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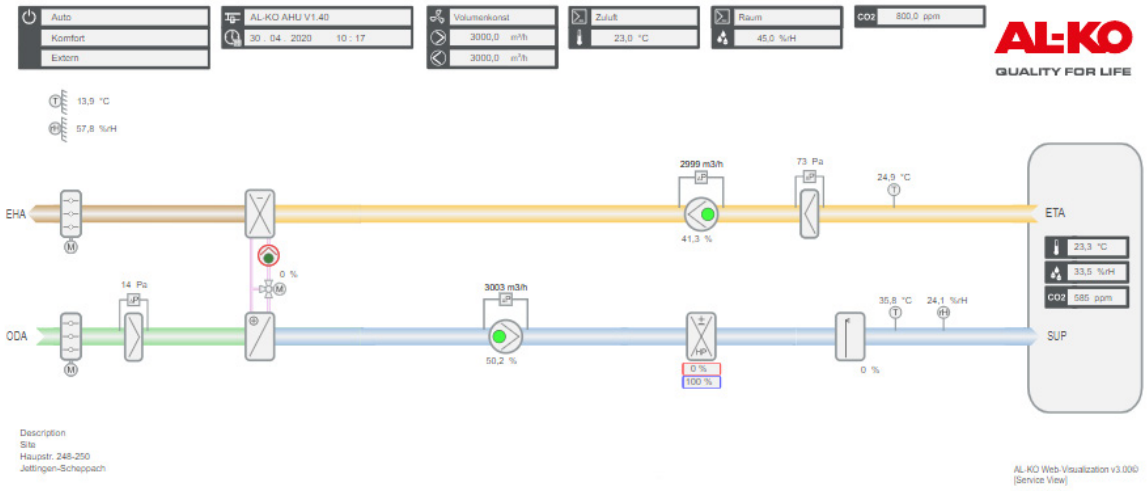

OPERATING MANUAL

CONTROL UNIT ART TECH LEVEL II

Legal

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Revision history

Version	Description	Date
-	Start of authoring	17/10/2017
0.1	Issuance of draft to customer service to support commissioning	07/02/2018
0.2	Target audience, depictions and important safety instructions added New arrangement of various sections Completion of various sections	27/02/2018
0.2	Incorporation of correction feedback. Menu section moved forward. New depictions identifying plant equipment and configuration.	28/03/2018
1.0	Contents migrated to InDesign and adapted editorially.	26/11/2018
2.0	Addition of new functions from the software release V1.40	17/02/2021

Table of contents

1 About this document

- The German version is the original operating manual. All further language versions are translations of the original operating manual.
- Read through this operating manual prior to installation, commissioning and maintenance. This is the prerequisite for safe work and trouble-free handling.
- Observe the safety instructions and warnings in this operating manual and on the product.
- This operating manual is a permanent part of the described product and must be handed over to the buyer if the product is sold.

1.1 Validity

This document applies to all software applications called AL-KO AHU v1.xx. The software applications are used in the MSR systems of the AT4, Easyair® and Easyair® Flat products.

Depending on the plant equipment, not all functions will be available after the plant is switched off. Easyair® and Easyair® Flat have a less extensive range of optional equipment than AT4.

1.2 Target group

The operating manual is directed toward service and commissioning technicians. It is intended to provide assistance with the commissioning and setting of the ventilation and air conditioning systems of AL-KO Therm GmbH, which are equipped with the ART Tech Level II MSR system at the factory.

The target group of the operating manual must already be knowledgeable in the following areas:

- General knowledge about measuring and control equipment for ventilation and air conditioning systems;
- Knowledge about the correct commissioning and operation of the ventilation and air conditioning systems.

1.3 Explanation of symbols

1.3.1 Safety instructions

⚠ DANGER!

This signal word is used to indicate an imminently dangerous situation which, if not avoided, will result in death or severe injury.

⚠ WARNING!

This signal word is used to indicate a potentially dangerous situation which, if not avoided, could result in death or severe injury.

⚠ CAUTION!

This signal word is used to indicate a potentially dangerous situation which, if not avoided, could result in minor injury.

ATTENTION!

This signal word is used to indicate a potential risk of property damage.

NOTE!

Special instructions for ease of understanding and handling.

1.3.2 Abbreviations and figures

Abbreviation	Description
EXT (ETA)	Extract air
ART	AL-KO control technique
OUTS (ODA)	Outdoor air
CFA	Central fire alarm system
FD	Fire damper(s)
EXH (EHA)	Exhaust air
BMS	Building management system
HMI	Human Machine Interface
LED	Light emitting diode
MSR system	Instrumentation and control system
PI controller	Proportional integral controller
SP	Setpoint
RCA	Recirculation air
Hrec (HR)	Heat recovery
ZUL (SUP)	Supply air
PIN	Password
ID	Password
Login	Password

Equipment!

This is how different possible equipment ranges of the plants are displayed. Easyair® and Easyair® Flat have a less extensive range of optional equipment than AT4. Thus, not all described functions are available in every device.

Configuration!

The configuration is important in addition to the equipment. Some functions are available in every device if configured accordingly.

NOTE!

The terms PIN, password and login all refer to the password.

2 Important information

2.1 General safety instructions

- The MSR system may only be used for measuring, control and monitoring of the ventilation and air conditioning systems of AL-KO Therm GmbH.
- The MSR system may only be connected and used with components released or recommended by AL-KO Therm GmbH. As part of the overall configuration, the user of the components must adhere to all safety instructions of the respective manufacturer.
- Devices and system components may only be used in technically perfect condition. Malfunctions and damage that could affect safety must be rectified immediately.
- The standard passwords for the operating devices must be changed individually to prevent unauthorised accesses. Never give out passwords to unauthorised persons.
- When connecting the MSR system to the existing building network, it must be ensured that the Internet access of the building network is always protected against attacks by the latest technology.
- If the MSR system has an Internet connection that is separate from the building network (e.g. UMTS modem), it must be ensured that there is no connection to the building network.
- To prevent manipulations on the MSR system, only authorised persons are permitted to have access to the switch cabinet.
- All applicable safety, building, accident prevention, installation and other relevant regulations with an influence on the safe use of the MSR system must be observed while performing any work on the system.
- The switch cabinet must only be opened by electrical technicians.
- Before opening the switch cabinet, switch off the power supply. Do not work while the equipment is energised.
- The plant must be de-energised when changing fuses. Only use the intended replacement types.
- Safety equipment, safety features and monitoring equipment must not be removed, bypassed or disabled in any other way.
- The necessary protective measures against high contact voltage must be adhered to. Do not take any steps that would impair the effectiveness of existing protective measures.
- Do not remove covers, housings and other protective equipment. Do not operate the plant and its components if standard protective equipment has failed or is impaired.
- The MSR system may only be commissioned and operated by persons who have read the operating manual.
- Avoid electromagnetic and other disturbing influences on the signal and connecting lines.
- Only install the system and plant components in accordance with the installation and usage regulations.
- Protect the electronic components, open printed circuit boards and unconnected electrical connections against static electricity. Take the necessary protective measures, such as earthing, potential equilibrium, conductive mats, and avoiding highly insulating materials, etc.
- The main switch mounted on the switch cabinet of the control is not permitted to be used for switching the plant on and off during normal operation. If it is used to switch off the plant, frost protection of the hot water heater will no longer be ensured.

2.2 Safety instructions for transport and storage

- When transporting under difficult conditions (e.g. on open vehicles, under unusual vibrational stresses, transport by sea or in tropical/subtropical countries), additional packaging must be used that will protect against these particular influences.
- Store the switch cabinet in a way that prevents damage from ambient conditions. Constant and, above all, abrupt temperature changes must be prevented during storage. This is especially harmful if moisture is able to form condensation.
- Damage that results from improper packaging, storage, and transport are at the expense of the person responsible.

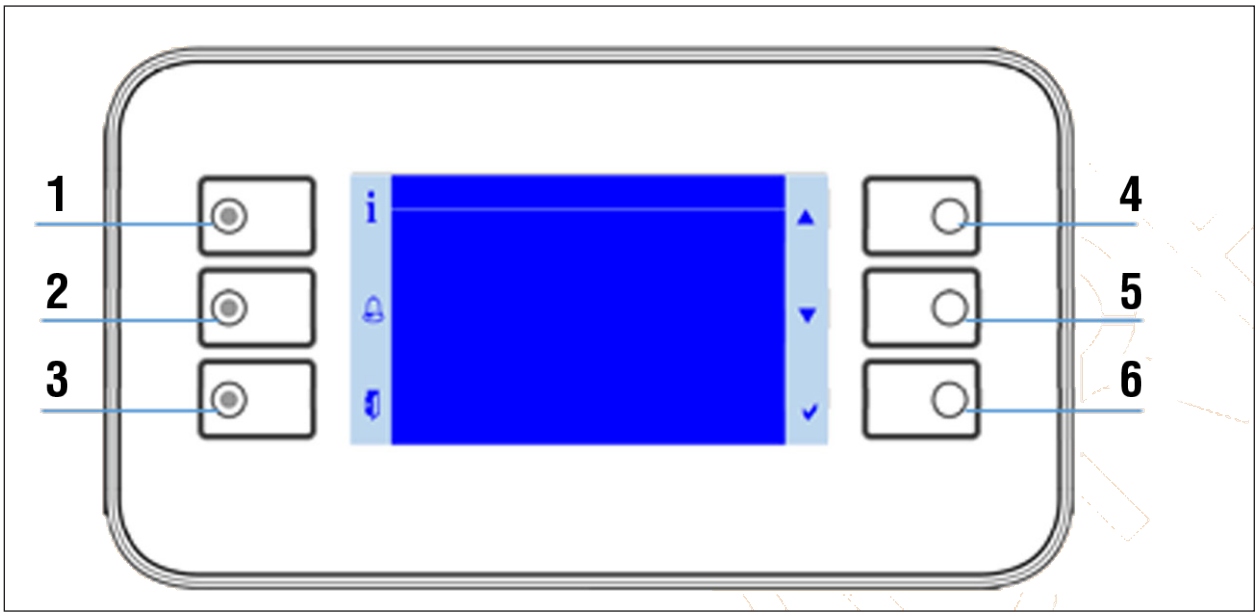
2.3 Safety instructions for service and maintenance

- The maintenance of the MSR system is limited to regular cleaning and inspection of the clamping and plug-in connections. During maintenance, check that all clamping and plug-in connections are firmly seated and make perfect contact.
- The built-in parts inside the switch cabinet are best freed of dust and other contamination during the regular maintenance tasks. The outside of the switch cabinet can be cleaned with a moist (not wet), soft lint-free cloth when necessary. Commercially available dishwashing detergent or a neutral cleaner can be used as a cleaning agent. This is especially harmful if moisture is able to form condensation.
- Never use abrasive cleaning agents or cleaning agents that can dissolve plastics. Avoid acidic or alkaline solvents, spray water, impacts or jolts.
- Diagnostics, fault elimination and recommissioning must only be performed by authorised persons. This also applies to work performed inside the switch cabinet (e.g. inspections, fuse replacements).
- Unauthorised activities may result in the loss of the manufacturer's warranty. Any damage to the system and the associated secondary damage are the responsibility of the party causing such damage.

3 Control panel

3.1 HMI Basic (switch cabinet control panel)

With the HMI Basic, you can configure the entire plant and put it into operation according to the logged-in password level. The control panel has a two-colour LCD with 8 x 30 characters and six operating buttons. It is backlit. The HMI Basic is standard equipment of the control and is installed locally in the switch cabinet.



- Pressing any button activates the backlighting.
- The six control panel buttons correlate to the six symbols arranged on the left and right of the display area.

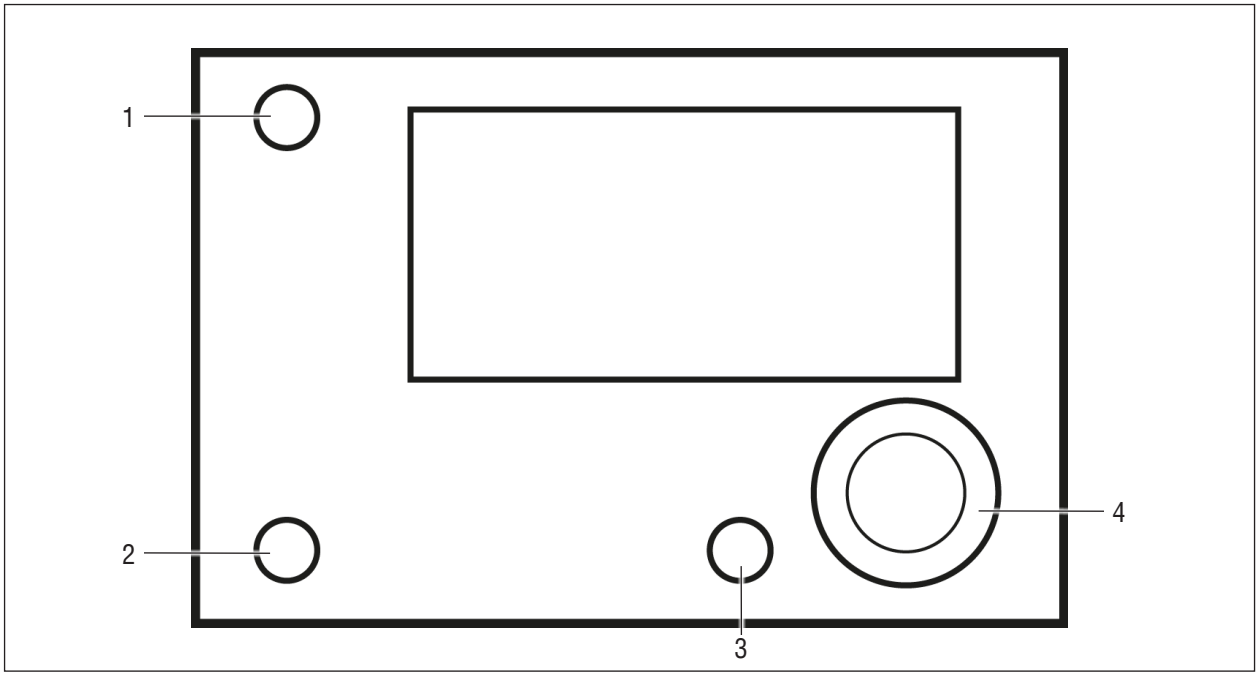
NOTE!

Please give the operator the one-sided separate document entitled “HMII Basic Quick Guide”.

No.	Symbol	Designation	General function
1		INFO button with integrated LED	Press this button to return to the home page. The integrated LED indicates the plant operating state.
2		ALARM button with integrated LED	Press this button to access the alarm pages. The integrated alarm LED indicates the alarm and acknowledgement status.
3		ESC button	Press this button to return to the previous page.
4		UP arrow key	This button can be used to scroll up in the menu or to increase a set value.
5		DOWN arrow key	This button can be used to scroll down in the menu or to decrease a set value.
6		ENTER button	This button can be used to confirm a new setting or to jump to a menu item or a detail page.

3.2 HMI Facility

With the HMI Facility, the entire plant can be fully configured and put into operation according to the logged-in password level. The control panel has a two-colour LCD with 8 x 30 characters, four operating buttons and a rotary button. The HMI Facility is an optional equipment of the control and is designed for stand-alone installation in a control room. The menu structure and password levels are identical to HMI Basic.



- Pressing any button or turning the rotary button activates the backlighting on the control panel.

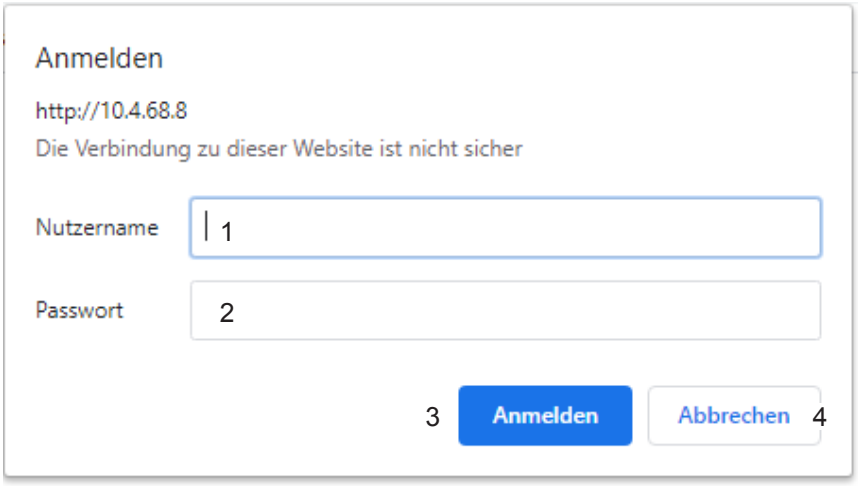
No.	Designation	General function
1	INFO button with integrated LED	Press this button to return to the home page. The integrated LED indicates the plant operating state.
2	ALARM button with integrated LED	Press this button to access the alarm pages. The integrated alarm LED indicates the alarm and acknowledgement status.
3	ESC button	Press this button to return to the previous page.
4	Rotary button	■ Turning the button clockwise corresponds to scrolling up in the menu or increasing a setting (-> see also the UP arrow key in HMI Basic). ■ Turning the button anti-clockwise corresponds to scrolling down in the menu or decreasing a setting (-> see also the DOWN arrow key in HMI Basic). ■ Pressing the rotary button confirms a new setting or jumps to a menu item or a detail page (-> see also the ENTER button in HMI Basic).

3.3 HMI Web

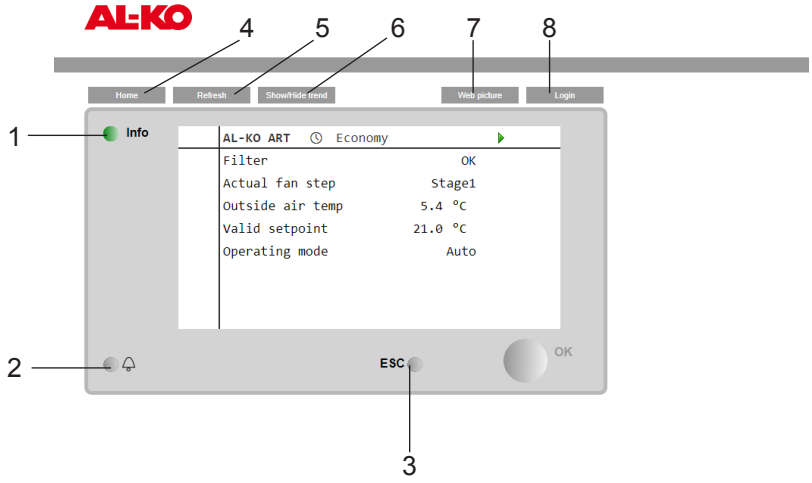
With the HMI Web, the entire plant can be fully configured and put into operation according to the logged-in password level. HMI Web is part of the standard controller equipment.

It can be accessed via the network connection of the controller via a terminal device provided by the customer (PC, notebook, tablet) with a web browser. The menu structure and password levels are identical to HMI Basic.

This access is also possible wirelessly by using a commercially available WLAN router.

Step	Description
1	Make sure that the controller and the on-site terminal device (PC, notebook, tablet) with which you want to access the Web interface are in the same network. Settings such as DHCP may be necessary. If you have connection problems, contact the responsible network administrator.
2	Open an HTML5-enabled web browser on the terminal device. The following browsers are tested and supported: Google Chrome, Mozilla Firefox, Microsoft Edge.
3	Enter the IP address of the controller in the address bar of the web browser. The IP address of the controller can be read from the local control unit. See "12.1 TCP/IP settings" on page 75. The access data query appears:  1 Username 2 Password 3 Log in 4 Cancel

4	Enter username and password. Default username: WEB Default password: SBTAdmin! Username and password can be changed. See "12.1 TCP/IP settings" on page 75. The Web interface appears. 
5	For expanded enabling of Web Pictures (plant diagram): Enter the username: ADMIN and the order-specific password. The order-specific password can be obtained on request from the manufacturer.



Visually, the display of the HMI Web in the web browser is based on the HMI Facility. The keys described below can be pressed with the mouse button (PC, notebook) or by touch (tablet), depending on the terminal device used. Menu items or detail pages can be selected directly. Use the mouse wheel (PC, notebook) or gestures (tablet) in the menu to scroll up and down.

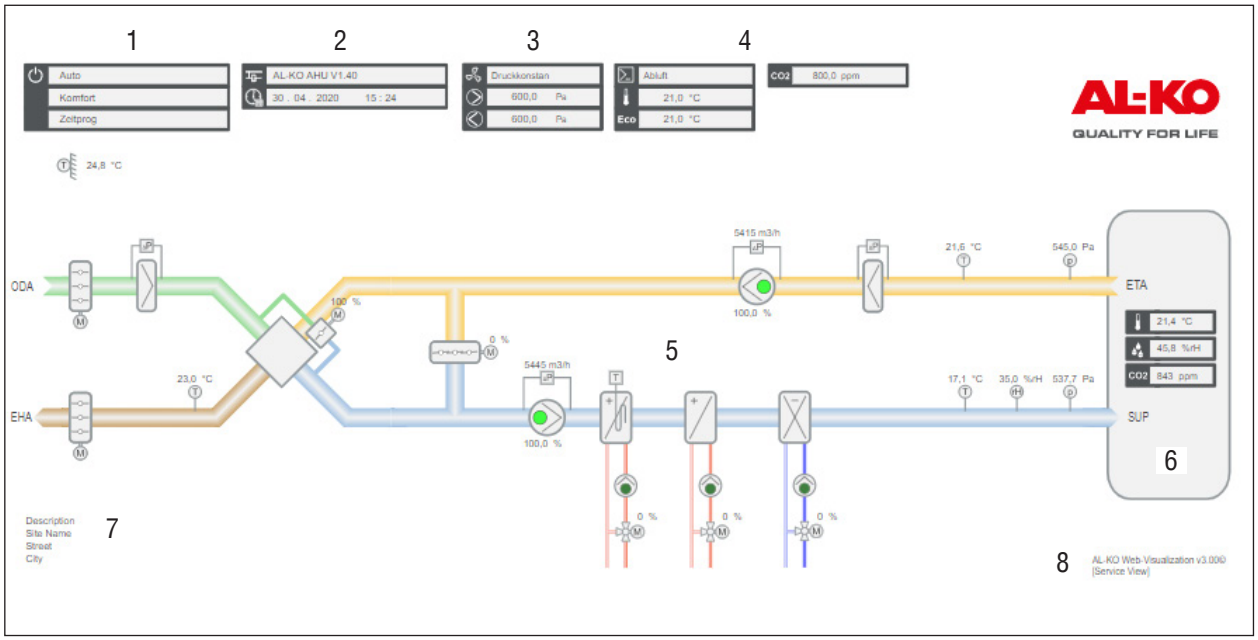
No.	Designation	General function
1	INFO button with integrated LED	Press this button to return to the home page. The integrated LED indicates the plant operating state.
2	ALARM button with integrated LED	Press this button to access the alarm pages. The integrated alarm LED indicates the alarm and acknowledgement status.

3	ESC button	Press this button to return to the previous page.
4	Home	Press this button to return to the home page.
5	Refresh	Updates the browser window.
6	Show/Hide Trend	Shows or hides the online trend window below the user interface. To record a value (e.g. supply air temperature), press a value directly. When the trend window is displayed, it is immediately displayed in the window. Up to five values can be simultaneously recorded online. The online trend function is used for commissioning and diagnostics. The data will not be saved.
7	Web Picture	The plant display is visualised graphically.
8	Login	Press this button to enter the password.

3.4 Operable plant diagram (Web Pictures)

The AL-KO Web Pictures is structured according to the plant configuration. The plant and its components can be monitored at a glance on the plant schematic diagram. The setpoints for the temperature, humidity and air quality can be adjusted. Clicking on the respective setpoints opens a window in which the desired setpoint can be entered.

The same operating principle is used to the operating mode, the alarm acknowledgement and the location description.



No.	Symbol	Description
1		Display of the name and version of the controller software
		Display of the system time of the controller (date)
		Display of the system time of the controller (time)

2		Display of the current operating mode ■ Off — Plant is switched off ■ On/Comfort — Plant is running in comfort mode ■ Economy — The plant is running in economy mode
		Display of the current plant state ■ Configuration — Plant is being configured ■ Fire — Plant in fire mode ■ Alarm Danger — Plant is stopped and locked ■ Emergency Stop — Plant is stopped and locked ■ Alarm critical — Plant is stopped and locked ■ Manual — Mode is set via HMI ■ External — Mode is set externally ■ RoomUnit — Mode is set by room control panel ■ Boost — Boost function is active ■ Unoccupied Htg/Clg — Overheating/cool-down protection is active ■ Free cooling — Free fan cooling (night cooling) is active ■ BMS — Mode is set by the building management system ■ TSP — Mode is set by the timeswitch program ■ Calendar — Calendar sets the mode
		Display of current manual intervention ■ Auto — Auto mode via timeswitch program, presence, etc. ■ Off — Manual plant is off ■ Step 1 — Manual fan step 1 ■ Step 2 — Manual fan step 2 ■ Step 3 — Manual fan step 3 ■ Eco St1 — Manual fan step 1 in economy mode ■ Comf St1 — Manual fan step 1 in comfort mode ■ Eco St2 — Manual fan step 2 in economy mode ■ Comf St2 — Manual fan step 2 in comfort mode ■ Eco St3 — Manual fan step 3 in economy mode ■ Comf St3 — Manual fan step 3 in comfort mode
3		Display of fan controller type ■ FixedSpeed — Constant speed ■ Pressure — Pressure ■ Flow — Volume flow rate ■ SupplySlv — Extract-air-dependent volume flow control ■ ExhaustSlv — Supply-air-dependent volume flow control
		Display of current supply fan setpoint
		Display of current extract fan setpoint
4		Display of control type: Temperature/humidity ■ Supply — Pure supply control ■ RmCasc — Room supply air cascade ■ ExtrSplyC — Extract supply air cascade ■ RmSplyC Su — Room supply air cascade, pure room control, winter ■ ExtrSplyC Su — Extract supply air cascade, summer; pure extract air, winter ■ Room — Pure room control ■ Extract — Pure extract air control
		Display of comfort setpoint, temperature
		Display of eco setpoints, temperature
		Display of humidity setpoint
		Display of air quality setpoint

5		Generic illustration of the ventilation system. This varies depending on the configuration of the system. Fans and pumps are shown here with the following three states.	
		Dark green	Off
		Light green	On
		Red	Alarm
6		If there is an alarm, a bell symbol appears here. The bell symbol can have three colour states that reflect the alarm group.	
		Red	Group A (danger/critical)
		Orange	Group B (low)
		Yellow	Group C (warning)
7		Location description of the plant (change in the controller possible)	
8		Version number of the visualisation system	

3.5 HMI Room (room control panel/room unit)

The HMI Room is an optional equipment of the control and is designed for installation in a user room. Compared to the full control panels (HMI Basic, Facility and Web), the HMI Room offers operating capabilities that are adapted to user requirements.

In case of an alarm, the time display is replaced by the error code. The alarm is additionally displayed with a flashing bell symbol . See "17.3 Alarm table" on page 107.

NOTE!

See the separate document entitled “HMI Room Quick Guide” for explanations of the operation and display of HMI Room.

Please give the operator this one-sided separate document.

Switching rights

By default, the Room control panel (HMI Room) can perform the following switches:

- Change the operating mode (off, on, comfort, economy, automatic)
- Change the fan step (step 1, step 2, step 3, automatic)
- Shift the temperature setpoint (+/-3 K)

NOTE!

Automatic means that the next priority (see "6.1 Operating modes and control priorities" on page 35) will take over control.

The control rights of the HMI Room can be changed under the following menu item:

Main menu > Settings > Room units

Display	Values	Description
Manual control	■ No ■ Everything ■ Mode only ■ Step only	Indicates the control rights of the room control panels. ■ No control rights ■ Changing the operating mode and fan step is possible ■ Changing the operating mode is possible ■ Changing the fan step is possible
Stpt range +/-	0 – 12 K	Indicates the shift in the temperature setpoint that is permissible on the room control panel. A value of 0 means that a shift is no longer possible.
Stpt increment	■ 0.1 K ■ 0.5 K	Indicates the step size by which the temperature setpoint is shifted. ■ Step size 0.1 Kelvin ■ Step size 0.5 Kelvin

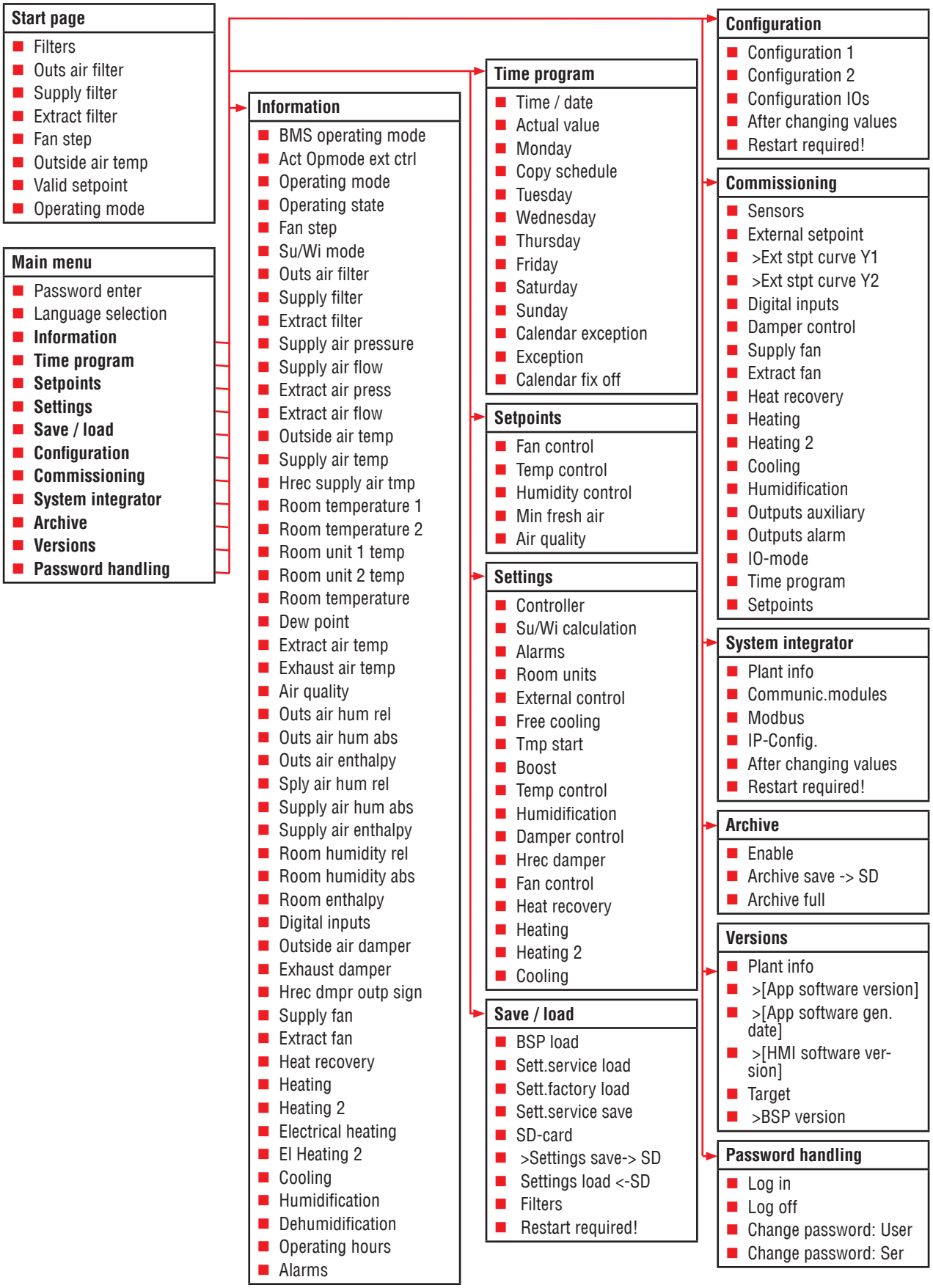
4 Menu

4.1 Overview of the entire structure

This section describes the first two levels of the menu structure. Some menu items are only visible in the appropriate password level.

NOTE!

Some menu items are only available if the configuration and/or the plant equipment requires them.


Start page
Filters
Outs air filter
Supply filter
Extract filter
Fan step
Outside air temp
Valid setpoint
Operating mode
Main menu
Password enter
Language selection
Information
Time program
Setpoints
Settings
Save / load
Configuration
Commissioning
System integrator
Archive
Versions
Password handling
Information
BMS operating mode
Act Opmode ext ctrl
Operating mode
Operating state
Fan step
Su/Wi mode
Outs air filter
Supply filter
Extract filter
Supply air pressure
Supply air flow
Extract air press
Extract air flow
Outside air temp
Supply air temp
Hrec supply air tmp
Room temperature 1
Room temperature 2
Room unit 1 temp
Room unit 2 temp
Room temperature
Dew point
Extract air temp
Exhaust air temp
Air quality
Outs air hum rel
Outs air hum abs
Outs air enthalpy
Sply air hum rel
Supply air hum abs
Supply air enthalpy
Room humidity rel
Room humidity abs
Room enthalpy
Digital inputs
Outside air damper
Exhaust damper
Hrec dmpr outp sign
Supply fan
Extract fan
Heat recovery
Heating
Heating 2
Electrical heating
El Heating 2
Cooling
Humidification
Dehumidification
Operating hours
Alarms
Time program
Time / date
Actual value
Monday
Copy schedule
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday
Calendar exception
Exception
Calendar fix off
Setpoints
Fan control
Temp control
Humidity control
Min fresh air
Air quality
Settings
Controller
Su/Wi calculation
Alarms
Room units
External control
Free cooling
Tmp start
Boost
Temp control
Humidification
Damper control
Hrec damper
Fan control
Heat recovery
Heating
Heating 2
Cooling
Save / load
BSP load
Sett.service load
Sett.factory load
Sett.service save
SD-card
>Settings save-> SD
Settings load <-SD
Filters
Restart required!
Configuration
Configuration 1
Configuration 2
Configuration IOs
After changing values
Restart required!
Commissioning
Sensors
External setpoint
>Ext stpt curve Y1
>Ext stpt curve Y2
Digital inputs
Damper control
Supply fan
Extract fan
Heat recovery
Heating
Heating 2
Cooling
Humidification
Outputs auxiliary
Outputs alarm
IO-mode
Time program
Setpoints
System integrator
Plant info
Communic.modules
Modbus
IP-Config.
After changing values
Restart required!
Archive
Enable
Archive save -> SD
Archive full
Versions
Plant info
>[App software version]
>[App software gen. date]
>[HMI software version]
Target
>BSP version
Password handling
Log in
Log off
Change password: User
Change password: Ser

4.2 Main overview

The INFO button takes you from the start page to the main menu. It contains the following menu items.

Menu item	Contents
Login	Log in with a password
Language selection	Select the language
Information	■ Read out sensor information (e.g. temperature, humidity, volume flow rate) ■ Read out the signals for components (e.g. heating, cooling, heat recovery, fans) ■ Read out the state of digital inputs (e.g. external enable) and outputs (e.g. alarm output) ■ Read out the operating hours of components (e.g. heating pump, cooling pump, fans)
Time program	■ Set system time ■ Set weekly program ■ Set calendar
Setpoints	■ Set temperature and humidity setpoints ■ Set the pressure and volume flow rate setpoints ■ Set the air quality setpoint and minimum fresh air share
Settings	■ Set parameters for functions such as free cooling, overheating/cool-down protection and boost ■ Set overrun and delay times for dampers, fans and pumps, for example ■ Set the reaction to a fire message ■ Set the frost protection setpoints and the intervals for pump kicks ■ Set the amplification and reset time (I) of all PI control loops of the plant (e.g. heat recovery, heater, heater frost protection, humidification)
Save / load	■ Save the current parameters on the SD card or in an internal memory ■ Load a parameter set from the SD card or from an internal memory
Configuration	■ Change the control types for fans, temperature and humidity ■ Set the number of plant steps ■ Set the availability of the economy and comfort modes
Commissioning	■ Guide for commissioning the control ■ Support of data point test of all inputs/outputs ■ Decommissioning of inputs and sensors for manual entries ■ Manual control of fans, pumps, dampers, etc.
Remote Cloud	■ Deactivate/activate the connection to AL-KO Remote Cloud ■ Execute received software updates
System integrator	■ Set network parameters for IP connections ■ Set the communication parameters for the building management via BACnet, Modbus and LON
Archive	■ Activate/deactivate the stored data recording ■ Set the storage process to save to the SD card
Versions	■ Read out the software version ■ Read out the firmware (BSP) version of the controller
PIN administration	■ Log in/out password ■ Change changeable passwords

4.3 Password level

To log in with a password, proceed as follows:

Step	Description
1	Go to the following menu item: **Main menu > Login**
2	Using the arrow keys, enter the four individual digits and confirm each digit individually with ENTER.

The logged-in password level is shown at the top right of the display in the form of key symbols.

NOTE!

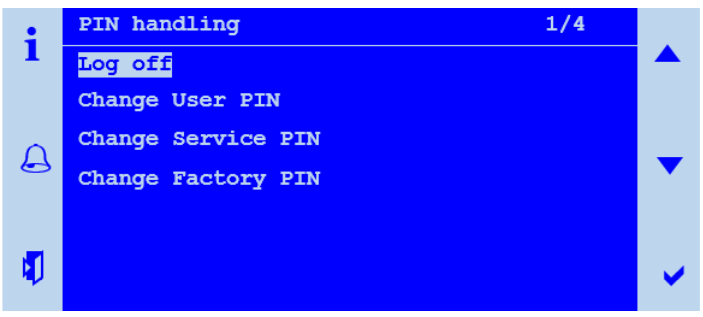
Always change the default password to a password of your choice to prevent unauthorised access. Never give out passwords to unauthorised persons.

The following password levels are stored:

Level	No.	Symbol	Default password	Typical settings
User (Operator)	6		1 0 0 0 (changeable)	■ Change temperature, humidity and air quality setpoints ■ Set the time program
System integrator	5		1 5 0 0 (not changeable)	■ Change and read out IP settings ■ Change communication settings for BACnet, Modbus and LON
Service	4		2 0 0 0 (changeable)	■ Change volume flow rate and pressure setpoints ■ Commissioning and configuration of sensors, actuators and functions ■ Make settings for special functions (e.g. free cooling)
Factory (Manufacturer)	2		* * * *	■ Advanced functions, settings and diagnostic options available to the manufacturer only

The passwords can be changed in the following menu item:

Main menu > PIN administration

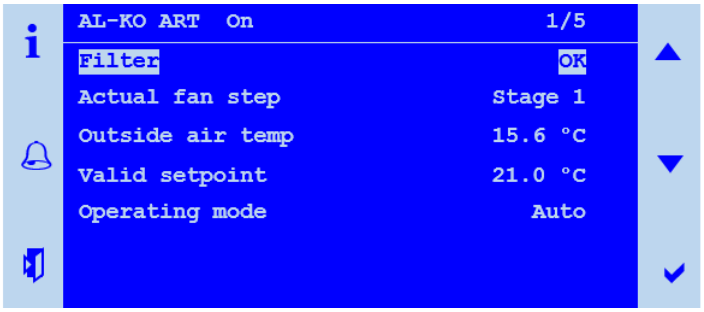


5 Display

5.1 Start page

If no entry is made on the control panel for an extended period, the display jumps back to the main menu. Press the INFO button to open the start menu. The main information on the plant can be found here.

For detailed information, see "5.5 Further information" on page 27.



Some displays are only available with certain plant equipment.

Some displays are only available with certain plant configurations.

Display	Values	Description
AL-KO ART		Information: You have an AL-KO ART controller
Symbol in the title line		Indicates the current plant operating status:
		■ Plant is controlled on the control panel (HMI Basic, Facility, Web)
		■ Plant is controlled via an external enable (e.g. presence sensor, party button)
		■ Plant is controlled on a room control panel (HMI Room)
		■ Plant is controlled via the building management system (e.g. BACnet, Modbus)
		■ Plant is controlled via the time program
		■ Plant is not functional: Configuration not complete
		■ Plant OFF: switched off alarm or emergency stop
		■ Plant ON: Free cooling, cool-down or overheating protection
		■ Plant ON: early start (boost)
Text in the title line		Indicates the current operating mode.
	■ Off	■ Plant OFF
	■ Start	■ Plant is starting (open the dampers, preflush the heaters)
	■ On	■ Plant ON
	■ Comfort	■ Plant ON in comfort mode
	■ Economy	■ Plant ON in economy mode
	■ Overrun	■ Plant continues running because humidifier or electric heater were in operation
Filters		Current state of filter:
	■ OK	■ Filter is OK
	■ Alarm	■ Filter is soiled

Outs air filter	.... %	Current degree of soiling of outdoor air filter
Supply filter	... %	Current degree of soiling of supply air filter
Extract filter	... %	Current degree of soiling of extract air filter
Fan step	■ Off ■ Step 1 ■ Step 2 ■ Step 3	Current fan step ■ Fans are off ■ Adjust fans to setpoint step 1 or operate at speed step 1 ■ Adjust fans to setpoint step 2 or operate at speed step 2 ■ Adjust fans to setpoint step 3 or operate at speed step 3
Outside air temp	... °C	Current measured outdoor temperature
Valid setpoint	... °C	Current setpoint of temperature control
Operating mode	■ Auto ■ Off ■ Step 1 ■ Step 2 ■ Step 3 ■ Eco St1 ■ Comf St1 ■ Eco St2 ■ Comf St2 ■ Eco St3 ■ Comf St3	Switch to the operating mode with the highest priority on the control panel: ■ Automatic mode ■ Plant OFF ■ Plant ON in step 1 ■ Plant ON in step 2 ■ Plant ON in step 3 ■ Plant ON in step 1 and temperature setpoint economy ■ Plant ON in step 1 and temperature setpoint comfort ■ Plant ON in step 2 and temperature setpoint economy ■ Plant ON in step 2 and temperature setpoint comfort ■ Plant ON in step 3 and temperature setpoint economy ■ Plant ON in step 3 and temperature setpoint comfort

5.2 INFO LED

On the control panel (HMI Basic, Facility or Web), an integrated LED is contained in the INFO button. This provides an initial indication of the state of the plant.

LED	State	Description
	Off	Plant is OFF
	Green flashing	Plant is starting (open the dampers, preflush the heaters)
	Green	Plant is ON
	Orange/red flashing	Manual mode is active (e.g. sensor is non-operational or control of pump or fan)
	Orange flashing	Plant is not functional, the configuration was not completed

5.3 Alarm LED

On the control panel (HMI Basic, Facility or Web), an integrated LED is contained in the ALARM button. This provides an initial overview of the alarm status of the plant.

LED	State	Description
	Off	No alarm
	Red flashing	Active alarm
	Red	Alarm is still active and an attempt has been made to acknowledge it.

5.4 Set the language

To set the HMI language, open the following menu item:

Main menu > Language selection

Three different language packages are available. The figure shows language package 1 as an example. The language packages are organised as follows.

Language package 1		Language package 2		Language package 3	
[EN]	English	[EN]	English	[EN]	English
[SE]	Svenska	[DE]	Deutsch	[DE]	Deutsch
[DE]	Deutsch	[IT]	Italiano	[CN]	中文
[FI]	Suomi	[ES]	Español	[DK]	Dansk
[PL]	Polski	[FR]	Français	[TK]	Turkçe
[RU]	русский	[NL]	Nederlands	[LT]	Lietuvių

NOTE!

The language package is already specified when the controller is ordered and uploaded into the controller at the factory.

5.5 Further information

5.5.1 Overview

For detailed information on the current plant operating state, open the following menu item:

Main menu > Information


Some displays are only available with certain plant equipment.


Some displays are only available with certain plant configurations.

Display	Values	Description
BMS operating mode		Indicates the operating mode currently requested by the building management system:
	■ Auto	■ Automatic mode
	■ Off	■ Plant OFF
	■ Step 1	■ Plant ON in step 1
	■ Step 2	■ Plant ON in step 2
	■ Step 3	■ Plant ON in step 3
	■ Eco St1	■ Plant ON in step 1 and temperature setpoint economy
	■ Comf St1	■ Plant ON in step 1 and temperature setpoint comfort
	■ Eco St2	■ Plant ON in step 2 and temperature setpoint economy
	■ Comf St2	■ Plant ON in step 2 and temperature setpoint comfort
	■ Eco St3	■ Plant ON in step 3 and temperature setpoint economy
	■ Comf St3	■ Plant ON in step 3 and temperature setpoint comfort
Act Opmode ext ctrl		Indicates the operating mode currently requested by external enable:
	■ Auto	■ Automatic
	■ Off	■ Off
	■ Step 1	■ Speed or setpoint step 1
	■ Step 2	■ Speed or setpoint step 2
	■ Step 3	■ Speed or setpoint step 3
Operating mode		Indicates the current operating mode:
	■ Off	■ Plant OFF
	■ Start	■ Plant is starting (open the dampers, preflush the heaters)
	■ On	■ Plant ON
	■ Comfort	■ Plant ON in comfort mode
	■ Eco	■ Plant ON in economy mode
	■ Overrun	■ Plant continues running because humidifier or electric heater were in operation

Operating state (arranged by priority)		Indicates the current plant operating state or by what means the plant is being controlled.
	■ Config	■ Plant OFF: Configuration not complete
	■ Fire	■ Plant OFF: Fire alarm
	■ Danger	■ Plant OFF: Alarm of danger/plant off (A) priority
	■ Emergency stop	■ Plant OFF: Emergency off is activated
	■ Alarm	■ Plant OFF: Alarm of critical (A) priority
	■ HMI/BMS	■ Plant controlled with the highest priority (control panel or building management system)
	■ Protection	■ Plant ON: Cool-down or overheat protection
	■ External	■ Plant is controlled via an external enable (e.g. presence sensor, party button)
	■ Boost	■ Plant ON: early start (boost)
	■ Room unit	■ Plant is controlled on a room control panel (HMI Room)
	■ Free cooling	■ Plant ON: Free cooling
	■ BMS	■ Plant is controlled via the building management system (e.g. BACnet, Modbus)
	■ Time program	■ Plant switched by weekly program
	■ Calendar	■ Plant switched by calendar
Fan step		Indicates the current fan step.
	■ Off	■ Fans are off
	■ Step 1	■ Adjust fans to setpoint step 1 or operate at speed step 1
	■ Step 2	■ Adjust fans to setpoint step 2 or operate at speed step 2
	■ Step 3	■ Adjust fans to setpoint step 3 or operate at speed step 3
Su/Wi mode		Indicates whether the plant is operating in summer or winter mode.
	■ Winter	■ The plant is operating in winter mode
	■ Summer	■ The plant is operating in summer mode
Outs air filter	... Pa	Indicates the currently measured differential pressure across the outdoor air filter.
Supply filter	... Pa	Indicates the currently measured differential pressure across the supply air filter.
Extract filter	... Pa	Indicates the currently measured differential pressure across the extract filter.
Filters		Current state of the filter.
	■ OK	■ Filter is OK
	■ Alarm	■ At least one filter is soiled
		 All filters are jointly monitored for faults depending on the plant equipment.
Supply air pressure	... Pa	Indicates the currently measured duct pressure in the supply air.
Supply air flow	... m^3/h	Indicates the currently calculated volume flow rate in the supply air.
Extract air press	... Pa	Indicates the currently measured duct pressure in the extract air.
Extract air flow	... m^3/h	Indicates the currently calculated volume flow rate in the extract air.
Outside air temp	... °C	Indicates the currently measured outdoor air temperature.
Supply air temp	... °C	Indicates the currently measured supply air temperature.
Hrec supply air tmp	... °C	Indicates the currently measured supply air temperature after heat recovery.
Room temperature 1	... °C	Indicates the currently measured room temperature at room sensor 1.
Room temperature 2	... °C	Indicates the currently measured room temperature at room sensor 2.

Room unit 1 temp.	... °C	Indicates the currently measured room temperature at room sensor 1.
Room unit temp 2	... °C	Indicates the currently measured room temperature at the room control panel 2.
Room temperature	... °C	Indicates the current applicable room temperature. The applicable room temperature for the temperature control can be configured.
Dew point	... °C	Indicates the currently calculated dew point in the room.
Extract air temp	... °C	Indicates the currently measured extract air temperature.
Exhaust air temp	... °C	Indicates the currently measured supply air temperature.
Air quality	... ppm	Indicates the currently measured room or extract air quality. Whether the room or extract air quality is measured depends on the plant equipment.
Outs air hum rel	... %rH	Indicates the currently measured relative air humidity.
Outs air hum abs	... g/kg	Indicates the currently calculated absolute air humidity.
Outs air enthalpy	... kJ/kg	Indicates the currently calculated outdoor air enthalpy.
Sply air hum rel	... %rH	Indicates the currently measured relative supply air humidity.
Supply air hum abs	... g/kg	Indicates the currently calculated absolute supply air humidity.
Supply air enthalpy	... kJ/kg	Indicates the currently calculated supply air enthalpy.
Room humidity	... %rH	Indicates the currently measured relative room or extract air humidity. Whether the room or extract air humidity is measured depends on the plant equipment.
Room humidity abs	... g/kg	Indicates the currently calculated absolute room or extract air humidity. Whether the room or extract air humidity is calculated depends on the plant equipment.
Room enthalpy	... kJ/kg	Indicates the currently calculated room or extract air enthalpy. Whether the room or extract air enthalpy is calculated depends on the plant equipment.
Digital inputs	-	Press ENTER to open the digital input information. See below for the contents.
Outside air damper	■ Open ■ Closed	Indicates the current control of the outdoor air/damper. ■ The damper is open or is being opened ■ The damper is closed or is being closed
Exhaust damper	■ Open ■ Closed	Indicates the current control of the exhaust damper. ■ The damper is open or is being opened ■ The damper is closed or is being closed
Hrec dmpr outp sign	0 – 100%	Indicates the current control signal to the recirculation air flap.
Recovery value	0 – 100%	Indicates the current share of recirculation air. The value may run opposite to the control signal if the operation of the flap drives is inverted.
Supply fan	0 – 100%	Indicates the current control signal to the supply fan. Press ENTER to open additional information on the supply fan. See below for the contents.
Extract fan	0 – 100%	Indicates the current control signal to the extract fan. Press ENTER to open additional information on the extract fan. See below for the contents.

Heat recovery	0 – 100%	Indicates the current control signal to the heat recovery. Press ENTER to open additional information on heat recovery. See below for the contents.
Heating	0 – 100%	Indicates the current control signal to the hot water heater. Press ENTER to open additional information on the heater. See below for the contents.
Heating 2	0 – 100%	Indicates the current control signal to the hot water preheater. Press ENTER to open additional information on the preheater. See below for the contents. Heating 2 is always the preheater, if present.
Electrical heating	0 – 100%	Indicates the current control signal to the electric heater. Press ENTER to open additional information on the electric heater. See below for the contents.
El Heating 2	0 – 100%	Indicates the current control signal to the electric preheater. Press ENTER to open additional information on the electric preheater. See below for the contents. Heating 2 is always the preheater, if present.
Cooling	0 – 100%	Indicates the current control signal to the cooler. Press ENTER to open additional information on the cooler. See below for the content.
Humidification	0 – 100%	Indicates the current control signal to the humidifier. Press ENTER to open additional information on the humidifier. See below for the contents.
Dehumidification	0 – 100%	Indicates the current control signal to the dehumidifier.
Operating hours	-	Press ENTER to open the detailed information.
Alarms	-	Press ENTER to open the detailed information. See below for the contents.
Aux op mode output	■ Off ■ On	Indicates the current operating status of the plant: ■ Plant OFF ■ Plant in operation

5.5.2 Digital input information

For detailed information on the state of the digital input information of the plant, open the following menu item:

Main menu > Information > Digital inputs

Display	Values	Description
Emergency stop	■ Off ■ On	Indicates the current status of the digital emergency stop input. ■ Input is open ■ Input is connected
Ext control input 1	■ Off ■ On	Indicates the current status of the digital external enable input 1: ■ Input is open ■ Input is connected
Ext control input 2	■ Off ■ On	Indicates the current status of the digital external enable input 2: ■ Input is open ■ Input is connected

5.5.3 Fans

For detailed information on the supply air fan state, open the following menu item:

Main menu > Information > Supply fan

Open the following menu item for the extract air fan:

Main menu > Information > Extract fan

Display	Values	Description
Output signal	0 – 100%	Indicates the current control signal.
Command	■ Off ■ On/St1	Indicates the current enabling state: ■ Fan is disabled ■ Fan is enabled
...-Fan Alarm	■ OK ■ Alarm	Indicates the current alarm status: ■ ...-Fan OK ■ ...-Fan has a fault
Fan alarm	■ OK ■ Alarm	Indicates the current alarm status: ■ Fans OK ■ At least one fan has a fault.

5.5.4 Heat recovery

For detailed information on the heat recovery state, open the following menu item:

Main menu > Information> Heat recovery

Display	Values	Description
Output signal	0 – 100%	Indicates the current control signal.
Command	■ Off ■ On	Indicates the current enabling state: ■ Heat recovery (pump) is disabled ■ Heat recovery (pump) is enabled
Heat recovery alarm	■ OK ■ Alarm	Indicates the current alarm status: ■ Heat recovery ON ■ Heat recovery has a fault
Hrec pump alarm	■ OK ■ Alarm	Indicates the current alarm status of the pump of the closed-cycle system: ■ Pump OK ■ Pump has a fault.
Heat recovery water temp.	... °C	Indicates the currently measured temperature at the return flow of the closed-cycle system
Hrec efficiency	0 – 100%	Indicates the currently calculated efficiency of the heat recovery.

5.5.5 Heating

For detailed information on the state of the hot water heater, open the following menu item:

Main menu > Information> Heating

Open the following menu item for the hot water preheating:

Main menu > Information> Heating 2

NOTE!

Heating 2 is always the preheater, if present.

Display	Values	Description
Output signal	0 – 100%	Indicates the current control signal.
Pre htg state Pre htg 2 state 	■ Passive ■ Active	Indicates the current state of the preflushing function: ■ The plant is not being flushed or is no longer being flushed ■ The plant is currently being flushed
Heating pump Heating 2 pump	■ Off ■ On	Indicates the current enabling state of the heating pump: ■ Pump is disabled ■ Pump is enabled
Htg frost monitor Htg 2 frost monitor 	■ OK ■ Frost	Indicates the current state of the frost protection thermostats: ■ Thermostat O, no danger of freezing ■ Danger of freezing
Heating frost tmp Heating 2 frost tmp 	... °C	Indicates the currently measured temperature at the return flow of the heater.

5.5.6 Electric heater

For detailed information on the state of the electric heater, open the following menu item:

Main menu > Information> Electric heating

Open the following menu item for the electric preheating:

Main menu > Information> El Heating 2

NOTE!

El Heating 2 is always the preheater if present.

Display	Values	Description
Output signal	0 – 100%	Indicates the current control signal.
Command	■ Off ■ On	Indicates the current enabling state: ■ The electric heater is disabled ■ The electric heater is enabled
El htg alarm El heating 2 alarm	■ OK ■ Alarm	Indicates the current alarm status: ■ Electric heater OK ■ Electric heater has a fault

5.5.7 Cooling

For detailed information on the state of the cooler, open the following menu item:

Main menu > Information> Cooling

Display	Values	Description
Output signal	0 – 100%	Indicates the current control signal.
Dehumidification	0 – 100%	Indicates the current dehumidification signal.
Command	■ Off ■ On	Indicates the current enabling state of the refrigerator: ■ Refrigerator is disabled ■ Refrigerator is enabled
Cooling pump	■ Off ■ On	Indicates the current enabling state of the heating pump: ■ Pump is disabled ■ Pump is enabled
Cooling DX alarm	■ OK ■ Alarm	Indicates the current alarm status: ■ Refrigerator OK ■ Refrigerator has a fault

5.5.8 Humidifier

For detailed information on the state of the humidifier, open the following menu item:

Main menu > Information> Humidification

Display	Values	Description
Output signal	0 – 100%	Indicates the current control signal.
Command	■ Off ■ On	Indicates the current enabling state: ■ Humidifier is disabled ■ Humidifier is enabled

5.5.9 Alarms

For information on the alarm status, open the following menu item:

Main menu > Information> Alarm handling

Display	Values	Description
Fire alarm	■ OK ■ Alarm	Indicates the current state of the fire alarm: ■ No alarm ■ Active fire alarm
Danger alarm (A)	■ OK ■ Alarm	Indicates a collective message of danger/plant off (A) alarm priority: ■ No alarm ■ Alarm of danger/plant off (A) priority is active
Critical alarm (A)	■ OK ■ Alarm	Indicates a collective message of critical (A) alarm priority: ■ No alarm ■ Alarm of critical (A) priority is active
Low alarm (B)	■ OK ■ Alarm	Indicates a collective message of low (B) alarm priority: ■ No alarm ■ Alarm of low (B) priority is active
Warning alarm (C)	■ OK ■ Alarm	Indicates a collective message of warning (C) alarm priority: ■ No alarm ■ Alarm of warning (C) priority is active
Alarm output	■ OK ■ Alarm	Indicates the current state of the alarm output: ■ No alarm ■ Alarm of danger/plant off (A) or critical (A) priority is active
Alarm output 2	■ OK ■ Alarm	Indicates the current state of the alarm output 2: ■ No alarm ■ Alarm of low (B) priority is active

6 Switching the plant on/off

6.1 Operating modes and control priorities

The plant has the following operating modes:

The availability of the economy and comfort operating modes and the steps depends on the plant configuration.

Display	Description
Off (=standby)	The plant is off (frost protection function is active if present)
Step 1	The plant is on in fan step 1
Step 2	The plant is on in fan step 2
Step 3	The plant is on in fan step 3
Comfort step 1	The plant is on in fan step 1 and is operating with the comfort temperature setpoint
Comfort step 2	The plant is on in fan step 2 and is operating with the comfort temperature setpoint
Comfort step 3	The plant is on in fan step 3 and is operating with the comfort temperature setpoint
Economy step 1	The plant is on in fan step 1 and is operating with the economy temperature setpoint
Economy step 2	The plant is on in fan step 2 and is operating with the economy temperature setpoint
Economy step 3	The plant is on in fan step 3 and is operating with the economy temperature setpoint

6.1.1 Control priorities

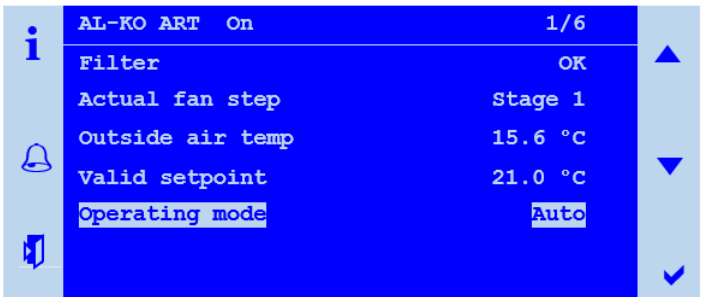
The available operating modes can be controlled by the following:

Control point	Priority
Full control panel (HMI Basic, Facility, Web)	Highest
External enable on digital input (e.g. presence sensor or hygrostat)	Second
Room control panels/room units (HMI Room)	Third
Building management system (e.g. BACnet or Modbus) The building management system can control the plant remotely via a defined data point with the highest priority in a manner that is equivalent to the control panel. See the data point lists of the different communication interfaces.	Fourth
Timeswitch program	Lowest

6.2 Manually at the control panel

To control the plant manually using the control panel (HMI Basic, Facility, Web), first open the start page using the INFO button. Then use the arrow keys to move to the operating mode switch:

Start page > Operating mode



Display	Values	Description
Operating mode		Switch to the operating mode with the highest priority on the control panel.
	■ Auto	■ Automatic mode
	■ Off	■ Plant OFF
	■ Step 1	■ Plant ON in step 1
	■ Step 2	■ Plant ON in step 2
	■ Step 3	■ Plant ON in step 3
	■ Eco St1	■ Plant ON in step 1 and temperature setpoint economy
	■ Comf St1	■ Plant ON in step 1 and temperature setpoint comfort
	■ Eco St2	■ Plant ON in step 2 and temperature setpoint economy
	■ Comf St2	■ Plant ON in step 2 and temperature setpoint comfort
	■ Eco St3	■ Plant ON in step 3 and temperature setpoint economy
	■ Comf St3	■ Plant ON in step 3 and temperature setpoint comfort

6.3 Time program

6.3.1 Weekly program

A weekly program is generally available. Up to six control points can be set per weekday.

To view and/or change the settings, open the following menu item:

Main menu > Time program

Display	Values	Description
Date/time (Ex. 17.10.2017 15:35:55)	DD.MM.YY / 00:00 - 23:59	Display of the current system time. It must be ensured that the system clock is running. If the date is set to 2003 and/or the time is not running, the system clock must be set. To do this, use the arrow keys to go to the system clock and press ENTER. Then use the arrow keys to set the individual digits of the system clock and confirm each individual digit with ENTER.

Current value		Indicates the operating mode currently requested by the building management system:
	■ Off	■ Plant OFF
	■ Step 1	■ Plant ON in step 1
	■ Step 2	■ Plant ON in step 2
	■ Step 3	■ Plant ON in step 3
	■ Eco St1	■ Plant ON in step 1 and temperature setpoint economy
	■ Comf St1	■ Plant ON in step 1 and temperature setpoint comfort
	■ Eco St2	■ Plant ON in step 2 and temperature setpoint economy
	■ Comf St2	■ Plant ON in step 2 and temperature setpoint comfort
	■ Comf St3	■ Plant ON in step 3 and temperature setpoint economy
	■ Eco St3	■ Plant ON in step 3 and temperature setpoint comfort
Monday		Indicates whether today is Monday according to the system clock and if the associated schedule is active:
	■ Passive	■ It is not Monday and the associated schedule is not active
	■ Active	■ It is Monday and the associated schedule is active
Copy schedule		Copying function to transfer the schedule from Monday to another day. This saves time when entering data.
	■ Mon to	■ Copy nothing
	■ Tue-Fri	■ Copy from Monday to Tuesday through Friday now
	■ Tue-Sun	■ Copy from Monday to Tuesday through Sunday now
	■ Tue	■ Copy from Monday to Tuesday now
	■ Wed	■ Copy from Monday to Wednesday now
	■ Thu	■ Copy from Monday to Thursday now
	■ Fri	■ Copy from Monday to Friday now
	■ Sat	■ Copy from Monday to Saturday now
	■ Sun	■ Copy from Monday to Sunday now
	■ Exc	■ Copy from Monday to exception now
Tuesday - Sunday		Indicates, as for Monday, whether today is Tuesday - Sunday according to the system clock and if the associated schedule is active:
	■ Passive	■ It is not Tuesday - Sunday and the associated schedule is not active
	■ Active	■ It is Tuesday - Sunday and the associated schedule is active
Calendar exception		Indicates whether the exception periods are currently set (e.g.holidays).
	■ Passive	■ No period is set
	■ Active	■ At least one period is set
		How the calendar functions is described below. See "6.3.2 Calendar" on page 39.
Exception		Indicates whether today is in an exception period according to the system clock and if the associated schedule is active.
	■ Passive	■ It is not exception day and the associated schedule is not active
	■ Active	■ It is an exception day and the associated schedule is active
		How the calendar functions is described below. See "6.3.2 Calendar" on page 39.

Calendar fix off	■ Passive ■ Active	Indicates whether fixed off periods are currently set, i.e. the plant is off: ■ No period is set ■ At least one period is set How the calendar functions is described below. See "6.3.2 Calendar" on page 39.

To view and/or change the schedule of a weekday, go to the weekday in question using the arrow keys and press ENTER.

The availability of the economy and comfort operating modes and the steps depends on the plant configuration.

Display	Values	Description
Time 1	00:00	The control time 1 is always set to 00:00 o'clock and cannot be changed
Value 1	■ Off ■ Step 1 ■ Step 2 ■ Step 3 ■ Eco St1 ■ Comf St1 ■ Eco St2 ■ Comf St2 ■ Comf St3 ■ Eco St3	Indicates the operating mode associated with control time 1. Set the control mode that the plant should run in at the beginning of the day. "Off" is recommended, unless the plant is to start running or be operating at 00:00 o'clock. ■ Plant OFF ■ Plant ON in step 1 ■ Plant ON in step 2 ■ Plant ON in step 3 ■ Plant ON in step 1 and temperature setpoint economy ■ Plant ON in step 1 and temperature setpoint comfort ■ Plant ON in step 2 and temperature setpoint economy ■ Plant ON in step 2 and temperature setpoint comfort ■ Plant ON in step 3 and temperature setpoint economy ■ Plant ON in step 3 and temperature setpoint comfort
Time 2 – Time 6	■ *: * ■ 00:00 - 23:59	Indicates the control times 2 to 6: ■ The control time is not used ■ Entered control time
Value 2 – Value 6	■ Off ■ Step 1 ■ Step 2 ■ Step 3 ■ Eco St1 ■ Comf St1 ■ Eco St2 ■ Comf St2 ■ Comf St3 ■ Eco St3	Indicates the operating modes 2 to 6 for the associated control times 2 to 6: ■ Plant OFF ■ Plant ON in step 1 ■ Plant ON in step 2 ■ Plant ON in step 3 ■ Plant ON in step 1 and temperature setpoint economy ■ Plant ON in step 1 and temperature setpoint comfort ■ Plant ON in step 2 and temperature setpoint economy ■ Plant ON in step 2 and temperature setpoint comfort ■ Plant ON in step 3 and temperature setpoint economy ■ Plant ON in step 3 and temperature setpoint comfort

6.3.2 Calendar

In addition to the weekly program, two calendars are generally available:

- Exception calendar
- Fix-off calendar

The exception calendar is for storing exception periods (e.g. holidays). In an exception period, the schedule stored for the exception day applies, i.e. the priority is higher than the weekly program.

The fix-off calendar always switches the plan to off and has a higher priority than the exception calendar.

Up to 10 periods can be set per calendar.

To set the schedule of the exception day, open the following menu item:

Main menu > Time program > Exception

NOTE!

The exception day is set like a normal weekday. See "6.3.1 Weekly program" on page 36.

To set the exception calendar, open the following menu item:

Main menu > Time program > Calendar exception

To set the fix-off calendar, open the following menu item:

Main menu > Time program > Fix-off calendar

To view and/or change the calendar, go to the calendar in question using the arrow keys and press ENTER.

Display	Values	Description
Actual value		Indicates whether a period is set in the calendar (e.g.holidays):
	■ Passive	■ No period is set
	■ Active	■ At least one period is set
Choice-1 – Choice-10		Indicates the type of entry for the corresponding period:
	■ Date	■ A special date/day
	■ Range	■ A time period (e.g. holiday)
	■ Weekday	■ An exact day of the week
	■ Off	■ Entries for the period have no validity
(Start) date		The start date is entered under the range. The exact date is entered under the date.
	■ *	■ The weekday is disregarded
	■ Mon – Sun	■ The weekday is not disregarded
	■ *	■ Not possible! Please enter the date.
	■ DD.MM.YY	■ Date entry
		To enter this, use the arrow keys to go to the line in question and press ENTER. Select the desired value using the arrow keys and confirm with ENTER. The cursor automatically moves to the next value in the same line. Select the value again and confirm it, etc.

End date	■ * ■ Mon – Sun ■ * ■ DD.MM.YY	The end date is entered under the range. ■ The weekday is disregarded ■ The weekday is not disregarded ■ Not possible! Please enter the date. ■ Date entry To enter this, use the arrow keys to go to the line in question and press ENTER. Select the desired value using the arrow keys and confirm with ENTER. The cursor automatically moves to the next value in the same line. Select the value again and confirm it, etc.
Weekday	■ * ■ 1. ■ 2. ■ 3. ■ 4. ■ 5. ■ Last ■ * ■ Mon – Sun ■ * ■ Even ■ Uneven ■ Jan – Dec	The weekday is entered under the weekday. The entry is made with three values: ■ Every one ■ First ■ Second ■ Third ■ Fourth ■ Fifth ■ Last ■ Not possible! ■ Monday – Sunday ■ In every month ■ In even months ■ In uneven months ■ In January – December To enter this, use the arrow keys to go to the line in question and press ENTER. Select the desired value using the arrow keys and confirm with ENTER. The cursor automatically moves to the next value in the same line. Select the value again and confirm it, etc.

6.4 External enable

6.4.1 Switching on via the party button

Using an on-site potential-free button, the plant switches into an adjustable fan step for an adjustable follow-up time.

NOTE!

Only the digital input “External control” is used for the function.

For the settings of the party button function, open the following menu item:

Main menu > Settings > External control

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Min run time	■ 0.0 – 23.0 h	Indicates the selected follow-up time after the party button is pressed. It is only recommended that the follow-up time is set for presence sensors without a built-in follow-up time. Otherwise, 0.0 h is recommended
Fan step	■ Auto ■ Off ■ Step 1 ■ Step 2 ■ Step 3	Indicates the selected fan steps for the party mode. ■ Automatic ■ Off ■ Speed or setpoint step 1 ■ Speed or setpoint step 2 ■ Speed or setpoint step 3 Automatic means that the next priority (e.g. time program) will take over control.
Start/stop function	■ No ■ Yes	Indicates whether the pulse function is selected for the input. ■ No pulse function ■ The first button press starts the party function and the second stops it again

Pulse function = off and min. runtime = 0:	The selected fan step is activated as long as the signal is active.
Pulse function = off and min. runtime > 0:	In case of a pulse at the input, the party function is started for the duration of an adjustable period. The timer is started again every time there is a pulse at the input.
Pulse function = on and min. runtime= 0:	In case of a pulse, the selected fan step is activated and stopped again at the next pulse.
Pulse function = on and min. runtime > 0:	In case of a pulse, the party function is started for the duration of an adjustable time and stopped again immediately at the next pulse.

6.4.2 Switching on via the presence sensor

The plant is switched on or switched into a different fan step via the presence sensor. For presence sensor without a built-in follow-up time, the follow-up time can be set in the controller.

NOTE!

Only the digital input “External control” is used for the function.

To view and/or change the settings, open the following menu item:

Main menu > Settings > External control

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Min run time	■ 0.0 – 23.0 h	Indicates the selected follow-up time after the presence signal has expired. It is only recommended that the follow-up time is set for presence sensors without a built-in follow-up time. Otherwise, 0.0 h is recommended.
Fan step	■ Auto ■ Off ■ Step 1 ■ Step 2 ■ Step 3	Indicates the selected fan steps in case of a presence signal. ■ Automatic ■ Off ■ Speed or setpoint step 1 ■ Speed or setpoint step 2 ■ Speed or setpoint step 3 Automatic means that the next priority (e.g. time program) will take over control.
Start/stop function	■ No ■ Yes	Indicates whether the pulse function is selected for the input. ■ No pulse function ■ The first input pulse starts the presence signal and the second stops it again The function is not suitable for presence sensors. No is recommended.

6.4.3 Switching on via the hygrostat

The plant is switched on or switched into a different fan step using a hygrostat. The follow-up time can generally be set.

NOTE!

Only the digital input “External control” is used for the function.

To view and/or change the settings, open the following menu item:

Main menu > Settings > External control

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Min run time	■ 0.0 – 23.0 h	Indicates the selected follow-up time when the hygrostat switches off: It is only recommended that the follow-up time is set for hygrostats without a built-in follow-up time. Otherwise, 0.0 h is recommended.
Fan step	■ Auto ■ Off ■ Step 1 ■ Step 2 ■ Step 3	Indicates the selected fan step when the hygrostat switches on. ■ Automatic ■ Off ■ Speed or setpoint step 1 ■ Speed or setpoint step 2 ■ Speed or setpoint step 3 Automatic means that the next priority (e.g. time program) will take over control.
Start/stop function	■ No ■ Yes	Indicates whether the pulse function is selected for the input. ■ No pulse function ■ The first input pulse starts the selected fan step and the second stops it again The function is not suitable for hygrostat operation. No is recommended.

6.4.4 Preselecting the fan step

Two digital inputs are available for external control of the plant. These are used to set the plant's operating mode.

NOTE!

For this function, the two digital inputs "External control" and "External control 2" are used.

Two digital inputs are available depending on the plant configuration.

Digital input External control 1	Digital input External control 2	Fan step	Temperature setpoint
Open	Open	Automatic Automatic means that the next priority (see "6.1 Operating modes and control priorities" on page 35) will take over switching.	
Connected	Open	Speed or setpoint step 1	See the selection below Tmp stpt input 1
Open	Connected	Speed or setpoint step 2	See the selection below Tmp stpt input 2
Connected	Connected	See the selection below Fan step	See the selection below Tmp stpt input 2

To view and/or change the settings, open the following menu item:

Main menu > Settings > External control

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Tmp stpt input 1	■ Comfort ■ Eco	Indicates the selected temperature setpoint that is used for the external enable input 1. ■ Comfort setpoint is used ■ Economy setpoint is used
Tmp stpt input 2	■ Comfort ■ Eco	Indicates the selected temperature setpoint that is used for the external enable input 2. ■ Comfort setpoint is used ■ Economy setpoint is used When both inputs are connected, the set values of input 2 is used.
Min run time	0.0 – 23.0 h	Indicates the follow-up time until the plant returns to the automatic mode. The follow-up time begins when both external enable inputs are no longer connected. Automatic means that the next priority (see "6.1 Operating modes and control priorities" on page 35) will take over switching.

Fan step 	■ Auto ■ Off ■ Step 1 ■ Step 2 ■ Step 3	Indicates the selected fan step when both inputs are connected. ■ Automatic mode when both are connected ■ Off when both are connected ■ Fan step 1 when both are connected ■ Fan step 2 when both are connected ■ Fan step 3 when both are connected  Automatic means that the next priority (see "6.1 Operating modes and control priorities" on page 35) will take over switching.
Start/stop function	■ No ■ Yes	Indicates whether the pulse function is selected for the inputs. ■ No pulse function ■ The first input pulse starts the command and the second stops it again

7 Fan control

7.1 Control strategy

The fan control is performed according to one of the following control strategies, depending on the plant configuration and equipment. For the setting of the setpoints, see "7.2 Setting the setpoints" on page 47.

7.1.1 Constant duct pressure

The supply and extract air duct pressures are measured using a pressure transmitter.

The duct pressures are continuously compared to the current setpoints and, if there is a deviation, corrected by adjusting the fan speed.

Up to three duct pressure setpoints can be set separately for the supply and extract air as fan steps.

NOTE!

This control strategy is used if volume flow controllers are contained in the duct system.

7.1.2 Volume flow control

The effective pressures of the supply and extract fans are measured with a pressure transmitter. The supply and extract volume flow rates are calculated using the preset K factors.

The volume flow rates are continuously compared to the current setpoints and, if there is a deviation, corrected by adjusting the fan speed.

Up to three duct pressure setpoints can be set separately for the supply and extract air as fan steps.

7.1.3 Constant speed control

The supply and extract fans are controlled with the fixed percentage value, depending on the active step. The volume flow rate and/or duct pressure must be measured externally.

Up to three percentage values can be set separately for the supply and extract air as fan steps.

7.1.4 Supply-air-dependent volume flow control

The supply air duct pressure is measured using a pressure transmitter. The duct pressure is continuously compared to the current setpoint and, if there is a deviation, corrected by adjusting the fan speed.

In addition to the supply air duct pressure, the resulting effective pressure of the supply fan is measured using a pressure transmitter. The supply volume flow rate is calculated using the preset K factor.

The effective pressure of the extract fan is also measured using a pressure transmitter. The preset K factor is used to calculate the volume flow rate of extract air.

The calculated volume flow rate of supply air is combined with an adjustable difference between the supply and extract volume flow rate and applied as the setpoint for the extract volume flow rate.

The volume flow rate of extract air is continuously compared with its calculated setpoint and, if there is a deviation, corrected by adjusting the fan speed.

Up to three duct pressure setpoints can be set as fan steps.

NOTE!

This control strategy is a supply air duct pressure control. The extract fan is adjusted in accordance with the supply volume flow rate.

7.1.5 Extract air-dependent volume flow control

The extract air duct pressure is recorded using a pressure transmitter. The duct pressure is continuously compared to the current setpoint and, if there is a deviation, corrected by adjusting the fan speed.

In addition to the extract air duct pressure, the resulting effective pressure of the extract fan is measured using a pressure transmitter. The extract volume flow rate is calculated using the set K factor.

The effective pressure of the supply fan is also measured using a pressure transmitter. The set K factor is used to calculate the supply volume flow rate.

The calculated volume flow rate of extract air is combined with an adjustable difference between the supply and extract volume flow rate and applied as the setpoint for the extract volume flow rate.

The extract volume flow rate is continuously compared with its calculated setpoint and, if there is a deviation, corrected by adjusting the fan speed.

Up to three duct pressure setpoints can be set as fan steps.

NOTE!

This control strategy is an extract air duct pressure control. The supply fan is adjusted in accordance with the volume flow rate of extract air.

7.2 Setting the setpoints

To set the setpoints of the supply fan, open the following menu item:

Main menu > Setpoints > Fan control > Supply fan

To set the setpoints of the extract fan, open the following menu item:

Main menu > Setpoints > Fan control > Extract fan

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

The number of available steps depends on the plant configuration and can be changed.

Display	Values	Description
Step 1	■ 0 – 160,000 m³/h ■ 0 – 5,000 Pa ■ 0 – 100%	Indicates the current setpoint of the fan in step 1; the setpoint can be overwritten here.
Step 2	■ 0 – 160,000 m³/h ■ 0 – 5,000 Pa ■ 0 – 100%	Indicates the current setpoint of the fan in step 2; the setpoint can be overwritten here.
Step 3	■ 0 – 160,000 m³/h ■ 0 – 5,000 Pa ■ 0 – 100%	Indicates the current setpoint of the fan in step 3; the setpoint can be overwritten here.

Max forcing	■ 0 – 160,000 – highest m³/h ■ 0 – 5,000 – highest Pa ■ 0 – 100 – highest %	Indicates the maximum permissible shift of the fan setpoint due to compensation. ■ The maximum setpoints is defined as follows: Highest available step setpoint + max compensation The effect will be described in the next section. See "7.2.1 Compensation function" on page 48.

7.2.1 Compensation function

Various control functions generate a positive or negative shift of the fan setpoint as a percentage.

If more than one compensation function is configured, the generated shifts are added up.

Example	
Sum of positive shifts	80%
Type of fan control	Flow rate
Number of plant steps	3 steps
Setpoint step 1	500 m³/h
Setpoint step 2	750 m³/h
Setpoint step 3	1,000 m³/h
Max forcing	200 m³/h
Current fan step	Step 1 (500 m³/h)

How far can the setpoint be shift at maximum?

Maximum setpoint = setpoint step 3 + max compensation = 1,000 m³/h + 200 m³/h = 1,200 m³/h

What is the current setpoint, taking into account the sum of the positive shifts?

Compensated setpoint = setpoint step 1 + 80% of max compensation= 500 m³/h + 0,8 * 200 m³/h = 660 m³/h

Summary: In the example, the fan setpoint is shifted upward by 160 m³/h to counteract poor air quality, for example.

7.2.2 Compensation disabling

When necessary, the effect of the compensation functions on the fans in steps 1 and/or 2 can be disabled. Go to the following menu item:

Main menu > Settings > Fan control

Display	Values	Description
Compensation disable		Indicates whether the compensation functions are permitted to shift the setpoint of the fan or not.
	■ No	■ Compensation is always permitted
	■ Step 1	■ Compensation is not permitted in fan step 1
	■ Step 1+2	■ Compensation is not permitted in fan steps 1 and 2

7.2.3 Slave fan additional setting

In the case of volume flow control guided by the supply and extract air, the duct pressure setpoint of the leading (master) fan is set as described in section "7.2 Setting the setpoints" on page 47.

The guided (slave) fan can operate at a difference to the leading fan if this is necessary.

In case of supply-air-guided volume flow control, a start setpoint can be set for the extract fan. This is necessary when the supply fan starts with a delay.

To set the slave fan, open the following menu item:

Main menu > Setpoints > Fan control

Display	Values	Description
Slave offset	■ -999 – 999 m^3/h	Indicates the setpoint for the difference between the supply and extract volume flow rates. This is maintained by the plant.
Slave start up stpt	■ 0 – 9,999 m^3/h	Indicates the setpoint of the extract fan when the supply fan is not yet running. This setpoint is needed so that the extract fan receives a setpoint when there is a delayed start of the supply fan.

8 Temperature control

8.1 Control strategy

The temperature control is performed according to one of the following control strategies, depending on the plant configuration and equipment. For settings of the setpoints and dead zones, see the next section "8.2 Setting the setpoints" on page 51.

8.1.1 Supply air control

The supply air temperature is continuously compared to the temperature setpoint and corrected if there is a deviation. For heating (winter), first the heat recovery system and then the heater are operated at full power. For cooling (summer), the cooler is operated at full power.

NOTE!

This control strategy maintains a constant supply air temperature year round. Room loads are not taken into consideration. Heaters or cooling surfaces control the room temperature.

8.1.2 Supply air/extract air cascade control

The extract air temperature is continuously compared to the temperature setpoint and corrected if there is a deviation. For this purpose, a supply air setpoint is calculated that is contained within the minimum and maximum supply air limits. The supply air temperature is continuously compared to the calculated supply air setpoint and corrected if there is a deviation. For heating (winter), first the heat recovery system and then the heater are operated at full power. For cooling (summer), the cooler is operated at full power.

8.1.3 Supply air/room cascade control

The room temperature is continuously compared to the temperature setpoint and corrected if there is a deviation. For this purpose, a supply air setpoint is calculated that is contained within the minimum and maximum supply air limits. The supply air temperature is continuously compared to the calculated supply air setpoint and corrected if there is a deviation. For heating (winter), first the heat recovery system and then the heater are operated at full power. For cooling (summer), the cooler is operated at full power.

8.1.4 Supply air/extract air cascade control only in summer

- Summer mode: Supply air/extract air cascade control as described in section "8.1.2 Supply air/extract air cascade control" on page 50.
- Winter mode: Supply air control as described in section "8.1.1 Supply air control" on page 50.

NOTE!

This control strategy maintains a constant supply air temperature in winter only. Room loads are not taken into consideration. Heaters control the room temperature.

8.1.5 Supply air/room cascade control only in summer

- Summer mode: Supply air/extract air cascade control as described in section "8.1.3 Supply air/room cascade control" on page 50.
- Winter mode: Supply air control as described in section "8.1.1 Supply air control" on page 50.

NOTE!

This control strategy maintains a constant supply air temperature in winter only. Room loads are not taken into consideration. Heaters control the room temperature.

8.1.6 Temperature-guided volume flow control

During heating, if the supply air setpoint is not reached while taking into account an adjustable dead zone, proceed as follows. As a final step after the heat recovery system and heating system, the fan speed is lowered to a settable maximum to increase heating power.

Two procedures are available for cooling. Which one is used can be set:

- If the supply air setpoint is not reached while taking into account an adjustable dead zone, the fan speed is raised to an adjustable maximum first, followed by the full-power operation of the cooler.
- If the supply air setpoint is not reached while taking into account an adjustable dead zone, the final step after the cooler is to raise the fan speed to an adjustable maximum as a final step to increase the cooling power.

*By default, the cooling function is always switched off since the speed increase is an intervention in the duct system. However, this must be set when the plan is commissioned.

To set the dead zones, see the next section "8.2 Setting the setpoints" on page 51.

NOTE!

A speed change is not recommended in combination with duct-side volume flow controllers

The function is available depending on the plant configuration.

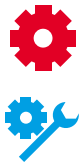
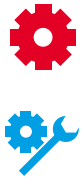
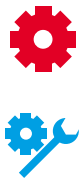
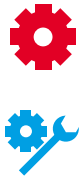
8.2 Setting the setpoints

To set the temperature setpoints, open the following menu item:

Main menu > Setpoints > Temperature control

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Control mode	■ Supply air ■ Extract air ■ Room	Indicates the current controlled variable according to which a parameter is set: ■ The supply air temperature is controlled ■ The exhaust air temperature is controlled ■ The room air temperature is controlled
Controlled variable	... °C	Indicates the actual value of the controlled variable according to which a parameter is set.

External setpoint 	... °C	Indicates the external setpoint input at the analogue input of the control.
Comfort setpoint	0.0 – 40.0 °C	Indicates the current setpoint for the comfort mode.
Comfort deadzone	0.5 – 20.0 K	Indicates the current dead zone for the comfort mode.
Eco setpoint 	0.0 – 40.0 °C	Indicates the current setpoint for the economy mode.
Economy deadzone 	1.0 – 20.0 K	Indicates the current dead zone between heating and cooling for the economy mode.
Fan htg deadzone 	0.0 – 20.0 K	Indicates the current dead zone for the “Temperature-guided volume flow control” function for heating.
Fan clg deadzone 	0.0 – 20.0 K	Indicates the current dead zone for the “Temperature-guided volume flow control” function for cooling.
Valid setpoint	... °C	Indicates the current valid setpoint for the temperature control.  This setpoint can contain shifts through the room control panels or the summer/winter compensation.
Act cooling stpt	... °C	Indicates the current setpoint for the controlled variable for cooling. It is calculated as follows: Setpoint + half dead zone.
Act heating stpt	... °C	Indicates the current setpoint for the controlled variable for heating. It is calculated as follows: Setpoint– half dead zone.
Casc controller tmp > High limit > Low limit 	■ 64.0 – 90.0 °C ■ 64.0 – 90.0 °C	Indicates the set limit values of the supply air temperature for the cascade control. ■ Maximum permissible supply air temperature ■ Minimum permissible supply air temperature
Act sply clg stpt 	... °C	Indicates the current setpoint for the cascade controller for cooling.
Act heating stpt 	... °C	Indicates the current setpoint for the cascade controller for heating.

9 Humidity control

9.1 Control strategy

The humidity control is performed according to one of the following control strategies, depending on the plant configuration and equipment. For settings of the setpoints and dead zones, see the next section "9.2 Setting the setpoint" on page 54.

9.1.1 Supply air control

The supply air humidity is continuously compared to the humidity setpoint and corrected if there is a deviation. In case of humidification, the humidifier is run at full power. In case of dehumidification, the cooler designed for dehumidification is run at full power.

9.1.2 Extract air control

The extract air humidity is continuously compared to the humidity setpoint and corrected in case of a deviation. In case of humidification, the humidifier is run at full power. In case of dehumidification, the cooler designed for dehumidification is run at full power.

9.1.3 Room control

The room humidity is continuously compared to the humidity setpoint and corrected if there is a deviation. In case of humidification, the humidifier is run at full power. In case of dehumidification, the cooler designed for dehumidification is run at full power.

9.1.4 Supply air/extract air cascade control

The extract air humidity is continuously compared to the humidity setpoint and corrected in case of a deviation. For this purpose, a supply air setpoint is calculated that is contained within the minimum and maximum supply air limits. The supply air humidity is continuously compared to the calculated supply air setpoint and corrected if there is a deviation. In case of humidification, the humidifier is run at full power. In case of dehumidification, the cooler designed for dehumidification is run at full power.

9.1.5 Supply air/room cascade control

The room humidity is continuously compared to the humidity setpoint and corrected if there is a deviation. For this purpose, a supply air setpoint is calculated that is contained within the minimum and maximum supply air limits. The room humidity is continuously compared to the calculated supply air setpoint and corrected if there is a deviation. In case of humidification, the humidifier is run at full power. In case of dehumidification, the cooler designed for dehumidification is run at full power.

9.1.6 Dew point monitor

The dew point in the room is calculated using the room humidity and the room temperature. By taking an adjustable dew point dead zone into account, the lower limit value of the supply air temperature is defined and handed over to the temperature control. This function is used for building protection.

To set the dead zone, see the next section "9.2 Setting the setpoint" on page 54.

NOTE!

The function is available depending on the plant configuration.

9.2 Setting the setpoint

To set the humidity setpoints, open the following menu item:

Main menu > Setpoints > Humidity control

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Control mode  	■ Supply air ■ Extract air ■ Room	Indicates the current controlled variable according to which a parameter is set: ■ The supply air humidity is controlled ■ The extract air humidity is controlled ■ The room humidity is controlled
Controlled variable	... % rH/g/kg	Indicates the actual value of the controlled variable according to which a parameter is set.
Setpoint	0 – 100% rH/g/kg	Indicates the current setpoint for the humidity control.
Dead zone	0 – 100% rH/g/kg	Indicates the current dead zone for the humidity control.
Dew point dead zone  	64.0 – 64.0 K	Indicates the current dead zone for the dew point monitor.
Act dehum stpt	... %rH/g/kg	Indicates the current setpoint for the controlled variable for dehumidification. It is calculated as follows: Setpoint + half dead zone.
Act hum stpt	... %rH/g/kg	Indicates the current setpoint for the controlled variable for humidification. It is calculated as follows: Setpoint– half dead zone.
Casc controller hum > High limit > Low limit  	■ 0.0 – 100% rH/g/kg ■ 0.0 – 100% rH/g/kg	Indicates the set limit values of the supply air humidity for the cascade control. ■ Maximum permissible supply air humidity ■ Minimum permissible supply air humidity
Act sply dehum stpt  	... %rH/g/kg	Indicates the current setpoint for the cascade controller for dehumidification.
Act sply hum stpt  	... %rH/g/kg	Indicates the current setpoint for the cascade controller for humidification.

10 Air quality control

10.1 Control strategy

10.1.1 Increase the fresh air share

The fresh air share is adjusted according to the room/extract air quality.

If the room/extract air quality varies from the set room/extract air setpoint, the fresh air share is increased steadily using a controller from the set minimum fresh air share to up to 100% fresh air.

NOTE!

The air quality control is available, depending on the plant configuration and equipment. The minimum fresh air share can be set as described in section "11.1 Minimum fresh air share" on page 56

10.1.2 Increasing the fresh air supply

The fresh air supply is adjusted according to the room/extract air quality.

If the room/extract air quality deviates from the set room/extract air setpoint, the fan set point is increased by shifting it up to a maximum difference.

NOTE!

The air quality control is available, depending on the plant configuration and equipment.

For plants without a recirculation air flap, the maximum permissible shift of the fan setpoint (see section "10.2 Setting the setpoint" on page 55) must be set during commissioning

10.2 Setting the setpoint

To set the setpoint of the air quality, open the following menu item:

Main menu > setpoints

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Air quality	0 – 3,000 ppm	Indicates the setpoint of the air quality.

11 Settings

11.1 Minimum fresh air share

If the plant has a recirculation air flap, the minimum fresh air share must be defined. The positions of the outdoor air and exhaust air flaps move in opposite directions to the recirculation air flap.

The possibility of setting the minimum fresh air share depends on whether the plant is equipped with a recirculation air or mixed air flap.

To set the minimum fresh air share, open the following menu item:

Main menu > setpoints

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Min fresh air	0 – 100%	Indicates the minimum fresh air share of the plant.

11.2 PI control

To access the PI controls, open the following menu item:

Main menu > Settings > Controller

Some PI controls are only available with certain plant equipment.

Some PI controls are only available with certain plant configurations.

Display	Values	Description
Supply fan	0 – 100%	Indicates the current output value of the controller for the supply air fan.
Extract fan	0 – 100%	Indicates the current output value of the controller for the exhaust air fan.
Air quality	0 – 100%	Indicates the current output value of the controller for the air quality. The controller acts on the fans or the recirculation air flap, depending on the plant configuration and equipment.
Casc controller tmp	0 – 100%	The controller calculates the setpoints for the supply air temperature for heating and cooling.
Hrec damper	0 – 100%	Indicates the current output value of the temperature control sequence for the recirculation air flap.
Heat recovery	0 – 100%	Indicates the current output value of the temperature control sequence for the heat recovery.
Hrec frost protect	0 – 100%	Indicates the current value of the frost protection controller for the heat recovery. The higher the value, the lower the level at which the heat recovery can be operated.
Heating	0 – 100%	Indicates the current output value of the temperature control sequence of the hot water heater.
Htg frost protect	0 – 100%	Indicates the current value of the frost protection controller for the hot water heater. If the value is higher than the value of the temperature control sequence, the frost protection controller acts on the heater valve.
Heating 2	0 – 100%	Indicates the current output value of the temperature control sequence of the hot water preheater. Heating 2 is always the preheater, if present.

Htg 2 frost protect	0 – 100%	Indicates the current value of the frost protection controller for the hot water preheater. If the value is higher than the value of the temperature control sequence, the frost protection controller acts on the preheater valve. Heating 2 is always the preheater, if present.
Electrical heating	0 – 100%	Indicates the current output value of the temperature control sequence of the electric heater.
El Heating 2	0 – 100%	Indicates the current output value of the temperature control sequence of the electric heater. Heating 2 is always the preheater, if present.
Fan heating	0 – 100%	Indicates the current output value for the heating case of the “temperature-guided volume flow control” function.
Cooling	0 – 100%	Indicates the current output value of the temperature control sequence of the cooler.
Fan cooling	0 – 100%	Indicates the current output value for the cooling case of the “temperature-guided volume flow control” function.
Casc controller hum	0 – 100%	The controller calculates the setpoints for the supply air humidity for humidification and dehumidification.
Humidification	0 – 100%	Indicates the current output value of the humidification sequence.
Dehumidification	0 – 100%	Indicates the current output value of the dehumidification function.

To change the settings of a controller, go to the controller in question using the arrow keys and press ENTER.

NOTE!

Normal controllers and the cascade controllers differ in their display.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Control output	0 – 100%	Indicates the current output value of the controller. The output value of a controller is the sum of the P and I components. The P component is determined by the amplification and the I component by the reset time.
Contr.out clg/deh (cascade controllers only)	...	Indicates the current output value of the cascade controller for cooling/dehumidification. The output value is restricted by the set supply air limits for temperature/humidity.
Contr.out htg/hum (cascade controllers only)	...	Indicates the current output value of the cascade controller for cooling/dehumidification. The output value is restricted by the set supply air limits for temperature/humidity.
Actual value	...	Indicates the current actual value with which the controller is operating.
Setpoint	...	Indicates the current setpoint with which the controller is operating.
Rm stpt clg/dehum (cascade controllers only)	...	Indicates the current setpoint for cooling/dehumidification with which the cascade controller is operating.
Rm stpt htg/hum (cascade controllers only)	...	Indicates the current setpoint for heating/humidification with which the cascade controller is operating.

Gain (Kp)	-1000.0000 – +1000.0000 0 – 1000.0000 (for cascade controller)	Indicates the current gain factor with which the controller or cascade controller is operating. This value can be set by pressing ENTER. First set the sign “+” r “-” using the arrow keys. Press ENTER again and then set every digit and confirm each one individually with ENTER. Control output (P component) = gain x (setpoint – actual value) Positive gains lead to the controller operating like a heat controller, e.g. if the actual value is less than the set point, the control output increases. Cascade controllers always operate as a heat controller. Negative gains lead to the controller operating like a cooling controller, e.g. if the actual value is larger than the set point, the control output increases.
Integr.act.ti.(Tn)	0 – 18,000 s	Indicates the current reset time with which the controller is operating. The reset time is a ramp time that is needed by the I component to achieve the same values as the P component.

11.3 Maintenance

11.3.1 Message

A maintenance interval can be defined in the control. After the interval has expired, an alarm message is output that provide information on the required maintenance.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Alarm handling

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Enble ophours alarm	■ No ■ Yes	Indicates whether a maintenance message is to be displayed. ■ Do not display a maintenance message ■ Maintenance messages may be displayed
Maintenance interval	0 – 999,999 h	Indicates the set maintenance interval after which an alarm message is to be displayed. The operating hours of the supply fan are decisive for the generation of the maintenance message.

11.3.2 Operating hours

Generally, the operating hours of the components are recorded. These can be reset again during maintenance.

Go to the following menu item to read out or reset the current operating hours:

Main menu > Information> Operating hours

Some operating hours counters are only available with certain plant equipment.

Some operating hour counters are only available with certain plant configurations.

Display	Values	Description
Supply fan	... h	Indicates the operating hours of the supply fan. The operating hours of the supply fan are decisive for the generation of the maintenance message.
>Reset	■ Execute ■	Trigger a reset the operating hours. ■ Reset the operating hours now ■ Do nothing
Extract fan	... h	Indicates the operating hours of the extract fan.
>Reset	■ Execute ■	Trigger a reset the operating hours. ■ Reset the operating hours now ■ Do nothing
Hrec (pump) cmd	... h	Indicates the operating hours of the pump enable for heat recovery.
>Reset	■ Execute ■	Trigger a reset the operating hours. ■ Reset the operating hours now ■ Do nothing
Heating pump	... h	Indicates the operating hours of the hot water heater pump.
>Reset	■ Execute ■	Trigger a reset the operating hours. ■ Reset the operating hours now ■ Do nothing
Cooling pump	... h	Indicates the operating hours of the hot water heater pump.
>Reset	■ Execute ■	Trigger a reset the operating hours. ■ Reset the operating hours now ■ Do nothing
Cooling DX	... h	Indicates the operating hours of the refrigerator.
>Reset	■ Execute ■	Trigger a reset the operating hours. ■ Reset the operating hours now ■ Do nothing
Humidifier	... h	IIndicates the operating hours of the humidifier.
>Reset	■ Execute ■	Trigger a reset the operating hours. ■ Reset the operating hours now ■ Do nothing
Electrical heating	... h	Indicates the operating hours of the electric heater.
>Reset	■ Execute ■	Trigger a reset the operating hours. ■ Reset the operating hours now ■ Do nothing
Heating 2 pump	... h	Indicates the operating hours of the hot water preheater pump. Heating 2 pump is the pump of heater 2. This is always the preheater, if present
>Reset	■ Execute ■	Trigger a reset the operating hours. ■ Reset the operating hours now ■ Do nothing
El Heating 2	... h	Indicates the operating hours of the electric heater. El Heating 2 is always the preheater if present.
>Reset	■ Execute ■	Trigger a reset the operating hours. ■ Reset the operating hours now ■ Do nothing

11.4 Filters

All air filters in the plant are monitored with differential pressure sensors. A maintenance message is created if the individually adjustable limit values are exceeded.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Alarm handling

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Depending on the plant equipment, not all functions will be available.

Display	Values	Description
Outs air filter		
> High limit	500 – 8,000 Pa	Indicates the set final pressure of the outdoor air filter at which an alarm message is displayed. The value corresponds to 100% on the soiling display on the start page. The display is available depending on the plant equipment.
> Low limit	500 – 8,000 Pa	Indicates the set initial pressure of the outdoor air filter. The value corresponds to 0% on the soiling display on the start page. The display is available depending on the plant equipment.
Supply filter		
> High limit	500 – 8,000 Pa	Indicates the set final pressure of the supply air filter at which an alarm message is displayed. The value corresponds to 100% on the soiling display on the start page. The display is available depending on the plant equipment.
> Low limit	500 – 8,000 Pa	Indicates the set initial pressure of the supply air filter. The value corresponds to 0% on the soiling display on the start page. The display is available depending on the plant equipment.
Extract filter		
> High limit	500 – 8,000 Pa	Indicates the set final pressure of the extract air filter at which an alarm message is displayed. The value corresponds to 100% on the soiling display on the start page. The display is available depending on the plant equipment.
> Low limit	500 – 8,000 Pa	Indicates the set initial pressure of the extract air filter. The value corresponds to 0% on the soiling display on the start page. The display is available depending on the plant equipment.
Filters	0 – 65,535 s	Indicates the set delay time between switching of the differential pressure switch and the alarm message. This setting is available if a differential pressure switch is used instead of differential pressure sensors.

11.5 Dampers

To view and/or change the settings, open the following menu item:

Main menu > Settings > Damper control

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Off delay by fanoff	0 – 36,000 s	Indicates the time delay until the dampers close after the plant is switched off.
Opening time	0 – 36,000 s	Indicates the run time of the dampers until they are open and the fans can start running.

11.6 Fans

To view and/or change the settings, open the following menu item:

Main menu > Settings > Fan control > Supply fan

Main menu > Settings > Fan control > Extract fan

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
K-fact	0 – 999.9	Indicates the K factor used to calculate the volume flow rate of the respective fans. Press ENTER to set the K factor. Each digit is set separately with the arrow keys and confirmed with ENTER. The K factor is displayed depending on the plant configuration.
Startup delay	0 – 36,000 s	Indicates the delay time with which the supply fan is started after the extract fan. A delayed startup time can only be set for the supply fan. In this way, the extract fan can be used to update the sensor values in the extract air in advance (temperature, humidity, air quality).
Min run time	0 – 36,000 s	Indicates the minimum run time for which the respective fan runs after startup.

11.7 Heat recovery

11.7.1 Quick heating

After the plant starts up, heat recovery is run at 100% for an adjustable run time. The quick heating starts when the limit value of the outside temperature is not reached when the plant is started up.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Heat recovery

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Start up time	0 – 36,000 s	Indicates the duration of the quick heating phase.
Start up tmp	-64.0 – 64.0 °C	Indicates the limit value of the outside temperature below which the quick heating starts.

11.7.2 Defrost protection

Plate exchangers are monitored for frost generation via the exhaust air temperature.

Closed-cycle systems are monitored for frost generation via the exhaust air temperature.

The lower limit value of the exhaust air temperature and the water temperature is adjustable.

If the temperature drops below this value, the requirement for heat recovery is reduced gradually in order to raise the exhaust air and water temperature again in this way.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Heat recovery

The function is available depending on the plant equipment.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Hrec frost setpoint	-64.0 – 64.0 °C	Indicates the lower limit value of the exhaust air and water temperature that needs to be maintained by the frost protection function.

11.7.3 Efficiency

The efficiency of the heat recovery is displayed under the following menu item:

Main menu > Information> Heat recovery

The function is available depending on the plant equipment.

When an adjustable limit value is dropped below, a message is output.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Alarm handling

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Hrec efficiency		
> Low limit	0 – 100%	Indicates the lower limit value of the efficiency at which an alarm message is output.

11.7.4 Hrec clg recovery

The heat recovery system is set to 100% to aid in cooling recovery if cooling becomes necessary. The following conditions for starting and ending the function are not adjustable.

The cooling recovery starts under the following conditions:

- Outside temperature > Extract air/room temperature +2 K and
- Extract air/room temperature > Temperature setpoint +1 K

The cooling recovery ends under the following conditions:

- Outside temperature ≤ Extract air/room temperature or
- Extract air/room temperature ≥ Temperature setpoint

If both extract air and room temperature are available, the extract air is always used.

11.7.5 Enthalpy-guided cooling recovery

The heat recovery system is set to 100% to aid in cooling recovery if cooling becomes necessary. The following conditions for starting and ending the function are not adjustable.

The cooling recovery starts under the following conditions:

- Outside enthalpy > Extract air/room enthalpy +2 kJ/kg and
- Extract air/room temperature > Temperature setpoint +1 K

The cooling recovery ends under the following conditions:

- Outside enthalpy ≤ Extract air/room enthalpy or
- Extract air/room temperature ≥ Temperature setpoint

If both extract air and room temperature are available, the extract air is always used.

The function is available depending on the plant equipment.

11.8 Hot water heater

11.8.1 Pump

The hot water heater pump is started at a valve setting of 5% and stopped again at a setting under 1%.

It is possible to run the pump continuously independently of the valve setting below a limit value of the outside temperature.

To prevent mechanical damage, the pump is started for an adjustable run time after an adjustable interval. Alternatively, a fixed weekday and time can be set for the pump kick.

To view and/or change the settings of the hot water heater pump, open the following menu item:

Main menu > Settings > Heating > Pump

Open the following menu item for the hot water preheating:

Main menu > Settings > Heating 2 > Pump

NOTE!

Heating 2 is always the preheater, if present.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Pump		
>Pump start outs tmp	-64.0 – 64.0 °C	Indicates the limit value of the outside temperature below which the pump is switched on independently of the valve setting.
>Min run time	0 – 36,000 s	Indicates the minimum run time of the pump after it was started.
>Kick date / time	■ * *: * ■ Mon – Sun 00:00 – 23:59	Indicates the weekday and/or the time defined for the pump kick: ■ No definition ■ Weekday and/or time have been defined
>Kick interval	0.0 – 36,000.0 h	Indicates the interval defined for the pump kick.
>Kick on time	0 – 36,000 s	Indicates the on-time defined for the pump kick.

11.8.2 Preflushing

If the temperature is below the limit value of the outside temperature when the plant starts, the hot water heater is first flushed before the fans start. For an adjustable time, the control valve is opened 100% and the pump is started.

The function is then disabled for an adjustable time so that the plant is not preflushed again if the plant were to be restarted again within a short period.

To view and/or change the settings of the preflushing of the hot water heater, open the following menu item:

Main menu > Settings > Heating > Preheating

Open the following menu item for the hot water preheating:

Main menu > Settings > Heating 2 > Preheating

NOTE!

Heating 2 is always the preheater, if present.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Preheating		
>Preheating on time	0 – 600 s	Indicates the on-time of the preflushing process.
>Temperatur X1	-30.0 – 5.0 °C	Indicates the lower outside temperature X1 at which the larger heating signal Y1 is used for preflushing.
>Temperatur X2	0.0 – 50.0 °C	Indicates the upper outside temperature X2 at which the smaller heating signal Y2 is used for preflushing. This value is the limit value of the outside temperature below which preflushing occurs.
>Heating signal Y1	0.0 – 100.0 %	Indicates the heating signal acting on the control valve with which preflushing occurs at the lower outside temperature X1.
>Heating signal Y2	0.0 – 100.0 %	Indicates the heating signal acting on the control valve with which preflushing occurs at the upper outside temperature X2.
>Min off time	0.0 – 1,440.0 min	Indicates the minimum off time of the preflushing function so that preflushing is not repeated again after a short period.

11.8.3 Frost protection

The hot water heater is protected against freezing by means of a frost protection thermostat. When the thermostat is triggered, the control valve is opened 100% and the pump is started.

Measures for frost prevention

For frost prevention, the control valve and the pump are continuously activated when the outside temperatures are low and the plant is switched off. For this purpose, a heating curve is set that defines the valve opening as a function of the outside temperature.

Frost prevention as a function of the outside temperature is available depending on the plant equipment.

For energy-optimised frost prevention, the return flow temperature is measured. The lower limit value of the return flow temperature can be set separately for the plant in operation and the plant switched off. If the temperature drops below this value, the control valve is kept fully open in order to correct the return flow temperature.

Frost prevention using a return flow sensor is available depending on the plant equipment.

The result of the frost prevention is a control value in terms of a percentage. This value applies to the control valve when it is larger than the control value from the temperature control sequence.

ATTENTION!

The main switch mounted on the switch cabinet of the control is not permitted to be used for switching the plant on and off during normal operation. If it is used to switch off the plant, frost protection of the hot water heater will no longer be ensured.

To view and/or change the settings for the frost protection of the hot water heater, open the following menu item:

Main menu > Settings > Heating > Frost protection

Open the following menu item for the hot water preheating:

Main menu > Settings > Heating 2 > Frost protection

NOTE!

Heating 2 is always the preheater, if present.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Frost protection		
>Setpoint	-64.0 – 64.0 °C	Indicates the lower limit value of the return flow temperature that the frost protection function maintains when the plant is in operation. The value is only used when frost prevention is based on a return flow sensor.
>Standby setpoint	-64.0 – 64.0 °C	Indicates the lower limit value of the return flow temperature that the frost protection function maintains when the plant is switched off. The value is only used when frost prevention is based on a return flow sensor.
>Function	■ Passive ■ Active	Indicates whether frost prevention based on the outside temperature is in use. ■ Frost prevention is passive and thus switched off ■ Frost prevention is active and thus switched on The value is only used when frost prevention is based on a return flow sensor.
>Temperatur X1	-64.0 – 64.0 °C	Indicates the lower outside temperature X1 at which the larger heating signal Y1 is used. The value is only used when frost prevention is based on the outside temperature.
>Temperatur X2	-64.0 – 64.0 °C	Indicates the upper outside temperature X2 at which the smaller heating signal Y2 is used for preflushing. The value is only used when frost prevention is based on the outside temperature.
>Heating signal Y1	0.0 – 100.0 %	Indicates the heating signal acting on the control valve with which pre-flushing occurs at the lower outside temperature X1. The value is only used when frost prevention is based on the outside temperature.
>Heating signal Y2	0.0 – 100.0 %	Indicates the heating signal acting on the control valve with which pre-flushing occurs at the upper outside temperature X2. The value is only used when frost prevention is based on the outside temperature.
>Current value	0.0 – 100.0 %	Indicates the current control value of the control valve of the frost prevention function. The value is only used when frost prevention is based on the outside temperature.

11.9 Electric heater

For cooling after operation of electric heaters, a follow-up time is set for the fans.

The heating signal above which an electric heater is enabled and the heating signal below which it is disabled again can be set as well.

To view and/or change the settings of the electric heater, open the following menu item:

Main menu > Settings > Electric heating

Open the following menu item for the electric preheating:

Main menu > Settings > El Heating 2

NOTE!

Heating 2 is always the preheater, if present.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Rundown time el htg	0 – 36,000 s	Indicates the follow-up time of the fan after the plant is switched off. The follow-up is only active if the electric heater was on.
Start stage 1	0 – 100%	Indicates the heating signal above which the enable is issued.
Stage hys off	0- Start stage 1	Indicates the heating signal below which the enable is rescinded.

11.10 Cooling

11.10.1 Cold water

The cooler can be disabled below a limit value of the outside temperature.

The pump of the cold-water cooler is started at a valve setting of 5% and stopped again below 1%.

To prevent mechanical damage, the pump is started for an adjustable run time after an adjustable interval. Alternatively, a fixed weekday and time can be set for the pump kick.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Cooling

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Disable by outs tmp	-64.0 – 64.0 °C	Indicates the limit value of the outside temperature under which the cooler is always disabled.
Pump		
>Min run time	0 – 36,000 s	Indicates the minimum run time of the pump after it was started.
>Kick date / time	■ * *: * ■ Mon – Sun 00:00 – 23:59	Indicates the weekday and/or the time defined for the pump kick. ■ No definition ■ Weekday and/or time have been defined
>Kick interval	0.0 – 36,000.0 h	Indicates the interval defined for the pump kick.
>Kick on time	0 – 36,000 s	Indicates the on-time defined for the pump kick.

11.10.2 Direct expansion

The refrigerator can be disabled below a limit value of the outside temperature.

The minimum run time and the minimum off time of the refrigerator can be set.

The cooling signal above which the refrigerator is enabled and the cooling signal below which it is disabled again can be set as well.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Cooling

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Disable by outs tmp	-64.0 – 64.0 °C	Indicates the limit value of the outside temperature under which the refrigerator is always disabled.
Min run time	0 – 36,000 s	Indicates the minimum run time of the enable.
Min off time	5 – 600 s	Indicates the minimum off time of the enable.
Start stage 1	0 – 100%	Indicates the cooling signal above which the enable is issued.
Stage hys off	0- Start stage 1	Indicates the cooling signal below which the enable is rescinded.

11.11 Supply air humidifier

The supply air humidifier can be disabled in summer mode. For drying after operation of humidifier, a follow-up time is set for the fans.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Humidification

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Summer disable	■ No ■ Yes	Indicates whether the humidifier is disabled in summer mode.
Rundown ti humidity	0 – 36,000 s	Indicates the follow-up time of the fan after the plant is switched off. The follow-up is only active if the humidifier was on.

11.12 Outdoor temperature compensation

The setpoints of the fans are adjusted as a function of the outside temperature.

If the outside temperature is between the start and end points, the fan setpoints are adjusted with a linear function up to the set maximum difference.

The start point, end point and difference can be adjusted separately for summer and winter.

NOTE!

This is a fan compensation function. See section "7.2.1 Compensation function" on page 48.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Fan control > Summer comp

Main menu > Settings > Fan control > Winter comp

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Current value	0.0 – 100.0 %	Indicates the current shift in the setpoint.
>Outs air tmp start	-64.0 – 64.0 °C	Indicates the outside temperature at which the setpoint shift begins.
Outs air tmp end	-64.0 – 64.0 °C	Indicates the outside temperature at which the setpoint shift begins.
Difference	-100.0 – 100.0 %	Indicates the maximum difference by which the setpoint is shifted.

11.13 Night cooling (free cooling)

When the plant is off, it is checked whether the room temperature in summer can be lowered by using a cooler outside temperature. For this purpose, the plant starts automatically with an adjustable fan step.

The free cooling function starts the plant under the following conditions:

- Outside temperature > Minimum outside temperature and
- Outside temperature < Room temperature – difference and
- Room temperature > Room setpoint + hysteresis

Free cooling is ended under the following conditions:

- The minimum run time has expired or
- The system switches on for regular operation (presence sensor, time program) or
- Outside temperature > Room temperature – 1 K or
- Room temperature ≤ Room setpoint

To view and/or change the settings, open the following menu item:

Main menu > Settings > Free cooling

This function requires a room temperature sensor.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Min run time	0.0 – 999.9 min	Indicates the minimum run time of the free cooling function.
Fan step	1 – 3	Indicates the current fan step with which the free cooling function starts.
Room tmp setpoint	-64.0 – 64.0 °C	Indicates the room temperature setpoint at which the free cooling function operates with supply air control. Only displayed in plants with supply air control.
Hysteresis	0.0 – 64.0 °C	Indicates the hysteresis with which the free cooling function is operating.
Delta	1.0 – 64.0 °C	Indicates the difference with which the free cooling function is operating.
Min outs tmp	-64.0 – 64.0 °C	Indicates the minimum outside temperature with which the free cooling function is operating.

11.14 Quick heating

After the plant starts up, recirculation air is run at 100% for an adjustable run time. The quick heating starts when the limit value of the outside temperature is not reached when the plant is started up.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Hrec damper

The function is only available if the plant features a recirculation air flap.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Start up time	0 – 36,000 s	Indicates the duration of the quick heating phase.
Start up tmp	-20.0 – 30.0 °C	Indicates the limit value of the outside temperature at which the quick heating starts.

11.15 Summer/winder switching

The switch between summer and winter is performed automatically via a dampened measurement of the outside temperature. For this purpose, the average value is calculated over an adjustable period. This value is then compared with the adjustable threshold values for summer and winter.

Optionally, the heating system can be disabled in summer and the cooling system can be disabled in winter.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Su/Wi calculation

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Su/Wi setting	■ No ■ Summer heating ■ Winter cooling ■ Both	Indicates the current setting. ■ No disabling of heater or cooler in summer or winter mode ■ Hot water heater is disabled in summer mode ■ Cooler is disabled in winter mode ■ Both disables are active
Outs air tmp damped	... °C	Indicates the dampened outside temperature during the set time constant.
Time constant	0.0 – 36,000.0 h	Indicates the current time constant for damping the outside temperature.
Outs air tmp summer	-64.0 – 64.0 °C	Indicates the current threshold value at which the summer mode begins. The threshold value compared to the outside temperature dampened by the time constant.
Outs air tmp winter	-64.0 – 64.0 °C	Indicates the current threshold value at which the winter mode begins. The threshold value compared to the outside temperature dampened by the time constant.

11.16 Peak load shut-off

If the outside temperature drops below an adjustable limit value, the fan steps 2 and 3 are disabled if they are present.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Fan control

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Disable high speed 2/3	-64.0 – 64.0 °C	Indicates the current lower limit value of the outside temperature at which the fan steps 2 and 3 are disabled.

11.17 Summer/winter compensation

The temperature setpoint is adapted as a function of the outside temperature.

If the outside temperature is between the start and end points, the setpoint is shifted with a linear function up to the set maximum difference.

The start point, end point and difference can be adjusted separately for summer and winter.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Temp control > Summer compensation

Main menu > Settings > Temp control > Winter compensation

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Current value	... °C	Indicates the current shift in the temperature setpoint.
>Outs air tmp start	-64.0 – 64.0 °C	Indicates the outside temperature at which the setpoint shift begins.
Outs air tmp end	-64.0 – 64.0 °C	Indicates the outside temperature at which the setpoint shift begins.
Difference	-64.0 – 64.0 K	Indicates the maximum difference by which the setpoint is shifted.

11.18 Draught limitation

The supply air temperature and room temperature are compared. If the difference varies from the set maximum permissible difference, the lower limit of the supply air temperature is raised.

To view and/or change the settings, open the following menu item:

Main menu > Settings > Temperature control

This function requires a room temperature sensor.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Draught clg max dev	0.0 – 64.0 °C	Indicates the maximum permissible difference between the supply air temperature and room temperature.

11.19 Boost heating/cooling

If certain room temperatures occur while the plant is switched off, this function moves the plant start forward by an adjustable period via the time program. In this way, the room setpoint can be achieved at the usual time.

The boos heating function starts the plant under the following conditions:

- Room temperature < Heating setpoint – Hysteresis
- Time to normal start < Start time in advance

Boost heating is ended when: Room temperature ≥ Heating setpoint

The boost cooling function starts the plant under the following conditions:

- Room temperature > Cooling setpoint + hysteresis
- Time to normal start < Start time in advance

Boost cooling is ended when: Room temperature ≤ Cooling setpoint

To view and/or change the settings, open the following menu item:

Main menu > Settings > Boost

The function is available depending on the plant equipment.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Start time	0 – 999 min	Indicates the time period by which the plant starts earlier.
Room tmp setpoint	-64.0 – 64.0 °C	Indicates the room setpoint with which the boost operates in case of supply air control. Only displayed in plants with supply air control.
Cooling setpoint	-64.0 – 64.0 °C	Indicates the room setpoint with which the boost operates in case of cooling.
Heating setpoint	-64.0 – 64.0 °C	Indicates the room setpoint with which the boost operates in case of heating.
Hysteresis	0.1 – 64.0 °C	Indicates the hysteresis with which the boost is operating.

11.20 Cool-down/overheating protection

If the plant is switched off, the room temperature will be checked whether it drops below an adjustable limit value or rises above an adjustable limit value. Then the plant starts automatically with an adjustable fan step and applies an adjustable heating setpoint or cooling setpoint. The function operates independently of the time program.

Cool-down protection starts the plant under the following conditions:

- Room temperature < Heating start value and
- Minimum off-time for the function has expired

Cool-down protection is ended under the following conditions:

- The minimum run time has expired or
- Room temperature > Heating start value + hysteresis

Overheating protection starts the plant under the following conditions:

- Room temperature > Cooling start value and
- Minimum off-time for the function has expired

Overheating protection is ended under the following conditions:

- The minimum run time has expired or
- Room temperature< Cooling start value – hysteresis

To view and/or change the settings, open the following menu item:

Main menu > Settings > Protection mode

NOTE!

This function requires a room temperature sensor.

This function requires a room temperature sensor.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Min run time	0.0 – 999.9 min	Indicates the minimum run time for the protection mode.
Fan step	1 – 3	Indicates the current fan step with which the protection mode starts.
Start stpt cooling	-64.0 – 64.0 °C	Indicates the start value of the overheating protection.
Cooling setpoint	-64.0 – 64.0 °C	Indicates the setpoint with which the overheating protection is operating.
Start stpt heating	-64.0 – 64.0 °C	Indicates the start value of the cool-down protection.
Heating setpoint	-64.0 – 64.0 °C	Indicates the setpoint with which the cool-down protection is operating.
Hysteresis	0.1 – 64.0 °C	Indicates the hysteresis with which the protection mode is operating.
Min off time	0 – 999 min	Indicates the minimum off time of the protection mode.

11.21 Central fire alarm system/smoke extraction

The control features a digital input for fire/smoke alarms. A central fire alarm system or a collective alarm from fire protection flaps or smoke detectors can be connected here.

The reaction of the plant to a fire/smoke alarm is adjustable; the following reactions are available:

- The plant is switched off and locked
- Switch on the supply air fan only (outdoor air flap opens automatically)
- Switch on the extract air fan only (exhaust air flap opens automatically)
- Switch on both fans (dampers open automatically)

To view and/or change the settings, open the following menu item:

Main menu > Settings > Fan control

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Fire mode		Indicates the current setting.
	■ Stop	■ Switch off the plant and lock it
	■ Supply air	■ Switch on the supply air fan only
	■ Extract air	■ Switch on the extract air fan only
	■ Both	■ Switch on both fans
Fire setpoint	0 – 100%	Shows the fan speed used for smoke extraction in %.

NOTE!

If the smoke extraction function is used in combination with a recirculation air flap, the external air flap and the exhaust air flap can be continuously actuated separately.

12 Building management system

12.1 TCP/IP settings

The system integrator has a separate password. Changes to the settings for the service technician cannot be made with this password.

To view and/or change the settings, open the following menu item:

Main menu > System integrator > IP-Config.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then the value can be changed using the arrow keys and the entry is completed with # and ENTER.

Display	Values	Description
DHCP	■ Passive ■ Active	Indicates whether the IP address is obtained automatically via a DHCP server. ■ No ■ Yes
IP address >	xxx.xxx.xxx.xxx	Indicates the current IP address of the controller.
Subnet mask >	xxx.xxx.xxx.xxx	Indicates the current subnet mask of the controller.
Standard gateway >	xxx.xxx.xxx.xxx	Indicates the current default gateway of the controller.
Preferred DNS server >	xxx.xxx.xxx.xxx	Indicates the preferred DNS server of the controller.
Alternative DNS server >	xxx.xxx.xxx.xxx	Indicates the alternative DNS server of the controller.
Host name >	POLxxx_xxxxxx	Indicates the current host name of the controller.
MAC name >	xx-xx-xx-xx-xx-xx	Indicates the MAC address of the controller.
Link	■ Passive ■ Active	Indicates whether a network connection exists at the interface. ■ No ■ Yes
100 Mbit	■ Passive ■ Active	Indicates whether a 100 MBit network connection exists. ■ No ■ Yes
Advanced		The Advanced settings are opened with ENTER. See below.
After changing values A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now A change to the settings requires a controller restart.

Advanced settings

Display	Values	Description
+Web HMI (HTTP)	■ Active ■ Passive	Indicates whether access to the controller is permitted via the Web. ■ Yes ■ No
Port	0 – 65535	Indicates the Ethernet port used for communication.
User name >	xxx	Indicates the current user name with which the controller can be access via the Internet.
Password >	xxx	Indicates the current password with which the controller can be access via the Internet.
After changing values A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now A change to the settings requires a controller restart.

12.2 Modbus TCP/IP (OnBoard)

A Modbus TCP/IP interface is available by default for communication with the building management system.

All TCP/IP communication parameters (IP address, subnet mask, etc.) are adjustable. The TCP port is defined at 502 and cannot be changed. To view and/or change the TCP/IP settings, see section "12.1 TCP/IP settings" on page 75.

NOTE!

See the separate documentation for the data points at the interface.

12.3 Modbus RS485 (bus module)

A Modbus RS485 interface is available as an option for communication with the building management system.

All RS285 communication parameters (slave address, baud rate, parity, etc.) are adjustable.

To view and/or change the settings, open the following menu item:

Main menu > System integrator > Communic.modules > Modbus

NOTE!

The interface is available depending on the plant equipment. See the separate documentation for the settings and data points at the interface.

12.4 BACnet TCP/IP (bus module)

A BACnet TCP/IP interface is available as an option for communication with the building management system.

It corresponds to the standard profile BACnet Building Controller (B-BC).

The EDE file (Engineering Data Exchange) is generically structured in accordance with the plant configuration and can be downloaded via the TCP/IP interface.

The BACnet communication parameters (device ID, device name, port, etc.) are adjustable.

All TCP/IP communication parameters (IP address, subnet mask, etc.) are adjustable.

To view and/or change the settings, open the following menu item:

Main menu > System integrator > Communic.modules > BACnet IP Mod.x

NOTE!

The interface is available depending on the plant equipment. See the separate documentation for the settings and data points at the interface.

12.5 BACnet MS/TP (bus module)

A BACnet RS485 interface is available as an option for communication with the building management system.

It corresponds to the standard profile BACnet Building Controller (B-BC).

The EDE file (Engineering Data Exchange) is generically structured in accordance with the plant configuration and can be downloaded with a BACnet browser.

The BACnet communication parameters (device ID, device name, port, etc.) are adjustable.

All RS285 communication parameters (address, baud rate, etc.) are adjustable.

To view and/or change the settings, open the following menu item:

Main menu > System integrator > Communic.modules > BACnet MSTP Mod.x

NOTE!

The interface is available depending on the plant equipment. See the separate documentation for the settings and data points at the interface.

12.6 LON (bus module)

A LON interface is available as an option for communication with the building management system. It features an FFT-10A bus coupler with a LonMark® certified channel type TP/FT-10.

All LON communication parameters (heartbeat, send interval, timeout, etc.) are adjustable.

To view and/or change the settings, open the following menu item:

Main menu > System integrator > Communic.modules > LON module x

NOTE!

The interface is available depending on the plant equipment. See the separate documentation for the settings and data points at the interface.

13 Commissioning

To commission the plant, open the following menu item:

Main menu > Commissioning

Preferably adhere to the following commissioning steps:

 Depending on the plant equipment, some points will need to be skipped.

 Depending on the plant configuration, some points will need to be skipped.

Step	Description	Section	Done
1	Data point test of inputs		
a	General sensors (temperature, humidity and air quality)	13.1	
b	External specification of the temperature setpoint from 0 to 10 V	13.2	
c	General digital inputs	13.3	
2	Component data point test and associated inputs		
a	Air flaps	13.4	
b	Supply air fan	13.5	
c	Extract air fan	13.6	
d	Heat recovery	13.7	
e	Hot water heater	13.8	
f	Electric heater	13.9	
g	Cooling	13:10	
h	Humidifier	13:11	
3	Data point test of general outputs	13:12	
4	Reset manual mode of inputs/outputs	14.5	
5	Set the time program	6.3	
6	Set the setpoints	7.2, 8.2, 9.2 and 10.2	

13.1 General sensors

Go to the following menu item:

Main menu > Commissioning > Sensors

All general temperature, humidity and air quality sensors are presented here in a list. During commissioning, check each individual display value for plausibility and correct wiring (e.g. warming of the sensor).

Mark the desired analogue input and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).

Display	Values	Description
Outside air temp	... °C	Indicates the currently measured outdoor air temperature.
Supply air temp	... °C	Indicates the currently used supply air temperature.
Room temperature 1	... °C	Indicates the currently used room temperature at room sensor 1.
Room temperature 2	... °C	Indicates the currently used room temperature at room sensor 2.
Room unit 1 temp	... °C	Indicates the currently used room temperature at room control panel 1.
Room unit 2 temp	... °C	Indicates the currently used room temperature at room control panel 2.
Extract air temp	... °C	Indicates the currently used extract air temperature.
Outs air hum rel	... %rH	Indicates the currently used relative outdoor air humidity.
Sply air hum rel	... %rH	Indicates the currently used relative supply air humidity.
Room humidity rel	... %rH	Indicates the currently used relative room or extract air humidity. Whether the room or extract air humidity is measured depends on the plant equipment.
Air quality	... ppm	Indicates the currently used room or extract air quality. Whether the room or extract air quality is measured depends on the plant equipment.

13.2 External temperature setpoint from 0–10 V

Go to the following menu item:

Main menu > Commissioning

Here you can set the scale of the external temperature setpoint according to the element connected to the analogue input (potentiometer, setpoint transducer, etc.).

Mark the analogue input “External setpoint” and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).


The external temperature setpoint is available depending on the plant configuration.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
External setpoint	- °C	Indicates the external setpoint input at the analogue input of the control. This is the result of the set setpoints Ext stpt curve Y1 and Ext stpt curve Y2.
>Ext stpt curve Y1	- °C	Indicates the value of the scaling at 0 V at the analogue input.
>Ext stpt curve Y2	- °C	Indicates the value of the scaling at 10 V at the analogue input.

13.3 General digital inputs

Go to the following menu item:

Main menu > Commissioning > Digital inputs

All general digital inputs are shown here. During commissioning, check each individual display value for plausibility and correct wiring (e.g. by switching or bridging).

Mark the desired digital input and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).

Display	Values	Description
Emergency stop	■ Off ■ On	Indicates the current status of the digital emergency stop input. ■ Input is open ■ Input is connected
Ext control input 1	■ Off ■ On	Indicates the current status of the digital external enable input 1. ■ Input is open ■ Input is connected
Ext control input 2	■ Off ■ On	Indicates the current status of the digital external enable input 2. ■ Input is open ■ Input is connected
Fire alarm	■ OK ■ Alarm	Indicates the current state of the fire alarm. ■ No alarm ■ Active fire alarm

13.4 Air flaps

Go to the following menu item:

Main menu > Commissioning > Damper control

The air flaps can be commissioned here. Mark the desired element and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).

Display	Values	Description
Outside air damper	■ Open ■ Closed	Indicates the current control of the outdoor air/damper. ■ The damper is open or is being opened ■ The damper is closed or is being closed This is a digital output.
Exhaust damper	■ Open ■ Closed	Indicates the current control of the exhaust damper. ■ The damper is open or is being opened ■ The damper is closed or is being closed This is a digital output.
Hrec dmpr outp sign	0 ... 100 %	Indicates the current control signal to the recirculation air flap. This is an analogue output. The working range of the analogue output can be scaled across the Min limit and Max limit. Min limit corresponds to 0% and Max limit corresponds to 100%.

13.5 Supply air fan

Go to the following menu item:

Main menu > Commissioning > Supply fan

Here you can commission the supply air fan and its adjacent sensors. Mark the desired element and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).

⚠ WARNING!

Risk of injury!

Unintentional starting of the fan can result in serious injury!

- Prevent the fan from starting unintentionally.

Depending on the plant equipment, some points will need to be skipped.

Depending on the plant configuration, some points will need to be skipped.

Display	Values	Description
Sply fan outp sign	0 – 100%	Indicates the current control signal. This is an analogue output.
Supply fan cmd	■ Off ■ On/St1	Indicates the current enabling state. ■ Fan is disabled ■ Fan is enabled This is a digital output.
Supply fan alarm	■ OK ■ Alarm	Indicates the current alarm status. ■ Fan OK ■ Fan has a fault This is a digital input.
Fan alarm	■ OK ■ Alarm	Indicates the current alarm status. ■ Fans OK ■ At least one fan has a fault This is a digital input.
Supply air pressure	... Pa	Indicates the currently measured duct pressure in the supply air. This is a digital input.
Supply air flow	... m^3/h	Indicates the currently calculated volume flow in the supply air. This is a digital input.
Outs air filter	... Pa	Indicates the currently measured differential pressure across the outdoor air filter. This is a digital input.
Supply filter	... Pa	Indicates the currently measured differential pressure across the supply air filter. This is a digital input.

13.6 Extract air fan

⚠ WARNING!

Risk of injury!

Unintentional starting of the fan can result in serious injury!

- Prevent the fan from starting unintentionally.

Go to the following menu item:

Main menu > Commissioning > Extract fan

Here you can commission the extract air fan and its adjacent sensors. Mark the desired element and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).

Display	Values	Description
Extr fan outp signal	0 ... 100 %	Indicates the current control signal. This is an analogue output.
Extract fan cmd	■ Off ■ On/St1	Indicates the current enabling state. ■ Fan is disabled ■ Fan is enabled This is a digital output.
Extract fan alarm	■ OK ■ Alarm	Indicates the current alarm status. ■ Fan OK ■ Fan has a fault This is a digital input.
Fan alarm	■ OK ■ Alarm	Indicates the current alarm status. ■ Fans OK ■ At least one fan has a fault This is a digital input.
Supply air pressure	... Pa	Indicates the currently measured duct pressure in the extract air. This is a digital input.
Extract air flow	... m^3/h	Indicates the currently calculated volume flow in the extract air. This is a digital input.
Extract filter	... Pa	Indicates the currently measured differential pressure across the outdoor air filter. This is a digital input.

13.7 Heat recovery

Go to the following menu item:

Main menu > Commissioning > Heat recovery

Here you can commission the heat recovery and its adjacent sensors. Mark the desired element and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).

Display	Values	Description
Hrec outp signal	0 ... 100 %	Indicates the current control signal. This is an analogue output. The working range of the analogue output can be scaled across the Min limit and Max limit. Min limit corresponds to 0% and Max limit corresponds to 100%.
Hrec (pump) cmd	■ Off ■ On/St1	Indicates the current enabling state. ■ Hrec is disabled ■ Hrec is enabled This is a digital output.
Heat recovery alarm	■ OK ■ Alarm	Indicates the current alarm status. ■ Hrec OK ■ Hrec has a fault This is a digital input.
Hrec supply air tmp	... °C	Indicates the currently measured supply air temperature after heat recovery. This is a digital input.
Exhaust air temp	... °C	Indicates the currently measured exhaust air temperature. This is a digital input.
Heat recovery water temp.	... °C	Indicates the currently measured temperature at the return flow of the closed-cycle system. This is a digital input.

13.8 Hot water heater

To commission the hot water heater, open the following menu item:

Main menu > Commissioning > Heating

Open the following menu item for the hot water preheating:

Main menu > Commissioning> Heating 2

NOTE!

Preventative frost protection functions as described in section "11.8.3 Frost protection" on page 65 must be taken note of during commissioning.

Mark the desired element and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).

NOTE!

Heating 2 is always the preheater, if present.

Display	Values	Description
Heating outp signal Htg 2 outp signal	0 ... 100 %	Indicates the current control signal. This is an analogue output. The working range of the analogue output can be scaled across the Min limit and Max limit. Min limit corresponds to 0% and Max limit corresponds to 100%.
Heating pump Heating 2 pump	■ Off ■ On	Indicates the current enabling state of the heating pump. ■ Pump is disabled ■ Pump is enabled This is a digital output.
Htg frost monitor Htg 2 Frost monitor	■ OK ■ Frost	Indicates the current state of the frost protection thermostats. ■ Thermostat O, no danger of freezing ■ Danger of freezing This is a digital input.
Heating frost tmp Heating 2 frost tmp	... °C	Indicates the currently measured temperature at the return flow of the heater. This is a digital input.

13.9 Electric heater

To commission the electric heater, open the following menu item:

Main menu > Settings > Electric heating

Open the following menu item for the electric preheating:

Main menu > Settings > El Heating 2

Mark the desired element and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).

NOTE!

- The flow monitor and the safety temperature limiter are in electrically connected and integrated in the release chain of the electric heater.
- The set values and the function of the flow monitor and safety temperature limit absolutely must be noted during commissioning.
- Heating 2 is always the preheater, if present.

Display	Values	Description
El htg outp signal El htg 2 outp sign	0 ... 100 %	Indicates the current control signal. This is an analogue output. The working range of the analogue output can be scaled across the Min limit and Max limit. Min limit corresponds to 0% and Max limit corresponds to 100%.
El heating cmd El heating 2 cmd	■ Off ■ On/St1	Indicates the current enabling state. ■ The electric heater is disabled ■ The electric heater is enabled This is a digital output.
El htg alarm El heating 2 alarm	■ OK ■ Alarm	Indicates the current alarm status. ■ Electric heater OK ■ Electric heater has a fault This is a digital input.

13.10 Cooling

Go to the following menu item:

Main menu > Commissioning > Cooling

The cooler can be commissioned here. Mark the desired element and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).

Display	Values	Description
Cooling outp signal	0 ... 100 %	Indicates the current control signal. This is an analogue output. The working range of the analogue output can be scaled across the Min limit and Max limit. Min limit corresponds to 0% and Max limit corresponds to 100%.
Command	■ Off ■ On/St1	Indicates the current enabling state of the refrigerator. ■ Refrigerator is disabled ■ Refrigerator is enabled This is a digital output.
Cooling pump	■ Off ■ On	Indicates the current enabling state of the heating pump. ■ Pump is disabled ■ Pump is enabled This is a digital output.
Cooling DX alarm	■ OK ■ Alarm	Indicates the current alarm status. ■ Refrigerator OK ■ Refrigerator has a fault This is a digital input.

13.11 Humidifier

Go to the following menu item:

Main menu > Commissioning > Humidification

The humidifier can be commissioned here. Mark the desired element and press ENTER for additional settings and/or manual mode (see section "14 Advanced settings and manual mode" on page 89).

NOTE!

The maximum hygrostat is electrically connected and integrated in the release chain of the humidifier at the plant.

The set values and the function of the maximum hygrostat absolutely must be noted during commissioning.

Display	Values	Description
Hum outp signal	0 ... 100 %	Indicates the current control signal. This is an analogue output.
Humidifier cmd	■ Off ■ On	Indicates the current enabling state. ■ Humidifier is disabled ■ Humidifier is enabled This is a digital output.

13.12 General digital inputs

Go to the following menu item for the output for operating signalling:

Main menu > Commissioning > Outputs auxiliary

Press ENTER for further settings and/or manual operating (see section "14 Advanced settings and manual mode" on page 89).

Display	Values	Description
Aux op mode output	■ Off ■ On	Indicates the current operating state of the plant. ■ Plant OFF ■ Plant in operation This is a digital output.

Go to the following menu item for the outputs for fault signalling:

Main menu > Commissioning > Outputs alarm

Press ENTER for further settings and/or manual operating (see section "14 Advanced settings and manual mode" on page 89).

Display	Values	Description
Alarm output	■ OK ■ Alarm	Indicates the current state of the alarm output. ■ No alarm ■ Alarm of danger/plant off (A) or critical (A) priority is active This is a digital output.
Alarm output 2	■ OK ■ Alarm	Indicates the current state of the alarm output 2. ■ No alarm ■ Alarm of low (B) priority is active This is a digital output.

14 Advanced settings and manual mode

14.1 Digital inputs

Each digital input has the following additional setting options and manual mode available.

NOTE!

The advanced settings and manual mode require technical know-how.

Manual mode can be reset globally for al inputs/outputs (see section "14.5 Resetting manual mode" on page 95).

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Out of service	■ Passive ■ Active	Indicates whether the value is in manual mode. ■ The value of the source selected under “Value selector” applies ■ The actual value can be specified manually
Actual value	See input ■ (State 1) ■ (State 2)	Indicates the value of the input that is currently relevant for the control. If “Out of service” is set to “Active”, the value can be specified here by pressing ENTER.
Value selector	■ Hardware ■ Comm. ■ AND ■ OR ■ Pref.HW ■ Pref.K.	Indicates the source of the value. ■ The value at the controller input ■ The value from the building management system ■ The controller input and the building management system are connected in series ■ The controller input and the building management system are connected in parallel ■ If both are available, the controller input is used ■ If both are available, the value of the building automation is used
Contact function	■ NC contact ■ NO contact	Shows the current function of the input. ■ The input is used as the NC contact (open input = state 2) ■ The input is used as the NO contact (open input = state 2) Changing the contact function can impair the wire breakage safety of the input.

14.2 Analogue inputs

Each analogue input has the following additional setting options and manual mode available.

NOTE!

The advanced settings and manual mode require technical know-how.

Manual mode can be reset globally for al inputs/outputs (see section "14.5 Resetting manual mode" on page 95).

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Out of service	■ Passive ■ Active	Indicates whether the value is in manual mode. ■ The value of the source selected under “Value selector” applies ■ The actual value can be specified manually
Actual value	... See input	Indicates the value of the sensor that is currently relevant for the control. If “Out of service” is set to “Active”, the value can be specified here by pressing ENTER.
Sensor correction	■ 64.0 – 64 K ■ 100.0 – 100.0 rH% ■ 3000 – 3000 ppm ■ 5000 – 5000 Pa ■ 40000 – 40000 m^3/h	The measured value can be corrected here.
Value selector	■ Hardware ■ Comm. ■ Averg. ■ Minimum ■ Maximum ■ Pref.HW ■ Pref.K.	Indicates the source of the value: ■ The value of the connected sensor ■ The value from the building management system ■ An average value from the connected sensor and the building management system ■ The smaller of the two values ■ The larger of the two values ■ If both are available, the connected sensor is used ■ If both are available, the value of the building automation is used

14.3 Digital outputs

Each digital output has the following additional setting options and manual mode available.

NOTE!

The advanced settings and manual mode require technical know-how.

Manual mode can be reset globally for al inputs/outputs (see section "14.5 Resetting manual mode" on page 95).

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Manual mode	See output	This makes manual operation of the output possible. Press ENTER and make a selection.
	■ AUTO	■ Automatic mode from the controller
	■ (State 1)	■ Output manual mode in state 1 (e.g. off or closed)
	■ (State 2)	■ Output manual mode in state 2 (e.g. on or open)
Actual value	See output	Indicates the current state of the output.
	■ (State 1)	■ Output in state 1 (e.g. off or closed)
	■ (State 2)	■ Output in state 2 (e.g. on or open)
Active priority		Indicates the priority with which the output is currently being controlled:
	■ Out of service	■ Output out of service
	■ Service/Config.	■ Prio 01: Output is fixed in state 1 because the configuration is not finished
	■ Protection P4	■ Prio 04: Output is fixed in state 1 because of danger
	■ Protection P5	■ Prio 05: Output is fixed in a defined state because of danger (e.g. frost protection)
	■ Active timer	■ Prio 06: Output remains in the current state for time x (e.g. follow-up time)
	■ Manual HMI/BMS	■ Prio 08: Manual intervention via HMI or building management system
	■ Auto mode P9	■ Prio 09: used briefly to reset the manual intervention
	■ Normal operation	■ Prio 15: Output is controlled by the controller
	■ Time program	■ Prio 16: Output is controlled by a time program
	■ Default value	■ Specification: if no other priority is active, this state is used
Contact function		Shows the current function of the output.
	■ NC contact	■ The output is used as an NC contact (state > 1 = output open)
	■ NO contact	■ The output is used as an NO contact (state > 1 = output open)
Priority array		Jumps to the overview of the priorities of the output.

Priority array of digital outputs

NOTE!

The lowest priority controls the output first, the highest takes precedence.

Display	Values	Description
Out of service Highest priority	 ■ Passive ■ Active	Indicates whether the output is in operation. ■ Output is used in automatic mode ■ Output is out of service and cannot be used
Service/Config.	See output ■ AUTO ■ (State 1)	Control value of Prio 01: Output is fixed in state 1 because the configuration is not finished. ■ The control of the output switches to the next priority ■ The priority controls the output into state 1
Protection P4	See output ■ AUTO ■ (State 1)	Control value of Prio 04: Output is fixed in state 1 because of danger. ■ The control of the output switches to the next priority ■ The priority controls the output into state 1
Protection P5	See output ■ AUTO ■ (State 1) ■ (State 2)	Control value of Prio 05: Output is fixed in a defined state because of danger (e.g. frost protection). ■ The control of the output switches to the next priority ■ The priority controls the output into state 1 ■ The priority controls the output into state 2
Active timer	See output ■ AUTO ■ (State 1) ■ (State 2)	Control value of Prio 06: Output remains in the current state for time x (e.g. follow-up time). ■ The control of the output switches to the next priority ■ The priority controls the output into state 1 ■ The priority controls the output into state 2
Manual HMI/BMS	See output ■ A ■ AUTO ■ (State 1) ■ (State 2)	Control value of Prio 08: Manual intervention via HMI or building management system. ■ The control of the output switches to the next priority ■ The priority controls the output into state 1 ■ The priority controls the output into state 2
Auto mode P9	See output ■ AUTO ■ (State 1) ■ (State 2)	Control value of Prio 09: used briefly to reset the manual intervention. ■ The control of the output switches to the next priority ■ The priority controls the output into state 1 ■ The priority controls the output into state 2
Normal operation	See output ■ AUTO ■ (State 1) ■ (State 2)	Control value of Prio 15: Output is controlled by the controller. ■ The control of the output switches to the next priority ■ The priority controls the output into state 1 ■ The priority controls the output into state 2
Time program	See output ■ AUTO ■ (State 1) ■ (State 2)	Control value of Prio 16: Output is controlled by a time program. ■ The control of the output switches to the next priority ■ The priority controls the output into state 1 ■ The priority controls the output into state 2
Default value	See output ■ (State 1) ■ (State 2)	Default control value: if no other priority is active, this state is used. ■ The default value of the output is state 1 ■ The default value of the output is state 2

14.4 Analogue outputs

Each analogue output has the following additional setting options and manual mode available.

NOTE!

The advanced settings and manual mode require technical know-how.

Manual mode can be reset globally for al inputs/outputs (see section "14.5 Resetting manual mode" on page 95).

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Manual mode	See output	This makes manual operation of the output possible. Press ENTER and make a selection.
	■ AUTO%	■ Automatic mode from the controller
	■ ... %	■ Output manual mode ... %
Actual value	■ ... %	■ Indicates the current value of the output.
Active priority		Indicates the priority with which the output is currently being controlled.
	■ Out of service	■ Output out of service
	■ Service/Config.	■ Prio 01: Output is fixed at 0% because the configuration is not finished
	■ Protection P4	■ Prio 04: Output is fixed at 0% because of danger
	■ Protection P5	■ Prio 05: Output is fixed in a defined state because of danger (e.g. frost protection)
	■ Active timer	■ Prio 06: Output remains in the current state for time x (e.g. follow-up time)
	■ Manual HMI/BMS	■ Prio 08: Manual intervention via HMI or building management system
	■ Auto mode P9	■ Prio 09: used briefly to reset the manual intervention
	■ Normal operation	■ Prio 15: Output is controlled by the controller
	■ Time program	■ Prio 16: Output is controlled by a time program
	■ Default value	■ Specification: if no other priority is active, this state is used
Priority array		Jumps to the overview of the priorities of the output. See below.

Priority array of analogue outputs

NOTE!

The lowest priority controls the output first.

Display	Values	Description
Out of service	■ Passive ■ Active	Indicates whether the output is in operation. ■ Output is used in automatic mode ■ Output is out of service and cannot be used
Service/Config.	■ AUTO% ■ 0 %	Control value of Prio 01: Output is fixed at 0% because the configuration is not finished. ■ The control of the output switches to the next priority ■ The priority controls the output with 0%
Protection P4	■ AUTO% ■ 0 %	Control value of Prio 04: Output is fixed at 0% because of danger. ■ The control of the output switches to the next priority ■ The priority controls the output with 0%
Protection P5	■ AUTO% ■ - %	Control value of Prio 05: Output is fixed in a defined state because of danger (e.g. frost protection). ■ The control of the output switches to the next priority ■ The priority controls the output with - %
Active timer	■ AUTO% ■ - %	Control value of Prio 06: Output remains in the current state for time x (e.g. follow-up time). ■ The control of the output switches to the next priority ■ The priority controls the output with - %
Manual HMI/BMS	■ AUTO% ■ - %	Control value of Prio 08: Manual intervention via HMI or building management system. ■ The control of the output switches to the next priority ■ The priority controls the output with - %
Auto mode P9	■ AUTO% ■ - %	Control value of Prio 09: used briefly to reset the manual intervention. ■ The control of the output switches to the next priority ■ The priority controls the output with - %
Normal operation	■ AUTO% ■ - %	Control value of Prio 15: Output is controlled by the controller. ■ The control of the output switches to the next priority ■ The priority controls the output with - %
Time program	■ AUTO% ■ - %	Control value of Prio 16: Output is controlled by a time program. ■ The control of the output switches to the next priority ■ The priority controls the output with - %
Default value	■ 0 ... 100 %	Default control value: if no other priority is active, this is used.

14.5 Resetting manual mode

Manual mode can be reset under the following menu item:

Main menu > Commissioning > IO-mode

Display	Values	Description
IO-mode >	■ Auto ■ Test ■ SetzAuto	■ All outputs are in automatic mode ■ Do not use; disables all outputs ■ Now reset all inputs/outputs to automatic mode To reset, select SetzAuto and press ENTER so that all inputs/outputs are reset.

15 Configuration

The control is configured at the factory for the ordered plant and equipment. Various changes can be made and are described in the subsequent sections.

15.1 Plant steps & comfort/economy mode

Upon delivery, the plant features three steps and a time program for switching the plant on and off.

The number of plant steps and the availability of the comfort and economy modes can be configured under the following menu items:

Main menu > Configuration > Configuration 1

NOTE!

The configuration may only be changed while the plant is switched off.

A change in the configuration requires a controller restart.

Display	Values	Description
TSP function	■ No ■ Yes ■ Comf+Eco	Indicates the function selected for the time program. ■ No time program in use ■ Time program for switching fan steps ■ Time program for switching fan steps and the comfort/eco operating modes
Plant steps	■ 1 step ■ 2 steps ■ 3 steps	Indicates the selected number of fan steps that are available to the plant. ■ 1-step plants ■ 2-step plants ■ 3-step plants The fan speed steps can be expressed in % or as pressure or volume flow rate setpoints, depending on the fan controller speed steps.
After changing values A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now

15.2 Inputs for ext. release

Upon delivery, either one or two inputs are available, as ordered, to enable external connection of the plant. See section "6.4 External enable" on page 41 for an explanation of the options.

The number can be configured under the following menu item if necessary:

Main menu > Configuration > Configuration 1

NOTE!

The configuration may only be changed while the plant is switched off.

A change in the configuration requires a controller restart.

Display	Values	Description
External control	■ No ■ 1 input ■ 2 inputs	Indicates the selected number of external enable inputs. ■ No enable inputs ■ One enable input (e.g. party button, presence sensor, hygrostat) ■ Two enable inputs (external fan steps)
After changing values A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now A change in the configuration requires a controller restart.

15.3 Fan control strategy

The strategy is configured as ordered at the factory. It can be changed.

NOTE!

If the configuration is changed here, it must be ensured that the plant is equipped with the sensors needed for the changed configuration.

To view and/or change the configuration, open the following menu item:

Main menu > Configuration > Configuration 1

NOTE!

The configuration may only be changed while the plant is switched off.

A change in the configuration requires a controller restart.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Fan control mode		Indicates the current fan control strategy.
	■ Direct	■ Not supported by AL-KO!
	■ Direct variable	■ Not supported by AL-KO!
	■ Fixed speed	■ Control of the fans using fixed speed values in %
	■ Pressure constant	■ Duct pressure control for both fans
	■ Volume constant	■ Volume flow control for both fans
	■ Supply slave	■ Duct pressure control in the extract air, adjustment of the supply air volume flow accordingly
	■ Extract slave	■ Duct pressure control in the supply air, adjustment of the extract air volume flow accordingly
After changing values A restart is required		A restart of the controller can be triggered here.
	■	■ Do nothing
	■ Execute	■ Restart now

15.4 Temperature control strategy

The control strategy is configured as ordered at the factory. It can be changed.

NOTE!

If the configuration is changed here, it must be ensured that the plant is equipped with the sensors needed for the changed configuration.

To view and/or change the configuration, open the following menu item:

Main menu > Configuration > Configuration 1

NOTE!

The configuration may only be changed while the plant is switched off.

A change in the configuration requires a controller restart.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Tmp control mode		Indicates the current temperature control strategy.
	■ Supply air	■ Pure supply air control
	■ RoomCasc	■ Supply air/room cascade control
	■ ExtractCasc	■ Supply air/extract air cascade control
	■ So RoomCasc	■ Supply air/room/cascade control in summer, pure supply air control in winter
	■ So ExtractCasc	■ Supply air/extract air/cascade control in summer, pure supply air control in winter
	■ Room	■ Not supported by AL-KO!
	■ Extract air	■ Not supported by AL-KO!

After changing values A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now A change in the configuration requires a controller restart.

15.5 Room temperature sensors and control panels

The sensors and room control panels are configured as ordered at the factory. Extract air and room sensors can be configured on or off as needed.

NOTE!

If the configuration is changed here, it must be ensured that the plant is equipped with the sensors needed for the changed configuration.

To view and/or change the configuration, open the following menu item:

Main menu > Configuration > Configuration 1

NOTE!

The configuration may only be changed while the plant is switched off.

A change in the configuration requires a controller restart.

Display	Values	Description
Room tmp sensor	■ Sensor 1 ■ Sensor 2 ■ Room Unit 1 ■ Room Unit 2 ■ QMX 1 ■ QMX 2 ■ Done	Indicates the selected room sensors and room control panels. ■ A ✔ symbol means that room sensor 1 is present ■ A ✔ symbol means that room sensor 2 is present ■ A ✔ symbol means that room control panel 1 is present ■ A ✔ symbol means that room control panel 2 is present ■ Not supported by AL-KO! ■ Not supported by AL-KO! ■ Accept the changes. Select the corresponding line with the arrow keys and press ENTER to set the ✔ symbol or remove it again. To accept a change, select “Done” using the arrow keys and confirm with ENTER.
Extract air tmp sen	■ No ■ Yes ■ Yes+Save	Indicates whether an extract air sensor is selected. ■ No extract air sensor present ■ Not supported by AL-KO! ■ The extract air sensor is present
After changing values A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now A change in the configuration requires a controller restart.

15.6 Valid room temperature

The room control panels also contain room sensors, which are set for display only at the factory. The actual room sensor is used only for temperature control by default. This assignment can be changed.

NOTE!

If the configuration is changed here, it must be ensured that the plant is equipped with the sensors needed for the changed configuration.

To view and/or change the configuration, open the following menu item:

Main menu > Configuration > Configuration 2

NOTE!

The configuration may only be changed while the plant is switched off.

A change in the configuration requires a controller restart.

Display	Values	Description
Room tmp mix	■ Average ■ Minimum ■ Maximum ■ Sensor 1 ■ Sensor 2 ■ Room unit 1 ■ Room unit 2	Indicates the current path to finding the valid room temperature: ■ Averaging across all available room temperatures ■ The minimum of all available room temperatures is valid ■ The maximum of all available room temperatures is valid ■ The temperature measured by the room sensor 1 is valid ■ The temperature measured by the room sensor 2 is valid ■ The temperature measured by the room control panel 1 is valid ■ The temperature measured by the room control panel 2 is valid
After changing values A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now A change in the configuration requires a controller restart.

NOTE!

If you are using our EnOcean wireless sensors as room sensors, note the included instructions on “Integration of an EnOcean System”.

15.7 Humidity control

The humidity control strategy is configured as ordered at the factory. It can be changed.

NOTE!

If the configuration is changed here, it must be ensured that the plant is equipped with the sensors needed for the changed configuration.

To view and/or change the configuration, open the following menu item:

Main menu > Configuration > Configuration 2

NOTE!

The configuration may only be changed while the plant is switched off.

A change in the configuration requires a controller restart.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Hum control mode	■ Room ■ Supply air ■ RoomCascade	Indicates the current humidity control strategy. ■ Pure room or extract air control ■ Pure supply air control ■ Supply air/room or supply air/extract air/cascade control The selection options depend on the sensor equipment of the plant. The control does not differentiate between the room sensor and extract air sensor.
Hum control unit	■ Relative ■ Absolute ■ CascRelAbs	Indicates the current unit of humidity control. ■ Control and display in relative humidity ■ Control and display in absolute humidity ■ The room/extract air humidity is displayed and controlled in relative terms, while the supply air humidity is displayed and controlled in absolute terms.
Dehum tmp prio	■ No ■ Yes	Indicates whether keeping the temperature constant should be given priority when dehumidifying. ■ Priority is given to dehumidification ■ Priority is given to temperature If “Yes”, the dehumidification signal is lowered beginning at a heating signal of 90%.
After changing values A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now A change in the configuration requires a controller restart.

15.8 Temperature control sequence

15.8.1 Fan cooling

The temperature control sequences of the cooler and the temperature-guided volume flow control can be flipped. When cooling, either the cooler power is increased first or the volume flow rate is increased.

To view and/or change the configuration, open the following menu item:

Main menu > Configuration > Configuration 2

NOTE!

The temperature-guided volume flow control function is available depending on the configuration.

The configuration may only be changed while the plant is switched off.

A change in the configuration requires a controller restart.

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Sequence fan clg	■ Vent-cool ■ Cool-vent	Indicates which sequencing is currently being used. ■ When cooling, the fan power is increased first, and then the cooler is operated at a higher rate. ■ When cooling, the cooler is operated at a higher rate first, and then the fan power is increased.
After changing values A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now A change in the configuration requires a controller restart.

15.9 Recirculation air flap - heating

The temperature control sequences of the recirculation air flap and the heating system can be flipped. When heating, either the recirculation air share is increased first or the available heating systems are actuated.

To view and/or change the configuration, open the following menu item:

Main menu > Configuration > Configuration 2

NOTE!

The configuration may only be changed while the plant is switched off.

A change in the configuration requires a controller restart

To change the value, go to the corresponding value with the arrow keys and press ENTER. Then change the value using the arrow keys and confirm the entry with ENTER.

Display	Values	Description
Sequence hrec dampr	■ Recirc-heat ■ Heat-recirc	Indicates which sequencing is currently being used. ■ When heating, first increase the share of recirculation air, and then actuate the heating system ■ When heating, first actuate the heating system, and then increase the share of recirculation air
After changing values A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now A change in the configuration requires a controller restart.

16 Parameter sets

16.1 SD-card

The controller features a slot of one SD card. This can be used to store parameter sets on an SD card or to load them from an SD card.

The SD card must meet the following criteria: max. 32 GB and FAT32 formatting.

The SD card can be removed after commissioning and kept as a parameter backup.

Go to the following menu item:

Main menu > Save / load > SD card

NOTE!

To load a parameter set from an SD card, at least the controller must be restarted. In case of malfunctions, it may be necessary to restart the system again.

Display	Values	Description
SD-card	■ k.card ■ Read.write. ■ Read only	Indicates whether an SD card has been inserted into the controller. ■ No card is inserted ■ A card is inserted from which and onto which data can be loaded ■ A card is inserted that is not permitted to be used for storage
>Settings save-> SD	■ ■ Execute	This can be used to store the parameter set on the SD card. ■ Do nothing ■ Store the parameter set now
>	■ ■ Done	Indicates the status when saving the parameter set on the SD card. ■ No display indicates that saving is still in progress ■ This display indicates that saving is completed
Settings load <-SD	■ ■ Execute	The parameter set can be loaded from the SD card here. ■ Do nothing ■ Load the parameter set now
>	■ ■ Done	Indicates the status when loading the parameter set from the SD card. ■ No display indicates that loading is still in progress ■ This display indicates that loading is completed
Filters	■ Archive ■ Time prog. ■ Comm mod. ■ EnableObj ■ Done	Makes it possible to load the parameters from the SD card selectively: ■ A ✔ symbol means that no data logging configuration is loaded ■ A ✔ symbol means that no time program is loaded ■ A ✔ symbol means that no parameters from communication modules (BACnet, Modbus, etc.) are loaded ■ A ✔ symbol means that no plant configuration data is loaded. ■ Accept the changes. Select the corresponding line with the arrow keys and press ENTER to set the ✔ symbol or remove it again. To accept a change, select “Done” using the arrow keys and confirm with ENTER.
A restart is required	■ ■ Execute	A restart of the controller can be triggered here. ■ Do nothing ■ Restart now

16.2 Internal memory

The controller has two internal memories. One is a service memory for storing the parameter set after commissioning, optimisation or expansion/changes on-site in the controller or to upload this status again. The other memory is a factory memory that contains the default settings.

Go to the following menu item:

Main menu > Save / load

Display	Values	Description
Sett.factory load	■ ■ Execute	The parameter set can be loaded from the factory memory here. This restores the default settings. ■ Do nothing ■ Load the parameter set now
Sett.service load	■ ■ Execute	The parameter set can be loaded from the service memory here. ■ Do nothing ■ Load the parameter set now The memory leaves the factory empty. After loading, the controller automatically restarts.
Sett.service save	■ ■ Execute	This can be used to store the parameter set in the service memory. ■ Do nothing ■ Store the parameter set now

17 Alarms

17.1 Page navigation

The ALARM button can be used to cycle through the following alarm pages.

Page	Description
Alarm list detail	Indicates the name, priority and time of occurrence of the selected alarm. The following priorities are possible: ■ Danger/plant off (A) ■ Critical (A) ■ Low (B) ■ Warning (C) See alarm table, section "17.3 Alarm table" on page 107 for the factory-assigned priorities.
Alarm list	Displays the list of active alarms. The list contains a maximum of 50 entries. Use the arrow keys to go to an entry and press ENTER to view the details of the alarm.
Alarm history	Displays the list of historic alarms. The list contains a maximum of 50 entries. The prefix + indicates an alarm that appeared. The prefix – indicates an alarm that disappeared. Use the arrow keys to go to an entry and press ENTER to view the details of the historic alarm. Alarm history detail Indicates the name (incl. prefix), priority and time when it appeared and disappeared. The following priorities are possible: ■ Danger/plant off (A) ■ Critical (A) ■ Low (B) ■ Warning (C) See alarm table, section "17.3 Alarm table" on page 107 for the factory-assigned priorities.
Alarming	Indicates the options for sorting the alarm list and alarm history. From here, ENTER can be used to open the alarm list or alarm history by making the necessary selection.

17.2 Acknowledge

Press the ALARM button repeatedly until the alarm list page appears. The top line shows Acknowledge. Ensure that the Acknowledge line is marked using the arrow keys and press ENTER.

Then us the arrow keys to go to Execute and press on ENTER again to confirm the selection.

The acknowledgement is executed.

If the alarm does not disappear after acknowledge is selected, the fault is still active.

17.3 Alarm table

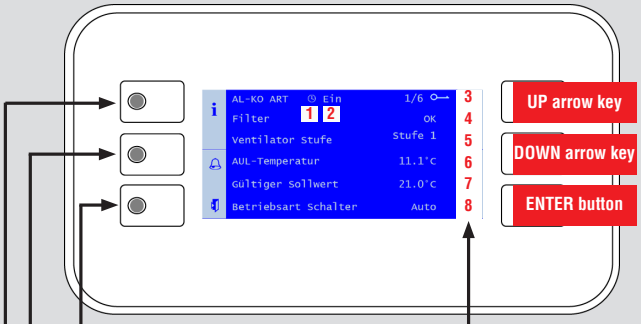
Alarm text	Alarm class	Alarm no. (room control panel)	Description
...:k.sensor			No sensor connected (poss. wiring fault)
-: Short circuit			Short circuit at input (poss. wiring fault)
-: U.limit			Upper limit was exceeded (poss. wiring fault)
-: L.limit			Lower limit was undercut (poss. wiring fault)
Fire alarm: Alarm	(A)Plant off	81	Central fire alarm system reporting fire
Fan alarm: Alarm	(A)Critical	66	Fan has a fault (general)
Filter: Alarm	(B)Low	39	Filter is soiled (general)
External setpoint: -	(B)Low	20	External temperature setpoint is faulty
Op hours alarm: Alarm	(B)Low	40	Maintenance required (general)
Outs air filter: U.limit	(B)Low	39	Outdoor air filter has reached the soiling limit
Supply filter: U.limit	(B)Low	39	Supply air filter has reached the soiling limit
Extract filter: U.limit	(B)Low	39	Extract air filter has reached the soiling limit
Supply air pressure: -	(A)Plant off	69	Supply air duct pressure is faulty
Supply air flow: -	(A)Plant off	69	Supply air volume flow is faulty
Extract air press: -	(A)Plant off	70	Extract air duct pressure is faulty
Extract air flow: -	(A)Plant off	70	Extract air volume flow is faulty
Outside air temp: -	(B)Low	25	Outdoor air temperature is faulty
Outs air relative -	(B)Low	47	Outdoor air humidity is faulty
Hrec supply air tmp: -	(B)Low	29	Supply air temperature after Hrec is faulty
Supply air temp: -	(A)Critical	60	Supply air temperature is faulty
Sply air hum rel: -	(B)Low	46	Supply air humidity is faulty
Room temperature 1 -	(B)Low	26	Room temperature 1 is faulty
Room temperature 2 -	(B)Low	27	Room temperature 2 is faulty
Room unit 1 temp: -	(B)Low	24	Room temperature sensor in room control panel 1 is faulty
Room unit temp 2: -	(B)Low	24	Room temperature sensor in room control panel 2 is faulty
Room humidity rel: -	(B)Low	48	Room humidity is faulty
Air quality: -	(B)Low	49	Air quality sensor is faulty
Dew point: -	(A)Plant off	68	Dew point is faulty
Extract air temp: -	(B)Low	61	Extract air temperature is faulty
Exhaust air tmp: -	(B)Low	28	Exhaust air temperature is faulty
Outs air dampr fdbk: Alarm	(A)Critical	65	No feedback that the outdoor air flap is open
Exh air dmper fdbk: Alarm	(A)Critical	65	No feedback that the exhaust air flap is open
Supply fan alarm: Alarm	(A)Critical	66	Supply air fan has a fault
Extract fan alarm: Alarm	(A)Critical	67	Extract air fan has a fault
Heat recovery alarm: Alarm	(B)Low	42	Rotation heat exchanger has a fault
Hrec pump alarm: Alarm	(B)Low	43	Pump of close-cycle system has a fault
Heat recovery water temp.: -	(A)Critical	83	Return flow temperature of closed-cycle system is faulty
Hrec efficiency: U.limit	(B)Low	44	Heat recovery efficiency is too low
Htg frost monitor: Frost	(A)Critical	85	Frost thermostat for hot water heater was triggered
Heating frost tmp	(A)Critical	82	Return flow temperature of hot water heater is faulty
El htg alarm: Alarm	(A)Critical	62	Electric heater has a fault (safety temperature limiter or flow monitor)
Htg 2 frost monitor: Frost	(A)Critical	86	Frost thermostat for hot water preheater was triggered

Heating 2 frost tmp	(A)Critical	84	Return flow temperature of hot water preheater is faulty
El heating 2 alarm: Alarm	(A)Critical	63	Electric preheater has a fault (safety temperature limiter or flow monitor)
Cooling DX alarm: Alarm	(B)Low	41	Refrigerator has a fault (safety temperature limiter or flow monitor)
Processbus comm: Alarm	(B)Low	23	Communication with the room control panels is faulty
Not config IO: Yes	(A)Plant off		Input and output are not configured
Doubled conf IO: Yes	(A)Plant off		Input or output is assigned twice

18 Appendix

ART Tech Level II

Quick Guide HMI Basic (Room Control Panel)



Display on the start page

If no button is pressed for a few minutes, the display jumps to the main menu. Press **INFO** to go to the start page with the most important plant information.

1. State
   - Plant switched on control panel (HMI Basic, Facility, Web)
   - Plant switched via external enable (e.g. presence sensor)
   - Plant switched on the room control panel (HMI Room)
   - Plant switched via the building management system
   - Plant switched via the time program
   - Plant OFF: Configuration is not complete
   - Plant OFF: switched off alarm or emergency stop
   - Plant ON: Free cooling, cool-down or overheating protection
   - Plant ON: early start before time program (boost)

2. Operating mode

Off	Plant OFF
Start	Plant is starting up (dampers open, pre heating)
On	Plant ON
Comfort	Plant ON in comfort mode
Economy	Plant ON in economy mode
Run-on	Plant follow-up (humidifier/electrical heating coil)

3.	Display of the logged-in password level
4. Filter alarm	Display of the filter state (depending on the equipment of the plant, the degree of soiling in percent is also displayed).
5. Fan steps	Display of the current fan steps
6. Outside air temp	Display of the current outdoor temperature
7. Valid setpoint	Display of the current valid temperature setpoint
8. Operating mode switch	Switching of the operating mode on the control panel

ALARM button with integrated ALARM LED

- **Off:** No alarm; press to go directly to the **alarm history**.
- **Red flashing:** Alarm
- **Red:** Alarm is still active; an attempt has been made to acknowledge it

INFO button with integrated INFO-LED

- **Off:** Plant off
- **Green flashing:** Plant starts (dampers open, preheating) or running on (humidifier drying, electric heating cooling)
- **Green:** Plant on
- **Orange/red flashing:** Manual mode active
- **Orange flashing:** Plant not functional as not fully configured

ESCAPE button

Press this button to return to the previous menu item.

Password entry

1. Press **INFO** to access the **main menu**. The topmost entry is the **password enter**. Press **ENTER**.
2. A password consists of four numbers. Each number is set separately with the **arrow keys** and confirmed with **ENTER**.
   Enter the user password **1 0 0 0** .
   After entering the password correctly, a key symbol appears at top right of the display.
3. Other passwords levels are described in the operating manual.

Acknowledging alarms (only when alarms are pending)

1. Press **ALARM**; the **alarm list detail** appears.
2. Then press **ALARM** again; the **alarm list** appears. The topmost entry is **Acknowledge**. Press **ENTER**.
3. Select **Execute** with the **arrow keys** and press **ENTER** again. The acknowledgement attempt is started.

Switch on the plant using the control panel (user password required)

1. Use **INFO** to access the **start page**. Select **Operating mode** with the **arrow keys** and press **ENTER**.
2. Use the **arrow keys** to mark the required **operating mode** and press **ENTER**.

Important information!

1. The number of plant steps and the availability of the economy mode depend on the configuration of the plant (see operating instructions).
2. In economy mode, the plant is operated at a reduced temperature setpoint. See the operating manual for further information.

Plant information

Use **INFO** to access the **main menu**. Select **Information** with the **arrow keys** and press **ENTER**.
See the operating manual for a description of the individual items.

Setting the temperature setpoint (user password required)

1. Use **INFO** to access the **main menu**. Select **Setpoints** with the arrow keys and press **ENTER**.
2. Go to **Temp control** with the **arrow keys** and press **ENTER**.
3. Select **Comfort setpoint** or **Economy setpoint** with the **arrow keys** and press **ENTER**. Now change the value with the **arrow keys** and confirm again with **ENTER**.

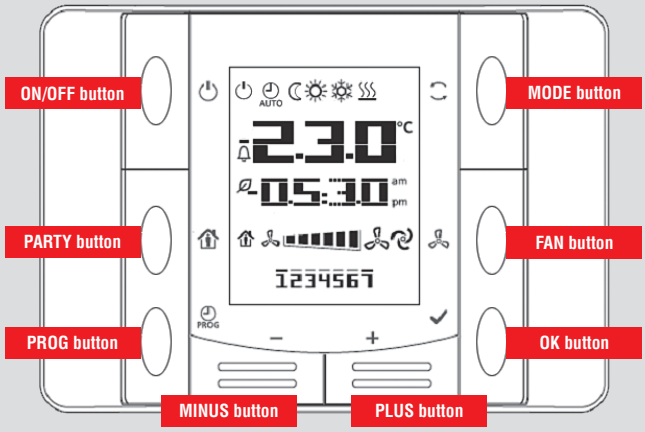
Setting the timer program (user password required)

1. Use **INFO** to access the **main menu**. Select **Time program** with the arrow keys and press **ENTER**.
2. Recommendation: Set the switching times for **Monday** and copy it to the other days. To do this, select **Monday** with the **arrow keys** and press **ENTER**.
3. **Time 1** is fixed to **00:00** and cannot be changed. For **Value 1**, **off** is recommended as otherwise the plant starts at 00:00.
   Use the **arrow keys** to go to **Time 2** or **Value 2** and press **ENTER**. Use the arrow keys to send the morning compensation time (e.g. **07:00**) and the operating mode (e.g. **Stage 1**).
4. Set the other value/time pairs in the same way. Leave unused switching times at ***:***.
   Set a corresponding **value ...** to **off** as the shut-down time.
5. If necessary, copy the time switching catalogue from **Monday** to other days. To do this, use the **arrow keys** to go to “Copy schedule” and press **ENTER**. Use the **arrow keys** to select the destination (e.g. **Tues-Fri** for Tuesday to Friday) and confirm with **ENTER**. The time switching catalogue is copied.

3421375

ART Tech Level II

Quick Guide to HMI Room (Room Control Panel)



Display range

23.0 °C	Temperature setpoint
05:30	Time (error code when an alarm is pending)
	Fan steps:

1-stage plants: Off = no display; On = 6 bars

2-stage plants: Off = no display; Stage 1 = 3 bars; Stage 2 = 6 bars

3-stage plants: Off = no display; Stage 1 = 2 bars; Stage 2 = 4 bars; Stage 3 = 6 bars

	Automatic: Fan steps are selected automatically
1234567	Weekday: 1 = Monday, 2 = Tuesday, 3 = Wednesday, …
	Plant OFF
AUTO	Automatic: Plant switched by time program or building management system
	Plant ON in economy mode (reduced temperature setpoint)
	Plant ON in comfort mode
	Cooling ON
	Heating ON
	Plant ON: Party mode
	Alarm
	Heat recovery ON

Switching the plant (only with switching authorisation)

If ⏻ is displayed at the top left, the plant is off. Press **ON/OFF** to switch the plant on.
The plant operating mode can then be switched (see **Switching the operating mode**).

Party mode

1. Press **PARTY** to start the party mode.
   The symbol is displayed and, instead of the time, the remaining run time of **P1:00** (= 1 hour and 59 minutes) is displayed.
   Press **PARTY** again to prematurely end the party mode.
2. Press **PLUS** to increase the remaining run time by 1 hour.
   Press **MINUS** to decrease the remaining run time by 1 hour.
3. Press **FAN** to switch in a cycle between:
   Stage 1, Stage 2, Stage 3 and Automatic.

Setting the temperature setpoint (not possible in party mode)

Press **PLUS** or **MINUS** to increase or decrease the setpoint by 0.5 °C.

Setting the time/date

Use **PROG** to switch to the time and date setting.
Press **PLUS** or **MINUS** to set the individual numbers and confirm with **OK**.

Switching the operating mode (only with switching authorisation)

1. Make sure that the plant is switched on (see **Switching the plant**).
2. Press **MODE** to switch in a cycle between:
   Comfort, Economy and Automatic.

   In Automatic, the time program or building management system decides on the operating mode.

Setting the fan steps (only with switching authorisation)

Press **FAN** to switch in a cycle between:
Stage 1, Stage 2, Stage 3 and Automatic.

Alarm display and acknowledgement

1. If 🔔 is displayed, an alarm is pending. Most alarms display an error code in addition to the symbol. This appears on the display instead of the time (e.g. A:81). See the operating manual for a description of the error codes.
2. Keep **OK** pressed for one second to start an acknowledgement attempt.

Important information!

1. The switching authorisation of the room control panel depends on the setting in the controller (see operating manual).
2. The possible setting range of the temperature setpoint depends on the setting in the control (see operating manual).
3. Flashing symbols in the display area indicate that the room control panel has been overridden by the controller.
4. The number of TSP steps and the availability of the economy mode depend on the configuration of the plant (see operating manual).
5. In economy mode, the plant is operated at a reduced temperature setpoint. See the operating manual for further information.

3421379

Tending table of data logging AL-KO AHU control

Description	Code	Comment
Filters		
Degree of soiling of outdoor air filter	SplyfilAlm	Only for Easy-Air
Degree of soiling of supply air filter	SplyfilAlm2	Only for Easy-Air
Degree of soiling of extract air filter	ExhFilAlm	Only for Easy-Air
Temperature sensors		
Outdoor air temperature	OutTmp	
Supply air temperature after heat recovery	HrecSupplyTmp	
Water temperature of heat recovery (run-around system)	HrecWtrTmp	
Supply air temperature	SupplyTmp	
Valid room temperature	ValidRoomTmp	
Extract air temperature	ReturnAirTmp	
Exhaust air temperature	ExhaustTmp	
Humidity sensors		
Outdoor air humidity	OutHum	
Room humidity	RoomHum	
Supply air humidity	SupplyHum	
Pressure sensors		
Supply air volume flow	SupplyFlow	
Supply air duct pressure	SupplyPrs	
Extract air volume flow	ReturnFlow	
Extract air duct pressure	ReturnPrs	
Other sensors		
Room air/extract air quality	AirQuality	

Notes

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QUALITY FOR LIFE

3421371/Februar 2021

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