# WOOFAA BCon Air Quality Monitor

# User Manual

# Table of Contents

# Product Overview

WOOFAA BCon air quality monitor is a professional indoor air quality testing equipment. It can measure the concentrations of PM2.5, PM10, TVOC (volatile organic compounds) and $CO_2$, and the values of temperature and relative humidity.

WOOFAA BCon is suitable for all kinds of indoor environment such as offices, classrooms, machine rooms, bedrooms, and can work with air ventilation devices and purifiers.

The data can be transferred to the server via RS485, RS433, WIFI communication, to realize project monitoring, air ventilation and purification device linkages, smart home services and other project requirements.

# Product Features

- Multiple measurement parameters: PM2.5, PM10, TVOC, HCHO, CO, $CO_2$, temperature, relative humidity
- Power source: 110-240VAC or 8-30VDC
- Communication protocols: RS485 / GPRS / RF433 / WiFi / Modbus
- WOOFAA BCon series products can be integrated with 86 box, support RS485, wireless 433 protocols.
- Can be customized to accommodate specific request, such as monitoring sulphur dioxide and oxygen gas concentration.
- Support mobile app, upper computer and web-based remote control. Intelligent control by Internet.


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# Product Specifications

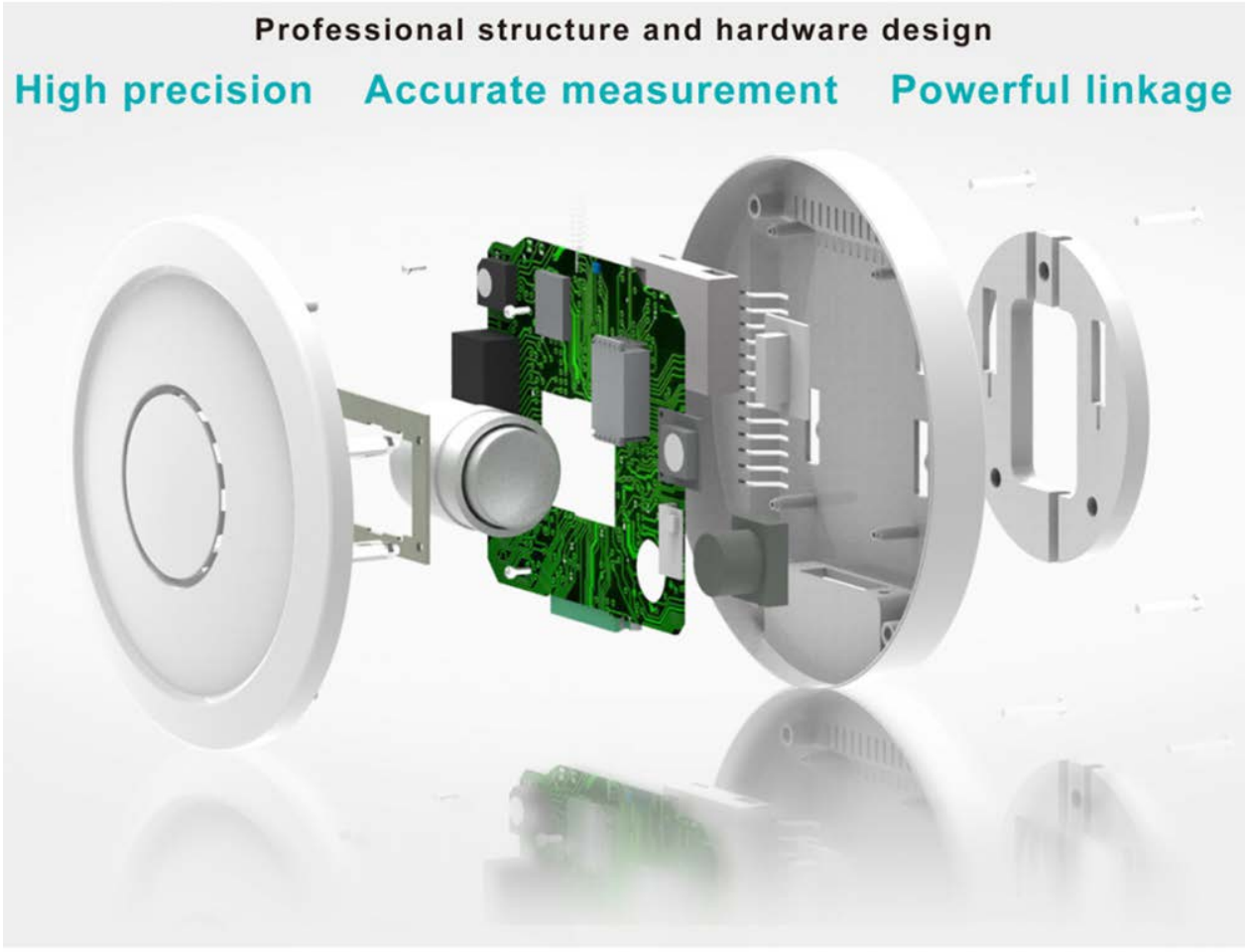
- PM2.5 and PM10 using laser scattering measurement
  - Measuring Range: 0.3 to 10 µm
  - Measuring Threshold: 0 to 500 µg/$m^3$
  - Counting Effectiveness: 50% @ 0.3 µm, 98% @ ≥ 0.5 µm
  - Accuracy: ±10%
  - Measuring Volume: 0.1 L
  - Response Time: ≤10 seconds
- TVOC using semiconductor sensor
  - Measuring Range: 0 to 3.00 mg /$m^3$ (Milli gram)
  - Accuracy: ±15%
  - Response Time: < 5 seconds
  - Warm-up Time: 15 minutes

- Carbon Dioxide ($CO_2$) using NDIR measurement
  - Measuring range: 400 ~ 2000 ppm
  - Temperature Coefficient: 0.2% FS /°C
  - Temperature Calibration: Auto
  - Measuring Accuracy: 22°C (72°F) ± 45ppm ± 3%
  - Stability: Within the life cycle (15 years), < 2% of the full measuring threshold
  - Calibration Cycle ABC Logic self-calibration (no user input required)
  - Nonlinear: < 1% Full Scale
  - Pressure Coefficient: 0.13% mmHg input
  - Reaction Time: < 2 minutes for 90% of change
  - Refresh Rate: 2 seconds
  - Warm-up Time: < 2 minutes (operation), 10 minutes (maximum accuracy)
  - Resolution: 1 ppm

- Carbon Monoxide (CO) using Electrochemical Measuring Method
  - Measuring Range: 0 ~ 500 ppm
  - Measuring Accuracy: 0.1 ppm
  - Warm-up Time: ≤ 3 minutes
  - Reaction Time: ≤ 60 seconds
  - Recovery Time: ≤ 60 seconds
  - Working Humidity: 15% ~ 65% Relative Humidity
- Formaldehyde (HCHO) using Electrochemical Measuring Method
  - Measuring Range: 0 ~ 5 mg/m3
  - Measuring Accuracy: ≤ 0.01 mg/m3
  - Warm-up Time: ≤ 3 minutes
  - Reaction Time: < 30 seconds
  - Working Temperature: 0 ~ 50°C
  - Working Humidity: 15% ~ 90% Relative Humidity

- Temperature
  - Working Range: -40 ~ +125°C
  - Resolution: 1°C
  - Accuracy: ±1°C
  - Repeatability: ±1°C
  - Response Time: 5 seconds
  - Long Time Drifting: < 0.04°C / year
- Relative Humidity
  - Working Range: 0 ~ 100%
  - Resolution: 1%
  - Accuracy: ±2%
  - Repeatability: ±1%
  - Lag: ±1%
  - Nonlinear: < 0.1%
  - Response Time: 8 seconds
  - Long Time Drifting: < 0.5% / year

- Work Status Display: 3 indicator light combination display
- Power Consumption: 3 ~ 5W (depend on the number of parameters)
- Power Supply: 8-30VDC / 110-230VAC, 50/60HZ
- Cable Entry: RS485 Screw Terminal 8-pins block
- Housing Material: ABS
- Overall Dimensions: Diameter 170 x Height 50mm
- Net Weight: 380g

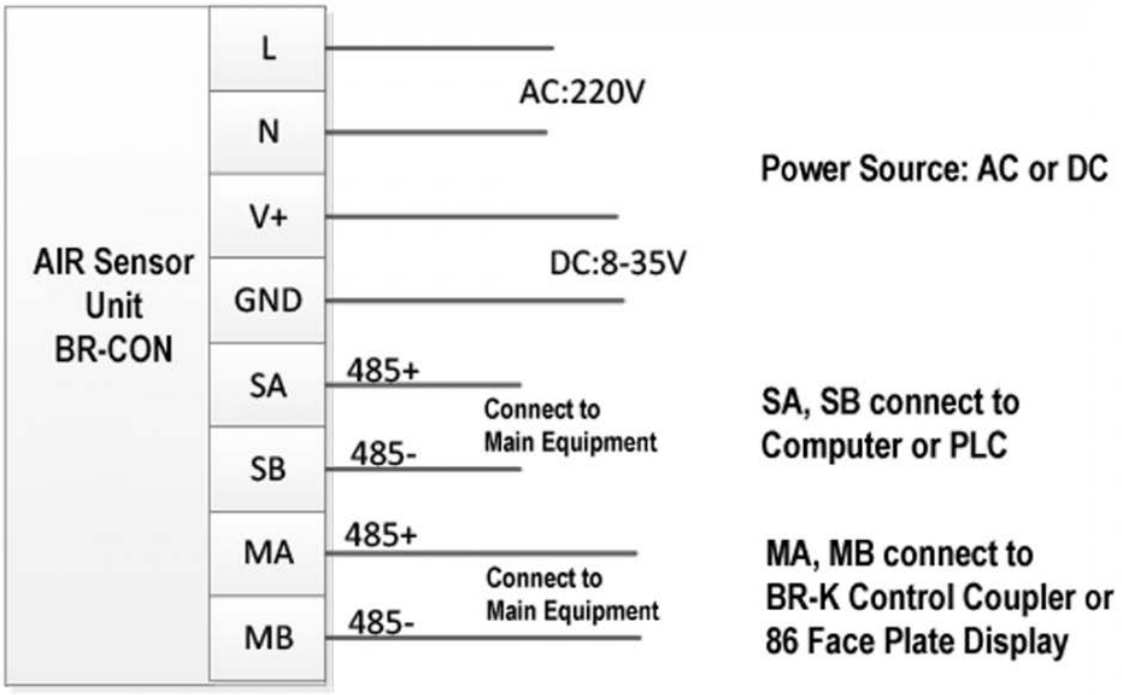



**Wiring Standard:** Cross cut area < 1.5mm$^2$

**Communication Port:** 8 ports connector

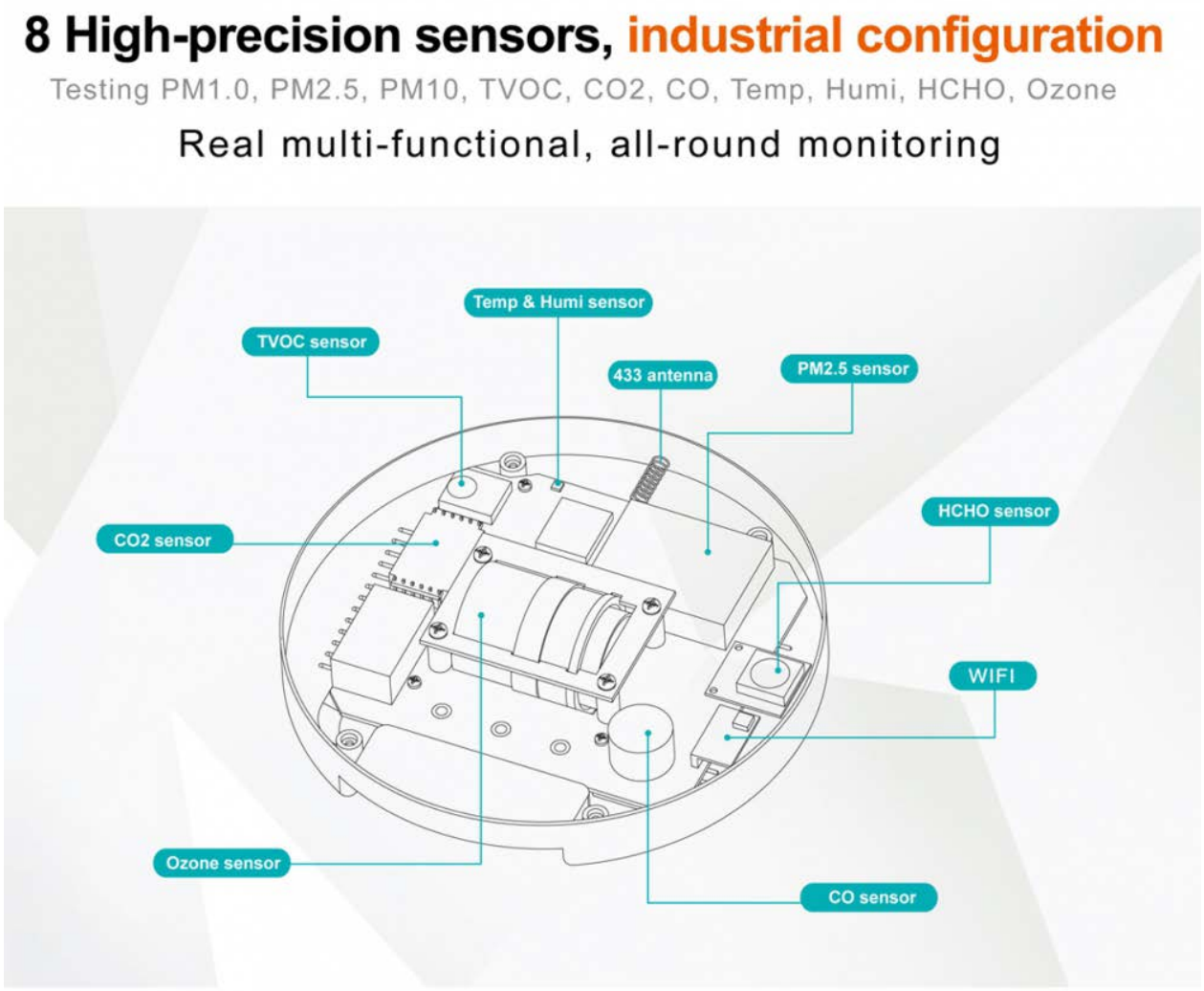
## Communication Interface:

- 2 ways RS485 with 10KV anti-electrostatic protection
- 1 ways RS485 used as the main MODBUS station to communicate with the integrated face plate
- 1 ways RS485 used as the MODBUS sub-station for long range data transfer
- 433MHz wireless (only used for integrated face plate with control module) (Optional)
- WiFi communication (Optional)
- GPRS communication (Optional)



## Environment for use

- Temperature range: 0 ~ 50 °C
- Humidity range: 0 ~ 80% Relative Humidity
- Pressure: 1 standard pressure
- Storage Temperature: -10 ~ 50 °C



# Operating Instructions

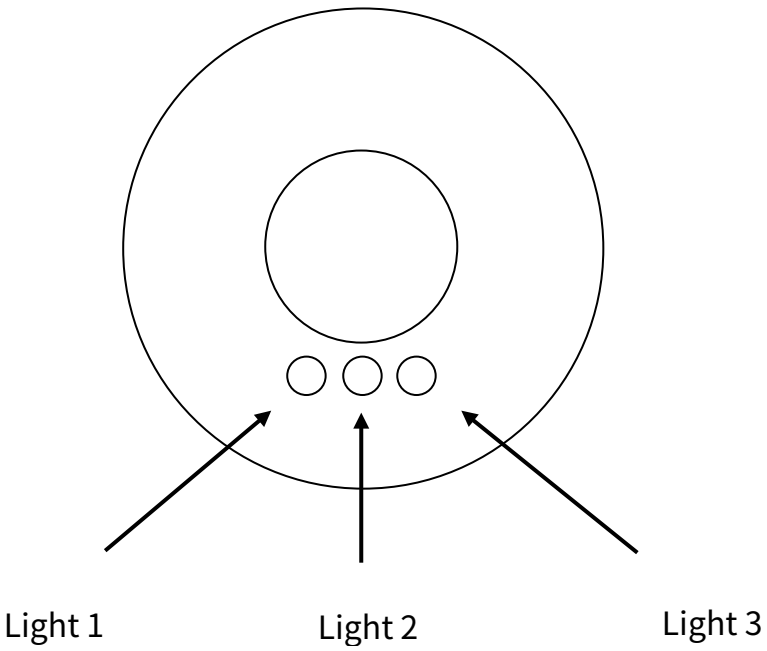
- BCon will automatically start monitoring once connected to power supply, and stop monitoring immediately upon disconnection.
- Dialing address:

| Dialing # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| ON | 1 | 2 | 4 | 8 | 16 | 32 | 64 | 128 |
| OFF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

The dialing number at the back of the unit represents the unit address. For example, if dialing number 1 and 4 is switched to the ON position, the unit address is 9.

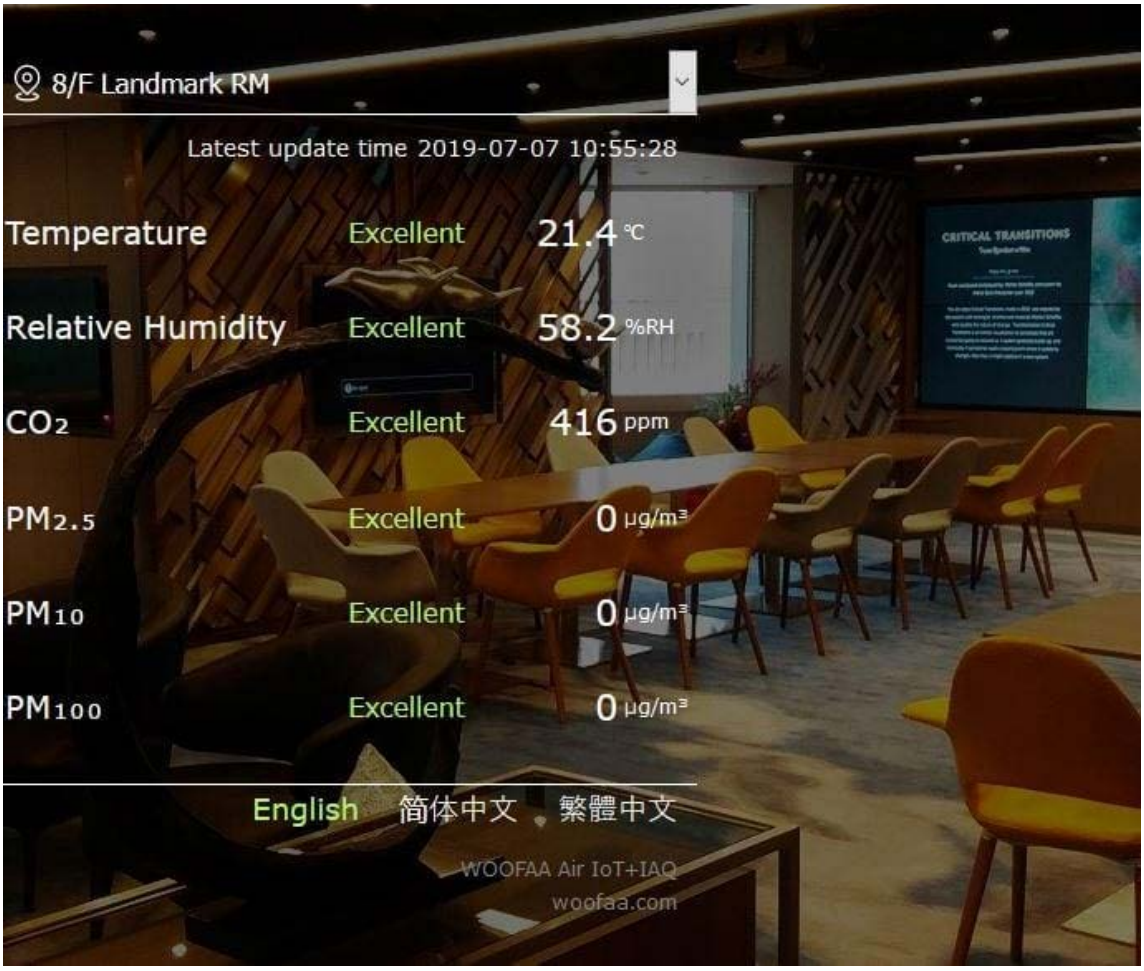
- 433 wireless setup:
    - Press and hold the function key for 3 seconds after the BCon is powered on.
    - The BCon will enter the 433 quick connect mode when all 3 lights are turned green.
    - Wait for the control coupler or integrated face plate to be paired.
    - When pairing is completed, the BCon will exit the pairing mode and all lights will return to normal function.
    - The pairing function will exit after 2 minutes if the BCon is not paired.

- Indicate light functions:
    - Light 1 (left) indicates RS485 communication. If RS485 function is working properly, it will flash green light. Otherwise, it will not flash any light.
    - Light 2 (middle) indicates wireless communication. If RS433 function is working properly, it will flash green light. When the BCon is being reset, solid green light can be seen for a few seconds. Otherwise, it will not flash any light.
    - Light 3 (right) indicates air quality. It will flash red light if the reading is higher than the pre-set threshold, and will flash green light if the reading is lower.



# Web-based Dashboard

The indoor air quality data measured by WOOFAA BCon can be transmitted via on-site WiFi network to a designated website. Such website can be hosted by client with custom domain name, or by WOOFAA with a dedicated subdomain name based on 'woofaa.com'.



Below functions can be achieved from this dashboard:

- Choose to see different devices' IAQ data from the drop-down menu;
- Assess the connectivity of air monitors from the latest update time;
- Check the concentrations of indoor air pollutants and the corresponding ranking (Excellent / Good / Fair);
- Select different language options.

During the initiation deployment, clients can request to change the website background image free of charge.

# RESTful API

RESTful API can be utilized for third party integration such as smart control devices and data storage. It can also be utilized to access historical data via web browsers.

```
https://客户专用的IP地址/api...record?device=xxxxxxxx

"result":
{
   "id":yyyyyyy,
   "device":"xxxxxxx",
   "pm2p5":"7.4",
   "co2":"471",
   "tvoc":"0.174",
   "humidity":"53.76",
   "temperature":"32.76",
   "pm10":"7.5",
   "pm100":"7.5",
   "date_created":"20QQ-10-04 02:38:30"
}
```

Real-time data RESTful API grab test:

https://demo.woofaa.com/api/iaqrecord?device=0000000023CD

Custom historical data RESTful API grab test:

https://demo.woofaa.com/api/iaqrecord?device=0000000023CD&start=2023-09-01T04:55:00Z&end=2023-09-01T05:55:00Z

(Note 1: The above historical data API only works if the date in the URL is within 90-days old.)

(Note 2: All IAQ data are stored with UTC timestamp format. Actual representing time may vary according to time zone.)

Remarks:

- Source code disclosure is excluded, and modification is not allowed.

# woofaa

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