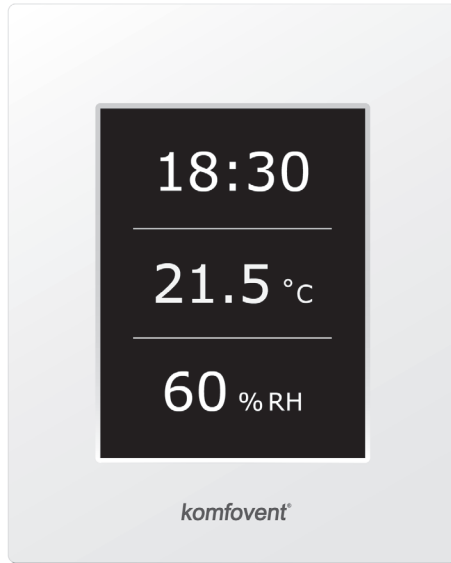


***komfovent***<sup>®</sup>



# C5.1

**EN** Electrical installation and Operation Manual



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This symbol indicates that this product is not to be disposed of with your household waste, according to the WEEE Directive (2002/96/EC) and your national law. This product should be handed over to a designated collection point, or to an authorised collection site for recycling waste electrical and electronic equipment (EEE). Improper handling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the effective usage of natural resources. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, waste authority, approved WEEE scheme or your household waste disposal service.

## 1. ELECTRICAL INSTALLATION MANUAL

Installation works can be performed only by the specialists that have required qualification. During installation following requirements must be fulfilled.



It is recommended to lay control cables separately from power cables, or use shielded cables. In such case it is necessary to earth cable shielding!



If AHU is used outdoors, all cables and wires, that are routed outside of the unit must be additionally protected from UV damage; for example it can be mounted inside of cable tray, corrugated tube or similar.

### 1.1. Air Handling Units Sections Connection

After unit parts have been connected together (see unit installation instruction), unit sections connecting cables and wires are connected.



Connector connection is performed strictly according to numeration given in wiring diagram, or adequate markings (see unit electric scheme).



When disconnecting unit sections, do not pull by connecting wires and cables!

### 1.2. Electric Power Supply Connection

If the air handling unit voltage is ~230 V; 50 Hz it is necessary to install the socket with grounding of corresponding capacity (see electric diagram unit). If the voltage is ~400 V; 50 Hz, the cable of electrical power supply is connected to the main switch, which is located on the unit's outside wall. It is necessary to connect earthing! Electrical power supply connection and other cable thicknesses are specified in the wiring diagram.



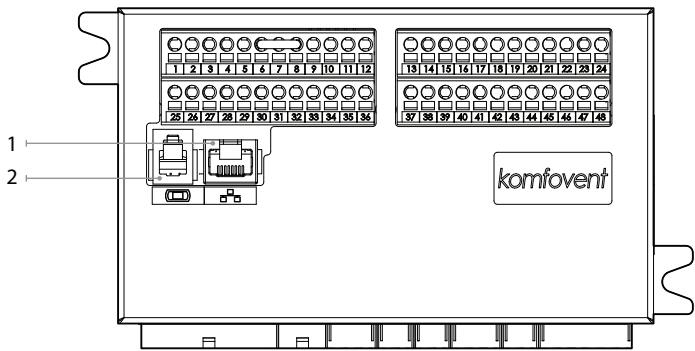
Air handling units designed for 400 V AC supply voltage must be connected to the stationary installation by solid cable. It is recommended to connect AHU to the mains via automatic circuit breaker with 30 mA current leakage protection (type B or B+).



Before connecting unit to the electrical power supply, it is necessary to check whether earthing has been installed properly.

1.3. External Elements Connection

The air handling unit is designed with external connection terminals which are located on the controller box, inside the air handling unit. All external control elements are connected to the terminals.



- 1. „Ethernet“ computer network or internet connection
- 2. Control panel connection

1.3 a Picture. Controller with connection terminals



Total power of all external elements with 24 V supply may not exceed 15 W.

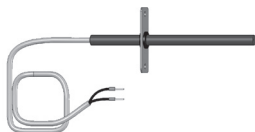
				MODBUS RS485 connection				Control input				External control				B5				B1			
				B	A	GND		IN4	IN3	IN2	IN1	C				NTC				NTC			
				1	2	3	4	5	6	7	8	9	10	11	12								
				25	26	27	28	29	30	31	32	33	34	35	36								
				0..10V	-24V	N		0..10V	-24V	N		0..10V	-24V	N		0..10V	-24V	N		0..10V	-24V	N	
Humidity sensor								Air quality sensor				Exhaust air pressure sensor				Supply air pressure sensor							
B9				B8				B7				B6											

## 1.4. Temperature Sensors Installation

The supply air temperature sensor B1 (1.4 a Picture) is mounted in the air duct in a projected place for it; after cooler section (if provided). The minimal distance from the duct connection of the unit up to the sensor should be not less than double diameter of the circular connection or a diagonal of rectangular connection.

The water temperature sensor B5 (1.4 b Picture) is mounted on the water pipe by screwing it into the provided hole. The sensor must be thermo insulated!

### Supply air temperature sensor B1

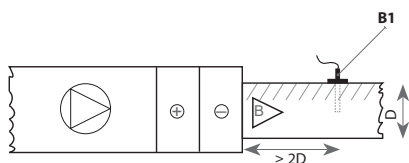


1.4 a Picture

### Water temperature sensor B5



1.4 b Picture



## 1.5. Requirements for the installation of the control panel

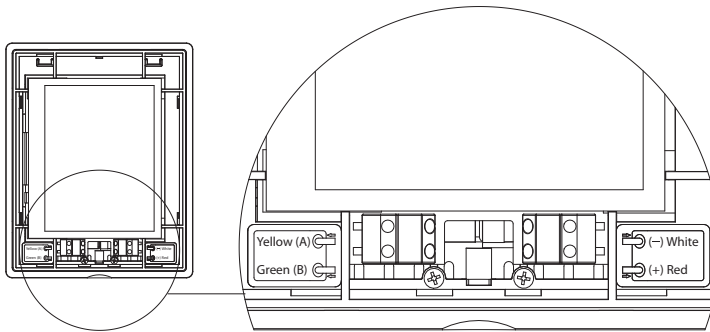
1. The control console should be installed in a room where the following conditions are ensured:
  - 1.1. ambient temperature: 0 °C ... 40 °C;
  - 1.2. relative humidity range: 20 % ... 80 %;
  - 1.3. protection against dripping of water (IP X0).
2. Control panel connection is provided through a hole in the back or bottom side.
3. The panel can be mounted on a flush mounting box or in any other place just screwing two holes on the fastening surface.



**Do not use any other type or size screws but those that are packed together for control panel mounting. Wrong screws may damage electronics board.**

## 1.6. Control panel connection

The control panel is connected to the controller box (see Picture 1.3 a). The length of the cable for connecting the panel with the unit may not exceed 150 m.



**1.6 Picture. Control panel connection**



**Control panel connection and other cable thicknesses are specified in the wiring diagram!**



**Remove protective screen tape, before mounting front cover on the control panel!**

## 2. OPERATION MANUAL

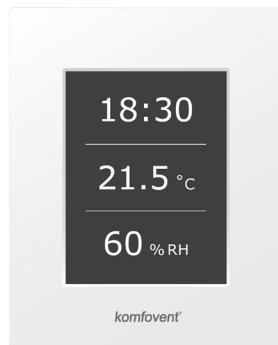
### 2.1. Unit Control

Air handling units control system ensures control of the physical processes that are taking place inside the air handling unit.

Control system consists of:

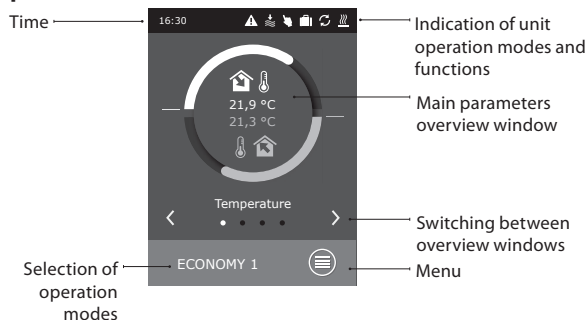
- main controller module;
- circuit breakers and main switch;
- control panel<sup>1</sup>, which can be installed in the convenient place for the user;
- pressure and temperature sensors.

Control panel (2.1 Picture) is designed for remote air handling unit control, setting and display of controller parameters.



2.1 Picture. Control panel

### 2.2. Control panel indication



#### Explanation of the displayed symbols

	Supply air temperature		Fan operation		Air humidifier operation
	Extract air temperature		Air flow increasing by activated function (see chapter Functions)		Summer night cooling mode
	Supply air volume		Air flow decreasing by activated function (see chapter Functions)		Weekly operation mode
	Extract air volume		Energy recovery operation		Holiday operation mode
	Supply air humidity		Air heater operation		„Override“ mode
	Extract air humidity		Air cooler operation		Alarm signal
	Extract (room) air quality				

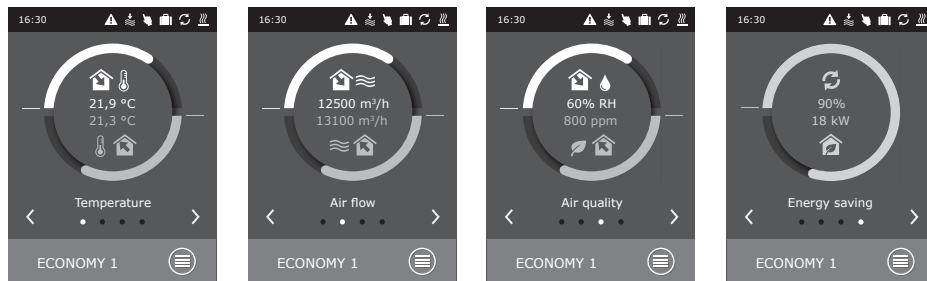
<sup>1</sup> Sold separately.



### 2.3. Parameters overview

The main parameters of the unit are indicated in four main windows of the panel: temperatures indication, air flow, air quality (humidity) and energy saving.

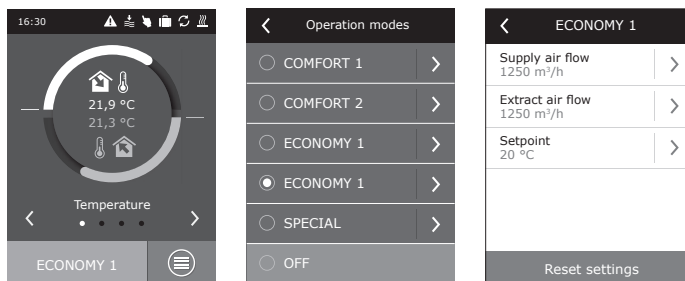
All other unit parameters are presented in the menu "Overview" (see 9 page).



### 2.4. Operation modes selection

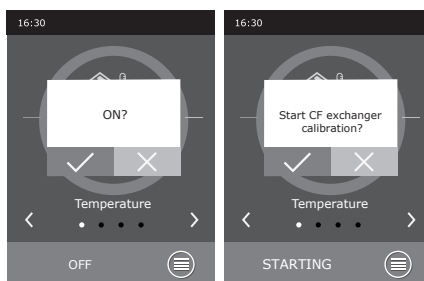
Six operation modes are possible, one of them user can select directly from control panel main window:

- Two Comfort and two Economy modes, for each of them the user can set air flow and temperature.
- Special mode allows the user not only to set air flow and temperature, but also to select blocking or using heating, cooling and other functions.
- OFF mode completely turns off the unit.



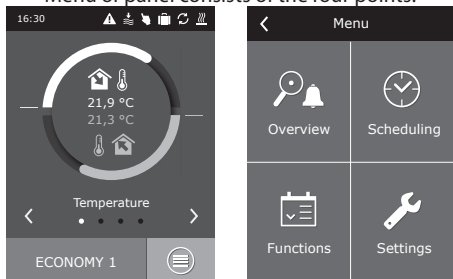
When AHU is stopped, by pressing modes button, it is possible to start the unit on the last active ventilation mode.

When starting CF type AHU for the first time, it will be needed to perform heat exchanger calibration, which is used for frost prevention function (See 2.5.1.3).



## 2.5. Menu

Menu of panel consists of the four points:



### 2.5.1. Overview

Main air handling unit parameters are presented in the main windows (Chapter 2.3). All other information, relating to the operation of the unit, malfunctions and efficiency status is detailed in overview menu.

#### 2.5.1.1. Alarms

This menu displays the notification of existing faults.

After failure elimination (see chapter 2.8), messages are deleted by selecting "Delete". By clicking on „History“ can be viewed up to 50 registered alarms.

#### 2.5.1.2. Operation counters

This menu displays operation time of the fans, the consumed energy of the heater and how much energy was recovered by the heat exchanger.

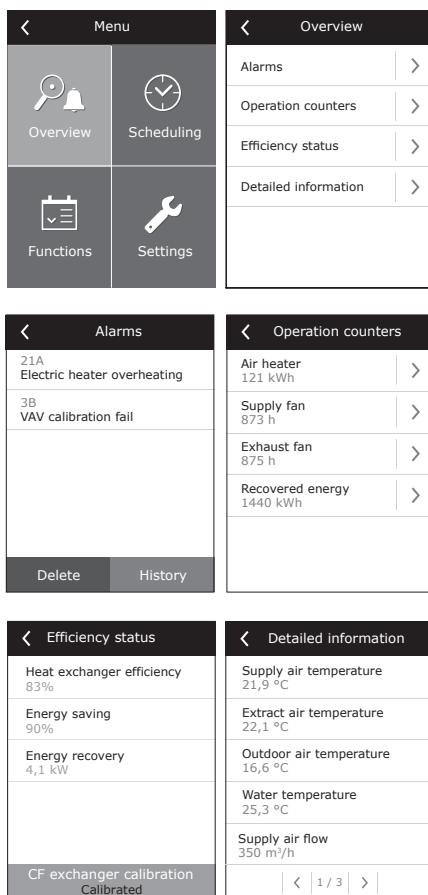
#### 2.5.1.3. Efficiency status

Menu for the heat exchanger efficiency and energy recovery monitoring in real time.

Also in this menu it is possible to start CF exchanger calibration<sup>1</sup>, if it was not performed during first start of AHU. If calibration was successful and "Calibrated" is shown – there is no need to start calibration again. During calibration AHU will operate for about 10 minutes on different ventilation intensities while measuring internal pressure. Thus do not open AHU doors, do not regulate duct system and do not change any settings during CF calibration. If you wish to stop calibration – turn off the unit from the control panel.

#### 2.5.1.4. Detailed information

All temperature sensor readings, functioning of separate air handling unit elements and other detailed information is available in this menu.



<sup>1</sup> Only in CF units.

### 2.5.2. Functions

In this menu item, the user can activate and set additional unit functions.

- ☐ blank box: function is not activated
- ☒ gray box: function is activated, but currently not operating
- ☒ blue box: currently operating function

#### 2.5.2.1. Air quality control

Air quality control is designed according to:

- CO<sub>2</sub> sensor<sup>1</sup> [0...2000 ppm];
- air quality sensor VOCq [0...100 %];
- air pollution sensor VOCp [0...100 %];
- relative humidity sensor [0...100 %];
- temperature sensor [0...50 °C].

Depending on the type of the selected sensor, the value of the air quality function to be maintained is set, and the air handling unit intensity will be adjusted according to that value. Ventilation intensity will be increased automatically in the case of deviation from the set value and decreased again when it is approached. For example, if the unit is designed with the CO<sub>2</sub> maintenance function and is equipped with a CO<sub>2</sub> sensor, after setting value 800 ppm, this set CO<sub>2</sub> level will be maintained by adjusting ventilation intensity, i.e. ventilation intensity will be increased if the CO<sub>2</sub> level grows and will be decreased when it returns to the previous condition.



**The function of air quality operates only if no other below function is active at the same time:**

- **summer night cooling;**
- **min. temperature control;**
- **outdoor compensated ventilation.**

#### 2.5.2.2. Operation on demand

The air handling unit start-up function is designed to start the unit which currently off, when one of the selected parameters has exceeded the critical limit.

< Operation on demand

☒ Enable

Setpoint  
1000 ppm

>

Reset settings

< Menu

🔍🔔  
Overview

🕒  
Scheduling

📅  
Functions

🔧  
Settings

< Functions

☒ Air quality control
 >

☐ Operation on demand
 >

☐ Outdoor compensated ventilation
 >

☐ Summer night cooling
 >

☐ Minimum temperature control
 >

<
1 / 2
>

< Air quality control

☒ Enable
 >

Setpoint 1  
1000 ppm

>

Mode 1  
COMFORT 1

>

Setpoint 2  
880 ppm

>

Mode 2  
COMFORT 2

>

Reset settings

<sup>1</sup> Factory setting.

The function provided for the start-up of the unit according to:

- room CO<sub>2</sub> sensor;
- room air quality sensor VOCq;
- room air pollution sensor VOCp;
- room relative humidity sensor;
- room temperature sensor.



Operation on demand (start-up / shut-down) is performed by the same sensor which is used in the control of the "Air quality function".



A room sensor with the analogue output (0...10 V DC) should be designed for this function.

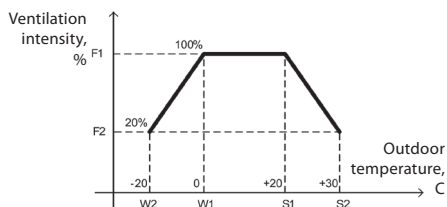
### 2.5.2.3. Outdoor compensated ventilation

< Outdoor compensated...		< Outdoor compensated...	
<input checked="" type="checkbox"/> Enable		Summer stop 35 °C	>
Minimum airflow 20 %	>		
Winter stop -15 °C	>		
Winter start 5 °C	>		
Summer start 25 °C	>		
< 1 / 2 >		< 2 / 2 >	
		Reset settings	

The ventilation compensation function adjusts the air volume depending on the existing outdoor temperature. It is possible to enter four temperature points, with two of them defining winter conditions and the other two defining summer conditions. When compensation start and end points for both winter and summer seasons are entered (it is also possible to enter only one of them, example only winter compensation; in this case, the start and the end points of summer compensation should be the same), the current ventilation intensity will be decreased in proportion according to the outdoor temperature until it reaches the minimum possible ventilation level of 20 %.



The ventilation compensation function does not operate when summer night cooling function is active.



- F1 – user-selected air flow (actual)
- F2 – minimum air flow 20 %
- W1 – winter compensation start point
- W2 – winter compensation end point
- S1 – summer compensation start point
- S2 – summer compensation end point

#### 2.5.2.4. Summer night cooling

<

Summer night cooling

☒

Enable

Start when indoor

25 °C

>

Stop when indoor

20 °C

>

Reset settings

Summer night cooling function is intended for energy saving during the summer season: by utilizing the outside chill of night hours, it is possible to cool down heated rooms, i.e. to remove excessive heat that accumulated in the room during day hours.

Summer night cooling function can start at night (from 00:00 h to 06:00 h a.m.) at any time, even when the air handling unit is not working and is in standby mode. User can set indoor temperature, at which this function starts and stops.

When this function is active, the current ventilation level is switched to the maximum ventilation intensity (100 %) and ventilation is performed only by means of fans, i.e. at that time neither the air cooling nor the energy recovery functions operate.



Summer night cooling function has an operating priority over the following functions: outdoor compensated ventilation and the air quality function.

#### 2.5.2.5. Minimum temperature control

Minimum temperature ...

☒ Enable

Setpoint  
15 °C

Reset settings

In winter time the minimum temperature control function forcibly reduces the supply and extract air flow set by the user when the heater capacity available in the unit is insufficient and/or heat recovery does not ensure minimally possible temperature supply to the room. The user can set a separate supply air temperature value so that when that value is not achieved, the intensity of the ventilation unit starts to be reduced automatically. The air flow may be reduced to the minimally possible ventilation intensity of 20 %.

During the summer, when the air handling unit provided with cooler, this function according to the same user-set value limits the cooling capacity, thus ensuring the minimum possible temperature supply to the room.



In ventilation intensity control, this function has top priority over "Outdoor compensated ventilation" and "VAV" functions.

### 2.5.2.6. Override function

Override (OVR) control of the unit can be performed by the external contact (see Picture 1.3 b) or device (timer, switch, thermostat, etc.). The received signal from the outside activates the OVR function, which ignores the current operation modes of the unit and performs one of the selected actions listed below:

- switches off the air handling unit;
- switches over the unit to operation according to the mode "Comfort1";
- switches over the unit to operation according to the mode "Comfort2";
- switches over the unit to operation according to the mode "Economy1";
- switches over the unit to operation according to the mode "Economy2";
- switches over the unit to operation according to the mode "Special";
- switches over the unit to operation according to the weekly schedule.

Override function	
<input checked="" type="checkbox"/> Enable	
Override If on	>
Mode ECONOMY 1	>
Reset settings	

The OVR function provides for three operation modes selectable depending on the needs of the user:

1. The mode "When on" – the function will respond to the external control contact only when the air handling unit is on.
2. The mode "When off" – the function will respond to the external control contact only when the air handling unit is off.
3. The mode "Always" – the function will respond to the external control contact irrespective of the operating condition of the unit.



The OVR function has the top priority and, therefore, ignores all previous modes. The function remains active as long as the external control contact is in the closed position.

### 2.5.2.7. Humidity control

Humidity control function is designed for maintenance of air humidity determined by the user. For proper operation of the function one or two additional humidity sensors shall be connected, depending on where humidity will be maintained. There are three modes for maintenance of humidity:

- **Supply air relative humidity level (RH).** A duct-mounted supply air humidity sensor is needed (B9). Air humidity setpoint is set in %RH.
- **Supply air absolute humidity level (AH).** A duct-mounted supply air humidity sensor is needed (B9). Air humidity setpoint is set in g/m<sup>3</sup> or g/kg.
- **Indoor air relative humidity level.** The determined humidity of indoor air is maintained, using the room air or exhaust air duct humidity sensor (B8). The supply air humidity limit is set using the duct humidity sensor or hygrostat (B9).

One of the below methods can be chosen for maintenance of the determined humidity:

- **Humidification of air.** There is a control signal of 0...10 V, directly reflecting the capacity of the humidifier from 0 to 100 %. If humidification is required, the control is transferred through the output TG3 of the controller.
- **Dehumidification of air.** There is a control signal of 0...10 V, directly reflecting the capacity of the dehumidifier from 0 to 100 %. If dehumidification is required, the control is transferred through the output TG3 of the controller.

Humidity control	
<input checked="" type="checkbox"/> Enable	
Setpoint 1 55% RH	>
Mode 1 COMFORT 1	>
Setpoint 2 30% RH	>
Mode 2 ECONOMY 2	>
Reset settings	

Humidity control	
<input checked="" type="checkbox"/> Enable	
Setpoint 1 10 g/m <sup>3</sup>	>
Mode 1 COMFORT 1	>
Setpoint 2 8 g/m <sup>3</sup>	>
Mode 2 ECONOMY 2	>
Reset settings	

- **Dehumidification of air: cooling-heating.** Dehumidification is performed using the coolers and heaters available in the air handling unit. If there are several coolers and heaters, then it shall be pre-determined which of them will be used in the dehumidification process.
- **Humidification and dehumidification of air.** For humidification of air the control signal of 0...10 V is used through the output TG3 of the controller, and the dehumidification of air is performed using the coolers and heaters available in the unit.



If the maintenance of the room air humidity is provided for, then the humidity function will prevail over the air quality and recirculation functions, i.e. when humidification or dehumidification is required, these functions will be blocked.



Humidity control function must be ordered in advance.

#### 2.5.2.8. Water heater/cooler

It is possible to block the water heaters and coolers by removing the check mark next to the related setting. In this case, water heaters and coolers will not be used either for the desired temperature or in any functions (for example during dehumidification). However, the water heater's freeze protection will work all the time, and if the water temperature drops below the critical limit, AHU will be stopped.

Water heater ...

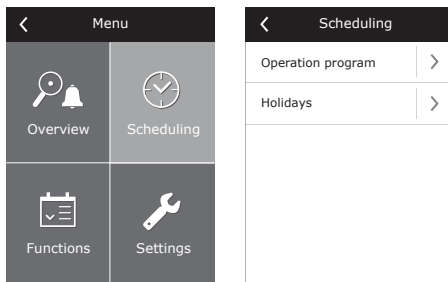
☒ Water heater

☒ Water cooler

Reset settings

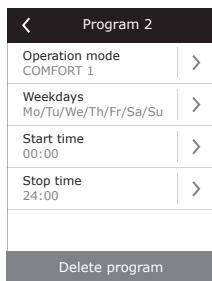
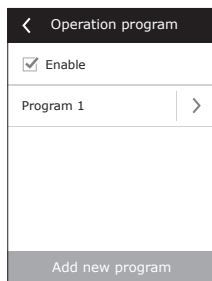
### 2.5.3. Scheduling

Menu for planning of the air handling unit operation according to the weekly program and the annual calendar.



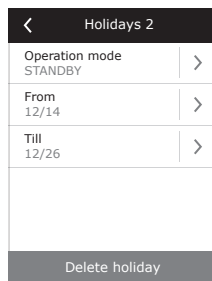
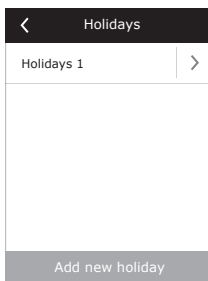
#### 2.5.3.1. Operation program

User can set up to twenty operation programs for the unit. For each program possible to adjust the mode of operation, day of the week and the time interval.



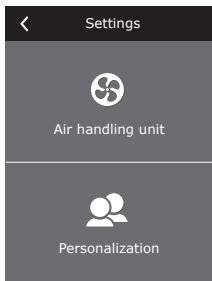
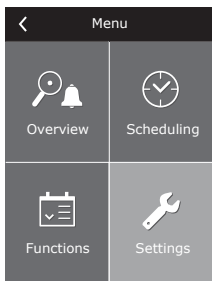
#### 2.5.3.2. Holidays

Holiday schedule specifies the time period during which the unit operates under selected mode. Possible to set up to ten holidays.



### 2.5.4. Settings

This menu is for air handling unit and the user parameter setting.



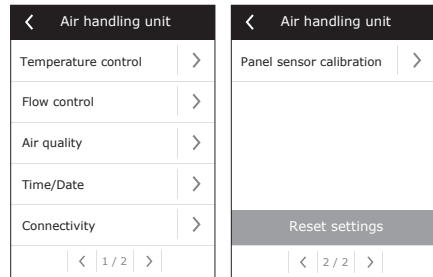


### 2.5.4.1. Air handling unit settings

#### Temperature control

The air handling unit provides for several temperature control modes:

- **Supply.** The unit supplies air according to the temperature preset by the user.
- **Extract.** Unit automatically supplies air of such temperature to maintain preset exhaust air temperature.
- **Room.** Operation is similar to the mode “exhaust” but temperature is maintained by the sensor mounted in the room (B8).
- **Balance.** Supply air temperature maintenance value will be determined automatically from the existing exhaust air temperature, i. e., what temperature air will be removed from the premises, the same temperature air will be supplied back.



**When “Balance” is selected, the temperature setpoint disappears.**

#### Air volume control

Supply and exhaust air volumes control modes have been provided in the unit:

- **CAV** – constant air volume control mode. The unit will supply and extract a constant air flow which is preset by the user, irrespective of any changes occurring in the ventilation system;
- **VAV** – variable air volume control mode. The unit will supply and extract an air flow with regard to the ventilation needs in different rooms. In case of frequently changing ventilation demands this air volumes maintenance mode signally reduces unit exploitation costs.  
It is possible to use a simplified VAV control function, “single-flow VAV control”. It means that the performance of this function requires only a single air flow pressure sensor, which is installed in a variable air duct system (e. g. in supply air). This variable system is called the master ventilation system, according to which control is performed, while the other air flow (in this case, discharged air) operates as the slave ventilation system and always follows the master one. If the supply air requirement in the ventilation system which is assigned as the master system decreases, the intensity of discharged air in the slave system is reduced correspondingly by the same percentage.



**If the variable air volume control function is mode is selected, the initial calibration of the control mode must be performed; otherwise, the unit will not operate if the VAV mode is selected.**

Variable air volume control mode calibration:

1. Before start of calibration the air distribution and exhaust devices in ventilation system should be adjusted, all valves for variable air flow in a way enabling air supply to all ventilated premises should be opened.
2. After switch on of the unit the VAV mode should be selected and calibration procedure should be confirmed. After the end of the calibration, depending on the configuration of pressure sensors, VAV mode status will change to Supply, Extract, Double.

3. After calibration the air handling unit further will operate in the previous mode.
- **DCV**– direct controlled volume. The air handling unit will operate similarly as in the CAV mode, but air volumes will be maintained directly in accordance with the values of the B6 and B7 analog input signals of controller. After giving the signal 0... 10 V to the appropriate input, it will be converted according to the current determined air volume. For example, if the maximum air flow of the unit is 1000 m<sup>3</sup>/h, setpoint in the panel – 800 m<sup>3</sup>/h, and the B6 input value – 7 V, the unit will supply constant air volume of 560 m<sup>3</sup>/h, i. e., 70 % of the set value. The same applies to the exhaust air only by B7 input.

### Air quality

Selected air quality sensor type is used in AQC, OOD functions.

Sensor type	
<input checked="" type="radio"/>	CO2
<input type="radio"/>	VOCq
<input type="radio"/>	VOCp
<input type="radio"/>	RH
<input type="radio"/>	TMP
<input checked="" type="checkbox"/> <input type="checkbox"/>	

### Time / Date

Time and date is required for air handling unit operation planning. Also it is possible to activate automatic daylight saving time.

Time/Date	
Time	09:40
Day/Month	25/05
Year	2019
Daylight saving time	On

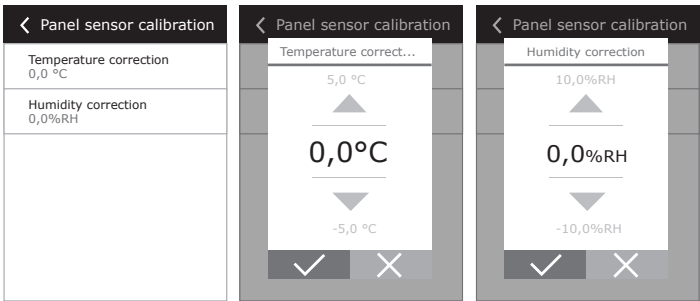
Daylight saving time	
<input checked="" type="checkbox"/>	Enable

### Connectivity

- IP address and subnet mask. Setting is required when air handling unit is connected to PC network or Internet.
- Controller ID. Number that identifies the controller, when several air handling units are connected to common network and controlled by one control panel.
- RS-485. Settings of external RS-485 interface (1, 2, 3 terminals, picture 1.3 b).

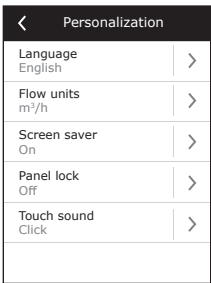
**Panel sensor calibration**

If the temperature and/or relative humidity measured by internal control panel sensors do not match the parameters measured by other devices, the accuracy of the sensors can be adjusted in this menu. The measured temperature may be adjusted within  $\pm 5\text{ }^{\circ}\text{C}$  and the humidity within  $\pm 10\%$  range.



**2.5.4.2. Personalization**

In this item for the user are presented menu language, measurement units and other control panel settings.



**2.6. Control of air handling units through a web browser**

You may not only monitor the operation of air handling units and the functionality of their individual components, change settings and activate extra functions by means of control panel but also by your computer. All you need is to connect the unit to the computer, local area network or the Internet using a network cable.



How to connect the unit directly to your computer:

1. Plug one end of the network cable into the controller port on the unit (see Picture 1.3 a) and the other end to the computer.
2. Go to the properties of your network card and enter IP address, e.g. 192.168.0.200, and subnet mask 255.255.0.0.
3. Open the web browser on your computer and disable all proxy servers in the settings.
4. In the address bar of your web browser enter the IP address associated with the air handling unit; the default IP address is 192.168.0.50. You can change it at any time on the control panel or from web browser (see connection settings).



**Note:** It is recommended to download the latest version of your web browser before use.

5. If the connection is successful, a window prompting to enter your user name and password appears:

A login form with a light gray background. It contains two input fields: 'User:' with the text 'user' entered, and 'Password:' with four black dots. To the right of the password field is a 'Log in' button.

**Note:** the user name is "user". The default password is also "user"; after logging in, the user can later change the password to any other of his/her choice (see user interface settings).



If the user has forgotten the modified password, it can be set to the default. To do this, user should to restore the factory settings of the air handling unit.

## 2.7. Additional control options

### 2.7.1. Combined water coil control

For the air handling unit with the combined water coil (Combi-coil – heater and cooler in one) the control of the mixing valve actuator is provided both under the air heating and cooling modes. The actuator is connected to the control terminals of the heating circuit and operates only under the heating mode by default. However upon transfer of the feedback signal confirming that there is cold water within the circulation system to the control terminals (IN4) of the external control (e. g., by connecting additional device: thermostat, switch, etc.), the air cooling function will be activated, and the mixing valve actuator (TG1) will be controlled under the air cooling mode.

### 2.7.2. Inverter direct evaporation cooler control

By default all units are provided with inverter type DX cooler control, which allows stepless control of the compressor. For the inverter unit power control, there is a modulated signal (TG2), as well as signals: cooler start (DX1), cooling demand DX2, heating demand DX3 (see Pic. 1.3 b).

There are three different control methods:

1. Universal control, suitable for most cooler units<sup>1</sup>.
2. Control adapted to Panasonic cooler units.
3. Control adapted to Daikin cooler units.

### 2.7.3. Multi-level control of direct evaporation cooler

For air cooling in the air handling unit there is provided 3 control contacts (connection is shown in Picture 1.3 b). Depending on how much will be cooling steps and how it will be divided on steps, it is recommended to select the optimal control method. If the capacity of all steps is the same, then only three control steps are possible. If cooling capacities of steps are close to ratio 1-2-4 (the capacity of each of the following steps is double the previous), then cooler control will be realized with seven cooling steps.

Example: To the terminals DX1 is connected 1kW cooler, to DX2 – 2kW and to terminals DX3 connected cooler with 4kW capacity. Control will be in steps:

1: 1 kW; 2: 2 kW; 3: 1 kW + 2 kW; 4: 4 kW; 5: 1 kW + 4 kW; 6: 2 kW + 4 kW; 7: 1 kW + 2 kW + 4 kW.



The function of step rotation is provided, when capacities of coolers are the same.



The number of direct evaporation cooling units must be provided in advance.

### 2.7.4. Reversal of direct evaporation coolers

There is a reverse option of direct evaporation coolers, i.e. when the cooler is switched to the heating mode. In such case, there must be only max 2 cooling control steps. There are control terminals DX3 for connection of the cooler reversing signal "Heating" (Pic. 1.3 b.).



The option of reversal of direct evaporation cooling units must be provided in advance.

<sup>1</sup> Factory setting.

## 2.8. Troubleshooting

If the unit fails to operate:

- Make sure that the unit is connected to the power supply network.
- Check whether the main switch (if designed) is turned on.
- Check all fuses of the automatics. If necessary, replace blown-out fuses with new ones having the same electrical parameters (the sizes of the fuses are indicated on the schematic electrical diagram).
- Check whether there is any failure message on the control panel. If there is indication, it needs to be eliminated first. In order to eliminate the failure, follow the table.
- If nothing is indicated on the control panel, check whether cable connecting control panel with the unit is not damaged.

**2.8 Table. Alarms indicated on the control panel, their possible causes and elimination methods**

Code	Message	Possible cause	Elimination
14B	Service time	If unit continuous operation (without breaks) was 12 months, then periodic inspection message appears.	After disconnecting the unit from power supply, it is necessary to carry out periodic inspection of the unit, i.e. to check the condition of the heat exchanger, the heater and fans.
1B, 19A	Low supply air flow	Too high resistance of the ventilation system.	Check pressure pipes, air dampers, air filters and make sure that the ventilation system is not blocked.
2B, 20A	Low extract air flow	Too high resistance of the ventilation system.	Check pressure pipes, air dampers, air filters and make sure that the ventilation system is not blocked.
3B	VAV calibration fail	Pressure sensors are not connected or broken.	Check connections of the sensor or replace the sensor.
4B	Change outdoor air filter	The fresh air filter is blocked.	Shut down the unit and replace the filter.
5B	Change extract air filter	The extract air filter is blocked.	Shut down the unit and replace the filter.
6B-11B	Electric heater off	The heater is disconnected due to too low air volume.	As soon as the heater cools down, protection resets automatically. It is recommended to increase the ventilation intensity level.
113B, 114B	CF exchanger not calibrated	CF exchanger calibration not performed or failed	Make sure that all doors are closed, there is no obstructions in the ducts and AHU can reach airflow setpoint of COMFORT 1 mode. Repeat calibration manually (see 2.5.1.3.).
127B	Service mode	Temporary mode, which can be activated by the service personnel.	The service mode is switched off by simply deleting the alert message.
1A, 2A	Supply air temperature sensor failure	The supply air temperature sensor is not connected or broken.	Check connections of the sensor or replace the sensor.
3A, 4A	Extract air temperature sensor failure	The discharged air temperature sensor is not connected or broken.	Check connections of the sensor or replace the sensor.

Code	Message	Possible cause	Elimination
5A, 6A	Outdoor air temperature sensor failure	The external air temperature sensor is not connected or broken.	Check connections of the sensor or replace the sensor.
7A, 8A	Exhaust air temperature sensor failure	The exhaust air temperature sensor is not connected or blocked.	Check connections of the sensor or replace the sensor.
9A, 10A	Water temperature sensor failure	The water temperature sensor is not connected or broken.	Check connections of the sensor or replace the sensor.
11A	Return water temperature low	Return water temperature of the heater dropped below the permissible limit.	Check the status and operation of the circulation pump, heating system and mixing valve actuator.
12A	Internal fire alarm	Fire danger in the ventilation system.	Check the ventilation system. Find the source of the heat.
13A	External fire alarm	A fire signal has been received from the fire signalization system of the building.	Delete alarm message and restart the unit when the fire signal disappears.
14A	External stop	A signal from an external device (switch, timer, or sensor) has been received.	As soon as the auxiliary device is switched off, the unit will operate in the previous mode.
15A	Heat exchanger failure	Blocked or not rotating rotor, by-pass damper failure.	Check the rotor drive, replace the belt or check the by-pass channel operation.
16A	Heat exchanger icing	Icing may form under a low outdoor temperature and high room humidity.	Check the operation of the rotation heat exchanger drive or the air bypass damper of the plate heat exchanger.
17A	Low supply air temperature	The heating equipment fails to operate or its capacity is insufficient.	Check the heating equipment.
18A	High supply air temperature	The heating equipment is not controllable (mixing valve or contactor is blocked).	Check the heating equipment.
21A-23A	Electric heater overheat	The emergency overheating protection of the electrical heater has actuated.	Protection can be reset only by pressing the RESET press-button on the heater.
24A, 25A	Evaporator air temperature sensor failure	The evaporator air temperature sensor is not connected or broken.	Check connections of the sensor or replace the sensor.
46A	CF exchanger not calibrated	CF calibration failed and there is a risk of exchanger freezing	Make sure that all doors are closed, there is no obstructions in the ducts and AHU can reached airflow setpoint of COMFORT 1 mode. Repeat calibration manually (see 2.5.1.3.).
15B	Evaporator icing	The evaporator is iced over due to excessively high humidity content in the exhaust air and low outdoor temperatures.	Check the operation of the evaporator defrost system.

Code	Message	Possible cause	Elimination
12B	High pressure on compressor	Compressor system operated in an overload mode as a result of too high temperature in the condensing unit.	Identify the cause and eliminate it.
13B	Low pressure on compressor	Compressor system is leaky or the amount of refrigerant is insufficient.	Identify the cause and eliminate it.
16B-18B, 28A-30A	Compressor failure	No power supply.	Check supply voltage on the circuit breaker and/or make sure whether it is on.
		Supply voltage mismatches.	Check that the supply voltage is on all three phases, if necessary, swap the two phase conductor positions.
		Compressor motor failure.	Check the compressor motor and replace it if necessary.
		Compressor drive failure.	Check the operation of the compressor drive and replace it if necessary.
99A	Supply fan drive failure	A fault signal has been received from the supply fan drive.	Check the supply fan drive and its messages.
100A	Supply fan drive overload	The supply fan drive is overloaded.	Check the condition of the supply fan drive and its cooling.
101A	Supply fan motor failure	The supply fan is broken.	Check the supply fan and replace it if necessary.
102A, 103A	Supply fan motor overload	The supply fan is overloaded.	Check the condition of the supply fan and make sure that the resistance of the ventilation system is not exceeded.
104A	Exhaust fan drive failure	A fault signal has been received from exhaust fan drive.	Check the exhaust fan drive and its messages.
105A	Exhaust fan drive overload	The exhaust fan drive is overloaded.	Check the condition of the exhaust fan drive and its cooling.
106A	Exhaust fan motor failure	The exhaust fan is broken.	Check the exhaust fan and replace it if necessary.
107A, 108A	Exhaust fan motor overload	The exhaust fan is overloaded.	Check the condition of the exhaust fan and make sure that the resistance of the ventilation system is not exceeded.
109A	Rotor drive failure	A fault signal has been received from the rotor drive.	Check the rotor drive and its messages.
110A	Rotor drive overload	The rotor drive is overloaded.	Check the condition of the rotor drive and its cooling.
111A	Rotor motor failure	The rotor motor is broken.	Check the rotor motor and replace it if necessary.



Code	Message	Possible cause	Elimination
112A, 113A	Rotor motor overload	The rotor motor is overloaded.	Check the condition of the rotor motor and make sure that the rotor is not blocked.
114A-124A	Communication error	No communication with the internal components of the air handling unit (controller extension modules, frequency converters, fans, etc.) or one / several of them are broken.	Check internal connections and functioning of separate components.
125A, 127A	Controller failure	Main controller module fault.	Replace the main controller.



**The emergency protection of the electrical heater against overheating can be reset with the RESET button only if the cause of the overheating of the heater has been clarified and eliminated.**



**If the unit is shut down and a failure text message is shown on the control panel, the fault must be eliminated!**



**Before performing any jobs inside the unit make sure that the unit is stopped and disconnected from the electrical power supply.**

After failure has been eliminated and power supply connected the error messages should be deleted. However if the failure has not been eliminated, unit either starts operating and after some time it stops again, or it does not operate and failure message is indicated.





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