

PMR 51 MDR2B



PMR 51

Application

- Indoor air quality monitoring
- Clean room monitoring

Features

- Particle size measurements
PM1.0, PM2.5, PM4.0 and PM10
- Concentration ranges
0 to 100 µg/m³ and 0 to 500 µg/m³
- Accuracy
10 µg/m³ for PM1.0 and PM2.5
25 µg/m³ for PM4.0 and PM10
- Maintenance-free,
fully factory calibrated laser optic sensor
- Estimated lifetime more than 10 years
- Output(s)
0-10 Vdc, 2-10 Vdc, 4-20 ma, 0-5 Vdc or 1-5 Vdc
(One output and Two PM outputs available)
- 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
- 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

With possibilities of 1 x PM output and 2 x PM outputs and without Humidity and Temperature options

| Mounting type | Output 1 PM | Output 2 PM. | "Options" | Advanced Options |
|----------------------|--|--|--|--|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| PMR = 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 | P = PID out T = RTC L = Datalogger |

With 1 x PM output and 1 x Humidity output and 1 x Temperature output

| Mounting type | Output 1 PM | 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"/> |
| PMR = 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 | P = PID out T = RTC L = Datalogger |

Ordering examples

| Type no. | Description |
|------------------|--|
| PMR 51 | Room Particle Matter transmitter, Two PM outputs, Output 1: 4-20 mA and Output 2: 0-10 Vdc |
| PMR 51 M | Room Particle Matter transmitter, Two PM outputs, Output 1: 4-20 mA and Output 2: 0-10 Vdc Modbus RS485 communication |
| PMR 51 MDR2B | Room Particle Matter transmitter, Two PM outputs, Output 1: 4-20 mA and Output 2: 0-10 Vdc Modbus RS485 communication, LCD Display, 2 x relay outputs and Buzzer |
| PMR P1T1H1 MDR2B | Room Particle Matter, Temperature and Humidity transmitter PM 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

Technical data








| | | |
|----------------|---|---|
| Electrical | Power Supply | 24 Vac (\pm %5), 50-60 Hz 15-35 Vdc |
| | Power Consumption | < 2.5 W |
| Outputs | Current Output | 4-20 mA, maximum 500 Ohm |
| | Voltage Output | 0-10 Vdc, minimum 1.000 Ohm 0-5 Vdc, minimum 1.000 Ohm |
| | Relay Output | Max. rating 1A @ 220 Vac |
| Accuracy | PM1.0 and PM2.5 | 10 μ g/m ³ |
| | PM4.0 and PM10 | 25 μ g/m ³ |
| | Humidity | 3%rH |
| | Temperature | 0.5°C |
| Sensor | Type | Laser optic |
| | Media | Air or non-aggressive gasses |
| | Life | More than 10 years, continuous working |
| | Storage temperature | -30 to 70°C |
| | Operating temperature | -10 to +60°C |
| Particle Sizes | Selectable by DIP switches on PCB, see page 4. | |
| | PM 1.0 | 0.3 to 1.0 μ m |
| | PM 2.5 | 0.3 to 2.5 μ m |
| | PM 4.0 | 0.3 to 4.0 μ m |
| | PM 10 | 0.3 to 10 μ m |
| Ranges | PM | 0 to 100 μ g/m ³ , 0 to 500 μ g/m ³ |
| | Temperature | 0 to 50°C |
| | Humidity | 0 to 100% rH |
| Response times | Selectable by DIP switches on PCB, see page 4. | |
| Connections | X1-X2 Terminals | Pluggable screw terminal |
| | X3 Terminals | Fixed screw terminal |
| | Cable | maximum 1.5mm ² |
| Protection | IP30 | |
| Standards | EMC Directive | EN 61326-1 |
| Dimensions | 86.0 x 86.0 x 30.7 mm | |
| Weight Packed | 125 grams | |
| Display | For PMR 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

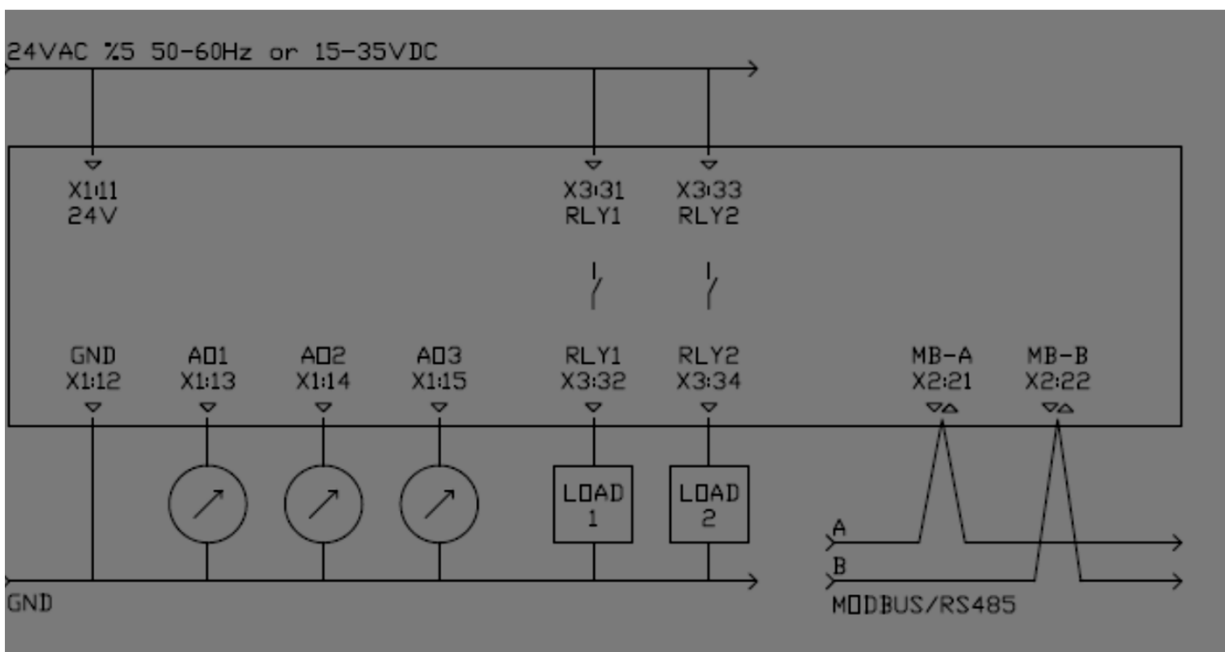
DIP Switch Settings

- 1.. Please check if there is any special instruction on the enclosure or inside the cover
2. Temperature range is fixed as 0 to 50°C
3. Humidity range is fixed as 0 to 100%rH

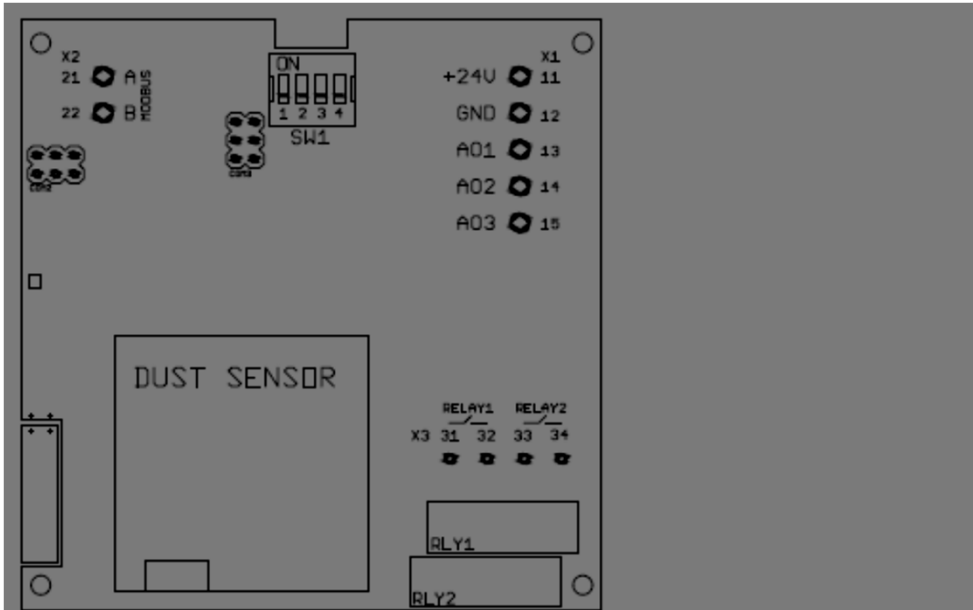
| DIP | Particle Size | DIP | Concentration Range | Response |
|---|----------------|---|---------------------|----------|
|  | 0.3 ... 2.5 µm |  | 0 ... 100 µg/m³ | 60 sec. |
|  | 0.3 ... 1.0 µm |  | 0 ... 100 µg/m³ | 10 sec. |
|  | 0.3 ... 4.0 µm |  | 0 ... 500 µg/m³ | 60 sec. |
|  | 0.3 ... 10 µm |  | 0 ... 500 µg/m³ | 10 sec. |

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 (± %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 |

TR1 not used

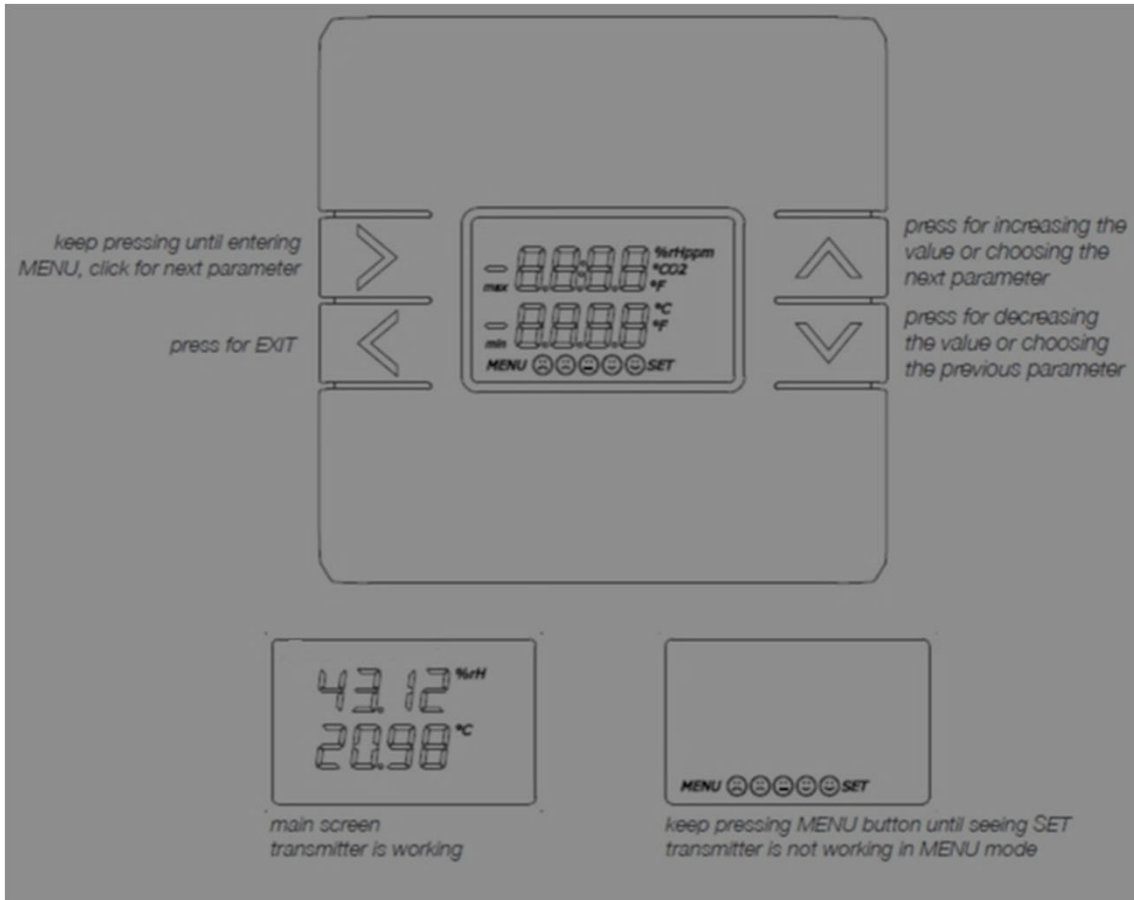
TR2 not used

RLY1 & RLY2 relay 1 and relay 2

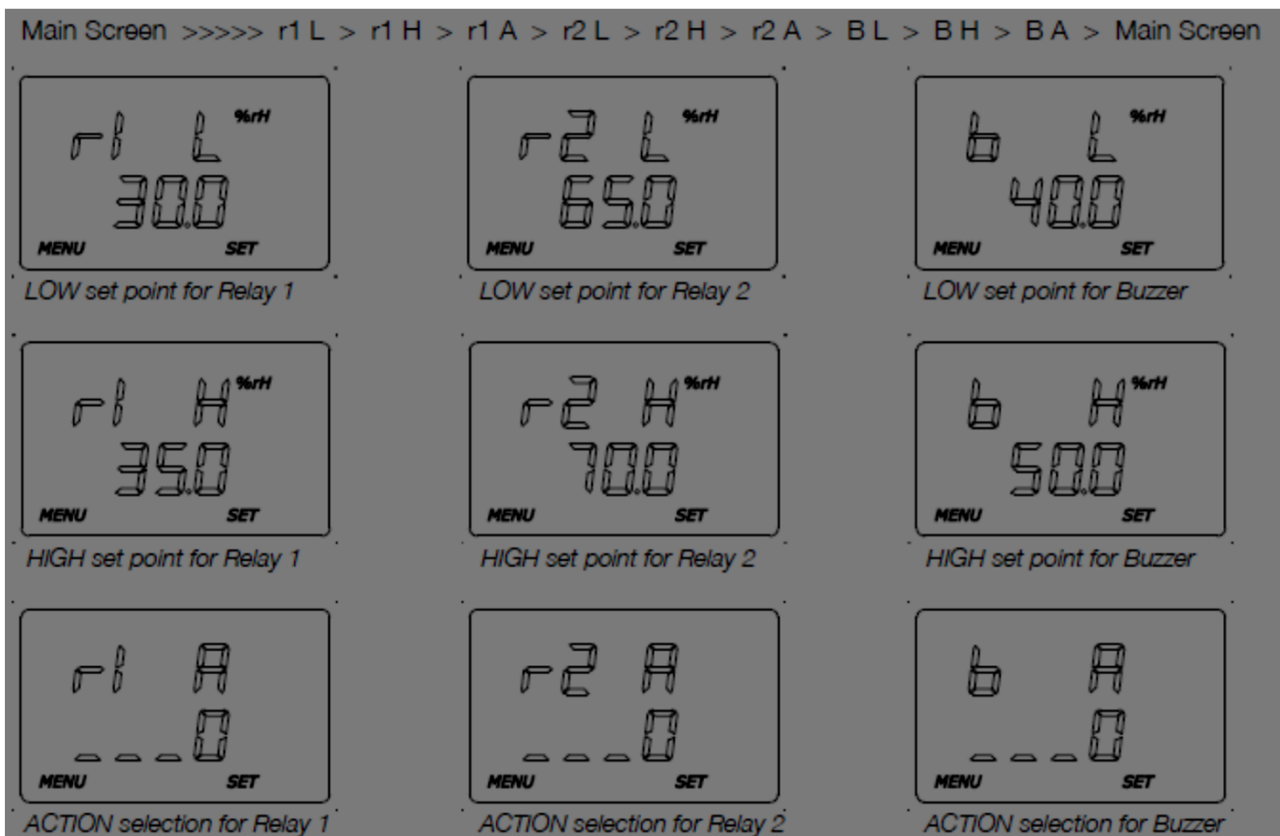
X3 TERMINAL

| | | |
|----|----------|--|
| 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



Parameters for Relay and 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.

| Register | R/W | Range | Description |
|----------|-------|------------|--|
| 1 | R & W | 1...254 | Modbus Address |
| 2 | R & W | 0...4 | Baudrate, 0: 9.600, 1: 19.200 |
| 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 | | PM2.5 x10, divide by 10 for exact value |
| 5 | R | | PM10 x10, divide by 10 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 |
| 18-30 | X | | only for service needs, do not change any parameter..! |
| 31 | R | | Temperature as C x10, divide by 10 for exact value |
| 32 | R | | Temperature as C |
| 33 | R | | Temperature as F x10, divide by 10 for exact value |
| 34 | R | | Temperature as F |
| 35 | R | | Humidity as %rH x10, divide by 10 for exact value |
| 36 | R | | Humidity as %rH |
| 37-40 | X | | blank |
| 41 | R | 0...10.000 | PM1.0 x10, divide by 10 for exact value |
| 42 | R | 0...10.000 | PM2.5 x10, divide by 10 for exact value |
| 43 | R | 0...10.000 | PM4.0 x10, divide by 10 for exact value |
| 44 | R | 0...10.000 | PM10 x10, divide by 10 for exact value |
| 45 | R | 0...1.000 | PM 1.0 |
| 46 | R | 0...1.000 | PM 2.5 |
| 47 | R | 0...1.000 | PM 4.0 |
| 48 | R | 0...1.000 | PM 10 |

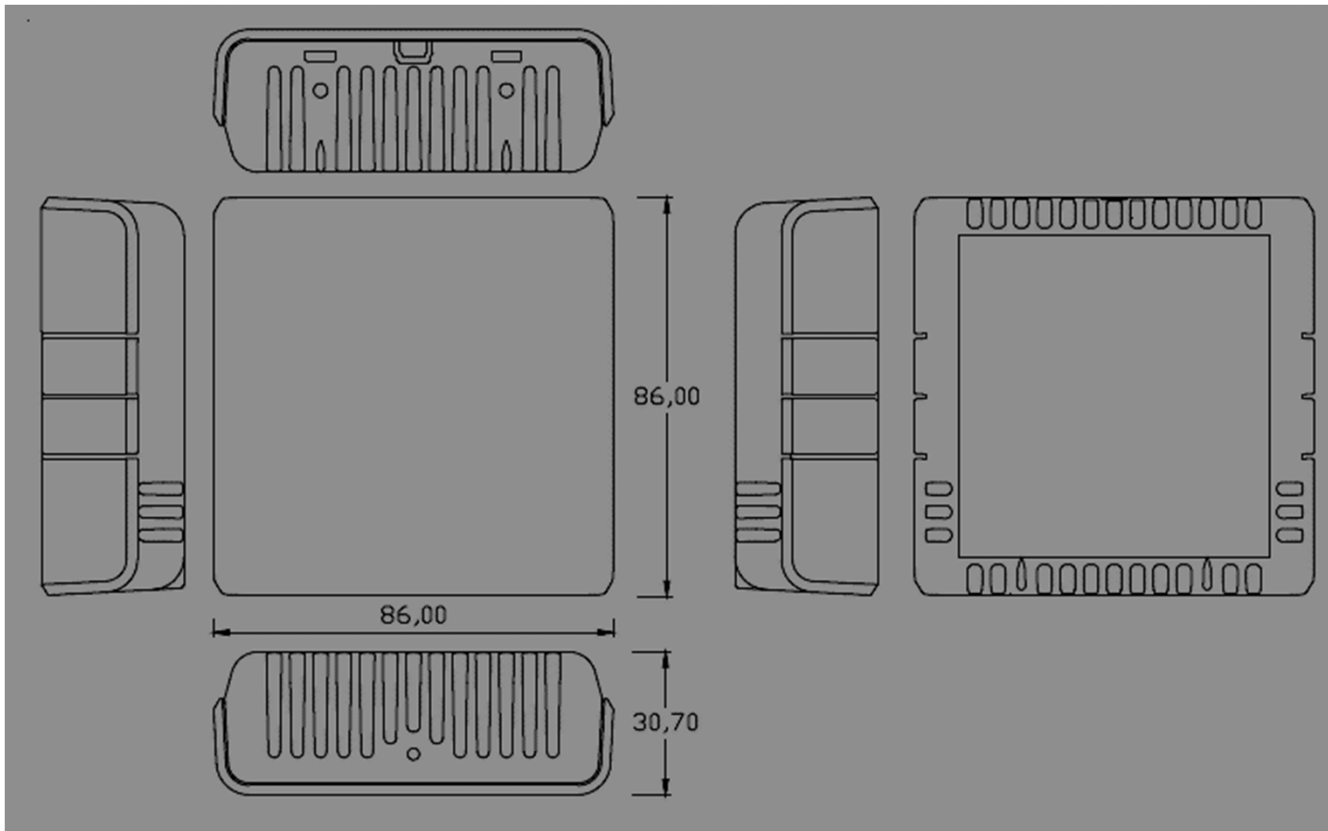
PM2.5 & Indoor Air Quality Index

The table below will give you a sense of what levels of PM2.5 are harmful and the appropriate precautions you need to take. It is based on the indoor air quality standards for particle pollution published by the U.S. Environmental Protection Agency.

| PM 2.5 | IAQ Index | IAQ Category | PM2.5 Health Effect | Precautionary Actions |
|-----------------|-------------|-------------------------------|--|--|
| 0.0 ... 12.0 | 0 ... 50 | Good | Little to no risk. | None |
| 12.0 ... 35.4 | 51 ... 100 | Moderate | Unusually sensitive individuals may experience respiratory symptoms. | Unusually sensitive people should consider reducing prolonged or heavy exertion. |
| 35.5 ... 55.4 | 101 ... 150 | Unhealthy for Sensitive Group | Increasing likelihood of respiratory symptoms in sensitive individuals, aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly. | People with respiratory or heart disease, the elderly and children should limit prolonged exertion. |
| 55.5 ... 150.4 | 151 ... 200 | Unhealthy | Increased aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; increased respiratory effects in general population. | People with respiratory or heart disease, the elderly and children should avoid prolonged exertion; everyone else should limit prolonged exertion. |
| 150.5 ... 250.4 | 201 ... 300 | Very Unhealthy | Significant aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; significant increase in respiratory effects in general population. | People with respiratory or heart disease, the elderly and children should avoid any outdoor activity; everyone else should avoid prolonged exertion. |
| 250.5 ... 500 | 301 ... 500 | Hazardous | Serious aggravation of heart or lung disease and premature mortality in persons with cardiopulmonary disease and the elderly; serious risk of respiratory effects in general population. | Everyone should avoid any outdoor exertion; people with respiratory or heart disease, the elderly and children should remain indoors. |

Source: U.S. Environmental Protection Agency

Dimensions (mm)



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.