

CO2R 51 MDR2B



CO2R 51 M

### Application

- Indoor Ventilation Control
- CO<sub>2</sub> monitoring in  
offices, conference rooms cinemas/theatre halls,  
exhibition halls, restaurants, shopping malls etc.

### Features

- Maintenance free NDIR sensor
- Measuring ranges  
400-2.000 ppm  
0-2.000 ppm  
0-5.000 ppm  
0-10.000 ppm  
selectable ranges with DIP switch  
On request 0-1.000 ppm
- Output(s)  
0-10 Vdc, 2-10 Vdc, 4-20 ma, 0-5 Vdc or 1-5 Vdc  
( One output and Two CO<sub>2</sub> outputs available )
- Estimated operating life 15 years
- ABC – Automatic Baseline Calculation
- Accuracy 70 ppm +3 % reading
- 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

### Temperature and Humidity Options

- Temperature measuring ranges  
0 to +50°C or -30 to +70°C
- Temperature output  
0-10 Vdc, 2-10 Vdc, 4-20 mA, 0-5 Vdc or 1-5 Vdc
- Humidity measuring ranges  
0 to 100% rH
- Humidity output  
0-10 Vdc, 2-10 Vdc, 4-20 mA, 0-5 Vdc or 1-5 Vdc

See ordering codes and technical data  
on next page for more detailed information

## Ordering codes

### Without Humidity and Temperature options and with possibility of 2 x CO<sub>2</sub> outputs

Mounting type	Output 1 CO <sub>2</sub>	Output 2 CO <sub>2</sub> .	"Options"	Advanced Options
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
CO2R = 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 B = Buzzer E = 1.000 ppm	P = PID out T = RTC L = Datalogger

### With Humidity and Temperature options

Mounting type	Output 1 CO <sub>2</sub>	Output 2 TEMP.	Output 3 HUM.	"Options"	Advanced Options
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
CO2R = Room	C0 = no output C1 = 0-10 Vdc C2 = 2-10 Vdc C3 = 0-5 Vdc C4 = 1-5 Vdc C5 = 4-20 mA	T0 = no output T1 = 0-10 Vdc T2 = 2-10 Vdc T3 = 0-5 Vdc T4 = 1-5 Vdc T5 = 4-20 mA	H0 = no output H1 = 0-10 Vdc H2 = 2-10 Vdc H3 = 0-5 Vdc H4 = 1-5 Vdc H5 = 4-20 mA	M = Modbus RS485 D = LCD display R1 = Relay x 1 R2 = Relays x 2 P = PID out B = Buzzer E = 1.000 ppm	P = PID out T = RTC L = Datalogger

## Ordering examples

Type no.	Description
CO2R 51 M	Carbon Dioxide (CO <sub>2</sub> ) room transmitter, Two CO <sub>2</sub> outputs, Output 1: 4-20 mA and Output 2: 0-10 Vdc Modbus RS485 communication
CO2R 51 MDR2B	Carbon Dioxide (CO <sub>2</sub> ) room transmitter, Two CO <sub>2</sub> outputs, Output 1: 4-20 mA and Output 2: 0-10 Vdc Modbus RS485 communication, LCD Display, 2 x relay outputs and Buzzer
CO2R C1T1H1 MDR2B	Carbon Dioxide (CO <sub>2</sub> ) room transmitter with Temperature and Humidity options, CO <sub>2</sub> output 0-10 Vdc TEMP. output 0-10 Vdc HUM. output 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)

## Technical data

Electrical	Power Supply	24 Vac ( $\pm$ %5), 50-60 Hz <sub>SEP</sub> <sup>[1]</sup> 15-35 Vdc
	Power Consumption	< 2.5 W
Outputs	Current Output	4-20 mA, maximum 500 $\Omega$ <sub>SEP</sub> <sup>[1]</sup>
	Voltage Output	0-10 Vdc, minimum 1.000 $\Omega$ 0-5 Vdc, minimum 1.000 $\Omega$
	Relay Output	max. rating 1A @ 220 Vac
Accuracy	CO <sub>2</sub>	70 ppm + 3% reading
	Temperature	$\pm$ 0.5°C
	Humidity	$\pm$ 3% rH
CO <sub>2</sub> sensor	Sensing Element	NDIR
	ABC period	8 days
	t <sub>90</sub>	< 120 sec.
	Sensor life time	> 15 years expected
	Resolution	1 ppm
	Operating Temperature	0 to +50°C
	Operating Humidity	0 to +85% % rH
	Operating Pressure	800 to 1.200 mbar
General data	Media	Air or non-aggressive gasses
	Storage temperature	-20 to +50°C
Ranges	CO <sub>2</sub>	400-2.000 ppm 0-2.000 ppm 0-5.000 ppm 0-10.000 ppm selectable ranges with DIP switch
	Temperature	0 to +50°C or -30 to +70°C selectable ranges with DIP switch
	Humidity	0 to 100% rH
Response time	Temperature ranges	60 seconds and 20 seconds selectable with DIP switch
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 CO2R 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

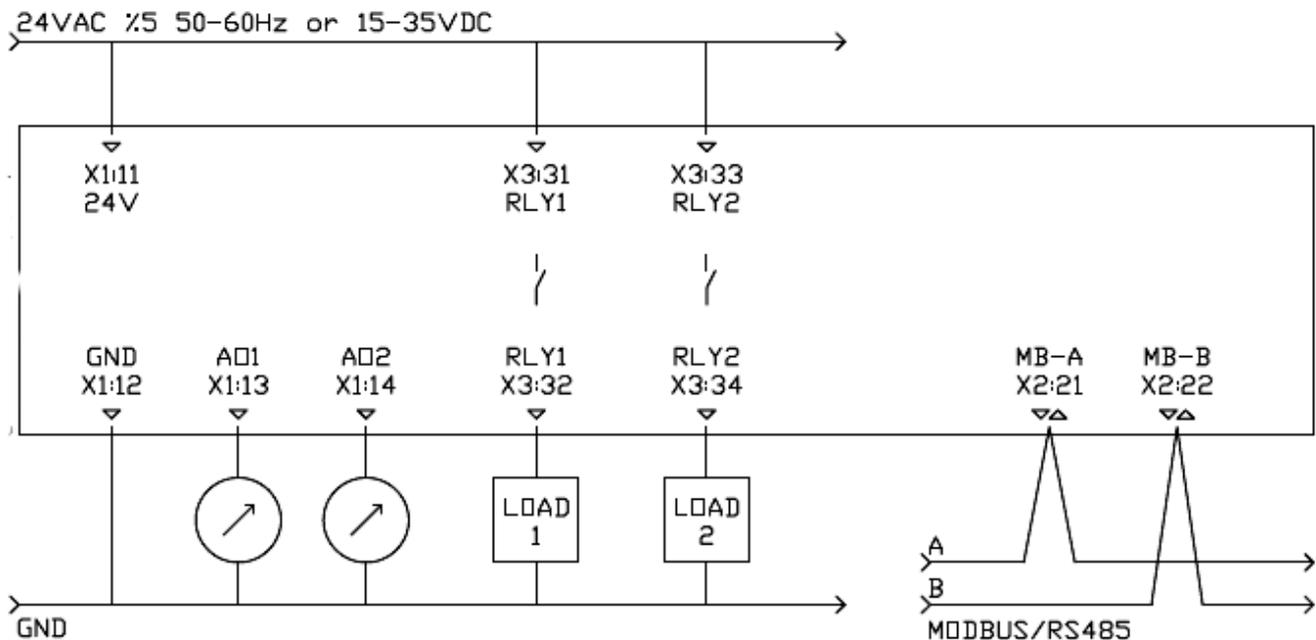
## DIP Switch Settings

- 1.. Please check if there is any special instruction on the enclosure or inside the cover
- 2.. DIP 3 has no function

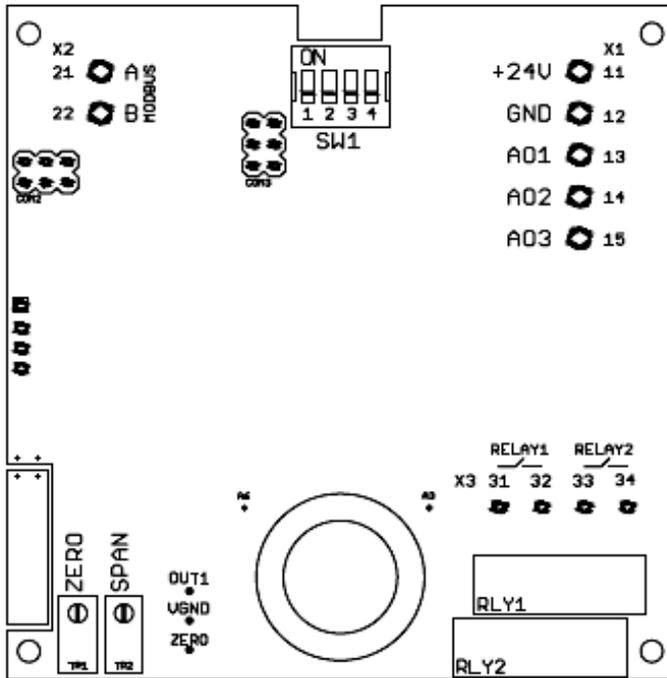
DIP 1-2	CO <sub>2</sub> Ranges	DIP 4	Response
	400-2.000 ppm		60 sec.
	0-2.000 ppm		20 sec.
	0-5.000 ppm		
	0-10.000 ppm		

## 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

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

### X2 TERMINAL

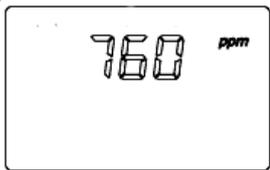
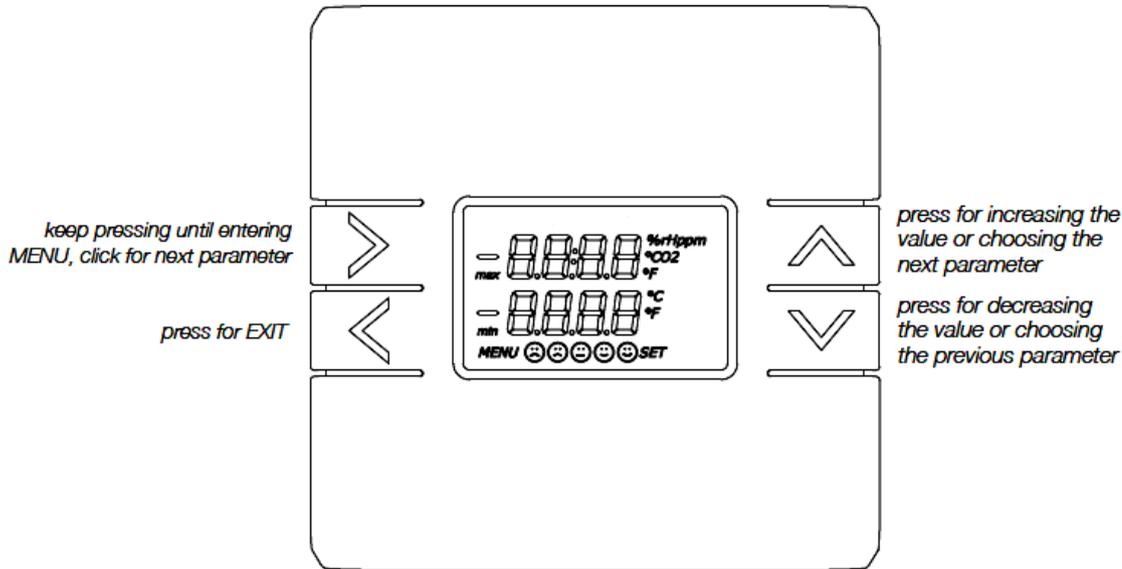
21	A / RS485	modbus communication positive pair
22	B / RS485	modbus communication negative pair

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

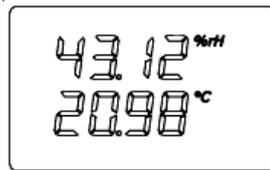
### X3 TERMINAL

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

**Display and Buttons**



main screen  
transmitter is working



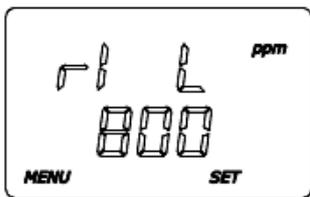
temperature & humidity values  
screen changes every 3 seconds



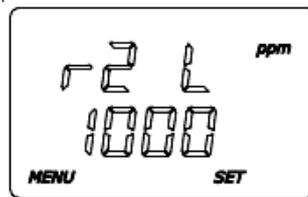
keep pressing MENU button until seeing SET  
transmitter is not working in MENU mode

**Parameters for Relay and Buzzer**

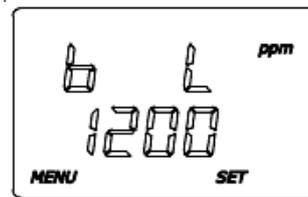
Main Screen >>>>> r1 L > r1 H > r1 A > r2 L > r2 H > r2 A > BL > BH > BA > Main Screen



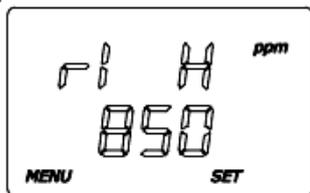
LOW set point for Relay 1



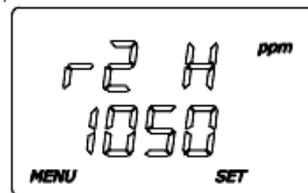
LOW set point for Relay 2



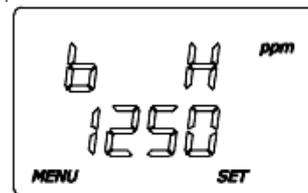
LOW set point for Buzzer



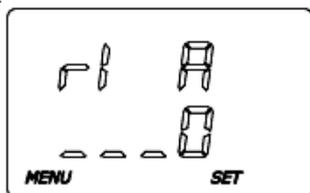
HIGH set point for Relay 1



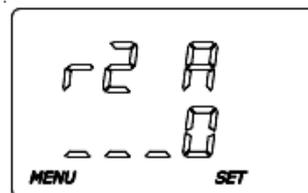
HIGH set point for Relay 2



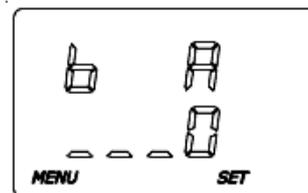
HIGH set point for Buzzer



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



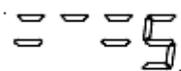
action 2, valid for relays and buzzer,  
relay contact is OPEN between points, CLOSED under LOWpoint and OPEN over HIGHpoint  
buzzer is SILENCE between points, WARNING under LOWpoint and SILENCE over HIGHpoint



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.

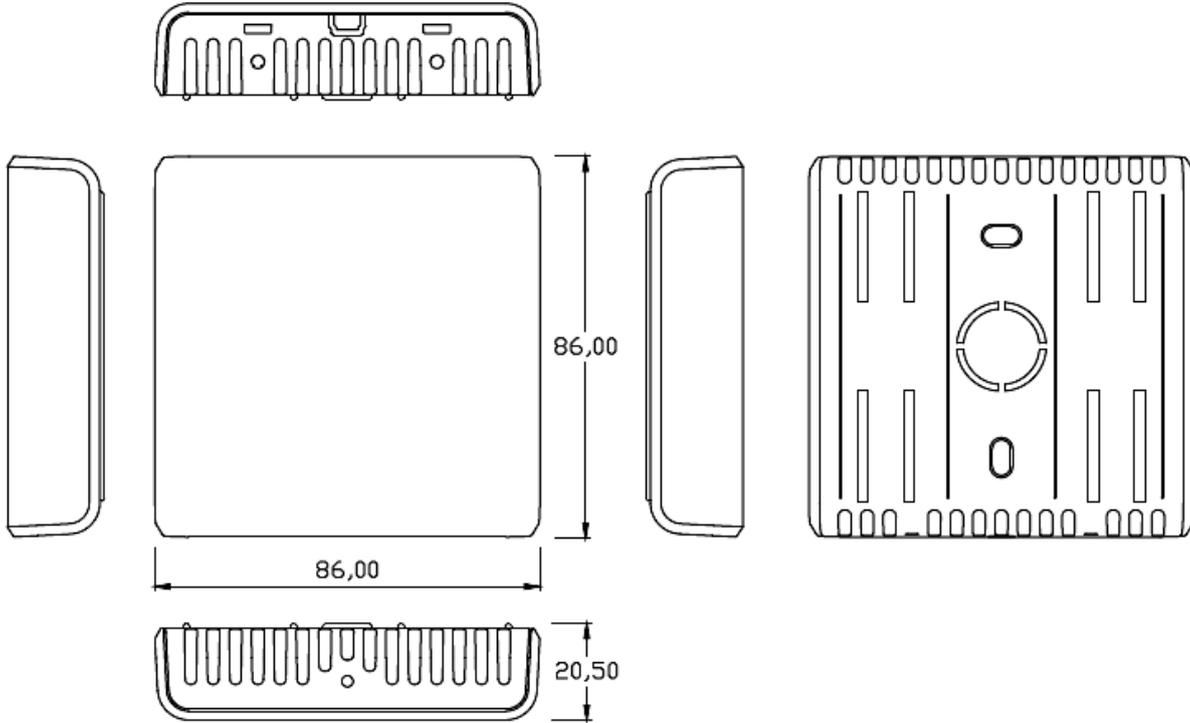
Unlisted registers are for analog output calibrations and some system parameters.

Please do not change unlisted registers..

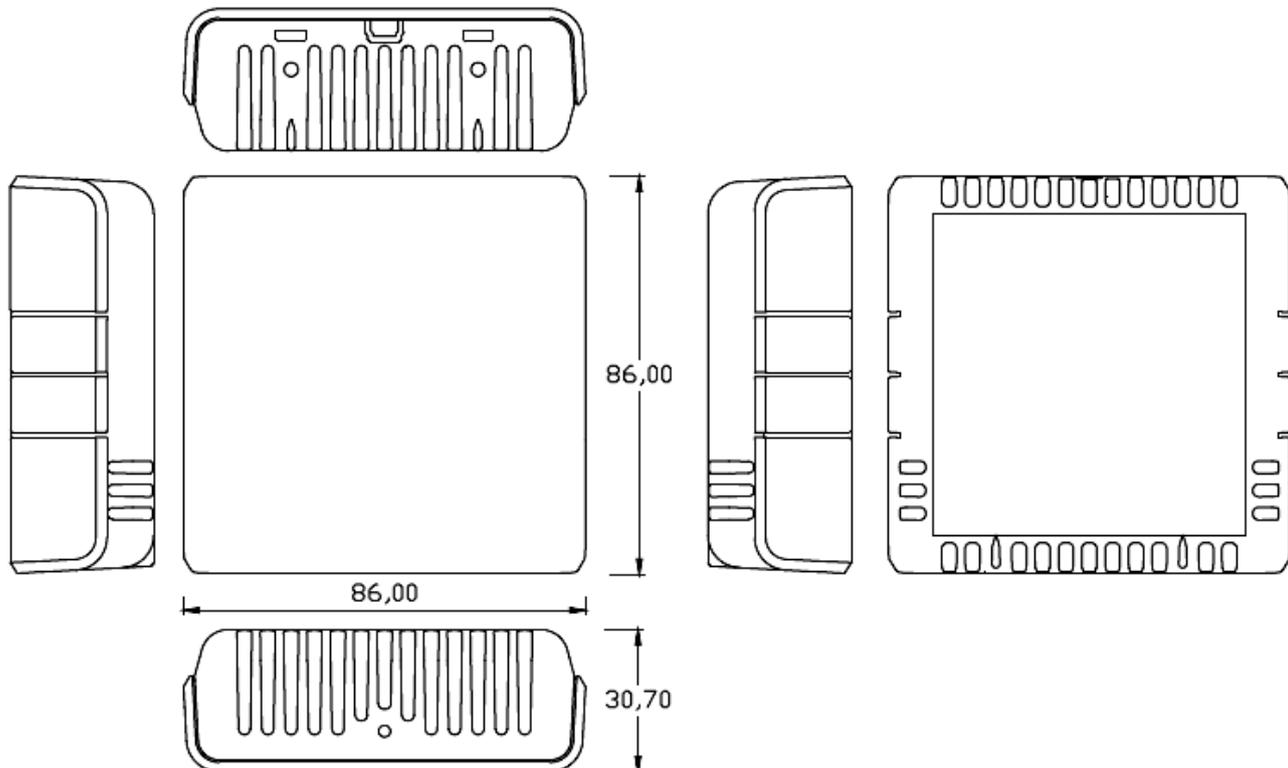
Register	R/W	Range	Description
1	R & W	1...254	Modbus Address
2	R & W	0...4	Baudrate, 0: 9.600, 1: 19.200, 2: 38.400, 3: 57.600, 4: 115.200
3	R & W	0...3	Bit_Parity_Stop, 0: 8bit_None_1, 1: 8bit_None_2, 2: 8bit_Even_1, 3: 8bit_Odd_1
4	R		CO2 level as ppm
5	R		Temperature as C x100, divide by 100 for exact value
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
18-29	R		Only for service needs
30	R		CO2 level as ppm
31	R		Temperature as C x100, divide by 100 for exact value
32	R		Temperature as C
33	R		Temperature as F x100, divide by 100 for exact value
34	R		Temperature as F
35	R		Humidity as %rH x100, divide by 100 for exact value
36	R		Humidity as %rH

**Dimensions (mm)**

**CO2R without relay**



**CO2R 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.