User Guide

Product Introduction

Adopting laser scattering principle to achieve accurate measurement, it can monitor PM1.0, PM2.5, PM10 and TSP at the same time.Compact structure, easy to install, waterproof and insect-proof, with temperature and humidity compensation, it can effectively reduce the influence of temperature and humidity on the measurement value, improve the accuracy of measurement in high humidity climatic environment, and can continuously monitor airborne particulate matter.

Use Case Scenarios

The sensor is suitable for outdoor weather stations, dust monitoring, building construction, industrial plants and other places.

Features

1. Laser principle detection, stable performance and accurate data.
2. Pump sampling and monitoring, heating and dehumidification, stable performance and long service life.
3. High sensitivity, small error, good consistency, strong anti-interference ability.

Product Specifications

Sensor	
Model	UB-PM-N1
Power Supply	DC 12V/2A
Particle Measurement Range	0.3~1.0μm；1.0~2.5μm；2.5~10μm； ＞10μm
Particle Counting Efficiency	50%@0.3μm 98%@≥0.5μm
Effective Measurement Range	PM2.5，PM10：0~1000μg/m³；TSP：0~2000μg/m³
Maximum Measurement Range	PM2.5，PM10：≥5000μg/m³；TSP：≥10000μg/m³
Resolution	1μg/m³
Integrated Response Time	≤10s
Working Environment	-30~70℃, 0-95%RH
Relay Output	AC 250V/1A，DC 30V/1A
Sampler	
Height Dimension	345mm
Maximum Diameter	95mm
Heating Power	1A
Power Supply	DC 12V
Temperature Range	20~70℃
Efficacy	Heating and dehumidification to ensure data accuracy
Material	Oxidation sandblasted aluminium
Maximum inrush current	Maximum inrush current value (@12V): ≤2A

Wiring Instruction

Communication protocols

1. Communication basic parameters

Communication Basic Parameter	
Coding System	8–bit binary
Data Bit	8 bits
Parity Checking Bit	none
Stop Bit	1 bit
Error Checking	CRC Check
Baud Rate	1200 bit/s, 2400 bit/s, 4800 bit/s, 9600 bit/s (default), 19200 bit/s

2. Data Frame Format

The Modbus-RTU communication protocol is used in the following format:

- Initial structure ≥ 4 bytes in time.
- Address code: 1 byte, default 0xA1.
- Function code: 1 byte, support function code 0x03 (read only) and 0x06 (read/write).
- Data area: N bytes, 16-bit data, high byte comes first.
- Error check: 16-bit CRC code.
- End structure ≥ 4 bytes of time.

Request					
Slave Address	Function Code	Register Address	No. of Registers	CRC LSB	CRC MSB
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

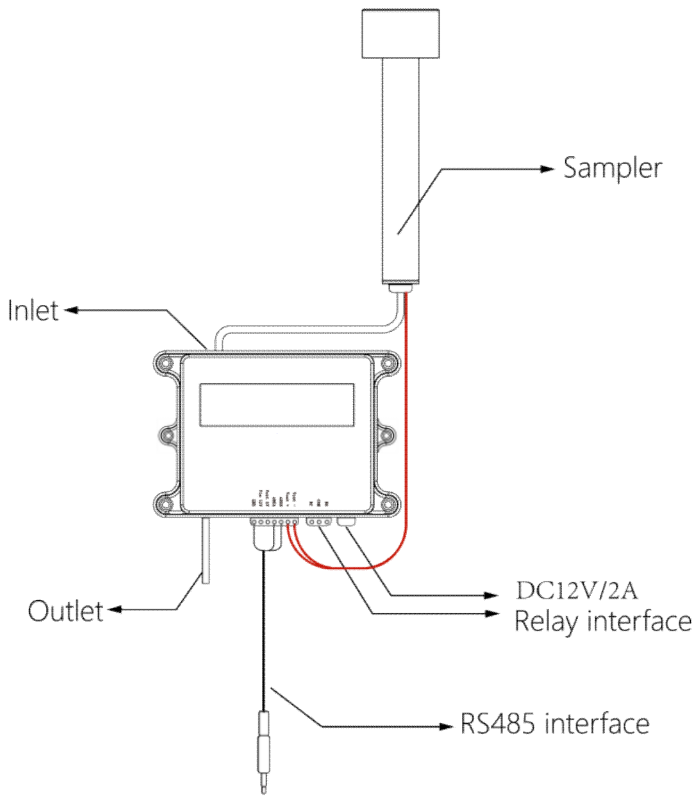
Response							
Slave Address	Function Code	No. of Bytes	Content 1	Content 1	...	Content n	CRC
1 byte	1 byte	1 byte	2 bytes	2 bytes	...	2 bytes	2 bytes

3. Register Address

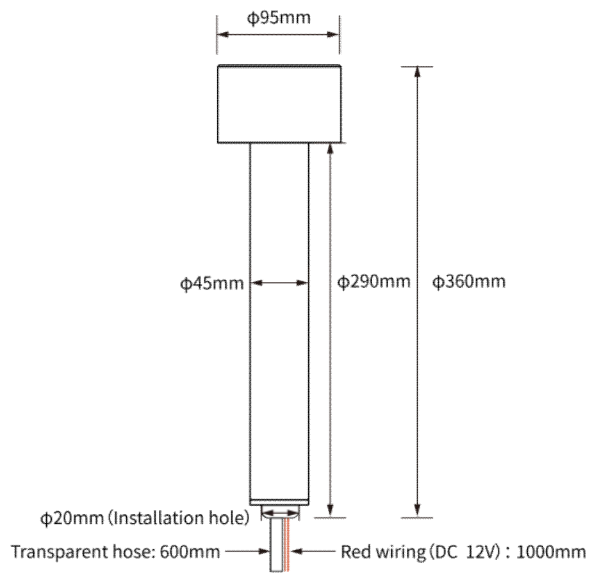
Register Address				
Address (hex)	Content	Register Length	Function Code	Description of definitions
0x0000	PM1.0 Concentration	1	03	Integer
0x0001	PM2.5 Concentration	1	03	Integer
0x0002	PM10 Concentration	1	03	Integer
0x0003	TSP Concentration	1	03	Integer
0x0020	Batch Calibration DATA	1	06	DATA stands for the proportion of PM data, can be

0x0021	PM1.0 Calibration Factor DATA	1	06	set arbitrarily, default 0x64 DATA=0x00, original value*0 DATA=0x32, original value *0.5 DATA=0x64, original value*1
0x0022	PM2.5 Calibration Factor DATA	1	06	
0x0023	PM10 Calibration Factor DATA	1	06	
0x0024	TSP Calibration Factor DATA	1	06	
0x0030	Cyclic Acquisition	1	06	1: On, 0: Off (default: On)
0x0031	Acquisition Cycle Time	1	06	1~600 minutes (default: 1 minute) Pump running for the first 45s of each acquisition cycle
0x0035	Heating Control	1	06	1: On, 0: Off (default: On, no Saving in power failure)
0x003A	Relay Control	1	06	1: On, 0: Off (default: On, no Saving in power failure)
0x0040	Pump Control	1	06	1: On, 0: Off (default: On, no Saving in power failure)
0x0042	Pump Motor Duty Cycle Adjustment	1	06	0~100 (default 0x4C, about 1.5 L/min)
0x0064	Address	1	06	1～255
0x0065	Baud Rate	1	06	1: 4800, 2: 9600(default), 3: 14400, 4: 19200，5: 38400, 6: 115200
0x0085	Device Factory Reset	1	06	1: Reset

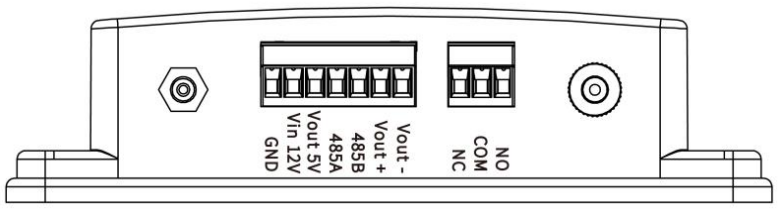
Interface Diagram



Sampler Dimension



Interface Definition



NOTE

1. Do not pull the sensor lead wire, do not drop or hit the sensor violently.
2. Please clean it regularly in the process of using to avoid debris blocking the sampling head.
3. In order to enhance the effective working time of the equipment, it is recommended to collect once every 5 minutes.