ATO

Indoor Comprehensive Environmental Monitoring Terminal

FST100-2204

Product Manual

(V1.1)

ATO

● Important statement

Thank you very much for choosing our products, we will serve you sincerely forever. The company pursues excellent quality and pays more attention to excellent after-sales service.

Operation errors will shorten the life of the product, reduce its performance, and may cause accidents in severe cases. Please hand over this manual to the end user and read it carefully before using the product. And please keep it in a safe place for reference when needed. The company reserves the right to modify this manual due to product technology and process updates. If there is any change, no further notice will be given, and the final interpretation of this manual is reserved.

● Features

1. High precision, high frequency response and good long-term stability.
2. On-site environmental data can be viewed in real time via RS485 MODBUS RTU.

● Application scope

1. Indoor environment monitoring.
2. Methane, oxygen, hydrogen sulfide, ammonia, CO2, temperature and humidity, PM2.5, PM10, illumination, etc.

● Technical indicators

transfer method	RS485
Protocol	MODBUS RTU
Power supply	12-24V DC power supply
Power consumption	Online current: ≤150mA
Operating temperature	-20~+60°C

● Precautions

1. After opening the product package, please check whether the appearance of the product is intact, verify whether the relevant contents of the product instruction manual are consistent with the product, and properly keep the product instruction manual for more than one year.
2. Connect strictly according to the product wiring diagram, and work under the product's allowable excitation voltage. Do not use it with overvoltage.
3. Do not knock the product to avoid damaging the appearance and internal structure of the ring.
4. The product does not have customer-repairable parts. Please contact our company if a fault occurs.

5. If our company's products malfunction under normal use, the warranty period is one year (13 months from the date of shipment to the date of return). Whether the malfunction occurs under normal circumstances will be determined by our company's quality inspectors. as basis. If the repair exceeds the time limit, the company will charge a basic fee, and all the company's products will be repaired for life.

6. For any unfinished information, please check our company's website or call us for enquiries.

MODBUSRTU communication protocol

● Basic settings of communication protocol

Transmission method: MODBUS-RTU mode

Communication parameters: Default baud rate 9600bps (optional 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps can be configured according to user requirements), 1 start bit, 8 data bits, no parity, 1 stop bit

Slave address: The factory default is 123, which can be configured according to user requirements; the universal slave address is 200 (Note: If a multi-machine communication network is formed, other slave addresses cannot be set to 200)

● Keep register list

parameter	MODBUS holding register address (16 bits)
Real-time value Default float ABCD	0000H, float type: float ABCD
Slave address (Address)	0014H, unsigned integer representation Default:123
Baud Rate	0016H, the default baud rate is 9600, and is saved as 96 when saving, and so on (all must be divided by 100)
Methane switch	0018H, default is 1, open
Oxygen switch	001AH, default is 1, open
Hydrogen sulfide switch	001CH, default is 1, open
Ammonia switch	001EH, default is 1, open
carbon dioxide switch	0020H, default is 1, open
PM2.5, PM10 switch	0022H, default is 1, open
Temperature and humidity switch	0024H, default is 1, open

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Light level switch	002AH, default is 1, open

Data message format

(1)Function code 0x03---Query the contents of the slave device register

Master device message	Correct message from the device
Slave device address (0x01~0xF7 1 byte)	Slave device address (0x01~0xF7 1 byte)
Function code (0x03 1 byte)	Function code (0x03 1 byte)
Starting register address (2 bytes)	Number of bytes in data area (2*number of registers*1 byte)
Number of registers (2 bytes)	Data area (register data 2*number of registers*1 byte)
CRC check code (2 bytes)	CRC check code (2 bytes)

(2)Function code 0x10---preset number of slave device registers

Master device message	Correct message from the device
Slave device address (0x01~0xF7 1 byte)	Slave device address (0x01~0xF7 1 byte)
Function code (0x10 1 byte)	Function code (0x10 1 byte)
Starting register address (2 bytes)	Starting register address (2 bytes)
Number of registers (2 bytes)	Number of registers (2 bytes)
Number of bytes (1 byte)	
Data written to the register (2* number of registers 1 byte)	
CRC check code (2 bytes)	CRC check code (2 bytes)

Note:

1. The CRC check code has the low digit first and the high digit last; the register address, register number and data are all high digit first and the low digit last;

2. The register word length is 16 bits (two bytes);

● **Register description and command format**

Register address (Hex)	Register contents	Number of registers	function code	type of data	data range
0x0000	Methane	2	03	float ABCD	0～100%LEL

0x0002	oxygen	2	03	float ABCD	0~30%VOL
0x0004	hydrogen sulfide	2	03	float ABCD	0~100PPM
0x0006	Ammonia	2	03	float ABCD	0~100PPM
0x0008	carbon dioxide	2	03	float ABCD	0~5000PPM
0x000A	PM2.5	2	03	float ABCD	0~2000ug/m3
0x000C	PM10	2	03	float ABCD	0~2000ug/m3
0x000E	temperature	2	03	float ABCD	-20~85 ℃
0x0010	humidity	2	03	float ABCD	0~100% RH
0x0012	Illumination	2	03	float ABCD	0~50000LUX

Command examples

All register address bytes, register number bytes, and data bytes in the command have the high byte in front and the low byte in the back; the CRC check code low byte in the front and the high byte in the back;

Read sensor value (eg: read register address 0x1C)

Slave device address No. 123, baud rate 9600, N, 8, 1

★ Host sends:

slave device address	function code	Starting register address		Number of registers		CRC-L	CRC-H
0x7B	0x03	0x00	0x1C	0x00	0x02	0x0E	0x57

★ Response from device:

slave device address	function code	Number of bytes in data area	Register data				CRC-L	CRC-H
0x7B	0x03	0x04	0x3F	0x80	0x00	0x00	0x2C	0x08

10H function code (example: modify the baud rate to 9600bps)

Note: 9600 needs to be divided by 100, just set it to 96.

★ Host command:

slave device address	function code	Starting register address		Number of registers		Number of bytes	Register data (high in front, low in back)				CRC-L	CRC-H
0x7B	0x10	0x00	0x16	0x00	0x02	0x04	0x42	0xc0	0x00	0x00	0xED	0xD4