Indoor Air Quality Monitor & Data Logger

M9-IAQS

Applications

▪ Residential ventilation system

▪ Business ventilation system

▪ Industrial ventilation system

M9-IAQS is an indoor air quality controller with screen provides customers with visual indoor air quality readings, such as PPM1.0, PPM2.5, PPM10, CO2, temperature, humidity, TVOC, etc. It can control the HVAC system directly. For example: Adjust the fan speed, control air supply / exhaust，set mode and other functions. It is widely used in residential, commercial and industrial applications, and can effectively improve air quality and create a healthy, comfortable, efficient, environmentally friendly, energy-saving living and working environment.

Features

▪Wireless EnOcean enabled

▪Compatible with embedded and wall-mounted fixing methods;

▪Compatible with push-button and touch-screen operation;

▪Using standard 86 box size, thickness <24mm;

▪PPM1.0, PPM2.5, PPM10, CO2, temperature, humidity, TVOC etc., multiple sensors can be optionally selected.

▪With fresh air control function, three level speed of wind can be adjusted, four working modes: intelligent, manual, mute, and periods.

▪Customizable filter alert function.

Working Principle

▪ The built-in dust sensor uses the principle of laser scattering technology to detect the indoor PM2.5 mass concentration in real time（μg/m³）;

▪ The built-in carbon dioxide sensor uses the principle of NDIR technology to detect indoor CO2 concentration in real time (ppm);

▪ The RH&T sensor use capacitor resistance material to detect the indoor temperature (° C) and humidity (%) in real time.

Specifications

Specifications	
Working principle	CO_2：NDIR PM：Laser scattering principle
Measurement range	PPM1.0, PPM2.5, PPM10：0~1000µg/m³ CO_2：0~5000ppm Temperature：-10℃~50℃ Humidity：0%~95%RH
PPM Measurement accuracy	≤ 100µg/m³：±10µg/m³ > 100µg/m³：±10% reading （Reference Instrument TSI 8530，25±2℃，50±10%RH）
CO_2 Measurement accuracy	±（50ppm+5% of reading）@ 0~50℃
Temperature Measurement accuracy	±1℃
Humidity Measurement accuracy	±8%RH
PM Response time T90	≤8s
CO_2 Response time T90	<120s
Working condition	-10~50℃，0~95%RH（Non-condensing）
Storage condition	-20~60℃，0~95%RH（Non-condensing）
Working voltage	12V-24V DC
Working current	<140mA
Standby current	≤90mA
Signal Output	EnOcean
Installation hole distance	60mm（standard）
Dimension	86*86*24.9 mm
Lifetime	PM：≥5 years CO_2：≥10 years

Dimensions and Interface Definition

1. Dimensions (Unit ： mm, tolerance： ±0.2 mm)
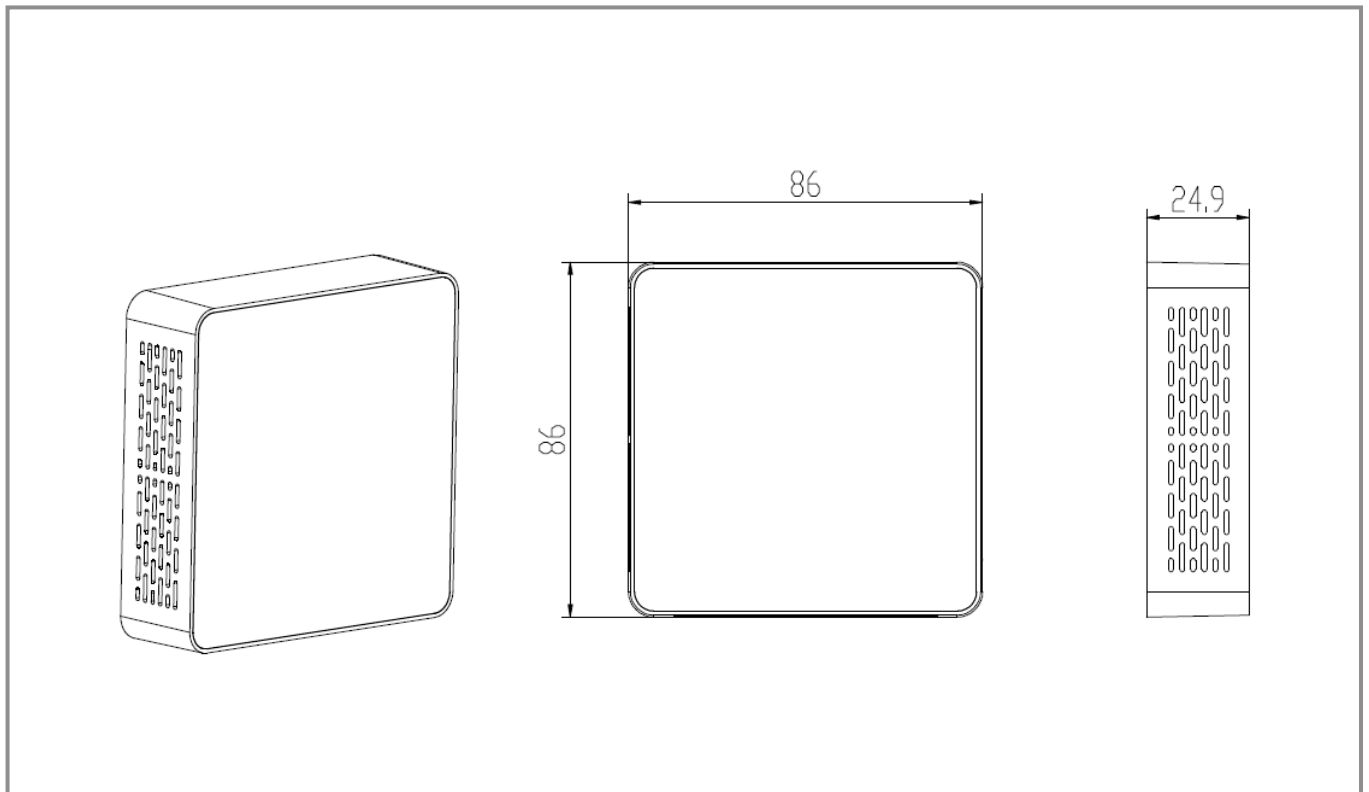
2. Pin definition
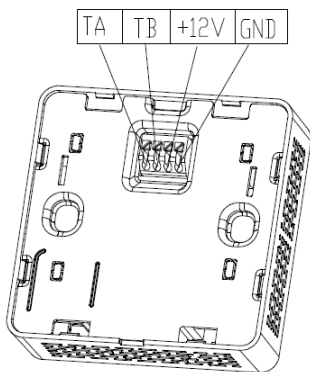
No.	Pin	Description
1	TA	Communication port（RS485_TA）
2	TB	Communication port（RS485_TB）
3	+12V	Power input（+12VDC/24VDC available）
4	GND	Power input（GND）

UI Interface Description

Parameter Range corresponding to color LIST			
Gas	Level	Range	Color
PPM (µg/m³)	Good	0~75	
	Just so so	75~115	
	Bad	≥115	
CO2 (ppm)	Good	0~600	
	Just so so	600~1000	
	Bad	≥1000	

Controlling Instructions

1 Working Mode
- ■ Manual Mode: The user can adjusts the fan speed switch manually (high, middle and low);；
- ■ Intelligent Mode: According to the setting value of PPM or CO_2, it can switch the fan speed automatically.
- ■ Mute Mode: Operation at low speed;
- ■ Periods Mode: The user can set different fan speed in four periods within 24 hours (00: 00 ~ 06: 00, 06: 00 ~ 12: 00, 12: 00 ~ 18: 00, 18: 00 ~ 24: 00)

2 Key's Function

- ■ ⏻ ：Power-on Key(long press for 2s);

- ■ ❋ ：Fan speed key, switch the fan speed(high, medium, low), the default is low speed when power on;

- ■ (OK) ：Confirmation key (use in confirm operating or standby mode setting);

- ■ ↻ ：Function key (adjust the fresh air and exhaust air). There are three status: "exhaust air", "fresh air", and "fresh air + exhaust air"; Default is "fresh air + exhaust air"

- ■ (M) ：Mode key (WIFI key also). There are four modes: manual, intelligent, mute, and periods. Default is manual mode. Long press till the buzzer off then is WIFI status.

3 Operation Instructions

1 Switch on and off: press and hold the ⏻ for 2s to turn on or off. When it's the switch off status, all readings and output will off.

2 Switch the operating mode: Press the (M) to change the operating mode. The working mode is cyclically switched in the four states of "periods-intelligent-manual-mute". After the mode setting is completed, press the (OK) the screen returns to the data detection interface.

3 Time period mode: Press the operating mode key and the confirmation key, the user can set the fan speed by ❋ for 4 time periods per day (00: 00 ~ 06: 00, 06: 00 ~ 12: 00, 12: 00 ~ 18: 00, 18: 00 ~ 24:00).

Note：This time period used for setting fan speed

For example：	Setting	Monday
00:00	Low	
06:00	Medium	
12:00	High	
18:00	Low	

By this logic, the fan speed be set to low speed from 00:00 to 06:00; and it be set to medium speed from 06:00 to 12:00, high speed from 12:00 to 18:00.

4 Intelligent Mode：

①Without CO2 sensor: the controller automatically adjusts the fan speed according to the air quality (PPM concentration); when the PPM concentration is higher than the set value of 115μg / m³, the fan runs at high speed; when the PPM concentration is between 75-114μg / m³, the fan runs at medium speed; when the PPM concentration is lower than the set value of 75 μg / m³, and the fan runs at low speed.

②With CO2 sensor: When the CO2 concentration is higher than the set value of 1000ppm, fan will run at high speed, when the CO2 concentration value is between 600-999ppm, the fan runs at medium speed, and when the CO2 concentration is lower than the set value of 600ppm, and the fan runs at low speed.

5 Manual mode: The fan speed switched by the user. Despite the time period and air quality. The fan speed can be adjusted by the 🌀 . The adjustment range is low-medium-high.

6 Mute mode: The fan runs at low speed and cannot switch the fan speed manually under this mode, and it's not affected by air quality.

7 Function setting: Press the 🔄 to cycle the HVAC system through the three states of "exhaust air-fresh air-fresh air + exhaust air", each time you press the key to switch one operating mode.

8 WIFI Connection:Long press Ⓜ till buzzer off , the WIFI icon become blue from red, then it starts connecting, the icon will turn to white if it match your net successfully.

9 Standby Mode: After the controller is powered on, if there is no operation of setting any of the above working modes and function settings, the controller will enter into the standby state after one minute. After a short press of the 🆗 key, the product enters the data detection interface.

Installation Instructions

Step 1: Fix the wall mounted bracket with screws on the 86 box which in the embedded wall, as shown below
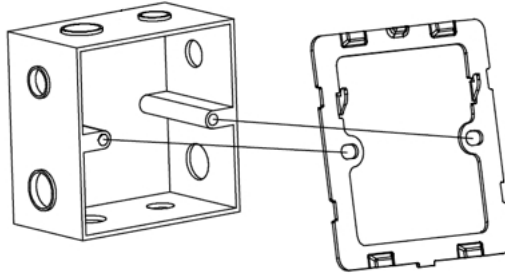
Step 2: Connecting Cable, connect the corresponding cable to the controller's RS485 interface according to the interface definition, as shown below:
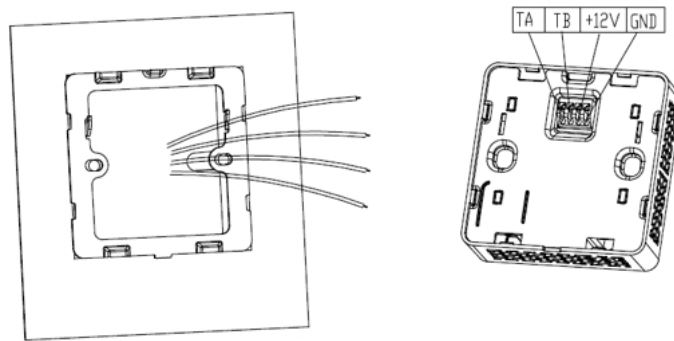
Step 3: Match the two holes in the controller with the hooks in the wall mount bracket and slide the controller down to ensure that the controller is tightly locked with the bracket.
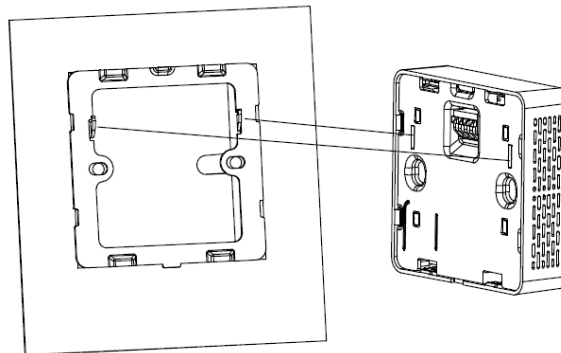
Precautions for use

▪ Do not place the controller in an environment where the ambient temperature is too high (above 60 ° C) or too low (below -20 ° C).

▪ Keep it out of reach of children as much as possible to prevent injury from collision and fall.

▪ Do not drop the controller or rub it against hard objects during use, otherwise it may cause damage to the controller's external light and damage.

▪ Do not place the controller in a dusty environment to avoid dust accumulation in the controller and affect the measurement accuracy.

▪ When using the controller, do not cover or block the vent hole with any object to avoid affecting the air quality monitoring.

▪ Do not disassemble, repair or modify the controller without permission.

Communication Protocol

1. General Statement

1) The M9-IAQS controller is connected to the HVAC controller through 485, it sends a command to the HVAC controller to achieve the AM6108 control the HVAC system by communication protocol.

2) Baud rate：9600, Data Bits: 8, Stop Bits: 1, Parity: No；

3) Communication distance ≤ 2km; and we suggest the terminal impedance be 120Ω, 1 / 2W.

2. Format of Serial Communication Protocol

Sending format of test software:

Start Symbol	Length	Command	IP Address	Data1	……	Data n	Check Sum
HEAD	LEN	CMD	ADD	DATA1	……	DATAn	CS
11H	XXH	XXH	XXH	XXH	……	XXH	XXH

Detail description on protocol format:

Protocol Format	Description
Start Symbol	Sending by controller is fixed as [11H]
Length	Length of frame bytes= data length +2 (including CMD+IP+DATA)
Command	Command is fixed as [55H]
Address	Controller address is （1～254，default is [01H]）
Data	Data of writing or reading, length is not fixed
Check Sum	Cumulative sum of data = 256-(HEAD+LEN+CMD+IP+DATA)

3. Controller Command

The system's default slave device address is 01H, the controller command is 55H, and the command format is as below:

11 10 55 01 DF1 DF2 DF3 DF4 DF5 DF6 DF7 DF8 DF9 DF10 DF11 DF12 DF13 DF14 CS

Slave response

16 02 55 01 CS

4. Command Table of Serial Protocol

Name	Data	Description	Note
Mode	DF1	0x00 Periods Mode 0x01 Intelligent Mode 0x02 Manual Mode 0x03 Mute Mode	
		0x01 Low	

Fan Speed Mode	DF2	0x02 Medium 0x03 High	
Air Switch（For fresh air and air exhaust）	DF3	0x00 air exhaust switch off and fresh air switch on 0x01 air exhaust switch on and fresh air switch off 0x02 air exhaust switch on and fresh air switch on	
Indoor PPM Concentration	DF4- DF5	0--1000	µg/m³
Indoor CO2 Concentration	DF6- DF7	0--5000	ppm
Indoor Temperature	DF8- DF9	0--600	(Corresponding value -100) / 10 ° C (-10.0-50.0), one decimal place is reserved
Indoor Humidity	DF10	0--95	0-95 %
Indoor HCHO Concentration	DF11- DF12	Reserved	
Indoor VOC lever	DF13-DF14	DF4=0x01 VOC L1 DF4=0x02 VOC L2 DF4=0x03 VOC L3	(1-3)
Error code	DF15- DF16	Reserved	
Reserved	DF17- DF18		
Reserved	DF19- DF20		
CheckSum	CS		

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