# GEISENFELD

### Operation & Maintenance Translation of the original operating instruction

## C-MAX COMPACT / FLEX

**TWO SOLUTIONS - ONE SYSTEM:** WOLF measurement and control technology

A DIE





Spirit of Air





### Quality Assurance



### Declaration of incorporation

WOLF Anagen-Technik Desten & Co. KD Münchemer Dir. 54 85290 Gesenriket, GERMANY		WOLF Arsagen Technik Greistr & Co. HD Microberer Ibr. 54 BEDD Geleenheit, GEPSMANY	CEMO
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### 1. Notes and regulations for the operator

#### Meaning of the operating instructions

Read these operating and maintenance instructions carefully before installation and commissioning to ensure correct use! We would like to point out that these operating and maintenance instructions only apply to the unit and in no case to the complete system! All unit-specific data such as order number, energy data, weight, dimensions, etc. can be found either on the type plate of the respective unit component or in the technical order confirmation. These operating and maintenance instructions are intended for safe working on and with the above-mentioned unit. They contain safety instructions that must be observed as well as information that is necessary for trouble-free operation of the unit. The operating and maintenance instructions must be kept with the unit. It must be ensured that all persons who have to carry out activities on the unit can consult the operating and maintenance instructions at any time. The operating and maintenance instructions must be kept for further use and must be passed on to every user or end customer.

#### Duty of care of the operator

- The contractor or operator must ensure that the equipment and operating materials are operated and maintained in accordance with the applicable rules and legal regulations.
- The operator is obliged to operate the unit only when it is in perfect condition.
- The unit may only be used for its intended purpose ("area of use").
- The safety devices must be checked regularly for proper functioning.
- The operating and maintenance instructions must always be kept available in a legible condition and complete at the place of use of the unit.
- The personnel must be regularly instructed in all applicable questions of occupational safety and environmental protection and must know the operating and maintenance instructions and in particular the safety instructions contained therein.
- All safety and warning notices attached to the unit must not be removed and must remain legible.

### 2. Intended use

This is a system-specific control for a WOLF central air handling unit for ventilation and air conditioning. The programming is made to the requirements of a specific system, therefore it cannot be mounted to another system. Modifications require prior inquiries to the manufacturer and execution by a service technician from WOLF Geisenfeld.

Any other use is expressly excluded by WOLF.



### 3. Safety\_

The qualified personnel responsible for installation, commissioning, maintenance, troubleshooting and decommissioning must be instructed to observe these operating instructions before starting work. All persons who carry out an activity on this device must have read the operating and maintenance instructions.

Non-observance of the operating instructions can endanger the persons entrusted with the work as well as cause malfunctions of the device.



#### Attention!

Activities on the air handling unit may only be started or carried out after the following functions have been ensured:

- Repair switches attached to the unit are connected in the control circuit of the air handling unit.
- All poles of the power supply are voltage-free
- Power-operated, rotating parts are secured against restarting (repair switch can be shut off).
- Rotating parts are at standstill
- Device components have cooled down to normal ambient temperatures (room temperature)

After completion of the work, start up the plant according to >> Commissioning - Test run <<!



Attention!

Only qualified personnel may be entrusted with work on electrical components. The local Energy Supply Companies (german: EVU) regulations and Association of Electrical, Electronic & Information Technologies (german: VDE) regulations must be observed.

No changes or additions may be made to the unit, otherwise the manufacturer's declaration of conformity will be invalidated! The heat recovery equipment can be a life-threatening source of danger due to rotating machine parts and the risk of electric shock. Failure to observe the following safety instructions will result in DANGER FROM ELEC-TRICAL SHOCK.

- The equipment contains high voltage capacitors that require a period of time to discharge after the main power supply is interrupted.
- Make sure the equipment is disconnected from the power supply before performing any work. Wait at least
  three minutes for the inverter to discharge to a safe voltage.
- Always disconnect the inverter from the circuit under test before performing a high voltage resistance test on that circuit.

#### Symbole:

The symbol opposite can be found in the operating instructions wherever, in the event of non-observance



- danger to life and limb of persons
- damage to the device can occur.



The symbol opposite can be found in the operating instructions wherever there is a danger from electrical components.



The adjacent symbol can be found in the operating instructions wherever danger or increased protective measures are required due to potentially explosive atmospheres.



The symbol opposite can be found in the operating instructions wherever there is a risk of crushing.





Warning of harmful and irritating substances



The adjacent symbol refers to guidelines or cross-references in the operating instructions which are important for the operation of the air handling unit.



The adjacent symbol refers to information or application tips in the operating instructions.



The adjacent symbol can be found wherever, for example, an ignition hazard may arise due to electrostatic charging. The entire device must be grounded (potential equalization) by the operator / on-site according to the state of the art to prevent electrostatic charging.



### 4. General information

### 04.01 Field of application

The WOLF control unit supplied is used to control the respective WOLF air handling unit. Due to the system-specific design, the control cannot be used for other units.

The area of application of the supplied air handling unit can be taken from the order confirmation, in particular from the technical unit design.

The overall responsibility for correct installation, proper use, maintenance and servicing always lies with the system builder or operator of the overall system.

### 04.02 Accessories

The manufacturer offers or supplies equipment according to tenders from external designers of the entire air handling system. As a rule, this is only a subsection of the entire air handling system. Since the delivery is made only through specialized companies, certain accessories such as:

- Damper actuators
- pumps
- valves
- ...

can be provided by the customer. In the technical design, reference is made to accessories provided by the customer. Safety-relevant accessories must be installed by the specialist company before the first test run.

### 04.03 Protection measures taken

As a rule, our devices are equipped with the device-related safety measures. The repair switches are to be secured against being switched on again during maintenance (repair switch can be shut off).

### 04.04 Material resistance to cleaning agents, disinfectants

For wipe disinfection of the inner surfaces of our air handling units in design

- Hot-dip galvanized
- Stainless steel (1. 4301)
- Aluminum (AIMg)

all commercially available disinfectants can be used.

We recommend disinfectants based on formaldehyde, whereby the information on the safety data sheets of the manufacturer, with regard to

- material compatibility
- processing

must be observed.

### 04.05 Lightning protection

According to VDE 0185 T1 (VDE: Association of Electrical, Electronic & Information Technologies), a professional lightning protection system must be installed on central roof systems.



### 5. Storage, transport and assembly

### 05.01 Receipt of goods, transport damage



Unpack the goods in the presence of the driver and check for completeness and damage on the basis of our delivery bill and damage.

Transport damage must be acknowledged by the forwarder! (date and signature) A subsequent claim will be rejected by the forwarding insurers.

### 05.02 Note on disposable packaging



This is purely transport packaging. It has been quantitatively reduced to the indispensable minimum in order to be able to transport and unload the high-quality parts without damage.

The material is fully recyclable and can therefore be recycled.

The disposal costs are borne by the recipient of the goods.

Alternatively, it is possible to return the packaging material to us. The costs for the return transport are to be borne by the customer of the goods. Please note that the packaging material must not be contaminated and must be delivered separately according to groups.

### 05.03 Storage and functional maintenance

If parts are packed in foil, this must be removed immediately after delivery. Foils promote the formation of condensation water and thus oxidation phenomena, especially on hot-dip galvanized material.

In the case of sendzimir-galvanized components, corrosion is possible at the cut edges. A reddish or whitish discoloration of the cut edge alone is not a sign of problematic corrosion. The corrosion protection is still guaranteed and does not represent a reduction in its quality or a reason for complaint.

All device components and parts must be stored in such a way that impairments, damage due to contamination, condensation, weathering or external influences are excluded. In case of storage, standstill or delayed commissioning (standstill longer than 3 months!), the belts of belt-driven components must be slackened. Rotating and rotating components such as fans, motors, pumps, heat recovery rotors, actuators and louver dampers must be moved and rotated monthly. In addition, the following measures should be observed:

- Remove foils
- Store units temporarily in a dry and dust-free place protected from the weather.
- Close device openings so that no impurities (dust, vermin) can penetrate.
- Avoid condensation
- Ensure functional integrity of the components and built-in parts
- Observe additional maintenance and operating instructions of the component manufacturers

The units must also be carefully protected from contamination during installation.

#### Maximum permissible storage period or downtime for: Frequency converters, EC controllers, motors with integrated controllers.

#### Reforming of DC link capacitors

The maximum permissible storage period or downtime without mains voltage depends in particular on the electrolytic capacitors, since the dielectric in the capacitor degrades and the electrolyte evaporates.

Depending on the duration without mains voltage supply, the internal capacitors must be reformed before applying the full mains voltage.

Period without mains voltage	Measure before commissioning
less than 1 year	none
1-2 years	Connect device to mains for 1 hour without enable
longer than 2 years	Reformatting (without enable) via adjustable supply voltage
	1. 30% of the mains voltage for 1 hour
	2. 60% of the mains voltage for 1 hour
	3. for 2 hours 85% of the mains voltage
	4. for 3 hours 100% of the mains voltage

Mains voltage: Technical data of the respective device,

for wide voltage range = upper value of the mains voltage specification.

#### C-MAX COMPACT/FLEX Storage, transport und Mounting



### 05.04 Construction site transport of assemblies



#### Caution!

Serious personal injury or property damage may result from falling loads if the safety instructions are not observed.

Use and observe safety regulations for means of transport, lifting gear and approved lifting gear (according to BGV D6, Regulations of the employers' liability insurance association).

Do not stand under suspended loads!

Devices without transport device: When transporting with a forklift or rollers, leave the transport pallet under the device under the unit. When transporting with a forklift, ensure that the forks extend over the full width of the housing. Frame must rest on forks on both sides.

The unit components may only be transported in the installed position. They must not be overturned or rotated in the longitudinal axis, otherwise damage may occur to installed parts (e.g. fan vibration dampers shear off).

For fastening the suspension ropes or chains to the load suspension bracket, fastening elements appropriate to the load, e.g. shackles, must be used! For crane transport, all applicable safety regulations according to DGUV regulation 52 Cranes and DGUV 500 chapter 2.8 must be observed (DGUV german: German Statutory Accident Insurance)



**Attention!** The maximum load capacity per delivery unit incl. dead weight of the lifting aids must not be exceeded! Exceeding the load capacity may result in damage to the delivery unit. There is a danger to life.

### 05.05 Mounting wall-mounted control cabinets



The control cabinet can be fastened with the four enclosed mounting brackets. These are screwed to the control cabinet rear panel using the enclosed screws and IP66 seals. The wall cabinet can thus be lifted with the lugs on the on-site fastenings in the wall and then screwed tight.

#### Please also refer to the documents enclosed with the control cabinet!

Only the weight of the control cabinet may be supported with the fastening of the control cabinet! No additional loads may be applied!





### 05.06 Mounting of floor-standing control cabinets



During installation, the base must be firmly screwed to the substrate using suitable mounting fixtures. The control cabinet is then screwed to the base using the fastening devices supplied.

Please also refer to the documents enclosed with the control cabinet!

### 05.07 Electrical connection



#### Attention!

During commissioning and maintenance, all terminal points of the electrical system must also be tightened.

EMC directives and radio interference suppression levels must be taken into account. For mains bypass circuits, the relevant regulations according to VDE (Energy Supply Companies) and EVU (Association of Electrical, Electronic & Information Technologies) for star-delta starting or direct starting must be observed. The connection guidelines of the manufacturer must be observed!



The cross-section of the ground cable must be at least 10 mm<sup>2</sup>, or two separately laid ground cables connected in accordance with DIN EN 50178 or IEC 61800-5-1 must be used. Always follow the national and local regulations on cable cross-section.

**Commissioning:** The operating instructions of the frequency inverter must be observed during commissioning. The setting values of the frequency converter must be logged.



#### Caution:

Touching electrical components can be life-threatening even after disconnection from the power supply. Wait at least 15 minutes.



**Caution:** The electrical connections as well as the wiring must be carried out by a qualified electrician. The applicable standards must be observed.



### 05.08 Mounting accessories

The installation and connection of accessories to the WOLF C-MAX control system must generally be carried out by a specialist. The installation position is the responsibility of the specialist company. This section is only an aid for positioning. The following device drawing schematically shows the position of the sensors of the control system:



#### Supply air temperature (humidity) sensor

The sensor must be positioned in the supply air duct at a sufficient distance from the last air handling unit, if possible in the center of the duct.

#### Exhaust air temperature (humidity) sensor

The sensor must be positioned in the exhaust air duct after the merging of the individual exhaust air lines and upstream of the exhaust air fan / heat recovery as centrally as possible in the duct.

#### Room temperature (humidity) sensor

The room sensor must be installed in the room to be ventilated. Care must be taken to ensure good positioning (not at doors, not in corners) in order to provide a good reference value for the room.

#### Outdoor air temperature sensor

The outdoor sensor must be positioned so that it is not exposed to direct sunlight (north side). For a good measurement result, it should be mounted on the outside of the building / AHU and not in the ductwork.

#### Heat recovery system anti-icing sensor

The exhaust air temperature sensor should be positioned as close as possible to the heat recovery and the outdoor air flow in the exhaust air of the AHU after heat recovery.

#### Duct pressure sensors

Duct pressure sensors should be mounted at the ductwork breakpoint. If mounted closer to the AHU, the duct pressure should be set so that all flow controllers have sufficient control range.

#### **Smoke Detectors / Heat Detectors**

These must be positioned as specified by the fire code official. Here, there are different regulations depending on the federal state / country.

#### Volume flow sensors

The volume flow sensors must be connected to the measuring nozzle of the nozzle pressure measurement on the fan.



### 6. Controller operation

### 06.01 Display

The main overview of the display shows the plant status of the plant.



#### **Operating elements**

The operating elements and their functions are:

Pos.	Bezeichnung	Funktionen
1	Display	<ul> <li>Display of menus, objects, parameters, parameter values, commands, etc.</li> </ul>
2	Up / Down	<ul> <li>Navigate through menus</li> <li>change parameter values</li> </ul>
3	Confirm key	<ul><li>Select menus</li><li>Accept changed value</li></ul>
4	Back key	<ul> <li>return to higher-level menu</li> <li>discard changed value</li> </ul>
5	Alarm key LED	Jump to alarm page
6	Info key LED	Signalization of the system status

### 06.02 Info LED

The Info LED on the control element provides information about the current system status

Off	System off
Green	On / Comfort / Economy
Green flashing	night cooling / boost / external control
Orange flashing	fire damper test
Orange	Stop (alarm / emergency stop)
Orange / Green flashing	Manual operation
Rot	Fire

C-MAX COMPACT/FLEX Controller operation



### 06.03 Menu tree

ome page	Mair	menu	-	<b>&gt;</b>	Attachment
		menu			Attachment
viain menu	- PIN	Input			- Main overview
Main overview	- Plar	t			- Inputs
Manual intervention	- Con	nmunication	$\overline{}$		- Outputs
Dutside air temperature	- Glo	oal functions			- Plant functions
	- Alar	m Control			- Setpoints / Settings
	- Syst	em Objects			- Damper control
	- Syst	em configuration			- Fan control
					- Temperature control
					- Humidity control
	Main	overview			- Air quality control
	- Mar	ual intervention			
	- Syst	em state			
	- Time	er program			
	- Out	side air temperature			Communication
					- communication module
	- Fan	control			- Communication config.
					- IP Config.
	Temp	erature control			- Modbus RTU (RS485)
					- Climatix IC
					- Bacnet
					- Processbus
					- Room devices
					- Humidity control
					- Air quality control

 System Objects
- Date Time
 - communication



### 06.04 Password input

Under Main menu -> PIN input the user, service or manufacturer level can be reached.

By entering the individual digits with Up/Down (2) and confirming each with (3), the password is entered into the input. The feedback of the input is done by a key in the right upper edge of the screen

User:	1000	1 key
Service:	2000	2 keys



**Attention!** Improper use of the password levels may result in irrevocable changes to the program. This may void the manufacturer's warranty!

### 06.05 Alarm menu



#### The user password level is required.

Pressing the alarm button (5) displays the last alarm.

By pressing the alarm button (5) again, the alarm lists are called up. All currently pending alarms are listed here.

C-MAX COMPACT/FLEX Controller operation



By selecting an alarm in the list with Up / Down (2) and confirming (3), detailed information on time etc. is displayed.

1st line	name of alarm	state
2nd line	message class	
3rd line	date	time

At the beginning of the alarm list is the acknowledgement of the alarms. In addition, the number of pending alarms is displayed at the right margin.

By pressing the alarm key (5) again, the alarm history is called up. The past and no longer active alarms are listed here. The alarm history can contain a maximum of 50 entries.

The alarm history can be reset in the Alarm menu. This menu can be reached by further pressing the alarm key (5)



### 06.06 Set setpoints

#### The user password level is required.

Via the menu tree Main menu -> Plant -> Setpoints an overview with the setpoints of the plant for the temperatures, volume flows / pressures etc. is reached. Here the setpoints can be changed by selecting a value with (3) and changing it via Up / Down (2) and then confirming the new value with (3).

### 06.07 Time input

By Main menu -> System objects the current date as well as the time must be set at the start-up. The values can be changed in the menu in the first program line. For this, the respective section is selected via Confirm (3) and changed with Up / Down (2).

Without setting the time, the system will not operate according to the time switch program and any fault messages will have an incorrect time stamp!

### 06.08 Plant status

The current plant status can be viewed in the main overview or under operating mode. To do this, open the menu via Main menu -> Plant -> Plant functions.

The first line shows the current operating mode of the plant. (operating status)

The following line shows the reason for this state. (Plant state)

Auto	ventilation system runs according to the set time switch program
Off	plant is switched off
Economy	system runs manually with the Economy setpoints

Comfort system runs manually with the Comfort setpoints

06

C-MAX COMPACT/FLEX Controller operation



### 06.09 Timer program

#### The user password level is required

The time switch program allows the system to be operated automatically without the need for manual intervention. For this purpose, the time and date must be set as described under 06.07. Then the setting of the switching times can be called up via Main menu -> Plant -> Plant functions -> Time switching program. Here, a switching program consisting of a maximum of 6 switching values can be configured for each day.

#### Example:

Select Monday (3)

Time-1 is fixed at 00:00, only the plant status can be changed.

Time-2 is the desired start time of the plant by selecting (3) and changing the time with (2). Then select the system status to the desired value (Economy / Comfort).

Time-3 is the desired switch-off time in the evening.

For simplification, the Monday program can be copied to the other days.

In addition, exception days and associated exception time switching programs can be set.

### 06.10 Outputs

#### Alarm output:

In this menu, the direction of rotation of the alarm output can be inverted. This is set to inverse (NC) in the factory. Main menu -> System -> Outputs -> Alarm output 1

By pressing "Contact function" it is possible to choose between inverse (NC) and normal (NO).

#### Heat pump heating / cooling:

If a heat pump is integrated in the system functions, the changeover contact heating / cooling of the heat pump can be selected. Under "Contact function", the heat pump is set to inverse (heating = closed, cooling = open) at the factory. By changing to normal, the contact function is (heating = open, cooling = closed).

This menu item can be found with a configured heat pump under Main menu -> System -> Temp control -> Heat pump mode.

### 06.11 Heating and cooling setpoints

When setting the temperature setpoints of the system, a distinction is made between setback mode (Economy) and normal mode (Comfort). The Economy heating value must always be lower than the Comfort heating setpoint. Similarly, the Economy cooling setpoint must be set greater than or equal to the Comfort cooling setpoint. A control hysteresis of at least 1 K must be maintained between heating and cooling to prevent the system from cycling between heating and cooling operation.

#### Example:

Economy heating	comfort heating	hysteresis	comfort cooling	economy cooling
19°C	21°C	>1 K	22°C	24°C



### 7. C-MAX compact

The WOLF C-MAX compact control system includes all the usual control and monitoring functions for air handling units. The schematic diagram shows the basic system structure with the possible functions that can be equipped. Some of these functions cannot all be used in parallel in one AHU.



#### Legend

The elements marked above are:

#### Pos. Element

- 1. Fire monitor
- 2. Timer program
- 3. Free alarm display
- 4. Occupancy button
- 5. Emergency button

- 6. Alarm display
- 7. Heat recovery: rotary heat exchanger, plate heat exchanger, water heat exchanger

The sequence diagram below describes the sequence of possible heating and cooling functions of the WOLF C-MAX Compact control. There is a freely adjustable dead zone between the heating and cooling sequences for energy-efficient operation without clocking changeover.





### 8. C-MAX flex

The WOLF C-MAX flex control system includes all the usual regulation, control and monitoring functions for air handling units (AHUs). In addition, many special functions such as zone control, various fire damper controls and comprehensive humidity control can be implemented. The principle diagram shows the basic system structure with the possible functions that can be equipped. In some cases, not all of these can be used in parallel in one AHU.



#### Legend

The elements marked above are:

#### Pos. Element

- 1. Fire monitor
- 2. Timer program
- 3. Free temperature sensor
- 4. Free alarm display
- 5. Display of a specific operating mode
- 6. Occupancy key
- 7. Set point adjustment

- 8. Emergency key
- 9. Alarm acknowledgement
- 10. alarm display
- 11. Heat recovery:
  - rotary heat exchanger, plate heat exchanger, water heat exchanger

The sequence diagram below describes the sequence of possible heating and cooling functions of the WOLF C-MAX flex control. There is a freely adjustable dead zone between the heating and cooling sequences for energy-efficient operation without clocking changeover.



With the WOLF C-MAX flex control system, a separate controlled system can be configured to control the desired room air or exhaust air humidity.



C-MAX COMPACT/FLEX C-MAX devices



### 9. C-MAX devices

### 09.01 POL822 room unit

The picture shows the POL822 room unit:



#### Keys and functions

The keys designated in the picture and their functions are:

Pos.	symbol	designation and function of the keys		
1	Ů	<b>On / Off</b> Switching between "Off" and "On" status. In the "Off" state, keys 2 - 8 are disabled and the display is switched off.		
2		Presence		
	Π	Switching on/off a programmed presence operating mode.		
3	PROG	<b>Program</b> – Press and hold: Set date and time of the room unit. – Press briefly: Change the timer program.		
4	_	<b>Minus</b> Shifting the temperature setpoint. Each press of the key decreases the setpoint by 0.1°C / 0.5°F or by 0.5°C / 1.0°F.		
5	+	<b>Plus</b> Shifting the temperature setpoint. Each press of the key increases the setpoint by 0.1°C / 0.5°F or by 0.5°C / 1.0°F.		
6	$\checkmark$	<b>OK</b> Confirm date / time and timer program entries.		
7	æ	Fan Adjustment of the system level. Each time the key is pressed*, the speed is increased by one step. (Enable and additionally OpMode not on Auto). <i>Cyclic operation: 1-2-3-Automatic-1-2-3-Automatic etc.</i>		
8	$\bigcirc$	Mode Choice between maximum three energy modes: Auto, Comfort and Economy. Each time the key is pressed*, the mode is advanced and displayed with the corresponding symbol. <i>Cyclic operation: Auto - Comfort - Economy - Auto etc.</i>		
9	Ø	<b>Recovery</b> The heat recovery is active.		



\*The "Press" function of the keys pos. 7 and pos. 8 must be enabled (Integrations / RoomUnit Settings / Manual Control "Yes").

C-MAX COMPACT / FLEX **C-MAX** devices



#### Indications in the display

The display shows:

- Room temperature (average, min, max)
- Setpoint shift
- Plant stage •
- Time •
- Weekday

Display	meaning
	<b>Temperature display range</b> Display of the return air temperature, the respective room unit temperature or the "mixed room temperature" in °C or °F.
	Temperature in °C resolution 0.1 °C
	Temperature in °F resolution 1.0 °F
	Setpoint shift Can be displayed/changed in °C or in °F Resolution 0.1°C/1.0F or 0.5°C/1.0F
am	Time
	Plant level
1234567	Weekday display (POL822.60/xxx only) 1 = Monday
(	<b>ON / OFF</b> The device is not completely switched off with "Off", but only set to standby mode
AUTO	Auto mode When the symbol is flashing, the room unit is overridden by the controller, keys 1, 2, 5 and 8 are disabled
$\square$	Economy operating mode active
<del>ک</del>	Comfort mode active
XŽ≮	Cooling
<u>\$\$\$\$</u>	Heating
୍ଡ	Automatic system control
	Presence operating mode
Ø	Energy feedback
Û	Alarm display
P	Parameter mode

When the controller sends an alarm to the room unit, the alarm indicator appears in the display. Depending on the alarm, the alarm number is also displayed with the alarm priority. The meaning of the alarm numbers can be read in section "11. Alarm list" on page.

- A = alarm to be switched off
- B = C = normal alarm
- Maintenance



### 09.02 Control panel

For rough environments, such as kitchens or industry, there is an optional control panel for simple system control.



### Depending on the requirements, this has the following functions:

- LED indicator lights: Operation, malfunction, maintenance (filter message)
- Operation selector switch: Auto / Off or Auto / Off / Stage1 / Stage2
- Temperature selection: Setpoint shift ±3K or setpoint setting 0°C - 50°C

### 09.03 HMI4Web

The web server provides remote access and plant monitoring within a closed network via an Ethernet connection. For this purpose, the following parameters must be set on the controller. After changing values it is mandatory to restart the controller!

#### The service level is required for setting!

Main menu -> System objects -> Communication -> IP config.

Name	Range	Function
DHCP	Active Passive	Display of the type of address reference: • Obtain address from DHCP server • IP address permanently set
Current IP		display of the subnet mask
Act. Mask		display of the subnet mask
Act. Gateway		display of the address of the gateway
Set IP		input of the IP address of the controller if DHCP is set passively
Set Mask		input of the subnet mask
Set Gateway		enter the address of the gateway
Primary DNS		enter Primary DNS
Secondary DNS		enter Secondary DNS
Name		display the controller name
MAC		display the Mac address of the controller
Link	Passive Active	<ul> <li>No connection to Ethernet</li> <li>Connection to Ethernet exists</li> </ul>
100 Mbit	Passive Active	Switching the transmission speed: • 10 MBit • 100 MBit
Extended		Jump to menu extended
Restart required!		

After successful setup, the controller can be accessed via the IP address (Current IP) with a web browser. The login data required for this are:

User name: ADMIN Password: SBTAdmin!



### 09.04 Touch-Panel

The optional touch panel offers a modern and comfortable operation and overview of the analog functions. The login is done with the normal user or service password.



- All important values of the AHU are automatically displayed in the overview. Here the temperature values as well as the plant states can be read and the setpoint temperatures can be adjusted.
- The system diagram is a factory-generated, automatically generated diagram of the ventilation system. Thus, the current states of fans, dampers, heat recovery or registers can be easily read.
- The operation manager displays the normal menu structure as described in 6. controller operation. Depending on the password level logged in, the system parameters can be adjusted here.
- The alarm page is analogous to the alarm button on the operating device. Alarms can be read with their respective time stamps and the alarm history can be viewed.
- Trend recording is a special function of the touch panel for displaying plant values in a diagram. Up to 5 values can be recorded simultaneously.
- Via schedule the time switching program of the plant can be adjusted with a view optimized for touch operation. The setting limits as described in 06.09 apply here.

C-MAX COMPACT/FLEX Communication



### 10. Communication

### 10.01 Modbus RTU

The Modbus RTU communication is realized via a separate additional module (POL902), which is optionally available. This is preconfigured as a Modbus slave to enable integration into a BMS network.

The Modbus protocol is a master / slave protocol. This means that a Modbus network consists of only one master and one or more slaves. The RS485 interface of the WOLF C-MAX controller is designed as a 3-wire with a common reference signal REF.



#### BSP LED:

Green = Operation and communication with controller Red = Fault Modbus module **BUS LED:** Green = communication on two channels Orange = Communication on one channel Red = No communication

#### Configuration by means of control cabinet operating panel:

Service level is required for setting!

Main menu -> Communication -> Communication module -> Modbus module -> Channel 1 / 2

Slave address: enter according to the default of the Modbus master (1 - 247)

Baud rate: All participants must be set to the same transmission rate. (2400, 4800, 9600, 19200, 38400)

Stop bit: All participants must be set to the same value (1 or 2 stop bits)

Parity: All nodes must be set to the same value (None, Even, Odd)

Response delay: Delays the response of the slave by n milliseconds

Termination: A RS485 network must always be terminated with terminating resistors at the last station.

Timeout comm.: Time after which the BUS LED switches to red / orange if no communication takes place.

Restart required! After adjusting values, a restart of the controller must take place.

C-MAX COMPACT/FLEX Communication



### 10.02 BACnet IP

The BACNet IP connection is established via the communication module (POL908), which is optionally available as an accessory. The module enables the integration of the WOLF C-MAX controller as a BACnet client in the on-site network.



BSP LED:

Green = Operation and communication with controller Red = Fault Modbus module - **BUS LED:** Green = Module ready for communication Orange = Start of control Red = No connection with TCP / IP network

#### Configuration by means of control cabinet operating panel:

Service level is required for setting!

Main menu -> Communication -> Communication module -> BACnet IP module

Device name: The device name must be unique in the network. The factory name consists of the mac address of the module and is therefore always unique.

Device ID: The ID must be unique in the network. The default ID is always unique at the factory.

Port: The value must be entered as a hexadecimal number (BAC0=47808, BAC1=47809, ..., BACF=47823).

DHCP: The IP address can be obtained from a DHCP server (DHCP=Active) or be permanently set on the controller (DHCP=Passive).

IP address: With Passive DHCP, the IP address must be permanently entered. The line must be filled with # if empty cells remain.

Mask: With Passive DHCP, the mask must be entered as a fixed value. The line must be filled with # if empty cells remain.

Gateway: With Passive DHCP, the gateway must be entered as a fixed value. The line must be padded with # if empty cells remain.

Write Values: This value must be set to "Active" if any changes have been made

#### Restart required! After adjusting values a restart of the controller must be done.

Un to higher level denote	a	
02/11/2009 01:49 02/11/2009 01:49 02/11/2009 01:49 02/11/2009 01:49 02/11/2009 01:49 02/11/2009 01:49 02/11/2009 01:49	123 HENRING 135 Comparison Long 135 Comparison Long 135 Comparison Long 136 Comparison Long 137 Henrikan Long 138 Henrikan Long 139 Henrikan Long 139 Henrikan Long	

Export EDE file: After successful setting the BACnet parameters, the EDE file with the data points can be read out on a connected PC.

For this purpose enter the address ftp://IP-Adresse/Temp in the browser. The two files selected in the picture must be downloaded and can be opened via Excel.



### 11. Alarm list

Alarm Text	Notific. class/	Alarm no.	Settings 1	Settings 2
	group	room unit		
Communication test	3/C	1		Time delay 600 s
External setpoint	2/B	20	High Limit 6.0 °C Low Limit -6.0 °C	Time delay 5s
Supplemental alarm	2/B	21		Time delay 0s
Manual mode	2/B	22		Time delay 1800 s
Modbus comm.	2/B	23		Time delay 10 s
Process bus comm.	2/B	23		Time delay 10 s
Room unit temp.	2/B	24		Time delay 17m
Room unit 2 temp.	2/B	24		Time delay 17m
AHU Rturn temp.	2/B	25		Time delay 0s
Room temperature	2/B	26		Time delay 0s
Room temperature 2	2/B	27		Time delay 0s
Extract air temperature	2/B	28	Low Limit -10.0 °C	Time delay 0s
Energy recover supply air temperature	2/B	29		Time delay 0s
Supply air temperature 2	2/B	30		Time delay 0s
Supplement temp.	2/B	31		Time delay 0s
Supply air temp. deviation	2/B	32	Max deviation = 10.0 °C Min Limit = 10.0°C StrtUpDly 60 s	Time delay 3600s
RAL temp. deviation	2/B	33	Max deviation = 10.0 °C Min Limit = 10.0°C StrtUpDly 600 s	Time delay 3600 s
H-Reg pump alarm	2/B	34		Time delay 0s
Heating reg. pump RM	2/B	34	StrtUpDly 10 s	Time delay 0s
C-Reg 2 CM alarm	2/B	35		Time delay 0s
Cooling register 2 RM	2/B	35	StrtUpDly 10 s	Time delay 5s
C-Reg 2 pump alarm	2/B	35	StrtUpDly 30 s	Time delay 1s
Cooling register 2 pump RM	2/B	35		Time delay 0s
C-Reg 2 pump alarm	2/B	36		Time delay 0s
Heating reg. 2 pump RM	2/B	36	StrtUpDly 10 s	Time delay 0s
Humid. pump alarm	2/B	37		Time delay 0s
Humid. pump RM	2/B	37	StrtUpDly 30 s	Time delay 5s
Humidifier RM	2/B	38	StrtUpDly 10 s	Time delay 5s
Exhaust air filter alarm	2/B	39		Time delay 0s
Filter alarm	2/B	39		Time delay 0s
Supply air filter alarm	2/B	39		Time delay 0s
Fan op hours alarm	2/B	40	Alarm Lim Op hours 17520 h	Time delay 0 s
C-Reg CM alarm	2/B	41		Time delay 0s
C-Reg CM RM	2/B	41	StrtUpDly 30 s	Time delay 1s
Cooling register pump Alm	2/B	41		Time delay 0s
Cooling reg. pump RM	2/B	41	StrtUpDly 10 s	Time delay 5s
HR Alarm	2/B	42		Time delay 0s
HR pump alarm	2/B	43		Time delay 0s
HR pump RM	2/B	43	StrtUpDly 10 s	Time delay 5s
HR efficiency	2/B	44		Time delay 600 s
HR damper	2/B	45		Time delay 0 s





Alarm Text	Notific. class/ Alarm no.		Settings 1	Settings 2	
	group	room unit			
Supply air relative humidity	2/B	46	High Limit 100%rel	Time delay 0 s	
Supply air humidity deviation	2/B	46	Max deviation = 5.0%rel Min Limit = 10.0%rel StrtUpDly 60 s	Time delay 3600 s	
AHU relative humidity	2/B	47	High Limit 100%rel	Time delay 0 s	
RAL humidity deviation	2/B	48	Max deviation = 10.0%rel Min Limit = 10.0%rel StrtUpDly 60 s	Time delay 3600 s	
Room air relative humidity	2/B	48	High Limit 100%rel	Time delay 0 s	
Air quality	2/B	49	High Limit 3000 ppm	Time delay 0 s	
Supply air temperature	1/A 60		Time delay 0 s		
Extract air temperature	act air temperature 2/B 61		Time delay 0 s		
ctric reg alarm 1/A 62		Time delay 0 s			
Electric reg 2 alarm	1/A	63		Time delay 0 s	
Fire dampers closed	1/A	64	Start delay=Clos. Time* 1.15	Time delay 5 s	
Fire damper change	1/A	64		Time delay 5 s	
Fire damper open	1/A	64	Start delay=Open. Time* 1.15	Time delay 5 s	
Extract air damper RM	1/A	65	StrtUpDly 180 s	Time delay 5 s	
Extract air damper RM	1/A	65	StrtUpDly 180 s	Time delay 5 s	
Fan alarm	1/A	66		Time delay 0 s	
Supply air fan alarm	1/A	66		Time delay 0 s	
Supply air fan RM	1/A	66	StrtUpDly 60 s	Time delay 5 s	
Extract air fan alarm	1/A	67		Time delay 0 s	
Extract air fan RM	1/A	67	StrtUpDly 30 s	Time delay 5 s	
Dew point	0/A	68		Time delay 0 s	
Supply air fan deviation	0/A	69	StrtUpDly 180 s	Time delay 60 s	
Supply air flow	0/A	69	High Limit 40000 l/s	Time delay 10 s	
Supply air pressure	0/A	69	High Limit 5000 Pa	Time delay 10 s	
Extract air fan deviation	0/A	70	StrtUpDly 180 s	Time delay 60 s	
Extract air flow	0/A	70	High Limit 20000 I/s	Time delay 10 s	
Extract air pressure	0/A	70	High Limit 5000 Pa	Time delay 10 s	
Extract air temp. fire alarm	1/A	81	Limit 50 °C	Time delay 2 s	
Supply air temp. fire alarm	1/A	81	Limit 70 °C	Time delay 2 s	
Fire alarm	0/A	81		Time delay 0 s	
H-Reg frost temp	1/A	82	Low Limit 5.0 °C	Time delay 0 s	
Heat recovery water temp.	1/A	83	Low Limit -2.0 °C	Time delay 0 s	
H-Reg 2 frost temp	1/A	84	Low Limit 5.0 °C	Time delay 0 s	
H-Reg frost detector	1/A	85		Time delay 0 s	
H-Reg 2 frost detector	1/A	86		Time delay 0 s	
HR frost detector	1/A	87		Time delay 1200 s	
HR frost pressure	1/A	87	High Limit 5000 Pa	Time delay 0 s	
Conf. alarm H-Reg 2	0/not Exist			Time delay 0 s	
Duplicate config IO	0/not Exist			Time delay 0 s	
Unconfigured IO	0/not Exist			Time delay 0 s	
IO auxiliary module	0/A			Time delay 0 s	



### 12. FAQ



This section describes the most common system malfunctions and a possible remedy suggestion. Interventions in the electrical system or the control functions of the systems must be carried out by a specialist!

#### 1. Frost protection triggers:

The fault causes can be: There is no hot water available for the system; The line length to the on-site generator is too long; The register is incorrectly piped (no injection circuit / mixing circuit); Check on-site heat supply; The prepurge time of the heating register must be extended; The register piping must be converted to an injection circuit.

#### 2. Fan malfunction:

The causes of the fault may be: The repair switch of the fan is switched off; not all phases (at 400 V) are connected to the fan (CAUTION! Call in an electrician!) -> Check unit and switch on repair switch; check fuses and feed. (ATTENTION! Call in electrician!)

#### 3. Error message "archive full":

The archive stores the messages on the WOLF C-MAX controller. This can be deleted via "Main menu -> System objects -> Archive -> Delete all data". (The service level is required for setting!) To switch off the archive permanently, select "->Activation" = "None" and restart the system via "Restart required".

#### 4. Regular fire damper malfunction:

The cause of the fault may be the integrated Fire protection damper test. This regularly closes and reopens the fire protection dampers to check their function. The test can be deactivated via "Main menu -> System > Settings > All settings > Damper control -> Fire dampers -> Autotest = 0".

#### 5. WOLF C-MAX controller display remains dark:

The cause of the error may be a tripped 24V fuse in the WOLF C-MAX control cabinet. This should be checked by a qualified electrician (24V fuse). In addition, the voltage supply of the control cabinet should be checked.

#### 6. Setpoint temperature not reached at very low outdoor temperatures:

The heat recovery system is continuously reduced via the heat recovery frost protection sensor if there is a risk of freezing. This stored temperature value (factory setting  $3^{\circ}$ C) can be adjusted via "Main menu > System > Temp control > Heat recovery > Frost setpoint". (The service level is required for adjustment!).

#### 7. Wrong direction of rotation of the AUL / FOL / UML dampers:

Check correct connection of the individual wires on the damper and control cabinet (CAUTION! Call in an electrician!). If necessary, the direction of action can be reversed by means of a switch on the damper actuator.

#### 8. Not plausible temperature values of AUL / ZUL / Raum / ABL / FOL:

Check wiring of individual sensors, whether each sensor is connected to the correct terminal.

#### 9. Control jumps between heating and cooling:

Insufficient hysteresis set between heating, and cooling setpoints. (min. 1K)

#### 10. Heating setpoint cannot be increased:

Check cooling setpoint! Cooling setpoint must be greater than heating value + 1K.

#### 11. Fan control oscillates (with volume flow, duct pressure control):

The cause of the error may be an incorrectly set PI controller. This can be set more slowly via "Main menu > System > Fan control > ZUL fan / ABL fan". The values should only be changed step by step.

P-component smaller, I-component larger -> PI-controller becomes slower P component larger, I component smaller -> PI controller becomes faster



### 13. Maintenance

### 13.01 Warranty

Our warranty will be void if damage is caused by improper handling, operation and maintenance. Experience has shown that improper or inadequate maintenance causes greater damage as the products age. Consumable and wear parts are generally excluded from the warranty.

The legislator clearly specifies annual maintenance intervals for safety equipment:

e.g.: Ordinance on workplaces - § 4, 3

Inspections of safety equipment may only be carried out by qualified or skilled personnel!

VDI 6022 Hygienic requirements for ventilation and air-conditioning systems

VDI 3801 Operation of ventilation and air-conditioning systems

DIN EN 13053 Performance program for the maintenance of ventilation and other technical equipment in buildings; ventilation and air-conditioning equipment and systems

AMEV Recommendation - Maintenance 85

DIN 1946/4 Ventilation systems in hospitals

DIN EN 13053 Central air handling units - Performance data for units, components and assemblies

We refer to the checklists contained in the aforementioned regulations, in which recommendations for maintenance intervals are given!

For maintenance and servicing work on air handling units, VDI 6022 requires training in accordance with Category B (hygiene training).

### 13.02 Electrical connections



Tighten all terminal points!

The safety functions of the control must be subjected to an annual function test and, if necessary, the defective components must be replaced/repaired.



### 14. Decommissioning, dismantling and disposal

### 14.01 Decommissioning

- Reduce plant to minimum capacity via regulation/control system.
- Close all control valves
- Switch off circulation pump
- Drain installed parts at risk of freezing. Blow through pipelines with compressed air until they are completely empty.
- Switch off the main switch and lock the system

### 14.02 Recommissioning

- Carry out a visual inspection to determine whether there is any visible damage. Then recommission the unit as described under Commissioning.
- Slowly refill drained components and carefully vent them.
- Open all valves
- Operate main switch
- Switch on regulation / control

### 14.03 Dismantling and disposal



#### **Dismantling - Disassembly**

Before starting dismantling, the air handling unit or the consumers installed in it must be disconnected from the power supply. All current-carrying connection lines must be removed by a qualified electrician.



Furthermore, all media-carrying components must be completely drained. This must be carried out by a specialist who will dispose of the water with antifreeze in a professional manner

- Water with antifreeze
- · Refrigerant in evaporator piping and condenser
- compressor oils

carried out.

#### Attention!

System parts are under pressure!

The AHU can then be dismantled on site into the individual unit modules or into its individual parts. This should also be carried out by a specialist company that is familiar with the environmentally friendly disposal of the individual parts.

Disposal must be carried out in accordance with the applicable, relevant and local environmental and recycling regulations of your country and municipality.

#### **C-MAX** COMPACT / FLEX Decommissioning, dismantling and disposal



The following materials are used in our air handling units

Casing - frame profiles, cladding panels and built-in parts:

- Hot-dip galvanized sheet steel
- Stainless steel 1.4301
- Aluminum AlMg
- copper
- Brass
- PVC

Sealing profiles:

- Rubber compound profiles EPDM
- Fluoroelastomers FKM
- PVC

Sealing compounds:

Polyurethane

Insulating material:

- Mineral wool
- Soundproofing mats
- Sandwich panels (coated, hot-dip galvanized steel sheet, polyurethane)
- Armaflex



### 15. Emergency

### 15.01 Fire fighting

There is no immediate fire hazard from the AHU. Only the seals, which are installed in small quantities, can burn off due to external influences. In the event of fire, self-contained breathing apparatus must be worn to fight the fire.

The unit must be disconnected from the power supply. Suitable extinguishing media are



- Water spray
- Extinguishing foam
- Extinguishing powder

### 15.02 Escaping harmful substances

Since only small quantities of combustible seals are installed, only small quantities of harmful substances can be produced in the event of fire. These are due to the materials used - nitrogen oxides, carbon dioxide, carbon monoxide, hydrogen chloride.

### 16. Quick Guide



### **C-MAX COMPACT / FLEX**

### Display

The main overview of the display shows the air handling unit status.

6	•	Hauptübersicht	2/77 0 AUS	2
5	•	Ceitschaltprogram Zeitschaltprogram	Aus Aus	2
4	•	AUL-Feuchte rel AUL-Feuchte abs	0 %rH 0.0g/kg	3

Pos.	Designation	Functions		
1	Display	<ul> <li>Display of menus, objects, parameters, parameter values, commands etc.</li> </ul>		
2	Up / Down	<ul><li>Navigating through menus</li><li>Changing parameter values</li></ul>		
3	Confirm button	<ul><li>Selecting menus</li><li>Applying the changed value</li></ul>		
4	Back button	<ul><li>Return to higher-level menu</li><li>Discard the changed value</li></ul>		
5	Alarm LED button	• Jump to the alarm page		
6	Info LED button	• Signalisation of the of unit status		

### Info LED

The info LED on the control element provides information on the current unit status.

Off	
Green	
Green blinking	

**Orange blinking** 

Orange

Red

Night cooling / Boost / external control **Fire Damper Test** Stop (Alarm / Emergency Stop) Orange / Green blinking Manual Operation Fire

Air Handling Unit is off

On / Comfort / Economy

### Password input

Main menu -> Passw	ord input	
User:	1000	1 Key
Service:	2000	2 Key



### **Quitting Alarm**

#### The user password level is required!

Press the alarm button (5) twice -> alarm list is displayed

- Activate the pending alarms by pressing Alarm. Quit by pressing Confirm (3).
- Then press Execute and Confirm (3).

### Adjusting Setpoints

#### The service password level is required!

Main menu -> System -> Settings

• Here the setpoints can be changed by selecting a value with (3) and changing it with up/down (2) and then confirming the new value with (3).

### Setting Time

Main menu -> System objects

- The current date and time must be set in the first line.
- If the time is not set, the system will not be operated according to the time switch programme and any fault messages will have an incorrect time stamp!

### Air Handling Unit Status

The current air handling unit status can be viewed in the main overview or under Unit Functions.

Main menu -> Air Handling Unit -> Unit functions

- The current operating mode of the unit is displayed in the first line.
- In the following line, the reason for this state is indicated (operation status).
- In the third line, the unit can be overridden by manual intervention.

### Time switch programme

The user password level is required!

Main menu -> System -> Setpoints / Settings -> Time switching programme

For each day, a switching programme consisting of a maximum of 6 clock times and switching values can be configured.

#### Example:

Selecting Monday (3)

- Time-1 is fixed at 00:00, only the unit status can be changed.
- **Time-2** is the desired starting time of the unit by selecting (3) and changing the time with (2). Then setting the unit status to the desired value (Economy / Comfort).
- Time-3 is the desired switch-off time in the evening.

To simplify matters, the Monday programme can be copied to the other days (Copy ZSK).

In addition, exception days and the corresponding exception time switch programmes can be set.

For further information, please refer to the operating and Maintenance Manual C-MAX compact / flex at: www.wolf-geisenfeld.de



The main ww

The latest version of the operating and maintenance instructions can be found at: www.wolf-geisenfeld.de/downloads



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