AVC-M Series Indoor Air Quality Transmitter (Wireless & RS485 output)

Thanks for choosing our product! Please read carefully and follow this instruction before using!

Introduction

In most public space or office buildings, the air ventilation and air quality is poor. The AVC-M series can detect several important parameters of indoor air quality and environment, such as CO_2, CO, HCHO, O_2, NH_3, TVOC, $PM_{2.5}$, PM_{10}, temperature and humidity. Easy installation and the recommended height of installation is 1~2M above the floor level. It uses good quality sensors; such as the NDIR CO_2 sensor; electro-chemical sensor for HCHO, CO, O_2 and NH_3; laser scattering principle sensor for $PM_{2.5}$ and PM_{10}; CMOS sensor for TVOC, temperature and humidity. AVC-M can be used with a monitoring system, which can activate ventilation system to keep a better indoor air quality or for energy saving. It is perfect for school, library, offices, meeting room, commercial building, shopping center, train/subway station or exhibition hall and etc.

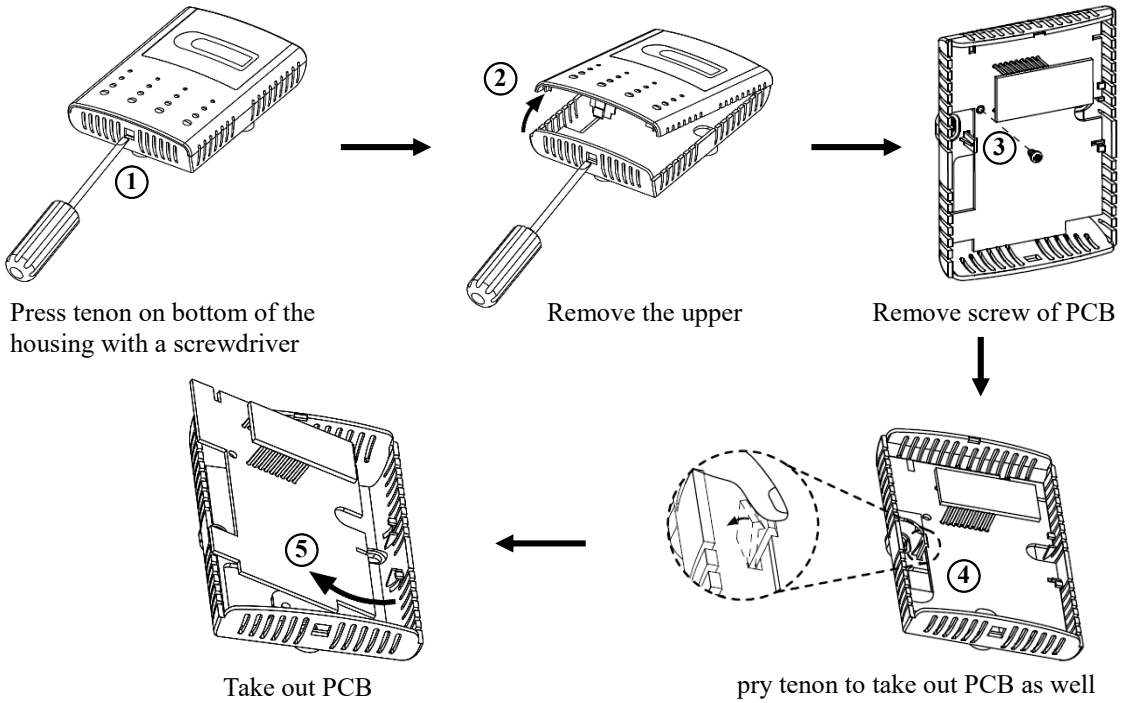
Notice for installation

1. Read these instructions carefully before installing and commissioning the transmitter. Failure to follow these instructions may result in product damage.
2. Please do not mount the transmitter near doors, opening windows, fans, air outlet, elevator entrance, or other known air disturbances. Install the transmitter at least 3 meters away from any air outlets.
3. Please do not install the transmitter in areas with rapid temperature changes or with extreme ambient conditions.
4. Please do not install the transmitter on an unstable or shaking surface.
5. Please keep away from the devices generating heat or emitting exhaust, and avoid the waterish area and direct sunlight.

Installation

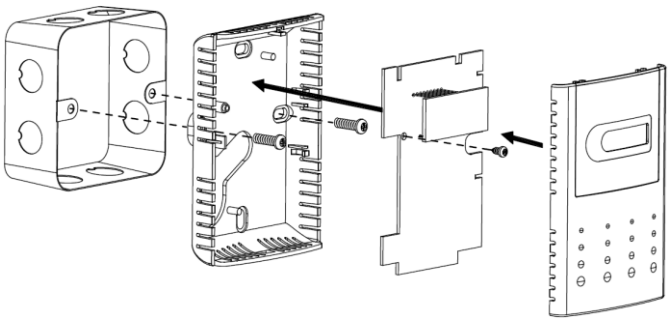
1 Please install the transmitter at a height of 1~2M above the floor level and the location

2 If use EU spec electrical box, don't need to removal PCB, directly tighten screw to electrical box, if use US spec electrical box, press tenon on bottom of the housing with a screwdriver to remove the upper cover, unsnap screw of PCB, then carefully pry tenon to take out PCB as well. (Please refer to Figure 1)

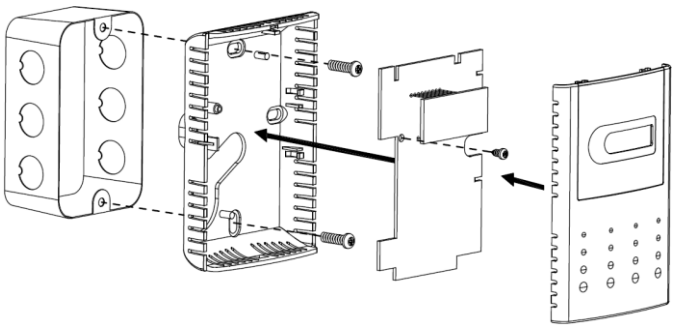


【Figure 1】

3 The base is screwed to an electrical box. (EU Spec electrical box refer to Figure 2, US spec electrical box refer to Figure 3)



【Figure 2】



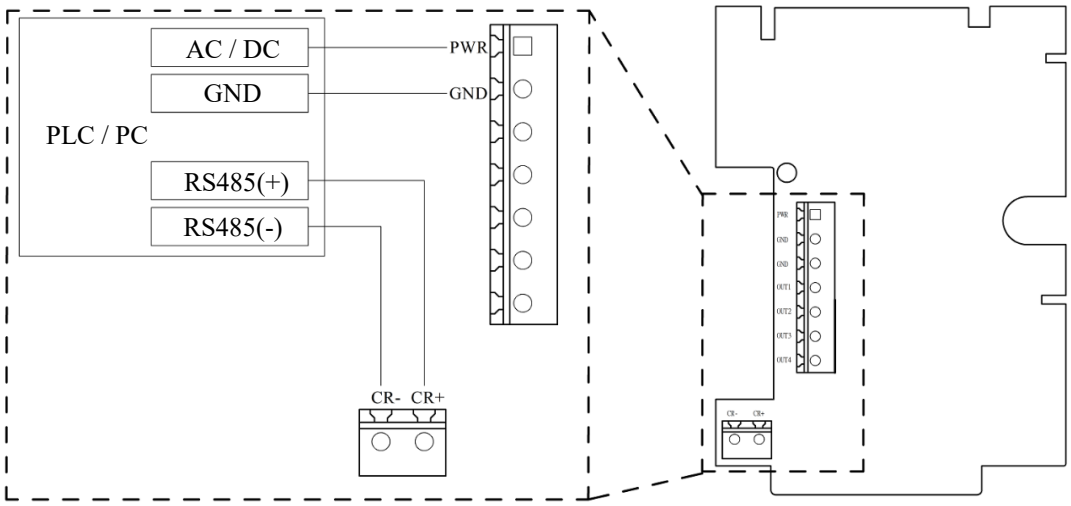
【Figure 3】

4 Please refer to Figure 4 for wiring.

Notice: Please remove power from the unit before wiring, in order to avoid any damage or hazard.

4.1 Use 18-22 AWG shielded wiring for all connections.

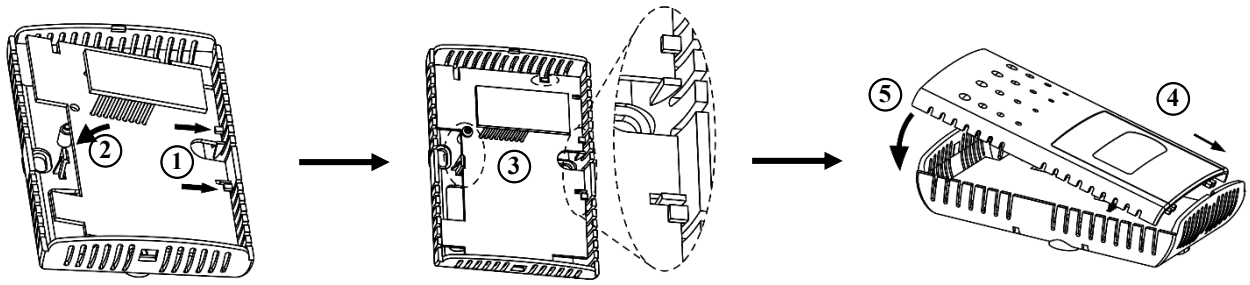
4.2 Power supply range 24Vac(50/60Hz) or 12-36Vdc.



【Figure 4】

5 After wiring, place back PCB and tighten screw, mount the upper cover back to the unit.

Notice: Be careful not to touch the any sensors, in order to avoid any result in product damage.



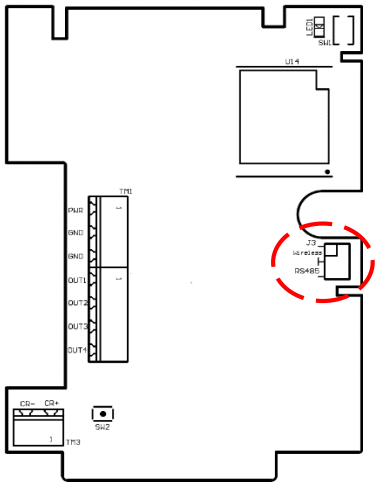
place PCB back to base

make sure that PCB embed in base

mount the upper cover back to the unit.

【Figure 5】

Transmission mode setting

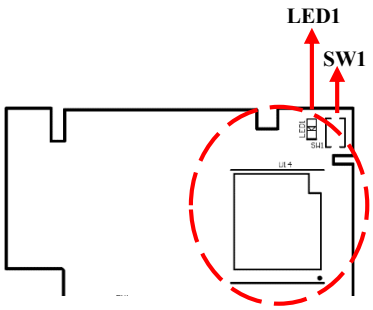


Jumper setting：

Transmission mode setting (Wireless/RS485)

Transmission mode	J3
Wireless	
RS485	

Join a wireless network (Only available for wireless version)



If the transmission mode is set as “Wireless”, please follow the steps as below to establish the connection between transmitter and receiver.

1. Please make sure the wireless receiver has been connected with PLC or with computer. (Please refer the manual of wireless receiver for the detail operation.)
2. Please press and hold the SW1 on wireless module until the LED1 (Green) is ON. And it will activate the pairing procedure and complete the connection within 60 sec.
3. When the LED1 switches off, the connection between the transmitter and receiver has been done. If the LED1 blinks every 5 secs, the connection fails. Then please repeat the above-mentioned steps.

Modbus RTU settings

1. Default setting: Device ID=1; Baud rate = 9600; Word Length = 8; Parity = none; Stop Bits = 1
2. Checksum is the error detection codes for CRC-16/MODBUS.
3. The measurement will be varied depending on detection functions of the model. The measurement value would be displayed as “0” if there is no corresponding detection function.

Command 0x04: Read input registers

Reading data type

Device ID	Function	Address (High byte)	Address (Low byte)	Data Length (High byte)	Data Length (Low byte)	Checksum (High byte)	Checksum (Low byte)
By setting	0x04	0x00	0x00	0x00	0x0A	0xXX	0xXX

Responding data type

Device ID	Function	Data byte	Data (High byte)	Data (Low byte)	Data (High byte)	Data (Low byte)	Checksum (High byte)	Checksum (Low byte)
By setting	0x04	0x14	0xXX	0xXX	…	…	0xXX	0xXX

Reading data register

Data (High byte)	Data (Low byte)	Description	Remark
0x00	0x00	CO_2 value	Decimal, Unit: ppm
0x00	0x01	$PM_{2.5}$ value	Decimal, Unit: ug/m^3

0x00	0x02	PM_{10} value	Decimal, Unit: ug/m^3
0x00	0x03	CO / NO_2 value	Note 1
0x00	0x04	O2 / HCHO / CL_2 / NH_3 / H_2S / O_3 value	Note 1
0x00	0x05	TVOC value	Decimal (IAQ)
0x00	0x06	TVOC value	Decimal (PPb)
0x00	0x07	Temperature value	Decimal, Two decimal places, Unit:℃
0x00	0x08	Humidity value	Decimal, Two decimal places, Unit: %RH

Note 1：

The data obtained of NO2, O_2, HCHO, O_3, CL_2, temperature or humidity have to be divided by 100 to get the measurement value; the data obtained of NH_3, H_2S have to be divided by 10 to get the measurement value.

For example, the temperature data obtained is 2600 which has to be divided by 100, and the measurement value is 26.00℃.

Command 0x03：Read holding registers

Reading data type

Device ID	Function	Address (High byte)	Address (Low byte)	Data Length (High byte)	Data Length (Low byte)	Checksum (High byte)	Checksum (Low byte)
By setting	0x03	0x00	0x00	0x00	0x0D	0xXX	0xXX

Responding data type

Device ID	Function	Data byte	Data (High byte)	Data (Low byte)	Data (High byte)	Data (Low byte)	Checksum (High byte)	Checksum (Low byte)
By setting	0x03	0x1A	0xXX	0xXX	…	…	0xXX	0xXX

Command 0x06：Write single registers

To calibrate 27℃ to 27.30℃, the correction value is (27.30 – 27.00) *100 = 30. And convert it into 0x001E (hexadecimal).

Writing data type

Device ID	Function	Address (High byte)	Address (Low byte)	Modify value (High byte)	Modify value (Low byte)	Checksum (High byte)	Checksum (Low byte)
By setting	0x06	0x00	0x08	0x00	0x1E	0xXX	0xXX

Responding data type

Device ID	Function	Address (High byte)	Address (Low byte)	Modify value (High byte)	Modify value (Low byte)	Checksum (High byte)	Checksum (Low byte)
By setting	0x06	0x00	0x08	0x00	0x1E	0xXX	0xXX

Modifying data register

Data address (High byte)	Data address (Low byte)	Description	Default	Adjustable minimum Range	Adjustable maximum Range
0x00	0x00	CO_2 manual calibration	0	-70 ppm	+70 ppm
0x00	0x01	$PM_{2.5}$ manual calibration	0	-150 ug/m^3	+150 ug/m^3
0x00	0x02	PM_{10} manual calibration	0	-150 ug/m^3	+150 ug/m^3
0x00	0x03	CO / NO2 manual calibration	0	Note 2	
0x00	0x04	O2 / HCHO / CL2 / NH3 / H2S / O3 manual calibration	0	Note 2	
0x00	0x05	TVOC(index) manual calibration	0	-100	+100

0x00	0x06	TVOC(ppb) manual calibration	0	-100	+100
0x00	0x07	Temperature manual calibration	0	-1000 (-10.00℃)	+1000 (+10.00℃)
0x00	0x08	Humidity manual calibration	0	-1000 (-10.00%RH)	+1000 (+10.00%RH)
0x00	0x09	Sampling interval	2	1	3600
0x00	0x0A	Baud rat and connection setting	0	Please refer to “Baud rat and connection setting”	
0x00	0x0B	Device ID	1	1	247

Note 2：

These any gas concentration to be adjusted by a fixed register, the data shows the concentration value plus current offset value.

For example, the CO_2 concentration data is 700, and CO_2 manual calibration is -70, the value is (700-70) = 670 ppm.

The CO’s range ±20ppm, The NO_2’s range±1.00ppm, The O_2’s range±15.00%, The NH_3’s range±25.0ppm。

The HCHO’s range±1.00ppm, The H_2S’s range±10.0ppm, The O_3’s range±1.00ppm, The CL_2’s range±1.00ppm。

Baud rat and connection setting

To change baud rate from 9600 to 19200, and set the connection setting as 8/E/2, the command would be “0x1011”.

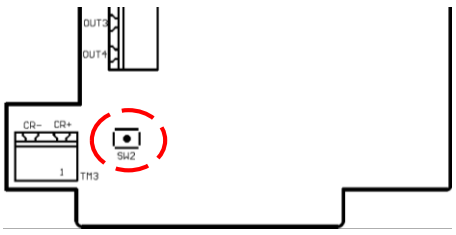
Settings	Device ID	Function	Address (High byte)	Address (Low byte)	Data (High byte)	Data (Low byte)	Checksum (High byte)	Checksum (Low byte)
9600	By setting	0x06	0x00	0x0B	0x00	-	0xXX	0xXX
19200	By setting	0x06	0x00	0x0B	0x10	-	0xXX	0xXX
38400	By setting	0x06	0x00	0x0B	0x20	-	0xXX	0xXX
57600	By setting	0x06	0x00	0x0B	0x30	-	0xXX	0xXX
115200	By setting	0x06	0x00	0x0B	0x40	-	0xXX	0xXX
8／N／1	By setting	0x06	0x00	0x0B	-	0x00	0xXX	0xXX
8／N／2	By setting	0x06	0x00	0x0B	-	0x01	0xXX	0xXX
8／E／1	By setting	0x06	0x00	0x0B	-	0x10	0xXX	0xXX
8／E／2	By setting	0x06	0x00	0x0B	-	0x11	0xXX	0xXX
8／O／1	By setting	0x06	0x00	0x0B	-	0x20	0xXX	0xXX
8／O／2	By setting	0x06	0x00	0x0B	-	0x21	0xXX	0xXX

* Notice：If the transmission mode is set as “Wireless”, please set the baud rate as 9600 and the connection setting as 8／N／1.

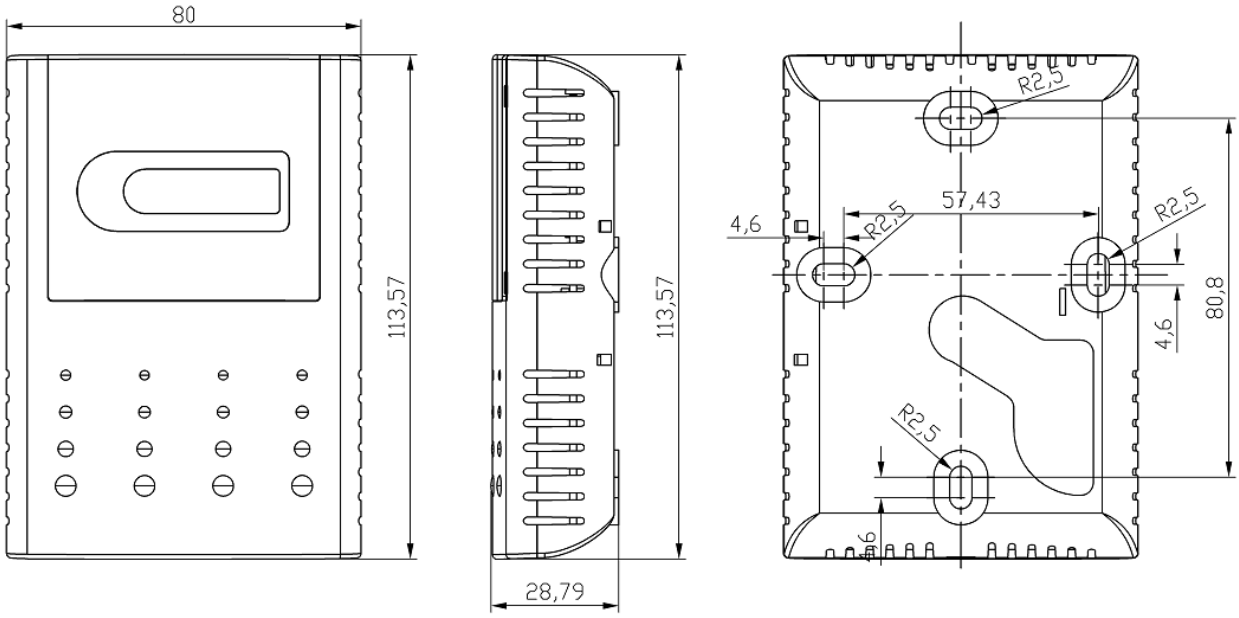
* Remark: The connection setting format is Word length／Parity／Stop bits; Parity: N = None, E = Even, O = Odd

Reset to default settings

To reset all the settings to default, please press and hold SW2 for 5 sec.



Dimensions (Unit: mm)



Trouble shooting

Problem	Possible cause	Recommended solution
No response after wiring power supply	1. Insufficient power supply 2. The power wiring is disconnected.	1. Please make sure the power supply should be more than 3W(RS485)、4.5W(LoRa). 2. Check power wiring.
RS485 connection fails	1. Incorrect device ID setting or incorrect connection settings. 2. RS485 wiring is disconnected.	1. Please verify the device ID and connection settings. 2. Check RS485 wiring. 3. Reset to default settings.
High loss rate of packet for RS485	1. Signal interference 2. RS485 wiring is disconnected.	1. It is recommended to use 2 pair twisted shielded cable. 2. Check RS485 wiring.
Fail to pair with LoRa devices	1. The antenna is not fixed. 2. There is some interference around.	1. Please check if antenna is fixed. 2. Please relocate the LoRa devices to avoid the interference. 3. Use signal test software to choose a better location to install the LoRa devices.
The loss rate of packet is high		