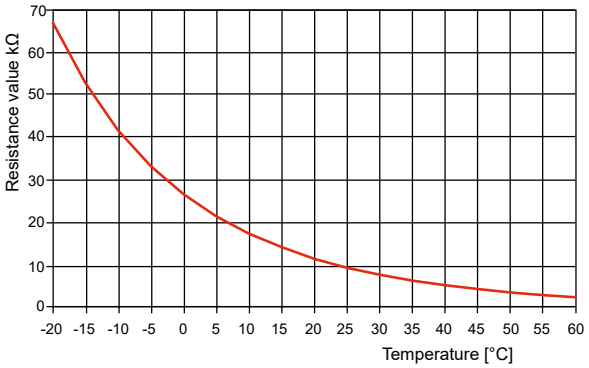


Fig. 2: Sensor characteristic curve NTC-10

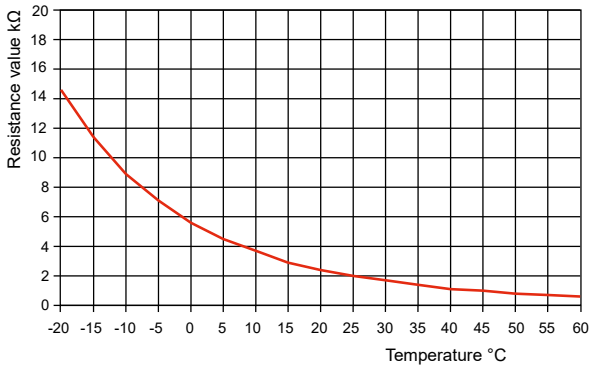


Fig. 3: Sensor characteristic curve NTC-2 in accordance with DIN 50350 Outside temperature sensor

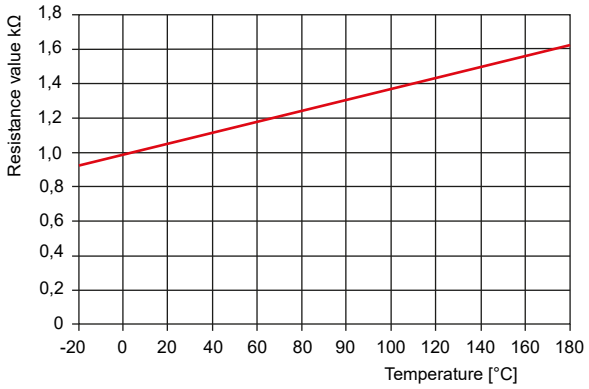


Fig. 4: Sensor characteristic curve PT1000

7.4 Electrical connection

All electrical connection work must be carried out by a trained electrician or a specialist in the specified tasks, observing the following:

- Installation and usage instructions
- Country-specific installation regulations e.g. VDE 0100
- Technical connection conditions from energy suppliers and supply grid operators (e.g. TAB)
- Local conditions

To ensure that the frost protection function of the heat pump works properly, the heat pump manager can only be briefly disconnected from the power supply and the flow must be maintained through the heat pump.

Feed all supply cables on the heat pump into the connection socket through the designated free cable glands.

The cables must be secured with strain relief.

This device complies with IEC 61000-3-12, providing that the short-circuit power Ssc on the connection point of the customer system with the public grid is ≥ 9780 kVA. It is the responsibility of the installer or device operator, if necessary following consultation with the distribution network operator, to ensure that this device is only connected to a connection point with a short-circuit power Ssc of ≥ 9780 kVA.
The heat pump fulfils the requirements of EN 61000-3-12 according to the THC values specified in Table 3 of the standard of a minimum value Rsce ≥ 350.

7.4.1 Electrical installation work

Before starting any work on electrical connections, observe the five safety rules for electrical engineering: Disconnect, Secure against switching on again, Ensure there is no voltage present across all poles, Earth and short-circuit, Cover or cordon off adjacent live parts.

After disconnecting, wait five minutes to ensure that all components are de-energised.

The precisely defined stripping lengths for the individual connecting cables (power connection, control voltage, communication cable) can be found in the electrical documentation.

Run a total of 3 lines/cables to the heat pump:

Power supply

A standard, 5-core cable provided on-site is used to connect the heat pump to the power supply.

Select the cable cross-section according to the power consumption of the heat pump and the applicable VDE (EN) and VNB regulations ▸ *Device information [12, p. 38]*. An all-pole disconnecting device with a contact gap of at least 3 mm (e.g. utility company blocking contactor, power contactor) must be installed in the heat pump power supply.

A 3-pole circuit breaker with joint tripping of all outer conductors, taking into account the design of the internal wiring, provides short-circuit protection (trip current in accordance with ▸ *Device information [12, p. 38]*). The relevant components in the heat pump contain an internal overload protection. When connecting, ensure that the incoming supply has a clockwise rotating field.

Phase sequence: L1, L2, L3.

Control voltage

The control voltage is supplied via the heat pump manager (controller -N1). A 3-pole line must be installed for this purpose in accordance with the electrical documentation.
Further information on the wiring of the heat pump manager, refer to the associated operating instructions.

Communication line

A shielded communication line (J-Y(ST)Y ..LG) (not included in scope of supply) connects the heat pump manager (controller -N1) with the -N0 refrigeration circuit controller installed in the heat pump.
For more detailed instructions, refer to the heat pump manager operating manual and the electrical documentation.

The communication cable is necessary for the function of the heat pump. It must be shielded and laid separately from the mains cable.

7.4.2 Demand sensor connection

The demand sensor R2.2 (NTC-10) is included with the heat pump manager (controller -N1). It must be installed depending on the hydraulics used ▸ *Hydraulic integration diagrams [16, p. 50]*.
If a demand sensor is not connected, the 2nd heat generator cannot be controlled using the heat pump manager in the event of an interruption in communication .

The return sensor R2 installed in the heat pump is active when the compressor is running and must not be disconnected!

Sensor cables can be extended up to 50 m with 2 × 0.75 mm cables.

7.4.3 Secondary pump M16 connection

The secondary pump (auxiliary circulating pump) M16 is controlled by the heat pump manager. Alternatively, depending on the type of heat pump, it could also be controlled by the heat pump itself.

A 230 V signal (ON/OFF) and a set value (0..10 V / PWM) are provided. In order to optimise the overall system and reach the efficiency values, use the set value signal. In the case of pumps without a set value signal, observe the limit values from the device information.

Alternative connection options for the pump (e.g. continuous voltage to pump, ON/OFF control via floating contact, ON/OFF control via set value, high connection power) must be prepared on site and implemented according to the pump type. For this, observe the pump manufacturer's specifications. See the electrical documentation for further details.

7.4.4 Frost protection

Regardless of the settings for the heat circulating pumps, they always run in heating, defrost and frost protection mode. In systems with multiple heating circuits, the 2nd and 3rd heat circulating pump has the same function.

NOTICE

Damage due to frost

When the heat pump manager has no voltage, there is no longer any flow through the heat pump and damage can occur due to frost.

- To guarantee the heat pump frost protection function, do not disconnect the heat pump manager from the voltage.
- The secondary pump M16 must either be connected to the heat pump manager or to the heat pump (connection box M16).

8 Commissioning

Commissioning must be carried out by specialist personnel.

Specialist tools must be used.

To ensure that commissioning is performed correctly, it should only be carried out by an after-sales service engineer authorised by the manufacturer *Personnel requirements [2.4, p. 8]*. Under certain conditions, this may be associated with an additional warranty service.

NOTICE

Damage due to operation with transport fastening

- Before commissioning, remove the transport fastening.

WARNING

Risk of injury

Working on the device without protective equipment can result in injuries such as cuts.

- Wear personal protective equipment consisting of safety gloves, safety shoes, safety glasses and long-sleeved clothing that fully covers the body.

8.1 Preparation

The following must be carried out and checked prior to commissioning:

- The casing covers of the heat pump must be fitted on all sides.
- There must be no ignition sources or fire loads in safety area.
- All connections on the heat pump are connected as described under *Assembly [7, p. 20]*.
- Solenoid valve Y19 has been actuated by the heat pump manager to ensure the water flow. Solenoid valve factory default = closed.
- The heating circuit has been filled and checked.
- All valves which could impair a proper flow in the heating circuit are open.
- The air intake and air outlet paths are clear.
- The settings on the heat pump manager (controller -N1) have been adapted to the heating system in accordance with the operating instructions.
- The condensate drain is ensured.
- Flush the hydraulic network properly before installing the heat pump. This includes the supply line to the heat pump. Only when flushing is complete can the heat pump be hydraulically integrated.
- The dirt traps fitted as standard or included for assembly **must be inspected between 4 and 8 weeks after commissioning of the heat pump or any changes to the heating system and cleaned if necessary!** Depending on the level of soiling, schedule additional maintenance intervals, which must be defined and carried out by a suitably qualified person. Unless there is an excessive accumulation of dirt, an interval of 1 year is generally effective.

8.2 Procedure

The heat pump is commissioned using the heat pump manager (controller -N1). Settings should be made in compliance with the operating instructions. At heating water temperatures below 7 °C, commissioning is not possible. **The water in the buffer tank must be heated to at least 20 °C using the 2nd heat generator.**

Observe the following procedure for fault-free commissioning:

1. Close all consumer circuits.
2. Actuate solenoid valve Y19 using the heat pump manager. The water flow can only be ensured once the solenoid valve is open. Solenoid valve factory default = closed.
3. Select “Winter” operating mode using the heat pump manager.
4. In the “Special functions” menu, start the “Commissioning” program.
   ▷ Wait until a return temperature of at least 29 °C has been reached.
5. Then slowly re-open the heating circuit valves in succession so that the heating water flow rate is continuously increased by slightly opening the relevant heating circuit. The heating water temperature in the buffer tank must not be allowed to drop below 24 °C during this process. This ensures that the heat pump can be defrosted at any time.
   ▶ When all heating circuits are fully open and a return temperature of at least 20 °C is maintained, the commissioning is complete.

9 Cleaning

Regular cleaning of the system ensures continuous efficient and fault-free operation.

DANGER

Risk of death due to fire and explosion

If there is a leakage of the propane refrigerant due to a fault, an ignitable atmosphere can form.

- Avoid ignition sources and fire loads in the protection zone.
- Keep the casing closed.

WARNING

Risk of injury and damage due to improper handling

- Work on the heat pump is only to be carried out by people with the expertise set out in *Personnel requirements [2.4, p. 8]*.

NOTICE

Damage due to leakage from hydraulic circuit

Leakage from the hydraulic circuit can result in damage due to escaping water.

- Ensure permanent sealing of the entire hydraulic network.

To protect the paint, do not lean or place any objects on the device.

Wipe the outdoor components of the heat pump with a damp cloth and commercially available cleaner.

Do not use cleaning agents containing sand, soda, acid or chloride, as these can damage the surface.

Only use genuine spare parts.

9.1 Cleaning the heating system

Choose cleaning intervals according to the degree of soiling in the system itself.

Cleaning the screen insert and dirt/magnetite separators

1. Depressurise the heating circuit in the area of the dirt trap.
2. Unscrew the screening chamber.
3. Remove and clean the screen insert.
4. Re-assembly the components in reverse order.

NOTICE! Ensure that the screen insert is installed correctly and the connection is tight.

Flushing the system

The ingress of oxygen into the heating water circuit may result in the formation of oxidation products (rust), particularly if steel components are used. These enter the heating system via the valves, the circulating pumps and/or plastic pipes. Particularly for the piping, diffusion-proof installation must therefore be ensured.

Residue from lubricants and sealants may also contaminate the heating water. If the contamination is so severe that the performance of the liquefier in the heat pump is reduced, the system must be cleaned by a specialist installation company.

- Based on current information, cleaning using a 5% phosphoric acid solution is recommended. If cleaning needs to be performed more frequently, a 5% formic acid solution should be used.
- The cleaning fluid should be at room temperature.
- When installed, the heat exchanger can only be flushed in the designated flow direction.
- We recommend connecting the flushing device directly to the feed and return for the liquefier in the heat pump to prevent acidic cleaning agent getting into the heating system circuit.
- Then re-flush thoroughly with suitable neutralising agents to prevent damage caused by any cleaning agent residue remaining in the system.

NOTICE! Handle acids with care. Always observe the trade association regulations and the cleaning agent manufacturer's specifications.

9.2 Cleaning the air system

- Under extreme weather conditions (e.g. snow drifts), ice may form on the air intake and air outlet grating in individual cases. Clear the air intake and air outlet area of ice and snow to ensure the minimum air flow.
- Remove any twigs, leaves and dirt accumulated around the device at regular intervals.
- Clean the evaporator, ventilator and condensate drain of contamination (leaves, twigs, etc.) as required.
  Removing the gratings on the front and rear
- If necessary, open the inspection cover to clean the condensate drain or the condensate hose.
  Removing the inspection cover [7.1.4, p. 22]

10 Faults / troubleshooting / repair

If any faults occur, notify the responsible after-sales service.

Repair work on the heat pump must only be performed by authorised and qualified after-sales service engineers.

Anyone carrying out work on the refrigeration circuit must be certified to safely handle flammable refrigerants or be supervised by a person with such certification.



DANGER

Risk of death due to fire or explosion

The device contains odourless, flammable refrigerant (R290). In case of leakage, the refrigerant can mix with the ambient air and form a flammable atmosphere.

- Work on the heat pump is only to be carried out by people with the expertise set out in *Personnel requirements [2.4, p. 8]*.
- Avoid ignition sources (naked flames, hot surfaces, electrical equipment with ignition sources and static discharge) and fire loads in the safety area.
- Do not smoke in the protection zone of the heat pump.
- Before and when opening the device, check the working area and the interior of the device for the presence of R290 using a refrigerant detector.
- Only use detectors and tools suitable and tested for work with R290 refrigerant.
- Cordon off the area around the device to prevent unauthorised access.
- Check the refrigeration cycle for leaks after completing all assembly work and before connecting the external power supply (load and control voltage).



DANGER

Risk of fatal electric shock

There is a risk of electric shock if the device is not fitted with all covering panels.

- Disconnect all electric circuits from the power supply before opening the device.
- Wait 5 minutes to ensure that all components are de-energised.



DANGER

Risk of lightning

During thunderstorms, do not stand in the immediate vicinity of the heat pump.



DANGER

Risk of fatal electric shock

There is a risk of death when working on the electrical equipment or live components in wet weather conditions (precipitation, snow, etc.).

- In case of precipitation such as rain, snow etc., keep the heat pump casing properly closed.



NOTICE

Damage due to leakage from hydraulic circuit

Leakage from the hydraulic circuit can result in damage due to escaping water.

- Ensure permanent sealing of the entire hydraulic network.

NOTICE

Malfunction due to incorrect software

- Only software that is authorised and approved by the manufacturer can be installed on the heat pump control system.

If the liquefier (plate heat exchanger) fails due to a defect (e.g. due to contamination, corrosion, refrigerant leak or calcination), as part of the repair (replacement or cleaning) replace the solenoid valve (Y19), the frost protection valves (HC6), the deaerator (HC5) and the check valve (HC4).

If the liquefier fails due to contamination, re-check the actions described under ▸ *Integration of heat pumps into existing systems (renovations) [7.2.6, p. 26]*.

Actions before repair

Before starting repair work, carry out the following steps:

- Externally disconnect the power supply to the device. After disconnecting, wait 5 minutes for all components to be de-energised.
- The earth connection must remain guaranteed.
- Do not damage the refrigeration circuit.
- Before and when opening the device, check the working area and the interior of the device for the presence of R290 using the refrigerant detector.
- For repair work during which a release of refrigerant is expected, use mobile ventilation (e.g. fan with explosion protection).
- Before starting work, check that the paint protector on the relevant component is in its original condition. Paint protectors that have to be removed for repair work must be re-attached when the work is complete.
- For soldering and welding work, an appropriate fire extinguisher must be located in the immediate vicinity.
- If refrigerant is added, there must be a CO_2 or powder extinguisher in the immediate vicinity.

Repair

Perform the necessary repair to the heat pump.

Use a Schrader valve quick opener to prevent excess leakages of refrigerant when connecting and sealing off hoses to the refrigeration circuit.

Actions after repair

- Check that the wiring is not subjected to any wear, corrosion, tension, vibration, sharp edges and other unfavourable environmental influences. The check should also take into account the effects of ageing.
- When replacing the high pressure switch, perform a leakage tightness test with nitrogen to ensure correct functioning.

10.1 Repairs to the refrigeration circuit

NOTICE

Damage due to freezing

When emptying and filling the refrigerant, damage can occur due to freezing.

- Ensure a continuous flow through the liquefier or, alternatively, drain the heating water from the unit.

10.1.1 Removal of refrigerant

Actions before removal

Ideally, the refrigerant should be extracted using suitable equipment and collected in approved recycling bottles. Personnel must be trained in handling recycling bottles for R290. Handling recycling bottles as well as their return/ disposal must comply with the safety regulations. Observe the information provided by the return system operator.

If extraction including return is not possible, as an alternative the refrigerant can be discharged using a hose into a safe zone, where there are no ignition sources, windows, doors, ventilation openings, light wells, openings for sewers or similar.

In addition, use a suitable fan (Ex zone II) at the outlet point to ensure sufficient dilution of the refrigerant. To achieve the fastest possible dilution of the refrigerant in the environment, raise the outlet point as high as possible rather than positioning it at ground level.

The zone around the outlet point must be cordoned off and indicated by appropriate warning notices. There must not be any ignition sources, windows, doors, ventilation openings, light wells, openings for sewers or property boundaries in the flow direction of the fan used to dilute the refrigerant.

Removal

1. Start drainage of the refrigerant on the service valve on the low pressure side.
2. After a few minutes, move the expansion valve to the open position using the permanent magnet.
3. Open the service valve on the high pressure side.
4. When drainage / extraction is complete, adequately flush the entire device with nitrogen.
5. Evacuate to an absolute pressure level of 20 mbar. Use vacuum pumps suitable for R290. The fan (Ex zone II) must be positioned in such a way that the vacuum pump is in the air flow.
6. Break the vacuum with nitrogen.
7. If there is still refrigerant in the refrigeration circuit, repeat the “Evacuation” and “Flushing” work steps. Check all service valves in the refrigeration circuit.

Repairs to the refrigeration circuit

- Always open the refrigeration circuit with a pipe cutter. Do not unsolder any components.
- During soldering work, flush the area with an adequate quantity of nitrogen.
- Replace the filter dryer whenever any repair work is performed on the open refrigeration circuit.

Components that have been removed can still release small quantities of refrigerant from compressor oil residue (especially from the compressor itself).

- Do not seal or solder removed components.
- Store the components in the open air until the work is complete.
- Subsequent transportation must be in a ventilated vehicle.

10.1.2 Filling with refrigerant

Actions before filling

- Before filling with refrigerant, perform the following checks:
  - Pressure test at solder connections that have been created
  - Leakage tightness test
  - Evacuate to an absolute pressure level of 2.7 mbar or lower
- The leak detector must be suitable for the type of refrigerant being used.
- Ensure that the refrigeration circuit is earthed.
- Do not use filling fittings for different refrigerants. Choose hoses that are as short as possible to minimise the amount of refrigerant they contain.
- Evacuate the filling hose and the manifold as far as the connection point on the device before filling. If the manifold and the filling hose are filled with propane, check them again for leaks.

Filling

- During filling, ensure that heating water is conveyed through the liquefier or, alternatively, that the heating water has been drained from the unit.
- Position the refrigerant bottles horizontally.
- Ventilate the refrigerant bottle and hoses externally with a fan (Ex zone II).
- Do not heat the refrigerant bottle with naked flames or a hair dryer. Possible methods of speeding up the filling include a hot water bath or heating sleeves suitable for propane bottles.
- After filling, safely drain the remaining quantity of propane in the manifold and the hoses.
- Check for leaks again after filling using the refrigerant detector. If a leakage is indicated, repeat the process.

10.2 Replacement of the refrigerant gas sensor

The heat pump contains a refrigerant gas sensor that must be replaced after an operating time of 15 years.

The sensor must be replaced by a Dimplex service partner.

Before the end of the service interval, the system operator is informed of the need for replacement via messages in the heat pump manager. From an operating period of 14 years, reminders of the service interval are given in recurring, ever shorter intervals via an fault shutdown of the heat pump.

The faults can be acknowledged on the heat pump manager by the system operator. In this case, the heat pump works as usual until the next reminder.

The reminders/fault shutdowns appear after the following operating times:

14 years + 0 weeks (first reminder)
14 years + 16 weeks
14 years + 32 weeks
14 years + 40 weeks
14 years + 44 weeks
14 years + 46 weeks
14 years + 48 weeks
14 years + 49 weeks
14 years + 50 weeks
14 years + 51 weeks
14 years + 52 weeks (last reminder)

After the final reminder, the heat pump manager prevents the continued operation of the heat pump! Normal operation of the heat pump is not possible without the sensor being replaced by a Dimplex service partner. Operation in frost protection mode is still possible.

After replacement of the sensor, the service interval starts again from the beginning and the reminders follow the sequence shown.

When replacing the refrigerant gas sensor, the solenoid valve (Y19), the frost protection valves (HC6), the deaerator (HC5) and the check valve (HC4) must be serviced by qualified personnel.

10.3 Automatic calibration of the refrigerant gas sensor

The refrigerant gas sensor has an automatic calibration function. In rare cases, this can result in a temporary fault shutdown. This fault can be acknowledged in the heat pump manager.

In extremely rare cases, in particular due to extreme environmentally-relevant influences, an unsuccessful automatic self-calibration results in the heat pump being blocked. In this case, frost protection is no longer guaranteed. The refrigerant gas sensor must be replaced by a Dimplex service partner.

NOTICE

Damage due to freezing

If a block occurs due to an unsuccessful automatic calibration of the refrigerant gas sensor during a frost period, there is a risk of freezing.

- Have the refrigerant gas sensor replaced by a Dimplex service partner as soon as possible.

11 Decommissioning/disposal

The heat pump must be removed by specialist personnel. Anyone carrying out work on the refrigeration circuit must be certified to safely handle flammable refrigerants or be supervised by a person with such certification.

DANGER

Risk of lightning

During thunderstorms, do not stand in the immediate vicinity of the heat pump.

DANGER

Risk of fatal electric shock

There is a risk of death when working on the electrical equipment or live components in wet weather conditions (precipitation, snow, etc.).

- In case of precipitation such as rain, snow etc., keep the heat pump casing properly closed.

DANGER

Risk of fatal electric shock

There is a risk of electric shock if the device is not fitted with all covering panels.

- Disconnect all electric circuits from the power supply before opening the device.
- Wait 5 minutes to ensure that all components are de-energised.

Decommissioning

To decommission the heat pump, carry out the following steps:

- Familiarise yourself with the device-specific and local conditions.
- Externally disconnect the heat pump from the power supply
- Shut off the heat pump from the hydraulic system.
- For disposal of the entire heat pump or parts of the refrigeration circuit, particularly the compressor, leave these parts open after removing the refrigerant *Repairs to the refrigeration circuit [10.1, p. 34]*.
- Do not seal off components by crimping or soldering.
- For disposal of the compressor, evacuate it with sufficient negative pressure to remove as much dissolved refrigerant from the compressor oil as possible. *Removal of refrigerant [10.1.1, p. 34]*
- Mark the heat pump to indicate that it has been decommissioned and the refrigerant removed. Sign and date this marking.

Disposal

Observe all relevant environmental requirements with regard to recovery, reuse and disposal of operating materials and components, in accordance with the applicable standards. Pay particular attention to proper disposal of the refrigerant oil.

12 Device information

1	**Type and order code**			**LA 4060CP**
2	**Design**			
2.1	Heat source			Air
2.2	Seasonal room heating energy efficiency ηs for average climate [1] 35 °C / 55 °C		%	186 / 149
2.3	Seasonal coefficient of performance SCOP average climate 35 °C / 55 °C [1]			4.72 / 3.80
2.4	Seasonal coefficient of performance SEER Fan convector / cooled ceiling [1]			3.58 / 4.08
2.5	Control			WPM
2.6	Thermal energy metering			Integrated
2.7	Installation location			Outdoors
2.8	Performance levels			Inverter
3	**Operating limits**			
3.1	Heating water flow / return		°C	Up to 70 / From 18
3.2	Cooling water flow		°C	7 to 20
3.3	Air (heating)		°C	-22 to 40
3.4	Air (cooling)		°C	10 to 45
4	**Flow**			
4.1	Heating water flow / internal pressure differential			
	Nominal flow according to EN 14511	A7 / W35...30	m^3/h / Pa	4.0 / 40000
4.2	Minimum heating water flow rate		m^3/h	4.0
4.3	Heating water flow rate for pump design		m^3/h / Pa	4.5 / 50000
4.4	Maximum heating / cooling water flow rate		m^3/h	5.0
4.5	Minimum cooling water flow rate / internal pressure differential		m^3/h / Pa	4.0 / 40000
4.6	Air flow	Normal operation	m^3/h	6500-14600
5	**Sound**			
5.1	Sound power level in accordance with EN 12102 (A7 / W55)	ErP in accordance with EN 12102	dB(A)	55 (17.1 kW)
5.2	Sound power level (A2 / W4x-42)	EN 14825 (Average M, operating point B)	dB(A)	57 (21.1 kW)
5.3	Sound power level (A-4 / W49) [2] [3]		dB(A)	69 (32.0 kW)
5.4	Sound power level (A-4 / W49)	Reduced operation	dB(A)	61 (~21 kW)
5.5	Sound pressure level (A7 / W55) free-standing installation at 10 m distance [4]	ErP in accordance with EN 12102	dB(A)	27
6	**Dimensions, weight and filling quantities**			
6.1	Device dimensions without connections	H × W × L	mm	1764 × 1970 × 1000
6.2	Device connections for heating		Inch	R 2” thread-sealing external thread
6.3	Weight of device including packaging		kg	566
6.4	Refrigerant / total filling weight		Type / kg	R290 / 4.0
6.5	GWP value / CO_2 equivalent		- / t	0.02 / 0.000
6.6	Refrigeration circuit hermetically sealed			Yes
6.7	Lubricant / total filling quantity		Type / l	160SZ / 3.6
7	**Electrical connection**			
7.1	Supply voltage / fusing / RCD type			3~/PE 400 V (50 Hz) / C50 / B
7.2	Short-circuit ratio Rsce		-	≥ 350
7.3	Short-circuit capacity Ssc		kVA	≥ 9780
7.4	Control voltage/fusing via WPM			1~/N/PE 230 V (50 Hz) / 6.3 AT

7.5	Degree of protection according to EN 60529		IP 24
7.6	Starting current		< I_B
7.7	Phase monitoring		Yes
7.8	Max. consumption / cos φ	kW / -	26 / 0.99
7.9	Max. operating current	A	40.6
7.10	Crank case heater power consumption (regulated)	W	65
7.11	Power consumption, fan	W	< 1950
7.12	Power consumption for A2 / W35 min. / max.	kW	4.6 / 10.5
8	**Complies with the European safety regulations**		see ▸ *CE declaration of conformity [2.3.1, p. 8]*
9	**Additional model features**		
9.1	Type of defrosting		Reverse circulation
9.2	Condensate tray frost protection / water in device is protected from freezing [5]		Yes
9.3	Permitted operating overpressure (heat sink)	bar	1.0 - 4.5
9.4	Start-to-leak pressure, safety valve (heat sink)	bar	5.4
10	**Performance**		
10.1	Heat output/coefficient of performance (COP) [1] [6]		EN 14511
	Performance level		Modulating
	A-10 / W35 max.	kW / --	38.4 / 2.5
	A-10 / W55 max.	kW / --	39.3 / 1.9
	A-7 / W35 min.	kW / --	23.4 / 3.3
	A-7 / W35 max.	kW / --	42.5 / 2.7
	A2 / W35 min.	kW / --	19.0 / 4.1
	A2 / W35 max.	kW / --	35.7 / 3.4
	A7 / W35 min.	kW / --	18.3 / 5.3
	A7 / W35 nominal point	kW / --	18.4 / 5.4
	A7 / W35 max.	kW / --	40.2 / 4.6
	A7 / W55 nominal point	kW / --	17.0 / 3.3
	A7 / W55 max.	kW / --	36.2 / 3.0
10.2	Cooling capacity / coefficient of performance (COP) [1] [6]		EN 14511
	A27 / W7 min.	kW / --	13.8 / 3.7
	A27 / W7 max.	kW / --	23.6 / 3.4
	A35 / W7 min.	kW / --	12.9 / 3.0
	A35 / W7 max.	kW / --	24.0 / 2.8
	A27 / W18 min.	kW / --	16.7 / 4.4
	A27 / W18 max.	kW / --	30.4 / 4.1
	A35 / W18 min.	kW / --	15.6 / 3.5
	A35 / W18 max.	kW / --	30.1 / 3.4

1. In the first 72 hours of operation following initial commissioning, the performance and efficiency of the heat pump may differ from the stated values.
2. The maximum sound power level can increase depending on the flow temperature, the required heat output and the current outside temperature.
3. The sound power level can be used to calculation the guideline immission value in accordance with German Noise Prevention Code for the *Average* climatic region in a mid-temperature application.
4. Calculated for open air installation. The installation-specific sound pressure level can be calculated under www.waermepumpe.de/werkzeuge/schallrechner for different installation variants.
5. The heat circulating pump and the heat pump controller must always be ready for operation.
6. The performance and efficiency of the heat pump may deviate from the specified values if pump M16 is not controlled using the heat pump manager control signal.

13 Product information in accordance with directive (EU) no. 813/2013 Annex II, Table 2

Information requirements for heat pump space heaters and heat pump combination heaters

Model	LA4060CP
Air-to-water heat pump	yes
Water-to-water heat pump	no
Brine-to-water heat pump	no
Low-temperature heat pump	no
Equipped with a supplementary heater	no
Heat pump combination heater	no

Parameters shall be declared for medium-temperature application, except for low-temperature heat pumps. For low- temperature heat pumps, parameters shall be declared for low-temperature application.

Parameters shall be declared for average climate conditions:

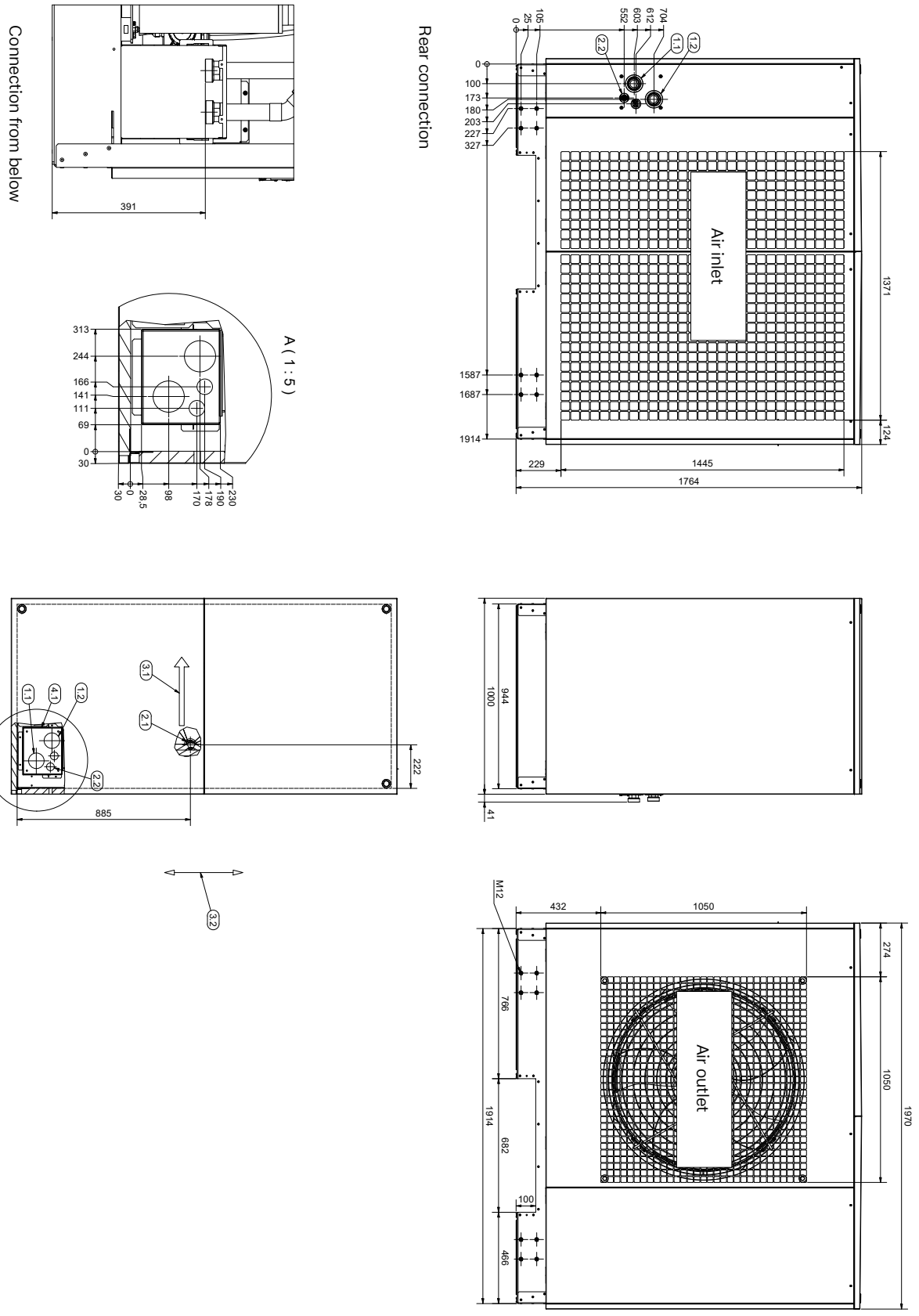
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heat output (*)	Prated	40	kW	**Seasonal space heating energy efficiency**	η_s	149	%
Declared capacity for heating foer part load at indoor temperature 20°C and outdoor temperature T*j*				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature T*j*			
Tj = - 7°C	P*dh*	34,0	kW	Tj = - 7°C	COP*d*	2,23	-
Tj = + 2°C	P*dh*	21,1	kW	Tj = + 2°C	COP*d*	3,72	-
Tj = + 7°C	P*dh*	18,2	kW	Tj = + 7°C	COP*d*	5,08	-
Tj = + 12°C	P*dh*	21,0	kW	Tj = + 12°C	COP*d*	6,42	-
Tj = bivalent temperature	P*dh*	39,3	kW	Tj = bivalent temperature	COP*d*	1,91	-
Tj = operation limit temperature	P*dh*	39,3	kW	Tj = operation limit temperature	COP*d*	1,91	-
For air-to-water heat pumps				For air-to-water heat pumps:			
Tj = -15°C (if TOL < -20°C)	P*dh*	-	kW	Tj = -15°C (if TOL < -20°C)	COP*d*	-	-
Bivalent temperature	T_{biv}	-10	°C	For air-to-water heat pumps: Operation limit temperature	TOL	-10	°C
Cycling interval capacity for heating	P*cych*	-	kW	Cycling interval efficiency	COP*cyc*	-	-
Degradation co-efficient (**)	C*dh*	0,99	-	Heating water operating limit temperature	WTOL	70	°C
Power consumption in modes other than active mode				Supplementary heater			
Off mode	P_{OFF}	0,024	kW	Rated heat output (*)	P*sup*	0	kW
Thermostat-off mode	P_{TO}	0,041	kW	Type of energy input		eletrical	
Standby mode	P_{SB}	0,041	kW				
Crankcase heater mode	P_{CK}	0,038	kW				
Other items							
Capacity control		variable		For air-to-water heat pumps: Rated air flow rate, outdoors	-	14600	m³ /h
Sound power level, indoors/ outdoors	L_{WA}	- / 55	dB	For water-/brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger	-	--	m³ /h
Emissions of nitrogen oxides	NO_x	-	mg/kWh				
For heat pump combination heater:							
Declared load profile		-		**Water heating energy efficiency**	η_{wh}	-	%
Daily electricity consumption	Q_{elec}	-	kWh	Daily fuel consumption	Q_{fuel}	-	kWh
Contact details	Glen Dimplex Deutschland GmbH, Am Goldenen Feld 18, 95326 Kulmbach						

(*) For heat pump space heaters and heat pump combination heaters, the rated output P*rated* is equal to the design load for heating P*designh* , and the rated heat output of a supplementary capacity for heating sup(*Tj*).

(**) If C*dh* is not determined by measurement nthen the default degradation is C*dh* = 0,9

(--) not applicable

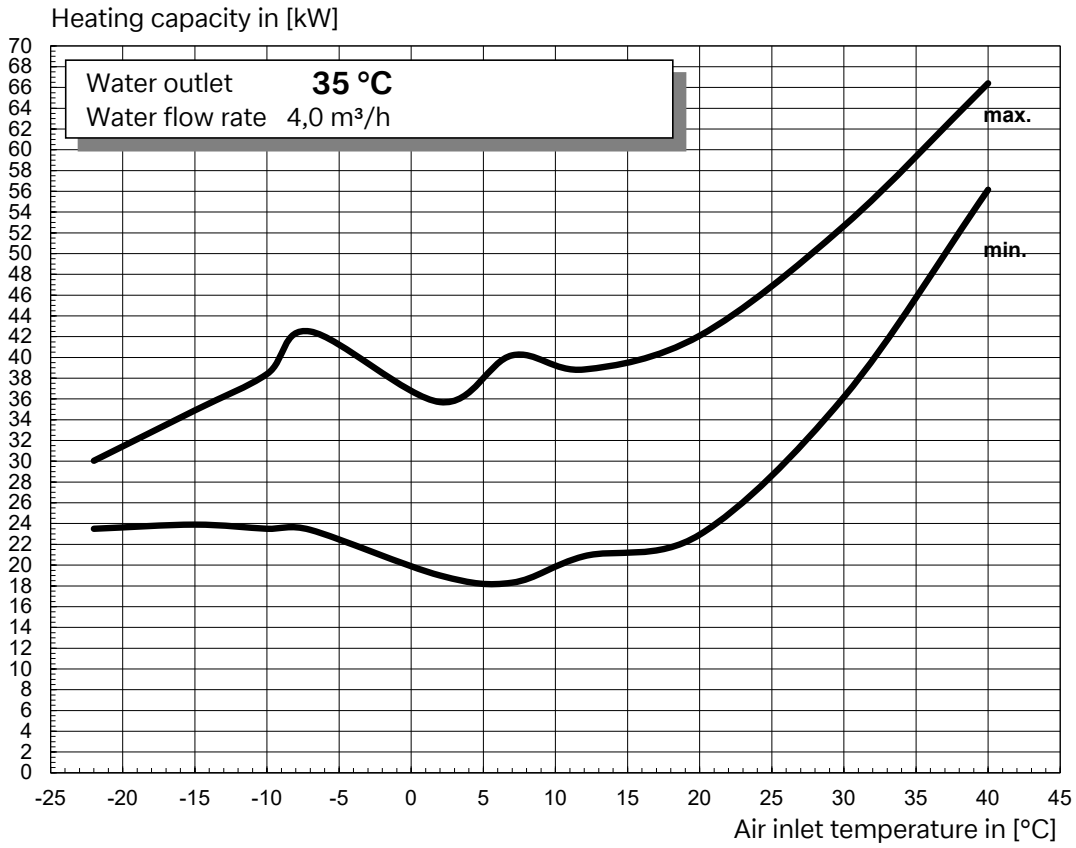
14 Dimension drawing

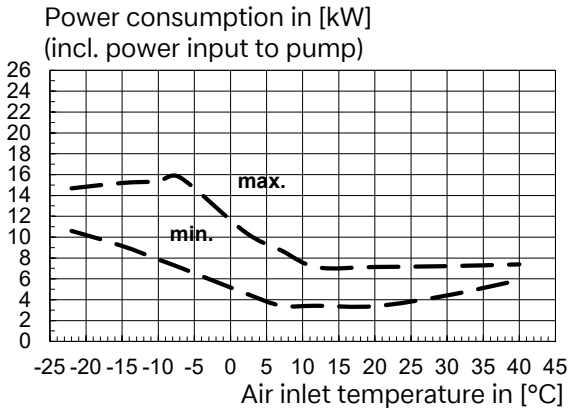


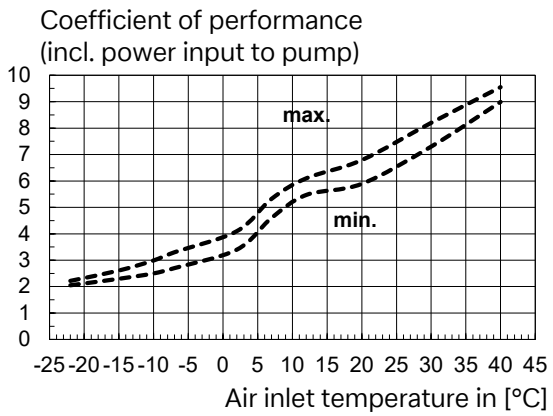
1.1	Heating flow R 2"	3.1	Direction of air flow
1.2	Heating return R 2"	3.2	Main wind direction with free-standing installation
2.1	Condensate pipe	4.1	Installation shaft for connection from below
2.2	Feed-through - electric wire		

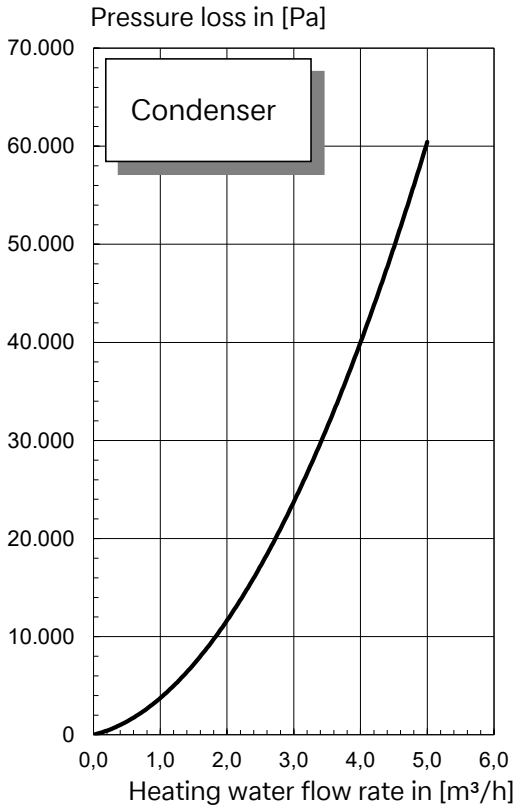
15 Diagrams

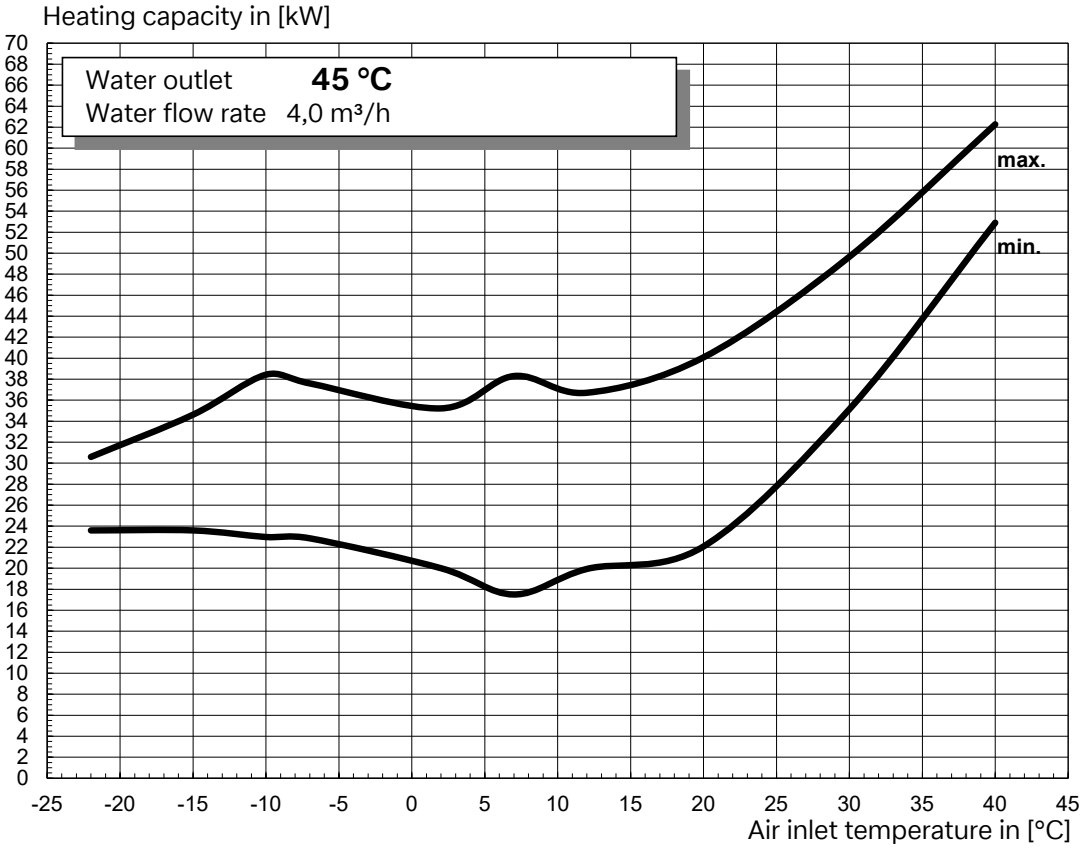
15.1 Heating curve

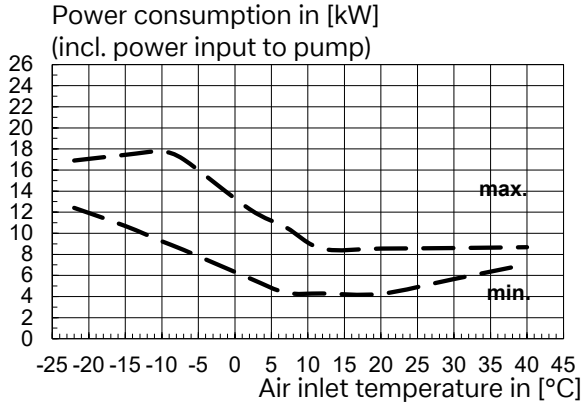


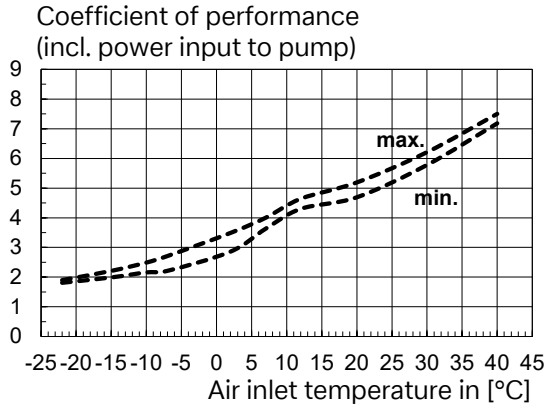


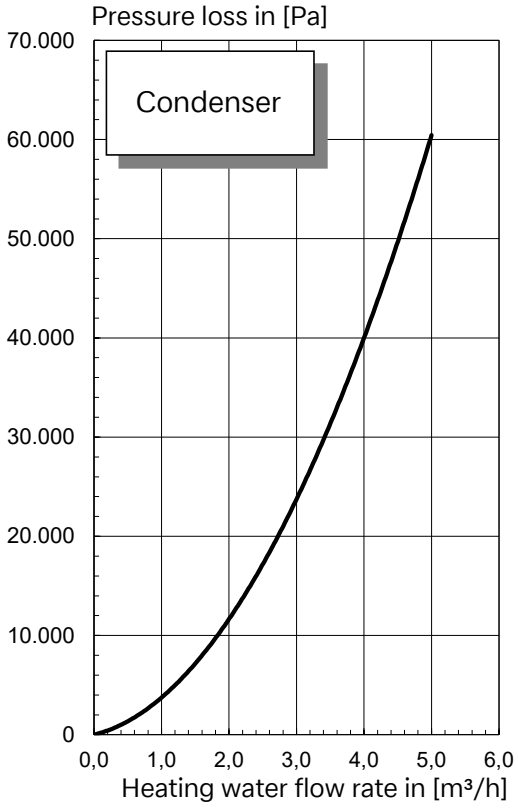


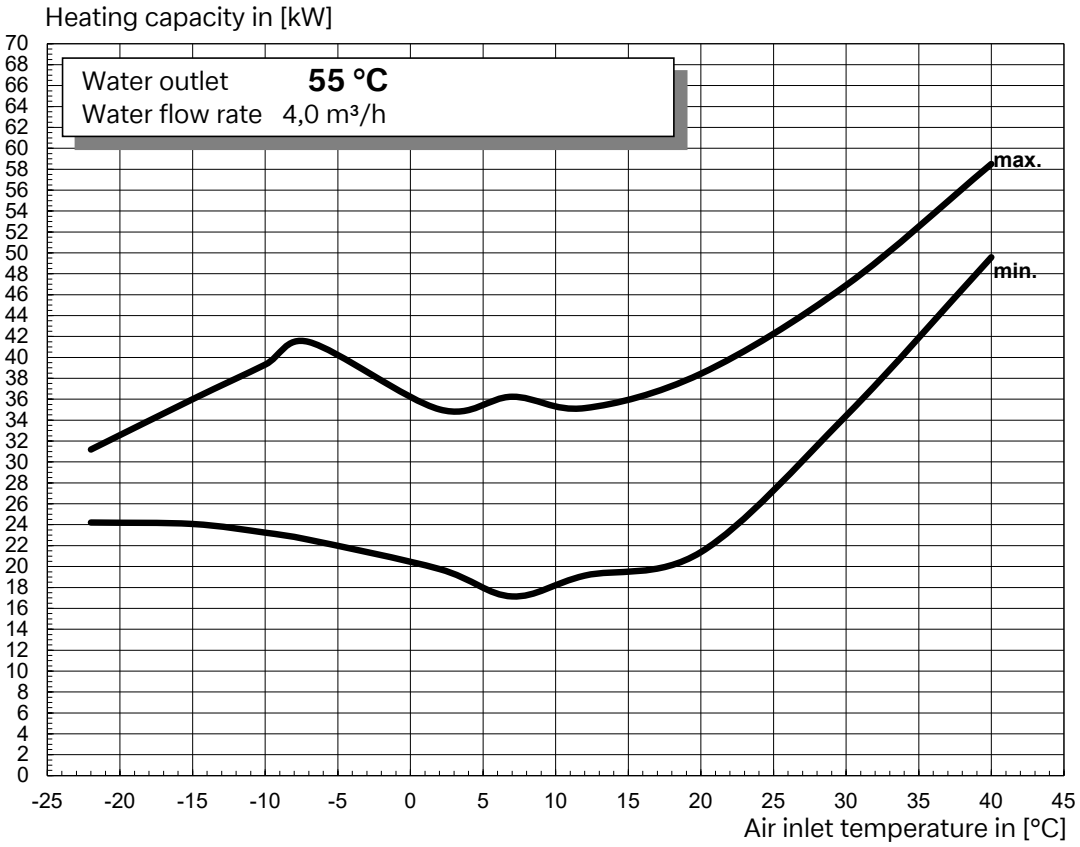


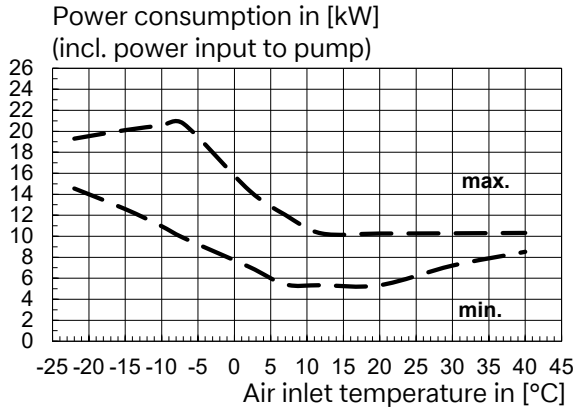

Heating capacity in [kW]
Water outlet 45 °C
Water flow rate 4,0 m³/h
max.
min.
Air inlet temperature in [°C]

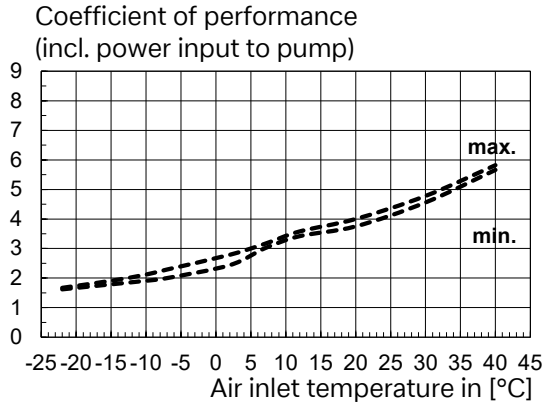

Power consumption in [kW]
(incl. power input to pump)
max.
min.
Air inlet temperature in [°C]

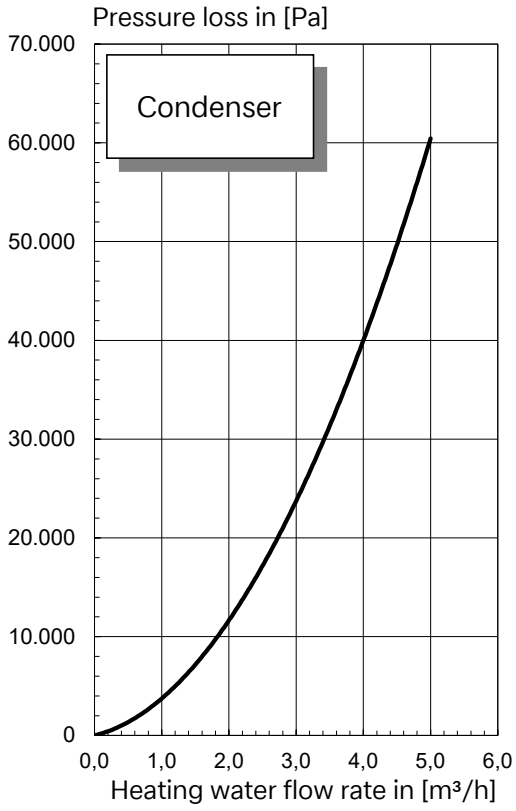

Coefficient of performance
(incl. power input to pump)
max.
min.
Air inlet temperature in [°C]

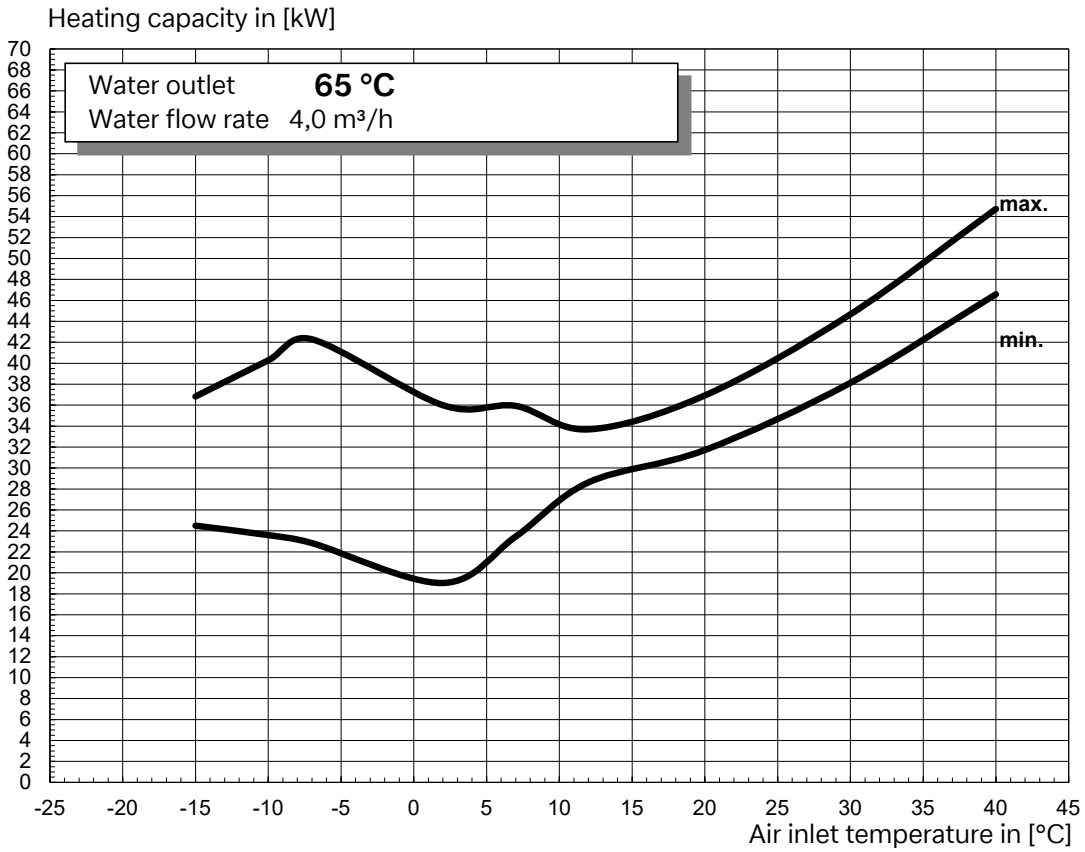

Pressure loss in [Pa]
Condenser
Heating water flow rate in [m³/h]

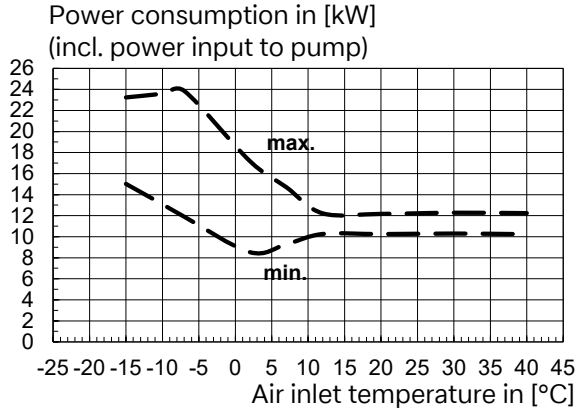

Heating capacity in [kW]
Water outlet 55 °C
Water flow rate 4,0 m³/h
max.
min.
Air inlet temperature in [°C]

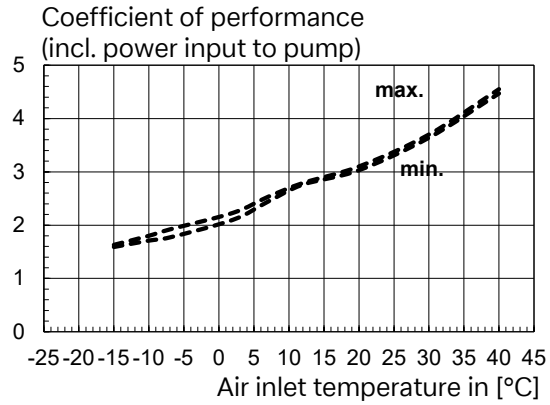

Power consumption in [kW]
(incl. power input to pump)
max.
min.
Air inlet temperature in [°C]

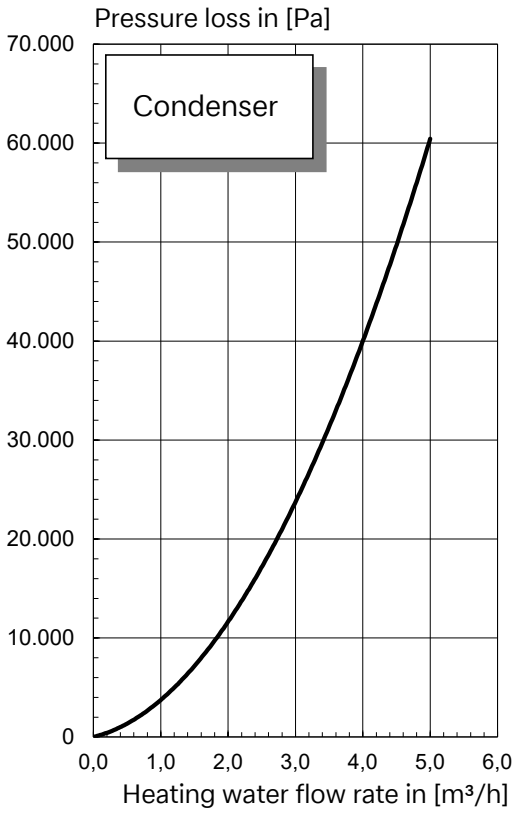

Coefficient of performance
(incl. power input to pump)
max.
min.
Air inlet temperature in [°C]


Pressure loss in [Pa]
Condenser
Heating water flow rate in [m³/h]

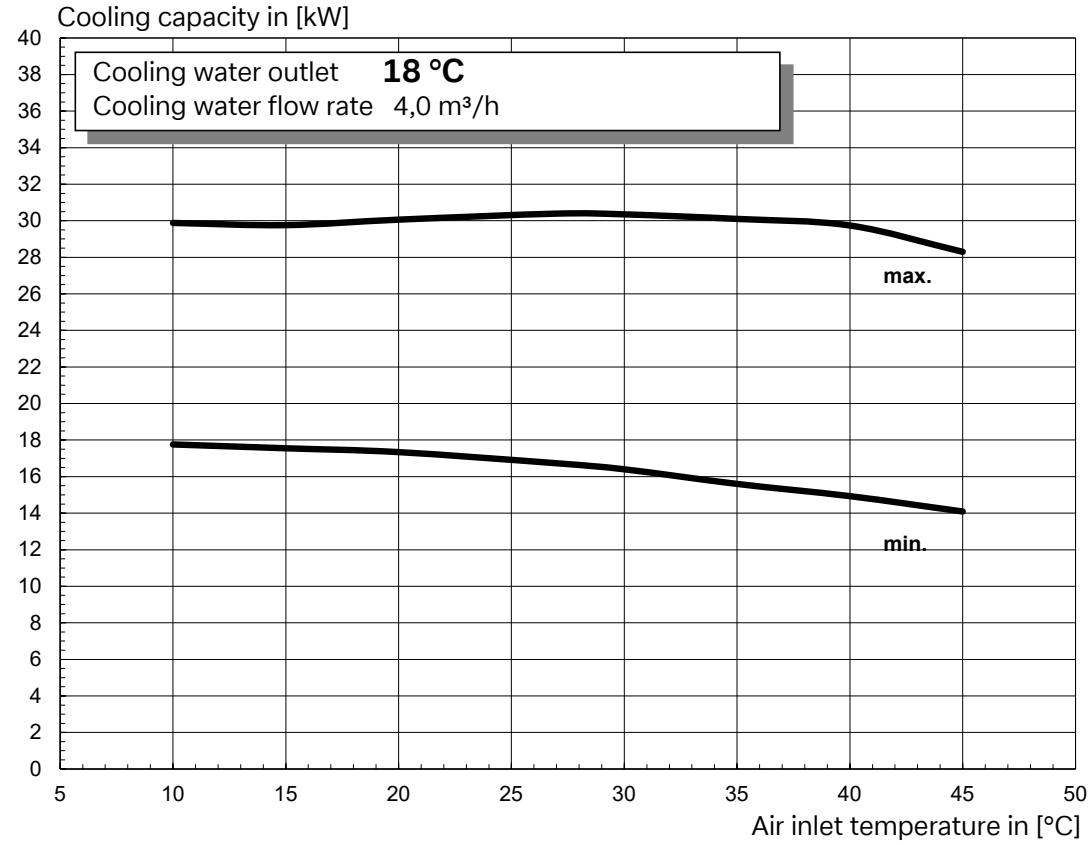

Heating capacity in [kW]
Water outlet 65 °C
Water flow rate 4,0 m³/h
max.
min.
Air inlet temperature in [°C]

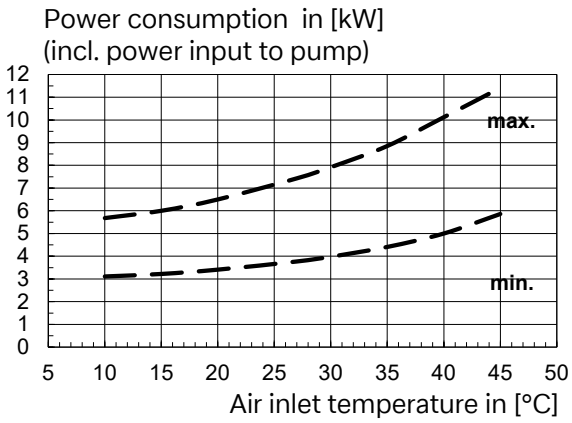

Power consumption in [kW]
(incl. power input to pump)
max.
min.
Air inlet temperature in [°C]

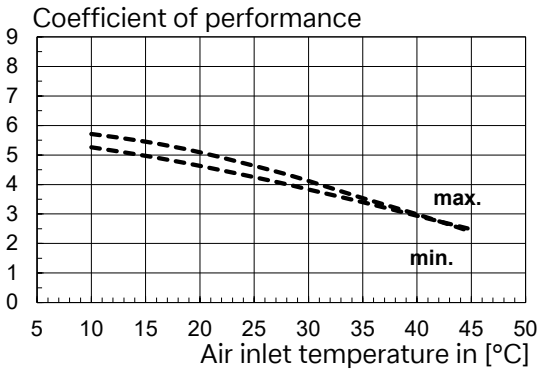

Coefficient of performance
(incl. power input to pump)
max.
min.
Air inlet temperature in [°C]

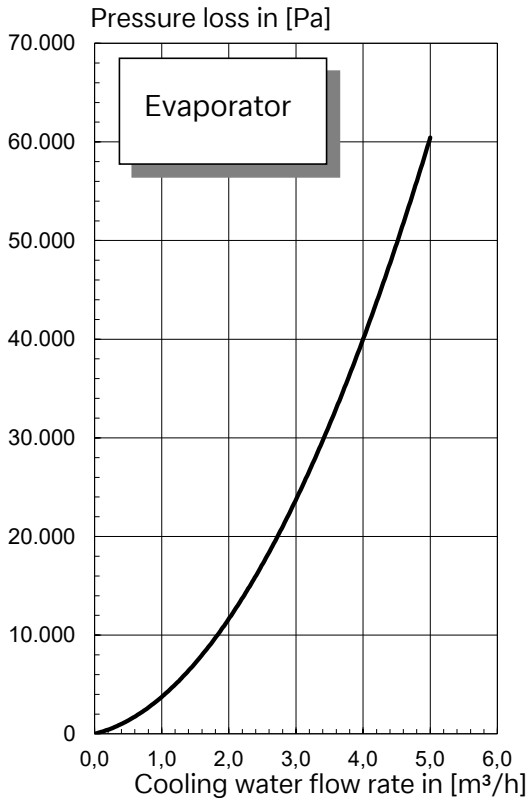

Pressure loss in [Pa]
Condenser
Heating water flow rate in [m³/h]

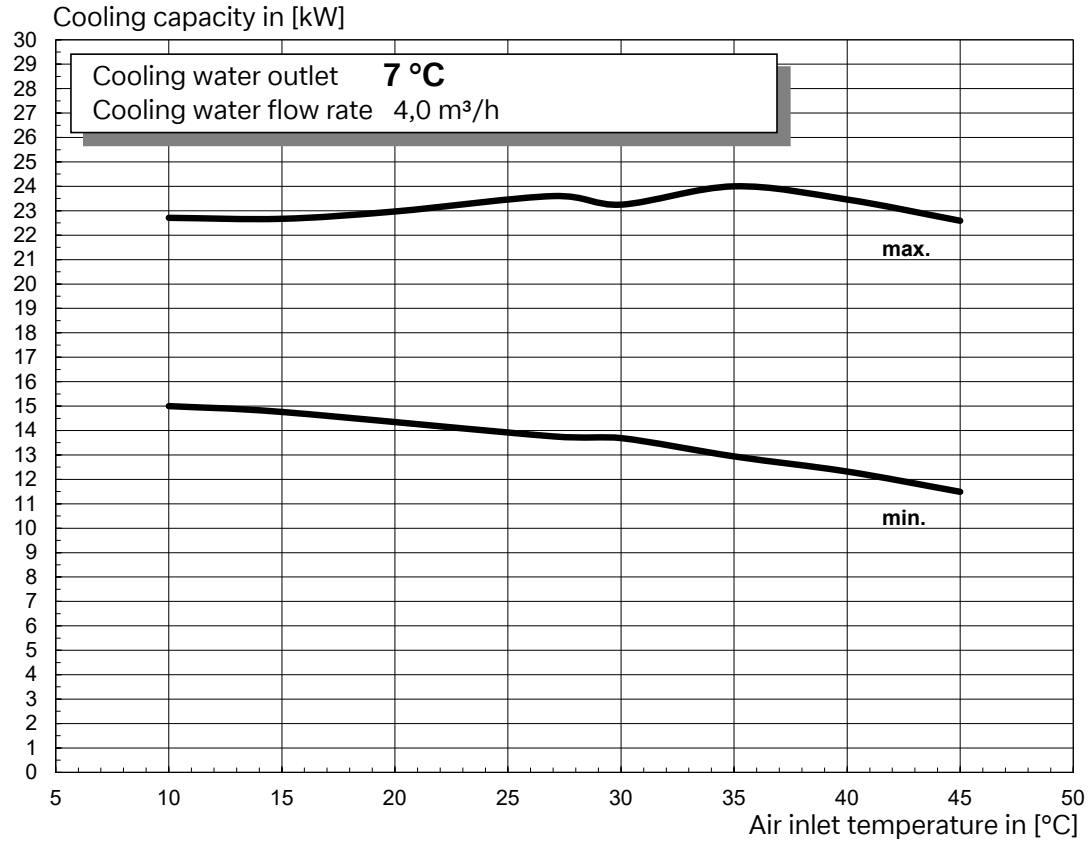
15.2 Cooling curve

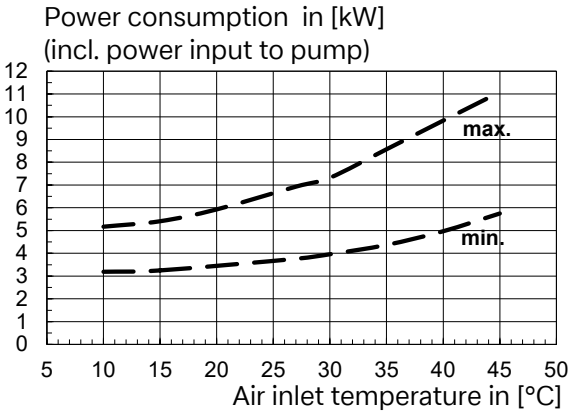


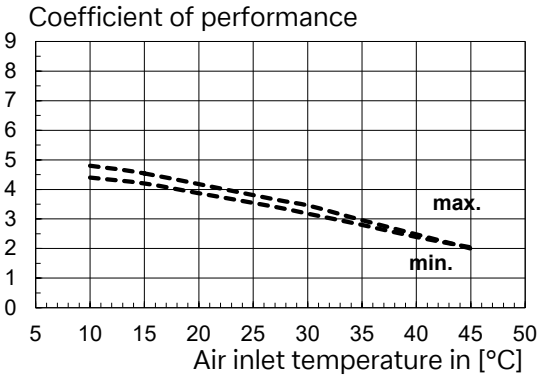


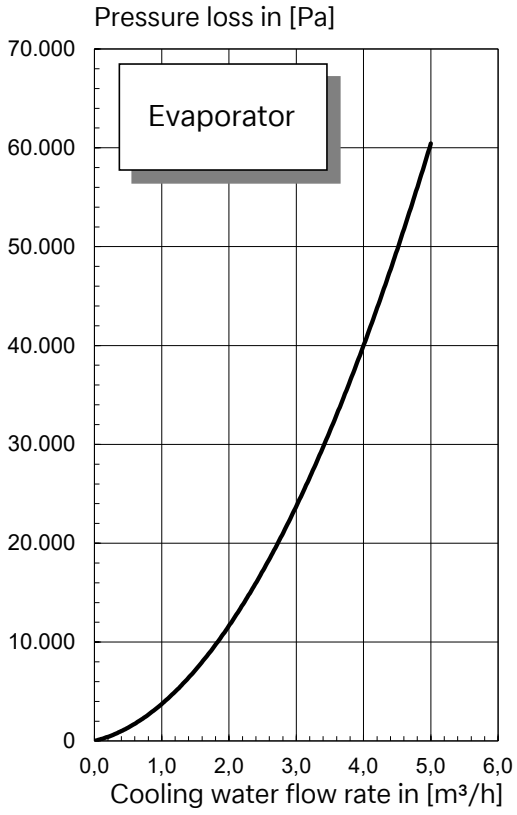




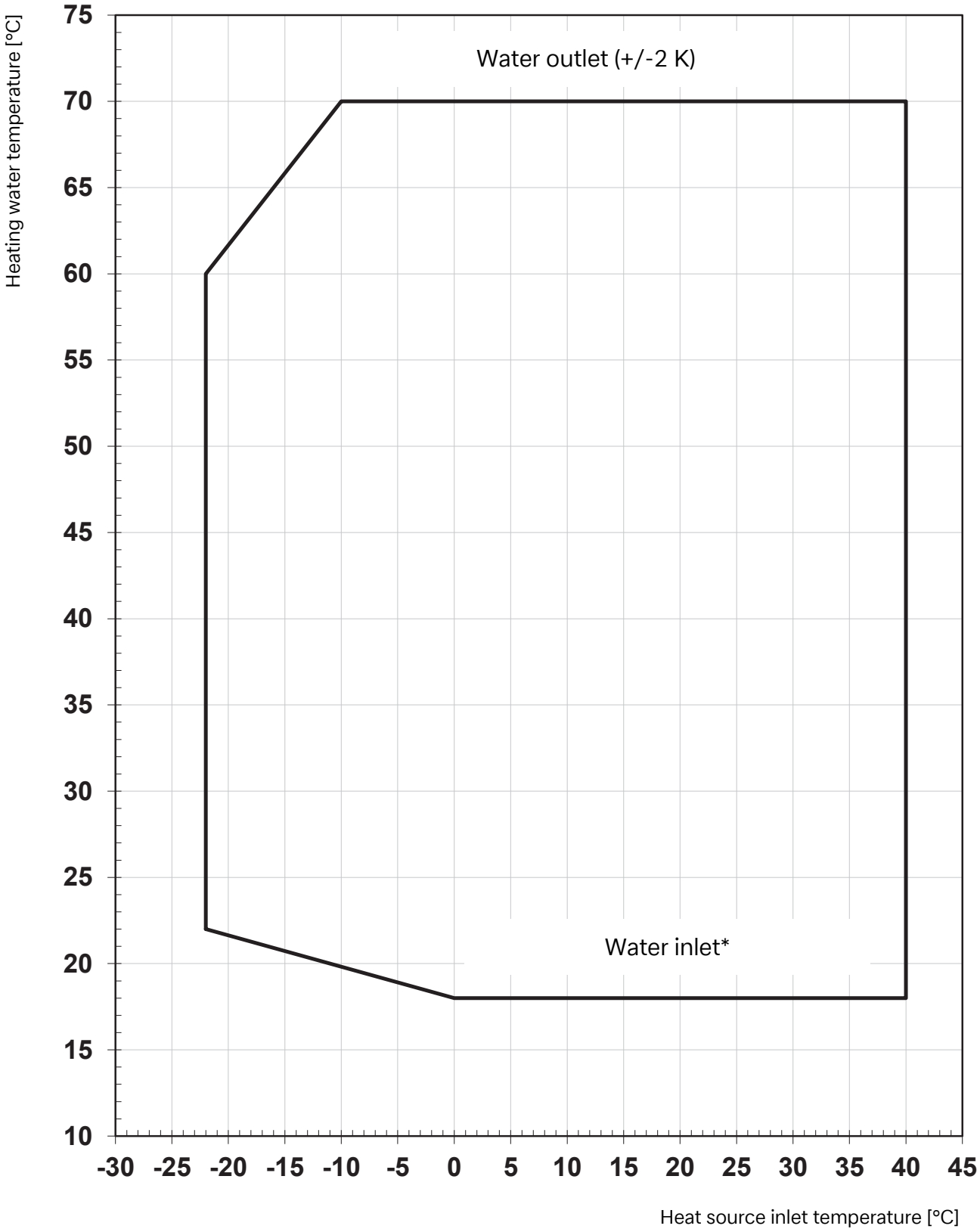

Cooling capacity in [kW]
Cooling water outlet 7 °C
Cooling water flow rate 4,0 m³/h
max.
min.
Air inlet temperature in [°C]


Power consumption in [kW]
(incl. power input to pump)
max.
min.
Air inlet temperature in [°C]


Coefficient of performance
max.
min.
Air inlet temperature in [°C]

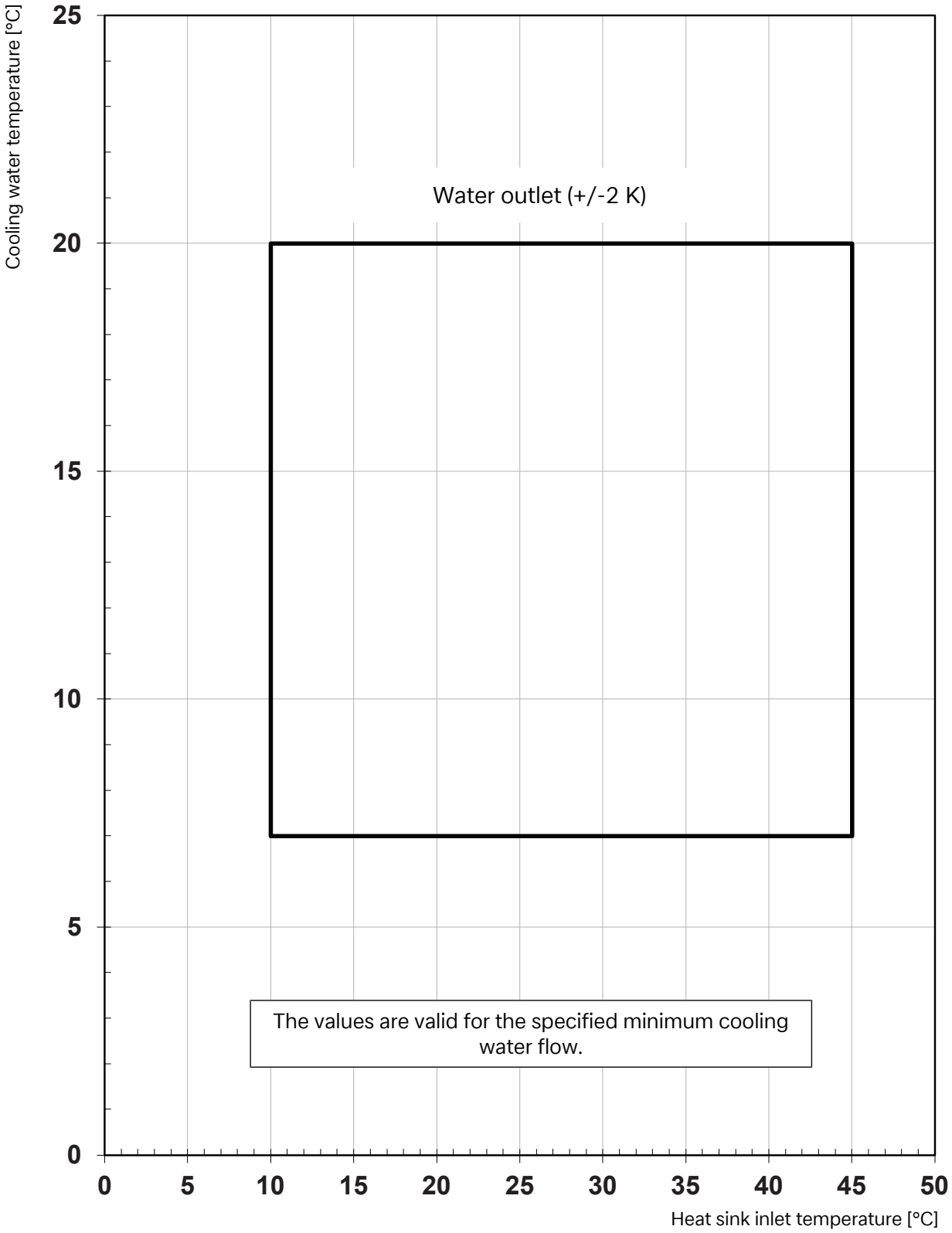

Pressure loss in [Pa]
Evaporator
Cooling water flow rate in [m³/h]

15.3 Operating limits for heating



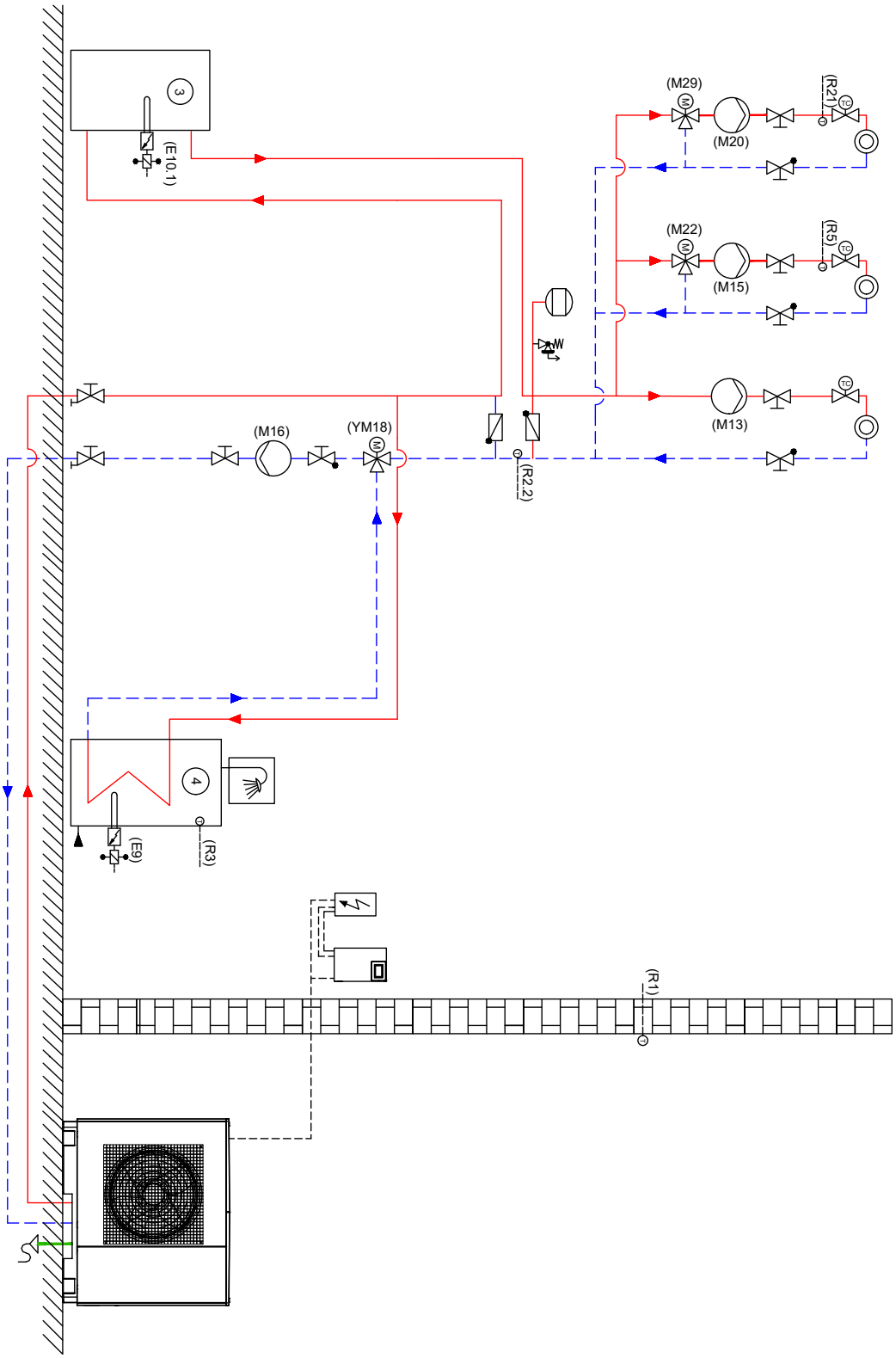
* For air-to-water heat pumps, the minimum heating water temperature is the minimum return temperature.

15.4 Operating limits for cooling



16 Hydraulic integration diagrams

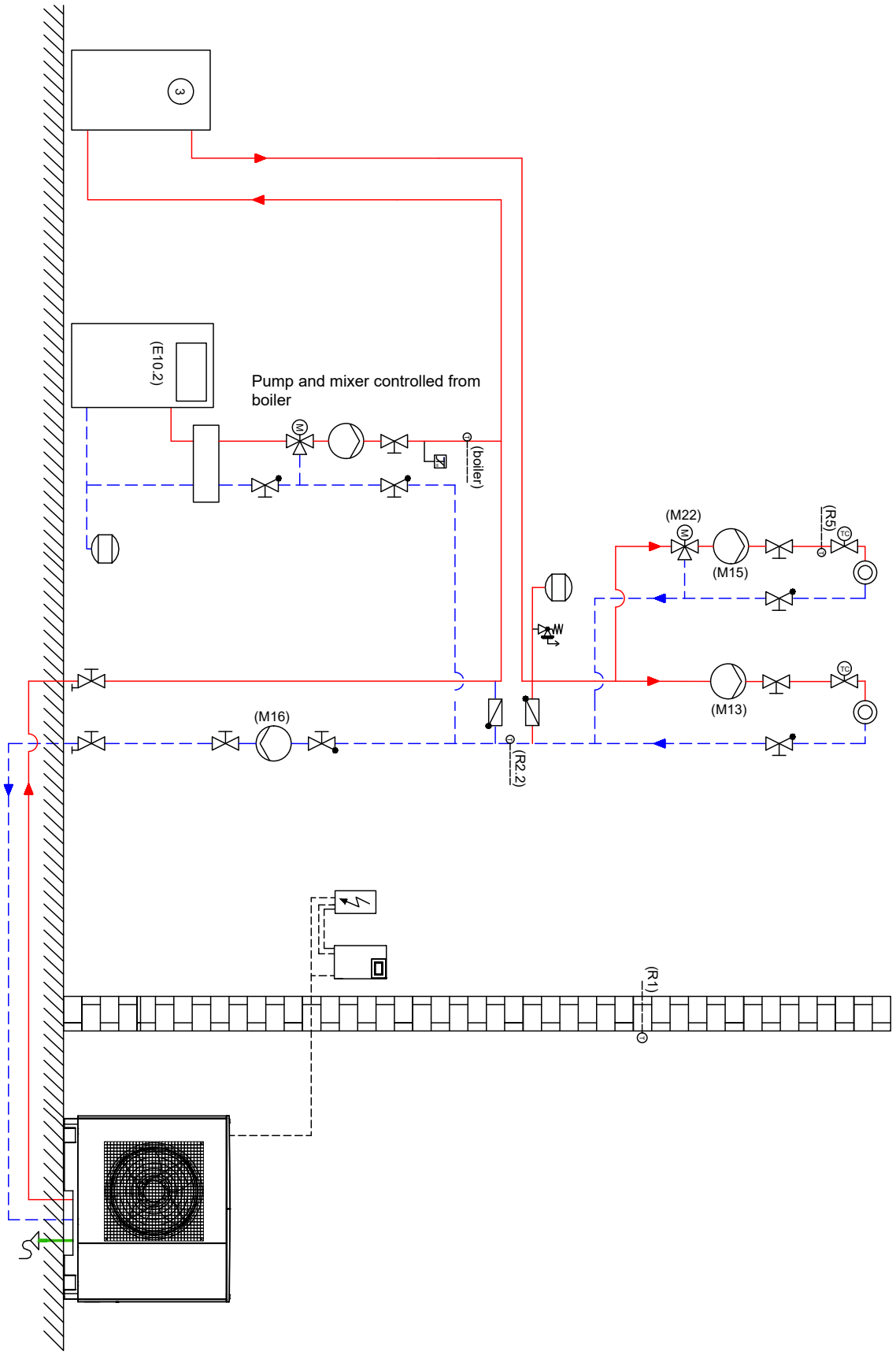
16.1 Integration diagram - Mono energy operation with domestic hot water preparation



NOTICE

The hydraulic integration diagram is an example and intended only as an aid. The system requires professional and safety-approved layout by a specialist planner. All information in the section on installation and the corresponding safety notes must be observed at all times.

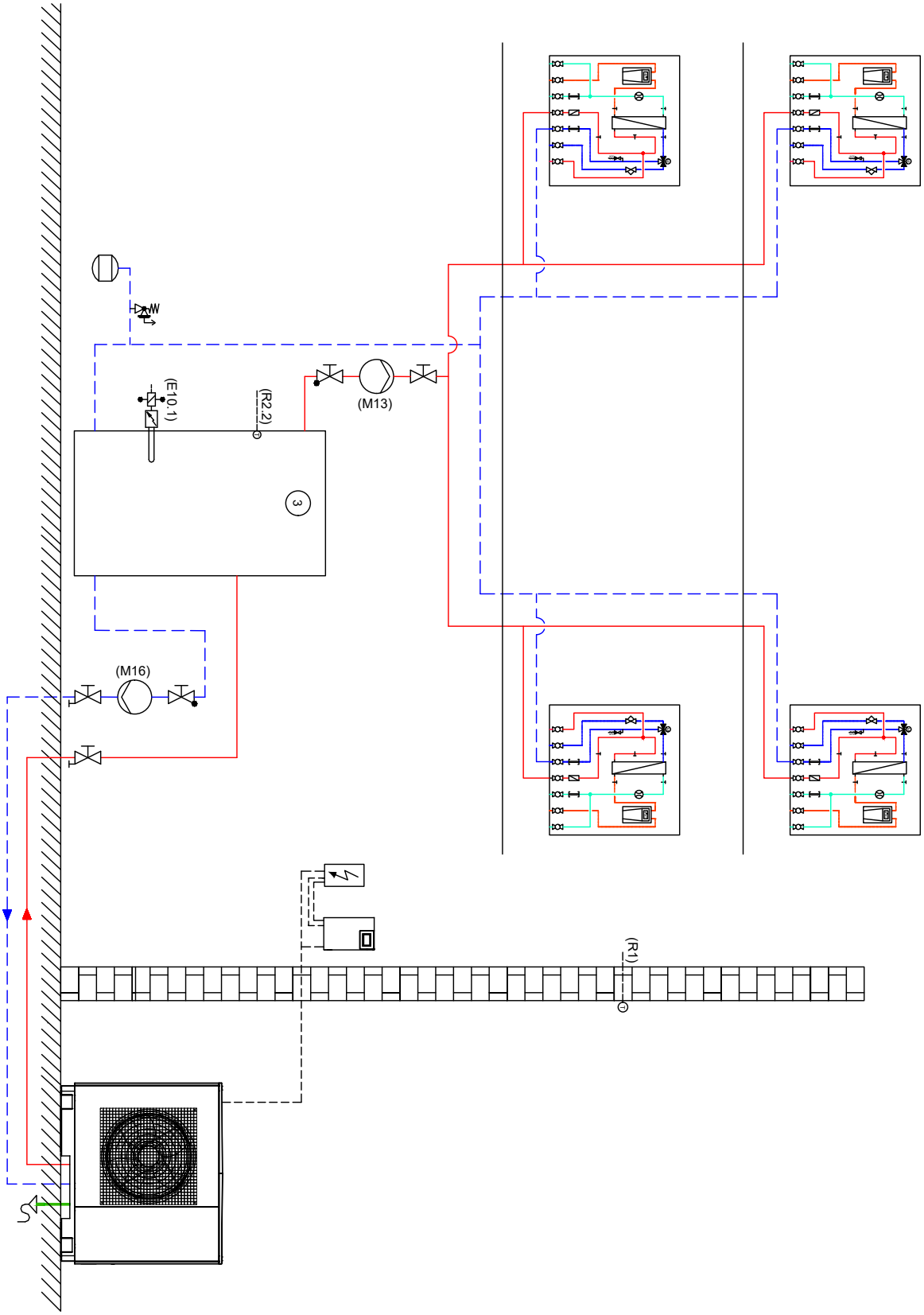
16.2 Integration diagram - Bivalent operation with gas / oil heating



NOTICE

The hydraulic integration diagram is an example and intended only as an aid. The system requires professional and safety-approved layout by a specialist planner. All information in the section on installation and the corresponding safety notes must be observed at all times.

16.3 Integration diagram - Mono energy operation with apartment stations (for 2-conductor systems)



NOTICE

The hydraulic integration diagram is an example and intended only as an aid. The system requires professional and safety-approved layout by a specialist planner. All information in the section on installation and the corresponding safety notes must be observed at all times.

16.4 Legend

	Isolating valve		Heat consumer
	Safety valve combination		Four-way reversing valve
	Circulating pump		Temperature sensor
	Expansion vessel		Flexible connection hose
	Room-temperature controlled valve		Check valve
	Isolating valve with check valve		Three-way mixer
	Isolating valve with drainage		Dirt trap
	Air-to-water heat pump		Buffer tank
	Heat pump manager		Domestic hot water cylinder
E9	Flange heater domestic hot water	R1	External sensor
E10.1	Buffer tank heating element	R2.2	Return sensor
E10.2	2nd heat generator	R3	Domestic hot water sensor
M13	Heating circuit pump for 1st heating circuit	R5	Sensor for mixed heating circuit
M15	Heating circuit pump for 2nd heating circuit	WWM	Unmixed heating circuit
M16	Generator circuit pump	MMH	Mixed heating circuit
M18	Domestic hot water circulating pump	MMB	Bivalent mixer module
M22	Mixed heating circuit mixer	YM18	Heating/Domestic hot water reversing valve

17 Checklist for the installation of a propane heat pump

Valid for LA 4060CP

This checklist serves to document that the installation requirements specified in the installation and operating instructions have been complied with. The installation and operating instructions constitute the legal basis. The following points refer exclusively to safety-relevant criteria. Installation conditions with regard to maintenance intervals, air circuit and static must be considered separately.

Order number: _____ Project number: _____

Customer: _____ Street _____ Post code _____ Town/ city _____

System location: _____ Street _____ Post code _____ Town/ city _____

Concerns	Criterion	Applicable	NOT applicable	Not available	Comments from GDD or technician
Propane protection and installation zone	The heat pump has been installed on a substructure that is at least 400 mm high or at floor level				
	The base is designed to allow air circulation (i.e. is not a solid surface)				
	All potential ignition sources are outside of the protection zone For protection zone, see detailed drawing ▸ *Protection zone [6.3, p. 16]*				Examples of potential ignition sources include: bulbs, electrical switches, contactors, relays, rotating parts with the potential to generate sparks Note: in the case of cascade systems, a further R290 heat pump does not constitute an ignition source.
	There are no flammable materials or equipment with fire loads in the protection zone				
	All building openings are located outside of the protection zone or are sealed airtight				Examples of building openings include: windows, doors, light wells, inlet/outlet openings, HVAC systems, openings to underground garages, etc.
	All roof drains with a connection to the sewer system are positioned outside of the protection zone				
	All pipe openings into the building are located outside of the protection zone or are sealed airtight				
	The heat pump was not installed in a pit or recess				
	The heat pump was not installed in the garage				

Concerns	Criterion	Applicable	NOT applicable	Not available	Comments from GDD or technician
Condensate separation	The condensate separation has been installed such that, in the event of a fault, NO R290 can leak into the building, the sewer system or building drainage				Potential condensate separation options: • Siphon filled with barrier fluid • Open condensate drain at installation site CAUTION: pay attention to ice formation! • Open discharge from the protection zone via a mixing section CAUTION: trace heating is required!
Site boundary	The heat pump has been installed such that the protection zone does not extend onto neighbouring properties or public traffic areas				
	In the event of a leak, there is no possibility of the refrigerant escaping into openings of neighbouring buildings				
	The heat pump has been installed such that the protection zone does not extend onto car or truck parking places				
	If necessary, an impact protection has been installed that can absorb a vehicle collision at maximum speed without damaging the refrigeration circuit				

If at least one question has been answered with “NOT applicable”, do not proceed for safety reasons. All information has been provided in cooperation with the customer and/or qualified installer. By signing, the undersigned confirms that the information provided is accurate and that the installation has been carried out in accordance with the installation and operating instructions of the unit.

Date	Surname, first name (in block letters)	Signature customer



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