Manual
CoolLoop

Water-cooled cabinet for lateral attachment to server cabinets

Effective cooling capacity
10 - 30 KW

date / Datum	issue / Ausgabe	author / erstellt	reviewed / geprüft
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Contents **page**

0. Abstract

The add-on CoolLoop cabinet is provided with an outlet for heat loads from 10 to 30 kW facilitating both its closed and open operation in servicing the computer center. It permits to be combined with closed server cabinets or to be applied as an “in-row cooler” in open operation. Cooling is effected via an air/water heat exchanger. The cooling capacity is adjusted to the emerging heat load.

Cables can be guided through the bottom as well as through the top lid. As a standard, the chilled water inlet is designed to go through the bottom opening.

1. Safety

1.1 Work safety Symbols

The following symbols refer to certain hazards or provide you with advice on safe operation.

Attention! Danger spot! Safety notice!

Hazard by electrical current or high voltage

Caution! Hot surface

Caution! Rotating parts / automatic start

Disconnect from power prior to works!

Attention! Refers to possible damage to the device

Hazard by electrical voltage

Note! Marks possible hazards for the environment

Important note, information

1.2. Safety notice

Our engineers can give you comprehensive advice in assembling the CoolLoop.
Extensive material, functional and quality testing guaranty high benefit and a long lifecycle.
Nonetheless, such devices may cause hazards if improperly handled by untrained personnel and if used for purposes they are not intended for.

Carefully read this assembly and operational manual prior to assembling and commissioning the CoolLoop.

The electrical equipment corresponds with applicable VDE and accident prevention regulations.
There are hazardous voltages (higher than 50V AC or higher than 100V DC):

→ behind cabinet doors
→ at the fans and their hook-ups

Use genuine fuses of the specified current.
Immediately switch OFF the device if there is any disturbance in the electrical supply or in the cold water supply.

Hazard by electrical voltage.
Maintenance and cleaning works are only permitted to be performed by trained personnel, whereby such personnel must safeguard that the device is free from voltage at the time of maintenance and cleaning.
Therefore, prior to any works, please take the device out of operation in accordance with instructions.
Internal sockets can be used only by authortized persons.

Hazard by works on the device carried out by non-experts.
Maintenance and cleaning works are only permitted to be performed by trained personnel. In order to keep the device in operationally safe condition and its long lifecycle, maintenance and cleaning intervals must be observed by all means.

Operate the CoolLoop only in accordance with its specified purpose, within its limits of capacity and approved operating means.

When performing any works on and with the device, please observe:

- Any respectively applicable regulations
  (e.g. VDE regulations or other nationally applicable guidelines)
- Any applicable accident prevention regulations (BGV)
- Any respective provisions
- Any applicable environment protection acts

Operate the device only in its proper condition. In the event of functional disturbances or deficiencies, the device must immediately be taken out of operation and the operator's responsible person must be informed of its state.
The device must only be taken into operation again after the flawless function of the device has been restored.

Caution! Hot surface!
Defect fans, power supply units or control boards may have run hot.
Allow them to cool down prior to any works.

2. Application Conditions

Appropriate use

The device is an add-on/in-row cabinet for circulation cooling and is only used for the removal heat from server cabinets to protect temperature-sensitive components.
The cooling system (cabinet – CoolLoop) works thermally independent of the room air or as an open system in conjunction with open server racks.

The total heat load issued from the installed equipment is taken out to be absorbed by a chilled water circuit in the building.

	For reliable function of the CoolLoop, chilled water must be available in an appropriate amount, at the appropriate temperature and pressure. The water quality must be in accordance with VGB-R 455 P. (see Annex)
	One of the fans must be running at all times (at least at minimum speed)! If this requierement can not be met the chilled water supply must be stopped! This requirement is crucial for the device propper function!
	Please consider installation of room airconditioning unit for following reasons: • CRAC unit provides humidity control • CRAC unit provides air filtration • CRAC unit provides fres air control • Eventhough Knürr CoolLoop is a closed architecture cooling device there is still a small heat load (max. 2% of nominal heat load) due to convection losses (exact number depends on your room configuration)

Ambient temperature at the site of installation:	10℃ to 35℃ (other temperatures upon request)
Absolute humidity at the site of installation:	8 g H_2O/ kg air recommended
Water temperature, feed:	4- 20℃
Nominal capacity at	12℃ feed (lower temperatu res upon request) 18℃ return and 20 – 25℃ fresh air to serv er
Use of anti-freeze in chilled water:	not recommended (upon request)
Water connection:	from below
Condensed water connection:	from below
Nominal voltage at cooling capacity: 10 KW, 20 KW, 30 KW	200V to 264V/ 50 / 60 Hz
Max. operating pressure:	10 bar

3. Description
3.1 General Function

CoolLoop complies with the conditions of EN 60950
Its modular design permits to be added on to the right, to the left or on both sides, and also centrally between two server racks to be cooled.

Heat emitted by installed equipment (e. g. servers) is reliably removed using the cold water system integrated in the CoolLoop. The cooling system is entirely safe in itself, so that water is prevented from ever entering the server area.

The cooling system comprises a high-performance air/water heat exchanger, a tested droplet separator, fans with fan control unit (fan-speed according to heat load) for the ducted supply of air.

In the closed mode of operation no heat (thermal load) is emitted to the ambient environment.

Attention! The CoolLoop only works if the cold fresh air to the server and heated return air from the server have fully been separated. Height units not in use have to be sealed using blanking panels.

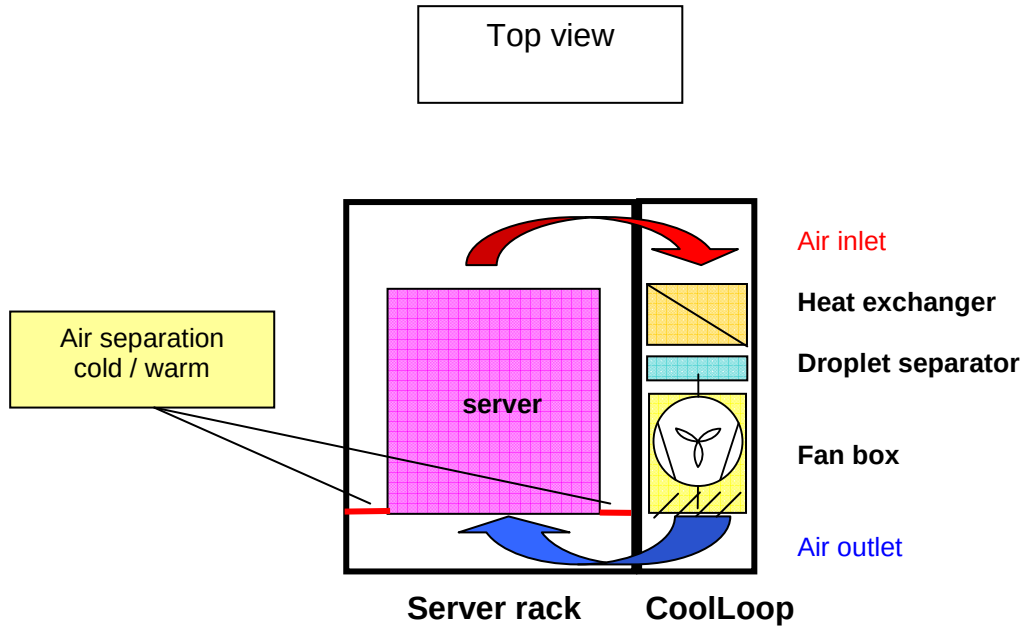
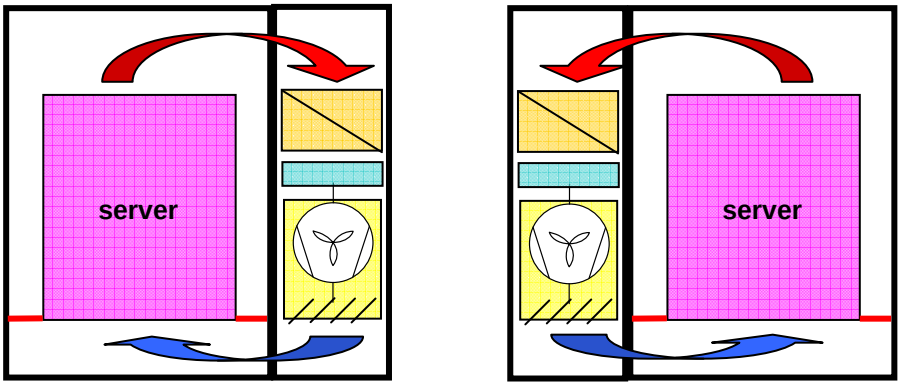


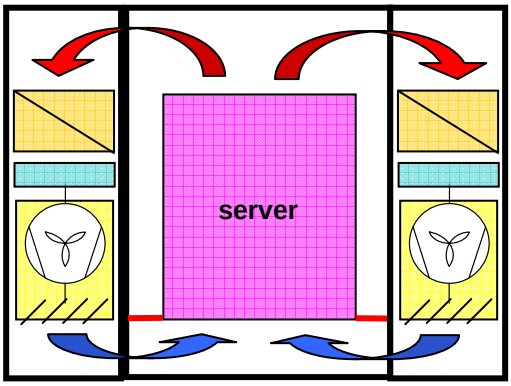
Figure CoolLoop, top view
Exemplary arrangement of a CoolLoop right of the server rack

3.2 Principle of Cooling Operation – CoolLoop Arrangements

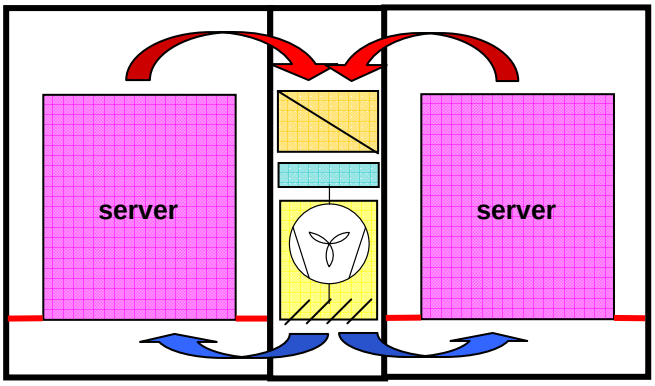
a) CoolLoop L
closed mode of operation:



CoolLoop arranged to the right or to the left



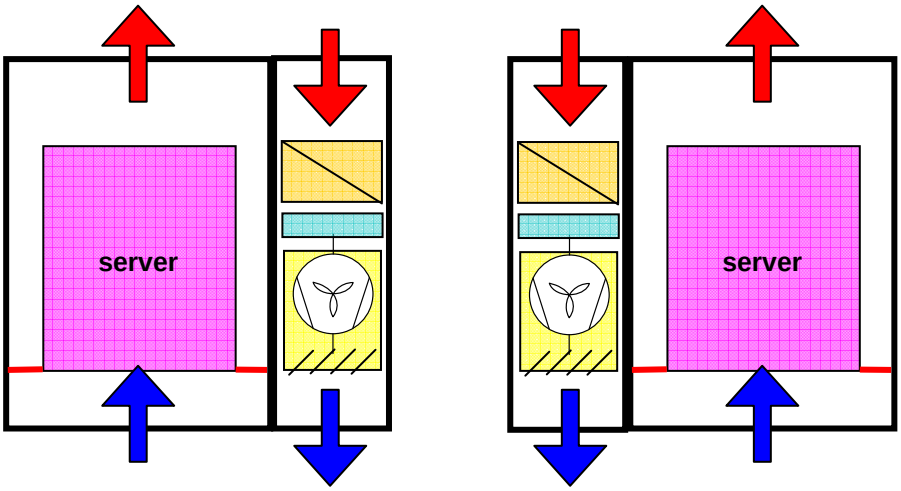
Two CoolLoops for one server cabinet:
Maximum cooling capacity or n+1 redundance



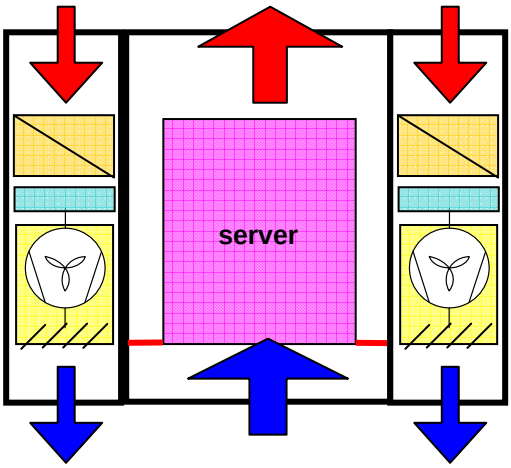
CoolLoop serving two server cabinets,
splitting the cooling capacity

Figures CoolLoop, arrangement options “closed”

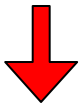
b) *CoolLoop T*
Any of these arrangements may also be applied in open mode of operation; however, in that case, perforated doors at both the rack and the CoolLoop must be applied.



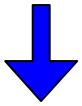
CoolLoop arranged to the right and to the left



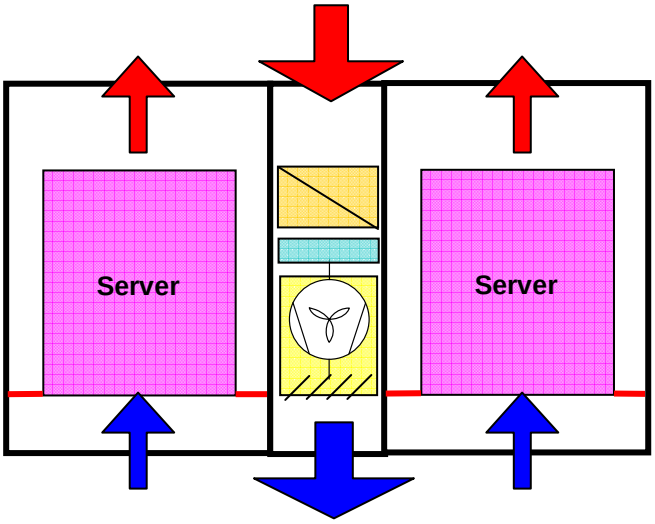
**Two CoolLoops for one server cabinet:
maximum cooling capacity or n+1 redundance**



Return air from server or air sucked in by the CoolLoop (warm)



Cooled air or fresh feed air to server



**CoolLoop serves two server cabinets,
Splitting the cooling capacity**

Figures CoolLoop, arrangement options “open”

Air that has been heated by the server (e.g. 35℃) is led through the laterally arranged wall openings or through the rear door to a special air/water heat exchanger.

Its heat is absorbed there and the air is cooled down to e.g. 20 - 25℃. Should deviation below the dew-point generate droplets of condensed water, they will safely be removed by the subsequent droplet separator.
The cooled air is now provided again by speed-controlled fan boxes at the front of the server. Non-return valves thereby prevent any re-circulation within the fan boxes.

The server fans can suck in the air and duct it via internal installations.

The chilled water is provided by a water chiller installed in the building.
Below the heat exchanger, there is a tub for collecting condensed water, with a 5/8“ outlet.
The CoolLoop can optionally come with a condensed water pump to pump the possibly accumulating condensed water into the existing sewage system.

In the event of any failure of the cooling plant, the server cabinet doors are to be opened in order to avoid any heat from piling up inside the rack housing. In such a case, the heat is discharged as thermal load to the ambient room of installation.

In the event of any failure of the CoolLoop fans, the device doors are to be opened in order to avoid any heat from piling up inside the housing. In such a case, the heat is discharged as thermal load to the ambient room of installation.

Note: Optionally, automatic door opening at the server rack can be provided which would facilitate the use of ambient air for cooling the server temporarily.

For maintenance purposes, both the front and the rear doors can be opened jointly or separately.

3.3 Overview and Dimensions

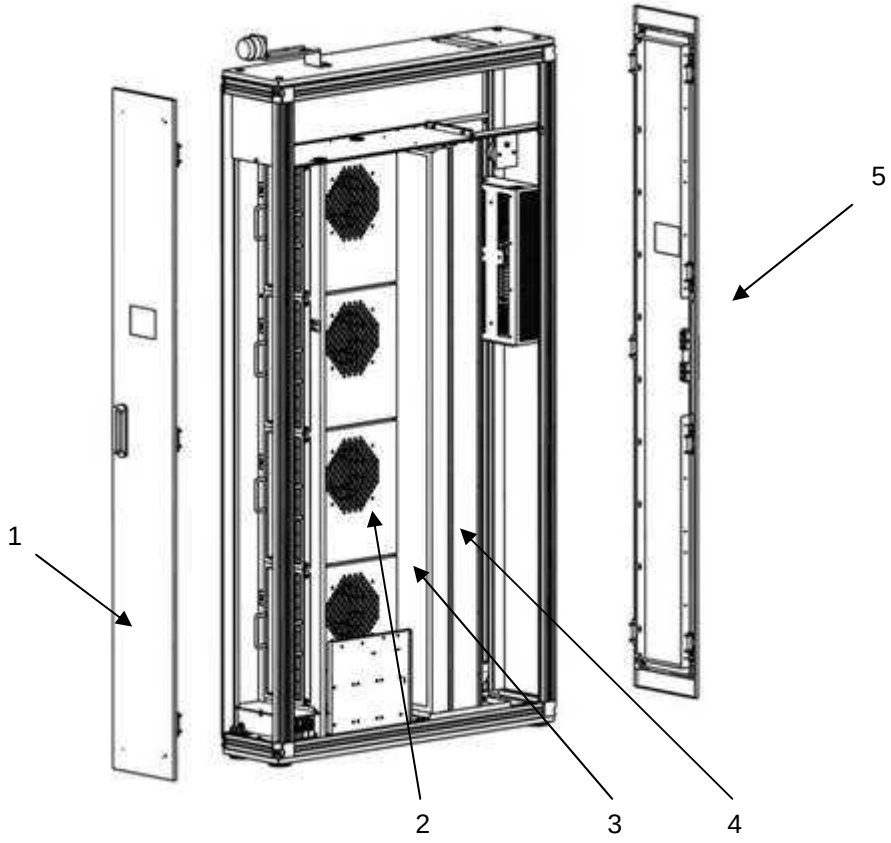


Figure CoolLoop 3D

1	front door (closed or perforated version)
2	fan plug in unit (max. 4, standard 3)
3	droplet separator
4	heat exchanger
5	rear door (closed or perforated version)

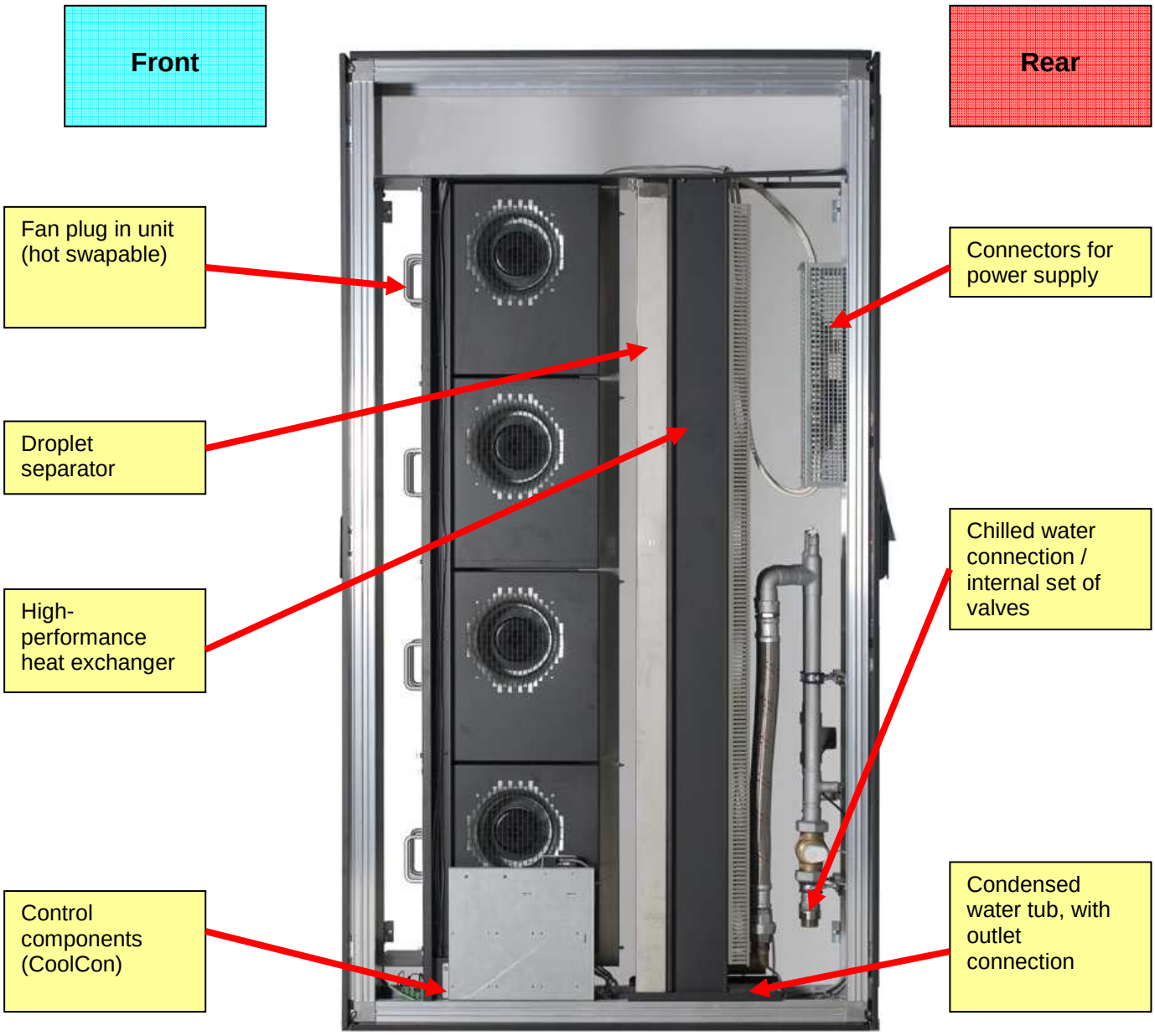


Figure CoolLoop, side view (with sidewall removed)

CooLoop bottom plate with openings

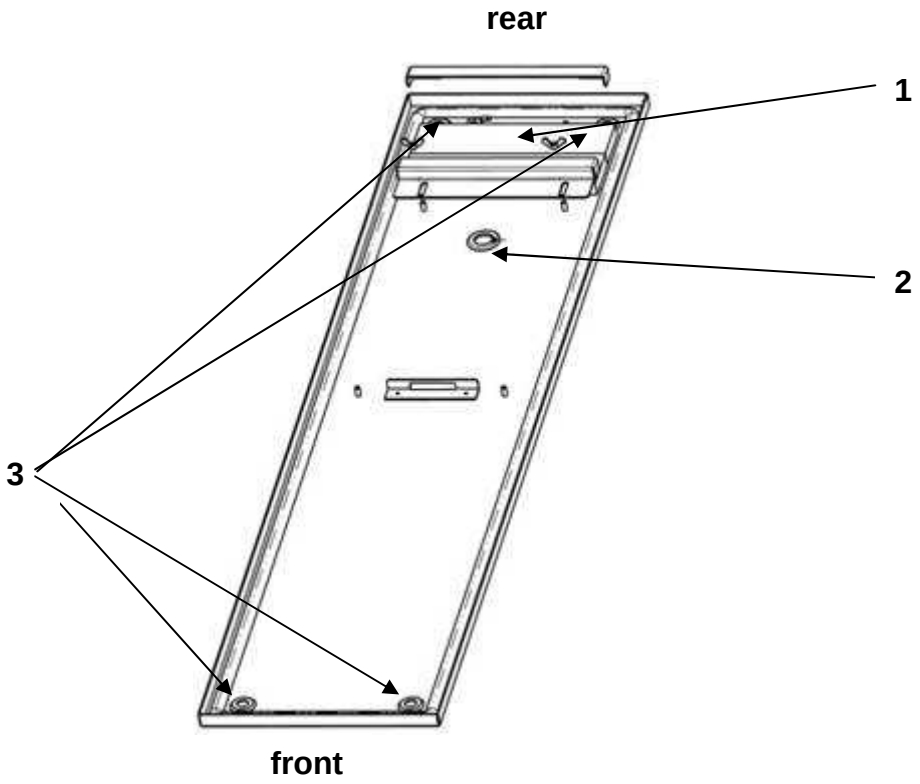


Figure CoolLoop bottom plate

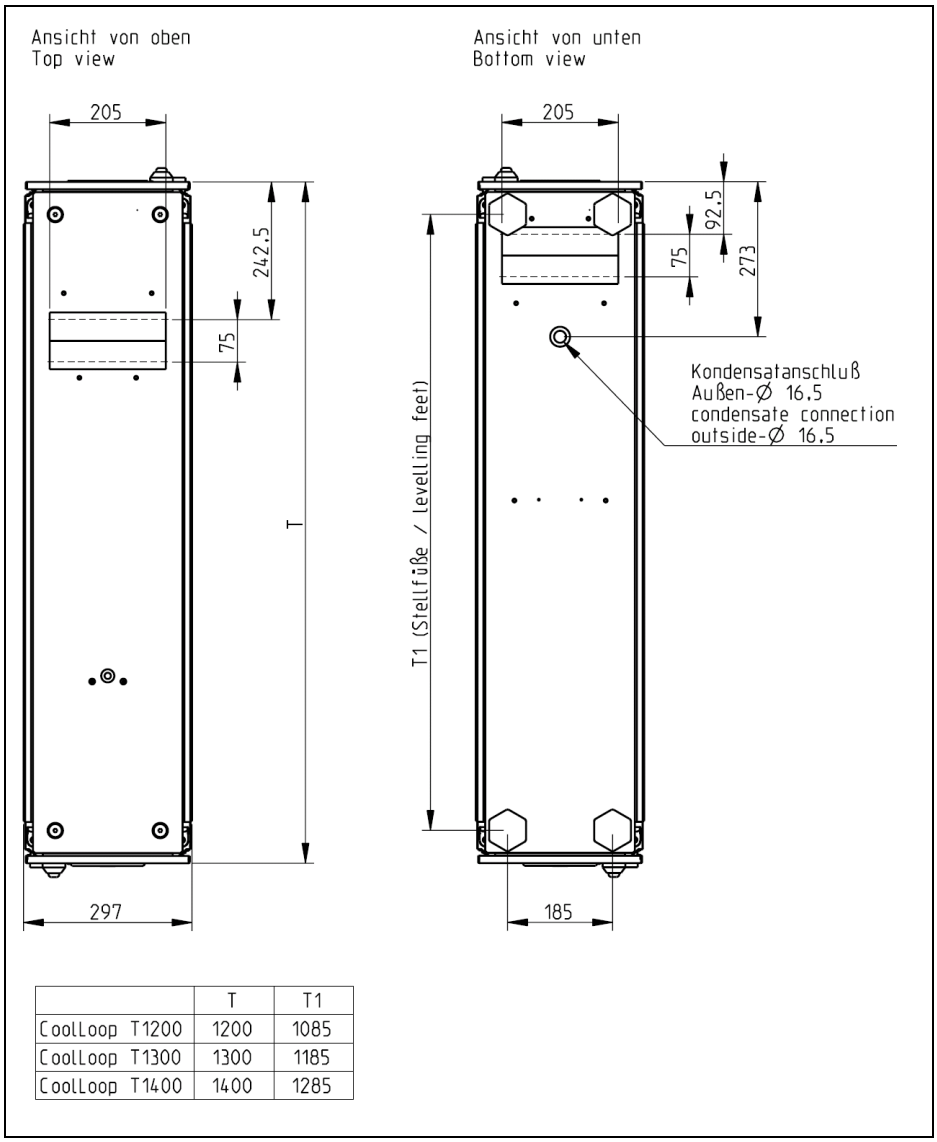
Legend:

1 chilled water inlet / cable inlet plate (to be closed by foaming)

2 ducts for condensed water outlets

3 feet, adjustable

The lead-in (1) is to be air-sealed after completing the works.



	T	T1
CoolLoop T1200	1200	1085
CoolLoop T1300	1300	1185
CoolLoop T1400	1400	1285

Figure Dimensions of the lid, bottom plate / openings

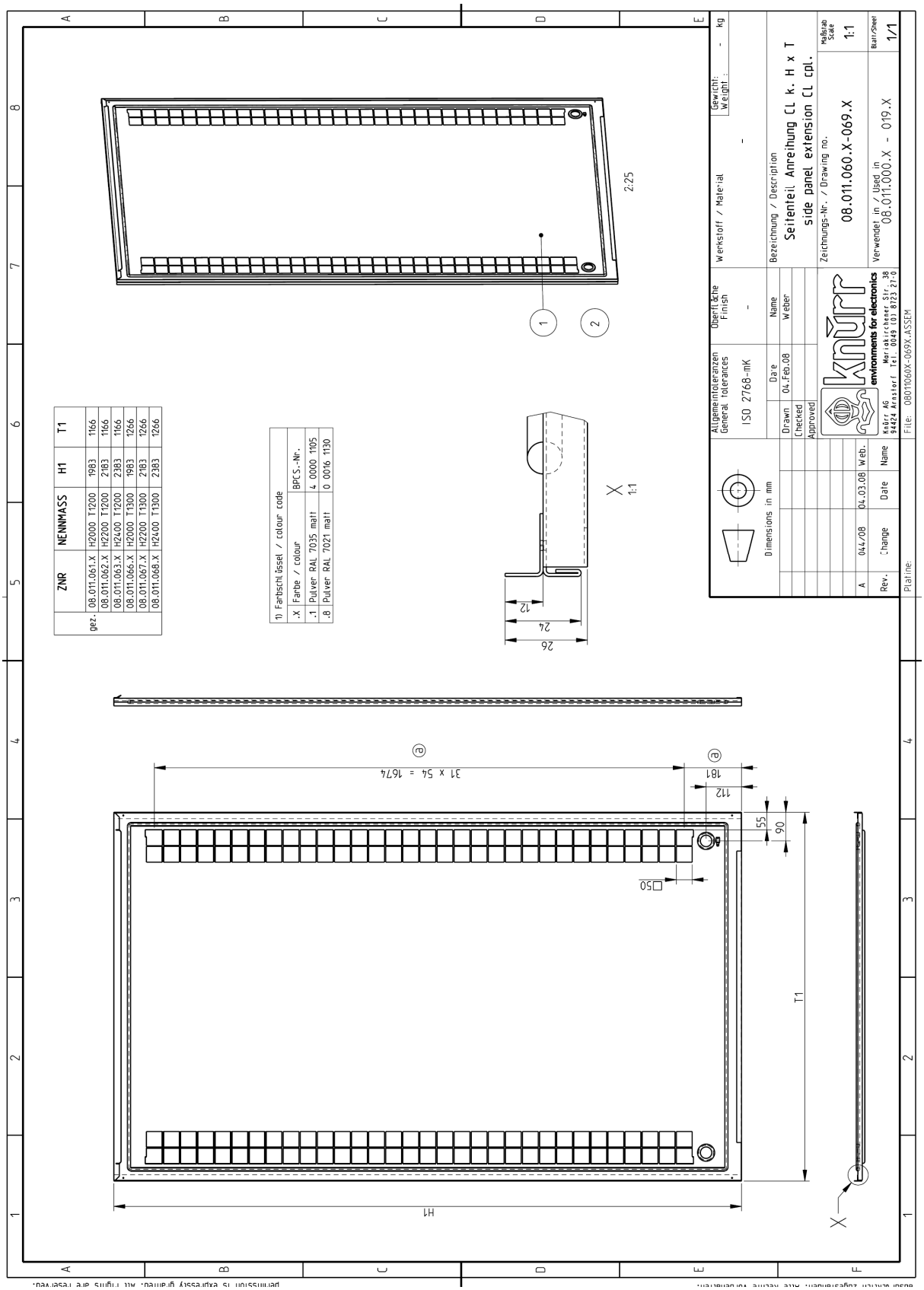


Figure Air inlet / outlet openings in the separation wall between the CoolLoop and the server cabinet

The air inlet/outlet opening must in any case be kept unobstructed to guarantee free air circulation. Do not cover them by separate installation, such as socket strips.

3.4 Technical Specifications

Housing material:	frame from aluminum profile / steel sheet, galvanized and coated
Applicable temperature range:	10℃ to 35℃ (other temperatures upon request)
Absolute humidity:	8 g/kg recommended
Cold air outlet after heat exchanger:	20 - 25℃ acc . to ASHRAE
Temperature difference via server:	approx. 15K, depending on server equipment
Noise level:	60,4 dB(A) noise pressure in 1m distance (CoolLoop (L), 4 fans 75% fan speed)
	74,4 dB(A) noise pressure in 1m distance (CoolLoop (T), 4 fans, 75% fan speed)

Chilled water

Cooling capacity depending on number of fans:	10, 20, 30 KW
Chilled water temperature, feed:	4 - 20℃
Nominal capacity at	12℃ feed (lower temperatur es on request) 18℃ return and 20 – 25℃ fresh air to serve r
Max. operating pressure, chilled water:	10 bar
Connection feed/return:	1 ¼“, male thread

CoolLoop Data Overview, Table A

General data

Chilled water temperature: 4 to 20℃
Spread of chilled water: 12 / 18℃ (design conditi ons)
Fresh air temperature to server: 20 - 25℃
Connection heat exchanger: 1 1/4“ male thread
Connection condensed water tub: 5/8“ hose connection

Max. oper ating pressure of heat exchanger: 10bar
Water contained: 8.6l
Abso lute humidity on location: 8g/kg recommended
Color code standard colors: 8 = RAL 7021 (black gray)

Effective cooling capacity-	Number of fan rack units	Height	Width	Depth	Effective height In server cabinet	Weight (empty)	Flow quantity at)*	Pressure loss CoolLoop	Pressure loss connection set	Quanity of circulated air in server cabinet	Data of electrical Connections Voltage / Current / Capacity / Frequency	Fusing / power supply
kW		**mm**	**mm**	**mm**	**HE**	**kg**	**m³/h**	**Bar**	**bar**	**m³/h**	**V / A / Watt / Hz**	**A / mm²**
10	1	2000 2200	300	1200/ 1300	42 46 50	188	1.49	0.05	0.01	1800	200 to 264 1.7 410 50 / 60	16 / 3 x 2.5 (C type tripping characteristic)
20	2	2000 2200	300	1200/ 1300	42 46 50	202	2.98	0.19	0.03	3600	200 to 264 3.4 810 50 / 60	16 / 3 x 2.5 (C type tripping characteristic)
30	3	2000 2200	300	1200/ 1300	42 46 50	216	4.48	0.43	0.07	5400	200 to 264 5.1 1230 50 / 60	16 / 3 x 2.5 (C type tripping characteristic)
30	3+1 (n+1)	2000 2200	300	1200/ 1300	42 46 50	230	4.43	0.42	0.07	5400	200 to 264 4.1 990 50 / 60	16 / 3 x 2.5 (C type tripping characteristic)

CoolLoop Data Overview, Table B (Article Nos.)

CoolLoop Overview (Standard)						
Article No.	**Specification**	**Function**	**Height [mm]**	**Width [mm}**	**Depth [mm]**	**Remarks**
08.011.001.8	CoolLoop (L)	closed air duct (Loop)	2000	300	1200	metal sheet doors, closed
08.011.002.8	CoolLoop (L)	closed air duct (Loop)	2200	300	1200	metal sheet doors, closed
08.011.006.8	CoolLoop (L)	closed air duct (Loop)	2000	300	1300	metal sheet doors, closed
08.011.007.8	CoolLoop (L)	closed air duct (Loop)	2200	300	1300	metal sheet doors, closed
08.011.501.8	CoolLoop (T)	open system, (through)	2000	300	1200	perforated doors
08.011.502.8	CoolLoop (T)	open system, (through)	2200	300	1200	perforated doors
08.011.506.8	CoolLoop (T)	open system, (through)	2000	300	1300	perforated doors
08.011.507.8	CoolLoop (T)	open system, (through)	2200	300	1300	perforated doors

Color code standard colors: 8 = RAL 7021 (black-gray)

3.5 Control

The main task of the control is to provide constant temperature conditions to the installations in the server cabinet at varying loads as well as to run the supporting system in an energy-saving mode.

Another task is the comprehensive visualization and transfer of monitored parameter with process decisions derived therefrom to guarantee availability; everything with view of data exchange and access via the network.

A series of control and monitoring options complements the basic concept for all applications that occur and that are to be safeguarded.

Temperature is controlled depending on the inside temperature in the server cabinet.

Fan control:

A temperature sensor permanently measures the temperature at the rear of the server in the server cabinet (return air side of the server). The circulated amount is adjusted by the fans to the current cooling requirement.

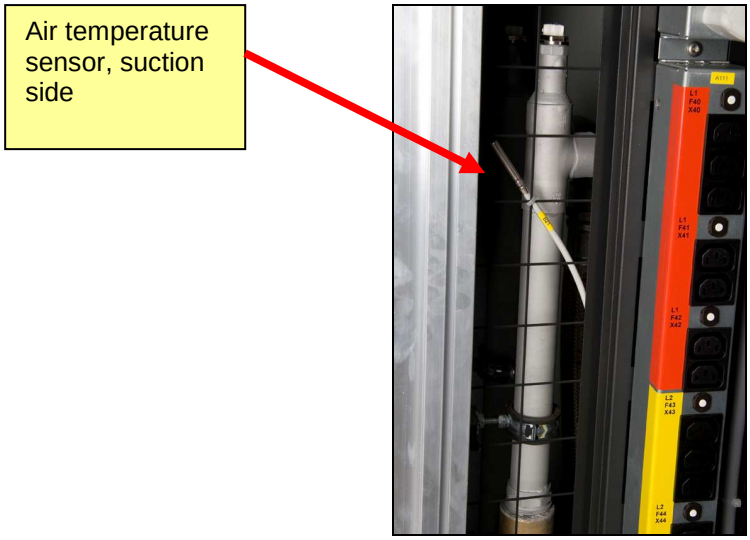


Figure CoolLoop, temperature sensor at rear

The fans start at a minimum speed of 25% of the maximum speed rate. The speed increases to 100% proportionately to temperature to achive max. 40℃ at the server outlet side.
In case of a failure or short circuit of the temperature sensor, the fans are tunred up to maximum speed.

Control of the cooling capacity:

A *three-way* or *two-way* valve ***(the respective version is an order option)*** adjusts the chilled water flow to the de-heating capacity. This is mainly of advantage for avoiding low temperatures in a partial load operation.
In the event of failure, the valve will open and the entire volume flow will be run via the register.
To keep 20℃ at the air supply side the valve cont rols the water flow between 0% and 100% of the designed flow rate (distribution and quantity control).

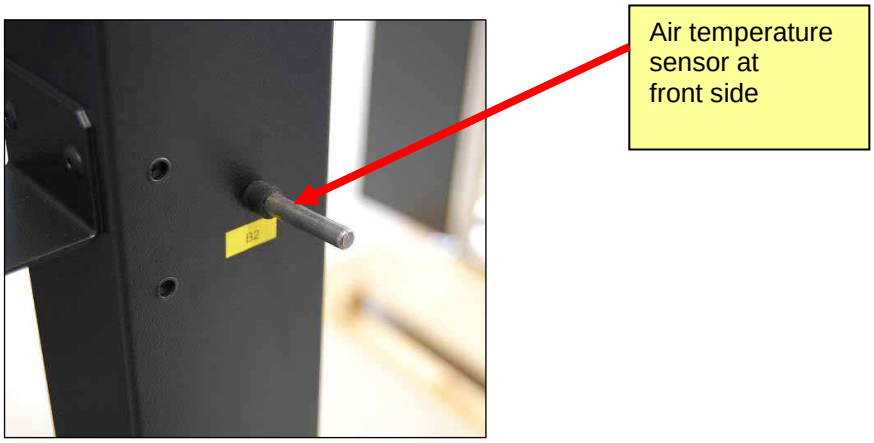


Figure CoolLoop, temperature sensor ont the fresh air side

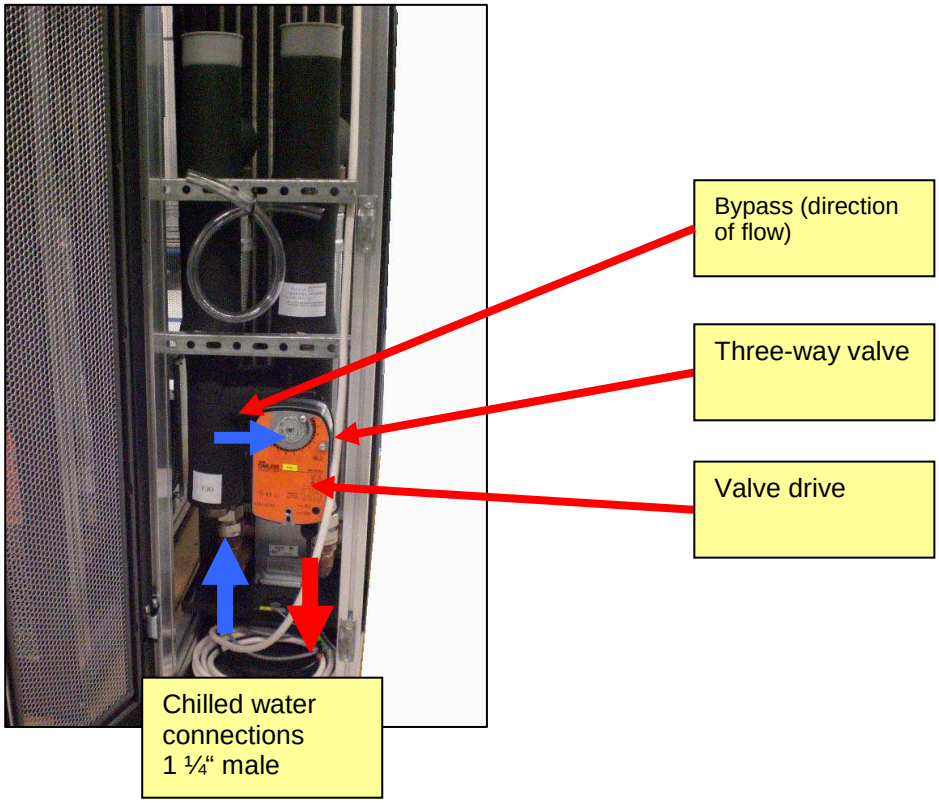


Figure CoolLoop, set of valves / three-way valve, chilled water connection

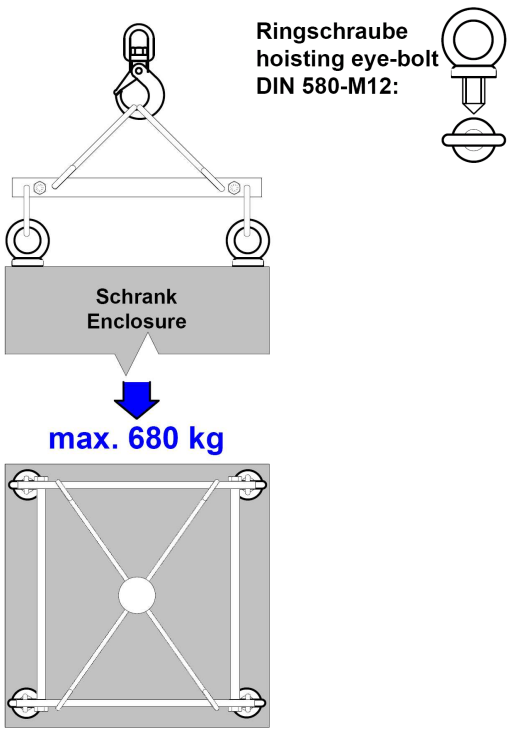
Please note the detailed manual of the “CoolCon” Control at the annex.

4. Storage and Handling

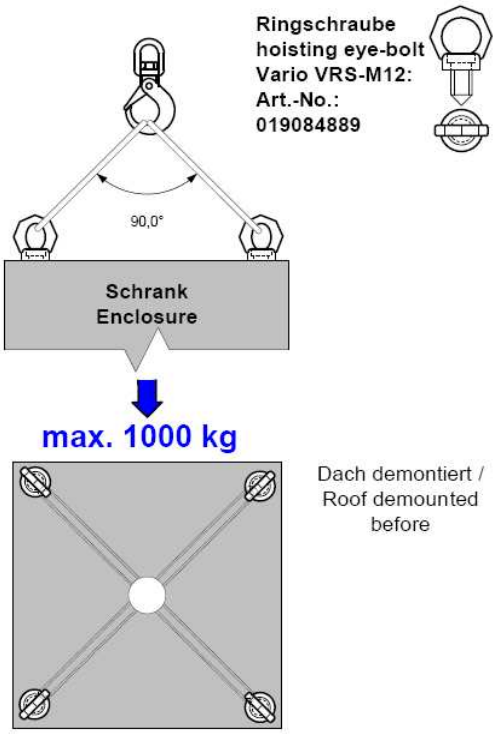
- Keep CoolLoop in its original packaging dry and weather-protected.
- Cover open pallets with plastic sheeting and protect functional component from being soiled (e.g. sand, rain, dust, etc.).
- Observe storage temperatures between –30℃ and +50 ℃.
- The heat exchanger must be emptied completely (frost damage hazard).
- When stored for more than a year, check the fan bearings for easy movement prior to assembly (⇒ turn them by hand).
- CoolLoop can be transported by forklift or crane. When transporting it by crane, use belts. The weight of each CoolLoop is, depending on its model, up to 160 kg (empty).
- Avoid warping the housing or other damaging.
- Use appropriate means during assembly, e.g. proper scaffolding.
- Prior to lifting the CoolLoop with the help of a crane or forklift, close all maintenance doors.
- Do not step underneath any hoisted loads.
- Hooks to be hooked on hoisting eye-bolts must be suitable and be able to withstand the tensile force.
- CoolLoop must not be pulled transversely by the crane.
- Prior to commissioning the CoolLoop, any packaging must have been removed.

Safety notice for transport by crane

< 680 kg



> 680 kg



5. Assembly and Commissioning
5.1 Preparation for Assembly

Before assembling the device, you will need to check a few items.
These checks will serve the safety and flawless function of the cabinet.
Apply your greatest care to these checks to guarantee that the device will run smoothly.

Check the device for damage during delivery:
Upon receipt of the CoolLoop, its packing must not show any visible damage on the outside pörobably caused by trannsport. Any damage of the packaging may hint at possible damage suffered during transport. In the worst case, this may result in functional failure.

Return of the device in the possible event of transport damage
Should the device not be returned in its original packaging, the return packaging must meet the following requirements:
The distance of the device to its packaging must at least be 30 mm.

For your support during assembly, a checklist has been enclosed, which you should fill in prior to commissioning.
Commissioning can also be carried out by a specialized firm. For this purpose, the enclosed commissioning protocol is to be used.

The CoolLoop is to be installed on a level basis. Therefore, prior to assembly, check its horizontal alignment.
Please note that the basis must be able to bear the mass of the CoolLoop as well as of the added on rack or racks.

In order to obtain proper air circulation, make sure that there is no packaging material or other installations

- in the fan rack units
- in the cooler area
- at the air inlet
- at the air inlet,

which could obstruct or hinder any air circulation.

5.2 Setup of Devices

Make sure that access to connections (chilled water, condensed water, electrical and data cables) is not hindered by the floor design.

After its setting up, the feet of the CoolLoop are to be adjusted in such a way that the cabinet is standing upright in perfectly vertical position. After aligning it, its doors must close easily.
The feet are adjusted by means of a spanner (SW 65mm). Consider the length of thread.

Adding-on

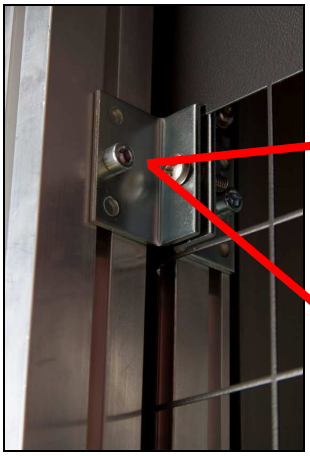


Figure Connecting set

Figure Rear of the server cabinet with an upper and lower point of connection (the front needs to be fastened similarly)

CoolLoop and the added-on server cabinet or cabinets are bolted with each other by means of the connecting set in order to reach the required stability. The add-on set comes enclosed with the server cabinet.
A total of four points is fixed by the ventilation grids.

5.3 Connection of Chilled Water

Principally, there are two connection systems:

Set of internal valves:

All the control and measuring armatures are installed within the CoolLoop.
Their connection is made about 10 cm above the bottom of the CoolLoop.

For connection to the piping system that may exist in the building's false flooring, we recommend to use the optional connecting set (flexible reinforced stainless stell tubes, ball valve, and control valve)

Set of external valves:

Control and measuring armatures are installed outside the CoolLoop, i.e. in the rised floor.
The connection between CoolLoop and pipework is made via "connecting set" (including 1.5-m flexible reinforced stainless steel tubes, a ball valve and a control valve).

Control valve as a two-way or three-way valve:

Depending on the requirements of the hydraulic network, the chilled water control valve can be ordered as a three-way valve (by-pass control / control of amounts being constant in the sytem) or as a two-way valve (quantity control / variable volume flow in the system).
When making the order, the respective version has to be specified with the configuration of the CoolLoop.

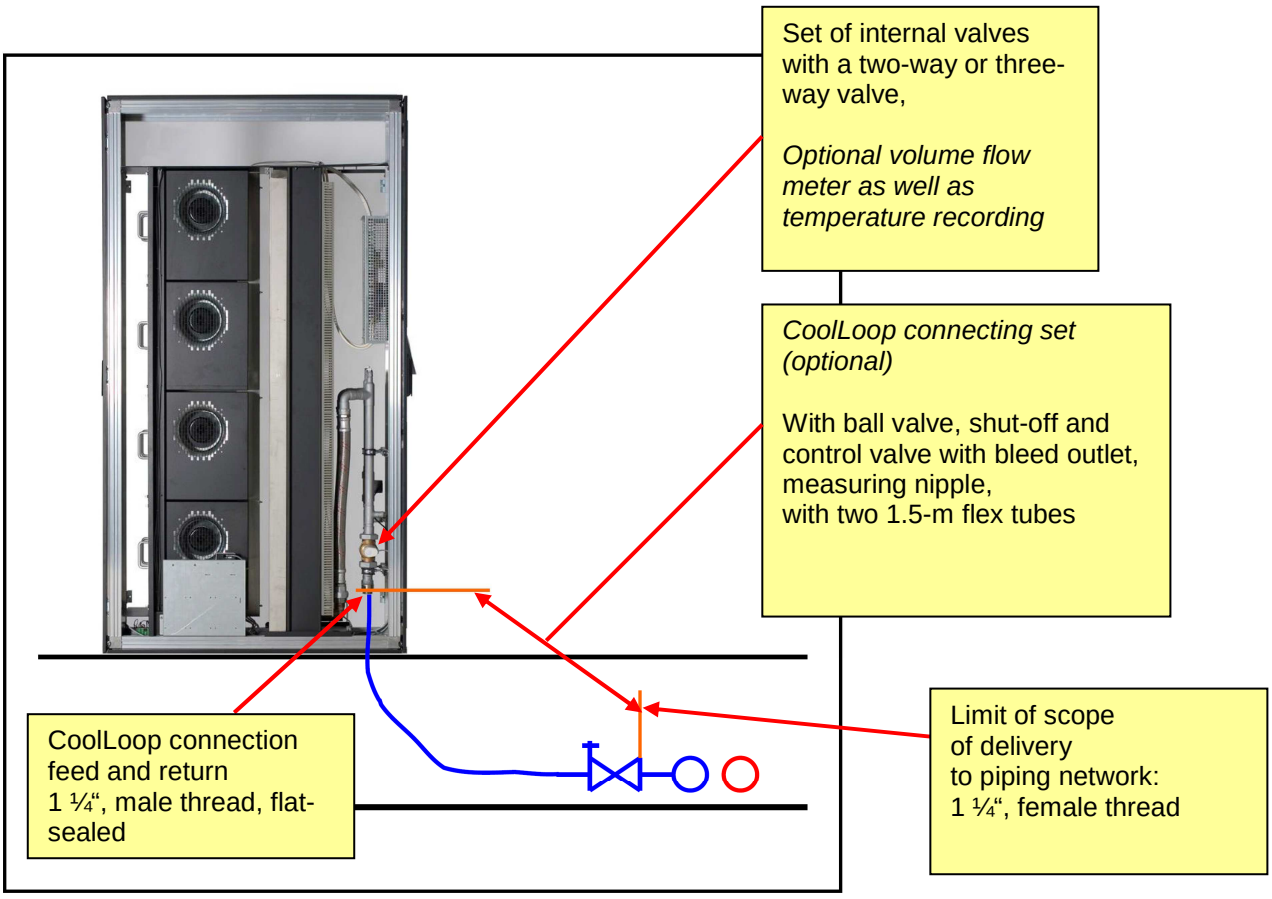


Figure CoolLoop side view with set of internal valves

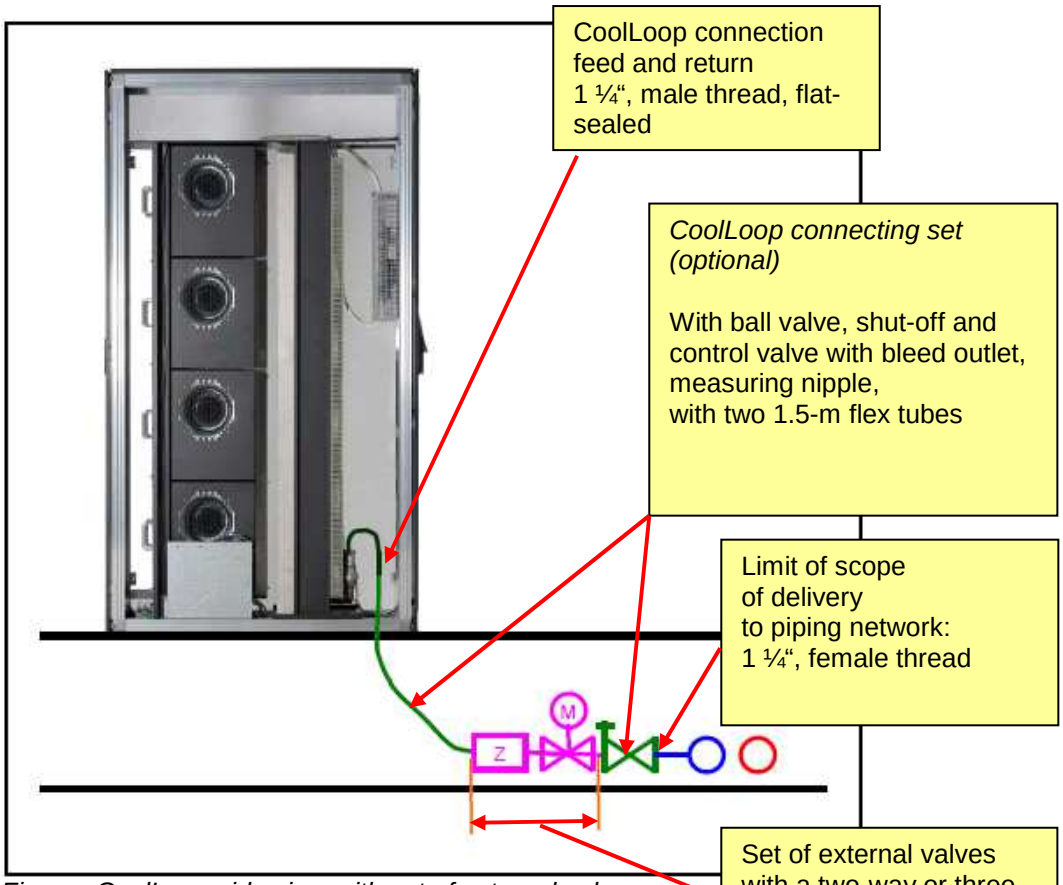


Figure CoolLoop side view with set of external valves

Figure CoolLoop, set of external valves
(Figure Project Implementation)

Should the heat exchanger be thread-connected to the chilled water net, the pipe socket must be counter-fixed when fastening the connection.
Prior to commissioning the cabinet, all piping connections must be tested for being leak-proof.

Preparation of the heat exchanger for its initial commissioning:

- Appropriate assembly and connection with supply lines.
- When filling the system with water, carefully bleed the cooler.
- For this purpose, open the bleeding valve until the water stream is free from bubbles.
- After bleeding, close the valve carefully again.
- If required, fasten bolted connections again
- For longer downtimes or in the event of frost hazard, completely empty the heat exchanger and supply lines. Make sure it has completely been emptied by blowing it out with compressed air and by removing all bleeding and draining screws.

Bleeding at set of internal valves:

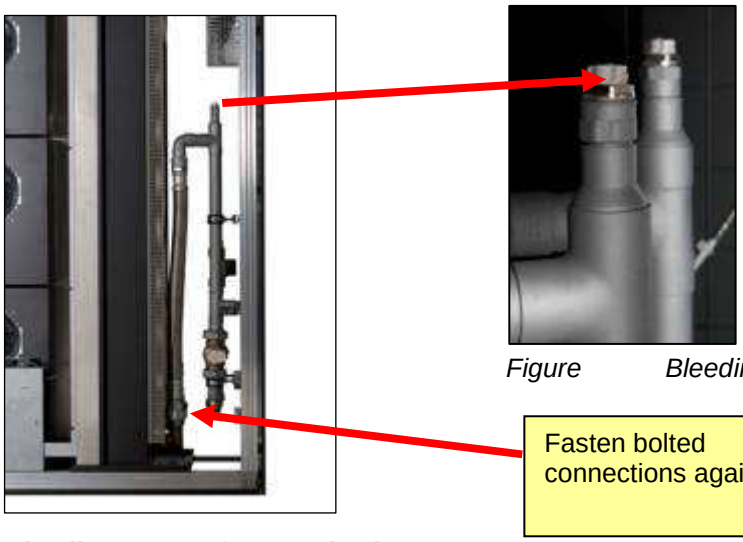


Figure Bleeding valves at set of internal valves

Bleeding at set of external valves:

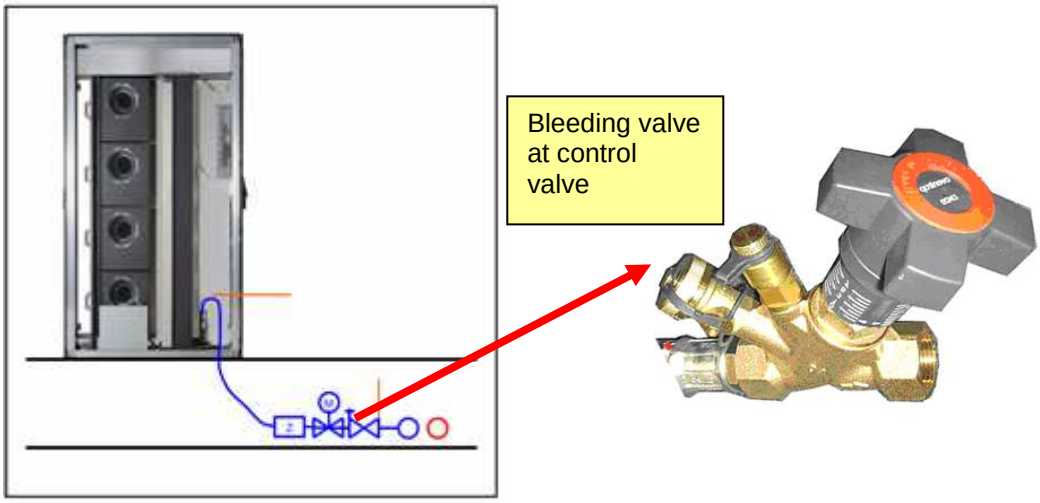


Figure CoolLoop connection to set of external valves

*Note: Use of the **optional connecting set** with the set of internal valves simplifies beeding; the use of the internal bleeding valves in the CoolLoop will not be required then.*

Heat exchanger connection

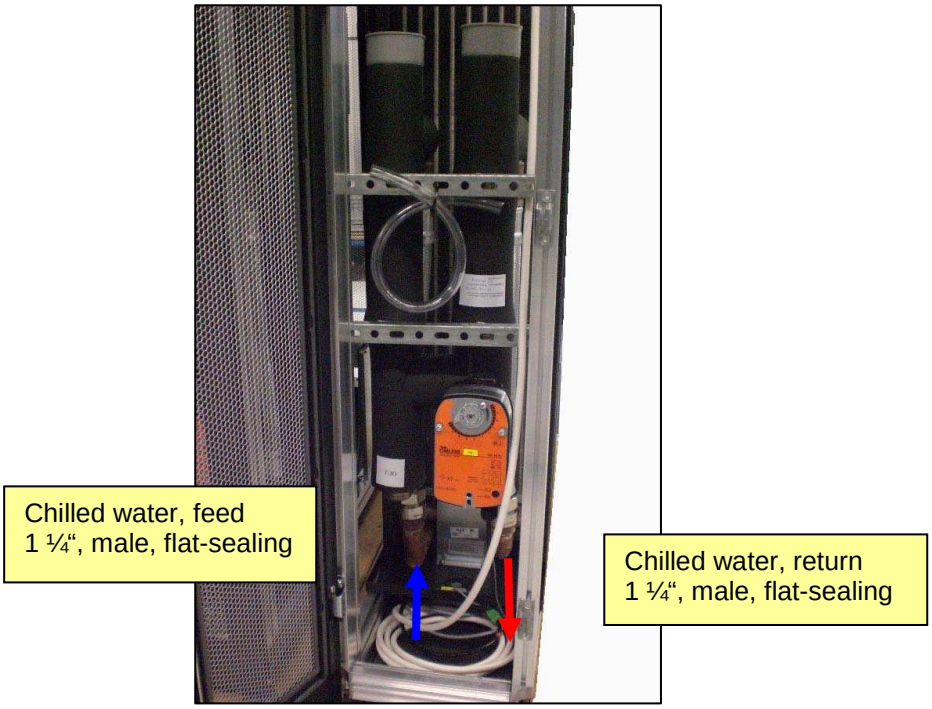


Figure Rear of CoolLoop
With set of internal valves

Pipe insulation

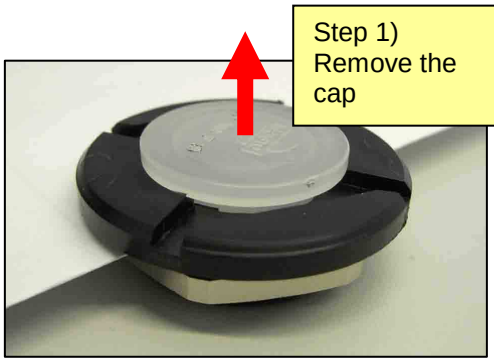
Chilled water pipes should be provided with diffusion-proof insulation against the emergence of condensate and loss of energy.

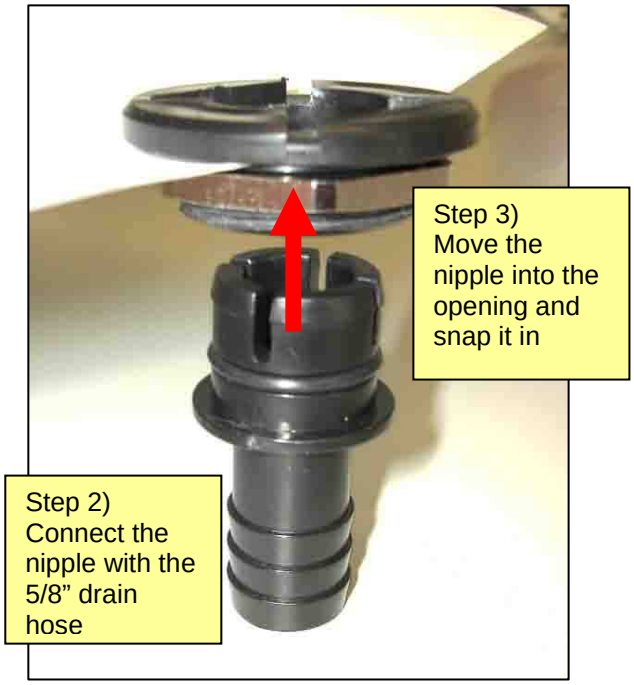
Insulation thickness: “F” (9 - 12mm) at λ = 0.037 W/mK (10℃)

5.4 Connection to Condensed Water

If CoolLoop operates below the dew-point, condensed water may accrue. For draining such condensed water, a condensed water connection of a diameter of 5/8“ is provided for in the condensed water tub.

Preparation for connection:





When connecting the condensed water tube take care that the condensed water line is connected to a siphon trap with a non-return valve and self-filling and that the condensed water line is inclined.
The level of installation of the respective siphon trap must be designed for negative or excess pressure, respectively, of 800 Pa so that sucking in air or releasing it from the sewage asystem is prevented. Condensed water is drained depressurized or optionally by means of a condensate water pump.

Condensed water pump **(optional)**:	installed in the condensed water tub
Quantity pumped:	10 l/h
Pump height:	14 m
Suction height:	2 m

5.6 Electrical Connection

The circuit diagram comes enclosed with the device.

Make sure that during the assembly of the CooLoop, it is disconnected from power supply. Therefore, take the cabinet out of operaion prior to assembly and secure it against unauthorized re-connection.

As soon as all precautions for assembly have been taken, you may start to install the electrical connection.

The device must only be connected electrically by authorized personnel (electrically skilled staff). Thereby, the personnel must make sure that during such connecting works the cabinet remains free from voltage and is secured against being switched ON by unauthorized parties. Internal sockets can be used only by authortized persons.

Check whether the voltage and frequency as provided by the customer as well as the size of pre-fusing correspond with the specifications on the nameplate.

The connection to the power supply will be effected via a connection line to be provided and which is to be connected to the terminal board.

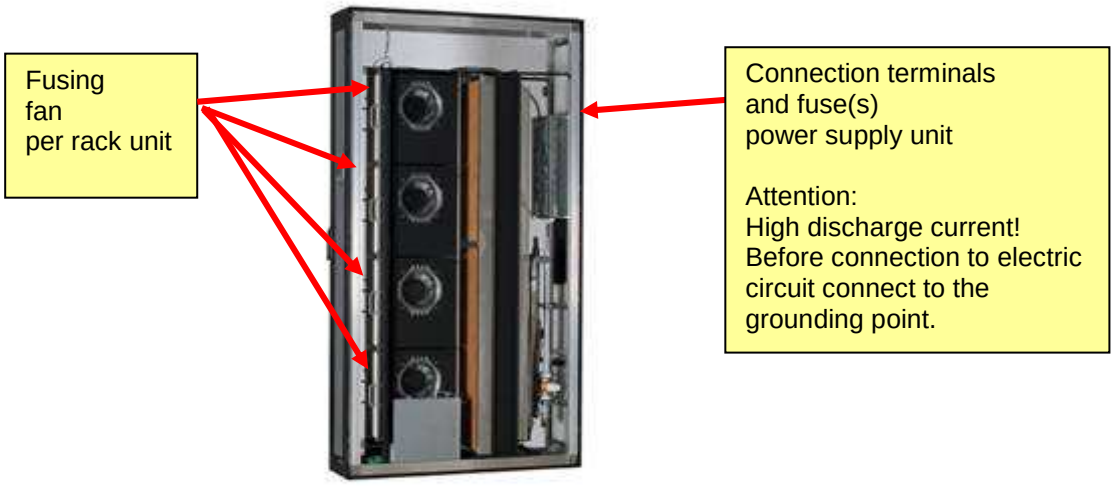


Figure CoolLoop side view

For connection of the device to power:

- Switch off all automatic safety cutouts (4 x fans, power supply unit)
- Derive the connection scheme from the power flow diagram
- Connect the connecting line to the computer room.
- Check for safe grounding connection.

Put the CoolLoop into operation again in accordance with instructions.
Switch all automatic safety cutouts ON.
The device fans start turning clock-wise.
Status LED at the fan front will shine green.

This device has no own switch to mains, the switch must be installed in the building electrical network. Please use a protect switch 16 A according to the wiring sceme. (EN 60950-1, 3.4.3

5.7 Sealing of the Housing

The air-tightness of the housing corresponds with RAL 652.

In order to guarantee optimum cooling performance, the housing must be sealed as follows:

- Cut pipe duct into the foam, seal it expertly with foam panel material.
- Seal cable bushings by foaming.
- Keep air carefully separated between the cold and warm sides of the CoolLoop and the server cabinet.

6. Options

6.1 CoolCon - Eco Fan Control *(optional)*

By means of Eco Fan Control function the six-grade fan control will be transformed to linear setting. This enables run method with continuously controlled speed and thus optimisation of power consumption

Advantages:
- Continuous control of fan speed in relation to thermal load values
- Optimal system operation point
- Operating costs decrease

6.2 CoolCon - Monitoring Premium *(optional)*

This optional software provides connection to 10/100Mbit Ethernet for communication.
This supports TCP/IP, HTTP, FTP, SNMP and NTP protocols. Configuration and check is carried out by means of integrated web server, FTP server, as well as by means of SNMP agent. No additional software is required for configuration and check. All setting and state queries are realised by means of web browser.
Installation of Java-Runtime min. of version 1.4 is required. Following options are available: check up to four plug-in fan components, one release sensor, temperature sensors for inlet air to server, return air, as well as box control.
Access is protected by two-level password. User may configure and parameterise values related to temperature, humidity and alarms within tolerances defined in factory configuration process. Logic configuration may be connected by four logic functions AND/OR at two levels and it may be issued with delay as needed.
CooLCon supports SNMP and SNMP-Traps in version v2c
Language for indication may be selected between German and English

Advantages:

- Settings, access and display are possible by means of web browser
- Parameterisation of values for alarms and control settings
- SNMP (V2C) functions, incl. Traps
- Two-level protection by means of password
- Two-level logic configuration for connection

<u>The detailed manual follows in the annex.</u>

A interface to Modbus RTU, Modbus TCP, BACnet IP (read) are available optionally on inquiry.

6.3 CoolCon - Monitoring Premium Plus *(optional)*

As supplement *CoolCon Monitoring Premium - software*, this option enables data recording into MS SQL databank and store them into memory.

Advantages:

- Data storage in external memory assessment, resp. archiving
- Recording of parameters, messages, and alarms in time

6.4 Connection Set *(optional)*

CoolLoop connection set consisting of:

a) Two flexible, armored tubes, plaited in stainless steel, EPDM-resistant against water and anti-freeze anti-freeze, tube connections nickel-plated,

Temperature range:	0 - 110℃
Operating pressure:	max. 10 bar
Inner diameter:	31 mm
Connections:	Screw connection, 1 ¼“, female, flat-sealing
Length:	1500 mm

b) Ball valve

Connections:	1 1/4“, female thread

c) Shut-off and control valve with draining and bleeding connection of ¾“ as well as a nipple for measuring pressure and temperature

Connections:	1 1/4“, female thread

d) Two double nipples of 1 ¼“

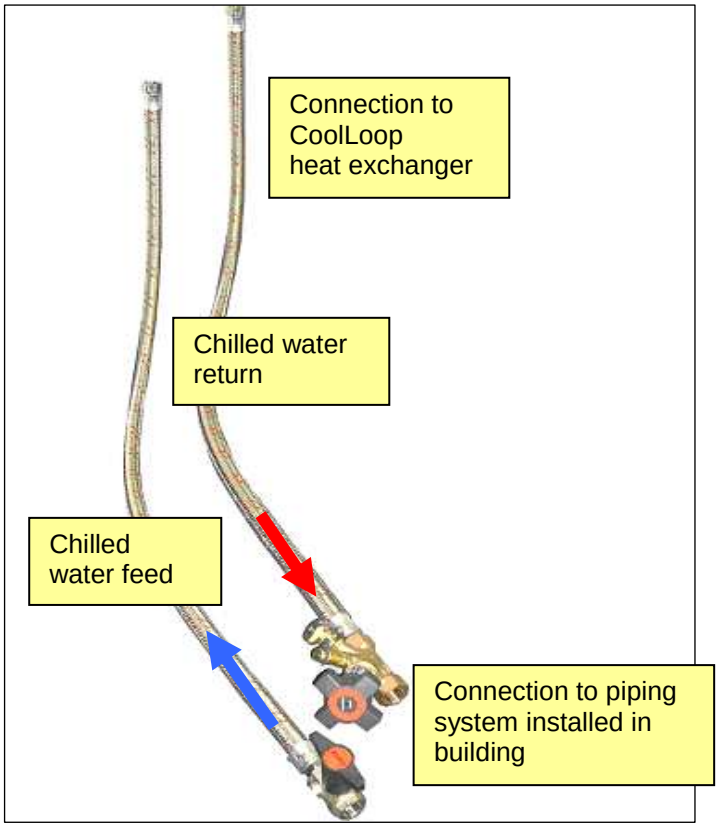


Figure Connection set

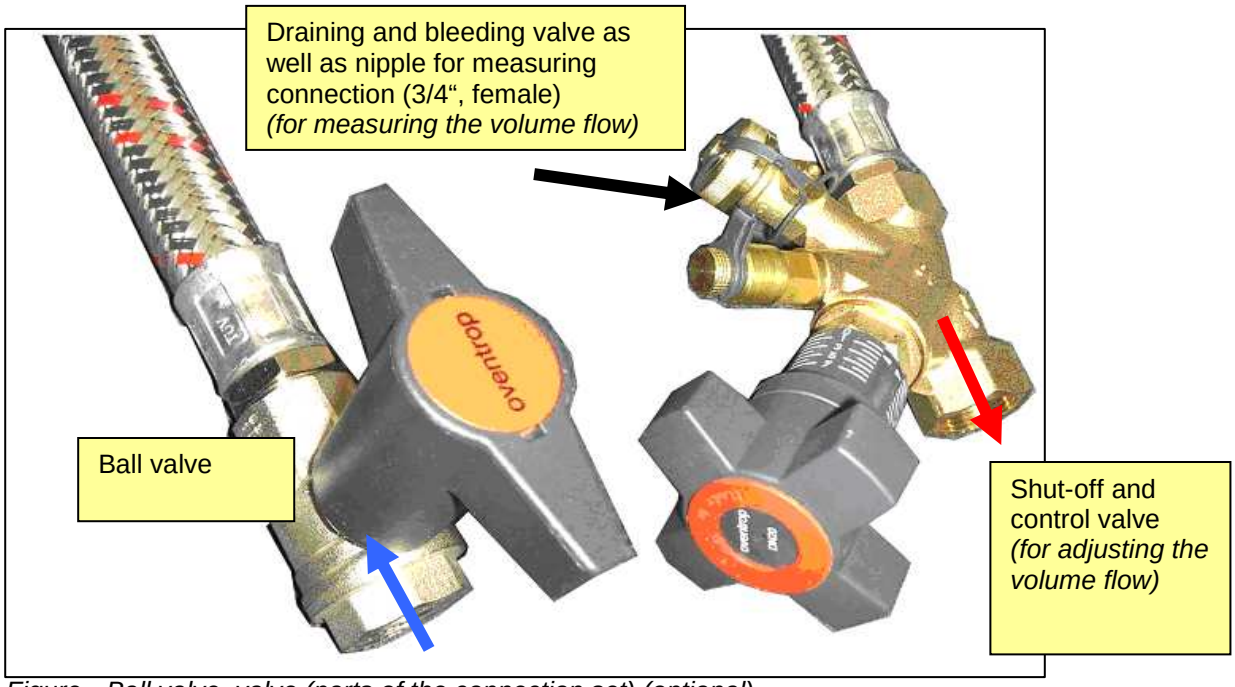


Figure Ball valve, valve (parts of the connection set) (optional)

Note: **All parts of the connection set are delivered as individual parts and are to be connected by the customer.**

6.5 Touch Display, Monochromatic / Color *(optional)*

The optional display will show status information **depending on the version of equipment**:

Example *“Basic Level“*:

- doors on the CoolLoop or server cabinet open / closed
- speed rate of fans
- status of each fan (failure) or rack unit unpopulated
- temperatures of blowing off / sucking in
- humidity of blowing off
- temperatures of feed / return chilled water
- flow rate of chilled water
- water indicator

In case of occurrence, alarms have a red or black (monochromatic) background.

By pressing the field “Alarms”, you will get to the display for “Alarms“.

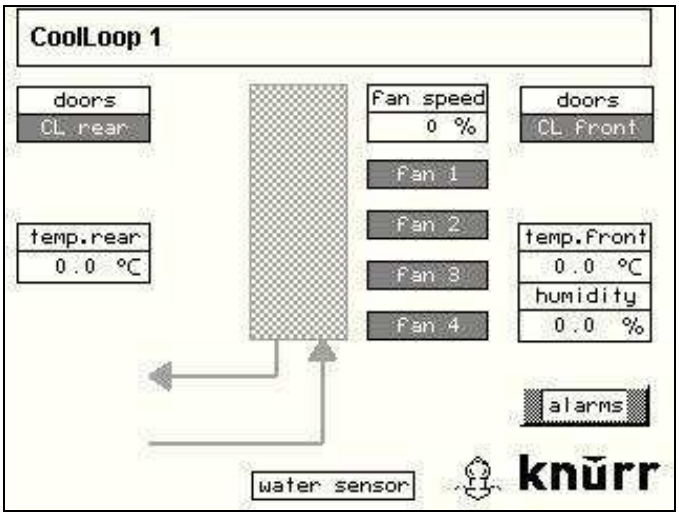


Figure Monochrome display "Basic Level"

Example *"Alarm Level":*

In case of occurrence, alarms have a red or black (monochromatic) background.

- Sensoric error: Error with sensors for temperature, flow rate, humidity

By pressing the field "Back", you will return to the "Basic Level".

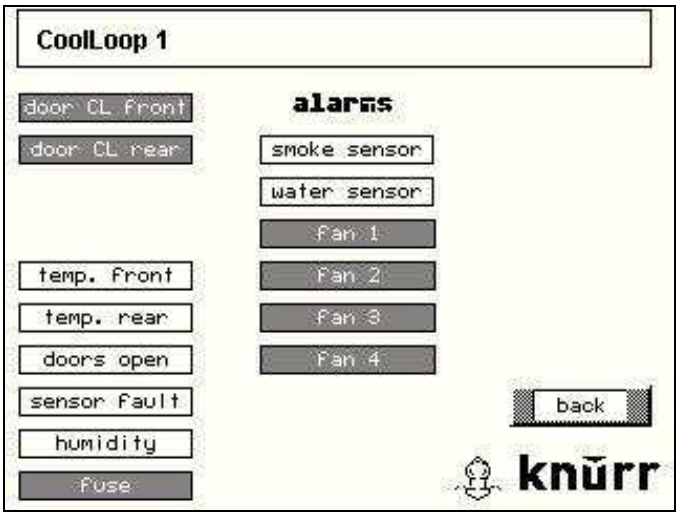


Figure Monochrome display "Alarm Level"

6.6 Server Shut-down, Master *(optional)*

The signal excess temperature from the control circuit board enables to shut down the primary power supply. This shut-down is effected by high-performance breakers at the power input; push buttons in the cabinet principally serve to reset.

A total of four servers can be shut down; each power supply 3x400V, external pre-fusing max. 3x32A . Use this option for the first server power supply (grid A) only.

There are various possibilities to control and signal this function. Please inquire about the version provided for in your model in the enclosed circuit diagram.

6.7 Server Shut-down, Slave *(optional)*

Extension for the “Server Shut-down, Master” if more than on server power supply is to be disconnected (max. 4).

6.8 A / B Changeover of Electrical Power Supply *(optional)*

The A+B changeover provides for the possibility of self-supplying the CoolLoop out of two independent grids.

6.9 Automatic Door Opening *(optional)*

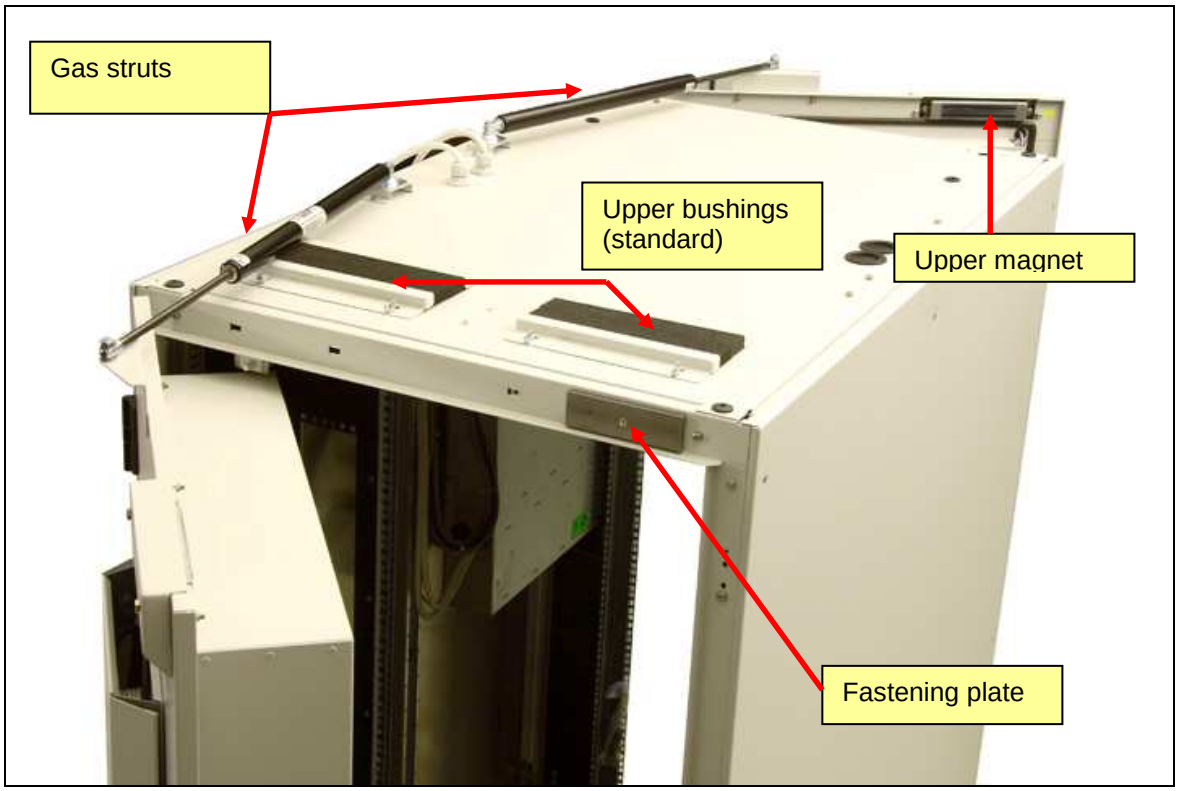


Figure Rooftop with automatic door opener [here CoolTherm]

Function

The front und rear doors of the server cabinet are kept closed by two electrical magnets each. Up to four doors can be controlled.

If the power supply of the electrical magnets is interrupted, the door is gently opened by a gas strut.

The electrical door opening can prevent damage to the inside of the cabinet caused by excess temperature as well as in the emergence of moisture. When doors open automatically, the heat load is transferred to the ambient room. Hence, servers cannot overheat.

Such door opening also prevents sucking in air with water droplets due to feedback on humidity.

In the event of fire or smoke developing inside the cabinet, the doors will remain closed and the fans are shut down. The opening of doors resulting from excess temperature due to fire will be suppressed.

Alternatively, intended opening of the doors in the event of smoke is also possible in order to extinguish fire by means of the existing gas fire extinguishing system.

It is possible that the doors can open themselves at any time.
Bear that in mind when you are within the pivoting range of the doors.

Triggering door opening:

- via the temperature sensor at the front (standard)

- optionally via the smoke alarm

- optionally via the moisture alarm

- or by a separate thermostat

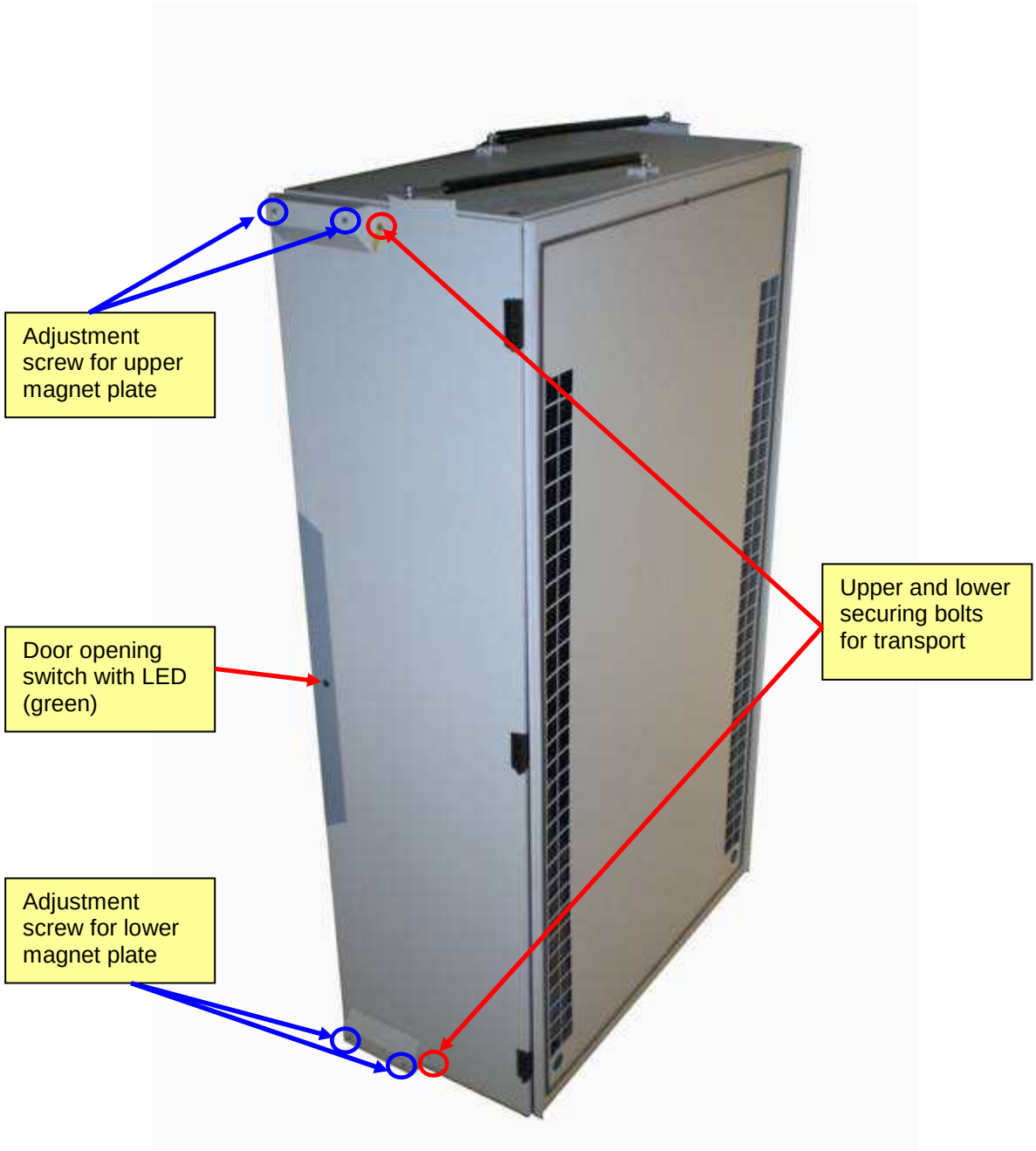


Figure Automatic door opening [here Miracel light grey]

Initial commissioning:

- Loosen the upper and lower securing bolts for transport
- Connect the wiring of the server cabinet / CoolLoop
- Facilitate general power supply
- See: *Manual closing*

Attention! In the event of further power disruptions during the commissioning stage, doors will open by themselves; if the securing bolts for transport are to be reused, use them <u>both</u> by all means, since otherwise this will cause the doors to warp!

- **Adjustment opf magnet plates:**
  After transportation and placing the rack, the positioning of the magnet plates must be checked. It may become necessary to adjust the magnets with the fastening plate. For this purpose, turn the adjustment screws (A) accordingly until the magnets have been aligned absolutely parallel to the fastening plate and the doors remain closed.
  This adjustment must be fixed by a locknut (B) against the threaded insert.

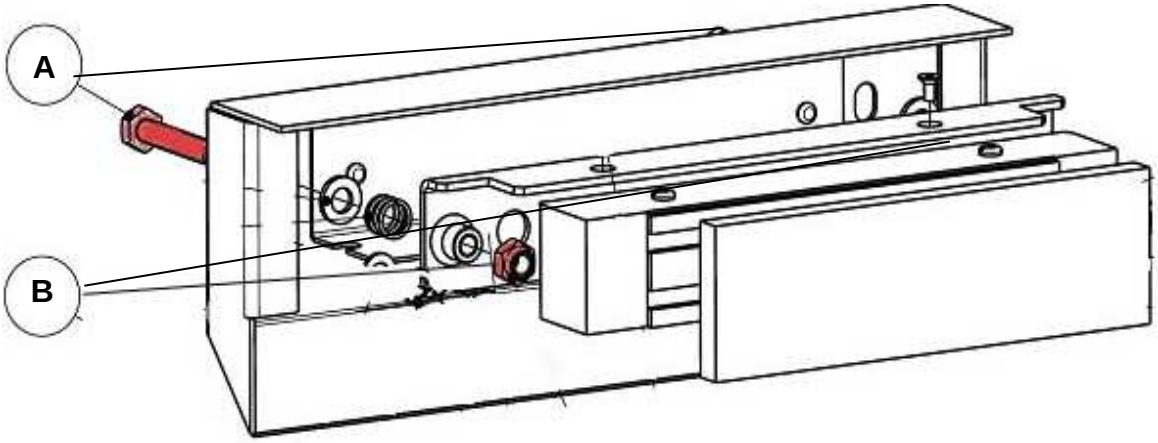


Figure Detail of the closing magnet

Manual closing:

- Push the green LED switch to activate the electrical magnets.
- The LED will shine.
- Slide the doors smoothly shut, **both** surfaces of the magnets must stick.

Manual opening:

- Push the LED switch – the green LED will be OFF.
- The cabinet door will open by itself.

6.10 Additional Digital I/O *(optional)*

Four digital inputs are provided. Isolated contacts available for connection relate to the internal operational voltage (+24 V DC). (WARNING! - Supply voltage of CoolCon Control relate to PE). Furthermore four digital relay outputs as isolated contacts are available (max. 30 V AC/DC, 1 A AC/DC).
Configuration to be performed by the client via web-visualization. Logic configuration of CoolCon enables the user to set logic functions for the switching of four relay outputs or the generation of software messages (trap / SNMP variable). E.g. in case of breakdown of the air conditioning unit AND alarm due to overheating, a trap can be generated or a relay can be switched. A total of four logic gates in two levels each are available. These signals can be released and inverted individually. By means of AND/OR the inputs selected are consequentially interconnected; if necessary, signals and interconnection outcomes can be delayed.
Outputs of the first logic level can be interconnected AND/OR once more in the second level, which enables extensive logic functions.
Logic interconnection outcomes can be assigned to relays or software messages (trap / SNMP variable).

Advantages:
- Integration into the building monitoring system of the customer
- Logic interconnections of events/alarms for message generation
- via relay contacts or as software messages (trap / SNMP variable)
- Access to alarms/messages generated by CoolCon control

6.11 Flashlight *(optional)*

Flashing light “Emergency”, mounted on the CoolLoop rooftop
For the laying and installation, the light can be solved by the connector.

6.12 Door Contacts CoolLoop *(optional)*

Consisting of two door contacts for CoolLoop, installed at front and rear door.

6.13 Door Contacts Server Rack *(optional)*

Consisting of four door contacts for two server cabinets, for front and rear each.

6.14 Temperature Server Racks *(optional)*

Consisting of four temperature sensors Pt100.

6.15 Humidity Sensor *(optional)*

Analog measurement of relative air humidity at the heat exchanger output. (chilled air)

6.16 Smoke Alarm *(optional)*

Conservative smoke sensor (optical detection) installed at the rear side of CoolLoop, under the roof.

6.17 Very Early Fire Detection *(optional)*

The 1U 19” very early fire detection system has especially been designed to fit the conditions of rack monitoring with changing volume air flow, but it can be evenly well applied in conventional racks. Its ultra-flat design does not require the full height of 19” rack units.

Figure 1HE very early fire detection system (front control panel)

Main features:

Very early fire detection (sensibility 0.1 to 2.0 % light blur/m)
Simple installation in a vertical **or** horizontal 1U 19” rack unit
Power supply 24V DC
Main dimensions length 370 mm, weight just less than 4 kg
2 alarm levels (pre-alarm, main alarm)
Signal passed on via potential-free contacts or optional network interface card

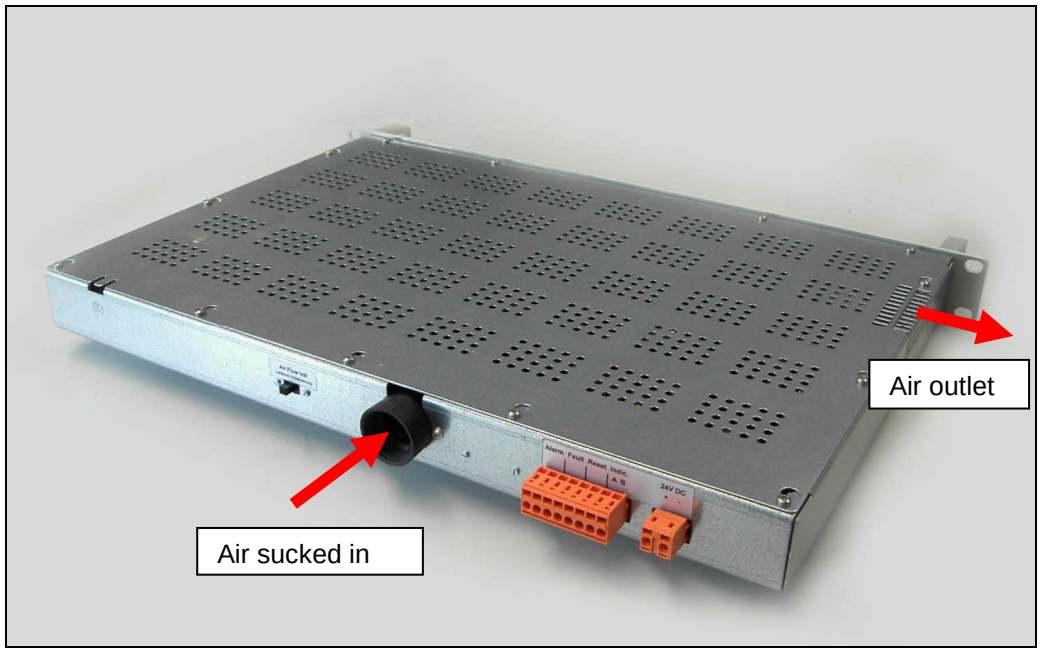


Figure 1U very early fire detection system (rear with cable connectors)

6.18 Very Early Fire Detection and Fire-Extinguishing *(optional)*

Detection system as above, but with an integrated fire-extinguishing system for **closed** server cabinets (combined CoolLoop / server cabinet)

Figure 2 U fire detection and extinguishing insert
(Figure with optional special equipment)

Main features:

Very early fire detection (Sensibility 0.1 to 2.0 % light blur/m)
Simple installation in a vertical **or** horizontal 2U 19" rack unit
Power supply: 230V AC
Emergeny power supply: 4 h
Main dimensions: length 670mm, weight just less than 35 kg
2 alarm levels (pre-alarm, main alarm)
Signal passed on via potential-free contacts or optional network interface card
Extinguishing gas: Novec 1230
Extinguishing volume: 2.2 – 4.4 m³
(enough for one Rack, for more racks extensionl units are needed)

For succesful fire supression all rack cut-outs, cable and pipe entries must be closed or sealed after installation on site, also after every change of it.

Furthermore it is necessary to shut off the energy for any fire: server powersupply. This must be done at the same time when the extinguishing starts.

6.19 Heat Quantity Meter / Flow Rate Sensor *(optional)*

Measurement of the chilled water volume flow as well as of the chilled water feed and return temperatures
The sensor wheel of the direction of measurement only partially, i.e. by a few millimeters, intrudes into the pipe's cross-section, so that impurifications will not clog or impair the hydraulic system.

Advantages:
- The indication of the instant current cooling output through the web and/or display.
- Indication/check of the instant current water flow temperatures of the forward and backward flow for the purpose of the setting or diagnosis.
- The high safety and none flowmeter pressure loss thanks to the side placement of the rotating part
- The system maintenance-free arrangement without additional filter

7. Maintenance and Repair

Maintenance and repair shall only be performed by trained and Instructed specialists and in accordance with the manufacturer's respectively applicable regulations!

Use only genuine spareparts tested and released by us.
(If required, request a full list of spareparts from the manufacturer.)
For cleaning purposes, use only commercial cleaning agents observing their respective safety instructions. Do not use any scratching or scraping tools (the surface protection will suffer!)

Please check the tightness of the cooling water system connections regularly.

Prior to any maintenance works:

- Properly switch OFF all fans and other electrical components and disconnect them from their power supply! (Main fuse OFF!)
- Wait until rotating wheels stop!
- Protect them against re-connecting them!
- Stop the water circuit and prevent it from being re-started.

General checks of fans (annually)

- unusual noise during operation (clearance of bearing too wide?)

Replace fans

(their normal lifecycle is approx. 40,000 operating hours at a temperatur of 40℃)

1. Check which fan is failing, e.g. by checking the fan's surface temperature; then take out the respective fuse at the front

2. Loosen the two fastening bolts

3. Exchange fans

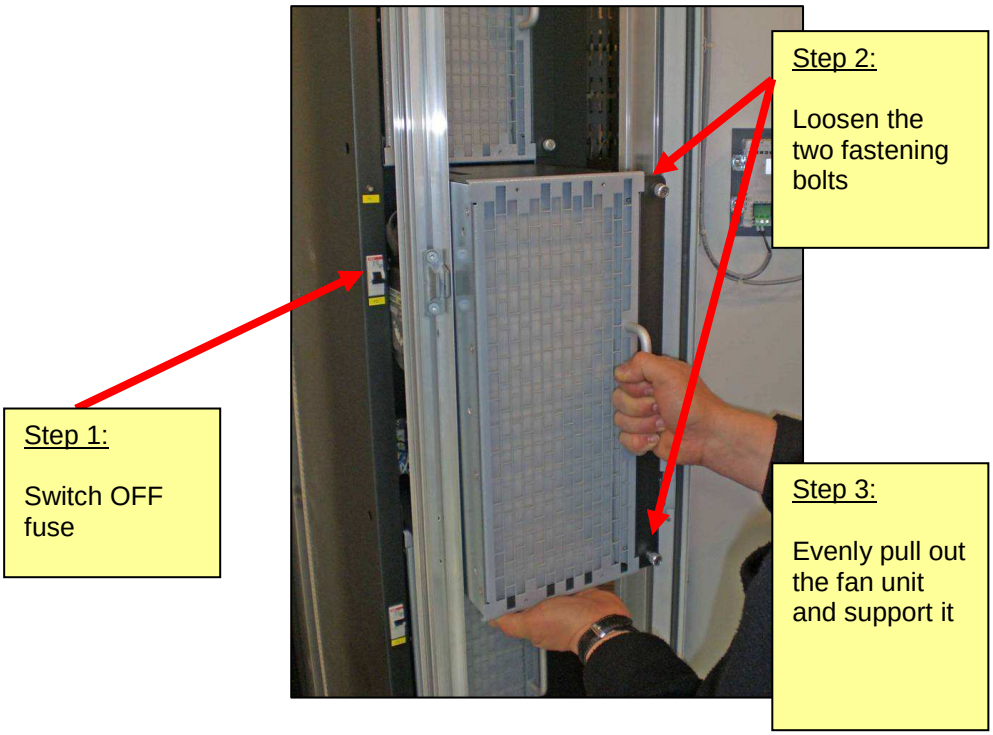


Figure Replacement of fan units

To insert the replacing fan, proceed in reverse sequence.
- Fasten the bolts fixing the fan
- Switch fuse ON again

Properly dispose of the replaced fan!

General check of the cooler (annually)

- Check heat exchanger for being soiled on the air side or for damage.
- Check feed and return if functional.
- If required, clean the air side.
- Check the smell trap (external) regularly if functional.
- Visually check the water circuit at regular intervals for tightness.

C

Heavily soiled heat exchangers are largely limited in their operation
and must immediately be cleaned.
For cleaning their lamellas, use a vacuum cleaner, compressed air or a soft brush.
When cleaning the lamellas, do not bend them. This will increase pressure loss.

Regularly check the condensed water drain and, if necessary, clean it.

8. Disassembly and Disposal

The CoolLoop must be disassembled by qualified staff only.

Prior to any disassembling works:
- Properly switch OFF all fans and other electrical components and disconnect them from their power supply!
- Protect them against re-connecting them!
- Stop the water circuit and prevent it from being re-started.

Separate the device from the external water circuit by closing the shut-off valves and drain the system‘s water circuit.

Transport the device, as described in the chapter on “Transport”, by means of a hoisting apparatus of sufficient carrying capacity.

Dispose of the A/C device in accordance with locally applicable waste disposal and safety regulations. For this purpose, we recommend to employ a company specializing in recycling.
All parts can be dismantled and consist of:

- Aluminum, steel, brass, copper
- marked plastic parts
- electronic components

9. Customer Service, Manufacturer’s Address

All Knürr products are subject to permanent quality testing and correspond with applicable regulations.
Please relate any queries you may have with view of our products to the provider of your system or directly to:

Knürr AG

Glashüttenstraße 1
01623 Lommatzsch

Phone: +49 (0) 800 000 6295

E-mail: service@knuerr.com

10. Annexes

10.1 Quality Requirements of Water Used in the CoolLoop

In order to safeguard the maximum lifetime of air/water heat exchangers, the water applied for chilling purposes must meet the VGB Chilled Water Guidelines (VGB-R 455 P). The chilled water used must be soft enough to prevent deposits, but it must not be too soft which would lead to corrosion of the heat exchanger.

The following table contains the most important impurities and counter-measures for their removal:

Water impurification	**Method for removal**
Mechanical impurification (dp < 1 mm)	Filter the water
Excess hardness	Soften the water by ion exchange
Moderate level of mechanical impurities and hardeners	Add dispersion or stabilizing agents
Moderate level of chemical impurities	Add deadening agents and inhibitors
Biological impurities (bacterian and algae)	Add biocides

It is recommended to get as closest as possible to the following hydrological parameters:

Hydrological data		
pH values	>7	
Carbonate hardness	>3 <8	°dH
Free carbondioxide	8 - 15	mg/dm3
Comnined carbondioxide	8 - 15	mg/dm3
Aggressive carbondioxide	0	mg/dm3
Sulfides	< 10	mg/dm3
Oxygen	< 50	mg/dm3
Chloride ions	< 250	mg/dm3
Sulfate ions	< 10	mg/dm3
Nitrates and nitrites	< 7	mg/dm3
COB	< 5	mg/dm3
Ammonia	< 5	mg/dm3
Iron	< 0.2	mg/dm3
Manganese	< 0.2	mg/dm3
Cunductivity	< 30	µS/cm
Solid residue from evapration	< 500	mg/dm3
Potassium manganate consumption	< 25	mg/dm3
Suspended matter	< 3	mg/dm3
(partial flow cleaning is recommended)	> 3 < 15	mg/dm3
(permanent cleaning)	> 15	mg/dm3

10.2. Checklist for Setting up the Device

Performed checks	**Done** (to be signed upon completion)	**Remarks**
Check device for damage upon receipt.		
Check the ground for being horizontal.		
Check bearing capacity of ground.		
Add-on and align, connect to server cabinet, position feet of CoolLoop and adjust them horizontally		
Cables connected with server cabinet: - Temperature sensors (optional) - Server shut-down (optional) - Automatic door opening - Door contact (optional) - Fire alarm systems (optional)		
Cable connected with set of external valves (optional): - Valve drive - Flowmeter with temperature sensors (optional)		
Optional automatic door opening adjusted at server cabinet		
No remainders of packaging inside CoolLoop		
All assembly tools removed		
Cable bushings into the device proper and air-tight		
Cable connections checked (power supply)		
Chilled water connection leak-proof / pressure-tested		
Chilled water system deaerated		
Volume flow of chilled water adjusted		
Condensed water line unobstructed		
Smell trap of chilled water system functional		
Cooler tub connected to condensed water line		
Fans checked for dunction		
All front panels closed (air ducts technically separated)		

..... Place:

..... Date:

..... Signature of Tester

10.3 Commissioning Protocol

CoolLoop Commissioning Protocol

1. General Details

1.1 Customer/Site of installation

Customer's name: ……..

Customer's address: ……..

……..

……..

Contact partner: ……..

Phone number: ……..

Site of installation / room number: .....

Humidity at site of installation: ..... % rel. humidity

Ambient temperature ..... °C

1.2 Configuration

Cabinet type:

CoolLoop 10 kW ☐ CoolLoop 20 kW ☐ CoolLoop 30 kW ☐

Commisson number: .....
Serial number: .....

Special remarks:
.....
.....
.....

2. State Check

2.1 General State

Customer's proof of bearing capacity of ground / transport ways ☐

Check of alignment ☐

Transport damage to housing: yes ☐ no ☐

Remarks
.....
.....
.....

Residual packaging removed: yes ☐ no ☐

Assembly tools removed: yes ☐ no ☐

Air ducts checked: yes ☐ no ☐
(Server cabinet front plates closed, lamellas at fan rack unit aligned,
Connecting opening CoolLoop / server cabinet)

2.2 Chilled Water System within the Facility

Chilled water: with anti-freeze ☐ without anti-freeze ☐

CoolLoop

Connected to: CTU ☐ cold water system, direct ☐

Circuit in building, direct ☐

Chilled water temperature (primary): Feed: ..... ℃ Return: ..... ° C

Chilled water pressure Feed: ..... bar Return: ..... bar

Connection: set of interne valves ☐

with Knürr connection set ☐

set of external valves ☐

Customer's hydraulic plant OK

(visual check): yes ☐ no ☐

Remarks: ……..

2.3 Electrical Data/ Documents

Power circuit diagram enclosed: yes ☐ no ☐
Remarks:
.....

Cabling checked:

Acceptance protocol for electrical installation available:

yes ☐ no ☐

Remarks:
.....

3. Functional Check

3.1 Mechanical Functions

Damage to heat exchanger/
Connections/ lamellas / surface: none ☐ existing ☐
Remarks:
.....

Add-on screwed to fit, stiffening wall: yes ☐ no ☐
remarks:
.....

Front door, closing: yes ☐ no ☐
Remarks:
.....

Rear door, closing: yes ☐ no ☐
Remarks:
.....

Pipe duct inlets / cable bushings closed: yes ☐ no ☐
Remarks:
.....

Condensed water drain open / connected: yes ☐ no ☐
remarks:
.....

Fans run perfectly (bearings OK)

Visual check yes ☐ no ☐
Remarks:
.....

3.2 Electrical Functions

Functional check of valve / fan control yes ☐ no ☐
Remarks:
.....

Fans shut down when doors open yes ☐ no ☐
Remarks:
.....

Functional check of smoke alarm (optional) yes ☐ no ☐
Remarks:
.....

Functional check of temperature control (optional):

yes ☐ no ☐
Remarks:
.....

Functional check
of automatic door opening (optional) yes ☐ no ☐
Adjustment of electric magnets – see Operation Manual “Automatic Door Opening / Initial Commissioning”
Remarks:
.....

Functional check of water alarm (optional) yes ☐ no ☐
Remarks:
.....

Check for error / disturbance alarms yes ☐ no ☐
Remarks:
.....

3.3 Thermodynamic Checks

Condensed wate forming at heat exchanger yes ☐ no ☐
Remarks:
.....

Chilled water entering heat exchanger: .....°C

Chilled water leaving heat exchanger: .....°C

Cabinet temperature in front of heat exchanger: .....°C

Cabinet temperature behind of heat exchanger: .....°C

Chilled water network bleeded: yes ☐ no ☐

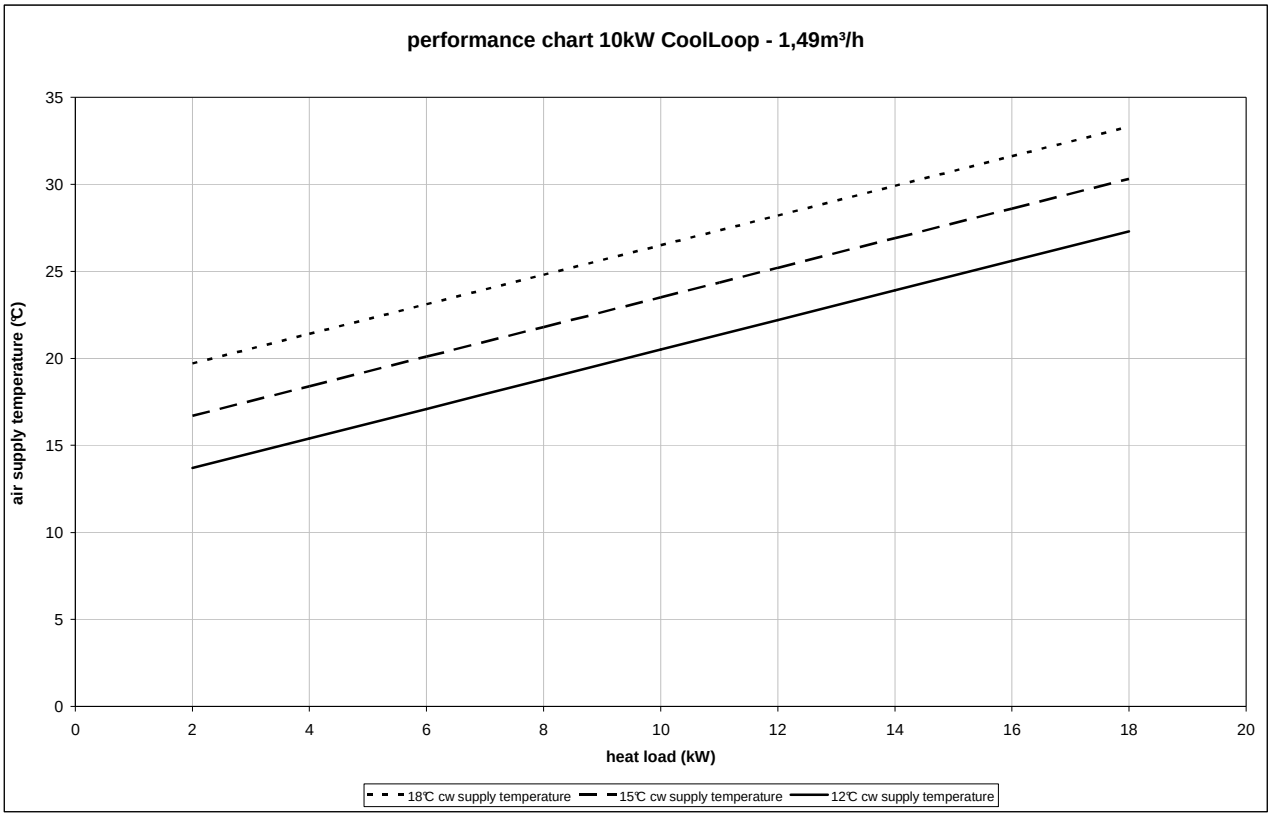
Pressure of chilled water network tested: (customer's protocol available)	yes	☐	no	☐
Volume flow adjusted:	yes	☐	no	☐
			external	☐
Volume flow:	…… l / min		external	☐

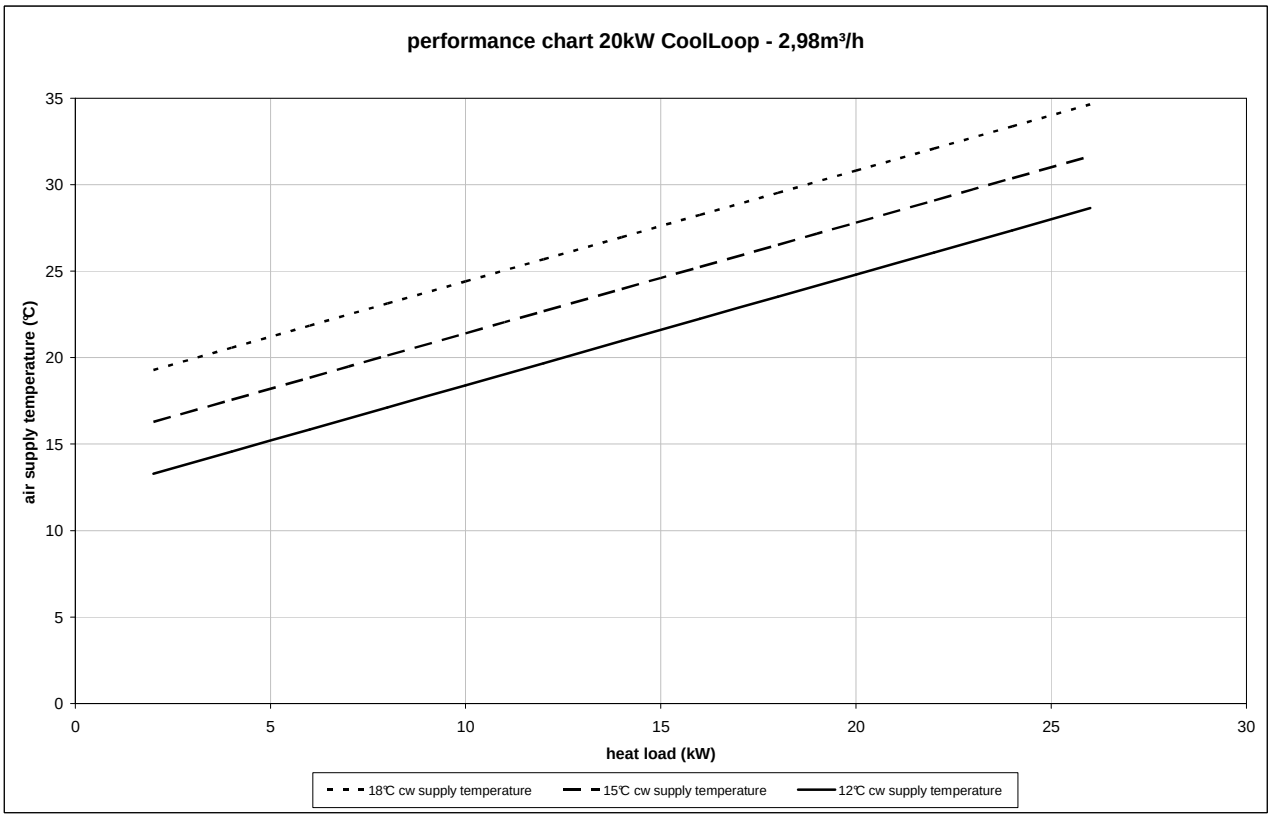
Remarks:
.....

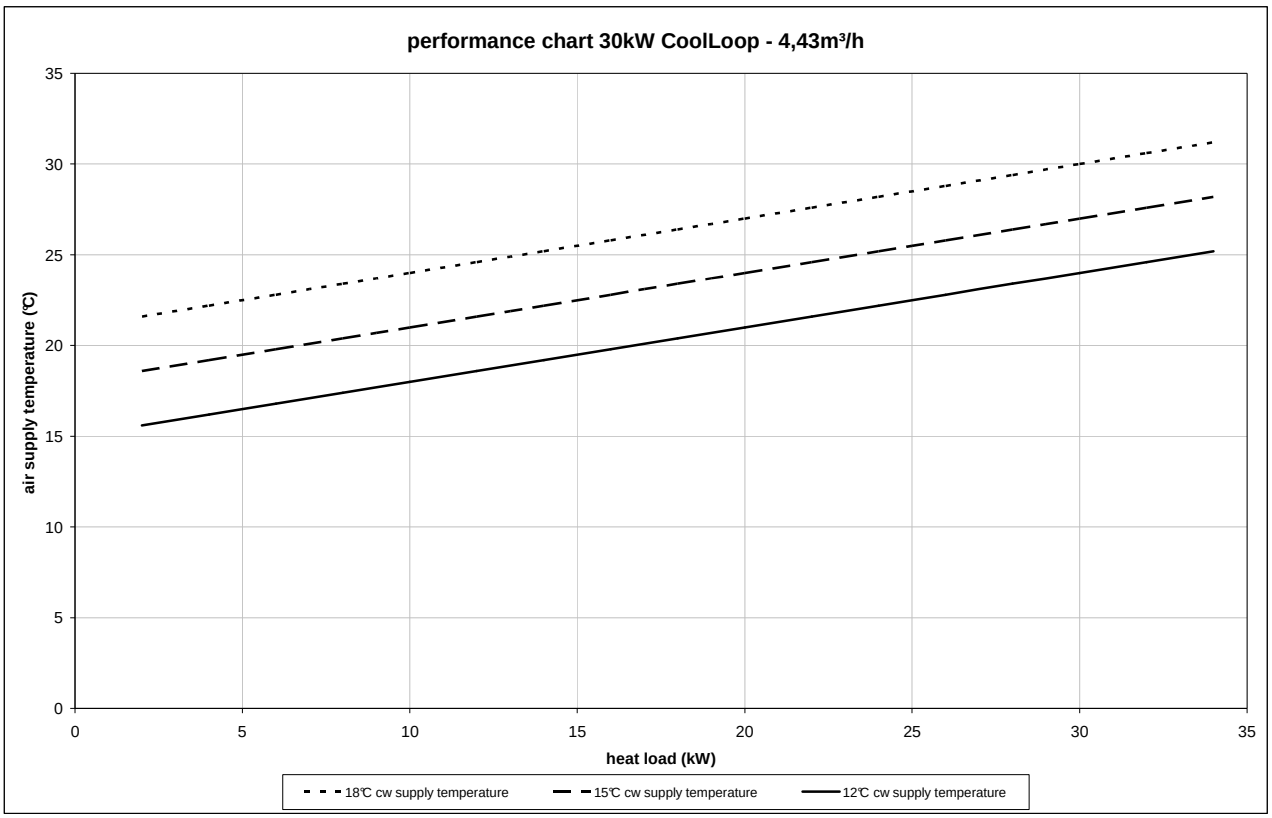
Correctness of above values is hereby confirmed.
Commissioning was performed during on-going operation.

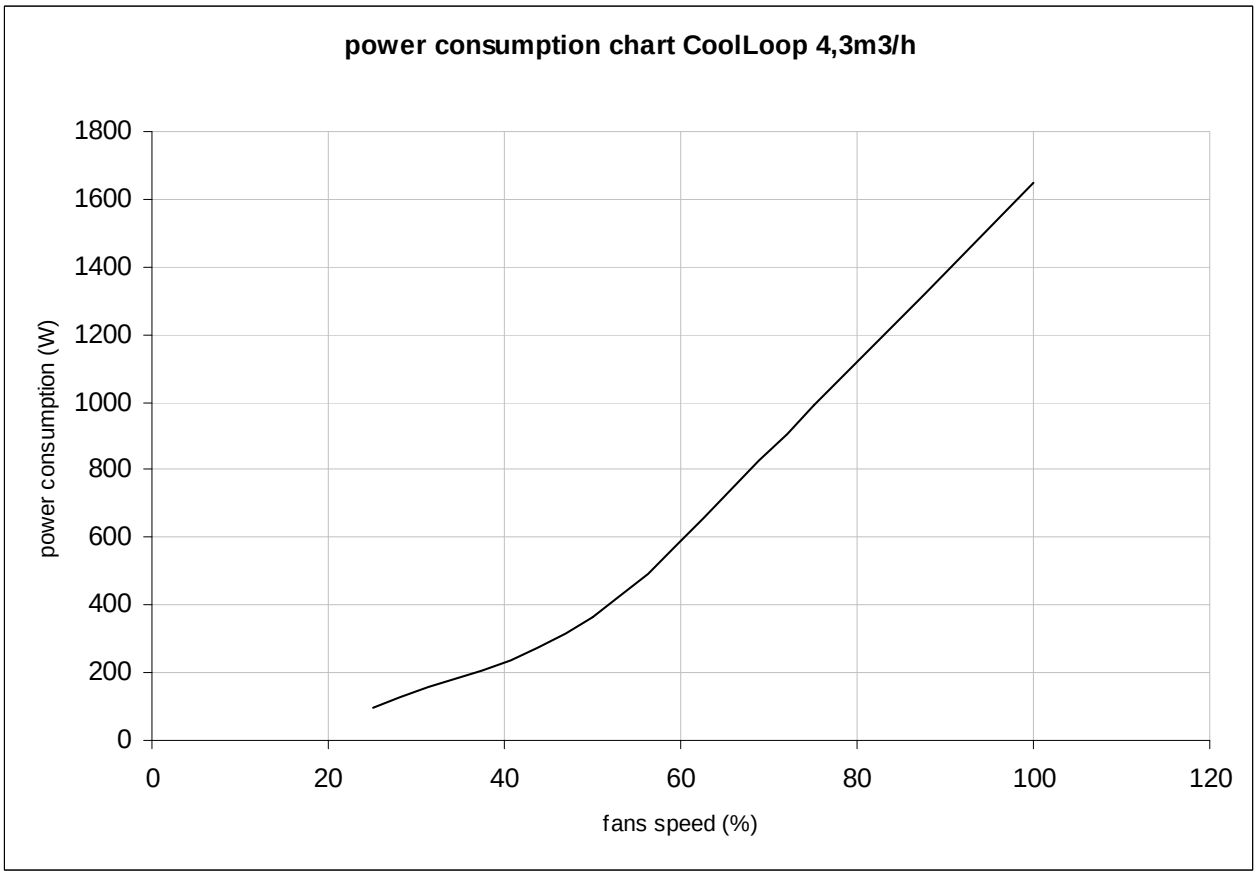
.....	.....	.....
Commissioning firm	Date	Signature
.....	.....	.....
Customer	Date	Signature

10.4 CoolLoop Characteristic Lines






performance chart 30kW CoolLoop - 4,43m³/h
air supply temperature (°C)
heat load (kW)
18°C cw supply temperature
15°C cw supply temperature
12°C cw supply temperature


power consumption chart CoolLoop 4,3m3/h
power consumption (W)
fans speed (%)

10.5 Default Control Settings

Fan speed	25 to 100%	
	Designed value:	40℃ at suction side (warm)
	Upper warning:	45℃
	Upper alarm:	50℃
Chilled water valve	0 to 100% flow volume	
	Designed value:	22℃ at blow side (cold)
	Upper warning:	26℃
	Upper alarm:	30℃
	Door opening:	32℃ (optional)
	Server shut-down:	35℃ (optional)
Humidity sensor*) (optional)	Upper alarm	85% rel. humidity
	Lower alarm	25% rel. humidity
Chilled water temperature monitoring (optional)	Upper feed alarm	16℃
	Lower feed alarm	10℃
	Upper return alarm	22℃
	Lower return warning	10℃
Front LED at fan	Permanent green	Status OK
	Slowly flashing	Front door closed, rear open
	Quickly flashing	Front door open, rear closed
		Front and rear doors open

Attention: ***All adjustments may vary depending on the project.***

*) CoolLoop does not actively affect humidity. There is no controlled humidifying or de-humidifying.

10.6 CoolCon Control

Introduction

The CoolCon control serves the control of air conditioning and the monitoring of the CoolLoop and the server cabinets attached to it.
It is a mnodularly expandable monitoring and control system.
The basic variant enables the monitoring of up to four fan racks, a leakage sensor, temperature sensors for supply and return air as well as air conditioning of the cabinet. Thereby, the chilled water quantity is adjusted to the required cooling by means of a control valve; the fan speed is likewise variable.
The fans supply only the actually required air flow.

A 10/100MBit Ethernet connection is available *as option* from “Monitoring Premium” for communication to support TCP/IP, HTTP, FTP, SNMP and NTP protocols. It is configured and monitored via an integrated Web server, an FTP server as well as an SNMP agent.

The basic version may additionally be expanded by the following options:

- server shutdown:
  shutdown of the power supply to connected servers

- A/B toggling:
  automatic toggling of supply voltage in the event of mains failure (in the case of two supply mains)

- automatic door opening:
  emergency door opening in the event of excess temperature

- digital inputs/ouputs at free disposal:
  for hooking up further monitoring systems

- safety package Basic:
  door contact switch at CoolLoop and a flashing light for error warning

- safety package Max.:
  as saftey package Basic plus two additional temperature sensors per each server cabinet

- humidity measuring
  measuring and monitoring of relative humidity

- smoke alarm:
  in the CoolLoop for smoke warning

- very early fire detection:
  sensitive system for very early fire detection

- fire extinction:
  as with very early fire detection plus additional fire extinction system

- heat meter:
  monitoring of power input of server cabinet

- display, monochrome:
  visualisation of the most essential system parameters directly on the cabinet

- display, color:
  as with display, monochrome, but color display for better visualisation of values and alarms

- power/voltage/capacity measuring:
  for monitoring the power and capacity input of the server cabinet

Visualisation

Configuration and monitoring do not require additonal software. All adjustments and status queries are requested via a Web browser. Java-Runtime, from version 1.4, is required to be installed. When using version 6, please note that, in the Java control panel under *General – Temporary Internet files – Settings*, the entry *Keep temporary files on my compouter* is disabled. Should any access have been made already without disabling above setting, temporary files must be deleted from Java and the Internet browser after disabling it.

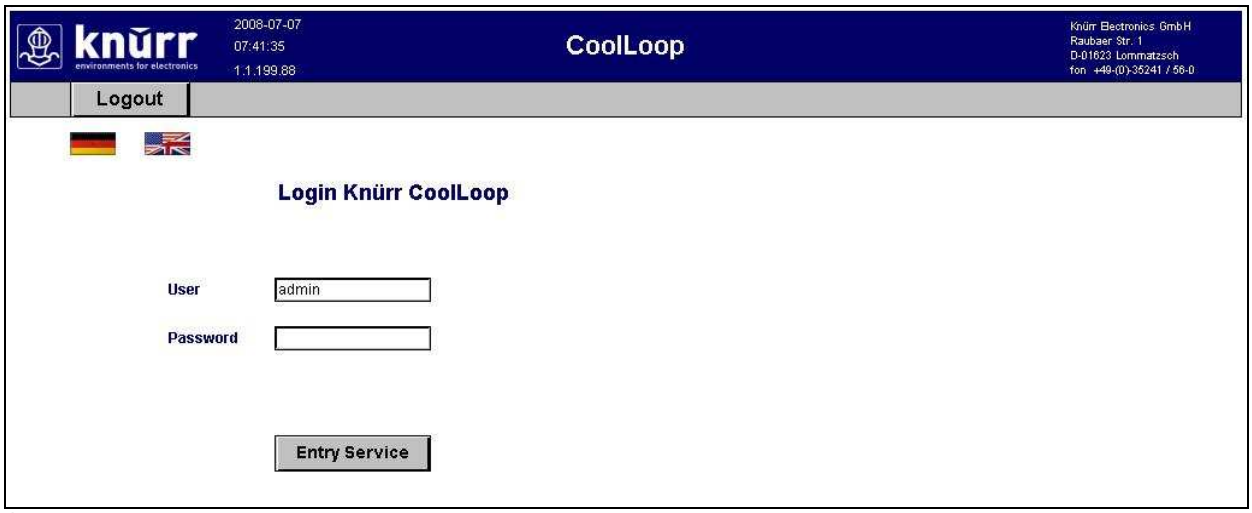
Login

Control can be accessed by simply entering the IP address into the browser. Default setting as a standard is 1.1.199.88.
Within the opening login window, authorised users can register on two possible levels.
Level 1:
authorises to only watch User name: *user*
Password: *1111*

Level 2:
Auhtorises to watch and to configure User name: *admin*
Password *knuerr*

After logging in onto Level 2, user names and passwords can be changed in the window *User*. They should not exceed 10 characters.

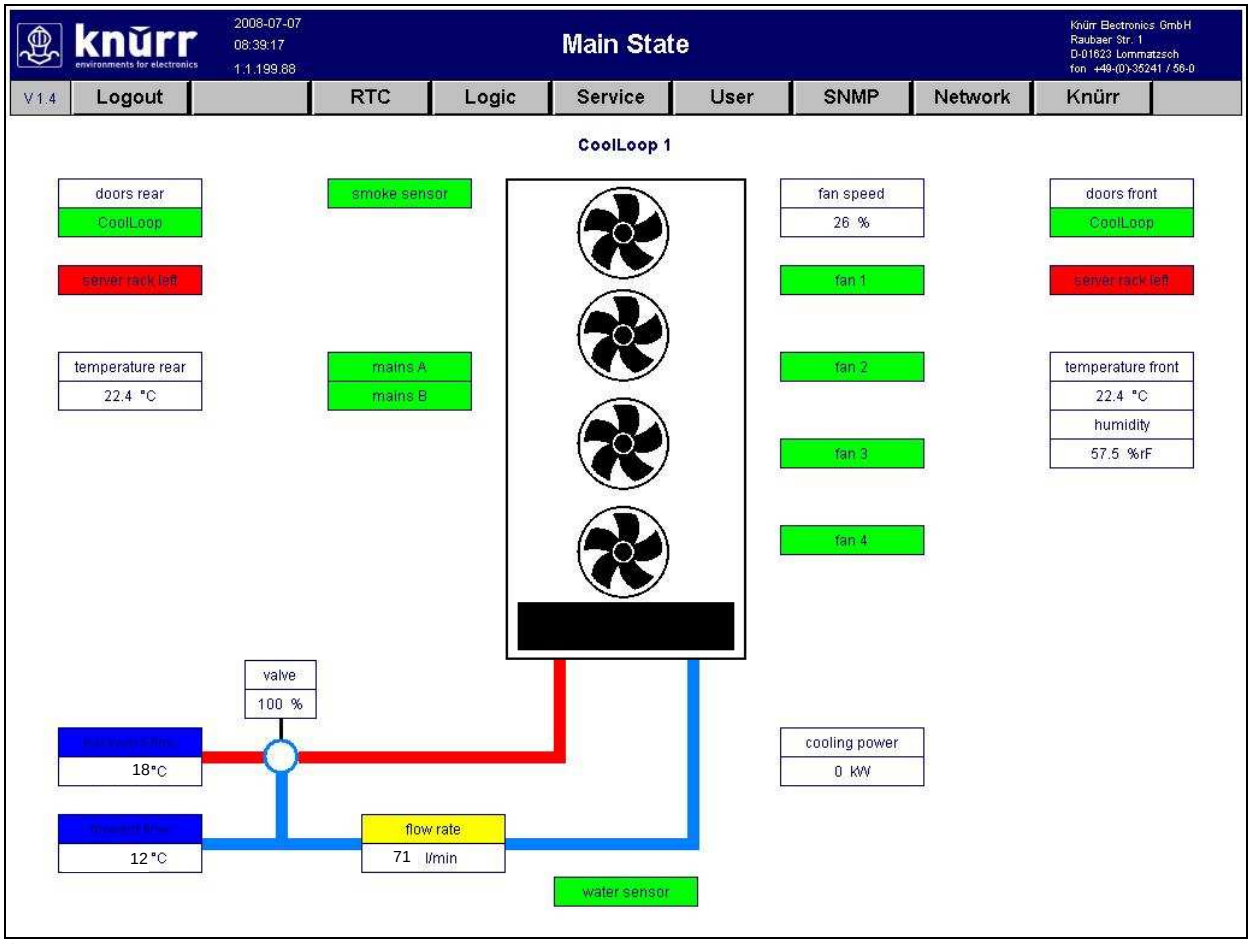
German and English are supported as languages of display; choose between the flag symbol buttons on the Login page.



Status page

Status

After successful login, the status page will open displaying all the current state temperatures. This page can be seen by users authorised for both Levels and 1 and 2; setting changes are not possible here.



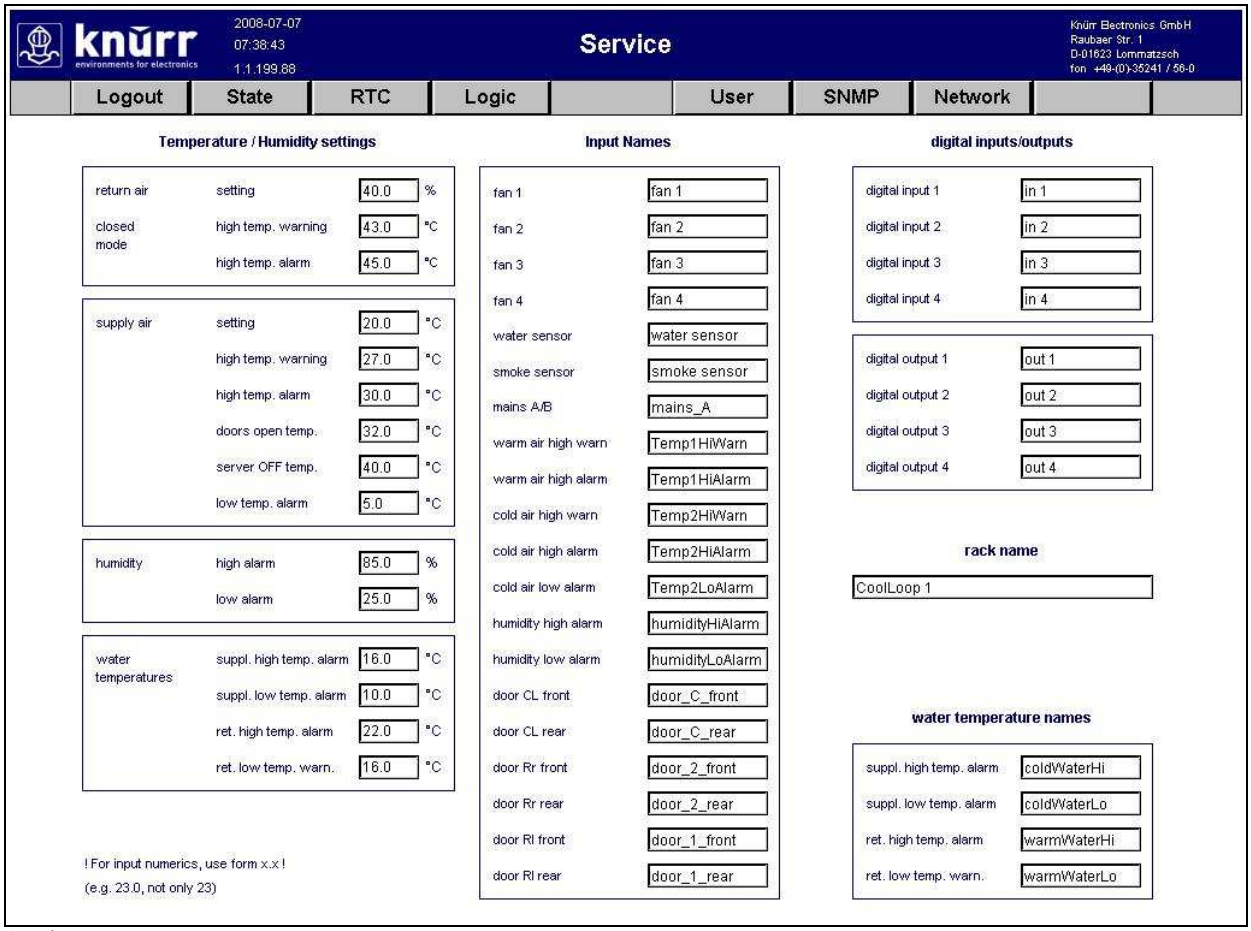
Status page

All contacts are displayed *green* in their normal status and, in the event of an alarm, turn *red*. The name fields of analog values are not coloured in their normal states;
they will turn
yellow when exceeding their upper warning limits,
red when reaching their upper warning values
and *blue* at their lower alarm values.
Depending on the number of inserted fan racks and the options installed, the display may vary from the figure.

The value settings for upper and lower alarms and warnings are possible only on User Level 2 on the *Service* page within the scope of adjustment (→ Table default setting).
The set values for server supply air (valve control) and server return air (fan control), the threshold values for alarms and warnings are also default here.

Here, in columns *Input Names* and *digital inputs/outputs,* messages and contacts can be specified individually. They will then appear in further configuration windows and be dispersed as additional text in the trap messages. Such specifications must not exceed a length of **24** characters.

The specification of the cabinet can be entered in the box *Rack Name*. It will then be displayed at the top of the *Status* page, shown on the display (optionally) and can be requested by SNMP.



Service page

The value settings for server supply air (valve control) and server return air (fan control) as well as the threshold values for alarms and warnings are default in the column *Temperature / humidity settings*.

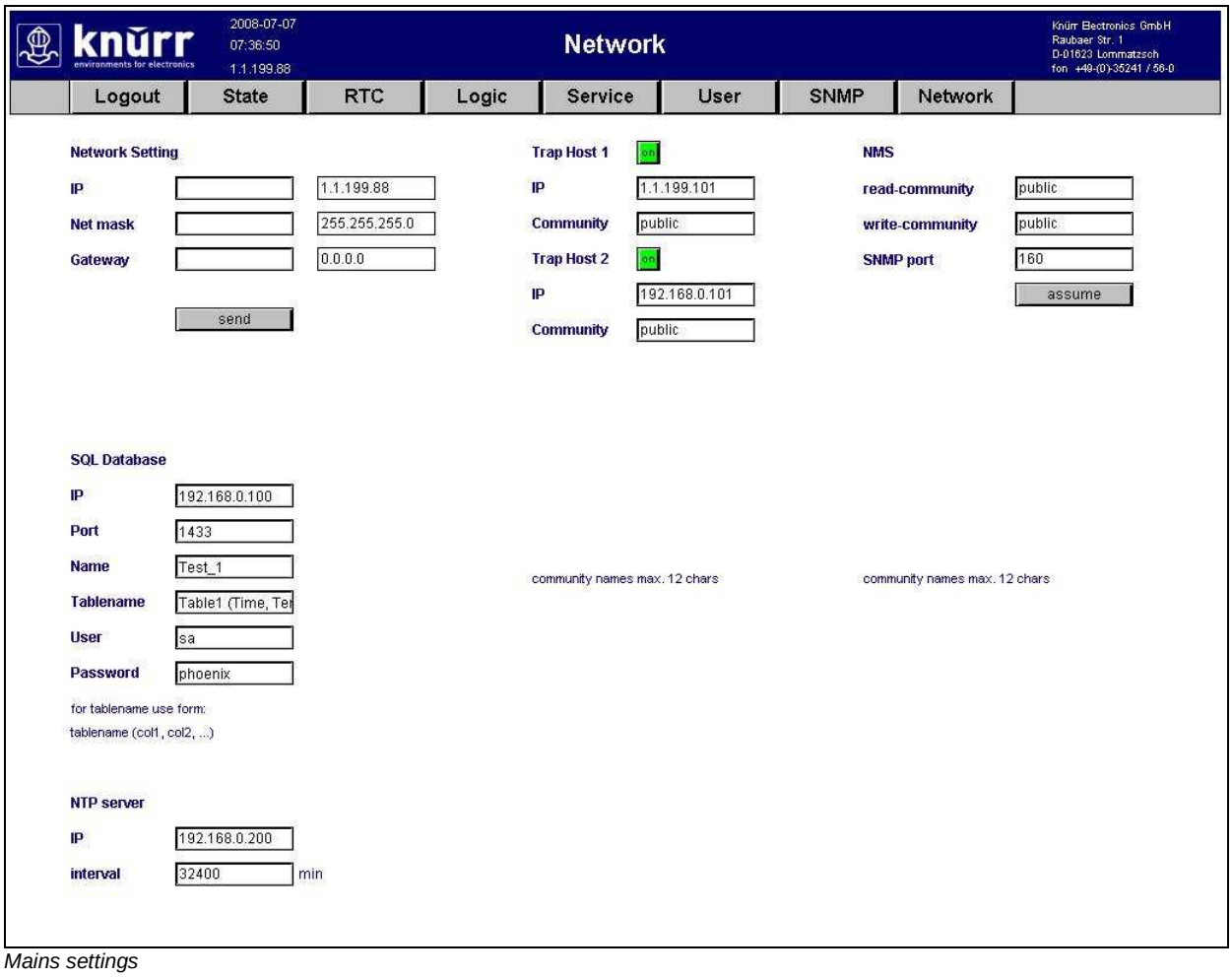
Default values:

Value	Basic setting	Range
Warm air:		
Value setting	40℃	35 - 45℃
Upper temperature warning	45℃	35 - 50℃
Upper temperature alarm	50℃	35 - 55℃
Cold air:		
Value setting	22℃	20 - 25℃
Upper temperature warning	26℃	20 - 35℃
Upper temperature alarm	30℃	20 - 40℃
Emergency opening doors	32℃	30 - 40℃
Server shutdown	35℃	25 - 40℃
Lower temperature alarm	10℃	1 - 15℃
Relative humidity:		
Upper alarm	85%rel.hum.	50 - 90%rel.hum.
Lower alarm	25%rel.hum.	20 - 30%rel.hum.
Water temperature:		
Feed, upper temperature alarm	16℃	10 - 25℃
Feed, lower temperature alarm	10℃	5 - 20℃
Return, upper temperature alarm	22℃	15 - 30℃
Return, lower temperature alarm	10℃	5 - 20℃

Mains setting

The network settings can be altered after successful login on Level 2 via the button *Network*. The following are default values:

IP address: 1.1.199.88
Net mask: 255.255.255.0



Mains settings

For any change, the new values need to be entered into the respective boxes and to be transferred by using the *send* button. After a short waiting time, the control needs to be started anew by means of the *reset* button in order to activate the changed data.

NTP server:

For synchronising the internal realtime clock with a time server, its address is entered here as well as the updating interval in seconds. As another option, the clock can be set manually via the *RTC* page.

Trap Host and NMS:

The settings required for SNMP management for the trap receiver, community names and SNMP port are made here. Trap recipients may be activated individually via the respective buttons. A detailed description of SNMP functions can be found in Section SNMP.

Note:
Due to the system, the SNMP communication cannot be effected at its standard port 161. In the box *SNMP port* any port may be selected; Port 160 is the default port.
Traps are sent on via Port 162 as a standard.

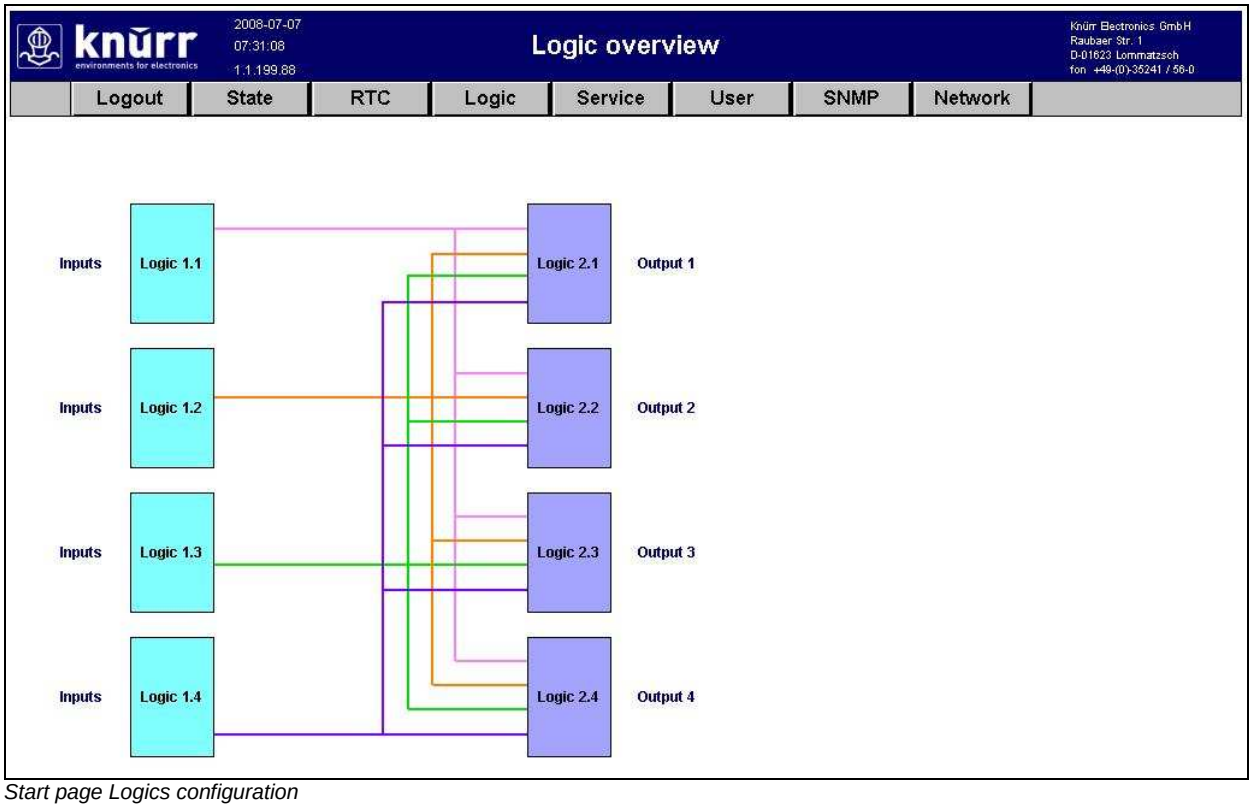
SQL:

With the database functions enabled, the required entries for access to a database can be made here. Only the link-in to Microsoft SQL is possible. As a standard, the values for the server supply air and return air are written into a table. Further values may be implemented upon request.

Logics configuration

The Logics configuration of CoolCon permits the user to determine logic functions for circuiting the 4 relay outputs (optional) or to generate an SNMP trap (traps are also possible, if option *digital inputs/ouputs* is not available). If an alarm is received, e.g. failure of a conditioning unit AND an alarm due to overheating, a trap and the switching ON of a contact can be configured in an additional alarm system. A total of four logic functions (AND / OR) on two levels each as well as four optional relay outputs are available. The outputs of the first logic level may be linked on the second level once again by AND/OR, which enables extensive logic linking.

The Logics configuration can be accessed via the *Logic* button: The Logics survey will appear showing a scheme. The various logic units can be accessed by clicking on the coloured boxes.

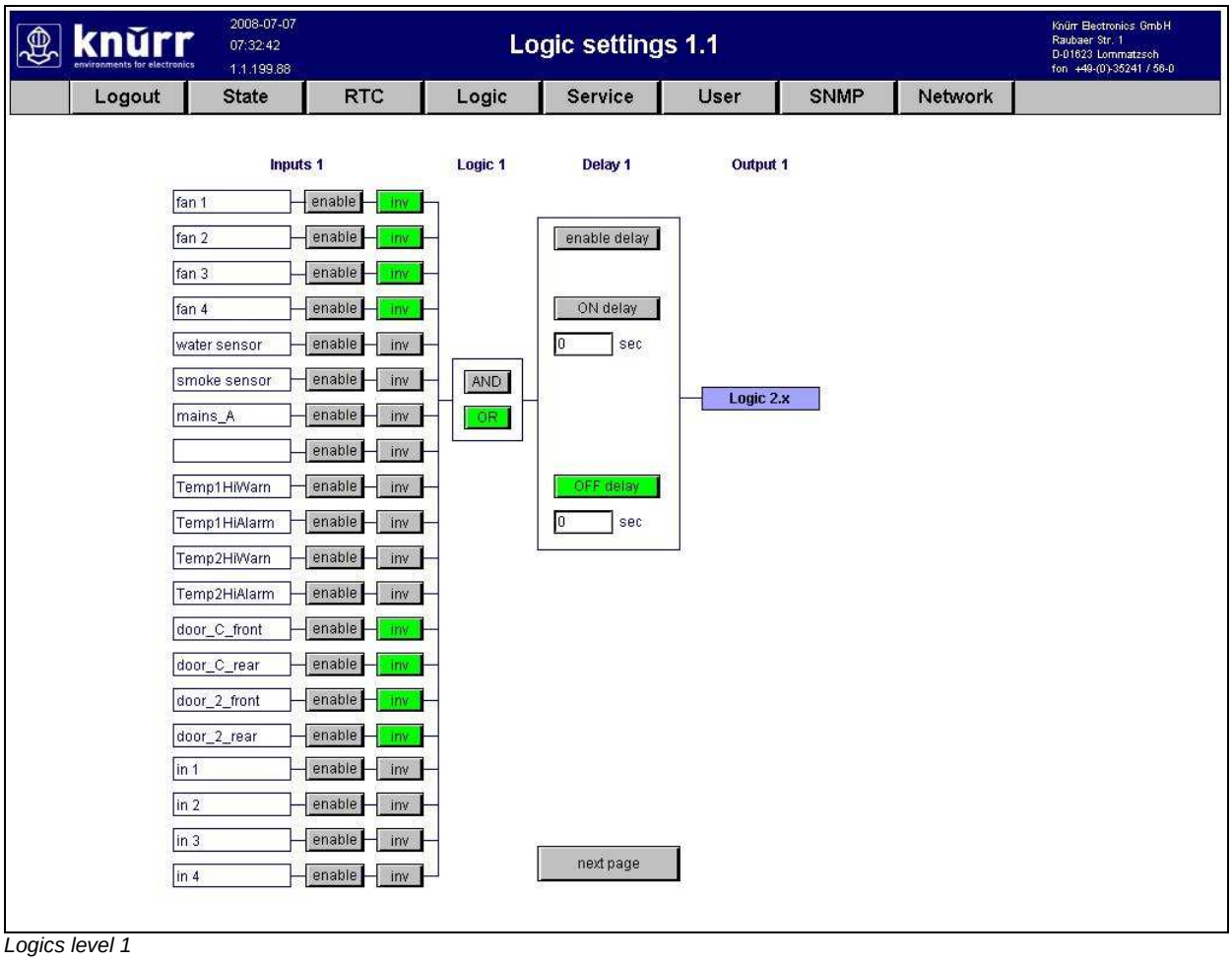


Start page Logics configuration

On Logics level 1, the following input conditions can be used for generating an output signal:

- Error message fans 1 to 4
- Water alarm
- Smoke alarm
- Mains A
- Mains B
- Upper temperature warning and alarm for server supply air
- Upper temperature warning and alarm for server return air
- Door contact switch CoolLoop
- Door contact switch server cabinet
- Free digital inputs

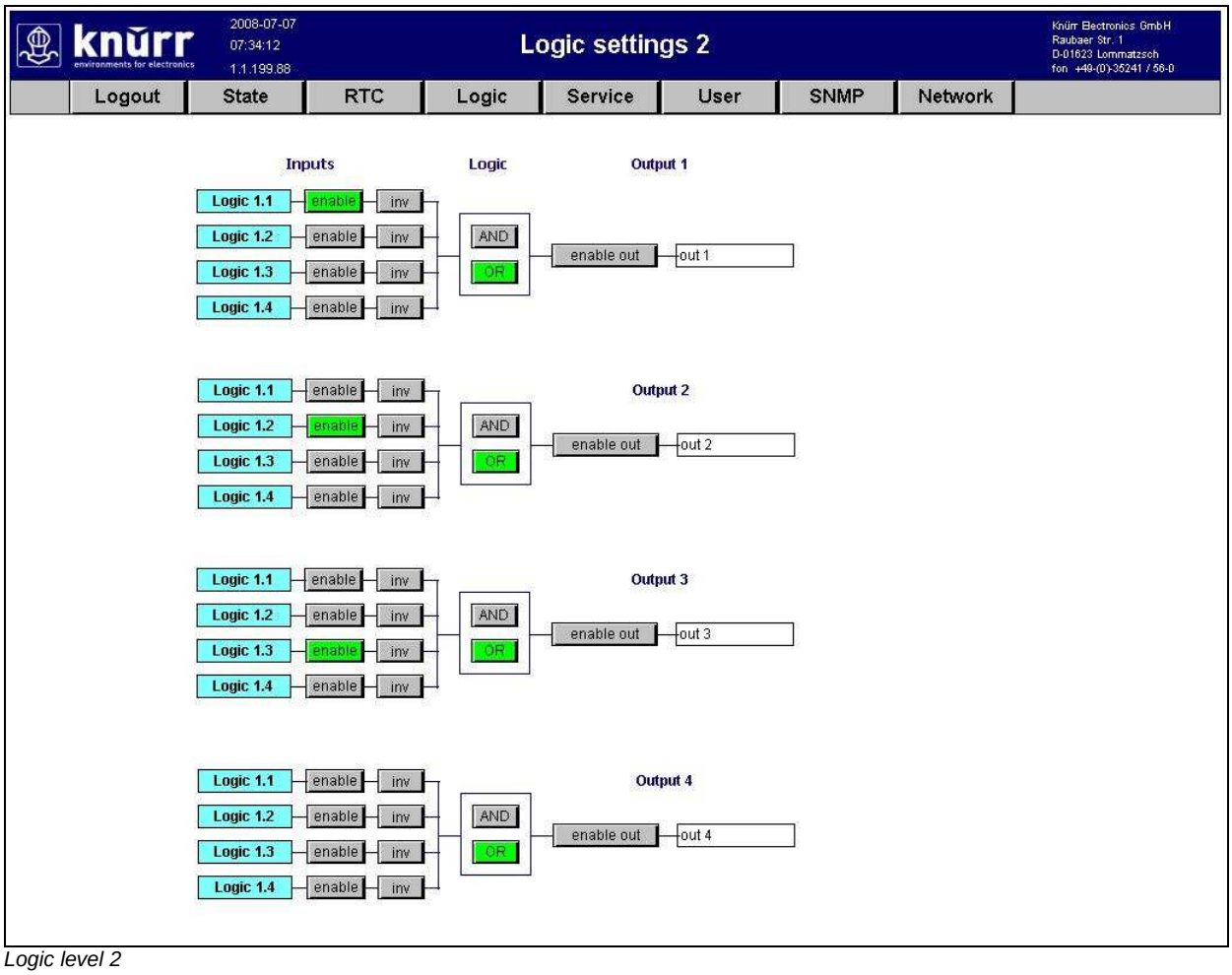
These signals can be enabled (*enable*) or inverted *(inv*) individually. The selected inputs can then logically be linked by means of *AND / OR*; if required, the reaction time (in seconds) in which the linking result is put out can be delayed by means of *enable delay* and *ON delay* or *OFF delay.*



Logics level 1

The *Next (vor)* button will take you to the next field of configuration on Logics level 1 where the same inputs are available, but can be logically linked otherwise.

Clicking onto the output *Logic 2.x* will take you to Logics level 2. Its default setting is configured in such a way that the results from Logic levels 1 are passed on directly to outputs 1 to 4. Each output must now only be enabled by means of *enable out*. The linked result will then be available at the relay outputs (optional) or is sent out as an SNMP trap if trap dispatch has been enabled. For further logical linking, proceed analog to Logic level 1.



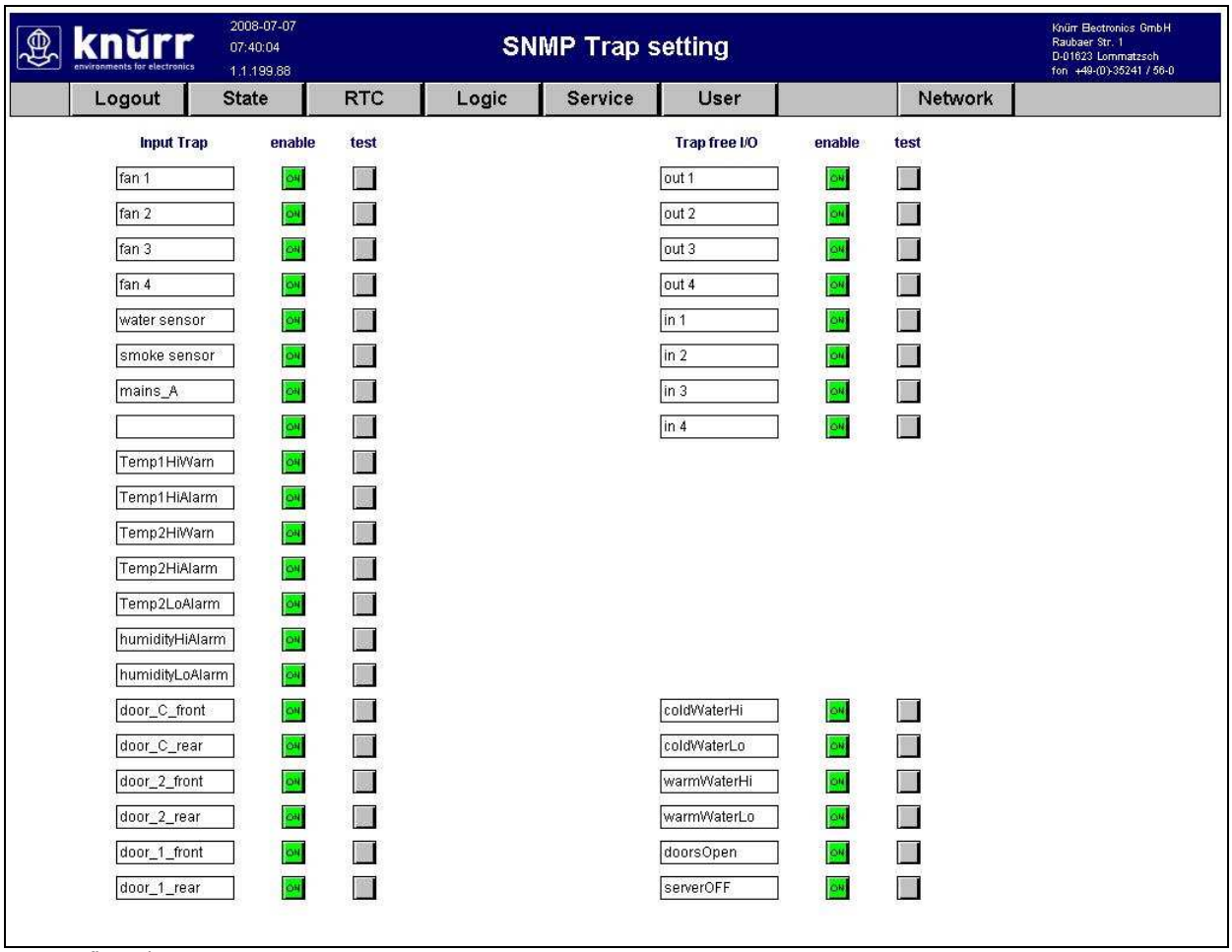
Logic level 2

SNMP

CoolCon supports SNMP and SNMP traps in Version v2c. The MIB file required for integration into a network management system can be downloaded via *ftp://<Adresse CoolLoop>* from control. The file is located in the root directory of control and is named *KNUERR-COOLCONTROL-MIB_Vx.mib*.
Note: Download this file only; all other files must not be altered or renamed in order to guarantee the system to work flawlessly.

Trap configuration

The trap configuration can be found in window *SNMP*. It be specified there for the respective inputs and threshold levels whether a trap shall be sent at each change of state. Incoming and outgoing traps are always triggered for one event.



Trap configuration

The names displayed correlate to those that have been specified in the *Service* window.
A trap can be triggered manually for each event by using the buttons in the *Test* column. Before using this function, release of the desired input must be disabled and, by subsequently clicking on it, be tested. An incoming and outgoing trap, respectively, is sent.

SNMP MIB

In order to monitor the CoolLoop and the server cabinet attached to it by SNMP it is necessary to link the MIB into the network management system in use. The following table lists all elements contained in the MIB. Depending on the option applied, not all OIDs are used.

Content	Object 1	Object 2	Object 3	Explanation
enterprises.knuerr.cooling.coolControl 1.3.6.1.4.1.2769.2.1.				
coolEnvironment	1			Analog inputs
temp1		1		Temperature server return air CL / CT
temp1Name			1	Warm air
temp1CalibrationOffset			2	Offset temperature
temp1Current			3	Temperature value, return air
temp1SettingLevel			4	Normal value
temp1WarningLevel			5	Upper warning threshold
temp1AlarmLevel			6	Upper alarm value
temp2		2		Temperature server supply air CL / CT
temp2Name			1	Cold air
temp2CalibrationOffset			2	Offset temperature
temp2Current			3	Temperature value, supply air
temp2NormLevel			4	Normal value
temp2WarningLevel			5	Upper warning threshold
temp2AlarmLevel			6	Upper alarm value
temp2DoorsOpenLevel			7	Door opening value
temp2ServerOFFLevel			8	Server shutdown value
temp3		3		Temperature server return air, right rack
temp3Name			1	Warm air, left
temp3CalibrationOffset			2	Offset temperature
temp3Current			3	Temperature value, return air
temp3WarningLevel			4	Upper warning threshold
temp3AlarmLevel			5	Upper alarm value
temp4		4		Temperature supply air, right rack
temp4Name			1	Cold air, left
temp4CalibrationOffset			2	Offset temperature
temp4Current			3	Temperature value, supply air
temp4WarningLevel			4	Upper warning threshold
temp4AlarmLevel			5	Upper alarm value
temp5		5		Temperature server return air, left rack
temp5Name			1	Warm air, right
temp5CalibrationOffset			2	Offset temperature
temp5Current			3	Temperature value, return air
temp5WarningLevel			4	Upper warning threshold
temp5AlarmLevel			5	Upper alarm value
temp6		6		Temperature server, supply air, left rack
temp6Name			1	Cold air, right
temp6CalibrationOffset			2	Offset temperature

temp6Current			3	Temperature value, supply air
temp6WarningLevel			4	Upper warning threshold
temp6AlarmLevel			5	Upper alarm value
hum1		7		Relative humidity
hum1Name			1	Name humidity
hum1Current			2	Humidity value, air
hum1LowAlarmLevel			3	Lower alarm value
hum1UpperAlarmLevel			4	Upper alarm value
tempOutWater		8		Chilled water, return
tempOutWaterName			1	Name chilled water, return
tempOutWaterCurrent			2	Temperature value chilled water, return
tempOutWaterLoAlarmLevel			3	Lower alarm value
tempOutWaterHiAlarmLevel			4	Upper alarm value
tempInWater		9		Chilled water, feed
tempInWaterName			1	Name chilled water, feed
tempInWaterCurrent			2	Temperature
tempInWaterLoAlarmLevel			3	Lower alarm value
tempInWaterHiAlarmLevel			4	Upper alarm value
flowWater		10		Chilled water, flow rate
flowWaterName			1	Name water flow rate
flowWaterCurrent			2	Water flow rate
energyConsumptionMainsA		11		Power mains A
activePowerMainsA			1	Effective power mains A
currentL1A			2	Current mains A L1
currentL2A			3	Current mains A L2
currentL3A			4	Current mains A L3
voltageL1A			5	Voltage mains A L1 - N
voltageL2A			6	Voltage mains A L2 - N
voltageL3A			7	Voltage mains A L3 - N
cosphiA			8	Power factor mains A
apparentPowerMainsA			9	Apparent power mains A
reactivePowerMainsA			10	Idle power mains A
energyConsumptionMainsB		12		Energy mains B
activePowerMainsB			1	Effective power mains B
currentL1B			2	Current mains B L1
currentL2B			3	Current mains B L2
currentL3B			4	Current mains B L3
voltageL1A			5	Voltage mains B L1 - N
voltageL2A			6	Voltage mains B L2 - N
voltageL3A			7	Voltage mains B L3 - N
cosphiB			8	Power factor mains B
apparentPowerMainsB			9	Apparent power mains B
reactivePowerMainsB			10	Idle power mains B
coolContacts	.2			Digital system inputs
contactBasisNames		1		Names inputs basic device
fan1Name			1	Name fan 1
fan2Name			2	Name fan 2

fan3Name			3	Name fan 3
fan4Name			4	Name fan 4
waterName			5	Name water
smokeName			6	Name smoke
mainsAName			7	Name mains A
mainsBName			8	Name mains B
contactSmokeExtingNames		2		Namen contacts very early fire detection
smokePreAlarmName			1	Name pre-alarm
smokeMainAlarmName			2	Name main alarm
smokeDefectName			3	Name device defect
smokeExtinguishedName			4	Name extinction triggered
contactDoorNames		3		Namen door contacts
doorLeftFrontName			1	Name door, front left
doorLeftRearName			2	Name door, rear left
doorRightFrontName			3	Name door, front right
doorRightRearName			4	Name door, rear right
doorCoolFrontName			5	Name door C, front
doorCoolRearName			6	Name door C, rear
contactBasisCurrentStates		4		Status inputs basic device
fan1CurrentStates			1	Status fan 1
fan2CurrentStates			2	Status fan 2
fan3CurrentStates			3	Status fan 3
fan4CurrentStates			4	Status fan 4
waterCurrentStates			5	Status water sensor
smokeCurrentStates			6	Status smoke sensor
mainsACurrentStates			7	Status mains A
mainsBCurrentStates			8	Status mains B
contactSmokeExtingCurrentStates		5		Status very early fire detection
smokePreAlarmCurrentStates			1	Status pre-alarm
smokeMainAlarmCurrentStates			2	Status main alarm
smokeDefectCurrentStates			3	Status device defect
smokeExtinguishedCurrentStates			4	Status extinction triggered
contactDoorCurrentStates		6		Status door contacts
doorLeftFrontCurrentStates			1	Status door, front left
doorLeftRearCurrentStates			2	Status door, rear left
doorRightFrontCurrentStates			3	Status door, front right
doorRightRearCurrentStates			4	Status door, rear right
doorCoolFrontCurrentStates			5	Status door C, front
doorCoolRearCurrentStates			6	Status door C, rear
contactBasisTraps		7		Trap release inputs, basic device
fan1Trap			1	Trap release fan 1
fan2Trap			2	Trap release fan 2
fan3Trap			3	Trap release fan 3
fan4Trap			4	Trap release fan 4
waterTrap			5	Trap release water sensor
smokeTrap			6	Trap release smoke sensor
mainsATrap			7	Trap release mains A
mainsBTrap			8	Trap release mains B

contactSmokeExtingTraps		8		Trap release very early fire detection
smokePreAlarmTrap			1	Trap release pre-alarm
smokeMainAlarmTrap			2	Trap release main alarm
smokeDefectTrap			3	Trap release device defect
smokeExtinguishedTrap			4	Trap release extinction triggered
contactDoorTraps		9		Trap release door contacts
doorLeftFrontTrap			1	Trap release door, front left
doorLeftRearTrap			2	Trap release door, rear left
doorRightFrontTrap			3	Trap release door, front right
doorRightRearTrap			4	Trap release door, rear right
doorCoolFrontTrap			5	Trap release door C, front
doorCoolRearTrap			6	Trap release door C, rear
contactBasisTrapRepeat		10		Trap repeat inputs basic device
fan1TrapRepeat			1	Trap repeat time fan 1
fan2TrapRepeat			2	Trap repeat time fan 2
fan3TrapRepeat			3	Trap repeat time fan 3
fan4TrapRepeat			4	Trap repeat time fan 4
waterTrapRepeat			5	Trap repeat time water
smokeTrapRepeat			6	Trap repeat time smoke
mainsATrapRepeat			7	Trap repeat time mains A
mainsBTrapRepeat			8	Trap repeat time mains B
contactSmokeExtingTrapRepeat		11		Trap repeat very early fire detection
smokePreAlarmTrapRepeat			1	Trap repeat time pre-alarm
smokeMainAlarmTrapRepeat			2	Trap repeat time main alarm
smokeDefectTrapRepeat			3	Trap repeat time device defect
smokeExtinguishedTrapRepeat			4	Trap repeat time extinction triggered
contactDoorTrapRepeat		12		Trap repeat door contacts
doorLeftfrontTrapRepeat			1	Trap repeat time door, front left
doorLeftRearTrapRepeat			2	Trap repeat time door, rear left
doorRightFrontTrapRepeat			3	Trap repeat time door, front right
doorRightRearTrapRepeat			4	Trap repeat time door, rear right
doorCoolFrontTrapRepeat			5	Trap repeat time door C, front
doorCoolRearTrapRepeat			6	Trap repeat time door C, rear
coolOutput	.3			Digital outputs
outputEnables		1		
out1Enable			1	Output 1
out2Enable			2	Output 2
out3Enable			3	Output 3
out4Enable			4	Output 4
outputNames		2		
out1Name			1	Name output 1
out2Name			2	Name output 2
out3Name			3	Name output 3
out4Name			4	Name output 4
outputStates		3		Status outputs
out1State			1	Status output 1

out2State			2	Status output 2
out3State			3	Status output 3
out4State			4	Status output 4
outputTraps		4		Trap release outputs
out1Trap			1	Trap release output 1
out2Trap			2	Trap release output 2
out3Trap			3	Trap release output 3
out4Trap			4	Trap release output 4
outputTrapRepeat		5		Trap repeat outputs
out1TrapRepeat			1	Trap repeat time output 1
out2TrapRepeat			2	Trap repeat time output 2
out3TrapRepeat			3	Trap repeat time output 3
out4TrapRepeat			4	Trap repeat time output 4
coolSystem	.4			System data
coolsystem		1		
systemManufacturer			1	mib-2.system.sysContact
systemType			2	mib-2.system.sysDescr
systemLocation			3	mib-2.system.sysLocation
systemName			4	mib-2.system.sysName
coolTrap	.5			Traps
fan1Norm		1		Fan 1 normal
fan1Alarm		2		Fan 1 alarm
fan2Norm		3		Fan 2 normal
fan2Alarm		4		Fan 2 alarm
fan3Norm		5		Fan 3 normal
fan3Alarm		6		Fan 3 alarm
fan4Norm		7		Fan 4 normal
fan4Alarm		8		Fan 4 alarm
waterNorm		9		Water normal
waterAlarm		10		Water alarm
smokeNorm		11		Smoke normal
smokeAlarm		12		Smoke alarm
mainsANorm		13		Mains A normal
mainsAAlarm		14		Mains A alarm
mainsBNorm		15		Mains B normal
mainsBAlarm		16		Mains B alarm
smokePreAlarmNorm		17		Very early fire detection, normal
smokePreAlarmAlarm		18		Very early fire detection, alarm
smokeMainAlarmNorm		19		Very early fire detection, normal
smokeMainAlarmAlarm		20		Very early fire detection, alarm
smokeDefectNorm		21		Device defect, normal
smokeDefectAlarm		22		Device defect, alarm
smokeExtinguishedNorm		23		Extinction triggered, normal
smokeExtinguishedAlarm		24		Extinction triggered, alarm
doorLeftFrontNorm		25		Door, front left, normal
doorLeftFrontAlarm		26		Door, front left, alarm
doorLeftRearNorm		27		Door, rear left, normal
doorLeftRearAlarm		28		Door, rear left, alarm
doorRightFrontNorm		29		Door, front right, normal
doorRightFrontAlarm		30		Door, front right, alarm

	doorRightRearNorm		31	Door, rear right, normal
	doorRightRearAlarm		32	Door, rear right, alarm
	doorCfrontNorm		33	Door C, front, normal
	doorCfrontAlarm		34	Door C, front, alarm
	doorCrearNorm		35	Door C, rear, normal
	doorCrearAlarm		36	Door C, rear, alarm
	spare1Norm		37	Reserve
	spare1NotNorm		38	Reserve
	spare2Norm		39	Reserve
	spare2NotNorm		40	Reserve
	out1Norm		41	Output1, normal
	out1NotNorm		42	Output 1, abnormal
	out2Norm		43	Output 2, normal
	out2NotNorm		44	Output 2, abnormal
	out3Norm		45	Output 3, normal
	out3NotNorm		46	Output 3, abnormal
	out4Norm		47	Output 4, normal
	out4NotNorm		48	Output 4, abnormal
	temp1UpperNoWarning		49	Upper non-warning threshold
	temp1UpperWarning		50	Upper warning threshold
	temp1UpperNoAlarm		51	Upper non-alarm value
	temp1UpperAlarm		52	Upper alarm value
	temp2UpperNoWarning		53	Upper non-warning threshold
	temp2UpperWarning		54	Upper warning threshold
	temp2UpperNoAlarm		55	Upper non-alarm value
	temp2UpperAlarm		56	Upper alarm value
	temp3UpperNoWarning		57	Upper non-warning threshold
	temp3UpperWarning		58	Upper warning threshold
	temp3UpperNoAlarm		59	Upper non-alarm value
	temp3UpperAlarm		60	Upper alarm value
	temp4UpperNoWarning		61	Upper non-warning threshold
	temp4UpperWarning		62	Upper warning threshold
	temp4UpperNoAlarm		63	Upper non-alarm value
	temp4UpperAlarm		64	Upper alarm value
	temp5UpperNoWarning		65	Upper non-warning threshold
	temp5UpperWarning		66	Upper warning threshold
	temp5UpperNoAlarm		67	Upper non-alarm value
	temp5UpperAlarm		68	Upper alarm value
	temp6UpperNoWarning		69	Upper non-warning threshold
	temp6UpperWarning		70	Upper warning threshold
	temp6UpperNoAlarm		71	Upper non-alarm value
	temp6UpperAlarm		72	Upper alarm value
	temp1LowNoAlarm		73	Lower non-alarm value
	temp1LowAlarm		74	Lower alarm value
	temp2LowNoAlarm		75	Lower non-alarm value
	temp2LowAlarm		76	Lower alarm value
	humidityUpperNormal		77	Humidity upper normal value
	humidityUpperAlarm		78	Humidity upper alarm value
	humidityLowNormal		79	Humidity lower normal value
	humidityLowalarm		80	Humidity lower alarm value
	coldwaterLowNormal		81	Chilled water lower normal value
	coldwaterLowAlarm		82	Chilled water lower alarm value
	coldwaterUpperNormal		83	Chilled water upper normal value
	coldwaterUpperAlarm		84	Chilled water upper alarm value
	warmwaterLowNormal		85	Warm water lower normal value

warmwaterLowAlarm		86		Warm water lower alarm value
warmwaterUpperNormal		87		Warm water upper normal value
warmwaterUpperAlarm		88		Warm water upper alarm value
temp2DoorOpenNorm		89		Door opening value normal
temp2DoorOpenAlarm		90		Door opening value Alarm
temp2ServerOFFNorm		91		Server shutdown value normal
temp2ServerOFFAlarm		92		Server shutdown value Alarm
in1Normal		93		Input 1 normal
in1NotNormal		94		Input 1 abnormal
in2Normal		95		Input 2 normal
in2NotNormal		96		Input 2 abnormal
in3Normal		97		Input 3 normal
in3NotNormal		98		Input 3 abnormal
in4Normal		99		Input 4 normal
in4NotNormal		100		Input 4 abnormal
currentL1aNorm		101		Mains A current L1 normal
currentL1aAlarm		102		Mains A current L1 too high
currentL2aNorm		103		Mains A current L2 normal
currentL2aAlarm		104		Mains A current L2 too high
currentL3aNorm		105		Mains A current L3 normal
currentL3aAlarm		106		Mains A current L3 too high
currentL1bNorm		107		Mains B current L1 normal
currentL1bAlarm		108		Mains B current L1 too high
currentL2bNorm		109		Mains B current L2 normal
currentL2bAlarm		110		Mains B current L2 too high
currentL3bNorm		111		Mains B current L3 normal
currentL3bAlarm		112		Mains B current L3 too high
voltageMainsANorm		113		Mains A phase returned
voltageMainsAAlarm		114		Mains A phase failed
voltageMainsBNorm		115		Mains B phase returned
voltageMainsBAlarm		116		Mains B phase failed
powerMainsANorm		117		Mains A effective power normal
powerMainsAAlarm		118		Mains A effective power too high
powerMainsBNorm		119		Mains B effective power normal
powerMainsBAlarm		120		Mains B effective power too high
coolInput	.6			Digital inputs
inputNames		1		Namen digital inputs
in1Name			1	Name input 1
in2Name			2	Name input 2
in3Name			3	Name input 3
in4Name			4	Name input 4
inputStates		2		Status digital inputs
in1State			1	Status input 1
in2State			2	Status input 2
in3State			3	Status input 3
in4State			4	Status input 4
inputTraps		3		Trap release digital inputs
in1Trap			1	Trap release input 1
in2Trap			2	Trap release input 2
in3Trap			3	Trap release input 3
in4Trap			4	Trap release input 4

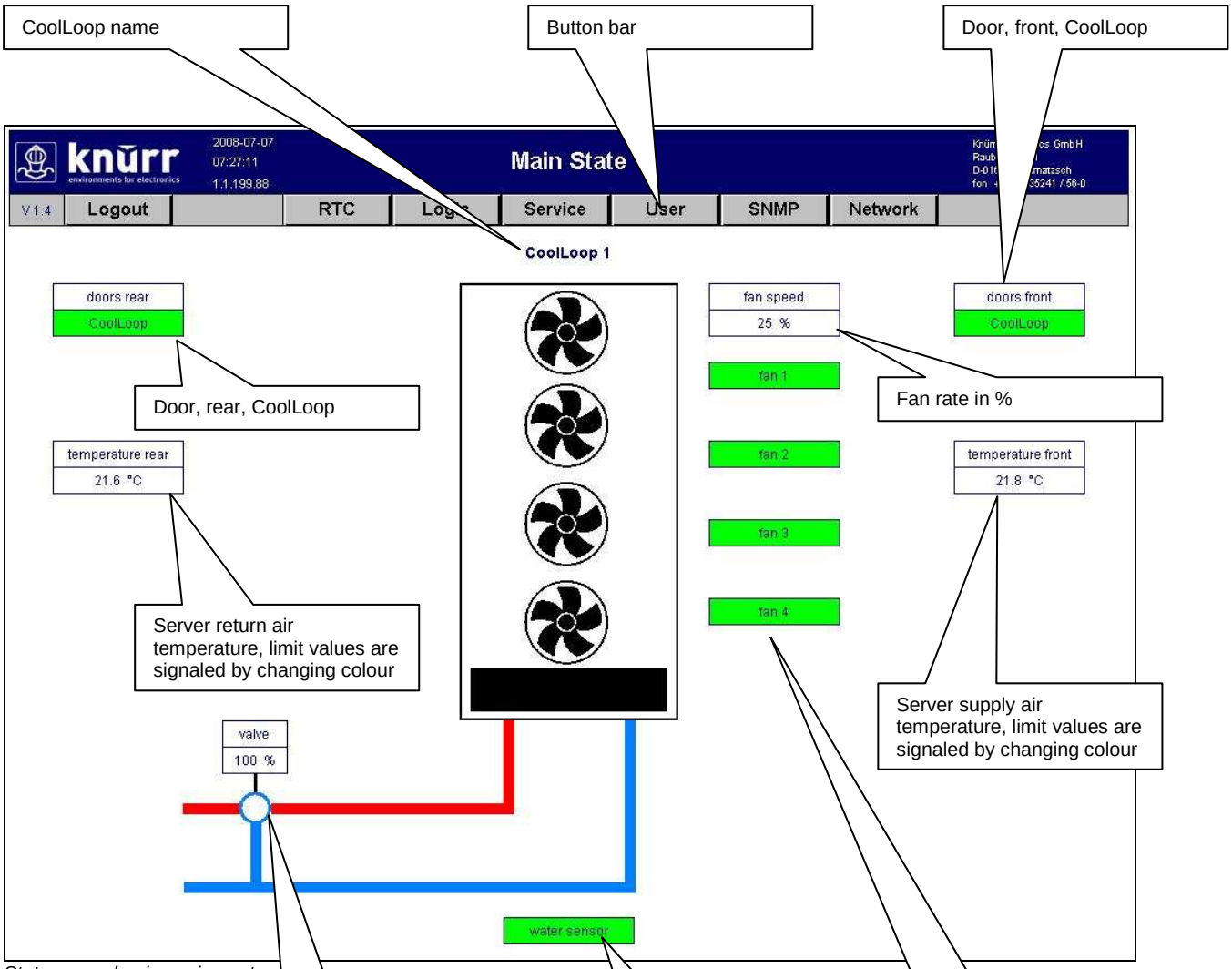
inputTrapRepeat		4		Trap repeat digital inputs
in1TrapRepeat			1	Trap repeat time input 1
in2TrapRepeat			2	Trap repeat time input 2
in3TrapRepeat			3	Trap repeat time input 3
in4TrapRepeat			4	Trap repeat time input 4

Functionality of the Basic Variant

Component	Function	Assembly	Connection	Variables	SNMP
Fan 1 (Alarm. = 0)	Status fan 1 Failure is signaled: Web visualisation display flashing light SNMP trap	ILC150:I1	5.1.1	ONBOARD_ INPUT_BIT0	Status check Trap in case of status change
Fan 2 (Alarm. = 0)	Status fan 2 Failure is signaled: Web visualisation display flashing light SNMP trap	ILC150:I2	6.2.1	ONBOARD_ INPUT_BIT1	Status check Trap in case of status change
Fan 3 (Alarm. = 0)	Status fan 3 Failure is signaled: Web visualisation display flashing light SNMP trap	ILC150:I3	5.1.4	ONBOARD_ INPUT_BIT2	Status check Trap in case of status change
Fan 4 (Alarm. = 0)	Status fan 4 Failure is signaled: Web visualisation display flashing light SNMP trap	ILC150:I4	6.2.4	ONBOARD_ INPUT_BIT3	Status check Trap in case of status change
B8 - water sensor (Alarm = 1)	Message when water level in condensate collection tub high is signaled: Web visualisation display flashing light SNMP trap	ILC150:I5	7.3.1	ONBOARD_ INPUT_BIT4	Status check Trap in case of status change
B7 - smoke sensor (Alarm = 1) (optional)	Signaling smoke; if required, doors can be opened and server shut down is signaled: Web visualisation display flashing light SNMP trap	ILC150:I6	8.4.1	ONBOARD_ INPUT_BIT5	Status check Trap in case of status change
Q12 - Mains contactor mains A (Mains A avail. = 1)	Mains supply failed is signaled: Web visualisation display flashing light SNMP trap	ILC150:I7	7.3.4	ONBOARD_ INPUT_BIT6	Status check Trap in case of status change
K15 - Monitoring mains B (Mains B avail. = 1)	Standby net failed is signaled: Web visualisation display flashing light	ILC150:I8	8.4.4	ONBOARD_ INPUT_BIT7	Status check Trap in case of status change

	SNMP trap				
P1 - Status LED	System o.k. = permanent light warning = flashing slowly Active if: doors, front, are open warm air upper warning value cold air upper warning value fire detection pre-alarm (optional) fire detection defect (optional) alarm = flashing rapidly active if: see flashlight	ILC150:O1	3.1.1	ONBOARD_ OUTPUT_BIT0	No
K12 - Fan emergency mode (Störung = 0)	Fan in emergency mode if: supply SPS OFF SPS in STOP failure of temperature sensors CoolLoop cold or warm air	ILC150:O2	4.2.1	ONBOARD_ OUTPUT_BIT1	No
K30 - Bridging of doorm opening if fire extinction active (optional)	Extinction blocked if at least one door open	ILC150:O4	4.2.4	ONBOARD_ OUTPUT_BIT3	No
B1 - Temperature sensor heat exchanger input	Measuring/display calibration value set value upper warning value Upper alarm value Exceeding the threshold levels is signaled: Web visualisation display flashing light SNMP trap	1-2RTD:Ch1	9.1.1 rt 9.1.2 bn 9.1.3 sw 9.1.4 sh	Tmp_1 / tmp_1r set_norm_temp1 set_warn_temp1 set_fail_temp1	Value requested Trap if falling short of or exceeding limit values
B2 - Temperature sensor Heat exchanger output	Measuring/display calibration value set value upper uUpper alarm value door-OPEN value server-OFF value lower alarm value Falling short of or exceeding threshold values is signaled: Web visualisation Display Flashing light SNMP trap	1-2RTD:Ch2	10.1.1 rt 10.1.2 bn 10.1.3 sw 10.1.4 sh	Tmp_2 / tmp_2r set_norm_temp2 set_warn_temp2 set_fail_temp2 set_off_temp2 serv_off_temp2 set_loalarm_temp2	Value requested Trap if falling short of or exceeding limit values
Fan 1 ... 4 - control voltage 0-10V	Joint control of fans	1-AO2/U:Ch1	11.1.1	fan_out	No
M9 - Control voltage 0-10V	Valve control	1-AO2/U:Ch2	12.2.1	mix_out	No

Fan 1 - (existing = 1)	Detection of fan 1 plugged visible by: Web visualisation Display	1-DI4:1	13.1.1	fan_1_en	No
Fan 2 - (existing = 1)	Detection of fan 2 plugged visible by: Web visualisation Display	1-DI4:2	14.2.1	fan_2_en	No
Fan 3 - (existing = 1)	Detection of fan 3 plugged visible by: Web visualisation Display	1-DI4:3	13.1.4	fan_3_en	No
Fan 4 - (existing = 1)	Detection of fan 4 plugged visible by: Web visualisation Display	1-DI4:4	14.2.4	fan_4_en	No



Status page basic equipment

Three-port valve with flow display in %

Water sensor

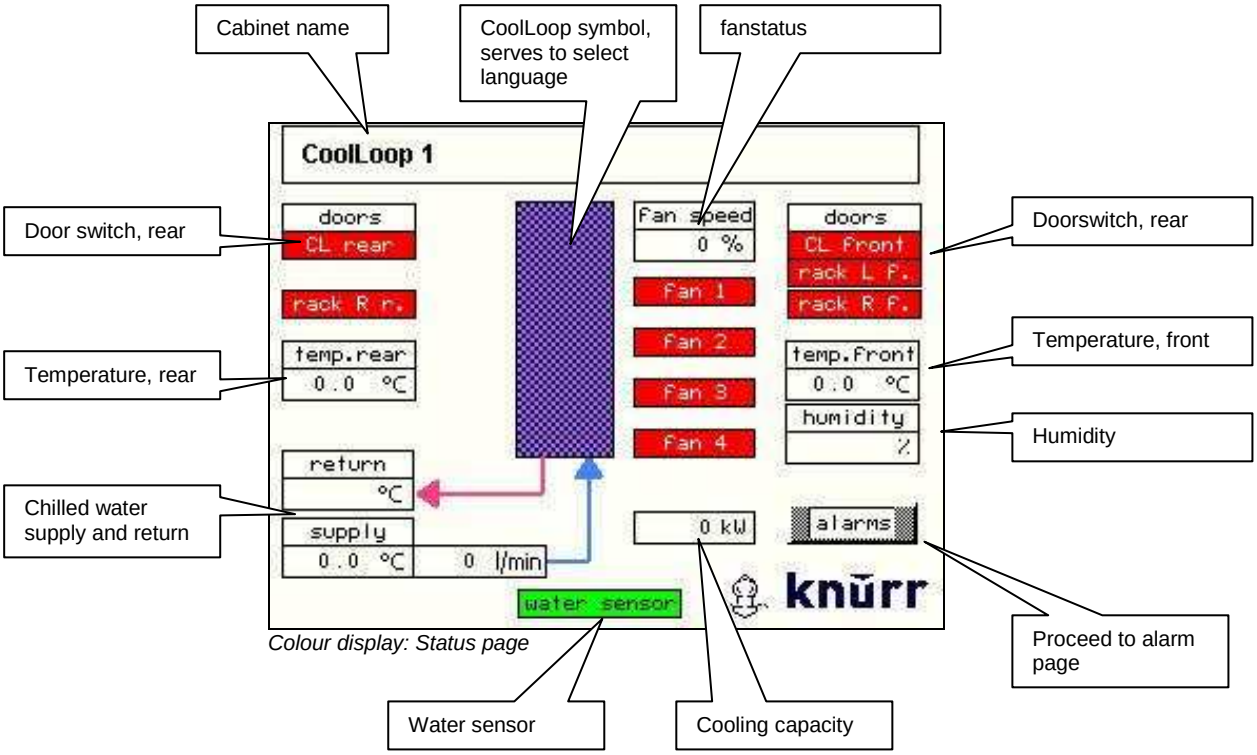
Fan display:
field and graphic only visible if fan insert has been plugged

green: fan o.k.
red: fan error

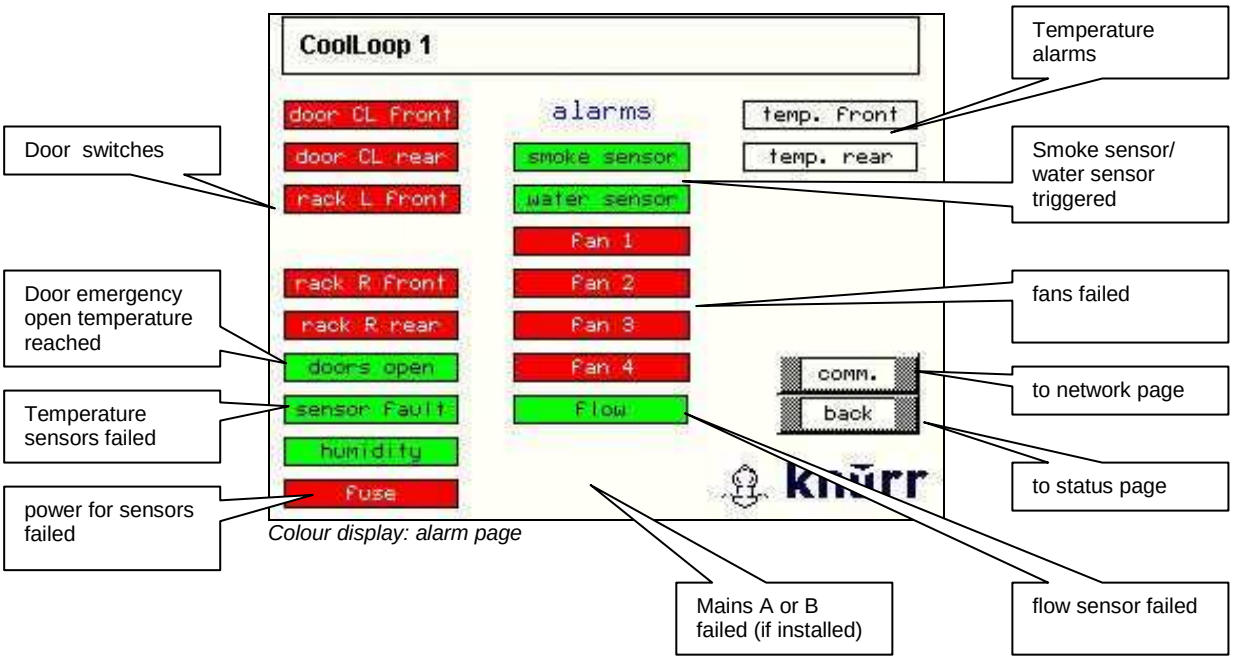
Options

Display

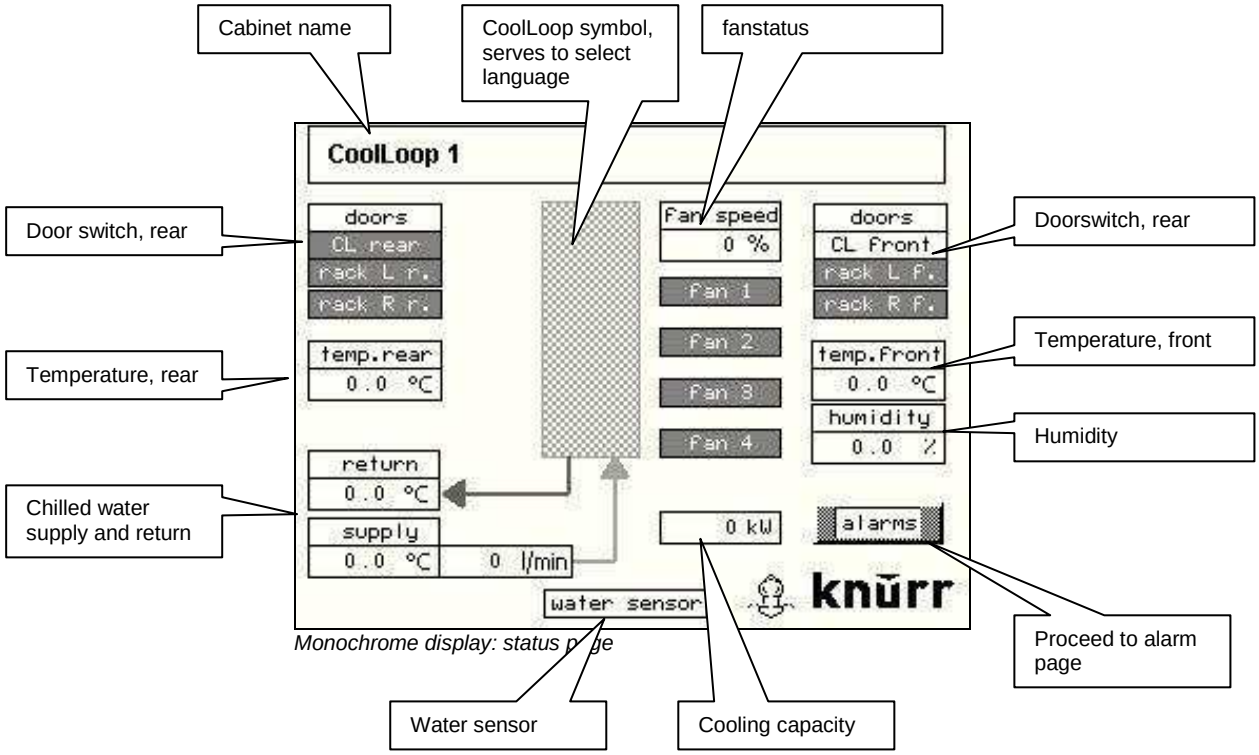
Component	Function	Assembly	Connection	Variables	SNMP
A27 - monochrome (optional)	Visualisation of the actual operational mode and of alarm messages: in its normal status, all fields for contacts and limit values are transparent, background colour is orange; in case of failure, the causing element changes to a dark background, the background colour will turn red	RS485	55.1.2 56.2.2	RS485_I_ ProcessData RS485_Q_ ProcessData	No
A27 - colour (optional)	Visualisation of the actual operational mode and of alarm messages: in its normal status, all fields for contacts and limit values are green, in case of failure, the causing element changes to a red background	RS485	55.1.2 56.2.2	RS485_I_ ProcessData RS485_Q_ ProcessData	No



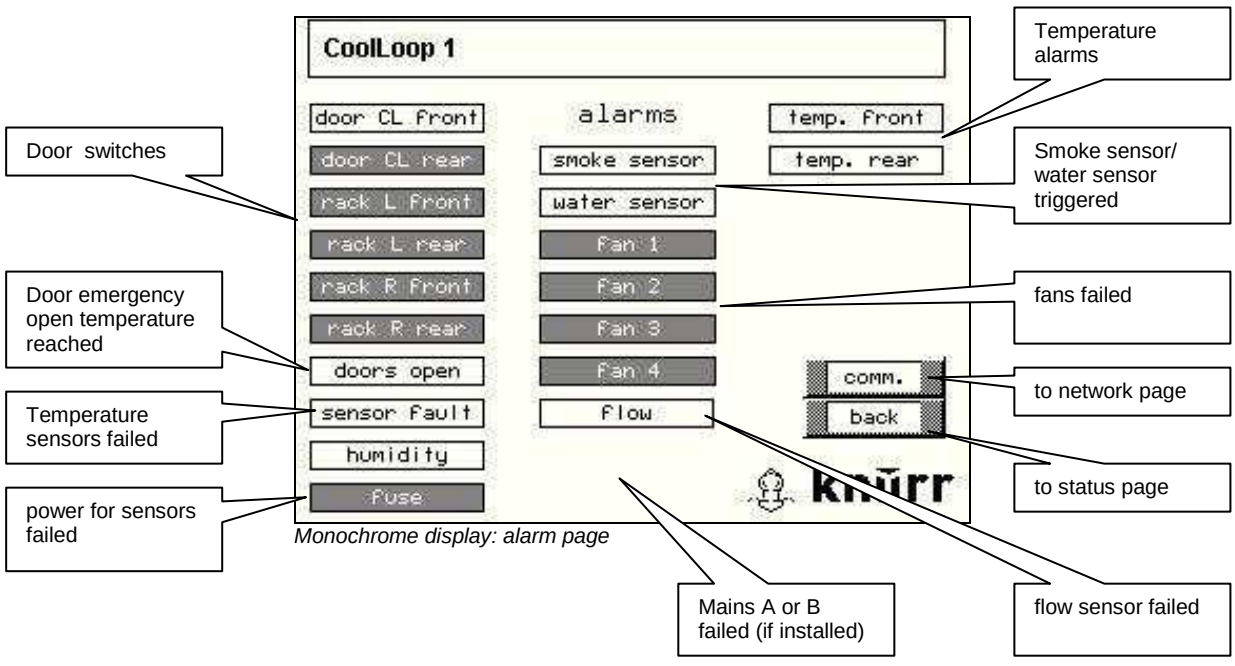
Colour display: Status page



Colour display: alarm page



Monochrome display: status page



Monochrome display: alarm page

Server shutdown

Component	Function	Assembly	Connection	Variables	SNMP
K111 –	Rack, left server shutdown mains A	1-DO4:1	21.1.1	serv_1a	No
K121 –	Rack, left server shutdown mains B	1-DO4:2	22.2.1	serv_1b	No
K211	Rack, right server shutdown mains A	1-DO4:3	21.1.4	serv_2a	No
K212	Rack, right server shutdown mains B	1-DO4:4	22.2.4	serv_2b	No
Q111 (contactor ON = 1)	Rack, left contactor server mainsA	2-DI4:1	23.1.1	serv_1a_fb	No
Q121 (contactor ON = 1)	Rack, left contactor server mainsB	2-DI4:2	24.2.1	serv_1b_fb	No
Q211 (contactor ON = 1)	Rack, right contactor server mainsA	2-DI4:3	23.1.4	serv_2a_fb	No
Q212 (contactor ON = 1)	Rack, right contactor server mainsA	2-DI4:4	24.2.4	serv_2b_fb	No

Automatic door opening

Component	Function	Assembly	Connection	Variables	SNMP
K50 –	Rack, left, door opening, front	2-DO4:1	25.1.1	tuer_1v_open	No
K51 –	Rack, left, door opening, rear	2-DO4:2	26.2.1	tuer_1h_open	No
K52 –	Rack, right, door opening, front	2-DO4:3	25.1.4	tuer_2v_open	No
K53 –	Rack, right, door opening, rear	2-DO4:4	26.2.4	tuer_2h_open	No

Digital inputs/outputs, freely configurable

Component	Function	Assembly	Connection	Variables	SNMP
K40 – digitaler output 1 1 changer	Output of messages generated via the internal logic configuration	3-DO4:1	61.1.1	out_10	Status check Trap in case of status change
K41 – digitaler output 2 1 changer		3-DO4:2	62.2.1	out_11	
K42 – digitaler output 3 1 changer		3-DO4:3	61.1.4	out_12	
K43 – digitaler output 4 1 changer		3-DO4:4	62.2.4	out_13	
digital input 1	Digital inputs, can be linked via the logic configuration with internal variables AND / OR; the result is available from the digital outputs	6-DI4:1	59.1.1	ctmr_in_10	Status check Trap in case of status change
digital input 2		6-DI4:2	60.2.1	ctmr_in_11	
digital input 3		6-DI4:3	59.1.4	ctmr_in_12	
digital input 4		6-DI4:4	60.2.4	ctmr_in_13	
	Joint voltage (+24V) for digital inputs	6-DI4:24V1 6-DI4:24V2	60.1.2 60.2.2		
Voltage supply for digital inputs/outputs	Fusing of +24V for digital inputs	2-PWR IN			No

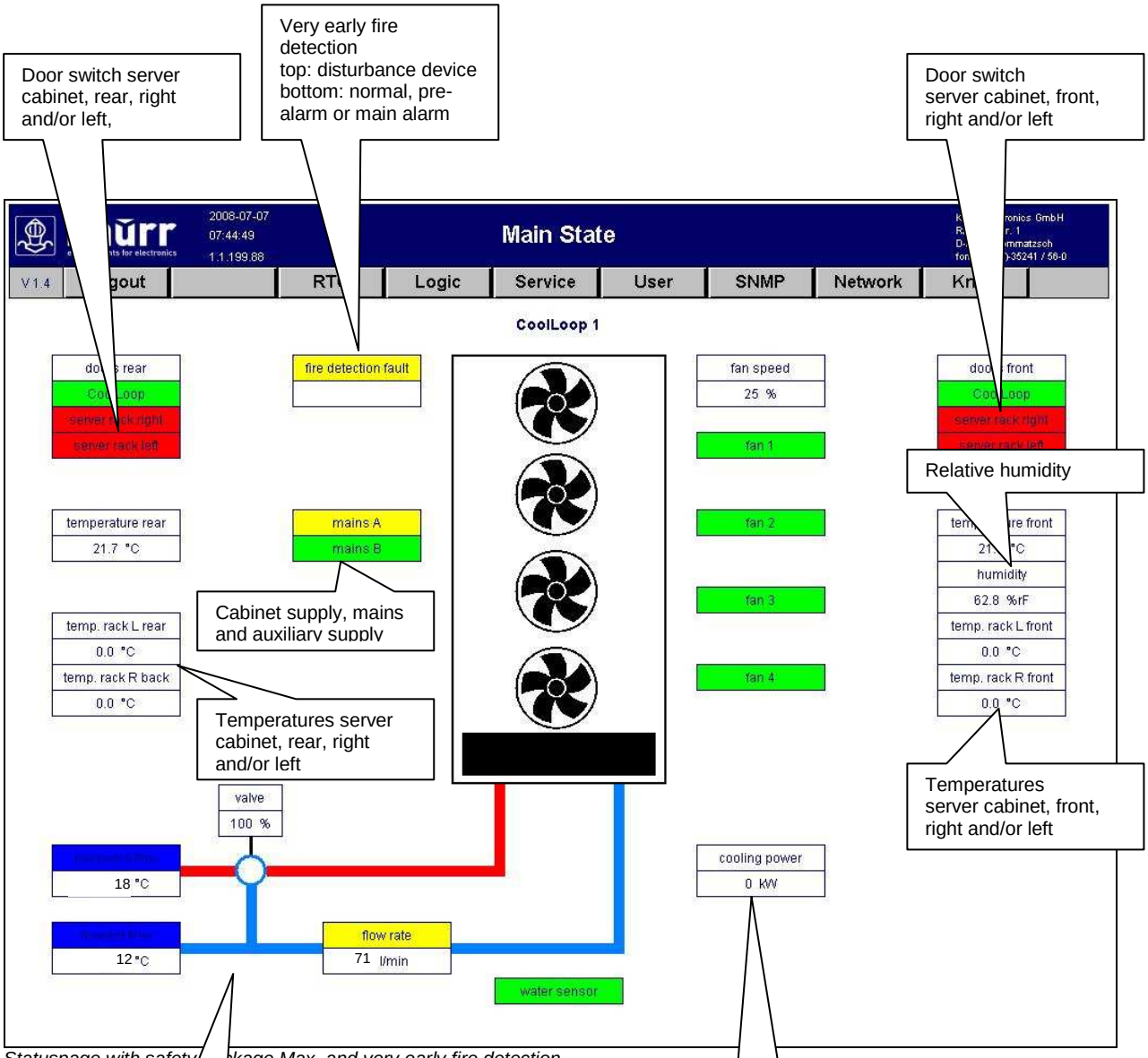
Sicherheitspaket Basis

Component	Function	Assembly	Connection	Variables	SNMP
S10 – S1 0– contact switches CoolLoop /-Therm, front (door closed = 1)	Status door, front CoolLoop / -Therm signaling: Web visualisation display (optional) flashing light (optional) relay contact (optional)	3-DI4:1	27.1.1	tuer_c_v	Status check Trap in case of status change
S11 – contact switches CoolLoop /-Therm, rear (door closed = 1)	Status door, rear CoolLoop / -Therm signaling: Web visualisation display (optional) flashing light (optional) relay contact (optional)	3-DI4:2	28.2.1	tuer_c_h	Status check Trap in case of status change
S14 – contact switches server cabinet, left, front (door closed = 1)	Status door, front, server cabinet, left signaling: Web visualisation display (optional) flashing light (optional) relay contact (optional)	4-DI4:1	29.1.1	tuer_1_v	Status check Trap in case of status change
S15 – contact switches Serverschrank, left, rear (door closed = 1)	- Status report door server cabinet signaling: Web visualisation display (optional) flashing light (optional) relay contact (optional)	4-DI4:2	30.2.1	tuer_1_h	Status check Trap in case of status change
S16 – contact switches Serverschrank right, front (door closed = 1)	- Status report door server cabinet signaling: Web visualisation display (optional) flashing light (optional) relay contact (optional)	4-DI4:3	29.1.4	tuer_2_v	Status check Trap in case of status change
S17 – contact switches server cabinet right, rear (door closed = 1)	- Status report door server cabinet signaling: Web visualisation display (optional) flashing light (optional) relay contact (optional)	4-DI4:4 (Segment 29,30)	30.2.4	tuer_2_h	Status check Trap in case of status change
P2 - Flashlight collective error (alarm = 1)	Activ if at least one of the following alarms occurs: water alarm smoke alarm warm air upper alarm cold air upper alarm cold air lower alarm humidity upper alarm humidity lower alarm flowmeter deficient	ILC150:O3	3.1.4	ONBOARD_ OUTPUT_BIT2	No

	fire detection main alarm Sensorfehler fan 1 failure fan 2 failure fan 3 failure fan 4 failure voltage supply of optional packages missing (optional) server shutdown at excess temperature was not working				

Saftey package Max.

Component	Function	Assembly	Connection	Variables	SNMP
B21 Server return air cabinet, left	Measurement of return air server cabinet, left is signaled: Web visualisation display	1-4/8RTD:Ch 1	39.1.1 39.1.2	Temp_3	Value requested
B22 Server supply air cabinet, left	Measurement of supply air server cabinet, left is signaled: Web visualisation display	1-4/8RTD:Ch 2	40.2.1 40.2.2	Temp_4	Value requested
B23 Server return air cabinet, right	Measurement of return air server cabinet, right is signaled: Web visualisation display	1-4/8RTD:Ch 3	41.1.1 41.1.2	Temp_5	Value requested
B24 Server supply air cabinet, right	Measurement of supply air server cabinet, right is signaled: Web visualisation display	1-4/8RTD:Ch 4	42.2.1 42.2.2	Temp_6	Value requested



Statuspage with safety ckage Max. and very early fire detection

Relative humidity

Component	Function	SPS assembly	SPS connection	SPS variable	SNMP
B5 – Sensor humidity	Measurement of relative humidity calibration value upper alarm value lower alarm value falling short of or exceeding threshold levels is signaled: Web visualisation display flashing light SNMP trap	1-AI2:Ch 1	47.1.1 47.1.3	hum_1	Value requested Trap in the event of falling short of or exceeding limit values

Smoke sensor

Component	Function	Assembly	Connection	Variable	SNMP
B7 - smoke sensor (alarm = 1)	Signalng amoke, if necessary, doors can be opened and server shut down is signaled: Web visualisation display flashing light SNMP trap	ILC150:I6	8.4.1	ONBOARD_ INPUT_BIT5	Status check Trap in case of status change

Very early fire detection / fire extinction

Component	Function	Assembly	Connection	Variables	SNMP
A30:2 pre-alarm (alarm = 1)	Goes off in case of smoke, from light diffusion of 60% of the main alarm value is signaled: Web visualisation SNMP trap	5-DI4:1	31.1.1	rauch_valm	Status check Trap in case of status change
A30:4 main alarm (alarm = 1)	Goes off when smoke occurs, from 0.5% of light diffusion/m is signaled: Web visualisation SNMP trap	5-DI4:2	32.2.1	rauch_halm	Status check Trap in case of status change
A30:32 disturbance (alarm = 0)	Internal defect of very early fire detection is signaled: Web visualisation SNMP trap	5-DI4:3	31.1.4	rauch_fail	Status check Trap in case of status change
Extinction triggered (message = 1)	When fire extinction is installed, report when extinction has been triggered is signaled: Web visualisation SNMP trap	5-DI4:4	32.2.4	rauch_glt	Status check Trap in case of status change

Heat flowmeter

Component	Function	Assembly	Connection	Variables	SNMP
B11 temperature chilled water feed	Temperature measurement is signaled: Web visualisation display SNMP	2-2RTD:Ch 1	49.1.1 49.1.2	was_klt_in	Value requested Trap in the event of falling short of or exceeding limit values
B12 temperature chilled water return	Temperature measurement is signaled: Web visualisation display SNMP	2-2RTD:Ch 2	50.2.1 50.2.2	was_wrm_in	Value requested Trap in the event of falling short of or exceeding limit values
B26 Flowmeter	Measurement of water flow is signaled: Web visualisation display SNMP	2-AI2:Ch 1	51.1.2 51.1.3	was_flow_in	Value requested

Leistungsmessung

Component	Function	Assembly	Connection	Variables	SNMP
	Measurement of current, voltage, effective power, apparent power, power factor; for mains A and B each	RS485	55.1.2 56.2.2	RS485_I_ ProcessData RS485_Q_ ProcessData	Value requested Trap in the event of falling short of or exceeding limit values