

# Laser PM2.5 Sensor specification

**Product model: SDS018**

**Version: V1.5**

**CE FC RoHS**



**Nova Fitness Co.,Ltd**

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## Overview

The SDS018 using principle of laser scattering ,can get the particle concentration between 0.3 to 10 $\mu$ m in the air. It with digital output and built-in fan is stable and reliable.



## Characteristics

1. Accurate and Reliable: laser detection, stable, good consistency;
2. Quick response: response time is less than 10 seconds when the scene changes;
3. Easy integration: UART output (or IO output can be customized), fan built-in;
4. High resolution: resolution of 0.3 $\mu$ g/m<sup>3</sup>;
5. Certification: products have passed CE/FCC/RoHS certification.

## Scope of application

Detector of PM2.5;Purifier;Fresh air system and other Air purification detection testing fields.

## Working principle

Using laser scattering principle:

Light scattering can be induced when particles go through the detecting area. The scattered light is transformed into electrical signals and these signals will be amplified and processed. The number and diameter of particles can be obtained by analysis because the signal waveform has certain relations with the particles diameter.

## Technical parameters

| No | Item                   | Parameter   | Note           |
|----|------------------------|---|----------------|
| 1  | Measurement parameters | PM2.5,PM10  |                |
| 2  | Range                  | 0.0-999.9 $\mu\text{g}/\text{m}^3$                |                |
| 3  | Rated voltage          | 5V  |                |
| 4  | Rated current          | 60mA $\pm$ 10mA                                   |                |
| 5  | Sleep current          | <4 mA   | Lase&Fan sleep |
| 6  | Temperature range      | Storage environment: -20 ~ +60 $^{\circ}\text{C}$ |                |
|    |                        | Work environment: -10 ~ +50 $^{\circ}\text{C}$    |                |
| 7  | Humidity range         | Storage environment: Max 90%                      |                |

|    |                                   |   |                           |
|----|-----------------------------------|---|---------------------------|
|    |                                   | Work environment: Max 70%                                   |                           |
| 8  | Air pressure                      | 86KPa~110KPa  |                           |
| 9  | Corresponding time                | 1s  |                           |
| 10 | Serial data<br>output frequency   | 1Hz   |                           |
| 11 | Minimum resolution of<br>particle | 0.3 $\mu$ m   |                           |
| 12 | Relative error                    | Maximum of<br>$\pm 15\%$ and $\pm 10\mu\text{g}/\text{m}^3$ | 25 $^{\circ}$ C,<br>50%RH |
| 13 | Product size                      | 59x45x20mm  |                           |
| 14 | Certification                     | CE/FCC/RoHS   |                           |

## Power requirement

Power Voltage: 4.7~5.3V

Power supply: >1W

Supply voltage ripple: <20mV

## About service life

Service life is the key parameter of laser dust sensor. The laser diode in this sensor has high quality and its service life is up to 8000 hours. If you need real-time data (such as detector), you can use the default configuration that measures at the frequency of 1time per second. On the occasion of

real-time demand is not high (such as filter, air quality monitoring, etc.), you can use the discontinuous working method to prolong the service life. For example, you can start the sensor for 30 seconds per minutes. If you have any other requirements, please contact us, we are willing to serve for manufacturers and developers.

## Product specifications

### 1.Product size

L\*W\*H=59\*45\*20mm

### 2.Interface specification

| No | Name        | Comment                          |
|----|-------------|----------------------------------|
| 1  | NC          | Not Connect                      |
| 2  | 1 $\mu$ m   | PWM output, see for more details |
| 3  | 5V          | 5V Input                         |
| 4  | 2.5 $\mu$ m | PWM output, see for more details |
| 5  | GND         | Ground                           |
| 6  | R           | RX of UART (TTL) @3.3V           |
| 7  | T           | TX of UART (TTL) @3.3V           |

PS: The distance between each pin is 2.54mm.

## The UART communication protocol

Bit rate : 9600

Data bit : 8

Parity bit: NO

stop bit : 1

Packet frequency: 1Hz

| The number of bytes | Name           | Content         |
|---------------------|----------------|-----------------|
| 0                   | Message header | AA              |
| 1                   | Commander No.  | C0              |
| 2                   | DATA 1         | PM2.5 Low byte  |
| 3                   | DATA 2         | PM2.5 High byte |
| 4                   | DATA 3         | PM10 Low byte   |
| 5                   | DATA 4         | PM10 High byte  |
| 6                   | DATA 5         | ID byte 1       |
| 7                   | DATA 6         | ID byte 2       |
| 8                   | Check-sum      | Check-sum       |
| 9                   | Message tail   | AB              |

Check-sum: Check-sum=DATA1+DATA2+...+DATA6。

PM2.5 value:  $PM2.5(\mu g/m^3) = ((PM2.5 \text{ High byte} * 256) + PM2.5 \text{ low byte}) / 10$

PM10 value:  $PM10(\mu g/m^3) = ((PM10 \text{ high byte} * 256) + PM10 \text{ low byte}) / 10$

### PWM output description

PWM have 2 types of output. One is default ,the other is customized.

PWM output 1: (default)

Output range:

PM2.5: 0-999 $\mu g/m^3$

PM10 : 0-999 $\mu\text{g}/\text{m}^3$

Port:

PM2.5-->1 $\mu\text{m}$  port output

PM10-->2.5 $\mu\text{m}$  port output

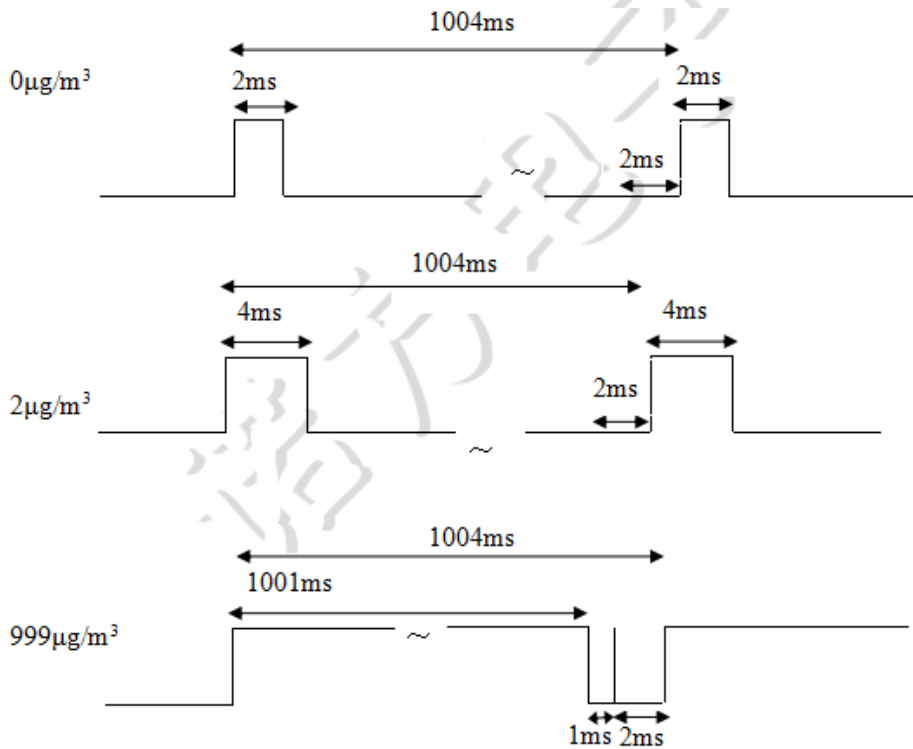
period: 1004ms +1%

Period start high time: 2ms

Period time: 1000ms +1%

Period end low time: 2ms

Output wave:



PWM output 2: (for customized output )

PWM output with a low pulse signal, the acquisition cycle is 5s or multiples of 5s. The low pulse output signal of the second pin corresponds to the particle whose concentration is greater than 1 $\mu\text{m}$ . The low pulse



output signal of the fourth pin corresponds to the particle whose concentration is greater than  $2.5\mu\text{m}$ .

If the acquisition cycle is 5s:

Low pulse duty ratio (%) = All low pulse width (ms) / 5000(ms)\* 100  
(ms)

Low pulse duty ratio has a linear relation with dust concentration, the corresponding relationship as below:

| Low pulse duty ratio (%) | Concentration of particulates ( $\mu\text{g}/\text{m}^3$ ) |
|--------------------------|--|
| 0                        | 0  |
| 20                       | 500  |
| 40                       | 999  |

$\text{PM}_{2.5}(\mu\text{g}/\text{m}^3) = (\text{Low pulse duty ratio of the second pin} - \text{Low pulse duty ratio of the fourth}) * 1000 / 40$

$\text{PM}_{10}(\mu\text{g}/\text{m}^3) = (\text{Low pulse duty ratio of the second pin}) * 1000 / 40$

The typical values of low pulse width:

| Parameter       | Minimum (ms) | Typical value (ms) | Maximum (ms) |
|-----------------|--------------|--------------------|--------------|
| Low pulse width | 1            | 5                  | 100          |

## Extended functionality

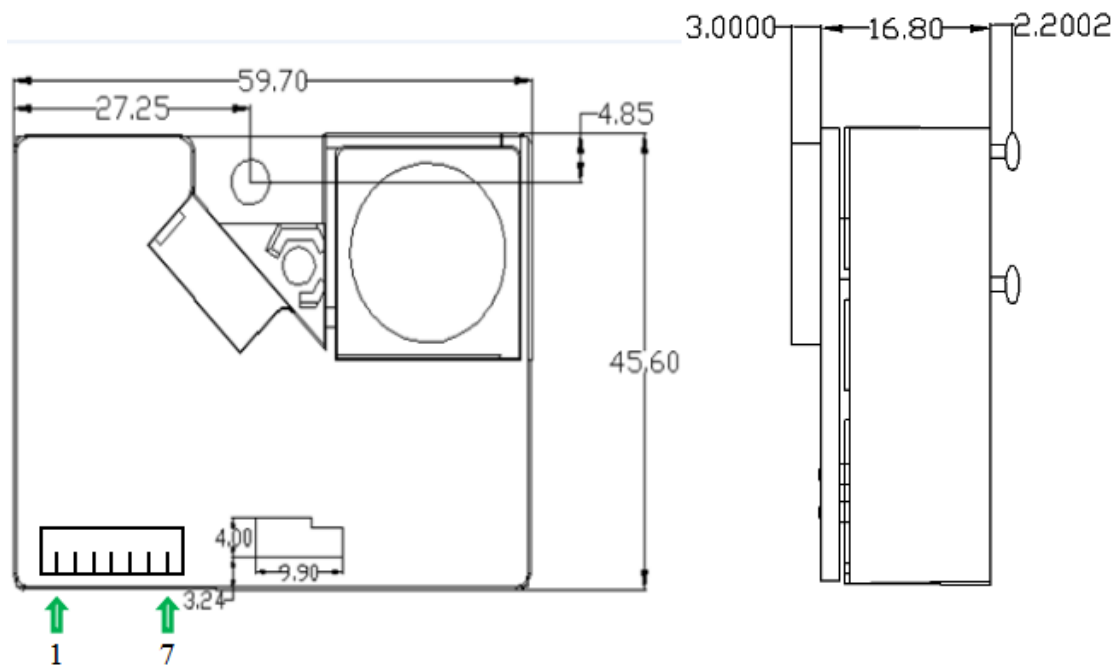
1. Manual hibernation(Sleep and wake up)
2. Timed hibernate(Cycle to work)
3. User ID setting

4.Set data reporting mode(Active report and query report)

5.Version number query

If you have any other requirements, please contact us.

## Installation size



## Package



There are 24 sensors on each floor



Each box:  $9 \times 24 = 216$

## Matters needing attention

- 1、 In the context of the sensor power supply;
- 2、 Do not press the sensor fan site;
- 3、 Note the process design to ensure smoothness and stability of sensor airflow;
- 4、 Please ensure that the sensor to work under normal conditions of temperature and humidity;
- 5、 Avoid severe vibration during transport, so as not to affect the accuracy of detection and accuracy;
- 6、 Follow this specification is the correct sensor installation.

## Contact

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