IOT-S300AQ Air quality (PM2.5/PM10) Sensor Instruction Manual

1. Product introduction

1.1 Product Overview

Our air quality transmitter is an industrial grade general particle concentration transmitter. It adopts the principle of laser scattering measurement and sieves through the unique data dual frequency acquisition technology to obtain the particles with the equivalent particle size per unit volume. The number of particles, and the particle size concentration of the equivalent particle size per unit volume is calculated by a scientific and unique algorithm, and the data is output through the ModBus-RTU protocol using the RS485 interface. It can be used in outdoor weather stations, dust monitoring, libraries, archives, industrial plants and other places that require PM2.5 or PM10 concentration monitoring.

1.1 Features

■ Range: PM2.5: 0~500μg/m3;PM10: 0~1000μg/m3

■ PM2.5, PM10 simultaneous output

■ Unique dual-frequency data acquisition and automatic calibration technology, the consistency can reach ±10%

■ Adopt advanced laser anti-attenuation technology to ensure long-term stability of equipment

■ Standard ModBus-RTU communication protocol, easy to access

1.2 Main technical indicators

Supply voltage	10~30VDC
Accuracy	±10%
Measuring range	PM2.5: 0~500μg/m3 PM10:0~1000μg/m3
Resolution	1μg/m^3
output signal	RS485（Modbus RTU protocol）
Operating temperature	-10~50℃

● **Electrical interface and connection method**
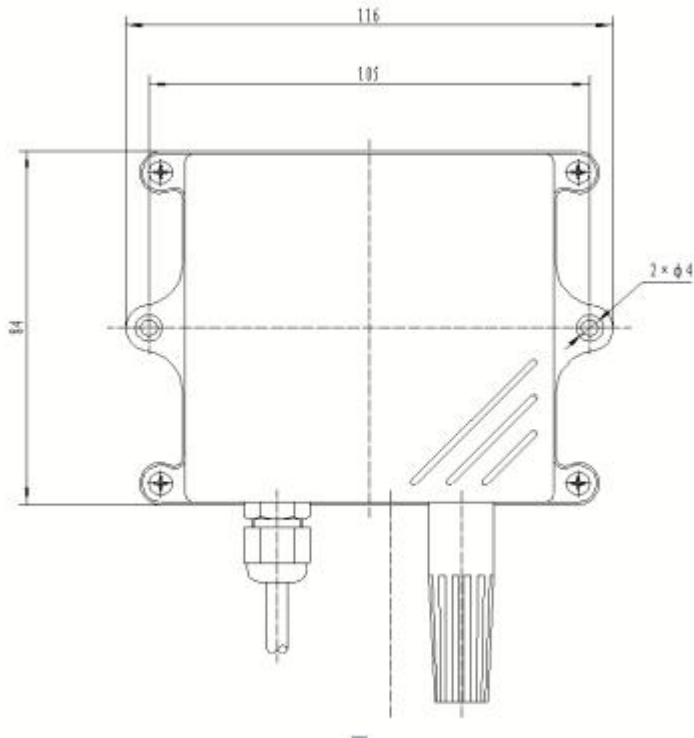
直接引线
MODBUS(RS485/RS232)

Modbus RS485		
	Wire color	Explanation
Power supply	Red	Power positive（10~30V DC）
	Black	Power negative
Communication	Green	RS485-A
	White	RS485-B
Analog signal		
Power supply	Red	Power positive (10~30V DC)
Communication	Black	Power negative
	Green	(Temperature)Iout+
	White	(Temperature)Iout-
	Bluer	(Humidity)Iout+
	Yellow	(Humidity)Iout-

1.3 Communication protocol basic settings

Transmission mode: MODBUS-RTU mode.

Communication parameters: default baud rate 9600bps (optional 2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, can be configured according to user requirements), 1 start bit, 8 data bits, no parity (optional odd) Check, even parity), 1 stop bit, after changing the communication parameters, it is recommended that the sensor be powered on again.

Slave address: The factory default is 1, which can be configured according to user requirements.

1.3.1 Holding Register List

parameter	MODBUS holding register address (16 bits)
PM2.5 value	Address: 0000H The reading value is the measured value of PM2.5. For example, if the reading value is 0x0079 and the decimal value is 121, the measured value of PM2.5 is 121μg/m3.
PM10 value	Address: 0001H The reading value is the measured value of PM10. For example, if the reading value is 0x009D and the decimal value is 157, the measured value of PM10 is 157μg/m3.
Baud rate	Address: 0014H The setting values are 24, 48, 96, 192, 384, 576, 1152, corresponding to the baud rate, 2400, 4800, 9600, 19200, 38400, 57600, 115200, for example, the default baud rate is 9600, the setting value is 0x0060
Check Digit	Address: 0015H 0x0000 means no parity, 0x0001 means odd parity, 0x0002 means even parity
Slave address	Address: 0017H Default: 0x0001

Note: Access is prohibited for other addresses.

1.3.2 Modbus RTU instruction

Supported MODBUS function codes: 0x03, 0x06

Example of 03H function code: Read the PM2.5 measurement data of the sensor whose slave address is No. 1.

★ Host query command:

Slave Address	01H	Slave address
Function	03H	function code
Starting Address Hi	00H	Start register address is 8 bits high
Starting Address Lo	00H	Start register address is lower 8 bits
No. of Registers Hi	00H	The upper 8 bits of the number of registers

No. of Registers Lo	01H	The lower 8 bits of the number of registers
CRC Check Lo	84H	CRC check code is lower 8 bits
CRC Check Hi	0AH	CRC check code is 8 digits high

★ slave response:

Slave Address	01H	Slave address
Function	03H	function code
Byte Count	02H	2 bytes in length
Data Hi	00H	PM2.5 is: 121μg/m3
Data Lo	79H	PM2.5 is: 121μg/m3
CRC Check Lo	79H	CRC check code is lower 8 bits
CRC Check Hi	A6H	CRC check code is 8 digits high

Example of 06H function code: modify the baud rate (this example is modified to 57600bps)

★ Host query command:

Slave Address	01H	Slave address
Function	06H	function code
Starting Address Hi	00H	The baud rate holding register address is 0014H
Starting Address Lo	14H	The baud rate holding register address is 0014H
Data Hi	02H	When the baud rate is 57600bps, the value of the register is 576, which is 0x0240.
Data Lo	40H	When the baud rate is 57600bps, the value of the register is 576, which is 0x0240.
CRC Check Lo	C9H	CRC check code is lower 8 bits
CRC Check Hi	5EH	CRC check code is 8 digits high

★ slave response:

Slave Address	01H	Slave address
Function	06H	function code
Starting Address Hi	00H	The baud rate holding register address is 0014H
Starting Address Lo	14H	The baud rate holding register address is

		0014H
Data Hi	02H	When the baud rate is 57600bps, the value of the register is 576, which is 0x0240.
Data Lo	40H	When the baud rate is 57600bps, the value of the register is 576, which is 0x0240.
CRC Check Lo	C9H	CRC check code is lower 8 bits
CRC Check Hi	5EH	CRC check code is 8 digits high