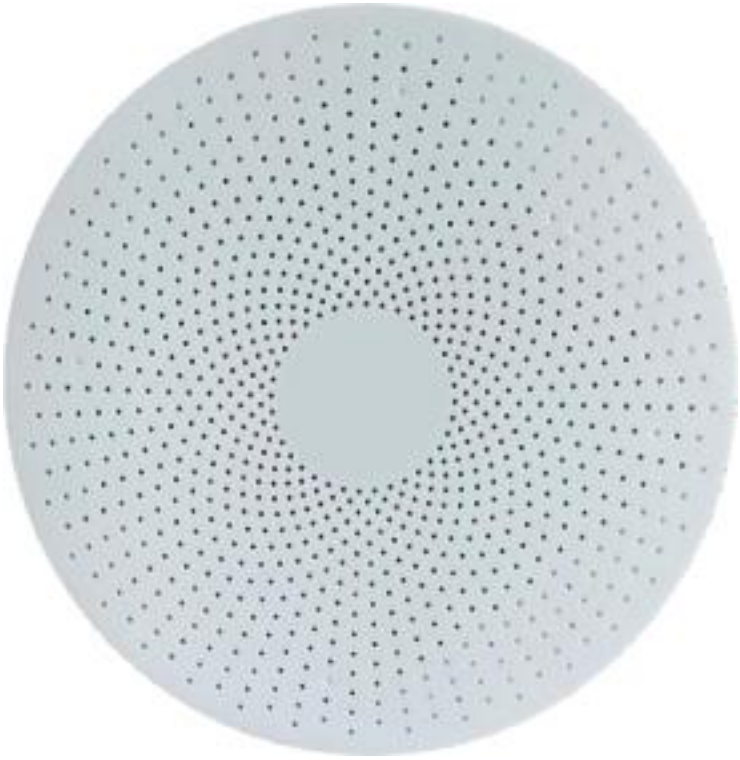
Multi-parameter Air Quality Sensor

Manual

E60

V1.1



Version Updating

Date	Version	Revise	Note
2020.02.19	V1.0	Create manual	
2021.08.10	V1.1	Update Register Description	

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1. Product Overview

E60 is a cost-effective multi-parameter air quality sensor integrated module, able to detect indoor pm2.5 mass concentration, CO2 concentration, temperature, humidity, formaldehyde concentration, VOC concentration, smoke concentration, special gas concentration and many other air indicators of real-time measurement values, its performance temperature, compact design, full functionality, rich interface.

1.1 Features

- Can simultaneously output PM1.0, PM2.5, PM10, VOC, RH&T formaldehyde, CO2 and other indicators;
- Fast response, low power consumption, good long-term stability;
- Ultra-thin design, more scientific air duct layout;
- Correction compensation technology to ensure the accuracy of data in the whole temperature range;
- Highly integrated sensors, and can be optional

1.2 Parameter

Detection parameters	Carbon dioxide, formaldehyde, PM2.5, TVOC, temperature, humidity, etc.		
Signal output	Standard Modbus RS485		
Working temperature	-10℃~55℃		
Working humidity	0~95%RH		
DC power supply	10~30V		
Maximum power consumption	0.2W (24V power supply)		
Shell material	ABS flame retardant shell		
Installation	Wall-mounted, ceiling-mounted		
Current impedance requirement			
Supply voltage	12V	20V	24V

Maximum impedance	125Ω	250Ω	＞500Ω

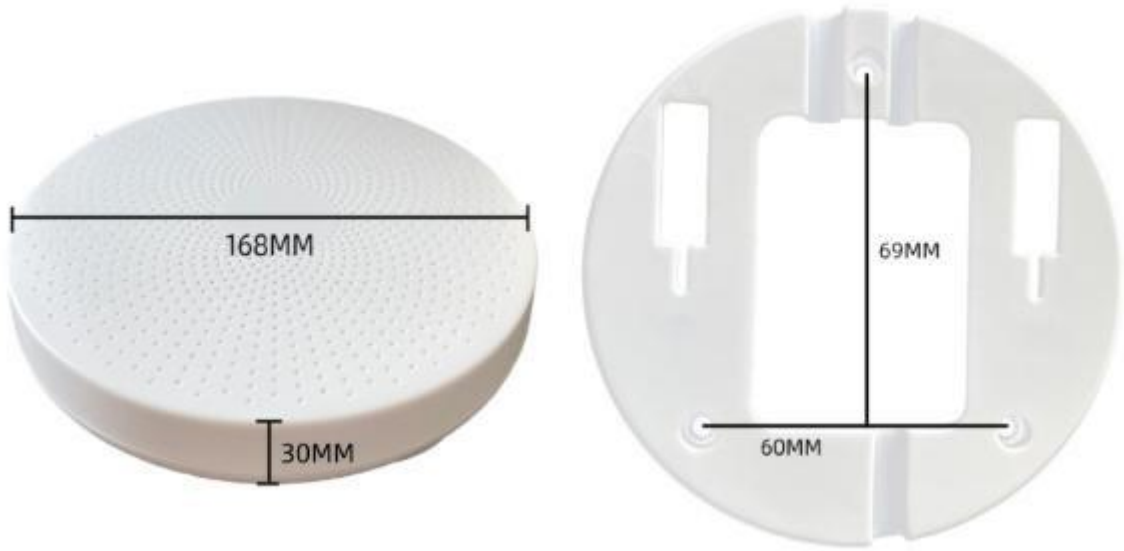
E60-A	Dust (PM1.0/PM2.5/PM10) + CO_2+ Formaldehyde+Temperature and Humidity
E60-B	Dust (PM1.0/ PM2.5/ PM10) + CO_2+TVOC+ temperature and humidity
E60-C	Dust (PM1.0/PM2.5/PM10) + CO_2+formaldehyde+temperature and humidity+TVOC

1.3 Application

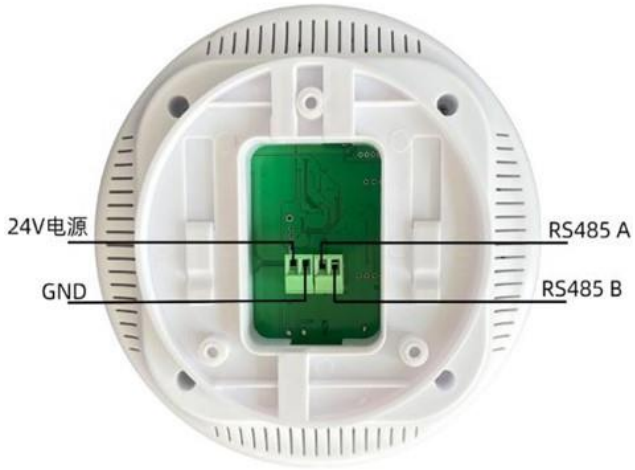
- Fresh air system, central air conditioning
- Pharmaceutical industry, electronics industry, food processing, finishing clean room, precision test area and other industries
- Air quality detector
- And other more needs air quality testing, testing field

2. Description

2.1 Size



2.2 Wiring



2.3 Testing parameters

Detection parameters	Range	Resolution	Accuracy	Preheating time
Dust PM2.5 PM10	0~1000ug/m³	1ug/m³	±10%	≤2min
Formaldehyde	0~5ppm	0.01ppm	±5%FS	≥5min
Carbon Dioxide CO2	0~5000ppm	1ppm	±(40ppm+3%F-S)	2min (available) 10min(maximum accuracy)
Temperature	-40°C~+ 120°C	0.1°C	±0.5C (25C)	
Humidity	0% RH-100% RH	0.1%RH	±3%RH (60%RH, 259C	
Atmospheric pressure	0~ 120Kpa	0.1Kpa	±0.15Kpa@25*C75Kpa	
Illumination	0~ 200000Lux	1Lux	±7% (25°C)	
Odor TVOC	0~ 60000ppb	1ppb	±8% FS±125ppb	
Ozone 03	0~ 10ppm	0.01ppm	±6%FS	≥5min
Oxygen 02	0~ 25%Vol	0.1%Vol	±3%FS	≥5min
Hydrogen sulfide H2S	0~ 100ppm	1ppm	±3%FS	≥5min

Methane CH4	0~ 100%LEL	1%LEL	±5%FS	≥5min
Carbon monoxide CO	0~ 1000ppm	1ppm	±3%FS	≥5min
Nitrogen Dioxide NO2	0~ 20ppm	0.1ppm	±3%FS	≥5min
Sulfur dioxide SO2	0~ 20ppm	0.1ppm	±3%FS	≥5min
Hydrogen H2	0~ 1000ppm	1ppm	±3%FS	≥5min
Ammonia NH3	0~ 1000ppm	1ppm	±3%FS	≥5min

2.4 Cautions

- The PM2.5 sensor on this module is suitable for the detection of dust particles in general indoor environment. The actual use environment should avoid grease environment, dust particles too large, high humidity environment, such as: kitchen, bathroom, smoking room, outdoor environment, etc. If used in such environments should add appropriate protective measures on the equipment to avoid sticky particles or large particles into the sensor, the formation of internal storage in the sensor and affect the performance of the sensor.
- Modules avoid contact with organic solvents (including silicone and other adhesives), paints, chemicals, oils and highly concentrated gases.
- Modules must not be completely encapsulated with resin material or submerged in an oxygen-free environment, as this may damage the performance of the sensor.
- Modules should not be used in environments containing corrosive gases for long periods of time, as corrosive gases can damage the sensors.
- The module must be warmed up for more than 3 minutes when it is first used.
- Do not use this module in systems involving personal safety.

- If the sensor is to be placed in a small space, this space should be well ventilated.
- Do not install the module in an environment with strong convection air.
- Do not leave the module in high concentration organic gas for a long time. Long-term storage will cause the zero point of the sensor to drift and recover slowly.
- It is prohibited to encapsulate modules with hot melt adhesives or sealants with curing temperatures above 80°C.
- The sensor should be kept away from heat sources and protected from direct sunlight or other thermal radiation.
- The module must not be subjected to excessive impact or vibration.

3 Communication Protocol

3.1 Communication Properties

Baud rate: default is 9600
Start bit: 1bit
Data length: 8bit
Checksum type: None
Stop bit: 1bit

3.2 Communication frame structure

Host station send command format：

Address field	Function Code	Start register address	Number of read registers	CRC check low bit	CRC check high bit
1 byte	1 byte	1 byte	2 byte	1 byte	1 byte
（0~255）	0x03/ 0x06	High Byte, Low Byte	High Byte, Low Byte	CRC check low bit	CRC check high bit

Function Code

Data Type	Function Code		Function code meaning	Note
	Decimal	Hexadecimal		
Byte	3	0x03	Read holding register	Read detector internal information (e.g., concentration, etc.)
	6	0x06	Write single register	Write detector information (e.g. modify low value, etc.)

Address Description

Read data area (Read register instruction: 0x03)

No.	Address()	Data definition	Remarks
01	0x00	Formaldehyde	Read only
02	0x01	PM2.5 concentration	Read only
03	0x02	TVOC concentration	Read only
04	0x03	CO2 concentration	Read only
05	0x04	Temperature	Read only
06	0x05	Humidity	Read only
07	0x06	PM1.0	Read only
08	0x07	PM10	Read only
09	0x08	No	Read only
10	0x09	No	Read only
11	0x0A	No	Read only
12	0x0B	No	Read only
			Extended area, same below

Description:

Temperature values greater than 500 part is positive temperature, less than 500 part is negative temperature. The temperature value needs to be subtracted from 500 and divided by 10 to arrive at the correct temperature value. The humidity value should be divided by 10 to get the correct humidity value. PM concentration, formaldehyde, VOC unit is μg/m³, CO2 unit is PPM.

The address of the device has been written in the factory and is marked on the product with a label.

4. After-sale Service Commitment

OneFex provides after-sales service of the device within one year from the date of sale. But for damage caused by improper use, you need to send it back and take the freight for repair or adjust. Make sure that the package is in good condition to avoid damage during transportation. Repair the damage of device instrument is free.

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