VENTIAIR

Operation instructions

Controller for air handling units CU24V2-L

WWW.VENTIAIR.COM

WARNING: Please read this manual carefully before connecting the panel

Contact:

VentiAir s.r.o.
Adolfovice 512
790 01 Bělá pod Pradědem
CZ – Czech Republic
IČ: 06935320 DIČ: CZ06935320
email: obchod@ventiair.com; technical@ventiair.com
tel.: +420 602 500 287

The device is manufactured in accordance with the European standard EN1886, EN13053

This documentation must always be handed over to the customer!
In case of non-compliance with the conditions stated in this documentation, VentiAir s.r.o. reserves the right to refuse the warranty.

Version 01/2025

WARNING!!

When connecting the panel to the controller, take care not to change the G0 earth voltage cable with G phase cable in one of the devices.

Reversing these cables in one of the devices will lead to a short-circuit between G and G0 through the RS485 output and to the damage of this output.

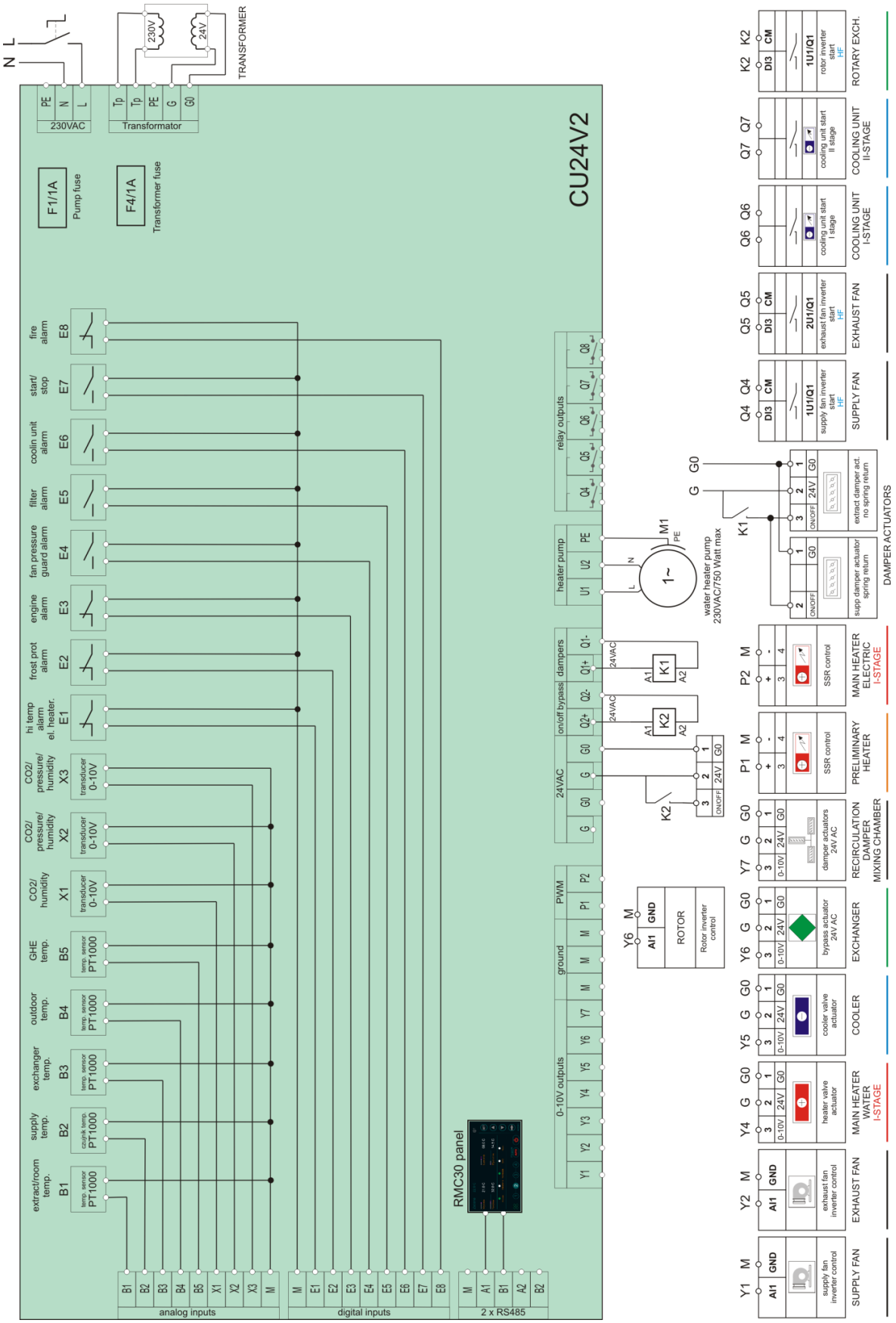
24 V AC power supply should be connected as below:

- G0 earth voltage cable should be connected to terminal No. 1

- G phase cable should be connected to terminal No. 2

1 CONTENTS

2 WIRING DIAGRAM OF CU24V2 – GLOBAL WIRING



3 TERMINALS

L-N **230VAC power line supply**

PE **Ground**

Tp-Tp **Primary windings of the transformer:**

The L-N powerline is internally connected to Tp-Tp to supply the primary windings of the transformer

G0-G **24VAC** Power supply for the controller: G0 is the (-) terminal and G is the (+) terminal. The 24VAC secondary windings of the transformer should be connected to G0-G

M **Signal ground** for analog inputs B1-B5, X1-X3, digital inputs E1-E8, 0-10V outputs Y1-Y7, PWM outputs P1, P2

B1-B5 Resistive PT1000 inputs

X1-X3 Analog inputs 0-10VDC

E1-E8 Digital inputs, potential-free contacts

Do not apply voltage to the E1... E8 digital inputs.

Q1, Q2 24VAC output for direct supplying of damper actuators, **4A max load**

Q4-Q8 Relay outputs - closing contacts, **4A max load**

Y1-Y7 Analog outputs 0-10VDC

P1, P2 Modulated outputs 21V DC: electric heat current valves driving

Connect the device to be controlled (e.g. a semiconductor relay) to P1(+) and M(-) or P2(+) and M(-)

A1, B1 Serial interface RS485

A2, B2 Serial interface RS485

4 PANEL CONNECTION

No.	Type	Description
1	Power supply (-)	G0: Supply earth voltage
2	Power supply (+)	G: +24V AC
3	Unused	-
4	M	Ground
5	A	Serial interface RS485
6	B	

5 OPERATION

The CU24V2 controller is a configurable controller for HVAC AHUs. The rich configuration options of the controller allows to create applications for AHU in almost all configurations. The controller comes complete with a 4.3" wall-mounted color touch panel RMC30, which allows you to create applications, parameterize the controller and manage the unit. The panel has a built-in very innovative and intelligent interface that allows the user to easily and clearly program the controller and navigate in the menu system. It has a unique solution consisting of a built-in guide, which during navigation in the menu, prompts the user how to use the buttons and explains the parameter designations, so there is no need to consult the instructions. When creating an application, the user only selects which functions he wants to use, while the controller sets the input/output for the task depending on the selected other functions, then the selection is displayed on the panel in real time. The I/O list of the built application along with the description and visualization is made available and can be consulted when connecting devices to the controller.

5.1 BASIC FUNCTIONS

- Temperature control
  - Cascade temperature control with min/max limitation. or airflow adjustment
  - Water and electric heater control
  - Water cooler and chiller control
  - Heat pump control
  - Pre-heating function
  - Active water heater frost protection
  - Protection of electric heaters against overheating
  - Preliminary heater
  - Cascade connection of two heaters: I and II section

- Fan control
  - Supply and exhaust fan control

  - Frequency converter control
  - Engine alarm
  - Fan pressure switch
- Control of heat recovery system
  - Rotary, cross and glycol exchanger control
  - Mixing chamber control
  - Exchanger freezing protection
- CO_2 regulation
- Supply and exhaust pressure regulation
- Humidity control
- Real time clock with weekly work schedule
- Alarms
  - Signalling and alarm management
  - Alarm history overview
- BMS
  - Possibility to connect to the BMS system via the RS485 serial link
  - MODBUS communication protocol

5.2 POWER ON AND SCANNING THE NETWORK

At power on RMC30 panel will scan the network to find device. The address of the device is displayed in the top right corner and is preceded by the character "@". After a device is detected data will be loaded from it before the panel can start operating. During data loading an animation appears on the top-right side of the display. **After power on wait until full data load full display of information before using the keys to navigate**.

5.3 KEYS DESCRIPTION:

Entering the Menu review or entering the parameter editing mode in the Menu.

Scrolling the menu backward or change parameter value during setting.

Scrolling the menu forward or changing the parameter value during setting.

Switching main screen views or moving to the next parameter during setting.

The AHU is working. Pressing switches off the AHU.
The AHU is off. Pressing turns on the AHU.

Selection of program AUTO, MAN, PRO1, PRO2. Each press switches to the next value on the list.

Switching fan gears

5.4 LOGIN

The CU24V2 controller has 3 access level:

- Level 0: level at power on without login
- Level 1: **User**, password at factory set: **0**
- Level 2: **Admin1**, password at factory set: **0**
- Level 3: **Admin2**, password at factory set: **11**

Level 3 is the highest and gives access to the editing of any parameter.

All parameters can be viewed without need to log in with any password. But editing the parameters values are done according to the login level for the parameter. Parameters that are not allowed to be changed without password have * or ** displayed. The number of * is the log in level needed for the parameter to be edited. A parameter without symbol * or ** can be changed.

To login:

1. Click SET and hold (about 1-2 sec) until the first Menu page **Menu #1 Zone 1 – All** appears.
2. Go to **Menu #38 LOGIN** (last page in the menu system) by pressing ▲
3. Click on SET and hold until the value of LOGIN changes from white to **green**. Editing mode is indicated by a red circle SET.
4. Enter the password with the button ▲ ▼
5. After entering the password click and hold SET until the color of the parameter value goes out (green to white color). The red circle in the button will also turn off and go back to SET

After validating the password the **LOGIN** level will be displayed and be > 0. If the password is not valid the displayed LOGIN level will be 0.

Once the password is validated it will be valid you can change parameters values according to you login level. After leaving the menu system and back to main view the password will still be valid for one minute, so when you come back to menu system again you don't have to login. But if you stay out of the menu system for more than one minute the password validation will be cancelled and you will have to login again to edit parameters.

Until you don't leave the menu system the password validation is active.

5.5 ALARM LIST

To view the alarm list switch the display views using the  button, or touch the Alarm light area when an alarm is activated.

Clearing alarm with the "clear" button can be done only after logged in with password.

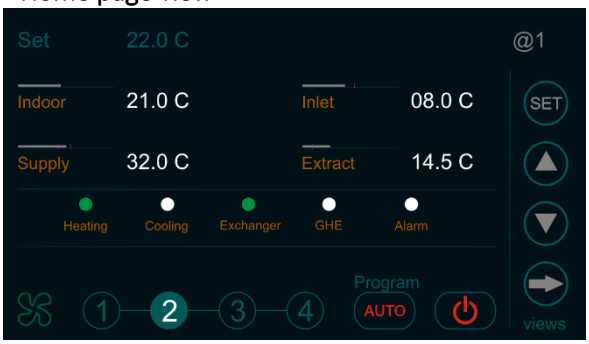
Alarm nr	Alarm name	Description
1	Heater freeze	**Operation**: Water heater frost alarm occurs when the digital input E2 is opened. The alarm stops the AHU and open the heater valve at 100% to protect the heater. **Alarm clearing**: To clear the alarm the input E2 should be closed, then alarm can be cleared by the "clear" button if the parameter FOVER = MAN or automatically cleared if FOVER = AUTO. See FOVER in Menu #20.
2	Engine failure	**Operation**: Engine failure alarm occurs when input E3 is **opened**. The alarm stops the AHU. **Alarm clearing:** To clear alarm input E3 should be closed, then clearing is done by click on **START** button to start the AHU or by the "clear" button.
3	Fan pressure-1	**Operation**: Supply/Extract fan pressure guard alarm occurs when input E4 is **opened** for a time longer than the time set by the parameter PREST (Menu #30). The alarm stops the AHU. **Alarm clearing:** To clear alarm input E4 should be closed, then clearing is done by click on **START** button to start the AHU or by the "clear" button.
4	Fan pressure-2	**Operation**: Extract fan pressure guard alarm. There is no separate input for extract fan pressure guard, and bot supply and extract fan pressure guards should be connected to input E4.
5	Fire alarm	**Operation**: Fire alarm occurs when input E8 is **opened**. The alarm stops the AHU. **Alarm clearing**: To clear alarm input E8 should be closed, then clearing is done by the "clear" button. After clearing the AHU can be started by **START** button.
6	Hi temperature	**Operation**: High temperature alarm occurs when input E1 is **opened**. The alarm switch of all heaters but does not stop the AHU. **Alarm clearing**: Alarm clears automatically after input E1 is closed.

7	Exchanger freeze	**Operation**: Exchanger freeze alarms occurs when the temperature sensed at the exchanger outlet falls below the value set by parameter EPRO (Menu #10). The alarm opens fully the bypass damper or stops the rotary exchanger, but does not stop the AHU. **Alarm clearing**: Alarm clears automatically after the temperature has raised above the set alarm value EPRO by 1 C.
8	Chiller alarm	**Operation**: Chiller alarm occurs when input E6 is **closed**. The alarm switch off the cooling unit but does not stop the AHU. **Alarm clearing**: - Manually clearing using the "clear" button with input E6 **opened** - Automatically cleared when input E6 is **opened** and after **5 min** have elapsed from the time the alarm occurred. - Stop the AHU then start again. The alarm clears automatically at start.
9	Pump failure	**Not available**
10	Filters alarm	**Operation**: Filters guards alarm occurs when input E5 is **closed**. **Alarm clearing**: Alarm clears automatically after input E5 is **opened**. There is one common input dedicated to filters guards. All filters guards should be connected in parallel to the input E5.
19	Low water temp.	**Not available**
20	Sensor break	**Operation**: Sensor break alarm occurs when the main temperature sensor is not connected at input B1 or when there is a short circuit. **Alarm clearing**: Automatically cleared after sensor is connected.
22	Low pressure-1	**Operation**: Switch off the compressor 1
23	High pressue-1	**Operation**: Switch off the compressor 1
24	Water leak	**Operation**: Switch off the evaporator if parameter WLEAK = Yes (Menu #17)
25	Low pressure-2	**Operation**: Switch off the compressor 2
26	High pressue-2	**Operation**: Switch off the compressor 2

5.6 HOME PAGE AND SETPOINT EDITING

The home page contains all the most important information of the HVAC unit and enables direct editing of setpoints such as temperature, fan speed, work program and switching on/off of the unit, without having to scroll the screens to search for information.

Home page view



a. Increasing the temperature: click 

b. Reducing the temperature: click 

c. Setting fan speed: click on the appropriate number in the field 

d. Change work program: click on  until the desired program appears

e. Turning on or off the unit: click on  or 

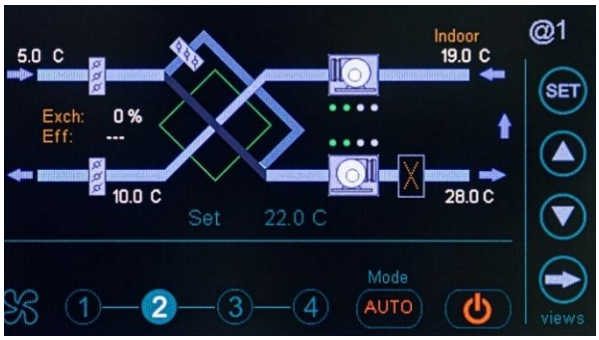
Note: The temperature changes every 0.5 C. For a more accurate temperature editing, this should be done within the time schedule.

5.7 SWITCHING HOME SCREEN VIEWS

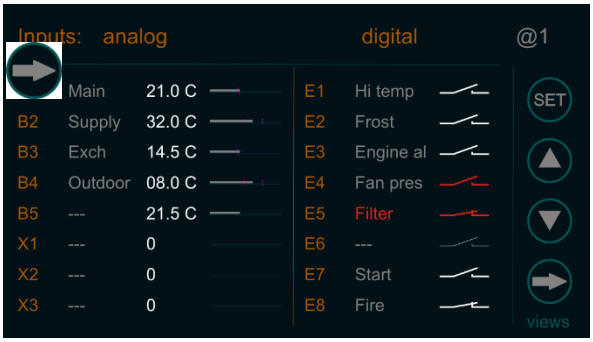
The RMC30 panel enables displaying all information from the HVAC unit. This information is grouped into several views that can be switch with the key in the order shown below.

1. Home page

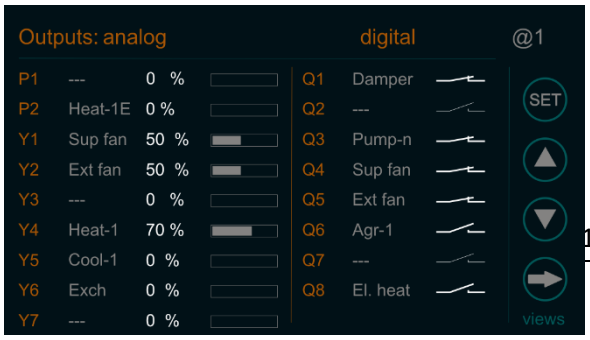
2. Scheme



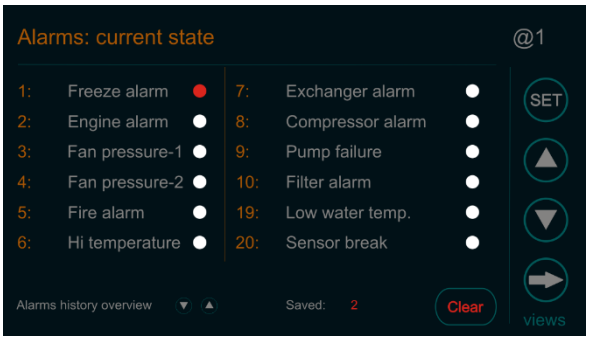
3. Analog and digital inputs display



4. Analog and digital outputs display



5. Alarms display



5.8 ABBREVIATION DESCRIPTION

Abbreviation description for input

Shortcut	Description
Main	Main sensor
Supply	Supply sensor
Outdoor	Outdoor sensor

Exch	Exchanger sensor
GHE	GHE temperature sensor
Pre-heat	Preliminary heating temperature sensor
CO2	CO_2 transducer
Hum	Humidity transducer
Pres-1	Pressure transducer 1
Pres-2	Pressure transducer 2
Frost	Frost thermostat
Pres-S	Supply fan pressure guard
Pres-E	Extract fan pressure guard
Engine al	Engine alarm
Aprot	Cooling unit alarm
Fire	Fire alarm
Hi temp	Hi temperature alarm
Pump al	Pomp alarm
Filter	Filter alarm
Start	Start/stop input
Cust-1	Custom function 1 input
Cust-2	Custom function 2 input

Abbreviation description for output

Shortcut	Description
Heat-1	Main heater (first heating step)
Heat-sec	Secondary heating (second heating step)
Heat-1 E	Electric heater (first heating step)
El. heat	Electric heater supply
Cooling	Cooling control
Agr-1	Cooling unit – 1 step
Agr-2	Cooling unit – 2 step
Exch	Exchanger control
Damper	On/off damper
Recirc	Recirculation control (mixing chamber)
Bypass	Bypass control
GHE	GHE control
Pump-H	Water heater pump
Pump-C	Water cooling pump
Pump-ex	Exchanger pump
Heat P	Heating pump
CO2	CO_2 control
Pres-1	Pressure control-1
Pres-2	Pressure control-2
Sup fan	Supply fan control
Ext fan	Extract fan control

5.9 APPLICATION SETTING

The CU24V2 controller has built-in some predefined applications that can be selected from a list by setting the parameter APP. To manually define your own application set the parameter APP = USER. When a predefined application is selected (APP is other than USER) the items in the menu for manual defining an application will be disabled.

Predefined application list:

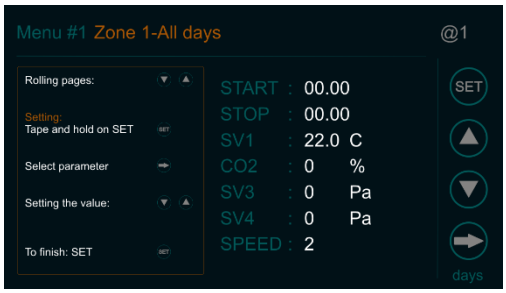
Nr	Heating	Cooling	Preheat	Sec heat	Exchanger (bypass)	Recirculation	Heat pump	CO_2 control
Heat recovery units with on/off bypass control								
1-rec	P2	-	-	-	Q2	-	-	-
2-rec	P2	-	P1	-	Q2	-	-	-
AHU with water heater								
3-w	Y4	-	-	-	Y6, Q2	-	-	-
4-wx	Y4	Q6	-	-	Y6, Q2			
5-wxr	Y4	Q6	-	-	Y6, Q2	Y7	-	-
AHU with electric heater								
6-e	P2	-	-	-	Y6, Q2	-	-	-
7-ex	P2	Q6	-	-	Y6, Q2	-	-	-
8-exr	P2	Q6	-	-	Y6, Q2	Y7	-	-
AHU with heat pump								
9-hp	Y4	Y4, Q7	-	-	Y6, Q2	-	Q6	-
10-hp	Y4	Y4, Q7	-	P2	Y6, Q2	-	Q6	-
AHU with CO_2 control								
11-co	Y4	Q6	-	-	Y6, Q2	-	-	Y1, Y2

The setting below is common to all the **predefined applications**:

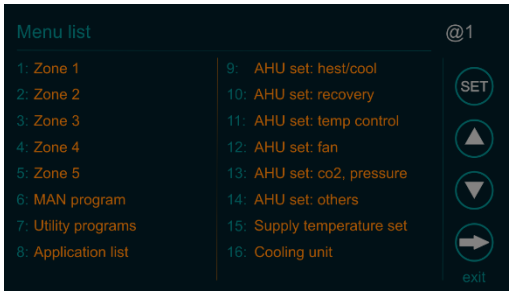
- **Supply fan inverter control**: Y1
- **Supply fan inverter start**: Q4
- **Extract fan inverter control**: Y2
- **Extract fan inverter start**: Q5
- **On/Off dampers**: Q1
- **Water heater pump**: U1-U2

5.10 MENU OVERVIEW AND PARAMETERS SETTING

1. Click SET and hold until the first page Menu #1 of the Menu appears (about 1 sec).



2. There are two ways to search parameters:
   a. Scroll the pages with the buttons ▼ ▲ until you find the parameter.
   b. Faster method:
      - Click on Menu #1 to open the page with the menu contents as below



      - Scroll with the buttons ▼ ▲ to search the relevant chapter
      - Click on a chapter to directly open its page with the parameter list

3. To enable editing parameters, click on SET and hold until the color of the first parameter from the list changes. Editing mode is indicated by a red circle SET.

4. Set the desired parameter value with the buttons ▼ ▲

5. To switch to the next parameter click →

6. To finish editing click and hold SET until the colour of the parameter value goes out.
   The red circle in the button will also turn off and go back to SET.

7. To exit the Menu section and return to the home page, click →.
   Note: To switch days of the week in the schedule (Menu #1 to Menu #6) press in the menu title "All days".

5.10.1 Menu #1 Zone 1 – All days

Name	Default setting	Range	Description
START	00.00	00.00 ÷ 23.59 G:M	Time zone start time
STOP	00.00	00.00 ÷ 23.59 G:M	Time zone end time
SV1	22.0	-24.0 ÷ 69.0 °C	Set temperature
CO2/SV2	0	0 ÷ 100 %	Set value of CO_2 or humidity
SV3	0	0 ÷ 1000 Pa,%	Set value of for pressure, CO_2 or humidity
SV4	0	0 ÷ 1000 Pa,%	Set value of for pressure, CO_2 or humidity
SPEED	2	1 ÷ 4	Fan speed

5.10.2 Menu #2 Zone 2 – All days

As above

5.10.3 Menu #3 Zone 3 – All days

5.10.4 Menu #4 Zone 4 – All days

5.10.5 Menu #5 Zone 5 – All days

5.10.6 Menu #6 MAN program – All days

Name	**Default setting**	**Range**	**Description**
TIME	00.00	00.00 ÷ 23.59 G:M	Program running time
SV1	22.0	-24.0 ÷ 69.0 °C	Set temperature
CO2	0	0 ÷ 100 %	Set value of CO_2 or humidity
SV3	0	0 ÷ 1000 Pa,%	Set value of for pressure, CO_2 or humidity
SV4	0	0 ÷ 1000 Pa,%	Set value of for pressure, CO_2 or humidity
SPEED	2	1 ÷ 4	Fan speed

5.10.7 Menu #7 Utility programs

Name	**Default setting**	**Range**	**Description**
PRO1	OFF	OFF, S4-E4,S1-E4, S0-E4,S1-E1, S4-E1, S4-E0	Work program for fans. The program is controlled by the defined digital input following the activation of the parameter PR1IN in Menu #14. It performs according to the set value if PRO1 is selected as program and the digital input is activated. OFF: turning off the program S-supply; E-extract The number after the letter indicates the fan speed

PRO2	OFF	OFF, S4-E4,S1-E4, S0-E4,S1-E1, S4-E1, S4-E0	Work program for fans. The program is activated after selecting PRO2 OFF: turning off the program S-supply; E-extract The number after the letter indicates the fan speed

5.10.8 Menu #8 Application List

Name	Default setting	Range	Description
APP	4-WC	USER, 1÷11	Application select USER: Free application configuration DX: DX cooling system application 1÷11: Selecting among ready applications

5.10.9 Menu #9 AHU set: heat/cool

Name	Default setting	Range	Description
HEAT1	0-10V	none, 0-10V, PWM, elec-1, elec-2, elec-3	Main heater: First heating section 0-10V: 0-10V control PWM: PWM control of electric heater elec-1: ON/OFF control of electric heater – 1 stage elec-2: ON/OFF control of electric heater – 2 stage elec-3: ON/OFF control of electric heater – 3 stage
COOL	DX-1	none, water, DX-1, DX-2,	Cooling coil: DX-1: DX cooling ON/OFF one step DX-2: DX cooling ON/OFF two step
PHEAT	none	none, 0-10V, PWM	Preliminary heater: Mounted before the exchanger, it is used for pre-heating. 0-10V: 0-10V control PWM: PWM control of electric heater
HEAT2	none	none, 0-10V, PWM	Secondary heater: Works as a second heating section connected in cascade to the main heater HEAT1. During dehumidification, if heaters HEAT1 and HEAT2 are defined then HEAT1 will be switch off and only HEAT2 will work. 0-10V: 0-10V control PWM: PWM control of electric heater
HPUMP	none	none, HP-1, HP-2	Heat pump: HP-1: 0-10V for heating and cooling. HP-2: 5-10V for heating 5-0V for cooling

Heat pump control

The HPUMP parameter is for AHU with heat pump control. After activating this parameter the outputs of the controller will be set as bellow:

	Heating/cooling control output **HPUMP=HP-1**	Heating/cooling control output **HPUMP=HP-2**	Electric heater control output	heating activation	Cooling & heating activation	operating mode select: according to **HPMD** setting **(Menu #20)**
	Y4	**Y4**	**P2**	**U1-U2**	**Q6**	**Q7**
Heating mode	0-10V	5-10V	**PWM** output	**ON** state	**ON** state	**ON** when **HPMD=HEAT** **OFF** when **HPMD=COOL**
Cooling mode	0-10V	5-0V	**OFF** state	**OFF** state	**ON** state	**ON** when **HPMD=COOL** **OFF** when **HPMD=HEAT**

Control for two-stage inverter units

To control a two-stage inverter unit with heating and cooling function, set the parameters as follows:

COOL=INV-2 : Two-stage inverter

HPUMP=HP-1 or **HP-2** : Heat pump function

HPMD=HEAT or **COOL** : Selection of heating or cooling mode for output Q7

5.10.10 Menu #10 AHU set: recovery

Name	Default setting	Range	Description
ECON	bypass	none, bypass, inlet fan, 24VAC, contact	**Exchanger control:** **bypass** - 0-10V control for bypass and rotor actuator **inlet fan** - Exchanger without bypass with supply fan control for protection **24VAC** - 24VAC on/off output for control **contact** - Potential free contact for on/off control
EPRO	B3		Exchanger protection: Protection by temperature sensor on the exchanger outlet.
DACO	none	No, Yes	Recirculation (Mixing chamber): 0V - 0% recirculation and 100% fresh air 10V - 100% recirculation and 0% fresh air
GWC	none	No, Yes	Ground heat exchanger

5.10.11 Menu #11 AHU set: temp control

Name	Default setting	Range	Description
TCON	cascade	cascade, supply	Temperature control: Cascade control with supply and room/exhaust sensor, or supply control.

5.10.12 Menu #12 AHU set: fan

Name	Default setting	Range	Description
FCON	freq	1 speed, 2 speed 3 speed, 4 speed freq	Fan control: 1 speed – 4 speed: AC fan freq: EC fan or inverter control

5.10.13 Menu #13 AHU set: CO_2, pressure

Name	Default setting	Range	Description
PID2	No	No, co2-fan, co2-damp, humidity, deshum, hum-desh	PID #2 control: CO_2 or humidity control co2-fan CO_2 control by fan co2-damp CO_2 control by dampers humidity Humidification control deshum Deshumidification control hum-desh Humidification / deshumidification
PID3	No	No, pressure, CO2, humidity, deshum, hum-desh	PID #3 control: Pressure, CO_2 or humidity control pressure Pressure control by fan CO_2 Additional CO_2 control humidity Humidification control deshum Deshumidification control hum-desh Humidification / deshumidification
PID4	No	No, pressure, CO2, humidity, deshum, hum-desh	PID #4 control: Pressure, CO_2 or humidity control pressure Pressure control by fan CO2 Additional CO_2 control humidity Humidification control deshum Deshumidification control hum-desh Humidification / deshumidification

5.10.14 Menu #14 AHU set: others

Name	Default setting	Range	Description
ALOUT	No	No Yes	Alarm output: Digital output for alarm signalling

PR1IN	No	No Yes	Utility program-1: After enabling this function, the PRO1 program in Menu #7 will be controlled by the digital input indicated under this function.

5.10.15 Menu #15 Supply temperature set

Name	Default setting	Range	Description
MIN	15 °C	0 ÷ 66 °C	Minimum temperature
MAX	35 °C	0 ÷ 70 °C	Maximum temperature

5.10.16 Menu #16 Cooling unit

Name	Default setting	Range	Description
AOFF	05 °C	0 ÷ 20 °C	Cooling unit off: External temperature that disables the cooling unit
ONTM	5 min	0 ÷ 5 min	Cooling unit run time
OFFTM	5 min	0 ÷ 5 min	Cooling unit standby time

5.10.17 Menu #17 DX unit

Name	Default setting	Range	Description
SETP	27 bar	0 ÷ 100 bar	Setpoint for the condenser
CSTAR	22 bar	0 ÷ 50 bar	Condenser fan start pressure
CUTOF	10 bar	0 ÷ 50 bar	Condenser fan stop pressure
VSTAR	5 sec	3 ÷ 20 sec	Electronic expansion valve start time before compressor
VSTOP	5 sec	3 ÷ 20 sec	Electronic expansion valve stop time before compressor
WLEAK	No	No, Yes	Water leak alarm action: **No**- Evaporator fan is not stopped on water leak alarm **Yes**- Evaporator fan is stopped on water leak alarm
TERMO	OFF	0 (OFF) ÷ 10°C	Energy saving mode: **0 (OFF)** – the compressor is constantly modulated to maintain the desired temperature **A value > 0** - When the unit reaches temperature the compressor is switch off. It will start again when the temperature rises over the desired value by the value **TERMO**.

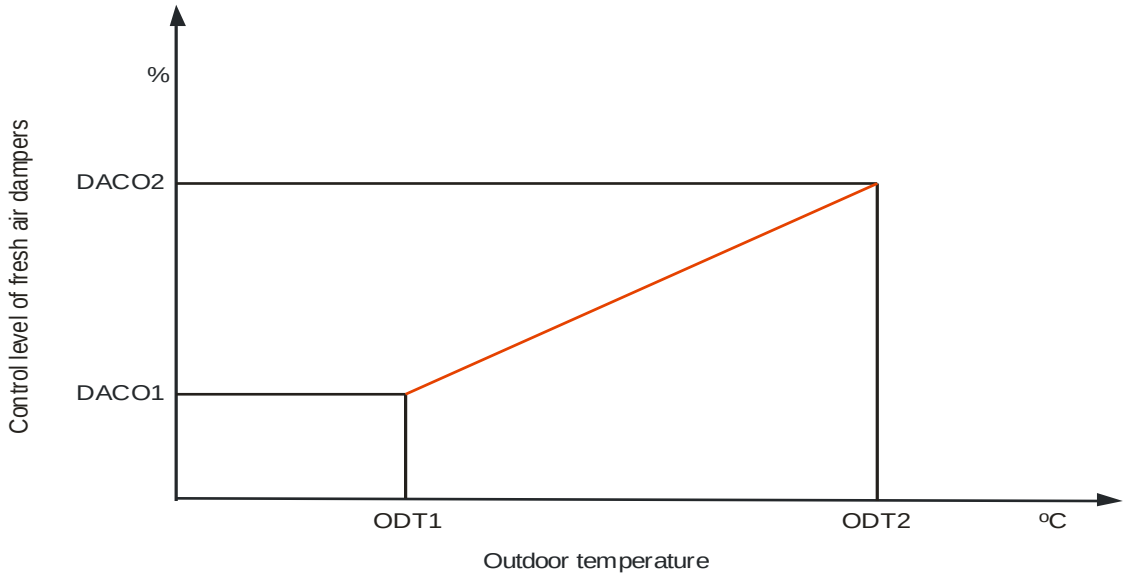
5.10.18 Menu #18 Exchanger

Name	Default setting	Range	Description
ELIM	5°C	-10 ÷ +10°C	**Exchanger protection:** The temperature below which alarm is set and the defrost starts.
PRT	8.0 °C	0 ÷ 15 °C	**Preheating temperature:** The set value for preheating.

5.10.19 Menu #19 Recirc. damper.

Name	Default setting	Range	Description
DMODE	OFF	OFF, 10%,20%,...100%, AUTO	**Dampers control:** OFF, 10..100%: dampers manually set AUTO: dampers controlled by the algorithm
ODT1	-5 °C	-25 ÷ 30°C	Outdoor temperature low range value.
DACO1	20 %	0 ÷ 100 %	Outdoor temperature high range value.
ODT2	15 °C	-25 ÷ 30°C	Damper control low range value
DACO2	100 %	0 ÷ 100 %	Damper control high range value

Mixing chamber dampers control description in AUTO mode



5.10.20 Menu #20 Bypass and GHE

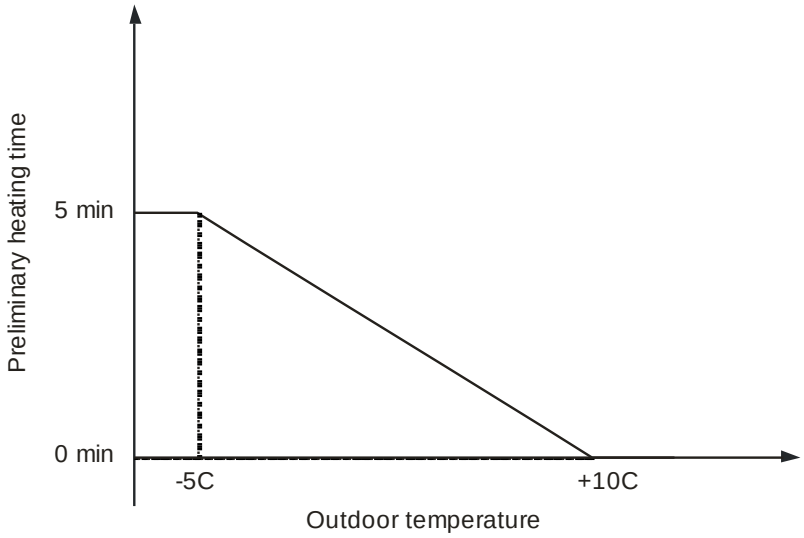
Name	Default setting	Range	Description
Bypass	AUTO	OFF, ON, AUTO	Bypass setting: OFF – Switch off Bypass ON – Switch on Bypass

			AUTO – Bypass is controlled depending on the outdoor and the outlet/indoor temperatures.
GWC	AUTO	OFF, ON, AUTO	GHE setting: OFF – Switch off GHE ON – Switch on GHE AUTO – GHE is controlled depending on the temperature.

5.10.21 Menu #21 Heating set

Name	Default setting	Range	Description
PREH	ON	OFF, ON	**Preliminary heating:** Before the fans start the heater is warm up.
FOVER	MAN	MAN, AUTO	**Frost alarm clearing:** **MAN** – Manual start of the unit after clearing alarm manually. **AUTO** – Automatic alarm reset and unit start after the alarm signal disappears.
PUMP	0°C	-25 ÷ +15°C	**Pump start temperature**: Outdoor temperature below which the water heater pump will be activated.
HPMD	COOL	COOL, HEAT	**Heat pump operating mode select** COOL: Q7 output closes for cooling mode Q7 output opens for heating mode HEAT: Q7 output closes for heating mode Q7 output opens for heating mode

Preliminary heating curve:



5.10.22 Menu #22 Ventilating

Name	Default setting	Range	Description
CYCLE	0 h	0 ÷ 6 h	**Ventilating cycle:** Ventilating function is activated only

			when the unit is standby. The AHU is started every CYCLE period and stopped after VTIME time.
VTIME	0 min	0 ÷ 60 min	**Ventilating time**

5.10.23 Menu #23 PID set: Heating

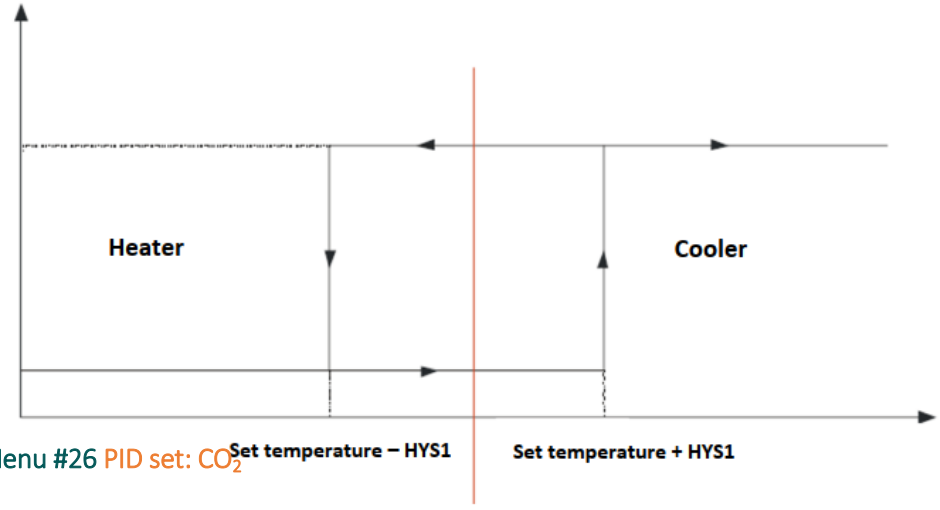
Name	Default setting	Range	Description
PBAND	30.0°C	0 ÷ 999.9°C	PBAND
INT	100 sec	0 ÷ 6000 sec	Integral time
HYS	1.5°C	0.5 ÷ 10.0°C	Heating hysteresis
HDIS	18°C	10 ÷ 22°C	**Heating disabling:** Outdoor temperature above witch heating is disabled (SUMMER).

5.10.24 Menu #24 PID set: Cooling

Name	Default setting	Range	Description
PBAND	30.0°C	0 ÷ 999.9°C	PBAND
INT	100 sec	0 ÷ 6000 sec	Integral time
HYS	1.5°C	0.5 ÷ 10.0°C	Heating hysteresis
CDIS	15°C	10 ÷ 22°C	**Cooling disabling:** Outdoor temperature bellow witch cooling is disabled (WINTER).

5.10.25 Menu #25 Heat–Cool hyst.

Name	Default setting	Range	Description
HYS1	2.0°C	0.5 ÷ 9.9°C	Dead zone between heating and cooling.



5.10.26 Menu #26 PID set: CO_2

Name	Default setting	Range	Description
PBAND	30	1 ÷ 4000	PBAND
INT	100 sec	0 ÷ 6000 sec	Integral time

5.10.27 Menu #27 PID set: pressure

Name	Default setting	Range	Description
PBAND	500	1 ÷ 4000	PBAND
INT	10 sec	0 ÷ 6000 sec	Integral time

5.10.28 Menu #28 PID set: humidifying

Name	Default setting	Range	Description
PBAND	30	1 ÷ 4000	PBAND
INT	100 sec	0 ÷ 6000 sec	Integral time

5.10.29 Menu #29 Measure ranges

Name	Default setting	Range	Description
X1R	100	0 ÷ 100	**Input range for X1 (PID2):** Setting the measuring range for input X1 (input for PID2 control). This is the measurement value corresponding to 10V signal from the transmitter.
X2R	1000	0 ÷ 1000	**Input range for X2 (PID3):** Setting the measuring range for input X2 (input for PID3 control). This is the measurement value corresponding to 10V signal from the transmitter.
X3R	1000	0 ÷ 1000	**Input range for X3 (PID4):** Setting the measuring range for input X3 (input for PID4 control). This is the measurement value corresponding to 10V signal from the transmitter.
OFS	0°C	0 ÷ 15.0°C	**Temperature shift:** The value for shifting down the temperature characteristic. The sensed value is decreased by the value OFS.

5.10.30 Menu #30 Units and flow

Name	Name	Default setting	Range
UNIT1	none	none, C, %RH, %, Pa, m3/h, ppm, m/sec, sec, min, h	**Unit fo X1 input:** The unit to display for the sensed value.
UNIT2	none	none, C, %RH, %,	**Unit fo X2 input:**

		Pa, m3/h, ppm, m/sec, sec, min, h	The unit to display for the sensed value.
UNIT3	none	none, C, %RH, %, Pa, m3/h, ppm, m/sec, sec, min, h	**Unit fo X3 input:** The unit to display for the sensed value.
K2	0		**K coefficient of the fan (X2 input)** The flow is calculated according to the formula: **Flow = K x square_root(Pressure)**
K3	0		**K coefficient of the fan (X3 input)** The flow is calculated according to the formula: **Flow = K x square_root (Pressure)**

5.10.31 Menu #31 Fan setting

Name	Name	Default setting	Range
FCOEF	1.00	0.5 ÷ 2	**Exhaust/supply ratio:** Exhaust fan speed ratio to supply fan. Exhaust = FCOEF x Supply.
FMIN	10 %	10 ÷ 25	**Fan minimum speed:** The speed below which the fan cannot go down during speed modulation.
FMOD	7 °C	-25 ÷ 10 °C	**Fan modulation start:** Defines when the supply fan starts modulating to protect the exchanger. This is the number of degree C above the exchanger protection value ELIM.
START	0 sec	0 ÷ 100 sec	Start delay
STOP	0 sec or 30 sec	0 ÷ 100 sec	Stop delay
PREST	60 sec	10 ÷ 300 sec	Fan pressure guard time

5.10.32 Menu #32 Gear setting

Name	**Name**	**Default setting**	**Range**
SPD1	25%	10 ÷ 100 %	Fan speed for gear 1
SPD2	50%	10 ÷ 100 %	Fan speed for gear 2
SPD3	75%	10 ÷ 100 %	Fan speed for gear 3
SPD4	100%	10 ÷ 100 %	Fan speed for gear 4

5.10.33 Menu #33 Clock

Name	**Default setting**	**Range**	**Description**
H:M		00.00 ÷ 23.59	Hour: Minute
WDAY		SUN ÷ SAT	Day of the week

DAY		1 ÷ 31	Day of the month
MON		JAN ÷ DEC	Month
YEAR		20 ÷ 40	Year

5.10.34 Menu #34 Communication

Name	Default setting	Range	Description
ADR	001	1 ÷ 255	Slave address: Slave address for Modbus communication.
MODE	RTU	RTU, ASCII	MODBUS mode
RATE	9600	2400, 4800, 9600, 19200	Baud rate
PARIT	LACK	NONE, ODD. EVEN	Parity
BITNR	8	7, 8	Bit number
STBIT	1	1, 2	Stop bit number

5.10.35 Menu #35 Simulation

Name	Default setting	Range	Description
SIM	OFF	OFF, ON	Outputs control: Simulation mode allows to manually control the outputs. After power on the simulation is always in the off state. OFF – Normal operation of the unit ON – Manual control mode

5.10.36 Menu #36 Password setting

Name	Default setting	Range	Description
User	0	0 ÷ 999	User password: access level 1 The lowest access level. User can edit desired values like set temperature, CO2, schedule … but cannot edit the parameters of the application for AHU.
Admin1	0	0 ÷ 999	Admin password 1: access level 2 All parameters can be edited except the password for admin2 and the AHU running time counter.
Admin2	11	0 ÷ 999	Admin password 2: access level 3 The highest level. All parameters can be edited.

5.10.37 Menu #37 Language select

Name	Default setting	Range	Description
LANG	ENG	ENG, POL, CZ	Language

5.10.38 Menu #38 Information

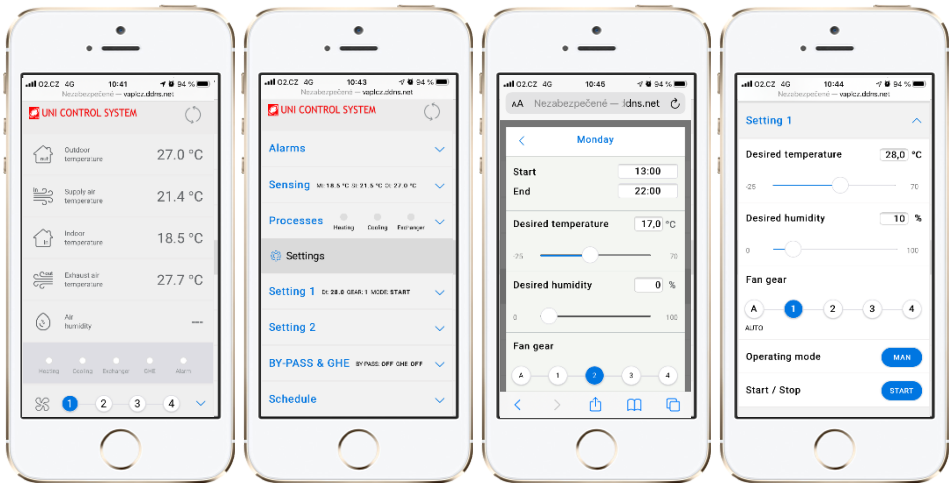
5.10.39 Menu #39 Login

Name	Default setting	Range	Description
LOGIN		0 ÷ 999	Login: Enter password for parameter editing. Parameters are visible without login, but some need login for editing.

6 ETHERNET

uManager 10 is a converter with built-in http server, which enables remote management of air handling units controlled by Uni Control System controllers by mean of a smartphone, tablet or computer. Communication with the is done via a website with a graphic interface, so you can manage the unit from anywhere in the world if the network is available. You can connect from iOS and Android or Windows devices. The smart interface recognizes the type of terminal and adapts automatically to it. The site works under various Internet browsers like Firefox, Chrome, Safari etc ....

6.1 SAMPLE INTERFACE PAGES:



6.2 CONNECTION

Connect the converter from one side to the controller through the RS485 serial port (terminals A, B) and on the other hand to the Internet socket.

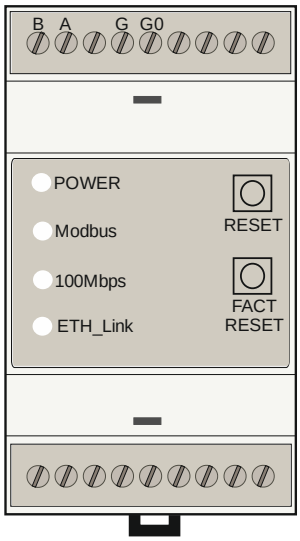
A 24VAC supply must be connected to the G0, G terminals

Descriptions of symbols:

- **G0, G**: 24 VAC power supply
- **A,B**: RS485 serial port

6.3 LED DESCRIPTION

- **POWER**: Power supply signalling
- **Modbus**: Modbus communication signalling Lights up when the transmission starts on Modbus. Goes off at the end of broadcasting
- **100Mbps**: LED lights up when the physical layer negotiates 100 MBps transfer rate. Goes off when the cable is disconnected
- **ETH_Link**: The LED lights up when the application has received the packet and is lit for 200 ms
- **RESET**: Device reset
- **FACT RESET**: Restore factory settings



6.4 CONVERTER CONNECTION

Enter the IP address of the device, the default values are:

- IP: **192.168.0.50**
- Address mask IP: 255.255.255.0
- TCP Port: 80
- Modbus: ASCII, 9600 baud, 8 bit data, 1 bit stop, No parity, address 1, delay 30

6.5 CONVERTER SETTINGS

After entering the converter's IP address, the login screen should appear in the browser. Enter your login and password there and click "Login". The default account is:

- Login: **admin**
- Password: **admin**

After logging in, select the option **Detail** at the bottom right of the screen.

In the subpage **Ethernet→ Configuration**, you must replace the factory IP with your own and set the network settings.

In the subpage **Modbus→ Configuration**, the communication parameters of the converter with the UCS controller must be set. The communication parameters must be identical to those set on the UCS controller.

For the ERC20 and CU24V1 controllers, you can find the communication parameters in the RMC20 panel menu.

For UCS controllers, the parameters can be found in the controller menu.

After entering new data, the converter is reset automatically and you must enter the new IP into the

browser to connect to the converter.

7 CU24V2 CONTROLLER – MODBUS REGISTER LIST

7.1 REGISTER LIST WITH ADDRESS (FUNCTION 03, 06)

Protocol: MODBUS RTU, MODBUS ASCII

Warning:

MODBUS address is the address that is specified directly in the MODBUS protocol frame,

Registers in the controller have double Modbus address. The second address is for use in the range from 0 to 9999 because not all software are able to use address above 9999. To have access to the second address just subtract the value 55536 from the address listed in the tables.

Items in red colour are not available.

Register Name	Register	MODBUS Address
Login registers	– **Login register** …… *To login write to this register the valid password* – **Login timer reset register** …… *After login write periodically value **AA hex (170 dec)** to this register to reset the timer before 1 minute, to avoid login cancel.*	**64777** **64778**
PWM outputs P *NOTE:* *1. Control values are in % with 1/10 precision. After reading the register value the dot should be placed artificially Ex.: Reading the value 257 should be treated as 25.7%* *2. The value **0x8000** means, the parameter is not available.*	0 – P1 1 - P2 … n - Pn	**65472** 65473 … 65472+n
0-10V analog outputs *NOTE:* *1. Control values are in % with 1/10 precision. After reading the register value the dot should be placed artificially Ex.: Reading the value 257 should be treated as 25.7%* *2. The value **0x8000** means, the parameter is not available.*	0 – Y1 1 – Y2 … n – Yn	**65408** 65409 …….
Alarms register bit alignment **Read and write** *Alarms register are 32-bit wide* *(see the description of registers)*	0 –……..……..……..…….. 1 – R1H: current alarm - High register ……..…….. 2 – R1L: current alarm – Low register ……..	**65280** 65281 65282

Desired values: read/write	0 – Desired temperature for the main heating/cooling . 2 – Desired value for CO_2 control..... 3 – Fan gear ……..……. **Writing**- 5 values: 0 – Gear according to the controller setting 1 – gear 1 2 – gear 2 3 – gear 3 4 – gear 4 **Reading**- 4 values: 0 – gear 1 1 – gear 2 2 – gear 3 3 – gear 4 4 – Running mode ……... **Writing** - 3 values: 0 – Running mode according to the controller setting 1 – AUTOMATIC 2 – MANUAL **Reading** - 2 values: 0 – AUTOMATIC 1 – MANUAL 5 – Desired value for pressure 1 (Inlet duct) …… 6 – Desired value for pressure 2 (Outlet duct) ……. 7 – Fan running speed ……... 9 – Desired temperature for preliminary heater ……	**65216** 65218 65219 65220 65221 65222 65223 65225
Device operating state	0 – Register 1 1 – Register 2	65152 65153
Sensed values *1. The sensed values have 1/10 precision. After reading the sensed value it should be divided by 10.* *Ex: Reading the number 257 should be treated as 25.7* *2. Reading the value **0xFFFF** means that , the parameter does not exist*	0 – Indoor/exhaust temperature…….. 1 – CO_2 sensed value…… 3 – Supply temperature……..…… 6 – Outdoor temperature……..…… 8 – Exchanger exhaust air temperature……...… 10 – Pressure value (inlet duct) ……..…… 12 – Pressure value (outlet duct) …… 25 – Ground Heating Exchanger temperature…..…..…	**64896** 64897 64899 64902 64904 64906 64908 64921
Reading control values *Comments:* *1. The control values are in % with 1/10 precision. After reading the sensed value it should be divided by 10.* *Np.: Reading the number 257 should be treated as 25.7%*	0 – Main heater control: 0-100% 1 – Secondary heater control: 0-100% 2 – Cooling control: 0-100% 3 – PID 2 control – humidifying: 0-100% 4 – PID 2 control – CO_2 / dehumidifying: 0-100% 5 – PID 3 control – pressure/humidifying: 0-100% 6 – PID 3 control – CO_2/ dehumidifying: 0-100% 7 – PID 4 control - pressure/humidifying: 0-100%	**64832** 64833 64834 64835 64836 64837 64838 64839
2. The value 0x8000 means that the given the parameter is not configured (does not exist)	8 – PID 4 control - CO_2/ dehumidifying: 0-100% 9 – Exchanger control: 0-100% 12 – Supply fan control 13 – Extract fan control	64840 64841 64844 64845

Start/Stop command and system operating state	Start/Stop command **Write**: Start=**0x00AA**, Stop=**0x0055** **Read**: System operating state 0 – system stopped by the operator 1 – system stopped by the ECO mode function 2 – system stopped by schedule 3 – 4 – 5 – System running	**64640**
Parameters – group 1	1 – **MIN**: Supply minimum temperature…….. 2 – **MAX**: Supply maximum temperature ……..…… 56 – **HDIS**: Heating disable outdoor temp. (Summer).. 57 – **CDIS**: Cooling disable outdoor temp. (Winter)…. 59 – **FCOEF**: Exhaust/Supply fan speed ratio 61 – **Bypass**: Bypass setting…… 0 – OFF (Bypass OFF) 1 – ON (Bypass ON) 2 – AUTO (control according to algorithm)	63233 63234 63288 63289 63291
Parameters – group 2	19- **Temperature control type** ……..….. 0 – Cascade control 1 – Supply control	63187

7.2 OPERATING STATE REGISTER DESCRIPTION

Register 1

Bit nr	Process	Availability
0		*No*
1		*No*
2		*No*
3		*No*
4		*No*
5		*No*
6	Delay at start of the unit	
7	Delay at stop of the unit	
8 - 10	Device state: 0 - system stopped by the operator 1 - system stopped by the ECO mode function 2 - system stopped by schedule 3 - 4 - 5 - System running	
11	*Valve setting before starting control*	*No*
12	*Pump testing*	*No*
13	Temperature control of the preliminary heater – heating process	
14	*Temperature control of the preliminary heater – cooling process*	*No*

15	Exchanger defrosting process	

Register 2

Bit nr	Process	Availability
0	Primary heating (main heating) – Indoor temperature control	
1	*Secondary heating*	*No*
2	Cooling – Indoor temperature control	
3	Exchanger exhaust air temperature control - heating	
4		*No*
5	*Humidification process*	*No*
6	*Dehumidification process*	*No*
7	Exchanger	
8	*By-pass*	*No*
9	*GHE (Ground Heating Exchanger)*	*No*
10	Inlet fan	
11	Extract fan	
12	*FREE COOLING*	*No*
13	Preliminary heating	
14	*Fast heatibg*	*No*
15	*Fast cooling*	*No*

0 – disabled; 1 – enabled

7.3 ALARM REGISTER DESCRIPTION R1H, R1L

RH - Register 1 (Most significant/high register)

Bit nr.	Alarm	Symbol	Availability
0		*RH+*	*No*
1		*RH-*	*No*
2		*A19*	*No*
3	Sensor break alarm	A20	
4	-		
5	Compressor low pressure	A22	
6	Compressor high pressure	A23	
7..15			

RL - Register 2 (Least significant/low register)

Bit nr.	Alarm	Symbol	Availability
0	Water heating coil frost alarm	A1	
1	*Engine alarm (thermic)*	*A2*	*No*
2	Inlet fan pressure guard alarm	A3	

3	*Extract fan pressure guard alarm*	*A4*	*No*
4	*Fire alarm*	*A5*	*No*
5	High temperature alarm	A6	
6	Exchanger freezing alarm	A7	
7	*Anti-freeze alarm*	*A8*	*No*
8	*Pump failure*	*A9*	*No*
9	Filter pressure guard alarm	A10	
10	*R1+*	*No*	
11	*R1-*	*No*	
12	*R2+*	*No*	
13	*R2-*	*No*	
14	*R3+*	*No*	
15	*R3-*	*No*	

7.4 INPUT REGISTERS: FUNCTION 04

Inputs	**Register address**
B1 – Exhaust sensor	0
B2 – Supply sensor	1
B3 – Exchanger sensor	2
B4 – Outdoor sensor	3
B5	4
X1	256
X2	257
X3	258

7.5 COILS (DIGITAL OUTPUTS): FUNCTION 01

Outputs	Q1	Q2	U1-U2	Q4	Q5	Q6	Q7	Q8
Function	Dampers	Bypass	Heating coil pump	Supply fan inverter start	Exhaust fan inverter start	Cooling unit 1-level	Cooling unit 2-level	Electric heater supply
Register Address	0	1	2	3	4	5	6	7

7.6 DISCRET INPUTS (DIGITAL INPUTS): FUNCTION 02

Inputs	E1	E2	E3	E4	E5	E6	E7	E8
Function	High temperature thermostat	Frost thermostat	Fan alarm	User function	Filter guard	Cooling unit alarm	System start	Fire alarm
Register Address	0	1	2	3	4	5	6	7