Operating & installation instructions

air/water heat pumps

aero 042
aero plus 044

/

Inbetriebnahmedatum / **Freischaltcode**
(bei der Inbetriebnahme eintragen lassen)

Ihre Maschinen-Nummer
(bei der Inbetriebnahme eintragen lassen)

Tel.

Ihr Service-Ansprechpartner

SmartHeat

By choosing the heat pump aero you have decided to purchase a proven product. The unit considers the knowledge acquired in many years of using heat pumps with state-of-the-art technique.

The heat pumps of the SmartHeat product range distinguish themselves by an optimization according to ecological points of view. The increasing performance as well as the use of coolants which are very harmful to the environment are to important criteria which had been taken into consideration when designing the units.

A high performance equals to a high ratio of regenerative environment (heat) energy, which is used to heat living rooms - and thus complies with a little part of CO_2 -emissions and little electrical power consumption. When operating a heat pump the user thus contributes to the protection of our environment and saves heating cost.

While using non-toxic, non-explosive and non-flammable coolants ozone-depleting chlorinated hydrocarbons are being replaced.

Please thoroughly read the present operating instructions and make sure to observe the safety-relevant notes.

Table of contents

1 General notes

1.1 Limitation of liability

All technical information data and notes for installation and operation included in these instructions are state-of-the-art at the time of printing and are performed considering our present experiences and knowledge in all conscience. It is not possible to derive any claims from the information, illustrations and descriptions of these instructions.

The manufacturer does **not assume any liability** for damages due to:

- Improper use
- Use of not admitted spare parts
- Unauthorized retrofitting of any kind
- Technical changes
- Improper changes of the coolant quantity
- Non-observance of the operating and installation instructions
- Damages resulting of the non-observance of applicable standards

1.2 Duty of care of the operator

In the design and completion of heat pumps all corresponding EC directives, DIN and VDE standards and regulations are complied with (refer to EC declaration of conformity).

The relevant VDE-, EN- and IEC- standards must be complied with for electrical connection of heat pumps. The local connecting conditions of the utilities must be observed.

The operator must in particular make sure that

- The technically conditioned minimum and maximum values does not fall short or are exceeded.
- The machine is only operated in proper, functional status and that in particular it is regularly checked if the safety installations are working properly.
- Only sufficiently qualified and authorized staff who knows the operating instructions and in particular the included safety instructions is allowed to install maintain and repair the machine.
- All safety and warning instructions applied on and in the machine must not be removed and must be maintained legible.

These operating instructions must be stored in the range of the controller. It must be guaranteed that all persons who have to perform activities on the machine can read the operating instructions at any time.

If it is necessary to switch off the complete system during the heating period, there is a risk that the system freezes. In order to avoid damages caused by frost, empty the water circuit of the system after complete switching off or decommissioning of the system.

1.3 Basic instructions

The heat pump must only be operated with all connected media.

A flow monitoring in the heating system must be guaranteed by the installation's operator.

Before opening the unit it must be made sure that the heat pump is zero potential.

Only a specialist is allowed to set the control to manual operation for a short term since in this way all control and safety functions are inoperative.

The unit must be installed on a sustainable, flat and horizontal ground.

The transportation of the heat pump must be performed with care. It is only allowed to tilt the machine cabinet to more than 15° for a short term.

Only operate the heat pump within the usage frequency (refer to the data sheet) (in Germany 50Hz).

In emergency situations decommission the heat pump resp. switch in currentless condition (main and control voltage).

Only expert approved specialists are allowed to work on the cooling circuit.

An external separator must be provided for all electrical supplies of the machine (e.g. main switch).

The refrigerant circuit of the heat pump must be controlled by certified staff, according to the regulation EC No 842/2006, at least every twelve months in order to check if the system is tight.

2 Purpose

2.1 Proper use

The heat pumps is to be used in be used in existing or newly constructed heating systems. The heat pump is only designed to heat up heating water and service water in an environment that does not require the active defrost. The existing operating and installation instructions are binding for the following heat pumps:

aero – Serie: aero 042/ aero plus 044

Please find the technical data of your heat pump in the annex.

	Type	Application limits	ΔT
Heating circuit	aero 042	25 … 60°C	5-7K
Heat source	aero 042	-15 … 20°C	-
Heating circuit	aero plus 044	20 … 65°C	5-7K
Heat source	aero plus 044	-20 … 20°C	-

3 Product description

3.1 Functional description

The SmartHeat air/water-heat pump aero is using energy from ambient air for warming of water in heating circuit and for domestic hot water production. The ambient air will be took into the integrated air register by the fan, heat will be extracted and contucted to the refrigerant circuit. During this process the refrigerant evaporates. In the following the temperature of the gaseous refrigerant will be raised by compression.

After evaporation and compression the heat energy of the refrigerant will be conducted by a heat exchanger to the buffer tank (not included in delivery) and the heating water circuit. During this process the refrigerant is condensing and becomes liquid. The coolant liquefies can be led back to the evaporator by the expansion valve again.

It must be ensured that due to the outside temperature does not come to freeze the register and thus an active defrost is required.

At low ambient temperatures, humidity accumulates as frost from the evaporator and deteriorates the heat transfer. The evaporator is defrosted automatically by the heat pump as required. Depending on the weather steam may be doing at the air outlet formed. Depending on the local conditions optimization in operation might be necessary.

To insure a sound decoupling, the heating circuit will be connected by flexible tubes. This also extends the operation time of the air/water heat pump.

3.2 Option R - Active cooling

3.2.1 General notes

The module active cooling allows you to operate your heat pump heating unit also with a cooling function in addition to the known hot and warm water preparation functions. These cooling function enables the cooling of the building in relation with an appropriate distribution system when it is operated in summer.

Since the module active cooling is based on the use of a cooling circuit of the heat pump there is a possibility of cooling also at increased outside and earth temperatures.

3.2.2 Operation

The heat pump module active cooling is based on the reversibly designed refrigerating circuit which is integrated in the heat pump basic unit, i.e. the heat pump is working in reverse operation. In this way it is possible to cool the heating water in summer by means of a heat pump. The living rooms are cooled down and the ground is heated up.

Since the module active cooling is based on the use of the heat pump compressor the accruing power consumption is comparable to the power consumption during the heating period.

3.2.3 Proper use

The module active cooling is an optional module for the upgrading of your heat pump device during production at the factory. The indications for the following heat pumps are binding:

aero serie: aero 042/ aero plus 044

The module active cooling represents a firmly combined unit together with the heat pump.

The manufacturer cannot be held liable for damages and malfunctions which can be traced back to non-observance of the operating and installation instructions.

It is necessary to install safety devices. Please request any further information at the service hotline: +49 3843 / 2279-111.

3.2.4 Planning and dimensioning

For planning and dimensioning of heating and cooling spaces consider the common technical rules.

For maximum transferable cooling capacity it can be calculated with 100 W/m^2 for wall and sealing spaces. For under-floor spaces, which are used for cooling, lower transferring capacities should be considered – at maximum 20 … 25 W/m^2. The surface of the floor is only suitable in lower rate for cooling a building. Important for the optimum heat transfer is the counter-flow principle inside the heat exchangers.

Remark: During cooling operation the relative humidity of the air is raising. This may lead to undershooting the dew point temperature and therefore condensing of water at the cooled spaces. If the condensing takes place at the surface or inside of the walls, there is the danger of damages by mildew.

Please consider that the room temperatur should not be lower than 6 K below outside air temperature with respect to health!

3.2.5 Electrical connection

The module active cooling reveives the required electric power with the power supply of the heat pump. An additional power supply is not required.

3.2.6 Hydraulic connection

If the heat pump is used for cooling, the distribution system inside the building must be suitable for this mode of operation. The low flow temperature during cooling mode could cause condensation of the system, so the piping must be properly insulated.
In the event that a low supply temperature is required during cooling operation (<15°C), an external 4-way valve must be incorporated into the installation to ensure that the heat exchanger continues to operate in counterflow.

During start-up of the heat pump with module „Active Cooling“ take care of good flow in heating circuit! Have a look at the data sheet of the heat pump! If this flow is not ensured, there is the possibility of freezing of the heat exchanger, if the heat pump operates in cooling mode during start-up unintentionally. This may lead to damages at the heat exchanger! A flow monitoring in the heating system must be guaranteed by the installation's operator.

During start-up with cold heating water this may be possible also at sufficient volume flow! The water of heating circuit should not be colder than 25°C at the first start-up!

4 Device view

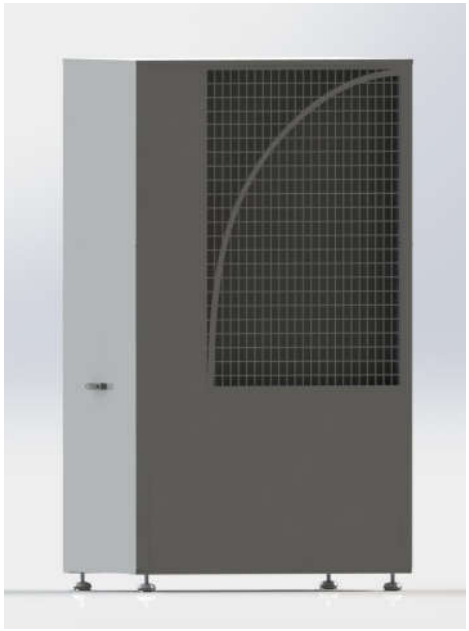


Fig.: Device view

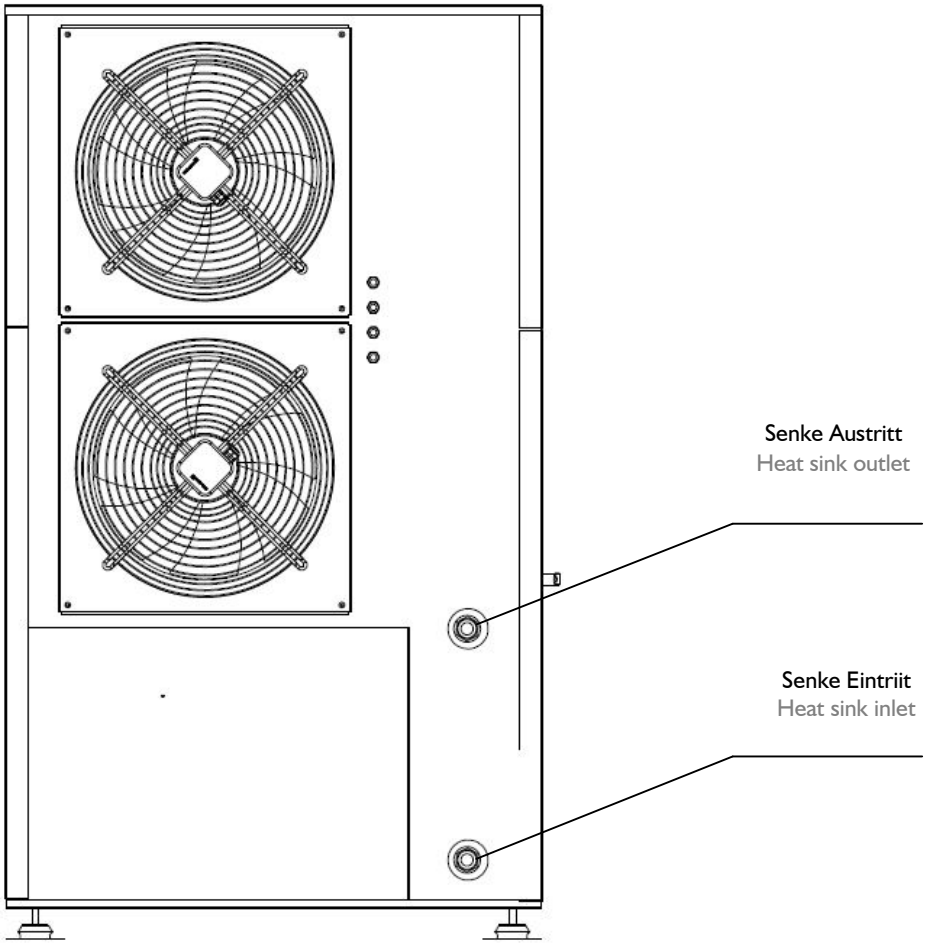
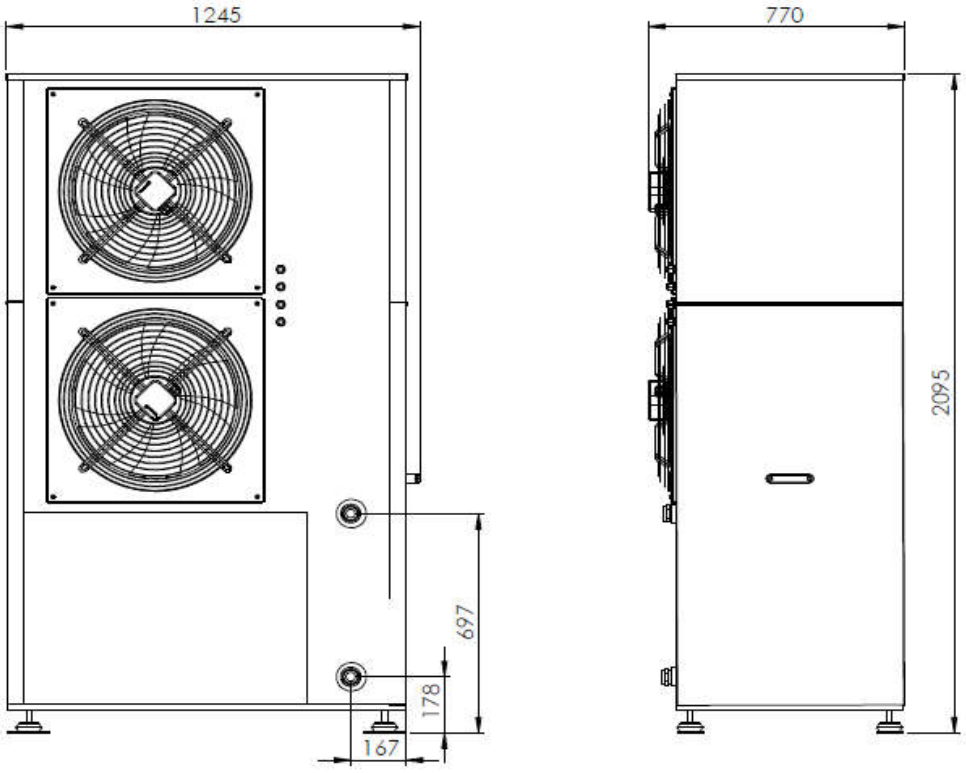
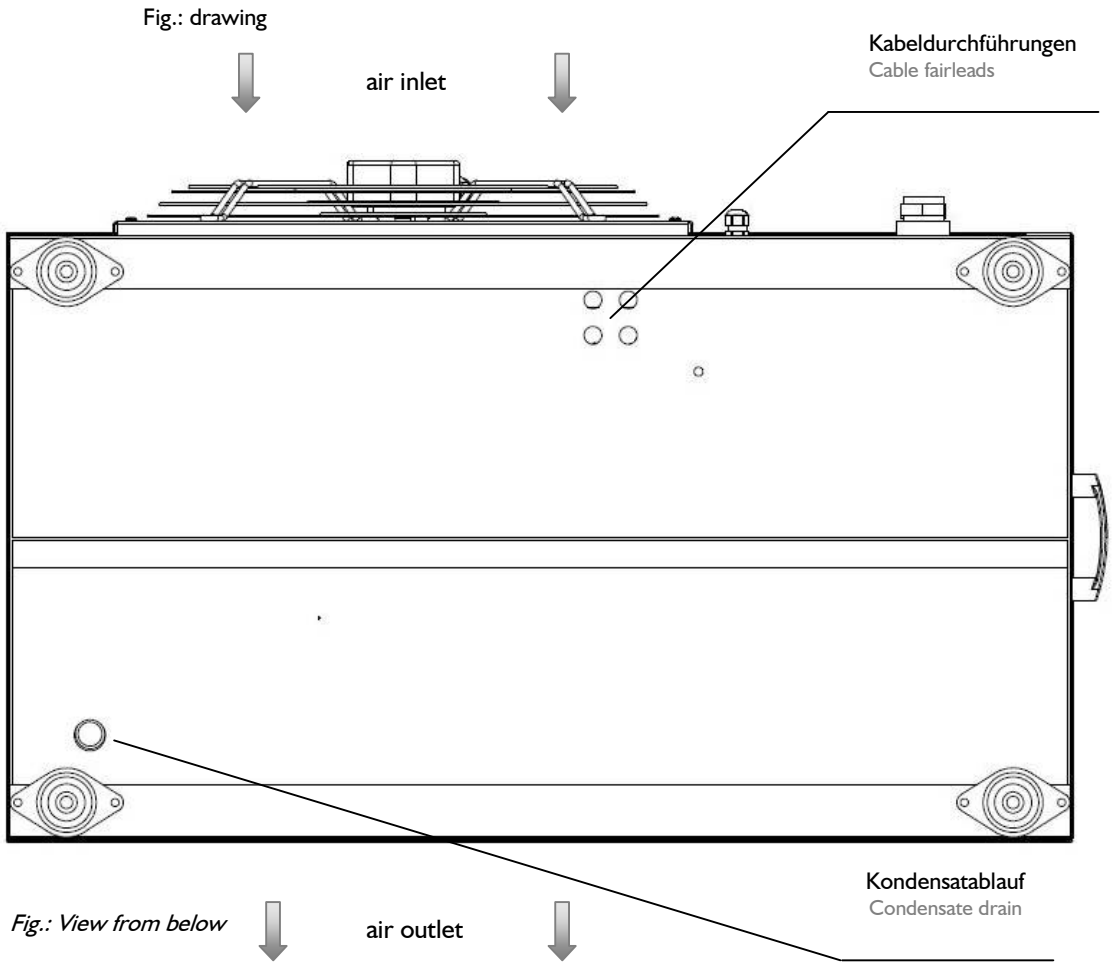


Fig.: Back view





5 Transportation

Before delivery our products are checked if they are without damages and functional and finally they are packed.

The transportation of the heat pump must be performed with care. It is only allowed to tilt the machine cabinet to more than 15° for a short term in order to insert it.

The manufacturer is not liable for transport damage during installation and commissioning of the machine

Danger: Danger to life due to suspended load ! Do not step unter the hovering load

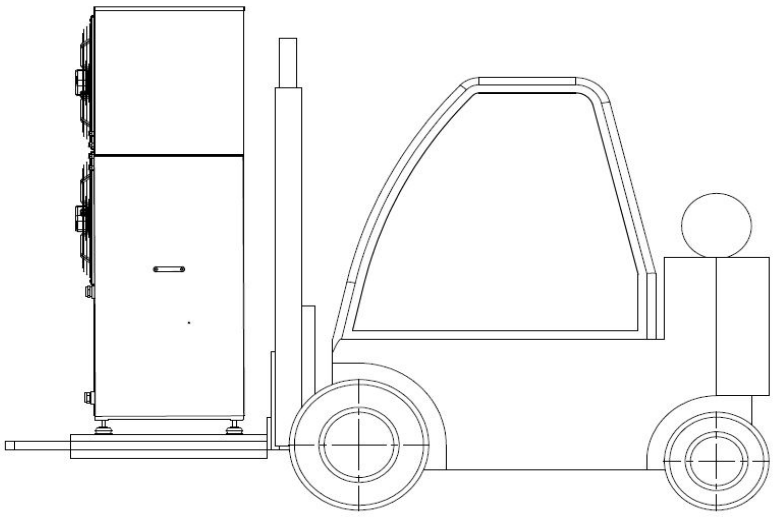
Transportation may only be carried out by trained specialists

In order that the cooling circuit and the function of compressors are not impaired it is necessary to transport the heat pump vertically.

Imperatively avoid serious impacts. The sensitive spring-supported bearing of the compressors might get damaged.

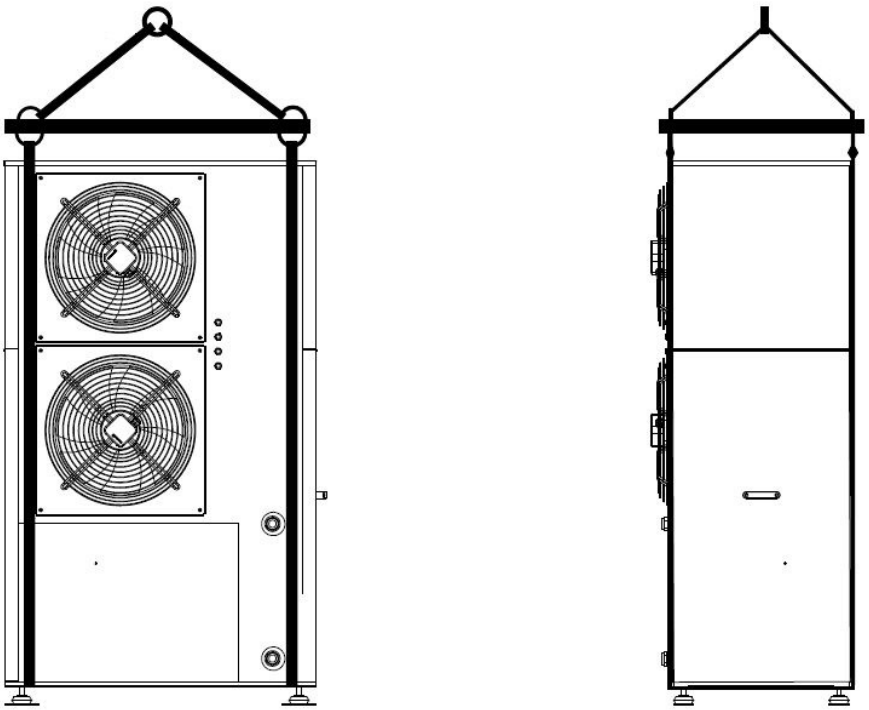
Observe the weight of the heat pump and use appropriately dimensioned transportation means. It is recommended to use a lift truck or a similar device in order to transport the unit to the installation place.

Lift by forklift



When using a forklift, drive under the machine only from the front or rear.
The mechine must be prevented from falling down.

Lift by crane



The device may only be lifted by trained professionals using a crane. In order not to damage the machine when lifting it Is essential to use a 4 point crane crosshead.

6 Installation

6.1 General notes

Install the heat pump in a way that the field service can easily perform commissioning and maintenance works and ensure free working space on all sides. The installation place for the heat pump must be completely plain, sufficiently dry and dimensioned for the weight of the machine.

Make sure to keep sufficient clearance to walls, palisades or fences when installing the heat pump in order to allow air flow. Also make sure that maintenance works are not hindered. This is ensured if the prescribed clearances to fixed walls are kept.

It is recommended to keep a clearance of min. 1.50m on both sides. Keep a minimum clearance of 2.00m to the fan in order to maintain the performance and to avoid short circuits of the air flow.

The heat pump is equipped with low-noise special fans. However, the existing noise development should be considered when selecting the installation place. Generally, the air inlet should be positioned towards to main downwind in order to allow smooth defrosting of the evaporator. When it is positioned free-standing in the zone of attack of the wind, it is necessary to adapt the installation to the main downwind

When installing the heat pump among others the requirements of the corresponding accident prevention and the regulations of safety and health at work.

When installing the air heat pump, it is necessary to consider the condensate accrual and the noise development.

Environmental temperature min. -15°C

Environmental temperature max. 35 °C

It is necessary to make sure that the heat pump is installed near ground. Any deviations from this rule, the approval of the manufacturer is required.

6.2 Minimum clearances for the installation

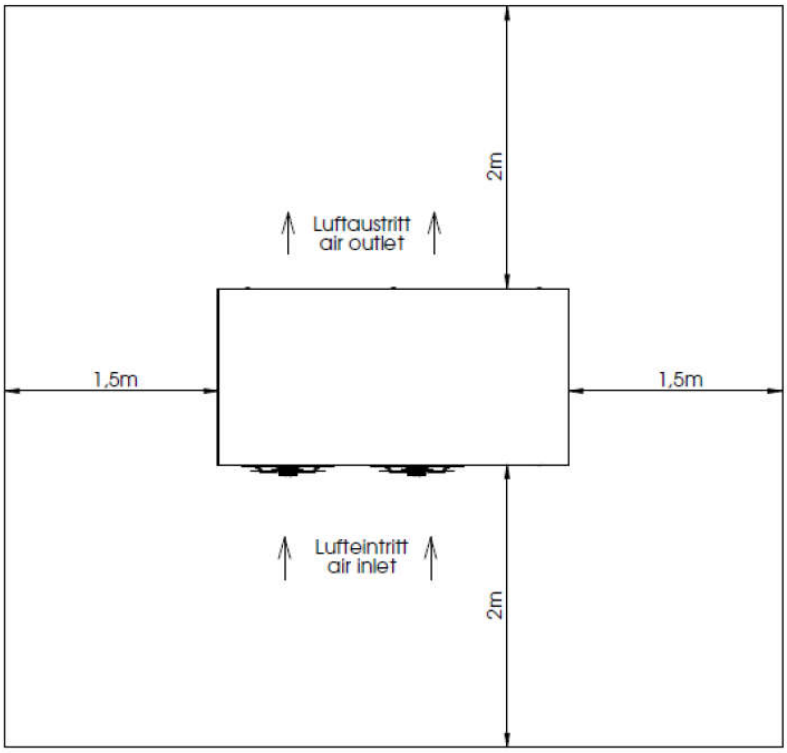


Fig.: Recommendation of minimum clearances for the installation

6.3 Foundation

General notes:

- Ground foundation frost-free
- Top smoothed evenly
- Top edge of foundation must at least be flush with the earth's surface
- Stability of the concrete must be selected according to the local conditions as well as according to the maximum capacity load
- Produce drainage for accruing condensate

Fig.: Strip foundation

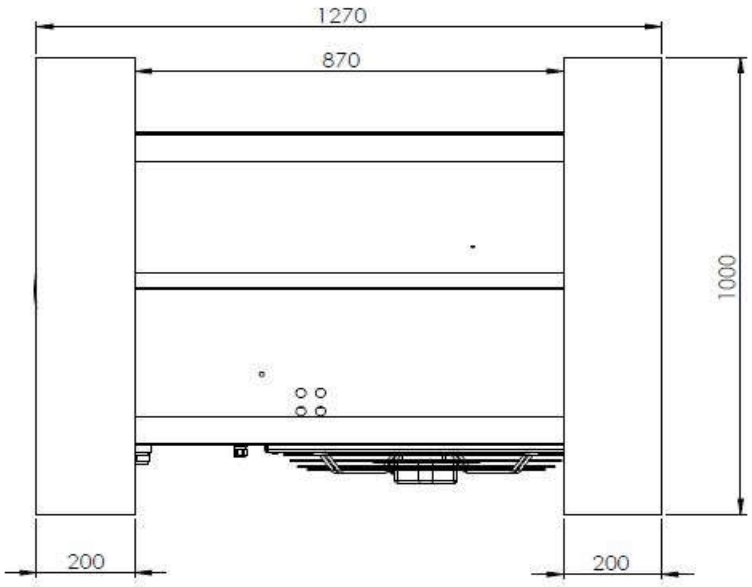


Fig.: Foundation plan

7 Assembly

7.1 General notes

The following connections must be made at the heat pump:

- Flow/return of the heating system
- Condensate drainage
- Cable to the display/ switches on displaybox/ emergency stopp button
- Power supply compressor, controler and fans

7.2 Preparation

If the construction and installation instructions for the excavation of a dig for the house connection line and the opening in the building are not observed, severe bodily injuries and material damages may occur.

When using outdoors, make sure to observe the relevant legal regulations of the employer's liability insurance association!

In the first step a suitable basement has to be installed (compare above). Between the heating or technical room (or cellar) and the basement a trench with a depth of 80cm has to be dig for laying for insulated tubes of heating water (flow and return flow tubes) and the prepared electric cables. It should be take notice, that flexible tubes hast to be used for connection to the heating circuit to avoid impact sound by decoupling.

The heating tubes should be insulated to avoid heat losses. Precondition for installation and getting-into-operation is, that a buffer tank and a controller board have been installed inside the house.

7.3 Connection of the heating system

Before connecting the heat pump to the heating system it is necessary to rinse the heating system in order to remove possible soiling, remainders of sealing material or other materials. Accumulation of remainders in the condenser can result in a complete failure of the heat pump. After having performed the installation of the heating system, fill, bleed and squeeze off the heating system.

The connections from the heating to the heat pump must be provided with external threads. The hot water pipes are led from the buttom up and installed. When connecting to the heat pump, it is necessary to counterhold with a wrench at the transitions. For the optimum connection comprehensive hydraulic accessories are available from the SmartHeat system, such as e. g. connection kits, switching units, etc.. If inappropriate connection material is used for the hydraulic installation strong noise development, malfunctions or material damages might occur! The integration of the heat pump into the heating network and for drinking water preparation may be very different depending on the respective application. The hydraulic connection scheme detailed in the annex shown a corresponding option.

In any case it must be observed that it is necessary to work with spreading between the flow and return from 5 – 7 K on the heating side in order to attain the values indicated on the data sheets resp. in order to avoid malfunctions. Compared to traditional incinerators of higher mass flows, i.e. larger pipe cross sections and corresponding pump designs.

Do not forget the safety devices and the expansion vessel when installing the heating system!

Before commissioning the heat pump, it is necessary to guarantee frost-protection. It is necessary to make sure that the hydraulic system does not freeze when the heat pump is switched off or fails.

The minimum heating water throughput of the heating pump must be made sure in any operating status of the heating system. A flow monitoring in the heating system must be guaranteed by the installation's operator.

7.4 Condensate drainage

Depending on the weather conditions and the system power, considerable water quantities might accrue. In order to be able to drain the accrued condensate safely and evenly, the condensate outlet must be fed into the rain water drainage.

The best solution in order to ensure a uniform condensate draining is to discharge the condensate into the rain water drainage.

The position and connection size of the condensate pipe are displayed in the strip foundation plan.

7.5 Electrical connection

7.5.1 General notes

The electrical cable from the house to the heat pump are laid in the ground and led into the heat pump from below through the provided bushings.

The cable connections between the heat pump and the controller box cabled ex works with the heat pump in the connection terminal box.

When connecting the cables for the power line (tariff or special tariff) a wrongly directed rotating field might result in performance decrease and material damages.

Always connect the power line in the right rotation field! Phase sequence: L1, L2, L3

If the inlets of the connection box are not yet properly wired, please contact the electronics company commissioned by the energy utilities.

The electrical connection of the heat pump has to be done by certified and authorized installers or, respectively, qualified electricians.

Work on the opened heat pump cabinet and connection box must **only be carried out in dead switched status and by an approved electrician or services technician**. All components, necessary for the power supply and control, are in the upper half of the heat pump cabinet.

The necessary cross section of the cable depends on the power consumption of the heat pump. Observe the technical connection conditions of the corresponding energy utilities as well as the VDE 0100.

Make sure to apply a right rotating field when connecting the supply lines for the main current (possibly special tariff). In case of a wrong rotating field the heat pump does not have any output and is getting damaged.

The compressor is protected against thermal overload. The fusing and the motor protective switch for the heat pump as well as the separator from the network must be produced by the system builder.

In case of an extension of the sensor connection line, it is necessary to use a line cross section of at least 0.75 mm².

Do not install the sensor cable together with the current-carrying conductions!

After installation and before commissioning of the system, it is necessary to check and document the earth conductor resistance and the isolation resistance according to DIN VDE 0701 and DIN VDE 0702. These tests must be repeated according to the intervals applicable on site or according to the DIN VDE regulations of the series DIN VDE 0701 and 0702 (commissioning, re-commissioning, etc.).

The terminal assignment diagram of the corresponding heat pump type applies. It is available in the machine and in the appendix of this manual.

7.5.2 Responsibilities for the electrical cabling

For electrical installation of different connection, different responsibilities are applicable. Please observe the following legal regulations:

- The local power supply company is responsible for the connection to a house connection (electricity meter).
- An electrical company approved by the power supply company is responsible for the installation and connection of the supply line between the electricity meter, fuses, main switch, motor protective switch and terminal box.
- Heating engineers authorizes by SmartHeat or correspondingly qualified electricians may perform the electrical connection of the heat pump *aero*. Further special knowledge which the installer gathers during training at SmartHeat is required for such works.
- It must be possible to completely separate the heat pump *aero* from the network and control tension via one or, if applicable, several separate external main switches which are upstream to the terminal box. The installer/operator is responsible for installing and connecting the external separator (main switch).

7.5.3 Electrical connections

The design of the electrical supplies and electrical main components are performed by the electrical specialized contractor depending on the local conditions.

The following electrical supplies must be available at the installation site of the heat pump:

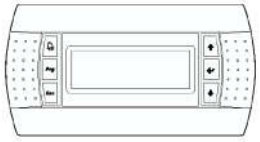


Fig.: Heat pump controller

1-stage	
1 x supply heat pump	3/N/PE ~ 50Hz / 400V
1 x supply control voltage	1/N/PE ~ 50 Hz / 230V

7.5.4 Connecting the connection cable to the controller

It is possible to install the control box at any position within the building. The connection cable between the control box and the terminal box are pre-assembled and are available in different lengths.

The connection cable of the control box must be led from the bottom through the provided cable glands into the heat pump and the terminal box which is located behind the maintenance opening. The wiring in the control box is pre-assembled.

Working steps:

1. Install the control box at any position within the building
2. Mount pre-assembled connection cables on the machine
3. Connect the controller connection cable according to the terminal assignment in the terminal box

Observe the corresponding terminal assignment when installing the connection cable from the control box to the terminal box!

8 Commissioning

8.1 General notes

In order to guarantee a proper commissioning, it should be performed by a service partner who is authorized by the manufacturer. Under certain conditions it is related to a prolongation of the guarantee (cf. guarantees).

8.2 Preparation

Make sure that:

- all necessary connections of the heating and process water had been performed.
- the device as well as the heating system had been properly flushed, filled and bled.
- all shut-off fittings in the heating circuit are open.
- the condensate draining is guaranteed.
- the rotary direction of the special fans complies with the indicated arrow direction.
- the air suction/ exhaust passage is not obstructed.
- the settings of the heat pump controller are adapted to the heating system according to the instructions for use
- the connection and protection of the electrical supply lines is performed.
- all screw connections are tight
- the mains switch is set to “ON” resp. “I”.
- The oil sump heaters of the compressors were activated for 3 hours before the first start

8.3 Notes for the proper aeration and de-aeration

It is commonly found that the heat pump heating systems do not work properly since the heating circuit does not have the necessary volume flow. This is resulting in a triggering of the safety-related equipment of the heat pump.

In case of insufficient or no flow in the heat exchanger of the heating circuit this will lead to a failure of high pressure. It cannot be excluded that in case of insufficient hot water flow also the safety temperature limiter will switch off the system. The enumerated failures are caused in the peripheral and in very rare cases in the heat pump itself. Wrong settings on the controller may have similar effects. The triggering of corresponding sensors and the signalling of a malfunction serve to protect the system and are generally not a sign for a defective heat pump.

8.3.1 Rinsing, de-aerating and filling

It is generally recommended to install a filling and rinsing fitting in the heating circuit, consisting of a shut-off device and two tank filling and draining valves. Before filling the hot water circuit it is necessary to fill the drinking water bag. The heating water is filled in a tank as openly as possible, from where it is pumped in the system in flow direction via the corresponding tank filling and draining valve by means of a powerful pump (e.g. CHI). The shut-off device between the two tank filling and draining valves remains closed. The water escapes from the second tank filling and draining valve after having flown through the system and must be re-conveyed into the open tank via a hose so that it is possible to control the escaping air. The process must be performed, interrupted and repeated via a longer term. (When using fresh water from the line it is particularly important to make interruptions.)

Close the tank filling and draining valve (output) and open the ball valve in order to pump the corresponding recipient into the MAG and to set the system pressure as soon as no more air is escaping from the heat circuit. As soon as this is done, the process can be considered as completed and the system will work successfully after de-aerating the system once again, in particular also the reservoir.

The rinsing process should be performed and logged according to VDI 2035.

8.3.2 Water analysis and water treatment

Planners and installers must check on the system if the available feed water is appropriate to fill the heating system with regard to the total hardness according to VDI 2035 sheet 1. The result of this test must be transmitted in writing to the builder / operator. The decisive factors are the heating performance and the specific system volume:

Total heat output	Total hardness	Total hardness	Total hardness
In kW	In °dH at <20l/kW least boiler screen surface	In °dH at >20l/kW<50l/kW least boiler screen surface	In °dH >50l/kW least boiler screen surface
<50kW	No requirements or <16.8°dH	11.2°dH	0.11°dH
>50kW<200kW	11.2°dH	8.4°dH	0.11°dH

Regarding this treatment the VDI 2035 gives three options:

- Softening / demineralisation
- Hardness stabilisation
- Hardness precipitation

At this, the *softening* represents the preferred procedure to avoid stone formation, at which the alkaline earths (magnesium and calcium ions) are permanently removed from the system. However, hereby sodium hydrogen carbonate ($NaHCO_3$) is formed in the system, which converts to alkalinized sodium carbonate (Na_2CO_3) by heating up the heating water. Since the generated CO_2 escapes from the system at the same time, the pH value demanded in the VDI 2035 sheet 2 between 8.2 and 9.5 (when using aluminium maximum 8.5) may considerably be exceeded. However, if the ph value is exceeded, there is a risk of corrosion damages, so that it is necessary to counteract such damages in a second step.

In the *hardness stabilisation* additives are added to the heating water by which the lime deposits in the system are influenced in a way that formation of stone is being avoided. Contrary to the softening the stone formers are not removed from the system. Regarding the selection, dosing, monitoring and disposal of the additives and of the conditioned heating water it is necessary to take additional measures. It is necessary to make sure that the additives themselves as well as combined with other products which need to be used do not cause any corrosion damages. Furthermore, no products containing phosphates should be used for hardness stabilisation since they precipitate as calcium phosphate mud together with lime.

In the frame of the *hardness precipitation* substances are added to the heating water, which let the dissolved alkaline earths precipitate as mud. This mud must be removed from the heating system by system technical and operational measures (desludging).

8.4 Control

The heat pump is mainly commissioned and operated by means of the heat pump controller; this controller should be located inside the building. The precondition for successful operation of the heat pump is that it is continuously switched on. The controller settings should be adapted to the heating system when commissioning.

Other changes of the settings are often not required, provided that the frame conditions remain unchanged. In case of changes of the frame conditions the parameters must be set in coordination with or by the customer service.

For heat pumps working in two-stage operation a second compressor is switched on in case of increased heat requirement.

The heat pump is working at two-stage operation. The second compressor is connected in case of increased heat requirement. In normal operation the compressors are working alternately, i.e. every 24 hours the leading compressor is changed. Thus the compressors are working an equal number of operating hours. If only one compressor is operated, the fans are running at stage I. Only if both compressors are operated, the fans are running at stage II.

The basic functions of the control as well as the general operation are described in the controller instructions (refer to part 2 of the operating instructions). Furthermore, you obtain information regarding the setting of the required room and hot water temperatures, the setting of your own daily programs for the heating operation and hot water preparation as well as the procedure in case of malfunctions of the system.

The first commissioning should be performed by a service partner authorized by the manufacturer for warranty reasons. When first commissioning the system the pre-settings are programmed and an adaptation to the existing heating system is required.

The operator or any other persons must not perform any changes of the settings on the control (internal heat pump).

The manual operation must only be used by the specialist for maintenance and service. This manual operation de-commissions all control and safety functions.

Please request any further information as well as a commissioning log at the service hotline: +49 3843 / 2279-111.

9 Maintenance, cleaning and care instructions

9.1 Maintenance

According to the EC-VO 842/2006 (F gas regulation) it is necessary to submit all coolant circuits of a coolant quantity >3kg (6 kg for hermetic systems) to a leak test every year. The coolant can be taken out of the machine via the type plate. The leak test must be performed by certified staff according to (EC) No 1516/2007. Document the leak test and keep the log of the machine and the log of the leak test for at least five years.

Perform the maintenance of the refrigerant components according to VDMA 24186-3

To get to the cooling components:

1. Unscrew + remove hexagon socket screws
2. Remove side cover
3. Put side cover apart
4. Perform maintenance, service or commissioning works
5. Position side cover
6. Fix side cover with hexagon socket screws

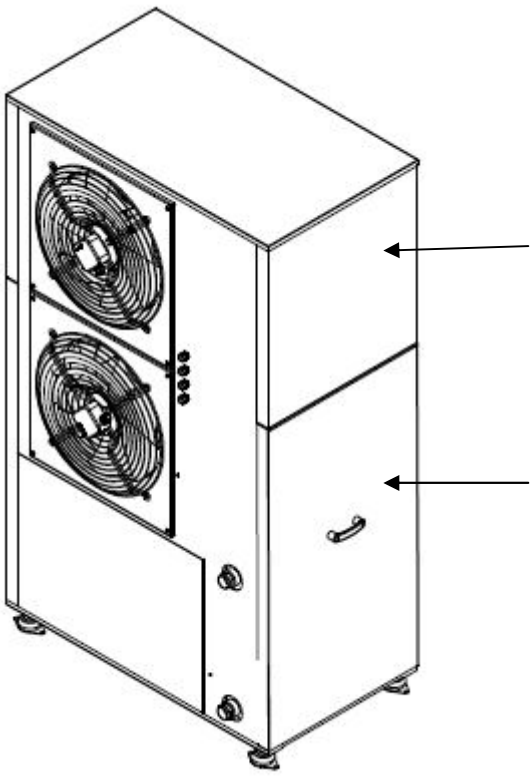


Fig.: Remove side cover

9.2 Cleaning of the air side

Fans, air register (evaporators) and condensate draining should be cleaned at the beginning of the heating period.

Any works on the heat pump must only be performed by an approved installer or service technician.

Before opening the lateral covers, it is necessary to make sure that the heat pump is disconnected from the power supply.

Avoid using sharp and hard objects when cleaning the system, in order to avoid damages of the evaporator and the condensate pan. At extreme weather conditions (e.g. snowdrifts) ice formation at the suction and exhaust grids might occasionally occur. Thus, in order to ensure a minimum air volume, it is necessary to remove ice and snow from the suction and exhaust areas. In order to guarantee proper draining from the condensate pan, it is necessary to regularly check the pan and to clean it, if required. To get inside the device, it is possible to remove the side cover. Make sure that all hexagon socket screws are removed beforehand.

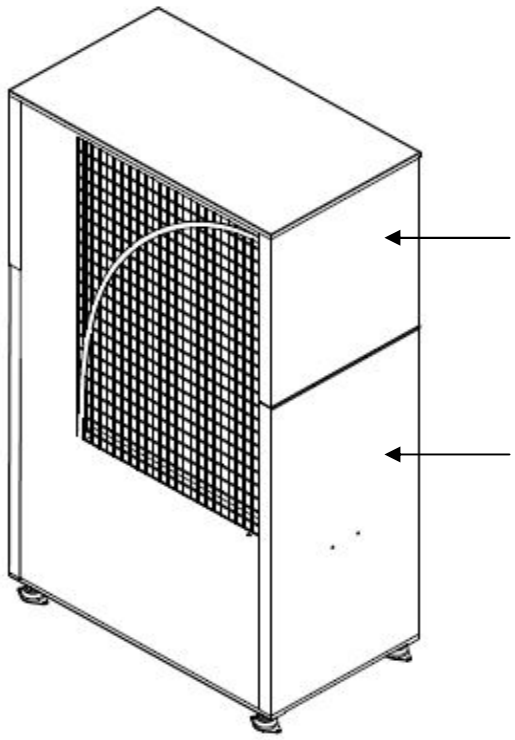


Fig.: Remove side cover

1. Unscrew + remove hexagon socket screws
2. Remove side cover
3. Put side cover apart
4. Clean interior of the heat pump
5. Position side cover
6. Fix side cover using hexagon socket screws

9.3 Cleaning of the heating system

Oxygen can form oxidation products (rust) in the heating water circuit in particular when using steel components. They attain the heating system via valves, re-circulation pumps or plastic tubes. Therefore, it is particularly necessary to make sure that the installation is diffusion tight in particular for tubes of the floor heating system.

Also remainders of lubricants and sealants may contaminate the heating water. If the water is heavily soiled so that the performance of the condenser in the heating pump is reduced, it is necessary to have the system cleaned by an installer. At this the condenser should be flushed contrary to the direction of flow.

In order to avoid that soiled heating water attains the heating system circuit we recommend you to directly connect the flushing device to the flow and return of the condenser of the heat pump. In order to avoid failures due to dirt deposits it is necessary to make sure that the heat exchanger in the heating system cannot be soiled by installing a dirt trap.

9.4 Care

The external parts of the heat pump can be treated with a damped cloth and commercially available cleaning agents.

Generally avoid depositing or cleaning any objects on the heat pump in order to protect the lacquer.

Do not use any cleaning agents containing soda, acids, sand or chlorine in order to protect the surface.

10 Failure

The heat pump aero is a quality product and should work trouble-free. Before delivery our products are tested in order to make sure that they are delivered without damages and functional. However if a failure occurs it is displayed on the heat pump controller.

Any possible errors and their corresponding remedies are listed in the instructions of the controller (refer to part 2 of the operating instructions). If it is not possible to remove a failure by oneself inform an approved installer or service technician.

Additional information is available upon request at the service hotline:
+49 3843 / 2279-111

11 Screed heating

Heat pump heating systems partially have a basically other behaviour them conventional incinerators since they are pretty well designed for the nominal heat requirement and dispose of a minimum surplus power in order to help you save money. Our experiences have shown that exactly for this reason some building owners have doubts about the performance of the heat pump in their new detached house when moving in. When moving in a new massive built home in the cold season it often reveals that the heat pump heating cannot perform both requirements: drying out a solid construction and covering the transmission and ventilation heat requirement.

In a solid built house there are huge quantities of water (walls, plaster, screed, etc.). In former times at least one year past from the start of construction until moving in the house naturally dried out in winter. Nowadays everything must happen within only a few weeks – but not only with the help of the heat pump.

Please note:
In order to evaporate 1000 l of water at a temperature of 20 °C about 680 kWh energy are required!

When using a gas heater for instance a 17-20 kW device is used for a nominal heat requirement of 10 kW in order to guarantee the required hot water preparation. Of course there are sufficient reserves for the dry heating phase. Expect to spend more money in electricity costs during the first heating period due to the dry heating phase. In pre-fabricated houses where there are no solid walls the dry heating phase is limited to the floor screed and therefore this period is considerably shorter.

12 Decommissioning

Provisional decommissioning:

By actuating the power switch and turning it to the position "OFF“ the system is decommissioned. Due to the risk of freezing it is only allowed to decommission the system without emptying the heating circuit at temperatures of more than 0°C.

Final decommissioning / disposal:

Before removing the heat pump, disconnect the machine from the power supply and shift it off.

A final decommissioning / disposal is only allowed if it is performed by an expert company.

The heat pump contains electrical and electronic components. In case of improper disposal they might have adverse effects on the environment. Herewith the manufacturer specially points out that the device must not be disposed of as domestic waste but it is necessary to dispose of it as hazardous waste.

Environmentally relevant requirements with regard to recycling, reuse and disposal of fuels and components according to the common standards must be complied with. At this it is particularly important to ensure a professional disposal of the coolant and refrigeration oil.

13 Hydraulic systems (Examples)

13.1 Basic notes

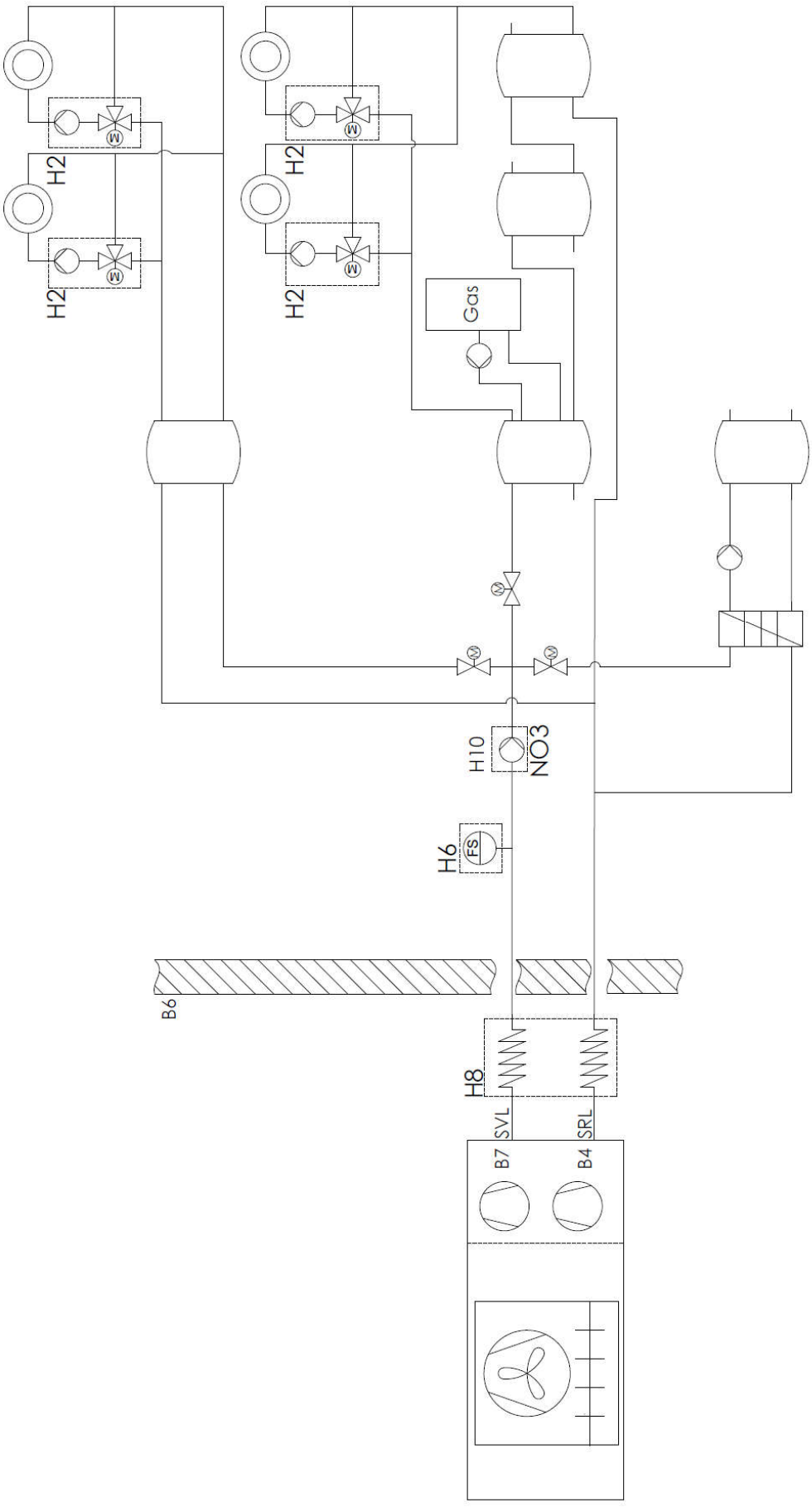
- To avoid the transmission of sound to the heating circuit, use flexible tubes for connection!
- Freezing protection of the heat pump and the connection tubes should be ensured by the installer and user!
- A minimum outgoing and backflow temperature of 25°C has to be ensured!

13.2 Hydraulic schematics

The following hydraulic schematics do not substitute professional planning. Observe valid rules and legal regulations!

All hydraulics and schemata are remarks.

Hydraulic system example aero 050-080 bivalent with buffer tank



13.3 Key

Bezeichnung Description	**Funktion** Function	
S 1	Soleverteilerset	Brine circuit manifold set
S 2	Sicherheitsset - Quelle	Safety set heat source
S 5	Set passiv Kühlung	Set passive cooling
S 6	Sicherheitsbaugruppe - Quelle	Safety assembly
H1	Sicherheitsset Option R	Safety set option R
H3	Sicherheitsbaugruppe Senke	Safety assembly heating circuit
H8	Anschlussset	Connection set
H10	Umwälzpumpensatz	Pump set
H11	Wärmemengenzähler	Heat meter
H13	Sicherheitsset - Senke	Safety set heating circuit
H15	Trinkwasser Anschlussset	Charge pump set

1. 3-Wege-Ventil, motorgesteuert
   3-way-valve, motor controlled
2. Abscheider, allgemein
   separator, general
3. Ventil, geschlossen
   valve, closed
4. Ventil, geöffnet
   valve, open
5. 3-Wege-Mischer
   3-way mixer
6. Eckventil, federbelastet
   valve, spring loaded
7. Heizstab, elektrisch
   heating, electrical
8. Verdichter
   compressor
9. Flüssigkeitsfilter, allgemein
   liquid filter, general
10. Kugelhahn
    ball valve
11. Rippenrohr-Wärmeübertrager, luftgekühlt
    finned tube heat exchanger, air cooled
12. Ausdehnungsgefäß
    expansion vessel
13. Strömungswächter
    flow switch
14. Druckanzeiger
    pressure indicator
15. Druckwächter (steigender Druck)
    pressure switch (increasing pressure)
16. Druckwächter (fallender Druck)
    pressure switch (falling pressure)
17. Pufferspeicher
    buffer tank
18. Pumpe, allgemein
    pump, general
19. Be- und Entlüftung, Rohrleitung
    exhausting valve
20. Rückschlagklappe, Rohrleitung
    non-return valve
21. Rückschlagventil, Kälteleitung
    non-return valve, cooling circuit
22. 2-Wege-Ventil
    2-way valve
23. Kompensator
    compensator
24. Hydraulische Weiche
    hydraulic shunt
25. Sicherheitsventil, federbelastet
    safety valve, spring loaded
26. Speicher
    tank
27. Temperatur, Anzeigen bzw. Überwachung
    temperature, indicator and controlling
28. Wärmeverbraucher
    heat consumer
29. Durchflußregulierung
    flowrate regulation
30. Multifunktionshahn/Spülhahn
    multifunction valve/ rinsing valve
31. Plattenwärmeübertrager
    plate heat exchangers
32. Auffangbehälter
    collecting vessel
33. Soleverteiler
    brine circuit mainfold
34. Durchflussanzeiger
    flow indicator
35. Druckschalter
    pressure switch
36. Absperrhahn
    stop cock
37. Solar System
    solar system
38. Mikroblasenabscheider
    microbubble separator
39. Wärmemengenzähler
    heat meter
40. Auslass, zur Atmosphäre
    outlet, to the atmosphere
41. Flussrichtung
    flow direction

14 Appendix

- EU declaration of conformity
- Technical data
- Terminal assignment plan

EU Konformitätserklärung/ EU Declaration of conformity

Der Unterzeichner/ The signatory:

SmartHeat Deutschland GmbH
Am Augraben 10
D 18273 Güstrow

bestätigt hiermit, dass die nachfolgenden Geräte in der von uns in Verkehr gebrachten Ausführungen die Bestimmungen folgender Richtlinien und Verordnungen erfüllen. Bei einer nicht mit uns abgestimmten Änderung des Gerätes verliert diese Erklärung ihre Gültigkeit.

certifies that the following indicated devices introduced into the market by us fulfill the requirements of following guidelines and regulations. Any modification to devices that have not been approved by us effectively voids this statement.

Bezeichnung der Wärmepumpe/ description of the heat pump
Typen/ types:
aero 031i (R), aero 042 (R), aero 043 HT, aero 084 (R),
aero 086 HT, aero 168 (R), aero 172 HT,
aero plus 044 (R), aero plus 088 (R), aero plus 176 (R),
aero plus 088 (R) Split

Richtlinien/ directives

2014/68/EU	Druckgeräterichtlinie/ pressure equipment directive
2006/42/EG	Maschinenrichtlinie/ mashinery directive
2014/30/EU	EMV- Richtlinie/ EMV-directives
2011/65/EU	RoHS II
2009/125/EG	Ökodesign- Richtlinie/ ecodesign directive

Angaben gemäß Druckgeräterichtlinie : Kategorie II, Modul A2, Zert.- Nr.: 0045/202/1240/Z/00209/20/D/001

Verordnungen/ regulations
811/2013 EU- Verordnung „Energiekennzeichnung“
813/2013 EU- Verordnung „Ökodesign“

Angewandte Normen/ applied standards

DIN 8901:2002-12
EN 378-1:2021-06
EN 378-2:2018-04
EN 378-3:2020-12
EN 378-4:2019-12
EN 12263:1999-01
EN 14511-1:2019-07
EN 14825:2019-07
EN 12102-1:2018-02
EN 50090-6-1:2018-04
EN 60204-1:2019-06
EN 60529:2014-09
EN 60730-1:2021-06
EN 61000-3-3:2020-07
EN 61000-3-11:2021-03
EN 61000-3-12:2012-06
EN ISO 12100:2011-03
EN ISO 13857:2020-04
EN ISO13854:2020-01

Güstrow, 28.10.2020

Dokumentenbevollmächtigter

P Retzlaff

Pascal Retzlaff