



VOCR 51 MDR2B



VOCR 51

**Features**

- Maintenance free MEMS sensor
- VOC (Volatile Organic Compounds): Ethanol, Methane, Carbon Monoxide, Hydrogen, Ammonia etc etc
- Automatic Baseline Calculation
- VOC ranges/sensitivity, Low, Medium and High
- Estimated operating life minimum 5 years
- Output(s)  
0-10 Vdc, 2-10 Vdc, 4-20 mA, 0-5 Vdc or 1-5 Vdc (see ordering next page)
- Accuracy +/- 10 % FSO
- Power supply 24 Vac/dc

Options

- Modbus RS485 communication
- LCD Display
- 1 x relay output , can be set individually
- 2 x relay outputs, can be set individually
- Buzzer

Applications

- Air quality applications: measuring VOC concentrations as of odors; tobacco smoke, body odor, or material fumes in cinema/theatre halls, exhibition halls, restaurants, canteens, shopping malls and conference rooms etc
- Ventilation control
- Occupancy level measuring

VOC Ranges/Sensitivity

0V or 4mA: BEST, Clean Air  
 1V or 5.6mA: STANDARD, calibrated level, reference level  
 10V or 20mA: WORST, polluted air

In normal conditions, base level is equals to 1V.

Lower than 1V is better than calibrated situation.  
 In some cases, indoor condition may be better than calibrated level.

Higher than 1V is showing polluted air level.  
 Pollution is measured from 1V to 10V.

Sensitivity for VOC.  
 Higher response for VOC gasses at HIGH sensitivity.  
 10V of HIGH is equal to 4V of LOW.  
 10V of MEDIUM is equal to 6V of LOW.  
 1V is same for all sensitivities.  
 Example: 3.0V @ LOW == 4.6V @ MEDIUM == 7.0V @ HIGH

Detectable gases

- |                        |                    |
|------------------------|--------------------|
| • Cigarette smoke      | • Ethanol          |
| • Automobile exhaust   | • Ethylene         |
| • Breath air           | • Ethylene oxide   |
| • Carbon monoxide (CO) | • Formaldehyde     |
| • Solvent fumes        | • Hydrogen         |
| • Alcohol fumes        | • Hydrogen sulfide |
| • Acetone              | • Isobutane        |
| • Acrylonitrile        | • Methane          |
| • Ammonia              | • Methanol         |
| • Benzene              | • n-Hexane 2       |
| • Chlorine             | • n-Petane         |
| • Dimethyl amine       | • Propane          |
| • Ethane               | • Sulfur dioxide   |

### Ordering codes

Mounting type	Output 1 VOC	Output 2 VOC	"Options"	Advanced Options
VOCR = Room	0 = no output 1 = 0-10 Vdc 2 = 2-10 Vdc 3 = 0-5 Vdc 4 = 1-5 Vdc 5 = 4-20 mA	0 = no output 1 = 0-10 Vdc 2 = 2-10 Vdc 3 = 0-5 Vdc 4 = 1-5 Vdc 5 = 4-20 mA	M = Modbus RS485 D = LCD display R1 = Relay x 1 R2 = Relays x 2 P = PID out B = Buzzer	P = PID out T = RTC L = Datalogger

### Ordering examples

Type no.	Description
<b>VOCR 51</b>	Air Quality (VOC) transmitter for room mounting VOC output 1: 4-20 mA VOC output 2: 0-10 Vdc
<b>VOCR 51 M</b>	Air Quality (VOC) transmitter for room mounting VOC output 1: 4-20 mA VOC output 2: 0-10 Vdc Modbus RS485 communication
<b>VOCR 51 MDR2B</b>	Air Quality (VOC) transmitter for room mounting VOC output 1: 4-20 mA VOC output 2: 0-10 Vdc Modbus RS485 communication, LCD Display, 2 x relay outputs and Buzzer

**Notes:**

Relay and Buzzer options should be ordered with LCD option for installer to change the set values and relay actions anytime.

For advanced options and special application contact us on [info@vcp.se](mailto:info@vcp.se)

Wall (IP65/IP41) and Duct types available.

## Technical data

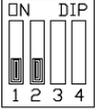
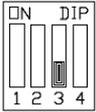
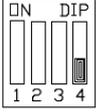
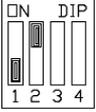
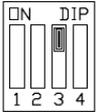
Electrical	Power Supply	24 Vac ( $\pm$ %5), 50-60 Hz <sub>SEP</sub> 15-35 Vdc
	Power Consumption	< 2.5 W
Outputs	Current Output	4-20 mA, maximum 500 $\Omega$ <sub>SEP</sub>
	Voltage Output	0-10 Vdc, minimum 1.000 $\Omega$ 0-5 Vdc, minimum 1.000 $\Omega$
	Relay Output	max. rating 1A @ 220 Vac
Accuracy	VOC	+/-10% FSO
Sensor	Sensing Element	MEMS type MOX sensing element
	Life time	> 5 years
	Resolution	0.5%
	Repeatability	< +/-5%
	Baseline	10%
	Operating Temperature	-20 to +50°C
	Operating Humidity	0 to +85% % rH
Operating Pressure	800 to 1.200 mbar	
General data	Sensing Element	Metal oxide
	Media	Air or non-aggressive gasses
	Storage temperature	0 to +50°C
Ranges	VOC	Low – Medium - High as sensitivity
Connections	X1-X2 Terminals	Pluggable screw terminal
	X3 Terminals	Fixed screw terminal
	Cable	maximum 1.5mm <sup>2</sup>
Protection	IP30	
Standards	EMC Directive	EN 61326-1
Dimensions	Enclosure without relay	86.0 x 86.0 x 20.5 mm
	Enclosure with relay	86.0 x 86.0 x 30.7 mm
Weight Packed	100 grams	
Display	For VOCCR types supplied with display the display type is LCD with visual area 25x40 mm	

## General Notes

- 1.. High density of some other gasses may effect the reading.
- 2.. Observe maximum permissible cable lengths.
- 3.. If cable runs parallel to the mains cable: Use shielded cables.
- 4.. Test only with certified calibration gasses.
- 5.. The cable entry always should have to be pointing downwards.
- 6.. The data indicated under 'Technical Data' apply only to vertically mounted transmitters.
- 7.. Wall type transmitters should have to be mounted in the center of wall but not near to any doors and windows

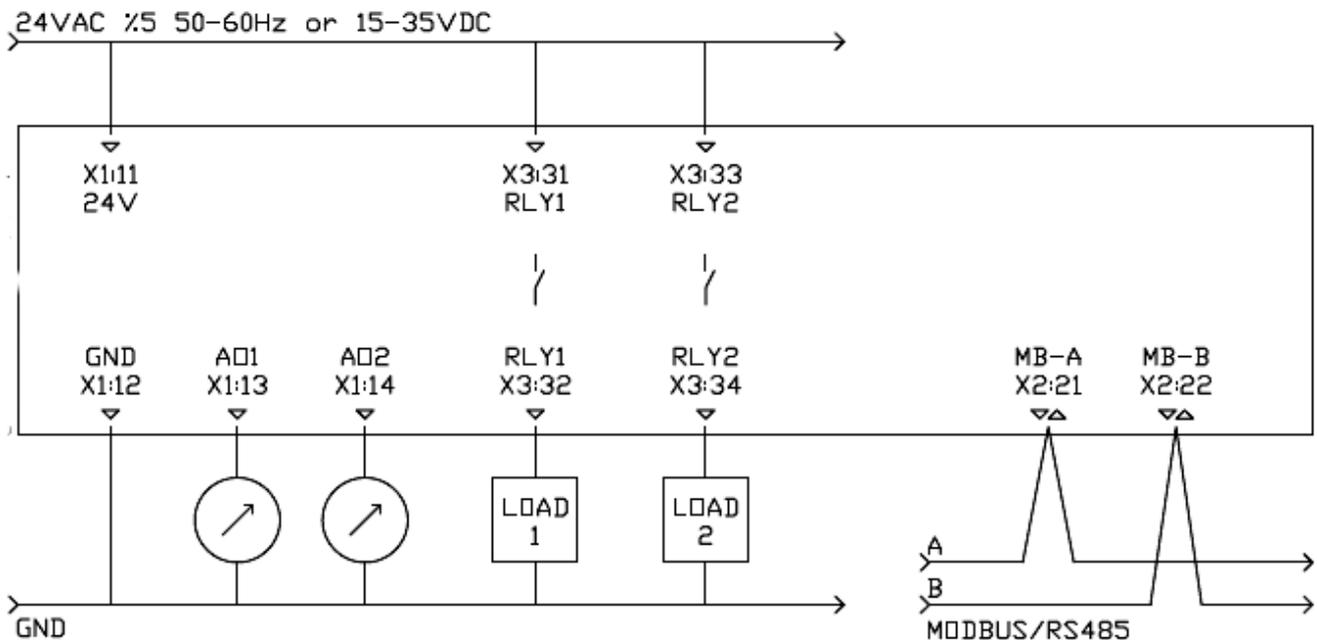
### DIP Switch Settings

- 1.. Please check if there is any special instruction on the enclosure or inside the cover.
- 2.. For any calibration, please do not keep the unit working for more than 10 minutes..

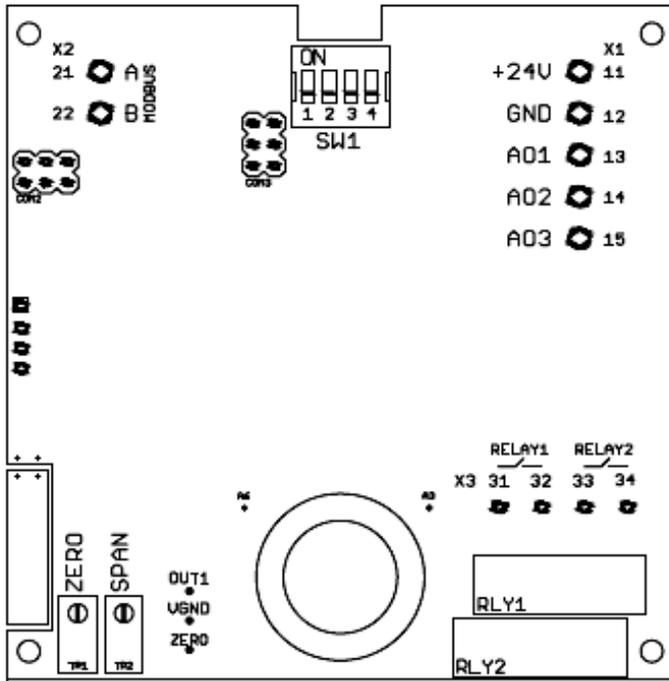
DIP 1-2	Range/Sensitivity	DIP 3	Baseline	DIP 4	Response
	Low		Auto		60 sec
	Medium		Manual		10 sec
	High				
	Calibration				

### Electrical Connections

- 1.. Please be sure about current direction for current outputs and polarity for voltage outputs.
- 2.. Relay contact is Normally Open and rating is max. 1A at 230VAC
- 3.. We kindly advise using 24V for avoiding high voltage harmonics and external power relay for bigger loads
- 4.. Please use shielded and twisted paired cables for Modbus connections
- 5.. Please observe RS485 termination rules, max. 32 devices in a single Modbus line



**Transmitter Hardware**



**SW1**                      DIP Switch for configuration range and response time

**X1 TERMINAL**

<b>11</b>	24V	15...35 Vdc or 24 Vac (± %5, 50-60 Hz)
<b>12</b>	GND	ground for power and reference for outputs
<b>13</b>	AO1	analog output 1
<b>14</b>	AO2	analog output 2
<b>15</b>	AO3	analog output 3

**X2 TERMINAL**

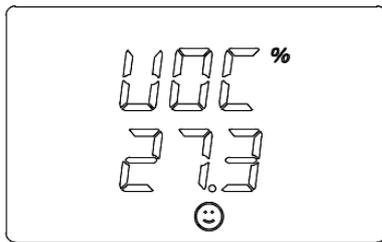
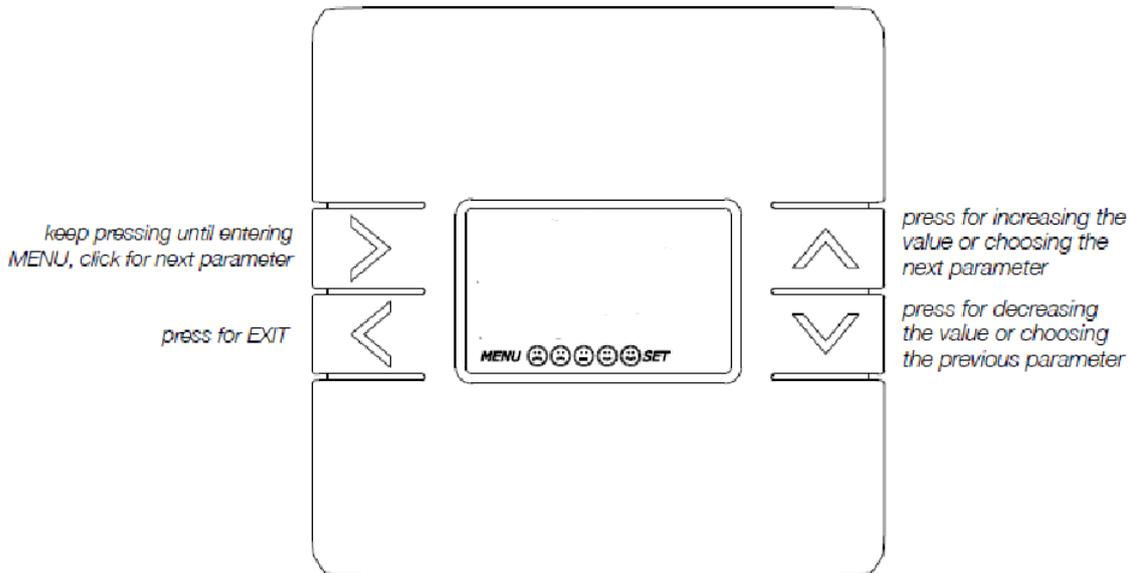
<b>21</b>	A / RS485	modbus communication positive pair
<b>22</b>	B / RS485	modbus communication negative pair

**RLY1 & RLY2**            relay 1 and relay 2

**X3 TERMINAL**

<b>31</b>	NO - RL1	relay 1 dry contact max. rating 1A @ 220 Vac
<b>32</b>	NO - RL1	relay 1 dry contact max. rating 1A @ 220 Vac
<b>33</b>	NO - RL2	relay 2 dry contact max. rating 1A @ 220 Vac
<b>34</b>	NO - RL2	relay 2 dry contact max. rating 1A @ 220 Vac

## Display and Buttons



main screen  
transmitter is working



keep pressing MENU button until seeing SET  
transmitter is not working in MENU mode

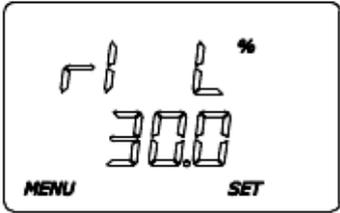
### Smiling Faces

Faces are showing the Air Quality (VOC) levels as below:

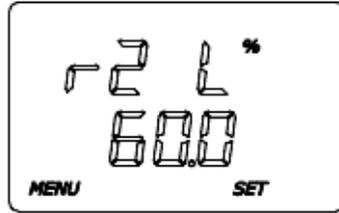
- 1.. Best % 0 – 15
- 2.. Good %15 – 35
- 3.. Fair %35 – 50
- 4.. Bad %50 – 75
- 5.. Worst %75 - 100

## Parameters for Relay and Buzzer

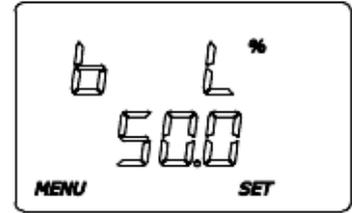
Main Screen >>>>> r1 L > r1 H > r1 A > r2 L > r2 H > r2 A > BL > BH > BA > Main Screen



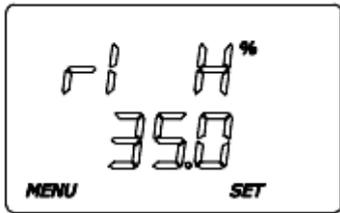
LOW set point for Relay 1



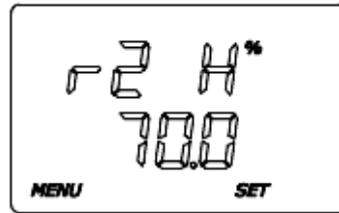
LOW set point for Relay 2



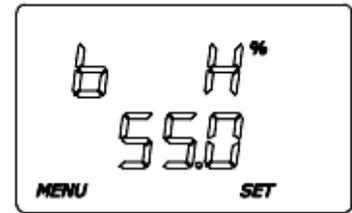
LOW set point for Buzzer



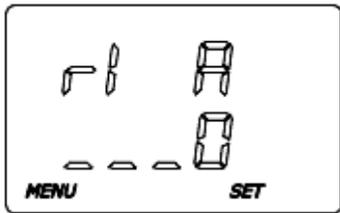
HIGH set point for Relay 1



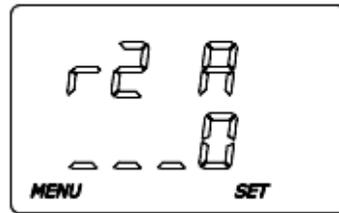
HIGH set point for Relay 2



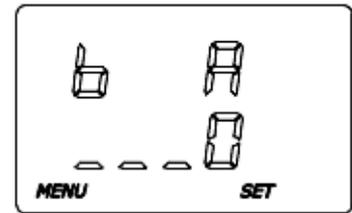
HIGH set point for Buzzer



ACTION selection for Relay 1



ACTION selection for Relay 2



ACTION selection for Buzzer

## Actions for Relay and Buzzer



action 0, valid for relays and buzzer,  
 relay contact is always OPEN  
 buzzer is always SILENCE



action 1, valid for relays and buzzer,  
 relay contact is CLOSED between points, OPEN under LOWpoint and OPEN over HIGHpoint  
 buzzer is WARNING between points, SILENCE under LOWpoint and SILENCE over HIGHpoint



action 2, valid for relays and buzzer,  
 relay contact is OPEN between points, CLOSED under LOWpoint and OPEN over HIGHpoint  
 buzzer is SILENCE between points, WARNING under LOWpoint and SILENCE over HIGHpoint



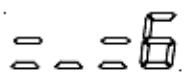
action 3, valid for relays and buzzer,  
 relay contact is CLOSED over HIGHpoint, OPEN under LOWpoint, hysteresis between points  
 buzzer is WARNING over HIGHpoint, SILENCE under LOWpoint, hysteresis between points



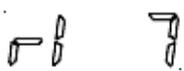
action 4, valid for relays and buzzer,  
 relay contact is OPEN over HIGHpoint, CLOSED under LOWpoint, hysteresis between points  
 buzzer is SILENCE over HIGHpoint, WARNING under LOWpoint, hysteresis between points



action 5, valid only for buzzer,  
 buzzer is WARNING over HIGHpoint, SILENCE under LOWpoint,  
 buzzer is WARNING intermittently between points,



action 6, valid only for buzzer,  
 buzzer is WARNING under LOWpoint, SILENCE over HIGHpoint,  
 buzzer is WARNING intermittently between points,



action 7, valid only for buzzer,  
 buzzer is following relay 1 contact,  
 buzzer is WARNING when relay 1 contact is CLOSED, SILENCE when the contact is OPEN



action 8, valid only for buzzer,  
 buzzer is following relay 2 contact,  
 buzzer is WARNING when relay 2 contact is CLOSED, SILENCE when the contact is OPEN

**Cont.. Actions for Relay and Buzzer**

ACTIONS	under LOW	between LOW & HIGH	over HIGH
0 : 0.0.0	Open / Silence	Open / Silence	Open / Silence
1 : 0.I.0	Open / Silence	Closed / Warning	Open / Silence
2 : I.0.I	Closed / Warning	Open / Silence	Closed / Warning
3 : 0.X.I	Open / Silence	Hysteresis	Closed / Warning
4 : I.X.0	Closed / Warning	Hysteresis	Open / Silence
5 : 0.-.I	Silence	Pre Alarm	Warning
6 : I.-.0	Warning	Pre Alarm	Silence
7 : =r1	Silence when RL1 is Open, Warning when RL1 is Closed		
8 : = r2	Silence when RL2 is Open, Warning when RL2 is Closed		

0 : Relay Contact is OPEN, Buzzer is in Silent mode

I : Relay Contact is CLOSED, Buzzer is in Warning mode

X : Relay Contact is at HYSTERESIS position, OPEN if previous position open, CLOSED if previous position closed  
 : Buzzer is in HYSTERESIS mode, Silent if previous mode is silent, Warning if previous mode is warning

- : Buzzer is in PRE ALARM mode, Buzzer is warning intermittently

## Modbus RS485 Protocol

Default Settings: Modbus ID:1, 9600, 8bit, None, 1. Register Table starts from Base 1.

Use Function 3 for Reading and Function 6 for Writing Holding Registers.

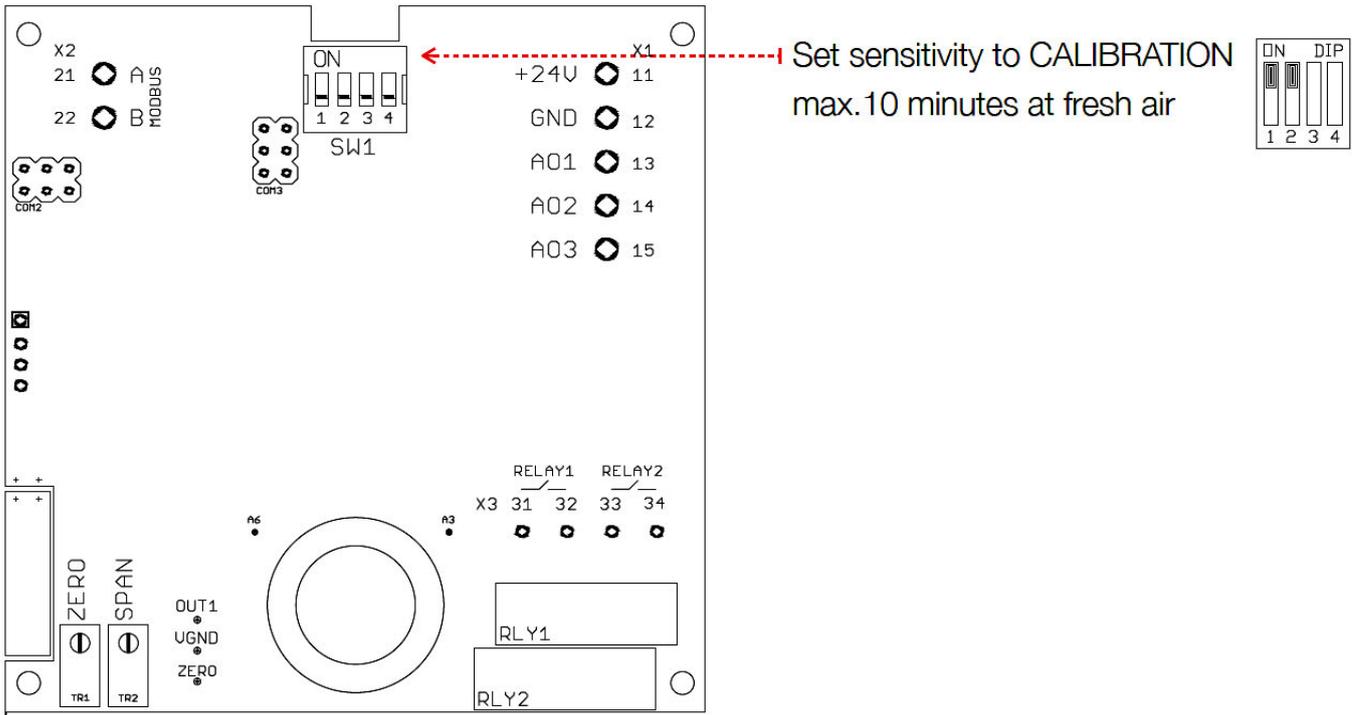
Whenever writing to any Modbus Parameter, new parameter is activated instantly and you should have to configure master device according to new parameters.

For every reboot/initializing, Modbus is activated with default parameters for 3 seconds.

After 3 seconds, Modbus is reconfigured according your parameter settings.

Register	R/W	Range	Description
1	R & W	1...254	Modbus Address
2	R & W	0...4	Baudrate, 0: 9.600, 1: 19.200, 2: 38.400, 3: 57.600, 4: 115.200
3	R & W	0...3	Bit_Parity_Stop, 0: 8bit_None_1, 1: 8bit_None_2, 2: 8bit_Even_1, 3: 8bit_Odd_1
4	R	0...1.000	VOC level as %, divide by 10 for exact value
5	R	1...5	VOC level as smiling faces, 1:0-15%, 2:15-35%, 3:35-50%, 4:50-75%, 5:75-100%
6	R	0 or 1	Relay 1, contact position, 0: OFF - Contact is Open, 1: ON - Contact is Closed
7	R	0...1.000	Relay 1, LOW point
8	R	0...1.000	Relay 1, HIGH point
9	R	0...4	Relay 1, ACTION
10	R	0 or 1	Relay 2, contact position, 0: OFF - Contact is Open, 1: ON - Contact is Closed
11	R	0...1.000	Relay 2, LOW point
12	R	0...1.000	Relay 2, HIGH point
13	R	0...4	Relay 2, ACTION
14	R	0 or 1	Buzzer, 0: OK-Silence, 1: PreAlarm - warning intermittently, 2: WARNING continuously
15	R	0...1.000	Buzzer, LOW point
16	R	0...1.000	Buzzer, HIGH point
17	R	0...4	Buzzer, ACTION

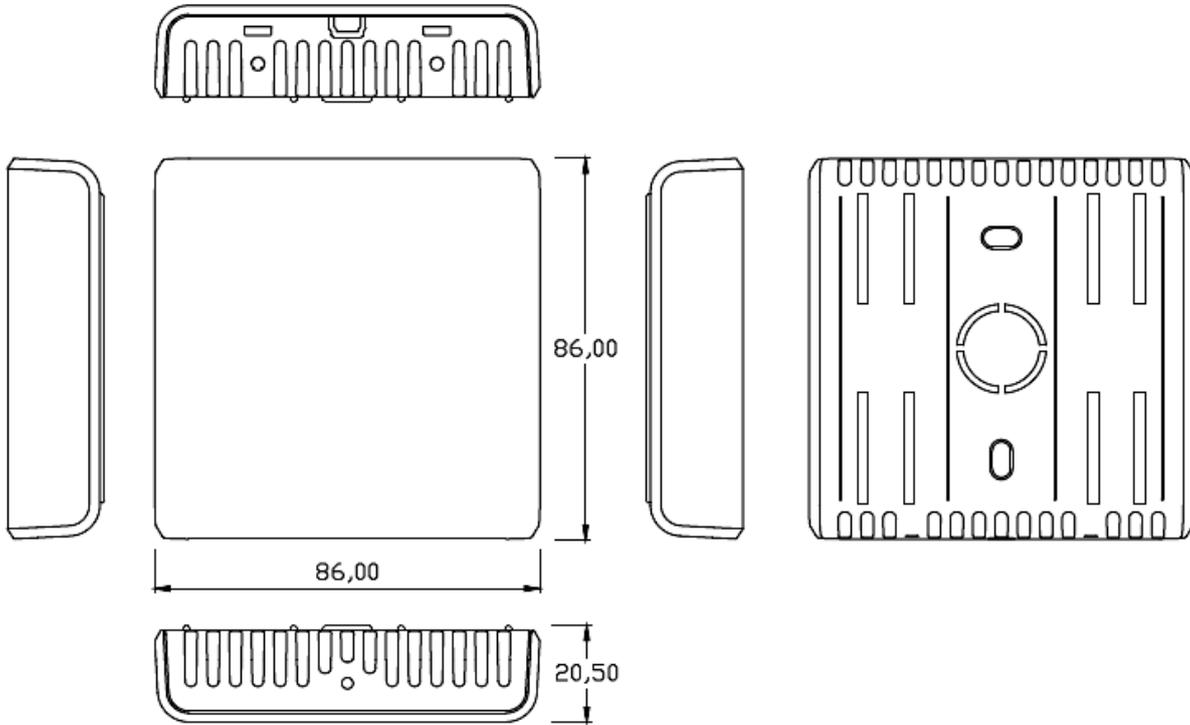
## Calibration



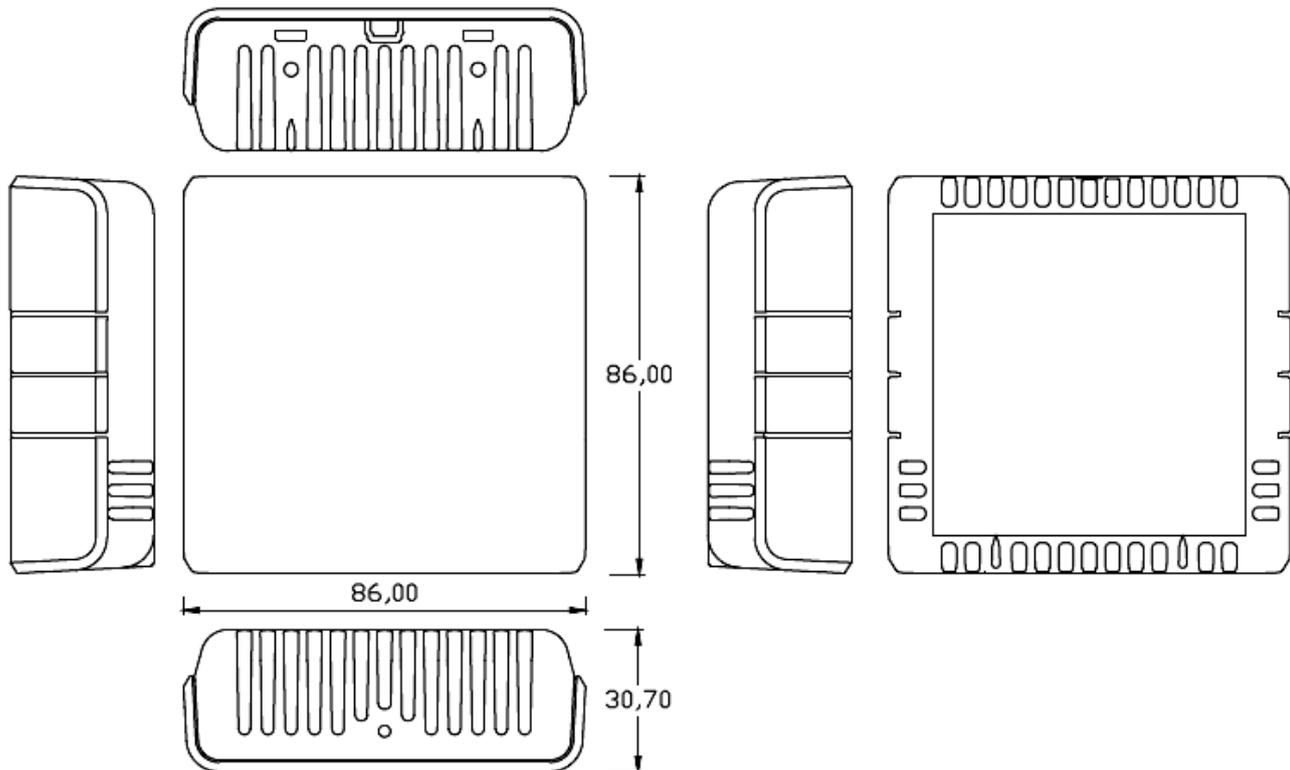
- 1.. Please keep the unit working for minimum 10 minutes at fresh air.
- 2.. Set sensitivity to Calibration Mode.
- 3.. Keep the unit working for between 8-10 minutes at fresh air.
- 4.. Do not forget the unit at calibration mode, do not keep working at calibration mode more than 10 minutes.
- 5.. Change sensitivity setting for settling to HIGH, MEDIUM or LOW.

**Dimensions (mm)**

**VOCR without relay**



**VOCR with relay**



We reserve the right to make changes in our products without any notice which may effect the accuracy of the information contained in this leaflet.