USER MANUAL

Evikontroll µGAS - E871C

Gas detection controller

August 2022

EVIKONTROLL µGAS

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1. SAFETY PRECAUTIONS

1. Work in or on electrical systems may only be carried out by qualified persons. For additional information about qualification of electrical personnel please refer to local laws and regulations and following OSHA regulations about occupational safety and health:

1) 1910.331   Scope;
2) 1910.332   Training;
3) 1910.333   Selection and use of work practices;
4) 1910.334   Use of equipment;
5) 1910.335   Safeguards for personnel protection.

The product must be installed by a certified person (gas detection systems, low current systems, automatics, fire safety certification). The warranty will not apply to devices which have been handled unprofessionally.

2. Misuse will impair the protection of the product. Always adhere to the safety provisions applicable in the country of use.

3. Do not perform any maintenance operation with the power on. Do not let water or foreign objects inside the device.

4. External circuits connected to the equipment should have sufficient insulation rating according to the environmental conditions and equipment power. For additional information please refer to OSHA regulation 1910.137- Electrical protective equipment and IEC 60664-1:2020 Insulation coordination for equipment within low-voltage systems.

The following safety regulations apply for the prevention of electric shock and electrocution:

a) Switch off the system

b) Secure the system to prevent it switching back on

c) Check the system to ensure it is de-energized

d) Ground and short the system

e) Cover or shield adjacent live parts

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2. TECHNICAL INFORMATION

Table 1. Technical information.

Power	
Operating voltage	24 VDC
Power consumption	<10 W
General information	
Protection class	IP20
Dimensions	90 x 157 x 58 mm
Operating conditions	Explosion-safe indoor confined spaces without aggressive gases or vapours
Temperature/humidity	-20 to +85 °C, 10-95 % RH (non condensing)
Screen	
Display diagonal	1.8"
Display type	TFT LCD
Display resolution	128 x 160 pixels
Communication interfaces	2 x RS485

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Network settings (Default)	
IP Address	192.168.0.102
Gate	192.168.0.1
Subnet mask	255.255.255.0
COM1 default interface	RS485

Table 2. Communication interfaces.

Interfaces	Protocols	Transfer format	Transfer rate
RS485	Modbus RTU	8 bit Even, Odd, None, 1 or 2 stop bits	4800, 9600, 19200, 38400, 57600 b/s
TCP/IP	HTTP / Websocket		

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3. PRODUCT DESCRIPTION
3.1 GENERAL

The first generation µGas gas detection control device has been designed specifically for monitoring the concentration of gases in various environments. The device has an integrated 1.8" screen for visualisation, operation and configuration. In addition, logging measured gas concentration levels, alarms and malfunctions, as well as a web server and 2x RS-485 ports for Modbus RTU communication with the building automation systems and detectors are all available in the system.

Figure 1. Front panel.

On the front panel:

- colour TFT display;

- 4 buttons for navigation;

- 6 LEDs for indicating different functions.

The connection scheme of the device is shown on figure 2 and described on table 3.
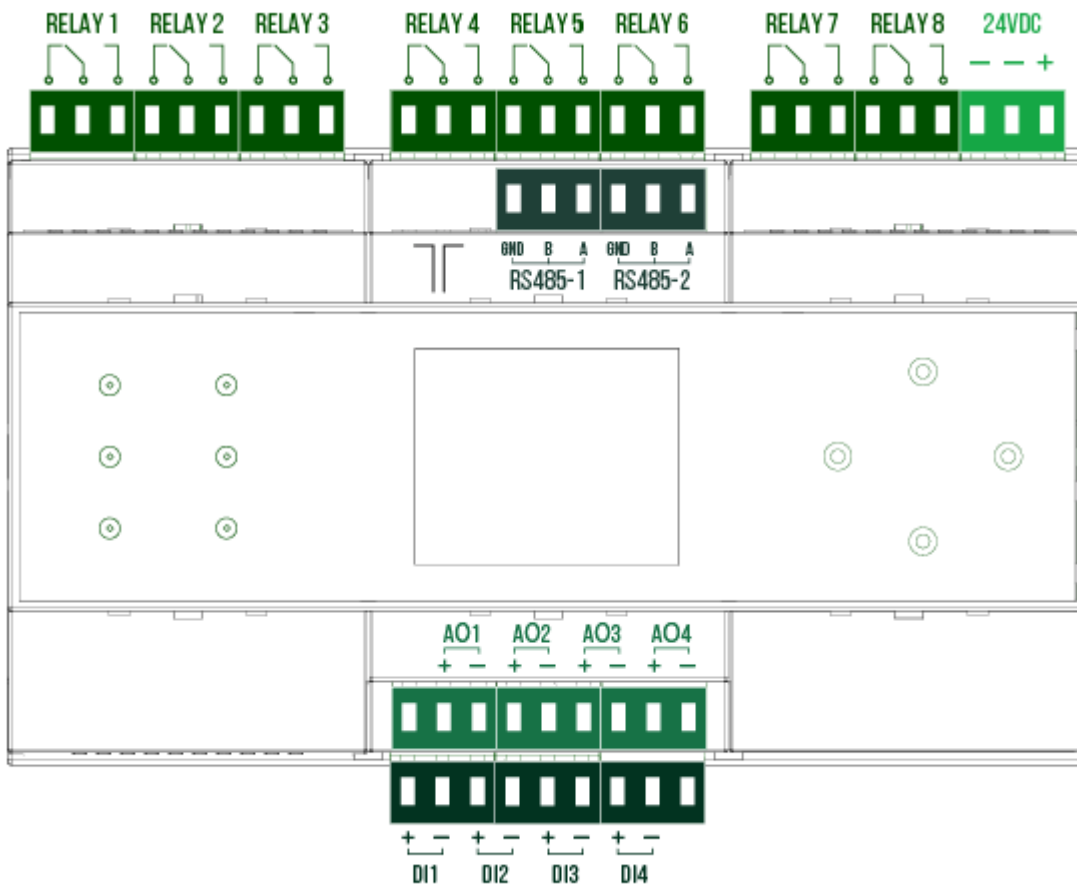
Figure 2. Connection scheme.

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Table 3. Device connections.

RELAY 1-8	NC	Normally closed
	COM	Common, switch-over
	NO	Normally open
24 VDC	-	11...30 VDC power supply, negative
	-	11...30 VDC power supply, negative
	+	11...30 VDC power supply, positive
⊤	WIFI	WIFI antenna for network connection
RS485-1, RS485-2	GND	Ground
	B	Data - (B)
	A	Data + (A)
DI1- DI4	+	Input A
	-	Input B
AO1-AO4	+	Output A 4-20 mA
	-	Output B GND

4. INSTALLATION

4.1 GENERAL INFORMATION

Before installation, please read through the following information.

This chapter describes the installation procedures for Evikontroll µGas control device. Evikontroll µGas control device is not certified for use in explosive or hazardous areas. However it can be connected to detectors which are certified for use in explosive or hazardous areas.

For installation in harsh conditions please refer to the control panel's operating conditions in paragraph 2 „Technical information". These conditions must be followed to guarantee the device's normal operating and expected lifetime.

Prior to installation, please refer to valid standards and regulations about electrical installation (IEC 60364-4 and IEC 60364-5) and gas detectors (EN 60079-29-2 and EN 45544-4).

The delivery set consist of:

1. Control Device E871C

2. User's manual

Instructions on starting and configuring the system are explained thoroughly in paragraph 5 „Graphical user interface".

4.2 BEFORE THE INSTALLATION

Before installation work, check the local regulations and site procedures and ensure that they are followed.

Check if the devices (transmitters, detectors etc) are suitable for connecting with the Evikontroll µGas device. The devices to be installed must be suitable for the area.

Please refer to device user manual and technical specifications for detailed information.

Installation of control panels and devices connected to it must be carried out by certified or competent people with experience of installing electrical equipment (please refer to chapter 1. Safety precautions).

4.3 INSTALLING THE CONTROLLER

Sufficient space must be reserved in the electrical cabinet. The µGas control device is designed as a separate device with the possibility of mounting on a DIN rail on a wall or in a control cabinet.
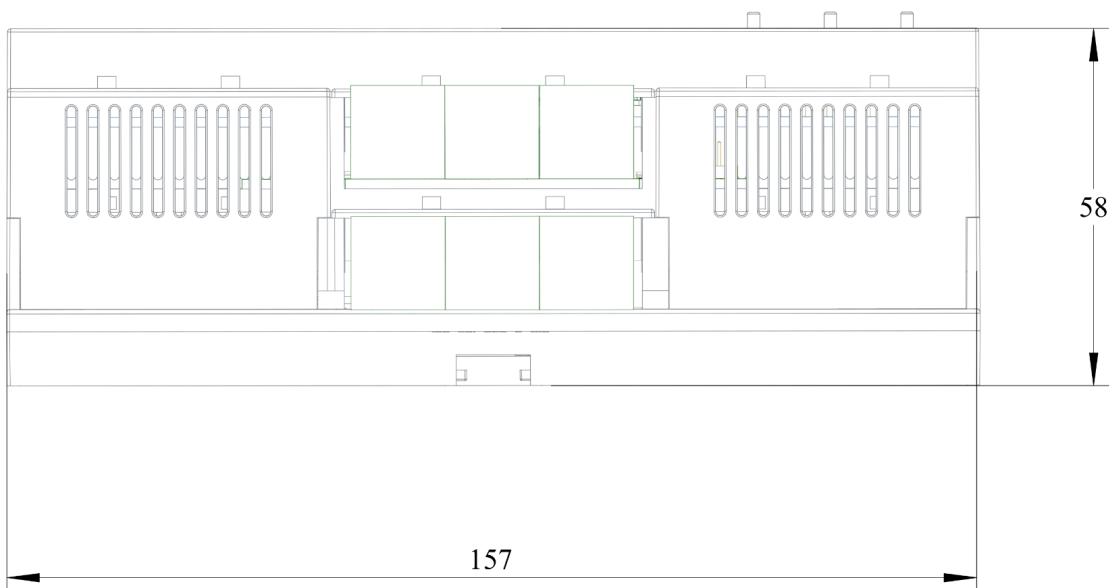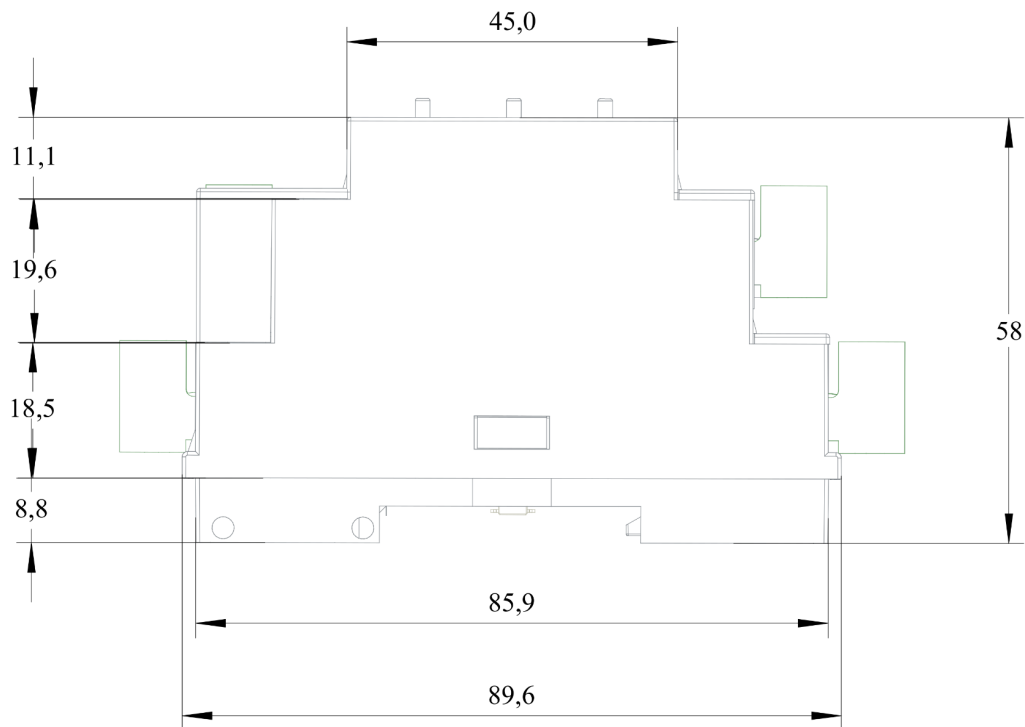
Figure 3. Control panel with dimensions.

Control cabinet's interior should be protected from moisture, foreign objects and dirt.

Do not put signal wires together with power cords in the same harness or ducting. We recommend using screened cables to protect circuits from external inducted interferences. Independent supply units mounted in the same electrical cabinet must be used to power the device.

4.4 SUPPLY VOLTAGE

Evikontroll µGas control panel operates with nominal 24 VDC. It is recommended to use an autonomous power supply to ensure continuous and stable power for the panel. Please ensure that any control or shutdown systems are inhibited before applying power to the Evikontroll µGas panel. The panel will not power up until a power supply is applied.

4.5 RS485 BUS CONNECTIONS

RS485 bus can be used to connect detectors, transmitters, relay modules and other needed devices with the Evikontroll µGas panel. The maximum number of devices to be operating simultaneously with the RS485 bus is shown on table 4.

Port RS-485-1 is used for connecting the controller to external automation system to act as a Modbus Slave. Port RS-485-2 is used for connecting above described devices with the controller.

Table 4. System specifications.

Detector quantity	Up to 32
Relay quantity	8
External relay module quantity	Up to 3
Analog outputs quantity	4
Humidity groups quantity	Up to 8 (5 inside and 5 outside sensors in one group)
Lights module quantity	Up to 32
Alarms	Up to 8

The devices in the bus line are connected in succession. Transmitter/detector connection to the panel is shown on figure 4.
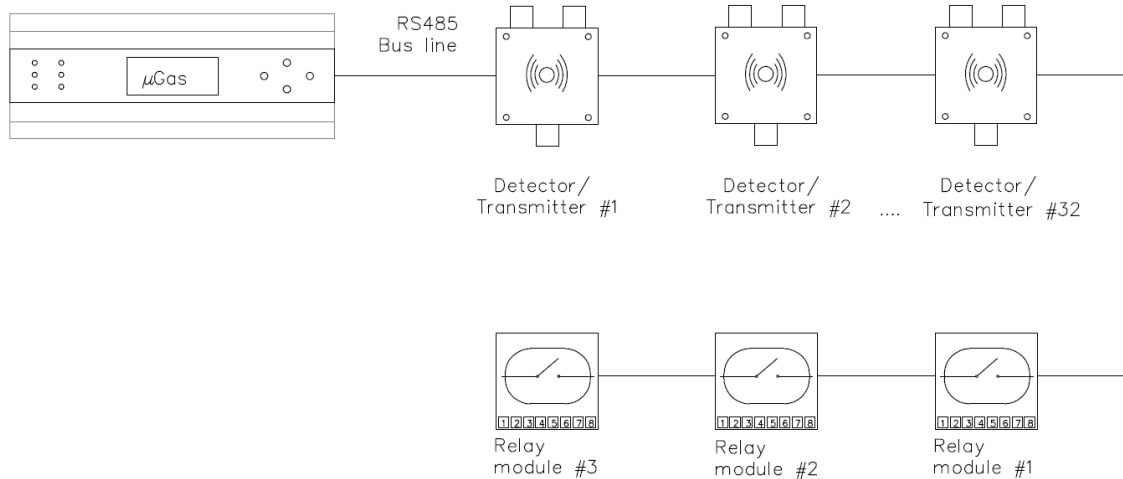
Figure 4. Connection of devices via bus line.

4.5.1 RS485 CABLING INSTALLATION

The correct and recommended way to connect the devices in a RS485 communication is using a daisy chain method. Any other way of connecting the devices together is not recommended as it might cause communication issues or damage to the overall network. The maximum length of the communication cable should not be longer than 700m without using the repeaters. If the branch is too long, it may cause a reflection (a portion of a transmitted signal will be reflected back to the transmitting device rather than continuing to the receiver, much like an echo). The guidelines for correct cabling along with an example of wrong cabling is shown on figure 5. The maximum number of devices that can be connected to a cable is 32, including the Master. Repeaters can be used in order to increase the extent of the Modbus network. Network connection using repeaters is shown on figure 6.
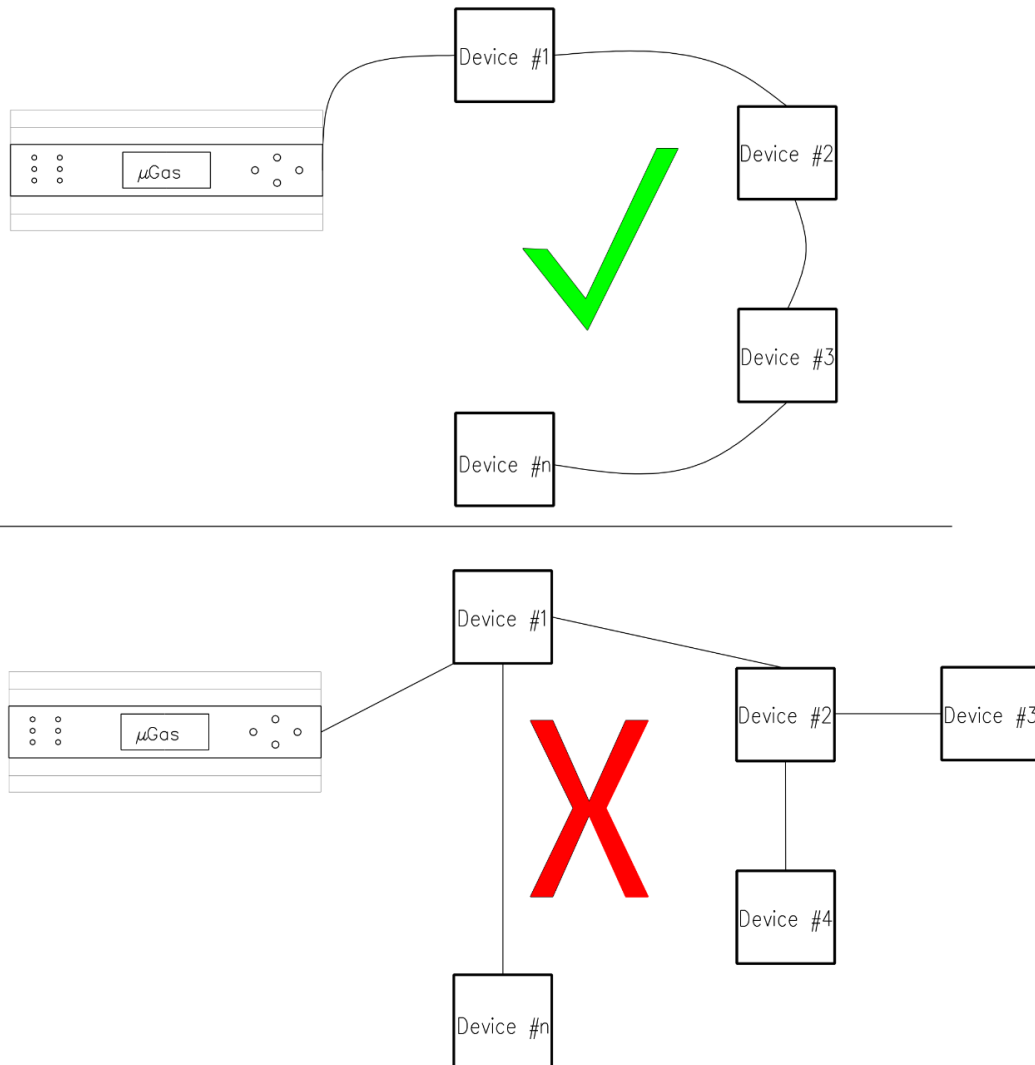
Figure 5. Correct and incorrect RS485 cabling.

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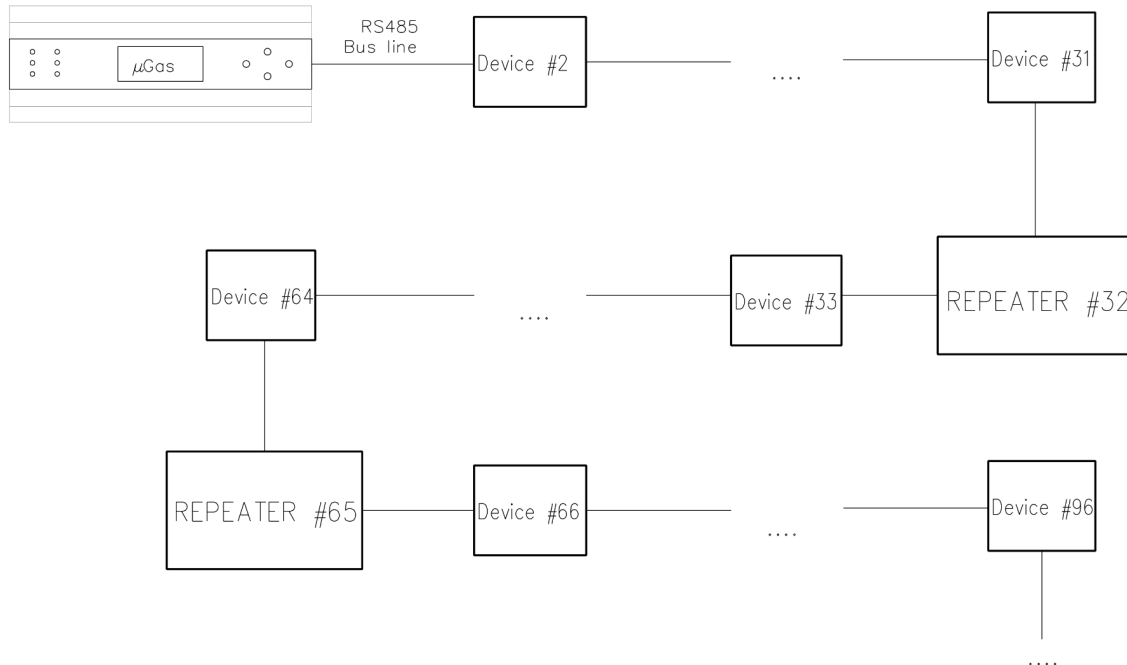
Figure 6. Network connection using repeaters.

The maximum length of a bus line is primarily limited by the signal transit time. The electrical characteristics of the bus cable restrict the cable length according to the selected bit rate. You can use cabling up to 250 meters with the baud rate of 250 kbit/s. The maximum bus length with a bit rate of 10 kbit/s is 1 km, and the shortest with 1 Mbit/s is 30 meters. Data rate for different bus lengths is shown on table 5.

Table 5. Bit rate according to bus length.

Bit rate	Bus length
1 Mbit/s	30 m
800 kbit/s	50 m
500 kbit/s	100 m
250 kbit/s	250 m
125 kbit/s	500 m
62,5 kbit/s	1000 m

4.5.2 TERMINAL RESISTORS

Terminal resistors are needed in bus systems because communication flows are two-way. The termination at each end absorbs the signal energy, ensuring that this is not reflected from the cable ends. Such reflections would cause interference and potentially damaged signals. In a low speed bus line each device should have a 120Ω resistor. Bus line scheme is shown on figure 7.
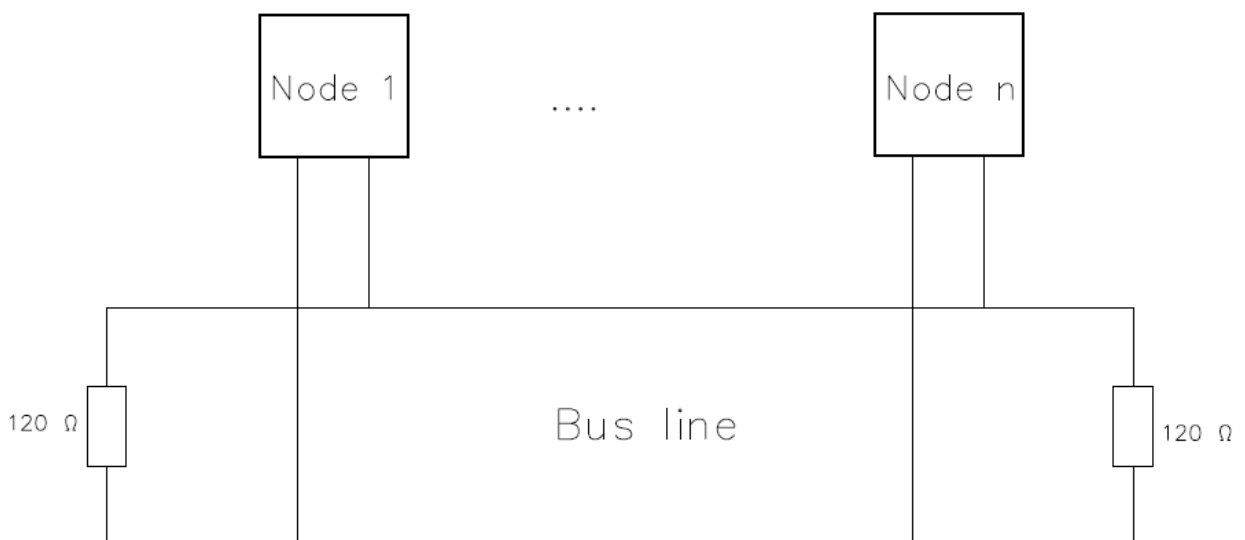
Figure 7. Bus line scheme with terminating resistors.

4.6 Current 4-20mA CONNECTIONS

When connecting devices through 4-20mA analog inputs, E7110-8A analog modules are needed for expansion. Accessories along with analog modules are shown in **appendix 1**. To connect the module proceed as follows:

- Collect the cables for connection of the module to the external devices, power source and RS485 interface cable;
- connect the module to the power source;
- connect the module to external devices;
- connect the module to RS485 interface;
- apply power.

Additional information about the E7110-8A analog module can be found in **appendix 2**. Transmitter/detector connection through the analog module is shown on figure 8.
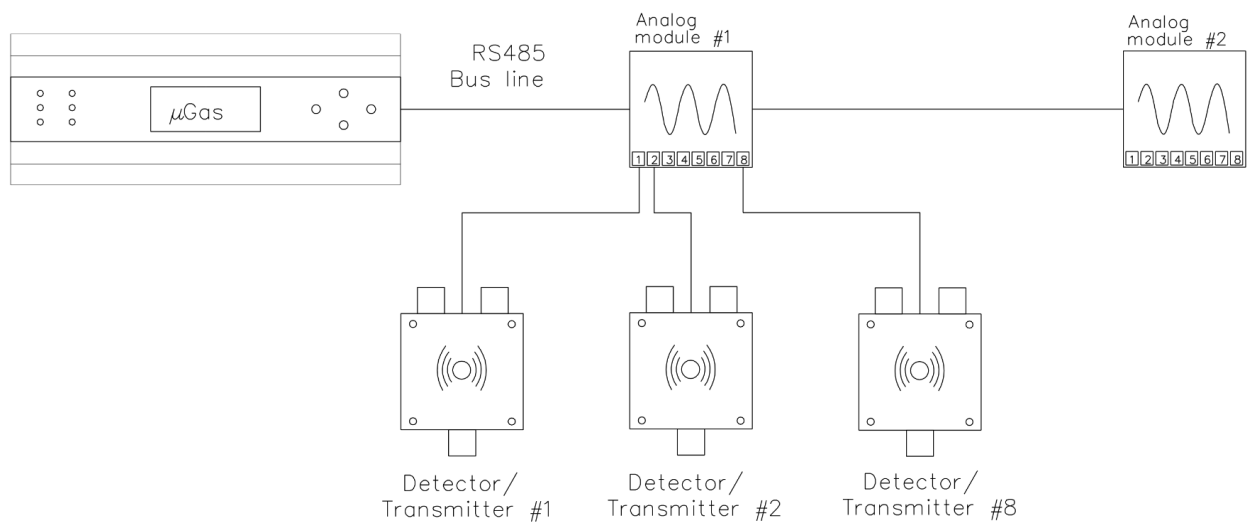
Figure 8. Bus connection using analog modules.

4.7 RELAYS

Up to 3x E7110-8R, 8-channel relay output modules can be configured to switch various devices on site. The relay can have different functions - inverted, pulsating. An inverted relay turns the device off when the alarm starts. A pulsating relay turns the device off when the alarm starts and turns it on again after some given period. To connect the relay module proceed as follows.

- Collect the cables for connection of the device to the sensors, power source and RS485 interface cable;
- connect the device to the power source;
- connect the device to actuators;
- connect the device to RS485 interface;
- apply power to the device.

Additional information about the E7110-8R relay module can be found in **appendix 3**.

4.8 NETWORK CONNECTION

Evikontroll μGas control unit has a web server, which can be used when the control unit is connected with an Ethernet network via data cable or Wifi. Web server can be accessed by using a device with an internet connection.

The web server can be accessed by connecting to the devices' WiFi network, opening the web browser and typing the IP-address on the URL tab. The IP address as well as WiFi AP name can be found on the device WiFi settings (chapter **5.2.3.3 WIFI PAGE**).

5. GRAPHICAL USER INTERFACE

With the Evikontroll μGas device, it is possible to navigate, operate and configure the system through a 1.8" touch screen or a web-based server.

5.1 DEVICE CONTROLS AND LEDS

The device has 4 buttons on the right side and 6 LED lights on the left side. The buttons are used to navigate different pages and choose options. The functions of the buttons are shown on figure 9.
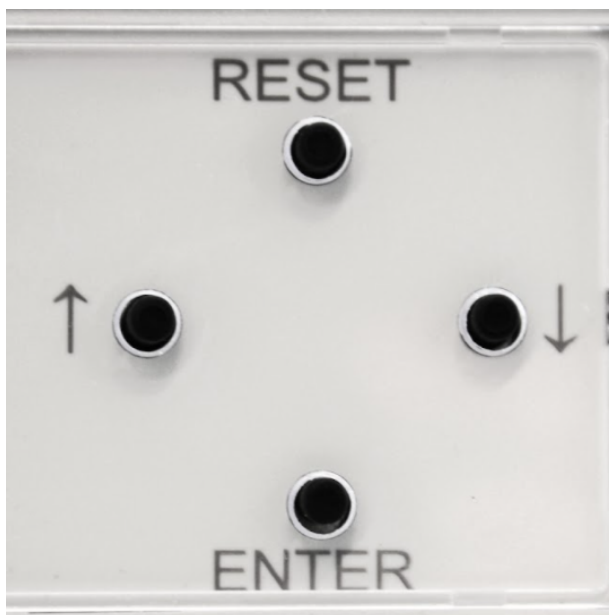
Figure 9. Buttons on the device.

Up button- "Reset" - return to first page;

Down button- "Enter" and "Activate";

Left button- navigate to the left;

Right button- navigate to the right.

LED lights on the device show alarms and signals. The LED lights are shown on figure 10.

Figure 10. LEDs on the device.

- FAULT LED shows connection errors with connected devices or under-/overrange alarm situations;
- ALARM LED shows that alarm has been triggered;
- CALIBRATE LED shows that the device is in calibration mode;
- Service shows that the device service is due;
- RS485-1 and RS485-2 LED blinks as the device is polling the connected devices on the bus line.

When navigating through menus, the user needs to navigate to the menu header and press the "Enter" key- the menu row will be activated (pink highlight). Then the navigation through menus can be done with "left" and "right" buttons. When pressing "Enter" while on the chosen menu, the menu header will become inactive (blue highlight) and then when pressing "left" or "right" the user can navigate on the selected page.

The logic of navigating is that before changing/switching the menu or value of a row the user needs to press "Enter" to make the choice/value active so that it could be

changed and then press "Enter" to make it inactive and move on with the menu or page values.

The menus also have an "Exit" row. By navigating to "Exit" and pressing "Enter" the screen will go back to the "Overview" page.

5.2 SYSTEM PAGES

Different menus which can be navigated on the device, are following:

- Overview
- Login
- Info
- Configuration
  - System
  - RS485-1
  - RS485-2
  - WIFI
  - Detector settings
  - Humidity settings
  - Relay module settings
  - Light module settings
  - Clock (Time and date settings)
  - E7131 settings
- Test
- Lights
- Service
- Humidity overview
- Relay settings (matrix)
- Analog page
- E7131 page

"OVERVIEW" and "HUMIDITY OVERVIEW" pages are accessible without entering the password. All other pages are password protected. The password can be entered on the login page.

5.2.1 Overview page

When the μGas device is connected with the power supply, the device will turn on. After booting up, the device will display the Overview page. Overview page is shown on figure 11.
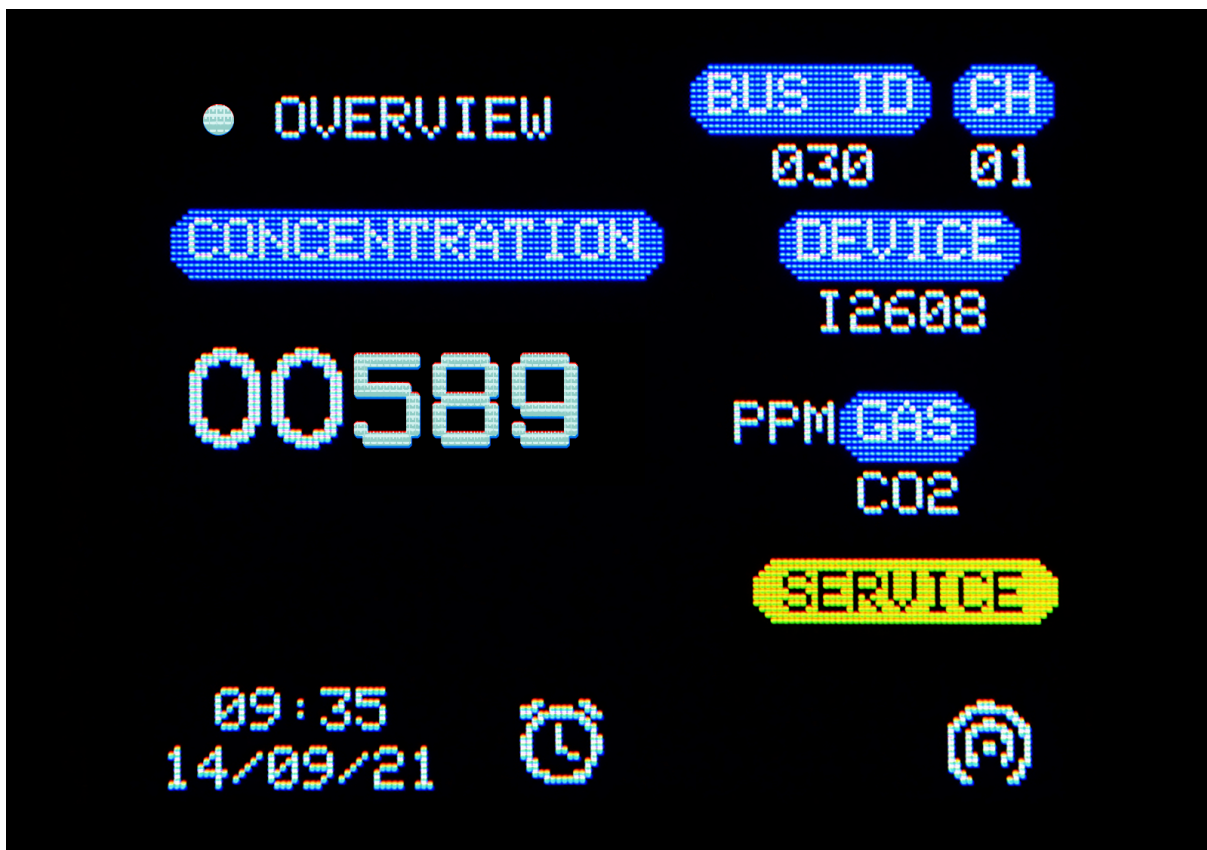
Figure 11. Device overview page.

The overview page displays general information.

- Bus ID shows the Modbus ID of the connected device.;
- CH shows the channel of the displayed transmitter;
- DEVICE shows the model of the connected transmitter;
- GAS shows the gas measured by the transmitter;
- Next to GAS, the device shows the measurement units of the transmitter;
- Time and date is shown on the left bottom side of the screen;
- When "SERVICE" appears on the right side of the screen, then service time is due;

- Different alarms. The alarms are shown on figure 12.

The device displays different detectors in the queue every five seconds. If no alarms are present then the device will display from the highest volume gas detectors to the lowest. If alarms are present then the device displays fault channels first and then after that highest alarm channels. Manual interruption with buttons will pause the automatic displaying. After 30 seconds of no interaction, the device resumes automatic queue displaying.
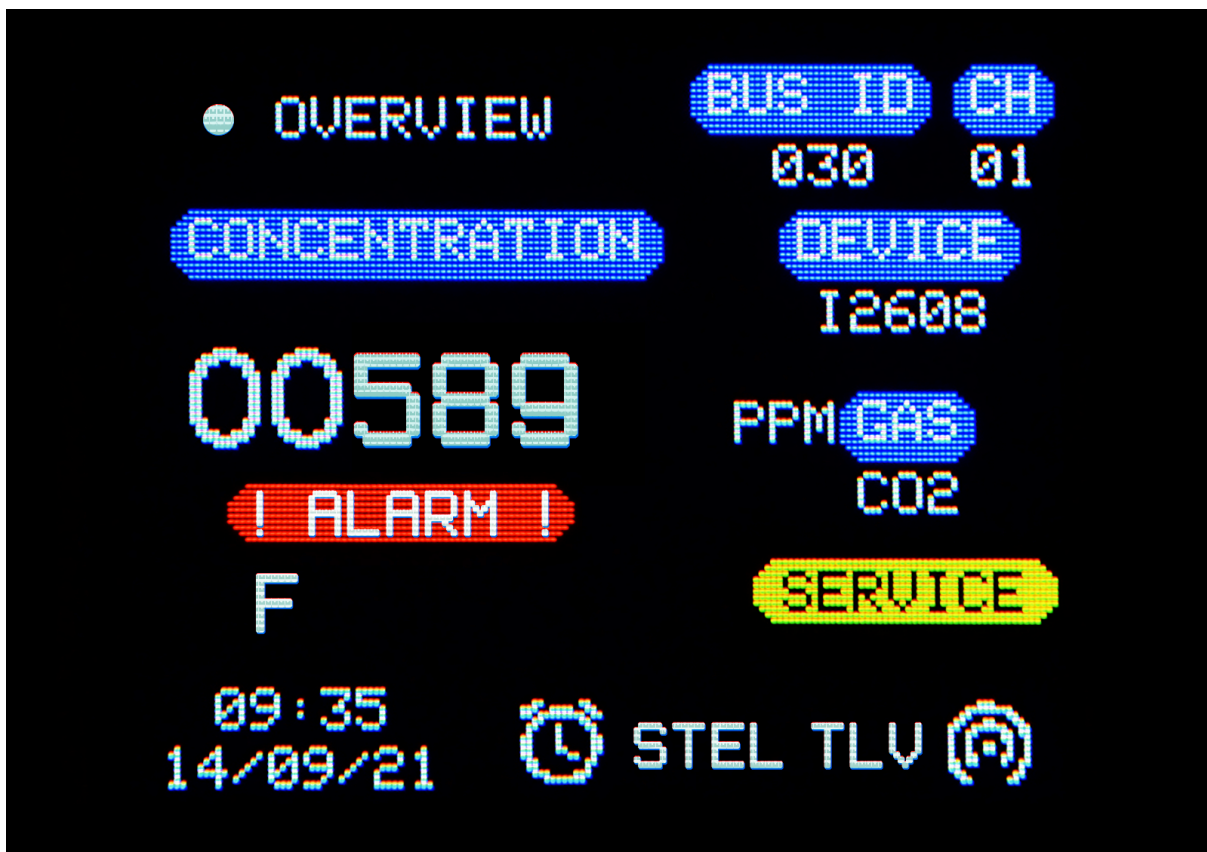
Figure 12. Alarms on overview page.

- "! ALARM !" shows that the displayed detector is in alarm situation;
- "F" (fault) shows connection errors with the device;
- " v " shows low-range alarm;
- " ^ " shows over-range alarm;
- "A1", "A2" and "A3" are user configurable alarms;

- The clock icon shows that some device in the system is in alarm situation;
- "STEL" shows that STEL limit is exceeded;
- "TLV" shows that the TLV (TWA) limit is exceeded.

Alarms can be configured from the device's web-server (Chapter 6 Web server).

5.2.2 Login page

To access password protected pages the user needs to enter the password on the login page. The default password is 1234. The password can be changed from the web server. The login page is shown on figure 13.

Figure 13. Login page.

After successful login a green dot appears in front of the page titles. When the login process is not done then a white dot will appear in front of the page titles.

The controller will log out after 2 minutes of inactivity. Then a new login process is needed to enter the password protected menus.

5.2.3 Information page

The information page displays system information. Information page is shown on figure 14.

Figure 14. Information page.

- First row shows the name of the network, which the device is connected with;
- Software version is displayed on the second row;
- Serial number of the device is shown on the third row;
- Channels row shows the amount of active channels;

- Lights row shows active lights;
- Relay modules shows active relay modules;
- AOS shows active analog outputs.

5.2.4 CONFIGURATION MENU

5.2.4.1 SYSTEM PAGE

From the system page the user can enable buzzer and restart the system. System page is shown on figure 15.

Figure 15. System page.

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5.2.4.2 RS-485 PAGES

RS485 pages show the RS485 outputs information. The user can see and change the slave ID, baudrate, parity and stop bits. RS485 page is shown on figure 16.

Figure 16. RS485 page.

When Modbus settings are changed and saved, the device will restart automatically.

5.2.4.3 WIFI PAGE

On the WIFI page the user can connect or disconnect with a wireless network. The page shows whether the device is connected to WIFI and the IP address of the connected WIFI device. The WIFI page is shown on figure 17.

Figure 17. Wifi page.

5.2.4.4 DETECTOR PAGE

The user can see and change the channels and slave IDs of the detectors. Also mark if the selected detector is available and active. Detector page is shown on figure 18.

Figure 18. Detector page.

When the detector is unavailable or inactive then the row is highlighted red.

When the settings have been changed, "Save & Exit" will save the new settings. "Exit" will cancel the changed settings and exit the page.

5.2.4.5 HUMIDITY SETTINGS PAGE

On the humidity settings page, the user can change and set channels and slave IDs. Humidity settings page is shown on figure 19.

Figure 19. Humidity settings page.

On the "CHANNEL" row "G" shows the group of sensors and "E" shows external sensors. The device supports up to 8 humidity groups. There can be a maximum of 5 external and 5 internal sensors in one humidity group.

Sensor availability can be set on the "S.AVAILABLE" row.

Group availability can be set on the "G.AVAILABLE" row. Next to that "GROUP ACTIVE" can also be set.

When the settings have been changed, "Save & Exit" will save the new settings. "Exit" will cancel the changed settings and exit the page.

5.2.4.6 RELAY MODULE PAGE

On the relay module page, the user can set module slave IDs and whether the module is "Available" or "Unavailable". The relay module page is shown on figure 20.
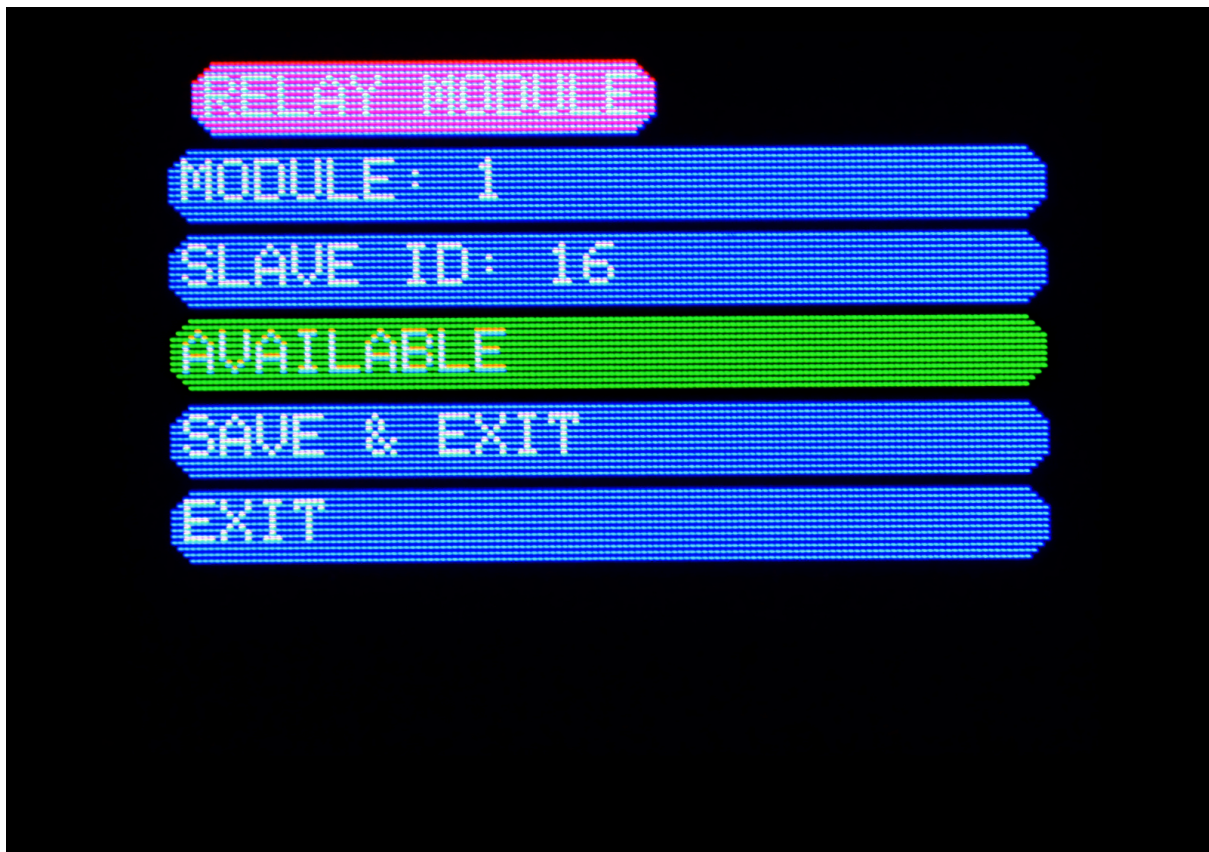
Figure 20. Relay module page.

5.2.4.7 LIGHT MODULE PAGE

Lights connected to the µGas device can be configured from the "LIGHT" menu. Lights page is shown on figure 21. The lights that can be connected with the system are shown on "Appendix 1 List of spare parts and accessories".

Figure 21. Light module page.

"LIGHT" row shows the channel of the light which is displayed.

The user can set the volume, maximum duration and blink frequency of the displayed light.

- The volume is the intensity of the light source- it can be set from 0-100 %. By pushing the button swiftly, the value increases/decreases one unit. By holding the button for 2 seconds, the value increases/decreases 10 units;
- Maximum duration shows the time that the light is on when the alarm occurs. The duration can be set from 0 to 14400 seconds. By pushing the button swiftly, the value increases/decreases one unit. By holding the button for 2 seconds, the value increases/decreases 600 units;
- For every alarm type (fault, underrange, alarm 1-3, overrange, TWA, STEL) the blinking frequency and operation mode can be set. When all the alarms are

configured, "SAVE&EXIT" needs to be clicked before moving on to another light module to save the alarm settings.

- Blink frequency for the alarm can be set to:
    - 1 Hz;
    - 2 Hz;
    - 0,5 Hz.
- OPMODE means operation mode and it can be set to 1, 2, 3, 4 and 5.
    - Mode 1 means alarm light flashing without horn;
    - Mode 2 means alarm light flashing with horn;
    - Mode 3 means permanent alarm light without horn;
    - Mode 4 means permanent alarm light with horn;
    - Mode 5 means the alarm light is off, only the horn will be activated.
- By clicking AVAILABLE, the user can set the availability of the displayed light. When the row is highlighted green, the light is available. When the row is highlighted red, the light is not available.

When the settings have been changed, "Save & Exit" will save the new settings. "Exit" will cancel the changed settings and exit the page.

5.2.4.8 CLOCK PAGE

The user can set time and date from the Clock page. The Clock page is shown on figure 22.
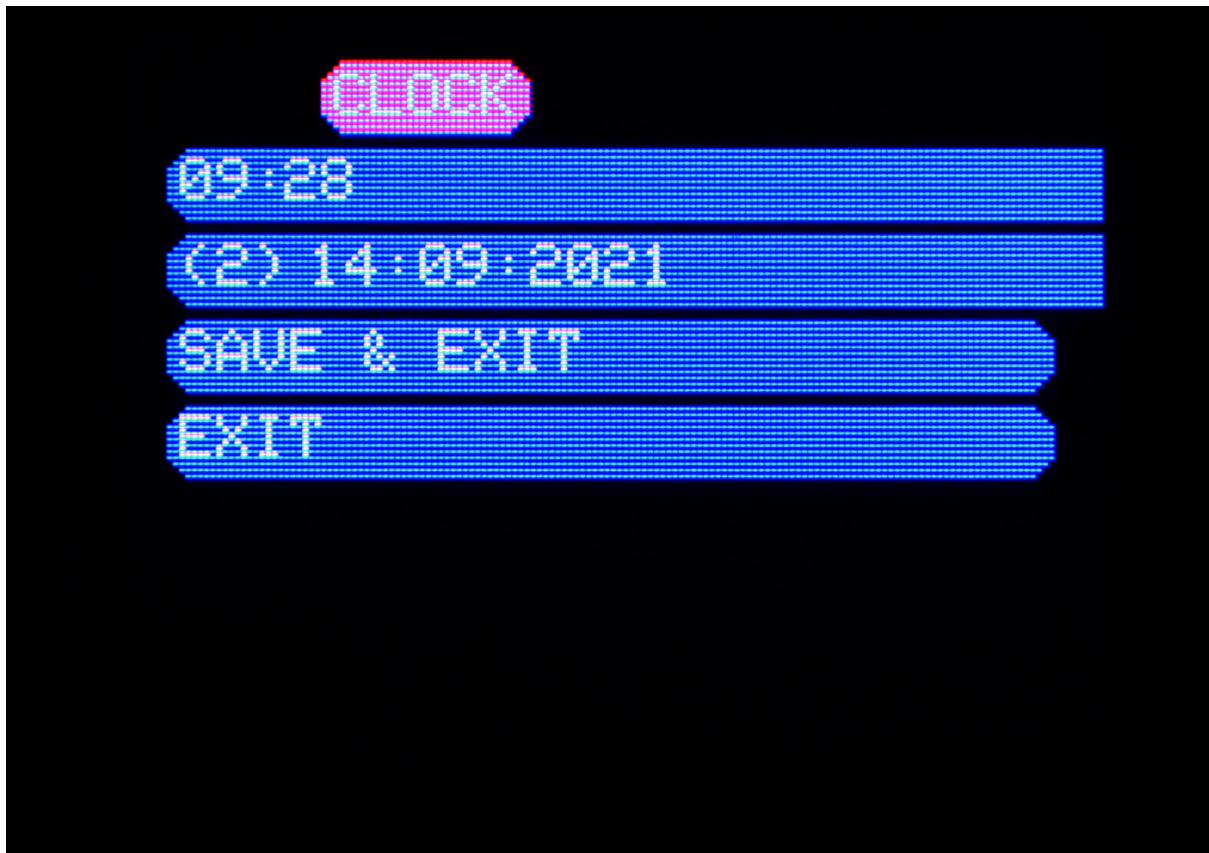
Figure 22. Clock page.

The time format is 24-hours. The date format is displayed:

- (1-7) shows the day of the week- 1 is Monday, 7 is Sunday;
- dd/mm/yyyy (day/month/year)

When the settings have been changed, "Save & Exit" will save the new settings. "Exit" will cancel the changed settings and exit the page.

After the Clock page there is an Exit option which returns to the Overview page.

5.2.4.9 E7131 PAGE

The E7131 analog/digital I/O module can be configured to the system. Information and connection scheme for the module is shown on appendix 4.

On the E7131 page, the user can set slave IDs and whether the module is available. The E7131 settings page is shown on figure 23.

Figure 23. E7131 settings page.

5.2.5 TEST MENU

The Test page is used to test connected and internal devices. Test menu is shown on figure 24.

Figure 24. Test page.

On the test page, the user can test:

- Internal relays- the device will test its internal relays. There are 8 internal relays (SPDT) and when testing, the device will click 2 times per 1 relay;
- Modbus relays- the device will test connected external relays;
- Analog outputs- ANALOG OUT HIGH will set the 4-20 mA output to 18 mA for 30 seconds. ANALOG OUT LOW will set the 4-20 mA output to 10 mA for 30 seconds. The user should measure the analog outputs in this process to ensure that the measured values match with the set values;
- Modbus lights- the device will test connected Modbus lights.

5.2.6 SERVICE MENU

The Service page displays manufacturer contacts and calibration information. The service page is shown on figure 25.
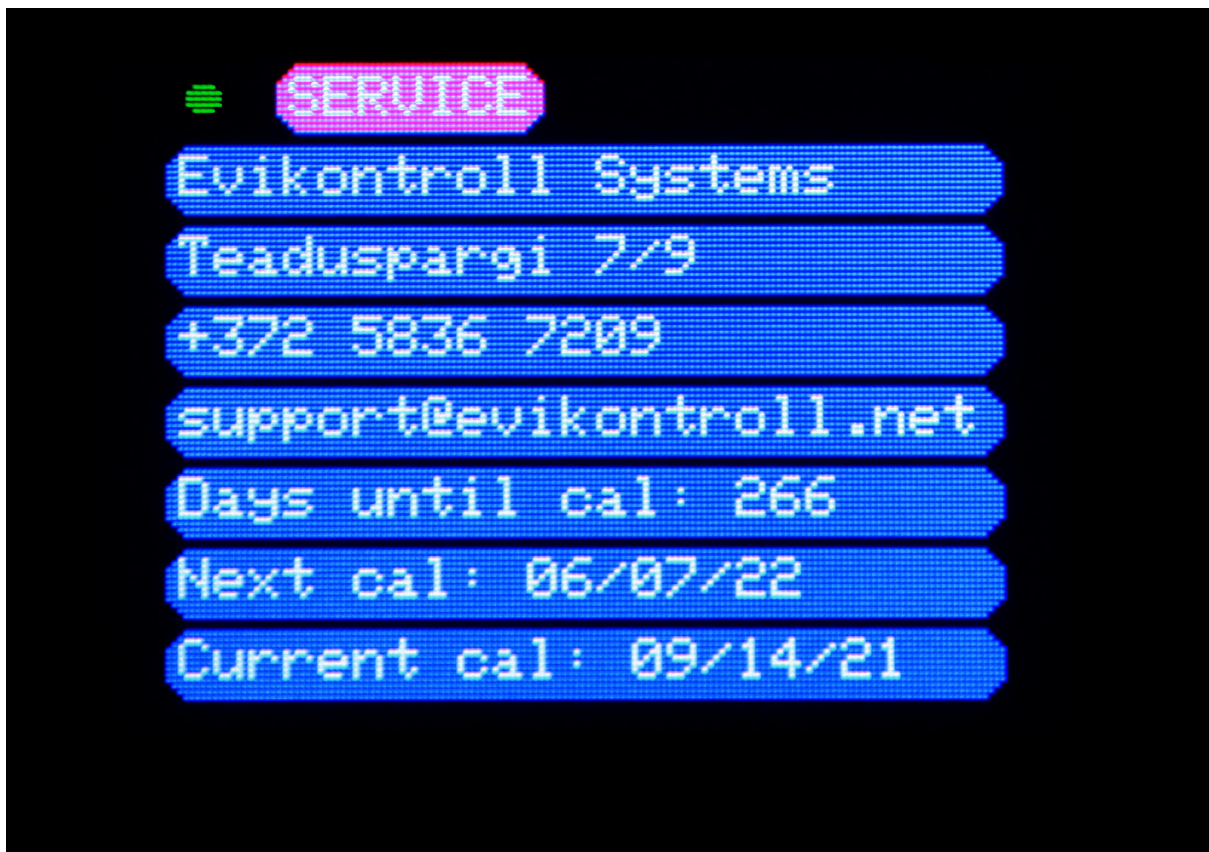
Figure 25. Service page.

The service page shows the number of days until calibration, next calibration and the date of the last calibration.

5.2.7 HUMIDITY MENU

The humidity page displays humidity overview. The humidity overview page is shown on figure 26.
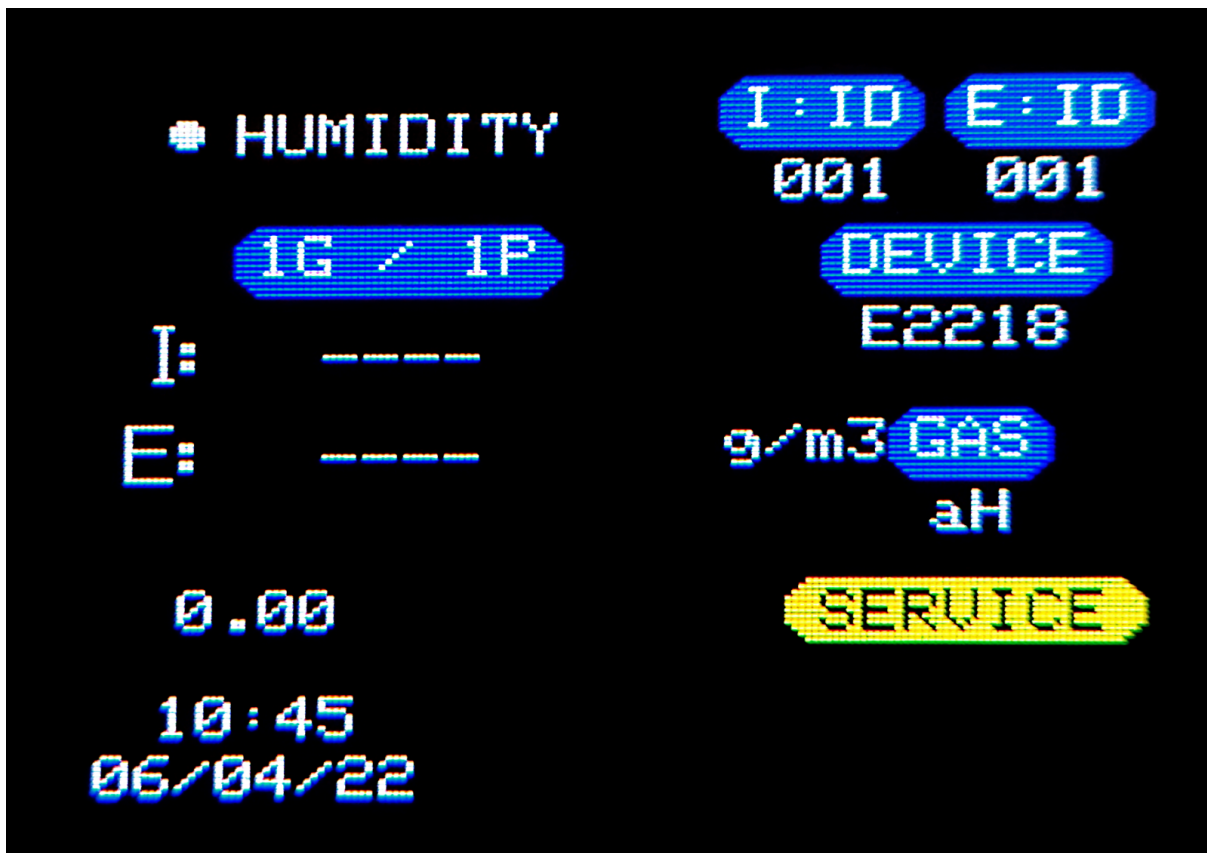
Figure 26. Humidity overview page.

Humidity overview page displays:

- Humidity groups and pairs (G/P). When the page is active, the user can change the displayed groups and pairs;
- Internal and external absolute humidity values in g/m^3(I, E);
- Internal and external average absolute humidity difference;
- The device model which is being used to measure humidity;
- Absolute humidity measurement unit;
- The alarms are the same as the general overview page (Chapter **5.2.1 Overview page**).

5.2.8 RELAYS PAGE

The Relays page displays the relay matrix. Relay matrix is shown on figure 27.

Figure 27. Relay matrix page.

The relay matrix displays:

- Internal relays (I);
- External relays E1-E5 on the first page, E6-E8 on the second page.

Relay matrix can be configured from the device's web server (Chapter 6 Web server).

5.2.9 LIGHTS MENU

The lights menu displays Modbus lights connected to the controller. If the light is configured to the system it will show as a dot. The lights menu is shown on figure 28.

Figure 28. Lights matrix page.

The states of the light modules are:

- Gray- alarm off;
- Red- fault;
- Green- alarm on.

5.2.10 ANALOG PAGE

The analog page displays the analog output values. The analog page is shown on figure 29.

Figure 29. Analog outputs page.

The μGas device supports 4 user-settable analog outputs.

5.2.11 E7131 PAGE

The E7131 page shows the Bus ID of the module and input information. The E7131 page is shown on figure 30.
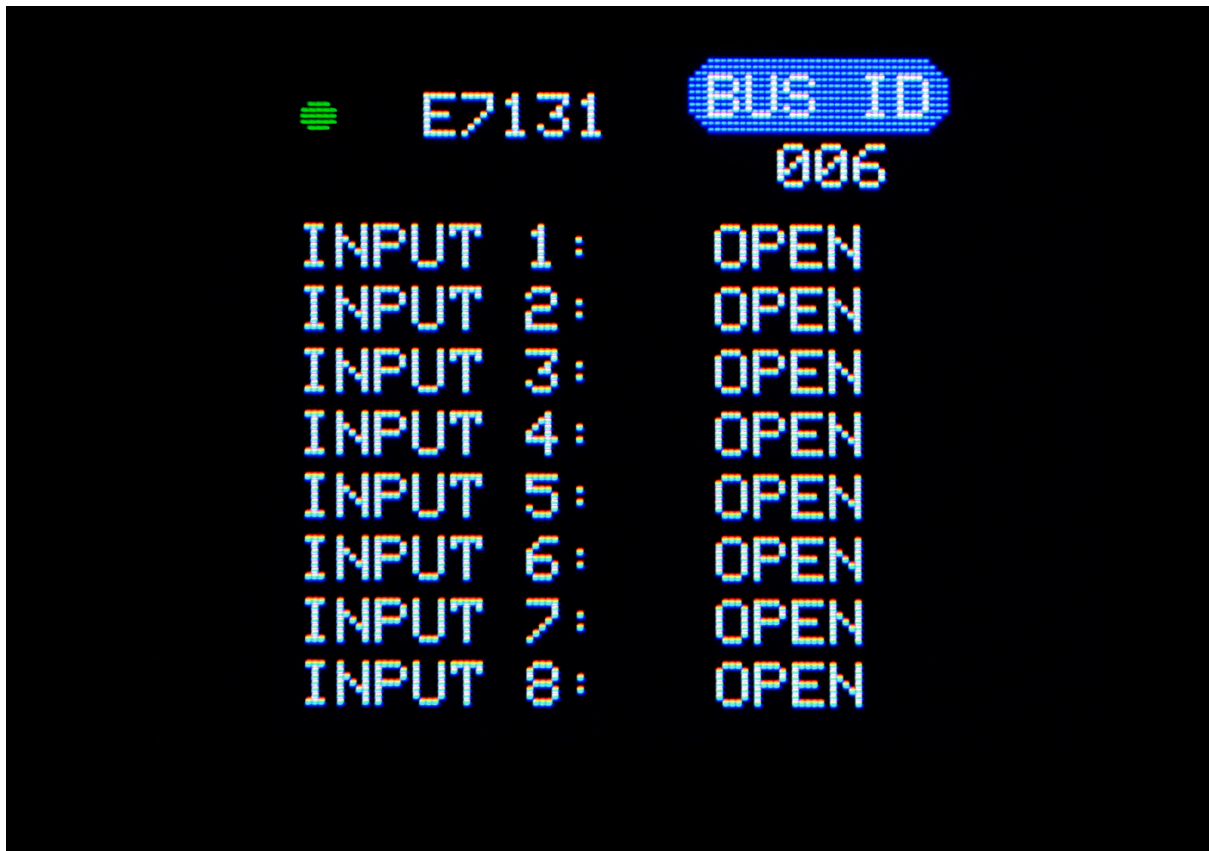
Figure 30. E7131 page.

6. WEB SERVER

6.1 FIRST CONNECTION

The μGas device creates a network uGAS(871 XXXXX). The password of that network is by default 12345678. In order to access the web server, the user needs to connect with this wifi network (with a laptop or smartphone) and enter 192.168.4.1 on the URL bar in the browser.

When in the web server, the configuration and calibration pages can be accessed by entering the password 1234 into the password dialog.

The IP address of the wifi network is shown on the μGas device or on the web server through the device's own network (192.168.4.1).

After software update it is required to clear browser cache to get the latest version of the web visualization.

6.2. MENU

The web server menu is used to navigate to pages. The web server menu is shown on figure 31.
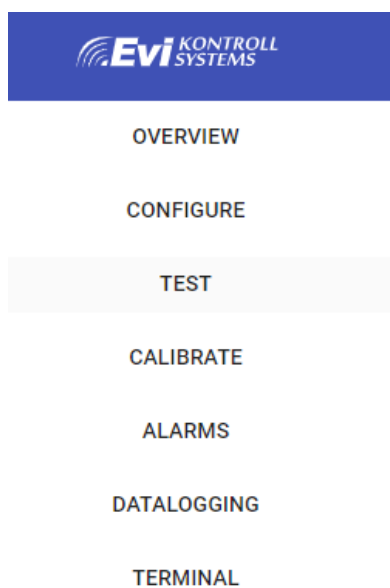
Figure 31. Web server menu.

6.3. OVERVIEW PAGE

The overview page displays general information such as measurement information, system information, service information and output information. Overview pages are shown on figure 32 to figure 37.

System Information

Parameter	Configured value
System version	100
System location	location
System name	EKS-robert
Connected WiFi name	Tenda_CE5DA8
Connected WiFi IP-address	192.168.0.102
Measuring channels	20
Modbus relays	1
Modbus lights	0
Active analog outputs	1

Figure 32. Web server overview page system information.

The system information tab displays:

- System version, location and name;
- Connected WIFI name and IP address;
- Amount of measuring channels;
- Amount of connected external relays
- Amount of connected Modbus lights;
- Active analog outputs.

Service Information

Parameter	Value
Company	Evikontroll Systems
Address	Teaduspargi 7/9
Phone	+372 5836 7209
E-mail	support@evikontroll.net
Days until next calibration	265
Next calibration	08/06/2022
Current calibration	14/09/2021

Figure 33. Web server overview page service information.

Please contact the manufacturer for information on how to change this information on request.

The service information tab displays:

- Manufacturers information;
- Last calibration time;
- Next calibration time;
- Days until next calibration.

Measurement Information

CHANNEL INFO   IO MODULE INFO

Channel	Concentration	Unit	Gas	Alarms	Graph
1	0	PPM	CO_2		GRAPH
2	0	PPM	CO		GRAPH
3	0	%LEL	NH_3		GRAPH

Measurement Information

CHANNEL INFO   **IO MODULE INFO**

Input	Input level / Input State	Input mode
1	Open	Dry Contact
2	Open	Dry Contact
3	Open	Dry Contact
4	Open	Dry Contact
5	Open	Dry Contact
6	Open	Dry Contact
7	Open	Dry Contact
8	Open	Dry Contact

Figure 34. Web server overview measurement information.

The measurement information tab displays:

1) Channel information
- Channel measurement values- concentration, unit;
- Measured gas;
- Alarms;
- Graph.

2) IO Module information
- Input;
- Input level / Input state;
- Input mode.

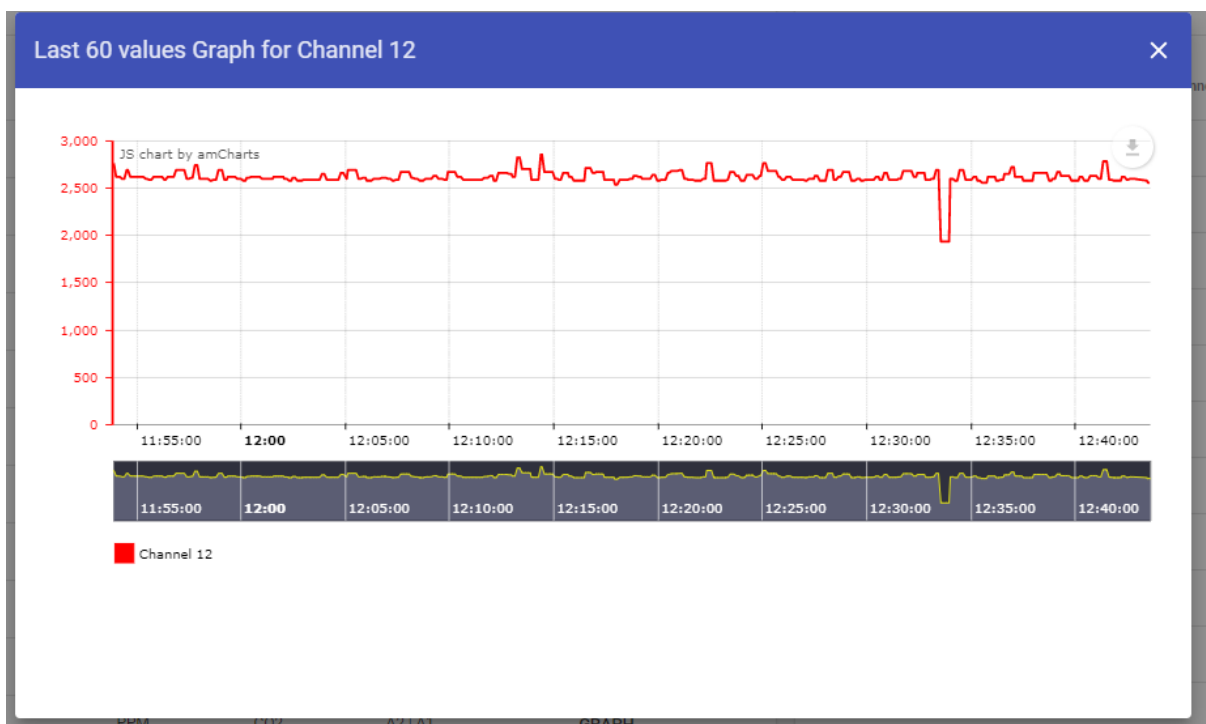The graph option on each channel opens the selected channel graph. The graph view is shown on figure 35.

Figure 35. Web server channel graph.

The graph can be zoomed in and out by selecting the area of the graph and making it active. On the right upper corner, the user can download, save, annotate and print the selected graph. The graph can be saved as SVG, JPG and PNG file. Measurement data can also be downloaded as a CSV file for further analysis.

On the overview page, there is also a graph, which shows all the channels with measured values. The overview graph is shown on figure 36.
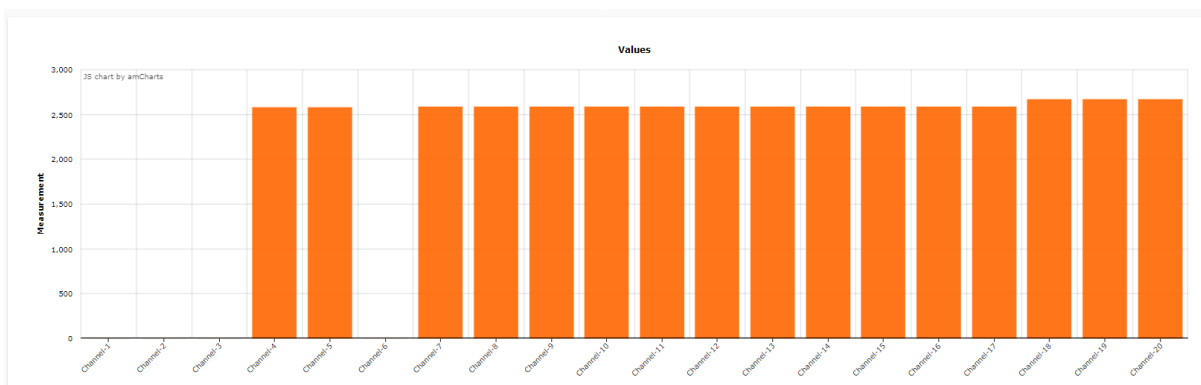

Figure 36. Web server channels overview graph.

Output information is also displayed on the overview page. Output information is shown on figure 37.

Output Information

Type	Channel	State
Analog	1	4.00
Analog	2	0.00
Analog	3	0.00
Analog	4	0.00
Relay	1	Closed
Relay	2	Open
Relay	3	Open
Relay	4	Open
Relay	5	Open
Relay	6	Open
Relay	7	Open
Relay	8	Closed

Figure 37. Web server outputs information graph.

Outputs information shows all the internal outputs states- 8 relays and 4 analog outputs.
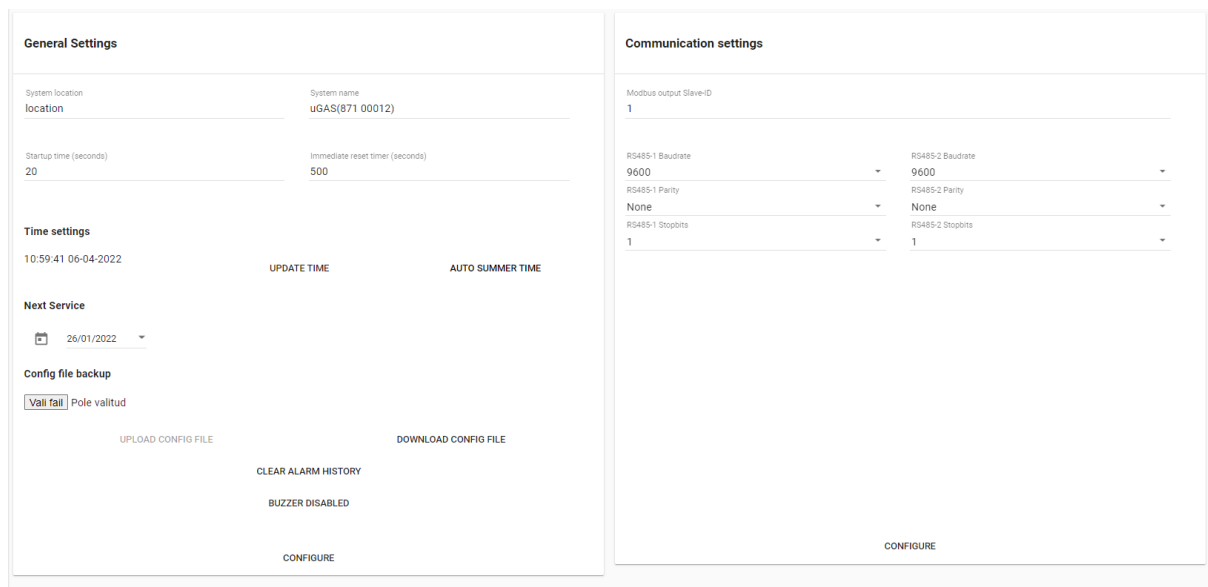
6.4. CONFIGURE PAGE

To enter the configuration, the user needs to insert a password. After inserting the correct password (default **1234**) the configuration page opens. The configuration page has different tabs for settings:

- General settings;
- WIFI settings;
- Detector settings;
- Analog settings;
- Humidity settings;
- Relay settings;
- Modbus relay settings;
- Modbus lights settings.

6.4.1 GENERAL SETTINGS

From general settings the user can set general and communication settings. General settings page is shown on figure 38.

Figure 38. Web server general settings configuration page.

From general settings, the user can set:

- System location - Text based parameter to indicate the location / area of detection area;
- System name - Text based parameter to indicate the unique name of the system;
- Startup time in seconds - Time after bootup to wait until all alarms are going to be active in the system;
- Immediate reset time - Time for silencing alarms when alarm occurs and the "RESET" button is pressed (longer pressing time) if left as 0 then alarm will be silenced indefinitely;
- Time and date;
- Auto summer time - the time is updated automatically according to the time zone daylight saving time;
- Next service time;
- Upload configuration backup file;
- Download configuration file.

After changing settings, "CONFIGURE" must be clicked in order to save the new settings.

From communication settings, the user can set:

- Modbus device Slave ID that will be configured;
- RS485 Baudrate- 4800, 9600, 19200, 38400 or 57600;
- RS485 Parity- none, even, odd;
- RS485 stopbits- 1 or 2.

6.4.2 WIFI SETTINGS

In WIFI settings the user can set WIFI settings and networks. The WIFI settings page is shown on figure 39.

Figure 39. Web server WIFI settings configuration page.

From WIFI settings, the user can set:

- SSID (network name);
- Password;
- AP password (access point password);
- DHCP - when selected, the device will receive its IP-address automatically, if not selected, then the IP-address needs to be set manually;
- IP, Netmask and Gateway.

From WIFI networks, the user can:

- See information about the connected WIFI network and possible other networks;
- Choose a WIFI network.

After changing settings, "CONFIGURE" must be clicked in order to save the new settings.

6.4.3 DETECTOR SETTINGS

From detector settings, the user can configure detectors, which are connected to the μGas device. The detector settings page is shown on figure 40.

Figure 40. Web server detector settings configuration page.

On this page, the user can:

- Choose the measurement range and channel for the selected detector;
- Choose detector type;
- Set the selected detector as "Available/unavailable" and "Active/Inactive":
  - Available/unavailable indicates if the system should communicate with the device;

- Active/inactive indicates If this channels alarms are switching the devices configured in the matrix;
- Choose measurement units- ppm, vol %, %, °C, °F, %LEL, %UE6, g/m^3, %RH, pH;
- Choose measurement range;
- Choose analog output scale override range- this option will preserve the measurement range and change analog scale for the device. For example if measurement range is 0…100 and analog output scale override range is 0…50 all values over 50 will be 20mA;
- Choose decimal points- 0, 1 or 2;
- Choose measured parameter- CO_2, CO, R-449a, rH, Temperature, CH_4, aH, O_2, O_3, H_2, Cl_2, C_2H_4, NO_2, SO_2, NH_3, EtOH, H_2S, $C_6H_5CH_3$, $C_6H_4(CH_3)_2$
- Set TWA active/inactive as well as setpoint of the TWA. The TWA reflects the maximum average exposure a worker can be subjected to without experiencing significant adverse health effects over the standardized eight-hour work period.
- Set STEL active/inactive as well as setpoint of the STEL. STEL is the maximum concentration of a chemical to which workers may be exposed continuously for a short period of time (usually 15 minutes) without any danger to health, safety or work efficiency.
- Choose logging type;
- Set the alarm type to high limit or low limit
    - *High limit* triggers alarm when the measured parameter reaches over the set limit.
    - *Low limit* triggers an alarm when the measured parameter goes below the set limit.
- Configure alarms. Alarm configuration tab is shown on figure 41.
- Configure relay matrix. Relay configuration tab is shown on figure 42.
- Configure external relay modules matrix.
- Configure lights matrix. The Light matrix configuration tab is shown on figure 43.
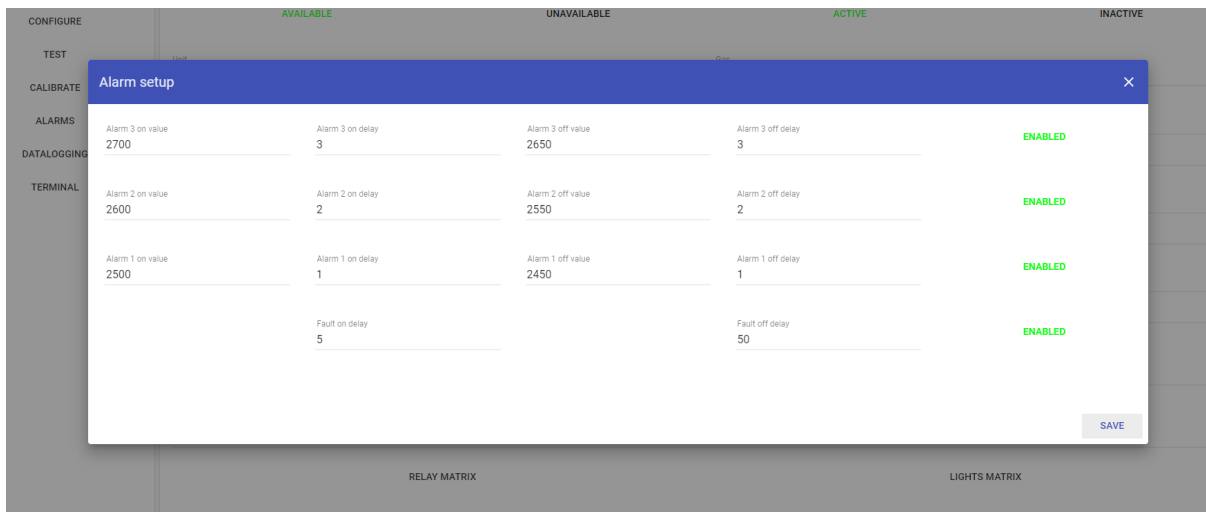
Figure 41. Web server detector settings alarm configuration page.

There are 3 user configurable alarms available for each detector as well as a Fault alarm. The alarms can be enabled/disabled from the right side of the alarm table. For each user configurable alarm, the user can set:

- Alarm on value- the value which measured value must exceed;
- Alarm on delay- the time period in which the measured value must exceed the "alarm on value" to generate an alarm;
- Alarm off value- the value which the measured value must fall under;
- Alarm off delay- the time period in which the measured value must fall under the "alarm off value" to silence the alarm.

After configuring the matrix, "SAVE" must be clicked in order to save the new settings.

Figure 42. Web server detector settings relay configuration page.

The user can configure 8 internal relays. The relays can be set to act on over-range situations, user configured alarm situations, under-range situations or TWA and STEL limits.

- Black text "DISABLED" means that the relay is disabled;
- Green text "ENABLED" means that the relay is enabled;
- Grey text "DISABLED" means that the relay is configured as a "FAULT" relay which can only be triggered when fault occurs.

After configuring the matrix, "SAVE" must be clicked in order to save the new settings.

Figure 43. Web server detector settings lights configuration page.

The user can configure up to 32 lights. The lights can be set to act on over-range situations, user configured alarm situations, under-range situations or TWA and STEL limits.

- Black text "DISABLED" means that the light is disabled;
- Green text "ENABLED" means that the light is enabled.

After configuring the matrix, "SAVE" must be clicked in order to save the new settings.

After changing settings, "CONFIGURE" must be clicked in order to save the new settings.

When clicking "COPY" the detector information and configuration is copied to the next detector.

6.4.4 ANALOG OUTPUTS SETTINGS

From analog settings, the user can configure analog outputs. The analog output settings are shown on figure 44.
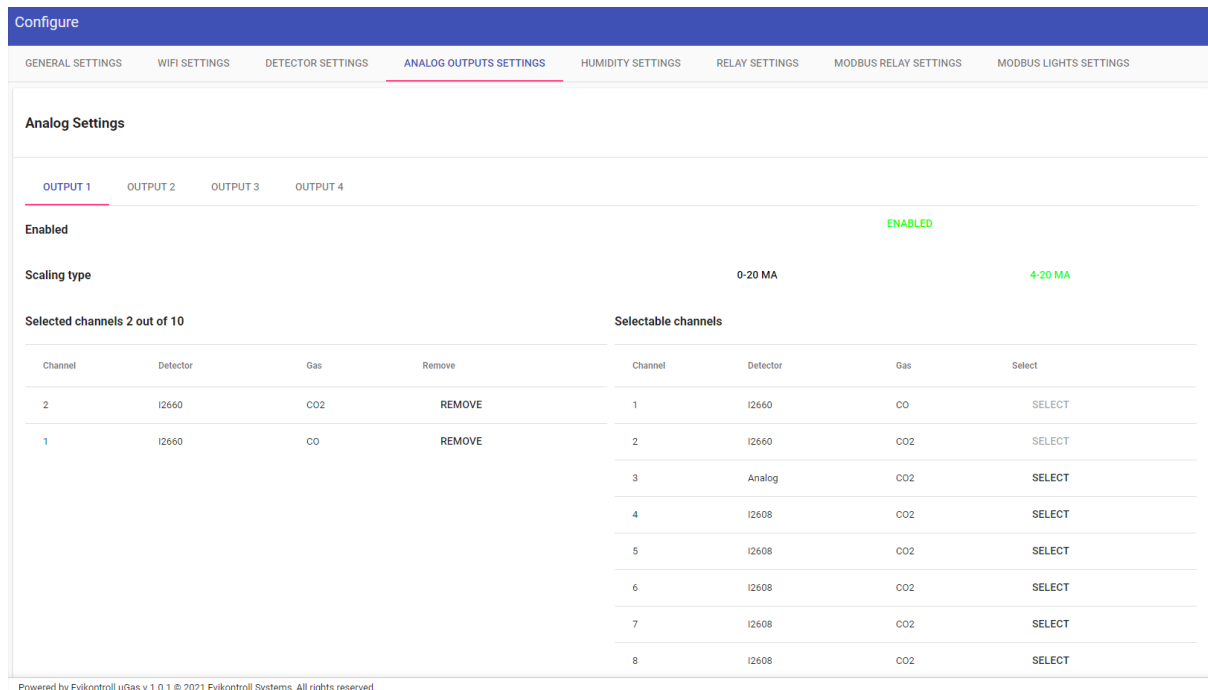
Figure 44. Web server analog outputs settings configuration page.

There are 4 analog outputs available. The user can:

- Select if the analog output is enabled or disabled;
- Choose scaling type- 0-20 mA or 4-20 mA;
- Select and remove channels.

When a detector is registered to an analog output, the analog output will give out a signal according to measured value. For example if the detector's measuring range is 0-100 ppm and current value is 50 ppm, then analog output will give 50% of the maximum (4mA to 20mA range, so 50% is 12 mA). If multiple detectors are registered to one analog output, the highest percentage is considered in scaling the 4-20 mA scale.This in return allows users to add various gases to analog outputs and see the highest level of them which should then control the ventilation for an example.

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After changing settings, "CONFIGURE" must be clicked in order to save the new settings.

6.4.5 HUMIDITY SETTINGS

From humidity settings, the user can configure humidity groups. Humidity settings page is shown on figure 45.
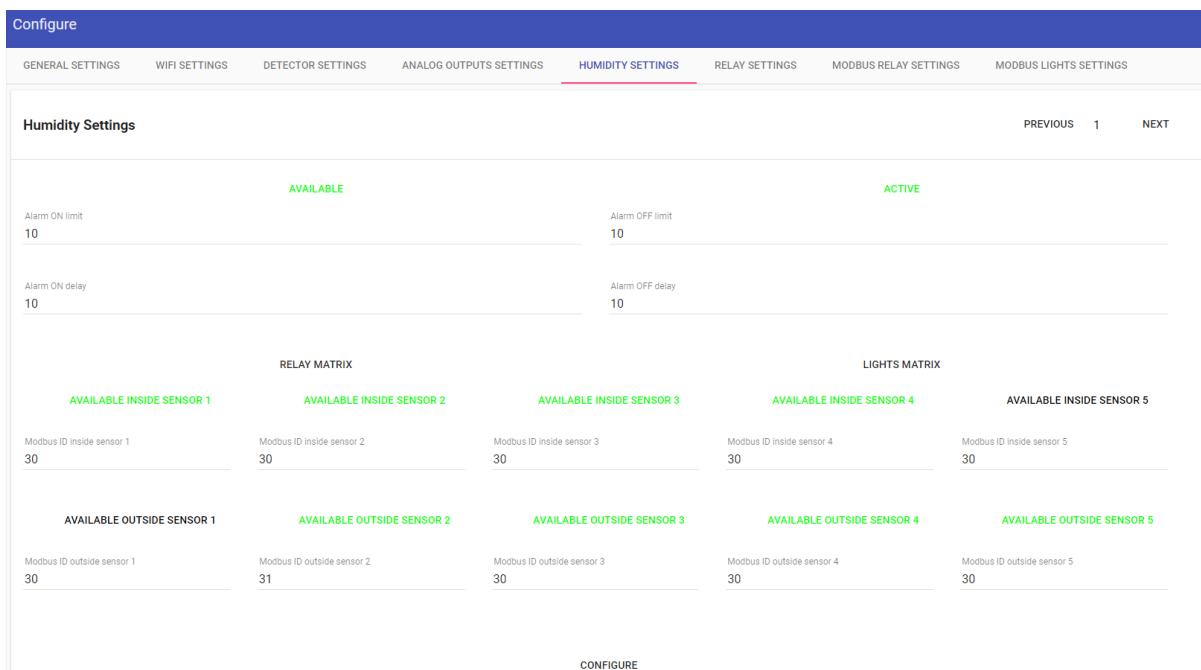
Figure 45. Web server humidity settings configuration page.

From humidity settings, the user can:

- Configure up to 8 independent humidity groups, each group has the possibility to configure 5 inside sensors and 5 outside sensors. The detectors measure absolute humidity;
- Set the group as "ACTIVE/INACTIVE" and "AVAILABLE/UNAVAILABLE";
- Set "ALARM ON/OFF" and accordingly the delays of the alarms in seconds;
- Mark each inside/outside sensor as "AVAILABLE/UNAVAILABLE";

- Activate relays for each humidity group- up to 8 relays. Humidity group relay matrix is shown on figure 46;
- Activate lights for each humidity group- up to 32. Humidity group lights matrix is shown on figure 47.

The groups can be changed from the top right corner by pressing "PREVIOUS/NEXT".

After changing settings, "CONFIGURE" must be clicked in order to save the new settings.
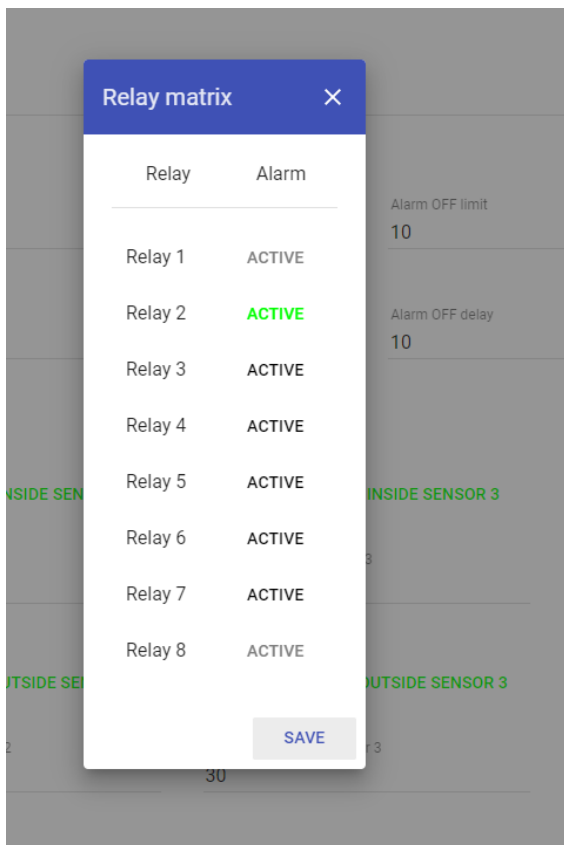
Figure 46. Web server humidity settings relay matrix page.
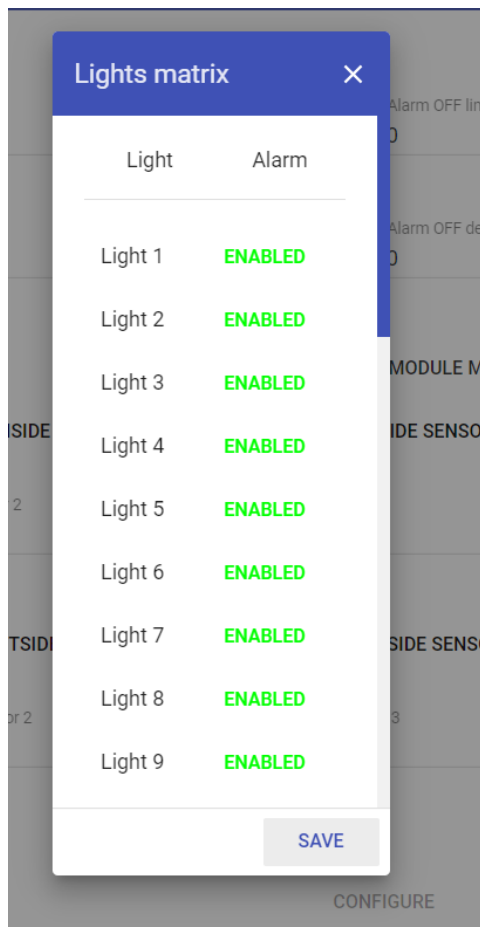
Figure 47. Web server humidity settings lights matrix page.

6.4.6 RELAY SETTINGS

From relay settings, the user can configure the 8 internal relays. The relay settings page is shown on figure 48.

EVIKONTROLL µGAS
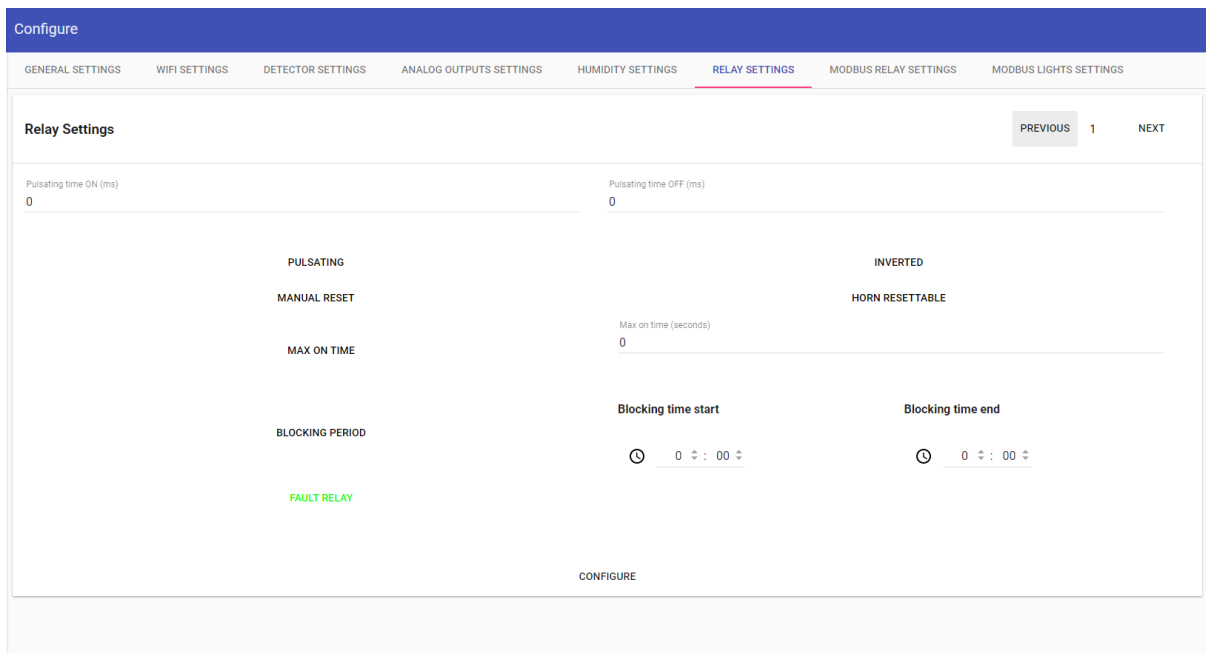
Figure 48. Web server relay settings page.
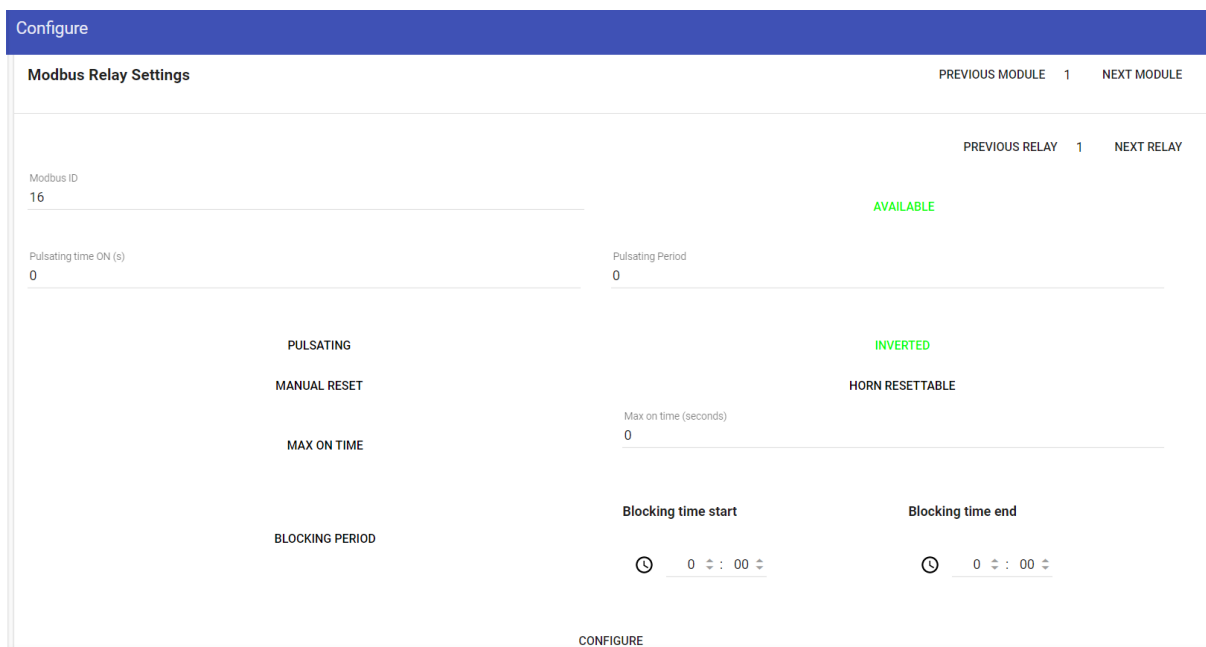
From the relay settings menu:

- *Relay type* could be set to inverted. If *inverted* is chosen then the device will turn off when the alarm is triggered.
- *Horn resettable* could be set to enabled or disabled. When *enabled* the alarm could be silenced from the screen.
- *Manual reset* could be set to enabled or disabled. When *enabled* the alarm can be silenced only when all the alarms are finished, when the situation is stabilized.
- *Pulsating* could be set to enabled or disabled. When *enabled* the user can set a period in which the relay turns on and off (ms).
- *Blocking period* could be set to enabled or disabled. If enabled the user can set the time range in which the alarms will not trigger. Blocking period has the highest priority.

- MAX ON TIME is the maximum time for a relay to be on. After maximum on time, the relay will be turned off.

- By pressing "FAULT RELAY" the displayed relay will be set as a fault relay.

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After changing settings, "CONFIGURE" must be clicked in order to save the new settings.

6.4.7 MODBUS RELAY SETTINGS

From Modbus relay settings, the external relay modules connected with the µGas device can be configured. Modbus relay settings are shown on figure 49.

Figure 49. Web server modbus relay settings page.

External connected relay modules can be configured the same way as internal relays. To configure the external relay module, the user needs to insert Modbus ID of the device. From the top right corner of the page, modules and relays can be changed with "PREVIOUS/NEXT". Up to 5 relay modules can be connected with the µGas device.

6.4.8 MODBUS LIGHTS SETTINGS

From Modbus lights settings, the lights connected to the μGas device can be configured. The lights settings page is shown on figure 50.

STEL Alarm

Blinking frequency
1 Hz

Operation mode
OFF

TWA Alarm

Blinking frequency
1 Hz

Operation mode
OFF

Humidity Alarm

Blinking frequency
1 Hz

Operation mode
OFF

CONFIGURE
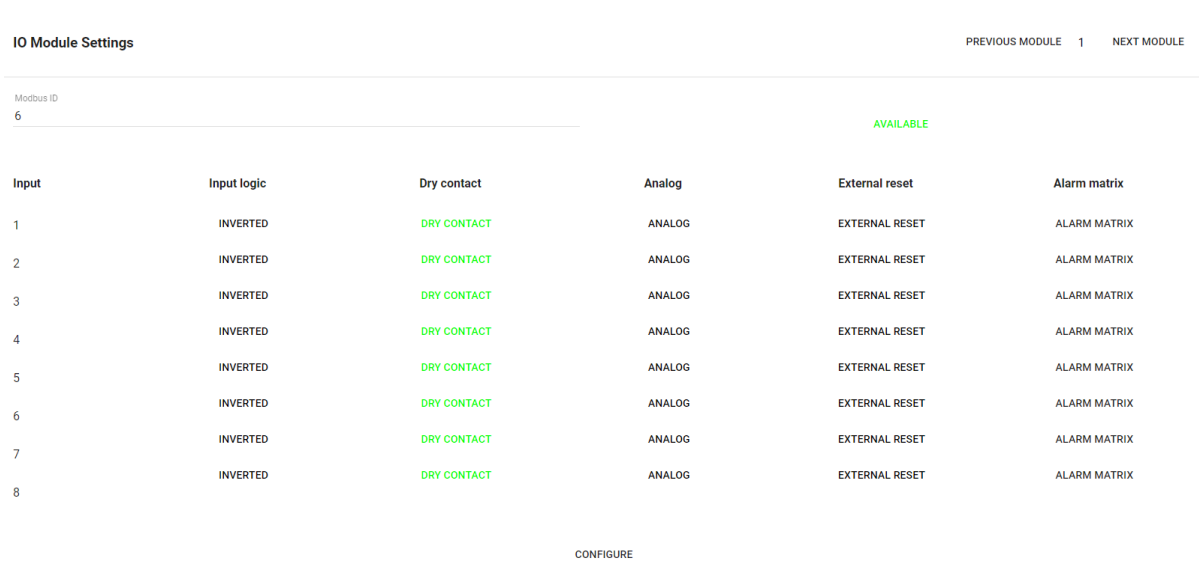
Figure 50. Web server modbus lights settings page.

The user can set the volume, maximum duration, blinking frequency and operation mode of the displayed light. The maximum amount of lights connected to the µGas device is 32.

- "VOLUME" is the intensity of the light source- it can be set from 0-100 %.
- Maximum duration shows the time that the light is on when the alarm occurs. The duration can be set from 0 to 14400 seconds.
- Blink frequency can be set to 0,5, 1 or 2 Hz.
    - Operation mode can be set to:
        - alarm light flashing without the horn;
        - alarm light flashing with horn;
        - permanent alarm light without the horn;
        - permanent alarm light with horn;
        - the alarm light is off, only the horn will be activated.

- By clicking AVAILABLE, the user can set the availability of the displayed light.
- For each alarm, the blinking frequency and operation mode can be configured separately.

6.4.9 IO MODULE SETTINGS

From IO module settings, the module inputs can be configured. The IO module settings page is shown on figure 51.

Figure 51. Web server IO module settings page.

The user can:

- Set input logic;
- Choose whether the input is used as dry contact, analog or external reset;
- Configure alarm matrix.

6.5. TEST PAGE

From test page, the user can test:

- Internal relays;
- Analog outputs;
- External relays;
- Modbus lights.

The test page is shown on figure 52.

Relay testing		
Channel	State	Toggle
1	0	TEST
2	0	TEST
3	0	TEST
4	0	TEST
5	0	TEST
6	0	TEST
7	0	TEST
8	0	TEST

Analog output testing			
Channel	State	Test-Low	Test-High
1	0.00	TEST - 10 MA	TEST - 18 MA
2	0.00	TEST - 10 MA	TEST - 18 MA
3	0.00	TEST - 10 MA	TEST - 18 MA
4	0.00	TEST - 10 MA	TEST - 18 MA

Modbus relay testing		
Module ID	Relay	Toggle

Modbus lights testing	
Light ID	Toggle
3	OFF

Figure 52. Web server test page.

On the test page, the user can test:
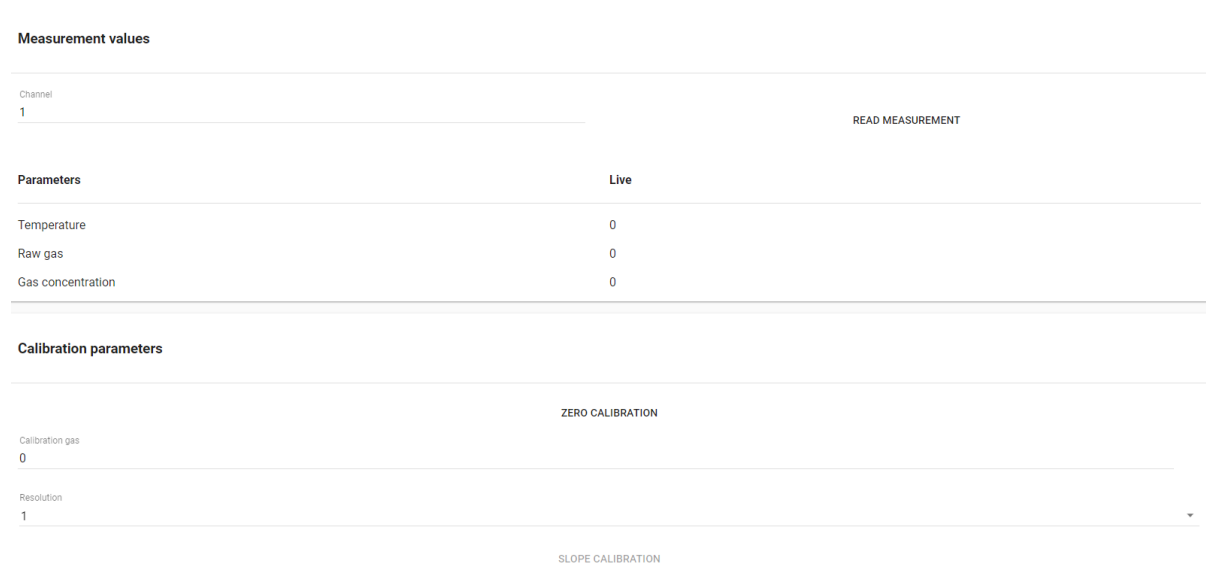
- Internal relays- the device will test its internal relays. There are 8 internal relays (SPDT). The user can test relays by clicking "TEST". When "TEST" is clicked, the relay in the device should click and the state of the relay change from 0 to 1 or 1 to 0;
- Modbus relays- the device will test connected external relays;
- Analog outputs- ANALOG OUT HIGH will set the 4-20 mA output to 18 mA for 30 seconds. ANALOG OUT LOW will set the 4-20 mA output to 10 mA for 30 seconds. The user should measure the analog outputs in this process to ensure that the measured values match with the set values;
- Modbus lights- the device will test connected Modbus lights.

6.6. CALIBRATION PAGE

Calibration menu is for calibrating the devices. Every device can be calibrated separately. Users can either *read settings* or calculate zero and slope and calibrate the device from scratch. Calibration menu is shown on figure 53.

NB! When the user is in the calibration menu, the communication of the whole system is halted and alarms are inhibited for the specific gas detector which is tested.

When the system detects a CO_2 sensor then the CO_2 calibration can be executed.

Figure 53. Web server calibration page.

Steps for calibrating zero:

      1. Read settings;
      2. Start measurement;
      3. Calculate zero;
      4. Write zero.

Steps for calibrating slope:

      1. Apply gas;
      2. Start measurement;
      3. Calculate slope;
      4. Write slope.

6.7. ALARMS PAGE

On the Alarms page, the last 100 alarms are displayed. The Alarms page is shown on figure 54.

Figure 54. Web server alarms page.

The alarm table shows:

- ID of the alarm (1 to 100);
- Alarm type
    - Humidity alarm;
    - Relay alarm;
    - Analog alarm;
    - Light alarm.
    - E7131 alarm
- Alarm level
    - Fault;
    - Under-range;
    - A1;

- - A2;
- - A3;
- - Over-range;
- - STEL;
- - TWA
- ● Start time of the alarm;
- ● End time of the alarm

6.8. DATALOGGING PAGE

The datalogging page shows up to 30 days of data. The datalogging page is shown on figure 55.

Figure 55. Web server datalogging file list page.

The datalogging page displays up to 30 days of data. The data is renewed every 30 minutes and saved every 4 hours. From the file list, the user can pick the date and by clicking "DOWNLOAD" the data measured on this date is displayed. The data file for a specific date is shown on figure 56.

Datalogging

Downloaded data for file 3

Channel	Graph
1	GRAPH
2	GRAPH
3	GRAPH
4	GRAPH
5	GRAPH
6	GRAPH
7	GRAPH
8	GRAPH
9	GRAPH
10	GRAPH
11	GRAPH
12	GRAPH
13	GRAPH
14	GRAPH
15	GRAPH
16	GRAPH

Figure 56. Web server datalogging download page.

All of the channels which are connected to the µGas device are shown separately on the data download page. By clicking "GRAPH", the graph of the channel is displayed. The datalogging graph of the channel is shown on figure 57.
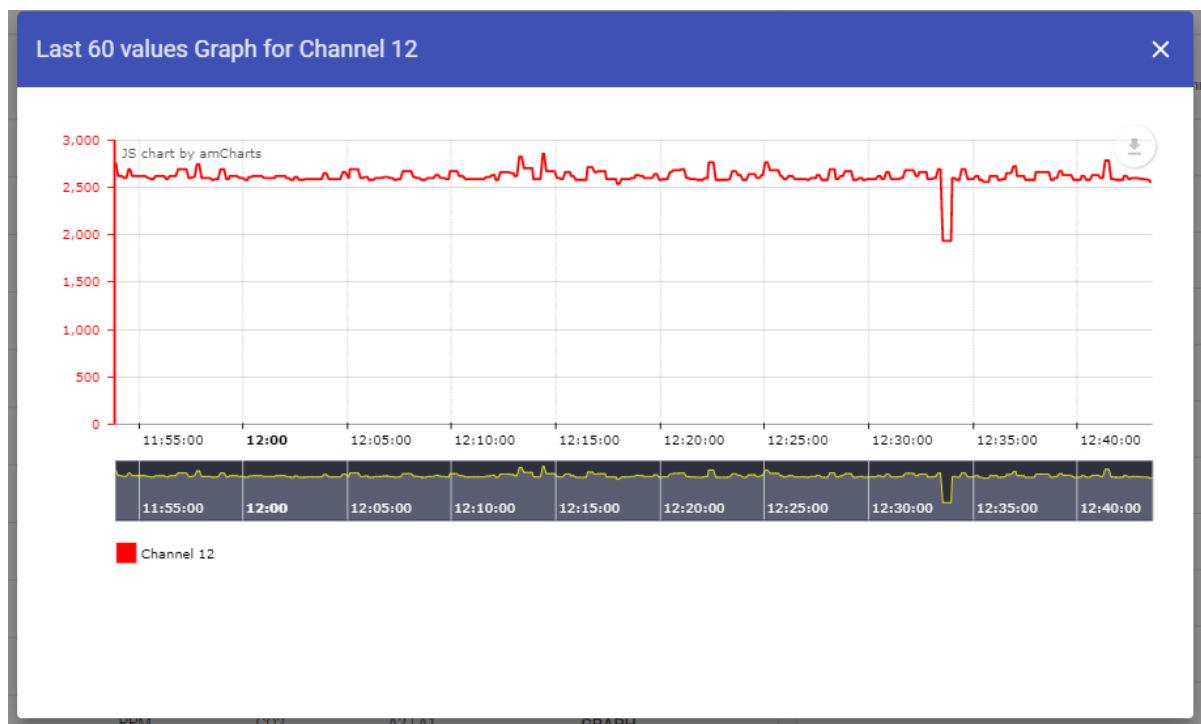
Figure 57. Web server datalogging download page.

The graph shows concentration throughout the time period. The graph can be minimized or maximized by selecting the time area on the graph. It can be downloaded as SVG, JPG, or PNG and saved as a CSV file.

7. OPERATION

This chapter will explain how the device operates and gives an overview of the initialization processes on the device and its web server.

1. When all electrical connections are done and the device is powered with a power supply it will turn on. While booting up the device displays information about configuration file reading and Wifi connection.
   - Configuration read successful/ Read config failed;
   - Connected to ap SSID:Wifinetwork password:password/ Failed to connect to ap SSID:Wifinetwork password:password.
2. Without logging in the user is permitted to view only the "Overview" and "Humidity" page.
3. The first page that will appear is "OVERVIEW" (chapter **5.2.1 Overview page**). The overview page displays connected devices with Slave IDs and measurement information. The device displays different detectors in the queue every five seconds. If no alarms are present then the device will display from the highest volume gas detectors to the lowest. If alarms are present then the device displays fault channels first and then after that highest alarm channels. Manual interruption with buttons will pause the automatic displaying. After 30 seconds of no interaction, the device resumes automatic queue displaying.
4. The controller has a possibility to control ventilation if humidity sensors are connected to the device. The measuring of the humidity is based on absolute humidity (not related to temperature compared to relative humidity). The user can set the lowest desired inside absolute humidity setpoint. The device analyzes outside humidity with inside humidity before functioning. If the inside humidity transmitter measures over the desired setpoint then the system will trigger a humidity alarm in case when outside air has less absolute humidity than inside sensor. For accurate measurements it is possible to configure up to 5 transmitters inside and 5 outside to average the measurement / get the highest value in 5 different locations depending on preference. (Chapter **5.2.4.5 HUMIDITY SETTINGS PAGE** and **5.2.7 HUMIDITY MENU**)
5. The controller communicates with the configured devices concurrently. After all detector channels have been communicated, the system will also check for lights and relay modules to figure out if all devices are responding correctly. When alarms occur the device displays "! ALARM !" on the overview page under the detector that is involved. The clock icon shows that some device in the system is in an alarm situation.

Depending on the alarm configuration following alarms will be displayed:

- Fault- Modbus connection error;
- Underrange- the measured value of the transmitter is below the measurement range of the transmitter;
- Alarm 1-3- user configured alarm ranges;
- Overrange- the measured value is over the measurement range of the transmitter;
- STEL- the measured value has exceeded the STEL value;
- TWA- the measured value has exceeded the TWA value.

Alarms are explained in chapter **5.2.1 Overview page**.

6. From the web server the user can choose alarm resets for the relays, Modbus relays and lights.
   - Auto reset is configured by default and operates automatically. For example if measured concentration exceeds the alarm level, the alarm and relay will turn on. When concentration level falls back to normal range the alarm and relay will be turned off. Pushing the "reset" button will not interfere with the relay.
   - Horn reset works the same as auto reset but in the alarm situation pressing the "reset" button will silence the alarm. If immediate reset is set as 0 then the alarm will not be switched on until a new alarm appears. Typically this functionality is used for pre-alarms.
   - Manual reset is only possible when alarms that switch the relay have normalized. This means that these alarms are latchable and are used on alarms which are not pre-alarms.
7. The alarms can be configured through the alarm matrix. The alarm matrixes are shown in chapter **6.4.3 DETECTOR SETTINGS**. For each detector the user can enable different alarms for Modbus relays, device relays and lights.
8. To configure the device a login process needs to be done from the "LOGIN" page (**5.2.2 Login page**). The default password is 1234.
9. After a successful login the device unlocks the password-protected pages and a green dot appears in front of the page titles. When the login process is not done then a white dot will appear in front of the page titles.
10. The configuration can be done through the device or web server. The default values of configuration are shown in chapter **5. GRAPHICAL USER INTERFACE**.
11. To enter the web server, the user needs to log in to the device Wifi network. The password of that network is by default 12345678. In order to access the web server, the user needs to connect with this network and enter 192.168.4.1 on the URL bar in the browser.

8. MAINTENANCE

Clean the device with soft damp cloth. Do not use any abrasive cleaning agents. Do not immerse the device into water or any cleaning media.

Routine checks should be done to the Evikontroll μGas system. System should be calibrated every 6 months. Evikontroll μGas system will notify the user when the service is due.

Maintenance should be done by a manufacturer approved certified technician in order for the warranty to apply.

8.1 DETECTOR TESTING

Routinely checks on detectors should be done to ensure correct operation and calibration. For more information about detector calibration and service intervals please refer to the relevant device user manual.

9. WARRANTY

This product is warranted to be free from defects in material and workmanship for a period of one year from the date of original sale. During this warranty period Manufacturer will, at its option, either repair or replace a product that proves to be defective. This warranty is void if the product has been operated in conditions outside ranges specified by the Manufacturer or damaged by customer error or negligence or if there has been an unauthorised modification.

Warranty product will be null and void if:

- The product is damaged physically

- The product is repaired, maintained, modified, and disassembled

9.1 WARRANTY PROCEDURE

To submit a warranty claim, please contact our customer support team. Following information should be included to the claim:

1) Your contacts- full name, phone number, e-mail;
2) Description of returned products and quantities;
3) Returned products' serial number;
4) Reason of return.

For warranty and technical support enquiries please contact:

Technical support:

Email: sales@evikon.ee

This product has been tested and it is complying with the Low Voltage Directive 2014/35/EU and the Electromagnetic Compatibility Directive 2014/30/EU. Conformity to the Directives is assured through application of the following harmonized EN standards:

- EN 61000-6-3:2007, EN 61326-1:2013 (EMC, Emissions)
- EN 61000-6-1:2007, EN 61000-6-2:2005, EN 61326-2-1:2013 (EMC, Immunity)
- EN 61010-1:2010, EN 61010-2-201:2013 (Electrical equipment safety)

APPENDIX 1. SPARE PARTS AND ACCESSORIES

PRODUCT CODE	PART	DESCRIPTION
E7110-8R	Relay output module	8 channels; DIN-rail or wall mount; RS485.
E7110-8A	Analog input module	8 channels; RTD, TC, mV, mA inputs; 0-1 V, 0/4-20 mA input signals; RS485.
E7110-8I	Analog output module	8 analog outputs 4-20 mA; DIN-rail or wall mount; RS485.
E7110-8AS	Analog output module	8 fast analog inputs; 0/4-20 mA, 0-10 V; 200 Hz sampling.
E7131	Analog/ Digital I/O Module	8 multifunctional analog outputs; Four SPDT relay outputs 5A 250 VAC; DIN-rail mount;

	RS485 Repeater	
	PSU	24 VDC 2.5A PSU
	Lights	305mm x 147mm x 22mm one site
	Lights	305mm x 147mm x 22mm double site
	Lights	625mm x 187mm x 22mm pictogram
	Lights	625mm x 187mm x 22mm one site
	Lights	625mm x 187mm x 22mm double site
	Lights	New design text / image for lights
	Modbus TCP/IP converter	Modbus RTU <-> TCP/IP converter
	Rail mounted terminal connector 1,5mm^2	1 way 3 terminal connector
	Rail mounted terminal connector 2,5mm^2	1 way 3 terminal connector
	Rail mounted terminal connector 1,5mm^2	2 ways 4 terminal connector

	Rail mounted terminal connector 2,5mm^2	1 way 4 terminal connector
	Lighting / sound device used with relay	Alarm device
	Current limiting resistors module (E7110-8I)	To limit to valid current
	UPS	24 VDC

APPENDIX 2. ANALOG MODULE E7110-8I
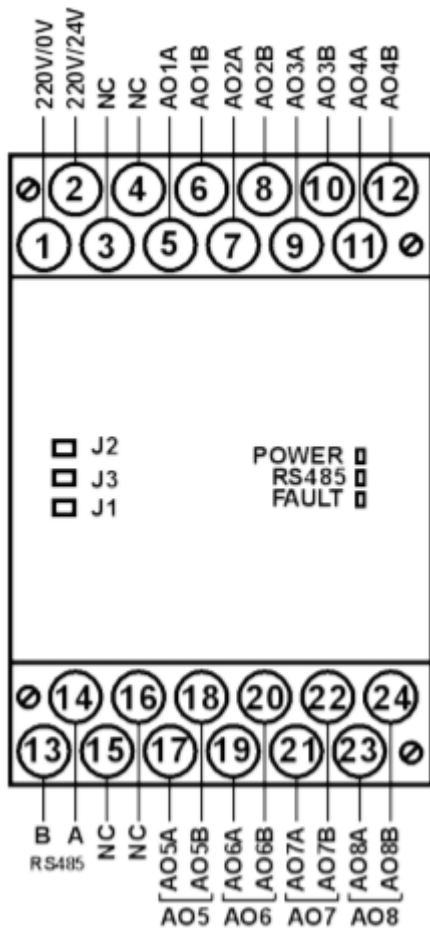
Figure 58. Analog output module terminal contacts, switches and LED indicators.

Jumpers functionality:

· J1- write protection. Factory setting: open (write protection is off);

· J2- return to factory network settings. By default J2 is open;

· J3- for manufacturer's service. J3 should be open during operation.

LED indicators on the front panel:

· POWER- lights when power is on;

· RS485- blinks when data communication is in progress;

· FAULT- lights if RS485 data communication time-out occurs.

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APPENDIX 3. RELAY MODULE E7110-8R
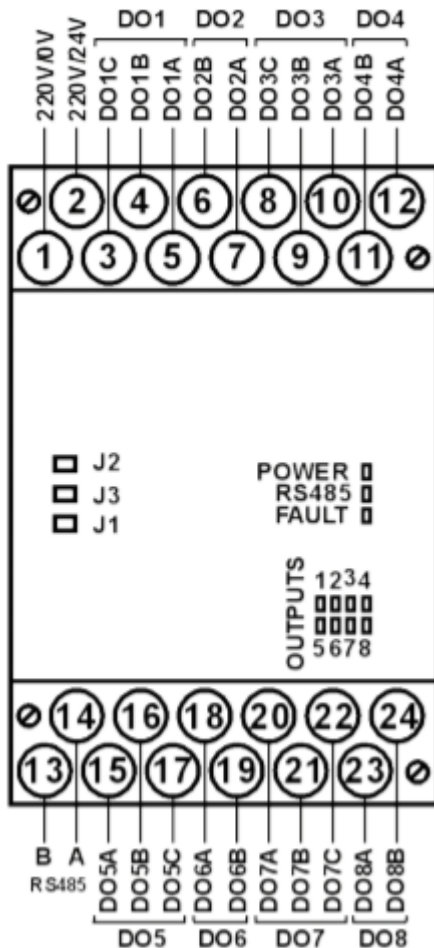
Figure 59. Relay module terminal contacts, jumpers and LED indicators.

Jumpers functionality:

· J1- write protection. Factory setting: open (write protection is off);

· J2- return to factory network settings. By default J2 is open;

· J3- for manufacturer's service. J3 should be open during operation.

LED indicators on the front panel:

- · OUTPUTS 1...8- light when the output is on;

- · POWER- lights when power is on;

- · RS485- blinks when data communication is in progress;

- · FAULT- lights if RS485 data communication time-out occurs.

APPENDIX 4. ANALOG/DIGITAL I/O MODULE E7131

E7131 is a special version of combined IO module, specifically designed to meet EN54 and UL864 requirements and to support the functions required for operating Class B lines with conventional smoke detectors.

The connection diagram of E7131 module is shown on figure 58.
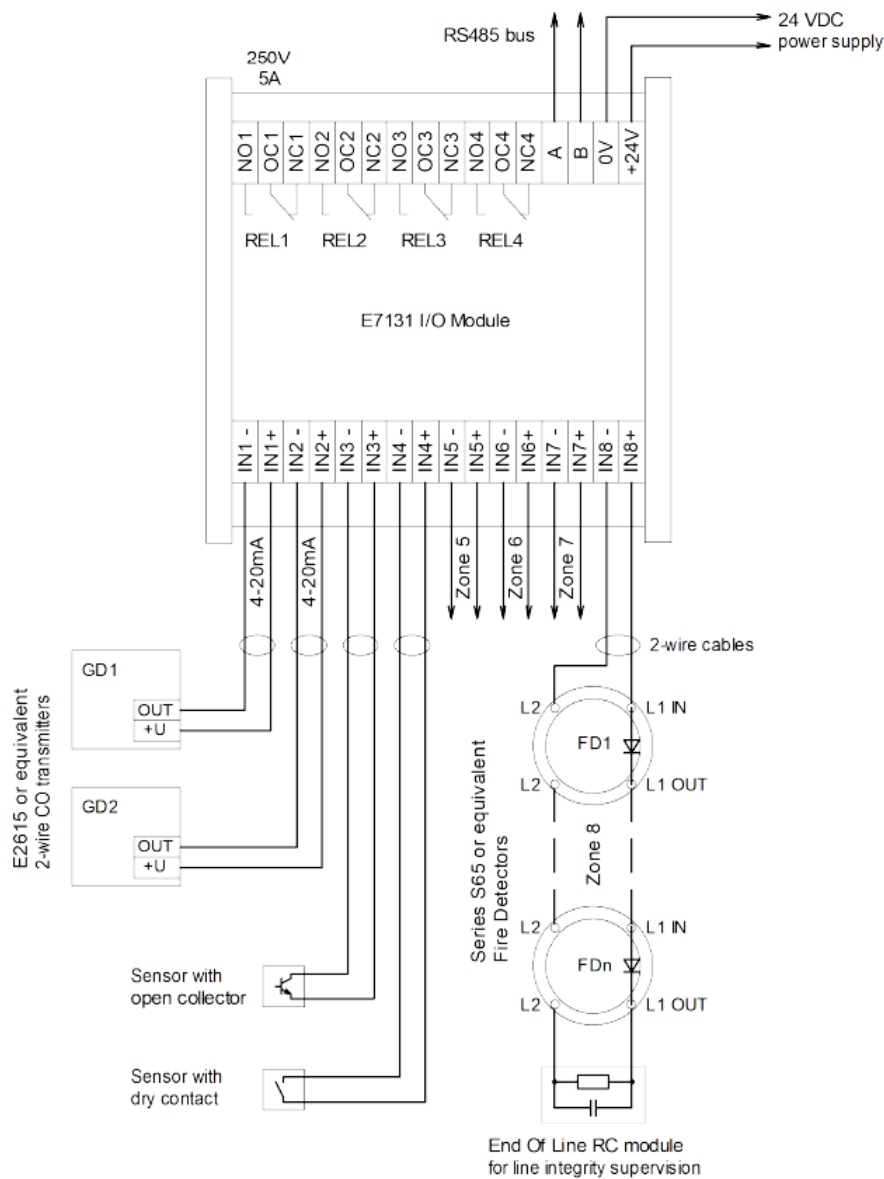
Figure 60. Analog/digital I/O module E7131 connection diagram.

APPENDIX 5. LIST OF COMPATIBLE EVIKON DETECTORS

SERIES	DESCRIPTION	GASES
E2608	IP65; RS485; Relay outputs; Remote probe option; Analog outputs.	CH4, C2H2, C2H4, C2H4O, Cl2, CO, CO2, H2, H2S, NH3, NO, NO2, O2, O3, SO2, SF6, VOC, halocarbon refrigerants
E2611	IP20; RS485; Relay outputs; Analog outputs.	CH4-C4H10, C2H2, H2, NH3, VOC, halocarbon refrigerants
E2618	IP65; RS485; Analog outputs.	CH4, C2H2, C2H4, C2H4O, Cl2, CO, CO2, H2, H2S, NH3, NO, NO2, O2, O3, SO2, SF6, VOC, halocarbon refrigerants
E2638	IP65; RS485; Relay outputs option; Remote probe option; Analog outputs.	CH4, C2H2, C2H4, C2H4O, Cl2, CO, CO2, H2, H2S, NH3, NO, NO2, O2, O3, SO2, SF6, VOC, halocarbon refrigerants

E2658	IP66; RS485; Relay outputs option; Analog outputs; Flameproof.	CH4, C2H2, C2H4, C2H4O, Cl2, CO, CO2, H2, H2S, NH3, NO, NO2, O2, O3, SO2, SF6, VOC, halocarbon refrigerants
E2660	IP65; RS485; Relay outputs option; Remote probe option; Analog outputs; Simultaneous detection of two gases.	CH4, C2H2, C2H4, C2H4O, Cl2, CO, CO2, H2, H2S, NH3, NO, NO2, O2, O3, SO2, SF6, VOC, halocarbon refrigerants

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APPENDIX 6. MODBUS REGISTERS

REG	DESCRIPTION	REMARKS	DATA TYPE
1	System version	0x100 Version 1.00	WORD
2	Measuring channels	Measuring channels active (0...32)	WORD
3	Modbus relays	Installed Modbus relays (0...4)	WORD
4	Modbus lights	Installed Modbus lights (0...32)	WORD
5	Active analog outputs	Currently active analog outputs (0...4)	WORD
6	Days until next calibration	Days until next calibration	WORD
7	Alarm QTY	Alarm count in memory (0...100)	WORD
8	Last alarm ID	Last alarm ID in memory	WORD
9	STA WIFI state	3= Connected 6= Disconnected 1= Reconnect	WORD
10	STA WIFI IP Address [0]	Device STA IP address 1st byte	WORD
11	STA WIFI IP Address [1]	Device STA IP address 2nd byte	WORD
12	STA WIFI IP Address [2]	Device STA IP address 3rd byte	WORD
13	STA WIFI IP Address [3]	Device STA IP address 4th byte	WORD

14	STA WIFI Netmask [0]	Device STA Netmask 1st byte	WORD
15	STA WIFI Netmask [1]	Device STA Netmask 2nd byte	WORD
16	STA WIFI Netmask [2]	Device STA Netmask 3rd byte	WORD
17	STA WIFI Netmask [3]	Device STA Netmask 4th byte	WORD
18	STA WIFI Gateway [0]	Device STA Gateway 1st byte	WORD
19	STA WIFI Gateway [1]	Device STA Gateway 2nd byte	WORD
20	STA WIFI Gateway [2]	Device STA Gateway 3rd byte	WORD
21	STA WIFI Gateway [3]	Device STA Gateway 4th byte	WORD
22	STA WIFI DHCP	Device STA DHCP active/inactive 0= Inactive 1= Active	WORD
23	STA WIFI Reconfigure	Reconfigure STA WIFI settings and reconnect 0= Idle for reconfiguring 1= Reconfigure 2= Reconfiguring	WORD
24	AP WIFI SSID hidden	0= Inactive 1= Active	WORD
25	AP WIFI IP Address [0]	Device AP IP address 1st byte	WORD
26	AP WIFI IP Address [1]	Device AP IP address 2nd byte	WORD
27	AP WIFI IP Address [2]	Device AP IP address 3rd byte	WORD

28	AP WIFI IP Address [3]	Device AP IP address 4th byte	WORD
29	Device startup time	Startup time in seconds to take after booting up the system to startcounting alarm states; warm up time for sensors. (0...999)	WORD
30	Immediate reset timer	Immediate reset timer for resetting relays from reset after reset button has been pressed for immediate resettable alarms	WORD
31	Access key input for gaining access for configuring via Modbus	Default pass: 0xA55A; After writing the register 0xA55A user gains access for configuring registers which are with write access	WORD
32	Confirm written changes to system config	Default pass 0xA55A; After writing the register 0xA55A system confirms all written modifications to the system and soft-reboots	WORD
33	Free system memory	Free heap of the processor	INT
35	Modbus output Bus ID	Modbus output in COM-2 Slave ID of the system (0...247)	WORD
36	RS485-1 Baudrate	Modbus output baudrate in RS485-1 (4800, 9600, 19200, 38400, 57600)	WORD
37	RS485-1 Parity	Modbus output parity in RS485-1 0= None 1= Even 2= Odd	WORD

38	RS485-1 Stopbits	Modbus output stopbits in RS485-1 (1...2)	WORD
39	RS485-1 Serial status	RS485-1 status 0= Driver problem 1= OK	WORD
40	RS485-2 Baudrate	Modbus output baudrate in RS485-2 (4800, 9600, 19200, 38400, 57600)	WORD
41	RS485-2 Parity	Modbus output parity in RS485-2 0= None 1= Even 2= Odd	WORD
42	RS485-2 Stopbits	Modbus output stopbits in RS485-2 (1...2)	WORD
43	RS485-2 Serial status	RS485-2 status 0= Driver problem 1= OK	WORD
44	Gas concentration Channel 1	Raw measured value from detector with multiplier. To get real value read multiplier configuration from device.	WORD
45	Gas concentration Channel 2	Raw measured value from detector with multiplier. To get real value read multiplier configuration from device.	WORD
...			

75	Gas concentration Channel 32	Raw measured value from detector with multiplier. To get real value read multiplier configuration from device.	WORD
76	Alarm state in Channel 1	Binary values for alarm state. Description in alarm state section 0= Inactive 1= Active	BINARY
77	Alarm state in Channel 2	Binary values for alarm state. Description in alarm state section 0= Inactive 1= Active	BINARY
...			
107	Alarm state in Channel 32	Binary values for alarm state. Description in alarm state section 0= Inactive 1= Active	BINARY
108	Unit in Channel 1	Decimal coding of unit. Description in unit section.	WORD
109	Unit in Channel 2	Decimal coding of unit. Description in unit section.	WORD
...			
139	Unit in Channel 32	Decimal coding of unit. Description in unit section.	WORD

140	Gas in Channel 1	Decimal coding of gas. Description in gas section.	WORD
141	Gas in Channel 2	Decimal coding of gas. Description in gas section.	WORD
...			
171	Gas in Channel 32	Decimal coding of gas. Description in gas section.	WORD
172	Detector type in Channel 1	Decimal coding of detector type. Description in detector type section.	WORD
173	Detector type in Channel 2	Decimal coding of detector type. Description in detector type section.	WORD
...			
203	Detector type in Channel 32	Decimal coding of detector type. Description in detector type section.	WORD
204	Detector channel in Channel 1	Detector channel of current measurement channel. Normally 1 if 1 channel detector is used. (1...8)	WORD

205	Detector channel in Channel 2	Detector channel of current measurement channel. Normally 1 if 1 channel detector is used. (1...8)	WORD
...			
235	Detector channel in Channel 32	Detector channel of current measurement channel. Normally 1 if 1 channel detector is used. (1...8)	WORD
236	Detector multiplier in Channel 1	Value multiplier (0.001...100)	FLOAT
238	Detector multiplier in Channel 2	Value multiplier (0.001...100)	FLOAT
240	Detector multiplier in Channel 3	Value multiplier (0.001...100)	FLOAT
...			
298	Detector multiplier in Channel 32	Value multiplier (0.001...100)	FLOAT

APPENDIX 7. ALARM STATE DESCRIPTIONS

Value / Bit of value	DESCRIPTION
0 / Bit[0] = 1	OK/Fault
1 / Bit[1] = 1	Under-range
2 / Bit[2] = 1	Alarm 1
3 / Bit[3] = 1	Alarm 2
4 / Bit[4] = 1	Alarm 3
5 / Bit[5] = 1	Over-range
6 / Bit[6] = 1	STEL
7 / Bit[7] = 1	TWA

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