Original operating instructions

WP Grid-HiQ & WP Grid-LoQ

As of 2025-04

ratiotherm
Smart Energy Systems

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1. FUNCTION DESCRIPTION

The WP Grid-HiQ 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 maximum flow temperature is 72 °C. The areas of application for this heat pump range from sustainable heating and energy networks, to photovoltaic-controlled electricity use, to charging large heat storage tanks, to use as a conventional water/water or brine/water heat pump. Thanks to its speed control, it covers a wide range of outputs and is therefore ideally suited for the use of fluctuating amounts of energy from photovoltaics, for example.

The WP Grid-LoQ is suitable for use in district heating networks with source temperatures below 15 °C. The maximum flow temperature is 72 °C. Thanks to its speed control, it covers a wide performance spectrum and enables perfect load management. Supplemented by the optional integrated district heating transfer, it enables a wide range of network strategies. The Grid-HiQ/LoQ is expanded by numerous options, making it a complete district heating technology package.

ADVANTAGES

- Use of highly fluctuating sources possible (HiQ)
- Use of varying source temperatures below 15 °C possible (LoQ)
- Passive and active cooling possible
- Maximum flexibility thanks to speed-controlled inverter operation
- Flow temperatures up to 72 °C possible
- Integrated energy management (smart grid-compatible)
- Easy installation thanks to complete pre-assembly at the factory, no refrigeration licence required
- With ratiotherm components, a fully coordinated, future-proof system

2 NOTES ON DOCUMENTATION

The following notes are a guide to the entire documentation.
Other documents apply in conjunction with these operating and installation instructions. These installation and operating instructions for specialist tradesmen are part of the ratiotherm WP Grid-HiQ/LoQ heat pump.

The ratiotherm WP Grid-HiQ/LoQ heat pump must not be operated without these instructions.

The manual must be made available to the operator and the specialist installer for information at all times.

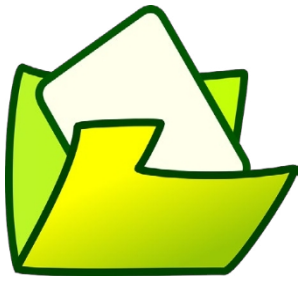
If the ratiotherm WP Grid-HiQ/LoQ heat pump is sold, the manual must also be supplied.

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

TARGET GROUP

These operating instructions are intended for

- the operator (user) and
- the specialist tradesman responsible for the system.



STORAGE OF DOCUMENTS

Keep this manual and all applicable documents in a place where they are available when needed.

Hand over the documents to the successor when moving out or selling.

2. NOTES ON DOCUMENTATION

2.1 BASIC SAFETY INSTRUCTIONS

DANGER!

Immediate danger

leading to serious injury or death.

Potentially hazardous situation

that could result in serious injury or death.

WARNING!

Potentially dangerous situation

that could result in personal injury.

CAUTION!

Potentially dangerous situation

that could result in personal injury or d a m a g e to a component or object in the vicinity.

NOTE!

Application notes

and other useful information that facilitates the intended use of the machine.

2.2 SYMBOLS USED

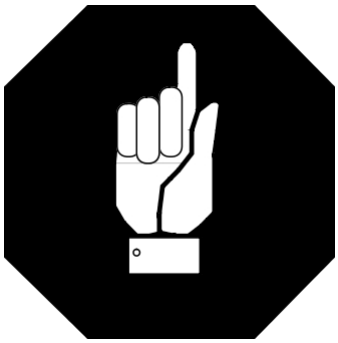
Danger

Danger from electric current

Warning of hot surfaces and liquids

STOP

De-energise before working



Warning regarding damage

Read the operating instructions

2.3 INTENDED USE

The ratiotherm WP Grid-HiQ/LoQ heat pump is built in accordance with the latest technology and recognised safety regulations.

The heating appliance is intended exclusively for domestic and/or commercial use for hot water preparation (domestic 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 devices and other property may occur.

The ratiotherm WP Grid-HiQ/LoQ heat pump is not intended for use by persons (including children) with limited physical, sensory or mental abilities.

The heat pump is also not to be operated by persons with insufficient experience and/or knowledge.

- unless they are supervised by a person responsible for their safety or have received instructions from this person on how to use the device.

The ratiotherm WP Grid-HiQ/LoQ heat pump is intended exclusively for hot water preparation (domestic water) and for heat and cold generation.

Any other or additional use is considered improper. The manufacturer/supplier is not liable for any damage resulting from this.

The risk is borne solely by the user (operator).

Proper use also includes observing the operating and installation instructions and all other applicable documents, as well as complying with the inspection and maintenance conditions.

2.4 GENERAL SAFETY INSTRUCTIONS

WARNING! POSSIBLE DAMAGE

- Use only by qualified and trained persons.
- Only for the intended use.
- Any other use constitutes misuse.

CAUTION! RISK OF SCALDING

- 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.

NOTE! POSSIBLE DAMAGE

Damage to the heat pump and components is possible.

- Read and follow the operating instructions.
- To avoid accidents and damage to property, observe the safety instructions!
- The national regulations of the country in which the ratiotherm WP Grid-HiQ/LoQ heat pump is used must be observed.

WARNING! POSSIBLE DAMAGE

Do not make any changes:

- to the heat pump;
- to the water and electricity pipes;
- to the safety valve;
- to structural conditions that could 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.

2.5 INSTALLATION AND SETTING

The installation, commissioning or dismantling of the device may only be carried out by a specialist with specific knowledge necessary for the activities involved with this device.

The existing regulations, rules and guidelines as well as the local installation requirements must be observed.

CAUTION!

Safety valve and blow-off line

The volume of water increases during the heating process. Therefore, never close the blow-off line of the safety valve.

Hot water may escape from the blow-off pipe!

Leak

If there are leaks in the heat pump area, switch off the system and shut off the connection to the rest of the heating system.
heating system. The leak must then be repaired immediately.

NOTE!

Corrosion damage

To prevent corrosion on the device, do not use sprays, solvents, chlorinated cleaning agents, paints, adhesives, etc. in the vicinity of the device. Under unfavourable circumstances, these substances can lead to corrosion.

Spare and wear parts

Components that have not been tested with the system may cause damage to the system or impair its functions. Only use original spare parts and original wear parts.

2.6 GUIDELINES, STANDARDS AND LAWS

When setting up and installing the heater, the following regulations, rules and guidelines must be observed in particular:

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

In addition, further local regulations and guidelines, e.g. local building regulations, may have to be observed.

As a general rule, the legal regulations applicable in the respective country must be observed!

2.7 QUALIFICATION OF PERSONNEL

The installation, commissioning or dismantling of the device may only be carried out by a specialist with specific knowledge necessary for the activities involved with this device.

By personnel, we mean all persons who work on the ratiotherm WP Grid-HiQ/LoQ heat pump. Trainees are not considered qualified personnel in this sense.

We assume that

- the operating personnel have been trained to operate the ratiotherm WP Grid-HiQ/LoQ heat pump.
- the maintenance personnel adjust, check and repair the ratiotherm WP Grid-HiQ/LoQ heat pump in such a way that there is no danger to people or property.

2. NOTES ON DOCUMENTATION

2.8 RESPONSIBILITY OF THE SPECIALIST TRADESMAN

CAUTION!

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.

To ensure safe installation, the responsible specialist must ensure that:

- the personnel have the necessary qualifications and receive the necessary training;
- the personnel have read and understood the operating instructions;
- staff have access to the operating instructions at all times;
- local accident prevention and environmental regulations are implemented and complied with;
- staff are instructed by the responsible supervisor and unauthorised persons are kept away from the ratiotherm WP Grid-HiQ/LoQ heat pump;
- the ratiotherm WP Grid-HiQ/LoQ heat pump is only handed over and operated in a safe and functional condition, and any damage to the heat pump is repaired immediately or the damaged heat pump is shut down immediately.

Technical modifications

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 disabled. Only original spare parts and original accessories from the manufacturer may be used.

3.1 WP GRID-HiQ

Grid-HiQ	F06	F14	F21	
Performance data heating mode				
W20/W55				
Heating output	3.06 to 8.7	5.9 to 19.8	7.8 to 25.1	kW
Power consumption	0.66 to 2.2	1.5 to 5.2	1.9 to 5.9	kW
COP at rated power	4.91	4.53	4.75	
Compressor				
Type	Fully hermetic, Rotary piston, inverter	Fully hermetic, scroll, inverter		
Blocking current LRA	32	40	45	A
Oil quantity	0.63	2	2	litres
Evaporator				
Design	Copper-brazed plate heat exchanger			
Material	Stainless steel / copper			
Volume flow brine	0.4 to 1	0.8 to 2	1 to 4	m^3/h
Pressure loss	0.2	0.3	0.3	bar
Temperature difference	3	5	5	K
Min./max. source temperature	10 / 55			°C
Connection dimensions	1 1/2", AG			
Condenser				
Design	Copper-brazed plate heat exchanger			
Material	Stainless steel / copper			
Water flow rate	0.8 to 2.2	1.2 to 2.5	1.6 to 4.8	m^3/h
Pressure loss	0.2	0.3	0.3	bar
Temperature difference	5 to 10			K
Min./max. flow temperature	30 / 72			°
Connection dimension	1 1/2", AG			
Refrigeration circuit				
Working medium	R134 A			
Filling quantity	1.4	1.7	2.2	kg
Max. operating pressure	26			bar
Electrical				
Mains connection	230 V / 1~ / 50 Hz	400 V / 3~ / 50 Hz		
Fuse protection	16	16	20	A
Max. operating current compressor	15	15.8	19	A
Device data				
Sound pressure level Interior at a distance of 1 m	40			dB(A)
Dimensions of interior	777 x 1800 x 512			WxHxD (mm)
Weight	210	230	250	kg
Max. operating pressure water	10			bar

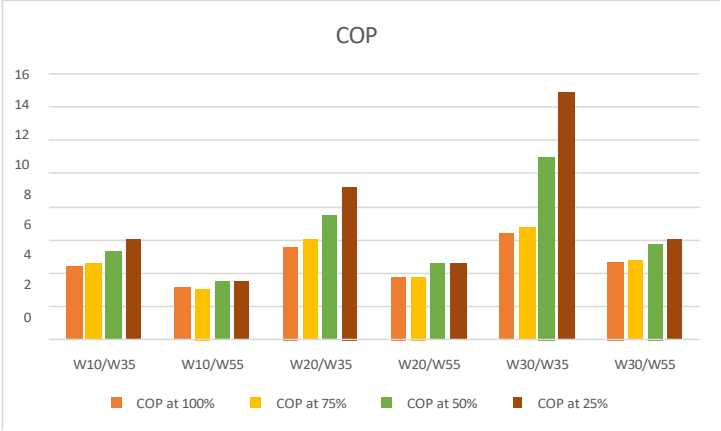
3. TECHNICAL DATA

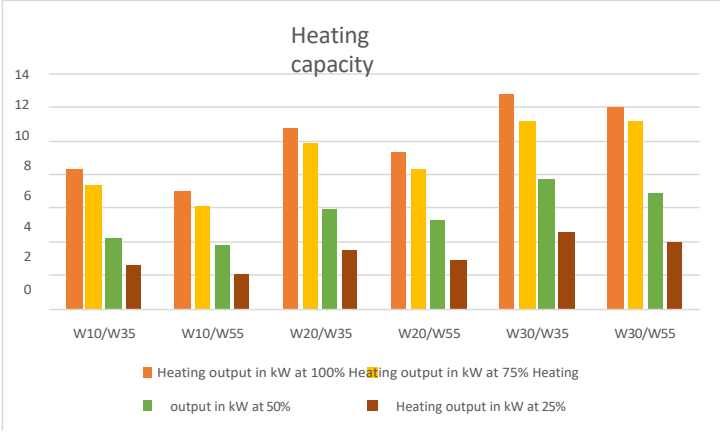
3.2 WP GRID-LoQ

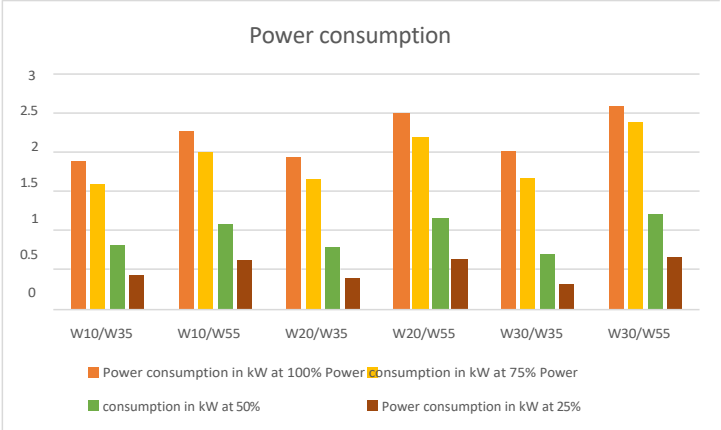
Grid-LoQ	F06	F14	F21	F27	
Performance data heating mode					
W10/W55					
Heating output	2.5 to 7.2	4.9 to 16.4	6.5 to 20.8	7.7 to 30.7	kW
Power consumption	0.66 to 2.2	1.5 to 5.2	1.9 to 5.9	2.5 to 10	kW
COP at rated power	3.77	3.3	3.33	3.37	
Compressor					
Type	Fully hermetic, Rotary piston, inverter	Fully hermetic, scroll, inverter			
Blocking current LRA	32	40	45	50	A
Oil quantity	0.63	2	2	2.5	litres
Evaporator					
Design	Copper-brazed plate heat exchanger				
Material	Stainless steel / copper				
Brine flow rate	0.4 to 1	0.8 to 2	1 to 4	1 to 4.5	m^3/h
Pressure loss	0.2	0.3	0.3	0.3	bar
Temperature difference	3	5	5	5	K
min./max. source temperature	-5 / 15				°C
Connection dimensions	1 1/2", AG				
Condenser					
Design	Copper-brazed plate heat exchanger				
Material	Stainless steel / copper				
Water flow rate	0.8 to 2.2	1.2 to 2.5	1.6 to 4.8	1.6 to 5.3	m^3/h
Pressure loss	0.2	0.3	0.3	0.3	bar
Temperature difference	5 to 10				K
Min./max. flow temperature	25 / 72				°
Connection dimension	1 1/2", AG				
Refrigeration circuit					
Working medium	R134 A			R513a	
Filling quantity	1.4	1.9	2.2	2.7	kg
Max. operating pressure	26				bar
Electrical					
Mains connection	230 V / 1~ / 50 Hz	400 V / 3~ / 50 Hz			
Fuse	16	16	20	25	A
Max. operating current compressor	15	15.8	19	24	A
Device data					
Sound pressure level Interior at a distance of 1 m	40				dB(A)
Internal dimensions	777 x 1800 x 512				WxHxD (mm)
Weight	210	230	250	270	kg
Max. operating pressure water	10				bar

3.3 PERFORMANCE CURVES OF THE GRID-HIQ F06

COP, heating capacity and power consumption at varying speeds:







	COP at				Heating capacity in kW at				Power consumption in kW at			
	100	75	50	25	100	75%	50	25	100	75	50	25
W10/W35	4.41	4.59	5.25	6.05	8.30	7.30	4.20	2.60	1.88	1.59	0.80	0.43
W10/W55	3.08	3.05	3.52	3.44	7.00	6.10	3.80	2.10	2.27	2.00	1.08	0.61
W20/W35	5.52	5.98	7.47	9.21	10.70	9.80	5.90	3.50	1.94	1.64	0.79	0.38
W20/W55	3.73	3.79	4.57	4.53	9.30	8.30	5.30	2.90	2.49	2.19	1.16	0.64
W30/W35	6.37	6.75	11.0	14.84	12.80	11.20	7.70	4.60	2.01	1.66	0.70	0.31
W30/W55	4.65	4.71	5.75	6.0	12.00	11.20	6.90	3.90	2.58	2.38	1.20	0.65

4. MECHANICAL INSTALLATION

4.1 INTERIOR UNIT

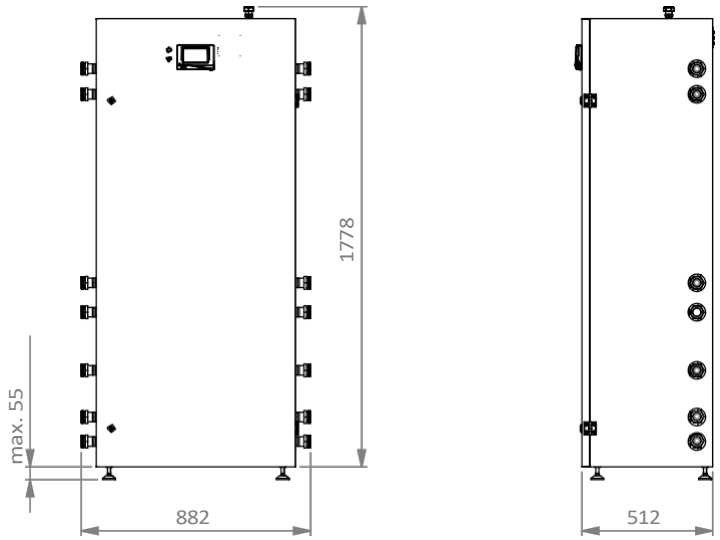
Storage conditions:

- Ensure frost-free storage.

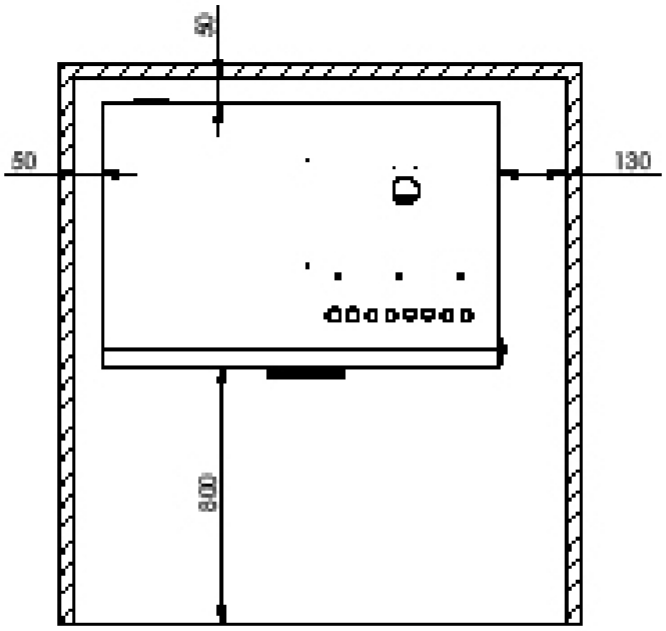
Installation conditions:

- A floor drain must be provided to protect against water damage.
- The ratiotherm WP Grid-HiQ/LoQ 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.
- Depending on the installation location, a sound-insulated base is recommended.

Dimensions:

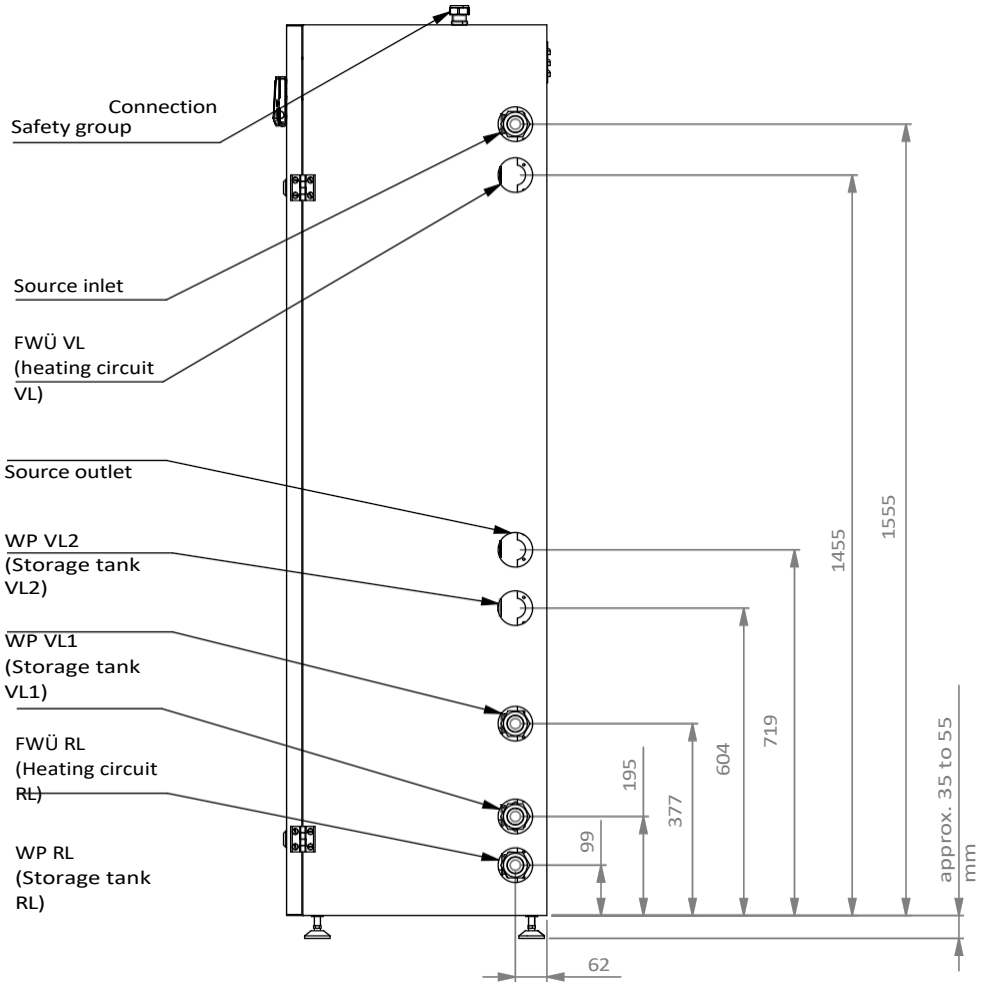


Distance measurements:



5. HYDRAULIC INSTALLATION

5.1 CONNECTION DIMENSIONS AND SIZE



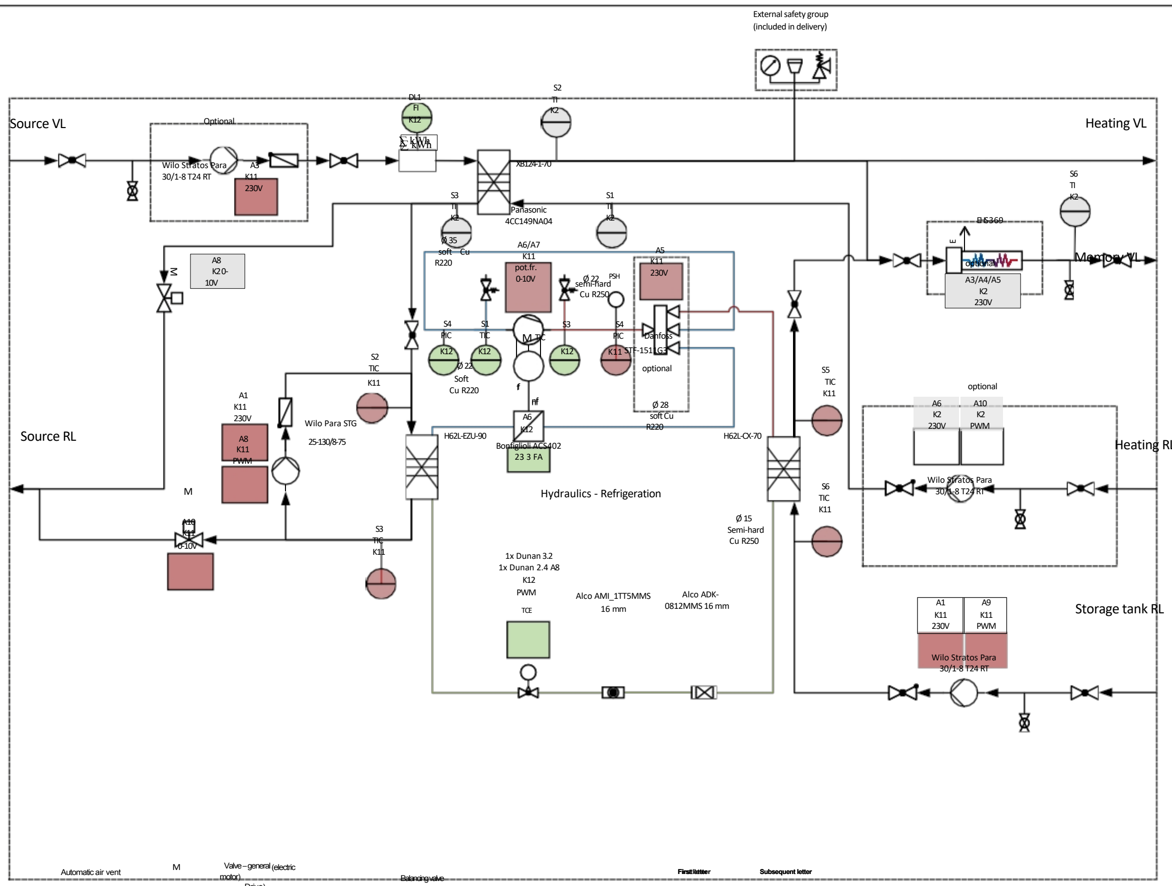
- Shut-off valves and vents must be provided on site.
- Sludge separators and magnetite separators must also be provided on site.
- A vibration-decoupled connection via hoses must be installed.

  Recommendation: Cornerstone TWS 40
- 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.
- A drain cock is installed in the system.
- When tightening, please hold the connections in place!

Input assignment K11	
S1	SmartGrid 1/EVU/etc.
S2	T. Cond. inlet
S3	T. Cond. outlet
S4	High pressure
S5	T. WP flow
S6	T. WP return

Output assignment K11	
A1	Pump evaporator/condenser
A2	Fault output
A3	Mains/normally closed source.
A4	Normally open source.
A5	4-way valve
A6	Compressor pot.
A7	Compressor 0/10V
A8	Pump. Cond PWM
A9	Pump cond. PWM
A10	District heating valve

Input assignment K2	
S1	T. FWÜ Secondary On
S2	T. FWÜ Sec. Off
S3	T. FWÜ Prim. Off
S4	Request cooling
S5	Request direct transfer
S6	T. E-rod VL



Input assignment K12	
S1	T. Outlet Verd. K.
S2	Request
S3	Inv. fault/T. hot gas.
S4	Low pressure
S5	0-10V T.Setpoint
S6	Smart Grid 2
DL1	Volume flow. Qu
DL2	Source primary input

Output assignment K12	
A5	Housing fan
A6	Interference suppression inverter
A7	24 V supply
A8	Expansion valve

Output assignment K2	
A1	Storage valve
A2	Storage valve
A3	E-staff Level 1
A4	E-staff Level 2
A5	E-rod stage 3
A6	Pu. FWÜ/switching valve.
A7	24V supply
A8	Valve FWÜ direct load.
A9	M-Bus
A10	Pump FWÜ (PWM)

Legend: Circulation pump, Compressor, Non-return valve, Check valve Safety valve, Flow switch, Flow meter, Automatic air vent, Vent, (KFE ball valve) Drain, Ball valve Passage, Outlet, Valve – general (electric motor) Drive (230V, 24V, 0-10V, pot. free, PWM), Valve - thermal, Temperature, pressure or full volume flow sensor, Heat meter, Three-way valve, Four-way valve, Slider, Schrader valve, Four-way valve Refrigeration technology, Balancing valve, Sight glass with indicator, Filter dryer, Heat exchanger (general), Heat exchanger Plates, Heat exchanger Finned tube, Valve regulating Passage, Pressure gauge with display, Shut-off valve with thermometer, Consumer, Expansion vessel, Collector, Ball valve, angle, First letter: T Temperature, P Pressure, F Flow, K Node, S Sensor input; Subsequent letter: T Temperature, I Indicator, A Output, C Control, A Message; Hot gas line, Suction gas line, Liquid line

Date	Name	Change	Status	Index
Signed 1 December 2021	Wenninger		Status as of 1 December 2021	
Reviewed 00.00.2000				

Plan designation: Piping and instrumentation diagram Max/Grid-HiQ F27 V2

Caution: This diagram is only a recommendation and does not claim to be exhaustive in any respect.

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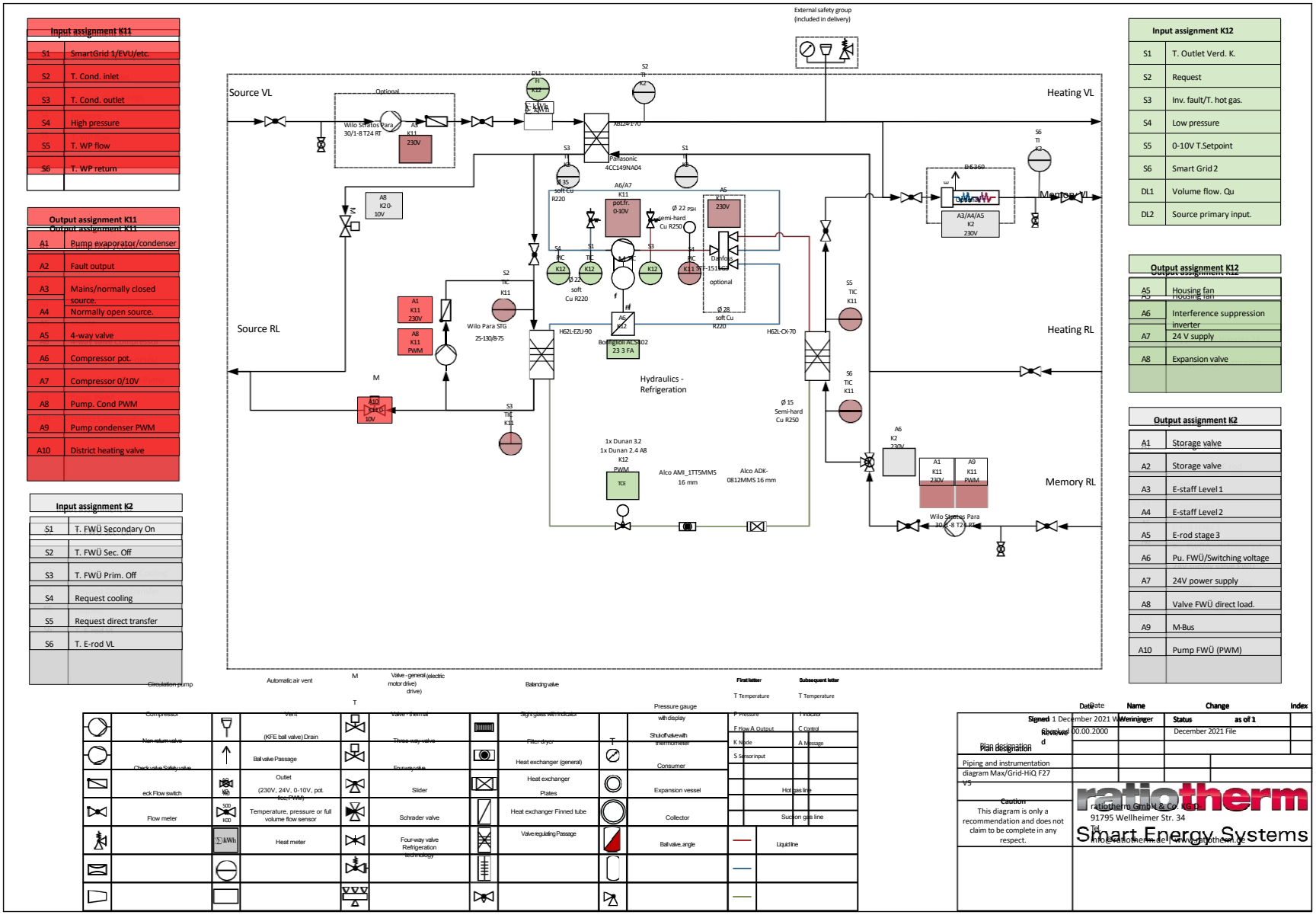
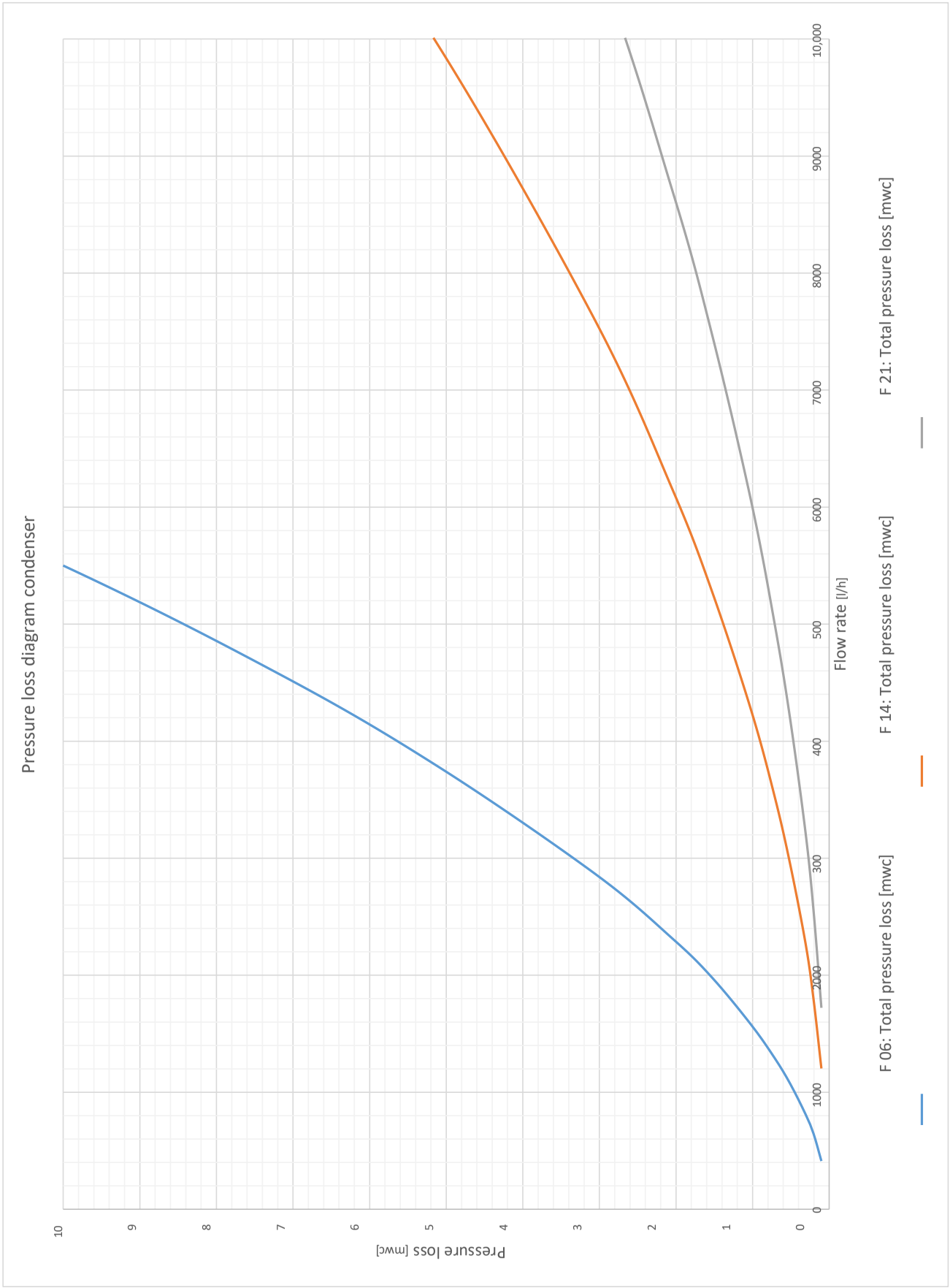
ratiotherm Smart Energy Systems



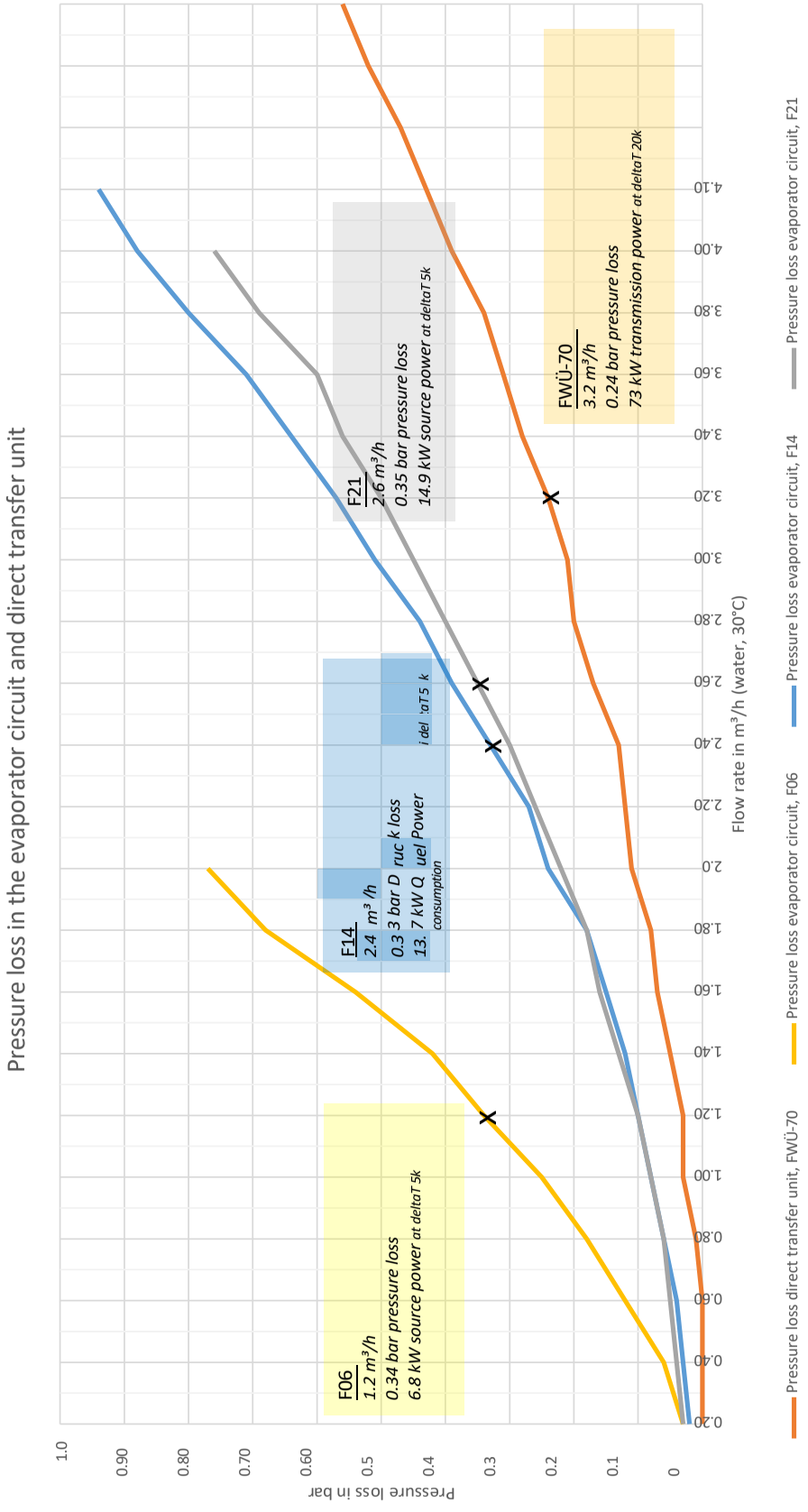
TU_D_WP_Grid-HiQ/LoQ_2024.03-jb - All information, images and drawings are subject to errors and changes. The generally applicable and recognised rules of technology must be observed at all times!
ATTENTION! Installation and wiring may only be carried out by authorised specialist personnel.

5. HYDRAULIC INSTALLATION

5.3 PRESSURE LOSS DIAGRAM CONDENSER



5.4 PRESSURE LOSS DIAGRAM EVAPORATOR



5. HYDRAULIC INSTALLATION

5.5 REQUIREMENTS FOR SYSTEM WATER

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

Parameters	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	◦

It must be ensured 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.

6.1 NOTES

- 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 residual current circuit breaker must be marked separately for the heater, e.g. as "WP". Please ensure that the phase and neutral conductors are correctly assigned during wiring.
- The power supplies for the control system, the compressor and the heating element 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 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.

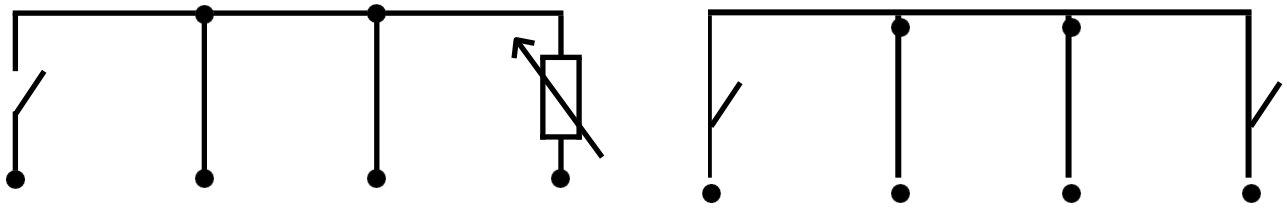
6. ELECTRICAL INSTALLATION

6.2 WIRING DIAGRAM AND DESCRIPTION

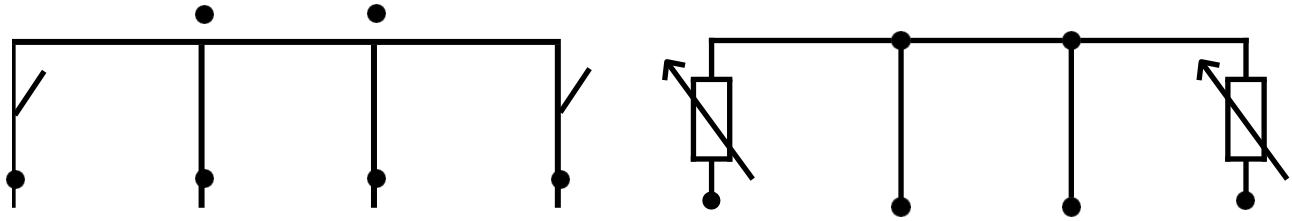
X1					X1				
L1	L2	L3	N	PE	L1	L2	L3	N	PE
400 V mains compressor					400 V mains Electric rod				

Bridges can be removed if a separate supply line is provided for the electric rod.

X2								
L1	N	PE	1	N	PE	2	N	PE
230 V mains control/pumps			230 V Fault output			230 V Source pump output		



X3							
1	GND	GND	2	3	GND	GND	4
WP request contact (potential-free)		WP speed signal (0 - 10 V)		Smart Grid 1 / Energy Suppliers		Smart Grid 2	



X3							
5	GND	GND	6	7	GND	GND	8
FWÜ Request contact (potential-free or 0 - 10 V)		Cooling request contact (potential-free)		Storage tank top		Storage tank bottom	

X4			
GND	12	CAN-H	CAN-L

CAN bus (Connection to RT-GLT)

6.2 TERMINAL DIAGRAM AND DESCRIPTION

- Terminal range X1 is intended for the compressor current. Depending on the power rating (e.g. F06), the connection can also be single-phase.
- X2.2 serves as an output for a source pump, provided that the system is not used in a district heating network. The output may be loaded with a maximum of 3 A.
- X3.3 and X3.4 are used to process a signal from the grid operator/energy supplier. X3.3 is backward compatible with the EVU contact.
- Please wire the EVU contact as a normally open contact (closed when EVU lock is active).
- X3.1 and X3.2 are request signals or target power or temperature specifications for the integrated compressor circuit.
- X3.5 is used to request the district heating direct transmitter (optionally also with setpoint temperature transfer).
- X3.6 activates cooling mode. Depending on the situation, the heat pump or the district heating transfer unit must also be requested.

6.3 ELECTRICAL CONNECTION POWER

	TYPE:	F06	F14	F21	F27
CONTROL VOLTAGE	Fuse:	B10A 1-pole	B10A 1-pole	B10A 1-pole	B10A 1-pole
	Cable cross-section cross-section:	3G 1.5 mm²	3G 1.5 mm²	3G 1.5 mm²	3G 1.5 mm²
COMPRESSOR	Fuse:	B16 1-pole	B16 3-pin	B20 3-pin	B25 3-pin
	Cable cross-section cross-section:	3G 2.5 mm²	5G 2.5 mm²	5G 4 mm²	5G 4 mm²

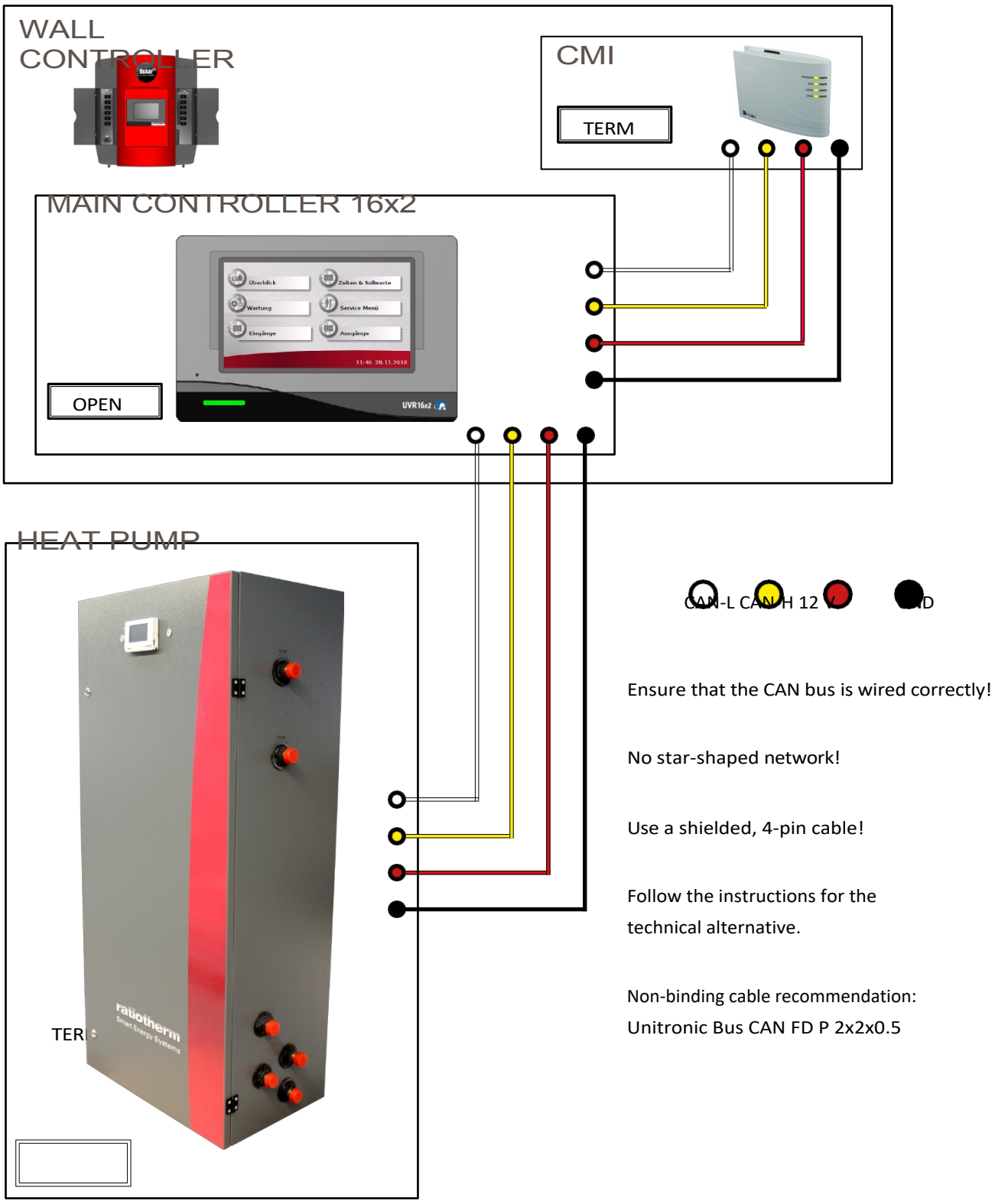
All information, images and drawings are subject to errors and changes.

ATTENTION! Installation, Wiring installation and wiring must only be carried out by authorised specialist personnel.

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.

6.4 CAN-BUS PLAN



Ensure that the CAN bus is wired correctly!

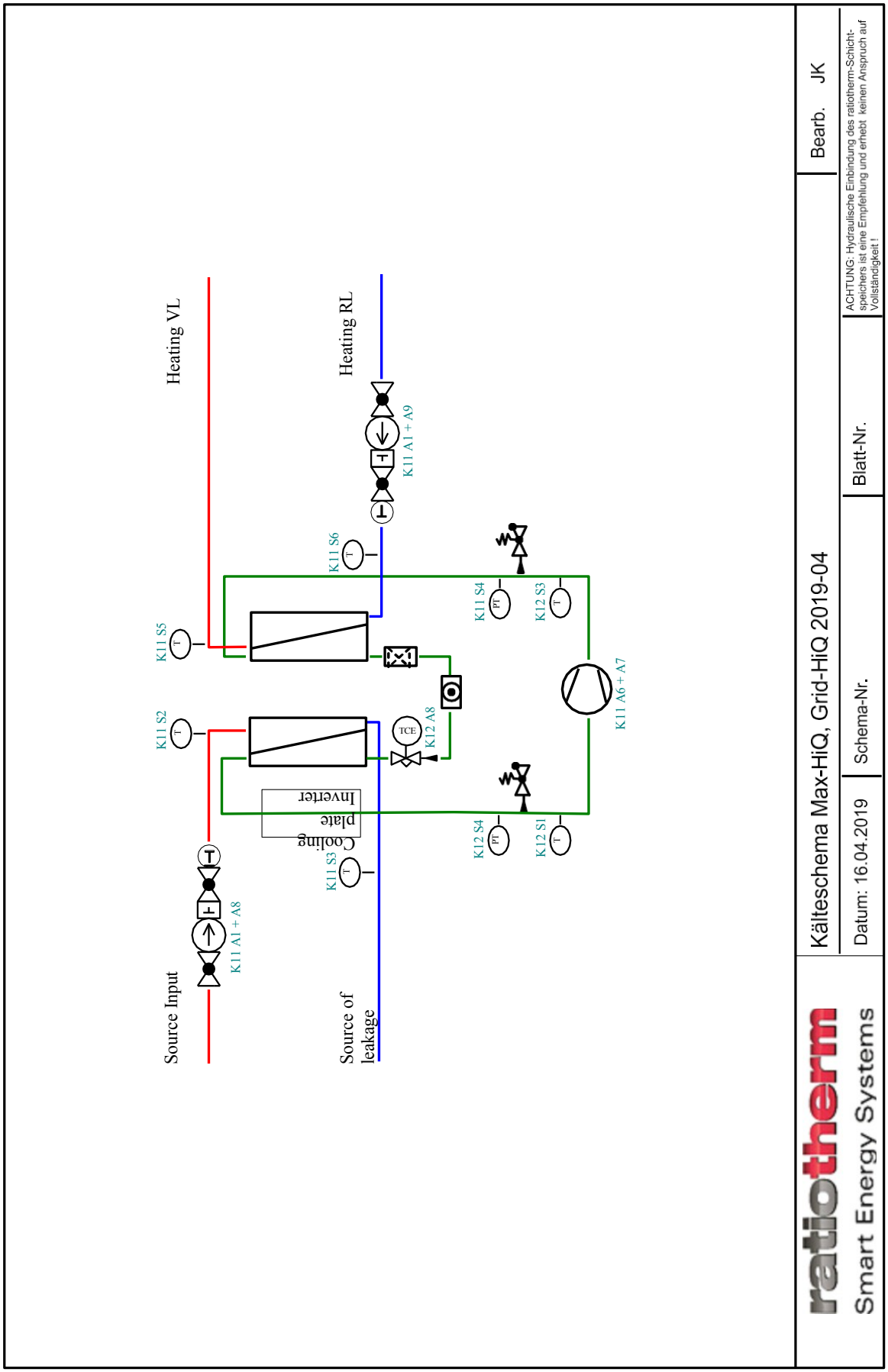
No star-shaped network!

Use a shielded, 4-pin cable!

Follow the instructions for the technical alternative.

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

7.1 COOLING SCHEME



8. STRUCTURE AND FUNCTION

8.1 STRUCTURE AND SPARE PARTS

The ratiotherm WP Grid-HiQ/LoQ heat pump has a complete refrigeration circuit and uses a source circuit as its primary energy source.

The refrigeration circuit is a hermetically sealed circuit consisting of a rotary piston compressor (F06) or a scroll compressor (F14, F21, F27), a condenser (plate heat exchanger), an evaporator (plate heat exchanger) and an electronic expansion valve, which controls the flow of refrigerant. The environmentally friendly R134 A is used as the working medium.

The ratiotherm WP Grid-HiQ/LoQ heat pump is shipped fully filled and ready for operation. No further refrigeration commissioning is required.

The ratiotherm WP Grid-HiQ/LoQ 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.

The WP Grid-HiQ/LoQ heat pump can be operated in combination with most electric, gas or oil boilers.

Display
ra/95.10.3219

ON/OFF switch
ra/13339

Contact sensor
ra/13440

Reset switch
ra/13340

Immersion sensor
ra/13467

8.1 STRUCTURE AND SPARE PARTS

Stepper motor control
ra/13047

RSM610 - 24 V
ra/13197

Frequency converter F06:
ra/13308
F14: *ra/13025*
F21: *ra/13023*

RSM610
ra/95.10.3305

High-pressure pressure transmitter
ra/13049

Cartridge pressure limiter
ra/10076

Low pressure transmitter
ra/13048

Evaporator F06:
ra/13192 F14:
ra/13291 F21:
ra/13421

Pump
ra/13309

Ex-valve F06:
ra/13036 F14:
ra/13040
F21: *ra/13038 (2x)*

Condenser
F06: *ra/13193*
F14: *ra/13319*
F21: *ra/13420*

Compressor
F06: *ra/13296*
F14: *ra/13327*
F21: *ra/13418*

400 V electricity meter
ra/13000

RSM610 - M-Bus + 24 V
ra/13405

RSM610
ra/95.10.3305

District heating direct transmitter
ra/13759

E-rod
ra/95.50.0001

WP 2-way valve
ra/13356

FWÜ 2-way valve
ra/13356

Filter dryer
F06: *ra/12210*
F14/F21: *ra/10034*

Sight glass
F06: *ra/10004*
F14/F21: *ra/11335*

Direct drive pump
F06: *ra/13310*
F14/F21: *ra/13423*

Condenser pump
F06: *ra/13310*
F14/F21: *ra/13423*

8.2 CONTROL LOGIC AND CONTROL

Control logic:

The unit basically has two separate control elements that communicate via the CAN bus:

- The district heating controller K2 manages the district heating direct transfer unit.
- K11 and K12 are the control elements for the heat pump unit.

District heating controller:

- If there is a 0-10 V signal at contact X3.5, the district heating transfer unit is activated. The 0-10 V signal is interpreted as the setpoint temperature. The district heating valve automatically regulates to this setpoint temperature. If the setpoint temperature specification is deactivated via a fixed value, the district heating valve regulates to fixed setpoint temperatures (heating mode, cooling mode).
- If an FWÜ pump is installed (can be activated via a fixed value), it is switched on. This regulates the setpoint temperature difference between the FWÜ inlet and FWÜ outlet on the secondary side.
- If cooling is activated via contact X3.6, the system checks whether the FWÜ or the WP is also requested. Depending on the combination, the FWÜ or the WP is activated and switched to cooling mode.
- If the heat pump is in cooling mode, heating mode is blocked until the heat pump is deactivated again. This means that in order to return to heating mode, the heat pump must first be deactivated.
- The electric heating rod can be activated via a fixed value. This is also activated in the event of a heat pump malfunction. Depending on the target/actual deviation, the three stages are switched on or off.

Heat pump unit:

- The heat pump is activated via input signal X3.1. This activates the evaporator and condenser pumps and the valves. The compressor starts up after 45 seconds. From model year 20/45 onwards, the heat pump is also activated when a 0-10V signal is applied to X3.2. This gives the user the choice of whether to activate the system digitally or via 0-10V.
- When the system is activated, the minimum running time is five minutes. An error immediately switches off the system.
- If a 0-10 V signal is present at input X3.2, this is interpreted as the setpoint temperature. The compressor speed is automatically regulated to the setpoint temperature. If the setpoint temperature is above 25 °C, the system is in heating mode.
- If the setpoint temperature is below 25 °C and cooling is active, the system switches to cooling mode.

- If there is no 0-10 V signal, the compressor runs at a constant speed (e.g. for DHW recharge). The speed can be set via a fixed value.
- The compressor speed is limited during the start-up phase, which is why full speed is only reached after 4 x 1.5 minutes.
- If the source temperature inside the evaporator is below 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 also prevented. Once temperatures return to normal, the machine starts up as usual.
- If the source temperature falls below 8 °C, a frost protection fault is triggered and the system is blocked for seven 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 heat pump flow temperature exceeds 72 °C or falls below 12 °C, the system automatically switches off for 20 minutes. If the temperature normalises during this time, the system restarts after the 20-minute waiting period.
- The evaporator pump regulates the deltaT between the source inlet and outlet (factory setting 3 K).
- If an anomaly is detected (HD, ND, forest protection), an error is triggered and the system is blocked for five or seven minutes. This cannot be acknowledged with the reset button!
- If the same error occurs three times within an hour, the system is locked. This can be cancelled using the reset button.
- To prevent anomalies, high pressure, low pressure and compressor temperature are monitored and, if necessary, the speed is reduced for at least eight minutes.
- In cooling mode, the FW valve is fully opened, the evaporator pump runs at minimum speed and the condenser pump control and compressor speed control are switched to inverse mode.

8.3 OPTIONS

1. Option: District heating direct transfer

If the network temperature is high enough 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 2 (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:

CF06:	*FWÜ-25 (Danfoss D55-H-36 or comparable)*
F06/F14/F21:	*FWÜ-70 (Danfoss XB12-70 or comparable)*

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:

CF06:	*Wilo Para STG 15/1-8 (or comparable)*
F06/F14/F21:	*Wilo Para STG 25/1-8 (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 during floor drying.

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

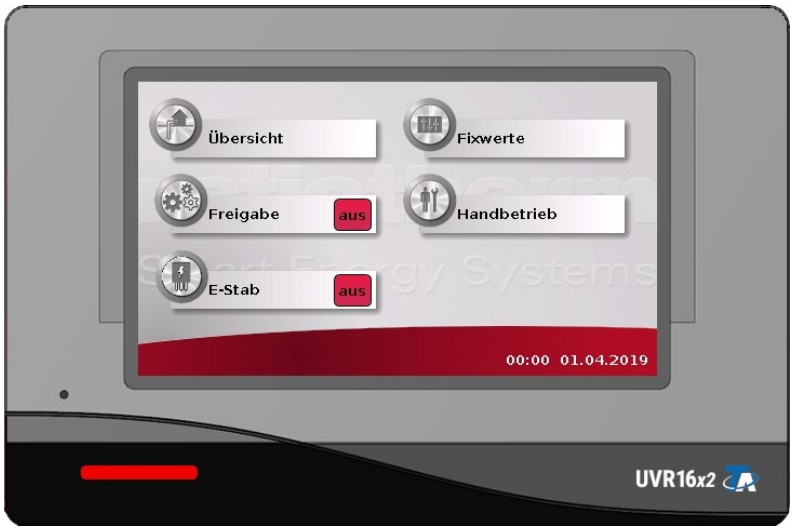
The remote maintenance module provides an Ethernet interface. When connected to a network, this enables remote maintenance of the device. It also allows connection to the higher-level building management system via ModBus/TCP or CAN-over-Ethernet. The interface is configured according to customer requirements.

5. Option: Active cooling

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

9. OPERATING INSTRUCTIONS

9.1 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 below the control knob.
- 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 obtain all the information necessary for operation (sensor values, network inputs).

Control elements:

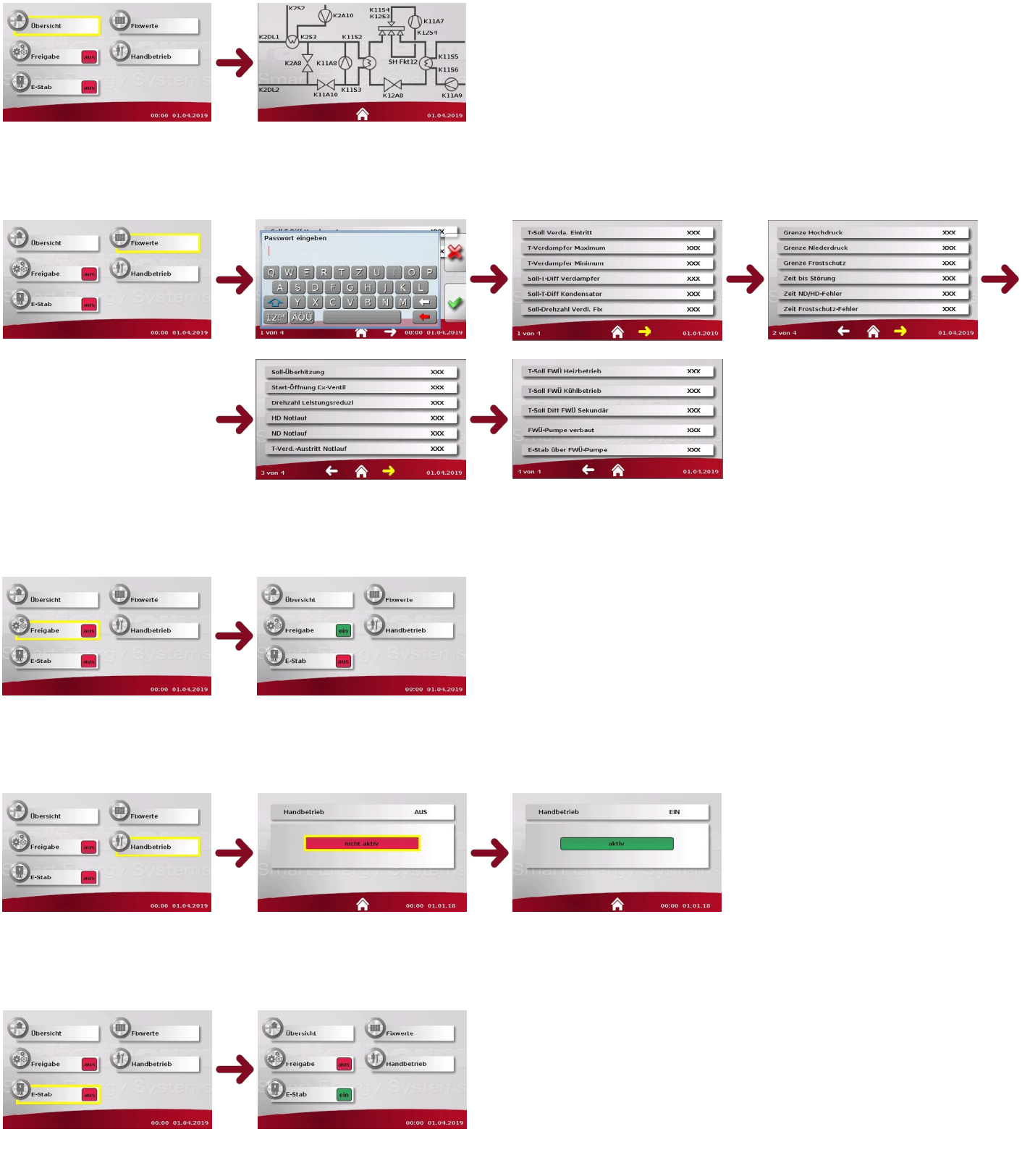
Previous page | Main menu | Next page

Control switch:

ON/OFF switch

Reset switch

Overview of the menu structure:



9.1 CONTROL OPERATION

E-rod: ON

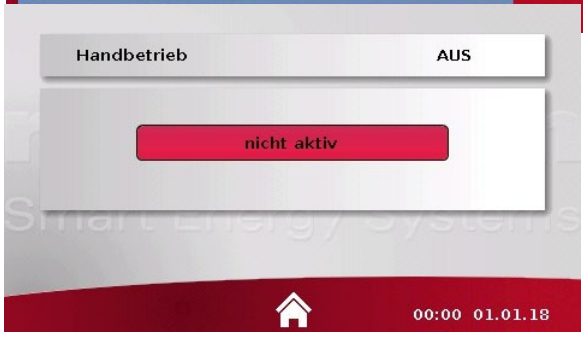
The E-rod can be switched on independently of the bivalence temperature.

Enable: ON

Heat pump may start up when requested.

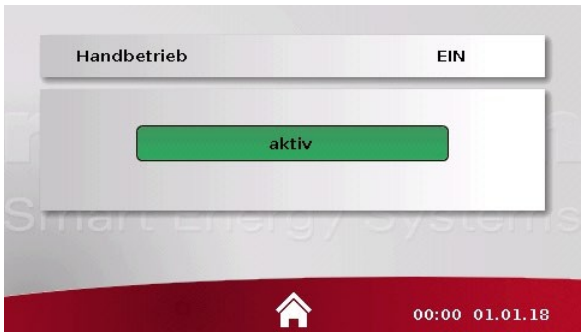
Enter password

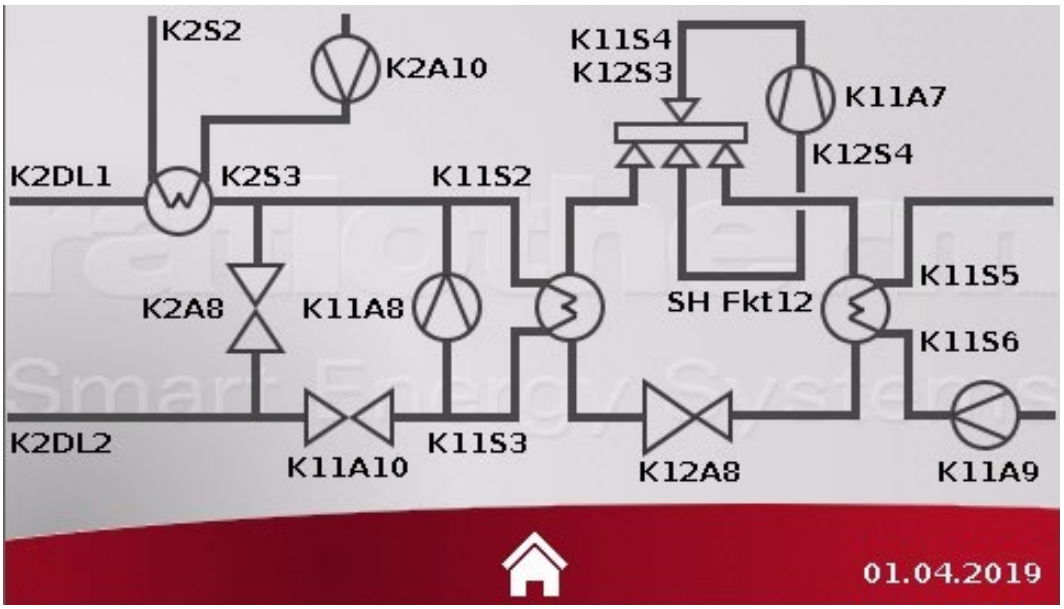
Enter the specialist password to access the specialist menu



Manual mode: ON

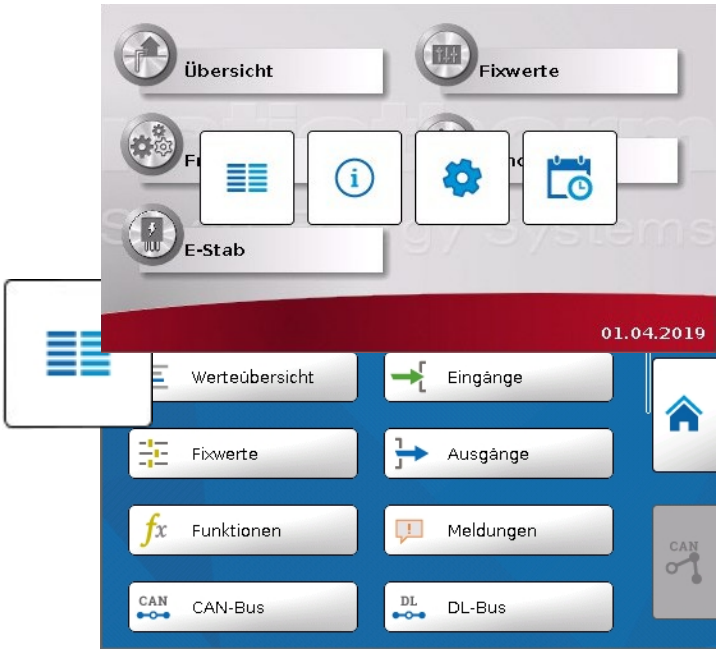
Forced start of the heat pump regardless of the request signal





K2S2	T-FWÜ Secondary outlet
K2S3	T-FWÜ Primary discharge
K2A8	Valve district heating
K2A10	PWM Pump FWÜ
K2DL1	T. District heating primary VL
K2DL2	T. District heating primary return
K11S2	T-evaporator inlet
K11S3	T-evaporator outlet
K11S4	High pressure
K11S5	T. Heat pump VL
K11S6	T. Heat pump RL/Reset
K11A7	Compressor 0-10 V
K11A8	Evaporator pump PWM
K11A9	Condenser pump PWM
K11A10	District heating valve 0-10 V
K12S3	Inverter fault/hot gas
K12S4	Low pressure
K12A8	Ex valve PWM
SH Fkt12	Actual overheating

9.1 CONTROLLER OPERATION

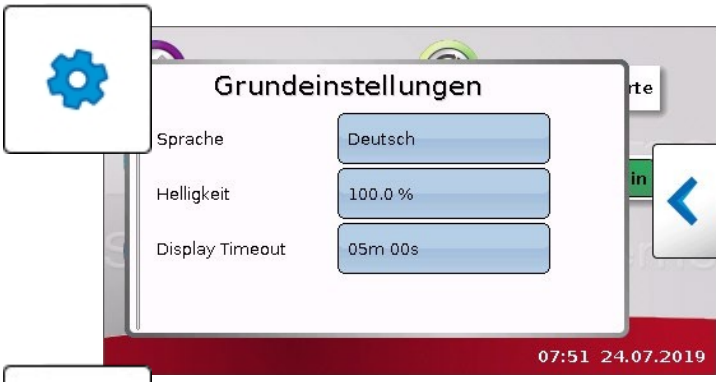


Intermediate menu

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

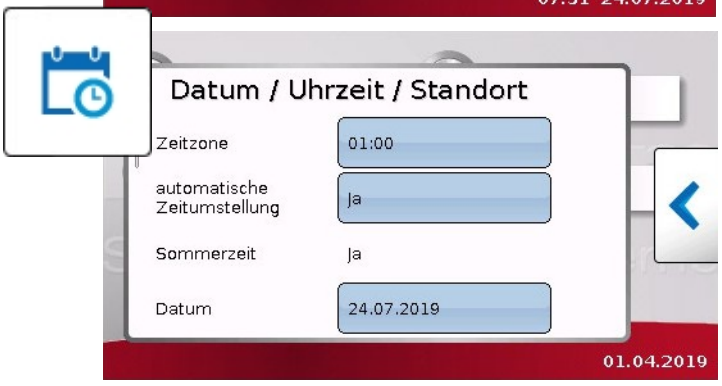
Controller menu

Link to the controller menu



Basic settings

Set the language, brightness and display timeout



Date/time/location

Time zone and date can be set

Fixed values	Description	Setting options	Preset setting
Specialist			
T-setpoint Evaporator inlet	Target 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
T-evaporator minimum	Minimum permissible evaporator temperature	8 °C to 20 °C	11
Target T-Diff evaporator	Setpoint temperature difference between evaporator inlet and outlet	1 °C to 8 °C	3.5 °C
Target T-Diff Condenser	Target temperature difference at the condenser	1 °C to 10 °C	8 °C
Target speed Compressor	Target speed of the compressor when no external speed signal is present.	0% to 100%	75
High pressure limit	Maximum pressure at which a high-pressure error or a high pressure fault is triggered.	20 bar to 26 bar	24 bar
Low pressure limit	Minimum pressure at which a low pressure fault or an ND 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.	8 °C
Time until malfunction	If three faults occur within one hour occur, the machine switches off. Error has	0 to 24 hours	60 min
Time ND/HD error	Time lock for restart if ND/HD occurred.	0 to 24 hours	5 min
Time Frost protection error	Time lock for restart if Frost protection error has occurred.	0 to 24 h	7
Target overheating	Target overheating of the expansion valve in Outdoor unit during normal operation	0 °C to 10 °C	5.3 °C
Start opening of expansion valve	Start opening of the expansion valve in Outdoor unit	Stages 0 to 500	Step 280
Power reduction Speed	Power reduction is active. Compressor speed during		
HD emergency operation	Maximum pressure at which a temporary power reduction is triggered.	15 bar to 25 bar Stages 0 to 100	Stage 45 22 bar
ND emergency operation	Minimum pressure at which a temporary power reduction is triggered.	1 bar to 10 bar	1.5 bar

9.2 SETTINGS

Fixed values	Description	Setting options	Preset setting
Specialist			
T.-Verd.-Outlet Emergency operation compressor,	Maximum discharge temperature of the compressor, at which a temporary reduction in output is triggered.	80 °C to 130 °C	110 °C
T-setpoint FWÜ heating mode	Setpoint temperature of the direct district heating transmission in heating mode when no external specification is available.	20 °C to 80 °C	37.2 °C
T-set FWÜ cooling mode	Setpoint temperature for direct district heating transmission in cooling mode when no external specification is available.	10 °C to 25 °C	18 °C
T-setpoint Diff FWÜ secondary at	Setpoint temperature difference on the secondary side District heating direct transfer	3 °C to 20 °C	10 °C
FWÜ pump installed	Activation of direct district heating transfer pump; only activate if installed!	OFF/ON	ON
E-rod via FWÜ pump FWÜ pump	Activate if the electric rod is flowed through via the . Otherwise, the condenser pump is activated in E-rod mode.	OFF/ON	OFF

10. TROUBLESHOOTING

INVERTER

Error message	Inverter malfunction
Fault description	Inverter fault contact does not close.
Behaviour of the heat pump	• System lock • Unlocking by pressing the reset switch
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)

HIGH PRESSURE

Error message	HD error	HD malfunction
Error description	High 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 HD fault	• Locking the system • Unlocking by pressing the reset switch
Cause of error	• Lack of heat dissipation • Blockage of cooling circuit • Heat sink too hot	
Troubleshooting	• Check the sink temperature or target temperatures • Temperatures below max. water temperature according to type plate • Check heat dissipation to the medium (pump, heat exchanger) • Vent and check the heating pressure • Refrigeration check	

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 low pressure fault	• Lock the system • Unlock by pressing the reset switch
Cause of error	• Lack of heat absorption • Insufficient refrigerant charge • Blockage of the refrigeration circuit	
Troubleshooting	• Check the heat absorption at the evaporator (flow rate, temperature); vent if necessary • Refrigeration check	

FROST PROTECTION

Error message	Frost protection error	Frost protection malfunction
Fault description	The frost protection limit of the hydraulic circuit has been triggered.	
Behaviour of the heat pump	• System lockout for 10 minutes • If 3 faults occur within 60 minutes, switch to frost protection fault	• System lockout • 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	

11. MAINTENANCE & SERVICING

11.1 CLEANING

Cleaning the heating side

- Cleaning: to be carried out by a plumber
- Flushing device: connection to the condenser's supply and return lines
- Condenser: flush against the normal flow direction (note gravity brake)

Cleaning the heat pump

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

NOTE! POSSIBLE DAMAGE

The surface of the device may be damaged by using the wrong cleaning agents.

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

11.2 MAINTENANCE

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

NOTE

The safety valve may become stuck due to limescale deposits.

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

11.2 MAINTENANCE

WARNING!

Risk of damage to property and personal injury due to improper handling!

- Never attempt to carry out maintenance or repairs on the system yourself.
- Commission a recognised, qualified and ratiotherm-authorised specialist tradesman to do this.
- We recommend taking out a maintenance contract.
- Failure to carry out maintenance can impair the operational safety of the appliance and lead to damage to property or personal injury.

11.3 LEAK TEST

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!

- 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 for this purpose can be found in the "System log for heat pumps".

12. DECOMMISSIONING & DISPOSAL

When the heat pump is taken out of service, the machine may only be dismantled by qualified personnel. Care must be taken to ensure that hazardous materials and waste are 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 from electricity.
Serious or fatal electric shocks are possible on electrical equipment.

DANGER!

- Disconnect the machine from the power supply before taking it out of service/dismantling it.
- Secure against being switched back on.

TEMPORARY DECOMMISSIONING

Switch the mains switch to the "OFF" position.

CAUTION

Damage to components and impaired functionality
Improper decommissioning of the machine may result in damage to components and thus functional impairment.

Possible damage to the system due to frost

- Water freezes at outdoor temperatures below 0 °C.
- Decommissioning without draining the heating circuit is only permitted at temperatures above 0 °C.

FINAL DECOMMISSIONING/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.

CAUTION!

Environmental pollution due to improper disposal.
Improper disposal of components and operating materials can cause environmental damage.

- Dispose of electrical and electronic components of the heat pump properly.
- Dispose of the refrigerant properly.

13.1 PUMP WILO-PARA STG

Technical data

Connection voltage	1 ~ 230 V +10 %/-15 %, 50/60 Hz
Protection class	IP X4D
Energy efficiency index EEI	see type plate (6)
Medium temperatures at max. ambient temperature	-20 °C to +95 °C (heating/GT) -10 °C to +110 °C (ST)
Ambient temperature	0 °C to +70 °C
Max. operating pressure	10 bar (1000 kPa)
Minimum inlet pressure at +95 °C/+110 °C	0.5 bar/1.0 bar (50 kPa/100 kPa)

Indicator lights (LEDs)

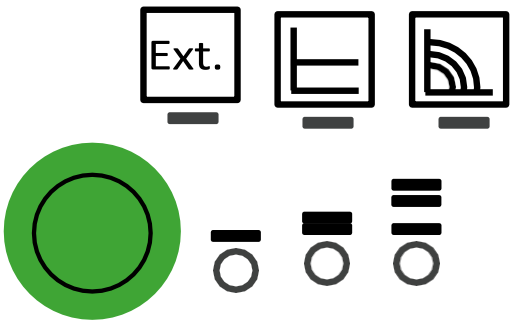
Signal indicator

- LED lights up green during normal operation
- LED lights up/flashes in case of malfunction

Display of selected control mode PWM, Δp-c and constant speed

Display of the selected characteristic curve (I, II, III) within the control mode

Control button



Press

- Select control mode
- Select characteristic curve (I, II, III) within the control type

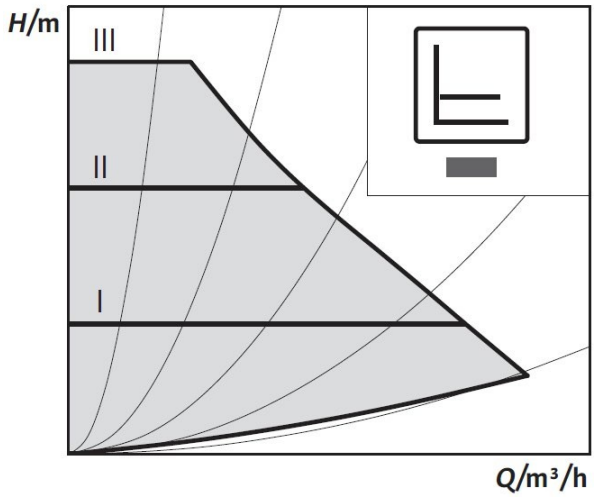
Press and hold

- Activate venting function (press for 3 seconds)
- Activate manual restart (press for 5 seconds)
- Lock/unlock button (press for 8 seconds)

13.1 PUMP WILO-PARA STG

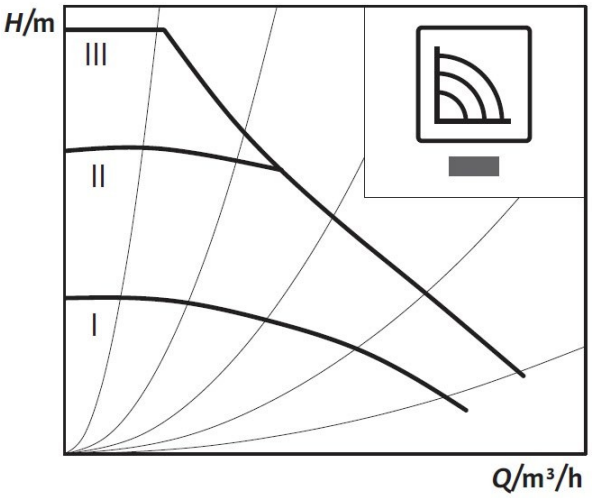
CONTROL TYPES AND FUNCTIONS

Constant differential pressure Δp-c (I, II, III)



Recommended for underfloor heating systems, large-diameter pipes, all applications without variable pipe network characteristics (e.g. storage tank charging pumps) and single-pipe heating systems with radiators.
The control keeps the set delivery head constant regardless of the delivered volume flow. Three predefined characteristics (I, II, III) to choose from.

Constant speed (I, II, III)

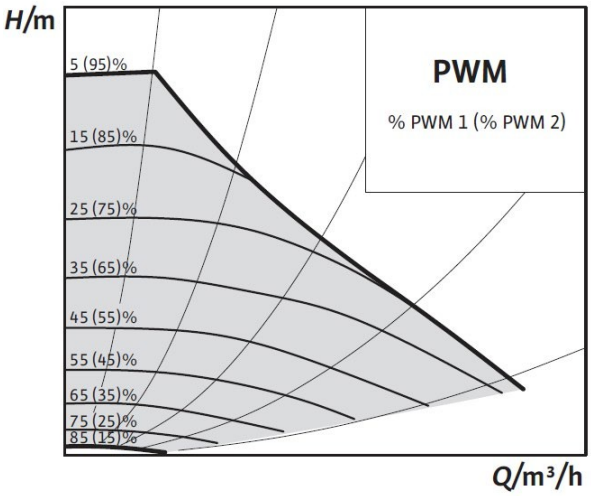


Recommended for systems with unchanging system resistance that require a constant volume flow.
The pump runs at three preset fixed speed levels (I, II, III).

NOTE!

Factory setting:
Constant speed, characteristic curve III

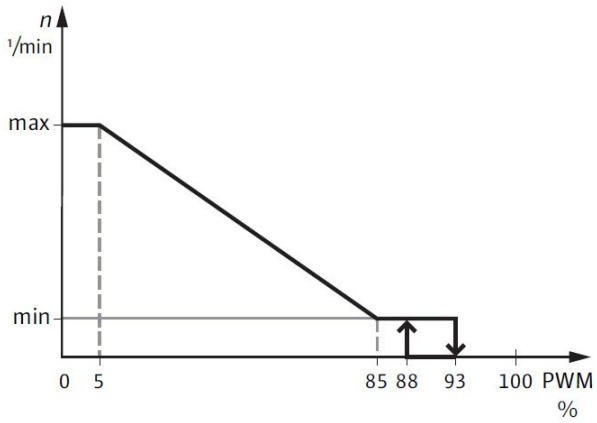
External control via iPWM signal



The required setpoint/actual value comparison is performed by an external controller for regulation purposes. A PWM signal (pulse width modulation) is supplied to the pump as a control variable via a separate cable with plug.

The PWM signal generator sends a periodic sequence of pulses (the duty cycle) to the pump in accordance with DIN IEC 60469-1.

13.1 PUMP WILO-PARA STG



iPWM 1 mode (heating application):

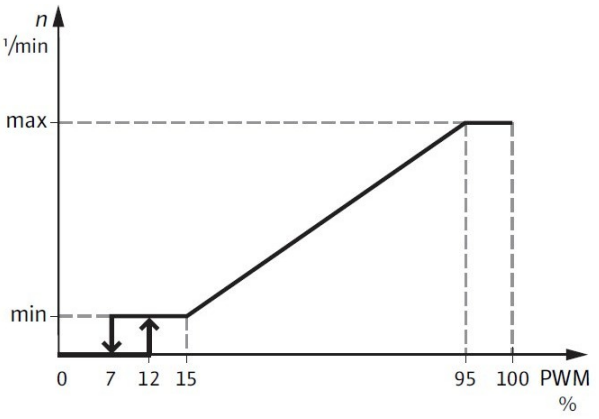
In iPWM 1 mode, the pump speed is controlled depending on the PWM input signal. Behaviour in the event of a cable break:

If the signal cable is disconnected from the pump,

e.g. due to a cable break, the pump accelerates to maximum speed.

PWM signal input [%]

> 5:	Pump runs at maximum speed
5 - 85:	The speed of the pump decreases linearly from n_{max} to n_{min}
85 - 93:	Pump runs at minimum speed (operation)
85 - 88:	Pump runs at minimum speed (start-up) 93 - 100: Pump stops (standby)



iPWM 2 mode:

In iPWM 2 mode, the pump speed is controlled depending on the PWM input signal. Behaviour in the event of a cable break:

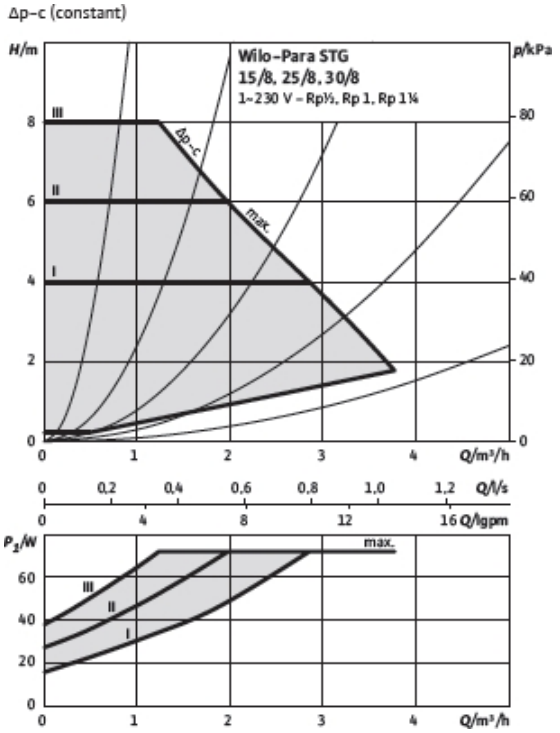
If the signal cable is disconnected from the pump, e.g. due to a cable break, the pump stops.

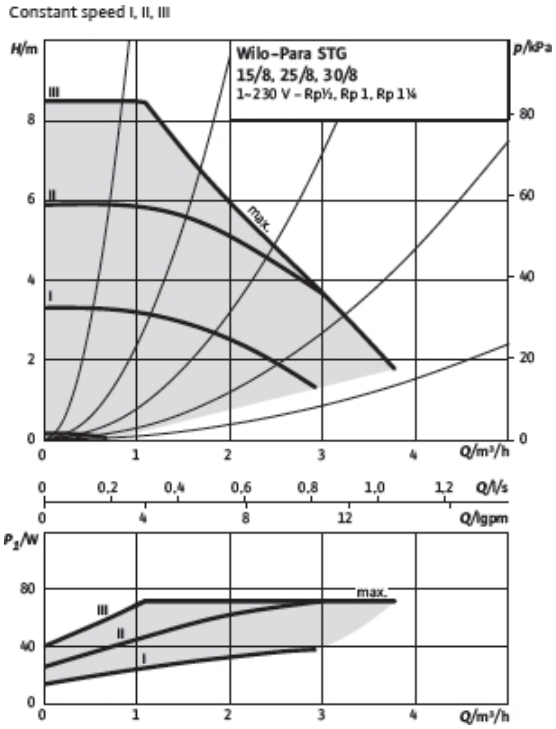
PWM signal input [%]

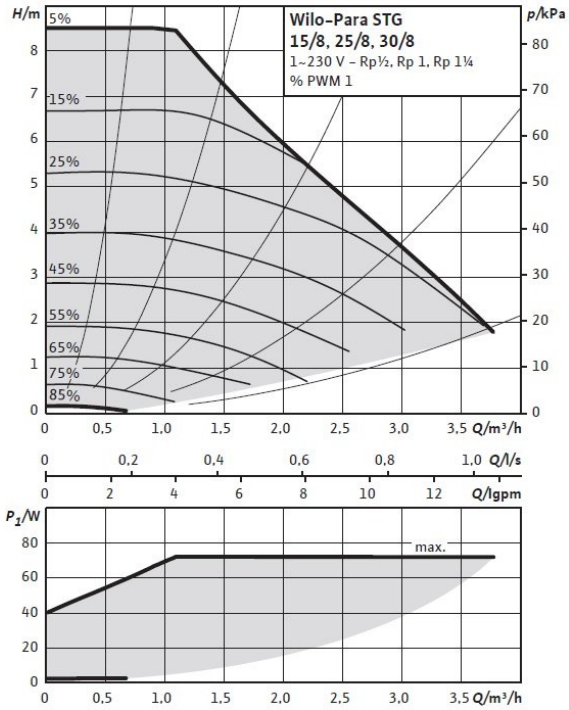
0 - 7:	Pump stops (standby)
7 - 15:	Pump runs at minimum speed (operation) 12 - 15: Pump runs at minimum speed (start-up) 15 - 95: The speed of the pump increases linearly from n_{min} to n_{max}
> 95:	Pump runs at maximum speed

13. APPENDIX

13.1 PUMP WILO-PARA STG







Ventilation

The venting function is activated by pressing and holding (3 seconds) the control button and automatically vents the pump. The heating system is not vented during this process.

Manual restart

A manual restart is activated by pressing and holding (5 seconds) the control button and unblocks the pump if necessary (e.g. after a long period of inactivity during the summer).

Key lock

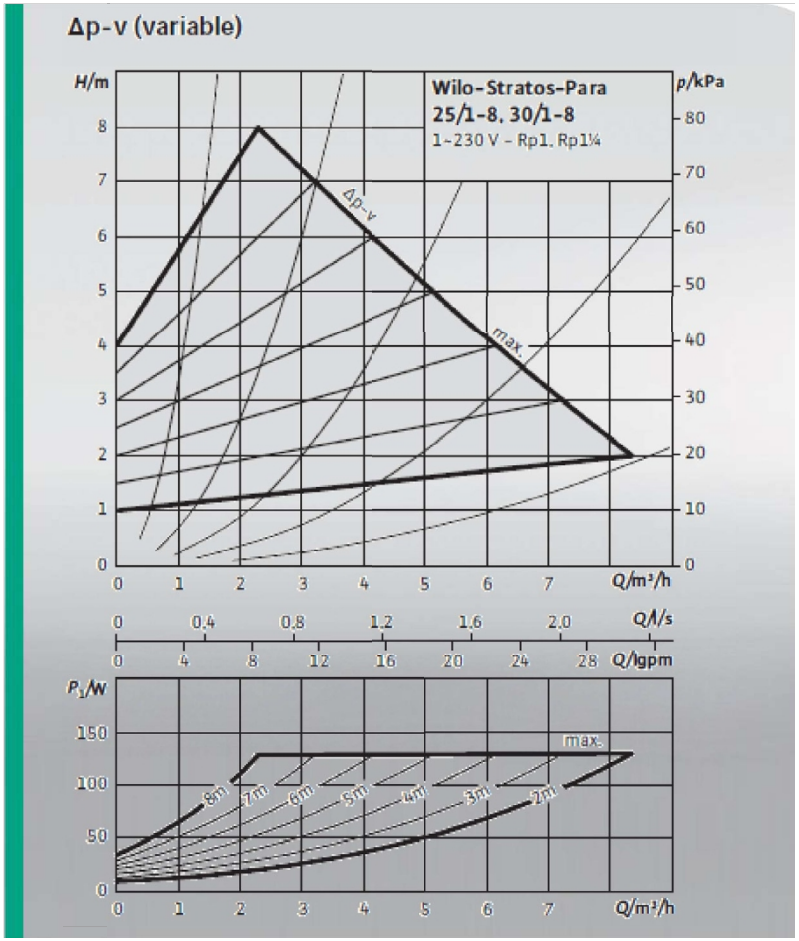
The key lock is activated by pressing and holding (8 seconds) the control button and locks the settings on the pump. It protects against unwanted or unauthorised adjustment of the pump.

Stratos PARA **/1-8

Field of application Heating/Geothermal/Solar

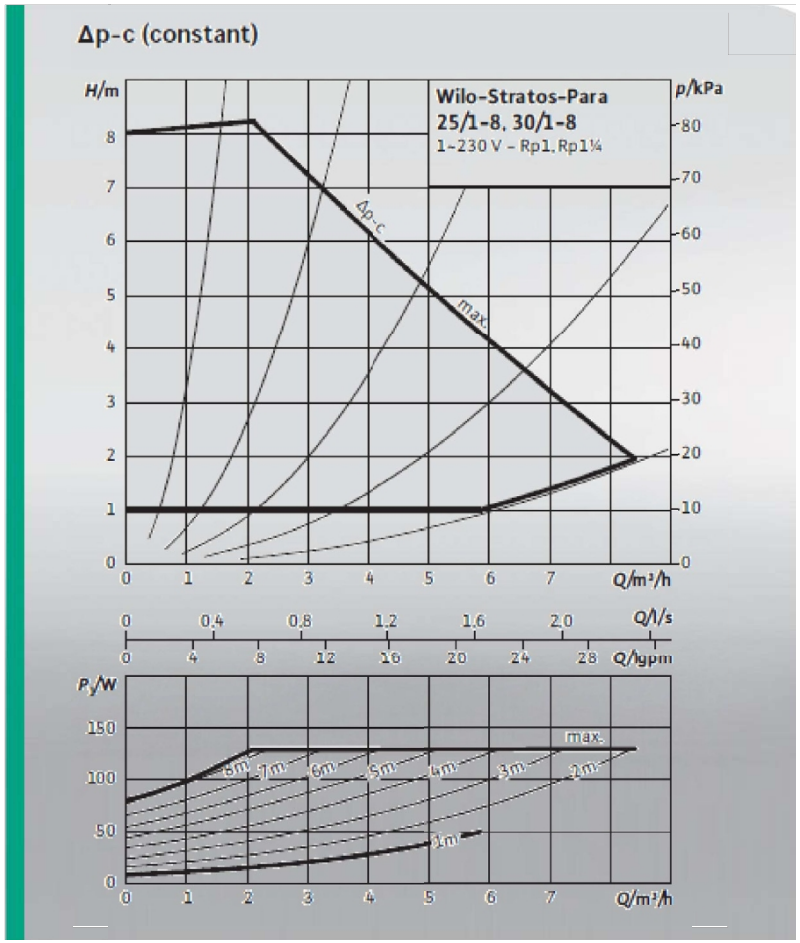
Stratos PARA 25/1-8 T1	
Stratos PARA	**Electronically controlled high-efficiency pump**
25	Threaded connection DN 25
1-8	1-8 = delivery head in [m] at Q = 0 m³/h
T	The pump is controlled by Red Knob technology P-v, for Δvariable differential pressure ΔP-c, for constant differential pressure Control input "Analog in 0 … 10V" with cable break detection Collective fault signal SSM

Hydraulic operational area Δp -v (variable)

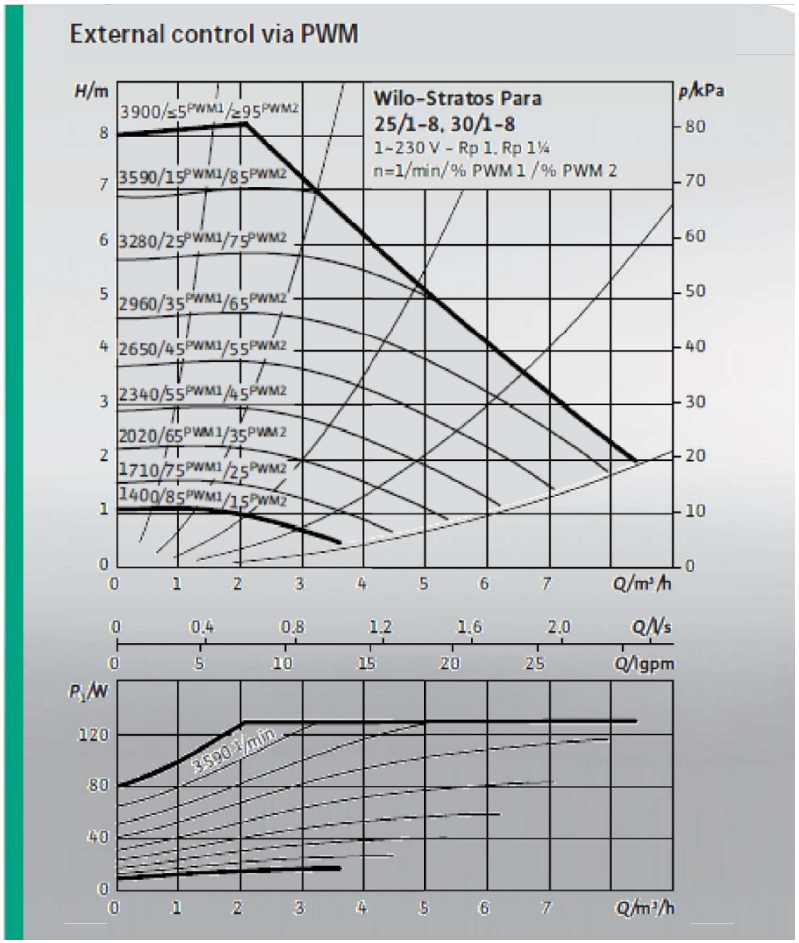


TU_D_WP_Grid-HiQ/LoQ_2024.03-jb - All information, images and drawings are subject to errors and changes. Compliance with generally applicable and recognised technical rules must be observed at all times!
ATTENTION! Installation and wiring must only be carried out by authorised specialists.

ΔpHydraulic operational area external control PWM -c (constant)



Hydraulic operational area external control PWM



13.3 ERROR CODES BONFIGLIOLI AGILE FREQUENCY CONVERTER

Error messages		
Code		Meaning
F00	00	No fault has occurred.
Overload		
F01	00	Frequency converter overloaded (60 s), check load behaviour. Reduce ramps and speed.
	01	Frequency converter overloaded in low output frequency range.
	02	Frequency converter overloaded (60s), check load behaviour.
	03	Short-term overload (1 s), check motor and application parameters.
Heat sink		
F02	00	Heat sink temperature too high, check cooling and fan.
	01	Heat sink temperature too low, check permissible ambient temperature.
Interior		
F03	00	Interior temperature too high, check cooling and fan.
	01	Interior temperature too low, check permitted ambient temperature.
	02	Electrolytic capacitor temperature too high, check cooling and fan.
Motor connection		
F04	00	Motor temperature too high or sensor defective, check connection to terminal X12.4.
	01	The motor protection switch has tripped, check the drive.
	02	The V-belt monitor reports that the drive is idling.
	03	Motor phase failure, check motor and cabling.
Output current		
F05	00	Overloaded, check load conditions and ramps.
	06	Motor phase current too high, check motor and wiring.
	07	Phase monitoring message, check motor and wiring.
	08	Phase monitoring message, check motor and wiring.
	09	Phase monitoring message, check motor and wiring.
	11	Motor is still turning. The motor, which is still energised, was turning and an attempt was made • to start the drive with the search function deactivated or • to start a device test.
Internal error		
F06	xx	Internal error. Please contact your Bonfiglioli branch.
DC link voltage		
F07	00	DC link voltage too high, check deceleration ramps and connected braking resistor.
	0	DC link voltage too low, check mains voltage.
	02	Mains failure, check mains voltage and circuit.
	03	Check for phase failure in the mains supply, mains fuse and circuit.
	04	*UD limit setpoint* 680 too low, check mains voltage.
	05	Overvoltage brake chopper. See complete operating instructions, chapter 13.3.
	06	Motor chopper overvoltage. See complete operating instructions, chapter 13.3.

13.3 ERROR CODES BONFIGLIOLI AGILE FREQUENCY CONVERTER

Error messages		
Code		Meaning
Electronics voltage		
F08	01	Electronics voltage DC 24V too low, check control terminals.
	04	Electronics voltage too high, check wiring of control terminals.
	05	Error in A/D converter. Remove all external connections (control terminals, etc.) and check whether the error persists.
	06	Supply voltage for the optional communication module too low. No communication possible via the bus system. Disconnect the wiring of the bus system and acknowledge the error message. Check the connections and cables of the bus system. Replace the communication module if the error still occurs even when the bus system is disconnected. Notify BONFIGLIOLI customer service if the error persists after replacing the communication module.
Brake chopper		
F10	10	Brake chopper overcurrent; see also the complete operating instructions, chapter 7.10.4.
Output frequency		
F11	00	Output frequency too high, check control signals and settings.
	0	Max. frequency reached by control, check deceleration ramps and connected braking resistor.
Safe Torque Off (STO)		
F12	01	The STO diagnostic software has detected that the STO shutdown paths are no longer functioning properly. Check the wiring and connect the shields correctly. Check the EMC environmental conditions. If the error persists, replace the device.
	02	Error message from the STO diagnostic function. If the error persists after restarting the device, replace the device.
	04	Internal device error. Notify BONFIGLIOLI customer service.
	05	The STOA and STOB enable signals were not switched simultaneously, but with too long a time interval. Check the control of the enable inputs.
	06	The voltage of the STO signals is too low. Check the dimensioning of the 24 V DC supply that supplies the STO inputs.
	07	The internal STO diagnostic software has detected that the STO signal levels do not indicate a clear status. Check the wiring and ensure that the signal levels are clearly defined (0V/24V). If the error persists, check with another device to see if the error also persists there.
	08	The STO diagnostic software has detected that the STO signal states within the device no longer correlate at different measuring points. Check the wiring and connect the shields correctly. If the error persists, replace the device.
	09	The STO diagnostic software has detected that an STO signal level is too high within the device. Check the wiring and ensure that the signal levels are clearly defined (0V/24V). If the error persists, replace the device.
Motor connection		
F13	00	Ground fault at the output, check the motor and cabling.
	10	Minimum current monitoring, check motor and wiring.

13.3 ERROR CODES BONFIGLIOLI AGILE FREQUENCY CONVERTER

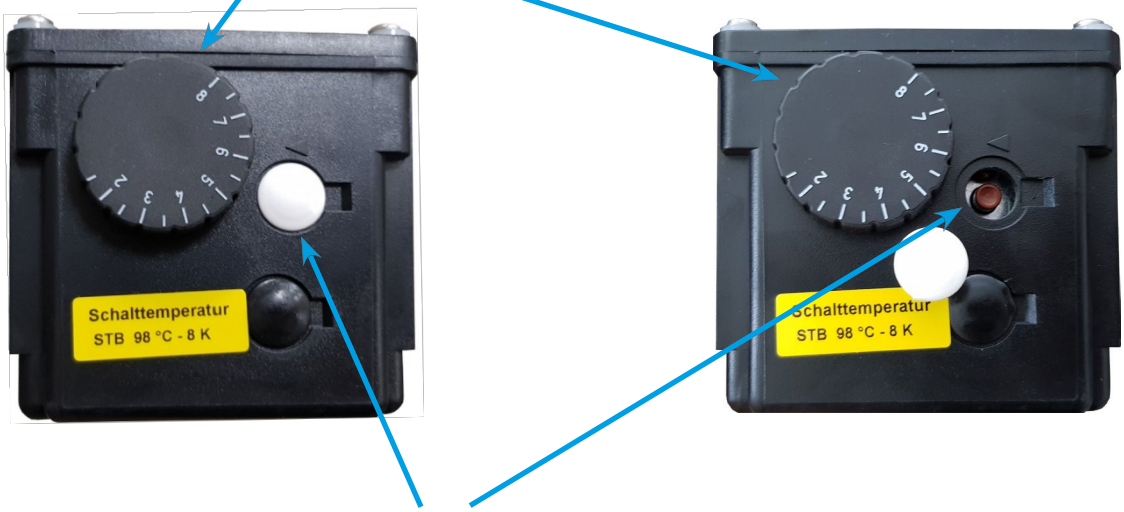
Error messages			
Code		Meaning	
Control connection			
F14	01	Setpoint signal at multifunction input 1 faulty, check signal.	
	02	Setpoint signal at multifunction input 2 faulty, check signal.	
	07	Overcurrent at multifunction input 1, check signal.	
	08	Overcurrent at multifunction input 2, check signal.	
	09	The actual value for the technology controller is missing. The absence was reported in accordance with the setting for *operating mode Actual value failure* 440.	
	50	Temperature measurement with KTY measuring resistor faulty. Check signal and measuring resistor.	
	54	External error; the drive has responded in accordance with the parameter setting for *operating mode ext. error* 535. The error was triggered by the logic signal or digital input signal assigned to the *external error* parameter 183.	
Modbus and VABus			
F20	10	Communication error according to parameter *X21: VABus watchdog timer* 1502.	
	11	Communication error according to parameter *CM: VABus watchdog timer* 413.	
CANopen			
F20	21	CAN bus OFF	
	22	CAN guarding	
	23	Error state	
	24	SYNC error (SYNC timing)	
	25	CAN error state	
	26	RxPDO1 length error	Number of bytes received differs from mapping.
	27	RxPDO2 length error	
	28	RxPDO3 length error	
	2	RxPDO1 timeout	RxPDO was not received within the expected time. Ensure that the RxPDO can be received within the time set in "Event time" (subindex 5).
	2B	RxPDO2 timeout	
	2C	RxPDO3 timeout	
DeviceNet			
20	5n	DeviceNet error. Please refer to the DeviceNet manual.	
Profibus			
20	6n	Profibus error. Please refer to the Profibus manual.	
Internal error			
F20	7x	Internal error. Please contact your Bonfiglioli branch.	
System bus			
F21	nn	Fault message on the system bus master in the event of a system bus slave fault, nn = node ID of the slave (hex).	
F22	0	System bus communication error, sync telegram timeout	
	0	Communication error on system bus, RxPDO1 timeout	
	02	Communication error system bus, timeout RxPDO2	
	03	Communication error system bus, timeout RxPDO3	
	10	Communication error system bus, bus off	
CANopen			
F23	nn	Heartbeat error, nn = triggering node.	

13.3 ERROR CODES BONFIGLIOLI AGILE FREQUENCY CONVERTER

Error messages		
Code		Meaning
CM module detection		
F24	00	Unknown CM module. Check compatibility of firmware and CM module.
Industrial Ethernet		
F27	nn	Industrial Ethernet error. Please refer to the instructions for the Ethernet module used.
EtherCAT		
F28	nn	EtherCAT error.
User error VPLC		
F30	3n	User-caused error of the internal PLC function. Please refer to the VPLC application manual.
Optional components		
F0B	13	The communication module was installed without disconnecting the mains voltage. Switch off the mains voltage.
Internal monitoring		
F0C	40	After 6 warm starts in less than 3 minutes, this error is triggered, as there is a high probability of a programming error in the PLC or function table. In addition, the function table is stopped (P.1399 = 0 only in RAM).

Temperature scale:

15 °C to 80 °C



Safety temperature limiter:

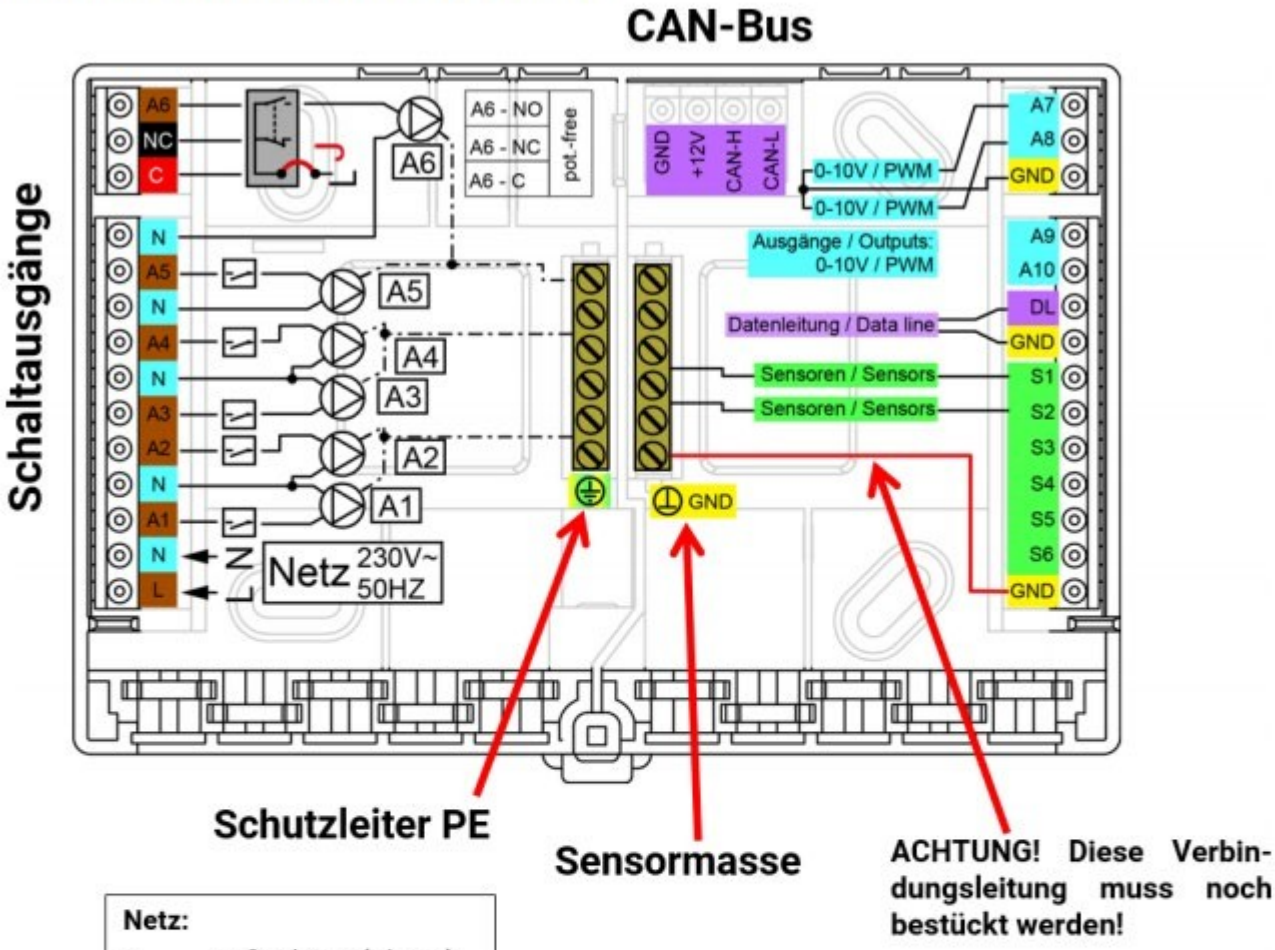
switches off the electric heating rod at 98 °C;

to reactivate the heating rod, open the white cap and press the button.

13.5 TECHNICAL DATA RSM610

Klemmenplan

Ansicht des Gehäuse-Unterteils mit Klemmen



Netz:

L.... Außenleiter (Phase)
N.... Neutralleiter
PE.... Schutzleiter

Ausgänge:

C.... Wurzel (A6)
A1 – A6.... Schließer **NO**
NC.... Öffner (A6)
N.... Neutralleiter

Netzanschluss

Das Modul hat ein eingebautes Netzteil und wird durch dieses versorgt. Der Netzanschluss muss daher **230V 50Hz** sein, diese Spannung wird auch durch die Ausgangsrelais durchgeschaltet. Das eingebaute Netzteil unterstützt gleichzeitig die Spannungsversorgung des CAN-Busses.

Technische Daten RSM610

alle Eingänge	Temperatursensoren der Typen PT1000, KTY (2 kΩ/25°C), KTY (1 kΩ/25°C), PT100, PT500, Ni1000, Ni1000TK5000 und Raumsensoren RAS bzw. RASPT, Strahlungssensor GBS01, Thermoelement THEL, Feuchtesensor RFS, Regensensor RES01, Impulse **max. 10 Hz** (z.B. für Volumenstromgeber VSG), Spannung **bis 3,3V DC**, Widerstand (1-100kΩ), sowie als Digitaleingang
Eingänge 4, 5	zusätzlich Spannung 0-10V DC
Eingang 6	zusätzlich Impulseingang **max. 20 Hz**, z.B. für Volumenstromgeber VSG oder S0-Signale
Ausgang 1-5	Relaisausgänge, Schließer
Ausgang 6	Relaisumschaltkontakt - **potentialfrei**
Ausgänge 7 - 10	Analogausgänge 0-10V (max. 20mA) oder PWM (10V/1kHz) in jeweils 1000 Stufen (=0,01V bzw. 0,1% pro Stufe) oder Erweiterungsmöglichkeit als Schaltausgänge mit Zusatzrelaismodulen
Ausgang 7 RSM610-24, -MB24	Versorgung für externe 24V-Geräte, **in Summe** mit den 12V-Geräten max. 6W
Ausgang 9 RSM610-MB, -MB24	M-Bus-Eingang für bis zu 4 M-Bus-Zähler
max. Schaltleistung	je Ausgang 230V / 3A
max. Buslast (DL-Bus)	100%
CAN-Bus	Standard-Datenrate 50 kbit/s, einstellbar von 5 bis 500 kbit/s
M-Bus RSM610-MB, -MB24	Standard-Baudrate 2400 Baud, einstellbar von 300 bis 38400 Baud, max. 4 M-Busgeräte auslesbar
12V	Versorgung für externe Geräte, **in Summe** max. 6W
Differenztemperaturen	mit getrennter Ein- und Ausschaltdifferenz
Schwellwerte	mit getrennter Ein- und Ausschaltdifferenz oder mit fixer Hysterese
Temperaturmessbereich	PT100, PT500, PT1000: -200,0°C bis + 850°C mit einer Auflösung von 0,1K; alle anderen Temperatursensoren: -49,9°C bis +249,9°C mit einer Auflösung von 0,1K
Genauigkeit Temperatur	typ. 0,4K, max. ±1K im Bereich von 0 - 100°C **für PT1000-Sensoren**
Genauigkeit Widerstandsmessung	max. 1,6% bei 100kΩ (Messgröße: Widerstand, Prozessgröße: Widerstand)
Genauigkeit Spannung	typ. 1%, max. 3% vom maximalen Messbereich des Eingangs
Genauigkeit Ausgang 0-10V	max. -2% bis +6%
Anschluss	100 - 230V, 50- 60Hz, (Ausgänge A1 – A5 und Gerät gemeinsam abgesichert mit 6,3A flink)
Zuleitung	3 x 1mm² H05VV-F laut EN 60730-1 (Kabel mit Schutzkontaktstecker im Sensor-Grundpaket enthalten)
Leistungsaufnahme	1,0 – 1,9 W, je nach Anzahl aktiver Schaltausgänge
Schutzart	IP40
Schutzklasse	II – Schutzisoliert ⧈
Zulässige Umgebungstemperatur	+5 bis +45°C

Technische Änderungen sowie Satz- und Druckfehler vorbehalten. Diese Anleitung ist nur für Geräte mit entsprechender Firmware-Version gültig. Unsere Produkte unterliegen ständigem technischen Fortschritt und Weiterentwicklung, wir behalten uns deshalb vor, Änderungen ohne gesonderte Benachrichtigung vorzunehmen.

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		Revision - Issue no.: 7
		Date: 14/8/2014
		Replaces: 15/11/2010
Tetrafluoroethane (R134a)		MSDS No. 14

Warning

SECTION 1. Identification of the substance or mixture and of **the company**

1.1. Product identifier Trade name

Safety data sheet no. : Tetrafluoroethane (R134a)
Chemical name : SDB No. 14
: **Tetrafluoroethan (R134a)**
CAS-Nr. :811-97-2
EG-Nr. :212-377-0
Index No. —
Registration No. : 01-2119459374-33-
Chemical formula : C2H2F4

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevante identifizierte Verwendungen : Verwendung als Kältemittel.
Industriell und berufsmäßig. Vor Anwendung Gefährdungsbeurteilung durchführen.
Prüfgas / Kalibriergas. Laborzwecke.
Kontaktieren Sie Ihren Lieferanten für weitere Informationen über Verwendungen.

1.3. Details of t h e supplier providing the safety data sheet Company name : TYCZKA INDUSTRIE-GASE GmbH

Landzungenstrasse 17
D-68159 Mannheim

Fax 0621/18009-150
sdb@tig.de / www.tig.de

EM Address (of the competent : sdb@tig.de

1 4 Emergency number

Notfall-Telefonnummer : 0800/1809555

TYCZKA INDUSTRIE-GASE	SAFETY DATA SHEET	Page: 2 / 10
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		Replaces: 15/11/2010
Tetrafluoroethane (R134a)		MSDS No. 14

SECTION 2. Potential hazards

2.1. Classification of the substance or mixture

Gefahrenklasse und -kategorie nach Verordnung EG 1272/2008 (CLP)

• Physical hazards : Gases under pressure - Liquefied gases - Caution - (CLP: Press. Gas Lig.) - H280 Classification according to EC 67/548 or EC 1999/45

: Nicht als gefährlicher Stoff / gefährliches Gemisch eingestuft.
In Anhang VI CLP nicht genannt.
Keine EG Kennzeichnung erforderlich.

2.2. Labelling elements

Labelling according to Regulation EC 1272/2008 (CLP)

• Hazard pictogram(s)

•GeahmnpilüogrammCode GHS04
• Signal word : Warning
• Hazard statements H280 - Contains gas under pressure; may explode if heated.
• Safety instructions
- Storage P403 - Store in a well-ventilated place.

2.3. Other hazards

Erstickend in hohen Konzentrationen.
Kontakt mit der Flüssigkeit kann Kaltverbrennungen/Erfrierungen verursachen

SECTION 3. Composition/information on ingredients

3.1. StoW / 3.2. Mixture

Einstufung(DSD)

Tetrafluoroethan (R134a)

Enthält keine anderen Komponenten oder Verunreinigungen, die die Einstufung dieses Produktes beeinflussen.
* 1: Aufgeführt in Anhang IV / V REACH, von der Registrierung ausgenommen.
* 2: Registrierungszeitraum noch nicht abgelaufen.
* 3: Registrierung nach REACH nicht erforderlich: Stoff wird importiert < 1t/a.
Volltext der R-Sätze siehe Abschnitt 16. Volltext der Gefahrenhinweise siehe Abschnitt 16.

TYCZKA INDUSTRIE-GASE GmbH
Landzungenstrasse 17 D-68159 Mannheim
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TIG TYCZKA INDUSTRIE-GASE	SAFETY DATA SHEET	Page: 3/10 Revision - Issue no.: 7 Date: 14/8/2014 Replaces: 15/11/2010
Tetrafluoroethane (R134a)		MSDS No. 14

SECTION 4. First aid measures

4.1. Description of first aid measures

- Einatmen	: Das Opfer ist unter Benutzung eines umluftunabhängigen Atemgerätes in frische Luft zu bringen. Warm und ruhig halten. Arzt hinzuziehen. Bei Atemstillstand künstliche Beatmung.
- Hautkontakt	For burns, rinse with water for at least 15 minutes. Cover with a sterile dressing. Consult a doctor.
- Eye contact	: Immediately rinse eyes with water for at least 15 minutes.
• Ingestion	: Ingestion is not considered a possible route of exposure.

4.2. Most important acute and delayed symptoms and effects

: Hohe Konzentrationen können Ersticken verursachen. Symptome können Verlust der Bewegungsfähigkeit und des Bewusstseins sein. Das Opfer bemerkt das Ersticken nicht. In niedrigen Konzentrationen können narkotische Effekte entstehen. Symptome können Schwindelgefühl, Kopfschmerz, Übelkeit und Koordinationsstörungen sein.

4.3. Indications for immediate medical attention or special treatment

SECTION 5. Firefighting measures

5 1 Extinguishing media

• Suitable extinguishing media	: water spray or water mist.
- Ungeeignete Löschmittel	: Wasserstrahl zum Löschen ungeeignet.

5.2. Special hazards arising from the substance or mixture

Special risks	: Exposure to fire may cause the container to burst/explode.
Gefährliche Verbrennungsprodukte	: Bei Einwirkung von Feuer können durch thermische Zersetzung die folgenden toxischen und/ oder ätzenden Stoffe entstehen: Kohlenmonoxid. Fluorwasserstoff. Carbonylfluorid.

5.3. Firefighting instructions

Spezifische Methoden	: Behälter aus dem Wirkbereich des Brandes entfernen, wenn dies gefahrlos möglich ist. Wenn möglich, Gasaustritt stoppen. Firefighting measures pfung auf den Brand in der Umgebung abstimmen. Druckbehälter können bersten, wenn sie direktem Feuer bzw. Wärmestrahlung durch Feuer ausgesetzt sind. Gefährdete Druckbehälter mit Wassersprühstrahl aus geschützter Position kühlen. Schadstoffbelastetes Löschwasser nicht in Abläufe und die Kanalisation gelangen lassen. Wassersprühstrahl oder Wassernebel einsetzen, um Rauch niederzuschlagen.
Spezielle Schutzausrüstung für die Feuerwehr	: Umluftunabhängiges Atemgerät benutzen. Standardschutzkleidung und -ausrüstung (Umluftunabhängiges Atemschutzgerät) für die Feuerwehr. Standard EN 469 - Schutzkleidung für die Feuerwehr.Standard EN 659 - Schutzhandschuhe für die Feuerwehr. Standard EN 137 - Umluftunabhängige Atemschutzgeräte mit Vollgesichtsmaske.

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SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

: Versuchen, den Gasaustritt zu stoppen.
Gebiet räumen.
Für ausreichende Lüftung sorgen.
Beim Betreten des Bereiches umluftunabhängiges Atemgerät benutzen, sofern nicht die Ungefährlichkeit der Atmosphäre nachgewiesen ist.
Eindringen in Kanalisation, Keller, Arbeitsgruben oder andere Orte, an denen die Ansammlung gefährlich sein könnte, verhindern.
Örtlichen Alarmplan beachten.
Auf windzugewandter Seite bleiben.

6.2. Environmental protection measures

: Versuchen, den Gasaustritt zu stoppen.

6.3. Methods and materials for containment and cleaning

6.4. Reference to other sections

: See also Sections 8 and 13.

SECTION 7. Handling and storage

7.1. Safety measures for safe handling

Safe handling of the substance	: Only experienced and appropriately trained persons should handle pressurised gas handhaben. Umgang mit dem Stoff im Einklang mit allgemeinen Arbeitsschutzmaßnahmen und Sicherheitsanweisungen. Nur solche Ausrüstung verwenden, die für dieses Produkt und den vorgesehenen Druck und Temperatur geeignet ist. Im Zweifelsfall den Gaselieferanten konsultieren. Beim Umgang mit dem Produkt nicht rauchen. Stellen Sie sicher, dass das gesamte Gassystem vor dem Gebrauch (und danch regelmäßig) for leaks (rv rd). Provide safety valves in gas installations. ( ) g Gas nicht einatmen. Produktaustritt an die Atmosphäre vermeiden.
Sicherer Umgang mit dem Druckgasbehälter.	: Bedienungshinweise des Gaselieferanten beachten. Eindringen von Wasser in den Gasbehälter verhindern. Rückströmung in den Gasbehälter verhindern. Gasflaschen vor mechanischer Beschädigung schützen; nicht ziehen, nicht rollen, nicht schieben, nicht fallen lassen. Für den Transport von Gasflaschen, selbst auf kurzen Strecken, immer einen Flaschenwagen oder anderen geeigneten Handwagen benutzen. Ventilschutzkappe nicht entfernen bevor die Flasche an einer Wand oder einen Labortisch oder auf einen Flaschenständer gestellt wurde, und zum Gebrauch bereit ist. Falls der Benutzer irgendwelche Schwierigkeiten bei der Bedienung des Flaschenventils bemerkt, den Gebrauch unterbrechen und Kontakt mit dem Lieferanten aufnehmen. Versuchen Sie nie, Ventile oder Sicherheitsdruckentlastungseinrichtungen am Behälter zu Beschädigungen an diesen Einrichtungen müssen umgehend dem Lieferanten mitgeteilt werden. Ventilanschlüsse des Behälters sauber und frei von Verunreinigungen halten, insbesondere frei von Öl und Wasser. Setzen Sie die Auslasskappen oder -stöpsel und die Ventilschutzkappe wieder auf, sobald der Behälter von der Anlage getrennt wird. wenn er noch immer angeschlossen ist. Versuchen Sie nicht, das Gas von einer Gasflasche oder Behälter in einen anderen umzufüllen. Benutzen Sie nie Flammen oder elektrische Heizgeräte zur Druckerhöhung im Behälter.

D eDi old dHr allgem2 u gbn und* anerk _e n : dR%n eled !ee niabendB dedun '/ n e hhaltee n are reserved.
ATTENTION! Installation and wiring must only be carried out by authorised specialists.

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SECTION 7. Handling and storage (ForteeDung)

Das Produktetikett dient der Identifizierung des Inhalts der Gasflasche und darf nicht entfernt oder unkenntlich gemacht werden.

7.2. Conditions for safe storage, taking into account incompatibilities

: Behälter bei weniger als 50°C an einem gut gelüfteten Ort lagern.
Alle Vorschriften und örtlichen Erfordernisse an die Lagerung von Behältern müssen eingehalten werden. Behälter aufrecht stehend lagern und gegen Umfallen sichern. Gelagerte Flaschen sollten regelmäßig auf Leckagen und korrekte Lagerbedingungen geprüft werden. Ein Ventilschutzring sollte vorhanden sein oder die Ventilschutzkappe angebracht werden. Die Behälter sollten an einem Ort ohne Brandgefahr und entfernt von Wärme- und Zündquellen gelagert werden.
Die Behälter nicht unter Bedingungen lagern, die die Korrosion beschleunigen. Von brennbaren Stoffen fernhalten.

7.3. Specific end uses

SECTION 8. Exposure controls/personal protective equipment

8.1. Parameters to be monitored

DNEL: Derived No Effect Level (
Beschäftigte)

Tetrafluoroethane (R134a) Long-term inhalation (systemic) [mg/m3]: 14000

PNEC: Abgeschätzte Nicht Effect

Tehafuoroshen(R134j : Freshwater [mg/L] : 0.1 Seawater [mg/L]
: 0.01 Aquatic intermittent [mg/L] :
Sediment, Freshwater [mg/kg dry weight] : 0.75 Sewage
Treatment Plant (STP) [mg/ly : 73

8.2. Exposure limits and monitoring

8.2.1. Geeignete technische Steuerungseinrichtungen : Anlagen, die unter Druck stehen, sollten regelmäßig auf Dichtheit geprüft werden.
Sauerstoff- Detektoren einsetzen, falls erstickend wirkende Gase emittiert werden können.
Sicherstellen, dass Konzentrationen des Produktes in der Umgebungsluft ausreichend unterhalb des Arbeitsplatzgrenzwertes liegen.
Allgemeine und und lokale Absaugung vorsehen.
Arbeitserlaubnisverfahren z.B. bei Wartungsarbeiten in Betracht ziehen.

8.2.2. Individuelle Schutzmaßnahmen, z.B. Persönliche Schutzausrüstung : Eine Gefährdungsbeurteilung sollte für alle Arbeitsbereiche erstellt und dokumentiert sein, in der alle Risiken der Verwendung des Produktes erfasst sind und die erforderliche persönliche Schutzausrüstung abgeleitet wird. Die folgenden Empfehlungen sollten in Betracht gezogen are:
Pers. Protective equipment that complies with EN / ISO standards protects the face and skin

from liquid splashes.

• Augen- / Gesichtschutz : Schutzbrille mit Seitenschutz tragen.
Schutzbrille mit Seitenschutz oder Vollschutzbrille tragen wenn Umfüllarbeiten oder An-und Abschließtätigkeiten ausgeführt werden..
Standard EN 166 - Persönlicher Augenschutz.

- Handschutz : Arbeitshandschuhe bei der Handhabung von Druckbehältern, Druckgasflaschen tragen.
Schutzhandschuhe gegen mechanische Risiken.

- Sonstige Schutzmaßnahmen : Beim Ungang mit Druckgasflaschen / Druckbehältern Sicherheitsschuhe tragen.
Standard EN ISO 20345 - Persönliche Schutzausrüstung - Sicherheitsschuhe.

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SECTION 8. Exposure controls/personal protective equipment (continued)

• Atemschutz : Umluftunabhängiges Atemschutzgerät oder eine Druckluftleitung mit Maske in im Fall von sauerstoffreduzierter Atmosphäre verwenden.
Standard EN 137 - Umluftunabhängige Atemschutzgeräte mit Vollgesichtsmaske.

• ThermischeGefahren : Keine erforderlich.

8.2.3. Begrenzung und Überwachung der Umweltexposition : Nationale Emmissionsregelungen beachten. Weitere Information für besondere Methoden der Abgasbehandlung siehe Abschnltt 13.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Aussehen
Physikalischer Zustand bei 20°C / 101. : Gas

Colour : Colourless.

Gesch Geruchsschwelle : Ethereal.
Smell perception is subjective and not suitable for preventing overexposure. warnen.

pH Not applicable.

Molmasse [g/mol] : 102

Schmelzpunkt [°C] : -101

Siedepunkt [°C] : -26.1

Critical temperature [°C : 101

Flash point [°C] : Not applicable to gases and gas mixtures.

Evaporation rate (ether=: Not applicable to gases and gas mixtures.
1)

Zündgrenzen [Vol.% in Luft] : Nicht brennbar.

Dampfdruck [20°C] : 4.7 bar

Löslichkeit in Wasser [mg/l] : 1930

Verteilungskoeffizient n-Oktanol/ Wasser [log Kow] : 0,94

Zündtemperatur [°C] Not applicable.

Viscosity at 20°C [mPa.sy : Nicht anwendbar.

Explosive Eigenschaften : Nicht anwendbar.

Oxidising properties None.

9.2. Other information

Sonstige Angaben : Gas/Dämpfe sind schwerer als Luft. Sie können sich in geschlossenen Räumen ansammeln, insbesondere am Fußboden oder in tiefergelegenen Bereichen.

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SECTION 10. Stability and reactivity

fl 0.4. Reactivity

. a G hre reactivity other than those listed in the following subsections

10.2. Chemical stability

' Stable under normal conditions.

fl 0.$. Possibility of hazardous reactions

. None.

10.4. Conditions to avoid

. None under the recommended conditions of use and storage (see section 7).

***fl* 0.5. Incompatible materials**

: Feuchtigkeit.
Weitere Informationen zur Materialverträglichkeit: siehe ISO11114.

10.6. Hazardous decomposition products

: Unter normalen Bedingungen bei Verwendung und Lagerung werden gefährliche Zersetzungsprodukte nicht erzeugt.

SECTION 11. Toxicological information

11.1. Information on toxicological effects

Acute toxicity — No toxic effects of the product are known. Skin irritation : No effects of the product are known. Serious eye damage/irritation : No effects of the product are known. 4enslbl]lslening of the respiratory tract/skin: No effects of the product are known. Carcinogenicity : No effects of the product are known.

Reproductive toxicity : No known effects of the product. Reproductive toxicity : No effects of the product known. Specific target organ toxicity in : No effects of the product known.

Specific target organ toxicity ( ): No known effects of the product.

wiederholter Exposition

Aspirationsgefahr : Nicht anwendbar auf Gase und Gasgemische.

SECTION 12. Environmental claims

12 1 Toxizität

EC50 48h - Daphnia magna [mg/l] : 930
EC50 72h - Algae {mg/y : No data available.
LCs0 98 hours - Fiach [mg/l} : 450

12.2. Persistence and degradability

Assessment : **Nicht leicht bio-abbaubar.**

12 3 Bioaccumulation potential

Assessment ' Due to the low logKow value (log Kow < 4), bioaccumulation of the substance is See Section 9.

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SECTION 12. Environmental information (continued)

12s. Mobility in soil

Bewertung : Wegen seiner hohen Volalität ist es unwahrscheinlich, dass das Produkt Boden- oder Wasserverschmutzung verursacht.

12.5. Results **of the PBT and vPvB assessment**

Not classified as PBT or vPvB.

12.6. Other harmful effects

Effect on ozone layer Particulate matter (PM) Carbon dioxide (CO2) — None. ' 1300

Auswirkung auf die globale Erwärmung : Enthält Treibhausgas(e), die im Kyotoprotokoll genannt sind. Kann bei Austritt großer Mengen zum Treibhauseffekt beitragen.

SECTION 13. Disposal considerations

13.1. Waste treatment methods

: Nicht in die Atmosphäre ablassen.
Nicht in die Kanalisation, Keller, Arbeitsgruben und ähnliche Plätze, an denen die Ansammlung des Gases gefährlich werden könnte, ausströmen lassen.
Für weitere Information über die Abfallbeseitigung siehe den EIGA-Code of practice Doc 30/10 ""Disposal of gases"" verfügbar unter http://www.eiga.org.
Ensure that emission values comply with local regulations or operating permits. 14 06 01: eingehalten werden.

Verzeichnis gefährlicher Abfälle (Entscheidung der Kommission EG 2001/118) Chlorinated/fluorinated hydrocarbons.

13.2. Additional information — None.

SECTION 14. Transport information

14.1. UN number — 3159

Kennzeichnung nach IMDG, IATA

2.2: Non-flammable, non-toxic gases

14.2. Proper UN shipping name

Transport by road/air : 1,1,1,2-TETRAFLUOROETHANE (GA6 AS REFRIGERANT R 134A) Transport **Eisenbahnverkehr (ADR/RID)**
by air (ICAO-W/ : 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134A) **IATA-DGR)**
Transport by sea (MDG) : 1,1,1,2-tetrafluoroethane (refrigerant gas R 134A)

143. Transport hazard class(es)

Transpon in StaBenv **Eisenbahnverkehr (ADR/RID)**

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

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SECTION 14. Transport information (continued)

Klasse : 2
Klassifizierungscode : 2 A
for labelling : 20

Tunnel restriction uug come : C/E : Beförderung in Tanks: Durchfahrt verboten durch Tunnel der Kategorien C, D und E
Sonstige Beförderungen: Durchfahrt verboten durch Tunnel der Kategorien E.

Tmnspoflim Luhveke lCAO•Tl
IATA-DGR)
Kas$ei Division NebengeCah(en) : 2.2
Transport Maritime transport@WDG)
Klasse/Division Nebengefahr(en) : 2.2
Nodal Pan (EmS) - Fire : FC
Nodal Pan (EmS) - Leakage : SV

14.4. Packaging group

Roadair transport : Nicht anwendbar.
Eisenbahnverkehr (ADR/RID)
T s tm Air transport {ICAO-TT / : Not applicable. Transport

by sea (IMDG) : Not applicable.

14.5. Environmental hazards

Transport by road/ None.
Eisenbahnverkehr (ADR/RID)
Transport by air {{CAO-T} / : None.
IATA-DGR)
Transport by sea {IMDG} : None.

14.6 Special precautions for the user

Verpackungsanweisung(en)
Transport im Straßen-/ Eisenbahnverkehr (ADR/RID) ' P200
Transport by air ICAO-T} / (
IATA-DGR)
Passagier- und Frachtflugzeug
Verpackungsanweisung - Passagier- und Frachtflugzeug : 200
Nur Frachtflugzeug
Verpackungsanweisung - Nur Frachtflugzeug : 200

Transport by sea {IMDG} : P200

Besondere Vorsichtsmaßnahmen für den Verwender : Möglichst nicht in Fahrzeugen transportieren, deren Laderaum nicht von der Fahrerkabine getrennt ist.
Der Fahrer muß die möglichen Gefahren der Ladung kennen und er muß wissen, was bei einem Unfall oder Notfall zu tun ist.

- Behälter sichern.
- Das Flaschenventil muß geschlossen und dicht sein.
- Die Ventilverschlußmutter oder der Verschlußstopfen (soweit vorhanden) muß korrekt befestigt sein.
- Die Ventilschutzeinrichtung (soweit vorhanden) muß korrekt befestigt sein.
- Ausreichende Lüftung sicherstellen.

14.7. Bulk cargo transport in accordance with Annex II of the MARPOL Convention 73/78 and in accordance with the IBC Code

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SECTION 14. Transport information (continued)

Massengutbeförderung gemäß Anhang II des MARPOL-Übereinkommens 73/ 78 und gemäß IBC-Code : Nicht anwendbar.

SECTION 15. Legal provisions

15.1. Safety, health and environmental regulations/specific legislation for the substance or mixture

EG-Gesetzgebung

None.
Verwendungsbeschränkung(en) : Nicht angeführt.
National legislation

National legislation Observe all national/local regulations.

15.2. Substance safety assessment

A chemical safety assessment (CSA) has been prepared.

SECTION 16. Other information

Änderungen See safety data sheet prepared in accordance with Regulation (EU) No. 453/ 01

Schulungshinweise Das Risiko des Erstickens wird oft übersehen und muß bei der Unterweisung der Mitarbeiter besonders hervorgehoben werden.

Weitere Angaben Dieses Sicherheits-Datenblatt wurde im Einklang mit geltenden europäischen Richtlinien erstellt. Es gilt für alle Länder, die diese Richtlinien in ihre nationale Gesetzgebung

Volltext der Gefahrenhinweise in Abschnitt 3. H280 - Contains gas under pressure; may explode if heated.

DISCLAIMER Bevor das Produkt in irgendeinem neuen Prozeß oder Versuch benutzt wird, sollte eine sorgfältige Untersuchung über die Materialverträglichkeit und die Sicherheit durchgeführt

Die Angaben in diesem Dokument sind keine vertraglichen Zusicherungen von Produkteigenschaften. Sie stützen sich auf den heutigen Stand der Kenntnisse.

End of document

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SAFETY DATA SHEET

1. Identification

Identification
Product name: **RL 32-3MAF** (4314-64, 4314-66, 4314-65, 4314-67)

Additional identification
Chemical name: Mixture

Recommended use and restrictions on use
Recommended use: Not determined.
Restrictions on use: Not determined.

Details of the supplier of the safety data sheet
Supplier
Company Name: THE LUBRIZOL CORPORATION
Address: 29400 LAKELAND BOULEVARD
WICKLIFFE, OH 44092-2298 US
Telephone: (440) 943-1200

Emergency telephone number:
FOR TRANSPORT EMERGENCY CALL CHEMTREC (+1)703 527 3887, OR WITHIN THE USA 800 424 9300 (LUBRIZOL)

2. Hazard identification

Hazard Classification
Not classified

Label elements:

Hazard symbol: No symbol

Signal word: No signal word.

Hazard Statement: Not applicable

Precautionary Statement: Not applicable

Other hazards which do not result in GHS classification: None identified.

3. Composition/information on ingredients

General information: The components are not hazardous or are below required disclosure limits.

4. First-aid measures

Ingestion: Treat symptomatically. Seek medical attention.

Inhalation: Remove exposed person to fresh air if adverse effects are observed.

Skin contact: Wash with soap and water. If skin irritation occurs, seek medical attention.
Wash contaminated clothing before reuse.

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Eye contact: Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses.

Most important symptoms/effects, acute and delayed

Symptoms: See section 11.

Indication of immediate medical attention and special treatment needed Treatment:

Treat symptomatically.

5. Fire-fighting measures

General fire hazards: No unusual fire or explosion hazards noted.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: CO_2, dry chemical or foam. Water can be used to cool and protect exposed material.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical: See section 10 for additional information. Keep away from heat, sparks and open flames. Water may cause splattering. Container may rupture when heated.

Special protective equipment and precautions for firefighters

Special firefighting procedures: No data available.

Special protective equipment for fire-fighters: Wear full protective fire gear including self-contained breathing apparatus operated in positive pressure mode with full facepiece, coat, trousers, gloves and boots.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Personal protective equipment must be worn; see the Personal Protection section for PPE recommendations. Ventilate the area if spilled in confined spaces or other poorly ventilated areas.

Methods and material for Containment and cleaning up: Contain spills well ahead of larger spills for later recovery and disposal. Pick up free spills. liquid for recycling and/or disposal. Residual liquid can be absorbed on inert material.

Environmental precautions: Avoid release to the environment. Do not contaminate water sources or Sewer. The environmental manager must be informed of all major spills. Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling: Observe good industrial hygiene practices. Provide adequate ventilation.
Wear appropriate personal protective equipment.
Keep away from ignition sources such as heat, sparks and open flames. No smoking.
Keep containers closed when not in use. Wash thoroughly after handling. Launder contaminated clothing before reuse. Empty containers contain product residue which may exhibit hazards of the product.

Maximum handling temperature:	Not determined.
Conditions for safe storage, including any incompatibilities:	Store away from incompatible materials. See section 10 for incompatible materials.
Maximum storage temperature:	Not determined.

8. Exposure controls/personal protection

Control Parameters: Occupational Exposure Limits

None of the components have assigned exposure limits.

Appropriate engineering controls:	Use material in a well-ventilated area only. Adequate ventilation should be provided so that exposure limits are not exceeded. Mechanical ventilation or local exhaust ventilation may be required.

Individual protection measures, such as personal protective equipment General information:
Use personal protective equipment as required.

Eye/face protection:	If contact is likely, safety glasses with side shields are recommended.
Skin protection	
Hand protection:	Neoprene. Suitable gloves can be recommended by the glove supplier.
Other:	A long-sleeved shirt is recommended. Wear an apron or protective clothing in case of contact.
Respiratory protection:	Use a respirator with an organic vapour cartridge if the exposure limit is exceeded. Consult with an industrial hygienist to determine the appropriate respiratory protection. Protection for your specific use of this material. A respiratory protection programme compliant with all applicable regulations must be followed whenever workplace conditions require the use of a respirator. Use self-contained breathing apparatus for entry into confined spaces, for other poorly ventilated areas and for large spill clean-up sites.
Hygiene measures:	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance	
Physical state:	liquid
Form:	liquid
Colour:	Colourless to yellow
Odour:	Mild
Odour threshold:	No data available.
pH	No data available.
Freezing point:	No data available.
Boiling point:	No data available.
Flash point:	464 °F (240 °C) (Cleveland Open Cup)

Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Upper explosive limit (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapour pressure:	No data available.
Vapour density:	No data available.
Relative density:	0.981 68 °F (20 °C)
Solubility	
Solubility in water:	Slightly soluble
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	31.2 mm²/s (104 °F (40 °C)) 5.6 mm²/s (100 °C (212 °F))
Other information	
Pour point temperature:	-69 °F (-56 °C)

10. Stability and reactivity

Reactivity:	No data available.
Chemical stability:	Material is stable under normal conditions.
Possibility of Hazardous Reactions:	Will not occur.
Conditions to Avoid:	Do not expose to excessive heat, ignition sources, or oxidising materials.
Incompatible Materials:	Strong acids. Strong bases. Strong oxidising agents.
Hazardous decomposition products:	Thermal decomposition or combustion may generate smoke, carbon monoxide, carbon dioxide, and other products of incomplete combustion.

11. Toxicological information

Information on likely routes of exposure Inhalation: No data available.

Ingestion:	No data available.
Skin contact:	No data available.
Eye contact:	No data available.

Information on toxicological effects Acute toxicity

Oral	
Product	Not classified for acute toxicity based on available data.
Dermal	
Product	Not classified for acute toxicity based on available data.

Inhalation
Product: Not classified for acute toxicity based on available data.

Skin corrosion/irritation:
Product: Prolonged or repeated contact may cause irritation. Remarks: Not classified as a primary skin irritant.

Serious eye damage/eye irritation:
Product: Remarks: Not classified as a primary eye irritant.

Respiratory sensitisation:
No data available No

Skin sensitisation:
data available

Specific Target Organ Toxicity - Single Exposure:
No data available

Aspiration hazard:
No data available

Chronic Effects

Carcinogenicity:
No data available

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ cell mutagenicity:
No data available

Reproductive toxicity:
No data available

Specific target organ toxicity – repeated exposure:
No data available

12. Ecological information

Ecotoxicity

Fish
No data available

Aquatic invertebrates Toxicity
No data available No

to aquatic plants
data available

Toxicity to soil-dwelling organisms
No data available No

Sediment Toxicity
data available

Toxicity to terrestrial plants
No data available

Toxicity to above-ground organisms
No data available

Toxicity to microorganisms
No data available

Persistence and degradability

Biodegradation
No data available

Bioaccumulative Potential

Bioconcentration Factor (BCF)
No data available

Partition coefficient n-octanol/water (log Kow)
No data available

Mobility:
No data available

Other adverse effects: No data available.

13. Disposal considerations

Disposal instructions: Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Since emptied containers retain product residue, follow label warnings even after container is emptied.

Contaminated packaging: Container packaging may exhibit hazards.

14. Transport information

DOT
Not regulated.

IMDG
Not regulated.

IATA
Not regulated.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
None known.

Shipping descriptions may vary based on mode of transport, quantities, temperature of the material, package size, and/or origin and destination It is the responsibility of the transporting organisation to follow all applicable laws, regulations and rules relating to the transportation of the material. Review classification requirements before shipping materials at elevated temperatures.

15. Regulatory information

TU_D_WP_Grid-HiQ/LoQ_2024.03-jb - 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.

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
None present or none present in regulated quantities.

Superfund Amendments and Reauthorisation Act of 1986 (SARA) Hazard categories
None known.

SARA 302 Extremely Hazardous Substance SARA
304 Emergency Release Notification SARA 311/312
Hazardous Chemical
SARA 313 (TRI Reporting)
This product may contain chemical(s) regulated under the Superfund Amendments and Reauthorisation Act (SARA). For additional information, please contact Lubrizol Customer Assistance: America(s): AmerLZAMCustomerAssistance@Lubrizol.com ; Europe: EMEAICustomerAssistance@Lubrizol.com ; Asia: APCustomerAssistance@Lubrizol.com

US State Regulations

US. California Proposition 65
No ingredient regulated by CA Prop 65 present.

Inventory Status

Australia (AICS)
All components comply with chemical notification requirements in Australia.

Canada (DSL/NDSL)
All components are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List.

China (IECSC)
All components of this product are listed on the Inventory of Existing Chemical Substances in China.

European Union (REACH)
To obtain information on the REACH compliance status of this product, please visit Lubrizol.com/REACH, or e-mail us at REACH_MSDS_INQUIRIES@Lubrizol.com

Japan (ENCS)
All components are in compliance with the Chemical Substances Control Law of Japan.

Korea (ECL)
All components are in compliance in Korea.

New Zealand (NZIoC)
All components are in compliance with chemical notification requirements in New Zealand.

Philippines (PICCS)
All components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969).

Switzerland (SWISS)
All components are in compliance with the Environmentally Hazardous Substances Ordinance in Switzerland.

Taiwan (TCSCA)
All components of this product are listed on the Taiwan inventory.

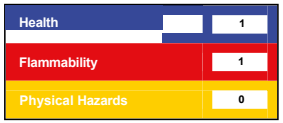
United States (TSCA)
All components of this material are on the US TSCA Inventory.

The information used to confirm the compliance status of this product may differ from the chemical information shown in Section 3.

Lubrizol
Version: 1.0
Revision Date: 03/08/2015

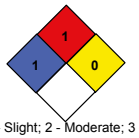
16.Other information, including date of preparation or last revision

HMIS Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible; *Chronic health effect

NFPA Hazard ID



Flammability
Health
Reactivity Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date:	03/08/2015
Version	1.0
Source of information:	Internal company data and other publicly available resources.
Further information:	Contact supplier (see Section 1)
Disclaimer:	As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.

Smart Energy Systems
retherm

TU_D_WP_Grid-HiO/LoO_2024.03-jb - All information, images and drawings are subject to errors and changes. Compliance with generally applicable and recognised technical rules must be observed at all times!
ATTENTION! Installation and wiring may only be carried out by authorised specialist personnel.

finder

Montage- und Bedienungsanleitung Typ 7E.46

65 A-Wirkenergiezähler 3-phasig, Fig. 1

Beschreibung

Der 7E.46 ist ein kompakter elektronischer Wirkenergiezähler für den Einsatz in 3-phasigen Netzen mit Neutralleiter. Sein gut ablesbares LC-Display bietet, je nach Typ, die Möglichkeit, zusätzliche Werte wie die Momentanleistung (Total oder pro Phase), sowie die Spannungen und Stromstärken pro Phase abzulesen.

Technische Daten

Anschlussbild	▪ Fig. 2
Abmessungen	▪ Fig. 3
Genauigkeitsklasse	▪ B, gemäss EN 50470-3, Kl. 1 gemäss IEC 62053-21
Referenz-, Maximal-, Anlaufstrom	▪ Iref = 10 A, Imax = 65 A, Ist = 40 mA
Betriebsspannung	▪ 3 × 230/400 VAC, 50 Hz Toleranz -20%/+15%
Zählbereich	▪ 00000,00...999999,9 kWh
S0-Ausgang (Schnittstelle)	▪ Optokoppler 5 - 30 VDC/20 mA, Impedanz 100 Ω, Impulsbreite 30 ms, 1000 Imp./kWh
Übertragungsdistanz	▪ maximal 1000 m (bei 30 V/20 mA)
Anschlüsse Hauptstromkreis	▪ Leiterquerschnitt (1,5 - 16) mm², Schraubendreher Pozi Nr. 1, Schlitz Nr. 2, Anzugsmoment (1,5 - 2) Nm
Anschlüsse Steuerstromkreis	▪ Leiterquerschnitt max. 2,5 mm², Schraubendreher Pozi Nr. 0, Schlitz Nr. 2, Anzugsmoment 0,8 Nm
Betriebstemperatur	▪ (-10 ... +55)°C (nicht kondensierend gemäss Norm EN 50470)

Anzeigeelemente (Fig. 4)

T1total	▪ Zeigt den totalen Energieverbrauch zu Tarif 1
T1part.	▪ Zeigt den partiellen Energieverbrauch zu Tarif 1, dieser Wert ist rückstellbar
T2total	▪ Zeigt den totalen Energieverbrauch zu Tarif 2
T2part.	▪ Zeigt den partiellen Energieverbrauch zu Tarif 2, dieser Wert ist rückstellbar
P(kW)	▪ Zeigt die momentane Leistung pro Phase oder aller Phasen zusammen
U(V)	▪ Zeigt die Spannung pro Phase
I(A)	▪ Zeigt den Strom pro Phase
100 Imp/kWh	▪ Pulsiert entsprechend der bezogenen Leistung
kWh	▪ Zeigt die Einheit kWh bei Verbrauchsanzeige
L1 / L2 / L3	▪ Bei P-, U-, I- oder Error-Anzeige wird die entsprechende Phase angezeigt
Error	▪ Bei fehlender Phase oder falscher Stromrichtung. Die entsprechende Phase wird zusätzlich angezeigt.

Hinweise vor dem Anschliessen

1. Nicht die Phase L1, L2 oder L3 an N anschliessen.
2. Um Feuchtigkeit im Zähler durch Kondenswasser zu vermeiden, den Zähler vor dem Anschliessen ca. eine halbe Stunde bei Raumtemperatur akklimatisieren.

Achtung!
Diese Geräte dürfen nur durch eine Elektrofachkraft installiert werden, andernfalls besteht Brandgefahr oder Gefahr eines elektrischen Schlages!

Bedienung der LCD-Anzeige

Die grafische Darstellung der Bedienung ist aus Fig. 4 ersichtlich.

Montagehinweis

Die 3-Phasen-Energiezähler lassen sich auf eine 35 mm Schiene (EN 60715TH35) aufschnappen. Sie dürfen nur in dazu geeigneten Installationsschränken verwendet werden.

EG-Konformitätserklärung

Finder SpA, erklärt in alleiniger Verantwortung:
Die folgenden Energiezähler sind konform zu den EG-Richtlinien:

- 7E.46.8.400.0002
- 7E.46.8.400.0012

Die folgenden Energiezähler sind zur Energieverrechnung an Dritte zugelassen:

- 7E.46.8.400.0012

Sie stimmen darüber hinaus mit folgenden Normen oder normativen Dokumenten überein:

- EN 50470 Teile 1 und 3 (Elektronische Zähler), Oktober 2006
- Richtlinie 2004/22/EG des Europäischen Parlaments und des Rates über Messgeräte (MID)
  - Anhang I, Grundlegende Anforderungen
  - Anhang MI-003, Elektrizitätszähler für den Wirkverbrauch

Ausstellungsjahr der EG Konformitätserklärung : 2009
Finder SPA
Konformitätsbewertungsstelle:
Zertifizierungstelle METAS-Cert, Nr. 1259
CH-3003 Bern-Wabern
Gezeichnet Marcello Grande, Technical Manager

4 319 5085 0a 01.2010 FINDER SpA
Via Drubiaglio, 14
10040 Almese (TO) - ITALY
Änderungen technischer Daten vorbehalten

Fig. 1

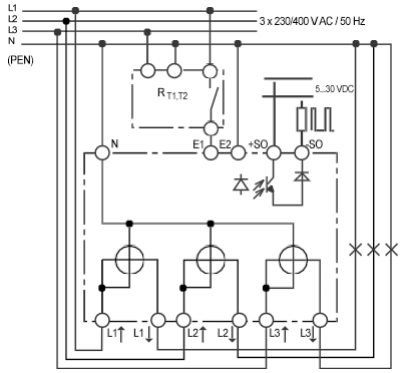


Fig. 2

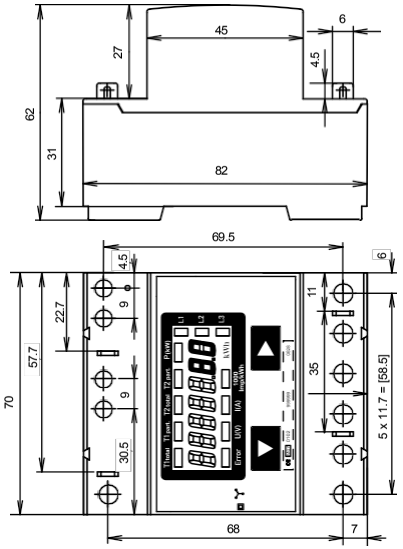


Fig. 3

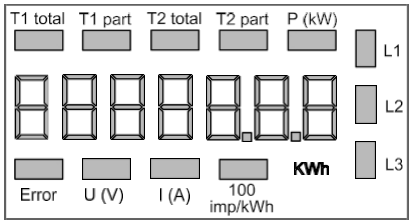


Fig. 4

13. APPENDIX

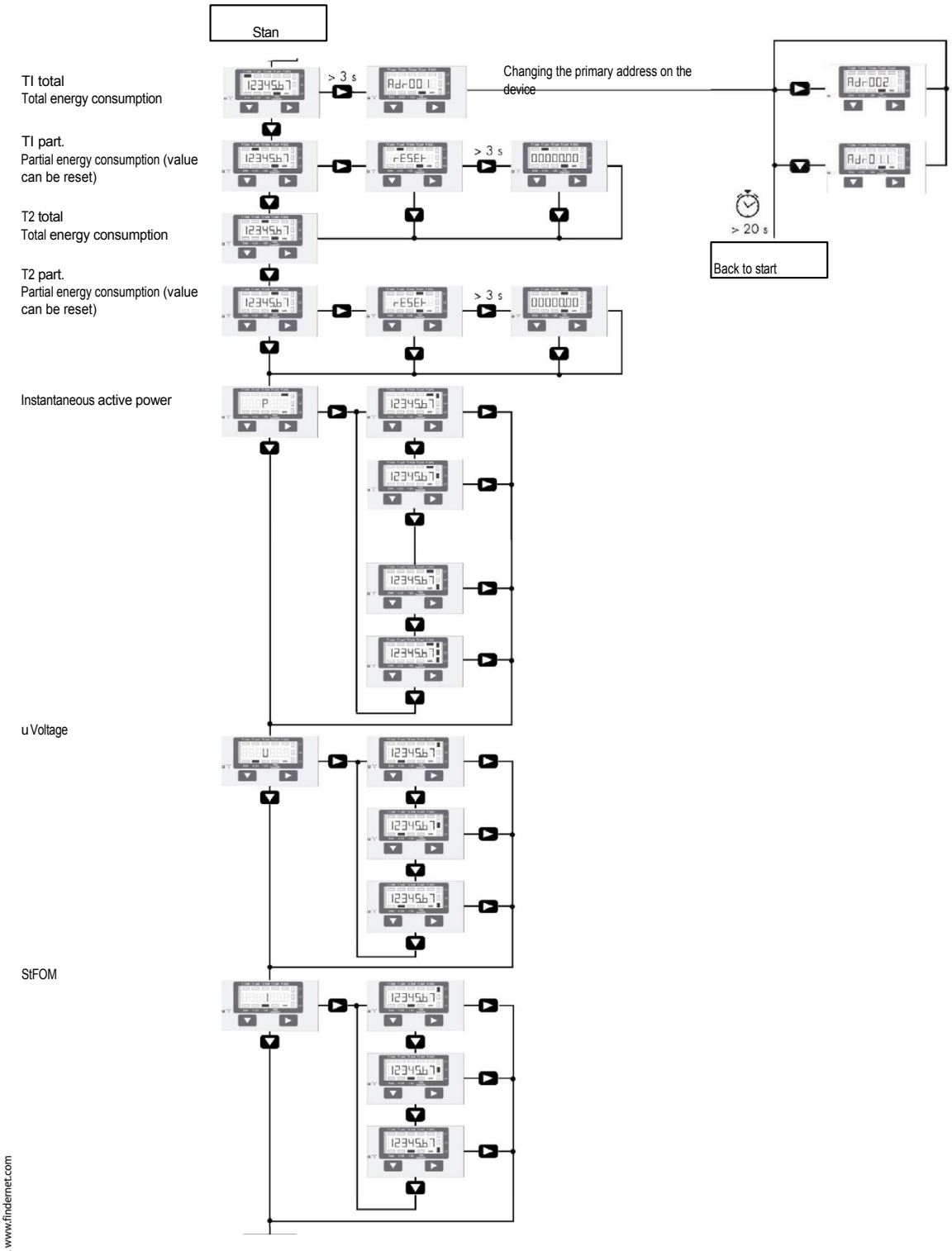
13.8 FINDER ACTIVE CURRENT METER

SERIES 7E
Electronic active current meters

finaer

SERIE 7E

Block diagram Type 7E.46 with integrated M-Bus interface

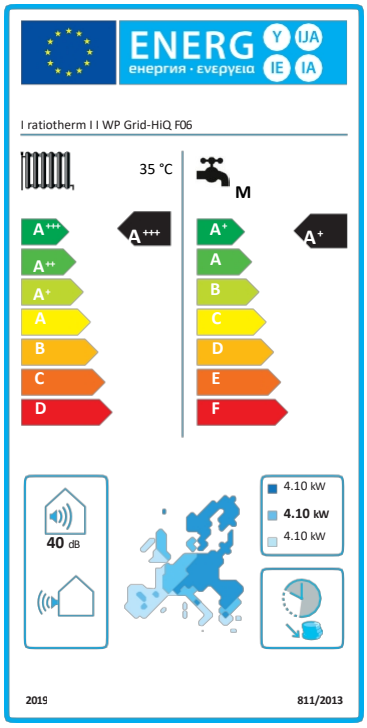


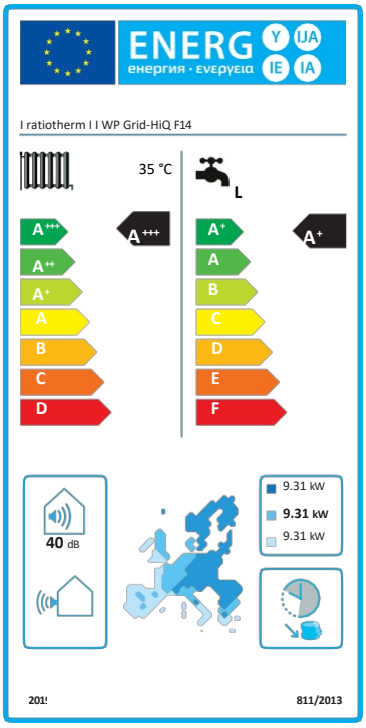
E

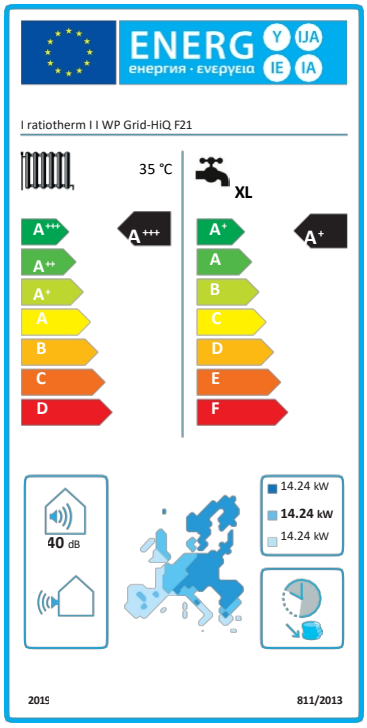
IX-2017, www.findernet.com

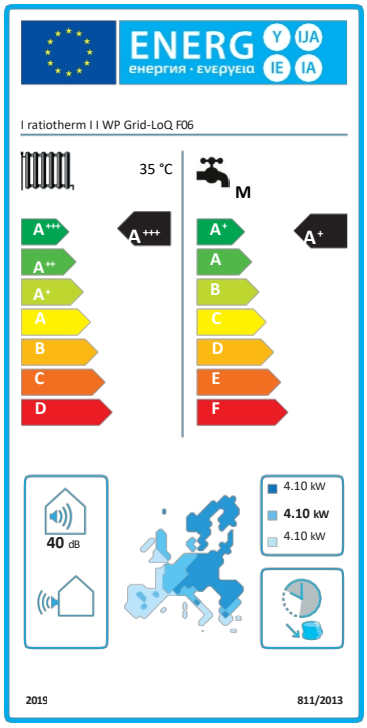
ratiotherm Smart Energy Systems

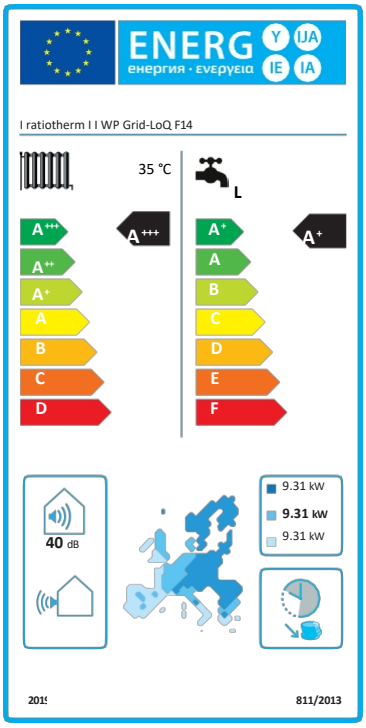
13.9 LABEL

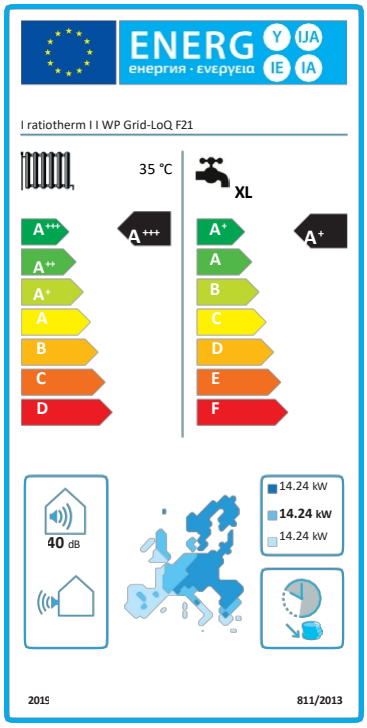

ENERG
енергия · ενεργεια
I ratiotherm I I WP Grid-HiQ F06
35 °C
M
A+++
A+
40 dB
4.10 kW
4.10 kW
4.10 kW
2019
811/2013


ENERG
енергия · ενεργεια
I ratiotherm I I WP Grid-HiQ F14
35 °C
L
A+++
A+
40 dB
9.31 kW
9.31 kW
9.31 kW
2019
811/2013


ENERG
енергия · ενεργεια
I ratiotherm I I WP Grid-HiQ F21
35 °C
XL
A+++
A+
40 dB
14.24 kW
14.24 kW
14.24 kW
2019
811/2013


ENERG
енергия · ενεργεια
I ratiotherm I I WP Grid-LoQ F06
35 °C
M
A+++
A+
40 dB
4.10 kW
4.10 kW
4.10 kW
2019
811/2013


ENERG
енергия · ενεργεια
I ratiotherm I I WP Grid-LoQ F14
35 °C
L
A+++
A+
40 dB
9.31 kW
9.31 kW
9.31 kW
2019
811/2013


ENERG
енергия · ενεργεια
I ratiotherm I I WP Grid-LoQ F21
35 °C
XL
A+++
A+
40 dB
14.24 kW
14.24 kW
14.24 kW
2019
811/2013

13.10 EC DECLARATION OF CONFORMITY

EC Declaration of Conformity in accordance with EC Machinery Directive 2006/42/EC, Annex II Part 1. A, EU Official Journal L 157/24 dated 9 June 2006

Manufacturer and address:	ratiotherm GmbH & Co. KG Wellheimer Straße 34 91795 Dollnstein
Authorised representative for documentation:	Julian Kruck Head of Heat Pump Technology
Product name:	Heat pump (water/water and brine/water)
Type:	WP Grid-HiQ F06/F14/F21 and WP Grid-LoQ F06/F14/F21

CE

We hereby declare that the above-mentioned machine has been developed, designed and manufactured in accordance with the EC/EU directives mentioned in this declaration.

The above-mentioned machine also complies with the protection objectives of the EU Directives

- "Low Voltage" 2014/35/EU, EU OJ L 96/357 of 29 March 2014,
- "RoHS" 2011/65/EU, EU OJ L 174/88 of 8 June 2011,
- "RoHS" 2011/65/EU, EU OJ L 189/164 of 15 May 2014,
- "ErP" 2009/125/EC, EU OJ L 285/10 of 21 October 2009,
- "EnEV" 2010/30/EU, EU OJ L 153/1 of 19 May 2015,

and the essential requirements of the EU Directive

- "EMC" 2014/30/EU, EU OJ L 96/79 of 26 February 2014.

Applied harmonised standards:

EN 378	EN 61000-3-2
EN 349	EN 61000-3-3
EN 60529	EN 61000-3-11
EN 60335-1	EN ISO 12100-1
EN 60335-2-40	EN ISO 12100-2
EN 55014-1	EN ISO 13857
EN 55014-2	EN 12141-1
EN 60204	EN 60730

Applied national standards and Specifications:

DIN EN 14511
DIN EN 12263
DIN 8901

ratiotherm GmbH & Co. KG
Wellheimer Straße 34
91795 Dollnstein

Dollnstein, 29 October 2019
Date

Signature

Julian Kruck, Head of Heat Pump Technology

You can find us here

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