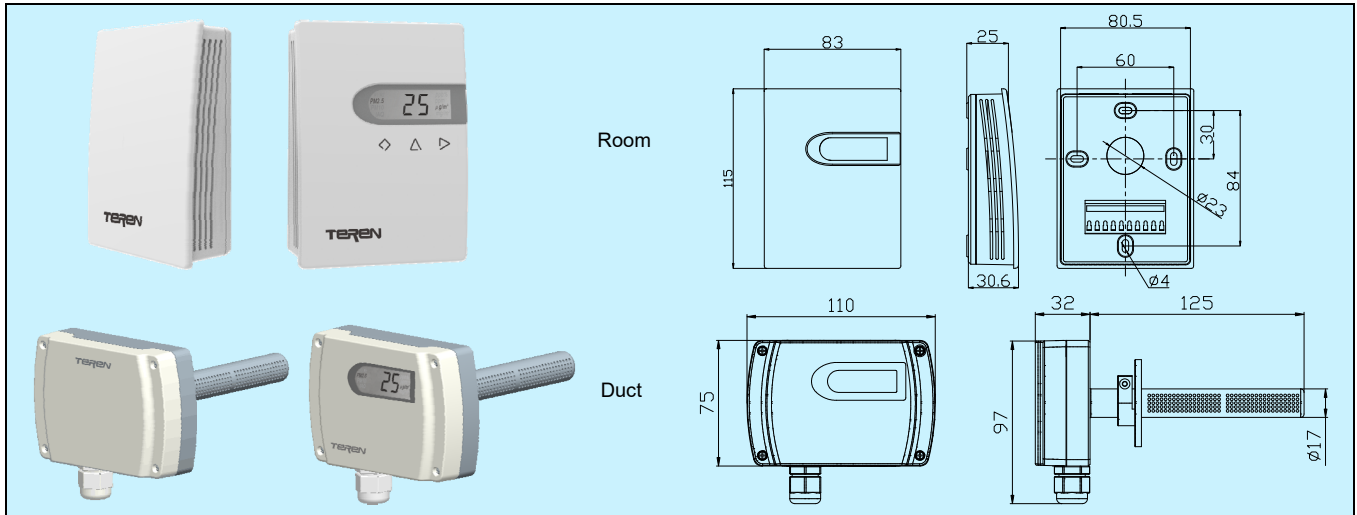# PM Particulate Matter Transmitter/Controller

Room

Duct

Applications & Features

● PM series are designed for monitoring & controlling environment air quality (particulate matter PM2.5 & PM10)
● PMW/PM25W/PM10W are suitable for wall mount and PMD/PM25D/PM10D are suitable for duct mount. The enclosure of duct mount applies patent design of assembled probe with very good sampling performance
● PM25W/PM25D have single channel output of PM2.5；PM10W/PM10D have single channel output of PM10；PMW/PMD have dual channels which can measure or control PM2.5 and PM10 simultaneously
● The sensor has very good long-term stability, consistency accuracy is up to +/-10% readings or +/-10 ug/m^3, with real-time response and support continuous acquisition
● MBTF is more than 3 years for continuous service (service life can be up to 8-10 years in typical stable concentration change working conditions and auto(intermittent) work mode), free maintenance
● All electrical terminals are on the inside bottom, avoid any possible destroy to PCB when wiring (room type)
● Digital technology applied, over voltage and reverse polarity protection, high reliability and anti-interference capability
● LCD & touch function keys selectable
● Optional relay output (room type), can set various parameters and functions with LCD and keys, support all alarm or control mode, so it can be a stand-alone controller

Specifications

Sensor: Laser particulate matter sensor, detected particle size 0.3~10 um (PM2.5 & PM10)
Service Life: MBTF more than 3 years in continuous service mode, service life up to 8-10 years in auto (intermittent) service mode
Sampling Method: Laser scattering principle
Range: (measuring range >1000ug/ m^3)
　　　PM2.5: 0~500 μg/m^3,particle size 0.3~2.5 μm
　　　PM10: 0~600 μg/m^3,particle size 0.3~10 μm
Accuracy: +/-10 ug/m^3 @0~100ug/m^3,
　　　　+/-10% reading@100~500/600ug/m^3
　　　　@25°C/50%RH，see accuracy curve
Resolution: 1 ug/m^3
Response time: in continuous service mode, sample time<1s, response time<10s
Output: Single channel: 4~20mA&0~10V, RS485/Modbus
　　　Dual channels: PM2.5: 4~20mA; PM10: 0~10V, RS485/Modbus
Relay: 1xSPST, 3A-30VDC/250VAC(room type only)

Power supply: 16~28VAC/16~35VDC
Load resistance: ≤500Ω (Current output), ≥2kΩ (Voltage output)
Display: Optional LCD for all models
Keys: Optional for room type only
Working environment: 0~50°C, 0~95%RH (Non-cond.)
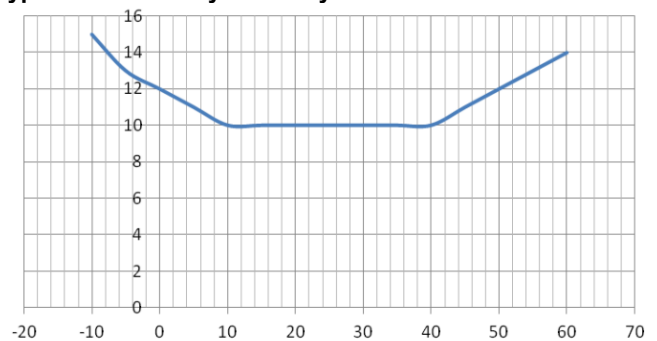**Storage temperature:** -30~70°C
Housing: fire retardant PC(UL94V-0)(PMW/PM10W),
　　　　fire retardant ABS+PC(UL94V-0)(PMD/PM10D)
Protection: IP30 (PMW/PM10W), IP65 (PMD/PM10D)
Weight: 200g (PMW/PM10W), 270g (PMD/PM10D)
Approval: CE

**Typical consistency accuracy curve:**

Models

| Model				
Model	PM25W			Room Transmitter (PM2.5)
	PM25D			Duct mount Transmitter (PM2.5)
	PM10W			Room Transmitter (PM10)
	PM10D			Duct mount Transmitter (PM10)
	PMW			Dual Channel Room Transmitter (PM2.5/10)
	PMD			Dual Channel Duct Transmitter (PM2.5/10)
Output		1		4~20mA&0~10VDC
		B		4~20mA&0~10VDC,RS485/Modbus
Relay			0	N/A
			1	1×SPST*
LCD/ Key			0	N/A
			1	LCD
			2	LCD, with backlight, touch keys**

*Only room products can select 1；**Only room products can select 2.

Connection

Different models have different electrical terminals. Please wire specific model according to the wiring diagram inside the front cover.
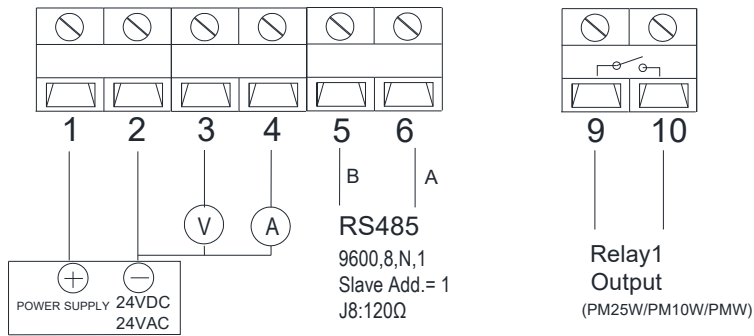
1. Analog output: Terminal 3 is output 0~10V, terminal 4 is output 4~20mA.

2. RS485/Modbus communication refer to "PM series particulate matter transmitter Modbus communication instruction"
   RS485 terminal resistance jumper J8 description as the following figure:

Terminal resistance：None (default)   Terminal resistance：120 Ω
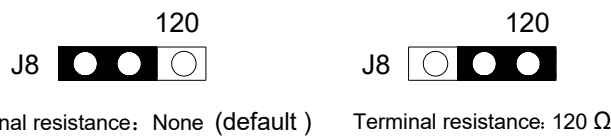
3. PM has two working modes, automatic mode (AUTO) and continuous mode (NORMAL). AUTO mode will automatically reduce the measuring time to extend the service life of the sensor when the dust concentration changes very slightly. Use MODE jumper to choose the mode. The factory default mode is AUTO as the following figure:

Continuous operation mode (NORMAL)   Automatic operation mode (AUTO) (default)
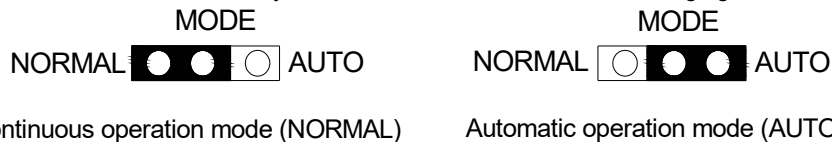
4. Relay output: Relay output setting refer to "PM series particulate matter transmitter MMI instruction"
   Terminals 9 and 10 close when relay 1 is on. Terminals 9 and 10 open when relay 1 is off.

installation

1.PMW/PM10W/PM25W
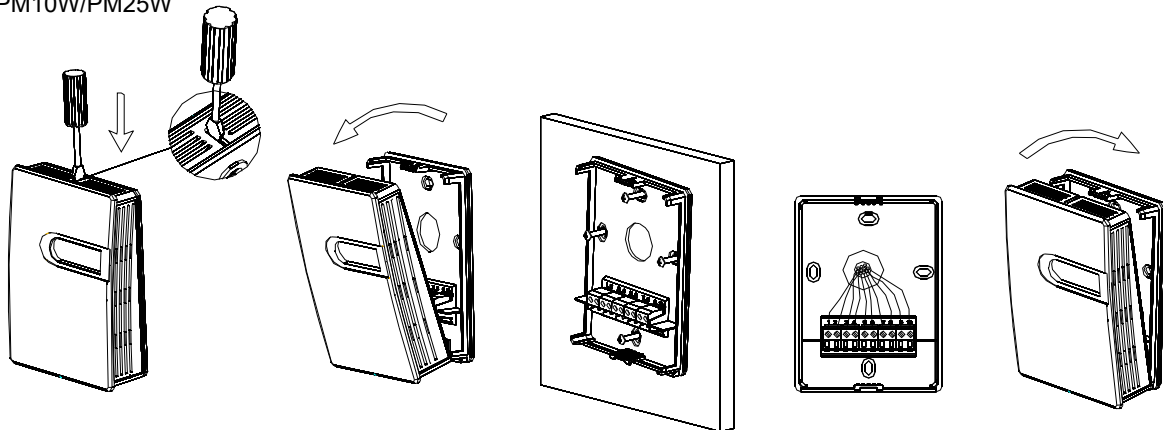
● It should be installed vertically on the wall. The installation site should be far away from heater, cooler, fan, humidifier, dehumidifier, and other heat/cool/humidity sources.
● Use a screwdriver, insert into the snap at the upper side of the housing, and push down a little, then open the front cover.
● Feed the cable into the housing before installing the base on the wall according to the diagram.
● Finish electrical connection according to the wiring diagram.
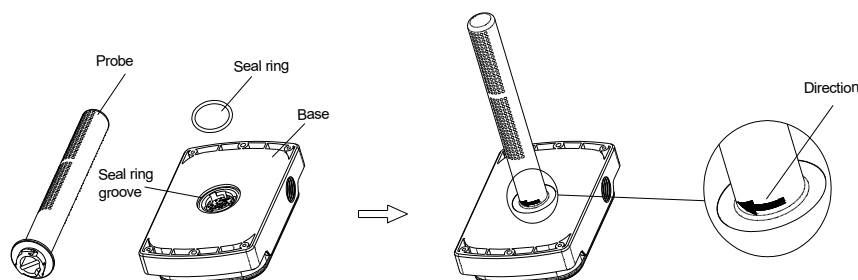● Restore the front cover, and finish the installation.

2.PMD/PM10D/PM25D

Fig.1

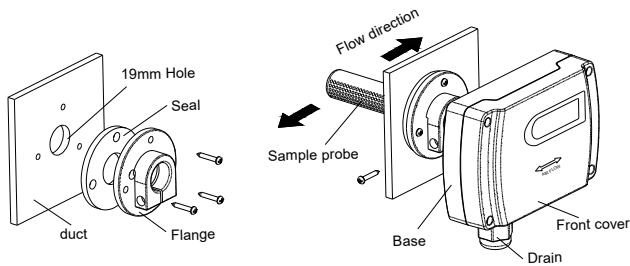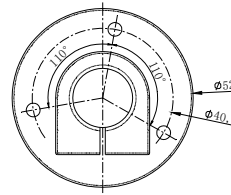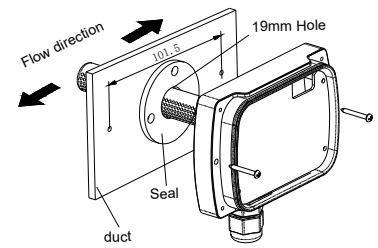Fig.2   Fig.3   Fig.4

● First, assemble the separated probe on the bottom of enclosure as Fig.1. Insert the seal ring properly and then insert the probe, screw according to the direction indication to the end.

● Duct mount via one of the following ways. Make sure all sampling holes on the probe should be inserted into the duct, and the direction shows on the front cover should be the same as air flow in the duct.

1. Install via the flange as Fig.2. Drill a φ19mm hole on the duct, install the seal ring and the flange on, then insert the probe into, screw to lock the whole enclosure on the flange.

2. Install the enclosure directly on the duct as Fig.4. Drill a φ19mm hole on the duct, insert the probe into with the seal ring, and screw the enclosure on the duct directly.

● Electrical wiring. Open the front cover. Finish wiring according to the diagram.

● During all above procedures of assembling, installing and wiring, all seal rings should be applied properly to ensure the whole enclosure structures and the assemble part of the probe with the duct can be air tightened. Only in this way, the measured air can go into the enclosure from the sample holes on the probe, other than from the other parts. Meanwhile, keep the whole protection rate up to IP65.

Attention

●This product uses laser particulate matter sensor. It is strictly prohibited to be disassembled. It is dangerous if the human body exposure to laser directly.

● This product is suitable for common environment measurement. If it is installed in the environment exceed the measurement range for a long time, it may lead to the decrease of the measurement accuracy. In the environment of high humidity, high temperature, smoking environment, etc., the performance of the sensor may also be decreased due to excessive dust and oil mist, etc.

● This product needs good ventilation and avoiding strong light into the housing. Installation environment needs to be stable without vibration. Vibration has certain affect on the accuracy of the sensor.

● It should be power OFF during installing and wiring. When using 24VAC, it is strongly recommended to power the unit with independent transformer. If sharing a 24VAC transformer with other equipments such as controllers, transmitters or actuators, please make sure the terminals 24V and GND are connected correctly. Otherwise, it will perhaps induce serious damages.

Warranty

During warranty period, if failed, the product can be returned for repairing or replacing after confirmed normal operation.

PM series particulate matter transmitter MMI instructions

1. Button definition

◇   ▷   △

Set/Save   Bit Select/decrease   Adjust/increase

User can enter corresponding operation instruction to set the parameters.
The backlight of LCD will be off after 30s without any key's operation.
Note: the LCD will display "----" when the settings are successful, and display "Err" when failed.

2. Operation instruction

Users can use this instructions to set transmitter parameters. Push ◇ to enter programming and display "P000"; then push▷ to select the bit and push △ to cyclic 0~9 settings, select different instructions to enter corresponding parameter group settings.

2.1 "P999": Reset

◇→ P000→▷/ △→P999→◇→"rSt"→◇→finish.
User can resume the factory default set. Input "P999", press button ◇, display "rSt", press button ◇, then all factory default set will restore.

2.2 "P083": Check LCD backlight, LCD display, Relay

◇→ P000→▷/ △→P083→◇→check LCD backlight on/off, LCD strokes display normal and relay alternately act→◇→finish.

2.3 "P091": PM2.5 transmission range (Default 0 ,500)

◇→ P000→▷/ △→P091→◇→XX (1)→▷/ △→XX(1)→◇→XX(2)→▷/ △→XX(2)→◇ finish.

XX(1) means low range,XX(2) means high range

2.4 "P161": PM2.5 1 point calibration

◇→ P000→▷/ △→P161→◇→X.X→▷/ △→X.X→◇ finish. XX means calibration value.

Press ◇ key to finish and display temperature single point calibration offset, after about 2 seconds later, finally display temperature read value; display value (output) = actual measurement + offset

2.5 "P401": Relay 1 setting (default set: 2, 100, 5, 3, 1, not needed for product without relay output option)
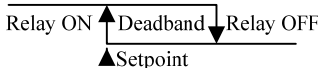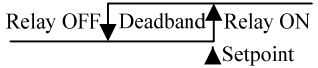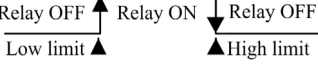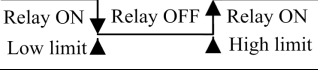
◇→ P000→▷/ △→P401→◇→XX(M)→▷/ △→XX(M)→◇→XX(P1)▷/△→XX(P1)→◇

→XX(P2)→▷/△→XX(P2)→◇→XX(P3)→▷/ △→XX(P3)→◇→XX(P4)→▷/ △→XX(P4)→◇ finish.

XX (M) means Mode, XX (P1) means Para. #1, XX (P2) means Para. #2, XX (P3) means Para. #3, XX (P4) means Para. #4, refer to descriptions below.

R1 symbol in LCD will be on when relay 1 is actuated.

Relays parameters and descriptions:

Mode	Mode Description	Para. #1	Para. #2	Para. #3	Para. #4	Definition
0	Cancel relay alarm function	N/A	N/A	N/A	N/A	Relay OFF
1	Relay actuate when input is lower than set point	Set point	Dead band	Actuate delay	Restore delay	Relay ON ↑Deadband↓Relay OFF ▲Setpoint
2	Relay actuate when input is higher than set point	Set point	Dead band	Actuate delay	Restore delay	Relay OFF↓Deadband↑Relay ON ▲Setpoint
3	Relay actuate between high and low limits	Low limit	High limit	Actuate delay	Restore delay	Relay OFF↑ Relay ON ↓Relay OFF Low limit▲ ▲High limit
4	Relay actuate outside high and low limits	Low limit	High limit	Actuate delay	Restore delay	Relay ON↓ Relay OFF↑ Relay ON Low limit▲ ▲High limit

2.6 "P483": Set RS485 baud rate (Default set: 9600, available 4800, 9600)

◇→ P000→▷/ △→P483→◇→XX→▷/ △→XX→◇ finish. XXX means baud rate.

2.7 "P484": Set RS485 parity (Default set: 0(None), available 0(None), 1(Odd), 2(Even))

◇→ P000→▷/ △→P484→◇→XX→▷/ △→XX→◇ finish. XXX means parity.

2.8 "P485": Set RS485 address(Default set: 1, available ranges 1~255, but recommend 1~32)

◇→ P000→▷/ △→P485→◇→XX→▷/ △→XX→◇ finish. XXX means address.

3. System Error signal

Error code	Possible Problems	Solution
Err	Key input error	Input right code
Er4	The sensor's reading is abnormal	check if the sensor is in good connection with the PCB