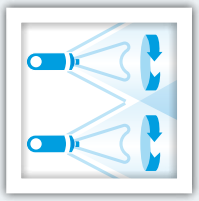
Air is our element
KLINGENBURG
energy recovery our passion

Documentation
Klingenburg Humidifier



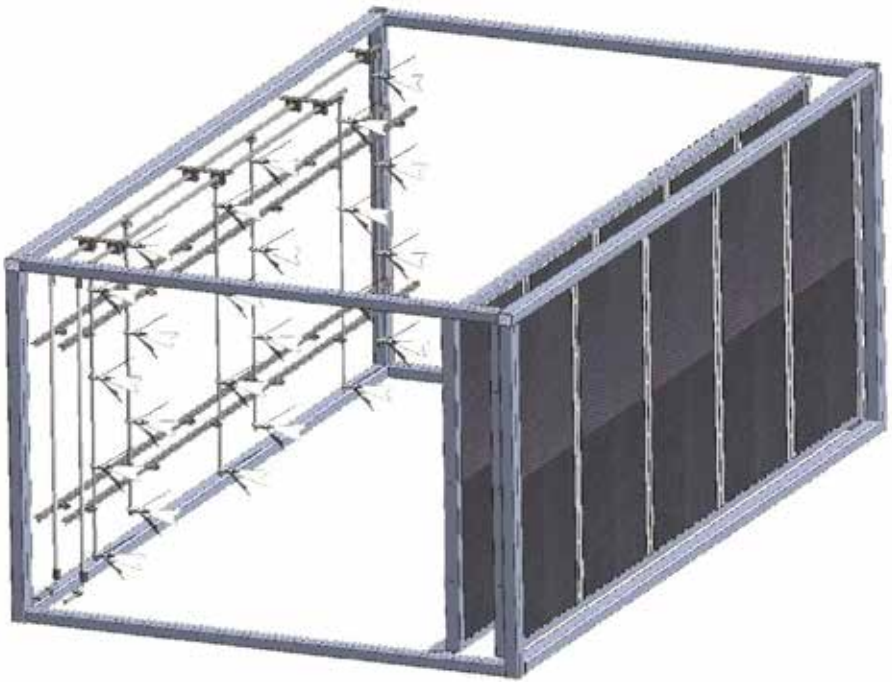
CERTO

Specification and general information

Version with control range extension
and aerosol separator made of
stainless steel mesh
(2 stages)

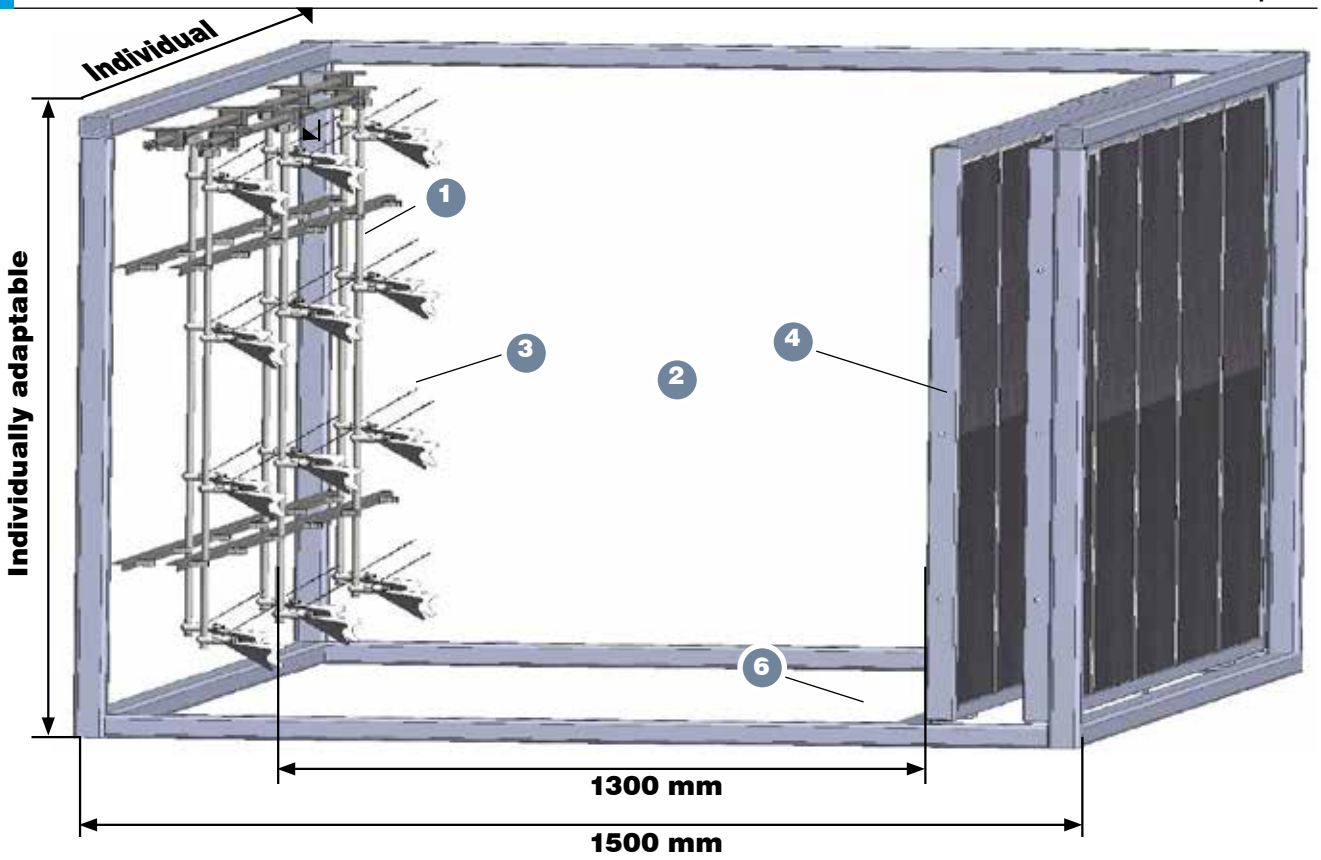
Version 01/21

Index



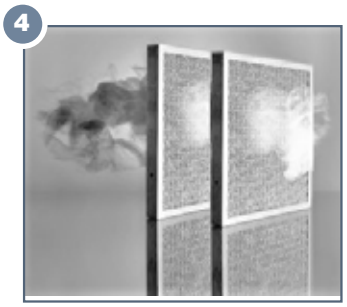
CERTO features

- Unrivalled evaporation output, up to 95% depending on operating mode
- Humidification up to super-saturation level from all operating points
- Minimum pressure loss
- No water recirculation, operates exclusively with fresh water
- Machine made of stainless steel
- Continuously adjustable humidification
- Complete emptying and drying of the drain pan
- Integrated hygienic control to rinse the tubes during shutdown and drying of the humidifier
- Uses the latest frequency converter technology
- Reliable performance figures
- Adaptable to customer dimensions. Available as a complete unit or a modular installation
- Ideal for retrofitting in existing installations
- Easily installable components
- Type examination with regard to conformity to VDI 6022 sheet 1 and 3803 sheet 1
- Hygiene testing by the National Institute of Publiic Health
- Complete compliance with hygienic requirements of ventilation and air-conditioning systems without using chemicals like silver ions, etc
- Optional complete emptying of the tubes is possible by air pressure



Separate connectable nozzle system (optional)

Nozzle with winglet



Aerosol separator made of stainless steel mesh

The CERTO air humidifier functions according to the principle of fine atomisation. The incoming air flow is led through a patented vortex generator and nozzle system **(1)**, generating stable longitudinal vortices. These vortices provide optimal mixing within the reaction chamber **(2)**. In the centre of each vortex, the water is atomised at high pressure over nozzles **(3)**. Working pressure operating range is between a minimum of 20 bar and a maximum of 140 bar. In this way, the air takes up the humidity and is also adiabatically cooled.

The multifunctional 2-stage aerosol separator made of knitted stainless steel**(4)** at the air outlet separates and re-evaporates the water that is not absorbed by the air.

For the complete system version the stainless steel bottom pan includes a double-sided gradient **(6)**. This ensures the complete drainage of the residual water. The use of fully deionised water (permeate from the reverse osmosis) guarantees excellent hygiene and safe operation. The high evaporation capacities permit the use of fresh water without circulating water or water supply in the humidifier

The entire construction takes hygienic requirements for operation in ventilation and air-conditioning systems into consideration, without the use of chemicals.

The humidification capacity is continuously controlled by adjusting the injected quantity of water. The humidifier, pump station and controller are all carefully coordinated.

Controller:

Controller type	CERTO-FU 750	CERTO-FU 1500	CERTO-FU 2200	CERTO-FU 4,0	CERTO-FU 5,5
Output kW	0,75	1,5	2,2	4,0	5,5
External fusing (slow-blow)	16 A	16 A	20 A	20 A	25 A
Supply line	220-240 V 50/60 Hz			380-460 V 50-60 Hz	
Ambient temperature	0-40 °C				
Protection type	IP 54				
Output frequency	0-80 Hz				
Frequency resolution	0,1 Hz				
Control signals	0 - 10 V ; 4 - 20 mA				
Capacity Output relay	250 V AC, 1 A				
Power supply cables	Generally speaking, shielded cables should be used				
Dimensions W / H / D [mm]	265 / 232 /128	355 / 266 /168	400 / 300 / 290	400 / 300 / 290	400 / 500 / 240
Weight [kg]	3,5	8	13	13	16

Pump station:

Minimum input pressure	2 bar				
Maximum input pressure	5 bar				
Maximum output pressure	140 bar				
Dimensions Pump station	W:500 H:650 D:540				
Weight Pump station	65 kg	69 kg	73 kg	76 kg	82 kg
Feed water quality	Deionised water with conductive value 5 - 20 microsiemens / cm / water hardness < 1°dH				

Motorleistung	Anschlusss-pannung	Anschluss-art	Nenn-Stromstärke	regelbar mit Reglertyp
0,55 kW (230/400V)	3 x 230 V	Dreieck	I_{nenn} 3,3 A	CERTO FU 750
0,75 kW (230/400V)	3 x 230 V	Dreieck	I_{nenn} 3,14 A	CERTO FU 750
1,5 kW (230/400V)	3 x 230 V	Dreieck	I_{nenn} 6,3 A	CERTO FU 1500
2,2 kW (230/400V)	3 x 230 V	Dreieck	I_{nenn} 8,52 A	CERTO FU 2200
4,0 kW (400/690V)	3 x 400 V	Dreieck	I_{nenn} 8,1 A	CERTO FU 4,0
5,5 kW (400/690V)	3 x 400 V	Dreieck	I_{nenn} 11,75 A	CERTO FU 5,5

Conformity to standards	VDI 6022, sheets 1, VDI 3803 sheets 1,
Test certificates	Hygiene conformity assessment DMT Essen / TÜV Nord / National Institute of Publiic Health

The CERTO is supplied via a high-pressure pump that functions using a belt-driven electric motor.

It is a robust high-pressure pump with ceramic pistons, a drive housing made of die-cast aluminium, a crankshaft with a ball bearing and an oil sight glass. Water-lubricated pumps can also be used. The pump head is chemically nickel-plated, meaning it can also be used with deionised water. The pump with the drive motor and all safety installations is referred to as a pump assembly.

Function of the Pump station

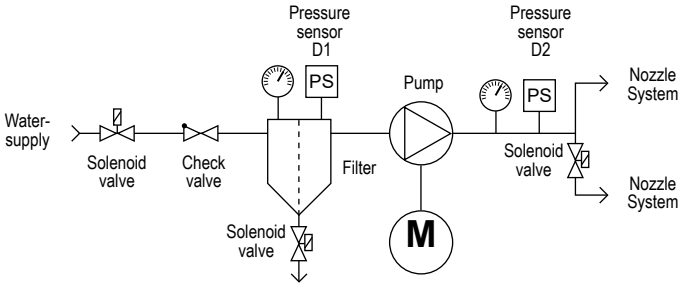
On the low-pressure side the water enters the filter unit with a 100 micron screen of the pump. The filter unit protects the pump and the nozzles against damage and obstruction.

The pump unit is equipped with a solenoid valve and a pressure control device on the low-pressure side. The solenoid valve stops the water supply when the unit is switched off.

The pump can only work properly with sufficient water supply pressure of 2 bar (30 psi) since it is not selfpriming. This water pressure is checked by the pressure control device. In case of a water supply pressure of 2 bars the pressure control device releases the pump for operation. If the water pressure falls below 1.6 bars (24 psi) the drive motor of the pump is switched off. By return off the minimum pressure, the pump is switched on. By operation of more then one humidifier with one reverse osmosis equipment, every pump must have a pressure of more than 2 bar (30 psi).

The water leaves the pump on the pressure side and is sprayed through the nozzles of the humidifier. The water pressure is indicated by a pressure gauge. For the protection of the pump a pressure switch is installed on the pressure side. If the admissible pump pressure is exceeded, the pressure switch device gives a signal to the control unit to reduce the speed of the pump and an error message is given.

Before leaving the factory the pump is operated with the appendant Klingenburg humidifier in order to check it for



Water quality

CERTO humidifiers ar operated with reverse-osmosis deionised water.

The eletrical conductivity for the humidifier water can not exceed the value of 5-20 μS/cm. Max. Hardness degree 1°dH.(german hardness). at 20°C.
PH - Wert: 7 +/- 1.

The particle freedom of the water is up to the operator.

The volume flow from the water treatment plant to your pump station should be greater than the maximum capacity of the humidification system.

To add water to your pumping station, you can choose between a 1/2 “threaded female thread and a supplied 13mm hose connector.

The standard version includes a 3m supply hose (1/2 “DN13) with DVGW approval. Optionally, other hose lengths can be enclosed.

Pump station weighs from 60 to 80 kg and contains:

- High pressure pump
- Drive motor
- Belt drive
- Magnet valve for water supply shutoff
- Pressure sensor on low pressure side
- Pressure sensor on high pressure side
- 2 manometers
- Water filter 100 μm
- Solenoid valve for hygienic cleaning

Other properties:

- Stable sheet steel system frame, with baked enamel, colour RAL 5015
- With attached shock absorbers for interior installation on load-bearing support surface
- The maintenance-friendly design permits easy access to all components
- The speed-controlled pump operation allows continuous adaptation of the water quantity to achieve the required air humidity
- Power transmission by sturdy toothed-belt technology, individually designed for optimal efficiency and broad control range

The CERTO safety package:

- Integrated water filter for the retention of possible impurities in the supply system and for the protection of the high-pressure pump against particulate matter
- Closed inspection cover on drive housing as protection against injuries due to contact with rotating parts
- Check valve and solenoid valve for switching off water intake during standstill
- Manometer on the low-pressure side and the high-pressure side for visual control of the pressures in the system
- Low-pressure switch as dry-running protection for pump, high pressure switch for limiting maximum allowed operational pressure
- The electrical connections are joined in a terminal box and pre-wired. Connection is by modular terminals connected to the same terminals of the control unit.

1. Drive motor
2. Speed-controlled high-pressure pump
3. Electrical distributor terminal box
4. Water filter with low-pressure switch
5. System frame with shock absorbers
6. Solenoid valve / water supply from reverse osmosis unit
   Connection size at the entrance over DN13 or 1/2 inch.
7. High-pressure block with high-pressure safety switch and water supply to CERTO
8. Solenoid valve for integrated hygienic control
   Connection size at the entrance over DN13 or 1/2 inch.
9. Drip-protection pan
10. High-pressure solenoid valve for load control

Control unit

- Controller built into control cabinet
- Suitable for seamless humidity adjustment (humidity control)
- Externally accessible and readable control panel / display
- Connection diagram enclosed for on-site connection wiring

- Operating instructions, including following details among others:
  - Controller functions
  - Installation position of the humidity sensor
  - Connection diagram

Type	Height H (mm)	Width W (mm)	Depth D (mm)
0,75 kW	265	232	128
1,5 kW	355	266	168
2,2 kW	400	300	290
4,0 kW	400	300	290
5,5 kW	500	400	240

Properties of the frequency converter:

- Microprocessor-controlled frequency converter
- Protection type IP 54
- Integrated mains filter to effectively suppress interference voltages and cooling elements outside the housing
- Additional control boards with all monitoring functions, signal relays and inputs for processing standard controller signals from MSR
- Easy control via 5-button, 2-line colour LCD plain text display and menu-driven parameterisation, with a range of languages available
- Display of set points and actual values and fault messages
- Integrated operating hours counter and service message to ensure maintenance intervals are observed
- Integrated hygiene control for rinsing piping when humidifier is switched off and has dried out
- Complete water evacuation from piping by the use of compressed air available as option
- Software updates allow retrofitting of subsequent functional enhancements

Inputs:

- Enabling - potential-free contact
- Control signal inputs, selectable 0-10 V, or 0/4-20 mA
- Humidity signal for internal humidity control via sensing element

Outputs: (max. 1A 250V~ AC1)

- Operation - potential-free contact
- Faults - potential-free contact
- Maintenance - potential-free contact
- Water processing - potential-free contact
- Dry-running - potential-free contact

Options:

- Menu language can be switched among German, English, French and Dutch
- Expanded control range for part-load operation under 20%

Add-on option:

Optionen der Reglermontage:

- Up to a control power of 1.5KW it is possible to integrate the control unit into the pump station. The integration of the control unit directly in the pump station reduces the installation effort. If you have any questions about this option, please contact us.

Attention !

The entire Klingenburg humidifier should be protected from frost!

Improper use

Any other use that does not conform to the intended use described above is not permitted.
Such use and changes to hardware and software will result in the loss of any warranty claims.

Installation

The device or duct connection is via a surrounding 60 or 80 mm wide flange made of aluminium. Prior to installation, the components should be checked for significant deficiencies (e.g. transport damage) and completeness, and, where applicable, consultation with Klingenburg GmbH concerning how best to proceed is advised. If multiple humidifiers are delivered together, the data of the type plates should be compared, to avoid mixing up assembly units.

The humidifier must be installed on a level, horizontal surface with the appropriate load-bearing capacity. With a suspended assembly, only permissible fixing materials may be used. The device must be oriented horizontally on all sides.

The water drainage outlet of the CERTO must be connected with a suitable siphon ensuring compliance with applicable regulations.

Caution

Subsequently, the water drainage must be checked by filling the inside of the humidifier with water. Once the unit has been successfully connected to the air duct network or device housing, no further correction is possible in the event of any deviation from the horizontal position!

A uniform air flow should be supplied. The fitting of rectifiers is only seldom required.

The water supply between the high-pressure side of the pump and the nozzle holder/distributor of the Klingenburg humidifier is connected via the 3 m long high-pressure hose supplied.

Attention !

Only qualified and authorized personnel are allowed to work with the humidifier system.
Persons transporting or working on and with the system must have read and understood the relevant parts of the operating instructions and in particular the chapter “Safety instructions”.
In addition, the operator must be informed by the operator about possible dangers.

Pump

The maximum input pressure of the pump assembly must not exceed 5 bar. Operating at any higher a pressure will damage the pump.

Prior to installation, the oil level should be checked and adjusted as required.

The individual steps are described in detail in the installation section.

Caution

The pump assembly may only be used with the corresponding humidifier. The pump must be operated with the corresponding controller. Non-compliance will invalidate any guarantee claims.

Connecting cables

The control unit must be wired according to the on-site circuit diagram.

Motor and sensor cables must be laid separately and shielded.

The pump assembly is equipped with pressure controllers (D1-D2) on both the low and high-pressure sides. These must always be connected to the respective controller connections.

The water supply between the on-site water pipe and the pump station input is connected via the 3 m long 1/2” low-pressure hose supplied. Other hose lengths of up to 10m are also available.

The on-site water supply pipe to the pump must be connected to the device in either rising or falling fashion. Any forms of connection allowing air pockets to form must always be avoided. The connection hoses must be properly sealed.

Observance of the assembly instructions

For the installation of the droplet separator and the nozzle system, please observe the installation instructions provided by Klingenburg and enclosed with the delivery of your humidifier.

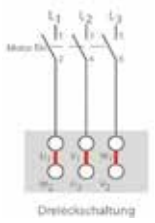
Motor connection

To eliminate the risk of interference via the motor supply cable, a shielded cable must be used for this.

A thermostatic contact must also be connected to protect the motor against excessive overheating at low speeds. If no thermostatic contact is connected, the motor guarantee will be invalidated.

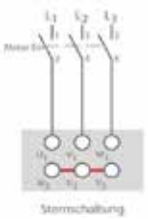
Klingenburg frequency converters FC-KB 0.55 to 2.2 operate with an output voltage of 3 x 230 V. For this purpose, the motor in the pump station must be delta-connected.

Delta-connection



Klingenburg frequency converters FC-KB 4.0 and 5.5 operate with an output voltage of 3 x 400 V. For this purpose, the motor in the pump station must be delta-connected (Motor 400/690 Volt).

Star-connection



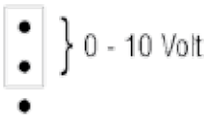
Control signal connection

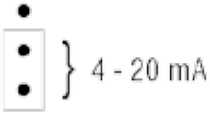
The CERTO FU allows the processing of the following control signals

0 - 10 V
4 - 20 mA

The control signals should be connected to terminals 8 and 9. Terminal 9 is reference potential (mass).

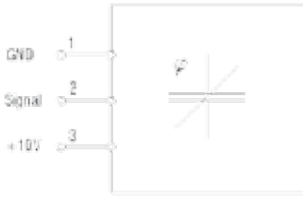
Jumper setting





Humidity sensor connection

The CERTO controller lets you connect a special humidity sensor (available as an accessory) directly to the device. It is able to ensure the constancy of an adjustable humidity value via the programming.



Connection to controller

The humidity sensor is connected to the control unit as follows:

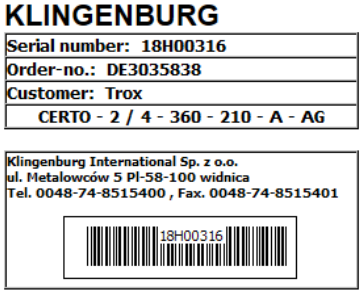
Terminal sensor	Terminal control unit
3 (+10 V input)	7 (+10 V output)
2 (signal output)	8 (0-10 V input)
1 (earth)	9 (earth)

Components

- Klingenburg - Humidifier
- Pump assembly
- Controller

are factory-coordinated to work together.
Accordingly, the individual components should not be exchanged for other parts! In this case, please always consult with our head office.
Should you have any enquiries concerning the device or its components, please always quote the type and number of the device.

Example type plate



Installation steps 1

Mechanical section

1. The inventory audit allows any missing system components required for commissioning to be determined early. If significant deficiencies on CERTO are detected prior to commissioning (e.g. transport damage), the commissioning should be ceased pending further action or repair. Regardless of circumstances, consult with Klingenburg GmbH on how best to proceed.

2. Checking of the piping between the pump station and humidifier. Here, care should be taken to ensure stress-free laying (no twists, kinks and air pockets). In addition, the high-pressure hose should be installed in a way that eliminates friction. (Risk of fraying during pump operation). The connection fittings on the humidifier or the pump station should be checked. The check should be performed using two wrenches for counterholding. The internal screw connections of the pump station are factory-tightened and sealed. Any subsequent adjustment will inevitably result in leakages.

3. General visual inspection of the hose connections within the pump station.

4. Checking the oil level of the pump via the dipstick at the bleeder screw or via the sight glass. Where applicable, the gear oil ISO VG 220 GL4 (e.g. Aral Degol BG220) should be refilled.

5. Checking the proper connection of the water drain: The drip molding via siphon has to be designed as a free drain und must not be connected to the wastewater network. The water trap in the siphon should be filled before switching on the fans, otherwise the water may stop flowing due to a vacuum in the device, which can cause damage.

Installation steps 2

Electro-mechanical section

6. Check the inter-wiring of the Klingenburg components and compare the same with the terminal connection plan. If any deviation is detected, the terminal connection plan takes priority. In the event of any doubt, consult Klingenburg GmbH to prevent the risk of serious damage. Incorrect connection could damage the controller, or the inputs and outputs on the construction side.

7. The jumper is to be connected according to the control signal.

8. The power and water supply can now be enabled and the system is ready for commissioning.

9. Starting up the system manually to check the basic functions between the Klingenburg humidifier and the pump station. Rotational direction check of the drive motor. The rotation direction arrow is situated on the motor's fan cover.

10. Checking of the technical specifications to be observed. The system is operated in manual operation up to the frequency limit specified on the pump data sheet, and the actual and set point pressures are compared. A deviation of +/- 10 % is permissible.

11. To check the low-pressure diaphragm pressure switch (D1) on the feed water supply, the intake pressure (flow pressure) should be reduced under 1.6 bar at the pump station input by slowly closing the shut-off valve for the water supply. The control must switch off the motor and after 25 seconds a fault message is triggered. If the pressure is allowed to return to around 2 bar, the control switches the motor back on once the fault signal has been acknowledged. If the pressure drops under 1.6 bar for less than 25 seconds, the system automatically resumes operation.

12. The control signal can now be transmitted to terminals 8 and 9.

13. Programming the controller and adjusting for external operation, see in the control section.

Attention !

The Klingenburg air humidification system may only be operated by Klingenburg or an authorized service partner.

An overview sketch can be found on page 46.

Hygienic requirements of ventilation and air-conditioning systems according to VDI 6022 and VDI 3803 Part 1

General points

The requirements of the above-mentioned regulations describe a minimum hygiene standard for ventilation and air conditioning systems. The guideline formulates requirements that must be met during the planning, execution, operation and maintenance of air handling systems in order to ensure hygienic operation.

VDI guidelines are part of the technical regulations and describe the state of the art. In the event of a dispute, these rules are used as a benchmark for compliance with the state of the art.

DIN 6022 applies to all air handling systems and units and their central and decentralized components that influence the supply air quality in occupied rooms in buildings.

In developing the Klingenburg humidifier, Klingenburg paid particular attention to ensuring that the design was flawless from a hygienic point of view, and had this tested and confirmed by a type examination carried out by the DMT Test Center for Air Hygiene, Essen.

However, in addition to the humidifier design, the fundamental prerequisite for hygienically flawless operation is the fulfillment of all requirements of VDI 6022 and VDI 3803 Part 1 with regard to the design, operation and maintenance of the entire air handling system in which a humidifier is integrated.

Design of the system

All requirements of VDI 6022 and VDI 3803 Part 1 regarding the design of the overall system (sequence of components, filter classes, etc.) must be taken into account.
The air velocity must not exceed 3.5 m/s.

Controller System

The Klingenburg control unit enables periodic flushing of the nozzle blocks and the water-carrying lines when the humidifier is not in operation for a longer period of time. See the Control section. In addition, the control of the system must be designed to meet the requirements of VDI 6022.

Water supply

The feed water must at least meet the microbiological requirements of the Drinking Water Ordinance and the requirements of VDI 3803 (Tables A1 and A3). Only water from reverse osmosis (permeate) between. 5 - 20 μS/cm and a water hardness <1°dH is to be used. The water-carrying pipes are to be made of corrosion-resistant materials, such as plastic or stainless steel. The operator is responsible for ensuring that the water is free of particles. If the humidifier is shut down for more than one day, the water treatment buffer tank must be emptied. The humidifier tank is designed with a slope on all sides to the drain point. The slope in the air direction is at least 50 mm/m, against the air direction 250 mm/m and laterally 10 mm/m. The wastewater drain is to be equipped with a suitable siphon and an open outlet. Biocides (e.g. hydrogen peroxide) for the disinfection of supply water may only be used if it can be ensured that no residues of these substances can enter the supply air. The supply water should be tested regularly (e.g. every 6 months). If the humidifier is disinfected with biocides or similar substances, the absence of residues must be ensured before commissioning.

Inspection

Before commissioning the entire air handling unit, an initial hygiene inspection must be carried out in accordance with VDI 6022.

Maintenance / operation

See also the section Operation / Maintenance. To ensure continuous hygienic operation over the entire humidification period, the measures prescribed in VDI 6022 must also be observed.

In particular, we refer to the checklist described in VDI 6022.(Table 8)

Failure to observe the above points will invalidate the humidifier's conformity with VDI 6022 and VDI 3803 Part 1.

ZERTIFIKAT

Genehmigung zur Nutzung des Prüfzeichens

FREIWILLIGE PRODUKTPRÜFUNG
NACH VDI 6022-1:2018

– Geprüfte Hygieneeigenschaften –

TÜV NORD Systems GmbH & Co. KG, Hamburg (Deutschland),

bestätigt, dass das Luftbefeuchtungssystem

„CERTO“

die von VDI 6022-1 und VDI 3803-1 gestellten Hygieneanforderungen erfüllt.

Klingenburg International Sp. z o.o., Świdnica (Polen)

wird daher das Recht verliehen, das nachstehend abgedruckte Prüfzeichen
in Zusammenhang mit dem o. g. Produkt zu führen.

TÜV NORD Systems GmbH & Co. KG
Prüfstelle für Kälte-, Klima- und Lüftungstechnik

Digitally signed by Steimle Monika
Date: 2022.04.12 15:34:27 +02'00'

Dipl.-Ing. Monika Steimle

Essen, 12. April 2022

Die Zertifizierung basiert auf einer Baumusterprüfung der Luftbefeuchtungssysteme und nicht auf einer ausgeführten Anlage.
Die Gültigkeit des Zertifikats beträgt 15 Monate.
Die Prüfzeichennutzung ist in dem zugehörigen Vertrag geregelt.

DMT GmbH & Co. KG · Tremoniastraße 13 · 44137 Dortmund

TÜV NORD Systems GmbH & Co. KG
Frau Vera Gräff
Am TÜV 1
45307 Essen

DMT GmbH & Co. KG
Anlagen- & Produktsicherheit
Technische Gebäudesicherheit

Tremoniastraße 13
44137 Dortmund, Deutschland

Kontakt:
Daniel Michalek
Telefon 0231 5333 217
E-Mail daniel.michalek@dmt-group.com

Baumusterprüfung der Konformität mit der Richtlinie VDI 6022 Blatt 1 (Ergänzungsprüfung)

Prüfzeugnis 2022 – 8119426854

Prüfzeugnis:	2022 – 8119426854
Standort / Prüfgegenstand:	Hochdruckluftbefeuchtungssystem „CERTO“ Klingenburg International Sp.z o.o. Niederlassung Deutschland Gahlener Str. 250 46282 Dorsten
Prüfung vor Ort:	16.02.2022
Dokumentenprüfung:	bis einschließlich 25.02.2022
Ausstelldatum:	25.02.2022
Prüfer:	Daniel Michalek

PRÜFSTELLE FÜR KÄLTE-, KLIMA- UND LÜFTUNGSTECHNIK

TÜV NORD Systems GmbH & Co. KG
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TÜV®

Gesch.-Nr.: KKL/1005/20
Auftrags-Nr.: 81 19 33 75 82

Essen, 5. April 2022
DoKl/GrV

Bericht Nr.: TR-KKL-2022-013

Ergänzungsprüfung an einem Luftbefeuchtungssystem in Hygieneausführung nach VDI 6022-1

Auftraggeber	**Klingenburg International Sp. z o.o.** ul. Metalowców 5 58-100 ŚWIDNICA, POLEN
Prüfobjekt	**Luftbefeuchtungssystem „CERTO“ mit einem zweistufigen Aerosolabscheider aus Edelstahlstrick**
Auftragsdatum	21.06.2021
Prüfziel	Ergänzungsprüfung zur Bestätigung der Eignung von einem Aerosolabscheider in einem Luftbefeuchtungssystem für den Einsatz in raumlufttechnischen Anlagen mit erhöhten Hygieneanforderungen
Prüfgrundlagen	VDI 6022-1:2018-01 VDI 3803-1:2020
Prüfzeitraum	
• Grundprüfung	Juli 2019 bis Januar 2021
• Ergänzungsprüfung	Juni 2021 bis Februar 2022

Dieser Bericht umfasst 2 Seiten und 8 Seiten Anhang.

Die Prüfergebnisse beziehen sich ausschließlich auf die Prüfobjekte.
Die Veröffentlichung von Auszügen aus diesem Bericht ist nicht ohne schriftliche Genehmigung von TÜV NORD Systems GmbH & Co. KG gestattet.

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NARODOWY INSTYTUT ZDROWIA PUBLICZNEGO - Państwowy Zakład Higieny
NATIONAL INSTITUTE OF PUBLIC HEALTH - National Institute of Hygiene

ZAKŁAD BEZPIECZEŃSTWA ZDROWOTNEGO ŚRODOWISKA
DEPARTMENT OF ENVIRONMENTAL HEALTH AND SAFETY

ATEST HIGIENICZNY

BK/K/0058/01/2019
ORYGINAŁ

HYGIENIC CERTIFICATE

NATIONAL INSTITUTE OF PUBLIC HEALTH – NATIONAL INSTITUTE OF HYGIENE

Wyrób / product: **Nawilżacz powietrza CERTO**

Zawierający / containing: stal nierdzewna, aluminium, poliamid i inne składniki wg dokumentacji producenta

Przeznaczony do / destined: stosowania w systemach wentylacji przemysłowej i publicznej

Wymieniony wyżej produkt odpowiada wymaganiom higienicznym przy spełnieniu następujących warunków / the above-named product is acceptable according to hygienic criteria with the following conditions:

- Zastosowanie wyrobów musi być zgodne z przepisami dotyczącymi obiektu, w którym są one montowane
- Zastosowanie w obiektach podmiotów wykonujących działalność leczniczą z wyłączeniem pomieszczeń o podwyższonych wymaganiach higienicznych
- Montaż i eksploatacja zgodnie z zaleceniami producenta

Atest higieniczny nie dot. parametrów technicznych, walorów użytkowych i oceny właściwości alergizujących wyrobu / Hygienic certificate does not apply to technical parameters, utility value and allergenic properties of the product

Wytwórca / producer:

Klingenburg International sp. z o. o

58-100 Świdnica, ul. Metalowców 5

Niniejszy dokument wydano na wniosek / this certificate issued for:

Klingenburg International sp. z o. o

58-100 Świdnica, ul. Metalowców 5

Atest może być zmieniony lub unieważniony po przedstawieniu stosownych dowodów przez którąkolwiek stronę. Niniejszy atest traci ważność po 2024-06-04 lub w przypadku zmian w recepturze albo w technologii wytwarzania wyrobu.

The certificate may be corrected or cancelled after appropriate motivation. The certificate loses its validity after 2024-06-04 or in the case of changes in composition or in technology of production.

Data wydania atestu higienicznego: 4 czerwca 2019

The date of issue of the certificate: 4th June 2019

Kierownik
Zakładu Bezpieczeństwa Zdrowotnego Środowiska

dr hab. Jolanta Solecka, prof. NIZP-PZH

Attention !

To ensure trouble-free operation of the Klingenburg humidifier, the ventilation system should meet the following requirements:

- There must be a homogeneous flow profile in air temperature and velocity on the upstream and downstream sides. This applies in particular if the fan is located directly on the air inlet side of the humidifier. We recommend providing a stilling distance of approx. 1.0m.

- An empty section of at least 700 mm in length should be provided before and after the humidifier for accessibility and maintenance. Please observe VDI 6022 and VDI 3803 Part 1 for this.
  When designing the humidification chamber, the requirements of the VDI 6022 must be taken into account.

- Fan arrangement / part-load operation in connection with demand-based control / circulatory air operation:
  => When demand-based control of the volume flow or circulatory air operation applies, a control-range extension of the humidifier must be included. During the expansion process, some of the nozzles in operation will be shut off by a magnetic valve depending on the motor frequency.

- Filter layout before / after humidifier according to DIN EN 13053 and VDI 6022

- During the operation of the humidifier, the design data to the order underlying must be observed!

- Wear parts should be replaced regularly and are not subject to the warranty.
  A list of spare / wear parts can be found on page 21.

- The room temperature during operation of the pump station and the controller should be between 5 and 35°C.

- The CERTO humidifier is not frost-proof and not suitable for outdoor installation.

- Air speed should be between 0.5 - 3.5 m/s within the humidifier cross-section.

- Operation of the humidifier exclusively with deionized water (permeate) from the reverse osmosis system. between electrical conductivity 5 - 20µS/cm.; degree of hardness <1° dH at 20°C, PH - value: 7 +/- 1

- The particle freedom of the water is up to the operator.

- To guarantee operational reliability of the humidifier, air quality must be ensured according to the current standards, particularly when operating with circulating air

- When operating the humidifier only with a preheater, a humidity limiter should be fitted downstream of the humidifier.

- In the event of the ventilation system malfunctioning, to protect downstream components against moisture damage, we recommend using materials resistant to deionised water, such as seawater-resistant aluminium or stainless steel. Galvanised materials should include a powder coating. In addition, a drain pan should be included.

- The operator must ensure that the pump station and hose lines are monitored for leaks or hose ruptures.

Cleaning and disinfection

General points:
Despite the high level of water purity (permeate), humidity chambers, in which the humidity is adjusted via high-pressure humidifiers, must be regularly cleaned and disinfected.

VDI 6022 stipulates that hygiene inspections must be performed at regular intervals. In HVAC systems including humidifiers, the systems must be checked every two years by specially trained personnel and the minimum requirements specified (e.g. VDI 6022 must be met.

Frequency:
Depending on the level of soiling, generally 2-3 times per period of operation, see also VDI 6022, but a minimum of every 6 months. Since the level of air pollution may vary, the operator is responsible in this case for ensuring that the recommended maintenance intervals suffice. In accordance with DIN 6022 the hygienist must determine how often maintenance intervals should be performed.

Note:
When using separate cleaning agents and disinfectants, care should be taken to ensure that the use of the cleaning agent does not compromise the disinfectant in any way.

Relevant components:
- Droplet separator
- Nozzle holders incl. nozzles
- Drip tray, side walls in the rear area of the device
- Drainage

Cleaning agent:
Before using cleaning agents, ensure that the safety data sheets and the notes of the respective manufacturers have been read and observed.

For limescale deposits:
Cleaning agent that can reliably remove all limescale deposits must be used.

or:
Vinegar-based cleaner

For easily water-soluble deposits:
Warm water (40 - 60°). You may use a high-pressure cleaner. Do not aim the water jet directly at the seals and lighting!

Desinfection:
After the preliminary cleaning, a suitable surface disinfectant must be used. We recommend the use of Incidin Extra N by ECOLAB for example. For the intended use of this product please pay attention to the manufacturer´s instructions.

Protection regulation:
- Safety glasses
- Rubber gloves
- Half mask (respiratory protection) with minimum E-filter and protection level P3
- Sturdy shoes

Important notes:
- Shoes or boots which come into contact with the humidifier chamber must be clean and disinfected!
- After an extended period of operation, deposits in the device are likely. The type of minerals and quantity of deposits depends on the water quality and, where applicable, on the air quality (dust content etc.). In most cases, these deposits tend to consist of lime ($CaCO^3$) and plaster (CaSO4). Operating the CERTO with permeate produced via reverse-osmosis ensures that no impurities will be introduced via the water. Due to possible airborne impurities, e.g. during circulatory air operation in production facilities, insufficient air filtration may lead to these contaminants being deposited in the humidifier.
- The seal of the access panel must be carefully checked for any damage, and immediately replaced if any damage is detected.

Interim cleaning during humidification periods
Interim cleaning involves either all or part of the following sets of maintenance work.

Final cleaning, preparation for humidification downtime
During final cleaning, all the following maintenance instructions should be taken into consideration.

Humidifier interior (except post-evaporator)

When using cleaning agents, the technical usage instructions supplied by the manufacturer should be the first point of reference (see annex). The water used for rinsing should be of at least drinkable quality.

- Cover the air inlets and outlets of the device where possible (it is important to minimise the amount of spray cleaner that infiltrates the nearby ducts).
- Apply the cleaning agent using a paintbrush, brush or spray gun (Care should be taken to ensure that the cleaning chemicals do not come into contact with the door seals).
- Please observe the exposure time specified by the manufacturer
- Repeat the process until the deposits have been removed satisfactorily.
- Ensure sufficient neutralisation and rinsing with fresh water to remove any traces of cleaner and rinse all corners with a water jet.
- Additional rinsing of the drain troughs.
- Ensure sufficient ventilation for the air-conditioning control unit!

Caution!

Residual cleaning agents or disinfectants may cause an unpleasant odour if they are not sufficiently rinsed away. It is important to ensure that following the maintenance operations, all traces of the cleaning agents are eliminated from the humidifier.

Cleaning of the droplet separator ((Aerosol separator made of stainless steel mesh)

The droplet separator of the high-pressure humidifier also functions as a post-evaporator. It serves to bind excess water and release it back into the air by evaporation. The droplet separator is made of 1.4305 stainless steel.

Due to the use of osmosis water, residues on the droplet separator are only possible due to an unclean air intake. If contamination occurs, cleaning by means of a water jet up to max. 20 bar is permissible. Handling must be carried out with appropriate sensitivity. However, the use of a soft water jet from the mains is recommended. Cleaning must not be carried out mechanically with scraping, grinding or abrasive tools and aids. Cleaning agents with a pH value of 4-7 should be used to loosen dirt. Cleaning can also be carried out by using hot water in combination with a suitable cleaning agent.

With regular maintenance, the separators are not subject to wear and tear and therefore do not need to be replaced regularly.

Maintenance and Operation

Maintenance and operation

General points:

Generally speaking, VDI 6022 should be observed for the maintenance and operation of the humidifier. This particularly includes compliance with the time cycles specified in the annex to VDI 6022 for checking (e.g. for impurities and faults) and maintenance measures. Depending on the respective local conditions (e.g. circulatory air operation), it may also be necessary to expand the scope of these measures.

Components

- Klingenburg Humifier
- Pump station
- Controller

Attention !

Spare parts and consumables

The components listed here are considered wear parts and are not covered by the manufacturer‘s warranty.

- HP pump (NP 10/01-160; NP 10/02-160; 10/04-140; NP 10/10-140; NP 10/13-140; NP 10/15-140; NP 16/21-140)
- Valve set for HP pump
- Seal set for HP pump
- Toothed belt
- High-pressure switch (135/150 bar)
- Low-pressure switch (1,6/2 bar)
- Magnetic valve NP / HP
- Low-pressure manometer
- High-pressure manometer
- Seal set nozzle holder
- Seal for high-pressure nozzle
- High-pressure nozzle
- Nozzle screen
- Filter unit (made by Brauckmann F 76 (S) 100 µm)

a detailed list of spare parts can be found on page 48.

Safety instructions and warnings

Before installing and setting up the frequency converter, please read the product manual carefully and observe all warning and safety instructions. Ensure this product manual is always easily accessible in the vicinity of the frequency converter.

Definition of safety notes:

Warning!

Non-compliance with this safety note may result in death, serious bodily injury or considerable damage to property.

Caution

Non-compliance with this safety note may result in minor physical injury or damage to property.

Before commencing maintenance operations, the system must be switched off!

Maintenance of pump station

Pump

The oil should be changed after the first 200 operating hours and subsequently after every further 2500 operating hours. When it is time time for an oil change, a service message is shown. The oil change must also be performed at the prescribed intervals, regardless of other regular maintenance, and no later than every 6 months.
When operating the unit in humid areas, or when it is exposed to considerable fluctuations in temperature, condensed water may form in the crankcase. Defective seals may also result in water infiltrating the unit.
The fill level and water content of the pump oil should be checked via the sight glass and when the pump is switched off, 2x monthly or a minimum of once a month.
The sight glass must be half-covered at all times and the oil must always have a clear appearance.
In the event of clouding or foaming, immediately change the oil, otherwise the pump may be damaged.

Oil fill volumes for high pressure pumps:

NP 10/01-160	0,22 litre
NP 10/02-140	0,22 litre
NP 10/04-140	0,24 litre
NP 10/07-140	0,24 litre
NP 10/10-140	0,24 litre
NP 10/13-140	0,24 litre
NP 10/15-140	0,24 litre
NP 16/21-140	0,48 litre

Oil quality:

Gear oil ISO VG 220 GL4 (e.g. Aral Degol Bg220)
or KFZ-gear oil SAE 90 GL4

Caution!

Used oil is hazardous waste and must be disposed of in an environmentally friendly manner according to the local waste regulations.

Note for enhanced operational reliability, e.g. for production plants

To further enhance the operational reliability of the CERTO, we recommend replacing the following wear components as a precautionary measure as part of maintenance operations. The actual attainable service life of these parts is considerably higher than the specified values.

We recommend replacing water pump seals every 4000 operating hours. The assembly instructions for the repair kit should be observed.

We recommend replacing the valves of the pump every 4000 operating hours. The assembly instructions of the repair kit should be observed.

Attention !

After a downtime of more than three months, a maintenance with cleaning of the spray system, and an oil and O-ring change on the high-pressure pump is advisable.

In general, the pump should be switched off after a longer standstill, a time of 5 - 10 min. flushed with water before the Regelbetreib is turned on.Hier this favors the swelling of the seals and reduces the leakage.

Attention !

Generally, every plunger pump has an operational leak. This can be up to 150ml per day.

Filter

Generally speaking, the filters should be rinsed during each maintenance operation. The supply lines to the pump station including filter can be rinsed via the magnetic valves underneath the filter casing. The rinsing interval and duration of the rinsing process can be adjusted via the controller. Where applicable, the filter cartridge should be cleaned or replaced once it has been removed.

Hoses

The connection hoses on the high- and low-pressure sides should be checked to ensure they remain in good working order. If any cracks or damage are noticed on the high-pressure hoses, they must be replaced. Defective hoses should be clearly labelled or taken out of service.

The hose connections must be checked to ensure firm mounting and watertightness and tightened if required. During a final cleaning procedure, e.g. preparation for humidification downtime, all water-filled parts should be emptied and dried out.

High pressure hose

Every high-pressure hose line is subject to DIN 20666 Irrespective of the hose marking, at least the following information must be permanently marked:

- Name or plate of the manufacturer
- maximum operating pressure
- year
- production month

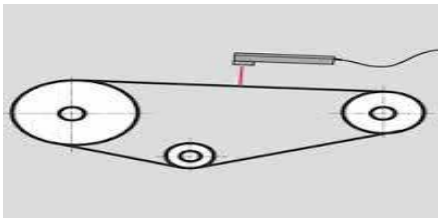
Replacement of hydraulic hose assemblies.

In principle, all high-pressure hose lines are subject to natural aging during expert storage and permissible stress during use, which alters the material and composite properties and reduces the efficiency of the hose line.
The service life of a hose is limited and the operator must ensure that hose lines are replaced at appropriate intervals.

The maximum service life as well as the maximum use of a high-pressure hose can be found in DIN 20066.

Drive belts

Checking of the drive unit, particularly the tension of the drive belt between motor and pump. The control must be set and checked by a suitable preload meter.
A twisting can lead to cracks in the gas-fiber core of the belt. The leads to the final tearing of the belt.



Distributors, nozzle heads, nozzles

If the maximum frequency according to the data sheet varies from the design pressure by more than +/ - 20%, the nozzles must be cleaned or replaced. We also recommend visual inspection of the spray cone for uniform atomisation.

Instructions for cleaning the nozzles

- Unscrewing nozzles
- Place component parts in cleaning agent / disinfectant
- Rinsing with water
- Rinsing of the HP hose, distributor and nozzle holders with the above cleaning agent followed by fresh water
- Purging with compressed air
- Screwing nozzles into the nozzle holder / replacing sealing rings

The service life of a nozzle depends on the process conditions under which it is used. For example, pressure, temperature and the liquid flowing through the nozzle have a decisive influence on the service life. A nozzle is therefore a wearing part
whose service life depends on many influencing factors.

Maintenance of CERTO-FU controller
The controller is maintenance-free. The settings should be compared with the data sheets. It is important to ensure unhindered heat dissipation. Impurities may be removed with a slightly moistened cloth. Do not use cleaning agents containing solvents.

Caution!

A built-in restart mode incorporated in the software means that in the event of over- or under-voltage and overcurrent, the controller does not immediately trigger a fault but attempts to reset itself for around 10 minutes. If the reset process can be performed within this 10-minute period, the controller resumes normal operation. However, if the FC-KB is unable to reset itself due to a longer-lasting fault, a fault signal is indicated on the fault signal output after 10 minutes and the fault message appears on the controller display.

Warning!

This function triggers an automatic restart of the frequency converter and thus of the drive unit in the event of a fault after the configured waiting time has elapsed – provided a start instruction has been given. Care should be taken to ensure that no persons are endangered in the event of a restart.

Warning!

This frequency converter creates dangerous electrical voltage and controls dangerous rotating parts. Failure to comply with the information in this manual could cause death, severe bodily injury or significant physical damage.

The installation, initial operation and maintenance of this drive may only be performed by expert staff that are well versed in the functionality and equipment as well as the machine.
The installation, initial operation and maintenance of this drive may only be performed by expert staff that are well versed in the functionality and equipment as well as the machine.

The device contains intermediate circuit capacitors that also carry out switchover of dangerously high voltages on the grid side. After switching off the voltage, wait at least 15 minutes before opening the device and working on it. Please be sure that no live parts are touched.

The ground fault safety serves only as protection for the frequency converter and not as personal protection. In accordance with VDE 0160 (German abbreviation for the Association for Electrical, Electronic &Information Technologies), the three-phase frequency converter must not be operated on a leakage current circuit breaker, because a possible direct current component will reduce the sensitivity of the leakage current circuit breaker in the event of a fault.
For safety precautions consider of all regulations of VDE 0160

Warning!

Ground the frequency converter to the connection provided for it.

Warning!

To avoid injury and damage, do not touch any parts within the housing – not with hands or any kind of object – when mains voltage is present or the intermediate circuit capacitor is not loaded. Do not work on wiring or test signals when mains voltage is present.

Pay special attention when the automatic restart is activated. To avoid injury from possible uncontrolled restart of the frequency converter after a power outage, install a switch element on the grid side that de-energises in a power outage and can only be turned on after return of voltage by manual confirmation (e.g., contactor, etc.).

Warning!

Ensure that the input voltage corresponds with the voltage listed on the label. Environmental influences such as high temperature and high humidity are to be avoided as well as dust, dirt and aggressive gases.
The install location should be a well-ventilated location away from direct sunlight. Install the device on a non-flammable, vertical wall that does not transmit vibrations. Do not connect mains voltage to the output terminals U/T1, V/T2, W/T3.
Please contact the motor or machine manufacturer if standard motors with a frequency of > 60 Hz will be operated.
All frequency converters are tested for dielectric strength and insulation resistance measurements. Insulation resistance measurements, for example, in the course of inspection, must not be conducted between the power terminals and earth. Do not carry out insulation resistance measurements on the control terminals.
During operation it must be ensured that the mains voltage is constantly on. Control commands and operating signals (such as start/stop) must only be implemented via the control terminals or the control panel and not by switching the mains supply or a motor contactor.
Do not install capacitors or overvoltage arrestors in the motor lead.

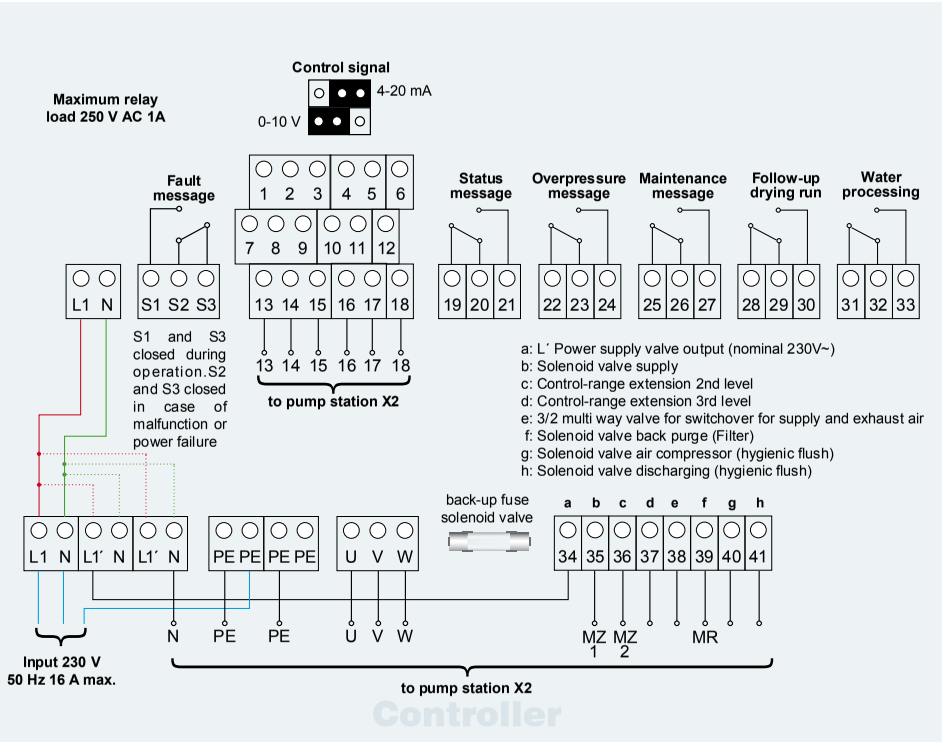
Caution!

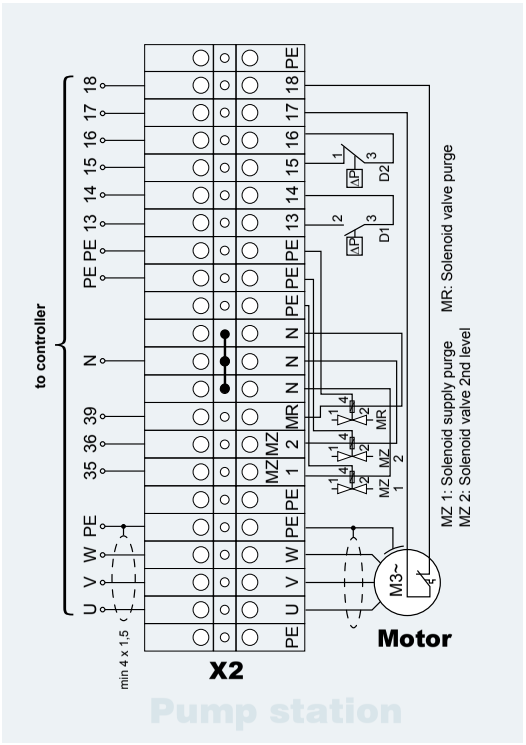
In order to guarantee that your Klingenburg frequency converter operates securely and reliably, all respective safety regulations, such as accident prevention regulations, VDE regulations, etc,. must be observed.

As these regulations could contain different details within the German speaking areas, the user must observe the requirements that are valid for their area.

Klingenburg GmbH cannot exonerate the user from the obligation to follow the most current safety regulations.
The technical data and descriptions in these operating instructions are compiled according to the best of our knowledge and belief. Product improvements are constantly performed. For this reason, Klingenburg GmbH reserves the right to make such changes without prior notice.
Despite the careful creation of these instructions, Klingenburg GmbH cannot be held liable for errors or damage which arise from use of this manual.

Terminals at the control units CERTO 750/1500 with 2nd level





Terminal connections
Control unit:

5: swith over contact (potential-free) +24 V=
6: Intake- and exhaust air humidification (Parameter sets)
7: +10 V
8: Controller signal input (+)
9: Controller signal earth (- / GND)
10: Earth
11: Controller enable +24 V=
12: Controller enable
13: Low pressure switch D1 +24 V=
14: Low pressure switch D1
15: High pressure switch D2 +24 V=
16: High pressure switch D2
17: Thermal contact motor +24 V=
18: Thermal contact motor

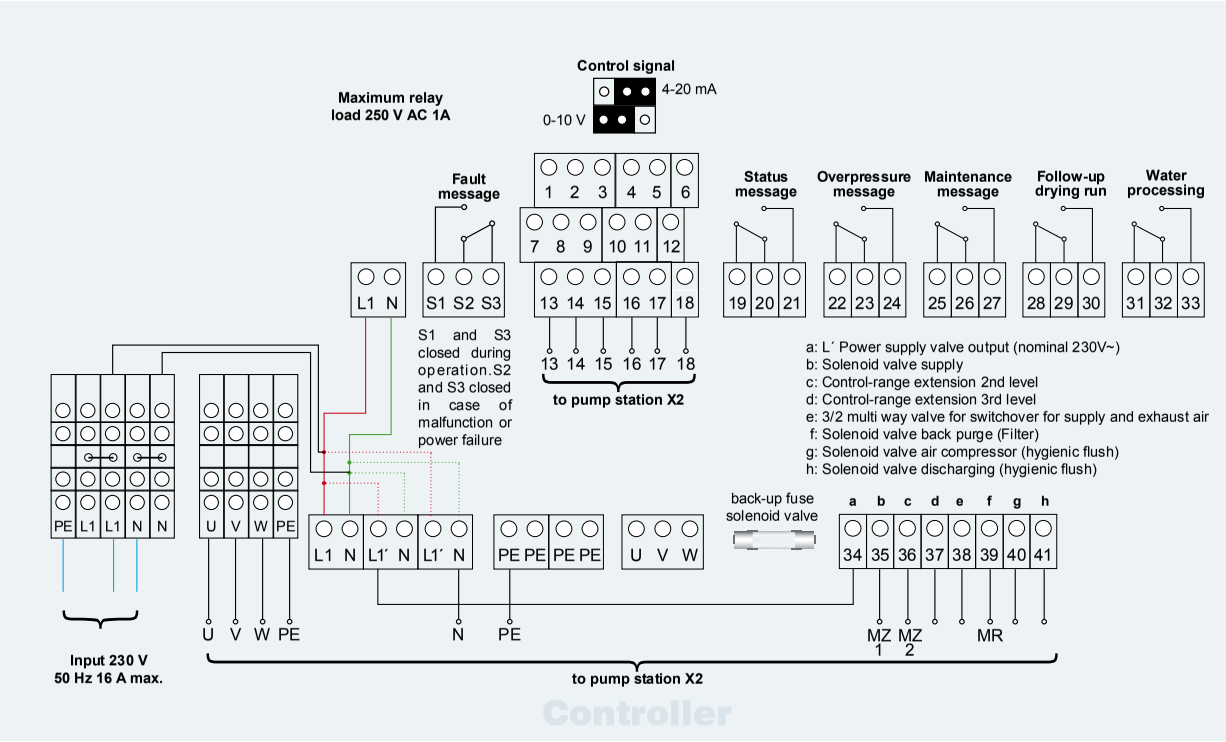
Humidity sensor connection:

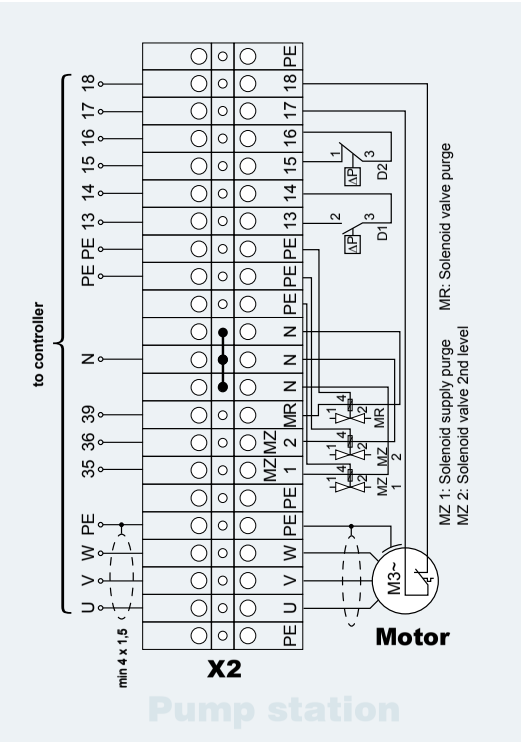
Terminal sensor	Terminal control unit
3 (+10 V input)	7 (+10 V output)
2 (signal output)	8 (0-10 V input)
1 (earth)	9 (earth)

Terminal connections
Pump station:

13: Low pressure switch D1 (+)
14: Low pressure switch D1 (-)
15: High pressure switch D2 (+)
16: High pressure switch D2 (-)
17: Thermal contact motor (+)
18: Thermal contact motor (-)

Terminals at the control units CERTO 2,2 kW with 2nd level





Terminal connections
Control unit:

5: swith over contact (potential-free) +24 V=
6: Intake- and exhaust air humidification (Parameter sets)
7: +10 V
8: Controller signal input (+)
9: Controller signal earth (- / GND)
10: Earth
11: Controller enable +24 V=
12: Controller enable
13: Low pressure switch D1 +24 V=
14: Low pressure switch D1
15: High pressure switch D2 +24 V=
16: High pressure switch D2
17: Thermal contact motor +24 V=
18: Thermal contact motor

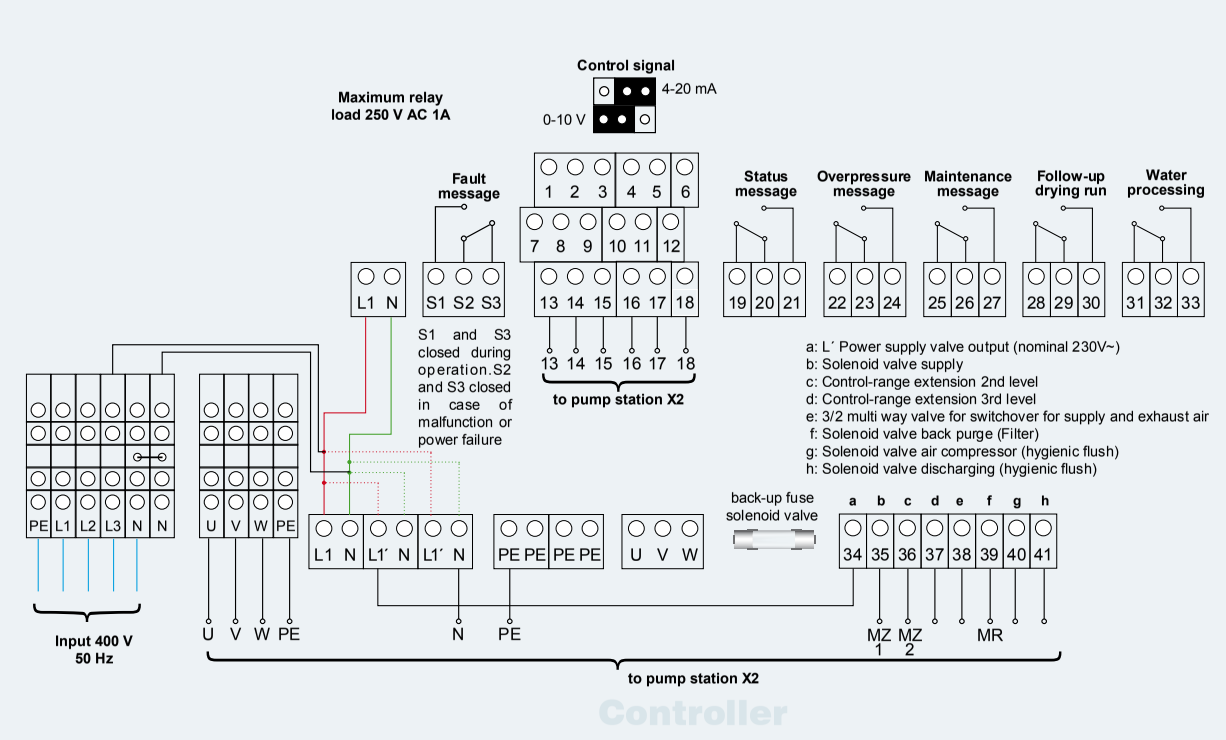
Humidity sensor connection:

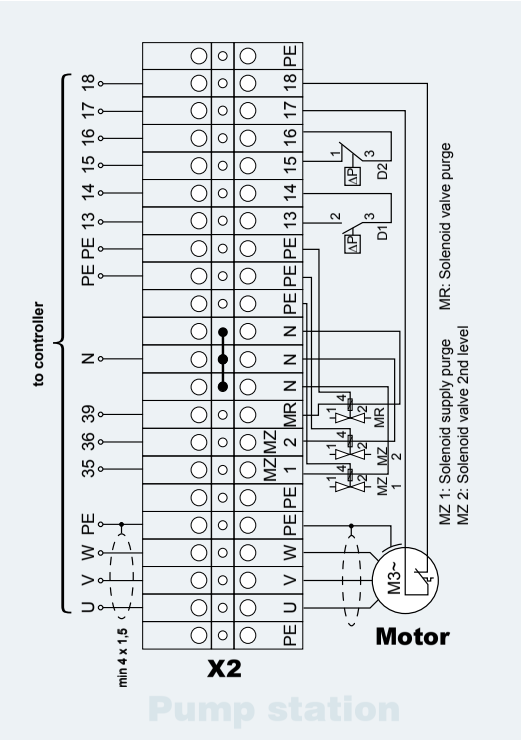
Terminal sensor	Terminal control unit
3 (+10 V input)	7 (+10 V output)
2 (signal output)	8 (0-10 V input)
1 (earth)	9 (earth)

Terminal connections
Pump station:

13: Low pressure switch D1 (+)
14: Low pressure switch D1 (-)
15: High pressure switch D2 (+)
16: High pressure switch D2 (-)
17: Thermal contact motor (+)
18: Thermal contact motor (-)

Terminals at the control units CERTO from 4 kW with 2nd level





Terminal connections
Control unit:

5: swith over contact (potential-free) +24 V=
6: Intake- and exhaust air humidification (Parameter sets)
7: +10 V
8: Controller signal input (+)
9: Controller signal earth (- / GND)
10: Earth
11: Controller enable +24 V=
12: Controller enable
13: Low pressure switch D1 +24 V=
14: Low pressure switch D1
15: High pressure switch D2 +24 V=
16: High pressure switch D2
17: Thermal contact motor +24 V=
18: Thermal contact motor

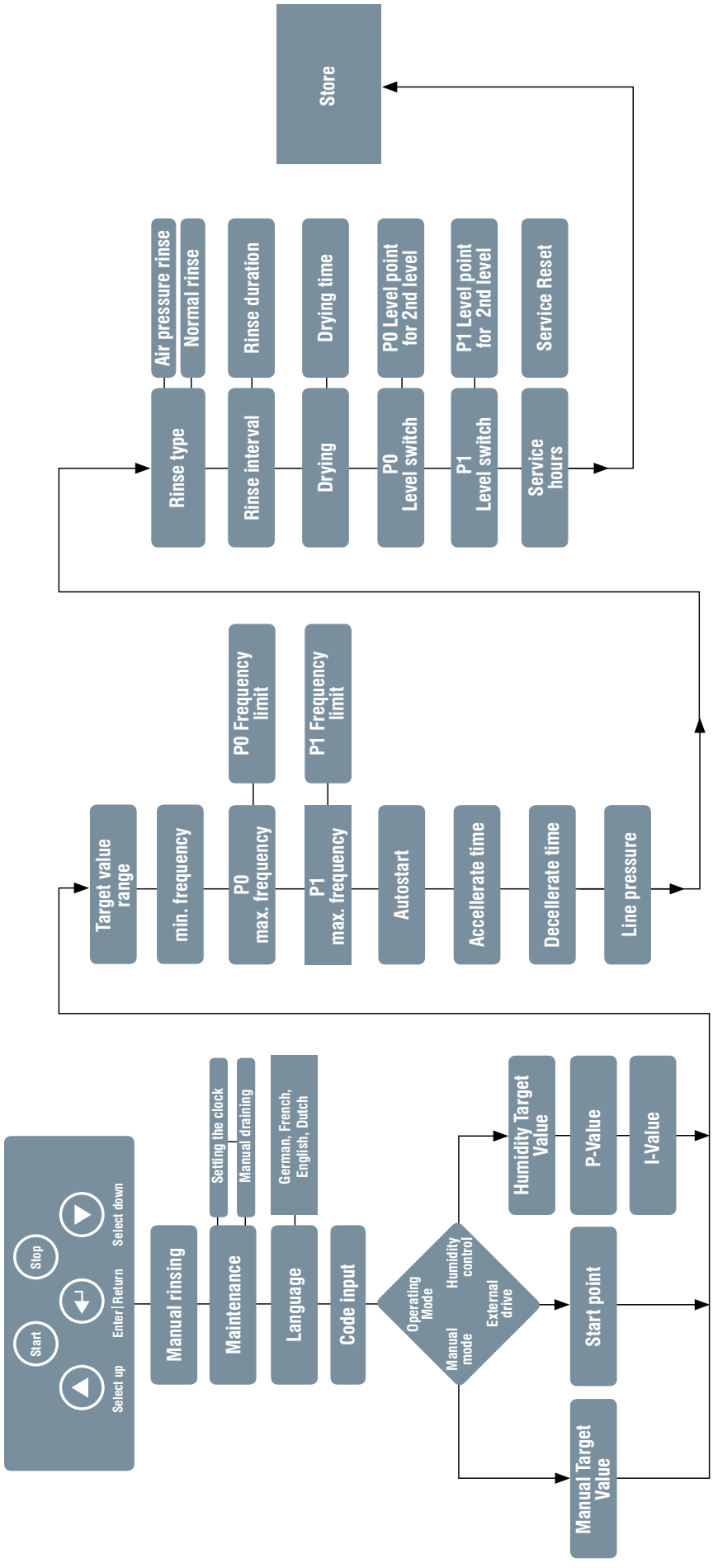
Humidity sensor connection:

Terminal sensor	Terminal control unit
3 (+10 V input)	7 (+10 V output)
2 (signal output)	8 (0-10 V input)
1 (earth)	9 (earth)

Terminal connections
Pump station:

13: Low pressure switch D1 (+)
14: Low pressure switch D1 (-)
15: High pressure switch D2 (+)
16: High pressure switch D2 (-)
17: Thermal contact motor (+)
18: Thermal contact motor (-)

Menu structure overview



New CERTO controller with switch for humidifying inlet and outlet air

The new CERTO controller is able to operate both an inlet air and outlet air humidifier if they are used seasonally and do not have to run at the same time, via 1 controller and 1 pumping station with a 3/2 way valve.

The client must only provide one potential-free contact which, when open or closed, will tell the controller whether to run the inlet air or outlet air humidifier (control terminals 5 and 6).

2 sets of parameters are saved in the controller, which are assigned to each humidifier. This makes it possible to set up different power outputs for the humidifiers.

You can also activate expanded control ranges (2nd and 3rd levels) separately for the inlet air and outlet air humidifiers. You may only switch over during shutdown!

4. Menu structure

The control unit has a double-line, multi-colour illuminated display and is operated via 5 keys.

Start Stop — Only for “on-site” operation - priority

Select up | Enter | Return | Select down — The menu is accessed by pressing the keys simultaneously. (Control unit reset):

Attention: Error acknowledgement is also carried out via this key combination:

Navigation: The left (▲) key: selects the menu item above. The right (▼) key: selects the menu item below. The middle (↵) key: input or acknowledgement. This takes you to the menu item settings that are set with the selection keys and confirmed with the (↵) key. Once the settings are made, move to the next menu item by pressing the Enter key (↵) again.

Once the wiring is completed, the device version will appear on the display when the voltage is switched on:

```
   Befeuchter
V:  KB5.00  DEFNL
```

If the autostart function is enabled, the following message appears:

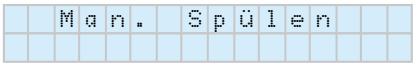
```
   Achtung!!!
  Autostart!!!
```

If you access the menu during operation, the following message appears:

```
   Motor Stop!
R Istfreq.: xxHz
```

5. Menu navigation

Pressing the three keys (▲ ▼ ↵) will take you to:



Manual rinsing

Manual rinsing

With this function you can manually rinse the water conduits, the pumping station, and the nozzles. This is recommended before the first start-up and after longer periods of shutdown.
Rinse times are determined under the menu option “Rinse type” (see pages 20-22).

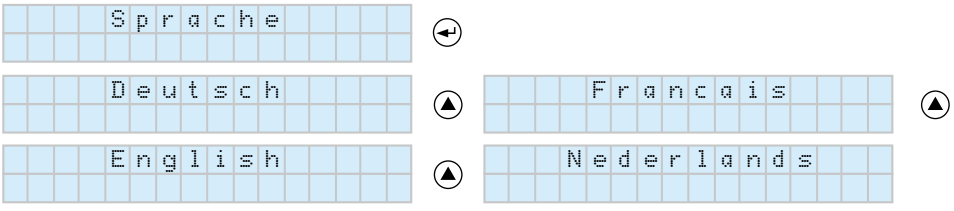
Use the ▲-button to exit the “Manual Rinse” menu option.
Press the Enter button (↵) to start the rinsing process. After the rinsing process, the controller will switch to Off and must be reactivated by using the Start button!

Move to the next menu item by using the right (▼) button.

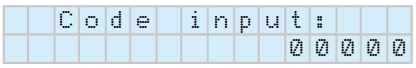
This sets the clock that controls the error log. Pressing ,↵ again will open the menu item “Manual draining”.

If your CERTO has a pressured air rinse function, you can use manual rinse to completely empty the pumping station and nozzles before longer shutdown periods. Use the left ▲ button to start the pressured air rinse. After approx. 10 seconds, the rinse valve under the filter will close and the pressured air will clear the nozzles. After a visual check, end the process with the Enter button ↵.

Use the Enter button ↵ to move to the next menu option.

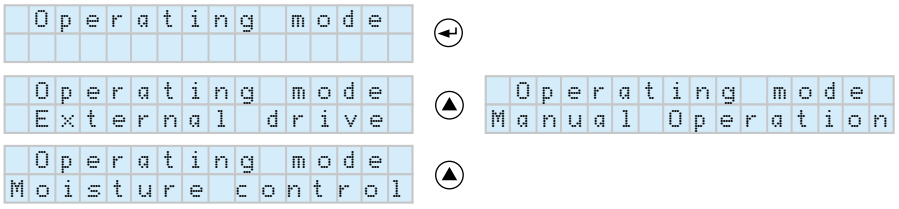


By pressing the three buttons (▲ ▼ ↵) you will come to:



To access the main menu, the code 00111 must be entered. This code request protects against unauthorised access. It is therefore advisable to keep these operating instructions in a safe place.
If the entered code is wrong, the menu will be exited!

Main menu:
Confirming with (↵) takes you to the menu item "Operating mode" for selecting the control option.

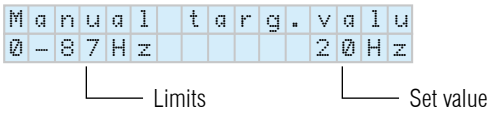


Depending on the on-site conditions, you can choose between external control via a control signal, manual operation and humidity control (with optional humidity sensor). The operating mode can be changed by pressing the left (▲) and right selection key (▼).

After selecting the control option, the entry must be confirmed with the Enter key (↵).

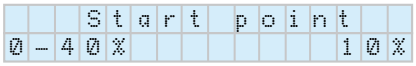
6. Manual operation / external control / humidity control

Manual operation
If "Manual operation" has been selected, a manual target value between 3 Hz and the factory-set maximum frequency can be specified. The manual target value is set by pressing the selection keys.



This value is confirmed by pressing the Enter key ↵.

External control.
If "External control" has been selected, the following display appears:



The start point can be set from 0-40% and relates to the control signal. Example: If set at 10%, the control unit will only react to a control signal of 1 Volt. As a result, interfering voltages, which can lead to inadvertent operation of the control unit, are suppressed. **Example Application:** For large humidifiers (>500 l/h) this can be operated with two pumping stations, two CERTO controllers and 4-6 nozzle systems.

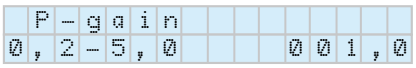
With the same control signal, the second CERTO controller may have its starting point set to 60%, for example. This means the second pumping station and its nozzle system will only switch on at high humidifying power output. This saves water and facilitates better control in the lower and middle humidifying range.

Humidity control

If “Humidity control” has been selected, the following display appears:

Here, the relative humidity the humidifier can achieve is set between 10 % and 95 %.

The PI-controller is activated duringhumidity control. This ensures that the set target value remains constant. The Klingenburg humidity sensor is required for this purpose. The gain factor is set here.

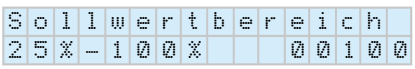


Attention:

The value must not be set >1.0, since this could lead to strong sub-harmonics and harmonics.

This controls the reaction time of the control. The greater the time, the slower the control.

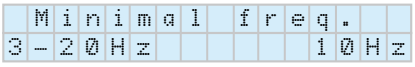
Target value range



Target value range

Caution! Only change this setting if 1 humidifier is operated with 2 controllers. If one humidifier is operated in parallel with 2 pumping stations and 2 controllers, the target value may be reduced in this function. Example: At a setting of 70%, the CERTO will reach maximum humidity at just 7 volts of control signal. This can optimise the transition to the 2nd controller.

Minimum frequency



The minimum frequency is factory set. The nozzle pressure should be set at a minimum of 5 bar in any humidification situation. Changing this frequency means that humidification is not guaranteed but the humidifier is operating all the same. Controllability is also compromised This setting value is calculated at the factory and preset and checked during a trial run. Frequency range: 3-20 Hz. Changes can cause damage to the humidifier.

Maximum frequency

With the switching function, you can determine two different maximum frequencies in two sets of parameters. Parameter P1 represents the normal setting. On special models, the parameter set P0 may be activated without potential by closing control terminals 5 and 6.

P0 Maximum frequency

P0 Maxi.frequenz
50-87Hz 80Hz

P0 Frequency limitation

P0 Frequbegrenz.
22-Fmax 80Hz

P1 Maximum frequency

P1 Maxi.frequenz
50-87Hz 80Hz

P1 Frequency limitation

P1 Frequbegrenz.
22-Fmax 80Hz

The maximum frequency is factory set. The humidifier is designed for a specific humidification capacity. To achieve this value, the complete humidification system is synchronised. This setting value is calculated at the factory and preset and checked during a trial run. Frequency range: 50-87 Hz. Changes can cause damage to the humidifier.

Pressing the Enter key (↵) in the setting values of “Maximum frequency” will take you to the menu item Frequency limit. If excessive humidity occurs or the water consumption is too high, the frequency can be adjusted here. It is important to note that the maximum frequency remains unchanged.

Autostart function

Autostartfunkt.
Autostart on

The Start and Stop button under the display screen has priority. The “Autostart on” function puts the control unit in Run mode, when menu navigation is completed and after a control unit reset, i.e. if approval is given and a control signal is present, the control unit starts the humidifier up again. If “Autostart off” is programmed, the control unit must be activated via the Start button (Start). This setting is useful for maintenance or during longer downtimes.

Power-up time

Acceler.time
1-600sec 15s

The power-up time is factory set. This is the time required to reach the designed maximum speed. This is to ensure that the components of the drive system are not put under unnecessary strain.

With frequent use of the control range extension (2nd level), this time will be preset between 20 and 30 seconds - but it may vary.

Power-down time

	D	e	c	e	l	e	r	.	t	i	m	e		
1	–	3	0	s	e	c						1	0	s

The power-down time is factory set. In contrast to the power-up time, this is the time required for the motor to get from maximum speed to zero. Again, the aim is to protect the mechanical components. This value is preset at 10 seconds. Adjustment range: 1-30 s. Changes can cause damage to the humidifier.

Line pressure fault message

	W	a	t	e	r		p	r	e	s	s	u	r	e
S	t	ö	r	m	e	l	d	.		n	.		3	0	s

Fault Message after 30 s

If several appliances are using the osmosis system and are running simultaneously, the line pressure can drop below 1.6 bar. This causes the humidifier to stop or switch off. In this menu item, the tripping time of the line pressure fault message can be extended (up to 30 minutes) or the fault message can even be switched off (Fault message off). This means that the humidifier is on standby for longer or all the time, when the line pressure is above 2 bar.

Rinse type

				S	p	ü	l	a	r	t				

Rinse Type

Rinse Type

				S	p	ü	l	a	r	t				
	N	o	r	m	a	l	s	p	ü	l	u	n	g	

Normal rinse

Rinse Type

				S	p	ü	l	a	r	t				
D	r	u	c	k	l	u	f	t	s	p	ü	l	u	n	g

Air pressure rinse

The type of hygienic rinse is set depending on the model. For normal rinsing, forward water pressure will rinse the conduit, filter, pump and nozzles with fresh water. If oil-free pressured air is available, air rinse is preferable. In this hygienic rinse there are 3 steps. First the conduits are rinsed with fresh water. In the second step the filter is cleared using pressured air, and in the third step the nozzles are also cleared with pressured air. This complete clearing of the humidifier's system can exclude bacterial contamination due to standing water. An optional pressured air compressor can be integrated into the pumping station.

Rinse interval

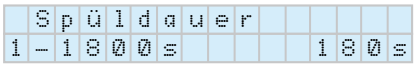
		W	a	s	h	.	i	n	t	e	r	v	a	l	
1	–	9	6	h								4	8	h

For hygienic operation of the humidifier, the controller has two different kinds of rinses serially integrated. The factory setting for the rinse interval is preset to 48 hours (values can be set between 1 and 96 hours). This is the time between two rinse procedures. A rinse is activated when the humidifier receives no request via the control signal or connected humidity sensor, over the duration of the set rinse interval.
Caution: The hygienic rinses are also active without a specified permission. Mains power must always be connected.

Changes lead to increased water usage and should only be made if a hygiene inspection reveals bacterial contamination due to standing water.
When „Normal Rinse“ is selected, the following will appear:

Rinse Type
Normal rinse

Rinse duration
1-1800s 180s

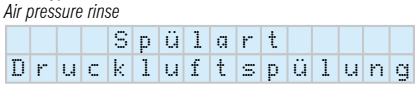


Normal rinse duration

The actual rinse procedure has an adjustable time duration between 10 and 1800 seconds, which is preset to 180 seconds. For half of the set time, the water conduit, filter and pumping station are rinsed with water. Then the rinse valve under the filter will close, and only the nozzles are rinsed with water.

Air pressure rinse duration

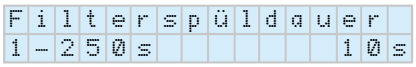
Rinse Type
Air pressure rinse



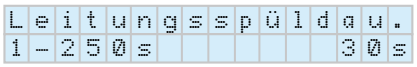
For the pressured air hygienic rinse, the times are freely selectable for each rinse phase.

Conduit rinse

Filter rinse duration

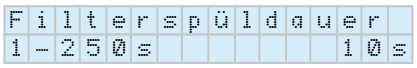


Blowout duration



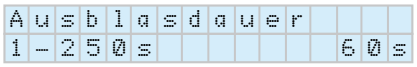
Conduit rinse

In the first phase, the water conduit to the humidifier is rinsed with fresh water via forwards pressure through the pumping station’s filter. The time duration should be adjusted appropriate to the lengths of the conduits.



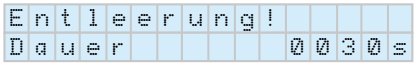
Filter rinse duration

During the second phase, the water intake is stopped, the air pressure is activated, and the filter is cleared using oil-free pressured air. The time can be set short at 5 - 10 seconds, because the filter cup is quickly clear of water.



Blowout duration

The last phase empties the pumping station, all nozzles, distributors and nozzle holders via magnetic valves mounted on the additional distributor of the nozzle system to remove the water. The blowout duration is based on the number of distributors, nozzle holders and nozzles.



Emptying
Duration

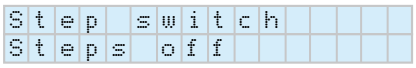
After that, the rinsing valves and back-rinsing valve under the filter stay open for 30 seconds to make the system pressure-free. This duration is not adjustable

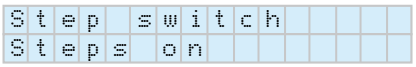
Drying run

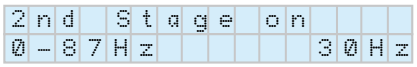
The control unit is equipped with a delayed shut-off control for drying the humidifier. This function allows an enforced shut-off delay of the ventilation system. During operation and after the pump has been switched off, the floating output is switched on for the set time. Adjustment range: 15 - 120 min. or off.

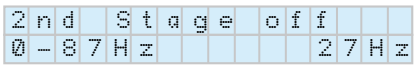
Step switch

For large humidifiers that use a lot of water, it may be useful to switch the nozzle assemblies in groups. In transitional periods when less humidification is required, this can be achieved with fewer nozzles and higher pressure. Depending on the frequency, the nozzle assemblies can be switched on in succession via high pressure solenoid valves.









Up to 2 levels can be switched,
and for normal rinsing 3 steps can be switched.

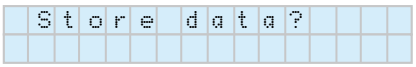
If the second set of parameters is needed for a special configuration, the control range extensions (2nd and 3rd levels) can be determined separately for parameter set P0.

Reset service notice

After the first 200 hours of operation, and then after every 2500 hours of operation, the display will blink red at intervals and the maintenance notice will be activated. This is to draw attention to a necessary oil change in the high pressure pump. The humidifier is still operable

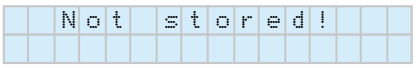
This menu item is only available, if the “Service” message appears during operation and the recommended oil change intervals have been exceeded. Once the oil change has been carried out, the message can be reset by pressing the left selection key (▲) and confirming with the Enter key (↵), thus initiating a new interval cycle. Proof that the oil change has been carried out must be provided. **Attention!** Resetting the service message without an oil change will damage the pump and void the warranty.

Saving the settings



The changes made must now be saved. This is necessary in order to start the control unit in the selected mode.

Pressing the Enter key (↵) saves the values.



If the changes should not be saved, the action can be cancelled by pressing the selection keys (▲ ▼).

Messages displayed for different control options during operation

For external control:

The display (Control signal is present, release enabled) is shown in the event of external control.

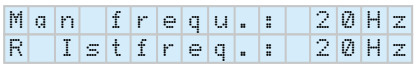
Target frequency
Actual frequency

„R“ for Run

Target frequency
Actual frequency

„S“ means stopped via Stop button (Stop)
Press the Start key (Start) , to activate autostart.

In manual operation



Manual frequency
Actual frequency

Started up via the Start button(Start) in manual mode.

Humidity control via humidity sensor

Humidity target: 60% Humidity actual: 58%
Actual frequency

Humidity control is enabled.

Water treatment

The CERTO controller has a relay contact to the water treatment (terminals 31, 32, and 33). This contact switches in parallel with the intake valve, i.e. when the CERTO is operating, the contact will activate the water treatment. A dosing pump can add additives to the deionised water for the hygiene of the CERTO. If this is not necessary, this contact can also be used to activate the pressure-increasing pump of the building's own osmosis system.

Switching contact for alternating between inlet and outlet air humidifier mode

The CERTO controller can use a potential-free contact (control terminals 5 and 6) to alternate between operating two humidifiers with different settings. In the menu, set the 2 sets of parameters (P1 and P0) for the maximum frequency and the control range extension, one for an inlet air humidifier and one for an outlet air humidifier.

If the switching contact at control terminals 5 and 6 is open, then parameter set P1 is active and the 3/2 way valve (valve output 38) is not triggered.

If the other humidifier is to be activated, switch control terminals 5 and 6 to potential-free before start-up. This will switch on parameter set P0 and the 3/2 way valve is switched over via the valve output (38).

If the switching contact is opened again while the machine is shut down, the other humidifier will be active again.

When operated for half a year, the switching contact must be open or closed during the entire run time.

7. Fault and error messages

Controller disabled

When this message appears in the display, the control unit is externally disabled via terminals 11 and 12. That is to say, the DDC has not enabled the control unit or the connection is faulty e.g. due to loose terminals etc. Generally, the message “Controller disabled” is not a fault, the controller has merely not been enabled because, for example, the fan was switched off.

Line pressure

Message appears when the line pressure drops below 1.6 bar.

When this message appears on the display, the primary pressure (flow pressure) of the feedwater pipe has dropped below 1.6 bar. The pressure switch sends an enabling signal to the control unit when the pressure reaches 2 bar. If the pressure drops below the minimum limit for a maximum of 30 seconds, the message “Line pressure?” is displayed.
If the pressure rises above 2 bar again during this time, the humidifier starts automatically. If the pressure drops below the minimum limit for more than 30 seconds, a fault message is displayed. This fault can be caused by several factors. The water supply may be switched off or restricted. The water supply pressure drops below 2 bar. The water filter is heavily contaminated. The supply pressure can also drop due to increased flow rate.

Conduit pressure fault
Actual frequency

Fault message after the set tripping time.

Pressing the three buttons (▲ ↵ ▼) below the display simultaneously, acknowledges the fault message.

8.3 Overpressure

Target frequency
Actual frequency

Overpressure message is displayed!

When this message appears on the display, the pressure downstream from the high pressure pump is too high. The high pressure pressure switch is triggered at a pressure of 150 bar, and reduces the speed of the motor. If the pump speed has dropped enough for the pressure switch to turn on again at 135 bar, the control unit saves this frequency and the humidifier returns to operating mode. This saved frequency is stored as the maximum frequency until the fault has been rectified or the control unit has been reset. Since the Klingenburg humidifier continues to operate and the nominal frequency is thus also shown in the display, an overpressure fault is displayed.

An overpressure fault can be caused by several factors:

- the maximum frequency is set too high.
- the atmomiser nozzles may be dirty, which leads to increased flow resistance. This leads to higher pressure for the same amount of water.

Motor overheating

The motor in the pump station is protected against damage from overheating. A thermal contact inside the motor sends a signal to the control unit, causing the motor to switch off and triggering a fault message.

Service indicator

The Service message appears if the recommended oil change intervals have been exceeded. The first message appears after the first 50 operating hours and then every 1000 operating hours after that. Pressing the Enter key (↵) can suppress the message in order to return to the frequency display. The Service message can be reset in programming mode once the oil change has been carried out. If the Service message is not reset, it will reappear in the display.

Error codes

The seven possible faults are displayed by the two-digit error code in the second line of the display.

01	Excessive voltage (motor / rotor blocked; short circuit between U, V, W)
05	Overload (control unit / motor overloaded)
09	Undervoltage
14	Earth fault
15	Overvoltage
21	Overheating in the final stage, ambient temperature too high; control unit overloaded
99	Software error

When the control unit registers a fault, the fault message is displayed in clear text or as hardware error EXX code. In some cases, the humidifier will automatically start up again and continue to run under restricted conditions. The control unit is ready for operation again, when the fault is acknowledged either by switching off the supply voltage or by simultaneously pressing the three buttons.

If the humidifier does not start, you should check the following:

- Line pressure
- Control signal
- Controller enable
- Power supply

When all the conditions are met and the humidifier is still not working, please contact the customer service of Klingenburg GmbH.

Communication error

Communication between the display circuit board and the frequency converter is via a monitored connection. If the connection is faulty, the message appears. The fault is automatically detected and another connection attempt is made. Normally, after a successful attempt at reconnection, the fault is rectified within a few seconds. If the message remains on the display for some time, you should ensure that the connectors on the display's circuit board and the frequency converter are a tight fit, while the control unit is disconnected from the mains. If the message still remains, please contact the customer service of Klingenburg GmbH.

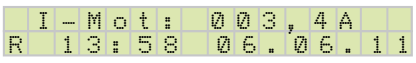
Software update

The special design of the control unit allows the software to be updated at any time.

8. Status messages

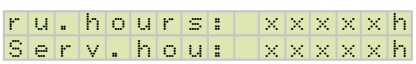
By pressing the left selection key (▲), the following operating status messages can be displayed successively:

1x ▲:



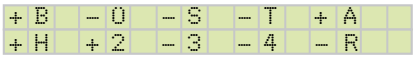
Motor current, time and date

2x ▲:



Operating hours and service hours

3x ▲:



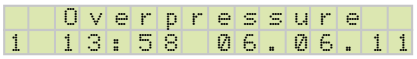
Status display of the 10 relays

A“+” in front of the letter equals: “Relay output connected”
A “-” in front of the letter equals: “Relay output open”

B	Status message
O	Overpressure message
S	Maintenance message
T	Follow-up drying run
A	Water treatment

H	Main valve intake
2	2nd level
3	3rd level
4	4th level
R	Backflushing

4x ▲:



Most recent fault message

5x ▲: **Second most recent fault message**

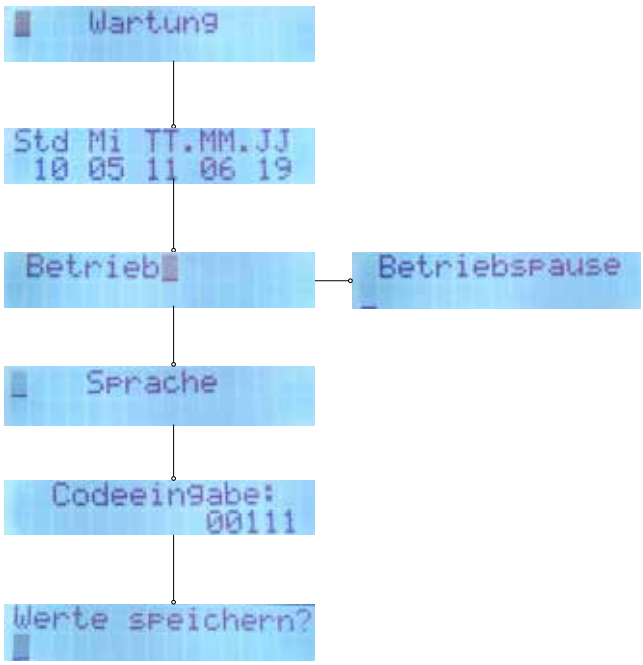
6x ▲: **Third most recent fault message**

The three most recent faults are saved.
To return to the normal display, press the right selection key (▼) repeatedly.

Special function operating pause!

The operation pause is a parameter item in the controller menu that allows to temporarily shut down the humidifier without switching off the power supply. When this option is active, the message Operation pause lights up blue in the display. In the active operating pause, the rinsing function and the external control of the control unit are deactivated. This option should only be used if the humidifier has previously been taken out of operation. This means that all water-bearing parts must have been drained. Otherwise, there is a risk of contamination by water passing through.

The activation and deactivation of the operating pause is integrated under the menu item Maintenance in the control unit of the control device.



9. Technical Data

	CERTO-FU 750	CERTO-FU 1500
Output	0,75 kW	1,5 kW
Protection (external)	16 A	16 A
Protection (internal) Solenoid valve supply	6,3 A delayed fuse (5 x 20 mm)	
Mains voltage	220-240 Volt / 50-60 Hz 1~ N / PE	
Weight	3500 g	8000 g
Ambient temperature	from -10°C to +40°C (For temperatures below 0°C it is necessary to switch on the unit's mains voltage without running the motor, so that the control unit can warm up)	
Humidity adjustment range (only for humidity control)	10% to 95% rel. humidity	
Protection class	IP 54	
Output frequency	0-80 Hz (factory set as per data sheet)	

	CERTO-FU 750	CERTO-FU 1500
Frequency resolution	0,1 Hz	
Control signals	0-10 V, 0-20 mA, 4-20 mA	
Fault alarm relay	Potential free changeover contact, load capacity 250 V AC, 1 A	
Motor connection cable	The connecting cable must always be shielded, for cable lengths over 50 m current limiters should be provided. Please enquire.	
Dimensions	L=256 mm W=232 mm H=128 mm	L=355 mm B=262 mm H=168 mm

Motor power	Connection voltage	Connection type	Nominal current strength	can be controlled with controller type:
0,55 kW	3 x 230 V	Delta	$I_{nominal}$ 3,3 A	CERTO FU 750
0,75 kW	3 x 230 V	Delta	$I_{nominal}$ 3,14 A	CERTO FU 750
1,5 kW	3 x 230 V	Delta	$I_{nominal}$ 6,3 A	CERTO FU 1500

Here you can enter your set values

Manual target value						
Starting point						
Target humidity						
P boosting						
Integrator time						
Min frequency						
P0 Max. frequ.						
P0 frequ. limit						
P1 Max. frequ.						
P1 frequ. limit						
Accellerate time						
Decellerate time						
Rinse interval						
Normal rinse Rinse duration						

Air pressure rinse Conduit rinse duration						
Air pressure rinse Filter rinse duration						
Air pressure rinse Blowout duration						
Drying						
P0 Level 2 on						
P0 Level 2 off						
P0 Level 3 on						
P0 Level 3 off						
P1 Level 2 on						
P1 Level 2 off						
P1 Level 3 on						
P1 Level 3 off						

10. Safety and precautions

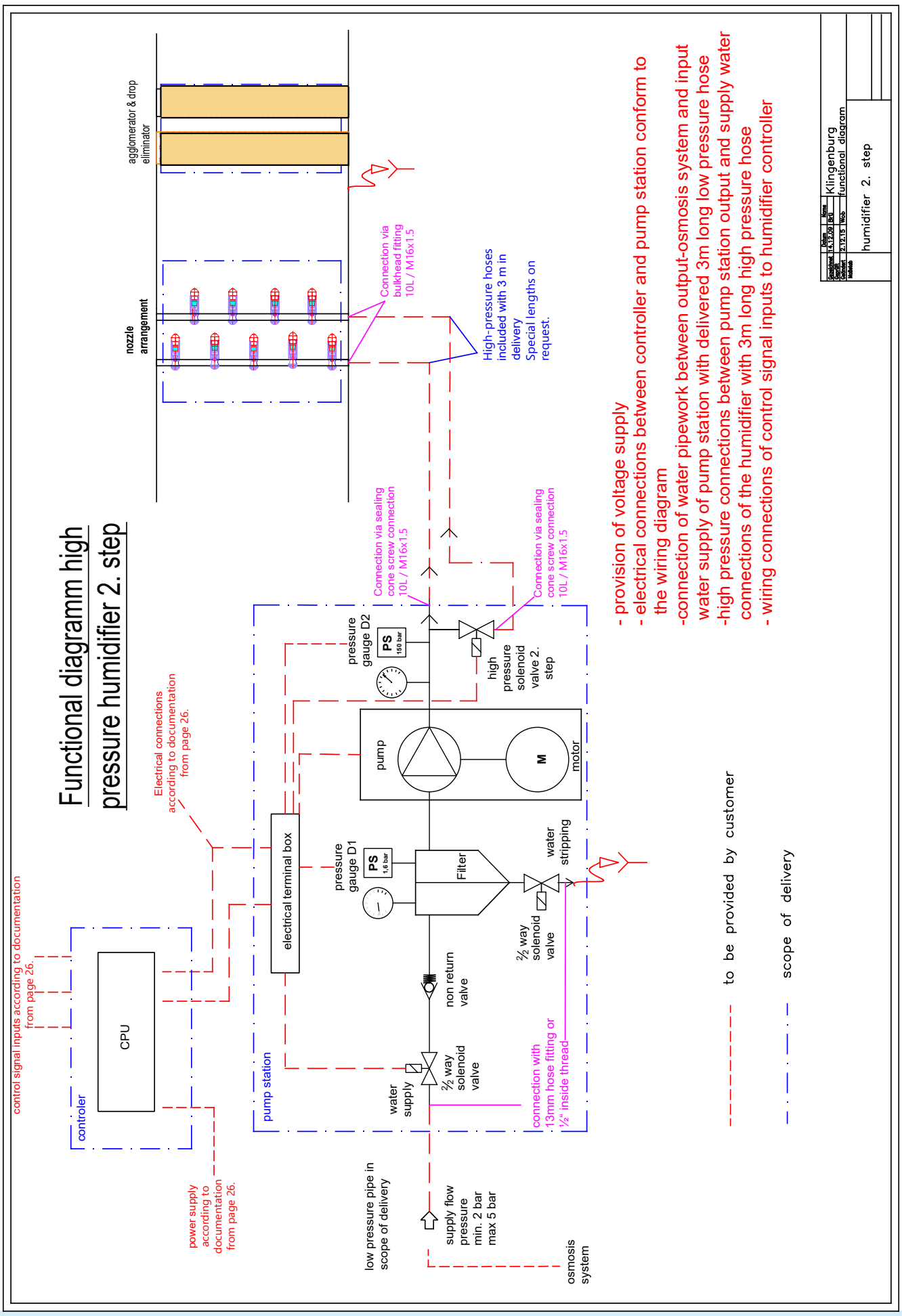
Before installation and initial operation of the frequency converter, please read through the product handbook carefully and observe all warnings and safety precautions. Make sure that the product manual is easily reachable in the area of the frequency converter.

Definition of tips:
Warning! Failure to comply with this information could cause death, severe bodily injury or significant physical damage.
Caution! Failure to comply with this information could cause minor bodily injury or physical damage.
General: During operation it must be ensured that the mains voltage is constantly on.

Warning!
- This frequency converter creates dangerous electrical voltage and controls dangerous rotating parts. Failure to comply with the information in this manual could cause death, severe bodily injury or significant physical damage.
- The installation, initial operation and maintenance of this drive may only be performed by expert staff that are well versed in the functionality and equipment as well as the machine.
- The device contains intermediate circuit capacitors that also carry out switchover of dangerously high voltages on the grid side. After switching off the voltage, wait at least 15 minutes before opening the device and working on it. Please be sure that no live parts are touched.
- The ground fault safety serves only as protection for the frequency converter and not as personal protection. In accordance with VDE 0160 (German abbreviation for the Association for Electrical, Electronic &Information Technologies), the three-phase frequency converter must not be operated on a leakage current circuit breaker, because a possible direct current component will reduce the sensitivity of the leakage current circuit breaker in the event of a fault.
- The provisions of VDE 0160 should be observed as protective measures.
- Ground the frequency converter to the connection provided for it.
- To avoid injury and damage, do not touch any parts within the housing – not with hands or any kind of object – when mains voltage is present or the intermediate circuit capacitor is not loaded. Do not work on wiring or test signals when mains voltage is present.

- Pay special attention when the automatic restart is activated. To avoid injury from possible uncontrolled restart of the frequency converter after a power outage, install a switch element on the grid side that de-energises in a power outage and can only be turned on after return of voltage by manual confirmation (e.g., contactor, etc.).
- Ensure that the input voltage corresponds with the voltage listed on the label. Environmental influences such as high temperature and high humidity are to be avoided as well as dust, dirt and aggressive gases.
- The install location should be a well-ventilated location away from direct sunlight. Install the device on a non-flammable, vertical wall that does not transmit vibrations. Do not connect mains voltage to the output terminals U/T1, V/T2, W/T3.
- Please contact the motor or machine manufacturer if standard motors with a frequency of $>$ 60 Hz will be operated.
- All frequency converters are tested for dielectric strength and insulation resistance measurements. Insulation resistance measurements, for example, in the course of inspection, must not be conducted between the power terminals and earth. Do not carry out insulation resistance measurements on the control terminals.
- During operation it must be ensured that the mains voltage is constantly on. Control commands and operating signals (such as start/stop) must only be implemented via the control terminals or the control panel and not by switching the mains supply or a motor contactor.
- Do not install capacitors or overvoltage arrestors in the motor lead.

Caution!
- In order to guarantee that your Klingenburg frequency converter operates securely and reliably, all respective safety regulations, such as accident prevention regulations, VDE regulations, etc,. must be observed.
- As these regulations could contain different details within the German speaking areas, the user must observe the requirements that are valid for their area.
- Klingenburg GmbH cannot exonerate the user from the obligation to follow the most current safety regulations. The technical data and descriptions in these operating instructions are compiled according to the best of our knowledge and belief. Product improvements are constantly performed. For this reason, Klingenburg GmbH reserves the right to make such changes without prior notice.
- Despite the careful creation of these instructions, Klingenburg GmbH cannot be held liable for errors or damage which arise from use of this manual.


Functional diagramm high
pressure humidifier 2. step
agglomerator & drop eliminator
nozzle arrangement
Connection via bulkhead fitting 10L / M16x1.5
High-pressure hoses included with 3 m in delivery
Special lengths on request.
Connection via sealing cone screw connection 10L / M16x1.5
Connection via sealing cone screw connection 10L / M16x1.5
pressure gauge D2
PS 150 bar
high pressure solenoid valve 2. step
pump
M
motor
Electrical connections according to documentation from page 26.
electrical terminal box
pressure gauge D1
PS 1,6 bar
Filter
water stripping
2/2 way solenoid valve
non return valve
2/2 way solenoid valve
water supply
pump station
connection with 13mm hose fitting or ½" inside thread
control signal inputs according to documentation from page 26.
controler
CPU
power supply according to documentation from page 26.
low pressure pipe in scope of delivery
supply flow pressure min. 2 bar max 5 bar
osmosis system
- provision of voltage supply
- electrical connections between controller and pump station conform to the wiring diagram
-connection of water pipework between output-osmosis system and input water supply of pump station with delivered 3m long low pressure hose
-high pressure connections between pump station output and supply water connections of the humidifier with 3m long high pressure hose
- wiring connections of control signal inputs to humidifier controller
to be provided by customer
scope of delivery
Klingenburg
functional diagram
humidifier 2. step

Item No. description

nozzles

348-4057 high pressure nozzle CERTO A 2.1
348-3829 high pressure nozzle CERTO 1 3.6
(alternative to nozzle KLI 3.5)

388-4017 PE-Filter for high pressure nozzle (100 pieces)

seal kit and valve kit for high pressure pump

388-2668 seal kit No. 14.0444
suitable for Speck high pressure pump
NP 10/04 // NP 10/07 // NP 10/10 // NP 10/13 // NP 10/15
388-2930 seal kit No. 14.0406 NP 16/21
338-3885 seal kit No. 14.0766
suitable for Speck high pressure pump NP 10/01 // NP 10/02
338-2669 valve kit No. 14.0364 every Speck pump

controller / electric motor

338-2172 electric motor 0,55 kW
338-2166 electric motor 0,75 kW
338-2167 electric motor 1,5 kW
338-2168 electric motor 2,2 kW
338-2169 electric motor 4,0 kW
338-2170 electric motor 5,5 kW

338-4047 display circuit board CERTO (all controller)
338-4046 circuit board CERTO (all controller)

359-1066 controller 0,75 kW
359-1067 controller 1,5 kW
359-1063 controller 2,2 kW
359-1064 controller 4,0 kW
359-1610 controller 5,5 kW

Item No. description

pump station

999-0554 high pressure switch 150 bar 1/4“
999-1138 low pressure switch 2 bar 1/4“

399-2882 2/2 solenoid valve NC 230V 1/2“ (collant inlet)
399-4290 2/2 solenoid valve NC 230V 1/2“ (collant inlet) silicon free
143-1946 high pressure 2/2 solenoid valve; AISI 304; 0-180 bar; 230V

348-0911 high pressure gauge 0-250 bar glycerin filled
348-4297 high pressure gauge 0-250 bar glycerin filled silicon free

348-3246 low pressure gauge 0-16 bar glycerin filled
348-4298 low pressure gauge 0-16 bar glycerin filled silicon free

334-1662 belt pulley D=92; d=15

348-0943 waterfilter, Honeywell F 76 S 100μ

338-0799 belt 8M-20-1040
338-0800 belt 8M-20-1064
338-0801 belt 8M-20-1080
338-0802 belt 8M-20-1120
338-0805 belt 8M-20-1160
338-0806 belt 8M-20-1176
338-0812 belt 8M-20-1280
338-0819 belt 8M-20-1600
338-0789 belt 8M-20-776
338-0790 belt 8M-20-800
338-0791 belt 8M-20-840
338-0793 belt 8M-20-880
338-0795 belt 8M-20-920
338-0796 belt 8M-20-936
338-0798 belt 8M-20-976

humidifier

348-2265 high pressure hose 0,262 m 2 x 90° S-Form
348-1435 high pressure hose 3 m straigh/angled
each additional meter

Checklist - Commissioning report Klingenburg humidifier

KLINGENBURG Luftbefeuchtung

Customer Number:

Order number:

Customer of the assignment:

Company:
Contact Person:
Phone:
Address:

The installation site:

Company:
Contact Person:
Phone:
Address:

To the plant:

Building:
Facility name:

Controller:
KB-Nummer: Construction year:

	Done yes	Done no	Observation:
1) HD-Hose, Tube, Nozzel tube, Nozzel			
Number of nozzles (nozzle sticks)	☐	☐	
Type of nozzles			
Complete system flushed	☐	☐	
Spray pattern of nozzles checked	☐	☐	
Winglets adjusted	☐	☐	
Tightness of the nozzle system	☐	☐	
2) Pump station			
Oil control HD-Pump, Type	☐	☐	
Controlled pump drive	☐	☐	
Solenoid valves (ND, HD)	☐	☐	
Pressure gauge 0 - 16 bar, 0 - 250 bar	☐	☐	
Inlet pressure of the pump station	☐	☐	
Tightness of the pump station	☐	☐	
Drain checked	☐	☐	
Pressure switch checked (ND / HD)	☐	☐	
3) Controller			
Checked electrical connections	☐	☐	
Communication with the GLT: - Control signal	☐	☐	
- Error messages	☐	☐	
Controller programmed	☐	☐	

Current consumption [A]: Controller: L1: L2: L3:
Motor: U: V: W:

4) Humidifier data

	Shall	Be	2. Step Shall	2. Step Be	3. Step Shall	3. Step Be
Frequency [Hz]						
Pressure [bar]						
Frequency Min [Hz]						

Operating hours as per display

5) Setting values of the controller

Start point		Rinse duration	
Humidity setpoint		P boosting	
Min. Frequency		Drying	
Max. Frequency		Level 2 on	
Power-up time		Level 2 off	
Power-down time		Level 3 on	
Rinse interval		Level 3 off	

6) various

7) Personnel Staff on site: yes ☐ no ☐ Name:

Name (customer) in print: Signature:

Date: Klingenburg Signature:

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Checklist - Maintenance log
Klingenburg Humidifier

KLINGENBURG
Humidification

Customer Number: _____ Order Number: _____

Customer:

Company: _____
Contact Person: _____
Address: _____
_____

System:

Contact Person: _____
Company / Fon: _____
Conditioning address: _____
_____

Place of installation of the humidifier

Building: _____
System designation: _____
_____

Controller: _____
Typ: _____ / _____
KB-Number: _____ Year built: _____

	Done Yes	No	Comment:
1) KB-Interior cleaning:			
Side walls	☐	☐	
Floor incl. Drainage	☐	☐	
Top	☐	☐	
Resonanzprofile / Winglets	☐	☐	
Drop separator	☐	☐	
2) HD hose, distribution pipes, nozzles:			
Nozzle flow controlled	☐	☐	
Number of nozzles			
Typ of nozzles	☐	☐	
HD hose rinsed	☐	☐	
Distributor tube flushed	☐	☐	
Number of nozzle tubes			
Nozzle pipes flushed	☐	☐	
3) Pump station:			
Filter checked and cleaned	☐	☐	
Oil control HP pump, type	☐	☐	
	☐	☐	
Timing belt checked	☐	☐	
Pulley checked	☐	☐	
Solenoid valve water inlet	☐	☐	
Backwash valve tested	☐	☐	
Manometer 0 - 16 bar	☐	☐	
Manometer 0 - 250 bar	☐	☐	
Setting values controller	☐	☐	

4) Humidifier data:

	Shoud	be	was at
Frequency [Hz]			
Pressure [bar]			
Frequency min [Hz]			
Flow rate [l/h]			
Operating hours as per display			

5) Others:

Date _____ Signature _____

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Maintenance schedule- CERTO high pressure humidifier

Designation	Exchange in case of Defect	Exchange regularly	Interval
HD - Pump	YES	-	
Gear oil	-	YES	1.) 200 h 2.) 2500h
Valve kit for HP - pump	YES	YES	4.000 h
Gasket set for HP - pump	YES	YES	4.000 h
Tension pulley	YES	After visual and mech. check At the discretion of the technician	
Toothed belt	YES	After visual and mech. check At the discretion of the technician	
High pressure switch 150 bar	YES	For safety reasons Exchange every 2 years	
Low pressure switch 1.6/2 bar	YES	For safety reasons Exchange every 2 years	
2/2 way solenoid valve NC 230V 1/2" 0-6 bar	YES	-	
2/2 way HP solenoid valve V2A; 0-200 bar	YES	-	
Low pressure gauge	YES	-	
High pressure gauge	YES	-	
Gasket set for nozzle block	YES	-	
High pressure nozzle	YES	Change or clean when spray picture decreases	
PE filter for high pressure nozzle	YES	Change 2 x yearly	
Filter element (make Brauckmann F76 (S) 100μm)	YES	-	
HD hose 3 m length	YES	according to VDI 20066 replacement every 5 years	5 years
HD hose 0.262 m 2 x 90° S-shape	YES	according to VDI 20066 replacement every 5 years	5 years
Engine	YES	-	

1.) First oil change

2.) Regular oil change

Air is our element
KLINGENBURG
energy recovery our ***passion***

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