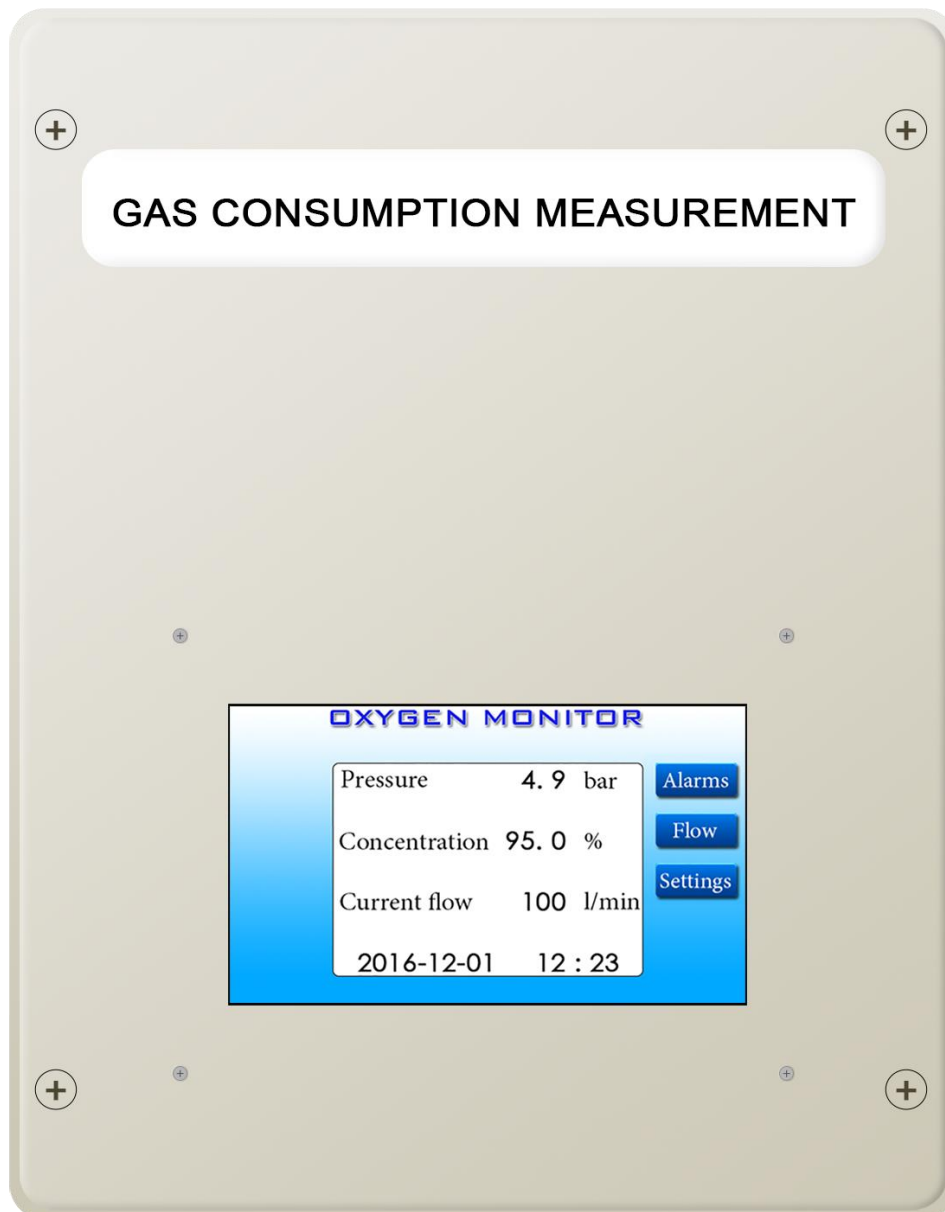




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## OXYGEN FLOW MEASUREMENT WITH OXYGEN CONCENTRATION MONITOR



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# 1. General information and specification

## 1.1. About device

This device is designed and developed to deliver all necessary information about oxygen, such as working pressure (section 4.), oxygen content (section 5.) and current flow / consumption (section 6.).

All the information are displayed in real-time, to track that oxygen is delivered according to required parameters, moreover it is possible to check monthly and total consumption of oxygen, which can help to significantly reduce costs of oxygen therapy.

## 1.2. Specification

<b>Input</b>	Pressure sensor	Analog voltage
	Concentration sensor	Paramagnetic Paracube® Micro
	Flow sensor	Thermal mass sensor FS7
<b>Output</b>	Digital	Relay (HF49F) 30V 3A DC / 48V 3A AC
	MODBUS RTU	9600 BAUD, 8 bits, 2 stop bits without parity control
	LOG module	Recording all alarms and confirmations; Gas consumption for last 6 month
<b>Measuring range</b>	Pressure	0-16 bar
	Concentration	0-100%
	Flow	0-350 l/min, 0-500 l/min
<b>Oxygen inlet pressure</b>	Max 16 bar	
<b>Oxygen inlet/outlet</b>	22mm (copper pipe)	
<b>Connections</b>	Transmission	RJ-45 or STL-1550/4-3.5
	I/O	STL-1550/4-3.5 / MC- 1.5/2-5.08
<b>Power supply</b>	230V AC	
<b>Current</b>	0.1A	
<b>Working temperature</b>	5-50°C	

## 2. Installation

- a. First unscrew 4 locking screws on the front panel.
- b. Place the box on the wall and mark holes.
- c. Make 4 holes and put dowels in.
- d. Place the box again on the wall and screw it tightly.
- e. Make sure valves are closed.
- f. Prepare inlet and outlet pipes (22mm) and solder brass adapter (3/4" male) with copper pipe.
- g. Connect the box to the pipeline system and screw unions tightly.
- h. Open main valve, then open valves in the box slowly.
- i. Connect all cables according to the scheme (section 15).
- j. Close front panel and lock it with 4 locking screws.

## 3. Controller

Each device comes along with built-in 7" display controller which shows all information about monitored gas.

### 3.1. First start

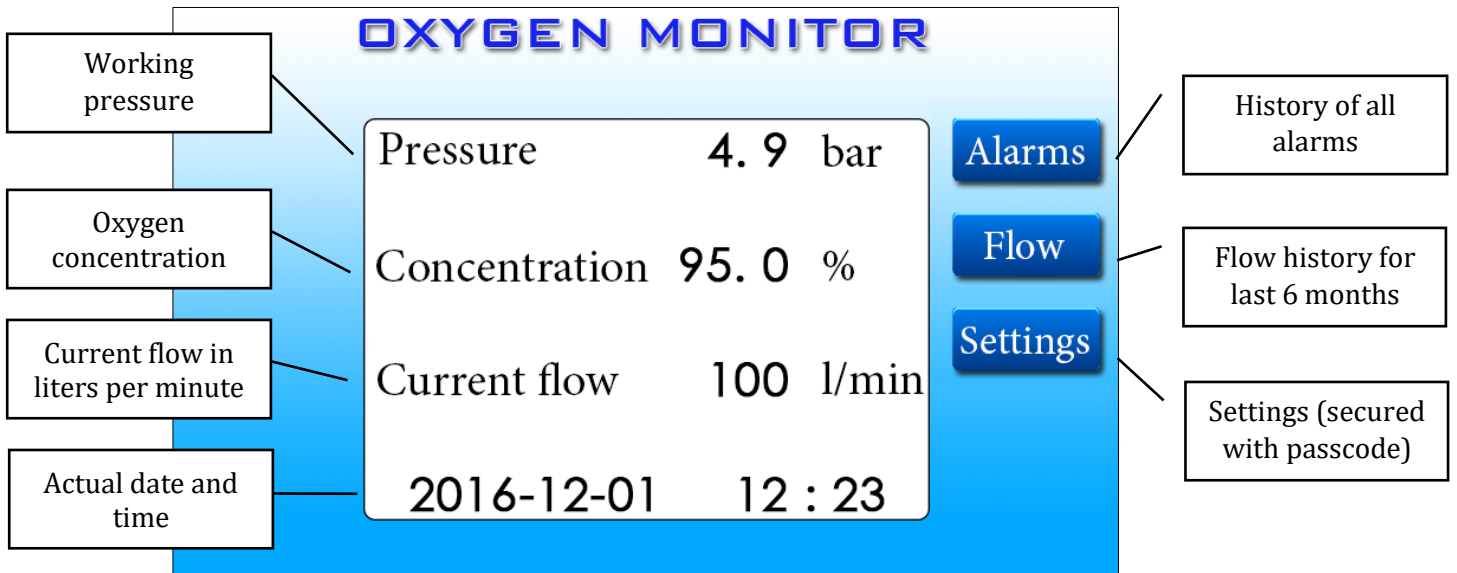
After first boot-up it is advised to set date and clock due to proper recording and informing about alarm states.

Recommended date system is Gregorian calendar, however it is possible to use Julian calendar system.

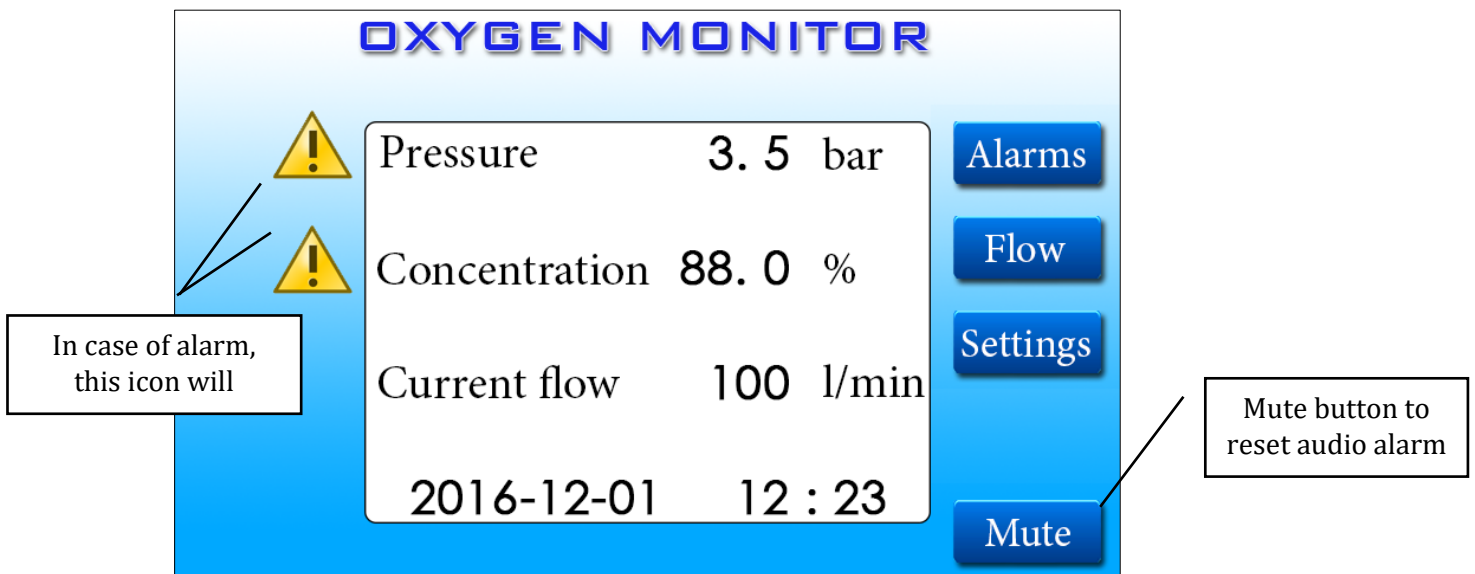
To change date and clock go to Settings menu (section 3.3.)

### 3.2. Main screen

On the main screen is shown live preview of gas parameters (pressure, concentration and current flow), every alarm states and actual date and clock.



1. Main screen of controller

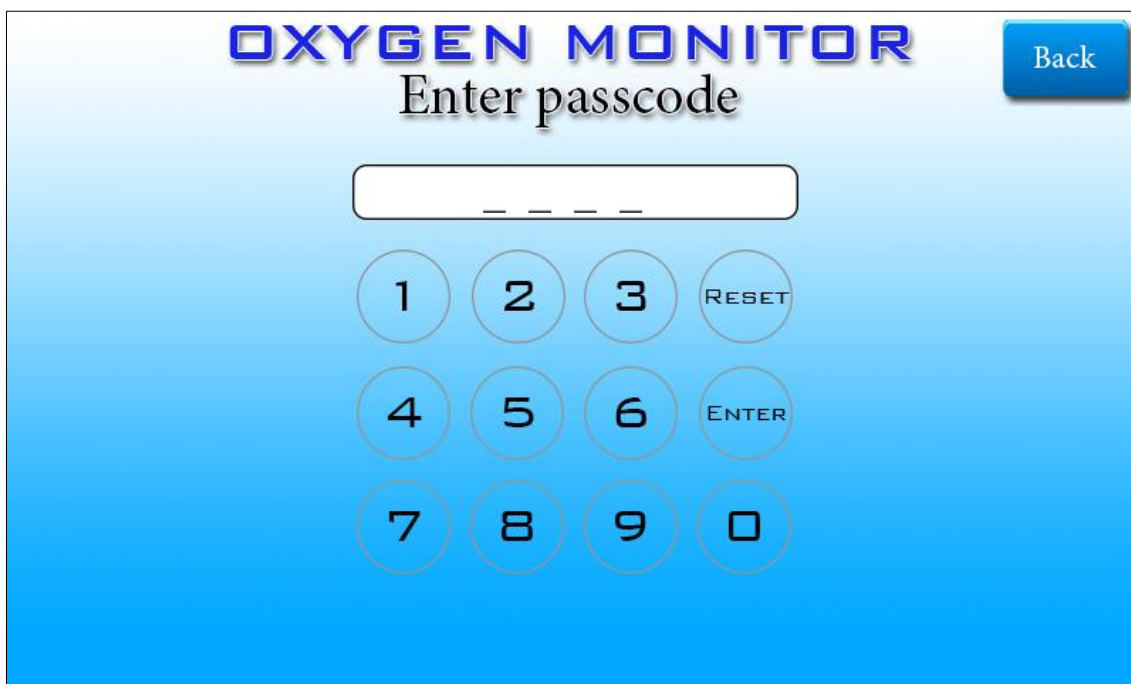


2. Alarm screen

There will be an audio and visual alarm when either pressure or concentration will drop below or rise above set threshold. To mute audio alarm touch the MUTE button on the screen. Every 1 minute there will be single “beep” signal, after 10 minutes alarm will return if the cause of the problem is not solved.

### 3.3. Settings

Settings screen allows to change alarm thresholds, date, clock and relay state.

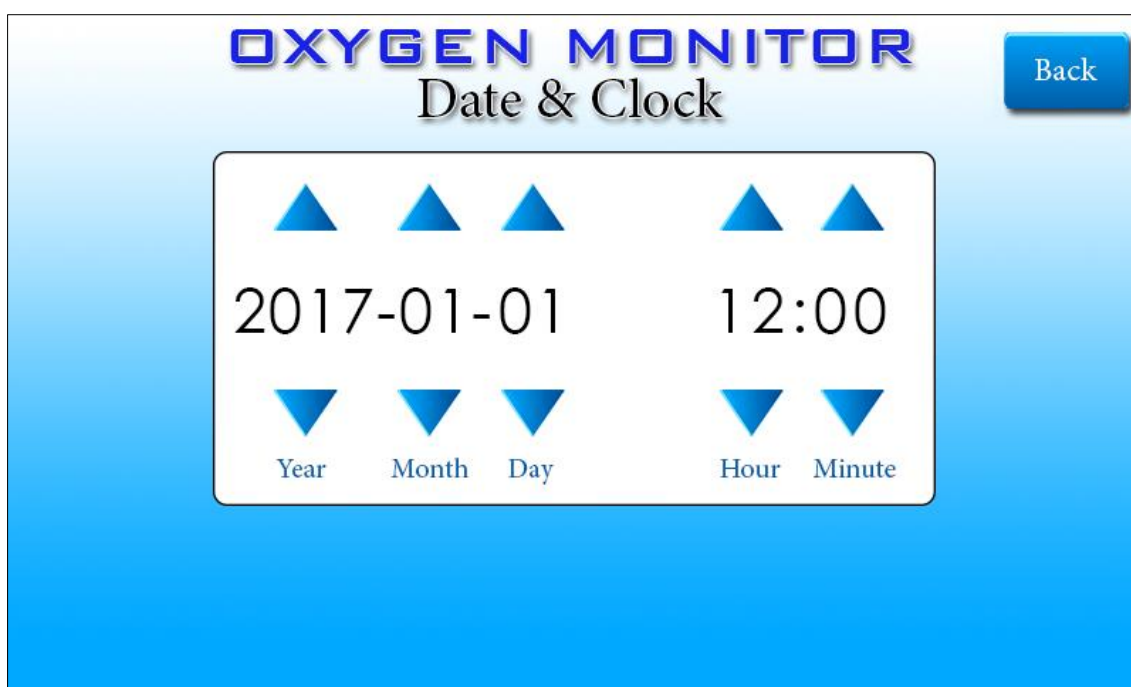


To access to Settings enter passcode **5287** and touch **Enter**.

If wrong digit or code is entered, touch RESET and re-enter passcode again, if passcode is wrong, there will be single “beep” sound.

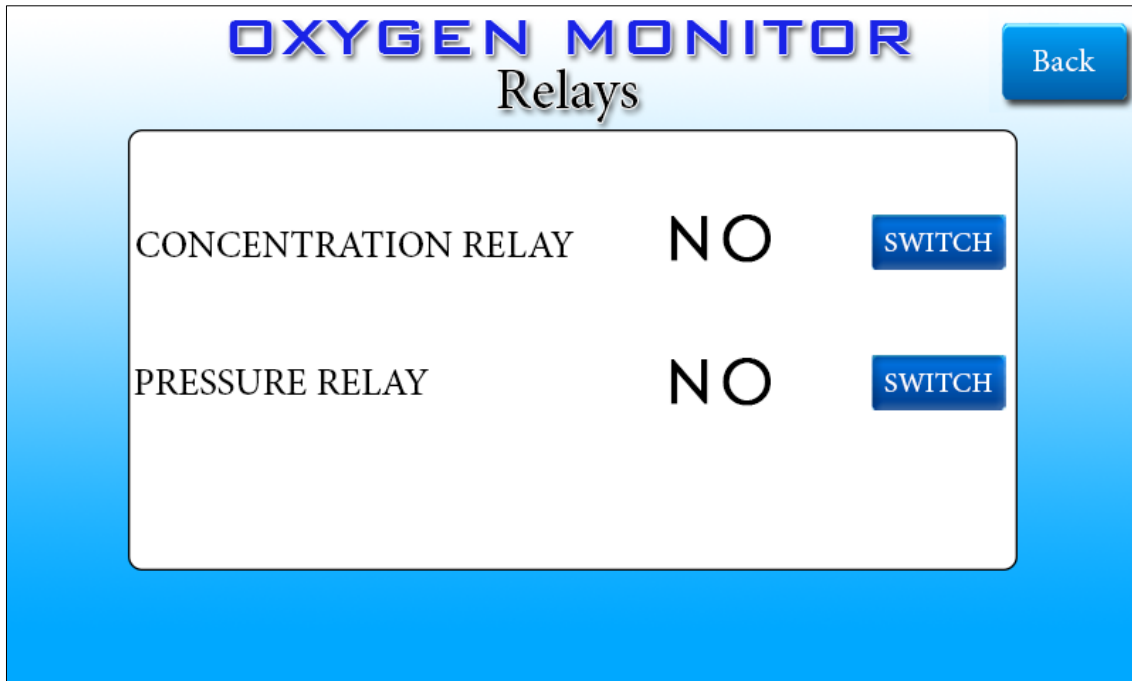
After access is granted operator will have possibility to change settings;

#### 3.3.1. Date and clock



To set date and clock use up and down arrows to change values. Then touch Back to save.

### 3.3.2. Relays



Default setting is normally open (**NO**) for both relays. Normally open means that when alarm appears circuit is open and opposite for normally closed (**NC**).

To change state of relay touch **SWITCH** button, then **Back** to save settings.

## 3. Pressure monitoring

Mounted pressure sensor measures actual pressure from Oxygen supply source.

Measuring range is from 0 to 16 bar.

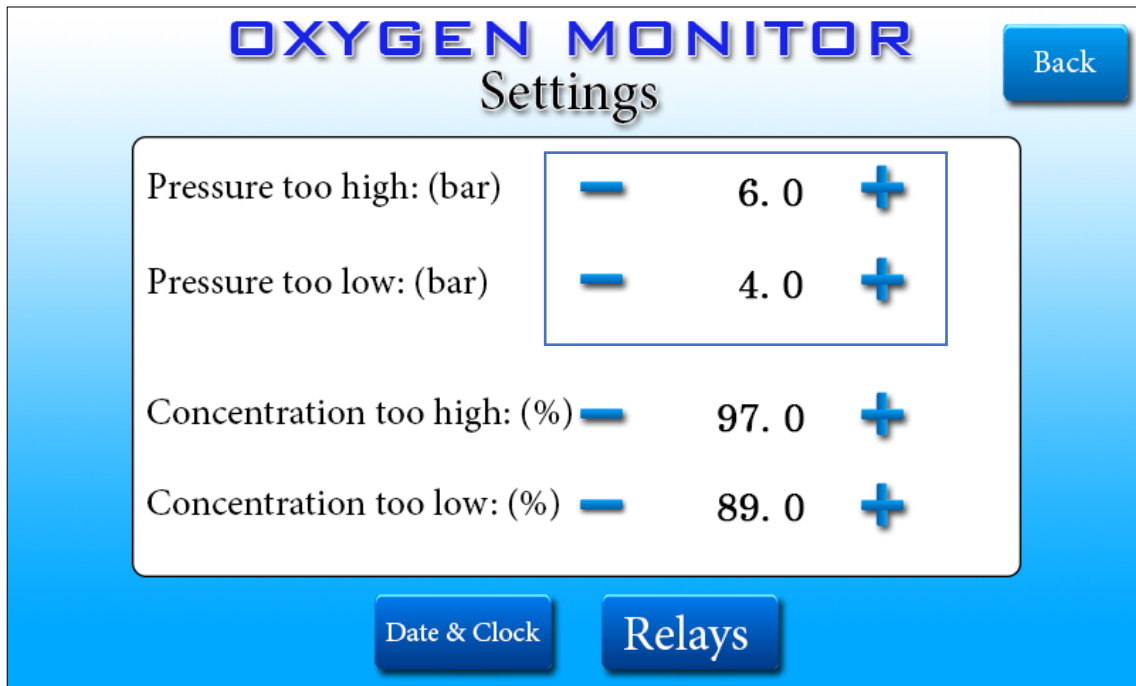
### 3.1. Alarm threshold setting

Default alarm threshold is set to 4.0 bar for too low and 6.0 bar for too high pressure, but it can be defined individually by operator.

In that case if pressure drops below 4.0 bar or rise above 6.0 bar there will be an audio and visual alarm on main screen.

To change values, simply touch "+" or "-" to adjust high or low pressure.

Touch "Back" button to go back to main screen, all changes will be saved automatically.



## 4. Concentration monitor

Oxygen passes through paramagnetic sensor which measures oxygen concentration.

Measuring range is from 0 to 100% V/V.

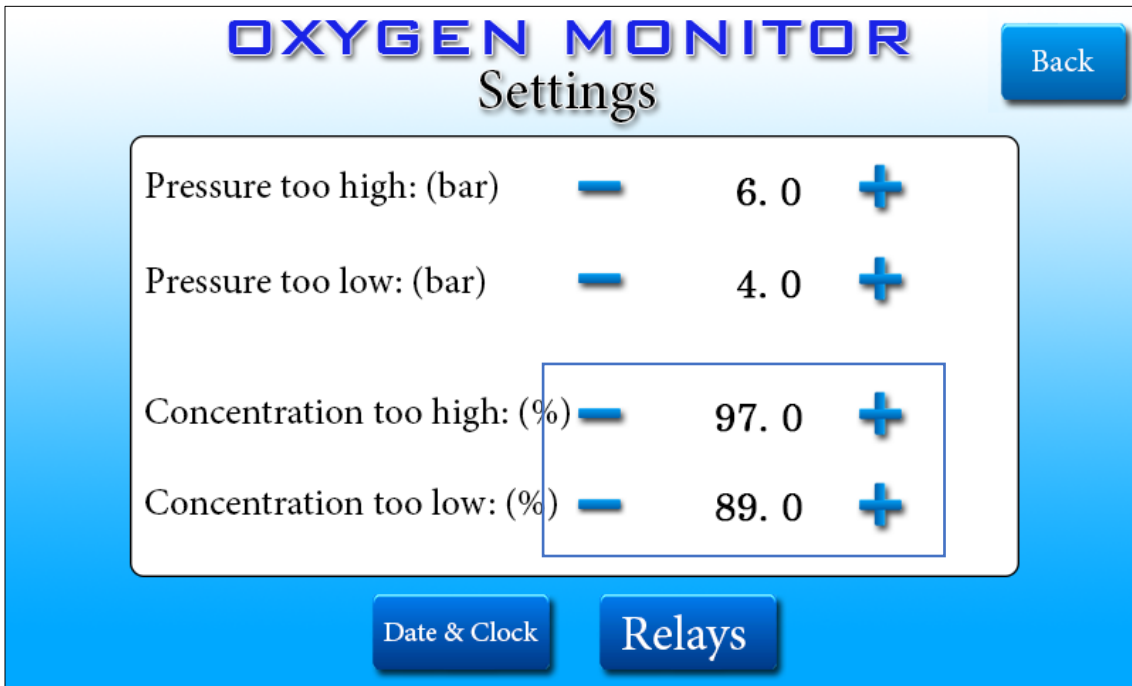
### 4.1. Alarm threshold setting

Default alarm threshold is set to 89.0 % for too low and 97.0 bar for too high concentration, but it can be defined individually by user.

In that case if concentration drops below 89.0 % or rise above 97.0 % there will be an audio and visual alarm on main screen.

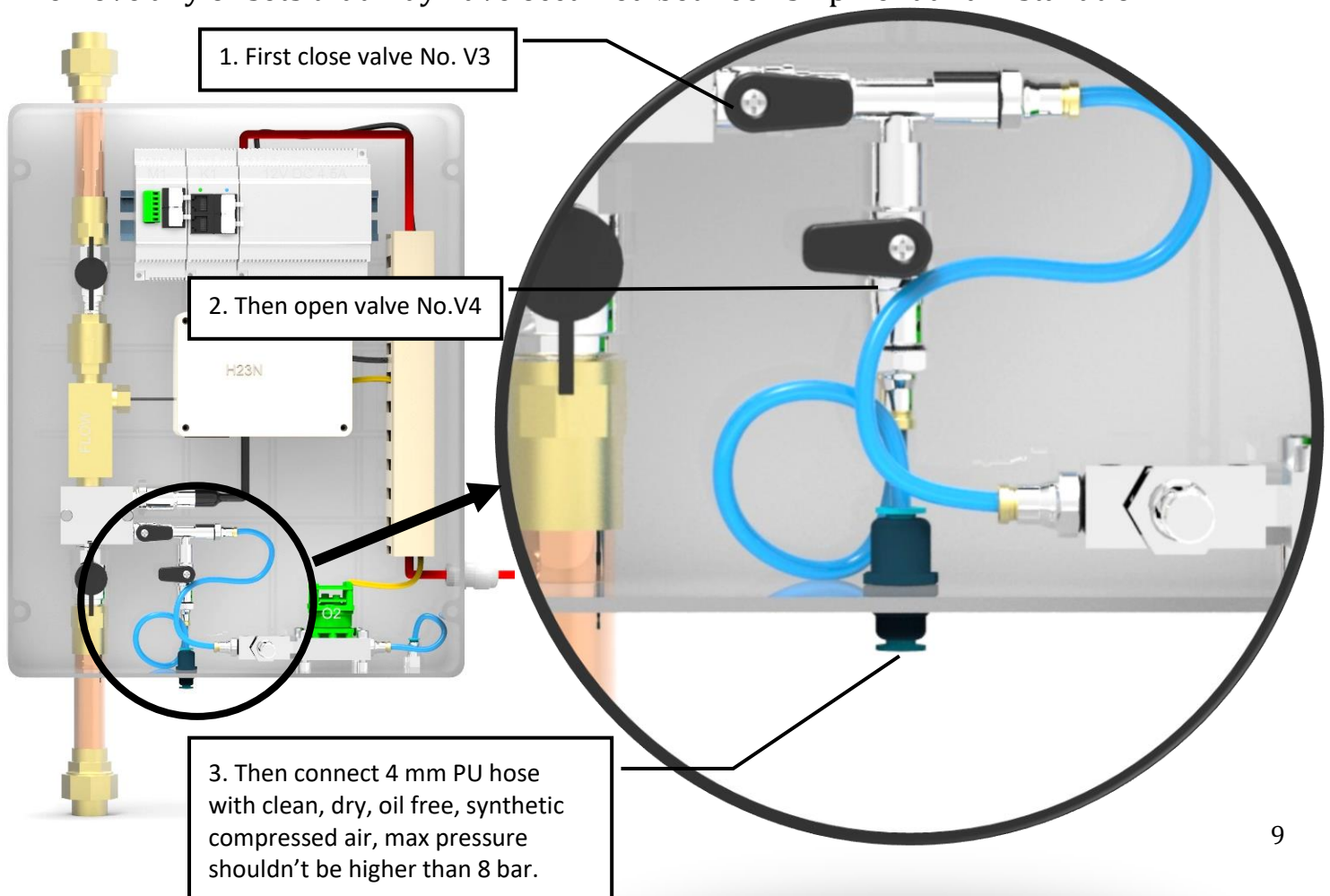
To change values, simply touch “+” or “-” to adjust high or low concentration. Touch “Back” button to go back to main screen, all changes will be saved automatically.

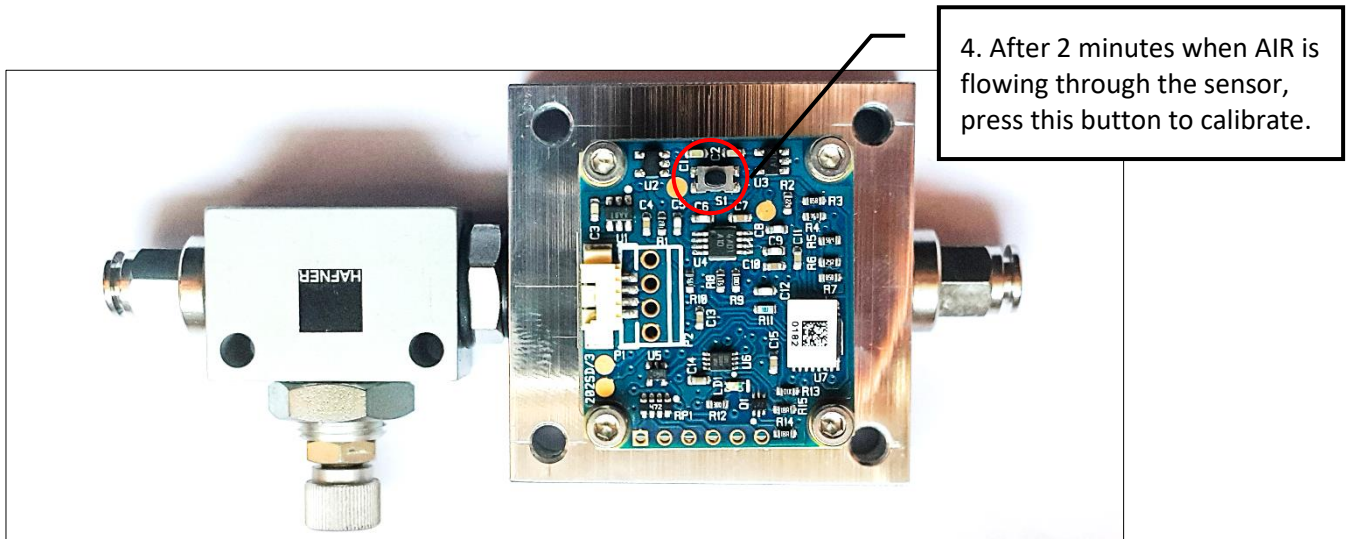




## 4.2. Sensor calibration

Sensor is already calibrated prior to shipment; however in the unlikely event that displayed concentration varies from this what should be indicated (after connecting gas with known concentration or calibrating gas), it is possible to recalibrate the sensor to remove any offsets that may have occurred between shipment and installation.





During calibration LED blinks with orange and green colors alternately. Calibration is done, when LED will stop blinking and will be glowing with stable green light.

Disconnect compressed air and repeat steps 2 and 1 backward, after 1-2 minutes measurement should stabilize.

## 5. Flow measurement

Gas passes through sensor and its speed is calculated and displayed as flow value in liters per minute.

### 5.1. History

# OXYGEN MONITOR

## Flow history

Back

<u>TOTAL</u>	<b>6828</b>	<b>m<sup>3</sup></b>
--------------	-------------	----------------------

Months			
Present	1145 m <sup>3</sup>	3 back	1126 m <sup>3</sup>
1 back	1120 m <sup>3</sup>	4 back	1165 m <sup>3</sup>
2 back	1131 m <sup>3</sup>	5 back	1141 m <sup>3</sup>

History screen shows total consumption of gas for past six months. Every month is measured separately. Each consumption per month is presented in cubic meters. Total consumption counter will count display till 655 359 m<sup>3</sup>, after that it will reset itself and start from 0.

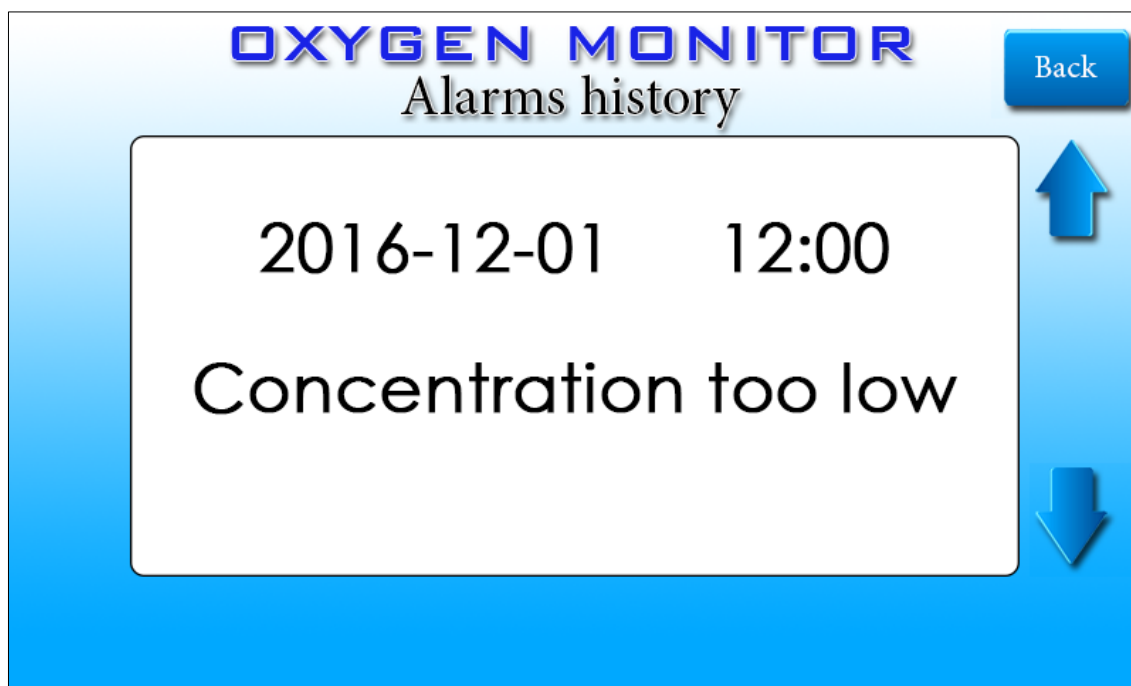
For easier recalculations of oxygen please use table below, all values are given at 1024 hPa, 20°C:

Liquid oxygen	Gasous	
1 kg	0.74 m <sup>3</sup>	740 liters
1.34 kg	1 m <sup>3</sup>	1000 liters

## 6. Alarms

This menu allows to display every alarm ever occurred.

Each alarm is displayed on separate screen, therefore arrows are used to scroll to next or previous screen.



## 7. Power saving mode

Power saving mode activates after 15 minutes of inactivity, by turning the screen off.

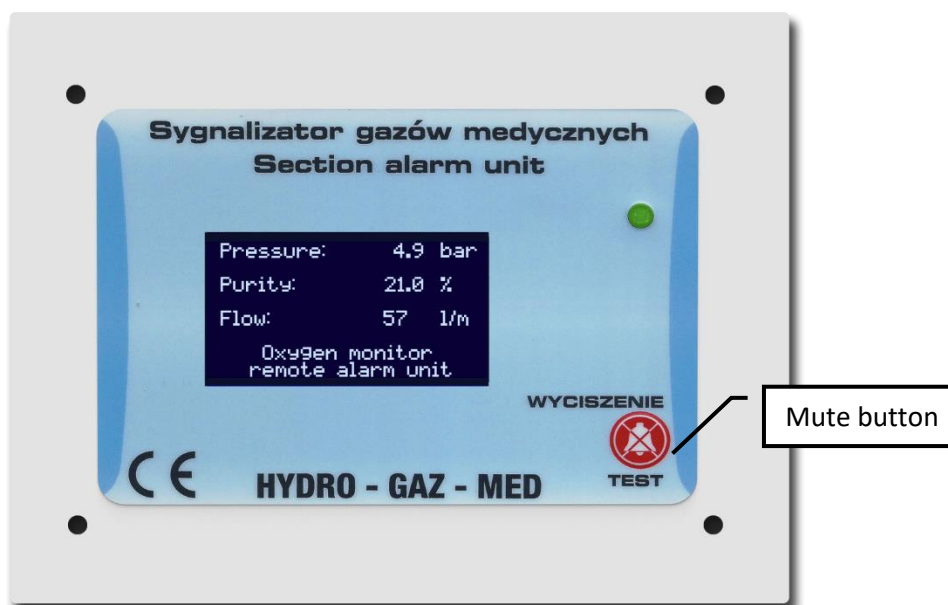
To turn on back, simply touch the screen.

## 8. Remote alarm unit

To master alarm unit (controller) it is possible to connect any number of slave units (remote alarm units) and at any place up to 200 meters from master unit.\* This device reads information from controller and if any error occurs there will be an audio and visual alarm. To mute audio alarm press TEST button on front panel.

Cables must be FTP shielded and terminated with an RJ-45 connectors as shown in section 14.

*\*cables to remote units must be situated at least 0.5 meters from power supply lines (above 50 V AC/DC)*



## 9. MODBUS

MODBUS	DI	RI	RO
9600 bps	0. Pressure alarm	0. Pressure value	0.
Device address 200	1. Concentration alarm	1. Concentration value	1.
Base address 0	2.	2. Flow value	2.

## 10. Maintenance and service

Maintenance and service of the Oxygen Monitor is limited to calibrating the Paramagnetic sensor every 2 years (see paragraph 5.2.)

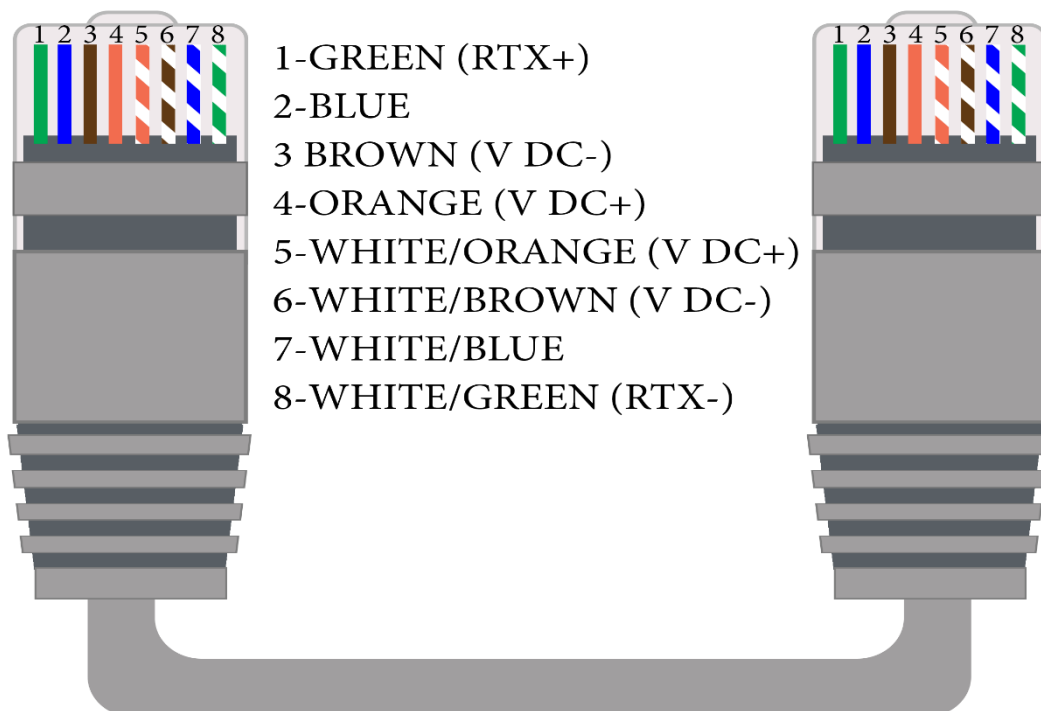
## 11. Parts list

Pressure sensor	-	cat. No.: 3100R0016G05B000
MODBUS RTU	-	cat. No: HGM-M1
Paracube® Micro	-	cat. No.: 01115715
12V DC Power supply	-	cat No.: MW12VDR-60-12

## 12. Authorized service

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## 13. FTP cable scheme (only for remote alarm unit)



# 14.Connection scheme

