

Belaria® pro (20,25)

Modulating air/water heat pump

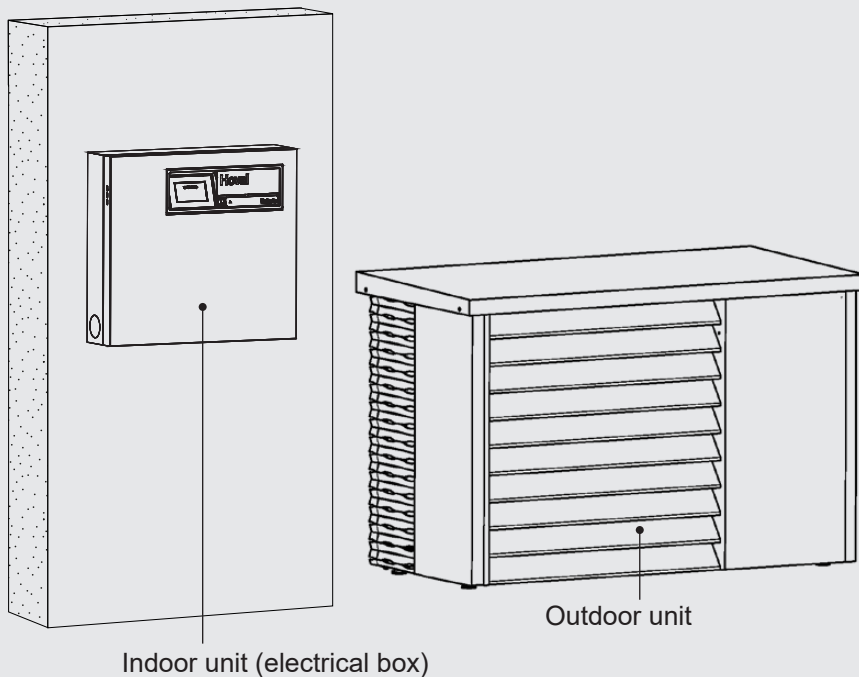
Hoval

Technical information Installation instructions

Subject to modifications

4 222 017 / 00 - 03/26

EN



These instructions are applicable to the following types:
1-Belaria® pro (20,25)

Hoval products must be installed and commissioned by specialists only. These instructions are intended exclusively for the **specialist**. Electrical installation must be performed by a licenced electrical company.

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1. Important notices

1.1 System manual

All instructions relevant to your system can be found in the Hoval system manual. Please retain all instructions. In exceptional cases, the instructions can be found with the components.

Further sources of information:

- Hoval catalogue
- Standards, regulations

1.2 General safety instructions



- Read all the documents carefully. They contain important information on correct installation as well as safe and economical operation of the plant.
- Due to the high system pressures, high temperatures and live electrical parts, installation and maintenance work can be associated with hazards. This work is only allowed to be carried out by experts.
- Before anyone carries out any work on the heat pump, they must have read and understood the relevant instructions. Observe local safety and accident prevention regulations.
- Furthermore, all safety instructions in the respective documents, stickers on the heat pumps themselves and all other applicable safety regulations must be observed.
- Always use the appropriate personal protective equipment when working.



DANGER

The outdoor unit is filled with the non-toxic, odourless and colourless but inflammable refrigerant R290 (propane). This is heavier than air. If it escapes, there is a danger of fire/explosion.

- All potential sources of ignition must be kept at least 1 m away in all directions (depending on the local conditions and the existing ventilation level)
- Smoking and the use of naked flames is prohibited in this area.



WARNING

The heat generator can only be completely de-energised by disconnection from the mains (e.g. all-pole switch). The power supply to the heating system should be switched off when work is being performed and safeguarded to prevent it being switched back on inadvertently.



CAUTION

There is a danger of scalding at higher hot water temperatures. The necessity for on-site scalding protection must be checked.



NOTICE

The outdoor unit is only allowed to be operated with fresh air as its heat source. Integration into ventilation systems is not permitted.



NOTICE

Heat generators are only allowed to be installed by capable specialists and only put into operation by customer service technicians who have been specially trained by Hoval for this purpose.

1.3 Explanation of the symbols

1.3.1 Warnings



DANGER

... indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

... indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

... indicates a possible hazardous situation which, if not avoided, could result in a minor or moderate injury.



NOTICE

... indicates a possible risk situation which, if not avoided, could result in property damage.

1.3.2 Warning symbols

The following warning symbols are combined with signal words CAUTION, WARNING and DANGER for the warning notes.



General warning of a danger zone.



“Warning: dangerous electrical voltage” as a warning for accident prevention. Ensures that people do not come into contact with electrical voltage. The danger sign with the black lightning symbol warns against the danger of electrical voltage.



Warning symbol “Warning of flammable substances”
 Incorrect handling of flammable substances can lead to serious damage, potentially fatal injuries and incalculable costs.

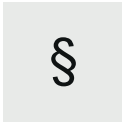


Warning symbol “Warning: hot surfaces or fluids”
 Hot surfaces or fluids can cause scalding.

1.3.3 Information



Information:
 Provides important information.



Provides important information. Refers to standards and directives.



Follow the instructions for use.
 Requirement to follow the instructions for use.



Recycling involves the reuse of waste products and/or their precursors as secondary raw materials.

1.4 On delivery

Carry out a visual inspection immediately on receiving the heat generator.
 If any damage is found, take the necessary steps as defined in the delivery contract.
 The respective risk carrier bears the cost of repairs.

1.5 Notes on the installation location
1.5.1 Installation location of electrical box

! **NOTICES**

- The electrical box must be set up in a room which is protected against frost!
 The room temperature must be between 5 °C and 25 °C!
- Installation in wet and damp rooms, dusty rooms or rooms with a potentially explosive atmosphere is not permitted.

Also, the boiler room in which the electrical box is installed should, if possible, be located outside the living area that is susceptible to noise and be fitted with a sound-insulating door.

1.5.2 Installation location of the outdoor unit

Requirements on the surrounding area

Failure to comply with the requirements for the surrounding area at the installation site can lead to a hazardous situation if refrigerant escapes.



WARNING

- The outdoor unit is only allowed to be installed and operated outdoors and must not be installed or stored in closed rooms, below ground level or in a corrosive environment.
- Use in potentially explosive areas or in potentially explosive atmospheres is prohibited.
- Installation in passageways, escape routes or in front of entrances or exits is prohibited.
- At the entrances to properties, it must be ensured that no vehicle can enter the protection zone.
- To prevent the heat pump from being touched by vehicles, a collision guard must be installed if necessary. This must be located outside the protection zone.
- The unit must be protected against excessive heating (ambient temperature > 43 °C)

Structural requirements

The structural requirements must be complied with to prevent damage to the outdoor unit, and to prevent a hazardous situation in the event of a refrigerant leak.



WARNING

- The outdoor unit is not approved for wall installation. In the case of roof installation, the engineering guidelines must be observed.
- The outdoor unit must not be enclosed by four walls or installed in a wall recess.
- The air intake and air exhaust sides must not be narrowed or blocked.
- Protect the unit from mechanical damage and from falling over or falling down.
- Wall ducts must be configured so as to be air tight.
- The condensate drain must not be led into the building.
- Ensure sufficient ventilation.

Requirements on the protection zone

A protection area of at least 1 m must be maintained on all sides of the outdoor unit. The extent of the protection zone is to be assessed depending on the local conditions, the existing degree of ventilation and the on-site situation. Failure to comply with the requirements for the protection zone at the installation site can lead to a hazardous situation if refrigerant escapes.



WARNING

The following must be excluded within the protection zone:

- Ignition sources (e.g. naked flames, cigarettes, tools that can strike sparks, surfaces with high temperatures)
- Openings (e.g. windows, doors, ventilation pipes)
- Sinks (e.g. air shafts, drains)
- Electrical building connections
- Public footpaths and driveways
- Property boundaries or neighbouring properties

In the case of a roof installation, the protection zone applies to the entire area below the heat pump, even if the distance to the ground is more than one metre.

During work on the heat pump, the prohibition of ignition sources within the protection zone must be visibly indicated with signs.

1.5.3 On-site system design for the outdoor unit

When choosing the installation site, the installation regulations in chapter 1.5.2 must be observed.

Sound emission

- The outdoor unit runs exceptionally smoothly, thanks to its engineering design. Nevertheless, it is important that the installation area is as far as possible from the living area that is sensitive to noise.
- The installation location must be chosen in such a way that no noise pollution can occur (do not install near bedrooms, keep a distance from neighbours), hedges and bushes can have a sound-absorbing effect.
- If vibrations of the outdoor unit are transmitted via walls, ceilings, floors or other solid bodies, this is called structure-borne sound. To avoid this structure-borne noise, the outdoor unit or the base must be decoupled from the building.

Static system design

- The outdoor unit must always be installed on a solid surface in a horizontal position. A concrete base, concrete slab or other appropriate supports can be provided on site.
- The load-bearing capacity must be adequate.
- The outdoor unit should be installed at a slight elevation compared to relief features in the immediate vicinity; the recommendation is at least 200 mm. If the base is lower than the expected amount of snowfall, the intake side must be kept free of snow if necessary.

Minimum distances and protection zone

- When installing the outdoor unit, care must be taken to ensure that local conditions do not cause any short-circuits in the air flow between the intake and outlet sides. This means that the outdoor unit must not be enclosed by four walls or installed in a wall niche, for example.
- It must be mounted in such a way that there is sufficient space around the outdoor unit, but also above it, for installation and maintenance purposes.
- The air intake and air outlet sides must not be narrowed or blocked
- The air outlet side must be the side facing away from the building and unobstructed (> 3 m)
- The minimum distances stated in chapter 2.7 must be observed.

Routing of hydraulic connection lines

- The hydraulic connection lines should be kept as short as possible due to heat losses and pressure drops.
- The built-in charging pump is designed for a line length between outdoor unit and storage tank of up to 30 m (in one direction).
- For longer distances, the charging pump must be designed separately.

- The hydraulic connection lines must be laid below the frost line and be well insulated. The empty piping for the hydraulic connection lines and/or electrical cables must be sealed on both sides so as to be air tight.



NOTICE

It is important that the lines and the connection are also well insulated inside the outdoor unit.

Weather-related system design

- Unobstructed air inflow and outflow must be possible.
- The intake air must be free of impurities such as sand and aggressive substances such as ammonia, sulphur, chlorine etc.
- If the machine is installed at wind-prone locations, the alignment of the machine must be selected in such a way that the expected wind direction is at right angles to the suction direction of the outdoor unit (chapter 3.2).
- If there is no possibility other than to install in an area subject to strong winds, an additional wind shield in the form of a hedge, for example, should be provided, or additional fastening should be attached.



NOTICE

- At exposed installation locations prone to wind load, e.g. on building roofs, the surface load on the upper horizontal cover surface of the heat pump caused by wind suction must not exceed a value of 2000 N/m². The heat pump casing might be damaged if this value is not complied with.
- The permitted surface load must be determined in accordance with the specifications of standard EN 1991-1-1. Compliance must be checked by a qualified specialist. A professional inspection of the actual conditions on site is mandatory and must be carried out by a qualified specialist.

- If the installation location is not protected against snowfall, it must be chosen in such a way that the evaporator remains free of snow in any case.

Rime on outdoor unit

- Depending on weather conditions and outside air humidity, ice may form on the protective grilles of the outdoor unit. This is a frequently occurring effect in nature and is referred to as rime. This rime must be removed by the operator during these cold spells.



NOTICE

Under no circumstances is the outdoor unit allowed to be drilled into, flame-cut or exposed to other mechanically damaging external influences.

Condensate collection

- Air/water heat pumps generate condensate during operation. This can amount to 10 litres per defrost cycle within 2 minutes for the outdoor unit.
- The condensate drain must be protected against frost.
- The condensate drip tray included in the outdoor unit is already equipped with a tray heating at the factory and thus prevents freezing.
- The condensate drain line is also secured with the pre-assembled heating tape.

Frost hazard

- The air outlet has increased susceptibility to frost. Water pipes and water containers must not be situated right next to the outlet side.

Frost protection

- If a building is not permanently occupied (e.g. holiday home), a bivalent, second heat generator must be correctly put into operation or retrofitted.



NOTICE

An electric heating element does not constitute full bivalence but provides protection against frost if needed.

- Systems in buildings that are not permanently occupied must be inspected regularly by the operator to ensure they are working correctly. Installation of Hoval Connect is recommended.
- If frost protection of the outdoor unit cannot be guaranteed, the heating water must be completely drained from the connection pipes and the outdoor unit.



WARNING

In the following situation, it is essential to contact Hoval customer service to check the heat pump:

- the hydraulic system of the heat pump is not filled with frost protection agent
- and the outdoor temperature is below the freezing point
- and the heat pump has not been in operation for a relatively long time due to a power interruption (external power supply failure or switching off the power supply)
- and the water has not been drained from the heat pump

Minimum temperature on the heating side

- To enable air/water heat pumps to defrost correctly, a minimum temperature of 20 °C is required on the heating side. The temperature must not fall below this minimum value during the colder periods of the year.
- If the temperature does fall below the minimum value, a bivalent heat generator must be used to heat the system back to the minimum temperature of 20 °C.

General information

- If installed near the coast, the location must be 5 km from the coastline. If this safety distance is not complied with, increased corrosion can be expected. These cases are excluded from the warranty.
- To prevent damage caused by animals such as rodents or insects, all cable ducts must be properly sealed.

1.6 Transport

1.6.1 Transport of the electrical box

The electrical box with a weight of approx. 25 kg is packed in a cardboard box and can be carried to the installation site by two people.

1.6.2 Transport of the outdoor unit

- To prevent damage during transport, the outdoor unit should be moved to its final installation location in packed state on the wooden pallet with a forklift, lift truck or crane.



NOTICE

If it is necessary to lift the outdoor unit to the place of installation, there are three stiffening brackets with recesses under the sheet metal roof of the outdoor unit for suspension of the outdoor unit during transport (dismantling see chapter 3.2.2).

- There is a danger of the outdoor unit tilting over when lifting it from the wooden pallet. The outdoor unit must therefore be secured accordingly. Pay attention to the weight and the centre of gravity of the outdoor unit when doing this!



WARNING

Caution: Risk of injury from falling or tipping load if handled improperly.

During all works:

- Wear protective equipment.
- Never step beneath suspended loads.
- Use a forklift with sufficient lifting capacity.
- Observe safety and accident prevention regulations.

1.7 Guarantee

The guarantee does not cover defects attributable to:

- Failure to comply with these instructions
- Failure to comply with the operating instructions
- Incorrect installation
- Failure to comply with the engineering guidelines
- Maintenance not carried out by Hoval or by a company authorised by Hoval
- Failure to comply with the specified maintenance intervals
- Failure to comply with the intended cleaning intervals
- Impermissible modifications
- Incorrect use
- Use of heating water outside the water quality specifications
- Unsuitable chemical additives to the heating water
- Damage caused by the negligent application of force
- Force majeure such as lightning strike, fire, storm, frost
- Corrosion by paints, adhesives, solvents, for example
- Corrosion caused by not observing the required water quality



DANGER

Modifications to the unit

Impermissible modifications to the unit can have fatal consequences.

Hoval will assume no warranty or liability coverage for any resultant damages.

- Only install additional components tested by Hoval
- Only install original Hoval spare parts
- Do not remove, bypass or otherwise disable the safety and monitoring equipment



NOTICE

Filling the entire system with glycol or a frost protection agent/water mixture is considered improper use and is not permitted. If this is nevertheless desired for frost protection reasons, the system must be designed with a system separation. Only environmental compatible frost protection agent is allowed to be used.

1.8 Regulations, standards and directives



When installing the heat generator, observe all valid national and international routing and safety regulations as well as the information in these assembly instructions.

These include:

- the generally valid accident prevention and safety regulations
- environmental regulations
- the stipulations of the employers' liability insurance associations
- the applicable laws, standards, directives and regulations, e.g. DIN, EN, DVGW, VDI and VDE
- the regulations of the local utility companies



An annual check and maintenance of the plant by customer service is recommended, particularly in respect of preserving any claims under guarantee.

The heat generator is not subject to Regulation (EU) No. 573/2024 of 7 February 2024 on fluorinated greenhouse gases. A regular leak test is therefore not a mandatory requirement, but is recommended.



In Switzerland and the Principality of Liechtenstein, according to the ChemRRV ordinance, a leak check must be carried out regularly for plants with > 3 kg of refrigerant.

2. Technical information

2.1 Description

The Belaria® pro (20,25) is a compact air/water heat pump with a modulating scroll compressor and an inverter. The condenser is a copper-brazed stainless steel plate heat exchanger, and the evaporator is a straight fin evaporator. The outdoor unit has a safety valve, an automatic air vent, two electronic expansion valves, electronic high and low pressure monitoring and a variable-speed axial fan. A condensate trace heater for tray heating and for collected condensate drainage is already permanently installed. The outdoor unit is covered with powder-coated sheets in the colour anthracite (DB703).

The connections for the electrical system are located to the left of the fan, the connections for the hydraulics to the right. The outdoor unit is filled with refrigerant R290 and checked for function and tightness at the factory.

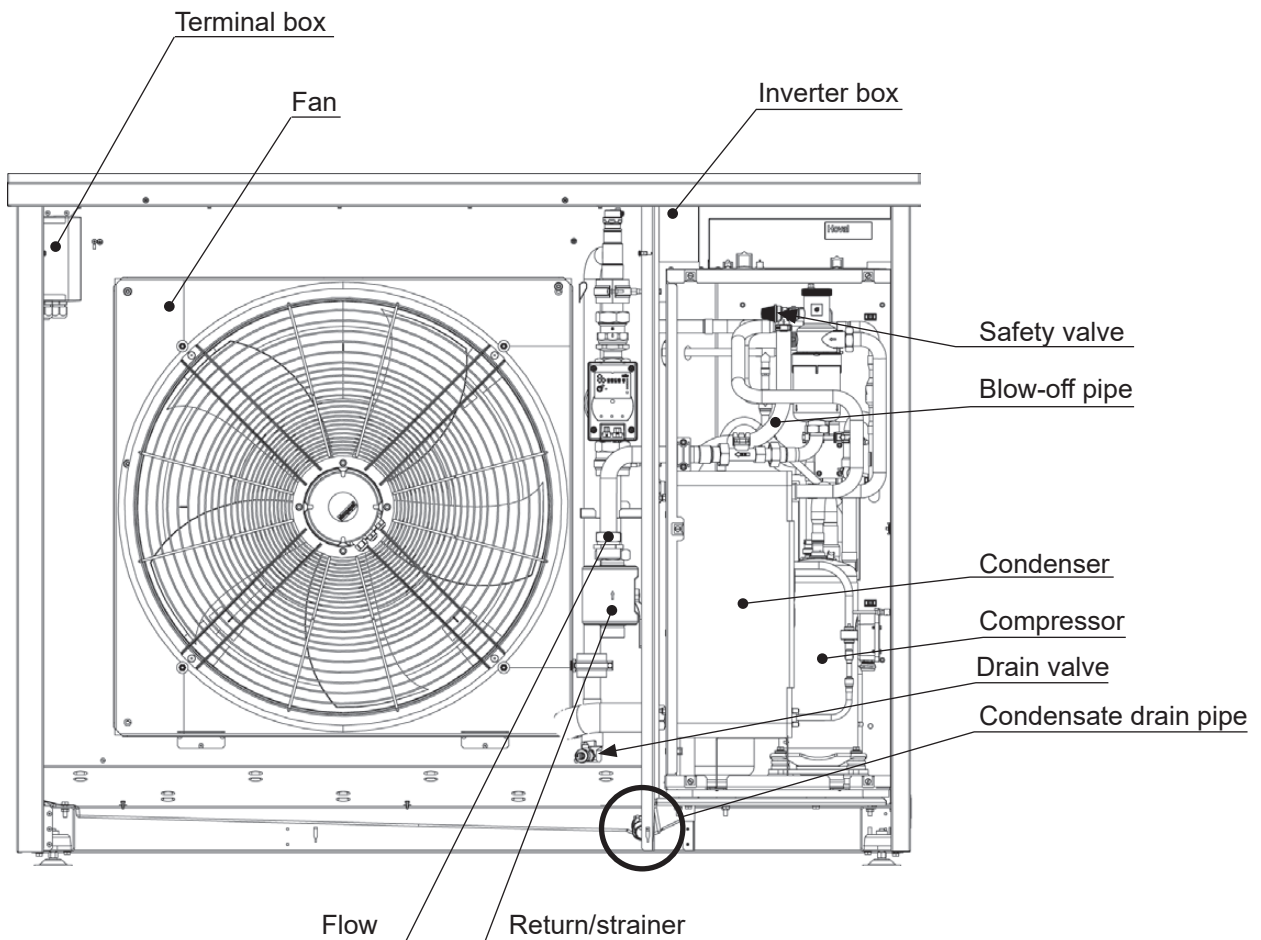
The indoor unit of the Belaria® pro (20,25) is a compact, wall-mounted electrical box made of powder-coated sheet steel in the colours flame red/brown red (RAL 3000/ RAL 3011).

The electrical box includes the heat generator control, the heat pump automatic function device WFA-200S and a 4.3-inch colour touch display.

A sensor package with contact sensor, immersion sensor and outdoor sensor for use on the system side is included. The cable introduction for the electrical system is located on the underside of the electrical box."



The lower the maximum flow temperature is dimensioned for, the higher the operational number of the outdoor unit.



2.1.1 Description of automatic function device

The ingenious control program of the built-in WFA-200S heat pump automatic function device is adapted to efficient heat pump application. The entire heat pump system is activated according to requirements and is equipped with a large number of monitoring, safety and reporting functions.

Functions integrated in the WFA-200S:

- Superheat and subcooling control
- Output modulation of the compressor
- PWM activation of the pumps and the fan
- Monitoring of the refrigeration circuit (temperature and pressure sensors)
- Energy balancing (heating, domestic hot water)
- Fault message forwarding
- RS485 connection to TopTronic® E

2.2 Area of application

The heat pump is suitable for monovalent heating and cooling of single family homes and blocks of flats using ambient air. The building should also be equipped with low-temperature heating (e.g. underfloor heating system, wall heating, low-temperature radiators).

The heat pump operates using the refrigerant R290 which circulates in a closed circuit if proper mounting and commissioning has been carried out.

2.2.1 Building drying or screed heating

The heat pump plant is not designed for the increased heat demand necessary for drying out buildings or screed heating. This must be done with other units to be provided on site.

2.3 Basic scope

2.3.1 Belaria® pro (20,25)

Outdoor unit

- Cooling unit with refrigerant R290
- Speed-controlled scroll compressor
- Speed-controlled high-efficiency pump
- Flow rate sensor/heat meter
- Straight fin evaporator
- Speed-controlled axial fan with FlowGrid (inlet grille)
- Plate-type condenser made of stainless steel/copper
- With built-in automatic air vent and 2.5 bar safety valve
- Condensate drip tray incl. tray heating and condensate heating tape for channelling all the condensate in the outdoor unit, fixed installation, 1" connection
- Hydraulic connections behind louvre grille
 - Filter ball valve installed in the heat pump return
- With cooling function with corresponding hydraulics
- Electrical connections behind louvre grille

Indoor unit

- TopTronic® E control installed with TopTronic® E control module
- With WFA-200S automatic heat pump device
- Hydraulic connections at bottom
- Electrical connections introduced from bottom
- With fitting accessories for fixing the indoor unit to the wall
- Shut-off ball valves are included in the scope of delivery

2.4 Technical data

Hoval Belaria® pro (20,25)

Type		(20)	(25)
• Energy efficiency class of the compound system with control ¹⁾ (A+++ → D)	35 °C/55 °C	A+++/A+++	A+++/A+++
• Room heating energy efficiency "moderate climate" 35 °C η _S	%	223	220
• Room heating energy efficiency "moderate climate" 55 °C η _S	%	162	164
• Seasonal coefficient of performance moderate climate 35 °C/55 °C	SCOP	5.6/4.1	5.6/4.2
• Seasonal energy efficiency ratio A35W18 ²⁾	SEER	5.6	5.6
• Seasonal energy efficiency ratio A35W7 ²⁾	SEER	3.2	3.2
Max./min. performance data heating and cooling in acc. with EN 14511			
• Max. heat output A2W35	kW	19.2	24.0
• Max. heat output A-7W35	kW	17.7	22.1
• Min. heat output A15W35	kW	12.6	12.6
• Max. cooling capacity A35W18	kW	20.9	20.9
• Max. cooling capacity A35W7	kW	19.1	19.1
• Min. cooling capacity A35W18	kW	13.0	13.0
Nominal output data heating in acc. with EN 14511			
• Nominal heat output A2W35	kW	11.8	14.4
• Coefficient of performance A2W35	COP	4.8	4.8
• Nominal heat output A7W35	kW	13.5	16.5
• Coefficient of performance A7W35	COP	5.7	5.5
• Nominal heat output A-7W35	kW	11.9	14.5
• Coefficient of performance A-7W35	COP	3.5	3.5
Nominal output data cooling in acc. with EN 14511			
• Nominal cooling capacity A35W18	kW	18.6	18.6
• Energy efficiency ratio A35W18	EER	4.5	4.5
• Nominal cooling capacity A35W7	kW	13.8	13.8
• Energy efficiency ratio A35W7	EER	3.4	3.4
Sound data			
• Max. sound power level outdoor unit, day operation	dB(A)	62	62
• Sound power level EN 12102 outdoor unit whisper mode	dB(A)	57	57
• Sound power level EN 12102 outdoor unit ³⁾	dB(A)	61	61
• Sound pressure level 5 m ⁴⁾	dB(A)	42	42
• Sound pressure level 10 m ⁴⁾	dB(A)	36	36
Hydraulic data			
• Max. flow temperature	°C	70	70
• Max. flow rate heating side with A7W35, ΔT 6 K	m ³ /h	3.1	3.9
• Nominal flow rate heating side with A7W35, ΔT 5 K	m ³ /h	2.3	2.9
• Max. flow rate heating side with A35W7, ΔT 4 K	m ³ /h	4.1	4.1
• Residual overpressure of heating pump at nominal flow A7W35, ΔT 5 K	kPa	70	62
• Residual overpressure of heating pump at max. flow rate A35W7, ΔT 4 K	kPa	20	20
• Max. operating pressure on the heating side ⁵⁾	bar	2.5	2.5
• Flow/return connection heating	G	1½"	1½"
• Nominal air volume outdoor unit (A7W35 and nominal rotation speed)	m ³ /h	6600	6600
• Max. air volume outdoor unit (A7W35 and max. rotation speed)	m ³ /h	8000	8000
• Hydraulic connection line, max. length/dimension inside	m/DN	30/40	30/40

Type		(20)	(25)
Cooling technical data			
• Compressor		modulating	modulating
• Refrigerant		R290	R290
• Refrigerant filling quantity	kg	4.4	4.4
• Compressor oil type		PZ46M	PZ46M
• Compressor oil filling quantity	l	0.9	0.9
Electrical data			
• Electrical connection compressor	V/Hz	3~400/50	3~400/50
• Control electrical connection	V/Hz	1~230/50	1~230/50
• Electrical connection electric heating element	V/Hz	-	-
• Max. heat pump operating current	A	19.5	19.5
• Max. compressor operating current	A	19.2	19.2
• Max. fan operating current	A	0.3	0.3
• Max. operating current electric heating element	A	-	-
• Max. output of electric heating element	kW	-	-
• Max. heat pump power consumption	kW	11.9	11.9
• Max. fan power consumption	W	194	194
• Max. starting current heat pump I_A	A	19.2	19.2
• Output factor ($\cos \varphi$)		0.88	0.88
• External protection main current	A	C/K 20	C/K 20
• External protection control current	A	B/Z 13	B/Z 13
• External protection electric heating element	A	-	-
• Fault-current circuit breaker		RCCB type B, $I_{\Delta n} \geq 300$ mA	
• Recommended cable		Cu 5 x 4.0 mm ²	
• Nominal electrical output with A-7W35	kW	3.7	4.1
• Max. electrical output	kW	8.0 at A-20W60	11.4 at A-20W60
• Active power of heat pump	kW	10.5	10.5
• Max. operating voltage U_b	V	3~400	3~400
• Max. operating current I_b	A	19.5	19.5
• Max. inverter output current	A	24.0	24.0
• Pulse count		3	3
• Max. switching frequency per hour/day at $t_n 0$ °C	n	3/72	3/72
• Continuous load changes			No
• Starting up under load			No
• Feedback into the power system			No
• Power factor correction			No
• Starting up assistance			Output control
• Type of starting up assistance			Frequency converter
• Frequency converter			60-360 Hz (20-120 rps)
• Starting current/nominal current ratio			0.99
Dimensions/weight of outdoor unit			
• Dimensions (H x W x D)	mm	1464 x 1928 x 997	
• Weight	kg	460	460
• Protection class		IP24	IP24
Dimensions/weight of electrical box			
• Dimensions (H x W x D)	mm	750 x 600 x 160	
• Weight	kg	22	22
• Protection class		IP20	IP20

¹⁾ Related to moderate climate.

²⁾ EN 14825

³⁾ The sound values apply when the evaporator is clean. These values are temporarily exceeded before defrosting.

⁴⁾ The sound pressure levels indicated apply if the outdoor unit is placed at a building façade. These values are reduced by 3 dB(A) if the outdoor unit is free-standing. With installation in a corner, the sound pressure level increases by 3 dB(A).

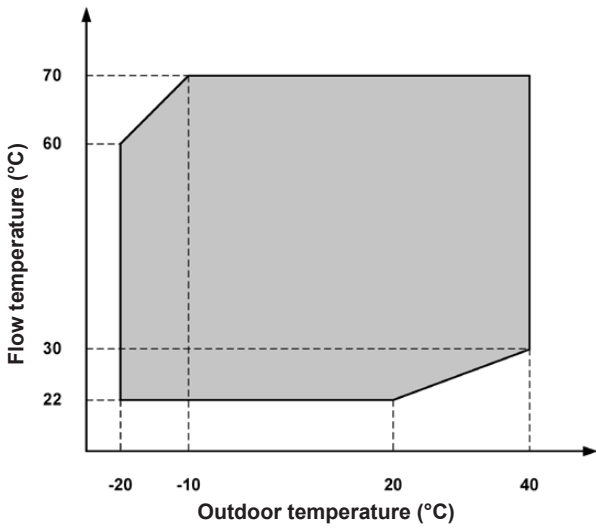
⁵⁾ Maximum operating pressure of the system without isolating system 2.5 bar, because the outdoor unit is protected with 2.5 bar. Provide general protection of the system in the building with 3.0 bar. An isolating system must be provided for system pressures of 2.5 bar or more.

Using a fault-current circuit breaker RCCB type B, $I_{\Delta n} \geq 300$ mA must be clarified based on the regulations of the country in question.

2.5 Diagrams of areas of application

2.5.1 Heating and domestic hot water

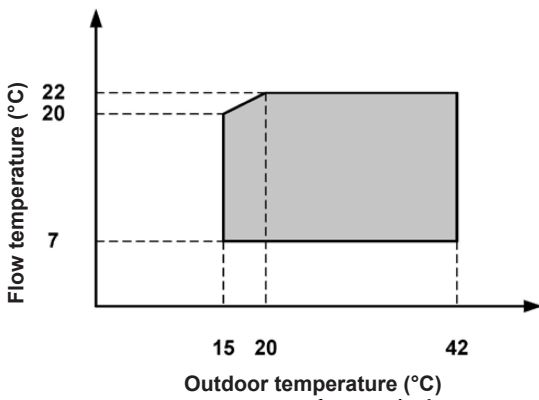
Belaria® pro (20,25)



Area of application of the heat pump for heating/domestic hot water

2.5.2 Cooling

Belaria® pro (20,25)



Area of application of the heat pump for cooling

2.6 Performance data

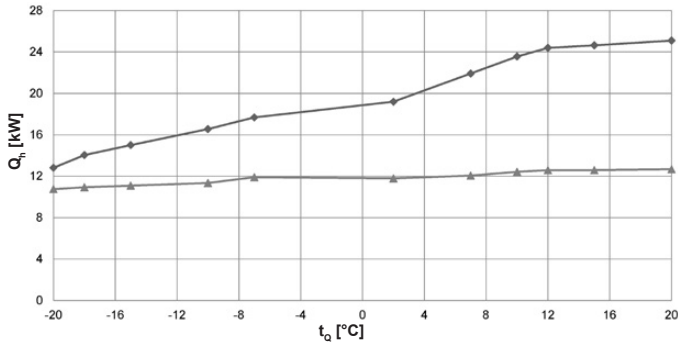
2.6.1 Performance data heating

Maximum heat output allowing for defrosting losses

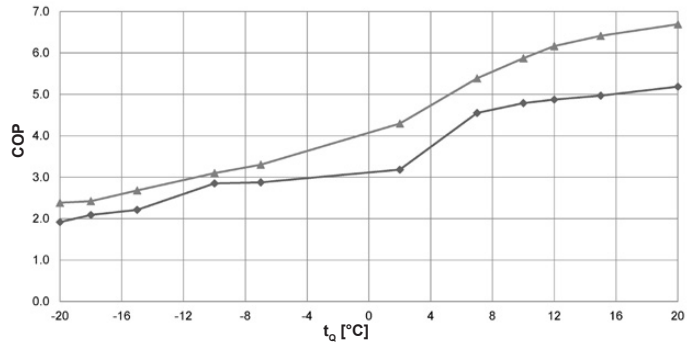
Belaria® pro (20)

Data according to EN 14511

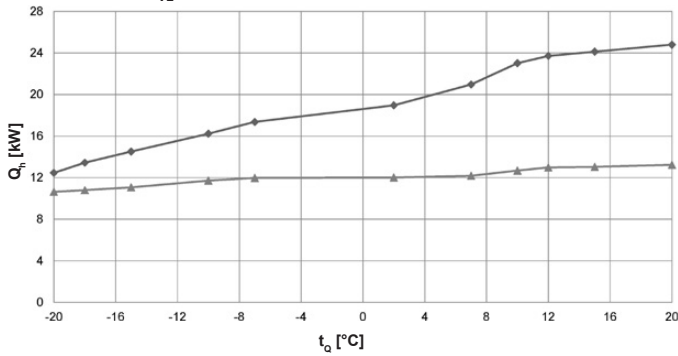
Heat output – $t_{VL} 35\text{ °C}$



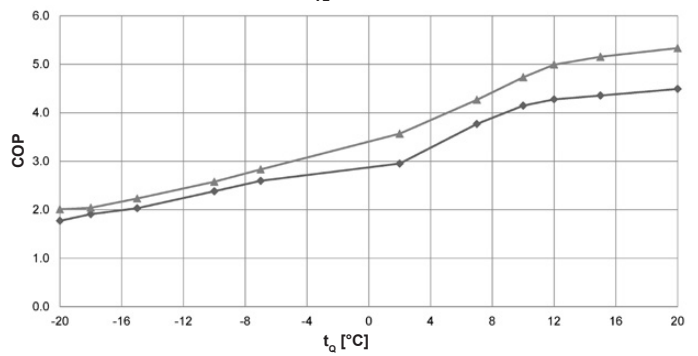
Coefficient of performance – $t_{VL} 35\text{ °C}$



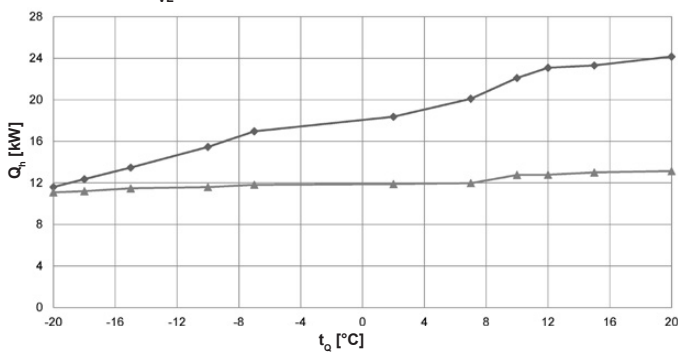
Heat output – $t_{VL} 45\text{ °C}$



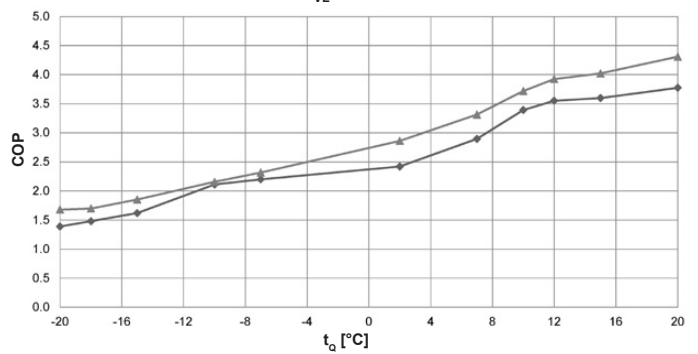
Coefficient of performance – $t_{VL} 45\text{ °C}$



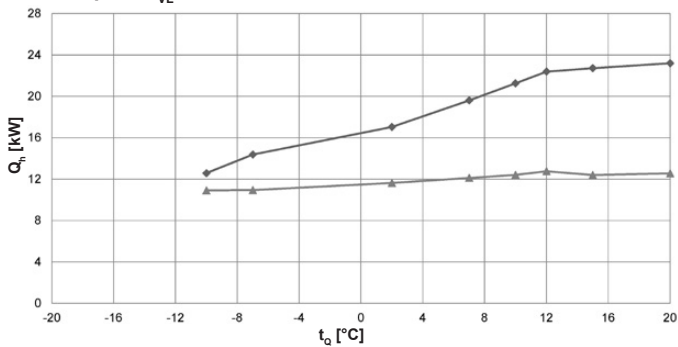
Heat output – $t_{VL} 55\text{ °C}$



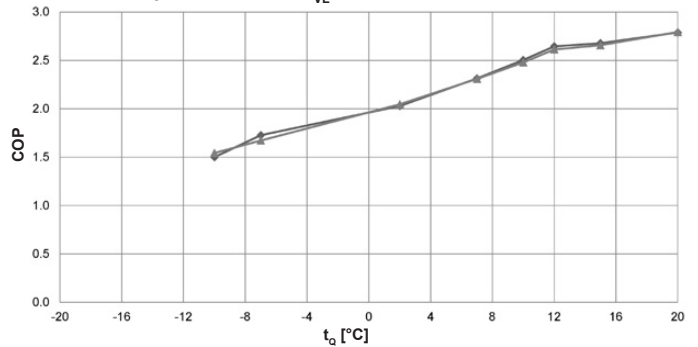
Coefficient of performance – $t_{VL} 55\text{ °C}$



Heat output – $t_{VL} 70\text{ °C}$



Coefficient of performance – $t_{VL} 70\text{ °C}$



t_{VL} = heating flow temperature (°C)

t_0 = source temperature (°C)

Q_h = heat output (kW), measured in accordance with standard EN 14511

COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

◆ Maximum output

▲ Minimum output

Belaria® pro (20)
Data according to EN 14511

t_{VL} °C	t_o °C	Maximum output			Minimum output		
		Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-20	12.8	6.7	1.9	10.8	4.5	2.4
	-18	14.0	6.7	2.1	10.9	4.5	2.4
	-15	15.0	6.8	2.2	11.1	4.1	2.7
	-10	16.6	5.8	2.9	11.4	3.7	3.1
	-7	17.7	6.1	2.9	11.9	3.6	3.3
	2	19.2	6.0	3.2	11.8	2.7	4.3
	7	21.9	4.8	4.6	12.1	2.2	5.4
	10	23.6	4.9	4.8	12.4	2.1	5.9
	12	24.4	5.0	4.9	12.6	2.0	6.2
	15	24.6	5.0	5.0	12.6	2.0	6.4
20	25.1	4.8	5.2	12.7	1.9	6.7	
45	-20	12.5	7.0	1.8	10.6	5.3	2.0
	-18	13.5	7.0	1.9	10.8	5.3	2.0
	-15	14.5	7.1	2.0	11.1	5.0	2.2
	-10	16.2	6.8	2.4	11.7	4.5	2.6
	-7	17.4	6.7	2.6	12.0	4.2	2.8
	2	19.0	6.4	3.0	12.0	3.4	3.6
	7	21.0	5.6	3.8	12.2	2.9	4.3
	10	23.0	5.6	4.1	12.7	2.7	4.7
	12	23.7	5.5	4.3	13.0	2.6	5.0
	15	24.1	5.5	4.4	13.0	2.5	5.2
20	24.8	5.5	4.5	13.2	2.5	5.3	
50	-20	12.0	7.8	1.5	11.5	5.8	2.0
	-18	12.9	7.7	1.7	11.6	5.8	2.0
	-15	14.0	7.7	1.8	10.9	5.4	2.0
	-10	15.8	7.1	2.2	11.2	5.0	2.3
	-7	17.4	7.3	2.4	11.5	4.6	2.5
	2	18.7	7.0	2.7	11.7	3.7	3.1
	7	20.5	6.2	3.3	12.0	3.2	3.7
	10	22.6	6.0	3.7	12.3	3.0	4.1
	12	23.4	6.0	3.9	12.4	2.9	4.3
	15	23.7	6.0	3.9	12.5	2.8	4.4
20	24.5	6.0	4.1	12.6	2.8	4.5	
55	-20	11.6	8.4	1.4	11.1	6.6	1.7
	-18	12.4	8.3	1.5	11.2	6.6	1.7
	-15	13.5	8.3	1.6	11.5	6.2	1.9
	-10	15.5	7.3	2.1	11.6	5.4	2.2
	-7	17.0	7.7	2.2	11.8	5.1	2.3
	2	18.4	7.6	2.4	11.9	4.2	2.9
	7	20.1	6.9	2.9	12.0	3.6	3.3
	10	22.1	6.5	3.4	12.8	3.4	3.7
	12	23.1	6.5	3.6	12.8	3.3	3.9
	15	23.3	6.5	3.6	13.0	3.2	4.0
20	24.2	6.4	3.8	13.1	3.0	4.3	

t_{VL} = heating flow temperature (°C)
 t_o = source temperature (°C)
 Q_h = heat output (kW), measured in accordance with standard EN 14511
P = power consumption for the overall unit (kW)
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Additional performance data – heating
see next page

Belaria® pro (20)

Data according to EN 14511

t _{VL} °C	t _Q °C	Maximum output			Minimum output		
		Q _h kW	P kW	COP	Q _h kW	P kW	COP
60	-20	11.2	9.1	1.2	10.8	7.1	1.5
	-18	11.8	9.1	1.3	10.9	7.1	1.5
	-15	13.0	8.9	1.5	11.2	6.7	1.7
	-10	15.1	8.3	1.8	11.5	6.0	1.9
	-7	16.6	8.1	2.0	11.6	5.6	2.1
	2	18.1	8.2	2.2	11.3	4.8	2.3
	7	19.7	7.6	2.6	12.1	4.2	2.9
	10	21.6	7.0	3.1	12.4	3.8	3.2
	12	22.8	7.0	3.3	12.8	3.8	3.4
	15	22.9	7.0	3.3	12.8	3.7	3.5
	20	23.7	6.8	3.5	12.9	3.5	3.7
70	-20	-	-	-	-	-	-
	-18	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	12.6	8.4	1.5	10.9	7.1	1.5
	-7	14.4	8.3	1.7	10.9	6.5	1.7
	2	17.0	8.4	2.0	11.6	5.7	2.0
	7	19.6	8.5	2.3	12.1	5.2	2.3
	10	21.2	8.5	2.5	12.4	5.0	2.5
	12	22.4	8.5	2.6	12.8	4.9	2.6
	15	22.7	8.5	2.7	12.4	4.7	2.7
	20	23.2	8.3	2.8	12.6	4.5	2.8

t_{VL} = heating flow temperature (°C)

t_Q = source temperature (°C)

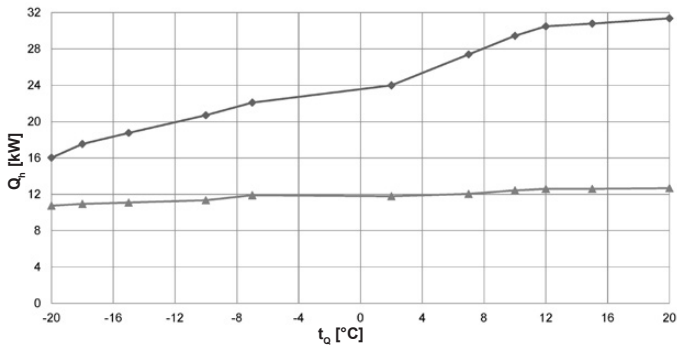
Q_h = heat output (kW), measured in accordance with standard EN 14511

P = power consumption for the overall unit (kW)

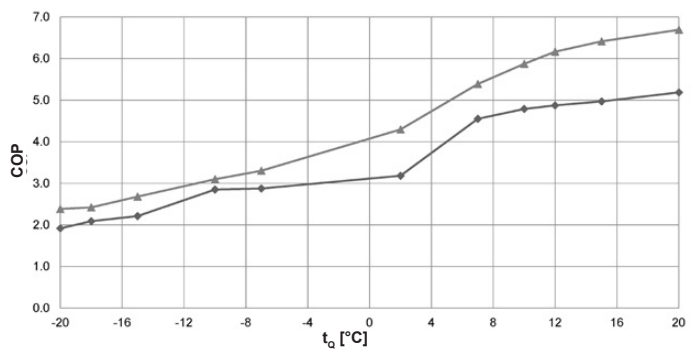
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Belaria® pro (25)
Data according to EN 14511

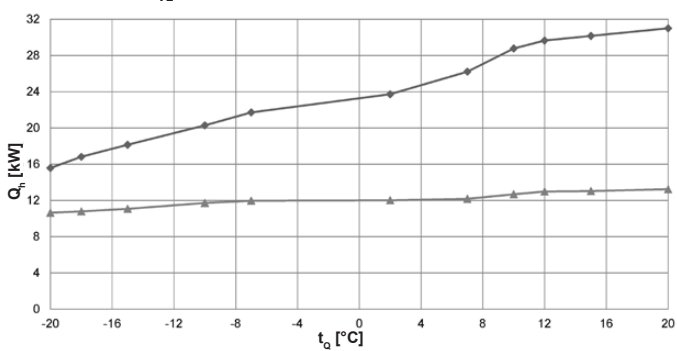
Heat output – $t_{VL} 35\text{ °C}$



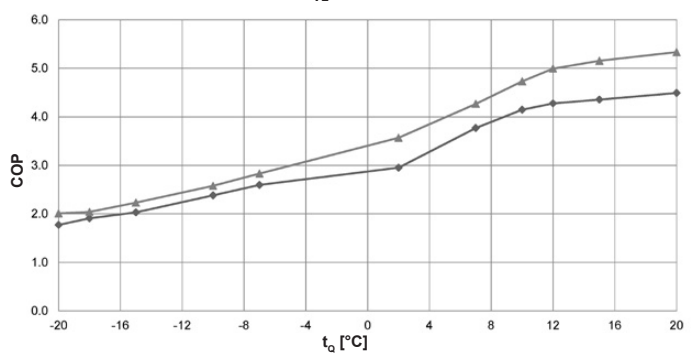
Coefficient of performance – $t_{VL} 35\text{ °C}$



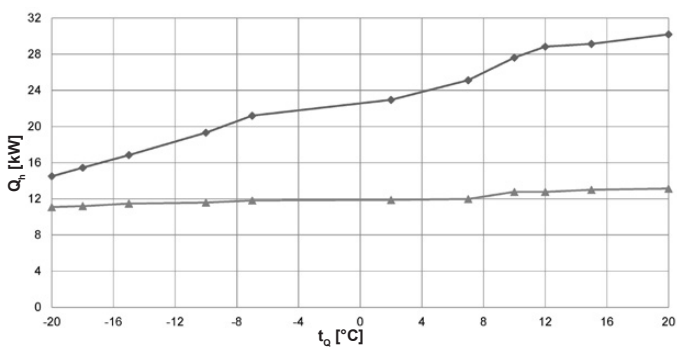
Heat output – $t_{VL} 45\text{ °C}$



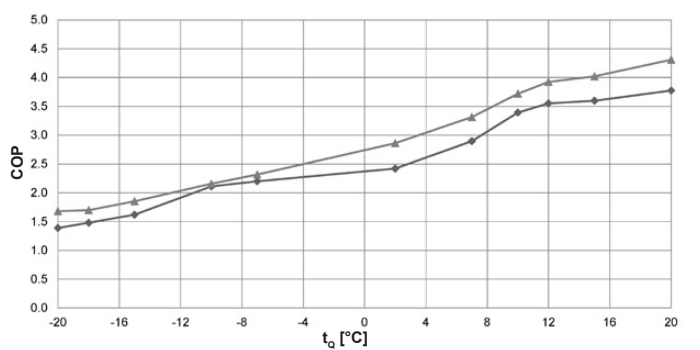
Coefficient of performance – $t_{VL} 45\text{ °C}$



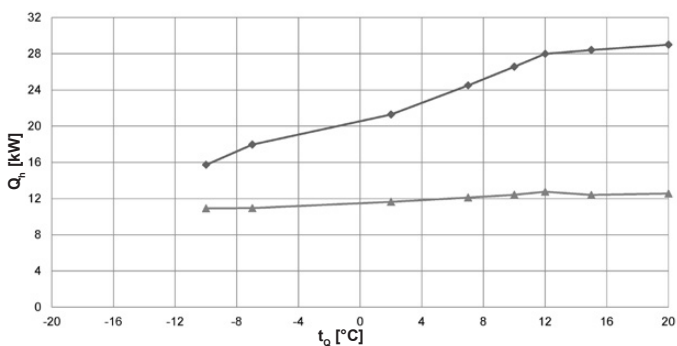
Heat output – $t_{VL} 55\text{ °C}$



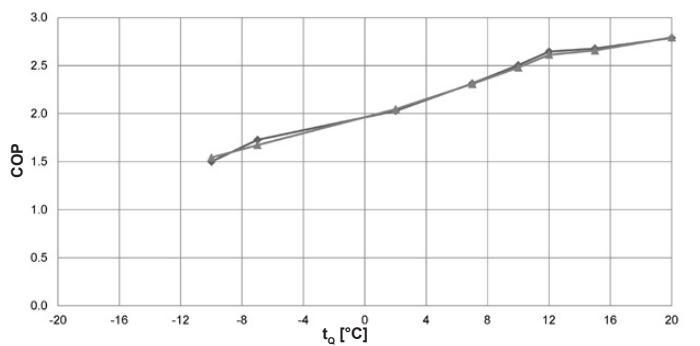
Coefficient of performance – $t_{VL} 55\text{ °C}$



Heat output – $t_{VL} 70\text{ °C}$



Coefficient of performance – $t_{VL} 70\text{ °C}$



t_{VL} = heating flow temperature (°C)
 t_o = source temperature (°C)
 Q_h = heat output (kW), measured in accordance with standard EN 14511
 COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

◆ Maximum output
 ▲ Minimum output

Belaria® pro (25)

Data according to EN 14511

t_{VL} °C	t_Q °C	Maximum output			Minimum output		
		Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-20	16.0	8.4	1.9	10.8	4.5	2.4
	-18	17.6	8.4	2.1	10.9	4.5	2.4
	-15	18.8	8.5	2.2	11.1	4.1	2.7
	-10	20.7	7.3	2.9	11.4	3.7	3.1
	-7	22.1	7.7	2.9	11.9	3.6	3.3
	2	24.0	7.5	3.2	11.8	2.7	4.3
	7	27.4	6.0	4.6	12.1	2.2	5.4
	10	29.5	6.2	4.8	12.4	2.1	5.9
	12	30.5	6.3	4.9	12.6	2.0	6.2
	15	30.8	6.2	5.0	12.6	2.0	6.4
20	31.4	6.1	5.2	12.7	1.9	6.7	
45	-20	15.6	8.8	1.8	10.6	5.3	2.0
	-18	16.8	8.8	1.9	10.8	5.3	2.0
	-15	18.1	8.9	2.0	11.1	5.0	2.2
	-10	20.3	8.5	2.4	11.7	4.5	2.6
	-7	21.7	8.4	2.6	12.0	4.2	2.8
	2	23.7	8.0	3.0	12.0	3.4	3.6
	7	26.2	7.0	3.8	12.2	2.9	4.3
	10	28.8	6.9	4.1	12.7	2.7	4.7
	12	29.6	6.9	4.3	13.0	2.6	5.0
	15	30.2	6.9	4.4	13.0	2.5	5.2
20	31.0	6.9	4.5	13.2	2.5	5.3	
50	-20	15.0	9.7	1.5	11.5	5.8	2.0
	-18	16.1	9.6	1.7	11.6	5.8	2.0
	-15	17.5	9.7	1.8	10.9	5.4	2.0
	-10	19.8	8.8	2.2	11.2	5.0	2.3
	-7	21.7	9.1	2.4	11.5	4.6	2.5
	2	23.3	8.8	2.7	11.7	3.7	3.1
	7	25.7	7.8	3.3	12.0	3.2	3.7
	10	28.2	7.5	3.7	12.3	3.0	4.1
	12	29.2	7.5	3.9	12.4	2.9	4.3
	15	29.6	7.5	3.9	12.5	2.8	4.4
20	30.6	7.5	4.1	12.6	2.8	4.5	
55	-20	14.5	10.4	1.4	11.1	6.6	1.7
	-18	15.4	10.4	1.5	11.2	6.6	1.7
	-15	16.9	10.4	1.6	11.5	6.2	1.9
	-10	19.3	9.2	2.1	11.6	5.4	2.2
	-7	21.2	9.6	2.2	11.8	5.1	2.3
	2	23.0	9.5	2.4	11.9	4.2	2.9
	7	25.1	8.7	2.9	12.0	3.6	3.3
	10	27.6	8.1	3.4	12.8	3.4	3.7
	12	28.8	8.1	3.6	12.8	3.3	3.9
	15	29.1	8.1	3.6	13.0	3.2	4.0
20	30.2	8.0	3.8	13.1	3.0	4.3	

t_{VL} = heating flow temperature (°C)

t_Q = source temperature (°C)

Q_h = heat output (kW), measured in accordance with standard EN 14511

COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

Additional performance data – heating
see next page

Belaria® pro (25)

Data according to EN 14511

t_{VL} °C	t_o °C	Maximum output			Minimum output		
		Q_h kW	P kW	COP	Q_h kW	P kW	COP
35	-20	14.0	11.4	1.2	10.8	7.1	1.5
	-18	14.8	11.4	1.3	10.9	7.1	1.5
	-15	16.2	11.1	1.5	11.2	6.7	1.7
	-10	18.8	10.4	1.8	11.5	6.0	1.9
	-7	20.7	10.2	2.0	11.6	5.6	2.1
	2	22.6	10.2	2.2	11.3	4.8	2.3
	7	24.6	9.5	2.6	12.1	4.2	2.9
	10	27.0	8.7	3.1	12.4	3.8	3.2
	12	28.4	8.7	3.3	12.8	3.8	3.4
	15	28.6	8.7	3.3	12.8	3.7	3.5
45	20	29.7	8.5	3.5	12.9	3.5	3.7
	-20	-	-	-	-	-	-
	-18	-	-	-	-	-	-
	-15	-	-	-	-	-	-
	-10	15.7	10.5	1.5	10.9	7.1	1.5
	-7	18.0	10.4	1.7	10.9	6.5	1.7
	2	21.3	10.5	2.0	11.6	5.7	2.0
	7	24.5	10.6	2.3	12.1	5.2	2.3
	10	26.6	10.6	2.5	12.4	5.0	2.5
	12	28.0	10.6	2.6	12.8	4.9	2.6
15	28.4	10.6	2.7	12.4	4.7	2.7	
20	29.0	10.4	2.8	12.6	4.5	2.8	

t_{VL} = heating flow temperature (°C)

t_o = source temperature (°C)

Q_h = heat output (kW), measured in accordance with standard EN 14511

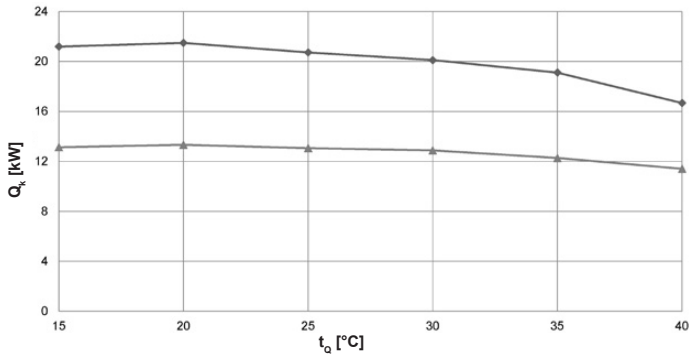
COP = Coefficient of Performance for the overall unit in accordance with standard EN 14511

2.6.2 Performance data cooling Maximum cooling capacity

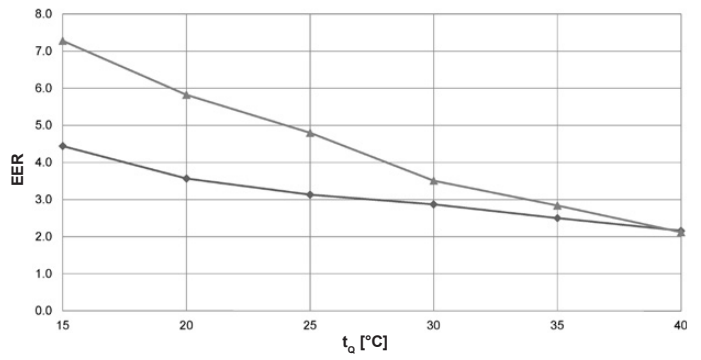
Belaria® pro (20)

Data according to EN 14511

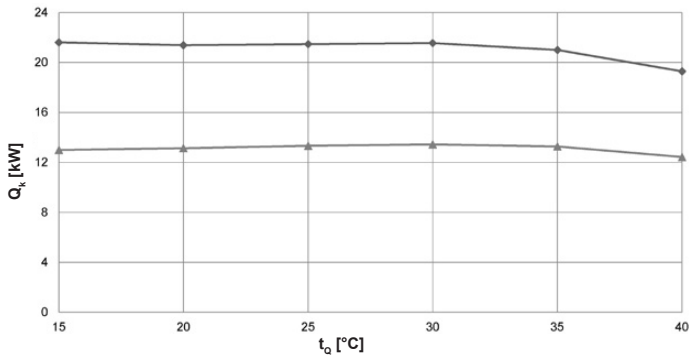
Cooling capacity – $t_{VL} 7\text{ °C}$



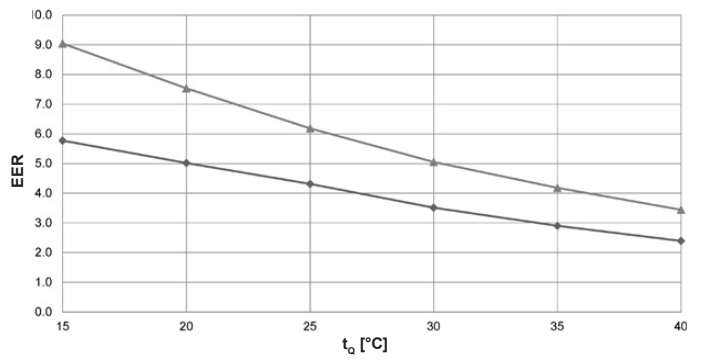
Energy efficiency ratio – $t_{VL} 7\text{ °C}$



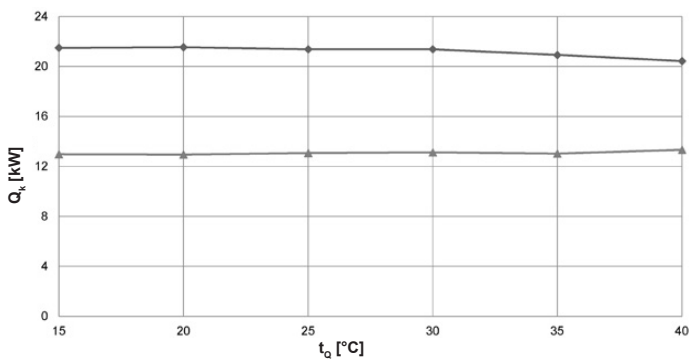
Cooling capacity – $t_{VL} 12\text{ °C}$



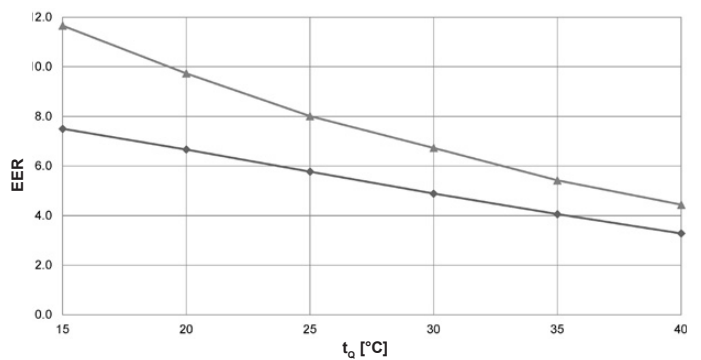
Energy efficiency ratio – $t_{VL} 12\text{ °C}$



Cooling capacity – $t_{VL} 18\text{ °C}$



Energy efficiency ratio – $t_{VL} 18\text{ °C}$



◆ Maximum output
▲ Minimum output

Belaria® pro (20)

Data according to EN 14511

t_{VL} °C	t_Q °C	Maximum output			Minimum output		
		Q_k kW	P kW	EER	Q_k kW	P kW	EER
7	15	21.2	4.8	4.4	13.1	1.8	7.3
	20	21.5	6.0	3.6	13.3	2.3	5.8
	25	20.7	6.6	3.1	13.1	2.7	4.8
	30	20.1	7.0	2.9	12.9	3.7	3.5
	35	19.1	7.6	2.5	12.3	4.3	2.8
	40	16.7	7.7	2.2	11.4	5.4	2.1
12	15	21.6	3.8	5.8	13.0	1.4	9.0
	20	21.4	4.3	5.0	13.1	1.7	7.5
	25	21.5	5.0	4.3	13.3	2.2	6.2
	30	21.6	6.1	3.5	13.4	2.7	5.1
	35	21.0	7.2	2.9	13.3	3.2	4.2
	40	19.3	8.1	2.4	12.4	3.6	3.4
18	15	21.5	2.9	7.5	13.0	1.1	11.7
	20	21.5	3.2	6.7	13.0	1.3	9.7
	25	21.4	3.7	5.8	13.1	1.6	8.0
	30	21.4	4.4	4.9	13.1	2.0	6.7
	35	20.9	5.2	4.1	13.0	2.4	5.4
	40	20.4	6.2	3.3	13.3	3.0	4.4

t_{VL} = cooling water flow temperature (°C)

t_Q = source temperature (°C)

Q_k = cooling capacity (kW), measured in accordance with standard EN 14511

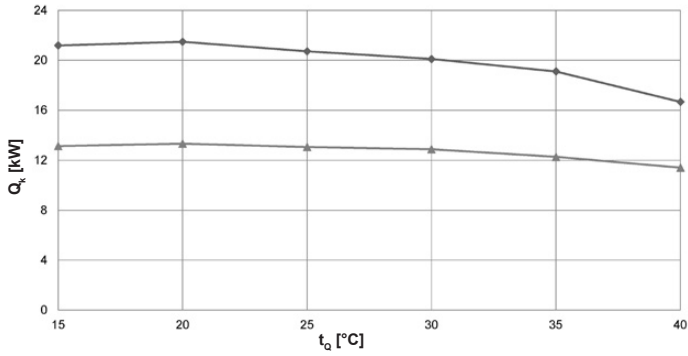
P = power consumption for the overall unit (kW)

EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

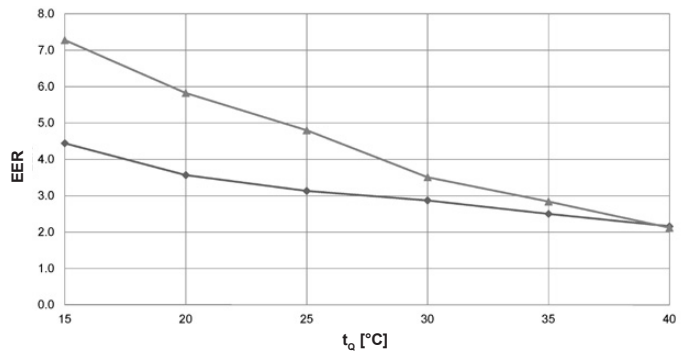
Belaria® pro (25)

Data according to EN 14511

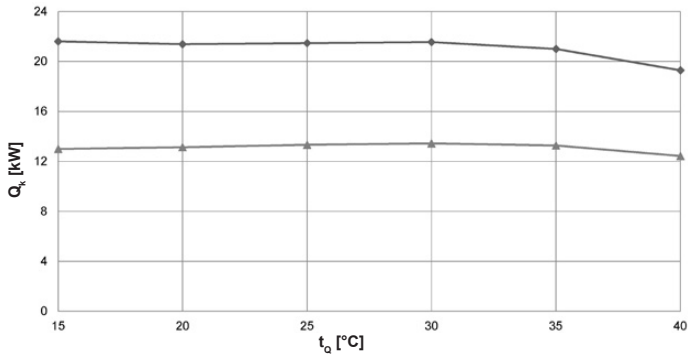
Cooling capacity – $t_{VL} 7\text{ °C}$



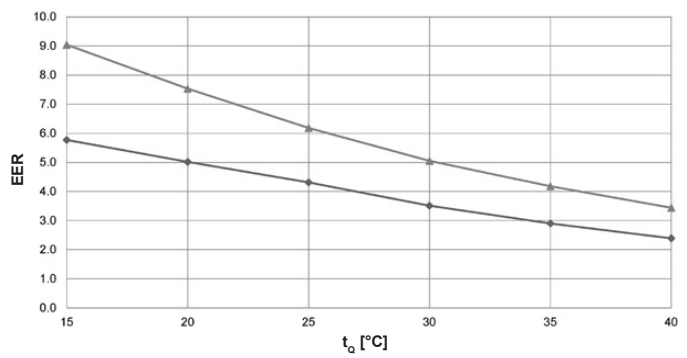
Energy efficiency ratio – $t_{VL} 7\text{ °C}$



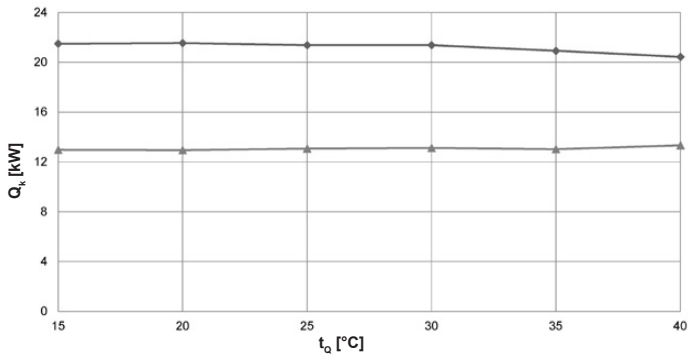
Cooling capacity – $t_{VL} 12\text{ °C}$



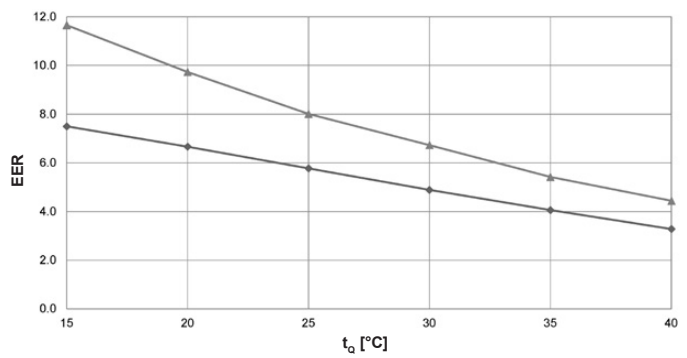
Energy efficiency ratio – $t_{VL} 12\text{ °C}$



Cooling capacity – $t_{VL} 18\text{ °C}$



Energy efficiency ratio – $t_{VL} 18\text{ °C}$



- ◆ Maximum output
- ▲ Minimum output

Belaria® pro (25)

Data according to EN 14511

t_{VL} °C	t_Q °C	Maximum output			Minimum output		
		Q_k kW	P kW	EER	Q_k kW	P kW	EER
7	15	21.2	4.8	4.4	13.1	1.8	7.3
	20	21.5	6.0	3.6	13.3	2.3	5.8
	25	20.7	6.6	3.1	13.1	2.7	4.8
	30	20.1	7.0	2.9	12.9	3.7	3.5
	35	19.1	7.6	2.5	12.3	4.3	2.8
	40	16.7	7.7	2.2	11.4	5.4	2.1
12	15	21.6	3.8	5.8	13.0	1.4	9.0
	20	21.4	4.3	5.0	13.1	1.7	7.5
	25	21.5	5.0	4.3	13.3	2.2	6.2
	30	21.6	6.1	3.5	13.4	2.7	5.1
	35	21.0	7.2	2.9	13.3	3.2	4.2
	40	19.3	8.1	2.4	12.4	3.6	3.4
18	15	21.5	2.9	7.5	13.0	1.1	11.7
	20	21.5	3.2	6.7	13.0	1.3	9.7
	25	21.4	3.7	5.8	13.1	1.6	8.0
	30	21.4	4.4	4.9	13.1	2.0	6.7
	35	20.9	5.2	4.1	13.0	2.4	5.4
	40	20.4	6.2	3.3	13.3	3.0	4.4

t_{VL} = cooling water flow temperature (°C)

t_Q = source temperature (°C)

Q_k = cooling capacity (kW), measured in accordance with standard EN 14511

P = power consumption for the overall unit (kW)

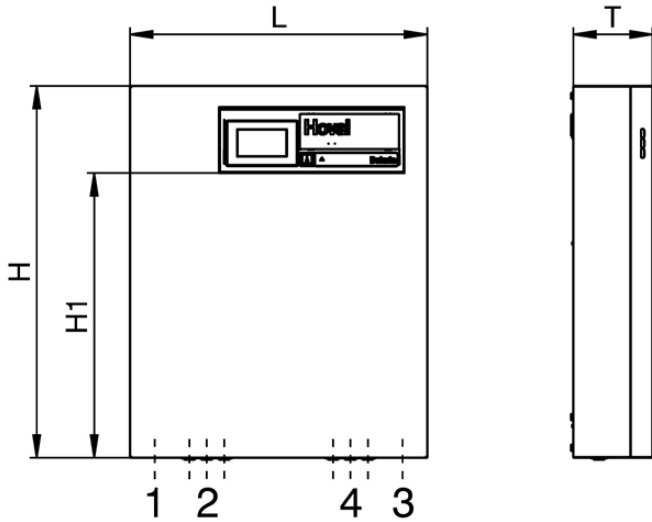
EER = Energy Efficiency Ratio for the overall unit in accordance with standard EN 14511

2.7 Dimensions and space requirement

2.7.1 Dimensions and space requirement of electrical box

Dimensions of Belaria® pro (20,25) electrical box

(Dimensions in mm)

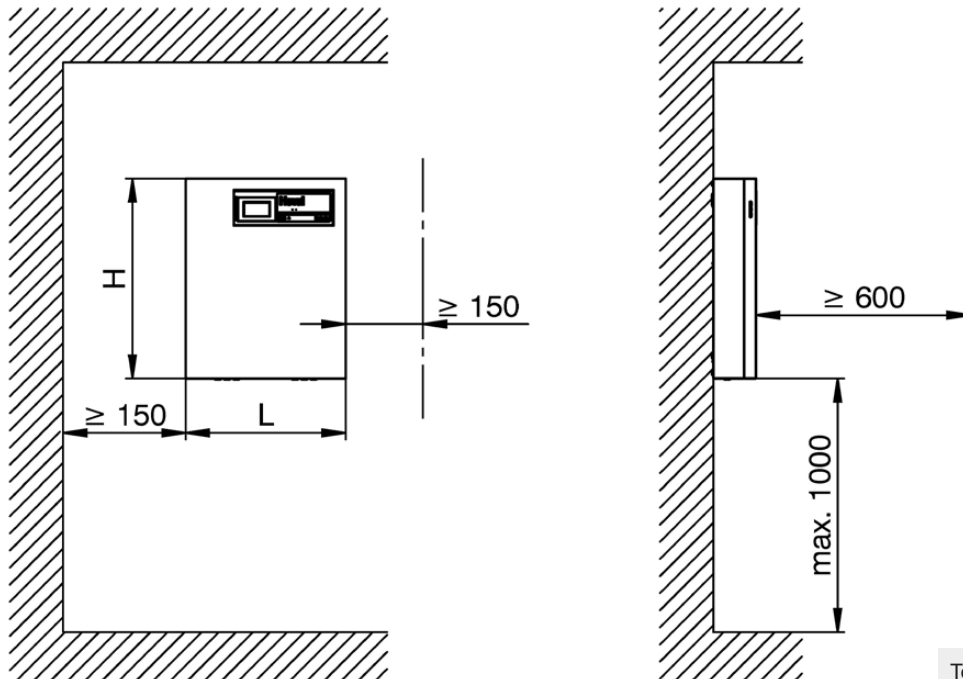


Typ	L	H	H1	T
Belaria® pro (20,25)	600	750	574	160

- 1 Cable feed-in control current, main current
- 2 Optional: Cable feed-in control current, main current
- 3 Cable feed-in sensors, RS485
- 4 Optional: Cable feed-in sensors, RS485

Space required

Wall-mounted electrical box

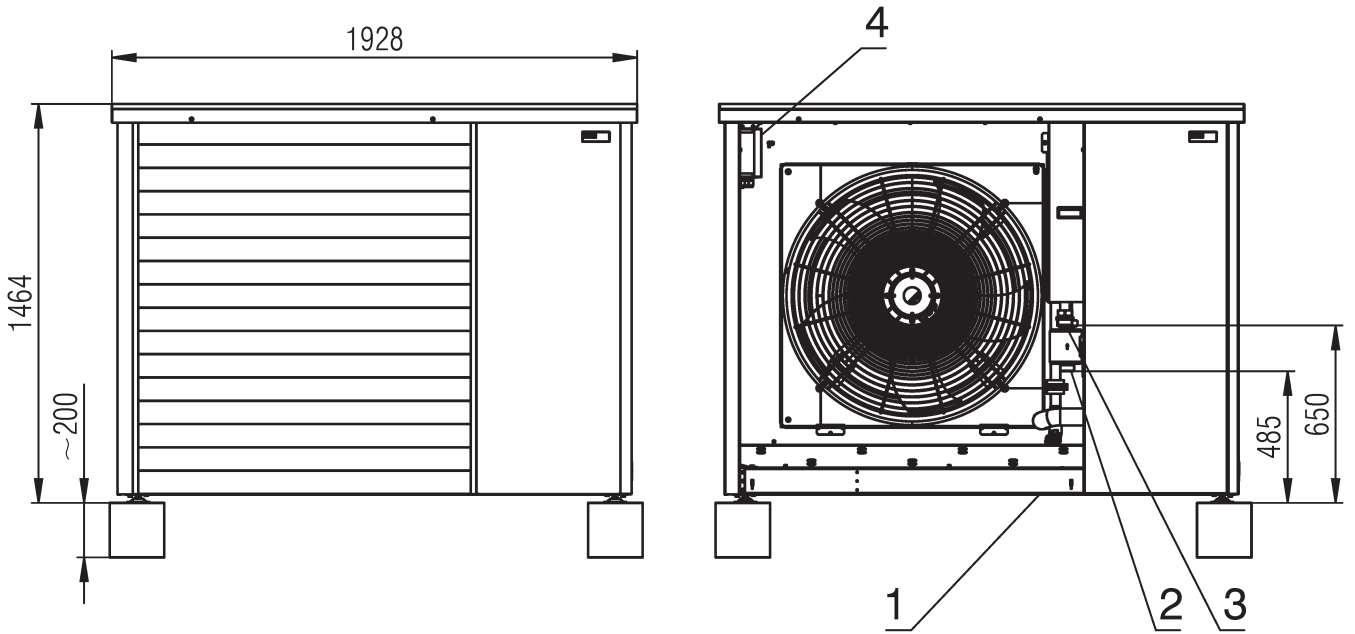


To ensure good operability and accessibility to the electrical connections, a clearance of max. 1000 mm must be provided from the ground to the lower edge of the electrical box.

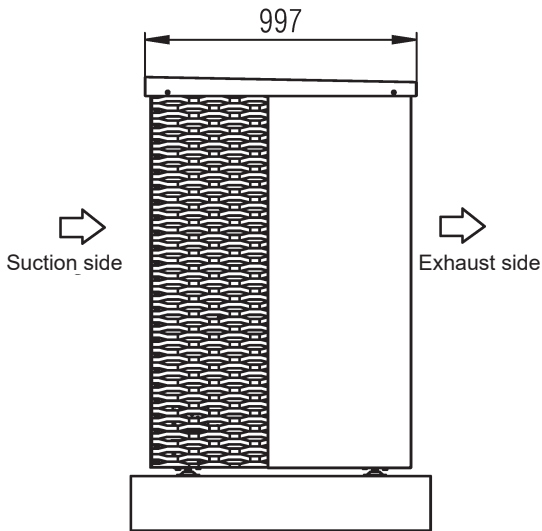
2.7.2 Dimensions of outdoor unit

(Dimensions in mm)

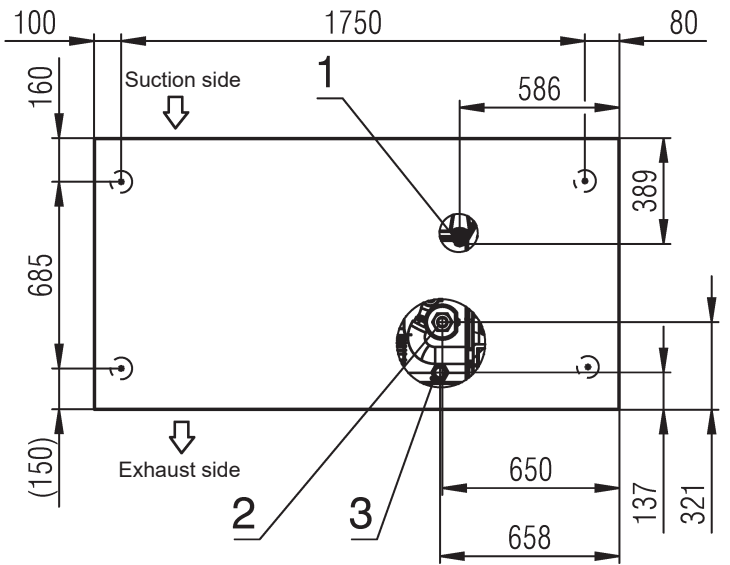
View from front



View from the left



View from above

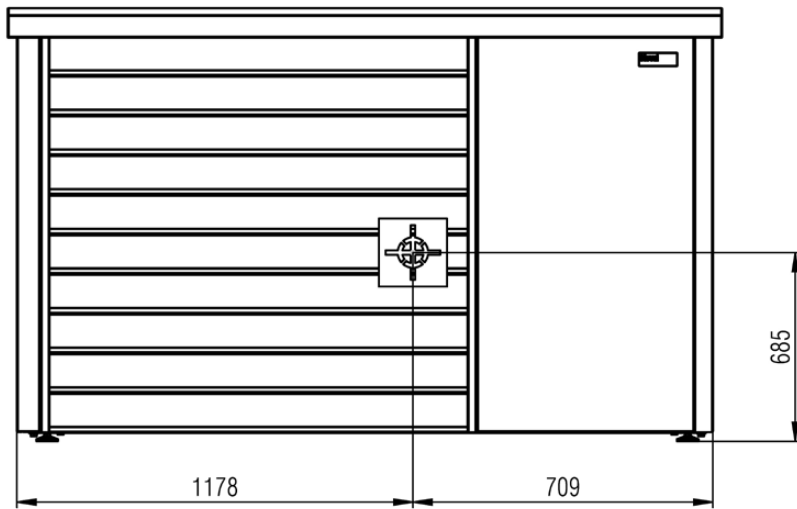
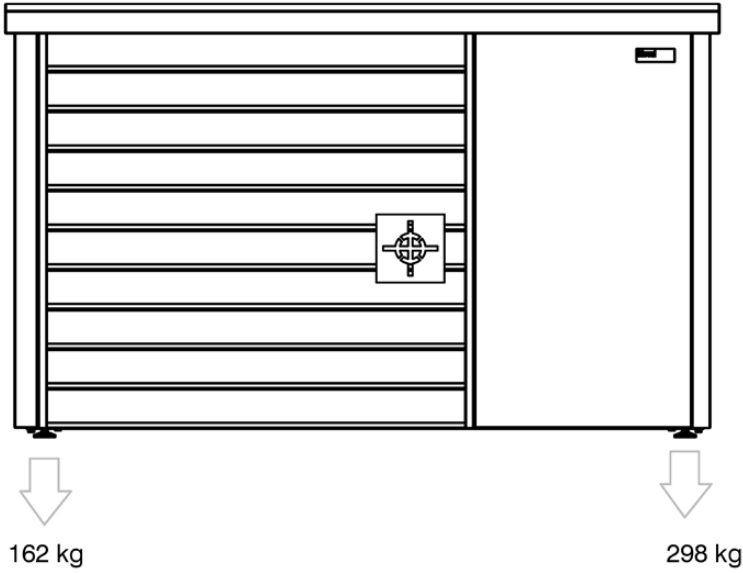


- 1 Condensate drain 1" 1½" ET
- 2 Connection hydraulic connection line return 1½" ET
- 3 Connection hydraulic connection line flow 1½" ET
- 4 Electrical connection

2.7.3 Outdoor unit centre of gravity

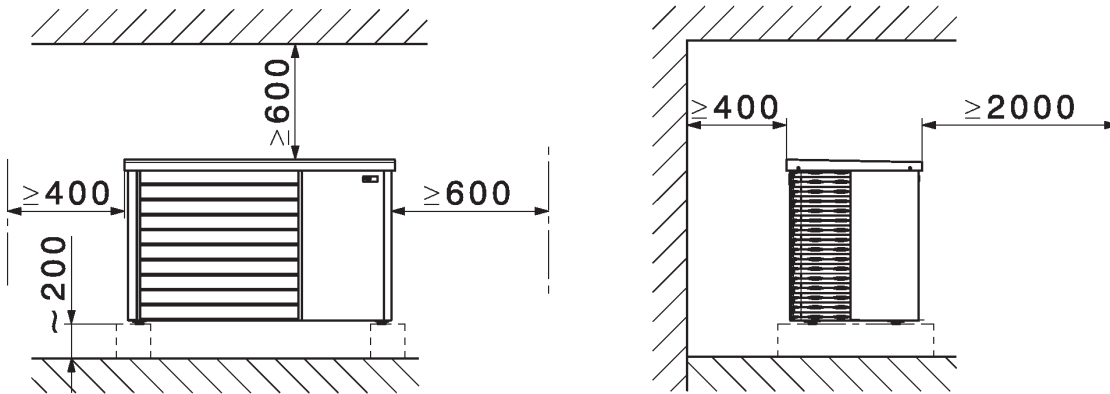
(Dimensions in mm)

Centre of gravity

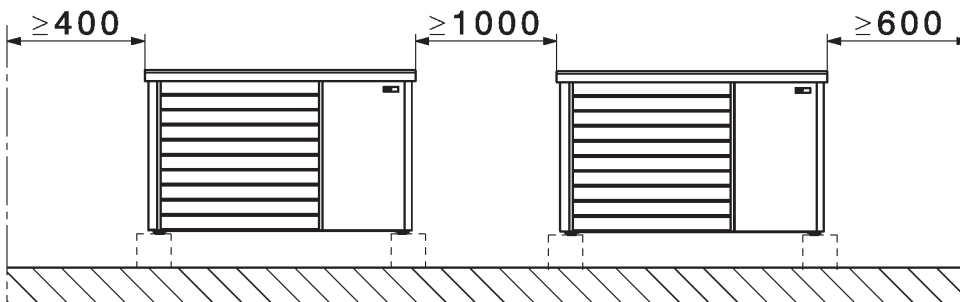


2.7.4 Space requirement outdoor unit

(Dimensions in mm)

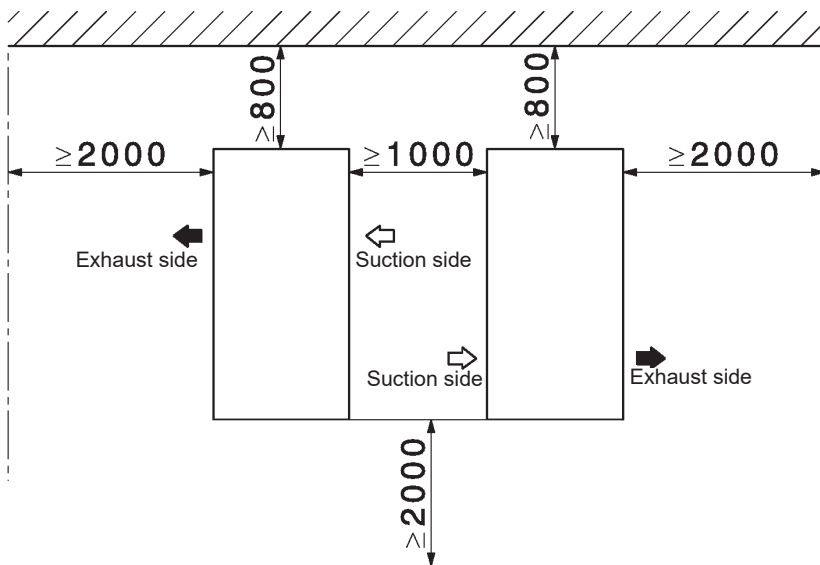


Cascade plant



In order to ensure accessibility during maintenance, a clearance of at least 600 mm upwards must be maintained. For any service work, the minimum clearances at the rear and sides of the heat pump must be observed.

**Outdoor unit
View from above**



WARNING

Any possible openings/recesses and ignition sources must be avoided within a radius of one meter around the outdoor unit.

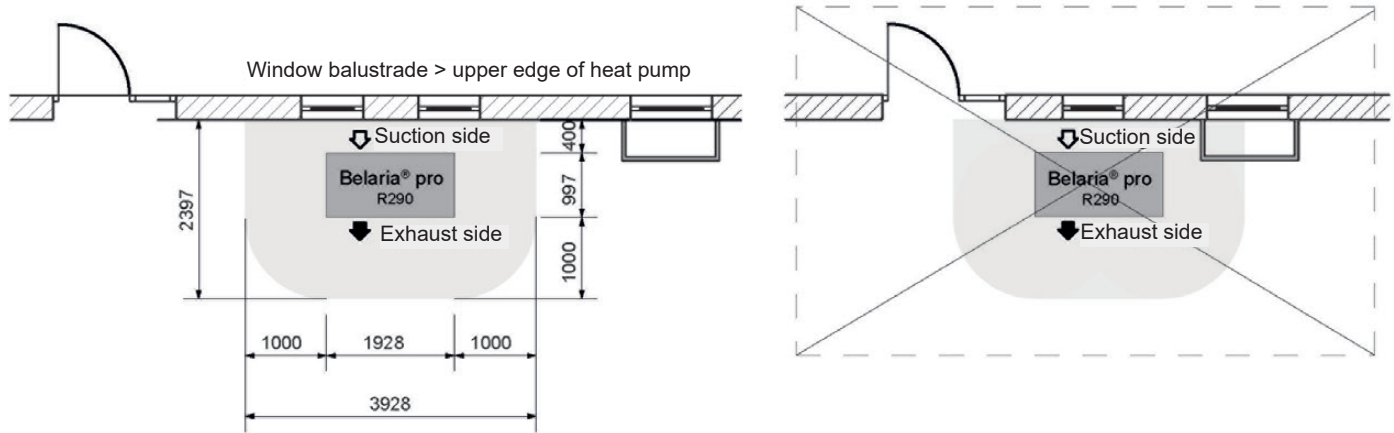
Further important safety and installation instructions for the outdoor unit can be found in the chapter 1.2 and 1.5.

2.7.5 Representation of protection zones

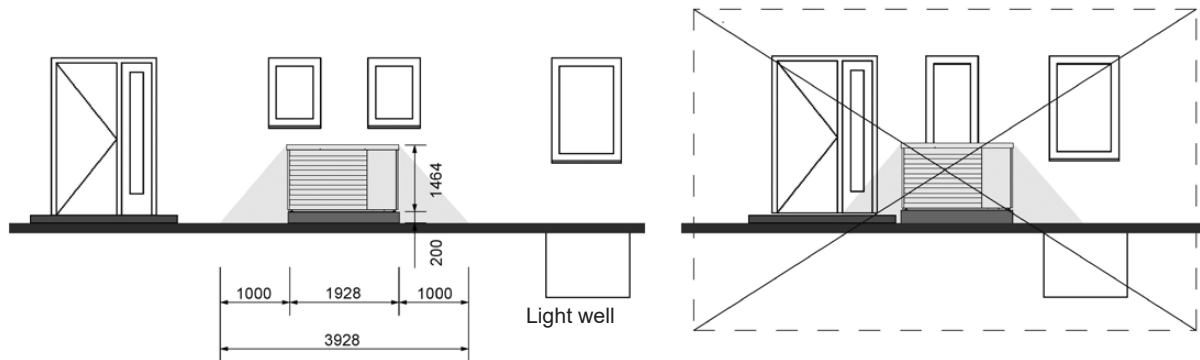
Belaria® pro with refrigerant R290

(Dimensions in mm)

Floor plan – protection zone when installed in front of a wall



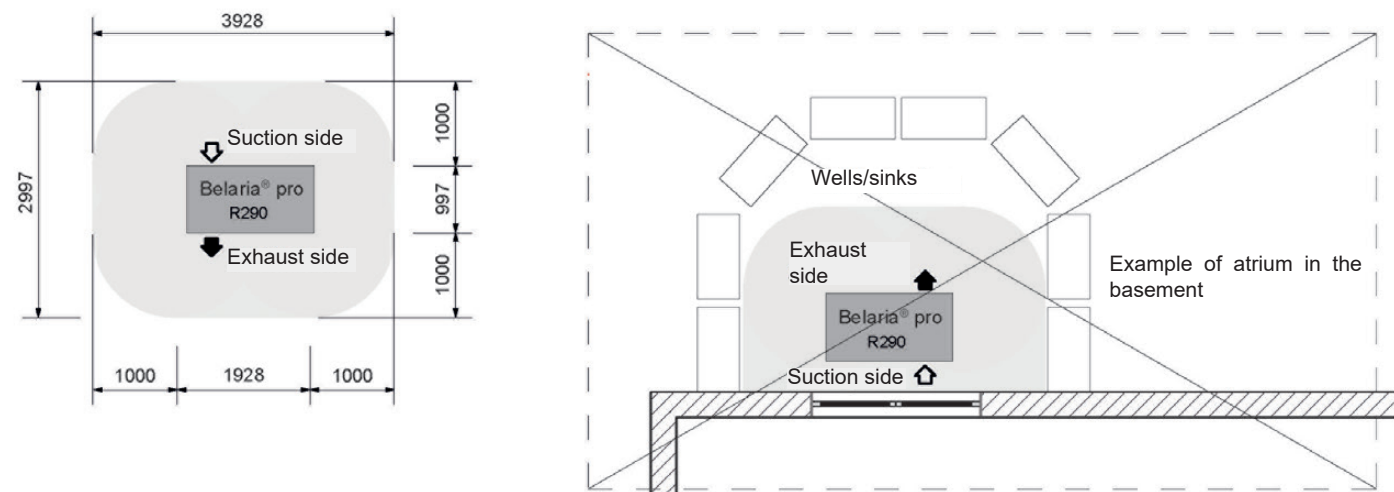
View – protection zone when installed in front of a wall



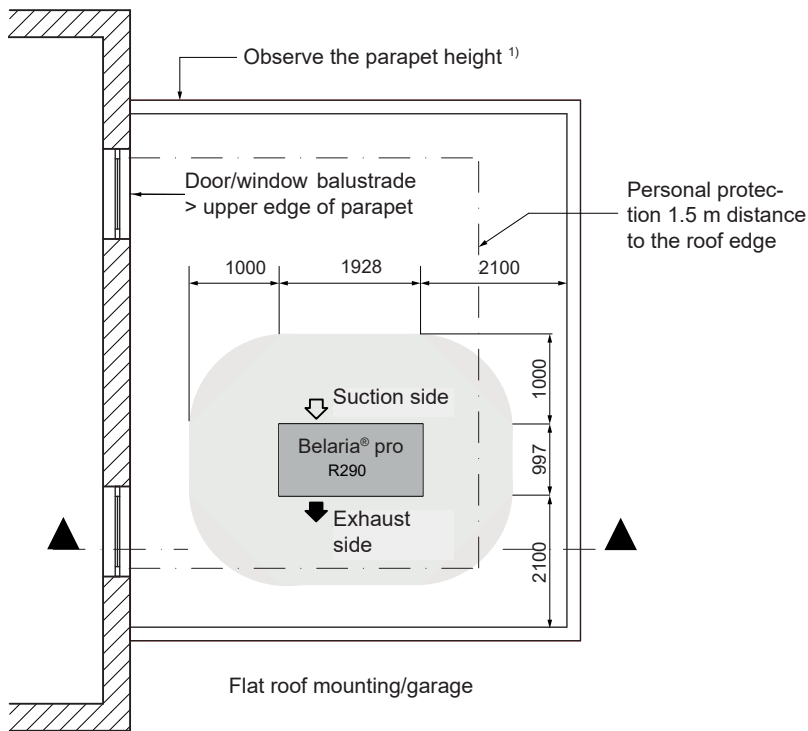
WARNING

- The heat pump (outdoor unit) is only allowed to be placed outdoors and under no circumstances indoors.
- The outdoor unit is filled with the non-toxic, odourless and colourless but flammable refrigerant R290 (propane), which is heavier than air. If this escapes, there is a danger of fire/explosion. Therefore, all potential sources of ignition must be kept at least 1 m away in all directions. Smoking and the use of naked flames is prohibited in this area.
- Window balustrades must be higher than the upper edge of the outdoor unit in the protection zone!
- The heat pump must be at least 1 m from the property boundary; observe building regulations!
- At the entrances to properties, it must be ensured that no vehicle can enter the protection zone.
- To prevent the heat pump from being touched by vehicles, a collision guard must be installed if necessary. This must be located outside the protection zone.

Floor plan – protection zone when installed outdoors

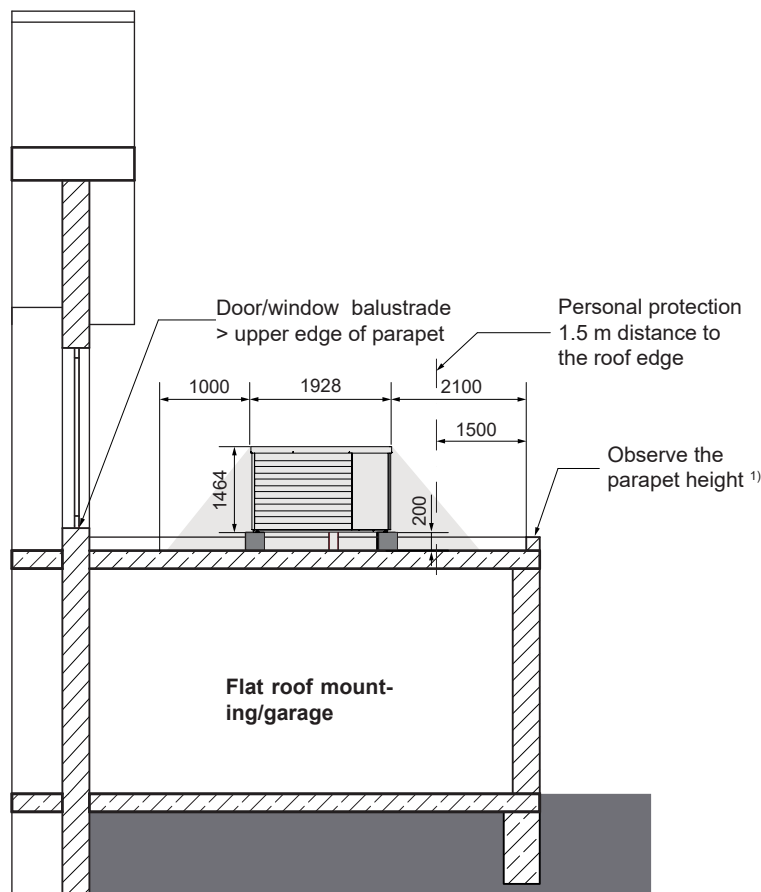


Floor plan flat roof – protection zone



1) In case of flat roof installation, the parapet must not represent a potential sink in which refrigerant could accumulate. No ignitable mixture is allowed to form.

Section flat roof – protection zone



- Strict compliance with safety measures regarding combustible refrigerants.
- All standards concerning statics, wind load and access to roofs must be complied with. The outdoor unit must be firmly bolted onto the substructure (e.g. strip foundation). The heat pump must be prevented from tilting.
- At exposed installation locations prone to wind load, e.g. on building roofs, the surface load on the upper horizontal cover surface of the heat pump caused by wind suction must not exceed a value of 2000 N/m². The heat pump casing might be damaged if this value is not complied with.
- Minimum distance of the heat pump to the roof edge: 1.5 m (personal protection) + 0.6 m (working area refrigeration circuit).
- Accessibility for maintenance and repair work must be ensured. For work on the heat pump, a measuring case and test equipment, refrigerant bottle, etc. must be transported to the site, amongst other things. In addition to the safety equipment (fall protection devices, anchoring devices, etc.), this must also be taken into account for skylights, stairs, railings, etc.
- There must be no floor-to-ceiling doors/windows to the flat roof, or balustrade must be higher than the parapet.
- Protection zones around windows must be complied with.
- There must not be any pipe vents, skylights or the like on the flat roof in a vicinity of 1 m around the heat pump.
- If there is a risk of frost, a siphon must be installed in the shaft immediately before the condensate drain is introduced into the downpipe.
- Condensate drain into the sewage system via a frost-proof siphon or allow it to seep away freely.

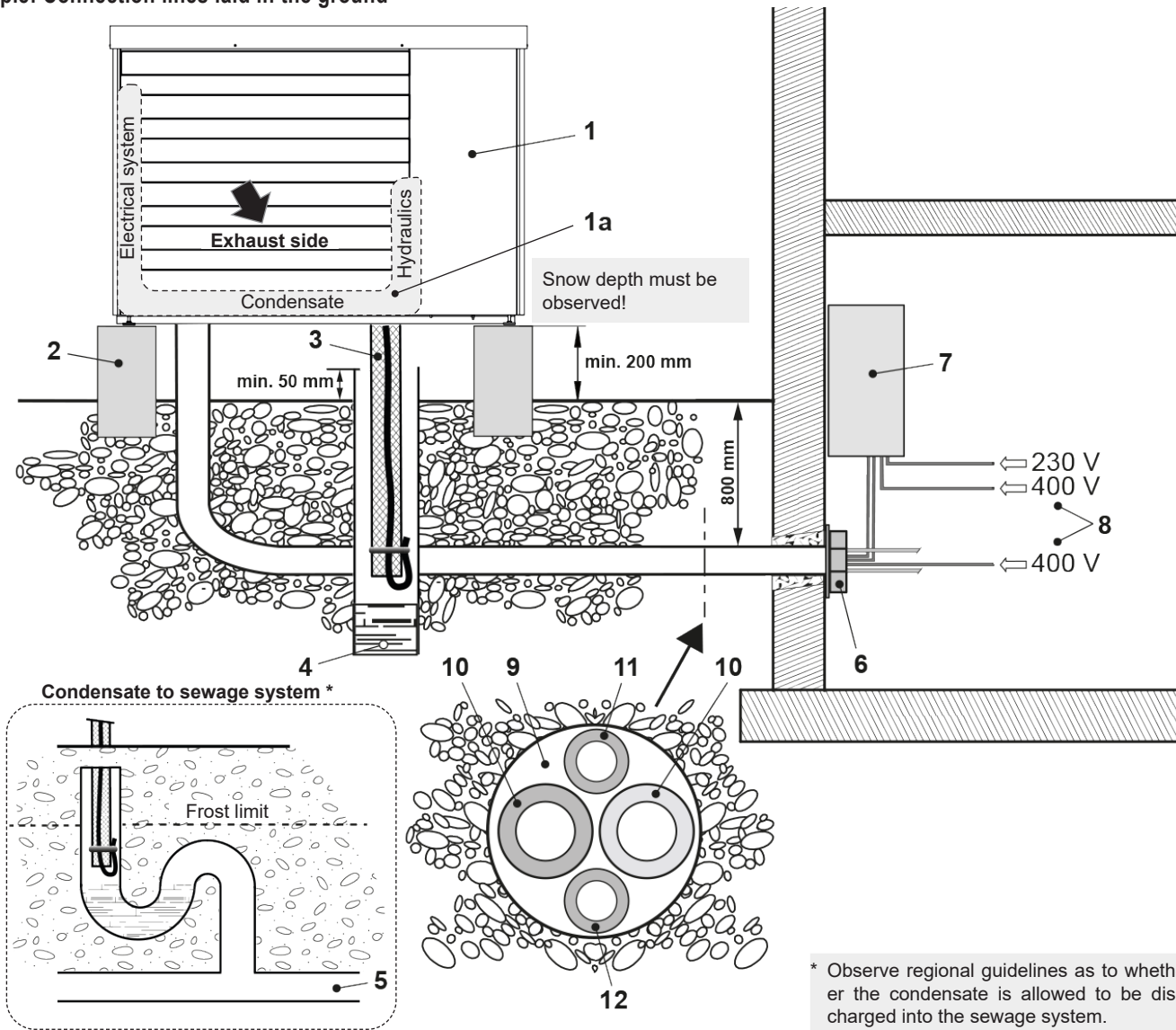
3. Assembly

3.1 Diagram of wall penetration, ground and routing works

The wall penetration should slope down from the inside to the outside. To avoid damage, the opening should be padded on the inside or, for example, lined with a PVC pipe.

After installation, the wall opening must be sealed with a suitable sealing compound on site in compliance with fire protection regulations!

Example: Connection lines laid in the ground



- 1 Outdoor unit
- 1a Space for connection of hydraulics (FL + RT), condensate drain and electrics.
- 2 Strip foundation
- 3 Condensate drain heat pump Ø 28 mm, drain pipe DN 100
- 4 Variant 1: Seepage (duct/gravel layer)
- 5 Variant 2: Discharging into the sewage system (penetration into the soil must be made leak-tight)
- 6 Wall lead-through (hydraulic and electrical connections)
- 7 Electrical box

- 8 Main current: 3 x 400 V/50 Hz
Control current: 1 x 230 V/50 Hz
Main current for electric heating element: 3 x 400 V/50 Hz
Network cables (optional)
- 9 Empty tube for hydraulics and electrics
- 10 Connection line flow + return
- 11 Empty tube for electrical connections for outdoor unit
Main current for outdoor unit: 3 x 400 V/50 Hz
Control current for outdoor unit: 1 x 230 V/50 Hz
- 12 Empty tube for data bus RS485

3.2 Installation of outdoor unit



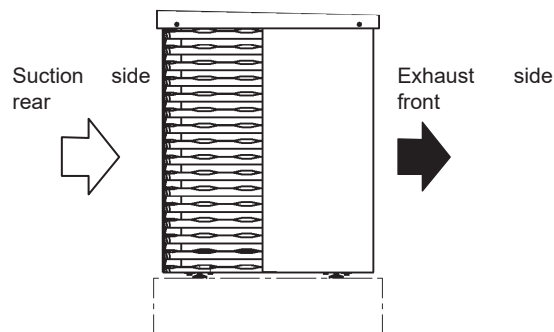
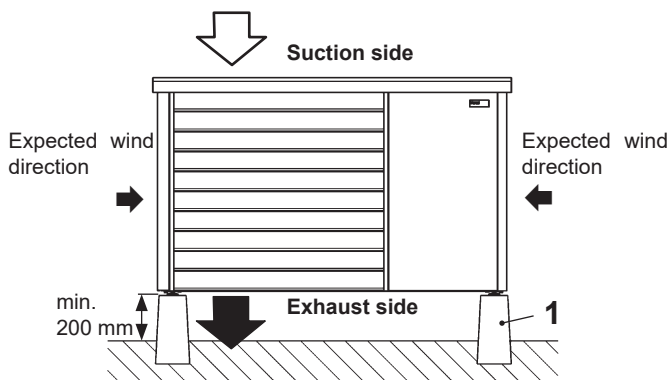
The applicable laws, regulations and standards have to be observed, in particular EN 378 Parts 1 and 2 as well as BGR 500.

3.2.1 Installation variants and foundation diagrams

If the outdoor unit is installed at wind-prone locations, the alignment of the outdoor unit must be selected in such a way that the expected wind direction is at right angles to the suction/discharge direction. Depending on the wind load, further fastening measures may be necessary, or else a windbreak should be provided.

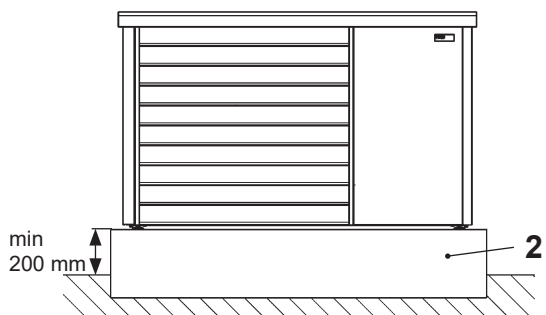
! **NOTICE**
 At exposed installation locations prone to wind load, e.g. on building roofs, the surface load on the upper horizontal cover surface of the heat pump caused by wind suction must not exceed a value of 2000 N/m². The heat pump casing might be damaged if this value is not complied with.

Variant 1: firm base on site with strip foundation (1)



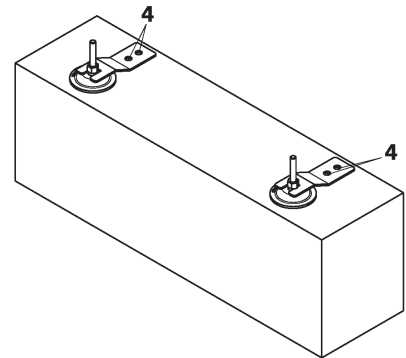
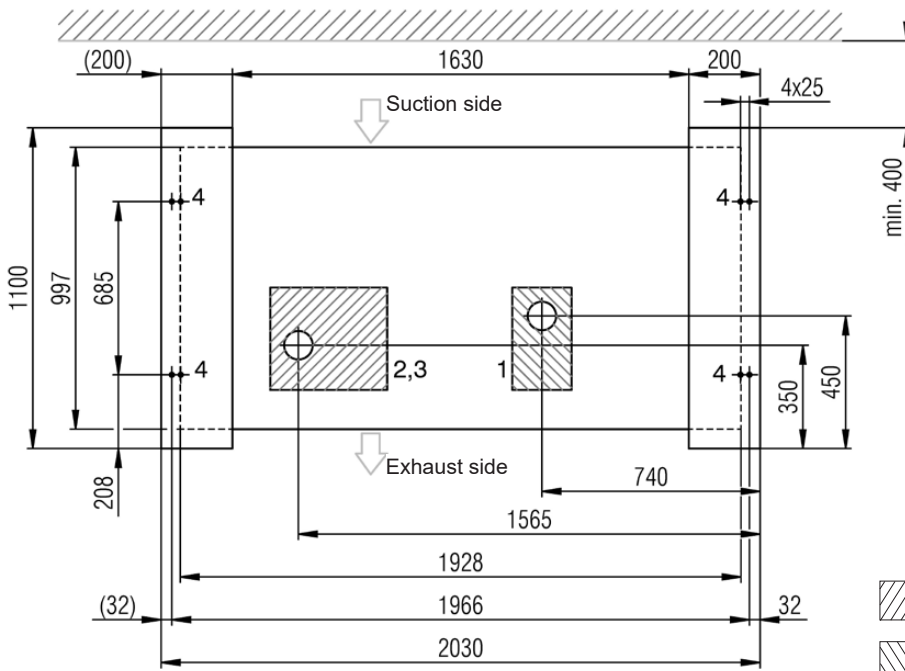
The base must not form a sink. A circumferential base is therefore not permitted.

Variant 2: firm base on site with floor plate (2)



- When building the foundation on site, use the distances of the fixing holes in the drawings on pages 34 and 35.
- To avoid structure-borne noise, the base must be decoupled from the building.

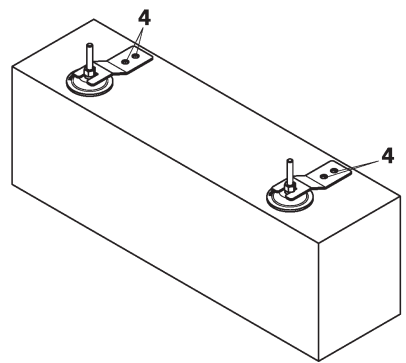
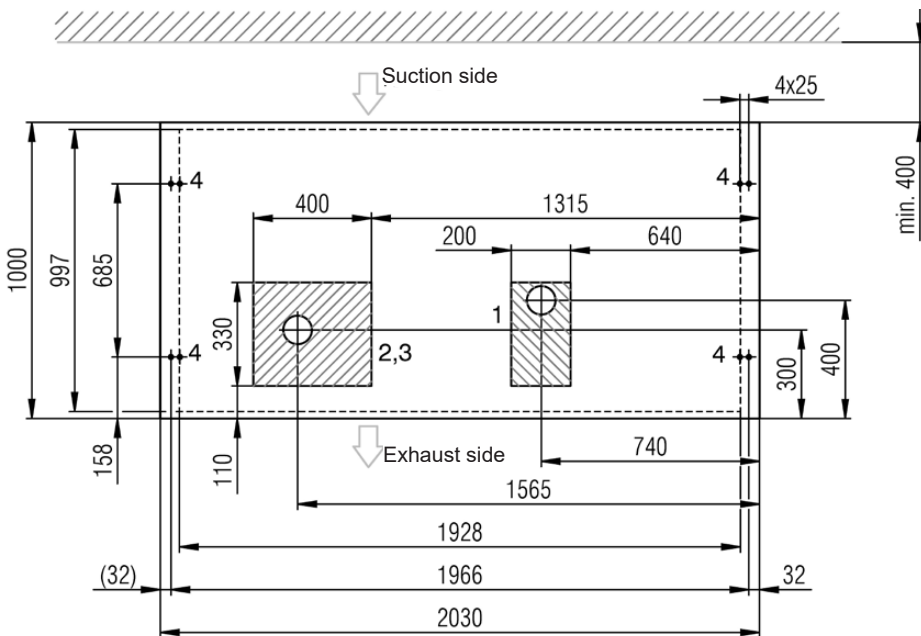
Variante 1: Strip foundation (fastening from outside/side)
 Plan concrete base set
 (view from above, dimensions in mm)



Attachment of the outdoor unit from the outside (laterally) using the supplied clamps. The clamps are visible. It is not necessary to remove the cladding sections.

- Possible area for empty tubes in the strip foundation
- Possible area for condensate drain in the strip foundation

Variante 2: Floor plate (fastening from outside/side)
 Plan
 (view from above, dimensions in mm)

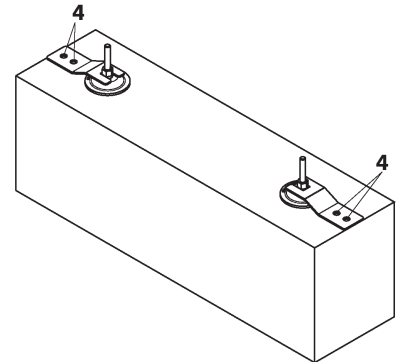
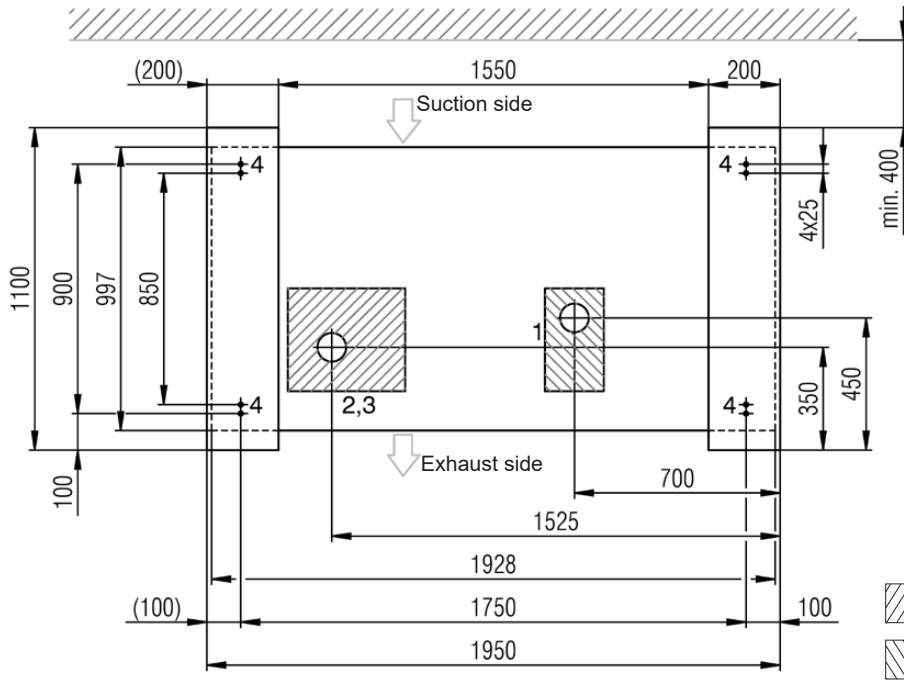


Attachment of the outdoor unit from the outside (laterally) using the supplied clamps. The clamps are visible. It is not necessary to remove the cladding sections.

- 1 Condensate drain area
- 2 Area Flow hydraulics
Return hydraulics
- 3 Electrics area
- 4 Attachment points M8

- Possible area for empty tubes in the floor plate
- Possible area for condensate drain in the floor plate

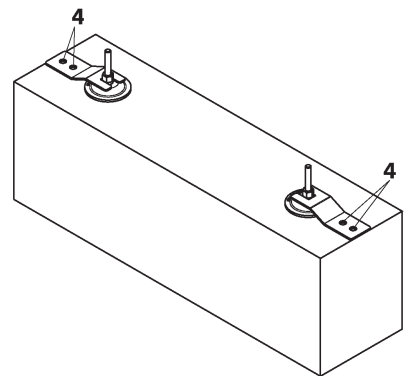
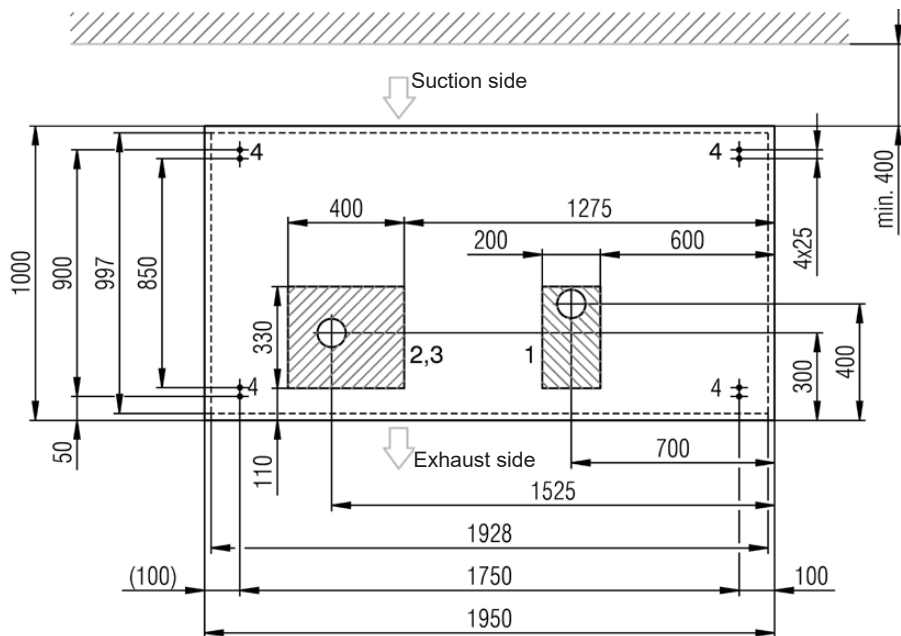
Variant 1: Strip foundation (fastening inside/below the heat pump)
 Plan concrete base set
 (view from above, dimensions in mm)



Attachment of the outdoor unit from the “inside/bottom” (grey area) of the heat pump using the supplied clamps. The clamps are not visible. It is necessary to remove the cladding sections.

- Possible area for empty tubes in the strip foundation
- Possible area for condensate drain in the strip foundation

Variant 2: Floor plate (fastening inside/below the heat pump)
 Plan
 (view from above, dimensions in mm)



Attachment of the outdoor unit from the “inside/bottom” (grey area) of the heat pump using the supplied clamps. The clamps are not visible. It is necessary to remove the cladding sections.

- 1 Condensate drain area
- 2 Area Flow hydraulics
Return hydraulics
- 3 Electrics area
- 4 Attachment points M8

- Possible area for empty tubes in the floor plate
- Possible area for condensate drain in the floor plate

3.2.2 Transport



NOTICE

- The outdoor unit is never allowed to be tilted more than 30° during transport.
- Pay attention to the centre of gravity when transporting! The centre of gravity of the system is not in the middle, see chapter 2.7.3

Further important information about transport can be found in chapter 1.6.2.

Transport by lift truck or forklift

The transport frame and packaging remain assembled. The fork must be inserted on the cooling element side in the longitudinal direction.

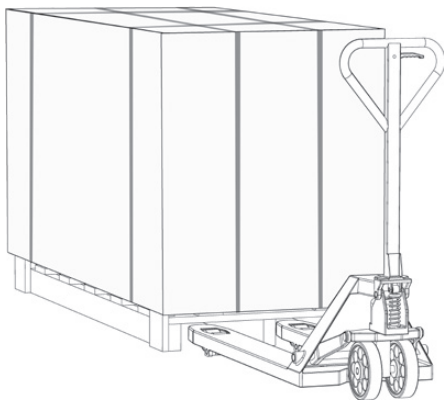


Fig. 01



The outdoor unit is secured to the pallet for transport with four stainless steel attachment brackets (detail A) and screws (4 x). These attachment brackets must be reused on site for fastening the outdoor unit to the concrete base.

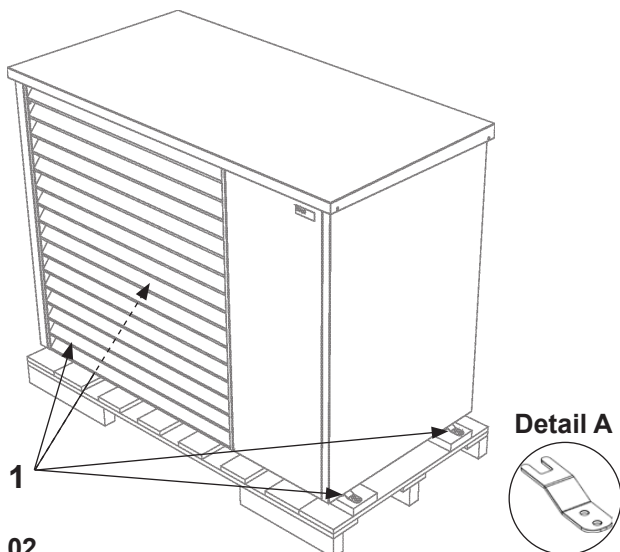


Fig. 02

Transport by crane

The pallet must be released before the outdoor unit is lifted by a crane and hoisted to the installation site. There are three stiffening brackets below the cover (Fig. 03) with openings for the passage of the transport straps.

The angle of inclination of the strands must not exceed 60°.

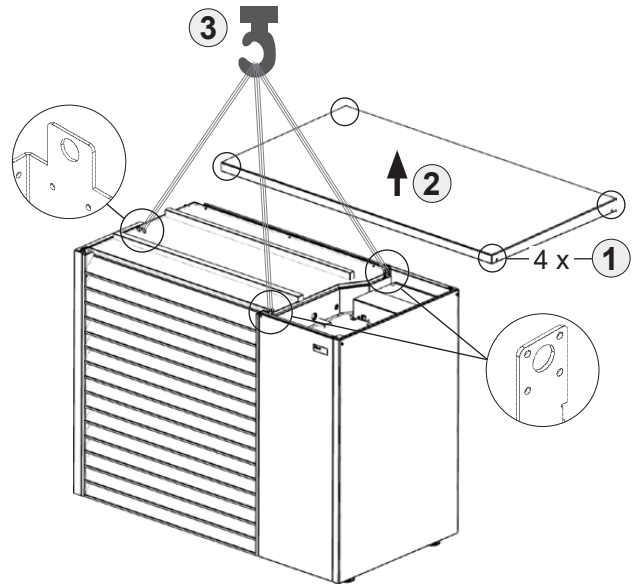


Fig. 03

3.2.3 Mounting outdoor unit on foundation

When placing the base, it is essential to pay attention to the maximum length of the hydraulic connection lines.

1. Place the outdoor unit (1, Fig. 04) on a firm surface (concrete base (2), floor plate or similar base) on site. Please also note the "static system design" in chapter 1.5.3.
2. Position the outdoor unit horizontally using the adjustable feet.
 - Make sure that the upper ends of the adjusting threads are not in contact with the strut above. Otherwise, the vibration compensation would be reduced.
3. Secure the outdoor unit with the attachment brackets (4).
 - Securing according to the selected variant on page 34 and 35.

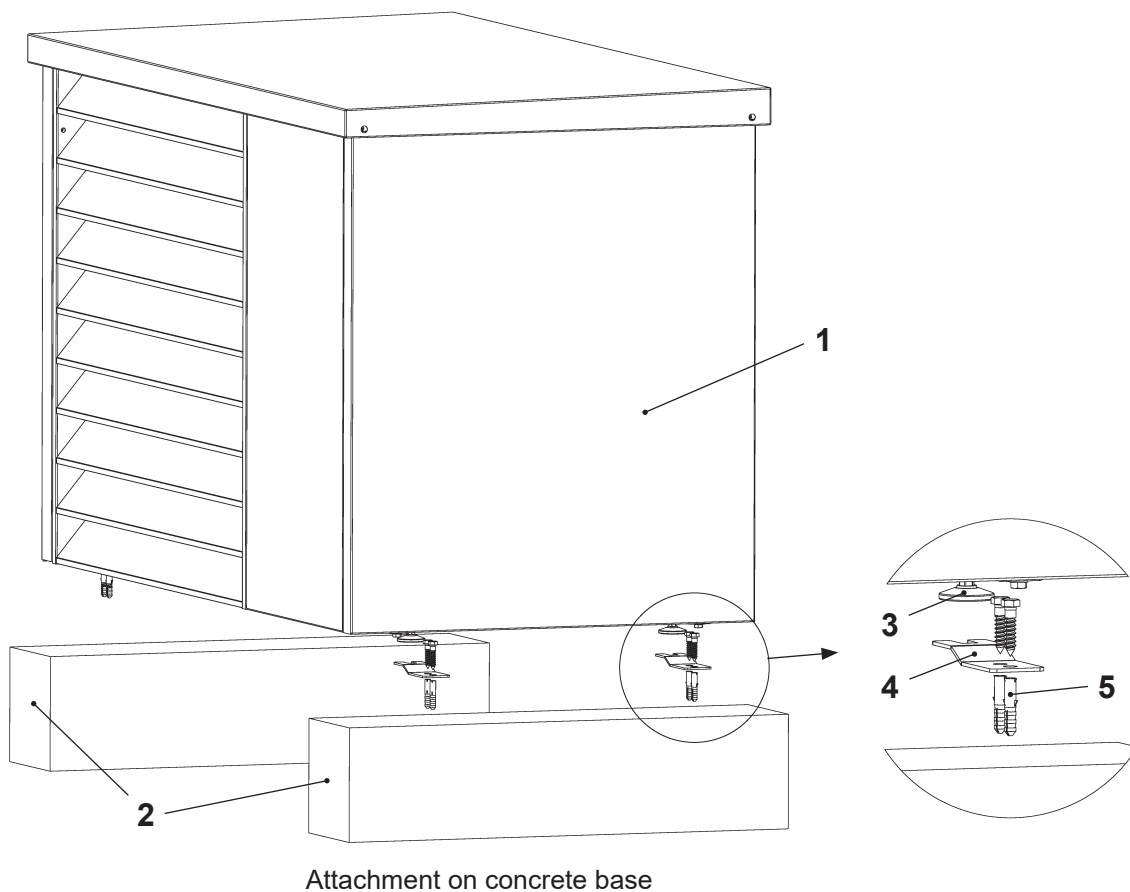


Fig. 04



When building the foundation on site, use the distances of the fixing holes in the drawings on pages 34 and 35.

3.2.4 Grounding the outdoor unit

If the protective earth conductor has been properly connected, then the controller box (Fig. 05) is grounded. After maintenance work, make sure that the grounding is properly restored.

If required, external lightning protection can be attached on the outdoor unit in a 10 mm hole (Fig. 06). This is marked with a sticker (Fig. 06) and is located on the base frame of the outdoor unit. The country-specific regulations must be observed for the configuration of the lightning protection.



Fig. 05

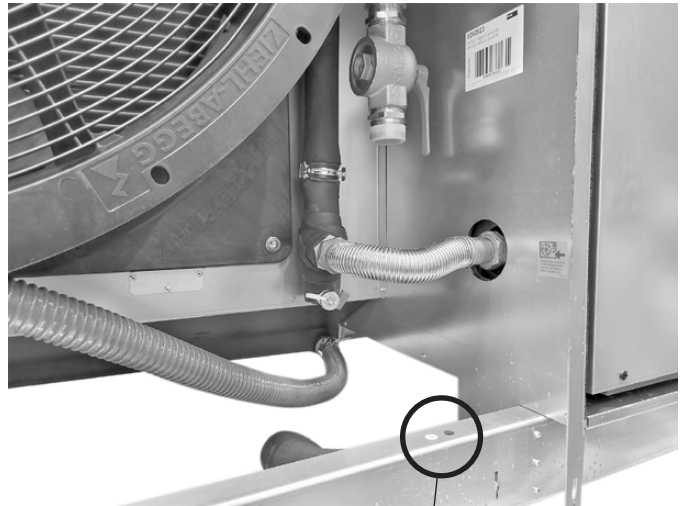


Fig. 06

External lightning protection connection

ASSEMBLY

3.2.5 Making the condensate drain

Special measures must be taken for the resulting condensate. Per defrosting cycle, up to 10 litres of condensate per evaporator unit can accumulate within 2 minutes. In this regard, it must always be ensured that this is properly discharged or can seep away.

The condensate drain must be discharged outside the building and must not be led into or through a building (observe regulations in chapter 1.5). The drain must be configured so that the condensate can flow away without problems even at outdoor temperatures below 0 °C. The pre-installed heating tape must be placed in the condensate drain line.



NOTICE

In order to avoid overheating or a defect of the condensate trace heating, the heating cable in downpipes must not be laid in loops but only as a single line. The heating cable must not touch itself (loops) (minimum clearance 50 mm). Smallest bending radius 25 mm. A specific heat output of 30 W/m is achieved with the pre-installed heating tape.
 - This value must not be exceeded (e.g. by laying a second heating tape in the same line).

Condensate drain connection

The corrugated hose of 1 m is already fixed to the condensate drain pipe with a pipe clamp at the factory. The condensate drain trace heater is also already installed in the condensate drip tray and inserted into the corrugated hose.

The condensate drain hose must finally be laid on site in the empty pipe provided by the customer in accordance with the selected drain variant.

Condensate drain variants

Variant 1 – seepage (Fig. 07)



NOTICE

If the condensate is discharged into a shaft as a soakaway, the gravel layer (coarse gravel) must be below the frost protection limit. Make the empty pipe/shaft protrude by approx. 50 mm as a refrigerant barrier or ensure that the inlet is sufficiently sealed against gas ingress.

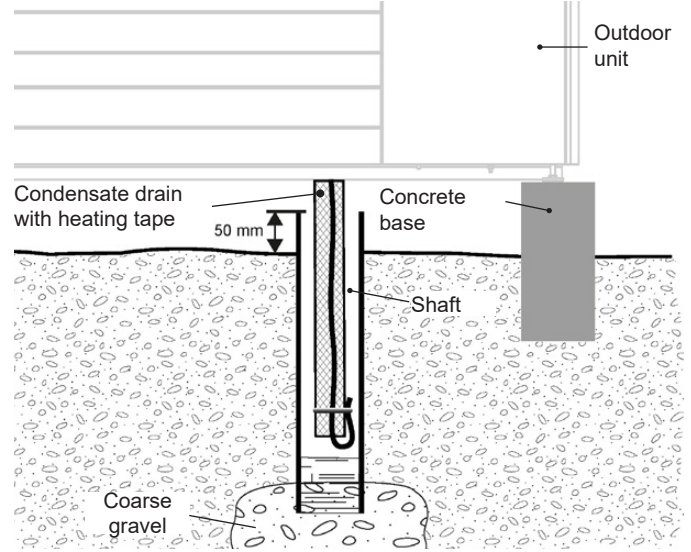


Fig. 07

Variant 2 – Sewage system (Fig. 08)



NOTICE

If the condensate flows into the sewage system via a waste water pipe, the condensate drain must be connected to a siphon underneath the frost limit. The shaft must be sealed at the surface as a refrigerant and odour barrier.

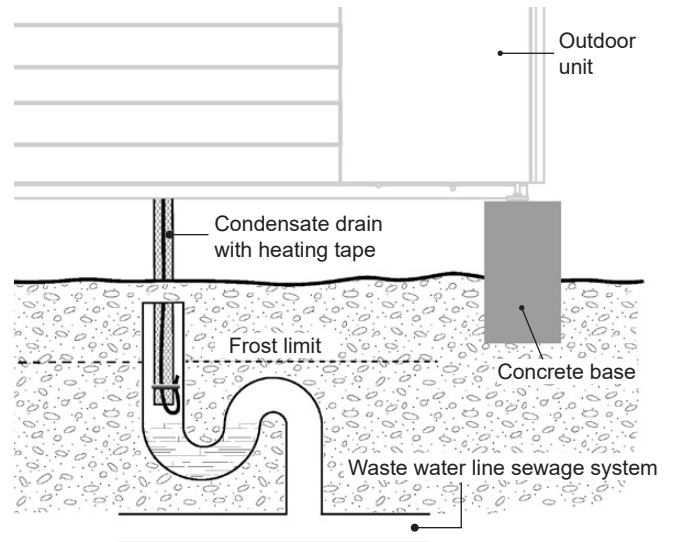


Fig. 08

3.3 Installation of electrical box

3.3.1 Wall installation

! NOTICE

When installing the electrical box, observe the minimum clearances specified in chapter 2.7.1.

Mount the electrical box at a height such that the control module can be easily operated.

- A distance of 1750 mm from the floor to the upper edge of the wall bracket is recommended (see Fig. 10).

Content of mounting set

- 4 wood screws Ø 4.5 x 35
- 4 washers
- 4 dowels Ø 6 x 29



The mounting set is located inside the electrical box at the time of delivery.

Before installation, check whether:

- the intended wall can withstand the operating weight
- there is sufficient space for service work (chapter 2.7.1)
- the place of installation is free from dust and dirt

Installation sequence:

1. Mount the wall bracket supplied with the electrical box (1, Fig. 09, Fig. 10) at the required height using two of the dowels and wood screws supplied.
 - Use the outer drill holes.

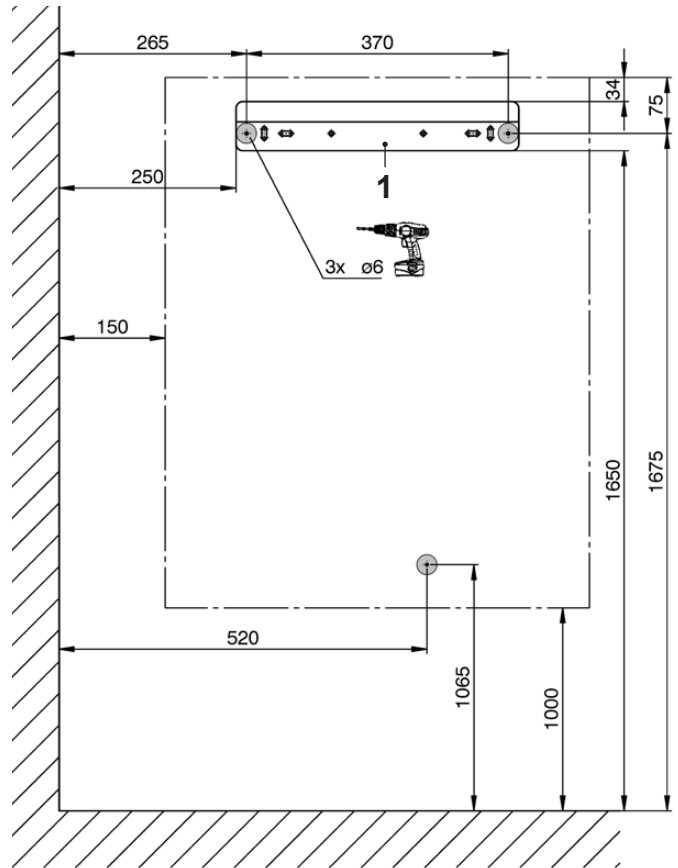


Fig. 10

2. Remove the front (2, Fig. 11) and electrical box cover (3) of the electrical box.

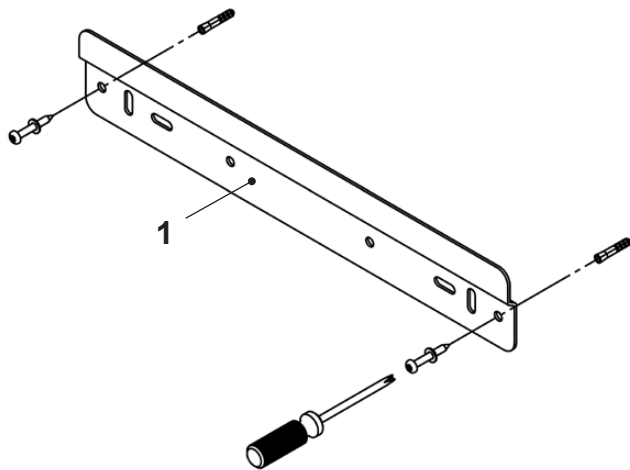


Fig. 09

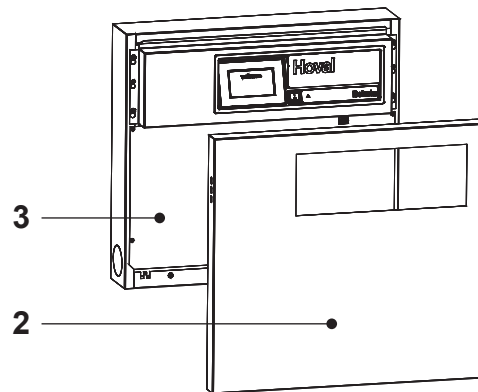


Fig. 11

3. Carefully insert the electrical box (4) into the wall bracket (1).
4. Mark the slotted hole (5, Fig. 12) of the electrical box on the wall.

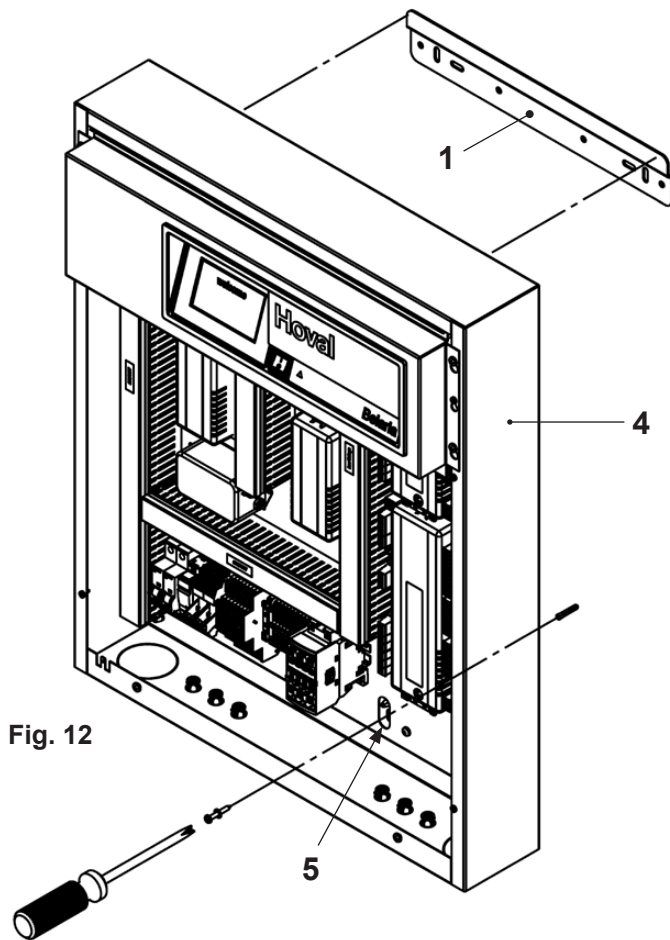


Fig. 12

5. Remove the electrical box again.
6. Drill the hole at the marked position and insert the dowel.
7. Re-insert the electrical box into the wall bracket and secure it with the wood screw.

4. Installation

§

All pertinent laws, regulations and standards for heating house pipework and for heat pump systems must be complied with, in particular EN 378 parts 1 and 2 as well as BGR 500.

- It is imperative that a sludge separator is installed in the heating return upstream from the outdoor unit.
- The safety and expansion fittings for a closed-circuit heating system must be provided in accordance with EN 12828.
- Dimensioning of the pipework must be done according to the required flow rates, see chapter 2.4.
- Ventilation must be provided at the highest points and drainage at the lowest points of the connection pipes.
- To prevent energy losses, the connection lines must be insulated with suitable material.
- A vibration decoupler available as an accessory can be used to prevent solid-borne noise in the heating flow and return!

!

NOTICE

- Provide cut-offs in all supply and drain lines! The line between the heat generator and safety group must not be shut off.
- False flow rates as a result of false pipework, false fittings or improper pump operation could cause damage!

Important information for creating the hydraulic connection lines

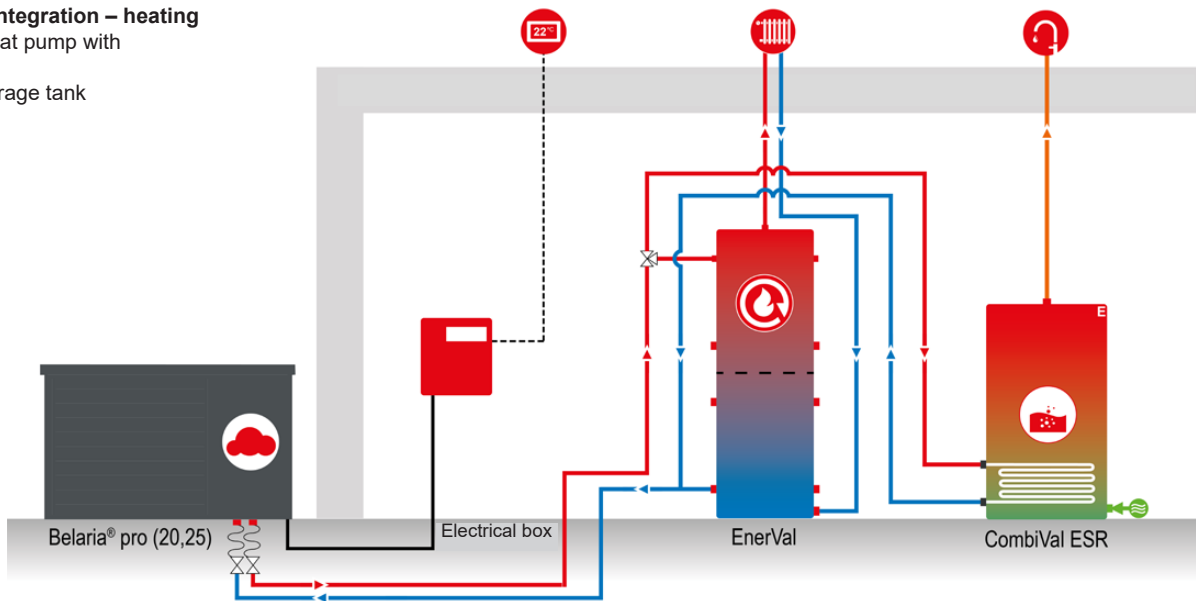
- The maximum permissible length of the DN 40 lines between the indoor and outdoor unit is 30 m and must not be exceeded.
- The hydraulic connection lines must be laid below the frost line and be well insulated.
- The empty piping for the hydraulic connection lines must be sealed on both sides so as to be air tight.

4.1 Example

Hydraulic integration – heating

Air/water heat pump with

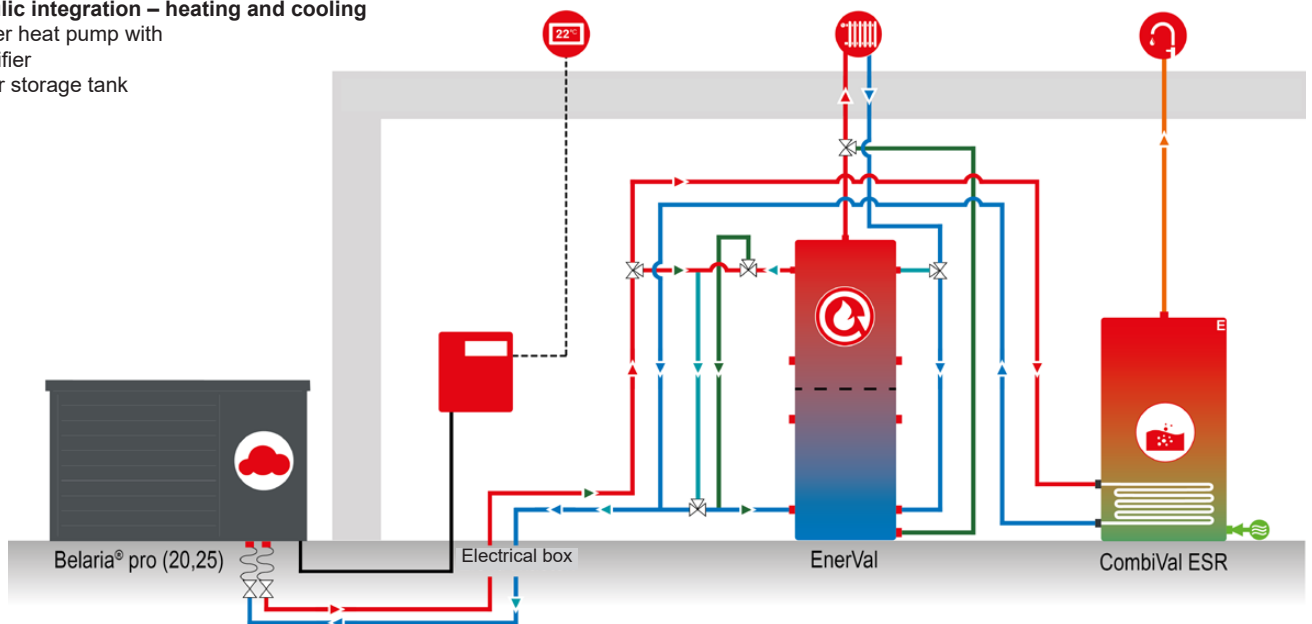
- calorifier
- buffer storage tank



Hydraulic integration – heating and cooling

Air/water heat pump with

- calorifier
- buffer storage tank



- The example schematics merely show the basic principle and do not contain all information required for installation. Installation must be carried out according to the conditions on site, dimensioning and local regulations.
- In plants with system separation, no venting valve or safety valve is allowed to be installed in the primary circuit within the building.
- It is imperative that a sludge separator is installed in the heating return.
- With underfloor heating, a flow temperature monitor has to be installed.
- Shut-off devices to the safety equipment (diaphragm pressure expansion tank, safety valve, etc.) must be secured against unintentional closing!

The project planning documents of the responsible Hoval sales company must be observed with regard to suitable hydraulic circuits.

Looking for the appropriate hydraulic schematic? Please contact your local Hoval partner.

4.2 Installation of outdoor unit

4.2.1 Oxygen diffusion

In the case of underfloor heating systems without diffusion-proof plastic piping or open heating systems, corrosion of the steel parts can occur as a result of oxygen diffusion if steel pipes, steel radiators or storage tanks are used.

Corrosion residue can settle in the condenser and cause heat pump power loss and high-pressure faults.

The use of underfloor heating systems without diffusion-proof plastic piping in conjunction with open heating systems or steel piping installations should therefore be avoided.

Systems with continual oxygen intake (for example, underfloor heating systems without diffusion-proof plastic piping) or intermittent oxygen intake (e.g. requiring frequent topping-up) must be equipped with a system separation.

4.2.2 Connection on the heating side

The connections for the heating flow and return are located on the front of the outdoor unit behind the slatted front. The connections are described in chapter 2.7.

- To connect the outdoor unit hydraulically, the slatted front on the outlet side must be removed.
 - Undo both screws (1, Fig. 13)
 - Raise the slatted front slightly
 - Tilt the slatted front forwards
 - Remove the slatted front forwards.



All claddings, including the slatted front, are hooked in underneath (2) with a metal tab!

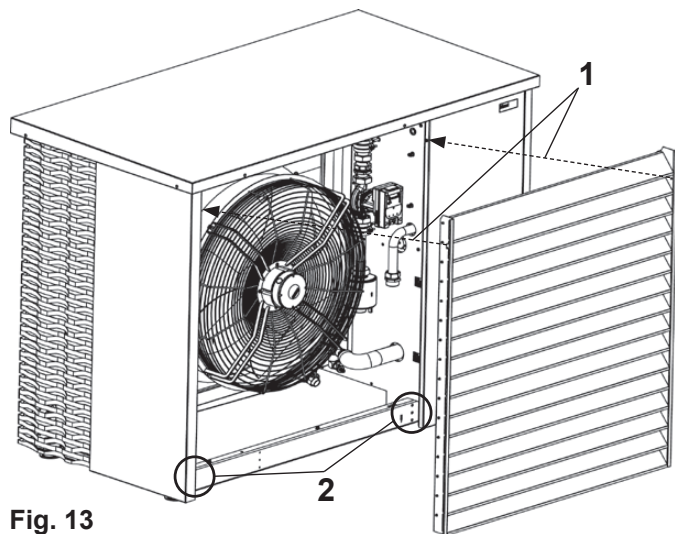


Fig. 13



The entire hydraulic connection line must be properly insulated. Also, the areas that are located in the outdoor unit.

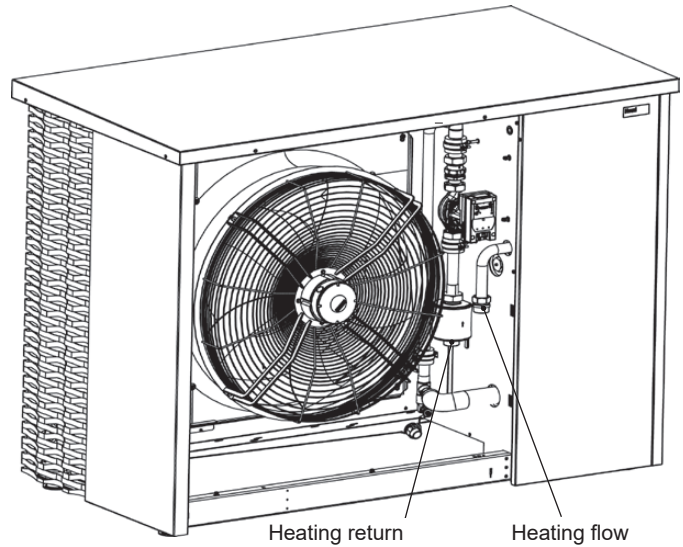


Fig. 14



The hydraulic integration can be found in chapter 4.1.

4.2.3 Safety valve

A gas separator including safety valve and automatic air vent is installed inside the refrigeration section of the outdoor unit.

Response pressure: 2.5 bar + 0.15/- 0.35

The blow-off pipe is already fitted to the safety valve at the factory. This leads into the area below the refrigeration casing to the outside.

4.2.4 Cleaning and servicing the strainer

! **NOTICE**
The strainer and the sludge separator must be cleaned during all maintenance work.

A filter ball valve (strainer) (1, Fig. 15) is installed in the return of the outdoor unit, which is located at the bottom right, directly in front of the lead-through into the refrigeration section.

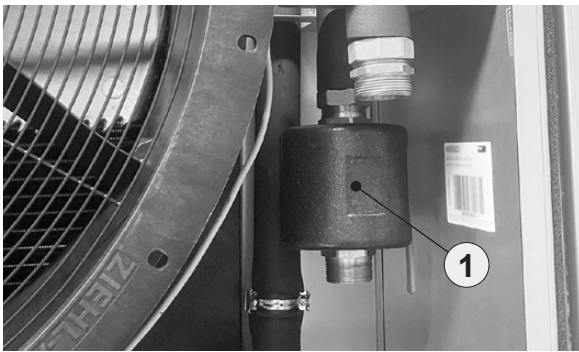


Fig. 15

During commissioning and all maintenance work, this filter must be cleaned as follows.

1. Allow the charging pump to run for 30 minutes before commissioning (not necessary for maintenance).
2. Switch off the charging pump.
3. Remove the hard shell insulation from the ball valve (1, Fig. 15).
4. Close the filter ball valve by aligning the wing handle (2, Fig. 16) horizontally.
5. Open the screw connection (3, Fig. 16) on the underside of the filter ball valve.
 - Water can emerge when opening!

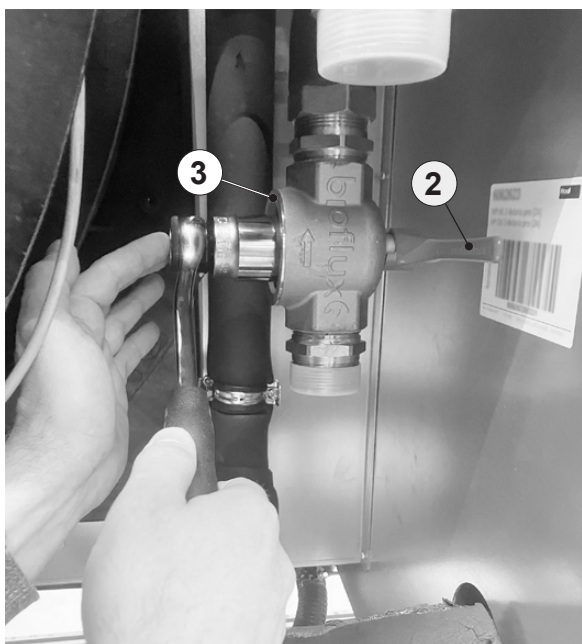


Fig. 16

6. Remove and clean the filter (4, Fig. 17).

! **NOTICE**
After cleaning, reinsert the filter exactly as you removed it. The recess of the filter must be at the front in order to avoid damage.

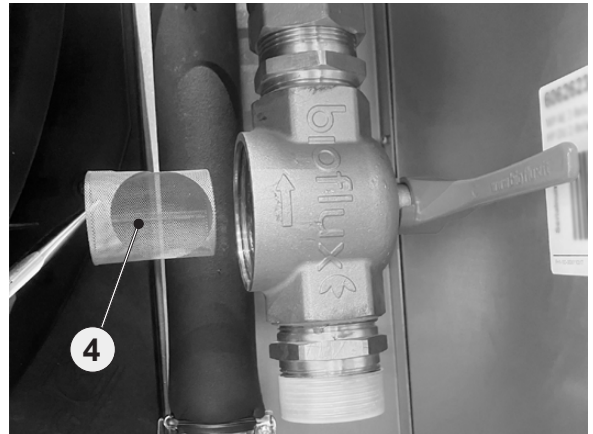
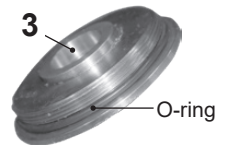


Fig. 17

7. Screw the screw connection (3, Fig. 16) back into the filter ball valve.



Lubricate the O-ring with silicone grease in advance.



8. Open the wing handle on the ball valve again and reattach the hard shell insulation.

4.2.5 Cleaning and servicing the sludge separator



NOTICE

The differential pressure must not exceed 0.3 bar, otherwise the filter cartridge might suffer permanent damage!

If the differential pressure is 0.3 bar or more, the filter cartridge must be cleaned.

The first check should be carried out during commissioning, subsequent checks depend on the degree of contamination in the system, but should be carried out at least every 6 months.

Procedure:

1. Shut off the protective filter using shut-off valves (1, Fig. 18) (or shut-off valves provided by the customer).
2. Drain residual water from the filter through the drain valve (2).
3. Carefully unscrew the filter cup (3) and filter cartridge (4)
4. Depending on the degree of contamination, clean the filter cartridge and filter cup using a water jet, brush, etc. If heavily soiled, clean with DC 316-F Cleaning Fluid.
5. Clean the magnetic rod (5) with a dry cloth to remove any impurities.
6. Carry out recommissioning in reverse order.

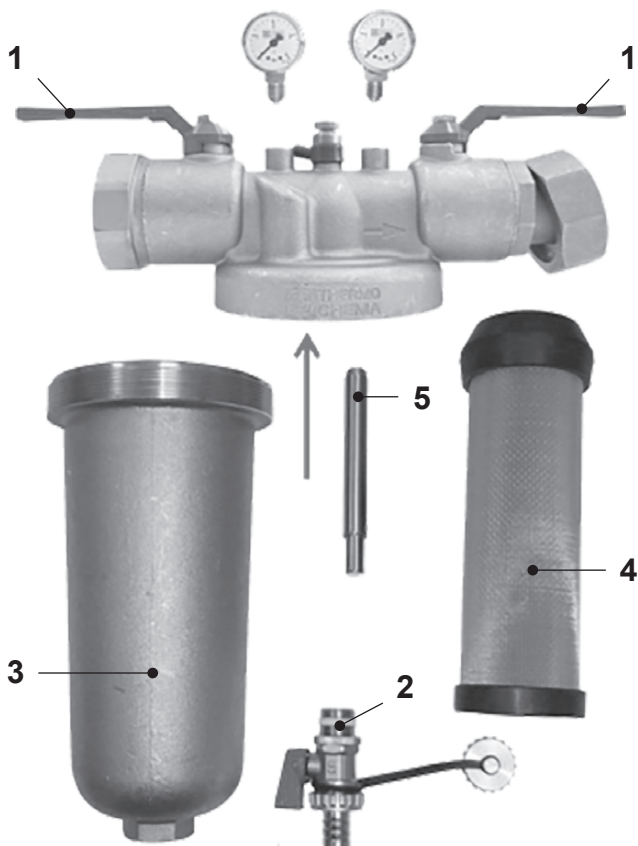


Fig. 18

4.2.6 Electrical connection



A qualified technician must install the electrical supply to the equipment.

The electric wiring diagram is supplied separately. The required cable cross-section for the mains supply can be taken from this.

The electrical connection must be carried out by a qualified technician and registered with the responsible energy supply company. The relevant electrical installation company is responsible for ensuring that electrical connection is carried out in accordance with standards and that safeguard measures are put in place.

- The line voltage must lie within certain tolerance limits to ensure the flawless operation of the heat generator. These are +6 % and -10 % for control current and ± 10 % for main current.
- A fault-current circuit breaker is recommended. Country-specific requirements must be complied with. If the “fault-current circuit breaker” safeguard measure is implemented by the electrical company, a separate fault-current circuit breaker is recommended for the heat generator.
- This fault-current circuit breaker must be of the all-current-sensitive type B ($I_{\Delta N} \geq 300$ mA). The specified RCCB types apply to the heat generator regardless of externally connected components (refer to assembly instructions, data sheets).
- Owing to the starting currents that occur, circuit breakers with a type “C” or “K” tripping characteristic are to be used for the main circuit.
- For the control circuit and additional electric heating, circuit breakers with a type “B” or “Z” tripping characteristic are sufficient.
- The electrical connection and feeder lines must be copper cables. Please refer to the wiring diagram for electrical details.
- For the electrical connection, comply with the safety measures relating to EMC-compliant assembly (see chapter 4.4).



WARNING

All electrical power supply circuits must be switched off and secured against reactivation before the connection terminals are accessed.



NOTICE

- The pumps must be checked for seizing before commissioning of the system
- Check and retighten the terminals and attachment screw connections before commissioning the plant
- The system must not be connected to the mains power supply and operated until the entire heating system has been filled; otherwise, the circulating pump could run dry.

Connecting the outdoor unit electrically

Disassemble the slatted front (1, Fig. 19) of the outdoor unit and connect the connection lines of the indoor unit in accordance with the included electric wiring diagram on the terminal box.

1. Disassemble the slatted front as described in chapter 4.2.2.
2. Remove the terminal box cover by loosening the four screws.
3. Connecting the outdoor unit electrically according to the electric wiring diagram
4. Reinstall the slatted front.

The incoming cables must be protected with appropriate strength; see chapter 2.4.

The line cross-sections for the main circuit connection must be dimensioned in accordance with the technical data (see the electric wiring diagram).



For an example of laying electrical cables underground, see chapter 3.1.

The connection terminals are now freely accessible.

Main current: 3 x 400 V/50 Hz

Control current: 1 x 230 V/50 Hz

Outdoor unit

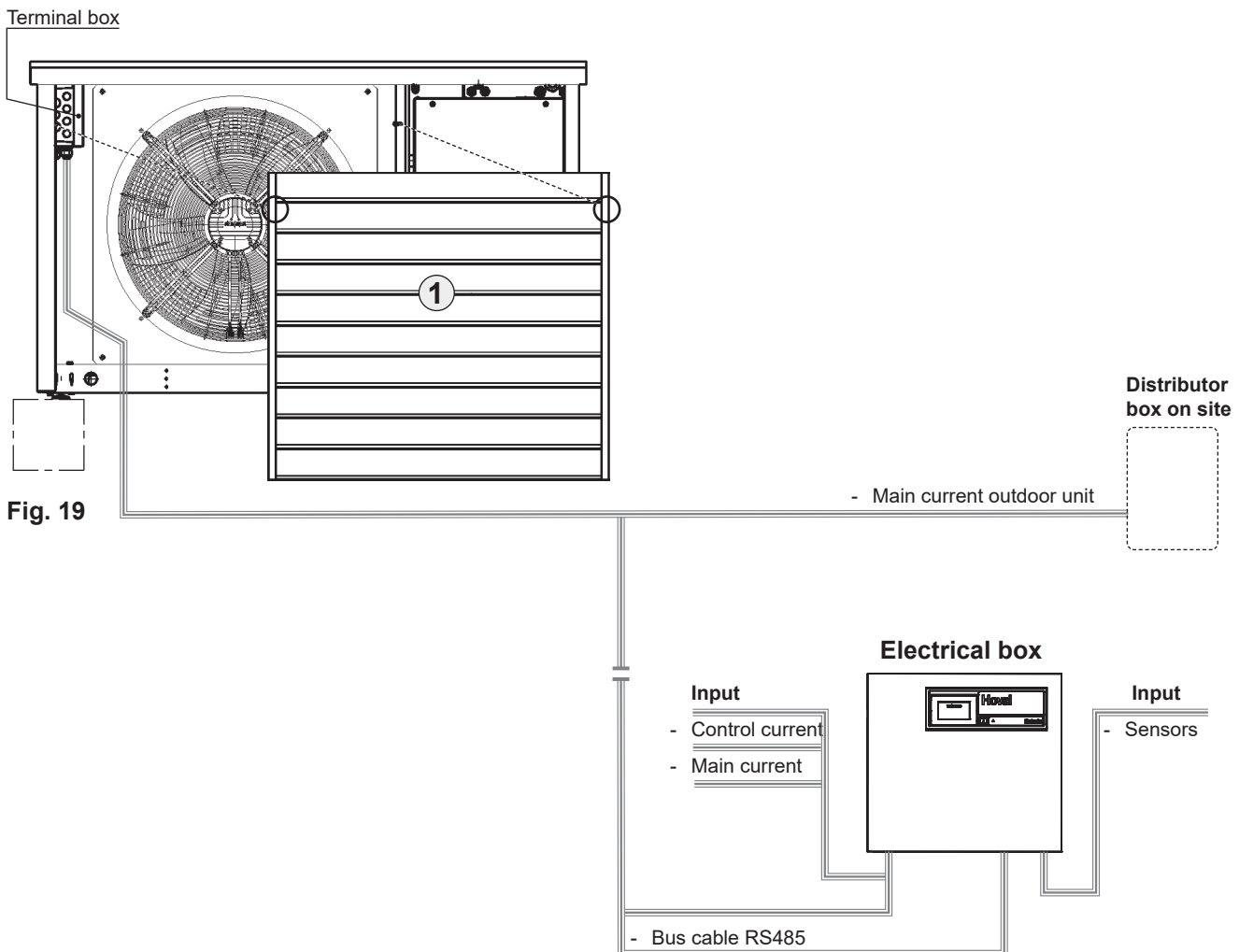


Fig. 19

4.3 Installation Elektrokasten

4.3.1 Electrical connection



A qualified technician must install the electrical supply to the equipment.

The electric wiring diagram is supplied separately. The required cable cross-section for the mains supply can be taken from this.

The electrical connection must be carried out by a qualified technician and registered with the responsible energy supply company. The relevant electrical installation company is responsible for ensuring that electrical connection is carried out in accordance with standards and that safeguard measures are put in place.

- The line voltage must lie within certain tolerance limits to ensure the flawless operation of the heat generator. These are +6 % and –10 % for control current and ± 10 % for main current.
- A fault-current circuit breaker is recommended. Country-specific requirements must be complied with. If the “fault-current circuit breaker” safeguard measure is implemented by the electrical company, a separate fault-current circuit breaker is recommended for the heat generator.
- This fault-current circuit breaker must be of the all-current-sensitive type B ($I_{\Delta N} \geq 300$ mA). The specified RCCB types apply to the heat generator regardless of externally connected components (refer to assembly instructions, data sheets).
- Owing to the starting currents that occur, circuit breakers with a type “C” or “K” tripping characteristic are to be used for the main circuit.
- For the control circuit and additional electric heating, circuit breakers with a type “B” or “Z” tripping characteristic are sufficient.
- The electrical connection and feeder lines must be copper cables. Please refer to the wiring diagram for electrical details
- For the electrical connection, comply with the safety measures relating to EMC-compliant assembly (see chapter 4.4).



WARNING

All electrical power supply circuits must be switched off and secured against reactivation before the connection terminals are accessed.



NOTICE

- The pumps must be checked for seizing before commissioning of the system!
- Check and retighten the terminals and attachment screw connections before commissioning the plant.
- The system must not be connected to the mains power supply and operated until the entire heating system has been filled; otherwise, the circulating pump could run dry.

Connecting the electrical box electrically

For the electrical connection, the front cladding (1, Fig. 20) must be removed and the electrical cover plate (2) dismantled.

The cable introductions are located on the underside of the electrical box (see chapter 2.7).

Disassembly of the front cladding:

1. Slide the front cladding (1, Fig. 20) upwards out of the catch (keyhole), pull it out at the bottom and remove it from the casing.
2. Remove the electrical cover plate (2).

The connection terminals are now freely accessible.

Control current: 1 x 230 V/50 Hz

The incoming cables must be protected with appropriate strength; see chapter 2.4.

Connection terminals:

3-tiered: output terminals 230 V/50 Hz

Grounding of the system:

If the protective earth conductor has been properly connected, then the control panel and casing of the electrical box are grounded. After maintenance work, make sure that the grounding is properly restored.



NOTICE

The heat pump was tested at the factory with a test voltage of 500 V DC. When an insulation measurement is carried out on the system by the power utility operator, the electronic components of the heat pump must be disconnected beforehand so as not to cause any damage to the unit. Thus, only the electrical feeder cable of the heat pumps can be tested.

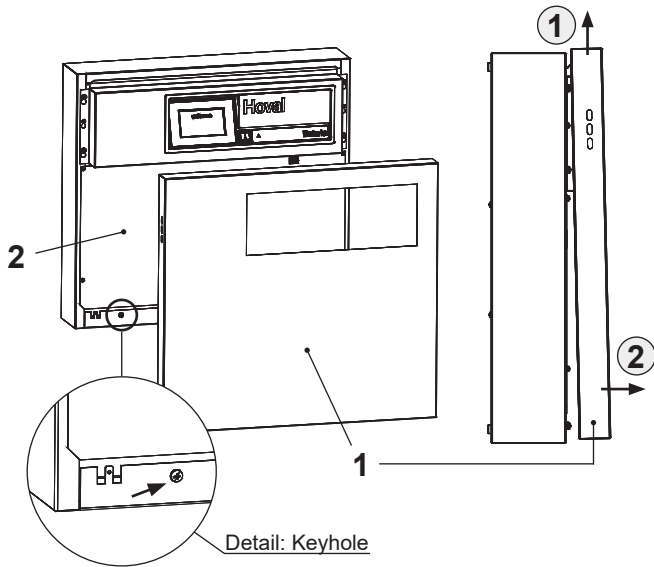
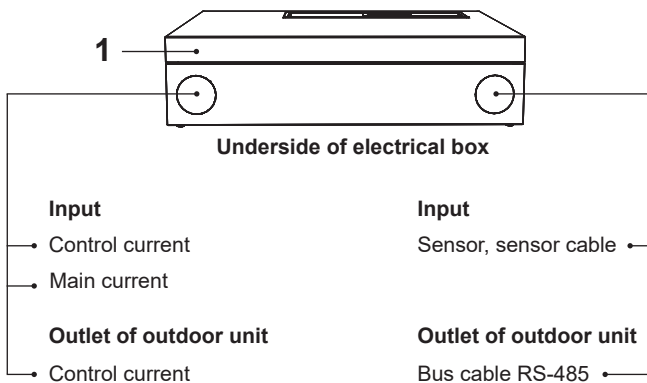


Fig. 20



4.3.2 Control set for external electric heating element

The electrical box does not have an electric heating element as standard. When using an externally installed electric heating element, a control set is required for its control, which is installed in the electrical box.

The control set includes a contactor as well as terminal blocks and is pre-wired at the factory.

Control set installation:

1. Disassembly of the front cladding
 - Slide the front cladding upwards out of the catch (key-hole), pull it out at the bottom and remove it from the casing.
 - Remove the electrical cover plate.
 - Space for the control set is provided on a top hat rail.
2. Mount the control set (1) on the top hat rail Fig. 21.
 - Laying the cabling in the cable ducts
3. Connect the electric heating element electrically according to the electric wiring diagram.

Installation of a module expansion and controller modules

Fig. 21 shows the position at which additional module extensions (TTE-FE) and controller modules (heating circuit/domestic hot water, buffer, solar or measuring module) can be installed if required.

The supplementary plug set must be ordered in order to use expanded controller functions.

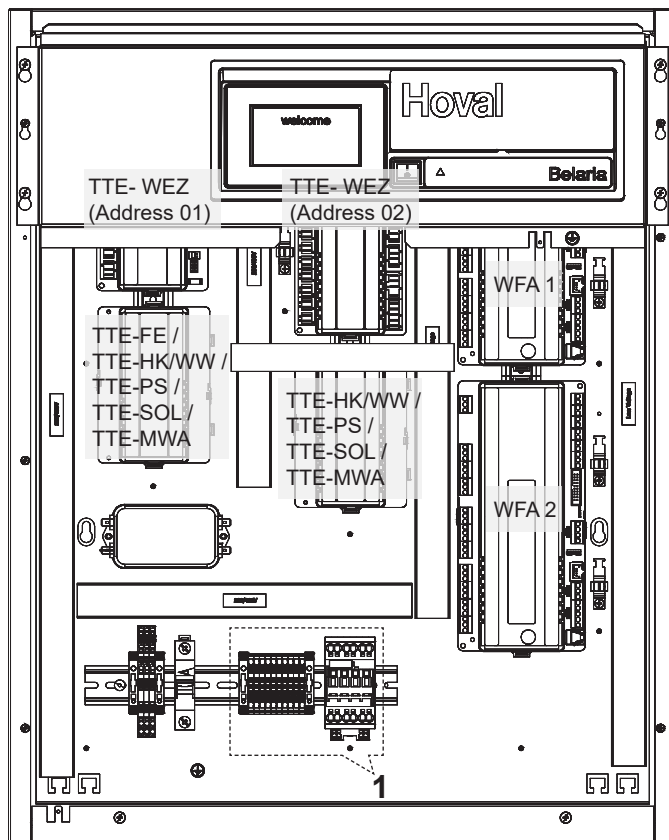
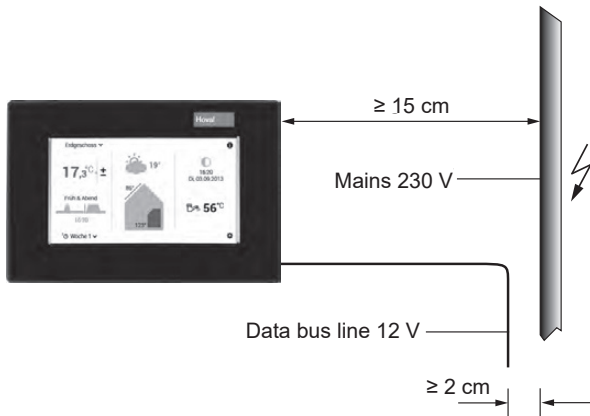


Fig. 21

4.4 Safety measures relating to EMC-compliant assembly

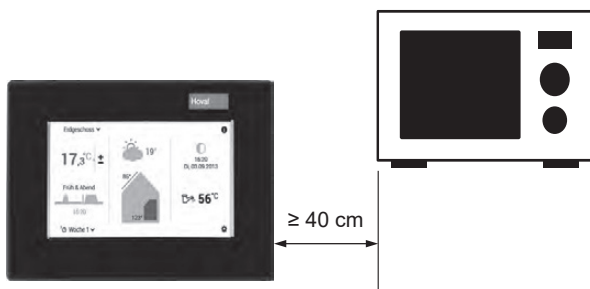
- Cables carrying mains voltage must be routed separately from sensor or data bus cables. A minimum distance of 2 cm between the cables must be observed. Cable crossovers are permitted.

Minimum distances for electrical installation



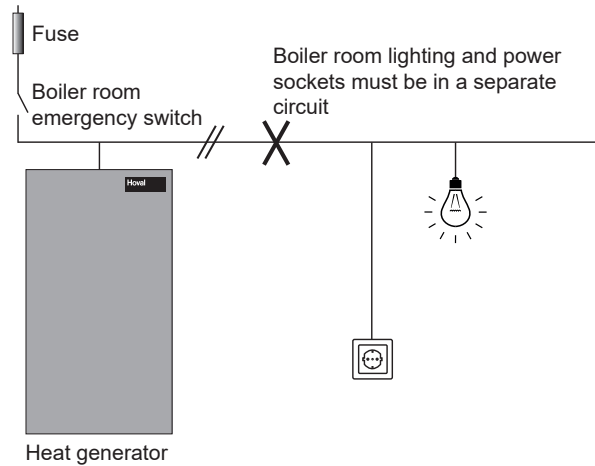
- In the case of controller modules with their own mains supply, it is imperative that cables carrying mains voltage are routed separately from sensor or data bus cables. If cable ducts are used, these must be provided with separator strips.
- When mounting controller modules or room control modules, maintain a minimum clearance of 40 cm from other electrical devices with electromagnetic emissions, such as power contactors, motors, transformers, dimmers, microwave ovens and TV sets, loudspeakers, computers, mobile phones, etc.

Minimum distance from other electrical units



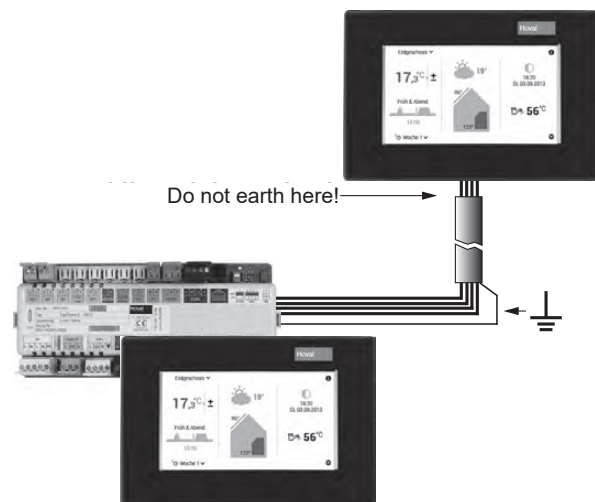
- Avoid unnecessary cable lengths, including in spare cables
- Coils of relays, contactors and other inductors in the panel, and possibly in the vicinity, must be connected. The connection can be made with RC elements, for example.

- Measures must be taken in the building and on electrical equipment to protect the units against overvoltage caused by lightning strikes.
- The mains connection for the heating system must be designed as an independent electrical circuit. Neither fluorescent lamps nor any other equipment which might cause interference may be connected, nor may it be possible to connect such equipment.



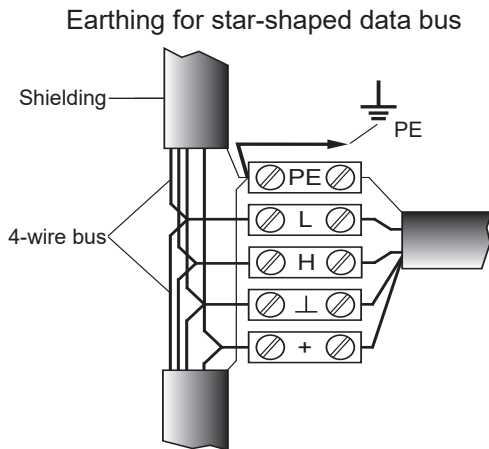
- Equipotential bonding must be established between the individual control components, control panels and the heating system.
- Shielded cables must be used for the data lines. Recommended versions: J-Y(ST)Y 2 x 2 x 0.8 mm
- Shields of data lines, analogue signal cables and power cables must be connected to earth over a large area with a highly conductive connection. The cable shields must be connected to a shield bar directly after the entry of the cable into the panel.
- Multiple earthing of a cable is not permitted (ripple pickup).

One-sided earthing of the shielding



Basic/controller module with control module

In the case of star-shaped data bus networks, double earthing is not permitted. The earthing must be carried out on one side at the star point.



To ensure correct electrical installation, unit connection and equipotential bonding (energy supply company and building installation), all applicable laws, regulations and standards must be complied with; in particular, the regulations of the responsible energy supply company. Common equipotential bonding must be carried out in accordance with the regulations and standards. The cable shield is not allowed to be used for equipotential bonding.

The work is only allowed to be carried out by qualified specialist personnel. It is the responsibility of the electrician to ensure appropriate EMC installation.

- The outdoor sensor must not be mounted in the vicinity of transmitters and receivers (on garage walls near receivers for garage door openers, amateur radio antennae, radio alarm installations or in the immediate vicinity of large transmitters, etc.).

Maximum permitted cable lengths for cables carrying sensor and low voltage (without PWM):

- Min. 0.5 mm² (J-Y(ST)Y 2 x 2 x 0.8 mm)
- Max. permitted cable length: 50 m
- Max. PWM cable length according to pump specification

Longer connecting cables should be avoided because of the danger of radiated interference!

Inter-building installations

- Inter-building installations and laying the bus line underground are not permitted without prior engineering and additional measures
- Where possible, avoid routing low-voltage and safety extra-low voltage cables (CAN bus line) in parallel in adjacent buildings (overbuildings) or through underground car parks. If this cannot be avoided, one or more of the following options should be selected to improve the decoupling:
 - Increase the spacing distance
 - Route cables in a metal cable tray or metal cable duct that is enclosed on all sides, and must be well earthed
 - Use high-quality twisted-pair cables
- Potential differences between CAN_H, CAN_L and ground must be kept low
- If there are higher potential differences, the frequency of errors will increase until the point when bus traffic is completely blocked

4.4.1 Recommended cable cross-sections and maximum permitted cable lengths:

Line type	Cross-section	Length
Power supply of the heat generator (230 V/400 V)	See wiring diagram	unlimited
Cables carrying mains voltages from actuators	See wiring diagram	unlimited
Cables carrying low voltage (sensors)	min. 0.5 mm ²	max. 50 m
Data bus lines (shielded)	2 × 2 × 0.6 mm ²	max. 100 m

The electrical connection must be established in accordance with the applicable standards of nationally or internationally recognised professional associations.



At this point it is above all else the responsibility of the electrician to avoid potential means of interplay when constructing the electrical installation.

4.5 Flushing, filling and venting the heating circuit



The system must be absolutely free of air before commissioning.

! **NOTICE**

- Before flushing, make sure that the built-in circulating pump is flushed in the prescribed direction to avoid damage to the circulating pump.
- A non-return valve is installed in the return line before it enters the condenser.
- Only fill in the direction of the condenser.
- For operation, the groove on the non-return valve must be set so that the point is facing towards the “Z” position (Fig. 22).



Fig. 22

! **NOTICE**

It is imperative that a sludge separator is installed in the heating return. The already installed strainer (in the outdoor unit) and the sludge separator must be cleaned before commissioning after the heating side has been thoroughly flushed (procedure as described in chapter 4.2.4).

To vent the process water charging circuit, the heating circuit and process water charging circuit must be flushed simultaneously. While flushing the circuits, the three-way valve must be switched over several times manually to allow the air to be purged from both circuits.

Then pressure-test the system with 2.0 bar and check for leaks (also inside the outdoor unit). After flushing and venting the system, apply the required system pressure.

! **NOTICE**

- Pressure must not exceed 2.2 bar during flushing.
- Before flushing and filling, check in the outdoor unit that the blow-off pipe is firmly seated on the safety valve outlet. If necessary, retighten the hose coupling.
- When flushing and filling, always observe the opening pressure of the safety valve in the outdoor unit!

To prevent refrigerant from entering the water circuit and escaping inside the building, the safety valve in the outdoor unit has been configured for 2.5 bar. This ensures that the safety valve in the outdoor unit responds before the safety valve in the indoor unit.

! **NOTICE**

When the outdoor unit is connected to the water supply (for filling the heating circuit), an appropriate safety device on the system side must ensure that non-domestic water is prevented from being sucked back into the water supply system.

4.6 Water quality of the heating water

Heating water

§

European Standard EN 14868 and the corresponding national standard (ÖNORM H5195, VDI 2035, SWKI BT102-01) must be observed.

In particular, the following specifications must be complied with:

- Hoval heat generators are suitable for heating systems without significant oxygen intake (system type I in accordance with EN 14868).
- Systems with
 - continuous oxygen intake (e. g. underfloor heating systems without diffusion-proof plastic piping) or
 - intermittent oxygen intake (e. g. requiring frequent topping-up)
 must be equipped with **separate circuits**.
- Treated heating water must be tested at least 1x per year, or more frequently if specified by the manufacturer of the inhibitor.
- In the case of existing systems (e. g. replacing the heat generator), if the water quality of the existing heating water meets the requirements of VDI 2035, re-filling the system is not recommended. The requirements of VDI 2035 also apply to replacement water.
- Before filling new systems and, where necessary, existing systems, the heating system must be professionally cleaned and flushed!
The heat generator must not be filled until the heating system has been flushed.
- Parts of the heat generator/calorifier which come into contact with water are made of copper and stainless steel.

- Due to the danger of stress corrosion to the stainless steel part and the pitting in the copper part of the heat generator, the chloride, nitrate and sulphate content in the heating water must not exceed 100 mg/l in total.
- After 6-12 weeks of heating, the pH value of the heating water should be between 8.3 and 9.0.

Filling and replacement water

- As a rule, the best filling and replacement water for a system with Hoval heat generator is untreated mains water. However, the quality of the untreated mains water must still meet the requirements of VDI 2035 or be demineralised and/or treated with inhibitors. The requirements of EN 14868 must be met in this context.
- To maintain the high efficiency of the heat generator, the water content of the system and the maximum flow temperature should not exceed the values in the table (not for CH*), based on the output of the heat generator (smallest heat generator for systems with more than one heat generator).
- The total quantity of filling and replacement water added to the heat generator over its service life must not be higher than three times the system water content.

For brine/water heat pumps and all air/water heat pumps

Maximum filling quantity without/with demineralisation

Total output of heat pump(s)	Total hardness of the filling and replacement water depending on the specific system volume			Max. permissible total alkaline earths
	< 20 litres/kW	≥ 20 litres/kW and < 50 litres/kW	≥ 50 litres/kW	[mol/m³]
< 50 kW	≤ 16.8 °dH	≤ 11.2 °dH	≤ 0.11 °dH	no requirement
50 - 200 kW	≤ 11.2 °dH	≤ 8.4 °dH	≤ 0.11 °dH	≤ 2.0
200 - 600 kW	≤ 8.4 °dH	≤ 0.11 °dH	≤ 0.11 °dH	≤ 1.5
> 600 kW	< 0.11 °dH	< 0.11 °dH	≤ 0.11 °dH	≤ 0.02
Max. permissible electrical conductivity depending on the oxygen content of the system volume				
	O ₂ < 0.02 mg/l	“containing salt”	O ₂ ≥ 0.02 mg/l and < 0.1 mg/l	“low-salt”
	< 1500 µS/cm		< 100 µS/cm	

* In Switzerland, SWKI BT102-01 must be complied with.

5. Commissioning

Commissioning may only be performed by Hoval customer service or a trained specialist authorised by Hoval.

The following persons are required at the start of commissioning:

Installation engineer/planner/electrician

The system operator must be present at the end of commissioning so that the operation and maintenance of the heat generator can be explained to him, as well as the safety instructions relating to the heat pump.

5.1 Prerequisites for commissioning

A full installation inspection has been completed by the responsible installer and electrician.

The installation inspection prevents damage to the heating system that may result from improperly performed work.

The following must be checked:

- The heat generator was installed and assembled in accordance with the specifications in these installation instructions and the Hoval engineering guidelines.
- The condensate drain is ensured. The condensate drain heating tape has been checked to ensure that it is clamped everywhere in the evaporator tray at the designated points.
- The electrical installation must be completed and safeguarded according to applicable regulations and standards. Observe the instructions for carrying out the insulation measurement in chapter 4.3.1.
- The clockwise rotating field of the load feeder (compressor) has been checked.
- The fuse protection of main current and control current is performed according to the technical data.
- All pipe systems and components of the plant have been checked for leaks.
- The heating and any storage tank that might be present have been rinsed, filled and thoroughly vented, see chapter 4.5.
- Strainer and sludge separator have been cleaned.
- All valves and shut-off devices in the heating circuit must be open.
- In the outdoor unit, check the blow-off pipe for firm seating on the safety valve, tighten the hose coupling if necessary
- Visual inspection of the tightness of the safety valve in the outdoor unit (no dripping on the valve/no residues in the blow-off pipe)

5.2 Commissioning of the heat pump



- The TopTronic® E controller modules should be configured by a specialist authorised by Hoval (commissioning assistant).
- The heat pump can only be put into operation if the return temperature is above 15 °C.
- The heat pump has a preset start-up delay, meaning that the compressor will not start up until this time has elapsed.



Further information on commissioning can be found in the commissioning checklist and in the TopTronic® E control module quick reference guide.

Carry out the following checks again before commissioning:

- The refrigeration circuit has been checked for leaks using a leak detector.
- The transport locks (marked in dark grey, Fig. 23) outside and inside the refrigeration section have been removed.
 - The cover and cladding parts must be removed.

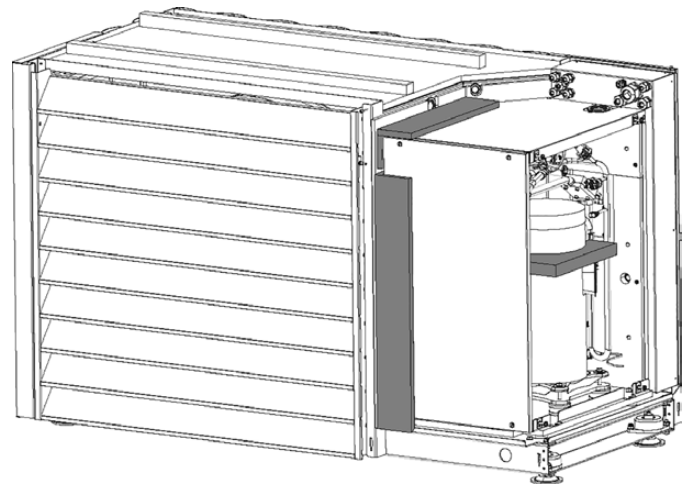


Fig. 23

Commissioning procedure:

1. Carry out the parameter settings according to the system diagram.
2. Start relay test and functional test of the following components:
 - Fan (direction of rotation OK?)
 - Circulating pump and if necessary heat source pump (flow direction OK?)
 - 4-way valve and expansion valves
 - Condensate drain heating
 - Switching valve heating/domestic hot water
3. Carry out steps according to chapters 4.5 and 5.2.1.
4. Switching the heat generator on
 - Set blocking switch on the control module to "I".
5. Start up the heat generator and complete the commissioning log.
6. Check the function of all safety and control devices.
7. Check the operating modes (heating, domestic hot water, cooling).
 - Pay attention to the switching of the 4-way valve and the switching valve.
8. Set the basic program of the heating control (see operating instructions).



No further settings are required after commissioning. The heat pump is switched on/off automatically.



NOTICE

If the cover of the heat pump has been removed, it must be properly reinstalled after the work has been completed. Make sure that the cover is fully connected to the heat pump using all the screw holes provided, to ensure stability and tightness. The screws on the cover are secured with threadlocker (medium-strength) and tightened to a torque of 5 Nm.

5.2.1 Setting the relief valve with modular storage tank

1. Close all heating circuits.
2. Switch on the pump (CP) via the relay test and read off the flow rate.
3. Set the relief valve to minimum flow rate for defrosting.
4. Open the heating circuits again.
5. Terminate the relay test.

5.3 Monitoring work before handover to the operator

Before the heat generator is handed over to the operator, all commissioning or maintenance work must have been completed and the plant checked.

- Hydraulic lines have been checked and tested for leaks.
- All safety devices and covers that were removed have been re-installed.
- The screws on the cover are secured with threadlocker (medium-strength) and tightened to a torque of 5 Nm.
- For devices that do not yet have a data plate attached at the position in Fig. 24, the data plate supplied in the system manual must be attached.
- The information sign "Outdoor unit contains safety valve 2.5 bar" must be affixed near or on the indoor unit.

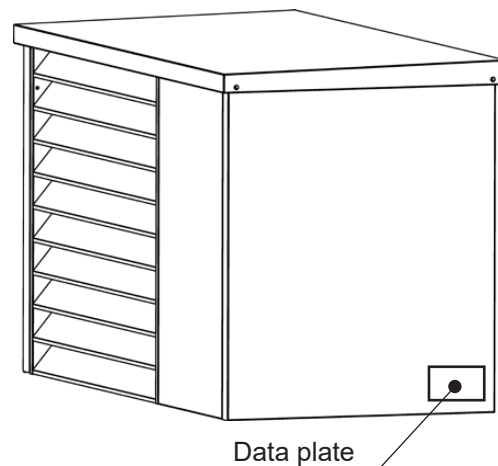


Fig. 24

5.4 Handing the heat generator over to the operator

The following points must be carried out on the handover to the owner:

- Instruction in operation, maintenance and safety equipment of the plant.
- Instruction in any applicable safety instructions relating to the refrigerant used.
- Handover of all instructions and documents.
- Inform the owner that these instructions must always be kept with the plant.
- Written confirmation of the instruction.



The handover report is on the last page of the document.

5.5 Manual operation

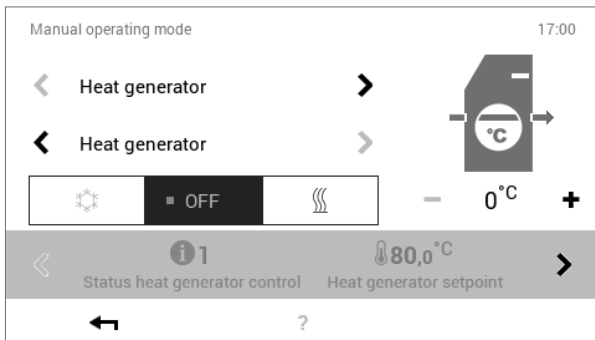
This chapter is exclusively intended to describe the function of the manual operation settings. All other control elements of the control unit are described in the operating instructions.



CAUTION

Scalding hazard due to hot water temperature, since the hot water temperature can exceed the temperature setpoint!

Manual operation



Settings under:

Home Screen > Main menu (page 2) > Manual operation.



For detailed information see operating instructions, "Manual operation" chapter.

REACTIONS for manual operation

- Setting the required setpoint temperature using the selected heating or hot water circuit
- All heating pumps ON
- Note the maximum permissible temperature of the floor heating!

6. Maintenance

6.1 Maintenance work

Regularly scheduled maintenance and the examination and care of all important system parts ensure safe and economical operation of the system in the long run. We therefore recommend that you conclude a service contract with your Hoval customer service for this purpose.

The work described below is normally performed by the specialist technician in the course of maintenance. Nevertheless, carry out the following checks during the year and perform the work described as necessary (chapters 6.2 – 6.3.1).



NOTICE

When reconnecting the outdoor unit, secure all fillister-head screws on the cover with threadlocker (medium strength) and tighten to a maximum torque of 5 Nm.

6.2 Checking the water pressure

Read out the water pressure in the plant off the pressure gauge. If the water pressure is too low, inform your installer or top it up with water.

6.2.1 Refilling the heating system

- Set blocking switch to "0".
- The shut-off valves in the heating flow and return lines must be open.
- Open the mixing valve approx. $\frac{1}{4}$ of the way by hand.
- If the heating system is filled with frost protection agent or treated water, the heating engineer's instructions must be followed.
- Connect a hose between the filling cock and the water tap:
 - Fill the hose with water before establishing the connection to prevent any air from entering the heating system.
 - Unscrew the hose again after filling to break the connection reliably.
- Slowly fill with water while checking the water level on the hydrometer or pressure gauge.
- Vent radiators.
- Check the water level again.
- Switch the system on again.



Complete filling and draining must be performed by the heating engineer

6.3 Cleaning

6.3.1 General cleaning

We recommend cleaning the heat generator to remove accumulated dust and dirt. When cleaning, please pay attention to any damage. If the heat generator is damaged, please contact our customer service.

If necessary, the indoor unit and outdoor unit can be cleaned with a damp cloth. There is no need to de-energise the unit, because this is only an external surface cleaning process. The use of cleansing agents is not recommended.

Outdoor unit



NOTICE

Prior to work on the outdoor unit, observe the safety regulations in chapter 1.



NOTICE

Work on the refrigeration circuit (compressor, condenser, evaporator, expansion valve etc. and including the circuit pipework) is only allowed to be carried out by authorised Hoval service technicians with technical approval.

The plate pack of the evaporator must be checked regularly and, if necessary, carefully cleaned by hand to remove impurities (e.g. leaves, ...).

To avoid water damage, the condensate drip tray and the condensate drain must be checked regularly for dirt (e.g. leaves, ...). If necessary, this dirt must be removed carefully by hand. This ensures proper drainage of the condensate.



WARNING

The heat generator can only be completely de-energised by disconnection from the mains (e.g. all-pole switch).

Cleaning procedure for the evaporator and the condensate drip tray:

1. Dismantle cover (1, Fig. 25)
 - Remove two screws (2, Fig. 25) each on left and right.
2. Remove the insulation (3, Fig. 26)
 - Cleaning can be carried out through the cleaning opening (4, Fig. 26)
3. Clean evaporator and condensate drip tray.



NOTICE

Proceed carefully when cleaning to avoid damaging the evaporator pipework. Do not use high-pressure cleaners, pointed objects or the like to remove dirt.

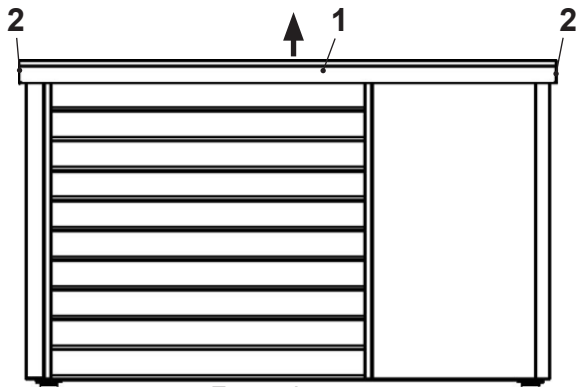


Fig. 25

Front view

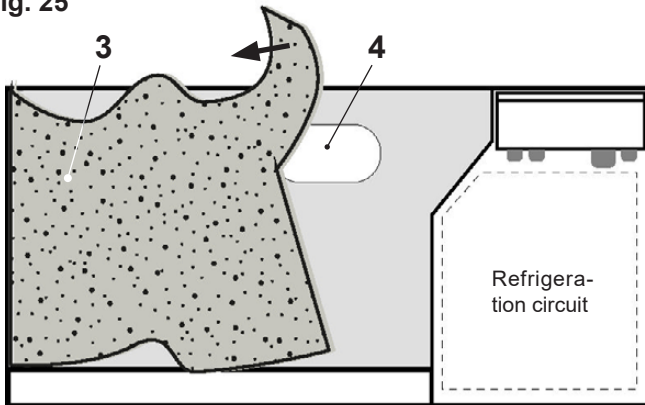


Fig. 26

View from above

6.3.2 Cleaning the condenser

Set the blocking switch to "0" (1, Fig. 27) and disconnect the heat generator from the mains (main switch, fuse).

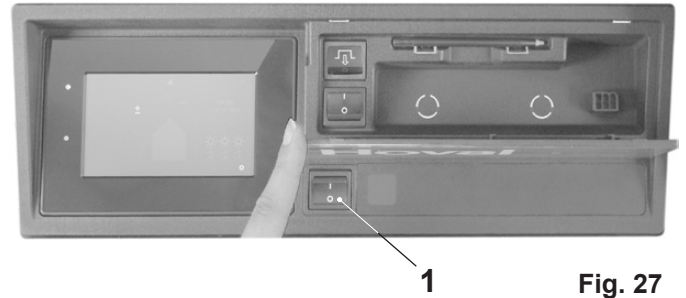


Fig. 27



WARNING

The heat generator can only be de-energised by disconnection from the mains (e.g. all-pole switch).

The plate heat exchanger can be cleaned on the heating side using a cleansing fluid (e.g. solution with 5 % phosphoric acid). The flow speed in this case should be approx. 1.5 times faster than the operating speed and in the opposite direction of flow to the normal flow direction. Then all the cleansing fluid must be removed from the system by flushing with water.

6.3.3 Cleaning and servicing the strainer

If present, the strainer must be cleaned during maintenance, see chapter 4.2.4.

6.3.4 Cleaning and servicing the sludge separator

If present, the sludge separator must be cleaned during maintenance, see chapter 4.2.5.

7. Decommissioning and storage

Certain situations require professional decommissioning of the system.

This chapter will briefly discuss:

- Which work steps are to be carried out for decommissioning
- How, if necessary, a heat pump that is not needed for the moment should be stored

7.1 Decommissioning



The heat pump must be removed by qualified personnel.

To put the heat pump out of operation, please follow the steps below:

1. Switch off the power supply to the plant completely.
2. Close all inlet and outlet valves.
3. Empty the heat pump of refrigerant, water and, if necessary, brine.
4. Drain the condensate line.



Dispose of drained operating fluid properly. Observe the relevant national regulations and standards.

5. Disconnect all connecting lines leading to the heat pump (if applicable: refrigerant line, brine line, water line, electrical cable).

6. Remove the heat pump in the reverse order of the initial installation.



NOTICE

Observe the safety precautions in the corresponding chapters.



NOTICE

- A non-return valve is installed in the return line of the outdoor unit before it enters the condenser.
- For complete drainage of the outdoor unit:
 - the groove on the non-return valve must be set so that the point is facing towards the "A" position
 - the drain valve (1, Fig. Fig. 28) must be opened.

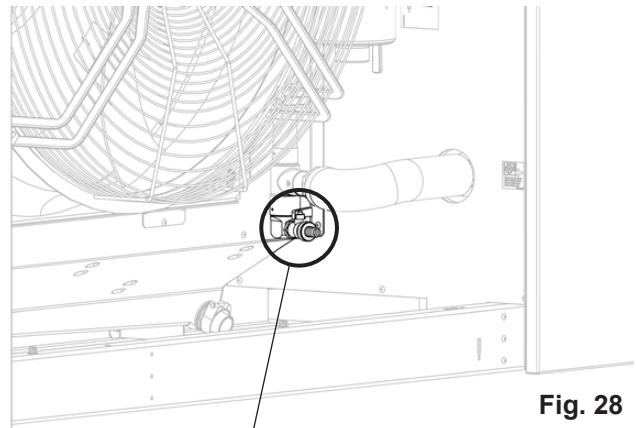
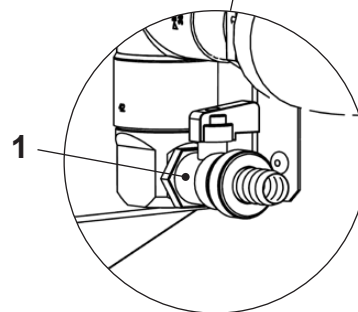


Fig. 28



7.2 Storage

7.2.1 Storage of the indoor unit

The indoor unit must be stored in such a way that no damage can occur and the unit is protected from moisture and frost

7.2.2 Storage of the outdoor unit

- Only transport and store the outdoor unit in an upright position.
- Only tilt the heat pump temporarily (max. 30°). When the heat pump is tilted, the refrigerant is distributed in the system.
 - Wait at least 30 minutes before starting up the heat pump after tilting.
- The outdoor unit must be stored so that the unit cannot be damaged.
- Stacking or storage at height is not permitted.
 - The installation regulations in chapter 1.5.2 apply for storage in an interim storage facility and at the end customer's premises.
- The outdoor unit is only allowed to be stored outside the building and not in closed rooms (garage, cellar, etc.).
- When removing the packaging, check the heat pump for damage.
 - If the heat pump was damaged during transport or storage, contact Hoval customer service immediately. They must carry out a leak test with a suitable leak detector. In the event of a leak, the heat pump must be repaired.
- Do not install and commission a damaged heat pump.

Corrosion protection:

Sprays, solvents, cleaning agents and detergents containing chlorine, paints, varnishes, adhesives, road salt, etc. must not be used or stored on the heat pump (indoor and outdoor unit) and its surroundings. Under unfavourable circumstances, these substances can lead to corrosion of the heat pump and other components of the heating system.



NOTICE

- Do not store the unit at temperatures below -20 °C or above 43 °C.
- Heat pumps must not be stored in damp or dusty rooms
- Do not stack heat pumps for storage.

8. Disposal



Dispose of the packaging properly.

Heat pumps are electrical devices made from high-quality materials and filled with refrigerant and must therefore not be disposed of as normal household waste, but professionally and correctly as prescribed by the local authorities.

Used batteries must not be disposed of as domestic waste. Remove the batteries contained in the heat pump and return them to appropriate collection points.



The refrigerant is only allowed to be drawn off and disposed of in accordance with the relevant regulations by an authorised Hoval customer service technician. Failure to effect proper disposal can lead to damage to the environment and health.



WARNING

Units must be marked accordingly to indicate that they have been taken out of operation and drained of refrigerant. This marking must be dated and signed. A notice indicating the presence of flammable refrigerant (e.g. flame symbol) must be visible on the dismantled units or components, or must be attached before disposal.

9. Appendix

9.1 Malfuction and fault description



NOTICE

- Heat pumps are only allowed to be serviced and repaired by a qualified Hoval service technician authorised by Hoval.
- Any person performing work on the refrigeration circuit must have a certificate of competence in handling flammable refrigerants or be supervised by such a person.

Fault types

In the event of a fault (blocking or locking-off), a code is shown on the control module display. This can be read by clicking on the coloured triangle.

The code provides information on the cause of the fault. The following is shown on the display:

- W:xx** Warnings: The heat pump continues to run with restrictions.
- B:xx** Blockages: The heat pump is blocked. If the reason for the blockage is removed, the heat pump restarts by itself.
- E:xx** Locking systems: The heat pump is locked, the plant must be acknowledged manually.

Alarm messages

- B:01 High-pressure fault**
E:01 Possible cause:
- No water circulation in the heating circuit
 - Heating circulating pump is not running
 - Heating system pressure too low
 - Air in the heating system
- B:02 Low-pressure fault**
E:02 Possible cause:
- No air flowing through the outdoor unit
 - Leak in refrigeration circuit
 - Evaporator iced up

The heat pump automatic function device is not running:

- Check the position of the blocking switch (5, Fig. 29).
 - The switch must be in the "I" position.

9.1.1 Reset fault messages

To reset the fault message for the heat pump automatic function device, the "Reset button" (1, Fig. 29) on the TopTronic® E controller must be pressed **for at least 1 second**.



The reset button must not be pressed more than once. If the failure indication lamp continues to be lit, please contact Hoval customer service.



Below the reset button (1, Fig. 29), there is a mains isolator switch (6) with which the heat pump can be disconnected from the electrical power supply.



WARNING

Even if the blocking switch is set to "0" or the mains disconnection switch is set to "0" or "OFF", part of the plant is still live. To isolate the plant from voltage, the electrical power supply must be interrupted externally (e.g. main switch).

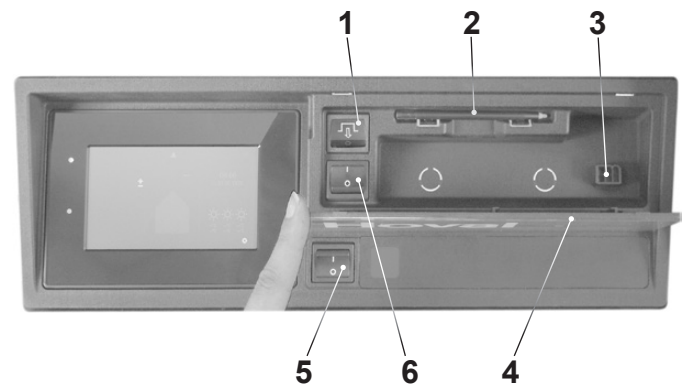


Fig. 29

Item	Designation
1	Reset button
2	Stylus
3	Service plug
4	Hinged cover
5	Blocking switch
6	Mains isolator switch

Confirmation

The user (owner) of the system herewith confirms that

- he has received adequate instruction in the operating and maintenance of the installation,
- received and taken note of the operating and maintenance instructions and, where applicable other documents concerning the installation and any further components.
- and is consequently sufficiently familiar with the installation.

Installation address:

Type:

.....

Serial number:

.....

Year of manufacture:

Place, Date:

System installer:

System user:

.....

.....



Confirmation

The user (owner) of the system herewith confirms that

- he has received adequate instruction in the operating and maintenance of the installation,
- received and taken note of the operating and maintenance instructions and, where applicable other documents concerning the installation and any further components.
- and is consequently sufficiently familiar with the installation.

Installation address:

Type:

.....

Serial number:

.....

Year of manufacture:

Place, Date:

System installer:

System user:

.....

.....

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You can count on us.

Hoval is one of the leading international companies for heating and indoor climate solutions. Drawing on more than 75 years of experience and benefiting from a close-knit team culture, the Hoval Group delivers exciting solutions and develops technically superior products. This leadership role requires a sense of responsibility for energy and the environment, which is expressed in an intelligent combination of different heating technologies and customised indoor climate solutions.

Hoval also provides personal consultations and comprehensive customer service. With around 2500 employees in 15 companies around the world, Hoval sees itself not as a conglomerate, but as a large family that thinks and acts globally.

Hoval heating and indoor climate solutions are currently exported to more than 50 countries.

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for energy and environment**

Liechtenstein

Hoval Aktiengesellschaft
9490 Vaduz
+423 399 24 00
hoval.com

United Kingdom

Hoval Ltd.
Newark Notts. NG 24 1JN
+44 1636 672 711
hoval.co.uk