Original operating instructions

WP Max-HiQ CF06 & WP Max-LoQ CF06

As of 2025-06

ratiotherm
Smart Energy Systems

INFORMATION

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 and must be handed over to personnel who come into contact with the device. The operator must ensure that the information contained in the operating instructions and the accompanying documents is 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, objects or the device itself caused by:

- improper use,
- non-compliance,
- insufficient attention

the safety criteria contained herein or by:

- modification of the device,
- use of unsuitable spare parts.

The copyright for this operating manual is held exclusively by the company:

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For better readability, the generic masculine form is used in this original operating manual. The personal designations used refer to all genders.

As of: 7 October 2024

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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 CF06 heat pump. The ratiotherm WP Max-HiQ/LoQ CF06 heat pump must not be operated without this document.
The operating instructions must be made available to the operator and the specialist technician for information at all times. If the ratiotherm WP Max-HiQ/LoQ CF06 heat pump 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 DIN ISO 3864-1 standard. The design complies with DIN EN 82079-1 and ANSI Z 535.4.

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

1.2 SAFETY SIGNS

1.2.1 OTHER SIGNS IN ACCORDANCE WITH DIN EN ISO 7010

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

- Mandatory signs ⇨ prescribe an action (e.g. use eye protection).
- Warning signs ⇨ Visually represent 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
	Follow instructions		General mandatory sign
	Disconnect before maintenance or repair		Use hand protection

1.2.2 OTHER SIGNS IN ACCORDANCE WITH 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 DATA

Device name: Heat pump (water/water) or (brine/water) Type: WP
Max-HiQ CF06 & WP Max-LoQ CF06
Year of manufacture: See type plate
Country of origin: Germany

2.2 INTENDED USE

The WP Max-HiQ/LoQ CF06 device uses ambient heat 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. Intended use also includes:

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

The Max-HiQ/LoQ CF06 device is state-of-the-art and has been constructed in accordance with recognised safety regulations. The device is intended exclusively for domestic and/or commercial use for hot water preparation (domestic water) and for heat and 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 device and other property may occur. The Max-HiQ/LoQ CF06 is not intended for use by persons (including children) with limited physical, sensory or mental abilities, or 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 allow it to be used 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/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 capable of working on the device
- Knowledge of how to operate the product, imparted by specialist personnel and the o

Specialist personnel

A person employed by a qualified specialist company for heating systems and hot water supply. 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 potential hazardous situations.

Qualification of specialist personnel:

- Of legal age and physically/mentally capable of working on the device
- Knowledge and several years of experience in working on heating and hot water systems

2.4 MISUSE

2.4.1 REASONABLY FORESEEABLE MISUSES

Reasonably foreseeable misuse that poses a risk to personnel, third parties or the device applies to all operating modes:

- Using the device contrary to its intended use
- Feeding in 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
- Making c h a n g e s to the device or adding or modifying components without prior consultation with ratiotherm GmbH & Co. KG
- Operating the device contrary to the provisions of the risk assessment
- Bypassing or decommissioning protective and safety devices
- Operating the device with obvious faults
- Operation of the device by persons with limited physical, sensory or mental abilities or by children

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 E 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" are available to the operator at the latest upon conclusion of the contract. 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
- Operating 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
- 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 notices 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 plant 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 legal guidelines, standards and laws applicable in the respective country must be observed.

3. SAFETY INSTRUCTIONS

DANGER

Read and observe the operating instructions before starting work on and with the device.

Despite all precautions taken, there may still be some residual risks that are not immediately apparent. 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 pipe.
- 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, chlorine-based 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 operation. 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. The following must also be observed:

- applicable binding regulations for accident prevention
- Recognised technical rules for safe and professional working practices
- existing environmental protection regulations
- 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 following components:

- Heat pump and pipes for water and electricity
- Safety valve
- Structural conditions that may affect the operational safety of the appliance
- Structural conditions in the vicinity of the appliance, insofar as these may affect the operational safety of the appliance

3.3 RESTRICTED 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 pose a serious risk of 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 zone.

4. DESIGN AND FUNCTION

4.1 TECHNICAL DATA

	HiQ CF06	LoQ CF06	Unit
Performance data for heating mode			
	W20/W55	W10/W55	
Heating capacity	3.06 to 8.7	2.5 to 7.2	kW
Power consumption	0.66 to 2.2	0.66 to 2.2	kW
COP at rated power	4.91	3.77	
Compressor			
Design	Fully hermetic, rotary piston, inverter		
Speed	1000 to 7200		rpm
Max. operating current	15		A
Blocking current LRA	32		A
Oil quantity	0.63		litres
Evaporator			
Design	Copper-brazed plate heat exchanger		
Material	Stainless steel / copper		
Brine flow rate	0.4 to 1		m^3 /h
Pressure loss	0.34		bar
Temperature difference	3		K
Test pressure	65		bar
Min./max. source temperature	10 / 55		°C
Connection dimensions	1",AG		
Condenser			
Design	Copper-brazed plate heat exchanger		
Material	Stainless steel / copper		
Water flow rate	0.8 to 2.2		m^3 /h
Pressure loss	0.2		bar
Temperature difference	5 to 10		K
Test pressure	65		bar
Min./max. flow temperature	30 / 72		°C
Connection dimension	1",AG		
Refrigeration circuit			
Working fluid	R134a		
Filling quantity	1.4		kg
Max. operating pressure	26		bar
Electrical			
Mains connection	230 V / 1~ / 50 Hz		
Fuse	16		A
Max. operating current compressor	15		A
Device data			
Sound pressure level	Interior at a distance of 1 m		

42	dB(A)

	HiQ CF06	LoQ CF06	Unit
Dimensions of inner section (200 L storage)	930 x 1950 x 740		W x H x D (mm)
Internal dimensions (400 L storage tank)	1102 x 1950 x 903		W x H x D (mm)
Weight of inner section (200 L storage tank)	280 (130 + 150)		kg
Weight of inner unit (400 L storage tank)	380 (130 + 250)		kg
Max. operating pressure water	10		bar
Max. VL temperature	72		°C
Buffer tank			
Capacity	200 or 400		L
Max. operating pressure buffer	3		bar
Dimensions Buffer + insulation or TWK (200 L storage tank)	530 x 1950 x 740		W x H x D (mm)
Dimensions buffer + insulation or TWK (400 L storage tank)	702 x 1950 x 903		W x H x D (mm)
Weight of buffer or TWK (200 L storage tank)	approx. 100		kg
Weight of buffer or TWK (400 L capacity)	approx. 200		kg
Max. operating temperature	90		°C
Fresh water station			
Max. tap volume (10–50 °C)	25		L/min
Pressure loss sec. at 25 L/min	80		mbar
Primary heating circuit temperature	55		°C
Secondary hot water temperature	50		°C
Primary volume	1500		L/h
Primary pressure loss	425		mbar
Max. operating pressure	10		bar
Direct transfer			
Design	Copper-brazed plate heat exchanger		
Material	Stainless steel / copper		
Water flow rate	0.2 to 1.7		m^3 /h
Max. pressure loss	0.2		bar
Temperature difference	5 to 10		K
Test pressure	30		bar
Connection dimension	1",AG		
Max. transmission capacity	20 kW at sec. 50 °C / prim. 55 °C		
Buffer storage tank			
Pump	Wilo Para STG 1-7		
Mixer	Three-way with 3-point drive		
Voltage pump + actuator	230 V 50 Hz		
Free pump pressure	5.5		mWS
Temperature difference	5 to 10		K
Max. operating pressure	3		bar
Connection dimension	1",AG		
Secondary expansion vessel	24 litres + 24 litres (optional)		

4.2 FUNCTION DESCRIPTION

The WP Max-HiQ CF06 high-temperature heat pump is suitable for widely varying source temperatures in the range from 10 to 55 °C. This flexibility is achieved by a patented process that enables the system to always reach the optimum operating point despite changing source temperatures. The Max-LoQ CF06 heat pump, on the other hand, is suitable for source temperatures from -15 to 15 °C. The maximum flow temperature is 72 °C. The units include an integrated 200 or 400 litre buffer tank with expansion vessel and heating circuit, as well as a fresh water station and house controller. This means that the entire boiler room can be accommodated in a single unit, enabling quick and easy installation. The areas of application for the heat pumps range from sustainable heating and energy networks and photovoltaic-controlled electricity use to use as conventional water/water or brine/water heat pumps. Thanks to their speed control, they cover a wide range of outputs and are therefore ideally suited for the use of fluctuating amounts of energy from photovoltaics, for example.

ADVANTA GES

- Use of highly fluctuating sources possible: HiQ: 10 to 55 °C LoQ: -15 to 15 °C
- Maximum flexibility thanks to speed-controlled inverter operation
- Passive and active cooling possible
- Integrated district heating direct transfer
- unit Flow temperatures up to 72 °C possible
- Integrated energy management (smart grid-compatible)
- Numerous network strategies possible Easy
- installation thanks to complete pre-assembly
- at the factory, no refrigeration licence required With ratiotherm components, a
- completely coordinated, future-proof system system

4.3 STRUCTURE AND SPARE PARTS

The ratiotherm WP Max-HiQ/LoQ CF06 heat pump is a complete heating system in a single housing.

The heat pump can be divided into three parts:

- 200-litre buffer tank or 400-litre buffer tank including FriWa, 24-litre MAG and the option of connecting a circulation unit
- Housing with heating circuit, control system, 24 litre MAG (optional), district heating direct transfer unit (optional) and electric heating rod (optional)
- Insertable refrigeration circuit

The refrigeration circuit is a hermetically sealed circuit consisting of a rotary piston compressor, a condenser (plate heat exchanger), an evaporator (plate heat exchanger) and an electronic expansion valve, which controls the flow of refrigerant. The environmentally friendly R 134A is used as the working medium. The refrigeration circuit is shipped fully charged and ready for operation. No further refrigeration commissioning is required. The ratiotherm WP Max-HiQ/LoQ CF06 heat pump is controlled by the RSM610 controller from Technische Alternativen. All parameters and operating states of the heat pump are shown on a separate display.

Electricity meter
ra/13000

2x UVR610K
ra/14414

CMI module
ra/95.10.3219

Display
ra/95.10.3212

Mains filter
ra/14617

2x UVR610K
ra/14414

Stepper motor control
ra/13047

Capacitor
ra/13193

Evaporator
ra/13192

High pressure pressure transmitter
ra/13049

Filter dryer
ra/12201
with active cooling:
ra/10337

Hot water station flow

WW station return flow

Drainage + expansion tank connection

4-way valve
ra/13052

3-way valve
ra/13607

Buffer tank 200 L *ra/13641*
400 L *ra/14013*

Plate heat exchanger Cu-Lot
ra/11244

3x E-rod relay
ra/12906

Frequency converter
ra/14542

FriWa charging pump
ra/14121

Cartridge pressure limiter
ra/10076

Diaphragm expansion vessel
ra/13636

Low pressure transmitter
ra/13048

Sight glass
ra/10004

Loading circuit Flow

Loading circuit Return

4.4 CONTROL LOGIC AND CONTROL

Control logic:

- The unit basically has three separate control elements that communicate via the CAN bus:
- K1 handles storage management, heating circuit control and DHW preparation.
- K2 manages the requirements according to the required and available temperature level and controls the direct heat pump transfer.
- K11 and K12 are the control elements for the heat pump unit.

Main controller:

- This is where target times and target values for hot water supply, circulation and the heating circuit are stored.
- If T-storage-bottom < T-DHW target, a DHW request is made. This is terminated when T-storage-top > T-DHW setpoint.
- A sensor (PT1000) is required on the circulation return pipe for circulation mode. If the time programme is active or if water is being drawn, the circulation pump is activated. When the temperature at the circulation return pipe reaches the set target temperature (8 K below DHW target outlet), the pump deactivates. If the temperature then drops again by 5 K, the pump activates again.
- The heating circuit is controlled depending on the outside temperature (this must be provided by the GLT). If this is active, a heating request is made.
- The user can activate cooling via a fixed value. The mixer regulates to an adjustable flow temperature. The minimum temperature can be limited via dew point monitoring.

District heating controller:

- The district heating controller manages the DHW or heating requests.
- To do this, the FW valve is first opened for 45 seconds. During this time, the current mains temperature level is checked.
- If the network temperature level corresponds to the requested temperature or is above it, the FW transfer unit is activated.
- The FW valve regulates to the setpoint temperature at the FWÜ outlet on the secondary side.
- If a direct charge pump is installed (adjustable via a fixed value), DHW can also be prepared via the FW transfer unit, provided that the network temperature level is sufficiently high.
- If the temperature level is not sufficient, the heat pump unit is activated.
- In cooling mode, the temperature comparison is carried out in the same way as in heating mode. If the mains temperature is below the setpoint temperature, FWÜ is activated.
- If the network is not sufficiently cool and the heat pump unit has the capacity to cool (adjustable via a fixed value), a cooling request is sent to the heat pump.
- To avoid errors due to insufficient flow (e.g. closed heating circuit actuators), the system has an electric hydraulic switch. This is always open at the start and closes during normal operation. If T-WP VL deviates too much from T-WP RL, it opens.
- The electric rod can be activated via a fixed value. It is also activated in the event of a heat pump malfunction. Depending on the target/actual deviation, the 3 stages are switched on or off.

Heat pump unit:

- The heat pump is requested by K2. The evaporator and condenser pumps and the valves are then activated. The compressor starts up after 45 seconds.
- When the system is activated, the minimum running time is 5 minutes. An error immediately switches off the system.
- In heating or cooling mode, the control system regulates to the target temperature transmitted by K1.
- In DHW mode, the compressor runs at a constant speed to ensure rapid recharging.
- The compressor speed is limited during the start-up phase, which is why full speed is only reached after 4 x 1.5 minutes.
- A start command and a minimum speed can be specified via a signal from the higher-level control system. (If the start command is overridden by a regular request, resulting in a higher setpoint speed, the latter takes precedence.)
- If the source temperature inside the evaporator falls below an adjustable value (standard: 11 °C) for longer than one minute, the system is shut down for frost protection reasons. If the evaporator temperature is above 55 °C, start-up is prevented. Once temperatures return to normal, the machine starts up as usual.
- If the source temperature drops below 8 °C for water/water or an adjustable value for brine/water, a frost protection fault is triggered and the system is blocked for 7 minutes or, if this occurs repeatedly, locked.
- The condenser pump regulates the deltaT between the heating flow and return (factory setting 8 K).
- If the heating flow temperature rises above 69 °C, the pump begins to increase its speed to prevent shutdown.
- If the heating flow temperature exceeds 72 °C, the system automatically switches off for 20 minutes. If the temperature drops during this time, the system restarts after the 20-minute wait.
- The evaporator pump regulates the deltaT between the source inlet and outlet (factory setting 3 K).
- If an anomaly is detected (HD, ND, frost protection), an error is triggered and the system is blocked for 5 or 7 minutes. This cannot be acknowledged with the reset button!
- If the same error occurs three times within an hour, the system is locked. The lock can be released using the reset button.
- To prevent an anomaly, high pressure, low pressure and compressor temperature are monitored and, if necessary, the speed is reduced for at least eight minutes.

4.5 OPTIONS

1. Option: District heating direct transfer

If the network temperature is sufficiently high for direct use (without a heat pump), it is advisable to install a direct transfer unit. This enables direct heat transfer without increasing the temperature level via a heat pump. This means, for example, that the heating circuit can be operated directly. The option includes a copper-brazed plate heat exchanger and a district heating valve. In combination with option 3 (direct charge pump), no external pump (e.g. heating circuit pump) is required. In addition, the direct transfer unit can be used for passive cooling of the heating circuit during the summer months.

Available power ratings: *FWÜ-25 (Danfoss D55-H-36 or comparable)*

4.5 OPTIONS

2. Option: FWÜ direct charging pump

If an FWÜ is installed, an additional charging pump may be useful. This enables independent charging of a storage tank or other heat sink.

Pump type: *Wilo Para STG 15/1-8 (or comparable)*

3. Option: Electric heating rod

A 9 kW electric heating element can be integrated into the unit as an emergency heat generator. Thanks to a 3-stage control system based on a comparison of the target and actual temperatures, the heating element can ensure a reliable supply in the event of a mains or compressor failure. It can also be activated for floor drying.

4. Option: Heat meter

Depending on customer requirements, heat meters can be integrated into the device. These can be installed on the primary or secondary side. Depending on the hydraulics, two heat meters may be required on the secondary side. The size of the heat meter depends on the capacity of the compressor or heat pump. On request, heat meters provided by the customer can also be installed. The heat meters are recorded via an M-Bus interface and can be read out via the building management system.

Meter sizes used: *Landis&Gyr T230 qp1.5 (or comparable)*

5. Remote maintenance/interface module option (CoE, ModBus)

The remote maintenance module provides an Ethernet interface. When connected to a network, this enables remote maintenance of the device. It also allows a connection to the higher-level GLT via ModBus/TCP or CAN-over-Ethernet. The interface is configured according to customer requirements.

6. Option: Active cooling

With this option, a 4-way valve is installed in the heat pump's refrigeration circuit. This enables the refrigeration cycle to be reversed. This allows the heating circuit to be cooled even if the mains temperature is above the cooling setpoint temperature.

7. Option: additional diaphragm expansion vessel (24 litres)

A 24-litre expansion vessel is already integrated as standard in the CF06 series to secure the buffer volume. A second 24-litre diaphragm expansion vessel can also be integrated to compensate for the water volume in the heating circuit.

Type: *Reflex F24*

8. Option: Bad point measurement

With this option, a pressure sensor is installed on each of the connection ports for the source/district heating inlet and outlet. These enable the applied pressure to be determined and a differential pressure measurement to be taken, thereby optimising the network pump control.

4.6 SAFETY DEVICES

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

1	Protective enclosure or housing
2	Main safety switch
3	Safety group consisting of safety valve, float vent and pressure gauge (not included in delivery! Piping to be provided by customer)

-	Primary side flow monitoring
-	Pressure monitoring of the compressor
-	Pressure switch for refrigeration circuit
-	Diaphragm expansion vessel (buffer, integrated)
-	Diaphragm expansion vessel (heating circuit, optional)

5. TRANSPORT, ASSEMBLY AND INSTALLATION

5.1 TRANSPORT AND UNPACKING

The following instructions for transporting the device must be observed:

- Only allow qualified personnel to carry out the transport.
- Protect yourself with PPE (e.g. safety shoes, etc.).
- Take note of the device weight in order to select the appropriate lifting equipment (forklift, pallet truck, sack truck, etc.):
  - Weight of heat pump: approx. 130 kg
  - Weight of 200 L storage tank: approx. 150 kg
  - Weight of 400 L storage tank: approx. 250 kg
- Please note the centre of gravity of the device.
- Remove all packaging materials.

NOTE

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.
- The compressor is equipped with a transport lock, which must be removed before commissioning the system.

The heat pump is secured to a pallet with 4 anchor plates and 8 screws upon delivery. The screws anchor plates removed before both parts of the heat pump can be lifted off the pallet. A sack truck with stair function is recommended for transporting the heat pump to the basement. The heat pump side may be tilted for a short time if necessary to move the heat pump to its installation site. To do this, the front of the unit must face downwards and the tilt angle must not exceed 45°. After tilting a heat pump, the unit must be left to stand for 6 hours before it can be operated. Otherwise, the unit must be stored upright and delivered upright by a shipping company.

5.2 MECHANICAL INSTALLATION

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

- The danger zone for assembly and installation must be well lit.
- Staff must have the necessary qualifications, have received the necessary training and be instructed by the responsible supervisor.
- Personnel must have read and understood the operating instructions.
- Personnel must have access to the operating instructions at all times.
- Local accident prevention and environmental regulations must be implemented and complied with.
- Unauthorised persons must be kept away from the device.
- The device may only be handed over and operated in a safe and functional condition. Damage to the heat pump must be repaired immediately or the heat pump must be shut down.

Storage conditions:

- Ensure frost-free storage.

Installation conditions:

- A floor drain must be provided to protect against water damage.
- The ratiotherm WP Max-HiQ/LoQ CF06 heat pump must be installed in a clean, ventilated and dry location. The ambient temperature must be permanently > 10 °C and < 35 °C.
- The minimum distances must be observed for maintenance reasons.
- In installation rooms with sound-reflecting walls, the operating noise can be significantly amplified. Acoustic insulation on the affected surfaces can remedy this.
- To prevent vibration transmission, we recommend installation on raw concrete. If this is not possible, the screed at the installation site should be removed and a concrete base created on the raw concrete. If this is also not possible, the use of a sound-insulated base is recommended.
- After installation, the device must be aligned in a horizontal position (the levelling feet are adjustable).
- The minimum room height should be 2.15 m (there are connections at the top of the heat pump).

5.2.1 MAINTENANCE AREA

Heat pump with 200 litre storage tank (right)

Heat pump with 400 litre storage tank (right)

The maintenance intervals must be strictly adhered to in order to guarantee trouble-free maintenance of the heat pump. The device consists of two parts: the heat pump and the storage tank. The storage tank can be installed either to the left or right of the heat pump. When ordering the device, you must decide on an orientation, but this is not final. During commissioning, the orientation can be changed with a little extra effort. Please note that there must be 600 mm of space on the heat pump side and 50 mm on the storage tank side.

View from above.
All dimensions are given in millimetres.

5.3 HYDRAULIC INSTALLATION

5.3.1 CONNECTION DIMENSIONS AND SIZE: 200 LITRE STORAGE TANK ON THE LEFT

Minimum room height:
2.15 m
(connections on top of the heat pump)

Connection size: 1", AG
flat seal

All dimensions are given in millimetres.

- Shut-off valves and vents must be provided on site.
- Sludge separators and magnetite separators must also be provided on site.
- A vibration-decoupled connection via hoses must be installed.
  Recommendation: Cornerstone TWS 25
- The condenser/sink pump is integrated into the device; a mains pump can be integrated as an option.
- Please fill the system via the return flow. Follow the flushing instructions!
- Drain taps are installed in the system.
- When tightening, please hold the connections in place!

5.3.2 CONNECTION DIMENSIONS AND DIMENSIONS: 200 LITRE STORAGE TANK ON THE RIGHT

Minimum room height:
2.15 m
(Connections on top of the heat pump)

Connection dimensions:
1", AG flat seal

All dimensions are given in millimetres.

5.3.3 CONNECTION DIMENSIONS AND SIZE: 400 LITRE STORAGE TANK, LEFT

Minimum room height:
2.15 m
(connections on top of the heat pump)

Connection dimensions:
1", flat seal

All dimensions are given in millimetres.

5.3.4 CONNECTION DIMENSIONS AND SIZE: 400 LITRE STORAGE TANK ON THE RIGHT

Minimum room height:
2.15 m
(connections on top of the heat pump)

Connection dimensions:
1", AG flat seal

All dimensions are given in millimetres.

5.3.5 HYDRAULIC DIAGRAM WITH COOLING CIRCUIT

5.3.6 INSTALLATION INSTRUCTIONS

The machine is delivered on a pallet in two parts:

- Storage module (200/400 litre buffer tank including FriWa and 24 litre MAG)
- Hydraulic module + refrigeration unit

For easier transport, the refrigeration unit (approx. 80 kg) can be removed from the hydraulic module.

To do this, you will need:

- 4 hose connections (shut-off valves are because it is available),

- electrical connection to the housing (6 plug connections),

- Sensor S5,

- 2 screw connections in the base plate,

- electrical connection to the district heating valve (make sure the plug is locked in place)

to be loosened.

1

The refrigeration unit can then be pulled out towards the front (1). Reinstallation is carried out in reverse order. Please ensure that the unit is centred so that it does not hit the outer casing during operation. It is advisable to reinsert the refrigeration circuit at the end of the leak test. This makes some of the connection points easier to access.

The machine is basically suitable for right- and left-side mounting. For this reason, the connecting pipes have two ends. The unused ends must be fitted with end caps (5 connections in total).

3

Depending on the installation situation, the storage module is first positioned and aligned in the water (2). It should be noted that the lower side connections on the side facing away from the hydraulic module must be fitted with blind plugs (3). Two 60 mm double nipples must be inserted on the side facing the hydraulic module (4).

4

First remove the side cover on the opposite side of the hydraulic module where the storage tank is to be placed (5).

6

For better accessibility, it is recommended to remove the E-rod and the MAG inside the hydraulic module. To do this, loosen the screw connections and three connections on the E-rod, then use the hook supplied to temporarily attach it to the refrigeration unit (6/7).

2

5

7

To dismantle the MAG, the hydraulic connection must be disconnected and the retaining screw removed.
(8). Installation is carried out in reverse order. Here too, it is advisable to reassemble the MAG at the end of the leak test, as this makes some connection points easier to reach.

8

The hydraulic module is then placed next to the storage module and slid towards it. Make sure that the 5 pipe connections slide through the insulation of the cladding (9).

The hydraulic module must be connected completely to the storage module and aligned in the water. The height of the two modules must be adjusted so that they can be connected (10).

The three connections on the rear panel can then be rigidly connected (please seal the other ends of the connections with end caps). Please pay close attention to the seals (supplied) (11).

10

The connection to the storage tank is made flexibly via two hose connections (12).
The piping of the two units can now be carried out (heating circuit, cold water, hot water, circulation, mains connection).

A pressure test must be carried out before commissioning. Compressed air is the preferred method for this. Please do not exceed a maximum pressure of 2.5 bar. All screw connections must be checked during this process. ratiotherm checks all devices for leaks, but screw connections can still become loose during transport.

11

12

Once all connections are sealed, the taps can be opened one after the other and the system filled. While filling the system, air must be vented from the following valves:

Supply side:

Plate heat exchanger Refrigeration module source inlet

Heating side:

Plate heat exchanger Refrigeration module Flow

Plate heat exchanger Refrigeration module Return

Compact drinking water station

Top side of hydraulic module

Top of storage tank

Boiler safety group (floating air vent)

Ensure that the water used for filling is suitable (see *5.3.7 Requirements for system water*).

5.3.7 REQUIREMENTS FOR SYSTEM WATER

Parameter	Unit	Concentration	Copper soldered
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	∘
		> 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_3, NH_4^+)	mg/L	< 2	+
		2 - 20	∘
		> 20	-
Alkalinity (HCO_3)	mg/L	< 60	+
		60 - 300	+
		> 300	∘
Sulphate (SO_4^{2-})	mg/L	< 100	+
		100 - 300	∘/-
		> 300	-
HCO_3 / SO_4^{2-}	mg/L	> 1.5	+
		< 1.5	∘/-
Nitrates (NO_3)	mg/L	< 100	+
		> 100	∘
Hydrogen sulphide (H_2S)	mg/L	< 0.05	+
		> 0.05	∘/-
Free carbon dioxide (CO_2)	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.
- Ensure that the device 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.

5.3.8 GROUNDWATER REQUIREMENTS

Parameter	Unit	Concentration	Copper soldered	Stainless steel	Screwed
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_3, NH_4^+)	mg/L	< 2	+	+	+
		2 - 20	∘	+	+
		> 20	-	+	+
Alkalinity (HCO_3)	mg/L	< 60	+	+	+
		60 - 300	+	+	+
		> 300	∘	+	+
Sulphate (SO_4^{2-})	mg/L	< 100	+	+	+
		100 - 300	∘/-	+	+
		> 300	-	+	+
HCO_3 / SO_4^{2-}	mg/L	> 1.5	+	+	+
		< 1.5	∘/-	+	+
Nitrates (NO_3)	mg/L	<100	+	+	+
		> 100	∘	+	+
Hydrogen sulphide (H_2S)	mg/L	< 0.05	+	+	+
		> 0.05	∘/-	+	+
Free carbon dioxide (CO_2)	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 a criterion does not meet the minimum requirement (-), the use of the respective type should be avoided.

5.3.9 PRESSURE LOSS DIAGRAM NETWORK CONNECTION

5.4 ELECTRICAL INSTALLATION

DANGER

- The power supply to the heater comes from the building distribution system and must be protected by a separate 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-40/0.3
- A separate RCD must be provided for each outdoor or indoor unit!
- 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 power supply to the control unit (230 V supply line), the compressor (230 V supply line) and the heating element (400 V supply line) must go through the same RCD, but must be individually protected by circuit breakers (LS switches).
- Ensure that the rotating field is clockwise.
- The device must be earthed.
- Use cable cross-sections appropriate for the power rating of the heater.
- The electrical installation must comply with the applicable standards and generally accepted rules of technology.
- Never work on the hydraulics or mechanics of the device while it is live.
- The same applies when filling or subsequently pressurising.
- Even when the main switch of the device is turned off, voltage is still present at the cable terminal.
- To completely disconnect the device from the mains, the RCD circuit breaker in the switch 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.

5.4.1 ELECTRICAL CONNECTION POWER

	Type	CF06
Control voltage	Fuse	B10A 1-pole
	Cable cross-section	3G 1.5 mm²
Compressor	Fuse	B16 1-pole
	Cable cross-section	3G 2.5 mm²
Heating element	Fuse	B16 3-pole
	Cable cross-section	5G 2.5 mm²

- All information, images and drawings are subject to errors and changes.
- Attention! Installation and wiring must only be carried out by authorised specialists.
- The generally applicable and recognised rules of technology and any local regulations must be observed.
- Values apply to installation in conduits up to 100 m cable length.

5.4.2 TERMINAL DIAGRAM AND DESCRIPTION

- Terminal area X1 is intended for the compressor current and the electric rod. Depending on the desired connection and operating mode, the compressor and electric rod can be fused together.
- X2.1 serves as the power supply for the hot water pump. The output may be loaded with a maximum of 3 A.
- X2.2 serves as a switching output for a circulation pump (optional). The output may be loaded with a maximum of 3 A.
- X3.1 and X3.2 are used to process a signal from the grid operator/energy supplier. X3.1 is backwards compatible with the EVU contact.
- Please wire the EVU contact as a normally open contact (closed when EVU lock is active).

X1							
L1	L2	L3	N	PE	L1	N	PE
400 V mains E-rod					230 V mains Compressor		

X2								
L1	N	PE	1	N	PE	2	N	PE
230 V mains control/pumps			230 V supply hot water pump			230 V Output circulation pump		

X3					
1	GND	2	GND	3	GND
EVU / Smart Grid 1		Smart Grid 2		Circulation Directive	

X4					
12 V	CAN-H	CAN-L	GND	MBus	MBus
CAN connection to rZR16x2				Connection for M-Bus devices	

5.4.3 CAN BUS PLAN (STANDARD)

NOTES

Ensure that the CAN bus is wired correctly. No star-shaped network!
Set up the network as a chain.

The total load of all devices must not exceed 6 watts.

The jumper for the termination must be set to TERM on the first and last CAN bus participants. Participants in between must be set to OPEN.

Use shielded, 4-pin cable!

Follow the instructions in the technical alternative.

Non-binding cable recommendation: Unitronic Bus CAN FD P 2x2x0.5

ratiotherm
Smart Energy Systems

6. OPERATION

6.1 CONTROLLER OPERATION

- The rZR16x2 is operated via a 4.3" touch screen (= touch-sensitive 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 different 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 light – After hardware initialisation, the controller waits approx. 30 seconds to receive all the information necessary for operation (sensor values, network inputs).

Controls:

Previous page

Main menu

Next page

Control switch:

6.2 MENU STRUCTURE

"Boiler room" overview

Overview of the system and the current operating parameters

Heat pump overview

Fixed values of the heat pump unit

Settings for heating circuit 1
(see next page)

Hot water settings
(see next page)

Settings for energy meter and heat meter

Times and setpoints:

The desired temperatures for the heating circuit and hot water can be set here. Time programmes can be set for the heating circuit, hot water and circulation, either for individual weekdays or entire periods.

Cooling - Enable: ON
Cooling may start when requested

Electric heating element: ON
The electric heating rod can be switched on independently of the bivalence temperature

Enter password

Enter the specialist password to access the specialist menu.

District heating - Release: ON District heating valves may open when required.

Heat pump – release: ON Heat pump may start up when required.

Floor drying may only be used with district heating or the electric rod. If the heat pump is used to generate and use heat for screed heating, the warranty will expire immediately!

Einzelraumregelung
Einzelraumsteuerung Knoten 34
11:06 10.04.2025
Einzelraumsteuerung - Raumauswahl
Ausgänge
Bezeichnung_Raum6 0.0 °C
Bezeichnung_Raum4 0.0 °C
Bezeichnung_Raum5 0.0 °C
0.0 °C
0.0 °C
0.0 °C
Ausgänge - Bezeichnung UVR-K34
A1 Bezeichnung_Raum1 EIN Auto
A2 Bezeichnung_Raum2 EIN Auto
A3 Bezeichnung_Raum3 EIN Auto
A4 Bezeichnung_Raum4 EIN Auto
A5 Bezeichnung_Raum5 EIN Auto
A6 Bezeichnung_Raum6 EIN Auto
Zeitprog. 1 - Bezeichnung_Raum1
Mo Di Mi Do Fr Sa So
00:00 - 24:00 21.0 °C 23.0 °C
00:00 - 00:00 0.0 °C 0.0 °C
00:00 - 00:00 0.0 °C 0.0 °C
Manuell Heizen/Kühlen
Absenktemperaturen
1 von 3
11:07 10.04.2025
Zeitprog. 2 - Bezeichnung_Raum1
07:00 - 23:00 21.0 °C 23.0 °C
2 von 3
Zeitprog. 3 - Bezeichnung_Raum1
3 von 3
Manuell Heizen/Kühlen - Bezeichnung_Raum1
Manuelle Heiztemperatur 22.0 °C
Manuelle Kühltemperatur 21.0 °C
11:08 10.04.2025
Absenktemp. - Bezeichnung_Raum1
Raumsolltemperatur außerhalb der Zeitprogramme:
Raumsolltemperatur Heizen 19.0 °C
Raumsolltemperatur Kühlen 30.0 °C

6.2.1 OVERVIEW AND VALUES

K1 S1	T. memory above
K1 S2	T. memory bottom
K1 S4	T.Hot water
K1 S6	Hot water flow
K1 A1	Heating circuit pump 1
K1 A2	Circulation pump
K1 A5	Pump FW to storage tank
K1 A7	PWM hot water pump
K1 Fkt3	Mixer 0 - 100%
K2 S1	T-FW Primary inlet
K2 S2	T-FWÜ Secondary outlet
K2 S3	T-FWÜ Secondary entry
K2 A3	E-rod Level 1
K2 A4	E-rod Level 2
K2 A5	E-rod Level 3
K2 A6	Valves HK to WP or FW
K2 A8	District heating valve
K11 S1	T evaporator inlet
K11 S2	T evaporator outlet
K11 S3	T. Heat pump VL
K11 S4	T. Heat pump RL/Reset
K11 S5	High pressure
K11 A7	Compressor 0-10 V
K11 A8	Evaporator pump PWM
K11 A9	Condenser pump PWM
K11 A10	District heating valve 0-10V
K12 S4	T-compressor outlet
K12 S5	Low pressure
K12 A8	Ex-valve PWM
SH K12 Fkt28	Actual overheating

6.2.2 INTERMEDIATE MENU AND BASIC SETTINGS

Intermediate menu

Press and hold the display for 5 seconds to access the intermediate menu, which allows you to configure basic settings or switch to the controller menu.

Controller menu

Link to the controller menu

Basic settings

You can set the language, brightness and display timeout.

Date/time/location

Time zone and date can be set

6.3 INTERFACES

Device inputs (from GLT to substation)						CAN bus		Modbus TCP					
Designation measurement	Unit of	Min	Max	Description	Optional	Internal	External	IP address	Device number	Function	Address	Data type	By-Sequence
Digital													
WP Run command	ON / OFF	0	1	Run command for compressor	yes	20 / 1	According to customer configurable requirements			03-read holding register		8-bit signed	Big Endian
WP lock	ON / OFF	0	1	Lock for compressor	yes	20 / 2							
WP reset	ON / OFF	0	1	Option to reset heat pump unit via GLT	Yes	20 / 3							
E-rod lock	ON / OFF	0	1	Lock for E-rod	Yes	20							
Analogue													
T-Outside	Temperature in °C	-99.9	99.9	Outdoor temperature recorded by GLT; necessary for HK control	No	20	According to customer configurable requirements						
Target speed of compressor	Dimension less	0	10	Option to specify a minimum target speed for the compressor	Yes	20							

Device outputs (from substation to GLT)					CAN bus		Modbus TCP
Designation	Unit of measurement	Min	Max	Description	Internal	External	
Digital							
Cooling enabled	ON / OFF	0	1	When the user activates cooling, the signal becomes active.	1 / 3	According to customer configurable requirements	
E-rod active	ON / OFF	0	1	When the user or WP fault activates the E-rod, the signal becomes active.	2 / 5		
Undersupply	ON / OFF	0	1	If T-memory is above T-WW target for longer than 3 hours, the signal becomes active.	1 / 6		
WP fault	ON / OFF	0	1	If there is a heat pump fault, the signal becomes active.	11 / 9		
Compressor active	ON / OFF	0	1	When the heat pump compressor is running, the signal becomes active.	11 / 10		
FWÜ active	ON / OFF	0	1	When FW direct transmission is active, the signal becomes active.	2 / 6		
Analogue							
T memory top	Temperature in °C	-99.9	99.9	Temperature in buffer storage Top	1 / 4	According to customer configurable requirements	
T-storage tank bottom	Temperature in °C	-99.9	99.9	Temperature in buffer storage tank bottom	1 / 5		
T-FW Primary inlet	Temperature in °C	-99.9	99.9	Temperature at grid entry; primary side	2 / 3		
Pressure source inlet	Pressure in bar			Only with bad point measurement option: Pressure at source inlet	2 / 4		
Pressure at source outlet	Pressure in bar			Only with bad point measurement option: Pressure at source outlet	2 / 5		
230 V Active power	Power in kW			Active power compressor connection 230 V	2 / 15		
230 V Energy quantity	Energy in kWh			Energy consumed by the compressor 230 V	2 / 16		
230 V Meter number	Dimensionless			Meter identification number	2 / 17		
400 V Active power	Power in kW			Total active power for compressor and electric rod 400 V	2 / 18		
400 V Energy quantity	Energy in kWh			Energy consumed by compressor and electric rod	2 / 19		
400 V Meter number	Dimensionless			Meter identification number	2 / 20		
WMZ primary flow rate	Volume flow in m^3 /h			Flow rate on primary side	2 / 21		
WMZ primary T-difference	Temperature in °C	-99.9	99.9	Temperature difference on the primary side	2 / 22		
WMZ primary output	Power in kW			Power on primary side	2 / 23		
WMZ primary heat quantity	Energy in kWh			Heat quantity on primary side	2 / 24		
WMZ primary Meter number	Dimensionless			Identification number of the heat meter on the primary side	2 / 25		
WMZ primary cooling quantity	Energy in kWh			Secondary refrigerant quantity	2 / 26		
WMZ secondary flow rate	Volume flow in m^3 /h			Flow rate on secondary side	2 / 27		
WMZ sec. T-difference	Temperature in °C	-99.9	99.9	Temperature difference on secondary side	2 / 28		
WMZ sec. Power	Power in kW			Power on secondary side	2 / 29		
WMZ sec. Heat quantity	Energy in kWh			Heat quantity on the secondary side	2 / 30		
WMZ sec. Meter number	Dimensionless			Identification number of the heat quantity meter on the secondary side	2 / 31		
WMZ sec. Cooling quantity	Energy in kWh			Refrigerant quantity on the secondary side	2 / 32		

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ATTENTION! Installation and wiring may only be carried out by authorised specialist personnel.

6.4 SETTINGS

Fixed values	Description	Setting options	preset Settings
Specialist			
Target value for hot water outlet the drinking water station.	Setpoint temperature at which the hot water should leave water station.	38 °C to 55 °C	42 °C
Minimum hot water setpoint reservoir	Minimum temperature in the storage tank as hot water ; independent of the time programme.	30 °C to 75 °C 30 to 100	40 °C 80
Setpoint speed for hot water operation during	Target speed of the heat pump hot water preparation		
Target T-Diff Condenser	Target temperature difference at the condenser	1 °C to 10 °C	8
Target speed Verdi. Fix	Target speed of the compressor when no external speed signal is present.	0% to 100	75
T-setpoint evaporator inlet	Set evaporator inlet temperature (mixing temperature injection circuit)	10 °C to 30 °C	30 °C
T-Evaporator Maximum	Maximum permissible evaporator temperature	35 °C to 70 °C	55 °C
T-evaporator minimum	Minimum permissible evaporator temperature	8°C to 20 °C	11 °C
Target T-Diff evaporator	Setpoint temperature difference between evaporator inlet and outlet	1 °C to 8 °C	3.5 °C
Start opening of expansion valve	Start opening of the expansion valve in the outdoor unit	Levels 0 to 500	Level 280
High pressure limit	Maximum pressure at which a high-pressure fault or HD fault is triggered.	20 bar to 26 bar	24 bar
Low pressure limit	Minimum pressure at which an LP error or LP fault is triggered.	0.8 bar to 5 bar	1 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 until malfunction	If three faults occur within one hour, the machine switches off.	0 to 24 h	60 min
ND/HD error time	Time lock for restart if ND/HD error has occurred.	0 to 24 h	5 min
Time for frost protection error	Time lock for restart if frost protection error has occurred.	0 to 24 hours	7 min
Target overheating	Target overheating of the expansion valve during normal operation	0 °C to 10 °C	5.3 °C
Speed Power reduction	Compressor speed while power reduction is active.	Stages 0 to 100	Step 45
ND Emergency mode	Minimum pressure at which a temporary reduction in power is triggered.	1 bar to 10 bar	1.5 bar
HD emergency mode	Maximum pressure at which a temporary reduction in performance is triggered.	15 bar to 25 bar	22 bar
T.-Verd.-Outlet Emergency mode	Maximum discharge temperature of the compressor, at which a temporary reduction in performance is triggered.	80 °C to 130 °C	110 °C

Fixwerte

Fixed values	Description	Setting options	preset setting
Specialist			
WW direct loading installed	Activation of direct storage loading; only switch on if installed!	OFF/ON	ON
FWÜ installed	Activation of district heating direct transmission; only activate if installed!	OFF/ON	ON
Active cooling installed	Activation of active cooling via reversal of the refrigeration process; only activate if installed!	OFF/ON	OFF
Start value for diverter valve	Start opening of the heat pump switch to ensure flow.	0 to 100	100

7. MAINTENANCE

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

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 work 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
Error description	High pressure protection of the refrigeration circuit has been triggered	
Behaviour of the heat pump	• System locked for 5 minutes • If 3 errors occur within 60 minutes, switch to HD fault	• Lock the system • Unlock by pressing the reset switch
Cause of error	• Lack of heat dissipation • Heat sink too hot	
Troubleshooting	• Checking the sink temperature or target temperatures • Temperatures below max. water temperature according to type plate • Checking the heat output to the medium (pump, heat exchanger) • Vent and check the heating pressure	

7.1.2 LOW PRESSURE

Error message	ND error	ND fault
Error description	Low pressure protection of the refrigeration circuit has been triggered.	
Behaviour of the heat pump	• System locked for 5 minutes • If 3 faults occur within 60 minutes, switch to ND fault	• System lockout • Unlock by pressing the reset button
Cause of error	• Insufficient heat absorption • Insufficient refrigerant charge • Blockage of the refrigeration circuit	
Troubleshooting	• Check heat absorption at the evaporator (flow rate, temperature); vent if necessary • Refrigeration check	

7.1.3 FAN (IF OUTDOOR UNIT IS PRESENT)

Error message	Fan malfunction
Fault description	Fan fault contact does not close.
Behaviour of the heat pump	• System lock • Unlocking by pressing the reset switch
Cause of fault	• No power supply • Blockage of the fan wheel • Other fan malfunction
Troubleshooting	• Check the power supply • Check that the fan wheel is free to move • Replace the fan

7.1.4 INVERTER

Error message	Inverter malfunction
Fault description	Inverter fault contact does not close.
Behaviour of the Heat pump	• System lock • Unlock by pressing the reset button
Cause of fault	• No power supply • Other inverter malfunction
Troubleshooting	• Check the power supply (right-hand rotating field, phase failure) • Check the error code (see appendix)

7.1.5 HOT GAS

Error message	Hot gas
Error description	Compressor outlet temperature is too high for 20 minutes.
Behaviour of the heat pump	• System lockout • Unlocking by pressing the reset switch
Cause of error	• Compressor outlet temperature too high for 20 minutes
Troubleshooting	• Check sensor plausibility • Refrigeration check

7.1.6 FROST PROTECTION

Error message	Frost protection error	Frost protection malfunction
Error description	Frost protection limit of the hydraulic circuit has been triggered	
Behaviour of the heat pump	• System locked for 10 minutes • If 3 faults occur within 60 minutes, switch to frost protection malfunction	• Lock the system • Unlock by pressing the reset switch
Cause of error	• Lack of heat absorption in the inner section • Heat source too cold	
Troubleshooting	• Check the heat source (temperatures, pumps, heat exchangers) • Vent	

7.2 CLEANING

7.2.1 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)

7.2.2 CLEANING THE HEAT PUMP

- The devices can be cleaned with a standard household cleaner (see below for exceptions).
- Check the air inlets and outlets (regularly check the intake and exhaust hood grilles for adhering leaves and other dirt).
- Sweep away any dirt. The fan should not be running while sweeping, as otherwise the dirt could be sucked into the device.

NOTE

Improper cleaning

Using the wrong cleaning agents can damage the surfaces of the device. Please note the following information:

- 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.

NOTE

Limescale

Limescale deposits can cause the safety valve to stick.

Operate the safety valve of the heating system manually once a month.

7.3 LEAK TEST OF THE HEAT PUMP

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 - Leak tightness of refrigeration systems and heat pumps - Leak detection/leak testing"

NOTE

Leak test

The test must be carried out in accordance with the system logbook. The results of the test must be documented in accordance with regulations and kept for at least 5 years. A system log can be found in the "System logbook for heat pumps".

7.4 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 were used.
These safety signs are clearly visible to everyone, must be kept in a recognisable and legible condition and must 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.

7.5 MAINTENANCE PLAN

DANGER! Do not operate the device if there are any defects.

Maintenance work Operators and users	Measures	Interval
Visual and functional inspection	• Check the device for visible defects and mechanical damage. • Perform a visual inspection of the operating elements. • Perform a visual and functional inspection of all safety devices. • Observe the information in section "7.2 Cleaning".	Monthly
Cleaning the device		As required
Qualified personnel		
Inspection of electrical components Inspection of hydraulic components Inspection of refrigeration components Inspection of safety devices	• Check the electrical components for damage. • Carry out repairs if necessary. • Check the hydraulic components for damage. • Carry out repairs if necessary. • Check the refrigeration components for damage. • Carry out repairs if necessary. • Perform a visual and functional inspection of all safety devices. • Document these checks.	Annually Annually Annually Annually
Checking symbols on the device	• Check the symbols on the device. • Renew the symbols if necessary.	Annually
Checking purchased components	• Observe the manufacturer's documentation for purchased components.	Annually

8. DECOMMISSIONING

When the heat pump is taken out of service, 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 original operating instructions 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 may result in damage to components and functional impairments.

Switch off the device at the main switch.

Please note the following information:

- 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 regarding 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 device 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. EU 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	Email	info@ratiotherm.de
Wellheimer Straße 34	Telephone:	+49 (0) 8422/9977-0
91795 Dollnstein	Website	www.ratiotherm.de

that the device:

Device name:	**WP Max-HiQ CF06, WP Max-LoQ CF06**
Year of manufacture:	see type plate
Intended use:	The heat pump uses heat from environmental sources to provide direct heating support and hot water p r e p a r a t i o n .

in the delivered version 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:

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

Applied harmonised standards:	Applicable EC directives
• DIN EN 378-1-4	• Directive 2014/30/EU
• DIN EN ISO 12100	• Directive 2014/35/EU
• DIN EN 60204-1	• Directive 2014/68/EU
• DIN EN 60335-1	• Directive 2009/125/EC
• DIN EN 60335-2-40	• Directive 2011/65/EU

Documents to be compiled:

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. Any unauthorised changes in this sense shall exclude any liability on our part.

Dollnstein, _____ Signature of authorised representative: _____ Details of the person authorised to issue this declaration on behalf of the manufacturer or its authorised representative:

Name: _____ Position: _____

Address: ratiotherm GmbH & Co. KG, Wellheimer Straße 34, 91795 Dollnstein

You can find us here

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