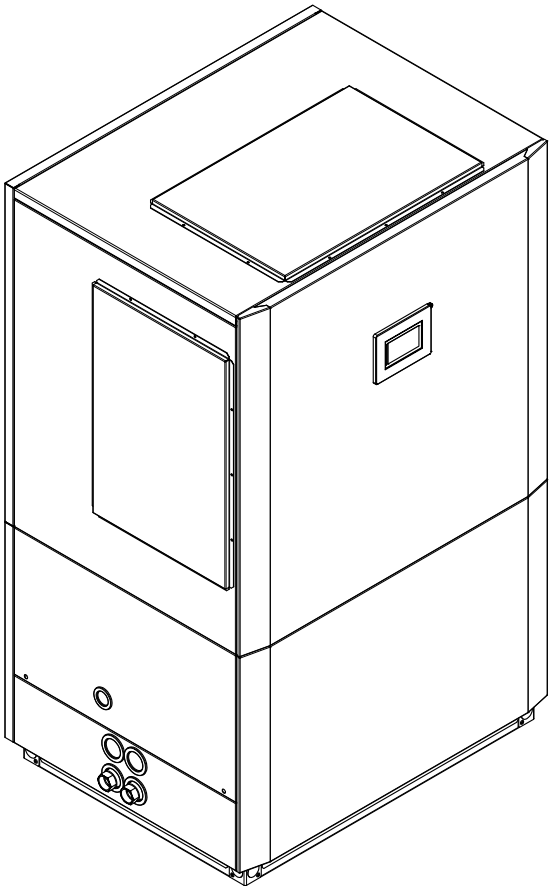
Glen Dimplex Deutschland

Dimplex

# LI 16I-TUR



**Montage- und Gebrauchsanweisung**

Luft/Wasser-Wärmepumpe für Innenaufstellung

**Installation and Operating Instruction**

Air-to-Water Heat Pump for Indoor Installation

**Instructions de montage et d'utilisation**

Pompe à chaleur air-eau pour installation intérieure

Bestell-Nr. | Order no. | No de commande: 452169.66.06b

DE | EN | FR · FD 0411

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# 1 Safety notes

## 1.1 Symbols and markings

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

**⚠ CAUTION!**

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

**i 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 prohibited. 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, in agricultural establishments and in hotels, guest houses and similar / other residential buildings.

The construction and design of the heat pump complies with all relevant EU directives, 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 the network operator must also be observed.

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

This unit 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 the safe use of the unit 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 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

By operating 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.

It is particularly important for the efficiency of a heat pump to keep the temperature difference between heating water and heat source as small as possible. For this reason, it is advisable to design the heat source and heating system very carefully. **A temperature difference of approx. one Kelvin (one °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 e.g. 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 because this increases the temperature difference, in turn reducing the COP.

Correct adjustment of the heat pump manager is also important for energy-efficient use of the heat pump. Further information can be found in the operating instructions of the heat pump manager.

# 2 Purpose of the heat pump

## 2.1 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 circulating pump(s) must be controlled using the heat pump manager.

If function-relevant or safety-relevant pump functions, such as integration of the heat pump into the building management system, are not supported, then this can result in loss of warranty and cause a write-off of the heat pump.

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

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

The heat pump is suitable for mono-energy and bivalent operation down to an external temperature of -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. For drying out buildings in autumn or winter, we recommend installing a suitable 2nd heat generator (e.g. 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

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

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

Electrical energy is used to raise the temperature of the heat in the environment to a higher level. As the energy extracted from the air is transferred to the heating water, this type of device is called an air-to-water heat pump.

The air-to-water heat pump consists of the main components: evaporator, ventilator and expansion valve, as well as the low-noise compressors, the liquefier and the electrical control system.

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

### 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 refrigerating circuit, 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.

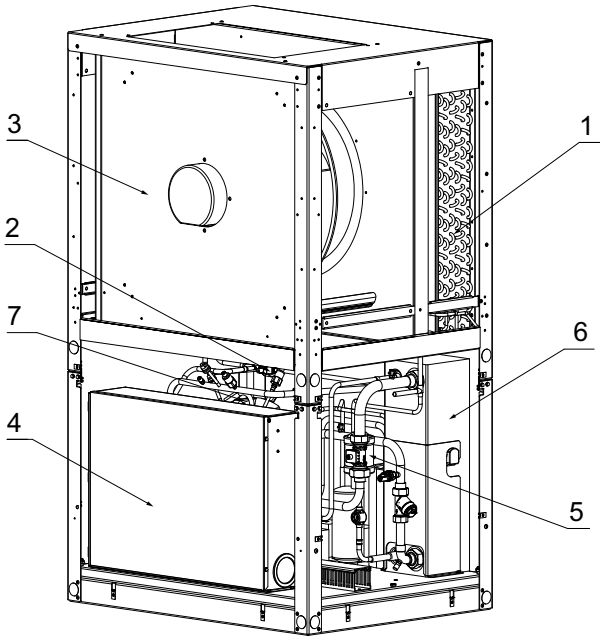
The integrated thermal energy metering must not be used for heating cost billing purposes. EN 1434 is not applicable.

# 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 R407C included in the Kyoto protocol. Information on the GWP value and $CO_2$ equivalent of the refrigerant can be found in the chapter 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.

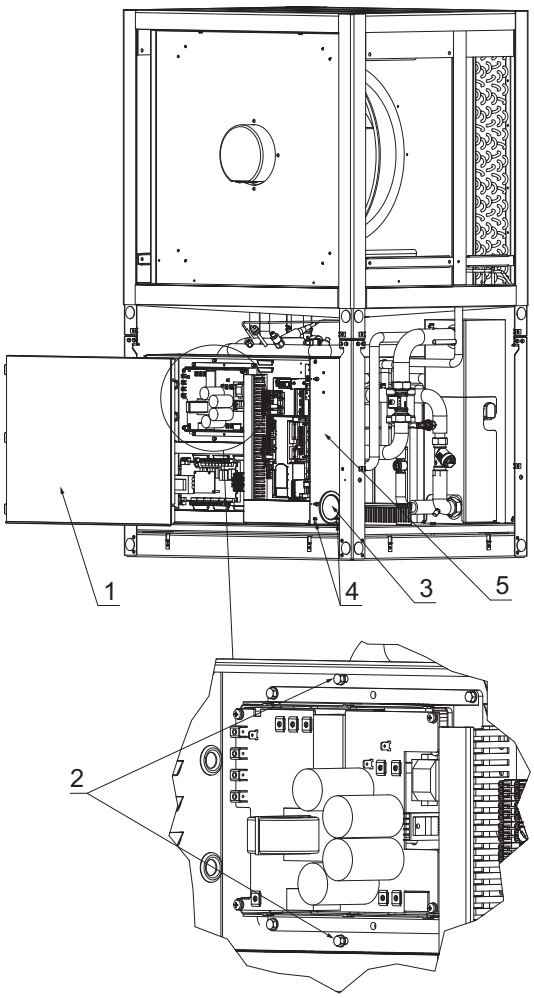
(Mains)connecting terminals, power electronics for the compressor, refrigeration circuit controller and heat pump manager are located in the switch box

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 vent plugs ø 30 - black

**Outside the packaging:**

Documentation

# 4 Accessories

## 4.1 Room climate station

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

This is done by setting the desired room temperature on the heat pump manager. The minimum possible cooling water temperature is calculated from the room temperature and air 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 technology

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 parameterisation of the interface.

The following network connections can be made on the heat pump manager:

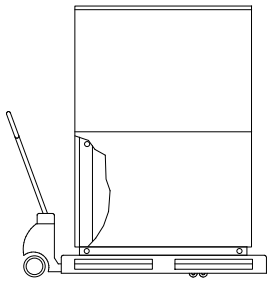
- Modbus
- EIB, KNX
- Ethernet

# 5 Transport

**⚠ CAUTION!**

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

Use a pallet for transporting the heat pump to the 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 base plate or frame.

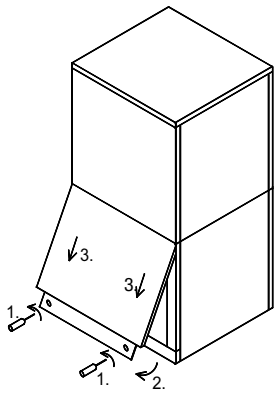


The heat pump and the transport pallet are joined by four transit bolts. These must be removed.

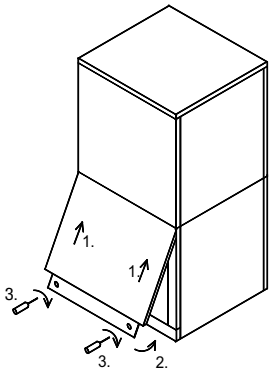
Before using the transport holes in the frame, it is necessary to remove the lower side panel assemblies. This is done by loosening each of the two screws at the base and then withdrawing the panels by unhooking them from above. Rehang the panels by gently pushing them in an upwards direction.

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

At the installation location, 8 black dust caps, which are included in the packaging of the device, must be snapped into the transport holes.

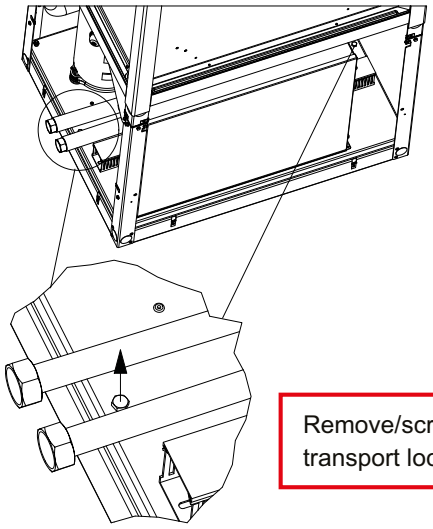



Opening the cover




Closing the cover

After the transport, the transport securing device is to be removed on either side at the bottom of the unit.




**⚠ CAUTION!**

**The transport securing device is to be removed prior to commissioning.**

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 cables at 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!**

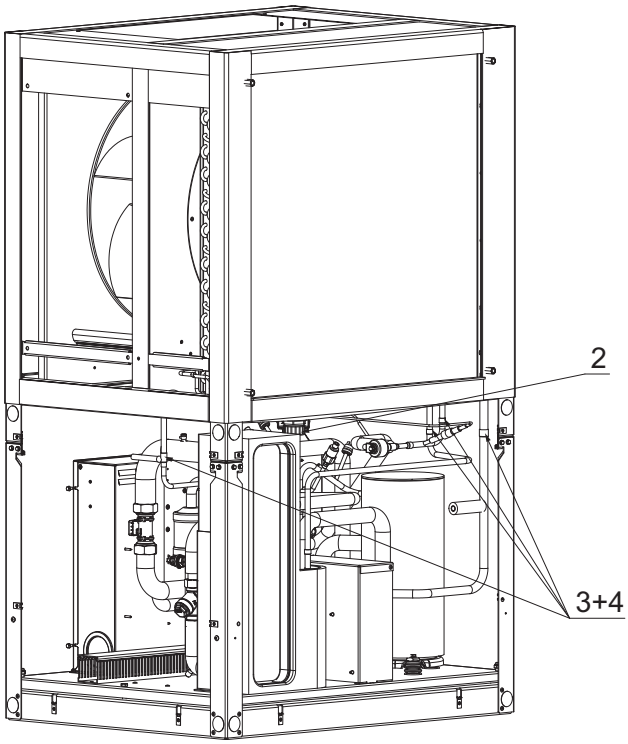
**Do not lift by the condensate tray. This cannot withstand any forces.**

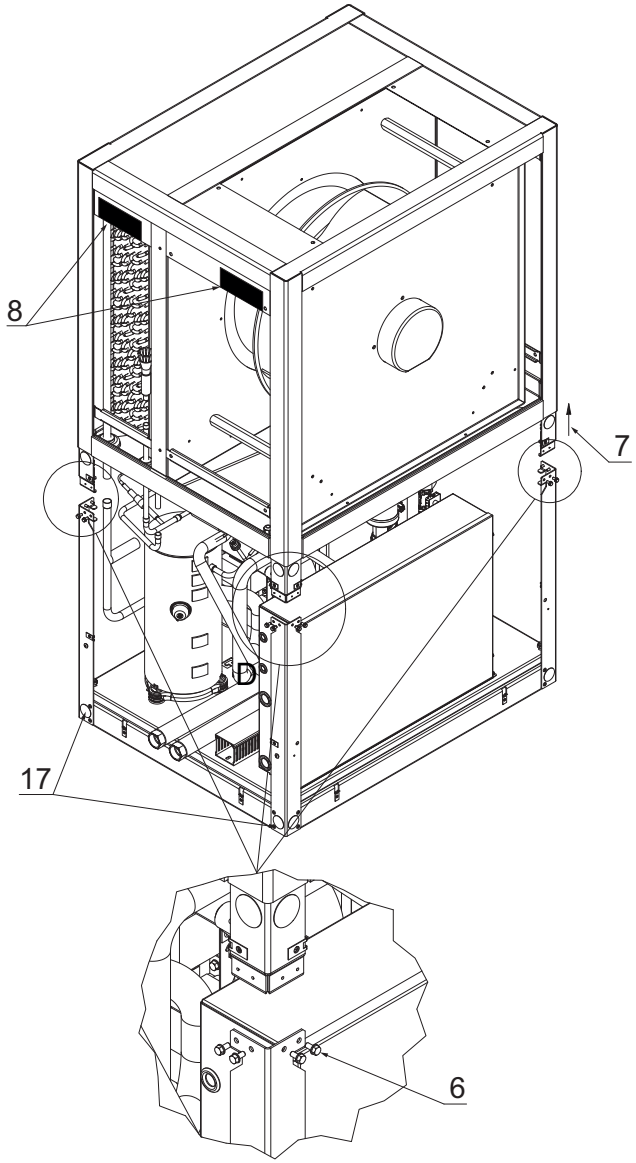
**⚠ CAUTION!**

**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.**



# 6 Set-up

## 6.1 General Information

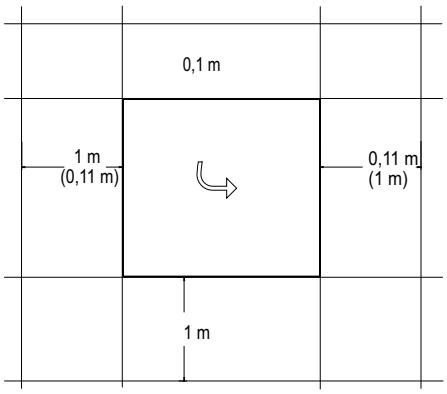
The heat pump has been designed for areas that are accessible to the general public, as well as for areas that are not accessible to the general public.

The 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 cladding sections, 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(see cap. 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 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.
The heat pump must be installed so that maintenance work can be carried out without being hindered. This can be ensured by maintaining a clearance of 1m 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.




**NOTE**

**The heat pump is not intended for use over 2000 metres above sea level.**

Neither frost nor temperatures higher than 35 °C must occur in the installation location 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 external 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 a wooden floor is not recommended.

## 6.2 Condensed Water Pipe

Condensed water 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 clearing tanks or cesspits, as aggressive vapours or a condensed water pipe which has not been laid in a frost-free manner could 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 Installation

## 7.1 General Information

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

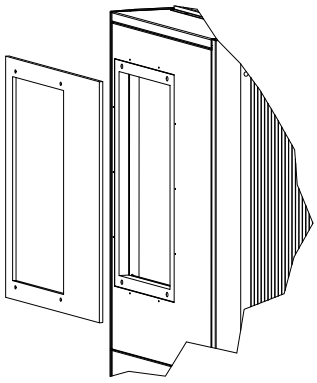
- Fresh and exhaust air
- Flow and return flow of the heating system
- Condensate outflow
- Voltage supply
- Temperature sensor

## 7.2 Air Connection

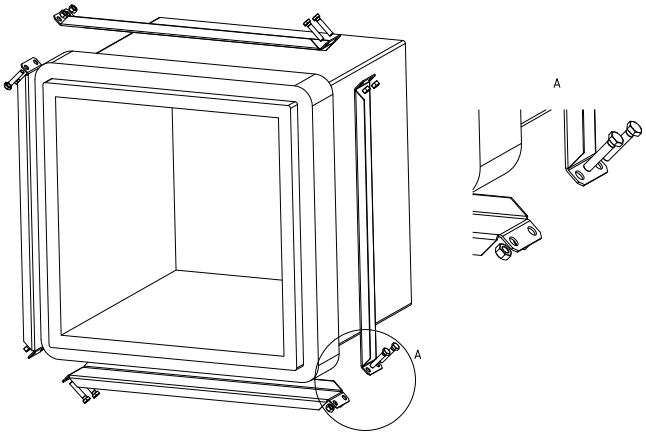
**⚠ CAUTION!**
**Do not restrict or block the area around the air intake or outlet.**

**⚠ CAUTION!**
**Only operate the heat pump with the air ducts connected.**

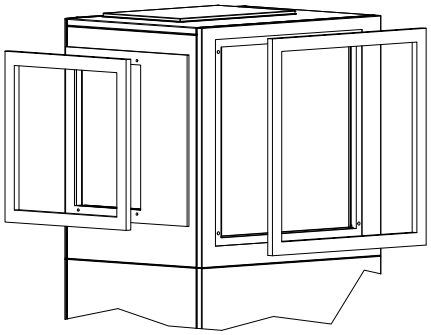
The glass fibre reinforced concrete air ducts offered as accessories are moisture-resistant and diffusion-free (exhaust air duct 600 x 600 and inlet duct 750 x 750). When using the air duct for the air outlet side (600 x 600), the "insulating mat duct connection" (in the accessory pack) is to be adhered 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 are not screwed directly onto the heat pump. Only the rubber seal comes into direct contact with the heat pump when the system is installed correctly. 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.



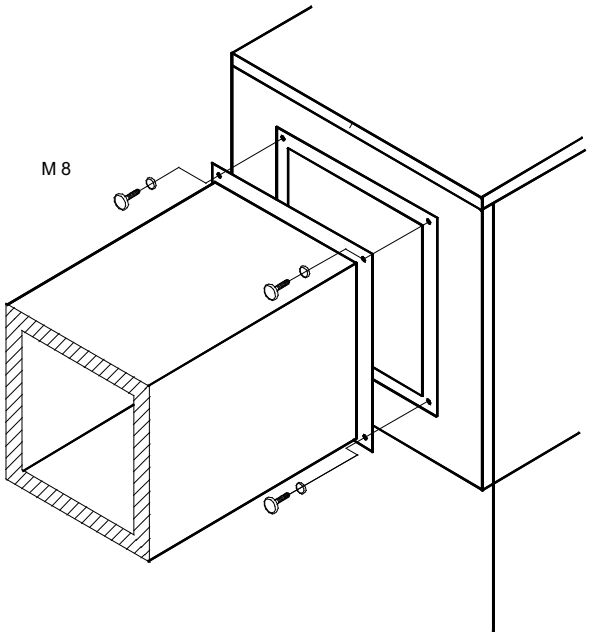
The large sealing ring can be used to position the air intake opening of the heat pump directly onto an appropriately constructed wall opening.

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 ventilator 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 only touch the insulation. There should be no contact with the external sheeting.

Care must also be taken to ensure that suitable vibration isolation and duct insulation are provided.



## 7.3 Heating System Connection

The heating system connections on the heat pump have a 1" internal thread. Use a spanner 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 front panels must be removed. The two connecting pipes, including pipe supports, must be moved from the left to the right side of the device. The front panels 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 liquifier could cause the heat pump to completely break down. For systems in which the heating water flow can be shut off via the radiator or thermostat valves, an overflow valve must be installed in a heating bypass behind the heat pump by the customer. This ensures a minimum heating water flow rate through the heat pump and helps to avoid faults.

Once the heating system has been installed, it must be filled, de-aerated and pressure-tested.

**NOTE**

**Pump units with check valves maintain the specified flow directions. If there is incorrect distribution or breaking off of the volume flow, these units (and the check valves in particular) must be checked! The use of check valves are mandatory in the event of several heating circuits or parallel connections for heat pumps in order to avoid incorrect distribution.**

## 7.4 Water Quality in Heating Systems

### 7.4.1 Scale Formation

Scale formation in heating systems cannot be avoided, but in systems with flow temperatures below 60 °C the problem is so small that it is negligible. 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. One preferred method for preventing scale formation is softening because this permanently removes alkaline earths (calcium and magnesium ions) from the heating system.

The following values for water quality in heating water and cold water must be observed and checked during an on-site check:

- Degree of hardness
- Conductivity
- pH value
- Filterable materials

The following (limit) values must absolutely be observed:

- Maximum degree of hardness in filling water and supplementary water 11 dGH.
- The conductivity in demineralised water (DM water) (low-salt) may not be greater than 100 µS/cm.
- The conductivity in partially demineralised water (saline) may not be greater than 500 µS/cm.
- The pH value must be between 8.2 and 9.
- The limit value for filterable materials in heating water is < 30 mg/l

If necessary, for example in bivalent systems, the specifications listed in the table below must also be observed, or the precise guidelines for filling water and supplementary water and the total hardness must be taken from the table in accordance with VDI 2035 – Sheet 1.

**NOTE**

**The specific volumes of a heating system must be determined before filling the system.**

The saturation index SI is used to determine whether water has a tendency towards lime dissolution or lime separation. This shows whether the pH value corresponds to a neutral pH point or by how much it undershoots it due to excess acid or by how much it exceeds it due to carbonic acid deficit. At a saturation index below 0, the water is aggressive and will tend towards corrosion. At a saturation index above 0, the water is calcareous.

The saturation index SI should be between - 0.2 < 0 < 0.2

<table>
<tr><th colspan="4">Filling and supplementary water as well as heating water, depending on heat output</th></tr>
<tr><td rowspan="2">Overall heat output in kW</td><td colspan="3">Total alkaline earths in mol/m³ (Total hardness in dGH)</td></tr>
<tr><td>≤ 20</td><td>> 20 to ≤ 50</td><td>> 50</td></tr>
<tr><td></td><td colspan="3">Specific system volume in l/kW Heat output [1]</td></tr>
<tr><td>≤ 50<br>specific water content<br>heat generator > 0.3 k per kW [2]</td><td>none</td><td>≤ 3.0 (16.8)</td><td rowspan="5">< 0.05 (0.3)</td></tr>
<tr><td>≤ 50<br>specific water content<br>heat generator > 0.3 k per kW [2]<br>(e.g. circulating water heaters) and systems with electric heating elements</td><td>≤ 3.0 (16.8)</td><td>≤ 1.5 (8.4)</td></tr>
<tr><td>> 50 kW to ≤ 200 kW</td><td>≤ 2.0 (11.2)</td><td>≤ 1.0 (5.6)</td></tr>
<tr><td>> 200 kW to ≤ 600 kW</td><td>≤ 1.5 (8.4)</td><td rowspan="2">< 0.05 (0.3)</td></tr>
<tr><td>> 600 kW</td><td>< 0.05 (0.3)</td></tr>
<tr><td colspan="4">Heating water, depending on heating output</td></tr>
<tr><td>Operating mode</td><td colspan="3">Electrical conductivity in µS/cm</td></tr>
<tr><td>Low-salt [3]</td><td colspan="3">> 10 to ≤ 100</td></tr>
<tr><td>Containing salt</td><td colspan="3">> 100 to ≤ 1500</td></tr>
<tr><td rowspan="2"></td><td colspan="3">Appearance</td></tr>
<tr><td colspan="3">clear, free from sedimentary substances</td></tr>
</table>

1. For the purpose of calculating the specific system volume, the smallest individual heat output is to be used for systems with several heat generators.
2. In systems with several heat generators with different specific water contents, the smallest specific water content is decisive.
3. Full softening is recommended for systems with aluminium alloys.

Fig. 7.1:Guideline values for filling and supplementary in accordance with VDI 2035

**⚠ CAUTION!**

**When using demineralised water, ensure that the minimum permissible pH value of 8.2 is not undershot. Failure to comply with this value can result in the heat pump being destroyed.**

## 7.4.2 Corrosion

The VDI 2035 recommends the use of partially demineralised water or demineralised water in systems with larger-than-average specific system volumes of 50 l/kW.

These measures (e.g. pH stabilizers) are implemented to set the pH value of the heating water to minimise the risk of corrosion in the heat pump and in the heating system.

Irrespective of the legal requirements, the following limit values in the heating water used for various substances must not be undershot or exceeded. This is to ensure safe operation of the heat pump. A water analysis must be carried out before commissioning the system. If the water analysis produces a "-" for a maximum of one indicator or a "o" for a maximum of two indicators, the analysis must be classed as negative.

| Evaluation characteristic | Concentration range (mg/l or ppm) | Stainless steel | Copper |
|---|---|---|---|
| Bicarbonate ($HCO_3^-$) | < 70 | + | o |
| | 70 - 300 | + | + |
| | > 300 | + | o |
| Sulphate ($SO_4^{2-}$) | < 70 | + | + |
| | 70 - 300 | o | o/- |
| | > 300 | - | - |
| Hydrogencarbonate/sulphate $HCO_3^-/SO_4^{2-}$ | > 1.0 | + | + |
| | < 1.0 | o | - |
| Electrical conductivity [1] | < 10 µS/cm | o | o |
| | 10 - 500 µS/cm | + | + |
| | > 500 µS/cm | o | o |
| pH value [2] | < 6.0 | - | - |
| | 6.0 - 8.2 | o | o |
| | 8.2 - 9.0 | + | + |
| | > 9.0 | o | o |
| Ammonium ($NH_4^+$) | < 2 | + | + |
| | 2 - 20 | o | o |
| | > 20 | - | - |
| Chloride ions ($Cl^-$) | < 50 | + | + |
| | 50 - 150 | o | o |
| | > 150 | - | - |
| Free chlorine ($Cl_2$) | < 0.5 | + | + |
| | 0.5 - 5 | - | o |
| | > 5 | - | - |
| Hydrogen sulphide ($H_2S$) | < 0.05 | + | + |
| | > 0.05 | + | o/- |
| Carbon dioxide ($CO_2$) | < 5 | + | + |
| | 5 - 10 | + | o |
| | > 10 | o | - |
| Nitrate ($NO_3^-$) | < 100 | + | + |
| | > 100 | o | o |
| Iron (Fe) | < 0.2 | + | + |
| | > 0.2 | o | o |
| Aluminium (Al) | < 0.2 | + | + |
| | > 0.2 | + | o |
| Manganese (Mn) | < 0.05 | + | + |
| | > 0.05 | o | o |
| Saturation Index | < -0.2 | o | o |
| | -0.2 - 0.1 | + | + |
| | 0.1 - 0.2 | + | o |
| | > 0.2 | o | o |
| Filterable materials | < 30 | + | + |
| | > 30 | - | - |
| Total hardness | < 6 °dGH | o/+ | o/+ |
| | 6 - 11 °dGH | + | + |
| | > 11 °dGH | - | - |
| Oxygen ($O_2$) | < 0.02 | + | + |
| | < 0.1 | +/o | +/o |
| | > 0.1 | - | - |
| Nitrite ($NO_2^-$) | < 0.1 | + | + |
| | > 0.1 | - | - |
| Sulphide ($S^{2-}$) | < 1.0 | + | + |
| | > 1.0 | - | - |

1. If the limit values in the VDI 2035 are more restrictive, these apply accordingly.
2. When using demineralised water, ensure that the minimum permissible pH value of 8.2 is not undershot. Failure to comply with this value can result in the heat pump being destroyed.

Fig. 7.2:Limit values for the quality of heating water

Resistance of copper-soldered or welded stainless-steel plate heat exchangers to the substances present in water:

Notes

- "+" = Normally good resistance
- "o" = Corrosion problems may arise,particularly if several factors receive an evaluation of "o"
- "-" = Should not be used

**NOTE**

**The water quality should be checked again after 4 to 6 weeks, as the quality could change during the first few weeks of operation due to chemical reactions.**

**NOTE**

**It is mandatory to use hydraulically closed systems. It is not permissible to use any open hydraulic systems!**

### 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 either a dual differential pressureless manifold or an overflow valve. The procedure for setting an overflow valve is described in the chapter "Start-up". 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.

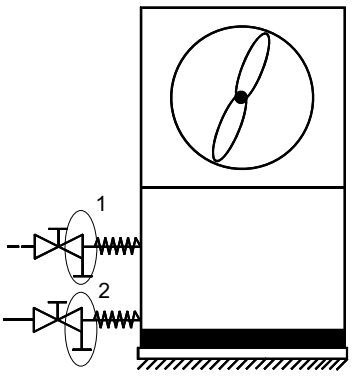
The specified nominal flow rate (See “Device information” on page 18.) must be guaranteed in every operating status. An installed flow rate switch is used only for switching off the heat pump in the event of an unusual and abrupt drop in the heating water flow rate and not to monitor and safeguard the nominal flow rate.

**NOTE**

**The use of an overflow valve is only recommended for panel heating and a max. heating water flow of 1.3 m³/h. System faults may result if this is not observed.**

### Antifreeze

A method of manual drainage (see illustration) should be provided for heat pumps which are exposed to frost. The antifreeze function of the heat pump manager is active whenever the heat pump manager and the heat circulating pump are ready for operation. When decommissioning the heat pump, or in the event of a power failure, the system must be drained through the indicated points (see illustration); it may be necessary to purge the system with compressed air. If heat pump systems are implemented in buildings where a power failure cannot be detected (holiday homes etc.), the heating circuit should be operated with suitable frost protection.




## 7.5 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)

### 7.5.1 Sensor characteristic curves

| Temperature in °C | -20 | -15 | -10 | -5 | 0 | 5 | 10 |
|---|---|---|---|---|---|---|---|
| NTC-2 in kΩ | 14.6 | 11.4 | 8.9 | 7.1 | 5.6 | 4.5 | 3.7 |
| NTC-10 in kΩ | 67.7 | 53.4 | 42.3 | 33.9 | 27.3 | 22.1 | 18.0 |

| 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| 2.9 | 2.4 | 2.0 | 1.7 | 1.4 | 1.1 | 1.0 | 0.8 | 0.7 | 0.6 |
| 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.7.3 on pag. 11. The only exception is the external temperature sensor included in the scope of supply of the heat pump (see Fig.7.4 on pag. 11)

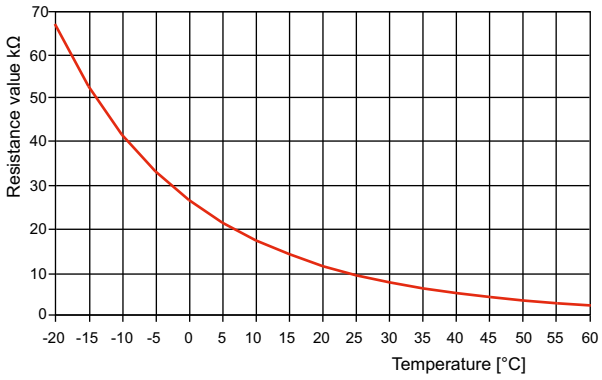



Fig. 7.3:Sensor characteristic curve NTC-10

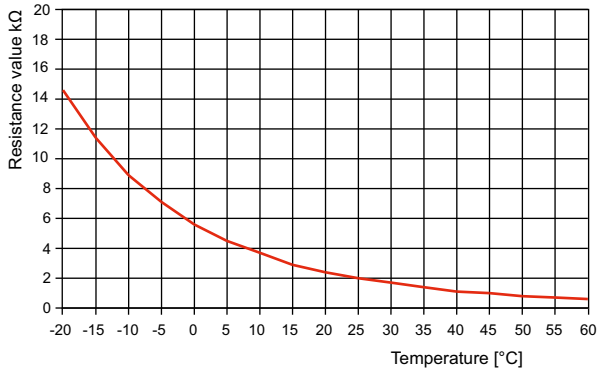



Fig. 7.4:Sensor characteristic curve, NTC-2 according to DIN 44574 External temperature sensor

### 7.5.2 Mounting the external 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 parameter sensor lead | |
|---|---|
| Conductor material | Cu |
| Cable-length | 50 m |
| Ambient temperature | 35 °C |
| Laying system | B2 (DIN VDE 0298-4 / IEC 60364-5-52) |
| External diameter | 4-8 mm |

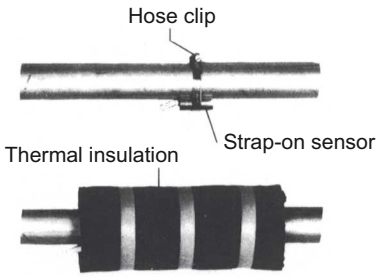
### 7.5.3 Installing the strap-on sensor

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.




### 7.5.4 Hydraulic distribution system

The compact manifold and the dual differential pressureless manifold function as an interface between the heat pump, the heating distribution system, the buffer tank and, in some cases, even the 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.

#### Compact manifold

The return sensor can remain in the heat pump, or should be installed in the immersion sleeve. The remaining empty space between the sensor and the immersion sleeve must be filled completely with heat transfer compound.

#### Dual differential pressureless manifold

In order for the heating circuit pumps of the generator and consumer circuits to supply the flow to the return sensor, this must be installed in the immersion sleeve of the dual differential pressureless manifold.

## 7.6 Electrical connection

### 7.6.1 General

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.

### 7.6.2 Electrical installation work

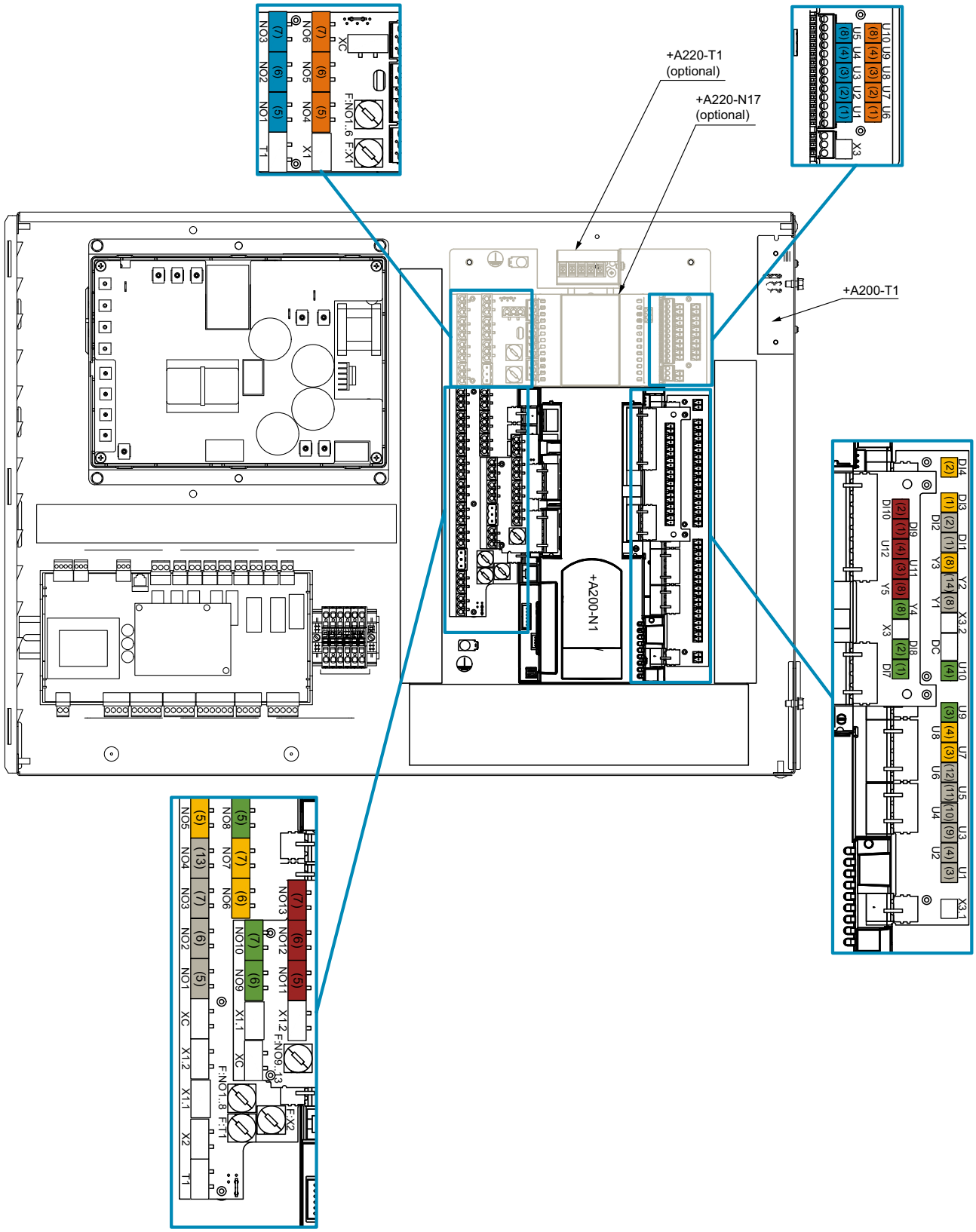
1) The 4-core electrical supply cable for the output section of the heat pump is fed from the heat pump meter via the utility company blocking contactor (if required) into the heat pump.
   The mains cable is connected at the heat pump switch box using terminals X1: L1/L2/L3/PE
   An all-pole disconnecting 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 company 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) (230V) 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**

**Sensor cables can be extended up to 50 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.**


+A220-T1
(optional)
+A220-N17
(optional)
+A200-T1
+A200-N1

### 7.6.3 Connecting an electronically regulated circulating pump

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.**

In many cases, the supply voltage of the pump is stuck on continuous current when using larger electronically controlled circulating pumps (the manufacturer's information on the pump being used should be taken into consideration). The pump is then generally actuated using the Start/Stop input. This input is operated with extra low voltage from the pump (a link cable is usually inserted in the factory default of the pump). In order to be able to actuate the input, a coupling relay with a floating contact is required. This must be controlled with the pump function of a 230 V relay output of the controller. Due to the extra low voltage to be switched, a suitable relay with the appropriate contact material (gilded) must be selected and integrated on-site.

### 7.6.4 Frost protection

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

**⚠ CAUTION!**

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

**⚠ CAUTION!**

**The primary pump (M11 – responsible for the heat source flow rate) and the secondary pump (M16 – responsible for the warm/cold water flow rate) must always be clamped to the heat pump manager in all cases. This is the only way to ensure the pump flows and returns necessary for operation and to ensure that the necessary safety measures are in place.**

# 8 Start-up

## 8.1 General Information

To ensure that start-up is performed correctly, it should only be carried out by an after-sales service technician authorised by the manufacturer. These measures can also include an additional warranty under certain conditions (see Warranty).

## 8.2 Preparation

The following items need to be checked prior to start-up:

- All of the heat pump connections must be established as described in Chapter 6.
- All valves that 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 ventilator 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 controller's operating instructions.
- Ensure the condensate outflow functions.
- The hydraulic network must be flushed correctly before installing the heat pump. This includes the supply line to the heat pump. Only when flushing is complete can the heat pump be hydraulically integrated.
- The dirt traps present as standard or included for assembly must be inspected between 4 and 8 weeks after the heat pump is commissioned or changes made to the heating system and cleaned if necessary. Further maintenance intervals must be scheduled depending on the level of soiling, which must be defined and carried out by a suitably qualified person.
- Both the accessories pack in the switch box and that which is located under the ventilator must be removed.

#### Special notes for the integration of heat pumps in existing systems (renovations):

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

- Compliance with the water properties and water quality
- Flushing of the hydraulic system
- Maintenance interval of the dirt traps

If silting or ferromagnetic particles are to be expected in the hydraulic network, dirt separators or magnetite separators must be installed on-site before the medium enters the heat pump. The maintenance intervals must be defined by a suitably qualified person.

## 8.3 Procedure

The heat pump is started up via the heat pump manager. Adjustments should be made in compliance with the instructions.

If an overflow valve is fitted to maintain the minimum heating water flow rate, the valve must be adapted to the requirements of the heating system. Incorrect adjustment can lead to faulty operation and increased energy consumption. We recommend carrying out the following procedure to correctly adjust the overflow valve:

Close all of the heating circuits that may also be closed during operation (depending on the type of heat pump usage) so that the most unfavorable operating state - with respect to the water flow rate - 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 heating flow and 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 start up.

| 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 hot water temperatures under 7 °C, start-up is not possible. The water in the buffer tank must be heated to a minimum of 18 °C with the second heat generator.

To ensure a problem-free start-up, the following procedure is to be implemented:

1) Close all consumer circuits.
2) Ensure that the heat pump has the correct water flow.
3) Select "Winter" mode on the heat pump manager.
4) In the special functions menu, start the "Start-up" 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 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 heat circuits are fully open and a return temperature of at least 18 °C is maintained, the heat pump start-up is complete.

**⚠ CAUTION!**

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

# 9 Maintenance / Cleaning

## 9.1 Maintenance

To protect the paintwork, avoid leaning or putting objects on the device. External heat pump parts can be wiped with a damp cloth and 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 can not be contaminated. We recommend protecting the evaporator by installing a bird guard in the inlet duct. At least 80 % of the cross section of the grating should be open. In the event that operating malfunctions due to contamination still occur, 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 products enter the heating system via the valves, the circulating pumps and/or plastic pipes. It is therefore essential - in particular with respect to the piping of underfloor heating systems - that only diffusion-proof materials are used.

**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 case of severe contamination leading to a reduction in the performance of the liquifier in the heat pump, the system must be cleaned by a heating 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 either case, 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 flow of the liquifier of the heat pump.

It is 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 great care and all relevant regulations of the employers' liability insurance associations must be adhered to.

The manufacturer's instructions regarding cleaning agent must be complied with at all times.

## 9.3 Cleaning the Air System

Air ducts, evaporator, ventilator and condensate outflow should be cleaned of contamination (leaves, twigs, etc.) before the heating period. Do this by opening the front of the heat pump. 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 isolated from the power supply.**

Remove and rehang the side 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 for cleaning.

# 10 Faults / Trouble-Shooting

This heat pump is a quality product and is designed for trouble-free operation. In the event that a fault should occur, it will be shown on the heat pump manager display. Simply consult the Faults and Trouble-shooting 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!**

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

After disconnecting the power supply, always wait for at least 5 minutes to allow stored electric charges to dissipate.

**⚠ CAUTION!**

**Any work on the heat pump may 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 deinstallation of the heat pump must be performed by technical personnel. Observe all environmentally-relevant 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 refrigeration oils.

# 12 Device information

| | | | |
|---|---|---|---|
| **1** | **Type and order code** | | LI 16I-TUR |
| **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** | | |
| **5** | **Heating water flow rate internal pressure differential** | | |
| | **Nominal flow rate in accordance with 14511 A7 / 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 |
| **5.1** | **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 |
| **5.2** | **Sound power level according to EN12102 with A7 / W55 Device/outside** [3 4] **Normal operation** | **dB(A)** | 50 / 57 |
| **5.3** | **Sound power level according to EN12102 with A7 / W55 Device/outside** [3 4] **Lower operation** [5] | **dB(A)** | 49 / 52 |
| **5.4** | **Sound pressure level at a distance of 1 m indoors** [4 6] | **dB(A)** | 43 |
| **5.5** | **Sound power level (A2/W31) indoor/outdoor** [3 6 7] | **dB(A)** | 50 / 58 |
| | **Heat output (low temperature application A2/W31)** | | 6.2 |
| **5.6** | **Air flow with an external static pressure differential** | **m³/h /Pa**<br>**m³/h /Pa** | 4000 / 0<br>3800 / 25 |
| **6** | **Dimensions, weight and filling quantities** | | |
| **6.1** | **Device dimensions** [8] | **H x W x D mm** | 1560 x 960 x 760 |
| **6.2** | **Device connections for heating** | **Inches** | G 1 |
| **6.3** | **Weight of the transportable unit(s) incl. packaging** | **kg** | 275 |
| **6.4** | **Refrigerant / total filling weight** | **Type / kg** | R410A / 4.78 |
| **6.5** | **GWP value / $CO_2$ equivalent** | **--- / t** | 2088 / 9.9 |
| **6.6** | **Refrigeration circuit hermetically sealed** | | yes |
| **6.7** | **Lubricant / total filling quantity** | **Type / litres** | Polyolester (POE)/1.24 |
| **6.8** | **Volume of heating water in the indoor component** | **litres** | 5 |
| **7** | **Electrical connection** | | |
| **7.1** | **Supply voltage / fusing / RCD type** | | 3~/PE 400V (50Hz) / C10A / B |
| **7.2** | **Control voltage / fusing / RCD type** | | 1~/N/PE 230V (50Hz) / C13A / A |
| **7.3** | **Degree of protection according to EN 60 529** | | IP 21 |
| **7.4** | **Starting current limiter** | | Inverter |
| **7.5** | **Starting current** | **A** | Inverter |
| **7.6** | **Nominal power consumption A2 W35/ max. power consumption** [2] | **kW** | 1.43 / 4.9 |
| **7.7** | **Nominal current A2 / W35 / cos φ** | **A / ---** | 2.3 / 0.99 |
| **7.8** | **Power consumption of fan** | **W** | up to 250 |

| | | | | |
|---|---|---|---|---|
| **8** | **Complies with the European safety regulations** | | [9] | |
| **9** | **Additional model features** | | | |
| **9.1** | **Type of defrosting** | | Reverse cycle | |
| **9.2** | **Condensate tray frost protection / Water in device is protected from freezing** [10] | | Yes | |
| **9.3** | **Max. operating overpressure (heat sink)** | **bar** | 3.0 | |
| **10** | **Heat output / COP** [2] | | | |
| **10.1** | **Heat output / COP** | | EN 14511 | |
| | **with A-7 / W35** | **kW / ---** | 10.7 / 3.1 | |
| | **with A2 / W35** | **kW / ---** | 6.0 / 4.2 | |
| | **with A7 / W35** | **kW / ---** | 7.1 / 5.1 | |
| **11** | **Cooling capacity / coefficient of performance (COP)** [2 3] | | | |
| **11.1** | **Cooling capacity / coefficient of performance (COP)** | | EN 14511 | max. power |
| | **with A27 / W18** | **kW / ---** | 8.6 / 3.9 | 10.7 / --- |
| | **with A27 / W7** | **kW / ---** | 8.0 / 3.0 | 8.4 / --- |
| | **with A35 / W18** | **kW / ---** | 9.8 / 3.6 | 10.1 / --- |
| | **with A35 / W7** | **kW / ---** | 7.1 / 2.4 | 7.5 / --- |

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 (available as an option) 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. Operating point according to EN 14825: Low temperature application with moderate climate, partial load ratio B
8. Note that additional space is required for pipe connections, operation and maintenance.
9. see CE declaration of conformity
10. The heat circulating pump and the heat pump manager must always be ready for operation.

# 13 Product information as per Regulation (EU) No 813/ 2013, Annex II, Table 2

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

| | |
|---|---|
| Model | LI 16I-TUR |
| Air-to-water heat pump | yes |
| Water-to-water heat pump | no |
| Brine-to-water heat pump | no |
| Low-temperature heat pump | no |
| Equipped with a supplementary heater | no |
| Heat pump combination heater | no |

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

Parameters shall be declared for average climate conditions:

| Item | Symbol | Value | Unit | Item | Symbol | Value | Unit |
|---|---|---|---|---|---|---|---|
| **Rated heat output (*)** | Prated | 10 | kW | **Seasonal space heating energy efficiency** | $\eta_s$ | 145 | % |
| Declared capacity for heating foer part load at indoor temperature 20°C and outdoor temperature T*j* | | | | Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature T*j* | | | |
| Tj = - 7°C | P*dh* | 9,0 | kW | Tj = - 7°C | COP*d* | 2,42 | - |
| Tj = + 2°C | P*dh* | 5,9 | kW | Tj = + 2°C | COP*d* | 3,68 | - |
| Tj = + 7°C | P*dh* | 6,9 | kW | Tj = + 7°C | COP*d* | 4,67 | - |
| Tj = + 12°C | P*dh* | 8,0 | kW | Tj = + 12°C | COP*d* | 5,84 | - |
| Tj = bivalent temperature | P*dh* | 9,6 | kW | Tj = bivalent temperature | COP*d* | 2,17 | - |
| Tj = operation limit temperature | P*dh* | 9,6 | kW | Tj = operation limit temperature | COP*d* | 2,17 | - |
| For air-to-water heat pumps | | | | For air-to-water heat pumps: | | | |
| Tj = -15°C (if TOL < -20°C) | P*dh* | 0,0 | kW | Tj = -15°C (if TOL < -20°C) | COP*d* | 0,00 | - |
| Bivalent temperature | $T_{biv}$ | -10 | °C | For air-to-water heat pumps: Operation limit temperature | TOL | -10 | °C |
| Cycling interval capacity for heating | P*cych* | - | kW | Cycling interval efficiency | COP*cyc* | - | - |
| Degradation co-efficient (**) | C*dh* | 0,90 | - | Heating water operating limit temperature | WTOL | 60 | °C |
| Power consumption in modes other than active mode | | | | Supplementary heater | | | |
| Off mode | $P_{OFF}$ | 0,019 | kW | Rated heat output (*) | P*sup* | 0 | kW |
| Thermostat-off mode | $P_{TO}$ | 0,021 | kW | Type of energy input | | eletrical | |
| Standby mode | $P_{SB}$ | 0,019 | kW | | | | |
| Crankcase heater mode | $P_{CK}$ | 0,000 | kW | | | | |
| Other items | | | | | | | |
| Capacity control | | variable | | For air-to-water heat pumps: Rated air flow rate, outdoors | - | 3800 | m³ /h |
| Sound power level, indoors/ outdoors | $L_{WA}$ | 50/57 | dB | For water-/brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger | - | -- | m³ /h |
| Emissions of nitrogen oxides | $NO_x$ | - | mg/kWh | | | | |
| For heat pump combination heater: | | | | | | | |
| **Declared load profile** | | - | | **Water heating energy efficiency** | $\eta_{wh}$ | - | % |
| Daily electricity consumption | $Q_{elec}$ | - | kWh | Daily fuel consumption | $Q_{fuel}$ | - | kWh |
| Contact details | Glen Dimplex Deutschland GmbH, Am Goldenen Feld 18, 95326 Kulmbach | | | | | | |

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

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

# Anhang / Appendix / Annexes

**1 Maßbilder / Dimension Drawings / Schémas cotés ..... A-II**
1.1 Maßbild / Dimension drawing / Schéma coté ..... A-II

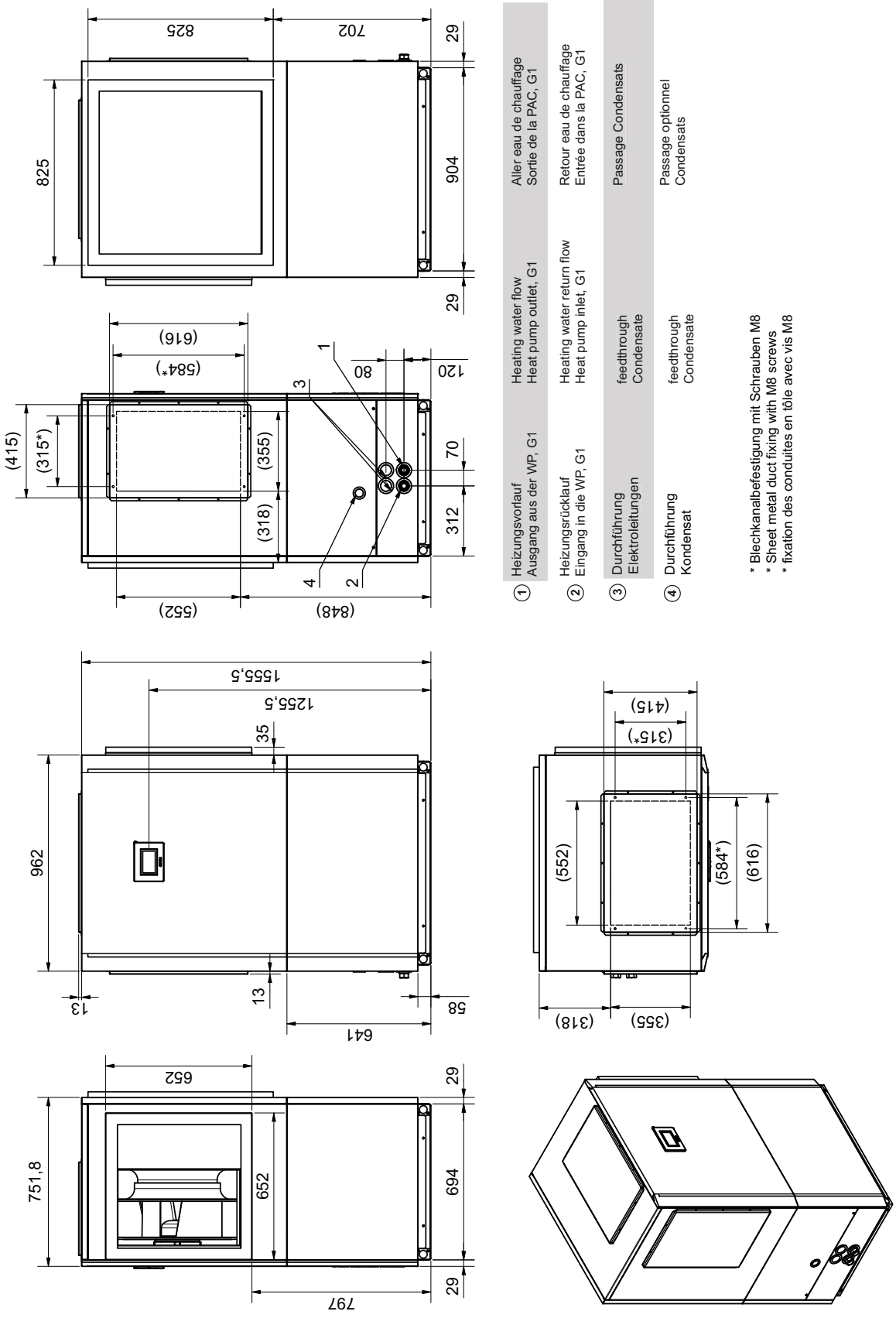
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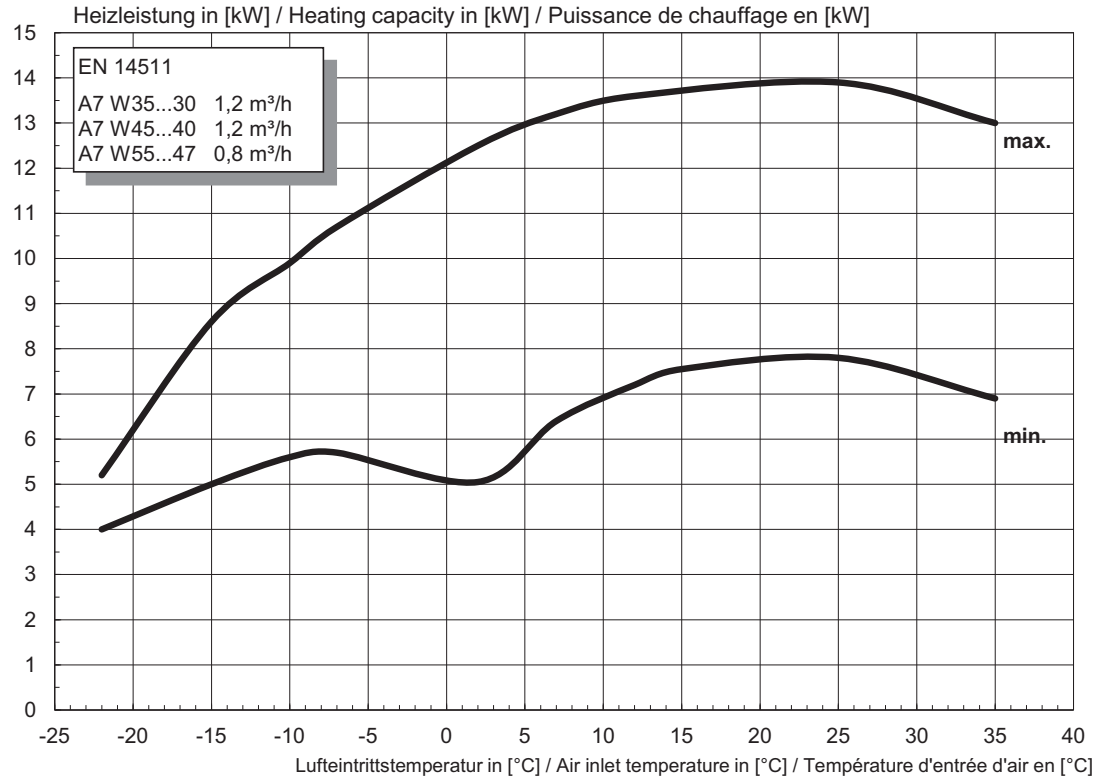
# 1 Maßbilder / Dimension Drawings / Schémas cotés

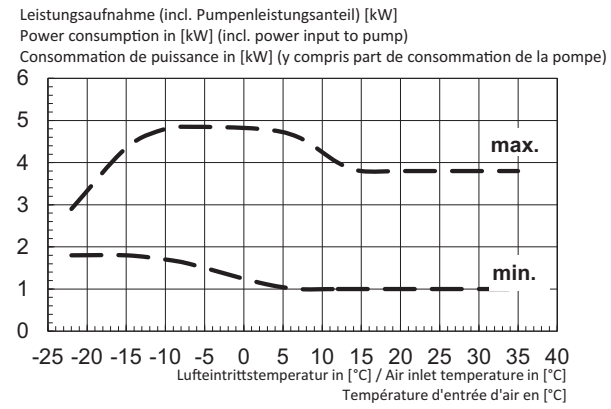
## 1.1 Maßbild / Dimension drawing / Schéma coté

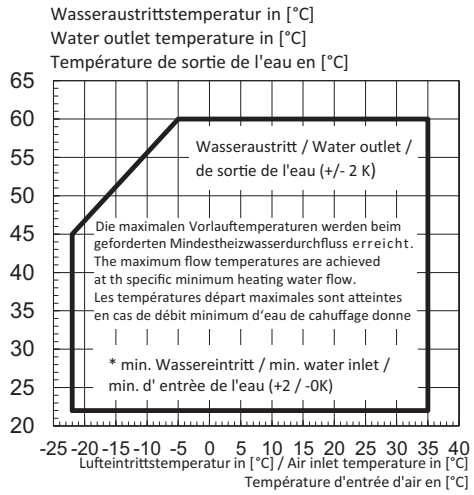


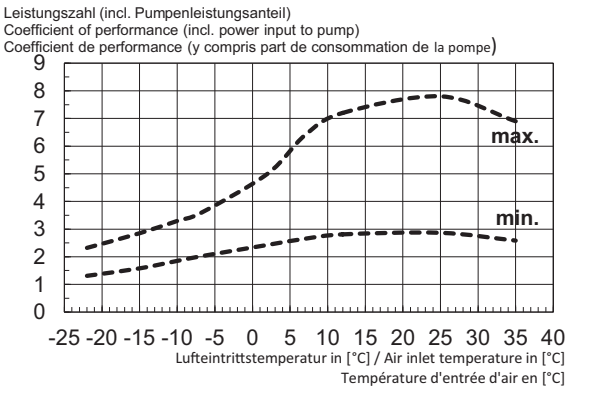
# 2 Diagramme / Diagrams / Diagrammes

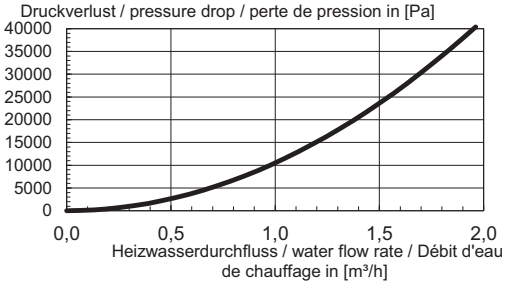
## 2.1 Kennlinien Heizen / Characteristic curves for heating operation / Courbes caractéristiques mode chauffage

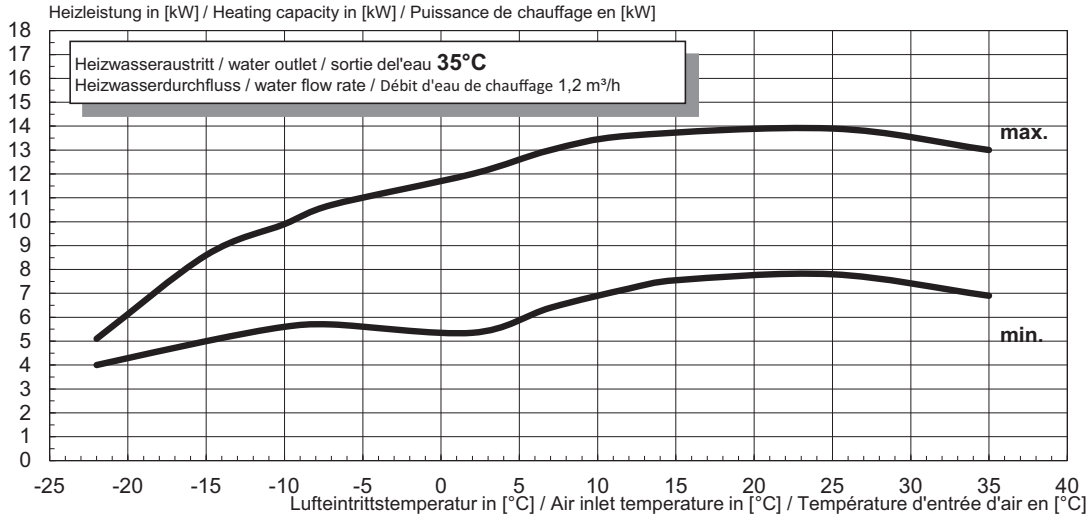


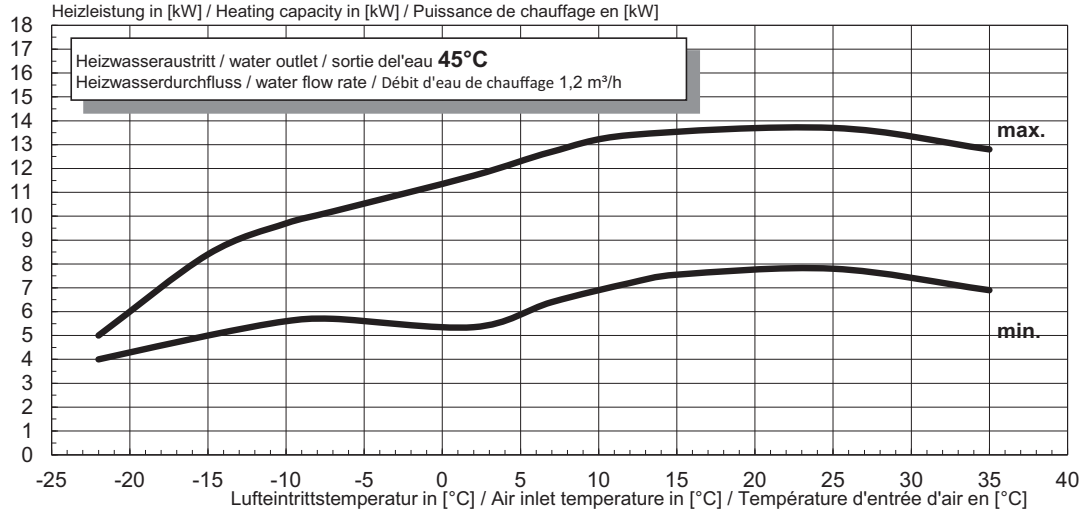



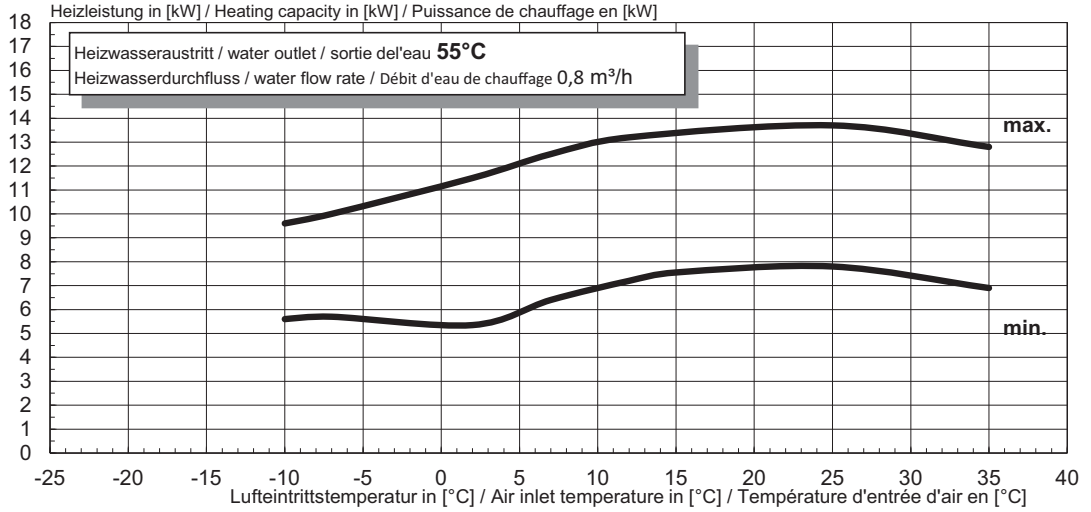



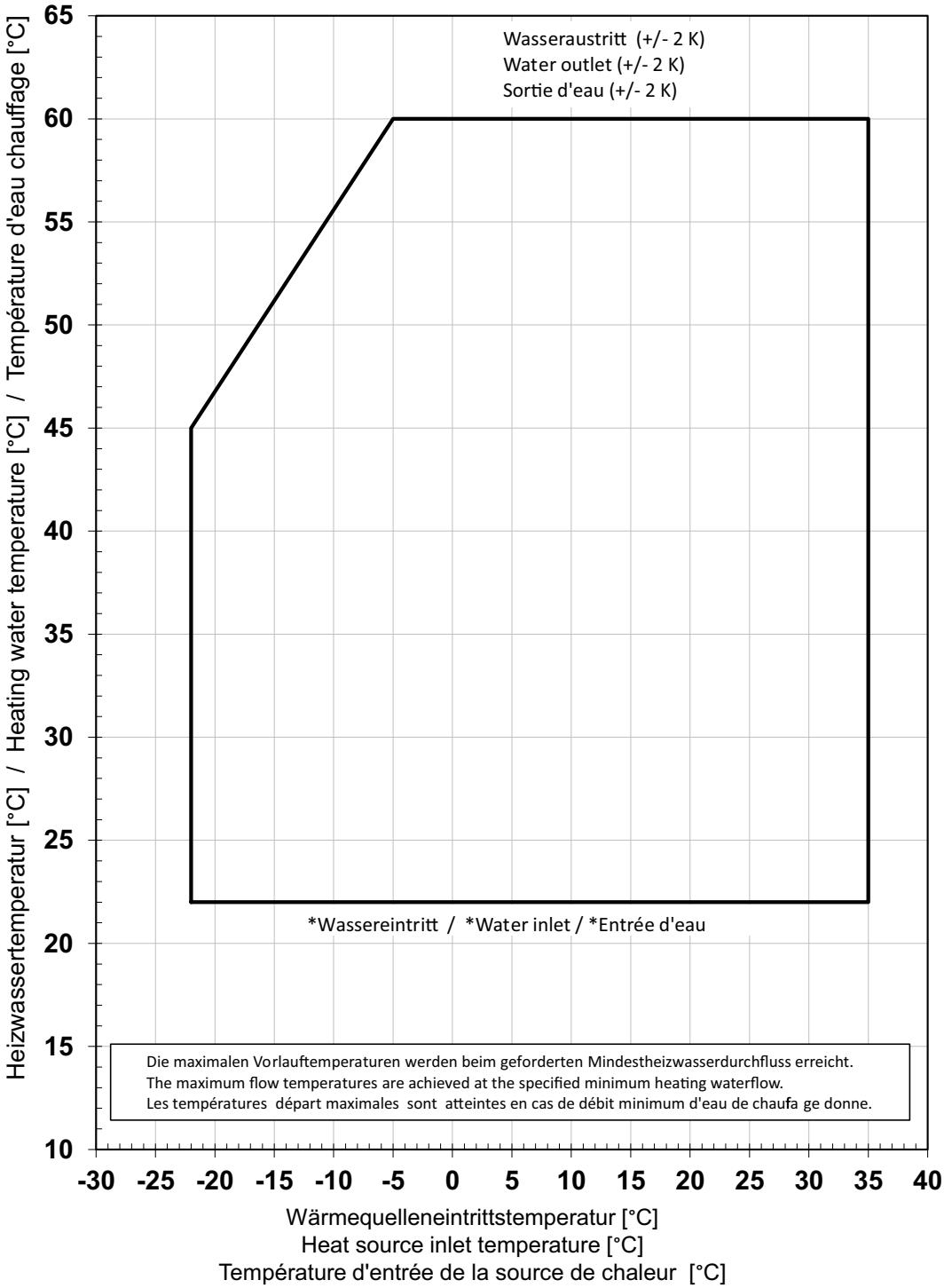




Heizleistung in [kW] / Heating capacity in [kW] / Puissance de chauffage en [kW]
Heizwasseraustritt / water outlet / sortie del'eau 35°C
Heizwasserdurchfluss / water flow rate / Débit d'eau de chauffage 1,2 m³/h
max.
min.
Lufteintrittstemperatur in [°C] / Air inlet temperature in [°C] / Température d'entrée d'air en [°C]


Heizleistung in [kW] / Heating capacity in [kW] / Puissance de chauffage en [kW]
Heizwasseraustritt / water outlet / sortie del'eau 45°C
Heizwasserdurchfluss / water flow rate / Débit d'eau de chauffage 1,2 m³/h
max.
min.
Lufteintrittstemperatur in [°C] / Air inlet temperature in [°C] / Température d'entrée d'air en [°C]

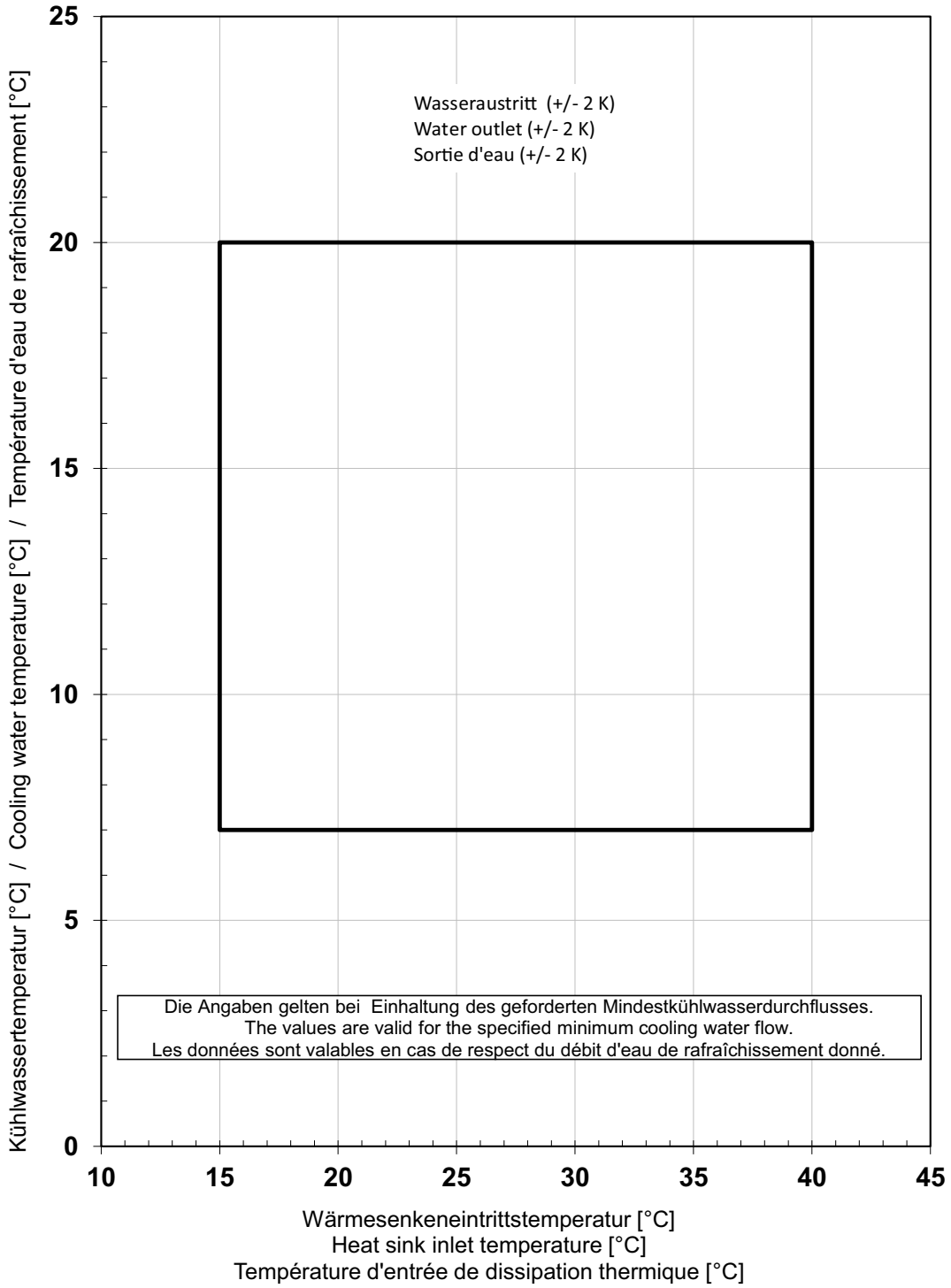

Heizleistung in [kW] / Heating capacity in [kW] / Puissance de chauffage en [kW]
Heizwasseraustritt / water outlet / sortie del'eau 55°C
Heizwasserdurchfluss / water flow rate / Débit d'eau de chauffage 0,8 m³/h
max.
min.
Lufteintrittstemperatur in [°C] / Air inlet temperature in [°C] / Température d'entrée d'air en [°C]

## 2.2 Einsatzgrenzendiagramm Heizen / Operating limits diagram heating / Diagramme des seuils d'utilisation chauffage



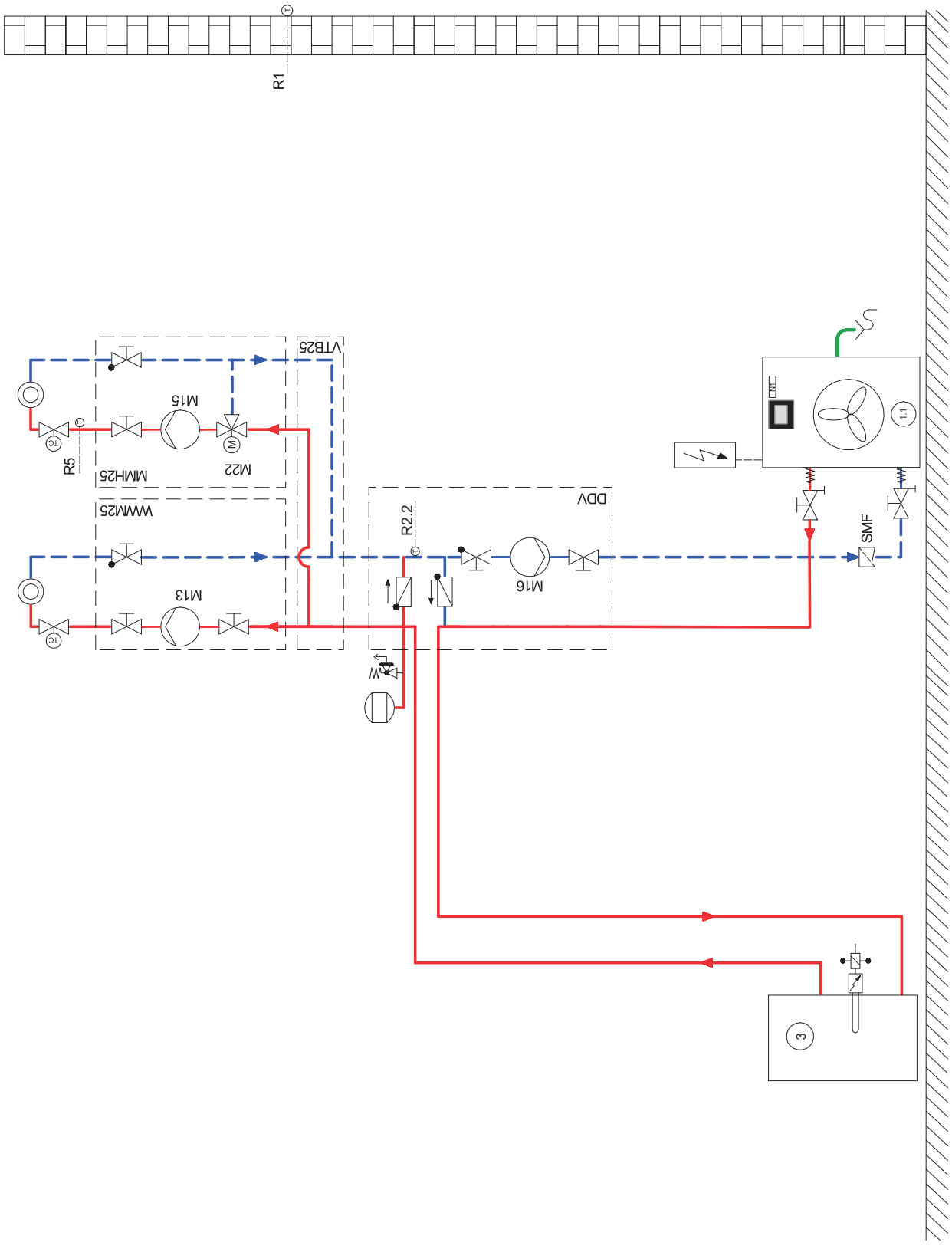

*Bei Luft/Wasser-Wärmepumpen stellt die minimale Heizwassertemperatur die Mindest-Rücklauftemperatur dar
*For air-to-water heat pumps the minimum heating water temperature is the minimum return temperature
*Sur les pompes à chaleur air / eau, la température minimale d'eau de chauffage correspond à la température retour minimale

## 2.3 Einsatzgrenzendiagramm Kühlen / Operating limits diagram cooling / Diagramme des seuils d'utilisation rafraîchissement

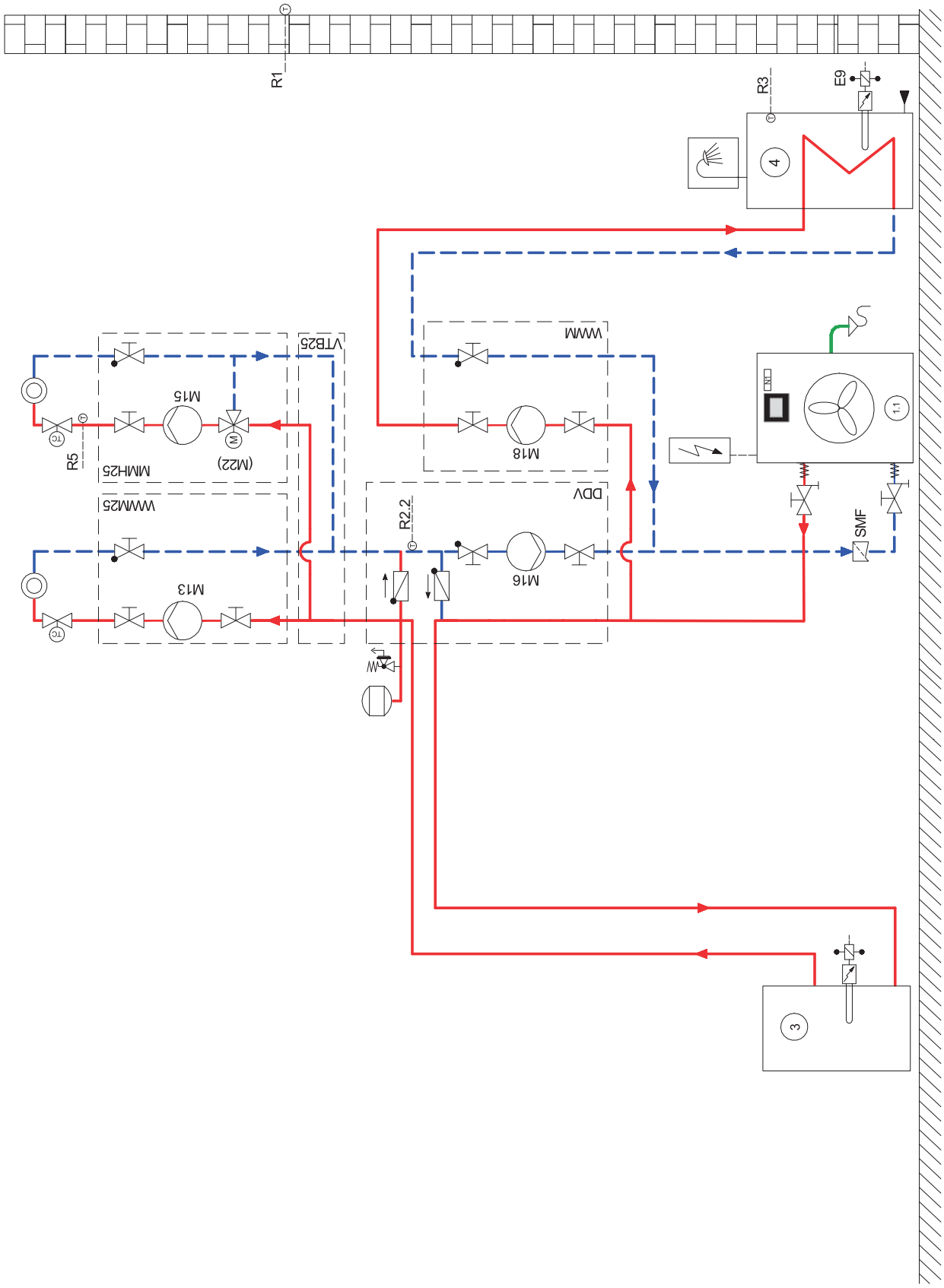


# 3 Einbindungsschemen / Integration diagram / Schéma d'intégration

## 3.1 Hydraulische Einbindungsschema / Hydraulic integration diagram / Schéma d'intégration hydraulique



## 3.2 Hydraulische Einbindungsschema / Hydraulic integration diagram / Schéma d'intégration hydraulique



## 3.3 Legende / Legend / Légende

| | | | |
|---|---|---|---|
|  | Absperrventil | Shutoff valve | Vanne d’arrêt |
|  | Sicherheitsventilkombination | Safety valve combination | Jeu de vannes de sécurité |
|  | Umwälzpumpe | Circulating pump | Circulateur |
|  | Ausdehnungsgefäß | Expansion vessel | Vase d’expansion |
|  | Raumtemperaturgesteuertes Ventil | Room temperature-controlled valve | Vanne commandée par température ambiante |
|  | Absperrventil mit Rückschlagventil | Shutoff valve with check valve | Vanne d’arrêt avec clapet anti-retour |
|  | Absperrventil mit Entwässerung | Shutoff valve with drainage | Vanne d’arrêt avec vidange |
|  | Wärmeverbraucher | Heat consumer | Consommateur de chaleur |
|  | Temperaturfühler | Temperature sensor | Sonde de température |
|  | Flexibler Anschlussschlauch | Flexible connection hose | Tuyau de raccordement flexible |
|  | Rückschlagklappe | Check valve | Clapet anti-retour |
|  | Dreiwegemischer | Three-way mixer | Mélangeur 3 voies |
| | | | |
| ⑭ | Luft/Wasser-Wärmepumpe | Air-to-water heat pump | Pompe à chaleur air/eau |
| ② | Wärmepumpenmanager | Heat pump manager | Gestionnaire de pompe à chaleur |
| ③ | Reihen-Pufferspeicher | Buffer tank connected in series | Ballon tampon en série |
| ④ | Warmwasserspeicher | Hot water cylinder | Ballon d’eau chaude sanitaire |
| | | | |
| E9 | Flanschheizung Warmwasser | Hot water flange heater | Cartouche chauffante eau chaude sanitaire |
| E10.1 | Tauchheizkörper | Immersion heater | Résistance immergée |
| M13 | Heizungsumwälzpumpe Hauptkreis | Heat circulating pump for main circuit | Circulateur de chauffage circuit principal |
| M15 | Heizungsumwälzpumpe 2. Heizkreis | Heat circulating pump for heating circuit 2 | Circulateur de chauffage 2ème circuit de chauffage |
| M16 | Zusatzumwälzpumpe | Auxiliary circulation pump | Circulateur supplémentaire |
| M18 | Warmwasserladepumpe | Hot water loading pump | Pompe de charge eau chaude sanitaire |
| M22 | Mischer 2. Heizkreis | Mixer for heating circuit 2 | Mélangeur 2ème circuit de chauffage |
| N1 | Wärmepumpenmanager | Heat pump manager | Gestionnaire de pompe à chaleur |
| R1 | Außenwandfühler | External wall sensor | Sonde sur mur extérieur |
| R2.2 | Anforderungsfühler | Demand sensor | Sonde de demande |
| R3 | Warmwasserfühler | Hot water sensor | Sonde sur circuit d’eau chaude sanitaire |
| R5 | Temperaturfühler 2. Heizkreis | Temperature sensor for heating circuit 2 | Sonde de température 2ème circuit de chauffage |

# 4 Konformitätserklärung / Declaration of Conformity / Déclaration de conformité

Die aktuelle CE-Konformitätserklärung finden Sie als Download unter:
You can find and download the current CE conformity declaration at:
Vous pouvez télécharger la déclaration de conformité CE actuelle sous :

**https://dimplex.de/li16i-tur**



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