Particles Sensor

（**Model**：TZH03）

Manual

Version：1.1

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Taiyuan Tengxing sensor technology Co., Ltd

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TZH03 Particles Sensor

Profile

This sensor integrates infrared PM2.5 detection technology, using particle counting principle to detect PM2.5 in the environment. It can detect the particles (diameter ≥1μm).

Before delivery, the sensor has been aged, debugged, calibrated with good consistency and high sensitivity.

Features

*Good Stability for Long Time   *Low Consumption   *Good Anti-interference Performance
*High Sensitivity   *Good Consistency

Applications

*Air purifier   *Air refresher   *Portable Instrumentation
*HVAC system   *Air conditioner   *Domestic and Commercial AC

Technical Parameters

| Model		TZH03
Working voltage range		5±0.2 V (DC)
Output mode		UART、PWM
Output signal voltage		4.5±0.2 V
Detection ability		Smallest particles 1 μm diameter
Detection Range		4 ~ 500ug/m
Warm-up time		≤10s
Working Current		≤30mA
Humidity range	Storage	≤95%RH
	Working	≤95%RH(No condensation)
Temperature range	Storage	-30℃～60℃
	Working	0℃～50℃
Size		46.0×32.0×18.3mm（L×W×H）
Physical interface		ZH1.5mm-4P Connector Socket

Dimensions:
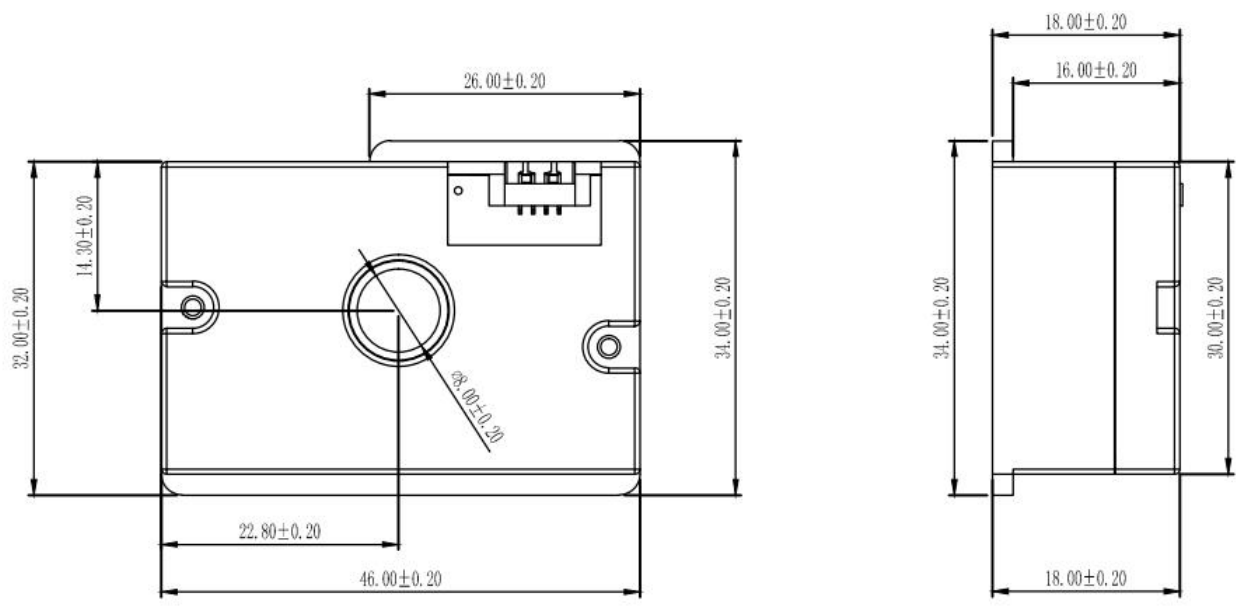
Fig 1

Detection Principle Introduction:
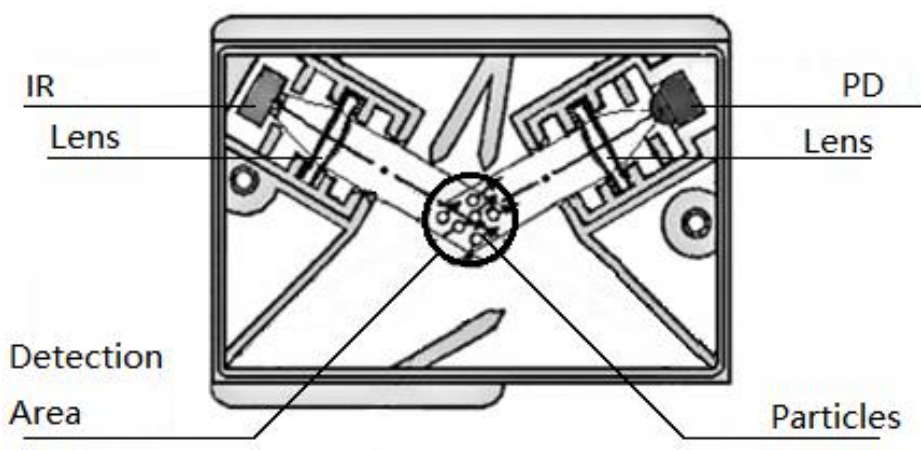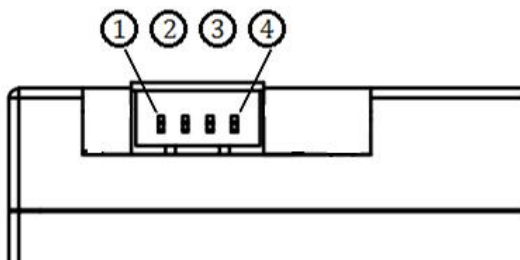

Fig 2
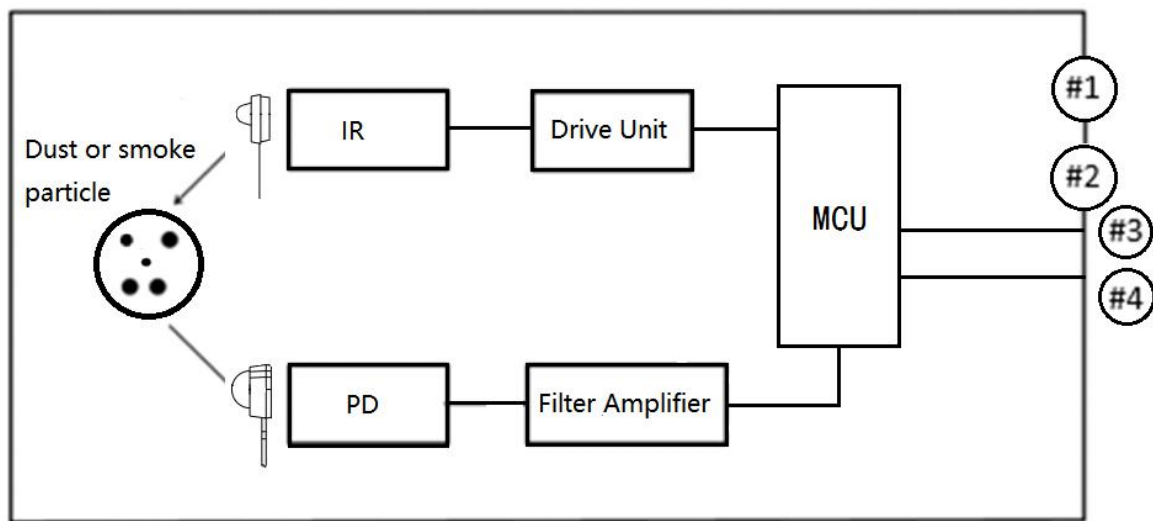
Fig 3

Pins Definition

Fig 4 Connector Sketch

Pins Definition	
PIN1	GND
PIN2	VCC
PIN3	RXD
PIN4	TXD/PWM

Remarks

The T Z H 03'
s two mode settings can only be performed before the sensor is normally powered on.
Please make a hardware connection in advance.

In UART mode, Pin4 is serial port data transmitter
In PWM mode, Pin4 is output of PWM
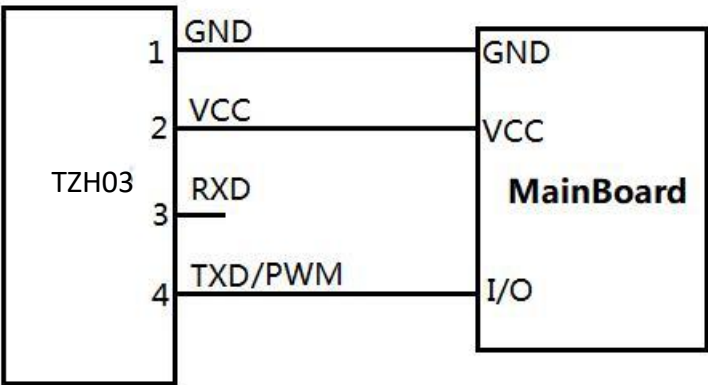
Application Circuit

1. PWM Mode Application Circuit
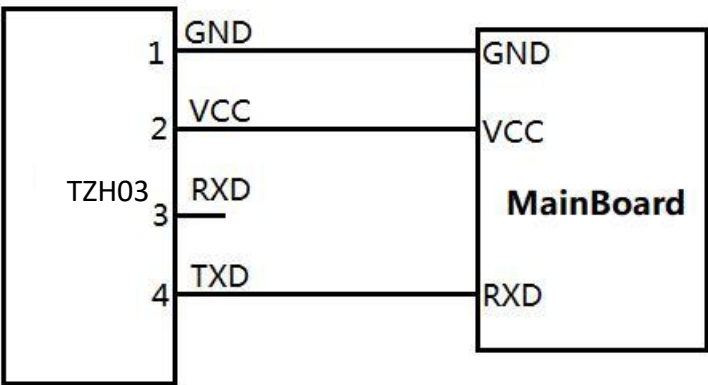

Fig 5

2. UART Mode Application Circuit

Fig 6

Remarks:
The sensor has two output modes: PWM or UART, which are set in factory.

PWM Mode

In PWM mode, the sensor outputs PWM signal through PWM port (PIN 4). The PWM cycle is 1s, and the dust concentration value is calculated according to the width of low level. The low pulse width of PIN output corresponds to the average value of dust concentration. The value of concentration was processed by software filtering, and the pulsation amplitude was relatively small.
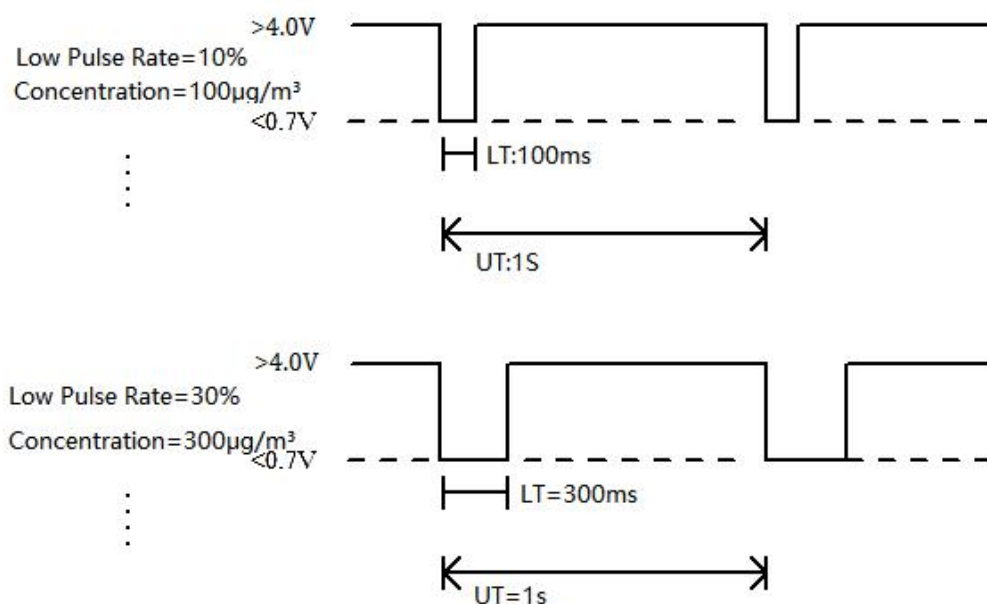
Fig7   PM2.5 Output Wave

Remarks：1. LT : the pulse width of low level in one period.(unit: ms)
2. UT : the pulse width of one period(unit: ms)
3. The low pulse rate: RT=LT/ UT ✕ 100%
4. The relationship between LT and condensation: 1ms = 1ug/m^3

UART Mode

In serial mode, the sensor outputs serial data through TXD pin (PIN 4), the concentration value will be send every other one second
The general serial port settings are as follows:

Baud rate	9600
Interface level	4.5±0.2 V（TTL）
Data bits	8
Stop bits	1
Parity	None

Cautions

1.Terms of Use
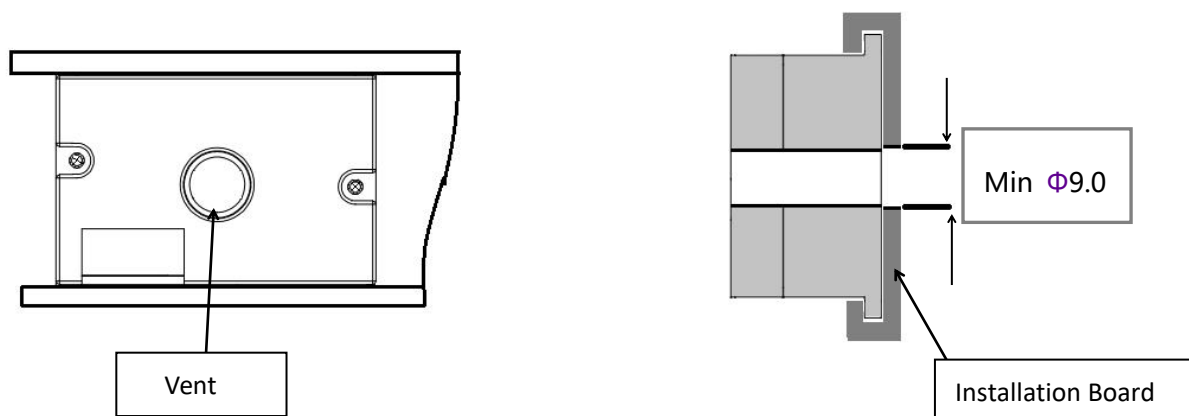
1.1 Installation Sketch

Vent

Min Φ9.0

Installation Board

3. Installation suggestions

2.1 the sensor should be installed in the air circulation position to avoid contact with organic solvents;

2.2 recommended air velocity: (1.0 ~ 3) m / s; air volume: 0.004 ~ 0.01 CMM;

2.3 it is recommended to keep the sensor terminal downward;

2.4 it is recommended to add 3-5mm thick black breathable filter cotton at the air inlet side of the sensor to prevent the accumulation of dust and other large particles;

2.5 it is recommended to keep away from high-frequency and high-voltage generator during installation to prevent interference to the sensor;

2.6 it is recommended to install it at the backlight to prevent the sensor error from increasing due to external light;

2.7 the sensor shell is conductive material and connected with circuit GND. GND pin should be prevented from connecting into the system with voltage higher than the safety voltage of human body, and it's definitely it can't be applied to the system involving human safety.

3.To avoid harmful interference

3.1 To avoid exposure to water vapor, away from the bathroom or air humidifier, the water mist will bring PM2.5 data abnormal fluctuations; The sensor sensitivity will be reduced by splashing water or immersed in water.

3.2 To avoid strong electromagnetic interference, the sensor has certain anti-interference performance, but it should still avoid strong electromagnetic environment. When using wireless communication module (such as WiFi, Bluetooth, GPRS, etc.), it is necessary to keep a sufficient distance from the sensor, and the specific safe distance shall be verified by the user.

4.Transport & storage

1. Avoid vibration：Frequent transport and assembly process, excessive vibration will lead to optical device dislocation affect the original calibration data

2. Long-term storage：Sealed bags sealed to avoid contact with corrosive gas damage to circuit boards and optics.