Micro-dust sensor

（Model:ZPH05）

Manual

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郑州炜盛电子科技有限公司

Zhengzhou Winsen Electronic Technology Co., Ltd

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ZPH05 Micro-dust Sensor

Profile

The sensor adopts the principle of optical contrast, which can accurately and quickly detect the level of dust and sewage on the optical path.

The sensor has been aged and calibrated before shipment, which has a good consistency and sensitivity.

Features

*Accurately identify different particles   *Output the number of particles   *Fast response
*Optical path blockage abnormal alarm   *Good anti-interference   *Small size
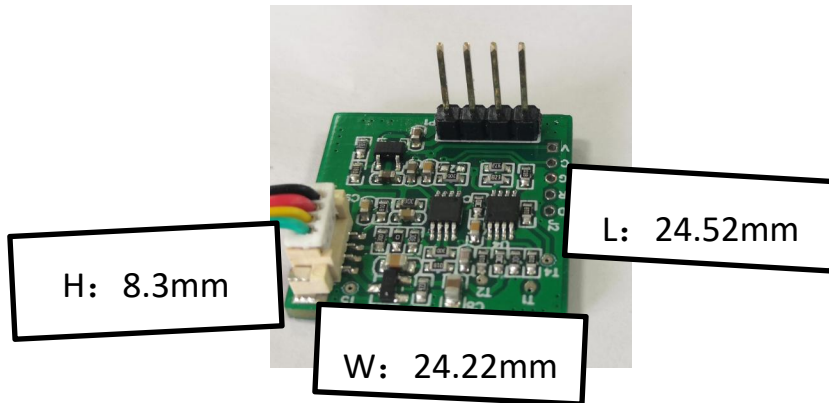
Applications

*Vacuum cleaner   *Scrubber   *Dust Mite Controller
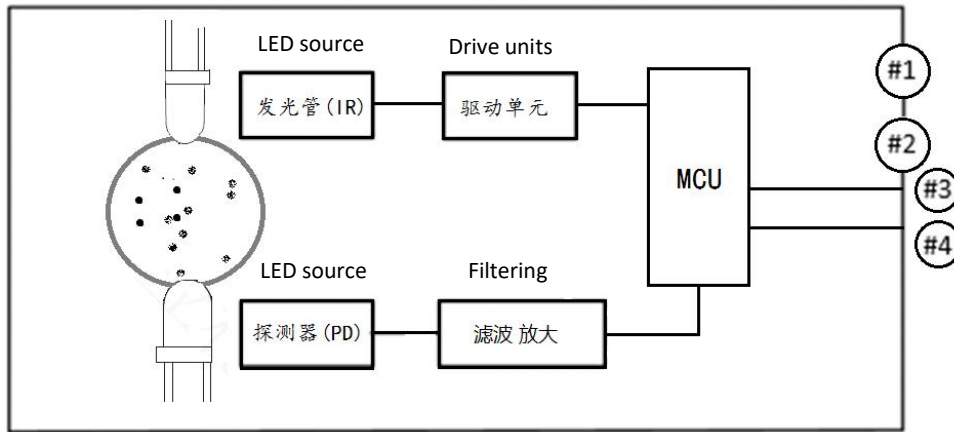*Sweeping robot   *Range Hood

Technical Parameters

Model		ZPH05
Working voltage range		5±0.2 V (DC)
Output Mode		UART、PWM
Output signal voltage		4.4±0.2 V
Detection ability		Smallest particles 10 μm diameter
Scope of test		1-4 grades
Warm-up time		≤2s
Working current		≤60mA
Humidity Range	Storage	≤95%RH
	Working	≤95%RH (non-condensation)
Temperature Range	Storage	-30℃～60℃
	Working	0℃～50℃
Size（L×W×H）		24.52×24.22×8.3 (mm)
Physical interface		EH2.54-4P(Terminal socket)

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Dimensions：

H：8.3mm

L：24.52mm

W：24.22mm

Fig1

Description of sensor detection principle：

LED source   Drive units

发光管(IR)   驱动单元

MCU

#1
#2
#3
#4

LED source   Filtering

探测器(PD)   滤波 放大

Fig 2. Principle schematic

Pins Definition

Fig 3. Terminal diagram
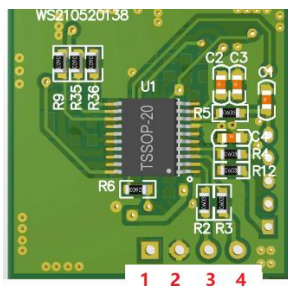
| Pins Definition	
Pin 1	+5V
Pin 2	GND
Pin 3	TXD/PWM
Pin 4	RXD

Remarks：

1. The sensor has two output methods: PWM or UART, In UART mode,

   Pin4 is used as serial port data transmitter; In PWM mode, Pin4 is used as PWM output.

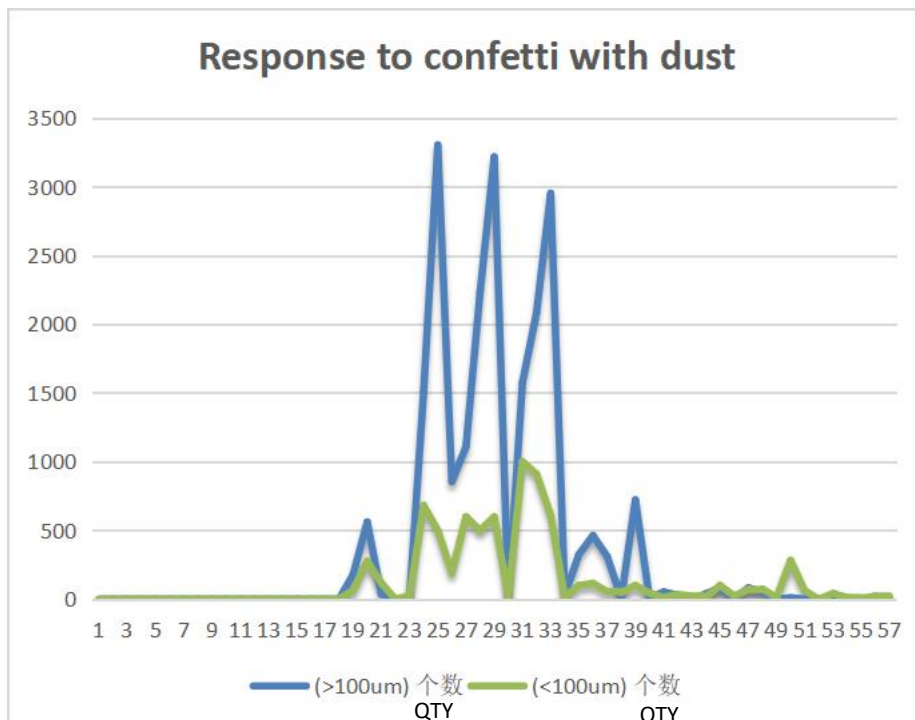2. The output method of the sensor is set at the factory.

Performance introduction

The sensor can accurately identify particles of different sizes,

1. Response to flour using a vacuum cleaner fitted with ZPH05:

2. Response to confetti：

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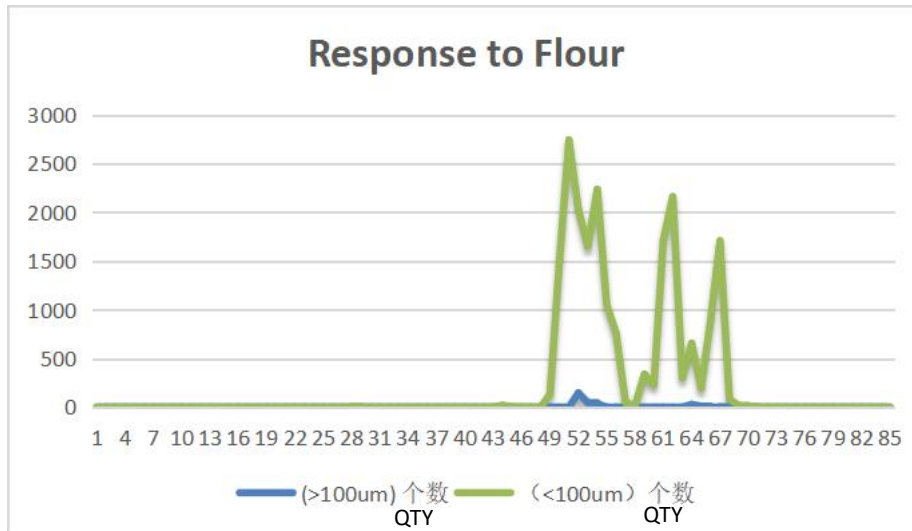
PWM output

In PWM mode, the sensor outputs a PWM signal through the PWM port (pin 3). The PWM period is 500mS, and the level is calculated according to the low level width. Levels 1-4 correspond to 100-400mS respectively. The low pulse width of the pin output corresponds to the sensor level value. The level value is internally processed by software filtering, and the beating amplitude is relatively small.

If the optical path of the sensor is seriously blocked, which affects the measurement, the sensor will output a PWM with a period of 500mS and a low-level width of 495mS until the optical path of the sensor returns to normal.

Grade 1st: the
Ground is clean

Grade 3rd: the
Ground is dirty
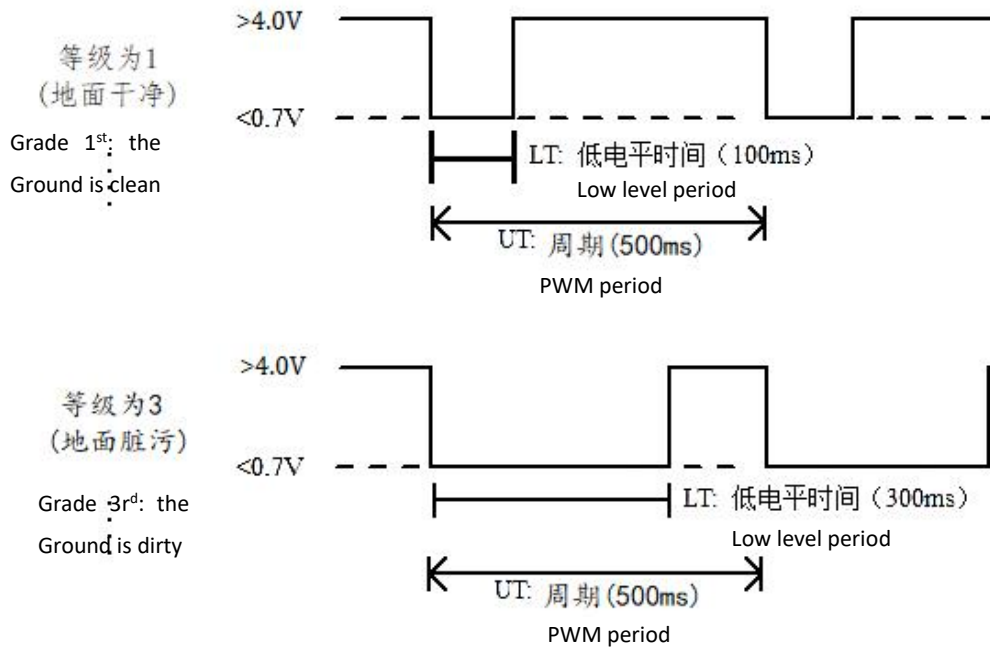
Fig 4   PM2.5 output waveform

Remarks：   1.low pulse width 100ms = 1 grade。

UART output

In serial port mode, the sensor outputs serial port data through the TXD pin (pin 3), and sends a frame of data every 500mS。

Serial port general settings：

Baud rate	9600
Interface level	4.4±0.2 V(TTL)
Data byte	8 bytes
Stop byte	2 byte
Check byte	no

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Cautions：

Installation：

1. The installation position of sensor transmitter and receiver should be designed at 180°±10°

2. In order to ensure accuracy and consistency, the distance between the launch tube and the receiver should not be too long (recommended less than 60mm)

3. External light and foreign objects should be avoided in the optical beam area

4. The sensor's location should avoid strong vibration

5. The connection between the receiver and the sensor motherboard should avoid strong electromagnetic environment. When there is a wireless communication module (such as WiFi, Bluetooth, GPRS, etc.) around the sensor, it should keep a sufficient distance from the sensor. Please verify the specific safety distance by yourself.

Transport & storage：

1. Avoid vibration - During transportation and assembly, frequent and excessive vibration will cause dislocation of optoelectronic devices and affect the original calibration data.

2. Long term storage - Store in a sealed bag to avoid contact with corrosive gases to damage circuit boards and optical devices.

Zhengzhou Winsen Electronics Technology Co., Ltd
Add: No.299, Jinsuo Road, National Hi-Tech Zone, Zhengzhou 450001 China
Tel: +86-371-67169097/67169670
Fax: +86-371-60932988
E-mail: sales@winsensor.com
Website: www.winsen-sensor.com

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