



Siargo Ltd.

AM1000 Series MEMS Environmental Meter

Modbus RTU Protocol

(V A.0)

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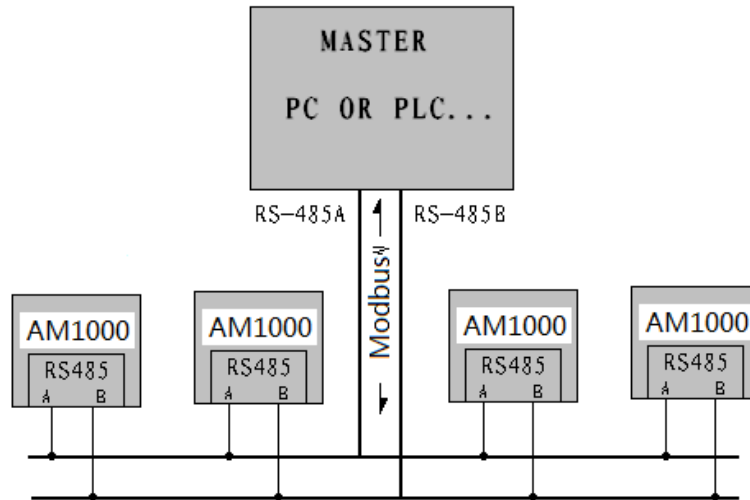
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1 Hardware connection

The AM1000 series MEMS environmental meter protocol is based on standard Modbus RTU mode. A master (PC or PLC) can communicate with several slaves (AM1000), setting parameter or getting data.

The hardware layer is TIA/EIA-485-A. The connection is as below:



2 Communication parameter

The UART parameter is shown as table-1.

Table-1 Modbus Communication parameter

Communication parameter	protocol
	RTU
Baud rate(Bits per second)	38400 bps
Start bits	1
Data bits	8
Stop bits	1
Even/Odd parity	None
Bits period	104.2 μ s
Bytes period	1.1458ms
Maximum data length	20
Maximum Node	247

3 Frame

The framing function is accord with The Standard Modbus RTU framing, which is shown as below:

Start_bits	Address	Function code	Data	CRC	Stop_bits
T1-T2-T3-T4	8Bit	8Bit	N 8Bit ($20 \geq n \geq 0$)	16Bit	T1-T2-T3-T4

Start_bits: 4 periods bit time, to indicate a new frame.

Address: The address, can be set as 1 to 247, 0 is broadcast address.

Function code : Define the action that AM1000 should takes, or indicate that which code the AM1000 is responding .

Data: Including the address of register, length of data and the data.

CRC : CRC verify code, the low byte is flowed by high byte. For example, the 16bit CRC code is divide as BYTE_H BYTE_L, in the frame, the BYTE_L goes first, then the BYTE_H, at last, is the stop signal .

Stop_bits: 4 periods bit time, to indicate that the current framing is over.

4 Function code

The AM1000 Modbus Function-code is a subclass of Standard Modbus Function-Code .By using these function-code, We can set or read the registers of the AM1000.

They are shown as table-2:

Table-2 AM1000 Modbus function-code

CODE	Name	action
0x03	Read register	Read register (one or more)
0x06	Set single register	Write one single 16bit register
0x10	Set multi registers	Write multi registers

5 Registers

The AM1000 has several registers .We can get the information (such as “address”, “flow rate” and so on) form reading these registers, or we can write into some of the registers for setting parameters of the Flow meter. The registers are shown as table-3:

Table-3 The register of AM1000

NAME	Description	REGISTER	Note
Address	The address of AM1000 (W/R)	0x0001	
Flow Rate	The current flow rate (R)	0x0002~0x0003	
Temperature	The temperature of the measured gas (R)	0x0025	
Humidity	The humidity of the measured gas (R)	0x0026	

* R - read only , W/R - write and read.

Table-4 Description of registers

Flow meter Address	0x0001	WRITE	A
		READ	A
Description	The address of meter in modbus protocol		
Value type	UINT16		
Detail	Value from 1 to 247, 0 is broadcast address.		
Flow Velocity	0x0002~0x0003	WRITE	N
		READ	A
Description	The current flow velocity		
Value type	UINT32		
Detail	Flow velocity = (value(0x0002) * 65536 + value(0x0003)) /1000 Example: When we get “0” from register 0x0002 and “20340” from register 0x0003, the flow velocity will be $(0*65536 + 20340)/1000= 20.34 \text{ m/s}$		
Temperature	0x0025	WRITE	N
		READ	A
Description	The temperature of the measured gas		
Value type	UINT16		
Detail	Temperature = value(0x0025) /100, unit is °C Example: When we get “2020 (0x07E4)” from register 0x0025, the gas temperature be $2020/100= 20.2 \text{ }^{\circ}\text{C}$		
Humidity	0x0026	WRITE	N
		READ	A
Description	The humidity of the measured gas		
Value type	UINT16		
Detail	Temperature = value(0x0026) /100, unit is %RH Example: When we get “5220 (0x1464)” from register 0x0026, the gas temperature be $5220/100= 52.2 \text{ \%RH}$		