

WIRELESS CONTROL SYSTEM



S21

EN

USER'S MANUAL



BLAUBERG
Ventilatoren

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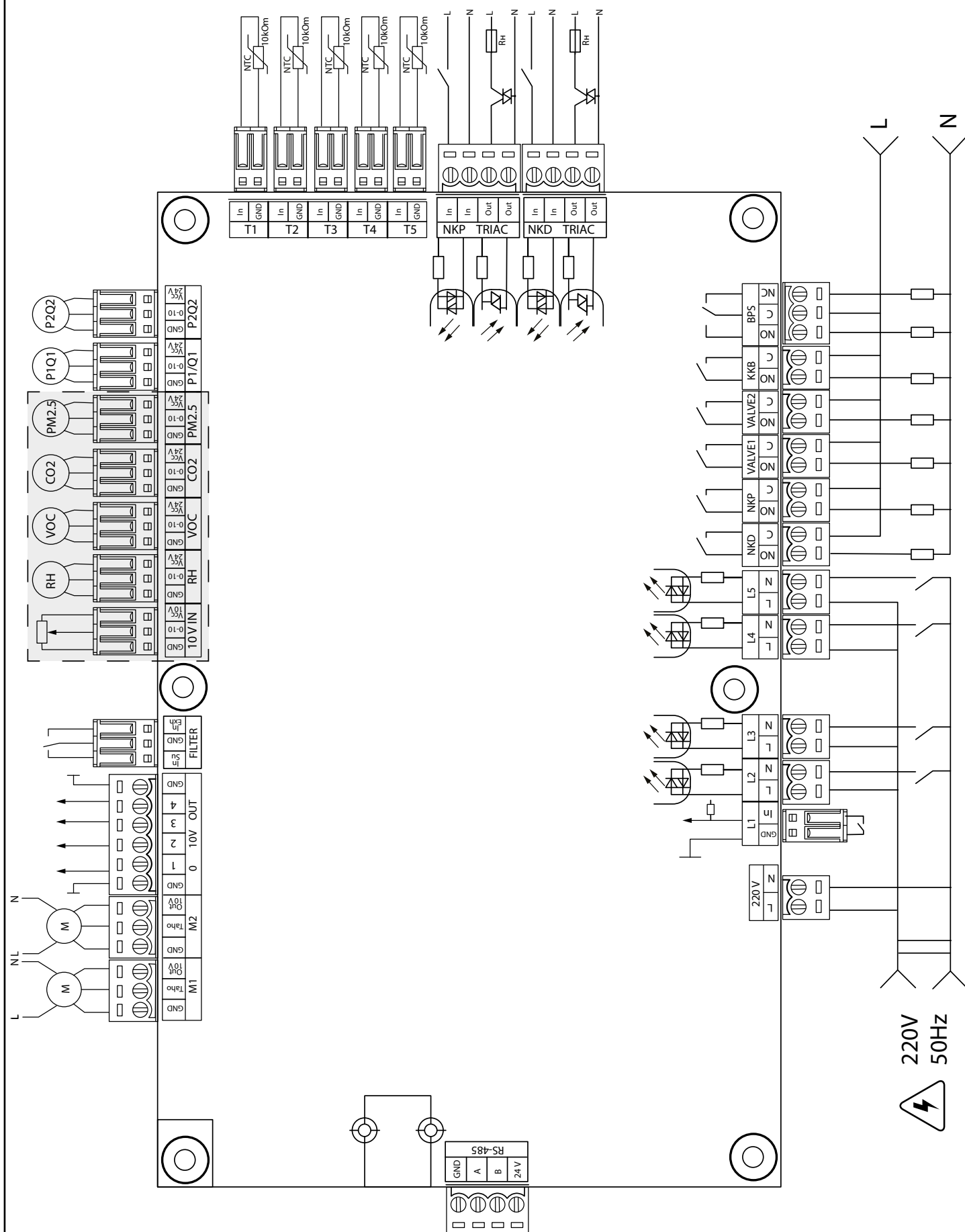
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This user's manual is a main operating document intended for technical, maintenance, and operating staff.

The manual contains information about purpose, technical details, operating principle, design, and installation of the S21 unit and all its modifications.

Technical and maintenance staff must have theoretical and practical training in the field of ventilation systems and should be able to work in accordance with workplace safety rules as well as construction norms and standards applicable in the territory of the country.

CONTROLLER WIRING DIAGRAM



Controller power supply: 100-250 V, 50 (60) Hz, maximum power consumption – 30 W.

Controller inputs

| Input purpose | Input type | Signal type | Designation | Operation logic | Comments |
|---|------------|--------------------------------|-----------------|-----------------|---|
| Outdoor air temperature | Analogue | NTC 10 kOm | T1 | | -40...120 °C |
| Supply air temperature or temperature downstream of the main air heater | Analogue | NTC 10 kOm | T2 | | -40...120 °C |
| Extract air temperature | Analogue | NTC 10 kOm | T3 | | -40...120 °C |
| Extract air temperature | Analogue | NTC 10 kOm | T4 | | -40...120 °C |
| Return heat medium temperature | Analogue | NTC 10 kOm | T5 | | -40...120 °C |
| External set point adjuster | Analogue | 0-10 V | 10 V IN | | Enables fan speed control by means of a potentiometer. This input is enabled/disabled via the Engineering Menu (sensors). The terminal is energised with 10 V. |
| Main humidity sensor | Analogue | 0-10 V | RH | | Each of the sensors is enabled/disabled via the Engineering menu. The sensors are energised with 24 V for powering external sensors. The power supply overload protection is triggered by a short circuit or a total current on the 24 V line in excess of 700 mA. Once the overload protection is activated, the power is restored only after a manual reset at the power supply unit. |
| Main VOC sensor | Analogue | 0-10 V | VOC | | |
| Main CO2 sensor | Analogue | 0-10 V | CO2 | | |
| Main PM2.5 sensor | Analogue | 0-10 V | PM2.5 | | |
| Supply fan control | Discrete | Open collector/ dry contact | M1 (TACHO) | NC | The control feature can be configured to fan tach pulses or an external dry contact, or disabled. You can also program the number of tach pulses per fan revolution and the alarm condition detection time. |
| Exhaust fan control | Discrete | Open collector/ dry contact | M2 (TACHO) | NC | |
| Supply filter contamination control | Discrete | Dry contact | FILTER (IN SU) | NO | |
| Extract filter contamination control | Discrete | Dry contact | FILTER (IN EXH) | NO | |
| Heat medium flow control | Discrete | Dry contact | L1 | NC | This input is enabled/disabled via the Engineering Menu. |
| Heat medium pressure control | Discrete | ~220 V | L2 | NC | This input is enabled/disabled via the Engineering Menu. |
| Fire alarm sensor | Discrete | ~220 V | L3 | NC | This input is enabled/disabled via the Engineering Menu. |
| Boost switch | Discrete | ~220 V | L4 | NO | This input is enabled/disabled via the Engineering Menu. |
| Fireplace switch | Discrete | ~220 V | L5 | NO | This input is enabled/disabled via the Engineering Menu. |
| Electric preheating thermostat (alarm) | Discrete | ~220 V | NKP TRIAC (IN) | NC | |
| Electric reheater thermostat (alarm) or water heater capillary thermostat (alarm) | Discrete | ~220 V | NKD TRIAC (IN) | NC | |

Controller outputs

| Output purpose | Output type | Signal type | Designation | Note |
|---|------------------------|--------------------------------------|-----------------|--|
| Supply fan control | Analogue | 0-10 V | M1 (OUT 0-10) | You can configure the minimum and the maximum value of the signal sent to an active fan and the delay before switching to automatic control after activating the unit. |
| Exhaust fan control | Analogue | 0-10 V | M2 (OUT 0-10) | |
| Analogue control of the reheater or water heater valve control | Analogue | 0-10 V | 0-10V OUT (1) | The operation of this output depends on the heater type selected via the Engineering Menu: Electric. The system controls an external circuit board which operates the heater (e.g. multi-stage) Water. 2-10 V valve control signal. |
| Analogue control of the bypass | Analogue | 0-10 V | 0-10V OUT (2) | |
| Analogue control of the cooler | Analogue | 0-10 V | 0-10V OUT (3) | The operation of this output depends on the cooler type selected via the Engineering Menu: Discrete. Output inactive. Analogue. The output will control the built-in or external cooler with its own control circuit. |
| Electric preheater control | External TRIAC control | | NKP TRIAC (OUT) | PWM signal is modulated to an external TRIAC with a 10 second cycle. |
| Electric reheater control | External TRIAC control | | NKP TRIAC (OUT) | PWM signal is modulated to an external TRIAC with a 10 second cycle. |
| Electric preheater release | Relay | 3A, =30 V/~250 V | NKP | |
| Electric heater release or water heater pump release | Relay | 3A, =30 V/~250 V | NKD | |
| Supply damper actuator control and/or supply fan frequency converter release | Relay | 3A, =30 V/~250 V | VALVE1 | |
| Extract damper actuator control and/or exhaust fan frequency converter release | Relay | 3A, =30 V/~250 V | VALVE2 | |
| Discrete control of the cooler | Relay | 3A, =30 V/~250 V | KKB | The operation of this output depends on the cooler type selected via the Engineering Menu: Discrete. The output will directly control the cooler. Analogue. The output will be used for cooler release. You can configure the minimum activation period and the minimum idle time before a subsequent activation. |
| Discrete control of the bypass or analogue control of the rotary heat exchanger | Two relay outputs | 3A, =30 V/~250 V 3A, =30 V/~250 V | BPS | The operation of this output depends on the unit configuration. Discrete bypass: Opening the bypass closes the BPS relay (C - NO) and opens the BPS relay (C - NC). Closing the bypass opens the BPS relay (C - NO) and closes the BPS relay (C - NC). Rotary heat exchanger: Discrete. The output will directly control the actuator. Analogue. The output will be used for actuator release. The BPS relay (C - NO) is enabled. |

Communication interfaces

| | |
|--------|--|
| RS-485 | The terminal (RS-485) is energised with 24 DCV to power up to 16 external devices. The maximum current is 500 mA. Any current in excess of 500 mA triggers the overload protection to automatically restore power once the load reverts to normal. |
| Wi-Fi | The unit can be fitted with a 50 ohm remote antenna. |

CONNECTING A MOBILE DEVICE TO THE UNIT

The fan is controlled by the **Blauberg AHU** application on the mobile device.

The application is available for download at App Store, Play Market or via the QR code.



[App Store](#)

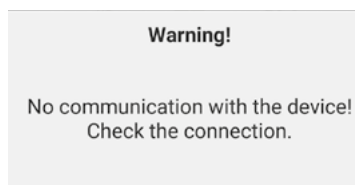


[Play Market](#)

Wi-Fi technical data

| | |
|-------------------------------|--------------------|
| Standard | IEEE 802,11, b/g/n |
| Frequency band [GHz] | 2.4 |
| Transmission power [mW] (dBm) | 100(+20) |
| Network | DHCP |
| WLAN safety | WPA, WPA2 |





When starting the application, a message on the absence of communication with the fan appears on the screen if the device is not connected to the unit.

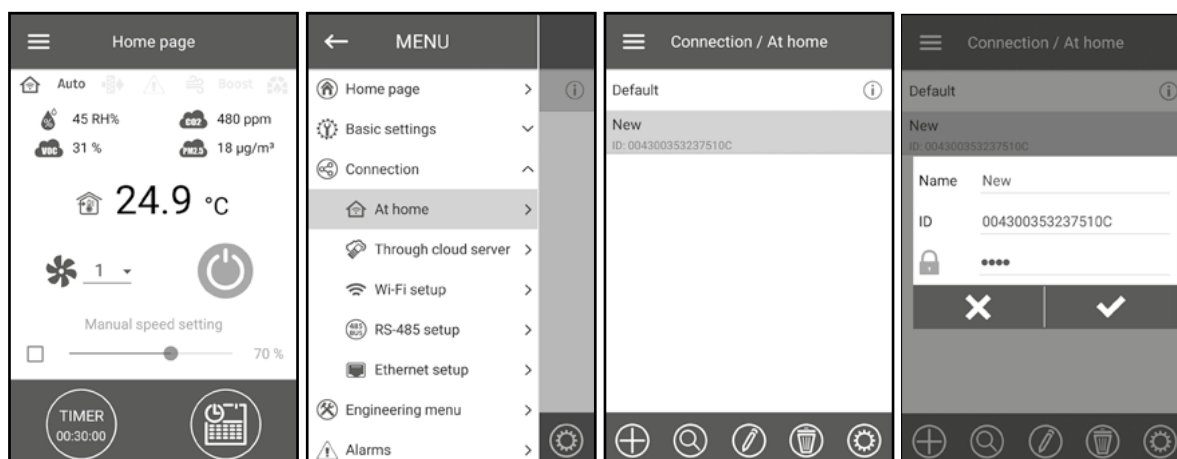


By default, the unit operates as a Wi-Fi access point. After installing the application, connect the mobile device to the unit as to a Wi-Fi access point (FAN: + 16 characters of the ID number) indicated on the control board and on the unit casing.

Wi-Fi access point password: 11111111.


Start the application and create a new connection.

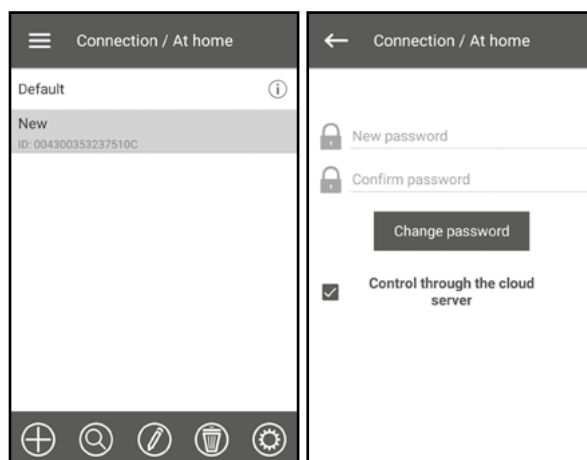
1. Enter the application menu .
2. Select Connection - **At Home** from the menu.
3. If the mobile device is connected to the unit Wi-Fi access point directly without a router, select the **Default** connection. If connecting via a router, first run a unit network search by pressing the  button.
4. Select the connection with the necessary ID.
5. Edit the connection settings by pressing the .
6. If necessary, change the connection name and create a new password for the unit (using the permissible symbols 0..9, a...z, A...Z). By default the unit password is set to 1111.
7. Confirm the entry by pressing the  button.



UNIT PASSWORD CHANGE

Go to **Menu** (☰) - **Connection - At Home**.

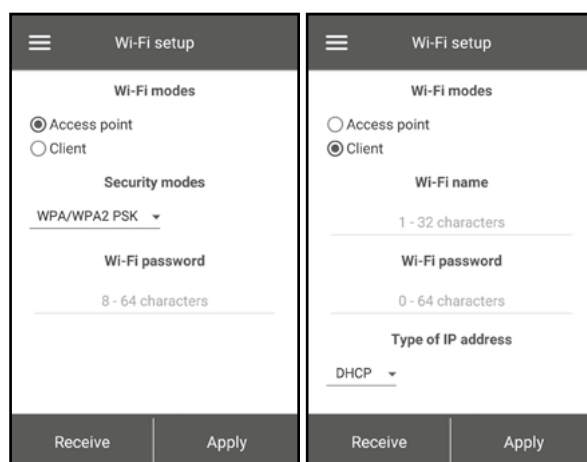
1. Choose the connection and press .
2. Enter and confirm the password (valid characters: 0..9, a .. z, A .. Z).
3. Press **Change Password**.



WI-FI PARAMETER SETUP

Go to **Menu** (☰) - **Connection - Wi-Fi setup**.

Press the **Receive** button to display the current Wi-Fi settings.
Select one of the Wi-Fi modes: Access point or Client.



Access point: access point mode without a home router. Up to 8 devices can be connected to the unit in this mode.

Select the desired security level for the **Access point** mode:

- **Open:** open Wi-Fi network without a password.
- **WPA PSK:** password-protected. Outdated encryption technology, using the WPA protocol, which does not guarantee complete security.
- **WPA2 PSK:** password-protected. The most secure type of data encryption for modern network devices.
- **WPA/WPA2 PSK:** password-protected (recommended). Security best combined technology that activates WPA and WPA2 and at the same time provides maximum compatibility with any devices. Enter your access point password and press the **APPLY** button.

Client: operation mode on the home router network.

Enter the home router details and the IP address type for the **Client** mode:

- Enter the name of the Wi-Fi home router access point.
- Enter the password for the Wi-Fi home router access point.

Select the IP address type:

DHCP: the IP address is set up automatically upon connection to the home router (recommended).

Static: enables manual entry of the desired IP address, subnet mask and default gateway. These settings are recommended for technical specialists only. Select this IP address type at your own risk.

Then press the **APPLY** button.

SPECIAL SETUP MODE

In the event of losing the Wi-Fi password or the unit password, connecting external devices or in other cases, use the special Setup mode to restore access to the unit functions.

To enter the special **Setup mode**, press and hold the **Setup mode** button on the control panel for 5 seconds before the LED on the button starts flashing.

The location of the **Setup mode** button is specified in the unit user's manual. The unit will continue in this mode for 3 minutes and then automatically revert to the previous settings.

To exit the **Setup mode**, press and hold the button again for 5 seconds until the LED on the button stops flashing.

Settings for a special Setup mode

| | |
|---|---|
| Wi-Fi name: | Setup mode |
| Wi-Fi password: | 11111111 (the unit password is ignored) |
| Type of the Ethernet IP address: | DHCP |
| RS-485 address: | 1 |
| The transmission rate of the RS-485: | 115200 baud |
| RS-485 stop bits: | 2 |
| RS-485 parity: | none |
| Engineering menu password: | 1111 |


CLOUD SERVER CONNECTION

The units can be controlled using the mobile app via a cloud server connection. This function allows controlling the unit that is connected to the home router, at any remote location via the Internet.

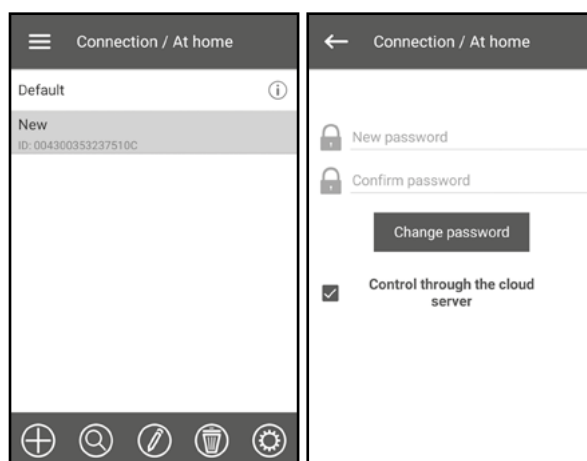
Activating control via cloud server

By default the **Control through the cloud server** function is disabled.

Activation sequence:






1. Go to **Menu** (☰) - **Connection - At home**.
2. Select the desired unit connection.
3. Enter the connection settings menu by pressing .
4. Enable **Control through the cloud server**.

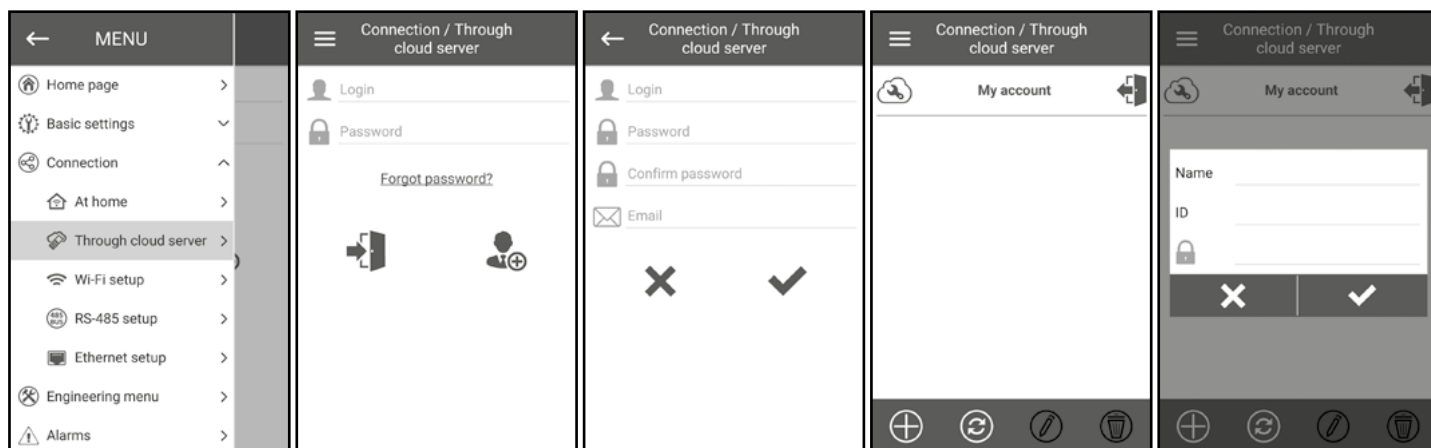
Note: With this function enabled any loss of Internet connection provided by the home router may result in temporary loss of communication with the unit.



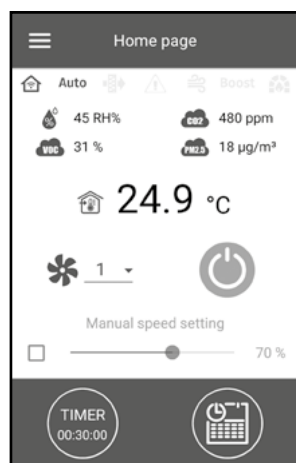
CREATING AN ACCOUNT TO CONTROL THE UNIT THROUGH A CLOUD SERVER

Open the mobile app and go to **MENU** (☰) -> **CONNECTION** -> **THROUGH CLOUD SERVER**:

1. To add a new account, press the  button.
2. Enter a login, a password and an e-mail address for password recovery. Then press .
3. The app will log into the newly created account automatically. Add a new connection .
4. Enter a random name of the unit and an ID number (shown on the control board and on the unit casing) as well as a unit password (by default: 1111).
5. Confirm the entered data by pressing the  button.
6. To exit the account, press .



HOME PAGE



Indicators:



Current type of unit connection. Home connection or connection via a cloud server through Internet respectively.

Current operation mode of the unit.



Ventilation only (no temperature control, heat recovery only), **ventilation + heating** (the unit warms up the outdoor air by means of the electric heater or with the outdoor air heat), **ventilation + cooling** (the unit only cools air by means of the cooler or with the outdoor air cold), **auto** (the control system automatically determines if air heating or cooling is necessary) correspondingly.



Filter replacement indicator.



Red colour – alarm indication, orange colour – warning indication.



Electric heater cooling indicator (preheating or reheating) before switching off the unit.

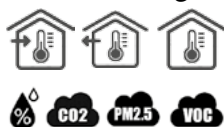
Boost

Boost mode indication.



Fireplace mode indication.

Sensor readings:



Current temperature of the selected sensor, which controls the air temperature (in the supply air duct, in the extract air duct and in the room respectively).

Current values for the humidity sensor, CO₂, PM2.5, and VOC correspondingly. The screen displays the setpoint value for a particular type of sensor connected to the circuit board (hereinafter «main sensor») or if no external sensor is connected - the information from the one built into the control panel (if present). The indicator colour provides the following information: gray - no sensor detected; blue - sensor working normally; red - sensor signal exceeds the pre-set value.

CONTROL BUTTONS



Unit on/Standby.



Selection of pre-set speed.



Manual speed setup. To activate the scroll bar, check it.



Timer activation. Timer settings are made in the **Menu (≡) - Basic Settings - Timers**.

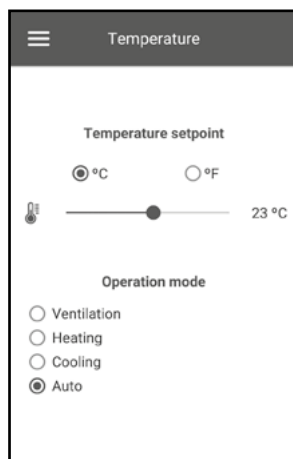


Week-scheduled operation mode activation. The settings of this mode are made in the **Menu (≡) - Basic settings - Schedule**.

BASIC SETTINGS

Temperature

Go to **Menu (≡) - Basic settings - Temperature**.



Temperature setpoint



Select the temperature units for display.



23 °C

Temperature setting for the normal mode (when the timer and weekly schedule mode are disabled).

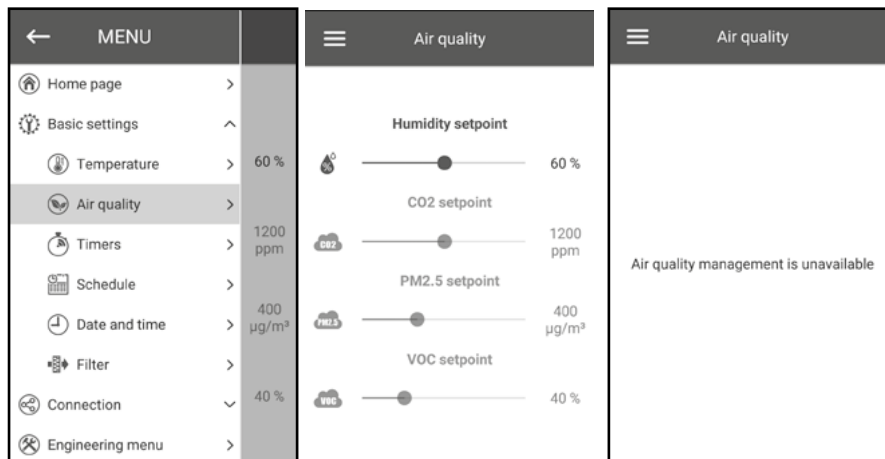
Operating mode: select the operating mode to affect the normal mode, timer and the weekly schedule.

- **Ventilation:** no temperature control, heat recovery only.
- **Heating:** only air heating with the electric heater or the outdoor air heat.
- **Cooling:** only air cooling by means of the cooler or with the outdoor air cold.
- **Auto:** the control system automatically determines if air heating or cooling is necessary.

The temperature control function is not available in units not equipped with a heater, cooler, bypass or rotary heat exchanger.

Air quality

Go to **Menu (≡) - Basic settings - Air quality**



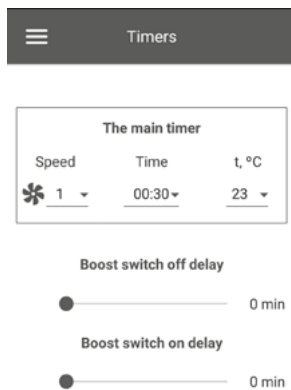
This menu contains the humidity, CO₂, PM2.5, and VOC setpoint sliders. If any of these values are exceeded, the PI controller of the unit will smoothly increase the fan speed. The fan speed will not exceed the set air flow rate for speed III. As the sensor signals revert to normal, the unit will smoothly reduce the fan speed to the initial level. Any non-active sensors displayed as semi-transparent are not accessible.

To enable the sensors, go to **Menu (≡) - Engineering Menu - Sensors** (see the «Engineering menu» section).

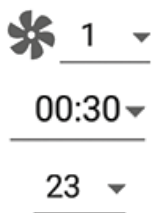
If all the sensors are inactive, the control elements are replaced with the «**Air quality management not available**» message.

TIMERS

Timer settings are made in the **Menu (≡) - Basic Settings - Timers**.



Main timer: Timer mode settings. When the timer is activated in the **Home page** menu, the unit temporarily goes to the following settings:



Pre-set speed selection: 1,2,3...,standby.

Timer setting.

Select the desired temperature control level. The temperature control level can be selected in a +15 °C ...+30 °C range or disabled (off). If off is selected, the unit does not control air temperature during timer operation.

Boost turn-off delay:

Select the delay time for the Boost mode deactivation after a loss of signal at the discrete input (Boost switch) on the control circuit board.

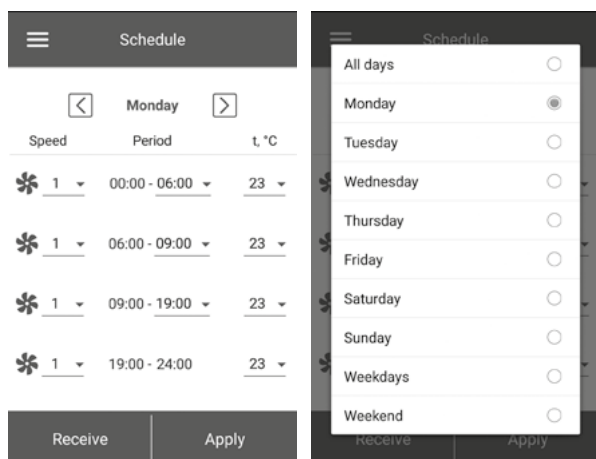
Boost turn-on delay:

Select the delay time for the Boost mode activation after a supply of signal to the discrete input (Boost switch).

To enable the discrete input (Boost switch), go to **Menu (≡) - Engineering menu - Sensors**.

SCHEDULE

Go to **Menu (≡) - Basic settings - Schedule**.



To set up a weekly schedule, there are 4 time intervals available for each day of the week. Adjustment can be made separately for every day, weekdays, weekends or for the whole week. When the **Schedule** mode is activated from the Home page, the unit will operate as scheduled according to the following parameters:



Pre-set speed selection: 1,2,3...,standby.

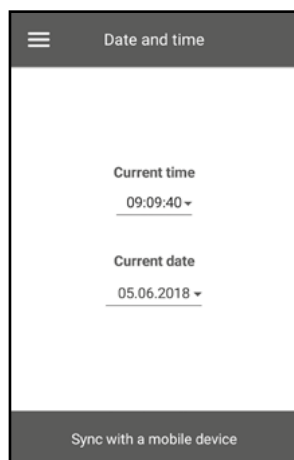
Time setting for a specific time segment.

Control temperature selection. Options available: +15 °C ...+30 °C, off. If OFF is selected, temperature control will not be performed for a specific period of time.

For proper operation of **Schedule**, make sure to set the correct date and time.

DATE AND TIME

Go to **Menu** (☰) - **Basic settings** - **Date and time**.



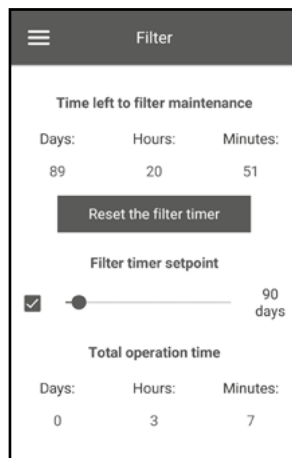
Current time and date are displayed and adjusted in this menu.

Time display format: **hh:mm:ss**.

Date display format: **dd.mm.yyyy**.

FILTER

Go to **Menu** (☰) - **Basic settings** - **Filter**.



Filter timer setpoint: When the set time (70-365 days) has elapsed, the filter change indicator appears and filter replacement information is displayed in the Alarms menu. To disable the timer, remove the selection next to the slider of filter timer setpoint. If the unit is equipped with filter contamination control pressure switches, once the timer is disabled the filter contamination is signalled by the pressure switches only.

Total operating time of the unit: displays the unit total operating time (non-resettable).

CONNECTION

RS-485 setup

Go to **Menu** (☰) - **Connection** - **RS-485 setup**.



Default settings:

- **Controller address:** 1.
- **RS-485 baud rate:** 115200 baud.
- **RS-485 stop bits:** 2.
- **RS-485 parity:** none.

Note: you can use the RS-485 bus to connect up to 16 units (slave devices) and up to 16 control panels (master devices). The slave and master devices have separate IDs. Some control panels only accept the RS-485 default values (see the control panel data sheet). If you set the RS-485 parameters at the unit to enable external control (e.g. with a smart home controller or a BMS system), some control panels

may malfunction.

ETHERNET SETUP

Go to **Menu** (☰) - **Connection** - **Ethernet setup**.

| Ethernet setup | | Ethernet setup | | Ethernet setup | |
|------------------------------|-------|--------------------------------------|-------|--------------------------------|--|
| Type of IP address DHCP ▾ | | Type of IP address Static ▾ | | Ethernet module is unavailable | |
| | | IP address 192 . 168 . 0 . 2 | | | |
| | | Subnet mask 255 . 255 . 255 . 0 | | | |
| | | Default gateway 192 . 168 . 0 . 1 | | | |
| Receive | Apply | Receive | Apply | | |

Press the **Receive** button to display the current Ethernet settings.

DHCP: the IP address is set up automatically upon connection to the home router (recommended).

Static: enables manual entry of the desired IP address, subnet mask and default gateway. These settings are recommended for technical specialists only. Select this IP address type at your own risk.

Then press the **APPLY** button.

If the control system fails to detect an Ethernet adapter, the «**Ethernet adapter not available**» message is displayed.

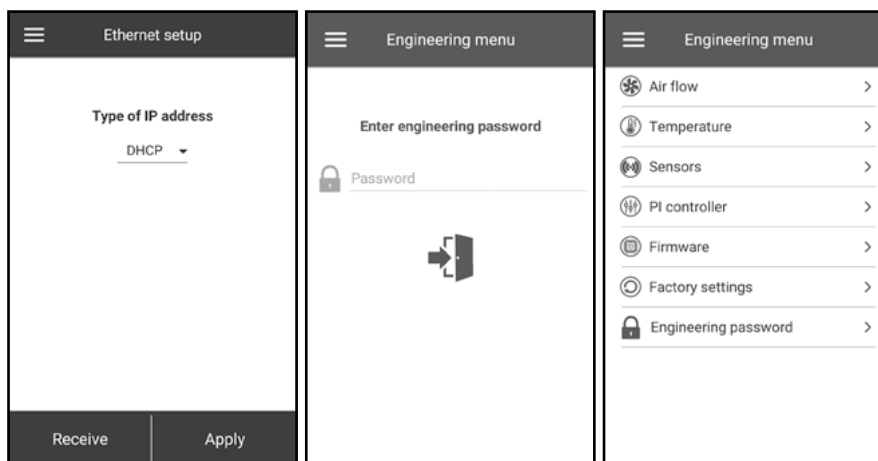
ENGINEERING MENU

Entering engineering menu

Go to **Menu (≡) - Engineering menu.**

Enter the engineering password. By default the password is 1111.

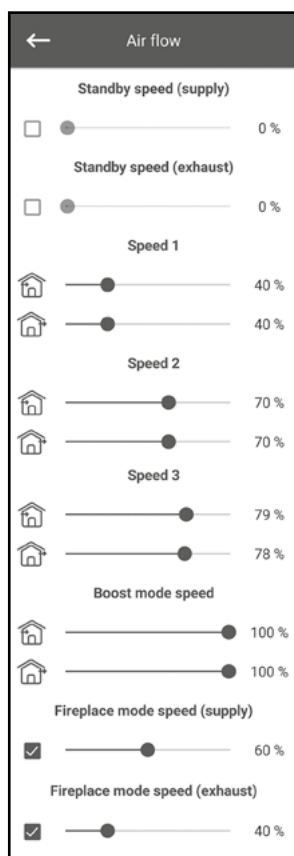
To change the engineering password, go to **Menu (≡) - Engineering menu - Engineering password.**



Note: the engineering menu requires expert skills. Inadvertent changes to the engineering menu parameters may cause unit malfunction.

AIR FLOW

Go to **Menu (≡) - Engineering menu - Air flow.**



This menu section enables setting the air flow values for the **Standby** mode, speed 1,2,3 pre-sets as well as the **Boost** and **Fireplace** modes.

If the air flow value selected for the **Standby** mode is larger than 0 %, the temperature control function for this mode according to setpoint selected (only +15°C temperature is maintained provided the unit is equipped with a heater and the **Heating** or **Auto** mode is selected in the **Basic settings -> Temperature**) as well as the air quality management function will not be available.

If the unit is controlled with an external 0-10 V input or if the PI controller is triggered by a humidity, CO₂, PM2.5 or VOC level alarm, the balance between the supply and extract air will correspond to speed 1,2,3 pre-sets.

TEMPERATURE

Go to **Menu** (≡) - **Engineering menu - Temperature**

← Temperature

Current temperature

-4.2 °C 25.6 °C
 25.8 °C 25.3 °C
 -- °C 25.6 °C

Sensor selection

☒ In the supply duct
☐ In the extract duct
☐ In the room

Min. supply air temperature

☒ 10 °C

Changeover winter/summer

7 °C

Main heater type

☐ Disable
☒ Electrical
☐ Water

Main heater control mode

☐ Manual
☒ Auto

Auto reduction airflow

☐ Off
☒ On

Return water

50 °C ▾ Max. start temp.
 30 °C ▾ Min. start temp.
 20 °C ▾ Max. alarm temp.
 12 °C ▾ Min. alarm temp.

Max. start time

5 min ▾

Min. valve position

0 %

Cooler type

☒ Disable
☐ Relay
☐ Analog (0-10V)

Cooler control mode

☐ On
☒ Auto

Min. time off Min. time on
 3 min ▾ 1 min ▾

Cooler hysteresis

2 °C

Bypass control mode

☐ Manual
☒ Auto

Freeze protection

☐ Disable
☒ Supply fan
☐ Bypass
☐ Preheating

Pre-heater test

☐ 50 %

Current temperature



Intake air temperature.



Supply air temperature.



Extract air temperature upstream of the heat exchanger.



Extract air temperature downstream of the heat exchanger.



Room temperature (in the controller).



Return heat medium temperature.

Selecting the master sensor for temperature control to be displayed on the home page.

You can select one of the three temperature sensors:

in the supply air duct (default).

in the extract air duct.

in the room (in the control panel).

Note: if the selected indoor sensor is absent, the system will control the temperature using the sensor in the supply air duct as confirmed by a corresponding message.**Minimum supply air temperature.** The minimum temperature of the supply air to prevent cold outdoor air from entering the serviced space. If the temperature drops below the pre-set minimum level and does not return to normal within 10 minutes, an alarm is triggered causing the unit to shut down.**Changeover winter/summer.** The setpoint for the winter/summer changeover selectable in the +5 °C to +15 °C range (+7 °C by default). Uses the feedback from the outdoor temperature sensor. Affects the water heater and cooler operation. In the winter season the cooler is disabled while the water heater provides preheating of the circuit before the unit start.**Main heater type.** The main heater control mode option becomes available while selecting the electric heater or the water heater.**Note:** if the water heater is active, prior to disabling it make sure that the heat-transfer medium supply has been disconnected and that the circuit has been drained to avoid damaging the water heater by disabling it during the winter season. Also prior to enabling either heater make sure that all the necessary sensors are present to avoid triggering an alarm condition and causing the unit to shut down.**Main heater control mode.** Two options are available: **manual** control and **automatic** control. If manual control is selected, the 0...100 % heater control slider appears. While in the manual mode the heater is enabled only if the supply fan is active and the supply air duct temperature is below +45 °C.

Automatic reduction of the air flow rate.

If the main heater cannot heat the temperature in the supply duct to the level of the user-set room temperature, the air flow will be automatically reduced to reach the set temperature.

Min. valve position — setting of the minimum valve position (0-100 %) of the water heater in winter.

Max. starting time — set time (2-30 min.) after which an alarm will be generated in case of underheating of the return heat medium to the starting temperature of the AHU in winter.

Max. starting temperature — final value of the return heat medium temperature required for the AHU start in winter at outdoor temperature $\leq -30\text{ }^{\circ}\text{C}$.

Min. starting temperature — initial value of the return heat medium temperature required for the AHU start in winter at outdoor temperature $\geq +10\text{ }^{\circ}\text{C}$

Max. alarm temperature — final value of the return heat medium temperature for the AHU shutdown caused by a freeze alarm in winter at outdoor temperature $\leq -30\text{ }^{\circ}\text{C}$.

Min. alarm temperature — initial value of the return heat medium temperature for the AHU shutdown caused by a freeze alarm in winter at outdoor temperature $\geq +10\text{ }^{\circ}\text{C}$.

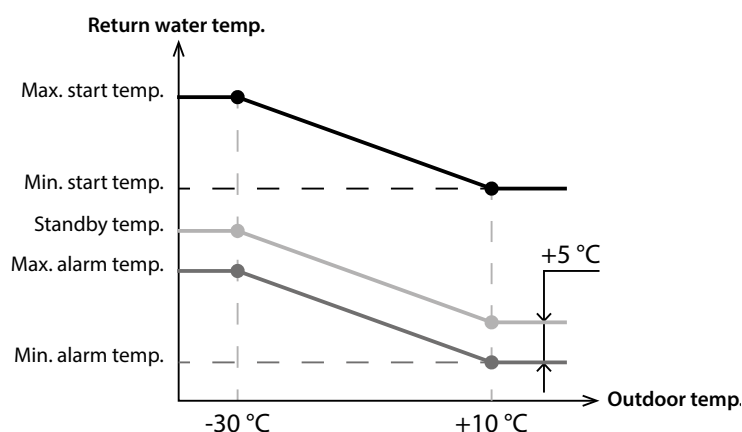
Starting temperature setting range: $+30\text{ }^{\circ}\text{C} \dots +60\text{ }^{\circ}\text{C}$.

Alarm temperature setting range: $+10\text{ }^{\circ}\text{C} \dots +30\text{ }^{\circ}\text{C}$.

Temperature settings for the return heat medium are automatically calculated based on outdoor temperature of $-30\text{ }^{\circ}\text{C} \dots +10\text{ }^{\circ}\text{C}$.

Standby temp. = alarm temp. of $+5\text{ }^{\circ}\text{C}$ — return heat medium temperature in winter in Standby mode.

In winter, when the AHU is running, this setpoint is designed to prevent the return heat medium temperature from dropping to the alarm temperature at a low temperature setpoint in the supply duct or when the heater operation is not allowed.



Cooler type. Cooler control logic selection. If discrete is selected, the cooler is controlled by means of a relay. If analogue is selected, the cooler is controlled by means of a 0-10 V signal and a release relay. Both the discrete and analogue options enable the **cooler control mode** selection and setting **minimum cooler on/off time**.

Cooler control mode. Two options are available: **manual (on)** and **auto**. If discrete is selected, the cooler can be switched on manually or automatically. If analogue is selected, the 0...100 % cooler control slider appears on selecting the manual mode.

Min. time before OFF. The minimum time for the cooler operation before deactivation.

Min. time before ON. The minimum time for the cooler idling before re-activation.

Cooler hysteresis. Available for coolers with discrete control.

Bypass/rotary heat exchanger control mode. Displays the bypass control mode or the rotary heat exchanger control mode depending on the unit configuration. The following modes are available for discrete configurations of the bypass/rotary heat exchanger: **close/run, open/stop, auto**. The following modes are available for analogue configurations of the bypass/rotary heat exchanger: **manual** and **auto**. If manual mode is enabled, the **0...100 %** bypass/rotary heat exchanger control slider appears. The 0 % value corresponds to a completely closed position of the bypass or maximum speed of the rotary heat exchanger.

Freeze protection.

Freeze protection is activated if the outdoor temperature drops below -3 °C and the supply and exhaust fans are enabled.

Freeze protection is deactivated when the outdoor temperature raises above -1 °C or if the supply or exhaust fan is disabled.

Types of heat exchanger freeze protection:

- Supply fan

The freeze protection of the heat exchanger by the supply fan provides for the periodic stopping of the fan when the extract air temperature downstream of the heat exchanger drops below +3 °C. If the temperature rises above +7 °C, the fan will start again.

- Bypass

The bypass maintains the temperature of +5 °C in the extract duct downstream of the heat exchanger.

If the bypass opens 100 % and it is not enough, the exhaust fan speed will increase smoothly and then the supply fan speed will decrease to reach a temperature of +5 °C in the extract duct downstream of the heat exchanger.

Note: Note: the freeze protection is activated only if the main heater is enabled, the bypass is located on the outdoor side and Heating or Auto mode is selected. Otherwise, freeze protection by intermittent shutdown of the supply fan will be automatically activated.

- Preheating

If freeze protection is activated, the preheater maintains the temperature of +5 °C in the extract duct downstream of the heat exchanger.



Note: if freeze protection by preheating with an electric heater is selected, make sure that the heater is connected to the unit, otherwise the unit will stop due to alarm.

- Disabling protection

Note: if you disable protection, you are at risk! The corresponding warning will be displayed on the screen.

SENSORS

Go to **Menu** (≡) - **Engineering menu** - **Sensors**.

| Sensors | |
|---|----------|
| <input checked="" type="checkbox"/> Main humidity sensor | 45 % |
| <input type="checkbox"/> External humidity sensor | -- |
| <input type="checkbox"/> Main CO ₂ sensor | 497 ppm |
|  Measurement range | 2000 |
| <input type="checkbox"/> External CO ₂ sensor | -- |
| <input type="checkbox"/> Main PM2.5 sensor | 19 µg/m³ |
|  Measurement range | 1000 |
| <input type="checkbox"/> External PM2.5 sensor | -- |
| <input type="checkbox"/> Main VOC sensor | 31 % |
| <input type="checkbox"/> External VOC sensor | -- |
| <input type="checkbox"/> Control device 0-10V | 0% |
| <input checked="" type="checkbox"/> Boost switch | off |
| <input checked="" type="checkbox"/> Fireplace switch | off |
| <input type="checkbox"/> Fire alarm sensor | off |
| <input type="checkbox"/> Water pressure sensor | off |
| <input type="checkbox"/> Water flow sensor | off |
| Supply fan RPM | 0 |
| Exhaust fan RPM | 0 |
| Supply filter control | off |
| Extract filter control | off |
| Pre-heater thermostat | off |
| Main heater thermostat | on |
| Battery voltage | 3.27 V |

Main sensor: a wired sensor connected to the control circuit board.

External sensor: a remote sensor that may be contained in the control panel or in a special device with a parallel connection to the control panel.

Note: also requires activation of the sensor built into the control panel (see the instruction manual for the specific control panel). If the same sensor is shared by several control panels, activate the built-in sensor in only one of the control panels or otherwise the panels will show incorrect feedback from the sensor.

If the corresponding main sensor or built-in control panel sensor is enabled, the unit begins to respond to its signals. Enabling a missing sensor triggers the corresponding warning in the **Alarms** menu.

 : setting the measurement range for the CO₂ or the PM2.5 sensor.

This setting defines the sensor signal limit value which corresponds to 10 V at the analogue input.

Boost switch. If this input is enabled, the Boost mode is activated on receiving a signal to this input (on).

Fireplace switch. If this input is enabled, the Fireplace mode is activated on receiving a signal to this input (on).

Note: the **Fireplace** mode is not available if the unit is configured to heat exchanger freeze protection by supply fan or by bypass with the heater disabled.

0-10 V control device. If this input is enabled, the unit stops responding to pre-set speeds 1,2,3.. and will respond to an external pot resistor connected to the control circuit board. To enable this control option, the unit must be in any mode other than **Standby**.

Fire alarm sensor. Make sure that the fire alarm sensor is connected before enabling this input. A loss of signal at this input (off) triggers an alarm condition and causes the unit to shut down.

Water pressure sensor. If this sensor is enabled, the unit control system will monitor the heat-transfer medium pressure. While the water heater is active, a loss of signal at this input (**off**) triggers an alarm condition and causes the unit to shut down.

Water flow sensor.

If this sensor is enabled, the unit control system monitors the heat-transfer flow. While the water heater is active, a loss of signal at this input (off) triggers an alarm condition and causes the unit to shut down.

Depending on the unit configuration, the screen shows the **supply/exhaust fan speed in rpm** or **the supply/exhaust fan status** (**off** - fan not spinning, **on** - fan spinning).

Supply/extract filter contamination control **Off** - filter OK, **on** - replace the filter.

Main heater/preheater thermostat. If the respective heater is active, a loss of signal at these inputs (off) triggers an alarm condition and causes the unit to shut down.

Battery voltage. If the battery voltage drops below 2 V, replace the battery.

PID CONTROLLER

Go to **Menu** (≡) - **Engineering menu** - **PID controller**.

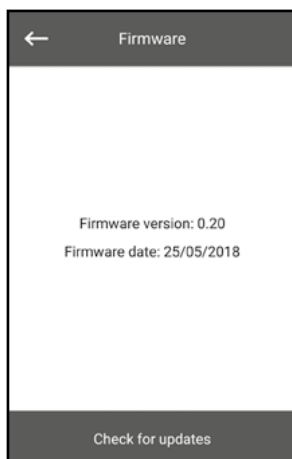
| ← PID controller | | | |
|------------------|-----|-----|------|
| Main heater | | | |
| Kp | Ki | Kd | U(t) |
| 400 | 400 | 600 | 0 % |
| Pre-heater | | | |
| Kp | Ki | Kd | U(t) |
| 200 | 200 | 500 | 0 % |
| Bypass | | | |
| Kp | Ki | Kd | U(t) |
| 200 | 200 | 500 | 0 % |
| Cooler | | | |
| Kp | Ki | Kd | U(t) |
| 200 | 200 | 500 | 0 % |
| Humidity | | | |
| Kp | Ki | Kd | U(t) |
| 150 | 150 | 0 | 0 % |
| CO2 | | | |
| Kp | Ki | Kd | U(t) |
| 150 | 150 | 0 | 0 % |
| PM2.5 | | | |
| Kp | Ki | Kd | U(t) |
| 150 | 150 | 0 | 0 % |
| VOC | | | |
| Kp | Ki | Kd | U(t) |
| 150 | 150 | 0 | 0 % |

This menu contains **PID controller** settings. The **Kp**, **Ki** and **Kd** factors affect the control signal change rate in response to external factors. Increasing the factor values causes the control signal change faster while decreasing the factor values results in slower control signal changes.

U(t): PI controller output, 0-100 %.

FIRMWARE

Go to **Menu** (☰) - **Engineering menu** - **Firmware**.



This menu displays the current firmware version and date.

To check for the latest firmware update, connect the unit to a router with Internet access. Then press the **Check for updates** button.

If your unit is running the latest firmware version, the corresponding message is displayed. If a newer version is available, the screen will show the new firmware version and a complete history of changes, and the **Upgrade firmware** button becomes active. Once you press the **Upgrade firmware** button the firmware upgrade process begins. During the firmware upgrade do not power down the unit, do not close the mobile application and do not select a new connection. When the firmware upgrade is complete, the screen will show a confirmation and the connection to the device will be temporarily lost.

Factory settings

Go to **Menu** (☰) - **Engineering menu** - **Factory settings**.



Use this menu to revert all the settings to their factory values. The reset may cause a temporary loss of connection to the device as it affects the Wi-Fi, RS-485 and Ethernet settings. If necessary, enter the new settings for your Wi-Fi, RS-485, and Ethernet connections.

ENGINEERING PASSWORD

Go to Menu (☰) - Engineering menu - Engineering password.

Use this menu to change the engineering password.

ALARMS

Go to Menu (☰) - Alarms (Current alarms/Alarm history)

The Alarms menu displays a list of alarms and warnings. Alarm records are highlighted in red, warning records are highlighted in black.

Alarm

A serious operation error has occurred. The unit is forcibly turned off.
The alarm must be reset manually using the Reset Alarms button.

Warning

The unit is not forcibly turned off.
The warnings are reset automatically after the cause is eliminated.

Current alarms

Each entry in the current alarm window contains a code and a brief description of the alarm/warning.
Record display format:

Code: №

Alarm!/Warning!

...

Alarm log

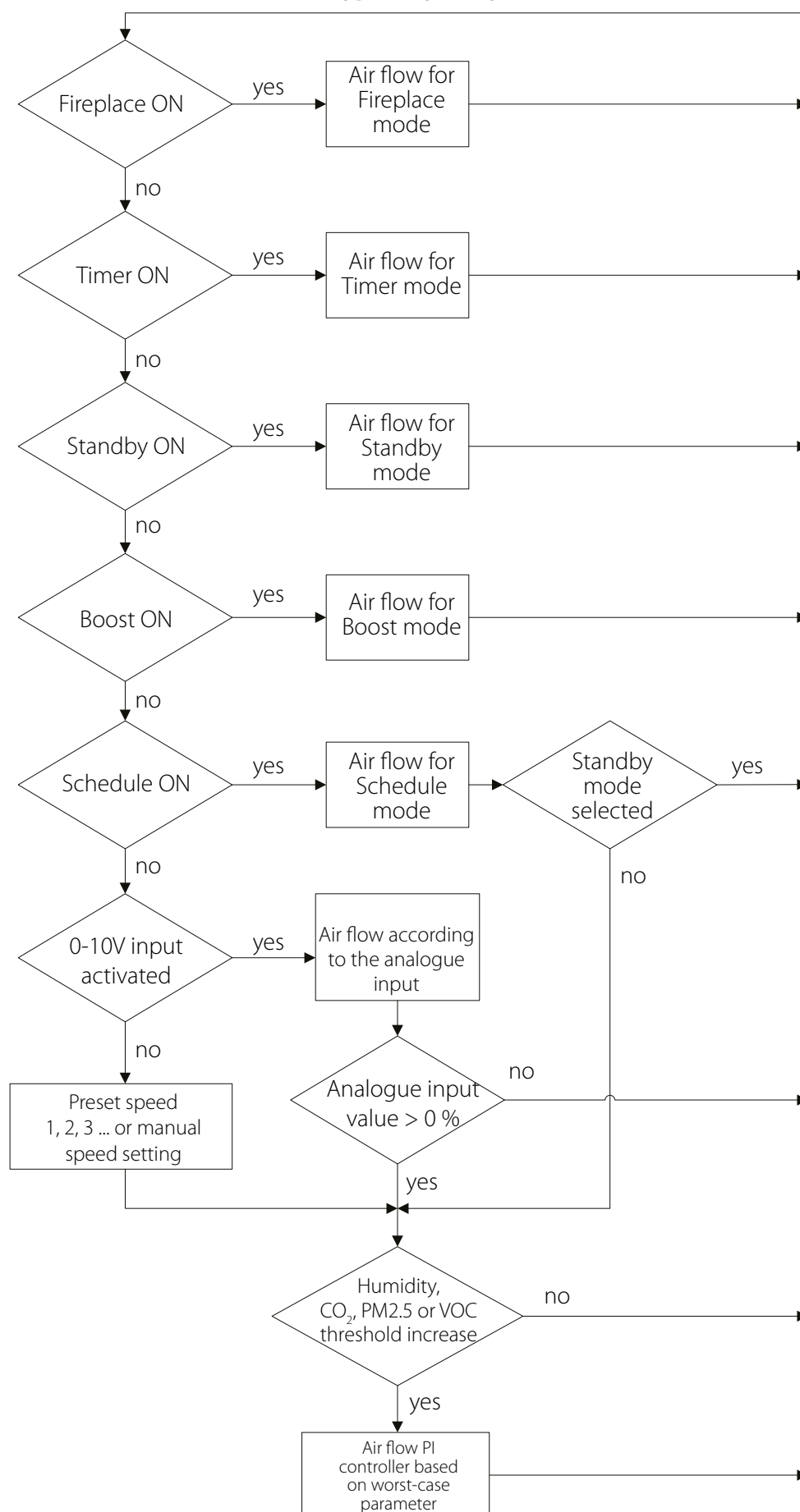
Each alarm log entry contains a code, date, time, and a brief description of the alarm/warning.
Record display format:

Code: №, dd.mm.yyyy, hh: mm: ss

Alarm!/Warning!

...

The alarm/warning codes and their description are given in the table below.

MODE PRIORITIES

ALARM AND WARNING CODES

| Code | Description |
|------------|---|
| 0 | Alarm! Supply fan malfunction. <ul style="list-style-type: none"> Determined depending on a specific configuration. By rpm: if the supply fan speed drops below 300 rpm for 30 seconds (configurable within a 5 to 120 second range). By discrete input: if the discrete input (TAHO M1) remains open for 30 seconds (configurable within a 5 to 120 second range) provided that the supply fan must be running. |
| 1 | Alarm! Extract fan malfunction. Determined depending on a specific configuration. <ul style="list-style-type: none"> By rpm: if the extract fan speed drops below 300 rpm for 30 seconds (configurable within a 5 to 120 second range). By discrete input: if the discrete input (TAHO M2) remains open for 30 seconds (configurable within a 5 to 120 second range) provided that the extract fan must be running. |
| 2 | Alarm! No outdoor air temperature sensor detected. Determined if the heat exchanger freeze protection is active or the unit is configured with a bypass, a rotary heat exchanger, a cooler or a water heater. |
| 3 | Alarm! Short circuit of the outdoor air temperature sensor. Determined if the heat exchanger freeze protection is active or the unit is configured with a bypass, a rotary heat exchanger, a cooler or a water heater. |
| 4 | Alarm! No supply air temperature sensor detected. Determined in any unit configuration. |
| 5 | Alarm! Short circuit of the supply air temperature sensor. Determined in any unit configuration |
| 6 | Alarm! No sensor of the extract air temperature upstream of the heat exchanger detected. Determined if the extract air temperature sensor is selected as the master sensor for temperature control provided that the main heater or condensing unit are enabled. The alarm will also be determined irrespective of which sensor is selected for temperature control if the bypass or rotary heat exchanger is enabled. |
| 7 | Alarm! Short circuit of the extract air temperature sensor. Determined if the extract air temperature sensor is selected as the master sensor for temperature control provided that the main heater or condensing unit are enabled. The alarm will also be determined irrespective of which sensor is selected for temperature control if the bypass or rotary heat exchanger is enabled. |
| 8 | Alarm! No sensor of the exhaust air temperature downstream of the heat exchanger detected. Determined if the heat exchanger freeze protection is active. |
| 9 | Alarm! Short circuit of the exhaust air temperature sensor. Determined if the heat exchanger freeze protection is active. |
| 10 | Alarm! Preheater protective thermostat activated. Determined if the preheater is selected for protecting the heat exchanger from freezing (NKP IN). |
| 11 | Alarm! Main heater protective thermostat activated. Determined if electric or water heater is enabled as the main heater and the discrete input (NKD IN) is open. |
| 12 | Alarm! Preheating cannot provide heat exchanger freezing protection. Determined if the preheater is selected for protecting the heat exchanger from freezing and freezing danger warning has been active for 30 minutes. |
| 13 | Warning! Main humidity sensor not detected. Determined if the main humidity sensor is activated and its signal value is 0. |
| 14 | Warning! Main CO₂ sensor not detected. Determined if the main CO ₂ sensor is activated and its signal value is 0. |
| 15 | Warning! Main PM2.5 sensor not detected. Determined if the main PM2.5 sensor is activated and its signal value is 0. |
| 16 | Warning! Main VOC sensor not detected. Determined if the main VOC sensor is activated and its signal value is 0. |
| 17 | Warning! External humidity sensor not detected. Determined if the sensor has sent no feedback to the controller for 20 seconds while being active. |
| 18 | Warning! External CO₂ sensor not detected. Determined if the sensor has sent no feedback to the controller for 20 seconds while being active. |
| 19 | Warning! External PM2.5 sensor not detected. Determined if the sensor has sent no feedback to the controller for 20 seconds while being active. |
| 20. | Warning! External VOC sensor not detected. Determined if the sensor has sent no feedback to the controller for 20 seconds while being active. |
| 21 | Warning! Indoor air temperature not detected! The air temperature is controlled by using the feedback from the temperature sensor in the supply air duct downstream of the heat exchanger. Determined if no sensor data has been communicated from the control panel to the controller for 20 seconds if the sensor is selected as the temperature control master sensor provided that the main heater, the bypass, the rotary heat exchanger or the condensing unit are enabled. |

| | |
|-----------|---|
| 22 | Warning! Heat exchanger freezing danger. Determined if the supply fan is enabled, the outdoor temperature drops below -3 °C and remains below -1 °C, and the exhaust air temperature downstream of the heat exchanger drops below 2 °C and remains below 3 °C. |
| 23 | Warning! The battery is low. The weekly schedule function will work incorrectly. Determined if no battery is detected or its voltage level drops below 2 V. The battery voltage level is monitored every 5 minutes. |
| 24 | Warning! Replace the supply air filter. Determined if the pressure switch is triggered closing the discrete input (FILTER IN SU). |
| 25 | Alarm! Fire alarm activated. Determined if the fire alarm sensor is triggered opening the discrete input (L3). This alarm causes the fans to shut down immediately overriding any prior electric heater blowing commands. |
| 26 | Alarm! Low supply air temperature. Determined if the minimum supply air temperature control function is enabled (the default setpoint is +10 °C configurable within a +5 °C to +12 °C range), and the supply air temperature remains below the control setpoint for 10 minutes with the condensing unit disabled and the bypass closed. |
| 27 | Alarm! Return water temperature sensor not detected. Determined if the water heater is enabled as the main heater. |
| 28 | Alarm! Short circuit of the return water temperature sensor. Determined if the water heater is enabled as the main heater. |
| 29 | Warning! Replace the extract air filter. Determined if the pressure switch is triggered closing the discrete input (FILTER IN EXH). |
| 30 | Alarm! No water pressure detected. Determined if no water pressure is detected provided that the water heater and the water pressure sensor are enabled. |
| 31 | Alarm! No water flow detected. Determined if no water flow is detected provided that the water heater and the water flow sensor are enabled. |
| 32 | Alarm! Low return water temperature. |
| 33 | Alarm! Supply fan cannot provide heat exchanger freezing protection. Determined if the supply fan is selected for protecting the heat exchanger from freezing and the freezing danger warning has been active for 30 minutes. |
| 34 | Alarm! Bypass cannot provide heat exchanger freezing protection. Determined if the bypass is selected for protecting the heat exchanger from freezing and the freezing danger warning has been active for 30 minutes. |
| 35 | Warning! Freeze protection disabled. This may cause heat exchanger freezing! Determined if the rotary heat exchanger is not enabled and the freeze protection is deactivated. |
| 36 | Warning! The main heater is operated in the manual mode. |
| 37 | Warning! The cooler is operated in the manual mode. |
| 38 | Warning! The bypass is operated in the manual mode. |
| 39 | Warning! The rotary heat exchanger is operated in manual mode. |
| 40 | Warning! The filter timer countdown is completed. Please, replace the filter. |
| 41 | Warning! Incorrect operation of the rotary heat exchanger. |
| 42 | Warning! Preheater is operated in the manual mode. |
| 43 | Alarm! Return water temperature failed to reach setpoint in due time before AHU start. |
| 44 | Warning! The selected type of freeze protection of the heat exchanger by means of the bypass is replaced by freeze protection by means of the supply fan as the main heater operation is not allowed. |
| 45 | Warning! The fireplace mode is locked. This mode is not compatible with the selected type of freeze protection of the heat exchanger. |



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