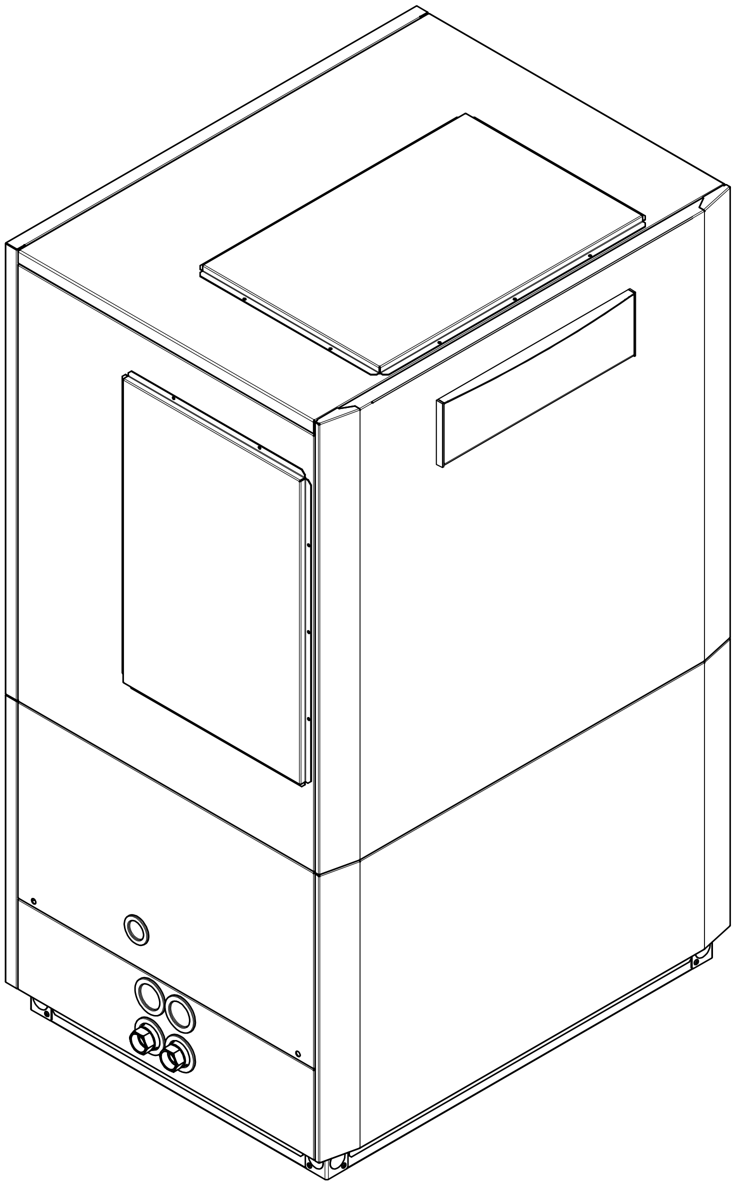
–weishaupt–

manual

Installation and operating instructions



Weishaupt
Air-to-water heat pump for indoor installation·WWP LI 16-A R

83321202 · 09/2020

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1 Safety notes

1.1 Symbols and markings

Particularly important information in these instructions is marked with CAUTION! or NOTE.

⚠ **CAUTION**

Immediate danger to life or danger of severe personal injury or significant damage to property.

⚠ **Note**

Risk of damage to property or minor personal injury or important information with no further risk of personal injury or damage to property.

1.2 Intended use

This device is only intended for use as specified by the manufacturer. Any other use beyond that intended by the manufacturer is considered improper use. This requires the user to abide by the relevant project planning documents. Please refrain from tampering with or altering the device.

1.3 Legal regulations and directives

This heat pump is designed for use in a domestic environment according to Article 1, Paragraph 2 k) of EU directive 2006/42/EC (Machinery Directive) and is thus subject to the requirements of EU directive 2014/35/EU (Low Voltage Directive). It is thus also intended for use by non-professionals for heating shops, offices and other similar working environments, agricultural establishments and hotels, guest houses and other residential buildings.

The construction and design of the heat pump complies with all relevant EU directives, and DIN/VDE regulations (see CE declaration of conformity).

When connecting the heat pump to the power supply, the relevant VDE, EN and IEC standards are to be adhered to. Any further connection requirements stipulated by local utility companies must also be observed.

When connecting the heating system, all applicable regulations must also be adhered to.

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

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

⚠ **CAUTION**

When operating or maintaining a heat pump, the legal requirements of the country where the heat pump is operated apply. Depending on the refrigerant fill quantity, the heat pump must be inspected for leaks at regular intervals by a certified technician, and these inspections must be recorded.

More information can be found in the accompanying log book.

1.4 Energy-efficient use of the heat pump

With the purchase of this heat pump, you are helping to protect the environment.
A prerequisite for energy-efficient operation is the correct design of the heat source system and heating system.
To maintain heat pump efficiency, it is particularly important to keep the temperature difference between the heating water and heat source to a minimum. For this reason, it is advisable to design the heat source and heating system very carefully. **A temperature difference of approx. 1 Kelvin (1 °C) increases the power consumption by around 2.5%.** When designing the heating system, it should be borne in mind that special consumers such as domestic hot water preparation should also be taken into consideration and dimensioned for low temperatures. **Underfloor heating systems (panel heating)** are optimally suited for heat pump use on account of the low flow temperatures (30 °C to 40 °C).
It is important to ensure that the heat exchangers are not contaminated during operation, as this increases the temperature difference, which in turn reduces the coefficient of performance (COP).
When set correctly, the heat pump manager is also an essential factor in the energy-efficient use of the heat pump. Further information can be found in the heat pump manager operating instructions.

2 Intended use of the heat pump

2.1 Area of application

The air-to-water heat pump is to be used exclusively for the heating and cooling of heating water. It can be used in new or existing heating systems.

The heat pump is suitable for mono energy and bivalent operation in outside air temperatures to -22 °C.

Proper defrosting of the evaporator is guaranteed by maintaining a heating water return temperature of more than 22 °C (+2 °C/-0 °C) during continuous operation.

The heat pump is not designed for the increased heat consumption required when a building is being dried out. For this reason, the additional heat consumption should be met using special devices provided by the customer. If a building is to be dried out in autumn or winter, we recommend installing an additional electric heating element (available as an accessory).

In cooling operation, the heat pump is suitable for air temperatures ranging from +15 °C to + 40 °C. It can be used for silent and dynamic cooling. The minimum cooling water inlet temperature is +7 °C.

⚠ **Note**

The device is not suitable for operation with a frequency converter.

2.2 Operating principle

Heating

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

The heat is "pumped" to a higher temperature level by increasing its pressure with the aid of an electrically driven compressor. It is then transferred to the heating water via the liquefier (heat exchanger).

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

The air-to-water heat pump consists of the main components: evaporator, fan, expansion valve, compressor, the liquefier and the electrical control system.

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

Cooling

The functions of the evaporator and the liquefier are reversed in the "Cooling" operating mode.

The heating water transfers its heat to the refrigerant via the liquefier, which is now functioning as an evaporator. The refrigerant is brought to a higher temperature level using the compressor. Heat is transferred to the surrounding air via the liquefier (which, in heating operation, functions as an evaporator).

2.3 Functional description for integrated thermal energy metering

The compressor manufacturer's performance specifications for different pressure levels are stored in the heat pump software. Two additional pressure sensors for determining the current pressure level are installed in the refrigeration circuit of the heat pump, one before and one after the compressor. The current heat output can be calculated from the compressor data stored in the software and the current pressure level. The integral for the heat output over the runtime gives the quantity of thermal energy supplied by the heat pump, which is displayed separately for heating, domestic hot water preparation and swimming pool water preparation on the heat pump manager's display.

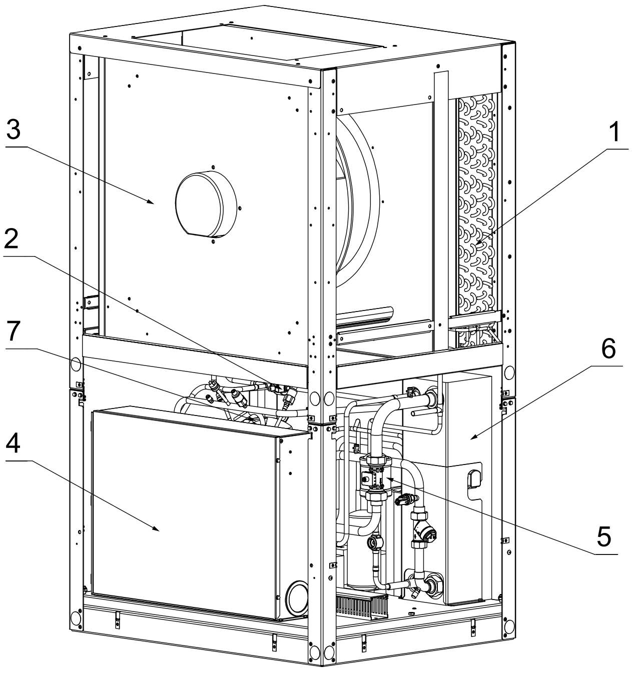
The integrated thermal energy metering must not be used for heating cost billing purposes. EN 1434 is not applicable.

3 Scope of supply

3.1 Basic device

The heat pump contains the components listed below.

The refrigeration circuit is "hermetically sealed" and contains the fluorinated refrigerant R410A incorporated in the Kyoto protocol. Information on the GWP value and CO_2 equivalent of the refrigerant is available under “Device information”. The refrigerant is CFC-free, non-ozone depleting and non-combustible.



1. Evaporator
2. Expansion valve
3. Fan
4. Switch box
5. Filter dryer
6. Liquefier
7. Compressor

3.2 Switch box

The switch box is located in the heat pump. The switch box cover can be removed once the lower front cover has been removed and the two screws on the side have been unfastened.

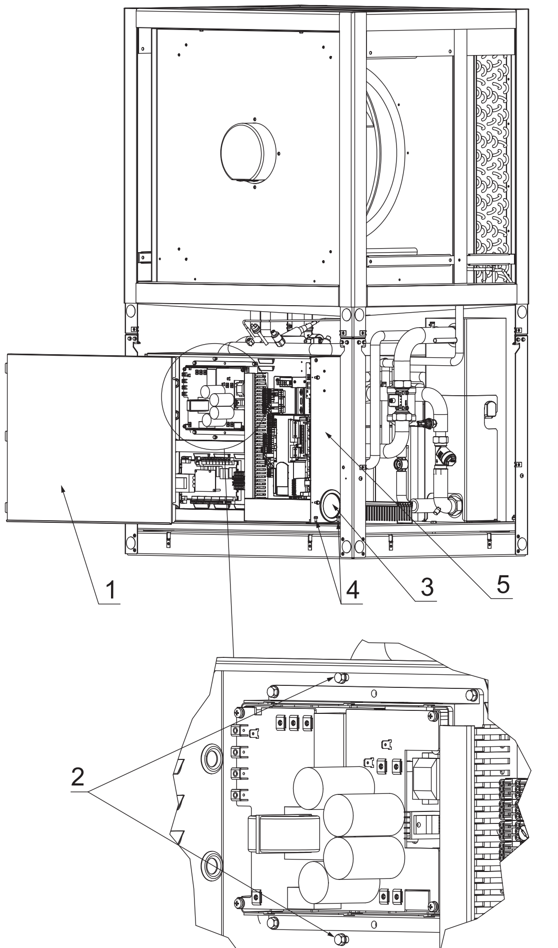
(Mains)connecting terminals, power electronics for the compressor, refrigeration circuit controller and heat pump manager are located in the switch box

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

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

The enclosed operating instructions describe the function and use of the heat pump manager.

In order to simplify service work on the refrigeration circuit, it is possible to remove the switch box and position it next to the device. For this, the cover must be removed and the switch box disconnected from the cooling.



1. Remove switch box cover
2. Unfasten 2x screws for cooling
3. Disconnect supply lines at the controller and guide through grommet
4. Unfasten 2x screws for switch box
5. Push the switch box slightly to the right and lift it out to the front

3.3 Accessories pack

On top of the heat pump:

1 x insulating mat, duct connection

1 x small sealing ring, air intake

1 x large sealing ring, air outlet

In the condensate tray:

1 x external sensor with mounting material

Under fan:

8 x sealing plugs ø 30 - black

Outside the packaging:

Documentation

4 Accessories

4.1 Air conditioning

With cooling using panel heating/cooling systems, regulation is carried out according to the room temperature and humidity measured.

This is done by setting the desired room temperature on the heat pump manager or room control unit. The minimum possible cooling water temperature is calculated from the room temperature and humidity measured in the reference room. The control response of the cooling system is influenced by the currently measured room temperature and the set room set temperature.

4.2 Building management system

The heat pump manager can be connected to a building management system network via supplementation of the relevant interface plug-in card. The supplementary installation instructions of the interface card must be consulted regarding the exact connection and parametrisation of the interface.

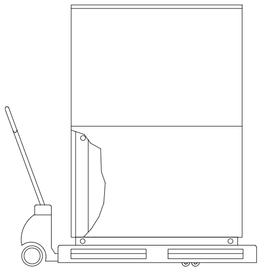
The following network connections can be made on the heat pump manager:
- Modbus
- EIB, KNX
- Ethernet

5 Transport

⚠ CAUTION

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

A pallet should be used to transport the heat pump to its final installation location. The basic device can be transported with a lift truck, hand truck or by means of 3/4" pipes fed through the holes in the baseplate or frame.

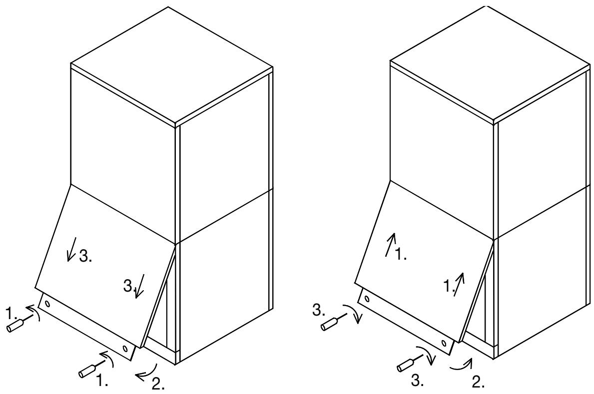


The heat pump and the transport pallet are joined by four anti-tipping devices. These must be removed.

Before using the transport holes in the frame, it is necessary to remove the lower panel assemblies. This is done by loosening each of the two screws at the base and then withdrawing the panels by unhooking them from above. Rehang the panels by gently pushing them in an upwards direction.

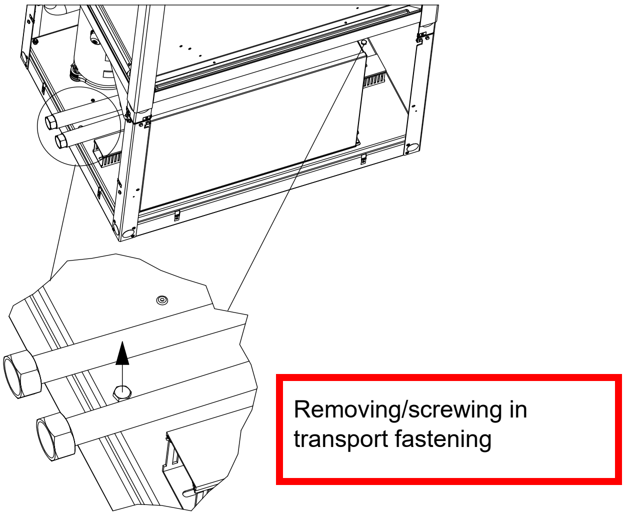
Be careful not to damage any components when inserting the pipes through the frame.

Any transport holes are to be covered at the installation location using the 8 black dust caps, which are included in the device's accessories pack.



Opening the cover
Closing the cover

After transportation, the transport fastening in the device is to be removed from both sides of the base.



⚠ CAUTION

Before commissioning, the transport fastening must be removed.

For easier transportation into existing homes/buildings, it is possible to separate the basic device into two parts.

Once the covering panels have been removed, please proceed as follows:

1. Drain refrigerant
2. Remove condensate hose
3. Remove the pipe insulation above the soldering points
4. Separate 4x soldering points chip-free.
5. Disconnect cable on the fan and pull through the cable glands in the condensate tray.
6. Unfasten 4x screws in the corners in each case
7. Lift down the top part of the heat pump
8. Areas for lifting on the frame
9. Transport heat pump to the installation location
10. Join the parts
11. Re-solder the separation points again (with inert gas flushing)
12. Evacuate the refrigeration circuit
13. Add refrigerant
14. Perform leakage tightness test
15. Re-attach pipe insulation
16. Re-connect fan
17. Bores for attaching a transport aid (e.g. lifting straps etc.)

⚠ CAUTION

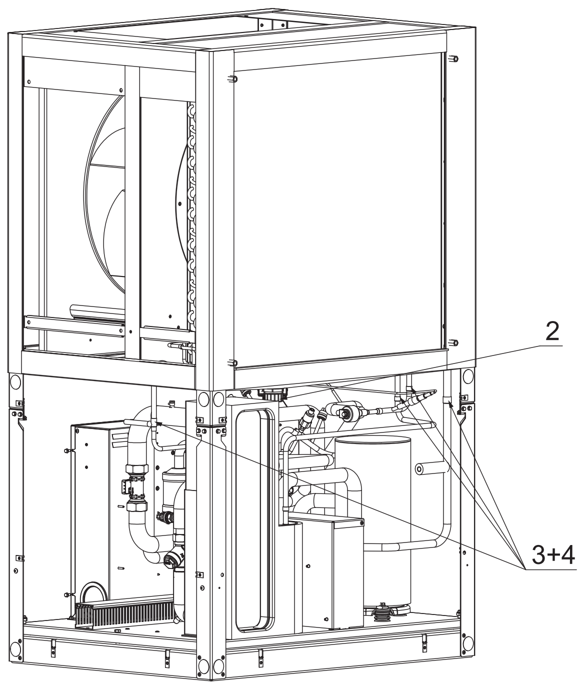
Do not lift by the condensate tray. This cannot withstand any forces.

⚠ CAUTION

Work on the refrigeration circuit and electrics may only be performed by competent experts.

⚠ CAUTION

The condensate hose must be removed before the upper part is put down.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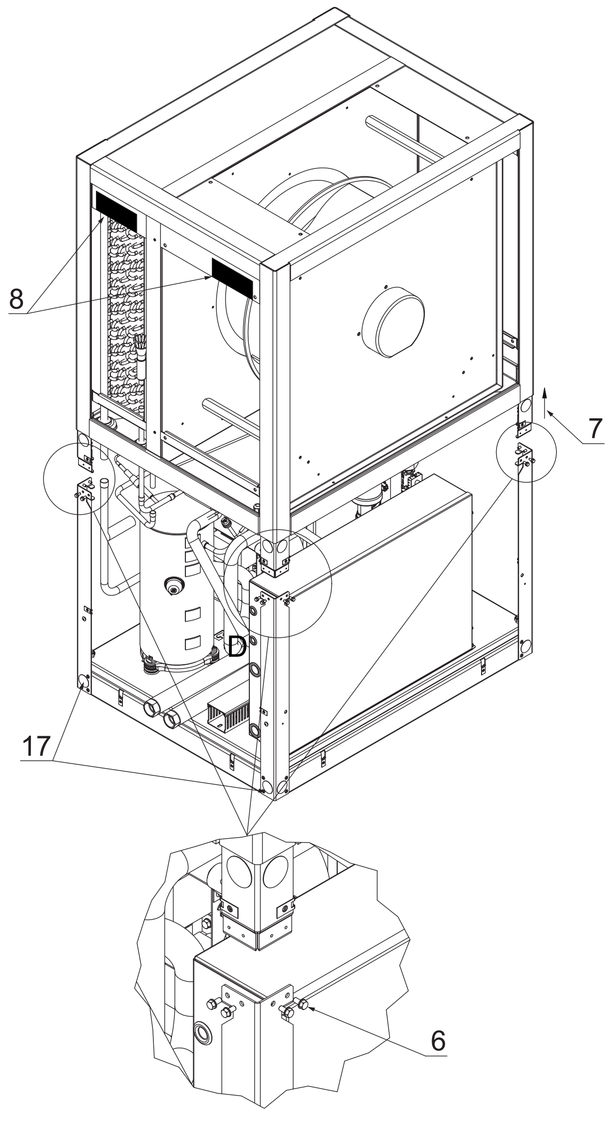
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6 Installation

6.1 General information

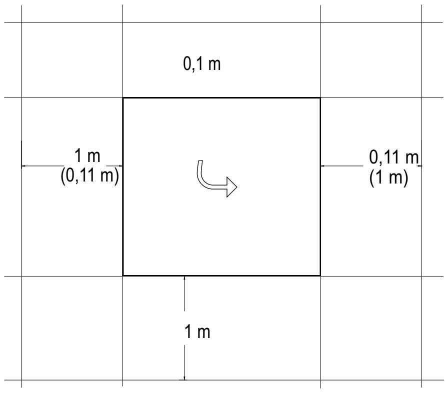
The device is designed to enable several connection options. The position of the air outlet opening can be moved from right (factory default) to left or top by turning over one of the two screwed on covers.

By replacing the bottom side panel assemblies, it is also possible to move the hydraulic connection from left (factory default) to right. The different connection options are shown in the dimension drawing (Chapter 1 on page II).

The air-to-water heat pump must be installed in a frost-free, dry room on an even, smooth and horizontal surface. The entire base of the frame should lie directly on the floor to ensure an adequate soundproof seal. If supporting feet are used, the heat pump must be installed horizontally. In this case, the specified sound level can be up to 3 dB(A) higher, and additional sound insulation measures may be necessary.

If the device is installed on top of a built-under buffer tank, a surface that fully supports the base is required. The heat pump must be installed in a way that allows maintenance work to be carried out without hindrance. This can be ensured by maintaining a clearance of 1 m in front of the heat pump and to the side on which the heating water connections are located.

The side panel assemblies must not be covered by connecting pipes.



Neither frost nor temperatures higher than 35 °C must occur in the installation room at any time of the year.

Never install the device in rooms subject to high humidity. Condensation can form on the heat pump and air circuit if the humidity exceeds 50% and the outside temperature is below 0 °C.

If the heat pump is installed on an upper storey, the load-bearing capacity of the ceiling should be checked. On account of the acoustics, measures for isolating possible vibrations should also be very carefully planned in advance as well. Installation on floors above wooden ceilings is not recommended.

6.2 Condensate pipe

Condensate that forms during operation must be drained off frost free. To ensure proper drainage, the heat pump must be mounted horizontally. The condensate pipe must have a minimum diameter of 50 mm and must be fed into a sewer in such a way that it is safe from frost. Do not discharge the condensate directly into clarifiers or cess pits. The aggressive vapours and a condensate pipe laid in an area which is not frost free can destroy the evaporator.

6.3 Sound

- We recommend connecting the heat pump to the heating system using a flexible hose to prevent solid-borne noise transmission to the heating system if requirements regarding noise are high.
- Installed air ducts should be sound-isolated from the heat pump to prevent the transmission of solid-borne sound to the ducts.
- If the transport restraint screws are not removed from the compressor, acoustic emissions from the device are significantly louder!

7 Assembly

7.1 General information

The following connections need to be established on the heat pump:

- Supply and exhaust air
- Flow and return of the heating system
- Condensate drain
- Power supply
- Temperature sensor (e.g. external sensor)

7.2 Air connection

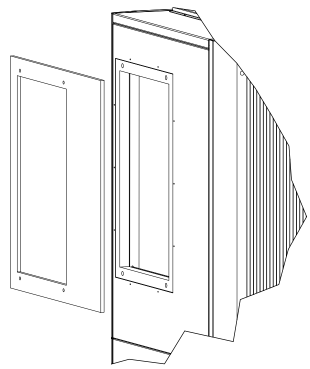
⚠ **CAUTION**

Do not restrict or block the area around the intake or the air outlet area.

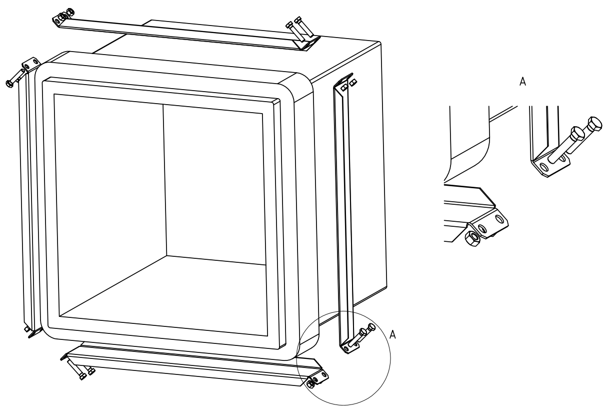
⚠ **CAUTION**

Only operate the heat pump with the air ducts connected.

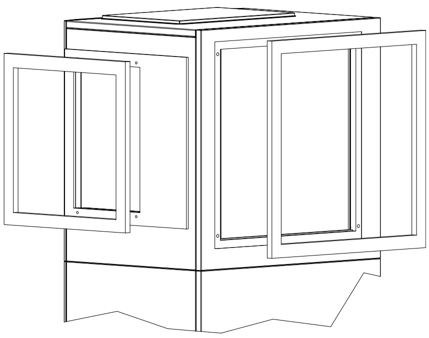
The glass fibre reinforced concrete air ducts offered as accessories are moisture resistant and diffusion free (exhaust air duct 600 (600 x 600) and inlet duct 800 (769 x 769)). When using the air duct for the air outlet side (600 x 600), the "insulating mat duct connection" (in the accessory pack) is to be adhered to the air outlet on the desired connection side.



The sealing collar is used to seal the air ducts on the heat pump. The air ducts themselves are not screwed directly onto the heat pump. When the system is installed ready for operation, only the rubber seal comes into direct contact with the heat pump. This guarantees easy assembly and disassembly of the heat pump and also ensures that solid-borne sound is well insulated.



If an alternative air duct is being used to that which has been supplied as an accessory, care must be taken to ensure that it does not reduce the cross-sectional area of the air intake and air outlet sides. The "small and large sealing rings" included in the scope of supply can be used for sealing the heat pump connection. They also function as vibration isolators.



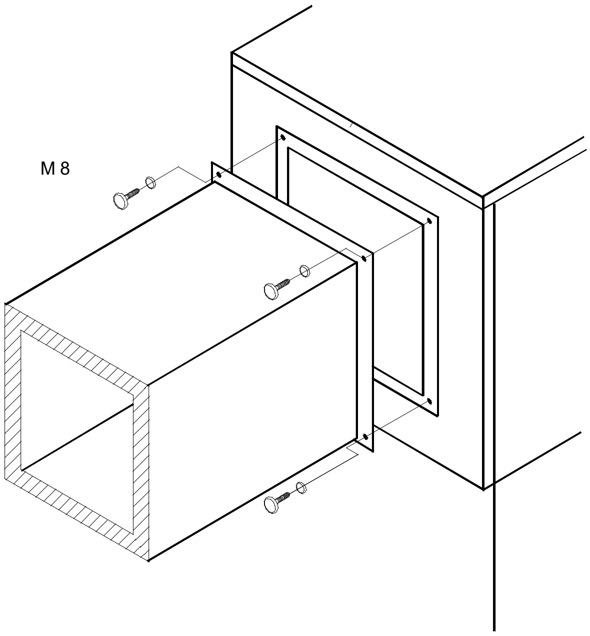
The large sealing ring can be used to position the air intake opening of the heat pump directly onto an appropriately constructed wall opening.

It must be ensured that the interior side of the wall opening is lined with thermal insulation to prevent the wall from becoming cold and to prevent moisture from penetrating the wall.

When very short air ducts are used on the air outlet, the exterior side of the wall opening must be fitted with a safety guard or an air deflector grille suitable for preventing body parts (fingers or arms, especially those of children) coming into contact with the fan in the heat pump.

If flange-mounted air ducts are used, connecting stubs are secured on the air inlet and air outlet sides with 4 M8 hexagon bolts in the threaded holes provided (the hexagonal long nuts). When doing this, ensure that both air duct stubs touch only the insulation. There should be no contact with the external sheeting.

Also ensure that the vibration and duct insulation are adequate



7.3 Connection on heating side

The heating system connections on the heat pump have a 1" internal thread. A spanner must be used to firmly grip the transitions when connecting the heat pump.

The connection on the heating side can also be made towards the right. To do this, the left and right bottom panel assemblies must be removed. The two connecting pipes, including pipe supports, must be moved from the left to the right side of the device. The panel assemblies must then be re-mounted the opposite way around.

Before connecting the heating water system to the heat pump, the heating system must be flushed to remove any impurities, residue from sealants, etc. Any accumulation of deposits in the liquefier may cause the heat pump to completely break down. For systems in which the heating water flow rate can be shut off via the radiator or thermostat valves, an overflow valve must be installed on-site in a heating bypass downstream from the heat pump. This ensures a minimum heating water flow rate through the heat pump and helps to avoid faults.

Once the heat pump has been connected to the heating system, it must be filled, purged and pressure-tested.

The following points must be observed when filling the system:
- Untreated filling water and make-up water must be of drinking water quality (colourless, clear, free of deposits)
- Filling water and make-up water must be pre-filtered (max. pore size 5 µm).

Scale formation in domestic hot water heating systems cannot be avoided, but in systems with flow temperatures below 60 °C, the problem can be disregarded. With high-temperature heat pumps and in particular with bivalent systems in the higher performance range (heat pump + boiler combination), flow temperatures of 60 °C and more can be achieved. The following standard values should therefore be adhered to with regard to the filling and make-up water according to VDI 2035, sheet 1: the total hardness values can be found in the table.

<table>
<tr><th rowspan="3">Total heat output in kW</th><th rowspan="3">Total Alkaline earths in mol/m³ and/or mmol</th><th colspan="3">Specific system volume (VDI 2035) in l/kW</th></tr>
<tr><th>< 20</th><th>≥ 20 < 50</th><th>≥ 50</th></tr>
<tr><th colspan="3">Total hardness in dGH</th></tr>
<tr><td>< 50</td><td>≤ 2.0</td><td>≤ 16.8</td><td>≤ 11.2</td><td rowspan="4">< 0.11[1]</td></tr>
<tr><td>50 – 200</td><td>≤ 2.0</td><td>≤ 11.2</td><td>≤ 8.4</td></tr>
<tr><td>200 – 600</td><td>≤ 1.5</td><td>≤ 8.4</td><td rowspan="2">< 0.11[1]</td></tr>
<tr><td>> 600</td><td>< 0.02</td><td>< 0.11[1]</td></tr>
</table>

1. This value lies outside the permissible value for heat exchangers in heat pumps.

Fig. 7.1: Guideline values for filling and make-up water in accordance with VDI 2035

For systems with an above-average specific system volume of 50 l/kW, VDI 2035 recommends the use of fully demineralised water and a pH stabiliser to minimise the risk of corrosion in the heat pump and heating system.

⚠ CAUTION

With fully demineralised water, it is important to ensure that the minimum permissible pH value of 7.5 (minimum permissible value for copper) is complied with. Failure to comply with this value can result in the heat pump being destroyed.

Minimum heating water flow rate

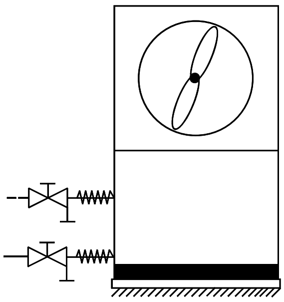
The minimum heating water flow rate through the heat pump must be assured in all operating states of the heating system. This can be accomplished, for example, by installing a hydraulic switch or an overflow valve. The procedure for setting an overflow valve is described in the chapter "Commissioning". When the minimum heating water flow rate is undershot, the plate heat exchanger in the refrigeration circuit can freeze, which can lead to total loss of the heat pump.

The nominal flow rate is specified depending on the max. flow temperature in the device information and must be taken into account during planning. With design temperatures below 30 °C in the flow, the design must be based on the max. volume flow with 5 K spread for A7/W35.

The specified nominal flow rate (See "Device information" on page 30.) must be assured in all operating states. An installed flow rate switch is used only for switching off the heat pump in the event of an unusual and abrupt drop in the heating water flow rate and not to monitor and safeguard the nominal flow rate.

Frost protection

A method of manual drainage (see illustration) should be provided for heat pumps which are exposed to frost. The frost protection function of the heat pump manager is active whenever the heat pump manager and the heat circulating pump are ready for operation. The system must be drained if the heat pump is taken out of service or in the event of a power failure. The heating circuit should be operated with a suitable frost protection if heat pump systems are implemented in buildings where a power failure cannot be detected (holiday home).



7.4 Temperature sensor

Depending on the heat pump type used, the following temperature sensors are already installed or must be additionally mounted:

- Outside temperature (R1)
- Temperature 1st, 2nd and 3rd heating circuit (R2, R5 and R13)
- Flow temperature (R9), as a frost protection sensor in the case of air-to-water heat pumps
- Outlet temperature of the heat source in the case of brine-to-water and water-to-water heat pumps
- Domestic hot water temperature (R3)
- Temperature of renewable thermal storage (R13)

7.4.1 Sensor characteristic curves

Temperature in °C	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55	60
NTC-2 in kΩ	14.6	11.4	8.9	7.1	5.6	4.5	3.7	2.9	2.4	2.0	1.7	1.4	1.1	1.0	0.8	0.7	0.6
NTC-10 in kΩ	67.7	53.4	42.3	33.9	27.3	22.1	18.0	14.9	12.1	10.0	8.4	7.0	5.9	5.0	4.2	3.6	3.1

The temperature sensors to be connected to the heat pump manager must correspond to the sensor characteristic curve illustrated in Fig. 7.2 on page 19. The only exception is the outside temperature sensor included in the scope of supply of the heat pump (see Fig. 7.3 on page 19)

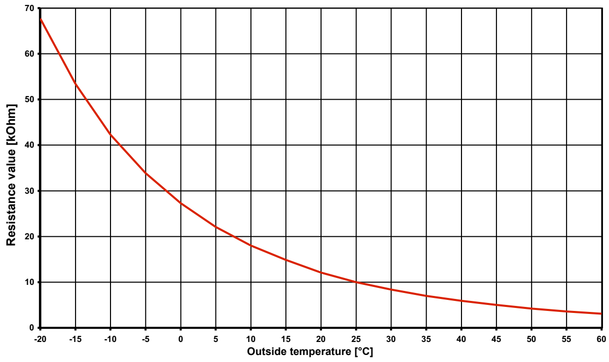


Fig. 7.2: Sensor characteristic curve NTC-10

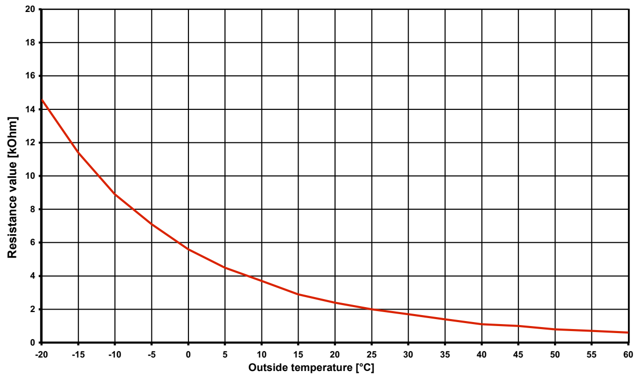


Fig. 7.3: Sensor characteristic curve NTC-2 according to DIN 44574 Outside temperature sensor

7.4.2 Mounting the outside temperature sensor

The temperature sensor must be mounted in such a way that all weather conditions are taken into consideration and the measured value is not falsified.

- Mount on the external wall on the north or north-west side where possible
- Do not install in a "sheltered position" (e.g. in a wall niche or under a balcony)
- Not in the vicinity of windows, doors, exhaust air vents, external lighting or heat pumps
- Not to be exposed to direct sunlight at any time of year

Dimensioning parameters, sensor cable

Conductor material	Cu
Cable length	50 m
Ambient temperature	35 °C
Routing type	B2 (DIN VDE 0298-4/ IEC 60364-5-52)
External diameter	4-8 mm

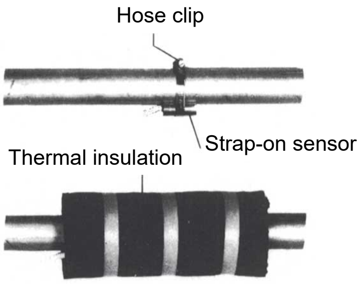
7.4.3 Installing the strap-on sensor

It is only necessary to mount the strap-on sensors if they are included in the scope of supply of the heat pump but have not yet been installed.

The strap-on sensors can be fitted as pipe-mounted sensors or installed in the immersion sleeve of the compact manifold.

Mounting as a pipe-mounted sensor

- Remove paint, rust and scale from heating pipe
- Coat the cleaned surface with heat transfer compound (apply sparingly)
- Attach the sensor with a hose clip (tighten firmly, as loose sensors can cause malfunctions) and thermally insulate



7.4.4 Hydraulic distribution system

The compact manifold and the hydraulic switch function as an interface between the heat pump, the heating distribution system, the buffer tank and, in some cases, even the domestic hot water cylinder. A compact system is used to simplify the installation process, so that a lot of different components do not have to be installed individually. Further information can be found in the relevant installation instructions.

7.5 Electrical connection

7.5.1 General information

All electrical installation work must be carried out by a trained electrician or a specialist for the specified tasks in accordance with the
- installation and operating instructions,
- country-specific installation regulations (e.g. VDE 0100),
- technical connection conditions of the energy suppliers and supply grid operators (e.g. TAB) and
- local conditions

To ensure that the frost protection function of the heat pump works properly, the heat pump manager must remain connected to the power supply and the flow must be maintained through the heat pump at all times.

The switching contacts of the output relay are interference-suppressed. Therefore, depending on the internal resistance of the measuring instrument, a voltage can also be measured when the contacts are open. However, this will be much lower than the line voltage.

7.5.2 Electrical installation work

1. The 4-core electrical supply cable for the output section of the heat pump is fed from the heat pump meter via the utility company blocking contactor (if required) into the heat pump.
   The mains cable is connected at the heat pump switch box using terminals X1: L1/L2/L3/PE
   An all-pole disconnecting device with a contact gap of at least 3 mm (e.g. utility company blocking contactor or power contactor) and an all-pole circuit breaker with common tripping for all external conductors must be installed in the power supply for the heat pump (tripping current and characteristic in compliance with the device information).
2. The three-core supply cable for the heat pump manager (heating controller N1) is fed into the heat pump.
   Connection of the control cable to pin X1.1 “230 V-IN” (white): L/PE/N.
   Details on the power consumption of the heat pump are listed on both the product information sheet and the type plate.
   The supply cable (L/N/PE~230 V, 50 Hz) for the heat pump manager must have a continuous voltage. For this reason, it should be tapped upstream from the utility company blocking contactor or be connected to the household current, because otherwise important protection functions could be lost during a utility block.
3. The utility company blocking contactor (K22) with 3 main contacts (1/3/5 // 2/4/6) and an auxiliary contact (NO contact e.g. 13/14) should be dimensioned according to the heat pump output and must be supplied on-site. The NO contact of the utility blocking contactor (13/14) is connected to pin (1) (=DI1) of function block 0 (grey). CAUTION! Extra-low voltage!
4. The contactor (K20) for the immersion heater (E10) of mono energy systems (HG 2) should be dimensioned according to the radiator output and must be provided on-site. The control (230 V AC) is performed from the heat pump manager, with the function applied via pin (7) (=NO3) of function block 0 (grey).
5. The contactor (K21) for the flange heater (E9) in the domestic hot water cylinder should be dimensioned according to the radiator output and must be provided on-site. The control (230 V AC) is performed from the heat pump manager via pin (7) of the defined function block.
6. The contactors mentioned above in points 3, 4 and 5 are installed in the electrical distribution system. The mains cables for the radiators should be dimensioned and protected according to DIN VDE 0100.
7. The heat circulating pump (M13) is connected to pin (5) (230 V) and (8) (control signal) of function block 0 (grey).
8. The domestic hot water circulating pump (M18) is connected to pin (5) of the defined function block.
9. The external sensor (R1) is connected to pin (3) (=U1) of function block 0 (grey).

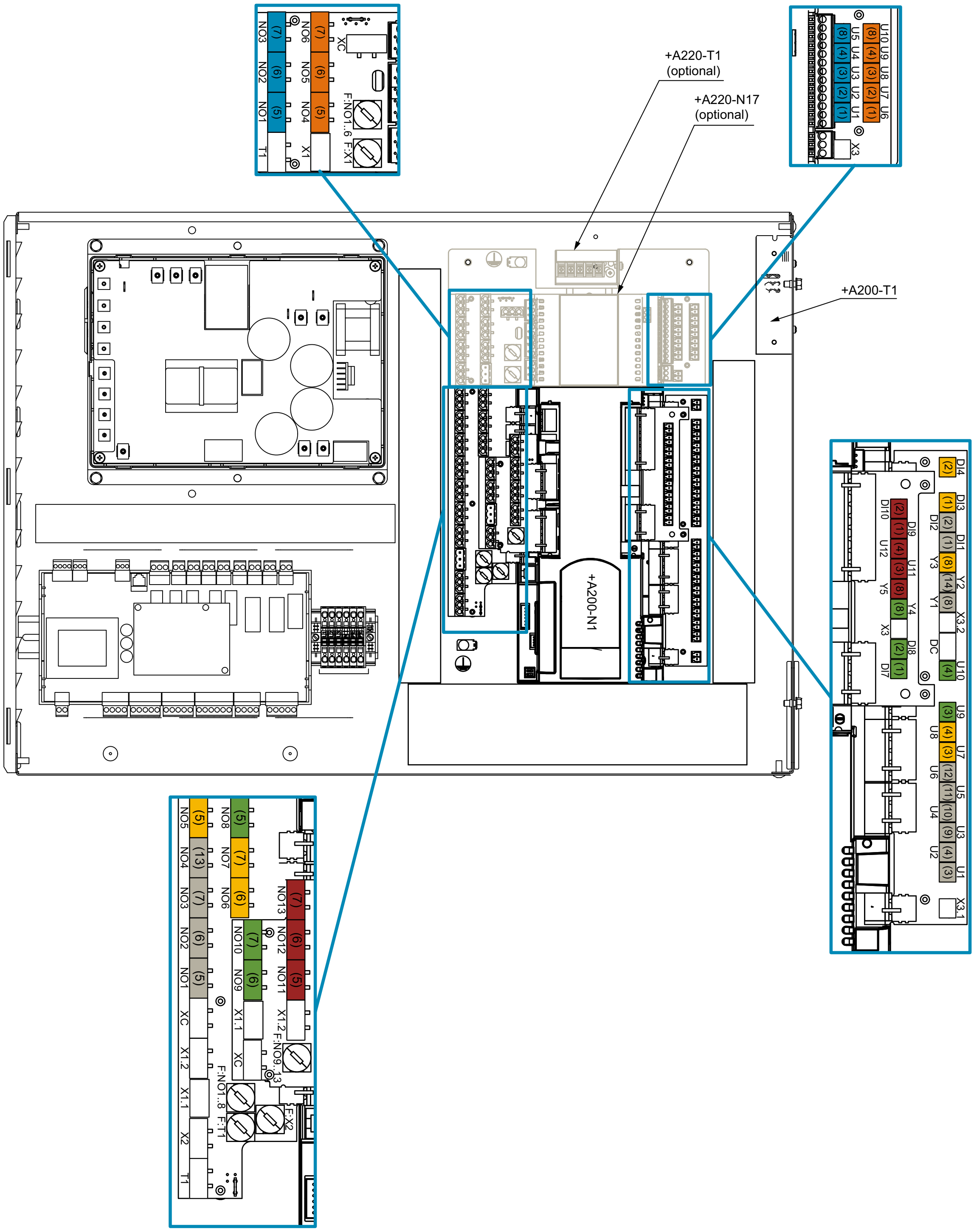
10. The domestic hot water sensor (R3) is installed in the domestic hot water cylinder and is connected to pin (3) of the defined function block

⚠Note

If three-phase pumps are implemented, a power contactor can be controlled via the 230 V output signal of the heat pump manager.
Sensor cables can be extended up to 40 m with 2 x 0.75 mm cables.

⚠Note

Further information on the wiring of the heat pump manager is available in the electrical documentation.



7.5.3 Connecting electronically regulated circulating pumps

Electronically regulated circulating pumps may have high starting currents, which may shorten the service life of the heat pump manager. A coupling relay must therefore be installed between the output of the heat pump manager and the electronically regulated circulating pump. This is not necessary if the permissible operating current of 2 A and a maximum starting current of 12 A of the electronically controlled circulating pump is not exceeded or an explicit release is in place from the pump manufacturer. Further details can be taken from the electrical documentation.

⚠ **CAUTION**

It is not permitted to connect more than one electronically regulated circulating pump via a relay output.

8 Commissioning

8.1 General information

To ensure that commissioning is performed correctly, it should only be carried out by an after-sales service technician authorised by the manufacturer (Weishaupt technician). Under certain conditions, this may be associated with an additional warranty service.

8.2 Preparation

The following items must be checked prior to commissioning:
- All of the heat pump connections must be installed as described in Chapter 6.
- All valves which could impair the proper flow of the heating water in the heating circuit must be open.
- The air intake and air outlet paths must be clear.
- The fan must turn in the direction indicated by the arrow.
- The settings of the heat pump manager must be adapted to the heating system in accordance with the operating instructions.
- Ensure that the condensate drain functions properly.
- The accessories pack in the switch box and the accessories pack in the area below the fan must have been removed!

8.3 Procedure

The heat pump is commissioned via the heat pump manager. Settings should be made in compliance with the heat pump manager's instructions.

If an overflow valve is fitted to ensure a minimum heating water flow, the overflow valve must be set in accordance with the requirements of the respective heating system. Incorrect adjustment can lead to faulty operation and increased energy consumption. We recommend carrying out the following procedure to set the overflow valve correctly:

Close all heating circuits that may also be closed during operation (depending on how the heat pump is being used) so that the most unfavourable operating status with regard to the water flow is achieved. This normally means the heating circuits of the rooms on the south and west sides of the building. At least one heating circuit must remain open (e.g. bathroom).

The overflow valve should be opened far enough to produce the maximum temperature spread between the heat flow and heat return flow, listed in the following table, for the current heat source temperature. The temperature spread should be measured as close as possible to the heat pump. The heating element of mono energy systems should be disconnected during commissioning.

Heat source temperature		Max. temperature spread between heating flow and return flow
from	to	
-20 °C	-15 °C	4 K
-14 °C	-10 °C	5 K
-9 °C	-5 °C	6 K
-4 °C	0 °C	7 K
1 °C	5 °C	8 K
6 °C	10 °C	9 K
11 °C	15 °C	10 K
16 °C	20 °C	11 K
21 °C	25 °C	12 K
26 °C	30 °C	13 K
31 °C	35 °C	14 K

At heating water temperatures under 7 °C, commissioning is not possible. The water in the buffer tank must be heated with the 2nd heat generator to at least 18 °C.

To ensure problem-free commissioning, the following procedure is to be implemented:
1. Close all consumer circuits.
2. Ensure that the heat pump has the correct water flow.
3. Use the manager to select the automatic operating mode.
4. In the special functions menu, start the "Commissioning" program.
5. Wait until a return temperature of at least 25 °C has been reached.
6. Now slowly reopen the heating circuit valves in succession so that the heating water flow rate is constantly raised by slightly opening the respective heating circuit. The heating water temperature in the buffer tank must not be allowed to drop below 20 °C during this process. This ensures that the heat pump can be defrosted at any time.
7. When all heating circuits are fully open and a return temperature of at least 18 °C is maintained, the commissioning is complete.

⚠ CAUTION

Operating the heat pump at lower system temperatures may cause the heat pump to break down completely.

9 Cleaning / maintenance

9.1 Maintenance

To protect the paintwork, avoid leaning anything against the device or putting objects on the device. External heat pump parts can be wiped with a damp cloth and commercially available domestic cleaner.

⚠ Note

Never use cleaning agents containing sand, soda, acid or chloride, as these can damage the surfaces.

To prevent faults due to sediment in the heat exchanger of the heat pump, ensure that the heat exchanger in the heating system cannot be contaminated. We recommend protecting the evaporator by installing a bird guard in the inlet duct. At least 80% of the cross section should be open. Should operating malfunctions due to contamination still occur, however, the system should be cleaned as described below.

9.2 Cleaning the heating system

⚠ CAUTION

The integrated dirt trap must be cleaned at regular intervals.

The maintenance intervals should be defined according to the degree of soiling in the system. The filter insert should also be cleaned.

For cleaning, the heating circuit must be made pressureless in the vicinity of the dirt trap, the filter compartment unscrewed, and the filter insert removed and cleaned. Assembly carried out in reverse order requires attention to correct assembly of the screen inserts and tightness of the screw joints.

The ingress of oxygen into the heating water circuit may result in the formation of oxidation products (rust), particularly if steel components are used. These enter the heating system via the valves, the circulating pumps and/or plastic pipes. A diffusion-resistant installation is therefore essential, especially with regard to the piping of underfloor heating systems.

⚠ Note

We recommend the installation of a suitable corrosion protection system to prevent the formation of deposits (e.g. rust) in the condenser of the heat pump.

Residue from lubricants and sealants may also contaminate the heating water.

In the event of severe contamination leading to a reduction in the performance of the liquefier in the heat pump, the system must be cleaned by a technician.

Based on current information, we recommend using a 5% phosphoric acid solution for cleaning purposes. However, if cleaning needs to be performed more frequently, a 5% formic acid solution should be used.

In both cases, the cleaning fluid should be at room temperature. We recommend flushing the heat exchanger in the direction opposite to the normal flow direction. To prevent acidic cleaning agents from entering the heating system circuit, we recommend connecting the flushing device directly to the flow and return of the liquefier of the heat pump.

It is then important that the system be thoroughly flushed using appropriate neutralising agents to prevent any damage from being caused by cleaning agent residue remaining in the system.

Acids must be used with care and the regulations of the employers liability insurance associations must be adhered to.

The instructions of the cleaning agent manufacturer must always be observed.

9.3 Cleaning the air system

The air ducts, evaporator, fan and condensate drain should be cleaned of contamination (leaves, twigs, etc.) before each new heating period. To do this, the heat pump must be opened at the side. The bottom section should be opened first, followed by the top section.

⚠ **CAUTION**

Before opening the device, ensure that all circuits are disconnected from the power supply.

Remove and rehang the panel assemblies, as described in Chapter 4.

To prevent the evaporator and the condensate tray from being damaged, do not use hard or sharp objects when cleaning.

10 Faults / troubleshooting

This heat pump is a quality product and is designed for trouble-free operation. Should a fault occur, however, it will be indicated on the heat pump manager display. In this case, consult the "Faults and troubleshooting" page in the operating instructions of the heat pump manager.

If you cannot correct the fault yourself, please contact your after-sales service technician.

⚠ CAUTION

Work on the heat pump must only be performed by authorised and qualified after-sales service technicians!

11 Decommissioning / disposal

Before removing the heat pump, disconnect it from the power source and close all valves. The heat pump must be dismantled by trained personnel. Observe all environmental requirements regarding the recovery, recycling and disposal of materials and components in accordance with all applicable standards. Particular attention should be paid to the proper disposal of refrigerants and refrigerant oils.

12 Device information

1	**Type and order code**		WWP LI 16-A R
2	**Design**		
2.1	Heat source		Air
2.2	Seasonal coefficient of performance (COP) average climate 35 °C / 55 °C		4.77 / 3.71
2.3	Controller		Integrated
2.4	Heat generator installation location		Indoors
2.5	Heat source installation location		Indoors
2.6	Thermal energy metering		Integrated
2.7	Performance levels		Variable
3	**Operating limits**		
3.1	Heating water flow / return [1]	°C	up to 60 ± 2K / from 22
3.2	Air (heating) [1]	°C	-22 to +35
3.3	Cooling water flow	°C	+7 to +20
3.4	Air (cooling)	°C	+15 to +40
4	**Flow [2] / sound**		
4.1	Heating water flow rate, internal pressure differential		
	Nominal flow rate in accordance with 14511A7 / W35 ... 30	m³/h / Pa	1.2 / 15600
	A7 / W45 ... 40	m³/h / Pa	1.2 / 15600
	A7 / W55 ... 47	m³/h / Pa	0.8 / 6100
	Minimum heating water flow	m³/h / Pa	0.8 / 6100
4.2	Cooling water flow rate / internal pressure differential		
	Nominal flow rate in accordance with EN14511 35 / W18 ... 23	m³/h / Pa	1.6 / 26000
	Minimum cooling water flow	m³/h / Pa	1.2 / 15600
4.3	Sound power level according to EN12102 with A7 / W55 Device/outside [3 4] Normal operation	dB(A)	50 / 53
4.4	Sound power level according to EN12102 with A7 / W55 Device/outside [3 4] Lower operation [5]	dB(A)	50 / 51
4.5	Sound pressure level at a distance of 1 m indoors [4 6]	dB(A)	43
4.6	Air flow with an external static pressure differential	m³/h /Pa m³/h /Pa	4000 / 0 3800 / 25
5	**Dimensions, weight and filling quantities**		
5.1	Device dimensions [7]	H x W x D mm	1556x962x782
5.2	Device connections for heating	Inches	G 1
5.3	Weight of the transportable unit(s) incl. packaging	kg	275
5.4	Refrigerant/total filling weight	Type/kg	R410A / 4.78
5.5	GWP value / CO_2 equivalent	--- / t	2088 / 9.9
5.6	Refrigeration circuit hermetically sealed		Yes
5.7	Lubricant/total filling quantity	Type/litres	Polyolester (POE)/1.24
5.8	Volume of heating water in the indoor component	Litres	5
6	**Electrical connection**		
6.1	Supply voltage/fusing/RCD type		3~/PE 400V (50 Hz) / C10A / B
6.2	Control voltage / fusing / RCD type		1~/N/PE 230V (50 Hz) / C13A / A
6.3	Degree of protection according to EN 60 529		IP 21
6.4	Starting current limiter		Inverter
6.5	Starting current	A	Inverter
6.6	Nominal power consumption A2 / W35 / max. power consumption [2]	kW	1.43 / 4.9
6.7	Nominal current A2 / W35 / cos φ	A / ---	2.3 / 0.99
6.8	Power consumption of fan	W	up to 250

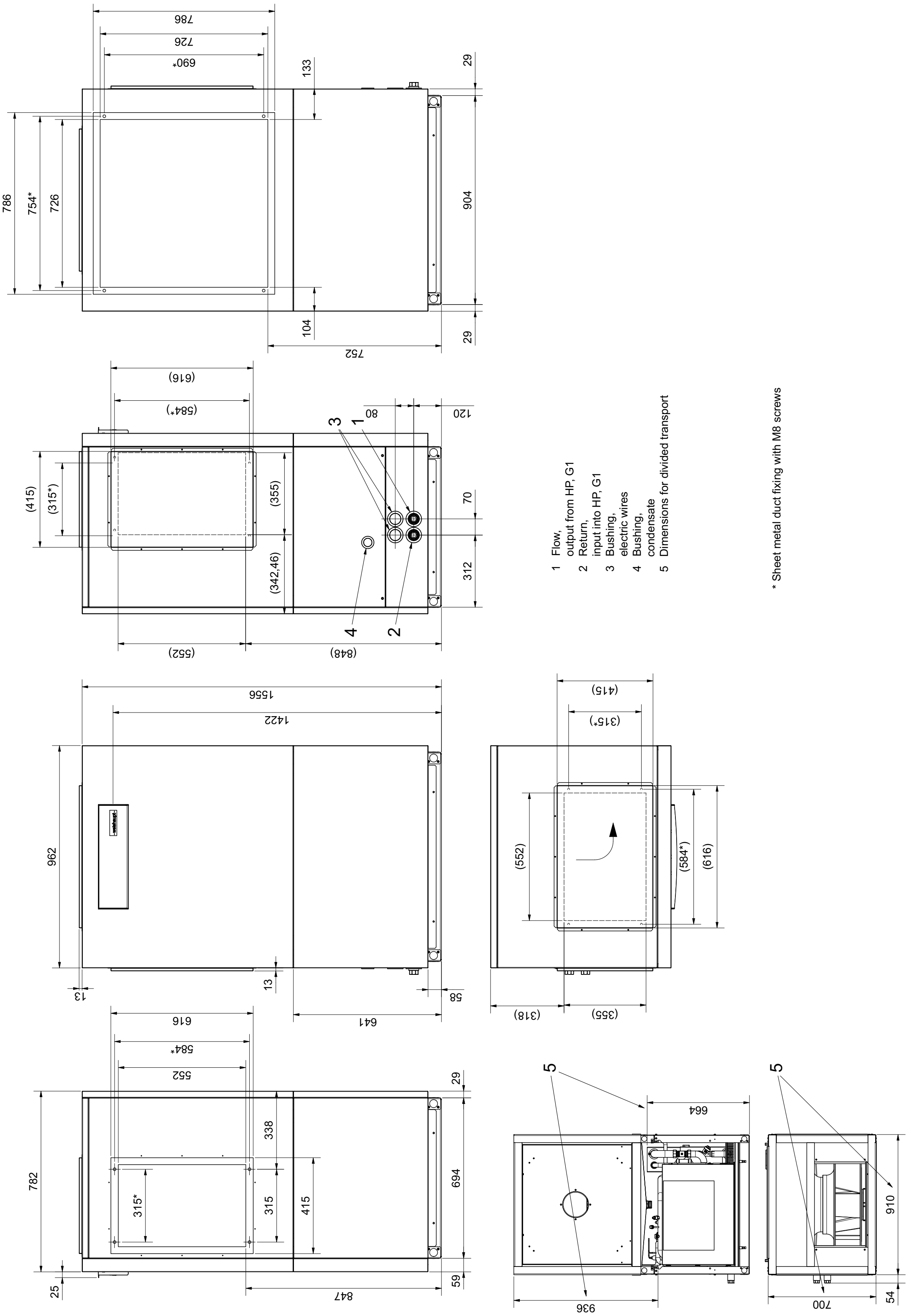
7 Complies with the European safety regulations		[8]
8 Additional model features		
8.1 Type of defrosting		Reverse cycle
8.2 Condensate tray frost protection/water in device is protected from freezing [9]		Yes
8.3 Max. operating overpressure (heat sink)	**bar**	3.0
9 Heat output / coefficient of performance (COP) [2]		
9.1 Heat output / coefficient of performance (COP)		EN 14511
at A-7 / W35	**kW / ---**	10.7 / 3.1
at A2 / W35	**kW / ---**	6.0 / 4.2
at A7 / W35	**kW / ---**	7.1 / 5.1
10 Cooling capacity / coefficient of performance (COP) [2 3]		
10.1 Cooling capacity / coefficient of performance (COP)		EN 14511
at A27 / W18	**kW / ---**	8.6 / 3.9
at A27 / W7	**kW / ---**	8.0 / 3.0
at A35 / W18	**kW / ---**	9.8 / 3.6
at A35 / W7	**kW / ---**	7.1 / 2.4

1. For air temperatures between -22 °C and -5 °C, flow temperature increasing from 45 °C to 60 °C.
2. This data indicates the size and capacity of the system according to EN 14511. For an analysis of the economic and energy efficiency of the system, the bivalence point and the regulation should be taken into consideration. These figures are only achieved with clean heat exchangers. Instructions for care, commissioning and operation can be found in the relevant sections of the installation and operation instructions. The specified values have the following meaning, e.g. A2/W35: Heat source temperature 2 °C and heating water flow temperature 35 °C.
3. The maximum sound power level under full load can increase by up to 5 dB(A).
4. The specified sound levels apply if the supporting feet provided are not used. If the supporting feet are used, the level can increase by up to 3 dB(A).
5. The heat output and COP is reduced by approx. 5% in lower operation
6. The specified sound pressure level represents the free sound area level. The measured value can vary by up to 16 dB(A), depending on the installation location.
7. Note that additional space is required for pipe connections, operation and maintenance.
8. see CE declaration of conformity
9. The heat circulating pump and the heat pump manager must always be ready for operation.

Appendix

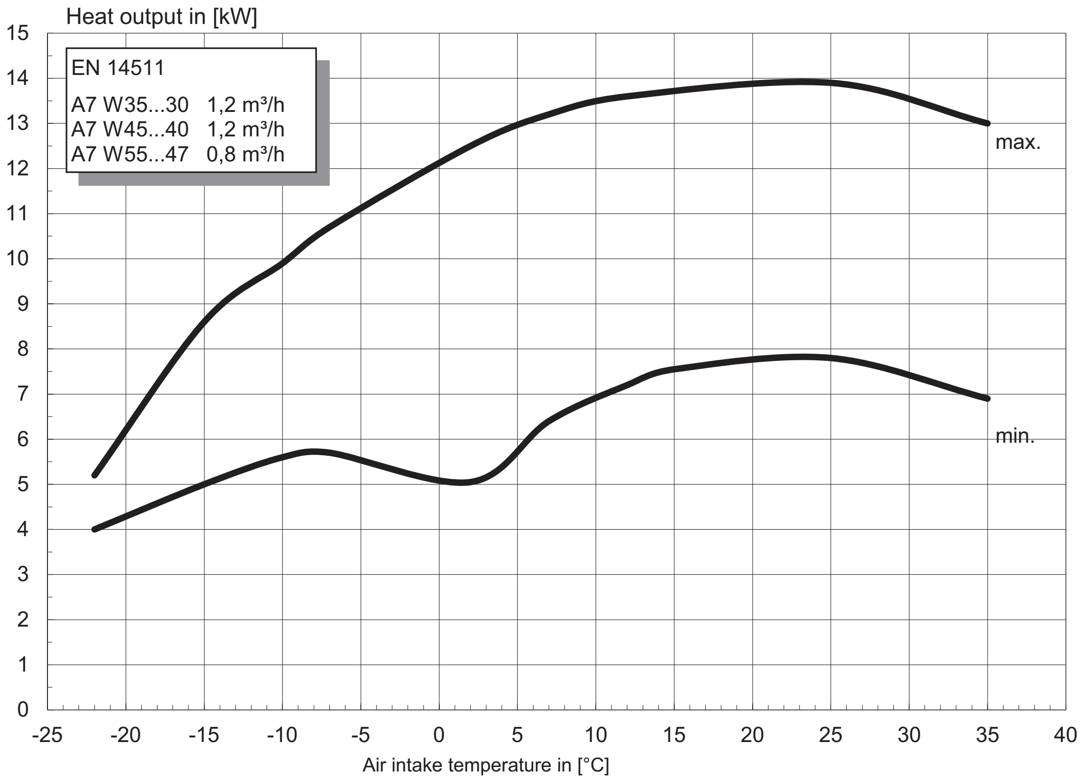
1 Dimension drawings

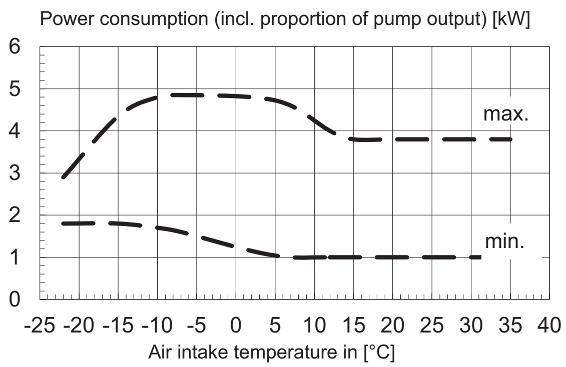
1.1 Dimension drawing

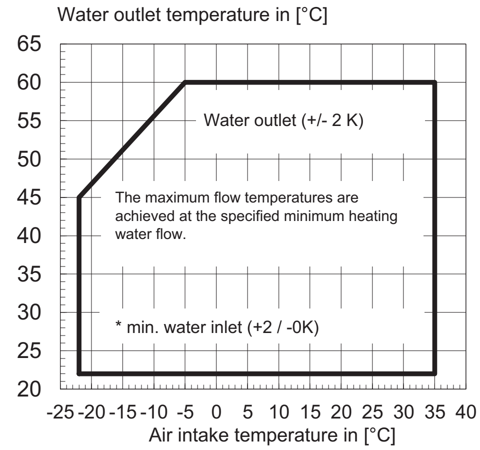


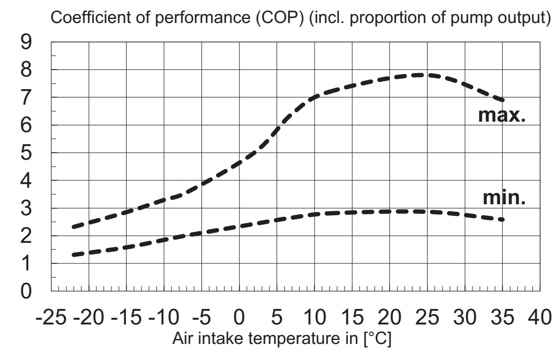
2 Diagrams

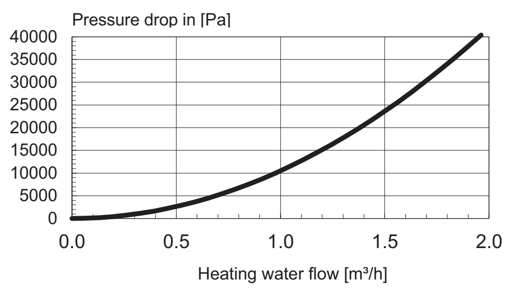
2.1 Characteristic curve, heating

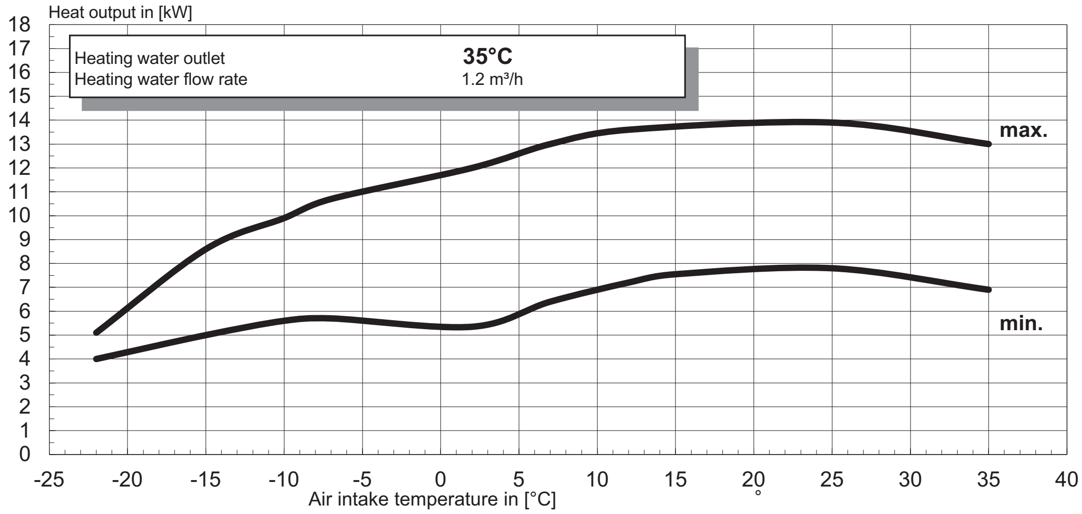


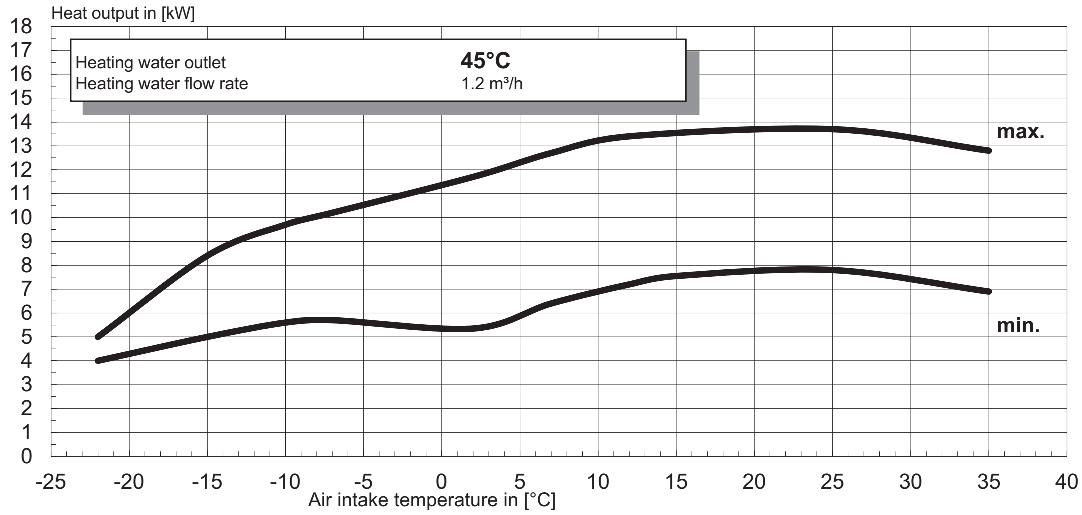


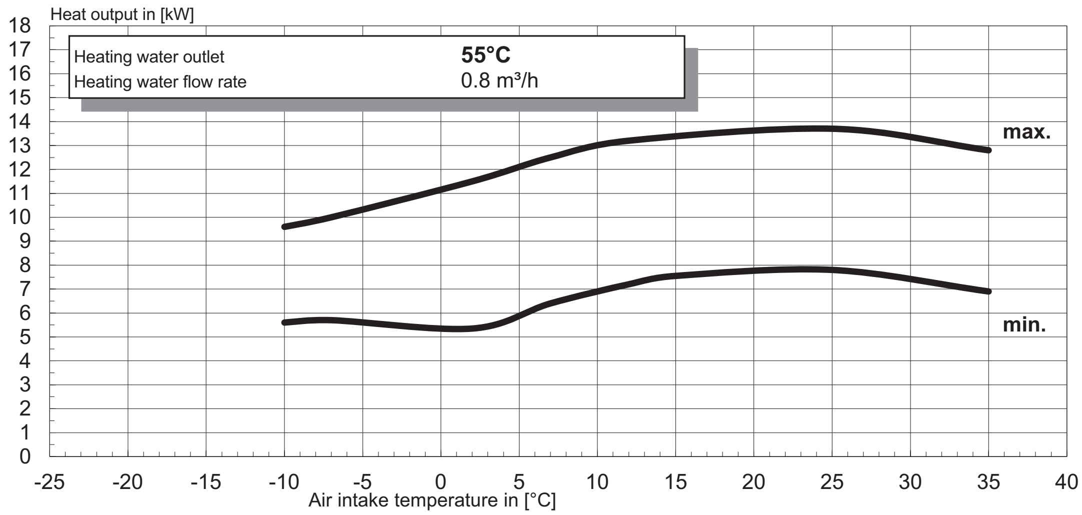




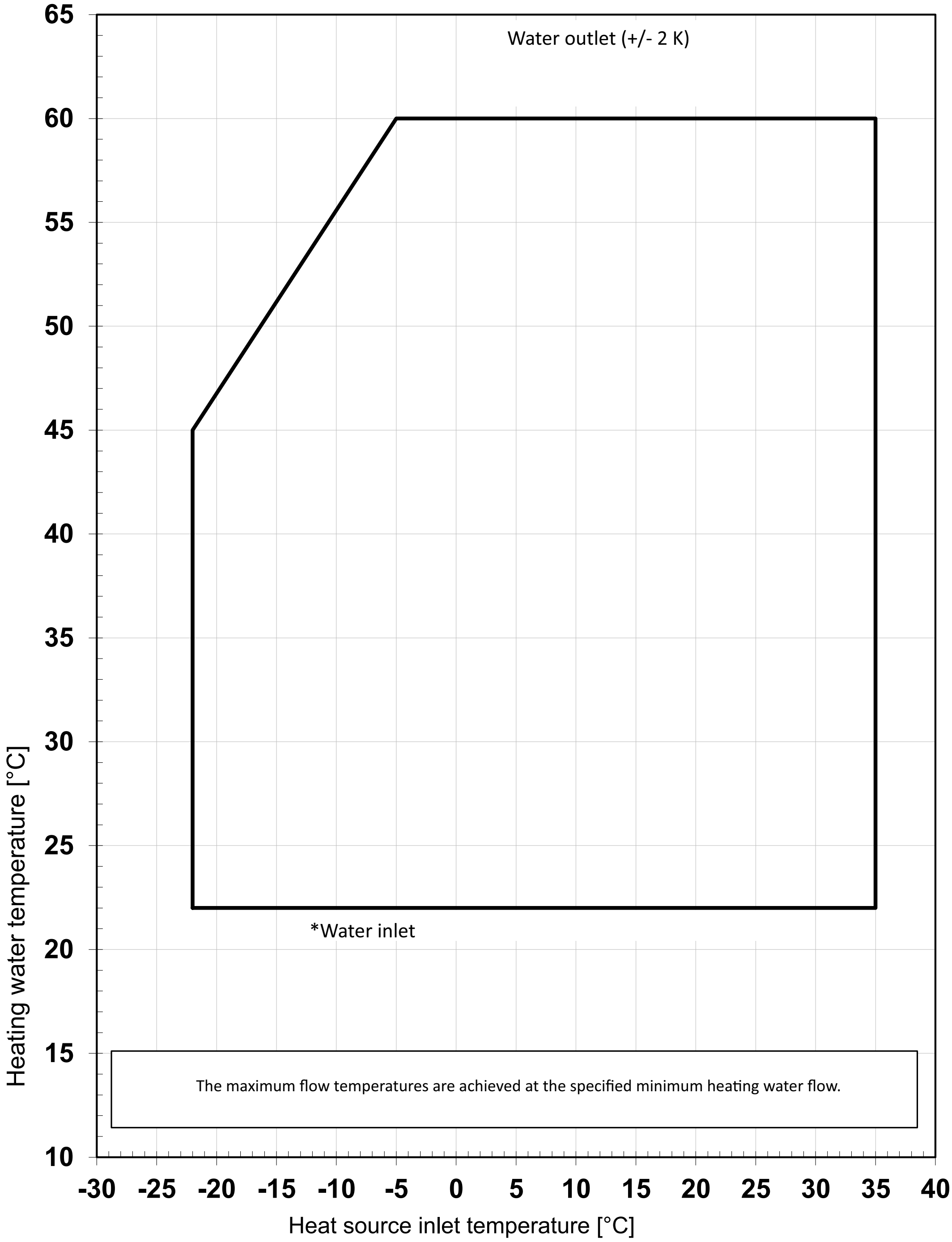



Heat output in [kW]
Heating water outlet
35°C
Heating water flow rate
1.2 m³/h
max.
min.
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
Air intake temperature in [°C]


Heat output in [kW]
Heating water outlet
45°C
Heating water flow rate
1.2 m³/h
max.
min.
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
Air intake temperature in [°C]

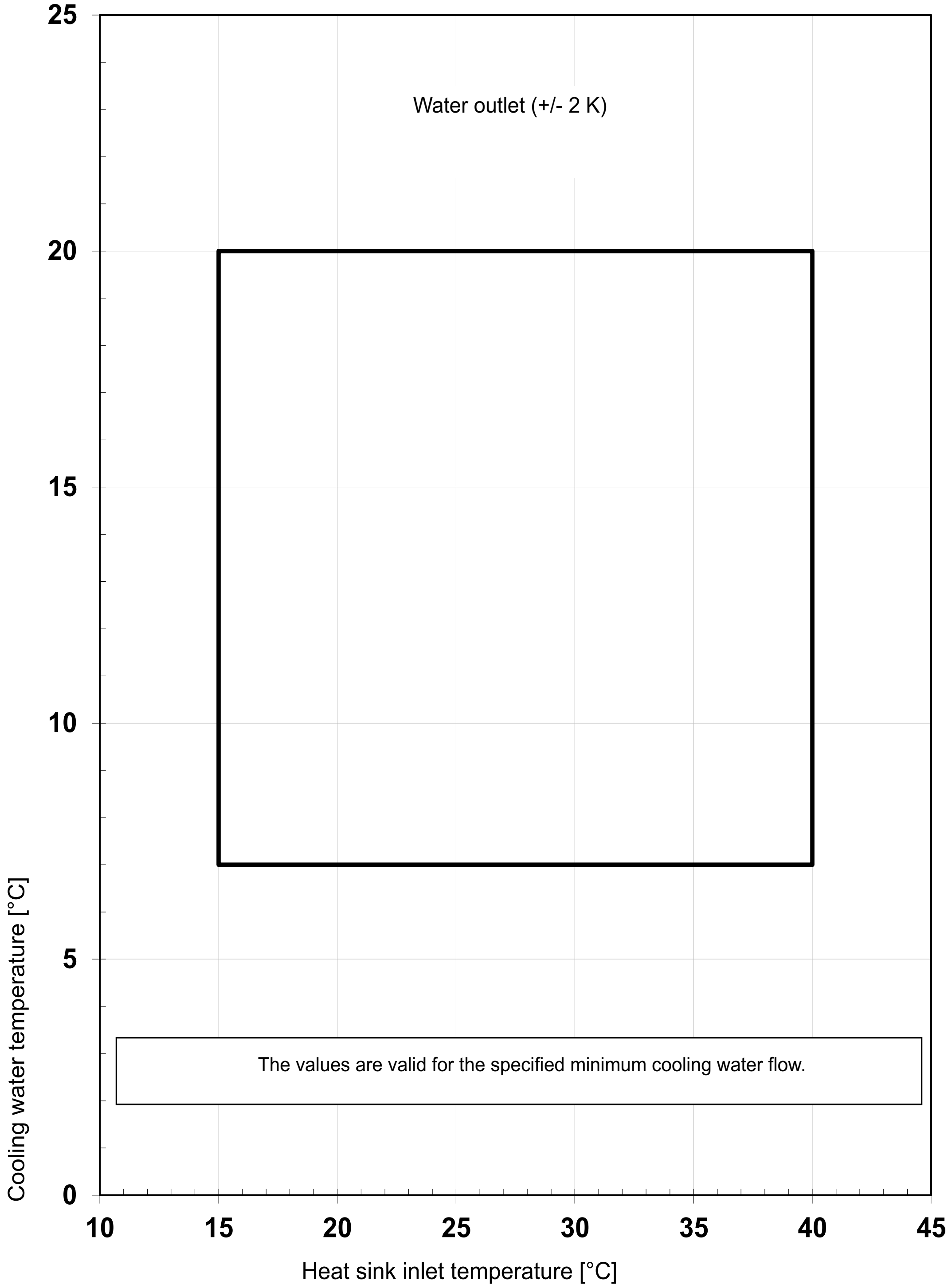

Heat output in [kW]
Heating water outlet
55°C
Heating water flow rate
0.8 m³/h
max.
min.
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
Air intake temperature in [°C]

2.2 Operating limits diagram, heating



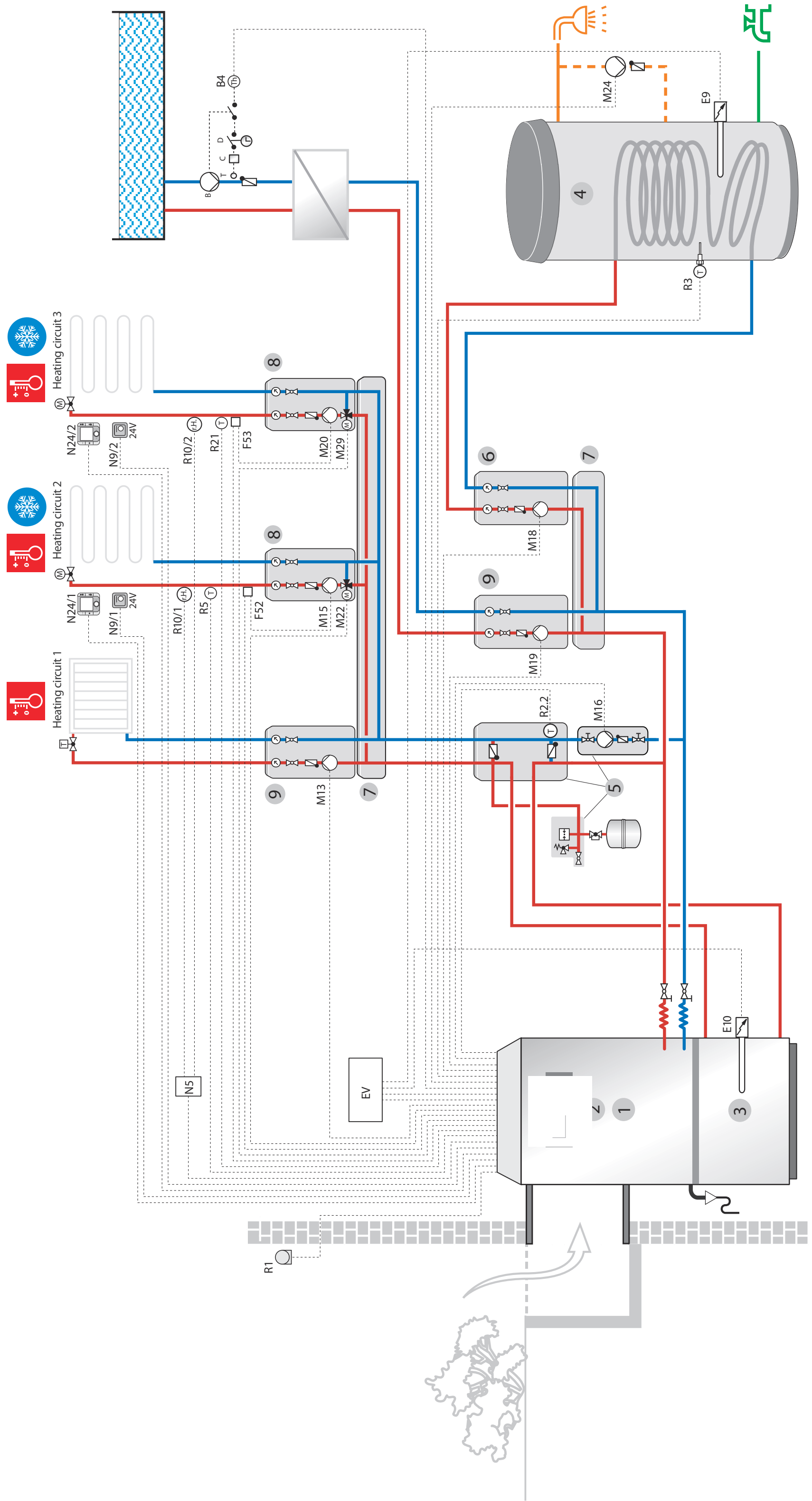
*For air-to-water heat pumps, the minimum heating water temperature is the minimum return temperature

2.3 Operating limits diagram, cooling



3 Integration diagrams

3.1 Sample system diagram



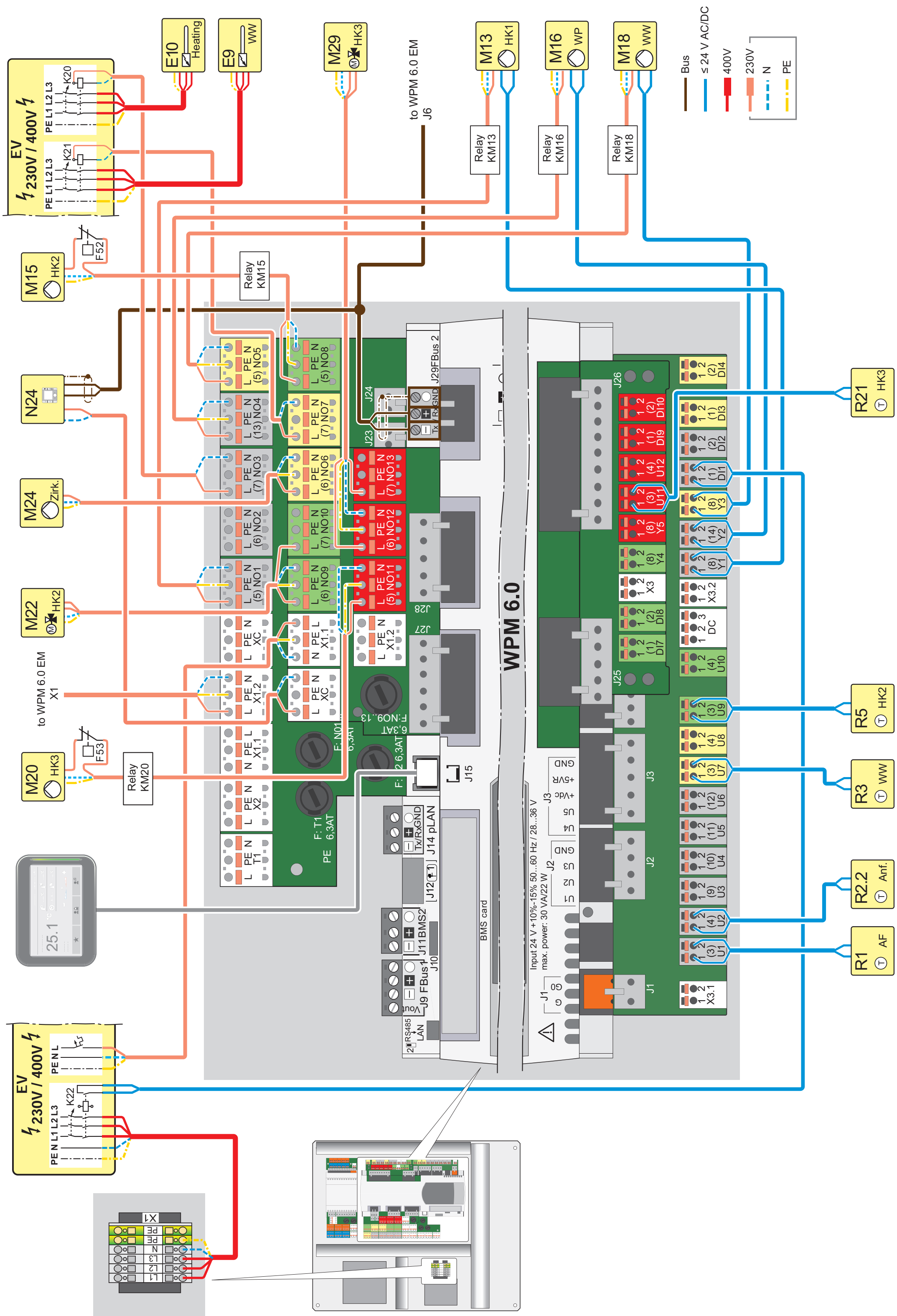
1 Air/water heat pump
2 Heat pump manager/controller
3 Buffer storage
4 Potable water storage WAS LE-Eco
5 Double differential pressureless manifold
6 Potable water module
7 Manifold bar
8 Mixer module
9 Pump assembly

B4 Swimming pool water thermostat
EV Electrical distributor
E9 Potable water flange heater
E10 Immersion heater
F52 Temperature switch underfloor heat. HC 2
F53 Temperature switch underfloor heat. HC 3
M13 Heating circulation pump HC 1
M15 Heating circulation pump HC 2
M16 Additional circulation pump
M18 Potable water feeder pump
M19 Swimming pool pump
M20 Heating circulation pump HC 3

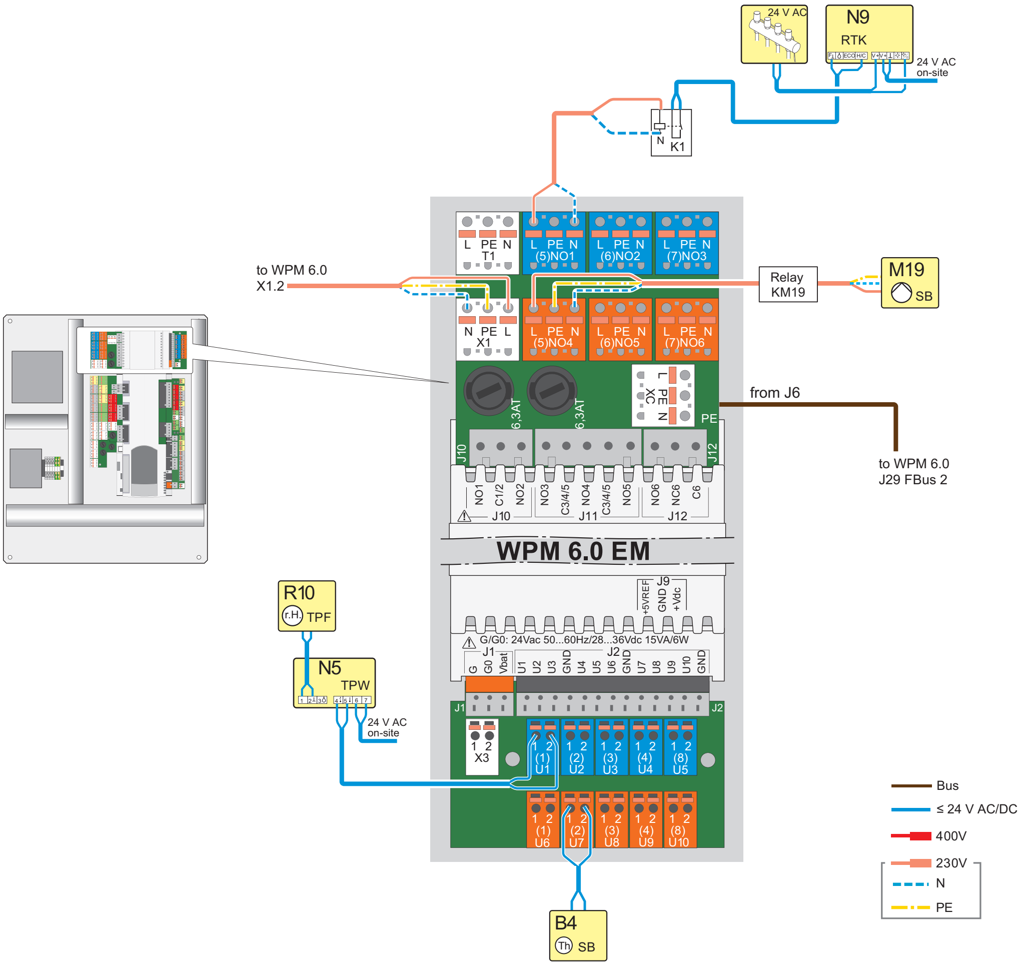
M22 Mixer HC 2
M24 Circulation pump
M29 Mixer HC 3
N5 Extended dewpoint monitoring
N9 Room thermostat (switchable)
N24 Smart RTC
R1 External sensor
R2.2 Demand sensor
R3 Potable water sensor
R5 Flow sensor HC 2
R10 Dewpoint sensor
R21 Flow sensor HC 3

The system example is a non-binding draft design with no claims of completeness. Final system design must be carried out in consultation with an expert planner.

3.2 Circuit diagram



3.3 Circuit diagram, extension module



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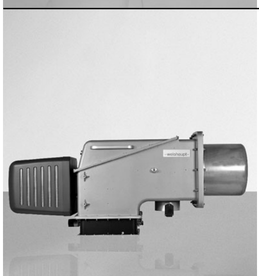

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Wall-hung condensing boilers for gas **up to 800 kW**

The wall-hung condensing boilers WTC-GW have been developed to meet the highest demands in ease of operation and efficiency. Modulating operation means these units operate quietly and economically.

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The floor-standing condensing boilers WTC-GB (up to 300 kW) and WTC-OB (up to 45 kW) are efficient, low in pollutants and versatile in use.
Even the largest capacities can be covered by cascading up to four gas condensing boilers.

Solar systems

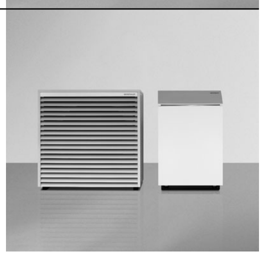
The stylish flat-plate collectors are the ideal complement for any Weishaupt heating system. They are suitable for solar water heating and for combined heating support. With versions for on-roof, in-roof and flat roof installations, solar energy can be utilised on almost any roof.

Water heaters/Energy storage

The diverse program of potable water and energy storage for various heat sources includes storage volumes of 70 to 3,000 litres. In order to minimize storage losses, potable water cylinders from 140 to 500 litres are available with highly efficient insulation using vacuum insulation panels.

Heat pumps **up to 180 kW (Single device)**

The heat pump range offers solutions for the utilisation of heat from the air, the soil or ground water.
Some systems are also suitable for cooling buildings.



Geothermal probe drilling

With its daughter company, BauGrund Süd, Weishaupt also offers geothermal probe and well drilling. With the experience of more than 17,000 systems and more than 3.2 million meters of drilling, BauGrund Süd offers a comprehensive service program.

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