Plantower PMS 7003 sensor data sheet (PDF)

Document preview

Page 1

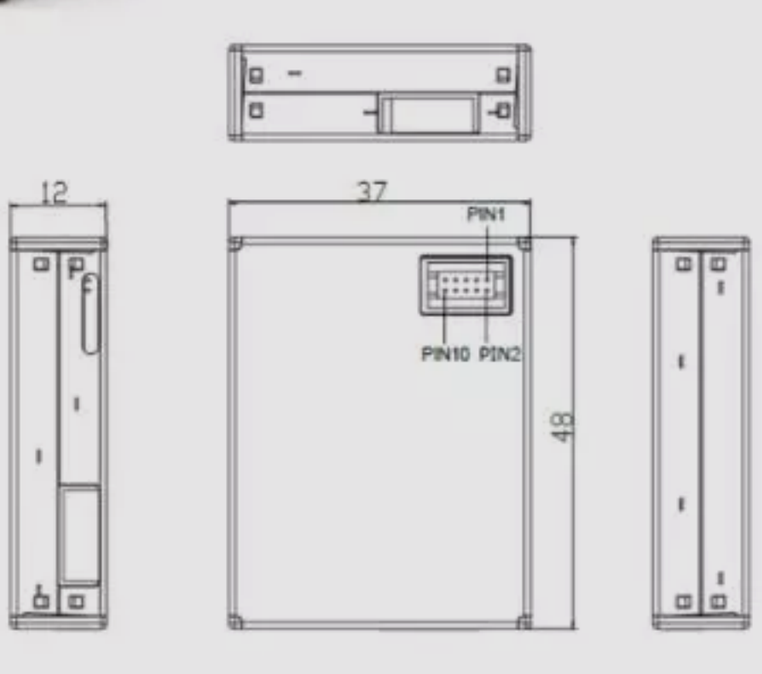
Beijing Kondo Technology Co., Ltd. 2016 Product Data Handbook

DSENSOR

Digital Universal Particle Concentration Sensors
PMS7003 data sheet

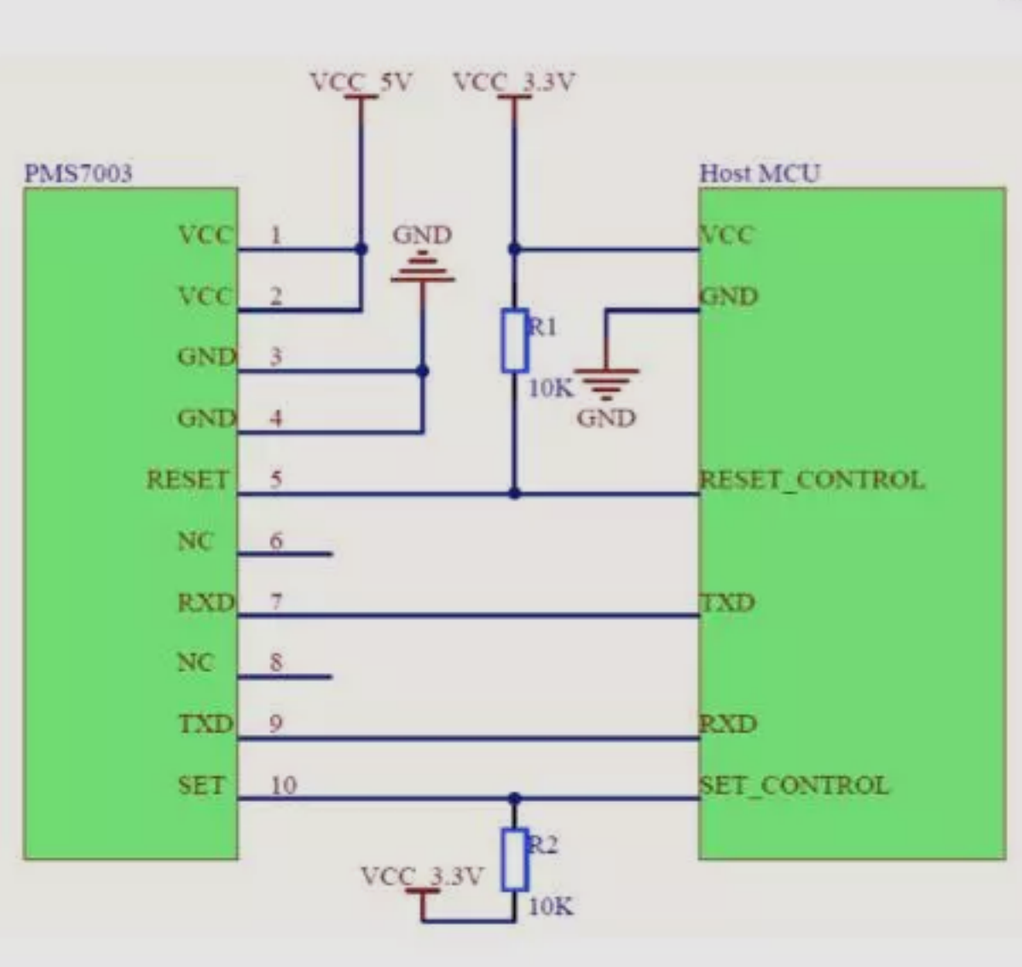
prepared by

Plantower
PMS-7003
Air Quality Sensor



Pin1----------VCC
Pin2----------VCC
Pin3----------GND
Pin4----------GND
Pin5----------Reset
Pin6----------N/C
Pin7----------RX
Pin8----------N/C
Pin9----------TX
Pin10---------Set

Measures:
0.3
0.5
1.0
2.5
5.0
10.0



Beijing Kondo Technology Co., Ltd. 2016 Product Data Handbook

DSENSOR

Digital Universal Particle Concentration Sensors

PMS7003 data sheet

prepared by	Zhou yong	version	V2.2
Review	Zheng Haoxin	Release date	2016-04-07

Key Features

- laser scattering principle to achieve accurate measurement
- zero error alarm rate
- real-time response and support continuous acquisition
- minimum resolution particle size 0.3μ m
- new patent structure, six full range of shielding, anti-jamming performance stronger
- The direction of the inlet and outlet can be selected, the scope of application is wide and the user does not need to design the air duct again
- ultra-thin design, only 12 mm, suitable for portable devices

Overview

PMS7003 is a digital versatile particle concentration sensor based on the principle of laser scattering, continuous mining

And calculate the number of suspended particles in different sizes of air in the unit volume, that is, the concentration distribution of particles,

And converted into mass concentration, and in the form of general digital interface output. The sensor can be embedded in a variety of air

Suspended particle concentration in the instrument or environmental improvement equipment, to provide timely and accurate concentration

according to.

working principle

The sensor uses the principle of laser scattering. Even if the laser irradiation in the air on the suspended particles to produce scattering,

At the same time, the scattered light is collected at a certain angle to obtain the curve of the scattered light intensity with time.
And then microprocessing
Using the algorithm based on Mie (MIE) theory, the equivalent particle size and the volume per unit volume

Particle size of the number of particles. The functional block diagram of the sensor is shown in Fig

Beijing Kondo Technology Co., Ltd. 2016 Product Data Handbook

air

sensor

Air channel

Laser source laser Light

Light scattering Measuring the cavity Generating component

Electrical signal filter amplification Circuit

electrical signal microprocessor

Digital signal

air

Figure 1 sensor block diagram

Technical indicators

As shown in Table 1

Table 1 sensor technical indicators

parameter	index	unit
Particle measurement range	0.3 to 1.0; 1.0 to 2.5; 2.5 to 10	Micron (m)
Particle counting efficiency	50 %@0.3 microns 98% @>= 0.5 microns	
Particle mass concentration effective amount (PM2.5 standard)	0 ~ 500	Micrograms / cubic meter
Particle mass concentration		Micrograms / cubic meter
Particle mass concentration consistency (PM2.5 standard value) *	± 10% @ 100 ~ 500 micrograms / cubic meter ± 10 micrograms / cubic meter @ 0 ~ 100 micrograms / cubic meter	
Called quasi-volume	0.1	L (L)
Single response time	<1	Seconds (s)
Integrated response time	≤ 10	Seconds (s)
DC supply voltage	Typ: 5.0 Min: 4.5 Max: 5.5	Volts (V)
Working current	≤ 100	MA (mA)
Standby current	≤ 200	Microanism (μ A)

Beijing Kondo Technology Co., Ltd. 2016 Product Data Handbook

Data interface level	L <0.8 @ 3.3 H> 2.7@3.3	Volts (V)
Operating temperature range	-10 ~ + 60	Celsius (° C)
Operating humidity range	0 ~ 99%	
Storage temperature range	-40 ~ + 80	Celsius (° C)
Mean time between failures	≥3	Year (Y)
biggest size	48 × 37 × 12	Mm (mm)

Note: The basic data for obtaining the consistency of the particle concentration is the data of the communication protocol 2 (see Appendix A)

Environmental conditions of 20 °C, humidity 50%

Output the result

The main output is the mass per unit volume of particles and the number of particles, of which the number of particles per unit volume

For 0.1 liters, the mass concentration unit is: micrograms / cubic meter.

The output is divided into active and passive outputs. After the sensor is powered on, the default state is active output

The sensor sends the serial data to the host, the time interval is 200 ~ 800ms, the air concentration of particles

High, the shorter the time interval. Active output is divided into two modes: smooth mode and fast mode. in the air

Particle concentration changes less, the sensor output for the smooth mode, that is, every three times the same set of output values,

The actual data update period is approximately 2s.
When the concentration of particles in the air changes greatly, the sensor output automatically
Switch to fast mode, each output is a new value, the actual data update cycle of 200 ~ 800ms.

Shape structure and interface definition

Figure 2 shape and interface definition

Beijing Kondo Technology Co., Ltd. 2016 Product Data Handbook

Table 2 Digital Interface Pin Definitions

PIN1	VCC	Power supply is 5V
PIN2	VCC	Power supply is 5V
PIN3	GND	Negative power supply
PIN4	GND	Negative power supply
PIN5	RESET	Module reset signal / TTL level @ 3.3V, low reset
PIN6	NC	
PIN7	RX	Serial Receive Pin / TTL Level @ 3.3V
PIN8	NC	
PIN9	TX	Serial port pin / TTL level @ 3.3V
PIN10	SET	Set pin / TTL level @ 3.3V, high or floating for Normal working state, low level is dormant state

Typical circuit connection

Figure 3 Typical circuit connection diagram

Circuit design should be noted

1. PMS7003 requires 5V power supply, this is because the fan needs 5V drive. But other data communication and control
   Pins require 3.3V as a high level. So the host board with which the communication is connected should be powered by 3.3V.
   If the motherboard MCU is 5V power supply, then the communication line (RXD, TXD) and control line (SET, RESET)
   Should be added to the level conversion chip or circuit.
2. SET and RESET internal pull-up resistor, if not used, it should be vacant.

Beijing Kondo Technology Co., Ltd. 2016 Product Data Handbook

3. PIN6 and PIN8 for the program internal debugging, the application circuit should be vacant.
4. When applying the sleep function, note that the fan stops working when you sleep and the fan restart requires at least 30
   Sec settling time, so to obtain accurate data, the sleep wake-up after the sensor working time should not be low
   In 30 seconds.

Typical output characteristics
Asymmetric unit: μ g / m³ (PM2.5 mass concentration standard value, Appendix A data 2) abscissa unit: times