

# Original operating instructions

WP Max-HiQ KK & WP Max-LoQ KK

As of 2025-04

# INFORMATION

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These operating instructions are part of the technical documentation for the device in accordance with:

- Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
- Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of Member States relating to the making available on the market of pressure equipment

These operating instructions are intended for the operator, who must hand them over to the personnel who come into contact with the device. The operator must ensure that the information contained in the operating instructions and the accompanying documents has been read and understood.

**NOTE:** If in any doubt, consult the operating instructions, which must be kept in a known and easily accessible place.

The manufacturer accepts no liability for damage to persons, animals or property, or to the device itself, resulting from improper use, failure to observe or insufficient observance of the safety criteria contained in these operating instructions, or from modification of the device or the use of unsuitable spare parts. The copyright for these operating instructions is held exclusively by the company:

**ratiotherm**

Smart Energy Systems

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# 1. INFORMATION ABOUT THE DOCUMENT

The following notes serve as a guide through the entire documentation. Other documents are also valid in conjunction with these operating instructions. These operating instructions for specialist tradesmen are an integral part of the ratiotherm WP Max-HiQ/LoQ KK. The ratiotherm WP Max-HiQ/LoQ KK must not be operated without these operating instructions. The operating instructions must be made available to the operator and the specialist installer for information at all times. If the ratiotherm WP Max-HiQ/LoQ KK is sold, the instructions must be included.

We accept no liability for damage caused by failure to observe these instructions.

## 1.1 SAFETY AND WARNING NOTICES

### Signal words and colours

The following signal words are based on DIN ISO 3864-2 and are used in this documentation. The safety colours have been adopted from the ISO 3864-1 standard. The design complies with DIN EN 82079-1 and ANSI Z 535.4.

Signal word	Explanation
<b>DANGER</b>	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
<b>WARNING</b>	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
<b>CAUTION</b>	Indicates a hazardous situation which, if not avoided, could result in minor injury or property damage.
<b>NOTE</b>	Indicates operating instructions and cross-references. A note indicates the risk of property damage or risk of injury.

## 1.2 SAFETY SIGNS

### 1.2.1 OTHER SYMBOLS ACCORDING TO DIN ISO 7010

Some of the following special safety signs according to DIN EN ISO 7010 and DIN ISO 3864 are used at the relevant points in this operating manual and, depending on the combination of signal word and graphic symbol, require special attention. Please note the distinction between:

- Mandatory signs – prescribe an action (e.g. use eye protection).
- Warning signs – depict a source of danger and supplement a warning notice.
- Prohibition signs – prohibit certain actions.

Symbol	Explanation	Symbol	Explanation
	General warning sign		Warning of flammable substances
	Warning of electrical voltage		General prohibition sign
	Warning of hot surfaces		No entry

Symbol	Explanation	Symbol	Explanation
	Follow instructions		General command sign
	De-energise before maintenance or repair		Use hand protection

### 1.2.2 OTHER SIGNS ACCORDING TO DIN ISO 7000

Symbol	Explanation	Symbol	Explanation
	Observe the operating manual (instructions for use)		Service indicator, Refer to the operating manual (instructions for use)
	Instructions for use/operating instructions (operating manual)		

### 1.2.3 OTHER SYMBOLS

Symbol	Explanation	Symbol	Explanation
	Recycling		Dispose of packaging material in accordance with regulations

## 2. IDENTIFICATION AND NOTES

### 2.1 PRODUCT

Device designation:	Heat pump
Type	WP Max-HiQ/LoQ KK
Year of manufacture:	See type plate
Country of origin:	Germany

### 2.2 INTENDED USE

The WP Max-HiQ/LoQ KK device is designed to use heat from the environment to provide direct heating support and hot water preparation. Any other or extended use of the device is considered improper and therefore inappropriate. In this case, the safety and protective functions of the device may be impaired. ratiotherm GmbH & Co. KG is not liable for any damage resulting from this. Proper use also includes:



- Compliance with all instructions in this operating manual,
- Observing all warnings and
- Compliance with the inspection and maintenance conditions.

The WP Max-HiQ/LoQ KK device is built in accordance with the latest technology and recognised safety regulations. The device is intended exclusively for domestic and/or commercial use for hot water preparation (service water) and for heat or cold generation.

Improper or unintended use may result in danger to the life and limb of the user or third parties. In addition, damage to the



the device and other property. The WP Max-HiQ/LoQ KK device is not intended for use by persons (including children) with limited physical, sensory or mental abilities, or by persons with insufficient experience and/or knowledge. The risk is borne solely by the operator and user.

### 2.3 TARGET GROUPS

For safety reasons, the design of the device does not permit its use by persons with disabilities (e.g. visual impairments).

**⚠ DANGER!** Only perform tasks for which you are authorised.

#### 2.3.1 TARGET GROUP MATRIX

Tasks	Operators and users	Specialist personnel
Transport/storage		X
Assembly/installation		X
Commissioning/adjustment		X
Automatic operation (control)	X	X
Set-up/conversion/technical modification		X
Maintenance/inspections/repairs		X
Cleaning	X	X
Troubleshooting and fault rectification		X
Decommissioning/dismantling/disposal		X

## 2.3.2 TARGET GROUP DEFINITION

### Operators and users

A person who has purchased the device for use in an existing system for direct heating support and hot water preparation. The person must have knowledge of the necessary protective devices and protective measures.

Qualification of operators and users:

- Of legal age and physically/mentally fit to perform work on the device.
- Knowledge of how to operate the product, imparted by qualified personnel and the operating instructions.



### Specialist personnel

A person from a qualified specialist company for heating and hot water systems. The specialist personnel must have acquired special knowledge and experience through professional training. The person must have knowledge of relevant standards, be able to assess the work assigned to them (e.g. instruction of personnel, switching on, programmes and switching off) and identify possible hazardous situations.

Qualification of qualified personnel:

- Of legal age and physically/mentally capable of performing work on the device.
- Knowledge: several years of experience working on heating systems and hot water preparation

## 2.4 MISUSE

### 2.4.1 REASONABLY FORESEEABLE MISUSE

Reasonably foreseeable misuse that poses a risk to personnel, third parties or the device is defined for all operating modes as:

- Using the device contrary to its intended use.
- Supplying components that are not certified by the manufacturer.
- Operating the device outside its physical operating limits.
- Modifying the control software without prior consultation with ratiotherm GmbH & Co. KG.
- Modifications to the device as well as additions and conversions without prior consultation with ratiotherm GmbH & Co. KG.
- Operating the device contrary to the provisions of the risk assessment.
- Bypassing or deactivating protective and safety devices.
- Operating the device with obvious faults.
- Operation of the device by persons (including children) with limited physical, sensory or mental abilities.



#### **⚠ DANGER**

#### **Unauthorised modifications to the device**

Unauthorised modifications pose a risk of death or injury.

**Do not make any unauthorised modifications to the device without the prior consent of ratiotherm GmbH & Co. KG.**

## 2.4.2 UNFORESEEABLE MISUSE/ABUSE

Unforeseeable misuse may occur due to:

- Disasters,
- the impact of foreign objects and/or
- force majeure.

## 2.5 WARRANTY, LIABILITY, GUIDELINES, STANDARDS AND LAWS

The "General Terms and Conditions of Sale and Delivery" of ratiotherm GmbH & Co. KG apply in principle. The "General Terms and Conditions of Sale and Delivery" have been available to the operator since the conclusion of the contract at the latest. Warranty and liability claims for personal injury and property damage are excluded if the damage is attributable to one or more of the following causes:

- Improper use of the device,
- Improper handling of the device,
- Operation of the device with defective protective devices,
- Failure to observe the safety and warning instructions in the operating manual,
- Unauthorised structural modifications to the device,
- Inadequate implementation of the specified maintenance measures, and
- disasters involving foreign objects or force majeure.

The operating instructions must be read before handling the device. The operating instructions familiarise personnel with the handling of the device and provide information on all phases of the device's life cycle.

The operating instructions must be accessible to personnel at all times. The safety and warning instructions in the operating instructions and on the device must be observed and complied with. If you have any further questions that go beyond the scope of these operating instructions, please contact ratiotherm GmbH & Co. KG.

The following guidelines, standards and laws must be observed when using the device in Germany:

- VDE and EVU regulations and provisions (in particular VDE 0100)
- Regulations and provisions of local utility companies
- DVGW worksheet W 382 "Installation and operation of pressure reducers in drinking water consumption systems"
- DIN 1988 – TRWI Technical rules for drinking water installations
- DIN 4753 – Water heating systems for drinking and service water
- DIN 8947 – Ready-to-connect heat pumps for water heating with electrically driven compressors
- Accident prevention regulations VGB 20 Accident prevention regulations "Refrigeration systems" with implementation instructions
- Energy Saving Ordinance EnEV – Ordinance on energy-saving thermal insulation and energy-saving system technology in buildings from 2009



### NOTE

#### Guidelines, standards and laws

Additional local guidelines, standards and laws, e.g. building regulations, may apply. **As a general rule, the applicable legal guidelines, standards and laws in the respective country must be observed.**

## 3. SAFETY INSTRUCTIONS

 **DANGER!** Read and observe the operating instructions before working on and with the device.

Despite all precautions taken, there may still be some residual risks. You can reduce the existing residual risks by observing and complying with the general safety instructions and warnings as well as the intended use.

### 3.1 GENERAL SAFETY INSTRUCTIONS

Observe the following general safety instructions:

- The volume of water increases during the heating process. Therefore, never close the blow-off pipe of the safety valve.
- Please note that hot water may escape from the blow-off line.
- If leaks occur in the vicinity of the appliance, switch off the appliance and isolate it from the rest of the heating system. The leaks must then be repaired immediately.
- Do not use the following products to prevent corrosion on the device: sprays, solvents, chlorinated cleaning agents, paints, adhesives, etc.
- Components that have not been tested with the device may cause damage to the device or impair its functions. Only use original spare parts and original wear parts.
- Only allow qualified personnel to carry out the assembly/installation/commissioning/adjustment of the device.
- Observe the existing regulations, rules and guidelines as well as the local installation requirements.
- To avoid injuries of any kind, the general accident prevention regulations must be observed under all circumstances and appropriate personal protective equipment must be used.
- Technical modifications to the system are not permitted. This also applies to the retrofitting of safety devices and welding on load-bearing parts.  
Safety devices must not be taken out of service. Only original spare parts and original accessories from the manufacturer may be used.

### 3.2 ADDITIONAL INFORMATION

Local accident prevention regulations apply to all work on the device. Please also observe the

- applicable binding regulations for accident prevention,
- Recognised technical rules for safe and professional work,
- Existing regulations on environmental protection and
- other applicable regulations.
- The outlet temperature at the hot water taps can be up to 60 °C. Carefully check the water temperature at the hot water taps before placing your hands completely under the water jet.
- Do not make any changes to the components:
  - On the air heat pump and the water and electricity pipes;
  - To the safety valve;
  - To structural conditions that may affect the operational safety of the device;
  - To structural conditions in the vicinity of the device, insofar as these may affect the operational safety of the device.

### 3.3 RESIDUAL RISK



#### **WARNING**

##### **Measures/work carried out by unauthorised/unqualified personnel**

Measures/work carried out on the device and/or its components and connections by unauthorised/unqualified personnel can result in serious injury.



**In the event of malfunctions, only allow qualified personnel to carry out measures/work on the device and/or its components and connections.**



#### **WARNING**

##### **Damaged insulation**

Damaged insulation poses a serious risk of burns on hot and/or cold surfaces.



**Protect yourself with suitable PPE (e.g. heat- and cold-resistant protective gloves).**

Allow hot or cold surfaces to cool down or warm up before working. Replace damaged insulation.



#### **WARNING**

##### **Ignition sources in the danger zone**

Ignition sources in the danger zone can cause flammable substances to ignite and/or explode.

**Keep ignition sources away from the danger area.**

## 4. DESIGN AND FUNCTION

### 4.1 TECHNICAL DATA WP MAX-HIQ KK

Max-HiQ KK	F27	35	43	Unit
<b>Performance data Heating mode</b>				
W20/W55				
Heating output	9.1 to 35.1	32.5	40.6	kW
Power consumption	2.1 to 8.3	7.7	9.8	kW
COP at rated power	4.23	4.24	4.14	
<b>Compressor</b>				
Design	Fully hermetic, scroll, inverter	Fully hermetic, Scroll, fixed speed		
Speed	1500 to 4800	2900	2900	n/min
Max. operating current	25	20	26	A
Starting current	/	45	55	A
Blocking current LRA	/	96	105	A
Oil quantity	2.5	2.8	3.5	litres
<b>Evaporator</b>				
Design	Copper-brazed plate heat exchanger			
Material	Stainless steel / Copper			
Max. volume flow brine	7.8	7.8	8.5	m <sup>3</sup> /h
Pressure loss	0.1	0.1	0.2	bar
Temperature difference		3		K
Min./max. source temperature		+10 to +55		°C
Max. operating pressure		6		bar
Test pressure		58		bar
Operating range		-196 to 200		°C
Connection dimensions		2",AG		
<b>Condenser</b>				
Design	Copper-brazed plate heat exchanger			
Material	Stainless steel / copper			
Max. water flow rate	4	3.5	4	m <sup>3</sup> /h
Pressure loss	0.06	0.06	0.1	bar
Temperature difference		8		K
Min./max. lowering temperature		25 to 75		°C
Max. operating pressure		3		bar
Test pressure		58		bar
Operating range		-196 to 200		°C
Connection dimensions		2",AG		
<b>Refrigeration circuit</b>				
Working fluid		R513A		
Filling quantity	4.8	5.6	6.4	kg
Max. operating pressure		28		bar

Electrical				
Mains connection	400 V / 3~ / 50Hz			
Fuse	25	25 (slow)	32 (slow-blow)	A
Device data				
Sound pressure level Interior at a distance of 1 m	50			dB(A)
Module dimensions	650 x 1760 x 450			W x H x D (mm)
Weight of module without attachments	173	177	181	kg
Weight of module with attachments	223	227	231	kg

## 4.2 TECHNICAL DATA WP MAX-LOQ KK

Max-LoQ KK	F27	35	43	Unit
Performance data Heating mode				
W10/W35				
Heating output	8.9 to 32	29.5	38	kW
Power consumption	1.7 to 7.1	5.4	7.0	kW
COP at rated power	5.05	5.5	5.4	
S0/W35				
Heating capacity	6.9 to 24.8	23	28.9	kW
Power consumption	1.8 to 6.9	5.2	6.6	kW
COP at rated power	3.84	4.41	4.4	
Compressor				
design	Fully hermetic, scroll, inverter speed	Fully hermetic, Scroll, fixed		
Speed	1500 to 4800	2900	2900	n/min
Max. operating current	35	20	26	A
Starting current	/	45	55	A
Blocking current LRA	/	96	105	A
Oil quantity	2.5	2.8	3.5	litres
Evaporator				
Design	Copper-brazed plate heat exchanger			
Material	Stainless steel / copper			
Max. brine flow rate	4	3.5	4	m <sup>3</sup> /h
Pressure loss	0.06	0.06	0.1	bar
Temperature difference	3			K
Min./max. source temperature	-5 to +15			°C
Max. operating pressure	6			bar
Test pressure	58			bar
Area of application	-196 to +200			°C
Connection dimensions	2",AG			

<b>Condenser</b>				
Design	Copper-brazed plate heat exchanger			
Material	Stainless steel / copper			
Max. water flow rate	4	3.5	4	m <sup>3</sup> /h
Pressure loss	0.06	0.06	0.1	bar
Temperature difference	8			K
Min./max. lowering temperature	25 to 75			°C
Max. operating pressure	3			bar
Test pressure	58			bar
Operating range	-196 to +200			°C
Connection dimensions	2",AG			
<b>Refrigeration circuit</b>				
Working fluid	R513A			
Filling quantity	4.8	5.6	6.4	kg
Max. operating pressure	28			bar
<b>Electrical</b>				
Mains connection	400 V / 3~ / 50 Hz			
Fuse protection	25	25 (slow)	32 (slow-blow)	A
<b>Device data</b>				
Sound pressure level Interior at a distance of 1 m	50			dB(A)
Module dimensions	650 x 1760 x 450			W x H x D (mm)
Weight of module without attachments	173	177	181	kg
Weight of module with attachments	223	227	231	kg

## 4.3 FUNCTION DESCRIPTION

The WP Max-HiQ KK and WP Max-LoQ KK cascade heat pumps are unique on the market in terms of their design. They consist of a base platform and two or three independent heat pumps in a modular design. Thanks to a wide range of power module combinations, the output of the cascade heat pumps can be tailored perfectly to requirements (even retrospectively). In addition, they can be

Power modules can be quickly added, exchanged or replaced in the event of damage. This dramatically increases operational reliability and performance flexibility. Another advantage of the cascade design is the ability to achieve very high outputs without falling under the mandatory leak test requirement. Each power module consists of a complete refrigeration circuit, a condenser pump and an independent control system. The heat pumps are suitable for use as brine/water or water/water heat pumps. A technology patented by ratiotherm enables the use of source temperatures in the range of 10 to 55 °C with the WP Max-HiQ KK, while the WP Max-LoQ KK can be used with source temperatures between -5 and 15 °C. The environmentally friendly refrigerant R513A enables flow temperatures of 75 °C.

### ADVANTAGES

- Reliable operation thanks to high-quality components
- Best efficiency thanks to high coefficients of performance
- High power reserve thanks to cascade design
- Integrated cascade control for optimum operating conditions at all times.
- Flexibly combinable heat pump modules allow a wide range of outputs



## 4.4 DESIGN AND SPARE PARTS

The ratiotherm WP Max-HiQ/LoQ KK heat pump consists of a base platform and up to three independent refrigeration circuits.

The base platform consists of a control cabinet containing the electrical distribution system and the platform controller. Four large manifold pipes with individual outlets to the heat pump modules are also attached to the rear of the platform. This makes it possible to connect up to three heat pump modules to the platform using plug & play technology.

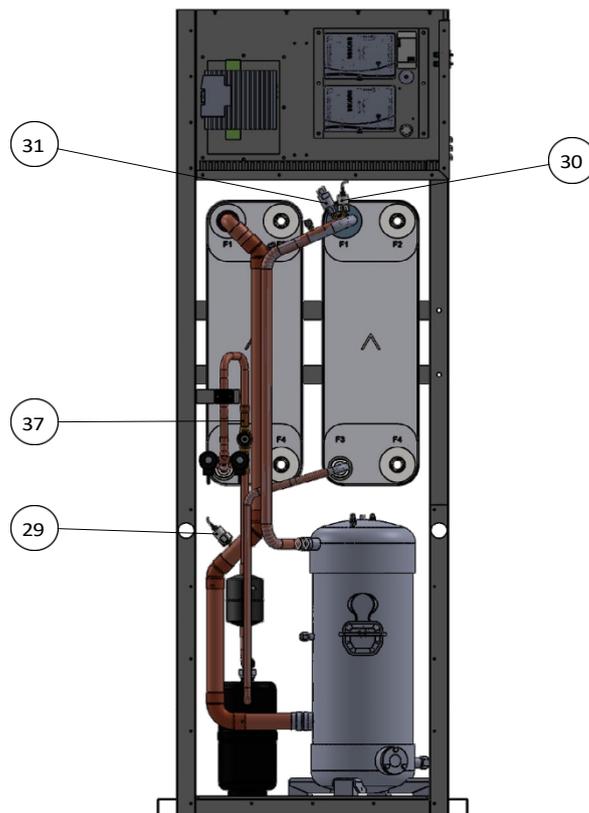
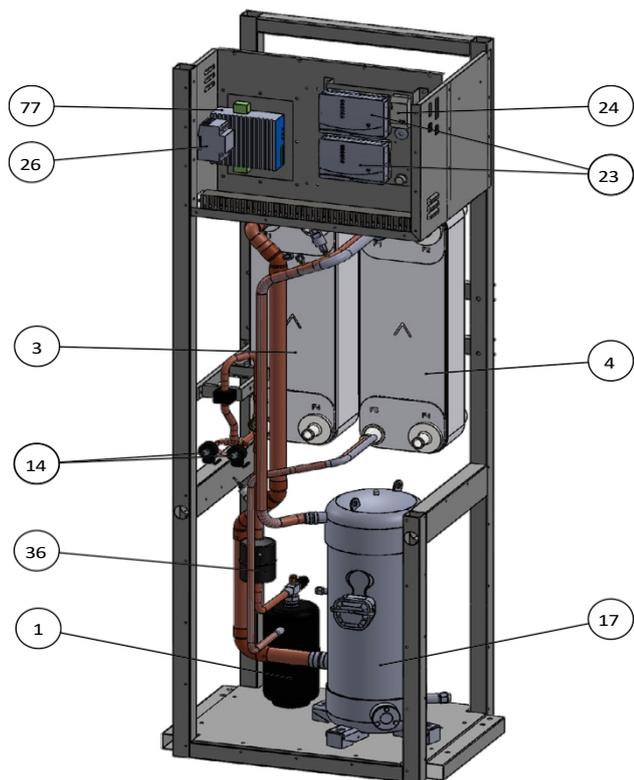
The heat pump modules each consist of independent refrigeration and control circuits. The refrigeration circuit is a hermetically sealed circuit consisting of a scroll compressor, a condenser, an evaporator and an electronic expansion valve that controls the flow of refrigerant.

The refrigeration circuits are shipped fully filled and ready for operation. No further refrigeration commissioning is required.

The heat pump modules are each controlled by Technische Alternativen UVR610 controllers. The respective modules are controlled from the higher-level platform control system.

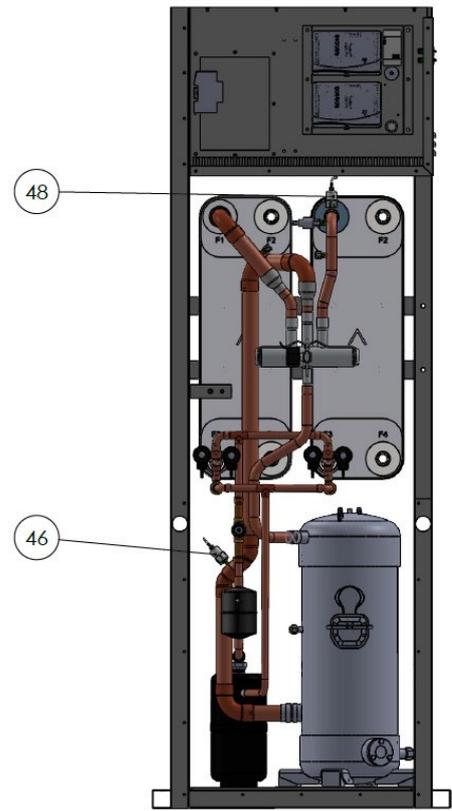
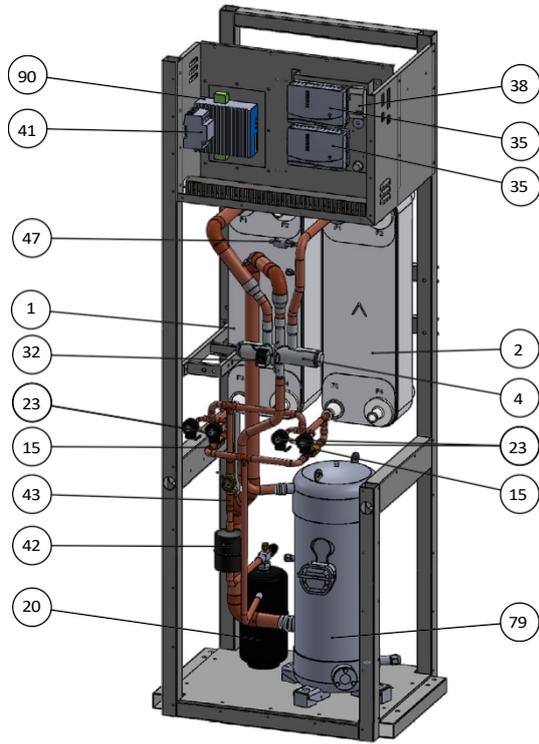
The appropriate pump groups are attached to the rear of the modules. These are vibration-decoupled and connected to the manifold pipes.

4.4.1 STANDARD



Number	Designation	Quantity	RA number	F27		35		43	
				HiQ	LoQ	HiQ	LoQ	HiQ	LoQ
1	Collector	1	ra/10313	x		x		x	
3	Evaporator	1	ra/13673	x		x		x	
4	Capacitor	1	ra/13672	x		x		x	
14	Expansion valve	2	ra/14499	x		x		x	x
			ra/13038	x		x	x		x
17	Compressor	1	ra/14277	x					
			ra/14918						x
			ra/13746			x			
23	UVR610	2	ra/14414	x		x		x	
24	Stepper motor control module	1	ra/13047	x		x		x	
26	Contactor 3-phase	1	ra/12270			x			
	Contactor 3-phase	1	ra/14957						x
29	Low pressure sensor	1	ra/13048	x		x		x	
30	High-pressure sensor	1	ra/13049	x		x		x	
31	Cartridge pressure limiter	1	ra/10076	x		x		x	
36	Filter dryer	1	ra/14661	x		x		x	
37	Sight glass	1	ra/14660	x		x		x	
77	Soft start	1	ra/11398			x			
			ra/14956						x
	Frequency converter	1	ra/14541	x					

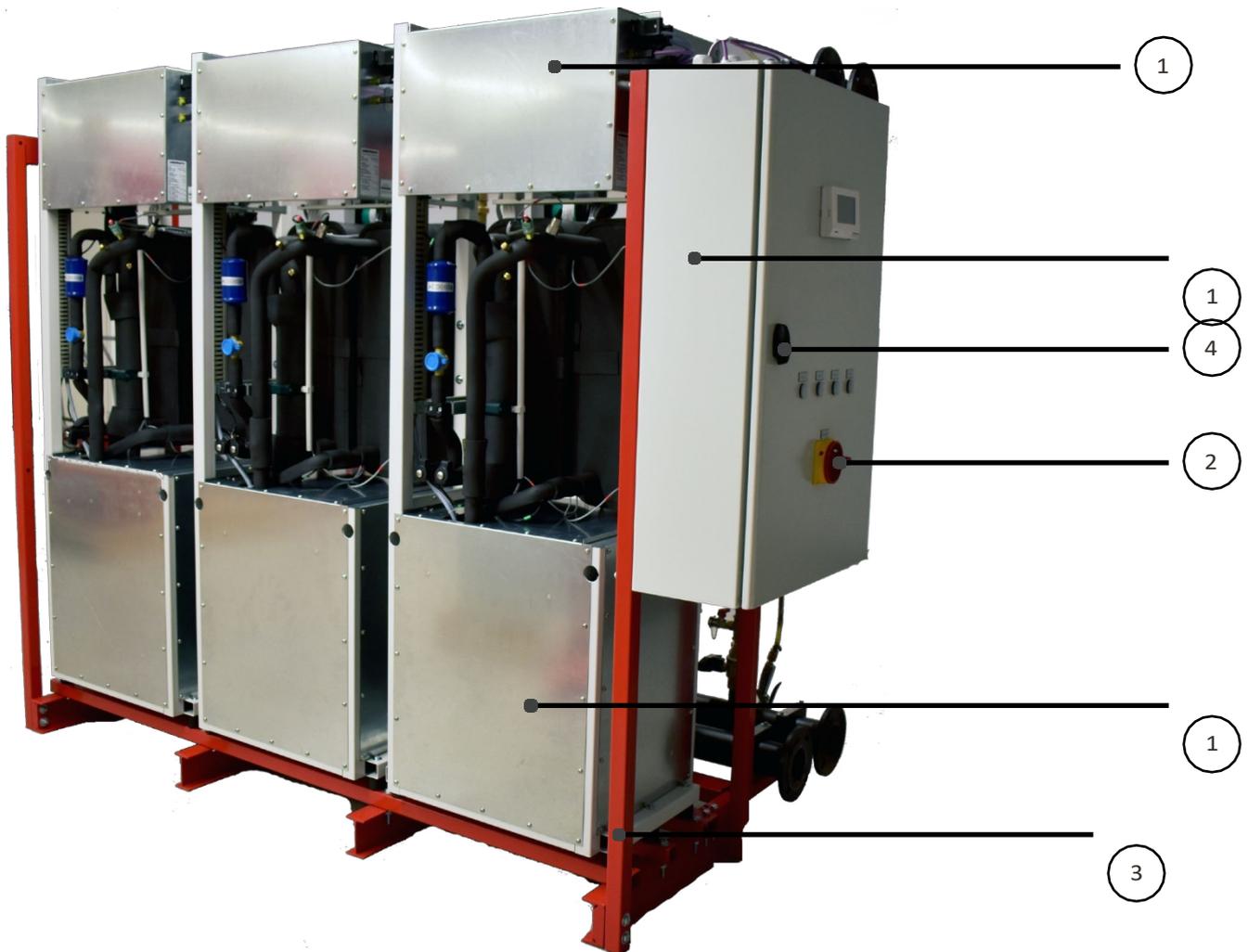
4.4.2 WITH ACTIVE COOLING



Number	Designation	Number	RA number	F27		F35		F43	
				HiQ	LoQ	HiQ	LoQ	HiQ	LoQ
1	Evaporator	1	ra/13673	x		x		x	
2	Capacitor	1	ra/16372	x		x		x	
4	4-way non-return valve	1	ra/10938	x		x		x	
15	Check valve	2	ra/14624	x		x		x	
20	Collector	1	ra/10313	x		x		x	
23	Expansion valve	4	ra/14499	x		x		x	
32	Solenoid valve coil	1	ra10993	x		x		x	
35	UVR610K-OD	2	ra14414	x		x		x	
38	SMS-14	1	ra/13047	x		x		x	
41	Contactora 3-phase	1		x		x		x	
42	Filter dryer	1	ra/14661	x		x		x	
43	Sight glass	1	ra/14660	x		x		x	
46	Pressure transmitter 0-15 bar	1	ra/13048	x		x		x	
47	Cartridge pressure limiter	1	ra/10076	x		x		x	
48	Pressure transmitter 0-40 bar	1	ra/13049	x		x		x	
			ra/14277	x					
79	Compressor	1	ra/14918						x
			ra/13746			x			
90	Soft start	1	ra/11398			x			
			ra/14956						x
	Frequency converter	1	ra/14541	x					

## 4.5 SAFETY DEVICES

The device is equipped with various safety features. The safety features are shown in the following illustration:

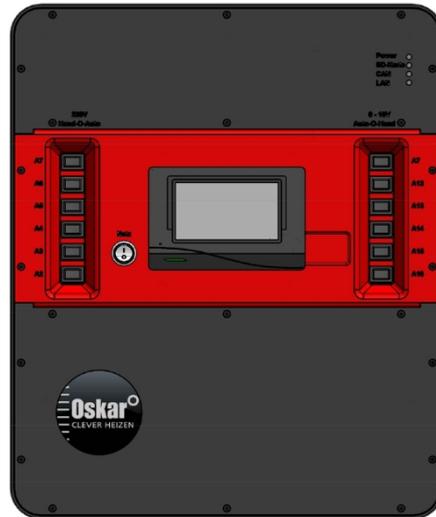


1	Protective enclosure or housing	2	Main switch
3	Base frame	4	Mechanical lock

## 4.6 CONTROL LOGIC AND CONTROL

### Control logic in conjunction with ratiotherm central controller rZR 16x2:

- The heat pump controller communicates with rZR via CAN bus.
- The central controller requests the heat pump and specifies the corresponding target temperature.
- In heating mode, the heat pump automatically regulates its output according to the specified target temperature.
- It is therefore possible that the heat pump may run for very long periods at low output. This is desirable and does not affect the service life.
- In hot water mode, the compressor runs at a constant speed. The target speed can be set via a fixed value (factory setting 75%).
- Cooling is also activated by the central controller. In cooling mode, the heat pump regulates to the setpoint outlet temperature, which is defined via a fixed value.



### Control logic in conjunction with external controllers:

- The request via external controllers has priority over the ratiotherm controllers (keyword: power-to-heat).
- The heat pump can be requested via a digital signal.
- A 0-10 V input is also available. If there is no 0-10 V signal, the heat pump automatically regulates itself to a setpoint temperature. This is defined via a fixed value (factory setting 50 °C).
- If a 0-10 V signal is present, the fixed value "0-10 V temperature setpoint" can be used to whether a set speed or a set temperature is transferred (factory setting = off: 0-10 V signal is evaluated as set speed).
- The target temperature is defined as: 0 V = 0 °C 10 V = 100 °C
- A digital input is also available, which can be used to activate cooling.
- Here too, the heat pump regulates itself to a fixed setpoint temperature.

## 5. TRANSPORT, ASSEMBLY AND INSTALLATION

### 5.1 TRANSPORT AND UNPACKING

The following instructions for transporting the device must be observed:

- Only allow qualified specialists to carry out the transport.
- Protect yourself with PPE (e.g. safety shoes, etc.).
- Take note of the weight of the device (approx. 1.2 t or 225 kg) in order to select the appropriate lifting equipment (forklift, pallet truck, etc.).
- Take note of the centre of gravity of the device.
- Remove all packaging materials.

Do not damage the device when removing the packaging materials.

- When disposing of the transport and storage packaging, comply with local disposal regulations and applicable environmental protection laws.
- When unpacking the device, check that the delivery is complete.
- Use the delivery notes and packing lists provided to check the contents.



## 5.2 MECHANICAL INSTALLATION

The responsible specialist tradesman (qualified personnel) must ensure the following measures are taken:

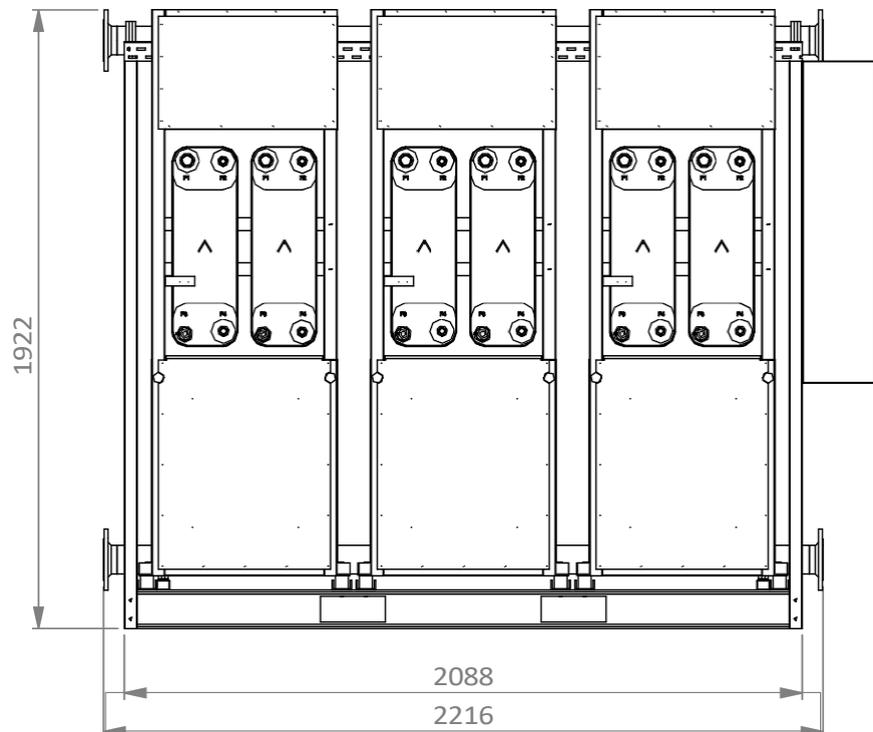
- Illuminate the danger zone for assembly and installation with additional lighting units if necessary.
- That the personnel have the necessary qualifications and receive the necessary training.
- That the personnel have read and understood the operating instructions.
- That the personnel have access to the operating instructions at all times.
- Local accident prevention and environmental regulations are implemented and complied with.
- The personnel are instructed by the responsible supervisor and unauthorised persons are kept away from the device.
- Only hand over and operate the device when it is in a safe and functional condition.

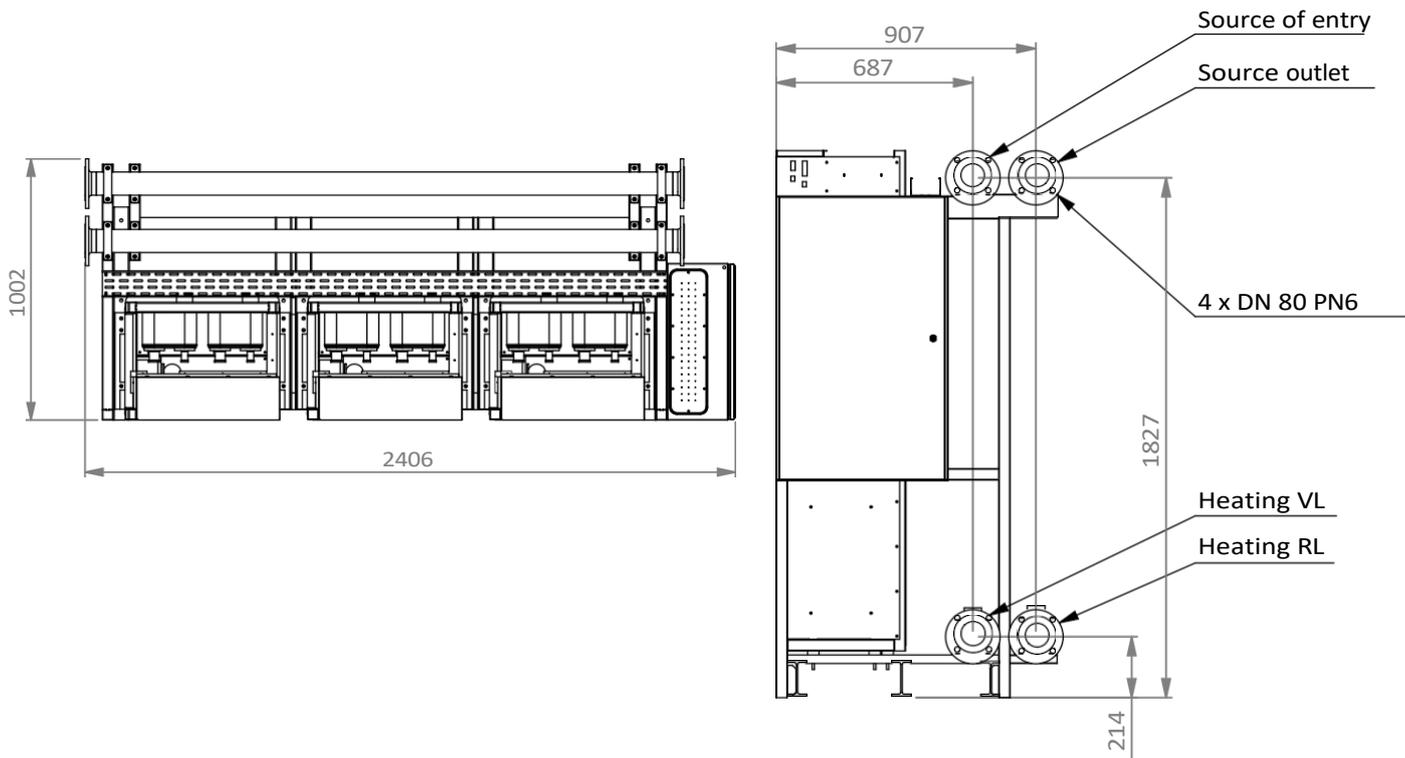
### Storage conditions:

- Ensure that the device is stored in a frost-free environment.

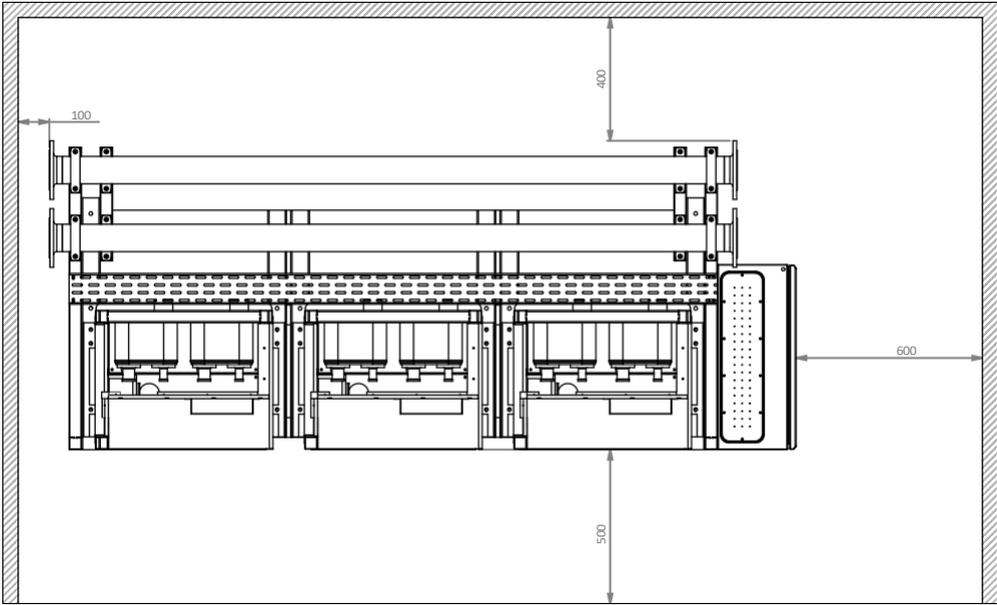
### Installation conditions:

- A floor drain must be provided to protect against water damage.
- The ratiotherm WP Max-Hiq/LoQ heat pump must be installed on a stable, level surface.
- The ratiotherm WP Max-Hiq/LoQ heat pump must be installed in a clean, ventilated and dry location.
- The location must have a constant temperature of 10 °C to 35 °C.
- The minimum distances must be observed for maintenance reasons.
- Depending on the installation location, a sound-insulated base is recommended.
  - Our recommendation: Getzner Sylomer.





### 5.3 MAINTENANCE AREA



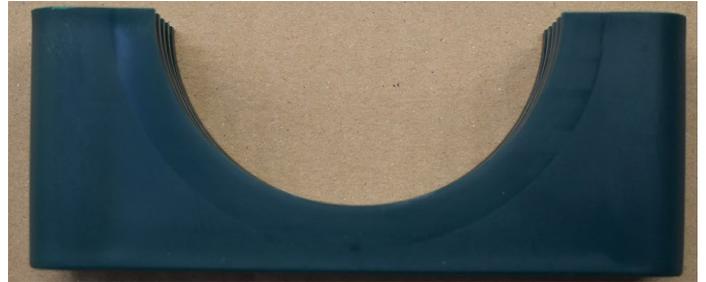
## 5.4 ASSEMBLY INSTRUCTIONS

Parts list:

No.	Description	Quantity	Image
1	IPE beam	3	
2	U-profile, length 816 mm	2	
3	U-profile, length 736 mm	4	
4	Tube holder	2	
5	Side supports	2	
6	Hexagon screw M10x95	8	
7	Hexagon screw M10x25	22	
8	Hexagon screw M8x60	8	
9	Hexagon screw M8x50	18	
10	Hexagon screw M8x15	18	
11	Hexagon screw M6x125	16	
12	Washer 10.5 x 30	48	
13	Washer 10.5 x 20	22	
14	Washer 8.5 x 24	52	
15	Washer 6.5 x 20	16	
16	Snap ring M10	30	
17	Snap ring M8	44	

18	Snap ring M10	30
19	Nut M10	8
20	Nut M8	18

21	Rubber buffer 40x40 M8 IG/IG	16
----	------------------------------	----



22	Cover plates Clamping jaws	8
----	----------------------------	---



23	Electrical control cabinet	1
----	----------------------------	---

24	DN80 pipe Heating VL (number 1)	1
----	---------------------------------	---



25	DN80 pipe heating RL (number 2)	1
----	---------------------------------	---



26	DN80 pipe source inlet (number 3)	1
----	-----------------------------------	---



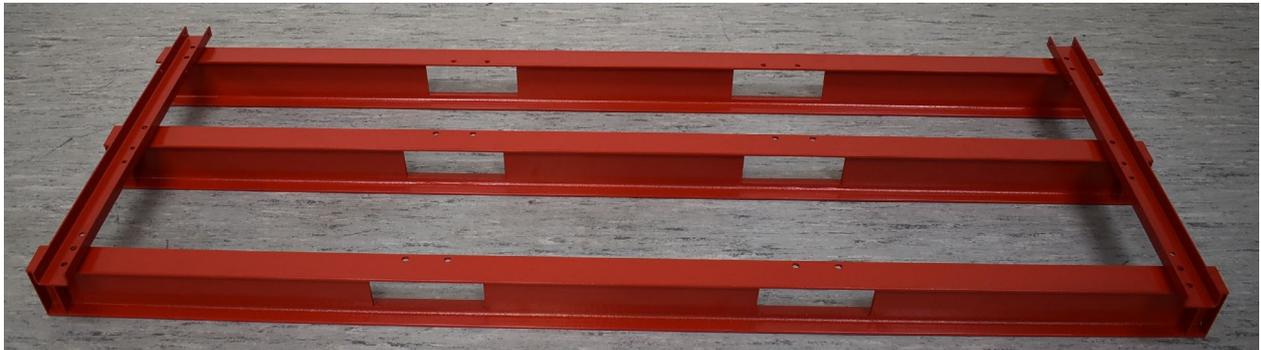
27	Pipe DN80 source inlet (number 4)	1
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**Step 1:** Lay out 3x IPE beams: The stop for the square pipe must face forwards on the front two IPE beams and backwards on the rear beam.



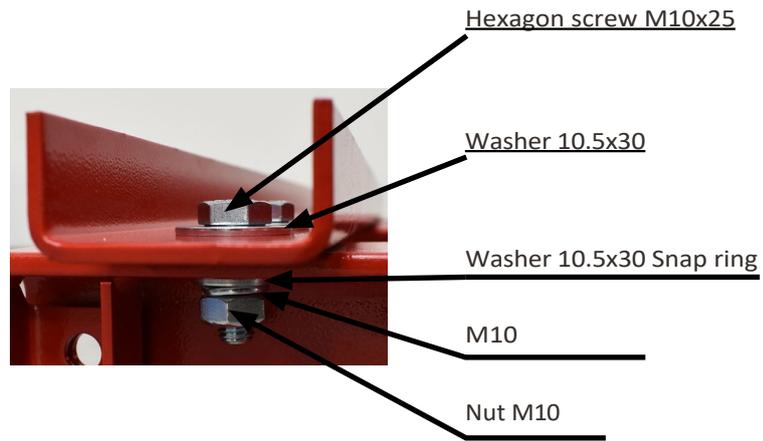
**Step 2:** Place 2x U-profiles with a length of 816 mm on the left and right: The end with 3 holes must face forwards.



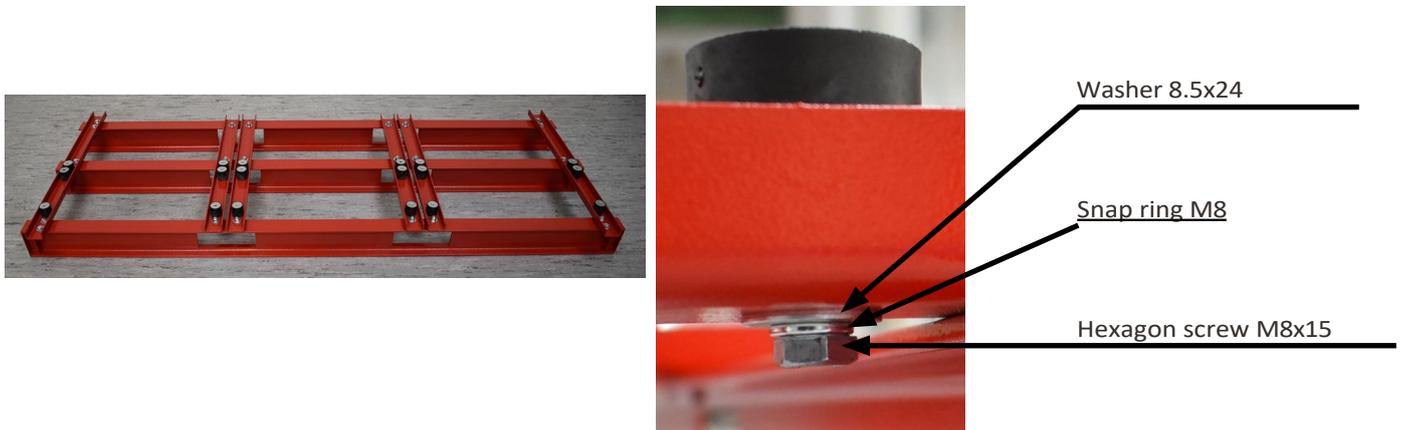
**Step 3:** Place 4 x 736 mm U-profiles in the middle: the end with 2 holes must face forwards.



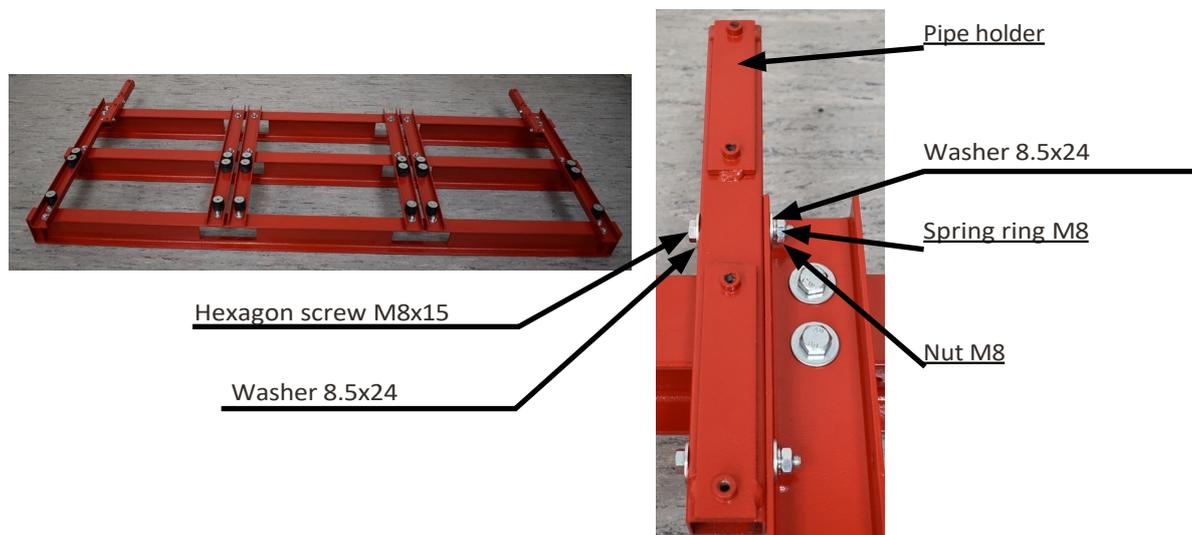
**Step 4:** Screw the U-profiles in place: Use 22x M10x25 and 22x washers 10.5x30 from above and 22x washers 40x5x20, 22x snap rings M10 and 22x nuts M10.



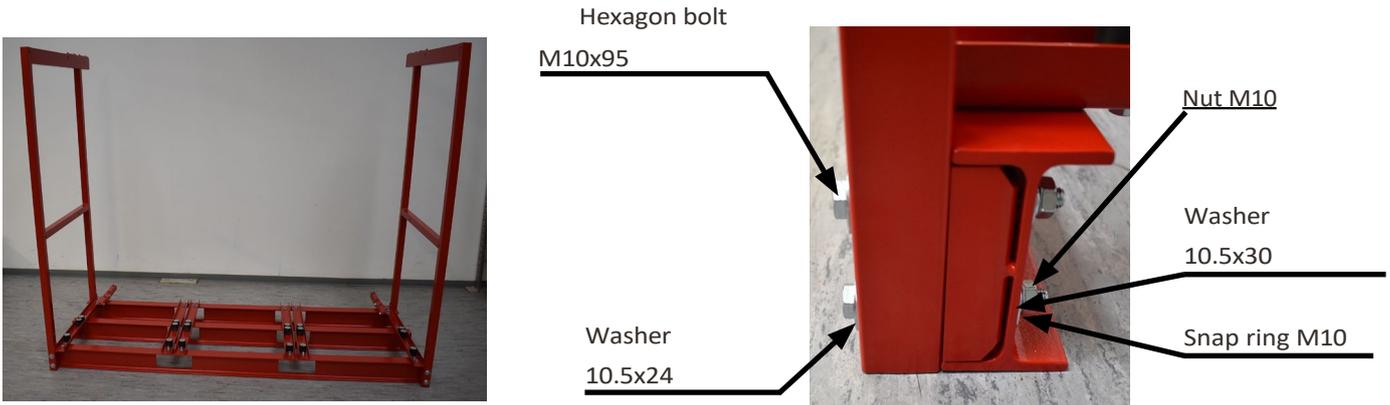
**Step 5:** Place 18x rubber buffers on through holes D9.5 in the U-profiles and screw them in place from below using 18x hexagon screws M8x15, 18x snap rings M8 and 18x washers 8.5x24.



**Step 6:** Screw on 2x pipe holders with 4x hexagon screws M8x60, 8x washers 8.5x24 and 4x snap rings M8.



**Step 7:** Screw 2x side supports to the left and right of the base frame: Use 8x hexagon screws M10X95; 16x washers 10.5x30, 8x snap rings M10 and 8x nuts M10.



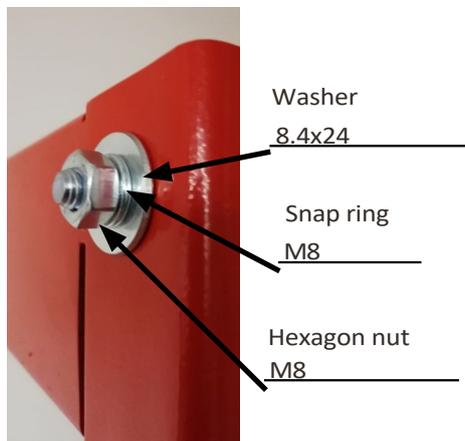
**Step 8:** Mount the control cabinet on the desired side of the substructure, either left or right (here on the right), using 4x M8x55 hexagon bolts, 8x 8.4x24.4 washers, 4x M10 snap rings and 4x M8 nuts.



Inside top:



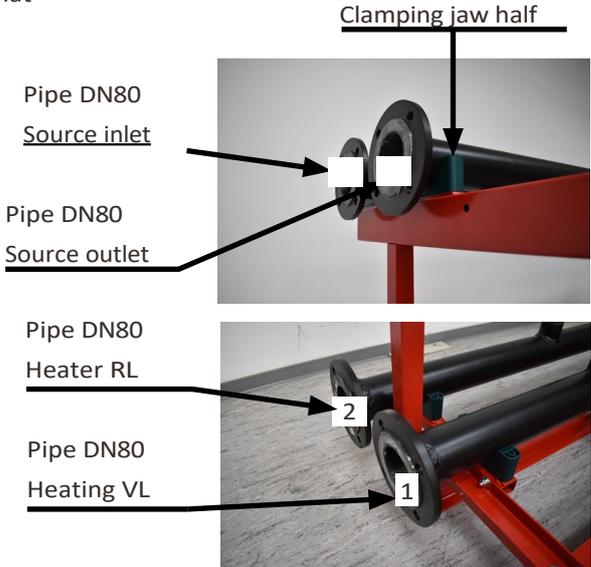
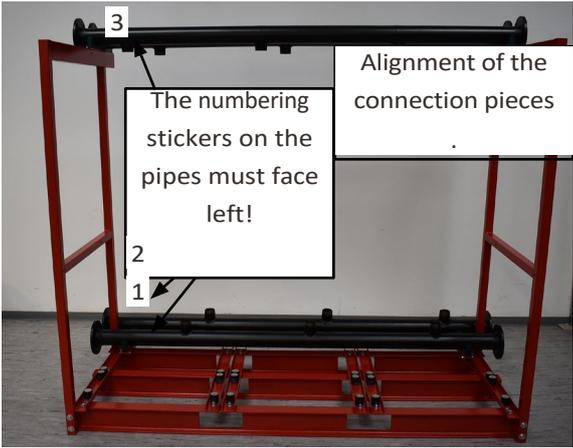
Rear:



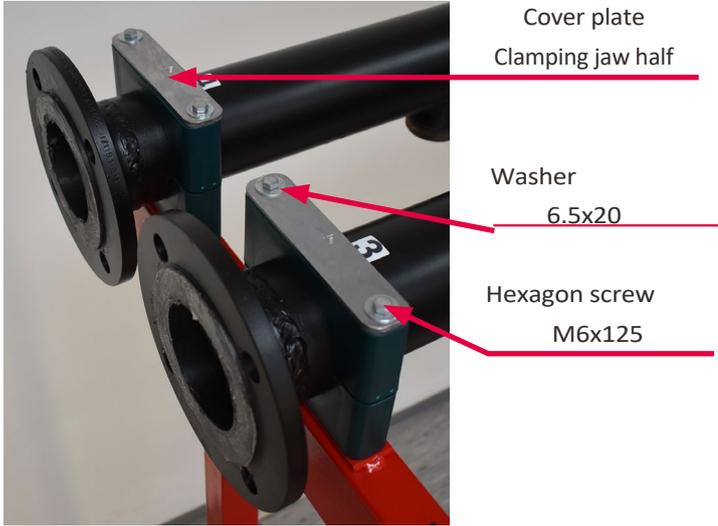
Inside bottom:



**Step 9:** Place the 4x DN80 pipes with 8x clamp jaw halves. Ensure that the pipes are in the correct position!



**Step 10:** Secure the pipes with 8x clamp jaw halves, 8x clamp jaw cover plates, 16x M6x125 hexagon screws and 16x 6.5x20 washers.



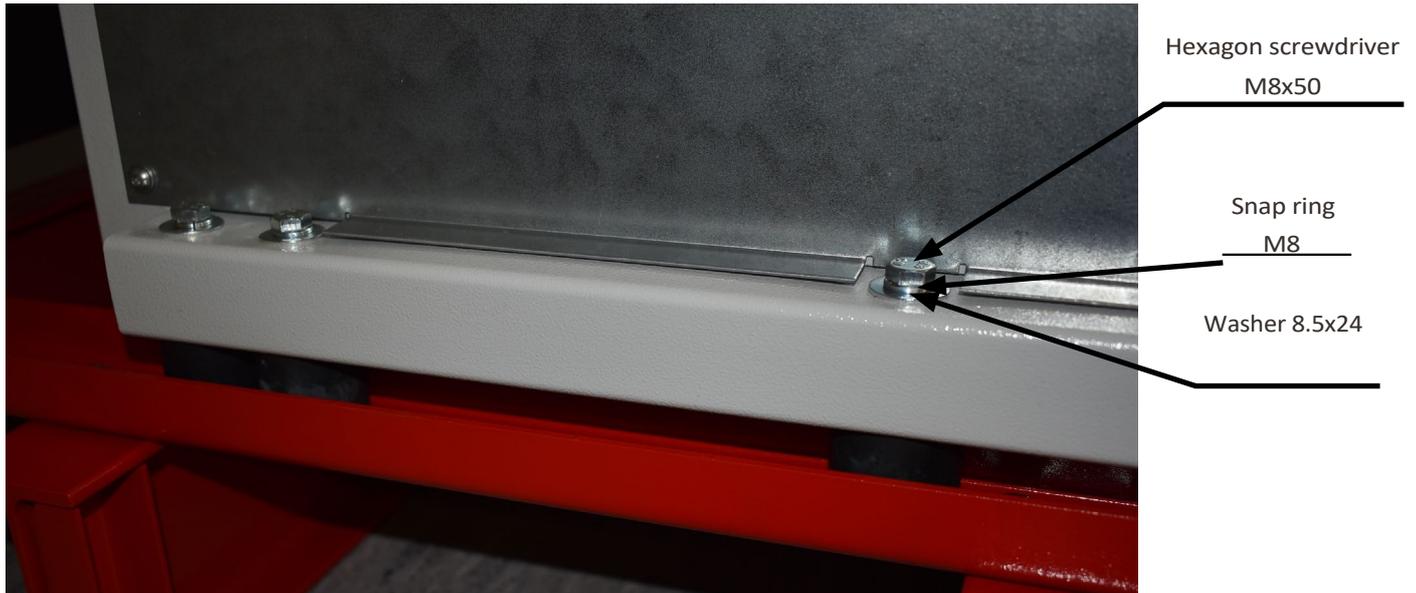
**Step 11:** Inserting the refrigeration units  
Ensure that the stages are correctly assigned!



Rods/pipes (max. 33 mm OD) can be used for setting up. **Please secure them to prevent slipping!**



**Step 12:** Fixing the refrigeration units with 18x M8x50 hexagon bolts, 18x M8 snap rings and 18x 8.5x24 washers

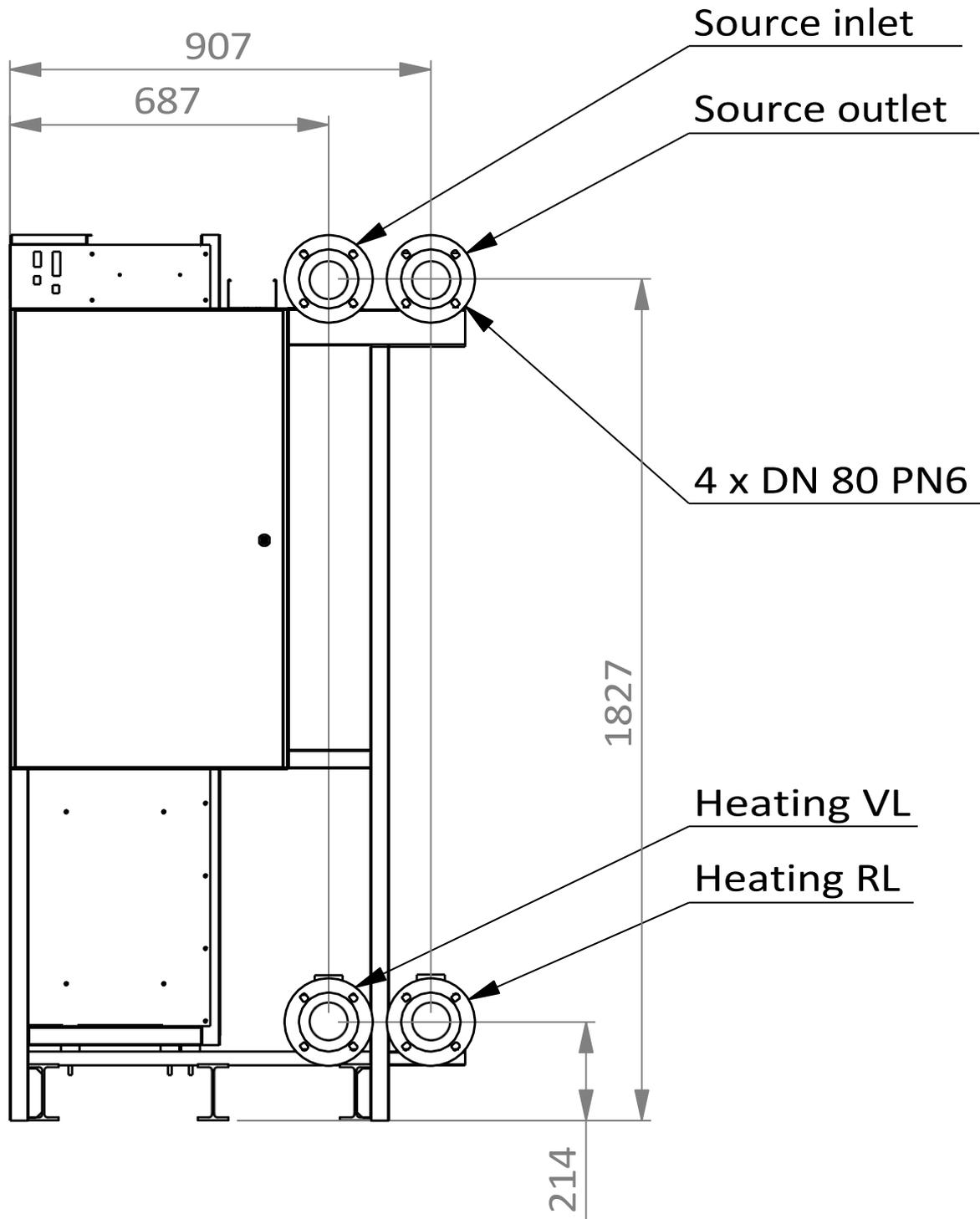


**Step 13:** Establish electrical connection between refrigeration units and electrical box (plug connections are coded).

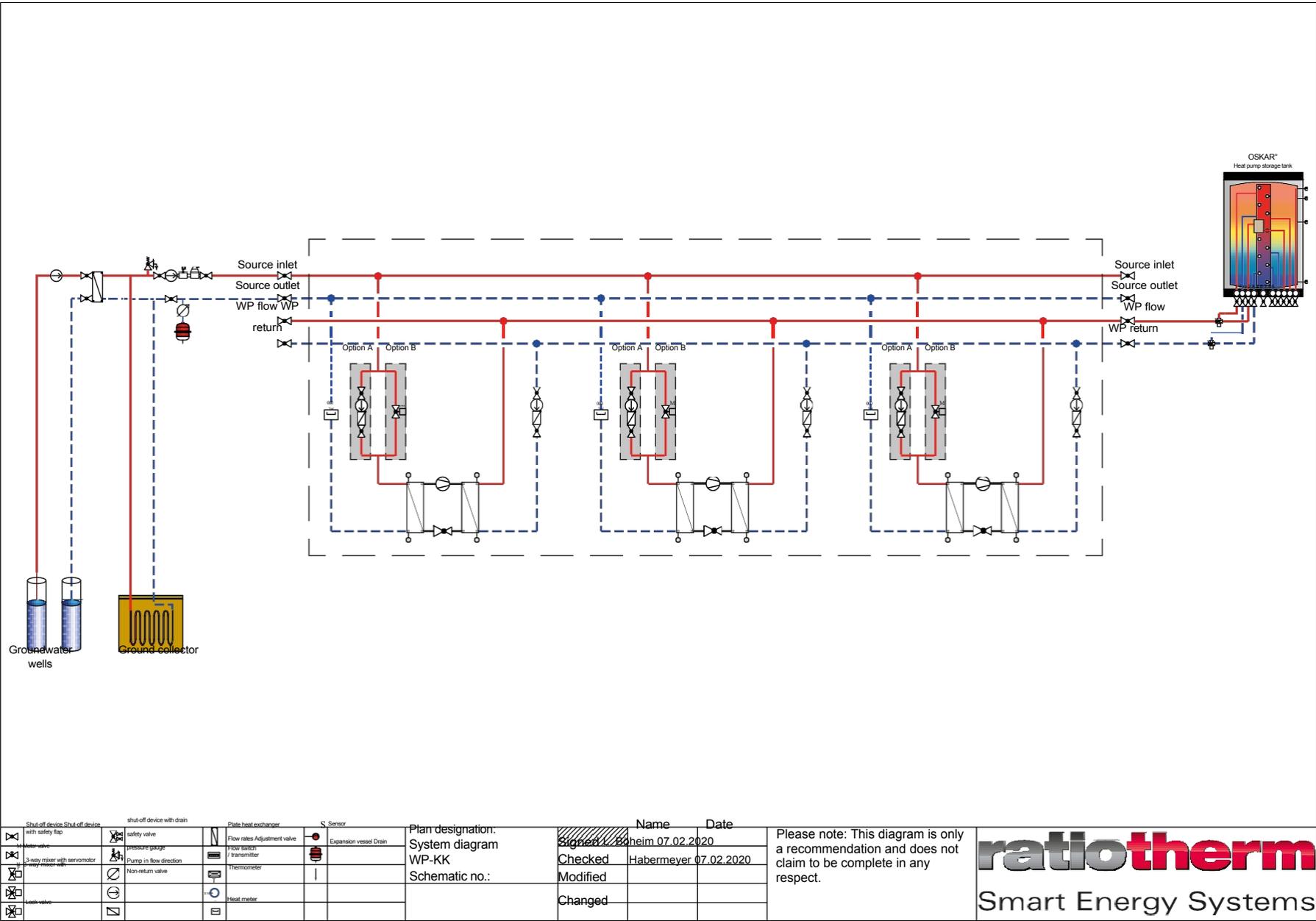
**Step 14:** Install the hydraulic assemblies and check for leaks. Connect the pumps and valves if necessary.

## 5.5 HYDRAULIC INSTALLATION

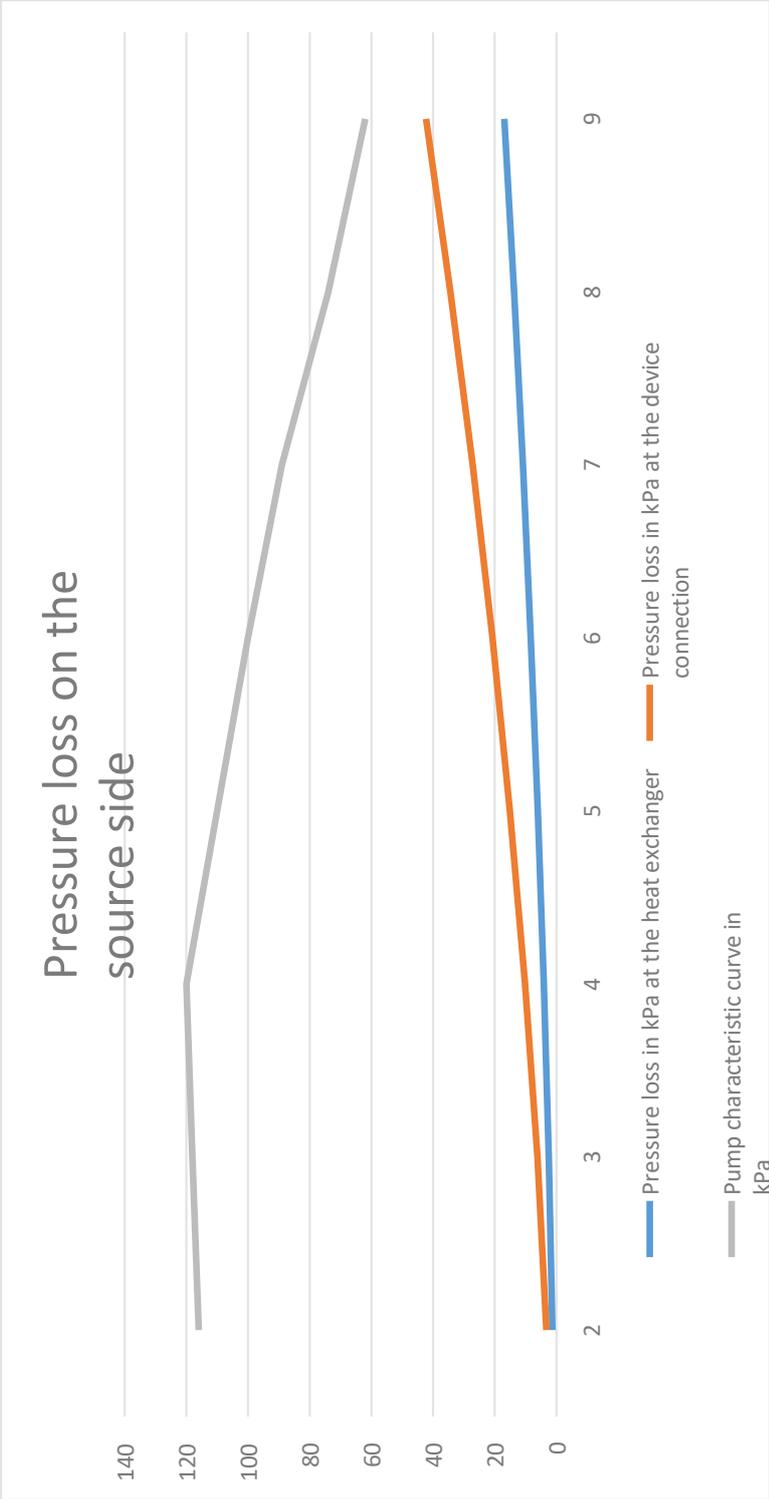
- Shut-off valves and vents must be provided on site.
- Sludge separators and magnetite separators must also be installed on site.
- The system must be filled via the return line.



5.5.1 HYDRAULIC DIAGRAM



5.5.2 PRESSURE LOSS DIAGRAM ON THE SOURCE SIDE



### 5.5.3 REQUIREMENTS FOR THE SOURCE CIRCUIT MEDIUM

Parameters	Unit	Concentration	Copper soldered	Stainless steel	Screwed
pH	/	< 6.0	-	°	°
		6.0 - 7.5	°	+	+
		7.5 - 8.5	+	+	+
		8.5 - 10.0	°	+	+
		> 10	°	+	+
Conductivity	µS/cm	< 10	+	+	+
		10 - 500	+	+	+
		500 - 1,000	°	+	+
		> 1,000	-	+	+
Chloride	mg/L	< 10	+	+	+
		10 - 50	+	+	+
		50 - 80	+	+	+
		80 - 100	+	+	+
		100 - 1,000	°	°	°
Free chlorine	mg/L	< 0.5	+	+	+
		0.5 - 1.0	+	+	°
		1.0 - 5.0	°	°	-
		> 5.0	-	-	-
Total hardness	°dH	< 5	+	+	+
		5 - 15	+	+	+
		15 - 30	°	+	+
		> 30	-	+	+
Ammonia (NH <sub>3</sub> , NH <sub>4</sub> <sup>+</sup> )	mg/L	< 2	+	+	+
		2 - 20	°	+	+
		> 20	-	+	+
Alkalinity (HCO <sub>3</sub> <sup>-</sup> )	mg/L	< 60	+	+	+
		60 - 300	+	+	+
		> 300	°	+	+
Sulphate (SO <sub>4</sub> <sup>2-</sup> )	mg/L	< 100	+	+	+
		100 - 300	°/-	+	+
		> 300	-	+	+
HCO <sub>3</sub> <sup>-</sup> / SO <sub>4</sub> <sup>2-</sup>	mg/L	> 1.5	+	+	+
		< 1.5	°/-	+	+
Nitrates (NO <sub>3</sub> <sup>-</sup> )	mg/L	< 100	+	+	+
		> 100	°	+	+
Hydrogen sulphide (H <sub>2</sub> S)	mg/L	< 0.05	+	+	+
		> 0.05	°/-	+	+
Free carbon dioxide (CO <sub>2</sub> )	mg/L	< 5	+	+	+
		5 - 20	°	+	+
		> 20	-	+	+
Manganese	mg/L	< 0.1	+	+	+
		> 0.1	°	+	+
Iron (Fe)	mg/L	< 0.2	+	+	+
		> 0.2	°	+	+
Aluminium	mg/L	< 0.2	+	+	+
		> 0.2	°	+	+

Depending on the water quality of the well, the use of a safety heat exchanger is recommended. Based on the water quality found, the table can be used to decide whether and which safety heat exchanger should be used. If the properties are not optimal for more than two criteria (°) or if one criterion does not meet the minimum requirement (-), the use of the respective type should be avoided.

#### 5.5.4 REQUIREMENTS FOR HEATING WATER

Parameter	Unit	Concentration	Copper
pH value	/	< 6.0	-
		6.0 - 7.5	°
		7.5 - 8.5	+
		8.5 - 10.0	°
		> 10	°
Conductivity	µS/cm	< 10	+
		10 - 500	+
		500 - 1,000	°
		> 1,000	-
Chloride	mg/L	< 10	+
		10 - 50	+
		50 - 80	+
		80 - 100	+
		100 - 1,000	°
		> 1,000	-
Free chlorine	mg/L	< 0.5	+
		0.5 - 1.0	+
		1.0 - 5.0	°
		> 5.0	-
Total hardness	°dH	< 5	+
		5 - 15	+
		15 - 30	°
		> 30	-
Ammonia (NH <sub>3</sub> , NH <sub>4</sub> <sup>+</sup> )	mg/L	< 2	+
		2 - 20	°
		> 20	-
Alkalinity (HCO <sub>3</sub> <sup>-</sup> )	mg/L	< 60	+
		60 - 300	+
		> 300	°
Sulphate (SO <sub>4</sub> <sup>2-</sup> )	mg/L	< 100	+
		100 - 300	°/-
		> 300	-
HCO <sub>3</sub> <sup>-</sup> / SO <sub>4</sub> <sup>2-</sup>	mg/L	> 1.5	+
		< 1.5	°/-
Nitrates (NO <sub>3</sub> <sup>-</sup> )	mg/L	< 100	+
		> 100	°
Hydrogen sulphide (H <sub>2</sub> S)	mg/L	< 0.05	+
		> 0.05	°/-
Free carbon dioxide (CO <sub>2</sub> )	mg/L	< 5	+
		5 - 20	°
		> 20	-
Manganese	mg/L	< 0.1	+
		> 0.1	°
Iron (Fe)	mg/L	< 0.2	+
		> 0.2	°
Aluminium	mg/L	< 0.2	+
		> 0.2	°

**NOTE:** The system water may contain a maximum of 50% glycol.

**NOTE:** Ensure that the system water meets all requirements. If the properties are not optimal (°) for more than two criteria or if one criterion does not meet the minimum requirement (-), **no** warranty claim can be made.

## 5.6 ELECTRICAL INSTALLATION



### **DANGER!**

- The power supply to the heater comes from the control cabinet and must be protected by a type B residual current device with a tripping current of **300 mA (RCD)**, **10 ms short-time delay** and with the appropriate power rating. Recommendation: ABB F204B-80/0.3
- The RCD must be marked separately for the heater, e.g. as "WP". Please ensure that the phase/neutral conductor is correctly assigned during cabling.
- The 400 V and 230 V supply must go through the same RCD, but must be protected individually by circuit breakers.
- Ensure that the rotating field is clockwise.
- The device must be earthed.
- Use a cable cross-section that is suitable for the power rating of the heater.
- The electrical installation must comply with the applicable standards and generally accepted technical rules.
- Never work on the hydraulics or mechanics of the device while it is live.
- The same applies when filling or subsequently pressurising.
- Even if the main switch of the device is switched off, the cable terminal is still live.
- To completely disconnect the device from the mains, the RCD circuit breaker in the control cabinet must be switched off.
- Maintenance work may only be carried out by an authorised person.
- Never short-circuit the safety pressure limiter of the heat pump.

### 5.6.1 TERMINAL DIAGRAM AND DESCRIPTION

- Terminal range X1.L1 to X1.L3 is intended for the compressor supply. X1.2 is intended for supplying the control system and the pump.
- X3.5 and X3.7 are used to process a signal from the grid operator/energy supplier. X3.5 is backwards compatible with the EVU contact.
- Please wire the EVU contact as a normally open contact (EVU lock active, then closed).
- X1.1 to X1.16 are used to connect the modules.
- X1.16 serves as a fault output and outputs 230 V in the event of a fault.
- X1.20 is used to control a source pump.

X1																
L1	L2	L3	N	PE	L	N	PE	PA	1	2	3	N	PE	4	N	PE
400 V mains compressor					230 V mains Control/pumps			Potential equalisation	Compressor WPU. 1				Control WPU. 1			

X1															
5	6	7	N	PE	8	N	PE	9	10	11	N	PE	12	N	PE
Compressor WPU. 2					Control WPU. 2			Compressor WPU. 3				Control WPU. 3			

X1					
13	N	PE	14	N	PE
Fault 230 V			Source pump 230 V		

X3											
1	2	3	4	5	6	7	8	9	10	11	12
0 - 10 V	GND	S1	GND	S2	GND	S3	GND	S4	GND	S5	GND
Operating signal (0 - 10 V)		WPU request		Smart Grid 1 / EVU approval		Smart Grid 2		0 - 10 V Target speed / target temperature		Total flow temperature	

X3								X7	
13	14	21	22	23	24	19	20	1	2
S6	GND	12 V	GND	CAN-H	CAN-L	M-Bus	GND	CAN-H	CAN-L
Return temperature total		CAN bus (connection to RT-GLT)				M-Bus		CAN bus to heat pump module	

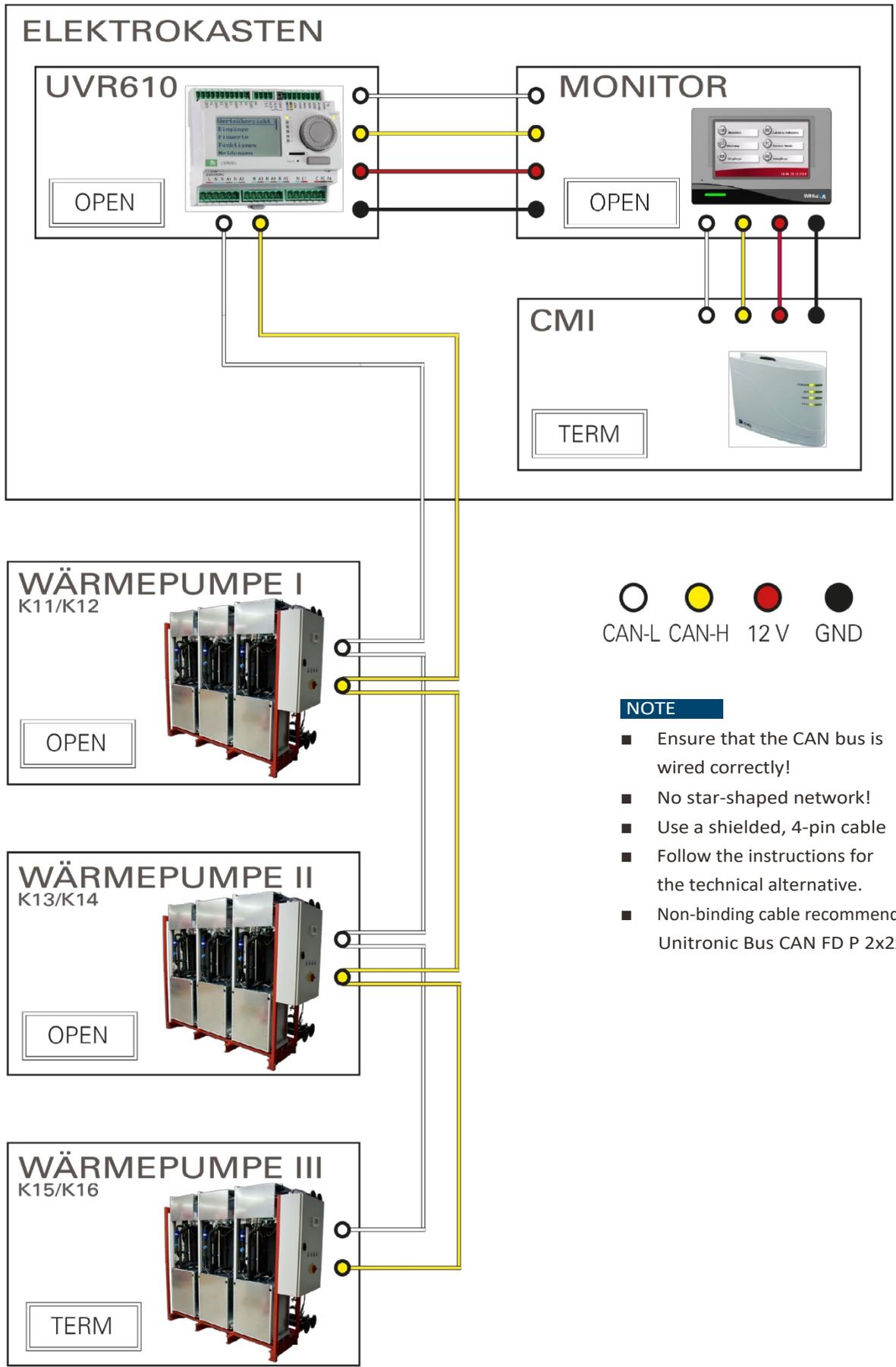
**Electrical connection ratings:**

- 400 V compressor C80
- 230 V Control B16

\*Fuse protection depending on type and number of individual modules

\*See appendix to the original operating instructions, chapter 4.3 Wiring diagram

### 5.6.2 CAN BUS PLAN



○    ●    ●    ●  
CAN-L CAN-H 12 V GND

**NOTE**

- Ensure that the CAN bus is wired correctly!
- No star-shaped network!
- Use a shielded, 4-pin cable
- Follow the instructions for the technical alternative.
- Non-binding cable recommendation: Unitronic Bus CAN FD P 2x2x0.5

# 6. OPERATION

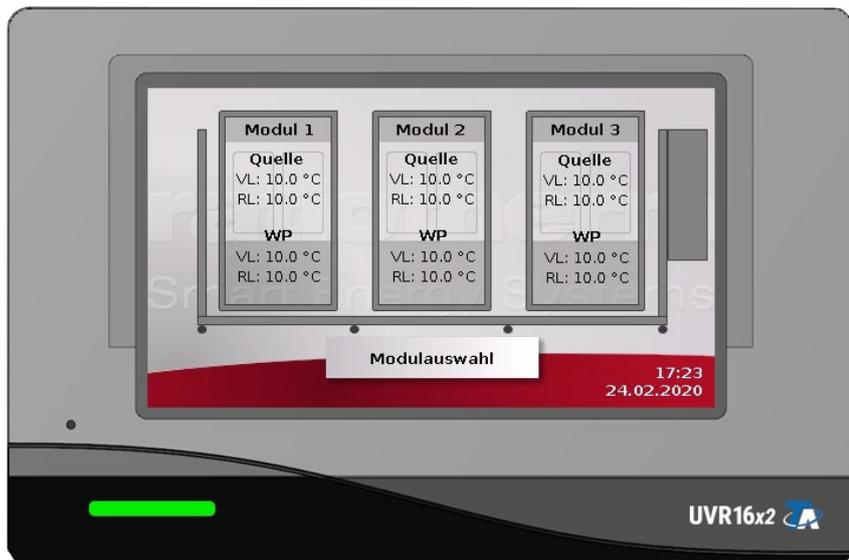
## 6.1 INTERFACES

Outputs (from module 1 to peripherals)					CAN bus		Modbus TCP
Designation	Unit of measurement	Min	Max	Description	Internal	External	
<b>Digital</b>							
Compressor active	ON / OFF	0	1	When the compressor is running, the signal becomes active.	11 / 10		According to customer requirements
Fault collection message	ON / OFF	0	1	If there is an error or fault, the signal becomes active.	11 / 9		
Frost protection fault	ON / OFF	0	1	If there is a frost protection fault (fault = system locked), the signal becomes active.	11 / 4		
Frost protection error	ON / OFF	0	1	If there is a frost protection error (error acknowledges itself), signal becomes active.	11 / 3		
HD fault	ON / OFF	0	1	If a high pressure fault occurs (fault = system locked), the signal becomes active.	11 / 6		
HD error	ON / OFF	0	1	If there is a high pressure error (error acknowledges itself), signal becomes active.	11 / 5		
ND fault	ON / OFF	0	1	If there is a low pressure fault (fault = system locked), the signal becomes active.	11 / 8		
ND error	ON / OFF	0	1	If there is a low pressure error (error acknowledges itself), the signal becomes active.	11 / 7		
Inverter fault	ON / OFF	0	1	If there is an inverter fault (fault = system locked), the signal becomes active.	11 / 11		
Power reduction	ON / OFF	0	1	If the system is in power reduction mode, the signal becomes active.	12 / 4		
<b>Analogue</b>							
High pressure	bar	0	40	Current high pressure value of the refrigeration circuit	11 / 1		According to customer requirements
Low pressure	bar	0	15	Current low pressure value of the refrigeration circuit	12		
T-WP VL	°C	-273	99	Current flow temperature of the heat pump	11		
T-WP RL	°C	-273	99	Current return temperature of the heat pump	11		
T-source inlet	°C	-273	99	Current inlet temperature of the source	11		
T-source outlet	°C	-273	999	Current outlet temperature of the source	11		
Evaporator volume flow	L/h	0	10	Current volume flow on source side	12		

TU\_D\_WP\_Max\_HIQ&LoQ-KK\_2025-04\_GB - All information, images and drawings are subject to errors and changes. The generally applicable and recognised rules of technology must be observed at all times!  
ATTENTION! Installation and wiring may only be carried out by authorised specialist personnel.

## 6.2 CONTROLLER OPERATION

The rZR16x2 is operated via a 4.3" touch screen. For easier handling, a stylus is provided, which is inserted above the controller (under the cover). The stylus can be used to tap on control surfaces and scroll through the display view by sliding the scroll bar. Selecting one of the windows takes you to the corresponding submenu.



The indicator light can display various statuses:

- Red steady light - The controller is booting up (=start-up routine after switching on, a reset or update) or displaying a message that has not yet been deleted.
- Orange steady light - Hardware initialisation after booting.
- Green steady light - Normal operation of the controller.
- Green flashing – After hardware initialisation, the controller waits approx. 30 seconds to receive all the information necessary for operation (sensor values, network inputs).

### 6.2.1 CONTROLS



Previous page



Main menu



Next page

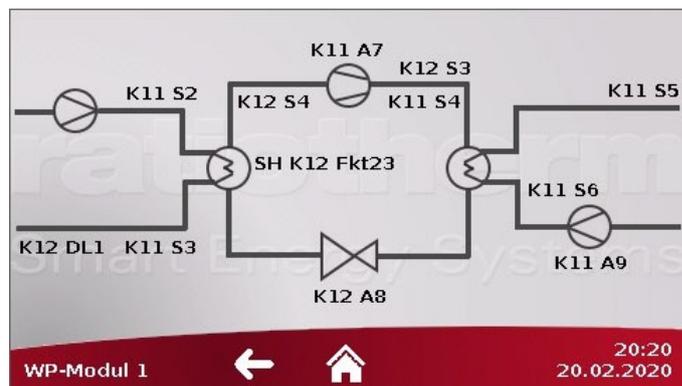
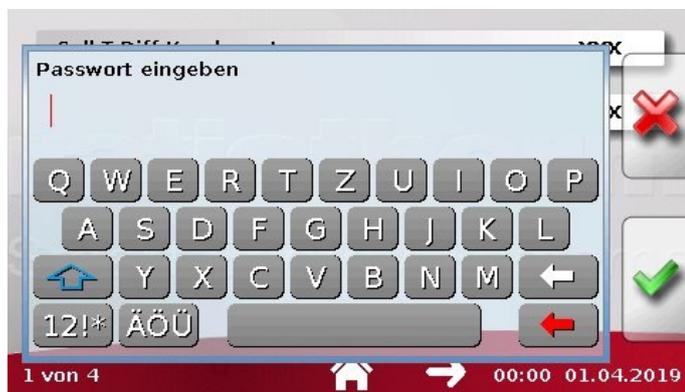
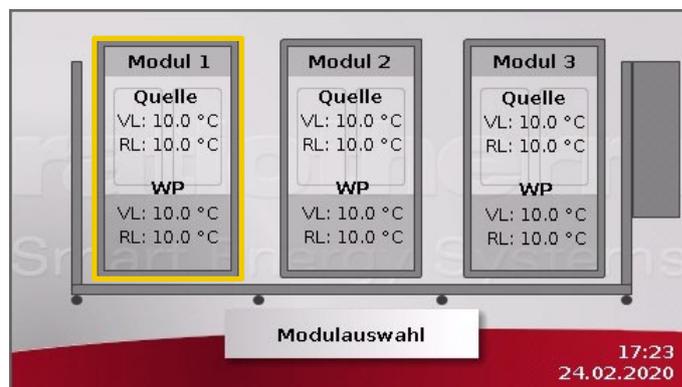
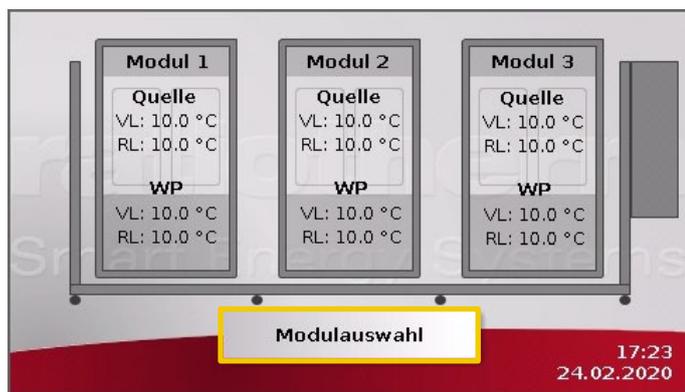
### 6.2.2 CONTROL SWITCH

ON/OFF switch

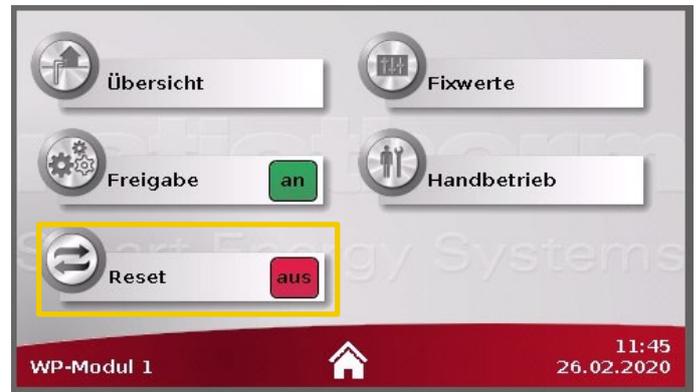
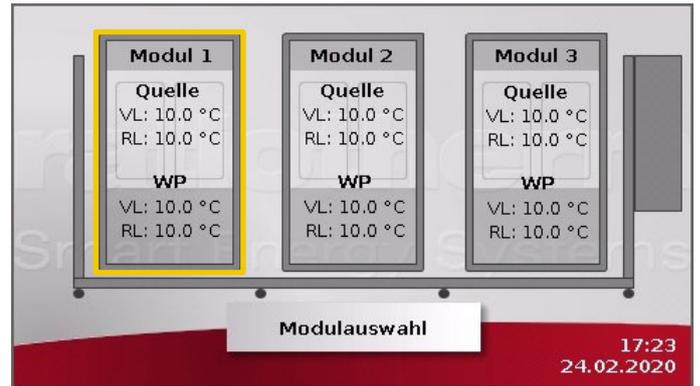
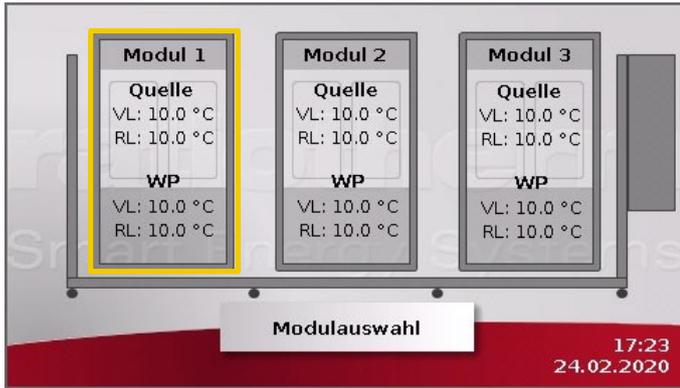


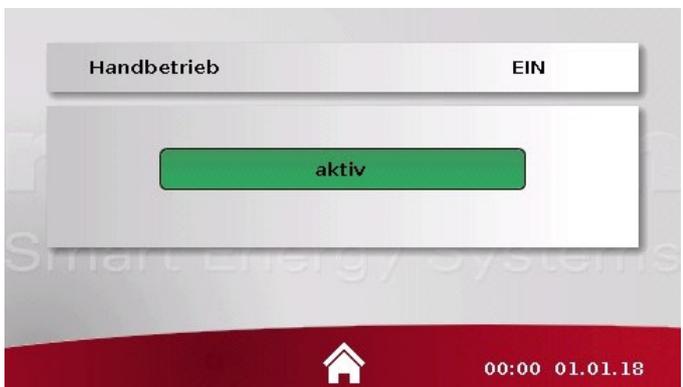
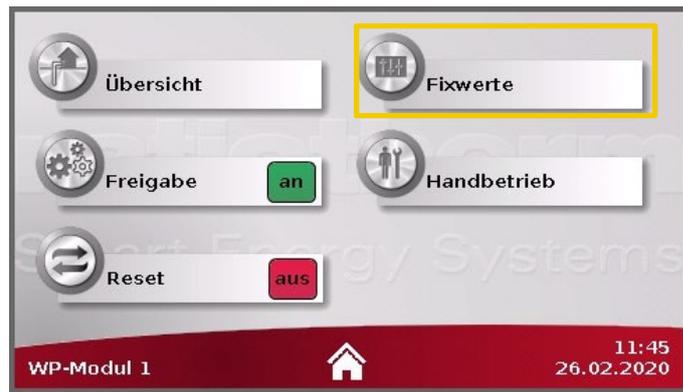
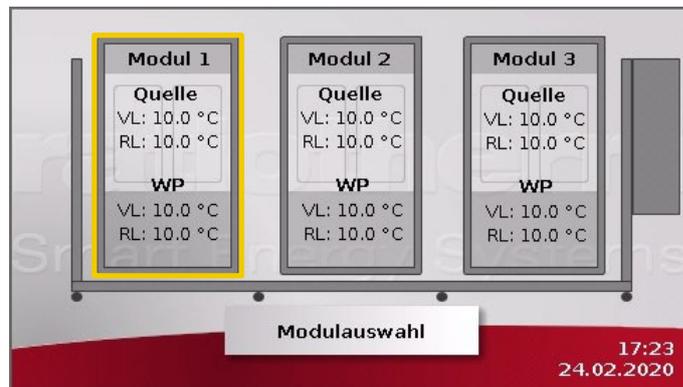
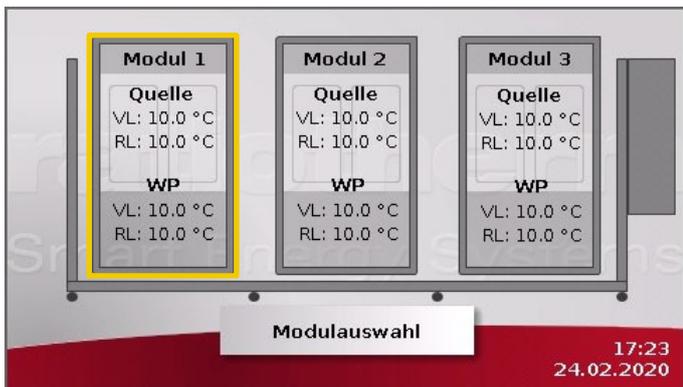
### 6.2.3 MENU STRUCTURE

Designation	Symbol	Description
On this surface Press		Yellow frame
Shows the path		Yellow arrow
Shows the path on the next page on		Yellow line



By tapping on the modules, the values for each heat pump can be viewed individually.







T-Verdampfer Maximum	XXX
T-Verdampfer Minimum	XXX
Soll-Überhitzung	XXX
Start-Öffnung Ex-Ventil	XXX
T-Soll Verda. Eintritt	XXX
Soll-T-Diff Verdampfer	XXX

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Drehzahl Leistungsreduzierung	XXX
Grenze Hochdruck	XXX
Grenze Niederdruck	XXX
Grenze Frostschutz	XXX
Zeit bis Störung	XXX

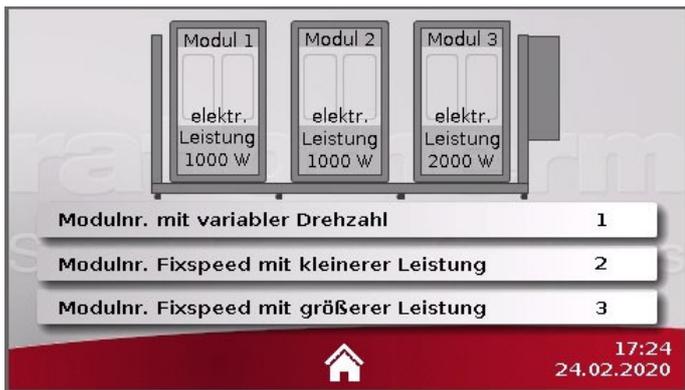
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Zeit ND/HD-Fehler	XXX
ND Notlauf	XXX
HD Notlauf	XXX
T-Verd.-Austritt Notlauf	XXX
Zeit Frostschutz-Fehler	XXX
Zeit bis Störung	XXX

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## 6.2.4 MENU DESCRIPTION



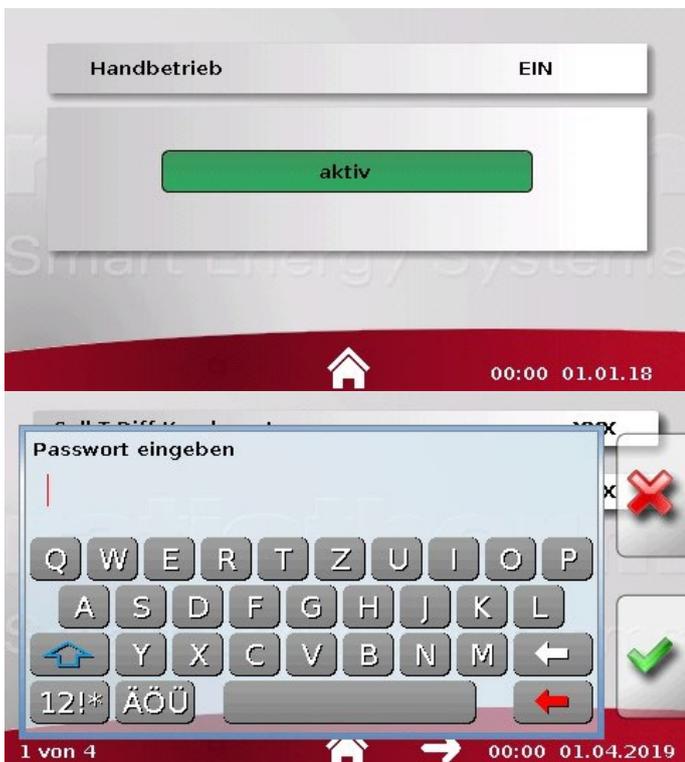
### Module selection

The specialist password allows you to access the module selection. By tapping on "Module number....." or "1000 W", numbers and electrical outputs can be assigned to the individual modules.



### Reset

Reset all values to factory settings



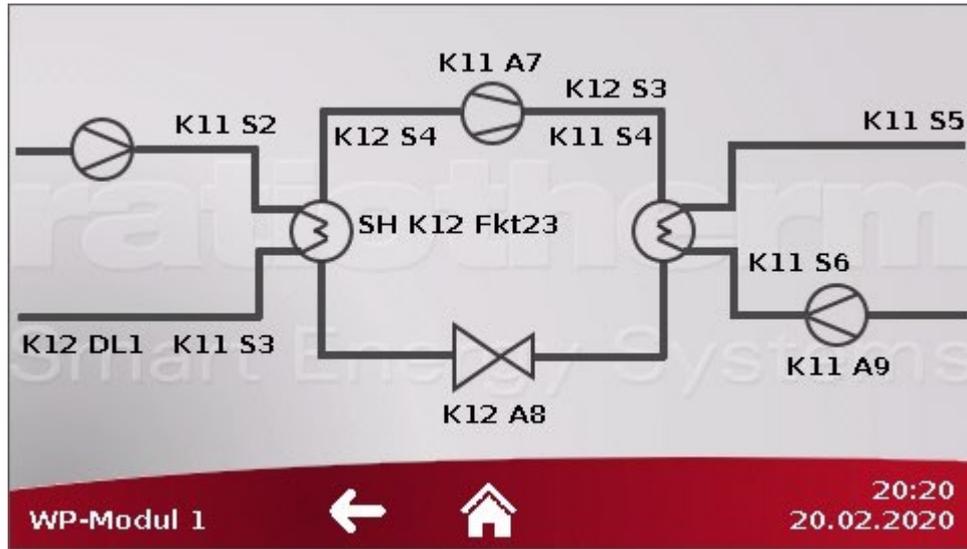
### Manual mode: A

Forced start of the stage regardless of the request signal

### Enter password

Enter the specialist password to access the specialist menu.

Overview is the same for all heat pump modules



K11 S2	T evaporator inlet
K11 S3	T evaporator outlet
K11 S4	High pressure
K11 S5	T. Heat pump VL
K11 S6	T. Heat pump RL/Reset
K11 A7	Compressor 0-10 V
K11 A9	Condenser pump PWM
K12 S3	Inverter fault/heating gas
K12 S4	Low pressure
K12 A8	Ex valve PWM
K12 DL1	Volume flow source SH
K12 Fkt23	Actual overheating

## 6.3 SETTINGS



### Fixwerte

Fixed values	Description	Setting options	Default
<b>Operator and user</b>			
Electrical power module 1	Electrical power of HP module 1 in watts	0 to 30,000	100
Electrical power module 2	Electrical power of WP module 2 in watts	0 to 30000	1000
Electrical power module 3	Electrical power of WP module 3 in watts	0 to 30000	2000
Module number va. Speed	WP module with variable speed	1 to 3	1
Module number Fixed speed min	WP module with fixed speed min.	1 to 3	2
Module number Fixed speed max	WP module with fixed speed max.	1 to 3	3
0 -10 V Temperature setting	Setting for processing the 0-10 V signal: OFF: 0 - 10 V signal is evaluated as target speed : 0 V = 0% 10 V = 100%	OFF / ON	OFF
Target T-Diff capacitor	Target temperature difference at condenser	1 °C to 10 °C	8 °C
Target speed Verdi. Fixed	Target speed of the compressor when no external speed signal is present.	0% to 100%	75
<b>Qualified personnel</b>			
T evaporator Maximum	Maximum permissible Evaporator temperature	35 °C to 70 °C	55 °C
T-evaporator minimum	Minimum permissible evaporator temperature	4 °C to 20 °C	11 °C
Target superheat	Setpoint superheat of the expansion valve in the outdoor unit during normal operation	0 °C to 10 °C	7.3 °C
Start opening of expansion valve	Start opening of the expansion valve in the outdoor unit	Levels 0 to 500	Step 375
T-setpoint evaporator inlet	Desired evaporator inlet temperature (mixer temperature injection circuit)	10 °C to 30 °C	30 °C
Target T-Diff evaporator	Target temperature difference between evaporator inlet and outlet	1 °C to 8 °C	3.5 °C
Speed Power reduction	Compressor speed during power reduction power reduction is active	Steps 0 to 100	Level 45

Fixed values	Description	Setting options	Default
<b>Specialist</b>			
High pressure limit	Maximum pressure at which a high pressure error or high pressure fault is triggered is triggered.	20 bar to 26 bar	24 bar
Low pressure limit	Minimum pressure at which an LP fault or LP malfunction is triggered	0.8 bar to 5 bar	0.8 bar
Frost protection limit	Minimum temperature at which a frost protection error or frost protection malfunction is triggered.	4 °C to 12 °C	8 °C
Time ND/HD error	Time lock for restart if ND/HD error has occurred	0 to 24 h	5 min
ND emergency operation	Minimum pressure at which a temporary power reduction is triggered	0 bar to 10 bar	1 bar
HD emergency operation	Maximum pressure at which a temporary reduction in performance is triggered is triggered.	15 bar to 25 bar	22.8 bar
T.-Verd.-Outlet Emergency mode	Maximum discharge temperature of the compressor at which a temporary reduction in output is triggered	80 °C to 130 °C	110°C
Time frost protection error	Time lock for restart	0 to 24 h	7 min
Time until fault	If three faults occur within one hour, the machine switches off. machine switches off.	0 to 24 hours	60 min

## 7. MAINTENANCE

Regular inspection of the appliance by a recognised, qualified and ratiotherm-authorized specialist is essential to ensure continuous operational readiness, operational safety, reliability and a long service life. We recommend having maintenance carried out annually.

**NOTE:** We recommend taking out a maintenance contract.



### **WARNING**

#### **Improper handling**

Improper handling of the appliance can result in serious injury. **Never attempt to carry out maintenance and/or repairs on the appliance yourself.**

For maintenance work, commission a recognised, qualified specialist tradesman (specialist personnel) authorised by ratiotherm GmbH & Co. KG.

## 7.1 TROUBLESHOOTING

### 7.1.1 HIGH PRESSURE

Error message	HD error	HD fault
<b>Error description</b>	<b>High pressure protection of the refrigeration circuit has been triggered.</b>	
Behaviour of the heat pump	<ul style="list-style-type: none"> <li>■ System locked for 5 minutes</li> <li>■ If 3 faults occur within 60 minutes, switch to HD fault</li> </ul>	<ul style="list-style-type: none"> <li>■ Lock the system</li> <li>■ Unlock by pressing the reset button</li> </ul>
Cause of error	<ul style="list-style-type: none"> <li>■ Lack of heat dissipation</li> <li>■ Blockage of cooling circuit</li> <li>■ Heat sink too hot</li> </ul>	
Troubleshooting	<ul style="list-style-type: none"> <li>■ Check the sink temperature or target temperatures</li> <li>■ Temperatures below max. water temperature according to type plate</li> <li>■ Vent and check the heating pressure</li> <li>■ Refrigeration check</li> </ul>	

### 7.1.2 LOW PRESSURE

Error message	ND error	ND fault
<b>Error description</b>	<b>Low pressure protection of the refrigeration circuit has been triggered.</b>	
Behaviour of the heat pump	<ul style="list-style-type: none"> <li>■ System locked for 5 minutes</li> <li>■ If 3 faults occur within 60 minutes, switch to low pressure fault</li> </ul>	<ul style="list-style-type: none"> <li>■ Lock the system</li> <li>■ Unlock by pressing the reset button</li> </ul>
Cause of error	<ul style="list-style-type: none"> <li>■ Insufficient heat absorption</li> <li>■ Insufficient refrigerant charge</li> <li>■ Blockage of the refrigeration circuit</li> </ul>	
Troubleshooting	<ul style="list-style-type: none"> <li>■ Check heat absorption at the evaporator (flow rate, temperature); vent if necessary</li> <li>■ Refrigeration check</li> </ul>	

### 7.1.4 FROST PROTECTION

Error message	Frost protection error	Frost protection malfunction
<b>Fault description</b>	<b>Frost protection limit of the hydraulic circuit has been triggered.</b>	
Behaviour of the heat pump	<ul style="list-style-type: none"> <li>■ System lockout for 10 minutes</li> <li>■ If 3 faults occur within 60 minutes, switch to frost protection fault</li> </ul>	<ul style="list-style-type: none"> <li>■ System lockout</li> <li>■ Unlock by confirming the reset switch</li> </ul>
Cause of error	<ul style="list-style-type: none"> <li>■ Lack of heat absorption in the inner section</li> <li>■ Heat source too cold</li> </ul>	
Troubleshooting	<ul style="list-style-type: none"> <li>■ Check the heat source (temperature, pumps, heat exchanger)</li> <li>■ Vent</li> </ul>	

### 7.13 INVERTER

Error message	Inverter malfunction
<b>Fault description</b>	<b>Inverter fault contact does not close.</b>
Behaviour of the heat pump	<ul style="list-style-type: none"> <li>■ System lock</li> <li>■ Unlocking by pressing the reset switch</li> </ul>
Cause of fault	<ul style="list-style-type: none"> <li>■ No power supply</li> </ul>
Troubleshooting	<ul style="list-style-type: none"> <li>■ Check the power supply (clockwise rotation, phase failure)</li> <li>■ Check the error code (see appendix)</li> </ul>

## 72 CLEANING

### 721 CLEANING THE HEATING SIDE

- Cleaning: to be carried out by an installer.
- Flushing device: connection to the condenser's flow and return pipes.
- Condenser: flush against the normal flow direction (note gravity brake).

### 722 CLEANING THE HEAT PUMP

- The devices can be cleaned with a standard household cleaner (see below for exceptions).



#### NOTE

##### Improper cleaning

Using the wrong cleaning agents can damage the surfaces of the units.

##### Please observe the following instructions.

- Do not use abrasive or cleaning agents that could damage the plastic trim, fittings or controls.
- Do not use sprays, solvents or chlorine-based cleaning agents.
- Clean the heat pump casing with a damp cloth and a little soap.
- Avoid placing or leaning objects on or against the heat pump.

## 73 CHECKING THE HEAT PUMP FOR LEAKS

In accordance with Regulation (EC) No. 842/2006 on certain fluorinated greenhouse gases, the heat pump must be checked regularly for leaks. This check can be carried out by a recognised and qualified specialist (with certification as a refrigeration engineer or state-certified technician specialising in refrigeration technology). The following must be observed:

- DIN EN 378:2000 "Refrigerating systems and heat pumps – Safety and environmental requirements"
- VDMA Standard Sheet 24243 (August 2005) "Refrigerating machines and systems - Tightness of refrigeration systems and heat pumps - Leak detection/leak testing"



#### NOTE

##### Leak test

The test must be carried out in accordance with the plant logbook. The results of the test must be documented in accordance with regulations and kept for at least 5 years. In

"Asset register for heat pumps" contains an asset log for this purpose.

## 74 SYMBOLS ON THE DEVICE

In order to provide staff with important information and warnings, standardised safety symbols based on the DIN EN ISO 7010, DIN ISO 3864 and DIN ISO 7000 standards have been used. These safety symbols are:

- Clearly visible to all,
- Kept in a recognisable/legible condition and
- be replaced if necessary.

As the design of the device and the complexity of the production processes do not allow the use of persons with disabilities (e.g. with visual impairments) for safety reasons, the manufacturer has decided not to affix tactile symbols. The requirements for personnel and the technical qualifications required to operate the device are described in chapter "2.3 Target groups" on page 6.

## 75 MAINTENANCE PLAN

 **DANGER!** Do not operate the device if defects are found

Maintenance work	Measures	Interval
<b>Operators and users</b>		
Visual and functional inspection	<ul style="list-style-type: none"> <li>■ Check the device for visible defects and mechanical damage.</li> <li>■ Perform a visual inspection of the operating elements.</li> <li>■ Perform a visual and functional inspection of all safety devices.</li> </ul>	Monthly
Cleaning the device	<ul style="list-style-type: none"> <li>■ Observe the information in Chapter "7.2 Cleaning" on page 48.</li> </ul>	As required
<b>Qualified personnel</b>		
Checking electrical components	<ul style="list-style-type: none"> <li>■ Check the electrical components for damage.</li> <li>■ Carry out repairs if necessary.</li> </ul>	Annually
Inspection of hydraulic components	<ul style="list-style-type: none"> <li>■ Check the hydraulic components for damage.</li> <li>■ Carry out repairs if necessary.</li> </ul>	Annually
Inspection of refrigeration components	<ul style="list-style-type: none"> <li>■ Check the refrigeration components for damage.</li> <li>■ Carry out repairs if necessary.</li> </ul>	Annually
Inspection of safety devices	<ul style="list-style-type: none"> <li>■ Perform a visual and functional inspection of all safety devices.</li> <li>■ Document these checks.</li> </ul>	Annually
Check symbols on device	<ul style="list-style-type: none"> <li>■ Check the symbols on the device.</li> <li>■ Renew the symbols if necessary.</li> </ul>	Annually
Check Purchased components	<ul style="list-style-type: none"> <li>■ Observe the manufacturer's documentation for the purchased components.</li> </ul>	Annually

## 8 DECOMMISSIONING

When the heat pump is no longer in use, it must only be dismantled by qualified personnel. Hazardous materials and waste must be disposed of properly. When dismantling the heat pump, observe the instructions at the beginning of the technical documentation and the safety instructions listed below.



### **⚠ DANGER**

#### **Fatal electric shock**

There is a risk of fatal electric shock from electrical equipment.

**Disconnect the device from the power supply before decommissioning/dismantling.**

Secure the device against being switched back on.

### 8.1 TEMPORARY DECOMMISSIONING



#### **NOTE**

#### **Improper decommissioning**

Improper decommissioning of the device can result in damage to components and impaired functionality.

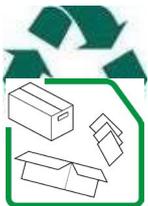
**Switch off the device at the main switch.**

Please note the following:

- Frost can cause damage to the device.
- Water freezes at outdoor temperatures below 0 °C.
- Decommissioning without draining the heating circuit is only permitted at temperatures above 0 °C.

### 8.2 FINAL DECOMMISSIONING AND DISPOSAL

Only a specialist company may carry out the final decommissioning/disposal. Environmental requirements relating to the recovery, reuse and disposal of operating materials and components in accordance with current standards must be observed.



#### **NOTE**

#### **Improper disposal**

Improper disposal of the unit may result in environmental pollution and/or damage.

**Dispose of electrical and electronic components and the refrigerant from the heat pump properly and in accordance with applicable local regulations.**

## 9. EC DECLARATION OF CONFORMITY

In accordance with the Low Voltage Directive 2014/35/EU, Annex IV and the Pressure Equipment Directive (2014/68/EU), Annex IV. We hereby declare under our sole responsibility:

Manufacturer	
ratiotherm GmbH & Co. KG Wellheimer Straße 34 91795 Dollnstein	Email info@ratiotherm.de Telephone: +49 (0) 8422/9977-0 Website www.ratiotherm.de

that the device:

Device name: **WP Max-HiQ&LoQ KK**  
Year of manufacture: 2022  
Intended use: The WP Max-HiQ&LoQ KK device is used to utilise environmental heat from water to provide direct heating support and hot water preparation.

in the version supplied complies with the directives

- Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
- Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of Member States relating to the making available on the market of pressure equipment

and with the harmonised standards and directives listed below, to which this declaration refers:

Applied harmonised standards:	Applicable EC directives
<ul style="list-style-type: none"><li>■ DIN EN 378-1-4</li><li>■ DIN EN ISO 12100</li><li>■ DIN EN 60204-1</li><li>■ DIN EN 60335-1</li><li>■ DIN EN 60335-2-40</li></ul>	<ul style="list-style-type: none"><li>■ Directive 2014/30/EU</li><li>■ Directive 2014/35/EU</li><li>■ Directive 2014/68/EU</li><li>■ Directive 2009/125/EC</li><li>■ Directive 2011/65/EU</li></ul>

Technical documentation is available. Name and address of the person authorised to compile the technical documentation:

Name Julian Kruck, Head of Heat Pump Technology  
Address: ratiotherm GmbH & Co. KG, Wellheimer Straße 34, 91795 Dollnstein

We hereby certify that the certification procedure has been carried out in accordance with the Low Voltage Directive 2014/35/EU, Annex IV and the Pressure Equipment Directive (2014/68/EU), and that the provisions of the standard DIN EN ISO/IEC 17050-1 "Conformity assessment – Declaration of conformity by suppliers – Part 1 : General requirements" have been observed in issuing this declaration of conformity. This declaration shall cease to be valid if any changes are made to the device without our consent. We shall not be liable for any unauthorised modifications of this kind.

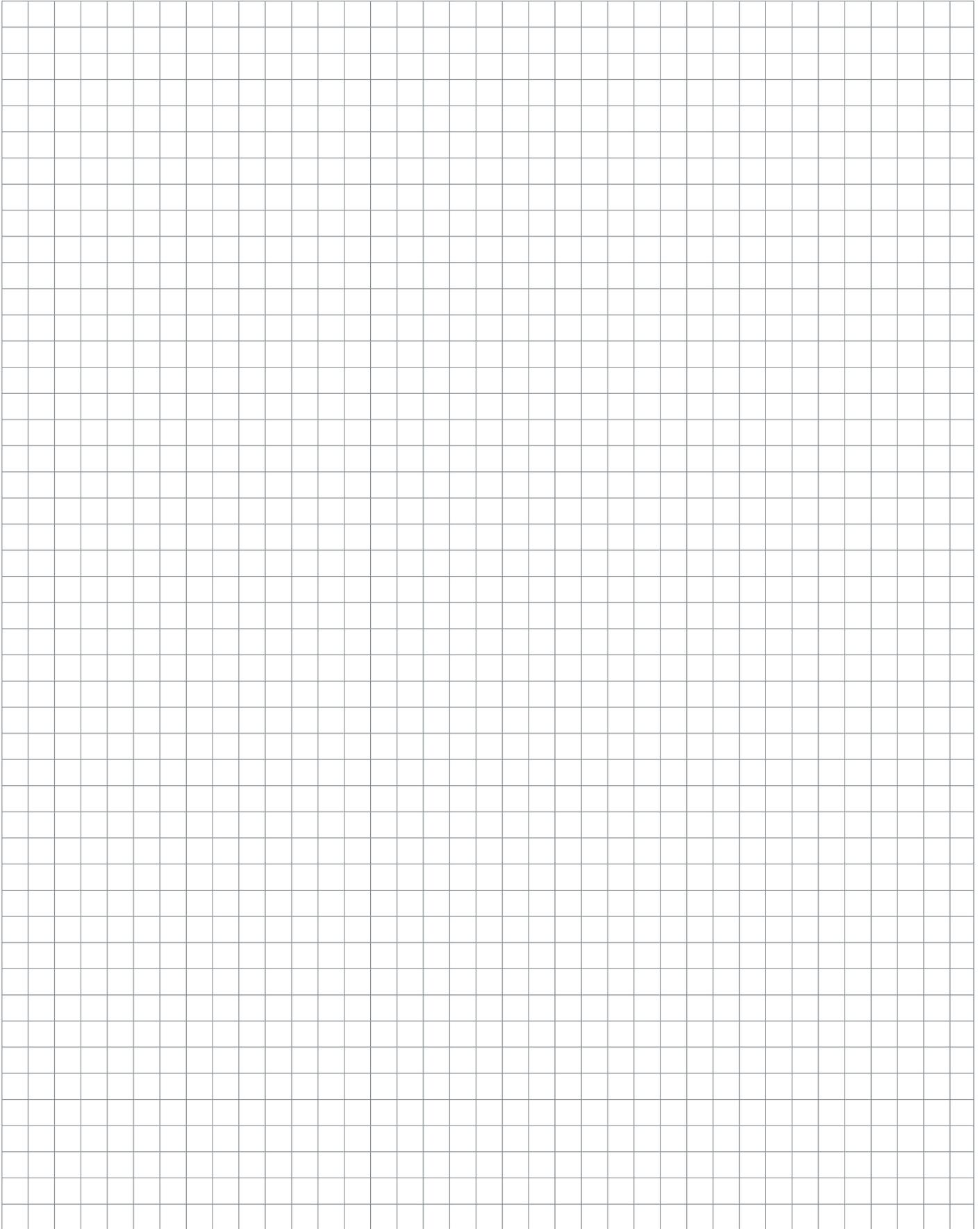
Dollnstein, on \_\_\_\_\_ Signature of authorised representative: \_\_\_\_\_

Details of the person authorised to issue this declaration on behalf of the manufacturer or his authorised representative:

Name: \_\_\_\_\_ Position: \_\_\_\_\_  
Address: ratiotherm GmbH & Co. KG, Wellheimer Straße 34, 91795 Dollnstein

# 10. NOTES

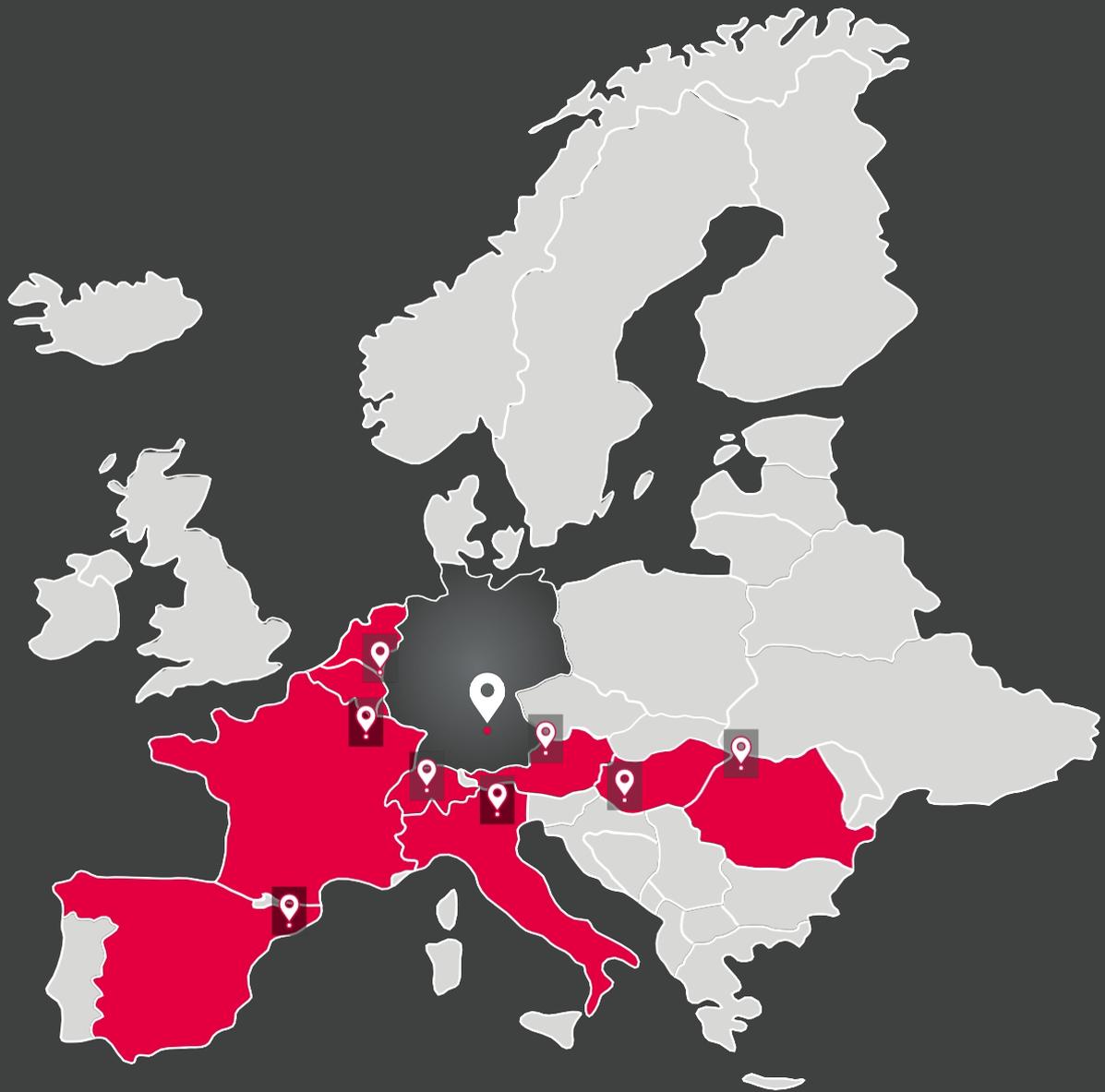
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A large grid of graph paper, consisting of 20 columns and 30 rows of small squares, intended for taking notes or drawing.

# You can find us here



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